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# TFX-213

**User guide**  
**Datasheet**

TFX-213-A-en Manual

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## Table of contents

### 1 User guide

#### 1.1 Parts

#### 1.2 Connection

#### 1.3 Command

#### 1.4 Display

##### 1.4.1 Left group

##### 1.4.2 Right group

#### 1.5 Charge

#### 1.6 Best practice

### 2 Datasheet

#### 2.1 Input

#### 2.2 Output

##### 2.2.1 Levels

##### 2.2.2 Protection

##### 2.2.3 Impedance

#### 2.3 Efficiency

#### 2.4 Autonomy

#### 2.5 Operating conditions

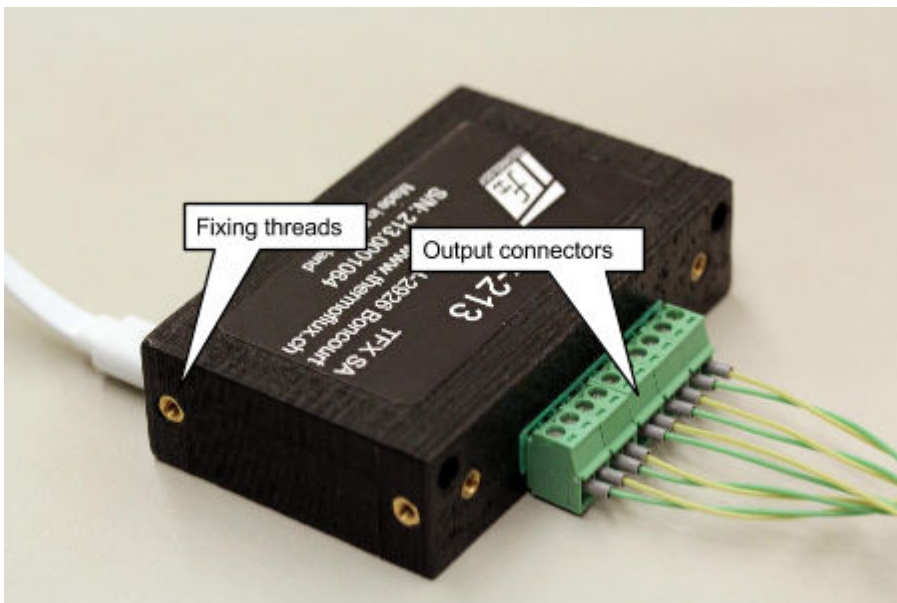
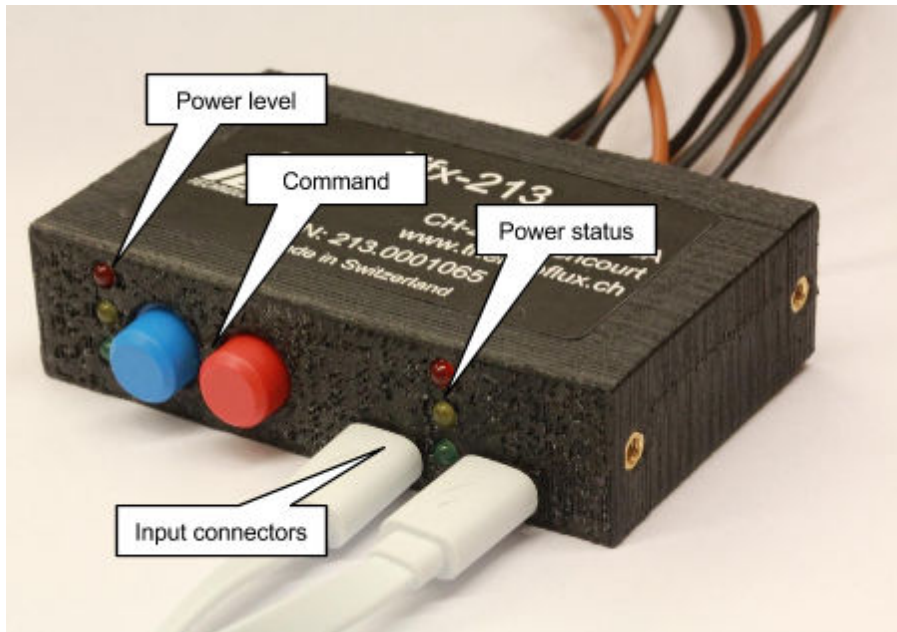
#### 2.6 Size

