

**OPERATION AND MAINTENANCE MANUAL  
SUPPLIER DOCUMENTATION**

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**TAG NO.:** 65GC, 90SR  
**GE NO.:** GE312A6077P001/4  
**DESIGNATION:** SERVO VALVE  
  
**MFR. MODEL NO.:** 771K200/ 771K202



# GE Energy Products - Europe

A GE Power Systems Business

| Rev | Date     | Written By  | Checked By | Approved By | Status |
|-----|----------|-------------|------------|-------------|--------|
| 0   | 19.09.00 | Kruschinski |            |             |        |
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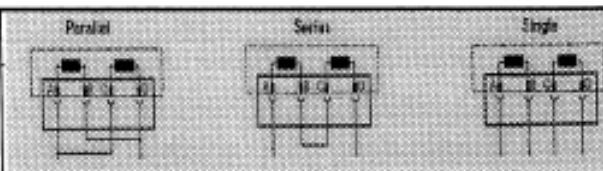
|                                |                                                   |       |
|--------------------------------|---------------------------------------------------|-------|
| GE Number<br>GE 312A6077P001/4 | GAS TURBINE GENERATOR<br>Servovalve<br>DATA SHEET | Site  |
| Item No<br>0541                | Tag Number<br>65 GC/ 90SR                         | Plant |

## Introduction

|                |                                |                                           |                                |
|----------------|--------------------------------|-------------------------------------------|--------------------------------|
| Applicable to: | <input type="radio"/> Proposal | <input checked="" type="radio"/> Purchase | <input type="radio"/> As built |
| For            | Unit                           | Serial No.                                |                                |
| Site           | No. Required                   |                                           |                                |
| Service        | Type                           |                                           |                                |
| Manufacturer   | Model                          | 771K200 / 771K202                         |                                |

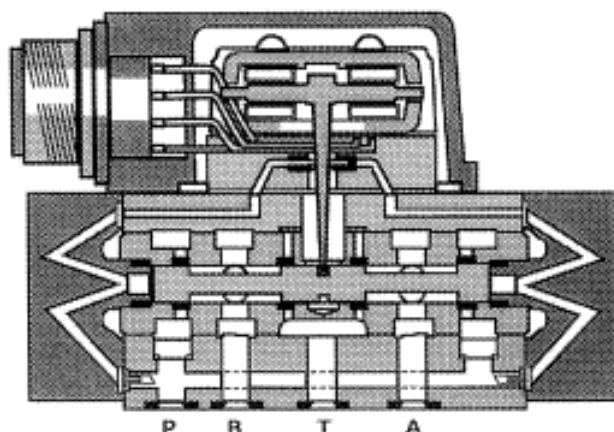
## General

Tag No.  
GE Tag No. 65 GC/ 90SR/ 90TV-1  
Service  
P & ID No.  
Material Source



## Design Data

|                                            |                                 |      |                                               |          |             |       |
|--------------------------------------------|---------------------------------|------|-----------------------------------------------|----------|-------------|-------|
| Operating Pressure                         | 250- 3000                       | PSIG | Coil Resistance                               | 40       | 160         | 80    |
| Temperature Range                          | -29- 135                        | °C   | Rated Current                                 | 40       | 20          | 40    |
| Seal Material                              | Viton                           |      | Coil Inductance                               | 0.10     | 0.36        | 0.12  |
| Operating Fluid                            |                                 |      | Electrical Power                              | 0.064    | 0.064       | 0.128 |
| Recommended Cleanliness Class              | ISO 4406< 14/11                 |      | Polarity for Valve                            |          |             |       |
| Filter Rating                              | $\beta_{10} \geq 75$            |      | Opening                                       | A and C+ | A+,D-       | A+,B- |
| Installation Operations                    | Any position, fixed or moveable |      | Rated Flow at 1000 psi drop across Servovalve |          | 5.0         | GPM   |
| Vibration                                  | 30 g, 3 Axes                    |      | Torque Motor Coil                             |          |             |       |
| Weight                                     | 0.86                            | kg   | per Coil)                                     |          | 1000 +- 10% |       |
| Degree of Protection                       | EN50529P: class IP65            |      | Continuous Saturation                         |          |             |       |
| Valve Body Version                         | 4- way                          |      | Current/ Power per Coi                        | 20       | mA          | 0.5   |
| Pilot Stage                                | Nozzle/ Flapper                 |      | Null Internal Leakage at 1500PSIG Nominal     |          | 0.43        | GPM   |
| Pilot Connexion                            | Internal                        |      | Overlap Limit                                 |          | 2           | %     |
| Fluid Supply                               | constant Supply pressure        |      | Mechanical Null Bias                          |          |             |       |
| Supply Pressure                            |                                 |      | Criteria                                      |          | 10 +- 4%    |       |
| min                                        | 14                              | bar  | Dynamic Response at 1500 PSIG Supply Pressure |          |             |       |
| max                                        | 210                             | bar  | Decibels                                      |          | 3           | Down  |
| Proof Pressure                             | 310                             | bar  | Frequency                                     |          | 65          | Hz    |
| Flow Tolerance @ 1,000 psi dP <sub>n</sub> | -10                             | %    | Phase Lag                                     |          | 90          | DEG   |
| Symmetry                                   | < 10                            | %    | Leadwire                                      |          | 22          | AWG   |
| Threshold                                  | < 0.5                           | %    | Leadwire Length                               |          | 72- 78      | Inch  |
| Hysteresis                                 | < 3.0                           | %    |                                               |          |             |       |
| Null Shift                                 | < 2.0                           | %    |                                               |          |             |       |
| Total Deadband                             | 0.25                            | %    |                                               |          |             |       |



View from Pressure Side

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|                 |                                |                                     |       |
|-----------------|--------------------------------|-------------------------------------|-------|
|                 | GE Number<br>GE 312A8077P001/4 | GAS TURBINE GENERATOR<br>Servovalve | Site  |
| Item No<br>0541 | Tag Number<br>65 GC/ 90SR      | DATA SHEET                          | Plant |

## Introduction

Applicable to:

☐ Proposal

- Purchase

○ As built

For

Unit

Serial No.

