

HZLY Easy Access Manual

USER MANUAL

Huazheng Electric Manufacturing(Baoding) Co.,Ltd



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I. Overview

1.The Scope Of Products

HZLY oil filter high-efficiency vacuum oil filter is used to remove trace moisture and solid pollutants from petroleum-based oils such as transformer oil, hydraulic oil, lubricating oil and gas turbine oil. The oil filter can bypass or clean the oil separately as needed.

2.Product Features

HZLY series equipment can:

- A.Remove traces of water from the media. The total water content limit of the treated media can be less than 10 PPM.
- B.Remove the gas from the medium. The gas content limit of the treated medium may be less than 1%.
- C.Filter out solid particles in the medium. Control fluid cleanliness to NAS 6 or higher.

Note: This equipment is not suitable for applications where water is high, such as the requirement to remove deposited water. One solution at this time is to use this equipment with our HCP series. This will quickly remove large amounts of water from the oil and eventually reduce the total water content to 10-30 PPM or less.

II. Structure And Function

1.Structure Description

HZLY Oil filter is divided into two types: mobile and fixed. Mobile devices can be replaced as needed, and equipped with universal brake casters to help position the equipment on a narrow or uneven work site. Fixed structures are used for long - term non - moving work situations.

2.Function Introduction

2.1 Machine Function

HZLY Oil Filter has both dehydration and particle filtration functions.It does not require



intervention by operators when working normally.

The device will give an alarm when there is an abnormality or need to be maintained.

For some reason, when the equipment is in danger, the internal security system will force the equipment to stop automatically.

2.2 The Filtration System

The HZLY oil filter is equipped with a primary filter (FL01) with a precision of 50 μm to protect the oil pump. A 5-10 μm filter element is available in the secondary filter (FL02). Depending on the customer's requirements for cleanliness of the oil, the three-stage filter is available with an optional 1-3 μm filter.

2.3 Von Spree Patent Degassing System

The vacuum pump removes the gas in the evacuation chamber to form a high vacuum state, and the oil enters the degassing chamber through the atomizer under the action of the negative pressure. Under the action of the atomizer, the oil is atomized into 50~500 μm particles or bubbles, and the water is quickly evaporated into steam and steam under vacuum and the gas is discharged to the atmosphere under the action of a vacuum pump. The atomizer adopts an inverted structure, and the oil mist passes both the rise time and the fall time in the degassing chamber, thus greatly prolonging the degassing time of the oil. Under the same vacuum pump configuration, the degassing efficiency of our company's oil filter is 3-5 times that of other oil filters.

2.4 Heating System

In order to improve the degassing efficiency, the oil needs to be heated to a certain temperature before entering the degassing chamber. Our factory presets the temperature to 60 °C. The higher the temperature, the higher the degassing efficiency; but too high a temperature may cause oil cracking. In order to protect the heater and prevent oil cracking, the heater is equipped with a liquid level detecting device (LS01), which will be prohibited when there is no oil in the heater.

2.5 Condensing System

To protect the vacuum pump, the gas passes through the condenser before entering the vacuum pump to reduce the gas temperature. Only when the water content in the oil is too high, part of the water vapor is condensed and becomes liquid water deposited on the bottom



of the condenser. The condenser is equipped with a liquid level detecting device (LS04). When the LS04 detects the liquid level, the vacuum pump stops running and the “Condenser Full” indicator lights up.

2.6 Vacuum System

The vacuum system consists of a vacuum pump (P01) and vacuum pump accessories.

2.7 Oil Drain System

The oil drain system consists of a gear pump with a displacement of xxml/r and a xxKw/x class motor. The check valve (CV02) is used to prevent oil from flowing back into the degassing chamber when the oil pump motor is stopped. The pressure switch (PS01) is used to detect the discharge pressure of the gear pump. When the gear pump discharge pressure is greater than 0.3Mpa, the gear pump drive motor stops running and the “filter blockage” indicator lights up.

