Worthington Creyssensac

User's manual EN

VCI07

For variable speed compressors

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Applicable as of Version 12

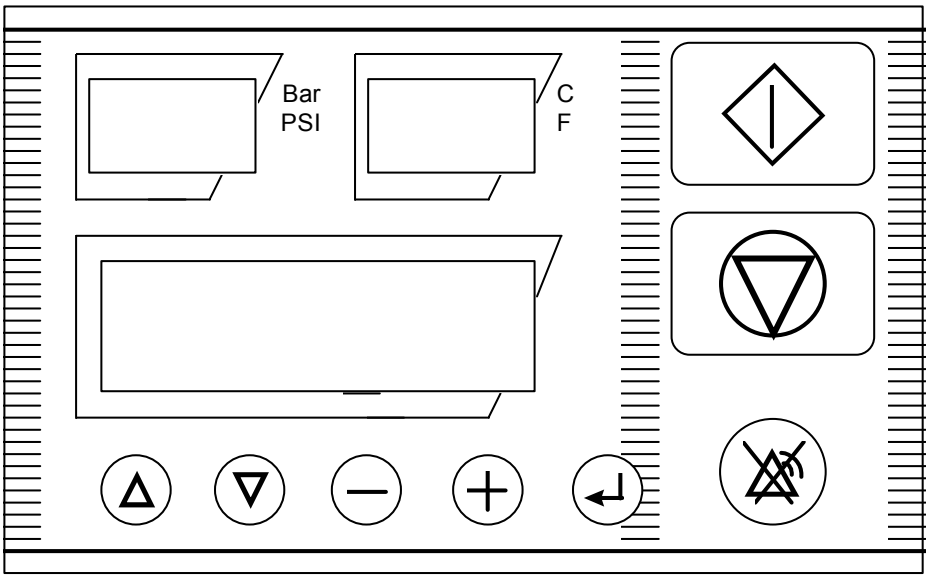


Table of contains

1 - General information

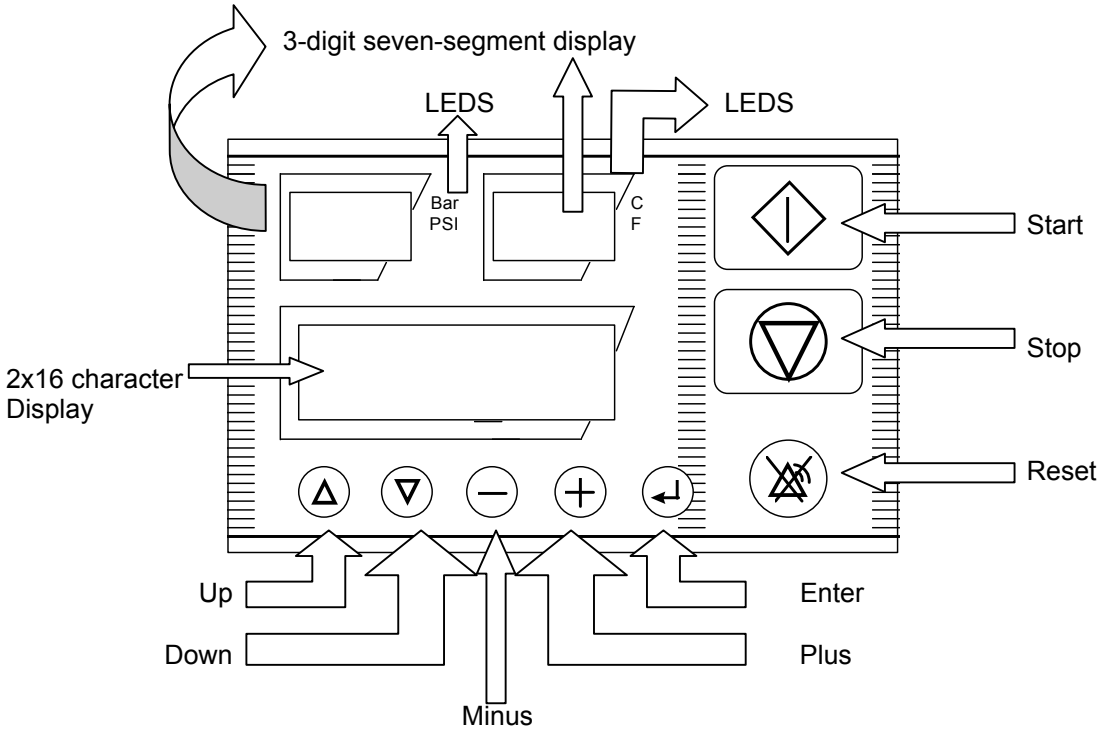
The VCI07 controller has been developed for the control of medium to large size variable speed compressors, integrating “Variable Speed”.

