1100W AC/DC Switching Power Supply
Model: TG20-1100-0X



FEATURES

- Universal 90-264VAC input voltage.
- Operating ambient temperature range: -20°C to +60°C.
- Built-in active PFC function.
- Output short circuit, over-current, over-voltage protection, over-temperature protection.
- 1100W 1U Slim type power supply.
- High efficiency up to 80Plus Platinum.
- N+1 redundancy design with active current sharing.
- Digital power management (PMBus).
- Operating altitude up to 5000m.
- Complies with IEC/EN/UL 62368-1 standard.

Models & Ratings

Model No.	Output Power	Main Output Voltage/ Current	Standby Output Voltage/ Current	Efficiency (80 plus)	External Capacitive Load
TG20-1100-01	1100W	12.0V / 90.0A	12.0V / 3.0A	Platinum	11,000μF / 2,200μF
TG20-1100-02	1100W	12.0V / 90.0A	12.0V / 3.0A	Platinum	11,000μF / 2,200μF

Model No.

TG20-1100-01 is airflow out type; TG20-1100-02 is airflow in type.

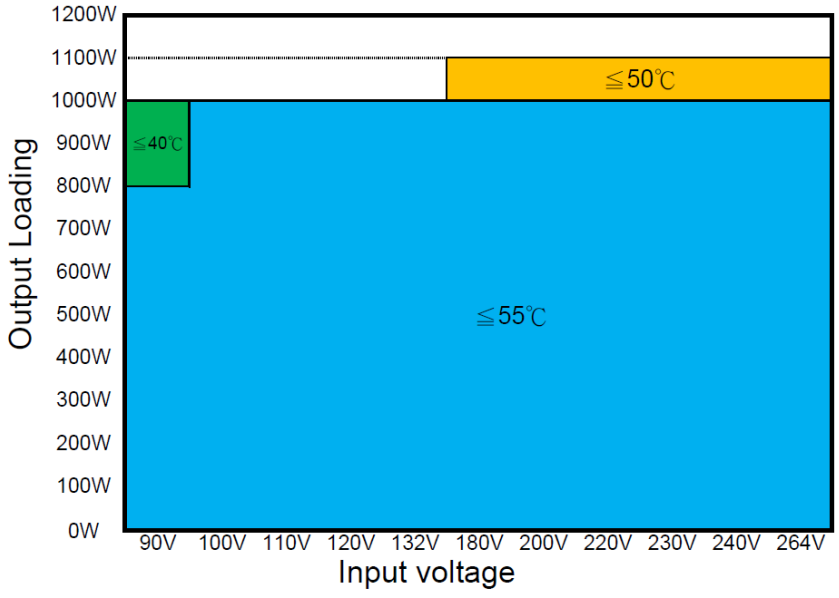
Efficiency

The power supply efficiency must exceed 80Plus Platinum at all specified load points. The efficiency should be measured at 230VAC and with external fan power according to Climate Saver /80Plus efficiency measurement specifications (CSCI-09-10)

Load	20%	50%	100%
230VAC/50Hz	90%	94%	91%

Output Power

The relationship between input voltage, output power and operating environment temperature is shown in the figure below:



Input Specifications

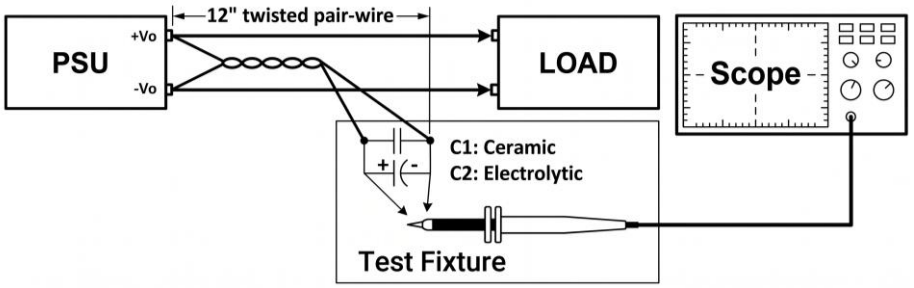
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		90	100 - 240	264	VAC
	DC input		180	240	310	VDC
Input Frequency	-		47	50 - 60	63	Hz
Input Current	100VAC		-	-	14.0	Arms
	200VAC		-	-	7.0	
Inrush Current	100-240VAC	At 25°C, Cold start	-	-	55	A peak
Power Factor	115/230VAC	At 100% load	0.98	-	-	-
Touch Current	264VAC		-	-	1.75	mA

Input voltage: AC input
Power turn on : 85V±5V
Power turn off : 75V±5V
DC input
Power turn on : 175V±5V
Power turn off : 165V±5V (slow turn off over 10s)

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Output from 0 - 100% load	11.4	12.0	12.6	VDC
Initial setting output voltage	50% load	12.1	-	12.15	VDC
Output Current	Output range	0	-	90.0	A
Line Regulation	100% load	-	±1	-	%
Load Regulation	Output from 0 - 100% load	11.4	-	12.6	V
Ripple & Noise	20MHz bandwidth	-	-	1	%
Turn On Time	100VAC/60Hz rated load from input AC turn on	-	-	2.5	S
Hold Up Time	With 70% of maximum load and over 100-240VAC input.	12	-	-	mS
Short Circuit Protection	Output shut down and latch off	-	-	-	-
Over Current Protection	Output shut down and latch off	58.2	-	71.4	A
Over Voltage Protection	Output shut down and latch off	13.3	-	14.5	V
Under Voltage Protection	Output shut down and latch off	9.0	-	11.0	V
Parallel Operation	Active current sharing	1		4	Pcs
Standby Output	The maximum output current is 3A	11.4V	12.0	12.6V	V

Ripple & Noise :
The output is decoupled with 100μF low ESR aluminum electrolytic (C2) and 0.1μF ceramic capacitor (C1). Measurement is made with a high impedance probe connected across the decoupling capacitance. Measurements shall be made with an oscilloscope with 20MHz bandwidth.



When the +12V output is less than 3A, the power supply is in burst mode and the ripple specification is relaxed to 350mV.

