

## Product Datasheet - Technical Specifications



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# PeakTech®

Unser Wert ist messbar...



**PeakTech® 6165 - 6168**

**Bedienungsanleitung / Operation manual**

**Labor-DC-Schaltnetzteil /  
Laboratory Switching Mode Power Supply**



## 1. Safety instructions for operating the appliance

This product fulfils the requirements of the following European Union directives for CE conformity: 2014/30/EU (electromagnetic compatibility), 2014/35/EU (low voltage), 2011/65/EU (RoHS).

 To ensure the operational safety of the appliances and to avoid serious injury due to current or voltage surges or short circuits, the following safety instructions must be observed when operating the appliances.

 Damage caused by non-compliance with these instructions is excluded from claims of any kind.

### General:

- Read these operating instructions carefully and make them available to subsequent users.
- Always observe the warning notices on the appliance, never cover or remove it.
- Ensure that the appliance is used in accordance with protection class I.
- Familiarise yourself with the functions of the appliance and its accessories before using it for the first time.
- Do not operate the device unattended or only when it is secured against unauthorised access.
- Only use the device for its intended purpose and pay particular attention to the warning notices on the device and information on the maximum input and output values.
- Power supply units can heat up during operation! Always ensure good ventilation and never cover the ventilation slots of the appliance to prevent heat build-up.
- Never touch any heated heat sinks on or in the appliance and allow the appliance to cool down after operation.
- Power supply units can be very heavy and cause damage or injury when dropped. Ensure safe handling and only carry the device using the handle provided.

### Electrical safety:

- Before connecting the devices to a socket, ensure that the voltage setting on the devices matches the existing mains voltage.
- Only connect appliances to sockets with "PE" protective earthing and earthed neutral conductor.
- The appliance must be positioned so that the mains plug can be removed from the socket at any time.
- Do not insert any metal or other conductive objects through the ventilation slots!
- Do not place any liquids on or next to the appliance (risk of short circuit if the container tips over)!
- Voltages below 25 VAC or 60 VDC are generally considered safe to touch, voltages above 50VAC and 120VDC are considered dangerous voltages.
- Switching power supplies are not designed for series or serial connection of several devices. This can lead to control problems and unexpected behaviour as well as dangerous damage.
- Never touch live, electrically conductive connections on the appliance or the mains supply.
- Work on hazardous voltages may only be carried out by or under the supervision and instruction of authorised specialist personnel.
- Wear suitable protective equipment when working with dangerous voltages and observe the relevant safety rules.
- Do not exceed the maximum permissible input values under any circumstances (risk of serious injury and/or destruction of the device)
- Remove the mains cable and all connecting cables before moving the appliance.
- Laboratory power supplies are not designed for charging batteries. Such use can lead to serious damage to the device or, if handled incorrectly, to explosion or fire of the battery, which are excluded from claims of any kind.
- Inductive loads, such as some electric motors, can run on after being switched off and generate a reverse voltage which can damage the appliance. Ensure correct use!

### Measuring environment:

- Avoid any proximity to explosive and flammable substances, gases and dust. An electrical spark could lead to an explosion or deflagration - danger to life!
- Do not carry out measurements in corrosive environments, the device could be damaged or contact points inside and outside the device could corrode.
- Avoid working in environments with high interference frequencies, high-energy circuits or strong magnetic fields, as these can have a negative effect on the device.
- Avoid storage and use in extremely cold, damp or hot environments, as well as prolonged exposure to direct sunlight.
- Only use the appliance in dust-free and dry indoor areas.
- Before starting operation, the appliance should be stabilised to the ambient temperature (important when transporting from cold to warm rooms and vice versa) to prevent the formation of condensation.

### Maintenance and care:

- Never operate the appliance if it is not fully closed.
- Check the appliance and its accessories for damage to the insulation, cracks, kinks and breaks before each use. If in doubt, do not use the appliance.
- Only replace defective fuses with a fuse that corresponds to the original value. Never short-circuit the fuse or fuse holder.
- Clean the housing regularly with a damp cloth and a mild detergent. Do not use corrosive abrasive cleaners. Carefully remove dust and dirt from the ventilation openings with a Hoover when the appliance is switched off.
- Do not make any technical modifications to the appliance. Any technical modification will immediately invalidate the warranty and may lead to various hazards.
- Opening the devices and maintenance and repair work may only be carried out by qualified service technicians.

