

INVT Low-Voltage General-Purpose VFD

Quick Start Guide

This guide briefly describes the external wiring, terminals, keypad, quick running, common function parameter settings, and common faults and solutions of INVT low-voltage general-purpose variable-frequency drives (including GD10/GD20/GD27/GD30/GD100/GD200A/GD270).

Visit www.invt.com for more information and source download.

Warning

This guide only provides the basic installation and commissioning information. Failure to comply with the safety instructions and installation and commissioning instructions in the relevant documentation may result in accidents such as equipment damage, personal injury, or even death.

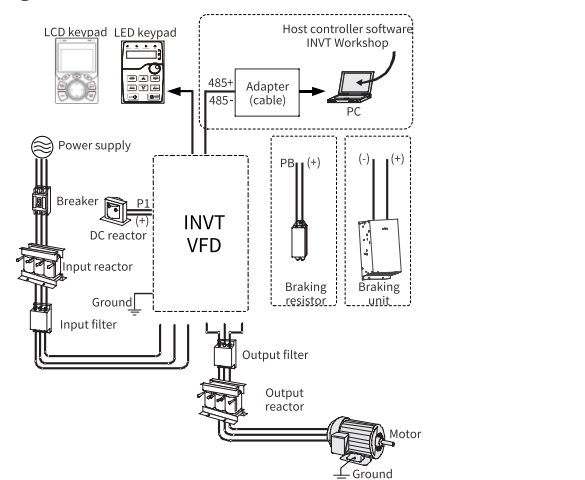
Only trained and qualified professionals are allowed to carry out related operations.

Danger

Do not perform any operations including wiring, inspection, or component replacement when power supply is applied. Before performing these operations, ensure all the input power supplies have been disconnected, and wait for at least the time designated on the VFD or until the DC bus voltage is less than 36V.

Minimum waiting time	VFD model
5 minutes	1PH 220V 0.2~2.2kW; 3PH 220V 0.2~2.2kW; 3PH 380V 0.75~110kW
15 minutes	3PH 380V 132~315kW
20 minutes	3PH 380V >355kW

External wiring



Terminal

Terminal	Description
Main circuit terminal	
R, S, T (or U, V, W)	3PH (or 1PH) AC input terminals, connected to the grid
P1	P1 and (+) connect to external DC reactor terminals.
(+)	(+) and (-) connect to external braking unit terminals or shared DC bus terminals.
PB	PB and (+) connect to external braking resistor terminals.
PE	PE terminal. The PE terminals of each machine must be grounded reliably.
Control circuit terminals	
+10V	Locally provided 10V power supply
AI/n	Analog input. The default input type is voltage, which can be changed through the related jumper cap, DIP switch, or parameter.
GND	Reference ground of +10V
AO/n	Analog output. Range: 0~10V or 0~20mA
RO/nA	Relay output. RO/nA: NO; RO/nB: NC; RO/nC: common
RO/nB	Common
RO/nC	Common
HDO	Switch capacity: 50mA/30V. Output frequency range: 0~50kHz
COM	Reference ground of +24V
CME	Common terminal of open collector output; short connected to COM by default
Y1~Yn	Switch capacity: 50mA/30V. Output frequency range: 0~1kHz
485+	RS485 differential signal communication port. The standard communication interface should be shielded twisted pair. Determine whether to connect the 120Ω terminal matching resistor of RS485 communication through the DIP switch or jumper.
485-	
PE	Grounding terminal
PW	External power terminal for digital input circuits. In NPN mode, short connect PW and +24V. In PNP mode, short connect PW and COM.
+24V	User power supply provided by the VFD. Max. output current: 200mA
S1~Sn	Digital input Internal impedance: 3.3kΩ 12~30V voltage input is acceptable Bidirectional input terminals, supporting both NPN and PNP connection methods Max. input frequency: 1kHz Programmable digital input terminals, the functions of which can be set through the related parameters
HDIA	Channels for both high frequency pulse input and digital input Max. input frequency: 50kHz Duty ratio: 30%~70%
HDIB	Support for quadrature encoder input when both HDIA and HDIB are available, with the speed measurement function
+24V~H1	Safe torque off (STO) inputs STO redundant input, connected to the external NC contact. When the contact opens, STO acts and the VFD stops output.
+24V~H2	Input signal wires use shielded wires whose length is within 25m. The H1 and H2 terminals are short connected to +24V by default. Remove the jumper from the terminals before using the STO function.

