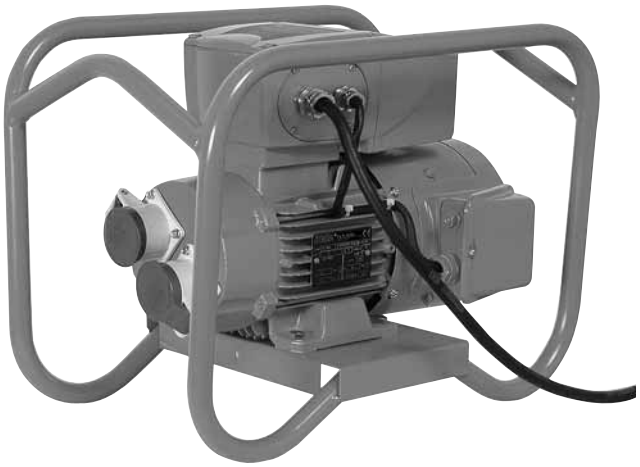
LEROY SOMER

3639 - 07.2007 / c

en



This manual is to be given to the end user

CONVERSTAT

Frequency changer

Installation and maintenance

CONVERSTAT
Frequency changer

NOTE

LEROY-SOMER reserves the right to modify the characteristics of its products at any time in order to incorporate the latest technological developments. The information contained in this document may therefore be changed without notice.

CAUTION

For the user's own safety, this CONVERSTAT must be connected to an approved earth (⏚ terminal).

If accidentally starting the installation is likely to cause a risk to personnel or the machines being driven, it is essential to supply the equipment via a circuit-breaking device (power contactor) which can be controlled via an external safety system (emergency stop, detection of errors on the installation).

The CONVERSTAT is fitted with safety devices which, in the event of a fault, control stopping and thus stop the machine. Voltage fluctuations, and in particular power cuts, may also cause the unit to stop.
The removal of the causes of the shutdown can lead to restarting, which may be dangerous for certain machines or installations. In such cases, it is essential that the user takes appropriate precautions against the unit restarting after an unscheduled stop.
The variable speed drive is designed to be able to supply a motor and the driven machine above its rated speed.
If the motor or the machine are not mechanically designed to withstand such speeds, the user may be exposed to serious danger resulting from their mechanical deterioration. It is important that the user checks that the installation can withstand it, before programming a high speed.
The variable speed drive which is the subject of this manual is designed to be integrated in an installation or an electrical machine, and can under no circumstances be considered to be a safety device. It is therefore the responsibility of the machine manufacturer, the designer of the installation or the user to take all necessary precautions to ensure that the system complies with current standards, and to provide any devices required to ensure the safety of equipment and personnel.

LEROY-SOMER declines all responsibility in the event of the above recommendations not being observed.

CONVERSTAT
Frequency changer

SAFETY AND OPERATING INSTRUCTIONS FOR ELECTRICAL ACTUATORS (In accordance with the low voltage directive 73/23/EEC modified by 93/68/EEC)

• Throughout the manual, this symbol warns of consequences which may arise from inappropriate use of the CONVERSTAT, since electrical risks may lead to material or physical damage as well as constituting a fire hazard.

1 - General

Depending on their degree of protection, CONVERSTAT units may contain moving parts, as well as hot surfaces, during operation.
Unjustified removal of protection devices, incorrect use, faulty installation or inappropriate operation could represent a serious risk to personnel and equipment.
For further information, consult the manual.
All work relating to transportation, installation, commissioning and maintenance must be performed by experienced, qualified personnel (see IEC 364 or CENELEC HD 384, or DIN VDE 0100 and national specifications for installation and accident prevention).
In these basic safety instructions, qualified personnel means persons competent to install, mount, commission and operate the product and possessing the relevant qualifications.

2 - Use

CONVERSTAT units are components designed for integration in installations or electrical machines.
When integrated in a machine, commissioning must not take place until it has been verified that the machine conforms with directive 89/392/EEC (Machinery Directive).
It is also necessary to comply with standard EN 60204, which stipulates in particular that electrical actuators (of which the inverters form part) cannot be regarded as circuit-breaking devices and certainly not as isolating switches.
Commissioning can take place only if the requirements of the Electromagnetic Compatibility Directive (89/336/EEC, modified by 92/31/EEC) are met.
CONVERSTAT units meet the requirements of the Low Voltage Directive 73/23/EEC, modified by 93/68/EEC. The harmonised standard of the DIN VDE 0160 series in connection with standard VDE 0660, part 500 and EN 60146/ VDE 0558 are also applicable.
The technical characteristics and instructions concerning the connection conditions specified on the nameplate and in the documentation provided must be observed without fail.

3 - Transportation, storage

All instructions concerning transportation, storage and correct handling must be observed.
The climatic conditions specified in the technical manual must be observed.

4 - Installation

The installation and cooling of equipment must comply with the specifications in the manual supplied with the product.
CONVERSTAT units must be protected against excessive stress. In particular, there must be no damage to parts and/or modification of the clearance between components during transportation and handling. Avoid touching the electronic components and contact parts.
CONVERSTAT units contain parts which are sensitive to electrostatic stress and may be easily damaged if handled incorrectly. Electrical components must not be exposed to mechanical damage or destruction (risks to health!).

5 - Electrical connection

When work is performed on CONVERSTAT units which are powered up, national accident prevention specifications must be respected.
The electrical installation must comply with the relevant specifications (for example conductor cross-sections, protection via fused circuit-breaker, connection of protective conductor). More detailed information is given in the manual.
Instructions for an installation which meets the requirements for electromagnetic compatibility, such as screening, earthing, presence of filters and correct insertion of cables and conductors, are given in the documentation supplied with CONVERSTAT units. These instructions must be followed in all cases, even if the CONVERSTAT carries the CE mark. Adherence to the limits given in the EMC legislation is the responsibility of the manufacturer of the installation or the machine.

