KGP5000 series Smart valve positioner

HART Communication Operation Manual

For PC-based application / Handheld application



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1. Introduction

Please read carefully at first!

This operation manual includes getting information, calibration, maintenance steps, diagnosis and so on for the KGP5000 series smart valve positioner by HART communication. Read this operation manual and an instruction manual carefully before using the positioner.

Please read this along with the instruction manual for the KGP5000 you are using.

% Please check the instruction manual (CD) included at the time of delivery.

% If you do not know the instruction manual for your device, check the positioner version / electronics version / software version of your device and order the latest version.

Notes regarding this operation manual.

- > The user should read and understand this publication.
- > The contents of this publication are subject to change without notice to improve specifications.
- The contents of this publication may not be reproduced or duplicated in whole or in part, without prior consent.
- This publication may not be revised so long as changes in structure and specifications have no effect on the operation of the positioner.
- The contents of this publication are described as correct as possible but if anything is unclear or you have any questions, please contact KOSO sales office.

1.1. Scope of this operation manual

This document is compatible with the following versions as below.

KGP5003

Electronics Version : 1.0.0 and more Software Version : 1.0.0 and more

HART®(※) EDD/FDI

EDD Version	:	3 and more
FDI Version	:	03.00.00 and more

% HART[®] is a registered trademark of FieldComm Group.

1.2. Safety notices

This document describes safety notices by using warnings and cautions as below. The user should thoroughly review safety notices described in this operation manual prior to installation, operation, maintenance for the positioner.



Warning

Death or severe personal injury can occur if the user fails to keep safety precautions.



Caution

Minor personal injury or property damage, damages or breakdown of the positioner and the system equipped with the positioner can occur if the user fails to keep safety precautions.

It should be noted that this operation manual includes information for only this smart valve positioner. Therefore, it is the responsibility of the user to consider safety considerations relate to any other installation methods or operation methods except the method provided herein.

1.3. Product summary

KGP5000 series smart valve positioner is a control device mounted on the pneumatic actuator for control valve, which positions a control valve according to a 4 to 20mA signal from a higher-level control system or a control device. Position feedback control system which receives feedback signal mapped to the desired valve travel and compares both input signal and feedback signal enables accurate positioning of a control valve.

In addition, it is possible to use this positioner to operate various types of pneumatic actuator such as linear or rotary motion actuators both of single and double acting.

Furthermore, the positioner utilizing digital techniques performs the functions of advanced PID controller, local user interface (LUI) using LCD, diagnosis utilizing sensing techniques with potentiometers and internal pressure sensors. Such features enable an easy installation and calibration, an effective monitoring, and an efficient process management relevant to operations and maintenance.

This device can do the work of setting and adjustment by a communication tool of a HART communicator.

1.4. Electrical connections



Warning

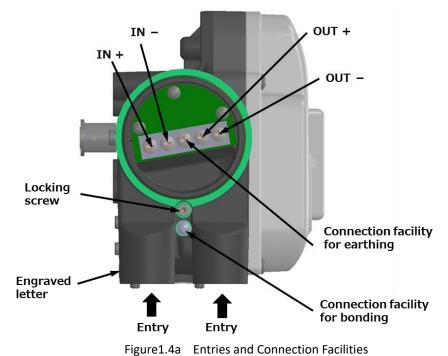
- Disconnect the power supply before wiring connections.
- Wiring connections must be done in accordance with national electrical code requirements.
- Avoid wiring connection on wet weather days or in environments are saturated with water. They are liable to electric leakage or damage to the positioner.

Caution

- Close the unused entries for flameproof enclosures with blanking elements to avoid the intrusion of humidity, dust, etc.
- > The entries shall be sealed with sealants to avoid the intrusion of water or rain
- Earthing and bonding conductor shall be connected by terminal lugs (Tinning copper).
- Earthing or bonding conductor shall be firmly connected by using screws with captive spring lock washer(M4) provided on the positioner in such a way to prevent loosening and twisting.
- When using the flame proof type, a conductor with a cross-sectional area of at least 1mm² shall be used for internal earthing.
- When using the flame proof type, a conductor with a cross-sectional area of at least 4mm² shall be used for external bonding.
- Check the specifications of cable glands and blanking elements to make sure to use only suitable Ex certificated cable glands and blanking elements. See Table 1.4a shows the suitable Ex certificated cable glands and blanking elements for each proof type.

The figure 1.4a below shows the layout of the entries for electrical connections and terminals. There are a few different types of thread for entries.

You can identify the type of the thread by the engraved letter on the outside of entries. The letter "M" means M20X1.5, the letter "N" means 1/2NPT and the letter "_" means G1/2.



Make wiring connections according to the following procedure.

1. Remove the terminal cover.

- 2. Lead a cable into the terminal box from the outside through the entries and the cable gland.
- 3. Connect wires of loop current, respectively, to IN+ and IN- of the positioner.
- 4. Connect wires of position transmitter, respectively, to OUT+ and OUT- of the positioner. X Model KGP5003 only
- 5. As illustrated in figure 1.4a, two connection facilities for earthing and bonding conductors are available. The two connection facilities are equipotential. Make wiring connections according to local electrical codes which apply to the application.
- 6. Fix a cable with the cable gland following the instruction manual of the cable gland manufacturer.
- 7. Replace the terminal cover.
- 8. Turn the cover locking screw counterclockwise to fix the terminal cover.

Field wiring diagram is shown in figure 1.4b and 1.4c.

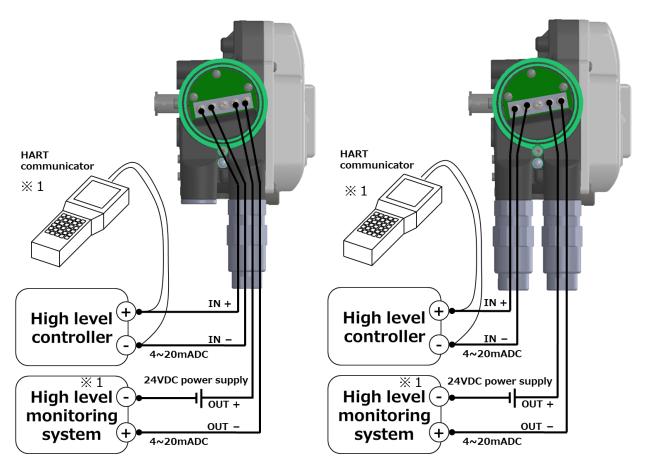


Figure 1.4b Field wiring diagram for 1 cable(4-core) Figure 1.4c Field wiring diagram for 2 cable(2-core)

⅔1 Model KGP5003 only

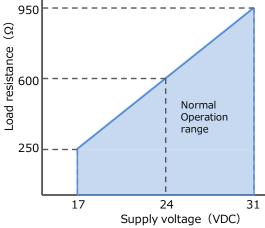


Figure 1.4d Load resistance to supply voltage relationship via the connection of position transmitter

Supply power to the positioner according to the load resistance. It should be noted that the supply power must not be exceed 40VDC.

Table 1.4a The suitable Excertificated cable glands and blanking elements for each proof type						
Proof type	Thread form of	Certification Rated ambient		Service temperature		
	entries		temperature range	range		
TIIS	G1/2	Ex d IIC Gb	-20°C∼+60°C	-20°C∼+63°C		
CCC(NEPSI)	1/2NPT	Ex db IIC Gb	-40°C∼+70°C	-40°C∼+73°C		
KOSHA	1/2NPT	Ex d IIC	-20°C∼+60°C	-20°C∼+63°C		
IECEx, CNS	1/2NPT or M20X1.5	Ex db IIC Gb	-40°C∼+70°C	-40°C∼+72°C		
ATEX	1/2NPT or M20X1.5	ll 2 G Ex db llC Gb	-40°C∼+70°C	-40°C∼+72°C		
EAC	1/2NPT or M20X1.5	1 Ex db IIC Gb	-40°C∼+70°C	-40°C∼+72°C		

Table 1.4a	The suitable Ex certificated cable glands and blanking elements for each proof type

1.5. Setup and information



Warning

- Changes in parameters and so on owing to setup procedure may cause unexpected movements of the valve. Perform the setup in the conditions such as offline state which does not directly affect the process.
- Don't remove the terminal cover of the positioner during or after the passage of electric current. In case the terminal cover must be opened reluctantly, perform that after confirming that flammable, explosive gases are not present, and the environment is not saturated with water or steam.
- > Don't touch the moving parts during the setup procedure. It causes personal injury.
- Keep away from a magnet material or a magnetic-tripped screwdriver. It unexpectedly moves the control valve so that it may cause a serious damage.
- Don't use a wireless transceiver near the positioner.

1.6. Preparation for HART communication

A personal computer or communicator and a HART modem are required to acquire the information of this device unit via HART communication and perform installation / setting work, maintenance, alarm setting / diagnosis. In addition, the HART modem driver and EDD (Electronic Device Description) or FDI (Field Device Integration) package for KGP5000 communication must be installed on the PC.

Note: If you want to download and install EDD/FDI to a communicator, please check with the communicator manufacturer.

Note: Please check with each manufacturer for the installation of the HART modem driver and management software.

The steps for connecting to a PC and downloading EDD/FDI is shown below.

1) Download EDD/FDI for HART communication.

The EDD/FDI for HART communication can be downloaded from the following FieldComm Group website. You can also use the EDD/FDI from the CD that was included when you purchased this device unit.

Download to PC:

- Go following web site: <u>URL: https: //www.fieldcommgroup.org/registered-products.</u>
- 2 Enter "KGP5000" in the "Search by Product Name" field and click "Search" button.
- ③ Select and click the KGP5000 icon.
- ④ Select Version "3".
- (5) Click "EDD Download >" or "FDI Download 03.00.00" to start download and save files to any location.
- 2) Installation of EDD/FDI for HART communication.

To register the downloaded EDD and FDI to the management software or communicator, please check the instruction manual of the management software or communicator you are using.

3) Connection

Connect a communication tool (e.g. HART Communicator or host controller...) to IN+ and IN- of the instrument as described in section 1.4.

2. Menu tree of the HART Communication

2.1. Menu type

This manual explains how to operate the KGP5000 via HART communication using the FDI RRTE (%) screen.

- The menu structure differs between the PC-based application (management software that runs on a PC) and the handheld application (tablet-type communicators).
- If you are using a PC-based application type, see chapters 2. to 8.
 If you are using a handheld application type (communicator), see section 9.
- ※ FDI RRTE (Reference Run-Time Environment) is an FDI reference application provided by FieldComm Group.
 <u>Screen images used in this manual attribute to FieldComm Group.</u>

Menu items	Description	
① Process Variables	Process variables and information root menu	
2 Device Settings	Device settings menu	
③ Maintenance	Maintenance root menu	
④ Diagnostics	Diagnostics and Alarm root menu	
⑤ Offline	Offline root menu	
6 Online	Root menu for handheld application type	

Table 2.1a Menu item

2.2. Menu structure

2.2.1. Process Variables menu

For details on the Process Variables menu, see 4. Process Variables.

		[Process Variab	es] top menu
Offline Q Device Settings	Diagnostics Maintenance Online Proce	ss Variables Health ? Simulation	
20 10 20	Position 50 60 70 80 90 5 100 5 50 6 70 70 70 70 70 70 70 70 70 70	Position	
Monitor Set point Position Input IP signal Loop Current	50.0 % 50.0 % 50.0 % 49.1 % 11.999 mA	P-sup. P-out1 P-out2 Temperature	301.74 kPa 138.98 kPa 141.38 kPa 26 °C
Trend Trend Manual setpoint Manual setpoint Device information Serial No. Tag HART device information	00000000 TAG_0005		
Alarm EEPROM failure Position sensor failure P-sup. sensor failure P-out1 sensor failure P-out2 sensor failure	Good Good	 Input signal alarm Position alarm Deviation alarm Temperature alarm Low sup-pres. alarm High sup-pres. alarm 	ок ✓ ок ✓ ок ✓ ок ✓ ок ✓ ок ✓ ок ✓
PST alarm			
PST stroke alarm	ОК		
PST incomplete alarm	ОК		
PST pressure alarm	ОК		

Figure 2.2.1a [Process Variables] top menu

2.2.2. Device Settings menu

For details on the Device settings menu, see 5. Device Settings.

This menu consists of the **[Device Settings] top menu** and the **[Extended device settings] menu** as a submenu. The top menu displays an overview of the current settings. To check details or change settings, open the **[Extended device settings] menu**.

Offline Q Devi	ce Settings 🛞 Diagnostics	Maintenance Online	Process Variables (\mathbf{x})	Health ? Simula	ition 🔵	
tended device settings			Exte	ended device	settings] menu	
ummary of config. parameter – – Basic setup –			Detail setup			
Actuator motion	Linear		 Cutoff/Limit 	0% side	Cutoff	~
Actuator type	Single		Cutoff/Limit	0% side value	0.5 %	
Valve action	ATO		Cutoff/Limit	100% side	Disable	~
Packing friction	Low		Cutoff/Limit	100% side value	99.5 %	
Booster option	Disable		 Dead band fl 	ag	Disable	\lor
Booster type	Large		 Dead band vi 	alue	0.3 %	
Set point dir.	Normal		 Transfer Func 	tion	Linear	~
Posi. transmit. dir.	Normal		 Range ability 			1
Easy/Expert tuning			Input dampe	r	Disable	v
Rank	xs		 Input dampe 	r factor		0.0
Custom PID flag	Disable		 Split range 0^t 	%	4.0 mA	
Response tuning	0 Normal		 Split range 10 	00%	20.0 mA	
			PT burnout d	ir.	Low	~
			AT span limit		105 %	
			Integ. stop p	res.	Enable	V
			Integ. stop p	res. value	10.00 kPa	

Figure 2.2.2a [Device Settings] top menu

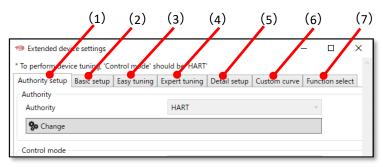


Figure.2.2.2b [Extended device settings] menu

[Extended device settings] menu consists of the following menus:

(1) Authority setup	See 3. Authority setup
(2) Basic setup	See 5.2. Basic setup
(3) Easy tuning	See 5.3. Easy tuning
(4) Expert tuning	See 5.4. Expert tuning
(5) Detail setup	See 5.5. Detail setup
(6) Custom curve	See 5.6. Custom curve
(7) Function select	See 5.7. Function select

2.2.3. Maintenance menu

For details on the Maintenance menu, see 6. Maintenance. This menu consists of the [Maintenance] top menu and the [Extended maintenance] menu as a submenu. The top menu displays device basic information. To check details, change settings, perform calibration or ..., open the [Extended maintenance] menu.

	e Settings X Diagnostics X Maintenance X Online Process Variables X
Extended maintenance	
Serial No. Serial No.	00000000
Version Electronics	
Liectionics	1
	0
	0
Software	
	1
	0
	0
HART version	
HART Protocol Revision	7
Device rev	3
HART relation	2222222
Tag	7777777
Long Tag	???????????????????????????????????????
(1) • Extended mantenance	e 2.2.3a [Maintenance] top menu (2) (3) (4) (5) (6) (7) ation, 'Control mode' should be 'BART' nulation test Service HART relation Setting list Factory setup
Authority Authority Authority	HART Y

[Extended maintenance] menu consists of the following menus:

(1) Authority setupSee 3. Authority setup(2) CalibrationSee 6.2. Calibration(3) Simulation testSee 6.3. Simulation test(4) ServiceSee 6.4. Service(5) HART relationSee 6.5. HART relation(6) Setting listSee 6.6. Setting list(7) Factory setup \divideontimes See 6.7. Factory setup% This menu is not displayed by default.

2.2.4. Diagnostics menu

For details on the Diagnostics menu, see 7. Diagnostics. This menu consists of the [Diagnostics] top menu and the [Extended diagnostics] menu as a submenu.

The top menu displays diagnostics results. To check details, change settings, perform diagnostics, open the **[Extended diagnostics] menu**.

[Diagnostics] top menu				
Device	Settings 🛞 Diagnostics 🗴 Mainter	nance 🗴 Online Process Variables 🗴 Health ?	Simulation 🔵	
Extended diagnostics		Extended diagnos	tics] menu	
Alarm status		Online diagnostics		
EEPROM failure	Good	Total stroke	2	
Position sensor failure	Good	Total direction change	13	
P-sup. sensor failure	Good	Total time	2.3 h	
P-out1 sensor failure	Good	 Low position time 	0.4 h	
P-out2 sensor failure	Good	V Minimum temperature	23 Celsius	
Input signal alarm	ОК	 Maximum temperature 	27 Celsius	
Position alarm	ОК	 Low temperature time 	0.0 h	
Deviation alarm	ОК	 High temperature time 	0.0 h	
Temperature alarm	ОК	v		
Low sup-pres. alarm	ОК	v .		
High sup-pres. alarm	ОК	~		
PST alarm				
PST stroke alarm	ОК	v		
PST incomplete alarm	ОК	v .		
PST pressure alarm	ОК	~		

Figure 2.2.4a [Diagnostics] top menu

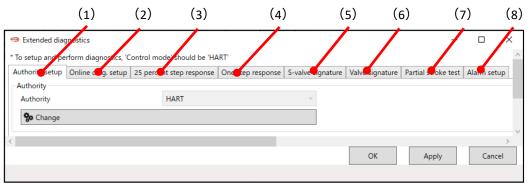


Figure 2.2.4b [Extended diagnostics] menu

[Extended diagnostics] menu consists of the following menus:

Authority setup	See 3. Authority setup
(2) Online diag. setup	See 7.2. Online diag. setup
(3) 25 percent step response	See 7.3. 25 % step response
(4) One step response	See 7.4. One step response
(5) S-valve signature	See 7.5. Simple valve signature
(6) Valve signature	See 7.6. Valve signature
(7) Partial stroke test	See 7.7. Partial stroke test (PST)
(8) Alarm setup	See 7.8. Alarm setup

2.2.5. Offline menu

For details on the Offline menu, see 8. Offline.

[Offl	ine] menu		
⊕ 🌣 ▼ Offline 🗴 🙎 Device	Settings 🛞 Diagnostics 🛞 Maintenance 🛞 Online	Process Variables 🗴 Health ?	Simulation 🔵
Device settings Diagnostics Mainter	hance		
Authority setup		Detail setup	
Authority	HART ~	Cutoff/Limit 0% side	Disable ~
Control mode	4-20mA ~	Cutoff/Limit 0% side value	0.5 %
Basic setup		Cutoff/Limit 100% side	Disable ~
Actuator motion	Linear v	Cutoff/Limit 100% side value	99.5 %
Actuator type	Single v	Dead band flag	Disable ~
Valve action	ATO ~	Dead band value	0.3 %
Packing friction	Low ~	Transfer Function	Linear ~
Booster option	Disable ~	Range ability	1
Booster type	Large ×	Input damper	Disable \vee
Set point dir.	Normal Y	Input damper factor	0.0
Posi. transmit. dir.	Normal ×	Split range 0%	4.0 mA
		Split range 100%	20.0 mA
		PT burnout dir.	Low ~
		AT span limit	105 %
		Integ. stop pres.	Disable \vee
		Integ. stop pres. value	0.00 kPa
		Function select	
		Temperature unit	Celsius ~
		Pressure unit	kPa ~
		LCD posiiton disp. mode	Normal

Figure.2.2.5a [Offline] menu

2.2.6. Online menu

For details on the Online menu, see 9. Online.

Offline 🗴 🧕	Device Settings 🗴	Diagnostics 🗴	Maintenance 🗴	Online 🗴	Process Variables (x)
Label			Value	Units	
 Online 					
 Information 					
Monitor					
▷ Alarm					
▷ PST alarm					
Version					
Config. parameter					
Online diagnostics					
 Authority setup 					
Authority					
Control mode					
▲ Setup					
Basic setup					
Easy tuning					
Expert tuning					
Detail setup					
Custom curve					
Function select					
 Maintenance 					
Calibration					
Simulation test					
Service					
HART relation					
Factory setup					
4 Diag & Alarms					
Online diag. setup					
▷ PST setup					
25% step response					
S-valve signature					
Alarm setup					

Figure 2.2.6a [Online] menu

3. Authority setup

3.1. Operating and Setting authority from HART host controller

This device uses the "**Authority** (write authority)" parameter to change the authority to rewrite settings. To change the positioner settings from HART host controller, change the "**Authority**" parameter to "HART" to remove the write protection.

Furthermore, to control special operations such as automatic adjustment, calibration, simulation, and offline diagnosis separately from input signals from HART host controller, it is necessary to change the "**Control mode**" (operation authority) parameter to "HART".

	Table 3.1 List of selectable functions		
Items	DescriptionSet write authority to HART communication.Select HART in case in which settings should be configured via not LUI but HART communication only.Once HART is selected, only 'Information' from 'TOP' menu will be able to be accessed through LUI.% If to change the setting back from HART to LUI, please get permission in advance from the person responsible for controlling the device via HART communication.% To reset from HART to LCD(LUI), the following special operation must be conducted.When a screen is displayed as shown below, MENU > Information > Monitor > Status1.Press the up1.Press the up1.arrow keys simultaneously for four (4) seconds.2.When a "Yes/No" confirmation is displayed, select "Yes".3.The switching from HART to LCD(LUI) of access authority will be completed.	Parameter	LCD
Control mode	Set operational authority. Select "HART" to execute operations from HART host controller. Select "4-20mA" to execute operations from input signal.	4-20 mA/ HART	4-20 mA

Note: To change Authority to "HART", the LUI (LCD) screen must be in the TOP menu, Alarm status menu, or Information menu.

3.1.1. Check "Authority" and "Control mode"

MENU) Device Settings > Extended device settings > Authority setup

- 1 Select [Device Settings] from the menu tab to open the [Device Settings] top menu.
- 2 Click [Extended device settings] and open [Extended device settings] menu.

Offline ♀ Device Settings	(x) Diagnostics	Maintenance	$Online\ \widehat{\mathbf{X}}$	Pro
Extended device settings				
Summary of config. parameter Basic setup				
Actuator motion	Linear		Ų	
Actuator tura	Single			

③ Select [Authority setup] menu tab.

🐵 Extended devi	ice settings				-	_		×
* To perform devic	ce tuning, 'Co	ntrol mode' s	hould be 'HART					
Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Funct	tion select	:
Authority								
Authority			HART			~		
😵 Change								
Control mode								
Control mode			4-20mA			~		
😵 Change								

Same menu also exist under the [Extended maintenance] menu and [Extended diagnostics menu].
 MENU) Maintenance > Extended maintenance > Authority setup
 MENU) Diagnostics > Extended diagnostics > Authority setup

3.1.2. Change "Authority"

The steps to change "Authority" is shown below.

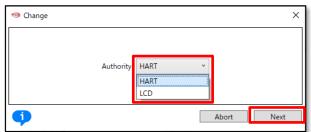
MENU) Device Settings > Extended device settings > Authority setup > Authority

① Click [Change] in the [Authority] menu group.



② If give authority to change configuration to the HART host controller, select "HART".

If do not give authority to change configuration to the HART host controller, select "LCD". Click [Next] to configure.



3.1.3. Change "Control mode"

To change "**Control mode**" is shown below. <u>X</u> In order to change "**Control mode**", the "**Authority**" setting must be "HART". MENU) Device Settings > Extended device settings > Authority setup > Control mode

① Click [Change] in the [Control mode] menu group.



② If give operational authority to the HART host controller, select "HART". If do not give operational authority to the HART host controller, select "4-20mA". Click [Next] to configure.

🐵 Change	×
Control mode	4-20mA 4-20mA HART
•	Abort Next

4. Process Variables

This menu offers to display the process variables and other basic information and control setpoints.

MENU) Process Variables

Select [Process Variables] from the menu tab to open the [Process Variables] top menu.

∿¤ -	Offline	9	Device Settings	Diagnostics	Maintenance	Online	Process Variables
-------------	---------	---	-----------------	-------------	-------------	--------	-------------------

This menu offers to confirm the following information.

