13 Diagnosis

13.1 Display of LED Characters

Character	A	b	C	d	E	F	H	i	L
Display									
Character	n	O	o	P	r	S	t	U	–
Display									

Tab. 13-1: Display of LED characters

13.2 Status Code

Code	Description
P.oFF	Displayed only at power down / drop in stop state
tUnE	Motor parameter tuning
88888	Power on during start state
PSLP	PID sleeping
StO-A	Safe torque off enabled
PAr1	Parameter Set change from Set2 to Set1
PAr2	Parameter Set change from Set1 to Set2
S.Err	Parameter change blocked
PrSE	Parameter setting contradiction, parameter password protected

13.3 Warning Code

Code	Description
PLE	Pump leakage
OE-4	Overvoltage during stop
Ot	Motor over temperature
E-St	Terminal Error Signal
C-dr	Communication disconnection
Aib-	Analog input broken wire detection
FLE	Fan maintenance period expired
OCi	Communication data exceeds value range
UH-A	Under Temperature warning
APF1	ASF customer warning 1
APF2	ASF customer warning 2
APF3	ASF customer warning 3
APF4	ASF customer warning 4

Code	Description
APF5	ASF customer warning 5
USdc	UnSupported Device Configuration
Sli-	Speed limited by maximum Voltage
iSt	Invalid State Transition
FtL	RPDO Telegram Loss
Fdi	Option card process data invalid

13.4 Error Code

13.4.1 Error 1 (OC-1), Error 2 (OC-2), Error 3 (OC-3): Overcurrent

Possible reason	Solution
The motor has been damaged due to overheating or the motor insulation is damaged	Check the insulation resistance. If it is damaged, replace the motor
Magnetic contactor (MC) on the output side of the drive has turned on or off	Set up the operation sequence so that the MC is not tripped while the drive is outputting current
Drive fails to operate properly due to interference	Review the possible solutions provided for handling interference, check the section on handling interference and the control circuit lines, main circuit lines, and ground wiring
One of the motor cables has shorted out or there is a grounding problem	• Check the motor cables, remove the short circuit and power the drive back up • Check the resistance between the motor cables and the ground terminal, replace damaged cables
The control mode and motor do not match	Check which control mode the drive is set to (C0.00) • For SM, set C0.00 = 1, 2 • For ASM, set C0.00 = 0, 1, 2
Excessively short acceleration/deceleration time	Increase acceleration time (E0.26)/deceleration time (E0.27)
Excessive start-up frequency	Reduce start frequency (E0.36)
Excessive load rotation inertia or impact	Increase acceleration time (E0.26), reduce sudden load change
Running command active while motor is coasting	Restart after motor stop or start with speed capture (E0.35)
Wrong setting of user-defined V/f curve parameters	Adjust setting of user-defined V/f curve parameters
Wrong motor parameters setting	• Check motor nameplate parameters • Motor parameters retuning
Excessive torque boost	Reduce torque boost setting (C2.21, C2.22)
Phase-phase or line-to-ground short circuit	Check if phase-phase or line-to-ground short circuit, if short circuit exists, then the transistor is damaged, please contact service
Excessive overexcitation braking factor	Reduce [E0.55]
Load change in run mode	Reduce occurrence and scale of change

Possible reason	Solution
Low mains voltage	Check input power supply
The motor cable is too long	• Decrease the carrier frequency (C0.05) • Use a frequency converter with larger power

13.4.2 Error 4 (OE-1), Error 5 (OE-2), Error 6 (OE-3): Overvoltage

Possible reason	Solution
Surge voltage from power supply	Check input power supply
Motor to earth short circuit causes DC-bus capacitors overcharged	Check motor connection
Direct start during motor running	Restart after motor stop or start with speed capture (E0.35)
Excessively short acceleration time	Increase acceleration time (E0.26) or use S-curve (E0.25, E0.28, E0.29)
Wrong setting of speed tracing parameters	Adjust setting of speed tracing parameters(E0.42, E0.43)
Encoder cable is disconnected or wiring is wrong	Check the wring of encoder
Deceleration time is too short	Increase deceleration time(E0.27); Add braking resistor

