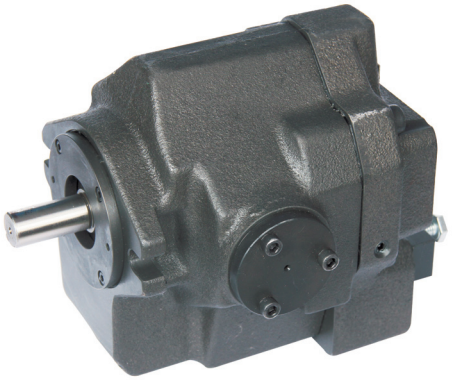
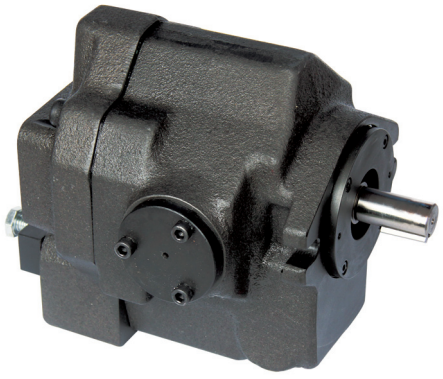
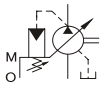
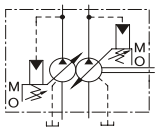
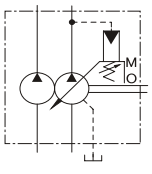
A Series Variable Displacement Piston Pumps

A系列变量柱塞泵

■ A系列變量柱塞泵 "A" Series Variable Displacement Piston Pumps





型號 Model		JIS液壓圖形符號 JIS hydraulic graphic symbol	幾何排量 cm³/rev Geometric displacement cm3/rev 1 2 5 10 20 50 100 200 300	最高工作壓力 Maximum working pressure MPa
"A" Series Variable Displacement Piston Pumps A系列變量柱塞泵	單泵 注)1 note 1 Single pump		A10 A16 A22 A37 A56 A70 A90 A145 A220	21 21 16 28 16
	雙聯泵 Double pump		從動端泵 Driven end pump: A16 A37 A56 驅動端泵 Drive end pump: A16 A37 A56 A70 A90 A145 A220	28 注)2
	變量·定量雙聯泵 Variable ·ration double pump		從動端泵 Driven end pump: PV2R1 PV2R2 驅動端泵 Drive end pump: A16 A37 A56 A70 A90 A145 A220	28 注)2

注)1．具備有以壓力補償控制型爲首的多種控制型式。
注)2．雙聯泵的最高壓力取決于泵的組合有所不同，詳情請和我們聯系。
Note 1: various control type with pressure compensation control type being main.
Note 2: maximum pressure of the double pump depends upon the different combination of pumps, please contact us for details.

■ A系列變量柱塞泵的液壓油液 The hydraulic oil of a series variable displacement piston pumps

■ 液壓油液 The hydraulic oil

可使用溫度爲0～60℃時油的粘度範圍爲20～400mm²/s、清潔的石油基液壓油（相當于ISO VG32或46）。

The viscosity range of the oil is between 20 and 400mm²/s when the applicable temperature is between 0 and 60℃ and clean petroleum base hydraulic oil is used here (equivalent to is vg32 or 46).

■ 防止杂物混入 To prevent the debris from entering

油液的汙染會引起泵的故障和縮短壽命的原因。必須注意油液的汙染控制，請保持汙染度在NAS10級以內。

吸油口必須安裝至少爲100μm（150目）油箱過濾器。回油路必須安裝一個小于10μm的管道式濾油器。

The pollution of the oil can lead to the breakdown of pumps and shortness of the service life. The pollution control of the oil must be paid attention to and the pollution degree should be kept within the grade of nas10.

The tank filter of more than 100μm (150 meshes) must be equipped in the suction orifice and the pipeline filter of less than 10μm must be installed in the return oil line.

■ A變量柱塞泵使用注意事項 The notes for use of a series variable displacement piston pumps

■ 泵安裝 Installation of pumps

安裝泵時，加油口位置應向上。

The oil filler should face upward when installing pumps.

■ 轴的对中 Alignment of the shaft

盡可能使用撓性聯軸節，以避免由于彎曲或推力引起的任何應力。最大允許不同軸度誤差TIR（Total Indicator Reading）小于0.1mm，最大允許角度誤差小于0.2°。

Use the flexible coupling as much as possible to avoid any stress caused by bending or thrust. Attention, the maximum allowable different axis deviation TIR (total indicator reading) should be less than 0.1mm and maximum allowable angle deviation should be less than 0.2°.

■ 吸入壓力 Suction pressure

泵入口處允許吸入壓力在-16.7～+50kPa之間。吸入口配管的直徑要與所規定的管法蘭的直徑相同。泵的吸入幾高度離油箱液面必須小于1m。

The suction pressure in the inlet of pumps is allowed between -16.7 and +50kpa. The diameter of the suction inlet should be the same as that of the specified pipe flange. The distance from the suction inlet of pumps to the liquid level of the tank must be less than 1m.

■ 配管須知 Piping requirements

在吸入口或輸出口使用鋼管時，由于配管對泵的額外負載可産生噪聲的原因。爲了避免額外的負載，請使用橡膠軟管。

When steel pipes are used in the suction inlet or outlet, for the piping can generate noise to the additional load of pumps, the rubber hose should be used to avoid the additional load.

■ 吸入管 Suction pipe

如泵高于液面安裝時，吸入管和吸入管濾油器不要高于泵的接口位置，以防止空氣進入吸入管。

If the pump is mounted above the liquid level, the suction pipe and its oil filter should be below the interface location of the pump to prevent air entering the suction pipe.

■ 泄油管 Oil drain pipe

按照下表安裝泄油管路，並應保證泵腔内的壓力保持低于0.1MPa的正常壓力，沖擊壓力小于0.5MPa。

配管長度小于1m，要單獨安裝不要與返油管合流，管末端應浸沒在油中。

The oil drain pipeline is mounted according to the following table and the pressure in the pump chamber should be ensured to keep below the normal pressure of 0.1MPa and the surge pressure should be less than 0.5MPa.

The length of pipes should be less than 1m, they should be mounted individually and not interflow with oil return pipes and their pipe end should immerse in the oil.

■ 泄油管尺寸推薦值 The oil drain pipe size recommendation

型號 Model	配管·接頭尺寸 Piping connector size	配管内徑 Piping inner diameter
A10，A16，A22	3/8（内徑大于Φ8.5） 3/8 (inner diameter more thanΦ8.5)	大于Φ10 More thanΦ10
A37，A45	1/2（内徑大于Φ12） 1/2(inner diameter more thanΦ12)	大于Φ12 More thanΦ12
A56，A70，A90 A100，A145	3/4（内徑大于Φ16） 3/4 (inner diameter more thanΦ16)	大于Φ19 More thanΦ19

■ 排氣 Exhaust

爲避免泵殼内和管路内的混入空氣引起振動，有必要放氣，爲此推薦輸出管路處使用排氣閥。
To avoid the vibration caused by the mixed air in the pump shell and pipeline, it is necessary to deflate and recommended to use the vent valve in the output pipeline.

■ 启动时注意 Notes when starting

在第一次啓動前，通過加油口將清潔的液壓油液注入（見下表）。
爲了避免第一次啓動時的氣堵現象，調節液壓回路使泵輸出的油直接回油箱，或用換向閥使執行元件在空載情況下運行。
Before the first start, infuse the clean working oil by the value in the following table through the oil filler.
To avoid the air blocking phenomenon for the first start, regulate hydraulic return line to make the output oil of pumps return directly the tank or use the reversing valve to let the actuator run under the no-load state.

■ 液压油液加注量油 Hydraulic oil filling capacity

型號 Model	加注油cm^3 Filling capacity cm^3
A10	370
A16，A22	600
A37，A45、A56	1200
A70	2100
A90，A100	2500
A145	3300

■ 壓力、流量的調節 Regulation of pressure and flow

出廠時，泵調整在最大油量和最小壓力。
可依工作情況調節流量和壓力。
When leaving the factory, pumps are regulated to keep at the maximum flow and minimum pressure.
The flow and pressure can be regulated according to the working condition.

■ 壓力調節 Pressure regulation

順時針旋轉調節螺釘，壓力增加。
調節螺釘'轉相應的調節量見下表。
調節後一定要擰緊螺釘。
Regulate the pressure regulating screw clockwise and pressure increases.
Adjustment corresponding to 1 revolution of the screw can be seen in the following table.
The screw must be tightened after regulating.

■ 流量调节 Flow regulation

順時針旋轉調節螺釘，流量減小。
調整螺釘'轉相應的調節量見下表。
調節後一定要擰緊螺釘。
Rotate the regulating screw clockwise and flow reduces.
Adjustment corresponding to 1 revolution of the screw can be seen in the following table.
The screw must be tightened after regulating.

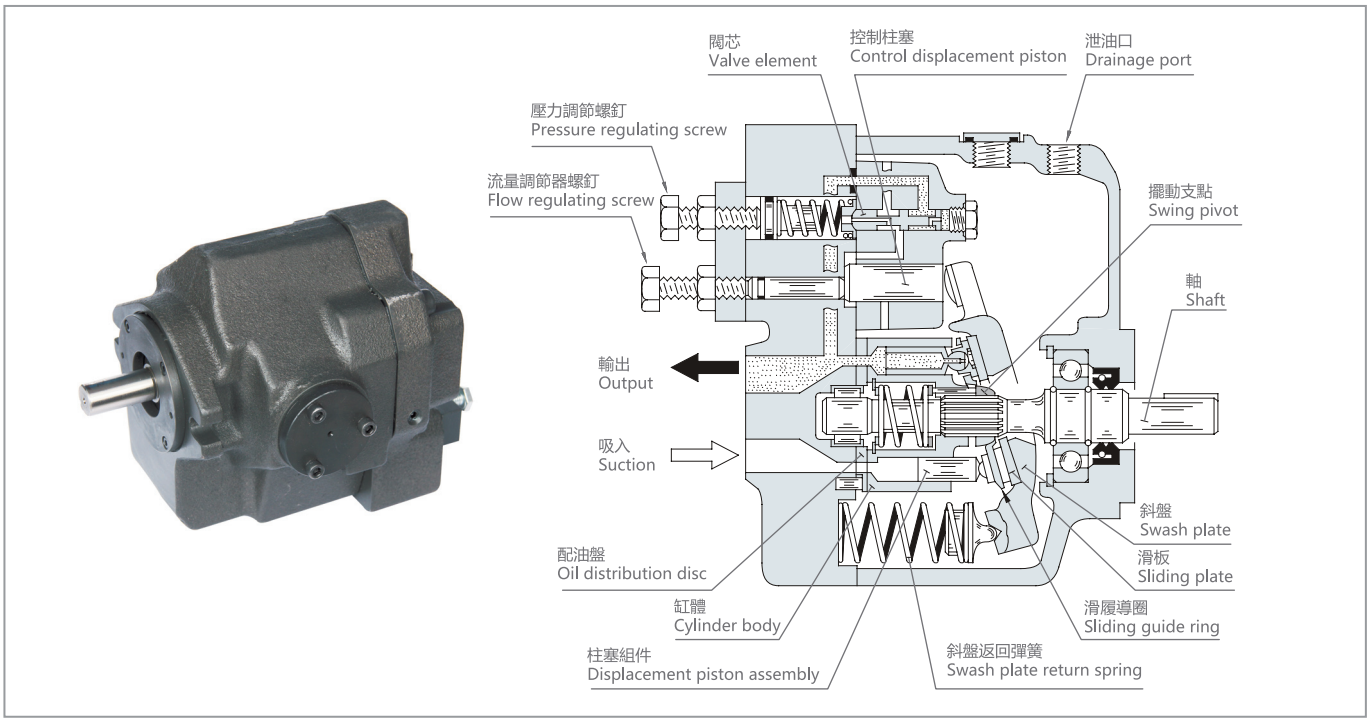
■ 相當于壓力調節螺釘1轉的調節量
Adjustment corresponding to 1 revolution of the pressure regulating screw

