KGP2000 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 KGP2000 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 KGP2000 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. \geq
- \triangleright The contents of this publication are subject to change without notice to improve specifications.
- \geq The contents of this publication may not be reproduced or duplicated in whole or in part, without prior consent.
- \triangleright This publication may not be revised so long as changes in structure and specifications have no effect on the operation of the positioner.
- \triangleright 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.

KGP2003

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

HART[®](※) EDD/FDI

EDD Version	:	1 and more
FDI Version	:	01.00.00 and more

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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

KGP2000 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. 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.

The figure around the electrical connection is shown below.





Figure 1.4b Entry type of screw and Connection facilities for bonding

Make wiring connections according to the following procedure.

% See KGP2000 instruction manual for connection precautions.

- 1. Remove the front cover.
- 2. Lead a cable into the terminal 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 KGP2003 only
- 5. There is a connection terminal on the outside of the device for the external bonding conductor, as shown in Figures 1.4a and 1.4b Make wiring connections according to the installation environment and applicable laws and regulations.
- 6. Fix a cable with the cable gland following the instruction manual of the cable gland manufacturer.
- 7. Replace the front cover.

This positioner uses a 4-20mA loop current as its power source. HART communication is performed using a digital signal superimposed on this loop current.

Field wiring diagram is shown in figure 1.4c and 1.4d



⅔1 Model KGP2003 only





Figure 1.4e 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.

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 KGP2000 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 "KGP2000" in the "Search by Product Name" field and click "Search" button.
- ③ Select and click the KGP2000 icon.
- ④ Select Version "1".
- (5) Click "EDD Download >" or "FDI Download 01.00.00" 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 KGP2000 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 Variables] top menu
🐠 🛪 🔍 Offline 🙎 Device Settings Diagno	stics Maintenance	Online	Process Variables ×	
Position				
40 50 60 30 70 20 80 - 10 90 % 100			Position	
Set point		50.0 %	5	
Position		0.1 %	5	
Input		50.0 %	5	
Loop Current		12.004 n	A	
Temperature		22 °	2	
Detail				
Trand				
Trend				
Manual setpoint Manual setpoint				
Serial No.			00000000	
Tag	????????			
HART device information				
Alarm				1
EEPROM failure	Good		\sim	
Position sensor failure	Good		\sim	
Input signal alarm	ОК		~	
Position alarm	ОК		\sim	
Deviation alarm	ОК		\sim	
Temperature alarm	ОК		~	
IP deviation alarm	ОК		\sim	
PST alarm PST stroke alarm	OK		~	
PST incomplete alarm	OK		~	
				J

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 🙎	Device Settings 🛞 Diagnostics M	laintenance Online	Process Variables 🛞 Health ?	Simulation 🔵
tended device settings		•	Extended device	settings] menu
ummary of config. parameter				
Basic setup			Detail setup	
Actuator motion	Linear	U	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 flag	Disable
Booster type	Large	\sim	Dead band value	0.3 %
Set point dir.	Normal	~	Transfer function	Linear
Posi. transmit. dir.	Normal	~	Input damper flag	Disable
Easy/Expert tuning			Input damper factor	100.
Rank	XS	~	Range ability	
Response tuning	0 Normal	~	Split range 0%	4.0 mA
			Split range 100%	20.0 mA
			PT burnout dir.	Low
			AT span limit	105 %

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

See 3. Authority setup

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. [Maintenance] top menu

	evice Settings Diagnostics	Maintenance 🗙 Onl	ne Process Variables	-
Extended maintenance			Exte	nded maintenance] men
Serial No.				
Serial No.		000000	00	
Version				
Electronics				
			1	
			0	
			0	
Software				
			1	
			0	
			0	
HART version				
HART Protocol Revision			7	
Device Revision			1	
HART relation				
Tag	????????			
Long Tag	77777777777777777777777	777777777777		

Figure 2.2.3a [Maintenance] top menu

 Extended maintenance To perform carbration and imulation, 	'Copyrol mode' si			7
* To perform carbration and simulation,	'Cop rol mode' si	uid be 'HAT'		1
Authority setup Calibration Simulation	on test Service H	HART relation Setting	nst Factory setup	1
Authority	LCD		Ŷ	

Figure 2.2.3b [Extended maintenance] menu

[Extended maintenance] menu consists of the following menus:

(1) Authority setup	See 3. Authority setup
(2) Calibration	See 6.2. Calibration
(3) Simulation test	See 6.3. Simulation test
(4) Service	See 6.4. Service
(5) HART relation	See 6.5. HART relation
(6) Setting list	See 6.6. Setting list
(7) Factory setup 🔆	See 6.7. Factory setup
💥 This menu is not displayed by d	lefault.

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

	K				
	Settings 🛞 Diagnostics 🛞	Maintenance 🛞 Online	Process Variables 🛞 Health	n ? Simulation	
Extended diagnostics		←→	[Extended diagnost	ics] menu	
Alarm		(Online diagnostics		
EEPROM failure	Good	~	Total stroke		85
Position sensor failure	Good	~	Total direction change		341
Input signal alarm	ОК	~	Total time	8.6 h	
Position alarm	ОК	~	Low position time	1.5 h	
Deviation alarm	ОК	~	Minimum temperature	24 Cels	ius
Temperature alarm	ОК	~	Maximum temperature	25 Cels	ius
IP deviation alarm	ОК	~	Low temperature time	0.0 h	
PST alarm			High temperature time	0.0 h	
PST stroke alarm	ОК	, L	PST status		
PST incomplete alarm	ОК	~	PST status	Waiting(Stop)	~
			PST flag	Disable	~
		1	Remaining days	0 day	(s)
🗞 Alarm clear					

Figure 2.2.4a [Diagnostics] top menu



Figure2.2.4b [Extended diagnostics] menu

[Extended diagnostics] menu consists of the following menus:

- (1) Authority setup
- (2) Online diag. setup
- (3) 25 percent step response
- (4) One step response
- (5) Partial stroke test
- (6) Alarm setup

See 7.2. Online diag. setup

See 3. Authority setup

- See 7.3. 25% step response See 7.4. One step response
- See 7.5. Partial stroke test (PST)
- See 7.6. Alarm setup

2.2.5. Offline menu

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

Dev	ce Settings Diag	nostics 🗴	$Maintenance\ \overleftarrow{X}$	On
Device settings Diagnostics Maintenar	ce			
Authority setup				
Authority	HART			~
Control mode	4-20mA			~
Basic setup				
Actuator motion	Linear			~
Actuator type	Single			~
Valve action	ATO			~
Packing friction	Low			~
Booster option	Disable			Ŷ
Booster type	Large			~
Set point dir.	Normal			~
Posi. transmit. dir.	Normal			~
				-
Detailed setup				_
Cutoff/Limit 0% side	Disable			~
Cutoff/Limit 0% side value		0.5	s %	
Cutoff/Limit 100% side	Disable			~
Cutoff/Limit 100% side value		99.5	i %	
Dead band flag	Disable			~
Dead band value			%	
Deau Dariu Value		0.5		
Transfer function	Linear	0.3	1	~
Transfer function Range ability	Linear	0.:		~ 1
Transfer function Range ability Input damper flag	Linear Disable	0.:		~ 1 ~
Transfer function Range ability Input damper flag Input damper factor	Linear Disable	0.:	99	~ 1 ~
Transfer function Range ability Input damper flag Input damper factor Split range 0%	Linear Disable	4.0	99 mA	× 1 .9
Transfer function Range ability Input damper flag Input damper factor Split range 0% Split range 100%	Linear Disable	4.0	99 JmA JmA	× 1 .9
Transfer function Range ability Input damper flag Input damper factor Split range 0% Split range 100% PT burnout dir.	Linear Disable	4.0	99]mA]mA	× .9
Transfer function Range ability Input damper flag Input damper factor Split range 0% Split range 100% PT burnout dir. AT span limit	Linear Disable	4.0	99 mA mA %	× .9
Transfer function Range ability Input damper flag Input damper factor Split range 0% Split range 100% PT burnout dir. AT span limit Function select	Linear Disable	4.0 20.0	99]mA]mA	<pre>> 1 .9 </pre>

Figure2.2.5a [Offline] menu

2.2.6. Online menu

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

₽	Q	Offline	9	Device Settings	Diagnostics	(\mathbf{x})	Maintenance 🛞	Onl	ine 🛞 🛛
		Lab	el				Value		Units
▲ Online									
Set p	point							50.0	%
Posit	tion							0.1	%
Inpu	t							50.0	%
Loop	o Curr	ent					12	2.004	mA
▲ Infor	rmatio	n							
⊳ N	Monito	or							
⊳ 4	Alarm								
⊳F	PST ala	arm							
⊳ \	/ersior	n							
⊳ (Config	. paramete	r						
⊳ (Online	diagnostic	s						
⊿ Auth	nority	setup							
⊳ 4	Author	rity							
⊳ (Contro	l mode							
✓ Setu	р								
ÞE	Basic s	etup							
ÞE	lasy tu	uning							
ÞE	xpert	tuning							
ÞE	Detail	setup							
⊳ (Custor	n curve							
⊳F	unctio	on select							
▲ Mair	ntenar	nce							
⊳ (Calibra	ation							
⊳ s	Simula	tion test							
⊳ s	Service	•							
Þŀ	HART	relation							
⊳F	actory	y setup							
▲ Diag	& Ala	arms							
▶ 0	Online	diag. setu	р						
ÞF	PST se	tup							
⊳ 2	25% st	ep respons	se						
⊳ ⊿	larm	setup							

Figure2.2.6a [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	Description	Parameter	Default			
Authority	Set write authority to HART communication. Select HART in case in which settings should be configured via not LUI but HART communication only. <u>Once HART is selected, only "Information" and</u> <u>"Authority" from "TOP" menu will be able to be</u> <u>accessed through LUI.</u> X 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.	LCD / HART	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 🗴	Diagnostics	Maintenance	Online 🗴	Pro
Extended device settings					
Summary of config. para Basic setup	meter				
Actuator motion	L	inear		~	
A		See 1-			

③ Select [Authority setup] menu tab.