13.4.3 Error 8 (UE-1): Undervoltage during Run

Possible reason	Solution
Power failure during running	• Check if the main circuit drive input power is disconnected or wired incorrectly • Check if one of the drive input power wiring terminals is loose • Check the voltage from the drive input power • Check if the power has been interrupted
The soft start relay or contactor is damaged	Cycle power on and power off the drive and see if the fault reoccurs, if the problem continues, replace either the control board or the converter. For instructions on replacing the control board, please contact service.

13.4.4 Error 9 (SC): Surge Current or Short Circuit

Possible reason	Solution
Multiple motors are driven by one frequency converter in V/f mode	Increase capacity of frequency converter or decrease number of motors
Surge current	Increase the acceleration time (E0.26), reduce the overexcitation braking factor (E0.55)
Drive fails to operate properly due to interference	Review the list of possible solutions provided for controlling interference, review the section on handling interference and check the control circuit lines, main circuit lines, and ground wiring.

13.4.5 Error 10 (IPH.L): Input Phase Loss

Possible reason	Solution
Abnormal, omitted or broken connections of frequency converter power supply	Check power supply connections, remove omitted or broken connections
Broken fuse	Check fuse
Imbalance in the three phases of input power supply	Check if the imbalance situation exceeds converter withstand capability
Main circuit capacitor deterioration	Contact with service

13.4.6 Error 11 (OPH.L): Output Phase Loss

Possible reason	Solution
Abnormal, omitted or broken connections of frequency converter outputs	Check the connections of frequency converter outputs, remove omitted or broken connections
Imbalance in the three phases of outputs	Check if the transistor is damaged

13.4.7 Error 12 (ESS-): Soft Start Error

Possible reason	Solution
Power failure	Check the input power supply
Input phase loss occurs during start-up (3 phase)	Remove the input phase loss

13.4.8 Error 20 (OL-1): Converter Overload

Possible reason	Solution
Long time overload	Reduce overload time, reduce load
Wrong settings of V/f curve parameters	Adjust settings of V/f curve parameters

Possible reason	Solution
Overload happens at lower speed	• Reduce load at lower speed • Reduce the carrier frequency (C0.05) • Use a frequency converter with larger power
Excessive load, excessive short Acc. / Dec. time or cycle	• Adjust load, acceleration/deceleration time or cycle • Use a frequency converter with larger power
Low mains voltage	Check input power supply
Excessive torque compensation	Reduce torque compensation setting (C2.21, C2.22)
Excessive overexcitation braking factor	Reduce [E0.55]
Input phase loss	Check the power supply for phase loss
Acceleration/deceleration or cycle times are too short	Increase the settings for acceleration/deceleration or cycle times
The capacity of frequency converter is too small	Replace the frequency converter with a larger model
Wrong setting of speed tracing parameters	Adjust setting of speed tracing parameters(E0.42, E0.43)
Temperature is too high	• Check if the environment temperature is too high • Check if the fan is work normally

13.4.9 Error 21 (OH): Converter over Temperature

Possible reason	Solution
Frequency converter (heat sink) temperature is higher than max. allowable temperature Max. allowable temperature: • 0.4...90kW: 95 °C • 110...160kW: 100 °C	• Check the temperature surrounding the drive – Improve the air circulation within the enclosure panel – Install a fan or air conditioner to cool the surrounding area – Remove anything near the drive that might be producing excessive heat • Load is too heavy – Reduce load if necessary – Reduce carrier frequency (C0.05) • Temperature detection circuit error, contact with service

13.4.10 Error 23 (FF): Fan Failure

Possible reason	Solution
Fan defect	• Check if the fan is blocked Clear the fan or replace it • Fan control circuit error Replace the circuit board or converter, contact with service