2.8 Oil Level Control System

When the liquid level in the oil tank rises, the liquid level float (FB01) floats and drives the handle of the ball valve (MV11) to lift, the diameter of the ball valve becomes smaller, and the oil intake becomes smaller; On the contrary, the amount of oil entering becomes larger.

2.9 Overall Structure And Piping

The frame is made of high quality carbon steel and the surface is sprayed with plastics.

The container is made of high quality carbon steel and the surface is sprayed with plastics.

The connecting pipe is made of quality carbon steel and the surface is sprayed with plastics.

2.10 Electrical System

It has the functions of monitoring and alarming, action control and stopping protection for the equipment, which can make the equipment work automatically, safely and reliably. The PLC controller and remote monitoring display can be selected according to the user's needs.

The following control and display elements are arranged on the operation panel of the equipment:

●<POWER> (Green light)



- <Vacuum pump> (Two green lighted selector switch)
- <Oil pump> (Two green lighted selector switch)
- <Heater> (Two green lighted selector switch)
- <Emergency stop> (Red mushroom button)
- <Motor overload> (Red light)
- <Condenser full> (Red light)
- <Fine filter blocked> (Red light)
- <Temperature controller>

The temperature controller is used to control the oil heating temperature. For the use of the temperature controller, refer to the instruction manual of the temperature controller.”.

III. Safety

1. Safety Protection Function Of Equipment

HZLY oil filter provides the following alarm, protection and automatic shutdown functions to ensure that the equipment works correctly and safely.

■Oil pump pressure protection

During system operation, if the oil pump outlet pressure reaches 0.3mpa, the pressure switch (PS01) will operate, the equipment will stop running, and the "fine filter blocking" alarm indicator will light up. At this point, it is necessary to check whether the oil outlet valve (MV01) is in the open position, whether the oil temperature is too low, and whether the filter (FL02, FS03) is blocked. After the fault is eliminated, the power must be cut off before the device can be restarted.

■Motor overload protection

In case of short circuit or overload of motor M01 or M02, the thermal relay (FR1 or FR2) will be disconnected and the equipment will stop running, while the "motor overload" alarm light will be on. At this point, it is necessary to check the motor (M01 or M02) or re-calibrate the thermal relay according to the motor current. Press FR1 or FR2 "Reset" button after the failure is eliminated.

■Power phase loss, phase failure protection

When the phase sequence error, phase loss, voltage is too high or the voltage is too low



in the three-phase power supply, the PR is disconnected and the device stops running.

■Vacuum pump oil anti-leakage protection

When the condenser level switch (LS04) detects the level, the equipment stops running and the "full condenser" indicator lights up. At this point, manual air supply valve (MV07) shall be opened. After the vacuum in the degassing chamber is completely eliminated, the condenser air drain valve (MV13) shall be opened to discharge liquid. After the fault is eliminated, the power must be cut off before the device can be restarted.

2.Safety Precautions For Users

The user shall check whether the actual conditions of use such as power supply, working pressure, temperature, medium, etc. are consistent with the requirements for the use of the equipment, and whether the use of the equipment complies with local safety regulations.

The equipment is manufactured in accordance with the standard of Huazheng company and manufactured for quality inspection and testing. However, due to transportation and other reasons, the user should check and confirm that all components are not damaged and that the connecting parts and fasteners should not be loose. Operators should receive the corresponding mechanical and electrical safety training, and confirm the qualification of operation before the operation of the equipment.

IV. Handling And Storage

1. Handling

The outer packing should be removed before handling. All valves should be closed.

Use forklift or crane for overall handling. Only the casters of the equipment themselves can be used to move above the smooth ground.


2. Storage

The equipment should be stored in a clean and dry place. The surface should be covered for dust-proof, all pipe mouth sealed with plug.