The VCI07 has a metal housing and can be mounted inside or outside the electrical cabinet of the compressor.

Two 3-digit LCD displays and an alphanumeric display with 2 lines of 16 characters permanently show the behaviour of the compressor.
We devoted special attention to the development of a simple user interface.

2 - User interface

The VCI07 controller is equipped with three bottom-view-side-lighted displays, 8 push buttons and 4 LEDS.



2.1 Displays

The VCI07 is equipped with 3-bottom view - side lighted displays. Each display is dedicated for a specific purpose:

The following messages can be displayed:

Display type	Message	Meaning
3 digit seven segment (left display)	e.g. 6.8 - - -	• Current pressure is constantly being displayed • Indicating a pressure sensor error
3 digit seven segment (right display)	e.g. 86 - - -	• Current temperature is being constantly displayed • Indicating a pressure sensor error
Alpha numeric 2 lines 16 character	e.g. emergency stop e.g. standby e.g. oil service	Error indications Status indications Service timers

Table 1

2.2 Push buttons

The VCI07 is equipped with 8 tactile push buttons. In the standard software, each push button has its own specific function.

Button	Function
Arrow up	Select previous menu item
Arrow down	Select next menu item
Minus	Exit current menu (back to previous)
Plus	Entering the selected menu
Enter	Modifying / confirming variable settings
Green rectangular	Starting the compressor locally
Red rectangular	Stopping the compressor locally
Reset	Return to the basic menu or Reset the controller whenever an alarm/warning occurred.

Table 2

2.3 LED's

The VCI07 is equipped with 4 LEDS. Each LED has its own specific function.

LED	Meaning
BAR	The pressure unit is set at BAR (see Table **7** on page 9)
PSI	The pressure unit is set at PSI (see Table **7** on page 9)
°C	The temperature unit is set at Celsius (see Table **7** on page 9)
°F	The temperature unit is set at Fahrenheit (see Table **7** on page 9)