### **Attention: Do not connect several devices in series!**

In contrast to linear power supply units, switching power supply units are not designed for series connection operation. Internal earth references can lead to dangerous potential shifts, unstable control circuits and insulation problems. For such applications, only use special power supply units that are expressly intended by the manufacturer for series connection of several power supply units.

### **Caution when operating inductive loads!**

Inductive loads such as relays, motors or solenoid coils generate voltage peaks that can damage the power supply unit. Avoid this type of application or use freewheeling diodes for protection and ensure controlled current consumption to prevent overloads or shutdowns.

## 2. Introduction

### High-performance switched-mode power supply units with adjustable output voltage and current limitation

These newly developed power supply units are state-of-the-art switching power supplies with an output voltage and current limitation that can be adjusted via digital potentiometers. Thanks to automatic switching between stable voltage and current, the output power can be flexibly adapted to the respective requirements. The output voltage can be precisely adjusted in 10mV steps within the nominal range (C.V.). In continuous current mode (C.C.), the output current can also be precisely adjusted within the defined range in 10mA steps.

With their compact dimensions, low weight and modern, attractive design, these power supply units are ideal for use in laboratories, schools, industry, inspections and ageing and test scenarios, especially in the production of LED systems, DIY development projects, testing of electronic automotive components and other DC applications that require high currents and stable voltages.

The output values for voltage and current are displayed clearly and concisely on a large, white LED digital display.

