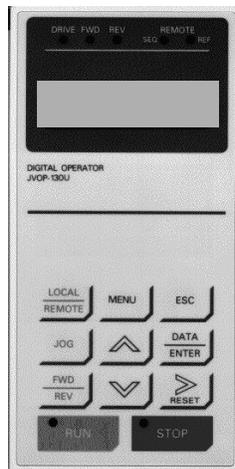
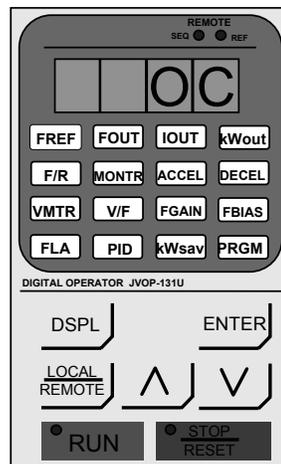


Yaskawa Electric
America
Unit Troubleshooting Manual
Section Three:
Fault Codes & Appendix
GPD 506/P5 and GPD 515/G5
(0.4 ~ 160kW)

Section Three: Fault Codes



GPD 515/G5



GPD 505/P5



GPD 506/P5

Fault Codes

The GPD 506/P5 and GPD 515/G5 inverters can store up to (4) faults.

The GPD 515/G5 inverter has a fault trace that saves the drive status at the time of the fault, and a fault history indicating elapsed time of the stored faults.

The fault codes can be grouped into (3) categories:

- **Major Fault** - Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.
- **Minor Fault** - Operation continues and the fault flashes on the digital operator. The fault relay does not activate.
- **Parameter Setting Error** - Inverter can't run. The fault is displayed on the digital operator, and the fault relay is not activated.

A complete list of fault codes may be found in the appendix.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓ **515** ✓

UV1
DC Bus Undervolt

U_{u1}

505

Undervoltage of the main circuit when running.

230V Units - trip point 190V DC or less.

460V Units - trip point 380V DC or less.

600V Units - trip point 546V DC or less.

Possible Cause(s): Single phase condition on the input, low input voltage at L1, L2, and L3.

Corrective Action: Check the three phase input voltage, verify L2-05 for 515/G5 units.

UV2
CTL PS Undervolt

U_{u2}

Undervoltage of the control circuit when running.

230V Units - 30kW ~ 75kW, monitors the (-15V) power supply.

460V Units - 55kW ~ 160kW, monitors the (-15V) power supply.

Possible Cause(s): External load connected pulling down the inverter power supplies.

Corrective Action: Repair or replace the power/gate drive board.

Fault Codes

Major Fault - Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.

506 ✓ **515** ✓

505

UV3
MC Answerback

Uu3

The pre-charge contactor opened while the inverter is running.

- This fault only applies to 230V units 18kW ~ 75kW , 460V units 22kW ~ 160kW and 600V units 30kW ~ 160kW .

Possible Cause(s): Contacts on contactor are dirty, contactor does not function mechanically.

Corrective Action: Check the contactor, check the ribbon cable from the control board to the gate drive board.

OV
DC Bus Overvolt

OU

Overvoltage of the main circuit when running.

230V Units - trip point 400V DC or more.

460V Units - trip point 800V DC or more.

600V Units - trip point 1050V DC or more.

Possible Cause(s): High input voltage at L1, L2, and L3. The deceleration time is set too short. Power factor correction capacitors are being used on the input to the inverter.

Corrective Action: Check the input circuit, verify the program parameters, add a braking resistor, remove the power factor correction capacitors.

Fault Codes

Major Fault - Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.

506 ✓ **515** ✓

OC
Over current

505

OC

Designed to protect the inverter.

Output current has exceeded OC level of the inverter rated value instantaneously.

<u>OC - 200%</u>	<u>OC - 180%</u>
20P4 - 2015	2018 - 2075
40P4 - 4015	4018 - 4160
51P5 - 5160	

Possible Cause(s): Shorted inverter output phase to phase, shorted motor, locked rotor.

Corrective Action: Remove the motor and run the inverter without the motor. Check the motor for a phase to phase short. Check the inverter for a phase to phase short at the output.

GF
Ground Fault

gf

Designed to protect the inverter.

Inverter output grounding current has exceeded 50% of the inverter rated current.

Possible Cause(s): Motor lead shorted to ground, DCCT defective.

Corrective Action: Remove the motor and run the inverter without the motor. Check the motor for a phase to ground short. Check the output current with a clamp on meter to verify the DCCT reading.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓ **515** ✓

505

SC
Short Circuit

SC

The inverter output is short-circuited.

Possible Cause(s): Shorted inverter output phase to phase, shorted motor, locked rotor.

Corrective Action: Remove the motor and run the inverter without the motor. Check the motor for a phase to phase short. Check the inverter for a phase to phase short at the output.

PUF
DC Bus Fuse Open

PUf

Detects if the DC bus fuse has opened.

Possible Cause(s): Shorted output transistor, shorted main circuit component.

Corrective Action: Remove power from the inverter and disconnect the motor. Perform the checks without/with power starting on page 10. Replace the shorted component(s), then replace the defective fuse.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓ **515** ✓

505

OL1
Motor Overloaded

o1

Motor overload, designed to protect the motor.

Fully adjustable from parameter setting (n033 and n034 for 506/P5 and E1-02 and E2-01 for 515/G5)

A pre-alarm can be selected as a minor fault by using the multi-function outputs.

Possible Cause(s): Motor is overloaded.

Corrective Action: Verify the program settings, reduce the load on the motor.

OL2
Inv Overloaded

o2

Inverter overload, designed to protect the inverter.

120 or 150% of inverter rated current for 1 minute.

515 - 150% for 1 minute

505 and 506 - 120% or 150% depending on drive capacity and setting parameter n116

Possible Cause(s): Motor is overloaded.

Corrective Action: Verify the program settings, reduce the load on the motor.

Fault Codes

Major Fault - Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.

506 ✓

515 ✓

505

OL3
Overtorque Det 1

o|3

Over torque detection function.

A customer programmable current detection. Response may be selected. A minor fault contact output can be programmed by using the multi-function outputs.

Possible Cause(s): Motor is overloaded.

Corrective Action: Verify the program settings, reduce the load on the motor.

506

515 ✓

505

OL4
Overtorque Det 2

N/A

Over torque detection function (2).

A customer programmable current detection. Response may be selected. A minor fault contact output can be programmed by using the multi-function outputs.

Possible Cause(s): Motor is overloaded.

Corrective Action: Verify the program settings, reduce the load on the motor.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓ **515** ✓

505

PF
Input Pha Loss

Sp1

Inverter input power supply has an open phase.
Large imbalance of input voltage.

Possible Cause(s): Open phase on the input of the inverter. Loose terminal screws at terminals L1, L2, or L3. Program parameters set incorrectly (n083 for 506/P5, L8-05 for 515/G5)

Corrective Action: Tighten the terminal screws, check the input voltage, verify the program settings.

506 **515** ✓

505

LF
Output Pha Loss

Sp0

Inverter output has an open phase.

Possible Cause(s): Open phase on the output of the inverter. Loose terminal screws at terminals T1, T2, or T3. Program parameters set incorrectly.

Corrective Action: Tighten the terminal screws, check the output voltage, verify the program settings.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

<u>506</u>	<u>515</u> ✓	<u>505</u>	
OS Overspeed Det		N/A	The motor speed has exceeded the overspeed level when operating in the Closed Loop V/f or Closed Loop Flux Vector modes.

Possible Cause(s): The load has changed considerably, the program settings may not be set correctly.

Corrective Action: Check the load on the motor, verify the program settings (F1-08 PG Overspeed Level, and F1-09 PG Overspeed Time).

<u>506</u>	<u>515</u> ✓	<u>505</u>	
PGO PG open		N/A	Feedback pulses are not received by the PG option board.

Possible Cause(s): The Pulse Generator feedback wires may be broken or not properly connected to the PG feedback option board.

Corrective Action: Check for a broken wire or a loose connection from the Pulse Generator, verify the program settings.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓ **515** ✓

RR
DynBrk Transistr

505

N/A

The braking transistor has failed.

230V Units - 0.4kW ~ 7.5kW

460V Units - 0.4kW ~ 15kW

Possible Cause(s): Shorted braking transistor, high DC bus voltage, defective braking resistor.

Corrective Action: Replace defective transistor or resistor, monitor DC bus level.

RH
DynBrk Resistor

N/A

The braking resistor temperature has exceeded the allowable value.

