

VARIABLE SPEED DRIVES



 **Lovato**
electric

ENERGY AND AUTOMATION

COMPACT, VERSATILE
HIGH PERFORMANCE



VARIABLE
SPEED DRIVES
0.4...30kW THREE-PHASE

APPLICATION AREAS

Automatic car washing equipment



Pumps

Fans, dryers, water purification systems, waterworks, etc.



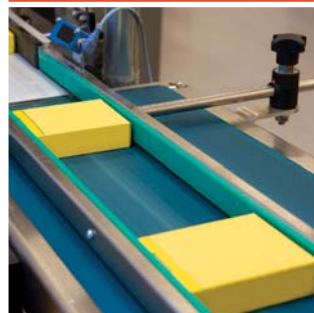
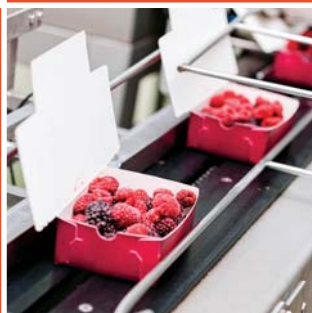
Fans

Fans for air conditioning, refrigeration systems, compressors.



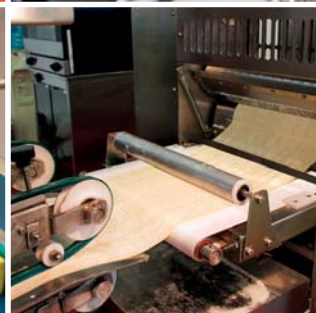
Packaging

Automatic and semi-automatic packaging machines for cartons, plastic bags or cases or with cellophane, etc.



Conveyance machinery

Product conveyor belts for warehouses, trade businesses, etc.

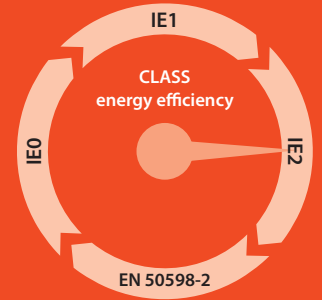


Food processing industry

Machinery for bread, bakery and fresh pasta, confectionery equipment, mixers and blenders, flour and liquid dispensing equipment, etc.

VLB3 series

MODULARITY AND DIAGNOSTIC



IE2 efficiency class (EN50598-2)

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



Logic unit



Display and keypad



USB module



WLAN module

USER'S INTERFACE MODULES

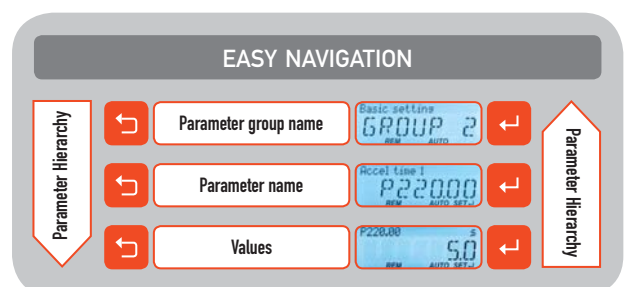
- Interchangeable.
 - Removable without interrupting the power supply.
- Advantages**
- Re-usable on most drives.
 - Protection of settings with the ability to operate the drive even without modules.

USB INTERFACE



- Parameter access also without powering the speed drive.
- Parameters setting easy and repeatable.
 - Trouble status (load curves, PID parameter control, etc.).

KEYPAD AND DISPLAY



Example "acceleration time"

- Group 2 (basic setup).
- Parameter 20.

