POLIMAT CONTROL VALVES
SERIES 2000-DIGIT-F3

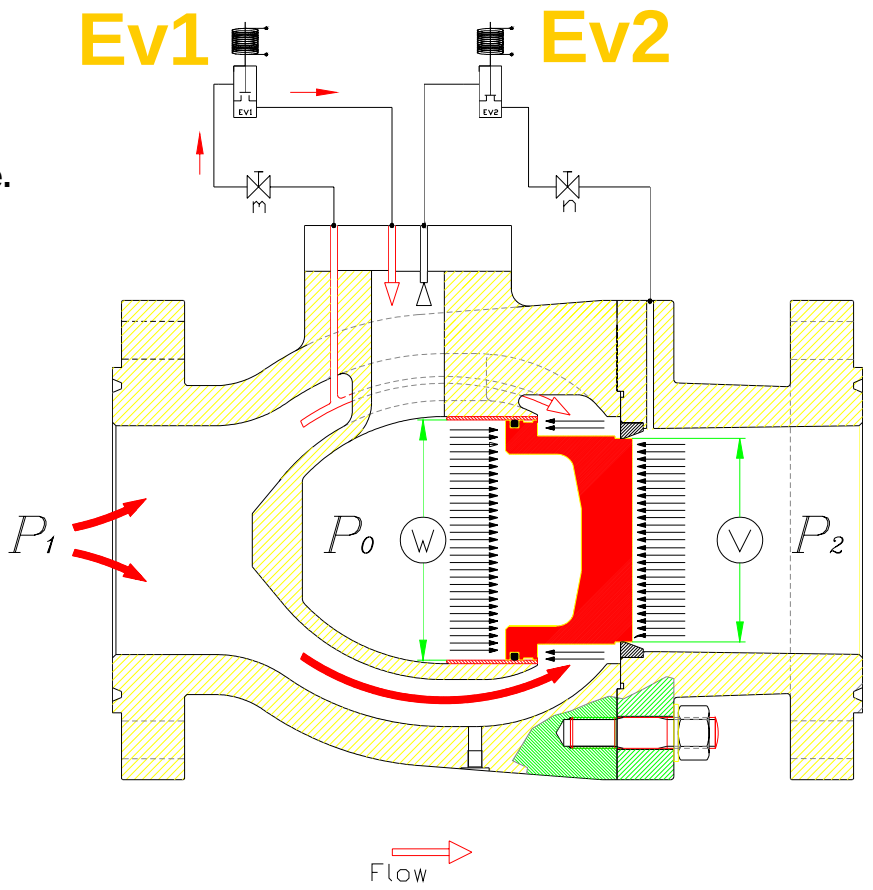
Principle of Operation

The Polimat valve can be divided into 3 zones.
The P1 upstream pressure zone
The P2 downstream pressure zone
The P0 internal chamber pressure zone: its own fluctuations determine the operation of the valve.

The digital Polimat valve is equipped with two 2 ways solenoid valves:
EV1 normally open, connecting the upstream zone with the internal chamber
EV2 normally closed, connecting the internal chamber with the downstream zone

Closing
In idling conditions pressure P0 rises to the value P1, thus the closing thrust acting on the piston is given by:

P1*W – P1 (W-V) – P2*V
If P2=0, then P1*V



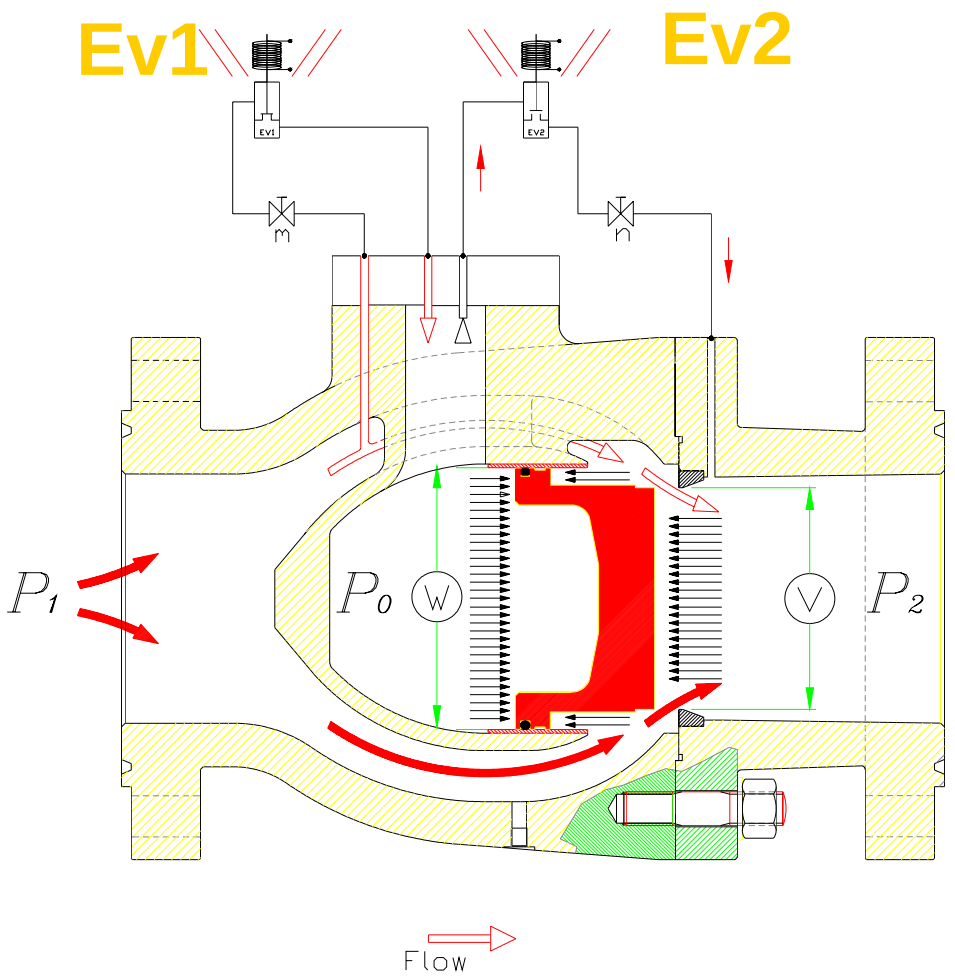
Principle of Operation (continued)

Opening

By energizing EV1 and EV2, the pressure P0 discharges from the internal chamber and the opening thrust acting on the piston is given by:

P1 (W-V) + P2*W – P0*W

if P2=0, then P1*V – P0*W

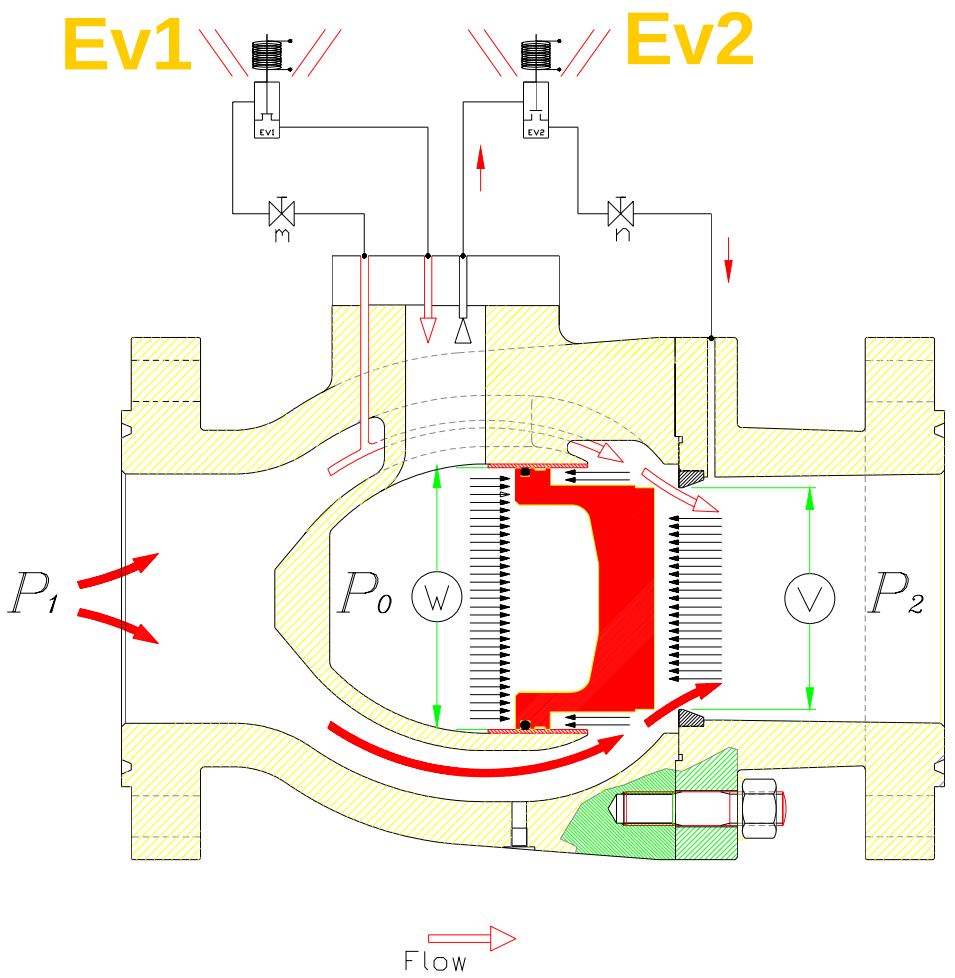


Principle of Operation (continued)

