TATSUNO EUROPE a.s.

LPG MASTER METER

TATSUNO EUROPE

Technical Specification

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This manual is intended for the users of TATSUNO EUROPE LPG Master Meter. TATSUNO EUROPE a.s. recommends thorough reading of this manual. The manual must be available to the dispenser attendant during operation and regular maintenance of the LPG Master Meter.

- Make it available to other owners and users.

Document revisions

Revision No. / Date	**Changes**	**Made by**
Revision 00 / 18. 5. 2023	Basic version of the document	Milan Berka
Revision 01 / 13. 7. 2023	Change of technical parameters	Milan Berka

1. PERMITTED USE

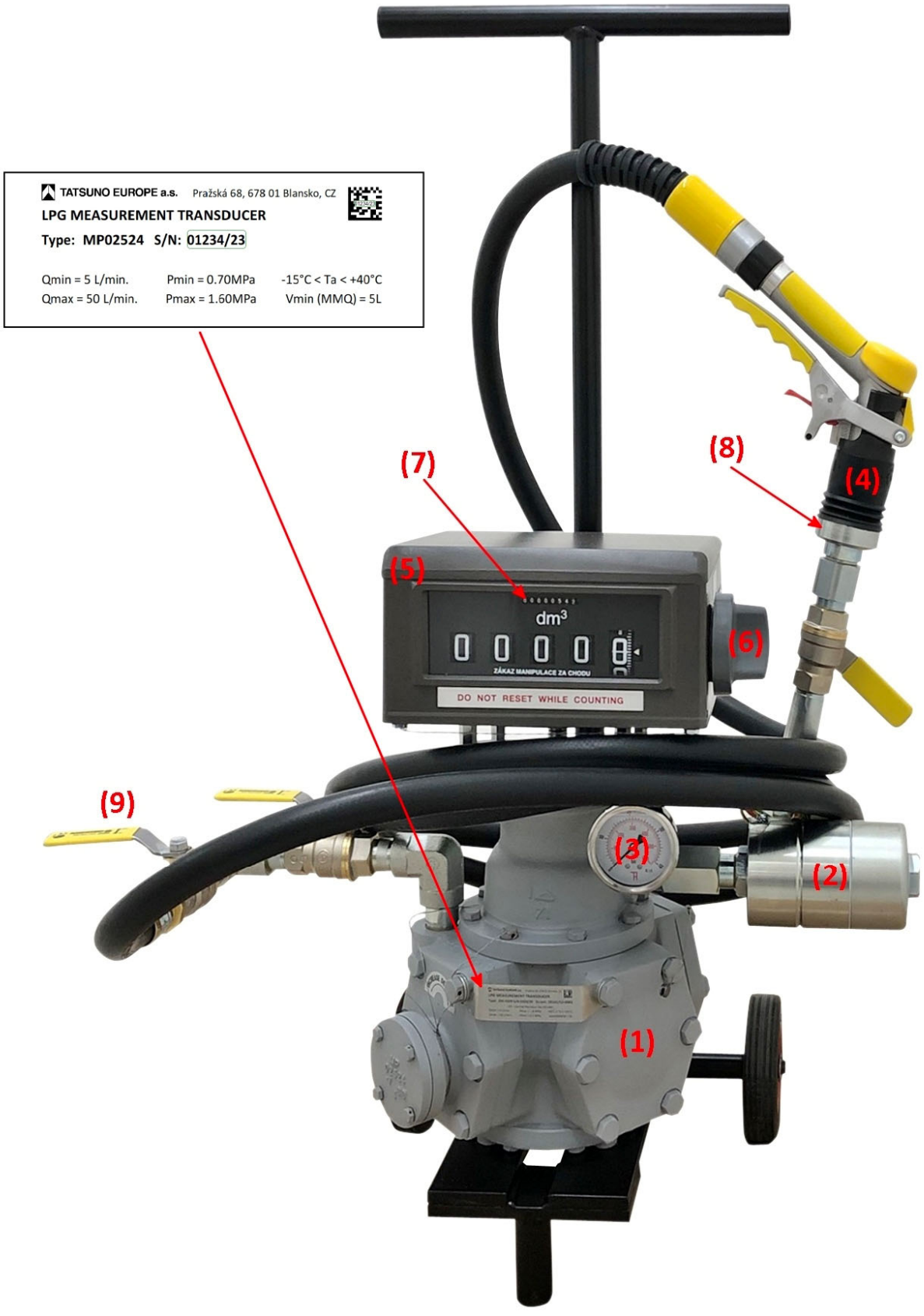
TATSUNO EUROPE LPG Master Meter is designed for metrological verification of LPG dispensers on service station.

