

真空壓力比例閥 Proportional Vacuum Regulator

QKL-B4HV



產品特色 Features

- ◆ 體積小 Compact
- ◆ 精度高 High Precision
- ◆ 靈敏度高 High Sensitivity
- ◆ 正壓/真空雙應用平台
Positive & Vacuum Dual-Range Platform

產業應用 Industrial application

- ◆ 半導體與電子製程 Semiconductor & Electronics
- ◆ 自動化設備與機械手臂 Automation & Robotics
- ◆ 包裝與貼合製程 Packaging & Lamination
- ◆ 檢測與實驗設備 Testing & Laboratory Equipment

產品敘述 Product Description

QKL-B4HV 為專為真空應用所開發的壓力比例閥，有-1~0bar 真空壓力範圍、-1~6 bar 與-1~9 bar 之聯成壓範圍供選擇，可精準調節並穩定控制真空壓力，確保製程條件一致且具高度重複性。

該採用閉迴路控制架構，即時迴授實際壓力並自動修正輸出，有效降低真空壓力波動對製程所造成的影響。相較於傳統真空閥搭配機械式調整方式，QKL-B4HV 能提供更高的控制精度與系統穩定性，特別適合對真空度要求嚴謹的自動化與精密製程應用。

支援多種控制訊號，包括 0-10 V、4-20 mA 及 RS485(Modbus)，可輕鬆整合至 PLC 或工業控制系統。廣泛應用於半導體、電子、自動化設備、包裝貼合及檢測與實驗設備等真空應用場景，是設備開發與系統升級的理想真空壓力控制解決方案。

QKL-B4HV is a proportional pressure regulator designed for vacuum applications, offering -1 to 0 bar vacuum pressure, as well as compound pressure ranges of -1 to 6 bar and -1 to 9 bar. It provides precise and stable vacuum pressure control to ensure consistent and repeatable process conditions.

With a closed-loop control architecture and real-time pressure feedback, QKL-B4HV automatically corrects output to minimize pressure fluctuations. Supporting 0-10 V, 4-20 mA, and RS485 (Modbus) control signals, it integrates easily with PLCs and industrial control systems and is suitable for semiconductor, electronics, automation, packaging, and laboratory vacuum applications.

All our products have CE, SGS, RoHS certification with ISO13485 quality system.

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產品規格 Specifications

系列 Type	QKL-B4HV	QKL-B4HV-P6	QKL-B4HV-P9
輸入訊號 Input Signal	0-10V / 4-20mA / RS485		
輸出壓力 Output Range	-1~0 bar(-100~0 kPa)	-1~6 bar	-1~9 bar
監控信號 Monitor Output	0-10V / 4-20mA / RS485		
工作電源 Supply	DC24V (≤14W)		
響應時間 Response	200 msec		
介質 Medium	真空 Vacuum		
重複精度 Repeatability	±0.25% F.S.		
遲滯 Hysteresis	±0.25% F.S.		
線性度 Linearity	±0.25% F.S.		
綜合精度 Accuracy	±0.25% F.S.		
靈敏度 Sensitive	±0.25% F.S.		
流量 Max. Flow Rate	90 L/min @1bar		
使用溫度範圍 Temp. Range(Operating)	-196 ~ 70 °C (-320 ~ 158 °F)		
牙口 Port Size	1/8"PT		
底座材質 Manifold Material	鋁合金 Aluminum		
固定架材質 Mounting Bracket Material	鍍鋅鋼板 Galvanized Steel		
電氣連接 Electrical Connection	M12 電氣端子(2m) M12 Connector(2m)		
防護等級 Ingress Protection	IP 65		
重量 Weight	800 g		

型號選擇 Ordering Code

QKL - □ - □ - □ - □ - □ - □

系列 Type

B4HV	內部迴授 Internal Feedback	1/8"PT
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輸入訊號 Input Signal

*E	0 - 10 V
A	4 - 20 mA
R	RS485 Modbus

監控訊號
Monitor Output

C	0 - 10 V
A	4 - 20 mA
R	RS485 Modbus

固定架
Mounting Bracket

M	M type
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壓力範圍
Pressure Range

-	-1~0 bar (-100~0 kPa)
P6	-1 ~ 6 bar
P9	-1 ~ 9 bar

顯示單位
Display Unit

S	kPa
U	bar

*若控制訊號選擇 0-10V，請留意最小的驅動電流為 3mA。

For Command Signal type 0-10V, the minimum driving current is 3mA.