6 - Operation

Installations incorporating CONVERSTAT units must be fitted with additional protection and monitoring devices as laid down in the current relevant safety regulations: law on technical equipment, accident prevention regulations, etc. Modifications of CONVERSTAT units using control software are permitted.
Active parts of the device and live power connections must not be touched immediately after the CONVERSTAT is powered down, as the capacitors may still be charged. In view of this, the warnings fixed to CONVERSTAT units must be observed.
During operation, all protective covers must remain closed.

7 - Servicing and maintenance

Refer to the manufacturer's documentation.

CONVERSTAT
Frequency changer

CONTENTS

en

1 - GENERAL INFORMATION

1.1 - General operating principle

CONVERSTAT is the physical association of a 3-phase transformer and a 3-phase or single-phase frequency inverter.

In the standard version, the CONVERSTAT does not require any connection other than the power supply.
The options may be used to broaden the application range of the CONVERSTAT.
Thanks to the advanced technology of the IGBT power module, very high efficiency and reduced noise levels are possible.

1.2 - Product designation

CONVERSTAT											
200/240 V single-phase power supply				200/240 V 3-phase power supply				400/480 V 3-phase power supply			
CVA rating	42 V/200 Hz output			CVA rating	42 V/200 Hz output			CVA rating	42 V/200 Hz output		
	kVA	A	No. of sockets		kVA	A	No. of sockets		kVA	A	No. of sockets
80 L	0.8	10	2	80 L	0.8	10	2	80 L	-	-	-
80 L	1.8	25	2	80 L	1.8	25	2	80 L	1.8	25	2
				80 L	2.2	28	2	80 L	2.2	28	2
								112 MG	3.5	48	4
								112 MG	4.7	65	4

The sum of the currents taken by needle motors or external vibrators must not exceed the maximum output current.

Options	
Designation	**Description**
BMA 31 32	Speed control knob and integrated run/stop control
PXLCD VMA 30	VARMECA 30 console
VMA SOFT	VARMECA 30 PC software

1.3 - Characteristics

1.3.1 - Electrical data

Single phase

Power supply	Single-phase supply 200 V -10% to 240 V +10% 50-60 Hz ± 2%
Output voltage	42 V
Power range	0.8 and 1.8 kVA
Maximum number of power-ups per hour	10

3-phase

Power supply	3-phase supply 380 V -10% to 480 V +10%, 50 - 60 Hz ± 2%
Output voltage	Fixed 42 V or variable from 0 to 42 V*
Power range	1.8 - 2.2** - 3.5 - 4.7 kVA
Maximum number of power-ups per hour	100

* with BMA 31 32 option
** 2.2 kVA maximum for 230 V supply

Operation on a generator set
To avoid any interference between the generator set and the CONVERSTAT, the subtransient reactance (X"d) must be less than or equal to 7%.
In practice, the generator set is dimensioned to have 2.5 times the power of the chargers.

1.3.2 - Characteristics and functions

CHARACTERISTICS	CONVERSTAT
Overload	150% of In for 60 s, 10 times per hour
Efficiency	97.5% x transformer efficiency

CONTROL	CONVERSTAT
Frequency reference	•Analogue reference(0 V or 4 mA = minimum speed) (10 V or 20 mA = maximum speed) - 0 - 10 V with integrated potentiometer (BMA 31 32 option) - 0 - 10 V with remote potentiometer option - 0 - 10 V with external reference* - 4 - 20 mA with external reference* •Digital reference**
Run/Stop	•With integral pushbutton •With remote volt-free contact •With integrated Run/Stop control (BMA 31 32 option)
Stop mode	•On ramp (with pushbutton or integrated Run/Stop control) •Freewheel stop (by cutting the power supply)**

INDICATION	CONVERSTAT
Display with option: - BMA 31 32	With indicator lamps •Steady green light: mains connected •Flashing green light: current limit •Flashing red light: overload •Steady red light: fault

PROTECTION	CONVERSTAT
Power	•Undervoltage •Overvoltage •Overloads: - thermal inverter and transformer •Short-circuit -transformer windings
Fault reset	•By switching off the CONVERSTAT

* Input DI4: OFF 0-10 V, ON 4-20 mA ** Accessible with parameter-setting option

1.4 - Environmental characteristics

Characteristics	Level
Degree of protection	**IP 65**
Storage temperature	**-40°C to +70°C (IEC 68-2-1)**
Transport temperature	**-40°C to +70°C**
Operating temperature	**-20°C to +40°C (+50°C with derating)**
Altitude	**≤ 1000 m without derating**
Ambient humidity	**95% non-condensing**
Vibrations	**IEC 68-2-34 (acceleration 0.01 g²/Hz)**
Shocks	**IEC 68-2-29 (peak acceleration 15g)**
Immunity	**Conforming to EN 61000-6-2**
Radiated and conducted emissions	**Conforming to EN 50081-2**

1.5 - Radio-frequency interference

1.5.1 - General

Variable speed drives use high-speed switches (transistors, semi-conductors) which switch high voltages (around 550 V DC for 3-phase drives) at high frequencies (several kHz). This provides better efficiency and a low level of motor noise.
As a result, they generate radio-frequency signals which may disturb operation of other equipment or distort measurements taken by sensors:
- Due to high-frequency leakage currents which escape to earth via the stray capacity of the drive/motor cable and that of the motor via the metal structures which support the motor
- By conduction or feedback of R.F. signals on the power supply cable: conducted emissions
- By direct radiation near to the mains supply power cable or the drive/motor cable: radiated emissions

These phenomena are of direct interest to the user.
The frequency range concerned (radio frequency) does not affect the energy distribution company.

⚠ Conformity of the drive is only assured when the mechanical and electrical installation instructions described in this manual are adhered to.

1.5.2 - Standards (Emission)

The maximum emission level is set by the generic industrial (EN 50081-2) and residential (EN 50081-1) standards.
CONVERSTAT conforms to the following standards:
EN 50081-2, EN 61000-6-4 - EN 61800-3, IEC 61800-3.

