Fronius IG Plus series State codes

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Dear Fronius customer!

These state codes will help you to ascertain errors of the FRONIUS IG inverters, the photovoltaic system as well as installation and operation errors. They have been classified in classes from 1 to 5 depending on their cause.

Service class 1

These errors usually occur only temporarily and are caused by the public mains. The inverter reacts by disconnecting from the public mains and attempts to switch on again after the specified mains monitoring period, insofar as no further error occurs during this period. The error code is displayed whilst the public mains is being checked.

Code	Description	Possible causes	Remedy (sequence)
1x2* **	Grid voltage beyond permitted limit	1. Mains voltage error 2. Incorrect values in the Service Menu 3. Contact error on the ribbon cable 4. Measuring error on the Fronius IG Plus	1. Check mains voltage 2. Check values in the Service Menu 3. Check the ribbon cable 4. Replace the PINCI board
1x3* **	Grid voltage below permitted limit	1. Mains voltage error 2. Incorrect values in the Service Menu 3. Contact error on the ribbon cable 4. Measuring error on the Fronius IG Plus	1. Check mains voltage 2. Check values in the Service Menu 3. Check the ribbon cable 4. Replace the PINCI board
1x5* **	Mains frequency beyond permitted limits	1. Mains frequency error 2. Incorrect values in the Service Menu 3. Contact error on the ribbon cable 4. Measuring error on the Fronius IG Plus	1. Check mains frequency 2. Check values in the Service Menu 3. Check the ribbon cable 4. Replace the PINCI board
1x6* **	Mains frequency below permitted limits	1. Mains frequency error 2. Incorrect values in the Service Menu 3. Contact error on the ribbon cable 4. Measuring error on the Fronius IG Plus	1. Check mains frequency 2. Check values in the Service Menu 3. Check the ribbon cable 4. Replace the PINCI board
1x7* **	Synchronisation with the public mains supply not possible	1. Mains not connected 2. Incorrect values in the Service Menu 3. Contact error on the ribbon cable 4. Lines on the PINCI board not connected 5. Measuring error on the Fronius IG Plus	1. Connect mains 2. Check values in the Service Menu 3. Check the ribbon cables 4. Connect lines 5. Replace the PINCI board
108	Islanding detected	1. Islanding detected 2. Severe disturbances in public mains 3. Measuring error on PINCI board of the Fronius IG Plus	1. Automatic correction 2. Automatic correction 3. Replace the PINCI board of the Fronius IG Plus

Service class 1 (continued)

Code	Description	Possible causes	Remedy (sequence)
109	General mains error	1. Mains disturbances have been detected 2. Mains voltage not present 3. Contact error of the neutral cable 4. Measuring error on PINCI board	1. Automatic correction 2. Check mains voltage 3. Check neutral cable contact 4. Check STATE PS menu; replace affected PINCI board
110	Safety disconnection through one phase master	1. Phase master detected a disturbance on the mains 2. Measuring error on PINCI board	1. Automatic correction 2. Replace affected PINCI board

Service class 3

This group summarises Fronius IG Plus error states that can occur during feed in operation. However these do not indicate damaged electronics and do not lead to a remaining interruption of the feed in operation. After switching off and passing the grid monitoring period, the Fronius IG Plus starts feed in operation again. In case of a temperature excess additional cooling down phase is maintained

Code	Description	Possible causes	Remedy (sequence)
301	Safety circuit detects a current peak on the mains supply	1. Voltage drop on the public mains 2. Choke cables mixed up 3. Connections L1 and N mixed up on the C-BOX board 4. PINCI board faulty	1. Automatic correction 2. Fix choke cables in correct order 3. Connect L1 and N correctly on the C-BOX board 4. Replace the PINCI board
302	Safety circuit detects a current peak on the PV generator side	1. Voltage drop on the public mains supply 2. Transformer switching process during MPP tracking 3. Choke cables mixed up 4. Constantly PINCI board faulty	1. Automatic correction 2. Automatic correction 3. Fix choke cables in correct order 4. Replace PINCI board
303	Temperature on PINCI board too high	1. Exalted ambient temperature 2. Distance between the inverters too small 3. Fan cable not connected 4. PINCI board defect	1. Change installation location 2. Increase distance 3. Connected fan cable 4. Replace PINCI board
304	Heat sink temperature on the PINCI board too high	1. Ventilation slot congested 2. Exalted ambient temperature 3. Distance between the inverters too small 4. Fan cable not connected 5. PINCI board faulty	1. Free ventilation slot 2. Change installation location 3. Increase distance 4. Connect fan cable 5. Replace the PINCI board
305	Feed-in process not possible, even though public mains parameter within the limits	1. Loose connection on the mains cables 2. Choke not connected 3. Error on mains relay (L1 or N) 4. Controller on the PINCI board faulty	1. Connect mains cables properly 2. Connect choke 3. Replace the PINCI board 4. Replace the PINCI board
306*	POWER LOW*	1. Intermediate circuit voltage has dropped below permissible threshold value for feed in	1. Check modules 2. Replace the PINCI board
307*	DC LOW*	1. DC-input voltage is too low for feed in	1. Check modules 2. Replace the PINCI board

