



LPG DISPENSERS

TATSUNO EUROPE

Quick User Guide

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Created by:	Ing. Milan Berka
TATSUNO EUROPE a.s., Pražská 2325/68, 678 01 Blansko, Czech Republic, tel.+420 516 428411, http://www.tatsuno-europe.com	

© TATSUNO EUROPE a.s.
Pražská 2325/68 • 67801 Blansko
Czech Republic
Tel.: +420 516428411 • Fax: +420 516428410
e-mail: info@tatsuno-europe.com, <http://www.tatsuno-europe.com>



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INTRODUCTION

This Quick User Guide is intended for the users of TATSUNO EUROPE electronic LPG dispensers and owners of fuel station where dispensers are installed and operated. 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 dispensers.

- Make it available to other owners and users.
- Update manuals. You can find a detailed **Installation and User Guide (IN040)**, including **Installation Plans (IN041)**, here <https://www.tatsuno-europe.com/en/download/>

The contents of the manual at the time of its release corresponds to reality. The manufacturer reserves the right to alter the technical specifications of the device or its properties without a written notice, due to its development and continuous improvement. All rights are reserved. No part of this manual may be reproduced or transferred without a written approval of TATSUNO EUROPE a.s.

Document revisions

Revision No. / Date	Changes	Made by
Revision 00 / 6. 4. 2018	Basic version of the document	Milan Berka
Revision 01 / 5. 2. 2022	Update of technical data, error code messages, dispenser settings (PDEX5 counter)	Milan Berka

1. INTRODUCTORY INFORMATION

Symbols used in this manual:



Warning



Explosion hazard



Attention! Electrical device



Smoking forbidden



Open flame use forbidden



Use of mobile phones forbidden

Terms used in this manual requiring special attention:

CAUTION Failure to meet the requirements stated together with this term may create conditions leading to a personal injury or death or to extensive loss of property.

WARNING Failure to meet the requirements stated together with this term may lead to a personal injury and/or may cause dispenser damage.

NOTICE Items stated together with this term draw reader's attention to legal and/or statutory requirements that regulate the assembly and use of dispensers. Failure to meet these requirements may create a dangerous situation and/or result in dispenser damage.

NOTE Items stated together with this term are to draw reader's attention to assembly procedures, techniques and operating methods etc. that are important to ensure correct assembly and proper operation of dispensers and which, if not observed, may result in damage, failure or poor performance of dispensers.

1.1. PERMITTED USE

TATSUNO EUROPE dispensers, OCEAN LPG, and SHARK LPG type series, are designed for stationary or mobile placement for the delivery of liquefied propane-butane (LPG) in a given amount from a fuel tank to a tank of a motor vehicles.

CAUTION *Dispensers are complex devices that must secure a whole range of difficult functions. Therefore, tanks and pipelines must be cleaned and fuel must be checked for cleanliness before commissioning (Filter clogging in a dispenser cannot be considered a reason for warranty repair!). An inspection of wiring and a check of connection correctness must be performed before commissioning to prevent any electric shock injuries and to ensure safety against explosion (fuels are combustibles of class I).*

NOTICE *Any modification of the dispenser may invalidate the device certification. Refer to certification documents and manufacturer instruction manuals if any modification of the wiring and/or device is considered.*

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

1.2. HEALTH AND SAFETY

1.1.1. LIST OF SAFETY FACTORS

- Any odour of LPG must be immediately reported.
- It is necessary that all work at the fuel station, especially construction and repairs, is performed in compliance with this list.
- It is the obligation of the constructor that all his employees comply with all laws, directives, and other regulations.
- The liquid fuels (LPG) may only be stored in tanks and containers compatible with these liquids and gases.

Locations requiring higher carefulness

- The interior of a tank, pipes, shafts of storage tanks, filling shafts, relief shafts, containers, and dispensers.
- All locations where accumulation of fuel vapours may occur and when these vapours are heavier than air, such as in drainage shafts, low-lying rooms, cellars, trenches, etc.
- The surroundings of tank ventilation, especially during filling.
- Any locations nearby deliveries, other vehicles during deliveries, especially in windless conditions.
- A radius of 1 m around the pipes transporting LPG or containing gasoline vapours.
- The filters.

1.1.2. OBLIGATIONS OF EMPLOYEES

- To ensure optimum prevention of injuries, in addition to general rules for employee protection it is necessary to consider also national legislation about employee protection and actively support all measures improving safety standards.
- An employee is obliged to observe all company guidelines about accident prevention except for the cases when these guidelines are assessed as illegitimate.
- Employees must not act according to any instruction that violate safety rules.
- Employees may use designed tools only for their original purposes that are defined by the company itself.
- If an employee detects a tool unsuitable in terms of safety, he/she must immediately remove the defect. If the defect removal is not within the employee's job content or if an employee does not have enough knowledge for its removal, he/she must immediately inform his/her superordinate.

The same applies also to the following:

- **Working materials** that are not properly packed or correctly described so that they correspond to safety requirements.

- **Working methods and processes** that are not correctly coordinated or checked so that they correspond to safety requirements.
- **If dangerous procedures are performed by several persons**, permanent flawless communication between them is necessary to prevent hazardous situations. In such a case a person must be appointed and authorized to perform overall supervision.

1.1.3. DANGER

Before starting work, the dispenser must be insulated (i.e., completely disconnected from the power supply) and the main switch must be switched off. The submersible pump (if used) and the control signals from the dispenser must also be insulated. This ensures technician safety. As a further precaution, turn off the main power supply in the fuel station booth and place there a clear warning to prevent it from being accidentally switched on. It is not allowed to turn on the dispenser before it is checked and approved by an authorized technician. This authorization is subject to the relevant national legislation. Removed packaging and facing material must be stored in such a way as to prevent damage to parts and personal injury. Covers that can be opened, such as the counter box, should be handled with care. Ensure that the fuse is in the correct position to prevent the lid from falling off on the head of the service technician or another person. For unmanned fuel stations, the Installation and User Manual must be available to all end-users. It should be placed visibly on the notice board and illuminated enough to be readable at night. For unmanned fuel stations, breakaway couplings must also be used to reduce the risk in the case of departure after the delivery nozzle has been forgotten in the vehicle tank.

WARNING *Only qualified personnel authorized to do so may perform connecting and disconnecting to/from the electrical system. Work in hazardous areas must be ensured by complying with all applicable legal standards.*

1.1.4. PERSONAL PROTECTIVE EQUIPMENT

Protective clothing

The following clothing must always be worn during dispenser installation and maintenance:

- Protective helmet.
- Protective footwear (conductive).
- Protective leather gloves.
- Anti-static clothing.
- Eye protection.

Protective equipment for work in a hazardous environment

The following safety equipment is required to work in a hazardous environment:

- Only spark-free tools are permitted when working on the dispenser.
- It is strictly forbidden to use electric tools.
- Only explosion-protected working lights are permitted.
- It is strictly forbidden to use telecommunication tools in hazardous areas.


Safety instructions

The following safety instructions must be observed during installation and maintenance:

- Wear suitable protective clothing and gloves.
- Smoking and open fire are forbidden.
- Long hair and ties can be trapped in moving parts. Hair must be reasonably covered.

Device design safety

DEVICE DESIGN SAFETY IS GUARANTEED BY THE MANUFACTURER

The dispenser design meets the requirements of EN 14678-1 standard and is designed for operation in environments designated by symbols  II 2G IIA T3 stated on the type label of the dispenser.

Operating safety

The operator is responsible for the fuel station operation and is obliged to entrust its operation only to trained employees having relevant authorization. The task of the attendant is, while observing all safety regulations, check the condition of dispensers, reservoirs, machinery operation, gas pressure and keep prescribed operating records in regular intervals.

Attendant's responsibilities

- Keep the operated devices in a safe and proper condition.
- Immediately inform the operator about each failure, defect or abnormality during the gas device operation and immediately decommission the device in case of danger of delay.
- Permanently keep the gas device tidy and clean and ensure that no unauthorized persons are nearby the device.
- Immediately inform the operator about circumstances that impede the device operation for the attendant (in case of sudden indisposition).
- Write down the records into the operation logbook about the shift start and finish, inspections performed by the attendant and maintenance work, repairs, inspections, and audits.
- The fuel station and LPG dispenser attendant must not perform any repairs of the machinery and modify the settings of safety fittings on his/her own.

A special case is performing service interventions

A service worker must not violate the operating safety during repairs and other activities. He/she must pay special attention to removing the covers of the dispenser not to cause any injury of him nor a casual customer. **While handling of electrical components, he/she must ensure safe disconnecting of electrical energy supply. Only approved components may be used for part replacements.** All parts subject to approval must be always put into condition which is prescribed by technical documentation (airtightness, grounding, electrostatically conductive delivery hoses, etc.).

2. TATSUNO EUROPE DISPENSERS

2.1. DESCRIPTION OF DISPENSERS

All TATSUNO EUROPE dispensers are equipped with high quality Japanese hydraulics from TATSUNO Corporation (hereinafter referred to as TATSUNO) and a powerful reliable electronic counter of the Czech company TATSUNO EUROPE (hereinafter referred to as TE). All dispensers work in the manual mode – independently, offline – as well as the automated mode, when they are controlled remotely from the kiosk of a fuel station and connected to the cash register (POS) via a data line. All dispensers have body parts (covers, doors, lids, etc.) made of steel painted sheet metal or stainless-steel sheet metal. Supporting parts of dispenser frames are made of steel painted sheet metal of a thickness 0.8 to 2.5 mm, or stainless-steel sheet metal. Each dispenser is equipped with an electronic counter with its own diagnostics and displays showing the delivered amount of money in the currency of the country of installation, the amount of fuel in litres or kilograms and the fuel unit price. Displays of the fuel dispensers specified for private use display only the dispensed fuel volume in litres.

NOTICE *Standard painted versions of TATSUNO EUROPE dispensers are not intended for use in high humidity, chemical and saltwater areas. For such applications TATSUNO EUROPE supplies options using stainless steel materials.*

LPG dispensers are equipped with TATSUNO hydraulics with high reliability and long service life. The two-channel TATSUNO pulse generator is mounted on a piston meter or it is its integral part. The measuring unit consists of a piston meter, a filter, a separator, a liquid phase check valve, and a gaseous phase safety valve. The safety valve is adjusted to a pressure of 1.8 MPa and prevents the maximum operating pressure from being exceeded by discharging the liquid phase back into the storage tank. An electronic differential pressure sensor (formerly TATSUNO differential valve) is mounted at the output of the meter to check the pressure difference between the liquid medium and its gaseous phase. In case of insufficient pressure difference (<1 bar), the pumping of the medium is terminated to avoid inaccurate measurement due to the presence of the gaseous phase in the meter. The pumped medium (LPG) is supplied by a pump

located outside the dispenser space, flows through the inlet safety solenoid valve (if installed) then through the G $\frac{3}{4}$ " shut-off ball valve through the particulate filter 25 μ m into the separator. If the liquid contains the gaseous components, these are separated and returned to the storage tank from the top of the separator by a return pipeline which must be opened (ball valve at the inlet G $\frac{1}{2}$ ") if the dispensing module is in operation. Reverse piping inside diameter must be at least DN 16. From the separator, the liquid flows through the check valve to the piston meter and flows through the solenoid valve controlling the flow of the medium (if installed), the sight hole and the breakaway coupling into the delivery hose and through the delivery nozzle it is transported to the vehicle storage tank. The filling pressure can be monitored on a manometer located under the delivery nozzle hanger.

2.2. BASIC TECHNICAL PARAMETERS

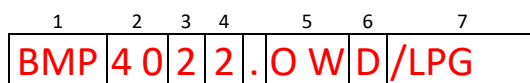
Table 1 - LPG (liquefied propane butane) dispensers and modules

Maximum flow rate Q _{max} [L/min]	30 to 50			
Minimum flow rate Q _{min} [L/min]	5			
Lowest metering MMQ [L]	5			
Maximum pressure [MPa]	1.8			
Minimum pressure [MPa]	0.7			
Maximum unit price (number of digits)	9999(4) or 99999(5) *			
Maximum amount to pay (number of digits)	999999(6) or 9999999(7) *			
Maximum volume (number of digits)	999999(6) or 1999999(6.5) *			
Scale interval [L]	0.01			
Display type	Electronic			
Type of delivered fluid	LPG (liquefied propane-butane)			
Filtration of mechanical particles	Input filter >25 μ m			
Fluid temperature range [°C]	-20 to +40			
Ambient temperature range [°C]	-20 to +40			
Accuracy class	1.0			
Mechanical class	M1, M2 for counters PDEX5 and TBELTx			
Electromagnetic class	E1, E2 for the counter PDEX5			
Humidity	Condensing			
Location	Open			
Measured unit	Volume [L] or volume at 15 °C [L]			
Electronic counter	TBELTx	PDEX	TBELTM	PDEX5
Program version (W&M check sum)	1.01 (8CA4)	1.03 (20260)	1.01 (4092)	1.01 (4573), 1.02 (dbd2FFA4)
Calculator powering	230V \pm 10%; 50Hz; max. 300VA			
Electro-magnetic valves	Proportional or two-state; + 24VDC / max.1A			

*Data transmission of the entire contents of the display with the number of digits 7/6.5/5 is only possible using the extended communication protocol (8/8/6)

2.3. DISPENSER MODEL IDENTIFICATION

The basic design of the OCEAN LPG and SHARK LPG series business branding is:



A stand-alone dispenser always starts with a BMP abbreviation followed by a clarification of the dispenser configuration and design.

Field	Values	Description
1	-----> BMP MOD	Device type Dispenser. Standalone dispenser. Dispensing module. Measuring and dispensing system without an electronic counter. It does not work independently. The dispensing modules are only in OCEAN EURO LPG or OCEAN TOWER LPG versions.
2	-----> 5 40	Series of dispensers SHARK. Simple single-product to two-product dispensers of the SHARK JUNIOR LPG and SHARK ECONOMY LPG series. OCEAN. Single single-product to two-product dispensers of the OCEAN EURO LPG and OCEAN TOWER LPG series.
3	1,2	Number of products. Number of fuel inputs.
4	1, 2 to 4	Number of delivery hoses. It corresponds to the number of measuring systems.
5	-----> S SX OE*	Dispenser design. SHARK JUNIOR LPG dispensers. Single-product, one- to two-hose dispensers with a height of 1400 mm. SHARK ECONOMY LPG dispensers. Two-product, one- to two-hose dispensers with a height of 1400 mm. OCEAN EURO LPG dispensers. Multi-product, one- to ten-hose dispensers with a height of 1900 mm.

Field	Values	Description
	OW	OCEAN TOWER LPG dispensers. Multi-product, one- to ten-hose dispensers with a height of 1900 mm.
6	----->	Dispenser orientation
	D	Double-sided dispenser.
	L	Single-sided dispenser – left.
	R	Single-sided dispenser – right.
7	----->	Specifying abbreviation
	/LPG	The LPG (liquefied propane-butane) dispenser or module.
	-ZV1	The dispenser where the hose exits from the rear cover and the nozzle is also located on the rear cover, see figure.
	-ZV2	The dispenser where the hose exits from the rear cover and the nozzle is located on the front of the dispenser
	-HS; -HR	A spring hose holder (SHARK); hose reel (OCEAN)
	-SC	Simultaneous delivery of hoses on a two-hose dispenser.
	-NC	Non-simultaneous delivery of hoses on a two-hose dispenser.
	-2C	Simultaneous delivery of two delivery hoses on one side of the multi-product dispenser.
-4C	Simultaneous pumping of four delivery hoses on a double-sided multi-product dispenser.	

/* Note: Serial production of the OCEAN EURO series dispensers was terminated in October 2020.

2.3.1. DISPENSER PARTS MARKING CONVENTIONS

Chyba! Nenalezen zdroj odkazů. illustrates the LPG dispenser marking and sorting system. In dispensers where it is not clear if the left or right side of the dispenser concerns (SHARK ECONOMY LPG), the location of the nameplate which is always closest to product No. 1 and nozzle No. 1 (1A) is decisive. In the case of a double-sided dispenser, the right side of the dispenser is also referred to as side A and the left side is referred to as side B. For a one-sided left or one-sided right dispenser, it is always only side A.

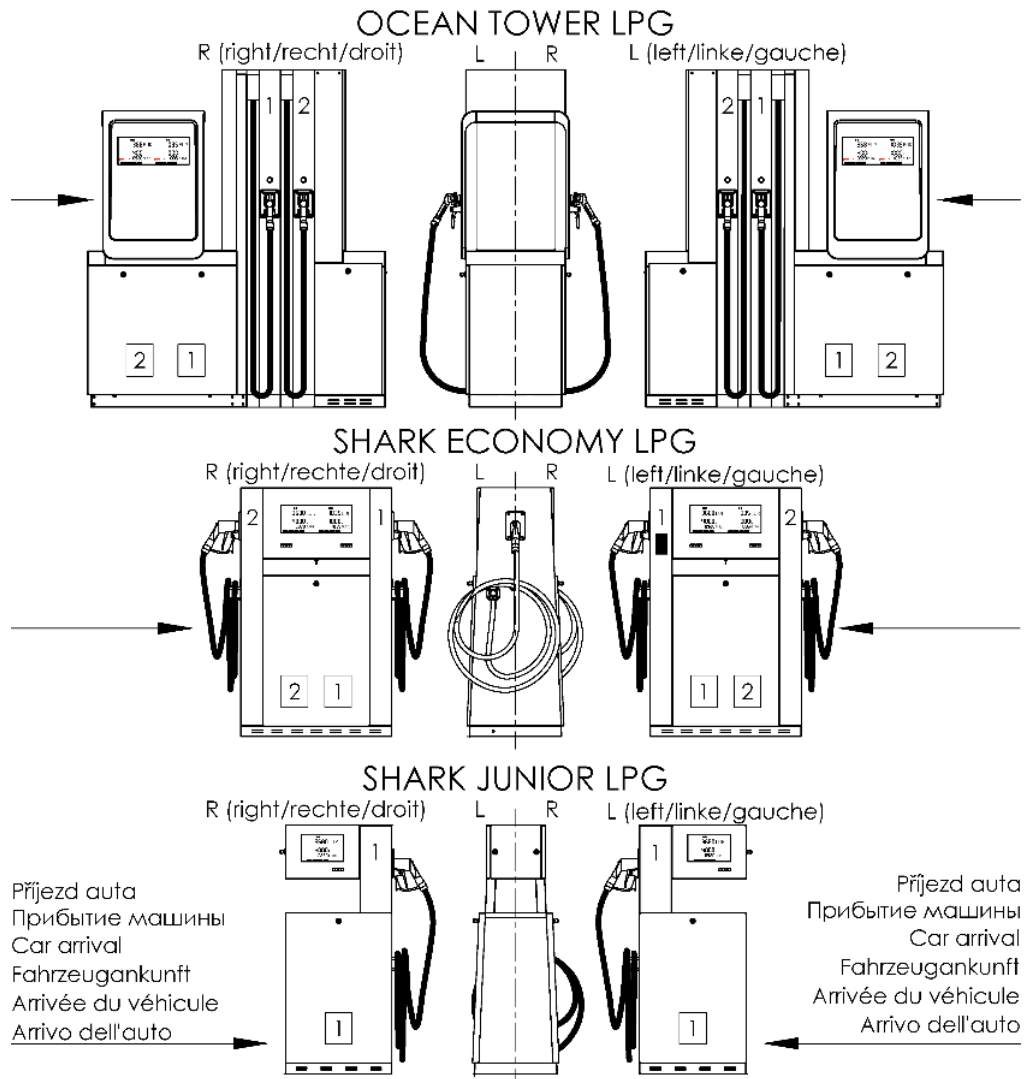


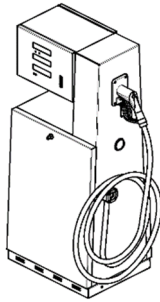
Figure 1 - Dispenser marking system with the recommended arrival direction

2.4. STANDARD MODELS OF DISPENSERS

2.4.1. SHARK JUNIOR LPG DISPENSERS

SHARK JUNIOR LPG dispensers are produced only in a pressure version, i.e., without a pump, in a single-sided left (L), single-sided right (R) or double-sided (D) version with one free-hanging delivery hose for LPG (liquefied propane butane) delivery.

