WOODWARD

Product Manual 55035
(Revision NEW)
Original Instructions

Dual-Pump Hydraulic Support Package for Woodward Equipment

Installation and Operation Manual

General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

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The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

Contents

Illustrations and Tables

Warnings and Notices

Important Definitions

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

⚠WARNING

Overspeed / Overtemperature / Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

⚠WARNING

Automotive Applications

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE

Battery Charging Device

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

Dual-Pump Hydraulic Support Package for Woodward Equipment

Introduction

The Dual-Pump Hydraulic Support Package is a skid mounted device designed to supply filtered, pressurized hydraulic fluid to Woodward hydraulic or hydraulic-mechanical prime mover equipment.

Description

The Dual-Pump Hydraulic Support Package contains two electric-motor-driven fixed displacement pumps, which are assembled to a common reservoir.

The system incorporates a dual-filter system to remove contaminants from hydraulic fluid. The assembly includes a metal shade cover to minimize temperature increases resulting from radiant heat.

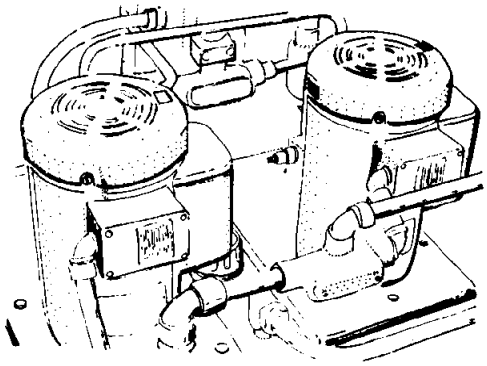

Figure 1. Dual Pumps

Tank and Heaters

The unit contains a 20 US gallon (76 L) reservoir with two immersion heaters, each rated at 2000 W. The heaters maintain hydraulic fluid at optimum operating temperature during periods of cool ambient temperatures.

The tank has a sight/temperature gauge externally located at the front. The fluid level should always be high enough to cover at least one-half the sight glass. Optimum fluid temperature is 110 to 140 °F (43 to 60 °C).

The heaters are each powered from a separately fused side of the main switch. Each has an adjustable thermostat.

There is a drain on the side of the tank.

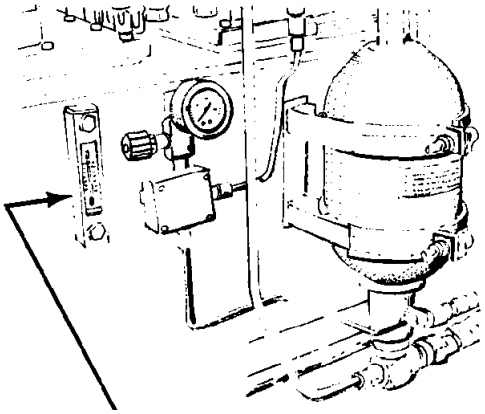

Figure 2. Sight Gauge

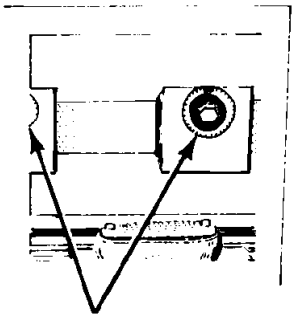

Figure 3. Heater Thermostats

Coolers

A fan-assisted, oil-to-air cooler is available to cool hydraulic fluid during periods of warm ambient temperatures.

Fluid temperature is controlled by air flowing through cooling coils, and air flow is controlled by three adjustable louvers. These louvers never should be left in a closed position.

Filter

The system contains a 20 µm dual-element filter. The operator may select the element in use simply by moving a lever from one extreme position to the other. The element nearest the knob at the bottom of the handle is the element selected for use.

Filter elements may be changed by unscrewing the canister, removing the old element, inserting a new element, and placing the canister securely back into position.

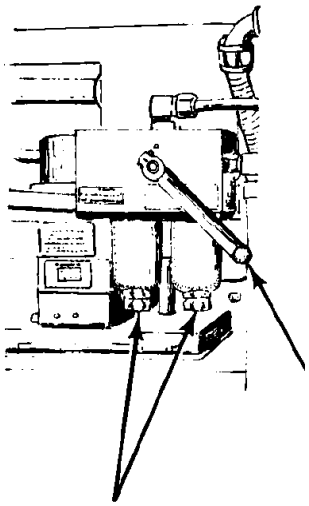

Figure 4. Dual Filters
(Handle position indicates filter in use.)