V. Installation

1. Install the equipment next to the user's equipment according to the external dimensions and connection dimensions specified in the random drawing. Mobile structures should lock the casters to prevent movement at work.
2. Before shipment, the equipment should be tested by using petroleum based oil. It is recommended to remove residual oil from the equipment before operation.
3. Remove all caps from the equipment piping.
4. The inlet and outlet of the equipment is connected with the user's oil tank by the pipe with diameter and material in line with the requirements.

 **Attention: The hoses shipped with the equipment are only for temporary use (such as commissioning). Long-term use may cause dangers in strength and media compatibility! Users must equip them with appropriate inlet and outlet piping according to their own use and management requirements. !**

5. The installation position of the inlet pipe of the equipment should be more than 150mm above the bottom of the user oil tank to avoid large pollution suction equipment; The installation position of the flowline shall be placed on the top of the user oil tank.
6. Confirm that the power switch QS1 and QS2 of the device are disconnected and connected to the power supply.

 **Attention: the power supply should be consistent with the nameplate parameters of the equipment. Terminals L1, L2 and L3 are power phase lines and N are neutral lines.**

VI. Start Running

1. Pre-start Check

Steps	Item	Remark
1	Remove all plug at the pipe opening and open outlet ball valve (MV01) and tank inlet and outlet valves.	
2	Open the condenser drain valve (MV13) until the condenser is drained and closed.	



3	Connect the power supply (three phase four wire and ground wire), switch on QS1 and QS2.	At this time, the power indicator on the control panel is on
4	Check the power indicator on the control panel. If the power supply is abnormal, the power failure is corrected according to the PR indicator.	Power supply cut off phase, wrong phase, too high voltage and too low voltage, PR will be automatically cut off power.
5	Open the pump and close it immediately. See if the motor steering is correct	The motor direction should be consistent with the direction of the arrow on the pump body
6	If the motor turns incorrectly, disconnect the power supply and switch the wiring of any two terminals in L1, L2 and L3.	The motor transfer is correctly set at the factory. This operation is only required after the motor and the electrical control box are rewired.
7	Turn on the vacuum pump. After 1 minute of operation, check if the vacuum pump oil level is within the allowable range.	The oil level of the vacuum pump should be between the red scale of the vacuum pump oil level mirror.

2. First Run

Step	Item	Remark
1	Open the inlet ball valve (MV02) and inner circulation valve (MV03) and close the outlet ball valve (MV01).	
2	Start the vacuum pump (P01).	
3	Open the pump (P02) when the oil reaches the bottom of the Vacuum chamber.	If the foam in the degassing chamber exceeds the center of the degassing chamber, the manual refill valve MV07 shall be slightly opened until the foam is below the exit of the atomizer.
4	Open heater (HT).	Set the temperature controller as required. Factory set at 60 °C.
5	During the internal circulation, the foam will gradually become less and the filling valve can be slightly closed until the foam is below the atomizer outlet.	
6	When there is little bubble in the degassing chamber, open the outlet ball valve and partially or completely close the internal circulation valve MV03.	The opening Angle of internal circulation shall ensure that the oil temperature can be stabilized at the set value of the temperature controller.

3. Shut Down



Step	Item	Remark
1	Wait 1 minute after turning off the heater (HT)	
2	Close the vacuum pump (P01) and the inlet valve (MV02) and open the air supply valve (MV07).	
3	Turn off the oil pump (P02) after the oil in the oil storage room is drained.	
4	When the vacuum gauge shows 0, close the air supply valve (MV07), the oil outlet valve (MV01) and the tank inlet and outlet valves.	
5	Disconnect the device from the power supply.	
6	If the equipment is not used for more than 96 hours, drain the oil in the vacuum pump and vacuum pump oil filter.	Prevent the vacuum pump chamber from corrosion due to too much water content in the oil

4. Emergency Stop

Step	Item	Remark
1	Press the "Emergency stop / reset" button	
2	If the device can't get close, try to cut off the power of the device at a distance.	
3	Close the oil inlet and outlet pipe valves (MV01, MV02) as soon as possible.	
4	Disconnect circuit breakers QS1 and QS2.	

