

# STROKE CONTROL for High Pressure Pumps

## Load balancing of multiple high pressure pumps feeding into a common network

Additional production volumes often require an expansion of pump capacity. As an alternative to the purchase of larger pumps, the load balancing stroke control system allows for an interlinking and efficient operation of many STREAMLINE pumps in a pump network. Especially production facilities with multiple high pressure pumps and cutting stations working in an independent fashion can benefit of the many advantages of such a pump network.

### Always a Steady Feed of High Pressure Water

In case of a shut-down of a pump, the neighboring pumps take over its function thus guaranteeing a steady feed of high pressure water. Therefore, pumps can be fully isolated and maintained whilst production continues.

### Reduced Costs and High Reliability

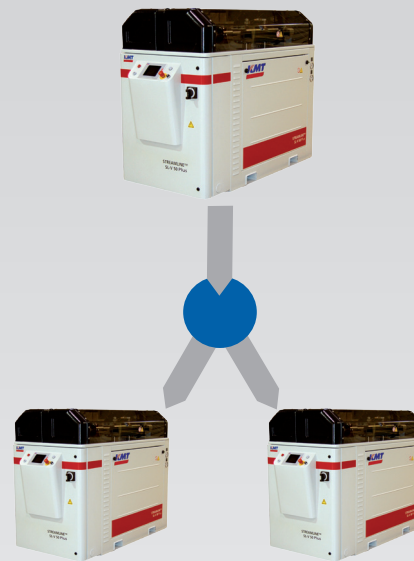
The balanced distribution of the workload in the pump network results in an even wear and longer lifetime of the single components of the connected pumps. Therefore, the operating costs are minimized. Additionally, a high reliability is achieved because service intervals and preventive maintenance can be predictably scheduled.

### Parallel Operation of Differently Powered Pumps

The central server unit calculates the optimal load for every pump in the network, always depending on the pump's engine power. This procedure guarantees that every pump carries an equal load considering its maximum capacity. In this way, every pump works as efficiently as possible resulting in further reduced costs due to the decrease of electric and cooling requirements.

### A Simple Way of Adding Capacity

The control via the centralized server unit facilitates releasing additional pump volume due to the better use of unused capacity: For example, an installation of three pumps with 3.8 l/min and a utilized flow rate of 3.4 l/min leaves an excess capacity of  $3 \times (3.8 - 3.4) = 1.2$  l/min. An increase in production volume or nozzle diameter could lead to a flow rate bottleneck requiring further pump investment. The operation with stroke control allows the remaining capacities of all the network pumps to be coupled together thus resulting in an incremental benefit. However, should a further pump become necessary due to increased production requirements, it can easily be added to the network.



### Optimized Pressure Signal for High Cut Quality

Normally, the central server unit controls the intensifiers of the connected pumps of the network so that they operate with a phase shift. This leads to a very smooth pressure signal which significantly affects the cut edge quality of the workpiece.

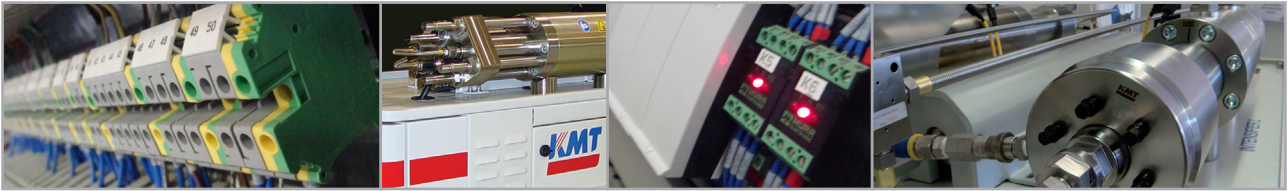
### Benefits of the Stroke Control at a Glance:

- Easy operation
- Easy increase and reduction of the number of connected pumps
- Possibility to connect pumps of different power and capacity
- Only a yearly calibration is necessary to maintain the system
- Any pumps can be used with any table
- PLC balancing proportional hydraulic control
- Overstroke and safety systems are not affected

### KMT Service Guaranteed Worldwide

KMT WATERJET operates on five continents and maintains a network of sales and service agencies all over the world. You can thus be rest assured that spare parts for your equipment will be readily available. Thanks to the global network of KMT WATERJET, assistance is never far away.





