Product designation         Variable speed drives drives           Product type designation         VES           General characteristics           Rated power supply voltage         400480VAC 50/60Hz           Rated output voltage         VAC         Three-phase 0480VAC 0.599Hz           Rated output current         A         5.6           Rated output power         kW         2.2           Rated output power         HP 3 (heavy load)           EMC filter         Built-in EMC           EMC filter         Built-in EMC           EMC filter         Built-in EMC           Expressor cat.           Technical features           EMC filter         Three-phase           Three-phase           Land mains soldage         VAC 300480           Operating mains voltage range         VAC 400480           Operating mains frequency range         Hz 4565           Rated mains current with mains choke         Three-phase           Output type         Three-phase           Output voltage range         VAC 300480           Output power         Three-phase           Current overload         VAC 300480           Operating mains frequency </th <th></th> <th></th> <th></th> <th>8. 1</th>				8. 1
General characteristics           Rated power supply voltage         400480VAC 50/60Hz 50/60Hz           Rated output voltage         VAC 400480VAC 0-599Hz           Rated output current         A 5.6           Rated output power         kW 2.2           Rated output power         kW 2.2           Rated output power         Built-in EMC suppressor cat. (cc.)           EMC filter         Built-in EMC suppressor cat. (cc.)           EMC filter         Three-phase suppressor cat. (cc.)           EMC filter         <	Product designation			
Rated output voltage         400480VAC 5006Hz 5006				VLB3
Rated output voltage   S0/60Hz	General characteristics			400 400\/AC
Rated output current         A         5.6           Rated output power         kW         2.2           Rated output power         HP         3 (heavy load)           EMC filter         Built-in EMC suppressor cat. C2           Technical features           Input type         Three-phase           Rated mains voltage         VAC         400480           Operating mains voltage range         VAC         340528           Rated mains trequency         Hz         50/60           Operating mains frequency range         Hz         4565           Rated mains current without mains choke         7.8         7.8           Rated mains current without mains choke         5.3         7.8           Rated mains current with mains choke         7.8         7.8           Rated mains current with mains choke         5.3         7.8           Output frequency range         VAC         0480           Output frequency range         VAC         0480           Output frequency range         Hz         0599           Current overload         %/s         20599           Brake chopper         4kHz: 66W           Switching frequency         Yes           Switching frequenc	Rated power supply voltage			50/60Hz
Rated output power         kW         2.2           Rated output power         HP         3 (heavy load)           EMC filter         Built-in EMC suppressor cat. C2           Technical features           Input type         Three-phase           Rated mains voltage         VAC         400480           Operating mains voltage range         VAC         340528           Rated mains frequency         Hz         50/60           Operating mains frequency range         Hz         4565           Rated mains current without mains choke         7.8         5.3           Rated mains current with mains choke         7.8         5.3           Output type         Three-phase         Three-phase           Output voltage range         VAC         0480           Output type         Three-phase         0480           Output voltage range         VAC         0480           Output voltage range         VAC         0480           Output type         Three-phase         150% for 60s; 200% for 3s           Apparent output power         3.6 (heavy load)           Power loss         Without EMC category         Yes           Switching frequency         VAC         0480	Rated output voltage		VAC	480VAC 0-599Hz
Rated output power         HP suit-in EMC subpressor cat. C2           EMC filter         Built-in EMC subpressor cat. C2           Technical features         Three-phase           Input type         VAC 400480           Operating mains voltage range         VAC 340528           Rated mains frequency         Hz 50/60           Operating mains frequency range         Hz 50/60           Operating mains frequency range         Tx8           Rated mains current without mains choke         7.8           Rated mains current with mains choke         7.8           Output type         Three-phase           Output voltage range         VAC 0480           Output voltage range         VAC 0480           Output frequency range         Hz 0599           Current overload         %/s         150% for 60s; 200% for 3s           Apparent output power         3.6 (heavy load)         4kHz: 66W (heavy load)           Power loss         Reserved         7xes           Switching frequency         Yes           Without EMC category         m         50m / 100m (40°C max, witching frequency 4kHz max)           Max motor cable length         Category C1 m 2 category C2 m 2 category C3 m 3 cat	·			
Built-in EMC suppressor cat. C2   Technical features   Three-phase				
EMC filter         suppressor cat. C2           Technical features           Input type         Three-phase           Rated mains voltage range         VAC         400480           Operating mains voltage range         Hz         50/60           Rated mains frequency         Hz         4565           Rated mains current without mains choke         7.8         5.3           Rated mains current with mains choke         5.3         Three-phase           Output type         Three-phase           Output frequency range         Hz         0599           Current overload         %/s         150% for 60s; 200% for 3s           Apparent output power         3.6 (heavy load)           Power loss         4kHz: 66W (heavy load)           Brake chopper         Yes           Switching frequency         Yes           Max motor cable length         Without EMC category         frequency 4kHz max/switching frequency 4kHz	Rated output power		HP	
Input type         Three-phase           Rated mains voltage         VAC         400480           Operating mains voltage range         VAC         340528           Rated mains frequency         Hz         50/60           Operating mains frequency range         Hz         4565           Rated mains current without mains choke         7.8	EMC filter			suppressor cat.
Rated mains voltage         VAC         400480           Operating mains voltage range         VAC         340528           Rated mains frequency         Hz         50/60           Operating mains frequency range         Hz         4565           Rated mains current without mains choke         7.8           Rated mains current with mains choke         5.3           Output type         Three-phase           Output frequency range         VAC         0480           Output frequency range         Hz         0599           Current overload         Hz         0599           Current output power         3.6 (heavy load)           Power loss         4kHz: 66W           Brake chopper         Yes           Switching frequency         216kHz           Max motor cable length         Shielded           Without EMC category         m         50m / 100m (40°C max, switching frequency 4kHz max)           Category C1 m         Category C1 m         3 category C2 m         20 category C3 m <t< td=""><td>Technical features</td><td></td><td></td><td></td></t<>	Technical features			
Operating mains voltage range         VAC         340528           Rated mains frequency         Hz         50/60           Operating mains frequency range         Hz         4565           Rated mains current without mains choke         7.8         Rated mains current with mains choke         5.3           Output type         Three-phase         Output voltage range         VAC         0480           Output frequency range         Hz         0599         150% for 60s; 200% for 3s           Current overload         %/s         150% for 60s; 200% for 3s         200% for 3s         3.6 (heavy load)           Power loss         4kHz: 66W (heavy load)         4kHz: 6				
Rated mains frequency				
Operating mains frequency range         Hz         4565           Rated mains current without mains choke         7.8           Rated mains current with mains choke         5.3           Output type         Three-phase           Output voltage range         VAC 0480           Output frequency range         Hz 0599           Current overload         %/s 200% for 3s           Apparent output power         3.6 (heavy load)           Power loss         4KHz: 66W (heavy load)           Brake chopper         Yes           Switching frequency         216kHz           Max motor cable length         Without EMC category         m 3           Category C1 max)         Category C2 m 20           Category C2 m 20         Category C3 m 35           Unshielded         Without EMC category m 200				
Rated mains current without mains choke   7.8     Rated mains current with mains choke   5.3     Output type   Three-phase     Output voltage range   VAC   0480     Output frequency range   Hz   0599     Current overload   %/s   150% for 60s; 200% for 3s     Apparent output power   3.6 (heavy load)     Power loss   4kHz: 66W (heavy load)     Brake chopper   216kHz     Switching frequency   7es     Switching frequency   50m / 100m (40°C max, switching frequency akHz max)     Category C1				
Rated mains current with mains choke   5.3			HZ	
Output type         Three-phase           Output voltage range         VAC         0480           Output frequency range         Hz         0599           Current overload         %/s         150% for 60s; 200% for 3s           Apparent output power         3.6 (heavy load)           Power loss         4kHz: 66W (heavy load)           Brake chopper         Yes           Switching frequency         216kHz           Max motor cable length         Shielded           Without EMC category         m           Category C1 m         3           Category C2 m         20           Category C3 m         35           Unshielded         Without EMC category         m         200				
Output voltage range         VAC         0480           Output frequency range         Hz         0599           Current overload         %/s         150% for 60s; 200% for 3s           Apparent output power         3.6 (heavy load)           Power loss         4kHz: 66W (heavy load)           Brake chopper         7es           Switching frequency         216kHz           Max motor cable length         Shielded           Without EMC category         m           Category C1 m         3           Category C2 m         20           Category C3 m         35           Unshielded         Without EMC category         m         200				
Output frequency range         Hz         0599           Current overload         %/s         150% for 60s; 200% for 3s           Apparent output power         3.6 (heavy load)           Power loss         4kHz: 66W (heavy load)           Brake chopper         Yes           Switching frequency         216kHz           Max motor cable length         50m / 100m (40°C max, switching frequency 4kHz max)           Category C1 max, switching frequency 4kHz max)         Category C2 m 20 m 20 Category C2 m 35           Unshielded         Without EMC category m 35           Unshielded         Without EMC category m 200			\/ <b>\</b> C	
Current overload         %/s         150% for 60s; 200% for 3s           Apparent output power         3.6 (heavy load)           Power loss         4kHz: 66W (heavy load)           Brake chopper         Yes           Switching frequency         216kHz           Max motor cable length         50m / 100m (40°C max, switching frequency 4kHz max)           Category C1 max         3 category C1 max           Category C2 max         20 category C3 max           Unshielded         Without EMC category max				
Apparent output power Power loss Brake chopper Switching frequency Max motor cable length Shielded  Without EMC category C1 m 3 Category C2 m 20 Category C3 m 35 Category C3 m 35 Unshielded  Without EMC category m 200				
Power loss			%/s	200% for 3s
Brake chopper Switching frequency  Max motor cable length Shielded  Shielded  Without EMC category  Category C1 m 3 Category C2 m 20 Category C3 m 35  Unshielded  Without EMC category m 200	Apparent output power			
Switching frequency   Yes	Power loss			
Switching frequency  Max motor cable length  Shielded  Without EMC category  Category C1 m 3 Category C2 m 20 Category C3 m 35  Unshielded  Without EMC category m 200	Brake chonner			
Max motor cable length  Shielded  Without EMC category m switching frequency 4kHz max)  Category C1 m 3 Category C2 m 20 Category C3 m 35  Unshielded  Without EMC category m 200				
Shielded  Without EMC category  Without EMC category  Mithout EMC category  Category C1 m 3 Category C2 m 20 Category C3 m 35  Unshielded  Without EMC category m 200				2 101(1)2
Without EMC category m switching frequency 4kHz max)  Category C1 m 3 Category C2 m 20 Category C3 m 35  Unshielded  Without EMC category m 200	S .			
Without EMC category m switching frequency 4kHz max)  Category C1 m 3 Category C2 m 20 Category C3 m 35  Unshielded  Without EMC category m 200				50m / 100m
Category C2 m 20 Category C3 m 35  Unshielded  Without EMC category m 200		Without EMC category	m	switching frequency 4kHz
Category C3 m 35 Unshielded Without EMC category m 200			m	
Unshielded Without EMC category m 200			m	
Without EMC category m 200		Category C3	m	35
Functions		Without EMC category	m	200
	Functions			





