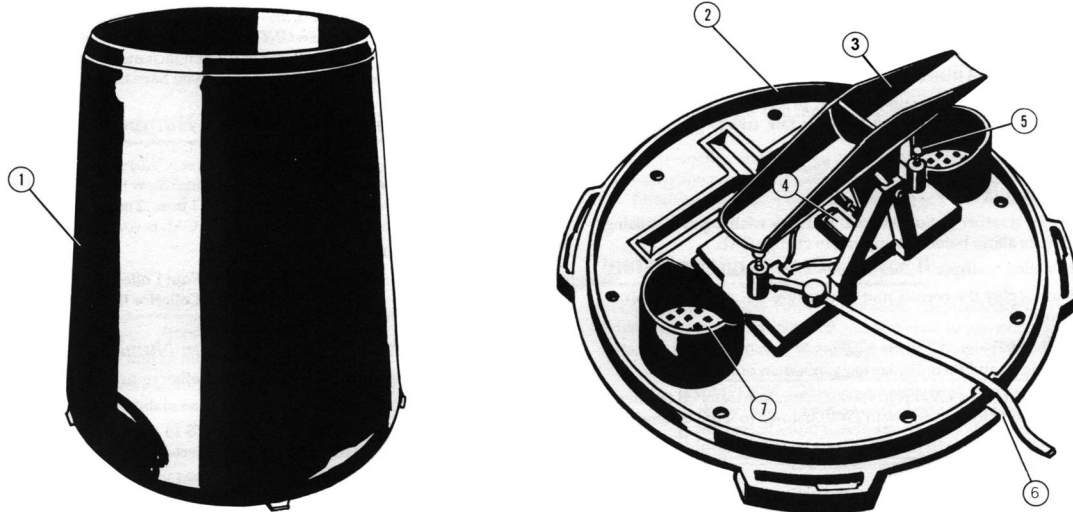


Precipitation Sensor

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Description

Precipitation sensor type 4413 is designed to measure the amount and intensity of rain by using the tipping bucket rain gauge system. The optional type with built-in heating is -in a limited range- able to measure solid precipitation (snow, hail) as well. The orifice of this instrument is approx. 200 cm², approaching the rules of the German Meteorological Service. The corresponding bucket content is 4 cm³, featuring a resolution of 0.2 mm precipitation (version 441301 and 441302), resp. 2 cm³ corr. 0.1 mm precipitation (version 441303 and 441304). Precipitation events can be recorded by means of a built-in datalogger (versions 441305-441308).

Construction

The instrument consists of collecting funnel (1), base plate (2), tipping bucket (3), Reed switch (4), stop screws (5), cable outlet unheated version (6) and grids (7). A heating, controlled by thermostat, is optionally available (version 441302 and 441304); in this case the collecting funnel is insulated. The datalogger (version 441305-08) is placed in a separate housing, accessible after removing the collecting funnel. The RS232 interface is built as a 3 p.-coaxial connector. Power supply is achieved by means of a Li-battery on the datalogger's print plate.

Technical Data

Orifice:	approx. 200 cm ² (211 cm ²)
Bucket content:	approx. 4 cm ³ resp. 2 cm ³
Resolution:	0.2 mm precipitation resp. 0.1 mm precipitation
Operating range:	0...15 mm/min
Accuracy:	± 2 % for 0...25 mm/h ± 3 % for 0...50 mm/h
Output:	Reed switch Recommended load 12 V DC / 10 mA max.
Heating: Type 441302 / 441304	12 VAC / 24 W thermostat controlled
Dimensions:	Ø 165 x 241mm
Weight:	approx. 1.3 kg
Connection cable:	10 m cable (unheated versions) terminal bar (heated versions)
Datalogger:	
Memory capacity:	approx. 16 K data sets
Length of data set:	8 bit
Storage interval:	1 s up to 10 d (selectable)
Power supply:	Li-battery 3.7 V; 1/2 AA
Operating period:	approx. 2 years
Further details:	Refer to separate brochure.