Monitor, Trend, Manual input, Device Information and Alarm information.

Monitor					
Set point	50.1 %		P-sup.	287.67 kPa	
Position	50.1 %		P-out1	144.00 kPa	
Input	50.1 %		P-out2	179.31 kPa	
IP signal	44.5 %		Temperature	24 °C	
Loop Current	12.010 mA				
Trend					
Trend					
Manual setpoint					
Manual setpoint					
Device information					
Serial No.	0	0000000			
Tag	77777777				
HART device information					
					_
Alarm					_
EEPROM failure	Good	Ŷ	Input signal alarm	ОК	²
Position sensor failure	Good	\lor	Position alarm	ОК	5
P-sup. sensor failure	Good	\vee	Deviation alarm	ОК	~
P-out1 sensor failure	Good	~	Temperature alarm	ОК	~
P-out2 sensor failure	Good	~	Low sup-pres. alarm	ОК	2
			High sup-pres. alarm	ОК	~
DCT alarm					_
PST alarm PST stroke alarm	ОК	~			
PST stroke alarm	ОК	Ŷ			
	ок ок	~			

4.1. Monitor

Monitor the following measured value.

Displayed items are as follows:

[Monitor]

Setpoint	: Set point	P-sup.	: Supply pressure
Position	: Valve position	P-out1	: Output pressure 1
Input 🔆	: Percentage of input signal	P-out2	: Output pressure 2
IP signal	: IP signal current	Temperature	: Temperature
Loop current	: Input signal		

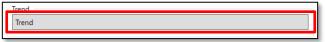
* When split range is set, the value displayed in "Input" differs from the actual valve opening.

4.2. Trend

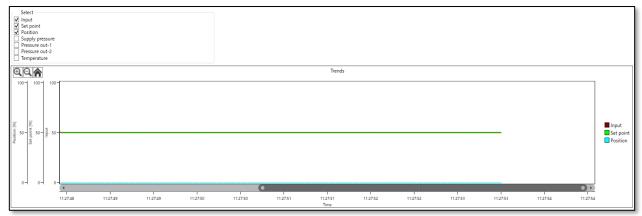
This menu offers to confirm status of positioner such as input current, set point, valve position, temperature.

MENU) Process Variables > Trend

1 Click [Trend] in the [Trend] menu group.



2 Trend graph is displayed.



Display items are as follows:

Input 💥	: Percentage of Input signal	Pressure out-1	: Output pressure 1
Set point	: Set point	Pressure out-2	: Output pressure 2
Position	: Valve position	Temperature	: Temperature
Supply pressure	: Supply pressure		

% When split range is set, the value displayed in "Input" differs from the actual valve opening.

4.3. Manual setpoint

This menu offers the ability to control Setpoint from the HART host controller.



> To activate this function, "Authority" must be "HART".

MENU) Process Variables > Manual setpoint

① Click [Manual setpoint] in the [Manual setpoint] group menu.

Manual setpoint Manual setpoint

1) Enable manual setpoint

The steps for specifying setpoint from the HART host controller is shown below.

① Click [Manual setpoint on].

🐵 Manual setpoint		_	
Control mode	HART	ý	^
Set point	100.0 %		
% Manual setpoint on			
🗫 Manual setpoint off			
<			>
	ОК Ар	oly	Cancel

2 Enter the setpoint value and click [Next].

Manual setpoint on		×
Set value to move (0.0-100.0)[%] = Manual setpoint	100.0 %	
•	Abort	Next

2) Disable manual setpoint

To return device control to input signals, perform the following operations.

① Click [Manual setpoint off].

🐵 Manual setpoint		_	\Box \times
Control mode	HART		· ^
Set point	100.0 %		
Se Manual setpoint on			
🗫 Manual setpoint off			
<			>
	OK Apply		Cancel

4.4. Device information

This menu displays device information for the positioner. Display the following items:

Serial No. : Serial number Tag : Tag number

To view detailed information, perform the following operations.

1 Click [Device information] in the [HART device information] menu group.

Device information Serial No.	0000000
Tag	77777777
HART device information	

② Open the detailed information menu.

Manufacturer	KOSO ~
Device Type	KGP5000 ~
Device Identifier	0
Tag	????????
Long Tag	7777777777777777777777777777777777
Descriptor	77777777777777
Date	2015/01/06
Message	77777777777777777777777777777777777
Final Assembly Number	0

Displayed items are as follows:

Manufacturer	: Manufacturer	Descriptor	: Descriptor
Device Type	: Model	Date	: Date
Device Identifier	: Device Identifier	Message	: Message
Тад	: Tag number	Final Assembly Number	: Final Assembly Number
Long Tag	: Long Tag number		

4.5. Alarm, PST alarm

This menu displays alarm information of the positioner.

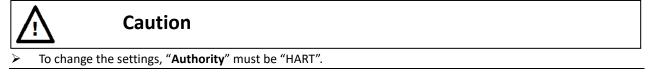
Alarm					
EEPROM failure	Good	۷.	Input signal alarm	ОК	~
Position sensor failure	Good	~	Position alarm	ОК	~
P-sup. sensor failure	Good	~	Deviation alarm	ОК	~
P-out1 sensor failure	Good	~	Temperature alarm	ОК	~
P-out2 sensor failure	Good	~	Low sup-pres. alarm	ОК	~
			High sup-pres. alarm	ОК	\sim
PST alarm					
PST stroke alarm	ОК	~			
PST incomplete alarm	ОК	v			
PST pressure alarm	ОК	~			

Displayed items are as follows:

[Alarm]			
EEPROM failure	: Memory failure	Input signal alarm	: Input signal alarm
Position sensor failure	: Position sensor failure	Position alarm	: Valve position alarm
P-sup. sensor failure	: Supply pressure sensor failure	Deviation alarm	: Deviation alarm
P-out1 sensor failure	: Output pressure1 sensor failure	Temperature alarm	: Temperature alarm
P-out2 sensor failure	: Output pressure2 sensor failure	Low sup-pres. alarm	: Low supply pressure alarm
		High sup-pres. alarm	: High supply pressure alarm
[PST alarm]			
PST stroke alarm	: PST stroke alarm	PST incomplete alarm	: PST incomplete alarm
PST pressure alarm	: PST pressure alarm		

5. Device Settings

This menu offers the setup of the essential items and the detailed items required for control with the positioner.



MENU) Device Settings

① Select [Device Settings] from the menu tab to open the **[Device Settings] top menu**.

🐠 🌣 🔹 Offline 🛛 🙎	Device Settings 🗴	Diagnostics N	Maintenance	Online	Process Variables 🗴

Displays an overview of the current device settings.

Extended device settings					
Summary of config. parameter			Detail setup		
Actuator motion	Linear	~	Cutoff/Limit 0% side	Cutoff	
Actuator type	Single	~	Cutoff/Limit 0% side value	0.5 %	
5300 Actuator	Other	\sim	Cutoff/Limit 100% side	Disable	U
Valve action	ATO	\sim	Cutoff/Limit 100% side value	99.5 %	
Packing friction	Low	\sim	Dead band flag	Disable	~
Booster option	Disable	\sim	Dead band value	0.3 %	
Booster type	Large	~	Transfer Function	Linear	U U
Set point dir.	Normal	~	Range ability		1
Posi. transmit. dir.	Normal	\sim	Input damper	Disable	U I
Easy/Expert tuning			Input damper factor		0.0
Rank	XS	\sim	Split range 0%	4.0 mA	
Custom PID flag	Disable	\sim	Split range 100%	20.0 mA	
Response tuning	0 Normal	~	PT burnout dir.	Low	U
			AT span limit	103 %	
			Integ. stop pres.	Disable	Ų
			Integ. stop pres. value	0.00 kPa	

Basic setup]			
Actuator motion	: Stem motion type	Actuator type	: Acting type
5300 Actuator	: KOSO high power actuator	Valve action	: Direction of a valve when Pout1 is output
Packing friction	: Packing material	Booster option	: Booster option enable/disable
Booster type	: Booster type	Set point dir.	: Setpoint direction
Posi. transmit. dir.	: Position transmitter direction		
Easy/Expert tuning]			
Rank	: Rank of the PID parameter	Custom PID flag	: PID custom enable/disable

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Response tuning	: Response tuning		
[Detail setup]		-	
Cutoff/Limit 0% side	: Cutoff/Limit 0% side enable/disable	Cutoff/Limit 0% side value	: Cutoff/Limit 0% side value
Cutoff/Limit 100% side	: Cutoff/Limit 100% side enable/disable	Cutoff/Limit 100% side value	: Cutoff/Limit 100% side value
Dead bang flag	: Deadband enable/disable	Dead band value	: Deadband value
Transfer function	: Transfer function	Range ability	: Range ability
Input damper	: Input dumper enable/disable	Input damper factor	: Input damper factor
Split range 0%	: Split range 0% side	Split range 100%	: Split range 100% side
PT burnout dir.	: Burnout direction of the Position transmitter	AT span limit	: Autotune span limit value
Integ. stop pres.	: Integral stop pressure enable/disable	Integ. stop pres. value	: Integral stop pressure threshold value

5.1. Extended device settings

This menu is an extended menu for basic settings, tuning, detailed settings, and function settings for controlling the positioner.

tended device settings			
ummary of config. parameter — – Basic setup –		Detail setup	
Actuator motion	Linear	Cutoff/Limit 0% side	Cutoff
Actuator type	Single	 Cutoff/Limit 0% side value 	0.
Valve action	ATO	 Cutoff/Limit 100% side 	Disable
Packing friction	Low	 Cutoff/Limit 100% side value 	99.
Booster option	Disable	 Dead band flag 	Disable
Booster type	Large	 Dead band value 	0
Set point dir.	Normal	~ Transfer Function	Linear
Posi. transmit. dir.	Normal	~ Range ability	
Easy/Expert tuning		Input damper	Disable
Rank	XS	 Input damper factor 	
Custom PID flag	Disable	 Split range 0% 	4.
Response tuning	0 Normal	 Split range 100% 	20.
		PT burnout dir.	Low
		AT span limit	10
		Integ. stop pres.	Enable
		Integ. stop pres. value	10.0

MENU) Device Settings > Extended device settings

2 Open the [Extended device settings] menu.

Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Funct	ion select
Authority Authority			HART			~	
% Change							
Control mode -							
Control mode			4-20mA				

Menu items are as follows:

(1) Authority setup	See 3. Authority setup
(2) Basic setup	See 5.2. Basic setup
(3) Easy tuning	See 5.3. Easy tuning
(4) Expert tuning	See 5.4. Expert tuning
(5) Detail setup	See 5.5. Detail setup
(6) Custom curve	See 5.6. Custom curve
(7) Function select	See 5.7. Function select
Click on the tab to open each menu.	



1

0.0

5.2. Basic setup

Select essential parameters necessary for the control of the positioner.

X Perform basic setup surely before performing the following setup (easy tuning) in next section.

Caution

To change the settings, "Authority" must be "HART".

Setup items are as follows:

Actuator motion	: Stem motion type	Actuator type	: Acting type
Valve action	: Valve direction	Packing friction	: Packing material
Booster option	: Booster option	Set point dir.	: Setpoint direction
Posi. transmit. dir.	: Direction of Position		
	transmitter		

[∗] For details on each item, refer to the KGP5000 instruction manual.

MENU) Device Settings > Extended device settings > Basic setup

① Select the [Basic setup] tab in the [Extended device settings] menu to open the [Basic setup] menu.

Extended device settings			-	- 0
To perform device tuning 'Contr	ol mode' should be 'HART'			
Authority seture Basic seture B	asy tuning Expert tuning Detail setup	Custom curve Function select		
Actuator motion		Booster option		
Actuator motion	Linear	 Booster option 	Disable	~
😵 Change		Booster type	Large	Ŷ
Actuator type		😵 Change		
Actuator type	Single	Set point dir.		
5300 Actuator	Other	∨ Set point dir.	Normal	Ŷ
😵 Change		😵 Change		
Valve action		Posi. transmit dir.		
Valve action	ATO	 Posi. transmit. dir. 	Normal	Ŷ
😵 Change		😵 Change		
Packing friction				
Packing friction	Low	~		
% Change				
			OK Apply	Cancel

Click [Change] within each menu group to change the current settings.



5.3. Easy tuning

Easy tuning is the setup to ensure that the positioner is operated smoothly relative to the actuator on which the positioner is mounted. It is possible to perform easily zero/span adjustments of a control valve, selection of suitable PID parameters, setting of other parameters necessary to control.

Caution
 HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.

Before performing Full autotune, Position setup, and Auto span, set the "Control mode" to "HART".

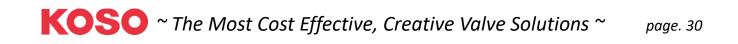
Note

Before performing operation of this section, all parameters of basic setup described in **5.2 Basic setup** must be configured. If wrong parameters were configured, it is possible to choose unsuitable PID parameters.

MENU) Device Settings > Extended device settings > Easy tuning

① Click [Easy tuning] tab in the [Extended device settings] and open the [Easy tuning] menu.

Extended device settings			-		\times
* To perform device tuning, 'Control mode' s	hould be 'HART'				~
Authority setup Basic setup Easy tuning	xpert tuning Detail setup Custom curve	Functio	n select		
Autotune status			Position setup		
Autotune status	No autotune	\sim	Manual span		
Autotune result	Completed OK!	\sim	😵 0% position adjust		
			😵 100% position adjust		
Full autotune			Auto span		
So Full autotune			Span autotune		
So Abort autotune					
			Se Abort autotune		
Tuning result					
Tuning result			Position		
Response tuning			TATA TATA		
Response tuning	0 Normal	\sim	40 ⁵⁰ 60 40		
🗫 Change			30 70		
			20 80	Positio	on
			10 90 0 sc 100		
			% ¹⁰⁰ %		
					<u> </u>



5.3.1. Full autotune

While performing a sequence of operations, it configures automatically settings such as detection and calibration of zero · span, selection of suitable PID parameters to apply the control, detection and calibration of IP signal current bias.

Note

The configuration time varies with actuator size.

5.3.1.1. Execute full autotune

MENU) Device Settings > Extended device settings > Easy tuning > Full autotune

① Click [Full autotune] in the [Full autotune] menu group.

X Click [Abort autotune] to cancel full autotune.

Extended dev * To perform devi	-	ntrol mode' sl	nould be 'HART'								-		×
Authority setup Autotune status Autotune statu	Basic setup			Detail setup	Custom curve	V Positi	on setup nual span 0% position						
Full autotune						Aut	 100% posit span Span autot Abort auto 	une			 		
Tuning result Tuning result Response tunin Response tunin	-		0 Normal				40	Position 50 e	7.7.7. 50				
😓 Change							30 20		70 80			Positi	on

2 Confirm the message and click [Next].

🐵 Full autotune		×
	You are about to start Full autotune	
•	Abort Next	

③ Wait until "Autotune status" field becomes "Complete autotune".

Autotune status Autotune status	Complete autotune \vee
Autotune result	Completed OK!
Full autotune So Full autotune So Abort autotune	

% If a problem occurs during the operation, an error message will be displayed in the "Autotune result" field and operation will be stopped. For error details, refer to **Appendix B. Error Messages**.

5.3.1.2. Display full autotune result

MENU) Device Settings > Extended device settings > Easy tuning > Tuning result

1 Click [Tuning result] in the [Tuning result] menu group and display the autotune result.

100 Extended device settings	-		\times
* To perform device tuning, 'Control mode' should be 'HART'			^
Authority setup Basic setup Easy tuning Expert tuning Detail setup Custom curve Function select			
Autotune status Position setup			
Autotune status No autotune V Manual span	 		
Autotune result Completed OK!	 		
Full autotune			
See Full autotune	 		
Span autotune			
Se Abort autotune			
Tuning result			
Tuning result Position			
Response tuning			
Response tuning 0 Normal 40 5 60			
Se Change 20 80 -	I	Positic	m

- 2 Click [Reload tuning result] to update to the latest information.
- ③ Click [OK] to close the menu.

🐵 Tuning result	_		×
😵 Reload tuning result			^
Rank	XS		 Control of the second se
Stroke sp. (Air-In)	480 ms		
Stroke sp. (Air-Out)	520 ms		
BIAS value	44.5 %		
IP signal	45.2 %		
<	OK Apply	Cance	>

5.3.2. Position setup

Only zero/span settings can be performed independently, independent of full autotune. There are two different ways of Zero/span settings whether to specify Zero/span manually or to determine these automatically.

5.3.2.1. Manual calibration of Zero/span point

Only the zero point and span point of the control valve are set manually.

MENU) Device Settings > Extended device settings > Easy tuning > Position setup > Manual span > 0% or 100% position adjust

① Click [0% position adjust] or [100% position adjust] in the [Manual span] menu group.

Extended device settings				-	\times
* To perform device tuning, 'Control mode' sh	ould be 'HART'				^
Authority setup Basic setup Easy tuning	Expert tuning Detail setup	Custom curve	Function select		
Autotune status			Position setup		
Autotune status	No autotune		Manual span		
Autotune result	Completed OK!		% 0% position adjust % 100% position adjust		
Full autotune					
😵 Full autotune			Auto span		
So Abort autotune			Span autotune		

② Select the amount of adjustment per button click in the "Adjust value" field.

🐵 0% position adjust	×
Position	10.2 %
Adjust value (0.1-15.0)[%]	0.1% ~
Adjust span 0% point	0.1%
1) Set adjust value	0.5%
2) Adjust and Set by buttons below	1.0%
3) Push OK to set	5.0%
<	10.0%
	15.0% Abot OK(set) Meve Meve

- ③ Click [Move-] or [Move +] and adjust individually the value of each position in 0% and 100% of the valve travel.
- ④ After adjustment, click [OK(set)] to configure the 0% or 100% valve opening position.

🐵 0% position adjust							Х
Position				10.2	2 %		^
Adjust value (0.1-15.0)[%]		0.1%				U	
Adjust span 0% point							
1) Set adjust value							
2) Adjust and Set by buttons below							
3) Push OK to set							
<							>
•	Abort		OK(set)		Move -	Move	<u>+</u>

5.3.2.2. Auto calibration of Zero/span point

Only the zero point and span point of the control valve are set automatically.

MENU) Device Settings > Extended device settings > Easy tuning > Position setup > Auto span > Span autotune

① Click [Span Autotune] in the [Auto span] menu group.

X Click [Abort autotune] to cancel Span autotune.

Ş	Extended dev	ice settings										-		×
* To	perform devi	ce tuning, 'Co	ontrol mode' sl	hould be 'HART										^
Au	thority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Function select							
A	utotune statu:	5					Positi	on setup						
A	utotune statu	5		No autotune				nual span						
A	lutotune result	t		Completed 0	DK!		~	0% position			 			
FL	ull autotune								,,					
1	😓 Full autotu	ne						o span						
4	😓 Abort auto	tune					8	Span autotu	ne					
								Abort autotu	ine					
Γ Γ	uning result													
	Tuning result							F	osition					ī.
R	esponse tunin	g						111	11111					
R	lesponse tunin	g		0 Normal			>	40	50 60					
	% Change							30 20		70 - 80 -		I	Positio	on

2 Confirm the message and click [Next].

🐵 Span autotune		×
	You are about to start span autotune.	
•	Abort Next	

③ Wait until "Autotune status" field becomes "Complete autotune".

Autotune status	
Autotune status	Complete autotune 🗸
Autotune result	Completed OK!
Full autotune So Full autotune So Abort autotune	

% If a problem occurs during the operation, an error message will be displayed in the "Autotune result" field and operation will be stopped. For error details, refer to **Appendix B. Error Messages.**

5.3.3. Response tuning

This operation is used to perform an additional fine adjustment relevant to the control response after performing PID tuning.

MENU) Device Settings > Extended device settings > Easy tuning > Response tuning

① Click [Change] int the [Response tuning] menu group.

Tuning result	Position	
Response tuning	AL THE TRACE	
Response tuning 0 Normal V	40 50 60	
😓 Change	30 70	Position
	20 🕚 80 -	Position

② Select level of "Response tuning" and Click [Next] to configure.

1 Change	×
Response tuning value Response tuning	0 Normal v
•	-7 More stable ^ -6 More stable -5 More stable -4 More stable

A. In case the higher response sensitivity is desired,

i.e., you wish to reduce response time by making the response quicker,

Select "+ More aggressive" and the most suitable stage among nine stages (+1 \sim +9). The response sensitivity increases in proportion to number of the stage.

B. In case the lower motion sensitivity is desired,

i.e., you wish to decrease the overshoot by making the response slower,

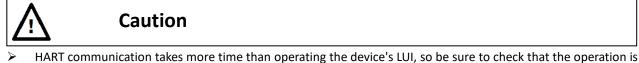
Select "- More stable" and the most suitable stage among nine stages (-1 \sim -9). The response sensitivity decreases in proportion to number of the stage.

C. In case of restoring the response to original settings,

Select "0 Normal".

5.4. Expert tuning

Use this setting in case in which the desired response has not been achieved through easy tuning. More suitable control parameters are configured according to each actuator by tuning individually parameters necessary to control the response.



- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- Before performing IP signal current bias (Auto), set the "Control mode" to "HART".

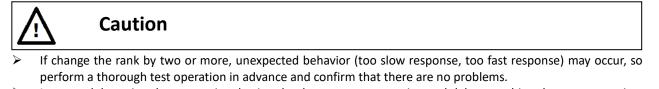
MENU) Device Settings > Extended device settings > Expert tuning

① Click [Expert tuning] menu tab in the [Extended device settings] menu and open the [Expert tuning] menu.

100 Extended device settings				_	\times
* To perform device tuning, 'Control mode' s	hould be 'HART'				
Authority setup Basic setup Easy tuning	Expert tuning Detail setup Custom curv	e Functio	n select		
PID parameter set			Sensitivity setup		
Rank	XS	\sim	Auto bias and rank		
😵 Change			Auto bias		
PID custom setup			Manual bias		
PID custom setup					

5.4.1. Preset setting for PID parameter

It is possible to select preset values prepared previously as PID parameter sets inside the device.



In general, lowering the proportional gain takes longer to start moving and delays reaching the target opening. On the other hand, increasing the proportional gain causes instability and hunting.

MENU) Device Settings > Extended device settings > Expert tuning > PID parameter set

The steps for change the rank of PID parameter set is below.

① Click [Change] in the [PID parameter set] menu group.

	🐵 Extended devi	ce settings								_	×
•	* To perform devic	ce tuning, 'Co	ntrol mode' s	hould be 'HART							\sim
	Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Functio	on sele	lect		
	PID parameter s	et						Sen	nsitivity setup		
	Rank			XS			~	Au	uto bias and rank		
So Change								Au	uto bias		
	PID custom setu							Ma	fanual bias		
	PID custom set	up									

② Select rank and click [Next] to configure.

🐵 Change				×
	Which ?	Custom v	1	
		Custom		
		XS		
		SS	Abort	Next
Y		S M	Abort	ivext

5.4.2. Custom setting for PID parameter

It is possible to tune individually PID parameters shown as below.

Caution

If the rank setting in the [PID parameter set] menu is other than "Custom", cannot change the parameter value using the following steps.

X For details and precautions for each parameter., refer to the KGP5000 instruction manual.

MENU) Device Settings > Extended device settings > Expert tuning > PID custom setup

① Click [PID custom setup] in the [PID custom setup] menu group.

Extended device settings					-		×
* To perform device tuning, 'Control mode' s	hould be 'HART'						
Authority setup Basic setup Easy tuning	Expert tuning Detail setup	Custom curve Fun	ction	select			
PID parameter set				Sensitivity setup			
Rank	Custom	~		Auto bias and rank			
😵 Change				Auto bias			
PID custom setup			1	Manual bias			
PID custom setup							
							\ >
						Clo	se

② [PID custom setup] menu opens.

