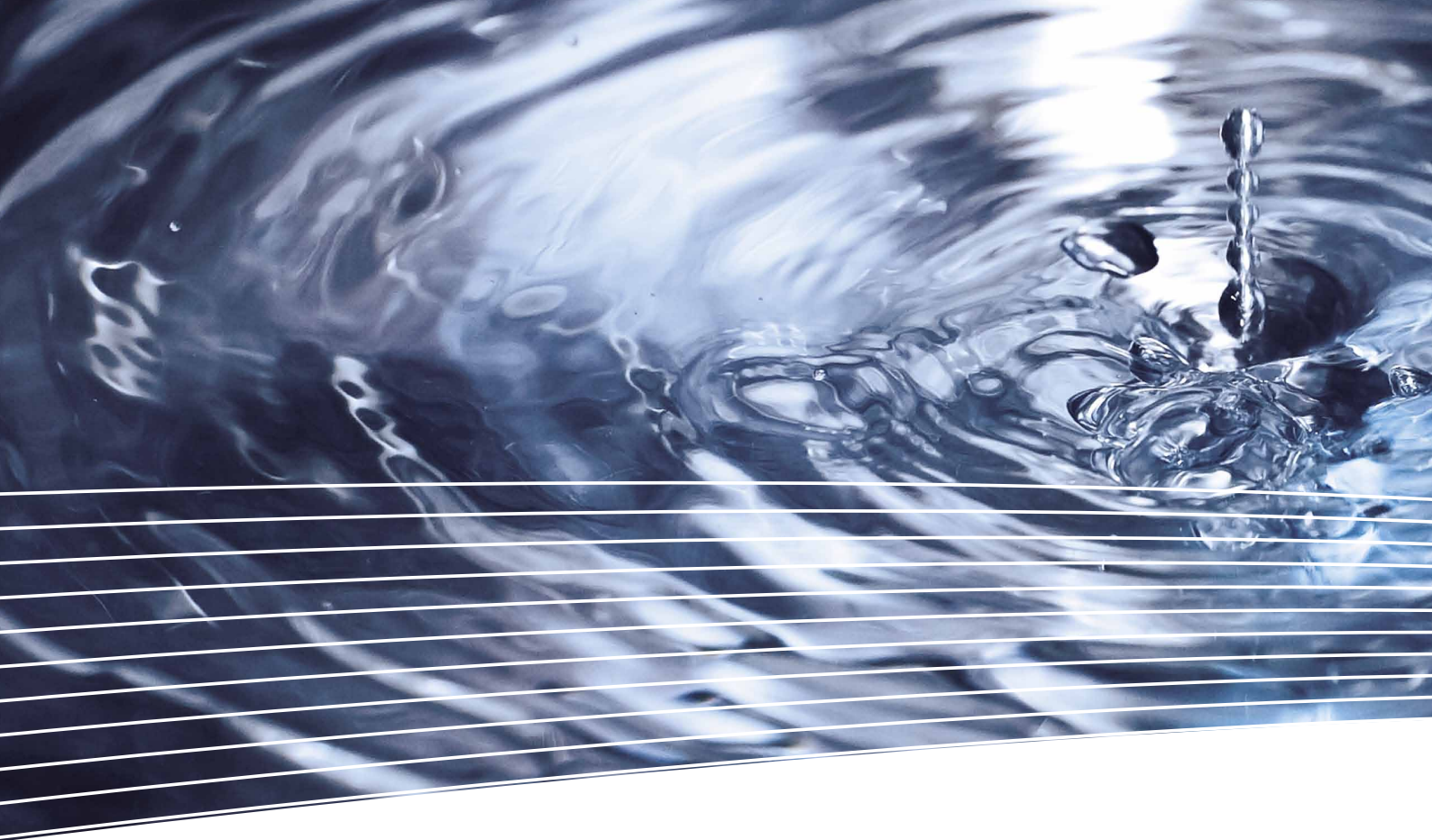




VACON[®] 100 FLOW
INTELLIGENT PROCESS CONTROL



TAKING CARE OF THE ESSENTIALS

The Water & Wastewater and Building Automation industries are two key ingredients in our everyday lives and yet so often go unnoticed. In fact, the only time most people become aware of them is when a problem arises somewhere along the line. VACON® 100 FLOW is designed to ensure pump and fan solutions control air- and waterflow quietly, efficiently and without interruptions.

EXPERTISE IN THE FIELD

VACON 100 FLOW builds on a long and illustrious track record in the industry. Vacon has produced a number of significant innovations ever since the company's founding in 1993. In 1995 we introduced a Multipump application. VACON 100 FLOW further develops Multimaster technology, first introduced in 2002, to provide functionalities that significantly extend flow systems' lifecycle and reduce operational costs. Compared to conventional control schemes, VACON® AC Drives are typically able to reduce energy costs by as much as 30% in pump and fan applications, usually offering a return on investment of less than a year.

