

OSENZA

INNOVATIONS



FTX-602/302-PWR+

USER MANUAL

DMK-0045A-1

OSENZA INNOVATIONS CORPORATION
www.osensa.com



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Safety Message

The information contained in this document is not intended to explain all safety concerns associated with installation, operation and maintenance of this product. This product is designed to be installed by knowledgeable personnel who possess relevant technical skills and follow safe work practices.

Corporate Contact

OSENSA Innovations Corporation
8672 Commerce Court
Burnaby, BC, Canada, V5A 4N7
Telephone (888) 732-0016
(604) 259-7177
Fax (778) 355-0796
Email support@osensa.com
info@osensa.com
Website www.osensa.com

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Contents

Product Overview	4
FTX-602/302-PWR+ Fiber Optic Temperature Transmitter	4
LED Status Indicators	5
Device Specifications.....	5
Getting Started	6
Inspecting the Package and Product.....	6
Customer Support	6
Device Safety Information	6
<i>Device Warning!</i>	6
Operating Environment	6
Installation	7
Installation Overview	7
Device Installation.....	7
Temperature Probe Installation	9
Device Communication.....	10
<i>RS-485 BUS Communication</i>	10
Device Setup and Configuration.....	11
Setting Modbus ID.....	11
Display Temperature Readings.....	12
Supported Modbus Functions	13
Common Modbus Addresses	14

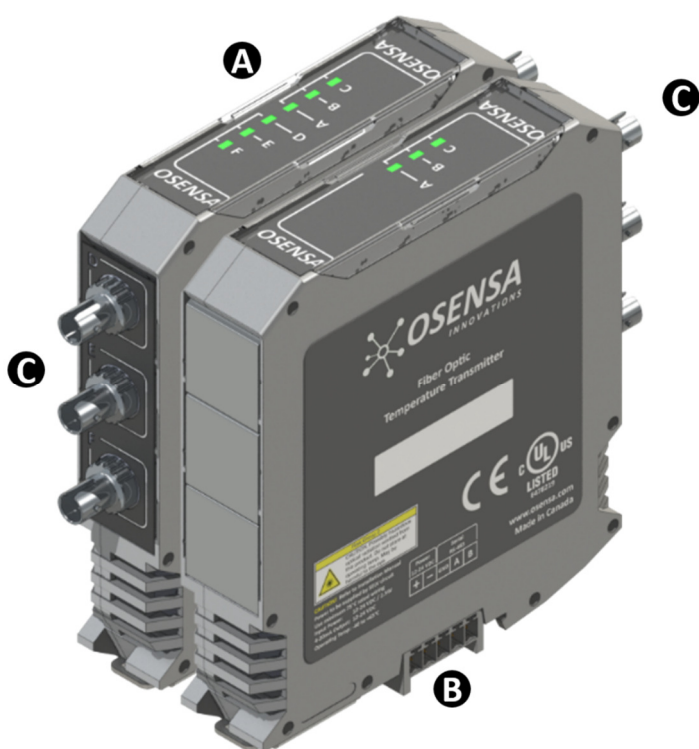


Product Overview

FTX-602/302-PWR+ Fiber Optic Temperature Transmitter

The FTX-602/302-PWR+ Fiber Optic Temperature Transmitter is an industrial optical signal conditioner that accurately reads fiber-optic temperature probes based on the principle of time-decay fluorescence thermometry. It reads Osenza's PRB-GB3 and PRB-PF1 style optical probes and is particularly well suited for low and medium voltage switch gear, bus bar and generator thermal monitoring applications.

The FTX-602/302-PWR+ offers only Modbus RTU over RS-485 digital communication.



Location	Description
A	LED Status Indicators
B	Shared RS-485 and Input Power T-BUS Connector
C	Fiber Optic Temperature Probe Interface (ST Receptacle)



LED Status Indicators

The tri-color LED status indicators show the current state of each sensing channel according to the table below. When the device is initially powered up, and when probes are connected or disconnected, the indicator LED's will change status as the device automatically configures itself. A 10 second delay may be observed after a new probe is connected, as the device only checks for probe presence periodically.

