

User Manual MC4.0



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By using this TSR meter you can enjoy high precision and quality. You benefit from many years of measurement experience, the intensive cooperation with domestic and foreign universities, universities of applied sciences and research institutes. The MC4.0 is manufactured in our factory with the utmost care. All sensors are calibrated in our accredited wind tunnel systems and checked precisely for the prescribed tolerance values.

A. Description

Safety and foreseeable misuse

- Use MC4.0 only according to the instructions in this manual. Another use may result in property damage or personal injury.
- Always use MC4.0 outside areas of highly flammable and/or explosive substances. Use in hazardous areas is not permitted!
- Avoid moisture, extreme temperatures, vibrations and vibrations, as well as strong sources of electromagnetic interference. These can significantly affect the quality of the measurements or damage the device.
- Unauthorized changes to the device can lead to malfunctions and are prohibited for safety reasons.
- After the service life has expired, send the device back to TSR Messtechnik. We take care of the professional disposal.



B. How it works

Purpose

Applications and tasks:

- Measuring and regulating air technology systems
- Room climate measurement
- Measurement of air flow under field conditions
- Saving and printing measurement results

Measures:

- Flow
- Volume flow
- Temperature
- Relative humidity

Delivery scope

MiniAir20 and MC4.0 were inspected at the factory prior to delivery and left our house in perfect condition. Please check the product for damage upon receipt of the goods. If the transport damage is detected, please contact us immediately.

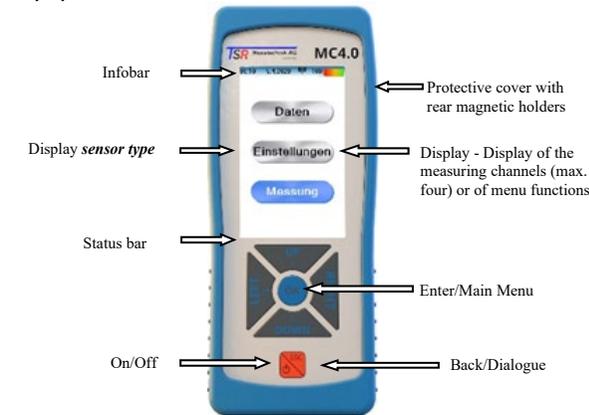
Typical scope of delivery is:

- MC4.0 Multi-channel meter
- Sensor MiniAir20 (if ordered)
- Charger/power supply USB 5 Watts
- User manual (complete manual online on tsr-ag.ch)
- Equipment accessories

Power supply

The power supply is provided via a fixed battery in the device. The USB-C charger is included.

Display and control elements



Connections and interfaces



1. Lemo plug for sensors

Connect the sensor for flow with the five-pole socket. Matching sensor types are listed in chapter "Supported Sensor Types".

2. USB-C connection for sensor (front side)

Connect digital sensors to the mc 4.0 device (coming soon)

3. USB-C connection for power supply

To charge the battery or mains operation of the device.

Commissioning

Charging the battery

- ⚠ Use only the supplied power supply and charging cable to charge the battery. Non-compatible power supplies can damage the device! For initial commissioning, connect the power supply to MC4.0 and charge the battery for approx. 2 hours. The device is then ready for operation and can be used. The battery is fixed in the MC4.0 and designed for a long service life.
- ⚠ Please do not do any unauthorized work on the battery or the device. This can cause irreparable damage to the device!

C. Operation

Key functions

To Switch on: press the button long.

To turn off: Press the key for a few seconds Instrument displays Switch off mode. Confirm to Switch off instrument with yes.

Back (Esc): After turning on the device the button has a back function and cancel or exit selected settings and menu items.

The Ok key confirm inputs and activate menus or menu items (Enter function).

Navigate between individual menu items with UP, DOWN, LEFT, RIGHT You can also change parametric values.



Connecting sensors

MC4.0 offers sensor sockets for flow measurement as well as for humidity and temperature measurement. The MiniAir20 and MiniWater20 series range sensors are supported for flow measurement in air and water. These are complemented by a combined humidity and temperature sensor.

- Connect the sensor connector to the socket in the device.
- The sensors should only be plugged in and out when the MC4.0 is switched off.

☑ The MiniAir/Water20 sensors are detected automatically, the sensor type is displayed in the Start menu.

