

This application note describes the comprehensive PMBus™ digital communications feature-set for the Murata AC-DC front end power supply modules listed below. For additional details, refer to the corresponding datasheet.

MPS #	Model Number	Address	Main Output	Standby Output	Airflow
M1975	D1U54T-W-1200-12-HB3AC	ADDR_SEL (External resistor)	12Vdc	12Vdc	Front to Back
M2045	D1U54T-W-1200-12-HB4TAC			12Vdc	Back to Front
M2046	D1U54T-W-1200-12-HU3AC			3.3Vdc/5Vdc	Front to Back
M2047	D1U54T-W-1200-12-HU4TAC			3.3Vdc/5Vdc	Back to Front

Standard PMBus™

The following general statements apply:

- All data communicated over the PMBus™ interface uses PEC (Packet Error Checking) as defined by the standard for PMBus™ Power Systems Management Protocol Part 1 – General Requirements Rev 1.2.
To correctly execute the “write” operation (and avoid setting CML errors) the PEC protocol must be enabled in the host system.
- Linear data formatting is used for all passed parameters; direct data formatting is not supported.
- Block reads (where the first byte received denotes the remaining bytes to be clocked out) are supported on this product.
- A minimum of 300µs delay between transactions (between the STOP of one command and the START of the next command) is recommended for robust communications.
- Up to 400KHz I²C communications is supported for the PMBus™ interface.
- The PMBus™ slave controller does “clock stretch” on ACK or NAK.
- At initial power up (from application of the AC/DC source) The host/system should wait for assertion of the PW_OK signal before commencing communications with power supply module.
- STATUS_X register bits and associated hardware signal are “sticky” and require “CLEAR_FAULTS” write command or power recycle to clear, even after the imposing fault stimulus has been removed.

Device Addressing:

The power supply module contains two internal slave devices (a secondary side microcontroller + external EEPROM), and are accessible to host/system via the PMBus. The following addresses can be assigned to the internal slave devices by placing a pulldown resistor “Rn” from the power module’s “ADDR” Pin to output return.

SLAVE DEVICE SERIAL ADDRESS SELECTION OPTIONS		
Microcontroller	External EEPROM	Rn (ohm)
0xB0	0xA0	820
0xB2	0xA2	2700
0xB4	0xA4	5600
0xB6	0xA6	8200
0xB8	0xA8	15000
0xBA	0xAA	27000
0xBC	0xAC	56000
0xBE	0xAE	180000

Note: Leaving the “ADDR” pin unterminated will result in default address BE/AE being assigned Resistor tolerance +/-5% or better

PMBus™ Command List:

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
00	PAGE	R/W	All		1			Command to provide ability to configure, control & monitor multiple outputs	YES
01	OPERATION	R/W	All	Bit Flags	1	5:0		Set output margin high/low voltages	NO
						7:6		Turn the unit on/off in conjunction with digital input from PSON_H	YES
02	ON_OFF_CONFIG	Send	All	Bit Flags	1	0	ON_OFF_DELAY	Set when Turn off immediately (default) / 0 = Use delay @ turn-off	YES
						1	ON_OFF_POLARITY	Set when Power on processing is active high (default)	YES
						2	USE_CONTROL	Set when Use CONTROL pin for on/off power processing (default)	YES
						3	USE_OPERATION	Set when Use OPERATION command for on/off power processing (default)	YES
						4	USE_CNTL_AND_OP	Set when Use both CONTROL pin & OPERATION command (default)	YES
						5	RESERVED		NO
						6	RESERVED		NO
						7	RESERVED		NO
03	CLEAR_FAULTS	W	All		0			Write only command clears all faults that have been set in all the STATUS_XXXX registers simultaneously	YES
04	PHASE	R/W	All		1			Command to provide the ability to configure, control, and monitor multiple phases on one PMBus unit.	NO
05	PAGE_PLUS_WRITE	Block Write	All		Variable			Command used to set the page within a device, send a command, and send the data for the command in one packet	YES
06	PAGE_PLUS_READ	Block Write / Block Read Process Call	All		Variable			Command used to set the page within a device, send a command, and read the data returned by the command in one packet	YES
10	WRITE_PROTECT	R/W	All		1			Command to provide ability to configure, control & monitor multiple outputs	YES
11	STORE_DEFAULT_ALL	Send	All		0			Command instructs PMBus device to copy contents of Operating Memory to matching NVM	NO
12	RESTORE_DEFAULT_ALL	Send	All		0			Command instructs PMBus device to copy contents of NVM to matching Operating Memory	NO
13	STORE_DEFAULT_CODE	W	All		1			Command instructs the PMBus device to copy the parameter whose Command Code matches value in the data byte, from Operating Memory to matching NVM	NO
14	RESTORE_DEFAULT_CODE	W	All		1			Command instructs the PMBus device to copy the parameter whose Command Code matches value in the data byte, from NVM to matching Operating Memory	NO
15	STORE_USER_ALL	Send	All		0			Command instructs the PMBus device to copy the entire contents of Operating Memory to matching NVM	NO
16	RESTORE_USER_ALL	Send	All		0			Command instructs the PMBus device to copy the entire contents of NVM to matching Operating Memory	NO
17	STORE_USER_CODE	W	All		1			Command instructs the PMBus device to copy the parameter whose Command Code matches value in the data byte from Operating Memory to matching NVM User Store memory	NO
18	RESTORE_USER_CODE	W	All		1			Command instructs the PMBus device to copy the parameter whose Command Code matches value in the data byte from NVM to matching Operating memory Store memory	NO
19	CAPABILITY	R	All	Bit Flags	1	0:3	RESERVED		NO
						4	SMBALERT_L	Set when device has SMBALERT_L pin which supports the SMBus Alert Response protocol	YES
						6:5	MAX_BUS_SPEED	01 = Max supported bus speed = 400kHz; 00 Max supported bus speed = 100kHz	NO
						7	PEC	Set when packet error checking is supported	YES
1A	QUERY	Block Write / Block Read Process Call	All	Bit Flags	1	1:0	RESERVED		NO
						4:2	DATA_FORMAT	PMBus 1.2 Spec Section 11.13 Table 8.	YES
						5	READ_SUPPORT	1 = Supported ; 0 = Not Supported	YES
						6	WRITE_SUPPORT	1 = Supported ; 0 = Not Supported	YES
						7	COMMAND_SUPPORT	1 = Supported ; 0 = Not Supported	YES

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
1B	SMBALERT_MASK	Block Write / Block Read Process Call	All		2			Command may be used to prevent a warning or fault condition from asserting the SMBALERT# signal	YES
20	VOUT_MODE	R	0	Bit Flags	1			Single data byte sets the READ_VOUT sensor to linear mode data format and supplies N exponent for translation to volts PMBus Spec - Part II - Revision 1.2 - Sections 8.1-8.3	YES
20	VSTBY_MODE	R	1	Bit Flags	1			Single data byte sets the READ_VSTBY sensor to linear mode data format and supplies N exponent for translation to volts PMBus Spec - Part II - Revision 1.2 - Sections 8.1-8.3	YES
21	VOUT_COMMAND	R/W	0	Linear Data Format	2			Manual override main output setpoint command - Voltage range setting 11.5V - 12.75V Command speed formatted in Linear as per command 0x8B - VOUT_COMMAND	YES
21	VSTBY_COMMAND	R/W	1	Linear Data Format	2			Manual override standby output setpoint command - Voltage range setting x. Command speed formatted in Linear as per command 0x8B - VOUT_COMMAND	NO
22	VOUT_TRIM	R/W	0	Linear Data Format	2			Command used to apply a fixed offset voltage to the output voltage command value	NO
23	VSTBY_TRIM	R/W	1	Linear Data Format	2			Command used to apply a fixed offset voltage to the output voltage command value	NO
23	VOUT_CAL_OFFSET	R/W	0	Linear Data Format	2			Command used to apply a fixed offset voltage to the output voltage command value	NO
23	VSTBY_CAL_OFFSET	R/W	1	Linear Data Format	2			Command used to apply a fixed offset voltage to the output voltage command value	NO
24	VOUT_MAX	R/W	0	Linear Data Format	2			Command sets upper limit output voltage can be set regardless of other command/combination	NO
24	VSTBY_MAX	R/W	1	Linear Data Format	2			Command sets upper limit output voltage can be set regardless of other command/combination	NO
25	VOUT_MARGIN_HIGH	R/W	0	Linear Data Format	2			Load the unit with the voltage to which the output is to be changed when the OPERATION command set to "Margin High"	NO
25	VSTBY_MARGIN_LOW	R/W	1	Linear Data Format	2			Load the unit with the voltage to which the output is to be changed when the OPERATION command set to "Margin High"	NO
26	VOUT_MARGIN_HIGH	R/W	0	Linear Data Format	2			Load the unit with the voltage to which the output is to be changed when the OPERATION command set to "Margin Low"	NO
26	VSTBY_MARGIN_LOW	R/W	1	Linear Data Format	2			Load the unit with the voltage to which the output is to be changed when the OPERATION command set to "Margin Low"	NO
27	VOUT_TRANSITION_RATE	R/W	0	Linear Data Format	2			Command sets the rate in mV/μs at which the output should change voltage	NO
27	VSTBY_TRANSITION_RATE	R/W	1	Linear Data Format	2			Command sets the rate in mV/μs at which the output should change voltage	NO
28	VOUT_DROOP	R/W	0	Linear Data Format	2			Command sets the rate (mV/A) which output voltage decreases (or increases) with increasing (or decreasing) output current (in Adaptive Voltage Positioning/passive current sharing)	NO
28	VSTBY_DROOP	R/W	1	Linear Data Format	2			Command sets the rate (mV/A) which output voltage decreases (or increases) with increasing (or decreasing) output current (in Adaptive Voltage Positioning/passive current sharing)	NO
29	VOUT_SCALE_LOOP	R/W	0	Linear Data Format	2			PMBus Spec - Part II - Revision 1.2 - Section 13.10	NO
29	VSTBY_SCALE_LOOP	R/W	1	Linear Data Format	2			PMBus Spec - Part II - Revision 1.2 - Section 13.10	NO
2A	VOUT_SCALE_MONITOR	R/W	0	Linear Data Format	2			PMBus Spec - Part II - Revision 1.2 - Section 13.11	NO
2A	VSTBY_SCALE_MONITOR	R/W	1	Linear Data Format	2			PMBus Spec - Part II - Revision 1.2 - Section 13.11	NO
30	COEFFICIENTS	Block Write / Block Read Process Call	All		5			Command used to retrieve the m, b and R coefficients needed by data in the DIRECT format	NO

