

Status diagnostics and troubleshooting

Status code display

The inverter performs a system self-diagnosis that automatically detects many faults that may occur and shows them on the display. This means you are promptly made aware of malfunctions in the inverter or the photovoltaic system, or of any installation or operating faults.

If the system self-diagnosis has detected a specific fault, the associated status code will be shown on the display.

IMPORTANT! Status codes may sometimes appear briefly as a result of the inverter's control response. If the inverter then continues working with no sign of any problem, this means that there was no fault.

Total failure of the display

If the display fails to come on some time after sunrise:

- Check the AC voltage on the inverter connection sockets:
the AC voltage must be 220/230 V (+ 10 % / - 5 %) or 380/400 V (+ 10 % / - 5 %).

Class 1 status codes

Class 1 status codes generally only arise momentarily and are caused by the public grid.

Example: The grid frequency is too high and the inverter may not feed any energy into the grid owing to a standard. There is nothing wrong with the device.

The initial response of the inverter is to disconnect itself from the grid. The grid is subsequently checked during the stipulated monitoring period. If no further problem has been detected by the end of this period, then the inverter will resume feeding energy into the grid.

The GPIS SoftStart function is activated according to the country setup:

After cutting out due to an AC error, the output power of the inverter is continuously increased in line with the national guidelines.

| Code | Description | Behaviour | Remedy |
|------|--------------------------------|---|---|
| 102 | AC voltage too high | Following careful testing and when the grid conditions are within the permissible range again, the inverter will resume feeding energy into the grid. | Check grid connections; if this status code keeps recurring, contact your system engineer |
| 103 | AC voltage too low | | |
| 105 | AC frequency too high | | |
| 106 | AC frequency too low | | |
| 107 | No AC grid | | |
| 108 | Stand-alone operation detected | | |
| 112 | RCMU error | | |

Class 3 status codes

Class 3 includes status codes that may occur while feeding energy into the grid, but generally do not cause the process to be interrupted for any length of time.

The inverter disconnects automatically from the grid, the grid is then monitored as specified and the inverter attempts to resume feeding energy into the grid.

| Code | Description | Behaviour | Remedy |
|--|---|--|---|
| 301 | Overcurrent (AC) | Short-term interruption while feeding energy into the grid. The inverter resumes its start-up routine. | *) |
| 302 | Overcurrent (DC) | | |
| 303 | DC module overtemperature | Short-term interruption while feeding energy into the grid. The inverter resumes with its startup routine. | Purge cooling air openings and heat sink; **) |
| 304 | AC module overtemperature | | |
| 305 | No power being fed in, despite closed relay | Short-term interruption while feeding energy into the grid. The inverter resumes with its startup routine. | **) |
| 306 | PV output too low for feeding energy into the grid | Short-term interruption while feeding energy into the grid. The inverter resumes its start-up routine. | wait for sufficient level of insolation; **) |
| 307 | DC low DC input voltage too low for feeding energy into the grid | | |
| IMPORTANT! Due to the low level of insolation early in the morning and in the evening, the status codes 306 (Power low) and 307 (DC low) are displayed routinely at these times of day. These status codes do not indicate any kind of fault. | | | |
| 308 | Intermediate circuit voltage too high | Short-term interruption while feeding energy into the grid. The inverter resumes its start-up routine. | **) |
| 309 | DC input voltage MPPT 1 too high | | |
| 311 | Polarity of DC strings reversed | | |
| 313 | DC input voltage MPPT2 too high | | |
| 314 | Current sensor calibration timeout | Short-term interruption while feeding energy into the grid. The inverter resumes with its startup routine. | *) |
| 315 | AC current sensor error | | |
| 316 | InterruptCheck fail | | |
| 325 | Overtemperature in the connection area | | |
| 326 | Fan 1 error | | |
| 327 | Fan 2 error | | |

*) If the status code is displayed all the time: notify a Fronius-trained service engineer

**) Fault is rectified automatically. If this status code keeps recurring, contact your system engineer

Status codes – Class 4 Some of the class 4 status codes necessitate intervention by a Fronius-trained service technician.