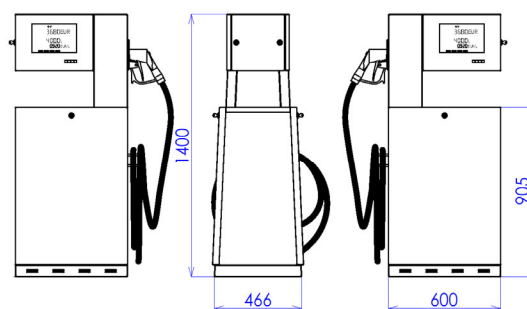
List of standard SHARK JUNIOR LPG models:



Dispenser model	Access to dispenser (2-double-sided, 1-single-sided)	Number of products (number of pumps or inputs)	Number of meters (number of measuring systems)	Number of delivery nozzles (number of delivery hoses)	Number of displays	Pumping performance (L/min)
BMP511.SL /LPG	1	1	1	1	1	50
BMP511.SR /LPG	1	1	1	1	1	50
BMP511.SD /LPG	2	1	1	1	2	50

Notes: The pumping performance depends on the conditions at the station (pump distance, pump pressure ... etc). The standard pumping per is 50 L/min. Note that when exceeding the maximum operating pressure of 18 bar (0.18 MPa), higher pumping performance may also occur but also a lack of separation of the gaseous phase from the LPG fuel. By default, LPG dispensers are equipped with DISH standard connector most widely used in Europe. At customer's request, the dispensers can be equipped with ACME standard nozzles (Belgium, Germany, Ireland and Austria), BAYO, or EURO nozzles (Spain, Portugal).

Pictures (PNG, DWG) with dimensions of all models can be downloaded here: <https://www.tatsuno-europe.com/en/download/>

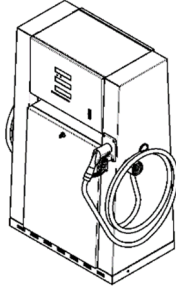


BMP511.SD /LPG

Figure 2 – Standard model SHARK JUNIOR LPG

2.4.2. SHARK ECONOMY LPG DISPENSERS

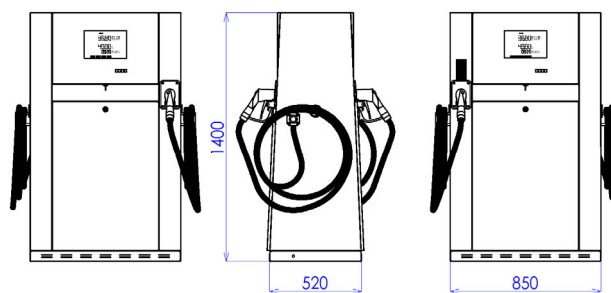
SHARK ECONOMY LPG dispensers are produced only in a pressure version, i.e., without a pump, in a single-sided left (L) or double-sided (D) version with one or two free-hanging delivery hoses for LPG (liquefied propane butane) delivery. The delivery nozzles may be located on the front (-ZV2) or on the side of the dispenser. List of standard SHARK ECONOMY LPG models:



Dispenser model	Access to dispenser (2-double-sided, 1-single-sided)	Number of products (number of LPG inputs and separators)	Number of meters (number of measuring systems)	Number of delivery nozzles (number of delivery hoses)	Number of displays (number of simultaneous deliveries)	Pumping performance (L/min)
BMP522.SXL /LPG	1	2	2	2	2	50+50
BMP512.SXL /LPG	1	1	2	2	2	35+35
BMP522.SXD /LPG	2	2	2	2	4	50+50
BMP522.SXD /LPG	2	1	2	2	4	35+35
BMP522.SXD /LPG-ZV2	2	2	2	2	2	50+50
BMP522.SXD /LPG-ZV2	2	1	2	2	2	35+35

Notes: The pumping performance depends on the conditions at the station (pump distance, pump pressure ... etc). Standard pumping performance for models with two inlets, two hoses (22) is 50 L/min. For models with one input, two hoses (12) the performance is 35 L/min. Note that when exceeding the maximum operating pressure of 18 bar (0.18 MPa), higher pumping performance may also occur but also a lack of separation of the gaseous phase from the LPG fuel. By default, LPG dispensers are equipped with DISH standard connector most widely used in Europe. At customer's request, the dispensers can be equipped with ACME standard nozzles (Belgium, Germany, Ireland, and Austria), BAYO, or EURO nozzles (Spain, Portugal).

Pictures (PNG, DWG) with dimensions of all models can be downloaded here: <https://www.tatsuno-europe.com/en/download/>.

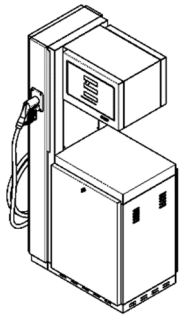


BMP522.SXD /LPG-ZV2

Figure 3 – Standard SHARK ECONOMY LPG models

2.4.3. OCEAN EURO LPG DISPENSERS

OCEAN EURO LPG dispensers are produced only in a pressure version, i.e., without a pump, in a single-sided left (L), single-sided right (R) or double-sided (D) version with one to four delivery hoses for LPG (liquefied propane butane) delivery. Delivery hoses are free hanging or fitted with a reel (-HR) and are terminated by front-mounted delivery nozzles. The design of dispensers can be basic or one of the specific variants CUBE, FIN or WAVE. List of standard OCEAN EURO LPG models:



Dispenser model	Access to dispenser (1-single-sided, 2-double-sided)	Number of pressure inputs	Number of meters (number of measuring systems)	Number of delivery hoses	Number of main displays (number of simultaneous deliveries)	Filling performance (L/min)
BMP4011.OEL(R) /LPG	1	1	1	1	1	1x50
BMP4011.OEL(R) /LPG-HR	1	1	1	1	1	1x50
BMP4012.OED /LPG	2	1	2	2	2	2x35
BMP4012.OED /LPG-HR	2	1	2	2	2	2x35
BMP4022.OED /LPG	2	2	2	2	2	2x50
BMP4022.OED /LPG-HR	2	2	2	2	2	2x50
BMP4022.OEL(R) /LPG-2C	1	2	2	2	2	2x50
BMP4034.OED /LPG-4C	2	3	4	4	4	2x50 + 2x35

Notes: The pumping performance depends on the conditions at the station (pump distance, pump pressure ... etc). Standard pumping performance for models with one inlet, one hose (11) and two inlets, two hoses (22) is 50 L/min. For models with one input, two hoses (12) the performance is 35 L/min. Note that when exceeding the maximum operating pressure of 18 bar (0.18 MPa), higher pumping performance may also occur but also a lack of separation of the gaseous phase from the LPG fuel. By default, LPG dispensers are equipped with DISH standard connector most widely used in Europe. At customer's request, the dispensers can be equipped with ACME standard nozzles (Belgium, Germany, Ireland, and Austria), BAYO, or EURO nozzles (Spain, Portugal).

Pictures (PNG, DWG) with dimensions of all models can be downloaded here: <https://www.tatsuno-europe.com/en/download/>.

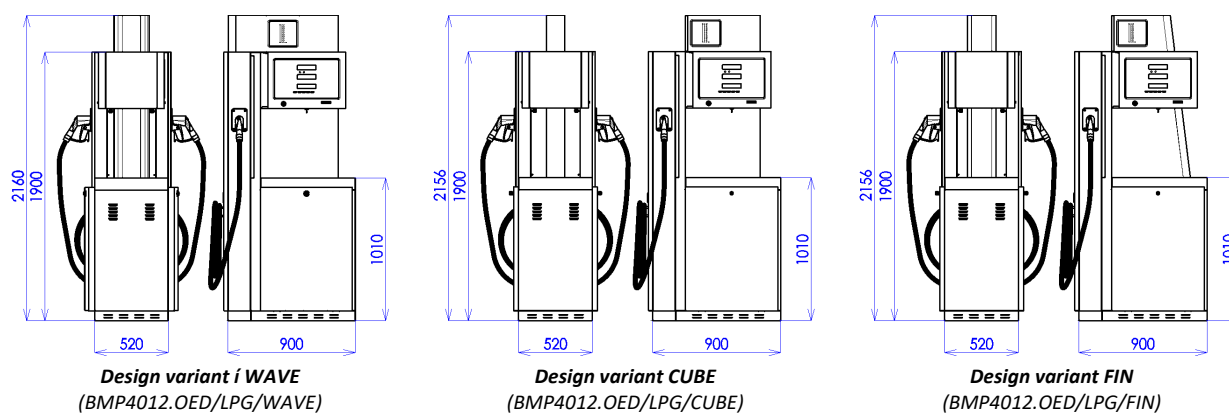


Figure 4 - Design variants of OCEAN EURO LPG dispensers

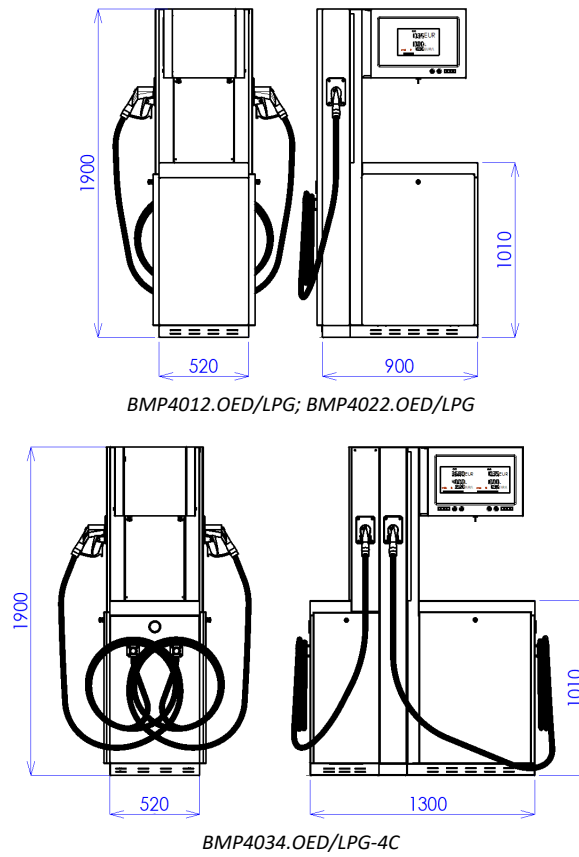


Figure 5 - Overview of standard OCEAN EURO LPG models without hose reels

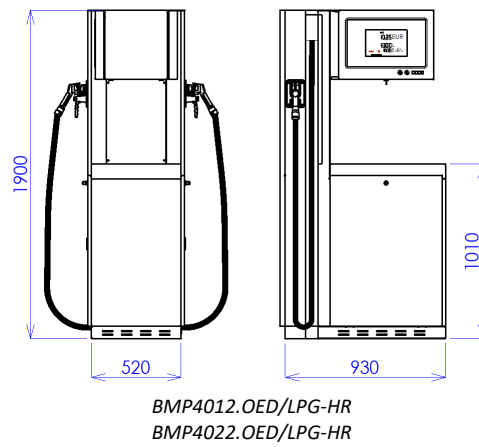
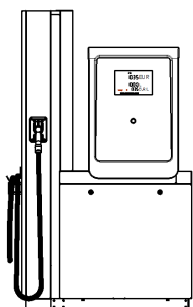


Figure 6 - Overview of standard OCEAN EURO LPG models with delivery hose reels

2.4.4. OCEAN TOWER LPG DISPENSERS

OCEAN TOWER LPG dispensers are produced only in the remote (pressure) version, i.e., without pump, in one-sided left (L), one-sided right (R) or double-sided (D) version with one to four dispensing hoses for dispensing LPG (liquefied propane-butane). The dispensing hoses are freely hung or equipped with a reel (see models marked "-HR") and are terminated by dispensing nozzles located from the front of the dispenser.

List of standard OCEAN TOWER LPG dispenser models:



Model stojanu	Access to dispenser (1-single-sided, 2-double-sided)	Number of pressure inputs	Number of meters (number of measuring systems)	Number of filling hoses	Number of main displays (number of simultaneous deliveries)	Filling performance (kg/min)
BMP4011.OWL(R) /LPG	1	1	1	1	1	1x50
BMP4011.OWL(R) /LPG-HR	1	1	1	1	1	1x50
BMP4012.OWD /LPG	2	1	2	2	2	2x35
BMP4012.OWD /LPG-HR	2	1	2	2	2	2x35
BMP4022.OWD /LPG	2	2	2	2	2	2x50
BMP4022.OWD /LPG-HR	2	2	2	2	2	2x50
BMP4022.OWL(R) /LPG-2C	1	2	2	2	2	2x50
BMP4022.OWL(R) /LPG-2C-HR	1	2	2	2	2	2x50
BMP4034.OWD /LPG-4C	2	3	4	4	4	2x50 + 2x35
BMP4034.OWD /LPG-4C-HR	2	3	4	4	4	2x50 + 2x35

Notes: The filling performance depends on the conditions at the station (distance from the LPG pump, LPG pump pressure..., etc.). The standard filling capacity for models with one inlet, one hose (11) and two inlets, two hoses (22) is 50 L/min. For models with one inlet, two hoses (12), the output capacity is 35 L/min. Please note that exceeding the maximum operating pressure of 18 bar (0.18MPa) may result in higher filling capacity but also insufficient separation of the gaseous phase from the LPG fuel. As standard, LPG dispensers are equipped with DISH nozzle (nozzle connector) most used in Europe. At the customer's request, the dispenser can be equipped with ACME nozzle (Belgium, Germany, Ireland and Austria), BAYO or EURO (Spain, Portugal).

Pictures (PNG, DWG) with dimensions of all models can be downloaded here: <https://www.tatsuno-europe.com/en/download/>.

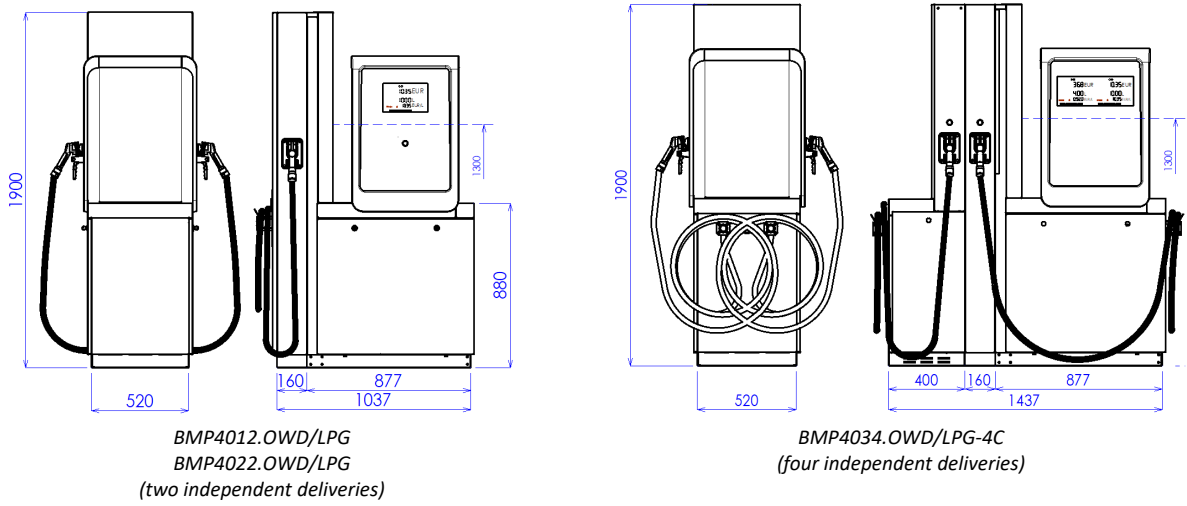


Figure 7 – Overview of standard OCEAN TOWER LPG dispensers with free hanging hoses

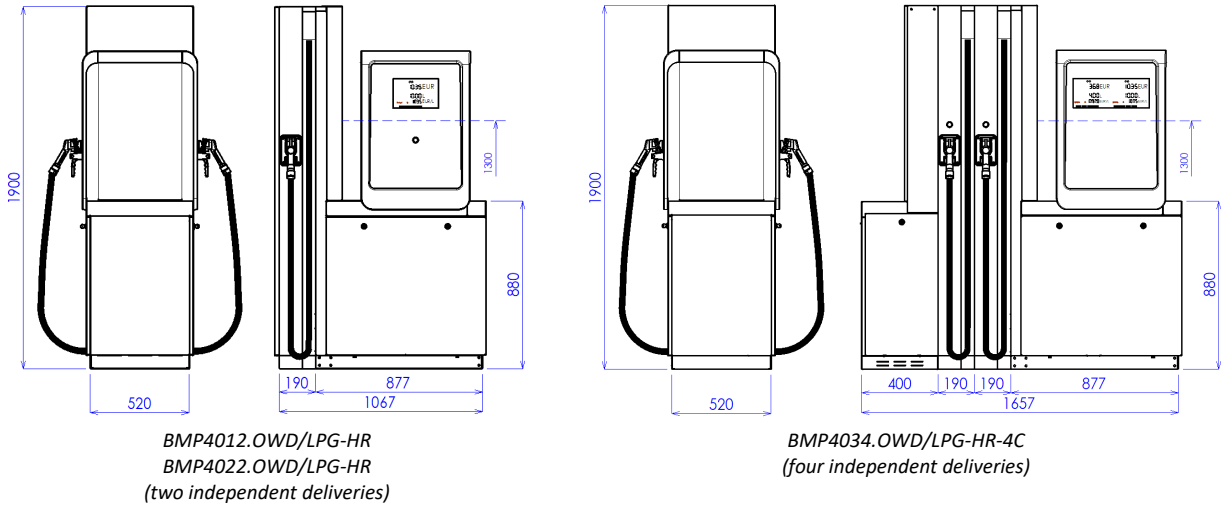


Figure 8 - Overview of standard OCEAN TOWER LPG dispensers with hose reels (-HR)