Hot Swap Transient Load :
When an additional power supply is ORed together, or, removed from a group of one to three ORed power supplies, the outputs shall maintain regulation.

Turn On/Off Overshoot :
Overshoot at turn on shall be less than 10% of the nominal output voltage.

Dynamic Load :
The output voltages shall remain within limits specified for the step loading and capacitive loading specified in the test table below. The load transient repetition rate shall be tested between 50Hz and 5KHz frequency.

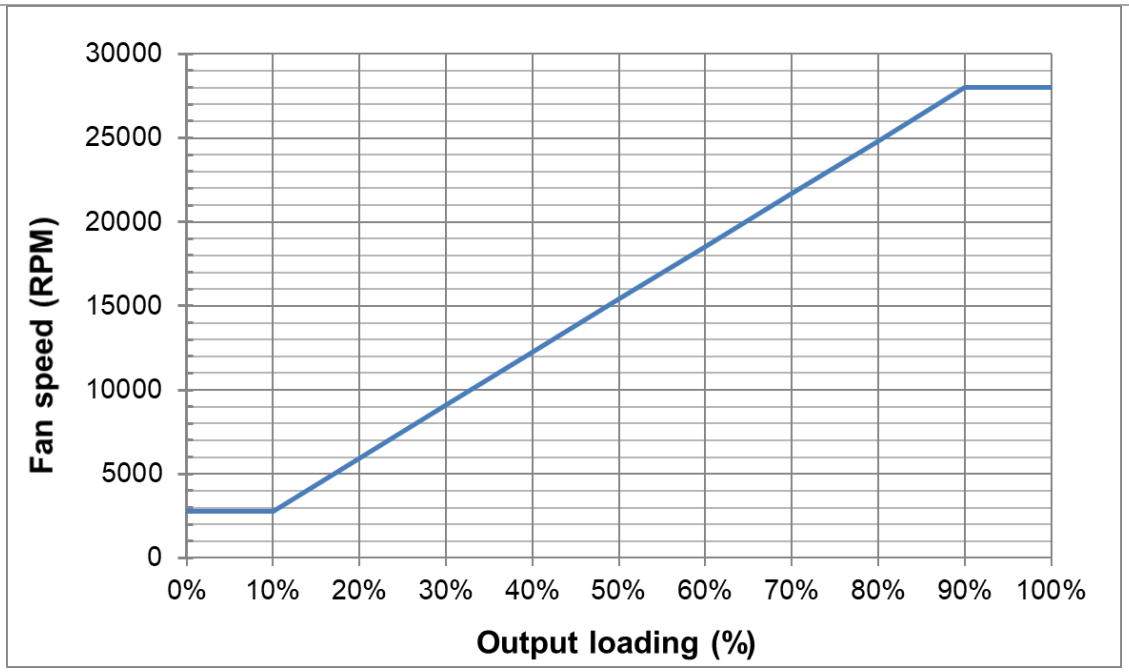
Output	△Step Load Size	Load Slew Rate	Test capacitive Load
12V	40% of max load	0.5A/uS	11000uF

Note: Step load for 40% load change (above 25% load), at 50Hz-5KHz. The recovery time is less than 500us.

Thermal Fault Protection :
If monitored components critical temperatures are reached, the power supply shall stay in regulation for 10 seconds after declaring the over temperature condition by setting the OT Warning bit of STATUS_TEMPERATURE command in PMBus, if the over temperature persists then set OT Fault bit of STATUS_TEMPERATURE command , then shuts down. Over temperature protect will be 2 level band. One is OTP warning and the other is OTP fault. If secondary side Hot spot over 120°C (PMBus 8Eh command value) or primary side Hot spot over 115°C(PMBus 8Fh command value) or Ambient temperature over 65°C (PMBus 8Dh command value) STATUS_TEMPERATURE warning bit should be set and PMBus SMBAlert pin pull to logic low. If secondary side Hot spot over 125°C (PMBus 8Eh command value) or primary side Hot spot over 120°C (PMBus 8Fh command value) or Ambient temperature over 75°C (PMBus 8Dh command value) STATUS_TEMPERATURE fault bit should be set and PMBus SMBAlert pin pull to logic low and PSU shunt down.

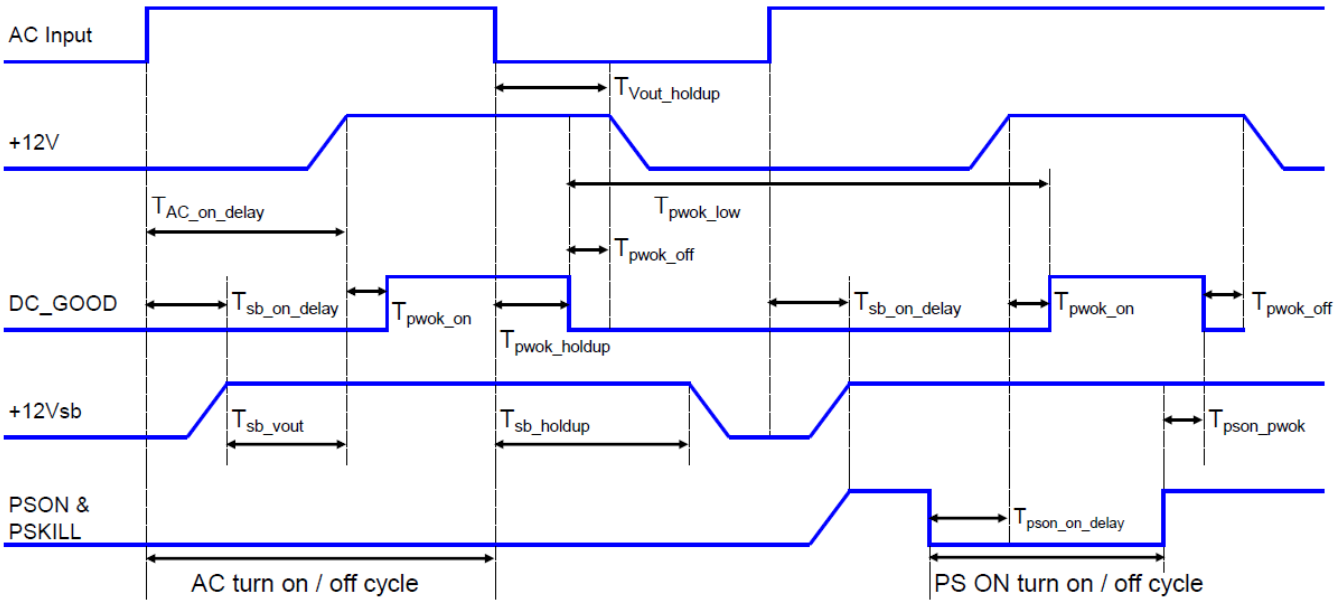
Fan Fault Protection :
After 10 sec the power supply should be latch off when fan fault occur. When fan speed malfunction, fan warning signal should be sent it out first then latch off the power supply.