GOING WITH THE FLOW

Pumps and fans control the flow of water and air through the pipes, vents and waterways that are often out of

sight, and yet remain central to our lives. Like in so many industrial processes, AC drives optimize these systems and make sure that processes use as little energy as possible. Pumping process water, cooling water and other fluids usually requires that pressure remains constant despite varying demand. VACON 100 FLOW comes equipped with a number of innovative functions that ensure you achieve this.

24/7 SERVICE AND SUPPORT

When it comes to flow control processes, it's critical for systems to run smoothly at all times. Since Vacon is the world's leading company that's whole focus is on AC drive solutions, it's only right that our aftermarket product care is second to none. We offer services that ensure products remain effective for as long as possible, so that repairs and downtime are kept to the bare minimum.



INTELLIGENT PUMP & FAN CONTROL

VACON® 100 FLOW is an AC drive dedicated to improving flow control in Water & Wastewater and Building Automation applications. It combines the core functionality of VACON® 100 with dedicated functions that are specifically designed with flow control application processes in mind. VACON 100 FLOW is available in a number of frame sizes with either IP21/UL Type 1 or IP54/UL Type 12 approved enclosures. It has a power range of 0.55 kW/0.75 HP to 160 kW/250 HP and a voltage range of 230 V to 500 V.

DEDICATED FUNCTIONALITY

VACON 100 FLOW places an emphasis on user-friendliness and functionalities created for use in pump & fan applications. We have used our extensive experience in the field to handpick all the features that are best suited to application requirements and putting them in one dedicated product. For instance, standard PID control eliminates the need for an external controller by using a sensor to control pump speed. This is useful when reacting to fluctuations in demand.

APPLICATION MENUS FOR WATER AND HVAC

StartUp Wizard and the Quick Setup menu make it easy for users to select the relevant parameters and monitoring values. Unique application menus guide the user through a quick and easy installation and commissioning, with all the relevant parameters presented to them without the need to navigate a long list. StartUp Wizard and the Quick Setup menu can be activated either through the detachable keypad or by using VACON® Live, Vacon's online PC programming tool for AC drives.

CONNECT TO YOUR CONTROL SYSTEM

All VACON 100 series AC drives are equipped with built-in Ethernet. This feature means that no additional options or gateways are needed to communicate with process automation. It also provides access for commissioning and maintenance through VACON Live and makes local or remote monitoring possible.

BUILT TO LAST WITHOUT INTERRUPTION

Unplanned downtime is a problem for all applications, not least pump and fan systems, which is why it is important that components have as long a lifecycle as possible. VACON 100 FLOW uses electrolytic-free DC link technology which guarantees users the longest possible lifecycle and availability. By avoiding the need to replace electrolytic capacitors — that often wear out over time — interruptions and costs are kept to a minimum.

EASY TO OPERATE

USER-FRIENDLY KEYPAD

Vacon has ensured that the user interface is simple and intuitive to use. You will enjoy the keypad's well-structured menu system which enables fast commissioning and trouble-free operation.

- Graphical and text keypad with multiple language support
- 9 signals can be monitored at the same time on a single multimonitor page is configurable to either 4, 6 or 9 signals
- 3 color LED status indicator on the control unit:
blinking green = ready; **green** = run;
yellow = alarm; **red** = fault
- Trend display for two signals at the same time



QUICK SET UP

Easy commissioning tools ensure a hassle-free set up whatever the application. Easy diagnostic with help in plain text is provided for each parameter, signal and fault.

StartUp Wizard — for fast setup of the drive

Fire Mode Wizard — for easy commissioning of Fire Mode function

Application selections — for easy commissioning of HVAC, PID, Multipump single drive and Multipump Multidrive applications

VACON 100® FLOW also features a real-time clock that supports calendar-based functions.

EASY INSTALLATION

- Both IP21/UL Type 1 and IP54/UL Type 12 units have the same footprint. Compact IP54/UL Type 12 units can be installed side-by-side to save a space.
- Frame sizes MR8 and MR9 are also available as IP00/UL Open Type for cabinet installation
- Flange mounting option for throughhole mounting, reducing heat loss and enclosure size
- Integrated lead-in grommets and 360 degree grounding ensure IP54/UL Type 12 and EMC compliance and lead to further cost savings.

DRIVE CUSTOMIZER

- Built-in functionality enables the drive to adapt to functions requiring I/O and control logic
- Wide array of logical and numerical functions which ensure specific user requirements are met
- No need for special tools or training
- Fully graphically configurable using VACON® Live

EASY TO INTEGRATE

FIELDBUS OPTIONS

- Easy integration with plant automation system using built-in Modbus RTU (RS485) or Modbus TCP (Ethernet)
- Integration over Profinet IO or Ethernet IP systems through software options
- Click-in fieldbus options facilitate integration to traditional systems using Profibus DP, DeviceNet, CANopen & LonWorks
 - Ensures increased control and monitoring with reduced cabling

Modbus TCP, Ethernet IP, Profinet IO, Modbus RTU, Profibus DP, DeviceNet, LonWorks, CANOpen, BACnet MSTP, BACnet IP, Metasys N2

BUILT-IN ETHERNET

- No additional options or gateways needed
- Access provided for commissioning and maintenance through VACON® Live
- Local or remote monitoring possible