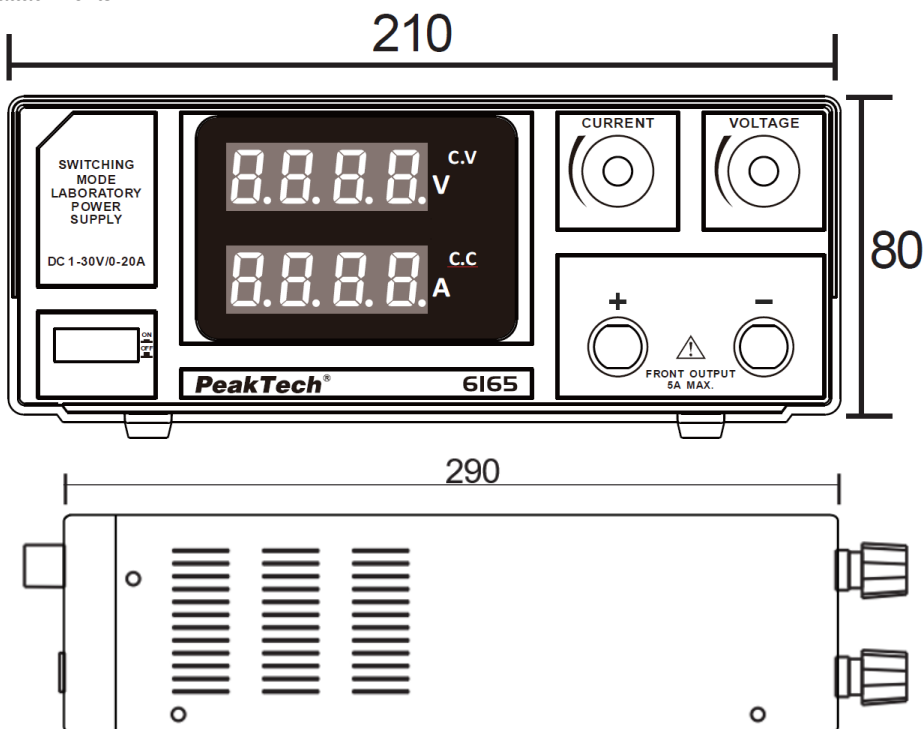
## 3. Technical data

|                        |                                                                                          |
|------------------------|------------------------------------------------------------------------------------------|
| Power supply:          | 220 V AC +/- 10% ; 50 / 60 Hz                                                            |
| Output voltage:        | P 6165: 1 - 30 V DC<br>P 6166: 1 - 30 V DC<br>P 6167: 1 - 60 V DC<br>P 6168: 1 - 15 V DC |
| Output current:        | P 6165: 0 - 20 A DC<br>P 6166: 0 - 30 A DC<br>P 6167: 0 - 15 A DC<br>P 6168: 0 - 60 A DC |
| Residual ripple        | (0-30V) ≤100 mV P-P (50Hz ~ 20MHz)                                                       |
| Noise:                 | (0-60V) ≤150 mV rms (50Hz ~ 20MHz)                                                       |
| Load stability:        | $1 \times 10^{-3} + 20\text{mV}$                                                         |
| Insulation resistance: | Input and output terminals ≥ 2000 V<br>Input and chassis earth ≥ 2000 V                  |
| Overload protection:   | Current limiting protection, overheating protection                                      |
| Accuracy:              |                                                                                          |
| Voltage display:       | ± 0.2 % + 3 digits                                                                       |
| Current display:       | ± 0.3 % + 5 digits                                                                       |
| Voltage output:        | ± 0.2 % + 2 digits                                                                       |
| Current output:        | ± 0.2 % + 5 digits                                                                       |

|                       |                                                                      |
|-----------------------|----------------------------------------------------------------------|
| Operating conditions: | Temperature: 0 ~ 30°C Humidity: < 80%                                |
| Use:                  | Indoor use only                                                      |
| Weight :              | approx. 3.3 kg                                                       |
| Accessories:          | Mains cable and operating instructions                               |
| Dimensions :          | (WxHxD) 290 x 80 x 210 mm Chassis<br>(WxHxD) 340 x 88 x 210 mm Total |

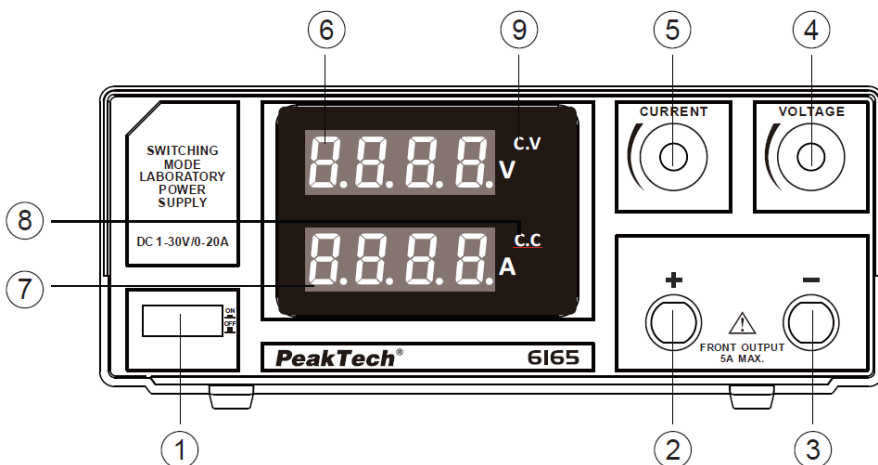
### **3.1 Dimensions of the housing chassis**

Listed here are the pure dimensions of the housing without feet, knobs, sockets and other attachments.



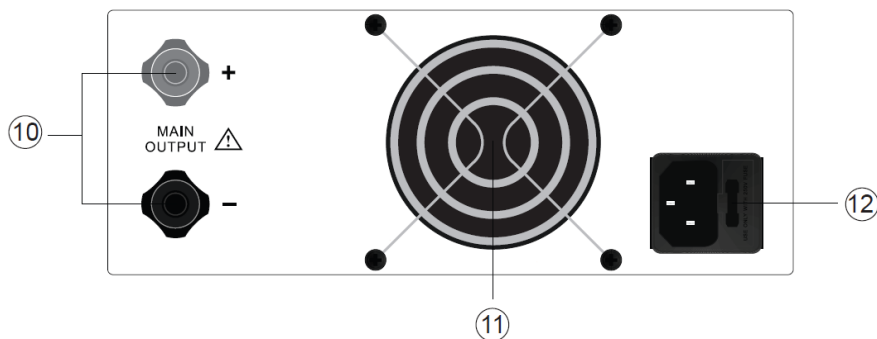
## 4. Device description

### 4.1 Displays and controls on the front of the appliance



- (1) Mains switch: "ON" / "OFF"
- (2) + Output (positive) for 5A max.
- (3) - Output (negative) for 5A max.
- (4) Voltage regulator
- (5) Current regulator (constant current limitation)
- (6) Voltage display
- (7) Current display
- (8) Constant current indicator (C.C.) lights up in constant current
- (9) Constant voltage indicator (C.V.) lights up in constant voltage mode