Site

No. Required

Service

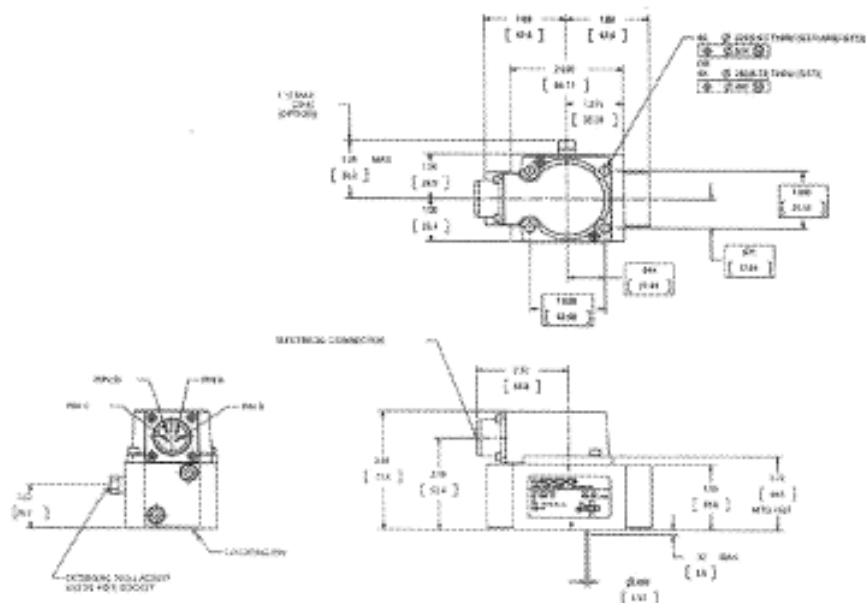
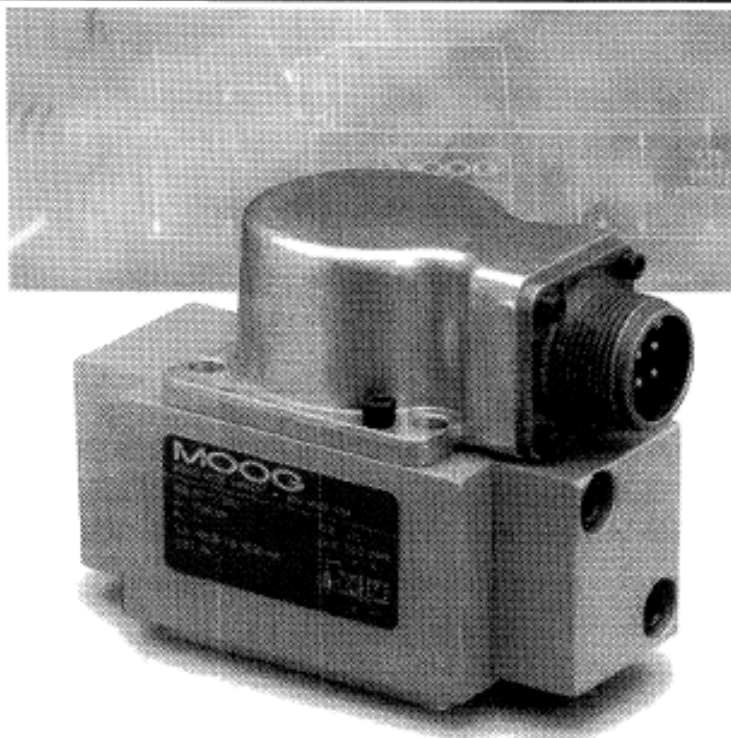
Type

Manufacturer

MOOG

Modeli

G771K200

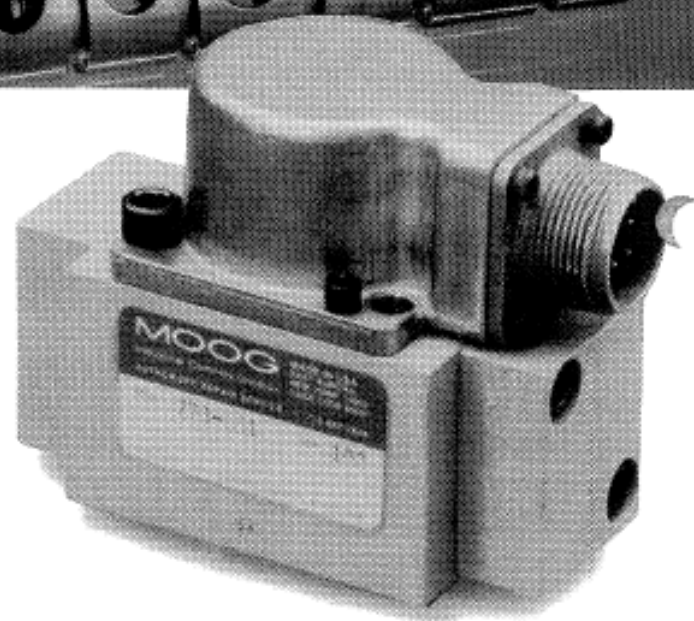
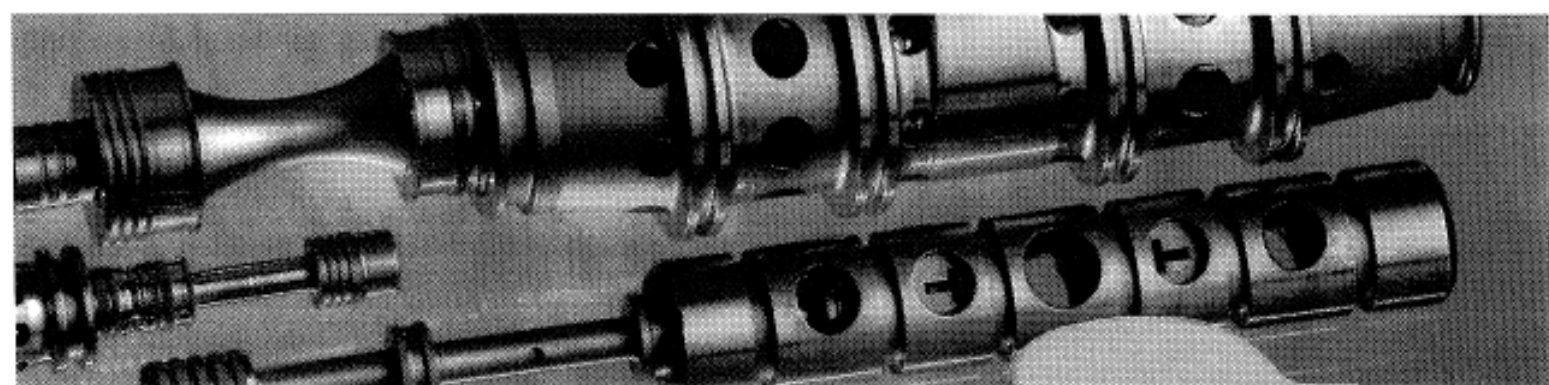


# MOOG

771, 772, 773 Series

Servovalves

ISO 10372-03-03-0-92



## 771/2/3 SERIES TWO STAGE SERVOVALVES

### 771/2/3 SERIES SERVOVALVES

The 771/2/3 Series flow control servovalves are throttle valves for 3- and preferably 4-way applications. They are a high performance, two-stage design that covers the range of rated flows from 1 to 15 gpm at 1000 psi valve drop. The output stage is a closed center, four-way sliding spool. The pilot stage is a symmetrical double-nozzle and flapper, driven by a double air gap, dry torque motor. Mechanical feedback of spool position is provided by

a cantilever spring. The valve design is simple and rugged for dependable, long life operation.