1.5.3 - Standards (Immunity)

The minimum immunity level is set by the generic industrial (EN 51000-6-2) and residential (EN 51000-6-1) standards.
VARMECA 30 conforms to the following standards:
EN 61000-4-2, IEC 61000-4-2 - EN 61000-4-3, IEC 61000-4-3 - EN 61000-4-5, IEC 61000-4-5 - EN 61000-4-6, IEC 61000-4-6 EN 61000-4-11, IEC 61000-4-11 - EN 61000-6-2, IEC 61000-6-2 - EN 61000-3, IEC 61000-3.

1.5.4 - Earth leakage current

Earth leakage currents may depend on the type of RFI filter used. The CONVERSTAT can be supplied with its filter integrated and wired-up. The levels of leakage current also depend on the voltage and/or the power supply frequency and the size of the motor.
In all cases, for conformity with immunity standards, a voltage limiting device is connected to earth. The shunt current is negligible in normal circumstances.

1.5.4.1 - Use of earth leakage detector (residual current device)

1- Type AC: which detects AC faults. Not to be used with variable speed drives.
2- Type A: which detects AC faults and pulsed DC faults (provided that the DC is cancelled out at least once per cycle). Only for use with single-phase drives.
3 - Type B: which detects AC faults, pulsed DC faults and smoothed DC faults. **Only this type is suitable for use with all variable speed drives.**
Note: If an external RFI filter is being used, a delay of 50 ms should be incorporated to avoid spurious faults being taken into account.

1.5.5 - Control cable immunity

Control cable immunity can be increased outside the CONVERSTAT by one of the following 2 methods:
• Use of shielded twisted pair cable, with shielding connected to earth around its circumference within 100 mm of the CONVERSTAT.
• Passing the cable through a ferrite ring at 100 mm maximum distance from the CONVERSTAT.
Note: Several control cables can pass through a single ferrite.

1.5.6 - Control circuit immunity when overvoltage occurs

Immunity to overvoltages of control circuits or long cables connected outside a building.
The various drive input and output circuits conform to standard EN61000-6-2 (1 kV) relating to overvoltages.

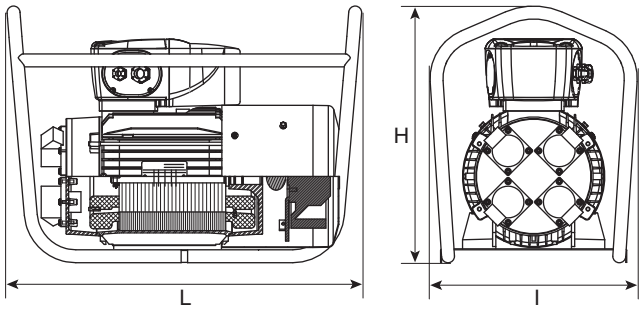
There are some exceptions, where the installation may be exposed to overvoltage peaks which exceed the levels laid down by the standard. This may be the case in the event of lightning strikes or earth faults associated with long cable lengths (>30 m). To limit the risks of damage to the drive, the following precautions could be taken:
- Galvanic isolation of the I/O
- Duplication of the cable shielding with an earth wire of 10 mm^2 minimum. The cable shielding and the earth wire must be linked at both ends and connected to earth with the shortest possible connection. This stratagem enables high currents to pass into the earth wire, rather than into the shielding.
- Reinforcement of the digital and analogue I/O protection by adding a zener diode or a peak limiter.

1.6 - Description of cables and protective devices

• It is the responsibility of the user to connect and provide protection for the CONVERSTAT in accordance with current legislation and regulations in the country of use. This is particularly important as regards the size of cables, the type and rating of fuses, the earth or ground connection, powering down, acknowledging faults, insulation and protection against overcurrents.
• These tables are given for information only, and must under no circumstances be used in place of the current standards.
• When using a circuit-breaker, it must be a motor circuit-breaker (D curve).
• The residual current device must be type B. Too many devices connected to a single residual current device can cause it to trip. Check that the circuit-breaker is only protecting the CONVERSTAT.
• Comply with the size of protection fuses.

1.7 - Weights and dimensions

	CONVERSTAT	
	CVA 80 L	CVA 112 MG
Length (L)	450	530
Height (H)	370	390
Width (W)	320	320
Weight (kg)	25	43



2 - INSTALLATION

• It is the responsibility of the owner or user to ensure that the installation, operation and maintenance of the drive and its options comply with legislation relating to the safety of personnel and equipment and with the current regulations of the country of use.
• Before carrying out any work, disconnect and lock the changer power supply. For the single-phase range, wait 2 minutes to make sure that the capacitors have discharged.
• After connection, ensure that the seals are firmly in place, and that the screws and cable glands are watertight to ensure IP 65 protection.
• Holes are provided at the lowest points of the changers to drain off any moisture that may have accumulated inside during cooling of the machine. In conditions which encourage the formation of condensation, it is advisable to leave the drain holes permanently open.
• When the cover is open, the CONVERSTAT degree of protection is IP10. Any work should only be carried out by experienced, qualified personnel.

2.1 - General

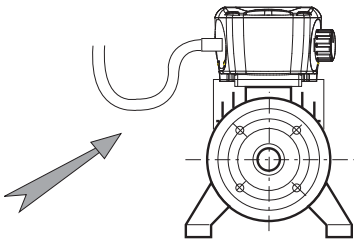
The CONVERSTAT is fitted to the machine like a standard motor, with flange or foot mounting.
The assembly is cooled by forced ventilation. Make sure that the ventilation air inlet is free of obstruction.
The positions of the potentiometer/cable gland supports are specified at the time of ordering. However they may be reversed if necessary.