Extended devi	ce settings				-	_		×
* To perform devir	e tuning, 'Co	ontrol mode' s'	hould be 'HART					
Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Funct	tion select	1
Authority	1		HART			~		
😵 Change								
Control mode								
Control mode			4-20mA			~		
😵 Change							ļ	
L								

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.

Control mode		
Control mode	HART	Ŷ
So Change		

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 v 4-20mA HART
•	Abort Next

4. Process Variables

This menu offers to display the process variables and other basic information, and to 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	50.0	%	
Position	0.1	%	
Input	50.0	%	
Loop Current	12.004	mA	
Temperature	22	°C	
Detail			
Trend			
Trend			
Manual setpoint			
Manual setpoint			
Device information			
Device information		0000000	
Senar No.		0000000	
Tag ????????			
-			
HART device information			
HART device information			
ART device information			
Alarm - EEPROM failure	Good	~	
Alarm EEPROM failure Position sensor failure	Good	~	
Alarm EEPROM failure Position sensor failure Input signal alarm	Good Good OK		
Alarm EEPROM failure Position sensor failure Input signal alarm Position alarm	Good Good OK OK		
Alarm Alarm EEPROM failure Position sensor failure Input signal alarm Position alarm Deviation alarm	Good Good OK OK OK	· · · ·	
Alarm EEPROM failure Position sensor failure Input signal alarm Position alarm Deviation alarm Temperature alarm	Good Good OK OK OK		
Alarm EEPROM failure Position sensor failure Input signal alarm Position alarm Deviation alarm Temperature alarm IP deviation alarm	Good Good OK OK OK OK OK	> > > > > > > >	
Alarm EEPROM failure Position sensor failure Input signal alarm Position alarm Deviation alarm Temperature alarm IP deviation alarm	Good Good OK OK OK OK		
Alarm EEPROM failure Position sensor failure Input signal alarm Position alarm Deviation alarm IP deviation alarm IP deviation alarm PST alarm PST stroke alarm	Good Good OK OK OK OK OK		
Alarm EEPROM failure Position sensor failure Input signal alarm Position alarm Deviation alarm Temperature alarm IP deviation alarm PST alarm PST stroke alarm PST incomplete alarm	Good Good OK OK OK OK OK		

4.1. Monitor

Monitor the following measured value.

Displayed items are as follows:

[Monitor]

Setpoint	: Set point	Input 🔆	: Percentage of input signal
Position	: Valve position	Loop current	: Input current
Temperature	: Temperature		

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

To view other items, do the following:

① Click [Detail] in the [Monitor] menu group.

Monitor					
Set point	50.0	%			
Position	0.1	%			
Input	50.0	%			
Loop Current	12.005	mA			
Temperature	22	°C			
Detail					
·					

② Open another window.

Status Authority	LCD v
Mode	4-20mA ~
Control mode	4-20mA ~
Input/posi etc	
Loop Current	12.005 mA
Set point	50.0 %
Position	0.1 %
IP signal	75.5 %
Deviation	49.9 %
Temperature	22 °C

Displayed items are as follows:

[Status]			
Authority	: Write authority	Control mode	: Operational authority
Mode	: Special control mode		
[Input/posi etc]			
Loop current	: Input current	IP signal	: IP signal current
Set point	: Setpoint	Deviation	: Deviation
Position	: Valve position	Temperature	: Temperature

4.2. Trend

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

MENU) Process Variables > Trend

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

Γ	Trend	
	Trend	
Ľ		

2 Trend graph is displayed.



Display items are as follows:

input /it	. Fercentage of input signal	Position	: valve position
Set point :	: Setpoint	Temperature	: Temperature

% 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.

Caution

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		_	\Box \times
Control mode	HART	9	^
Set point	100.0 %		_
😵 Manual setpoint on]
😵 Manual setpoint off			
<			>
	OK Apply		Cancel

2 Enter the setpoint value in the "Manual setpoint" field and click [Next].

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

2) Disable manual setpoint

To return device control to "Input signal", perform the following operations.

① Click [Manual setpoint off].

🐵 Manual setpoint		_	
Control mode	HART	U	
Set point	100.0 %		
🗫 Manual setpoint on			
😵 Manual setpoint off			
<	ОК Аррју		Cancel

4.4. Device information

This menu displays device information for the positioner.

Displayed items are as follows:

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	????????
HART device information	

② Open the detailed information menu.

Manufacturer	KOSO
Device Type	KGP2000 ~
Device Identifier	0
Tag	11771777
Long Tag	11771777777777777777777777777777777
Descriptor	1177177777777777
Date	2015/01/06
Message	11771777777777777777777777777777777
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 ~		
Position sensor failure	Good ~		
Input signal alarm	ОК ~		
Position alarm	ОК		
Deviation alarm	ОК		
Temperature alarm	ОК ~		
IP deviation alarm	ОК		
CPST alarm			
PST stroke alarm	ОК		
PST incomplete alarm	ОК		

Displayed items are as follows:

[Alarm]			
EEPROM failure	: Memory failure	Deviation alarm	: Deviation alarm
Position sensor failure	: Position sensor failure	Temperature alarm	: Temperature alarm
Input signal alarm	: Input signal alarm	IP deviation alarm	: IP deviation alarm
Position alarm : Valve position alarm			
[PST alarm]		_	
PST stroke alarm	: PST stroke alarm	PST incomplete alarm	: PST incomplete alarm

5. Device Settings

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

	Caution	
۶	To change the settings, "Authority" m	iust be "HART".
ME	NU) Device Settings	

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

Displays an overview of the current 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	0.5 %	
Valve action	ATO	2	Cutoff/Limit 100% side	Disable	v
Packing friction	Low	2	Cutoff/Limit 100% side value	99.5 %	
Booster option	Disable	2	Dead band flag	Disable	v
Booster type	Large	2	Dead band value	0.3 %	
Set point dir.	Normal	2	Transfer function	Linear	v
Posi. transmit. dir.	Normal	2	Input damper flag	Disable	v
Easy/Expert tuning			Input damper factor	1	00.0
Rank	XS	9	Range ability		1
Response tuning	0 Normal	2	Split range 0%	4.0 mA	
			Split range 100%	20.0 mA	
			PT burnout dir.	Low	~
			AT span limit	105 %	

Display items are as fol	lows:		
[Summary of config. pa	rameters]		
[Basic setup]			
Actuator motion	: Stem motion type	Actuator type	: Acting type
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	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

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Cutoff/Limit 100%	: Cutoff/Limit 100% side	Cutoff/Limit 100%	: Cutoff/Limit 100% side
side	enable/disable	side value	value
Dead bang flag	: Deadband enable/disable	Dead band value	: Deadband value
Transfer function	: Transfer function	Input damper flag	: Input dumper
			enable/disable
Input damper factor	: Input damper factor	Range ability	: Range ability
Split range 0%	: Split range 0% side	Split range 100%	: Split range 100% side
PT burnout dir.	: Burnout direction of the	AT span limit	: Autotune span limit
	Position transmitter		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.

MENU)	Device	Settinas >	Extended	device	settinas
	Dence	Settings	Enternaca	actice	secongs

① Click [Extended device settings] in the [Device Settings] top menu.

Extended device settings					
Summary of config. parameter — Basic setup —			Detail setup		
Actuator motion	Linear	2	Cutoff/Limit 0% side	Cutoff	~
Actuator type	Single	2	Cutoff/Limit 0% side value	0.5 %	
Valve action	ATO	2	Cutoff/Limit 100% side	Disable	U
Packing friction	Low	2	Cutoff/Limit 100% side value	99.5 %	
Booster option	Disable	~	Dead band flag	Disable	U
Booster type	Large	2	Dead band value	0.3 %	
Set point dir.	Normal	~	Transfer function	Linear	~
Posi. transmit. dir.	Normal	2	Input damper flag	Disable	~
Easy/Expert tuning			Input damper factor		100.0
Rank	XS	2	Range ability		1
Response tuning	0 Normal	2	Split range 0%	4.0 mA	
			Split range 100%	20.0 mA	
			PT burnout dir.	Low	~
			AT span limit	105 %	

② Open the [Extended device settings] menu.

io perioriti della	ce tuning, Co	introl mode si	nould be HARI				
Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Function sel	ect
Authority							
Authority			HART			\sim	
So Change							
Control mode							

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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.

5.2. Basic setup

Select essential parameters necessary for the control of the positioner.

<u>* Perform basic setup surely before performing the following setup (easy tuning) in next section.</u>



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		

⅔ For details on each item, refer to the KGP2000 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.