NOTICE ***Any modification of the LPG Master Meter may invalidate the device certification.***

Each LPG Master Meter is properly tested in the factory in terms of its function, safety, and metrology. The delivery of each LPG Master Meter also contains certification documents that must be submitted by the operator on demand.

2. BASIC TECHNICAL PARAMETERS

Maximum flow rate Q_{max} [L/min]	50
Minimum flow rate Q_{min} [L/min]	5
Lowest metering MMQ [L]	5
Maximum pressure [MPa]	1.6
Minimum pressure [MPa]	0.7
Maximum volume [L]	9999.9 L
Scale interval [L]	0.01 L
Type of delivered fluid	LPG (liquefied propane-butane)
Fluid temperature range [°C]	-15 to +40
Ambient temperature range [°C]	-15 to +40
Accuracy	< ±0.5% (according calibration certificate); design accuracy = ±0.2%
Mechanical class	M2
Humidity	Condensing
Location	Open
Measured unit	Volume [L]
Counter with Display and Totalizer	Mechanic counter **(5)** with wheel for mechanical zeroing **(6)** and 8-digits non-reset totaliser **(7)**
Measuring device	LPG piston meter TATSUNO type MP-025024 **(1)** with back valve
Filtration of mechanical particles	Input filter >25µm **(2)**
Pressure gauge	0 – 63 bar (0 – 6.3 MPa); 63 mm **(3)**
Input connection	DISH connector **(8)** for nozzle LPG 821 IGSY or ELAFLEX ZVG 2 DISH or another DISH type)
Output connection	Hose ELAFLEX LPG DN16 (4.5m) with nozzle LPG 821 IGSY terminated by DISH connector (4)
Shut Off Valves	mechanical, 3/4" **(9)**


TATSUNO EUROPE a.s. Pražská 68, 678 01 Blansko, CZ
LPG MEASUREMENT TRANSDUCER
Type: MP02524 S/N: 01234/23
Qmin = 5 L/min. Pmin = 0.70MPa -15°C < Ta < +40°C
Qmax = 50 L/min. Pmax = 1.60MPa Vmin (MMQ) = 5L
(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)
(9)
dm3
0 0 0 0
ZÁKAZ MANIPULACE ZA CHODU
DO NOT RESET WHILE COUNTING

3. DESCRIPTION OF CALIBRATION PROCESS (RECOMMENDED)

1) LPG master meter is connected to LPG dispenser
2) The preliminary run is used to flush the dispenser with the test liquid, to equalize the temperatures and to reliably flush out the gas phase. The LPG dispenser is started and the dispenser is pre-run for 2 to 3 minutes at a maximum flow rate of at least 100 L. The presence of the gas phase is observed in the sight glass.
3) The temperature volume correction on the dispenser counter is switched off.
4) The LPG pump starts
5) A high flow rate Q(1) is set
6) The exact test amount of liquid (V_n = 100 litres) is pumped according to the LPG Master Meter (if possible, without any interruption)
7) The volume V_n (on Master Meter), the volume Vi (on the display of LPG dispenser) is read and the corrected standard volume V_{nk} and the meter error EV are calculated. The EV meter error is logged along with the Q(1) high flow value.
8) Set the low flow rate Q(2)
9) The exact test amount of liquid (V_n = 20 litres) is pumped according to the LPG Master meter (if possible, without interruption)
10) The volume V_n (on the Master Meter), the volume V_i (on the LPG dispenser) is read and the corrected standard volume V_{nk} and the meter error E_v are calculated. The E_v meter error is logged along with the low flow Q(2) value.