A plugged-element indicator is located on the top of the filter assembly almost directly behind the upper oil-line fitting. The indicator is a red “pop-up” device enclosed in clear flexible plastic cover. When the red device is visible, one of two conditions may exist:

- A pressure transient has activated the device; or
- The element is plugged.

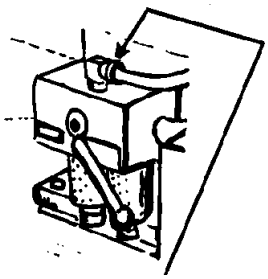

Figure 5. Clogged Filter Indicator

The operator may test for a plugged element by performing the following procedure:

1. While the pumps are running and delivering fluid to the filter, depress the red indicator. If the indicator remains depressed, the cause was probably a pressure transient. If the indicator reappears, the filter element is probably plugged and requires replacement.

2. Place the remaining element in operation, and replace the plugged element.

NOTICE **Continued operation with an inoperative filter may cause damage to the equipment being supplied with the hydraulic fluid.**

Pump System

The support package contains two identical pump systems designed for redundant, sequential operation. If the operational pumping system experiences failure of the pump motor, the pump, or the unloading valve, the second system automatically comes on-line.

Each system contains a relief valve for protection against overpressure. A two-way solenoid valve permits pump-to-tank unloading at zero pressure when flow is not required.

A control panel contains a selector switch to allow the operator to select either pump number one or pump number two as the primary pump. The panel also contains an ON button and a STOP button used to start and stop pumping operations.

The pump motors are protected by overcurrent protectors, which, when tripped, may be reset. These protectors are located on the side opposite the ON/STOP switch. If a motor should fail to start, be sure the appropriate overcurrent protector has not tripped. These devices are easily reset by depressing the tripped button.

The pumps are capable of delivering approximately 1.5 US gallons (5.7 L) of fluid per minute. If the load demand is 1/2 US gallon (1.9 L) per minute (typical of most actuators), the anticipated percent of pump “on” time to total time is approximately 30%.

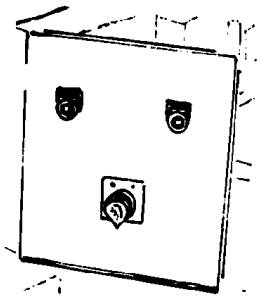

Figure 6. Control Panel

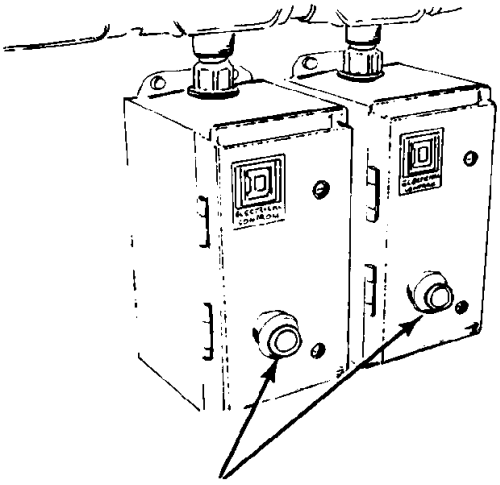

Figure 7. Overcurrent Resets

Accumulator

A pressure gauge is located adjacent to the sight gauge. The pressure gauge informs the operator of system pressure at the accumulator.

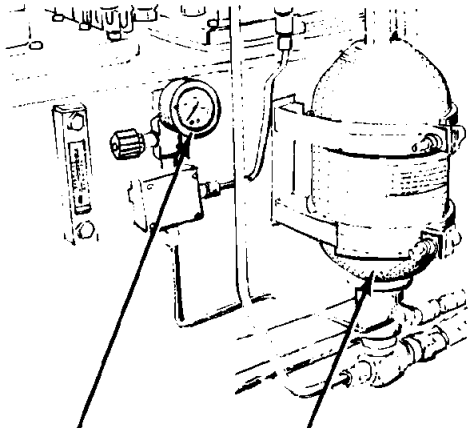

Figure 8. Accumulator and Pressure Gauge
(left arrow=pressure gauge, right arrow=accumulator)

The system contains a 1 US gallon (3.8 L) accumulator having a dry-nitrogen precharge of 700 psig (4826 kPa). Two pressure switches are located at the accumulator.

One pressure switch cycles between 1200 psig (8274 kPa) (where it unloads the active pump) and 1100 psig (7584 kPa) (where the active pump is called to deliver more oil).