These valves are suitable for electrohydraulic position, speed, pressure or force control systems with high dynamic response requirements.

#### Principle of operation

An electrical command signal (flow rate set point) is applied to the torque motor coils, and creates a magnetic force which acts on the ends of the pilot stage armature. This causes a

deflection of the armature/flapper assembly within the flexure tube. Deflection of the flapper restricts fluid flow through one nozzle which is carried through to one spool end, displacing the spool.

Movement of the spool opens the supply pressure port (P) to one control port, while simultaneously opening the tank port (T) to the other control port. The spool motion also applies a force to the cantilever spring, creating a restoring torque on the armature/flapper assembly.

Once the restoring torque becomes equal to the torque from the magnetic forces, the armature/flapper assembly moves back to the neutral position and the spool is held open in a state of equilibrium until the command signal changes to a new level.

In summary, the spool position is proportional to the input current and with constant pressure drop across the valve, flow to the load is proportional to the spool position.

#### VALVE FEATURES

- > 2-stage design with dry torque motor
- > Low friction double nozzle pilot stage
- > High spool control forces
- > High dynamics
- > Rugged, long-life design
- > High resolution, low hysteresis
- > Completely set-up at the factory
- > Small body size

The actual flow is dependent upon electrical command signal and valve pressure drop. The flow for a given valve pressure drop can be calculated using the square root function for sharp edge orifices:

$$Q = Q_N \sqrt{\frac{\Delta p}{\Delta p_N}}$$

- $Q$  [gpm] = calculated flow
- $Q_N$  [gpm] = rated flow
- $\Delta p$  [psi] = actual valve pressure drop
- $\Delta p_N$  [psi] = rated valve pressure drop



This catalog is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has

to check the suitability of the products described here. In case of doubt, please contact Moog Inc.

# 771/2/3 SERIES GENERAL TECHNICAL DATA

## Operating Pressure

ports P, T, A and B

up to 3,000 psi

## Temperature Range

Fluid

-40°F to 275°F

Ambient

-40°F to 275°F

## Seal Material

Viton, others on request

## Operating Fluid

Compatible with common hydraulic fluids, other fluids on request.

Recommended viscosity

60-450 SUS @ 100°F

**System Filtration:** High pressure filter (without bypass, but with dirt alarm) mounted in the main flow and if possible, directly upstream of the valve.

**Class of Cleanliness:** The cleanliness of the hydraulic fluid greatly effects the performance (spool positioning, high resolution) and wear (metering edges, pressure gain, leakage) of the servovalve.

## Recommended Cleanliness Class

For normal operation

ISO 4406 < 14/11

For longer life

ISO 4406 < 13/10

## Filter Rating recommended

For normal operation

B<sub>1</sub> □ 75 (10 µm absolute)

For longer life

B<sub>3</sub> □ 75 (5 µm absolute)

## Installation Operations

Any position, fixed or moveable.

## Vibration

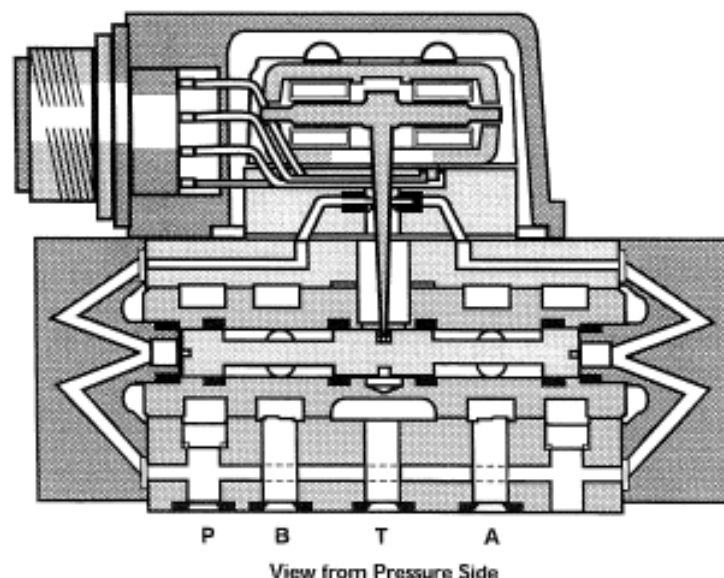
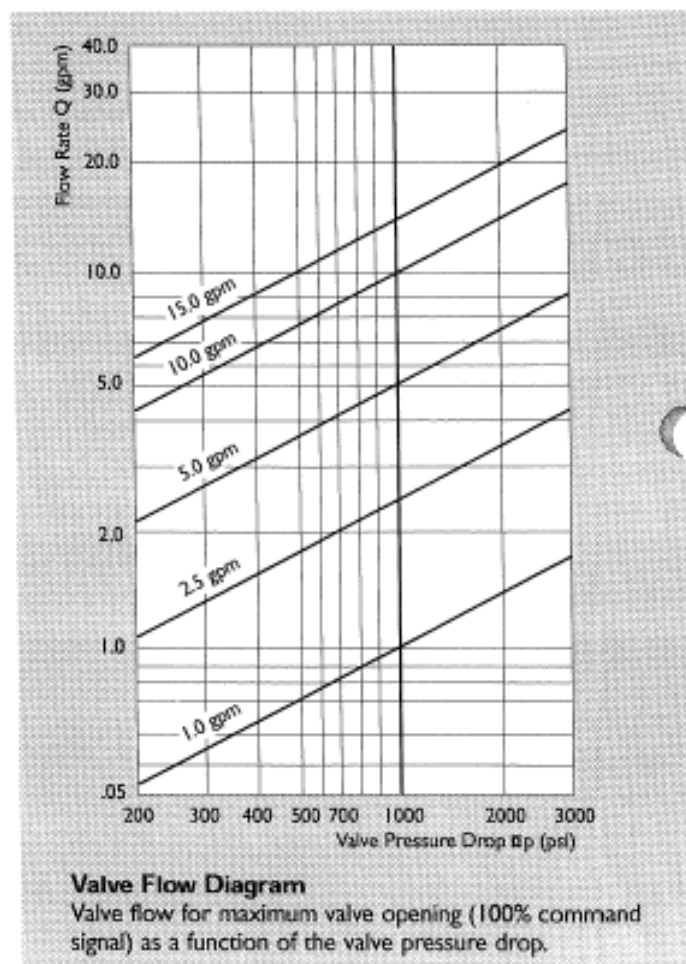
30 g, 3 axes

## Weight

2.0 lb. (0.9 kg)

## Shipping Plate

Delivered with an oil sealed shipping plate.