PID custom setup			- 🗆 X
Air-Out/In different PID		Inside threshold	
Air-Out/In different PID	Yes	Inside threshold	10.0 %
% Change		😓 Change	
PID parameter Air-In		Inside PID AI	
P value	0.5	Inside P value	1.4
l value	5.0	Inside I value	2.0
D value	1.0	Inside D value	2.4
😵 Change		% Change	
PID parameter Air-Out		Inside PID AO	
rP value	0.8	Inside rP value	3.0
rl value	5.0	Inside rl value	2.0
rD value	0.9	Inside rD value	1.4
🎭 Change		😵 Change	
<			
			OK Apply Cancel

To change the current settings, click [Change] within each menu group.

5.4.3. Setup for IP signal current bias

IP signal current bias is the parameter necessary to determine the control output signal (IP signal) corresponding to an input signal inside the device.

There are two different ways whether to determine IP signal current bias automatically or to specify it manually.

5.4.3.1. Auto setup for IP signal current bias

1) Set IP signal current bias and PID parameters together

MENU) Device Settings > Extended device settings > Expert tuning > Sensitivity setup > Auto bias and rank

① Click [Auto bias and rank] in the [Sensitivity setup] menu group.

Extended device settings						-	×
* To perform device tuning, 'Control mode' should be 'HART'							\sim
Authority setup Basic setup Easy tuning Ex	xpert tuning Detail setup	Custom curve	Functio	n select			
PID parameter set				Sensit	ivity setup		
Rank	nk XS ~		~	Auto	bias and rank		
😵 Change	😵 Change				bias		
PID custom setup PID custom setup				Manu	ual bias		

Click [Auto bias and rank] in the [Auto bias and rank] menu group. % Click [Abort autotune] to cancel Auto bias and rank.

🐵 Auto bias and rank		-		×
Auto bias and rank				
Autotune status	No autotune		~	
Autotune result	Completed OK!		~	
🗫 Auto bias and rank				
% Abort autotune				

③ Confirm the message and click [Next].

Auto bias and rank	×
You are about to start auto bias & rank tuning.	
Abort Next]

④ Wait until "Autotune status" field becomes "Complete autotune".

🧐 Auto bias and rank		_		×
Auto bias and rank				^
Autotune status	Complete autotune		~	
Autotune result	Completed OK!		\lor	

X If a problem occurs during the operation, an error message will be displayed in the "Autotune result" field and operation will be stopped. For error details, refer to **Appendix B. Error Messages**.

2) Set IP signal current bias only

MENU) Device Settings > Extended device settings > Expert tuning > Sensitivity setup > Auto bias

① Click [Auto bias] in the [Sensitivity setup] menu group.

Extended dev	ice settings								_	×
* To perform devi	ce tuning, 'Co	ntrol mode' s	hould be 'HART							
Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Functi	on se	elect		
PID parameter	set						Se	ensitivity setup		
Rank			XS			\sim	1	Auto bias and rank		
😵 Change	Se Change				4	Auto bias				
PID custom setu							1	Manual bias		

Click [Start auto bias] in the [Auto bias] menu group.
 % Click [Abort autotune] to cancel Auto bias.

Auto bias	— 🗆	×
uto bias		
Autotune status	Complete autotune	1
Autotune result	Completed OK!	,
😵 Start auto bias		
Start auto bias		
So Abort autotune		
-		
-		

③ Confirm the message and click [Next].

🐵 Auto bias	>	<
	You are about to start auto bias tuning	
•	Abort Next	

④ Wait until "Autotune status" field becomes "Complete autotune".

🐵 Auto bias		-		×
Auto bias				^
Autotune status	Complete autotune			~
Autotune result	Completed OK!			~
% Auto bias				
😵 Abort autotune				
<				> \
	OK Apply		Can	cel

% If a problem occurs during the operation, an error message will be displayed in the "Autotune result" field and operation will be stopped. For error details, refer to **Appendix B. Error Messages**.

5.4.3.2. Manual setup for IP signal current bias

Specify individually IP signal current bias of each position in 25% and 75% of the valve travel.

MENU) Device Settings > Extended device settings > Expert tuning > Sensitivity setup >Manual bias

1 Click [Manual bias] in the [Sensitivity setup] menu group.

🐵 Extended device settings				-	\times
* To perform device tuning, 'Control mode' should be '	HART'				
Authority setup Basic setup Easy tuning Expert tu	ning Detail setup Custom curve	Function	n select		
PID parameter set			Sensitivity setup		
Rank XS		~	Auto bias and rank		
% Change			Auto bias		<u>i</u>
PID custom setup			Manual bias		
PID custom setup					
					v

② Click [Manual bias] in the [Manual bias] menu group and enter setting value.

🐵 Manual bias		-		×
Manual bias				^
25% position		44.6 %		
75% position		46.0 %		_
% Manual bias				
<				_ ~
	ОК	Apply	Can	cel

5.5. Detail setup

Set values which need to be changed to achieve the desired response.



- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- > To change the settings, "Authority" must be "HART" (See 3. Authority setup).

Setup items are as follows:

Secup items are as follows.					
Cutoff/Limit	: Cutoff/Limit				
Dead band	: Deviation value below which the integral action is disabled.				
Transfer function	: Type of the flow characteristic curve				
Range ability	: Rangeability in relevant to the equal percentage characteristic curve				
Damper setting	: Damping coefficient to the input signal.				
Split range	: Split range				
PT burnout dir.	: Burnout direction of position transmitter				
AT span limit	: Full mechanical limit of valve travel over the 100% travel position				
Integ. stop pres.	: Integral stop pressure				

% Refer to the KGP5000 instruction manual for details and precautions for each parameter.

MENU) Device Settings > Extended device settings > Detail setup

① Click [Detail setup] tab menu in the [Extended device settings] menu. [Detail setup] menu opens.

To perform device tuning, 'Control mod								
			1					
uthority setup Basic setup Easy tun	ng Expert tuning	Detail setup	Custom curve					
Cutoff or Limit			-		Damper setting			
Cutoff/Limit 0% side	Cutoff			\sim	Input damper	Disable		~
Cutoff/Limit 0% side value		0.5	i %		Input damper factor			0.
Cutoff/Limit 100% side	Disable			\sim	😵 Change			
Cutoff/Limit 100% side value		99.5	i %		Split range			
😵 Change					Split range 0%		4.0 mA	
Dead band					Split range 100%		20.0 mA	
Dead band flag	Disable			~	😵 Change			
Dead band value		0.3	8 %		PT burnout dir.			
😵 Change					PT burnout dir.	Low		~
Transfer function					😓 Change			
Transfer Function	Linear			~	AT span limit			
😵 Change					AT span limit		105 %	
Range ability					😓 Change			
Range ability				1	Integ. stop pres.			
😵 Change					Integ. stop pres.	Enable		`
					Integ. stop pres. value		10.00 kPa	
					😵 Change			

To change the current settings, click [Change] within each menu group.

5.6. Custom curve

Set the flow characteristic curve by specifying arbitrary 19 points.

Since the 0% valve travel corresponds to the 0% input and the 100% valve travel corresponds to the 100% input, set points of the intervals between them.

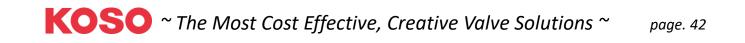
% Define the relationship in such a way that the valve travel monotonically increases as the input increases.

MENU) Device Settings > Extended device settings > Custom curve

① Click [Custom curve] tab menu. [Custom curve] menu opens.

Extended device	settings						-	
o perform device	tuning, 'Control mode' sh	ould be 'HART'						
uthority setup B	asic setup Easy tuning	Expert tuning	Detail setup	Custom curve	function select			
Change custom	n curve							
Custom curve				_				
X1 value			100.0	o %	Y1 value		100.0 %	
X2 value			100.0	o %	Y2 value		100.0 %	
X3 value			100.0	o %	Y3 value		100.0 %	
X4 value			100.0	o %	Y4 value		100.0 %	
X5 value			100.0	o %	Y5 value		100.0 %	
X6 value			100.0	o %	Y6 value		100.0 %	
X7 value			100.0	o %	Y7 value		100.0 %	
X8 value			100.0	o %	Y8 value		100.0 %	
X9 value			100.0	D %	Y9 value		100.0 %	
X10 value			100.0	D %	Y10 value		100.0 %	
X11 value			100.0	D %	Y11 value		100.0 %	
X12 value			100.0	o %	Y12 value		100.0 %	
X13 value			100.0	D %	Y13 value		100.0 %	
X14 value			100.0	D %	Y14 value	[100.0 %	
X15 value			100.0	o %	Y15 value	[100.0 %	
X16 value			100.0	o %	Y16 value		100.0 %	
X17 value			100.0	o %	Y17 value		100.0 %	
X18 value			100.0	o %	Y18 value		100.0 %	
X19 value			100.0	o %	Y19 value		100.0 %	

To enter the setting value, click [Change custom curve] and enter the setting value.



5.7. Function select

The following functions can be set individually.

Password setup	: Password setup					
Screen saver	: Screen saver					
Temperature unit	: Temperature unit					
Pressure unit	: Pressure unit					
LCD display mode	: LCD display mode of valve position					
	Converting a second for details and areas where such a second areas the second are					

X See KGP5000 instruction manual for details and precautions for each parameter.

MENU) Device Settings > Extended device settings > Function select

① Click [Function select] menu tab in the [Extended device settings] menu. [Function select] menu opens.

To perform device tuning, 'Control mode' should be 'HART' Authority setup Basic setup Easy tuning Expert tuning Detail setup Custom curve Function select Password setup Password status Disable Password setup Screen saver Screen saver Screen saver Change Temperature unit Temperature unit Temperature unit Pressure unit Pressure unit Pressure unit Curve Change LCD display mode LCD position disp. mode Normal	Extended devi	ce settings					-		×
Password setup Password status Disable Screen saver Screen saver Screen saver Ominutes Image: Screen saver Vaiting time Ominutes Image: Screen saver Change Temperature unit Image: Screen saver Pressure unit Image: Screen saver Image: Sc	' To perform devic	e tuning, 'Co	ntrol mode' s	hould be 'HART					
Password status Disable Password setup Screen saver Screen saver Screen saver Ominutes Image: Streen saver Change Temperature unit Image: Streen saver Pressure unit Pressure unit Image: Streen saver Image: Streen	Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curv	Fund	tion sele	ect
Password setup Screen saver Screen saver Disable Screen saver Disable Waiting time Ominutes Change Pressure unit Pressure unit Pressure unit Pressure unit LCD display mode LCD position disp. mode Normal	Password setup						_		
Screen saver Screen saver Screen saver Waiting time ♥ Change Temperature unit Temperature unit Temperature unit Pressure unit Pressure unit Pressure unit LCD display mode LCD position disp. mode Normal	Password status			Disable			\sim		
Screen saver Disable Waiting time Ominutes Change Temperature unit Temperature unit C C C Change Pressure unit Pressure unit C C C C C C C C C C C C C C C C C C C	So Password s	etup							
Waiting time Ominutes Waiting time Ominutes Change Temperature unit Temperature unit Temperature unit C C C C C C C C C C C C C C C C C C C	Screen saver								
Change Temperature unit Temperature unit Temperature unit C <td< td=""><td>Screen saver</td><td></td><td></td><td>Disable</td><td></td><td></td><td>\sim</td><td></td><td></td></td<>	Screen saver			Disable			\sim		
Change Temperature unit Temperature unit *C * Change Pressure unit Pressure unit Pressure unit LCD display mode LCD position disp. mode Normal	Waiting time				() minutes			
Temperature unit Temperature unit Temperature unit Temperature unit Temperature unit Pressure unit Pressure unit Pressure unit LCD display mode LCD position disp. mode Normal	0.0					_			
Temperature unit °C Change Pressure unit Pressure unit kPa Change LCD display mode LCD position disp. mode Normal	30 Change								
Temperature unit °C Change Pressure unit Pressure unit kPa Change LCD display mode LCD position disp. mode Normal	Temperature uni	t							
Pressure unit Pressure unit kPa Change LCD display mode LCD position disp. mode Normal				°C			~		
Pressure unit kPa	😓 Change								
Change LCD display mode LCD posiiton disp. mode Normal	Pressure unit								
LCD display mode LCD posiiton disp. mode Normal	Pressure unit			kPa			~		
LCD posiiton disp. mode Normal	😵 Change								
LCD posiiton disp. mode Normal	LCD display mod	le							
😵 Change				Normal			~		
• •	So Change								
	e								

To change the current settings, click [Change] within each menu group.

* For password settings, refer to **Appendix D. Password setup**.

6. Maintenance

This menu offers maintenance, adjustment, and HART-related settings for the positioner.

A Cautio	on		
To change the setti	ngs, " Authority " must be	"HART".	
MENU) <i>Maintenance</i>	monu tab [Maintenance	l ton monu or	
	menu tab. [Maintenance		_
Offline ♀ Device Set	ttings Diagnostics Maintenance 🗴	Online Process Varia	ables
Extended maintenance			
Serial No.			
Serial No.		0000000	
Version			
Electronics			
		1	
		0	
		0	
Software			
		1	
		0	
		0	
HART version			
HART Protocol Revision		7	
Device rev		з	
- HART relation			
Tag	????????		

Display items are as follows:

Long Tag

[Serial No.]			
Serial No.	: Serial number		
[Version]			
Electronics	: Hardware revision	Software	: Software revision
[HART version]			
HART Protocol Revision	: HART protocol version	Device rev	: Field device revision
[HART relation]			
Тад	: Tag number	Long Tag	: Long Tag number



6.1. Extended maintenance

This menu offers maintenance, adjustment, and HART-related settings for the positioner.

MENU) Maintenance > Extended maintenance

① Click [Extended maintenance] in the [Maintenance] top menu.

Extended maintenance	
Serial No.	
Serial No.	0000000
Version Electronics	
	1
	0
	0
Software	
	1
	0
	0
l	

[Extended maintenance] menu opens. 2

Extended main		×					
To perform calib	pration and si	mulation, 'Contro	l mode' s	hould be 'HART'			
Authority setup	Calibration	Simulation test	Service	HART relation	Setting list		
Authority							
Authority			HART			~	
Change							
Control mode			HART			\sim	
So Change							
0							

Menu items are as follows:

- (1) Authority setup menu See 3. Authority setup
- (2) Calibration menu See 6.2 Calibration
- See 6.3 Simulation test (3) Simulation test menu
- (4) Service menu See 6.4. Service
- (5) HART relation menu See 6.5. HART relation
- (6) Setting list menu See 6.6. Setting list
- (7) Factory setup menu See 6.7. Factory setup 💥
- % This menu is displayed only when the "Factory setup" field is "ON" in the [Maintenance] > [Service] > [Factory menu].

Click on the tab to open each menu.



6.2. Calibration

Since the operation described in this section is preset from the factory, generally, it is not necessary to repeat this. However, since there is a case in which a deviation is produced from long-term operation and so on, if necessary, perform this operation.

Caution

- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- Before performing calibration, set "Control mode" to "HART".

MENU) Maintenance > Extended maintenance > Calibration

① Click [Calibration] menu tab in the [Extended maintenance] menu. [Calibration] menu opens.

1999 Extended maintenance	_	×
* To perform calibration and simulation, 'Control mode' should be 'HART'		
Authority seture Calibration imulation test Service HART relation	Setting list	_
Input signal c ai.		
So Calibrate		
Cross point cal.		
So Calibrate		
Position transmit. cal.		5
Se Calibrate		
Pressure sensor cal.		5
🗫 Calibrate		

6.2.1. Input signal calibration

Calibrate the value of input signal which the positioner can receive.

The steps to calibration each value of 4mA and 20mA is shown as below.

MENU) Maintenance > Extended maintenance > Calibration > Input signal cal.

① Click [Calibrate] in the [Input signal cal.] menu group.

Extended maintenance				—	>
To perform calibration and si	mulation, 'Contro	l mode' sl	hould be 'HART'		
Authority setup Calibration	Simulation test	Service	HART relation	Setting list	
Input signal cal					
😵 Calibrate					
					_
Cross point cal.					 5
Cross point cal.					
% Calibrate					
Se Calibrate Position transmit. cal.					
% Calibrate					
Se Calibrate Position transmit. cal.					
So Calibrate Position transmit. cal. So Calibrate					

② Confirm the message and click [Next].



③ Set the input signal to 4mA and click [Next].

🐵 Calibrate			×
	Set input signal 4.0mA		
()		Abort	Next

④ Set the input signal to 20mA and click [Next].

🐵 Calibrate		×
Set input signal 20.0mA		
()	Abort	Next

(5) Calibration is complete when the message "Input signal calibration is completed" is displayed.

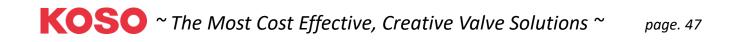
6.2.2. Cross point calibration.

Calibrate the position which of the feedback lever becomes in the horizontal position. It is necessary to perform it to precisely control the travel position. When a feedback lever isn't installed horizontally in the 50% position, this calibration will be required.

The steps are shown below.

```
MENU) Maintenance > Extended maintenance > Calibration > Cross point cal.
```

① Click [Calibrate] menu tab in the [Cross point cal.] menu group.



🐵 Extended main	ntenance				_	×
* To perform calib	ration and sir	mulation, 'Contro	l mode' s	hould be 'HART'		
Authority setup	Calibration	Simulation test	Service	HART relation	Setting list	
Input signal cal.						
% Calibrate						
Cross point cal.						
% Calibrate						
6º Cambrate						٩.
- Position transmi	it cal					
So Calibrate	in con					1
30 Calibrate						
Pressure sensor	cal.					
😵 Calibrate						

2 Confirm the message and click [Next].

🐵 Calibrate		×
	You are about to perform cross point calibration	
•	Abort	t

③ Select the amount of adjustment with one button click in the "Adjust value" field.

Adjust value (0.1-15.0)[%]	0.1% ~	
Adjust cross point	0.1%	
1) Set adjust value	0.2%	
2) Adjust and Set by buttons below	0.5%	
3) Abort : Abort calibration	1.0%	
	5.0%	

- ④ Click [Up(+)] or [Down(-)] to make the feedback lever horizontal.
- (5) When reach the horizontal position, click [Ok(set)] to complete the crosspoint calibration.

Position adjust					×
Adjust value (0.1-15.0)[%]	0.1%	5		v	^
Adjust cross point					
1) Set adjust value					
2) Adjust and Set by buttons below					
3) Abort : Abort calibration					\sim
<				\rightarrow	
•	Abort	OK(set)	Down(-)	Up(+)	

6.2.3. Position transmitter calibration

Calibrate the position transmitter signal which the positioner may send. The steps to calibrate the position transmitter signal of both position 0% and 100% is shown below.

MENU) Maintenance > Extended maintenance > Calibration > Position transmit. cal.

① Click [Calibrate] in the [Position transmit. cal.] menu group.

Authority setup	Calibration	Simulation test	Service	HART relation	Setting list	
Input signal cal.						_
So Calibrate						
Cross point cal.						
Calibrate						
% Calibrate						
Calibrate						
% Calibrate						
Calibrate						
So Calibrate	it. cal.					

2 Confirm the message and click [Next].

🐵 Calibrate		×
	You are about to perform position transmitter calibration	
ø	Abort Next	

First, perform calibration on the 0% side.

③ Select the amount of adjustment with one button click in the "Adjust value" field.

<0% side>		^
Adjust value (1-255)[dec]	1	~
Adjust position transmitter output	1	
1) Set adjust value	2	
2) Adjust and Set by buttons below	5	
3) Abort : Abort calibration	10	
<	100	>
•	255 AboxOK(set)Devvn()U	,)

④ Click [Up(+)] or [Down(-)] to adjust position transmitter signal. After completing the adjustment, click [OK(set)] to configure.

1 10% side		×
<0% side>		\sim
Adjust value (1-255)[dec]	1 ~	
Adjust position transmitter output		
1) Set adjust value		
2) Adjust and Set by buttons below		
3) Abort : Abort calibration		\sim
<	>	
•	Abort OK(set) Down(-) Up(+)	

Next, perform calibration on the 100% side.

5 Select the amount of adjustment with one button click in the "Adjust value" field.

100% side	×
<100% side>	~
Adjust value (1-255)[dec]	1 ~
Adjust position transmitter output	1
1) Set adjust value	2
2) Adjust and Set by buttons below	5
3) Abort : Abort calibration	10
<	100
•	Abort OK(set) Down(-) Op(+)

6 Click [Up(+)] or [Down(-)] to adjust position transmitter signal. After completing the adjustment, click [OK(set)] to complete calibration.

100% side						×
<100% side>						\sim
Adjust value (1-255)[dec]		1			~	
Adjust position transmitter output						
1) Set adjust value						
2) Adjust and Set by buttons below						
3) Abort : Abort calibration						\sim
<					\rightarrow	
•	Abort		OK(set)	Down(-)	Up(+)	

6.2.4. Pressure sensor calibration

Calibrate three pressure sensors attached in the positioner. It is necessary to connect the positioner to a pressure measuring device of gauge pressure type which is used for pressure reference. It is required to calibrate both first order pressure (1st-P) and the second order pressure (2nd-P) for each sensor.

The steps to calibrate the supply pressure sensor is showed as below.

MENU) Maintenance > Extended maintenance > Calibration > Pressure sensor cal.

① Click [Calibrate] in the [Pressure sensor cal.] menu group.

🐵 Extended mai	ntenance				_	×
* To perform calib	ration and sir	mulation, 'Contro	l mode' s	hould be 'HART'		
Authority setup	Calibration	Simulation test	Service	HART relation	Setting list	
Input signal cal.						
% Calibrate						
Cross point cal.						
😵 Calibrate						
Position transm	it. cal.					
So Calibrate						
P	cal.					
😵 Calibrate						

② Confirm the message and click [Next].

1999 Pressure sensor cal.	×
You are about to perform pressure sensor calibration	
Abort	Next

③ Select "Sup. press." In the "Pressure sensor" field and Click [Next].

1 Pressure sensor cal.		×
Select pressure sensor		
Pressure sensor	Sup. press.	~
	Sup. press.	
	Out1 press.	
6	Out2 press.	h
Y		

④ Stop pressure supply, enter pressure value in the "Pressure value" field and Click [Next].

1 Pressure sensor cal.		×
Enter pressure value for lower side (0-999)[kPa] Pressure value		Q
•	Abort	Next

⑤ Resume pressure supply, enter pressure value in the "Pressure value" field and Clic[Next] to complete calibration.

Pressure sensor cal.	×
Enter pressure value for upper side(0-999)[kPa] Pressure value	300
•	Abort Next

6.3. Simulation test

It is possible to generate input signal, IP signal current and position transmitter output in similar manner with the desired control.

Caution

- Simulation test is the function which enables the positioner to be operated regardless of the signal from a higherlevel control system connected with the positioner. Prior to operating this function, make sure that the simulation will not affect the process.
- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- Before performing simulation test, set "Control mode" to "HART".

MENU) Maintenance > Extended maintenance > Simulation test

① Click [Simulation test] menu tab in the [Extended maintenance] menu. [Simulation test] menu opens.

Extended main	ntenance				_	×
* To perform calib	ration and c	imulation, 'Control	mode' s	hould be 'HART'		
Authority setup	Calibratio	Simulation test	ervice	HART relation	Setting list	
Manual setpoin	t					
Manual setpoi	nt					
IP signal						
Simulate						
Position transm	it.					
😵 Simulate						

6.3.1. Manual setpoint simulation

It is possible to operate the control valve by pseudo input signal.

MENU) Maintenance > Extended maintenance > Simulation test > Manual setpoint

① Click [Manual setpoint] in the [Manual setpoint] menu group. Another menu opens.

🐵 Extended mai	ntenance				-	×
* To perform calib	oration and si	mulation, 'Contro	l mode' sl	hould be 'HART'		
Authority setup	Calibration	Simulation test	Service	HART relation	Setting list	
- Manual setpoin	+					
Manual setpoi	nt					
IP signal						
Simulate						
-						
Position transm	it.					
Simulate						
-						

2 Click [Manual setpoint] in the [Manual setpoint] menu group, [Manual setpoint] sub menu opens.

🐵 Manual setpoint			-		×
Set point		50.0 %			
Position		50.0 %			_
😵 Manual setpoint					
					-
<			_		>
	ОК	Apply		Canc	el

3 Enter setpoint value in the "Manual setpoint" field and click [Next]. Perform simulate manual setpoint and return menu of (2).