The second pressure switch is a control switch set at 1000 psig (6895 kPa). If delivered pressure falls below 1000 psig (6895 kPa) for a preset period of time, the electric system automatically shuts down the active pump and activates the secondary pump. If the secondary pump cannot deliver a pressure of 1000 psig (6895 kPa) within the preset period of time, the system shuts down, and voltage is delivered to alarm terminals.

To reset a shut-down system, push the STOP button on the control panel; then restart operation.

The preset time is controlled by two time-delay switches (one for each pump). These switches are inside the ON/STOP control panel, and may be accessed by opening the front of the enclosure. Each switch is adjustable for a 15- to 30-second delay.

IMPORTANT

If a motor should consistently fail to start or consistently switch over to the standby motor, or should the system consistently shut down, the preset time may be set too low.

Shut the system down, increase the preset time, and restart.

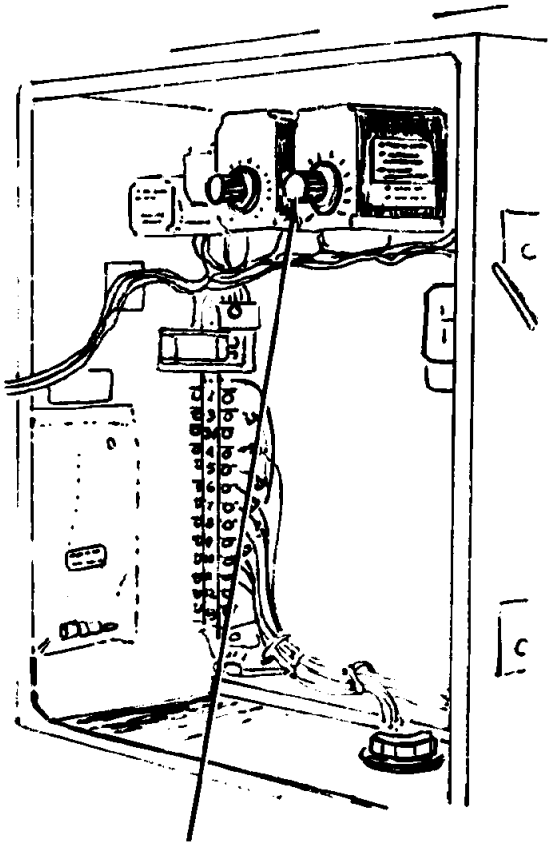

Figure 9. Adjustable Time-Delay Switches

Installation

Location

This unit is designed for either indoor or outdoor placement.

Electrical

The unit is designed for single phase 115 Vac operation. Woodward recommends providing a minimum of 60 A service to the control.

The main power box does not contain a conduit cutout; therefore an appropriate size hole must be provided.

Make all wiring in accordance with local and national codes.

Hydraulic fittings have standard pipe threads and require female connections.

⚠WARNING **Always be sure to use correctly rated hose or pipe for all hydraulic connections.**

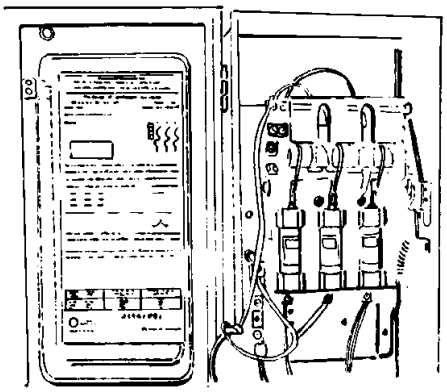

Figure 10. Main Power Box

Filling Reservoir and Operating

Fill the reservoir with clean hydraulic oil that conforms to Woodward requirements for the prime mover equipment being supplied. For more information on oils, see Woodward manual 25071, *Oils for Hydraulic Controls*.

IMPORTANT **Woodward recommends using a pump with a 10 µm filter when adding oil to the reservoir.**

During the run, closely observe the filters. If any element's visual indicator indicates a plugged condition, switch to the other filter and immediately replace the plugged filter element.

Troubleshooting

The following items are a few of the more often encountered items that may cause equipment failure, performance, or malfunction:

Hydraulic System

Hydraulic Oil Is Dirty

- Improper component cleaning after performing service;
- Fill pipe inadequately screened;
- Air breather not assembled (or improperly assembled) to the unit;
- Gaskets improperly seated or broken with missing material;
- Inadequate protection of pipe lines while servicing the unit;
- Dirty or ruptured filter.