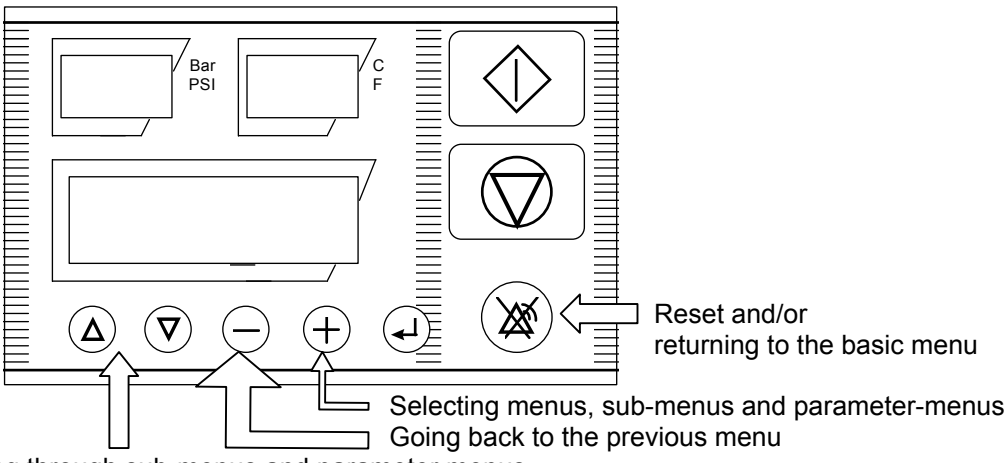
Table 3

3 - Menus and functions

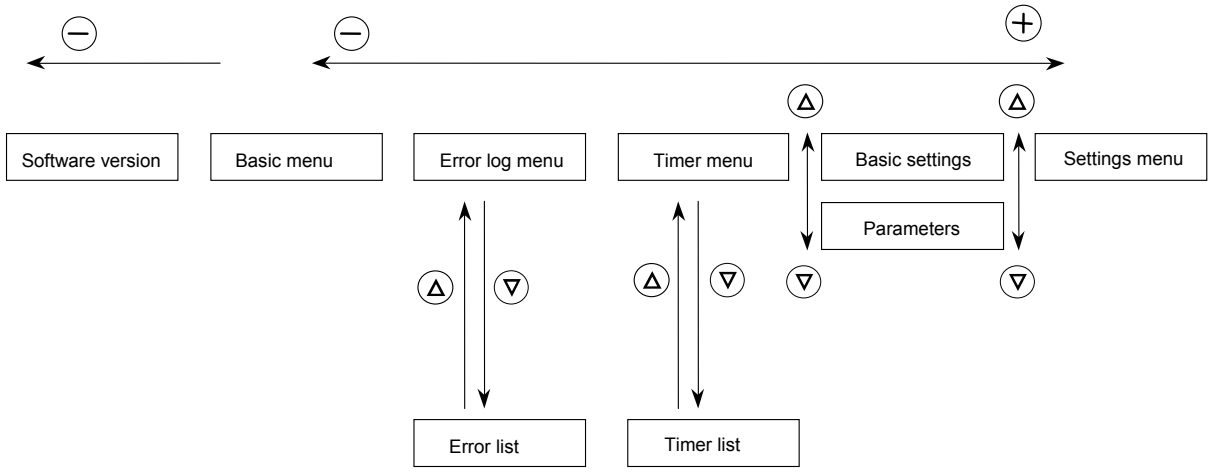
3.1 Menu code entry / parameter modification

This paragraph explains how to select a menu and how to scroll through the different parameters.

3.1.1 Entering menus



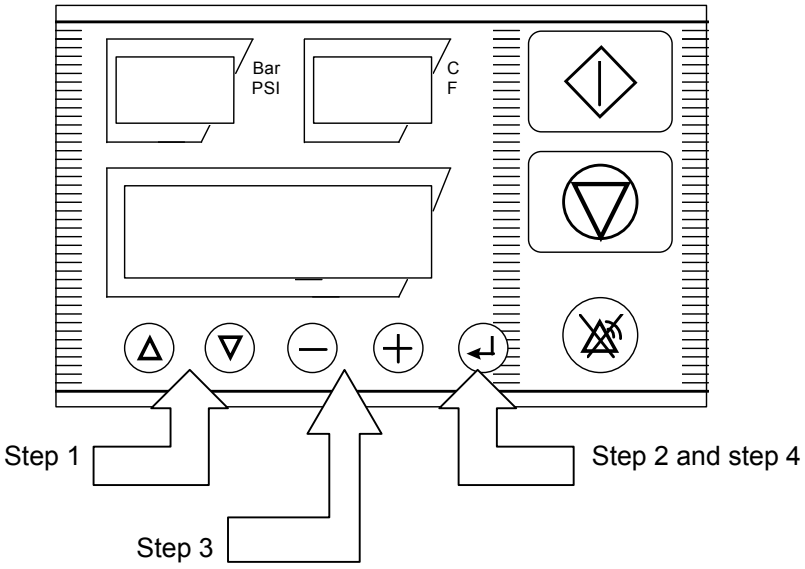
How the different menus and sub-menus can be entered, is shown below:



3.1.2 Parameter modification

a) Parameter modification without password protection

- Within the entered menu, select the parameter to be changed by scrolling through the menu with the up and down arrow-button (step 1)
- Push the enter-button and the parameter value will start blinking (step 2)
- Change the blinking value with the “+” or “-“ button (step 3)
- Confirm with the enter-button (step 4)



3.2 Menu structure – quick reference

Basic menu	Date & time	
	Ready to start	
	Standby	
	Starting	
	OnLoad	
	OFFloaded	
	Stopping (soft stop)	
	Blowing down	
	Warning and alarms	High pressure
		High temperature
		Air filter blocked
		Reversed phases
		Motor overload
		Motor over temperature
		Fan motor overload
		Power failure
		etc.
Error log menu	Logged error Nr. 1: error type + date & time	
	Logged error Nr. 2: error type + date & time	
	Logged error Nr. 3: error type + date & time	
	Logged error Nr. 4: error type + date & time	
	Logged error Nr. 5: error type + date & time	
	Logged error Nr. 6: error type + date & time	
	Logged error Nr. 7: error type + date & time	
	Logged error Nr. 8: error type + date & time	
	Logged error Nr. 9: error type + date & time	
	Logged error Nr. 10: error type + date & time	
Timer menu	Runn. hrs	
	Load hrs	
	Remaining hours to air filter change	
	Remaining hours to oil filter change	
	Remaining hours to oil separator service	
	Remaining hours to oil change	
	Grease motor	
Basic settings	Pressure unload level	
	Pressure load level	
	Pressure time programming ON / OFF	
	Pressure time settings	Current time & date set-up
		Date 1+time+pressure 1
		Date 1+time+pressure 2
		Date 1+time+pressure 3
		Date 1+time+pressure 4
		etc. (up to 32)
	Drain spit time : sec.	
	Drain dwell time : sec.	
	Dr. alarm 5 °C – 30 °C	
	Dryer start 0 – 15 min	
Settings menu	**Accessible only for aftersales and factory settings**	