LED Color	State	Description
Green	Solid	Probe connected, no fault conditions
	Blinking	Probe disconnected
Orange	Solid	Warning, maximum LED current
	Blinking	Critical warning, low signal level
Red	Solid	EEPROM Updating
	Blinking	No signal, possible LED Failure
None	Off	No Power to the Transmitter

Device Specifications

Model Name	FTX-602-PWR+	FTX-302-PWR+
Number of Channels	6	3
Analog Output	None	None
Digital Interface	Isolated RS-485	Isolated RS-485
Operating Environment	-40°C to +65°C	-40°C to +65°C
Update rate	30 Hz	30 Hz
Measurement Range	-40°C to +200°C	
Resolution	0.1°C	
System Accuracy *	±1.0°C	
Comm. Protocol	Modbus RTU, Half Duplex	
Status Indication	3 Color Flashing and Solid LEDs	
Operating Humidity	0 to 95% RH (Non-Condensing)	
Dimensions	114mm Tall x 22.5mm Wide x 102mm Long	
Power	12-24 VDC (2.5W max)	
Mounting	35mm DIN Rail	
Configuration Software	OSENSAView or OSENSAView Pro	
* Measurement accuracy includes Probe Accuracy and Transmitter Accuracy		



Getting Started

Inspecting the Package and Product

Examine the packaging for obvious signs of damage prior to installing this product and notify the carrier if you suspect any damage occurred during shipment or delivery. Inspect the contents of the package to confirm all items on the packing list are present.

In the unlikely event items are missing or damaged, contact your OSENSA Innovations distributor to report the problem. If you purchased the products directly from the factory, contact OSENSA Innovations Corp.

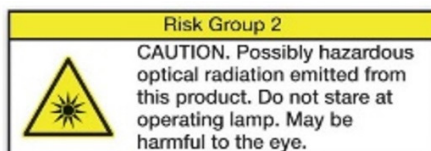
Customer Support

OSENSA Innovations Corporation
8672 Commerce Court
Burnaby, BC, Canada, V5A 4N7
Telephone (888) 732-0016
(604) 259-7177
Fax (778) 355-0796
Email support@osensa.com
Website www.osensa.com

Device Safety Information

The FTX-602/302-PWR+ temperature transmitter contains LEDs that emit light intensity described under Risk Group 2. The device presents a moderate risk to the human eye due to the high intensity light. Do not look directly at the LED or into a fiber optic cable while the device is in operation.

Device Warning!



Operating Environment

To extend the service life of the product, it is advisable to install the device in a well-ventilated area to minimize the internal board temperature. Ensuring the internal PCB temperature does not exceed 75°C will extend the life of the product. The maximum operating temperature rating assumes the device inputs are supplied with 12VDC. If powering from 24VDC, each unit should be de-rated by 10°C. Similarly, if 3 or more units are connected together directly in contact with each other the maximum temperature rating should be de-rated by 5°C.



