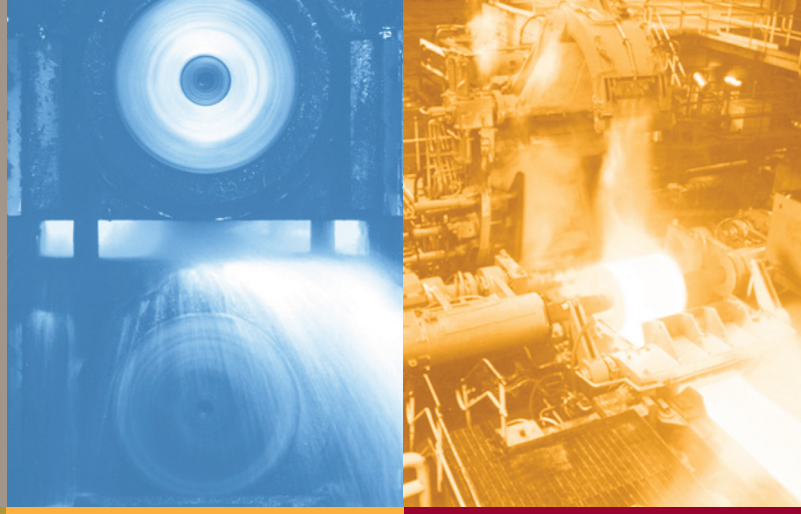
DDV Tester

G040-124-002

Portable, stand alone tester
with LED display



The Moog G040-124-002 Direct Drive Valve (DDV) Tester tests a DDV, without the need for electrical power or hydraulic supply. Internal rechargeable batteries eliminate the need for external electrical power by powering the Tester as well as the valve.

Testing is simple and straightforward. Plug the Tester's connector into the valve, rotate the command potentiometer and observe the spool LED display following the command. A hydraulic supply is not necessary because the force required to position the spool is generated electrically by the valve's linear force motor.

A measurement of the valve's operation can be made with a digital multimeter on the command and spool test points.

More test points, connected directly to the valve's connector pins, aid in troubleshooting. A test point that gives an output proportional to the valve's supply current is also very useful in troubleshooting.

FEATURES

- Fully tests a Moog Direct Drive Valve (DDV)
- Works with all command signals
- LED display of spool position
- Normalized ±10 V command and spool test points
- Valve pin test points
- Valve supply current test point
- Internal rechargeable batteries power the valve and Tester

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SPECIFICATIONS

Command outputs	0 to ±10 V @ ±10 mA max 0 to ±10 mA @ 1 k load min 4 to 20 mA @ 0 to 500 Ohm load
Spool input	4 to 20 mA, 500 Ohm load
Supply to valve	24 V nominal @ 2.1 A max
Test points	Command, 0 to ±10 V Spool, 0 to ±10 V A, valve supply pin, 22 to 26 V IA, valve supply current, 1 V = 1 A PE, protective earth F, spool signal, 2 to 10 V D, command signal 0 V, zero volts (ground) reference
LEDs	Lo.V, threshold = 22 V Hi.I, threshold = 250 mA Vs, ±15 V internal supply > ±12 V
Battery	Sealed lead acid, 2 x 12 V, 0.8 AHr
Charge time	4.5 hours typical from 22 V
Operate time	40 minutes @ 500 mA supply to valve 2 hours for typical use
Operating temp	0 to 40°C (32 to 104°F)

Dimensions	70 mm (2 3/4 ins.) H 190 mm (7 1/2 ins.) W 130 mm (5 1/8 ins.) D Depth to end of cable gland is 210 mm (8 1/4 ins.)
Cable length	2 m (6 ft. 6 ins.)
Weight	1.5 kg (3 lb. 5 oz.)
EMC	CE marked EN61000-6-3 emission EN61000-6-2 immunity
Battery charger	240 mA @ 29.4 V (red LED) 27.4 V float (green LED) 90-264 VAC, 47-63 Hz AC connector, 2 pin IEC 320-C7 –25 to 40°C (–13 to 104°F) CE marked EN50081.1 emission EN50082.1 immunity

ORDERING INFORMATION

G040-124-002
DDV Tester with batteries installed and a battery charger (AC power lead, IEC 320-C7, not included)

C70591
Charger only (AC power lead, IEC 320-C7, not included)

C70589
Replacement battery (2 required)

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VALVE ELECTRONICS WITH SUPPLY VOLTAGE 24 VOLT AND 6+PE POLE CONNECTOR

Command signal 0 to ±10 mA floating,
Valves with current command input

The spool stroke of the valve is proportional to the current flowing between pins D and E.

