

高壓切削冷卻系統

High-Pressure Coolant Systems



安全 ● 節省成本 ● 提升競爭力
Save ● Economical ● Competitive

POLARJET 

公司介紹

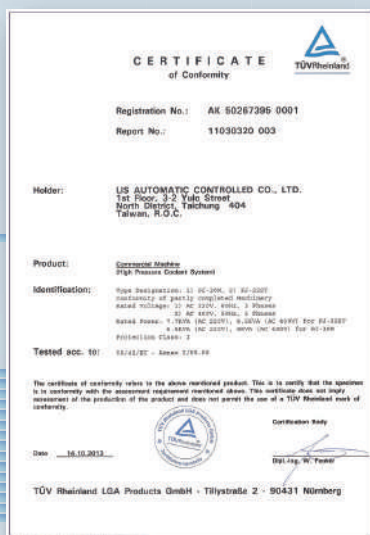
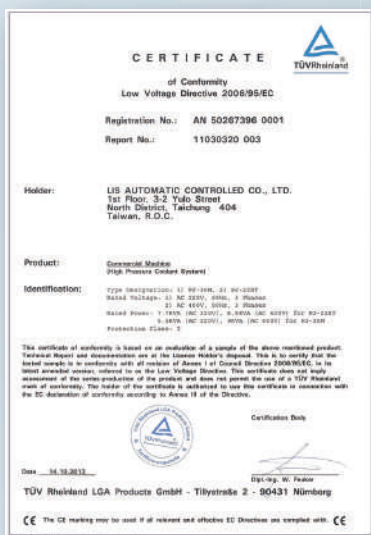
立石自動控制機器股份有限公司在1979年成立於台灣工具機產業的重要都市—台中市。過去30年，在國內和國際上，立石已是許多工具機製造者油壓單元的獨佔的設計和製造者。我們的產品線已擴展且已變得更加創新來符合一直在進步的金屬切削、壓鑄、和塑膠射出工具機等的需求。在2006年，立石公司成立了PolarJet CNC Solutions, Inc. 專門在生產高壓切削系統來幫助國內外的客戶解決難切削材料加工問題。經過這些年的努力，我們已經研發成功一系列的產品提供給不同型態的工具機使用。我們依舊會以客戶優先的立場持續創新，以客戶至上的目標持續邁進，一同與我們的客戶創造雙贏。

About the company

LIS Automatic Controlled Co., LTD. was founded in 1979 in the city of Taichung, the capital of the machine tools industry of Taiwan. For the past thirty years

LIS has been the sole designer and manufacturer of hydraulic units for many machine tools manufacturers, both domestic and international. Our product lines have expanded and have become more innovative to meet the demands of ever-improving metal cutting, die casting, and plastic injection tools etc. We're proud to introduce to you our product suppliers whom we have firm establishments of business relationships and commitments for many years; S.A.M. HYDRAULIK S.p.A., HST Hydrospeichertechnik GmbH, ROTOFLUX Srl etc... Here at LIS, we also produce our own line of valves, pumps, motors, filters, high pressure coolant through spindle systems, hydraulic power pack etc... We custom design to our customer's industry needs at a competitive price and will guaranty their post installation satisfaction. LIS is also a sourcing agent for your business connection to Taiwan, China and pacific rims.





公司沿革

- | 1979年成立立石自動控制.生產油壓單元系統
- | 1982年開始代理歐洲油壓系統以及零件至台灣
- | 2006年開始研發生產高壓系統
- | 2010年第二代PJ系列陸續推出
- | 2011年發表PJ-30M
- | 2012年發表最新PJ-22ST,同期間宣布興建新廠房以及開發研究室
- | 2013年發表多款革命性產品並全系列產品取得CE認證.新廠房落成投入生產
- | 2014年底推出140Bar變頻高壓系統
- | 2015年底推出100Bar變頻高壓整合冷凍機系統
- | 2016年持續研發新機種
- | 2017年發表高壓用消泡裝置及專利高效能低耗材過濾系統
- | 2018年發表精巧型高壓系統