Installation

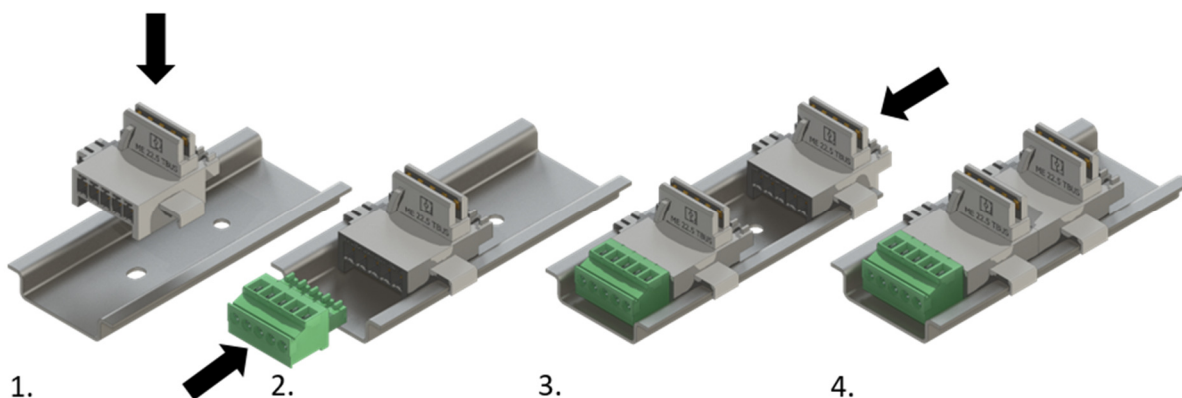
Installation Overview

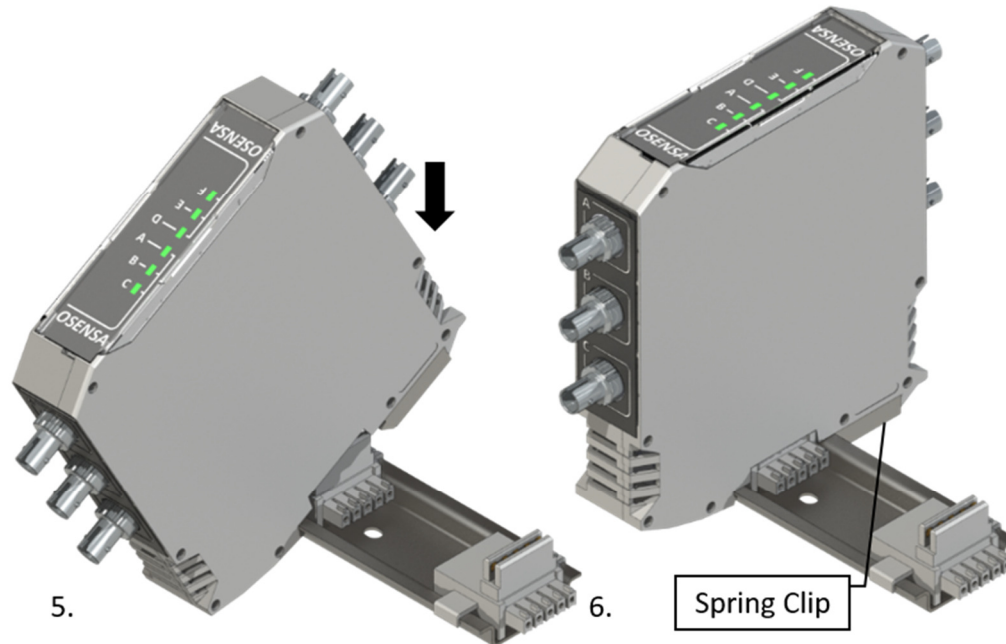
The FTX-602/302-PWR+ transmitter must be mounted on a DIN rail and powered through the T-BUS connector. Here is a general overview of the installation procedure.

1. Install OSENSAView software on your PC or Laptop
2. Snap the FTX-602/302-PWR+ Transmitter onto a section of 35mm DIN rail
3. Connect a fiber optic temperature probe
4. Connect power supply and RS-485 serial wires to the T-BUS connector terminal
5. Apply power to the FTX-602/302-PWR+
6. Connect to computer
7. Start the OSENSAView software

Device Installation

The transmitter is designed to mount to standard 35mm DIN rail. A DIN rail T-BUS connector (ACC-CON-TBUS) must be installed onto the DIN rail first. The transmitter then rotates down and snaps onto the DIN rail over the T-BUS connector. Refer to the images below. The green wiring connector (ACC-CON-TBUS-WIRE) is then slid into the T-BUS connector.