SAFE TORQUE OFF, ATEX THERMISTOR INPUT

- STO prevents drive from generating torque on the motor shaft or unintentionally starting
- Eliminates separate components and the need to wire and service them
- Certified and compliant with European ATEX directive, 94/9/EC for temperature supervision of motors that are placed in potentially hazardous areas
- Available with option board

VACON® SAVE

VACON Save is a savings calculator for pump, fan and compressor applications which can be used to estimate cost and energy savings. It's a great tool for customers who are looking to work out the best and most economical pump and fan solution. Downloadable from www.vacon.com





MULTIPUMP CONTROL SOLUTIONS

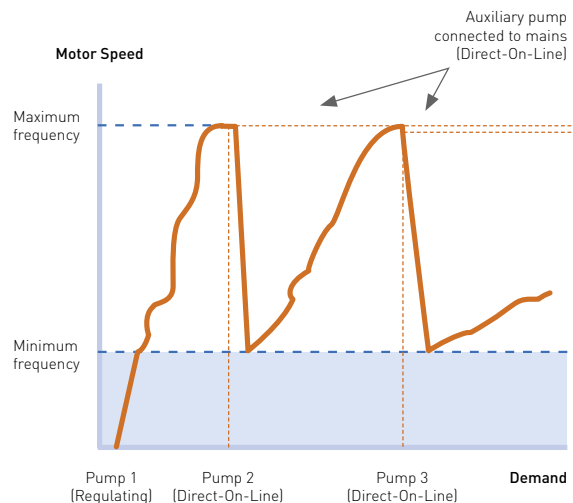
Vacon has long provided pump and fan solutions which ensure that users get the best functionality and cost-efficiency out of their process. We are able to offer three Multipump control solutions, each of which offers unsurpassed control of flow and pressure.

Demand for water or ventilation fluctuates throughout the course of a day. For instance, demand for running water in a major city usually peaks in the morning, as a great number of inhabitants are in the shower preparing for the working day. Conversely, in the middle of the night next to no water is being used.

By using several pumps as opposed to a single one, higher redundancy and efficiency is achieved since the load is lightened by being spread across several pumps. It also makes for greater redundancy – if one pump fails, the others can take on its load.

SINGLE DRIVE SYSTEM

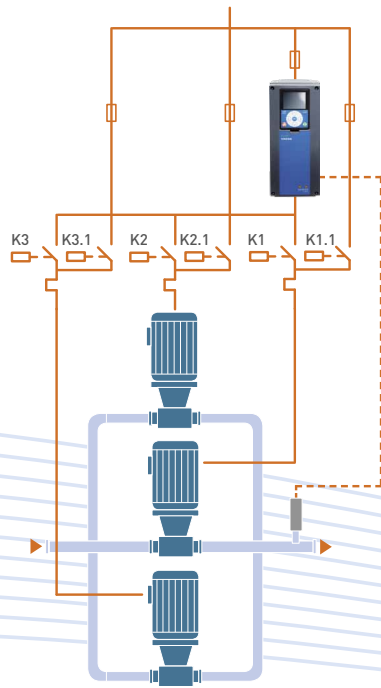
Multipump control is a single-drive solution in which one AC drive controls the leading pump. If the demand exceeds the capabilities of the pump, additional fixed-speed pumps can be connected online directly or with a soft starter. You can choose between fixed setups and solutions in which the leading and auxiliary pumps alternate in roles to equalize wear and tear.



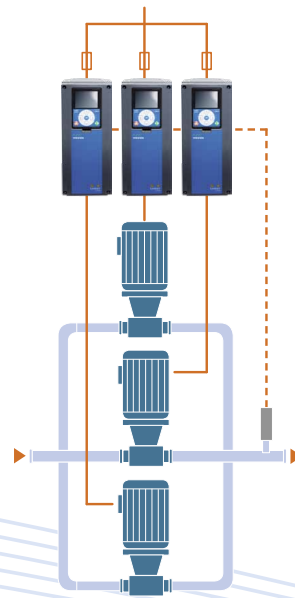
Single drive Multipump

SINGLE DRIVE SYSTEM IN BRIEF

- Maximum 8 pumps
- No need for an external controller
- Alternation of all pumps or only auxiliary pumps