Supported sensor types

Sensor type and measuring range	Short display in the Start menu
MiniAir20 Micro Air 0-20m/s	Micro 20m/s Air
MiniAir20 Micro Air 0-40m/s	Micro 40m/s Air
MiniWater20 Micro Water 0-5m/s	Micro 5m/s Water
MiniWater20 Micro Water 0-10m/s	Micro 10m/s water
MiniAir20 Mini Air 0-20m/s	Mini 20m/s air
MiniAir20 Mini Air 0-40m/s	Mini 40m/s Air
MiniWater20 Mini Water 0-5m/s	Mini 5m/s water
MiniWater20 Mini Water 0-10m/s	Mini 10m/s water
MiniAir20 Macro Air 0-20m/s	Macro 20m/s air
MiniAir20 Macro Air 0-40m/s	Macro 40m/s air
MiniAir20 Micro Air 0-20m/s Steel 140°C	Micro 20m/s Air 140°C
MiniAir20 Micro Air 0-40m/s Steel 140°C	Micro 40m/s Air 140°C
MiniAir20 Mini Air 0-20m/s Steel 140°C	Mini 20m/s air 140°C
MiniAir20 Mini Air 0-40m/s Steel 140°C	Mini 40m/s air 140°C
MiniAir20 Macro Air 0-20m/s Steel 140°C	Macro 20m/s air 140°C
MiniAir20 Macro Air 0-40m/s Steel 140°C	Macro 40m/s air 140°C
MiniAir20 Micro Air 0-20m/s Steel 250°C	Micro 20m/s Air 250°C
MiniAir20 Micro Air 0-40m/s Steel 250°C	Micro 40m/s Air 250°C
MiniAir20 Mini Air 0-20m/s Steel 250°C	Mini 20m/s air 250°C
MiniAir20 Mini Air 0-40m/s Steel 250°C	Mini 40m/s air 250°C
Humidity/temperature sensor	---

Info and status bar

The information bar is located at the top of the display and is permanently displayed when the device starts.

It displays:

- Battery capacity - battery level numeric in percent
- Date/time in all profiles/menus, Bluetooth/WiFi status

The status bar is located at the bottom of the display and appears when a measurement profile or menu is activated. Advertisements:

- Info Configuration settings in the dialog menu
- Instantaneic value or interval measurement - active measurement profile
- Log AKTIV or Log STOPP - Datalogger on/off
- File icon and name when browsing and displaying saved measurement results

Start Menu

The Start menu is the central selection area for device functions and device information. After the device starts, the Start menu is displayed with the following menu items:

- **Display sensor type:** Supported sensors (table "Supported sensor types") are displayed graphically and with a short description. For incompatible sensors, the message Sensor Type is not displayed detected.
- **Measure**
- **Data**
- **Settings**

Setting the Measuring Instrument

Starting from the **Start menu/Settings**, device settings can be made or changed to MC4.0.

Configuration

The configuration of the device is done in the Settings menu.

Status: **Start Menu -> Settings**

- **Menu Units** - Change the dimension of the of measuring variable.

Measure	Dimensions
Temperature (air)	°C, °F
Volume (flow)	m ³ /h, l/s, m ³ /s
Flow	m/s, km/h

- **Set the time/date.**
- **Language** - Select English, German, French or Italian
- **Display** - Setting the display brightness
- **Bluetooth/WIFI** Setting the display brightness device data and serial number.
- **Factory settings** - Attention! This command deletes all manually set settings and returns the device to the delivery state!
- **Info** - Device Information(Serial No. & Manufacturers)

Measuring profiles

Activate and stop profiles

Status: Menu Measurement is activated

Function Menu call with button UP/ or with click on Menu. Activate the desired measurement profile with the OK button. Display shows either Average or Logger.

Measure:

- There are two profiles to choose from for measurement tasks:
- **Average:** In the Average measurement profile, average, min. and max. values of the recorded measuring variables are formed over defined or free time intervals.
- **Logger:** Datalogger enables the recording of momentary values in start-stop measurement with adjustable interval (time span between two recordings). At least 1,000,000 data records can be logged (card memory with 4 GB).

Settings for measurements

Measurement configurations can be made from the Startmenu/Measurement/Menu.

Loggerinterval: Select menu in the function bar menu, select menu item logger interval: Set the desired time span between the recordings, setting range 1- 7200 s

Averagingtime: Select menu item averaging time, den set desired value in the range 1- 7200 s

Units - Change the dimension of the measures.

Temperature (air): °C, °F, volume (flow): m³/h, l/s, m³/s, flow: m/s, km/h

Flow rate measurement - volume measurement to determine flow in ventilation systems or pipes. This function must be adjusted manually. Informations of the pipe shape and diameter are required.

Selection: Startmenu/Measurement/Menu/Flow rate measurement

- Define pipe shape: Round or rectangle.
- Permeable. or height/width, setting range 000-999mm.

