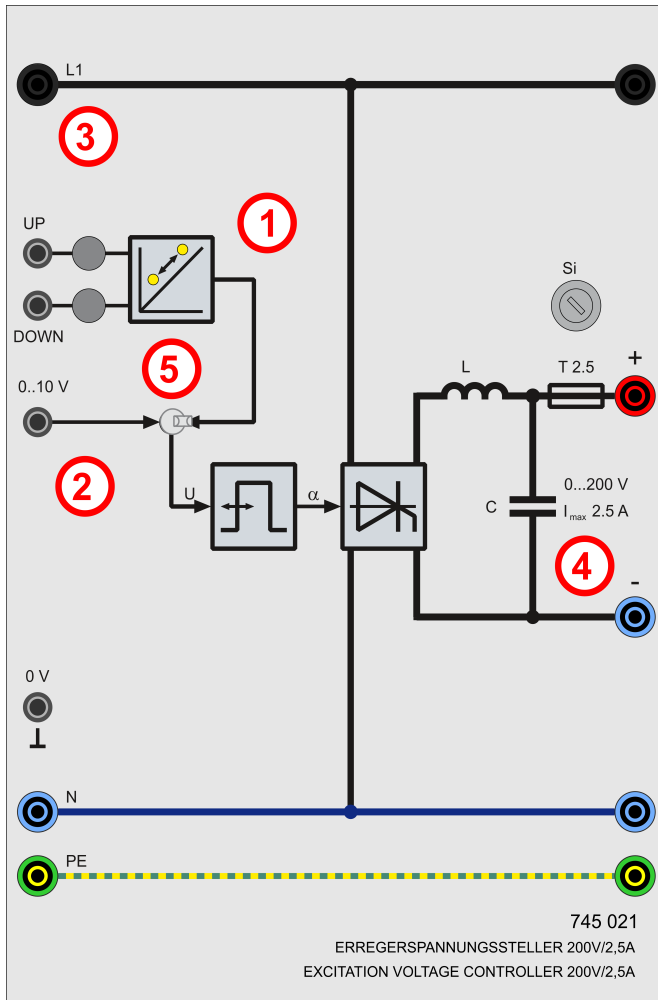


Instruction sheet 745 021

Excitation voltage controller 200 V/2.5 A



- 1 Impulse input
- 2 Analog voltage input
- 3 Supply voltage input
- 4 DC output
- 5 Switch analog / impulse

Safety instructions

The training panel is designed to comply with safety class I and corresponds to the safety stipulations set forth under EN 61010.

When the device is operated as directed, safe operation is guaranteed. However, safety cannot be guaranteed if the device is operated improperly or handled without the appropriate care.

- Only use safety connecting leads/bridging plugs because the voltage at the output sockets "+" and "-" is contact-hazardous!
- The voltage at the output sockets "+" and "-" is not electrically isolated from the mains.
- Connect PE to the motor or generator.
- Carry out modifications to the experiment set up only when the power is off.
- Never apply an external voltage to the output sockets.
- If you assume that safe operation is no longer possible (e.g. in the case of visible damage), then the

device must be switched off immediately and secured to prevent it from being accidentally put back into operation.

1 Description and intended use

An adjustable DC supply voltage is required to feed the excitation winding of a synchronous machine. The excitation voltage controller supplies a smoothed DC output voltage of 0 to 200 V with a maximum current of 2.5 A. The output is protected against overloads and short-circuits.

The DC voltage can either be set manually via UP/DOWN keys or externally via the control inputs. Increasing or decreasing voltage is indicated by two yellow LED's. It can supply both LD didactic generator power classes, 0.3 kW and 1.0 kW.

2 Set up

1. Connect the generator to the DC output, according to the experimental description.

2. Connect the controls if necessary.
 - Inputs UP/DOWN when using the impulse mode.
 - Inputs 0..10 V and 0 V when using the analog voltage mode.
3. The excitation voltage controller itself requires a supply voltage of 230 V \pm 10 % (115 V possible); 3 A; 50/60 Hz to input L1/N. It receives this voltage via sockets L1 3 and N directly from the experimental setup.

When the synchronous machine is run up asynchronously, it is not necessary to short circuit the excitation winding.

3 Description of the assembly

3.1 Impulse input 1

Generally, the excitation of synchronous generators is controlled with relay contacts. Here, the excitation current is dependent on an integral function of the switching time. Otherwise the generator control and the excitation control would interfere with each other.

The following diagram shows the excitation current I_{EX} over t when controlled with the impulse input.