Single drive system

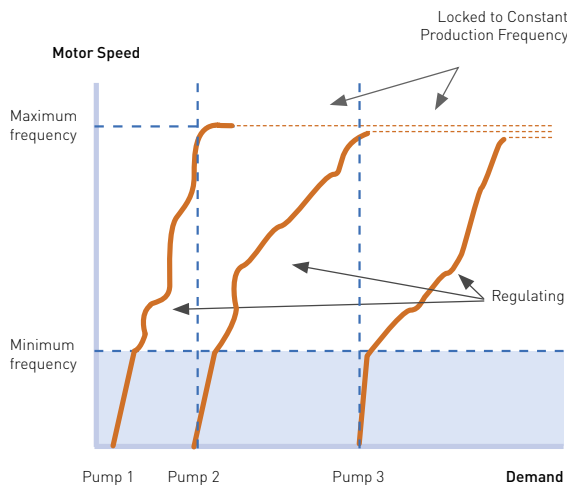


Multi drive system

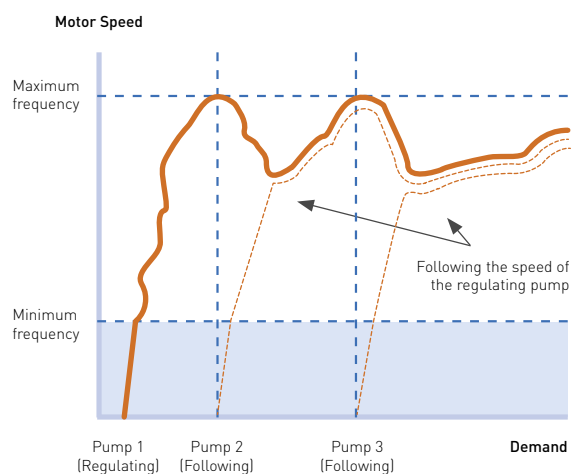
MULTIDRIVE SYSTEMS

In **Multimaster** technology, each pump is controlled by its own AC drive. The integrated RS-485 interface allows the drives to communicate without the need for any external controller. As demand increases, the leading drive increases its speed until the capacity is exceeded, at which point the excess load is transferred to the next drive in the series. This method ensures pumps start and stop smoothly, and reduces the need for additional control wiring, motor protection relay and contactors.

Multifollower mode follows the same principle as Multimaster in that each pump is controlled by its own AC drive. Where this system differs is that, as demand increases and the lead drive's capacity is exceeded, additional drives running in parallel are brought into operation. This ensures that all pumps run at the same operating speed, reducing noise and general stress, thus improving reliability.



Multimaster



Multifollower

MULTIDRIVE SYSTEMS IN BRIEF

- Maximum 8 pumps
- No need for an external controller
- Communication between drives using integrated RS-485

WHAT'S IN IT FOR YOU

MULTIPUMP FEATURES

| FUNCTION | DESCRIPTION | BENEFITS |
|--|--|---|
| Multipump single drive | Multipump solution with one drive and auxiliary pumps running at fixed speeds | Simplest multipump solution |
| Multipump Multifollower | Intelligent multipump solution using parallel pumps with comprehensive speed control | Efficient pumping and minimal noise for systems with large flow variations. |
| Multipump Multimaster | Intelligent speed control of parallel pumps with speed control of all pumps | Efficient pumping in systems with large flow variations |
| Multipump interlocking of pumps | Able to disconnect pumps from multipump system using a digital signal | Avoid unnecessary downtime during pump system maintenance |
| Multipump diagnostics | Monitor usage period and number of starts for each pump | Enables preventive maintenance based on pump usage |
| Anti-blocking system | Ensures inactive pumps are run at regular intervals to avoid deterioration. | High level of redundancy ensures pumps remain in good condition |
| Multipump overpressure protection | Fast disconnect of pumps during periods of high line pressure | Reduces the risk of overpressure in case of sudden flow reduction |
| Pump alternation within multipump systems | Alternates multipump control sequence | Usage spread equally across all pumps |
| Real-time clock based multipump alternation | Alternates pumps at designated times | Spreads load across pumps to reduce wear and tear |

PUMPING FEATURES

| FUNCTION | DESCRIPTION | BENEFITS |
|-------------------------------------|--|--|
| PID controller | Built-in controller that controls drive speed to maintain constant pressure | No need for external controllers |
| Second PID controller | Built-in controller that can be used to control external equipment | Saves the need of using external controllers |
| 2-Zone PID control | Control of two parallel process values | Better process control when two values are needed simultaneously |
| Frost protection for pump | Temperature-sensitive sleep mode for pump | Reduces risk of frost-induced damages to pump |
| Pressure loss compensation | Compensates pressure loss in piping when pressure sensor is close to pump | Stabilizes pressure in systems with long pipes |
| Start boost | Increased starting torque | Ensures that pump starts reliably |
| Sleep boosting | Increases system pressure before entering sleep mode | Maximizes pressure buffering time before wakeup e.g. in hydrofor applications |
| No demand detection | Ensures pump pressure is speed-responsive | Ensures that the pump does not run at unnecessarily high speeds, reducing energy consumption |
| Soft filling of pipe | Runs the pump at low speed until a pressure increase indicates the pipe is full | Reduces the risk of water hammers in the piping system |
| Dry pump supervision | Stops pump when there is not enough torque on the motor shaft | Protects the pump from damage from long dry runs |
| Priming pump | Control of additional priming pump with relay output | Main pump and piping automatically filled with water during startup |
| Jockey pump | Control of small jockey pump during low flow hours to maintain pressure | Main pump can be disconnected during periods of low demand |
| Auto-cleaning / anti-ragging | Detects when pump torque is increasing due to blocked pump and runs a user-defined cleaning sequence | Reduces risk of unplanned downtime in wastewater applications |