# 1 User guide

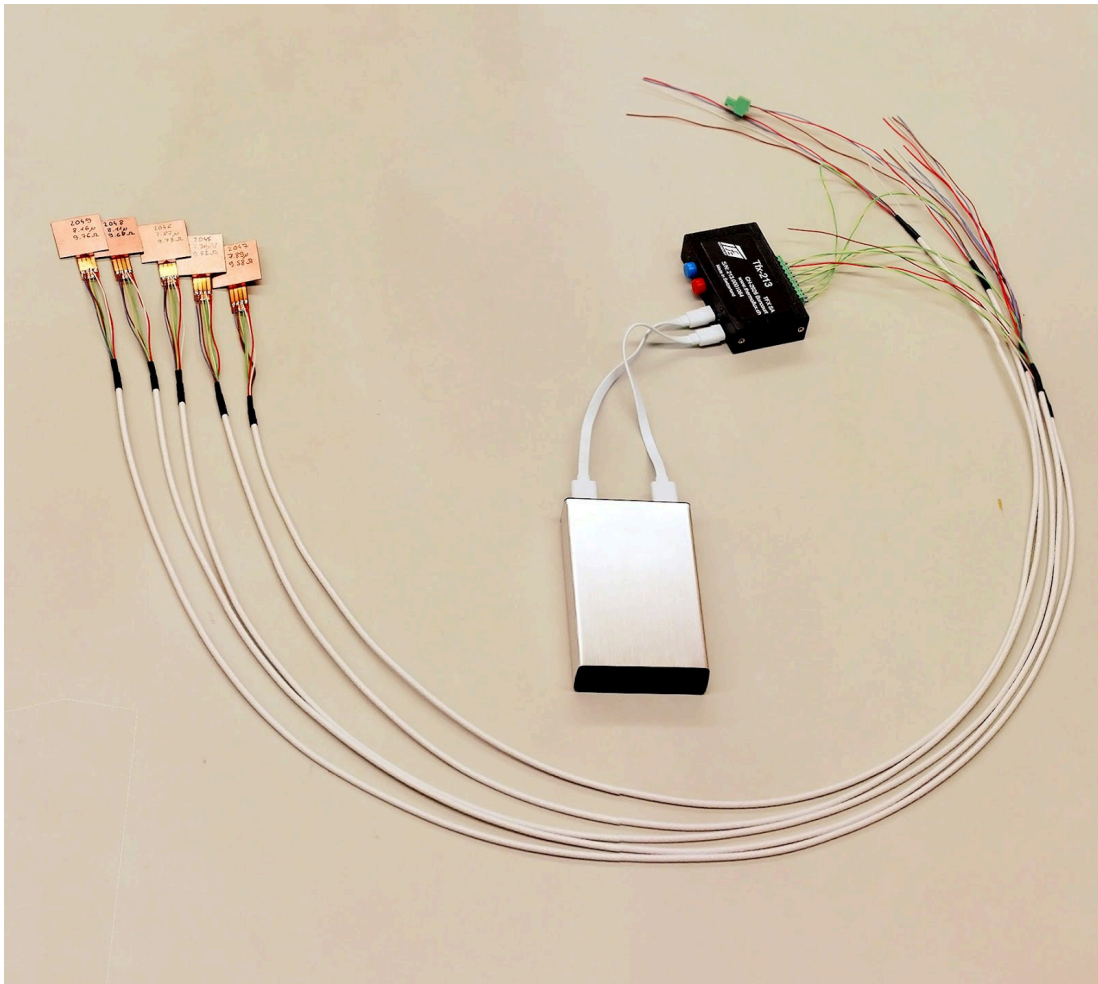
Tfx-213 power supply is designed to heat 5 Tfx-161 active sensors from a 5V battery pack.

This guide is designed for the users of the system and resumes main datasheet.

## 1.1 Parts



## 1.2 Connection



Connect a battery pack on the Tfx-213 on one side and connect up to 5 Tfx-161 sensors (or equivalent loads) on the other side. With Tfx-161 sensors, connect Heat Flux and Temperature wires on the datalogger.

## 1.3 Commands

Click simultaneously during 1 second on **blue** and **red** buttons to turn on and off.



Adjust power level with one button :

- **blue** to decrease
- **red** to increase

The level is stored in memory, it is possible to turn on and off the supply quickly and keep the same power.

