

XCITE Owner's Manual

1302C HYDRAULIC POWER SUPPLY

XCITE Preface

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1302C Hydraulic Power Supply



1. Introduction

The XCITE Hydraulic Power Supplies are designed to fulfill the power requirements of exciter heads using the most energy-efficient and maintenance free components available. All units use a highly reliable, variable volume, pressure compensated, axial-piston pump to deliver only the energy demanded by the load, thus reducing power consumption.

2. Theory of Operation

The purpose of the XCITE Hydraulic Power Supply is to supply clean hydraulic oil at a constant pressure under the varying flow demands of the force exciter head. The system was designed to do this is the most efficient manner, considering power requirements, reliability, safety, ease of maintenance, and operator convenience.

2.1. Circuit Description (Hydraulic) - See Drawing B-30259

An oil reservoir provides storage for all necessary supply oil and provides some oil cooling. Mounted on the reservoir are oil level and oil temperature gauges, a temperature sensitive switch, and a reservoir fluid level detector switch for motor shut down. A 3000PSI pressure is achieved by a variable volume, pressure-compensated pump that has a factory set delivery rate.

Fluid from the pump first passes through a five-micron (absolute) filter. Should this filter become clogged, a pressure drop builds up across the sensor, causing a switch to trip. This causes the FILTER light to illuminate. The system should not be operated until the filter element is changed. After passing through the filter, oil flows to the pressure output disconnect.

2.2. Circuit Description (Electric) - See Drawing B-30260

The electrical input is specified at the time of purchase as either 200-230 or 380-460 volt, 50/60 Hz, three phase. The fourth wire (green) is a ground wire and must be tied to earth ground to prevent floating grounds due to an unbalanced load.

The pump motor uses the high voltage three-phase power, while the remaining loads derive 120 volt, single-phase from the step-down Transformer T-1 (designated 5), appropriately connected to the incoming power to provide 120 VAC on the secondary of the transformer.

Two-way protection of the three-phase power is provided. A magnetic circuit protector provides over current protection. It is also connected to the electrical box operating handle to disconnect power in the electrical box.

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Pump motor overload protection is provided by thermal overload heaters in the motor starter, which were specifically designed for the pump motor. A *RESET* button is conveniently located inside the electrical box, should be thermal overload trip. The pump start relay (1CR), (designated 09), is a latch-up design so that momentary switches may be used for pump start and pump stop operations.

A phase sequence relay 1PM (designated 04) is connected to and monitors the 3-phase incoming line to determine if the phasing is connected correctly to provide proper motor rotation. If the *PHASE CORRECT* light is off, any two legs of the incoming lines should be reversed.

If the phase is incorrect, 1PM (04) remains de-energized, thus preventing the system from being energized. If the phasing is correct, 1PM (04) energizes, allowing 120 VAC from T-1 (05) to be applied to the pump unit.

The T-1(05) Transformer is fused by 4FU and 5FU (designated 21). The system POWER switch connects power to the control circuits. If oil temperature is normal, relay 2CR (designated 09) is not energized. Momentarily, pressing the START button will energize 1CR (designated 09) if oil level, temperature, filter, and pressure selection are correct.

Relay 1CR (09) energizes the motor starter 02. Auxiliary contact 1M closes, latching 1CR. A normally closed CR1(09) contact opens, turning off the *STOP* light.

Momentarily pressing the STOP button breaks the latch-up circuit and deenergize 1CR (09) and the pressure relief solenoid. After a short delay, an *OFF DELAY* contact on 1CR opens, de-energizing the motor-starter coil and causing the pump to stop.

Relay 3CR (designated 09) is normally not energized unless the oil level drops. If the *RED OIL LEVEL LOW* light illuminates, the system must be reset by pushing the pump *STOP BUTTON* on the Master Controller and oil must be added to the reservoir. When a low oil level is detected, the pump is turned off.

Relay 2CR (09) is normally not energized unless the oil temperature exceeds 140 degrees F. If the *RED OIL OVERTEMP* light is illuminated, the system must be reset by pushing the pump *STOP BUTTON* on the Master Controller after the system cools down.

If the differential pressure drop across the filter exceeds approximately 50PSI, the *RED FILTER* restriction light will illuminate, the Power Supply will **NOT** shut off, however the filter should be changed when the filter light is illuminated.

3. Description

Included with the hydraulic power supply are an oil supply line pressure gauge and a timer which records actual pump running time. Mounted on the side of the reservoir is an oil level sight gauge with an integral oil temperature thermometer. A reservoir drain is also located on the reservoir. All motor controls and associated electrical equipment are located in the electrical control box. Connections for pressure and return hoses are attached with quick disconnect style connectors.

3.1. Major Components

- Oil Reservoir
- Motor
- Variable volume pressure-compensated Pump
- Five-micron Filter Assembly
- Water Heat Exchanger
- Motor Control Box
- Hydraulic Hoses

3.2. Control Components

3.2.1. Emergency Stop Switch

This switch de-energizes the motor-starter relay, bypassing all shutdown logic; thus causing the motor to stop. Use it only in an emergency situation.

WARNING

Some operating conditions cause the system to shutdown.

3.3. Monitoring Devices

3.3.1. Phase Sequence Relay (PHASE Indicator)

A phase sequence relay monitors the three-phase power applied to the unit. If the phasing of the wires is incorrect, the relay will prevent the pump from being energized, and the *PHASE CORRECT* lamp will NOT illuminate.

