



Technical Bulletin Supplement to (TB-0053S-01) F3 & F4 Varispeed Fault Codes

F3 & F4 Varispeed Fault Codes (BEST Software)

This is a supplement to TB-0053 for the possible fault codes that may be generated by the F3 & F4 inverter. These codes will only be visible by use of the BEST converter and software.

	Error descriptions	Result: Possible causes and solutions
1	Undervoltage in Direct Current (DC) intermediate circuit	Possible failure reasons: - Phase failure in power supply * Check frequency inverter power supply - Power supply voltage too low * Check frequency inverter power supply. It should not drop below 380 V - 5 % (342 V)
2	Overvoltage in Direct Current (DC) intermediate circuit	Possible failure reasons: - Power supply voltage too high * Check frequency inverter power supply voltage. It should not be higher than 480 V + 5 % (504 V) - Configuration possibility "Power supply voltage" not adjusted to the actual one * Check if the "Power supply voltage" is adjusted to the nominal value of the local power supply voltage - Voltage peaks due to defective compressor valve plate * Pump down the compressor suction side; close the suction shut-off valve and observe if the pressure on the compressor suction side increases unusually fast (checking the discharge valves) * The suction valves of the compressor can only be checked by removing the cylinder heads - Network fault power too low (mainly in case of generator operation) * Check if the ratio of the "Short circuit current of the PCC (Power Control Center)" divided by the "sum of the max. Operating currents of the connected VARISPEED compressors" is higher than 70. Typically this is the case when the sum of the power of all the VARISPEEDs connected, exceeds 50 % of the assigned transformer power or 25 % of the assigned genset power
3	Overcurrent	Possible failure reasons: - Liquid operation * Check the superheat at compressor inlet * Check if refrigerant can condense in the cylinder head during standstill * Check if refrigerant can condense in the suction pipe or crankcase of the compressor during standstill - Wrong parameterization of the frequency inverter * Check if parameters are different from the standard setting by clicking the button for transferring the standard setting to the frequency inverter - Wrong motor connection * Check connection bridges at compressor terminal plate - Phase failure at motor terminals * Check wiring at motor terminals - Defective insulation of cables from frequency inverter to motor * Check cables - Short circuit inside motor * Check motor winding resistances - Compressor mechanically defect * In case the compressor doesn't start anymore, it indicates that the compressor is mechanically defect - Shut-off or interruption of the power supply voltage to the frequency inverter while the compressor is running * Check if any component switches unusually often the mains contactor in front of the frequency inverter. A good indication therefore is the counter "Number of inverter power-ups" * Compare the wiring diagram with the schematic one recommended by BITZER. The power supply to the frequency inverter should only be disconnected by opening of the safety circuit

21	Overtemperature (IGBT)	<p>Possible failure reasons:</p> <ul style="list-style-type: none"> - Suction gas temperature too high to sufficiently cool the frequency inverter <ul style="list-style-type: none"> * Check that the max. Suction gas temperature does not exceed 20 °C - Operation outside of the application range <ul style="list-style-type: none"> * Check if the evaporating temperature or condensing temperature exceeds the application range of the compressor (defective condenser fan, ...) * Check ambient temperature of the frequency inverter. It should not exceed 43 °C - Defective compressor valve plate <ul style="list-style-type: none"> * Pump down the compressor suction side; close the suction shut-off valve and observe if the pressure on the compressor suction side increases unusually fast (checking the discharge valves) * The suction valves of the compressor can only be checked by removing the cylinder heads - Compressors C1-C3: Wrong or wrong positioned suction gas filter <ul style="list-style-type: none"> * Check if the suction gas filter is positioned correctly. The two corners must show into the direction of the motor (suction gas cooling) * Check if the suction gas filter is equipped with a guiding plate. Therefore, the suction gas valve must be dismantled - Insufficient heat transfer to ambient <ul style="list-style-type: none"> * Check if frequency inverter housing is clean - Insufficient heat transfer at frequency inverter cooling plate <ul style="list-style-type: none"> * Check frequency inverter mounting at the compressor
18	Autotune fault	<p>Possible failure reasons:</p> <ul style="list-style-type: none"> - Wrong motor connection <ul style="list-style-type: none"> * Check connection bridges at compressor terminal plate - Phase failure at motor terminals <ul style="list-style-type: none"> * Check wiring at motor terminals - Defective insulation of cables from frequency inverter to motor <ul style="list-style-type: none"> * Check cables - Short circuit inside motor <ul style="list-style-type: none"> * Check motor winding resistances
20	Frequency inverter overload	<p>Detailed failure description: Frequency inverter overload does mean that the output current was too high over a longer period of time whereas the trip "Overcurrent" stands for a direct shut off due to a very high current (e. g. short circuit)</p> <p>Possible failure reasons:</p> <ul style="list-style-type: none"> - Operation outside of the application range <ul style="list-style-type: none"> * Check if the evaporating temperature or condensing temperature exceeds the application range of the compressor (defective condenser fan, ...) - Liquid operation <ul style="list-style-type: none"> * Check the superheat at compressor inlet * Check if refrigerant can condense in the cylinder head during standstill * Check if refrigerant can condense in the suction pipe or crankcase of the compressor during standstill - Wrong parameterization of the frequency inverter <ul style="list-style-type: none"> * Check if parameters are different from the standard setting by clicking the button for transferring the standard setting to the frequency inverter - Wrong motor connection <ul style="list-style-type: none"> * Check connection bridges at compressor terminal plate
22	Control board overheating (resin temperature))	<p>Possible failure reasons:</p> <ul style="list-style-type: none"> - Suction gas temperature too high to sufficiently cool the frequency inverter <ul style="list-style-type: none"> * Check that the max. suction gas temperature does not exceed 20 °C - Operation outside of the application range <ul style="list-style-type: none"> * Check if the evaporating temperature or condensing temperature exceeds the application range of the compressor (defective condenser fan, ...) - Defective compressor valve plate <ul style="list-style-type: none"> * Pump down the compressor suction side; close the suction shut-off valve and observe if the pressure on the compressor suction side increases unusually fast (checking the discharge valves) * The suction valves of the compressor can only be checked by removing the cylinder heads - Insufficient heat transfer at frequency inverter cooling plate <ul style="list-style-type: none"> * Check frequency inverter mounting at the compressor - Insufficient heat transfer to ambient <ul style="list-style-type: none"> * Check if frequency inverter housing is clean