100 % valve opening P ➡ A and B ➡ T is achieved at I_D = +10 mA. At 0 mA command the spool is in centred position. The input pins D and E are inverting. Either pin D or E is used according to the required operating direction. It is necessary to connect the unused pin to signal ground in the cabinet.

Command signal 0 to ±10 mA,
Valves with current command input (legacy valves)

The spool stroke of the valve is proportional to (I_D – I_E).
100 % valve opening P ➡ A and B ➡ T with (I_D – I_E) = +10 mA.
Either pin D or E is used according to the desired flow phasing.
The unused pin is left unconnected. R_{in} (D to B) = 200 Ω.
R_{in} (E to B) = 200 Ω.

Command signal 0 to ±10 V,
Valves with voltage command input

The spool stroke of the valve is proportional to (U_D – U_E).

100 % valve opening P ➡ A and B ➡ T is achieved at (U_D – U_E) = +10 V.

At 0 V command the spool is in centred position. The input stage is a differential amplifier. When only one command signal is connected to the valve it is necessary to connect the unused pin to signal ground in the cabinet, according to the required operating direction.

Command signal 4 to 20 mA,
Valves with current command input (legacy valves)

The spool stroke of the valve is proportional to I_D minus the centre null current of 12 mA. 100 % valve opening P ➡ A and B ➡ T with I_D = +20 mA. 100 % valve opening P ➡ B and A ➡ T with I_D = +4 mA. Use pin D as signal input. Pin E is left unconnected. R_{in} (D to B) = 200 Ω.

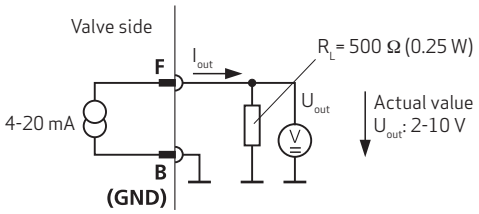
Actual value 4 to 20 mA

The actual spool position value can be measured at pin F (see diagram below). This signal can be used for monitoring and fault detection purposes.

The spool stroke range corresponds to 4 to 20 mA.

The centred position is at 12 mA.
20 mA corresponds to 100 % valve opening P ➡ A and B ➡ T.

Circuit diagram for measurement of actual value I_F (position of spool) for valves with 6+PE pole connector

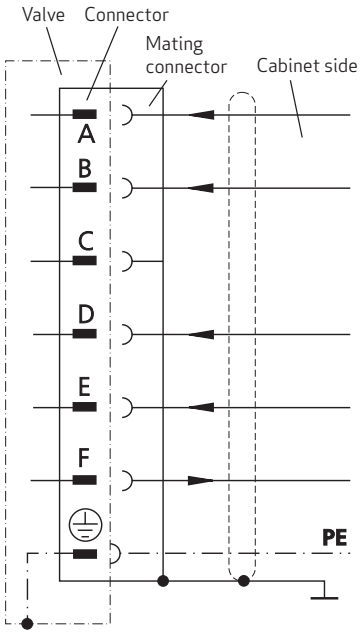


The position signal output 4 to 20 mA allows the detection of a cable break when I_F = 0 mA.

For failure detection purposes it is necessary to connect pin F of the mating connector and route this signal to the control cabinet.

WIRING FOR VALVES WITH 6+PE POLE CONNECTOR

(to EN 175201 Part 804[1]), and mating connector (type R and S, metal shell) with leading protective earth connection (⏚).



Function	Current command 0 to ± 10 mA floating	Voltage command 0 to ± 10 VDC
Supply	24 VDC (19 to 32 VDC)	
Supply / Signal ground	⊥ (0 V)	
Not used		
Input rated command (differential)	Input command I_D = - I_E: 0 to ± 10 mA Input command (inv.) I_E = - I_D: 0 to ± 10 mA R_{in} (D to E) = 200 Ω Input voltage U_{D-B} and U_{E-B} for both signal types is limited to min. -15 V, max. +24 V.	U_{D-E} = 0 to ± 10 V R_{in} (D to E) = 10 KΩ
Output actual valve spool position	I_{F-B} = 4 to 20 mA. At 12 mA spool is in centred position. R_L = 300 to 500 Ω	
Protective earth		

[1] formerly DIN 43563

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The circled numbers in **bold** refer to the corresponding area in figure 1.

1. Supply on/off

Turn on the Tester with the on/off switch on the rear panel. The Vs LED in (2) indicates correct internal supplies.

2. Indicators and battery charging

If the Lo.V LED is illuminated, do not use the Tester; charge its batteries. Plug the charger into the charge socket on the rear panel and charge until the charger LED is green.

