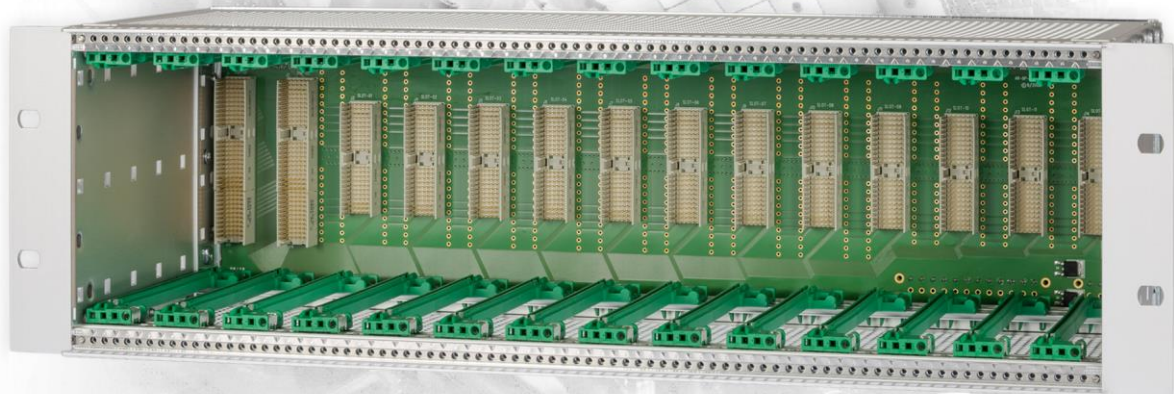


# Component Manual

## SignalProcessingUnit

SPU14 | SPU14r | SPU12-3P

Module Rack



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# Specific Safety Instructions



Before using this product, the user has to be familiar with the general safety instructions. Use the separate **Safety Information** manual for this purpose.

This chapter only describes specific safety instructions for this product.

Please note that this component manual covers different *SignalProcessingUnit* types. To distinguish between these variants, a few descriptions and details in this manual are separated to show the specific differences. The user has to verify which variant is used. This can be easily done by checking the type label on the back side of the device.

---

## Field of Application

The *SignalProcessingUnit (SPU)* has been designed for installation and operation in a 19" cabinet, fulfilling the requirements of a fire enclosure. Other uses are not permitted due to safety aspects.

---

## Safety Devices

### **SPU14 and SPU12-3P**

Both are equipped with a redundant power supply connector and a reset button.

### **SPU14r**

The *SPU14r* is equipped with two redundant power supply connectors and two reset buttons.

Check the chapters *Installation and Maintenance - Power Supply* and *Component Layout - Rear Side* for details.



It is mandatory to use an external current limiter with max 10A for each redundant power supply connector when using a *SPU14* or *SPU12-3P* (e.g. a certified fuse, a corresponding power supply or an all-pole circuit breaker). For the *SPU14r* use 5 A instead for each part. These devices must stay accessible after installation.



Even if the power is interrupted using the Reset button, the following module is still energized:

- Power Supply Connector

If a complete separation of the unit from the power supply is necessary, a removal of all screw terminals is advised. For this purpose, the two screws of each terminal have to be unscrewed. Afterwards the terminals can be removed from the device (see *Installation and Maintenance - Power Supply*).

# Product Description

The *IFTA* systems are based on a modular hardware architecture. One of the core component to ensure that, is the *SignalProcessingUnit*. The product is a 19" module rack containing a backplane. It is responsible for the mounting of all the different modules available and ensures their processing.

## **SPU14**

Contains one backplane and provides the most usable *I/O Module Slots* as shown in chapter *Module Layout - SPU14*.

## **SPU14r**

The *SPU14r* includes two completely independent backplanes (hereinafter described as *Part 1* and *Part 2*) to ensure a redundant operation. Both parts are providing the full functionality of a single *SPU*. For more details, see chapter *Module Layout - SPU14r*.