Company History

- | 1979 Establish LIS automatics Inc, manufacturer hydraulic system
- | 1982 Introduce European hydraulic system and components to Taiwan
- | 2006 Establish PolarJet CNC Solutions Inc. and develop high pressure coolant system
- | 2010 Publish 2nd generation PJ series
- | 2011 Publish PJ-30M
- | 2012 Publish PJ-22ST. Meanwhile, PolarJet CNC Solutions Inc. announces building of a new company facility with research and development laboratory
- | 2013 Published a variety of revolutionary product with CE certification and move to new facility
- | 2014 Publish variable volume system 140 bar
- | 2015 Publish variable volume system 100 bar with oil chiller include.
- | 2016 Keep developing new PolarJet
- | 2017 Publish anti-foaming device for high-pressure coolant system & PJ-saving system (Patented high-performance & low-cost of material filtration system.)
- | 2018 Publish compact type high-pressure coolant system

為何選擇高壓切削液系統？

常見問題：

1. 當過熱切削時，蒸氣屏障形成
2. 切消液分配不均，會使刀尖無法取得所需的潤滑
3. 再切削刀具潤滑不足的情況下，會導致切屑回到切削點
因此，重覆加工切屑會使得刀具壽命縮短及破壞工件表面

我們的解決方案：

1. 集中瞄準的高壓切消液可穿透蒸氣屏障，然後順利降低切削時所產生的高溫
2. 有效地供給切消液，顯著地提高刀具壽命
3. 足夠的潤滑改善了工件表面精度，且減少去除毛邊的時間

傳統方式 vs. 高壓方式

集中流量且精確瞄準目標：

第二運動定律：力量等於質量乘以速度使用簡化的數學符號表示 $F = M * V$

V = 速度，這是由適當校準過的壓力而產生這是在 1000 psi(70 bar) 或以上的情況下

M = 質量，經由正確供應的切消液流量來幫助工具機進行車銑和鑽孔加工方面的應用

高壓的好處

使鐵屑更易受到控制（斷屑情況良好，減少殘屑發生）

節省刀具成本（刀具壽命提升200%以上）

提高生產效能(加工速度、加工精度)

集中流量精確瞄準目標

Why Choose a High-Pressure Coolant System?

Common Problem:

1. Steam forms a vapor barrier when overheating occurs.
2. Poor distribution of coolant prevents proper lubrication from reaching to the cutting tool tip.
3. Insufficient lubricity results in chips returning back into tool interface. Consequently, repeatedly hitting chips shortens tool life and damages workpiece surface.

Our Solution:

1. Properly aimed, high-pressure coolant penetrates vapor barrier and eliminates heat.
2. Efficient coolant distribution significantly increases tool life.
3. Sufficient lubrication improves finished surface and reduces time spent on the deburring process.

Traditional Flood Coolant vs. High-Pressure Coolant

Precision Targeting with Proper Force:

2nd Law of Motion: Force equals mass times velocity. Using simplified mathematical symbols: $F = M * V$

V = Velocity, which is generated by properly calibrated pressure; in this case at 1000 psi (70 bar) or above.

M = Mass, which is supplied by the correct volume of coolant. For milling and cutting applications, 0.5 gpm/hp or 2.0 lpm/kw; for drilling and cannulation applications, 10 gpm/inch of tool diameter or 1.5 lpm/mm.

The benefits of high-pressure coolant system

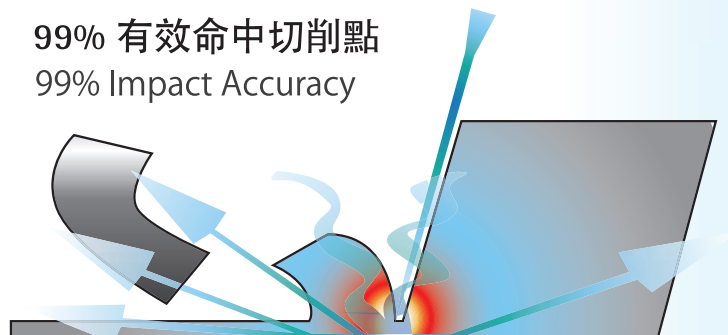
Make the chip more susceptible to control (Better chip solution, reduce the long chip situation)

Saving the cost of tools (increase tool life by more than 200%)

Improve production efficiency (Processing speed, processing accuracy)

Properly aiming at the target

99% 有效命中切削點
99% Impact Accuracy



PJ-20 V0

新發售
NEW

(變頻 Variable volume)