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
31	POUT_MAX	R/W	All	Linear Data Format	2			Commands sets output power (watts) which unit starts regulating in constant power mode	NO
32	MAX_DUTY	R/W	All	Linear Data Format	2			Command sets maximum duty cycle (%) of the unit's power conversion stage	NO
33	FREQUENCY_SWITCH	R/W	All	Linear Data Format	2			Command sets switching frequency (kHz) of a PMBus device	NO
35	VIN_ON	R/W	All	Linear Data Format	2			Command sets value of input voltage (Vdc/Vrms) at which unit should start power conversion	NO
36	VIN_OFF	R/W	All	Linear Data Format	2			Command sets value of input voltage (Vdc/Vrms) at which unit should stop power conversion	NO
37	INTERLEAVE	R/W	All	Bit Flags	2			PMBus Spec - Part II - Revision 1.2 - Section 14.7	NO
38	IOUT_CAL_GAIN	R/W	All	Linear Data Format	2			Command used to set the ratio of the voltage at the current sense pins to the sensed current	NO
39	IOUT_CAL_OFFSET	R/W	All	Linear Data Format	2			Command used to null out any offsets in the output current sensing circuit	NO
3A	FAN_CONFIG_1_2	R	All	Bit Flags	1	0	FAN_2_TACH_PULSES	Fan 2 Tachometer pulses per revolution (lower bit)	NO
						1	FAN_2_TACH_PULSES	Fan 2 Tachometer pulses per revolution (upper bit)	NO
						2	FAN_2_SETTING_MODE	Set when fan is commanded in RPM (Clear when fan is commanded in Duty Cycle)	NO
						3	FAN_2_INSTALLATION	Set when fan is installed in position 2	NO
						4	FAN_1_TACH_PULSES	Fan 1 Tachometer pulses per revolution (lower bit)	YES
						5	FAN_1_TACH_PULSES	Fan 1 Tachometer pulses per revolution (upper bit)	YES
						6	FAN_1_SETTING_MODE	Set when fan is commanded in RPM (Clear when fan is commanded in Duty Cycle)	YES
						7	FAN_1_INSTALLATION	Set when fan is installed in position 1	YES
3B	FAN_COMMAND_1	R/W	All	Linear Data Format	2			Manual fan override command fan speed value in Duty Cycle Command speed formatted in Linear as per command 0x90 - READ_FAN_SPEED_1	YES
3C	FAN_COMMAND_2	R/W	All	Linear Data Format	2			Manual fan override command fan speed value in Duty Cycle Command speed formatted in Linear as per command 0x91 - READ_FAN_SPEED_2	NO
3D	FAN_CONFIG_3_4	R	All	Bit Flags	1	0	FAN_4_TACH_PULSES	Fan 4 Tachometer pulses per revolution (lower bit)	NO
						1	FAN_4_TACH_PULSES	Fan 4 Tachometer pulses per revolution (upper bit)	NO
						2	FAN_4_SETTING_MODE	Set when fan is commanded in RPM (Clear when fan is commanded in Duty Cycle)	NO
						3	FAN_4_INSTALLATION	Set when fan is installed in position 4	NO
						4	FAN_3_TACH_PULSES	Fan 3 Tachometer pulses per revolution (lower bit)	NO
						5	FAN_3_TACH_PULSES	Fan 3 Tachometer pulses per revolution (upper bit)	NO
						6	FAN_3_SETTING_MODE	Set when fan is commanded in RPM (Clear when fan is commanded in Duty Cycle)	NO
						7	FAN_3_INSTALLATION	Set when fan is installed in position 3	NO
3E	FAN_COMMAND_3	R/W	All	Linear Data Format	2			Manual fan override command fan speed value in Duty Cycle Command speed formatted in Linear as per command 0x92 - READ_FAN_SPEED_3	NO
3F	FAN_COMMAND_4	R/W	All	Linear Data Format	2			Manual fan override command fan speed value in Duty Cycle Command speed formatted in Linear as per command 0x93 - READ_FAN_SPEED_4	NO

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
40	VOUT_OV_FAULT_LIMIT	R	0	Linear Data Format	2		Limits and Response: 12Vsb Models 5Vsb Models 3.3Vsb Models	Main Output Overvoltage Fault Limit	YES
40	VSTBY_OV_FAULT_LIMIT	R	1	Linear Data Format	2			Standby(Auxilliary) Output Overvoltage Fault Limit	YES
41	VOUT_OV_FAULT_RESPONSE	R	0	Bit Flags	1			Main Output Overvoltage Fault Response Actions	YES
41	VSTBY_OV_FAULT_RESPONSE	R	1	Bit Flags	1			Standby(Auxilliary) Output Overvoltage Fault Response Actions	YES
42	VOUT_OV_WARN_LIMIT	R	0	Linear Data Format	2			Main Output Overvoltage Warning Limit	YES
42	VSTBY_OV_WARN_LIMIT	R	1	Linear Data Format	2			Standby(Auxilliary) Output Overvoltage Warning Limit	YES
43	VOUT_UV_WARN_LIMIT	R	0	Linear Data Format	2			Main Output Undervoltage Warning Limit	YES
43	VSTBY_UV_WARN_LIMIT	R	1	Linear Data Format	2			Standby(Auxilliary) Output Undervoltage Warning Limit	YES
44	VOUT_UV_FAULT_LIMIT	R	0	Linear Data Format	2			Main Output Undervoltage Fault Limit	YES
44	VSTBY_UV_FAULT_LIMIT	R	1	Linear Data Format	2			Standby(Auxilliary) Output Undervoltage Fault Limit	YES
45	VOUT_UV_FAULT_RESPONSE	R	0	Bit Flags	1			Main Output Undervoltage Fault Response Actions	YES
45	VSTBY_UV_FAULT_RESPONSE	R	1	Bit Flags	1			Standby(Auxilliary) Output Undervoltage Fault Response Actions	YES
46	IOUT_OC_FAULT_LIMIT	R	0	Linear Data Format	2			Main Output Overcurrent Fault Limit	YES
46	ISTBY_OC_FAULT_LIMIT	R	1	Linear Data Format	2			Standby(Auxilliary) Output Overcurrent Fault Limit	YES
47	IOUT_OC_FAULT_RESPONSE	R	0	Bit Flags	1			Main Output Overcurrent Fault Response Actions	YES
47	ISTBY_OC_FAULT_RESPONSE	R	1	Bit Flags	1			Standby(Auxilliary) Output Overcurrent Fault Response Actions	YES
48	IOUT_OC_LV_FAULT_LIMIT	R	0	Linear Data Format	2			Main Output Overcurrent Foldback Fault Limit	NO
48	ISTBY_OC_LV_FAULT_LIMIT	R	1	Linear Data Format	2			Standby(Auxilliary) Output Overcurrent Foldback Fault Limit	NO
49	IOUT_OC_LV_FAULT_RESPONSE	R	0	Bit Flags	1			Main Output Overcurrent Foldback Fault Response Actions	NO
49	ISTBY_OC_LV_FAULT_RESPONSE	R	1	Bit Flags	1			Standby(Auxilliary) Output Overcurrent Foldback Fault Response Actions	NO
4A	IOUT_OC_WARN_LIMIT	R	0	Linear Data Format	2			Main Output Overcurrent Warning Limit	YES
4A	ISTBY_OC_WARN_LIMIT	R	1	Linear Data Format	2			Standby(Auxilliary) Output Overvoltage Warning Limit	YES
4B	IOUT_UC_FAULT_LIMIT	R	0	Linear Data Format	2			Main Output Undercurrent Fault Limit	NO
4B	ISTBY_UC_FAULT_LIMIT	R	1	Linear Data Format	2			Standby(Auxilliary) Output Undercurrent Fault Limit	NO
4C	IOUT_UC_FAULT_RESPONSE	R	0	Bit Flags	1			Main Output Undercurrent Fault Response Actions	NO
4C	ISTBY_UC_FAULT_RESPONSE	R	1	Bit Flags	1			Standby(Auxilliary) Output Undercurrent Fault Response Actions	NO
4F	AIRFLOW_1_OT_FAULT_LIMIT	R	0	Linear Data Format	2			Airflow 1 Overtemperature Fault Limit→ Intake F-B models “page ‘0’”; Exhaust B-F models “page 1”	YES
4F	HOTSPOT_1_OT_FAULT_LIMIT	R	3	Linear Data Format	2			Hotspot 1 Overtemperature Fault Limit→ Primary Hotspot	YES
4F	AIRFLOW_2_OT_FAULT_LIMIT	R	1	Linear Data Format	2			Airflow 2 Overtemperature Fault Limit → Secondary Airflow (Exhaust F-B models “page 1”, Intake B-F models Pg. 0”)	YES
4F	HOTSPOT_2_OT_FAULT_LIMIT	R	2	Linear Data Format	2			Hotspot 2 Overtemperature Fault Limit → Secondary Hotspot	YES
50	AIRFLOW_1_OT_FAULT_RESPONSE	R	0	Bit Flags	1			Airflow 1 Overtemperature Fault Response Actions	YES
50	HOTSPOT_1_OT_FAULT_RESPONSE	R	3	Bit Flags	1			Hotspot 1 Overtemperature Fault Response Actions	YES
50	AIRFLOW_2_OT_FAULT_RESPONSE	R	1	Bit Flags	1			Airflow 2 Overtemperature Fault Response Actions	YES
50	HOTSPOT_2_OT_FAULT_RESPONSE	R	2	Bit Flags	1			Hotspot 2 Overtemperature Fault Response Actions	YES
51	AIRFLOW_1_OT_WARN_LIMIT	R	0	Linear Data Format	2			Primary Airflow (Intake F-B models “page ‘0’”; Exhaust B-F models “page 1”)	YES

