

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 connections:
the AC voltage must be 230 V (+ 10 % / - 5 %)*.

* The mains voltage tolerance depends on the country setup

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		
103	AC voltage too low		
105	AC frequency 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
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 due to overcurrent in the inverter.	Fault is rectified automatically; if this status code is displayed all the time: notify a Fronius-trained service engineer
302	Overcurrent (DC)	The inverter resumes with its start-up routine.	
303	Power stage set overtemperature	Short-term interruption while feeding energy into the grid due to overtemperature The inverter resumes with its start-up routine.	Purge openings for cooling air and heat sink if necessary; fault is rectified automatically; if this status code keeps recurring, contact your system engineer
304	Internal temperature too high		
306	LOW PV OUTPUT Intermediate circuit voltage too low for feeding energy into the grid	Short-term interruption while feeding energy into the grid The inverter resumes with its start-up routine.	Fault is rectified automatically; if this status code occurs when there is sufficient insolation, contact your system engineer
307	LOW PV VOLTAGE DC input voltage too low for feeding energy into the grid		

IMPORTANT! Due to the low level of insolation, the status codes 306 (LOW PV OUTPUT) and 307 (LOW PV VOLTAGE) are displayed routinely every morning and evening. These status codes do not indicate any kind of fault.

308	Intermediate circuit overvoltage	Short-term interruption while feeding energy into the grid The inverter resumes with its start-up routine.	Fault is rectified automatically; if this status code is displayed all the time: notify a Fronius-trained service engineer
309	DC input voltage MPPT 1 too high		
313	DC input voltage MPPT 2 too high		

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		
406	Power stage set temperature sensor faulty	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid.	If the status code is displayed all the time: Notify a Fronius-trained service technician.
407	Internal temperature sensor faulty		
408	Direct current feeding in detected		
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.	-	If this status code keeps recurring, contact your system engineer.

Code	Description	Behaviour	Remedy
415	Safety cut-out via option card or RECERBO has triggered	The inverter is not feeding any energy into the grid.	
416	No communication possible between power stage set and control system.		
417	Hardware ID problem	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid.	If the status code is displayed all the time: Notify a Fronius-trained service technician.
419	Unique ID conflict		
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; If the status code is displayed all the time: Notify a Fronius-trained service technician.
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; If the status code is displayed all the time: Notify a Fronius-trained service technician.
437	Power stage set problem		
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)	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid.	Update inverter firmware; If the status code is displayed all the time: Notify a Fronius-trained service technician.
443	Intermediate circuit voltage too low or asymmetric	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.
445	Impermissible limit value settings	The inverter is not feeding any energy into the grid for safety reasons.	Update inverter firmware; If the status code is displayed all the time: Notify a Fronius-trained service technician.
447	Insulation fault		
448	Neutral conductor not connected		
450	Guard cannot be found		
451	Memory error detected		
452	Communication error between the processors	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid.	If the status code is displayed all the time: Notify a Fronius-trained service technician.
453	Short-term grid voltage error		
454	Short-term grid frequency error		
456	Anti-islanding function is no longer being implemented correctly		

Code	Description	Behaviour	Remedy
457	Grid relay sticking		
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	The inverter is not feeding any energy into the grid.	Notify a Fronius-trained service technician.
461	DSP data memory error		
462	Error during DC feed monitoring routine		
463	Reversed AC polarity, AC connector inserted incorrectly		
474	RCMU sensor faulty		
475	Solar module ground, insulation fault (connection between solar module and ground)	The inverter is not feeding any energy into the grid.	If this status code keeps recurring, contact your system engineer.
476	Driver supply voltage too low		
479	Intermediate circuit voltage relay is switched off	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid.	If the status code is displayed all the time: Notify a Fronius-trained service technician.
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; If the status code is displayed all the time: Notify a Fronius-trained service technician.
482	Start-up incomplete		Perform AC reset (switch automatic circuit breaker off and on again), complete start-up
483	Voltage $U_{DC \text{ fixed}}$ on MPP2 string out of limits	The inverter is not feeding any energy into the grid.	Check the MPP settings; If the status code is displayed all the time: Notify a Fronius-trained service technician.
485	CAN transmit buffer is full		Perform AC reset (switch automatic circuit breaker off and on again); If this status code is displayed all the time: Notify a Fronius-trained service technician.
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.

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	If this status code keeps recurring, contact your system engineer.
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) If the status code is displayed all the time: look out for further status codes
515	Unable to communicate with filter	Warning message on the display	If the status code is displayed all the time: Notify a Fronius-trained service technician.
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.	Purge openings for cooling air and heat sink if necessary; fault is rectified automatically; if this status code keeps recurring, contact your system engineer
522	DC low String 1	Warning message on the display	If this status code keeps recurring, contact your system engineer.
523	DC low String 2		
558	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)	Possible error displays or malfunctions on the inverter	If this status code keeps recurring, contact your system engineer.
560	Power derating caused by overfrequency	This status code is displayed when the grid frequency becomes excessively high. The inverter will then reduce its output. The status indicator will continue to be displayed until the inverter has returned to normal operation.	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. If this status code keeps recurring, contact your system engineer.
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'

Class 7 status codes 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
705	Conflict when setting the inverter number (e.g. number already assigned)	-	Correct the inverter number via the Setup menu
721	EEPROM has been reinitialised or EEPROM is faulty	Warning message is shown on the display	Acknowledge status code; If the status code is displayed all the time: notify a Fronius-trained service engineer

Code	Description	Behaviour	Remedy
731	Initialisation error - USB stick is not supported	Warning message is shown on the display	Check or replace USB stick Check the file system on the USB stick If the status code is displayed all the time: notify a Fronius-trained service engineer
732	Overcurrent on USB stick		
733	No USB stick connected	Warning message is shown on the display.	Connect or check USB stick If the status code is displayed all the time: notify a Fronius-trained service engineer
734	Update file not recognised or not present	Warning message is shown on the display	Check update file (e.g. for correct file name) If the status code is displayed all the time: notify a Fronius-trained service engineer
735	Update file does not match the device, update file too old	Warning message appears on the display, update process is interrupted	Check update file and if necessary organise an update file to match the device (e.g. at http://www.fronius.com) If the status code is displayed all the time: notify a Fronius-trained service engineer
736	Write or read error occurred	Warning message is shown on the display	Check USB stick and the data contained on it or replace USB stick Never unplug a USB stick if the 'Data Transmission' LED is still flashing or lit. If the status code is displayed all the time: notify a Fronius-trained service engineer
738	Log file cannot be saved (e.g. USB stick is write-protected or full)	Warning message is shown on the display	Create storage space, remove write protection, check or replace USB stick if necessary If the status code is displayed all the time: notify a Fronius-trained service engineer
743	Error occurred during update process	Warning message is shown on the display	Repeat the update process, check USB stick If the status code is displayed all the time: notify a Fronius-trained service engineer
745	Update file corrupt	Warning message appears on the display, update process is interrupted	Re-download update file If the status code is displayed all the time: notify a Fronius-trained service engineer
751	Time lost	Warning message is shown on the display	Reset the time and date on the inverter If the status code is displayed all the time: notify a Fronius-trained service engineer
752	Real Time Clock module communication error		

Code	Description	Behaviour	Remedy
757	Hardware error in the Real Time Clock module	Error message is shown 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)	If the status code is displayed all the time: notify a Fronius-trained service engineer
766	Emergency power derating has been activated (max. 750 W)	Error message is shown on the display	

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.