Service class 3 (continued)

Code	Description	Possible causes	Remedy (sequence)
308	Intermediate circuit voltage out of the maximum limit	1. Public mains disturbances 2. Constantly PINCI board faulty	1. Reinforce mains cable 2. Replace the PINCI board

Service class 4

Errors from this class require intervention from a technician to remedy them. They are either temporary or lasting and are triggered by faulty hardware or a software problem.

Code	Description	Possible causes	Remedy (sequence)
401	Communication error between IG BRAIN and the PINCI board	1. Ribbon cable between IG BRAIN and PINCI board faulty or not connected properly 2. Power supply on the PINCI board damaged	1. Check ribbon cable between C-BOX and PINCI board 2. Replace the PINCI board
402	Write access to the internal Fronius IG Plus memory failed	1. Faulty data record 2. EE-Prom on the IG BRAIN unit faulty	1. Disconnect Fronius IG Plus from the DC-supply briefly 2. Replace IG BRAIN board, resp. send inverter for reparation
403	The area in the internal memory for the country setting is incomplete	1. Faulty data record 2. EE-Prom on the IG BRAIN board faulty	1. Disconnect Fronius IG Plus from the DC-supply briefly 2. Replace IG BRAIN board, resp. send inverter for reparation
406	Temperature sensor on the PINCI board faulty or not connected	1. Temperature sensor on the PINCI board not connected 2. Temperature sensor on the PINCI board faulty 3. Measuring circuit on PINCI board faulty	1. Connect temperature sensor 2. Replace temperature sensor 3. Replace the PINCI board
407	Temperature sensor on the heat sink faulty or not connected	1. Temperature sensor on the PINCI board not connected 2. Temperature sensor on the PINCI board faulty 3. Measuring circuit on PINCI board faulty	1. Connect temperature sensor 2. Replace temperature sensor 3. Replace the PINCI board
408	Unsymmetry on the public mains detected	1. Disturbances on the public mains 2. Loose connection on the mains cables 3. Controller on the PINCI board faulty 4. Measuring circuit on the PINCI board faulty	1. Error is remedied automatically 2. Check mains cable 3. Replace the PINCI board 4. Replace the PINCI board
412	Value for fixed voltage is set higher than the open circuit voltage of the PV-generator	1.+2. Transformer transmission ratio for the fixed voltage does not fit with the generator voltage 3. DC-voltage of the PV-generator higher than the maximum input voltage of the inverter	1. Change operation mode in the service menu to MPP-mode 2. Set the correct value for the fixed voltage in the service menu 3. Change wiring of the PV-generator
413	Open circuit voltage too high in the moment of transformer switching	1. MPP-Tracking is adjusted automatically – Fronius IG Plus restarts	1. Calculate the voltage and change to FIX-mode in the service menu temporarily

Service class 4 (continued)