Speed reference signalsExternal potentiometer 010kΩ Voltage signals: 0 10VDC or -10 +10VDC Current signals: 0/4 20mA Buttons on front keyboard Door-mount installation kit 15 preset speeds via digital inputs Motor potentiometer Fieldbus3-wire controlYesS-shape curvesYesS-lip compensationYesFlying restartYesAccess to DC busYesDC brakingYesDC injection at startYesPID controlYes, with sleep and rinse functionSequencer (programmable frequency/time cycles)YesPreset speedsYesMotorpotentiometerYes	Motor control modes	V/f linear, quadratic torque, sensorless vector control, ECO mode, servo control with encoder feedback, multipoint V/f curve, V/f closed loop control with encoder feedback, torque setpoint, sensorless control for synchronous motors up to 22kW
S-shape curvesYesSlip compensationYesFlying restartYesAccess to DC busYesDC brakingYesDC injection at startYesPID controlYes, with sleep and rinse functionSequencer (programmable frequency/time cycles)YesPreset speedsYes	Speed reference signals	potentiometer 010kΩ Voltage signals: 0 10VDC or -10 +10VDC Current signals: 0/4 20mA Buttons on front keyboard Door-mount installation kit 15 preset speeds via digital inputs Motor potentiometer
Slip compensationYesFlying restartYesAccess to DC busYesDC brakingYesDC injection at startYesPID controlYes, with sleep and rinse functionSequencer (programmable frequency/time cycles)YesPreset speedsYes	3-wire control	-
Slip compensationYesFlying restartYesAccess to DC busYesDC brakingYesDC injection at startYesPID controlYes, with sleep and rinse functionSequencer (programmable frequency/time cycles)YesPreset speedsYes	S-shape curves	Yes
Access to DC bus  DC braking  DC injection at start  PID control  Sequencer (programmable frequency/time cycles)  Preset speeds  Yes  Yes  Yes  Yes  Yes, with sleep and rinse function  Yes	Slip compensation	Yes
DC braking       Yes         DC injection at start       Yes         PID control       Yes, with sleep and rinse function         Sequencer (programmable frequency/time cycles)       Yes         Preset speeds       Yes	Flying restart	Yes
DC injection at start  PID control  Sequencer (programmable frequency/time cycles)  Preset speeds  Yes  Yes, with sleep and rinse function  Yes  Yes		
PID control  Yes, with sleep and rinse function  Sequencer (programmable frequency/time cycles)  Yes  Preset speeds  Yes		Yes
Sequencer (programmable frequency/time cycles)  Preset speeds  And rinse function  Yes  Yes	DC injection at start	Yes
Preset speeds Yes	PID control	
Preset speeds Yes	Sequencer (programmable frequency/time cycles)	Yes
Motorpotentiometer Yes	Preset speeds	Yes
	Motorpotentiometer	Yes
Different parameter configuration sets  Yes	Different parameter configuration sets	Yes
Parameters changeover function Yes	Parameters changeover function	Yes
Favorite parameters menu Yes		Yes
Autotuning		No
Safe torque Off (STO) safety function Optional		Optional
PTC probe input Yes		Yes





