VARIABLE SPEED DRIVES

VLA1 SERIES

Lovato electric
ENERGY AND AUTOMATION
**Variable speed drives**

**VLA1 series**

**SIMPLE | COMPACT | VERSATILE | TOP performance**

- Single-phase input 200...240VAC (50/60Hz)
- Three-phase output 240VAC max.
- Three-phase motor power from 0.25 to 2.2kW (240VAC)

**VERSATILITY AND TOP PERFORMANCE**

VLA1 is a variable speed drive with single-phase input. The different integrated motor control modes and the wide range of functions available make it extremely versatile for a wide range of applications, such as pump and fan control, automatic door management, assembly or packaging machines, packing machines, conveyor belts and many more.

**COMPACT DIMENSIONS AND "SIDE BY SIDE" INSTALLATION**

The container with "book" format only 60 mm wide for the whole range makes it extremely compact. It is also possible to install several drives side by side without gaps to minimize space requirements.

**IE2 efficiency class (EN50598-2)**

The drive efficiency is 25% higher than the reference value for the IE1 class.

- The parameters are divided into groups of the same type (e.g. group for configuration of motor parameters, group for configuration of basic parameters, group for configuration of I/O functions, group for configuration of PID control, etc...) making navigation faster and more intuitive.
- It is also possible to custom configure a group of “favourite” parameters by selecting the most common parameters.

**SIMPLE AND FLEXIBLE PROGRAMMING**

- **Example “acceleration time”**
  - Group 2 (basic setup).
  - Parameter 20.

**EASY NAVIGATION**

<table>
<thead>
<tr>
<th>Parameter hierarchy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter group name</td>
</tr>
<tr>
<td>Group 2</td>
</tr>
<tr>
<td>Parameter name</td>
</tr>
<tr>
<td>P22000</td>
</tr>
<tr>
<td>Values</td>
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<tr>
<td>50</td>
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</tbody>
</table>

**IE1**

**IE0**

**IE2**

**EN 50598-2**

**CLASS energy efficiency**

The drive efficiency is 25% higher than the reference value for the IE1 class.

**Example “acceleration time”**
- Group 2 (basic setup).
- Parameter 20.
DISPLAY AND KEYBOARD
The keyboard with display supplied as standard allows simple and intuitive programming of the drive.

- The alphanumeric display allows you to view not only the code but also a text description of the parameter being modified, helping the user to understand the function being configured even without the need for a manual.
- In addition to the basic buttons for navigating the programming menus, the keyboard has two additional buttons for immediate activation of the full control for the drive from the keypad (to start the motor using the start and stop keys on board and adjust the frequency using the arrow keys, regardless of the settings configured) and to reverse the motor direction of rotation.

MOTOR CONTROL MODES
- Speed control:
  - Linear V/f
  - Square V/f for pumps and fans
- Torque control:
  - Open ring vector control (sensorless)
  - Torque setpoint.

USB COMMUNICATION MODULE
As an alternative to the programming via the keypad with display supplied as standard, the drive can be programmed from a PC via the USB communication module code VLAX C02.

It is possible to exchange the display keyboard (VLAX C01) with the USB module (VLAX C02) at any time, even without interrupting the power supply of the drive.
You can do this via the USB module:
- access the parameters without powering the drive
- set the parameters simply and repeatedly using VLBX SW software
- carry out operating diagnostics (trends, measurement monitoring, PID parameter control, etc.).

EMC SPECIFICATIONS
Integrated EMC filters (EN 61800-3) cat. C2 for motor cable length:
- up to 5m for 0.25 and 0.4kW sizes
- up to 20m for 0.75, 1.5 and 2.2kW sizes.

Integrated filter can be deactivated in case of IT networks

SEQUENCER
The user can program frequency/time cycles consisting of different steps each characterized by motor speed and duration.

PID CONTROL
In some applications, such as pump or fan control, the output frequency from the drive is determined by the objective of maintaining constant pressures or flows. Typically, through the analogue input, the current value of the quantity to be controlled is read (feedback) and with PID back control the drive sets the motor speed in order to reach the target value (setpoint).

The PID control also includes the functions of:
- **sleep**: if the calculated frequency is lower than a settable limit, or if the motor speed approaches the minimum allowable speed indicating no propulsion is required, the drive stops the motor to avoid wasting energy;
- **wake-up**: during the sleep phase, if the calculated frequency exceeds a set threshold value, the drive restarts to control the motor at the appropriate speed to follow the target value (setpoint) without the need for manual start.