Modbus-RTU

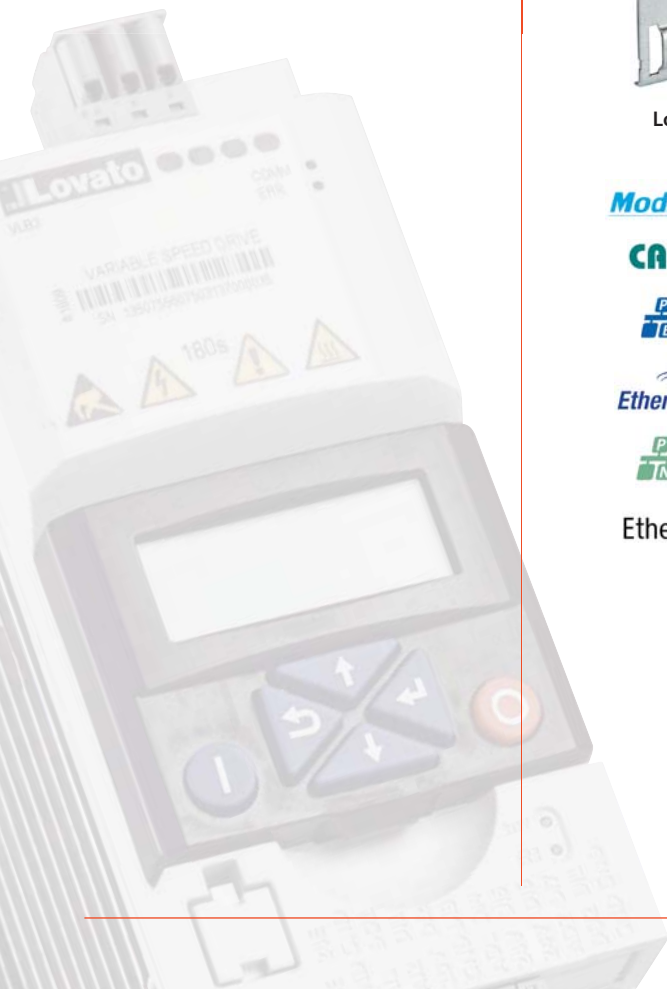
CANopen

PROFIBUS

EtherNet/IP

PROFINET

EtherCAT



■ EMC CHARACTERISTICS

Built-in EMC suppressor (EN61800-3), motor cable length:

- up to 3m for cat. C1
- up to 20m for cat. C2



■ STO SAFETY MODULE (Safe Torque Off)



Performance level
ISO 13849-1 (EN 954-1)
Safety class SIL 3
EN 62061 / EN 61800-5-2

■ MOTOR CONTROL METHOD

Speed

Control with linear, quadratic or ECO (for energy saving) curve

Torque

Open or closed ring vector control

■ "SIDE-BY-SIDE" INSTALLATION



Multiple speed drives can be installed without side clearance for space saving.

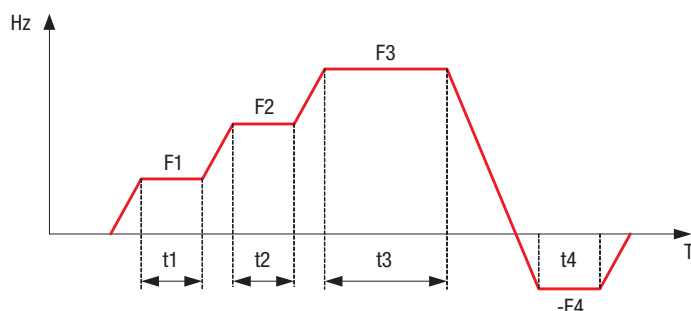
■ SEQUENCER FUNCTION

The user can program frequency-time cycles made up of steps, each characterised by motor speed, rotation direction and step duration.

The sequence cycle can be carried out in diverse mode:

- one single cycle with final motor stopping;
- one single cycle with final motor running at last speed set;
- repeat cycles with no pause.

The sequence cycle can be stopped at any moment.

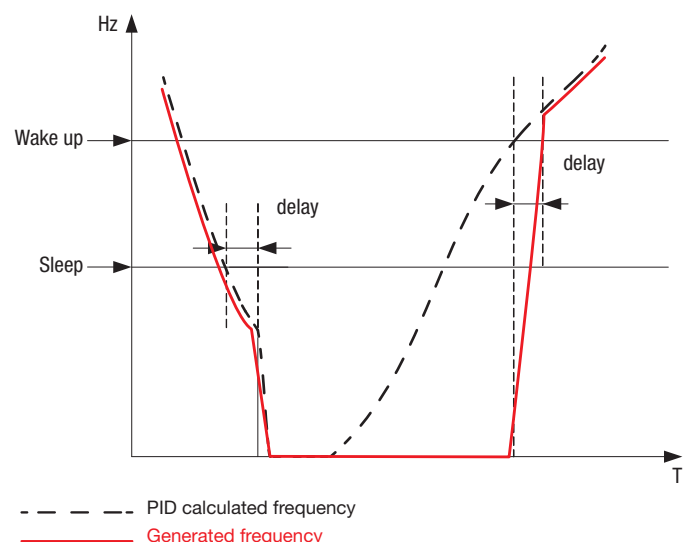


■ PID CONTROL

In some applications, for instance pumps or fans, the output frequency of the drive is defined by the target to keep pressure or flow constant. Typically, by using the analog input, feedback is monitored and, with the PID offset control, the speed drive sets motor speed to obtain the target setpoint.