# 7 1/3 SERIES TECHNICAL DATA

## Model...Type

Mounting Pattern

Valve Body Version

Pilot Stage

Pilot Connection

Rated Flow

Response Time\*

Threshold\*

Hysteresis\*

Shift

Null Leakage Flow\*

Optional, Internal or External

( $\pm 10\%$ ) at  $p_{in} = 1,000$  psi

Standard [gpm]

Standard [ms]

[gpm]

[ms]

[%]

[%]

[%]

[gpm]

771

771

773

ISO 10372 - 02 - 02 - 0 - 92

4-way

2-stage with spool-bushing assembly

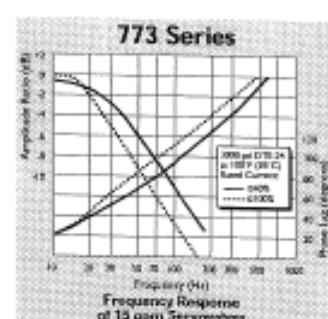
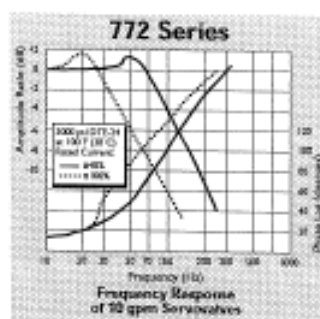
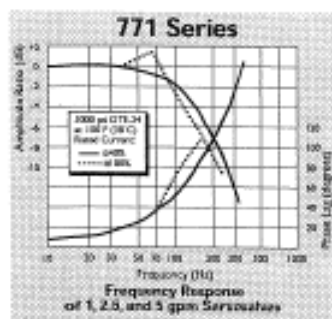
Nozzle/Flapper, Highflow

Internal only

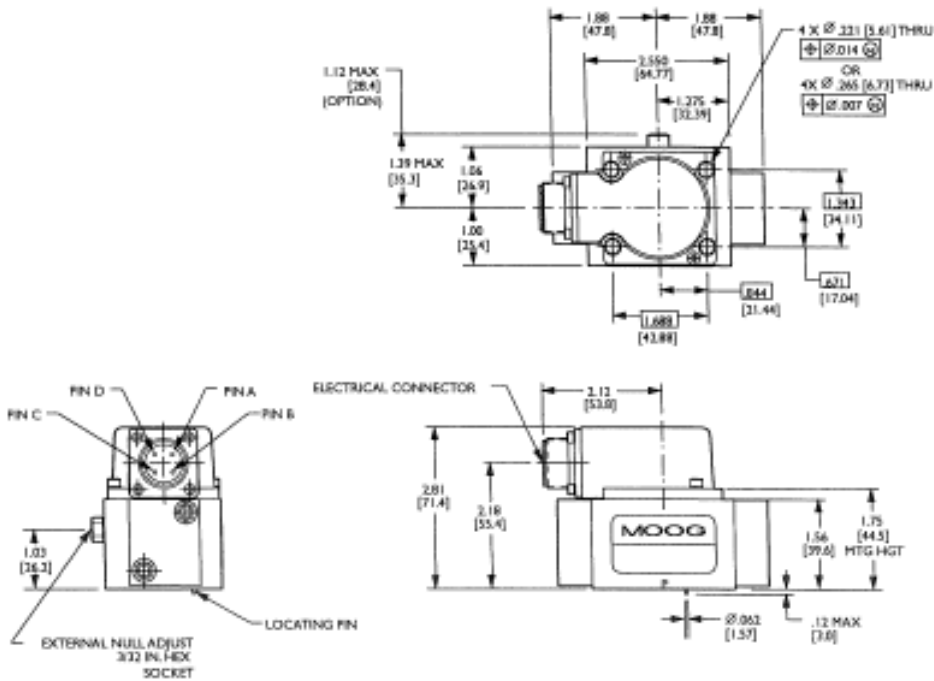
|     |     |        |      |      |
|-----|-----|--------|------|------|
| 1.0 | 2.5 | 5.0    | 10.0 | 15.0 |
| 6   | 6   | 6      | 10   | 16   |
|     |     | < 0.5% |      |      |
|     |     | < 3.0% |      |      |
|     |     | < 2.0% |      |      |
|     |     | 0.35   |      |      |

\* Measured at 1,000 psi pilot or operating pressure

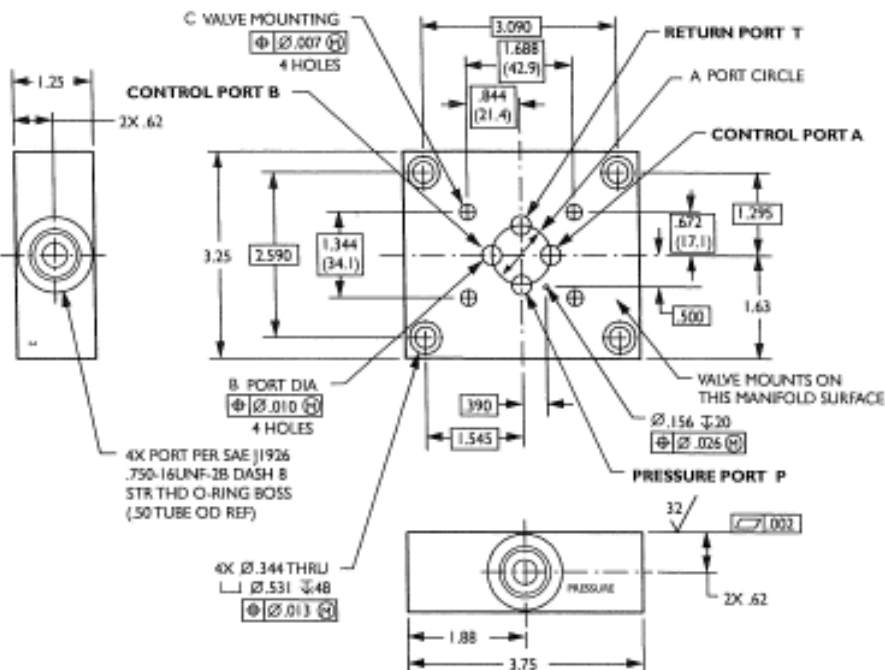
Typical characteristic curves with  $\pm 40\%$  and  $\pm 100\%$  input signal, measured at 3,000 psi operating pressure.



## 771/2/3 SERIES INSTALLATION DRAWINGS



TYPICAL SUBPLATE MANIFOLD



The mounting manifold must conform to ISO 10372-03-03-0-92. Surface to which valve is mounted requires a  $\sqrt{.002}$  finish, flat within 0.002[0.05] TIR.

**For External Null Adjust:**  
Flow out of Port B will increase with clockwise rotation of null adjust screw ( $\frac{1}{16}$  hex key).

**For External Null Adjust:**  
Flow bias is continually varied for a given port as the null adjust is rotated.

TYPICAL SUBPLATE MANIFOLD

| Model Number | A Port Circle Dia | B Port Dia | C Mtg Holes |
|--------------|-------------------|------------|-------------|
| 771-XXX      | .625              | .191       | .190-32 NF  |
| 772-XXX      | .780              | .261       | .190-32 NF  |
| 773-XXX      | .937              | .312       | .250-20 NC  |



## 771/2/3 SERIES ELECTRICAL CONNECTIONS

### Rated current and coil resistance

A variety of coils are available for 771/2/3 Series Servovalves, which offer a wide choice of rated current. See Table I.