RATINGS AND DIMENSIONS

MAINS VOLTAGE 208—240 V, 50/60 HZ, 3~

| AC drive type | Loadability | | Max Current I _s | Motor shaft power | | Frame size | Dimensions WxHxD (mm) WxHxD (inch) | Weight (kg) (lbs) |
|---------------------------------|----------------------------------|--------------------------|----------------------------|------------------------|-------------------------|------------|--|-------------------------|
| | Cont. current I _L [A] | 10% overload current [A] | | 10% overload 40°C [kW] | 10% overload 104°F [HP] | | | |
| VACON 0100-3L-0003-2-FLOW | 3.7 | 4.1 | 5.2 | 0.55 | 0.75 | MR4 | 128x328x190 5x12.9x7.5 | 6.0 13.0 |
| VACON 0100-3L-0004-2-FLOW | 4.8 | 5.3 | 7.4 | 0.75 | 1.0 | | | |
| VACON 0100-3L-0007-2-FLOW | 6.6 | 7.3 | 9.6 | 1.1 | 1.5 | | | |
| VACON 0100-3L-0008-2-FLOW | 8.0 | 8.8 | 13.2 | 1.5 | 2.0 | | | |
| VACON 0100-3L-0011-2-FLOW | 11.0 | 12.1 | 16.0 | 2.2 | 3.0 | | | |
| VACON 0100-3L-0012-2-FLOW | 12.5 | 13.8 | 19.2 | 3.0 | 4.0 | | | |
| VACON 0100-3L-0018-2-FLOW | 18.0 | 19.8 | 25.0 | 4.0 | 5.0 | MR5 | 144x419x214 5.7x16.5x8.4 | 10.0 22.0 |
| VACON 0100-3L-0024-2-FLOW | 24.0 | 26.4 | 36.0 | 5.5 | 7.5 | | | |
| VACON 0100-3L-0031-2-FLOW | 31.0 | 34.1 | 46.0 | 7.5 | 10.0 | | | |
| VACON 0100-3L-0048-2-FLOW | 48.0 | 52.8 | 62.0 | 11.0 | 15.0 | MR6 | 195x557x229 7.7x21.9x9 | 20.0 44.0 |
| VACON 0100-3L-0062-2-FLOW | 62.0 | 68.2 | 96.0 | 15.0 | 20.0 | | | |
| VACON 0100-3L-0075-2-FLOW | 75.0 | 82.5 | 124.0 | 18.5 | 25.0 | MR7 | 237x660x259 9.3x26x10.2 | 37.5 83.0 |
| VACON 0100-3L-0088-2-FLOW | 88.0 | 96.8 | 150.0 | 22.0 | 30.0 | | | |
| VACON 0100-3L-0105-2-FLOW | 105.0 | 115.5 | 176.0 | 30.0 | 40.0 | | | |
| VACON 0100-3L-0140-2-FLOW | 140.0 | 154.0 | 210.0 | 37.0 | 50.0 | MR8 | 290x966x343 11.4x38x13.5 | 66.0 145.5 |
| VACON 0100-3L-0170-2-FLOW | 170.0 | 187.0 | 280.0 | 45.0 | 60.0 | | | |
| VACON 0100-3L-0205-2-FLOW | 205.0 | 225.5 | 340.0 | 55.0 | 75.0 | | | |
| VACON 0100-3L-0261-2-FLOW | 261.0 | 287.1 | 410.0 | 75.0 | 100.0 | MR9 | 480x1150x365 18.9x45.3x14.4 | 108.0 238.0 |
| VACON 0100-3L-0310-2-FLOW | 310.0 | 341.0 | 502.0 | 90.0 | 125.0 | | | |
| VACON 0100-3L-0140-2-FLOW +IP00 | 140.0 | 154.0 | 210.0 | 37.0 | 50.0 | MR8* | 290x794x343 11.4x31.3x13.5 | 62.0 136.7 |
| VACON 0100-3L-0170-2-FLOW +IP00 | 170.0 | 187.0 | 280.0 | 45.0 | 60.0 | | | |
| VACON 0100-3L-0205-2-FLOW +IP00 | 205.0 | 225.5 | 340.0 | 55.0 | 75.0 | | | |
| VACON 0100-3L-0261-2-FLOW +IP00 | 261.0 | 287.1 | 410.0 | 75.0 | 100.0 | MR9* | 480x970x365 18.9x38.2x14.4 | 97.0 213.8 |
| VACON 0100-3L-0310-2-FLOW +IP00 | 310.0 | 341.0 | 502.0 | 90.0 | 125.0 | | | |

* Frame sizes MR8 and MR9 are available as IP00/UL Open Type for cabinet installation

