

# Analog transmitter U16/14-100k

## Manual





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## 1 Box contents

Quantity	Description
1	Transmitter U16/14-100k
1	Receiver U16/14-100k
1	External filter SUB-D for EMC-tests
1	optical fiber 62,5 / 125µm
2	Chargers
1	Manual (english)
1	External battery pack (optional)

The shipment includes charged batteries. However, due to the self-discharging of NiMH-batteries they should be recharged again before use.

Read chapter 5 (Maintenance) before charging the devices!

## 2 Characteristics

The **U16/14-100k** can be used to optically transmit analog voltage signals. Because of the optical transmission, the system is very robust against EMS (electromagnetic susceptibility). It can withstand high electric and magnetic fields, like they appear in EMC-tests and also is optimized for low noise emission.

The standard voltage range of the system is +/-15V. It is available with x=1 to 16 input channels. For more information about the variants, see datasheet or call us.

Power is supplied by internal NiMH-batteries which make the system easy to use. The **U16/14-100k** is prepared for the use of external batteries (with optional battery pack).

Read chap. 5 before charging!

### 3 Field of application

- Transmission of analog signals during EMC-tests
- Transmission of analog signals over long distances without voltage loss (up to 100m or more, depending on timing requirements)
- Handle ground potential problems

An external filter has to be used for high level EMC-tests. The filter has to be attached directly to the input of the transceiver located in the absorber lined chamber. Depending on the range of use (ESD, BCI, ...) there may be different filters available. Please contact us to get the best solution.

### 4 External filters

An external filter mounted to the device inside the anechoic chamber has to be used for all emissions and immunity tests. With this, a damage of the device is avoided during immunity tests (=> obligatory! no internal filter existing) and the emissions spectrum is reduced during emissions testing.

Filters and voltage dividers have to be connected directly to the device since they are matched to its input-impedance (do not use an extension!). Notice the differentiation of input- and output filters (see chapter4.1).

#### 4.1 Differentiation: input vs. output filter

If you want to transmit analog voltages from outside into the anechoic chamber, output filters are needed (the external filter has to be mounted to the device inside the anechoic chamber)! This has to be mentioned while ordering the equipment, because input filters are the standard (used to transmit signals out of the chamber). Notice that input filters cannot simply be mounted to the receiver (output), because of different impedances. Incorrect measurements would be the result!

- Transmission from inside to the outside of the anechoic chamber: input filter (mounted to transmitter), Standard
- Transmission from outside to the inside of the anechoic chamber: output filter (mounted to receiver )

**The use of an external filter for high level EMI-tests is essential. If disregarded, the system might get damaged!**

**Respect the application purpose while choosing the external filter! Input- and output filters are not interchangeable**

## 5 Maintenance

Maximum charging current is 1 A

**Devices must be turned off before connecting to charger, or else the system might get damaged!**

Pinning of charge- / buffer connector

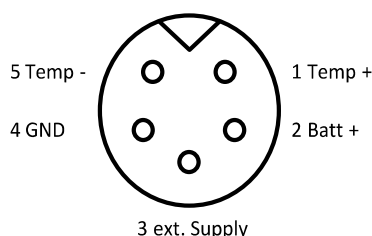
**Do not use charger or power supply during EMI-test!**

**Do not open the devices!  
Short cut / fire hazard!**

Recharge batteries after use with the enclosed charger. To prevent a lazy battery effect, discharge the devices every 5 times completely by using the automatic switch off (Leave the system on, until it turns off automatically). Afterwards, charge the devices as usual.

The devices have to be turned off before connecting to the charger. If this is disregarded, the system might get damaged!

Figure 5.1 shows the pinning of the charge connector. Chargers have to be connected to pin 2 (+) and pin 4 (GND). An external supply (6...8V, 0.5A) can be connected to pin 3 (+) and pin 4 (GND). **Use only power supplies which are certified by mk-messtechnik.**



*Figure 5.1: pinning of charge plug*

The included chargers are not meant to power the transmitter or receiver during operation. The device outside the shielded room can be run with an external power supply (optional). The internal device can be run with an external battery, if needed (optional). Do not use the external power supply or charger to power the device inside the shielded room while EMI-tests are running. This might damage it!

Due to self-discharge issues with NiMH batteries, recharge batteries before use, if the system has not been used for a longer time.

Do not use cleaning agents or solvents to clean the devices, only use a slightly moistened, soft cloth.

Do not open the devices, as there are no parts inside which have to be maintained. The opened housing can pose a fire hazard through short-circuit currents! Please contact your distributor or the manufacturer if you have any problems. Send in the complete system (both devices), if a problem cannot be solved by turning the devices off and on again or by checking the positions of the switches. Please contact us in any case before sending in the devices.