## **SPU12-3P**

Close to the *SPU14* variant but with an additional *Processing Slot*. For example, this allows the use of two *IFTA* SlotPC modules at the same time.

---

## Specifications

### **Environmental**

Operating temperature:	5 – 40 °C
Storage temperature:	-20 – 65 °C
Humidity:	0 – 85 % non-condensing
Altitude:	Max. 2,000 m
Pollution degree:	1
General:	For indoor use only Operate in a clean and dry environment

## Technical Data

Type:	19" module rack, 3 U	
Module slots:	SPU14	14
	SPU14r	14
	SPU12-3P	12
Dimension:	See <b>Component Layout - Dimensions - Figure 1</b>	
Weight: <sup>1</sup>	SPU14	2.9 kg
	SPU14r	3.1 kg
	SPU12-3P	2.9 kg

## Technical Requirements

Mounting:	19" case / cabinet
Free space: <sup>2</sup>	5 U (incl. 2 x 1 U for heat dissipation for both sides)

## Power Consumption

Supply voltage: <sup>3</sup>	24 VDC (18 ... 32 VDC)	
Overvoltage category:	I	
Consumption: <sup>4</sup>	SPU14	Max. 8 A at 24 VDC
	SPU14r	Max. 4 A at 24 VDC for each part
	SPU12-3P	Max. 8 A at 24 VDC



The power supply must meet SELV (Safety Extra Low Voltage) requirements.

## Input Signals

For safety reasons all input signals to the modules must meet SELV (Safety Extra Low Voltage) ) and limited energy circuit requirements.



All input signals to the modules must meet SELV (Safety Extra Low Voltage) ) and limited energy circuit requirements.

<sup>1</sup> Without any modules

<sup>2</sup> More details are described in the corresponding **Installation Manual**.

<sup>3</sup> A few older modules only support 23 ... 27 VDC (see corresponding component manual). Therefore the supply voltage of 18 ... 32 VDC isn't valid if at least one mounted module doesn't support it.

<sup>4</sup> The power consumption is depending on the mounted modules.