			- 0
I mode' should be 'HART'			
y tuning Expert tuning Detail setup C	ustom curve Function select		
	Booster option		
Linear	 Booster option 	Disable	
	Booster type	Large	
	🗫 Change		
Single	Set point dir.		
	Set point dir.	Normal	
	🗫 Change		
ATC	Posi. transmit. dir.		
	Posi. transmit. dir.	Normal	
	🗫 Change		
Low	~		
			Close
			Clos
	I mode' should be 'HART' y tuning Expert tuning Detail setup C Linear Single ATC Low	I mode' should be 'HART' y tuning Expert tuning Detail setup Custom curve Function select Linear Single Single ATC Low Low Change Posi. transmit. dir. Posi. transmit. dir. Posi. transmit. dir. Posi. transmit. dir. Posi. transmit. dir. Posi. transmit. dir.	I mode' should be 'HART' y tuning Expert tuning Detail setup Custom curve Function select Linear Booster option Disable Booster option Disable Booster type Large Booster type Change Set point dir. Normal Set point dir. Normal Posi. transmit. dir. Normal Low Posi. transmit. dir. Normal Com Vertication Select

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

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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' sl	hould be 'HART'				~
Authority setup Basic setup Easy tuning	xpert tuning Detail setup Custom curve	Funct	ion select		
- Autotune status	_		Position setup		
Autotune status	No autotune	~	Manual span		וה
Autotune result	Completed OK!	~	So 0% position adjust		1
- Full autotune			So 100% position adjust		
So Full autotune			Auto span		
So Abort autotune			😵 Span autotune		
			😵 Abort autotune		
Tuning result		_			5
Tuning result			Position		Ξ.
Response tuning Response tuning	0 Normal	>	40 50 60 30 70 20 80 - 10 90 0 55 100	Positi	ion

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	ice settings										_		×
* To perform devi	ce tuning, 'Co	ontrol mode' s	hould be 'HART										^
Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Function select							
-Autotune statu	5					Positio	on setup						
Autotune statu	5		No autotune			Mar	ual span						
Autotune result	t		Completed (DK!		~	0% position a	adjust		 			
Full autotune							100% positio	n adjust					
😵 Full autotu	ne					Auto	span						
So Abort auto	tune					80	Span autotur	ne					
						%	Abort autotu	ne					
Tuning result													
Tuning result							P	osition					٦.
Response tunin	9						1111	1111					
Response tunin	9		0 Normal			>	40	5D 60	(*)}				
😵 Change							30 20		70 80			Positio	on

2 Confirm the message and click [Next].

🐵 Full autotune		×
	You are about to start Full autotune	
•	Abort Nex	-

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

Autotune status Autotune status	Complete autotune
Autotune result	Completed OK!
Full autotune Full 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.

Extended devi	ce settings						-	- 🗆	×
* To perform devi	e tuning, 'Co	ontrol mode' sl	hould be 'HART'						
Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Function selec			
Autotune status						Posit	n setup		
Autotune status	;		No autotune			~ Ma	ual span		<u>, </u>
Autotune result			Completed (DK!		~	0% position adjust		
						0	100% position adjust		
Full autotune									
So Full autotu	ne					Au	span		<u>-</u>
So Abort auto	tune					9	Span autotune		
•						9	Abort autotune		
Tuning result —									-
Tuning result							Position		5
Response tunin	9					_	ATT TOTAL		
Response tunin	9		0 Normal			~	40 SD 60		
So Change							30 70		
							20 6 80	Posit	ion

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

🐵 Tuning result	– <u> </u>
😵 Update tuning result	^
Rank	×S ~
Stroke sp. (Air-In)	440 ms
Stroke sp. (Air-Out)	580 ms
Bias value	50.2 %
IP signal	0.0 %
<	↓
	OK Apply Cancel

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	×
* 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	
Autotune status No autotune 🗸 Manual span	
Autotune result Completed OK! Completed OK!	
Full autotune	
See Full autotune Auto span	 a
So Abort autotune So Span autotune So Abort autotune So Abort 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(cot) 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							×
Position				10.2	2 %		^
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							
<							>
•	Abort		OK(set)		Move -	Move	+

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.
- ☆ Click [Abort autotune] to cancel Span autotune.

Extended devi	ce settings											-		Х
* To perform device	e tuning, 'Co	ontrol mode' sl	nould be 'HART'											~
Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Function	n select							
-Autotune status							Positio	n setup						
Autotune status	;		No autotune			\sim	Manu	ual span						
Autotune result			Completed (DK!		>	9 0	0% position	adjust		 	 		
Full autotune							- 24	100% positio	on aujust					
Se Full autotu	ne						Auto	span						
% Abort auto	tune						6 0	Span autotu Abort autotu	ine		 	 		ш
Tuning result														J
Tuning result								I	Position					
Response tuning	9							11	1111	1				
Response tunin	9		0 Normal			~		40	3D 6	i0 · ·				
🔅 Change								30 20		70 80			Positi	on

2 Confirm the message and click [Next].

🐵 Span autotune		×
	You are about to start Span autotune	
•	Abort	t

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

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		ATT THE REAL OF TH
Response tuning	0 Normal 🗸 🗸	40 50 60
😓 Change		30 70 Position

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

🐵 Change		×
Response tuning value Response tuning	0 Normal	Ŷ
•	-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.

Caution

- 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	_	×
* To perform device tuning, 'Control mode' should be 'HART'		
Authority setup Basic setup Easy tuning Expert tuning Detail setup Custom curve Function select		
PID parameter set		
Rank XS ··· Auto bias and rank		
Se 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 are as follows.

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

ſ	Extended devi	ce settings								-	×
	* To perform devic	e tuning, 'Co	ntrol mode' si	hould be 'HART							
	Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Functio	on select	t		
	PID parameter s	et						Sensit	itivity setup		
	Rank			XS			~	Auto	o bias and rank		
	😵 Change						Auto	o bias			
	PID custom setu PID custom set	up						Man	nual bias		

② Select rank and click [Next] to configure.

🐵 Change			×
Rank	Custom Y		
	Custom		
	XS		
1	S	Abort	Next
•	м		
5.4.2. Custom setting for PID parameter

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



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

% For details and precautions for each parameter., refer to the KGP2000 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'	should be 'HART'						
Authority setup Basic setup Easy tuning	Expert tuning Detail setup	Custom curve Functi	ion	select			
PID parameter set				Sensitivity setup			
Rank	Custom	Ŷ		Auto bias and rank			
😵 Change				Auto bias			
PID custom setup	PID custom setup			Manual bias			
PID custom setup							
·		,					~
<							>
						Clo	se

2 [PID custom setup] menu opens.

PID custom setup				– – ×
Air-Out/In different PID			Inside threshold	
Air-Out/In different PID	Yes	~	Inside threshold	10.0 %
😒 Change			So 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.

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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 positioner.

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 devi	ice tuning, 'Co	ontrol mode' s	hould be 'HART	1						\sim
	Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Functio	on selec	ct		
	PID parameter	set						Sens	sitivity setup		 -
	Rank			XS			\sim	Aut	to bias and rank		
	😒 Change					Aut	to bias		Γ		
	PID custom setup				Ma	anual bias					
	PID custom setup										

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

🐵 Auto bias and rank		-		Х
Auto bias and rank				
Autotune status	No autotune		~	
Autotune result	Completed OK!		~	
🗫 Auto bias and rank				
Se Abort autotune				j

③ Confirm the message and click [Next].



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

🐵 Auto bias and rank		_		×
Auto bias and rank				^
Autotune status	Complete autotune		Ý	
Autotune result	Completed OK!		Ŷ	

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.

1	Extended device settings									-	×
,	* To perform devi	ce tuning, 'Cor	ntrol mode' s	hould be 'HART'							
	Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Funct	ion sele	ct		
	PID parameter s	et						Ser	sitivity setup		
	Rank			XS			\sim	Αι	to bias and rank		
	😵 Change			Au	to bias						
	PID custom setup			M	nual bias						
	PID custom setup										

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

Auto bias		
Autotune status	No autotune	~
Autotune result	Completed OK!	~
Auto bias		
So Abort autotune		
50 Abort autotune		3

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 become "Complete autotune".

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

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**.

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.

Γ	Extended devi	Extended device settings								-	×
	* To perform devic	ce tuning, 'Co	ontrol mode' s	hould be 'HART	•						\sim
	Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Functio	on selec	t		
	PID parameter s	set						Sens	itivity setup		
	Rank			XS			\sim	Aut	to bias and rank		
	😵 Change				Aut	o bias		i			
	PID custom setup				Mar	nual bias					
	PID custom setup										
Ш											

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

🐵 Manual bias			_		×
Manual bias					^
25% position		51.8 %			
75% position		49.0 %			
% Change	1				
<			_		×
	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:

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

% Refer to the KGP2000 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.

Extended dev	ice settings								_		>
' To perform devi	ce tuning, 'Con	trol mode' sł	nould be 'HAR	r'	•						
Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	lustom curve	Funct	ion select				
Cutoff or Limit							Damper setting				
Cutoff/Limit 0%	6 side		Cutoff			~	Input damper flag	Disable		\sim	
Cutoff/Limit 0%	6 side value			0.5	%		Input damper factor			100.0)
Cutoff/Limit 10	0% side		Disable			~	😵 Change				
Cutoff/Limit 10	0% side value			99.5	%		Split range				
😓 Change							Split range 0%		4.0 mA		
Dead band							Split range 100%		20.0 mA		
Dead band flag	J		Disable			~	😵 Change				
Dead band valu	Je			0.3	%		PT burnout dir.				
😓 Change							PT burnout dir.	Low		v	
Transfer functio	n						😵 Change				
Transfer functio	n		Linear			~	AT span limit				
😓 Change							AT span limit		105 %		
Range ability							% Change				
Range ability						1					
😵 Change											

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

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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				_	×
* To perform device tuning, 'Control mode	e' should be 'HART'				
Authority setup Basic setup Easy tunin	ng Expert tuning Detail setup	Custom curve Function select			
😵 Change custom curve					
Custom curve		7			
X1 value	100.0	% Y1 value	100.0 %		
X2 value	100.0	% Y2 value	100.0 %		
X3 value	100.0	% Y3 value	100.0 %		
X4 value	100.0	% Y4 value	100.0 %		
X5 value	100.0	% Y5 value	100.0 %		
X6 value	100.0	% Y6 value	100.0 %		
X7 value	100.0	% Y7 value	100.0 %		
X8 value	100.0	% Y8 value	100.0 %		
X9 value	100.0	% Y9 value	100.0 %		
X10 value	100.0	% Y10 value	100.0 %		
X11 value	100.0	% Y11 value	100.0 %		
X12 value	100.0	% Y12 value	100.0 %		
X13 value	100.0	% ¥13 value	100.0 %		
X14 value	100.0	% Y14 value	100.0 %		
X15 value	100.0	% Y15 value	100.0 %		
X16 value	100.0	% Y16 value	100.0 %		
X17 value	100.0	% ¥17 value	100.0 %		
X18 value	100.0	% ¥18 value	100.0 %		
X19 value	100.0	% 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.