🐵 Manual setpoint	×
Set value to move (0.0-100.0)[%] Manual setpoint	50.0 %
•	Abort Next

④ Click [OK] or [Cancel], return to the [Simulation test] menu.

🐵 Manual setpoint		_		×
Set point		50.0 %		
Position		50.0 %		
😵 Manual setpoint				
<	ОК	Apply	Can	cel

6.3.2. IP signal simulation

It is possible to operate the control valve by providing the IP signal directly to the torque motor unit.

MENU) Maintenance > Extended maintenance > Simulation test > IP signal

① Click [Simulate] in the [IP signal] menu group.

* To perform calib	ration and si	mulation, 'Contro	l mode' sł	hould be 'HART'		_	
Authority setup	Calibration	Simulation test	Service	HART relation	Setting list		
Manual setpoint	t						
Manual setpoir	nt						
· · · · · · · · · · · · · · · · · · ·							
ID eignal							
ID signal							1
]
	it.]
% Simulate	it.]

2 Select whether or not to adjust temperature. In general, select "Yes" and click [Next].

🐵 Simulate	×
Do you want temperature correction?	Yes v
•	Abort Next

③ Enter the IP signal values in the "IP signal value" field and click [Next]. Perform simulation.

④ To return to the normal control, click [Abort].

🐵 Simulate	×
IP signal simulation (0-100)[%] IP signal value	0%
•	Abort Next

6.3.3. Position transmitter simulation

It is possible to output the position transmitter signal with a pseudo-set position transmitter value.

MENU) Maintenance > Extended maintenance > Simulation test > Position transmitter

① Click [Simulate] in the [Position transmitter] menu group.

Extended main	ntenance				-	×
* To perform calib	oration and si	mulation, 'Contro	l mode' sl	nould be 'HART'		
Authority setup	Calibration	Simulation test	Service	HART relation	Setting list	
Manual setpoin	t					
Manual setpoi	nt					
IP signal						
😵 Simulate						
Position transm	it.					
0° Simulate						J
						_

2 Enter position transmitter value in the "Position transmit adj." field and click [Next]. Perform simulation.

Any position transmitter value from 0-100% can be output. If set 100.1%, positioner outputs NAMUR Burnout High signal. If set 100.2%, positioner outputs NAMUR Burnout Low signal.

To return to the normal output, click [Abort].



KOSO ~ The Most Cost Effective, Creative Valve Solutions ~

1999 Simulate	×
Position transmit. sim. (0-100, 100.1:NAMUR High, 100.2:NAM Position transmit. adj.	MUR Low)[%]
•	Abort Next

6.4. Service

The operator can identify the current internal control variables as follows.

MENU) Maintenance > Extended maintenance > Service

① Click [Service] menu tab in the [Extended maintenance] menu and open the [Service] menu.

Extended maintenance						- 0	×
* To perform calibration and simulation, 'Cor	ntrol mode' should be 'HART'						
Authority setup Calibration Simulation te	es Service ART relation Setting list						
Angle							
Angle	-43.8617 °						
Stroke angle							
Span setting stroke 0	-8.80164 deg						
Cross point	1.5043 deg						
Span setting stroke 100	11.93024 deg						
% Update							
Raw AD values							
Input(4-20mA)	7846	Air P1	00D7	Temperature		02	7F
Position(Sin)	CC58	Air P2	00D5	Positon transmit. PWM		oCo	64
Position(Cos)	8307	Air P3	00D3	IP signal PWM		43	E8
Time stamp							
Date	Apr 09 2024	Time	13:25:39				
PID values							
Set point	49.6 %						
Position	-50.0 %						
р	518.7						
i	96.8						
d	-0.3						
Factory menu							
Factory menu	OFF ~						
🗫 Change							
					OK Apply		>
					OK Apply		ancel

Display items are as follow [Angle]	vs:		
Angle	: Angle of potentiometer]	
[Stroke angle] 🔆		_	
Span setting stroke 0	: Angle value at 0% span	Cross point	: Angle of cross point
Span setting stroke 100	: Angle value at 100% span		
X Click [Update] to obtair	the latest information.	-	
[Raw AD Value]			
Input(4-20mA)	: AD value of Input signal	Position(Sin)	: AD value of valve
			position(sin)
Position(Cos)	: AD value of valve	Air P1	: AD value of pressure sensor 1
	position(cos)		
Air P2	: AD value of pressure sensor 2	Air P3	: AD value of pressure sensor 3
Temperature	: AD value of temperature	Position transmit.	: PWM value of position
		PWM	transmitter

IP signal PWM : PWM value of IP signal current			
[Time stamp]			
Date	: Firmware time stamp - Date	Time	: Firmware time stamp - Time
[PID values]			
Set point	: Set point	Position	: Valve position
р	: Proportional gain	i	: Integral coefficient
d	: Differential gain		

6.4.1. Switching of Factory setup menu

Enable/Disable the [Factory setup] menu.



Caution

Since the suitable parameters are configured at the factory, in general, do not perform switching of factory setup and the reconfiguration on its menu. The reconfiguration of the values causes the case that the desired response may not be achieved.

MENU) Maintenance > Extended maintenance > Service > Factory menu

① Click [Change] in the [Factory menu] menu group and select "ON".

Factory menu			
Factory menu	OFF	~	
😵 Change			

② [Factory setup] tab menu is added in the [Extended maintenance] menu.



6.5. HART relation

Display and configure information related to HART communication.

MENU)	Maintenance >	Extended	maintenance >	Service
-------	---------------	----------	---------------	---------

① Click [HART relation] menu tab in the [Extended maintenance].

Extended maintenance					-	
To perform calibration and simula	tion, 'Control mode' should be 'HART'					
Authority setup Calibration Sim	ulation test Service HART relation setting	list Factory se	tup			
HART device information			HART Find device			
% Update device information			So Find device			
Manufacturer	KOSO	>	HART Squawk			
Device Type	KGP5000	>	Squawk			
Device Identifier		0	Dynamic var. assign			
Tag	????????		Primary Variable	Input		Ŷ
😵 Change Tag			Secondary Variable	Position		~
Long Tag	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Tertiary Variable	IP signal		~
😵 Change Long tag			Quaternary Variable	Pot. angle		×
Descriptor	???????????????????????????????????????		😵 Change			
% Change Descriptor			Reboot			
Date		2015/01/06	% Reboot			
% Change Date						
Message	777777777777777777777777777777777777					
% Change Message						
Final Assembly Number		0				
So Change Final assembly num						
						 _

Display items are as follows: [HART device information]

[HART device information]			
Manufacture	: Manufacture	Device Type	: Model
Device Identifier	: Device Identifier	Тад	: Tag number
Long Tag	: Long Tag number	Descriptor	: Descriptor
Date	: Date	Message	: Message
Final Assembly Number	: Final Assembly Number		
[Dynamic var. assign]		-	
Primary Variable	: Primary Variable	Secondary Variable	: Secondary Variable
Tertiary Variable	: Tertiary Variable	Quaternary Variable	: Quaternary Variable



6.5.1. Update device information

Update HART information to the latest.

1 Click [Update device information] in the [HART device information] menu group. Reacquire the HART related information from positioner.



6.5.2. HART Find device

Confirm whether the positioner replies or not to the Find Device command sent from a HART communication tool is done.

X To respond to Find device, the positioner's "Maintenance > HART relation >Find device" setting must be "Armed". X If the device cannot be found, communication may have been interrupted.

MENU) Maintenance > Extended maintenance > HART relation > Find device

(1) Click [Find device] in the [HART find device] menu group.

L	HART find device
l	😵 Find device
L	

6.5.3. HART Squawk

When receiving the Squawk command from a HART communication tool, "Squawk ON !!" or " Squawk ONCE ON" is indicated(blinked) on a LCD screen of this device.

X To display Squawk, the LCD screen must be at the top menu or the "Maintenance > HART relation > Squawk" menu. MENU) Maintenance > Extended maintenance > HART relation > Squawk> Squawk

- ① To change "Number of Squawks", select "Change Number Squawks" and click [Next]. Enter the number.
- ② To execute Squawk, select "Squawk" and click [Next], perform Squawk.
- ③ To exit [Squawk] menu, select "Exit" and click [Next].

🐵 Squawk	×
Squawks = 5, begin squawkin	g Change Number of Squawks ¥ Change Number of Squawks Squawk Exit
•	Abort Next



6.5.4. HART/Device Information

Some HART device information can be changed.

Тад	: Tag number	Long Tag	: Long Tag number
Descriptor	: Descriptor	Date	: Date
Message	: Message	Final Assembly Number	: Final Assembly Number

The following explains how to change "Tag" as an example.

"Long Tag", "Descriptor", "Date", "Message", and "Final Assembly Number" can also be changed in the same way.

① Click [Change Tag] in the [HART device information] menu group.

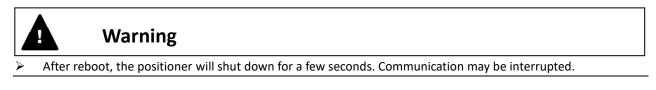
Tag	????????
🗫 Change Tag	

2 Enter any 8-digit alphanumeric character or symbol and click [Next]

🐵 Change Tag			×
Tag Tag	????????		
•		Abort	Next

6.5.5. Reboot

This is a function to restart the positioner.



To reboot the positioner, do the following: MENU) *Maintenance > Extended maintenance > HART relation > Reboot*

① Click [Reboot] in the [Reboot] menu group.

Reboot	
😵 Reboot	

2 A confirmation message will be displayed twice, so click [Next] if execute it.

6.5.6. Dynamic Variables assignment

Among dynamic variables, Secondary Variable (SV), Tertiary Variable (TV), and Quaternary Variable (QV) can be assigned to another variable.

MENU) Maintenance > Extended maintenance > HART relation >Dynamic var. assignment

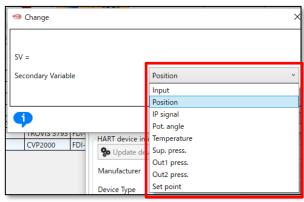
① Click [Change] in the [Dynamic var. assign] menu group.

Dynamic var. assign			
Primary Variable	Input	Υ.	
Secondary Variable	Position	v	
Tertiary Variable	IP signal	~	
Quaternary Variable	Pot. angle	~	
😵 Change			

② Select the Dynamic Variables to change and click [Next].

🐵 Change			×
	Which variable you want to change?	SV ×	
•		TV QV Abort Next	:

③ Select variables to assign and click [Next].



The variables that can be set are as follows:

Input	: Percentage of Input signal	
Position	: Valve position	
IP signal	: IP signal current	
Pot. angle	: Angle of potentiometer	
Temperature	: Temperature	
Sup. press.	: Supply pressure	
Out1 press.	: Output pressure 1	
Out2 press.	: Output pressure 2	
Set point	: Set point	

6.6. Setting list

Displays the current main settings.

6.7. Factory setup



Caution

Since the suitable parameters are configured at the factory, in general, do not perform switching of factory setup and the reconfiguration on its menu. The reconfiguration of the values causes the case that the desired response may not be achieved.

% The menu is displayed only when the "Factory setup" field is "ON" in the "[Maintenance] > [Service] > [Factory menu]".

The items that can be set are as follows:

IP signal range	: IP signal range
IP signal factor	: IP signal factor
Cutoff IP signal	: Cutoff IP signal
Restore factory default	: Restore factory default setting
Virtual DIP SW	: Setting of Virtual DIP SW

⅔ For details on each item, see KGP5000 instruction manual.

① Click [Factory setup] menu tab in the [Extended maintenance] menu and open the [Factory setup] menu.

Authority setup Calibration Simu	Ilation test Service HART relation Factory setup		
IP signal range		Virtual DIP SW	
Air-In	100 %	Virtual SW1	
		bit0 bit1	
Air-Out	100 %	bit2	
So Change		bit3	
So change		bit4	
		bit5	
IP signal factor		bit6	
Factor	1.	bit7	
A . a		Virtual SW2	
😵 Change		bit8	
		bit9	
Cutoff IP signal		bit10	
0% side	25 %	bit11 bit12	
		bit13	
100% side	75 %	bit14	
😵 Change		bit15	
To Change			
		🗫 Change	
Restore factory default			
So Restore			

To change the current settings, check the setting values for each item group and click [Change].

6.7.1. Restore factory default

Return to factory default settings.



All current setting values will be overwritten to the factory settings.

MENU) Maintenance > Extended maintenance > Factory setup > Restore factory default

① Click [Restore] in the [Restore factory default] menu group.

Restore factory default

- 2 A confirmation message will be output twice, so click [Next] if execute.
- ③ Read the factory default settings and overwrite the current settings.

7. Diagnostics

This positioner is equipped with the on-line diagnostics which acquires and estimates data during plant operation and the offline diagnostics performed in maintenance. Through appropriate diagnostic settings based on an operating condition of the installation environment and a process, it's possible to do efficient prevention and forecast preservation.



To change the settings, "Authority" must be "HART".

MENU) Diagnostics

① Click [Diagnostics] menu tab to open the [Diagnostics] top menu.

Offline Q Device Settings	Diagnostics X Maintenance X Online	Process Variables Health ? Simulation	
Extended diagnostics			
Alarm status		Online diagnostics	
EEPROM failure	Good v	Total stroke	10
Position sensor failure	Good	Total direction change	59
P-sup. sensor failure	Good v	Total time	16.3 h
P-out1 sensor failure	Good v	Low position time	6.8 h
P-out2 sensor failure	Good	Minimum temperature	24 Celsius
Input signal alarm	ОК ∨	Maximum temperature	27 Celsius
Position alarm	∨	Low temperature time	0.0 h
Deviation alarm	∨	High temperature time	0.0 h
Temperature alarm	∨		
Low sup-pres. alarm	ОК ∨		
High sup-pres. alarm	ОК ∨		
PST alarm			
PST stroke alarm	ОК ∨		
PST incomplete alarm	∨		
PST pressure alarm	ОК		
😓 Alarm clear			

Displays alarm status, PST alarm, and online diagnostic status.

The displayed items are as follows:

Alarm status]			
EEPROM failure	: Memory failure	Position sensor failure	: Position sensor failure
P-sup. sensor failure	: Supply pressure sensor failure	P-out1 sensor failure	: Output pressure sensor 1 failure
P-out2 sensor failure	: Output pressure sensor 2 failure		
Input signal alarm	: Input signal alarm	Position alarm : Valve position alarm	
Deviation alarm	: Deviation alarm	Temperature alarm	: Temperature alarm
Low-sup-pres. alarm	: Low supply pressure alarm	High-sup-pres. alarm	: High supply pressure alarm
PST alarm]			
PST stroke alarm	: PST stroke alarm	PST incomplete alarm	: PST incomplete alarm
PST pressure alarm	: PST pressure alarm		

[Online diagnostics]			
Total stroke	: Total stroke	Total direction change	: Total direction change
Total time	: Total time	Low position time	: Low position control
			time
Minimum temperature	: Minimum	Maximum temperature	: Maximum temperature
	temperature		
Low temperature time	: Ambient low	High temperature time	: Ambient high
	temperature time		temperature time

7.1. Extended diagnostics

This menu is an extended menu for configuring diagnosis related settings, diagnosis execution, and alarm settings.

MENU) Diagnostics > Extended diagnostics

① Click [Extended diagnostics] menu tab in the [Diagnostics] top menu.

Offline Q Device Settings Diag	agnostics 🛞 Maintenance 🛞 Online Process Variables Health 🕐 Simulation
Extended diagnostics	
Alarm status	Online diagnostics
EEPROM failure Goo	od v Total stroke 10

② [Extended diagnostics] menu opens.

🐵 Extended diag	nostics					-		Х
* To setup and pe	rform diagnostics, 'C	ontrol mode' should be 'HA	.RT'					1
Authority setup	Online diag. setup 25 percent step response One step response S-valve signature Valve signature Partial s						Alarm setup	•
Authority								
Authority		HART		~				
% Change								
Control mode								
Control mode		4-20mA		\sim				
% Change								

Menu items are as follows:	
(1) Authority setup menu	See 3. Authority setup
(2) Online diag. setup menu	See 7.2. Online diagnostics setup
(3) 25 percent step response menu	See 7.3. 25% step response
(4) One step response menu	See 7.4. One step response
(5) S-valve signature menu	See 7.5. Simple valve signature
(6) Valve signature menu	See 7.6. Valve signature
(7) Partial stroke test menu	See 7.7. Partial stroke test (PST)
(8) Alarm setup menu	See 7.8. Alarm setup

Click on the tab to open each menu.

7.2. Online diagnostics setup

Configure settings related to online diagnosis.

Setup items are as follows:	
Total stroke	: A threshold of the position change to accumulate is set.
Total direction change	: A change width to judge direction change is set.
Low position time	: A position to judge low position is set.
High/Low temperature time	: A temperature to judge high/low temperature is set.
Partial stroke 🔆	: Partial stroke

% For settings related to Partial stroke test, see 7.7. Partial stroke test (PST) .

% For details on each item, see KGP5000 instruction manual.

MENU) Diagnostics > Extended diagnostics > Online diag. setup

① Click [Online diag. setup] menu tab in the [Extended diagnostics] menu. [Online diag. setup] menu opens.

page. 66

🐵 Extended diag	inostics										_		×
* To setup and pe	rform diagnostics, 'Co	ntrol mode' should be 'HA	RT'										
Authority setup	Online diag. setup	25 percent step response	One step response	S-valve sign	ature	Valve signature	Partial s	troke test	Alarm setup				
🗫 All diag. log	clear												
Total stroke					-Low po	osition time —							
Criteria			10 %		Criteria	a				5.0	%		
😵 Change					% C	hange							
😓 Clear log					% C	lear log							
Total direction of	hange				High/L	ow temperatur	re time						
Criteria			10 %		Criteria	a (Low)				0	°C		
😵 Change					Criteria	a (High)				50	°C		
% Clear log					% C	hange							
					% C	lear log							
													<u> </u>
<									ОК	Appl	у	Cano	> cel

7.2.1. Online diagnostics setting / Confirmation and Clear of results

The following is an explanation using a total stroke as an example.

1) Setting of total stroke criteria

MENU) Diagnostics > Extended diagnostics > Online diag. setup> Total stroke

① Click [Change] in the [Total stroke] menu group.

- Total stroke Criteria	10 %
🏀 Change	
🗫 Clear log	

2 Enter the criteria value in the "Criteria" field and click [Next].

🐵 Change	×
Total stroke setting (1-50)[%] Criteria	10 %
•	Abort

2) Check the results

Diagnostics result can confirm in the [Diagnostics] top menu.

MENU) Diagnostics

① Click [Diagnostics] menu tab from top menu. [Diagnostics] top menu opens.

Extended diagnostics]	
Error/Alarm status		Online diagnostics	
EEPROM error	Good ~	Total stroke	76
Position sensor error	Good	Total direction change	248
Input signal alarm	ОК	Total time	69.1 h
Position alarm	ОК	Low position time	5.5 h
Deviation alarm	ок ∨	Minimum temperature	16 Celsius
Temperature alarm	ок ∨	Maximum temperature	26 Celsius
Error/Alarm history		Low temperature time	0.0 h
EEPROM error	Good	High temperature time	0.0 h
Position sensor error	Good		
Input signal alarm	ОК ∨		

The displayed items are as follows:

[Online diagnostics]			
Total stroke	: Total stroke	Total direction change	: Total direction change
Total time	: Total time	Low position time	: Low position control time
Minimum temperature	: Minimum temperature	Maximum temperature	: Maximum temperature
Low temperature time	: Ambient low temperature time	High temperature time	: Ambient high temperature time

3) Clear Total stroke log

MENU) Diagnostics > Extended diagnostics > Online diag. setup> Total stroke

① Click [Clear log] in the [Total stroke] menu group.

Total stroke	
Criteria	10 %
😵 Change	
🗞 Clear log	

2 Confirm the message and click [Next] to clear the log of total stroke diagnostics results.

🐵 Clear log		Х
	You are about to clear log of total stroke !!	
•	Abort Nex	t

7.2.1.1. All diagnostics log clear

The steps to clear all diagnostic logs are as follows.

MENU) Diagnostics > Extended diagnostics > Online diag. setup> All diag. log clear

① Click [All diag. log clear] in the [Online diag. setup] menu.

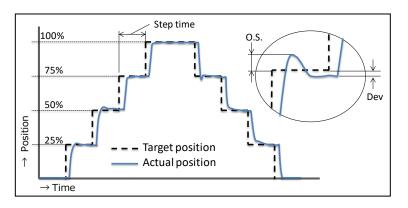
Extended diag	gnostics							-		\times
* To setup and pe	rform diagnostics, 'Co	ontrol mode' should be 'HA	.RT'							^
Authority setup	Online diag. setup	25 percent step response	One step response	S-valve sign	ature Valve signature	Partial stroke test	Alarm setup			
😵 All diag. log	clear									
Total stroke —					Low position time					
Criteria			10 %		Criteria			5.0 %		
😵 Change					😵 Change					
😓 Clear log					😵 Clear log					
Total direction	change				High/Low temperature	e time				
Criteria			10 %		Criteria (Low)			0 °C		
😓 Change					Criteria (High)			50 °C		
😵 Clear log					😵 Change					
					😓 Clear log					
							ОК	Apply	Cano	cel

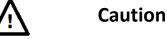
2 Confirm the message and click [Next] to clear all logs of diagnostics results.

🐵 All diag. log claer		×
	You are about to clear all diagnostics logs	
•	Abort Next	

7.3. 25% step response

The 25% step response is executed, and the maximum overshoot (O.S.) and the final deviation (Dev.) are recorded. The degradation over time in step response can be checked by comparing initial values, previous values and present values.





- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- Before performing 25% step response, set "Control mode" to "HART".

MENU) Diagnostics > Extended diagnostics > 25 percent step response

① Click [25 percent step response] menu tab in the [Extended diagnostics] menu. [25 percent step response] menu opens.

🐵 Extended diag	inostics					-		×
* To setup and per	rform diagnostics, 'C	ontrol mode' should be 'HA	ART'					^
Authority setup	Online diag. setup	25 percent step response	One step response	S-valve signature	Valve signature	Partial stroke test	Alarm setup	0
Status			•					
Local operation	mode	HART		~				
Setting								
Step time			60 s					
😓 Change								
Perform								
😒 Start								
So Abort oper	ation							

The steps for setting, executing, displaying the result and saving the 25% step response are shown below.

1) Settings of 25% step response

① Click [Change] in the [Setting] menu group.

Setting	
Step time	60 s
🗫 Change	

② Enter step time value in the "Step time" field and click [Next].

🐵 Change	×
Step time (1-999)[s] Step time	60 s
•	Abort Next

Setting value is as follows:

Step time [s]

: Set a waiting time per 1 step. Initial value: 60sec

2) Execution of 25% step response

① Click [Start] in the [Perform] menu group.

% Click [Abort operation] to cancel operation.

Status		
Mode	HART	~
Setting		
-		
Step time	60 s	
% Change		
Perform		
😒 Start		
% Abort operation		

2 Confirm the message and click [Next].

🐵 Start	×
	You are about to perform 25% step response
•	Abort Next

③ Wait until "Mode" field in the [Status] menu group becomes "HART".

3) Check the results of 25% step response

① Click [Reload test result] in the [Result] menu group.