Fan Control :
System control fan speed of PSU by duty from 10~100%, n=0.
If the system written value is over than PSU FAN control, system can control FAN speed of PSU by 10~100%.
If the system written value is less than PSU FAN control or out of range or some data-error, FAN obeyed the PSU FAN control.



Fan speed control tolerance to whichever is the ≦10000rpm +2000/-1000rpm and >10000rpm ±2800rpm of fan controlled speed.
In operating mode the fan will operate at maximum RPM when the ambient temperature exceeds 55°C or the Primary hot spot exceeds 115°C or the Secondary hot spot exceeds 120°C.

Sequencing :



ITEM	DESCRIPTION	Min	Max
TVsb_on_delay	Delay from AC being applied to +12Vsb being within regulation	-	1500ms
TVsb_rise	+12Vsb output voltage rise time	10ms	70ms
TVout_rise	+12V output voltage rise time	10ms	70ms
Tac_on_delay	Delay from AC being applied to all output voltages being within regulation	-	3000ms
Tvout_holdup	Time all output voltages stay within regulation after loss of AC at 50% load condition	10ms	-

Tpwok_holdup	Delay from loss of AC to de-assertion of DC_GOOD at 50% load condition	8ms	-
Tpson_on_delay	Delay from PSON&PSKILL active to output voltages within regulation limits.	5ms	400ms
Tpson_pwok	Delay from PSON&PSKILL de-active to DC_GOOD being de-asserted	-	5ms
Tpwok_on	Delay from output voltages within regulation limits to DC_GOOD asserted at turn on.	100ms	500ms
Tpwok_off	Delay from DC_GOOD de-asserted to +12V output voltage dropping out of regulation limits at 50% load condition.	1ms	-
Tpwok_low	Duration of DC_GOOD being in the de-asserted state during an off/on cycle using AC or the PSON&PSKILL signal.	100ms	-
Tsb_vout	Delay from +12Vsb being in regulation to O/Ps being in regulation at AC turn on	50ms	1000ms
Tsb_holdup	Time the +12Vsb output voltage stays within regulation after loss of AC.	70ms	-

Note: DC_GOOD and +12V hold-up test condition also follows the hold-up time with 50% of maximum load and over 100-240VAC input.

Current Sharing Operation :

The +12V output has active load sharing. The output will share within 10% at full load. The failure of a power supply should not affect the load sharing or output voltages of the other supplies still operating.
The +12Vsb output isn't required to actively share current between the power sources (passive sharing).

LED Indicator :

All LEDs shall protrude beyond the supply chassis surface for good visibility.
There is a dual-color LED

Power Supply Condition	LEDs State
DC_GOOD (Power normal)	Solid green
Power supply warning events where the power supply continues to operate; over temperature, over power, over current, slow fan speed.	1Hz Blink amber
No AC power	Not lit
Fault：Ambient or Hot spot occur OTP, Fan fault, Input AC UV, +12V output occur OVP, UVP or OCP (without +12Vsb)	Solid amber

Standby Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Output from 0 - 100% load	11.4	12.0	12.6	VDC
Output Current	Output range	0.1	-	3.0	A
Line Regulation	100% load	-	±1	-	%
Load Regulation	Output from 0 - 100% load	11.4	-	12.6	V
Ripple & Noise	20MHz bandwidth	-	-	1	%
Turn On Time	100VAC/60Hz rated load from input AC turn on	-	-	1.5	S
Short Circuit Protection	Output shut down and auto-recovery	-	-	-	-
Over Current Protection	Output shut down and auto-recovery	3.3	-	6.0	A

Notes
In standby mode, the fan may operate when the standby current is > 1A.

Analog and Digital Signal

Item	Function
PS ON and PSKILL	PSON and PSKILL are active low input signals to the power supply. When both signals are low, the power supply is activated with the main 12V output.
DC_GOOD	DC_GOOD is an active high output signal from the power supply used to indicate that: ◆ The PSON signal is active low ◆ The main 12V output is above its under-voltage threshold and below its over-voltage threshold ◆ The load is below the over current threshold ◆ The power supply is operating normally and within thermal limits. If DC_GOOD transitions from high to low (de-asserted) shows the power supply shut down and latch off.
PRESENT	PRESENT is an active low output signal from the power supply used to indicate that the power supply is physically present. The power supply generates this signal by wiring the signal pin to ground internally.
VSENSE (+ & -)	+VSENSE and -VSENSE are input signals to the power supply used to provide for remote sensing of the main 12V output voltage. The power supply must be able to compensate for up to 500mV of IR drop measured between the power supply connector output and the location where the remote sense points are applied.
12VLS	12VLS is an analog output signal used to help equalize the load sharing of the main 12V output between multiple power supplies. It also represents the amount of the loading on the power supply (or supplies).
A0 and A1	ADDR is 2 pin digital I/O signal the power supply uses to set its serial bus eight bit address. A0/A1 include internal 10K pull up resistor to 5Vdc. Host system not need add pull up resistor if A0/A1 pin config to logic 1.
SCL and SDA	SCL and SDA comprise a bi-directional serial data bus used to communicate between the SMBus / PMBus devices with-in the power supply and the host system.
SMBus_ALERT#	SMBAlert is an open collector active low output signal from the power supply. When driven low, it indicates one or more PMBus status power port bits have changed state. SMBAlert will be setting by following cases: ◆ AC input voltage drops below warning threshold. ◆ +12V output current ramps over warning threshold. ◆ Hot spot or ambient temperature ramps over warning threshold.