Description of Installation Steps:

1. Snap a DIN rail T-BUS connector (ACC-CON-TBUS) onto a section of 35mm DIN rail.
2. Slide the green 5-position wire terminal block (ACC-CON-TBUS-WIRE) into the DIN rail T-BUS connector. The wire terminal block allows for the connection of wires for power and RS-485 communication.
3. If needed, snap more T-BUS connectors (ACC-CON-TBUS) onto the DIN rail.
4. Hook the front bottom of the temperature transmitter (the side opposite of the metal spring clip) onto the DIN rail and pivot the device over top of the T-BUS connector. Rotate the device downwards onto the DIN rail.
5. The spring clip will snap into place, securing the temperature transmitter to the DIN rail.

Note: The Transmitter shall be installed inside an industrial panel or similar end use UL Listed enclosure.

To remove the transmitter from the DIN rail:

1. Pull back on the metal spring clip (a flat head screw driver is handy for this operation).
2. Rotate the transmitter forward and lift off the DIN rail.



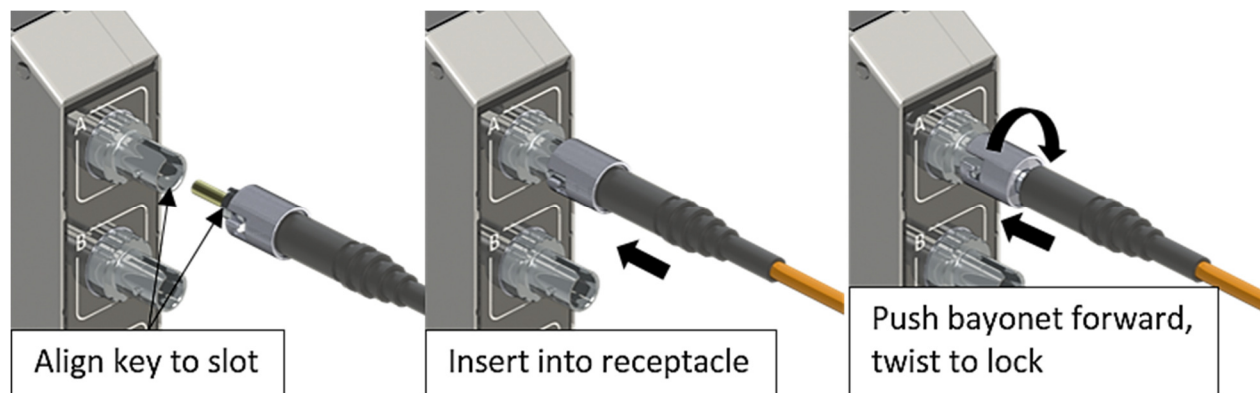
Temperature Probe Installation

The transmitter has receptacles that connect to temperature probes using ST connectors. The ST connector on the probe has three main features: a spring-loaded bayonet lock, a key, and a ferrule.



When mating the ST connector to the receptacle on the transmitter, the key must be properly aligned with the slot before insertion. The purpose of the key is to prevent the ferrule from rotating. The bayonet lock is then engaged by pushing and twisting until it reaches the end of its travel. When locked, the bayonet spring prevents the probe from disconnecting.

Note that not all ST connectors have the key feature.





