MULTI-VE 11 to 22 kW

STAINLESS STEEL MULTI-STAGE VERTICAL PUMPS
with integrated EVS*
In-line Series - 50/60 Hz
2 ranges: stainless steel 304 and 316L
* Electronic Variation Speed

OPERATING LIMITS
Flow rates up to: 98 m³/h
Head up to: 250 m CE
Max. discharge pressure: 16 et 25 bar
Max. suction pressure: 10 bar
Temperature range: - 15° to +120°C*
Max. ambient temperature: + 40°C
ND of ports: 50 à 80

ADVANTAGES
• Reduction of mechanical and electrical constraints compared to a standard pump:
  - No more successive starts and stops,
  - flexible use, reduction of hammering and knocking,
  - limiting of starting current,
  - adjustment to installation by precise adjustment of speed and pressure.

• Reduction in sound levels by adapting pump speed to requirements.

• Easy installation and use thanks to simple implementation and operation.

• Savings:
  - Optimization of complete product pump + motor + converter guaranteeing energy savings.
  - A single pump covers a full range of standard pumps.
  - One contact, one supplier for a complete automatic system.

• Safety: on a booster set, each pump is equipped with a frequency converter so that the function is still provided if one of the converters is faulty.

APPLICATIONS
Pumping of clear unfilled liquids in housing, agricultural and industrial sectors.
• Supply - Boosting.
• Watering - Irrigation.
• High pressure washing.
• Heating - Air conditioning.
• Water treatment.

Incorporation into modular booster systems dedicated to building market.

Pumped fluids:
• Range 304: clear, non-aggressive (drinking water, water glycol)
• Range 316L: aggressive liquids (demineralized sea water, chlorinated water...)

MULTI-VE PN25
MULTI-VE 11 to 22 kW

**DESIGN**

- **Hydraulic part**
  - All stainless, centrifugal.
  - Multi-stage with 3 to 10 stages.
  - Vertical shaft, suction/discharge orifices IN-LINE in bottom section.
  - Shell equipped with round flanges NP25 and NP16.
  - Lower guide bearing above second stage.
  - Tightness at shaft passage by standardized mechanical packing.

- **Motor**
  Closed flange with standardized shaft end for vertical operation, equipped with EVS.
  Motor-pump link via coupling with safety protection.

**STANDARD CONSTRUCTION**

- **Range**
  - Stainless steel 304 SS 316L
  - 18/36/50 36/90

- **Main part**
  - Material
    - Sole fixing pump Cast iron EN GJL 250
    - Pump casing suction and discharge Cast iron EN GJL 250
    - Motor support lantern Cast iron EN GJL 250
    - Impellers SS 304 SS 316L
    - Cells (stage shell) SS 304 SS 316L
    - Ext. liner tube SS 304 SS 316L
    - Pump shaft SS 316 L SS 316L
    - Intermediate bearing Tungsten carbide
    - Mechanical seal Carbide Si/Carbon
    - O-rings EPDM* Viton**

**OPERATION**

Electronic speed variation is applied to the asynchronous motors of the MULTI-VE centrifugal pumps. The goal is to regulate the speed of the AC motor by converting voltage and frequency of the mains inputs from 380 to 440 V ± 6% at 50 or 60 Hz into a three-phase voltage system with variable frequency and amplitude.

The frequency converter then makes it possible to control the speed of the motor. This simultaneous action on the frequency and voltage is by means of two main elements:

- a diode rectifier
- a pulse width modulating inverter (MLI)

The AC voltage conducted through the diode bridge is converted into a rectified DC voltage. At this stage, to refine the quality of the DC voltage at the rectifier output, a set of capacitors and coils eliminates any residual ripple output from the rectifier. In this way, we obtain a smooth DC voltage called the “DC bus”.

With this development, the inverter definitively adjusts the voltage at the output of the variator to optimize the magnetizing of the motor. The set voltage at the inverter input is converted again into a variable voltage by acting as voltage pulses for a variable period of time via the transistors.

