

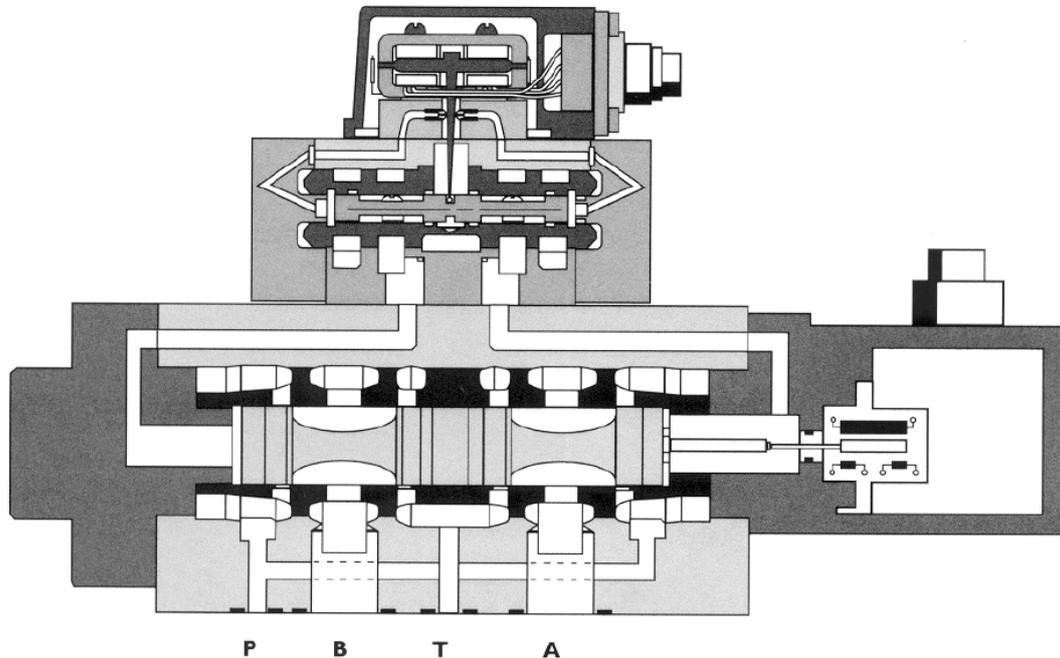
Feedback Expert Manual



This electronic device is used to test servovalves which are equipped with an LVDT transducer on the valve spool and which have no internal electronics closing the position loop of the spool.

In the following pages will be described the function of this electronic device.

This picture shows a 3-stage servovalve which is equipped with a two-stage pilot servovalve (having a mechanical spool position feedback). On the third-stage spool is attached a LVDT position transducer.

