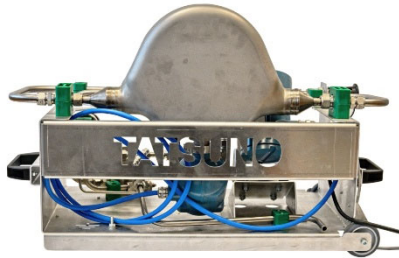


Quick Operating Instructions for the CNG Master Calibration Device

The TATSUNO mobile calibration device, type **CNG Master**, is designed for the calibration and metrological verification of dispensers intended for filling road vehicles with compressed natural gas (CNG) or biogas (BioCNG) at public and non-public filling stations. The lightweight trolley is equipped with a highly



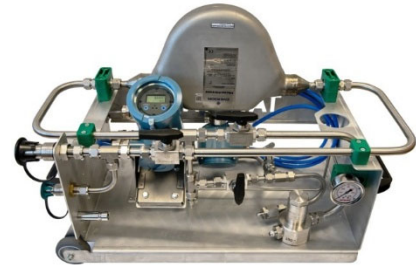
accurate **Micro Motion mass flow meter**, an outlet particulate filter, a pressure gauge, inlet and outlet ball shut-off valves, and a vent valve. The pressure inlet to the trolley is equipped with two connectors for **NGV1 (B200)** and **NGV2 (C200)** dispensing nozzles. The pressure components, including the piping, are made of stainless steel. For easy handling, the trolley is manufactured from a lightweight aluminium alloy and is equipped with transport wheels and plastic handles. As standard, the trolley is equipped with a **3 m pressure-**



rated filling and vent hose terminated with an **OPW CT1000LS filling nozzle**. The CNG Master trolley is designed for use in potentially explosive atmospheres and is connected between the CNG dispenser being verified and the vehicle (or a test pressure vessel). The quantity of gas measured and indicated on the dispenser display is compared with

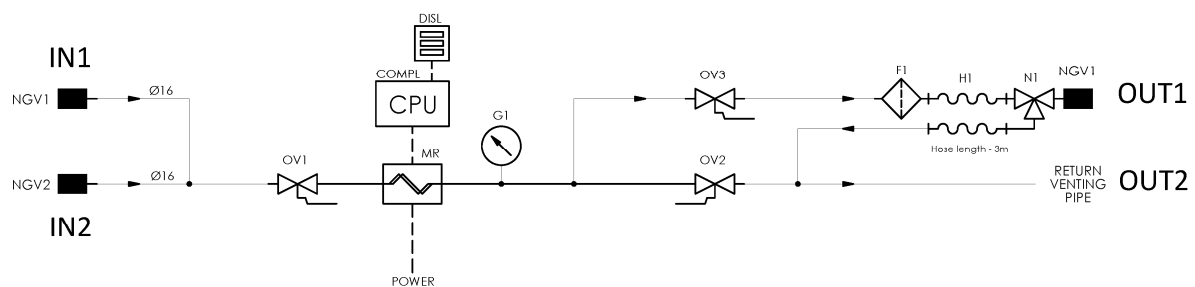


the quantity indicated on the display of the officially calibrated mass flow meter installed on the trolley. Before starting the measurement, the value on the trolley display can be reset to zero using the touch sensors on the display. As an optional feature, the CNG Master can be equipped with an external zero-reset device (push-button) and a filling hose of a special length terminated with a different type of dispensing nozzle (**WEH, STAUBLI, OPW, ELAFLEX, etc.**). For remote transmission of measured data, a data link can be connected to the mass flow meter, allowing remote



reading of the meter values using the freeware **ProLink III Basic** software (Modbus). For more convenient operation, the latest version of the mass flow meter with **Wi-Fi data transmission** can be used..

Connection Diagram:



Basic Technical Parameters:

Maximum flow rate:	up to 70 kg/min
Accuracy:	< 0.1% (at a minimum delivered quantity of 2 kg)
Maximum operating pressure:	30.0 MPa (300 bar)
Test pressure:	43.0 MPa (430 bar)
Power supply:	230 V +10% / -15%, 50 Hz
Ambient temperature:	-40 °C to +60 °C
Gas temperature:	-50 °C to +60 °C

Recommended Procedure for Verification of CNG Dispensers

Measurement Preparation

- 1) **OV1** open, **OV2** and **OV3** closed. Connect the power supply cable to the **230 V AC, 50 Hz** mains supply.

CAUTION The mains power connector is not designed for use in a potentially explosive atmosphere! Therefore, the power supply must be connected at a sufficient distance from all gas equipment, in a non-hazardous area.

NOTE Valve **OV1** is used only when setting the zero flow of the flow meter (the zero-flow range limit is based on the calculated measurement uncertainty), during which it is closed. Otherwise, it remains open.

- 2) Connect the filling nozzle of the CNG dispenser to connector **IN1** or **IN2**
- 3) Connect calibration device dispensing hose **H1**, terminated with dispensing nozzle **N1**, to the vehicle (or pressure cylinder)
- 4) Start filling from the CNG dispenser and pressurize the calibration device to a pressure **> 200 bar**.

Zero-Flow Check (verification that the zero flow complies with the required limits).

- 5) Close valve **OV1** and set the zero flow on the meter.

NOTE The method for setting zero flow on the meter differs depending on the CNG dispenser being verified. On TATSUNO EUROPE dispensers equipped with TBELTM electronics, zero flow is set using parameter **P97**. After setting the parameter value to **1**, the zero-point adjustment procedure starts. When the procedure has been completed, the message “**done**” appears on the dispenser display.

Measurement

- 6) Open valve **OV1**.
- 7) Reset the totalizer on display **DISL** of mass flow meter **MR** to zero

NOTE The totalizer can be reset using the two sensors on the display of the calibration device meter or by pressing the external zero-reset push-button, if installed

- 8) Open valve **OV2**.
- 9) Start filling from the CNG dispenser into the vehicle (or pressure cylinder). After the specified quantity of natural gas has been delivered, slowly close valve **OV2**. Do not terminate filling at the CNG dispenser by pressing the **STOP** button. Allow the dispenser to complete the transaction when the natural gas flow rate drops below the minimum flow rate Q_{min} .

NOTE If the natural gas flow rate drops below the minimum flow rate Q_{min} , the TATSUNO EUROPE CNG dispenser terminates filling and displays the message “**END**”, indicating that filling has been completed.

- 10) After filling has been completed, read the totalizer value from display **DISL** of mass flow meter **MR**. This value corresponds to the quantity of gas that has passed through the system. Compare this value with the quantity indicated on the CNG dispenser display and evaluate the measurement error.
- 11) Repeat steps 6 to 10.
- 12) Simulation of tests according to **OIML R139:2:2018, Clause 2.2.7.3**, and **OIML R139:3:2018, Test F.3**. Open valve **OV2** only partially to achieve a low flow rate.

WARNING The pressure in the CNG dispenser circuit and in the CNG Master must be the same before and after the test!

End of Measurement.

After completion of the measurement, release (vent) the natural gas from the calibration device by opening valve **OV3** – all valves open. For transportation of the calibration device, close valves **OV2** and **OV3**