

28.11.2007

ETI Motor for Bermad Motorized Pilot

We have purchased and performed some tests with
ETI VALVE ACTUATOR (Motor) Model VA21MRF-7222.

Please find below some data and perceptions regarding the conjunctions between the motor
& our #2PB pilot - where we stand, what needs to be done and where lay our strong/weak
points:

1. DATA:

- 1.1. Motor Assembly Weight: 1.9 Kg. (including adaptors)
- 1.2. Motor Assembly Height: 330 mm
- 1.3. Motor Diameter: 90 mm
- 1.4. Adaptor Ext. Diameter: 88 mm
- 1.5. Total number of turns: 9.5 turns
- 1.6. Total time for full travel: 360 sec. (6 minutes)
- 1.7. Time for one turn (360°): 38 sec.
- 1.8. Number of turns per 1 mA: $\frac{5}{8}$ turns (225°)
- 1.9. Time for turn during a change of 1 mA: 22 sec.

2. Issues to consider:

- 2.1. The motor range is constant according to the No. of turns, 0=4 mA; 9.5=20 mA. We need to find out/define if its possible to calibrate the range (turns to mA) and if this can be made by us in BERMAD (or our customers) by a destined program.
- 2.2. Different pilot springs and certainly different pilots, require different travels. we shall have to decide if we want to stock variations of motors (assuming its possible) or one motor with variations of setting screws (thread pitch) to provide constant travel/ No. of turns for all springs & pilots.
- 2.3. There is no protection to prevent the motor from turning against a "locked" spring. This might "burn" the motor.
- 2.4. The setting screw standard UNC thread type is fitted to seldom be used. We can expect the standard thread to wear out quit fast under intensive operation. Probably we should have to convert to Trapezoidal thread and its better to do it from the very start.
- 2.5. The motor we received from ETI for tests included adaptors to harness the motor to the pilot cover and setting screw (by a) ETI had designed and produced. We may want to make our own adaptors according to quality, availability and cost.

3. Pictures: Please find bellow some pictures we took demonstrating the converting process from standard PRV to one with a Motorized pilot + some "Close-Ups" of points need to be checked and understood.



3.1. Standard PRV

3.2. Replacing Pilot Cover



3.3. Pilot Cover Replaced



3.4. Pilot Covers + Set-Screws



3.5. Swivel Joint Assembling



3.6. Pilot Cover Adaptor





3.7. Motor Installing



3.8. Motor Installing – Tightening



3.9. Motorized Pilot PRV



3.10. Opening connections cover



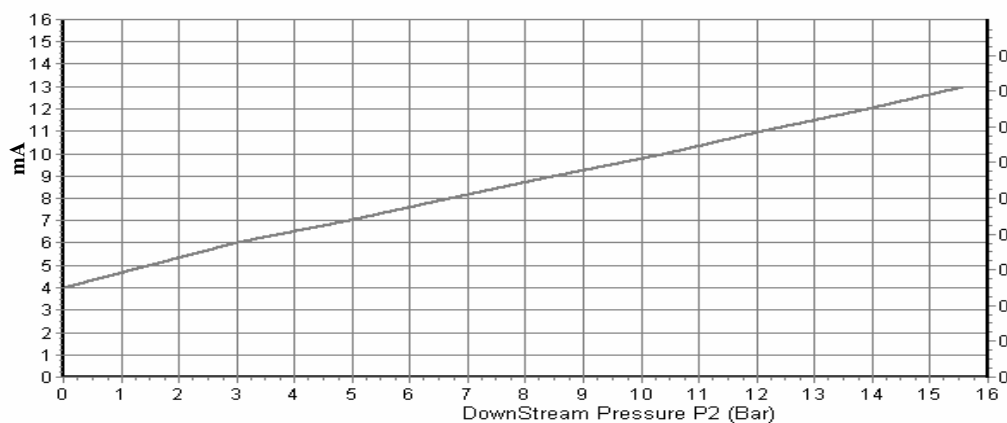
3.11. Connections Cover opened



3.12. Connections cover opened - wires pulled

4. **Valve Curves:** Please note that the attached Lab Curve is reaching only 13 mA due to the spring travel issue.

**BERMAD LABORATORY
VALVE TYPE: 8" 700 -PB-Pilot-Spring M
ETI-Valve Actuator**



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