MAINS VOLTAGE 380—500 V, 50/60 HZ, 3~

| AC drive type | Loadability | | Max Current I _s | Motor shaft power | | Frame size | Dimensions WxHxD (mm) WxHxD (inch) | Weight (kg) (lbs) |
|---------------------------------|----------------------------------|--------------------------|----------------------------|------------------------|-------------------------|------------|--|-------------------------|
| | Cont. current I _L [A] | 10% overload current [A] | | 10% overload 40°C [kW] | 10% overload 104°F [HP] | | | |
| VACON 0100-3L-0003-5-FLOW | 3.4 | 3.7 | 5.2 | 1.1 | 1.5 | MR4 | 128x328x190 5x12.9x7.5 | 6.0 13.0 |
| VACON 0100-3L-0004-5-FLOW | 4.8 | 5.3 | 6.8 | 1.5 | 2.0 | | | |
| VACON 0100-3L-0005-5-FLOW | 5.6 | 6.2 | 8.6 | 2.2 | 3.0 | | | |
| VACON 0100-3L-0008-5-FLOW | 8.0 | 8.8 | 11.2 | 3.0 | 4.0 | | | |
| VACON 0100-3L-0009-5-FLOW | 9.6 | 10.6 | 16.0 | 4.0 | 5.0 | | | |
| VACON 0100-3L-0012-5-FLOW | 12.0 | 13.2 | 19.2 | 5.5 | 7.5 | | | |
| VACON 0100-3L-0016-5-FLOW | 16.0 | 17.6 | 24.0 | 7.5 | 10.0 | MR5 | 144x419x214 5.7x16.5x8.4 | 10.0 22.0 |
| VACON 0100-3L-0023-5-FLOW | 23.0 | 25.3 | 32.0 | 11.0 | 15.0 | | | |
| VACON 0100-3L-0031-5-FLOW | 31.0 | 34.1 | 46.0 | 15.0 | 20.0 | | | |
| VACON 0100-3L-0038-5-FLOW | 38.0 | 41.8 | 62.0 | 18.5 | 25.0 | MR6 | 195x557x229 7.7x21.9x9 | 20.0 44.0 |
| VACON 0100-3L-0046-5-FLOW | 46.0 | 50.6 | 76.0 | 22.0 | 30.0 | | | |
| VACON 0100-3L-0061-5-FLOW | 61.0 | 67.1 | 92.0 | 30.0 | 40.0 | | | |
| VACON 0100-3L-0072-5-FLOW | 72.0 | 79.2 | 122.0 | 37.0 | 50.0 | MR7 | 237x660x259 9.3x26x10.2 | 37.5 83.0 |
| VACON 0100-3L-0087-5-FLOW | 87.0 | 95.7 | 144.0 | 45.0 | 60.0 | | | |
| VACON 0100-3L-0105-5-FLOW | 105.0 | 115.5 | 174.0 | 55.0 | 75.0 | | | |
| VACON 0100-3L-0140-5-FLOW | 140.0 | 154.0 | 210.0 | 75.0 | 100.0 | MR8 | 290x966x343 11.4x38x13.5 | 66.0 145.5 |
| VACON 0100-3L-0170-5-FLOW | 170.0 | 187.0 | 280.0 | 90.0 | 125.0 | | | |
| VACON 0100-3L-0205-5-FLOW | 205.0 | 225.5 | 340.0 | 110.0 | 150.0 | | | |
| VACON 0100-3L-0261-5-FLOW | 261.0 | 287.1 | 410.0 | 132.0 | 200.0 | MR9 | 480x1150x365 18.9x45.3x14.4 | 108.0 238.0 |
| VACON 0100-3L-0310-5-FLOW | 310.0 | 341.0 | 502.0 | 160.0 | 250.0 | | | |
| VACON 0100-3L-0140-5-FLOW +IP00 | 140.0 | 154.0 | 210.0 | 75.0 | 100.0 | MR8* | 290x794x343 11.4x31.3x13.5 | 62.0 136.7 |
| VACON 0100-3L-0170-5-FLOW +IP00 | 170.0 | 187.0 | 280.0 | 90.0 | 125.0 | | | |
| VACON 0100-3L-0205-5-FLOW +IP00 | 205.0 | 225.5 | 340.0 | 110.0 | 150.0 | | | |
| VACON 0100-3L-0261-5-FLOW +IP00 | 261.0 | 287.1 | 410.0 | 132.0 | 200.0 | MR9* | 480x970x365 18.9x38.2x14.4 | 97.0 213.8 |
| VACON 0100-3L-0310-5-FLOW +IP00 | 310.0 | 341.0 | 502.0 | 160.0 | 250.0 | | | |

* Frame sizes MR8 and MR9 are available as IP00/UL Open Type for cabinet installation