26	Overload of the +24 V power supply or digital output	<p>Possible failure reasons:</p> <ul style="list-style-type: none"> - Max. Current of the +24 V control voltage supply of the frequency inverter exceeded <ul style="list-style-type: none"> * Check the devices and the wiring at the in- and output terminals of the frequency inverter. <p>Common reasons for potential differences are wrong grounding, wrong grounding potential, EMC problems, unfavorable cable routing and too long cables.</p>
33	Failure during stator resistance measurement	<p>Possible failure reasons:</p> <ul style="list-style-type: none"> - Wrong motor connection <ul style="list-style-type: none"> * Check connection bridges at compressor terminal plate - Phase failure in power supply <ul style="list-style-type: none"> * Check frequency inverter power supply - Defective insulation of cables from frequency inverter to motor <ul style="list-style-type: none"> * Check cables - Short circuit inside motor <ul style="list-style-type: none"> * Check motor winding resistances - Wrong motor <ul style="list-style-type: none"> * Remove all wirings from the terminal plate (FI wiring as well as connection bridges) and measure the electrical continuity. There should be no electrical continuity between U1-V1-W1 as well as between U2-V2-W2. If there is continuity, please contact BITZER.
35	Safety input failure (SDI1 - SDI2)	<p>Possible failure reasons:</p> <ul style="list-style-type: none"> - The frequency inverter is disabled due to the opened safety input (SDI1 - SDI2) <ul style="list-style-type: none"> * Check if a bridge is applied between terminal pins SDI1 and SDI2
41	Overtemperature (IGBT sensor 1)	<p>Possible failure reasons:</p> <ul style="list-style-type: none"> - Suction gas temperature too high to sufficiently cool the frequency inverter <ul style="list-style-type: none"> * Check that the max. Suction gas temperature does not exceed 20 °C - Operation outside of the application range <ul style="list-style-type: none"> * Check if the evaporating temperature or condensing temperature exceeds the application range of the compressor (defective condenser fan, ...) * Check ambient temperature of the frequency inverter. It should not exceed 43 °C - Defective compressor valve plate <ul style="list-style-type: none"> * Pump down the compressor suction side; close the suction shut-off valve and observe if the pressure on the compressor suction side increases unusually fast (checking the discharge valves) <ul style="list-style-type: none"> * The suction valves of the compressor can only be checked by removing the cylinder heads - Compressors C1-C3: Wrong or wrong positioned suction gas filter <ul style="list-style-type: none"> * Check if the suction gas filter is positioned correctly. The two corners must show into the direction of the motor (suction gas cooling) <ul style="list-style-type: none"> * Check if the suction gas filter is equipped with a guiding plate. Therefore, the suction gas valve must be dismantled - Insufficient heat transfer to ambient <ul style="list-style-type: none"> * Check if frequency inverter housing is clean - Insufficient heat transfer at frequency inverter cooling plate <ul style="list-style-type: none"> * Check frequency inverter mounting at the compressor
42	Overtemperature (IGBT sensor 2)	<p>Possible failure reasons:</p> <ul style="list-style-type: none"> - Suction gas temperature too high to sufficiently cool the frequency inverter <ul style="list-style-type: none"> * Check that the max. Suction gas temperature does not exceed 20 °C - Operation outside of the application range <ul style="list-style-type: none"> * Check if the evaporating temperature or condensing temperature exceeds the application range of the compressor (defective condenser fan, ...) * Check ambient temperature of the frequency inverter. It should not exceed 43 °C - Defective compressor valve plate <ul style="list-style-type: none"> * Pump down the compressor suction side; close the suction shut-off valve and observe if the pressure on the compressor suction side increases unusually fast (checking the discharge valves) <ul style="list-style-type: none"> * The suction valves of the compressor can only be checked by removing the cylinder heads - Compressors C1-C3: Wrong or wrong positioned suction gas filter <ul style="list-style-type: none"> * Check if the suction gas filter is positioned correctly. The two corners must show into the direction of the motor (suction gas cooling) <ul style="list-style-type: none"> * Check if the suction gas filter is equipped with a guiding plate. Therefore, the suction gas valve must be dismantled - Insufficient heat transfer to ambient <ul style="list-style-type: none"> * Check if frequency inverter housing is clean - Insufficient heat transfer at frequency inverter cooling plate <ul style="list-style-type: none"> * Check frequency inverter mounting at the compressor