VACON STEP-DOWN STEP-UP

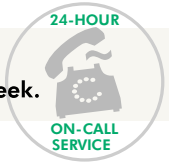
SOLUTION FOR MEDIUM VOLTAGE AC DRIVES

FOR SMOOTH CONTROL vacon

SAVE YOUR CONSUMPTION

Since its foundation in 1993 Vacon Plc has provided full-scope AC drives to its customers worldwide. Our innovative solutions help you save energy, improve your process and protect the environment by enabling adjustable speed control of pumps and blowers in an optimum way.

Vacon and its partners back you up with service and support 24 h a day / 7 days a week.



Why use speed control?

- the most efficient way to control the flow of pumps and blowers
- energy savings and process improvement by adapting the flow to real need
- soft starts and stops protect piping system from spikes
- no need to use inefficient throttling valves for flow control

Vacon has introduced a perfect solution for controlling medium voltage AC drives with low voltage frequency converters and standard transformers. Frequency converters designed for medium voltage motors (3.6, 6 or 10 kV) are typically expensive and need a lot of space for assembly. In addition, there are few medium voltage drives available for lower power ratings such as 250 or 800 kW. Still, motors with those power ratings are fairly common in water and wastewater plants; also district heating plants use these for the main feeder pumps.

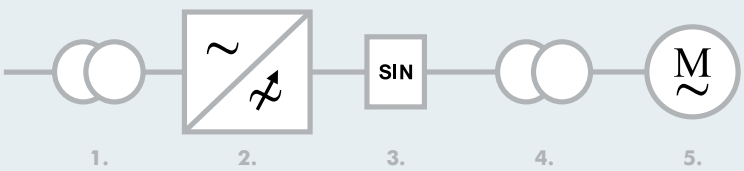
Controlling the flow by throttle is inefficient. A more efficient alternative is available: adjusting the speed of the motor by changing the supply frequency. The Vacon solution builds on the use of low voltage frequency converters and standard transformers. The transformers can be of dry-type e.g. cast resin or vacuum die cast or of oil-immersed type.

Benefits

- energy savings due to less consumption
- soft starts, no mechanical and electrical shocks
- no risk of damage to the motor, the sinus filter prevents voltage distortion
- easy to install, no need to replace the motor or the pump
- if and when the pump is going to be changed, it is also possible to change to a low voltage motor
- only a short interrupt time as the system can be pre-installed before changing the supply
- the transformers can be installed away from the frequency converters
- uses well proven low voltage technology
- Vacon 24-hour service network guarantees uninterrupted operation

The step-down transformer is for a 12- or 6-pulse rectifier.

Basic connection for a 6 kV AC motor and low voltage frequency converter



1. Step-down transformer 6/0.4 kV or 6/0.69 kV
2. Vacon CXC frequency converter
3. Vacon sinus filter
4. Step-up transformer 0.4/6 kV or 6/0.69 kV
5. 6 kV motor

Frequency converters are often used in processes of district heating plants.

Frequency converters with sinusoidal filters and transformers

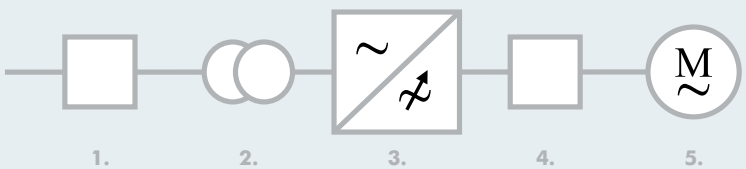
6-pulse 6/0.69 kV Step-down (kVA)	Transformer weight (kg)	Vacon frequency converter	Sinus filter	0.69/6 kV Step-up (kVA)	Transformer weight (kg)	Variable torque Motor / kW
370	1550	250	325SIN6B0	360	1500	315
470	1700	315	390SIN6B0	450	1650	400
590	2200	400	2 x 287SIN6B0	570	2000	500
740	2550	500	2 x 325SIN6B0	720	2500	630
940	3050	630	2 x 390SIN6B0	870	2950	800
1180	3150	900	3 x 325SIN6B0	1050	3300	1000
1470	3800	1250	3 x 430SIN6B0	1280	3950	1250