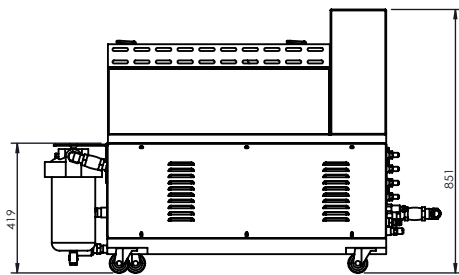
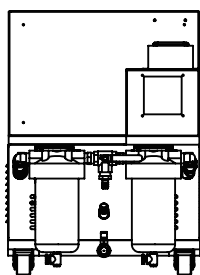
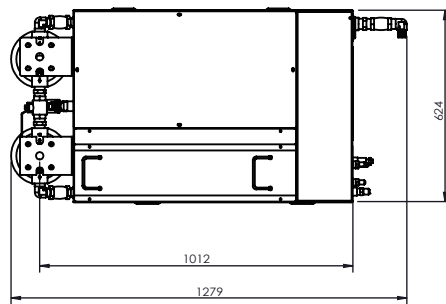
- PJ-Saving 專利高效能低耗材系統
PJ-saving system (Patented high-performance & low-cost of material filtration system)
- 創新智能型人機介面:
→ 提供即時與歷史機台異常記錄
→ 最新觸控式界面，可設定M碼多段壓力
→ 內建定期系統保養提醒功能
Innovative intelligent HMI screen:
→ Provide immediate and historical machine alarm records
→ Newest touch panel, using M codes to set up multiple pressure
→ Embedded regular system maintenance reminder function
- 總壓保護，避免無水加工
Pressure protection, to avoid waterless processing.
- 平均節能省電40%以上
Energy saving more than 40%
- 體積小，可放置於大部分料機底下，節省空間
Compact size, can be placed under the bar feeders, saving space

基本規格表 SPECIFICATION

適用液體	Fluid Type	油基切削液(黏度係數15-32cSt) Oil base coolant (viscosity 15-32cSt)
最大工作壓力	Max working pressure	140 Bar
最大流量	Max flow rate	20 Liter/min
出水口數目	Number of ports	4 (標準)(standard)
過濾精度	Filtration	5 μ 雙過濾器
尺寸	Dimension	1026x624x851 mm
重量	Weight	250 kg

選配功能 (Option)

1. 5-8個出水口 5-8 ports outlet
2. 油冷機 Oil chiller
3. 槍鑽檢知 Drilling output pressure detector
4. 消泡裝置 Anti-foaming



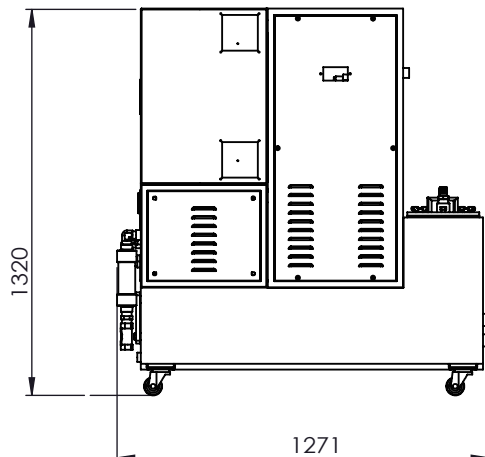
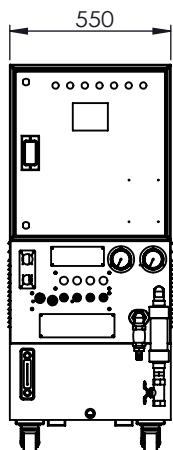
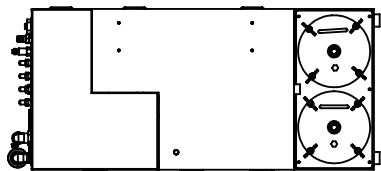
PJ-30VT

新發售
NEW

(變頻 Variable volume)



- PJ-Saving 專利高效能低耗材系統
PJ-saving system (Patented high-performance & low-cost of material filtration system.)
- 創新智能型人機介面：
→ 提供即時與歷史機台異常記錄
→ 最新觸控式界面，可設定M碼多段壓力
→ 智能系統自行保養通知
Innovative intelligent HMI screen:
→ Provide immediate and historical machine alarm records.
→ Newest touch panel, using M codes to set up multiple pressure.
→ Embedded regular system maintenance reminder function
- 總壓保護，避免無水加工
Pressure protection, to avoid waterless processing
- 平均節能省電40%以上
Energy saving more than 40%
- 水基切削液，油水比例1%
Water base coolant, oil ratio 1%
- 可適用於小孔徑加工
Applicable to small aperture machining.