(Protects Yaskawa 3% duty cycle resistors only)

Can be selected as a minor fault by using the multi-function outputs.

Possible Cause(s): Overhauling load, extended braking duty cycle, defective braking resistor.

Corrective Action: Verify braking duty cycle, monitor DC bus voltage, replace resistor.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

<p><u>506</u> <u>515</u> ✓</p> <div style="background-color: #cccccc; padding: 5px; border: 1px solid #000;"> <p style="text-align: center; margin: 0;">CF Out of Control</p> </div>	<p><u>505</u></p>	<p style="text-align: center;">N/A</p> <p>The actual torque during deceleration has reached the regen torque limit for more than 3 seconds. (Open Loop Flux Vector mode only)</p>
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Possible Cause(s): The regen torque limit value is set too low, load torque is excessively large.

Corrective Action: Verify the program setting, L7-03 forward regen torque limit and L7-04 reverse regen torque limit, extend the deceleration time.

<div style="background-color: #cccccc; padding: 5px; border: 1px solid #000;"> <p style="text-align: center; margin: 0;">SVE Zero Servo Fault</p> </div>	<p>N/A</p>	<p>In the zero servo mode, the motor shaft has rotated 10,000 non-quadrature PG pulses from the home position.</p>
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Possible Cause(s): Torque limit or zero servo gain set too low, load torque excessively large, PG signal noise.

Corrective Action: Verify the program parameters B9-01 zero servo gain and torque limit settings L7-01 ~ L7-02, check for noise on the PG signals.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓

515 ✓

505

OH1
Heatsnk MAX Temp

oh2

The transistor cooling fin temperature exceeded the allowable value. **506/P5** (105 ° C), **515/G5** (105 ° C)

Possible Cause(s): Cooling fan(s) are not working, high ambient temperature.

Corrective Action: Check for dirt build-up on the fans, reduce the ambient temperature around the inverter.

OPR
Oper Disconnect

opr-

The inverter will stop if the digital operator is removed when the inverter is commanded to run through the digital operator.

Possible Cause(s): The operator is not attached, broken operator cable.

Corrective Action: Attach the digital operator, check the cable connected to the digital operator, verify the program setting of parameter O2-06 for 515/G5 models and n112 for 506/P5 models.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

<u>506</u>	<u>515</u> ✓	<u>505</u>	
E-10 SI-F/G CPU down	N/A	N/A	The CPU on the SI-F/G option board has stopped operating. ♣
<p>Possible Cause(s): Defective option board, electrical noise effecting operation.</p> <p>Corrective Action: Cycle power, replace the option board.</p>			
E-15 SI-F/G Com Err	N/A	N/A	After initial communication has been established, the connection was then lost. ♣ Response may be selected.

Possible Cause(s): Connection is broken, master has stopped communicating.

Corrective Action: Check all connections, verify all user side software configurations.

♣ E-10 and E-15 fault codes may only appear when using the OMRON specification (O2-09=3).

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

<u>506</u>	<u>515</u> ✓	<u>505</u>
BUS SI-B Com Err	N/A	After initial communication has been established, the connection was then lost. Response may be selected.

Possible Cause(s): Connection is broken, master has stopped communicating.

Corrective Action: Check all connections, verify all user side software configurations.

<u>506</u> ✓	<u>515</u> ✓	<u>505</u>
CE Memobus Com Err	ce	Transmission error. Control data was not received normally when the power supply is turned on. Response may be selected.

Possible Cause(s): Connection is broken, master has stopped communicating.

Corrective Action: Check all connections, verify all user side software configurations.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓

515 ✓

505

EF3
External Fault3

ef3

External fault at terminal number 3.

Possible Cause(s): An external fault condition exists connected to terminal number 3.

Corrective Action: Check for an external condition, verify the program parameters.

EF4~8
External Fault

ef4
~6

External fault at the multi-function inputs terminal number 4 ~ 8. 506 is the same as 505 and only has EF 4-6.

Possible Cause(s): An external fault condition exists connected to one of the terminals 4, 5, 6, 7, or 8.

Corrective Action: Check for an external condition, verify the program parameters.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓ 515 ✓

505

EF0
External Fault

ef0

External fault from serial communication.

Possible Cause(s): An external fault condition exists.

Corrective Action: Check for an external condition, verify the program parameters.

506 ✓ 515

505

EF2
External Fault

ef2

External fault at the multi-function input terminal number S2.

Possible Cause(s): An external fault condition exists at terminal S2.

Corrective Action: Check for an external condition at terminal S2, verify the program parameters.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506

515 ✓

505

DEV
Speed Deviation

N/A

The deviation of the speed reference and speed feedback has exceeded the regulation level.

A minor fault contact output can be programmed by using the multi-function outputs.

Possible Cause(s): The load has changed considerably.

Corrective Action: Check the load on the motor, verify the program settings (F1-10 PG Deviate Level, F1-11 PG Deviate Time. F1-04 PG Deviation Select.

ERR
EEPROM R/W Err

N/A

EEPROM internal data does not match the value in RAM when setting a parameter.

Possible Cause(s): Control board hardware failure.

Corrective Action: Cycle power, replace the control board.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓ **515** ✓

CPF00
Com-Err(OP&INV)

505

cpf0

Transmission between the inverter and the operator cannot be established 5 seconds after supplying power.

Possible Cause(s): Digital operator cable not securely connected, digital operator defective, control board defective.

Corrective Action: Check the operator cable, replace the digital operator, replace the control board.

CPF01
Com-Err(OP&INV)

cpf1

Communication fault between the inverter and the operator has occurred for more than 2 seconds.

Possible Cause(s): Digital operator cable not securely connected, digital operator defective, control board defective.

Corrective Action: Check the digital operator cable, replace the digital operator, replace the control board.

Fault Codes

Major Fault - Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.

<u>506</u>	<u>515</u> ✓	<u>505</u>	
CPF02 BB Circuit Err		N/A	Baseblock circuit fault at power up.

Possible Cause(s): Gate array hardware failure during power up.

Corrective Action: Perform a factory initialization, cycle power, replace the control board.

<u>506</u> ✓	<u>515</u> ✓	<u>505</u>	
CPF03 EEPROM Error	cpf4		EEPROM fault, check sum not valid. 506 digital operator will display CPF04.

Possible Cause(s): Noise or spike on the control input terminals.

Corrective Action: Perform a factory initialization , cycle power, replace the control board.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506 ✓ **515** ✓

505

CPF04
Internal A/D Err

cpf5

CPU internal A/D converter fault. 506 digital operator will display CPF05.

Possible Cause(s): Noise or spike on the control board input terminals.

Corrective Action: Perform a factory initialization , cycle power, replace the control board.

506 **515** ✓

505

CPF05
External A/D Err

N/A

CPU external A/D converter fault.

Possible Cause(s): Noise or spike on the control board input terminals.

Corrective Action: Perform a factory initialization , cycle power, replace the control board.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

<u>506</u>	<u>515</u> ✓	<u>505</u>	
CPF06 Option Error		N/A	Option connection fault.
<p>Possible Cause(s): An option board is not correctly connected to the control board, an option board that is not made for the 515/G5 inverter is attached to the control board.</p> <p>Corrective Action: Remove power to the inverter and connect the option board once more. Perform a factory initialization , cycle power, replace the option board, replace the control board.</p>			
CPF20 Option A/D Error		N/A	A/D converter fault on the (AI-14B) option board.
<p>Possible Cause(s): Defective AI-14B option board, external input is loading down the option board.</p> <p>Corrective Action: Remove all inputs to the option board. Perform a factory initialization , cycle power, replace the option board, replace the control board.</p>			

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

506

515 ✓

505

CPF21
Option CPU down

N/A

The CPU on the SI-B option board has locked up.

Possible Cause(s): Noise or spike on the communication line, defective SI-B option board.

Corrective Action: Perform a factory initialization , cycle power, replace the option board, replace the control board.

CPF22
Option Type Err

N/A

DPRAM fault detected at power up.

Possible Cause(s): Unrecognizable communication or network option board is connected to the control board.

Corrective Action: Remove any option boards and cycle power, perform a factory initialization, replace the option board, replace the control board.

Fault Codes

Major Fault - *Motor coasts to a stop, the fault is displayed on the digital operator, and the fault relay is activated.*

<u>506</u>	<u>515</u> ✓	<u>505</u>	
CPF23 Option DPRAM Err		N/A	DPRAM handshake timing between the 515/G5 and a network or communication option card has timed out.

Possible Cause(s): An option board is not correctly connected to the control board, an option board that is not made for the 515/G5 inverter is attached to the control board.