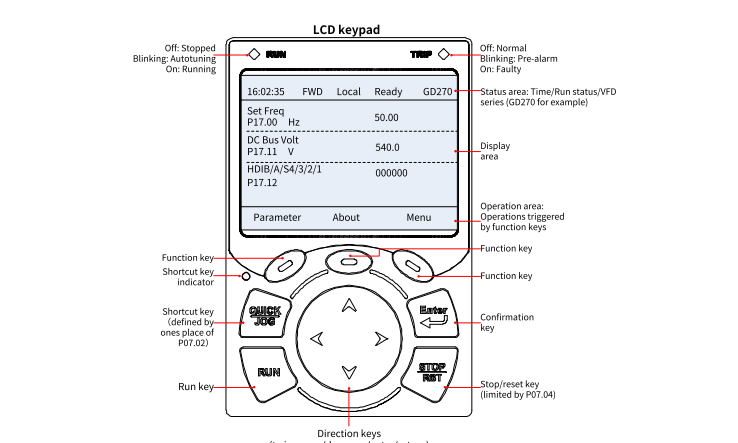
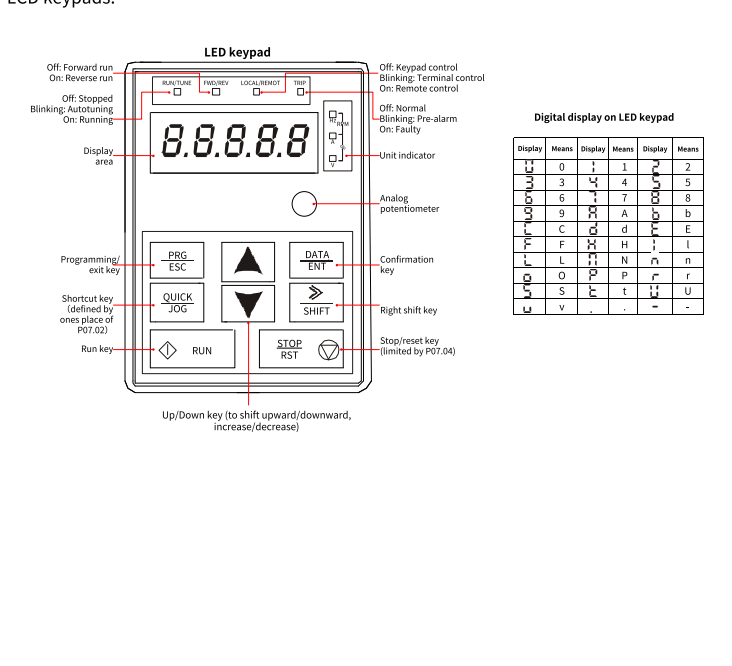
Note:

n is a natural number.

The terminals of different series may be different. For detailed terminal wiring, see the full version of corresponding product e-manual.

Keypad

The keypad may vary depending on the product. Some products may support optional LCD keypads.



Quick running

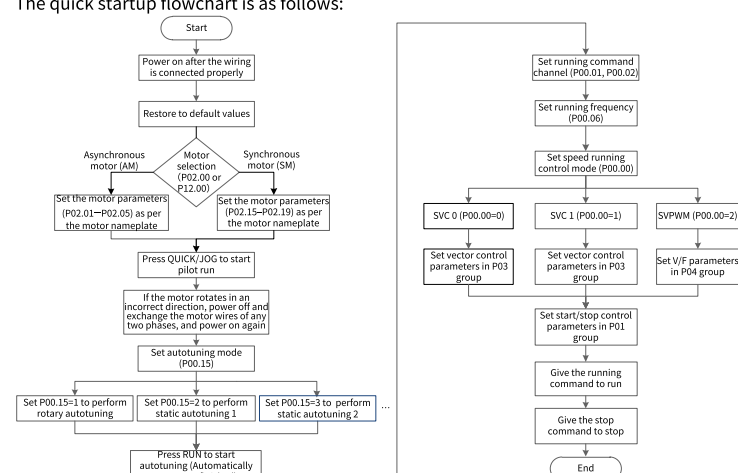
Check before power-on

Ensure that all terminals have been securely connected. Ensure that the motor power matches the VFD power.

