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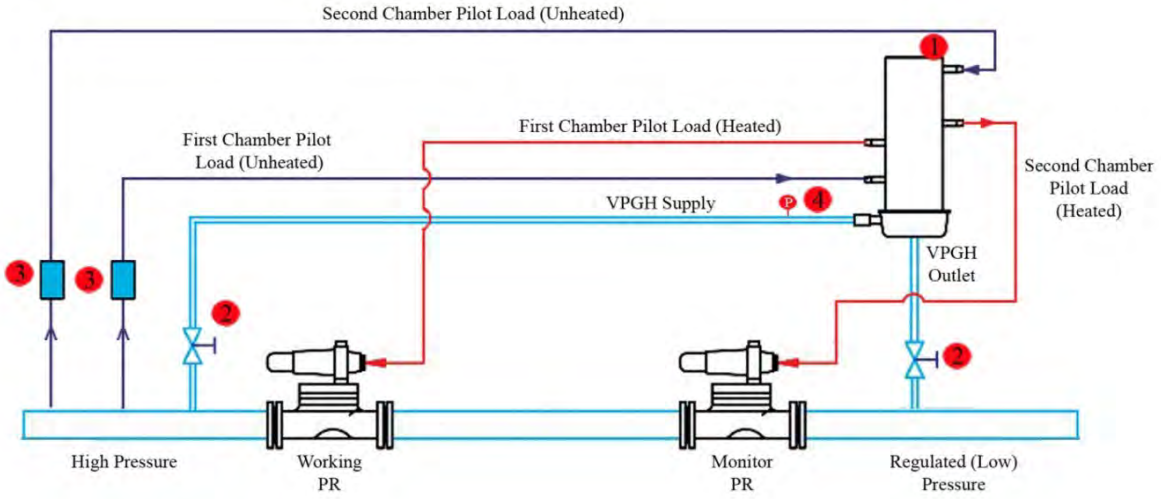
VORTEX PILOT GAS HEATER MANUAL

PRINCIPLE OF OPERATION

High pressure gas is delivered to a heat generating part **(Vortex Heater-VH)** of the **Vortex Pilot Gas Heater (VPGH).** As the gas is passes through the **VH**'s tangential nozzles its pressure decreases and flow velocity increases. The developed high kinetic energy flow undergoes energy division (vortex phenomenon) forming the low temperature (cold) and the high temperature (hot) vortex currents. Since the hot vortex current locates close to the **VH** walls, the current's thermal energy is transferred outside - to the pilot gas flow passing through the heat exchanger set up on the **VH's** outer walls. The depressurized gas flow is discharged from the **VH** into the low pressure line downstream of the pressure regulator.

INSTALLATION AND START UP
(By the example of a typical in pressure regulation PRS configured as a working/monitor facility)



Material – Item List:

1. Vortex Pilot Gas Heater
2. Lockup Ball Valve ½'' NPT
3. Pilot Gas Filter

4. Pressure gauge upstream and downstream of the VPGH installed in a close proximity to the unit. In the correct **VPGH** setting (no restrictions in the inlet and outlet lines), the upstream pressure gauge reading is equal to the main line's upstream pressure. Correspondingly, the reading at the **VPGH** outlet is equal to the main line's downstream pressure.
5. A shut off valve requested in case of the possibility of no flow conditions at PRS (zero demand) to prevent downstream overpressure. Recommended a ¾'' Fisher 627M upstream of the VPGH or self-operated Fisher 627 at the VPGH outlet side. The Fisher 627M sensing the downstream pressure has its set point above primary regulator delivery pressure (proportional to operational range of the spring) and, accordingly, operates either in a **fully open** or in a **fully closed** position. In the VPGH high pressure applications (inlet PRS pressure is equal or above 1,000 psi) it is recommended to use the Fisher orifice of ¼'' DIA. The 3/8'' orifice is suitable for low and medium PRS inlet pressures

Checklist: The following checklist should be used to confirm VPGH-DP is installed for optimal performance:

- The VPGH preferable mounting position is vertical, on the top of the main gas line. Care should be taken to prevent pipe insulation or Teflon tape from entering the VPGH inlet
- VPGH supply and outlet lines should be ½'' ID minimum with minimum practical length and bends. Excessive length or restricted vortex flow can prevent proper VPGH operation
- Pilot load lines, upstream and downstream of the VPGH, should be 1/4'' and also be, as practical, short and straight
- VPGH supply line and pilot load lines, upstream and downstream, should be thermally insulated

OPERATION

The gas flow with the pressure equal to the upstream main line pressure expands in the **VH** inlet nozzles, undergoes energy separation (Vortex phenomenon) and leaves the **VH** through its discharge orifice connected with the main line, downstream of the regulator. Since the **VH** flow is just a tiny fraction of the main flow, the **VT** discharge pressure would always be equal to the current downstream gas pressure. A small **VH** flow rate and highest **Fisher 627** set point allows the **VH** to operate even with a very small downstream flow demand. A pilot gas, taken upstream of the pressure regulator enters the **VH** heat exchanger, picks up the heat and with the same upstream pressure is directed to the pilot.

MAINTENANCE

NO MAINTENANCE IS REQUIRED.