Note: Dr. alarm and Dryer Start are visible if the drier option is enabled in the factory or in the SAV menu.

3.3 Menus and changeable features

3.3.1 Status menu

The status menu can be considered as the default menu. It is shown at start-up of the controller and the VCI07 will revert to this menu after one minute when the keyboard activity stops while displaying a different menu. The following messages are displayed :

- Machine status (e.g. standby, blowing down, onload, offload, etc.)
- Time and day
- Errors - active faults are blinking (e.g. air. Temp ----, Oil filt P warn, etc.)

3.3.2 Error log menu

The VCI07 saves the 10 most recent occurred faults. By using the up and down arrow-button all the messages can de displayed. Below an example is given:

Display message	Meaning
Fault log nr. 1 High pressure fault	Occurred fault number 1 is being displayed
Fault log nr. 2 Emergency stop	Occurred fault number 2 is being displayed
Fault log nr. 3 Air filter P warning	Occurred fault number 3 is being displayed
Fault log nr. 4 Temperature probe fault	Occurred fault number 4 is being displayed (See Table **1** on page 3)
Etc.	

Table 4

After a fault has been selected and the enter-button is pushed continuously, the date and time is displayed when the fault occurred.

3.3.3 Maintenance interval menu

In the timer menu the following timers can be checked:

Parameter	Meaning
Running hours	Total running hours is being displayed
Loaded hours	Total loaded hours is being displayed
Air filter time	Remaining hours to air filter service is being displayed
Oil filter time	Remaining hours to oil filter service is being displayed
Oil separator time	Remaining hours to oil separator service is being displayed
Oil change time	Remaining hours to oil change is being displayed
Lubrication	Motor lubrication

Table 5

Note: Setting and resetting the displayed values can be done in the service setting menu.