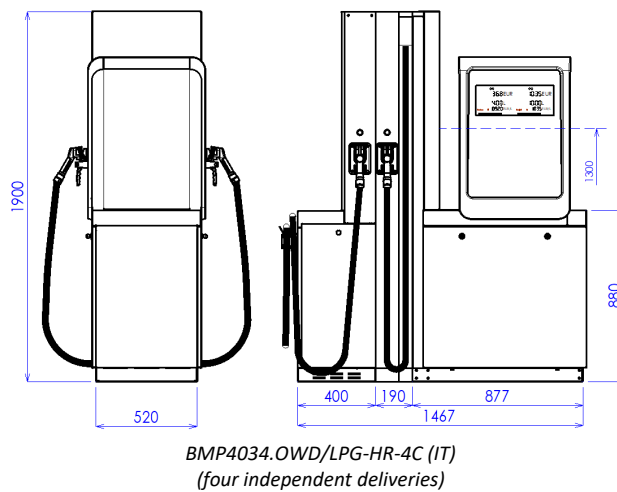


Figure 9 – Special model of the dispenser OCEAN TOWER LPG with two hose retractors and two free hanging hoses (for long distance nozzle reach)

2.5. TERMINOLOGY OF BASIC PARTS OF THE DISPENSER

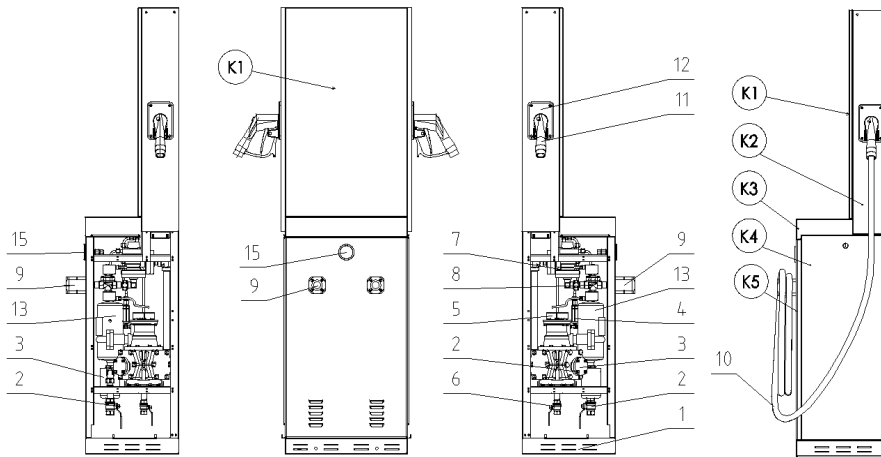


Figure 10 - Basic parts of the LPG dispensing module and its cover

Position	Device	Position	Device	Position	Device
1	Dispensing module foundation	8	Electro-magnetic valve	15	Manometer
2	Input ball valve (fluid)	9	Sight hole	-	-
3	Piston meter LPG	10	Delivery hoses	K1	Column lid LPG rear
4	Overpressure valve	11	Delivery nozzles	K2	Column lid LPG
5	Pulser – pulse generator	12	Nozzle cover	K3	LPG module roof
6	Output ball valve (gas)	13	Gaseous phase separator	K4	LPG module door
7	Differential valve	14	Filter	K5	Front column LPG
5	Pulser – pulse generator	K1	Column lid	K7	Front column combi
6	Heating element (ATEX)	K2	AdBlue® cover, front	-	-

2.6. NAMEPLATES

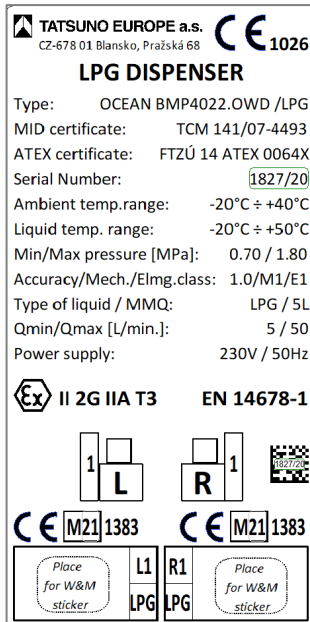


Figure 11 - Nameplate of a one or two-hose LPG dispenser

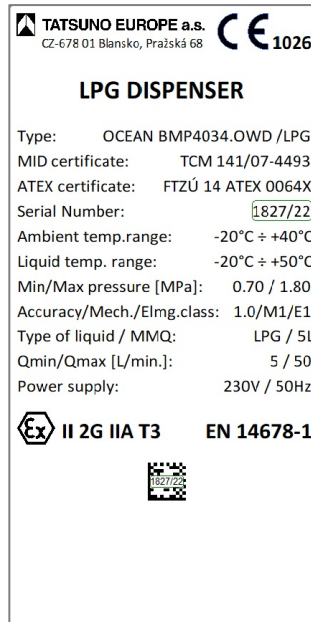


Figure 12 - Nameplate of the four-hose LPG dispenser

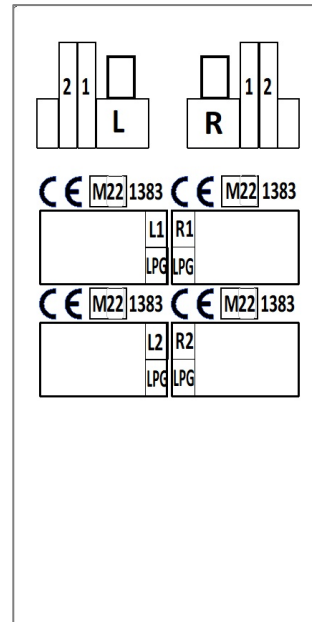





Figure 13 - Orientation label for four-hose LPG dispensers

Each dispenser is equipped with one nameplate, see Figure 11. If the number of delivery hoses is higher than two then the dispenser is supplemented with the so-called orientation label, see Figure 13, where it is schematically indicated what kind of fuel is pumped and with what hose. All data on the dispenser in terms of metrology and safety according

to WELMEC 10.5 and European standards for equipment located in potentially explosive areas (EN 14678-1) is contained in the nameplate. At the same time, the orientation label serves to metrology inspection for sticking the safety metrology labels stating the execution of measuring system verification.

Table 2 - Label information on the dispenser








TATSUNO EUROPE a.s.	Name and address of dispenser manufacturer
	Dispenser labelling means that it is designed, manufactured and labelled in accordance with European Commission directives. The dispenser is subject to a type examination certification in accordance with Directive 2014/32/EU - MID which was carried out by a notified body No. 1383 - ČMI Brno
	Dispenser labelling means that it is designed, manufactured and labelled in accordance with European Commission directives. The dispenser is subject to the type-examination certification in accordance with Directive 2014/34/EU - ATEX which has been carried out by a notified body No. 1026 - FTZÚ Ostrava Radvanice
LIQUID FUEL DISPENSER	Device identification
Type of	Marking of the dispenser type (see section 2.3)
MID certificate	Number of the metrology EU certificate approving the meter type – ČMI
ATEX certificate	Number of the EU certificate of type examination (ATEX certificate) – FTZÚ
Serial number	Serial number of the dispenser (seq. number / year of production)
Fluid/medium temperature range	Range of delivered liquid, medium or gas temperature for which the dispenser was designed and approved
Ambient temperature range	Range of ambient temperature for which the dispenser was designed and approved
Pressure min/max	Minimum and maximum working pressure
Accuracy class/mech/elm.	Accuracy class / Mechanical class / Electromagnetic class
LPG	Type of liquid, medium or gas for which the dispenser was designed and approved
Q _{max}	Maximum pumping / filling flow rate in L/min or kg/min
Q _{min}	Minimum pumping / filling flow rate in L/min or kg/min
MMQ	Minimum consumption in L or kg
	Identification of the protection of a non-explosive electrical device: II 2 – device for environment with an explosion hazard other than subsurface mines, probability of explosive atmosphere occurrence – zone 1 G – explosive atmosphere is formed by gases, vapours or mists IIA – gas group – the least dangerous T3 – maximum temperature of an electrical device that could cause ignition of the ambient atmosphere (200°C)
EN 13617-1; EN 14678-1	Number of the European standard under which the dispenser was approved

3. INSTALLATION

3.1. INSTRUCTIONS FOR OCCUPATIONAL SAFETY



CAUTION

-  The installation of this appliance must be carried out by qualified personnel according to the relevant standards, rules and regulations and local restrictions and according to these instructions.
-  It is forbidden to smoke or use open fire in the immediate vicinity of the dispenser.
-  Always follow the measures for handling of gasoline, diesel, LPG, AdBlue®, WSE and CNG
-  Observe all leaks in the dispenser. If any leakage of fuel, media or gas occurs due to any untightens, disconnect the supply voltage, and contact a service organization.
-  The electrical installation must be carried out by qualified specialists.
-  Ensure that a properly functioning fire extinguisher is available.
-  When handling of the appliance, use suitable protective equipment.

3.2. RECEIPT, TRANSPORT, UNPACKING

The customer shall contractually ensure the method of dispenser shipping. If the transport is ensured by TATSUNO EUROPE, a.s., it shall transport the product to an agreed place. The manufacturer has sufficient knowledge about the method of handling and transport. If the transport is ensured by the customer in another way, the manufacturer shall ensure professional loading. However, the manufacturer is not responsible for the method of transport. It is generally stated that the dispenser must be transported properly packed, always attached to the frame. The dispenser must be secured on the means of transport against

damage (covers, paint), shifting and overturning. All handling and transport shall be totally performed in a vertical position. The dispenser must not be laid on covers.

WARNING Only forklift trucks may be used during handling. In case of use of other handling equipment TATSUNO EUROPE, a.s. is not responsible for damage suffered.

Packaging of dispensers is performed differently, according to the destination.

NOTICE

- ▲ In case of packing the dispenser into a bubble wrap the maximum storage period under shelter is 3 months, 1 month in case of outdoor storage.
- ▲ In case of packing the dispenser into cardboard packaging the maximum storage period under shelter is 6 months.

3.2.1. DISPENSER HANDLING

The following rules must be observed when loading, unloading and setting up the dispenser.

- Use a forklift to handle the fuel dispenser firmly attached to the wooden pallet. Follow the safety rules described by the forklift manufacturer.

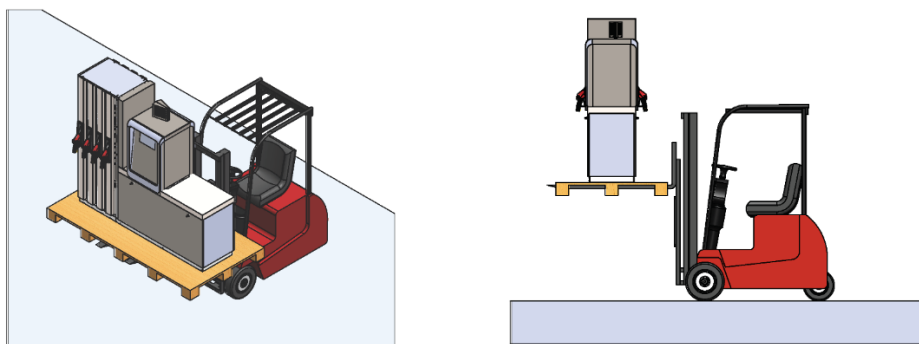


Figure 14 – Using of a forklift during loading and unloading

- When unloading and loading the fuel dispenser from or into the transport vehicle, use the direction from the side of the vehicle. Loading from the rear of the vehicle is dangerous and can damage the vehicle, the stand and injure people (see figure below).

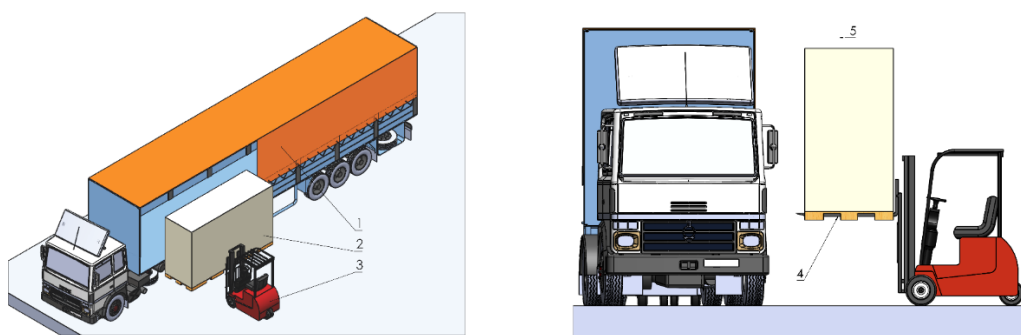


Figure 15 – Permitted direction of loading and unloading of the dispenser

(1-transport vehicle, 2-dispenser on a pallet, 3-forklift, 4-wooden pallet, 5-permitted direction of loading and unloading)

- When installing the dispenser on the site, first remove the dispenser covers (doors) and loosen the anchor bolts between the wooden pallet and the dispenser. Then pick up the dispenser from a wooden pallet and place it on the prepared base frame on the site. Use the holes in the dispenser for the 100 x 40 mm load forks to lift – see Figure 16, position 6).

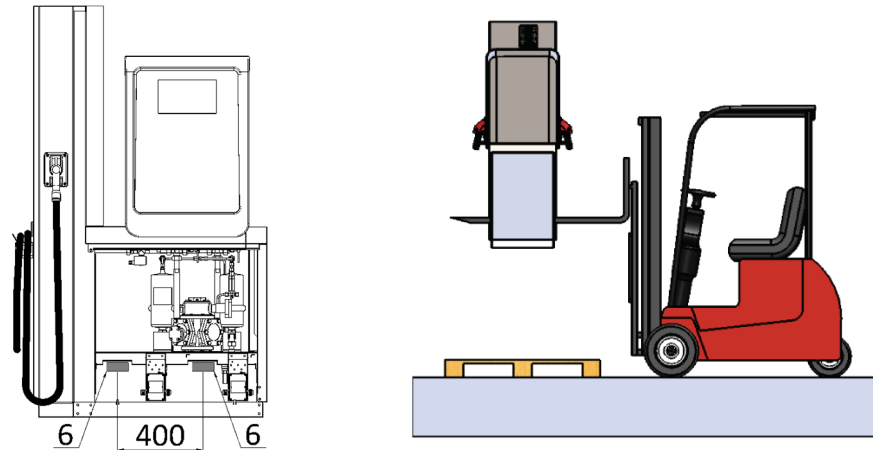


Figure 16 – Lifting the dispenser from the wooden transport pallet
(Position 6 - Transport holes for carrying fork 100 mm x 40 mm)

3.3. DISPENSER LOCATION

3.3.1. IN GENERAL

The manufacturer recommends placing dispensers on safety islands of fuel stations in such a way that the direction of arrival of the vehicles to the dispenser corresponds to the orientation of the arrow, see Figure 1. The same figure shows the numbering of the dispenser products.

The space for dispenser installation must be structurally secured so that the possibility of dispenser damage by an incoming car and following medium leakage into atmosphere is avoided as best as possible. Therefore, it is suggested to:

- Secure the access to the refilling position in straight direction
- Install the dispenser onto an elevated refuge with the following parameters
 - refuge elevation above the surrounding road at least 150 mm
 - refuge width at least 1,500 mm / refuge length at least 4,000 mm
- In case of dispenser installation directly onto the surface without a refuge it is necessary to secure the dispenser against collision with a vehicle by using a tube guard with the following parameters:
 - guard width at least 1,500 mm (refuge width) / length 2,000 mm
 - height of the upper edge of the tube above the road at least 450 mm

If there is a solid obstacle (column, wall, etc.) near the dispenser, then the minimum distance of the stand from these obstacles is about 1 meter for safe operation and maintenance.

An example of the recommended location of the dispenser at the station – see Figure 17.

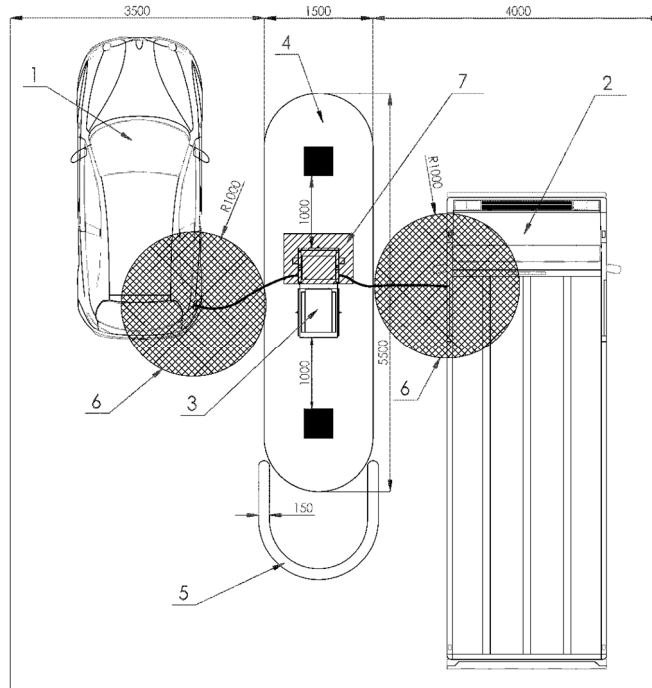


Figure 17 – Example of the dispenser location at the fuel station

(1-refilling position for passenger cars, 2- refilling position for trucks and buses, 3-dispenser, 4-dispenser refuge, 5-tube guard, 6-projection of the dangerous zone border (zone 1) of the filling end piece during delivery, 7- projection of the dangerous zone border (zone 2) of the dispenser

CAUTION LPG dispensers/modules are standardly equipped with a breakaway coupling located between the deliver hose and the dispenser. It breaks and interrupts the flow of LPG at both ends if a force greater than 200 N and less than 500 N is applied to it. However, for proper operation of the breakaway coupling, it is necessary to follow the recommended direction of arrival of the vehicles to the dispenser and position an LPG hose towards the exit from the fuel station!

3.3.2. INSTALLATION OF THE DISPENSERS IN TERMS OF EXTERNAL INFLUENCES (DANGER ZONES)

LPG dispensers create dangerous areas at the installation site - zones where under certain conditions (high surface temperature, flame, electric spark... etc.) the fuel or fuel vapor could ignite or explode.

Before installing the dispenser at the filling station, the following must be considered in particular:

- what danger zones the dispenser creates with its operation
- what danger zones are created by the surrounding equipment (adjacent dispenser, storage tank, etc ...)