Both functions are also equipped with a tripping delay to avoid unnecessary short motor start and stop cycles.
Variable speed drives
VLA series

**Single phase drives**

VLA1 is an ultra-compact drive with high performance. It integrates different motor control modes, like V/f linear and quadratic and sensorless vector control. VLA1 is extremely versatile and can be used in several applications such as conveyor belts, machine tools, control of automatic doors, packaging machines and in particular to manage pumps and fans thanks to specific integrated functions like the PID control and flying restart. Simple to install and configure. The user interface, which comprises of a built-in keypad and display, allows to access the setting parameters easily, thanks to the use of extended texts describing the functions and codes. Using the optional USB communication module, the programming, monitoring and diagnostic can be performed using a PC with software VLBXSW, downloadable from the website www.LovatoElectric.com.

**SPEED REFERENCE SIGNALS**

Reference signals for speed adjustment are obtained by:
- External potentiometer 1...10kΩ
- Voltage signal 0…10VDC or current signal 0/4...20mA
- Buttons on front keypad
- Door-mount installation kit
- 15 preset speeds via digital inputs
- Motor potentiometer.

**PROGRAMMABLE INPUTS**

- Selectable pNP or nPn I/O logic
- 5 digital inputs
- 1 digital output, 1 changeover relay output
- 2 analog inputs:
  - 1 voltage inputs 0...10VDC
  - 1 configurable as voltage 0...10VDC or as current 0/4...20mA
- 1 analog output configurable as voltage output 0...10VDC or current output 0/4...20mA.

**PROTECTIONS**

- Overcurrent
- Output short circuit and earth/ground leakage
- Overvoltage
- Undervoltage
- Phase loss
- Motor heat overload (I²t)
- Overspeed
- Speed reverse.

**FUNCTIONS**

- Speed control
- V/f linear or squared curves
- Sensorless vector control
- Flying restart
- DC braking and DC injection at start
- Integrated PID with sleep and wake-up thresholds
- Programmable frequency/time cycles
- Different parameter configurations
- User menu (favorite parameters)

**Operational characteristics**

- Input voltage: 200...240VAC single-phase
- Rated operational current le: 1.7...9.6A
- Mains frequency: 50/60Hz
- Output frequency: 0...599Hz
- Frequency modulation: 2...16kHz
- Current overload: 150% for 60s; 200% for 3s
- IEC degree of protection: IP20
- Ambient conditions:
  - Operating temperature: -10...+55°C (45°C without derating)
  - Maximum altitude: 4000m (1000m without derating)
  - Relative humidity: 5...95% (with no condensing)
- Side-by-side installation
- Built-in EMC suppressor (EN61800-3), cat. C2
- IE2 efficiency level (EN50598-2).

**Certifications and compliance**

Certifications: cULus, EAC, RCM.
Compliant with standards: EN61800-5-1, UL61800-5-1, CSA 22.2 No. 274.

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### Order code

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
<th>Qty</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>VLAX C01</td>
<td>Display and keypad</td>
<td>1</td>
<td>0.050</td>
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<tr>
<td>VLAX C02</td>
<td>USB communication module</td>
<td>1</td>
<td>0.050</td>
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<tr>
<td>VLAX P01</td>
<td>Door-mount installation kit for the keypad VLAX C01. IP65, Type 4/4X. Connecting cable included, 3m long.</td>
<td>1</td>
<td>0.340</td>
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</tbody>
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### Single phase drives

<table>
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<tr>
<th>Order code</th>
<th>Output current [A]</th>
<th>3-phase motor power at 240VAC [kW]</th>
<th>Qty</th>
<th>Weight [kg]</th>
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<tbody>
<tr>
<td>VLA1 02 A240</td>
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<td>0.25</td>
<td>0.33</td>
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<tr>
<td>VLA1 04 A240</td>
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<td>0.4</td>
<td>0.5</td>
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<td>VLA1 07 A240</td>
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<td>VLA1 15 A240</td>
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<td>1</td>
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<td>VLA1 22 A240</td>
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<td>2.2</td>
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### Accessories

- VLAX C01
- VLAX C02
- VLAX P01
Variable speed drives
Dimensions [mm]

SINGLE-PHASE VARIABLE SPEED DRIVES
VLA1 02 A240 - VLA1 04 A240

VLA1 07 A240

VLA1 15 A240 - VLA1 22 A240
The products described in this publication are subject to be revised or improved at any moment. Catalogue descriptions and details, such as technical and operational data, drawings, diagrams and instructions, etc., do not have any contractual value. In addition, products should be installed and used by qualified personnel and in compliance with the regulations in force for electrical systems in order to avoid damages and safety hazards.