# Component Layout

## Dimensions

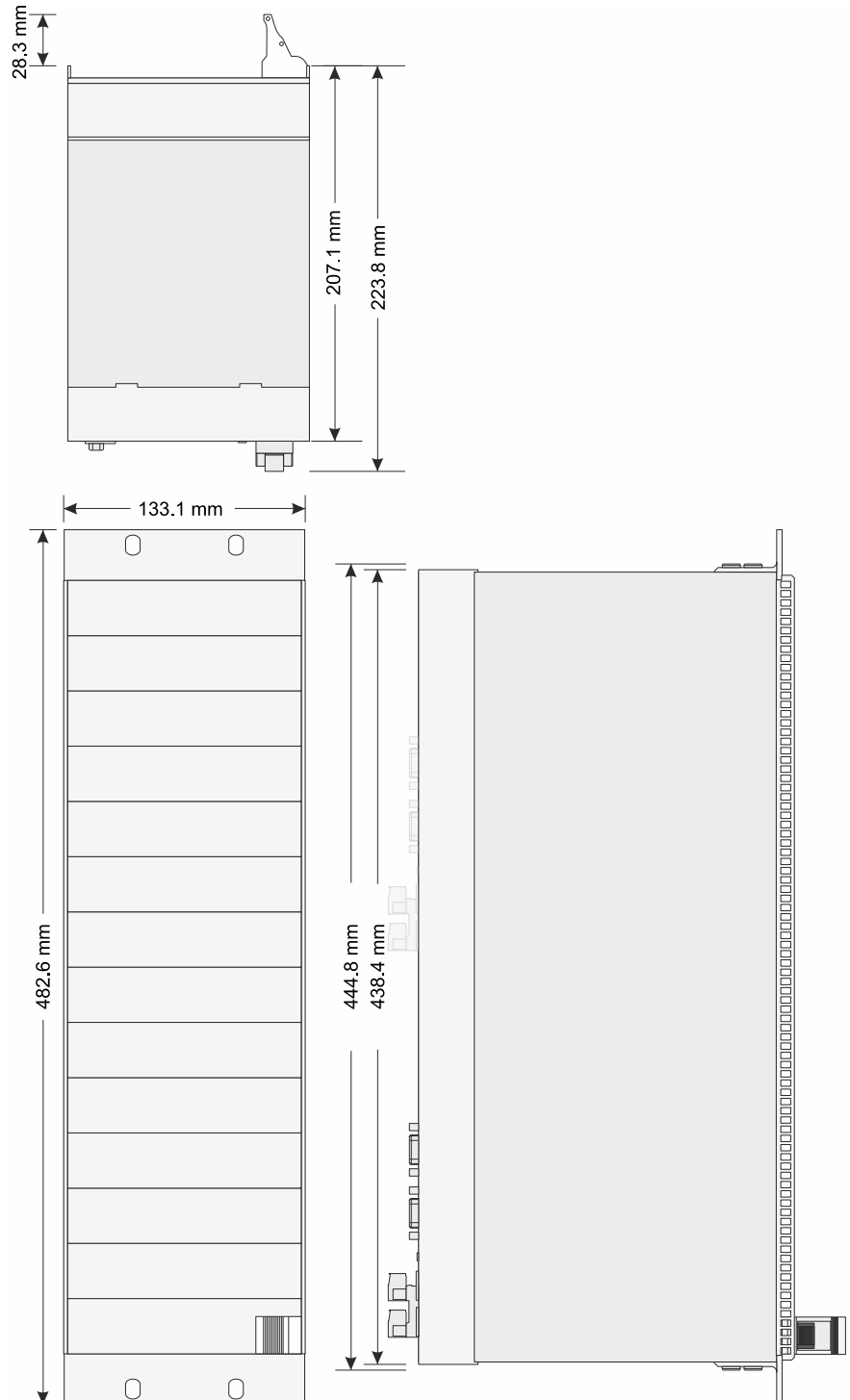
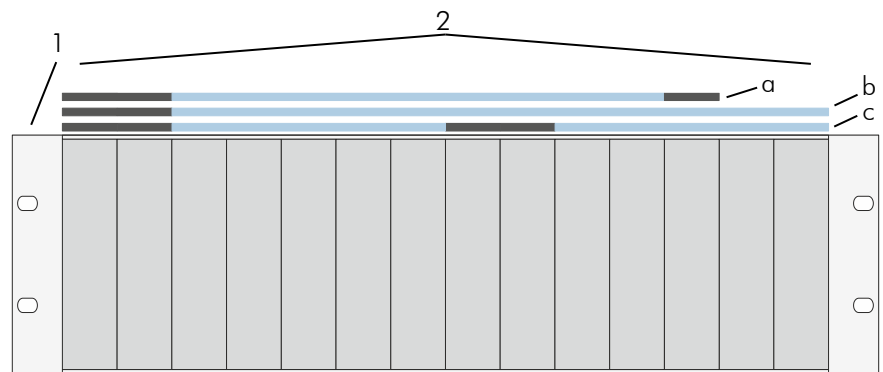


Figure 1: Dimensions of the SPU (figure similar, subject to modification)

## Front Side



**Figure 2:** Front view of the SPU (figure similar, subject to modification)

### (1) 19" Frame

For the mounting into a 19" cabinet

### (2) Module slots

Two slot types for the installation of the different modules. For more details see *Module Layout*.