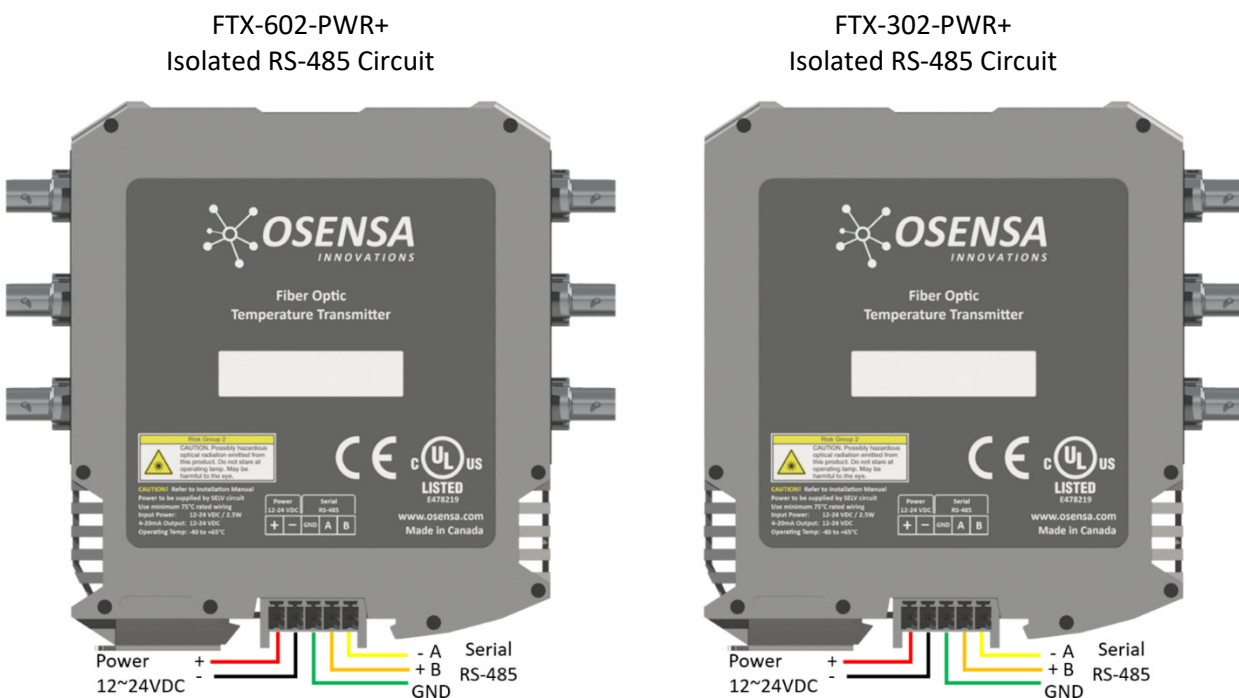
Device Communication

Power and communication is supplied to the FTX-602/302-PWR+ transmitter through the T-BUS terminal connection on the bottom of the device.

Note: Use minimum 75C rated wiring.

RS-485 BUS Communication

Multiple FTX-602/302-PWR+ temperature transmitters can be connected in series by using the shared RS-485 BUS. Devices are supplied power and serially connected to each other using a 5-position pluggable DIN rail T-BUS connector. This configuration will supply power and RS-485 communication to several transmitter devices at once. To install a transmitter, see the mechanical installation section of this document. The connector accepts 12 VDC to 24 VDC power from an SELV (Separated Extra-Low Voltage) protected circuit. The power input terminals are connected through internal wiring to the Side Input Power Terminals.





RS-485 Communication Parameters

The standard communication protocol is half-duplex MODBUS RTU. Multiple transmitters can be addressed by this common bus connection. Each transmitter must be configured with a unique MODBUS device ID in the range of 1 to 247. The factory default MODBUS device ID is 247. The table below summarizes the configurable communication parameters.

	Baud Rate	No. Bits	Parity	Stop Bits
RS-485 Interface	9600* 14400 19200 56000 115200	8	None	1

*Factory default value

Device Setup and Configuration

Install OsensaView FTX software on a laptop or PC and connect to the FTX-602/302-PWR+. Refer to the OSENSAView User Manual for installation instructions.