0	
Password setup	: Password setup
Screen saver	: Screen saver
Temperature unit	: Temperature unit
LCD display mode	: LCD display mode of valve position

% See KGP2000 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.

Extended device settings To perform device tuning, 'Control mode' should be 'HART'							
Authority setup	Basic setup	Easy tuning	Expert tuning	Detail setup	Custom curve	Function sele	ct
Password setup							
Password statu	s		Disable			\sim	
Se Password setup							
Screen saver							
Screen saver st	atus		Disable			y	
Waiting time				() minutes		
⋟ Change	Se Change						
Temperature ur	nit						
Temperature ur	nit		°C			\sim	
% Change							
LCD display mode							
LCD posiiton disp. mode						2	
Se Change							
							_

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.

<u>!</u>	Caution					
To change	e the settings,	"Authori	ty " must be	"HAR	Τ".	
(FNU) Mainte	phance					
	indrice					
1) Click [Main	ntenance] mer	nu tab. [N	/laintenance] top	menu o	opens.
🕕 🗘 🔻 Offline	Q Device Settings	Diagnostics	Maintenance 🗴	Online	Process V	/ariables
					_	
Extended maintenance	:e					
Serial No.				00000	000	
Version						
Electronics						
					1	
					0	
					0	
Software					- 1	
					1	
					0	
HART Protocol Revis	ion				7	
Device Revision					1	
HART relation						
Tag		77777777				
Long Tag		???????????????????????????????????????	???????????????????????????????????????			

Display items are as follows:

[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				
HART version					
HART Protocol Revision	7				
Device Revision	1				
HART relation					
Tag	77777777				
Long Tag	7777777777777777777777777777777				

[Extended maintenance] menu opens. 2

Extended maintenance							
* 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							
Control mode			HART			\sim	
% Change							

Menu items are as follows:

(1) Authority setup	See 3. Authority setup
(2) Calibration	See 6.2 Calibration
(3) Simulation test	See 6.3 Simulation test
(4) Service	See 6.4. Service
(5) HART relation	See 6.5. HART relation
(6) Setting list	See 6.6. Setting list
(7)Factory setup 🔆	See 6.7. Factory setup
This many is displayed only	when the "Eastery setup" fis

% 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.

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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.



- 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.

🥯 Extended maintenance									
* To perform calibration and simulation, 'Control mode' should be 'HART'									
Authority setup	Calibration	Simulation test	Service	HART relation	Setting list				
Input signal ca	. —	-							
% Calibrate									
Cross point ca	I								
😵 Calibrate									
Position transmit. cal.									

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 simulation, 'Control mode' should be 'HART'								
Authority setup Calibration Simulation test Service HART relation Setting list								
_Input signal cal.								
🗫 Calibrate								
Cross point cal.								
😵 Calibrate								
Position transmit. cal.								
Se 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 has 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.

uthority setup	Calibration	Simulation test	Service	HART relation	Setting list
Input signal ca					
% Calibrate					
-					
Cross point cal					
On Calibrate					
Se Cambrate					

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2 Confirm the message and click [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%	
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%			v	\sim
Adjust cross point						
1) Set adjust value						
2) Adjust and Set by buttons below						
3) Abort : Abort calibration						\sim
<					>	
•	Abor	t	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.

🐵 Extended mai	ntenance				
* To perform calib	pration and si	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					
-					
Desition transm	vit cal				
% Calibrate					

2 Confirm the message and click [Next].

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

First, perform calibration on the 0% side.

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

10% side	×
Adjust value (1-255)[dec] Adjust position transmitter output 1) Set adjust value 2) Adjust and Set by buttons below 3) Abort : Abort calibration	1 ~ ~ 1 2 5 10
••• <td>100 255 Abot OK(cet) Dawn() Up()</td>	100 255 Abo t OK(cet) Dawn() Up()

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

🧐 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, perform calibration on the 100% side.

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

🐵 100% side	×
Adjust value (1-255)[dec]	1 ~
Adjust position transmitter output 1) Set adjust value	2
2) Adjust and Set by buttons below	5
3) Abort : Abort calibration	10
•	255 Abok OK(24) Dom() Up(*)

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

100% 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	
<	>
Abo	ort OK(set) Down(-) Up(+)

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 mai	ntenance					
* To perform calib	pration and si	mulation, 'Contro	l mode' s	hould be 'HART'		
Authority setup	Calibration	Simulation test	Service	HART relation	Setting list]
Manual setpoir	nt					
Manual setpoi	int					
IP signal						
😵 Simulate						
Position transm	nitter					
😓 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 window opens.

uthority setup	Calibration	Simulation test	Service	HART relation	Setting list	
Manual setpoin	v t					
Manual setpoi	int					
ID sincel						
IP signal						
IP signal						
IP signal						
IP signal						

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

🐵 Manual setpoint			-		×
Set point		50.0 %			
Position		50.0 %			
😵 Manual setpoint					1
					-
<					>
	ОК	Apply		Cance	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 %			
Se Manual setpoint					
					\sim
<	ОК А	pply][Cance	4

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.

Manual setpoint			
Manual setpoint			
ID singel			
-			
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

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 mai	ntenance					
* To perform calib	pration and si	mulation, 'Contro	l mode' s	hould be 'HART'		
Authority setup	Calibration	Simulation test	Service	HART relation	Setting list	
Manual setpoir	nt					
Manual setpoi	int					
IP signal						
🗫 Simulate						
Pesition transm	itter					
🗫 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.

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



🐵 Simulate	×
Position transmit. sim. (0-100, 100.1:NAMUR Position transmit. adj.	High, 100.2:NAMUR Low][%] 0.0 %
•	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.

Authority setup Cali	ibration	Simulation tes	Service	IART relation	Setting list	Factory setup			
Raw AD values		•					PWM information		
Input(4-20mA)						7AB4	Position transmit.(PWM)		2A67
Position(Sin)						8697	Torque motor(PWM)		2035
Position(Cos)						C866	PID values		
Temperature						0312	Set point		50.0 %
Angle							Position		50.0 %
Angle				-2.606	51 °		р		-0.1
Stroke angle							i		102.0
Span setting stroke	0			-12.5772	?7 deg		d		-0.2
Cross point				-2.6683	19 deg		Factory menu		
Span setting stroke	100			8.3227	7 deg		Factory menu	ON	~
% Update							😵 Change		
Time stamp									
Date			Apr 12 202	4					
Time			10:43:03						

Display items are as follows: [Raw AD Value] Input(4-20mA) : AD value of Input signal Position(Sin) : AD value of valve Position(Cos) : AD value of valve : AD value of temperature Temperature [Angle] Angle : Angle of potentiometer [Stroke angle] 💥 Span setting stroke 0 : Angle value at 0% span : Angle of cross point Cross point Span setting stroke 100 : Angle value at 100% span X Click [Update] to obtain the latest information. [Time stamp] : Firmware time stamp - Date : Firmware time stamp - Time Date Time [PWM Information] : PWM value of position : PWM value of IP signal Position transmit. Torque motor PWM transmitter PWM current

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[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	ON	\sim
% Change		

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

100 Extended maintenance								
* To perform calibration and simulation, 'Control mode' should be 'HART'								
Authority setup Calibration Simulation test Service HART relation Setting list Factory setup								

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 simulation	n, 'Control mode' should be 'HART'			
HART device information	tion test Service Tract leadon Setting list	HART Find device		
So Update device information		So Find device		
Manufacturer	KOSO	HART Squawk		
Device Type	KGP2000	Squawk		
Device Identifier		0 Dynamic var. assign		
HART Protocol Revision		7 Primary Variable	Input	~
Device Revision		1 Secondary Variable	Position	~
Tag	7777777	Tertiary Variable	Set point	~
😵 Change Tag		Quaternary Variable	Temperature	~
Long Tag	77777777777777777777777777777777777	% Change		
😵 Change Long tag		Reboot		
Descriptor	7777777777777	% Reboot		
Se Change Descriptor				
Date	2015/01/	06		
😵 Change Date				
Message	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
So Change Message				
Final Assembly Number		0		
% Change Final assembly num.				

Display items are as follows: [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.

<u>X</u> In order for the positioner to respond to Find device, the positioner setting "Maintenance > HART relation >Find device" must be set to "Armed".

% 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.

h	HART find device
l	😵 Find device
Ľ	

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.

<u>X</u> 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

- 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 squawking? Change Number of	Squawks Y
Change Number of Squawk	Squawks
Exit A	bort Next

6.5.4. HART/Device Information

Some HART device information can be changed.