Corrective Action: Remove power to the inverter and connect the option board once more. Perform a factory initialization , cycle power, replace the option board, replace the control board.

Fault Codes

Minor Fault - *Operation continues and the digital operator indication blink*
The fault relay does not activate.

506 ✓ 515 ✓

505

UV
DC Bus Undervolt

U_u

The main circuit or control circuit voltage has fallen below the under voltage trip point momentarily.

A minor fault contact output can be programmed by using the multi-function outputs. (GPD515/G5 only)

Possible Cause(s): Single phase condition on the input, low input voltage at L1, L2, and L3.

Corrective Action: Check the three phase input voltage, verify setting of L2-05 for GPD515/G5

OV
DC Bus Overvolt

OU

The DC bus voltage has exceeded the overvoltage trip point while the inverter output is off.

Possible Cause(s): High input voltage at L1, L2, and L3. Power factor correction capacitors are being used on the input to the inverter.

Corrective Action: Check the input circuit, verify the program parameters, add a braking resistor, remove power factor correction capacitors.

Fault Codes

Minor Fault - *Operation continues and the digital operator indication blinks*
The fault relay does not activate.

506 ✓ 515 ✓

505

OH
Heatsnk Ovrtemp

oh1

The transistor cooling fin temperature exceeded the allowable value. **GPD 506/P5** (95 ° C), **GPD515/G5** (95 ° C) Response may be selected.

Possible Cause(s): Cooling fan(s) are not working, high ambient temperature.

Corrective Action: Check for dirt build-up on the fans, reduce the ambient temperature around the inverter.

OH2
Over Heat 2

oh3

Inverter overheat pre-alarm signal is input from the multi-function input terminals.

Possible Cause(s): An external overheat condition exists connected to one of the multi-function input terminals 3, 4, 5, 6, 7, or 8.

Corrective Action: Check for an external condition, verify the program parameters.

Fault Codes

Minor Fault - *Operation continues and the digital operator indication blinks*
The fault relay does not activate.

<u>506</u> ✓	<u>515</u> ✓	<u>505</u>	
OL3 Overtorque Det 1		o 3	Over torque detection function. A customer programmable current detection. Response may be selected. A minor fault contact output can be programmed by using the multi-function outputs.

Possible Cause(s): Motor is overloaded.

Corrective Action: Verify the program settings, reduce the load on the motor.

<u>506</u>	<u>515</u> ✓	<u>505</u>	
OL4 Overtorque Det 2		N/A	Over torque detection function (2). A customer programmable current detection. Response may be selected. A minor fault contact output can be programmed by using the multi-function outputs.

Possible Cause(s): Motor is overloaded.

Corrective Action: Verify the program settings, reduce the load on the motor.

Fault Codes

Minor Fault - *Operation continues and the digital operator indication blinks*
The fault relay does not activate.

506 ✓ 515 ✓

505

EF0
External Fault

ef0

External fault from serial communication.

Possible Cause(s): An external fault condition exists.

Corrective Action: Check for an external condition, verify the program parameters.

EF
External Fault

ef

Both the forward and the reverse run commands are input simultaneously for 500 ms or more.

Possible Cause(s): An external forward and reverse command are input simultaneously.

Corrective Action: Check external sequence logic.

Fault Codes

Minor Fault - *Operation continues and the digital operator indication blinks
The fault relay does not activate.*

<u>506</u>	<u>515</u> ✓	<u>505</u>	
EF3 External Fault3		N/A	External fault at terminal number 3.
	EF4~8 External Fault	N/A	External fault at the multi-function inputs terminal number 4 ~ 8.

Possible Cause(s): An external fault condition exists connected to terminal number 3.

Corrective Action: Check for an external condition, verify the program parameters.

Possible Cause(s): An external fault condition exists connected to one of the terminals 4, 5, 6, 7, or 8.

Corrective Action: Check for an external condition, verify the program parameters.

Fault Codes

Minor Fault - *Operation continues and the digital operator indication blinks
The fault relay does not activate.*

<u>506</u>	<u>515</u> ✓	<u>505</u>	
OS Overspeed Det		N/A	The motor speed has exceeded the overspeed level when operating in the Closed Loop V/f or Closed Loop Flux Vector modes.

Possible Cause(s): The load has changed considerably, the program settings are not set correctly.

Corrective Action: Check the load on the motor, verify the program settings (F1-08 PG Overspeed Level, and F1-09 PG Overspeed Time).

PGO PG open		N/A	Feedback pulses are not received by the PG option board.
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Possible Cause(s): The Pulse Generator feedback wires may be broken or not properly connected to the PG feedback option board, torque limit set too low, motor shaft locked.

Corrective Action: Check for a broken wire or a loose connection from the Pulse Generator, verify the program settings (F1-01 PPR, and F1-02 Feedback Loss Select), increase the torque limits.

Fault Codes

Minor Fault - *Operation continues and the digital operator indication blinks
The fault relay does not activate.*

<u>506</u> <u>515</u> ✓ <div style="background-color: #cccccc; padding: 5px; text-align: center;"> DEV Speed Deviation </div>	<u>505</u> N/A	<p>The deviation of the speed reference and speed feedback has exceeded the regulation level.</p> <p>A minor fault contact output can be programmed by using the multi-function outputs.</p>
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Possible Cause(s): The load has changed considerably.

Corrective Action: Check the load on the motor, verify the program settings (F1-10 PG Deviate Level, F1-11 PG Deviate Time. F1-04 PG Deviation Select.

<u>506</u> ✓ <u>515</u> ✓ <div style="background-color: #cccccc; padding: 5px; text-align: center;"> CE Memobus Com Err </div>	<u>505</u> <div style="border: 1px solid black; padding: 5px; text-align: center; width: 40px; margin: 0 auto;"> ce </div>	<p>Transmission error. Control data was not received normally when the power supply is turned on.</p> <p>Response may be selected.</p>
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Possible Cause(s): Connection is broken, master has stopped communicating.

Corrective Action: Check all connections, verify all user side software configurations.

Fault Codes

Minor Fault - *Operation continues and the digital operator indication blinks*
The fault relay does not activate.

506 ✓ 515 ✓

505

BB
Base Block

bb

External baseblock command is input from the multi-function input terminals.

A minor fault contact output can be programmed by using the multi-function outputs.

Possible Cause(s): A baseblock command was accepted at the multi-function input terminals 3, 4, 5, 6, 7, or 8.

Corrective Action: Check for an external condition, verify the program parameters.

Fault Codes

Parameter Setting Error - *Inverter can't run. The fault is displayed on the digital operator, and the fault relay is not activated.*

506 ✓ 515 ✓ 505

OPE01
kVA Selection

ope 1

Inverter kVA setting error.

Possible Cause(s): The control board was replaced and the kVA parameter is set incorrectly.

Corrective Action: Enter the correct kVA setting (O2-4 for GPD515/G5) and (n115 for GPD506/P5) by referring to the inverter model number.

OPE02
Limit

ope 6

Constant data is out of range. 506 digital operator will display OPE06.

Possible Cause(s): Parameter set above the allowable range.

Corrective Action: Verify the program settings.

Fault Codes

Parameter Setting Error - Inverter can't run. The fault is displayed on the digital operator, and the fault relay is not activated.

506 ✓ 515 ✓ 505

OPE03
Terminal

ope 3

Multi-function input selection fault.

Possible Cause(s): Duplicate functions are selected, up/down commands or trim control increase/decrease are not set simultaneously (GPD515/G5 only). Speed search from maximum frequency and speed search from set frequency are set simultaneously.

Corrective Action: Verify program settings 515/G5 (H1-01 ~ H1-06), 506/P5 (n035 ~ n039).

506 515 ✓ 505

OPE05
Sequence Select

N/A

Run command is selected through serial communication at 2CN but option board is not installed.

Possible Cause(s): Serial communication option board is not installed, option board is installed incorrectly. The run command selection parameter B1-02 is set to 3 and option board is not installed.

Corrective Action: Verify that an option board is installed. Remove power to the inverter and connect the option board once more.

Fault Codes

Parameter Setting Error - Inverter can't run. The fault is displayed on the digital operator, and the fault relay is not activated.

506 **515** ✓ **505**

OPE06 PG Opt Missing	N/A	Closed Loop Flux Vector mode has been selected without a PG board installed.
-------------------------	-----	--

Possible Cause(s): PG option board not correctly installed or missing. The control method selection parameter A1-02 is set to 1 or 3 without a feedback board installed.

