



*ValveExpert*  
*VX-MD-007*



# Test Equipment for Servo– and Proportional Valves

## Magnetizing Device ValveExpert VX-MD-007

Revision: December 2013

### Sort Description

## Review

The magnetizing device ValveExpert VX-MD-007 is a part of the test system ValveExpert. It consists of a variable transformer and an electromagnetic head.<sup>1</sup> Together with a servovalve test stand ValveExpert series, it allows adjustment of the magnetic field of Alnico permanent magnets<sup>2</sup> used in servovalves with mechanical feedback similar to Moog 76x series. The variable transformer is used to adjust current through the coil of the magnetic head. The magnetic head has a switch which is used to magnetize & to demagnetize the magnets of the valve under adjustment.

## Short description of the magnetizing/demagnetizing process<sup>3</sup>

### Demagnetizing

1. Turn the handle of the variable transformer to the maximal position.
2. Put the coil above the first stage of the valve under adjustment.
3. Press the switch on the magnetizing head (demagnetizing position), remove the head from the valve, and switch off the magnetizing head. To exclude the extra heating of the coil, the duration of this process must be very short. It usually takes less than a second. Note that demagnetizing does not depend on this time.
4. Check the flow rate of the servovalve. The flow should not depend on the control signal or this dependence must be very small.

### Magnetizing

1. Turn the handle of the auto-transformer in the *proper* position.
2. Put the coil above the first cascade of the valve.
3. Press the switch on the magnetizing head (magnetizing position) for a very short time. Duration of such an impulse should not be more than a second. Note that magnetizing level does not depend on this time and 200ms is enough for magnetization.
4. Remove the magnetizing head from the valve and check the flow of the servovalve. Usually it must be nominal flow  $\pm 10\%$  at nominal signal.
5. Repeat the steps 1-4 if the value of the flow is not correct.

In order to find the *proper* position of the auto-transformer handle, we usually use three test points. It means that we magnetize a servovalve at three different levels. (We use 80, 120 and 150 values of the variable transformer handle). Then we prognosticate the *proper* position using the cubic spline interpolation. But, with some experience, the *proper* position can be found experimentally without any computer extrapolation. Note that usually you have to demagnetize your valve completely if it is over-magnetized.

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<sup>1</sup>See the picture on the front.

<sup>2</sup>ALNICO magnets typically consists of 8–12% Al, 15–26% Ni, 5–24% Co, up to 6% Cu, up to 1% Ti

<sup>3</sup>The magnetizing process is shown on Figure 1.

## Caution



Note, current through the coil of the magnetizer can be up 6A. It is a big power which heats the coil very fast. Therefore, please care that your coil is not too hot ( $< 50^{\circ}\text{C}$ ).



Figure 1: Magnetizing of a Moog servovalve

## Test Process

The Figure 2 and Figure 3 show magnetic induction tests of magnetizer series VX-MD-007.<sup>4</sup> Reference settings of the variable auto transformer is 100VAC.<sup>5</sup> Nominal transformer input

<sup>4</sup>Magnetizer with serial No.: VX-MD-25022023.001 was used.

<sup>5</sup>Maximal tested value of the transformer is approximately 330VAC.



