

OPERATING MANUAL

(Item number of operating manual: 00 11 01 42)

PFT Frequency Converter



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Fault rectification and safety instructions for frequency converter
Safety instructions

- 1) Please consider that the condenser of the intermediate circuit of the frequency converter continues to carry voltage for some time even after the supply voltage has been switched off. To avoid the danger of electric shocks, the frequency converter must be cut off from the mains voltage prior to beginning any work on the unit. Wait at least one minute **after** switching off and all the unit's LEDs have gone dark before beginning work.
- 2) Insulation tests or withstand voltage tests may not be performed on any components of the frequency converter. The unit's electronics contain semiconductor parts which are not designed for such high voltages.
- 3) The digital control panel of the device may not be dismantled if the supply voltage is switched on. Never touch the circuit board while the device is still switched on.

Special warnings

- 1) The outlet of the frequency converter may never be connected to a normal LC/RC noise potential filter.
- 2) Never connect a condenser to the input/output stages and/or a surge arrester to the output stage of the device.
- 3) If the installation of a switch or contactor between the frequency converter and the motor should be required for any reason, care must be taken that the motor is not switched on or off during the operation of the frequency converter.

Important instruction, please be sure to observe!

Observe all safety instructions, warnings and operating instructions. The unit must always be operated with the housing closed and the terminals covered. Units with visible damage or missing parts may never be connected or switched on. The operator of the unit is fully responsible for all injuries to personnel and material damage arising from non-observance of these safety instructions and warnings.

Safety and operating instructions for frequency converter, introduction

Depending on the unit's protection category, parts of the frequency converter could conduct voltage during operation, may not be isolated or may exhibit high temperatures. If components of the housing or the terminal covers are removed, faulty installation or improper operation may result in serious injuries and damage to other devices. For this reason, be sure to follow all warnings and operating instructions contained in this manual. The installation, setup and maintenance of the unit may only be performed by persons specifically qualified for this. (IEC 364/ Cenelec HD 384 or DIN/VDE 0100 and IEC 664 or DIN/VDE). All relevant national safety and accident prevention regulations must likewise be observed. For the purpose of maintaining the safety requirements, qualified persons are defined as employees who are familiar with the installation, setup and operation of frequency converters and possess acceptable qualifications for this type of work.

Proper use

Frequency converters are designed for installation in electronic systems or machines. A frequency converter installed in a machine may only be put into operation if the machine conforms to EU guideline 89/392/EEC (machine directive). The directive EN 60204 must also be observed. Furthermore, the frequency converter may only be operated if it also conforms to the EMC standard (89/336/EEC). The frequency converters of this series meet the requirements of the low voltage guideline 73/23/EEC. The harmonised norms of the series prEN 50178/DIN VDE 0160 have likewise been applied together with EN 660439-1/VDE 06600 Part 500 and EN 60148/VDE 0558. The technical data on the type plate as well as the specifications and connection requirements in this documentation must likewise be observed at all times.

Transportation and storage

All instructions for transport, storage and proper handling must be observed. The ambient conditions must meet the requirements of prEN 50178.

Electrical connections

When working on voltage-carrying components, all national safety regulations must be observed (e.g. VBG 4 in Germany). The electrical installation of the units must conform to all applicable regulations. For further instructions, refer to the documentation. In particular, all installation instructions pertaining to EMC immunity must be observed, e.g. in relation to shielding, earthing, order of the filters and the laying of cables. This also applies to units with CE certification. The observance of the EMC regulations limits the responsibility of the manufacturer of the machine or system.

Operation

Please note that the condensers built into the unit are still under voltage for about 5 minutes after switching off the unit's power supply. Keep this in mind so that you do not contact any terminals or other parts of the electrical switching mechanisms after switching off the mains voltage.

Fault rectification, frequency converter

In this chapter, the frequency converter's fault indicators are described, as well as faults caused by malfunctions of the motor/machine and the appropriate remedies.

Fault diagnosis and remedies

In this section, the alarm and fault indicators are described as well as the faults caused by malfunctions of the VS-606V7 and appropriate measures to be taken.

< Remedies for versions with smooth cover >

1. Trigger an error reset or switch the voltage supply off and back on again.
2. If the fault can not be rectified in this way, proceed as follows:
 - (1) Switch the voltage supply off and check the external switching mechanism.
 - (2) Switch the voltage supply off and replace the smooth cover by a cover with a digital control panel so that fault signals are displayed. Faults are then displayed after switching the voltage back on.