## 6 Trouble shooting

The following trouble shooting list is provided to assist you while having problems. It might let you use the system again without a long down time:

<b>Error:</b>	<b>Possible reasons:</b>	<b>Solution:</b>
No or erroneous transmission Transmission does not start properly Noise at output	Wrong power-up sequence	Check documentation of hardware and position of switches
No transmission, DC voltage at output	No optical signal at the receiver  System (transmitter) turned off	Check optical fibers and connections, change fibers if necessary Turn on the devices
Transmission stops	Low battery  Signal of source interrupted	Check LEDs at transmitter and receiver, recharge batteries Test source signal directly at the device under test
Device cannot be turned on, cannot be charged	Batteries damaged  Internal fuse is broke  Charger or cable damaged  Batteries over discharged	Send in device to the manufacturer Send in device to the manufacturer Check / replace charger  Charge batteries, maybe use other charger (5 battery cells)
Output voltage does not correspond to the expected value	Voltage divider was not taken into account Erroneous transmission of the settings  Wrong filter chosen / filter not mounted	Set / Include ratio at the oscilloscope Turn off/on the devices again, take care of power-up sequence Take operation purpose into account (frequency range and transmission direction of the signal)

Error:	Possible reasons:	Solution:
Low-impedance at input	Input wiring defective (if system was used for immunity tests without external filter or over voltage at input)	Send in device to the manufacturer

## 7 Accessories / Options

Part	Order number	Comment
Optical fiber	LWL-1-xm	x = length in m, simplex
External batteries	BP-60-25	6V/2,5Ah
Connector cable for BP-60	SC-20-5m5m	Length approx. 20cm
Charger with connector plugs	CH1-5m	Standard charger
Input filter	FI-X-Y	X = ratio y = frequency limit in MHz (ask for details)
Output filter	FO-X-Y	X = ratio y = frequency limit in MHz (ask for details)
Manual	MA-U <sub>x</sub> /12-100k	German or english

## 8 Contact

mk-messtechnik GmbH  
Zeppelinstraße 1  
D-73274 Notzingen

Tel.: (+49) 7021 / 9566925  
Mobil: (+49) 160 / 96205204  
Fax: (+49) 7021 / 9566926

Email: [info@mk-messtechnik.de](mailto:info@mk-messtechnik.de)  
www: [www.mk-messtechnik.de](http://www.mk-messtechnik.de)

WEEE-Reg.-Nr. DE 21806070



## Appendix: Details and operation

The following chapter is used to describe special details of the **Ux/14-100k** system with up to  $x=16$  channels ( $\pm 15V$ ) for unidirectional transmission. In this appendix, the maximum number of channels is being described. The only difference if ordered with lower amount of channels is that the pins with the higher channel numbers don't have any function. The pinning of your system is always printed on the housing.

### a) Housing and connectors / switches

Fig. a.1 shows the front sides of transmitter (left) and receiver (right) with connectors:

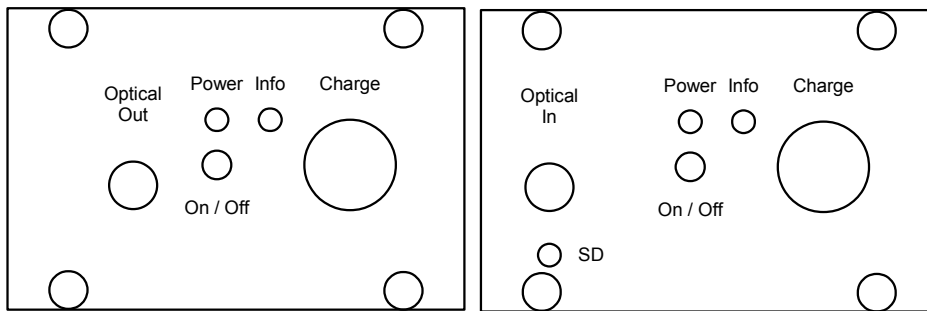


Fig. a.1: Front side of the devices with connectors and switches

- power push button with control LED (*Pwr On/Off*)
- battery information LED (*Info*)
- charge plug (*Charge*)
- optical connector FSMA (*Optical In*    *Optical Out*)
- Signal detect LED (*SD*), only on receiver side, gives information about connection to transmitter

Appendix for fully loaded U16/14-100k. The pinning of your system is always printed on the housing!