## 1.4 Display

The status of the power supply is displayed on 2 groups of leds:

- left group is for power level
- right group is for power status

### 1.4.1 Left group

Level	Display	Power	on 10 $\Omega$
0		OFF	0 W
1		25%	0.4 W
2		37.5%	0.6 W
3		50%	0.8 W
4		62.5%	1.0 W
5		75%	1.2 W
6		87.5%	1.4 W
7		100%	1.6 W

### 1.4.2 Right group

Only the green led is used for the moment. Yellow and red leds are reserved for communication control.

Status	Display	Comment
No supply on input	0%	
OFF	10%	Supplied but no power on outputs
Short-circuit	50%	Short circuit on an output. Remove before use.
Saturated	90%	Supply cannot deliver the rated power due to overload or undervoltage on input
ON	100%	Normal operation

## 1.5 Charge

Charge battery pack with the provided short micro-USB cable from the charger (USB A) to the battery pack (micro-USB). Check battery level directly on the pack (LED or LCD according to model).

## 1.6 Best practice

As the current passed through micro USB cable is relatively high regarding connector size, we recommend to use two cables between battery pack and Tfx-213 power supply for high levels of power.

## 2 Datasheet

### 2.1 Input

Tfx-213 power supply has 2 micro-USB standard connector to be connected to 5.1V battery pack. It requires up to 2A at full power. Due to losses in cables, use both connectors to work at nominal power on 5 loads.

### 2.2 Output

Tfx-213 has 5 output connectors with 2 pins and 3.5mm pitch. Connector type is MC 1,5-ST-3,5 by Phoenix Contact or equivalent.

#### 2.2.1 Levels

Output voltage can be adjusted on 7 fixed levels. The voltage is adjusted in a closed loop to avoid components drift regarding operating temperature or aging.

Power levels can be selected in range from 5% to 100% of nominal power. Nominal power has been set at 1.6W for a voltage of 4V on a impedance of 10 $\Omega$ .

Regarding original request, linear step have been selected between 25% and 100% of nominal power, with interval of 12.5%.

#### 2.2.2 Protection

Short-circuit protection is made by measuring output voltage continuously. If output voltage is below 0.5V, voltage converter is disabled for 100ms and start-up is operated. Display shows a 50% blinking on the status led.

A minimal output voltage is requested in order to enable the converter. Outputs are activated one-by-one until short circuit is removed. If not, the process is repeated continuously. Once removed, output voltage is set for power level.

#### 2.2.3 Impedance

Tfx-161 sensors have been designed with nominal impedance of 10 $\Omega$ . 5 sensors can be connected simultaneously.

If the heating point is made with other components, please respect impedance requirement for each output. A higher impedance is allowed, assuming that nominal power will be reduced, as the Tfx-213 power supply calculates equivalent output voltage on a basis of a nominal power of 1.6W on 10 $\Omega$  impedance.

### 2.3 Efficiency

Efficiency depends of power level. It is around 80% at full power, 5 loads at level 7.

### 2.4 Autonomy

Battery pack determines system autonomy. Trials have been made with 2 different packs.

- MI.COM 10'400mAh :
  - Level 6 (87.5%)
  - 5 loads
  - Operating time : 4h 03m
- Power bank 22'000mAh :
  - Level 7 (100%)
  - 5 loads
  - Operating time : 3h 01m

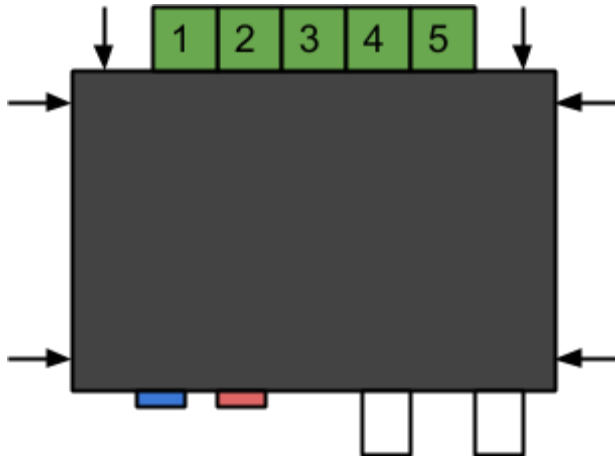
## 2.5 Operating conditions

Operational temperature range is 0-40°C, with possible condensation.

Tfx-213 power supply is designed to work in food environment, avoiding risk of losing parts.

## 2.6 Size

The box volume is 80x50x20, excluding buttons and connectors.



Fixing threads have been placed on 3 sides (left, right and output), at 10mm from the bottom and around 5mm from corners.

## Contacts

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## Revisions

A	05.02.2015	Initial release of manual