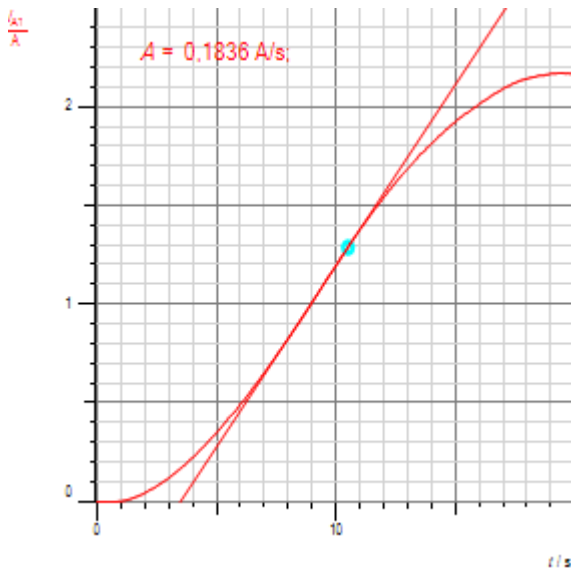


Fig. 1: Excitation current I_{EX} over time t controlled with impulse input.

Depending on the current level, the output is regulated faster or slower. Within a current range from 0.5 A to 1.6 A the curve is almost linear, with a slope of 0.18 A/s.

3.2 Analog voltage input 2

The analog voltage input has no integral function and therefore a direct effect on the output. Here, the output current depends on the voltage level at the input. The following diagram shows the excitation current I_{EX} over input voltage U when controlled with the analog voltage input.

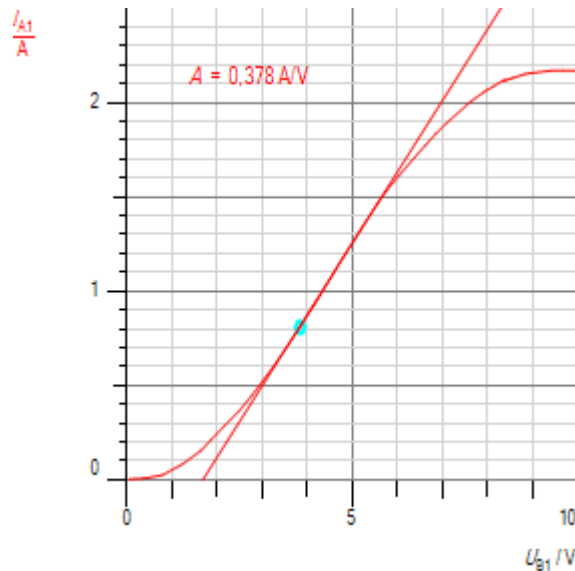


Fig. 2: Excitation current I_{EX} over input voltage U , when controlled with the analog voltage input.

3.3 DC Output 4

The DC output supplies the excitation winding of the generator with current. The output voltage depends on the control function and on the local grid voltage. The diagram shows the smoothed excitation current I_{EX} , when the generator is not rotating.

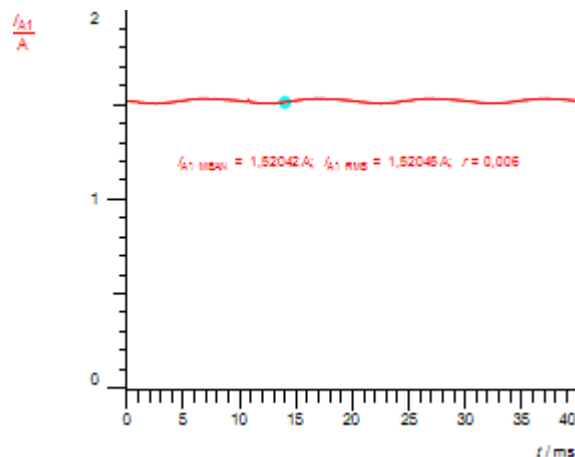


Fig. 3: Two periods of the smoothed excitation current I_{EX} .

The remaining small ripple is not interfering with the experiments, as it is negligible compared to the impact of the feedback of the rotating generator field.

3.4 Selection switch analog / impulse input 5

With this switch the input function can be selected. Flip right for impulse control, left for analog voltage control.

4 Technical Data / Additional Information

Output voltage U : 0...200 V

Output current I : max. 2.5 A

The output is overload-proof and short-circuit-proof.

Supply voltage: 230 V, 50/60 Hz. 115 V is supported with internal changes.

5 Operation

Select the input function with switch **5**.

In the analog voltage control mode and connected to the Machine Test CASSY, no further user inputs are required, as the excitation is controlled automatically via the CASSY.

With the impulse input mode, the manual control of the excitation is possible. You can increase or decrease the voltage with the push buttons. An external measurement instrument is nec-

essary to monitor the excitation voltage and current or the generator output.

6 Disposal



Electrical and electronic products must not be disposed of with household waste. Dispose of the product in accordance with the applicable legal regulations.