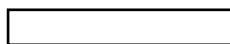
TECHNICAL DATA

| | | |
|----------------------------------|---|---|
| Mains connection | Input voltage U _{in} | 208...240 V; 380...500 V; -10%...+10% |
| | Input frequency | 47 - 65Hz |
| | Connection to mains | Once per minute or less |
| | Starting delay | 4 s [MR4 to MR6]; 6 s [MR7 to MR9] |
| Motor connection | Output voltage | 0-U _{in} |
| | Continuous output current | IL: Ambient temperature up to 40°C (104°F) overload 1.1 x IL (1 min./10 min). |
| | Output frequency | 0...320 Hz (standard) |
| | Frequency resolution | 0.01 Hz |
| Control characteristics | Switching frequency | 1.5...10 kHz; Automatic switching frequency reduction in case of overheating |
| | Frequency reference | Resolution 0.01 Hz |
| | Analog input | Resolution 0.1% (10-bit) |
| | Field weakening point | 8...320 Hz |
| | Acceleration time | 0.1...3000 sec |
| | Deceleration time | 0.1...3000 sec |
| Ambient conditions | Ambient operating temperature | IL : -10°C (-14°F) (no frost)... +50°C (122°F) Above +40°C (104°F) derating 1,5% per degree/°C |
| | Storage temperature | -40°C (-40°F)...+70°C (158°F) |
| | Relative humidity | 0 to 95% RH, non-condensing, non-corrosive |
| | Air quality: • Chemical vapors • Mechanical particles | EN/IEC 60721-3-3, unit in operation, class 3C3 (IP21/UL Type 1 Models 3C2) EN/IEC 60721-3-3, unit in operation, class 3S2 |
| | Altitude | 100% load capacity (no derating) up to 1.000 m (3280 ft) 1% derating for each 100 m (328 ft) above 1.000 m (3280 ft) Max. altitudes: 4000 m [13123 ft] (TN and IT systems) 240V relay voltage up to 3000m [9842 ft] from 3000 m ...4000m [9842 ft ... 13123 ft] 120V relay voltage can be used. |
| | Vibration | EN/IEC 61800-5-1 EN/IEC 60068-2-6 |
| | Shock | EN/IEC 61800-5-1 EN/IEC 60068-2-27 |
| | Enclosure class | IP21/UL Type 1 standard in entire range IP54/UL Type 12 option IP00/UL Open Type option for frames MR8, MR9 |
| EMC (at default settings) | Immunity | Fulfils EN/IEC 61800-3, first and second environment |
| | Emissions | EN/IEC 61800-3, Category C2 Vacon 100 will be delivered with class C2 EMC filtering, if not otherwise specified. Vacon 100 can be modified for IT networks |
| Emissions | Average sound pressure level in dB(A) (1 m from the drive) | MR4: 45...56 MR5: 57...65 MR6: 63...72 MR7: 43...73 MR8: 58...73 MR9: 54...75 Sound pressure depends on the cooling fans speed which is controlled in accordance with the drive temperature. |
| Safety and Approvals | | EN/IEC 61800-5-1, EN/IEC 61800-3, EN/IEC 61000-3-12, UL 508 C, CE, UL, cUL, GOST-R, C-Tick; (see unit nameplate for more detailed approvals) |
| Functional safety * | STO | EN/IEC 61800-5-2 Safe Torque Off (STO) SIL3, EN ISO 13849-1 PL“e” Category 3, EN 62061: SILCL3, IEC 61508: SIL3. |
| | ATEX Thermistor input | 94/9/EC, CE 0537 Ex 11 (2) GD |

* Optional

TYPE CODE KEY

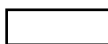
VACON 0100 - 3L - 0009 - 5 - FLOW + OPTION CODES



Product



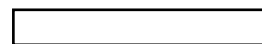
Input phase



Current rating



Voltage rating



+ Options

I/O CONFIGURATIONS & OPTIONS

| Basic I/O board | | | | | |
|-----------------|----------------------|----------------------------------|----------|---------------------|-----------------------------------|
| Terminal | Signal | | Terminal | Signal | |
| 1 | +10 V _{ref} | Reference output | 12 | 24 V _{out} | 24 V aux. voltage |
| 2 | AI1+ | Analog input, voltage or current | 13 | GND | I/O ground |
| 3 | AI1- | Analog input common (current) | 14 | DI4 | Digital input 4 |
| 4 | AI2+ | Analog input, voltage or current | 15 | DI5 | Digital input 5 |
| 5 | AI2- | Analog input common (current) | 16 | DI6 | Digital input 6 |
| 6 | 24 V _{out} | 24 V aux. voltage | 17 | CM | Common A for DI1-DI6 |
| 7 | GND | I/O ground | 18 | AO1+ | Analog signal (+output) |
| 8 | DI1 | Digital input 1 | 19 | AO-/GND | Analog output common |
| 9 | DI2 | Digital input 2 | 30 | +24 V _m | 24 V auxiliary input voltage |
| 10 | DI3 | Digital input 3 | A | RS485 | Differential receiver/transmitter |
| 11 | CM | Common A for DI1-DI6 | B | RS485 | Differential receiver/transmitter |

| Standard relay board | | | Optional relay board * | | |
|----------------------|----------|----------------|------------------------|----------|------------------|
| Terminal | +SBF3 | | Terminal | +SBF4 | |
| 21 | R01/1 NC | Relay output 1 | 21 | R01/1 NC | Relay output 1 |
| 22 | R01/2 CM | | 22 | R01/2 CM | |
| 23 | R01/3 NO | | 23 | R01/3 NO | |
| 24 | R02/1 NC | Relay output 2 | 24 | R02/1 NC | Relay output 2 |
| 25 | R02/2 CM | | 25 | R02/2 CM | |
| 26 | R02/3 NO | | 26 | R02/3 NO | |
| 32 | R03/1 CM | Relay output 3 | 28 | TI1+ | Thermistor input |
| 33 | R03/2 NO | | 29 | TI1- | |