13.4.11 Error 24 (Pdr): Pump Dry

Possible reason	Solution
PID feedback is excessively low while converter is running at output frequency high limit	• Check if the feedback signal is valid • If the PID control is used for controlling a water pump, check if the pump is running without water

13.4.12 Error 25 (CoL-): Command Value Lost

Possible reason	Solution
Panel potentiometer frequency setting command value lost	• Check if the panel is installed stably Reinstall the panel • Check if the extended line for the panel is broken Replace the extended line for the panel • The panel is broken Contact with service

13.4.13 Error 26 (StO-r): STO request

Possible reason	Solution
STO function is activated correctly in running mode, after re-energized input channels and reset the device, the device goes to normal state	Check the signal of STO input terminal

13.4.14 Error 27 (StO-E): STO error

Possible reason	Solution
STO function is activated incorrectly, it happens if one channel is energized but the other is deenergized	Check the signal of STO input terminal

13.4.15 Error 30 (OL-2): Motor Overload

Possible reason	Solution
Motor locked	Prevent motor lock
Normal motor runs long time with large load at low speed	● Increase frequency converter output frequency ● Reduce load ● Use variable frequency motor or set zero speed load (C1.76) to a higher value ● Set correct motor thermal model protection time constant (C1.74)
Low mains voltage	Check input power supply
Wrong settings of V/f curve related parameters	Adjust settings of V/f curve related parameters
Excessive sudden load change	Check load
Wrong input of rated motor current	Correct rated motor current in (C1.07)
Multiple motors are driven by one frequency converter	Connect only one motor to the frequency converter
Excessive overexcitation braking factor	Reduce [E0.55]
Wrong motor protection parameter settings	Adjust settings of C1.74, C1.75 and C1.76 according to actual motor situations
Output current imbalance due to input phase loss	Check if input phase loss

13.4.16 Error 31 (Ot): Motor over Temperature

Possible reason	Solution
Excessive load or bad cooling	● Check load ● Provide a better cooling condition
Temperature sensor defect	Check the motor temperature sensor feedback signal
Wrong motor protection parameter settings	Different motor with different maximum temperature, set motor protection parameters according to actual protection circuits (C1.72, C1.73, C1.74)

13.4.17 Error 32 (t-Er): Motor Parameter Tuning Error

Possible reason	Solution
Motor power and frequency converter power do not match	Motor power has to match with frequency converter power
Wrong setting of motor parameters	Correct motor parameters setting according to motor nameplate
No connection of converter and motor	Check motor cable connections

13.4.18 Error 33 (AdE-): Motor Angle Detection Error

Possible reason	Solution
Internal error occurs during synchronous motor angle detection	• Check the motor wiring • Check if output phase loss • Check if the motor is blocked • The converter can not receive the encoder signal – Check the encoder card – Check the wiring between the converter and encoder – Check the encoder

13.4.19 Error 34 (EnCE-): Encoder Connection Error

Possible reason	Solution
Wiring break or phase order error	• Check if the wring of encoder is reliable • Check encoder wring break detection parameter(H7.05 and H7.06) • Check encoder direction setting(H7.01) • Check encoder phase order error detection time(H7.07)
Number of resolver poles and motor poles does not match	• Check resolver poles(H7.31) • Check motor poles(C1.11)
The final calculated speed from encoder inclusive pole numbers exceeds the allowed range	• Check resolver poles(H7.31) • Check pulses per revolution of encoder(H7.20)
The speed status of the encoder processing is invalid	• Check the grounding • Check if the cable with the shields grounded at two ends • Check if the wring of encoder is reliable • Change encoder card
The angle status of the encoder processing is invalid	

13.4.20 Error 35 (SPE-): Speed Control Loop Error

Possible reason	Solution
The speed loop difference is outside [C3.26] over a time of [C3.25]	• Set appropriate C3.25 and C3.26 according to actual working condition • Check motor nameplate parameters(C1 group) • Check if the torque limitation level is too low • Motor control loop parameters error – Motor parameter tuning – Set relevant C3 group parameters according to actual working condition