Hazardous areas (zones, areas with a risk of explosion) are determined according to EN 60079-10. For LPG dispensers the hazardous zones are also regulated by the EN 14678-1 standard. Drawings of the zones created by the dispenser are part of the mandatory documentation of the dispenser manufacturer, see documents *IN041-ML Installation plans I* and *IN043 ML Installation plans II*. The drawing of the zones must define the spatial distribution of the hazardous areas inside and outside the dispenser - see the example in the figure below, where hazardous zone 2 (simply hatched) occurs up to a distance of 20 cm vertically and 5 cm horizontally from the contour of the dispenser. Inside the dispenser, in addition to the meter housing, there is zone 1 or zone 0 (inside the vapour recovery pipes). All electrical and non-electrical equipment located in these zones must be designed and approved for this hazardous environment (ATEX certificate, documentation archiving...).

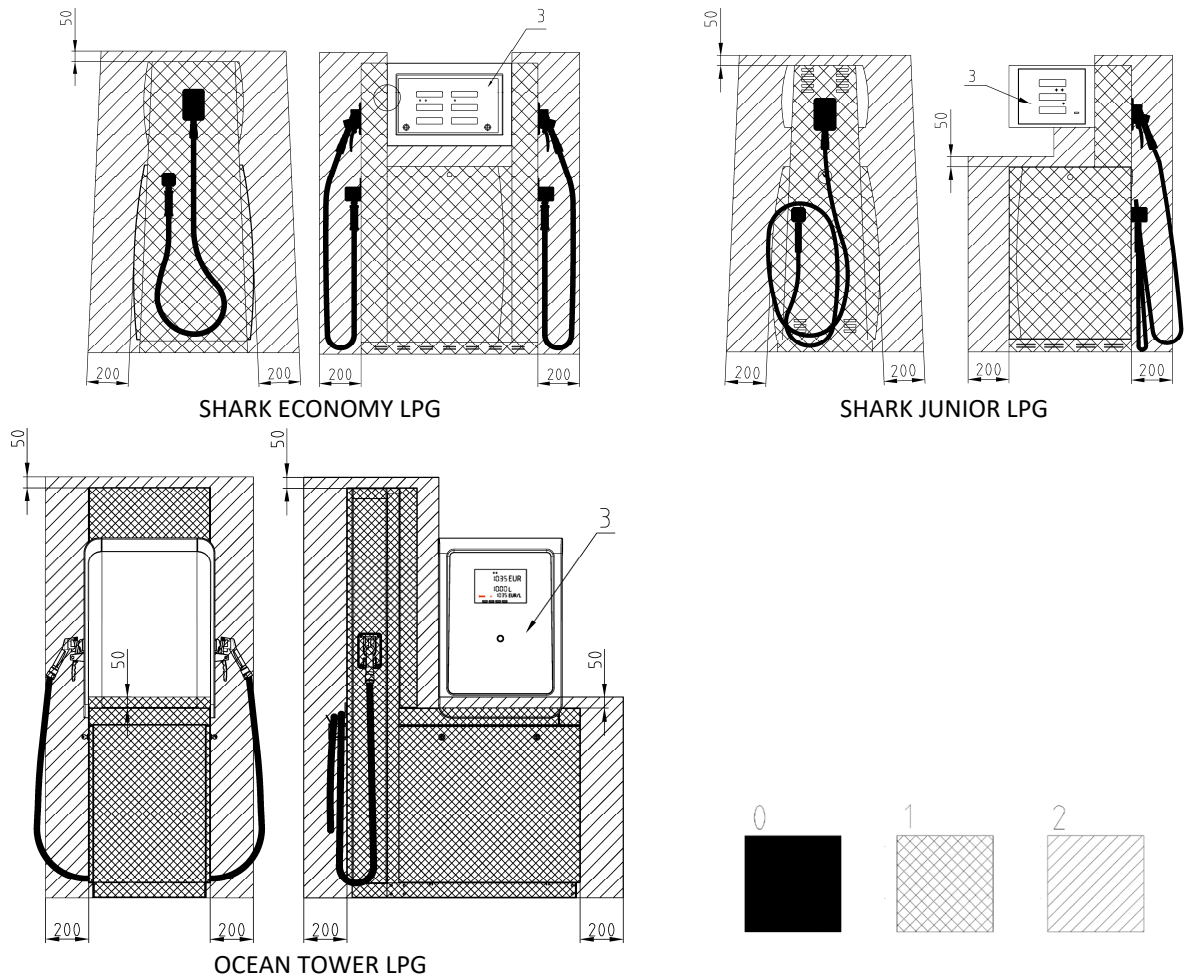


Figure 18 – The drawings of the hazardous zones of LPG dispensers according to EN 14678-1
(0 – zone 0; 1 – zone 1, 2 – zone 2; 3 – non-explosive area)

CAUTION TATSUNO EUROPE liquid or gaseous fuel dispensers **must not be located in the danger zone**. The electronic counters used in these dispensers are separated from other areas by a type 1 partition according to EN 13617-1, they are in an uncovered design (IP54 / IP55) and must therefore be located in a non-explosive area.

3.3.3. ORIENTATION OF A SINGLE-SIDED DISPENSER

Single-sided dispenser stands are labelled "L" and "R" ("L" left/left-sided and "R" right/right-sided) after the dispenser type designation, e.g., BMP4011.OWL/LPG, see section 2.3. Dispenser orientation is determined by a view of the dispenser from the vehicle arrival direction, see **Chyba! Nenalezen zdroj odkazů.**

3.3.4. DISPENSER DISTANCE FROM A TANK–FUEL TANK

The manufacturer recommends that the maximum distance of the dispensers from the storage tanks (LPG) be **50 meters**. All technological requirements for the filling station must be solved by a professionally prepared and approved filling station project consulted with the dispenser manufacturer.

3.4. MECHANICAL ATTACHMENT OF THE DISPENSER

Dispensers are attached to special foundation frames by using anchor bolt supplied with the dispenser. The foundation frame of the dispenser is not a part of dispenser standard equipment but may be ordered separately. The foundation frame is concreted into the safety island, then the front and rear covers of the dispenser are removed, the dispenser is

placed onto the foundation frame and attached by anchor bolts. The dispenser is then connected to the pressure line. In document *IN-041 Installation plans I.*, foundation frames and foundation plans of all types of dispensers with marked position of pressure piping are available.

CAUTION *LPG extrusion from the dispenser and pipeline, e.g., while removing the dispenser, is carried out with nitrogen or inert gas. Extrusion by air or oxygen is prohibited!*

NOTICE *According to EN 14678-1: 2013, clause 4.5.1.2, the liquid phase entry into the LPG dispenser/module and the gas phase output from the LPG dispenser/module must be protected by a device (shear valve or break point) to ensure that the flow of liquid LPG or LPG vapour into atmosphere is prevented in case of pipeline rupture. The shear valve or break point must be firmly attached to the frame of the dispenser and to the ground. Shear valves are not a part of the standard delivery of the dispenser!*

3.5. ELECTRICAL CONNECTION OF THE DISPENSER

For electrical connection of TATSUNO EUROPE dispensers, it is necessary to perform protection against touch voltage according to an international standard HD 60364-4-41:2017, and applicable electrical cables must be then routed to each dispenser. It is necessary that all dispensers at the fuel station are interconnected by a grounding wire and connected to the grounding system. As a grounding wire you can use a yellow-green cable with a section of at least **4 mm²** or a special grounding strap. The grounding wire must be connected to a central grounding terminal of the dispenser located on the foundation (bolt M10) marked with a mark for grounding.

CAUTION *Only cables complying with the requirements of European standard EN 13617-1:2012 may be used as supply cables. The essential properties of these cables include resistance to oils, gasoline, and gasoline vapour (according to HD21 13S1). Examples of electrical wiring are given in IN041 – Installation plans.*

NOTE *For easy installation (cable termination in a distribution box), it is necessary that the ends of all cables entering the dispenser are of a sufficient length – each end at least **3 m** above ground.*

In terms of used voltage and function the cables may be divided into power (supply) and signal cables.

Power cables:

- supply of counters, switching circuits and heating
- switching of pumps located outside the dispenser (pressure version of the dispenser/module)

Signal cables:

- communication line
- additional service and safety lines (STOP signal, pulse outputs, motor blocking, level gauges, etc.)

Table 3 – Cable characteristics

Cable type	Function	Number of wires	D _{Anom} [mm]
H05VV5-F 7x1.0	pumps switching	7	9.5 – 11.8
H05VV5-F 3x1.5	counter power supply, module pump switching, security line	3	7.4 – 9.4
H05VVC4V5-K 5x0.5	data line	5	10.1

Legend: D_{Anom} - cable outer diameter

NOTICE *Cable bushings M20 x 1.5 and M25 x 1.5 in an explosion-proof design with protection Ex II 2G Ex e II and IP65 are used in the dispenser distribution boxes. These bushings have a cable diameter range (D_{anom}) of **7.0 mm to 13.0 mm (M20) and 11.0 mm to 17.0 mm (M25)**. It is forbidden to use cables that have a diameter outside of the permitted bushing range!*

NOTICE *Each LPG dispenser must be secured with an electrical device equipped with the STOP function according to category 0 or 1 in EN 60204-1. The fuel station attendant must be familiar with the device function.*

NOTICE Pulse overvoltage may occur in any line due to the strike of lightning up to the distance of several kilometres or due to any industrial activity. The size of pulses formed by lightning induction is sufficient to a total damage of electrical equipment. For these reasons the overvoltage protection is used which diverts energy of the overvoltage pulse to the grounding wire, thus protecting the device. The dispenser manufacturer **recommends** protecting the main switchboard (or the secondary switchboard) supplying the dispensers, electronic devices (computer, payment terminal, etc.) and data lines by overvoltage protection and lightning arresters. **The manufacturer is not responsible for damage caused by insufficient protection of cable connections!**

NOTICE For trouble-free operation of dispensers, **it is necessary to consistently separate signal cables from power supply cables.** When power cables are in the vicinity of signal cables, the interference and undesirable parasitic phenomena occur that can cause problems with controlling the dispensers or even destruction of electronic devices placed in dispensers and in the booth. Therefore, any intersection or joint routing (in one harness) of signal and power cables must be avoided. This can be solved so that power and signal cables have their own "channels" (storage, metal pipes). **The manufacturer is not responsible for damage caused by improperly performed cable connections!**

4. DISPENSER SETTING AND BASIC FUNCTIONS



Dispenser setting is performed by the set of setting parameters via which it is possible to control functional parameters of the dispenser, totally change the mode and behaviour of the dispenser in different situations. Depending on the type of an electronic counter installed the parameter values can be viewed and changed using the remote IR (infrared) controller, the service keypad, or the pre-set keypad buttons located on the dispenser.

4.1. PDEX5 COUNTER

The PDEX5 electronic counter is set using the remote controller. The yellow service remote controller PDERT-5S is intended for service engineers authorized by the dispenser manufacturer. This remote controller allows to perform complete settings of all dispenser parameters. The silver remote controller PDERT-5O is intended for fuel station managers and this remote controller allows them to perform:

- reading non-resettable electronic litre totalizers of all delivery hoses
- reading and resetting daily electronic litre and financial totalizers of all hoses
- setting of unit prices of products (in manual operation)
- reading and setting of operating parameters of the dispenser

The setting mode may be called up at the dispenser by a below stated procedure only in the condition when the dispenser is at rest - i.e., in the condition of "finished delivery", all nozzles hung, all sales finished. There are two access modes:

-  The **operator mode** is designed for the operators of the fuel station. It only allows you to read the values of the electronic totalizers and values of the basic parameters of the dispensers. It does not allow you to reset or change the parameter values.
-  The **manager mode** is designed for the manager of the fuel station. It allows you to read the values of the electronic totalizers and set the basic operating parameters of the dispenser. The access to the Manager mode is protected by password.

4.1.1. DESCRIPTION OF PDERT-5O REMOTE CONTROLLER

The keyboard of the PDERT-5O remote manager's controller is described on Figure 20. While using the remote controller it is necessary to move the remote controller closer to the distance of approx. 1 meter from the centre of the dispenser display. In the electronic counter, the dispensing hoses (L1...L5, R1...R5) and the products (P1...P5) are marked with the numbers 1, 2, 3... .9, 10, see Figure 19.

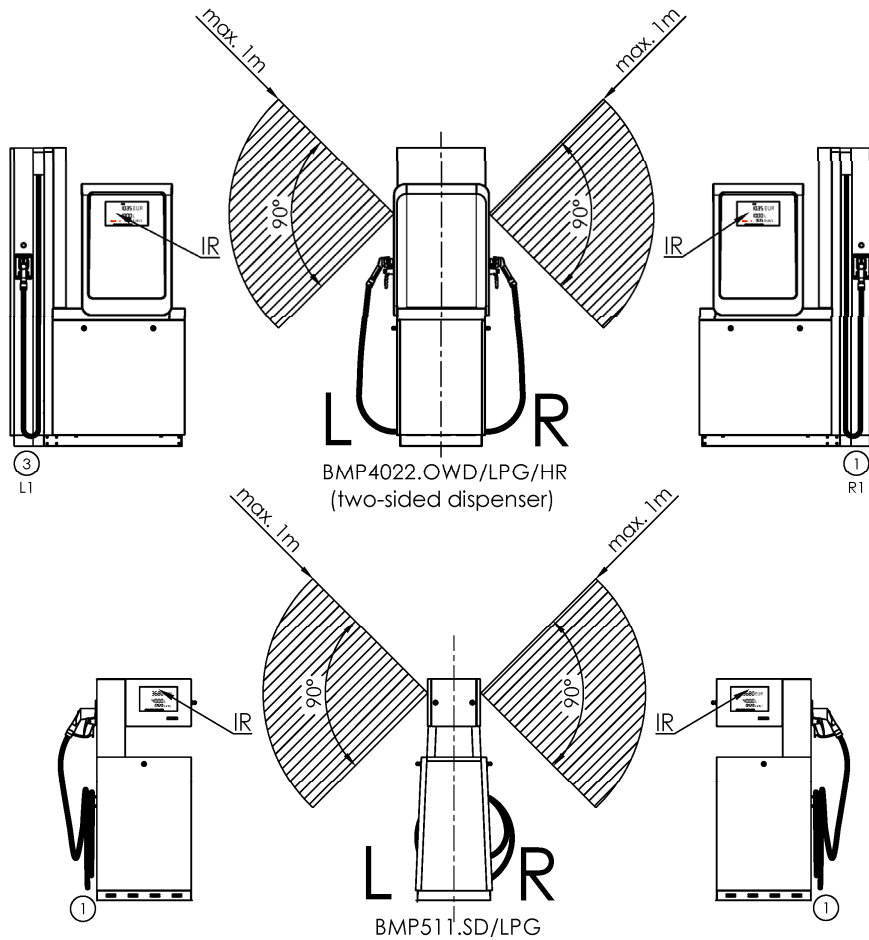


Figure 19 – Range of operation of the remote controller and marking of hoses and products in electronic counter (IR - position of infrared receiver on the display; ①, ②, ③ ... - nozzle position in calculator)

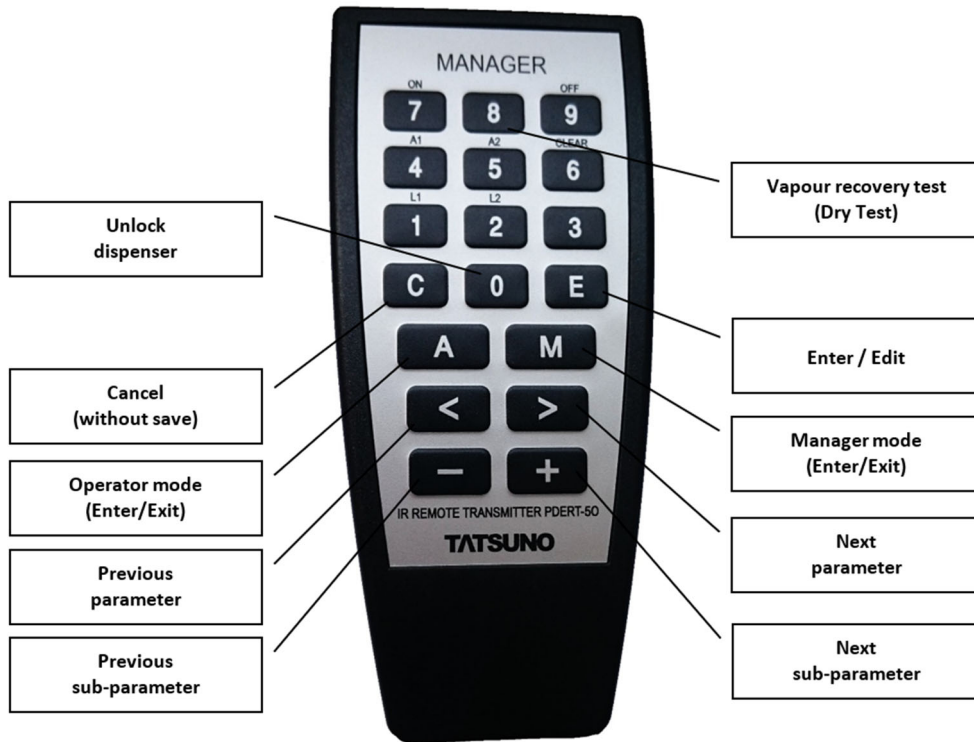





Figure 20 – Description of keys of the PDERT-50 remote controller

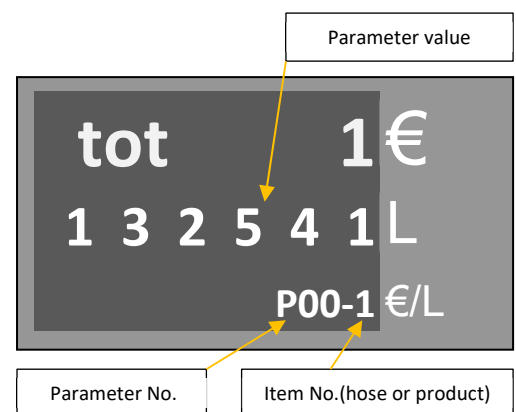
The manager mode is started by pressing the <M> button, the operator mode by the <A> button. The set and read values are displayed on the display. During the reading of the electronic totalizers, the convention of marking the parts of the dispenser applies which is described in Figure 19. In addition to setting and reading parameter values of the electronic counter of the dispenser, the remote controller can also be used for the following operating functions:

-  **Pre-selection of the delivered amount/volume.** Keys <0>, <1>, <9> can be used just like the pre-set keypad to set the volume/amount pre-selection on the dispenser.
-  **Unlocking the dispenser after delivery.** If the dispenser is in the manual mode with the blocking after delivery, you can unlock the dispenser with the <0> key, or only one side with the <C> key.
-  **Unlocking the dispenser after an error.** When the dispenser is in the manual mode and an error occurs on the dispenser, the error status can be cancelled by pressing the <0> key or by lifting and hanging the nozzle.

