Display Digital Pressure Sensor **P90** Series CE

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 Turn power off before connecting wiring. Wrong wiring or short circuit will damage and / or cause malfunction.
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.

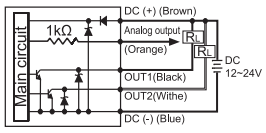
A. SPECIFICATIONS

TYPE		P90P-□-M5 (Positive)	P90V-□-M5 (Vacuum)	P90C-□-M5 (Compound)
Rated pressure range		0.000~1.000MPa	0.0~-101.3kPa	-100.0~100.0kPa
Set pressure range		-0.100~1.000MPa	10.0~-101.3kPa	-101.0~101.0kPa
Withstand pressure		1.5MPa	500kPa	
Fluid		Filtered Air, Non-corros / Non-flammable gas		
Set pressure resolution	kPa	—	0.1	
	MPa	0.001	—	
	kgf/cm²	0.01	0.001	
	bar	0.01	0.001	
	psi	0.1	0.01	
	inHg	—	0.1	
	mmHg	—	1	
Power supply voltage		12 to 24V DC ±10%, Ripple (P-P) 10% or less		
Current consumption		≤ 40 mA (With no load)		
Switch output	Output type	2 NPN or 2 PNP open collector		
	Max. load current	125 mA		
	Max. supply voltage	30V DC (at NPN output), 24V DC (at PNP output)		
	Residual voltage	≤ 1.5V		
	Response time	≤ 2.5ms (chattering-proof function: 25ms, 100ms, 250ms, 500ms, 1000ms and 1500ms selections)		
	Output short circuit protection	Yes		
Analog output	Voltage output — Voltage	1~5V ±2.5% F.S.		
	Voltage output — Impedance	About 1kΩ		
	Linearity	±1% F.S.		
Display	LED display	4digit, 7segment(red)		
	Switch ON Indicator	OUT1 red / OUT2 green		
	Updates time	About 0.2s		
	Indicator accuracy	±2% F.S. ±1 digit (ambient temperature: 25 ±3°C)		
Repeatability(Switch output)		±0.2% F.S. ±1 digit		
Environment	Enclosure	IP40		
	Operation ambient temp. range	0 ~ 50°C		
	Storage ambient temp. range	-10 ~ 60°C(No condensation or freezing)		
	Ambient humidity range	35 ~ 85% RH (No condensation)		
	Withstand voltage	1000V AC in 1-min (between case and lead wire)		
	Insulation resistance	50MΩ (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/s²(100G), 3 times each in direction of X, Y and Z		
Temperature characteristic		±2% F.S. of detected pressure (25°C) at temp. Range of 0~50°C		
Port size		M5		
Lead wire		Oil-resistance cable (0.14mm²)		
Weight		Approx. 53g (with 2 meter lead wire)		

B. OUTPUT CIRCUIT WIRING DIAGRAMS

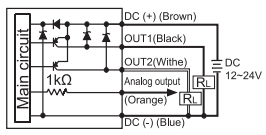
P90 □ -010 - M5

2NPN+Analog output (1~5V)



P90 □ -030 - M5

2PNP+Analog output (1~5V)



C. ORDERING INFORMATION

P 9 0 C - 0 1 0 - M 5

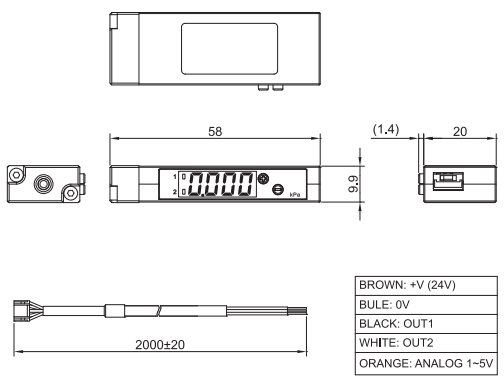
Pressure Range

C : Compound (-101.0~101.0kPa)
V : Vacuum (10.0~-101.3kPa)
P : Positive (-0.100~1.000MPa)