■ Processing Slot

■ I/O Module Slot

- |             |   |
|-------------|---|
| a. SPU12-3P | 3x Processing Slot, 9x I/O Module Slot  |
| b. SPU14    | 2x Processing Slot, 12x I/O Module Slot |
| c. SPU14r   | 4x Processing Slot, 10x I/O Module Slot |

## Rear Side

### SPU14 and SPU12-3P

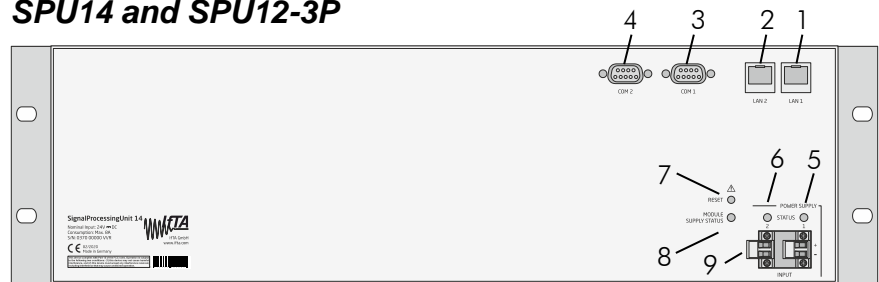


Figure 3: Rear view of the SPU14 / SPU12-3P (figure similar, subject to modification)

### SPU14r

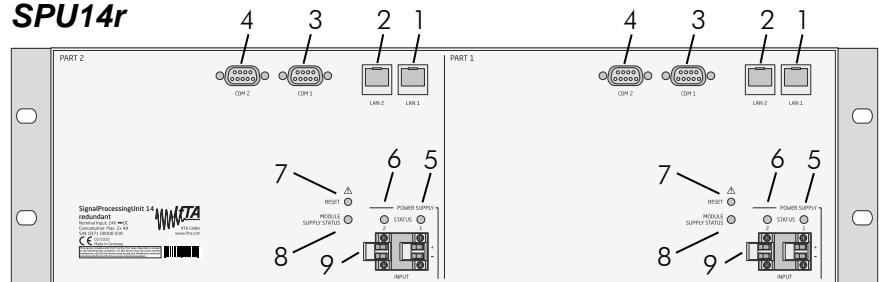


Figure 4: Rear view of the SPU14r (figure similar, subject to modification)

#### (1) LAN 1 connector

Network interface assigned to **Processing Slot 1** for data exchange

#### (2) LAN 2 connector

Network interface assigned to **Processing Slot 2** for data exchange

#### (3) COM 1 connector

RS232 interface assigned to **Processing Slot 1** for maintenance

#### (4) COM 2 connector

RS232 interface assigned to **Processing Slot 2** for maintenance

#### (5) POWER SUPPLY STATUS 1 LED

An illuminated LED indicates whether the power supply is present. Status for the first redundant power input.

#### (6) POWER SUPPLY STATUS 2 LED

An illuminated LED indicates whether the power supply is present. Status for the second redundant power input.

#### (7) RESET button

Button for a reset of the complete *SPU*. Holding it down will interrupt both redundant power supplies for this duration. Useful to perform a power cycle of the unit if required (see **Safety Devices**).

#### (8) MODULE SUPPLY STATUS

An illuminated LED indicates whether the internal power supply for installed modules is working.

#### (9) POWER SUPPLY INPUT connector

Connector for the two screw terminals to ensure a redundant power supply of the *SPU* (see **Power Supply**)

# Module Layout

## Available Slot Types

All units provide two different slot types for the different modules available:

- *Processing Slot*
- *I/O Module Slot*

The assignment of the different slot types for each variant is illustrated below.