| Code | Description | Behaviour | Remedy |
|------|--|---|--------|
| 401 | Unable to communicate with the power stage set | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid | *) |
| 406 | AC module temperature sensor faulty (L1) | | |
| 407 | AC module temperature sensor faulty (L2) | | |
| 408 | DC component measured in the grid too high | | |

| Code | Description | Behaviour | Remedy |
|-----------|--|---|--|
| 412 | Fixed voltage mode has been selected instead of MPP voltage mode, and the fixed voltage has been set to too low or too high a value. | - | **)) |
| 415 | Safety cut-out via option card or RECER-BO has triggered | The inverter is not feeding any energy into the grid. | *)) |
| 416 | No communication possible between power stage set and control system. | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid | *)) |
| 417 | Hardware ID problem | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid | Update inverter firmware; *)) |
| 419 | Unique ID conflict | | |
| 420 | No communication possible with the Fronius Datamanager | | |
| 421 | HID range error | | |
| 425 | Unable to communicate with the power stage set | | |
| 426 - 428 | Possible hardware fault | | |
| 431 | Software problem | The inverter is not feeding any energy into the grid. | Perform AC reset (switch automatic circuit breaker off and on again); update inverter firmware; *)) |
| 436 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid | Update inverter firmware; *)) |
| 437 | Power stage set problem | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid | Update inverter firmware; *)) |
| 438 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | | |
| 443 | Intermediate circuit voltage too low or asymmetric | The inverter is not feeding any energy into the grid. | *)) |
| 445 | - Compatibility error (e.g. due to replacement of a PC board) - Invalid power stage set configuration | The inverter is not feeding any energy into the grid. | Update inverter firmware; *)) |
| 447 | Insulation fault | The inverter is not feeding any energy into the grid. | *)) |
| 448 | Neutral conductor not connected | | |
| 450 | Guard cannot be found | | |

| Code | Description | Behaviour | Remedy |
|-------------|--|---|---|
| 451 | Memory error detected | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid | *) |
| 452 | Communication error between the processors | | |
| 453 | Grid voltage and power stage set are incompatible | | |
| 454 | Grid frequency and power stage set are incompatible | | |
| 456 | Anti-islanding function is no longer being implemented correctly | | |
| 457 | Grid voltage relay fault | The inverter is not feeding any energy into the grid. | Check AC cable *) |
| 458 | Error when recording measuring signal | The inverter is not feeding any energy into the grid. | *) |
| 459 | Error when recording the measuring signal for the insulation test | | |
| 460 | Reference voltage source for the digital signal processor (DSP) is working out of tolerance | | |
| 461 | DSP data memory error | | |
| 462 | Error during DC feed monitoring routine | | |
| 463 | Reversed AC polarity, AC connector inserted incorrectly | The inverter is not feeding any energy into the grid. | **) |
| 474 | RCMU sensor faulty | | |
| 475 | Insulation fault (connection between solar module and ground) | | |
| 476 | Driver supply voltage too low | | |
| 479 | Intermediate circuit voltage relay is switched off | | |
| 480, 481 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | The inverter is not feeding any energy into the grid. | Update inverter firmware; *) |
| 482 | Setup interrupted after initial start-up | The inverter is not feeding any energy into the grid. | Restart Setup after an AC reset (switch automatic circuit breaker off and on again) |
| 483 | Voltage $U_{DC \text{ fixed}}$ on MPP2 string out of limits | The inverter is not feeding any energy into the grid. | Check MPP settings; *) |
| 485 | CAN transmit buffer is full | The inverter is not feeding any energy into the grid. | Perform AC reset (switch automatic circuit breaker off and on again; *) |
| 489 | Permanent overvoltage on intermediate circuit capacitor (five 479 status codes in a row) | The inverter is not feeding any energy into the grid. | *) |

*) If the status code is displayed all the time: notify a Fronius-trained service technician

***) If this status code keeps recurring, contact your system engineer

**Status codes –
Class 5**

Class 5 status codes do not generally interfere with feeding energy into the grid, but can cause restrictions. These status codes are displayed until they are acknowledged by pressing a key (however, the inverter continues to operate normally in the background).