5. Operation

When the equipment is running, observe the working pressure, vacuum, temperature and degassing chamber foam. If there is no abnormal condition within a quarter of an hour, the operator can leave the device and let it run automatically.

Before leaving the equipment, please check the following points:

- If the mobile equipment, please confirm that the casters are fixed, will not move by itself, causing danger.

- The device has no abnormal vibration and noise.

VII. Maintenance



1. Fault Diagnosis And Elimination

fault phenomenon	Cause	Exclusion measures
The power indicator is off and the temperature controller is not displayed	1.QS1 and QS2 are not closed 2. Power supply fault phase, over voltage or under voltage 3. The power supply is not connected properly.	1. Close QS1 and QS2 2. Discharge power failure according to PR indicator lamp 3. Connect the zero line
The power indicator is not on. The temperature controller is on	1. The power indicator is broken	1. Replace power indicator
The power indicator is on and the temperature controller is not displayed.	1. Temperature controller is bad	2. Replace Temperature controller
No fault prompt, the device does not start	1. Emergency stop button is pressed or damaged 2. Relay KA2 is bad or badly contacted 3. Relay KA3 is bad or bad contact 4. Thermal relay FR1 is bad 5. Thermal relay FR2 is bad	1. Reset or replace the emergency stop button 2. Check or replace the relay KA2 3. Check or replace the relay KA3 4. Check or heat exchange relay FR1 5. Check or replace the heat relay FR2
"Motor overload" indicator lights up	1. Vacuum pump or oil pump motor overload 2. Thermal relay FR1 or FR2 calibration value is too low 3. Thermal relay FR1 or FR2 is broken 4. Vacuum pump motor or oil pump motor is broken	1. Eliminate overload fault of vacuum pump or oil pump motor 2. Re-calibrate the thermal relay FR1 or FR2 3. Replace the thermal relay FR1 or FR2 4. Replace the vacuum pump or pump motor
"Fine filter blocking" indicator light on	1. Oil outlet valve MV01 is not opened 2. Obstruction of fine filter (FL02,FL03) 3. Pressure switch (PS01) is broken	1. Open the oil outlet valve 2. Replace the fine filter (FL02,FL03) 3. Replace the pressure switch (PS01)
"Condenser full" indicator light on	1. High level of the condenser 2. The condenser level switch is installed in the wrong position 3. The condenser level switch (LS04) is broken	1. Drain the condenser liquid 2. The condenser level switch floating ball is installed vertically downward 3. Replace the condenser level switch (LS04)



2. Daily Maintenance Procedures

2.1 Filter Core Inspection, Cleaning And Replacement

After working for a period of time, the filter element must be maintained, including cleaned or replaced, when the pressure difference through the filter element increases to the design limit due to the blockage of dirt. The material and structure of the filter element determines whether it can be cleaned and how it is cleaned.

Note: In the filter element used in the HZLY oil filter, the coarse filter FL01 can be cleaned. Fine filter elements FL02, FL03 and vacuum pump oil filter cannot be cleaned and must be replaced.

2.2 Clean And Replace The Coarse Filter Element

When the vacuum degree reaches $-0.07 \sim -0.1 \text{ mpa}$, the oil viscosity is low, the liquid level control ball valve (MV11) is fully opened, and the oil intake speed is still slower than the oil discharge speed of the oil pump, the machine should be stopped to remove the filter mesh for maintenance. The filter can be cleaned in gasoline and alkaline cleaning liquid, and compressed air can be used to blow the dirt between the mesh holes. Before installation, check if the filter mesh is damaged. If damaged, replace it.