Regulating

When both EV1 and EV2 are closed (EV1 energized, EV2 de-energized) the valve remains in balanced position for partial opening.

It is then able to continuously adjust the opening rate thanks to the signals from a digital controller, driven by a flow-meter or a pressure sensor, depending on the required functions.



Principle of Operation (continued)

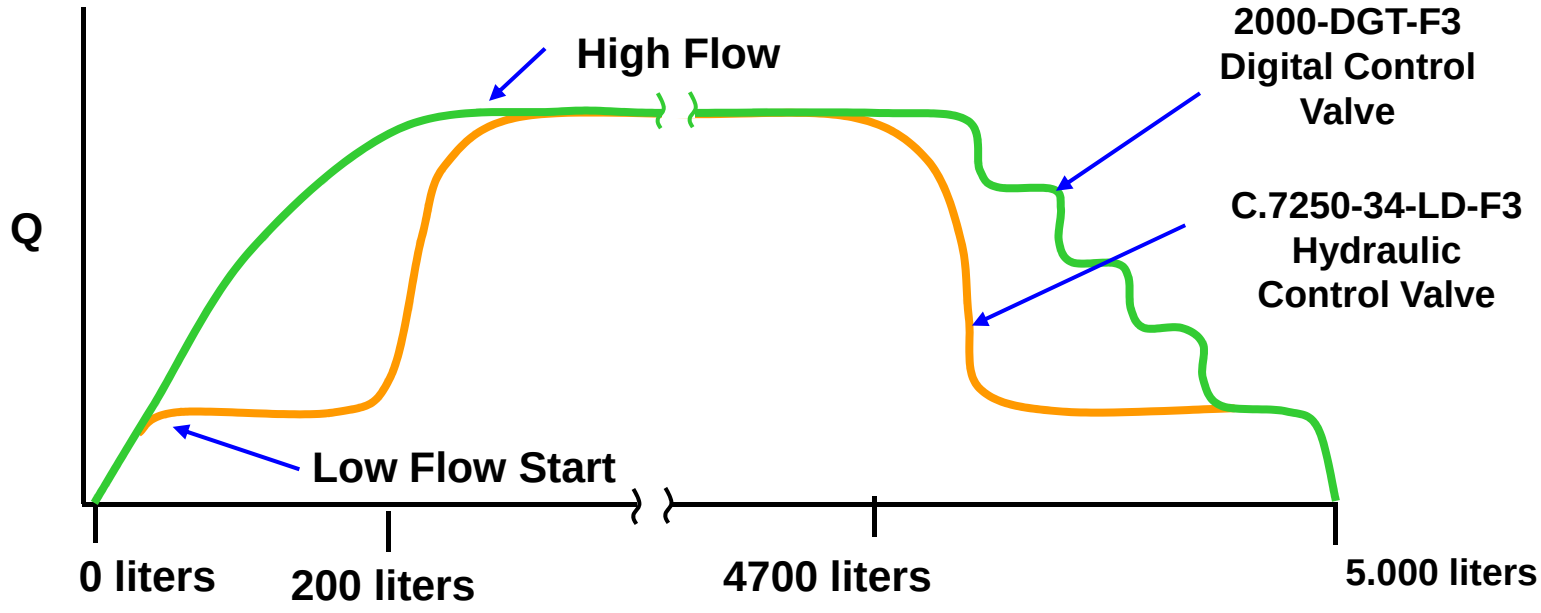
The following table shows the status of Polimat and Solenoid Valves on the different steps of a typical load

Polimat valve digit 2000	Solenoid valve EV1 “NO”	Solenoid valve EV2 “NC”
Close	Coil de-energized	Coil de-energized
Opening low-flow at the set value	Coil energized	Coil intermittently energized. De-energized when the set point is reached
High-flow	Coil energized	Coil intermittently energized. De-energized when the set point is reached
Flow-limiting at set value	Coil intermittently energized.	Coil intermittently energized.
Closing low-flow at the set value	Coil intermittently energized.	Coil de-energized
Closure.	Coil de-energized	Coil de-energized

Two needles valve “m” and “n”, allows to adjust the opening and closing time, and to damp possible swinging, by reducing or increasing the flow to and from the internal chamber.