The changeable	items are a	s follows:
----------------	-------------	------------

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	2333335
•	Abort Next

6.5.5. Reboot

This is a function to restart the positioner.



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

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

😵 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	~
Secondary Variable	Position	~
Tertiary Variable	Set point	~
Quaternary Variable	Temperature	~
😵 Change		
C		

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

🐵 Change			×
	Which variable you want to change?	SV × SV	
•		QV Abort Nex	ĸt

③ Select variables to assign and click [Next].

1 Change	×
SV	
Secondary Variable	Position v
	Input
	Position
	Set point
~	Temperature

The configurable variables are as follows:

: Percentage of Input signal
: Valve position
: Set point
: Temperature
: Deviation
: IP signal current
: Angle of potentiometer

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
IP correction	: IP deviation correction
Restore factory default	: Restore factory default setting
Virtual DIP SW	: Setting of Virtual DIP SW

* For details on each item, see KGP2000 instruction manual.

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

Authority setup Calibration Simu	lation test Service HART relation Setting lis Factor	setup
IP signal range		Virtual DIP SW
Air-In	100 %	Virtual SW1
Air-Out	100 %	bit1
So Change		bit2 bit3
.		bit4
P signal factor		bit6
Factor	1.) bit7
Se Change		Virtual SW2
ge entitige		bit8
Cutoff IP signal		bit10
0% side	25 %	bit11
100%	75.9/	bit13
100% side	/5 %	bit14
😵 Change		
IP correction		Se Change
IP correction	Enable	
10 de fatier des bald	- 0/	
IP deviation threshold	1 %	
IP deviation time	10 s	
😵 Change		
Restore factory default		

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	9	Device Settings	Diagnostics	Maintenance	Online	Process Variables

Extended diagnostics					
Alarm			Online diagnostics		
EEPROM failure	Good	~	Total stroke		85
Position sensor failure	Good	~	Total direction change		344
Input signal alarm	ОК	~	Total time	9.1 h	
Position alarm	ОК	~	Low position time	1.5 h	
Deviation alarm	ОК	\sim	Minimum temperature	24 Cel	lsius
Temperature alarm	ОК	\sim	Maximum temperature	25 Cel	lsius
IP deviation alarm	ОК	\sim	Low temperature time	0.0 h	
PST alarm			High temperature time	0.0 h	
PST stroke alarm	ОК	~	PST status		
PST incomplete alarm	ОК	\vee	PST status	Waiting(Stop)	~
			PST flag	Disable	~
			Remaining days	0 day	y(s)
😵 Alarm clear					

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

The displayed items are as follows:

[Alarm]			
EEPROM failure	: Memory failure	Position sensor failure	: Position sensor failure
Input signal alarm	: Input signal alarm	Position alarm	: Valve position alarm
Deviation alarm	: Deviation alarm	Temperature alarm	: Temperature alarm
IP deviation alarm	: IP deviation alarm		
[PST alarm]		-	
PST stroke alarm	: PST stroke alarm	PST incomplete alarm	: PST incomplete 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

[PST status]

PST status	: PST status	PST flag	: PST Disable/Enable flag
Remaining days	: Remaining days		

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] in the [Diagnostics] top menu.

Extended diagnostics			
Alarm		Online diagnostics]
EEPROM failure	Good v	Total stroke	85
Position sensor failure	Good	Total direction change	344
Input signal alarm	ОК	Total time	9.1 h
Position alarm	ОК ∨	Low position time	1.5 h
Deviation alarm	ОК ∨	Minimum temperature	24 Celsius
Temperature alarm	ОК ∨	Maximum temperature	25 Celsius
IP deviation alarm	ОК ∨	Low temperature time	0.0 h
PST alarm		High temperature time	0.0 h

2 [Extended diagnostics] menu opens.

Extended diagnostics						
* To perform diag	gnostics, 'Control mo	de' should	be 'HART'			
Authority setup	Online diag. setup	25 perce	ent step response	One step response	Partial stroke test	Alarm setup
Authority						
Authority			HART		Ŷ	
So Change						
Control mode						
Control mode	2		4-20mA		Ŷ	
% Change						

Menu items are as follows:	
(1) Authority setup	See 3. Authority setup
(2) Online diag. setup	See 7.2. Online diag. se
(3) 25% step response	See 7.3. 25% step resp
(4) One step response	See 7.4. One step respo
(5) Partial stroke test	See 7.5. Partial stroke t
(6) Alarm setup	See 7.6. Alarm setup

Click on the tab to open each menu.

7.2. Online diag. setup

Configure settings related to online diagnosis.

Setup items are as follows:	
-----------------------------	--

Total stroke	: A criteria of the position change to accumulate.
Total direction change	: A criteria of change width to judge direction change.
Low position time	: A criteria of position to judge low position.
High/Low temperature time	: A criteria of temperature to judge high/low temperature.

Online diag. setup 25% step response One step response Partial stroke test (PST)

%1 For settings related to Partial stroke test, see 7.5. Partial stroke test (PST).

: Partial stroke

※ For details on each item, see KGP2000 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.

Extended diagnostics	
* To perform diagnostics, 'Control mode' should be 'HART'	
Authority setup Online diag. setup 25 percent step response One step response Partial s	troke test Alarm setup
😵 All diag. log claer	
Total stroke	Low position time
Criteria 10 %	Criteria 5.0 %
😒 Change	😵 Change
😓 Clear log	😵 Clear log
Total direction change	High/Low temperature time
Criteria 10 %	Criteria (Low) 0 Celsius
Se Change	Criteria (High) 50 Celsius
😵 Clear log	😵 Change
	😵 Clear log

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	l menu group.
\sim	0			

- 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 Next

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				
Alarm			Online diagnostics	
EEPROM failure	Good	~	Total stroke	85
Position sensor failure	Good	~	Total direction change	344
Input signal alarm	OK	~	Total time	9.1 h
Position alarm	ОК	~	Low position time	1.5 h
Deviation alarm	ОК	U	Minimum temperature	24 Celsius
Temperature alarm	ОК	~	Maximum temperature	25 Celsius
IP deviation alarm	ОК	~	Low temperature time	0.0 h
PST alarm			High temperature time	0.0 h
PST stroke alarm	ОК	v		

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	High temperature time	: Ambient high temperature
	temperature time		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.



7.2.1.1. All diag. 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.

lo perform diagnostics, 'Control mode' sho	uld be 'HARI'		
Authority setup Online diag. setup 25 pe	rcent step response One step response P	artial stroke test Alarm setup	
😵 All diag. log claer			
Total stroke		Low position time	
Criteria	10 %	Criteria	5.0 %
% Change		🗫 Change	
😵 Clear log		😓 Clear log	
Total direction change		High/Low temperature time	
Criteria	10 %	Criteria (Low)	0 Celsius
😵 Change		Criteria (High)	50 Celsius
😵 Clear log		So Change	
		So Clear log	

2 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.

a monty setup	Online diag. setup	25 percent step response	One step response	Partial stroke test	Alarm setu
Status Mode		4-20mA		~	
Setting					
Step time			60 s		
% Change					
Perform					
Start					
So Start	ration				

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: 60 sec

2) Execution of 25% step response

Click [Start] in the [Perform] menu group.
 % Click [Abort operation] to cancel operation.

Status		
Mode	HART	Ÿ
Setting		
Step time	6	50 s
% Change		
Perform		
% Start		
So 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 [Result] in the [Result] menu.



② To check the result, Click [Update test result]. The execution results are read from the positioner, and the display is updated.

Result					=	□ ×
🗫 Update test result						^
💝 Save as		•				
< Now >		< Prev. >		< Init. >		
O.S. 0-25	0.0 %	O.S. 0-25	0.0 %	O.S. 0-25	0.0 %	
O.S. 25-50	0.0 %	O.S. 25-50	0.0 %	O.S. 25-50	0.0 %	
O.S. 50-75	0.0 %	O.S. 50-75	0.0 %	O.S. 50-75	0.0 %	
O.S. 75-100	0.0 %	O.S. 75-100	0.0 %	O.S. 75-100	0.0 %	
O.S. 100-75	0.0 %	O.S. 100-75	0.0 %	O.S. 100-75	0.0 %	
O.S. 75-50	0.0 %	O.S. 75-50	0.0 %	O.S. 75-50	0.0 %	
O.S. 50-25	0.0 %	O.S. 50-25	0.0 %	O.S. 50-25	0.0 %	
O.S. 25-0	0.0 %	O.S. 25-0	0.0 %	O.S. 25-0	0.0 %	
Dev. 0	0.0 %	Dev. 0	0.0 %	Dev. 0	0.0 %	
Dev. 0-25	0.0 %	Dev. 0-25	0.0 %	Dev. 0-25	0.0 %	
Dev. 25-50	0.0 %	Dev. 25-50	0.0 %	Dev. 25-50	0.0 %	
Dev. 50-75	0.0 %	Dev. 50-75	0.0 %	Dev. 50-75	0.0 %	
Dev. 75-100	0.0 %	Dev. 75-100	0.0 %	Dev. 75-100	0.0 %	
Dev. 100-75	0.0 %	Dev. 100-75	0.0 %	Dev. 100-75	0.0 %	
Dev. 75-50	0.0 %	Dev. 75-50	0.0 %	Dev. 75-50	0.0 %	
Dev. 50-25	0.0 %	Dev. 50-25	0.0 %	Dev. 50-25	0.0 %	
Dev. 25-0	0.0 %	Dev. 25-0	0.0 %	Dev. 25-0	0.0 %	
						v
						Close

4) Save the execution results

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

So Update 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.