4.1.2. DISPLAYING DATA IN THE SETTING MODE

All data is displayed on the dispenser display in setting modes. While controlling using the remote controller the data is displayed on the display of that side where the setting mode was called up from by the remote controller. Individual parameters are shown as follows on the display:

No. of parameter: P00
 Item No.: 1 (dispensing hose order)
 Parameter value: 1132541 (volume in centilitres)



4.1.3. OPERATOR MODE

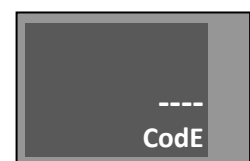
The operator mode of the PDEX5 counter is started by pointing the manager's remote controller on the dispenser display from the distance of approx. 1 m from the dispenser display centre and by pressing the <A> button. **All delivery nozzles on the dispenser must be hung in advance and the sale on the dispenser must be finished (paid).** After calling up the Attendant mode the value of the first parameter is displayed. Parameters and their items may be switched by using the <>> and <+> keys (see **Chyba! Nenalezen zdroj odkazů.**). The operator mode allows to view **but not change** the values of all parameters listed below, see table below.

Parameter	Description
P00	Non-resettable quantity totalizers - volume or weight
P01	Daily quantity totalizers - volume or weight
P02	Daily amount totalizers – in currency unit

Individual parameters will be described further. The operator mode is finished by pressing <M> or <A> keys. The mode is finished automatically if no remote controller button is pressed for 60 seconds.

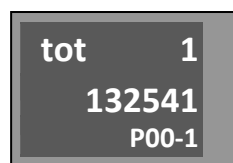
4.1.4. MANAGER MODE

The manager mode is started by pointing the manager's remote controller at the dispenser display from the distance of approx. 1 m from the dispenser display centre and by pressing the <M> button. **All delivery nozzles on the dispenser must be hung in advance and the sale on the dispenser must be finished (paid).** After calling up the manager mode the dispenser display shows a prompt for entering the 4-digit access password: Due to keeping the password confidential the digits entered are shown as dashes. The following default access password is set in the factory: "1111". **Example:** Gradually press <M> and <1111> and <E> keys.



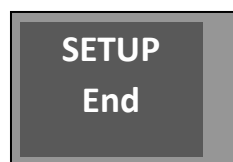
NOTE If the fuel station manager forgets the valid access password, then he/she must contact the authorized service staff who can set a new one.

After entering the valid access password, the display shows the value of the first parameter P00-1. Now it is possible to browse parameters by using the <>> key or by entering the **number of searched parameter** and confirm with the <E> key to go directly to the desired parameter. The Manager mode allows to view and change the values of parameters listed below, see table below.



Parameter	Description	Parameter	Description
P00	Non-resettable quantity totalizers - volume or weight	P15	Daily totalizers reset (P01 and P02)
P01	Daily quantity totalizers - volume or weight	P16-P19	not used
P02	Daily amount totalizers – in currency unit	P20	Error message codes history
P03	Unit price (manual/standalone mode)	P21	Error message codes statistics of filling point A
P04	Date and Time	P22	Error message codes statistics of filling point B
P05	Program version + checksums	P23	Error message codes statistics of filling point C
P06	Modbus interface activation (licence status)	P24	Error message codes statistics of filling point D
P07	not used	P25	Last fuelling history of filling point A
P08	Manager mode access password	P26	Last fuelling history of filling point B
P09	not used	P27	Last fuelling history of filling point C
P10	Serial numbers of peripheral units (processor, ...)	P28	Last fuelling history of filling point D
P11	Vapour recovery user test duration (Dry Test)	P29	Maintenance history
P12	Dispenser control mode	P30	Correction factors history
P13	Export of parameters	P31	Number of events
P14	Current product temperature	P32	Control mode changes history

The manager mode is finished by pressing <M> or <A> keys. The mode is also finished automatically if no remote controller button is pressed for 60 seconds. When leaving the setting mode, the message **SETUP End** appears on the display, and then the last fuelling transaction is displayed (the last state of the display before entering the manager mode).



4.1.5. NON-RESETTABLE VOLUME TOTALIZERS (P00)

Non-resettable electronic totalizers for all dispensing hoses (nozzles) are saved in the memory of the electronic counter. These totalizers state what total volume was delivered by individual delivery hoses. **These totalizers cannot be modified in any way.**

Parameter	Meaning
P00-1	quantity of the fuel delivered by hose 1 in centilitres (x 0.01L)
P00-2	quantity of the fuel delivered by hose 2 in centilitres (x 0.01L)
...	...
P00-10	quantity of the fuel delivered by hose 10 in centilitres (x 0.01L)

NOTE Number of totalizers of delivery hoses shown in the P00 parameter is conditioned by the configuration of the dispenser. The identification system of delivery hoses and products is described in Figure 19.

4.1.6. DAILY QUANTITY TOTALIZERS (P01)

Electronic daily quantity totalizers for all dispensing hoses are stored in the electronic counter's memory. They indicate how much fuel has been delivered by the individual dispensing hoses after the last reset (e.g., after the start of the shift). **These totalizers can be reset at any time using parameter P15** (see description below).

Parameter	Meaning
P01-1	quantity of the fuel delivered by hose 1 in centilitres (x 0.01L)
P01-2	quantity of the fuel delivered by hose 2 in centilitres (x 0.01L)
...	...
P01-10	quantity of the fuel delivered by hose 10 in centilitres (x 0.01L)

4.1.7. DAILY AMOUNT TOTALIZERS (P02)

Electronic daily amount totalizers for all dispensing hoses are stored in the electronic counter's memory. They indicate total amount of the fuel that has been delivered by the individual dispensing hoses after the last reset (e.g., after the start of the shift). **These totalizers can be reset at any time using parameter P15** (see description below).

Parameter	Meaning
P02-1	amount of the fuel delivered by hose 1 in currency unit (x 0.01€)
P02-2	amount of the fuel delivered by hose 2 in currency unit (x 0.01€)
...	...
P02-10	Amount of the fuel delivered by hose 10 in currency unit (x 0.01€)

4.1.8. FUEL PRODUCT UNIT PRICES (P03)

This feature allows you to view and set current unit prices (i.e., one litre of fuel) of all fuel products. These fuel unit prices are set on the display at the first lift of the delivery nozzle and reset of the display if the dispenser works in the **manual mode**. Setting is made by pressing the <E> key and entering the price in the <PPPP> format and confirming by the <E> key. The decimal point is not entered. E.g., unit price 1.03 €/L is entered as number 0103, price 34.15 CZK/L as number 3415, etc.

Parameter	Meaning	Factory setting
P03-1	fuel product unit price 1	0,00 €/L
P03-2	fuel product unit price 2	0,00 €/L
...
P03-10	fuel product unit price 10	0,00 €/L

NOTE Number of fuel products shown in the P03 parameter is conditioned by the configuration of the dispenser. The identification system of delivery hoses and products is described in **Chyba! Nenalezen zdroj odkazů.** if you change the unit price, such change will be reflected after a subsequent lift of the delivery nozzle.

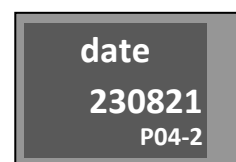
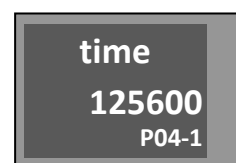
NOTICE Values set in the P03 parameter are valid **in the dispenser manual mode only**. If the dispenser is connected to the central control system of the fuel station, then the fuel unit price is set directly by the control system before each delivery. In such case the values of the P03 parameter are non-functional.

NOTICE The dispenser does **not enable deliveries with a zero value of the unit price**. In such case, after lifting the delivery nozzle the dispenser display shows the error message E30 and the delivery does not start.

4.1.9. CURRENT TIME AND DATE (P04)

This function allows to view and set the current time and date. The setting is made by pressing the <E> key by entering the time/date in the correct format and confirming with the <E> key.

Parameter	Meaning	Factory setting
P04-1	Time setting, format HHMMSS (i.e., 125600 = 12:56:00)	0:00:00
P04-2	Date setting, format DDMMYY (i.e., 230821 = 23. 08. 2021)	1.1.2001

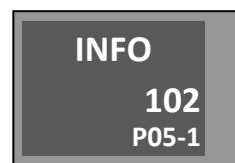


NOTE The time/date information is used by parameters P20 to P34 to record the exact moment of the fault, end of delivery, change of dispenser control mode..., etc. The date/time data has only an informative function, it does not affect the process of fuel delivery.

NOTICE The internal clock is reset at least 5 days after the power supply off. Time and date values will switch to factory setting and must be set again!

4.1.10. DISPLAYING THE PROGRAM VERSION AND CHECK SUMS (P05)

This function shows the number of the program version of the dispenser counter and different check sums. These values are intended for metrology authorities and authorized service engineers. The meaning of the individual parameters is described in the table below.



Parameter	Meaning
P05-1	Version of the metrologically relevant part of the program. It is specified in the type certificate (e.g., 102 = version V1.02)
P05-2	CRC (check sum) of metrologically relevant part of the program. It is specified in the type certificate (e.g., dbd2 FFA4)
P05-3	Version and release of the whole program (e.g., 1.02 release 14)
P05-4	CRC (check sum) of the whole program (e.g., 27E6 622d)
P05-5	CRC (check sum) of the temperature sensors unit PDEINP1 program (for temp. sensors 1 to 4). If not present „----“ is displayed
P05-6	CRC (check sum) of the temperature sensors unit PDEINP1 program (for temp. sensors 5 to 8). If not present „----“ is displayed
P05-7	Date and time the program compilation. The first line shows the time (hhmmss) and the second the date (DDMMYY).
P05-8	CRC of the program of the pressure sensors unit PDEDPS with address 1. If not present, "----" is displayed
P05-9	CRC of the program of the pressure sensors unit PDEDPS with address 2. If not present, "----" is displayed
P05-10	CRC of the program of the pressure sensors unit PDEDPS with address 3. If not present, "----" is displayed
P05-11	CRC of the program of the pressure sensors unit PDEDPS with address 4. If not present, "----" is displayed

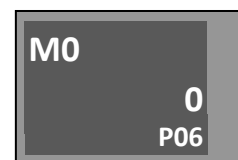
NOTE Metrologically relevant data P05-1 and P05-2 also appear on the display for a while after the power on.

NOTE The calculated CRC (cyclic redundancy sum) values from sub-parameters 1 and 3 are checked after switching on. If the calculated checksum is different from the stored correct sum, the dispenser is blocked and error message E13 is displayed. Higher cyclic checksum orders are displayed on the amount line, lower orders on the quantity line. The CRC of the peripheral unit programs (PDEINP and PDEDPS) is checked before each delivery is enabled. If the calculated value of the peripheral unit checksum does not match the correct value, delivery (fuelling, pumping) is not started and the corresponding error message is displayed.

4.1.11. MODBUS INTERFACE ACTIVATION (P06)

The modbus interface (diagnostic data line) allows service organizations to remotely diagnose dispensers. Parameter P06 allows to activate the Modbus interface by entering a valid key (eight-digit code).

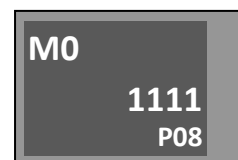
Parameter	Meaning	Factory setting
P06=0	The Modbus license is not valid. Modbus interface is not active	0
P06=1	The Modbus license is valid. Modbus interface is active	



4.1.12. MANAGER MODE ACCESS PASSWORD (P08)

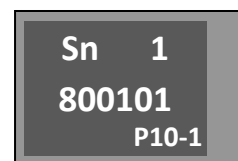
This function allows to view and change the password to the manager mode. The setting is made by pressing the <E> key by entering a new password in <PPPP> format and confirming <E>.

Parameter	Meaning	Factory setting
P08 = 1 to 9999	Manager mode access password	1111



4.1.13. SERIAL NUMBERS OF THE PERIPHERAL UNITS (P10)

The parameter is used to display the serial numbers of the connected peripheral units. The actual serial numbers of the peripheral units are compared with the numbers stored in the processor unit memory. If a mismatch is detected, an error message is displayed and fuel delivery is not allowed. The list of peripheral units is below.



Example: Parameter P10-1, serial number of the main processor unit SN: 18-00101 (see picture)

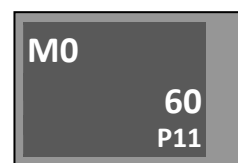
Parameter	Peripheral unit	Error message in case of detected mismatch
P10-1	Main processor unit	
P10-2	Main temperature sensors unit PDEINP1 (for temp. sensors 1 to 4)	E83-1
P10-3	Auxiliar temperature sensors unit PDEINP2 (for temp. sensors 5 to 8)	E83-2

Parameter	Peripheral unit	Error message in case of detected mismatch
P10-4	Mass meter A	E84-1
P10-5	Mass meter B	E84-2
P10-6	Main displaying unit (Master) of filling point A	E80-1
P10-7	Auxiliar displaying unit (Slave) of filling point A	E80-2
P10-8	Main electromechanical totalizers unit (Master) of filling point A	E82-1
P10-9	Auxiliar electromechanical totalizers unit (Slave) of filling point A	E82-2
P10-10	Main displaying unit (Master) of filling point B	E80-1
P10-11	Auxiliar displaying unit (Slave) of filling point B	E80-2
P10-12	Main electromechanical totalizers unit (Master) of filling point B	E82-1
P10-13	Auxiliar electromechanical totalizers unit (Slave) of filling point B	E82-2
P10-14	Main displaying unit (Master) of filling point C	E80-1
P10-15	Auxiliar displaying unit (Slave) of filling point C	E80-2
P10-16	Main electromechanical totalizers unit (Master) of filling point C	E82-1
P10-17	Auxiliar electromechanical totalizers unit (Slave) of filling point C	E82-2
P10-18	Main displaying unit (Master) of filling point D	E80-1
P10-19	Auxiliar displaying unit (Slave) of filling point D	E80-2
P10-20	Main electromechanical totalizers unit (Master) of filling point D	E82-1
P10-21	Auxiliar electromechanical totalizers unit (Slave) of filling point D	E82-2
P10-22	Pressure sensors unit PDEDPS with address 1	E85
P10-23	Pressure sensors unit PDEDPS with address 2	E85
P10-24	Pressure sensors unit PDEDPS with address 3	E85
P10-25	Pressure sensors unit PDEDPS with address 4	E85

4.1.14. VAPOUR RECOVERY USER TEST DURATION – DRY TEST (P11)

The parameter specifies the test duration in seconds for which the vapour recovery system vacuum pump will start after pressing the <8> button. The setting is made by pressing the <E> key by entering the test time in <SS> format and confirming with the <E> key.

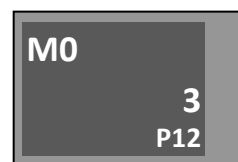
Parameter	Meaning	Factory setting
P11 = 5, 6...300	Dry Test duration in seconds	60 seconds



4.1.15. DISPENSER CONTROL MODE (P12)

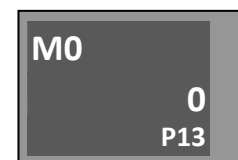
The parameter defines how the dispenser is controlled.

Parameter	Meaning	Factory setting
12 = 0	<u>Automatic mode with remote control</u> The dispenser is remotely controlled by a control computer/controller via a data line. It starts fuel delivery only when an authorization command from the the control system (POS) is received. The authorization command includes the unit price of fuel for each refuelling, preset maximum price or quantity, and the product number. Fuel delivery will not start at zero fuel price, zero preset amount/volume or if the product number does not match. In the event of a communication failure, the dispenser locks up with error E18. Error E18 always occurs if no communication is detected for more than 3 seconds. After communication is established, the error disappears automatically.	0
12 = 3	<u>Manual mode</u> The dispenser is completely independent, not remote controlled. The data line is blocked. Unit fuel prices are controlled by parameter P03. If a special manual mode with locking after delivery or a mode with RELEASE signal control is not set, pumping will start immediately after the dispensing nozzle is picked up and the display is reset. Switching from automatic to manual mode can be blocked by switch SW1-2.	



4.1.16. EXPORT OF PARAMETERS (P13)

To export the counter parameters from the memory to the memory card (SD card), press the <E> key, enter <1> and confirm with the <E> key. Before running the test, make sure that an SD card is inserted in the processor board. If the parameter export was successful, the message "done" will appear on the display. The file containing the parameters is saved on the card in the \CONFIG\EXPORT directory. When the data export is complete, the value of the parameter goes to the value 0.

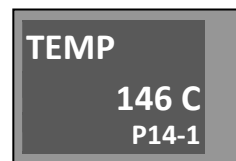


Parameter	Meaning	Factory setting
P13=0	Idle status	0
P13=1	Export of parameters	

4.1.17. CURRENT PRODUCT TEMPERATURE (P14)

The function displays the current temperature of the fuel products measured by the temperature sensors in the hydraulic of the dispenser. The subparameter number corresponds to the nozzle/hose number, not the temperature sensor number. The update of the temperature values takes place continuously approximately once per second. The temperature is displayed to one decimal place, e.g., 146 = 14,6 °C.

Parameter	Meaning
P14-1	Temperature of the product assigned to nozzle/hose 1
P14-2	Temperature of the product assigned to nozzle/hose 2
...	...
P14-10	Temperature of the product assigned to nozzle/hose 10

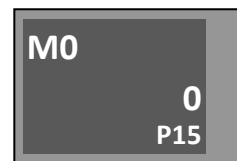


NOTE The number of nozzles/hoses displayed in parameter P14 is conditional on the set dispenser configuration. The system for marking dispensing hoses and products is described in Figure 77. If the temperature sensor is not connected, "- -" will appear on the display.

4.1.18. DAILY TOTALIZERS RESET (P15)

The parameter is used to reset all daily totalizers of dispensing hoses. After setting the parameter value to <1> and confirming (<E> + <1> + <E>), all totalizers that are part of parameters P01 and P02 will be reset to 0. The message "done" appears and the parameter value goes to 0.

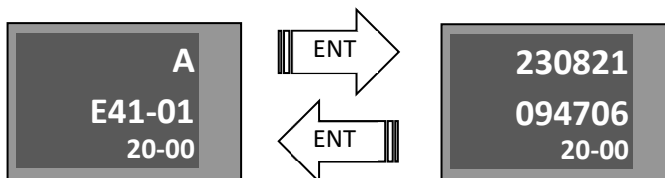
Parameter	Meaning	Factory setting
P15=0	Idle status	0
P15=1	Daily totalizers P01 and P02 reset to 0	



4.1.19. ERROR MESSAGE CODES HISTORY (P20)

The function is used to display the history of the last 100 error message codes that have occurred and displayed on the dispenser. The table of error messages codes is given in chapter 6.2.1. After switching to parameter P20, the display shows the code of the last error message and the designation for the filling point where the error occurred A, B, C or D (e.g., E41-01 pulse generator connection error at input PUL1 for filling point A). After pressing the <E> key, the date and time of the fault will be displayed. After pressing the <+> key, the code of the penultimate error message code, etc. appears on the display.