Code	Description	Possible causes	Remedy (sequence)
414	Memory array for Fronius IG Plus type in EE-PROM faulty	1. One-off – memory error 2. Repeated occurrence - EE-Prom for Fronius IG Plus type on IG BRAIN board faulty	1. Automatic correction 2. Inverter must be sent to Fronius
415	No ENS-enabling signal despite release by IG BRAIN	1. Jumper on C-BOX unit set incorrectly 2. C-BOX board faulty	1. Check jumper on C-BOX unit 2. Replace C-BOX board
416	Communication error between IG BRAIN and power stack	1. One-off → communication error 2. Ribbon cable between IG BRAIN board and PINCI board not connected properly or faulty 3. IG BRAIN unit faulty 4. Optocoupler on PINCI board faulty	1. Automatic correction 2. Check ribbon cable and replace if necessary 3. Replace IG BRAIN unit 4. Replace PINCI board
417	Hardware ID-collision	1. Two or more power stacks have the same number set on the DIP switch 2. Faulty RS485 transceiver on the PINCI board 3. Faulty Optocoupler on the PINCI board	1. Check position of DIP switch on PINCI boards 2.+3. Replace PINCI board
419	Two or more power stacks with identical Unique ID	1. Two or more power stacks have identical Unique ID.	1. Inverter must be sent to Fronius
421	Hardware ID sequence error	Power stack numbers are not set in sequence or do not start at 0 (DIP switch 0-14)	1. Check numbers of power stacks; adjust DIP switch setting if necessary
422**	Power stack communication error - SCS invalid	Communication between control unit and slave-power stack is incomplete	Automatic correction → Inverter gets restarted
423**	Power stack communication error SCS missing	Communication between control unit and slave-power stack is faulty	Automatic correction → Inverter gets restarted
424**	Power stack communication error transmission ratio missing	Transfer of transformer transmission ratio is faulty	Automatic correction → Inverter gets restarted
425	Receive time-out for data exchange with one or more power stacks exceeded	1. One-off → communication error 2. Ribbon cable between PINCI board and IG BRAIN not connected properly or faulty 3. Optocoupler on PINCI unit faulty	1. Automatic correction 2. Check ribbon cable and replace if necessary 3. Replace PINCI board

Service class 4 (continued)

Code	Description	Possible causes	Remedy (sequence)
426**	Power stack timeout – charging of intermediate circuit takes too long	Intermediate circuit voltage has dropped below the permissible threshold for feed in operation	1. Check modules 2. Replace PINCI board
427**	Power stack timeout – synchronisation to the public mains takes too long	1. No connection to the public grid 2. Measurment circuit on th PINCI board faulty	1. check the public grid 2. Replace PINCI board
428**	Power stack timeout – starting up the slave takes too long	Starting up of the slave-power stack takes too long	Inverter must be sent to Fronius
429**	Power stack timeout – shutting down the slave takes too long	Shutting down of the slave-power stack takes too long	Inverter must be sent to Fronius
431	All power stacks are in boot mode	All power stacks are in boot mode	1. Software update of inverter with Fronius Solar Update 2. Inverter must be sent to Fronius
432	Consistent error in power stack management	Consistent errors occur in the power stack management	1. Automatic correction 2. Inverter must be sent to Fronius
433	Allocation error of dynamic addresses	Errors occur during the allocation of the dynamic addresses	1. Automatic correction 2. Inverter must be sent to Fronius
434	Ground fault detected Ground monitoring system is active → 1A Only for USA version!	1. Wrong jumper position on the C-BOX 2. Ribbon cable between C-BOX and GFDI card faulty 3. GFDI card faulty	1. Check jumper position 2. Check ribbon cables 3. Replace GFDI card
435	Wrong configuration in EE-Prom	1. One-off error 2. Permanent error	1. Automatic correction 2. Inverter must be sent to Fronius
436	Error transmission faulty	1. One-off error 2. Permanent error	1. Automatic correction 2. Inverter must be sent to Fronius
437	Power stack-work-around is active	1. Network error occurs with some 1nd class messages (STATE 101, 102,...)	1. Disturbances on the public mains 2. Reinforce main cables 3. Change values in the service menu
438	Error during state code transmission	1. One-off error 2. Permanent error	1. Automatic correction 2. Inverter must be sent to Fronius
439	POWER LOW; DC LOW (Only in Balance Mode)	DC-input voltage is too low for feed in	1. Check modules 2. Replace the PINCI board
442	Master for one phase could not be assigned	1. Temporary communication error 2. Connection between IG BRAIN and power stacks faulty	1. Automatic correction 2. Check ribbon cables
443	DC-DC energy transfer failure	1. Error during switching on a power stack 2. Power stack failure 3. Transformer cables not connected or faulty	1. Automatic correction 2. Replace PINCI board 3. Check transformer cables

Service class 4 (continued)