$$\mathbf{E_V = (V_i - V_{nk}) / V_{nk} \times 100}$$

where: E_V is the error of the LPG dispenser meter (%),
V_i volume displayed on the tested LPG dispenser (L),
$V_{nk} = V_n \times C_s$ corrected volume of the LPG Master Meter (L)
V_n volume displayed on the Master Meter (L),
C_s is the correction factor for the given flow rate. The values of the correction factor are listed in the calibration certificate of the Master Meter (see chapter 5).

4. EU DECLARATION OF CONFORMITY

EU DECLARATION OF CONFORMITY

(according MID directive 2014/32/EU, Annex XIII and ATEX directive 2014/34/EU, Annex X)

1. Product model / Product: LPG Master Meter (based on flow meter M02524)

2. Name and address of the manufacturer: TATSUNO EUROPE a.s., Pražská 2325/68, Blansko, 678 01, Česká republika, www.tatsuno-europe.com, info@tatsuno-europe.com, tel.+420 516 428 411

3. This declaration of conformity is issued under the sole responsibility of the manufacturer

4. Object of the declaration: **LPG Master Meter for liquified propane butane**

5. The object of declaration described above is in conformity with the relevant Union harmonisation legislation:
   Directive 2014/34/EU (ATEX), issued 26.2.2014
   Directive 2014/32/EU (MID), issued 26.2.2014

6. References to the relevant harmonised standards used for references to the other technical specifications in relation to which conformity is declared:

   EN ISO 80079-36:2016 - Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements

   EN ISO 80079-37:2016 - Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protectionconstructional safety "c", control of ignition sources "b", liquid immersion "k".

   EN IEC 60079-0:2018 - Explosive atmospheres - Part 0: Equipment - General requirements

   EN 14678-1:2006 + A1:2009 - LPG equipment and accessories - Construction and performance of LPG equipment for automotive filling stations - Part 1: Dispensers

   ČSN EN 13463-1 Protection type: Ex II 2G Ex h IIA T3 Gb

   OIML R117-1:2007 - Dynamic measuring systems for liquids other than water

7. Certified body:

Name and number:	Performed:	Issued certificate no:
Physical-Technical Testing Institute, s.p., NB 1026, Pikartská 1337/7, 716 07 Ostrava - Radvanice, Czech Republic	EU type certification according Module B of Directive 2014/34/EU (MID), issued 26.2.2014	FTZÚ 03 ATEX 0025 (SHARK LPG dispensers) FTZÚ 14 ATEX 0064X (OCEAN LPG dispensers)
Czech Metrology Institute, NB 1383, Okružní 31, 638 00 Brno, Czech Republic	EU type certification according Module B of Directive 2014/32/EU (ATEX), issued 26.2.2014	TCM 141/07-4493 (LPG dispensers)

8. Additinal information:

Place and date of issue: Blansko, 10.06.2020

Name, function, signature: Milan Berka, QMS manager

Document no.: DOC_M02524_ENG

5. CALIBRATION CERTIFICATE - EXAMPLE

Czech Metrology Institute
Okružní 31, 638 00 Brno, Czech Republic
phone +420 545 555 111
www.cmi.cz

Laboratory: Regional Inspectorate Brno, Okružní 31, 638 00 Brno
Department of primary metrology of liquid flow, flow velocity and heat
tel. +420 545 555 111, fax. +420 545 555 183

CERTIFICATE OF CALIBRATION

6015-KL-P0142-23

Date of issue: 03.03.2023 Page 1 of 3

Customer: TATSUNO EUROPE a.s.
Pražská 2325/68, 678 01 Blansko

Meas. instrument: Volume flow meter for LPG
Manufacturer: Tatsuno Benč
Type: MP-02524
Serial number: 3979/22
Specification: 5-50 LPM, counter Veeder-root, SN: 2111805000

The results of the calibration have been obtained following the procedures reported in this Certificate and are related only to the calibrated measuring instrument, the date, place and conditions of the calibration.