Parameter	Meaning
(P)20-00	code of the last error
(P)20-01	code of the penultimate error
...	...
(P)20-98	99th error code in the sequence
(P)20-99	100th error code in the sequence

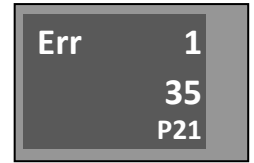
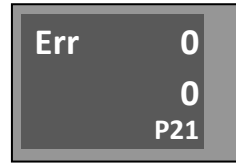


NOTE If two identical error message code occur in a row, then only the last one is displayed.

4.1.20. ERROR MESSAGE CODE STATISTICS OF FILLING POINT (P21, P22, P23, P24)

The parameter is used to display the cumulative numbers of individual error messages for a given filling point. The first line of the display shows the error message code and the second line the frequency of the error. After switching to parameter P21 (error message code statistics for filling point A), the display shows the fault frequency for error message code E0. After pressing the <+> key, the frequency of the error message code E1... etc... appears on the display. The table of error message codes is given in chapter 6.2.1.

Parameter	Meaning
P21	Error message code statistics of filling point A
P22	Error message code statistics of filling point B
P23	Error message code statistics of filling point C
P24	Error message code statistics of filling point D



NOTE A filling point (dispensing site, dispensing point) is defined as a place where one independent fuel dispensing (one pumping) can be performed. By default, a double-sided dispenser has two filling points - A and B (see Figure 79), a single-sided dispenser has one filling point - A. However, there are variants of dispensers, especially combined dispensers, where two simultaneous pumping can be performed on one side of the dispenser (diesel + AdBlue). The double-sided dispenser then has four filling points A, B, C and D (see Figure 80) and the single-sided dispenser has two filling points A and B. Each filling point must have one main display and can serve one to five dispensing hoses.

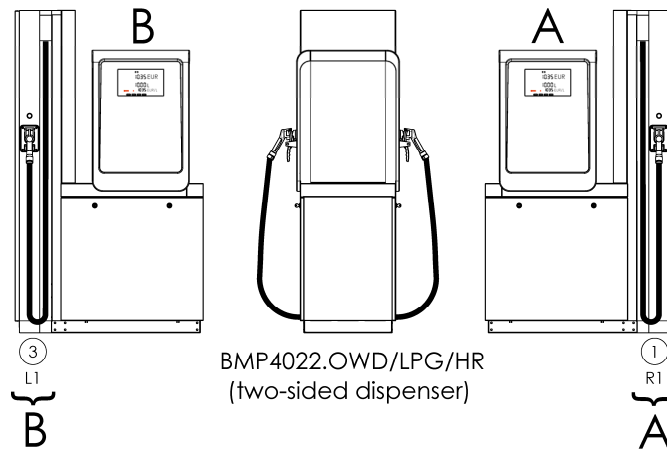


Figure 21 – Example of a standard dispenser with two filling points A and B (two simultaneous deliveries, two main displays; ①, ②, ③ ... - nozzle position in electronic counter)

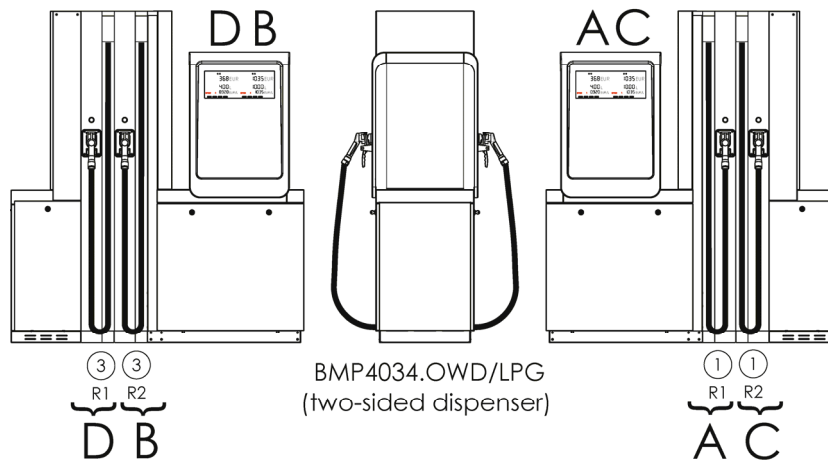
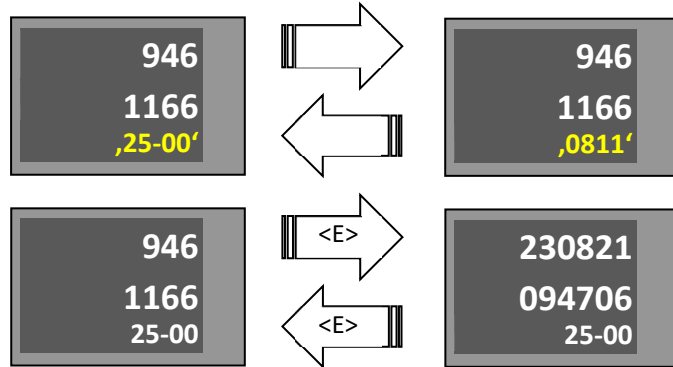


Figure 22 – Example of four-hoses dispenser with four filling points A, B, C and D (four simultaneous deliveries, four main displays; ①, ②, ③ ... - nozzle position in electronic counter)

4.1.21. LAST FUELLING HISTORY (P25, P26, P27, P28)

The parameter is used to display the last 100 fuellings (deliveries) for a given filling point. After switching to parameter P25 (last fuelling history at filling point A), the display shows the last fuelling transaction. The transaction price with the parameter number flashes on the unite price display. After pressing the <+> key, the penultimate fuelling..., etc. appears. After pressing the <E> key, the date and time of the end of the saved fuelling will appear on the display.

Parameter	Meaning
(P)25	Last fuelling history at filling point A
(P)26	Last fuelling history at filling point B
(P)27	Last fuelling history at filling point C
(P)28	Last fuelling history at filling point D

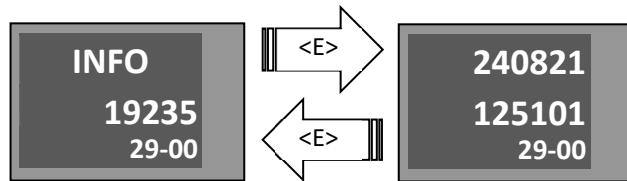


Example: Last fuelling at filling point A had a value of 11.66 L, 9.46 €, 0.811 €/L and was terminated 23.8.2021 at 9:47:06

4.1.22. MAINTENANCE HISTORY (P29)

The parameter allows you to display the identification codes of the last 50 service remote controllers that entered into service mode of the counter. After switching to parameter P29, the code of the last service remote controller (e.g., 19235) appears on the quantity display line. After pressing the <+> key, the penultimate remote controller code will appear. After pressing the <E> key, the date and time of entering the service controller into the setting mode of the dispenser counter will appear on the display (e.g., 24.8.2021 at 12:51:01).

Parameter	Meaning
P(29)-00	Code of the last remote controller
P(29)-01	Code of penultimate service controller
...	...
P(29)-49	Code of the 50th service controller in the sequence



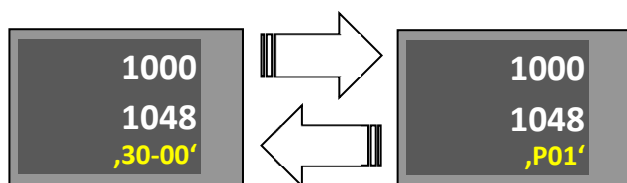
NOTE The yellow service remote controllers PDERT-5S are used by authorized service personnel of TATSUNO EUROPE dispensers. The service controllers each have their own internal identification code, which is written into the memory of the dispenser counter when entering the service mode. Using parameter P29, it is therefore possible to find out who entered the service mode of the counter and when, i.e., to identify the service technician and the time of the service intervention.



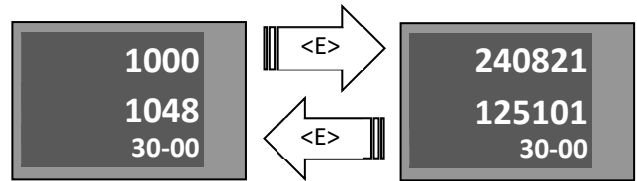
4.1.23. CORRECTION FACTOR CHANGES HISTORY (P30)

The parameter allows you to display the last 50 records of changes in the setting of correction factors of measuring devices (meters, pulse generators). After switching to parameter P30, the last record of the correction factor change appears on the display - the original correction factor appears on the amount display line, the new changed correction factor appears on the quantity display line, the measuring device number (P01, P02, ... P10) appears on the unit price display line and flashes with the parameter number and the sequence number of the correction factor change record. After pressing the <+> key, the penultimate record of the change of the correction factor..., etc. appears. After pressing the <E> key, the date and time of the correction factor change will appear on the display.

Parameter	Meaning
(P)30-00	Last record of the correction factor changes
(P)30-01	Penultimate record of the correction factor changes
...	...
P(30)-49	50th record of the correction factor changes



Example: Last record (00) of the change of the correction factor of the measuring device P01, the original correction factor = 1,000, the new correction factor = 1,048, the date and time of the change of the correction factor = 24.8.2021 at 12:51:01)

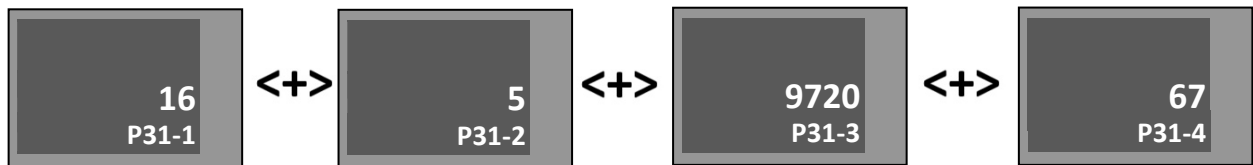


NOTE The correction factor (of meter, pulse generator ...) is used in the metrological setting of the measuring device. Authorized service or legal metrology personnel will adjust it so that the measuring equipment complies with local regulations in terms of accuracy (MID guidelines, ...). The change of the correction factor is preceded by a removal of the metrological seal or sticker. After setting the factor, a new seal must be installed in the presence of a metrologist. Parameter P30 is used to check station owners and metrology officers.

4.1.24. NUMBER OF EVENTS (P31)

The parameter is used to display the cumulative numbers of some important events, such as the number of correction factor changes, the number of peripheral unit serial numbers stored (i.e., the number of configuration saves), the number of counter starts (i.e., the number of power off), the number of service mode entries. After switching to parameter P31, the display shows the number of changes in the correction factors. After pressing the <+> key, the frequency of serial numbers..., etc. will appear on the display.

Parameter	Meaning
P31-1	Cumulative number of performed manual and automatic changes of the correction factor
P31-2	Cumulative number of peripheral unit serial number stores (= number of counter configuration stores)
P31-3	Cumulative number of power on counters (= number of power outages)
P31-4	Cumulative number of entries in configuration mode at the service level.

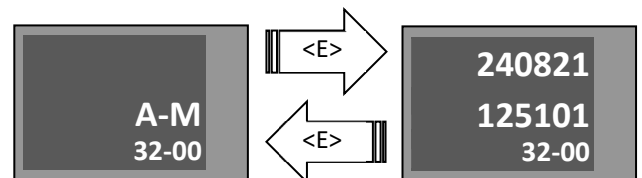


NOTE The serial numbers of the peripheral units are stored during the installation and recovery of the new electronic counter of the dispenser, or after the replacement of some of its important parts (display, temperature sensor unit...). Entry into the service mode and removal of the metrological seal is necessary for storage.

4.1.25. CONTROL MODE CHANGES HISTORY (P32)

The parameter allows to display the last 20 records about the change of the dispenser control mode, i.e., the change from manual to automatic mode and vice versa (see parameter P12). After switching to parameter P32, the last record of the change of the operating mode appears on the display - the amount display shows M-A (change from manual to automatic mode) or A-M (change from automatic to manual mode). After pressing the <+> key, the penultimate record of the change appears. After pressing the <E> key, the date and time of the mode change will appear on the display.

Parameter	Meaning
(P)33-00	Last change of the control mode
(P)33-01	Penultimate change of the control mode
...	...
P(33)-19	20 th change of the control mode in the sequence



Example: According to the last record (00), the change from automatic to manual mode (A-M) took place on 24.8.2021 at 12:51:01.

NOTE Monitoring of the change from automatic to manual mode is important. When fuel is fuelled in manual mode, POS-independent unit fuel prices are used and fuel dispensing data is not transmitted to the cash register. The transition from automatic to manual mode can be disabled by toggling switch SW1-2, which is protected by a seal.

5. OPERATION

5.1. INSTRUCTIONS FOR SAFE OPERATION

Dispensers are complex devices that have to secure a whole range of difficult functions. Therefore, cleaning of the storage tanks, piping systems and inspection of the pumped medium cleanliness must be carried out before commissioning. An inspection of wiring and a check of connection correctness must be performed before commissioning in order to prevent any electric shock injuries and to ensure safety against explosion.



Smoking forbidden



Open flame use
forbidden



Use of mobile phones forbidden

NOTICE For LPG dispensers/modules, a pressure test of the LPG dispenser must be performed with a pipeline system by pressure of 2.5 MPa, including a review, before commissioning.

CAUTION

- ⚠ *It is forbidden to smoke and use open fire in the immediate vicinity of the dispenser.*
- ⚠ *The smoking ban applies also to passengers inside the vehicle.*
- ⚠ *It is forbidden to use mobile phones in the immediate vicinity of the dispenser.*
- ⚠ *It is forbidden to pump into the vehicle tank while the engine is running.*

CAUTION

- ⚠ *Technical and technological devices must correspond to approved conditions together with regulations for safe operation and maintenance as well as solutions of emergencies. The device must be fitted with carbon-dioxide extinguishers according to the fire-safety solution.*
- ⚠ *The LPG fuel station may only be operated by demonstrably trained persons.*
- ⚠ *The "STOP button" is placed at the dispenser (for emergency situations). The procedure in case of fire or emergency is precisely defined in local operating rules and regulations – the attendant must be demonstrably trained with regard to this.*
- ⚠ *The "STOP line" must be located at least 5 meters from the dispenser.*
- ⚠ *LPG containers, piping and dispenser must be earthed, the grounding point for the pumping tank must be established and marked.*
- ⚠ *When filling LPG or filling out or removing from tanks, it is necessary to proceed according to the regulations issued, in accordance with specific conditions the entry and operation in the designated area of the fuel station must be avoided.*
- ⚠ *It is necessary to follow the prescribed procedure for the sale and delivery of LPG. In any danger, immediately disable this device. During the LPG delivery, the LPG station operator must also be present, the delivery must not be carried out in the event of the risk of atmospheric discharges in storms.*
- ⚠ *It is necessary to observe defined terms to perform regular checks and inspections of all installed technical devices. Do not allow persons without appropriate professional qualification to tamper the installed technology including the gas devices.*

CAUTION

- ⚠ *The attendant must not perform any repairs of the device and change setting of safety fittings. Regular maintenance and service may only be performed by an authorized service company.*
- ⚠ *The attendant must keep the device in proper and safe order, immediately inform the service organization about the defect of abnormality during operation and immediately decommission the device in case of danger of default.*

NOTICE The LPG dispenser must be secured with an electrical device equipped with the STOP function according to category 0 or 1 in EN 60204-1. The fuel station attendant must be familiar with the device function.



5.2. DISPENSER COMMISSIONING

ON/OFF switching of fuel dispensers is carried out in the main switchboard of the fuel station where the power supply of the dispensers is provided. Each dispenser has two power points in the main switchboard:

- Power supply of the dispenser electronic counter, switching and heating circuits

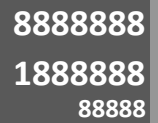
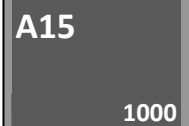
Both power points are secured by the circuit breakers that enable the dispenser to be switched on/off.

RECOMMENDATION *We recommend that you turn on the dispenser as follows:*

-  **Turn on the backup UPS located in the kiosk (the green LED on the UPS turns on)**
-  **Switching on the 230 V circuit breaker for stabilized power supply of the dispenser counter (all segments of the display are automatically tested and the last delivered values are displayed)**

The following processes occur when the power of the PDEX5 counter is turned on:

- **test of display units** (displays). The backlight of the displays lights up and then all display segments are displayed (eights) for approx. 1 second
- **time delay** when the counter is switched on. Time required to start the multimedia display. During the time delay, the displays show the filling point to which the display is connected A, B, C or D and the time in seconds remaining until the electronic dispenser counter is activated. The length of the time delay (15) can be set by the counter parameter, by default it is without delay. The positions of switches SW1-1, SW1-2, SW1-3 and SW1-4 are displayed on the unit price line (1=ON; 0=OFF). If switch SW1-1 is in position 1, then the selected metrological parameters cannot be set on the counter.
- **processor unit test.** Ten-second test in which all functions and memory of the processor unit are checked. During the test, the side of the counter to which the display is connected (A, B, C or D) is displayed, and:
 - version of the metrologically relevant part of the program (VER 1.02),
 - checksum of the metrologically relevant part of the program (dbd2 2FA4).
 - processor board type PDE5S or PDE5L
- **setting the counter status** before switching it off. The information that would appear on the display before the counter was last turned off is displayed. If the counter was operating in manual mode, then it is possible to start pumping immediately after picking up the gun. If the counter was operating in automatic mode, it waits for communication with the control computer to be established and, if necessary, for the transaction to be terminated (payment), if it was not terminated regularly before switching off.





Now the dispenser is ready for fuel delivery.

5.3. DISPENSER OPERATION

NOTICE *The operator is responsible for the operation of the fuel station and it is his duty to monitor the delivery of fuel and, in the event that the customer performs unauthorized operations at the self-service dispensers, he must instruct the customer about proper handling. The operator is also obliged to mark the risk area of the fuel station with warning symbols (smoking ban, ban on open fire, direction of arrival to the dispenser, etc.). The fuel station operating instructions must be freely accessible to the customer for any information on basic obligations.*

5.3.1. LPG DELIVERY

Before the delivery starts, the dispenser attendant checks whether the storage tank in a vehicle has a homologation mark, the vehicle engine and all electrical devices are turned off. Then he/she visually inspects the condition or wear of the filling neck that could be the reason for leaks. If he/she finds serious deficiencies, he/she is entitled to refuse storage tank filling. In case of gas leak or danger the attendant shall finish the delivery.