### SPU14

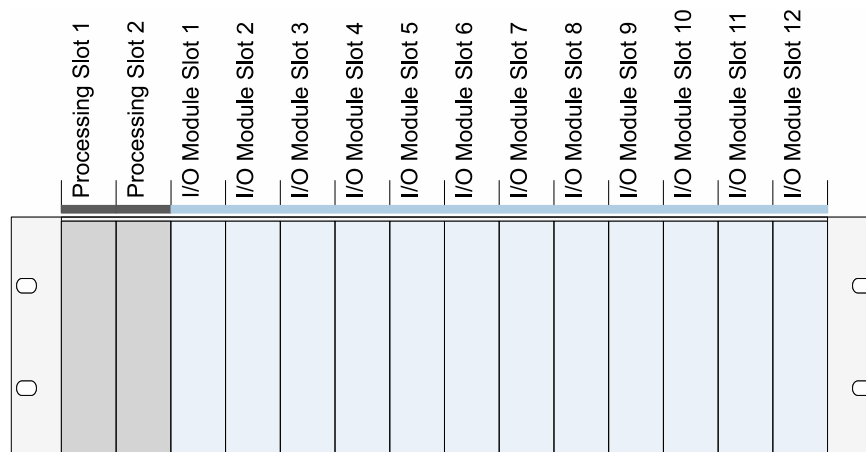


Figure 5: Slot type arrangement of the SPU14 (figure similar, subject to modification)

### SPU14r

The SPU14r is split into two completely independent hardware parts as illustrated in Figure 6 below.

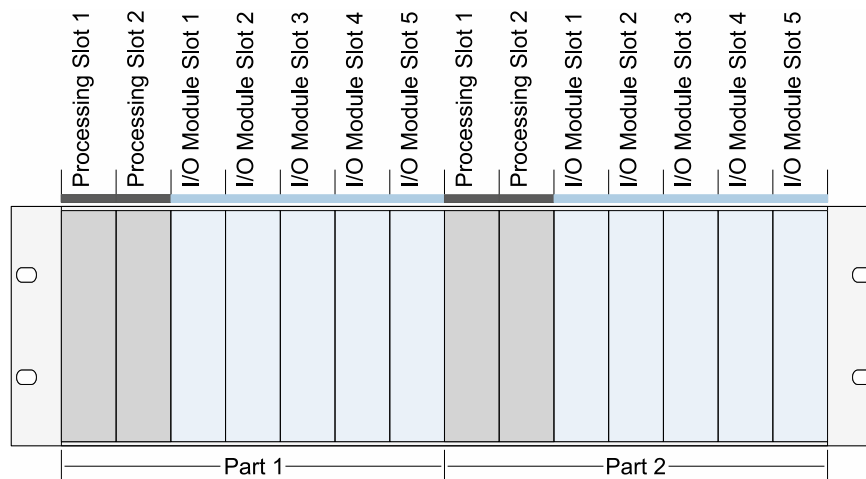


Figure 6: Slot type arrangement of the SPU14r (figure similar, subject to modification)

## SPU12-3P

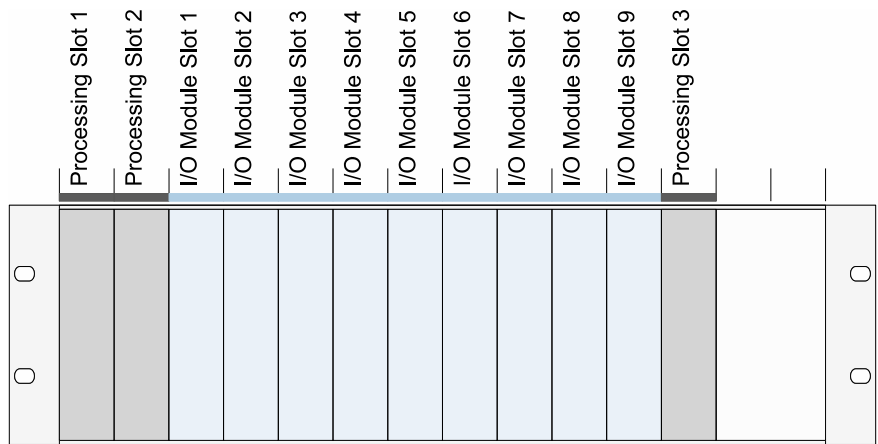


Figure 7: Slot type arrangement of the SPU12-3P (figure similar, subject to modification)

### Usability of the Processing Slots

Designated for modules which are providing a processing and/or control functionality. More details regarding the available modules are described in the chapter *Modules*.