3.3.2. Filter Pressure Drop Sensor (FILTER Indicator)

This sensor sends a signal if the differential pressure across the filter element is excessive. This occurs when the differential pressure drop across the replaceable filter element exceeds 50PSI. Excessive differential pressure occurs when the filter element is clogging, fluid viscosity is too high, fluid temperature is too low, or any combination. At that time, the *FILTER* light illuminates and the filter should be replaced.

Note: There may be times when the system is first started and the oil is cold that the filter light will illuminate. Allow 10 to 20 minutes of operation and if the filter light goes off, then the filter is not dirty and does not need replaced.

3.3.3. OIL OVERTEMP Indicator

The temperature sensor monitors the oil temperature of the reservoir and prevents the pump from running if the oil temperature exceeds 150degrees F. The *OIL OVERTEMP* light illuminates, indicating that the maximum allowable oil temperature has been exceeded.

3.3.4. LOW OIL Indicator

The level sensor monitors the oil level in the oil reservoir and prevents the pump from running if the oil level is low. The pump will shut down or fail to start until additional oil is added. The red *LOW OIL* indicator lamp illuminates during this condition.

3.3.5. Hour Meter

An hour meter is included with the Hydraulic Power Supply to indicate the time the unit has been energized.

4. Care and Maintenance



Electrocution or severe electrical shock may occur.

When the MAIN power is plugged in, the line side of the motor starter is at line voltage.

The XCITE Hydraulic Power Supply was designed so that no periodic lubrication on mechanical parts is required. Cleanliness is very important when using sophisticated hydraulic systems, and although a clean room environment is far from necessary, general cleanliness is recommended. Routine maintenance on the overall system should include the following.

4.1. Operating Care

- **4.1.1.** Wipe off all cables after each use.
- **4.1.2.** Never drag cables across the floor.
- **4.1.3.** Immediately after the hydraulic hoses are disconnected, cover all hydraulic connectors with the covers provided.

- **4.1.4.** During operation, the oil temperature should never rise above 145 degrees F. (The oil temperature thermal relay shuts down the system at 150 degrees F.)
- **4.1.5.** Before each test, check the oil pressure to make sure it is at 3000PSI. A flow screw adjustment is located on the top of the pump compensator assembly. This control is preset at the factory and should not be adjusted (knob with locknut).
- **4.1.6.** Before each test, check to make sure that the water supply is turned on and the supply water temperature is below 70 degrees F, that the pump maintenance warning lights are not illuminated, and that the phase sequence indicator shows proper motor phasing.

If for some reason the system has overloaded, the pump motor started thermal overload will trip. Reset it by opening the access door, and pushing the reset button located on the motor starter.

4.2. Maintenance

- **4.2.1.** To keep the system operating within the specified limits, it is necessary to periodically check the oil level by observing the oil level gauge. Fluid should fill the gauge.
- **4.2.2.** Oil should be changed after every 1000 hours of pump operation.
- **4.2.3.** The condition of the filter is displayed by the light on the electrical control box inside the cabinet. The filter requires replacement only when the *FILTER* light is illuminated.
- **4.2.4.** Oil should be drained from the reservoir during transportation.

5. Troubleshooting

Listed below are some of the common problems which may be experienced with a Power Supply.

5.1. Unit Overheats causing Pump To Turn Off and Oil Overtemp To Illuminate Overheating may be caused by an interuption in water flow to the water/oil heat exchanger or supply water temperatures above 70 degrees F. Check to see that water is flowing through the water/oil heat exchanger at 8GPM when the oil temperature is above 135 degrees F. If pump has shut down due to overheating, it will require several hours of natural cooling before the pump will restart. Note: Water flow begins at 115 degrees F & reaches full flow at 180 degrees F.

5.2. Pump de-energizes

A pump de-energizes for no apparent reason can be caused by a noisy 3-phase power line at which the 3-phase voltage drops below 220 VAC (60 Hz) for more than 10 milliseconds. This results in the phase monitor relay 1PM momentarily de-energizing, shutting off the system.

5.3. Reset of Pump for Restarting

If at any time, one of the monitoring devices (Section 3.3) are activated, and the pump shuts off, it will not restart until the fault is corrected and reset.

To reset the relays in the control unit, press and hold the *PUMP STOP* button on the Master Controller. If the fault has been cleared, the pump can then be restarted as normal.

6. Specifications

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Dimensions	
Height	60"
Width	36"
Depth	48"
Weight	1500 lb (without oil)
Hydraulic Oil	Mobil DTE-24
Filter	5 Micron
Pump	15 GPM
Pressure-compensated	3000 PSI
variable flow axial piston	
Motor, 480, 3-Phase, 60 Hz	30 HP
	Current at No Flow = 18.0 Amps/leg
	Current at Full Flow = 38.0 Amps/leg
	Starting Current = 65.0 Amps/leg
Reservoir	40 gallon
Cooling	Water (50 PSI, 70 degrees F, 8GPM Flow)
Cooming	Flow starts at 115 degrees F
	Full flow at 180 degrees F
Noise Level	
	78 to 84 dBA depending on
(at 3 feet with full pump flow at 3000PSI)	location

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7.

Drawings Model 1302C-480

Outline Dimensions	B-30258
Hydraulic Schematic	B-30259
Electrical Schematic 220 VAC, 60 Hz	B-30260
Electrical Box Layout	B-30261