Code	Description	Possible causes	Remedy (sequence)
445	Wrong power stack configuration	1. Communication between IG BRAIN and PINCI board faulty 2. PINCI board faulty	1. check the ribbon cable 2. Replace PINCI board
450	Monitoring of the central processing unit „Guard“ is activated	1. Communication between Guard and DSP is faulty 2. Guard processor is defect	1. Automatic correction 2. Replace PINCI board
451	EE Prom of Guard processor defect	1. Communication between Guard and DSP faulty 2. Guard processor is defect	1. Automatic correction 2. Replace PINCI board
452	Communication between Guard and DSP faulty	1. DSP and/or Guard defect	1. Replace PINCI board
453	Processor Guard detected a faulty grid voltage	1. Grid voltage faulty 2. Measurement circuit on PINCI board defect	1. Check grid voltage 2. Replace PINCI board
454	Processor Guard detected a faulty grid frequency	1. Grid frequency faulty 2. Measurement circuit on PINCI board defect	1. Check grid frequency 2. Replace PINCI board
455	AC measurement outside permitted limit	1. Grid error 2. Measurement circuit on PINCI board faulty	1. Check grid values 2. Replace PINCI board
456	Anti islanding test faulty	1. On off error 2. Permanent error	1. Automatic correction 2. Inverter must be sent to Fronius
457	Closed grid relay although start up signal	1. Grid relay open before enabled 2. Grid relay defect	1. Automatic correction 2. Replace PINCI board
460	Referencevoltage outside permitted limits	1. Grid voltage not available 2. Measurement circuit on PINCI board faulty	1. Check grid voltage 2. Replace PINCI board
461	Rod memory faulty	1. Strain EM interference fields 2. DSP on PINCI board defect	1. Check place of installation 2. Replace PINCI board
464	Wrong display version (only proto type)	1. Software of display is newer/older than IG BRAIN software 2. Software of IG BRAIN is newer/older than display software	1. + 2. Replace Display and/or IG BRAIN
465*	Unknown display version	1. Communication between IG BRAIN and display is faulty	1. Replace Display and/or IG BRAIN
466	Display is not available	1. Communication between IG BRAIN and display faulty 2. Ribbon cable of the display defect 3. IG BRAIN defect	1. Disconnect and connect the display 2. Replace Display 3. Replace IG BRAIN
467*	Error during start up	1. Communication error between Display and IG BRAIN 2. Ribbon cable of display defect	1. Automatic correction 2. Replace Display

Service class 4 (continued)

Code	Description	Possible causes	Remedy (sequence)
468	Memory stack for the menu items faulty	1. Communication error 2. Storage error on the display	1. Automatic correction 2. Replace display
469	Output choke mixed up	1. Choke connection IND1 & IND 2 mixed up 2. Circuit error on PINCI board	1. Connect choke connections in right way 2. Replace PINCI board
470	Relay for higher DC voltage does not open	1. Relay defect 2. Measurement circuit defect	1. + 2. Replace PINCI board
471	Defect module grounding fuse	1. Module grounding fuse defect 2. Measurement circuit defect	1. Check or replace the module grounding fuse 2. Replace PINCI board
474	100kOhm module grounding measurement detects failure	1. Isolation fault at the solar generator	1. Check cables and solar generator

Service class 5

Generally this class does not stop the feed in operation of the Fronius IG Plus. The state codes will be displayed until the message is acknowledged by pushing a button on the display (the inverter will work in feed in operation during this time).

Code	Description	Possible causes	Remedy (sequence)
501	Fan on PINC board defect	1. Fan defect 2. Measurement circuit for fan faulty	1. Replace fan 2. Replace PINCI board
502	An isolation fault between DC+ or DC- to earth has been detected	Isolation fault at the solar generator	Check cables and solar generator
504	An error occurred while scanning SolarNet addresses	Identical Fronius IG Plus address used twice	Check address of the inverters and other components
505	The area in the internal memory for the “Setup” values is incomplete	1. One-off – memory error 2. Permanent error - EE-Prom “Setup” on the IG BRAIN faulty	1. Automatic correction 2. Inverter must be sent to Fronius
506	The area in the internal memory for the “Total” values is incomplete	1. One-off – memory error 2. Permanent error - EE-Prom “Total” on the IG BRAIN faulty	1. Automatic correction 2. Inverter must be sent to Fronius
507	The area in the internal memory for the “Day/Year” values is incomplete	1. One-off – memory error 2. Permanent error - EE-Prom “Day/Year” on the IG BRAIN faulty	1. Automatic correction 2. Inverter must be sent to Fronius
508	The area in the internal memory for the “WR number” is damaged	1. One-off – memory error 2. Permanent error - EE-Prom “WR number” IG BRAIN faulty	1. Automatic correction 2. Inverter must be sent to Fronius
509	No feed in operation for 24 hours	1. Snow-covered or very dirty modules 2. Insufficient power from the modules for feed in operation 3. Hardware defect of the Fronius IG Plus	1. Clean modules or remove snow 2. Check other service codes and replace boards if necessary 3. Operate inverter without monitoring components and check other service codes → This error can only be displayed in conjunction with a Datalogger

Service class 5 (coninued)