In order to handle the modules mounted in the *I/O Module Slots*, it is necessary to install at least one module supporting processing and control functionality (e.g. an *IFTA DSP*).

### Usability of the I/O Module Slots

Basically all modules shown in the chapter *Modules - I/O Modules* can be used in the *I/O Module Slots*. The usability and maximum usable number of modules depends on the firmware version of the corresponding processing module. Details will be shown in the configuration software (e.g. *IFTA SignalMinerConfig*).

# Ordering Information

## SPU14

Product Key	Name	Slots	Interface	Design	Options	
□□□□	□□□	□□	□□□	□	□□	
0370	SPU	14	I04	D	Default	A Heavy duty
				C	Custom	B - ZZ Spare
				P	Prototype	

## SPU14r

Product Key	Name	Slots	Interface	Design	Options	
□□□□	□□□□	□□	□□□	□	□□	
0371	SPUR	14	I05	D	Default	A Heavy duty
				C	Custom	B - ZZ Spare
				P	Prototype	

## SPU12-3P

Product Key	Name	Slots	Interface	Design	Options	
□□□□	□□□□□	□□	□□□	□	□□	
0373	SPU3P	12	I04	D	Default	A Heavy duty
				C	Custom	B - ZZ Spare
				P	Prototype	

Default

---

# Modules

## Processing Slot Modules

### ***IfTA DSP (Digital Signal Processor)***

Function: Realtime processing and control of the installed modules

Details regarding the specification and requirements are described in the corresponding component manual *CM\_IfTA\_DSP*.

### ***IfTA SlotPC (Embedded PC)***

Function: Data storage, configuration and online access for clients

Details regarding the specification and requirements are described in the corresponding component manual *CM\_IfTA\_SlotPC*.

## I/O Modules

### ***IfTA AD4IEPE (Analog Input)***

Function: Fast analog input signals (voltage and current) and enhanced IEPE supply

Channels: 4

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual *CM\_IfTA\_AD4IEPE*.

### ***IfTA AD4Pro (Advanced Measurement Module)***

Function: Fast analog input signals (voltage and current), support of different strain-gauge types, strain-gauge pressure sensors (e.g. Kulite), IEPE supply and integrated charge amplifier

Channels: 4

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual *CM\_IfTA\_AD4Pro*.

### ***IfTA AD4PS (Analog Inputs + Power supply)***

Function: Fast analog input signals (voltage and current), IEPE supply, switchable power supply (voltage and current)

Channels: 4

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual *CM\_IfTA\_AD4PS*.

### ***IfTA PS4 (Power supply)***

Function: Switchable power supply (voltage and current)

Channels: 4

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual [CM>IfTA\\_PS4](#).

### ***IfTA AT2 (Analog Timer)***

Function: Precise timing measurement of analog signals (e.g. analysis of angle alteration or impulse widths)

Channels: 2

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual [CM>IfTA\\_AT2](#).

### ***IfTA AD16 (Analog Input)***

Function: Slow analog input signals (optional voltage or current)

Channels: 16

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual [CM>IfTA\\_AD16](#).

### ***IfTA TI4 (Temperature Input)***

Function: Slow temperature input signals

Channels: 4

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual [CM>IfTA\\_TI4](#).

### ***IfTA DigIn16 (Digital Input)***

Function: Digital binary input signals

Channels: 16

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual [CM>IfTA\\_DigIn16](#).

### ***IfTA DA8 (Analog Output)***

Function: Fast analog output signals (voltage or current)

Channels: 8

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual [CM>IfTA\\_DA8](#).