基本規格表 SPECIFICATION

適用液體	Fluid Type	水基切削液 油基切削液(黏度係數15-32cSt) Water base coolant Oil base coolant(viscosity 15-32cSt)
最大工作壓力	Max working pressure	70 Bar 100 Bar 140 Bar
最大流量	Max flow rate	30 Liter/min 27 Liter/min 24 Liter/min
出水口數目	Number of ports	1(標準) (standard)
過濾精度	Filtration	5 μ單過濾器 single filter
水箱容量	Tank capacity	140 L
尺寸(長x寬x高)	Dimension (DxWxH)	1271x550x1320
重量	Weight	345 kg

選配功能 (Option)

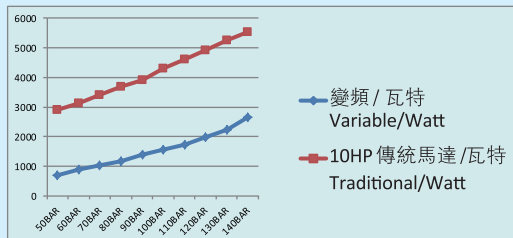
1. 2-8個出水口 2-8 ports outlet
2. 油冷機 Oil Chiller
3. 雙過濾罐 Dual filter
4. 槍鑽檢知 Drilling output pressure detector
5. 消泡裝置 Anti-foaming

變頻與傳統馬達輸出數據比較表

Output comparison of Variable Frequency and Traditional Motor

油基切削液 Oil base coolant

1mm X 2出水口 1mm X 2 outlets



節能電費比較 Electricity expense comparison:

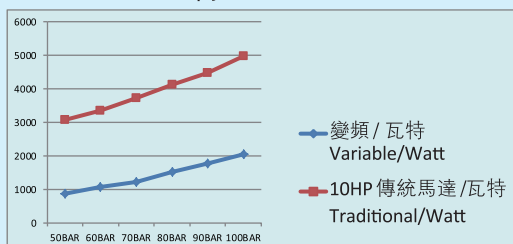
※ 1年使用250天 (1天使用24小時)		※ 250 days/year, 24 hr/day	
傳統10HP馬達電費為:	116400 元	Traditional 10 HP Motor:	USD 3880
變頻電費為:	55860 元	Variable Frequency:	USD 1862
變頻電費節省:	60540 元	Electricity expense saved:	USD 2018

以上資料係以140bar 1mm X 2 出水孔為例:
The above calculation is based on 140bar 1mm X 2 outlets

	耗電量(瓦特) Power consumption(Watt)	平均電價(1度3.5元) Average electricity expense (USD 0.12/degree)	使用12小時/天 12 hr/day
變頻 Variable Frequency	2662瓦特 Watt	使用1小時/9.31元 USD 0.31/hr	1天 111.72元 USD 3.72/day
傳統10HP馬達 Traditional 10 HP Motor	5544瓦特 Watt	使用1小時/19.4元 USD 0.65/hr	1天 232.8元 USD 7.76/day

水基切削液 Water base coolant

1mm X 2出水口 1mm X 2 outlets



節能電費比較 Electricity expense comparison:

※ 1年使用250天 (1天使用24小時)		※ 250 days/year, 24 hr/day	
傳統10HP馬達電費為:	104412元	Traditional 10 HP Motor:	USD 3480
變頻電費為:	42950元	Variable Frequency:	USD 1432
變頻電費節省:	61462元	Electricity expense saved:	USD 2049

以上資料係以100bar 1mm X 2 出水孔為例:
The above calculation is based on 100bar 1mm X 2 outlets

	耗電量(瓦特) Power consumption(Watt)	平均電價(1度3.5元) Average electricity expense (USD 0.12/degree)	使用12小時/天 12 hr/day
變頻 Variable Frequency	2046瓦特 Watt	使用1小時/7.16元 USD 0.24/hr	1天 85.9元 USD 2.86/day
傳統10HP馬達 Traditional 10 HP Motor	4972瓦特 Watt	使用1小時/17.4元 USD 0.58/hr	1天 208.8元 USD 6.96/day