Setting Modbus ID

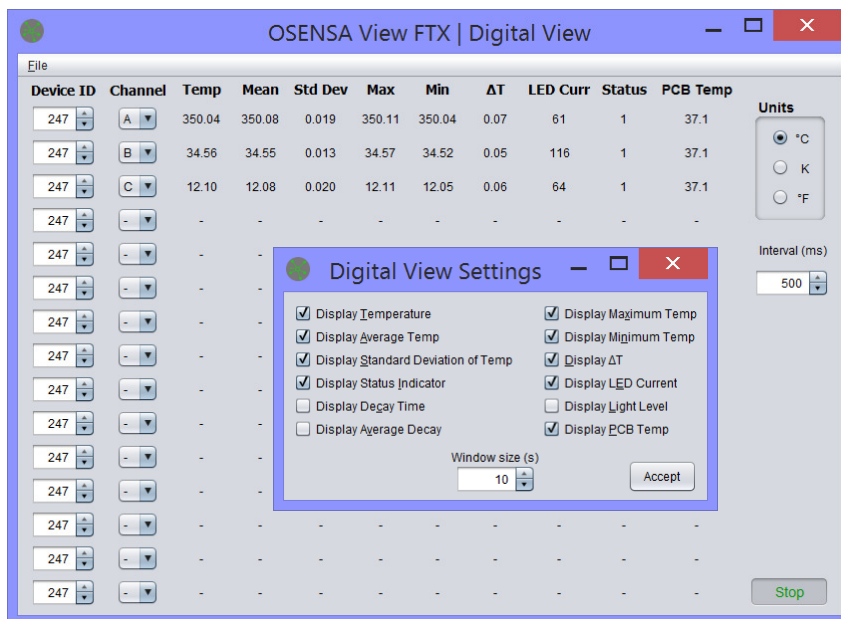
Select the Device ID window from the Config menu or press Ctrl+E. The window below will open. Select the current Device ID and click the Read button. The Serial Number will be read from the device. Enter the New Device ID value and then click the Write button to permanently save the change. Remember to label the transmitter with its new Modbus Device ID.





Display Temperature Readings

Open the Digital View window from the View menu or press Ctrl+D. The window below will open.



Select the correct Device ID and Channel to read and then press the Start button. Right clicking anywhere in the window will bring up the Display Settings window to configure which parameters are displayed. For further settings and features, refer to the OSENSAView User Manual.



Supported Modbus Functions

The FTX-602/302-PWR+ supports the following two Modbus commands.

- 0x03 Read Multiple Registers
- 0x10 Write Multiple Registers

Example: (0x03) Read Multiple Registers

	ID	Function	Addr.H	Addr.L	# Bytes.H	# Bytes.L	CRC.H	CRC.L
Master Send	0xF7	0x03	0x00	0x02	0x00	0x02	0x??	0x??

	ID	Function	# Bytes	Value.H	Value.L	Value.H	Value.L	CRC.H	CRC.L
Slave Response	0xF7	0x03	0x04	0x11	0x11	0x22	0x22	0x??	0x??

	ID	Function	Addr.H	Addr.L	Value.H	Value.L	CRC.H	CRC.L
Slave Response	0xF7	0x06	0x00	0x02	0xFF	0xFF	0x??	0x??

(Normal Response is echo of query)

Example: (0x10) Write Multiple Registers

	ID	Function	Addr.H	Addr.L	# Regs.H	# Regs.L	# Bytes	Value.H	Value.L	Value.H	Value.L	CRC.H	CRC.L
Master Send	0xF7	0x10	0x00	0x02	0x00	0x02	0x04	0x11	0x11	0x22	0x22	0x??	0x??

	ID	Function	Addr.H	Addr.L	# Regs.H	# Regs.L	CRC.H	CRC.L
Slave Response	0xF7	0x10	0x00	0x02	0x00	0x02	0x??	0x??

The default Modbus device ID is 247.

The default RS-485 baud rate is 9600, 8-N-1.

These default values are easily changed through OsensaView FTX configuration software.



Common Modbus Addresses

Channel Temperatures can be read from the Modbus addresses below. Values read are signed integers. Divide the integer value by 100 to get the temperature value with one digit after the decimal point. If the second digit after the decimal is even (zero), the temperature reading is valid. If the last digit is odd (one), the temperature reading is still converging and may have some error associated with it. If the temperature value is 327.67, then there is a probe error, likely caused from no probe being connected.