Output Specifications

010 : 2 NPN + Analog output (1~5V)
030 : 2 PNP + Analog output (1~5V)

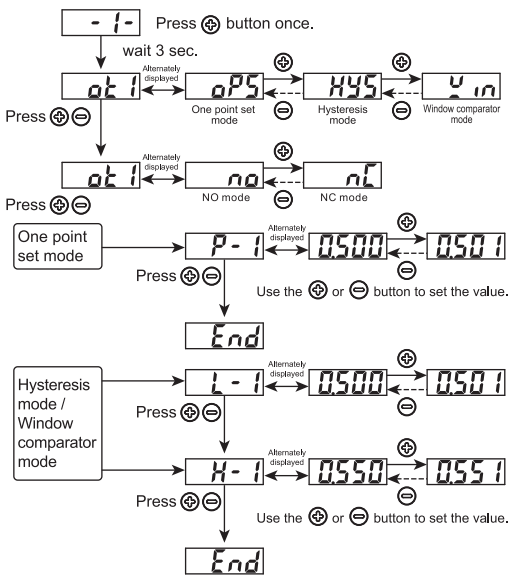
D. DIMENSIONS



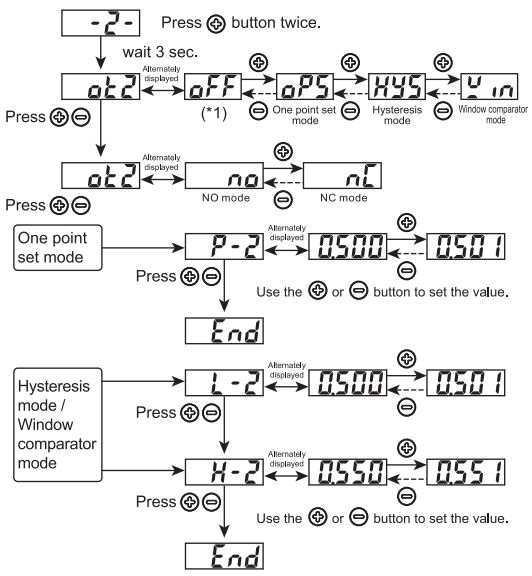
Unit:mm

E. INITIAL SETTING MODE

1 OUT1 type setting

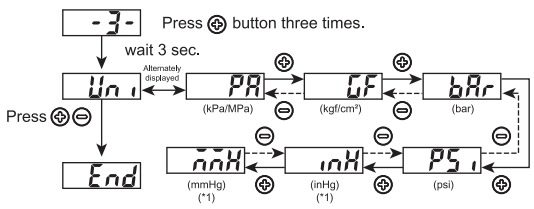


2 OUT2 type setting



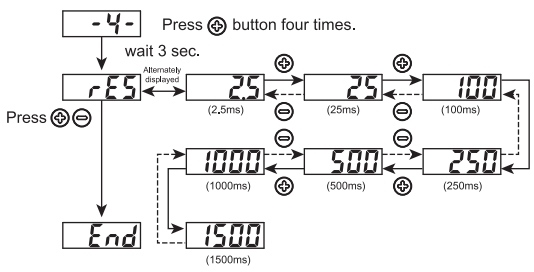
【NOTE :】
*1 When OUT2 Setting "oFF" directed end.