13.4.21 Error 38 (AibE): Analog Input Broken Wire Detection

Possible reason	Solution
Analog input wire is disconnected	• Check the setting of analog input broken wire protection E1.61 • The converter not receive analog input signal – Check the wiring of AI1, AI2, EAI1 and EAI2 – Check analog input signal source – Analog input port broken, replace the control board or converter, contact with service

13.4.22 Error 39 (EPS-): DC_IN Power Supply Error

Possible reason	Solution
DC_IN power supply voltage is out of range 20...28 V	• Check the voltage supply on DC_IN terminal and make sure the voltage is within the range of 20...28 V • Control board detection circuit of 24V is broken, replace the control board or converter, contact with service

13.4.23 Error 40 (dir1): Forward Running Lock Error

Possible reason	Solution
Direction control [E0.17] = '1: Forward only' Direction command is reverse	Correct the parameter setting

13.4.24 Error 41 (dir2): Reverse Running Lock Error

Possible reason	Solution
Direction control [E0.17] = '2: Reverse only' Direction command is forward	Correct the parameter setting

13.4.25 Error 42 (E-St): Terminal Error Signal

Possible reason	Solution
External error caused by input signals via external terminals	Check external terminals input signal
Wrong wiring / setting of multi-function external terminals	Ensure the right external signals have been connected correctly to the right multi-function external terminals which are assigned for external error input ([E1.00]...[E1.04] = 32, 33)
Converter stop caused by E-Stop active command via Modbus communication	Check the stop command via Modbus communication (0X0088: stop according to parameter setting; 0X0090: E-stop active). If converter receives 0X0090 , E-St will be displayed

13.4.26 Error 43 (FFE-): Firmware Version Mismatch

Possible reason	Solution
Operating panel may be placed to the frequency converter with older/newer firmware	Use the panel that firmware is compatible with the converter firmware
Extension card may be installed to the frequency converter with older/newer firmware	Update firmware of the extension card or converter
Converter firmware is not support the used extension card	Update the converter firmware

13.4.27 Error 44 (rS-): Modbus Communication Error

Possible reason	Solution
Modbus communication disconnection	• Check communication error detection parameters E8.01 and E8.02 • Check the device communication wiring • Check status of communication target

13.4.28 Error 45 (E.Par): Parameter Settings Invalid

Possible reason	Solution
Parameter settings are invalid after firmware update or extension card removed or parameter copy	1. Check parameter group '-EP-' and modify the parameter values appeared in '-EP-' 2. Initialize all parameters

13.4.29 Error 46 (U.Par): Unknown Parameter Restore Error

Possible reason	Solution
If one or more parameters in the backup were not found in the device, they will be skipped during parameter restore	Check the differences between the different firmware versions

13.4.30 Error 48 (idA-): Internal Communication Error

Possible reason	Solution
Internal error caused by communication	• Check if there is interference – Check the ground wiring – Check if there is strong interference source around the device • Converter internal circuit board connection is loosen due to vibration • Contact with service

13.4.31 Error 49 (idP-): Internal Parameter Error

Possible reason	Solution
Internal error caused by parameter handling	• Hint to check fan, Fan total running time(C0.51) exceeds 30000 hours – Check the Fan works normally or not – Update to latest version firmware and set C0.53=1 • Check if there is interference – Check the ground wiring – Check if there is strong interference source around the device • Contact with service

13.4.32 Error 50 (idE-): Converter Internal Error

Possible reason	Solution
Internal error occurs	• If E9.05=50, E9.97=53/54, then external analog input mode is not match with the parameter setting Check E1.35, E1.40, H8.05 and H8.30 setting • If E9.05=50, E9.97=0xA0, then firmware version of the control board is incompatible with the power board Update the control board and power board to the same firmware version • If E9.05=50, E9.97=6/35, then MCU is in protection mode – Check the ground wiring – Check if there is strong interference source around the device • If E9.05=50, E9.97=52, then power control board power source failure – Check the ground wiring – Check if there is strong interference source around the device – Power control board error, replace power control board or converter, contact with service • Contact with service