| Code | Description | Behaviour | Remedy |
|-------------|--|---|---|
| 502 | Insulation error on the solar modules | Warning message is shown on the display | **)) |
| 509 | No energy fed into the grid in the past 24 hours | Warning message is shown on the display | Acknowledge status code; check whether all the conditions for the problem-free feeding of energy into the grid have been met (e.g. are the solar modules covered with snow?); **)) |
| 515 | Unable to communicate with filter | Warning message on the display | *)) |
| 516 | No communication possible with the storage unit | Storage unit warning message | *)) |
| 517 | Power derating caused by too high a temperature | When power derating occurs, a warning message is shown on the display. | If necessary, purge cooling air openings and heat sink; fault is rectified automatically; **)) |
| 518 | Internal DSP malfunction | Warning message on the display | *)) |
| 519 | No communication possible with the storage unit | Storage unit warning message | *)) |
| 520 | No energy fed into the grid by MPPT1 in the past 24 hours | Warning message is shown on the display | Acknowledge status code; check whether all the conditions for the problem-free feeding of energy into the grid have been met (e.g. are the solar modules covered with snow?); *)) |
| 522 | DC low String 1 | Warning message on the display | *)) |
| 523 | DC low String 2 | | |
| 558, 559 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | Warning message on the display | Update inverter firmware; *)) |
| 560 | Power derating caused by overfrequency | Displayed when grid frequency becomes excessively high. The power is reduced. | As soon as the grid frequency is back within the permissible range and the inverter has returned to normal operation, the fault is rectified automatically; **)) |
| 564 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | Warning message on the display | Update inverter firmware; *)) |
| 566 | Arc detector switched off (e.g. during external arc monitoring) | The status code is displayed every day until the arc detector is reactivated. | No error Confirm status code by pressing 'Enter' |

| Code | Description | Behaviour | Remedy |
|------|---|--|--|
| 568 | Incorrect input signal on the multifunction current interface | The status code is displayed in the case of an incorrect input signal on the multifunction current interface and with the following setting: Basic menu / Input signal / Mode of operation = Ext. Signal, triggering method = Warning | Acknowledge status code; check the devices connected to the multifunction current interface; **) |
| 572 | Power limited by the power stage set | Power is being limited by the power stage set | *) |
| 573 | Undertemperature warning | Warning message on the display | *) |
| 581 | "Special Purpose Utility-Interactive" (SPUI) setup activated | The inverter is no longer compliant with the IEEE1547 and IEEE1574.1 standards because the standalone function has been deactivated, a frequency-dependent power reduction has been activated and the frequency and voltage limits are being changed | No error Confirm status code by pressing 'Enter' |

*) If the status code is displayed all the time: Notify a Fronius-trained service technician.

**) If this status code keeps recurring, contact your system engineer.

Class 6 status codes Some of the class 6 status codes necessitate intervention by a Fronius-trained service engineer.

| Code | Description | Behaviour | Remedy |
|------|--|---|---|
| 601 | CAN bus is full | The inverter is not feeding any energy into the grid. | Update inverter firmware; *) |
| 603 | AC module temperature sensor faulty (L3) | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid | *) |
| 604 | DC module temperature sensor faulty | | |
| 607 | RCMU error | The inverter is not feeding any energy into the grid. | Reset status code by pressing 'Enter'. The inverter resumes the feeding of energy into the grid; if the status code keeps appearing, check the complete photovoltaic system for damage; **) |
| 608 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | The inverter is not feeding any energy into the grid. | Update inverter firmware; *) |

*) If the status code is displayed all the time: notify a Fronius-trained service engineer

**) Fault is rectified automatically. If this status code keeps recurring, contact your system engineer

Status codes – Class 7

Class 7 status codes relate to the control system, the configuration and inverter data recording, and may directly or indirectly affect the process of feeding energy into the grid.