Corrective Action: Verify that an option board is installed. Remove power to the inverter and connect the option board once more.

OPE07 Analog Selection	N/A	The multi-function analog inputs terminals 14 and 16 are set for the same function.
---------------------------	-----	---

Possible Cause(s): Duplicate functions are selected.

Corrective Action: Verify the set values of H3-09 (terminal 14 selection) and H3-05 (terminal 16 selection).

Fault Codes

Parameter Setting Error - Inverter can't run. The fault is displayed on the digital operator, and the fault relay is not activated.

506 **515** ✓ **505**

OPE08 Terminal	N/A	Multi-function input or multi-function output data setting error.
-------------------	-----	---

Possible Cause(s): A multi-function selection has been chosen that is not offered in the present control mode.

Corrective Action: Check the “modified constants” area and verify the set values in parameters H1-01~H1-06, H2-01~H2-03, H3-05, H3-09, H4-01 and H4-04.

506 ✓ **515** ✓ **505**

OPE10 V/F Ptrn Setting	ope 5	V/F data setting fault. 506 digital operator will display OPE10.
---------------------------	---	--

Possible Cause(s): The V/f parameter settings are not set correctly.

Corrective Action: Check parameters (E1-04 ~ E1-11) for the 515/G5 and parameters (n012 ~ n018) for the 506/P5. A minimum frequency/voltage value may be set higher than the maximum frequency/voltage.

Fault Codes

Parameter Setting Error - *Inverter can't run. The fault is displayed on the digital operator, and the fault relay is not activated.*

<u>506</u>	<u>515</u> ✓	<u>505</u>	
OPE11 FC/ On-Dly	N/A		Carrier frequency data setting fault. Upper limit (C6-01) >5KHz, and the lower limit (C6-02) <= 5KHz. Carrier frequency proportional gain (C6-03) > 6 and (C6-01) < (C6-02).

Possible Cause(s): Parameter setting incorrect.

Corrective Action: Check the program settings and correct the errors.

<u>506</u> ✓	<u>515</u> ✓	<u>505</u>	
CALL Serial Com Call	call		Serial communication transmission error. Communication has not yet been established.

Possible Cause(s): Connection not made properly, user software not configured to the proper baud rate or configuration.

Corrective Action: Check all connections, verify all user side software configurations.

Fault Codes

Parameter Setting Error - *Inverter can't run. The fault is displayed on the digital operator, and the fault relay is not activated.*

<u>506</u>	<u>515</u> ✓	<u>505</u>	
CALL SI-F/G ComCall		N/A	Serial communication transmission error. Communication has not yet been established.

Possible Cause(s): Connection is broken, master has stopped communicating.

Corrective Action: Check all connections, verify all user side software configurations.

Appendix

In the appendix of this manual you will find the following information;

- *Fault code list*
- *Terminal function diagram for the GPD 515/G5*
- *Terminal function diagram for the GPD 506/P5*
- *Procedure for power component replacement*
- *Thermal compound specifications*
- *Power module layout*
- *Parts lists not found in the technical manuals*

Appendix

Fault Codes

G5 Code	G5 Text	P5 Code	Major Fault	Minor Fault	Parameter Setting Error	G5 MODBUS Register Data	Page #
BB	Base Block	bb		X			91
BUS	SI-B Com Err	N/A	X				74
CALL	Serial Com Call	CALL			X		96
CALL	SI-F/G ComCall	N/A			X		97
CE	Memobus Com Err	CE	X	X		21	74,90
CF	Out of Control	N/A	X			25	71
CPF00	Com-Err (OP&INV)	CPF0	X				78
CPF01	Com-Err (OP&INV)	CPF1	X				78
CPF02	BB Circuit Err	N/A	X				79
CPF03	EEPROM Error	CPF4	X				79
CPF04	Internal A/D Err	CPF5	X				80
CPF05	Internal A/D Err	N/A	X				80
CPF06	Option Error	N/A	X				81
CPF20	Option A/D Error	N/A	X				81
CPF21	Option CPU down	N/A	X				82
CPF22	Option Type Err	N/A	X				82
CPF23	Option DPRAM Err	N/A	X				83
DEV	Speed Deviation	N/A	X	X		19	77,90
E-10	SI-F/G CPU down	N/A	X			24	73
E-15	SI-F/G Com Err	N/A	X			23	73
EF	External Fault	EF		X			87
EF0	External Fault	EF0	X	X			76,87
N/A	N/A	EF2	X				76
EF3	External Fault 3	EF3	X	X		11	75,88
EF4	External Fault 4	EF4	X	X		12	75,88
EF5	External Fault 5	EF5	X	X		13	75,88
EF6	External Fault 6	EF6	X	X		14	75,88
EF7	External Fault 7	N/A	X	X		15	75,88
EF8	External Fault 8	N/A	X	X		16	75,88
ERR	EEPROM R/W Err	N/A	X			1F	77
GF	Ground Fault	GF	X			06	64
LF	Output Pha Loss	SPo	X			1C	68

Note: When communicating with the GPD 515G5 using the internal MODBUS protocol, access register 0090H to obtain the present fault.

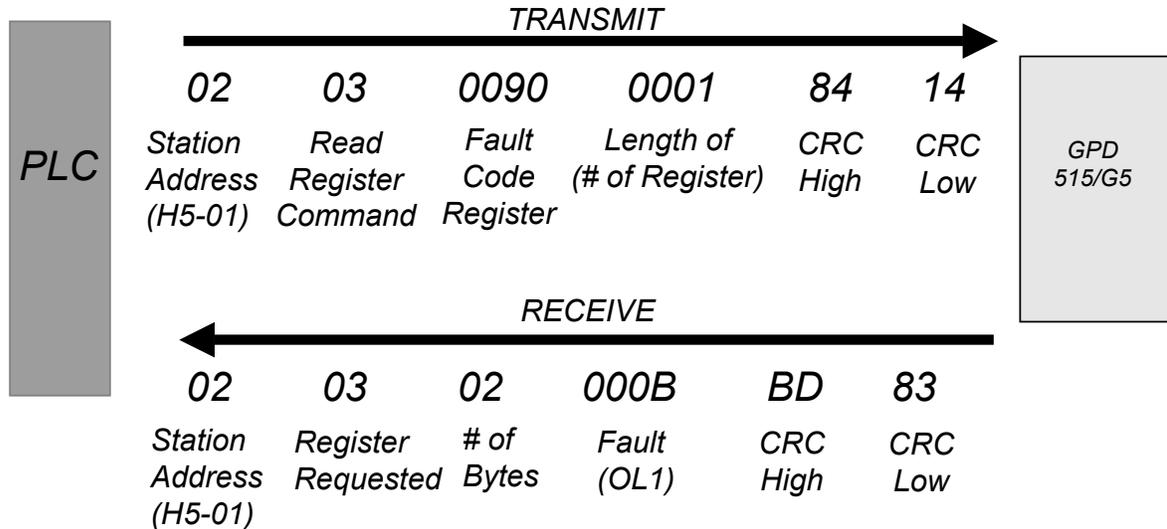
Fault Codes

G5 Code	G5 Text	P5 Code	Major Fault	Minor Fault	Parameter Setting Error	G5 MODBUS Register Data	Page #
OC	Over current	OC	X			07	64
OH	Heatsnk Overtemp	OH1		X			85
OH1	Heatsnk MAX Temp	OH2	X			0A	72
OH2	Over Heat 2	OH3		X			85
OL1	Motor Overloaded	OL1	X			0B	66
OL2	Inv Overloaded	OL2	X			0C	66
OL3	Overtorque Det 1	OL3	X	X		0D	67,86
OL4	Overtorque Det 2	N/A	X	X		0E	67,86
OPE01	KVA Selection	OPE1			X		92
OPE02	Limit	OPE6			X		92
OPE03	Terminal	OPE3			X		93
OPE05	Sequence Error	N/A			X		93
OPE06	PG Opt Missing	N/A			X		94
OPE07	Analog Selection	N/A			X		94
OPE08	Terminal	N/A			X		95
OPE10	V/F Ptrn Setting	OPE5			X		95
OPE11	FC/ On-Dly	N/A			X		96
OPR	Oper Disconnect	OPr	X			1E	72
OS	Overspeed Det	N/A	X	X		18	69,89
OV	DC Bus Overvolt	OU	X	X		08	63,84
PF	Input Pha Loss	SP1	X			1B	68
PGO	PG Open	N/A	X	X		1A	69,89
PUF	DC Bus Fuse Open	PUF	X			01	65
RH	DynBrk Resistor	N/A	X			10	70
RR	DynBrk Transistr	N/A	X			0F	70
SC	Short Circuit	SC	X			05	65
SVE	Zero Servo Fault	N/A	X			26	71
UV	DC Bus Undervolt	Uu		X			84
UV1	DC Bus Undervolt	UU1	X			02	62
UV2	CTL PS Undervolt	UU2	X			03	62
UV3	MC Answerback	UU3	X			04	63