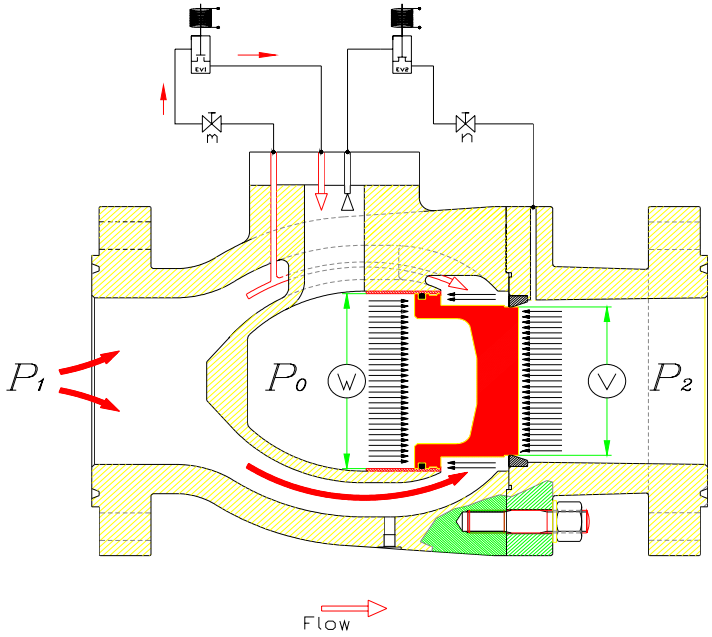
Set-Stop Loading Sequence

- Open and close the valve
- Control the “low flow” and “high flow” rates
- Control two-stage shut down



Series 2000-DGT-F3
Digital Set-Stop Valve flow rate limiting

- **Two speed controls (opening and closing)**
- **Two solenoids (N.O. And N.C.)**



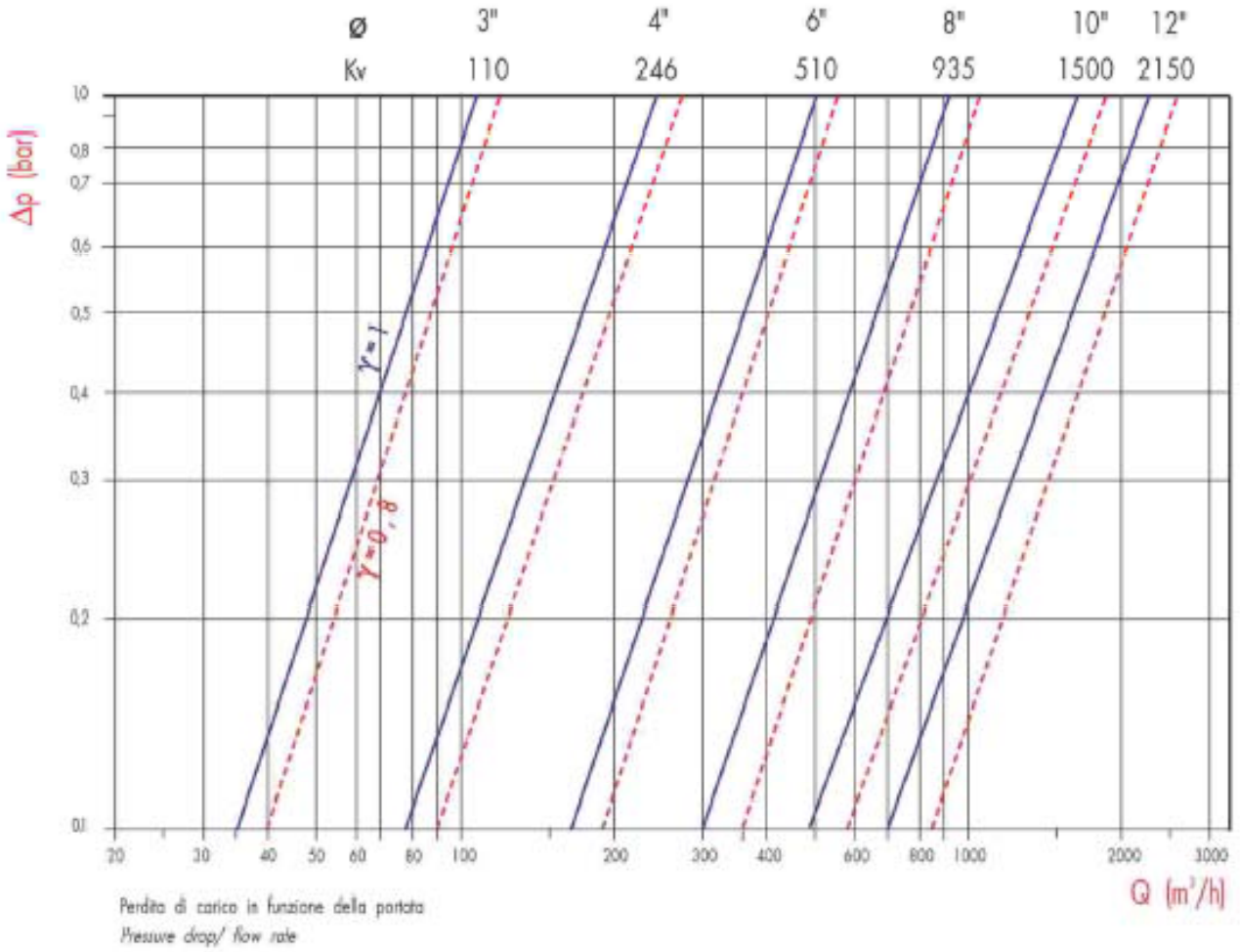
POLIMAT Valve Series 2000-DGT-F3

- Series 2000-DGT-F3 must be used with batch controller
- Low viscosity applications up to 6°E (45 cSt) viscosity
- Batch controller provides:
  - Flow rate contr
  - Low flow start
  - Dual rate of flov
  - Multi-stage closure

POLIMAT Valve Series 2000-DGT-F3

- **Pressure drop across valve is only power available to operate valve**
  - **Minimum pressure drop is 0,5 bar**

CHARACTERISTIC CURVES



Features and Advantages of Polimat Valves (continued)

Multi-function: several functions can be performed by the same valve in one time.

Modular design: the sophisticated modular design allows easy add-on of many additional functions without putting the valve out-of-service.

Compact design: all main functions are taken care of by the control-plate without need of external tubing. Thermal insulation can be easily performed.

High flow capacity: the “nozzle” design of the main plug allows for high flow rate minimizing pressure-drop, downstream cavitation and noise. Anti hammer-blow and smooth shut-off design.Tailored flow / stroke characteristic can be easily achieved in accordance with specifications and/or plant needs .If needed, flow characteristic can be adjusted at site with easy touch-up of the plug shape.

One only moving part: Solid stainless-steel main plug ifs fully guided by PTFE bushing all over the complete stroke inside the stainless-steel cylinder . No metal parts in contact, no wear particles , no risk of galling even for very low viscosity or aggressive media.

Features and Advantages of Polimat Valves (continued)

Material selection: All internal parts in contact with sliding seal are in stainless steel for minimal maintenance need.

One only sliding seal: Proprietary design of the composite sliding-seal (PTFE + elastomeric O-Ring) minimize friction and stick-slip effect . No differential pressure across the seal when the valve is in closed position

No diaphragm: the proprietary design of the rugged sliding-seal can withstand severe dynamic and static peaks of pressure.

Intrinsically safe: for all working conditions, any damage or the complete loss of sealing capability of the only one sliding seal, draws the valve to fail- close position.

Fire-safe: The complete loss of internal O-Rings' sealing capability draws the valve to close position and to metal-to-metal positive (pressure aided) seating

Soft seated: soft seat and metal-to-metal secondary seat grant bubble-tight positive shut-off.

Features and Advantages of Polimat Valves

Bi-directional design: The valve can be used in either flow direction (pressure to open or pressure to close). When used in pressure-to-close direction the internal trim and, as a consequence, the behaviour of the valve is not affected by the dynamic thrust of medium for any value of flow-rate.

Equilibrated design: The hydraulically equilibrated and mechanically rugged design of the main plug make the valve insensitive to any differential pressure . The valve behaviour remains fully predictable and constant up to full-rating differential pressure. High accuracy is granted independently of working conditions.

Easy maintenance: The absolute minimum quantity of moving parts (one only !!!) make the maintenance of the valve an extremely easy matter. No wear parts are foreseen. If the seat is damaged by foreign particles within the medium, the seat itself can be easily replaced and the valve maintained with no need for special tools.

Reliable set-up: the trip-point or the set-up of the valve can be factory set or field adjustable, depending on specifications.