### 4.2 Elements on the back of the device



- (10) Output sockets for full current load: red=positive; blue=negative
  - (11) Temperature-controlled fan
  - (12) Fuse holder
- Below the device: PE earth terminal

## 4.2.1 Using the connection terminals

This high-performance laboratory power supply has **two types of output connections**:

### 3. Rear high-current poles:

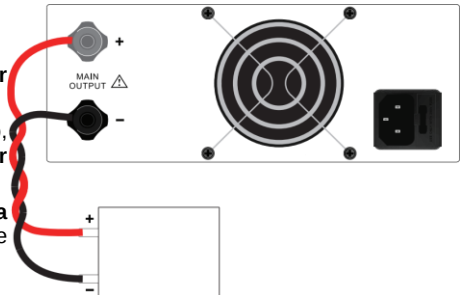
- **Solid screw terminals** are provided on the rear for currents above **5A**.
- These connections enable a **secure connection with thick cables** to avoid voltage drops and overheating.

### 4. Front 4mm safety sockets:

- These are designed for currents up to a maximum of **5A**.
- Higher currents could overload the contacts, lead to **increased heating** or damage the plug connections.

### Important safety instructions:

- Always use the **screw terminals on the rear** for **loads over 5A!**
- Thin cables or overloaded sockets can **heat up**, which can lead to **contact problems** or **dangerous damage**.
- Always use **high-quality cables with a sufficient cross-section** to minimise voltage losses.



## 5. Operation of the device

### 1. Setting the constant output voltage (CV mode)

- Turn the **current control (5)** **fully clockwise** (maximum current limitation).
- Switch on the appliance using the **mains switch (1)**.
- Set the desired **output voltage** with the **voltage regulator (4)**.
- **Only then** connect the **load** to the output sockets (10).
- The power supply unit now operates in **constant voltage mode (CV)** as long as the load draws less current than the set current limit allows.

 **Tip:** If the load has high inrush currents, the power supply unit can briefly switch to constant current mode.

### 2. Setting the current limit (CC mode & pre-display)

- Turn the **voltage regulator (4)** **fully clockwise** (maximum voltage).
- Turn the **current control (5)** **fully anti-clockwise** (lowest current limit).
- Switch on the appliance using the **mains switch (1)**.
- **Connect the load to the output sockets (10).**

- Increase the output current to the desired value by turning the **current regulator (5)**.
- The power supply unit now operates in **constant current mode (CC)** as soon as the load wants to draw more current than the set limit allows.

 **Tip:** The power supply unit has a **short-term display of the current limit**, even without a connected load. If you turn the **current control (5)**, the set **maximum current is shown on the display for 4 seconds** before the display jumps back to **0 A (no load current)**.

### 3. Difference between current limiting and current setting

The **current limitation** is only a direct **current setting** in CC mode.

- **Current limit:** The power supply unit determines how much **maximum current** may flow. If this value is exceeded, the device automatically reduces the voltage so that the current limit is not exceeded (**CC mode**).
- **Current setting:** A load only draws as much current as it actually needs - even if the limit is set higher.

#### NOTE:

- You **cannot** make a load draw more current than it needs!
- **Example:** A 12V motor that draws a maximum of 2A will not automatically draw 5A if the current limit is set to 5A.

 **Tip:** The current limiter is useful for **sensitive components** (e.g. LEDs, rechargeable batteries or electronic circuits) to prevent overcurrents. If this is not necessary, the current limitation can be set to the maximum value of the respective model.

### 4. Automatic switching between CV and CC mode

- The power supply unit automatically regulates between **constant voltage (CV)** and **constant current (CC)**.
- As soon as the **set maximum current is exceeded**, the power supply unit switches from **CV to CC** and reduces the output voltage to keep the current at the set value.
- The **CC or CV display (9)** shows the current operating mode.