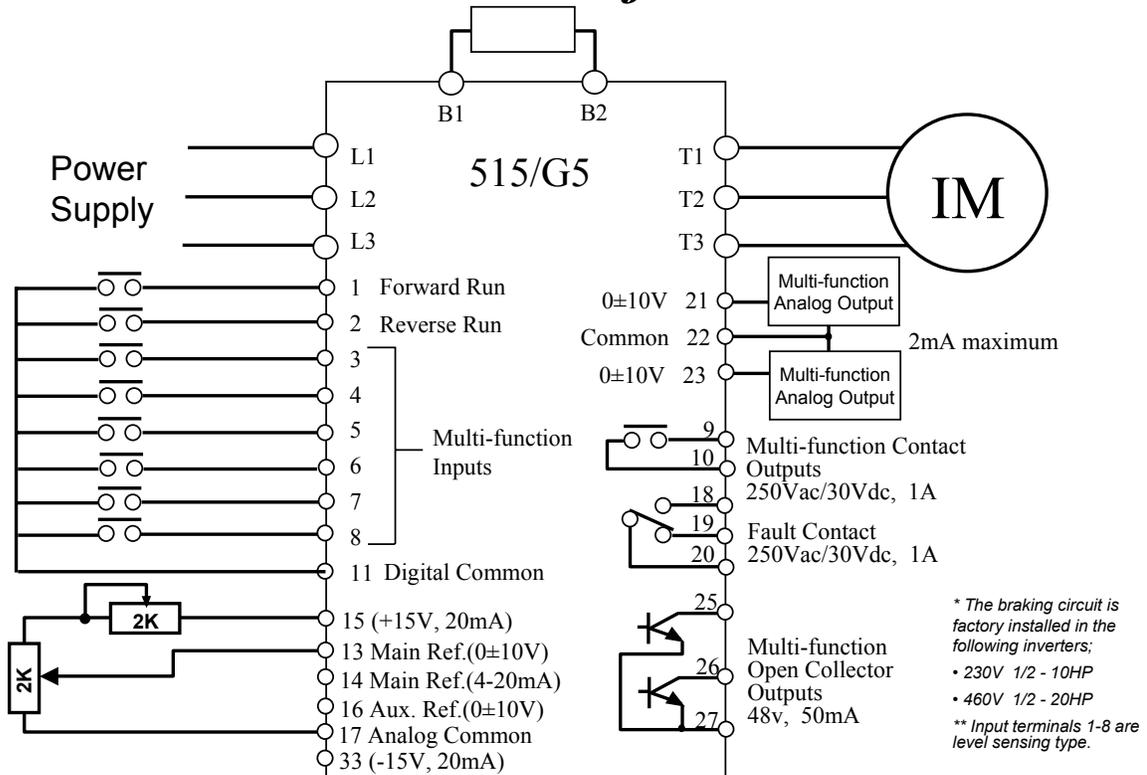
Note: When communicating with the GPD 515/G5 using the internal MODBUS protocol, access register 0090H to obtain the present fault.

GPD 515G5 MODBUS Register Data

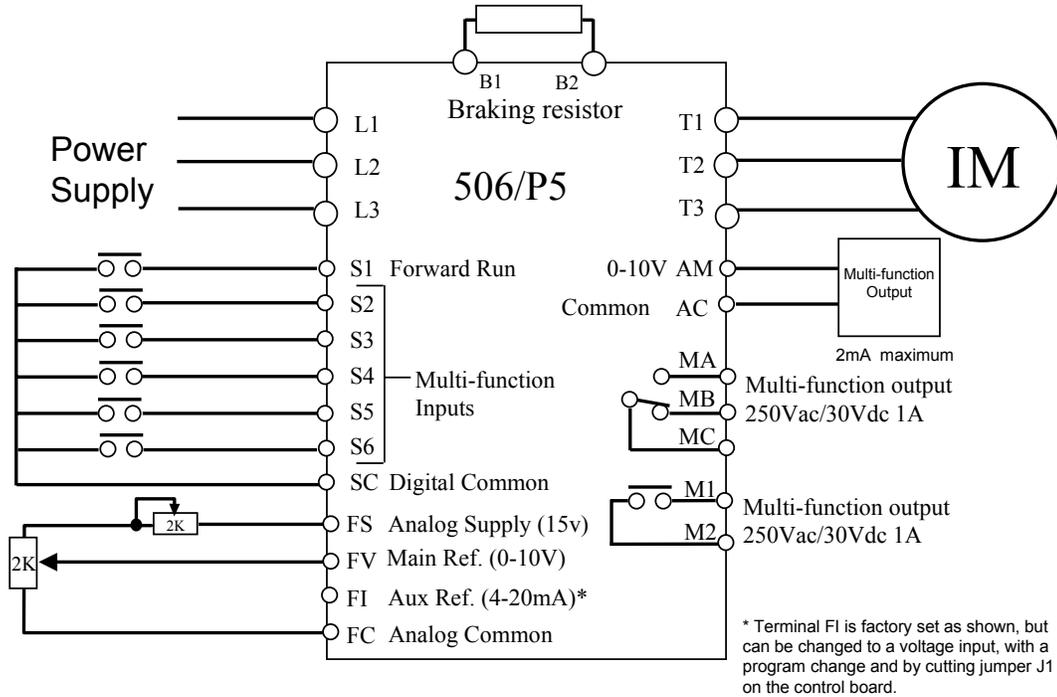
The present fault may be obtained by accessing register 0090H. An example of an OL1 fault being read from a GPD515/G5 with the station address of 02 is shown below.



Terminal Functions of the GPD515/G5



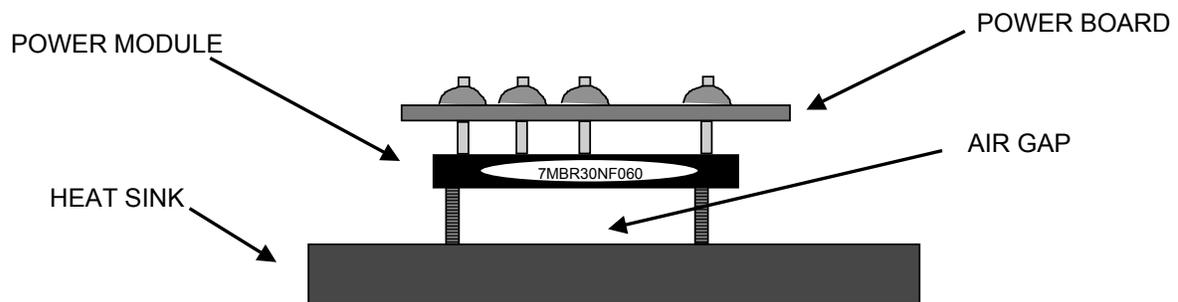
Terminal functions of the GPD 506/P5



Power Component Replacement

Incorrect Method for Replacement of Circuit Board Mounted Components

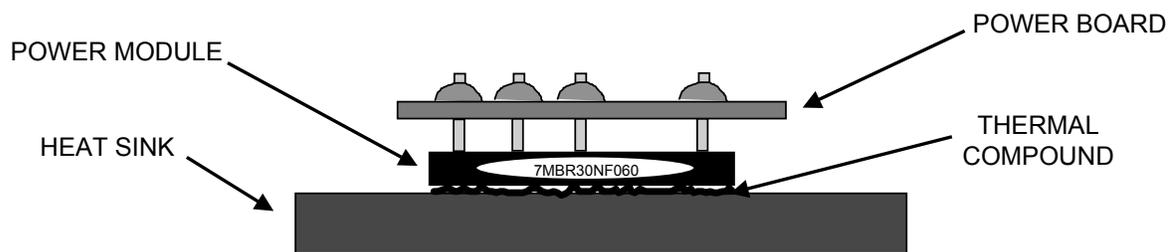
Large board-mounted components (input diodes, output IGBT's, and power modules) are not being correctly installed into small size inverters during repair. The components are being soldered to the power board, before being mounted to the heat sink.