3 - CONNECTIONS

• All connection work must be performed in accordance with the laws in force in the country of installation. This includes earthing to ensure that no directly accessible part of the drive can be at mains voltage or any other voltage which may be dangerous.
• The voltages on the cables or connections of the mains supply, the motor, the braking resistor or the filter may cause fatal electric shocks. Contact must be avoided in all circumstances.
• The changer must be supplied via a circuit-breaking device so that it can be powered down safely.
• The changer contains capacitors which remain charged at a fatal voltage even after the power supply has been cut off.
• Wait 2 minutes after powering down the drive before removing the protection devices.
• The changer power supply must be protected against overloads and short-circuits.
• It is vital to respect the rating of protection devices.
• Connection with copper conductor only.
• Check that the voltage and current of the drive, the motor and the mains supply are compatible.
• After the changer has been operating, the heatsink may be very hot, therefore avoid touching it.

3.1 - Wiring precautions

• When the CONVERSTAT is controlled remotely, avoid parallel routing of power cables and control cables.
• All remote control cables must be shielded and have a cross-section between 0.22 mm^2 and 1 mm^2. The shielding should be connected to earth at both ends.
• Check that the different earth points are actually at the same potential.
• Incorporate a bend where the cables enter the cable glands so that water cannot penetrate the terminal box.
• Tighten the cable gland firmly.



• The CONVERSTAT has a positive logic configuration.
Using a drive with a control system which has a different control logic may cause unwanted starting of the CONVERSTAT.
• The control circuits in the changer are isolated from the power circuits by single insulation (IEC 664-1). The installer must ensure that the external control circuits are isolated against any human contact.
• If the control circuits need to be connected to circuits conforming to SELV safety requirements, additional insulation must be inserted to maintain the SELV classification.

3.2 - Description of cables and protective devices

• These tables should never be used instead of current standards.

P (kVA)	230 V single-phase power supply				230 V 3-phase power supply				400 V 3-phase power supply			
	CVA rating	I (A)	gI fuses or circuit-breaker (A)	Cables (mm^2)	CVA rating	I (A)	gI fuses or circuit-breaker (A)	Cables (mm^2)	CVA rating	I (A)	gI fuses or circuit-breaker (A)	Cables (mm^2)
0.8	A 31M	7	16	2.5	A 31TL	5	8	1.5	A 31T	3	6	1.5
1.8	A 32M	14	25	2.5	A 32TL	7	16	2.5	A 32T	5	10	1.5
2.2					A 32TL	8	16	2.5	A 32T	6	10	2.5
4.7									A 32T	8	16	2.5

Note:

• The mains current value is a typical value which depends on the source impedance. The higher the impedance, the lower the current.

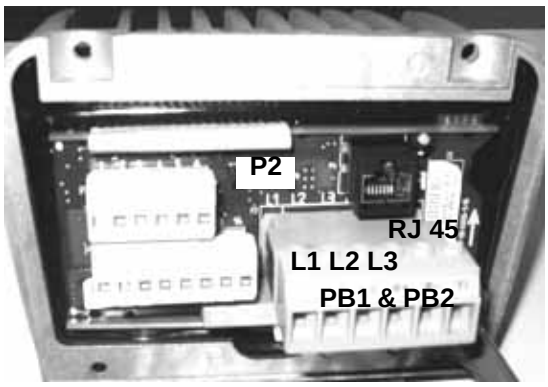
• The fuses (UL approved) are intended for installations capable of delivering 5000 A maximum at 480 V.

3.3 - Power terminal blocks

3.3.1 - Terminal block for power supply PB1 marked (L1, L2 and L3) or (L, N)

This terminal block is used to connect the 3-phase power supply.
Screw terminal block: VMA 32
Tightening torque: 0,8 Nm
Max. cross-section: 2,5 mm^2

VMA 32 T



VMA 32 M

3.4 - Terminal blocks for options

3.4.1 - RS485 type serial link connector

This is an RJ 45 connector and is used to connect the PX LCD console or a PC in order to use the VMA SOFT programming software.

3.4.2 - P2 connector

This is used to connect the following option: local potentiometer with integrated Run/Stop (BMA 31/32).

4 - COMMISSIONING

• Before switching on the CONVERSTAT, check that the electrical connections are correct, and that any moving parts are mechanically protected.
• For the safety of personnel, the CONVERSTAT must not be switched on with the protective cover removed.

4.1 - CONVERSTAT

4.1.1 - Starting

- Power-up.
- Press the green button, and the unit starts as soon as it is released. Press the red button to stop.

4.1.2 - Starting with the speed control button option (BMA option)

- Power-up: the green indicator lamp is lit continuously. The CONVERSTAT starts when the green button is pressed and stops when the red button is pressed.
- Set the output frequency using the side control knob.

5 - FAULTS - DIAGNOSTICS

Information relating to the status of the CONVERSTAT is provided by an indicator lamp inside the changer located on the local control (BMA 31/32 option) or by two indicator lamps.

Colour and state of indic. lamp	CONVERSTAT status	Checks to be performed
Steady green	No fault Mains present	
Flashing green	Current limiting	• Check that the changer is not overloaded or stalled
Flashing red	IGBT temperature alarm CONVERSTAT overload	• Check the air circulation in the forced ventilation • The changer is overloaded: check the current using a clamp ammeter
Steady red	• Short-circuit of a transformer winding • Locked needle motor • Winding insulation fault • I^2t overheating • Internal fault • Undervoltage • Overvoltage	• Check that no incident has occurred • Switch off and then on again to clear the fault. • Check the mains voltage • If the fault remains, consult LEROY-SOMER

Faults can be cleared by switching off the **CONVERSTAT**.

6 - MAINTENANCE

• All work relating to installation, commissioning and maintenance must be carried out by experienced, qualified personnel.
• Before carrying out any work, disconnect and lock the CONVERSTAT power supply circuit and wait 2 minutes for the capacitors to discharge.

6.1 - Servicing

No special servicing is required on the CONVERSTAT, apart from the regular removal of dust from the fan grille and the cooling fins located at the bottom of the casing.
Do not dismantle the CONVERSTAT while it is still under guarantee, as this would then immediately become null and void.