Signal Specification

Item	Operating Conditions		Min.	Typ.	Max.	Unit
PS ON and PSKILL	Output condition off	Remote off = High / floated	2.0	-	5.5	VDC
	Output condition on	Remote on = Low	0	-	0.8	
DC_GOOD	Power good	TTL High level	2.0	-	5.5	VDC
	Delay time	Main output reaches 90% of its set value	100	-	500	mS
	Output current		-	-	1.0	mA
	Power off/Power fail	TTL Low level	0	-	0.8	VDC
	Warning time	Main output falls to 90% of set value at Power off	1.0	-	-	mS
	Sink current		-	-	1.0	mA
12VLS	25% of power supply max. current capacity		1.8	2.0	2.2	V

	50% of power supply max. current capacity	3.6	4.0	4.4	V
	100% of power supply max. current capacity	7.2	8.0	8.8	V

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	Refer to power de-rating curve	-20	-	+60	°C
Storage Temperature	Non-operation	-40	-	+85	
Operating Humidity	Non-condensing	10	-	90	%
Storage Humidity		5	-	95	
Altitude	Operating altitude	-	-	5000	meter
Dielectric Strength Test	Input - FG	1800	-	-	VAC
Insulation Resistance	Input– FG, 500VDC, 3 seconds at 25°C and 70% RH	20	-	-	MΩ
Mean Time Between Failure	At 230VAC/50Hz, 100% load, 25°C, Telcordia SR332, issue 4.	100,000	-	-	Hrs.
Vibration	Operating：2.94 , 5-150Hz, 10 minutes per cycle, 30 minutes for each X, Y and Z axis.				
Shock	Non-operating：1.2G, duration time at 11mS, sine wave, each axis 1 times (X, Y, Z)				

Powwer De-rating :

Ambient de-rate each output as 1.3% per degree from 40°C to 55°C and 2% per degree from 55°C to 60°C at input ＜ 100Vac.

Ambient de-rate each output as 5% per degree from 55°C to 60°C at input 100~132Vac.

Ambient de-rate each output as 3.5% per degree from 50°C to 60°C at input 180~264Vac.

-20℃,115Vac start up, (-20°C ~ 0°C is can normal operation, but the output ripple and noise and regulation transient response specifications may not be met).

Altitude :

For every 305 meters of altitude increase, the operating ambient temperature needs to be decreased by 1°C.

Safety Approvals

Safety Standard	-	UL/cUL UL 62368-1, 3rd Edition CB IEC 62368-1, 3rd Edition
Safety Class	-	Class I

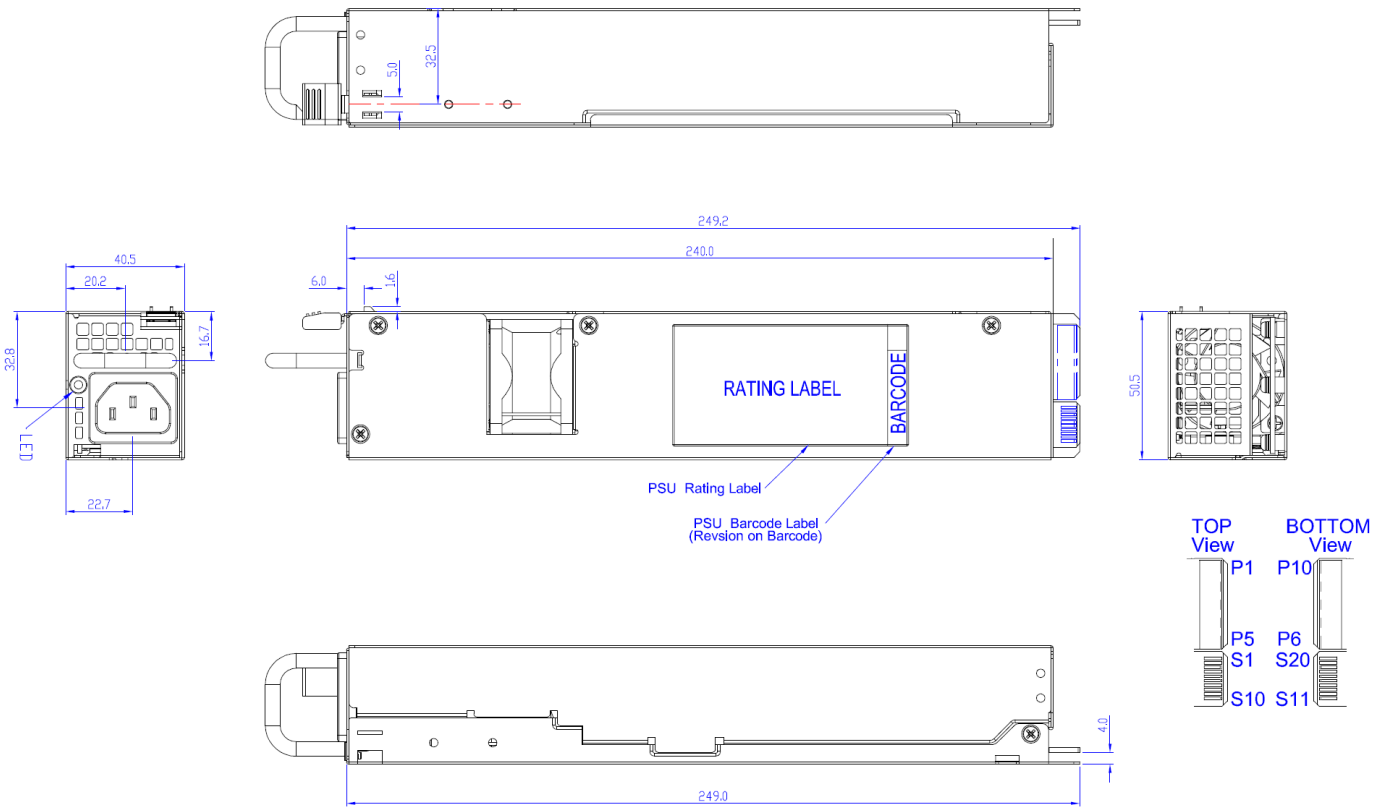
Electromagnetic Compatibility (EMC)

