

For your safety, please read the following before using.

- ① Do not use corrosive or flammable gas or liquid with this product.
- ② Please use within the rating pressure range. Do not apply pressure beyond recommended maximum withstand pressure, permanent damage to the pressure sensor may occur.
- ③ Do not drop, hit or allow excessive shock. Even if switch body appears undamaged, internal components may be broken and can cause malfunction.
- ④ Please turn off the power before connecting the product to the circuit control system. The solenoid valve driver is without short-circuit protection. If the red wire and the black wire contact, a short circuit will cause the solenoid valve control switch to burn out to damage the product.
- ⑤ Do not use in environment containing steam or oil vapor.
- ⑥ This product is not explosion-proof rated. Do not use in atmosphere containing flammable or explosive gases.
- ⑦ Wiring for pressure sensor should avoid power source line and high voltage line. If use in the same circuit, noise may cause malfunction.
- ⑧ Sensors at end-of-life must be disposed of in accordance with E-Waste regulations of the country/region, NOT disposed of with regular garbage.

A SPECIFICATIONS

MODEL		KP93		
Rated pressure range		-100.0 ~ 100.0kPa		
Set pressure range		-105.0 ~ 105.0kPa		
Withstand pressure		500kPa		
Fluid		Filtered Air, Non-corros / Non-flammable gas		
Set pressure resolution	kPa	0.1		
	kgf/cm ²	0.001		
	bar	0.001		
	psi	0.01		
	inHg	0.1		
	mmHg	1		
Power supply voltage		24V DC \pm 10%, Ripple (P-P) \leq 10%		
Current consumption		\leq 40 mA (With no load)		
Switch output		NPN or PNP open collector Max. load current : 125 mA Max. supply voltage : 24V DC Residual voltage : \leq 1.5V		
Command input		<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">NPN type Low-voltage input (Reed or Solid state), Low level : 0.4V DC or less, 10 ms or longer input</td> <td style="width: 50%; border: none;">PNP type High-voltage input (Reed or Solid state), High level : 20 ~24V DC, 10 ms or longer input</td> </tr> </table>	NPN type Low-voltage input (Reed or Solid state), Low level : 0.4V DC or less, 10 ms or longer input	PNP type High-voltage input (Reed or Solid state), High level : 20 ~24V DC, 10 ms or longer input
NPN type Low-voltage input (Reed or Solid state), Low level : 0.4V DC or less, 10 ms or longer input	PNP type High-voltage input (Reed or Solid state), High level : 20 ~24V DC, 10 ms or longer input			
Solenoid valve max. load current		200mA@24V DC max.		
Repeatability		\pm 0.2% F.S. \pm 1 digit		
Response time		\leq 2.5ms (chattering-proof function: 2.5ms, 20ms, 100ms, 500ms, 1000ms and 1999ms selectable)		
Output short circuit protection		OUT : Yes , V-sol / D-sol : None		
Display		3 ½ digit LED 7display (RED) (Sampling rate : 5 times / sec.)		
Indicator accuracy		\pm 2% F.S. \pm 1 digit		
Switch on indicator		OUT : Green , Command 1 V-Sol output : Red		
Environment	Enclosure	IP40		
	Ambient temp. range	Operation:0 ~ 50°C, Storage:-10 ~ 60°C (No condensation or freezing)		
	Ambient humidity range	Operation / Storage : 35 ~ 85% RH (No condensation)		
	Withstand voltage	1000V AC in 1-min (between case and lead wire)		
	Insulation resistance	\geq 50M Ω (at 500V DC, between case and lead wire)		
	Vibration	Total amplitude 1.5mm or 10G, 10Hz-150Hz-10Hz scan for 1 minute, two hours each direction of X, Y and Z		
Shock		980m/s ² (100G), 3 times each in direction of X, Y and Z		
Temperature characteristic		\pm 2% F.S. of detected pressure (25°C) at temp. (Range of 0 ~ 50°C)		
Port		L port / M5 port / None		
Lead wire		\varnothing 4 Oil-resistance cable (PVC) - 26 AWG (0.15 mm ²) - 5 cores		
Weight		Approx. 58g (with 2 meter lead wire)		