3 Unit setting

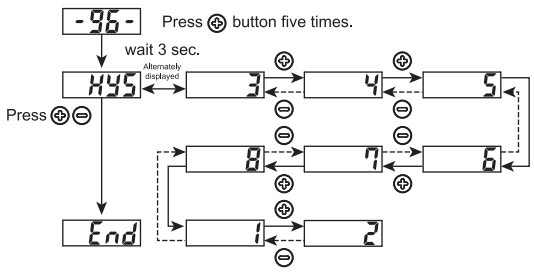


4 Response time setting

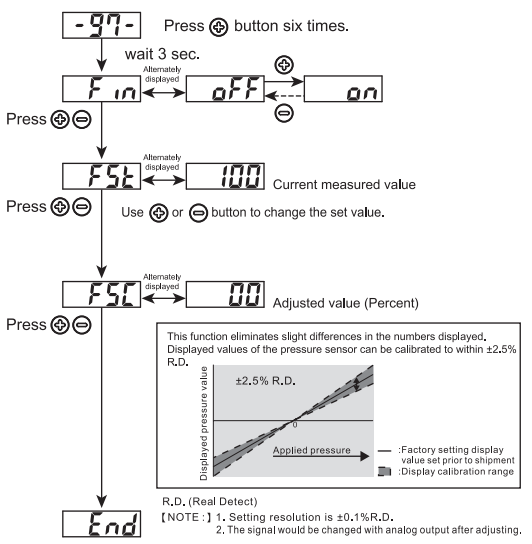
【NOTE :】
*1 Only applicable for Vacuum/Compound.



5 Fixed hysteresis value selection



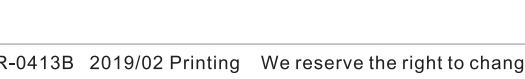
6 Display fine adjustment mode



7 Power-Save mode

◎ 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 Restore factory setting

F. ZERO POINT SETTING

Press ⊖ button for more than 3 sec. until "00" is shown.

※Zero resetting is possible only with an atmospheric pressure equivalent to 3% or less of F.S.

G. KEY LOCK MODE

Key lock mode can prevent operation mistakes.

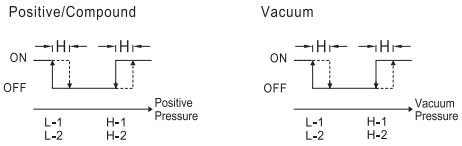
Press ⊕ button and ⊖ button at the same time for 3 sec.

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

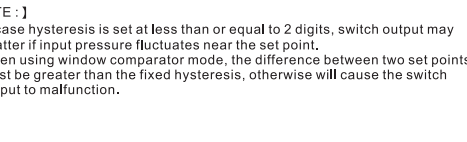
H. OUTPUT TYPE

(1) One point set mode:

Normal open mode



Normal close mode



(2) Hysteresis mode:

Normal open mode

Normal close mode

(3) Window comparator mode:

Normal open mode

Normal close mode

【NOTE :】
*1. In case hysteresis is set at less than or equal to 2 digits, switch output may chatter if input pressure fluctuates near the set point.
*2. When using window comparator mode, the difference between two set points must be greater than the fixed hysteresis, otherwise will cause the switch output to malfunction.

I. ANALOG OUTPUT DESCRIPTION

Analog output range 1 to 5V , proportional to the pressure range.

J. PRESSURE UNIT CONVERSION TABLE

From \ To	Pa	kPa	MPa	kgf/cm²	psi	bar	inHg
1 Pa	1	0.001	0.000001	0.000010197	0.00014538	0.00001	0.0002953
1 kPa	1000.000	1	0.001000	0.010197	0.145038	0.010000	0.2953
1 MPa	1000000	1000	1	10.197	145.038	10	295.2998
1 kgf/cm²	98066.5	98.0665	0.0980665	1	14.2233	0.980665	28.95979
1 psi	6895	6.895	0.006895	0.07031	1	0.06895	2.036074
1 bar	100000.0	100.0000	0.100000	1.01972	14.5038	1	29.52998
1 inHg	3386.388	3.386388	0.003386	0.034530	0.491141	0.033863	1

K. ERROR CODE INSTRUCTION

Error Type	Error code	Error Condition	Troubleshooting
Excessload currenterror — out1	Er1	Output 1 load current is more than 125 mA	Turn power off and check the cause of overload current or lower the current load under 125 mA, then restart .
Excessload currenterror — out2	Er2	Output 2 load current is more than 125 mA	
Residual pressure error	Err	During zero reset, ambient pressure is over ±3% F.S.	Change input pressure to ambient pressure and perform zero reset again.
Applied pressure error	FFF	Supply pressure exceeds the upper limit of pressure setting.	Adjust the pressure within operating pressure range.
	-FF	Supply pressure exceeds the lower limit of pressure setting.	
System error	Er4	Internal system error Internal data error	Turn power off, and then restart. If error condition remains, please return to factory for inspection.