LPG delivery into motor vehicles with attendants

The operation of the dispenser is ensured by the employee of the fuel station who lifts the delivery nozzle from the dispenser and connects it to the storage tank of the vehicle which must be secured against moving. After pressing the control button (START button) located on the counter case, the reset of the electronic counter is performed and the pump electric motor located at the storage tank starts. Delivery can be terminated at any time by releasing the control button. When refilling the "full" tank, after reaching the 80% fill level the tank filler neck is closed and the safety control (electronic counter) terminates the delivery within 10 seconds regardless of the control button. Delivery data remains recorded on the counter display. Dispensers equipped with an electronic pre-selection allow pre-selection of the exact quantity required which is determined by volume or amount. These stands are equipped with a two-stage solenoid valve.

NOTICE Pursuant to EN 14678-1:2013, article 4.5.8, LPG dispensers designed for self-service operation must be equipped with a "dead man button" (START button) to ensure that the delivery process can only be started and maintained by pressing this button. Release of this button shall immediately stop the flow of LPG.

NOTE According to EN 14678-1:2013, article 4.5.1.1, LPG dispensers must be equipped with a breakaway or shear coupling located between the delivery nozzle and the dispenser. This breakaway coupling disconnects the flow rate at both ends in case of emergency. LPG dispensers are standardly equipped with a breakaway coupling which breaks if a force greater than 200N and less than 500N is applied to it.

OBLIGATIONS OF LPG DISPENSER/MODULE ATTENDANT

- ⚠ *Observe operating rules and regulations and operating instructions of gas devices.*
- ⚠ *Keep the operated devices in a safe and proper condition.*
- ⚠ *Immediately inform the operator about each defect, failure, or abnormality during operation.*
- ⚠ *Immediately decommission the device in case of gas leak or danger.*
- ⚠ *Keep tidiness and cleanliness and ensure that no unauthorized persons are nearby the device.*
- ⚠ *Inform the operator about circumstances that impede the device operation for the attendant.*
- ⚠ *Properly write records to the logbook about the shift start and finish, inspections, repairs, and audits.*
- ⚠ *The dispenser and reservoir attendant must not perform any repairs or change the device and safety fittings setting on his/her own.*
- ⚠ *Regularly check the condition of delivery hoses, their correct position in the dispenser. Protect them from damage, especially when the dispenser is not equipped with a winch and the hose is lying on the ground.*

Unattended LPG delivery into motor vehicles

In the case of unattended delivery, the customer him/herself lifts the delivery nozzle from the dispenser and connects it to the tank of the vehicle. After pressing the control button (START button) located on the counter case, the reset of the electronic counter is performed and the pump electric motor located at the storage tank starts. Delivery can be terminated at any time by releasing the control button or by pressing the STOP button (safety STOP button). When refilling the "full" tank, after reaching the 80% fill level the tank filler neck is closed and the safety control (electronic counter) terminates the delivery within 10 seconds regardless of the control button. Upon completion, the customer is obliged to hang the delivery nozzle back into the dispenser, into the delivery nozzle holder. Only after the nozzle has

been properly hung up, the transaction is terminated and the registration of the delivery by the control system is completed.

NOTE *In the unattended mode, the start of delivery only occurs after lifting the nozzle and pressing the START button. Delivery termination only occurs after releasing the "START" button and returning the delivery nozzle. In the attended mode, commencing / terminating delivery occurs after pressing / releasing the START button.*

NOTE *LPG dispensers for unattended fuel stations must be, in addition to the START button, also equipped with a safety STOP button and the delivery nozzle position sensor – see EN 14678-1, art. 4.5.6 "Unattended fuel stations must be equipped with a device to ensure that the fuel filler is properly positioned back after the fuel delivery is completed".*

Safety at work with the LPG dispenser

The operator is responsible for the fuel station operation and is obliged to entrust its operation only to trained employees having relevant authorization. The attendant shall competently perform filling the LPG storage tanks of refilled vehicles, checks the conditions of the dispenser and other devices in regular intervals as well as the operation of the entire device, and keeps operating records. The smoking ban and ban on using open fire within a radius of 10 m must be located in a visible place nearby the dispenser. There must be also a notice on switching off the engine, max. filling level of 80% and securing the vehicle against spontaneous setting in motion.

In terms of construction, dispensers and all their components which could be the source of initiation of the explosion are approved by the state authorized institution, State Testing Office No. 210 FTZÚ Ostrava Radvanice that issues the relevant certificates. After detecting possible gas leak the detector sensors may be located in the dispenser area. However, these sensors are not included in the basic offer. In terms of hygiene, the given device is harmless for attendants and operators. While performing operation and maintenance it is advisable to protect your hands by wearing gloves.

5.3.2. ELECTROMECHANICAL TOTALIZERS

On demand, TATSUNO EUROPE dispensers are equipped with electromechanical totalizers for monitoring the total amount of fuel flown through each delivery hose. Totalizers are located on the dispenser display. Each delivery hose or nozzle has one seven-digit electromechanical totalizer that shows the **number of complete litres (kilograms for CNG) delivered through the appropriate delivery hose**. For multiple product dispensers, the electromechanical totalizers on the display are ordered from top to bottom or from left to right and are marked with delivery hose numbers.

NOTE *On display A, the electromechanical totalizers are numbered 1, 2, 3, 4. The numbers of the totalizers correspond to the delivery hoses 1A, 2A, 3A and 4A. On the display B, the electromechanical totalizers are also numbered 1, 2, 3, 4. The numbers of totalizers correspond to the delivery hoses 1B, 2B, 3B and 4B.*

5.3.3. TEMPERATURE VOLUME COMPENSATION (ATC).

LPG dispensers TATSUNO EUROPE allow conversion of the volume of dispensed fuel at a given temperature to a corrected volume corresponding to the reference temperature of 15°C. A precise calibrated temperature sensor Pt100 which measures the current temperature of dispensed fuel with the accuracy of $\pm 0.15^\circ\text{C}$ is incorporated in the dispenser hydraulic system before the flow meter. Temperature data from all temperature sensors are collected with the PDEINP unit located in the counter case and the data is transmitted to the dispenser counter. The electronic counter automatically recalculates and displays the delivered volume on the display for LPG – see table below. Fuel density at 15 °C is set in the parameter of the dispenser counter and must be within the range <500;600>. The temperature sensor state, PDEINP unit state and density value are checked before each dispensing. If an error is present, dispensing is not permitted and the error message E10 (sensor), E11 (density) or E12 (PDEINP) is displayed. The actual fuel temperature measured by the temperature sensor can be displayed in parameter P14.

Table 4 - Volume values for various ratios of liquefied propane butane at temperature T and dispensed volume $V_n = 100$ L

Liquid %Propane / %Butane	ρ_0 [kg/m ³]	T = -20 °C	T = -10 °C	T = 0 °C	T = +15 °C	T = +30 °C	T = +50 °C
100% Propane	508	109.28	106.86	104.25	100.00	95.34	88.48
90% P / 10%B	515	108.99	106.63	104.10	100.00	95.52	88.95
80%P / 20%B	523	108.67	106.38	103.94	100.00	95.72	89.48
70%P / 30%B	531	108.35	106.14	103.78	100.00	95.91	89.98
60%P / 40%B	538	108.09	105.93	103.65	100.00	96.08	90.42
50%P / 50%B	546	107.79	105.70	103.50	100.00	96.26	90.90
40%P / 60%B	554	107.50	105.47	103.35	100.00	96.44	91.36
30%P / 70%B	561	107.26	105.28	103.23	100.00	96.59	91.76
20%P / 80%B	569	106.98	105.07	103.09	100.00	96.76	92.20
10%P / 90%B	577	106.72	104.86	102.96	100.00	96.92	92.63
100% Butane	585	106.46	104.66	102.83	100.00	97.08	93.05

5.3.4. DIFFERENTIAL PRESSURE CONTROL

During LPG filling, the pressure of the liquid phase which is filled to the vehicles must be at least **one bar higher** than the pressure of the gas phase which is returned to the storage tank. If this condition is not met, the correct function of the gas phase separator and thus the accuracy of the measurement is not guaranteed. The dispenser counter (PDEX5) allows to check the value of the difference between the liquid phase pressure and the gas phase pressure in two ways:

- by using a differential pressure switch (pressostat TRAFAG)
- using two pressure sensors of the pressure measuring unit (PDEDPS)

The differential pressure-dependent filling control function is the same for both types of sensing. If the gas phase pressure is not at least one bar lower than the liquid phase pressure, the correct function of the separator is not ensured and the counter automatically throttles or closes the solenoid valve completely (according to the setting of service parameter M10-P05). If the pressure conditions do not equalize within the time set by parameter M10-P03, the filling is terminated and error message E86-1 is displayed. If the pressure difference rises above one bar again during the time given by parameter M10-P03, the valve opens and filling continues. During one filling, the pressure difference can drop a maximum of three times. When the pressure difference drops for the fourth time, the filling is stopped and error E86-2 is displayed. The most common cause of the decrease in pressure difference is the impermeability of the gas phase return line due to impurities or freezing, or a long unprotected line exposed to high temperatures, in which the liquid phase is gasified and the efficiency of the separator is insufficient.

5.3.5. DISPENSER OPERATING MODES

There are two basic dispenser operating modes:

- 1) manual mode
- 2) automatic (remote) mode

The **manual mode** is a status when the dispenser works independently of any remote control.

Delivery progress: The customer arrives at the dispensers and takes the delivery nozzle of the product he/she wants to deliver. The display will reset (approx. 1.5 seconds) and then the pump motor switches on and the dispenser is ready for delivery. Once the fuel has been delivered, the customer hangs up the delivery nozzle and pays for the delivered fuel to the operator. The dispenser is immediately ready for next delivery. Since the dispenser is not controlled in any way in the manual mode, it is necessary to manually set the fuel unit price on the dispenser – see sections 4.1.8 and **Chyba! Nenalezen zdroj odkazů..** The number of delivered litres per shift is determined by the difference between the electronic (or electromechanical) totalizers at the start and end of the shift.

The **automatic mode** is a status when the dispenser is remotely controlled by a control device (program in PC, control device, station controller, etc.). The automatic mode allows remotely control deliveries from the fuel station booth. The booth contains a control device by which the fuel station attendant releases the dispenser for delivery and collects information about the delivered fuel amount and price after the delivery is finished.

Delivery progress: The customer arrives at the dispensers and takes the delivery nozzle of the product he/she wants to deliver. The dispenser will require authorization from the control unit in the booth. The control unit sends a fuel unit price, a maximum amount/volume of delivery, and allows delivery. The display of the dispenser will reset (*approx. 2 seconds after removing the nozzle) and the pump motor switches on. Once the fuel has been delivered, the customer hangs the nozzle and pays the required amount to the booth where he receives the tax receipt (receipt) for the delivered fuel. The dispenser is immediately ready for next delivery. Since the dispenser is remotely controlled in the automatic mode, it is not necessary to manually set the fuel unit price on the dispenser. The correct unit price is automatically set by the control computer to all dispensers at the fuel station.

Switch from the automatic to the manual mode. By default, the dispensers are connected and set as it is expected they should work at the fuel station, i.e., if the fuel station is equipped with a control system, the dispensers will be set to the automatic mode; if the fuel station is without the control system, the dispensers are set to the manual mode by default. In case you have to switch the dispensers from automatic to manual mode - e.g., because of a crash in the control system, you have to change the value of parameter M0-P12 (P12) from value 0 to value 3 using the IR remote control and to check the setting of unit prices in parameter M0-P03 (P03) – see chapters 4.1.8

NOTICE *The switch from the automatic to manual mode must be discussed with the service engineer in advance!*

5.3.6. PRESET KEYPAD

TATSUNO EUROPE dispensers may be equipped with a so-called preselection keypad enabling preset the delivered amount or quantity (volume or weight) by the customer directly on the dispenser. The customer may decide before he/she starts the delivery what volume or for what sum of money he/she wants to refill the storage tank. The pre-selected value may be cancelled by pressing the <Cancel> button at the moment when the delivery has not started yet. It is then possible to set another pre-selected value or deliver in a classic way without using the pre-selection.

The dispensers can be equipped with the following two types of preselection keypads (see pictures below):

- 4-key preset keypad with 3 fixed amount or volume values (3 values of the buttons can be freely set using the service parameters of the counter)
- 12-key preset keypad that allows to enter any value for a preset amount or volume



Picture 1 – 4buttons preset keypad



Picture 2 – 12buttons preset keypad

NOTE *In case the pre-selection keyboards are used, it is necessary that the dispensers are equipped with throttle valves (slow down) that ensure safe deceleration of fuel flow rate before the target preset value.*

a) Example of entering the pre-selection in Euros

- The customer arrives to the dispenser and wants to deliver fuel for €10.
- a) Press the <5€> key twice on the 4-key preset keypad
- b) Press the <1> <0> keys on the 12-key preset keypad
- He/she selects the product he/she wants to deliver, lifts the delivery nozzle from the dispenser and puts it in the car tank.
- The dispenser delivers exactly the amount he/she has chosen and then stops automatically.
- The customer hangs the delivery nozzle back into the dispenser and goes to pay the sum.

b) Example of entering pre-selection in litres

- The customer arrives to the dispenser and wants to refill 20 litres of fuel.
- a) Press the <10L> key twice on the 4-key preset keypad
- b) Press the <2> <0> <#> keys on the 12-key preset keypad
- He/she selects the product he/she wants to deliver, lifts the delivery nozzle from the dispenser and puts it in the car tank.
- The dispenser delivers exactly the volume he/she has chosen and then stops automatically.
- The customer hangs the delivery nozzle back into the dispenser and goes to pay the volume.

5.3.7. DESCRIPTION OF THE PDEDIL V6 DISPLAY



The LCD display consists of the following parts:

Display segment	Function	Note
	Amount delivered	- for P12=0 it can display the value from € 0 to 99999.9 - for P12=1 it can display the value from € 0 to 999999.9
	Volume delivered	- for P12=0 it can display the value from 0 to 9999.99 L - for P12=1 it can display the value from 0 to 99999.99 L
	Delivered fuel unit price	- for P12=0 it can display the value from 0 to 99.99 €/L - for P12=1 it can display the value from 0 to 999.99 €/L
	Minimum Measured Quantity	- the display is set by parameter P91 for each delivery hose
	Temperature volume compensation (ATC)	- it appears automatically during delivery if the temperature compensation function is activated for the delivered product
	Dispenser status indication - released for delivery / blocked	- it appears automatically when the dispenser status changes
	Signalling of forced termination of delivery	- it appears after the STOP command has been received from the booth, after the preset number / preset amount has been reached or after the allowed time without delivery has been exceeded





Fault signalling or maintenance required.

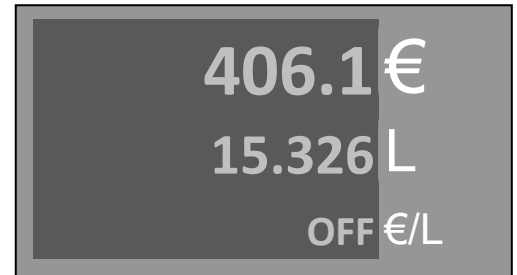
- it will be displayed at each fault indication together with the fault code (see 6.2.1)

5.3.8. DISPENSER OPERATION TERMINATION

RECOMMENDATION The manufacturer recommends disabling the dispenser in the following order:

-  Switch off the 230 V circuit breaker for stabilized power supply of the electronic counter of the dispenser.
-  Switch off the backup UPS located in the booth by a switch located at the rear panel (the green LED on the UPS turns off).










After switching off the power supply of the electronics in the fuel station switchboard, the "OFF" message is displayed on the unit price display and the display illumination switches off. The last data is shown on the display for at least 15 minutes after the power supply disconnection. After elapsing this period and "erasing" the display the display status is saved into the counter memory and will be shown after the power supply is connected again – see the previous section.



Now the dispenser is out of order.

6. MAINTENANCE AND SERVICE

6.1. MAIN PRINCIPLES OF DISPENSER MAINTENANCE

-  keep all functional units of the dispenser clean so that any potential unexpected defect may be easily identified and quickly removed
-  continuously check all connections if the leakage of the fuel occurs, tighten and reinforce joints
-  check and, if necessary, correct tensioning of the V-belt with the engine bracket
-  check and, if necessary, tighten the screws that secure the electric motor to the bracket
-  inspect the condition of the delivery nozzle and decide on repair or replacement of the delivery nozzle, if necessary, according to the type and size of the defect
-  regularly check the condition of the delivery hoses. In case of mechanical damage to the delivery hose, ensure its immediate replacement.
-  check the function of the door locks and the mechanism for hanging the delivery nozzle
-  care for external cleanliness of the dispenser, pay special attention to counter window cleanliness
-  regularly carry out sludge, water, and other impurities removal by using a sludge pump from tanks (fuel tanks)


CAUTION *It is necessary to always switch off electricity and take reliable measures against its reconnection before performing all maintenance work at mechanical, hydraulic or electrical parts.*


CAUTION *Do not remove the dispenser covers during operation!*

CAUTION *Do not open the distribution box lid if the dispenser is live!*





CAUTION

 *Any handling and dismantling, even opening the filter cap, is conditioned by extracting the medium with nitrogen or inert gas from the hydraulic system of the dispenser!*

 *The interventions into electrical and electronic parts may only be performed by a specialist who is responsible for device safety. The wires must be repositioned to their original position after finishing the service intervention. Proper fitting of wires must prevent contact with the movable parts of the reel module.*






 **Caution! Tightness of hydraulic sections must be visually inspected in every service intervention and possible medium leaks must be removed.**

THE OPERATOR OF THE DISPENSER IS OBLIGED TO:

-  Appoint an employee responsible for the operation and technical condition of the dispenser.
-  Ensure inspections, testing, repairs, and maintenance in a professional way.
-  Register documents and keep records on operation.
-  All activities related to attending, operation and servicing the LPG dispensing module may only be performed by employees with appropriate authorization.

PRINCIPLES OF LPG DISPENSER INSPECTIONS



Inspections of devices, reservoirs, pipeline systems and dispensers are performed on dates defined by the operating rules and regulations of the fuel station according to applicable regulations.

-  Review of the LPG dispensing module hydraulic system tightness by soap solution.
-  Review of the machinery.
-  Review of the check and safety valve functioning.
-  The inspection, calibration and official verification of the LPG dispenser is performed by the National Metrology Institute according to applicable regulations
-  The inspection is preceded by cleaning the entire device from dust, removal of water and other impurities from tanks.

6.1.1. MAINTENANCE OF DISPENSER COVERS



Covers of the dispenser (“body parts”) made of painted steel or stainless steel require regular maintenance. Pay special attention to the maintenance of such parts particularly in winter season when, due to the activity of aerosols from chloride agents created from salts used for road maintenance, the paint of unprotected body parts may be permanently damaged, or inter-crystal corrosion may appear in case of stainless-steel covers.