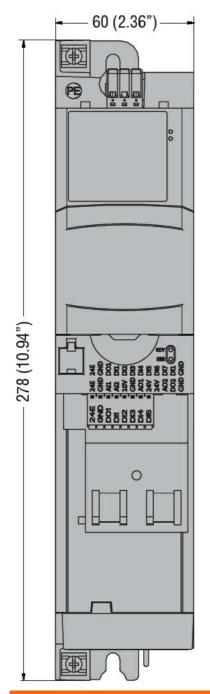
			Overcurrent
			Output short
			circuit and
			earth/ground
			leakage
Protections			Overvoltage
			Undervoltage
			Phase loss Motor
			heat overload
			(i2t) Overspeed
			Speed reverse
			Multi-pump PID
			control (1 main
			pump frequency
			regulated + 2
Special funct.			auxiliary pumps
			activated in direct
			mode in case of
			necessity)
Input and Output			necessity)
Input and Output  Number of digital input		Nr.	5
Number of digital input		INI.	Selectable PNP
Digital input type			
			or NPN logic
Number of digital output		Nr.	2
			1 relay output
			with changeover
Digital output arrangement			contact (C/O-
			SPDT) + 1 digital
			output
			Relay output: 3A
O to the standards and an			250VAC Digital
Output contacts ratings			output: 100mA
			max 30VDC
Number of analog input		Nr.	2
Trainibor of analog input			Configurable
Analanianuttus			0/210VDC,
Analog input type			-10+10VDC,
			05VDC, 0/4
			20mA
Number of analog output		Nr.	1
			configurable as
			010VDC, 0
Analog output type			5VDC, 2
			10VDC, 0/4
			20mA
Ambient conditions			
Temperature			
Operating temperature			
- L	min	°C	-10
		°C	+55
	max	J	100