### ***IfTA RelOut16 (Digital Output)***

Function: Digital binary output signals

Channels: 16

Details regarding the specification, channel assignment and requirements are described in the corresponding component manual [CM>IfTA\\_RelOut16](#).

### ***IfTA LMM2 (Optical In-/Output + TTL Output)***

Function: Laser optical measurement of rotational speed, angular velocity and vibration angle on rotors and shafts

Channels: 2

Details regarding the specification, connection and requirements are described in the corresponding component manual *CM\_IfTA\_LMM2*.

### ***IfTA Profibus (Data Exchange)***

Function: Data exchange via the field bus protocol *Profibus*

Details regarding the specification, connection and requirements are described in the corresponding component manual *CM\_IfTA\_Profibus / CM\_IfTA\_Fieldbus*.

### ***IfTA Profinet (Data Exchange)***

Function: Data exchange via the field bus protocol *Profinet*

Details regarding the specification, connection and requirements are described in the corresponding component manual *CM\_IfTA\_Fieldbus*.

# Installation and Maintenance



Before starting any work, the *SPU* must be disconnected from any power supply source and the user has to be familiar with the separate *Safety Information* manual.



Always use a suitable screw driver to tighten and loose the necessary screws.

---

## Power Supply

### ***SPU14 and SPU12-3P***

The *SPU14* and *SPU12-3P* are equipped with a power supply connector for up to two screw terminals to connect the unit to a 24VDC (18 ... 32VDC) power supply and ensure a redundant input.


### ***SPU14r***

The *SPU14r* is equipped with the same power supply connector as the *SPU14* and *SPU12-3P*. Due to its redundancy, it has two of them in total - one for each part.

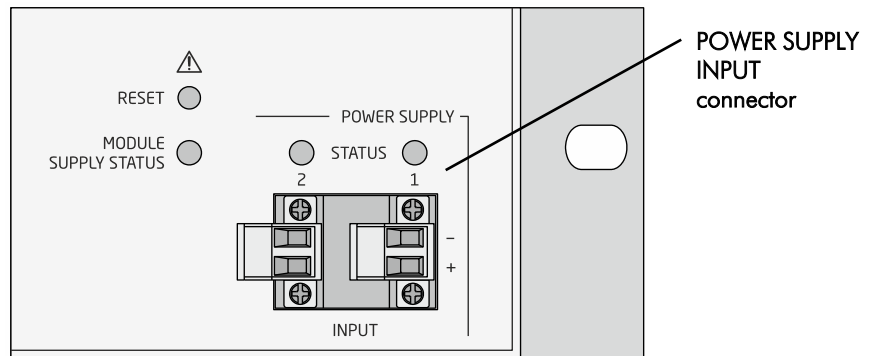
The following information is fitting for both, *Part 1* and *Part 2* of the *SPU14r*.



The power supply must meet SELV (Safety Extra Low Voltage) requirements.



Before connecting anything to the screw terminal, ensure to be familiar with the requirements (see chapter **Power Consumption**).



**Figure 8:** POWER SUPPLY INPUT connector including both mounted 2-pin screw terminals – 1 (right) and 2 (left) (figure similar, subject to modification)

The screw terminals can be fastened using the screws located on each side in order to lock them in place.

## Screw Terminal Specification

The technical specification of the screw terminal is as follows:

Screws:	M3 slotted
Diameter:	0.205 – 3.31 mm <sup>2</sup> / 24 – 12AWG
Cable type:	Flexible / fine-wired with end sleeve or solid wire
Cable length:	7 – 8 mm

## Screw Terminal Pin Assignment

The pin assignment of the screw terminals is as shown in **Table 1** below.