Recommended maintenance of painted covers:

-  Wash them with warm water at least twice per month (according to the level of fouling)
-  At least once a month or after each higher surface fouling with fuels – wash them with detergent, thoroughly clean the covers from salt residues, dust, and grease (according to the level of fouling) + restore the protective coating on design parts (car cosmetics).

WARNING *It is forbidden to clean the painted parts of the dispenser with chlorine-based products!!! Chlorine-containing products (disinfectants such as SAVO) cause corrosion of metal parts of the dispenser.*

Recommended maintenance of stainless covers:

-  Wash them with warm water at least twice per month (according to the level of fouling)
-  At least once a month or after each higher surface fouling with fuels – wash them with warm water, thoroughly clean the covers from salt residues, dust, and grease (according to the level of fouling) + restore the protective coating on design parts by using a special agent for stainless sheet metal.

RECOMMENDATION *We recommend the following protective agents and detergents for stainless sheet metal:
ULTRAPUR – d (producer: MMM-Group, Germany); **NEOBLANK spray** (producer: Chemische Fabrik GmbH, Hamburg, Germany);
ANTOX Surface Care 800 S (producer: Chemetall AG, Switzerland)*

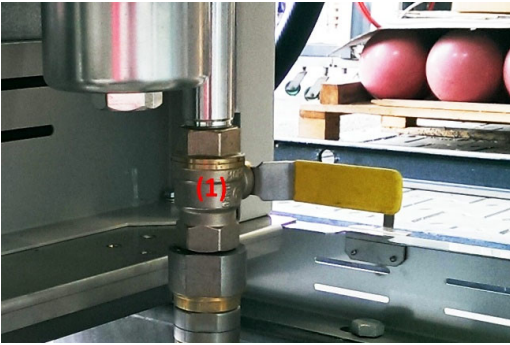
WARNING *Do not wash stainless steel covers with detergent and chlorine-based products!!!*

6.1.2. DEPRESSURIZING OF LPG DISPENSER

Before any service intervention in the LPG hydraulic module (e.g., replacement and/or cleaning of the inlet strainer, repair or replacement of the LPG meter, dispensing hose, dispensing nozzle ...), it is necessary to "depressurize" it, i.e., to drain the medium from the pressure module. The manufacturer recommends the following procedure:

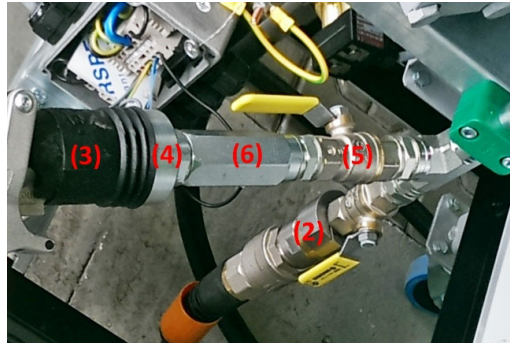
1.

Close the LPG liquid phase inlet ball valve (1).



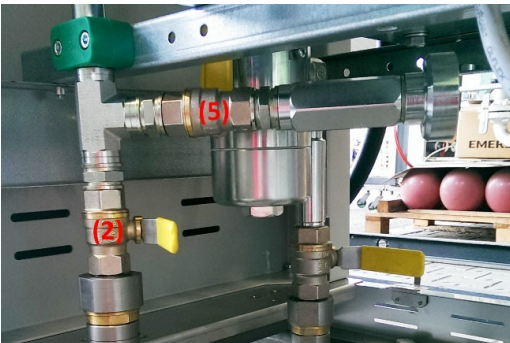
2.

Connect nozzle (3) to the auxiliary connector for return LPG outlet (4) and open auxiliary ball valve (5) located behind the check valve (6). Open the LPG vapour phase outlet ball valve (2).



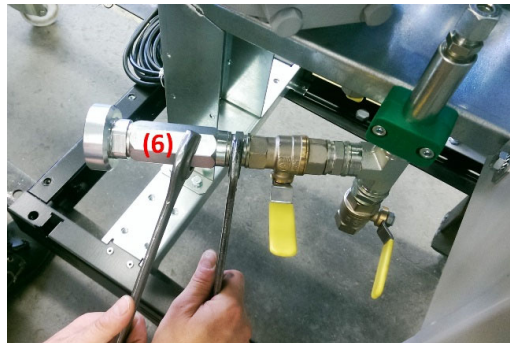
3.

Start fuelling by pressing START button (ON/OFF switch). Error 51 stops the dispenser (low differential pressure). Repeat fuelling for the second nozzle (E51). Hang up both nozzles and close auxiliary ball valve (5) and the LPG vapour phase outlet ball valve (2).



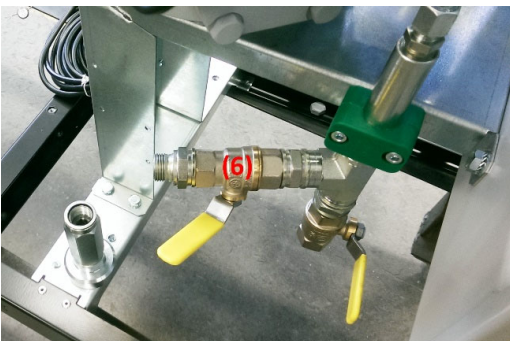
4.

Switch off power supply of the dispenser at main station switchboard and unscrew the check valve (6)



5.

Drain the rest of medium from LPG module by slow opening of auxiliary ball valve (5).



6.2. TROUBLESHOOTING AND SOLVING DISPENSER DEFECTS

When you encounter a problem, first read the "What to do if ..." table (see Table 5) where the most frequently asked questions of the dispenser users about the problems encountered at the fuel station are described.

In the event of a dispenser defect, the electronic counter that controls the dispenser displays a fault message in the form of a numeric code. The fault codes for the individual types of electronic counters are listed in the chapter 6.2.1.

Table 5 - What to do if...

The dispenser does not respond to the removal of the delivery nozzle and there is no fault message on the display
<p>This means that the dispenser is without the power supply, or the delivery nozzle on the dispenser is poorly hinged, or that the dispenser is blocked by the control system.</p> <ul style="list-style-type: none"> ➤ Check proper hanging of all delivery nozzles ➤ Check whether pumping made on the dispenser is paid at the cash desk ➤ If the dispenser is in manual mode, try unlocking the dispenser with the IR remote controller (press "0") ➤ Turn the power supply of dispenser counter off and on. ➤ Check the power supply of dispenser, i.e., when the power is turned on the display must pass the test ➤ Check the position of the circuit-breaker for the single-phase power supply 230V of the dispenser in the main switchboard of the fuel station ➤ If the dispenser is connected to the control computer, the dispenser blocking may be coupled to a control system that does not release the dispenser for pumping or blocks the dispenser. Turn the power dispenser off and on and change the dispenser mode from automatic to manual. If the stand is in a manual mode, there is a fault on the control computer side.
When the delivery nozzle is lifted, the display is reset but the pump does not start
<p>This means that the dispenser electric motor has not been started. The cause may be the power supply circuit breaker that is located in the main switchboard or the electrical motor protection disconnected inside the dispenser.</p> <ul style="list-style-type: none"> ➤ Check the position of the circuit breaker of three-phase supply of the dispenser motors in the main switchboard of the fuel station
An error message "E18" will appear on the display of the dispenser
<p>This is a dispenser fault message that indicates that communication between the dispenser and the control unit (computer, station controller, control console, etc.) has been lost.</p> <ul style="list-style-type: none"> ➤ check the correct operation of the control unit (turning on the counter, turning on the data converter) ➤ check the data cable connection
At the beginning of the delivery, the customer removes the delivery nozzle and does not deliver (e.g., because of opening the fuel tank of the car). After a while the pump turns off. The display shows "STOP".
This is a dispenser report that states that the delivery has been terminated due to interrupting the delivery for longer than 60 seconds. Hang the delivery nozzle and re-deliver.
During delivery the delivery is interrupted (e.g., changing the canisters), the pump switches off after a while. The display shows "STOP".
This is a dispenser report that states that the delivery has been terminated due to interrupting the delivery for longer than 60 seconds. Hang the delivery nozzle and re-deliver.
After picking up the delivery nozzle an error message "E30" appears on the display of the dispenser.
<p>This is a fuel dispenser failure report that states that the fuel unit price is zero.</p> <ul style="list-style-type: none"> ➤ If the dispenser is operating in a manual mode without the remote control, then the unit price is incorrectly set. Set the fuel unit price, see chapter 4.1.8 and Chyba! Nenalezen zdroj odkazů.. ➤ If the dispenser is controlled remotely, then check the fuel unit price settings in the station controller (computer, controller). Before each delivery, the fuel price is automatically sent to the dispenser.

6.2.1. ERROR MESSAGES OF THE DISPENSER

In every defect of the dispenser equipped with the PDEX5, PDEX, TBELTM or TBELTX counter, delivery is interrupted and the display shows an error message ("E" + error code). Depending on the message type, either the whole dispenser is blocked (fatal error), or only the part where the fault appeared is blocked. Important error messages are saved in the counter memory, where they can be shown using parameter Error message code history and Error message code statistics.

Table 6 - Error message types

Message type	Method of dispenser blocking	Method of dispenser unblocking
LOCK (operational blocking)	Only part of the dispenser is blocked	Hanging the dispensing nozzle clears the message from the display
ALERT (alert message)	Only the faulty part of the dispenser is blocked and the error message code is saved in the history and statistics	Removing the cause of the error clears the message from the display
NFAT (non-fatal error)	Only the faulty part of the dispenser is blocked and the error message code is saved in the history and statistics	Hanging and lifting the dispensing nozzle clears the message from the display Possible to unblock the dispenser and clear the error by a remote controller or unblocking the dispenser over the data line.
FATAL (fatal error)	Blocks entire dispenser and the error message is saved in the history and statistics	The cause of the error must be removed and the dispenser counter power source must be switched off/on.

Table 7 – Error message codes of the dispenser equipped with the PDEX5, PDEX, TBELTM or TBELTX counter

Code of message	Type of message	Cause of error message	Removing error message
OFF	FATAL	Power failure Power failure longer than 3-5 periods, t > 100ms	It is necessary to turn off the counter power source for approx. 10 seconds and then turn the source back on.
STOP	LOCK	Maximum time to interrupt delivery exceeded	Hang up the nozzle.
E1	NFAT	Display failure.	Turn the power supply of the dispenser off and on. If the fault persists, call an authorized service centre.
E2	FATAL	Display failure.	
E5	ALERT	Display failure	
E6	NFAT	Electromechanical totalizer failure	
E7	NFAT	Leakage in the hydraulic system	
E8	ALERT	Low fuel level in the storage tank	
E9	FATAL	Repeated leakage of the hydraulic system	
E10	NFAT	Error of temperature measuring sensor	
E11	NFAT	Invalid value of fuel density	
E12	FATAL	Temperature correction unit error	
E13	FATAL	Program error, metrological or program checksum error	
E15	NFAT	Maximum product flow exceeded	
E16	ALERT	Credit unit error	
E17	NFAT	Data line error	
E18	ALERT	Data line error	
E20	NFAT	Power failure during delivery	
E21	NFAT	Incorrect position of switches SW1-1 and/or SW1-4	Controlling computer is not connected, or communication cable not connected correctly.
E22	FATAL	Data initialization.	Check the dispenser power supply (power source).
E23	NFAT	Corrupted values in the FRAM memory	Check the position of the switches on the processor unit. Switch SW1-1 must be in the ON position and switch SW1-4 in the OFF position. If the fault persists, call an authorized service centre.
E24	FATAL	Corrupted values in FRAM memory	Turn the power supply of the dispenser off and on. If the fault persists, call an authorized service centre.
E25	FATAL	Damaged values of electronic totalizers in FRAM memory	
E26	ALERT	TOTAL STOP button pressed	
E27	FATAL	Blocking the dispenser by the manufacturer	Unlock the TOTAL STOP button, turn the dispenser power off and on again.
E28	NFAT	Unauthorized service remote controller	Call an authorized service centre.
E29	NFAT	Wrong password	The service remote controller identification number is out of allowed range. Use a permitted remote controller.
E30	LOCK	Product unit price is zero	Enter the correct manager or service password.
E31-40	NFAT	Pulse generator channel error	If the dispenser is operating in automatic mode, set a non-zero unit price at the POS. If the dispenser operates in manual mode, set the non-zero fuel price in parameter P03
E41-50	NFAT	Connection error or internal pulse generator error	
E51	NFAT	Pump aeration	Raise and hang up the delivery nozzle several times.
E52	NFAT	Pump aeration - repeatedly	Turn the power supply of the dispenser off and on. If the fault persists, call an authorized service centre.
E53	NFAT	The dispenser door (cover) was opened	Check the intake manifold and the fuel level in the storage tank. Turn the stand power off and on. If the fault persists, call an authorized service centre.
E70	NFAT	Mass meter failure	Close all dispenser doors and covers and clear errors by entering manager or service level setup mode by the remote controller.
E71	NFAT	Communication error with mass meter	
E72	NFAT	Internal mass meter error	
E73	NFAT	Mass meter reset error	
E74	NFAT	Mass meter configuration error	
E75	NFAT	Mass meter zero point setting error	
E76	NFAT	Damaged stored value of the meter zero point	
E80	NFAT	The display serial number does not match	
E81	NFAT	The serial number of the auxiliar display does not match.	
E82	NFAT	The serial number of the totalizer unit does not match.	
E83	NFAT	The serial number of the PDEINP unit does not match.	
E84	NFAT	The serial number of the mass meter does not match	
E87	NFAT	Electromechanical totalizer coil failure	Turn the power supply of the dispenser off and on. If the fault persists, call an authorized service centre.

6.3. SERVICE OF DISPENSERS

- service work is carried out in accordance with the operating rules at the fuel station
- before starting the service, the dispenser must be shut down, marked visibly with the "OUT OF SERVICE" sign and the driveway must be marked with the "NO ENTRY" sign
- the dispenser must be disconnected from the power supply (switch off by the main switch on the switchboard)
- the valves on the supply line must be fully closed
- during service work, vehicles must be prevented from passing within 5 meters around
- a fire extinguisher must be available to workers
- service work may only be performed by an authorized service agent

6.3.1. WARRANTY AND COMPLAINTS

The contractual warranty is determined – by default, the manufacturer provides warranty for provided devices for 2 years or 1 million litres of delivered fuels. This warranty does not cover consumables. In case of any complaints the following information must be specified:

- Serial number and type – see the type label
- Exact description of the defect and circumstances of its occurrence

The complaint shall be invalid if the safety seals are broken or the device has been tampered with. Defects and deficiencies caused by incorrect or unauthorized use or maintenance are not covered by the warranty (e.g., problems caused due to the water content and impurities in the tank and hydraulic system). During operation, it is necessary to regularly check water and impurities presence and perform cleaning if necessary.





6.3.2. ACCESSORIES

- Installation and User Manual
- Certificate on product quality and completeness
- EU Declaration of conformity
- Data sheet of the dispenser
- Logbook of all meters installed in the dispenser
- IR controller for counter operation and setting
(may be ordered with dispensers equipped with the PDEX5, PDEX or TBELTM counter)
- Foundation frame (may be ordered)

Spare parts catalogue

This document is intended for service companies and service engineers only.

6.3.3. EU DECLARATION OF CONFORMITY

	<h1>EU DECLARATION OF CONFORMITY</h1>														
1. Product model:	<u>BMP 511.SL/LPG</u>														
Serial number:	<u>12345/22</u>														
2. Name and address of the manufacturer:	TATSUNO EUROPE a.s., Pražská 2325/68, Blansko, 678 01, Czech Republic, Reg.No.: 26221454, Tax Reg.No.: CZ26221454, www.tatsuno-europe.com														
3. This declaration of conformity is issued under the sole responsibility of the manufacturer															
4. Object of the declaration:	Electronic LPG dispenser type series SHARK BMP5xx.Sxx/LPG or OCEAN BMP40xx.Oxx/LPG														
Purpose and scope of product use:	The equipment serves for dispensing of liquefied petroleum gas (LPG) - liquefied propane butane														
5. The object of the declaration described above is in conformity with relevant Union harmonisation legislation:	Directive 2014/34/EU (ATEX), issued 26.2.2014 Directive 2014/30/EU (EMC), issued 26.2.2014 Directive 2014/32/EU (MID), issued 26.2.2014														
6. References to relevant harmonised standards used or references to other technical specifications in relation to which conformity is declared:	EN 14678-1:2013 - LPG equipment and accessories - Construction and performance of LPG equipment for automotive filling stations - Part 1: Dispensers Protection type:  OIML R117-1:2019 - Dynamic measuring systems for liquids other than water														
7. Notified body:															
	<table border="1"> <thead> <tr> <th>Name, number and address</th> <th>Performed:</th> <th>Issued certificate:</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Physical-Technical Testing Institute, s.p. NB 1026, Pikartská 1337/7, 716 07 Ostrava-Radvanice, Czech Republic</td> <td>EU Type Examination Certificate in acc. Module B of Directive 2014/34/EU</td> <td>FTZÚ 03 ATEX 0025 (type SHARK) FTZÚ 14 ATEX 0064X (type OCEAN)</td> </tr> <tr> <td>Quality Assurance Notification in acc. Article 21 and Annex IV and VII of Directive 2014/34/EU</td> <td>FTZÚ 02 ATEX Q030</td> </tr> <tr> <td rowspan="2">Czech Metrology Institute, NB 1383, Okružní 31, 638 00 Brno, Czech Republic</td> <td>EU Type Examination Certificate in acc. Module B of directive 2014/32/EU</td> <td>TCM 141/07-4493</td> </tr> <tr> <td>Certificate Of Quality System in acc. Module D of Directive 2014/32/EU</td> <td>0119-SJ-A006-07</td> </tr> </tbody> </table>	Name, number and address	Performed:	Issued certificate:	Physical-Technical Testing Institute, s.p. NB 1026, Pikartská 1337/7, 716 07 Ostrava-Radvanice, Czech Republic	EU Type Examination Certificate in acc. Module B of Directive 2014/34/EU	FTZÚ 03 ATEX 0025 (type SHARK) FTZÚ 14 ATEX 0064X (type OCEAN)	Quality Assurance Notification in acc. Article 21 and Annex IV and VII of Directive 2014/34/EU	FTZÚ 02 ATEX Q030	Czech Metrology Institute, NB 1383, Okružní 31, 638 00 Brno, Czech Republic	EU Type Examination Certificate in acc. Module B of directive 2014/32/EU	TCM 141/07-4493	Certificate Of Quality System in acc. Module D of Directive 2014/32/EU	0119-SJ-A006-07	
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8. Additional information															
Signed for on behalf of:	Milan Berka, QMS manager														
Place and date of issue:	Blansko, 20.08.2022														
Form Version: 06/2020		Document No.: DC 12345/22													

NOTES:
