



Fig. 1 - Metalforming press

## Digital “P/Q” control for modern presses easy solution for complex machine operations

The whole range of Atos digital proportional directional valves and cartridges can be equipped with integral P/Q control option to perfectly suit, with best accuracy and dynamics, the injection and mould controls of plastic and die-casting machines and the cushion control of vertical metals presses (Fig. 1).

The P/Q innovative function strongly simplifies the machine control architecture by integrating in a single digital proportional valve, direct or pilot operated, complex machine functions previously performed by multiple proportional controls.

New proportional P/Q valves combine a pressure/force control to the conventional speed/flow regulation of directional proportionals (Fig. 2). The valves are operated by two reference signals (flow and pressure/force) and a dedicated algorithm automatically selects which control is active time by time.

Flow control is active when the system’s actual pressure/force is lower than the relevant reference signal, while pressure/force control becomes active if the system’s pressure/force grows up to this value.

3 basic functional schemes have been developed in order to fulfil the widest range of motion control applications and to yield the best system performances:

- pressure control with one remote pressure transducer - pressure closed loop control on one user line equipped with a remote pressure transducer
- force control with two pressure transducers - pressure closed loop control on both valve’s user ports equipped with two remote pressure transducers (Fig. 3). The actuator force is calculated by the pressure feedback’s balance ( $P_a - P_b$ )
- force control with load cell - force closed loop control performed by installing a load cell between the actuator and the controlled load

Integral digital electronics offers better performances, optimized motion control and powerful diagnostics thanks to Atos original software with intuitive graphical interface (Fig. 4). They are available with CANopen, Profibus DP, EtherCAT or POWERLINK interfaces for a quick integration in the machine fieldbus network.

Thanks to the innovative P/Q control function, Atos proportional valves can be successfully applied to many other applications domains, providing best performances, system simplification, quick and easy tuning.



Fig. 2 - Digital P/Q proportional

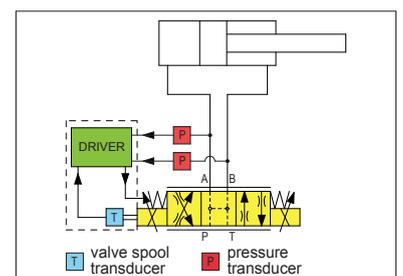


Fig. 3 - Force control by 2 pressure transducers

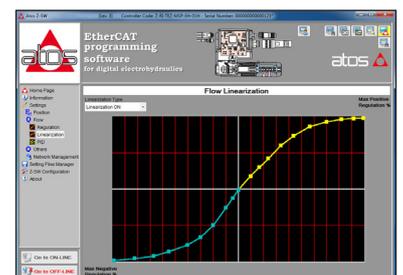


Fig. 4 - Atos E-SW-\*/S software

For further information look at [www.atos.com](http://www.atos.com)



Digital P/Q proportional

## Digital “P/Q” control for high dynamic presses

Innovative digital P/Q proportional valves, perform combined Speed & Force controls in plastic and die-casting machines - injection and mould control or in vertical metal presses - cushion control.

P/Q valves are operated by two independent reference signals (flow and pressure/force) and a dedicated algorithm automatically selects which control is active time by time: flow control is active when the system's actual pressure/force is lower than reference signal, while pressure/force control becomes active if system's pressure/force grows up to this value.

3 operational modes are available:

- pressure control with one remote pressure transducer
- force control with two pressure transducers - force control = delta pressure ( $P_a - P_b$ ) on actuator ports
- force control with load cell installed on the actuator rod

Atos onboard digital P/Q electronics offer superior performances with simplified control architecture plus powerful software settings & diagnostics; they are also available in CANopen, Profibus DP, EtherCAT or POWERLINK executions.

For further information look at [www.atos.com](http://www.atos.com)