

## AC1000 User manual

The combined pump is a device that provides pressure oil for fuel dispenser and continuously separates and eliminates the gas in the measured liquid.

### 1.1 Structure performance and working principle

Flow rate:	$\geq 85\text{L/min}$	Working pressure:	0.25~0.35MPa
Indicated value of vacuum:	$\geq 0.054\text{MPa}$	Speed RPM:	650r/min
Pressure resistance:	0.30MPa	Noise:	$\leq 72\text{db (A)}$
Working life:	$1.8 \times 10^6 \text{ L}$	Motor power:	1.1KW

Capacity of oil-gas separation: 10% (Viscosity of oil is more than 1mPa.s)

### 1.2 Structure and working principle:

#### 1.2.1 Structure and working principle of vane pump:

The main moving part of the combined pump is vane pump, which is composed of pulley, rotor assembly, stator, etc. its structure and working principle are shown in Fig. 1.

As shown in Figure 1, a rotor is eccentrically installed in the stator, and six grooves are distributed along the circumference of the rotor. Six blades are installed in the groove, and the rotor has a ring rejection on both sides of the axial direction. Under the action of centrifugal force and ring rejection, the blade is close to the outer wall of pump cavity and can move radially along the rotor. The rotor is driven by the pump shaft and rotates clockwise, and the pump will start to work.

Due to the eccentric arrangement of the rotor in the vane pump body, a crescent shaped space is formed between the rotor and the body. The space held by blades a and B is smaller than that held by blades B and C. at the same time, as the volume of B and C gradually expands, it is an oil absorption process, and the volume from B, C to D and E is gradually reduced, so it is an oil pressing process. Therefore, in Fig. 1, the vertical line is taken as the center, the left side is the low pressure area, and the right side is the high pressure area.

#### 1.2.2 Overall structure and working principle of combined pump::

The combined pump is composed of vane pump, high pressure chamber, atmospheric pressure chamber and low pressure chamber. Its structure and working principle are shown in Fig. 2

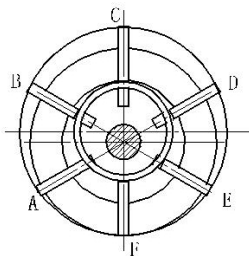


图1 叶片泵工作原理图

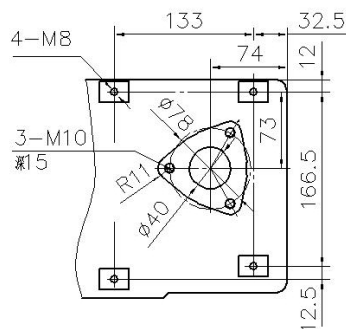


图2.1底部安装尺寸图

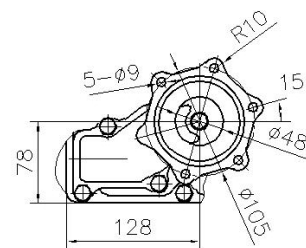


图2.2顶部安装尺寸图

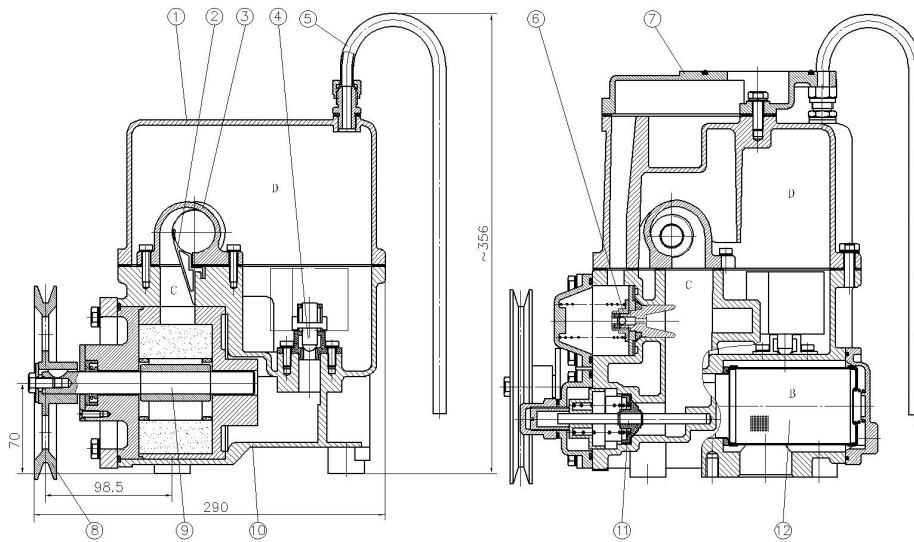


图2.3组合泵结构及工作原理图

- B.Low pressure chamber
- C.High pressure chamber
- D.Normal pressure chamber
- 1.Upper cover
- 2.Flow deflector
- 3.Exhaust pipe assembly
- 4.Oil return valve
- 5.Ventilation tube
- 6.Outlet valve
- 7.Connector
- 8.Pulley
- 9.Rotor assembly
- 10.Body
- 11.Pressure valve
- 12.Flow meter

When the combined pump works, the low pressure chamber is under negative pressure. The oil enters the low pressure chamber from the bottom oil inlet, flows through the filter to the oil inlet of the vane pump, and then enters the high pressure chamber after being pressurized by the vane pump. At the beginning, the pressure in the high pressure chamber is low, the outlet valve is closed, and a large amount of gas is discharged to the atmospheric chamber through the middle hole of the exhaust pipe, and is discharged out of the machine through the vent pipe. When the gas in the high pressure chamber decreases gradually and the pressure increases, the outlet valve opens under the action of pressure oil. At this time, the high-pressure oil forms a swirl through the guide vane, and the gas and a small amount of oil particles gather in the middle of the exhaust pipe and are discharged to the atmospheric pressure chamber through the middle small hole; the high-pressure oil flows tangential along the pipe wall and is discharged to the high-pressure chamber at the liquid outlet.

The gas and a small amount of oil entering the atmospheric chamber are discharged out of the machine through the vent pipe. When the oil accumulates to a certain height in the atmospheric chamber, the return oil floats upward. Open the oil return valve, and the oil returns to the low pressure chamber through the oil return valve. In this way, oil and gas separation is completed.

When the oil discharge channel connected to the connector is smooth, the outlet valve is opened, the pressure valve is closed, the high pressure chamber is isolated from the low pressure chamber, and all high pressure oil is discharged from the connector. When the oil discharge channel is blocked, the oil pressure increases; at this time, the pressure valve opens, connecting the high-pressure chamber with the low-pressure chamber, and the blocked oil flows back to the low-pressure chamber again. In this way, the output of stabilized oil, and ensure the safe operation of the combined pump.

Screw the adjusting screw of pressure valve to adjust the outlet pressure of combined pump.

## 2 Main faults and troubleshooting of combined pump

### 2.1 No oil supply, insufficient oil supply (slow flow rate)

#### 2.1.1 Belt slipping, resulting in insufficient oil pressure.

Troubleshooting: loosen the fastening screw of the pressing wheel, adjust the V-belt properly or replace the belt.

#### 2.1.2 The rotation direction of pump shaft is not correct.

Troubleshooting: change the position of any two live wires in the power line and change the rotation direction of the motor.

2.1.3 Blade wear, resulting in internal leakage.

Troubleshooting: replace the worn blade.

2.1.4 The pressure valve is stuck in the open state.

Troubleshooting: eliminate foreign matters in pressure valve and repair or replace corresponding parts.

2.1.5 The filter is blocked and the oil inlet resistance increases.

Troubleshooting: clean the filter.

2.1.6 The outlet valve card died of closed or non fully open state.

Troubleshooting: eliminate foreign matters of outlet valve, repair or replace corresponding parts.

2.1.7 The return valve is stuck in the open state, resulting in air circulation.

Troubleshooting: repair or replace the oil return valve to make it work normally.

2.1.8 Exhaust pipe gasket failure or screw loose, resulting in internal leakage..

Troubleshooting: tighten the screw or replace the gasket

## 2.2 Big noise

2.2.1 Shaft sleeve wear, resulting in the rotor inclined to the end face, abnormal work.

Troubleshooting: replace the shaft sleeve, repair the pump body, pump cover end face.

2.2.2 The pressure valve is not flexible, resulting in unstable pressure and increased noise.

Troubleshooting: remove foreign matters in pressure valve.

2.2.3 The filter in front of the oil inlet of the pump is blocked, the oil supply is insufficient and the noise is increased.

Troubleshooting: clean the filter.

## 2.3 Leakage

2.3.1 Oil seal failure or blade, pump shaft wear serious.

Troubleshooting: replace the oil seal, if the blade pump shaft wear serious, should be replaced together.

2.3.2 The fastening screw is loose or the sealing gasket and O-ring are invalid.

Troubleshooting: tighten the loose screws and replace the sealing gasket and O-ring.

## 2.4 Oil outlet from vent pipe

2.4.1 The oil return valve is stuck in the closed state, so the atmospheric oil cannot return to the low pressure chamber.

Troubleshooting: repair or replace the oil return valve

2.4.2 The oil level of overhead oil cylinder is higher than that of combined pump, so the oil in atmospheric chamber cannot return to low pressure chamber

Troubleshooting: remove the vent pipe and block the vent.

## 2.5 Oil and gas cannot be separated

2.5.1 The deflector is damaged and gas cannot accumulate in the middle of the pipe.

Troubleshooting: replace the reverse flow sheet

2.5.2 The oil return valve is stuck in the open state, and a large amount of gas is sucked into the combined pump.

Troubleshooting: repair or replace the oil return valve

## 3 Catalogue of wearing parts

Item No.	Part Name	Specifications	Materials	pcs
AC1000-11	Blade	4.75×26.5×66.5	Hard graphite	6
AC1000-14	Axle sleeve	φ 21× φ 19×26.3	Compound material	2