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
51	HOTSPOT_1_OT_WARN_LIMIT	R	3	Linear Data Format	2			Primary Hotspot - PFC	YES
51	AIRFLOW_2_OT_WARN_LIMIT	R	1	Linear Data Format	2			Secondary Airflow (Exhaust F-B models "page 1", Intake B-F models Pg. 0")	YES
51	HOTSPOT_2_OT_WARN_LIMIT	R	2	Linear Data Format	2			Secondary Hotspot - Main output hotspot	YES
52	AIRFLOW_1_UT_FAULT_LIMIT	R	0	Linear Data Format	2			Airflow 1 Undertemperature Fault Limit	NO
52	HOTSPOT_1_UT_FAULT_LIMIT	R	1	Linear Data Format	2			Hotspot 1 Undertemperature Fault Limit	NO
52	AIRFLOW_2_UT_FAULT_LIMIT	R	2	Linear Data Format	2			Airflow 2 Undertemperature Fault Limit	NO
52	HOTSPOT_2_UT_FAULT_LIMIT	R	3	Linear Data Format	2			Hotspot 2 Undertemperature Fault Limit	NO
53	AIRFLOW_1_UT_FAULT_RESPONSE	R	0	Bit Flags	1		Limits and Response: 12Vsb Models 5Vsb Models 3.3Vsb Models	Airflow 1 Undertemperature Fault Response Actions	NO
53	HOTSPOT_1_UT_FAULT_RESPONSE	R	3	Bit Flags	1			Hotspot 1 Undertemperature Fault Response Actions	NO
53	AIRFLOW_2_UT_FAULT_RESPONSE	R	1	Bit Flags	1			Airflow 2 Undertemperature Fault Response Actions	NO
53	HOTSPOT_2_UT_FAULT_RESPONSE	R	2	Bit Flags	1			Hotspot 2 Undertemperature Fault Response Actions	NO
55	VIN_OV_FAULT_LIMIT	R	All	Linear Data Format	2			Input Overvoltage Fault Limit	YES
56	VIN_OV_FAULT_RESPONSE	R	All	Bit Flags	1			Input Overvoltage Fault Response Actions	YES
57	VIN_OV_WARN_LIMIT	R	All	Linear Data Format	2			Input Overvoltage Warning Limit	YES
58	VIN_UV_WARN_LIMIT	R	All	Linear Data Format	2			Input Undervoltage Warning Limit	YES
59	VIN_UV_FAULT_LIMIT	R	All	Linear Data Format	2			Input Undervoltage Fault Limit	YES
5A	VIN_UV_FAULT_RESPONSE	R	All	Bit Flags	1			Input Undervoltage Fault Response Actions	YES
5B	IIN_OC_FAULT_LIMIT	R	All	Linear Data Format	2			Input Overcurrent Fault Limit	YES
5C	IIN_OC_FAULT_RESPONSE	R	All	Bit Flags	1			Input Overcurrent Fault Response Actions	YES
5D	IIN_OC_WARN_LIMIT	R	All	Linear Data Format	2			Input Overcurrent Warning Limit	YES
5E	POWER_GOOD_ON	R	All	Linear Data Format	2			Power Good On Main Output Voltage Limit	YES
5F	POWER_GOOD_OFF	R	All	Linear Data Format	2			Power Good Off Main Output Voltage Limit	YES
60	TON_DELAY	R	All	Linear Data Format	2			Sets the time (mSec) from when a start condition is received (as programmed by the ON_OFF_CONFIG command) until the output voltage starts to rise	NO
61	TON_RISE	R	All	Linear Data Format	2			Sets the time (mSec) from when the output starts to rise until the voltage has entered the regulation band.	NO
62	TON_MAX_FAULT_LIMIT	R	All	Linear Data Format	2			Command sets an upper limit (mSec) on how long the unit can attempt to power up the output without reaching the output undervoltage fault limit	NO
63	TON_MAX_FAULT_RESPONSE	R	All	Bit Flags	1			Command instructs the device on what action to take in response to a TON_MAX fault	NO
64	TOFF_DELAY	R	All	Linear Data Format	2			Sets the time (mSec) from a stop condition is received (as programmed by the ON_OFF_CONFIG command) until the unit stops transferring energy to the output	NO
65	TOFF_FALL	R	All	Linear Data Format	2			Sets the time (mSec) from the end of the turn-off delay time until the voltage is commanded to zero.	NO
66	TOFF_MAX_WARN_LIMIT	R	All	Linear Data Format	2			Command sets an upper limit(mSec), on how long unit can attempt to power down output without reaching 12.5% of the output voltage programmed at the time the unit is turned off	NO
68	POUT_OP_FAULT_LIMIT	R	All	Linear Data Format	2			Output Overpower Fault Limit	YES
69	POUT_OP_FAULT_RESPONSE	R	All	Bit Flags	1			Output Overpower Fault Response Actions	YES
6A	POUT_OP_WARN_LIMIT	R	All	Linear Data Format	2			Output Overpower Warning Limit	YES
6B	PIN_OP_WARN_LIMIT	R	All	Linear Data Format	2			Input Overpower Warning Limit	YES

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
78	STATUS_BYTE	R	All	Bit Flags	1	0	NONE_F_W	Set when a fault not listed in [7:1] occurred	NO
						1	CML_F	Set when a communications, memory, or logic fault has occurred	YES
						2	TEMPERATURE_F_W	Set when an overtemperature fault or warning has occurred	YES
						3	INPUT_UV_F	Set when an input undervoltage fault has occurred	YES
						4	OUTPUT_OC_F	Set when an output overcurrent fault has occurred	YES
						5	OUTPUT_OV_F	Set when an output overvoltage fault has occurred	YES
						6	UNIT_OFF	Set when unit not providing power to the output	YES
						7	BUSY_F	Asserted when device busy and unable to respond fault	YES
79	STATUS_WORD	R	All	Bit Flags	2	0	NONE_F_W	Set when a fault not listed in [7:1] occurred	NO
						1	CML_F	Set when a communications, memory, or logic fault has occurred	YES
						2	TEMPERATURE_F_W	Set when an overtemperature fault or warning has occurred	YES
						3	INPUT_UV_F	Set when an input undervoltage fault has occurred	YES
						4	OUTPUT_OC_F	Set when an output overcurrent fault has occurred	YES
						5	OUTPUT_OV_F	Set when an output overvoltage fault has occurred	YES
						6	UNIT_OFF	Set when unit not providing power to the output	YES
						7	BUSY_F	Asserted when device busy and unable to respond fault	YES
						8	UNKNOWN_F_W	Set when a fault not listed in [15:1] has occurred	NO
						9	STATUS_OTHER_F_W	Set when a bit in command STATUS_OTHER set	NO
						10	FANS_F_W	Set when a fan fault or warning has occurred	YES
						11	POWER_GOOD_L	Set when the POWER_GOOD signal is negated	YES
						12	MFR_SPECIFIC_F_W	Manufacturer specific fault or warning has occurred	YES
						13	INPUT_F_W	Set when an Input voltage/current/power fault or warning has occurred	YES
						14	IOUT_POUT_F_W	Set when an output current / output power fault or warning has occurred	YES
						15	VOUT_F_W	Set when an output voltage fault or warning has occurred	YES
7A	STATUS_VOUT	R/W	0	Bit Flags	1	0	VOUT_TRACKING_E	Set when an error in the output voltage during power-up/down has occurred	NO
						1	TON_MAX_W	Set when the output turn-on timing has exceeded the TON_MAX warning timing	NO
						2	TON_MAX_F	Set when the output turn-on timing has exceeded the TON_MAX fault timing	NO
						3	VOUT_MAX_F	Set when the output is set higher than the commanded VOUT_MAX limit	NO
						4	VOUT_UV_F	Set when an output undervoltage fault has occurred	YES
						5	VOUT_UV_W	Set when an output undervoltage warning has occurred	YES
						6	VOUT_OV_W	Set when an output overvoltage warning has occurred	YES
						7	VOUT_OV_F	Set when an output overvoltage fault has occurred	YES
7A	STATUS_VSTBY	R/W	1	Bit Flags	1	0	VOUT_TRACKING_E	Set when an error in the output voltage during power-up/down has occurred	NO
						1	TON_MAX_W	Set when the output turn-on timing has exceeded the TON_MAX warning timing	NO
						2	TON_MAX_F	Set when the output turn-on timing has exceeded the TON_MAX fault timing	NO
						3	VOUT_MAX_F	Set when the output is set higher than the commanded VOUT_MAX limit	NO
						4	VOUT_UV_F	Set when an output undervoltage fault has occurred	NO
						5	VOUT_UV_W	Set when an output undervoltage warning has occurred	YES
						6	VOUT_OV_W	Set when an output overvoltage warning has occurred	YES
						7	VOUT_OV_F	Set when an output overvoltage fault has occurred	YES
7B	STATUS_IOUT	R/W	0	Bit Flags	1	0	POUT_OP_W	Set when an output overpower warning has occurred	YES
						1	POUT_OP_F	Set when an output overpower fault has occurred	YES
						2	POWER_LIMIT_MODE	Set when the unit has entered output power limiting mode	NO
						3	CURRENT_SHARE_F	Set when an output current share fault has occurred	NO
						4	IOUT_UC_W	Set when an output undercurrent fault has occurred	NO
						5	IOUT_OC_W	Set when an output overcurrent warning has occurred	YES
						6	IOUT_OC_SHUTDOWN	Set when an output overcurrent and low voltage shutdown fault has occurred	YES
						7	IOUT_OC_F	Set when an output overcurrent fault has occurred	YES

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
7B	STATUS_ISTBY	R/W	1	Bit Flags	1	0	POUT_OP_W	Set when an output overpower warning has occurred	NO
						1	POUT_OP_F	Set when an output overpower fault has occurred	NO
						2	POWER_LIMIT_MODE	Set when the unit has entered output power limiting mode	NO
						3	CURRENT_SHARE_F	Set when an output current share fault has occurred	NO
						4	IOUT_UC_W	Set when an output undercurrent fault has occurred	NO
						5	IOUT_OC_W	Set when an output overcurrent warning has occurred	YES
						6	IOUT_OC_SHUTDOWN	Set when an output overcurrent and low voltage shutdown fault has occurred	YES
						7	IOUT_OC_F	Set when an output overcurrent fault has occurred	YES
7C	STATUS_INPUT	R/W	All	Bit Flags	1	0	PIN_OP_W	Set when an input overpower warning has occurred	YES
						1	IIN_OC_W	Set when an input overcurrent warning has occurred	YES
						2	IIN_OC_F	Set when an input overcurrent fault has occurred	YES
						3	VIN_UV_OFF	Set when the Unit is OFF for insufficient input voltage	NO
						4	VIN_UV_F	Set when an input undervoltage fault has occurred	NO
						5	VIN_UV_W	Set when an input undervoltage warning has occurred	YES
						6	VIN_OV_W	Set when an input overvoltage warning has occurred	YES
						7	VIN_OV_F	Set when an input overvoltage fault has occurred	YES
7D	STATUS_TEMPERATURE	R/W	All	Bit Flags	1	0	RESERVED	Reserved	NO
						1	RESERVED	Reserved	NO
						2	RESERVED	Reserved	NO
						3	RESERVED	Reserved	NO
						4	TEMPERATURE_UT_F	Set when an undertemperature fault has occurred	NO
						5	TEMPERATURE_UT_W	Set when an undertemperature warning has occurred	NO
						6	TEMPERATURE_OT_W	Set when an overtemperature warning has occurred	YES
						7	TEMPERATURE_OT_F	Set when an overtemperature fault has occurred	YES
7E	STATUS_CML	R/W	All	Bit Flags	1	0	OTHER_MEMORY_F	Set when another memory or logic fault has occurred	NO
						1	OTHER_COMM_F	Set when a communication fault not listed in [7:3] has occurred (example: UART or SPI)	YES
						2	RESERVED	Reserved	NO
						3	PROCESSOR_F	Set when a processor fault is detected	NO
						4	MEMORY_F	Set when a memory fault is detected (example: Checksum errors during bootload)	NO
						5	PEC_ERROR_F	Set when a packet error checking (PEC) failed has occurred	YES
						6	DATA_ERROR_F	Set when invalid or unsupported data is received	YES
						7	COMMAND_ERROR_F	Set when an invalid or unsupported command is received	YES
7F	STATUS_OTHER	R/W	All	Bit Flags	1	0	RESERVED	Reserved	NO
						1	ORING_OUTPUT_F	Set when output ORing device fault occurs	NO
						2	ORING_INPUT_B_F	Set when input B ORing device fault occurs	NO
						3	ORING_INPUT_A_F	Set when input A ORing device fault occurs	NO
						4	FUSE_INPUT_B_F	Set when input B fuse/breaker fault occurs	NO
						5	FUSE_INPUT_A_F	Set when input A fuse/breaker fault occurs	NO
						6	RESERVED	Reserved	NO
						7	RESERVED	Reserved	NO
80	STATUS_MFR_SPECIFIC	R/W	All	Bit Flags	1	0	VINT_RANGE_F	Set when an internal voltage (VCC2, VCC4, or VDD) out-of-range fault has occurred	YES
						1	IIN_CH1_OC_F	Set when the primary boost switch current exceeds a specified number of power-limited cycles	NO
						2	IIN_CH2_OC_F	Set when the primary boost switch current exceeds a specified number of power-limited cycles	NO
						3	VINT_RANGE_F	Set when an internal voltage (VCC2, VCC4, or VDD) out-of-range fault has occurred	YES
						4	VBUS_UV_F	Set when the primary boost output bus undervoltage fault has occurred	YES
						5	VBUS_UV_W	Set when the primary boost output bus undervoltage warning has occurred	YES
						6	VBUS_OV_W	Set when the primary boost output bus overvoltage warning has occurred	YES
						7	VBUS_OV_F	Set when the primary boost output bus overvoltage fault has occurred	YES