< Remedies for versions with digital control panel >

: ON : Flashing : OFF

Alarm signals and their meaning

Alarm display		Status of the frequency converter	Explanation	Causes and remedy
Digital control panel	OPERATION (green) ALARM (red)			
Flashing		Warning Fault The contacts do not change their state.	UV (under-voltage of power supply) The main circuit's voltage has fallen below the under-voltage trigger value while the frequency converter's output was switched off. 200 V: Switches itself off if the direct voltage in the main circuit is below about 200 V (single-phase: 160 V). 400 V: Switches itself off if the direct voltage in the main circuit is below about 400 V. (Control voltage error) A control voltage error was detected while the inverter output was switched off.	Check: • Mains voltage • Mains voltage connection • Condition of all terminals
Flashing			OV (over-voltage in main circuit) The main circuit's voltage has risen above the over-voltage trigger value while the frequency converter's output was switched off. 200 V: About 410 V or more. 400 V: About 820 V or more.	Check the supply voltage.
Flashing			OH (excess temperature of output component) The air temperature at the output component's inlet has risen while the frequency converter's output is switched off.	Check the air temperature.
Flashing			CAL (MEMOBUS communication is pending) With parameter n003 (selection of operational command) set to 2 or parameter n004 (selection of frequency conduction value) set to 6 and the supply voltage switched on, the control system did not receive the correct data.	Check the communication systems and transmission signals.

Alarm display		Status of the frequency converter	Explanation	Causes and remedy
Digital control panel	OPERATION (green) ALARM (red)			
Flashing		Warning: Fault The contacts do not change their state.	OP□ (parameter setting error for parameters set via MEMOBUS communication) OP1: Two or more values have been set for the selection of the multi-function input. (Parameters n050 to n056) OP2: Incorrect relation between the V/F parameters. (Parameters n011, n013, n016) OP3: The setting for the motor's nominal current is more than 150% of the frequency converter's nominal current. (Parameter n036) OP4: The upper/lower fixed reference values are interchanged. (Parameters n033 and n034) OP5: (Parameters n083 to n085)	Check the settings.
Flashing			OL 3 (overtorque) The motor current exceeds the value set by parameter n089.	Reduce the load and lengthen the acceleration/ deceleration times.
Flashing			SER (sequence error) While in output mode, the frequency converter received a local/remote selection command or modification commands (via multi-function terminals) for the communication/control terminals.	Check the external electric circuit (signal sequence).

Alarm display		Status of the frequency converter	Explanation	Causes and remedy
Digital control panel	OPERATION (green) ALARM (red)			
Flashing		Warning Fault The contacts do not change their state.	BB (external base block) An external base block is active at a multi-functional terminal. The frequency converter's output is switched off (motor slows down and stops). This state is neutralised as soon as the input command is no longer received.	Check the external electric circuit (signal sequence).
Flashing			EF (simultaneous right run and left run command) If a right run command and a left run command are simultaneously queued for more than 500 ms, the frequency converter shuts down in compliance with parameter n005.	Check the external electric circuit (signal sequence).
Flashing			STP (Stop command from control panel) While a right-left run command was queued at the control circuit terminals or while an operational command was queued at the communication terminals, the □ button was pressed. The frequency converter shuts down in compliance with parameter n005. Frequency converter with emergency stop receives an emergency stop signal. The frequency converter shuts down in compliance with parameter n005.	Open the right-left run command at the control circuit terminals. Check the external electric circuit (signal sequence).
Flashing			FAN (fan error) The fan is jammed.	Check: • The fan • Is the fan connected correctly?
Flashing			CE (MEMOBUS) communication error	Check the communication systems and transmission signals.
Flashing			FBL (loss of PID feedback) The PID feedback value has fallen below the detection level. If the PID feedback is lost, the frequency converter continues operating according to the specifications in parameter n136.	Check the mechanical system. Rectify the cause or increase the value of parameter n137.
Flashing			Communication error with one of the optional cards. A communication error has occurred in an operation mode in which either an operational command is used or in which the fixed reference value is from an optional card.	Check the communication systems and transmission signals.

Alarm display		Status of the frequency converter	Explanation	Causes and remedy
Digital control panel	OPERATION (green) ALARM (red)			
		The frequency converter's output is switched off, the motor slows down and stops.	<p>OC (over-current) The inverter's output current has briefly risen 250% above the nominal current.</p>	<p>Short circuit or short-to-ground at output side of converter. Load's torque of inertia too high. Acceleration/delay time too short (parameters n019 to n022). Special motor Motor is started while it is still slowing to a stop. The motor output is greater than the output of the frequency converter. Open/close a contactor on the output side of the frequency converter.</p>
			<p>OV (over-voltage in main circuit) The direct voltage in the main circuit rises above the permitted value due to excess power returned by the motor. Trigger voltage 200 V: Shutdown if direct voltage in main circuit exceeds 410 V. 400 V: Shutdown if direct voltage in main circuit exceeds 820 V.</p>	<p>Delay time too short (parameters n020 and n022) Lowering mode or other negative load (hoist, etc.) Lengthen the deceleration time Connection of an additional brake resistor</p>
			<p>UV1 (under-voltage in main circuit) The direct voltage in the main circuit exceeds the permitted value while frequency converter's output is in operation. Trigger voltage 200 V: Shutdown if direct voltage in main circuit falls below 200 V. (Single-phase: 160 V) 400 V: Shutdown if direct voltage in main circuit falls below 40 V.</p>	<p>Reduction of supply voltage Interruption of one phase of the supply voltage Short power failure Check: Supply voltage Main circuit wiring connection Terminal connections</p>