數位顯示型壓力傳感器 P90 Series

使用本產品應注意事項:

① 禁止使用於腐蝕性及易燃性的氣體或任何液體。

② 請在規格表內的額定壓力範圍內使用，若供給之壓力超過最大耐壓會使本產品損壞，導致功能異常。

③ 裝設本產品時，請勿用力撞擊或從高處掉落，即使外觀未受損害也可能因內部零件損壞而導致功能異常。

④ 在連接本產品於電路控制系統時，應先關掉電源，因為錯誤的接線或短路會導致本產品損壞。

⑤ 本產品請勿使用在有水氣或油霧的環境中。

⑥ 本系列產品並未有防爆驗証，請勿使用於空氣中含有爆炸性氣體或粉塵環境中。

⑦ 不可將連接本產品的導線與電源線或其它高壓電線綑綁在一起，免雜訊的干擾，而影響到本產品的功能。

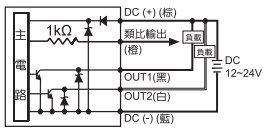
A. 規格表

型 號		P90P-□- M5 (正 壓)	P90V-□- M5 (負 壓)	P90C-□- M5 (連成壓)
額定壓力範圍		0.000~1.000MPa	0.0 ~ -101.3kPa	-100.0 ~ 100.0kPa
設定壓力範圍		-0.100~1.000MPa	10.0 ~ -101.3kPa	-101.0 ~ 101.0kPa
耐壓力		1.5MPa	500kPa	
適用氣體		空氣，非腐蝕性，不可燃性		
壓力單位設定最小刻度	kPa	—	0.1	
	MPa	0.001	—	
	kgf/cm²	0.01	0.001	
	bar	0.01	0.001	
	psi	0.1	0.01	
	inHg	—	0.1	
	mmHg	—	1	
電源電壓		12 to 24V DC ±10% , 漣波峰值 (P-P)10% 以下		
消費電流		≤ 40mA(無負載時)		
開關輸出	輸出模式	2 NPN 或 2 PNP 開集極輸出		
	最大負載電流	125 mA		
	電源電壓	30 V DC (NPN output), 24V DC (PNP output)		
	內部壓降	≤ 1.5V		
	反應時間	≤ 2.5ms (預防誤動作功能 : 25mms, 100ms, 250ms, 500ms, 1000ms, 和 1500ms 可選擇)		
	輸出短路保護	有		
線性類比輸出	電壓輸出 電壓	1~5V±2.5% F.S.		
	電壓輸出 輸出阻抗	約1kΩ		
	直線性	±1% F.S.		
顯示	顯示	4位,7段顯示(紅)		
	動作顯示燈	OUT1紅 / OUT2 綠		
	更新時間	約0.2秒		
	顯示精度	±2% F.S. ±1 digit (在周圍溫度: 25±3°C)		
重覆精度		±0.2% F.S. ±1 digit		
耐環境	防護等級	IP40		
	工作環境溫度	0 ~ 50°C		
	保存環境溫度	-10 ~ 60°C (無水露不結冰情況下)		
	周圍濕度	動作及保存: 35 ~ 85% RH (無水露)		
	耐電壓	1000VAC 1分鐘 (引線及塑膠外殼間)		
	絕緣阻抗	50MΩ以上(500V DC) (引線及塑膠外殼間)		
	耐振動	複振幅1.5 mm,每一分鐘10Hz ~ 150Hz ~ 10Hz X , Y , Z , 每個方向各2小時		
	耐衝擊	980 m/s² (100G), X,Y,Z 每個方向各3次		
溫度特性		±2% F.S.比較參考溫度25°C (0 ~ 50°C溫度範圍內)		
接管口徑		M5		
電線規格		耐油PVC電線(0.14mm²)		
重量		約53g (包含2公尺的電線)		