Hydraulic Oil Foams

- Tank-line return not below oil level;
- Broken pipe;
- Incompatible foreign material in oil;
- Aerating oil pump has a suction leak;
- Antifoaming additives missing.

Moisture Present in Hydraulic Oil
- Condensation caused by cold water lines placed against hot tank;
- Poorly gasketed tanks or open fill lines;
- Moisture in tanks containing replacement oil;
- Extreme temperature variations;
- Water accumulated over long periods of time was not drained.

Foreign Material in System
- Improper removal of pipe scale;
- Sealing compound inside fittings;
- Burrs on pipe;
- Shipping or packing material entered unit;
- Improper sealing of unit;
- Open lines, components, etc. not protected during repair;
- Repair/replacement parts contaminated.

Pump

Excess Noise
- Vacuum leaks in suction line;
- Vacuum leaks in pump shaft seal;
- Loose or worn parts in pumps, gears, bearings, etc.;
- Incompatibility of oil being pumped;
- Oil in reservoir being aerated;
- Filter cartridge incorrectly installed;
- Reservoir filter breather plugged;
- Air leak in lines or fittings;
- Oil level too low;
- Intake oil contains air bubbles.

Pump Does Not Deliver Oil
- Low reservoir level;
- Priming inhibited by air leak in suction line;
- Pump shaft does not rotate fast enough;
- Broken parts or broken pump shaft;
- Pump is dirty.

Storing and Shipping

The unit always should always be protected from dirt, dust, and moisture, with all unused ports plugged.

If the unit will be stored for a period exceeding six months, the reservoir and filter should be completely filled with clean hydraulic oil.

If preparing the unit for shipment, drain the tank and install shipping plugs in all open ports.

