VICKERS®

Installation and commissioning (start-up) guidelines for electro-hydraulic proportional pressure controls

EHST-3, 11 design
EHST-3, 30 design
EHST-3, 40 design

Note:

1. The EHST-3-***-40 model is a direct replacement for both the -30, and the -11 models. The -40 design does not require separate +15 & -15 volt supplies as the -11 design, and features European CE approval for electromagnetic compatibility.

2. The EHST-3-***-30 model is a direct replacement for the -11 design. The -30 design does not require separate +15 & -15 volt supplies as the -11 design.

3. Refer to product literature 689 for wiring practices required to be compliant with European RFI/EMC regulations. (Applies to -40 design only)

P/N 866371 Rev. B
Leaflet No. B9055
Date: August 1999

Introduction

These pressure controls are for use as the on-board pilot stage of two- stage pressure controlled valves and variable displacement pumps. EHST-3 valves have integral electronics which ensure very accurate control of pilot pressure by a remotely modulated analog input signal.
These pilot valves are particularly suited to control by programmable logic controls or microprocessors.

WARNING - The operation and performance of this valve was factory checked by Vickers before dispatch, but Vickers warranty on this product may be nullified by such actions as:

- Dismantling of any part of the valve other than those indicated in this leaflet.
- Incorrect installation.
- Application of the valve outside of its published performance limits.
- Incorrect electrical connection.
- Incorrect electrical control signals.

Before installing the valve, check that the model designation on the nameplate is that required for the application.

EHST-3 valve for a new application

Installation

1. Do not remove the protection plate on the valve mounting pad until immediately before installation. Take care not to lose the seals from the valve ports which, together with both mounting pads (aluminum-alloy valve body), must be kept clean, free from burrs and undamaged.

2. The valve mounting pad has a locating pin to ensure correct orientation relative to the ports in the mating mounting pad; the later should contain a mating hole.

3. Install the EHST-3 valve on the relevant mounting surface and secure with metric or inch bolts (as required). Respective bolt specifications are:

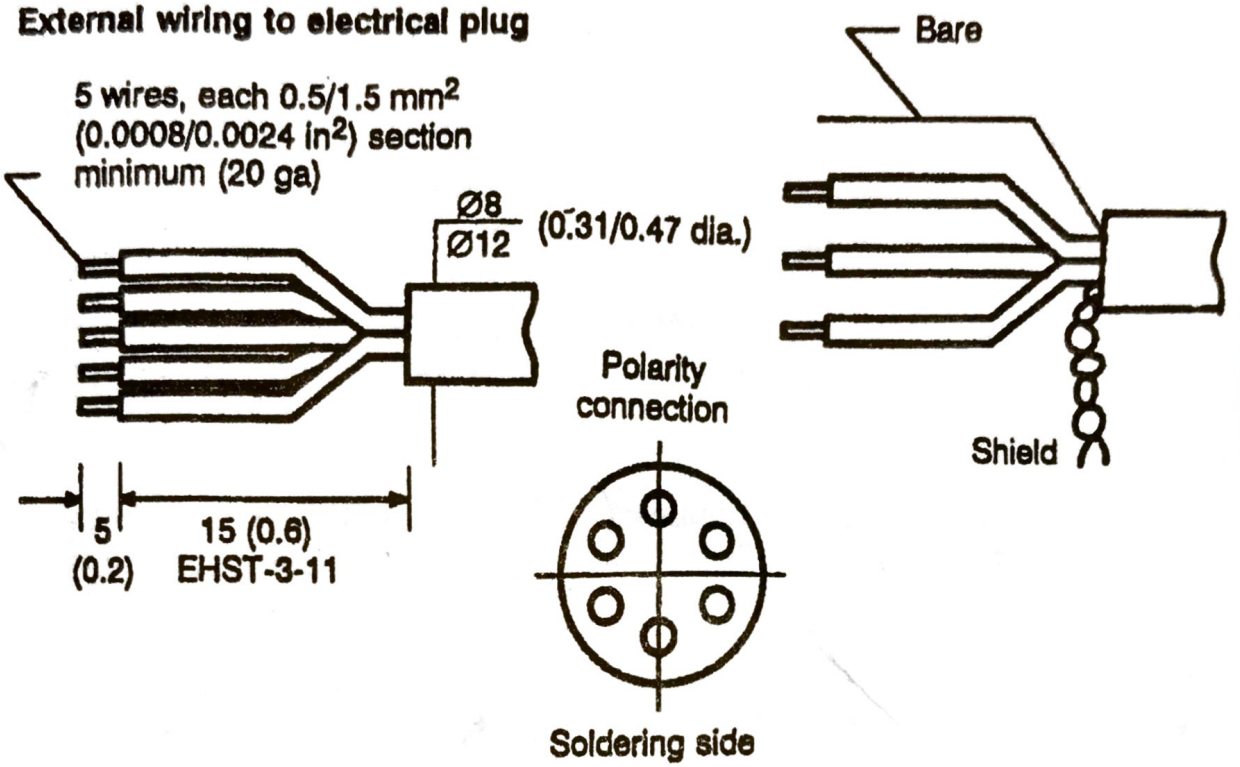
Metric: Vickers bolt kit no. BK 991917M (order separately), or 4 off M5 x 45 S.H.C. screws to ISO class 12.9 or equivalent.