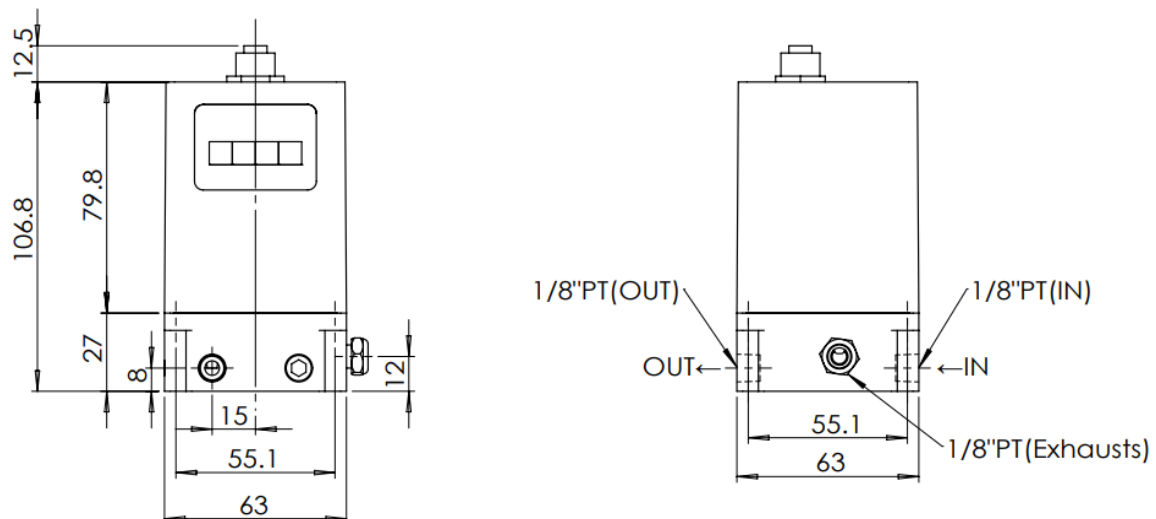
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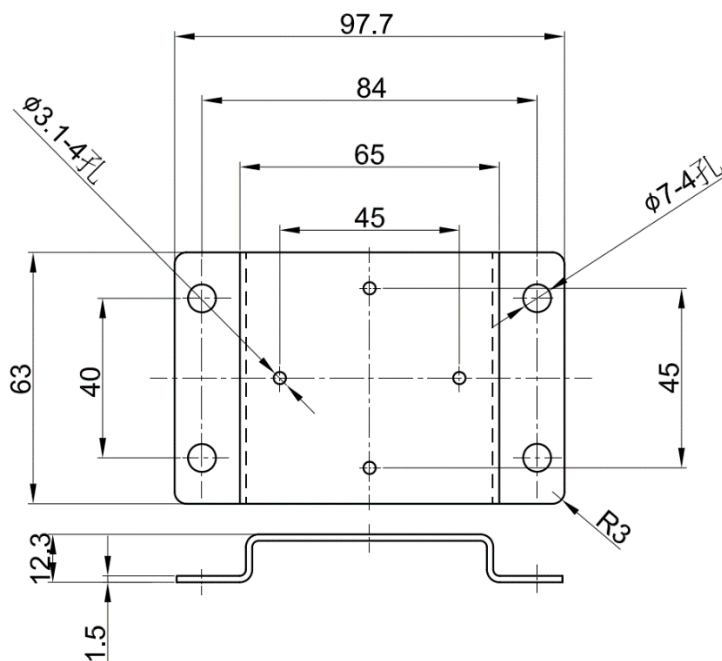


外觀尺寸 Overall Dimension

◆ QKL-B4H



◆ 固定架 M 型 Bracket M Type

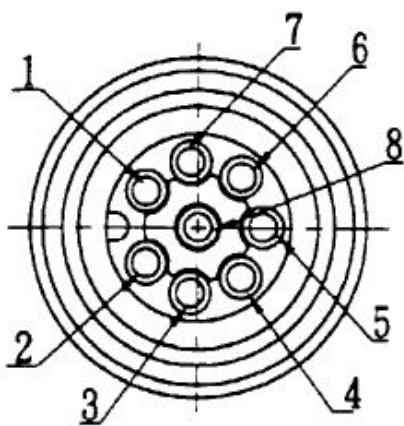


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接線方式 Wiring Description



編號 No.	顏色 Color	功能 Function	
1	藍色 Blue	電源(-)	24V DC Power (-)
2	棕色 Brown	電源(+)	24V DC Power (+)
3	黑色 Black	監控輸出(+)	Monitor output (+)
4	白色 White	類比訊號(+)	0-10 V Command (+) 4-20 mA Command (+)
5	灰色 Gray	RS485(D-)	
6	-	-	
7	紫色 purple	類比訊號(-)	Command (-)
		監控輸出(-)	Monitor output (-)
8	紅色 Red	RS485(D+)	

※此接線圖為線材公座俯視圖

The wiring diagram shows from top view



警告：當安置完成信號線後，切勿旋轉拉扯插頭，以避免內部傳感器受到損害，造成產品功能異常或故障。

Warning: Do not rotate the connection socket when connected, to avoid damage to the internal sensor.