* Standard relay board SBF3 (3XR0) can be replaced by SBF4 (2 x RO + Thermistor)

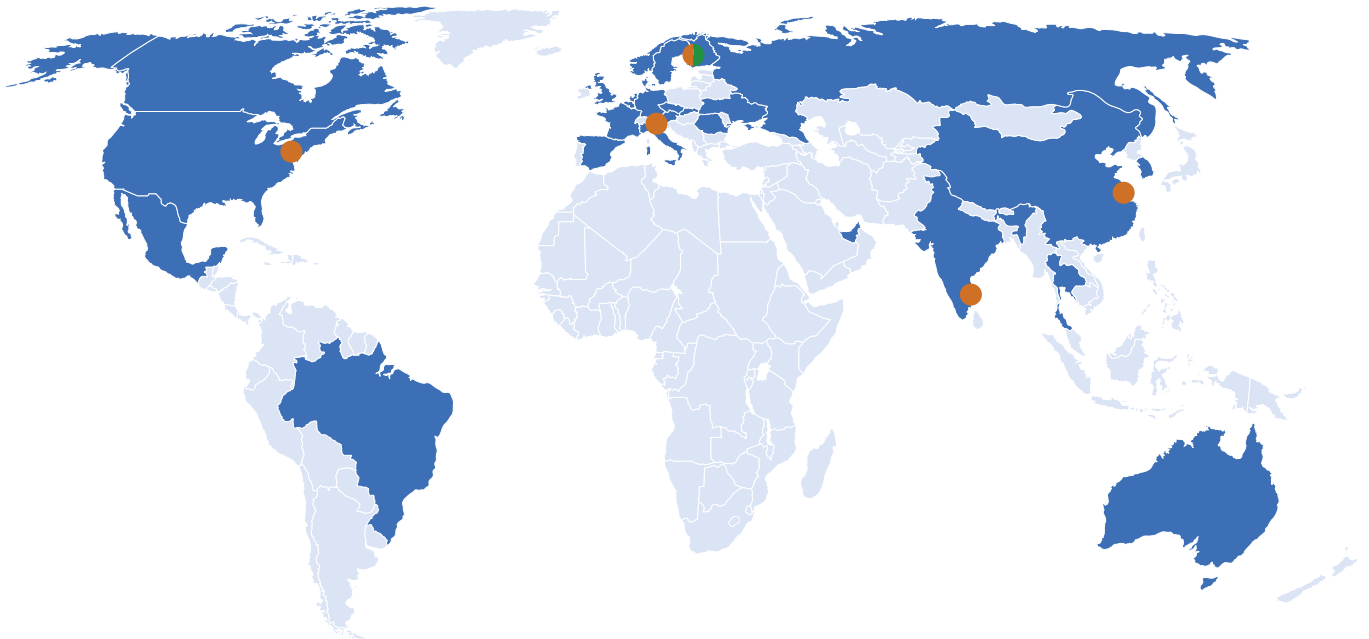
| Ethernet Terminal | |
|-------------------|------------------------|
| Terminal | Signal |
| RJ45 | Ethernet 10/100 Mbit/s |

| Factory options | Description |
|-------------------|---|
| +SBF4 | 2 x Ro + Thermistor (Replaces 3 relay standard board) |
| +IP54 | IP54 / UL Type 12 |
| +IP00 | IP00 / UL Open Type (for MR8 and MR9) |
| +SRBT | Real-time clock battery |
| ENC-QFLG-MR | Flange mounting kit for MR4-7 |
| +HMTX | Text keypad |
| +HMPA | Panel adapter |
| +S_B1 | 6 x DI/DO option board |
| +S_B2 | 2 x RO + Thermistor option board |
| +S_B4 | 1 x AI, 2 x AO option board |
| +S_B5 | 3 x RO option board |
| +S_B9 | 1 x RO, 5 x DI (42-240 VAC) option board |
| +S_BF | 1 x AO, 1 x DO, 1 x RO option board |
| +S_BH | Temperature measurement option board (PT100, PT1000, NI1000, KTY84-130, KTY84-150, KTY84-131) |
| +S_E3 | Profibus DPV1 option board |
| +S_E5 | Profibus DPV1 (D9) option board |
| +S_E6 | CANopen option board |
| +S_E7 | DeviceNET option board |
| +S_BJ | Safe Torque Off/ATEX option board |
| +FBIE | Ethernet IP and Profinet IO (software option onboard) |
| +QFLG | Flange mounting (MR4-MR7, for MR8 and MR9 with IP00) |
| +QGLC | Conduit plate with inch holes |
| +EMC4 | Change to EMC-level c4 for IT networks |
| Language packages | |
| +FL01 | English, German, Italian, French, Finnish, Swedish |
| +FL02 | English, German, Finnish, Danish, Swedish, Norwegian |
| +FL03 | English, Spanish, French, Italian, Dutch, Portuguese |
| +FL04 | English, German, Czech, Polish, Russian, Slovakian |
| +FL05 | English, German, Estonian, Hungarian, Romanian, Turkish |

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