Inch: Vickers bolt kit no BK MOD 617 (order separately), or 4 off 10-24 UNC-2B x 1.75" to SAE grade 7 or equivalent.

Note: Bolts must be evenly torqued to 8-9 Nm (210–240 lbf. in) with threads lubricated.

4. Wire the female plug to the external wiring in accordance with the circuit diagram for the application.

External wiring to electrical plug



Electrical Plug Pins (EHST-3-11)
A = +15 VDC, +-5%
B = −15 VDC, +-5%
C = Not used
D = +24 VDC, (22 to 28 VDC)
E = 0V
F = Signal

Electrical Plug Pins (EHST-3-30, -40)
A = Not used
B = Not used
C = Chassis Ground (-40 only)
D = +24 VDC, (22 to 28 VDC)
E = 0V
F = Signal

WARNINGS

a. Check that no electrical power is connected to the external wiring during installation.
b. Plug pins must never be connected to earth (ground) through any instrumentation.

Check that the main and amplifier supplies and the signal range will be within the limits specified above.

Use shielded cable, the shield being connected externally to 0V. Wire sections and length should be within the following limits:

0.5 mm² (0.0008 in²) min. ..... 30 m max. (100 ft)
1.0 mm² (0.0016 in²) min. ..... 60 m max. (200 ft)
1.5 mm² (0.0024 in²) min. ..... over 60 m (200 ft)

For EHST-3-'V' models, cable length can cause a performance deviation from the "as-delivered" condition in proportion to the length; the deviation is approx. 14% at the max. lengths stated.

Several EHST valves can be connected to a common power source provided that the following conditions are met:
EHST-3-'V' models (voltage control/command signal) must have separate power cables.
EHST-3-'I' models (current control/command signal) are recommended to have separate cables, but a combined cable can be used provided that the min. wire section is increasesd or the max. length decreased, proportionately.

Make a final check that all external wiring connections are in accordance with the circuit diagram for the application, taking account of all points in this section.

WARNING - immediately *before* connecting or disconnecting the electrical plug, check that all electrical power is turned off.

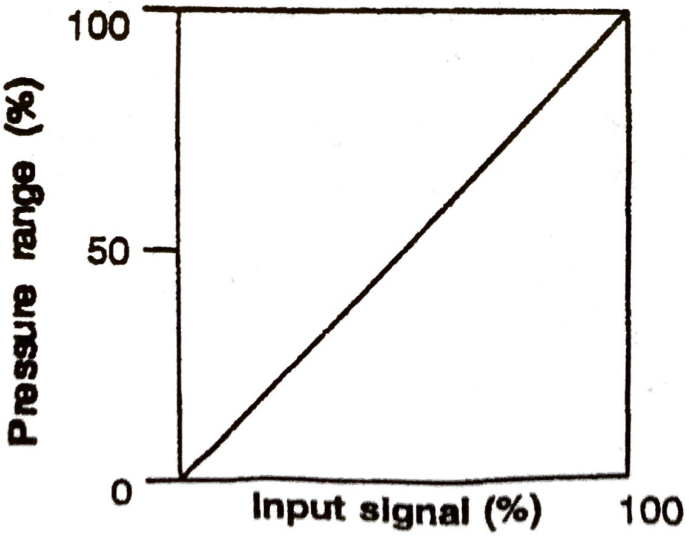
5. Install the remainder of the hydraulic and electrical systems of the application in accordance with the system designer's instructions.
If the factory-set EHST valve is to be trimmed to suit the application (see page 15), temporarily or permanently install a suitable pressure-measuring device, close to the mainstage valve or pump, for checking purposes.

Commissioning (start-up)

1. Start-up hydraulic system and flush it clean in accordance with the system designer's instructions.

2. Commission the application to the system designer's instructions.

Typical performance of factory-set valve
Test conditions: 1 l/min (0.26 USgpm) flow rate (rated). Antiwear hydraulic oil at 36 cSt (168 SUS) and at 50°C (122°F).