B. 輸出電路接線圖

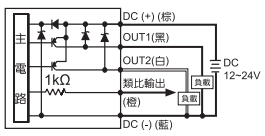
P90 □ -010 - M5

2NPN+類比輸出(1~5V)



P90 □ -030 - M5

2PNP+類比輸出(1~5V)



C. 型號規格說明

P 9 0 C - 0 1 0 - M 5

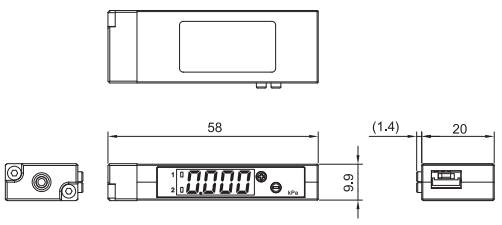
壓 力 類 型

C : 連成壓 (-101.0~101.0kPa)
V : 負壓 (10.0~-101.3kPa)
P : 正壓 (-0.100~1.000MPa)

輸 出 類 型

010 : 2NPN 輸出 + 類比輸出(1~5V)
030 : 2PNP 輸出 + 類比輸出(1~5V)

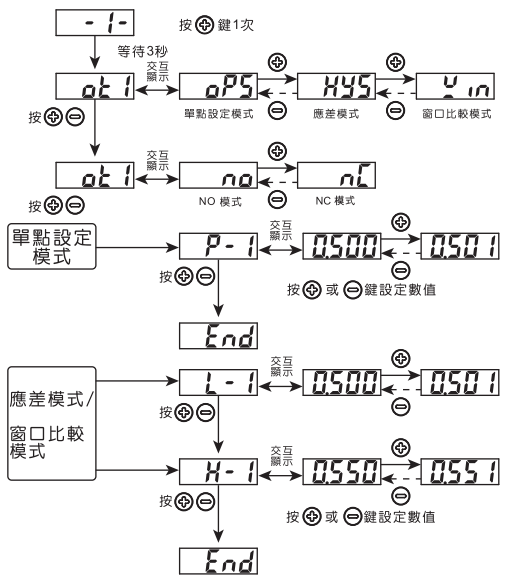
D. 外觀尺寸



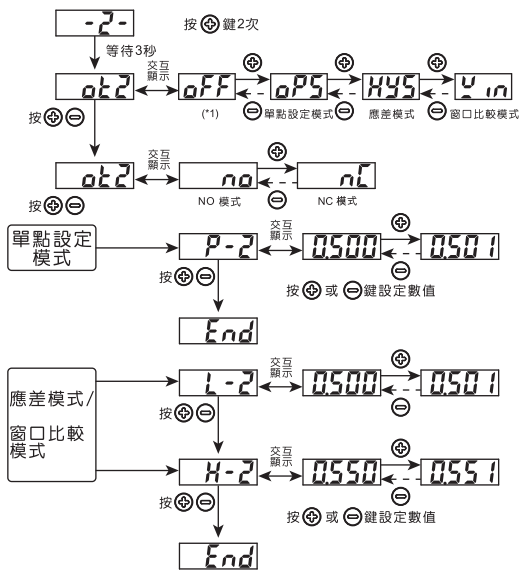
Unit:mm

E. 基本設定模式

1 OUT1型態設定

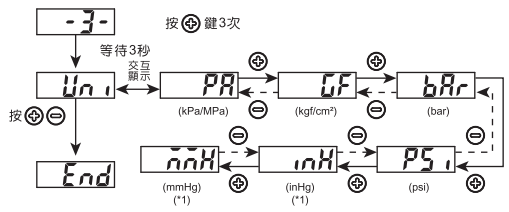


2 OUT2型態設定



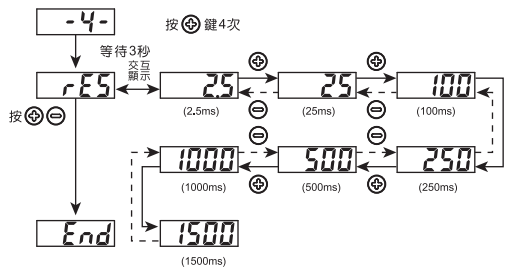
【註:】(*1)當OUT2 設定為 “oFF” 直接跳到END結束。

3 單位設定

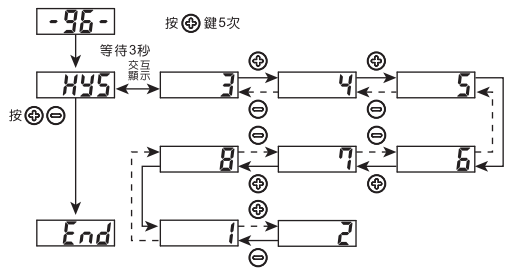