6.1.1 - Drain holes

Holes are provided at the lowest points of the enclosure, depending on the operating position (IM etc) to drain off any moisture that may have accumulated inside during cooling of the changers.
The holes may be sealed in various ways:
- Standard: with plastic plugs
- On request: with screws, siphon or plastic ventilator

Under certain special conditions, it is advisable to leave the drain holes permanently open (operating in environments with high levels of condensation).

Opening the holes periodically should be part of the regular maintenance procedure.

WARNING:
Certain components which are sensitive to electrostatic discharge may be destroyed simply by touching them.
Do not leave any metal object in the connection area, as this could cause a short-circuit.

6.2 - Measurements

6.2.1 - General

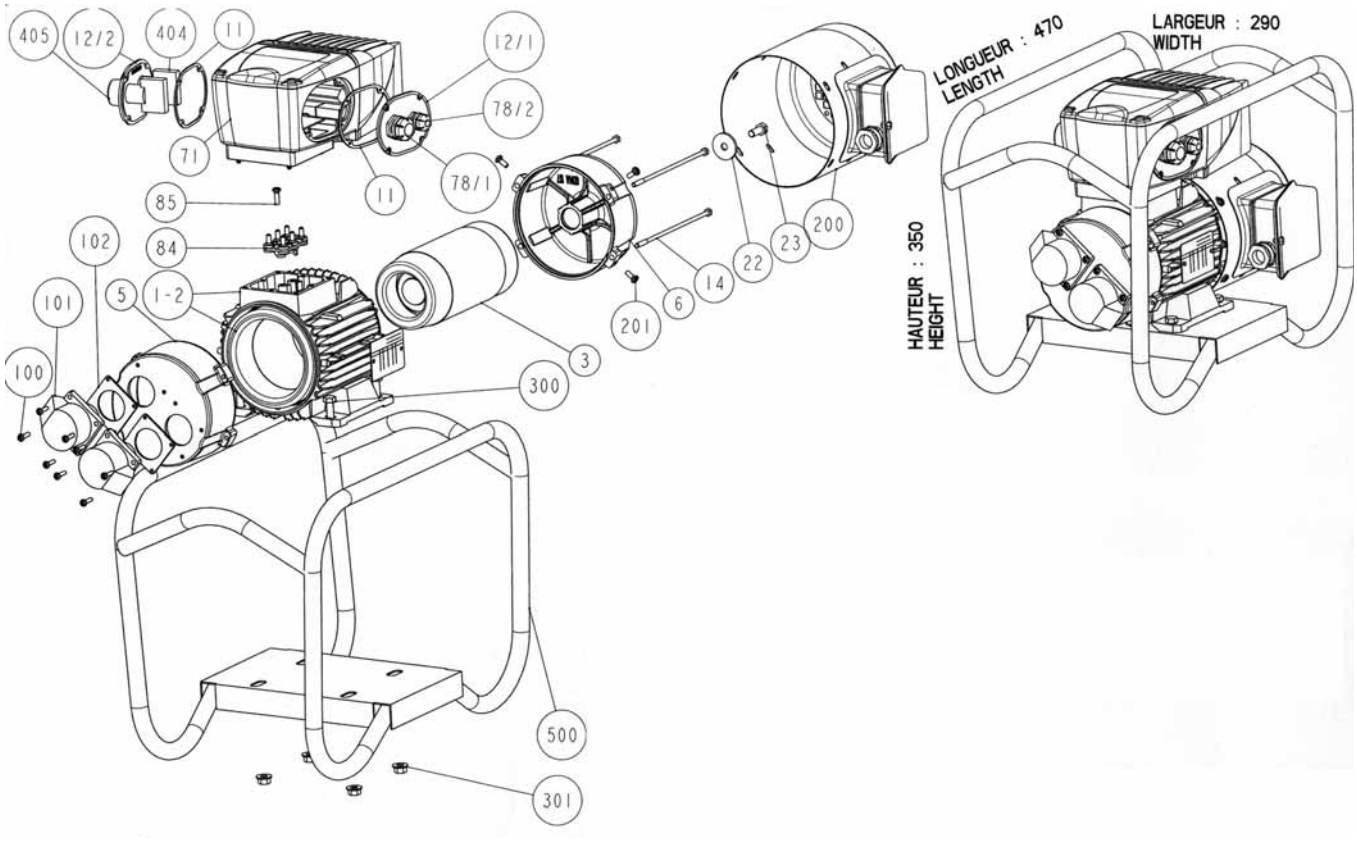
The input voltages can be measured using ordinary instruments.
The current IS NOT MEASURED ON THE CONVERSTAT POWER SUPPLY (L1, L2, L3) or (L, N).
It is measured using an ordinary clamp ammeter on one of the wires which goes to the transformer.

6.2.2 - Current measuring procedure

- Open the CONVERSTAT power supply circuit and lock it.
- Wait 2 minutes for the capacitors to discharge (for the single-phase range).
- Open the cover of the CONVERSTAT.
- Open the connection between terminals 11 and 12.
- Remove the TORX + slot type screws from the protection plate above the motor terminals.
- Run the longest black wire along the side of the protection circuit.
- Replace the protection plate and fasten it.
- Place the clamp ammeter in the loop of the cable going to the transformer.
- Remake the connection between terminals 11 and 12.