### Coil connections

A four-pin electrical connector (that mates with an MS3106F14S-2S) is standard. All four torque motor leads are available at the connector so external connections can be made for series, parallel or differential operation.

771/2/3 Series Servovalves can be supplied on special order with other connectors or a pigtail.

### Servoamplifier

The servovalve responds to input current, therefore, a servoamplifier that has high internal impedance (as obtained with current feedback) should be used. This will reduce the effects of coil inductance and will minimize changes due to coil resistance variations.

### ELECTRICAL CONNECTIONS

(Examples with typical 771/2/3 series coils)

|                               |              | Parallel                   | Series                            | Single                          |
|-------------------------------|--------------|----------------------------|-----------------------------------|---------------------------------|
| Coil Resistance               | [ $\Omega$ ] | 100                        | 400                               | 200                             |
| Rated Current                 | [mA]         | $\pm 15$                   | $\pm 7.5$                         | $\pm 15$                        |
| Electrical Power              | [W]          | .023                       | .023                              | .045                            |
| Connections for Valve Opening |              | A and C (+)<br>B and D (-) | A (+), D (-)<br>B and C connected | A (+), B (-)<br>or C (+), D (-) |
| P B, A T                      |              |                            |                                   |                                 |

Note: Before applying electrical signals the pilot stage has to be pressurized.

TABLE I

| Nominal Resistance Per Coil at 77°F (25°C) $\Omega$ | Recommended Rated Current-mA                    |              | Approximate Coil Inductance*-Henrys |              |                |
|-----------------------------------------------------|-------------------------------------------------|--------------|-------------------------------------|--------------|----------------|
|                                                     | Parallel, Differential or Single Coil Operation | Series Coils | Single Coils                        | Series Coils | Parallel Coils |
| 80                                                  | $\pm 40$                                        | $\pm 20$     | 0.12                                | 0.36         | 0.10           |
| 200                                                 | $\pm 15$                                        | $\pm 7.5$    | 0.72                                | 2.20         | 0.59           |
| 1000                                                | $\pm 8$                                         | $\pm 4$      | 3.20                                | 9.70         | 2.60           |

\* Measured at 50 Hz

# 771/2/3 SERIES

## ORDERING INFORMATION

### SPARE PARTS AND ACCESSORIES

| Model Number                                                |  | Type Designation                         |  |
|-------------------------------------------------------------|--|------------------------------------------|--|
| 771, 772, 773                                               |  |                                          |  |
| Optional Feature                                            |  | Signals for 100% Spool Stroke            |  |
| Series specification                                        |  | 4 ±4 mA series                           |  |
| K Intrinsically safe                                        |  | H ±7.5 mA series                         |  |
|                                                             |  | L ±20 mA series                          |  |
|                                                             |  | N ±30 mA series                          |  |
|                                                             |  | Z ±100 mA series                         |  |
|                                                             |  | Y Special signal (see spec. sheet)*      |  |
| Model Designation                                           |  | Valve Connector                          |  |
| Assigned at the factory                                     |  | A Connector C1 (A) - side (RH)           |  |
|                                                             |  | B Connector C2 (B) - side (LH)           |  |
|                                                             |  | X Special connector*                     |  |
| Factory Identification (Revision Level)                     |  | Seal Material                            |  |
|                                                             |  | V Viton                                  |  |
|                                                             |  | N NBR (Buna)                             |  |
|                                                             |  | Others on request*                       |  |
| Valve Version                                               |  | Pilot Connections and Pressure           |  |
| S Standard response                                         |  | Pressure (psi) Supply                    |  |
|                                                             |  | A 250 to 3,000 Internal                  |  |
| Rated Flow                                                  |  | Spool Position without Electrical Signal |  |
| Q (gpm) at Δp = 1,000 psi                                   |  | M Mid position                           |  |
| Standard High Response                                      |  | Pilot Stage                              |  |
| 04 1 771 series only                                        |  | F Standard dynamics                      |  |
| 10 2.5 771 series only                                      |  |                                          |  |
| 19 5.0 771 series only                                      |  |                                          |  |
| 38 10.0 772 series only                                     |  |                                          |  |
| 57 15.0 773 series only                                     |  |                                          |  |
| Maximum Operating Pressure p <sub>o</sub> and Body Material |  |                                          |  |
| F 3,000 psi aluminum                                        |  |                                          |  |
| Main Spool Type                                             |  |                                          |  |
| O 4-way / seat cut / linear                                 |  |                                          |  |
| D 4-way / +/-10% overlap / linear                           |  |                                          |  |
| X Special*                                                  |  |                                          |  |

Preferred configurations highlighted.  
All combinations may not be available.  
Options may increase price and delivery.  
Technical changes are reserved.

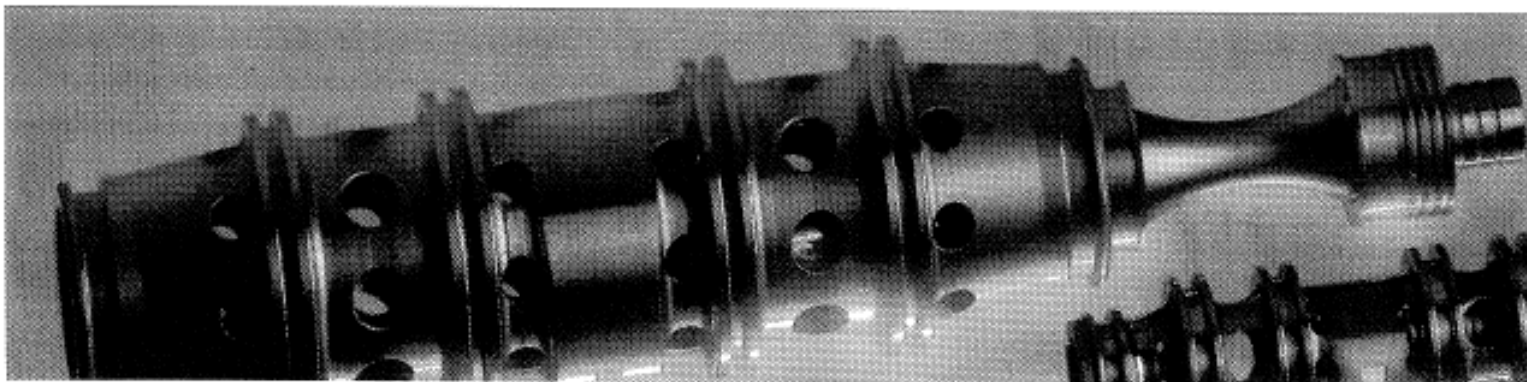
\* Optional designs are available with intrinsically safe coils (FM approved), and/or special spool bushing lap configuration. Available seal materials: VITON (Std.), BUNA or EPR.