The Hi.I LED illuminates if the supply current to the valve is greater than 250 mA. This current will occur during normal operation. The warning is provided to maximize battery life by alerting the user to occasions when high current may not be necessary.

3. Valve connector

Plug the valve connector, (3), into the valve.

4. Command

Select the type of command with the command selector in (4). The command type is stamped on the valve nameplate. If this is not present, or cannot be read, determine the signal type from the model or box-car number.

Vary the command with the command potentiometer and observe the spool LED display in (5) following the command.

5. Spool

For precise confirmation of correct valve operation, measure at the ±10 V command and ±10 V spool test points. Measure with respect to the 0 V test point in (6). Without flow, the spool test point signal will follow the command, unless the spool movement is restricted.

6. Test points

The test points of (6) enable direct measurement of signals on the valve connector pins and an indirect measurement of the supply current to the valve. The IA valve current test point scaling is 1 V = 1 A. High current draw can indicate a sticking spool, due to contamination or physical damage to the spool or bushing.

7. Other valves

The Tester can also be used to test +24 V, 6+PE proportional valves. Pin C on the valve connector is wired to 24 V to provide the enable signal required by proportional valves.

8. Battery replacement

- Remove the four screws on the bottom and lift the front panel from the base.
- Disconnect the battery leads from the circuit card.
- Remove the four self threading screws on the edge of the battery cover. Remove the counter sunk screw in the centre of the model number label.
- Lift off the battery cover.
- Note the battery orientation and place the new batteries in the same way.
- When reassembling, be careful not to pinch any internal wires.
- Ensure the new batteries receive a full charge before using.

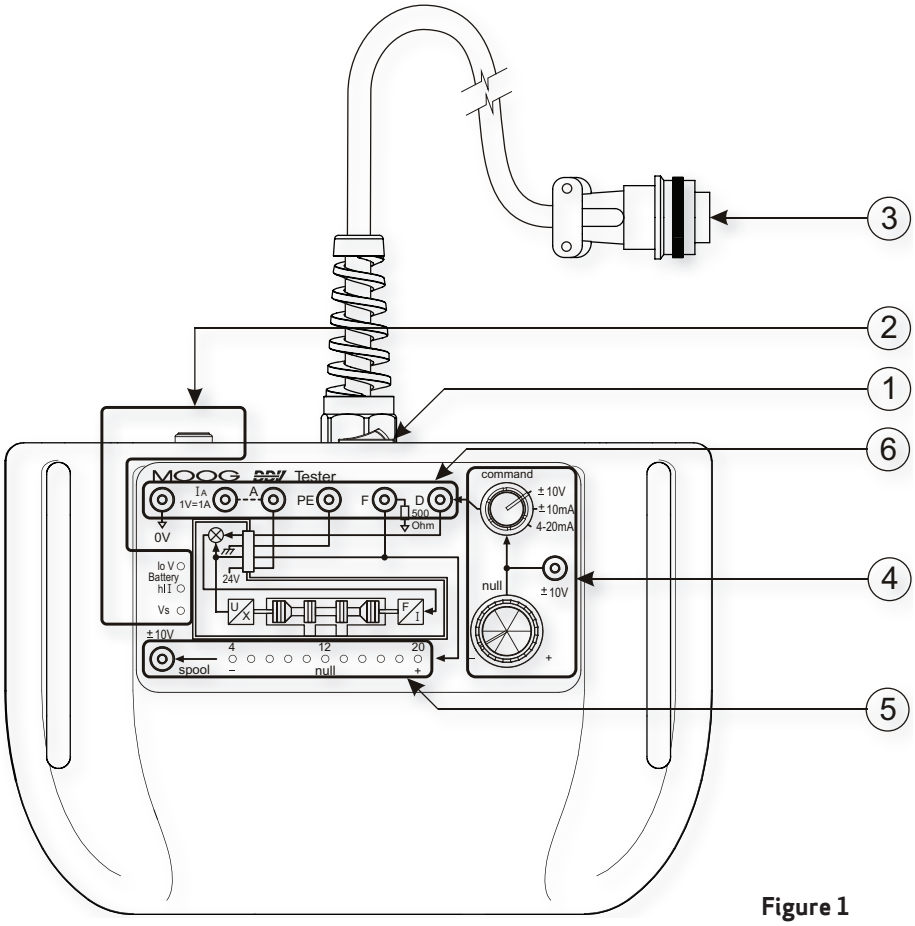

Figure 1

Moog has offices around the world.
For more information or the office nearest you, contact us online.

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www.moog.com/industrial

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