This principle is refer to as pulse width modulation. These transistors are controlled by the microcontroller which activates or deactivates them so as to vary the frequency at the variator output. The transistors (IGBT: Insulated Gate Bipolar Transistor) therefore operate by switching and act as switches to convert the DC voltage into a variable voltage. The IGBT switching activation frequency creates variable voltage and frequency magnitudes. The frequency must be high to eliminate the noise produce by magnetization.

**IDENTIFICATION**

- **Pump code** MULTI-VE 3603-7.5 F X V - T/2
- **Nominal flow (m³/h)**
- **Number of stages** 7.5 or 11; power for MULTI-VE 3603 only
  - O: Oval flanges NP16
  - F: Round flanges NP25
  - A: ANSI Flanges (Nema)
- **S**: St.Steel 304
- **X**: St.Steel 316L
- **E**: EPDM
- **V**: Viton
- **T**: 3-phase
- **T4 ≥ 5.5 kW (nothing = no motor)**
- **2**: 2 pole

* T° 120°C — **T° 90°C

**Range**

- Non-aggressive liquids
- Aggressive liquids

- **Main part**
  - Material
    - Sole fixing pump Cast iron EN GJL 250
    - Pump casing suction and discharge Cast iron EN GJL 250
    - Motor support lantern Cast iron EN GJL 250
    - Impellers SS 304 SS 316L
    - Cells (stage shell) SS 304 SS 316L
    - Ext. liner tube SS 304 SS 316L
    - Pump shaft SS 316 L SS 316L
    - Intermediate bearing Tungsten carbide
    - Mechanical seal Carbide Si/Carbon
    - O-rings EPDM* Viton**

**S**: Stainless steel 304 (X5CrNi18-10) or 316L (X2CrNiMo17.12.2) recommended materials offering high resistance to corrosion.

Clean conveyed liquids with fibers and containing little sand/silica (max concentration 40 g/m³).

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- **2**: 2 pole
The pump must be controlled by either a 0 - 10 V or 4 - 20 mA external signal.

The main application for these pumps is to install them in parallel to form a booster controlled by a variable speed control unit. This booster range is called the ALTI-E.

**CONTROL LAWS**

The pump's speed is varied through an external signal according to the 2 laws below, which are dependent on this type of input (voltage or current). In both cases, the pump will move along its own curve at between 40 and 100% of its speed in response to the external signal emitted.

- **0-10 V control**

  ![Graph](image)

  - The pump is not running
  - Control in %

- **0-20 mA control**

  ![Graph](image)

  - The pump is not running
  - Commande en %

**ADJUSTING OF THE SETPOINT PRESSURE**

- External order signal: 0-10 V or 4-20 mA

**MULTI-VE 11 to 22 kW**
DISPLAY

<table>
<thead>
<tr>
<th>LED condition</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lit</td>
<td>Flashing</td>
</tr>
<tr>
<td>LED 1 Red</td>
<td>Fault detected</td>
</tr>
<tr>
<td>LED 2 Green</td>
<td>The pump is running</td>
</tr>
<tr>
<td>LED 3 Green</td>
<td>Pump switched on</td>
</tr>
</tbody>
</table>

LED 1 : Red indicating a fault
LED 2 : Green indicating that the pump is in operation
LED 3 : Green indicating that the pump is switched on

INTEGRATED E.V.S. CONTROL

Maintenance troubleshooting
The frequency converter is equipped with fault analysis software allowing maintenance staff to perform a pre-diagnosis on the operation or non-operation of the pump.

When a fault appears, a counter starts and the number of faults is recorded. If the number of faults is less than 5, and if after 10 minutes no more faults have been detected, the number of faults recorded by the counter is reduced by 1 and the pump automatically restarts once the fault has disappeared. The pump automatically stops if this number is greater than 5 for 10 minutes.

Analysis is based on parameters such as:
- Motor temperature, converter temperature, over/under-intensity, power supply fault, short circuit, pump jammed, etc

AUXILIARY CONTACT

Centralized management
The pump speed variation unit is equipped with a “zero potential” contact output relay intended for a centralized management interface.

The relay is active when the pump is in operation or is able to operate.