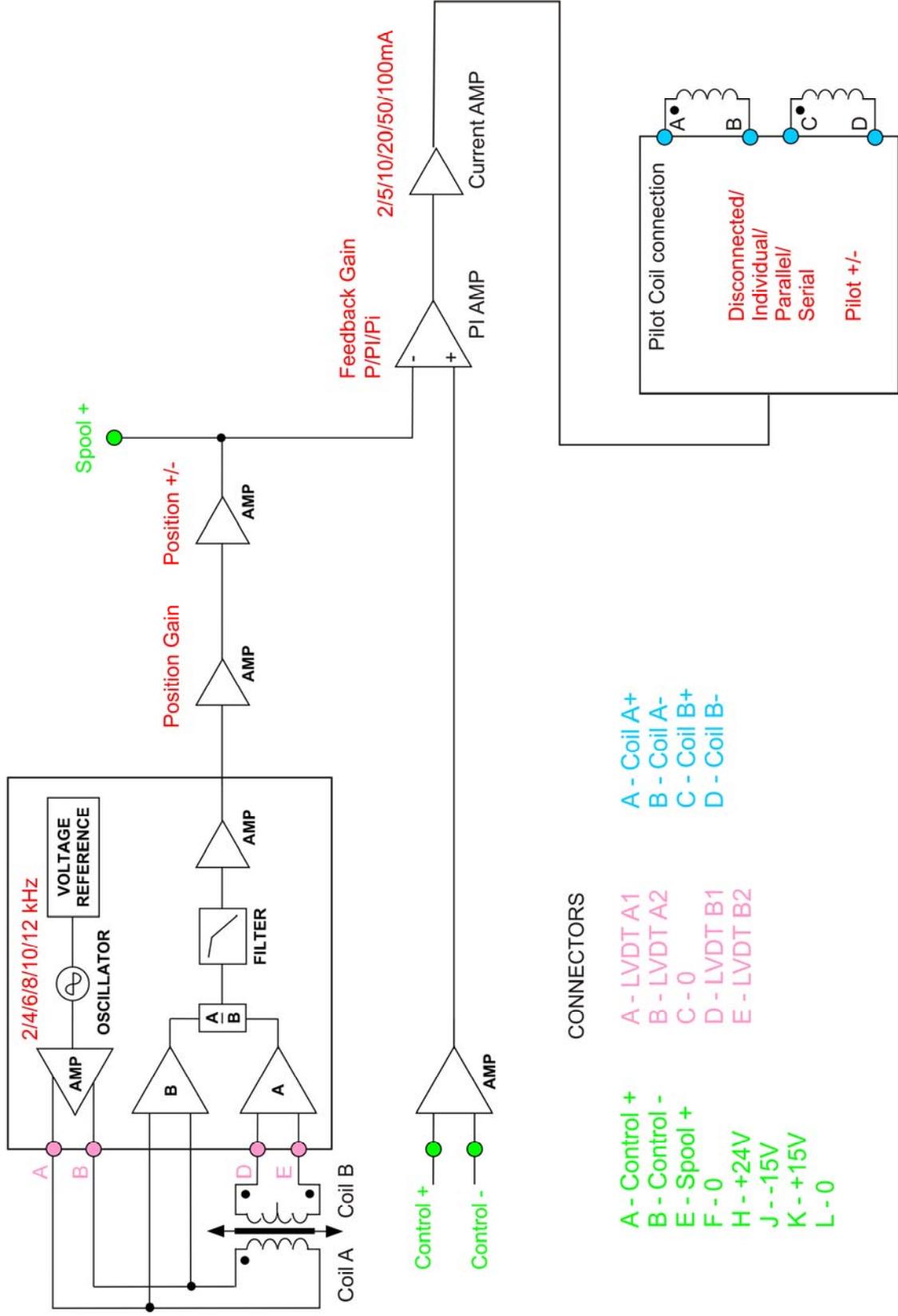


With a command signal on the pilot servovalve the third-stage spool can be moved back and forth, but the spool would only go in hard-over positions. This way the hydraulic characteristics of the third stage can not be evaluated.

The Feedback-Expert electronic allows building a closed loop position control on the third stage spool. Now, the linearity and hydraulic performances of that spool can be measured.

The loop gain of each servovalve shall be adjusted in accordance with the components used. The components of importance are the pilot servovalve, the LVDT transducer and the third stage spool. The Feedback-Expert electronic allows adjusting the closed loop position control of the spool such that the spool can be moved in a controlled manner and the position output signal of the LVDT can be adjusted.

The bloc schema of the Feedback-Expert shows how the closed loop system can be adjusted.



A - Coil A+
 B - Coil A-
 C - Coil B+
 D - Coil B-

CONNECTORS

A - LVDT A1
 B - LVDT A2
 C - 0
 D - LVDT B1
 E - LVDT B2

A - Control +
 B - Control -
 E - Spool +
 F - 0
 H - +24V
 J - -15V
 K - +15V
 L - 0

The various adjustments:

LVDT kHz



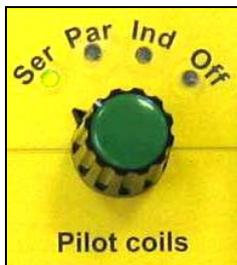
This switch allows selecting the excitation frequency of the primary coil of the LVDT transducer. The frequency depends on the layout of the transducer as defined by its manufacturer. The Feedback-Expert electronic enables to set the frequency from 2 to 12 kHz in steps of 2 kHz. The selected frequency will be shown by a LED display.

Pilot mA



This switch allows setting the current of the pilot servovalve. The current ranges are from 0 to 2 mA, 0 to 5 mA etc. and the current will be controlled by the ValveExpert test rig and this with the voltage range from ± 10 Volt. Attention: the current range goes into the loop gain; a too high current range may cause instabilities.

Pilot Coils



With this switch will be selected the coil connections of the pilot servovalve, and the meanings of the inscription are:

Ser: coils in series connection

Par: coils in parallel connection

Ind: a single coil is used

Off: the current on the pilot servovalve is cut off

Feedback



This potentiometer allows adjusting the loop gain of the spool position control. This adjustment has to be done carefully. A too high loop gain will cause instabilities. A too low loop gain will influence the test results of the transducer output (Hysteresis, non linearity...)

Feedback



The servo-amplifier is either a proportional or proportional-integral amplifier, and the markings mean:

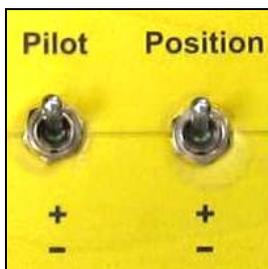
P: pure proportional amplifier

P+I: proportional-integral amplifier with a large time constant

P+i: proportional-integral amplifier with a small time constant

The best choice has to be tried out according to the valve components.

Polarität



With these two switches will be selected the polarity of the pilot servovalve and the position transducer.

Attention: the wrong polarity on the pilot valve will cause a hard-over failure on the third-stage spool (the spool will go at maximum speed to the end-stop).

The polarity of the position transducer can be freely selected to the convenience of the user.

Position



This potentiometer allows adjusting the range of the position output signal. The adjustment is usually done for the maximum stroke of the spool and a correspondent voltage will be adjusted (for example 10 Volt)

Various connections:

There are **3 cables** for following connections:

Stand:

A - Control +
B - Control -
E - Spool +
F - GND
G - GND
H - +24V
J - -15V
K - +15V
L - GND

This cable allows connecting Feedback-Expert to the test rig ValveExpert.

LVDT:

A - LVDT A1
B - LVDT A2
C - GND
D - LVDT B1
E - LVDT B2

This cable will be connected to the LVDT transducer.

Pilot:

A - Coil A+
B - Coil A-
C - Coil B+
D - Coil B-

This cable will be connected to the pilot servovalve

There are **4 BNC connectors** for following signals:

Control : Control signal

Position : Spool position signal

LVDT in : Excitation signal of the primary coil of the LVDT

LVDT out : Output signal of the secondary coil of the LVDT