Front sides with connectors

Fig. a.2 shows the rear sides of transmitter(left) and receiver (right) with connectors:

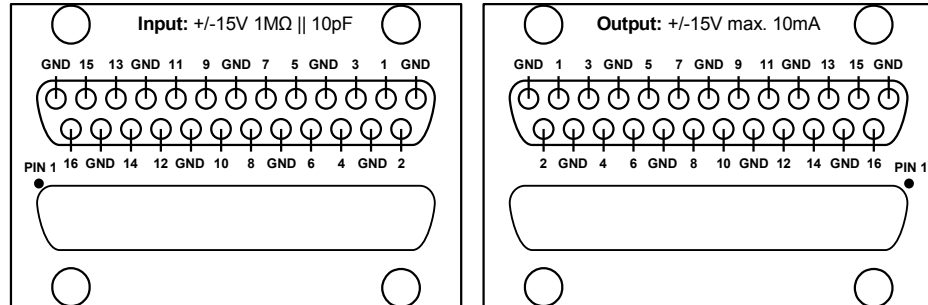


Fig. a.2: Rear side of the devices with connectors and switches

- Signal connector SUB-D 25 (Input: +/-15V 1MΩ || 10pF) and (Output: +/-15V 10mA)

The housing of the SUB-D connector is connected to the aluminum case, which is connected to the circuit GND. This should be taken into account during the test (possible ground loops, short circuits, parasitics to GND-plane!). The pinning is shown in Fig. a.2 and is also printed on the housings.

The receiver is also available as 19" rack mount kit (see Fig. a.3), which allows to integrate BNC plugs at the front (pinning: inner connector is signal) and additional other plugs in parallel (2mm Hirschmann in the shown case). Here, the SD-LED is integrated as well as the power switch.

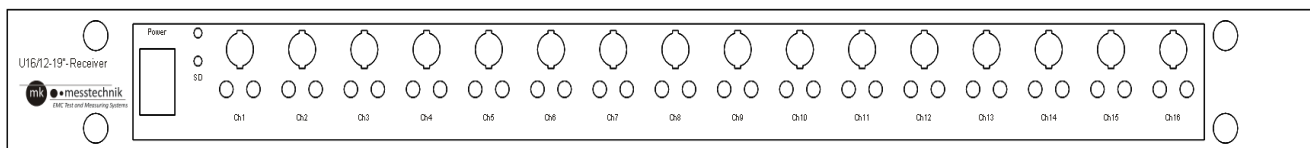


Fig. a.3: front side of 19" receiver with connectors

At the rear side of the receiver, the connectors for optical input and the power supply (6-8V, 0,5A) are placed.

Notice, that the 19" rack mount kit is not made for use inside the EMC chamber!

Rear sides with connectors  
Your pinning is printed on the housing!

The SUB-D housing has the same potential as the aluminum case.

Don't use 19" rack mount receiver inside the ALC!

## b) Operation and handling of the *Ux/14-100k*

- Choose and mount the correct filter for your application (cut off frequency as high as needed and as low as possible) to transmitter. The filters also contain hardware for signal condition. It is essential to use them for every setup.
- Connect the optical fiber
- Connect the analog signal cable to transmitter. It is recommended to choose the cable as short as possible, since the transmitter input ( $1M\Omega \parallel 10pF$ ) is not matched to your application (avoid oscillations).
- Connect the output of the receiver to a suitable high-impedance voltage measurement device, such as an oscilloscope or multimeter. The length of the connector cable should not be significantly longer than 1m, since the upper frequency limit is lowered by the parasitic capacitive load.
- Set the voltage measurement device to the expected voltage and time range, if necessary. If used, take optional included voltage divider into account, while setting / checking your measurement device.
- Turn on all devices (no order to be recognized). Communication between transmitter and receiver will be indicated by the Signal detect LED at the receiver.
- The *Ux/14-100k* system is ready to use about two seconds after turning on the transmitter.
- Check info LED if transmission stops suddenly!

If the transmission suddenly stops after a long duration of measurement, check the *Info* LED of the transmitter (see Figure a.1). If the battery power falls below 5,2V, the *Info LED* is switched on. The system should be reloaded soon. Below 4,5V, the system is turned off automatically.

The measurements can be extended by using the optional battery pack (BP-60) with connector cable or a power supply certified by mk-messtechnik. The external supply can be connected to the system any time (parallel). The connection to the internal battery is decoupled with a diode.

**Always use external filter! It contains signal conditioning hardware too and is necessary for correct measurements!**

**Check info LED if transmission stops suddenly!**

**Only use battery packs and connector cables provided from mk-messtechnik. Other modules influence EMS-performance and might damage the opto-system!**

Only use the battery pack and connector cables from mk-messtechnik!  
Others might lead to a damage of the system!