B ORDERING INFORMATION

K P 9 3 - 0 1 - □

Output Specifications

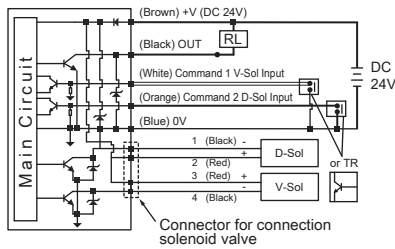
01 : NPN Output
03 : PNP Output

Piping Direction

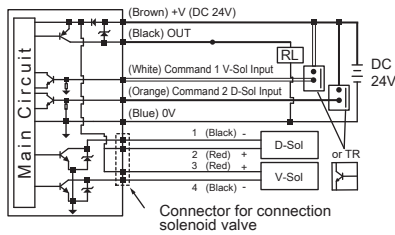
Blank : None
L : L Port
M5 : M5 Port

C OUTPUT CIRCUIT WIRING DIAGRAMS

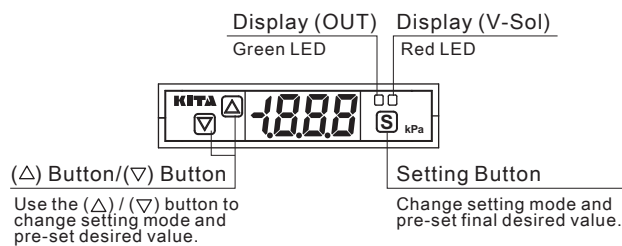
KP93 - 01- □
NPN Output



KP93 - 03- □
PNP Output

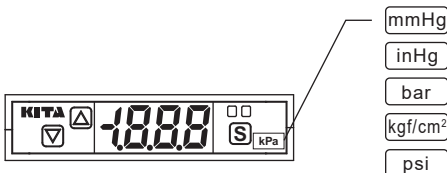


D PANEL DESCRIPTION



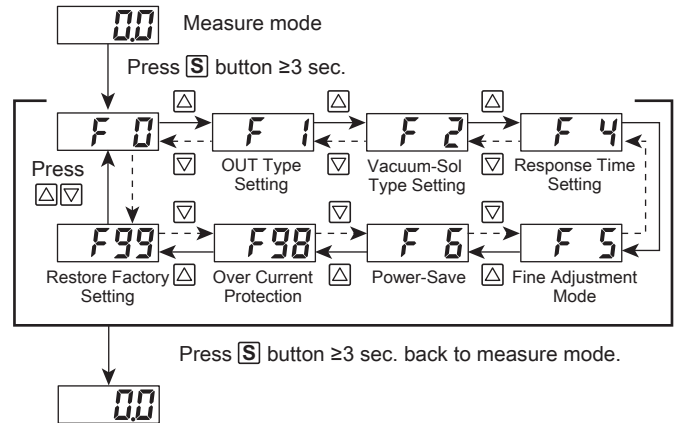
E CHANGE PRESSURE UNIT TAG

When the pressure setting is not kPa, please remove the pressure unit tag and place the selected tag on the indicated area of the faceplate to assure the pressure unit is not misemployed and that setting error does not occur.