Operating upon first power-on

After confirming the wiring and power are correct, close the air switch of the AC power at the VFD input side to power on the VFD. Using a LED keypad for example, the keypad displays 8.8.8.8.8 upon power-on and then the set frequency (50.00 in the example), indicating the VFD is initialized and ready to run. (For details about other types of keypad, see the full version of corresponding product e-manual.)

The quick start-up flowchart is as follows:



Common function parameter setup

The following briefly describes only some common function parameters and typical values.

"○" indicates that the value of the parameter can be modified when the VFD is in stopped or running state.

"●" indicates that the value of the parameter cannot be modified when the VFD is in running state.

(The VFD automatically checks and constrains the modification of parameters, which helps prevent incorrect modifications.)

Note: Function parameters may vary depending on the product. For details, see the full version of corresponding product e-manual.

Function code	Name	Description	Default	Modify
P00.00	Speed control mode	0: Sensorless vector control (SVC) mode 0 1: Sensorless vector control (SVC) mode 1 2: Space voltage vector control mode 3: Closed-loop vector control mode	Model depended	○
P00.01	Channel of running commands	0: Keypad 1: Terminal 2: Communication	0	○
P00.03	Max. output frequency	P00.04~400.00Hz	50.00Hz	○
P00.04	Upper limit of running frequency	P00.05~P00.03 (Max. output frequency)	50.00Hz	○

Function code	Name	Description	Default	Modify
P00.05	Lower limit of running frequency	0.00Hz~P00.04 (Upper limit of running frequency)	0.00Hz	○
P00.06	Setting channel of A frequency command	0: Keypad 1: AI1 (Corresponding to the keypad potentiometer) 2: AI2 (Corresponding to the AI terminal)	0	○
P00.07	Setting channel of B frequency command	0: Keypad 1: AI1 (Corresponding to the keypad potentiometer) 2: AI2 (Corresponding to the AI terminal)	2	○
P00.10	Frequency set through keypad	0.00 Hz~P00.03 (Max. output frequency)	50.00Hz	○
P00.11	ACC time 1	0.0~3600.0s	Model depended	○
P00.12	DEC time 1	0.0~3600.0s	Model depended	○
P00.13	Running direction	0: Run at the opposite direction. 2: Disable reverse running	0	○
P00.15	Motor parameter autotuning	0: No operation 1: Rotary autotuning 2: Static autotuning 1 3: Static autotuning 2	0	○
P00.18	Function parameter restore	0: No operation 1: Restore default values 2: Clear fault records 3: Lock all function codes	0	○
P01.00	Start mode	0: Direct start 1: Start after DC braking 2: Start after speed tracking	0	○
P01.08	Stop mode	0: Decelerate to stop 1: Coast to stop	0	○
P01.09	Starting frequency of DC braking for stop	0.00Hz~P00.03 (Max. output frequency)	0.00Hz	○
P01.11	DC braking current for stop	0.0~100.0%	0.00%	○
P01.12	DC braking time for stop	0.00~50.00s	0.00s	○
P01.18	Terminal-based running command protection at power-on	0: The terminal running command is invalid at power-on 1: The terminal running command is valid at power-on	0	○
P02.00	Type of motor 1	0: Asynchronous motor (AM) 1: Synchronous motor (SM)	0	○
P02.01	Rated power of AM 1	0.1~3000.0kW	Model depended	○
P02.02	Rated frequency of AM 1	0.01Hz~P00.03 (Max. output frequency)	50.00Hz	○
P02.03	Rated speed of AM 1	1~60000rpm	Model depended	○
P02.04	Rated voltage of AM 1	0~1200V	Model depended	○
P02.05	Rated current of AM 1	0.8~6000.0A	Model depended	○
P02.15	Rated power of SM 1	0.1~3000.0kW	Model depended	○
P02.16	Rated frequency of SM 1	0.01Hz~P00.03 (Max. output frequency)	50.00Hz	○
P02.17	Number of pole pairs of SM 1	1~128	2	○
P02.18	Rated voltage of SM 1	0~1200V	Model depended	○
P02.19	Rated current of SM 1	0.8~6000.0A	Model depended	○
P02.23	Counter-emf of SM	0~10000	300	○
P03.00	Speed-loop proportional gain 1	0.0~200.0	20.0	○
P03.01	Speed-loop integral time 1	0.000~10.000s	0.200s	○
P03.02	Speed-loop proportional gain 2	0.0~200.0	20.0	○
P03.03	Speed-loop integral time 2	0.000~10.000s	0.200s	○
P03.09	Current-loop proportional coefficient P	0~65535	1000	○
P03.11	Torque setting method	0: Torque control is invalid 1: Keypad (P03.12) 2: AI1 3: AI2 4: AI3 5: Pulse frequency HDI 6: Multi-step torque 7: Modbus communication 8: Torque control mode is used.	0	○