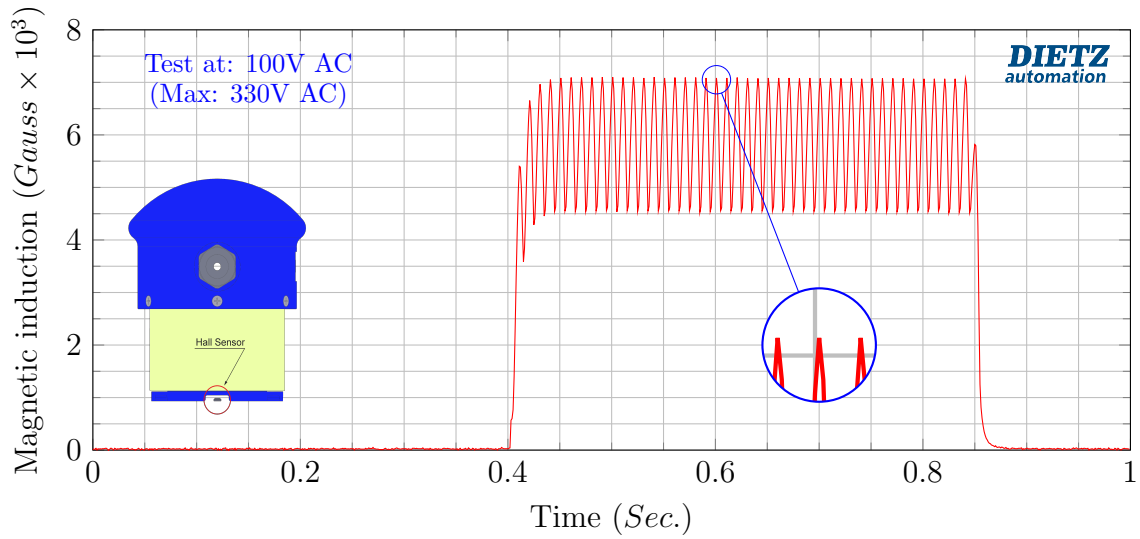


Figure 2: Test results of the magnetizing mode

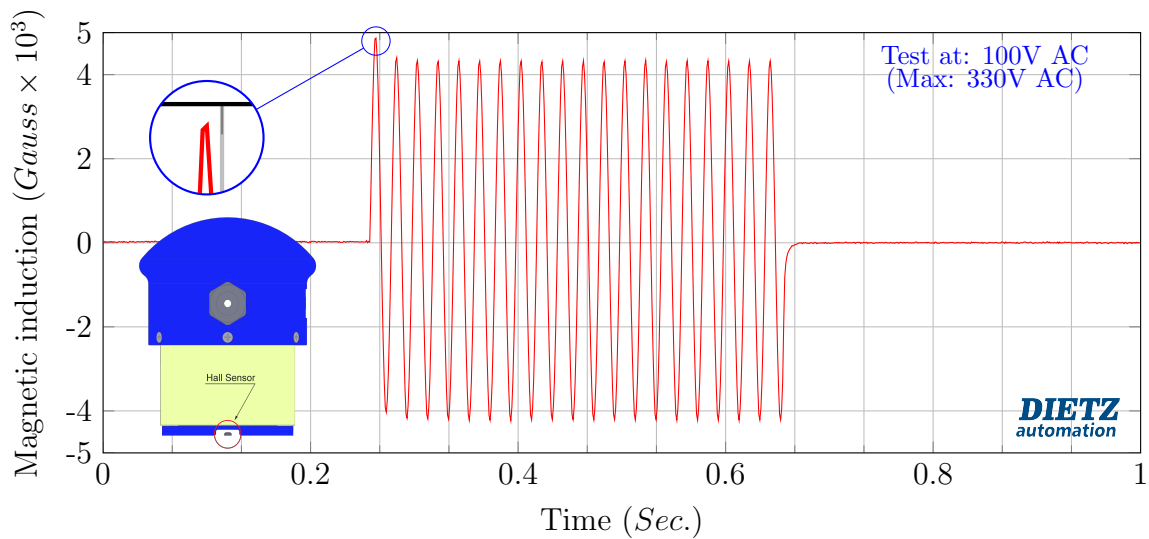


Figure 3: Test results of the demagnetizing mode

voltage is 230VAC, 50Hz.<sup>6</sup> Test was done with a hall sensor Honeywell SS495A located in the middle point of the magnetizer bottom plane (see Figure 2 and Figure 3). Label side of the sensor looked inside the magnetic head of the magnetizer. Sensitivity of the sensor is 3.125mV/G.

<sup>6</sup>Regular single phase electric power supply in Germany.

DIETZ automation GmbH  
Auf Maien 17  
66538 Neunkirchen  
Germany  
office: +49 6821 8691762  
cell: +49 1522 8712097  
shashkov@dietzautomation.com  
www.dietzautomation.com

USt. ID Nr.: 219 401 070  
Geschäftsführer: Dr. Mikhail Shashkov  
Handelsregister: AG Saarbrücken HRB 12729  
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