## Operating Mode of the Stroke Control

### Controlling the Network with a Central Server Unit

The server unit is a main computer unit. Its pressure commands come from the PLC controller of the master pump. These values are then communicated to the individual slave pumps. After a start-up phase, the server sets the strokes of each individual pump in order to facilitate an equal load on each individual unit. The Server receives notifications about each reciprocating plunger movement per time unit from the pumps. Should a variance in the number of strokes appear, the server commands the pumps by sending the appropriate electrical signal thus assuring an equal number of strokes on each pump unit. After a renewed measurement of the stroke speeds, the complete process starts over thus closing the control loop completely.

To include the actual water pressure in the tubing into the control loop, a pressure transducer must be installed into the HP plumbing. The transducer readings are then fed into the server, which in turn corrects the proportional valve signal of each pump according to the pressure differential and to the max. stroke count of each pump type in order to achieve an equal load on all pumps. The resulting precision of this control loop equals +/- 10 bar.

### REQUIRED HARDWARE

#### Server module

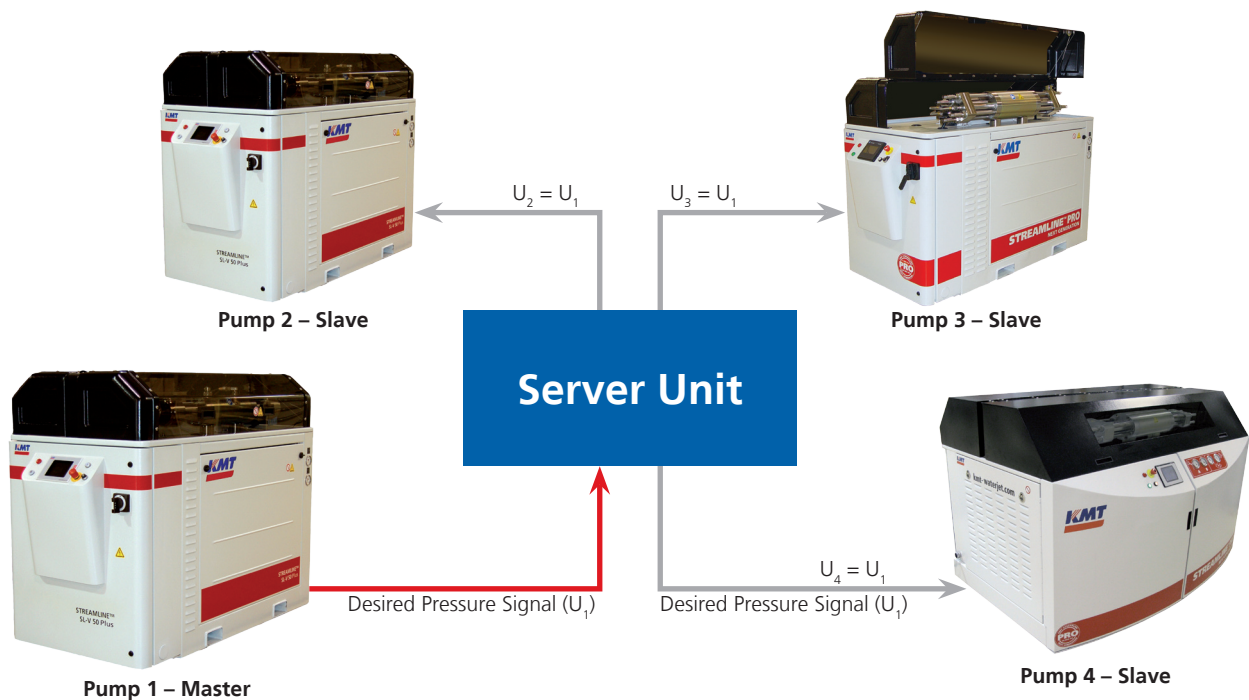
The central server unit, which is installed outside of the pump group, requires continuous electrical power. All PLCs of the pumps in the system are connected with this server in order to communicate the operating data as well as their name labels. The Server also processes the pressure signal from the transducer should this option be installed.

#### Pump module

Each pump in the network requires a hydraulically adjustable proportional valve. The adjustment of the integrated control software creates a clear hierarchy, which is necessary for smooth communication between the server and the individual pumps.

#### HP transducer

A pressure transducer is required for the exact setting of the required pressure output. When a difference between the nominal and gauge value occurs, a correctional signal is sent to achieve load balancing depending on the operating parameters.



KMT GmbH • KMT Waterjet Systems

Auf der Laukert 11 • Bad Nauheim • Germany  
Phone: +49-6032-997-0 • Fax: +49-6032-997-274

[www.kmt-waterjet.com](http://www.kmt-waterjet.com) • [info@kmt-waterjet.com](mailto:info@kmt-waterjet.com)