Result		
	So Reload test result	
	😵 Save as	

2 The execution results are read from the positioner, and the display is updated.

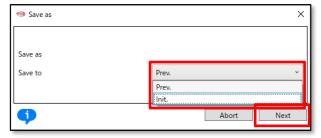
So Reload test result					
Save as					
< Now >		< Prev. >		< Init. >	
O.S. 0-25	0.0 %	O.S. 0-25	0.0 %	O.S. 0-25	
O.S. 25-50	0.0 %	O.S. 25-50	0.0 %	O.S. 25-50	
O.S. 50-75	0.0 %	O.S. 50-75	0.0 %	O.S. 50-75	
O.S. 75-100	0.0 %	O.S. 75-100	0.0 %	O.S. 75-100	
O.S. 100-75	0.0 %	O.S. 100-75	0.0 %	O.S. 100-75	
O.S. 75-50	0.0 %	O.S. 75-50	0.0 %	O.S. 75-50	
O.S. 50-25	0.0 %	O.S. 50-25	0.0 %	O.S. 50-25	
O.S. 25-0	0.0 %	O.S. 25-0	0.0 %	O.S. 25-0	
Dev. 0	0.0 %	Dev. 0	0.0 %	Dev. 0	
Dev. 0-25	0.0 %	Dev. 0-25	0.0 %	Dev. 0-25	
Dev. 25-50	0.0 %	Dev. 25-50	0.0 %	Dev. 25-50	
Dev. 50-75	0.0 %	Dev. 50-75	0.0 %	Dev. 50-75	
Dev. 75-100	0.0 %	Dev. 75-100	0.0 %	Dev. 75-100	
Dev. 100-75	0.0 %	Dev. 100-75	0.0 %	Dev. 100-75	
Dev. 75-50	0.0 %	Dev. 75-50	0.0 %	Dev. 75-50	
Dev. 50-25	0.0 %	Dev. 50-25	0.0 %	Dev. 50-25	
Dev. 25-0	0.0 %	Dev. 25-0	0.0 %	Dev. 25-0	

4) Save the execution results

① Click [Save as] in the [Result] menu group.

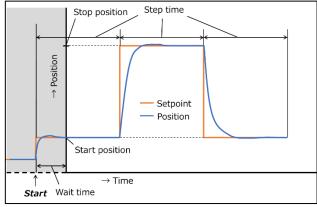
Result		
	🗫 Reload test result	
	😓 Save as	

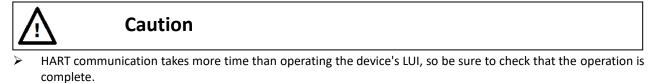
② Select the previous data "Prev" or the initial data "Init" as the data save destination. Click [Next] to save the results.



7.4. One step response

Performs a step response between the specified starting setpoint and ending setpoint and displays it on a graph.





Before performing one step response, set "Control mode" to "HART".

MENU) Diagnostics > Extended diagnostics > One step response

① Click [One step response] tab menu in the [Extended diagnostics] menu. [One step response] menu opens.

	Online diag. setup	25 percent step response	One step response	e S-valve signature	Valve signature	Partial stroke test	Alarm setup
Status Local operation r	node	HART		~			
Setting							
Start setpoint			25 %				
ind setpoint			75 %				
Step time			20 s				
Wait time			0 s				
Sample time			100 ms				
% Change							
😵 Change							

The steps for setting, executing, displaying, and clearing the results of the one step response are shown below.

1) Settings of one step response

① Click [Change] in the [Setting] menu group.

Setting				
Start setpoint	25 %			
End setpoint	75 %			
Step time	20 s			
Wait time	0 s			
Sample time	100 ms			
😓 Change				

2 Ente setting value int the "Start setpoint" field and click [Next].

🐵 Change	×
Start setpoint (0-100)[%] Start setpoint	25 %
()	Abort Next

③ Next, enter the setting values for "End point", "Step time", and "Wait time" and click [Next].

④ Enter the setting value in the "Sample time" field and click [Next].

🐵 Change	×
Sample time (40,100,200,400)[ms] Sample time	100 ms
•	Abort Next

Setting values are as follows:

Start setpoint [%]	: Set a start setpoint. Initial value: 25%
End setpoint [%]	: Set an end setpoint. Initial value: 75%
Step time [s]	: Set a waiting time per 1 step. Initial value: 20sec
Wait time [s]	: Set a waiting time from start to data acquisition. Initial value: Osec
Sample time [ms]	: Se a sampling time. Set the interval for acquiring position data. Initial value: 100msec

Processing ends when Step time x 3 times have elapsed or data for 600 samplings has been acquired.
 Therefore, set the optimal value according to the operating speed of the connected actuator.

If Sample time = 100(msec), 0.1(s) x 600 = 60(s), and the data acquisition time is 60 seconds.

2) Execution of the one step response

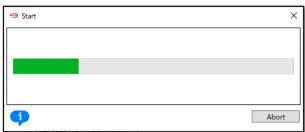
① Click [Start] in the [Perform] menu group.

1	-f
0	o Start
Q	• Abort operation

② Confirm the message and click [Next]. Start one step response.

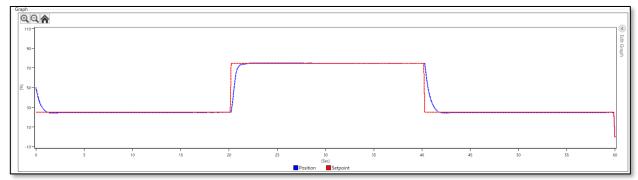


③ Wait until the execution completion message is displayed.
 ※ Click [Abort] to cancel operation.

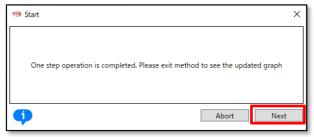


④ Start drawing the graph during execution.

% Depending on the host application, drawing may not start. In that case, wait for the message in 5 to be output.



(5) Confirm massage and click [Next] to complete process.



3) Clear the one step response graph display data

① Click [Clear graph] in the [Graph] menu group and initialize the graph data.

😵 Clear graph

② Graph will be cleared to initial condition.

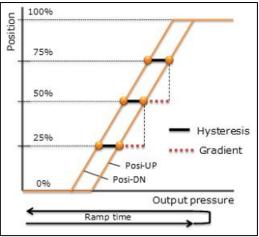
Graph												
110-												🕑 Edit Graph
90-												braph
70- E 50-												
30-												
10-												
0	5	10	15	20	25	30 [Sec] osition Setpoint	35	40	45	50	55	F 60

X As One step response data is not saved, it will be cleared when exit the application.

7.5. Simple valve signature

Output pressure at 25%, 50% and 75% position are measured, and a hysteresis and pressure gradient of control valve are calculated, and it's checked whether the values are in tolerance or not. It'll be a simple version of general valve signature.

The degradation of packing and spring in control valve can be checked by comparing initial values, previous values, and present values.



<u>•</u>

Caution

- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- > Before performing simple valve signature, set "Control mode" to "HART".

MENU) Diagnostics > Extended diagnostics > S-valve signature

① Click the [S-valve signature] menu tab in the [Extended diagnostics] menu. [S-valve signature] menu opens.

Authority setup	Online diag. setup	25 percent step response	One step	o response	S-valve signature	 Valve signature 	Partial stroke test	Alarm setup
Status								
Local operation	n mode	HART			~			
Setting								
Ramp time			60	s				
Hysteresis limit	t		50.0	kPa				
Gradient limit I	н		80.0	kPa				
Gradient limit l	L		20.0	kPa				
😵 Change								
Perform								
Start								
So Abort ope	ration							
Result								
😵 Update te	st result							
• •								

The steps for setting, executing and displaying result to the simple valve signature are shown below.

1) Settings of Simple valve signature

① Click [Change] in the [Setting] menu group.

Setting	
Ramp time	60 s
Hysteresis limit	50.0 kPa
Gradient limit H	80.0 kPa
Gradient limit L	20.0 kPa
😵 Change	

2 Enter the ramp time value in the "Ramp time" field and click [Next].

🐵 Change	×
Barra time (1.000)[4]	
Ramp time (1-999)[s]	
Ramp time	60 s
•	Abort Next

③ From then on, enter the setting values for "Hysteresis limit, Gradient limit H," in the same way.

④ Finally, enter the setting value of gradient limit low value in the "Gradient limit L" field and click [Next].

1999 Change		×
Gradient limit L (0-999)[kPa] Gradient limit L		20.0
•	 Abort	Next

Setting values are as follows:

Demon time [a]	· Cat a time to fully study by more input, Initial values Coase
Ramp time[s]	: Set a time to fully stroke by ramp input. Initial value: 60sec
Hysteresis limit [kPa,bar,psi]	: Set limit of pressure hysteresis. Initial: 50kPa
Gradient limit H [kPa,bar,psi]	: Set upper limit of pressure gradient (pressure difference)
	Initial value: 80kPa
Gradient limit L [kPa,bar,psi]	: Set lower limit of pressure gradient (pressure difference)
	Initial value: 20kPa

2) Execution of Simple valve signature

① Click [Start] in the [Perform] menu group.

0	Deferm-
	🗫 Start
ľ	So Abort operation
l	

2 Confirm the message and click [Next].

🐵 Start		Х
	You are about to perform simple valve signature.	
•	Abort Next	

Wait until "Local operation status" field in the [Status] menu group becomes "HART".
 Click [Abort operation] to cancel operation.

3) Check the result of simple valve signature

① Click [Update test result] in the [Result] menu group.

Result 😵 Update test result	
Display	
Sove as	

2 Click [Display] in the [Result] menu group.

Result	
So Update test result	
Display	
😵 Save as	
	J

③ Execution results are displayed.

Display						- 0	
	< Now >	<hysteresis></hysteresis>					
	P-hysteresis 25%	0 kPa	Judge. result	ОК	~		
	P-hysteresis 50%	0 kPa	Judge. result	ОК	~		
	P-hysteresis 75%	0 kPa	Judge. result	OK			
	1 Hjani Cala Faro	<average></average>	sugeresur	- Ch			
	P-average 25%	0 kPa					
	P-average 50%	0 kPa					
	P-average 75%	0 kPa					
		<gradient></gradient>					
	P-gradient 25-50%	0 kPa	Judge. result	NG	~		
	P-gradient 50-75%	0 kPa	Judge. result	NG	~		
	< Prev. >						
	51164.2	<hysteresis></hysteresis>					
	P-hysteresis 25%	0 kPa	Judge. result	ОК	~		
	P-hysteresis 50%	0 kPa	Judge. result	ОК	~		
	P-hysteresis 75%	0 kPa	Judge. result	ок	~		
		<average></average>					
	P-average 25%	0 kPa					
	P-average 50%	0 kPa					
	P-average 75%	0 kPa					
		<gradient></gradient>					
	D.gradient 25.50%	0 10.	ludes smilt	MG	~		
					OK Apply	Cano	nc

4) Save the execution result

① Click [Save as] in the [Result] menu group.

Result	
So Update test result	
Display	
Save as	

② Select the previous data "Prev" or the initial data "Init" as the data save destination. Click [Next] to save the results.

🐵 Save as	×
Save as	
Save to	Prev. ~
	Prev.
•	Abort Next

7.6. Valve signature

The valve signature shows the relationship between the operating pressure and the valve position when the valve is moved. And it shows the characteristics of a valve and an actuator.

From the data, various events occurring in the valve, such as irregular frictional force, can be found.

Measures the output air pressure at the specified starting and ending valve position and obtains and displays the signature data of the control valve.

Caution
 HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.

MENU) Diagnostics > Extended diagnostics > Valve signature

① Click [Valve signature] menu tab in the [Extended diagnostics] menu. [Valve signature] menu opens.

🐵 Extended diag	gnostics					-		×
* To setup and pe	rform diagnostics, 'C	ontrol mode' should be 'HA	RT'			_		
Authority setup	Online diag. setup	25 percent step response	One step response	S-valve signatur	• Valve signature	Partial stroke test	Alarm setu	р
Status								
Local operatio	n mode	HART		✓ P-c	out1			
Position			50.0 %	P-c	out2			
Setting								
Start position			0 %					
Stop position			100 %					
Ramp time			30 s					
Wait time			10 s					
🎭 Change								
Perform								
Start								
-								
Graph	7						NUL C	
QQ	1						Valve Sign	atu
110-								_

The steps for setting, executing, and displaying the Valve signature are shown below.

1) Settings of Valve signature

① Click [Setting] in the [Setting] menu group.

Setting	
Start position	0 %
Stop position	100 %
Ramp time	30 s
Wait time	10 s
😓 Change	

2 Enter start position in the "Start position field and click [Next].

19 Change		×
Start position (0-100)[%] Start position	0%	
•	Abort	Next

- 3 $% \label{eq:starses}$ From then on, enter the setting values for "Stop position" and "Ramp time" in the same way.
- ④ Finally, enter the wait time value in the "Wait time" field and click [Next].

🐵 Change		Х
Wait time (0-60)[s] Wait time	10 s	
•	Abort	Next

Setting values are as follows:

0	
Start position [%]	: Set the valve position to start ramp operation. Initial value: 0%
Stop position [%]	: Set the valve position to end ramp operation. Initial value: 100%
Ramp time [s]	: Set the ramp time. Initial value: 30sec
Wait time [s]	: Set the wait time. Initial value: 10sec

2) Execution of Valve signature

Executes a Valve signature. The execution steps are as follows:

① Click [Start] in the [Perform] menu group.

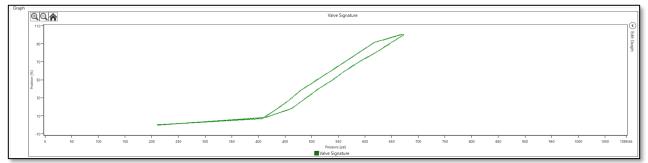
2 Confirm the message and click [Next].

🐵 Start		×
	You are about to perform valve signature	
•	Abort Next	

③ Wait for the following message to display when the execution is complete and click [Next].

🐵 Start	×
	Updating graph data is completed. Please exit method to see the updated graph
•	Abort Next

④ The execution results will be drawn in the [Graph] area.



3) Clear the Valve signature graph display data

① Click [Clear graph] in the [Graph] menu group to initialize the graph data.

😵 Clear graph

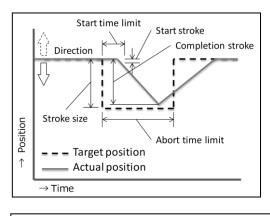
② Graph will be cleared to initial condition.

X As valve signature data is not saved, it will be cleared when exit the application.

7.7. Partial stroke test (PST)

This function is operated the setting position range at the set time interval (Executed online).

Test to move such emergency shutdown valves partially and periodically, and to confirm its safety functions. It's possible to give a partial valve travel change and to check the defective performance of sticking of a valve periodically.





MENU) Diagnostics > Extended diagnostics > Partial stroke test

① Click [Partial stroke test] in the [Extended diagnostics] menu tab. [Partial stroke test] menu opens.

Authority setup	Online diag. setup	25 percent step response	One step	o response	S-valve signature	Valve signatur	Partial stroke test	Alarm setu	ъ
PST status						•		-	
Local operation	mode	HART			\checkmark				
Setting									
PST online enab	ble	Disable			~				
Stroke size			10	%					
Completion stro	oke		9.8	%					
Start stroke			2.0	%					
Abort time limit	t		30	s					
Start time limit			10	s					
Abort pressure			100.0	kPa					
Interval day			1	day(s)					
Direction		- minus			ç				
😵 Change									
Manual PST									
Start PST									

The steps for setting, executing at online, and displaying the result for Partial stroke test are shown below.

1) Settings of the Partial stroke test

① Click [Change] in the [Setting] menu group.

PST online enable	Disable	
Stroke size	10 %	
Completion stroke	9.8 %	
Start stroke	2.0 %	
Abort time limit	30 s	
Start time limit	10 s	
Interval day	1 daj	y(s)
Direction	- minus	
% Change		

Select whether execute PST online or not in the "PST online enable" field and click [Next].
 This setting is ignored when execute offline.

🐵 Change			×
PST online enable PST online enable	Disable		v
•		Abort	Next

③ From then on, enter the setting values for "Stroke size", "Completion stroke", "Start stroke", "Abort time", "Start time limit", "Abort pressure", "Interval day" in the same way.

 $\ensuremath{\overset{\scriptstyle\bullet}{\times}}$ Setting of "Interval day" is ignored when execute online.

④ Finally, select the direction in the "Direction"" field and click [Next].

🐵 Change		×
Stroke direction Direction	- minus	Ţ
i		Abort Next

Setting values are as follows:

8	
Disable / Enable	: Select a periodical execution or not. Initial value Disable
Stroke size [%]	: Set a position width to move. Initial value 10%
Completion stroke [%]	: Set a stroke to judge movement completion. Initial value 9.8%
Start stroke [%]	: Set a stroke to judge movement start. Initial value 2.0%
Abort time limit [s]	: Set a time to judge movement cancellation before
	movement completion. Initial value 30sec
Start time limit [s]	: Set a time to judge movement cancellation before
	movement start. Initial value 10sec
Abort pressure [kPa/psi/bar]	: Set an output pressure 1(Pout1) change to judge movement
	cancellation. Initial value 100.0kPa
Interval day [day(s)]	: Set an interval of periodical execution. Initial value 1day
Direction	: Set a direction to move. Initial value -minus

3) Execution of Partial stroke test

Partial stroke tests can be performed manually offline. The execution method is as follows.

① Click [Start PST] in the [Manual PST] menu group.

ſ	Manual PST	1
	Start PST	
	So Abort operation	

② Confirm the message and click [Next].

🐵 Start PST		×
Ye	ou are about to perform PST manually.	
•	Abort	Next

7.8. Alarm setup

This device has a self-diagnosis function that generates an alarm. Alarm conditions related to valve position[™], deviation, temperature, and pressure can be set arbitrarily. In addition, when a severe failure of memory or sensors is detected, the IP signal is forcibly cut off and the system operates in a fail-safe manner. Additionally, the position transmitter outputs a burnout signal.

The alarm items that can be set are as follows:

Pressure failure	: Pressure sensor failure
Position alarm	: Position alarm
Deviation alarm	: Deviation alarm
Temperature alarm	: Temperature alarm
Low pressure alarm	: Low supply pressure alarm
High pressure alarm	: High supply pressure alarm

MENU) Diagnostics > Extended diagnostics > Alarm setup

① Click [Alarm setup] menu tab in the [Extended diagnostics] menu. [Alarm setup] menu opens.

Extended diagnostics					- 0
Authority setup Online diag. setup	25 percent step response One step response	S-valve signature Valve si	ignature Partial stroke	test Alarm setup	
Pressure failure		Temperature	alarm		
Pressure failure	Enable	 Low alarm 		Disable	
🐤 Change		Threshold (Lo	ow)		-45 °C
NAMUR Pressure failure	Failure	 High alarm 		Disable	
🎭 Change		Threshold (H	igh)		85 °C
Position alarm		😵 Change			
0% side	Disable	V NAMUR Tem	perature alarm	Out of spec.	
Threshold (0%)	-26.0 %	% Change			
100% side	Disable	- Low pressure	alarm		
Threshold (100%)	126.0 %	Low sup-pres	s. alarm	Disable	
😵 Change		Threshold (Lo	(wc		0 kPa
NAMUR Position alarm	Check function	V Change			
😵 Change		NAMUR Low	sup-pres. alarm	Out of spec.	
Deviation alarm		😵 Change			
Deviation alarm	Disable	High pressure	e alarm		
Threshold	99 %	High sup-pre	es. alarm	Disable	
Waiting time	99 s	Threshold (H	igh)		0 kPa
😵 Change		😵 Change			
NAMUR Deviation alarm	Check function	V NAMUR High	n sup-pres. alarm	Out of spec.	
😵 Change		😵 Change			

Displays the current alarm settings and NAMUR status settings.

X See KGP5000 instruction manual for details for each alarm item.

7.8.1. Alarm setup, check status, and clear

The position alarm is shown below as an example.

1) Alarm setup

MENU) Diagnostics > Extended diagnostics > Alarm setup

1 Click [Change] in the [Position alarm] menu group.

nority setup	Online diag. setup	25 percent step respon	nse One step respon	se S-valve signature
Press	ure failure			
Press	ure failure	Ena	ble	~
%	Change			
NAM	IUR Pressure failure	Fail	ure	~
% •	Change			
Positi	ion alarm			
0% si	ide	Dis	able	~
Three	shold (0%)		-26	.0 %
100%	5 side	Dis	able	~
Three	shold (100%)		126	.0 %
80	Change			
	IUR Position alarm	Ch	ck function	

② Select "Disable" or "Enable" in the "Low alarm" field and click [Next]. Here is an example where "Enable" is selected.

% If "Disable" is selected, move to the "High alarm" setting screen in (4).

🐵 Change	×
Low alarm	Disable v Disable Enable
	Abort Next

③ Enter the threshold value of the position to be set as low position alarm in the "Threshold" field and click [Next].

🐵 Change	×
Low alarm (-25.0 to +50.0)[%] Threshold	0.0%
•	Abort Next

④ Select "Disable" or "Enable" in the "High alarm" field and click [Next]. Here is an example where "Enable" is selected.

% If select "Disable", the input values up to this point will be set.



5 Enter the threshold value of the position to be set as high position alarm in the "Threshold" field and click [Next].

🐵 Change	×
High alarm (+50.0 to +125.0)[%] Threshold	100.0 %
•	Abort Next

X The actual alarm is output based on the OR condition of the "Low alarm" setting and "High alarm" setting.

2) Alarm status check

Alarm status can check in the [Process Variables] top menu or [Diagnostics] top menu.

① Click [Diagnostics] menu tab or [Process Variables] menu tab in the TOP menu.

Offline Q	Device Settings	x	Diagnostics (Maintenance 🗴	Online
Extended diagnostics					
Alarm status					
EEPROM failure		Go	od		~
Position sensor failure		Go	od		~
P-sup. sensor failure		Go	od		~
P-out1 sensor failure		Go	od		~
P-out2 sensor failure		Go	od		~
Input signal alarm		Ok	(~
Position alarm		Ok	(~
Deviation alarm		Ok	(~
Temperature alarm		Ok	(~
Low sup-pres. alarm		Ok	(~
High sup-pres. alarm		Ok	(~
PST alarm					
PST stroke alarm		Ok	(~
PST incomplete alarm		Ok	(~
PST pressure alarm		Ok	(~
😵 Alarm clear					

[Alarm status]			
EEPROM failure	: Memory failure	Position sensor failure	: Position sensor failure
P-sup. Sensor failure	: Pressure sensor failure	P-out1 sensor failure	: Output1 pressure sensor failure
P-out2 sensor failure	: Output2 pressure sensor failure		
Input signal alarm	: Input signal alarm	Position alarm	: Position alarm
Deviation alarm	: Deviation alarm	Temperature alarm	: Temperature alarm
Low sup-pres. alarm	: Low supply pressure alarm	High sup-pres. alarm	: High supply pressure alarm
[PST alarm]			
PST stroke alarm	: PST stroke alarm	PST incomplete alarm	: PST incomplete alarm
PST pressure alarm	: PST pressure alarm		

3) Alarm clear

MENU) Diagnostics > Extended diagnostics > Alarm clear

① Select [Diagnostics] menu tab from TOP menu and open [Diagnostics] top menu. Click [Alarm Clear] in the [Diagnostics] top menu. All alarm status is cleared.

PST alarm PST stroke alarm	ОК	~		
PST incomplete alarm	ОК	~		
PST pressure alarm	ОК	~		
🗞 Alarm clear				

7.8.2. NAMUR status assignment

The NAMUR status classification associated with each alarm can be arbitrarily selected.

The position alarm is shown below as an example.

① Click [Change] for NAMUR Position alarm in the [Position alarm] menu group.

Authority setup	Online diag. setup	25 percent step respons	One step response	S-valve signature	V
Press	sure failure				
Pres	sure failure	Enab	e	~	
%	Change				
NAM	IUR Pressure failure	Failu	e	Ŷ	
%	Change				
Posit	ion alarm				
0% s	ide	Disat	le	\checkmark	
Thre	shold (0%)		-26.0	%	
1009	% side	Disab	le	~	
Thre	shold (100%)		126.0	%	
%	Change				
NAM	IUR Position alarm	Chec	k function	Ŷ	
o so	Change				
					-

② Select the type of NAMUR status category to be assigned to the Position alarm and click [Next].

🐵 Change	×
NAMUR status	
Position alarm	Check function v
	Maintenance req.
	Out of spec.
•	Check function

The category of NAMUR status that can be selected are as follows.