Power Component Replacement

Correct Method for Replacement of Circuit Board Mounted Components

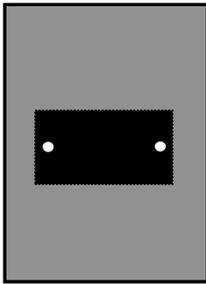
When mounted correctly, the power module with thermal compound applied, will be in contact with the heatsink. The specifications for the thermal compound can be found on the following page.



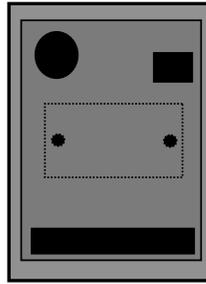
Power Component Replacement

Correct Method for Replacement of Circuit Board Mounted Components

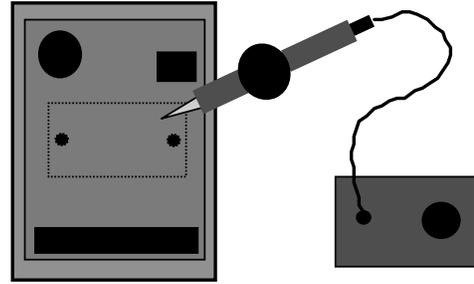
The component must first be mounted to the heat sink. The power board should then be installed into the inverter, over the top of the components. Then the components should be soldered to the power board.



1. Mount components to heat sink (include thermal compound)



2. Install power board over components



3. Solder components to the power board

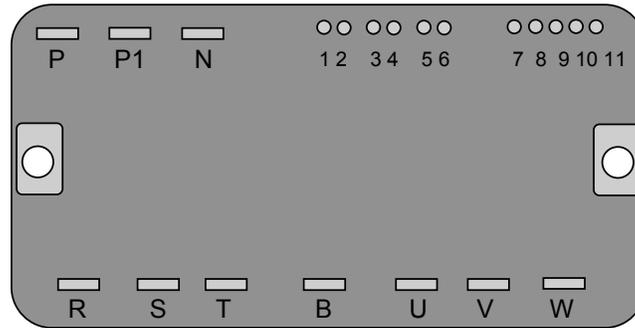
Thermal Compound

In the chart below is a list of thermal compound specifications. The thermal compound used on all power components in Yaskawa inverters is highlighted.

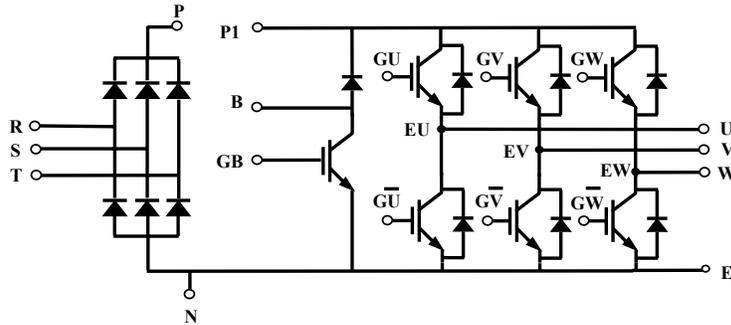
Vendor	SHIN-ETSU	SHIN-ETSU	TOSHIBA	CASTALL
Description	Thermal Compound	Thermal Compound	Thermal Compound	Thermal Compound
Material	Silicon Grease	Silicon Grease	Silicon Grease	Silicon Grease
Appearance	White Paste	-	-	-
Model Number	G746	KS609	YG6260	CASTALL800
Thermal Conductivity	$1.6 \times 10^{-3} \text{ cal/cm}\cdot\text{sec}\cdot^{\circ}\text{C}$	$1.5 \times 10^{-3} \text{ cal/cm}\cdot\text{sec}\cdot^{\circ}\text{C}$	$2 \times 10^{-3} \text{ cal/cm}\cdot\text{sec}\cdot^{\circ}\text{C}$	$1.8 \times 10^{-3} \text{ cal/cm}\cdot\text{sec}\cdot^{\circ}\text{C}$
Temperature Range	-50° C ~ 150° C	-55° C ~ 200° C	-50° C ~ 150° C	-55° C ~ 205° C

Power Module Layout

The power module layout for 230V models 0.4kW ~ 5.5kW and 460V models 0.4kW ~ 4.0kW is shown below.

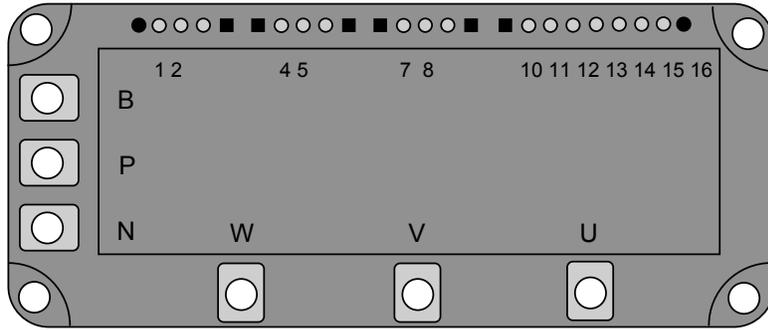


Pin #	Description
1	GU
2	EU
3	GV
4	EV
5	GW
6	EW
7	GU
8	GV
9	GW
10	GB
11	E

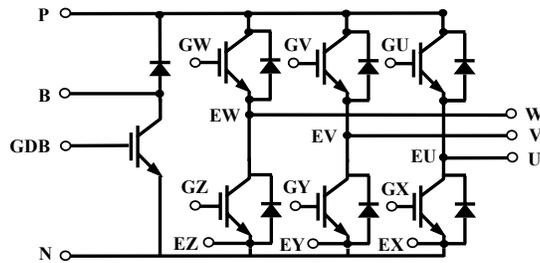


Power Module Layout

The power module layout for 230V model 7.5kW and 460V models 5.5kW and 7.5kW is shown below.

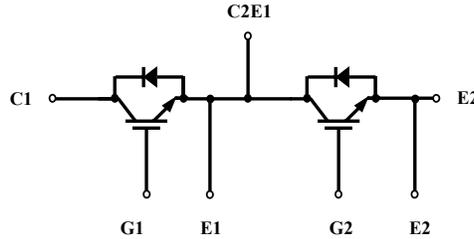
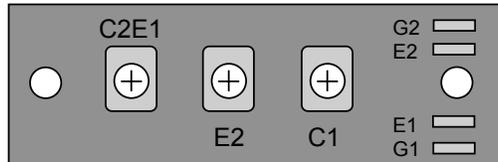


Pin #	Description
1	GW
2	EW
3	Not Used
4	GV
5	EV
6	Not Used
7	GU
8	EU
9	Not Used
10	GX
11	EX
12	GY
13	EY
14	GZ
15	EZ
16	GDB



Power Module Layout

The power module layout for 230V / 460V 11kW & 15kW models is shown below.



Soft Charge Resistor

Part Numbers:

Inverter Model Number (G5) 230V CIMR-	Inverter Model Number (PC5) 230V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Resistor Designation
G5U20P4 G5U20P7	P5U20P4 P5U20P7	KNYS7W400K	R010064	7W 40 OHM +/- 10%	R2
G5U21P5	P5U21P5	KNYS7W220K	R010072	7W 22 OHM +/- 10%	R2
G5U22P2 G5U23P7	P5U22P2 P5U23P7	KNYS7W4R5K	R010065	7W 4.5 OHM +/- 10%	R14, R22
G5U25P5 G5U27P5	P5U25P5 P5U27P5	KNYS7W3R0K	R010066	7W 3 OHM +/- 10%	R79, R80 R80, R83
G5U2011 G5U2015	P5U2011 P5U2015	RGHS60LS2R2OHMJ	R010062	2.2 OHM +/- 10%	R1
460V					
G5U40P4 G5U40P7 G5U41P5	P5U40P4 P5U40P7 P5U41P5	KNYS10W800K	R010067	10W 80 OHM +/- 10%	R4
G5U42P2 G5U43P7 G5U44P0	P5U42P2 P5U43P7 P5U44P0	KNYS10W500K	R010068	10W 50 OHM +/- 10%	R12 R8, R12 R8, R12
G5U45P5 G5U47P5	P5U45P5 P5U47P5	KNYS10W4R0K	R010069	10W 4 OHM +/- 10%	R79, R82
G5U4011 G5U4015	P5U4011 P5U4015	RGHS80LS6R2OHMJ	R010063	80W 6.2 OHM +/-10%	R1

Soft Charge Resistor

Part Numbers:

Inverter Model Number 230V CIMR-	Inverter Model Number 230V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Resistor Designation
G5U2018 G5U2022	P5U2018 P5U2022	RGHS60LS2R20HMJ	R010062	60W 2.2 OHM +/- 5%	R1
G5U2030 G5U2037 G5U2045 G5U2055	P5U2030 P5U2037 P5U2045 P5U2055	SMR120W	R007704	120W 1 OHM +/- 5%	R1
G5U2075	P5U2075	SMRW220W	R007705	220W 1 OHM +/- 5%	R1
460V	460V				
G5U4018 G5U4022	P5U4018 P5U4022	RGHS80LS6R20HMJ	R010063	80W 6.2 OHM +/-10%	R1
G5U4030 G5U4037 G5U4045	P5U4030 P5U4037 P5U4045	RGHS100LS4R0OHMJ	R010078	100W 4 OHM +/- 5%	R1
G5U4055 G5U4075 G5U4110 G5U4160	P5U4055 P5U4075 P5U4110 P5U4160	SMRW220W	R007705	220W 1 OHM +/- 5%	R1 R1,R2

Soft Charge Resistor

Part Numbers:

Inverter Model Number 600V CIMR-	Inverter Model Number 600V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Resistor Designation
G5U51P5 G5U52P2	P5U51P5 P5U52P2	KNYS10W500K	R010068	10W 500 OHM +/-5%	R1
G5U53P7	P5U53P7	KNYS10W500K	R010068	10W 500 OHM +/-5%	R73, R74
G5U5P5 G5U57P5	P5U5P5 P5U57P5	KNYS10W4ROK	RO10069	10W 40 OHM +/- 10%	R80, R85
G5U5011 G5U5015	P5U5011 P5U5015	RGHS80LS6R20HMJ	R010063	80W 6.2 OHM +/-5%	R1
G5U5018 G5U5022	P5U5018 P5U5022	SMR80WA4904	R007607	80W 4.3 OHM +/-10%	R1
G5U5030 G5U5037 G5U5045 G5U5055 G5U5075	P5U5030 P5U5037 P5U5045 P5U5055 P5U5075	SMR120WA4905	R007608	120W 3 OHM +/- 10%	R1
G5U5090 G5U5110 G5U5160	P5U5090 P5U5110 P5U5160	SMR220W	R007673	220W 3 OHM +/-5%	R1 R1,R2

Soft Charge Contactor

Part Numbers:

Inverter Model Number (G5) 230V CIMR-	Inverter Model Number (PC5) 230V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Contactors Designation
G5U20P4 G5U20P7 G5U21P5	P5U20P4 P5U20P7 P5U21P5	VSJ-24MC	POR003011	DC 24V	MC1
G5U22P2 G5U23P7	P5U22P2 P5U23P7	HE1AN-DC24V	POR003013		
G5U25P5 G5U27P5	P5U25P5 P5U27P5	HE2AN-DC24V	POR003014		
G5U2011 G5U2015	P5U2011 P5U2015	G7J-4A-B-DC24V	POR003012		
460V	460V				
G5U40P4 G5U40P7 G5U41P5 G5U42P2	P5U40P4 P5U40P7 P5U41P5 P5U42P2	JC2AF-B-DC24V	POR003015	DC 24V	MC1
G5U43P7 G5U44P0 G5U45P5	P5U43P7 P5U44P0 P5U45P5	HE2AN-DC24V	POR003014		
G5U47P5	P5U47P5	HP-20GU	MC003260		
G5U4011 G5U4015	P5U4011 P5U4015	G7J-4A-B-DC24V	POR003012		

Soft Charge Contactor

Part Numbers:

Inverter Model Number 230V CIMR-	Inverter Model Number 230V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	24V Coil	24V & 230V Coil	Designation
G5U2018	P5U2018	HI-20ETCU-U	MC003253	200V 35A		X	MC1
G5U2022	P5U2022	HI-25ETCU-U	MC003333	200V 58A		X	MC1
G5U2030 G5U2037	P5U2030 P5U2037	HI-35E2T2CU-U	MC003483	200V 70A		X	MC1
G5U2045 G5U2055	P5U2045 P5U2055	HI-35E2TCU	MC003259	250V 200A		X	MC1
G5U2075	P5U2075	HI-100E2TCU	MC003257	200V 190A		X	MC1
460V	460V						
G5U4018	P5U4018	HP-20GU	MC003260	DC 24V	X		MC1
G5U4022 G5U4030	P5U4022 P5U4030	HI-15E2TCU	MC003274	220V 30A		X	MC1
G5U4037	P5U4037	HI-20ETCU	MC003253	200V 35A		X	MC1
G5U4045	P5U4045	HI-25ETCU-U	MC003333	200V 58A		X	MC1
G5U4055 G5U4075	P5U4055 P5U4075	HI-35E2T2CU-U	MC003483	200V 70A		X	MC1
G5U4110	P5U4110	HI-35E2T2CU	MC003259	200V 115A		X	MC1
G5U4160	P5U4160	HI-100E2TCU	MC003257	200V 190A		X	MC1

Soft Charge Contactor

Part Numbers:

Inverter Model Number 600V CIMR-	Inverter Model Number 600V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	24V Coil	24V & 230V Coil	Resistor Designation
G5U51P5 G5U52P2	P5U51P5 P5U52P2	JC2AF-DC24V	POR001074	DC24V AC250V 10A	X		MC1
G5U53P7	P5U53P7	HE2AN-DC24V	POR003014	DC24V 20A 2 POLE	X		MC1
G5U5P5 G5U57P5	P5U5P5 P5U57P5	HP-20GU	MC003260	DC24V 20A 3A	X		MC1
G5U5011 G5U5015 G5U5018 G5U5022	P5U5011 P5U5015 P5U5018 P5U5022	HP-20GU	MC003260	24VDC 20A	X		MC1
G5U5030 G5U5037 G5U5045 G5U5055 G5U5075	P5U5030 P5U5037 P5U5045 P5U5055 P5U5075	HI-25ETCU-U	MC003333	200V 58A		X	MC1
G5U5090	P5U5090	SC-5N/UL	MC003401	660V 100A		X	MC1
G5U5110 G5U5160	P5U5110 P5U5160	SC-6N/UL	MC003402	660V 125A		X	MC1

Braking Transistor

Part Numbers:

Inverter Model Number (G5) 230V CIMR-	Inverter Model Number (PC5) 230V CIMR-	Mfg. Part Number	YEA Code	Specifications	IGBT Designation
G5U20P4	P5U20P4				
G5U20P7	P5U20P7				
G5U21P5	P5U21P5	INSIDE POWER MODULE			PM1
G5U22P2	P5U22P2	(SEE OUTPUT TRANSISTOR PARTS LIST)			
G5U23P7	P5U23P7				
G5U25P5	P5U25P5				
G5U27P5	P5U27P5				TM1
G5U2011	P5U2011	N/A			N/A
G5U2015	P5U2015				
460V	460V				
G5U40P4	P5U40P4				
G5U40P7	P5U40P7				
G5U41P5	P5U41P5				PM1
G5U42P2	P5U42P2	INSIDE POWER MODULE			
G5U43P7	P5U43P7	(SEE OUTPUT TRANSISTOR PARTS LIST)			
G5U44P0	P5U44P0				
G5U45P5	P5U45P5				TM1
G5U47P5	P5U47P5				
G5U4011	P5U4011	MG50Q1BS11	STR001058	1200V 50A 1 IN 1	TRM 4
G5U4015	P5U4015				

Caution: It is crucial that you remember to apply a thermal compound to the mounting surface of the power module, to ensure proper heat transfer from the module to the inverter's heat sink. Failure to do so may result in another component failure.

Braking Transistor

Part Numbers:

Inverter Model Number 600V CIMR-	Inverter Model Number 600V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	IGBT Designation
G5U51P5 G5U52P2 G5U53P7 G5U5P5 G5U57P5	P5U51P5 P5U52P2 P5U53P7 P5U5P5 P5U57P5	INSIDE POWER MODULE (SEE OUTPUT TRANSISTOR PARTS LIST)			PM1
G5U5011 G5U5015	P5U5011 P5U5015	MG50Q1BS11	STR001222	1200V 50A	TRM4
G5U5018 G5U5022	P5U5018 P5U5022	CM50E3Y-24E	STR001218	1200V 50A	TRM4
G5U5030 G5U5037 G5U5045 G5U5055 G5U5075 G5U5090 G5U5110 G5U5160	P5U5030 P5U5037 P5U5045 P5U5055 P5U5075 P5U5090 P5U5110 P5U5160	NOT INSTALLED IN THESE MODELS			

Caution: It is crucial that you remember to apply a thermal compound to the mounting surface of the power module, to ensure proper heat transfer from the module to the inverter's heat sink. Failure to do so may result in another component failure.