13.4.33 Error 51 (OCd-): Extension Card Internal Error

Possible reason	Solution
Extension card was successfully detected by the device at startup, but the communication failed afterwards	• Check if there is interference – Check the ground wiring – Check if there is strong interference source around the device • Check if the extension card is installed reliably • Contact with service

13.4.34 Error 52 (OCc): Extension Card PDOs Configuration Error

Possible reason	Solution
Internal communication error between communication card and converter control board	• Update firmware version • Contact with service

13.4.35 Error 54 (PcE-): Remote Control Communication Error

Possible reason	Solution
Error if communication to IndraWorks Ds/ ConverterWorks is lost during remote control	• Check communication status between frequency converter and IndraWorks Ds/ConverterWorks • Contact with service

13.4.36 Error 55 (PbrE): Parameter Backup / Restore Error

Possible reason	Solution
Error occurs during parameter backup/ restore process	• Parameter backup/restore process is interrupted Restart backup/restore process • Converter firmware version which is back up is incompatible with the version which is restored

13.4.37 Error 56 (PrEF): Parameter Restore Error after Firmware Update

Possible reason	Solution
Error occurs if parameter settings cannot be restored after firmware update	Parameters recover failed after firmware update from low version to high version Reset the error, set customer parameters again after initialization

13.4.38 Error 60 (ASF-): Application Firmware Error

Possible reason	Solution
The application firmware was not loaded correctly or trail use is over	• Currently converter firmware is not support this application firmware – Reload the application firmware version which is supported by the converter – Update the converter firmware to the version which support this application firmware • The application firmware is not certificated Certificate this application firmware

13.4.39 Error 61...65 (APE1...APE5): Application Error

Possible reason	Solution
Application error	Error which can be thrown by the application, description in application manual

13.4.40 Error 70 (EIBE): encoder input broken wire error

Possible reason	Solution
Error caused by Encoder card	See instruction manual of Encoder card

13.4.41 Error 71 (EPOE): encoder phase order error

Possible reason	Solution
Error caused by Encoder card	See instruction manual of Encoder card

13.4.42 Error 72 (RDOS): signal amplitude error

Possible reason	Solution
Error caused by Encoder card	See instruction manual of Encoder card

13.4.43 Error 73 (RLOT): signal phase error

Possible reason	Solution
Error caused by Encoder card	See instruction manual of Encoder card

13.4.44 Error 901 (FCd-): host communication timed out

Possible reason	Solution
Error caused by FieldBus card	See instruction manual of FieldBus card

13.4.45 Error 902 (FPC-): fieldbus process data configuration erroneous

Possible reason	Solution
Error caused by FieldBus card	See instruction manual of FieldBus card

13.4.46 Error 903 (FtL-): RPDO telegram loss

Possible reason	Solution
Error caused by FieldBus card	See instruction manual of FieldBus card

13.4.47 Error 904 (FIn-): Communication platform initialization failed

Possible reason	Solution
Error caused by FieldBus card	See instruction manual of FieldBus card

13.4.48 Error 905 (FnC-): fieldbus network configuration invalid

Possible reason	Solution
Error caused by FieldBus card	See instruction manual of FieldBus card

13.4.49 Error 906 (FCE-): communication platform critical error

Possible reason	Solution
Error caused by FieldBus card	See instruction manual of FieldBus card

13.4.50 Error 907 (FnF-): communication platform firmware corrupted

Possible reason	Solution
Error caused by FieldBus card	See instruction manual of FieldBus card

13.4.51 Error 908 (Fdi-): fieldbus data Invalid

Possible reason	Solution
Error caused by FieldBus card	See instruction manual of FieldBus card

13.5 Error Handling

13.5.1 Restarting after Power Loss

Code	Name	Setting range	Default	Min.	Attri.
E0.45	Power loss restart mode	0: Inactive 1: Active for panel control 2: Active for digital input control	0	–	Stop
E0.46	Power loss restart delay	0.0...10.0 s	1.0	0.1	Stop

[E0.45] decides the restart behavior after power loss:

If option 1 is selected, then converter will run automatically when AC power resumes, if the run command source is set to 'panel'.