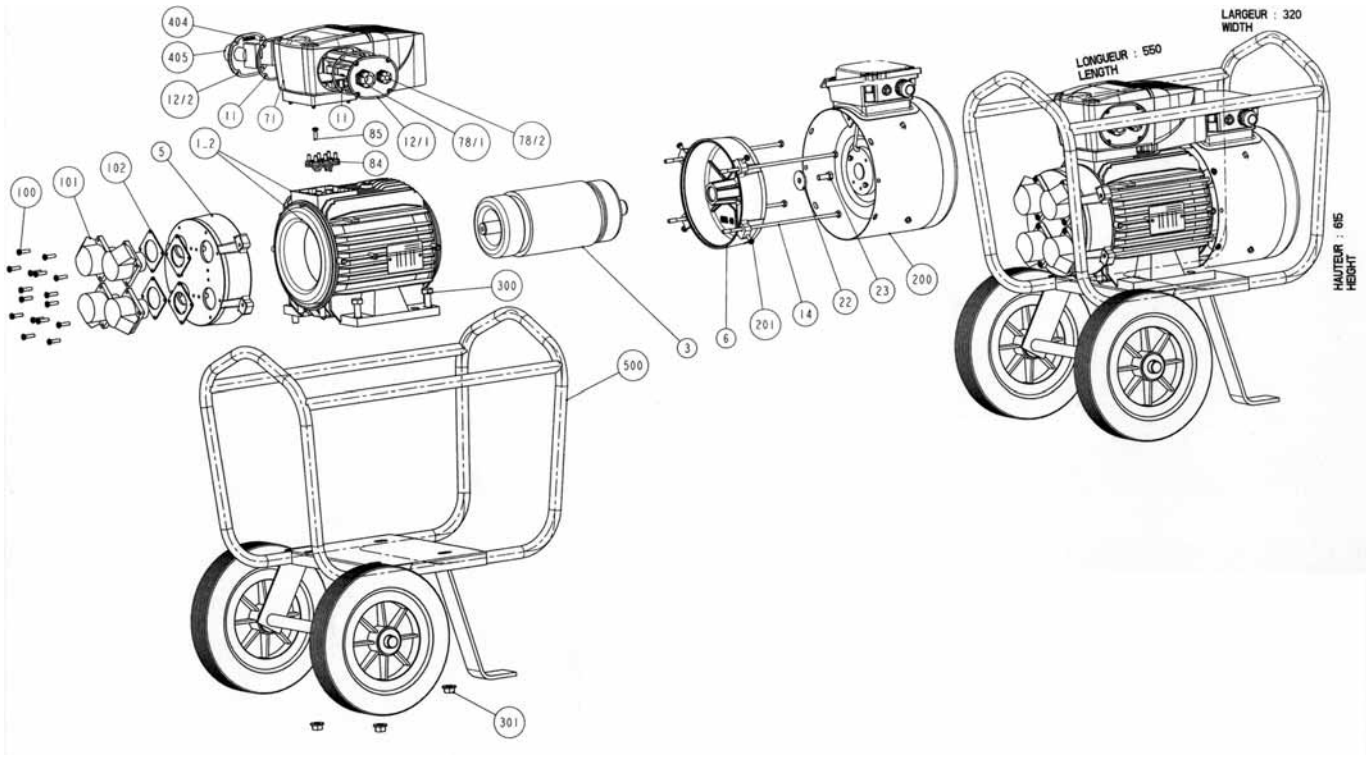
6.3 - Spare parts

6.3.1 - CVA 80 L



Ref.	Qty	Description	Code
1-2	1	Stator / Housing	
3	1	Wound rotor	FB04A_4
5	1	Aluminium DE shield	PUS139TA001
6	1	Aluminium NDE shield	PUS139TA002
11	2	Cheek piece seals	JO1092JN002
12/1	1	Cheek piece with 2 cable glands	PUS092PA001
12/2	1	D2380 cheek piece	PMA095WA004
14	4	Assembly screw	VIS005TT001
22	1	8.2x32x3 flat washer	VIS008PS003
23	1	M8x20 H screw	VIS008HF704
71	1	Electronic control unit	
78/1	1	Cable gland and reducer	JO1012PC100/JO1016PR010
78/2	1	Cable gland	JO1008PC100
84	1	Terminal block with M5 terminals	HE52A_1
85	1	Terminal block fixing screw	VIS005XS703
100	8	Socket fixing screw	VIS004XS703
101	2	32 A straight sockets	CNX032P1027
102	2	BR438 seal	JO1052JN005
200	1	Forced ventilation	HA04A 1818
201	4	Forced ventilation fixing screw	VIS005XS702
300	4	M8x25 H screw	
301	4	M8 lock nut	
404	1	STOP pushbutton	APE000AC008
405	1	RUN pushbutton	APE000AC008
500	1	Generator carrying frame	PDE460SO001

6.3.2 - CVA 112 MG



Ref.	Qty	Description	Code
1-2	1	Stator / Housing	
3	1	Wound rotor	FB07A_37
5	1	Aluminium DE shield	PUS186TA001
6	1	Aluminium NDE shield	PUS186TA003
11	2	Cheek piece seals	JO1092JN002
12/1	1	Cheek piece with 2 cable glands	PUS092PA001
12/2	1	D2380 cheek piece	PMA095WA004
14	4	Assembly screw	HH53A_24
22	1	8.2x32x3 flat washer	VIS008PS003
23	1	M8x20 H screw	VIS008HF704
71	1	Electronic control unit	
78/1	1	Cable gland and reducer	JO1012PC100/JO1016PR010
78/2	1	Cable gland	JO1008PC100
84	1	Terminal block with M5 terminals	HE52A_1
85	1	Terminal block fixing screw	VIS005XS703
100	16	Socket fixing screw	VIS004XS703
101	4	32 A straight sockets	CNX032P1027
102	4	BR438 seal	JO1052JN005
200	1	Forced ventilation	HA07A_1210
201	4	Forced ventilation fixing screw	VIS005XS702
300	4	M10x30 H screw	
301	4	M10 lock nut	
404	1	STOP pushbutton	APE000AC008
405	1	RUN pushbutton	APE000AC008
500	1	Generator carrying carriage	PDE270SO003

7 - OPERATING EXTENSIONS

7.1 - Control knob with integrated run/ stop control option (BMA 31/32)

In addition to frequency control, a run button and a stop button make it possible to control the CONVERSTAT locally, once it has been switched on, as required. For a run command to be taken into account, **the button must be held down for one second**.