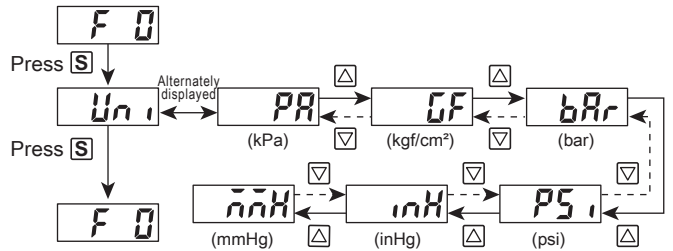


F BASIC SETTING MODE

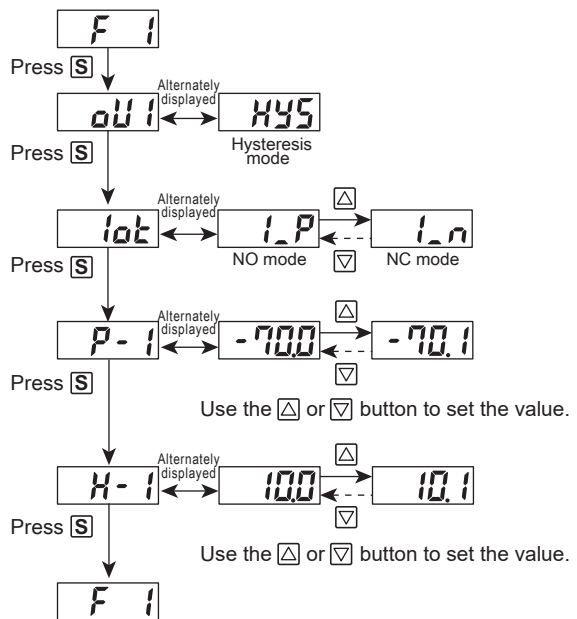
1 Function Selecting Mode



2 Unit Setting (F0)

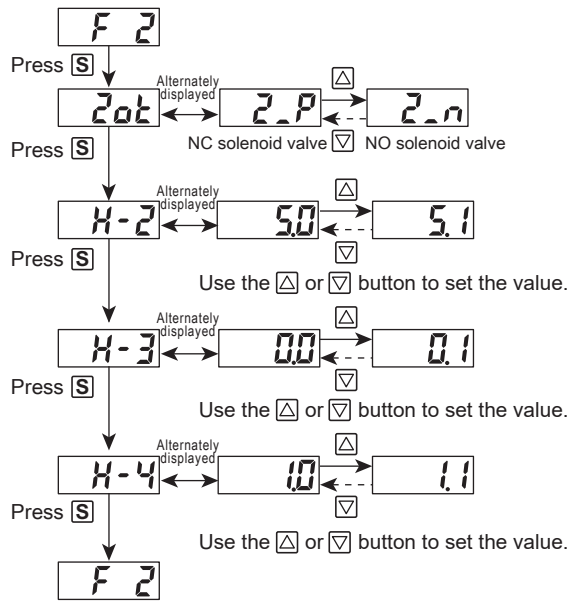


3 OUT Type Setting (F1)

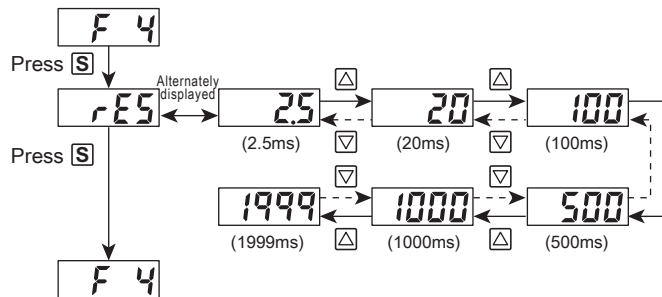


F BASIC SETTING MODE

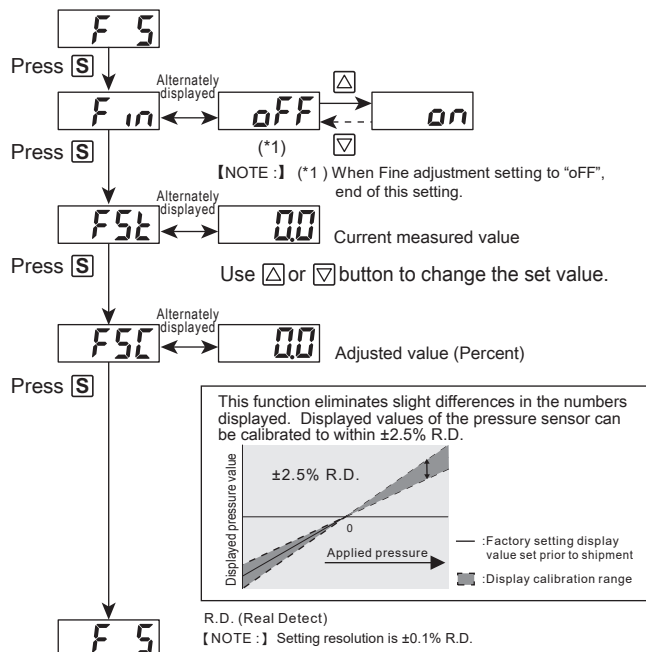
4 Vacuum-Sol Command Output Setting (F2)



5 Response Time Setting (F4)

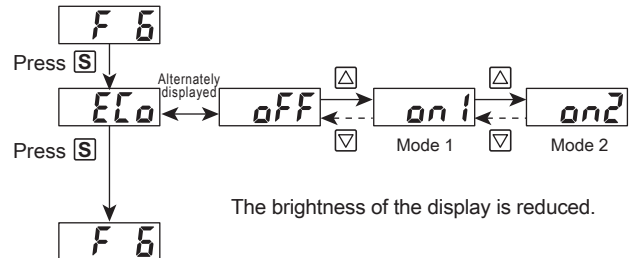


6 Display Fine Adjustment Mode (F5)

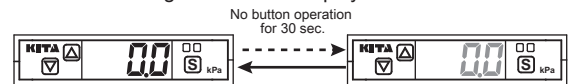


7 Power-Save Mode (F6)

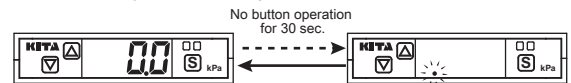
- ⊙ During Power-Save mode, the main display will turned off if no buttons is pressed after 30 seconds.
- ⊙ During Power-Save mode, the output LCD may not be synchronize with the output. It is normal and will not affect output operation.
- ⊙ Press any button to turn-on main display temporarily.