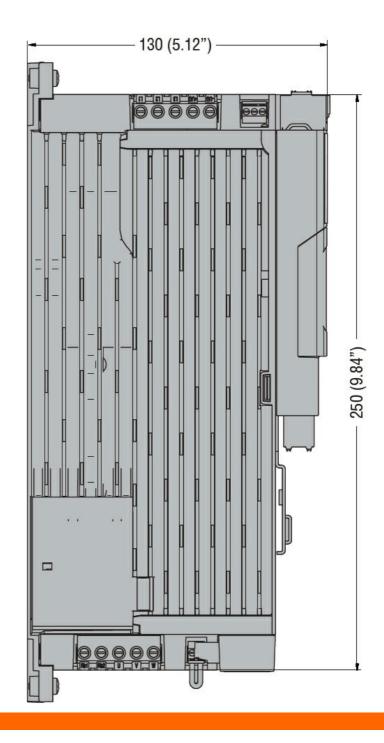




	urrent derating		switching frequency 2 or 4kHz: 2.5%/°C over 45°C switching frequency 8 or 16kHz: 2.5%/°C over 40°C
Storage temperature			
	min	°C	-25
	max	°C	+60
Relative humidity		%	595% (with no condensing)
Max altitude		m	4000m (over 1000m derate the rated current by 5%/1000m)
Maximum Pollution degree			2
Overvoltage category			III up to 2000m altitude (II above 2000m)
Housing			
Installation position			Vertical
IP degree of protection			IP20
Dimensions (W x H x D)		mm	60 x 278 x 130
Weight		Kg	1.35
Dimensions			







## Certifications and compliance

Compliance

CSA 22.2 n°274

EN 61800-5-1

UL61800-5-1

Certificates

CSA

cULus

EAC

**RCM** 

ETIM classification

ETIM 8.0

EC001857 -Frequency converter =< 1 kV