SERVICE NOTE

Notes on MFK/CS4/CS-L Installation

MFK1 Installation

Prerequisites

It is necessary to keep some distance between electronic and pick-up (part with the measuring coils) unit of the Kappabridge to reach high sensitivity of the system. Typical set-up is shown on the figure below. Typical distance between both units is approx. one meter. The controlling laptop is located between them, usually close to the electronic unit. So the table (or tables) must be at least 1.3 meter long with depth at least 0.5 meter.

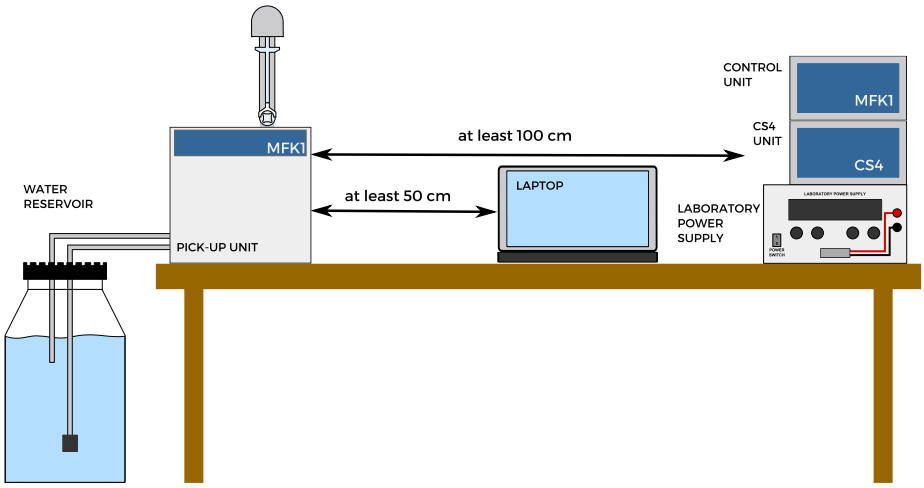

Figure 1: Recommended setup of MFK1/CS4/CS-L system

Table

Wooden (or plastic) with minimum amount of metal parts must be used for the pick-up unit of the kappabridge. Especially metal construction which creates closed loop under the desk may cause huge sensitivity problems (this loop "amplifies" magnetic disturbances and can make measurements impracticable). It is also better if table has no drawers.

Environment

The pick-up unit has quite good shielding of the electrostatic disturbances, but there is not any chance to shield outer magnetic fields. For this reason it is necessary to keep the pick-up unit as far as possible from the sources of the magnetic fields (just like CRT monitors, Xeroxes, laboratory instruments producing magnetic fields and so on). Temperature in the room must be as stable as possible. MFK1 can work in the standard range of laboratory temperatures (15-35 °C), but the stability of this temperature is crucial for high sensitivity of the measurements. Temperature change in the laboratory should be lower then 1 °C per hour. It is necessary to prevent air blowing around the pick-up unit – do not put the pick-up unit under the air condition units. Relative humidity must be lower then 80 %.

Power

MFK1 is ready for operation with these voltages - 240, 230, 120, 100 V ±10 %, 50 / 60 Hz, so it covers all the standard electricity systems over the world. It is necessary to have wall plugs equipped with grounding pin. The MFK1 itself needs 40 VA of power, computer needs another 100 VA. If you wish to run MFK1 with systems for measuring high or low temperature variations of the susceptibility then you need another 500 VA. So it is recommended to use power line with minimum rating 1000 VA (for example 100 Volts, 10 Amperes). It is also better if the MFK1 system has its own dedicated power line. Good-class UPS (Uninterruptible Power Supply) is recommended, but not needful.

Computer

Laptop with data acquisition (SAFYR) and data processing (Anisoft) software is provided together with the MFK1 system (with exception of China, import of the computers to China is prohibited). AGICO software runs on all versions of the Windows OS from Windows 98 up to Windows 10. Other operation systems are not supported.

Installation

Installation of the MFK1 consists of these steps:

- Unpacking the device.
- Connecting all the parts.
- Set of the sensitivity tests.
- Other tests of the system.

- Approx. 6 hours is necessary to complete this four routines, it depends on the version of the MFK1 (FA, A, FB, B). Then follows (usually next day).
- Customers training: introduction of the Kappabridge, measuring principles, how to operate device, introduction to measuring and data processing software.
- First customer's measurements.

So at least two working days are necessary for the MFK1 installation, but it is recommended to reserve three days for the installation – third day may be useful in the case of some problems during the installation.

CS4 Installation

CS4 is the optional supplement of the MFK1 (versions A or FA) system. This device allows to measure high temperature variation of the magnetic susceptibility in the temperature range from room temperature up to 700 °C. Same prerequisites as for MFK1 are necessary and there are some more. It is 50 liters of distilled (deionized) water for cooling system and argon gas for the protective atmosphere to prevent oxidation of the sample during the measurement. Installation of the CS4 requires at least one additional day to the MFK1 installation.

Distilled water

50 liters of distilled water is required for the cooling system. Distilled water is necessary due to the two main reasons.

1. Absence of the magnetic particles which may affect the measurement.
2. Distilled water is not favorable environment for bacteria or algae which may grow into the water.

Usual life-cycle of the water is one or two years. It is recommended to change the water every year. The life time of the water may be increased by the adding some kind of algaecide for water baths and circulators. In AGICO we are using neoLab-BAD Stabil, the dosage is 25 ml per year (for 50 liters reservoir). Water reservoir, pump and tubing are provided by AGICO as the part of the CS4 system.

Argon gas

Argon gas is used as the protective atmosphere during the high temperature measurements. Purity of the gas is not critical, we recommend

purity 99.5 %, but purity 99.9 % is better and price difference is negligible. We recommend to order at least 20 litre bottle. It is necessary to have pressure reduction valve on the bottle with range of output pressures form 0 up to approx. 10 bars (150 psi). Inner diameter of the argon tubing is 8 mm (5/16 inch) so the counterpiece on the valve must be prepared for such tube. See pictures below.

Detail of reduction valve.

Detail of tube connection, inner diameter of tube is 8 mm (5/16 inch)

Detail of tube counteripece.

Figure 2: Detail of argon gas connection

CS-L Installation

CS-L is the supplement for MFK1/CS4 system which serves for measuring of the low-temperature variations of the magnetic susceptibility. Range of temperatures is from -192 °C (temperature of the liquid nitrogen (LN2) is -196 °C) up to room temperature (measurement is usually performed only to 0 °C).

The requirements are the same as for MFK1/CS4 system with added need of liquid nitrogen. Approx. amount of liquid nitrogen is 0.25 liter per for one low-temperature measurement. We recommend 10 liter Dewar bottle for storing of the liquid nitrogen. For further manipulation with smaller amounts of liquid nitrogen, polystyrene pot is provided together with CS-L instrument. Argon gas is needful as well, because it is used for expelling of the liquid nitrogen from the cryostat.