型號 Model	相當于1轉的調節量MPa Adjustment corresponding to 1 revolution MPa
A10-fr01b	2.9
A10-fr01c/h	5.4
A16/a22/a37/a56-※-r-01-b	3.5
A16/a22/a37/a56-※-r-01-c	6.5
A16/a37/a56-※-r-01-h	7.9
A70/a90/a145-※r01b	2.3
A70/a90/a145-※r01c	3.2
A70/a90/a145-※r01h	4.0
A70/a90/a145-※r01k	4.7

■ 相當于流量調節螺釘1轉的調節量
Adjustment corresponding to 1 revolution of the flow regulating screw

型號 Model	相當于1轉的調節量cm^3/rev Adjustment corresponding to 1 revolution cm3/rev	最小調節流量cm^3/rev Minimum regulation flow cm3/rev
A10	1.1	2
A16	1.4	4
A22	2.0	6
A37	2.9	10
A56	3.9	12
A70	4.4	30
A90	4.8	56
A145	7.2	83

■ A系列變量柱塞泵 A Series Variable Displacement Piston Pumps



■ 特點 Features

高效率

當壓力在16MPa；轉數在1800r / min時容積效率大于98%

總效率大于90%，具有頂高的效率

High efficiency

When the pressure is 16MPa and rpm is 1800r/min, the volume efficiency is more than 98% and total efficiency exceeds 90%. The efficiency is extremely high.

低噪聲

A16型泵的噪聲低于57.3 dB(A)。

★ 測定位置：泵後側1m

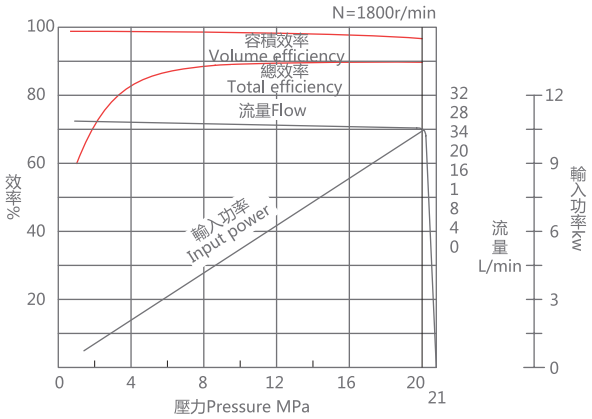
壓力：21MPa全截流

Low noise

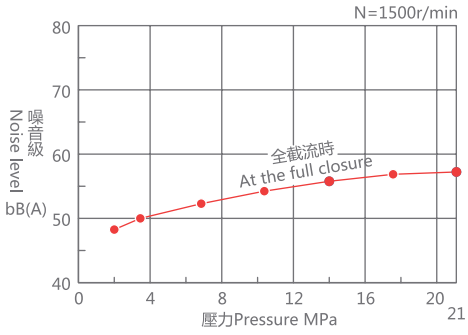
The noise of a16 type pump is lower than 57.3db (a).

★(measurement location: 1m from the back side of pump, pressure: 21MPa at full closure)

■ A16型效率特性 The efficiency properties of a16 type



■ A16型噪音測定例 Noise measurement example of a16 type



節能型

因爲總效率高，並具有良好截流特性，可節省輸入功率。

Power saving

Due to the high total efficiency and good closure property, it can save input power.

發熱量小

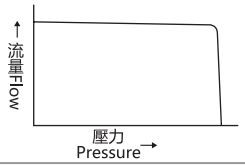
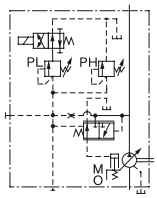
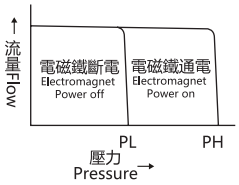
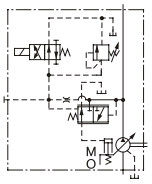
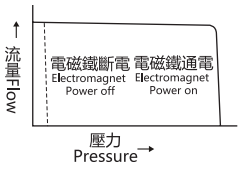
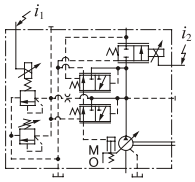
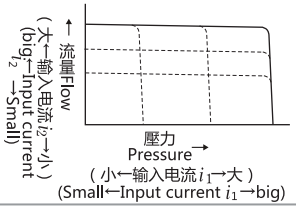
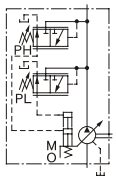
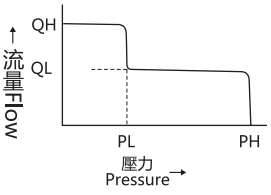
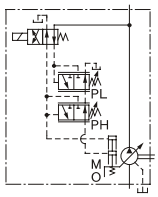
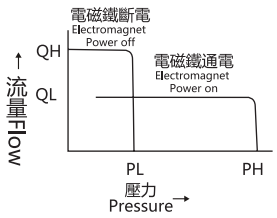
因爲功率損失小，可減少油液的升溫，因而可減小油箱的容量。

Small calorific value

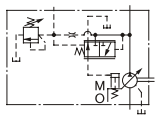
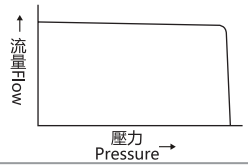
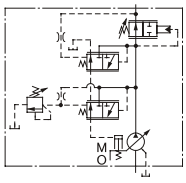
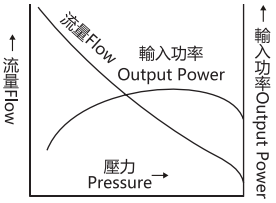
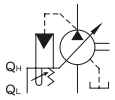
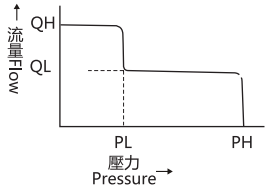
Because the power loss is small which can reduce the oil warming, the capacity of the tank can be reduced.

■ A系列變量柱塞泵控制方式 Control method of a series variable displacement piston pumps

單泵 Single pump

控制標記、控制方式 Control mark and method	JIS液壓圖形符號 JIS hydraulic graphic symbol	特 性 Properties	說 明 Instruction
"01"壓力補償控制型 "01" pressure compensation control type			▲當系統壓力升高，接近預調的截流壓力時，泵的流量自動減小，但維持設定壓力不變。 ▲流量和全截流壓力必要時可用手動進行調調整。 ▲When the system pressure rises and is close to the preset closure pressure, flow of the pump automatically decreases and the preset pressure doesn't change. ▲If necessary, flow and full closure pressure can be regulated manually.
"02" 雙壓控制型 "02" double pressure control type			▲電磁鐵通斷電可得高低兩個全截流壓力。 ▲當執行元件的速度不變，而要控制兩種不同輸出力的情況下使用較爲理想。 ▲可與多級壓力控制閥配合使用。 ▲Electromagnet power off and on corresponds to high and low full closure pressure respectively. ▲It is ideal to use when speed of actuator doesn't change and there is need to control two kinds of different output force. ▲It is can be used cooperatively with multi-grade pressure control valve
"03" 帶卸荷壓力補償控制型 "03" pressure compensation control type with unloading			▲壓力補償控制型上增加卸荷機能。 ▲適用于裝置的待機時間較長的情況。 ▲裝置待機時泵要卸荷，因而油溫和噪聲都較低。 ▲可與多級壓力控制閥配合使用。 ▲Pressure compensation control type is added with unloading function. ▲It is suitable when the stand-by time of the device is long. ▲It is can be used cooperatively with multi-grade pressure control valve.
"04" 電-液比例負載敏感控制型 "04" electro-liquid proportional loading sensitive pressure control type			▲對驅動執行元件，僅供應所需最小限度的壓力、流量的節能型泵控制系統。 ▲與專用功率放大器配合使用。 ▲流量和全截流壓力按功率放大器的輸入電流成比例地進行控制。 ▲The drive actuator only apply to energy-saving pump control system which requires the minimum limit of pressure and flow. ▲It is used cooperatively with the special power amplifier. ▲Flow and full closure pressure are controlled proportionally according to the input current of the power amplifier.
"05" 內控式雙壓雙流量控制型 "05" internal control double pressure and double flow control type			▲一個泵可起兩個泵的作用—低壓大流量和高壓小流量，因而可使用功率小的電動機。 ▲負荷增大時，泵的輸出壓力逐漸接近于設定壓力 "PL"，而流量自動減小到 "QL"。 ▲適用于如壓機等，加壓開始的同時，轉變爲低速進給的裝置。 ▲A pump can act as two pumps-low pressure and big flow and high pressure and small flow. So motor of small power can be used. ▲When load increases, output pressure of the pump becomes gradually close to the preset pressure "pl" and flow automatically decreases to "ql". ▲It is suitable for the press and other devices which are converted to low speed feed once pressure starts to boost.
"06" 電磁式雙壓雙流量控制型 "06" electromagne -tic double pressure and double flow control type			▲一個泵可起兩個泵的作用—低壓大流量和高壓小流量，因而可使用功率小的電動機。 ▲依電磁鐵的通斷進行高壓小流量—低壓大流量的轉接。 ▲適用于機床等當從快速進給—切削進給後，就開始進行機械加工的機械。 ▲A pump can act as two pumps-low pressure and big flow and high pressure and small flow. So motor of small power can be used. ▲Conversion between high pressure and small flow and low pressure and big flow is done through electromagnet power off and on. ▲It is suitable for the machine tool and other devices which start to do the machining work after the rapid feed is converted to the cutting feed.