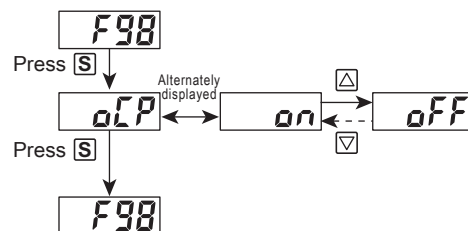
Mode 1 : The brightness of the display is reduced.



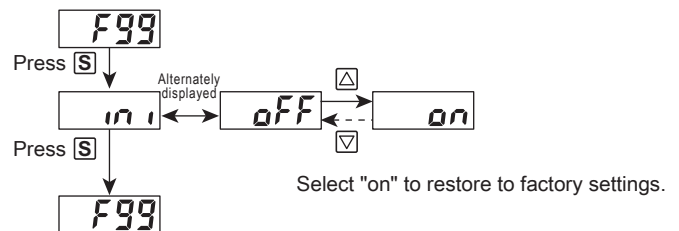
Mode 2 : Only the decimal point flashes.



8 Over Current Protection (F98)

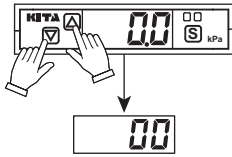


9 Restore Factory Setting (F99)



G ZERO POINT SETTING

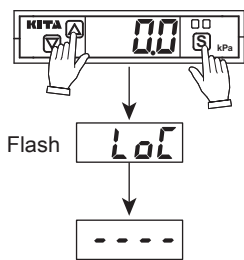
Press and during measurement mode for more than 3 sec. until "00" is shown.



※Zero resetting is possible only with an atmospheric pressure equivalent to 2% or less of F.S.

H KEY LOCK MODE

Key lock mode can prevent operation mistakes.
Press button and button at the same time for 3 sec.



※Unlock setting : Press button and button at the same time until the is displayed.

I OPERATION MODE

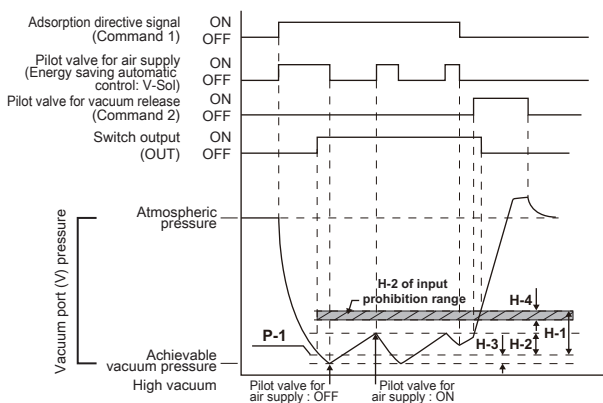
See below for the energy saving control operation and the set values which are preset to the switch.
If the operation shown below does not cause any problems, keep these setting.

Operation of OUT

When the pressure exceeds the set value (P-1), the pressure switch turns ON.
When the pressure decreases below the set value (P-1) by the hysteresis value (H-1), the switch turns OFF.
The default setting are P-1 : -70.0 kPa and H-1 : 10.0 kPa.

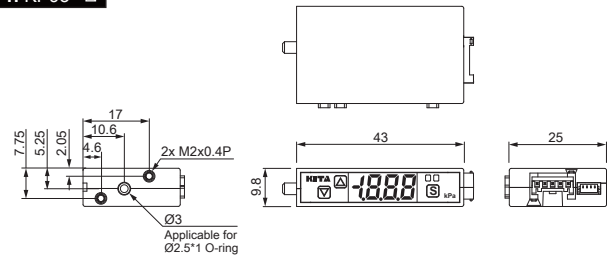
Operation of V-Sol

Supply pilot valve: V-Sol is turned on by the signal for suction.
Suction starts by the generation of vacuum pressure.
When the vacuum pressure reaches the set value (P-1 - H-3 : OFF point of supply pilot valve signal), the supply pilot valve is turned OFF.
After that, when the vacuum level decreases and reaches the suction switch ON point (P-1 + H-2 : Supply pilot valve signal ON point), the supply pilot valve turns on again to maintain the vacuum.
After the supply pilot valve is turned off, the vacuum pressure will decrease.
When the vacuum pressure reaches the suction switch ON point (P-1 + H-2 : ON point of supply pilot valve signal), the solenoid valve for supply will turn ON again and increase the vacuum pressure.
Afterwards, the supply pilot valve repeats this ON and OFF cycle.
Area in which setting of H-2 is prohibited can be set by the range in which H-4 : supply pilot valve signal is prohibited to input. ($H-1 \geq H-2 + H-4$)
The default settings are P-1 : -70.0 kPa, H-1 : 10.0 kPa, H-2 : 5.0 kPa, H-3 : 0.0 kPa, H-4 : 1.0 kPa.