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
81	STATUS_FANS_1_2	R/W	All	Bit Flags	1	0	FAN_AIRFLOW_W	Airflow warning	NO
						1	FAN_AIRFLOW_F	Airflow fault	NO
						2	FAN_2_OVERRIDE	Fan 2 speed overridden	NO
						3	FAN_1_OVERRIDE	Fan 1 speed overridden	YES
						4	FAN_2_W	Fan 2 warning	NO
						5	FAN_1_W	Fan 1 warning	YES
						6	FAN_2_F	Fan 2 fault	NO
						7	FAN_1_F	Fan 1 fault	YES
82	STATUS_FANS_3_4	R/W	All	Bit Flags	1	0	FAN_AIRFLOW_W	Airflow warning	NO
						1	FAN_AIRFLOW_F	Airflow fault	NO
						2	FAN_4_OVERRIDE	Fan 4 speed overridden	NO
						3	FAN_3_OVERRIDE	Fan 3 speed overridden	NO
						4	FAN_4_W	Fan 4 warning	NO
						5	FAN_3_W	Fan 3 warning	NO
						6	FAN_4_F	Fan 4 fault	NO
						7	FAN_3_F	Fan 3 fault	NO
86	READ_EIN	BLOCK READ	All	PMBus Spec 18.13	5			Input Energy Consumption Sensor	YES
87	READ_EOUT	BLOCK READ	All	PMBus Spec 18.13	5			Output Energy Consumption Sensor	YES
88	READ_VIN	R	All	Linear Data Format	2			Input Voltage Sensor Reading	YES
89	READ_IIN	R	All	Linear Data Format	2			Input Current Sensor Reading	YES
8A	READ_VCAP	R	All	Linear Data Format	2			PFC Output Voltage Sensor Reading	YES
8B	READ_VOUT	R	0	Linear Data Format	2			Main Output Voltage Sensor Reading	YES
8B	READ_VSTBY	R	1	Linear Data Format	2			Standby(Auxilliary) Output Voltage Sensor Reading	YES
8C	READ_IOUT	R	0	Linear Data Format	2			Main Output Current Sensor Reading	YES
8C	READ_ISTBY	R	1	Linear Data Format	2			Standby(Auxilliary) Output Current Sensor Reading	YES
8D	READ_TEMPERATURE_1	R	All	Linear Data Format	2			Intake airflow temperature sensor reading; there may be a significant variance between actual temperature measured near intake of power module and the reported sensor reading due to the location differences and also airflow conditions imposed by the system in which it is installed.	YES
8E	READ_TEMPERATURE_2	R	All	Linear Data Format	2		Link to Sensor data	Exhaust Airflow Temperature Sensor Reading	YES
8F	READ_TEMPERATURE_3	R	0	Linear Data Format	2			Hotspot 1 Temperature Sensor Reading	YES
8F	READ_TEMPERATURE_3	R	1	Linear Data Format	2			Hotspot 2 Temperature Sensor Reading	YES
90	READ_FAN_SPEED_1	R	All	Linear Data Format	2			Fan 1 Speed Sensor Reading	YES
91	READ_FAN_SPEED_2	R	All	Linear Data Format	2			Fan 2 Speed Sensor Reading	NO
92	READ_FAN_SPEED_3	R	All	Linear Data Format	2			Fan 3 Speed Sensor Reading	NO
93	READ_FAN_SPEED_4	R	All	Linear Data Format	2			Fan 4 Speed Sensor Reading	NO
94	READ_DUTY_CYCLE	R	All	Linear Data Format	2			Command returns the duty of the PMBus device's main power converter in percent	NO
95	READ_FREQUENCY	R	All	Linear Data Format	2			Command returns the switching frequency of PMBus device's main power converter in KHz	NO
96	READ_POUT	R	All	Linear Data Format	2			Output Power Sensor Reading	YES
97	READ_PIN	R	All	Linear Data Format	2			Input Power Sensor Reading	YES
98	PMBUS_REVISION	R	All	HEX	1			PMBus Specification Revision	YES

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
99	MFR_ID	BLOCK READ	All	Ascii Text Block	10		Additional Details	Power Supply Company Name	YES
9A	MFR_MODEL	BLOCK READ / BLOCK WRITE	All	Ascii Text Block	32 Max		Additional Details	Power Supply Model Number	YES
9B	MFR_REVISION	BLOCK READ	0	Ascii Text Block	17		Additional Details	Power Supply Firmware Revision	YES
9B	MFR_REVISION	BLOCK READ	1	Ascii Text Block	17			Power Supply Firmware Revision	YES
9B	MFR_REVISION	BLOCK READ	2	Ascii Text Block	17			Power Supply Firmware Revision	YES
9C	MFR_LOCATION	BLOCK READ / BLOCK WRITE	All	Ascii Text Block	16 Max		Additional Details	Power Supply Manufacture Location	YES
9D	MFR_DATE	BLOCK READ / BLOCK WRITE	All	Ascii Text Block	16 Max		Additional Details	Power Supply Manufacture Date	YES
9E	MFR_SERIAL	BLOCK READ / BLOCK WRITE	All	Ascii Text Block	16 Max		Additional Details	Power Supply Serial Number	YES
9F	APP_PROFILE SUPPORT	BLOCK READ	All		3			Command provides a means for a host to determine which PMBus Applications Profiles, and the revision of those profiles, that the device supports	YES

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
A0	MFR_VIN_MIN	R	All	Linear Data Format	2			Power Supply Input Voltage Minimum Specification	YES
A1	MFR_VIN_MAX	R	All	Linear Data Format	2			Power Supply Input Voltage Maximum Specification	YES
A2	MFR_IIN_MAX	R	All	Linear Data Format	2			Power Supply Input Current Maximum Specification	YES
A3	MFR_PIN_MAX	R	All	Linear Data Format	2			Power Supply Input Power Maximum Specification	YES
A4	MFR_VOUT_MIN	R	All	Linear Data Format	2			Power Supply Main Output Voltage Minimum Specification	YES
A5	MFR_VOUT_MAX	R	All	Linear Data Format	2			Power Supply Main Output Voltage Maximum Specification	YES
A6	MFR_IOUT_MAX	R	All	Linear Data Format	2		Link to Returned data	Power Supply Main Output Current Maximum Specification	YES
A7	MFR_POUT_MAX	R	All	Linear Data Format	2			Power Supply Output Power Maximum Specification	YES
A8	MFR_TAMBIENT_MAX	R	All	Linear Data Format	2			Power Supply Operating Ambient Temperature Maximum Specification	YES
A9	MFR_TAMBIENT_MIN	R	All	Linear Data Format	2			Power Supply Operating Ambient Temperature Minimum Specification	YES
AA	MFR_EFFICIENCY_LL	R	All	Linear Data Format	2			Power Supply Low-Line Input Voltage Specification	YES
				Linear Data Format	2			Power Supply Low-Line Low Power Specification	YES
				Linear Data Format	2			Power Supply Low-Line Low Power Efficiency Specification	YES
				Linear Data Format	2			Power Supply Low-Line Medium Power Specification	YES
				Linear Data Format	2			Power Supply Low-Line Medium Power Efficiency Specification	YES
				Linear Data Format	2			Power Supply Low-Line High Power Specification	YES
				Linear Data Format	2			Power Supply Low-Line High Power Efficiency Specification	YES
				Linear Data Format	2				
AB	MFR_EFFICIENCY_HL	R	All	Linear Data Format	2			Power Supply High-Line Input Voltage Specification	YES
				Linear Data Format	2			Power Supply High-Line Low Power Specification	YES
				Linear Data Format	2			Power Supply High-Line Low Power Efficiency Specification	YES
				Linear Data Format	2			Power Supply High-Line Medium Power Specification	YES
				Linear Data Format	2			Power Supply High-Line Medium Power Efficiency Specification	YES
				Linear Data Format	2			Power Supply High-Line High Power Specification	YES
				Linear Data Format	2			Power Supply High-Line High Power Efficiency Specification	YES
				Linear Data Format	2				
AC	MFR_PIN_ACCURACY	R	All	Linear Data Format	2			Command returns the accuracy (%) of the value returned by the READ_PIN command	YES
AD	IC_DEVICE_ID	BLOCK READ	All	Ascii Text Block	32 Max			Command used to set or read the type or part number of IC embedded within a PMBus that is used for the PMBus interface	YES
AE	IC_DEVICE_REV	BLOCK READ	All	Ascii Text Block	32 Max			Command is used set or read the revision of the IC whose type or part number is set or read with the IC_DEVICE_ID command	NO
B0	USER_DATA_00	R/W	All	Ascii Text Block	24			Customer text data block 00	NO
B1	USER_DATA_01	R/W	All	Ascii Text Block	24			Customer text data block 01	NO
B2	USER_DATA_02	R/W	All	Ascii Text Block	24			Customer text data block 02	NO
B3	USER_DATA_03	R/W	All	Ascii Text Block	24			Customer text data block 03	NO
C0	MFR_MAX_TEMP_1	R	All	Linear Data Format	2			Maximum temperature (degC) associated with READ_TEMPERATURE_1 - Inlet	YES
C1	MFR_MAX_TEMP_2	R	All	Linear Data Format	2			Maximum temperature (degC) associated with READ_TEMPERATURE_2 - Outlet	YES