The relay is deactivated on a first fault or a mains power cut.

It allows the control unit to be constantly informed of the pump’s availability.

Time

10 minutes
PUMP PERFORMANCE

ADVICE FOR CHOOSING A PUMP

A pump is represented by a network of curves corresponding to different frequencies (Hz) and therefore to different motor rotation speeds. The frequency is expressed as a %.

An ESV pump is represented by a network of curves; all the curves between 1 and 6 are covered.

With speed variation, the power input is adapted to the Q / H need required, resulting in large energy savings.

The NPSH of a MULTI-VE pump varies according to the curve on which it is placed. It is therefore important to know the desired pressure setpoint, especially for pumps used for suction on wells, and to take into account the pump’s NPSH at maximum frequency, in other words 100 %. The maximum suction height for this type of pump must not exceed 1 metre.

The benefits of speed variation are once again shown here by the yield, as the yield is optimum over a large flow rate range compared with a fixed speed pump.
MULTI-VE 11 to 22 kW

PRE-SELECTION GRAPH
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 1800 SERIE

MULTI-VE 1806-T-11

ISO 9906

Min. frequency
Frequency = 60%
Frequency = 70%
Frequency = 80%
Frequency = 90%
Frequency = 100%

Hm

Qm³/h

Imp.gpm

Hft

Qm³/h

P. abs. hyd.

NPSH

Eff.

Qm³/h
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 1800 SERIE

MULTI-VE 1808-T-15
ISO 9906

Min. frequency
Frequency = 60 %
Frequency = 70 %
Frequency = 80 %
Frequency = 90 %
Frequency = 100 %
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 1800 SERIE

- Min. frequency
- Frequency = 80 %
- Frequency = 70 %
- Frequency = 80 %
- Frequency = 90 %
- Frequency = 100 %
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 3600 SERIE

- Min. frequency
- Frequency = 60 %
- Frequency = 70 %
- Frequency = 80 %
- Frequency = 90 %
- Frequency = 100 %
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 3600 SERIE

- Min. frequency
- Frequency = 80 %
- Frequency = 70 %
- Frequency = 80 %
- Frequency = 90 %
- Frequency = 100 %
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 3600 SERIE

- Frequency = 60%
- Frequency = 70%
- Frequency = 80%
- Frequency = 90%
- Frequency = 100%

Qm³/h and Imp. gpm graph showing performance at various frequencies.
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 3600 SERIE

- Min. frequency
- Frequency = 60 %
- Frequency = 70 %
- Frequency = 80 %
- Frequency = 90 %
- Frequency = 100 %

Graph showing performance characteristics for different frequencies.
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 3600 SERIE
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 6000 SERIE

Min. frequency
- Frequency = 60 %
- Frequency = 70 %
- Frequency = 80 %
- Frequency = 90 %
- Frequency = 100 %
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 6000 SERIE

- Min. frequency
- Frequency = 60 %
- Frequency = 70 %
- Frequency = 80 %
- Frequency = 90 %
- Frequency = 100 %

- Qm³/h
- Imp.gpm
- Hz
- Hm
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 8000 SERIE
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 8000 SERIE
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 8000 SERIE

MULTI-VE 8004 - T - 22
ISO 9906

N.P.S.H

MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCE - 8000 SERIE

MULTI-VE 8004 - T - 22
ISO 9906

N.P.S.H
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCES - 100 00 SERIE
MULTI-VE 11 to 22 kW

HYDRAULIC PERFORMANCES - 100 00 SERIE
MULTI-VE 11 to 22 kW

ELECTRICAL DATA AND DIMENSIONS - 1800 SERIE

• PN 16/PN 25 (8")

<table>
<thead>
<tr>
<th>Order référence</th>
<th>Motor</th>
<th>Pump</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Hz</td>
<td>V</td>
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<td>MULTI-VE 1806...T4/2</td>
<td>16</td>
<td>50</td>
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<tr>
<td>MULTI-VE 1806...T4/2</td>
<td>25</td>
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<td>MULTI-VE 1808...T4/2</td>
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<tr>
<td>MULTI-VE 1810...T4/2</td>
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## ELECTRICAL DATA AND DIMENSIONS - 3600 SERIE