註：本節能數據為PJ-VT系列連續使用24Hr，油水比例8%所測得，實際加工時，因受客戶加工習慣與切削水油比例不同，或機台(零件)未保養等因素，其實際節能數據可能會有所差異。

Note: This energy saving parameters are obtained by testing PJ-VT series 24 hours continuously, with oil ratio 8% coolant, the actual parameters might be different lower when in different machining process and oil ratio at customer side, machine(parts) not regularly maintained and other factors during actual operation.

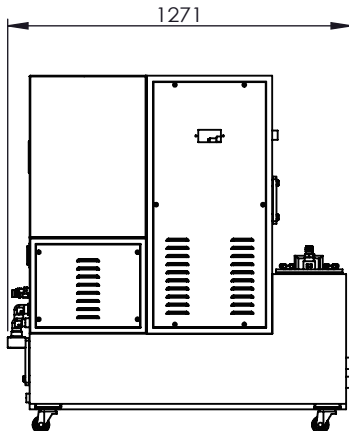
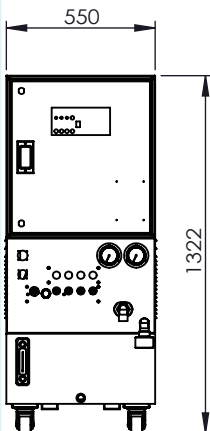
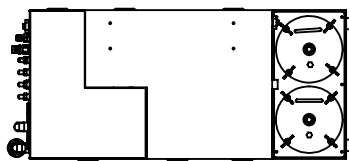
PJ-30MT



- PJ-Saving專利高效能低耗材系統
PJ-saving system (Patented high-performance & low-cost of material filtration system.)
- 電控面板模組化，便於維修
Modular PCB, easy to maintenance.
- 人性化操作面板，易於操作
Intuitive control panel, easy to operation.
- 副水箱設計，減低熱能及氣泡
With tank design to reduce heat and foaming.
- 水基切削液，油水比例1%
Water base coolant, oil ratio 1%

基本規格表 SPECIFICATION

適用液體	Fluid Type	水基切削液 油基切削液(黏度係數15-32cSt) Water base coolant Oil base coolant(viscosity 15-32cSt)
最大工作壓力	Max working pressure	70 Bar 100 Bar 140 Bar
最大流量	Max flow rate	30 Liter/min 27 Liter/min 24 Liter/min
出水口數目	Number of ports	1 (標準)(standard)
過濾精度	Filtration	5 μm 單過濾器 single filter
水箱容量	Tank capacity	140 Liter
尺寸 (長x寬x高)	Dimension (DxWxH)	1271x550x1322 mm
重量	Weight	345kg
選配功能 (Option)		
1. 油冷機	Oil chiller	4. 消泡裝置
2. 2~8個出水口	2~8 ports outlet	Anti-foaming
3. 雙過濾器	Dual filter	



PJ-22VT

(變頻 Variable volume)



- 平均節能省電40%以上
Energy saving more than 40%
- 可用M碼設定多段壓力,方便省時
Using M code to set up multiple pressure
- 人機介面為標準配備
HMI as standard
- 專門為走心式車床所設計
Customized design for Swiss turning lathe
- 適合槍鑽以及深孔加工
Ideal for gun drilling and cannulation processes

基本規格表 SPECIFICATION

適用液體	Fluid Type	純切削油(黏度係數32cSt以下) Neat cutting oil(viscosity max. 32cSt)
最大工作壓力	Max working pressure	140 Bar (Kg/cm ²)
最大流量	Max flow rate	22 Liter / min
出水口數目	Number of ports	4 (standard)
過濾精度	Filtration	5 μ
水箱容量	Tank capacity	83 L
尺寸	Dimension	1456x690x1348 mm
重量	Weight	274 kg

選配功能 (Option)

1. 油冷機 Oil chiller
2. 2~8個出水口 2~8 ports outlet
3. 深孔鑽輸出壓力檢支 Deep hole drill output pressure detector