12-pulse 6/0.69 kV Step-down (kVA)	Transformer weight (kg)	Vacon frequency converter	Sinus filter	0.69/6 kV Step-up (kVA)	Transformer weight (kg)	Variable torque Motor / kW
370	1550	250	325SIN6B0	360	1500	315
470	1750	315	390SIN6B0	450	1650	400
590	2050	400	2 x 287SIN6B0	570	2000	500
740	2500	500	2 x 325SIN6B0	720	2500	630
940	3000	630	2 x 390SIN6B0	870	2950	800
1180	3100	900	3 x 325SIN6B0	1050	3300	1000
1470	3700	1250	3 x 430SIN6B0	1280	3950	1250

Impedance Zk: 5-6.5% for step-down and 5-7% for step-up transformers.
Transformer values calculated by Trafotek, Finland.

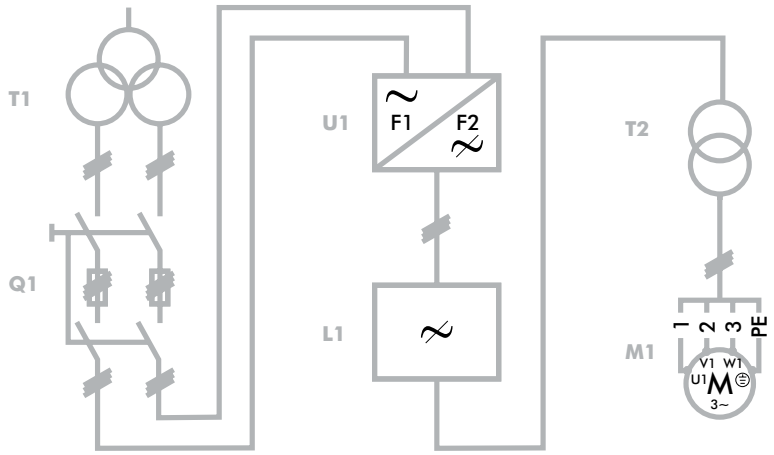
The step-down transformer is for a 12- or 6-pulse rectifier.

Basic connection for a low voltage 400 V or 690 V AC motor



1. 6 kV circuit breaker
2. Step-down transformer 6/0.4 kV or 6/0.69 kV
3. Vacon CXC frequency converter
4. Vacon sinus filter
5. 400 V or 690 V motor

Typical Vacon step-down step-up solution for 6 kV - 690 V - 6 kV



T1 6/0.69 kV

Q1 Circuit breaker

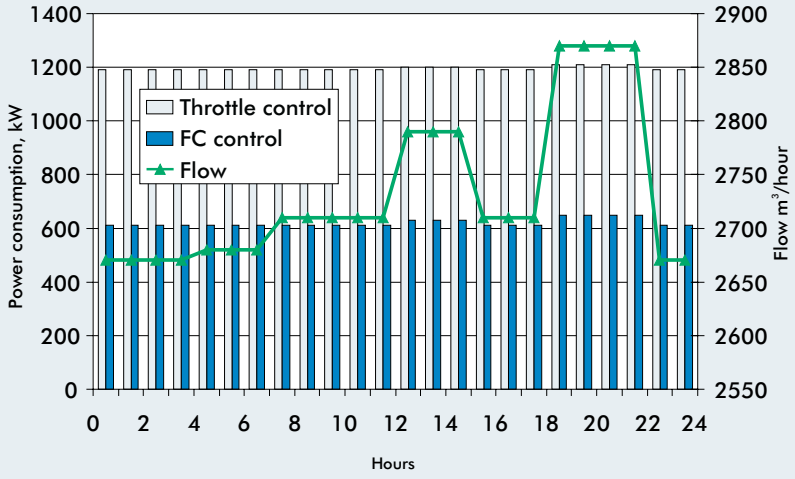
U1 FC 690 V

L1 Sinusoidal filter

T2 0.69/6 kV

M1 6 kV

Measured power consumption of a pump drive



Measured power consumption of a throttle controlled pump drive compared with that of a frequency converter controlled pump drive, along with an average hourly graph of water consumption.

Vacon Partner

Vacon Plc
P.O. Box 25 (Runsorintie 7)
FIN–65381 Vaasa, Finland
Phone: +358 (0)201 2121
Fax: +358 (0)201 212 205
www.vacon.com, vacon@vacon.com

BC00040A