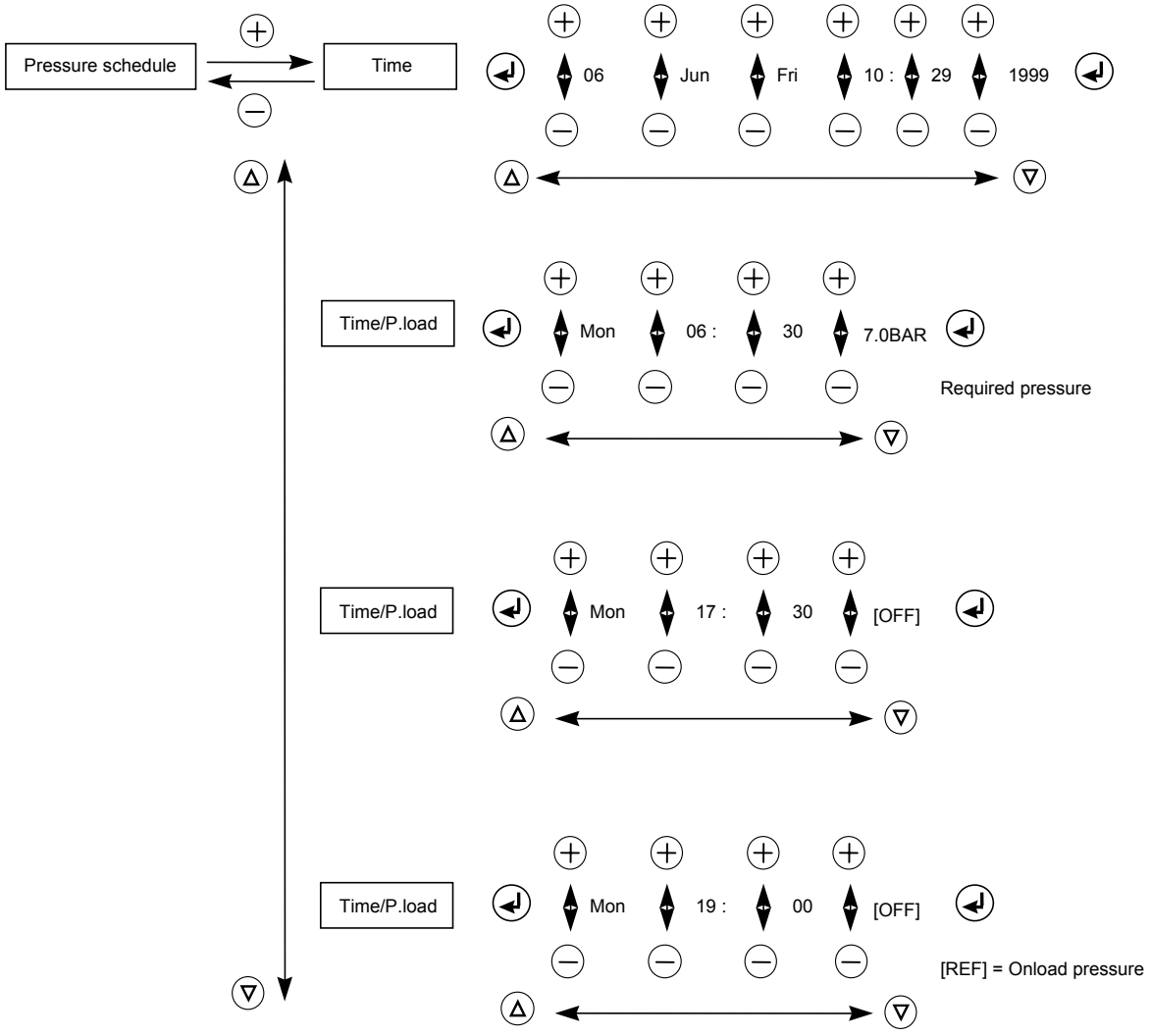
3.3.4 Basic settings menu

Parameter	Function	Default	Min.	Max.
Offload P	From this level the machine starts working offload (for max. value see also factory settings). After a timing ("slow down time"), the compressor stops except the pressure has reached the pressure load level.	8	6	P. max
On Load P	Pressure target in Variable Speed Regulation	6.6bar	P. min	Offload P.
P.schedule	Enabling or disabling the pressure schedule	OFF	OFF	ON
Press. schedule	The current time can be set as well as the configuration of the pressure schedule throughout the week (see 3.3.4.1 below)			
Drain spit time	Opening time of the drain to release the moisture of the after cooling process	2sec	1sec	20sec
Drain dwell time	Opening interval of the drain	30sec	10sec	120sec
Dr. alarm	Dryer high temperature alert threshold	0 °C	5 °C	30 °C
Dryer start	temporization of drier starting before the compressor = time necessary to produce dry air.	0	0	15min

Table 6

3.3.4.1 Pressure schedule

The pressure time menu is used for programming over an entire week of up to 32 different pressure settings (e.g.: [REF] onload P. or 7 bar pressure required), associated with specific times. To modify the parameters in this menu, also see settings: pressure time Chap. (3.2).



3.3.5 Machine configuration

In the machine configuration menu, the following application specific parameters can be set:

Parameter	Function	Default	Min.	Max.
			or possible values	
Auto restart	Automatic restart of the machine after a power failure in case when the machine was running before the power failure.	ARR	ARR	MAR
Start ctrl	Select between local ON/OFF (on VCI07 box) or remote ON/OFF via the digital input 3. ON/OFF check can also be made via the RS 485 link For example with Leadair	LOC	LOC, EXT, 485	
Press. ctrl	Selection between (no load / load) operation locally or via the RS 485 link (with Leadair) Remark: The DI 06 digital input has priority over this check function. DI 06 is the low-pressure switch input. Placing a relay in series with this pressure switch makes it possible to remotely control the (no load /load) operation.	LOC	LOC	485
Machine number	Address of the controller in an RS485 network	1	1	254
P unit	Selection of the pressure unit	BAR	BAR	PSI
T unit	Selection of the temperature unit	°C	°C	°F
Power unit	Defines and activates instantaneous power display	%	- - -	%
Language	Selection of the language in which the messages are displayed.	English		
Min temp	Minimum oil temperature below which the machine does not start.	2 °C	-10 °C	+10 °C
Relay 6	It defines R 06 output as: Alarm and fault reporting R 06 changes state in the event of a machine alarm Machine safety or maintenance counters to 0 ….. - or in the event of a fault the machine stops due to a safety problem - Fault report (only) Machine state: Output activated if the machine is operating (stand by) or if the motor is running	Alarm	Alarm / Error / State	

Table 7

Important note:
It is always possible to stop the machine locally when remote start / stop function is enabled.