POWER SUPPLY Connector	Pin No.	Description
Screw Terminal 1	+	+Vin 1
	–	GND
Screw Terminal 2	+	+Vin 2
	–	GND

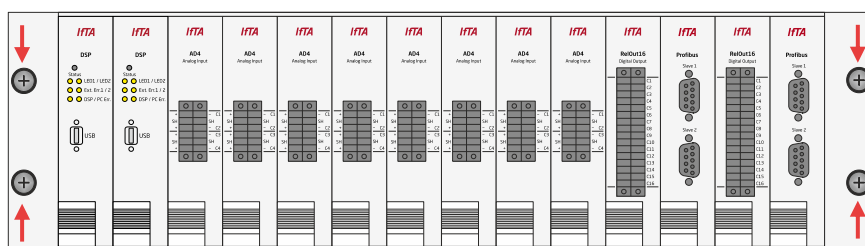
**Table 1:** Screw terminal pin assignment of the POWER SUPPLY INPUT connector

---

## Installation and Replacement of the Unit

For the initial installation of the unit, use the separate *Installation Manual*. To replace a *SPU*, follow the steps below.

- (1) Remove all attached cables on the rear and front side of the unit.
- (2) Unscrew the 4 bolts (marked red in **Figure 9**) which fix the 19" frame.
- (3) Carefully remove the *SPU* from the 19" rack.
- (4) Put the (new) module rack into the designated assembly area.
- (5) Fix the unit by tightening it with four screws at the 19" frame and re-establish all cable connections.



**Figure 9:** The mounted *SPU* (figure similar, subject to modification)

---

## Installation and Replacement of Modules

To install or replace a module, follow the steps below. Make sure to be familiar with the usage of the different slot types described in the chapter *Module Layout*.

- (1) Carefully unplug all front connectors in use.
- (2) Loosen the screws on the front side of the module (only the outer screws at the top and bottom side).
- (3) Carefully remove the module from the rack with the help of the board handle by unlocking it with the black button.
- (4) Put the replacement module into the appropriate slot by using the guide rails.
- (5) Check if the board is installed correctly and is properly locked by the handle.
- (6) In case any connectors or cables were removed from the module, reconnect them.
- (7) Fix the module by tightening the screws on the front panel.

---

## Ensuring proper Operation

After a replacement or an installation of hardware components or the replacement of the whole *SPU*, the system should be tested first to ensure that it works properly. The test should be carried out by qualified and authorized personnel only.

After putting the *SPU* into operation again, the user should check if everything started as expected. Most of the hard- and software of the *IFTA* systems has status signals (e.g. LEDs). The user has to check those signals to ensure that the system is faultless.

---

## Maintenance and Cleaning

The *SPU* itself has no actively turning parts nor other components which would require maintenance.

However, it's necessary to keep the device clean and free from dust using a soft cloth.



Please note that installed modules might have different maintenance requirements. Check the corresponding component manuals for details.

# Declarations and Certificates



## EC Declaration of Conformity

**Manufacturer Address:** IfTA Ingenieurbuero fuer Thermoakustik GmbH  
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D-82178 Puchheim  
Germany

**Products:** IfTA SignalProcessingUnit 14 incl. modules  
IfTA SignalProcessingUnit 14r incl. modules  
IfTA SignalProcessingUnit 12-3P incl. modules

**Models:** 0370-SPU-14-lxx-x  
0371-SPUR-14-lxx-x  
0373-SPU3P-12-lxx-x

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

<b>2014/30/EU</b>	Electromagnetic Compatibility (EMC)
<b>2014/35/EU</b>	Low Voltage (LVD)
<b>2011/65/EU</b>	Restriction of Hazardous Substances (RoHS)

Compliance was proved by the application of the following standards:

<b>EMC:</b>	EN 61326-1:2013 EN 55011:2009+A1:2010
<b>LVD:</b>	EN 61010-1:2010
<b>RoHS:</b>	EN 50581:2012

The object of the declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 174, 1.7.2011, p. 88):

*2021-03-16 / Puchheim*

Date / Place

  
Dr. Jakob Hermann, General Manager

# Appendix

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## Technical Support

If you have any questions about the use of this product, please contact:

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