 **Tip:** If the device switches to **CC mode** unexpectedly, check whether the load is drawing too much current or whether the current limit is set too low.

#### Additional notes

 Use **freewheeling diodes** for inductive loads (relays, motors) to avoid voltage peaks.

 **High current consumers** such as heating wires or power loads can have sudden high inrush currents. If the current limit is too low, the power supply unit may switch off.

 **Charging batteries or capacitors** with a laboratory power supply unit can be dangerous! For more information, read the paragraph under point **6**.

## 6. Attention !

In the event of a short circuit at the output, the current is limited by the current controls, but the appliance should be switched off and the short circuit eliminated before further use.

The main power must be switched off before maintenance and maintenance should only be carried out by qualified personnel.

The appliance should be located in a dry and well-ventilated place and if the appliance is not to be used for a longer period of time, the mains plug should be disconnected.

### Dangers when charging batteries with a laboratory power supply unit:

#### 4. No protection against reverse current:

- If the output voltage of the power supply unit is **lower** than the battery voltage, **reverse current** may flow.
- This can damage the power supply unit or cause the battery to discharge uncontrollably.

#### 5. No charge monitoring:

- A laboratory power supply unit **does not** recognise when the battery is fully charged.
- **There is no switch-off or reduction of the charging current**, which can lead to **overheating** and, in the worst case, to **an explosion** (especially with lithium-ion batteries).

#### 6. Hazardous chemical reactions:

- Incorrectly charged batteries can **outgas, inflate or catch fire**.
- This is particularly critical for **lithium batteries**, as they are extremely sensitive to overcharging.

### Recommended alternative:

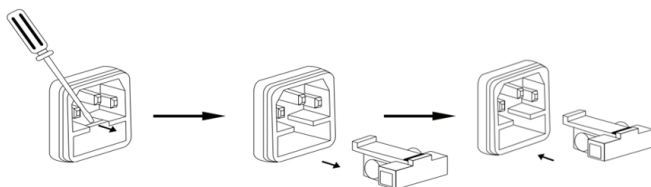
- **Always use a suitable charger with battery management!**
- If an external power source is required, a **special charging controller** should be connected between the mains adapter and the battery.

## 7. Replacing the device fuse

If the fuse blows during normal use, please replace it according to the following table:

| Model No. | Fuse Specification 5x20mm (220VAC) |
|-----------|------------------------------------|
| P 6165    | T8A 250VAC                         |
| P 6166    | T10A 250VAC                        |
| P 6167    | T10A 250VAC                        |
| P 6168    | T10A 250VAC                        |

Remove the power cord and use a small screwdriver to take out the fuse box and replace the fuse with a new one. Use a fuse only of the same specification and reinstall the fuse box.



## 8. Troubleshooting

|   | Possible malfunctions                                                               | Solutions                                                                                                                                                                                        |
|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | No output (no display in LED)                                                       | 1. Check the connection of the mains cable;<br>2. Check the condition of the fuses                                                                                                               |
| 2 | There is a display, but the output voltage is abnormal                              | 1. Check whether the output terminal connection is intact and correctly connected                                                                                                                |
| 3 | Load operation → No more output after a while                                       | 1. Check whether the fan is running or not.<br>2. Are there any obstructions to the fan outlet? Remove these                                                                                     |
| 4 | Connection at the front output → The desired current cannot be drawn                | 1. The front output is only suitable for loads up to 5A. Always connect larger loads to the rear output                                                                                          |
| 5 | The output current is limited and the voltage has collapsed                         | 1. Check the current setting knob (5) to see if the current limit is set too low. Adjust the current limit higher if necessary.                                                                  |
| 6 | Internal resistance of the load exceeds the current range. The device is in CC mode | 1. Set the current limit higher. If this is already at maximum, the maximum current of the power supply unit is not sufficient for the load. Check whether there is a short circuit in the load! |

**NOTE:** Please do not open the housing if a malfunction occurs. Maintenance and repair work may only be carried out by specialised personnel!

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*This manual considers the latest technical knowing. Technical changings which are in the interest of progress reserved.*

*We herewith confirm, that the units are calibrated by the factory according to the specifications as per the technical specifications.*

*We recommend to calibrate the unit again, after one year.*