- 2 indicator lamps
- Connected on the P2 connector (VMA 31/32)
- Do not wire the shunt between terminals 8-11, 1-2 and/or 9-11

8 - DESCRIPTION OF LCD KEYPAD CONSOLE OPTIONS

8.1 - Installation

8.1.1 - Checks on receipt

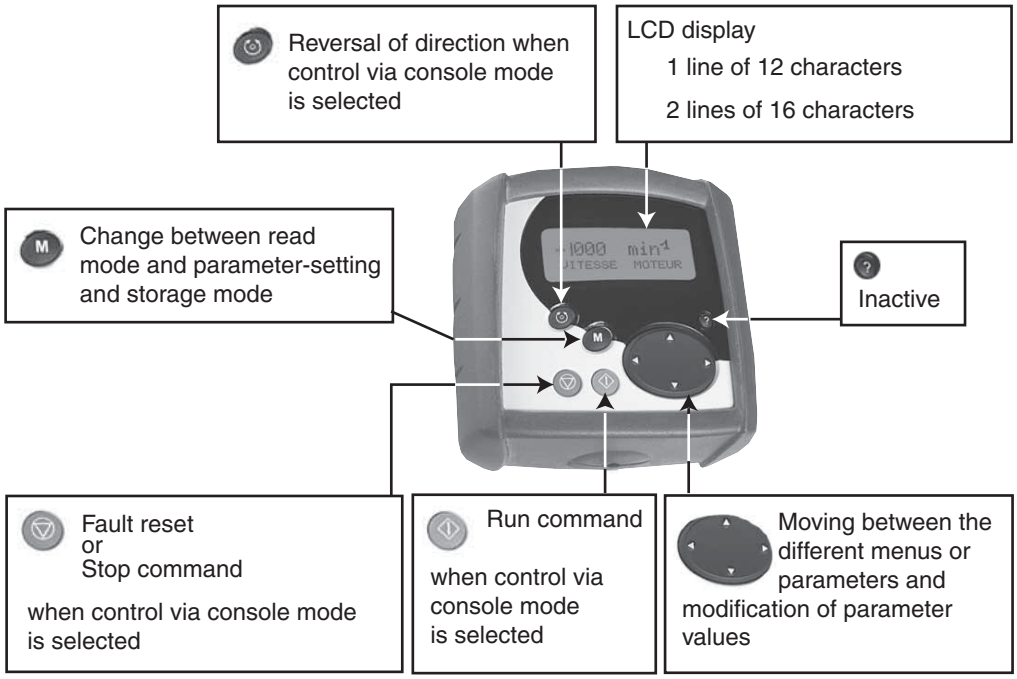
When you receive your LCD KEYPAD console, make sure that it has not been damaged during transport. Should damage have occurred please report it to those responsible for its transport.

8.1.2 - Connection

- Open the cover of the CONVERSTAT.
- Connect the RJ45 plug in the connector on the drive (can be connected while powered up).

If there are no terminal blocks, a fault appears on power-up: "User 1, fault".

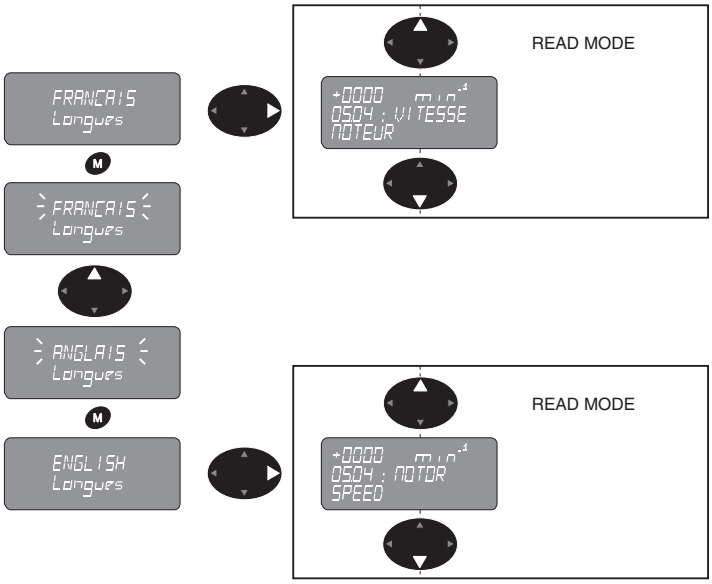
8.2 - Presentation of the LCD KEYPAD



8.3 - Read mode

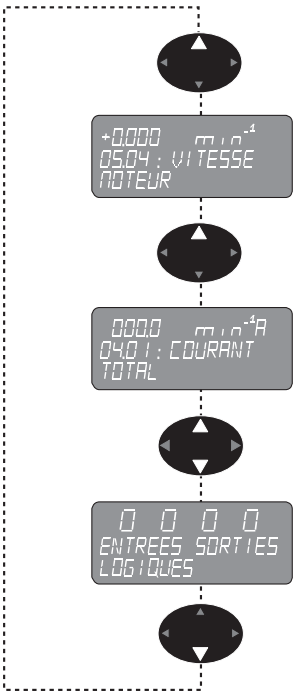
8.3.1 - Selection of language

As soon as it is powered up, the LCD KEYPAD console offers a choice of languages.