Alarm display		Status of the frequency converter	Explanation	Causes and remedy
Digital control panel	OPERATION (green) ALARM (red)			
		Protection mode The frequency converter's output is switched off, the motor slows down and stops.	UV2 (control voltage error) A control voltage error has been detected.	Switch the mains voltage off and back on again. If this doesn't help, the frequency converter must be replaced.
			OH (excess temperature of output component) Temperature rise due to overload of frequency converter or excess supply air temperature.	Overload False V/F setting Acceleration time too short (if error occurred while accelerating). Supply air temperature too high (> 50 °C) Check: Load V/F settings (constants n011 to n017), temperature of supply air
			OL1 (motor overload) The built-in electronic thermal motor overload protection device triggered.	Check the motor load or the V/F settings (parameters n011 to n017). Enter the nominal motor current value for parameter n036 specified on the type plate.
			OL2 (frequency converter overload) The built-in electronic thermal overload protection device of the frequency converter triggered.	Check the load or the V/F settings (parameters n011 to n017). Check the nominal output of the frequency converter.
			OL3 (excess torque) In V/F operation: The frequency converter's output current exceeds the value set via parameter n098. Vector operation: Motor current or torque exceeds the value set via parameters n097 and n098. If excess torque is detected, the frequency converter continues operation according to the conditions set in parameter n096.	Check the system driven and rectify the fault or increase the value of parameter n098 to the highest value permitted for the motor.

Alarm display		Status of the frequency converter	Explanation	Causes and remedy
Digital control panel	OPERATION (green) ALARM (red)			
		Protection mode The frequency converter's output is switched off, the motor slows down and stops.	EF□ (external fault) Frequency converter receives a fault signal via control circuit terminals. EF0: External reference value error via MEMOBUS communication EF1: External fault signal via control terminal S1 EF2: External fault signal via control terminal S2 EF3: External fault signal via control terminal S3 EF4: External fault signal via control terminal S4 EF5: External fault signal via control terminal S5 EF6: External fault signal via control terminal S6 EF7: External fault signal via control terminal S7	Check the external switch mechanism (command sequence).
			CPF-00 Communication between frequency converter and digital control panel was interrupted for more than 5 s while supply voltage was switched on.	Check if the control panel is installed correctly. Then switch the supply voltage off and back on again. If this doesn't help, the control panel or the frequency converter must be replaced.
			CPF-01 At the start of transmission with the digital control panel, a transmission error occurred lasting more than 5 s.	Check if the control panel is installed correctly. Then switch the supply voltage off and back on again. If this doesn't help, the control panel or the frequency converter must be replaced.

			<p>CPF-04</p> <p>An EEPROM error occurred in the control circuit of the frequency converter.</p>	<p>Record all parameter values, then re-initialise the parameters.</p> <p>Switch the supply voltage off and back on again. If this doesn't help, the control panel or the frequency converter must be replaced.</p>
		<p>Protection mode</p> <p>The frequency converter's output is switched off, the motor slows down and stops.</p>	<p>CPF-05</p> <p>An error at the A/D converter was detected.</p>	<p>Switch the supply voltage off and back on again. If this doesn't help, the control panel or the frequency converter must be replaced.</p>
			<p>CPF-06</p> <ul style="list-style-type: none"> Faulty connection to an optional card An unsuitable optional card was connected. 	<p>Switch the mains voltage off. Check the connection to the digital control panel. Check the software's version number (n179).</p>
			<p>CPF-07</p> <p>Fault in control panel circuit (EEPROM or A/D converter error)</p>	<p>Check if the control panel is installed correctly. Then switch the supply voltage off and back on again. If this doesn't help, the control panel or the frequency converter must be replaced.</p>
			<p>Self-diagnosis error of optional communication card</p>	<p>Optional card error</p>
			<p>Model code error of optional communication card</p>	<p>Replace optional card</p>
			<p>DPRAM error of optional communication card</p>	

			OPR (control panel communication error)	Check if the control panel is installed correctly. Then switch the supply voltage off and back on again. If this doesn't help, the control panel or the frequency converter must be replaced.
			CE (MEMOBUS communication error)	Check the communication systems and transmission signals.
		Stops in compliance with the parameter values.	STP (emergency stop) After receiving an emergency stop signal, the frequency converter shuts down in compliance with the settings of parameter n005.	Check the external switching mechanism (command sequence).
			FBL (loss of PID feedback) The PID feedback value has fallen below the detection level. If the PID feedback is lost, the frequency converter continues operation according to the specifications in parameter n136.	Check the mechanical system. Rectify the cause or increase the value of parameter n137.

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Knauf PFT GmbH & Co. KG
Postfach 60 D-97343 Iphofen
Einersheimer Straße 53 D-97346 Iphofen

Telephone +49 (0)93 23/31-1818

Fax +49 (0)93 23/31-770

E-mail info@pft-iphofen.de

Internet www.pft.eu