Maintenance req.	: Maintenance required
Out of spec.	: Out of specification
Check function	: Check function

8. Offline

It is possible to set the settings of the main unit in advance when HART communication is not connected, and then change the settings all at once after the connection is established (% FDI only).

Data is updated using the following combinations.

- 1) Transfer parameters from device to offline data set
- 2) Update Offline data set
- 3) Transfer offline data set to device

1) Transfer parameters from device to offline data set

When connected to a device, reads parameter data from the device and updates the offline database.

- 1 Click pull down menu.
- 2 Click "Transfer Parameters from Device to Offline Data Set"



③ Read the parameter data from the device and write it to the offline database.

2) Update Offline data set

Updates the offline database of parameter data when the device is not connected. % This operation does not update the positioner data.

MENU) Offline

① Click [Offline] menu tab from TOP menu and open [Offline] menu.

	∮ ¢•	Offline X	2 Device Settings	Diagnostics	Maintenance	Online	Process Variables
--	-------------	-----------	-------------------	-------------	-------------	--------	-------------------

The [Device Settings], [Diagnostics], and [Maintenance] tab menus will open as shown below.

Offline 🗴	Q Device Settings	Diagnostics	Maintenance	Online	Process Variables	Health
Device settings Diagno	ostics Maintenance					
	Authority					
	Authority		HART			*
	Control mode		4-20mA			~
	Basic setup					
	Actuator motion		Linear			~
	Actuator type		Single			~
	Valve action		ATO			*
	Packing friction		Low			~
	Booster option		Disable			~

The following shows how to change and update setting values using "Actuator motion" in the [Device settings] menu as an example.

- ① Click [Device settings] menu tab and open the [Device settings] menu.
- ② Click▼button of the item "Actuator motion" in the [Basic setup] menu group.

X Buttons cannot be selected for items whose settings cannot be changed.

Device settings Diagnostics Main	tenance		
Authority setup		Detail setup	
Authority	HART	 Cutoff/Limit 0% side 	Disable ~
Control mode	4-20mA	 Cutoff/Limit 0% side value 	0.5 %
Basic setup		Cutoff/Limit 100% side	Disable ~
Actuator motion	Linear	Cutoff/Limit 100% side value	99.5 %
Actuator type	Single	 Dead band flag 	Disable \vee
5300 Actuator	Other	 Dead band value 	0.3 %
Valve action	ATO	 Transfer Function 	Linear ~
Packing friction	Low	 Range ability 	1
Booster option	Disable	 Input damper 	Disable \vee
Booster type	Large	 Input damper factor 	0.0
Set point dir.	Normal	 Split range 0% 	4.0 mA
Posi. transmit. dir.	Normal	 Split range 100% 	20.0 mA
		PT humout dir	Low Y

③ Change setting (select "Rotary" here).

Device settings	Diagnostics	Maintenance	
Authority setup			
Authority			HART *
Control mode			4-20mA ~
Basic setup			
Actuator motio	n		Linear v
Actuator type			Linear
			Rotary
5300 Actuator			Other

④ A mark indicating "edited" will be displayed where the settings have been changed.

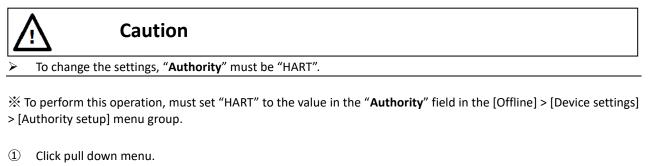
(5) Also, the [Apply] button and [Revert] button at the bottom right become active.

Device settings Diagnostics Maintenance		~
Authority setup		
Authority	HART	¥
Control mode	4-20mA	~
Basic setup		
Actuator motion	Ritary	*
Actuator type	Single	~
5300 Actuator	Other	*
Valve action	ATO	~
Packing friction	Low	~
Booster option	Disable	¥
Booster type	Large	~
Set point dir.	Normal	~
Posi. transmit. dir.	Normal	* V
<		>
	Apply	Revert

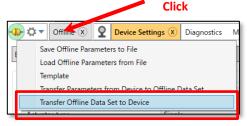
If click the [Apply] button, the edited values will be reflected in the offline database. If click the [Revert] button, the offline database will be restored to the settings before editing. X Does not affect the device settings.

3) Transfer offline data set to device

When connected to a device, sends the offline database parameter data to the device and rewrites the device data.



2 Click "Transfer Offline Data Set to Device".



③ Send all offline database parameter data to the device and rewrite the device data.

9. Online

This is a menu for handheld application devices. $\ddot{\times}$ Each sub-menu can be opened by moving the cursor to the corresponding menu and clicking or double-clicking.

9.1. Menu tree

9.1.1. Root menu

⊿ Online	
Information	
Authority setup	
Setup	
Maintenance	
Diag & Alarms	

Figure 9.1.1 Online root menu

9.1.2. Sub menu

9.1.2.1. Information menu

For details on the menu, See 9.2. Information menu.

4 Online
▲ Information
Monitor
▷ Alarm
▷ PST alarm
▷ Version
D Config. parameter
Doline diagnostics
Authority setup
▷ Setup
Maintenance
▷ Diag & Alarms

Figure 9.1.2a Information menu

9.1.2.2. Authority setup menu

For details on the menu, See 9.3. Authority setup menu.

▲ Online	
Information	
 Authority setup 	
Authority	
Control mode	
▷ Setup	
Maintenance	
▷ Diag & Alarms	

Figure 9.1.2b Authority setup menu

9.1.2.3. Setup menu

For details on the menu, See 9.4. Setup menu.

Online	
Information	
Authority setup	
⊿ Setup	
Basic setup	
Easy tuning	
Expert tuning	
Detail setup	
Custom curve	
Function select	
Maintenance	
Diag & Alarms	

Figure 9.1.2c Setup menu

9.1.2.4. Maintenance menu

For details on the menu, See, 9.5. Maintenance menu.

4 Online	
Information	
Authority setup	
▷ Setup	
Maintenance	
Calibration	
Simulation test	
Service	
HART relation	
Factory setup	
Diag & Alarms	

Figure 9.1.2d Maintenance menu

9.1.2.5. Diag & Alarms menu

For details on the menu, See 9.6. Diag & Alarms menu.

4 Online
▷ Information
Authority setup
▷ Setup
Maintenance
▲ Diag & Alarms
Online diag. setup
▷ PST setup
▷ 25% step response
S-valve signature
Alarm setup

Figure 9.1.2e Diag & Alarms menu

9.2. Information menu

The positioner's control information, alarm status, and diagnostic status can be monitored.

9.2.1. Monitor

The status of the positioner can be monitored.

① Open [Monitor] menu.

 Information 		
Monitor		
Set point	75.0	%
Position	75.0	%
Input	75.0	%
Loop Current	16.003	mA
IP signal	47.4	%
P-sup.	293.26	kPa
P-out1	108.47	kPa
P-out2	144.83	kPa
▲ Status		
Authority	LCD	
Local operation mode	4-20mA	
Control mode	4-20mA	

Displayed items are as follows:

Set point	: Set point	IP signal	: IP signal current
Position	: Valve position	P-sup.	: Supply pressure
Input 🔆	: Percentage of input signal	P-out1	: Output pressure 1
Loop current	: Input signal	P-out2	: Output pressure 2
[Status]			
Authority	: rewrite authority	Local operation mode	: Special control mode
Control mode	: operational authority.		

* When split range is set, the value displayed in "Input" differs from the actual valve opening.

9.2.2. Alarm

Alarm status can be monitored.

① Open [Alarm] menu.

· · ·	
 Information 	
Monitor	
⊿ Alarm	
EEPROM failure	Good
Position sensor failure	Good
P-sup. sensor failure	Good
P-out1 sensor failure	Good
P-out2 sensor failure	Good
Input signal alarm	OK
Position alarm	OK
Deviation alarm	OK
Temperature alarm	OK
Low sup-pres. alarm	OK
High sup-pres. alarm	OK

EEPROM failure	: Memory failure	Position sensor failure	: Position sensor failure
P-sup. sensor failure	: Supply pressure sensor	P-out1 sensor error	: Outpu1 pressure sensor
	failure		failure

P-out2 sensor error	: Outpu2 pressure sensor failure		
Input signal alarm	: Input signal alarm	Position alarm	: Position alarm
Deviation alarm	: Deviation alarm	Temperature alarm	: Temperature alarm
Low-sup-pres. alarm	: Low supply pressure alarm	High sup pres. alarm	: High supply pressure alarm

9.2.3. PST alarm

Execution results of online partial stroke test can be monitored.

① Open [PST alarm] menu.

 Information 	
Monitor	
Alarm	
PST alarm	
PST stroke alarm	OK
PST incomplete alarm	OK
PST pressure alarm	OK

Displayed items are as follows:

PST stroke alarm	: PST stroke alarm	PST incomplete alarm	: PST incomplete alarm
PST pressure alarm	: PST pressure alarm		

9.2.4. Version

The version of the device and corresponding HART standard can be checked.

① Open [Version] menu.

 Information 	
Monitor	
▷ Alarm	
▷ PST alarm	
 Version 	
Serial No.	
Serial No.	00000000
▲ Version	
Electronics	
	1
	0
	0
Software	
	1
	0
	0
HART version	
HART Protocol Revision	7
Device rev	3

[Version]

Serial No.	: Serial number		
Electronics	: Hardware revision	Software	: Software revision
HART Protocol Revision	: HART protocol revision	Device rev	: Field device revision

9.2.5. Config. parameter

Settings of configuration parameter can be checked.

① Open [Config. parameter] menu.

 Information 	
Monitor	
Alarm	
PST alarm	
Version	
4 Config. parameter	
Basic setup	
Easy/Expert tuning	
Detail setup	

9.2.5.1. Basic setup

The basic settings of the positioner can be checked.

① Open [Basic setup] menu.

 Config. parameter 	
4 Basic setup	
Actuator motion	Linear
Actuator type	Single
5300 Actuator	Other
Valve action	ATO
Packing friction	Low
Booster option	Disable
Booster type	Large
Set point dir.	Normal
Posi. transmit. dir.	Normal

Displayed items are as follows:

Actuator motion	: Stem motion type	Actuator type	: Acting type
5300 Actuator	: KOSO high power	Valve action	: Direction of a valve when
	actuator		Pout1 is output
Packing friction	: Packing material	Booster option	: Booster option
			enable/disable
Booster type	: Booster type	Set point dir.	: Setpoint direction
Posi. transmit. dir.	: Position transmitter		
	direction		

9.2.5.2. Easy/Expert tuning

The settings of the easy tuning and expert tuning can be checked.

① Open [Easy/Expert tuning] menu.

 Config. parameter 	
Basic setup	
4 Easy/Expert tuning	
Rank	XS
Custom PID flag	Enable
Response tuning	0 Normal
Detail setup	

Rank	: Rank of the PID	Custom PID flag	: PID custom
	parameter		enable/disable
Response tuning	: Response tuning		

9.2.5.3. Detail setup

The settings of the detailed setup parameters can be checked.

① Open [Detail setup] menu.

 Config. parameter 		
Basic setup		
Easy/Expert tuning		
4 Detail setup		
Cutoff/Limit 0% side	Cutoff	
Cutoff/Limit 0% side value	0.5	%
Cutoff/Limit 100% side	Disable	
Cutoff/Limit 100% side value	99.5	%
Dead band flag	Disable	
Dead band value	0.3	%
Transfer Function	Linear	
Range ability	1	
Input damper	Disable	
Input damper factor	0.0	
Split range 0%	4.0	mA
Split range 100%	20.0	mA
PT burnout dir.	Low	
AT span limit	102	%
Integ. stop pres.	Enable	
Integ. stop pres. value	4.00	kPa

Displayed items are as follows:

Bisplayed iterits are as folio			
Cutoff/Limit 0% side	: Cutoff/Limit 0% side enable/disable	Cutoff/Limit 0% side value	: Cutoff/Limit 0% side value
Cutoff/Limit 100% side	: Cutoff/Limit 100% side enable/disable	Cutoff/Limit 100% side value	: Cutoff/Limit 100% side value
Dead bang flag	: Deadband enable/disable	Dead band value	: Deadband value
Transfer function	: Transfer function	Range ability	: Range ability
Input damper	: Input dumper enable/disable	Input damper factor	: Input damper factor
Split range 0%	: Split range 0% side	Split range 100%	: Split range 100% side
PT burnout dir.	: Burnout direction of the Position transmitter	AT span limit	: Autotune span limit value
Integ. stop pres.	: Integral stop pressure enable/disable	Integ. stop pres. value	: Integral stop pressure threshold value

9.2.6. Online diagnostics

The result of the online diagnostics can be checked.

1 Open [Online diagnostics] menu.

Online		
 Information 		
Monitor		
▷ Error/Alarm		
Error/Alarm history		
▷ PST alarm		
Version		
Config. parameter		
4 Online diagnostics		
Total stroke	77	
Total direction change	250	
Total time	71.8	h
Low position time	5.5	h
Minimum temperature	16	Celsius
Maximum temperature	26	Celsius
Low temperature time	0.0	h
High temperature time	0.0	h

Total stroke	: Total stroke	Total direction change	: Total direction change
Total time	: Total time	Low position time	: Low position control time
Minimum temperature	: Minimum temperature	Maximum temperature	: Maximum temperature
Low temperature time	: Ambient low temperature time	High temperature time	: Ambient high temperature time

9.3. Authority setup menu

This device uses the "**Authority** (write authority)" parameter to change the authority to rewrite settings. To change the positioner settings from HART host controller, change the "**Authority**" parameter to "HART" to remove the write protection.

Furthermore, to control special operations such as automatic adjustment, calibration, simulation, and offline diagnosis separately from input signals from HART host controller, it is necessary to change the "**Control mode** (operation authority)" parameter to "HART".

	Table 9.3 List of selectable functions		
Items	 Set write authority to HART communication. Select HART in case in which settings should be configured via not LUI but HART communication only. Once HART is selected, only 'Information' from 'TOP' menu will be able to be accessed through LUI. ※ If to change the setting back from HART to LUI, please get permission in advance from the person responsible for controlling the device via HART communication. ※ To reset from HART to LCD(LUI), the following special operation must be conducted. When a screen is displayed as shown below, MENU > Information > Monitor > Status Press the up and left arrow keys simultaneously for four (4) seconds. When a "Yes/No" confirmation is displayed, select "Yes". The switching from HART to LCD(LUI) of access authority will be completed. 	Parameter	Default
Control mode	Set operational authority. Select "HART" to execute operations from HART host controller. Select "4-20mA" to execute operations from input signal.	4-20 mA/ HART	4-20 mA

X To change "Authority" to "HART", the LUI (LCD) screen must be in the TOP menu, or Alarm status menu.

① Open [Authority setup] menu.

Authority setup		
Authority		
Control mode		

9.3.1. Authority

1 Open [Authority] menu. To change the current setting, click [Change].

 Authority setting 	
 Authority 	
Authority	HART
Change	Change

9.3.2. Control mode

① Open [Control mode] men. To change the current setting, click [Change].

 Authority setting 	
Authority	
✓ Control mode	
Control mode	4-20m∆
Change	Change

9.4. Setup menu



9.4.1. Basic setup

Select essential parameters necessary for the control of the positioner. X Perform basic setup surely before performing the following setup (easy tuning) in next section.

① Open [Basic setup] menu.

▲ Setup	
▲ Basic setup	
Actuator motion	
Actuator type	
Valve action	
Packing friction	
Booster option	
Set point dir.	
Posi. transmit. dir.	

Setup items are as follows:

Actuator motion	: Stem motion type	Actuator type	: Acting type
Valve action	: Valve direction	Packing friction	: Packing material
Booster option	: Booster option	Set point dir.	: Setpoint direction
Posi. transmit. dir.	: Direction of Position		
	transmitter		

X For details on each item, refer to the KGP5000 instruction manual.

To change the current settings, check the setting values for each item and click [Change].

"Actuator motion" is shown below as an example.

① Open [Actuator motion] menu and check current setting. To change the settings , click [Change].

Actuator motion	
Actuator motion	Linear
Change	Change

② Select "Linear" or "Rotary", and click [Next] to set.

🐵 Change			×
Actuator motion			
Actuator motion	Linear		v
	Linear		
	Rotary		
•		Abort	Next

9.4.2. Easy tuning

Easy tuning is the setup to ensure that the positioner is operated smoothly relative to the actuator on which the positioner is mounted. It is possible to perform easily zero/span adjustments of a control valve, selection of suitable PID parameters, setting of other parameters necessary to control.



Caution

- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- Before performing Full autotune, Position setup, and Auto span, set the "Control mode" to "HART".

Note

Before performing operation of this section, all parameters of basic setup described in 9.4.1. Basic setup must be configured. If wrong parameters were configured, it is possible to choose unsuitable PID parameters.

① Open [Easy tuning] menu.

▲ Setup	
Basic setup	
4 Easy tuning	
Full autotune	
Tuning result	
Response tuning	
Position setup	

9.4.2.1. Full autotune

While performing a sequence of operations, it configures automatically settings such as detection and calibration of zero · span, selection of suitable PID parameters to apply the control, detection and calibration of IP signal current bias.

Note

The configuration time varies with actuator size.

① Open [Full autotune] menu, click [Full autotune] in the menu.

✓ Easy tuning	
 Full autotune 	
Autotune status	No autotune
Autotune result	Completed OK
Full autotune	Full autotune
Abort autotune	Abort autotune

2 Confirm the message and click [Next].

🐵 Full autotune		×
	You are about to start full autotune.	
•	Abort	Next

Wait until "Autotune status" field becomes "Complete autotune".
 % Click [Abort autotune] to cancel full autotune.



X If a problem occurs during the operation, an error message will be displayed in the "Autotune result" field and operation will be stopped. For error details, refer to **Appendix B. Error Messages**.

9.4.2.2. Tuning result

To check the result of full autotune, open the [Tuning result] menu.

① Open [Tuning result] menu, click [Reload tuning result] to update the autotune result.

Full autotune		
🔺 Tuning result		
Reload tuning result	Reload tuning result	
Rank	XS	
Stroke sp. (Air-In)	420	m
Stroke sp. (Air-Out)	580	m
BIAS value	47.3	%
IP signal	47.5	%

Displayed items are as follows:

Rank	: Rank of PID parameters		
Stroke sp. (Air-In)	: Stroke time of Air-In	Stroke sp. (Air-Out)	: Stroke time of Air-out
Bias value	: IP signal bias	IP signal	: IP signal current

9.4.2.3. Response tuning

This operation is used to perform an additional fine adjustment relevant to the control response after performing PID tuning.

① Open [Response tuning] menu. To change setting parameters, click [Change].

Easy tuning	
Autotune status	
Full autotune	
Tuning result	
Response tuning	
Response tuning	0 Normal
Change	<u>Change</u>

9.4.2.4. Position setup

Only zero/span settings can be performed independently, independent of full autotune. There are two different ways of Zero/span settings whether to specify Zero/span manually or to determine these automatically.

① Open [Position setup] menu.

 Easy tuning 	
▷ Full autotune	
Tuning result	
Response tuning	
Position setup	
Manual span	
Auto span	

1) Manual calibration of Zero/span point

Only the zero point and span point of the control valve are set manually.

① Open [Manual span] menu and click [0% position adjust] or [100% position adjust].

▲ Easy tuning	
Autotune status	
Full autotune	
Tuning result	
Response tuning	
 Position setup 	
▲ Manual span	
0% position adjust	0% position adjust
100% position adjust	<u>100% position adjust</u>

2 Select the amount of adjustment per button click in the "Adjust value" field.

Position	10.2	%
Adjust value (0.1-15.0)[%]	0.1%	v
Adjust span 0% point	0.1%	
1) Set adjust value	0.5%	
2) Adjust and Set by buttons below	1.0%	
3) Push OK to set	5.0%	
	10.0%	>
1	15.0% Abot <u>OK(set)</u>	Marra Marra

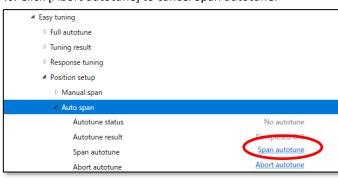
- ③ Click [Move-] or [Move +] and adjust individually the value of each position in 0% and 100% of the valve travel.
- ④ After adjustment, click [OK(set)] to configure the 0% or 100% valve opening position.

🐵 0% position adjust							Х
Position				10.2 9	6		\sim
Adjust value (0.1-15.0)[%]	(0.1%				v	
Adjust span 0% point							
1) Set adjust value							
2) Adjust and Set by buttons below							
3) Push OK to set							\sim
<		_					>
•	Abort		OK(set)	M	ove -	Move	+

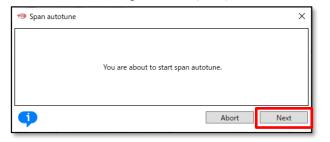
2) Auto calibration of Zero/span point

Only the zero point and span point of the control valve are set automatically.

Open [Auto span] menu and click [Span Autotune].
 % Click [Abort autotune] to cancel Span autotune.



② Confirm the message and click [Next].



③ Wait until "Autotune status" field becomes "Complete autotune".

 Auto span 	
Autotune status	Complete autotune
Autotune result	Completed OK!
Span autotune	Span autotune
Abort autotune	Abort autotune

% If a problem occurs during the operation, an error message will be displayed in the "Autotune result" field and operation will be stopped. For error details, refer to **Appendix B. Error Messages.**

9.4.3. Expert tuning

Use this setting in case in which the desired response has not been achieved through easy tuning. More suitable control parameters are configured according to each actuator by tuning individually parameters necessary to control the response.

HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.

Before performing IP signal current bias (Auto), set "Control mode" to "HART".

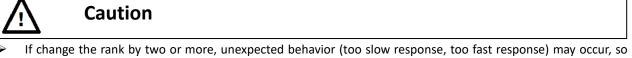
① Open [Expert tuning] menu.

✓ Setup	
Basic setup	
Easy tuning	
Expert tuning	
PID parameter set	
PID custom setup	
Sensitivity setup	

Caution

9.4.3.1. Preset setting for PID parameter

It is possible to select preset values prepared previously as PID parameter sets inside the device.



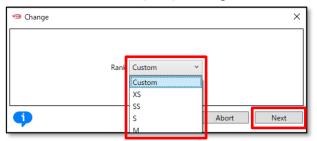
- perform a thorough test operation in advance and confirm that there are no problems.
 In general, lowering the proportional gain takes longer to start moving and delays reaching the target opening.
- In general, lowering the proportional gain takes longer to start moving and delays reaching the target opening. On the other hand, increasing the proportional gain causes instability and hunting.

X Detail for each parameter, see KGP5000 instruction manual.

① Click [Change] in the [PID parameter set] menu.

 Expert tuning 	
4 PID parameter set	
Rank	XS
Change	Change

② Select rank and click [Next] to configure.



9.4.3.2. Custom setting for PID parameter

It is possible to tune individually PID parameters shown as below.



If the rank setting in the [PID parameter set] menu is other than "Custom", cannot change the parameter value using the following steps.

X For details and precautions for each parameter., refer to the KGP5000 instruction manual.

① Open [PID custom setup] menu.

 Expert tuning 	
 PID parameter set 	
Rank	Custom
Change	<u>Change</u>
PID custom setup	
Air-Out/In different PID	
PID parameter Air-In	
PID parameter Air-Out	
Inside threshold	
Inside PID AI	
Inside PID AO	

If change the settings, open each menu and click [Change] in each menu.

9.4.3.3. Setup for IP signal current bias

IP signal current bias is the parameter necessary to determine the control output signal (IP signal) corresponding to an input signal inside the device.

There are two different ways whether to determine IP signal current bias automatically or to specify it manually.

① Open [Sensitivity setup] menu.

Expert tuning	
PID parameter set	
PID custom setup	
A Sensitivity setup	
Auto bias and rank	
Auto bias	
Manual bias	

1) Auto setup for IP signal current bias

1-1) Set IP signal current bias and PID parameters together.

Automatically performs IP signal bias settings and PID parameter selection.

Click [Auto bias and rank] in the [Auto bias and rank] menu.
 Click [Abort autotune] to cancel Auto bias and rank.