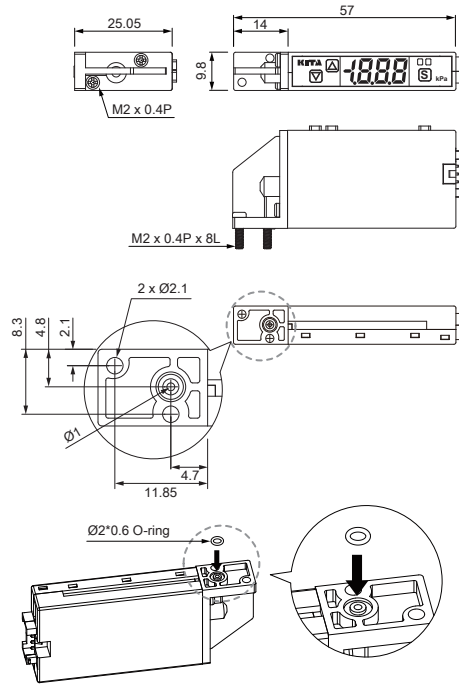


J DIMENSIONS

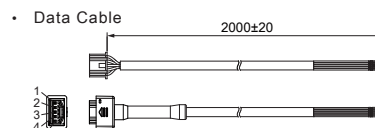
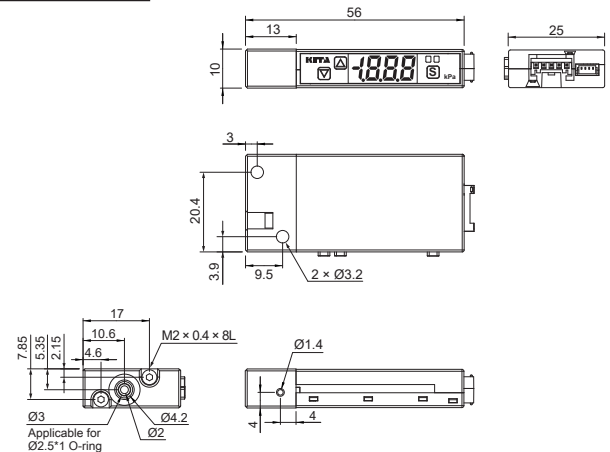
1. KP93 - □



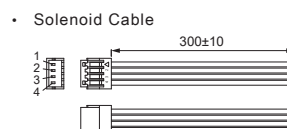
2. KP93 - □ - L



2. KP93 - □ - M5



PINNO.	Data Cable Color
1	DC(+)(Brown)
2	Command 2 D-Sol Input (Orange)
3	Command 1 V-Sol Input (White)
4	OUT (Black)
5	DC(-)(Blue)



PINNO.	Solenoid Cable Color	Solenoid Function
1	D-Sol (-) (Black)	Break solenoid valve
2	D-Sol (+) (Red)	
3	V-Sol (+) (Red)	Vacuum solenoid valve
4	V-Sol (-) (Black)	

Unit : mm

K PRESSURE UNIT CONVERSION TABLE

From \ To	kPa	kgf/cm ²	mmHg	psi	bar	inHg
1 kPa	1	0.010197	7.500616	0.145038	0.010000	0.2953
1 kgf/cm ²	98.0665	1	735.559	14.2233	0.980665	28.95979
1 mmHg	0.13332	0.0013595	1	0.019336	0.0013332	0.039370
1 psi	6.895	0.07031	51.7157	1	0.06895	2.036074
1 bar	100.0000	1.01972	750.062	14.5038	1	29.52998
1 inHg	3.386388	0.034530	25.40000	0.491141	0.033863	1

L ERROR CODE INSTRUCTION

Error Type	Error Code	Error Condition	Troubleshooting
Excess load current error	out Er I	Out load current is more than 125mA.	Turn power off and check the cause of overload current or lower the current load under spec., then restart.
Residual pressure error	Err	During zero reset, ambient pressure is over $\pm 2\%$ F.S.	Change input pressure to ambient pressure and perform zero reset again.
Applied pressure error	LLL	Supply pressure exceeds the upper limit of pressure setting.	Adjust the pressure within operating pressure range.
System error	Er 4	Internal system error Internal data error	Turn power off, and then restart. If error condition remains, please return to factory for inspection.