## SPARE PARTS AND ACCESSORIES

|                                                               |                                 |                             |
|---------------------------------------------------------------|---------------------------------|-----------------------------|
| O-Rings (included in delivery).                               |                                 |                             |
| for P,T,A and B                                               | FPM 85 Shore                    | Moog P/N                    |
| 771                                                           | ID 0.239 x 0.070                | 42082-7                     |
| 772                                                           | ID 0.364 x 0.070                | 42082-13                    |
| 773                                                           | ID 0.426 x 0.070                | 42082-22                    |
| Mating Connector, waterproof IP 65 (not included in delivery) |                                 | 49054F14S2S (MS3106F14S-2S) |
| Flushing Block                                                |                                 |                             |
| 771 and 772                                                   |                                 | A01704-1K1                  |
| 773                                                           |                                 | A01704-2K1                  |
| Mounting Bolts (included in delivery)                         |                                 |                             |
| 771 and 772                                                   | .190-32 NF x 2.0 long (4 pcs.)  | A01407-532                  |
| 773                                                           | .250-20 NC x 2.25 long (4 pcs.) | A31324-136B                 |
| Field Replaceable Filter Kit                                  |                                 | B52555RK54K1                |



|           |            |
|-----------|------------|
| Australia | Mulgrave   |
| Brazil    | São Paulo  |
| China     | Shanghai   |
| Denmark   | Copenhagen |
| England   | Tewkesbury |
| Finland   | Espoo      |
| France    | Rungis     |
| Germany   | Boblingen  |



|             |             |
|-------------|-------------|
| Hong Kong   | Hong Kong   |
| India       | Bangalore   |
| Ireland     | Ringaskiddy |
| Italy       | Malnate     |
| Japan       | Hiratsuka   |
| Korea       | Seoul       |
| Philippines | Baguio      |
| Singapore   | Singapore   |
| Spain       | Orio        |
| Sweden      | Askim       |
| USA         | East Aurora |

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 Toll Free: 1-800-272-MOOG

# MOOG

## 771/772/773 Series Installation and Operation Instruction

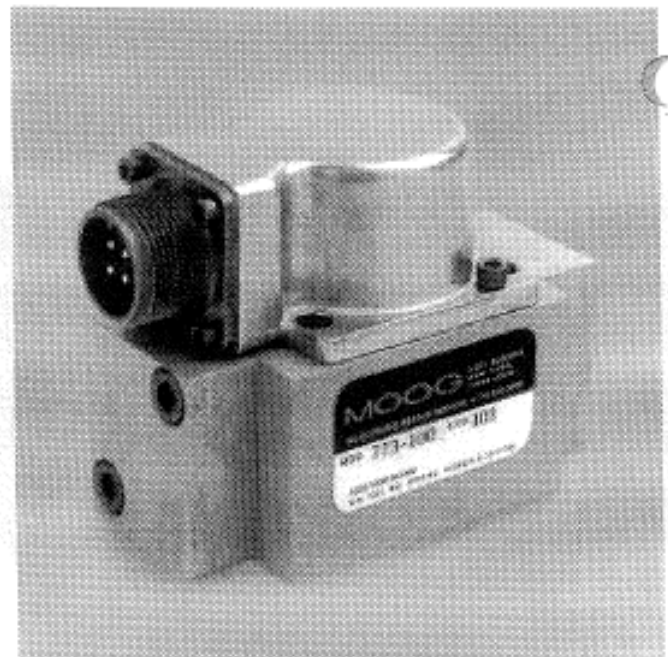
### Electrohydraulic Servovalve

#### 1. INTRODUCTION

This manual provides instructions and procedures necessary to install, operate and troubleshoot the Moog Inc. Series 771/772/773 Electrohydraulic Industrial Servovalve. Troubleshooting instructions are outlined to permit the identification of the specific component(s) suspected of failure.

#### 2. OPERATION

The Moog Inc. Series 771/772/773 Electrohydraulic Servovalve consists of a polarized electrical torque motor and two stages of hydraulic power amplification. The motor armature extends into the air gaps of the magnetic flux circuit and is supported in this position by a flexure tube member. The flexure tube acts as a seal between the electromagnetic and hydraulic sections of the valve. The two motor coils surround the armature, one on each side of the flexure tube.



The flapper of the first stage hydraulic amplifier is rigidly attached to the midpoint of the armature. The flapper extends through the flexure tube and passes between two nozzles, creating two variable orifices between the nozzle tips and the flapper. The pressure controlled by the flapper and nozzle variable orifice is fed to the end areas of the second stage spool.

The second stage is a conventional four-way spool design in which output flow from the valve, at a fixed valve pressure drop, is proportional to spool displacement from the null position. A cantilever feedback spring is fixed to the flapper and engages a slot at the center of the spool. Displacement of the spool deflects the feedback spring which creates a force on the armature/flapper assembly.

Input signal induces a magnetic charge in the armature and causes a deflection of the armature and flapper. This assembly pivots about the flexure tube and increases the size of one nozzle orifice and decreases the size of the other.

This action creates a differential pressure from one end of the spool to the other and results in spool displacement. The spool displacement causes a force in the feedback wire which opposes the original input signal torque. Spool movement continues until the feedback wire force equals the input signal force.

#### ELECTROHYDRAULIC VALVE CUT-AWAY

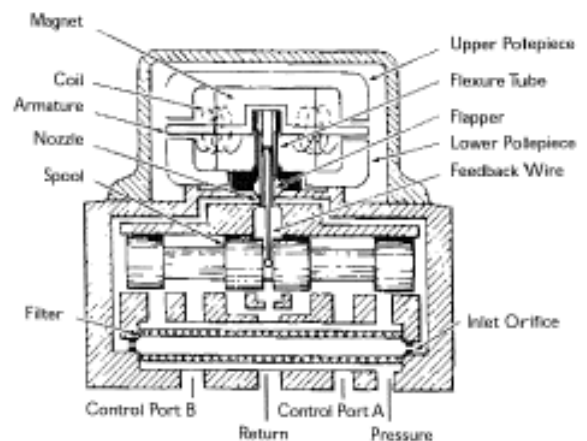


Figure 1 Moog Series 771/772/773

#### CAUTION

DISASSEMBLY, MAINTENANCE, OR REPAIR OTHER THAN IN ACCORDANCE WITH THE INSTRUCTIONS HEREIN OR OTHER SPECIFIC WRITTEN DIRECTIONS FROM MOOG WILL INVALIDATE MOOG'S OBLIGATIONS UNDER ITS WARRANTY.

### 3. HYDRAULIC SYSTEM PREPARATION

To prolong servovalve operational life and to reduce hydraulic system maintenance, it is recommended that the hydraulic fluid be kept at a cleanliness level of ISO DIS 4406 Code 16/13 maximum, 14/11 recommended. The most effective filtration scheme incorporates the use of a kidney loop or "off-line" filtration as one of the major filtration components. The filter for the "off-line" filtration scheme should be a  $\beta_{25} \geq 75$  filter for maximum effectiveness.