HEX	DEC	Description	Min	Max	R/W	Default (HEX)	Example																
100x Temperature in °C, valid reading? (Format: xxx.xn)																							
0400	1024	Ch A (1)	0	FFFF	R	32767	Max Range: -273.15 to +327.66, No probe = 32767																
0401	1025	Ch B (2)	0	FFFF	R	32767	Std Range: -50.00 to +225.00, No Probe 32767																
0402	1026	Ch C (3)	0	FFFF	R	32767	Last Digit=xxx.x0, (even) means valid temp reading																
0403	1027	Ch D (4)	0	FFFF	R	32767	Last Digit=xxx.x1, (odd) means convergence error																
0404	1028	Ch E (5)	0	FFFF	R	32767	Examples:																
0405	1029	Ch F (6)	0	FFFF	R	32767	<table><tr><th>Hex</th><th>Dec</th><th>Temp (°C)</th><th>Comment</th></tr><tr><td>0x3034</td><td>12340</td><td>123.4</td><td>Valid reading</td></tr><tr><td>0xF2A3</td><td>-3421</td><td>-34.2</td><td>Converging</td></tr><tr><td>0x7FFF</td><td>32767</td><td>327.6</td><td>Probe Error</td></tr></table>	Hex	Dec	Temp (°C)	Comment	0x3034	12340	123.4	Valid reading	0xF2A3	-3421	-34.2	Converging	0x7FFF	32767	327.6	Probe Error
Hex	Dec	Temp (°C)	Comment																				
0x3034	12340	123.4	Valid reading																				
0xF2A3	-3421	-34.2	Converging																				
0x7FFF	32767	327.6	Probe Error																				

Channel LED Power as a percentage of full power can be read from the Modbus addresses below. Values read are signed integers. Divide the integer value by 100 to get the temperature value with one digit after the decimal point. The second digit after the decimal represents the channel status. A status of 1 indicates Normal operation while status of 2 means No probe is connected. Status 3 means a probe is connected, but the maximum LED current is being used to read it. This indicates a potential problem with the probe or connections.

HEX	DEC	Description	Min	Max	R/W	Default (HEX)	Example																				
100x LED Power as %, status number (Format: xxx.xn)																											
0464	1124	Ch A (1)	0	FFFF	R	100.1	Max Range: 0.01 to 100.09, No Probe=100.02																				
0465	1125	Ch B (2)	0	FFFF	R	100.1	Examples:																				
0466	1126	Ch C (3)	0	FFFF	R	100.1	<table><tr><th>Hex</th><th>Dec</th><th>Pwr %</th><th>Status</th><th>Comment</th></tr><tr><td>0x04E3</td><td>1251</td><td>12.5</td><td>1</td><td>Normal Operation</td></tr><tr><td>0x2712</td><td>10002</td><td>100</td><td>2</td><td>No Probe</td></tr><tr><td>0x2713</td><td>10003</td><td>100</td><td>3</td><td>Max LED Current</td></tr></table>	Hex	Dec	Pwr %	Status	Comment	0x04E3	1251	12.5	1	Normal Operation	0x2712	10002	100	2	No Probe	0x2713	10003	100	3	Max LED Current
Hex	Dec	Pwr %	Status	Comment																							
0x04E3	1251	12.5	1	Normal Operation																							
0x2712	10002	100	2	No Probe																							
0x2713	10003	100	3	Max LED Current																							
0467	1127	Ch D (4)	0	FFFF	R	100.1																					
0468	1128	Ch E (5)	0	FFFF	R	100.1																					
0469	1129	Ch F (6)	0	FFFF	R	100.1																					

For a more detailed list of all available addresses for both Flash and RAM, please contact Osensa technical support.



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