Metrological traceability: Mass flowmeter MICRO MOTION CMF 200M / MVD 5700R, s.n. 14508666 / 12124428, secondary standard of II. level acording PNÚ 1402.1, calibrated by ČMI OI Brno, certificate of calibration No. 6015-KL-P0879-22.

The measurements are metrologically traceable to national/international standards.

Date of calibration: 02.03.2023

Calibrated by: **Head of department:**

Bc. Roman Stratil

Český metrologický institut -60-

Mgr. Jindřich Bílek, PhD.

CERTIFICATE OF CALIBRATION **6015-KL-P0142-23**

Calibration procedure: Dynamic volumetric method according to procedure no. 631-MP-A035.

Meter output: Direct reading.

Place of calibration: Blansko

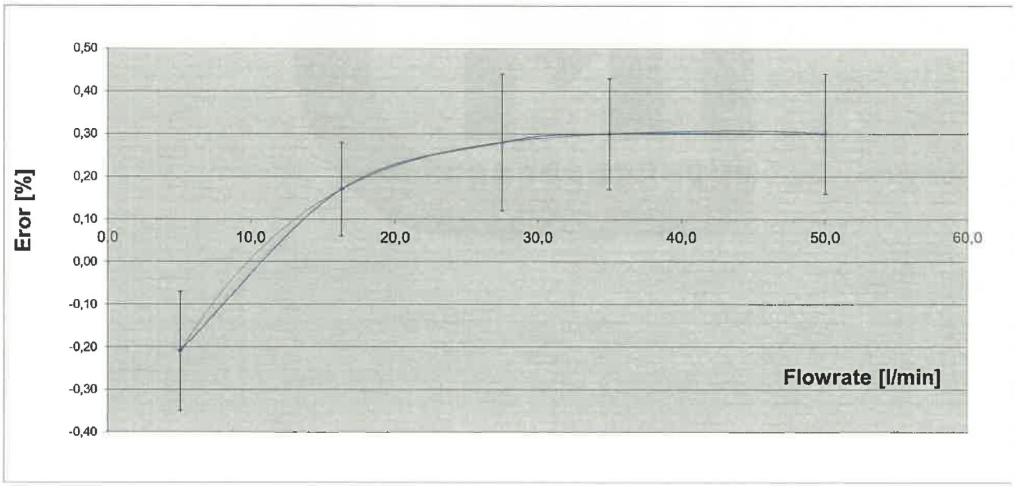
Ambient conditions: Temperature (6 ± 1) °C; RH (65 ± 10) %

Calibration conditions: LPG (5,7 ± 1) °C

Results of calibration:

The measured values

Flowrate	Error	Expanded uncertainty
[dm³/min]	[%]	[%]
5,1	-0,21	0,14
16,3	0,17	0,11
27,5	0,28	0,16
35,0	0,30	0,13
50,0	0,30	0,14



Český metrologický institut
Oblastní inspektorát Brno
Okružní 31
638 00 Brno
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Table of correction factors calculated for the selected flow rates

Flowrate	Error	Correction factor
[LPM]	[%]	[-]
5,0	-0,21	1,0022
7,5	-0,09	1,0009
10,0	0,01	0,9999
12,5	0,09	0,9991
15,0	0,15	0,9985
17,5	0,19	0,9981
20,0	0,23	0,9977
22,5	0,25	0,9975
25,0	0,27	0,9973
27,5	0,29	0,9972
30,0	0,30	0,9970
32,5	0,30	0,9970
35,0	0,30	0,9970
37,5	0,31	0,9969
40,0	0,31	0,9969
42,5	0,31	0,9969
45,0	0,30	0,9970
47,5	0,30	0,9970
50,0	0,30	0,9970

The standard uncertainty of measurement has been determined in accordance with EA-4/02 M:2022 and JCGM 100:2008 document. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k corresponding to a coverage probability of approximately 95 %, which for normal distribution corresponds to a coverage factor $k = 2$.

End of calibration certificate.

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