Upon system startup, and prior to mounting the servovalve, the entire hydraulic system should be purged of built-in contaminating particles by an adequate flushing. The servovalve should be replaced by a flushing manifold and the hydraulic circuit powered up under conditions of fluid temperature and fluid velocity reasonably simulating normal operating conditions. New system filters are installed during the flushing process whenever the pressure drop across the filter element becomes excessive. The flushing processes should turn over the fluid in the reservoir between fifty to one hundred times.

To maintain a clean hydraulic system, the filters must be replaced on a 30 day basis. It is best to monitor the pressure drop across the filter assembly and replace the filter element when the pressure drop becomes excessive. In addition to other filters that are installed in the hydraulic circuit, it is recommended that a large capacity, low pressure  $\beta_{25} \geq 75$  filter be installed in the return line. This filter will increase the interval between filter element replacements and greatly reduce the system contamination level.

### 4. INSTALLATION

The Moog 771/772/773 Series Industrial Servovalve may be mounted in any position, provided the servovalve pressure, piston and return ports match respective manifold ports.

The mounting pattern, port location and mounting bolts of the servovalve are shown on Figure 4. Apply a light film of oil to the screw threads and torque to 57 inch-pounds.

Wire mating connector for desired coil configuration and polarity. Thread connector to valve.

### 5. MECHANICAL NULL ADJUSTMENT

It is often desirable to adjust the flow null of a servovalve independent of other system parameters. The "mechanical null adjustment" on the Moog 771/772/773 Series servovalve allows at least  $\pm 20\%$  adjustment of flow null. The "mechanical null adjuster" is an eccentric bushing retainer pin located above the port designation on the valve body (see Figure 2) which, when rotated, provides control of the bushing position. Mechanical feedback elements position the spool relative to the valve body for a given input signal. Therefore, a movement of the bushing relative to the body changes the flow null.

#### Adjustment Procedure

1. Using a  $\frac{1}{2}$  inch Allen wrench, rotate mechanical null adjuster pin to obtain desired flow null. If excessive torque (more than 12 in.-lb.) is required to rotate null adjuster pin, perform Step 2.

#### Note:

Clockwise rotation of null adjuster pin produces open loop flow from port B to port A.

2. Using a  $\frac{1}{8}$  inch offset box wrench, loosen self-locking fitting. DO NOT remove self-locking fitting. Insert a  $\frac{1}{2}$  inch Allen wrench in null adjuster pin. Using the  $\frac{1}{8}$  inch offset box wrench, tighten self-locking fitting until a torque of 10 to 12 in.-lb. is required to rotate null adjuster pin with the Allen wrench. Perform Step 1 to establish desired flow null.

Table 1. Replacement Parts

| Part Description                          | Qty. | Part Number        |
|-------------------------------------------|------|--------------------|
| 771/772/773 Series Filter Replacement Kit | 1    | B52555R&K54K1      |
| Base O-Rings                              | 4    | see chart on pg. 4 |
| End Cap - O-Rings (1)                     | 2    | 42082-1            |
| Inlet Orifice End Cap O-Rings (1)         | 2    | 42082-1            |
| Inlet Orifice O-Rings (1)                 | 2    | 42082-189          |
| End Cap - Bushing O-Rings (1)             | 2    | 42082-42           |
| Filter Tube (1)                           | 1    | 14417-1            |

(1) Included in Filter Replacement Kit.

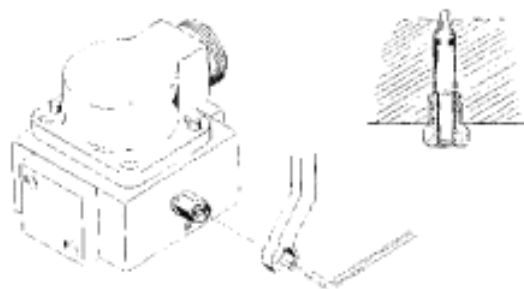


Figure 2  
Mechanical Null Adjustment

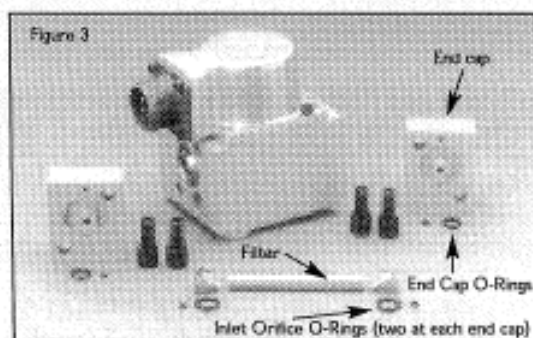
### 6. GENERAL SERVICING RECOMMENDATIONS

- a. Disconnect electrical lead to servovalve.
- b. Relieve hydraulic system of residual pressure.

## 7. TROUBLESHOOTING CHART

The following troubleshooting chart list potential troubles encountered, probable causes, and remedies.

| Potential Trouble                                                                                            | Probable Cause                                                       | Remedy                                                                                       |
|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Servovalve does not follow input command signal. (Actuator or components are stationary or creeping slowly.) | Plugged inlet filter element.                                        | Replace filter element.                                                                      |
| High threshold. (Jerky possible oscillatory or "hunting" motion in closed loop system.)                      | Plugged filter element.                                              | Replace filter element.                                                                      |
| Poor response. (Servovalve output lags electrical command signal).                                           | Partially plugged filter element.                                    | Replace filter element and check for dirty hydraulic fluid in system.                        |
| High Null Bias. (High input current required to maintain hydraulic cylinder or motor stationary.)            | 1. Incorrect null adjustment<br>2. Partially plugged filter element. | 1. Readjust null<br>2. Replace filter element and check for dirty hydraulic fluid in system. |



### Tools and Equipment

- Blade screwdriver
- $\frac{1}{8}$  Allen wrench
- No. 2-56 NC by  $1\frac{1}{2}$  inch screw
- Torque wrenches

## 8. FILTER ASSEMBLY REPLACEMENT

- Remove four socket head cap screws and lockwashers using a  $\frac{1}{8}$  inch Allen wrench. Remove end caps.
- Remove O-Rings from end caps.
- Remove inlet orifice assembly from both sides of body.  
**Note:** 2-56 screw threads into the filter plug and inlet orifice assembly. Remove filter. The inlet orifice assemblies are matched to each other and are therefore interchangeable.  
**Note:** These assemblies seat in body and cannot go through bore during removal.
- Remove O-Rings from inlet orifice assemblies.
- Visually inspect orifice assemblies for damage or foreign material.
- Discard O-Rings and filters.
- Install O-Rings on inlet orifices.
- Install filter and inlet orifice assembly in body. Inlet orifice assembly pilots into filter. Install the other inlet orifice assembly into other end of filter. Inlet orifice assemblies are interchangeable.
- Install O-Rings on end caps.
- Install end caps on body and install four socket head cap screws and lockwashers. Torque the screws to 85 inch-pounds.