Activate volume measurement

Volume measurement is factory-deactivated and must be manually activated and/or adjusted in the dialog menu before starting a measurement task.

Profile Instant value

If the Logger and Average functions are not started, the actual value is shown. Actual value: For ad-hoc measurements or rapid and overview measurements under field condition

Data logger

Datalogger allows recording instantaneous values in start-stop measurement with adjustable interval (time span between two recordings). It can be max. 1.000,000 records (card memory with 4GB).

Measures

Datalogger records all measurement variables for which a

- suitable sensor is plugged in
- optional channel is activated (volume measurement)

Conditions:

- Profile Logger enabled & logger interval set
- Start/stop recording
- Logger Start. After starting the logger, the menu can be closed. The readings will continue to be recorded until the data logger is terminated.
- To finish, press stop.

i If the logger is not stopped manually, the recording is continuous until the device is turned off or the battery is discharged. Log data is preserved in this case.

Profile Average measurement

In the Interval Measurement profile, average, min and max values of the measured variables are formed over defined or free-running time intervals. The Save and Printing functions are available for processing and visualizing the values. Prerequisites:

Connect flow measuring sensor (or additionally humidity/temperature sensor.

Activate profile - chapter Display of the measured values

Measured values, units and sensor detection are continuously displayed in the display. At the interval, updated average, min, and max values are displayed. In addition, a counter is displayed that counts the running interval time up to the final value.

Defined interval measurement

The measurement over a defined period of time is the standard interval measurement. It is used for series measurements with a constant time interval.

Select Menu in the toolbar, select averaging time and set the duration between 1 – 7200 s.

Processing Measuring Results

MC4.0 provides to possibilities for saved measuring results:

Display Data

Select Data: The .xml-files are saved in the internal storage sorted after measure profile and date. (To find specific data select the wanted measure profile, year and day.

Delete data/ measured values: Main menu / Select data / selected record / long press Ok or with touchscreen long click on the selected record to the file or delete folders.

D. Specifications

MiniController MC4.0

Sensor	Flow sensors for gases and waterHumidity and temperature sensors
Measuring units	Flow: m/s, km/hVolume flow: m ³ /h, l/s, m ³ /sHumidity: % rTemperature: °C, °F, °K
Display	TFT Dot Matrix Display
Measuring rate	2 measurements / s
Power supply	Lithiumpolymerbattery
Operating time per battery charge	approx. 8 hrs
Enclosure Dimensions (HxWxI)	168 x 68 x 38 mm
Enclosure protection type	IP 67

Weight	approx. 300 grams
Temperature	0 to 60°C
Operating humidity	0 to 90% rF
Calibration standard for air sensors	Laser Doppler Anemometer (LDA)

Important notes:

- Humidity, extreme temperatures, vibrations and vibrations must be avoided.
- Cleaning the case and glass with a soft, slightly damp cloth. Do not use abrasion and solvents, do not immerse in water.
- Remove used batteries immediately to avoid leakage and thus damage to the device. Please dispose of the batteries properly (environmental protection)
- Strong electromagnetic sources of interference (transformers, radios, transmitters, etc.) can affect measurement accuracy.
- The device must not be modified. Only original accessories are to be used.
 - The product must not be disposed of via public waste collection points or bins. It must either be disposed of properly in accordance with the WEEE Directive or can be returned to TSR Messtechnik AG at its own expense.



Guarantee

We assume the warranty for detectable material or manufacturing defects on plants and equipment for 12 months from delivery. In the case of incorrect applications, the warranty claim is not required.

In the event of warranty, the damaged part will be repaired or replaced free of charge at our discretion. The transport and travel costs shall be borne by the customer.

In the case of third-party materials, the supplier's warranty provisions apply. We assume no liability with regard to the suitability of the delivered goods for the intended purpose.

Our liability in all cases is limited to the defective device. Further liability for any damages is expressly excluded.

EU Declaration of Conformity:

Device:Wing wheel anemometer

Device designation:MiniController MC4.0 with sensor MiniAir20/MiniWater20

Type designation:MC4.0/f.6**/f.717.MC4.0

We hereby declare that the devices described above comply with the relevant provisions of electromagnetic compatibility in accordance with the EMC Directive 2014/30/EU.

The following harmonised standards have been applied:

- EN 55022:2011-12; (Emission)
- EN 61000-6-1:2007-10; (Immunity)

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Certified to **EN ISO 9001:2015** and **EN ISO/IEC 17025:2017** (for airflow)

Date: 30.01.2021