Method of replacing fine filter FL02, FL03

Step	Method	Remark
1	Close the ball valve (MV02) of the inlet pipe, open the oil outlet valve MV01 and the air supply valve MV07	
2	Start the oil pump and drain the oil in the filter as much as possible	Judging by observing the outlet transparent PVC steel pipe
3	Turn off the machine when there is no oil in the container.	
4	Unscrew the flange bolts one by one and remove the flange cover	
5	Unscrew the old filter.	After removing the filter core, check whether the "O" ring can continue to be used under the fixed thread of the filter core
6	Install and tighten the new filter	Be careful not to contaminate the filter when installing
7	Install the filter flange cover as per the original procedure.	



2.3 Inspection/maintenance Schedule

Item	Period/time	Remark
Check the fault light	daily	
Check each instrument for damage	daily	
Check whether the inlet and outlet hoses are damaged and sealed well	at any time	Do not use the test hose for a long time!
Replace the coarse filter FL01	When the vacuum reaches -0.07~-0.1Mpa, the viscosity of the oil is low, the liquid level control ball valve (MV11) is fully opened, and the oil inlet speed is still slower than the oil pump discharge speed.	
Replace the fine filter FL02, FL03	When the pressure reaches 0.25 MPa or the "Filter Blocking" indicator is on	
Replace vacuum pump oil	After the vacuum pump oil is emulsified or the vacuum pump runs for more than 500 hours	Be sure to replace the vacuum pump oil and vacuum pump oil filter in time, otherwise the vacuum pump will be damaged.
Clean up dirt or rust inside the container	When maintaining or replacing the filter element	
Check the status of hoses and seals	Weekly	
Check pressure switch	Every 6 months	
Check instrument accuracy	Every two years	

VIII. Technical Parameters

1. Name And Model Specification

Name: High efficiency vacuum oil filter

Specification: HZLY-xx (See nameplate)



2. Design Working Conditions

Medium used: petroleum base oil crystals

Inlet pressure: $>-0.01\text{Mpa}$

Ambient temperature: $-10\sim 60^{\circ}\text{C}$

Treatment medium maximum viscosity: $\leq 46\text{cSt}$

System work pressure: $<0.5\text{Mpa}$

Sealing material: nitrile rubber

3. Material

Container: carbon steel spray

Frame: carbon steel spray

4. Dimensions And Quality

Length, width and height

Weight

5. Interface Size (See Nameplate)

6. Drive System

Power supply: AC three-phase four-wire 380V/50Hz

Power: (See nameplate)

Maximum current: (See nameplate)