Snubber Diodes

Part Numbers:

Inverter Model Number 230V CIMR-	Inverter Model Number 230V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Diode Designation	
G5U2018 G5U2022	P5U2018 P5U2022	N/A				
G5U2030	P5U2030	MS0650D225P-1 MS0650D225N-1	SID000583 SID000582	50A 2.2MFD 50A 2.2MFD	SM1,3,5 SM2,4,6	
G5U2037	P5U2037	MS0650D225P-1 MS0650D225N-1	SID000583 SID000582	50A 2.2MFD 50A 2.2MFD	SM1,3,5 SM2,4,6	
G5U2045	P5U2045	MS0650D225P-1 MS0650D225P-2 MS0650D225N-1 MS0650D225N-2	SID000583 SID000585 SID000582 SID000584	50A 2.2MFD 50A 2.2MFD 50A 2.2MFD 50A 2.2MFD	SM11,31,51 SM12,32,52 SM21,41,61 SM22,42,62	
G5U2055	P5U2055	MS0650D225P-1 MS0650D225P-2 MS0650D225N-1 MS0650D225N-2	SID000583 SID000585 SID000582 SID000584	50A 2.2MFD 50A 2.2MFD 50A 2.2MFD 50A 2.2MFD	SM11,31,51 SM12,32,52 SM21,41,61 SM22,42,62	
G5U2075	P5U2075	MS0650D225P-1 MS0650D225P-2 MS0650D225N-1 MS0650D225N-2	SID000583 SID000585 SID000582 SID000584	50A 2.2MFD 50A 2.2MFD 50A 2.2MFD 50A 2.2MFD	SM111,121,311,321,511,521 SM112,122,312,322,521,522 SM211,221,411,421,611,621 SM212,222,412,422,612,622	
460V	460V	N/A				
G5U4018 G5U4022 G5U4030 G5U4037 G5U4045	P5U4018 P5U4022 P5U4030 P5U4037 P5U4045	N/A				
G5U4055	P5U4055	MS1250D225P MS1250D225N	SID000568 SID000567	50A 2.2MFD 50A 2.2MFD	SM1,3,5 SM2,4,6	
G5U4075	P5U4075	MS1250D225P MS1250D225N	SID000568 SID000567	50A 2.2MFD 50A 2.2MFD	SM1,3,5 SM2,4,6	
G5U4110	P5U4110	MS1250D225P MS1250D225N	SID000568 SID000567	50A 2.2MFD 50A 2.2MFD	SM11,12,31,32,51,52 SM21,22,41,42,61,62	
G5U4160	P5U4160	MS1250D225P MS1250D225N	SID000568 SID000567	50A 2.2MFD 50A 2.2MFD	SM11,12,31,32,51,52 SM21,22,41,42,61,62	

Caution: It is crucial that you remember to apply a thermal compound to the mounting surface of the transistor module, to ensure proper heat transfer from the module to the inverter heat sink. Failure to do so may result in another component failure.

Snubber Diodes

Part Numbers:

Inverter Model Number 600V CIMR-	Inverter Model Number 600V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Diode Designation
G5U51P5 G5U52P2 G5U53P7 G5U5P5 G5U57P5 G5U5011 G5U5015 G5U5018 G5U5022 G5U5030 G5U5037 G5U5045	P5U51P5 P5U52P2 P5U53P7 P5U5P5 P5U57P5 P5U5011 P5U5015 P5U5018 P5U5022 P5U5030 P5U5037 P5U5045			Not Required	
G5U5055 G5U5075	P5U5055 P5U5075	ERG28-14 ERG78-14	SID000506 SID000507	1400V 30A 1400V 30A	D3, D5, D7 D2, D4, D6
G5U5090 G5U5110 G5U5160	P5U5090 P5U5110 P5U5160	MS145OD225N MS145OD225P	SID000622 SID000623	1400V 50A 2.2MFD 1400V 50A 2.2MFD	SM1, SM3, SM5 SM2, SM4, SM6

Caution: It is crucial that you remember to apply a thermal compound to the mounting surface of the transistor module, to ensure proper heat transfer from the module to the inverter heat sink. Failure to do so may result in another component failure.

Snubber Resistors

Part Numbers:

Inverter Model Number 230V CIMR-	Inverter Model Number 230V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Resistor Designation
G5U2018 G5U2022	P5U2018 P5U2022	N/A			
G5U2030 G5U2037	P5U2030 P5U2037	ERF-60WH100	R007497	60W 10 OHM +/- 5%	R3~8
G5U2045 G5U2055	P5U2045 P5U2055	SMR90WA4748C	R007157	90W 10 OHM +/- 5% (X2)	R3~5
G5U2075	P5U2075	SMR90WA4748M	R007697	90W 5 OHM +/- 5% (X2)	R3~8
460V	460V				
G5U4018 G5U4022 G5U4030 G5U4037 G5U4045	P5U4018 P5U4022 P5U4030 P5U4037 P5U4045	N/A			
G5U4055 G5U4075	P5U4055 P5U4075	ERF-60WH100	R007497	60W 10 OHM +/- 5%	R5 ~ 10
G5U4110 G5U4160	P5U4110 P5U4160	SMR90WA4748C	R007157	90W 10 OHM +/- 5% (X2)	R7 ~ 9

Snubber Resistors

Part Numbers:

Inverter Model Number 600V CIMR-	Inverter Model Number 600V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Resistor Designation
G5U51P5 G5U52P2 G5U53P7 G5U5P5 G5U57P5 G5U5011 G5U5015 G5U5018 G5U5022 G5U5030 G5U5037 G5U5045	P5U51P5 P5U52P2 P5U53P7 P5U5P5 P5U57P5 P5U5011 P5U5015 P5U5018 P5U5022 P5U5030 P5U5037 P5U5045	Not Required			
G5U5055 G5U5075	P5U5055 P5U5075	ERF-60W	R007621	60W 10 OHM +/- 5%	R7 - R12
G5U5090 G5U5110 G5U5160	P5U5090 P5U5110 P5U5160	SMR90W	R007672	90W 10 OHM +/- 5%	R9 - R11 R12 - R14

Snubber Capacitors

Part Numbers:

Inverter Model Number 230V CIMR-	Inverter Model Number 230V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Capacitor Designation
G5U2018 G5U2022	P5U2018 P5U2022	MF-630MPD475K	C006066	4.7 MFD +/- 10%	C3~8
G5U2030 G5U2037 G5U2045 G5U2055 G5U2075	P5U2030 P5U2037 P5U2045 P5U2055 P5U2075	DE2110R472K2K	C003017	2KV 4700PF	C12~29 C17 ~ 52
460V	460V				
G5U4018 G5U4022 G5U4030 G5U4037 G5U4045	P5U4018 P5U4022 P5U4030 P5U4037 P5U4045	DMPPT3A335K	C006097	1000V 3.3MFD	C3 ~ 8 C5 ~ 10
G5U4055 G5U4075 G5U4110 G5U4160	P5U4055 P5U4075 P5U4110 P5U4160	DE2110R472K2K	C003017	2KV 4700PF	C8 ~ 25 C15 ~ 50

Snubber Capacitors

Part Numbers:

Inverter Model Number 600V CIMR-	Inverter Model Number 600V CIMR-	Mfg. Part Number	YEA Code Number	Specifications	Capacitor Designation
G5U51P5 G5U52P2 G5U53P7 G5U5P5 G5U57P5	P5U51P5 P5U52P2 P5U53P7 P5U5P5 P5U57P5	Not Required			
G5U5011 G5U5015	P5U5011 P5U5015	C1NP3B335K-YA	C006367	1250V 3.3UF +/-10%	C3 - C5
G5U5018 G5U5022	P5U5018 P5U5022	C1NP3B225K-YA	C006366	1250V 2.2UF +/-10%	C7 - C9
G5U5030 G5U5037 G5U5045	P5U5030 P5U5037 P5U5045	C1NP3B225K-YA	C006366	1250V 2.2UF +/-10%	C9-C14
G5U5055 G5U5075	P5U5055 P5U5075	DE2110R472K2K	C003017	2KV 4700PF	C19 - C21
G5U5090 G5U5110 G5U5160	P5U5090 P5U5110 P5U5160	DE2110R472K2K	C003017	2KV 4700PF	C21 - C38