🐵 Save as	×
Save as	
Save to	Prev. ~
	Prev.
	Init.
(Abort Next

7.4. One step response

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





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

uthority setup	Online diag. setup	25 percent step response	One step	o response	Partial stro	oke test	Alarm setu
Status							
Mode		4-20mA			~		
Setting							
Start setpoint			25	%			
End setpoint			75	%			
Step time			20	s			
Wait time			0	s			
Sample time			100	ms			
⋟ Change							
Perform							
On Start							

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 [s]	: Set a start setpoint. Initial value: 25%
End setpoint [s]	: 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 [s]	: 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.

Perform	
🗫 Start	
So Abort operation	

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



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



④ Confirm the message and Click [Next] to complete process.

1999 Start	×
One step operation has completed. Please exit method to see the updated graph	
Abort Next	

5 Display the Graph.



% If the graph does not update, click [View graph]. The graph will be displayed in a new window.

3) Clear the one step response graph display data

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

View graph	
😵 Clear graph	

② Graph will be cleared to initial condition.


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

7.5. 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 perc	ent step response	One step	o respons	Partial str	oke test	Alarm setu
PST status								
Mode			4-20mA			~		
Setting								
PST online enal	ble		Disable			~		
Stroke size				10	%			
Completion str	oke			9.8	%			
Start stroke				2.0	%			
Abort time limi	t			30	s			
Start time limit				10	s			
Interval day				1	day(s)			
Direction			- minus			~		
😓 Change								
Manual 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 day(s)	
Direction	- minus	~
Se 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 limit", "Start time limit", "Interval day" in the same way.

X 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	v]
•		Abort Next	

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
Interval day [day(s)]	: Set an interval of periodical execution. Initial value 1day
Direction	: Set a direction to move. Initial value -minus

2) Execution of Partial stroke test

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

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

Manual	PST	
% Sta	rt	
So Ab	ort operation	

② Confirm the message and click [Next].

🐵 Start	×
You are about t	o perform PST manually
•	Abort Next

7.6. Alarm setup

This device has a self-diagnosis function that generates an alarm.

Alarm conditions related to valve position, deviation, IP deviation and temperature 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:

Position alarm	: Position alarm
Deviation alarm	: Deviation alarm
Temperature alarm	: Temperature alarm
IP deviation alarm	: IP deviation alarm

MENU) Diagnostics > Extended diagnostics > Alarm setup

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

uthority setup Online diag. se	tup 25 percent step response One step resp	onse Partial stroke test Alarm setup	
Position alarm		Temperature alarm	
0% side	Disable	 Low alarm 	Disable
Threshold	-26.0 %	Threshold	-40 Celsius
100% side	Disable	✓ High alarm	Disable
Threshold	126.0 %	Threshold	85 Celsius
% Change		😓 Change	
NAMUR status		NAMUR status	
Position alarm	Check function	 Temperature alarms 	Out of specification
% Change		😵 Change	
Deviation alarm		IP deviation alarm	
Deviation alarm	Disable	 IP deviation alarm 	Disable
Threshold	99 %	Threshold	0 %
Waiting time	99 s	😵 Change	
% Change		NAMUR status	
NAMUR status		IP deviation alarm	Maintenance requied
Deviation alarm	Check function	Change	

Displays the current alarm settings and NAMUR status settings.

X See KGP2000 instruction manual for details for each alarm item.

7.6.1. 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.

authority setup	Online diag. setup	25 percent step response	One step response	Partial strok	e test Alarm setup
Position alarm					Temperature alarm
0% side		Disable		\sim	Low alarm
Threshold			-26.0 %		Threshold
100% side		Disable		~	High alarm
Threshold			126.0 %		Threshold
😵 Change					😵 Change
NAMUR statu	IS				NAMUR status
Position alarr	n	Check function		~	Temperature alarms

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	×
l ow alar	Dicable
LOW alar	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 entered 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.

Q Offline	9	Device Settings	Diagnostics 🛞	Maintenance	Online
Extended diagnostics					
Alarm					
EEPROM failure		God	d		~
Position sensor failure		Goo	d		Ŷ
Input signal alarm		ОК			Ŷ
Position alarm		ОК			Ŷ
Deviation alarm		ОК			Ŷ
Temperature alarm		ОК			Ŷ
IP deviation alarm		ОК			Ŷ
PST alarm					
PST stroke alarm		ОК			Ŷ
PST incomplete alarm		ОК			\sim
So Alarm clear					
•					

Display items are as follows:

[Alarm]			
EEPROM failure	: Memory failure	Position sensor failure	: Position sensor
Input signal alarm	: Input signal alarm	Position alarm	: Position alarm
Deviation alarm	: Deviation alarm	Temperature alarm	: Temperature alarm
IP deviation alarm	: IP deviation alarm		
[PST alarm]			
PST stroke alarm	: PST stroke alarm	PST incomplete alarm	: PST incomplete alarm

3) Alarm clear

MENU) 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.

🕂 🗘 🗸 Offline 🙎	Device Settings Diagnostics 🛞 Maintenance		Maintenance	Online
Extended diagnostics				
Alarm				
EEPROM failure	Good	d		\sim
Position sensor failure	Good	ł		~
Input signal alarm	ОК			~
Position alarm	ОК			~
Deviation alarm	ОК			~
Temperature alarm	ОК			~
IP deviation alarm	ОК			Ŷ
PST alarm				
PST stroke alarm	ОК			~
PST incomplete alarm	ОК			~
🗫 Alarm clear				
v				_

7.6.2. NAMUR status assignment

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

The position alarm is shown below as an example.

MENU) Diagnostics > Extended diagnostics > Alarm setup

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

Authority setup	Online diag. setup	25% step response	One step response	Partial stroke test	Alarm setup
Position alarm					Temperature a
0% side		Disable		~	Low alarm
Threshold			-26.0 %		Threshold
100% side		Disable		~	High alarm
Threshold			126.0 %		Threshold
% Change					% Change
NAMUR state	15				NAMUR stat
Position alar	n	Check funct	tion	\sim	Temperatur
😒 Change					😓 Change

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

🐵 Change	×
NAMUK 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

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. X This operation does not update the positioner data.

MENU) Offline

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

|--|

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

🐠 🌣 🔍 Offline 🗵	Q Device S	ettings	Diagnostics \bigotimes	Maintenance	Onlin
Device settings Diagnostics	Maintenance				
Authonity setup					
Authority		HART			~
Control mode		4-20m/	A.		~
Basic setup					
Actuator motion		Linear			~
Actuator type		Single			~
Valve action		ATO			~

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.

Device Settings Diagnostics 🛞 Maintenance Onlin Device settings agnostics Maintenance HART v Authority Control mode 4-20mA Basic setup Linear Actuator motion Single Actuator type ATO Valve action Packing friction Low Disable Booster option Booster type Large v Set point dir. Normal Posi. transmit. dir. Normal v

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

③ Change setting (select "Rotary" here).

Device settings Diagnostics	Maintenance	
Authority setup		
Authority		HART Y
Control mode		4-20mA ~
Basic setup	-	
Actuator motion		Linear Y
Actuator type		Linear
	L	Rotary
Valve action		AIO

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 v
Basic setup	
Actuator motion	Rytary *
Actuator type	Single v
Valve action	ATO v
Packing friction	Low v
Booster option	Disable v
Booster type	Large v
Set point dir.	Normal v
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.



- ① Click pull down menu.
- 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		
Set point	50.0	%
Position	50.0	%
Input	50.0	%
Loop Current	12.006	mA
Information		
Authority setup		
▷ Setup		
Maintenance		
Diag & Alarms		
		_

Figure 9.1.1 Online root menu

This menu allows to monitor the current status of the positioner.

Displayed items are as follows:

Set point	: Set point	Position	: Valve position
Input ※	: Percentage of input signal	Loop current	: Input current

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

9.1.2. Sub menu

9.1.2.1. Information menu

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

▲ Online		
Set point	50.0	%
Position	50.0	%
Input	50.0	%
Loop Current	12.005	mA
 Information 		
▷ Monitor		
▷ Alarm		
▷ PST alarm		
Version		
Config. parameter		
Online 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.

▲ Online				
Set point	50.0	%		
Position	50.0	%		
Input	50.0	%		
Loop Current	12.005	mA		
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				
Set point	50.0	%		
Position	50.0	%		
Input	50.0	%		
Loop Current	12.005	mA		
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.



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				
	Set point	50.0	%	
	Position	50.0	%	
	Input	50.0	%	
	Loop Current	12.006	mA	
₽	Information			
▷ Authority setup				
▷ Setup				
⊳	Maintenance			
4	Diag & Alarms			
	Doline diag. setup			
▷ PST setup				
▷ 25% step response				
	▷ 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	50.0	%	
Position	50.0	%	
Input	50.0	%	
Loop Current	12.005	mA	
IP signal	59.3	%	
Temperature	23	°C	
▲ Status			
Authority	HART		
Mode	HART		
Control mode	HART		

Displayed items are as follows:

Set point	: Set point	Position	: Valve position
Input ※	: Percentage of input signal	Loop current	: Input current
IP signal	: IP signal current	Temperature	: Temperature
[Status]			
Authority	: rewrite authority	Local operation mode	: Special control mode
Control mode	: operational authority.		