3.3.6 Regulating settings

While the compressor is running loaded, a variable output signal is being generated by the PWM output. This signal is based on a PI control algorithm and can be used to drive an actuator (e.g. a proportional valve or a frequency inverter). The pressure regulation algorithm will control the actuator in order to maintain the load pressure at all time. If the actuator can not sufficiently cut back, the compressor will rise until it reaches the unload pressure. The compressor will then unload and the PI pressure control algorithm is disabled. As the pressure goes down and reaches the load level again, the compressor loads again and the PI control will take over. (see Table 6, Chap. 3.3.4)

ATTENTION :
Do not adjust correctors P and I. They undergo in-factory configuration for compatibility with more than 95% of installations. During the setup, the installer checks the settings. If in doubt contact our after-sales service.

Parameter	Function	Default	Min.	Max.
Min. value	It reflects the minimum output level of the control algorithm at which can be cut back. Below this value, the compressor will be put offload. The minimum value is expressed in %.	0%	0%	100%
P factor	This proportional control factor determines how much the control will react to differences between actual and target pressure.	40%	0%	100%
I factor	This integral control factor determines the “weight” of the integral on the control action.	10%	0%	100%
Model	Maximum frequency management model.	Setting dependent upon machine type (see VCI07 settings instructions)		
Unload Fr.	The frequency at which the machine turns in no load operation	20Hz	0Hz	200Hz
Max. Freq.	Maximum frequency of variator.	Setting dependent upon machine type (see VCI07 settings instructions)		
Min Freq.	Motor-compressor minimum frequency, set into the variable speed drive. This parameter is useful for displaying the instantaneous power	10Hz	0Hz	200Hz
Max. Power	Maximum power of machine.	Setting dependent upon machine type (see VCI07 settings instructions)		
Onload loss	Defined for instantaneous power calculation	0	16	
Safety fac.=	Safety factor and proportional correction.	Setting dependent upon machine type (see VCI07 settings instructions)		
Ventil Stop.	Ventilator stop.	OFF	OFF	ON
T Vent. STOP	Time between shaft stop and ventilator stop = tempo at which the ventilator continues to turn after shaft stop. This safety feature prevents the oil temperature from rising after the machine has stopped.	60	0	600
Fan sp. entr	Activates the ventilation speed variation: used to control the oil temperature	OFF	ON	OFF
TH reg.	Visible when ‘Var ventil ‘ is active, this parameter is the oil temperature setpoint: it is the desired oil temperature	80 °C	70 °C	100 °C

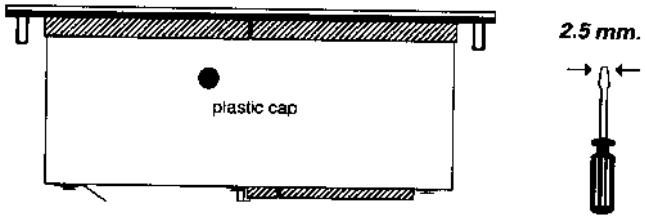
Table 8

3.4 Micro power interruptions

The VCI07 is standard equipped with a micro power interruption detection of 40ms function. Every zero passage of the 24VAC main is detected. When 2 consecutive cycles or a power failure of 40ms is detected, the controller will automatically stop the machine. At the same time, all relays are released and 3 horizontal dashes are displayed on the LED display. By stopping the machine during a micro power interruption, sparks on the relay contacts are avoided which will extend the relay lifetime.

4 - Contrast

The only possible adjustment is the visual angle of the alphanumeric display. In the factory this angle is already adjusted to its best position. When another angle is wanted it can be changed by removing the black cap at the bottom of the unit. Just behind the aperture a 270 degrees potentiometer is located. Use a screwdriver with a 25mm blade or less to make the adjustment. Do not forget to replace the black cap.



5 - Maintenance

The VCI07 does not need maintenance. When the front panel is dirty, it can be cleaned with a soft cloth drenched in soap water or methanol.