Function code	Name	Description	Default	Modify
P04.01	Torque boost of motor 1	0.0%: (Automatic torque boost), 0.1%~10.0%	0	○
P04.09	V/F slip compensation gain of motor 1	0.0~200.0%	100.0%	○
P04.10	Low-frequency oscillation control factor of motor 1	0~100	10	○
P04.11	High-frequency oscillation control factor of motor 1	0~100	10	○
P05.01	Function of S1	0: No function	1	○
P05.02	Function of S2	1: Run forward	4	○
P05.03	Function of S3	2: Run reverse	7	○
P05.04	Function of S4	3: Three-wire running control (SIN) 4: Jog forward 5: Jog reverse 6: Coast to stop 7: Reset faults	0	○
P05.37	AI2 lower limit	0.00V~P05.39	0.00V	○
P05.39	AI2 upper limit	P05.37~10.00V	10.00V	○
P06.01	Y1 output	0: Invald 1: Running 2: Running forward 3: Running reversely 4: Jogging 5: VFD in fault 6: Frequency level detection FDT1 8: Frequency reached	0	○
P06.03~P06.04	Relay output	0: Invald 1: Running 2: Running forward 3: Running reversely 4: Jogging 5: VFD in fault 6: Frequency level detection FDT1 8: Frequency reached	1	○
P06.14~P06.15	Analog output	0: Running frequency 1: Set frequency 3: Rotation speed (Relative to twice the motor synchronous rotation speed) 4: Output current (Relative to twice the VFD rated current) 5: Output current (Relative to twice the motor rated current) 6: Output voltage (Relative to 1.5 times the VFD rated voltage) 7: Output power (Relative to twice the motor rated power)	0	○
P06.16	HDO high-speed pulse output	0: No function 1: Running frequency 3: Rotation speed (Relative to twice the motor synchronous rotation speed) 4: Output current (Relative to twice the VFD rated current) 5: Output current (Relative to twice the motor rated current) 6: Output voltage (Relative to 1.5 times the VFD rated voltage) 7: Output power (Relative to twice the motor rated power)	0	○
P06.17~P06.26	AO output/upper limit settings	For details, see the full version of corresponding product e-manual.	0	○
P07.00	User password	0~65535	0	○
P14.00	Local communication address	1~247 Note: The communication address of a slave cannot be set to 0.	1	○
P14.01	Communication baud rate	0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS	4	○
P14.02	Data bit check	0: No check (N, 8, 1) for RTU 1: Even check (E, 8, 1) for RTU 2: Odd check (O, 8, 1) for RTU 3: No check (N, 8, 2) for RTU 4: Even check (E, 8, 2) for RTU 5: Odd check (O, 8, 2) for RTU	1	○

Common faults and solutions

Note: Our fault code scheme is being upgraded. Some products use the old scheme and the others use the new one, which are listed in "Fault code display".

Fault code display	Fault type	Possible cause	Solution
OU1	E1	Inverter unit U-phase protection	• Increase ACC/DEC time. • Check the inverter unit.
OU2	E2	Inverter unit V-phase protection	• Check whether the devices and system are grounded reliably. • Drive wires poorly connected. • Check for abnormal motor wiring and motor-to-ground short connection.
OU3	E3	Inverter unit W-phase protection	• Remove the dust or oil stain inside the VFD regularly.
OC1	E4	Overcurrent during ACC	• Increase ACC/DEC time. • Increase grid input voltage. • Select a VFD with larger power.
OC2	E5	Overcurrent during DEC	• VFD power too small. • Load sudden change or exception.
OC3	E6	Overcurrent during constant speed running	• 3PH output current imbalance. • Strong external interference sources (contactor switchover or improper grounding). • Check for abnormal VFD 3PH output voltage and motor 3PH resistance imbalance. • Check for strong interference (whether motor cable far away from contactor and system)

Fault code display	Fault type	Possible cause	Solution
OV1	E7	Overvoltage during ACC	• ACC/DEC time too short. • Increase ACC/DEC time.
OV2	E8	Overvoltage during DEC	• Abnormal input voltage. • Check the input power. • Use the speed tracking start function.
OV3	E9	Overvoltage during constant speed running	• Load started during rotating. • Motor energy regeneration too large. • Add dynamic braking devices or regenerative unit. • Set dynamic braking function parameters.
UV	E10	Bus undervoltage fault	• Grid voltage too low. • Abnormal voltage display. • Abnormal buffer contactor closing. • Increase grid input voltage. Contact us.
OL1	E11	Motor overload	• Grid voltage too low. • Incorrect motor rated current. • Motor stalling or load sudden change too great. • Reset the motor rated current in the motor parameter group. • Check the load and adjust the torque boost value.
OL2	E12	VFD overload	• ACC too fast. • Motor restarted during rotating. • Grid voltage too low. • Load too heavy. • VFD power too small. • Increase ACC time. • Avoid restart upon stop or enable speed tracking start. • Increase grid input voltage. • Select a VFD with larger power.
SPI	E13	Input phase loss	• R/S/T input phase loss or violent fluctuation. • Check for abnormal input power and loose input cables. • Input-side screws loosened. • Set parameters to screen out the fault.
SPO	E14	Output phase loss	• Output cables broken or short connected to the ground. • Check for loose or broken output cables. • U/V/W output phase loss or seriously asymmetrical 3PH loads. • Check for sharp load fluctuation and motor 3PH resistance imbalance.
OH2	E16	Inverter module overheat	• Air duct blocked or fan damaged. • Ambient temperature too high. • Keep good ventilation to lower ambient temperature. • Select a VFD with larger power.
CE	E18	RS485 communication fault	• Improper baud rate. • Communication line fault. • Incorrect communication address. • Communication line suffers from strong interference. • Set a proper baud rate. • Check the communication port wiring. • Set the communication address correctly. • Replace or change wiring to enhance anti-interference.
tE	E20	Motor autotuning fault	• Change the VFD model. • Set the motor type and nameplate parameters correctly. • Empty the motor load and re-perform autotuning. • Check motor wiring and parameter settings. • Check whether the upper limit frequency is greater than 2/3 of the rated frequency.
dEu	E34	Speed deviation fault	• Load too heavy or stalled. • Check motor parameter settings and re-perform motor parameter autotuning. • Check speed loop control parameter settings.
Sto	E35	Maladjustment fault	• Check for overload or stalling. • Check motor parameter and counter EMF settings. • Re-perform motor parameter autotuning. • Increase maladjustment detection time. • Adjust flux weakening coefficient and current loop parameters.

Appendix A Energy efficiency data

Model	Apparent power (kVA)	Rated output power (kW)	Rated output current (A)	Max. working temperature (°C)	Rated power frequency (Hz)	Rated power voltage (V)
GD10-0R2G-S2-B	0.61	0.2	1.6	50°C	Derate by 1% for every increase of 1°C when the temperature exceeds 40°C.	1PH 230V
GD10-0R4G-S2-B	0.95	0.4	2.5	50°C	Derate by 1% for every increase of 1°C when the temperature exceeds 40°C.	3PH 230V
GD10-0R7G-S2-B	1.60	0.75	4.2	50°C	Derate by 1% for every increase of 1°C when the temperature exceeds 40°C.	1PH 230V
GD10-1R5G-S2-B	2.36	1.5	7.5	50°C	Derate by 1% for every increase of 1°C when the temperature exceeds 40°C.	3PH 230V
GD10-2R2G-S2-B	3.81	2.2	10	50°C	Derate by 1% for every increase of 1°C when the temperature exceeds 40°C.	3PH 230V
GD10-0R2G-2-B	0.61	0.2	1.6	50°C	Derate by 1% for every increase of 1°C when the temperature exceeds 40°C.	1PH 230V
GD10-0R4G-2-B	0.95	0.4	2.5	50°C	Derate by 1% for every increase of 1°C when the temperature exceeds 40°C.	3PH 230V
GD10-0R7G-2-B	1.60	0.75	4.2	50°C	Derate by 1% for every increase of 1°C when the temperature exceeds 40°C.	1PH 230V

Model	Relative loss (%)						Standby loss (W)	Efficiency (%)		
	(0.25)	(0.50)	(0.60)	(0.75)	(0.50)	(0.50)				
GD10-1R5G-2-B	0.95	1.02	1.69	0.59	0.98	1.42	0.67	1.30	5	IE
GD10-2R2G-2-B	1.64	1.72	2.16	0.83	1.20	1.71	1.03	1.63	8	IE
GD10-0R7G-4-B	2.76	2.08	6.61	1.52	1.52	2.42	1.67	1.67	7	IE
GD10-1R5G-4-B	0.99	1.36	1.97	0.62	0.97	1.62	0.66	1.48	7	IE
GD10-2R2G-4-B	0.95	1.33	1.69	0.72	0.98	1.50	0.66	1.10	8	IE
GD20-0R4G-S2	1.13	2.01	2.56	1.36	1.78	4.25	4.47	5.63	5	IE
GD20-0R7G-S2	0.80	1.44	2.37	0.96	1.78	2.87	2.68	3.67	7	IE
GD20-1R5G-S2	1.27	1.95	2.61	1.56	2.05	3.29	1.99	3.46	8	IE
GD20-2R2G-S2	1.37	2.16	2.65	1.81	2.17	3.81	2.80	4.13	9	IE
GD20-004G-S2	1.16	1.52	2.85	1.50	2.53	4.03	2.76	5.12	8	IE
GD20-5R5G-S2	1.33	1.91	3.07	1.75	2.53	3.50	2.51	3.94	9	IE
GD20-0R4G-S2	2.11	2.13	2.56	2.00	1.73	2.21	1.26	2.17	5	IE
GD20-0R7G-S2	1.47	1.70	2.44	1.43	1.19	2.24	0.70	2.72	7	IE
GD20-1R5G-S2	1.23	1.56	2.32	0.97	1.34	2.05	0.99	2.74	8	IE
GD20-2R2G-S2	1.11	1.51	2.04	1.02	1.61	2.37	2.00	2.19	7	IE
GD20-0R4G-S2	2.41	2.45	2.74	1.97	2.01	2.26	1.15	1.61	6	IE
GD20-0R7G-S2	1.55	1.83	2.65	0.80	1.45	2.36	1.03	2.01	6	IE
GD20-1R5G-S2	1.10	1.48	2.22	1.14	1.62	2.69	1.27	2.89	7	IE
GD20-2R2G-S2	1.15	1.51	2.37	1.15	1.59	2.56	1.32	2.26	7	IE
GD20-0R7G-S2	1.88	2.17	2.69	2.15	2.25	3.09	1.64	2.52	8	IE
GD20-1R5G-S2	1.31	1.56	2.10	1.04	1.19	2.37	2.00	2.19	7	IE
GD20-2R2G-S2	1.32	1.51	2.20	1.36	1.78	2.37	1.71	2.62	7	IE
GD20-004G-S2	1.02	1.26	1.73	1.10	1.43	1.83	1.28	2.25	9	IE
GD20-5R5G-S2	1.01	1.16	2.05	1.09	1.45	2.41	1.34	2.80	9	IE
GD20-1R5G-S2	1.01	1.16	2.05	0.85	1.04	2.25	1.17	1.86	9	IE
GD20-011G-S2	0.61	0.84	1.55	0.61	1.04	1.97	0.99	1.16	6	IE
GD20-014G-S2	0.27	0.42	0.64	0.27	0.42	0.73	0.43	0.73	6	IE
GD20-018G-S2	0.54	0.74	1.22	0.77	1.03	1.70	0.96	1.65	11	IE
GD20-022G-S2	0.47	0.67	1.21	0.67	0.90	1.54	0.87	1.38	11	IE
GD20-030G-S2	0.53	0.72	0.71	0.71	0.90	0.85	1.45	1.50	13	IE
GD20-037G-S2	0.47	0.69	1.39	0.63	0.88	1.60	0.99	1.72	14	IE
GD20-045G-S2	0.49	0.69	1.39	0.78	1.00	1.64	0.97	1.66	21	IE
GD20-045G-4-B	0.49	0.69	1.39	0.78	1.00	1.64	0.97	1.66	21	IE
GD20-055G-S2	0.51	0.69	1.26	0.77	0.89	1.47	0.88	1.40	22	IE
GD20-055G-4-B	0.51	0.69	1.26	0.77	0.89	1.47	0.88	1.40	22	IE
GD20-075G-S2	0.44	0.61	1.12	0.51	0.69	1.29	0.76	1.42	22	IE
GD20-075G-4-B	0.44	0.61	1.12	0.51	0.69	1.29	0.76	1.42	22	IE
GD20-090G-S2	0.42	0.59	1.15	0.47	0.65	1.29	0.90	1.48	25	IE
GD20-090G-4-B	0.42	0.59	1.15	0.47	0.65	1.29	0.90	1.48	25	IE
GD20-110G-S2	0.44	0.63	1.30	0.48	0.75	1.64	0.80	1.78	28	IE
GD20-110G-4-B	0.44	0.63	1.30	0.48	0.75	1.64	0.80	1.78	28	IE
GD20A-0R7G-S2	1.73	1.71	2.39	1.03	0.76	1.55	0.39	1.19	3	IE
GD20A-1R5G-S2	1.52	1.49	1.81	1.06	1.00	1.76	0.84	1.86	3	IE
GD20A-2R2G-S2	1.21	2.36	2.15	0.81	1.03	1.51	0.87	1.49	5	IE
GD20A-5R5G-S2	0.97	1.67	1.96	0.99	1.17	1.65	1.17	1.80	5	IE
GD20A-087G-4-B	0.99	1.16	0.99	1.00	1.00	1.61	1.65	1.85	20	IE
GD20A-087G-011P-S2	0.77	1.05	1.86	0.69	0.93	1.56	0.96	1.69	7	IE
GD20A-1R5G-015P-S2	0.69	0.76	1.65	0.59	0.87	1.43	0.79	1.67	9	IE
GD20A-015G-018P-S2	0.60	0.72	1.42	0.66	0.69	1.26	0.73	1.40	9	IE
GD20A-018G-022P-S2	0.47	0.68	1.34	0.57	0.70	1.25	0.77	1.35	12	IE
GD20A-022G-030P-S2	0.53	0.71	0.69	0.52	0.66	1.08	0.66	1.14	12	IE
GD20A-037G-037P-S2	0.55	0.72	0.55	0.52	0.75	1.27	0.69	1.25	15	IE
GD20A-037G-045P-S2	0.41	0.65	1.03	0.51	0.65	1.12	0.68	1.25	17	IE
GD20A-045G-055P-S2	0.39	0.55	0.94	0.51	0.61	1.05	0.62	1.08	29	IE
GD20A-055G-075P-S2	0.43	0.67	0.97	0.58	0.77	1.24	0.82	1.22	33	IE
GD20A-075G-090P-S2	0.40	0.54	0.97	0.48	0.60	1.09	0.63	1.02	33	IE
GD20A-075G-110P-S2	0.42	0.55	0.95	0.49	0.61	1.16	0.65	0.78	37	IE
GD20A-110G-137P-S2	0.47	0.61	1.22	0.52	0.79	1.27	0.79	1.20	37	IE
GD20A-137G-160P-S2	0.47	0.59	1.06	0.61	0.71	1.28	0.85	1.43	55	IE
GD20A-160G-185P-S2	0.59	0.71	1.36	1.22	0.97	1.87	1.00	1.84	55	IE
GD20A-185G-200P-S2	0.62	0.76	1.21	1.17	1.12	1.70	1.08	1.61	55	IE
GD20A-200G-220P-S2	0.53	0.71	1.41	0.74	0.94	1.81	1.00	1.84	55	IE
GD20A-220G-240P-S2	0.33	0.42	0.69	0.85	0.95	1.33	1.10	1.18	80	IE
GD20A-240G-280P-S2	0.38	0.57	0.80	0.82	0.92	1.52	1.12	1.35	80	IE
GD20A-280G-315P-S2	0.40	0.59	1.10	0.64	0.89	1.58	1.12	1.35	80	IE
GD20A-315G-350P-S2	0.56	0.35	0.79	0.94	0.94	1.63	1.36	2.22	80	IE
GD20A-355G-400P-S2	0.37	0.47	0.98	0.91	1.11	1.95	1.42	2.44	80	IE
GD20A-400G-S2	0.17	0.26	0.42	0.28	0.41	0.74	0.47	0.92	80	IE
GD20A-450G-S2	0.31	0.54	0.98	0.46	0.62	1.02	0.67	0.85	80	IE
GD20A-500G-S2	0.38	0.35	0.98	0.62	0.61	1.00	0.83	0.80	80	IE
GD20A-630G-S2	0.23	0.30	0.99	0.61	0.79	1.30	0.82	1.02	80	IE
GD27-1R5-S2	0.78	0.95	1.03	0.86	1.17	1.23	1.35	1.52	19	IE
GD27-2R2G-S2	0.82	0.76	0.55	1.09	1.11	1.07	1.59	1.76	17	IE
GD27-004G-S2	0.74	1.20	1.55	1.15	1.28	1.89	1.45	2.29	16	IE
GD27-7R5-S2	0.68	0.78	1.75	0.76	1.03	1.79	1.22	2.06	16	IE
GD27-011G-S2	0.65	0.89	1.62	0.65	0.37	1.43	1.38	2.28	17	IE
GD27-014G-S2	0.99	0.95	1.26	0.77	0.90	1.46	1.47	2.19	27	IE
GD27-018G-S2	0.72	0.95	1.57	1.20	1.46	2.17	1.47	2.26	30	IE
GD27-022G-S2	0.67	0.87	1.44	1.07	1.29	1.92	1.27	2.04	30	IE
GD27-037G-S2	0.67	0.85	1.60	1.09	1.15	2.37	1.91	2.73	30	IE
GD27-045G-S2	0.47	0.62	1.14	1.09	1.27	1.90	1.52	2.02	30	IE
GD27-090G-S2	0.40	0.72	1.29	1.33	1.31	1.98	1.58	2.11	31	IE
GD27-137G-S2	0.41	0.80	1.26	0.98	0.98	2.02	1.65	2.17	33	IE
GD27-137G-S2	0.50	0.65	1.28	0.97	1.12	1.74	1.22	1.85	33	IE
GD27-250G-S2	0.65	0.91	1.86	1.33	1.72	2.79	1.73	2.85	42	IE
GD27-355G-S2	0.72	1.01	1.87	1.11	1.37	2.30	1.47	2.47	52	IE