Emissions	CE	EN55032 (CISPR32) Class A	
	RE	EN55032 (CISPR32) Class A	
	Harmonic Current	IEC/EN61000-3-2 Class A	
	Flicker	IEC/EN61000-3-3	
Immunity	ESD	IEC61000-4-2, level 4, Contact +/- 8KV; Air discharge +/-15KV	Criteria A
	RS	IEC61000-4-3, level 3, 10V/m	Criteria A
	EFT	IEC61000-4-4, level 3, +/- 2KV	Criteria A
	Surge	IEC61000-4-5, level 3, Line to Line +/-1KV; Line to Earth +/-2KV	Criteria A
	CS	IEC61000-4-6	Criteria A
	PFMF	IEC61000-4-8	Criteria A
	DIP	IEC61000-4-11	Criteria B

Dimensions and Recommended Layout

Item	Value	Unit
Weight (Typ.)	786	g
Size (L x W x H)	240 x 50.5 x 40.5	mm

Outline Drawing : (Unit: mm, Tolerance: ±0.5 mm)



Output Connector

The output gold finger connector connects the power as well as the signal to the system or power backplane board. The model of connector mated with the golden finger is FCI 10139371-1020BLF, FCI 10160926-002LFC or equivalent part.

DC output pin assignment

Pin	Name	Pin	Name
P1	SGND	P10	+12V
P2	SGND	P9	+12V
P3	SGND	P8	+12V
P4	SGND	P7	+12V
P5	SGND	P6	+12V
S1	+12Vsb	S20	+12Vsb
S2	+12Vsb	S19	+12Vsb
S3	PSON	S18	A1
S4	N/A	S17	A0
S5	PRESENT	S16	SDA
S6	N/A	S15	SCL
S7	N/A	S14	SMBus_ALERT
S8	+12VRS+	S13	DC_GOOD
S9	+12VRS-	S12	N/A
S10	+12VLS	S11	PSKILL

PMBus Specification

Address Signal Description :

Defines the PSU PMBus address as follows:

Host must wire A0 / A1 to ground via a 100ohm resistor if A0/A1 pin config to logic 0.

A1	A0	Address	
		Binary	Hex
0V (0)	0V (0)	1011 0000	B0
0V (0)	Open (1)	1011 0010	B2
Open (1)	0V (0)	1011 0100	B4
Open (1)	Open (1)	1011 0110	B6

Hardware :

The PMBus device in the power supply shall be compatible with both SMBus specification 2.0 for I2C Vdd based power and drive. The bus will be both 3.3V and 5V compatible.

The pull-ups will be provided external to the power supply via 4.7K~10Kohm in the host system.

Data Speed :

The PMBus device in the power supply shall operate at the 100Kbps SMBus speed.

PMBUS Command Summary :

PMBus commands are one byte command codes. As below listing is power supply can support of PMBus commands.

Code	Command	Bytes	Read / Write
01h	Operation	1	Read / Write
03h	Clear_Faults	0	Write
05h	Page_Plus_Write	Variable	Block Write
06h	Page_Plus_Read	Variable	Block Write – Block Read Process Call
19h	Capability	1	Read
1Ah	Query	1	Block Write – Block Read Process Call
1Bh	SMBALERT_Mask	2	Block Write – Block Read Process Call
20h	Vout_Mode	1	Read
30h	Coefficients	5	Block Write – Block Read Process Call
3Ah	Fan_Config	1	Read
3Bh	Fan_Command	2	Read / Write
78h	Status_Byte	1	Read
79h	Status_Word	2	Read
7Ah	Status_Vout	1	Read
7Bh	Status_Iout	1	Read
7Ch	Status_Input	1	Read
7Dh	Status_Temperature	1	Read
7Eh	Status_CML	1	Read
81h	Status_Fans	1	Read
86h	Read_Ein	6	Block Read
87h	Read_Eout	6	Block Read
88h	Read_Vin	2	Read
89h	Read_Iin	2	Read
8Bh	Read_Vout	2	Read
8Ch	Read_Iout	2	Read
8Dh	Read_Temperature1	2	Read
8Eh	Read_Temperature2	2	Read
8Fh	Read_Temperature3	2	Read
90h	Read_Fan speed	2	Read

96h	Read_Pout	2	Read
97h	Read_Pin	2	Read
98h	PMBus_Revision	1	Read
99h	MFR_ID	9	Block Read
9Ah	MFR_MODEL	12	Block Read
9Bh	MFR_Revision	2	Block Read
9Eh	MFR_Serial	14	Block Read

Data Formats :

The linear data format is typically used for commanding and reporting the parameters such as (but not only) the following:

- Input power and output power,
- Operating temperatures,
- Input current and output current,
- Input voltage,
- Fan speed RPM

The linear data format is a two bytes value with:

- An 11 bit, two's complement mantissa and
- A 5 bit, two's complement exponent (scaling factor).

The format of the two data bytes is illustrated in Figure 4.

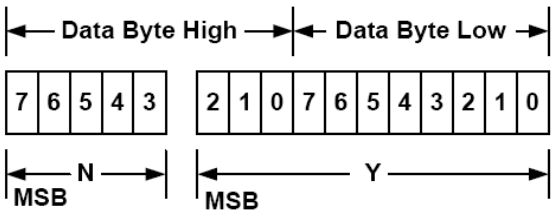


Figure 4. Linear Data Format Data Bytes

The relation between Y, N and the "real world" value is:

$X = Y \cdot 2^N$

Where, as described above:

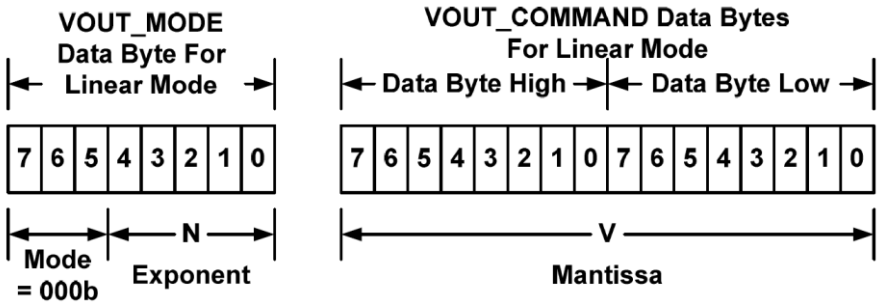
X is the "real world" value; Y is an 11 bit, two's complement integer; and N is a 5 bit, two's complement integer.