X 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
Input signal alarm	OK
Position alarm	OK
Deviation alarm	OK
Temperature alarm	OK
IP deviation alarm	ОК

Displayed items are as follows:

EEPROM failure	: Memory failure	Position sensor failure	: Position sensor failure
Input signal alarm	: Input signal alarm	Position alarm	: Position alarm
Deviation alarm	: Deviation alarm	Temperature alarm	: Temperature alarm
IP deviation alarm	: IP deviation 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

Displayed items are as	s follows:		
PST stroke alarm	: PST stroke alarm	PST incomplete alarm	: PST incomplete 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	
4 Serial No	
Serial No.	0000000
4 Verrien	0000000
Electronics	
	1
	0
	0
Software	
	1
	0
	0
▲ HART version	
HART Protocol Revision	7
Device Revision	1

Displayed items are as follows:

[]			
Serial No.	: Serial number		
Electronics	: Hardware revision	Software	: Software revision
HART Protocol Revision	: HART protocol revision	Device Revision	: 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	
Config. parameter	
Basic setup	
Easy/Expert tuning	
Detail setup	
Online diagnostics	

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
Valve action	ATC
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
Valve action	: Direction of a valve when	Packing friction	: Packing material
	Pout1 is output		
Booster option	: Booster option	Booster type	: Booster type
	enable/disable		
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	
Easy/Expert tuning	
Rank	XS
Response tuning	0 Normal
Detail setup	

Displayed items are as follows:

Rank : Rank of the PID parameter	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		
∠ 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	
Input damper flag	Disable	
Input damper factor	100.0	
Range ability	1	
Split range 0%	4.0	mA
Split range 100%	20.0	mA
PT burnout dir.	Low	
AT span limit	105	%

Displayed items are as follows:

Cutoff/Limit 0% side	: Cutoff/Limit 0% side enable/disable	Cutoff/Limit 0% value	: Cutoff/Limit 0% side value
Cutoff/Limit 100% side	: Cutoff/Limit 100% side enable/disable	Cutoff/Limit100% value	: Cutoff/Limit 100% side value
Dead band flag	: Deadband enable/disable	Dead band value	: Deadband value
Transfer function	: Transfer function		
Input damper flag	: Input dumper enable/disable	Input damper factor	: Input damper factor
Range ability	: Range ability		
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

9.2.6. Online diagnostics

The result of the online diagnostics can be checked.

① Open [Online diagnostics] menu.

▲ Online		
Set point	50.0	%
Position	50.0	%
Input	50.0	%
Loop Current	12.001	mA
▲ Information		
Monitor		
▷ Alarm		
▷ PST alarm		
Version		
Config. parameter		
4 Online diagnostics		
Total stroke	85	
Total direction change	344	
Total time	9.6	h
Low position time	1.5	h
Minimum temperature	24	Celsius
Maximum temperature	25	Celsius
Low temperature time	0.0	h
High temperature time	0.0	h

Displayed items are as follows:

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	
	temperature time		time	

9.3. Authority setup

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 0.2 List of calestable functions

Items	Description	Parameter	Default
Authority	Set write authority to HART communication. Select HART in case in which settings should be configured via not LUI but HART communication only. <u>Once HART is selected, only "Information" and</u> <u>"Authority" from "TOP" menu will be able to be</u> <u>accessed through LUI.</u> ※ 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.	LCD / HART	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

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	4-20mA
Change	Change

9.4. Setup menu

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

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 KGP2000 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	<u>Change</u>

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

🐵 Change	×
Actuator motion	
Actuator motion	Linear v
	Linear
	Rotary
1	Abort Next
T	

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	
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 Ne	xt

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

Easy tuning		
▷ Full autotune		
 Tuning result 		
Update tuning result	Update tuning result	
Rank	XS	
Stroke sp. (Air-In)	440	ms
Stroke sp. (Air-Out)	580	ms
Bias value	50.3	%
IP signal	49.9	%

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 	
Full autotune	
Tuning result	
A Response tuning	
Response tuning	0 Normal
Change	Change

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	
A 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].



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	% ~	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%	

- 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.

Position	10.2	%
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		

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].

🐵 Span autotune	×
You are a	bout to start Span autotune
•	Abort 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.



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	

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.



If change the rank by two or more, unexpected behavior (too slow response, too fast response) may occur, so 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. On the other hand, increasing the proportional gain causes instability and hunting.

X Detail for each parameter, see KGP2000 instruction manual.

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

Expert tuning	
PID parameter set	
Rank	XS
Change	Change

② Select rank and click [Next] to configure.

🐵 Change			×
Rani	Custom ~ Custom XS SS S M	Abort	Next

9.4.3.2. 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 KGP2000 instruction manual.

① Open [PID custom setup] menu.

 Expert tuning 	
 PID parameter set 	
Rank	Custom
Change	Change
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. Sensitivity setup

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.

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

X 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].

🐵 Auto bias and rank	×
You are about to start auto bias and rank tuning.	
Abort N	ext

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

 Auto bias and rank 			
Autotune status	Complete autotune		
Autotune result	Completed OK!		
Auto bias and rank	Auto bias and rank		
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**.

1-2) Set IP signal current bias only.

Only IP signal bias settings are automatically performed.

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

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

2 Confirm the message and click [Next].

🐵 Auto bias		×
	You are about to start auto bias tuning	
•	Abort 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**.

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.	

% Refer to the KGP2000 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				

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 curve] menu.

▲ Setup	
Basic setup	
Easy tuning	
Expert tuning	
Detail setup	
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
LCD display mode	: LCD display mode of valve position

X See KGP2000 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				
4 Function select				
Password setup				
Screen saver				
Temperature 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.

	Ŵ	Caution			
	To change	the settings, "Author	ty " must be "HART".		
Me	enu items 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.

4	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

① Open [Calibration] menu.

 Maintenance 	
A Calibration	
Input signal cal.	
Cross point cal.	
Position transmit. 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 has 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% ~	L
Adjust cross point	0.1%	L
1) Set adjust value	0.2%	L
2) Adjust and Set by buttons below	0.5%	L
3) Abort : Abort calibration	1.0%	L
	5.0%	L

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%	~
Adjust cross point		
1) Set adjust value		
2) Adjust and Set by buttons below		
3) Abort : Abort calibration		\sim
<		>
At	bort OK(set) Down(-)	Up(+)

9.5.1.3. Cross point 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
•	Abort OK(set) Domn() Up(1)

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

1 10 10 10 10 10 10 10 10 10 10 10 10 10			×
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		Х
Adjust value (1-255)[dec]	1 ~	\sim
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 Abox OK(set) Denn() Up()

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

🐵 100% 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(+)

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.

4 Simulation test	
Manual setpoint	
▷ IP signal	
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].



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	
	Abolt	

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].

 Simulation test 	
Manual setpoint	
▷ IP signal	
A Position transmitter	
Simulate	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, 100.1	:NAMUR High, 100.2:NAMUR Low)[%]
Position transmit. adj.	0.0 %
•	Abort Next

9.5.3. Service

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

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

① Open [Service] menu.

Maintenance		
Calibration		
Simulation test		
✓ Service		
Raw AD values		
▷ Angle		
Stroke angle		
▷ Time stamp		
PWM information		
PID values		
▷ Factory menu		

Display items are as follows:

[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 position(cos)	Temperature	: AD value of temperature
[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 obtain	n the latest information.	_	
[Time stamp]			
Date	: Firmware time stamp - Date	Time	: Firmware time stamp - Time
[PWM information]			
Position transmit. PWM	: PWM value of position transmitter	Torque motor (PWM)	: PWM value of IP signal current
[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	
Factory menu	ON
Change	<u>Change</u>

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


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
D Calibration
D 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	KGP2000
Device Identifier	0
HART Protocol Revision	7
Device Revision	1
Tag	????????
Change Tag	Change Tag
Long Tag	77777777777777777777777777777777777
Change Long tag	Change Long tag
Descriptor	777777777777777
Change Descriptor	Change Descriptor
Date	2015/01/06
Change Date	Change Date
Message	777777777777777777777777777777777777
Change Message	Change Message
Final Assembly Number	0
Change Final assembly num.	Change Final assembly num.

[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 Accombly Number	Final Assambly Number			

Final Assembly Number : Final Assembly Number

X This is read-only and cannot be changed.

Display items are as follows:

1) How to change HART device information

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	77777777
•	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.

<u>X</u> In order for the positioner to respond to Find device, the positioner setting "Maintenance > HART Relation > Find device" must be set to "Armed".

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

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



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 Relations > 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 💉
	Change Number of Squawks
	Squawk
()	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	Set point
Quaternary Variable	Temperature
Change	<u>Change</u>

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



③ Select variables to assign and click [Next].



The valiables that call be set are as follows.		
Input	: Percentage of Input signal	
Position	: Valve position	

Set point	: Set point
Temperature	: Temperature
Deviation	: Deviation
IP signal	: IP signal current
Pot. angle	: Angle of potentiometer

9.5.4.5. Reboot

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



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	
✓ Reboot	
Reboot	Reboot

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

9.5.5. 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].

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

The items that can be set are as follows:

% For details on each item, see KGP2000 instruction manual.

9.5.5.1. Restore factory default

Return to factory default settings.

Caution



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

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



- 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.

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

① Open [Diag & Alarm] menu.

⊿ Diag & Alarms	
Online diag. setup	
PST setup	
25% step response	
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
Alarm setup	: Alarm setup

9.6.1. Online diag. setup

Configure settings related to online diagnosis.

Total stroke	: A criteria of the position change to accumulate
Total direction change	: A criteria of change width to judge direction change
Low position time	: A criteria of position to judge low position
High/Low temperature time	: A criteria of temperature to judge high/low temperature
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 KGP2000 instruction manual.