Pressure control range bar (psi)	Model, by input signal range 0 to 10 V DC	4 to 20 mA
4 to 90 (58 to 1305)	EHST-3-BV*	EHST-3-BI*
5,5 to 210 (78 to 3045)	EHST-3-FV*	EHST-3-FI*

Hysteresis ..... ≤± 1,2%
Linearity ..... ≤ 1% of max. signal
Resolution, input to output ..... ≤ 0,1% of max. signal

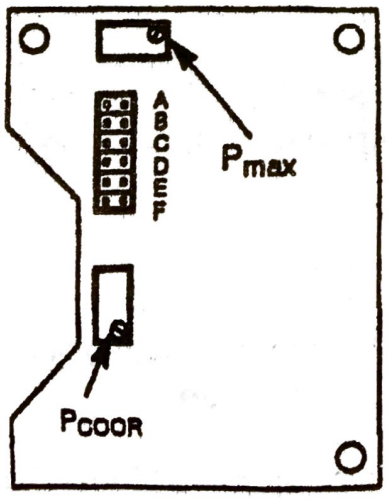
Frequency response:
Typical at 90° phase lag. ± 10% pressure amplitude at 50% full scale pressure and with small pressurized volume.
EHST-3-B ..... 120 Hz
EHST-3-F ..... 70 Hz

Typical performance of user's complete two-stage valve or pump
Similar to above, but may vary according to the characteristics of the user's mainstage valve or pump and the application.

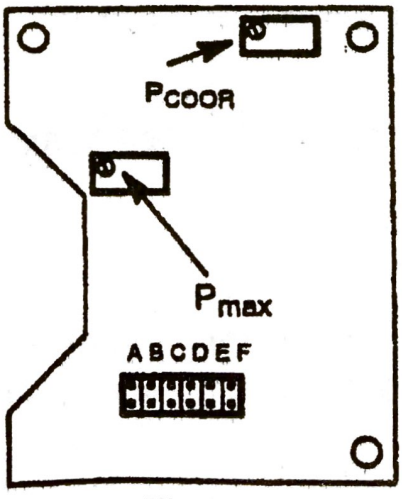
3. If required by the application, the maximum pressure and the pressure/signal characteristics of the EHST valve can be biased by adjustment of on-board potentiometers during commissioning. Access to these is under the nameplate adjacent to the electrical connector: temporarily remove the four screws and the nameplate for this purpose.

WARNINGS

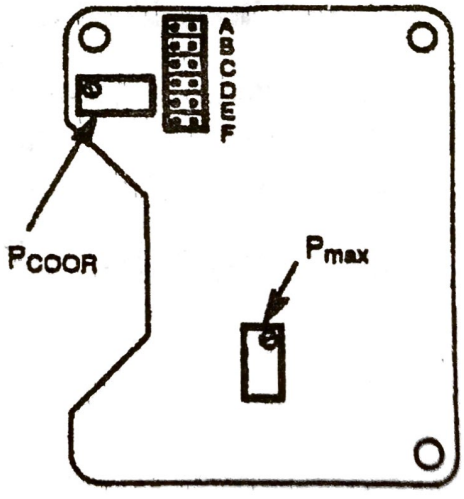
a. Do not touch (or tamper with) any exposed part except for adjusting only one or both potentiometers shown.
b. Any such changes made to the valve should be recorded, for future reference, in documentation related to the application.



EHST-3-11



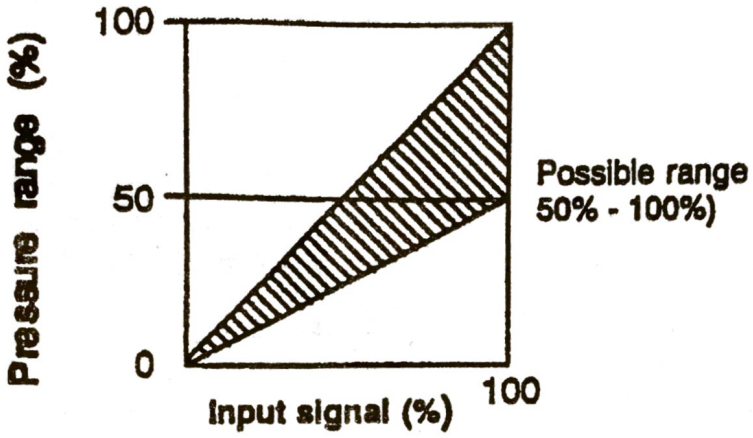
EHST-3-30



EHST-3-40

Max pressure adjustment

With system in operation, reduce maximum controlled pressure by turning P_{max} anti-clockwise. Check result on the appropriate pressure gauge in the system.