Ordering Code

Precipitation sensor with Reed contact	
0.2 mm resolution:	441301
As above, incl. datalogger:	441305
Precipitation sensor with Reed contact	
0.2 mm resolution, with built-in heating:	441302
As above, incl. datalogger:	441306
Precipitation sensor with Reed contact	
0.1 mm resolution:	441303
As above, incl. datalogger:	441307
Precipitation sensor with Reed contact	
0.1 mm resolution:, with built-in heating:	441304
As above, incl. datalogger:	441308
Configuration- and evaluation software:	1032.0000
RS232 interface cable for data read-out:	1032.1000

Installation

- Selection of measuring site:
Following hints have to be considered:
 - Larger obstacles, like trees and buildings should not be close to the site, as they would cause shadowing.
 - A plain surface has to be used as a base (for example socket type 9012). Take care that the base plate is correctly aligned horizontally (use a water level).
 - Make sure that the rainwater can flow off freely.
 - Items made of steel or iron should have a distance of at least 4 cm from the unit.
 - Choose a site which is easily accessible for cleaning and which is as little polluted by dust, seeds etc. as possible.
- Open the instrument by turning the collecting funnel counter clockwise. Screw down the base plate on its socket. Screws should be tightened carefully (not too tight).
- Connect the cable to a suitable data acquisition unit (for example datalogger COMBILOG (LT)), optionally to a suitable power supply (for example type 1732).
- Check the function by moving the tipping bucket manually. One pulse corresponds 0.2 mm resp. 0.1 mm rain.

- Place the collection funnel onto its base plate again, by clockwise turning (bayonet). Take care, that the cable remains in its correct position in the outlet groove.
- Place the collecting grid in its position in the centre of the collecting funnel.
- Fix the cable.

Maintenance

The instrument has frequently to be cleaned from leaves, dust or other pollution. Once or twice a year, it should be cleaned by means of a warm soap solution. Take care that the grids are not blocked.

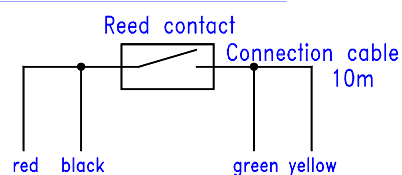
Recalibration

The instrument is adjusted for tipping point at exactly 0.2 mm resp. 0.1 mm rain. If ever a deviation is detected and a correction is necessary, this point can be changed by means of the stop screws (5), underneath the tipping bucket. On the base plate there is an engraved scale showing the equivalent amount of change, caused by one screw revolution. Turning the screws in positive (+) direction results in a more frequent tipping.

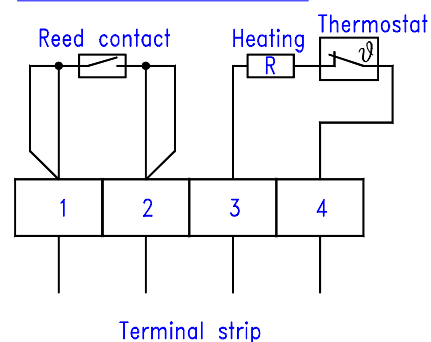
Please note that both screws have to be changed by the same degree!

Connection plan

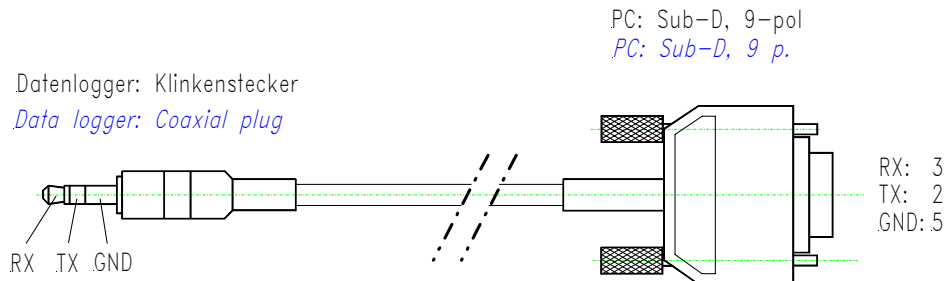
Type 441301 / 441303



Type 441302 / 441304



Serial interface cable RS232
type 1732.1000, for types 441305 - 441308



ATTENTION: Always connect interface cable to datalogger, first!

Operating the datalogger

(Types 441305 - 441308)



WARNINGS!

- If the equipment is installed or used in a manner not specified by the manufacturer then the protection provided by equipment may be impaired.
- This equipment contains a lithium battery. Danger of explosion if the battery is incorrectly replaced. Do not cut open, incinerate, expose to temperatures above 85°C (185°F) or recharge. Dispose of in accordance with local regulations.
- The battery should be replaced by a trained technician using the battery supplied in the appropriate manufacturer's service pack.
- This equipment should only be interfaced to a UL or CSA listed computer with RS232 levels of not more than ± 12 V.
- This equipment should only be interfaced to equipment which is powered by a Safety Extra Low Voltage Supply. The maximum voltage levels are to be 30 V rms, 42 V peak or 60 V dc and separated from hazardous voltages by double or reinforced insulation. For the United States consider a Safety Extra Low Voltage Supply to be Class 2 source as defined in the National Electrical Code. If the unit is connected to a computer outdoors the computer must also comply.
- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause any harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- **ATTENTION:** Always connect interface cable to datalogger, first!