① Open [Online diag. setup] menu.

▲ Diag & Alarms	
 Online diag. setup 	
All diag. log claer	<u>All diag. log claer</u>
▷ 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) Setting of total stroke criteria

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

ا Diag & Alarms	
 Online diag. setup 	
All diag. log claer	<u>All diag. log claer</u>
4 Total stroke	
Criteria	10 %
Change	Change
Clear log	<u>Clear log</u>

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].

▲ Diag & Alarms	
 Online diag. setup 	
All diag. log claer	<u>All diag. log claer</u>
4 Total stroke	
Criteria	10 %
Change	Change
Clear log	<u>Clear log</u>

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



9.6.1.2. All diag. log clear

- 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	
۱		

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.





Caution

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
Interval day	1	day(s)
Direction	- minus	
PST status	Waiting(Stop)	
Change	Change	
Start	Start	
Abort operation	Abort operation	

9.6.2.1. PST online diagnostic settings and results

1) Settings of the PST

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
Interval day	1	day(s)
Direction	- minus	
PST status	Waiting(Stop)	
Change	Change	
Start	Start	
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
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 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] in the [PST setup] menu.

PST status	Waiting(Stop)
Change	Change
Start	Start
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.



Setting value is as follows:

```
Step time [s] : Set a waiting time per 1 step. Initial value: 60sec
```

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	
▷ Setting	
4 Perform	
Mode	LIADT
Start	Start
Abort operation	Abort operation

2 Confirm the message and click [Next].

1999 Start	×
You are about to perform 25% step response	
Abort	Next

- ③ Wait until "Mode" field becomes "HART".
- 9.6.3.3. Check and save the results of 25% step response

1) Check the results

① Click [Update test result] in the [Result] menu to read execution results from the positioner and calculates the results.

▲ 25% step response	
▷ Setting	
▷ Perform	
⊿ Result	
Update test result	Update test result
Save as	Save as
▷ < Now >	
Prev. >	
▷ < Init. >	

② Click "< Now >" to check the current execution results.

▲ 25% step response		
Setting		
▷ Perform		
▲ Result		
Update test result	Update test result	
Save as	Save as	
⊿ < Now >		
O.S. 0-25	0.0	%
O.S. 25-50	0.4	%
O.S. 50-75	0.3	%
O.S. 75-100	0.3	%
O.S. 100-75	-0.6	%
O.S. 75-50	-0.3	%
O.S. 50-25	-0.3	%
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	%
Prev. >		
▷ < Init. >		

2) Save the results

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

▲ 25% step response	
▷ Setting	
▷ Perform	
⊿ Result	
Update test result	<u>Update test result</u>
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.	Ŷ
•	Init. Abort	Next

9.6.4. Alarm setup

This positioner has a self-diagnosis function that generates an alarm.

Alarm conditions related to valve position, deviation, temperature, and IP deviation 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:

Position alarm	: Position alarm	
Deviation alarm	: Deviation alarm	
Temperature alarm	: Temperature alarm	
IP deviation alarm	: IP deviation alarm	

X See KGP2000 instruction manual for details for each alarm item.

① Open [Alarm setup] menu.

Alarm setup	
Position alarm	
Deviation alarm	
Temperature alarm	
IP deviation alarm	
Alarm clear	<u>Alarm clear</u>

9.6.4.1. Alarm and NAMUR status setup, check status, and clear

1) Alarm clear

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.

 Alarm setup 		
Position alarm		
0% side	Disable	
Threshold	-26.0	%
100% side	Disable	
Threshold	126.0	%
Change	<u>Change</u>	
 NAMUR status 		
Position alarm	Check function	
Change	<u>Change</u>	
Deviation alarm		
Temperature alarm		
IP deviation alarm		
Alarm clear	<u>Alarm clear</u>	

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.

 Alarm setup 		
Position alarm		
0% side	Disable	
Threshold	-26.0	%
100% side	Disable	
Threshold	126.0	%
Change	<u>Change</u>	
 NAMUR status 		
Position alarm	Check function	
Change	<u>Change</u>	
Deviation alarm		
Temperature alarm		
▷ IP deviation alarm		
Alarm clear	Alarm clear	

② Select NAMUR status classification and click [Next].

🐵 Change	×
NAMUR 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.

4 Online		
Set point	50.0	%
Position	50.0	%
Input	50.0	%
Loop Current	12.007	mA
 Information 		
Monitor		
⊿ Alarm		
EEPROM failure	Good	
Position sensor failure	Good	
Input signal alarm	OK	
Position alarm	OK	
Deviation alarm	OK	
Temperature alarm	OK	
IP deviation alarm	OK	

9.6.4.2. 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 		
Position alarm		
0% side	Disable	
Threshold	-26.0	%
100% side	Disable	
Threshold	126.0	%
Change	<u>Change</u>	
 NAMUR status 		
Position alarm	Check function	
Change	<u>Change</u>	
Deviation alarm		
Temperature alarm		
IP deviation alarm		
Alarm clear	Alarm clear	<u>></u>

10. Trouble shooting

When problems occurred at the operation starting or during operation, please refer to the following table and take an action appropriately.

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
Maya tao claw	Actuator abnormality / Packing sticking or wear out	✓ Replace packing
wove 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
Dedees	Abnormal attachment	 ✓ Check there are no backlashes ✓ Check whether a feedback lever becomes horizontal at 50% position ✓ Readjust cross point
вай ассигасу	Abnormal control	 ✓ Check PID parameter ✓ Check dead band setting
	Actuator abnormality / Packing sticking or wear out	✓ Replace packing
	Loss of electrical power, disconnection or miswiring	✓ Check input current✓ Check wiring
LCD does not work	Temperature is too low	 ✓ Check indication in the LCD specification temperature range.
	Breakdown of positioner	Inquire to our office
Position transmitter	Loss of electrical power, disconnection or miswiring	✓ Check input voltage✓ Check wiring
output or drifts	Adjustment difference	 ✓ Implement position transmitter current calibration
Leak from valve seat	Lack of actuator output	 ✓ Increase actuator output (Raise actuator size)
01 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		内容
	Phenomenon	It does not reach the 0% travel position or steady state.
Error at closing	Possible	Lack in off-balanced pressure
Error at closing Error at opening Error at stopping	causes	
	Solution	Confirm off-balanced pressure
	Phenomenon	It does not reach the 0% travel position or steady state.
Frror at opening	Possible	Lack in off-balanced pressure
Litor at opening	causes	
	Solution	Confirm off-balanced pressure
	Phenomenon	It does not reach 100% travel position or the steady state.
	Possible	• Valve friction is large and a limit cycle is occurring.
	causes	•A limit cycle has occurred due to mechanical backlash such as the tension spring falling
		off or the screw loosening.
Error at stopping		•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	Possible	Decrease or pulsation in supply pressure
measurement	causes	
	Solution	Confirm the supply pressure

Table B 1	List of	error	messages
		CITUI	messages

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 enter 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									_		×
* To perform device tuning, 'Cont	rol mode' should be 'HART'										
Authority setup Basic setup E	asy tuning Expert tuning	Detail setup	Custom curve	Functio	on select						
Cutoff or Limit					Dampe	er setting					
Cutoff/Limit 0% side	Cutoff			\sim	Input o	damper flag	Disable			~	
Cutoff/Limit 0% side value		0.5	%		Input o	damper factor				Input da	mper fla
Cutoff/Limit 100% side	Disable			\sim	% • C	hange				input da	inper se
Cutoff/Limit 100% side value		99.5	%		Split ra	ange					
😒 Change					Split ra	ange 0%		4.0 mA			
Dead band					Split ra	ange 100%		20.0 mA			
Dead band flag	Disable			\sim	% C	hange					
Dead band value		0.3	%	_	⊂PT bur	mout dir.					
😵 Change					PT bur	rnout dir.	Low			Ŷ	
Transfer function					% CI	hange					
Transfer function	Linear			~	AT spa	an limit					
😒 Change					AT spa	an limit		105 %			
Range ability					% C	hange					
Range ability				1							
🗫 Change											
<										C	>
										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 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.

199 Extended device settings	-		Х
* 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		_	
Autotune result Completed OK!			
😵 100% position adjust			
Auto span			
So Span autotune			
So Abort autotune			
Tuning result			
Tuning result			-
Position			
Response tuning			
Kesponse tuning 0 Normai			
So Change	-	Position	
20 0 80 -	_	POSICIO	
10 90			
0 % 100			
<			>
		Clos	e

2 A confirmation dialog will be displayed, so click [Next].

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

109 Extended device settings	_		×
* 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			
Autotune status Complete autotune			
Autotune result Completed OK!			
Full autotune			
So Full autotune			
So Abort autotune			
Tuning result			
Tuning result Position			٦ L
Response tuning 0 Normal So Change 30			
		Position	1
		Clos	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	Ý
	Disable	
	Enable	
•	Abort	Next

③ If select "Enable", confirm the message and click [Next].

Password setup	×
You are about to set password	, don't forget the password !!
()	Abort Next

④ Enter a three-digit password and click [Next] to set it.

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'			•
<			>
		Clos	se 🛛

For handheld application menu

▲ Online	
Open protected menu	Open protected menu
Open force clear password menu	Open force clear password menu
▷ Information	

<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.</u>

■ 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
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Abu Dhabi Branch	Tel. (971) 2-639-06-55	Fax. (971) 2-639-08-89
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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 Engineering Co., Ltd., Seoul, Korea	Tel. (82) 2-539-9018	Fax. (82) 2-566-5119
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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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