单泵 Single pump

控制標記、控制方式 Control mark and method	JIS液壓圖形符號 JIS hydraulic graphic symbol	特 性 Properties	說 明 Instruction
“07” 外控式壓力補償控制型 “07” external control pressure compensation control type			▲與先導型溢流閥或多級壓力控制閥配合使用。 ▲控制先導壓力，可使全截流壓力依需要而進行遙控。 ▲It is used cooperatively with the pilot overflow valve and the multi-grade pressure control valve. ▲The pilot pressure is controlled so that the full closure pressure is controlled remotely according to the need.
“09” 恒功率控制型 “09” electromagne-tic double pressure and double flow control type			▲控制泵輸入功率與電動機輸出功率相合。隨泵輸出壓力上升，匹配預先設定輸入功率而減小流量。 ▲本泵可起兩個泵的作用—低壓大流量和高壓小流量，因而可使用功率小的電動機。 ▲Input power of the pump and output power of the motor are controlled coherently. ▲With the output power rising, match the preset input power and reduce the flow. ▲This pump can act as two pumps-low pressure and big flow and high pressure and small flow. So motor of small power can be used.
“00-Z500” 簡易雙壓雙流量控制型 “00-z500” simple double pressure and double flow control type			▲本泵可起兩個泵的作用—低壓大流量和高壓小流量，因而可使用功率小的電動機。 ▲負荷增大時，泵的輸出壓力逐漸接近于設定壓力 “PL”，而泵的流量自動減小到 “QL”。 ▲適用于如沖壓機加工開始就轉換爲低速進給的裝置。 ▲PH壓力由外部設置的溢流閥遙控控制。當改變沖壓加工品的材質和形狀時，易于更改加工壓力的設定。 ▲This pump can act as two pumps-low pressure and big flow and high pressure and small flow. So motor of small power can be used. ▲When load increases, output pressure of the pump becomes gradually close to the preset pressure “pl” and flow automatically decreases to “ql”. ▲It is suitable for the punching machine which is converted to the low speed feed when the process starts. ▲Ph pressure is controlled remotely by the external set overflow valve. When material and shape of the punching processed product change, set of process pressure is easy to alter.

■ A系列變量柱塞泵的型號和控制型式的組合 Type and combination of control type of a series variable displacement piston pumps

在下表中的○記號表示標准型。
O mark of the following table is the standard type.

型號 Model	幾何排量 cm³/rev Geometric displacement cm3/rev	控制方式 Control method									
		01	02	03	04	04E	05	06	07	09	00-Z500
A10	10.0	○							○		
A16	15.8	○	○	○	○	○	○	○	○	○	○
A22	22.2	○	○	○	○	○		○	○		
A37	36.9	○	○	○	○	○	○	○	○	○	○
A56	56.2	○	○	○	○	○	○	○	○	○	○
A70	70.0	○	○	○	○	○		○	○	○	○
A90	91.0	○	○	○	○	○		○	○	○	○
A145	145	○	○	○	○	○		○	○	○	○
A220	219	○		○	○				○		