6 - Start up and optimising final machine adjustments

The machine undergoes in-factory configuration in order to limit the need for adjustments during installation. Therefore, only the pressure thresholds need to be set :

- **“OnLoad P”** = desired regulation pressure (in vari-speed)
  In order to conserve energy to the maximum, it is advised to lower the regulation pressure to the lowest possible level (so as to optimize power)

- **“Offload P”** = Delayed stop pressure of the machine
  For energy consumption that is less than the minimum capacity , it is advised to set it at + 0,5 bar above the “P load”.

In certain rare cases, it may prove useful to adjust the regulation settings (see chapter 7, main operational occurrences).

7 - Main occurrences

Occurrences	Solutions
1. THE MACHINE STOPS AND STARTS AGAIN BUT ONLY FOR A SHORT TIME	Increase unloading time (for +5 to +20 s) so that the motor doesn't stop so often (the compressor runs for longer before stopping). If this delay is insufficient, increase the "unloading time" and the minimum unloading time by the same amount (for example : +30s)
2. THE MACHINE STOPS, DISPLAYING THE MESSAGE "MOTOR ERROR"	Check that there is no mechanical blockage of the motor. See variator instructions : the fault comes from the variator. Identify the fault. Ne pas réinitialiser la machine sans chercher la source du problème.
3. THE OIL TEMPERATURE IS TOO HIGH (THE MACHINE STOPS OR AN ALERT IS GIVEN)	Lower the pressure to the min. level that the client will need. Decrease the "dry fact" setting by 2 to 10% In the event of failure, proceed more progressively : by consecutive steps of 1 to 2%, testing each time the rise in machine temperature. In this way, machine cooling is steady and total absorbed power is reduced (as is the case with the capacity)
4. THERE ARE LARGE FLUCTUATIONS OF PRESSURE (MORE THAN 0,2 BARS) FOR FLOWS IN BETWEEN THE MAXIMUM AND MINIMUM CAPACITYI.	Read the variator frequency (see variator instructions) Check that it is higher than the minimum frequency (the capacity is thus higher than the minimum capacity). If this is the case, reduce the integral factor (I factor) so as to reduce fluctuations. Attention : reducing it too much will slow the rise in pressure.
5. THE PRESSURE DOES NOT RISE QUICKLY	Increase the P factor.
6. THE MACHINE EQUIPPED WITH A DRIER DOES NOT START	Wait or reduce the 'dém séch' drier starting time to 0 min for machine starting.
7. THE MACHINE STOPS AND ''ERR T. MOTEUR'' IS DISPLAYED	The variable speed motor is overheating (RLR 220V). Check that the machine is not operating at an excessive ambient temperature (> 40 °C)
8. THE MACHINE STOPS AND (DRYER FAULT) IS DISPLAYED	The drier low temperature threshold has been reached Contact your After Sales Service to check that the drier is not frozen, (if the drier is not frozen, it is possible to maintain the drier low temperature threshold in the drier menu)

8 - Dryer Management

This controller is compatible with the integral dryer and specific variable speed motor options.

Dryer Management

- The VCI07 may be configured in three manners to control the dryer:
  - **- - -** “no message”
  - Ale “Alert” (default setting)
  - ERR “Stop on FAULT”

- - -	Bottom Message /	Top Message /
Ale	Dryer t. too low	Dryer t. too high
ERR	ERR : Dryer t. low	ERR : Dryer t. high

A start time before compressor starting can be indicated (see Chap. 3.2 “Base” settings).

Dryer freezing

- The VCI07 indicates a dryer alert when the dryer temperature is less than the bottom threshold value:
It displays “Dryer t. too low” and the machine does not stop.
The unit may be stopped following an error message by changing its mode with ERR: it displays
“ ERR : Dryer t. low ”, the machine stops.

Dryer and By-Pass replacement

If the dryer is replaced or has a direct connection (by-pass), it is necessary to disable the dryer functions in the drier menu-accessible through SAV code.
The dryer “dew point” temperature acquisition is then disabled, as well as the ON/OFF control.

9 - Specific variable speed motor

In certain applications, the motor is equipped with motor temperature control probes.
A high motor temperature alarm is activated in order to alert the user about motor overheating.
A machine fault – a complete compressor shutdown is triggered when the maximum temperature threshold of the winding is reached (see Operation Incidents).
Check the compressor operation ambient temperature and the case internal temperature.

NOTES

NOTES

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