PID control also includes the following functions:

- **sleep:** when the PID output frequency is lower than the programmed limit, that is the speed drive is close to the allowable minimum when propulsion is not needed, the speed drive completely stops the motor for energy saving;
- **wake-up:** during sleep phase, when the PID output frequency is higher than the programmed limit, the speed drive picks up motor control again at a suitable speed to reach the target setpoint without a manual starting. Each function also has a programmable delay time to avoid inopportune and repetitive start-stop motor cycles.



GENERAL CHARACTERISTICS

VLB3 is a compact drive with three-phase supply input.

It is ideal for general applications and, in particular, to lift and manage pumps and fans, thanks to several specific built-in functions (S Curve, PID, torque squared control).

It does not require any space for side ventilation, allowing to install several side-by-side drives.

The user interface, which comprises built-in keyboard and display, allows to access the setting parameters easily, thanks to the use of extended texts describing the functions and codes.

Using the USB or Wi-Fi connection accessories, the programming, monitoring and diagnostics can be performed using a PC.

The RS485 communication port with built-in RTU modbus and EMC filter complete the hardware supply.

The logic unit can be replaced with one of the VLBX... codes, obtaining a different communication port.

Speed reference signals

- external potentiometer 0...10k Ω
- analog voltage signal -10...10VDC (two-pole) or analog current signal 0/4...20mA
- buttons on front keypad
- remote control panel
- 15 preset speeds via digital inputs
- motopotentiometer
- settings via modbus RTU protocol(RS485).

Programmable inputs/outputs

- pNp or nPn connections
- 5 digital inputs
- 1 digital output, 1 changeover relay output
- 2 voltage analog inputs -10...10VDC (two-pole) or current analog inputs 0/4...20mA selectable
- 1 voltage analog output 0...10VDC or current analog output 0/4...20mA selectable.

Protections

- overcurrent
- output short circuit and earth/ground leakage
- overvoltage
- undervoltage
- phase loss
- motor heat overload (I^2t)
- motor PTC heat protection
- drive motor and braking resistor overload
- overspeed
- speed reverse.

Functions

- speed or torque control
- V/f linear or squared curves
- open or closed ring vector control
- energy-saving ECO control
- S curves
- quick speed search
- access to DC bus
- DC braking and DC injection at start
- built-in PID with sleep and wake-up thresholds

- programmable frequency/time cycles
- ideal for asynchronous or permanent magnet motors
- different parameter configurations
- user menu (favorite parameters)
- Safe Torque Off (STO) input accessory class SIL 3 (EN62061 / EN61800-5-2).

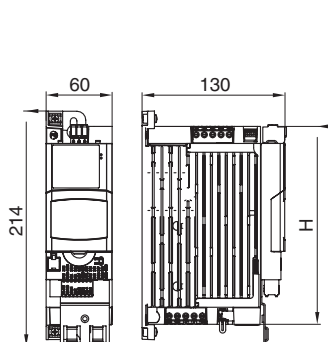
Operational characteristics

- input voltage: 400...480VAC three-phase
- rated operational current I_e : 1.3...66A
- mains frequency: 45...65Hz
- output frequency: 0...599Hz
- frequency modulation: 2...16kHz
- current overload: 150% for 60s; 200% for 0.5s
- IEC degree of protection: IP20
- operating temperature: -10...+60°C (45°C without derating)
- maximum altitude: 3000m (with power derating)
- Relative humidity: 5...95% (with no condensing)
- side-by-side installation
- built-in EMC suppressors (EN61800-3) motor cable length: up to 3m for cat. C1; up to 20m for cat. C2
- IE2 efficiency class (EN50598-2).

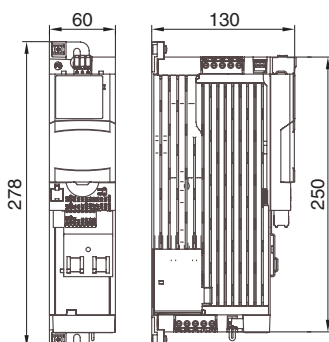
Certifications and compliance

Certifications obtained: cULus, CSA, EAC.
Compliant with standards: EN61800-5-1, UL61800-5-1, CSA 22.2 N $^{\circ}$. 274

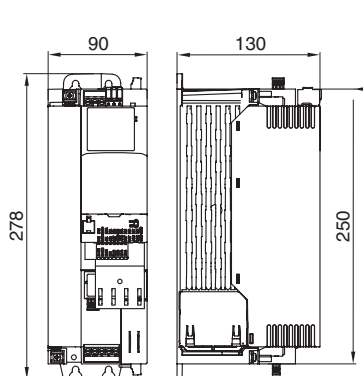
DIMENSIONS [mm]