 Sensitivity setup 	
Auto bias and rank	
Autotune status	No autotune
Autotune result	Completed OK!
Auto bias and rank	Auto bias and rank
Abort autotune	Abort autotune

2 Confirm the message and click [Next].



③ Wait until "Autotune status" field becomes "Complete autotune".



% If a problem occurs during the operation, an error message will be displayed in the "Autotune result" field and operation will be stopped. For error details, refer to **Appendix B. Error Messages**.

1-2) Set IP signal current bias only.

Only IP signal bias settings are automatically performed.

① Click [Start auto bias] in the [Auto bias] menu.

 Sensitivity setup 	
Auto bias and rank	
Auto bias	
Autotune status	Complete autotune
Autotune result	Complete LOKI
Start auto bias	Start auto bias
Abort autotune	Abort autotune

2 Confirm the message and click [Next].



③ Wait until "Autotune status" field becomes "Complete autotune".



X If a problem occurs during the operation, an error message will be displayed in the "Autotune result" field and operation will be stopped. For error details, refer to **Appendix B. Error Messages**.

2) Manual setup for IP signal current bias

Specify individually IP signal current bias of each position in 25% and 75% of the valve travel.

① Open [Manual bias] menu. To change settings, click [Change].

 Sensitivity setup 	
Auto bias and rank	
Auto bias	
 Manual bias 	
25% position	51.7 %
75% position	49.2 %
Change	<u>Change</u>

9.4.4. Detail setup

Set values which need to be changed to achieve the desired response.

Cutoff/Limit	: Cutoff/Limit
Dead band	: Deviation value below which the integral action is disabled.
Transfer function	: Type of the flow characteristic curve.
Range ability	: Rangeability in relevant to the equal percentage characteristic curve.
Damper setting	: Damping coefficient to the input signal.
Split range	: Split range.
PT burnout dir.	: Burnout direction of position transmitter.
AT span limit	: Full mechanical limit of valve travel over the 100% travel position.
Integ. stop pres.	: Integral stop pressure.

% Refer to the KGP5000 instruction manual for details and precautions for each parameter.

① Open [Detail setup] menu

▲ Setup	
Basic setup	
Easy tuning	
Expert tuning	
Detail setup	
▷ Cutoff or Limit	
Dead band	
▷ Transfer function	
Range ability	
Damper setting	
Split range	
PT burnout dir.	
AT span limit	
▷ Integ. stop pres.	

To change the current settings, check the setting values for each item and click [Change].

9.4.5. Custom curve

Set the flow characteristic curve by specifying arbitrary 19 points.

- X Since the 0% valve travel corresponds to the 0% input and the 100% valve travel corresponds to the 100% input, set points of the intervals between them.
- X Define the relationship in such a way that the valve travel monotonically increases as the input increases.

1	Open	[Custom	curvel	menu.
9	open	Leaston	curvej	mena.

✓ Setup	
Basic setup	
Easy tuning	
Expert tuning	
Detail setup	
4 Custom curve	
Change custom curve	Change custom curve
Custom curve	

To enter the setting value, click [Change custom curve] and enter the setting value.

9.4.6. Function select

The following functions can be set individually.

Password setup	: Password setup	
Screen saver	: Screen saver	
Temperature unit	: Temperature unit	
Pressure unit	: Pressure unit	
LCD display mode	: LCD display mode of valve position	
···		

X See KGP5000 instruction manual for details and precautions for each parameter.

① Open [Function select] menu.

▲ Setup	
Basic setup	
Easy tuning	
Expert tuning	
Detail setup	
Custom curve	
Function select	
Password setup	
Screen saver	
Temperature unit	
Pressure unit	
LCD display mode	

To check the setting values, open each menu. To change the current settings, click [Change] in each menu group.

※ For password settings, see **Appendix D. Password setup**.

9.5. Maintenance menu

This menu offers maintenance, adjustment, and HART-related settings for the positioner.

	Caution	
> To a	change the settings, "Authority" must be "HAR	RT".
Menu ite	ems are as follows:	

Calibration	: Calibration
Simulation test	: Simulation test
Service	: Service
HART relation	: HART relation
Factory setup 💥	: Factory setup

% This menu is displayed only when the "Factory setup" field is "ON" in the [Maintenance] > [Service] > [Factory menu].

① Open [Maintenance] menu.

Maintenance	
Calibration	
Simulation test	
Service	
HART relation	

9.5.1. Calibration

Since the operation described in this section is preset from the factory, generally, it is not necessary to repeat this. However, since there is a case in which a deviation is produced from long-term operation and so on, if necessary, perform this operation.

A Caution

- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- Before performing calibration, set "**Control mode**" to "HART".

Menu items are as follows:

Input signal cal.	: Input signal calibration
Cross point cal.	: Cross point calibration
Position transmit. cal.	: Position transmitter calibration
Pressure sensor. cal.	: Pressure sensor calibration

① Open [Calibration] menu.

 Maintenance 	
Calibration	
Input signal cal.	
Cross point cal.	
Position transmit. cal.	
Pressure sensor cal.	

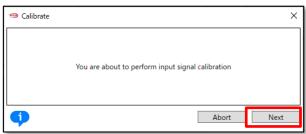
9.5.1.1. Input signal calibration

Calibrate the value of input signal which the positioner can receive.

① Open [Input signal cal.] menu and click [Calibrate].



2 Confirm the message and click [Next].



③ Set the input signal to 4mA and click [Next].

🐵 Calibrate			×
	Set input signal 4.0mA		
•		Abort	Next

④ Set the input signal to 20mA and click [Next].

🐵 Calibrate			×
	Set input signal 20.0mA		
•		Abort	Next

5 Calibration is complete when the message "Input signal calibration is completed" is displayed.

9.5.1.2. Cross point calibration

Calibrate the position which of the feedback lever becomes in the horizontal position. It is necessary to perform it to precisely control the travel position. When a feedback lever isn't installed horizontally in the 50% position, this calibration will be required.

The steps are shown below.

① Open [Cross point cal.] menu and click [Calibrate].

 Calibration 	
Input signal cal.	
Cross point cal.	
Calibrate	Calibrate

2 Confirm the message and click [Next].

🐵 Calibrate		×
	You are about to perform cross point calibration	
•	Abort Next	

③ Select the amount of adjustment with one button click in the "Adjust value" field.

Adjust value (0.1-15.0)[%]	0.1%	
Adjust cross point	0.1%	
1) Set adjust value	0.2%	Ш
2) Adjust and Set by buttons below	0.5%	Ш
3) Abort : Abort calibration	1.0%	Ш
	5.0%	

④ Click [Up(+)] or [Down(-)] to make the feedback lever horizontal.

(5) When reach the horizontal position, click [Ok(set)] to complete the crosspoint calibration.

Position adjust				×
Adjust value (0.1-15.0)[%]	0.1%	5		~
Adjust cross point				
1) Set adjust value				
2) Adjust and Set by buttons below				
3) Abort : Abort calibration				~
<				>
•	Abort	OK(set)	Down(-)	Up(+)

9.5.1.3. Position transmitter calibration

Calibrate the position transmitter signal which the positioner may send. The steps to calibrate the position transmitter signal of both position 0% and 100% is shown below.

① Open [Position transmit. cal.] menu and click [Calibrate].

 Calibration 	
Input signal cal.	
Cross point cal.	
 Position transmit. cal. 	
Calibrate	Calibrate

② Confirm the message and click [Next].

🐵 Calibrate		×
	You are about to perform position transmitter calibration	
()	Abort	Next

First, execute calibration on the 0% side.

③ Select the amount of adjustment with one button click in the "Adjust value" field.

<0% side>		
Adjust value (1-255)[dec]	1	~
Adjust position transmitter output	1	
1) Set adjust value	2	
2) Adjust and Set by buttons below	5	
3) Abort : Abort calibration	10	
	100	

④ Click [Up(+)] or [Down(-)] to adjust position transmitter signal. After completing the adjustment, click [OK(set)] to configure.

1990 0% side		Х
<0% side>		^
Adjust value (1-255)[dec]	1 ~	
Adjust position transmitter output		
1) Set adjust value		
2) Adjust and Set by buttons below		
3) Abort : Abort calibration		
<	>	
•	Abort OK(set) Down(-) Up(+)	

Next, execute calibration on the 100% side.

(5) Select the amount of adjustment with one button click in the "Adjust value" field.

🐵 100% side		\times
<100% side>		\sim
Adjust value (1-255)[dec]	1 ~	
Adjust position transmitter output	1	
1) Set adjust value	2	
2) Adjust and Set by buttons below	5	
3) Abort : Abort calibration	10	\sim
<	100	
•	255 Abort OK(set) Down(-) Up(+))

6 Click [Up(+)] or [Down(-)] to adjust position transmitter signal. After completing the adjustment, click [OK(set)] to complete calibration.

🧐 100% side				>	K
<100% side> Adjust value (1-255)[dec]	1				~
Adjust value (1 25) (dec) Adjust position transmitter output 1) Set adjust value 2) Adjust and Set by buttons below 3) Abort : Abort calibration					~
<					
•	Abort	OK(set)	Down(-)	Up(+)	

9.5.1.4. Pressure sensor calibration

Calibrate three pressure sensors attached in the positioner. It is necessary to connect the positioner to a pressure measuring device of gauge pressure type which is used for pressure reference. It is required to calibrate both first order pressure (1st-P) and the second order pressure (2nd-P) for each sensor.

The steps to calibrate the supply pressure sensor is showed as below.

① Open [Pressure sensor cal.] menu and click [Calibrate].

 Calibration 	
Input signal cal.	
Cross point cal.	
Position transmit. cal.	
4 Pressure sensor cal.	
Calibrate	<u>Calibrate</u>

② Confirm the message and click [Next].

🐵 Pressure sen	isor cal.	Х
	You are about to perform pressure sensor calibration	
•	Abort Next	t –

③ Select "Sup. press." In the "Pressure sensor" field and Click [Next].

Pressure sensor cal.	×
Select pressure sensor	
Pressure sensor	Sup. press. 👻
	Sup. press.
	Out1 press.
6	Out2 press.
•	

④ Stop pressure supply, enter pressure value in the "Pressure value" field and Click [Next].

Pressure sensor cal.		×
Enter pressure value for lower side (0-999)[kPa] Pressure value		Ō
•	Abort Nex	t

(5) Resume pressure supply, enter pressure value in the "Pressure value" field and Click [Next] to complete calibration.

1 Pressure sensor cal.	×
Enter pressure value for upper side(0-999) Pressure value	[kPa]
•	Abort Next

9.5.2. Simulation test

It is possible to generate input signal, IP signal current and position transmitter output in similar manner with the desired control.

Caution

- Simulation test is the function which enables the positioner to be operated regardless of the signal from a higherlevel control system connected with the positioner. Prior to operating this function, make sure that the simulation will not affect the process.
- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- Before performing simulation test, set "Control mode" to "HART".

Menu items are as follows:

Input signal	: Input signal simulation
IP signal	: IP signal current simulation
Position transmitter	: Position transmitter simulation

① Open [Simulation test] menu.

🔺 Simu	ulation test
⊳N	Vanual setpoint
Þ	P signal
ÞF	Position transmitter

9.5.2.1. Manual setpoint simulation

It is possible to operate the control valve by pseudo input signal.

① Open [Manual setpoint] menu and click [Manual setpoint].

 Simulation test 		
4 Manual setpoint		
Set point	50.0 %	
Position	50.0 %	
Manual setpoint	Manual setpoint	

2 Enter setpoint value in the "Manual setpoint" field and click [Next]. Perform simulate manual setpoint and return menu of ①.

🐵 Manual setpoint	×
Set value to move (0.0-100.0)[%] Manual setpoint	50.0 %
•	Abort Next

9.5.2.2. IP signal simulation

It is possible to move the control valve by providing the IP signal directly to the torque motor unit.

① Open [IP signal] menu and click [Simulate].

 Simulation test 	
Manual setpoint	
▲ IP signal	
Simulate	Simulate

② Select whether or not to adjust temperature. In general, select "Yes" and click [Next].

🐵 Simulate			×
	Do you want temperature correction?	Yes v	
•		Abort	Next

③ Enter the IP signal values in the "IP signal value" field and click [Next]. Perform simulation.

④ To return to the normal control, click [Abort].

🐵 Simulate	×
IP signal simulation (0-100)[%] IP signal value	0 %
•	Abort Next

9.5.2.3. Position transmitter simulation

It is possible to output the position transmitter signal with a pseudo-set position transmitter value.

① Open [Position transmitter] menu and click [Simulate].



2 Enter position transmitter value in the "Position transmit adj." field and click [Next]. Perform simulation.

Any position transmitter value from 0-100% can be output. If set 100.1%, positioner outputs NAMUR Burnout High signal. If set 100.2%, positioner outputs NAMUR Burnout Low signal.

③ To return to the normal output, click [Abort].

🐵 Simulate	×
Position transmit. sim. (0-100, 100 Position transmit. adj.	.1:NAMUR High, 100.2:NAMUR Low)[%]
•	Abort Next

9.5.3. Service

The operator can identify the current internal control variables as follows.

Angle	: Angle of potentiometer	
Stroke angle	: Stroke angle	
Raw AD values	: Raw AD values	
Time stamp	: Firmware time stamp	
PID values	: PID parameter values	
Factory menu	actory menu : Factory menu On/Off	

① Open [Service] menu.

▲ Maintenance	
Calibration	
Simulation test	
▲ Service	
Angle	
Stroke angle	
Raw AD values	
Time stamp	
PID values	
Factory menu	

Display items are as follows:

Angle]			
Angle	: Angle of potentiometer		
Stroke angle] 🔆	·		
Span setting stroke 0	: Angle value at 0% span	Cross point	: Angle of cross point
Span setting stroke 100	: Angle value at 100% span		
X Click [Update] to obtair	n the latest information.		
Raw AD Values]			
Input(4-20mA)	: AD value of Input signal	Position(Sin)	: AD value of valve
			position(sin)
Position(Cos)	: AD value of valve	Air P1	: AD value of pressure
	position(cos)		sensor 1
Air P2	: AD value of pressure	Air P3	: AD value of pressure
	sensor 2		sensor 3
Temperature	: AD value of temperature	Position transmit. PWM	: PWM value of position
			transmitter
IP signal PWM	: PWM value of IP signal		
	current		
Time stamp]			
Date	: Firmware time stamp	Time	: Firmware time stamp
	- Date		- Time
PID values]			
Set point	: Set point	Position	: Valve position
р	: Proportional gain	i	: Integral coefficient
d	: Differential gain		

9.5.3.1. Switching of Factory setup menu

Enable/Disable the [Factory setup] menu.



Caution

- Since the suitable parameters are configured at the factory, in general, do not perform switching of factory setup and the reconfiguration on its menu. The reconfiguration of the values causes the case that the desired response may not be achieved.
- Click [Change] in the [Factory setup] menu group.
 ※ By default, the Factory menu is not displayed.

Factory menu	
	ON
Change	<u>Change</u>

2 If switch Factory menu "ON", [Factory setup] menu is added in the [Maintenance] menu.

-	Maintenance	
	Calibration	
	Simulation test	
	Service	
	HART relation	
	▷ Factory setup	

9.5.4. HART relation

Display and configure information related to HART communication.

HART device information	: HART device information	
HART Find device	: Find device	
HART Squawk	: Squawk	
Dynamic var. assign	: Assignment of Dynamic Variables	
Reboot	: Reboot	

① Open [HART relation] menu.

▲ Maintenance	٦
D Calibration	
Simulation test	
Service	
4 HART relation	
HART device information	
HART Find device	
HART Squawk	
Dynamic var. assign	
> Reboot	

9.5.4.1. HART device information

- ① Open [HART device information] menu ※.
- % Click [Update device information] to get the latest information.

 HART relation 		
HART device information		
Update device information	Update device information	
Manufacturer	KOSO	
Device Type	KGP5000	
Device Identifier	0	
Tag	????????	
Change Tag	<u>Change Tag</u>	
Long Tag	777777777777777777777777777777777777777	
Change Long tag	Change Long tag	
Descriptor	???????????????????????????????????????	
Change Descriptor	Change Descriptor	
Date	2015/01/06	
Change Date	Change Date	
Message	777777777777777777777777777777777777777	
Change Message	Change Message	
Final Assembly Number	0	
Change Final assembly num.	Change Final assembly num.	

[HART device information	1]		
Manufacture 💥	: Manufacture	Device Type 💥	: Model
Device Identifier 💥	: Device Identifier	Тад	: Tag number
Long Tag	: Long tag number	Descriptor	: Descriptor
Date	: Date	Message	: Message
Final Assembly Number	: Final Assembly Number		

* This is read-only and cannot be changed.

1) How to change HART device information

Display items are as follows:

The following explains how to change "Tag" as an example.

"Long Tag", "Descriptor", "Date", "Message", and "Final Assembly Number" can also be changed in the same way.

① Click [Change] in the [HART device information] menu.



2 Enter any 8-digit alphanumeric character or symbol and click [Next]

🐵 Change Tag	×
Tag Tag	27777777
•	Abort Next

9.5.4.2. HART Find device

Confirm whether the positioner replies or not to the Find Device command sent from a HART communication tool is done.

X To respond to Find device, the positioner's "Maintenance > HART relation > Find device" setting must be "Armed".

% If the device cannot be found, communication may have been interrupted.

① Click [Find device] in the [HART Find device] menu.

 HART relation 	
HART device information	
4 HART Find device	
Find device	Find device

9.5.4.3. HART Squawk

When receiving the Squawk command from a HART communication tool, "Squawk ON !!" or "Squawk ONCE ON" is indicated(blinked) on a LCD screen of this device.

<u>X</u> To display Squawk, the LCD screen must be at the top menu or the "Maintenance > HART relation > Squawk" menu.

① Click [Squawk] in the [HART Squawk] menu.

 HART relation 	
HART device information	
HART Find device	
HART Squawk	
Squawk	Squawk

- 2 To change "Number of Squawks", select "Change Number Squawks" and click [Next]. Enter the number.
- ③ To execute Squawk, select "Squawk" and click [Next], perform Squawk.
- ④ To exit [Squawk] menu, select "Exit" and click [Next].

🐵 Squawk		×
Squawks = 5, begin squawking	Change Number of Squawks V	
	Change Number of Squawks	
	Squawk	
	Exit Next	
•	Abort Next	

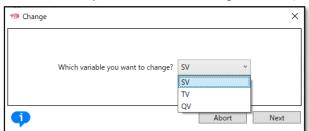
9.5.4.4. Dynamic Variables assignment

Among dynamic variables, Secondary Variable (SV), Tertiary Variable (TV), and Quaternary Variable (QV) can be assigned to another variable.

① Open [Dynamic var. assign] menu.

▲ HART relation	
HART device information	
HART Find device	
HART Squawk	
 A Dynamic var. assign 	
Primary Variable	Input
Secondary Variable	Position
Tertiary Variable	IP signal
Quaternary Variable	Pot angle
Change	Change

② Select the Dynamic Variables to change and click [Next].



③ Select variables to assign and click [Next].

🐵 Change	×
SV =	
Secondary Variable	Position Y
	Input
	Position
1	IP signal
	Pot. angle

Input	: Percentage of Input signal
Position	: Valve position
IP signal	: IP signal current
Pot. angle	: Angle of potentiometer
Temperature	: Temperature
Sup. press.	: Supply pressure
Out1 press.	: Output pressure 1
Out2 press.	: Output pressure 2
Set point	: Set point

The variables that can be set are as follows:

9.5.4.5. Reboot

This is a function to restart the device(positioner).



After reboot, the device will shut down for a few seconds. Communication may be interrupted.

To reboot the device, do the following:

① Click [Reboot] in the [Reboot] menu.

 HART relation 	
HART device information	
HART Find device	
HART Squawk	
Dynamic var. assign	
A Reboot	
Reboot	Reboot

2 A confirmation message will be displayed twice, so click [Next] if execute it.

9.5.5. Factory setup



Since the suitable parameters are configured at the factory, in general, do not perform switching of factory setup and the reconfiguration on its menu. The reconfiguration of the values causes the case that the desired response may not be achieved.

% The menu is displayed only when the "Factory setup" field is "ON" in the [Maintenance] > [Service] > [Factory menu].

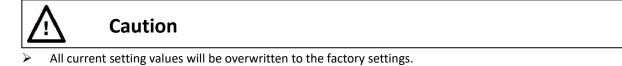
The items that can be set are as follows:

IP signal range	: IP signal range
IP signal factor	: IP signal factor
Cutoff IP signal	: Cutoff IP signal
Restore factory default	: Restore factory default setting
Virtual DIP SW	: Setting of Virtual DIP SW
× For datails on each item .co.	KCDE000 instruction menual

※ For details on each item, see KGP5000 instruction manual.

9.5.5.1. Restore factory default

Return to factory default settings.



① Click [Restore] in the [Restore factory default] menu.

 Factory setup 	
IP signal range	
IP signal factor	
D Cutoff IP signal	
Restore factory default	
Restore	Restore

- 2 A confirmation message will be output twice, so click [Next] if execute.
- ③ Read the factory default settings and overwrite the current settings.

9.6. Diag & Alarms menu

This positioner is equipped with the on-line diagnostics which acquires and estimates data during plant operation and the offline diagnostics performed in maintenance. Through appropriate diagnostic settings based on an operating condition of the installation environment and a process, it's possible to do efficient prevention and forecast preservation.

Caution To change the settings, "Authority" must be "HART".

① Open [Diag & Alarm] menu.

▲ Diag & Alarms
Online diag. setup
▷ PST setup
▷ 25% step response
S-valve signature
Alarm setup

Menu items are as follows:

Online diag. setup	: Online diagnostics setup
PST setup	: Partial stroke test setup
25% step response	: 25% step response
S-valve signature	: Simple valve signature
Alarm setup	: Alarm setup

9.6.1. Online diag. setup

Configure settings related to online diagnosis. Setup items are as follows:

Setup items are as follows:		
Total stroke	: A threshold of the position change to accumulate is set.	
Total direction change	: A change width to judge direction change is set.	
Low position time	: A position to judge low position is set.	
High/Low temperature time	: A temperature to judge high/low temperature is set.	
Partial stroke ※1	: Partial stroke	

%1 For settings related to Partial stroke test, see 9.6.2 PST setup.

※ For details on each item, see KGP5000 instruction manual.

① Open [Online diag. setup] menu.

✓ Diag & Alarms	
 A Online diag. setup 	
All diag. log claer	All diag. log claer
D Total stroke	
Total direction change	
Low position time	
High/Low temperature time	

9.6.1.1. Online diagnostics setting / Confirmation and Clear of results

The following is an explanation using a total stroke as an example.

1) Settings of total stroke criteria

① Open [Total stroke] menu and click [Change].



2 Enter the criteria value in the "Criteria" field and click [Next].

🐵 Change	×
Total stroke setting (1-50)[%] Criteria	10 %
•	Abort Next

2) Check the results

Diagnostics result can confirm in the [Information] > [Online diagnostics] menu. See 9.2.6. Online diagnostics for how to check.

3) Clear Total stroke log

① Open [Total stroke] menu and click [Clear log].



② Confirm the message and click [Next] to clear the log of total stroke diagnostics results.



9.6.1.2. Clear all diagnostics logs

The steps to clear all diagnostic logs are as follows.

① Click [All diag. log clear] int the [Online diag. setup] menu.



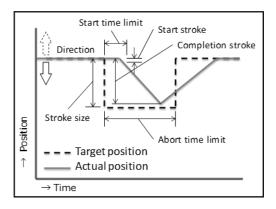
2 Confirm the message and click [Next] to clear all logs of diagnostics results.

🐵 All diag. log claer		×
	You are about to clear all diagnostics logs	
(Abort Next	

9.6.2. PST setup

This function is operated the setting position range at the set time interval (Executed Online).

Test to move such emergency shutdown valves partially and periodically, and to confirm its safety functions. It's possible to give a partial valve travel change and to check the defective performance of sticking of a valve periodically.





Before manually running the partial stroke test, set "Control mode" to "HART".