| Code | Description | Behaviour | Remedy |
|--------------|--|---|---|
| 701 - 704 | Provides information about the internal processor status | Warning message on the display | *) |
| 705 | Conflict when setting the inverter number (e.g. number already assigned) | - | Correct inverter number in Setup menu |
| 706 - 716 | Provides information about the internal processor status | Warning message on the display | *) |
| 721 | EEPROM has been re-initialised | Warning message on the display | Acknowledge status code; *) |
| 722 - 730 | Provides information about the internal processor status | Warning message on the display | *) |
| 731 | Initialisation error - USB flash drive is not supported | Warning message on the display | Check or replace USB flash drive Check file system on USB flash drive; *) |
| 732 | Initialisation error - Overcurrent on USB flash drive | | |
| 733 | No USB flash drive connected | Warning message on the display | Connect or check USB flash drive; *) |
| 734 | Update file not recognised or not present | Warning message on the display | Check update file (e.g. for correct file name) *) |
| 735 | Update file does not match the device, update file too old | Warning message on the display, update process is interrupted | Check update file and if necessary download an update file to match the device (e.g. at http://www.fronius.com); *) |
| 736 | Write or read error occurred | Warning message on the display | Check USB flash drive and the data contained on it or replace USB flash drive Never unplug a USB flash drive if the 'data transfer' LED is still flashing or lit; *) |
| 737 | File could not be opened | Warning message on the display | Remove and then reinsert USB flash drive; check or replace USB flash drive |
| 738 | Log file cannot be saved (e.g. USB flash drive is write-protected or full) | Warning message on the display | Create some storage space, remove write protection, if necessary check or replace USB flash drive; *) |
| 740 | Initialisation error - error in file system on USB flash drive | Warning message on the display | Check USB flash drive; reformat on PC for FAT12, FAT16 or FAT32 |
| 741 | Error during recording of logging data | Warning message on the display | Remove and then reinsert USB flash drive; check or replace USB flash drive |

| Code | Description | Behaviour | Remedy |
|-----------|---|--|--|
| 743 | Error occurred during update process | Warning message on the display | Repeat update process, check USB flash drive; *) |
| 745 | Update file corrupt | Warning message on the display, update process is interrupted | Download update file again; check or replace USB flash drive; *) |
| 746 | Error occurred during update process | Warning message on the display, update process is interrupted | Wait for two minutes, then start the update again; *) |
| 751 | Time lost | Warning message on the display | Reset time and date on the inverter; *) |
| 752 | Real Time Clock module communication error | | |
| 753 | Internal error: Real Time Clock module is in emergency mode | Time may be inaccurate or lost (feeding energy into the grid normal) | Reset time and date on the inverter |
| 754 - 755 | Provides information about the internal processor status | Warning message on the display | *) |
| 757 | Hardware error in the Real Time Clock module | Error message on the display; the inverter is not feeding any energy into the grid | *) |
| 758 | Internal error: Real Time Clock module is in emergency mode | Time may be inaccurate or lost (feeding energy into the grid normal) | Reset time and date on the inverter |
| 760 | Internal hardware error | Error message on the display | *) |
| 761 - 765 | Provides information about the internal processor status | Warning message on the display | *) |
| 766 | Emergency power limitation has been activated (max. 750 W) | Error message on the display | |
| 767 | Provides information about the internal processor status | Warning message on the display | *) |
| 768 | Different power limitation in the hardware modules | | |
| 772 | Storage unit not available | | |
| 773 | Software update group 0 (invalid country setup) | | |
| 775 | PMC power stage set not available | Warning message on the display | Press 'Enter' key to acknowledge error; *) |
| 776 | Invalid device type | | |
| 781 - 794 | Provides information about the internal processor status | Warning message on the display | *) |

*) If the status code is displayed all the time: Notify a Fronius-trained service technician

Class 10 - 12 status codes

1000 - 1299- Provide information on the status of the internal processor program

Description

Is of no concern when the inverter is working properly and only appears in the "Status PS" setup parameter. In the event of an actual error, this status code assists Fronius Technical Support during the error analysis.

Customer service **IMPORTANT!** Contact your Fronius dealer or a Fronius-trained service technician if

- an error appears frequently or all the time
- an error appears that is not listed in the tables

Operation in dusty environments When operating the inverter in extremely dusty environments:
when necessary, clean the cooling elements and fan on the back of the inverter as well as the air intakes at the mounting bracket using clean compressed air.