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
C2	MFR_MAX_TEMP_3	R	0	Linear Data Format	2			Maximum temperature (degC) associated with READ_TEMPERATURE_3 - Hotspot 1	YES
C2	MFR_MAX_TEMP_3	R	1	Linear Data Format	2			Maximum temperature (degC) associated with READ_TEMPERATURE_3 - Hotspot 2	YES
E1	EEPROM_WP	R/W	All	Integer	1			Byte to enable (write 0x9A) or disable (write 0x56) writes to the external EEPROM	NO
E2	READ_HOURS_USED	BLOCK READ	All	Linear Data Format	3			Power Supply Accumulated Main Output Power-On Hours	NO
E3	UART_STATUS_FLAGS	R	All	Bit Flags	6	0	BYTE_0	Primary status flags - byte 0	YES
						1	BYTE_1	Primary status flags - byte 1	YES
						2	BYTE_2	Secondary status flags 1 - byte 0	YES
						3	BYTE_3	Secondary status flags 1 - byte 1	YES
						4	BYTE_4	Secondary status flags 2 - byte 0	YES
						5	BYTE_5	Secondary status flags 2 - byte 1	YES
EC	MFR_VSTBY_SELECT	R/W	All	HEX	2			0xA55A - Configure power supply to 3.3V standby model 0x5AA5 - Configure power supply to 5V standby model (not valid for 12V standby model)	NO
ED	PS_STATUS	R	All	Bit Flags	2	0	CALIBRATION	Set when the unit is in Calibration mode	YES
						1	VSTBY_SELECT	Set when Vstby set to 5V; de-Set when Vstby set to 3.3V	NO
						2	PS_KILL	Set when the PS_KILL pin is defeated and the unit is properly seated in the chassis	YES
						3	VIN_OK	Set when the input voltage is within operating specification	YES
						4	VIN_RANGE	Set when input voltage range is high; de-Set when input voltage range is low	YES
						5	PFC_BUS	Set when the PFC BUS is within operating specification	YES
						6	PS_ON	Set when the PS_ON logic set to enable the main output	YES
						7	POWER_GOOD	Set when main output power delivered to unit is OK; mirrors the digital output signal	YES
						8	POWER_DOWN	Set when bootloader is taking control and the main output and PFC need to be shutdown	NO
						9	BOOTLOAD_COMPLETE	Set when the bootloader has completed and system reset needs to be Set	NO
						10	BOOTLOAD_MODE	Set when during bootloader mode	NO
						11	FAN_DIRECTION	Set when airflow front-to back; clear when airflow back-to-front	YES
						12	UNUSED		NO
						13	DEFAULT	Set when default calibration data used at power-up	YES
						14	WARNING	Set when power supply warning has occurred; tracks 'WARNING' status LED	YES
EE	PMBUS_CONFIG	R/W	All	Bit Flags	2	0	DATA_FORMAT	0 = Linear data format 1 = Direct data format	NO
						1	SMBALERT_L	0 = SMBALERT_L implemented & supported 1 = SMBALERT not implemented	YES
						2	MAX_BUS_SPEED	0 = 100kHz 1 = 400kHz	NO
						3	PEC	0 = PEC not supported 1 = PEC supported	YES
						4:7	RESERVED		NO
EF	LED_CONTROL	R	All	Bit Flags	1	0:2	LED_MODE	LED mode change bits	YES
						3:6	RESERVED		NO
						7	LED_CONTROL	LED manual/auto control toggle bit	NO
FO	READ_RESETS	R	All	Bit Flags	2			RCON register status flags for troubleshooting	YES
				Bit Flags	2			RCON2 register status flags for troubleshooting	

CMD CODE	COMMAND NAME	READ / WRITE	PG.	FORMAT	# OF BYTES	BIT#	BIT NAME	DEFINITION	Support Y/N
F8	BOOTLOAD_RESTART	R/W	All	HEX	1			Bootloader completion and application restart request command	YES
FA	BOOTLOAD_REQUEST	R/W	All	Ascii Text Block	6			Bootloader request command	YES
FB	BOOTLOAD_STATUS	R	All	Bit Flags	2	0	BOOTLOADING_PRI	Set when primary uC bootloading in process	YES
						1	BOOTLOADING_FLOAT	Set when floating uC bootloading in process	YES
						2	BOOTLOADING_SEC	Set when secondary uC bootloading in process	YES
						3	BOOTLOADED_PRI	Set when primary uC bootloading completed; reset required	YES
						4	BOOTLOADED_FLOAT	Set when floating uC bootloading completed; reset required	YES
						5	BOOTLOADED_SEC	Set when secondary uC bootloading completed; reset required	YES
						6	RESET_PRI	Set when primary uC reset	YES
						7	RESET_FLOAT	Set when floating uC reset	YES
						8	RESET_SEC	Set when secondary uC reset	YES
						9	RESERVED		NO
						10	RESERVED		NO
						11	RESERVED		NO
						12	RESERVED		NO
						13	RESERVED		NO
						14	RESERVED		NO
						15	RESERVED		NO
FC	RAPID_ON	R/W	All	Integer	1		Link To config bytes	RAPID_ON / Cold Redundancy Mode Command	YES

OPERATION COMMAND CODE 01 HEX

Link Back to Commands: [back to command 01](#)

Bit # / Bit Description								Valid Values		Power Supply On/Off Mode
7	6	5	4	3	2	1	0	Dec	Hex	
On/off 1	On/off 0	Margin on/off/high/low 1	Margin on/off/high/low 0	Margin fault control 1	Margin fault control 0	not used	not used			
0	0	x	x	x	x	x	x	0 - 63	0 - 3F	Disable power supply when OPERATION command supported
1	0	x	x	x	x	x	x	128 - 191	80 - BF	Enable power supply when OPERATION command supported (Default)

ON/OFF COMMAND CODE 02 HEX

Link Back to Commands: [back to command 02](#)

Bit # / Bit Description								Valid Values		Power Supply On/Off Mode
7	6	5	4	3	2	1	0	Dec	Hex	
reserved	reserved	reserved	CONTROL pin / OPERATION command PS on/off	OPERATION command on/off	CONTROL pin on/off	CONTROL pin polarity	CONTROL pin action			
0	0	0	1	0	1	0	1	21	15	Control pin only ; active low polarity
0	0	0	1	0	1	1	1	23	17	Control pin only ; active high polarity
0	0	0	1	1	0	x	1	25 or 27	19 or 1B	Operation command only
0	0	0	1	1	1	0	1	29	1D	Operation command and control pin; active low polarity (Default)
0	0	0	1	1	1	1	1	31	1F	Operation command and control pin ; active high polarity

Limits and Response:

The following tables list the PMBus limits for the operating parameter registers and associated fault / warning response.

12V STBY models:

Link back to: [Commands List](#)

Command Code (Hex)	Command Name	Read / Write	Page	Format	# of Bytes	Units	Scaling Coefficients				Bit #	Reading	Comments
							N	m	R	b			
40	VOUT_OV_FAULT_LIMIT	R	0	Linear Data Format	2	Vdc	-6					14	
40	VSTBY_OV_FAULT_LIMIT	R	1	Linear Data Format	2	Vdc	-6					14	
41	VOUT_OV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
41	VSTBY_OV_FAULT_RESPONSE	R	1	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
42	VOUT_OV_WARN_LIMIT	R	0	Linear Data Format	2	Vdc	-6					13.5	
42	VSTBY_OV_WARN_LIMIT	R	1	Linear Data Format	2	Vdc	-6					13.5	
43	VOUT_UV_WARN_LIMIT	R	0	Linear Data Format	2	Vdc	-6					11.4	
43	VSTBY_UV_WARN_LIMIT	R	1	Linear Data Format	2	Vdc	-6					11.1	
44	VOUT_UV_FAULT_LIMIT	R	0	Linear Data Format	2	Vdc	-6					10.9	
44	VSTBY_UV_FAULT_LIMIT	R	1	Linear Data Format	2	Vdc	-6					11.1	
45	VOUT_UV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
45	VSTBY_UV_FAULT_RESPONSE	R	1	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
46	IOUT_OC_FAULT_LIMIT	R	0	Linear Data Format	0	Adc	-3					110	
46	ISTBY_OC_FAULT_LIMIT	R	3	Linear Data Format	3	Adc	-8					2.5	
47	IOUT_OC_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	7	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Continuous restart (self-recovery)
47	ISTBY_OC_FAULT_RESPONSE	R	2	Bit Flags	1						2:0	0	Delay Time - None
											5:3	7	Response - Continuous restart (self-recovery)
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
4A	IOUT_OC_WARN_LIMIT	R	0	Linear Data Format	2	Adc	-3					105	
4A	ISTBY_OC_WARN_LIMIT	R	3	Linear Data Format	2	Adc	-8					2.25	

Command Code (Hex)	Command Name	Read / Write	Page	Format	# of Bytes	Units	Scaling Coefficients				Bit #	Reading	Comments
							N	m	R	b			
4F	AIRFLOW_1_OT_FAULT_LIMIT	R	0	Linear Data Format	2	°C	0					95	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
4F	HOTSPOT_1_OT_FAULT_LIMIT	R	3	Linear Data Format	2	°C	0					125	Primary Hotspot - PFC
4F	AIRFLOW_2_OT_FAULT_LIMIT	R	1	Linear Data Format	2	°C	0					75	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
4F	HOTSPOT_2_OT_FAULT_LIMIT	R	2	Linear Data Format	2	°C	0					130	Secondary Hotspot - Main output hotspot
50	AIRFLOW_1_OT_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
50	HOTSPOT_1_OT_FAULT_RESPONSE	R	3	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
50	AIRFLOW_2_OT_FAULT_RESPONSE	R	1	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
50	HOTSPOT_2_OT_FAULT_RESPONSE	R	2	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
51	AIRFLOW_1_OT_WARN_LIMIT	R	0	Linear Data Format	2	°C	0					85	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
51	HOTSPOT_1_OT_WARN_LIMIT	R	3	Linear Data Format	2	°C	0					120	Primary Hotspot - PFC
51	AIRFLOW_2_OT_WARN_LIMIT	R	1	Linear Data Format	2	°C	0					70	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
51	HOTSPOT_2_OT_WARN_LIMIT	R	2	Linear Data Format	2	°C	0					115	Secondary Hotspot - Main output hotspot
55	VIN_OV_FAULT_LIMIT	R	0	Linear Data Format	2	Vrms	-1					275	AC input mode; 410.0 DC input mode; Recoverable
56	VIN_OV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
57	VIN_OV_WARN_LIMIT	R	0	Linear Data Format	2	Vrms	-1					270	AC input mode, 405Vdc DC input mode; Recoverable
58	VIN_UV_WARN_LIMIT	R	0	Linear Data Format	2	Vrms	-1					80	AC input mode, 175Vdc DC input mode; Recoverable
59	VIN_UV_FAULT_LIMIT	R	0	Linear Data Format	2	Vrms	-1					72	Shut down threshold; AC input mode; 172 DC input mode; Recoverable