### Order référence

<table>
<thead>
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<th>Motor</th>
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<td>Freq. T.</td>
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<tr>
<td>Hz</td>
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<tr>
<td>without packaging</td>
<td>with packaging</td>
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<tr>
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</tr>
<tr>
<td>MULTI-VE 3604...T4/2</td>
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<td>MULTI-VE 3606...T4/2</td>
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<td>MULTI-VE 3607...T4/2</td>
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**MULTI-VE 11 to 22 kW**
## MULTI-VE 11 to 22 kW

### ELECTRICAL DATA AND DIMENSIONS - 6000 SERIE

- **PN 16/PN 25 (8")**

<table>
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</tr>
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<td>MULTI-VE 6004...T4/2</td>
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# ELECTRICAL DATA AND DIMENSIONS - 8000 SERIE

**PN 16/PN 25 (10”)**

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<th>In.</th>
<th>Freq.</th>
<th>T.</th>
<th>In.</th>
<th>P2</th>
<th>Casing motor</th>
<th>Flange</th>
<th>H</th>
<th>h2</th>
<th>ØM</th>
<th>X</th>
<th>Mass kg</th>
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<tr>
<td></td>
<td>NP</td>
<td>Hz</td>
<td>V</td>
<td>A</td>
<td>Hz</td>
<td>V</td>
<td>A</td>
<td>KW</td>
<td>motor</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>without pack.</td>
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<td>MULTI-VE8002-OGE-T4/2</td>
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<td>400</td>
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<td>60</td>
<td>380</td>
<td>21,2</td>
<td>11,00</td>
<td>160M2</td>
<td>FF300</td>
<td>1206,5</td>
<td>757</td>
<td>258</td>
<td>335</td>
</tr>
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<td>MULTI-VE8003/1-OGE-T4/2</td>
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<td>50</td>
<td>400</td>
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<td>60</td>
<td>380</td>
<td>28,4</td>
<td>15,00</td>
<td>160MX2 / L2</td>
<td>FF300</td>
<td>1303</td>
<td>842</td>
<td>313</td>
<td>365</td>
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<tr>
<td>MULTI-VE8004/2-OGE-T4/2</td>
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<td>50</td>
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<tr>
<td>MULTI-VE8004/2-FGE-T4/2</td>
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<tr>
<td>MULTI-VE8004-FGE-T4/2</td>
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<td>927</td>
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</tbody>
</table>
MULTI-VE 11 to 22 kW

**ELECTRICAL DATA AND DIMENSIONS - 100.00 SERIE**

<table>
<thead>
<tr>
<th>Order référence</th>
<th>Freq. p2 T. In.</th>
<th>Freq. T. In.</th>
<th>P2</th>
<th>Casing motor</th>
<th>Flange</th>
<th>H</th>
<th>h2</th>
<th>OM</th>
<th>X</th>
<th>Mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NP</td>
<td>Hz</td>
<td>V</td>
<td>A</td>
<td>Hz</td>
<td>V</td>
<td>A</td>
<td>KW</td>
<td>mm</td>
<td>mm</td>
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<td>380</td>
<td>37,3</td>
<td>22,00</td>
<td>180M2</td>
<td>FF300</td>
</tr>
</tbody>
</table>

**FEATURES**

**Assembly**
- Installation in an easily-reached place.
- Install a lifting hook in line with the pump for easy disassembly.
- Assembly on concrete block > 10 cm high with attachment by anchor bolts.
- An insulating material is required under the concrete base to prevent the transmitting of noises and vibrations.
- The installation should protect the pump against the bad weather and freezing (not of direct exposure to the rain or the sun).

**Packaging**
- Wooden crate;
- Supplied with seals and bolts, without counterflanges (optional).

**ACCESSORIES**
- Isolating valves
- Counter-flanges
- Anti-vibration sleeves
- Bladder vessel
- Non-return valves
- Foot valve strainer
- Water shortage protection