註:(*1)只適合於負壓及連成壓

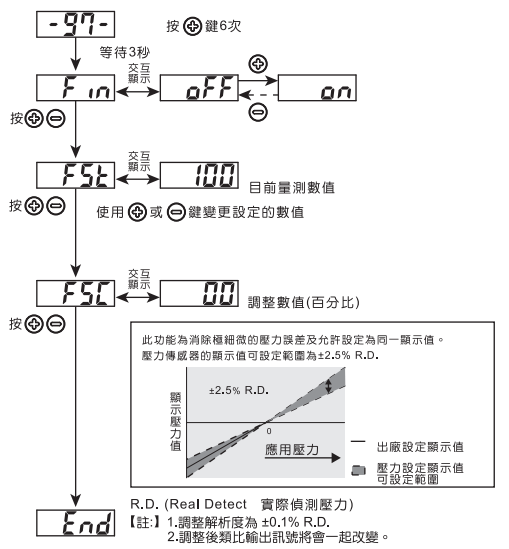
4 反應時間設定



5 固定應差數值設定



6 顯示微調模式



R.D. (Real Detect 實際偵測壓力)

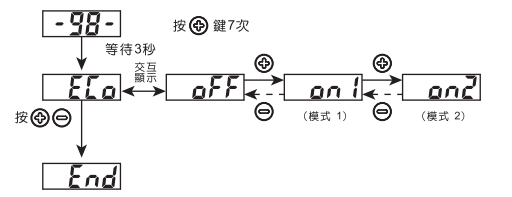
【註:】1.調整解析度為 ±0.1% R.D.
2.調整後類比輸出訊號將會一起改變。

7 省電模式

◎ 當啟動省電模式設定時，壓力傳感器在量測模式下，未按任何鍵30秒後，壓力傳感器會進入省電模式。

◎ 當壓力傳感器處於省電模式時，傳感器動作指示燈可能會有不同步的現象，但不會影響傳感器的動作。

◎ 當壓力傳感器處於省電模式時，按下任何鍵，壓力傳感器會自動回到一般量測模式。

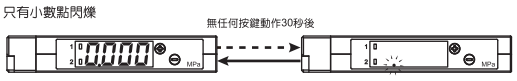


模式 1

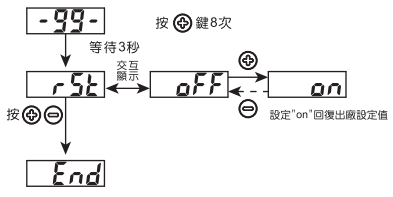
背光降低亮度

模式 2

只有小數點閃爍

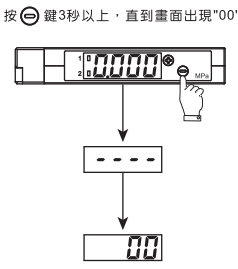


8 回復出廠設定值



F. 歸零設定

按 ⊖ 鍵3秒以上，直到畫面出現"00"

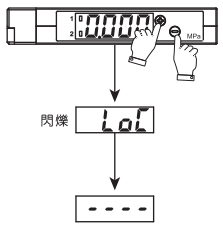


※歸零範圍限制小於3% F. S.