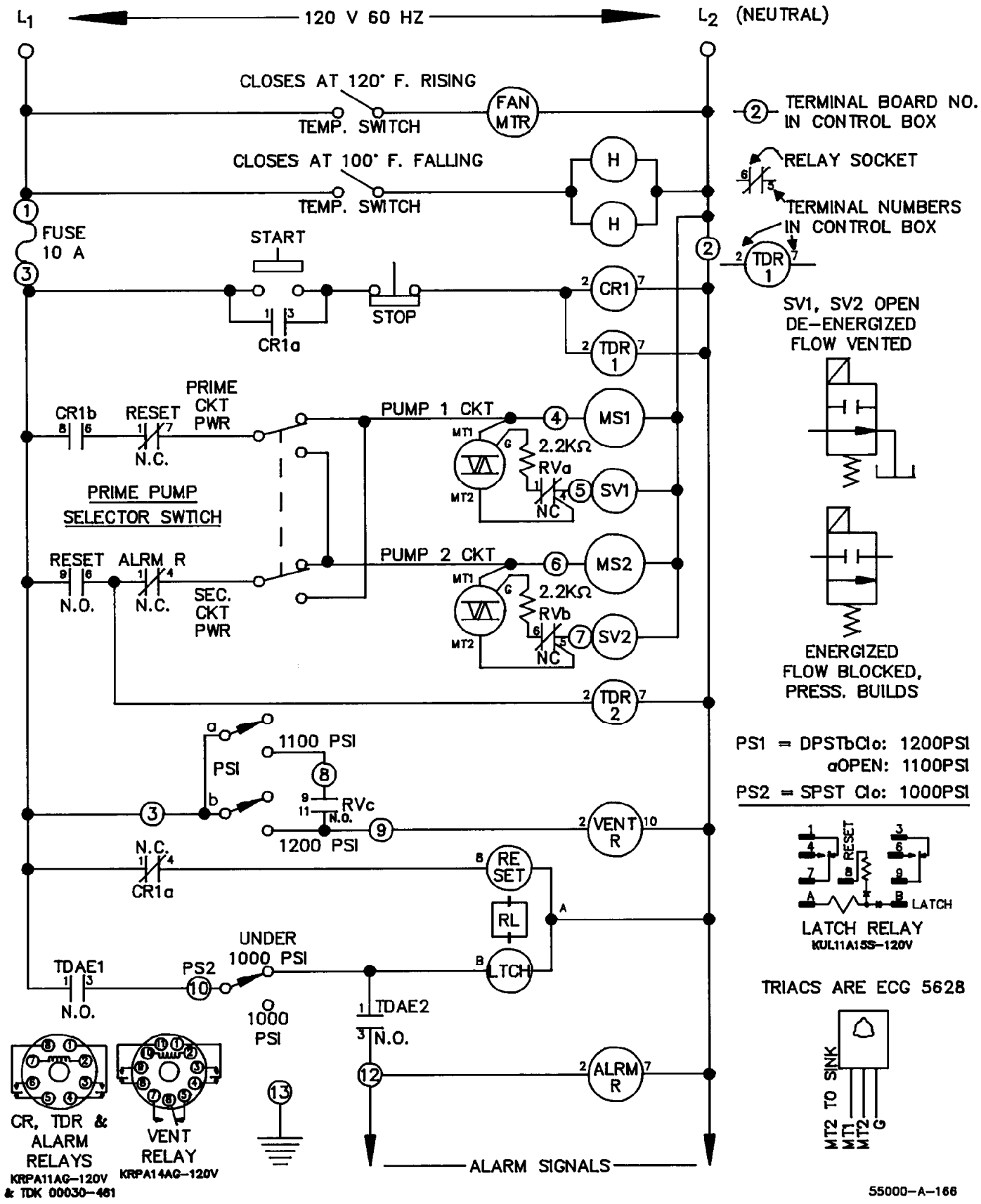

Figure 11. Wiring Diagram

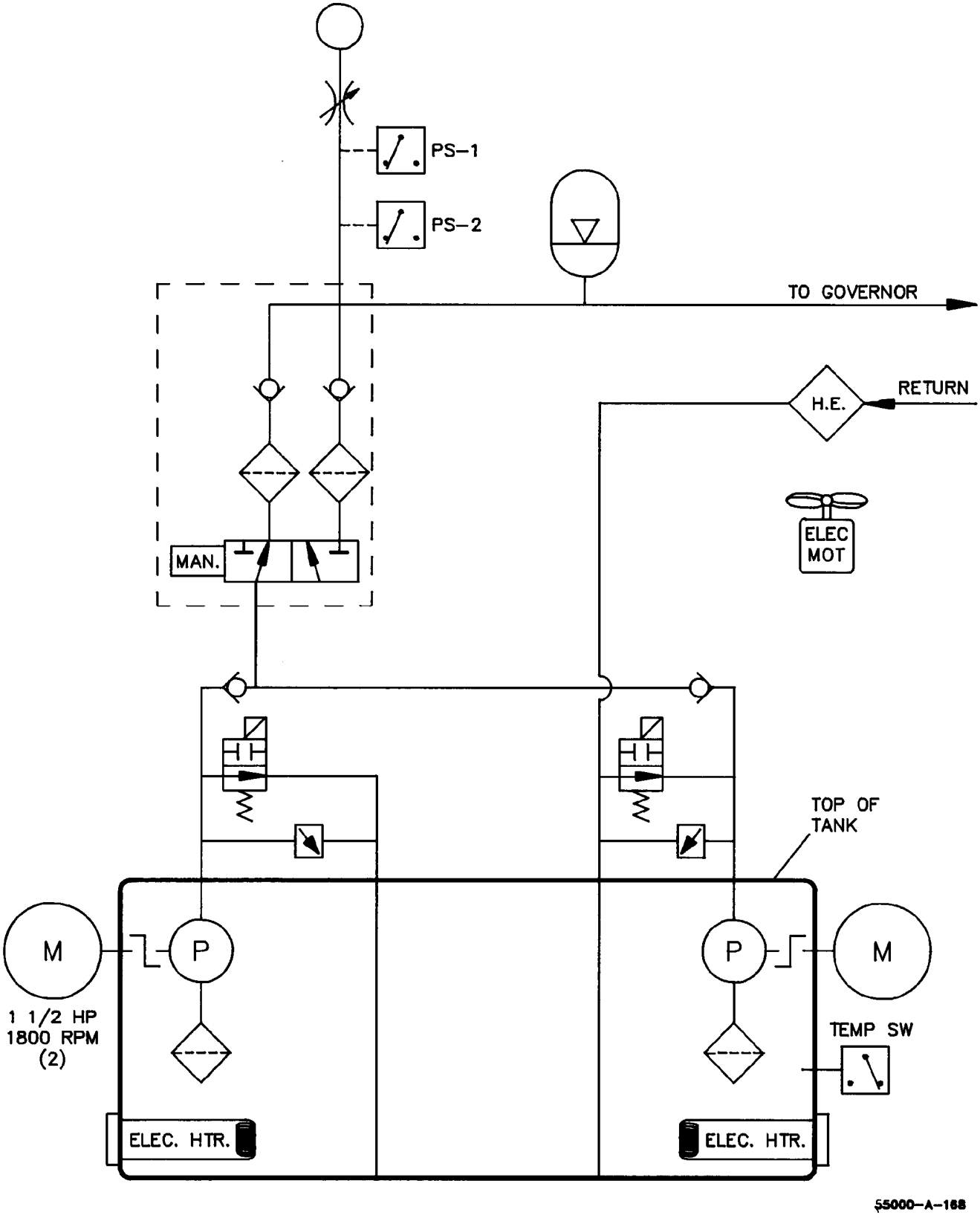

Figure 12. Hydraulic Schematic

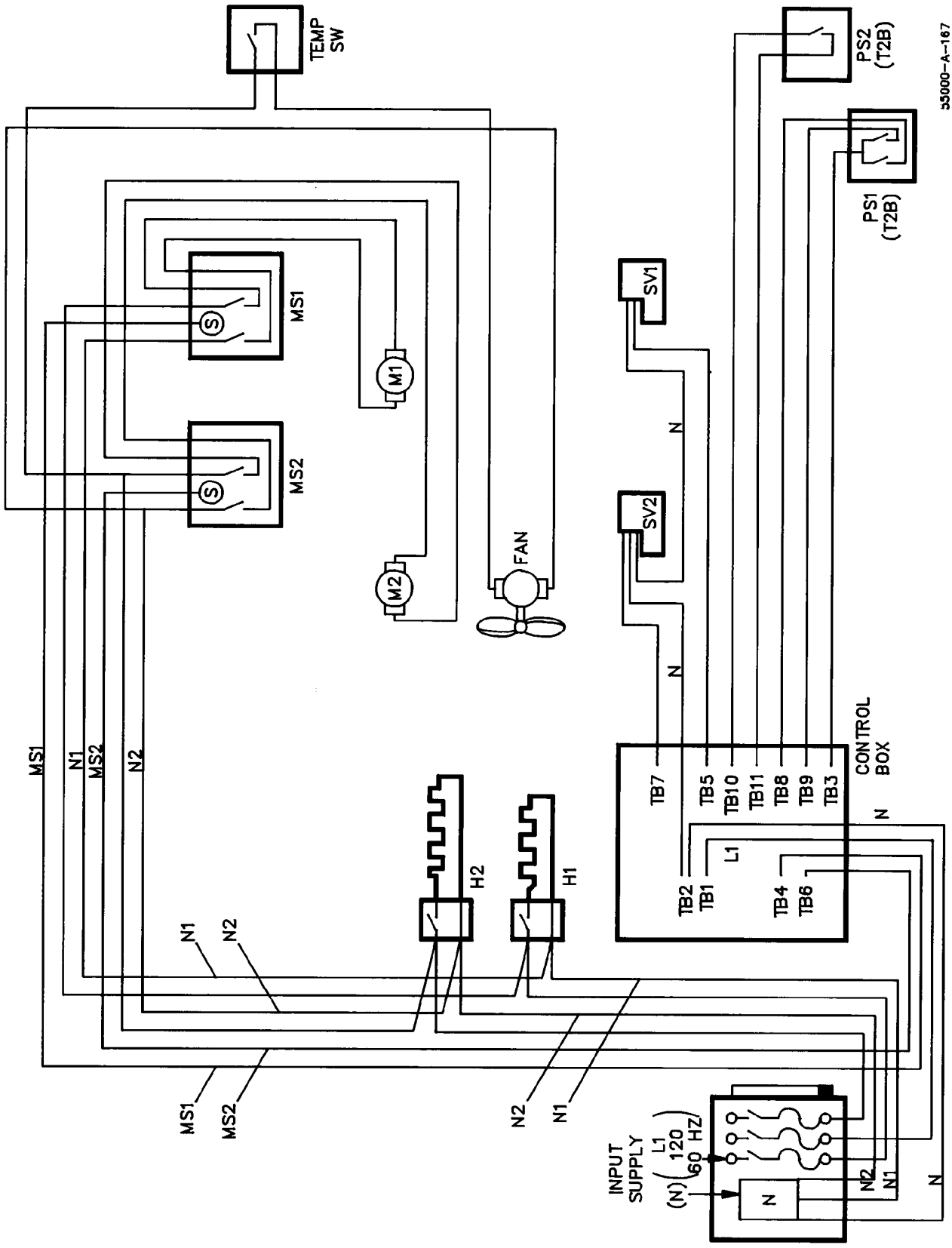

Figure 13. Power Distribution Diagram

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Send comments to: icinfo@woodward.com

Please reference publication 55035.

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