## 9. FUNCTIONAL CHECKOUT AND CENTERING

- Install servovalve on hydraulic system or test fixture, but do not connect electrical lead.
- Apply required system pressure to servovalve and visually examine for evidence of external leakage. If leakage is present and cannot be rectified by replacing O-Rings, remove the discrepant component and return for repair or replacement.  
**Note:** If the system components are drifting or hardover, adjust the mechanical null of the servovalve.
- Connect electrical lead to servovalve and check phasing in accordance with system requirements.

## 10. AUTHORIZED REPAIR FACILITIES

If servovalve continues to malfunction after all recommended corrective action procedures are performed, defective valve should be returned to Moog for repair. Moog does not authorize any facilities other than Moog or Moog subsidiaries to repair its servovalves. It is recommended you contact Moog at (716)655-3000 to locate your closest Moog repair facility. Repair by an independent (unauthorized) repair house will result in voiding the Moog warranty and could lead to performance degradation or safety problems.

## 770 SERIES INSTALLATION AND OPERATION INSTRUCTION

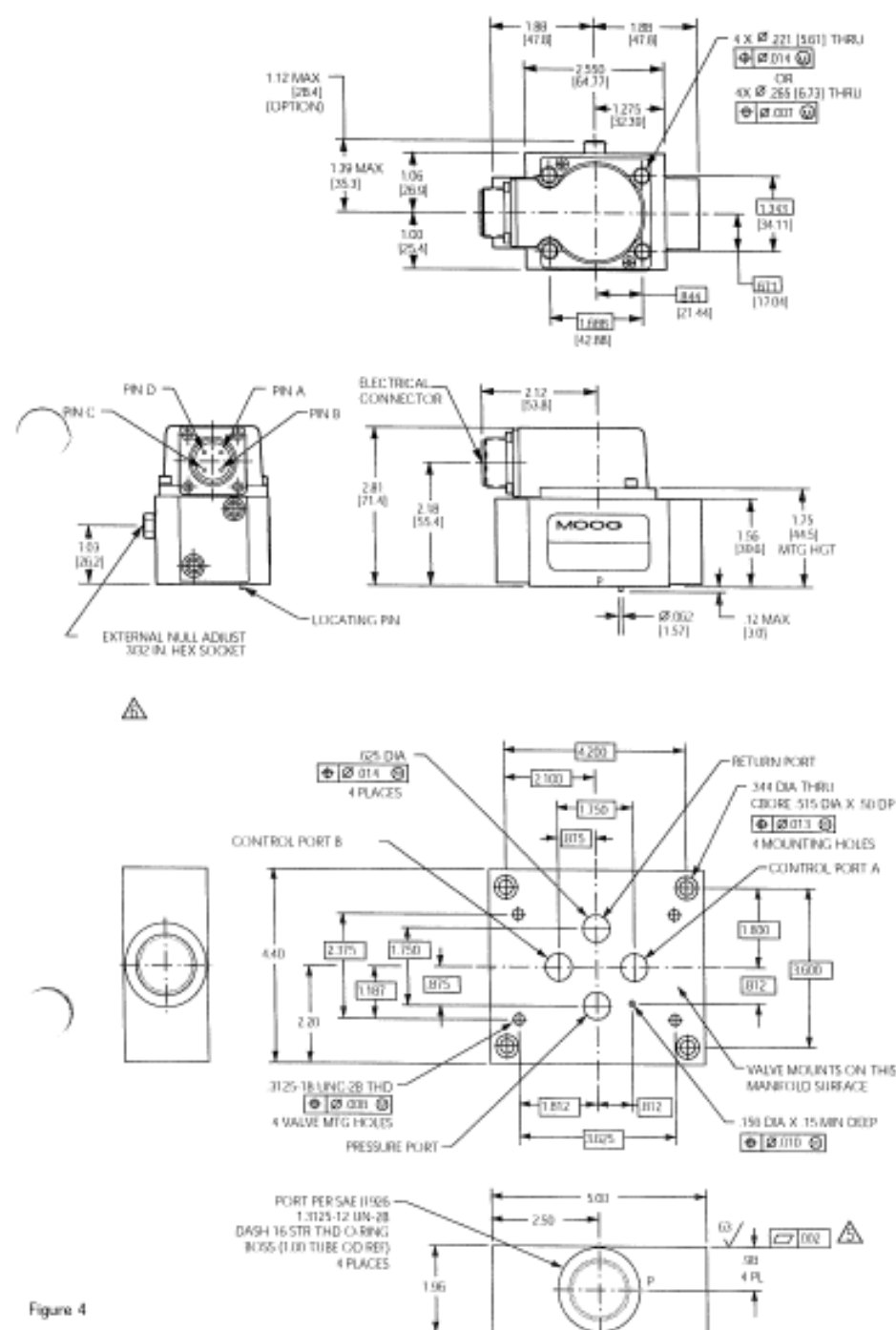


Figure 4

Three standard designs are available.

| Model Number | Port Circle Diameter in | Port Circle Diameter mm | Port Diameter in | Port Diameter mm | Manifold O-Rings Moog | Manifold O-Rings MS | Mounting Bolt Size (socket head cap screws) |
|--------------|-------------------------|-------------------------|------------------|------------------|-----------------------|---------------------|---------------------------------------------|
| 771-XXX      | .625                    | 15.8                    | .191             | 4.85             | -007                  | -010                | .190-32 NF x 2.0 long                       |
| 772-XXX      | .780                    | 19.8                    | .250             | 6.60             | -013                  | -012                | .190-32 NF x 2.0 long                       |
| 773-XXX      | .937                    | 23.8                    | .312             | 7.93             | -022                  | -013                | .250-20 NF x 2.25 long                      |

## NOTES

### 1 Fluid:

Industrial type petroleum base hydraulic fluid, maintained to ISO DIS 4406 Code 14/11 recommended.

### 2 Operating Temperature Range:

-40°F [-40°C] to +275°F [+135°C]

### 3 Valve Phasing:

Flow out port B results when Series coils: B & C connected, A+, D-; Parallel coils: A & C connected, B & D connected; Single coil: A+, B-, or C+, D-.

### 4 Ports:

See table below left.

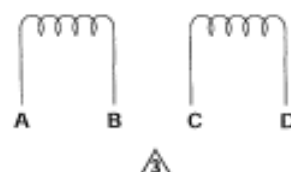
### 5 Surface:

Surface to which valve is mounted requires  $\sqrt{v}$  finish, flat within .002 [0.05] TIR.

### 6 Null Adjust:

Flow out port B results with clockwise rotation of null adjust screw. One quarter turn will produce 30% of rated flow.

## TYPICAL WIRING SCHEMATIC



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