Pressure bias, EHST-3-E valves only (fig. 1)**

With system in operation, raise the minimum controlled pressure by turning P_{corr} clockwise. Check result on the appropriate pressure gauge in the system.

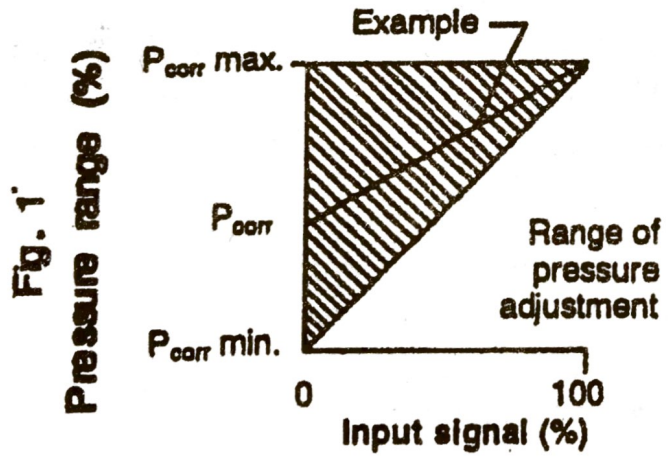


Fig. 1

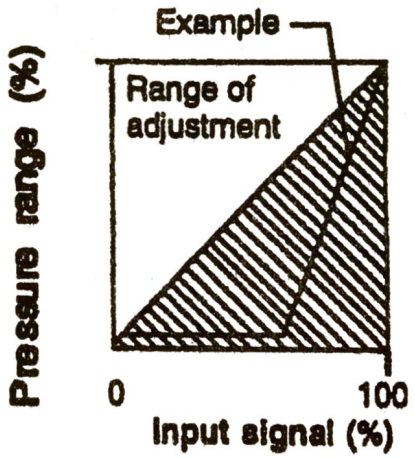


Fig. 2

Signal bias, EHST-3-f valves only (fig. 2)**

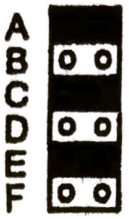
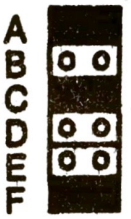
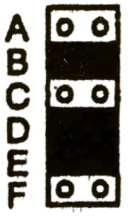
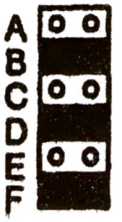
With system in operation, create signal bias by turning P_{corr} clockwise. Check result by voltage or current measurements, as appropriate, made in the external wiring.

Configuration

This valve has been configured using jumpers on the integral electronics circuit board to match the designation shown on the nameplate.

If the jumpers are moved for any reason then the performance of the valve will change and the designation will be affected as indicated below.

Detail of jumper positions (■) for all possible configurations.

Command Signal	Pressure bias	Signal bias	Model type
Current drive 4-20 mA			EHST-3-*IE-'
			EHST-3-*IE-'
Voltage drive 0-10 V DC			EHST-3-*VE-'
			EHST-3-*VE-'

New EHST valve replacing existing valve

Installation

1. **WARNINGS** - Before removing an existing valve:
   a. Turn off all electrical power.
   b. Relieve hydraulic pressure. Any accumulators must either be safely isolated from the system by suitable valves or the hydraulic fluid charge exhausted to reservoir.
   c. Any overhead or positive-head reservoirs must be isolated from the system by suitable valves.
   d. Lower all vertical cylinders.
   e. Block any load whose movement could generate pressure.

2. Disconnect wired female electrical plug by unscrewing it anti-clockwise.

3. Before removing valve, make provision to prevent any hazard arising from fluid that will drain from exposed mounting surfaces.

4. Unscrew the four valve-fixing-bolts, removing these and the valve. If the valve is to be returned to Vickers for repair, drain any fluid from it. Prevent dirt entering the ports and protect the body mounting surface from damage by fitting the protection plate that will be removed from the new valve (see page 12.)

5. See installation, page 12, step 1.

6. See installation, page 12, step 2.

7. Check that the new valve has the correct model designation and is configured as shown in Configuration, page 16.

8. Fit the new valve using the correct fixing bolts (see step 3, page 12.)

9. Make electrical connections by either:
   a. Inspecting plug and existing wiring and re-using if in good condition (in this case remove plug supplied with new valve and retain for possible future use).
   or
   b. Discarding existing plug and/or wiring and installing new in accordance with step 4, page 13.

Commissioning (start-up)

Re-commission the application to the system designer's instructions, noting the information and making adjustment(s) as described on page 14.

Further Information

Technical information leaflet V-441. The right to modification for technical improvements is reserved.