

Measurement Amplifier U

1020742 (230 V, 50/60 Hz)

1020744 (115 V, 50/60 Hz)

Instruction sheet

08/22 HJB



- 1 Measurement input
- 2 Socket for plug-in power supply
- 3 Display of operating voltage
- 4 Measurement output
- 5 Offset "fine" adjustment knob
- 6 Offset "coarse" adjustment knob
- 7 Amplification selector switch
- 8 Time constant selector switch

1. Safety instructions

The measurement amplifier U conforms to all safety regulations for electrical measuring, control, monitoring and laboratory equipment, as specified under DIN EN 61010, Section 1, and the equipment has been designed to meet protection class I. It is intended for operation in a dry environment, suitable for the operation of electrical equipment and systems.

Safe operation of the equipment is guaranteed, provided it is used correctly. However, there is no guarantee of safety if the equipment is used in an improper or careless manner.

If it may be assumed for any reason that non-hazardous operation will not be possible (e.g. visible damage), the equipment should be switched off immediately and secured against any unintended use.

In schools and other educational institutions, the operation of the measurement amplifier must be supervised by qualified personnel.

2. Description

The measurement amplifier U is designed for amplifying low-amplitude measurement signals from sources with low input impedance. Compensation of offset voltages is accomplished by fine and coarse offset adjustment knobs. The amplification itself can be selected from 0 to 5 powers of ten. High-frequency noise or other interference signals are suppressed by means of a low-pass filter with time constants between 0 and 3 s. The amplified input voltage is output as a signal in the range -12 ... +12 V with the same sign as the input.

Any voltmeter or an oscilloscope can be connected to the measurement amplifier output.

3. Technical data

Input resistance:	10 k Ω
Output resistance:	300 Ω
Offset voltage drift:	< 2 $\mu\text{V}/\text{K}$ (after about 15 minutes operation)
Gain factors:	10 ⁰ ; 10 ¹ ; 10 ² ; 10 ³ ; 10 ⁴ ; 10 ⁵
Tolerance of gain factors:	< 2.5%
Input voltage:	max. ± 12 V (overload protected for brief transients of up to 100 V)
Output voltage:	0 ... ± 12 V (short-circuit proof)
Power supply (via plug-in supply provided):	12 V AC
Ambient temperature:	5°C ... <u>23°C</u> ... 40°C
Storage temperature:	-20 ... 70°C
Relative humidity:	<85% without condensation
Storage alignment:	Horizontal
Contamination class:	2
Protection class:	IP20
Dimensions:	170x105x50 mm
Weight:	335 g approx.

Tab. 1: Input voltage and frequency ranges

Gain	Input voltage	Frequency
10 ⁰	-12 ... 12 V	0 ... 25 kHz
10 ¹	-1,2 ... 1.2 V	0 ... 25 kHz
10 ²	-120 ... 120 mV	0 ... 25 kHz
10 ³	-12 ... 12 mV	0 ... 20 kHz
10 ⁴	-1,2 ... 1.2 mV	0 ... 7 kHz
10 ⁵	-12 ... 12 μV	0 ... 7 kHz

Tab. 2: Cut-off frequency for switchable low-pass filter.

Time constant	Cut-off frequency
0.0 s	s. Tab. 1
0.1 s	1.6 Hz
0.3 s	0.5 Hz
1.0 s	0.16 H
3.0 s	0.05 Hz

4. Measurement procedure

It is recommended that you wait about 15 minutes after turning on the measurement amplifier U before starting any measurements in order for all components to settle into a stable equilibrium and thus minimise offset drift.

- Connect the measurement amplifier to the mains using the plug-in power supply provided.
- Connect a voltmeter or oscilloscope to the measurement output.
- Short the measurement input and calibrate the offset to 0 V.
- Connect the signal to be measured to the measurement input.
- Select a suitable gain factor for the input voltage range (cf. Table 1).
- Activate the low-pass filter if needed by setting a time constant > 0 s.

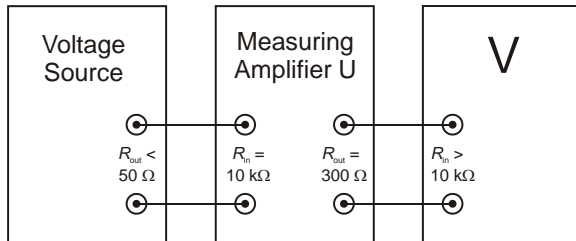


Fig. 1: Block circuit diagram specifying input and output resistance

Measurement of current

Additionally recommended:

Resistance 100 Ω , 5 % 1012910

By connecting an external resistor R_{shunt} to the input of the measurement amplifier it is also possible to measure amperage. A connected voltmeter displays the voltage:

$$U = 10^n \cdot R_{\text{shunt}} \cdot I.$$

- To avoid errors in measurement, do not select an external resistor of larger than 100 Ω if possible. If necessary, measure the resistance with an ohmmeter.
- Take note of maximum current.

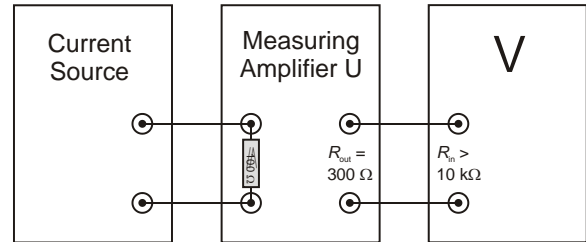


Fig. 2: Block circuit diagram for current measurement.

5. Storage, cleaning and disposal

- Keep the equipment in a clean, dry and dust-free place.
- Before cleaning the equipment, disconnect it from its power supply.
- Do not clean the unit with volatile solvents or abrasive cleaners.
- Use a soft, damp cloth to clean it.
- The packaging should be disposed of at local recycling points.
- Should you need to dispose of the equipment itself, never throw it away in normal domestic waste. If being used in private households it can be disposed of at the local public waste disposal authority.
- Comply with the applicable regulations for the disposal of electrical equipment.