① Open [PST setup] menu.

▲ Diag & Alarms		
Online diag. setup		
▲ PST setup		
PST online enable	Disable	
Stroke size	10	%
Completion stroke	9.8	%
Start stroke	2.0	%
Abort time limit	30	s
Start time limit	10	s
Abort pressure	100.0	kPa
Interval day	1	day(s)
Direction	- minus	
PST status	Waiting(Stop)	
Change	<u>Change</u>	
Start PST	Start PST	
Abort operation	Abort operation	

9.6.2.1. PST online diagnostic settings and results

1) Settings of the PST online

① Click [Change] in the [PST setup] menu.

▲ Diag & Alarms		
Online diag. setup		
▲ PST setup		
PST online enable	Disable	
Stroke size	10	%
Completion stroke	9.8	%
Start stroke	2.0	%
Abort time limit	30	s
Start time limit	10	s
Abort pressure	100.0	kPa
Interval day	1	day(s)
Direction	- minus	
PST status	Waiting(Stop)	
Change	<u>Change</u>	>
Start PST	Start PST	
Abort operation	Abort operation	

Setting values are as follows:

Disable / Enable	: Select a periodical execution or not. Initial value Disable
Stroke size [%]	: Set a position width to move. Initial value 10%
Completion stroke [%]	: Set a stroke to judge movement completion. Initial value 9.8%
Start stroke [%]	: Set a stroke to judge movement start. Initial value 2.0%
Abort time limit [s]	: Set a time to judge movement cancellation before movement
	completion. Initial value 30sec
Start time limit [s]	: Set a time to judge movement cancellation before movement
	start. Initial value 10sec
Abort pressure [kPa/psi/bar]	: Set a output pressure 1(Pout1) change to judge movement
	cancellation. Initial value 100.0kPa
Interval day [day(s)]	: Set an interval of periodical execution. Initial value 1day
Direction	: Set a direction to move. Initial value -minus

2) Check the PST online result

The results of the PST diagnostics can be checked at the "[Information] > [PST alarm]" menu. See 9.2.3. PST alarm for how to check.

9.6.2.2. Execution of PST offline

PST can be performed manually offline. The execution method is as follows.

① Click [Start PST] in the [PST setup] menu.

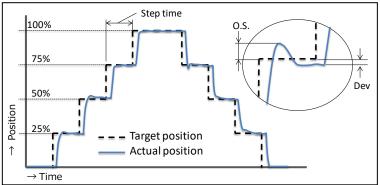
PST status	Waiting(Stop)
Change	Change
Start PST	Start PST
Abort operation	Abort operation

2 Confirm the message and click [Next].

Start PST		×
	You are about to perform PST manually.	
•	Abort Next	

9.6.3. 25% step response

The 25% step response is executed, and the maximum overshoot (O.S.) and the final deviation (Dev.) are recorded. The degradation over time in step response can be checked by comparing initial values, previous values, and present values.





Caution

- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- Before performing 25% step response, set "Control mode" to "HART".
- ① Open [25% step response] menu.

25% step response	
Setting	
Perform	
▷ Result	

9.6.3.1. Settings of 25% step response

① Click [Change] in the [Setting] menu.

25% step response	
 Setting 	
Step time	60 s
Change	Change

2 Enter step time value in the "Step time" field and click [Next].

199 Change	×
Step time (1-999)[s] Step time	60 s
•	Abort Next

Setting value is as follows:

Step time [s]

: Set a waiting time per 1 step. Initial value: 60 sec

9.6.3.2. Execution of 25% step response

Executes a 25% step response. The execution steps are as follows:

- ① Click [Start] in the [Perform] menu.
 - X Click [Abort autotune] to cancel operation.

▲ 25% step response	
b Setting	
▲ Perform	
Local operation mode	HART
Start	Start
Abort operation	Abort operation

② Confirm the message and click [Next].

🧐 Start	×
You are about to perform 25% step response	
Abort N	ext

③ Wait until "Local operation status" field becomes "HART".

9.6.3.3. Check and save the results of 25% step response

1) Check the results

① Click [Reload test result] in the [Result] menu to read execution results from the positioner and calculates the results.

▲ 25% step response	
Setting	
▷ Perform	
⊿ Result	
Reload test result	Reload test result
Save as	Save as
▷ < Now >	
▷ < Prev. >	
▷ < Init. >	

② Click "< Now >" to check the current execution results.

4	25% step response		
	Setting		
	Perform		
	▲ Result		
	Reload test result	Reload test result	
	Save as	Save as	
	∡ < Now >		
	O.S. 0-25	0.5	%
	O.S. 25-50	0.2	%
	O.S. 50-75	0.3	%
	O.S. 75-100	0.3	%
	O.S. 100-75	-0.6	%
	O.S. 75-50	-0.4	%
	O.S. 50-25	-0.4	%
	O.S. 25-0	0.0	%
	Dev. 0	0.0	%
	Dev. 0-25	0.0	%
	Dev. 25-50	0.0	%
	Dev. 50-75	0.0	%
	Dev. 75-100	0.0	%
	Dev. 100-75	0.0	%
	Dev. 75-50	0.0	%
	Dev. 50-25	0.0	%
	Dev. 25-0	0.0	%

2) Save the results

① Click [Save as] in the [Result] menu

▲ 25% step response	
▷ Setting	
▷ Perform	
▲ Result	
Reload test result	Reload test result
Save as	Save.as
▷ < Now >	
Prev. >	
▷ < Init. >	

② Select the previous data "Prev" or the initial data "Init" as the data save destination. Click [Next] to save the results.

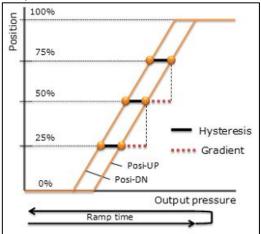
🐵 Save as		×
Save as		
Save to	Prev.	v
	Prev.	
•		Abort Next

9.6.4. S-valve signature

Output pressure at 25%, 50% and 75% position are measured, and a hysteresis and pressure gradient of control valve are calculated, and it's checked whether the values are in tolerance or not.

It'll be a simple version of general valve signature.

The degradation of packing and spring in control valve can be checked by comparing initial values, previous values, and present values.





Caution

- HART communication takes more time than operating the device's LUI, so be sure to check that the operation is complete.
- Before performing simple valve signature, set "Control mode" to "HART".

MENU) Diagnostics > Extended diagnostics > S-valve signature

① Click the [S-valve signature] menu.

Diag & Alarms	
Online diag. setup	
PST setup	
25% step response	
4 S-valve signature	
Setting	
Perform	
▷ Result	

9.6.4.1. Setting of S-valve signature

① Click [Change] in the [Setting] menu.

▲ Setting		
Ramp time	60	s
Hysteresis limit	50.0	kPa
Gradient limit H	80.0	kPa
Gradient limit L	20.0	kPa
Change	Change)

Setting values are as follows:

Ramp time[s]	: Set a time to fully stroke by ramp input. Initial value: 60sec
Hysteresis limit [kPa,bar,psi]	: Set limit of pressure hysteresis. Initial: 50kPa

Gradient limit H [kPa,bar,psi]	: Set upper limit of pressure gradient (pressure difference) Initial value: 80kPa	
Gradient limit L [kPa,bar,psi] : Set lower limit of pressure gradient (pressure difference) Initial value: 20kPa		

9.6.4.2. Execution of S-valve signature

The execution steps are as follows.

① Click [Start] in the [Perform] menu.

4 Perform	
Local operation mode	HART
Start	Start
Abort operation	Abort operation

2 Confirm the message and click [Next].

🐵 Start	×
	You are about to perform simple valve signature.
•	Abort Next

Wait until "Local operation status" field becomes "HART".
 % Click [Abort operation] to cancel operation.

9.6.4.3. Check and save the result of S-valve signature

1) Check the results

Check the execution results of S-valve signature using the following steps.

① Click [Update test result] in the [Result].

⊿ Result	
Update test result	Update test result
Display	
Save as	Save as

2 Click [Display] in the [Result] menu.



③ Click "< Now >" to check the current execution results.

▲ Display	
▷ < Now >	
Prev. >	
▷ < Init. >	

2) Save the results

Save the execution results of S-valve signature using the following steps.

① Click [Save as] in the [Result] menu.



② Select the previous data "Prev" or the initial data "Init" as the data save destination. Click [Next] to save the results.

🐵 Save as			×
Save as			
Save to	Prev.		v
	Prev.		
	Init.		
•		Abort	Next

9.6.5. Alarm setup

This positioner has a self-diagnosis function that generates an alarm. Alarm conditions related to valve position, deviation, temperature, and pressure can be set arbitrarily. In addition, when a severe failure of memory or sensors is detected, the IP signal is forcibly cut off and the system operates in a fail-safe manner. Additionally, the position transmitter outputs a burnout signal.

The alarm items that can be set are as follows:

Pressure failure	: Pressure sensor failure
Position alarm	: Position alarm
Deviation alarm	: Deviation alarm
Temperature alarm	: Temperature alarm
Low pressure alarm	: Low supply pressure alarm
High pressure alarm	: High supply pressure alarm

X See KGP5000 instruction manual for details for each alarm item.

① Open [Alarm setup] menu.

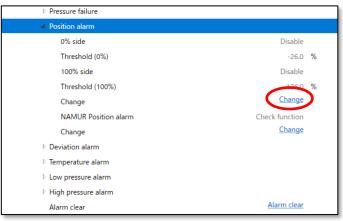
4 Alarm setup	
Pressure failure	
Position alarm	
Deviation alarm	
Temperature alarm	
Low pressure alarm	
High pressure alarm	
Alarm clear	Alarm clear

9.6.5.1. Alarm and NAMUR status setup, check status, and clear

1) Alarm setup

To change the settings, click [Change] in each menu to change the settings. Below is an example of "Position alarm".

① Click [Change] in the [Position alarm] menu and enter the setting value.



2) NAMUR status assignment

The NAMUR status classification associated with each alarm can be arbitrarily selected.

The position alarm is shown below as an example.

① Click [Change] In the [NAMUR status] sub menu in the [Position alarm] menu.

Pressure failure		
4 Position alarm		
0% side	Disable	
Threshold (0%)	-26.0	%
100% side	Disable	
Threshold (100%)	126.0	%
Change	<u>Change</u>	
NAMUR Position alarm	Check function	
Change	<u>Change</u>)
Deviation alarm		
Temperature alarm		
Low pressure alarm		
High pressure alarm		
Alarm clear	<u>Alarm clear</u>	

② Select NAMUR status classification and click [Next].

🐵 Change	×
NAMUR status	
NAMOR status	
Position alarm	Check function Y
	Maintenance req.
	Out of spec.
()	Check function

The category of NAMUR status that can be selected are as follows.

Maintenance req.	: Maintenance required
Out of spec.	: Out of specification
Check function	: Check function

3) Check alarm status

Alarm status can be checked using the following steps.

① Open "[Information]>[Alarm]" menu.

Information	
Monitor	
⊿ Alarm	
EEPROM failure	Good
Position sensor failure	Good
P-sup. sensor failure	Good
P-out1 sensor failure	Good
P-out2 sensor failure	Good
Input signal alarm	OK
Position alarm	OK
Deviation alarm	OK
Temperature alarm	OK
Low sup-pres. alarm	OK
High sup-pres. alarm	OK

9.6.5.2. Alarm clear

To clear a Failure state, the cause of the alarm must be removed, and the alarm must be cleared.

① Click [Alarm Clear] in the [Alarm setup] menu.

▲ Alarm setup	
Pressure failure	
Position alarm	
Deviation alarm	
Temperature alarm	
Low pressure alarm	
High pressure alarm	
Alarm clear	Alarm clear

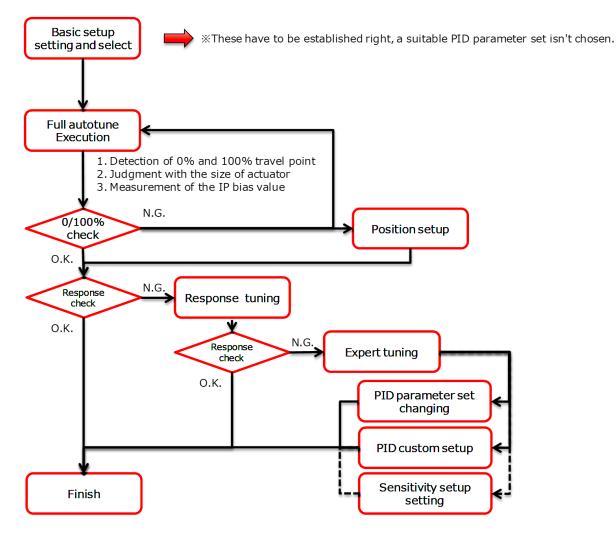
10. Trouble shooting

When problems occurred at the operation starting or during operation, please refer to the following table and take an action appropriately.

	Table 10. Trouble shooting	5
Phenomenon	Assumed cause	Action
	Loss of electrical power, disconnection or miswiring	✓ Check input current✓ Check wiring
	Drop of supply pressure or loss	 ✓ Check supply pressure ✓ Check air regulator
	Leak from air piping	✓ Check piping
Does not move	Actuator abnormality / Handle is in manual mode	✓ Set handle to auto mode
Mana ta alau	Actuator abnormality / Packing sticking or wear out	✓ Replace packing
Move too slow	Lack of actuator output	✓ Replace actuator
	Forced shut down by positioner alarm	✓ Check alarm status
Does not move fully Mistake of setting		 Check setting parameters Check PID parameter Check mode of A/M-unit
	Adjustment difference	 ✓ Cleaning of restriction ✓ Cleaning of nozzle flapper ✓ Adjustment of torque motor
	Breakdown of positioner	Inquire to our office
Hunting	Abnormality of positioner	 ✓ Cleaning of restriction ✓ Cleaning of nozzle flapper
Overshoot	Mismatch of PID parameter	✓ Check PID parameter
	Abnormal attachment	 ✓ Check there are no backlashes ✓ Check whether a feedback lever becomes horizontal at 50% position ✓ Readjust cross point
Bad accuracy	Abnormal control	 ✓ Check PID parameter ✓ Check dead band setting
	Actuator abnormality / Packing sticking or wear out	✓ Replace packing
LCD does not work	Loss of electrical power, disconnection or miswiring	 ✓ Check input current ✓ Check wiring
	Temperature is too low	✓ Check indication in the LCD specification temperature range.
	Breakdown of positioner	Inquire to our office
Position transmitter signal does not output or drifts	Loss of electrical power, disconnection or miswiring	✓ Check input voltage✓ Check wiring
	Adjustment difference	 ✓ Implement position transmitter current calibration
Leak from valve seat	Lack of actuator output	 ✓ Increase actuator output (Raise actuator size)
of CVs	Corrosion, erosion or defect in valve seat	 ✓ Overhauling of valve

Appendix A. Flow chart of settings procedure

In case of the purchase of a control valve with the positioner, settings described in this section are completed at the factory. Accordingly, it is not necessary to repeat the settings. However, if the positioner is specified on the order or it is separated from the control valve for maintenance, if necessary, perform the setting according to the following procedure.



Appendix B. Error message

If the problems cause during the operations such as <u>5.3.1. Full autotune</u>, <u>5.3.2 Position setup</u>, <u>5.4.2. Custom setting for</u> <u>PID parameter</u>, <u>9.4.2.1. Full autotune</u>, <u>9.4.2.4. Position setup</u>, <u>9.4.3.3. Setup for IP signal current bias</u>, the following error messages will be displayed, and the performance will be stopped.

Error		
Error at closing	Phenomenon	It does not reach the 0% travel position or steady state.
	Possible causes	Lack in off-balanced pressure
	Solution	Confirm off-balanced pressure
Phenomenon		It does not reach the 0% travel position or steady state.
Error at opening	Possible causes	Lack in off-balanced pressure
	Solution	Confirm off-balanced pressure
	Phenomenon	It does not reach 100% travel position or the steady state.
Error at stopping	Possible causes	 Valve friction is large and a limit cycle is occurring. A limit cycle has occurred due to mechanical backlash such as the tension spring falling off or the screw loosening. The appropriate PID parameters are not set.
	Solution	 Set dead band Remove mechanical backlash After changing the suitable PID parameters, perform the setup of position setup and IP signal bias.
	Phenomenon	It does not get correct span. Span is too narrow.
Error at span measurement	Possible causes	Decrease or pulsation in supply pressure
	Solution	Confirm the supply pressure

Table B 1	List of error messages
	LISC OF CITOL HICSSAGES

X In addition to the possible causes of each error code, if five minutes is passed while performing the specified operation, the error codes will be displayed.

Appendix C. How to change the settings of the menu for PC-based application

An example of how to operate and explain how to set it up.

C-1) Numeric input, list selection type

As an example of how to input numeric values and select a list, show how to change the "Dead band" and change the list and numeric value from the [Device setting] > [Extended device settings] > [Detail setup] menu.

① Confirm current setup value in the [Dead band] menu group. If need to make change, click [Change].

Extended device settings									-		Х
* To perform device tuning, 'Contr	ol mode' should be 'HART'										
Authority setup Basic setup Ea	asy tuning Expert tuning	Detail setup	ustom curve	Function	n select						
Cutoff or Limit					Damper	er setting					
Cutoff/Limit 0% side	Cutoff			>	Input d	lamper flag	Disable			~	
Cutoff/Limit 0% side value		0.5 %	6		Input d	lamper factor				Input da Input da	
Cutoff/Limit 100% side	Disable			\rightarrow	😵 Ch	nange			L	input da	inper se
Cutoff/Limit 100% side value		99.5 %	5		Split rar	nge					
😵 Change					Split ra	inge 0%		4.0 mA			
Dead band					Split ra	inge 100%		20.0 mA			
Dead band flag	Disable			\rightarrow	😵 Ch	nange					
Dead band value		0.3 %		_	_ PT burn	nout dir.					
🗫 Change					PT burn	nout dir.	Low			Ŷ	
Transfer function					😵 Ch	nange					
Transfer function	Linear			\sim	AT span	n limit					
😵 Change					AT spar	n limit		105 %			
Range ability					😵 Ch	nange					
Range ability				1							
🗫 Change											
<											>
										Clos	se

2 The setting value input menu will open.

- ③ Click $\mathbf{\nabla}$, select "Enable" in the list (list selection type).
- ④ Click [Next] to determine ※1

% If select "Disable", this setting will be determined and the menu will close.

19 Change	<
Dead band flag Disable V Disable Enable	
Abort Next	

- 5 Next, enter the deadband value in the "Dead band value" field (enter a number type).
- % Enter a value within the displayed valid range (0.1-10.0[%] in this example).
- 6 Click [Next] to determine %1
- O The setting change is complete, and the data is set in the positioner.

🐵 Change	×
Dead band value (0.1-10.0)[%] Dead band value	0.1%
	Abort Next

%1 : Depending on the host application, the [Next] button may display differently, such as [OK].

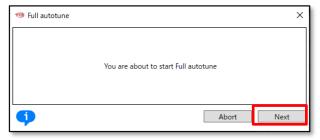
C-2) Execution type

As an example of the execution type operation, show how to perform full auto tuning from the [Device settings] > [Extended device settings] > [Easy tuning] menu.

① Click [Full autotune] in the [Full autotune] menu group.

Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Function :	elect		
Autotune status	;					r	Position setup		
Autotune status	5		No autotune			>	Manual span		
Autotune result	:		Completed O	DK!		~	😵 0% position adjust		
							😵 100% position adjust		
Se Full autotu	ne						Auto span		
-							😵 Span autotune		
So Abort auto	tune						So Abort autotune		
Tuning result							8 Abort autoralie		
Tuning result									_
							Position		
Response tunin	9						ATT TOTAL		
Response tunin	g		0 Normal			~	40 50 60		
So Change							30 70		
• •							20 80 -	Positio	'n
							10 90		
							0 % 100		
									_

② A confirmation dialog will be displayed, so click [Next].



- ③ Full autotuning will start on the positioner.
- ④ Check the progress during execution in the "Autotune status" field. When it becomes "Complete autotune", full autotune is complete.

Extended device settings					×
* To perform device tuning, 'Control m	ode' should be 'HART'				
Authority setup Basic setup Easy tu	uning Expert tuning Detail setup Cus	om curve Function select			
Autotupe status		Position setup			
Autotune status	Complete autotune	V Manual span			
Autotune result	Completed OK!	© 0% position adjust			
5 H		🗫 100% position adjust			
Full autotune		- Auto span			
So Abort autotune		😵 Span autotune			
So Abort autotune		So Abort autotune			
Tuning result					
Tuning result		Position			
Response tuning Response tuning	0 Normal	40 9 60			
	0 Normal	30 70			
% Change		20 60	Į	Positio	n
		× × · · · ·			
				C	>
				Clo	se

Appendix D. Password setup

This device allows to set a password with a three-digit integer.

- If set a password, only be able to access the information on each top menu without entering the password.
- ① Click [Change] in the [Password setup] menu.
- ② Select "Enable" to enable the password, or "Disable" to disable the password, then click [Next].
- ※ If select "Disable", set this value.

Password setup	×
You want to set password =	
Password	Disable v
	Disable
	Enable
•	Abort Next

③ If select "Enable", confirm the message and click [Next]. it.

1 Password setup	×
You are about to set password, don't forget	he password !!
•	Abort Next

④ Enter a three-digit password and click [Next] to set.

1 Password setup	×
Password(000-999)	
Password	000
•	Abort Next

% When locked with a password, the settings menu will be locked as shown below, and the menu will not be displayed unless enter the correct password in the [Open protected menu] menu.

For PC-based application menu,

Extended device settings	-		×
😵 Open protected menu			^
* To perform device tuning, 'Control mode' should be 'HART'			
<			>
		Close	e

For handheld application menu

4 Online	
Open protected menu	Open protected menu
Open force clear password menu	Open force clear password menu
▷ Information	

<u>X</u> The [Open force clear password menu] is a rescue menu if you forget the password. A secret code is required to unlock it, so if you have forgotten the password, please contact the sales office listed on the back of this manual.

■ WORLD-WIDE NETWORK (Sales, Manufacturing, Services)

Sales, Manufacturing, Services	TEL	FAX
Nihon KOSO Co., Ltd., Tokyo Japan	Tel. (81) 3-5202-4300	Fax. (81) 3-5202-4301
Paris Office	Tel. (33) 1-73-75-23-1	Fax. (33) 1-73-75-23-1
Moscow Office	Tel. (7) 495-775-8531	Fax. (7) 495-787-2758
Abu Dhabi Branch	Tel. (971) 2-639-06-55	Fax. (971) 2-639-08-89
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REXA Inc. Boston, U.S.A	Tel. (1) 508-584-1199	Fax. (1) 508-584-2525
Pacific Seismic Products.Inc., CA, U.S.A.	Tel. (1) 661-942-4499	Fax (1) 661-942-0999
KOSO Kent Introl. Ltd., U.K.	Tel. (44) 0-1484-710311	Fax. (44) 0-1484-407407
KOSO Control Engineering (Wuxi) Co., Ltd., China	Tel. (86) 510-85101567	Fax. (86) 510-85122498
Wuxi KOSO Fluid Control Co., Ltd., China	Tel. (86) 510-85585118	Fax. (86) 510-85585119
Wuxi KOSO Valve Casting Co., Ltd., China	Tel. (86) 510-85581109	Fax. (86) 510-85123093
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Korea KOSO Co., Ltd., Seoul, Korea	Tel. (82) 2-539-9011	Fax. (82) 2-566-5119
Korea KOSO Engineering Co., Ltd., Seoul, Korea	Tel. (82) 2-539-9018	Fax. (82) 2-566-5119
KOSO Controls Asia Pte Ltd., Singapore	Tel. (65) 67472722	Fax. (65) 67467677
KOSO India Private Limited	Tel. (91) 253-2383111	Fax. (91) 253-2384413
KOSO Control Europe s.r.o. Czech	Tel. (420) 513-035-180	Fax. (420) 545-422-529
KOSO Italy	Tel. (39) 02-93162165	Fax. (39) 02-9306847
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