HA22E

DATA SHEET

Model

Electrical Input, Single Acting (Spring Loaded) Servo
Electrical Input, Double Acting (Differential) Servo

Application

- HA22E Hydraulic Amplifier provides the force to operate the control valve of steam turbines or fuel control linkages of large reciprocating engines.
- The electrically controlled HA22E Amplifier is a pilot operated linear servo actuator, which is used in conjunction with the Si-TEC Xted CGC/CGC-ET governor (0 – 200 mA output), Woodward electronic governors, etc..

Key features

- Optimum transient & steady state response
- Minimal overshoot
- Shock resistant cast iron casing
- Billet power piston & output shaft
- Output shaft support bush (oil fed)
- Wear preventative coating for extended service life
- Oil accumulator for internal actuator
- High efficiency oil motor
- Optional oil filter for internal actuator
**Input**

- Resistance: 30 – 35 Ohms at 20 °C (68 °F)
- Maximum allowable current: 400 mA
- Typical operating current range: 25 – 160 mA
- Plug receptacle: 4-pin MS-3102C-145-2P

**Output**

- Piston size: 184.2 mm (7.25") diameter
- Maximum stroke: 76.2 mm +/- 0.76 mm (3.00" +/- 0.03")
- Rod size: 38.1 mm (1.5") diam. width 1.00" – 12 UNF thread
- Maximum stalling force (lbs.) in increase direction:
  - **Single-Acting Servo**
    - \( 39.8 \, P - (F1 + KX) \)
    - \( P = \) supply pressure
    - \( F1 = \) spring preload
    - \( K = \) spring scale
    - \( X = \) amplifier stroke
  - **Double-Acting Servo**
    - \( 24.5 \, P \)
    - where \( P = \) supply pressure
- Maximum side load on output shaft: 170 kg (375 lbs.)

**Typical calibration**

- **(min. & max. range)**
  - 25 mA input: 3.8 mm (0.15") output travel
  - 160 mA input: 69.1 mm (2.72") output travel

**Control quality**

- Time constant: Around 0.025 seconds
- Hysteresis: Within 0.25 %

**Construction**

- Cover: Cast aluminium
- Case: Cast ductile iron
- Output rod: Hardened and ground steel
- Mass/weight: 106 kg (234 lbs.)

**Mounting**

- Attitude: Vertical or horizontal with pilot valve above servo
- Mounting bolts: 0.625 diameter (4)

**Hydraulic supply**

- Type: Petroleum based oils
- Source: Prime mover lubricating system or external supply
- Operating supply pressure: 1035 to 3790 kPa (150 to 550 psi)
- Flow rate: 760 L/min (200 gpm) during speed transients (requires accumulator 9.5 L/min.); less than 15 L/min at 1035 kPa (150 psi) steady state leakage
- Supply filters: 10 – 15 microns (nominal)
- Viscosity: Up to 3000 SSU, but the normal performance is based on 50 to 2000 SSU
- Operating temperature: -30 to +120 °C

**Hydraulic fittings**

- Supply inlet: 1.625 – 12 UN 2B thread, 0.906 deep
- Drain: Internal drain through case bottom. Optional 1.3121 – 12 UN 2B thread, each side of case are both normally plugged.
- Starting oil inlet: 0.562 – 18 UNF 2B thread. Inlet is normally plugged.
HA 22E Hydraulic Amplifier (elec. input) - dimensions & physical outline