Command Code (Hex)	Command Name	Read / Write	Page	Format	# of Bytes	Units	Scaling Coefficients				Bit #	Reading	Comments
							N	m	R	b			
5A	VIN_UV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
5B	IIN_OC_FAULT_LIMIT	R	0	Linear Data Format	2	Arms	-6					14.6	
5C	IIN_OC_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
5D	IIN_OC_WARN_LIMIT	R	0	Linear Data Format	2	Arms	-6					14	
5E	POWER_GOOD_ON	R	0	Linear Data Format	2	Vdc	-6					10.9	
5F	POWER_GOOD_OFF	R	0	Linear Data Format	2	Vdc	-6					10.9	
68	POUT_OP_FAULT_LIMIT	R	0	Linear Data Format	2	Watts	1					1316	
69	POUT_OP_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
6A	POUT_OP_WARN_LIMIT	R	0	Linear Data Format	2	Watts	1					1256	
6B	PIN_OP_WARN_LIMIT	R	0	Linear Data Format	2	Vdc	1					1400	

Parameter Limits and Response
3.3Vsb Models

Link back to: [Commands List](#)

Command Code (Hex)	Command Name	Read / Write	Page	Format	# of Bytes	Units	Scaling Coefficients				Bit #	Reading	Comments
							N	m	R	b			
40	VOUT_OV_FAULT_LIMIT	R	0	Linear Data Format	2	Vdc	-6					14	
40	VSTBY_OV_FAULT_LIMIT	R	1	Linear Data Format	2	Vdc	-6					3.65	
41	VOUT_OV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
41	VSTBY_OV_FAULT_RESPONSE	R	1	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
42	VOUT_OV_WARN_LIMIT	R	0	Linear Data Format	2	Vdc	-6					13.5	
42	VSTBY_OV_WARN_LIMIT	R	1	Linear Data Format	2	Vdc	-6					3.5	
43	VOUT_UV_WARN_LIMIT	R	0	Linear Data Format	2	Vdc	-6					11.4	
43	VSTBY_UV_WARN_LIMIT	R	1	Linear Data Format	2	Vdc	-6					2.96	
44	VOUT_UV_FAULT_LIMIT	R	0	Linear Data Format	2	Vdc	-6					10.9	
44	VSTBY_UV_FAULT_LIMIT	R	1	Linear Data Format	2	Vdc	-6					2.76	
45	VOUT_UV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
45	VSTBY_UV_FAULT_RESPONSE	R	1	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
46	IOUT_OC_FAULT_LIMIT	R	0	Linear Data Format	0	Adc	-3					110	
46	ISTBY_OC_FAULT_LIMIT	R	3	Linear Data Format	3	Adc	-8					3.5	
47	IOUT_OC_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	7	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Continuous restart (self-recovery)
47	ISTBY_OC_FAULT_RESPONSE	R	2	Bit Flags	1						2:0	0	Delay Time - None
											5:3	7	Response - Continuous restart (self-recovery)
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
4A	IOUT_OC_WARN_LIMIT	R	0	Linear Data Format	2	Adc	-3					105	
4A	ISTBY_OC_WARN_LIMIT	R	3	Linear Data Format	2	Adc	-8					3.25	

Command Code (Hex)	Command Name	Read / Write	Page	Format	# of Bytes	Units	Scaling Coefficients				Bit #	Reading	Comments
							N	m	R	b			
4F	AIRFLOW_1_OT_FAULT_LIMIT	R	0	Linear Data Format	2	°C	0					95	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
4F	HOTSPOT_1_OT_FAULT_LIMIT	R	3	Linear Data Format	2	°C	0					125	Primary Hotspot - PFC
4F	AIRFLOW_2_OT_FAULT_LIMIT	R	1	Linear Data Format	2	°C	0					75	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
4F	HOTSPOT_2_OT_FAULT_LIMIT	R	2	Linear Data Format	2	°C	0					130	Secondary Hotspot - Main output hotspot
50	AIRFLOW_1_OT_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
50	HOTSPOT_1_OT_FAULT_RESPONSE	R	3	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
50	AIRFLOW_2_OT_FAULT_RESPONSE	R	1	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
50	HOTSPOT_2_OT_FAULT_RESPONSE	R	2	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
51	AIRFLOW_1_OT_WARN_LIMIT	R	0	Linear Data Format	2	°C	0					85	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
51	HOTSPOT_1_OT_WARN_LIMIT	R	3	Linear Data Format	2	°C	0					120	Primary Hotspot - PFC
51	AIRFLOW_2_OT_WARN_LIMIT	R	1	Linear Data Format	2	°C	0					70	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
51	HOTSPOT_2_OT_WARN_LIMIT	R	2	Linear Data Format	2	°C	0					115	Secondary Hotspot - Main output hotspot
55	VIN_OV_FAULT_LIMIT	R	0	Linear Data Format	2	Vrms	-1					275	AC input mode; 410.0 DC input mode; Recoverable
56	VIN_OV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
57	VIN_OV_WARN_LIMIT	R	0	Linear Data Format	2	Vrms	-1					270	AC input mode, 405Vdc DC input mode; Recoverable
58	VIN_UV_WARN_LIMIT	R	0	Linear Data Format	2	Vrms	-1					80	AC input mode, 175Vdc DC input mode; Recoverable
59	VIN_UV_FAULT_LIMIT	R	0	Linear Data Format	2	Vrms	-1					72	Shut down threshold; AC input mode; 172 DC input mode; Recoverable
5A	VIN_UV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
5B	IIN_OC_FAULT_LIMIT	R	0	Linear Data Format	2	Arms	-6					14.6	

Command Code (Hex)	Command Name	Read / Write	Page	Format	# of Bytes	Units	Scaling Coefficients				Bit #	Reading	Comments
							N	m	R	b			
5C	IIN_OC_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
5D	IIN_OC_WARN_LIMIT	R	0	Linear Data Format	2	Arms	-6					14	
5E	POWER_GOOD_ON	R	0	Linear Data Format	2	Vdc	-6					10.9	
5F	POWER_GOOD_OFF	R	0	Linear Data Format	2	Vdc	-6					10.9	
68	POUT_OP_FAULT_LIMIT	R	0	Linear Data Format	2	Watts	1					1316	
69	POUT_OP_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
6A	POUT_OP_WARN_LIMIT	R	0	Linear Data Format	2	Watts	1					1256	
6B	PIN_OP_WARN_LIMIT	R	0	Linear Data Format	2	Vdc	1					1400	

Parameter Limits and Response

5V STBY Models:

Link back to: [Commands List](#)

Command Code (Hex)	Command Name	Read / Write	Page	Format	# of Bytes	Units	Scaling Coefficients				Bit #	Reading	Comments
							N	m	R	b			
40	VOUT_OV_FAULT_LIMIT	R	0	Linear Data Format	2	Vdc	-6					14	
40	VSTBY_OV_FAULT_LIMIT	R	1	Linear Data Format	2	Vdc	-6					5.75	
41	VOUT_OV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
41	VSTBY_OV_FAULT_RESPONSE	R	1	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
42	VOUT_OV_WARN_LIMIT	R	0	Linear Data Format	2	Vdc	-6					13.5	
42	VSTBY_OV_WARN_LIMIT	R	1	Linear Data Format	2	Vdc	-6					5.5	
43	VOUT_UV_WARN_LIMIT	R	0	Linear Data Format	2	Vdc	-6					11.4	
43	VSTBY_UV_WARN_LIMIT	R	1	Linear Data Format	2	Vdc	-6					4.5	
44	VOUT_UV_FAULT_LIMIT	R	0	Linear Data Format	2	Vdc	-6					10.9	
44	VSTBY_UV_FAULT_LIMIT	R	1	Linear Data Format	2	Vdc	-6					4.2	
45	VOUT_UV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
45	VSTBY_UV_FAULT_RESPONSE	R	1	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
46	IOUT_OC_FAULT_LIMIT	R	0	Linear Data Format	0	Adc	-3					110	
46	ISTBY_OC_FAULT_LIMIT	R	3	Linear Data Format	3	Adc	-8					3.5	
47	IOUT_OC_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	7	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Continuous restart (self-recovery)
47	ISTBY_OC_FAULT_RESPONSE	R	2	Bit Flags	1						2:0	0	Delay Time - None
											5:3	7	Response - Continuous restart (self-recovery)
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
4A	IOUT_OC_WARN_LIMIT	R	0	Linear Data Format	2	Adc	-3					105	
4A	ISTBY_OC_WARN_LIMIT	R	3	Linear Data Format	2	Adc	-8					3.25	

Command Code (Hex)	Command Name	Read / Write	Page	Format	# of Bytes	Units	Scaling Coefficients				Bit #	Reading	Comments
							N	m	R	b			
4F	AIRFLOW_1_OT_FAULT_LIMIT	R	0	Linear Data Format	2	°C	0					95	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
4F	HOTSPOT_1_OT_FAULT_LIMIT	R	3	Linear Data Format	2	°C	0					125	Primary Hotspot - PFC
4F	AIRFLOW_2_OT_FAULT_LIMIT	R	1	Linear Data Format	2	°C	0					75	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
4F	HOTSPOT_2_OT_FAULT_LIMIT	R	2	Linear Data Format	2	°C	0					130	Secondary Hotspot - Main output hotspot
50	AIRFLOW_1_OT_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
50	HOTSPOT_1_OT_FAULT_RESPONSE	R	3	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
50	AIRFLOW_2_OT_FAULT_RESPONSE	R	1	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
50	HOTSPOT_2_OT_FAULT_RESPONSE	R	2	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
51	AIRFLOW_1_OT_WARN_LIMIT	R	0	Linear Data Format	2	°C	0					85	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
51	HOTSPOT_1_OT_WARN_LIMIT	R	3	Linear Data Format	2	°C	0					120	Primary Hotspot - PFC
51	AIRFLOW_2_OT_WARN_LIMIT	R	1	Linear Data Format	2	°C	0					70	Primary Airflow (Intake B-F models) "page '0'". Note Page 0 and Page 1 reverse for F-B models
51	HOTSPOT_2_OT_WARN_LIMIT	R	2	Linear Data Format	2	°C	0					115	Secondary Hotspot - Main output hotspot
55	VIN_OV_FAULT_LIMIT	R	0	Linear Data Format	2	Vrms	-1					275	AC input mode; 410.0 DC input mode; Recoverable
56	VIN_OV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
57	VIN_OV_WARN_LIMIT	R	0	Linear Data Format	2	Vrms	-1					270	AC input mode, 405Vdc DC input mode; Recoverable
58	VIN_UV_WARN_LIMIT	R	0	Linear Data Format	2	Vrms	-1					80	AC input mode, 175Vdc DC input mode; Recoverable
59	VIN_UV_FAULT_LIMIT	R	0	Linear Data Format	2	Vrms	-1					72	Shut down threshold; AC input mode; 172 DC input mode; Recoverable
5A	VIN_UV_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
5B	IIN_OC_FAULT_LIMIT	R	0	Linear Data Format	2	Arms	-6					14.6	