If option 2 is selected, then converter will run automatically when AC power resumes, if the run command source is set to 'multi-function digital input'.

The power loss restart procedure will be performed after [E0.46] 'Power loss restart delay'.

- If the frequency converter was running in 3-wire mode before power loss, the restart of the frequency converter is decided by the status of this 3-wire terminal after power on.
- If the power loss was caused by power supply interference, an error code 'UE-1' will be displayed on the operating panel in undervoltage situation, and the frequency converter will not restart automatically after power on even E0.45 is 'Active'.
- If the run command is from communication, the frequency converter **ONLY** restarts after sending a stop command first and then sending a run command by communication.
- When E0.45 select "1" or "2", if the power supply of frequency converter and the error "UE-1" recover within the time of [E9.01], the frequency converter will restart; if the error "UE-1" always exists during the time of [E9.01], the frequency converter will not restart.

13.5.2 Automatic Error Reset

Automatic error reset function is used to ensure continuous running without human intervention in the case of occasional errors, such as overcurrent or overvoltage at start or in the run mode. This function can be activated by setting [E9.00] ≠ 0.

When an error occurs, the frequency converter stops the output and the related error code is displayed at the same time. The system remains in idle mode for delay time [E9.01]. Then the error will automatically be reset and a run command will be generated to restart the frequency converter. This sequence will be performed [E9.00] times. If the error still exists, the frequency converter remains in idle mode and no longer performs automatic restart attempts. In this case, a manual error reset is required to resume the operation.

Automatic error reset is valid for the following errors: OC-1, OC-2, OC-3, OE-1, OE-2, OE-3, OE-4, OL-1, OL-2, UE-1*, E-St, OH and UH.

Code	Name	Setting range	Default	Min.	Attri.
E9.00	Automatic error reset attempts	0...3 (0: Inactive)	0	–	Stop
E9.01	Automatic error reset interval	0.1...60.0 s	10.0	0.1	Stop
E9.02	Automatic error reset attempts restart time	0...65,535	0	1	Stop

Parameter E9.02 can be used to reset the internal error rest attempts back to the value from [E9.00] in case there are no error events inside this restart time. The number of reset attempts is reset to [E9.00] when E9.02 is set to a value different to 0 and there are no error reset events inside the interval given from the value of parameter E9.02.

*:

1. If [E9.00] ≠ 0 and [E0.45] = 0, every time error ‘UE-1’ resets, the remaining times of automatic reset would decrease.
2. If [E9.00] ≠ 0 and [E0.45] ≠ 0, then reset time of error "UE-1" is without limitation.
3. If [E9.00] = 0 and [E0.45] ≠ 0, then reset time of error "UE-1" is without limitation.

13.5.3 Error Reset by Digital Input

The error reset input can be defined with one digital input. This function works in the same manner as the panel error reset function does, which allows remote error reset. 'Error reset signal' is edge sensitive.

Code	Name	Setting range	Default	Min.	Attri.
E1.00	X1 input	34: Error reset	0	–	Stop
E1.01	X2 input		0	–	Stop
E1.02	X3 input		0	–	Stop
E1.03	X4 input		0	–	Stop
E1.04	X5 input		0	–	Stop
H8.00	EX1 input		0	–	Stop
H8.01	EX2 input		0	–	Stop
H8.02	EX3 input		0	–	Stop
H8.03	EX4 input		0	–	Stop
H8.04	EX5 input		0	–	Stop

Set the respective parameter of any digital input as '34: Error reset signal'. For wiring diagram, please refer to chapter "Digital input NPN / PNP wiring" on page 75.