PJ-22ST



- 專門為走心式車床所設計
Customized design for Swiss turning lathe
- 適合槍鑽以及深孔加工
Ideal for gun drilling and cannulation processes

基本規格表 SPECIFICATION

適用液體	Fluid Type	純切削油(黏度係數32cSt以下) Neat Cutting Oil (viscosity max. 32cSt)
最大工作壓力	Max working pressure	140 Bar (Kg/cm ²)
最大流量	Max flow rate	22 Liter / min (at 60 Hz) 20 Liter / min (at 50 Hz)
出水口數目	Number of ports	4 (standard)
過濾精度	Filtration	5μ Single filter
水箱容量	Tank capacity	72 L
尺寸	Dimension	1100X461X1406 mm
重量	Weight	245 Kg

選配功能 (Option)

1. CE安全規範(謹適用於CE規範地區) CE Certificate
2. 油冷機 Oil Chiller
3. 特殊噴嘴 PolarJet coolant nozzle
4. 8個出水口 8ports outlet
5. 深孔鑽輸出壓力檢知 Deep hole drilling output pressure
6. 濾網阻塞外掛指示燈 Change filter plugin indicator light

PJ-20S



- 電控面板模組化，便於維修
Modular PCB, easy to maintenance.
- 人性化操作面板，易於操作
Intuitive control panel, easy to operation.
- 三組M碼輸出
3 sets of M code output.
- 體積小，空間省
Compact size, saving space.

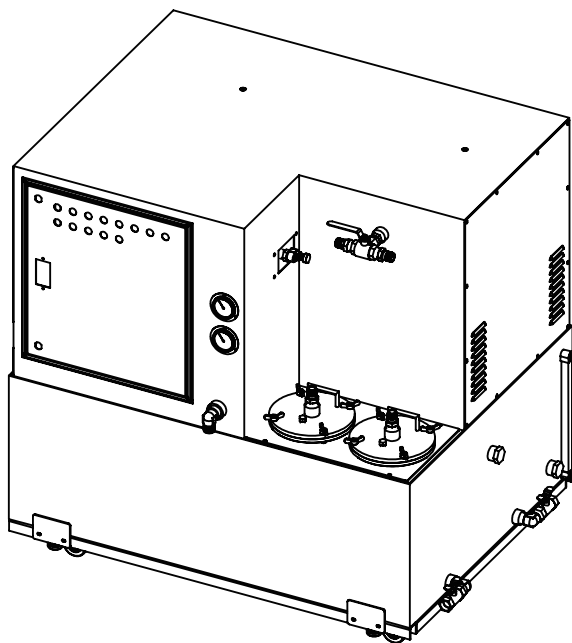
基本規格表 SPECIFICATION

適用液體	Fluid Type	油基切削液 Oil base coolant
最大工作壓力	Max working pressure	40 Bar (kg/cm ²)
最大流量	Max flow rate	20 Liter/min
出水口數目	Number of ports	3 (standard)
過濾精度	Filtration	25 μ Single filter
水箱容量	Tank	N/A
尺寸	Dimension	532 X 695 X 943 mm
重量	Weight	98 Kg

選配功能 (Option)

1. 4個出水口 4 ports outlet
2. 80L 副水箱 80L tank
3. 消泡裝置 Anti-foaming

客製機 (Customized Model)



- 可依照客戶需求特製
Customization according to customers, requirement

基本規格表 SPECIFICATION

適用液體	Fluid Type	水基切削液 Water base coolant 油基切削液 (黏度係數15-32cSt) Oil base coolant (viscosity 15-32cSt)
最大工作壓力	Max working pressure	30~250 Bar (Kg/cm ²)
最大流量	Max flow rate	10~75 Liter / min
出水口數目	Number of ports	1-8標準 (standard)
過濾精度	Filtration	5~25μ單過濾器 Single filter

MEMO



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Web: www.polarjet.com.tw

我們對品質的承諾 **Commitment to Quality**

- 所有的產品皆在裝運前作廣泛的測試
- PolarJet是以高品質元件組裝而成，為確保系統的耐久性及可靠性
- PolarJet系統將依照客戶的系統需求運作
- All Products Extensively Tested Prior to Shipment
- Built with the Highest Quality Components to Ensure Durability and Reliability
- System Functions According to Customer Specifications

POLARJET 