8.3.2 - Read mode

This mode is used to scroll through the parameters required for supervision and diagnostics:



List of parameters that can be displayed

05.01	Inverter frequency	01.49	Selected reference indicator
04.01	Total inverter current	01.50	Selected preset reference indicator
05.04	Inverter speed	01.01	Frequency/speed reference selected
04.02	Active inverter current	02.01	Post-ramp reference
05.02	Inverter voltage	06.22	Timer (3)
05.05	DC bus voltage	06.23	Timer
07.01	ADI1 input level	06.24	Energy meter (4)
07.02	ADI2 input level	06.25	Energy meter
07.03	ADIO3 input or output level	10.21	Trip 2
	Digital I/O states DI01 to DI4 + SDI1	10.22	Trip 3
08.01	Logic input 1	10.23	Trip 4
08.02	Logic input 2	10.24	Trip 5
08.03	Logic input 3	10.25	Trip 6
08.04	Logic input 4	10.26	Trip 7
08.09	Secure disable input	10.27	Trip 8
	Relay + Brake output states	10.28	Trip 9
08.07	Output relay (2)	10.29	Trip 10
12.40	Brake control (2)	11.29	VAR software version
		22.10	LCD console version
		11.32	Inverter rated current
		11.48	Preset configuration selection

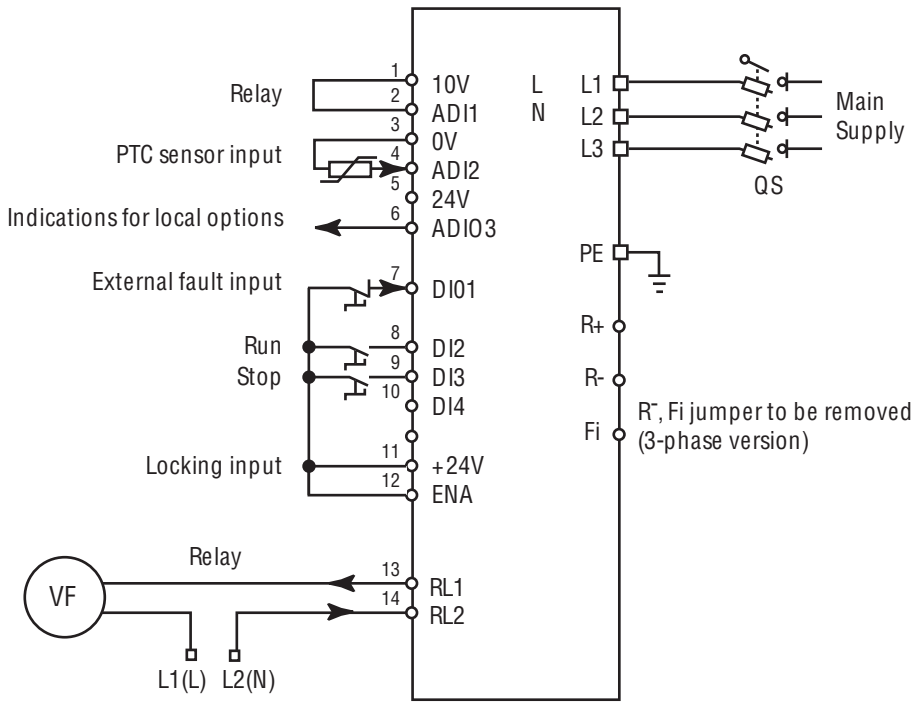
(1) Digital inputs 1, 2, 3, and 4 and the secure disable input are displayed on a single line according to their logic state (0 or 1) in the order (DI01, DI2, DI3, DI4, SDI1).
(2) Same as (1) for the output relay and brake control, in the order (relay, brake).
(3) Display of the timer on a single line (Year/Days, Hr/Min).
(4) Display of the energy meter on a single line (MWh, kWh).

8.4 - Control terminal blocks

• Check that the terminal block has been removed from its fixed holder (unplugged) before making any connections, so as to avoid putting pressure on the card.
• The CONVERSTAT has a positive logic configuration.

CONVER-STAT Terminal	Designation	Function
1	10V	+10V analogue internal supply
2	ADI1	Analogue or digital input 1 Assignment in standard configuration: 0-10 V frequency reference
3	0V	Logic circuit common 0V
4	ADI2	Analogue or digital input 2 Assignment in standard configuration: PTC sensor input
5	24V	+24 V internal supply
6	ADIO3	Analogue or digital input or analogue output 3 Assignment in standard configuration: BMA option LED control
7	DIO1	Digital input or output 1 Assignment in standard configuration: External fault management
8	DI2	Digital input 2 Assignment in standard configuration: Run forward
9	DI3	Digital input 3 Assignment in standard configuration: Stop
10	DI4	Digital input 4 Assignment in standard configuration: ADI1 type selection
11	24V	+24 V internal supply
12	ENA	Safety/unlocking input
13	RL1	Fault relay output
14	RL2	

8.5 - Connection diagram



8.6 - Switching to protective mode - Diagnostics

• The user must not attempt to repair the drive, or perform any diagnostics other than those listed in this section. If the drive malfunctions, it should be returned to LEROY-SOMER via your usual contact.

The LCD KEYPAD option gives a certain amount of information which simplifies the diagnostic process.

This information is broken down into 2 categories:
- Information concerning operation
- Fault tripping

If the drive switches to protection mode, the drive output bridge is inactive, and the drive no longer controls the changer. The display indicates "triP" and the fault code alternately.
All the faults indicated by the display unit are listed in the following table in alphabetical order.

Cause	Solution
Inverter overload I × t	**• Check that the inverter is not overloaded**
Drive overload I × t	
IGBT overheating (sensor)	**• Decrease the inverter load**
Overcurrent at CONVERSTAT output	
Overload on + 24 V supply or digital output	**• Check the total current consumption**
Phase loss	**• Check the mains supply (3 phases present and balanced)** **• Check the supply voltage level (at full load)** **Note: The loss of one phase can only be detected if the active current is between 50% and 100% of the rated value.** **The drive attempts to stop the changer before fault tripping occurs.**
Serial link fault	**• Replace the keypad or the cable** **• Check the connectors between the keypad and the drive** **• Check that the cable is not damaged**
User fault 1 via digital input	**• Check the wiring of terminal DI01**
User fault 2 high internal temperature	**• Check the CONVERSTAT cooling**
DC bus undervoltage	**• Check the mains supply**

LEROY-SOMER 16015 ANGOULÊME CEDEX - FRANCE

RCS ANGOULÊME N° B 671 820 223
Limited company with capital of 62,779,000 €

www.leroy-somer.com