Code	Description	Possible causes	Remedy (sequence)
510	Errors detected by SolarNet self diagnostic system	1. One-off – memory error 2. The EE-Prom on the IG BRAIN has been damaged	1. Automatic correction 2. Inverter must be sent to Fronius → This error can only be displayed in conjunction with a Datalogger → The error STATE 509 can not be displayed until the next start up 24-hour interval invalid.
511	Errors detected by LocalNet Sensor Card self diagnostic system	1. One-off – memory error 2. The EE-Prom on the control unit has been damaged	1. Automatic correction 2. Inverter must be sent to Fronius → This error can only be displayed in conjunction with a Datalogger and a Sensor Card/Box → The LCD display for the sensor value has been reset
512	According to the device type too many power stacks have been detected	1. Control unit detected too many power stacks after reaching the online threshold (Wait PS) 2. Wrong Device Type programmed	1. Automatic correction 2. Inverter must be sent to Fronius
513	Power stacks in boot mode	1. One-off occurrence 2. Control unit detected power stacks in boot mode	1. Automatic correction 2. Replace control unit →Inverter must be sent to Fronius
514	Incomplete number of power stacks detected after reaching online threshold – Device Type	1. According to the Device Type too few power stages detected after reaching online threshold (Wait PS) 2. Ribbon cable between IG Brain and PINCI board faulty 3. Faulty Optocoupler on PINCI board	1. Automatic correction 2. Check ribbon cables 3. Replace PINCI board
515	One or more power stacks notified STATE 406/407/409/410	1. Temperature sensor on PINCI board faulty or connected incorrectly	1. Check temperature sensor on PINCI board
516	One power stack exceeds the permitted limit of error messages per day (>50x)	1. Grid disturbances 2. Software problem 3. Hardware problem	1. Check STATE PS menu → SETUP → STATE PS → STATE PS00 → STATE xxx → STATE PS01 → STATE xxx

Service class 5 (continued)

Code	Description	Possible causes	Remedy (sequence)
517	Permanent POWER LOW or DC LOW Error	1. Transformer cables are not connected 2. Measuring circuit for the intermediate circuit voltage faulty 3. Rectifier bridge on PINCI board faulty	1. Connect transformer cables 2. Replace PINCI board 3. Replace PINCI board
550	Defect string fuse	1. One or more String fuses are defect 2. False position of the SM jumper	1. Check or replace the string fuses 2. Connect SM jumper properly
551	Defect module grounding fuse	1. Module grounding fuse defect 2. Isolation fault on the PV generator	1. -Check or replace the module grounding fuse 2. -Check cables and solar generator
552	AC Voltagederating	1. Mains voltage error 2. Measurement circuit defect	1. Check mains voltage 2. Replace PINCI board
553	Communication error with Phasenmaster	Communication error with one Phasenmaster	1. Automatic correction 2. Check ribbon cables 3. Replace PINCI board
554	EE-Prom of NL_MON defect	1. Mains voltage error 2. Incorrect values in the Service Menu 3. Measuring error on the Fronius IG Plus	1. Check mains voltage 2. Check values in the Service Menu 3. Replace the NL-MON board
555	Axial fan defect	1. Axial fan on the PINCI board not connected 2. Fan defect 3. Measuring error on the Fronius IG Plus	1. Connect axial fan 2. Replace axial fan 3. Replace the PINCI board
556	Radial fan defect	1. Radial fan on the PINCI board not connected 2. Fan defect 3. Measuring error on the Fronius IG Plus	1. Connect radial fan 2. Replace radial fan 3. Replace the PINCI board
558	Feature disabled	Old software on the PINCI board	Software update of inverter with Fronius Solar Update
562	Power reduction because of AC overcurrent	1. One-off 2. Permanent error	1. Automatic correction 2. State 301 will be shown

Note: The error codes 505 to 551 will not displayed after the ENTER button has been pressed or DC has been disconnected.

State 558 -> One of the IG BRAIN supported feature (Power Control Box, 100kOhm module grounding) is disabled because a other component (PINCI or Display) has a old software version

Note: Fields marked with * are shown as plain text on the LC-display!
However, the state code is displayed when this error is sent by SMS.
Fields marked with ** are not shown on the LC-display!
These errors will be displayed in the “Last error” menu.
Fields marked with *** are grid errors , at this codes is the 2nd position the phase on which the failure occurs
0 = error in all phases / 1 = phase 1 / 2 = phase 2 / 3 = phase 3

Note: The realisation of a software update mustn’t be done without the consent of the Fronius Technical Support, as the necessity has to be clarified depending on the serial number and the software version of the inverter.

This information is supplied without liability and is subject to change without notice.

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