1. TO BEGIN USING YOUR TINY DATALOGGER

You will need:


- ✓ GLM software installed on your PC, type 1032.0000
- ✓ Your datalogger
- ✓ Interface cable for configuration and read-out, type 1032.1000

- Start the GLM software .
- Connect the data logger to the computer serial port using the interface cable. Check that the chosen serial port is selected in the Communications options  (select **Options, Communication**).


- iii Click the CONNECT button to tell the computer a logger has been connected. The serial number of the logger will appear in the status bar at the bottom of the application window.

Now move on to one of the other sections to start the datalogger recording or to display the recording from the datalogger

2. TO START THE DATA LOGGER RECORDING


- i If you have not already done so, follow the instructions in the TO BEGIN USING YOUR TINY DATA LOGGER section.
- ii Click the GO button . The START LOGGING DIALOG will appear.

Tip: If the GO button is disabled, the data logger is already logging.

You will need to STOP the logger before you can start logging again. Click the STOP button . You may wish to display the recording (see next section) before attempting to launch the logger again.

- iii Now you can enter the logger settings:
 - The TITLE allows you to set up a short description, for example the place where the logger will be recording.
 - The LOGGING INTERVAL is the amount of time between each reading. The shorter the interval the more data you will collect. Selecting a longer interval allows the recording to last longer before the memory is full.
 - The READIND TYPE is only available when the logger interval is a number of minutes. The options allow intermediate readings to be summarised and only the minimum or maximum actually recorded.
 - The START OPTIONS allow you to set up a delay and some loggers allow a magnetic start option.
 - The STOP OPTIONS set up how the logger should stop recording or whether there should be no programmed end.
 - The ALARM SETTINGS are accessed via the **Alarms** button. The alarms are indicated on the logger.
- iv Click the START button to program the settings into the logger. The LAUNCH CONFIRMATION DIALOG appears. Do not disconnect the logger until the software tells you to you can.
- v When the logger is programmed you will see the message "YOU MAY NOW DISCONNECT THE LOGGER". Click the OK button. You have successfully set up the logger to make a recording.

3. TO DISPLAY THE RECORDING FROM THE DATA LOGGER

- i If you have not already done so, follow the instructions in the TO BEGIN USING YOUR TINY DATA LOGGER section.
- ii To offload the readings from the logger click the OFFLOAD button .

Tip: If the OFFLOAD button is disabled, the data logger must be stopped before the readings can be retrieved. Click the STOP button  and then retry the OFFLOAD button.



- iii During the offload, a dialog may appear showing the amount of data being transferred to the PC. If a UNITS PREFERENCE dialog appears, choose your preferred scale and click the OK button.

Tip: If you will always want to use only one of the options (e.g. always °C or °F) you can click the "Don't ask me this again" checkbox to prevent the dialog from appearing in future.


- iv A graph displaying your recording will now appear. You have successfully retrieved the readings recorded by the data logger!

*Tip: Save your data now (select **F**ile, **S**ave). If you close all the views of a recording without saving the data, GLM will remind you to save it.*

4. OTHER FEATURES OF THE GLM SOFTWARE

- i You can zoom in on areas of the graph using the mouse to drag a rectangle. Right clicking undoes zoom operations.
- ii GLM has the capability to display your recording as a list of readings. Click the READINGS button  to view a list of readings against times.
- iii A statistics view summarises information relating to the recording. Click the STATISTICS button  to view a table of logger and recording information.

Tip: As you zoom in the graph view the readings and statistics views update to reflect the newly selected data range.

- iv You can copy and paste a graph or a list of readings into another Windows[™] application.
- v Using the export function (select **F**ile, **E**xport) you can export data to a number of spread sheets or another applications.
- vi With more than one recording open in GLM , click the OVERLAY GRAPHS button  to combine several graphs.

*Tip: With the overlay graph, you can switch between absolute and relative time (select **O**verlay, **R**elative time) to compare data recorded at different times.*

GLM is a packed with other features to make analysing your data easy. To find out more use the GLM help file, which you can access from within GLM (select **H**elp, **H**elp **C**ontents) or from the Windows[™] Start menu under GML Manual.

The Fischer company reserves the right to make changes / improvements to their products and to their specifications at any time without prior notice to anyone.



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