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產品注意事項



安裝

比例閥可安裝任意方向，低壓控制建議垂直安裝。該閥後端需有至少40cc以上之容積，避免比例閥壓力控制不穩定。



配管前的處置

配管前請進行空氣吹拭(氣流沖洗)或清洗，以去除管內的切削粉、切削油、雜物等。

止洩帶的纏法：配管及接頭鎖緊時，不要讓配管螺牙的切削粉、止洩帶進入閥內部。使用止洩帶時，留下螺牙1.5-2 牙距的位置進行纏繞。



使用環境注意事項

1. 請勿在腐蝕性氣體、化學藥品、海水環境或附著上述物質的場所使用
2. 水、水蒸氣、灰塵等會附著本體的場所，容易從排氣孔、電磁閥排氣孔、內藏調壓閥的排氣孔進入本體內部，水分與灰塵等進入，是造成故障的原因之一。
3. 日光照射的場合，請用保護罩等遮蔽。
4. 周圍有熱源的場合，請遮斷輻射熱。
5. 會附著水滴、油及焊渣的場所，請採取適當的保護對策。



使用流體供給源注意事項

1. 適用於壓縮空氣、氧氣、氫氣、氮氣、氬氣...等惰性氣體。
2. 壓縮空氣中內含化學藥品、有機溶劑的合成油、鹽分、腐蝕性氣體等時，是造成作動不良的原因，請避免使用。
3. 當流體為氧氣時，就伴隨著重大、通常情況下難以考慮到的危險性。但是，可以對故障災害和經濟損失進行風險管理和控制。因此，請接收具有安全資格的專家的支持，請由具備充足知識和經驗的人員進行操作。
4. 氧氣是可以助燃的氣體。摩擦生熱、靜電釋放等都可能造成起火，並使金屬盒密封材料發生燃燒。因此，請安裝合適的過濾器，以防止金屬屑和塵埃的侵入。
5. 在靠近本產品的供給側，請安裝空氣過濾器。過濾精度應選 5 μm 以下。
6. 含大量冷凝水的壓縮空氣是造成本產品或其他氣動元件動作不良的原因。請設置後冷卻器、空氣乾燥器、冷凝水收集器等進行對策。
7. 由空壓機產生的碳粉多的話，會附著在本產品內部，成為動作不良的原因。
8. 對於可能會發生意外的場合，請考慮火災、爆炸，設計終止氧氣供應的迴路，實施安全措施。
9. 本產品的排氣通口，請根據氧氣排放場所的具體情況做適當的排氣配置。
10. 本產品不能用作緊急關閉裝置。應在系統中安裝冗余安全系統，以防止嚴重傷害或生命損失。



保固

自出廠起 12 個月以內為保固期限,請務必遵守使用注意事項,因人為因素造成的產品不良,則本公司對本保修不承擔任何責任。

Product Precautions



Installation

The valve can be mounted in any position. For very low pressure control, works best when mounted upright. And Ensure a minimum closed end volume of 40c.c. to allow proper functioning.



Preparation Before Piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

Wrapping of Sealant Tape

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping. When sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Operating Environment

1. Do not operate in locations having an atmosphere of corrosive gases, chemicals, sea water, or where there will be contact with the same.
2. In locations where the body is exposed to water, steam, dust, etc., there is a possibility that moisture or dust could enter the body through the EXH port, solenoid valve EXH port and/or built-in regulator EXH port, thereby causing problems.
3. In locations which receive direct sunlight, provide a protective cover etc.
4. In locations near heat sources, block off any radiated heat.
5. Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.



Air Supply

1. Compressed air, nitrogen, oxygen or argon can be used as a fluid.
2. Do not use compressed air which includes chemicals, synthetic oils containing organic solvents, salt, or corrosive gases, etc., as this can cause damage or malfunction.
3. If oxygen is used as the fluid, it can lead to serious and unforeseen risks. However, it is possible to manage and control the risk of hazards and economic loss. In order to use the product safely, it should only be handled by personnel with appropriate knowledge, with support from a suitably qualified specialist.
4. Oxygen gas increases the susceptibility of substances to burning; Oxygen gas can be ignited by frictional heat and static electricity. If oxygen is ignited, the metal and seal materials burn. Therefore, flush the piping thoroughly and mount a suitable filter to prevent foreign matter such as metal powder and dust from entering the product.
5. Take safety measures by installing safety devices (e.g. a circuit that stops the supply of oxygen gas) to prevent fire and explosion in the event of failure, taking flameproof safety standards into consideration.
6. Since there are some exhaust ports on the product, connect the piping in order to exhaust oxygen. Do not block the exhaust port.



Warranty

KaoLu Enterprise Co., Ltd. products are warranted to the original purchaser only against defects in material or workmanship for 6 months from the date of manufacture. The extent of KaoLu's liability under this warranty is limited to repair or replacement of the defective unit at KaoLu's option. KaoLu shall have no liability under this warranty where improper installation or filtration occurred.