Devices that use the linear format must accept and be able to process any value of N.

The linear data format is typically used for commanding and reporting the parameters such as (but not only) the following:

- Output voltage

The linear data format is a two bytes value with:



The relation between Y, N and the "real world" value is:

$X = Y \cdot 2^N$

Where, as described above:

X is the "real world" value; Y is an 11 bit, two's complement integer; and N is a 5 bit, two's complement integer and value default is -9.

DIRECT format data is a two byte, two's complement binary integer. DIRECT format data may be used with any

command that sends or reads a parametric value.

$$X = \frac{1}{m}(Y \times 10^{-R} - b)$$

Where:

X, is the calculated, "real world" value in the appropriate units (A, V, °C, etc.);
m, the slope coefficient, is a two byte, two's complement integer and value default is 1.
Y, is a two byte two's complement integer received from the PMBus device;
b, the offset, is a two byte, two's complement integer and value default is 0.
R, the exponent, is a one byte, two's complement integer and value default is 0.

Read commands :

The READ commands allow the host to read temperature, current, voltage, power and energy parameters of the power supply.

PMBus command	Description	Data format
Read_Vin	Returns the input voltage in voltage.	Linear
Read_Iin	Returns the input current in amperes.	Linear
Read_Pin	Returns the input power, in watts, of the power supply.	Linear
Read_Ein	Commands are used to return information the host can use to calculate the input power consumption of power supply.	Direct
Read_Eout	Commands are used to return information the host can use to calculate the output power consumption of power supply.	Direct
Read_Vout	Returns the output voltage in voltage.	Linear
Read_Iout	Returns the output current in amperes.	Linear
Read_Pout	Returns the output power, in watts, of the power supply.	Linear
Read_Temperature_1	Returns the temperature in ℃ of the airflow inside temperature.	Linear
Read_Temperature_2	Returns the temperature in ℃ of the hot spot temperature.	Linear
Read_Temperature_3	Returns the temperature in ℃ of the primary side hot spot temperature.	Linear
Read_Fan speed	Returns the fan speed in revolutions per minute	Linear

PMBus direct format set m = 01h, R = 00h, b = 00h.

Accuracy

	Accuracy	
	Pin < 100W	Pin > 100W
Read_Vin	±5%	
Read_Iin	±0.1A	±5%
Read_Pin	±10W	±5%
Read_Vout	±5%	
Read_Iout	±0.5A	±5%
Read_Pout	±10W	±5%
Read_Temperature_1	±5℃	
Read_Temperature_2	±5℃	
Read_Temperature_3	±5℃	
Read_Fan speed	<9000rpm±1000rpm; >9000rpm±2000rpm	

Capability and inventory reporting :

The follow commands shall be supported for discovery of the power supplies capabilities.

Command	Meaning	Value
Capability	Packet Error Checking is supported Maximum supported bus speed is 100KHz Support the SMBus Alert Response protocol	90h
Query	Used to determine if the PSU supports a specific command	Byte
PMBus_Revision	Used to verify the PMBus revision the power supply is base on	22h

PAGE_PLUS_WRITE :

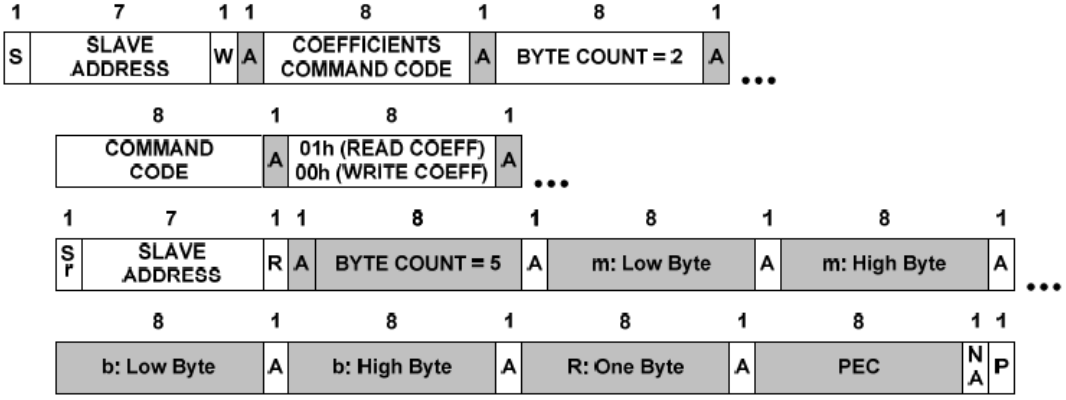
The PAGE_PLUS_WRITE command is used to set the page within a device, send a command, and send the data for the command in one packet.

PAGE_PLUS_READ :

The PAGE_PLUS_READ command is used to set the page within a device, send a command, and read the data returned by the command in one packet.

Coefficients :

This command is used to retrieve the m, b and R coefficients needed by data in the DIRECT format.



Status commands :

Status information is binary. A value of 1 indicates a fault or warning event has occurred and a value of 0 indicates that a fault or warning event has not occurred.

When the power an exception occurs, will set the warning bit. Warning bit will be automatically cleared when the anomalies remove.

The Status_Byte (78h) and Status_Word (79h) message content is described as shown below.