IX. Product Drawings

1. Hydraulic Schematic Diagram

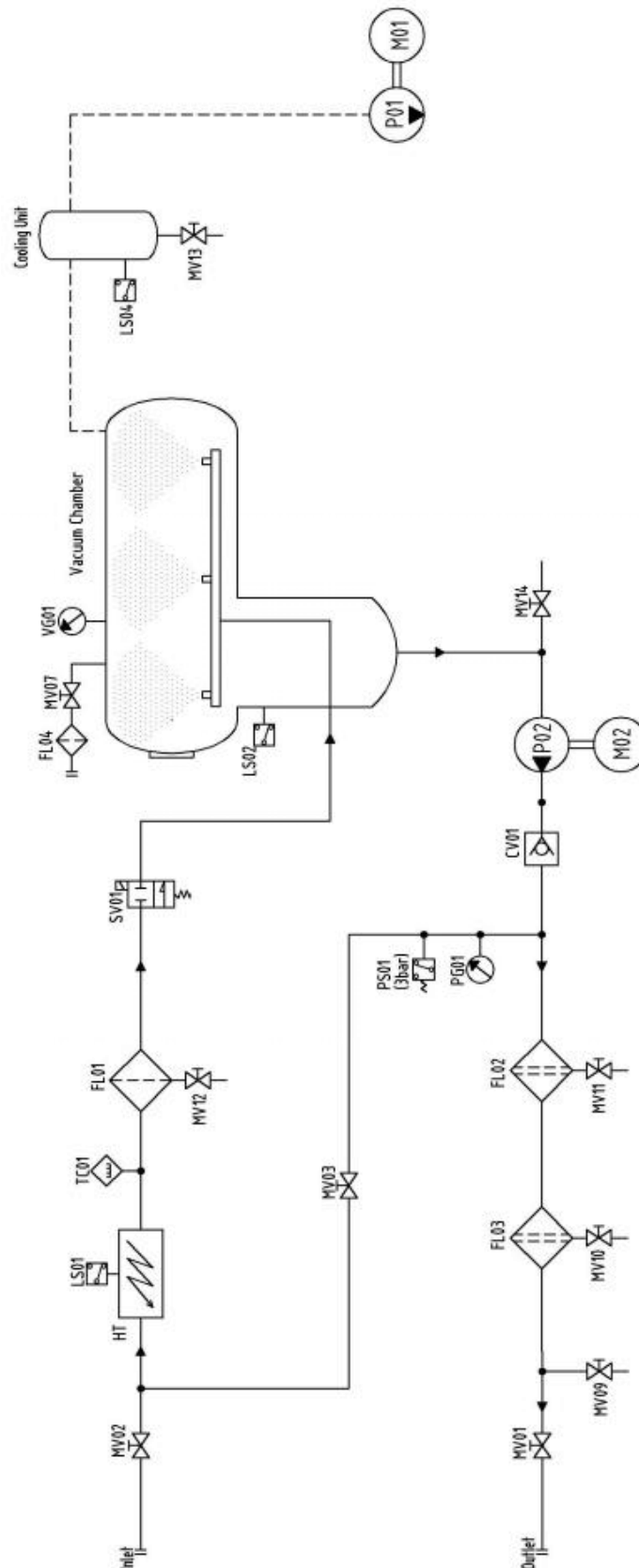


Diagrama de cableado para un sistema de control de motores y calefacción. El diagrama muestra la conexión entre un panel de control (con botones SB1, SB2, SB3, SB4, SB5, SB6, SB7, SB8, SB9, SB10, SB11, SB12, SB13, SB14, SB15, SB16, SB17, SB18, SB19, SB20, SB21, SB22, SB23, SB24, SB25, SB26, SB27, SB28, SB29, SB30, SB31, SB32, SB33, SB34, SB35, SB36, SB37, SB38, SB39, SB40, SB41, SB42, SB43, SB44, SB45, SB46, SB47, SB48, SB49, SB50, SB51, SB52, SB53, SB54, SB55, SB56, SB57, SB58, SB59, SB60, SB61, SB62, SB63, SB64, SB65, SB66, SB67, SB68, SB69, SB70, SB71, SB72, SB73, SB74, SB75, SB76, SB77, SB78, SB79, SB80, SB81, SB82, SB83, SB84, SB85, SB86, SB87, SB88, SB89, SB90, SB91, SB92, SB93, SB94, SB95, SB96, SB97, SB98, SB99, SB100, SB101, SB102, SB103, SB104, SB105, SB106, SB107, SB108, SB109, SB110, SB111, SB112, SB113, SB114, SB115, SB116, SB117, SB118, SB119, SB120, SB121, SB122, SB123, SB124, SB125, SB126, SB127, SB128, SB129, SB130, SB131, SB132, SB133, SB134, SB135, SB136, SB137, SB138, SB139, SB140, SB141, SB142, SB143, SB144, SB145, SB146, SB147, SB148, 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X. Packing List

No.	Item	Qty
1	Main engine	1
2	PVC steel wire reinforced hose	20
3	Oil sight glass	-
4	Hold hoop (ϕ 13-19)	-
5	Hold hoop (ϕ 32-44)	6
6	O-RING (ϕ 25x4)	2
7	O-RING (ϕ 35x4)	2
8	O-RING (ϕ 45x4)	2
9	O-RING (ϕ 60x4)	2
10	O-RING (ϕ 175x4)	1
11	Filter	-
12	Filter	-