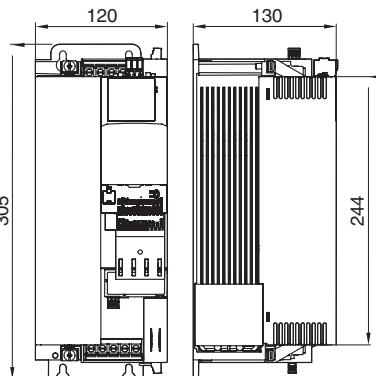
VLB3 0004 A480 (H=155) - VLB3 0007 A480 (H=180)



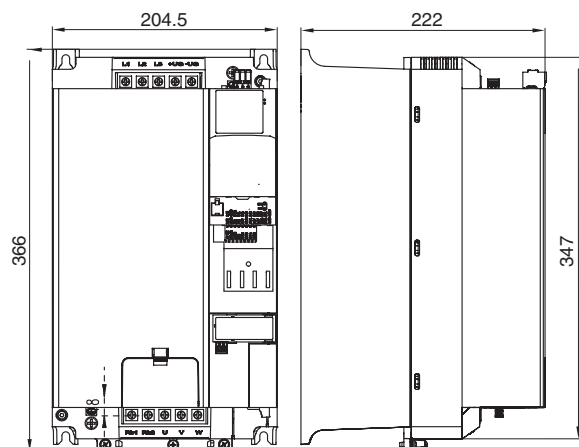
VLB3 0015 A480 - VLB3 0022 A480



VLB3 0040 A480 - VLB3 0055 A480



VLB3 0075 A480 - VLB3 0110 A480



VLB3 0150 A480 - VLB3 0185 A480 - VLB3 0220 A480 - VLB3 0300 A480

HOW TO ORDER

DRIVES



VLB3...

Order code	HEAVY-DUTY LOAD*			STANDARD LOAD**			Qty per pkg	Weight
	le	3-phase motor power at 400VAC		le	3-phase motor power at 400VAC			
	(A)	[kW]	[HP]	(A)	[kW]	[HP]	n°	[kg]
VLB3 0004 A480	1,3	0,4	0,54	1,5	0,75	1	1	0,850
VLB3 0007 A480	2,4	0,75	1	2,7	1,5	2	1	1,100
VLB3 0015 A480	3,9	1,5	2	4,5	2,2	3	1	1,380
VLB3 0022 A480	5,6	2,2	3	6,4	4	5	1	1,380
VLB3 0040 A480	9,5	4	5	10,9	5,5	7,5	1	2,450
VLB3 0055 A480	13	5,5	7,5	15	7,5	10	1	2,450
VLB3 0075 A480	17	7,5	10	19,6	11	15	1	3,950
VLB3 0110 A480	23,3	11	15	27,1	15	20	1	3,950
VLB3 0150 A480	32	15	20	36,9	18,5	25	1	10,650
VLB3 0185 A480	40	18,5	25	46,1	22	30	1	10,650
VLB3 0220 A480	47	22	30	54,2	30	40	1	10,650
VLB3 0300 A480	66	30	40	76,1	37	50	1	10,650

* Heavy-duty load: 150% overload for 60s.

** Standard load: 120% overload for 60s.

ACCESSORIES



VLBX C01



VLBX C02



VLBX L...

Order code	Description	Qty per pkg	Weight
		n°	[kg]
VLBX C01	Display and keyboard	1	0,032
VLBX C02	USB communication module	1	0,032
VLBX C03	Wi-Fi communication module	1	0,032
VLBX P01	Door-mount installation kit	1	0,032
VLBX SM	Safety input module	1	0,032
VLBX L01	Logic unit with CANopen	1	0,209
VLBX L02	Logic unit with ProfiBUS	1	0,209
VLBX L03	Logic unit with ProfiNET (available upon request)	1	0,209
VLBX L04	Logic unit with Ethercat (available upon request)	1	0,209
VLBX L05	Logic unit with EthernetIP (available upon request)	1	0,209

BRAKING RESISTORS

Order code	Power	Resistance	Output	Qty per pkg	Weight
	[W]	[Ω]	[kW]	n°	[kg]
VLBX R390	100	390	0,4...0,75	1	0,260
VLBX R180	200	180	1,5...2,2	1	0,630
VLBX R047	200	47	4...5,5	1	0,500
VLBX R027	200	27	7,5...11	1	0,500
VLBX R018	800	18	15	1	4,200
VLBX R015	800	15	18,5...22	1	4,200
VLBX R007	1900	7,5	30	1	9,500

THREE-PHASE INDUCTANCES

Order code	Current	Inductance	Output	Qty per pkg	Weight
	[A]	[mH]	[kW]	n°	[kg]
VLBX L590	50	0,59	22...30	1	8,350



ENERGY AND AUTOMATION

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