G. 按鍵鎖定模式

按鍵鎖模式可以預防操作錯誤情形。

同時按 ⊕ 鍵與 ⊖ 鍵3秒



※解除按鍵鎖 : 同時按 ⊕ 鍵與 ⊖ 鍵，

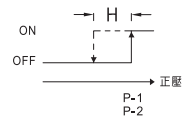
直至螢幕顯示 UnC 即為解鎖。

H. 輸出型式

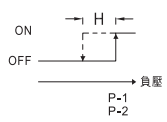
(1) 單點設定模式

常開模式

正壓/連成壓

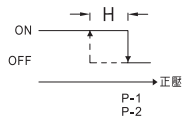


負壓

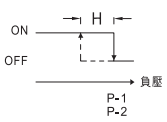


常閉模式

正壓/連成壓



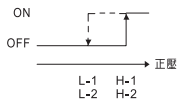
負壓



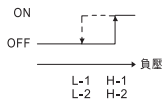
(2) 應差模式:

常開模式

正壓/連成壓

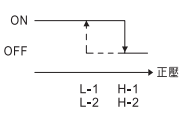


負壓

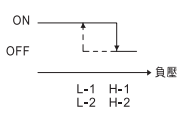


常閉模式

正壓/連成壓



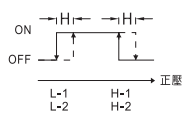
負壓



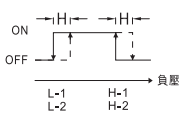
(3) 窗口比較模式:

常開模式

正壓/連成壓

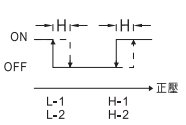


負壓

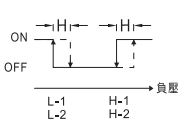


常閉模式

正壓/連成壓



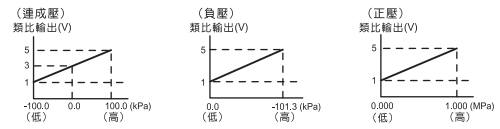
負壓



【註:】
*1. 當應差模式時，如壓力設定值在二個digits內，若輸入氣壓非常接近壓力設定值，壓力傳感器輸出可能會誤動作。
*2. 當設定於窗口比較模式時，設定2點之差一定要大於固定應差設定值，否則壓力傳感器輸出會無動作。

I. 線性類比輸出說明

類比輸出範圍介於 1 至 5V，符合所需壓力範圍值。



J. 壓力單位轉換表

To / From	Pa	kPa	Mpa	kgf/cm²	psi	bar	inHg
1 Pa	1	0.001	0.000001	0.000010197	0.000145038	0.00001	0.0002953
1 kPa	1000.000	1	0.001000	0.010197	0.145038	0.010000	0.2953
1 MPa	1000000	1000	1	10.197	145.038	10	295.2998
1 kgf/cm²	98066.5	98.0665	0.0980665	1	14.2233	0.980665	28.95979
1 psi	6895	6.895	0.006895	0.07031	1	0.06895	2.036074
1 bar	100000.0	100.0000	0.100000	1.01972	14.5038	1	29.52998
1 inHg	3386.388	3.386388	0.003386	0.034530	0.491141	0.033863	1

K. 錯誤訊息說明

錯誤名稱		錯誤顯示	錯誤說明	解 決
過電流錯誤	out1	Er1	輸出1負載電流超過125mA	關掉電源，檢查負載電流過大的原因或將負載電流降至125mA以內再重啟電源
	out2	Er2	輸出2負載電流超過125mA	
殘留壓力錯誤		Err	零值設定範圍超過±3% F.S.	改變周遭壓力之後，再重新作歸零
使用壓力錯誤		FFF	使用的壓力超過壓力設定值的上限	供給壓力請調整在使用壓力範圍內
		-FF	使用的壓力超過壓力設定值的下限	
系統錯誤		Er4	內部系統錯誤 內部資料錯誤	切斷電源並重新供電，若無回復正常狀態則需送回原廠分析