Byte	Bits	Bit name	Meaning
Low	7	Busy	Not support, set to 0
	6	OFF	+12V output off set to 1
	5	Vout_OV_Fault	+12V output overvoltage fault has occurred
	4	Iout_OC_Fault	+12V output overcurrent fault has occurred
	3	Vin_UV_Fault	Input undervoltage fault has occurred
	2	Temperature	A temperature fault or warning has occurred
	1	CML	A communications, memory or logic fault has occurred
	0	None of above	Not support, set to 0
High	7	Vout	+12V output voltage fault or warning has occurred
	6	Iout	+12V output current fault or warning has occurred
	5	Input	An input voltage fault or warning has occurred
	4	Not use	Not support, set to 0
	3	Power_Good#	The PWOK signal, if present, is negated
	2	Fans	A fan or airflow fault or warning has occurred

	1	Other	Not support, set to 0
	0	Not use	Not support, set to 0

The Status_Vout (7Ah) command returns one data byte with contents as below:

Bits	Meaning
7	+12V output voltage exceed 14V has occurred (Fault)
6	+12V output voltage exceed 13.2V has occurred (Warning)
5	+12V output voltage less than 10.8V has occurred (Warning)
4	+12V output voltage less than 10V has occurred (Fault)
3	Not support, set to 0
2	Not support, set to 0
1	Not support, set to 0
0	Not support, set to 0

The Status_Iout (7Bh) command returns one data byte with contents as below:

Bits	Meaning
7	+12V output current exceed 120% has occurred (Fault)
6	Not support, set to 0
5	+12V output current exceed 110% has occurred (Warning)
4	Not support, set to 0
3	Not support, set to 0
2	Not support, set to 0
1	Not support, set to 0
0	Not support, set to 0

The Status_Input (7Ch) command returns one data byte with contents as below:

Bits	Meaning
7	Not support, set to 0
6	Not support, set to 0
5	Input voltage less than 80±5Vrms has occurred (Warning)
4	Input voltage less than 75±5Vrms has occurred (Fault)
3	Unit Off For Insufficient Input Voltage
2	Not support, set to 0
1	Not support, set to 0
0	Not support, set to 0

Notes: Input voltage sense in front of PSU.

The Status_Temperature (7Dh) command returns one data byte with contents as below:

Bits	Meaning
7	Fault setting: Temperature (The power supply into the airflow inside) exceed 75 ±5℃ or Secondary hot spot exceed 125±5℃or Primary side hot spot exceed 120±5℃
6	Temperature (The power supply into the airflow inside) exceed 65 ±5℃ (Warning) or Secondary side hot spot exceed 120±5℃ or Primary side hot spot exceed 115±5℃ (Warning)
5	Not support, set to 0
4	Not support, set to 0
3	Reserved, read 0
2	Reserved, read 0
1	Reserved, read 0

0	Reserved, read 0

The Status_CML (7Eh) command returns one data byte with contents as below:

Bits	Meaning
7	Invalid Or Unsupported Command Received
6	Invalid Or Unsupported Data Received
5	Packet Error Check Failed
4	Not support, set to 0
3	Not support, set to 0
2	Reserved, read 0
1	Not support, set to 0
0	Not support, set to 0

The Status_Fans (81h) command reports on the status of fans installed in position

Bits	Meaning
7	Fan speed less than 1500 rpm during over 10 seconds If the fan control to stop condition will not set this bit
6	Not support, set to 0
5	Fan speed less than target 3000 rpm, during over 5 seconds If the fan control target less than 4600 rpm, The warning and fault bit may be together setting.
4	Not support, set to 0
3	Not support, set to 0
2	Not support, set to 0
1	Not support, set to 0
0	Not support, set to 0

SMBAlert signal :

Used to prevent a warning or fault condition from asserting the SMBAlert signal. The masks can be changed by system. By default the SMBAlert signal is asserted for the following cases.

- In Normal Input Voltage Rang and load current over 40%. AC input voltage drops below the fault threshold of the power supply for < 4ms.
- Thermal sensor on ambient or hot spot or primary side hot spot inside the power supply has exceeded its warning temperature.
- +12V output current exceed warning limit.

Manufacturer's Information and Ratings :

The following commands provide the ability for manufacturers to provide summary information about the unit's ratings. This information serves as an electronic nameplate for the user's convenience.

Command	Meaning	Value
MFR_ID	Defined the manufacturer's name	LEAD YEAR
MFR_MODEL	Defined the power model name	TG20-1100-0X
MFR_Serial	Product serial number	Variable

FAN Speed Control :

The power supply should support the PMBus commands to allow the system to control and monitor the power supply's fan.

Command	Meaning	Value
FAN_CONFIG_1_2	Fan 1 commanded in duty cycle 2 pulses per revolution	90h
FAN_COMMAND_1	System control fan speed of PSU by duty from 0~100%, n=0	Word

	Default value is 0 and FAN obeyed the PSU FAN control. If the system written value is over than PSU FAN control, system can control FAN speed of PSU by 0~100%. If the system written value is less than PSU FAN control or out of range or some data-error, FAN obeyed the PSU FAN control.	

Output Voltage Related Commands :

Command	Meaning	Value
VOUT_MODE	Linear data format, N = -9	17h

FRU Data Format :

The information to be contained in the FRU device is shown in the following table.

Address	Value	Description	Remark
00H	01	Common header format version	Common header
01H	00	Internal use area starting offset	No used
02H	00	Chassis info area starting offset	No used
03H	00	Board area starting offset	No used
04H	01	Product info area starting offset	
05H	0B	Multi record area starting offset	
06H	00	PAD (reserved – always 00H)	
07H	F3	Common header checksum	
08H	01	Product area format version	Product header
09H	09	Product area length	
0AH	19	Language (English)	
0BH	C9	Manufacturer name / length	
0CH	4C	L	
0DH	45	E	
0EH	41	A	
0FH	44	D	
10H	20		
11H	59	Y	
12H	45	E	
13H	41	A	
14H	52	R	
15H	CC	Model number / length	
16H	54	T	
17H	47	G	
18H	32	2	
19H	30	0	
1AH	2D	-	
1BH	31	1	
1CH	31	1	
1DH	30	0	
1EH	30	0	
1FH	2D	-	
20H	30	0	
21H	31	1	
22H	D4	Customer information (max 20 bytes)	Customer Name