Command Code (Hex)	Command Name	Read / Write	Page	Format	# of Bytes	Units	Scaling Coefficients				Bit #	Reading	Comments
							N	m	R	b			
5C	IIN_OC_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
5D	IIN_OC_WARN_LIMIT	R	0	Linear Data Format	2	Arms	-6					14	
5E	POWER_GOOD_ON	R	0	Linear Data Format	2	Vdc	-6					10.9	
5F	POWER_GOOD_OFF	R	0	Linear Data Format	2	Vdc	-6					10.9	
68	POUT_OP_FAULT_LIMIT	R	0	Linear Data Format	2	Watts	1					1316	
69	POUT_OP_FAULT_RESPONSE	R	0	Bit Flags	1						2:0	0	Delay Time - None
											5:3	0	Retry Setting - Unit does not attempt to restart & output remains disabled until fault clear
											7:6	3	Response - Output disabled while fault is present & remains disabled until fault cleared
6A	POUT_OP_WARN_LIMIT	R	0	Linear Data Format	2	Watts	1					1256	
6B	PIN_OP_WARN_LIMIT	R	0	Linear Data Format	2	Vdc	1					1400	

SENSOR DATA AND RESOLUTION:

Command Code (Hex)	Command Name	Description	Page	Format	Units	Scaling Coefficients				PMBus Reporting Sensor		
						N	m	R	b	Full-scale / Range	Resolution	Accuracy
88	READ_VIN	Input Voltage Sensor Reading	All	Linear Data Format	Vrms	-1				511.5	0.5	+ / - 2% of Reporting Full-Scale
89	READ_IIN	Input Current Sensor Reading	All	Linear Data Format	Arms	-6				31.97	0.0313	+ / - 5% of Reporting Full-Scale
8A	READ_VCAP	PFC Boost Output Voltage Sensor Reading	All	Linear Data Format	Vdc	-1				511.50	0.5000	+ / - 5% of Reporting Full-Scale
8B	READ_VOUT	Main Output Voltage Sensor Reading	0	Linear Data Format	Vdc	-6				15.98	0.0156	+ / - 2% of Reporting Full-Scale
8B	READ_VSTBY	Standby(Auxiliary) Output Voltage Sensor Reading	1	Linear Data Format	Vdc	-6				7.992	0.00781	+ / - 2% of Reporting Full-Scale
8C	READ_IOUT	Main Output Current Sensor Reading	0	Linear Data Format	Adc	-3				255.75	0.250	+ / - 2% of Reporting Full-Scale
8C	READ_ISTBY	Standby(Auxiliary) Output Current Sensor Reading	1	Linear Data Format	Adc	-8				7.992	0.00781	+ / - 2% of Reporting Full-Scale
8D	READ_TEMPERATURE_1	Temperature Sensor Reading - Inlet (Secondary Side)	0	Linear Data Format	°C	0				-40 to 150	1	+ / - 5°C
8E	READ_TEMPERATURE_2	Temperature Sensor Reading - Outlet (Primary Side)	0	Linear Data Format	°C	0				-40 to 150	1	+ / - 5°C
8F	READ_TEMPERATURE_3	Temperature Sensor Reading - Main Output Hotspot (Secondary Side)	0	Linear Data Format	°C	0				-40 to 150	1	+ / - 5°C
8F	READ_TEMPERATURE_3	Temperature Sensor Reading - PFC Hotspot (Primary Side)	1	Linear Data Format	°C	0				-40 to 150	1	+ / - 5°C
90	READ_FAN_SPEED_1	Fan 1 Speed Sensor Reading	All	Linear Data Format	RPM	5				32736	32	+ / - 5% of Reporting Full-Scale
96	READ_POUT	Output Power Sensor Reading	All	Linear Data Format	Watts	1				2046	2	+ / - 5% of Reporting Full-Scale
97	READ_PIN	Input Power Sensor Reading	All	Linear Data Format	Watts	1				2046	2	+ / - 5% of Reporting Full-Scale

Link back to: [Commands list_CMD_88](#)

MANUFACTURER'S GENERAL PARAMETRIC DATA:

Link back to: [Commands list](#)

Based on C16 models (Hx4TAC) Other models may vary

Command	Command Name	Value	Units
A0	MFR_VIN_MIN	90	V
A1	MFR_VIN_MAX	264	V
A2	MFR_IIN_MAX	12	A
A3	MFR_PIN_MAX	1320	W
A4	MFR_VOUT_MIN	11.76	V
A5	MFR_VOUT_MAX	12.234	V
A6	MFR_IOUT_MAX	100	A
A4 (Pg.1)	MFR_VSTBY_MIN	11.422	V
A5 (Pg.1)	MFR_VSTBY_MAX	12.578	V
A6 (Pg.1)	MFR_ISTBY_MAX	2.0	A
A7	MFR_POUT_MAX	1224	W
A8	MFR_TAMBIENT_MAX	55	C
A9	MFR_TAMBIENT_MIN	-5	C
AA	MFR_EFFICIENCY_LL_LENGTH	14	
	MFR_EFFICIENCY_LL_VIN	115	V
	MFR_EFFICIENCY_LL_POUT1	244	W
	MFR_EFFICIENCY_LL_EFF1	0.90	%
	MFR_EFFICIENCY_LL_POUT2	612	W
	MFR_EFFICIENCY_LL_EFF2	0.92	%
	MFR_EFFICIENCY_LL_POUT3	1224	W
	MFR_EFFICIENCY_LL_EFF3	0.89	%
AB	MFR_EFFICIENCY_HL_LENGTH	14	
	MFR_EFFICIENCY_HL_VIN	230	V
	MFR_EFFICIENCY_HL_POUT1	244	%
	MFR_EFFICIENCY_HL_EFF1	0.94	%
	MFR_EFFICIENCY_HL_POUT2	612	W
	MFR_EFFICIENCY_HL_EFF2	0.96	%
	MFR_EFFICIENCY_HL_POUT3	1224	W
	MFR_EFFICIENCY_HL_EFF3	0.91	%

PMBUS Configuration

Command Code EEh

Link back to: [Command List EEh](#)

Parameter	Bit#	Bit	Function	
Data Format	Bit 0	1	Direct Data Format	
		0	Linear Data Format	Default
SMBALERT	Bit 1	1	PS does not have SMBALERT pin or does not support SMBus alert protocol	
		0	PS does have SMBALERT pin and supports SMBus alert protocol	Default
Bus Speed	Bit 2	1	Maximum supported bus speed = 400kHz	Default
		0	Maximum supported bus speed = 100kHz	
PEC support	Bit 3	1	Packed error checking supported	Default
		0	Packed error checking not supported	

LED CONTROL

Command Code EFh

Bit # / Bit Description								Valid Values		Read / Write	LED Status & Control
7	6	5	4	3	2	1	0	Dec	Hex		
CONTROL Bit	reserved	reserved	reserved	reserved	LED Mode Bit 2	LED Mode Bit 1	LED Mode Bit 0				
Page 0 - INPUT LED											
0	0	0	0	0	0	0	0	0	0	Read	Auto - LED off (default)
0	0	0	0	0	0	0	1	1	1	Read	Auto - LED solid green (default)
0	0	0	0	0	0	1	0	2	2	Read	Auto - LED blinking green (default)
0	X	X	X	X	X	X	X	0 - 127	0 - 7F	Write	Set to Auto LED control
1	0	0	0	0	0	0	0	128	80	Read / Write	Set to Manual - LED off
1	0	0	0	0	0	0	1	129	81	Read / Write	Set to Manual - LED solid green
1	0	0	0	0	0	1	0	130	82	Read / Write	Set to Manual - LED blinking green
Page 1 - OUTPUT LED											
0	0	0	0	0	0	0	0	0	0	Read	Auto - LED off (default)
0	0	0	0	0	0	0	1	1	1	Read	Auto - LED solid green (default)
0	0	0	0	0	0	1	0	2	2	Read	Auto - LED blinking green (default)
0	0	0	0	0	0	1	1	3	3	Read	Auto - LED solid red (default)
0	0	0	0	0	1	0	0	4	4	Read	Auto - LED blinking red (default)
0	0	0	0	0	1	0	1	5	5	Read	Auto - LED solid yellow (default)
0	0	0	0	0	1	1	0	6	6	Read	Auto - LED blinking yellow (default)
0	X	X	X	X	X	X	X	0 - 127	0 - 7F	Write	Set to Auto LED control
1	0	0	0	0	0	0	0	128	80	Read / Write	Set to Manual - LED off
1	0	0	0	0	0	0	1	129	81	Read / Write	Set to Manual - LED solid green
1	0	0	0	0	0	1	0	130	82	Read / Write	Set to Manual - LED blinking green
1	0	0	0	0	0	1	1	131	83	Read / Write	Set to Manual - LED solid red
1	0	0	0	0	1	0	0	132	84	Read / Write	Set to Manual - LED blinking red
1	0	0	0	0	1	0	1	133	85	Read / Write	Set to Manual - LED solid yellow
1	0	0	0	0	1	1	0	134	86	Read / Write	Set to Manual - LED blinking yellow
= Default, x=don't care											

Manufacturers Internal FRU Data (PMBus Inventory Information Registers)

These results are variable length and presented in block format, where the first byte represents the QTY of bytes and the remaining bytes represent the text character in ACSII format. The data varies with model and unit to unit (includes serial number data).

The following tables detail the returned results that can be expected for the FRU values.

Link back to: [Command 99](#)

Command Code (Hex)	Command Name	Value	ID Length/Bit#ID/ASCII Text		
99	MFR_ID	Murata-PS	MFR_ID_LENGTH:	9	
			MFR_ID_0		'M'
			MFR_ID_1		'u'
			MFR_ID_2		'r'
			MFR_ID_3		'a'
			MFR_ID_4		't'
			MFR_ID_5		'a'
			MFR_ID_6		'.'
			MFR_ID_7		'P'
			MFR_ID_8		'S'

Command Code 0x9A (MFR_MODEL), D1U54T-W-1200-12-HB3AC shown for example purposes:

Link back to commands: [CMD 9A](#)

Command Code (Hex)	Command Name	Value	ID Length/Bit#ID/ASCII Text		
9A	MFR_MODEL	D1U54T-W-1200-12-HB3AC	MFR_MODEL_LENGTH	22	
			MFR_MODEL_0	'D'	
			MFR_MODEL_1	'1'	
			MFR_MODEL_2	'U'	
			MFR_MODEL_3	'5'	
			MFR_MODEL_4	'4'	
			MFR_MODEL_5	"T"	
			MFR_MODEL_6	"_"	
			MFR_MODEL_7	"W"	
			MFR_MODEL_8	"_"	
			MFR_MODEL_9	"1"	
			MFR_MODEL_10	"2"	
			MFR_MODEL_11	"0"	
			MFR_MODEL_12	"0"	
			MFR_MODEL_13	"_"	
			MFR_MODEL_14	"1"	
			MFR_MODEL_15	"2"	
			MFR_MODEL_16	"_"	
			MFR_MODEL_17	"H"	
			MFR_MODEL_18	"B"	
			MFR_MODEL_19	"3"	
			MFR_MODEL_20	"A"	
			MFR_MODEL_21	"C"	

Command Code 0x9B (MFR_REVISION), example only; actual results may vary:

Link Back to Commands: [CMD_9B](#)

Command Code (Hex)	Command Name	Value (Page Dependent)	ID Length/Bit#ID/ASCII Text		
9B	MFR_REVISION	Primary F/W Revision	MFR_REVISION_LENGTH = 16	Example Page 0: Primary F/W Rev	Example Page 1: Secondary F/W Rev
			MFR_REVISION_1	9	9
			MFR_REVISION_2	1	1
			MFR_REVISION_3	5	5
			MFR_REVISION_4	1	7
			MFR_REVISION_5	0	0
			MFR_REVISION_6	0	0
			MFR_REVISION_7	1	1
		Secondary F/W Revision	MFR_REVISION_8	9	9
			MFR_REVISION_9	7	7
			MFR_REVISION_10	5	5
			MFR_REVISION_11	-	-
			MFR_REVISION_12	0	0
			MFR_REVISION_13	1	1
			MFR_REVISION_14	-	-
			MFR_REVISION_15	0	0
			MFR_REVISION_16	1	1

Command Code 9C HEX (MFR_LOCATION):

Link Back to Commands List: [CMD_9C](#)

Command Code (Hex)	Command Name	Value	ID Length/Bit#ID/ASCII Text	
9C	MFR_LOCATION	China	MFR_LOCATION_LENGTH	
			MFR_LOCATION_0	'C'
			MFR_LOCATION_1	'h'
			MFR_LOCATION_2	'i'
			MFR_LOCATION_3	'n'
			MFR_LOCATION_4	'a'

Command Code 9D HEX (MFR_DATE) example only; actual results may vary::

Link Back to Commands List: [CMD_9D](#)

Command Code (Hex)	Command Name	Value	ID Length/Bit#ID/ASCII Text	
9D	MFR_DATE	1400	MFR_LOCATION_LENGTH	4
			MFR_DATE_0	"1"
			MFR_DATE_1	"4"
			MFR_DATE_2	"0"
			MFR_DATE_3	"0"

Command Code 9E HEX (MFR_SERIAL) example only; actual unit results may vary:

Link Back to Commands List: [CMD_9E](#)

Command Code (Hex)	Command Name	Value	ID Length/Bit#ID/ASCII Text	
9E	MFR_SERIAL	SSYYWWRxxxx	MFR_SERIAL_LENGTH	12
			MFR_SERIAL_0	'S'
			MFR_SERIAL_1	'S'
			MFR_SERIAL_2	'y'
			MFR_SERIAL_3	'y'
			MFR_SERIAL_4	'w'
			MFR_SERIAL_5	'w'
			MFR_SERIAL_6	'R'
			MFR_SERIAL_7	'R'
			MFR_SERIAL_8	'1'
			MFR_SERIAL_9	'9'
			MFR_SERIAL_10	'7'
			MFR_SERIAL_11	'5'

EEPROM DATA: Example, for illustration only. Actual results vary depending on the specific model

Example based on D1U54T-W-1200-12-HB3AC Model, IPMI Format

Product Info Area Field Name	Product Info Area Field Contents	Static or Dynamic Register? (S/D)	Description	Label Markings	Label Part Number
Manufacturer name	Murata-PS	S	Manufacturer name	MPS Logo	D9790701975
Model name	M1975	S	Product / project number (Mxxxx)	n/a	n/a
Part/product number	D1U54T-W-1200-12-HB3AC	D	Marketing / customer p/n (D1U54T...)	D1U54T-W-1200-12-HB3AC	D9790701975
Version		N/A	Not used	n/a	n/a
Serial number	SSYYWWRxxxx	D	MPS 12-digit serial number	SSYYWWRxxxx	D9790701975
Asset tag		N/A	Not used	n/a	n/a
FRU File ID		N/A	Not used	n/a	n/a
Custom field 1		N/A	Not used	n/a	n/a
Custom field 2		N/A	Not used	n/a	n/a
Custom field 3		N/A	Not used	n/a	n/a
Custom field 4		N/A	Not used	n/a	n/a
Fill unused space with 0x00					
Reference:	IPMI Platform Management FRU Information Storage Definition v1.0 http://www.intel.com/content/www/us/en/servers/ipmi/information-storage-definition.html				

Cold Redundancy (“Rapid_ON”) Configuration Bytes

This section describes the configuration and operating details of the cold redundant features of this power module. ACAN-112 contains further details about the Rapid_On signal configuration.

URL Link to [ACAN-112](#)

This series can be operated in one of two cold-redundant modes:

1) Automatic Mode CR (INTEL CRPS Compliant):

0x0h = conventional redundancy
0x1h = Master & Active PSU
0x2h = Cold_redundant_Level_1
0x3h = Cold_redundant_Level_2
0x4h = Cold_redundant_Level_3

2) Manual

Roll Names:

CONVENTIONAL REDUNDANCY: (BYTE 0x0h) = DEFAULT SETTING

COLD_REDUNDANCY_FORCED_ACTIVE: (byte 0x55h) At least one (1) PSU must be assigned this roll, aka “Always On” (subsequent PSUs assigned this same roll will be known as “ACTIVE & SLAVE” and the first PSU Assigned the roll of “55” provides the bus pull-up)

COLD_REDUNDANCY_FORCED_STANDBY_X: (byte 0xEh) System makes the PSU output on/off decision and write either “55h” or “Eh” as system requires. Up to 8 PSUs can be controlled in this mode.

NOTE: If the MASTER & ACTIVE PSU to a is written to mode “0x0” by host/system, the CR bus will be forced low and all connected PSUs will end CR mode and immediately share conventionally, while COLD_STANDBY_x assigned PSUs simply enter conventional current share and do not pull down the CR bus.

[Link back to Command 0xFC](#)

FAN COMMAND: 0X3B (FAN_COMMAND_1) [Link Back to Commands List: CMD_3B](#)

Manual fan speed control via PMBus™ is a linear data mode two byte command, speed expressed as fan duty cycle. This table below contains the manual fan speed command data in 1% increments, for illustration purposes.

The power supply automatically cancels manual fan speed control and enters automatic fan speed control by any of the following conditions or methods:

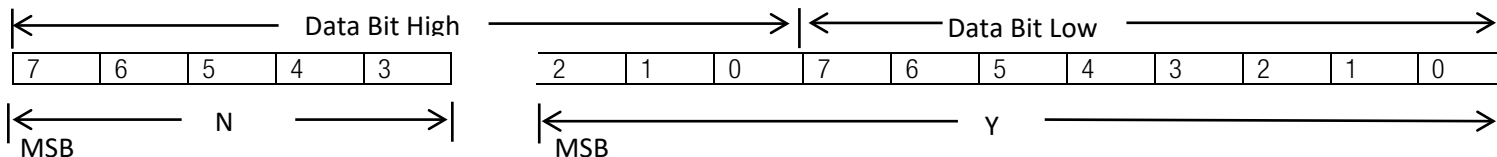
- 1) Writing the command "03h"(CLEAR_FAULTS).
- 2) Any overtemperature fault or warning (manual fan speed control mode can be resumed after the faults and warnings have ended)
- 3) Recycling of AC input voltage
- 4) Toggling PS_ON signal
- 5) Issuing a fan command that is outside the normal maximum limits, i.e., writing a fan speed of 110% duty cycle.

FAN COMMAND: 0X3B (FAN_COMMAND_1) [Link Back to Commands List: CMD_3B](#)

CMD 3B(h)	"Fan_COMMAND_1" (2 bytes)			CMD 3B(h)	"Fan_COMMAND_1" (2 bytes)			CMD 3B(h)	"Fan_COMMAND_1" (2 bytes)			CMD 3B(h)	"Fan_COMMAND_1" (2 bytes)		
% Duty Cycle	MSB(h)	LSB(h)	n(d)	% Duty Cycle	MSB(h)	LSB(h)	n(d)	% Duty Cycle	MSB(h)	LSB(h)	n(d)	% Duty Cycle	MSB(h)	LSB(h)	n(d)
0	B0	0	-10	26	B1	A	-10	51	B2	A	-10	76	B2	9	-10
1	B0	A	-10	27	B1	14	-10	52	B2	14	-10	77	B2	14	-10
2	B0	14	-10	28	B1	E1	-10	53	B2	1E	-10	78	B2	1E	-10
3	B0	1F	-10	29	B1	29	-10	54	B2	28	-10	79	B2	28	-10
4	B0	29	-10	30	B1	33	-10	55	B2	33	-10	80	B3	32	-10
5	B0	33	-10	31	B1	3D	-10	56	B2	3D	-10	81	B3	3D	-10
6	B0	3D	-10	32	B1	47	-10	57	B2	47	-10	82	B3	47	-10
7	B0	48	-10	33	B1	52	-10	58	B2	51	-10	83	B3	51	-10
8	B0	52	-10	34	B1	5C	-10	59	B2	5C	-10	84	B3	5B	-10
9	B0	5C	-10	35	B1	66	-10	60	B2	66	-10	85	B3	66	-10
10	B0	66	-10	36	B1	70	-10	61	B2	70	-10	86	B3	70	-10
11	B0	71	-10	37	B1	7B	-10	62	B2	7A	-10	87	B3	7A	-10
12	B0	7B	-10	38	B1	85	-10	63	B2	84	-10	88	B3	84	-10
13	B0	85	-10	39	B1	8F	-10	64	B2	8F	-10	89	B3	8E	-10
14	B0	8F	-10	40	B1	99	-10	65	B2	99	-10	90	B3	99	-10
15	B0	99	-10	41	B1	A3	-10	66	B2	A3	-10	91	B3	A3	-10
16	B0	A4	-10	42	B1	AE	-10	67	B2	AD	-10	92	B3	AD	-10
17	B0	AE	-10	43	B1	B8	-10	68	B2	B8	-10	93	B3	B7	-10
18	B0	B8	-10	44	B1	C2	-10	9	B2	C2	-10	94	B3	C2	-10
19	B0	C2	-10	45	B1	CC	-10	70	B2	CC	-10	95	B3	CC	-10
20	B0	CD	-10	46	B1	D7	-10	71	B2	D6	-10	96	B3	D6	-10
21	B0	D7	-10	47	B1	E1	-10	72	B2	E1	-10	97	B3	E0	-10
22	B0	E1	-10	48	B1	EB	-10	73	B2	EB	-10	98	B3	EB	-10
23	B0	EB	-10	49	B1	F5	-10	74	B2	F5	-10	99	B3	F5	-10
24	B0	F6	-10	50	B2	0	-10	75	B2	FF	-10	100	B3	FF	-10
25	B1	0	-10												

Linear Data Format

Telemetry sensor and output voltage readings follow linear format as defined by PMBus Power System Mgt Protocol Specification – Part II – Revision 1.2 (summarized below)



The Relationship 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 compliment integer; and

N is a 5 bit, two's compliment integer.

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This product is subject to the following operating requirements and the Life and Safety Critical Application Sales Policy. Refer to: <https://www.murata-ps.com/requirements/>

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