23H	20	X： ASCII code	
24H	20	X： ASCII code	
25H	20	X： ASCII code	
26H	20	X： ASCII code	
27H	20	X： ASCII code	
28H	20	X： ASCII code	
29H	20	X： ASCII code	
2AH	20	X： ASCII code	
2BH	20	X： ASCII code	
2CH	20	X： ASCII code	
2DH	20	X： ASCII code	
2EH	20	X： ASCII code	
2FH	20	X： ASCII code	
30H	20	X： ASCII code	
31H	20	X： ASCII code	
32H	20	X： ASCII code	
33H	20	X： ASCII code	
34H	20	X： ASCII code	
35H	20	X： ASCII code	
36H	20	X： ASCII code	
37H	C3	Product version / length	
38H	20	X：From A to Z	To be updated
39H	20	X：From 0 to 9	To be updated
3AH	20	X：Reserve	To be updated
3BH	D0	Product serial number / length	
3CH	20	X：T = LEAD YEAR, M = SMART, C = AMAX	To be updated
3DH	20	X：For LEAD YEAR model code (2 bytes)	
3EH	20	X	
3FH	20	X：Year (00~99) date code	To be updated
40H	20	X	To be updated
41H	20	X：Week (01~52)	To be updated
42H	20	X	To be updated
43H	20	X：Product version (2 bytes)	To be updated
44H	20	X	To be updated
45H	20	X：Serial number (000001~999999)	To be updated
46H	20	X	To be updated
47H	20	X	To be updated
48H	20	X	To be updated
49H	20	X	To be updated
4AH	20	X	To be updated
4BH	20	Asset tag / length	
4CH	C0	FRU File ID type/length byte	
4DH	C0	No more info fields	
4EH	C1	PAD (Always zero)	
4FH	00	PAD (Always zero)	
50H	00	PAD (Always zero)	

51H	00	PAD (Always zero)	
52H	00	PAD (Always zero)	
53H	00	PAD (Always zero)	
54H	00	PAD (Always zero)	
55H	00	PAD (Always zero)	
56H	00	PAD (Always zero)	
57H	DF	Product area checksum	
58H	00	Power supply information	Multi record
59H	02	Record format version	Header
5AH	18	Record length	
5BH	33	Record checksum	To be updated
5CH	B3	Header checksum	To be updated
5DH	4C	Output power (2 bytes)	1100W
5EH	04		
5FH	FF	Peak VA (FFFFh if not specified)	
60H	FF		
61H	37	Inrush current	55A
62H	0A	Inrush interval in ms	10ms
63H	28	Low end input voltage range 1 (The units are 10mV)	90V
64H	23		
65H	90	High end input voltage range 1 (The units are 10mV)	132V
66H	33		
67H	50	Low end input voltage range 2 (The units are 10mV)	180V
68H	46		
69H	20	High end input voltage range 2 (The units are 10mV)	264V
6AH	67		
6BH	00	Low end input frequency range, support DC input	0Hz
6CH	3F	High end Input frequency range	63Hz
6DH	08	Input dropout tolerance in ms	8ms
6EH	1A	Hot swap, Power factor correction support	
6FH	4C	Peak wattages	1100W
70H	04	Hold up time in second	0S
71H	12	+12V and +12Vsb combined wattages (800W at 90Vac, 1000W at 100~132Vac, 1100W at 180~264Vac)	1100W
72H	4C		
73H	04		
74H	00	Predictive fail tachometer lower threshold (RPS)	
75H	01	DC output	Multirecord
76H	02	Record format version	Header
77H	0D	Record length	
78H	B4	Record checksum	
79H	3C	Header checksum	
7AH	09	Output number 1	+12V
7BH	B0	Nominal voltage (The units are 10mV)	12.00V
7CH	04		
7DH	74	Maximum negative voltage deviation (The units are 10mV)	11.40V
7EH	04		
7FH	EC	Maximum positive voltage deviation (The units are 10mV)	12.60V
80H	04		

81H 82H	78 00	Ripple and noise pk-pk 10Hz to 20MHz (The units are mV)	120mV
83H 84H	64 00	Minimum current draw (The units are 10mA)	1.00A
85H 86H	28 23	Maximum current draw (The units are 10mA)	90.00A
87H	01	DC output	Multirecord
88H	82	Record format version	Header
89H	0D	Record length	
8AH	C3	Record checksum	
8BH	AD	Header checksum	
8CH	82	Output number 2	+12Vsb
8DH 8EH	B0 04	Nominal voltage (The units are 10mV)	12.00V
8FH 90H	74 04	Maximum negative voltage deviation (The units are 10mV)	11.40V
91H 92H	EC 04	Maximum positive voltage deviation (The units are 10mV)	12.60V
93H 94H	78 00	Ripple and noise pk-pk 10Hz to 20MHz (The units are mV)	120mV
95H 96H	64 00	Minimum current draw (The units are mA)	0.100A
97H 98H	B8 0B	Maximum current draw (The units are mA)	3.000A
99H | FFH	FF	Don't used	

Field replaceable unit data memory (Hex) show in below table:

Offset	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	01	00	00	00	01	0B	00	F3	01	09	19	C9	4C	45	41	44
10	20	59	45	41	52	CC	54	47	32	30	2D	31	31	30	30	2D
20	30	31	D4	20	20	20	20	20	20	20	20	20	20	20	20	20
30	20	20	20	20	20	20	20	C3	20	20	20	D0	20	20	20	20
40	20	20	20	20	20	20	20	20	20	20	20	20	C0	C0	C1	00
50	00	00	00	00	00	00	00	DF	00	02	18	33	B3	4C	04	FF
60	FF	37	0A	28	23	90	33	50	46	20	67	00	3F	08	1A	4C
70	04	12	4C	04	00	01	02	0D	B4	3C	09	B0	04	74	04	EC
80	04	78	00	64	00	28	23	01	82	0D	C3	AD	82	B0	04	74
90	04	EC	04	78	00	64	00	B8	0B	FF	FF	FF	FF	FF	FF	FF
A0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
B0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
C0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
D0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
E0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
F0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF