TATSUNO EUROPE

INSTALLATION INSTRUCTIONS FOR THE FUEL DISPENSERS OCEAN BMP4000.O EURO

BMP 4000
OCEAN

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INTRODUCTION

This manual is for users of the TATSUNO dispensers of the OCEAN EURO series as well as for designer studios who design petrol stations. The TATSUNO company recommends thorough studying of the manual including its attachments. The manual must be available to the dispenser operators during installation and regular maintenance.

- Keep this manual with its attachments over the whole life time of the dispenser
- Make it available to other owners and users as well
- Perform updates of the regulations (see www.tatsuno-europe.com)

At the time of publishing the attachments properly reflected reality. The producer reserves the right to change technical conditions of the equipment or its attributes without a written notice, due to the continuous development and improvements.

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Document revisions

Revision No / Date	Change description	Made by
3. 3. 2011	Basic version of the document	Ing. Milan Berka
Revision 01 / 8. 9. 2011	FTZÚ requirements added	Ing. Milan Berka
Revision 02 / 5. 10. 2011	FTZÚ requirements added	Ing. Milan Berka

1. INTRODUCTORY INFORMATION

Symbols used in this manual:

Warning

Explosion hazard

Beware of electrical appliance

No smoking

No open fire

No mobile phones

Terms used in this manual, which require special attention:

CAUTION *Violation of these requirements may create conditions, which may lead to injury or death of persons or to substantial damage to property.*

WARNING *Violation of these requirements may lead to injury of persons and/or damaging of the dispenser.*

NOTICE *This text informs about legal and/or statutory requirements concerning the installation and use of the dispenser. Violation of these requirements may create a hazardous situation and/or it may lead to damaging of the dispenser.*

NOTE *This text informs about installation procedures, techniques and operation methods etc., which are important for securing of proper installation and operation of the dispenser and which, if violated, may lead to damage, failure or bad performance of the dispenser.*

1.1. STUDY THE MANUAL FIRST

Before installing or using the dispenser, first study the relevant parts of the installation and user manual. Take into account all the hazards, warning and notes in the manual.

The producer provides this installation and user manual in order to present all the necessary information and instructions for full and efficient installation, use and maintenance of our dispensers of the OCEAN BMP4000.O EURO type series.

This manual was created by the producer and it forms an inseparable part of the dispenser accessories.

Use of this manual is in the full responsibility of the user; any operations, which are not descried here, must be considered forbidden. An operator, who performs such operations, will take all responsibility for the impact of such actions.

The manual is organised into individual sections, which have their subsections, so each topic is separated and corresponds to the logic of the operations (learn – prepare – use – maintain).

The manual properly reflects the technical situation at the moment of sale of the dispenser and it cannot be deemed faulty, if there are subsequent changes and updates to the latest status and new information.

NOTICE *Keep this manual and enclosed documents over the whole service life of the appliance for future reference!*

1.2. PERMITTED USE

The dispensers of the BMP4000.O, series are intended for stationary use, for dispensing of petrol, kerosene and diesel oil in specified quantities from the storage tank to the vehicles.

CAUTION *The dispenser is a complicated appliance, which must provide a lot of demanding functions.* ***This is why before commissioning, the tanks and pipes must be cleaned and the cleanliness of the fuel must be verified (dirty filters in the dispenser cannot be considered as a reason for warranty repair!). Before commissioning, the electricity wiring and proper connections must be reviewed, to prevent electric shock injury and to ensure explosion protection (the fuel is class I flammable material).***

Every fuel dispenser is tested at the production plant concerning its function, safety and metrology. The delivery of each fuel dispenser includes certificates needed by the operator as documentation for the authorities.

2. OCEAN EURO FUEL DISPENSERS

2.1. FUEL DISPENSER DESCRIPTION

The OCEAN BMP4000.O EURO dispensers serve to pump liquid fuels and oils, ethanol and petrol mixtures (max. E85) to vehicles and for commercial purposes. The dispensers are equipped with high quality Japanese hydraulics made by the TATSUNO Corporation and an efficient and reliable electronic counter by the Czech company TATSUNO EUROPE a.s. All the fuel dispensers can operate in a manual mode (individually, off-line) or in an automated mode, remotely controlled from the petrol station kiosk and connected to the cash desk (POS) via a data line.

The OCEAN BMP4000.O EURO series fuel dispensers have their enclosure (cover, door, lid etc.) made of a varnished metal sheet or inflammable laminate approved for this use by the state testing authority (statement of FTZÚ 04ST 0083). The supporting elements of the dispenser framework are made of varnished steel sheets of 0.8 - 2.5 mm thickness of from non-rusting metal sheet. Standard colours of the OCEAN dispensers are a combination of white and silver metallic colour**.** Every dispenser is equipped with **hydraulics** (pumping mono block + piston measurement) by the Japanese company **TATSUNO Corporation**. It is a proven type of hydraulics, popular all over the world, with high reliability and long service life. The pumping mono block has an intake and outlet filter, gas and vapour separator, check valve and a rotation pump with the option of operation pressure regulation. The four piston measurement can be regulated with a single piston. Each flow measurement apparatus includes a highly reliable two channel measurement **impulse sensor** with an anti explosion protection. Each fuel dispenser has an **electronic counter** with an own diagnostics and **displays** showing the pumped amount in CZK, fuel quantity in litres and the fuel unit price in CZK/litres. Displays of dispensers for non public sale show only pumped fuel quantity in litres. **The dispenser hoses** are made of high quality petrol resistant rubber with antistatic protection. As a rule, the dispensers are delivered with an automated stop-gun.

The main benefits of the OCEAN EURO fuel dispenser series are:

- high efficiency and guaranteed quality
- high variability – by installing selected accessories you can convert the low cost basic versions into luxurious fuel dispensers with plastic cover features
- easy maintenance and servicing – simple construction
- wide thermal range of operation (-45°C / +50°C)
- option of thermal volumetric correction of the pumped fuel at the referential temperature 15°C (20°C)
- controlled vapour exhaust with the option to block pumping, when the exhausts do not work properly (vapour flow sensor)
- pumping control using proportional solenoid valves +24Vss allowing continuous flow control

2.2. BASIC TECHNICAL DATA

2.2.1. HYDRAULIC UNIT OF FUEL DISPENSERS

Pumping output:	- standard	40 dm^3/min (30 ÷50 dm^3/min)
	- increased /H	80 dm^3/min (70 ÷ 90 dm^3/min)
	- very high /UH	130 dm^3/min (120 ÷ 150 dm^3/min)
Accuracy class:		0.5 (0.5%)
Maximum operating pressure:		0.18 MPa (1.8bar); 0.25 MPa (2.5bar) for /H or /UH
Electromotor of the pump:		three phase, 3x400V; 0.75 kW; 1395 RPM
Solenoid valves:		+24VDC / max.1A, or 230V AC; 50 Hz; 5W

2.2.2. ELECTRONIC COUNTER

Power supply:		230 VAC; +10% -15%; 50 Hz ± 5 Hz
Performance:		max. 300 VA
Display:		
	- volume	from 0.01 to 9999.99 dm^3
	- amount	from 0.1 to 99999.9 CZK
	- unit price	from 0.01 to 99.99 CZK/dm^3

2.2.3. AMBIENT CONDITIONS

Operating temperature:	from - 20°C to +40°C standard dispenser model
	from - 40°C to +50°C special model with heated displays
Pumped liquid temperature range:	from - 20°C to +50°C
Pumped liquid type:	petrol, diesel oil, bio diesel, petrol-ethanol mixture (max. E85)
Pumped liquid dynamic viscosity range:	0.5 - 10 mPa.s (0.5 - 10 cp)
Mechanic environment class:	M1
Electromagnetic environment class:	E1
Relative humidity:	from 5% to 95%, non-condensing

2.3. CERTIFICATES AND PERMITS

The OCEAN BMP4000.O EURO fuel dispensers comply with all European directives about safety and metrology.

2.3.1. METROLOGY

The appliance was certified by the Czech Metrology Institute in Brno, a notified body No. 1383. The assessment of the appliance compatibility used the procedure "B" (type testing) + "D" (ensuring production quality) according to government decree No. 464/2005 Coll., setting technical requirements for measuring apparatuses and implementing in the Czech Republic the directive of the European Parliament and European Council No. 2004/22/ES. There was issued an **ES type certificate (MID certificate)** for the fuel dispensers (petrol, diesel oil ethanol and their mixtures) TCM 141/07-4491, revision 4 of 25. 5. 2011. The certificate is based on the testing report No. 6015-PT-P0047-11. The tests were made according to OIML R117-1, OIML R118 and OIML D11.

On 24. 10. 2007 the company TATSUNO EUROPE a.s. received a **quality management system certificate** No. 0119-SJ-C006-07 from the Czech Metrology Institute and thus met the qualification requirement for declarations of conformity of type, based on ensuring measurement apparatus production quality according to attachment No. 2, procedure "D" (chapter. 6) of the government decree No. 464/2005 Coll. The certificate is reviewed by audits every year.

2.3.2. SAFETY

The dispensers were certified by the authorised entity No. 210 – The Physical Technical Testing Institute in Ostrava - Radvanice, a notified body No. 1026, for the use in areas with explosion hazard according to the directive 94/9/ES. The fuel dispensers were confirmed to comply with the European norm on the construction of fuel dispensers No. EN 13617-1. There was issued an **ES type certificate (ATEX certificate)** for fuel sale dispensers No. FTZÚ 10 ATEX 0259. All parts of the dispensers located in areas with explosion hazard comply with the European directive ATEX No. 94/9/ES.

On 28. 7. 2002 the company TATSUNO EUROPE a.s. received an **announcement on quality assurance** No. FTZÚ 02 ATEX Q030 from the Physical Technical Testing Institute in Ostrava – Radvanice. The certificate is reviewed by audits every year.

2.3.3. ELECTROMAGNETIC COMPATIBILITY (EMC)

The fuel dispensers were tested by the Czech Metrology Institute in Brno, a notified body No. 1383. The appliance compliance was assessed according to the directive of the European Parliament and European Council No. 2004/108/ES and in compliance with OIML R117-1, OIML R118. There were issued test reports No. 1013-PT-9019-07, 1013-PT-9020-07 8551-PT-E0151-10.

2.4. DISPENSER MODEL IDENTIFICATION

This section explains the marking (coding) system of the fuel dispensers OCEAN BMP4000.O EURO. Commercial marking of the dispenser has this basic form:

BMP40xy.OEz

where

x... is a number from 1 to 5 defining the total number of hydraulics (pumps) in the dispenser,
y... is a number from 1 to 10 defining the total number of dispenser guns or dispenser hoses,
z... is one of letters D, R and L defining the orientation of the dispenser in relation to the refuge island of the petrol station in the direction of vehicle arrival,

D… (double-sided) double sided dispenser,
R… (right) single sided right dispenser
L… (left) single sided left dispenser

The dispenser code always contains the **BMP** abbreviation, which denotes all fuel dispensers from the company TATSUNO EUROPE. Then there are two digits "**40**", meaning the types series BMP**40**00.O. Another number "**x"** defines the number of pumping/hydraulic units in the fuel dispensers (or the number of products). The "**y"** number defines the total number of hoses in the dispenser. Then there is a full stop and a two letter abbreviation "**OE"** meaning the **O**CEAN **E**URO design model of the dispenser. The last symbol "**z**" marks the orientation of the fuel dispenser from the direction of vehicle arrival to the dispenser.

Examples:

BMP4022.OEL is a 2 product, 2 hose, single sided, left side fuel dispenser of the series OCEAN EURO,
BMP4048.OED is a 4 product, 8 hose, double sided fuel dispenser of the series OCEAN EURO.

2.4.1. ADDITIONAL ABBREVIATIONS IN THE DISPENSER MARKING

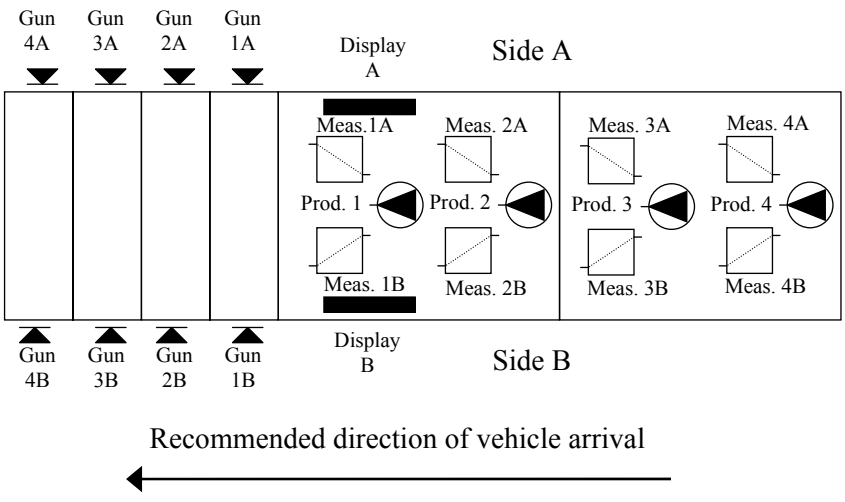
There may be additional abbreviations after the basic dispenser code:

Abbreviation	Description
/VR, /VR2, /VR3, /VR4	Vapour exhaust from one, two, three or four fuel products
/H, /H2, /H3, /H4	Higher performance for diesel oil in one, two, three or four pumps 70 ÷ 90 l/min
/UH, /UH2	Very high performance in diesel oil pumping of one or two hoses120 ÷ 150 l/min
/MAS, /MAS2	The main dispenser (MASTER) has an outlet leading to one or two nearby dispenser (SLAVE)

Abbreviation	Description
/SAT	A satellite dispenser connected to the MASTER dispenser (without its own hydraulics)
/HOOK	A dispenser without hose winders, has only hooks for hanging the hose.
/LON, /DART, /LOG	Data line with an interface IFSF-LON, DART or Logitron PUMALAN
/ER4, /TATPL, /ATCL	Data line with an interface Kienzle ER4, TATSUNO Party Line or Autotank ATCL
/TA2331	Outlet of pulses, gun and signal RELEASE to connect to Tankautomat TA2331
/ALX	Outlet of pulses and gun to connect to the terminal ALX (ALX-308)
-2C	Two simultaneous fuel drawings from a single sided dispenser (two displays on the same side)
-4C	Four simultaneous fuel drawings from a double sided dispenser (four displays on the dispenser)
-C1x	Lit LED sensor, 1 digit (0 to 9), x is a colour (č-red, b-white, m-blue, ž-yellow, z-green)
-C2xx	Lit LED number, 2 digits (10 through 29), x is a colour (č-red, b-white, m-blue, ž-yellow, z-green)

2.4.2. CONVENTIONAL MARKING OF THE DISPENSER PARTS

The illustration below shows the system of marking of the displays, dispenser guns/hoses, pumps and measuring apparatuses in the fuel dispenser.



Recommended direction of vehicle arrival

2.5. STANDARD MODELS OF THE OCEAN EURO DISPENSERS

Below you can see a list of standard models of the OCEAN EURO dispensers. The single sided models of OEL dispensers and right side OEL variants differ only by the opposite orientation of the dispensing hoses and display units. The rest of equipment is the same. In figure 1 you can see standard models of the OCEAN EURO dispenser in the basic version and in the luxurious version with plastic cover.

Table 1 – List of standard models of the OCEAN EURO fuel dispenser

Dispenser model	Qty of dispensing points	Qty of display units	Qty of products (pumps)	Qty of hoses	Pumping performance of the basic model* [L/min]
BMP4011.OEL	1	1	1	1	40 ÷ 50
BMP4011.OEL /H	1	1	1	1	80 ÷ 90
BMP4011.OER	1	1	1	1	40 ÷ 50
BMP4011.OER /H	1	1	1	1	80 ÷ 90
BMP4012.OED	2	2	1	2	40 ÷ 50
BMP4022.OEL	1	1	2	2	40 ÷ 50
BMP4022.OER	1	1	2	2	40 ÷ 50
BMP4024.OED	2	2	2	4	40 ÷ 50
BMP4033.OEL	1	1	3	3	40 ÷ 50
BMP4033.OER	1	1	3	3	40 ÷ 50
BMP4036.OED	2	2	3	6	40 ÷ 50
BMP4044.OEL	1	1	4	4	40 ÷ 50
BMP4044.OER	1	1	4	4	40 ÷ 50
BMP4048.OED	2	2	4	8	40 ÷ 50
BMP4055.OEL	1	1	5	5	40 ÷ 50
BMP4055.OER	1	1	5	5	40 ÷ 50
BMP40510.OED	2	2	5	10	40 ÷ 50

**Note: The pumping performance depends from the real conditions at the petrol station – quality and length of the fuel supply piping, suction head etc.*

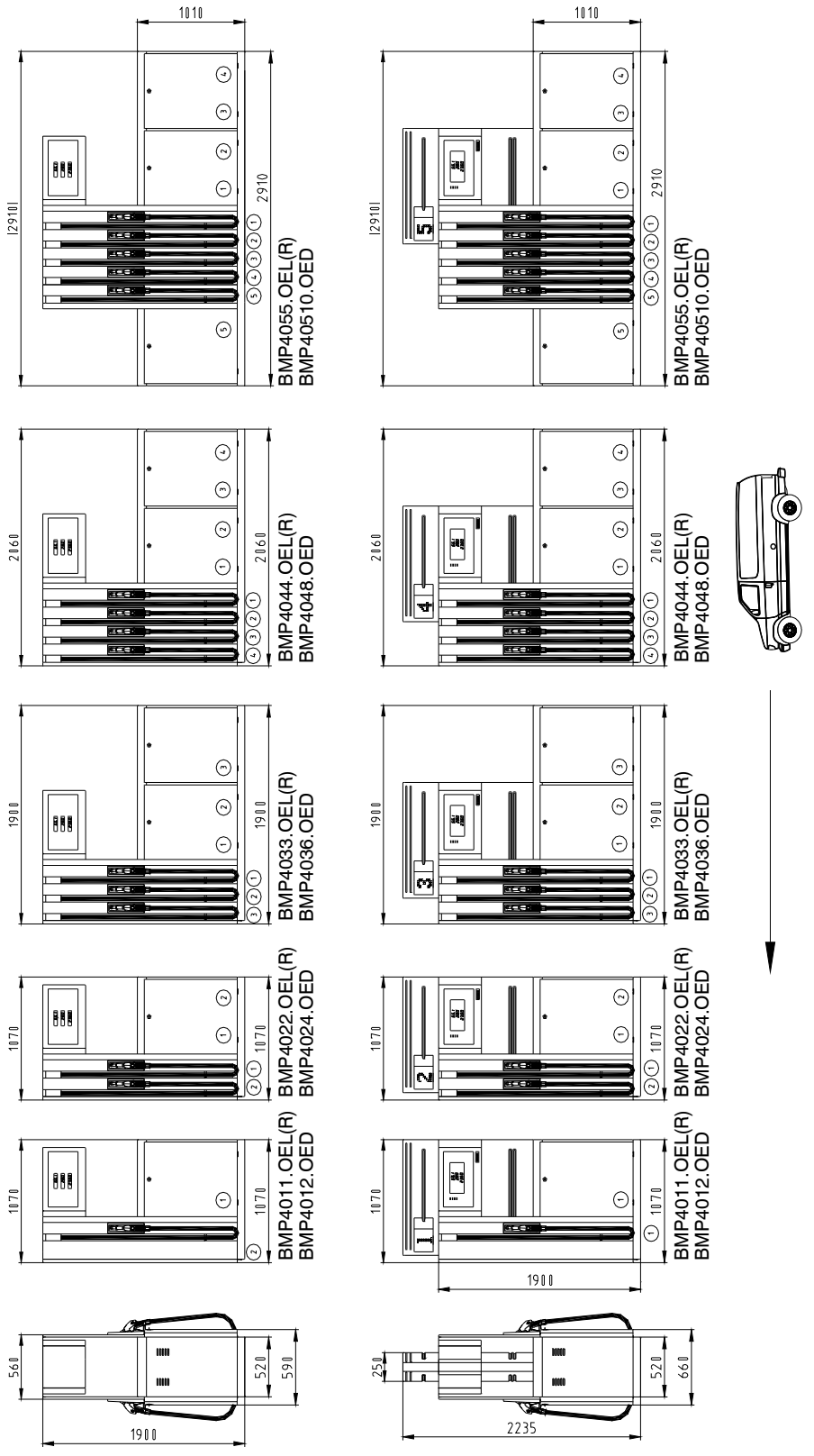


Figure 1 – List of standard models OCEAN EURO in the basic version and with plastic covers, showing the recommended direction of vehicle arrival and with the order of fuel products

All models of the OCEAN EURO fuel dispensers differ by the following features:

- **Quantity of dispensing points.** A dispensing point is the part of the dispenser, where the customer can draw fuel independently. According to the dispenser type, each dispensing point has one to five hoses, so the customer can choose the fuel type he wants, with at least one display. At one dispensing point only one fuel type can be drawn at the same time. The OCEAN EURO dispensers are equipped with one or two dispensing points as a rule. At the customer's special request, we can equip the dispenser with even four dispensing points (4 separate dispensing points, 4 displays).

- **Dispenser orientation.** All dispensers can be classified according to their orientation into *single-side or double-side* dispensers. Double sided dispensers allow that there can be a car and fuel drawing from both sides of the dispenser. Single sided dispensers allow vehicle arrival and fuel drawing from one side of the dispenser only. Concerning the arrival to the dispenser the single-sided dispensers can be classified into *left side* (the hose is on the left side) and *right-side* type.

- **Qty of fuel products.** According to the type, the fuel dispenser can draw *one to five different fuels.*

- **Qt of dispensing hoses (guns).** Each dispensing point of the dispenser has one to five dispensing hoses ending with dispensing guns. A dispenser can have 1 to 10 dispensing hoses/guns.

- **Pumping performance.** Pumping performance is the maximum achievable fuel flow in the dispensing gun. It is measured dm^3 (litres) per minute. The OCEAN EURO dispensers provide three levels of pumping performance: standard 35 to 50 L/min, increased 70 to 90 L/min and high 120 to 150 L/min. The real pumping performance depends from real conditions at the pumping station – quality and length of the supply pipe, suction head etc.

- **Display type.** According to the displayed values the displays can be divided into *litre displays* and *displays for public sale*. Litre displays show only the pumped quantity of fuel in centilitres and are used in dispensers for non public fuel dispensing (i.e. internal company pumping station). Displays for public sale show not only the pumped quantity, but also its cost amount in CZK and the unit price of the fuel product.

  According to the display technology the displays can be divided into *standard LCD displays and proportional (graphic) LCD displays*. Unlike the standard displays, the proportional ones can also show text information for the customers – such as advertisements during the meantime, when no pumping is executed – see Figure 2 and 3.

- **Display quantity.** The quantity of the displays depends from the dispenser orientation and the quantity of dispensing points in the dispenser. A dispenser can have 1 to 4 displays.

Figure 2 Proportional display during fuel pumping

Figure 3

Proportional display showing an advertisement

2.6. NAMES OF THE BASIC ELEMENTS OF A DISPENSER

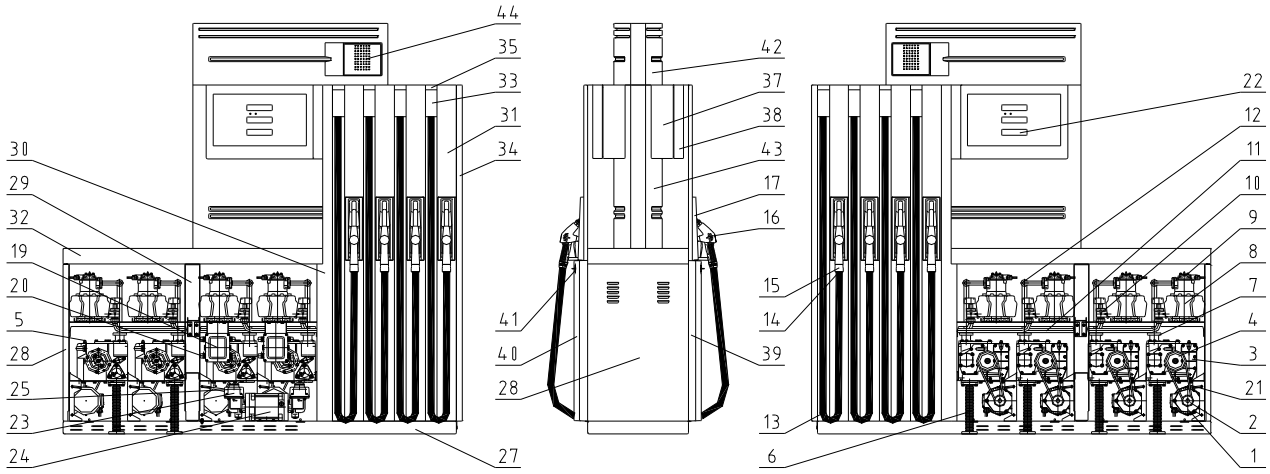


Figure 4 – Basic parts of an OCEAN dispenser

Position	Equipment	Position	Equipment	Position	Equipment
1	Pump engine	**16**	Dispenser gun	**32**	Hydraulics roof
2	Engine belt	**17**	Gun cover – “coffin”	**33**	Roof of columns
3	Pumping mono block	**(18)**	Magnetic sensor of dispensing gun position (gun cover)	**34**	Rear lid
4	Pump belt	**19**	Distribution box	**35**	Roof lid
5	Air separator sensor	**20**	Cable outlet - IP67	**36**	Winder holder
6	Connection element – bellows	**21**	V-belt (antistatic)	**37**	Counter box
7	Delivery coupling	**22**	Electronic counter	**38**	Mask + display mask metal sheet
8	Measurement apparatus	**23**	Recuperation air-pump	**39**	Right door
9	Pulser – impulse generator	**24**	Air-pump engine	**40**	Left door
10	Solenoid valve	**25**	Vapour flow sensor	**41**	Latch lock
11	Fuel pipe	**27**	Dispenser foundation	**42**	Upper fin
12	Thermal sensor Pt100	**28**	Front column	**43**	Bottom fin
13	Dispenser hose	**29**	Central column	**44**	Dispensing point number
14	Tear connection	**30**	Internal column		
15	Cylinder sight glass	**31**	Winder column		

2.7. PRODUCTION LABELS

Each OCEAN EURO dispenser is equipped with a type label and an orientation label. On the type label there are all data about the dispenser, concerning its metrology and safety according to the WELMEC 10.5 and the norm EN 13617-1, article 7.4. The orientation label serves for the metrology inspection, as the official metrology labels prove that the measurement system was reviewed.

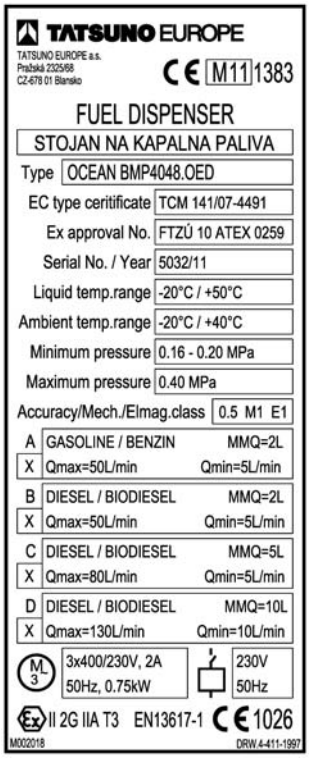


Figure 6 – Type label

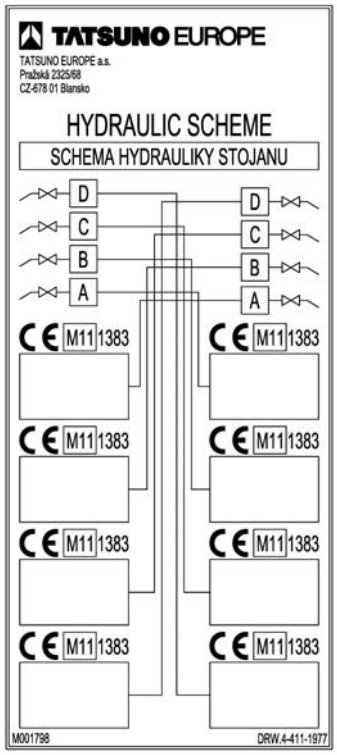


Figure5 – Orientation label

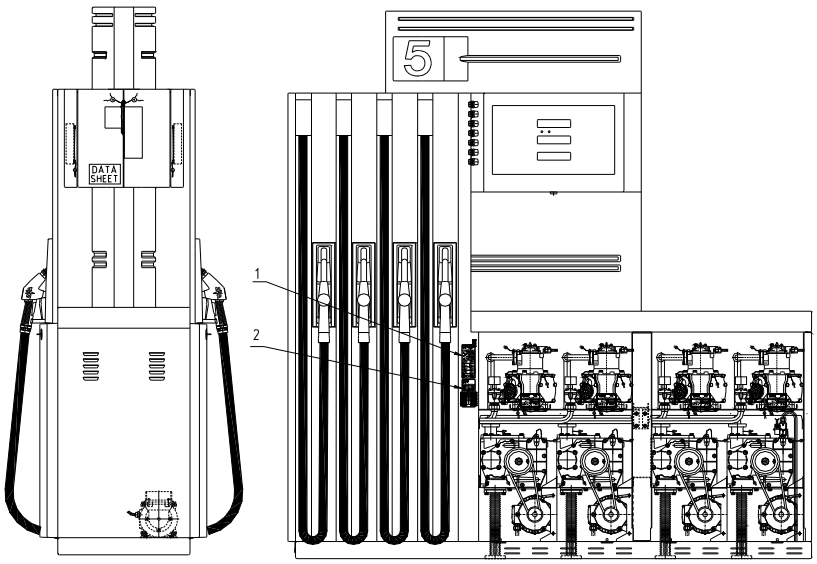


Figure 7 – Location of production labels on a dispenser (1 - type, 2 - orientation)

Table 2 – Info from a dispenser type label

TATSUNO EUROPE a.s.	Name an address of the fuel dispenser producer
CE 1383	This dispenser marking means that it was designed, produced and marked in compliance with the European Commission directives. The dispenser undergoes certification and type testing according to the directive 2004/22/ES – MID, performed by the notified body No. 1383 – ČMI Brno
CE 1026	This dispenser marking means that it was designed, produced and marked in compliance with the European Commission directives. The dispenser undergoes certification and type testing according to the directive 1994/9/EC – ATEX, performed by the notified body No. 1026 – FTZÚ Ostrava Radvanice
LIQUID FUEL DISPENSING	Purpose of the appliance
Type	Marking of the dispenser type (see chapter 2.5)
EC type certificate	No. of the metrological ES certificate of the measurement appliance type approval - ČMI
Ex approval No.	No. of the ES certificate about type testing (ATEX certificate) – FTZÚ
Serial Number / Year	Production number of the dispenser (ordinal No. / year of production)
Liquid temp. range	Temperature range of the pumped liquid for which the dispenser was designed and approved
Ambient temp. range	Temperature range of the environment for which the dispenser was designed and approved
Minimum pressure	Minimum operating pressure
Maximum pressure	Maximum operating pressure
Accuracy/Mech./Elmag.class	Accuracy class / Mechanical class / Electromagnetic class
A, B, C, D	Measurement system types – metrology parameters: A) Petrol with max performance Q_{max} = 50L/min; min. consumption MMQ = 2L B) Diesel with max performance Q_{max} = 50L/min; min. consumption MMQ = 2L C) Diesel with max performance Q_{max} = 80L/min; min. consumption MMQ = 5L D) Diesel with max performance Q_{max} = 130L/min; min. consumption MMQ = 10L
Ex II 2G IIA T3	Marking of the non-explosive electric appliance protection method: **II 2** – equipment for areas with explosion hazards except underground mines, probability of explosive atmosphere formation – zone 1 **G** – explosive atmosphere formed by gases, vapours or fog **IIA** – group of gases – the least dangerous **T3** – max temperature of the electric appliance, which might cause ignition of the ambient atmosphere (200^{O}C)
EN 13617-1	No. of the European norm, according to which the dispenser was approved
Power supply to the engines	3x400/230V; 50Hz; P=0,75kW; I=2A
Power supply to the electronics	230V; 50Hz

3. INSTALLATION

3.1. INSTRUCTIONS FOR SAFETY OF WORK

CAUTION

- *This appliance must be installed only by qualified authorised staff in compliance with relevant norms, directives and local limitations and according to this manual.*
- *In the immediate vicinity of the dispenser it is forbidden to smoke or use open fire.*
- *Always follow the procedures set for manipulation with petrol and diesel oil*
- *Monitor any leakage in the dispenser. In case of fuel leakage, disconnect the power supply and contact the service.*
- *Electric installation must be performed by qualified experts.*
- *Make sure that a properly working fire extinguisher is available.*
- *When manipulating with the equipment, use proper protection aids*

3.2. RECEIPT, TRANSPORT, UNPACKING

The customer will conclude a contract with the producer to organise the dispenser delivery. If the delivery is to be ensured by the company TATSUNO EUROPE a.s., it will transport the product to the agreed location. The producer has sufficient experience with manipulation and transportation. If the delivery is to be ensured by the customer in another way, the producer will only ensure professional loading, but will not be responsible for the transport. In general, the dispenser must be transported properly packed, fixed to the frame. In the transport vehicle the dispenser must be secured against damage (covers, paints), motion and tipping. Any manipulation and transport must be done in a vertical position, the dispenser must not be placed on its the covers.

WARNING *During manipulation it is allowed to use fork-lift trucks only. If other manipulation methods are used, TATSUNO EUROPE a.s. does not provide warranty for any damage!*

3.3. DISPENSER LOCATION

3.3.1. GENERAL

The producer recommends placing the dispensers on the refuge islands of the petrol station in such a way, that the direction of the vehicle arrival complies with the arrows in Figure 1. Numbering of products at the dispenser

is also shown in figure 1.

3.3.2. SINGLE SIDED DISPENSER ORIENTATION

Single sided dispensers are marked with letters "L" and "R" ("L"-left and "R"- right) after the dispenser type designation (e.g. BMP4011.OE**L** is a left-sided, single-sided, single-product dispenser and BMP4011.OE**R** is a right-sided, single-sided, single-product dispenser). The dispenser orientation is described from the view of the incoming vehicles – see Figure 8 and Figure 9.

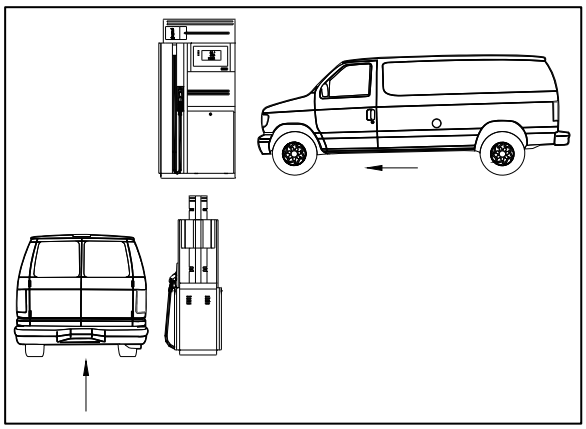


Figure 9 – Orientation of a left-sided dispenser BMP4011.OEL at a petrol station

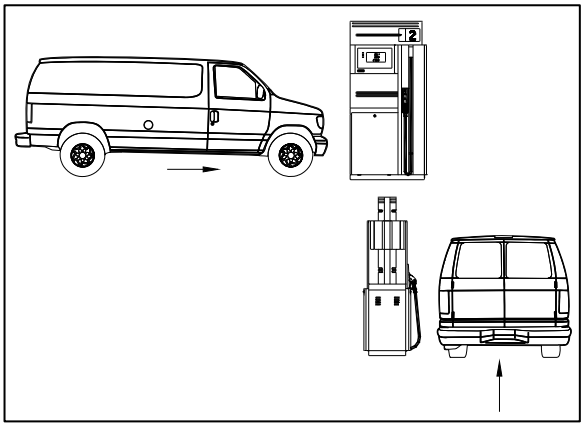


Figure 8 – Orientation of a right-sided dispenser BMP4011.OERat a petrol station

3.3.3. DISTANCE OF THE DISPENSER FROM THE STATION FUEL TANK

The producer recommends that the maximum distance of the dispensers from the station fuel tanks should be **50 meters** and the suction head max **5.5 meters.** Otherwise the suction performance of the dispenser may worsen, which may lead to lower pump performance (nominal flow) and increase the dispenser noise level. All technical requirements for the petrol station must be governed by a professionally prepared and duly approved petrol station project consulted with the producer of the dispensers.

The producer recommends that the distance of a single-sided dispenser from a wall should be at least **1m**.

3.3.4. STATION FUEL TANK TYPE

The OCEAN dispensers can be connected to underground fuel tanks or surface fuel tanks.

On the shaft, out of which the suction pipe goes, from the storage (underground) tank, there will be horizontally installed and concreted a steel base frame. The dispenser will be attached to this frame. To the shaft to the dispenser there must lead not only the grounding conduits, but also the following supply cables:

- **4-core cable feeding the three phase electro motors**
  (we recommend FABER KABEL type Y-JZ 4 x 1.5)
- **3-core cable feeding the counter and the dispenser's switching circuits**
  (we recommend FABER KABEL type Y-JB 3 x 2.5)
- **4-core shielded cable for a data line**
  (we recommend FABER KABEL type CY-JZ 5 x 0.75)

CAUTION ***As a supply cable there may be used only a cable, which complies with the requirements of the European norm EN 13617-1:2009. Among the basic attributes of these cables is their resistance to oil, petrol and petrol vapours.***

CAUTION ***Due to safety and environmental protection it is necessary to install a leakage tray to catch any leakage of fuel.***

Then we use bellows to connect the dispenser to the suction pipe. The dispenser foundations layout is in Attachment 1 of the installation instructions.

NOTICE ***The connections to the dispenser must be sealed so no flammable liquids or their vapours could get inside or outside. In the shafts under the dispenser there can be used only cable connectors resistant to flammable liquids.*** *Cable glands may be used only for one cable, unless they are glands designed for more cables.*

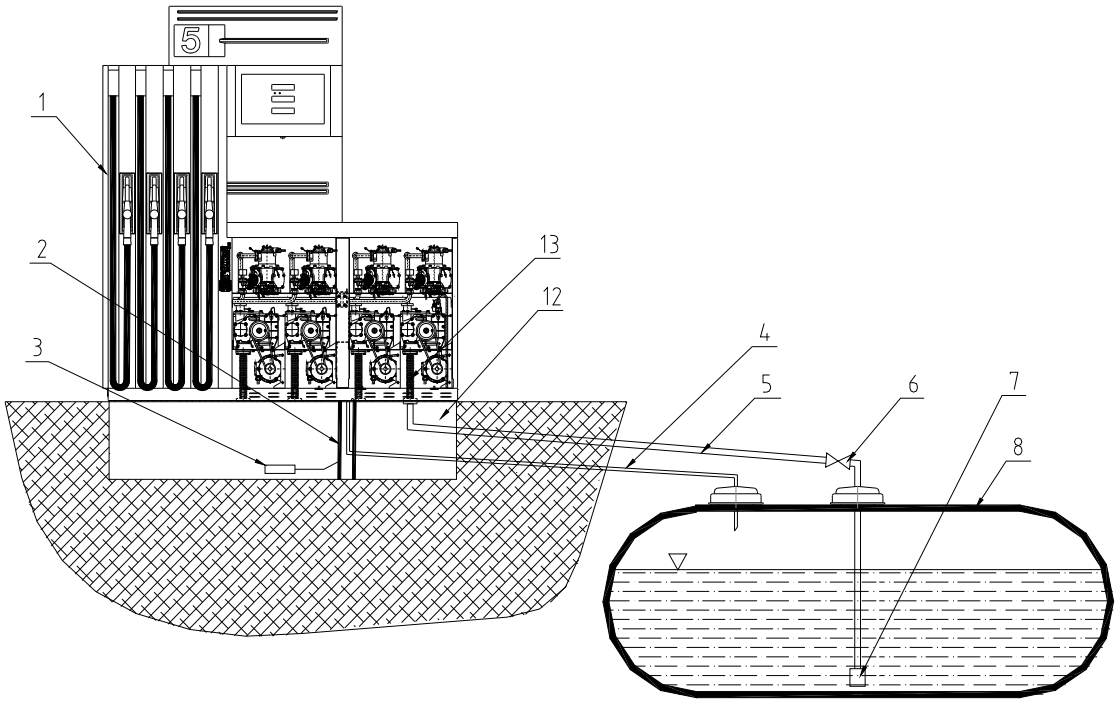


Figure 10 – Example of connection between the dispenser and the underground tank

Legend: 1-dispenser, 2-elektric supply cables and a data line, 3-sensor of liquids located on the bottom of the leakage tray, 4-piping for vapour removal (recuperation), 5-suction fuel pipe, 6-check valve, 7-suction basket (without a check valve), 8-underground fuel tank, 12-leakage ECO tray with a base frame of the dispenser, 13-connection element (bellows) with a flange.

CAUTION *If the dispenser is connected to the* ***underground tank****, it is necessary to insert a* ***check valve*** *into the suction piping, to secure that when the dispenser is idling, the fuel column is not broken, because this would then lead to suction of air, when another fuel drawing is started.* ***An independent check valve does not need to be installed if the suction basket is already equipped with one check valve (see Figure 10)***

CAUTION *If the dispenser is connected to a surface tank, due to safety reasons the suction piping must involve a* ***check valve****, to ensure that the pump of the dispenser generates an under-pressure approx. – 0.03 MPa. We recommend a valve* ***V316.XX****. The producer of these valves is ZPA Slavičín. At the lowest point of the piping there should be installed a* ***stop and bleed valve****, which can be closed by the operator, whenever the dispenser is out of operation. If there aren't such valves, any leakage in the fuel system may cause* ***uncontrolled fuel leakage (see Figure 11****).*

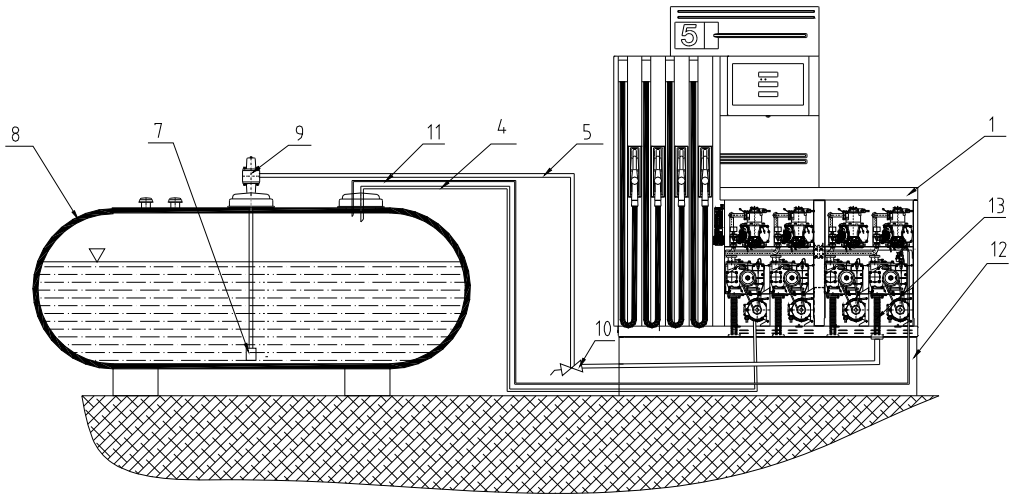


Figure 11 – Example of connection between the dispenser and the surface tank

Legend: 1-dispenser, 4-piping for vapour removal back (recuperation), 5-suction fuel pipe, 7-suction basket (without a check valve), 8-surface fuel tank, 9 – overpressure check valve, 10 – bleed and stop valve, 11 – back piping from the dispenser pump separator, 12-leakage ECO tray with a base frame of the dispenser, 13-connection element (bellows) with a flange.

NOTICE *concerning surface tanks. The pumping monoblock of the dispensers is constructed with an air separator permanently open into the air bleeding chamber formed by the area in the monoblock body and the monoblock lid. In the upper wall of the lid there is a hole with an installed DN6 connection to connect the air bleeding pipe. To prevent overfilling of the pumping monoblock bleeding chamber and outflow of the medium into the dispenser interior and its surroundings while the dispenser is out of operation, in case there is any leakage or if the check valve is blocked, the* ***pumping monoblock air separator outlet must be connected to the storage tank.*** *The connection may be the pipe Ø 10 x 1 (DN8) connected to the pipe connector DN8. The pipe connector is screwed over the seal in a M12x1.5 hole in the monoblock lid upper wall. The pipe outlet must lead to the lid of the storage tank, using a corner pipe DN8* ***(see Figure 12).***

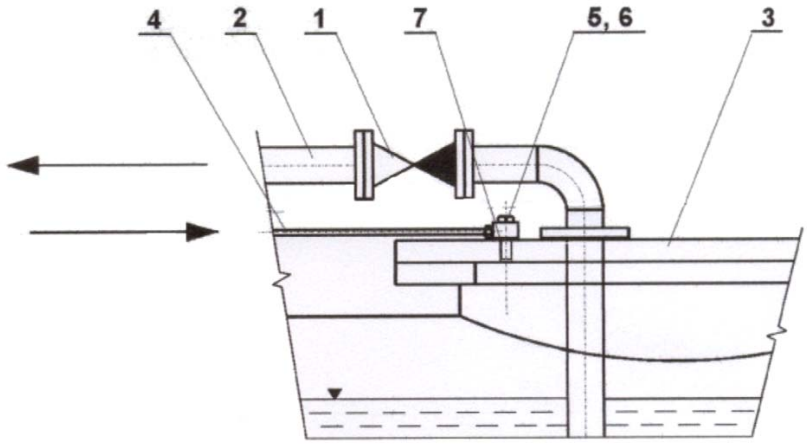


Figure 12 – Example of suction piping connecting the dispenser to a surface tank

Legend: 1-overpressure check valve (DN according to the suction piping), 2-suction piping from the tank DN40 (Q=40L/min) or DN50(Q=80-130L/min.), 3-lid of the tank, 4-pipe Ø 10 x 1 (DN8) for bleeding of air from the air separator of the dispenser, 5-corner pipe connector DN8 G3/8", 6-sealing ring 14 x 18, 7-sealing ring 12 x 16.

3.3.5. DISTRIBUTION PIPES

The dispenser producer recommends installing distribution pipes so from each dispenser pump there should be a separate pipe to the respective fuel tank.

NOTE *There is also the option of a "backbone" fuel distribution, where several dispensers (pumps) are connected to a single supply pipe from the tank. The dispenser producer* ***does not recommend*** *this backbone distribution type due to the risk of instability in the fuel suction from the tanks. If the designer should decide to use backbone distribution type anyway, the dispenser producer requires inserting* ***disc valves*** *in the suction piping, so the individual dispensers could be functionally isolated. Disc valves such as C09 DN32 are produced by the company Armatury Group a.s., Kravaře.*

3.3.6. DISPENSER LOCATION BASED ON OUTER INFLUENCES

CAUTION *Hazardous areas are defined according to ČSN EN 60079-10-1:2009 in the surroundings of the fuel dispenser.* ***Fuel dispenser of the OCEAN series must not be located in areas with the risk of an explosion,*** *i.e. in hazardous areas defined by the norm ČSN EN 60079-10-1:2009. Electronic counters used in these dispensers do not have any cover, they are located in areas with no risk of explosion and they are separated from other areas with a partition of type 1 according to ČSN EN 13617-1.*

3.3.7. PRESSURE SYSTEM

The OCEAN fuel dispensers can be connected not only to a classical suction system, where the fuel is sucked out of the fuel tank by the force of pumps located in the dispensers, but it can also be connected to a **pressure system**, where the fuel is "pushed" to the dispensers right out of the tanks, which have central pumps (such as the RED JACKET system). The advantage of the pressure system is low noise operation of the dispensers, but the disadvantage is high demand for the quality and sealing of the fuel piping. In the pressure system the dispenser has no pumping monoblock. The fuel piping is connected via an emergency stop valve, which is under the fuel dispenser and is firmly attached to its base frame. From there the fuel goes to the filter and is distributed via measurement appliances and control valves to the dispensing hoses and guns.

CAUTION ***According to the European norm EN 13617-1:2009 the dispenser OCEAN connected to a pressure system must have an emergency stop valve, which will shut off the pressure intake, in case the dispenser it torn off!*** *The emergency stop valve is not a part of the standard delivery of fuel dispensers. The dispenser producer recommends using the valve OPW 10BF. The fuel intake to the dispensers is through a pipe with a cap nut with an internal thread G1". The position of the intake piping is shown in Attachment 1, where you also can see the recommended connection to the pressure piping.*

CAUTION ***It is necessary to ensure, that at the fuel intake to the dispenser the maximum permitted pressure 0.40 MPa is not exceeded.***

To the shaft under the dispenser there must lead not only the grounding conduits, but also the following supply cables:

- **4-core cable feeding the three phase electro motors**
  (we recommend FABER CABLE type Y-JZ 4 x 1.5)

  This cable is necessary only for the dispensers, which have vapour exhausts - the cable supplies power to the electro motors of the exhausts.

- **7-core cable for switching of electro motors of pumps located in the tanks**
  (we recommend FABER CABLE type Y-JZ 7 x 1)

- **3-core cable feeding the counter and the dispenser's switching circuits**
  (we recommend FABER CABLE type Y-JB 3 x 2.5)

- **4-core shielded cable for a data line**
  (we recommend FABER CABLE type CY-JZ 5 x 0.75)

CAUTION ***As the supply cables there can be used only cables, which meet the requirements of the European norm EN 13617-1:2009. Among the basic attributes of these cables is resistance to oil, petrol and petrol vapours.***

3.3.8. DISPENSER SATELLITE

To all OCEAN type fuel dispenser there can be attached a “satellite”. It is an extra dispensing point – a column with a dispensing hose and gun, which is placed on the other side of the refuge island. A satellite can be used to refuel trucks, so the hoses of the main dispenser and the satellite can be used to fill both side tanks in one truck at the same time. The satellite column has no own control electronics or hydraulics and it is fully dependent on the master dispenser. An image of a satellite, its layout and base frame can be seen in Attachment 1.

3.4. MECHANICAL CONNECTION OF THE DISPENSER

The dispensers are attached to special base frames with anchoring bolts supplied along with the dispensers. The dispenser’s base frame is not part of the standard dispenser accessories, but it can be ordered extra. The base frame is concreted to the refuge island, then we remove the front and rear cover of the dispenser, place the dispenser on the base frame and fix with the bolts.

CAUTION ***Due to safety and environmental protection it is necessary to install a leakage tray under the dispenser to avoid leakage of fuel.***

Then we connect the dispenser to the suction piping, using bellows (suction piece), which is part of the dispenser delivery. In Attachment 1 you can see the base frames and layouts of all dispenser types with marked location of the suction piping and petrol vapour exhaust pipes from the dispensers. The delivery piping of vapour recuperation is connected to the piping with a lid G 1".

NOTE *The lid G 1" is part of the dispenser delivery.* ***The recuperation piping must end with an internal thread G1“.***

3.5. ELECTRIC WIRING OF THE FUEL DISPENSER

Electric wiring of the OCEAN fuel dispensers requires protection against contact voltage (according to the norm ČSN 33 2000-4-41 “Electro technical regulations - Electrical equipment - Part 4: Safety - Chapter 41: Protection against electrical shock”, published: August 2007, which complies with the international norm HD 60364-4-41:2007) and it requires that appropriate electrical cables must be led to each dispenser.

It is necessary, that all fuel dispensers at the station must be interconnected with a grounding conduit and connected to a grounding system. As the grounding conduit there can be used the green-yellow conduit of at least **4 mm^2** diameter, or a special flat conduit. The grounding conduit must be connected to a central grounding clamp of the fuel dispenser located in its base (bolt M10), identified with a grounding mark.

NOTICE *All the electric cables must be resistant to petrol vapours and must have good insulation attributes, because they will be under long-term influence of explosive environment. This is why the producer recommends using cables CMSM and CMFM (cables resistant to petrol vapour). An example of electric wiring of the fuel dispensers is shown in* ***Attachment 2****.*

NOTE *To allow for easy installation (cable ending in a distribution box) it is required that all cable terminations entering the fuel dispenser must have sufficient length – each end at least* ***3 m*** *above the ground.*

Concerning the used voltage and function the cable can be divided into power (supply) cables and signal cables.

Power cables:

- Supply power to electric motors of pumps and vacuum pumps
- Supply power to counters and switches

Signal cables:

- Communication line
- Additional service lines (pulse outputs, engine blocking, liquid level meters etc.)

3.5.1. POWERING THE ELECTRIC ENGINES OF PUMPS AND VACUUM PUMPS

Powers supply to electro motors of pumps and vacuum pumps in all types of dispensers is carried out by a 4-core cable FABER KABEL Y-JZ 4 x 1.5 or CMSM 4B x 1.5 (see Table 3), which leads from the main distributor in the kiosk to each fuel dispenser in its distribution supply box (see Attachment 2). In the distributor the cable is connected to fuses and a switch. Switching of individual motors of pumps and vacuum pumps is done by means of contactors inside the fuel dispenser.

All the OCEAN fuel dispensers have contactors and each motor in the dispensers is protected with a thermal residual current device. Switching of motors of pumps and vacuum pumps is carried out so that at any moment no more than two motors of pumps and two motors of vacuum pumps should be connected to the power supply cable.

Table 3 – Marking of conduits in a cable powering the electro motors of pumps and vacuum pumps

Marking of conductors in the cable FABER KABEL Y-JZ 4 x 1.5		
marking	colour	description
L1	Black 1	Phase1
L2	Black 2	Phase 2
L3	Black 3	Phase 3
PE	Green-yellow	Protective conductor

NOTICE *For the termination of the supply cable 3x400V in the distributor we recommend using a special engine circuit breaker, type **PKZM 0-10**, from the company Moeller Klöckner. This circuit breaker serves as a switch and it contains a short circuit and thermal protection. After installation in the distributor's door this circuit breaker can be complemented with a control head (IP65) with an extended spindle - type RH-PKZO.*

NOTE *For switching of motors of pumps and vacuum pumps in the dispensers there are used motor contactors **DIL EEM-10** and **DIL EM-10-GI** with thermal residual current devices of type **ZE-2.4** and **ZE-0.6** from the company Moeller Klöckner, or motor circuit breakers of type **PKZM 0-0.4** from the same producer. In Figure 13 there are shown the reaction times of the used residual current devices of the ZE type.*

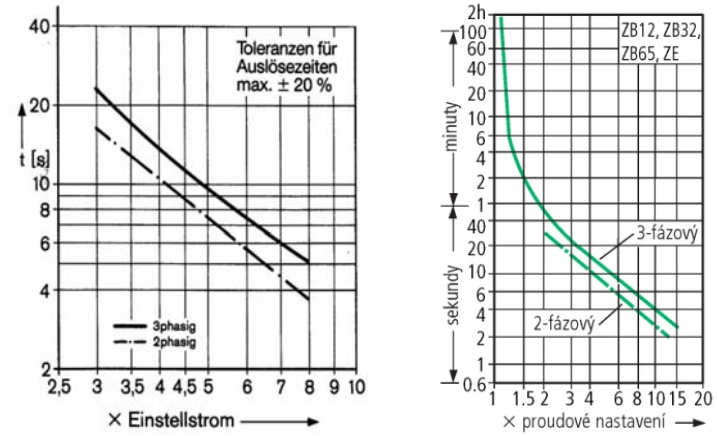


Figure 13 – Reaction times of the motor residual current devices of the ZE type

Electromotor parameters

Table 4 provides basic parameters of two electromotor types used in the OCEAN fuel dispensers.

Table 4 – Parameters of electromotors

Pump electromotor	Vacuum pump electromotors
1MA7083-4BA10-8N51	BA240TRII AR-R
Asynchronous motor	Asynchronous motor
230/400V; 50Hz	230/400V; 50Hz
Current 2.05 A	Current 1.1 A
Consumption 0.75 kW	Consumption 0.37 kW
1395 RPM	2840 RPM
Ia/In = 4,8	With internal thermal protection
IP 55	IP 54
T3, t_E = 16 sec	T3
cos ϕ = 0,75	cos ϕ = 0,8
Ex II 2 G Ex e II T3	Ex II 2G Ex d IIB T3
PTB 01 ATEX 3335X/03	ISSeP 08 ATEX 041X

NOTICE *After connecting the power supply to the electromotor, check the proper direction of its turning! The proper direction is marked by the arrow on the pump's belt - see Figure 14.*

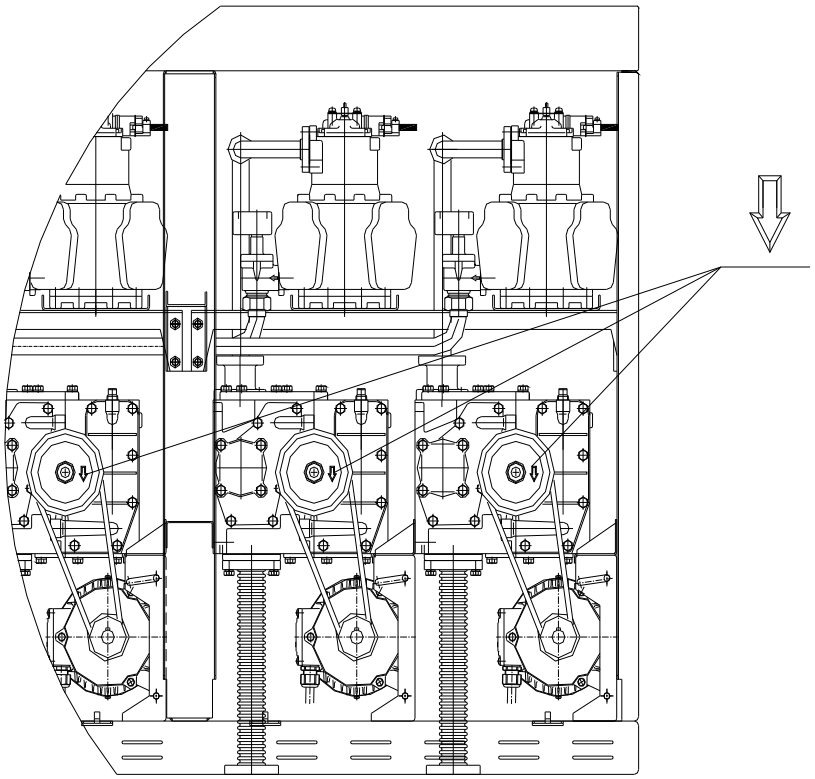


Figure 14 – Checking the direction of the pump motor revolving – see the arrow

3.5.2. POWER SUPPLY TO THE ELECTRONIC COUNTER AND SWITCHING ELEMENTS

The counter and the switching circuits are powered by a 3-core cable FABER KABEL type Y-JB 3 x 2.5, or type CMSM 3C x 2.5 (see Table 5), which leads from the main distributor in the kiosk to the first module of the fuel dispenser, in its power supply distribution box. The wiring of the power supply distribution boxes is described in Attachment 2. From the distribution box the power leads through a cable FABER Y-JB 3x2.5 to the head of the dispenser's electronics, where it ensures stabilised power supply to the electronic counter, switching elements and to any heating units.

Table 5 – Marking of conductors in the cable of the counter and switching elements power supply

Marking of conductors in the cable FABER KABEL Y-JB 3 x 2.5		
Marking	Colour	Description
L	Brown	Phase
N	Blue	Zero conductor
PE	Green-yellow	Protective conductor

Power for the counter leads from the dispenser to the main distributor, where it is connected via a circuit breaker 230V (230V, 6A) to a bus shared by all the fuel dispensers. From there the power for all dispensers leads to a stabilised backup power source, which can power the dispenser's counter for 3-5 minutes in case of a power blackout.

NOTICE *To ensure trouble free operation of the fuel dispensers, their producer recommends to backup the stabilised power supply for the dispensers with a backup power source UPS (Uninterruptible Power Supply). Power blackouts, strong interference or voltage drops during voltage peaks (especially in winter) are frequent phenomena in the electricity grid. All these problems can be eliminated by the use of a proper power backup UPS. There are essentially two types of power backups suitable to provide backup power for the dispensers:* ***UPS of the line-interactive type*** *and* ***UPS of the on-line type****.*
Petrol stations connected to a stable electricity grid (without voltage drops and interference) can do with the line-interactive UPS type to stabilise their power supply. In other cases there must be used the on-line UPS type. Interference, voltage drops or blackouts can cause frequent blocking of the dispensers, errors in the communication between the computer and the dispensers, computer errors (data loss) etc.

3.5.3. DATA (COMMUNICATION) LINE

The data line serves to control the fuel dispenser and to transfer data from the dispenser remotely, when the dispenser is in the automated mode. The dispenser is controlled with a single purpose console, a station controller, or directly by a computer in the petrol station kiosk. If the dispenser operates in manual mode only, this data line needs not be installed.

To install a data line it is necessary to bring a shielded communication cable to each fuel dispensers specifically a 4-core cable FABER KABEL type CY-JZ 5 x 0.75, or type CMFM 4D x 1 (see Table 6). The data cable must lead, in a ray-shaped layout, from the petrol station control room (kiosk, control panel) to the first module of each fuel dispenser, into its communication distribution box. The wiring of the communication distribution boxes is shown in Attachment 2. From the communication distribution box the cable FABER KABEL type CY-JZ 5 x 0.75 connects the data line to the head of the dispenser's electronics and is connected to its counter.

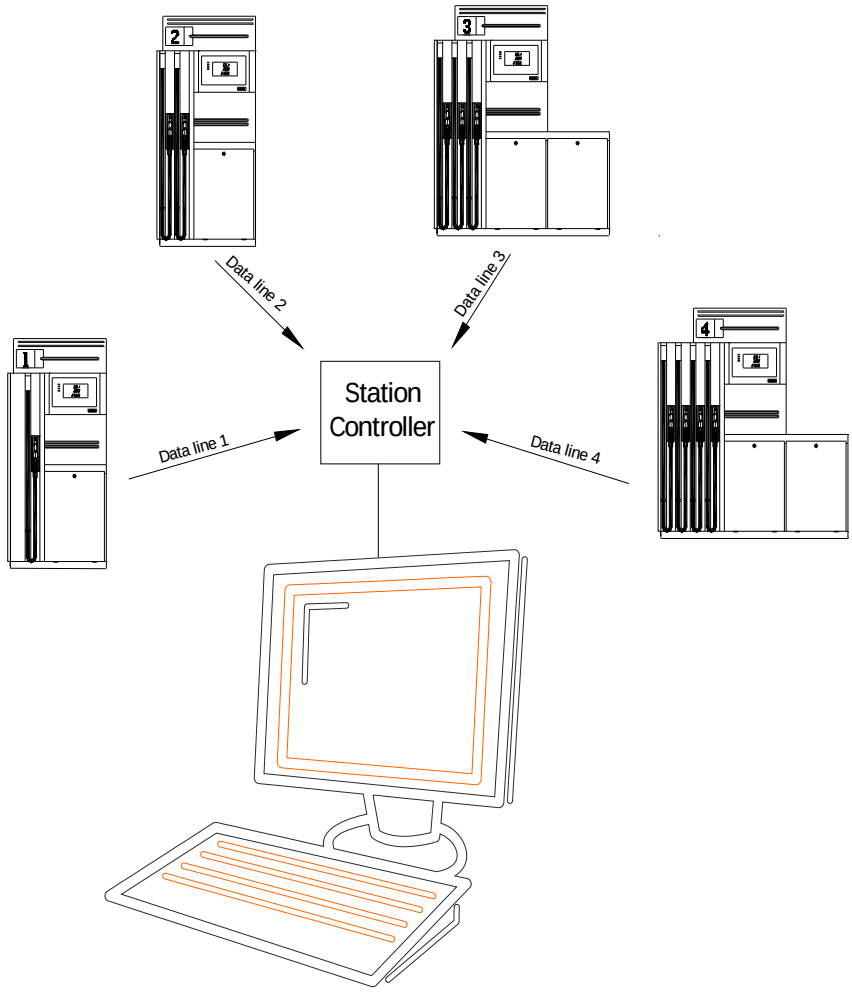


Figure 15 – Ray-like layout of data lines to the dispensers

Table 6 – Marking of conductors in the PDE data line

Marking of conductors in the cable FABER KABEL CY-JZ 5 x 0.75		
Marking	Colour	Description
A	Black1	data A
B	Black2	data B
-	Black3	Backup
-	Black4	Backup
	Green-yellow	Not used
ST	Shielding	Shielding

NOTICE *For the communication line there must be used* ***at least 4-core shielded data lines with minimum cross-section of conductors 0.5 mm^2.*** *The cable jacket must be self-extinguishing and resistant to petrol vapours*

As a standard the OCEAN dispensers are equipped with a PDE data line, which is a RS485 line with a

PDE communication protocol. At the customer's request we can complement the dispenser's counter with a data converter, which converts the PDE data line to a line of a different type and different communication protocol such as PUMA LAN, ER4, IFSF-LON, TATSUNO Party Line etc. This will also change the roles of the individual conductors in the data cable. Marking of the conductors in the most used data line types is stated in Table 7.

Table 7 – Marking of conductors for various types of data lines

Marking of conductors in the cable FABER KABEL CY-JZ 5 x 0.75 for various types of data lines							
Conductor colour	PDE	Easy Call	PUMA LAN	PUMA LAN + probes	ER4	DART	ACTL
Black1	A	D(-)	TX	TX	YA	A	Tx+
Black2	B	D(+)	RX	RX	ZA	B	Tx-
Black3	-	0V	AM	GND	YB	-	Rx+
Black4	-	Backup	0V	LL0	ZB	-	Rx-
Green-yellow	Not used	Not used	Not used	LL1	Not used	Not used	Not used
Shielding	ST	ST	ST	ST	ST	ST	ST

3.5.4. SERVICE LINES

Service lines are for special purposes. These lines are not necessary for the own operation of the dispenser, but they are used in situations, when selected functions of the dispensers are to be controlled remotely, or when we need to transmit some signals out of the dispenser. Always consult the technicians of TATSUNO EUROPE a.s. whether service line installation is necessary. For service lines we recommend using multi core shielded cables CY-JZ (1 mm^2).

3.5.5. CABLE ATTRIBUTES

For the installation there must be used cables, which are resistant to common chemicals, oils and which have sufficient thermal and mechanical resistance. These are attributes for instance of FABER KABEL type CY-JZ, Y-JZ, Y-JB. The main attributes of the FABER KABEL cables are listed in Table 8.

Table 8 – Cable attributes

Cable type	Function	No. of cores	I_{max} [A]	RI [Ω/km]	D_{Anom} [mm]	G [kg/km]
Y-JZ 4 x 1.5	Power for motors	4	18	13.3	8.1	117
Y-JZ 7 x 1	Switching of pumps in tanks (in the pressure system)	7	15	19.5	8.3	146
Y-JB 3 x 2.5	Power for the counter	3	26	7.98	9.2	148
CY-JZ 5 x 0.75	Data line	4	9	26	9.4	183

Legend: I_{max} – current carrying capacity (according to VDE 0298-3, Tab.9), RI - resistance, D_{Anom} – outer diameter of the cable, G – specific weight

NOTICE *Impulse surges can form in any conduit, when a lightning strikes within several kilometre distance, or due to industrial activities. The strength of the impulses due to induction from a lightning is enough to completely destroy an electronic apparatus. This is why there are used surge protections, which lead the overvoltage impulse energy to a grounding conductor and thus protect the given electric appliance. The producer of the dispensers* ***recommends*** *protecting the main distributor (or the secondary distributor), which supplies the dispensers, electronic equipment (computer, cash desk etc.) and data lines with overvoltage protections and lightning arresters.* ***The producer does not provide any warranty for damage caused due to insufficient protection of the cables!***

NOTICE *For trouble free operation of the fuel dispensers it* ***is necessary*** *to separate the signal cables from the power supply cables. If there are power cables near the signal cables, there forms an interference and this may cause problems with the control of the dispensers or it can even destroy the electronic appliances installed in the dispensers and in the kiosk. This is why any crossing or shared installation (in a single cluster) of signal and power cables must be avoided. It can be solved by putting signal cables and power cables into their own "channels" (metal pipes).* ***The producer does not provide any warranty for damage caused due by improperly solved cable connections!***

4. BASIC FUNCTIONS AND SETTINGS OF A DISPENSER

Setup of the fuel dispensers is carried out by means of a set of setup parameters, which regulate the functional parameters of the fuel dispenser and which can change the mode and behaviour of the dispenser in various situations. According to the type of the installed electronic counter the parameter values can be viewed and changed by a remoter IR controller, a service keyboard or by the pre-set keyboard on the dispenser.

The setup method of the dispenser differs according to the used counter in the head of the dispensers. In the following chapter there will be described the basic functions and setup procedures for the counters PDEX, TBELTx, ADP and ADPMPD.

4.1. PDEX COUNTER

The electronic counter PDEX for the fuel dispensers made by the company TATSUNO EUROPE a.s., is setup by a remote IR controller. For the service technology authorised by the dispenser producer there is used the yellow service remote controller PDERT-xS, which allows full setup of all parameters of the dispenser. For managers of the petrol stations there is used the white remote controller PDERT-xO, which allows:

- Reading of non-resettable litre meters of all dispensing hoses
- Reading and reset of daily electronic litre and money meters of all hoses
- Setting up individual product prices (in case of manual operation)
- Reading and setup of the dispenser's operating parameters

The setup mode can be changed in the dispenser by the above method only in a situation, when the fuel dispenser is idle – i.e. when fuel pumping has been completed, the guns are hung in their places and all sales have been completed. There are two access modes:

- ***Operator mode***, intended for the staff – it allows only reading the values of the electronic meters and values of the basic parameters of the dispensers. The values cannot be changed or reset.
- ***Manager mode,*** intended for the petrol station manager – it allows not only reading values from the dispensers, but also resetting the daily meters and setting basic operational parameters of the dispensers. Access to the manager mode is protected with a password.

4.1.1. PDERT REMOTE CONTROLLER DESCRIPTION

For dispensers with a PDEX counter there must be used an infra red remote controller to read values from the dispenser's displays (meters), to change the dispenser's operating mode or to set various parameters of the counter. The keyboard of the remote controller has the following keys and layout (Figure 16):

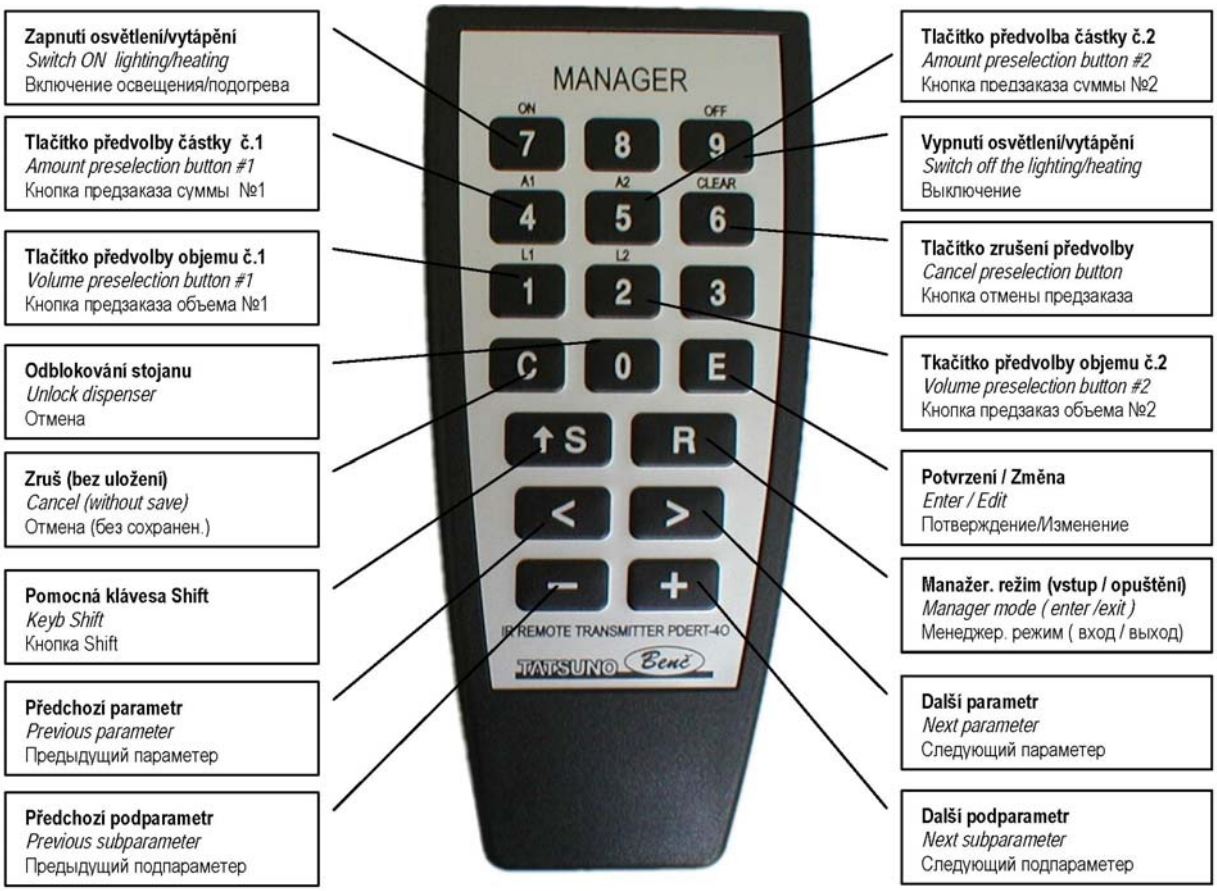


Figure 16 – Description of keys on the remote controller PDERT-4O

When using the IR remote controller, the controller must be approx. 1 meter from the centre of the fuel dispenser display – see Figure 17. The setup mode is triggered by the <R> key (manager mode), or by consequent pushing of the keys <S> and <R> (operator mode). The values to be set or read are shown in the display. During reading of the electronic summary meters, there apply the dispenser parts marking rules described in chapter 2.4.2. and shown in the Figure 17.

NOTE *Except setting up and reading of values, the keys A1, A2, L1, L2 and CLEAR can also be used to setup the options on the dispenser. The ON key allows testing the function of display heating. The key <0> allows unblocking a dispenser after an error or in the operating mode, which ensures blocking after refuelling.*

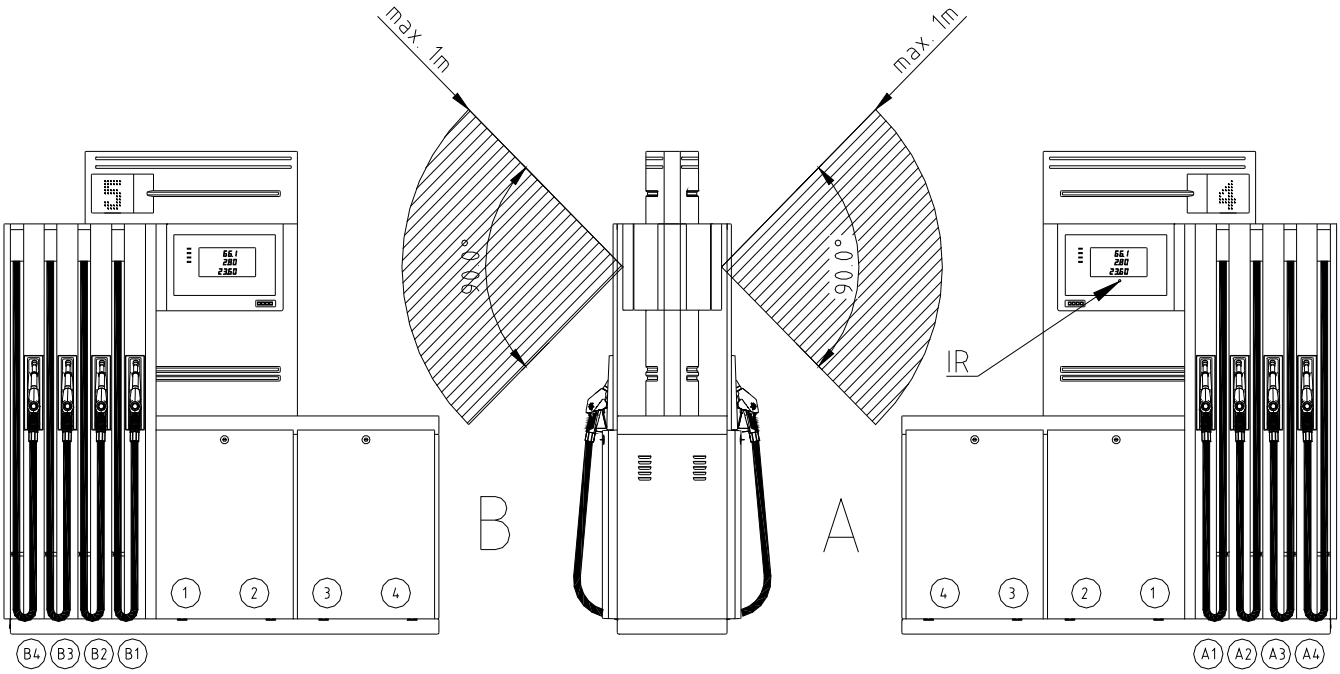
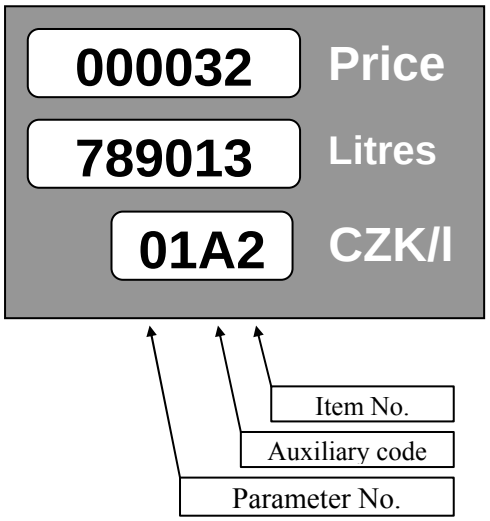


Figure 17 – Range of the remote control and marking of hoses and products of the dispenser

4.1.2. DISPLAY OF DATA IN THE SETUP MODE

All data in the setup modes are displayed in the fuel dispenser's display. When using the remote control, the data is shown in the display of the side, from which the setup mode was triggered by the remote control. The individual parameters are shown in the display as follows:

Parameter number: 01
Item number: 2 (order of the dispensing hose)
Auxiliary code: A (dispenser side)
Parameter value: 327890 13 (volume in centilitres)



4.1.3. OPERATOR MODE

The operator mode is triggered by pointing the infra - red remote controller at the fuel dispenser's display (in the distance approx. 1 m from the dispenser's display centre) and push the button <**R**>. **All guns of the dispenser must be hanged and the sale at the dispenser must be completed (paid) before you start.**

After triggering the operator mode, there is displayed the value of the first parameter. To navigate to the following parameters and their items, use the keys <**>**> and <**+**> (see Figure 16).

The operator mode allows displaying, **but not changing**, the value of the parameters shown in Table 9.

Table 9 – List of parameters for the setup operation mode

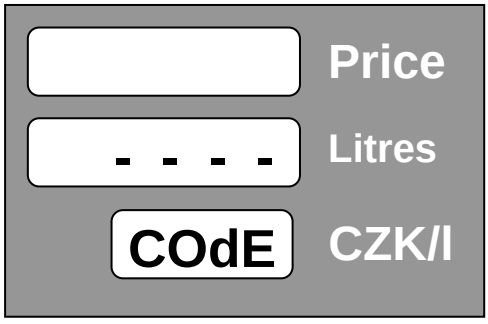
Parameter	Description
01	Non-resettable volumetric meters
02	Daily volume and money meters (resettable)
03	Unit price of products (in manual mode)
04	Current time and date
05	Program version and check sums
06	Error message history
07	Latest fuel drawing history

The individual parameters will be described in the following chapter.

The operator mode can be terminated by pushing the button **<R>**. The mode also gets terminated automatically, if no remote controller button is pushed over 60 seconds.

4.1.4. MANAGER MODE

Use the remoter controller (in the distance approx. 1 m from the dispenser's display centre) and push the button <**R**>. **All guns of the dispenser must be hanged and the sale at the dispenser must be completed (paid) before you start.** After triggering the manager mode, the display will ask you to enter a 4-digit access password:



In order to keep the password secret, the input numbers are displayed as dashes only. The default access password set from the factory is "1111".

Example:

Push the keys <**1**><**1**><**1**><**1**> and <**ENT**>

NOTE *If the petrol station manager forgets the valid password, the only help is to call an authorised service that will set a new password.*

After entering a valid access password, the display will show the value of the first parameter 01. Now you can scroll through the parameters using the <>> key or by entering the **search parameter number** and confirming with the key <**ENT**> to directly move to the required parameter.

The manager mode allows displaying and changing the value of the parameters listed in Table 10.

Table 10 – List of parameters in the manager mode

Parameter	Description
01	Non-resettable volumetric meters
02	Daily volume and money meters (resettable)
03	Unit price of products (in manual mode)
04	Current time and date
05	Program version and check sums
06	Error message history
07	Latest fuel drawing history
08	Manager mode access password
09	Maintenance history
10	- not used -
11	- not used -
12	Fuel dispenser control mode
13	Statistics of errors
14	Current operating temperature
15	Reset of the daily meters
16	Operating referential number
17	Display sub-lighting intensity
18	Text messages
19	Display segment error

The manager mode can be terminated by pushing the button <**R**>. The mode also gets terminated automatically, if no remote controller button is pushed over 60 seconds.

4.1.5. NON-RESETTABLE VOLUME METERS (CODE 01)

Electronic meters for all dispensing hoses (guns) are stored in the electronic counter memory. These meters are ***not resettable*** and they state, what total volume was drawn by the individual hoses.

Table 11 - P01 parameter values description

Parameter	Description
011A	Fuel volume drawn by hose 1 on side A in centilitres (x 0.01L)
012A	Fuel volume drawn by hose 2 on side A in centilitres (x 0.01L)
…	…
015A	Fuel volume drawn by hose 5 on side A in centilitres (x 0.01L)
011B	Fuel volume drawn by hose 1 on side B in centilitres (x 0.01L)
012B	Fuel volume drawn by hose 2 on side B in centilitres (x 0.01L)

Parameter	Description
…	…
015B	Fuel volume drawn by hose 5 on side B in centilitres (x 0.01L)

NOTE *The number of meters for dispensing hoses shown in parameter P01 depends from the dispenser configuration. The system of hose/gun marking in the dispenser is defined in chapter 2.4.2.*

4.1.6. DAILY METERS (CODE 02)

The electronic daily meters for all dispensing hoses (guns) are stored in the memory of the electronic counter. **These meters can be reset anytime using the P15 parameter** (see the description below). They state, what total volume and total amount of money was drawn by the individual hoses up to the time of their latest reset.

Table 12 - P02 parameter value description

Parameter	Description
02L1 (A)	Fuel volume drawn by hose 1 on side A in centilitres (x 0.01L)
02C1 (A)	Amount drawn by hose 2 on side A in the currency unit
…	…
02L5 (A)	Fuel volume drawn by hose 1 on side A in centilitres (x 0.01L)
02C5 (A)	Amount drawn by hose 2 on side A in the currency unit
02L1 (B)	Fuel volume drawn by hose 1 on side A in centilitres (x 0.01L)
02C1 (B)	Amount drawn by hose 2 on side A in the currency unit
…	…
02L5 (B)	Fuel volume drawn by hose 1 on side A in centilitres (x 0.01L)
02C5 (B)	Amount drawn by hose 2 on side A in the currency unit

NOTE *The number of meters for dispensing hoses shown in parameter P02 depends from the dispenser configuration. The system of hose/gun marking in the dispenser is defined in chapter 2.4.2.*

4.1.7. UNIT PRICES OF FUEL PRODUCTS (CODE 03)

This function allows displaying and setting the current unit price (i.e. the price of one litre of fuel) for all fuel products. These fuel unit prices are set on the display after the gun is lifted and the display is zeroed, in case the dispenser works in **manual mode.**

The setup is carried out by pushing the **<Ent>** key, entering the price in the CCCC format and confirming with the **<Ent>** key again. Decimal point is not used. For instance the price 1.03 Euro/L will be written as 0103, the price 34,15 CZK/L will be written as 3415 etc.

Table 13 - P03 parameter value description

Parameter	Description	Default setting
03 1	Unit price of fuel product 1	0,00 CZK / L
03 2	Unit price of fuel product 2	0,00 CZK / L
03 3	Unit price of fuel product 3	0,00 CZK / L
03 4	Unit price of fuel product 4	0,00 CZK / L
03 5	Unit price of fuel product 5	0,00 CZK / L

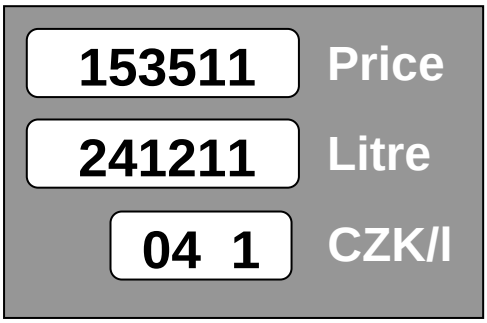
NOTE *The number of fuel products listed in parameter 03 depends from the dispenser configuration. The system of fuel product marking is described in chapter 2.4.2. and in Figure 1. When the unit price setting is changed, it will take effect only after the subsequent lifting of the gun.*

NOTICE *The values set in the P03 parameter are valid* ***only in the dispenser's manual mode****. If the fuel dispenser is connected to the station's central system, the fuel unit price is set directly by the control system prior to every fuel drawing. The P03 parameter value is not functional in this case.*

NOTICE *The fuel dispenser* ***does not allow drawing fuel for zero value of the unit price.*** *In that case after lifting the dispensing gun, the display of the dispenser will show an E30 error message and will not start pumping.*

4.1.8. CURRENT DATE AND TIME (CODE 04)

This function allows showing and setting the current time and date.



The first line of the display shows the time in the format "HHMMSS" (hours, minutes, seconds), the other line shows the date in the format „DDMMYY" (date, month, year) – for example 15:35:11 24.12.2011

Setting is made after pushing the **<Ent>** key by entering the time/date in the proper format and confirming by pushing **<Ent>** again.

Table 14 – Description and setting of the P04 parameter value.

Parameter	Description	Default setting
04 1	Setting the date – format DDMMYY (e.g. 241211 = 24. 12. 2011)	1.1.2001
04 2	Setting the time - format HHMMSS (e.g. 153511 = 15:35:11)	0:00:00

NOTE *The time and date is displayed in the graphic proportional display and it is used in the parameters P06 and P07 to record the time of an error and time, when the fuel drawing was completed.*

NOTICE *48 hours after an interruption of power supply to the fuel dispenser, the internal clock gets reset. The time and date values will change to the default setting and then they must be set to the current date again!*

4.1.9. DISPLAYING THE PROGRAMME VERSION AND THE CHECKSUMS (CODE 05)

This function shows the number of the dispenser counter programme version number and various check sums. These values serve for the inspecting metrology authorities and authorised service technicians.

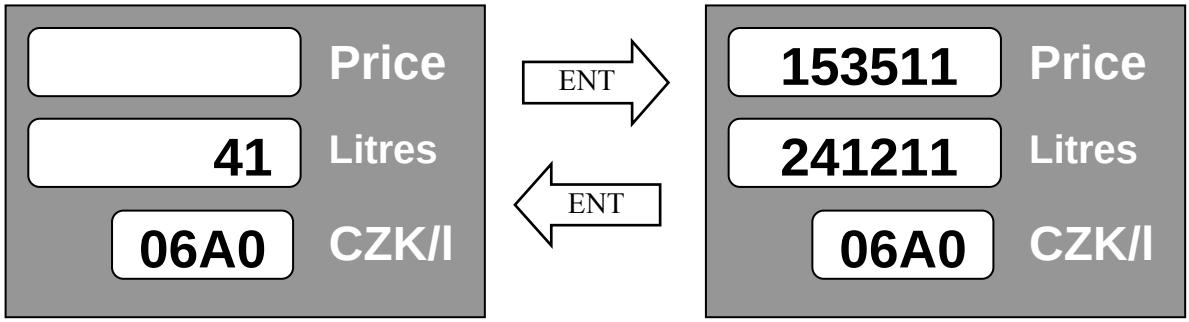
Table 15 - P05 parameter values description

Parameter	Description
05 1	Program version + edition (e.g. 1.03 + 7)
05 2	Check sum W&M (20260)
05 3	Check sum of the programme (e.g. 52359)
05 4	Check sum of the memory of parameters P20-P99 (e.g. 34567)
05 5	Check sum of the appliance for thermal compensation (e.g. 47644)
05 6	Time and date of programme creation (e.g. 19. 07. 2011, 07:56:17)

4.1.10. ERROR MESSAGE HISTORY (CODE 06)

This function serves to show the history of the last ten error messages for malfunctions of the fuel dispenser.

The error message table can be found in Attachment 3



After getting to parameter P06 the display will show the code of the last error message on the A side of the dispenser (e.g. 41 - E41 hose 1A pulser error, see Error message table in Attachment 3). After pushing the key **<ENT>** it shows the time and date, when the error occurred. After pushing the <+> key, the display shows the code of the last error message of the B side of the dispenser. See more in table 16.

Table 16 - P06 error messages history

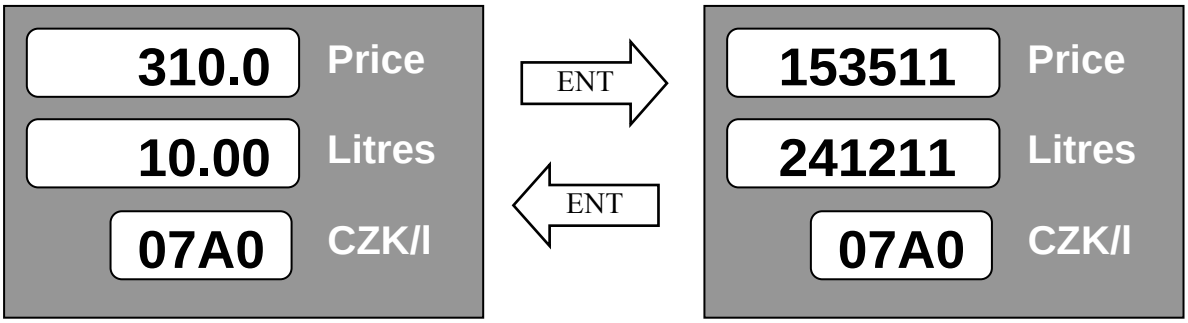
Parameter	Description
06A0	Code of the last error of the dispenser on side A
06B0	Code of the last error of the dispenser on side B
06A1	Code of the last but one error of the dispenser on side A
06B1	Code of the last but one error of the dispenser on side B
…	…
06A9	Code of the tenth recent error of the dispenser on side A
06B9	Code of the tenth recent error of the dispenser on side B

NOTE *If there are two errors of the same time with the same error code immediately after each other, only the last one will be stored in the counter memory.*

4.1.11. HISTORY OF THE RECENT FUEL DRAWING (CODE 07)

This function serves to show the history of the last ten fuel drawings on each side of the dispenser. This

parameter has the following data layout on the display:



After switching to parameter P07 the display will show the code of the last fuel drawing on the A side of the dispenser (e.g. 310 CZK / 10L). The price per litre alternates in the display with the parameter number. After pushing the key **<ENT>** it shows the time and date, when the fuel drawing was completed. After pushing the <+> key, the display shows the code of the last error message of the B side of the dispenser. See more in table 17.

Table 17 - P07 last fuel drawings history

Parameter	Description
07A0	Last fuel drawing on the side A of the dispenser
07B0	Last fuel drawing on the side B of the dispenser
07A1	Last but one fuel drawing on the side A of the dispenser
07B1	Last but one fuel drawing on the side B of the dispenser
…	…
07A9	Tenth recent fuel drawing on the side A of the dispenser
07B9	Tenth recent fuel drawing on the side B of the dispenser

NOTE *If the memory bank for the fuel drawing history is empty, i.e. there is no fuel drawing data stored in the memory, the display will only show this "------".*

4.1.12. ACCESS PASSWORD TO THE MANAGER MODE (CODE 08)

This function allows displaying and changing the access password for the manager mode.

The default access password set from the production is "1111".

4.1.13. MAINTENANCE HISTORY (CODE 09)

This function allows showing the codes of the latest 10 service remote controller used to set parameters of the counter.

4.1.14. OPERATING MODE OF THE FUEL DISPENSER (CODE 12)

This function defines the type of the operating mode of the dispenser.

Table 18 – Operating mode of the dispenser P12

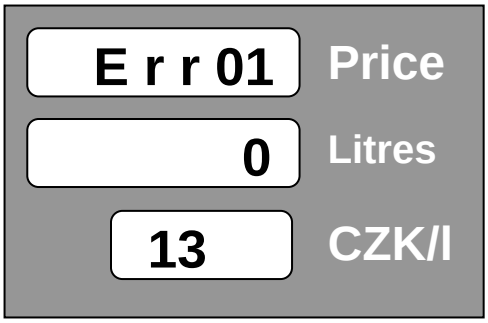
Parameter	Description
12 = 0	Automated mode with remote control
12 = 3	Manual mode

The parameter can have the value 0 and 3:

- If the parameter **P12 value equals 0**, the dispenser operates in a purely automated mode, i.e. it is connected to the control computer via a data line. The dispenser is fully controlled by the remote control unit (counter, control panel etc.) – release of the dispenser for fuel drawing, blocking of the dispenser, setting the fuel price and the maximum amount/volume for each drawing etc. Shortly after interruption of communication between the computer and the dispenser, the display will show an error message E18. Once the communication is restored, the E18 error message is cleared away.
- If the parameter **P12 value equals 3**, the dispenser operates in a purely manual mode. The dispenser is fully independent – not remotely controlled. The data line is blocked. The unit price of the fuel is controlled by the P03 parameter. Unless there is set a special manual mode with blocking after fuel drawing or a mode with the RELEASE signal controlling, the fuel drawing starts immediately after the gun is lifted and the display reset.

4.1.15. ERROR STATISTICS (CODE 13)

The function serves to show the statistics about the errors occurred on the dispenser since its initialisation or counter reset. This parameter has a different data layout in the display:



The first line of the display shows the dispenser error code - 01 through 59, the other line shows the frequency of the error occurrence since the dispenser was commissioned or since a reset of the statistics made by a service technician.

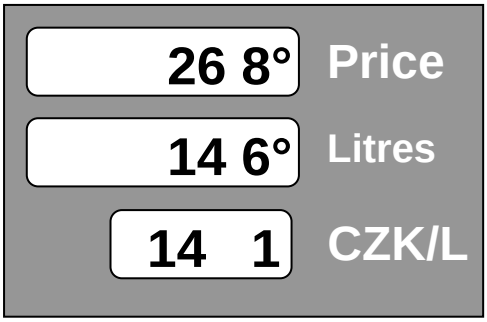
You can scroll the error statistics by keys <+> and <->.

Table of the error messages is in Attachment 3.

4.1.16. CURRENT OPERATING TEMPERATURE (CODE 14)

This function shows the current temperature measured by the thermal sensor in the processor board of the counter, or the current temperature of the thermal sensors Pt100 located in the dispenser's hydraulics, if installed.

This parameter has the following data layout on the display:



The first line of the display shows the temperature on the counter's processor board in decimals of degree Celsius (26.8°C). The second line shows the temperature of the fuel product No. 1 in the dispenser's hydraulic system in decimals of degree Celsius (14.6°C).

You can scroll the fuel products by using the keys <+> and <->.

Table 19 – Present operating temperature P14

Parameter	Description
14 1	Temperature around the counter's processor and temperature of the fuel product No. 1
14 2	Temperature around the counter's processor and temperature of the fuel product No. 2
14 3	Temperature around the counter's processor and temperature of the fuel product No. 3
14 4	Temperature around the counter's processor and temperature of the fuel product No. 4
14 5	Temperature around the counter's processor and temperature of the fuel product No. 5

NOTE *The number of fuel product listed in the parameter P14 depends from the fuel dispenser's configuration. The system of marking of the fuel products in the dispenser is described in chapter 2.4.2. and in Figure 1.*

4.1.17. RESET OF THE DAILY METERS (CODE 15)

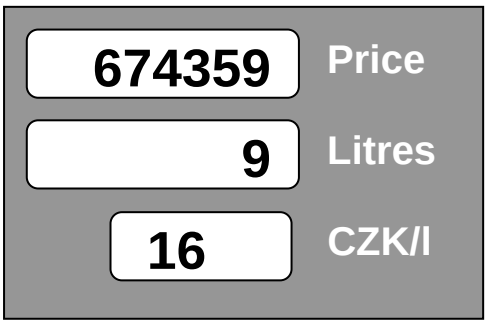
This function serves to zero all daily meters of the dispensing hoses/guns.

After setting the value of parameter **1** and confirming it (**<ENT>** + **<1>** + **<ENT>**), all the meters, which are part of parameter P02 are **reset to zero**.

4.1.18. OPERATING CHECKSUM NUMBER (CODE 16)

This function allows displaying a 6 digit operating check number and setting the operating code, if the dispenser is blocked or if it is started in a trial period.

This parameter has the following layout of data in the display:



The first line of the display shows a numeric code (operating checksum) needed to unblock the dispenser remotely. The other line shows the number of days in trial operation, after which the dispenser will be blocked

If the first line is empty and if there is 0 on the second line, the dispenser is in a standard operating mode.

4.1.19. DISPLAY SUBLIGHTING INTENSITY (CODE 17)

This function allows adjusting the intensity of the LED sublighting of the graphic proportional display PDEDCU. This parameter does not work with other types of displays.

Table 20 – Intensity of sublighting of the display P17

Parameter	Description
17 = 0	Sublighting of the display is unregulated
17 = 1-100	PWM value of the display sublighting

The standard default setting of the parameter is 70.

4.1.20. TEXT MESSAGES IN A GRAPHIC DISPLAY (CODE 18)

If the dispenser has a graphic proportional display PDECPU, this function allows adjusting the length of text messages, which appear in the screen. Text messages can be classified in two groups:

- Descriptions of the display
- Advertising message

The parameters reserved for the description of the display can have the value 0 and 1. When the value is 0, the message is not shown on the display. When the parameter value is 1, the message is shown.
The parameters reserved for advertising texts can have the values 0, 1, 2 through 9. When the parameter value is 0, the advertising message is not shown on the display, when the value is 1, 2, 3 through 9, the advertising the advertising message remains on the screen for 1, 2, 3 through 9 seconds (according to the parameter value). The advertising messages are shown on the display in the order 1, 2… through 9, but only during the time, when the dispenser is idle, after the last fuel drawing has been paid. The advertising message disappears as soon as the dispensing gun is lifted and the fuel drawing starts. The list of used parameters and their meaning can be seen in Table 21.

Table 21 – Text messages of a graphic display P17

Parameter	Description	Default setting
18 6	Description of the amount display	0 – do not display
18 7	Description of the volume display	0 – do not display
18 8	Description of the price display	0 – do not display
18 11	Advertising message No. 1	0 – do not display
18 12	Advertising message No. 2	0 – do not display
18 13	Advertising message No. 3	0 – do not display
18 14	Advertising message No. 4	0 – do not display
18 15	Advertising message No. 5	0 – do not display
18 16	Advertising message No. 6	0 – do not display
18 17	Advertising message No. 7	0 – do not display
18 18	Advertising message No. 8	0 – do not display
18 19	Advertising message No. 9	0 – do not display
18 20	Description in case of a pre-selection by amount	0 – do not display
18 21	Description in case of a pre-selection by volume	0 – do not display

NOTE *Parameter 18 is functional only for the graphic proportional display PDEDCU. For the other types of displays it does not work.*

4.1.21. DISPLAYING A DISPLAY SEGMENT ERROR (CODE 19)

This function allows switching on/off the displaying of a display segment error (Er1) by the processor.

Table 22 – Displaying a display segment error P17

Parameter	Description
19 = 0	The display segment error will not be shown
19 = 1	The display segment error will be shown

The default setting of the parameter value is 1.

4.2. TBELTX COUNTER

The electronic counter TBELTx for fuel dispensers produced by the company TATSUNO EUROPE a.s., is setup by means of a 4 key keyboard, or by a pre-set keyboard, if it is installed on the dispenser. This allows the following:

- Setup unit prices of fuel products (in case of manual operation)
- Read non-resettable electronic litre meters of all dispensing hoses

4.2.1. FUEL UNIT PRICE SETTING

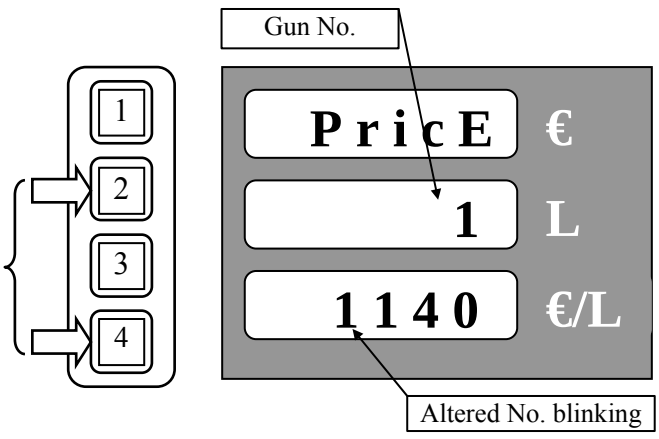
If the dispenser is in manual mode, the spent amount calculation uses unit prices of the products stored in the counter memory, where each pump is matched to a single fuel unit price. Any change in the unit price of fuel on the counter's display comes into effect only after the dispensing gun is lifted. From the production there is set a zero default price for all fuel products. A non-zero price must be set otherwise an error message "E30" – "zero price" will be displayed and the fuel drawing will not start.

If the dispenser is in automated mode, the calculation of the drawn amount uses the product unit prices, which are sent by the station's control computer, when releasing every fuel drawing. The prices stored in the P03 parameter of the counter's memory is not functional in this case.

Fuel price setting in manual mode

The price can be changed only in the time between switching the counter's power on and the first fuel drawing from the dispenser.

1. Turn the power to the counter off and on.
2. Push and hold the button 2 along with button 4 over at least 3 seconds.
3. On the middle line there will appear the number of the gun (product), which is being adjusted, on the bottom line there will be a unit price. The price is altered digit by digit. The currently adjusted digit is blinking.
4. Button 1 allows changing the value of the blinking digit.



5. Button 2 allows moving from one digit place to another.
6. Button 3 allows changing the gun number, for which the price is adjusted.
7. Price setup is terminated by pushing the button 4

NOTE *The fuel product marking system in the dispenser is described in 2.4.2. and in Figure 1*

4.2.2. READING OF ELECTRONIC METERS

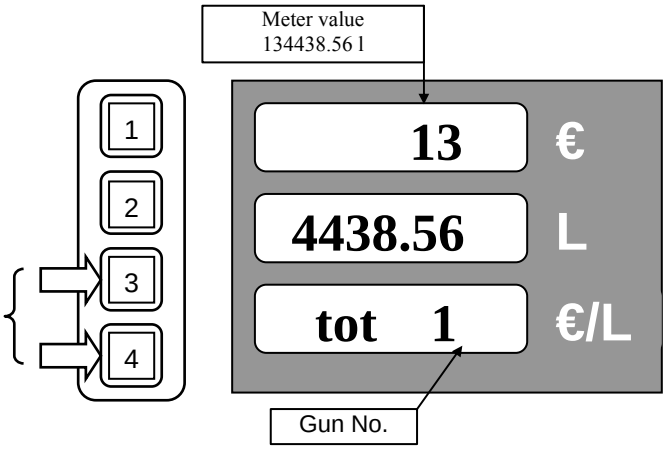
The counter TBELTx is equipped with electronic volume meters for each dispensing gun/hose. The value of these meters can be found, using the pre-set keyboard or by a command sent via the communication line.

The meter can be reset to zero by means of the P18 configuration parameter. The metes can be zeroed only if the switch SW1-1 is in the OFF position.

Electronic meter reading procedure:

The value of the meters can be shown on the counter's display, only if all guns are hanging and once the last fuel drawing has been paid.

1. Push and hold the button 3 and 4 simultaneously over at least 3 seconds.
2. On the bottom line there will appear the gun number. The upper and bottom line shows the meter value (the upper line shows the higher digit positions).
3. The buttons 1(+) and 2(-) allow changing the gun number.
4. The meter can be cleared off the screen by pushing the 4 button (Cancel).



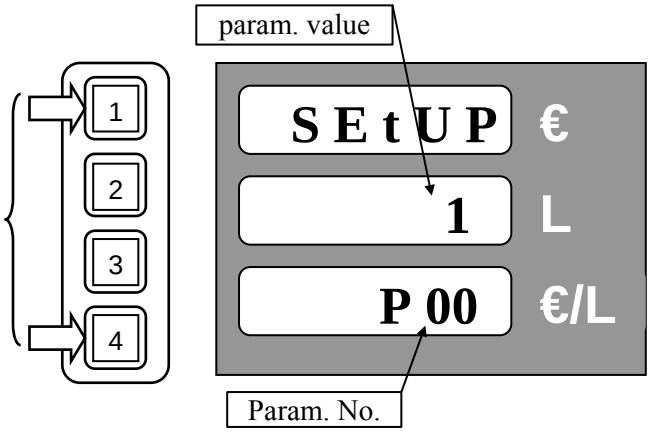
NOTE *The dispensing hose/gun marking system of the dispenser is described in 2.4.2. and in Figure 1*

4.2.3. OPERATING MODE CHANGE

The fuel dispenser operating mode must be changed, when the dispenser is to be disconnected from the control system (e.g. when the control system malfunctions), so the dispensers must be operated manually, or on the contrary, when the dispenser was operating in manual mode and now we need to connect it to the remote control system.

Operating mode change procedure:

1) Switch the power to the dispenser counter off and on again.
2) During the counter test (countdown to zero) push and hold the buttons 1 and 4 simultaneously, until the



letter "P" starts blinking on the bottom line. It signals start of the setup mode.
3) After the counter test there will appear the P00 parameter number on the bottom line.
4) On the middle line there appears the value of this parameter:
5) You can open the parameter for editing by pushing the 3 key (Enter).
6) After opening the parameter for adjustments, its value starts blinking.
7) The value parameter can be changed with keys 1 and 2 to the value 0 – for automated mode, or to 1 – for manual mode.
8) You can store the new parameter value by pushing the key 3 (Enter).
9) The parameter setting mode is terminated by holding the key 4 for at least 2 seconds (Cancel)

4.3. COUNTERS ADP AND ADPMPD

The counters ADP and ADPMPD, made by the company Beta Control s.r.o., are setup by an IR manager keyboard KL-MANINF, which has four keys <R>, <0>, <+> and <->. The functions of the keys are described in Table 23.

Table 23 – Keys on the keyboard KL-MAINF

Key	Function
<0>	Enter the unit price adjustment mode (after switching the counter on)
<->	Select a digit on the unit price display. Choosing a product to set the price.
<+>	Increasing the number value. Enter the meter value reading mode (when the dispenser is idle)

4.3.1. PRICE SETTING (FOR MANUAL OPERATION)

Setting of the fuel unit price is done in manual mode only. It is performed as follows:

- Turn the counter off and on.
- Point the IR keyboard on the dispenser's display and push the key <0>
- Select the digit of the price, the value of which is to be changed, by the key <->
- Adjust the value of the selected digit by the key <+>
- Move to another fuel product by using the key <->
- End the setup by pushing the key <0>

4.3.2. DISPLAYING THE ELECTRONIC METERS

The electronic meters of the dispensing hoses can be displayed as follows:

- The dispenser must be idle, all transactions have been sent to the cash desk and all dispensing guns are hanging.
- Point the IR keyboard at the dispenser's display and push the key <+>. There will appear a volume (litre) meter of the first dispensing gun – for U0000012345.90
- Push the key <+>. There will appear the amount meter for the first gun – such as A00000235678.9
- Push the key <+>. There will appear volume and amount meters for the next dispensing guns.
- Terminate reading of the meters by pushing the key <0>

4.3.3. SETUP OR VIEWING OF PARAMETERS

This action is reserved only to service technicians authorised by the producer!

5. OPERATION

5.1. INSTRUCTIONS FOR SAFE USE

The fuel dispenser is a complicated piece of equipment, which must perform a lot of demanding functions. This is why before commissioning there must be ensured cleaning of tanks, pipes and the cleanliness of the fuel must be verified. Before commissioning, the electric wiring and connections must be reviewed to avoid electric shock and to avoid the risk of explosion.

No smoking

No open fire

No use of mobile phones

Figure 19 – Recommended position of the info label

Figure 18 – Information label – Liquid fuel

CAUTION

- ⚠ ***In the vicinity of the fuel dispenser it is forbidden to smoke and use open fire.***
- ⚠ ***The smoking ban applies even to people inside cars.***
- ⚠ ***In the vicinity of the fuel dispenser it is forbidden to use mobile phones.***
- ⚠ ***It is forbidden to refuel the car while the engine is running.***

WARNING *The fuel dispensers are hygienically clean for the customer and operator. During standard maintenance and fuel drawing it is recommended to protect hands with gloves, e.g. gloves made of ecological foil. When the skin comes into contact with fuel, it should be washed with soap and water asap. If eyes are hit with fuel, search for medical attention immediately. During refuelling, avoid inhalation of petrol fumes.*

5.2. COMMISSIONING OF THE FUEL DISPENSER

Fuel dispensers are switched on and off at the main distributor of the petrol station, where the power to the dispensers leads. Each fuel dispenser has two power supply points from the main distributor:

- Power supply to the electro motors of pumps and vacuum pumps (3x400V)
- Power supply to the electronic counter of the dispenser and switching circuits (230V stabilised)

Both the supply points are protected with adequate circuit breakers that switch the dispensers off and on.

RECOMMENDATION *Turning the dispenser on should be carried out as follows:*

1) *Turn on the backup power source UPS located in the kiosk (a green light will come up on the UPS)*
2) *Turn on the 230V circuit breaker for stabilised power supply to the electronic counter of the fuel dispenser (an automatic test of all display segments will be performed and on the dispenser's display there will be shown the values of the last refuelling)*
3) *Turn on the 3x400V circuit breakers of pump and vacuum pump motors*

Now the fuel dispenser is ready to start pumping fuel.

5.3. OPERATION OF THE FUEL DISPENSER

RECOMMENDATION *The operator is responsible for the operation of the petrol station and must monitor the progress of fuel drawing. If a customer at the self-service dispensers violates the required procedures, the operator must inform the customer about the proper rules. The operator also has to mark the risky area with warning symbols in Czech (no smoking, no open fire, direction of arrival to the dispenser). There must be openly accessible operation rules displayed in Czech for the customer, if he or she should need any info about the basic requirements.*

The fuel dispenser is started by taking the gun out of the holder, which also causes a data reset on the electronic counter. The electro motor of the pump starts and now the fuel can be drawn. The refuelling speed is regulated with the dispensing gun. The refuelling is terminated by closing the gun (release of the control lever) and its hanging back to the holder, which also turns the pump electromotor off. The data about the drawn fuel quantity remains on the display until the next lifting of the gun or until the amount is paid.

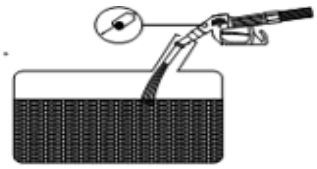
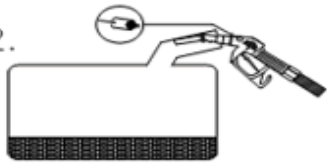
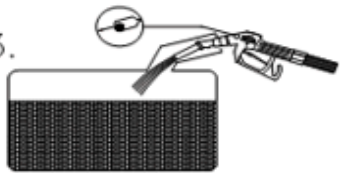
5.3.1. REFUELLING

The liquid dosed by the meter is taken to the dispensing hose and dispensing gun screwed on its end. For self-service operation of the dispensers there are used stop-guns with a safety shut-off.

The control level allows regulating the flow speed or even stopping it. In the basic version the dispensing gun is delivered with a lever arrest. Andhe customer's request we can supply a dispensing gun without any arrest. In this case the lever must be constantly pressed during the refuelling. When the lever is released or when the dispensing stop-gun falls out of the car fuel tank opening, the flow of fuel stops.

The stop-function also works, when the car tank is full, as soon as the sensor opening in the gun is filled with fuel. In this case, the flow will stop even when the control lever is pressed. The safety function helps also against improper handling of the gun. When the outflow extension is pointed more than 15 degrees off the horizontal level, the flow stops, even when the lever is pressed. After the application of the stop-function and safety function the control lever must be released to automatically revert to its default position.

Table 24 – Positions of the dispensing gun during refuelling a vehicle

1. 	**Proper position of the dispensing gun during refuelling** The dispensing gun is almost in a horizontal position, the ball does not prevent the flow of air and the fuel flows.
2. 	**Improper position of the dispensing gun** The dispensing gun is diverted from the horizontal position, the ball stops the flow of air and the fuel stops flowing.
3. 	Since the orifices of fuel tanks of various cars differ, you must find the optimum position for the dispensing gun, when the fuel still flows and is not stopped. The fuel flow may be turned off also when the fuel stream flowing out of the gun hits the wall of the car fuel tank orifice. In that case you need to find a different, optimal position.

5.3.2. ELECTROMECHANICAL LITRE METERS

At the customer's request the OCEAN dispensers can be equipped with mechanical meters to monitor the total consumed fuel in each dispensing hose. The meters are on the display of the fuel dispenser. For each dispensing hose or gun there is one seven-digit meter, which states the quantity of whole litres pumped in the given hose. For multi-product dispensers the electromechanical meters are listed on the display from top down or from left to the right and are numbered with the hose numbers. Variants of the layout of the electromechanical meters on the fuel dispenser display masks are shown in Figure 20.

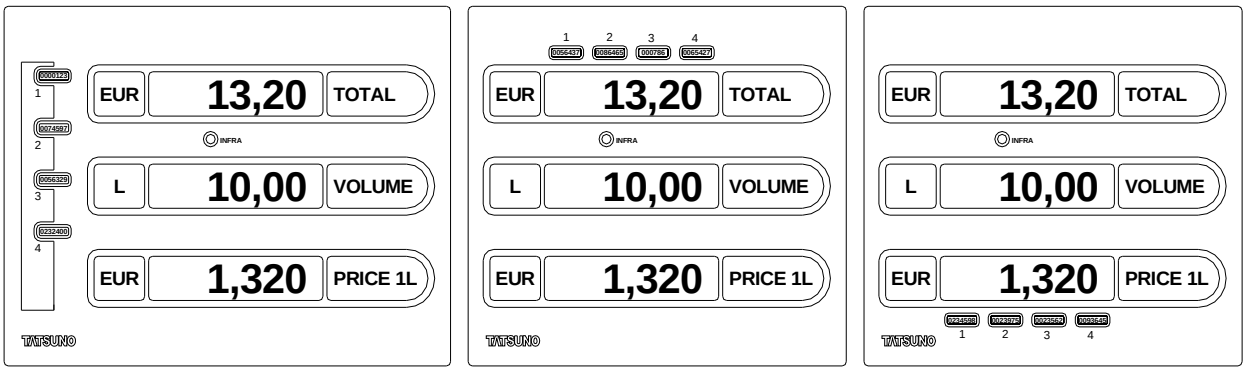


Figure 20 – Variants showing the location of the electromechanical meters and IR receivers on the display

NOTE *On display A the electromechanical meters are marked with numbers 1, 2, 3, 4 corresponding to hoses 1A, 2A, 3A and 4A. On display B the electromechanical meters are marked with numbers 1, 2, 3, 4 corresponding to hoses 1B, 2B, 3B and 4B. The system of marking the guns, hoses and fuel products in a dispenser is described in chapter 2.4.2. and in Figure 1.*

5.3.3. PETROL FUMES EXHAUST

At the customer's request the OCEAN dispensers can be equipped with a petrol fume exhaust, so a vacuum pump sucks the fuel fumes, except diesel oil and bio diesel, out of the dispensing gun's outlet to the petrol tank.

In case of fume exhaust in a single-product dispenser, the vacuum pump is powered directly by an electromotor of the dispenser's pump. In case of multi-product dispensers each side of the dispenser has its own vacuum pump powered by an electromotor.

The quantity of exhaust fumes is regulated according to the fuel flow volume. It means that if fuel is not pumped to the tank, the exhaust function is off.

The exhaust function is monitored by a fume flow meter VRS1.M installed at the outlet of each exhaust vacuum pump. The flow of fumes through the system is signalled either by a green diode lit on the display panel or by lit display segments on the first symbol of the unit price display.

When the fume exhaust mechanism is set properly, the signalisation of the exhaust activity is activated whenever the fuel is pumped and when the exhausted fumes go through the exhaust pipes, i.e. the fume flow sensor VRS1.M is active. A part of the hydraulic module of the OCEAN dispenser, with an electromotor, two exhaust vacuum pumps and VRS1.M sensors is shown in Figure 21.

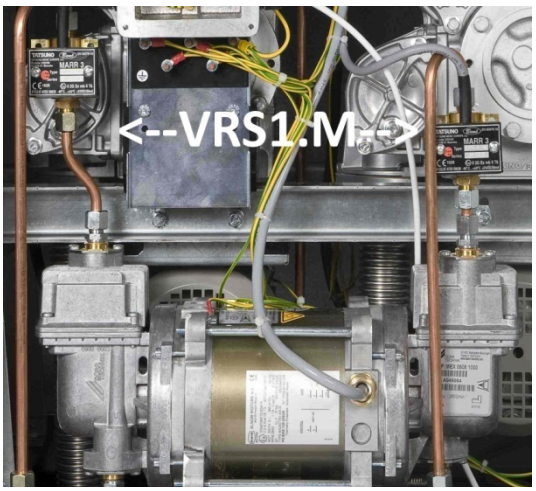


Figure 21 – Exhaust of fumes with flow sensors VRS1.M

Petrol station operation conditions (Directive 355/2002 Coll. - Attachment 12)

"All fuel dispensers must have a clear inscription informing the customers about the need to fully insert the dispensing gun into the filling orifice of the motor vehicle petrol tank."

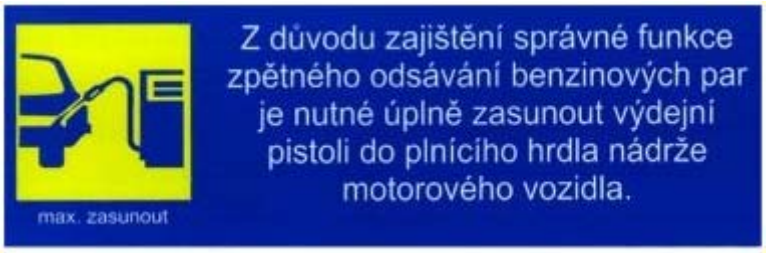


Figure 22 – Example of an info label about fume recuperation according to Directive 355/2002 Coll.

(In order to ensure proper functioning of the fuel vapours exhaust, the dispensing gun must be fully inserted into the orifice of the vehicle's fuel tank.

(insert as far as possible))

Petrol station operation conditions (Directive 355/2002 Coll. - Attachment 12)

"The functionality of the system of fume exhaust from the fuel dispensers is checked by the operators of the petrol station in regular intervals, at least once every shift. In dispensers with an optical signalisation of the vacuum pump functionality, the operator checks the functionality of the signalisation light during petrol drawing."

NOTICE *If you suspect that the exhaust may not work or that the signalling is broken, the operator must immediately inform the service provider to carry out an inspection and to repair any malfunction*

5.3.4. OPERATION MODES OF THE FUEL DISPENSER

The fuel dispenser has two basic operation modes:

1) manual mode
2) automatic (remote) mode

Manual mode is a condition, when the dispenser works independently, separately, without any remote control.

Progress of fuel pumping: The customer comes to the dispenser and takes the dispensing gun of the product, he intends to use. The display will get reset (ca 1.5 sec) and then the pump engine will switch on – now the dispenser is ready to start pumping. After refuelling the vehicle's tank, the customer puts the gun back and pays

the fuel to the operator. The dispenser is immediately ready for another customer. Because in the manual mode the dispenser is not controlled in any way, the fuel unit price must be set manually at the dispenser (see chapters 4.1.7., 4.2.1. and 4.4.1.) The quantity of pumped litres per work shift is measured as the difference between the electronic (or electromechanical) meter status at the beginning and at the end of the shift.

Automated mode is a condition, when the dispenser is remotely controlled (PC programme, control console, station controller etc.). Automated mode allows remote regulation of pumping from the petrol station kiosk. The kiosk contains a control station, which is used by the operator to release pumping at a dispenser and after the end of the pumping it collects information about the quantity of the consumed fuel and its price.

Progress of pumping: The customer comes to the dispenser and takes the dispensing gun of the product, he intends to use. The dispenser asks the control centre in the kiosk for a release. The control centre sends to the dispenser the unit price of fuel, maximum amount/volume of fuel drawing and allows pumping. The display will get reset (*ca 2 sec from lifting the gun) and the pump engine gets started. After refuelling the vehicle's tank, the customer puts the gun back and goes to the kiosk to pay the price and receives a tax document (receipt) for the payment. The dispenser is immediately ready for another customer. Because in the automated mode the dispenser is remotely controlled, the fuel unit price does not have to be set manually. Proper unit price is automatically set by the controlling computer for all dispensers of the station.

***Note:** Immediately after the pumping is released, the dispenser's display gets reset. The time from lifting the gun to zeroing the display and starting the pump can differ significantly due to the used control system and petrol station configuration, it can range from 2 to 5 seconds.*

Change from automated to manual mode. As a standard the fuel dispensers are installed and set according to the specific petrol station. If the petrol station has a control system, the dispensers will be set into an automated mode. If the petrol station does not have a control system, the dispensers will be set into a manual mode.

If we need to switch the dispensers from automated mode to manual mode – e.g. due to a malfunction of the control system, proceed as follows:

- ***Counter PDEX.*** Using the IR controller, change the P12 parameter value from 0 to 3 and change the unit prices in parameter P03, see chapter 4.1.
- ***Counter TBELTx.*** Using the 4-key keyboard change the P00 parameter value from 0 to 1 and check the unit price setting, see chapter 4.2.
- ***Counter ADP and ADPMPD.*** Using the IR controller change the P51 parameter value from 0 to 1 and check the unit price setting, see chapter 4.3.

NOTICE *Changing from automated to manual operation mode must always be consulted with a service technician in advance!*

5.3.5. PRE-SET KEYBOARD

The OCEAN dispensers can be equipped with a "pre-set keyboard" which allows the customer to pre-set the amount or the quantity of fuel, he/she wants, right at the dispenser. Before starting refuelling his vehicle, the customer can set, what volume of fuel or what amount of money he wants to spend.

The pre-set value can be cancelled by pushing the button <**Zruš**> (i.e. Cancel) before the pumping starts. Then you can choose a different pre-set value or draw petrol normally, without a pre-set.

NOTE *If you use the pre-set keyboard, the dispensers must be equipped with slow-down valves, which ensure safe slowdown of the fuel flow in advance before reaching the pre-set target value.*

a) Example of pre-set in Czech crowns

- The customer comes to the dispenser and wants to spend CZK 250 (that is 250 CZK) on the fuel
- On the pre-set keyboard he uses the keys to enter the value 250 (pushing the key **<100 CZK>** twice and the key **<10 CZK>** five times)
- He chooses the product to draw, takes the gun off the dispenser and inserts it into the vehicle's fuel tank.
- The dispenser will pump fuel worth exactly the amount, that was pre-set, and then it will stop automatically.
- The customer puts the gun back to the dispenser and goes to pay.

b) Example of pre-set in litres

- The customer comes to the dispenser and wants to get 20 litres of fuel
- On the pre-set keyboard he enters 20 (twice pushing the button **<10 litres>**)
- He chooses the product to draw, takes the gun off the dispenser and inserts it into the vehicle's fuel tank.
- The dispenser will pump fuel in the pre-set volume and then it will stop automatically.
- The customer puts the gun back to the dispenser and goes to pay.

***c) Example of getting a full tank, with final pumping to reach a round financial amount**

- The customer comes to the dispenser and wants to draw fuel in order to have a full tank.
- He chooses the product to draw, takes the dispensing gun and inserts it in the vehicle's fuel tank.
- When the tank is almost full, he takes the gun out and on the pre-set keyboard he pushes a key with the financial amount the multiplication of which he wants to spend (**<10 CZK>)**.
- He starts the gun again and lets the dispenser to pump some more fuel to reach the full financial amount (e.g. 320.0 CZK, or 400.0 CZK)
- He puts the gun back to the dispenser and goes to pay.

***d) Example of getting a full tank, with final pumping to reach a rounded volume value**

- The customer comes to the dispenser and wants to draw fuel in order to have a full tank.
- He chooses the product to draw, takes the dispensing gun and inserts it in the vehicle's fuel tank.
- When the tank is almost full, he takes the gun out and on the pre-set keyboard he pushes a key with the volume, the multiplication of which he wants to draw (e.g. **<1 L>)**.
- He starts the gun again and lets the dispenser to pump some more fuel to reach a rounded volume value (e.g. 25.00 L or 128.00 L)
- He puts the gun back to the dispenser and goes to pay.

***Note:** Examples c) and d) are possible only at the OCEAN dispenser with electronic counter PDEX and an activated pre-set keyboard function during fuel pumping.*

5.3.6. TURNING OFF THE FUEL DISPENSERS

RECOMMENDATION ***When turning off the dispenser, the producer recommends proceeding as follows:***

- ***Turn off the 3x400V circuit breakers of the pump and vacuum pump motor power supply***
- ***Turn off the 230V circuit breakers of the stabilised power supply to the dispenser's electronic counter***
- ***Turn off the UPS backup power source located in the kiosk. Use the switch on its rear panel (the green light on the UPS will go out)***

6. MAINTENANCE AND SERVICE

6.1. KEY MAINTENANCE RULES FOR THE FUEL DISPENSER

- Keep all functional units of the dispenser clean so that any malfunction could be easily seen and repaired
- Check regularly all connections to monitor any leakage. Tighten the connections or change the sealing, if necessary.
- Check proper strain on the V-belt and adjust it, if needed, using the engine's tilting console.
- Check the screws connecting the electromotor to the console. Adjust if needed.
- Check the dispensing gun condition. According to the severity and type of defect decide, if it is to be repaired or replaced.
- Regularly check the dispensing hose condition. In case of mechanical damage to the dispensing hose jacket, ensure its immediate replacement.
- Check the function of locks and mechanisms for hanging the dispensing gun
- Maintain outer cleanliness of the dispenser, especially clean the glass of the counter
- Regularly use the sludge pump to remove sludge, water and other impurities from the petrol station's fuel storage tanks.

CAUTION Before any maintenance on the mechanical, hydraulic or electrical elements, the power supply must be turned off and you need to ensure that the power cannot be restarted!

CAUTION DO NOT REMOVE THE COVERS OF THE DISPENSER WHEN IT IS RUNNING!

Figure 23 – Dispenser without its cover, side B

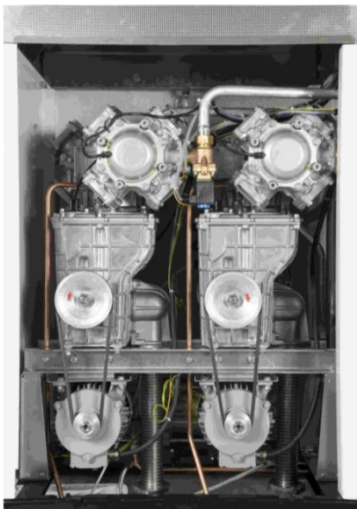


Figure 24 – Dispenser without its cover, side A

CAUTION **THE BELT BETWEEN THE ENGINE AND THE PUMP (OR VACUUM PUMP) IS ANTISTATIC. IT CANNOT BE REPLACED WITH A DIFFERENT TYPE!**

CAUTION **DO NOT OPEN THE DISTRIBUTION BOX LID, IF THE DISPENSER IS UNDER POWER!**

Figure 25 – Distribution box lid

6.1.1. MAINTENANCE OF THE DISPENSER COVER

The covers of the dispenser (bodywork) made of laminate, varnished steel or non-rusting steel require regular maintenance. Especially it is important during winter, when the chloride aerosols from road sprinkling salts can permanently damage the bodywork varnish, if it is not treated properly. Covers made of non-rusting steel can cause inter-crystalline corrosion. Regular maintenance of bodywork elements is done with water or a solution of detergent and with normally available automotive cosmetics.

6.2. TROUBLESHOOTING

If there are any problems with the fuel dispenser, first study the **Table 25 – What to do if…** There are described the most frequent questions of the dispenser users concerning problems occurring at a petrol station.

In case of a dispenser malfunction, the electronic counter, which controls the dispenser, will show an error message in the form of a numeric code. The error codes for the individual counter types are listed in Tables 27 and 28.

Table 25 – What to do, if ...

The dispenser does not respond to lifting the gun from the holder and the display fails to show any error message
It means the dispenser is without electric power or the dispensing guns are improperly hanged or the dispenser is blocked by the control system. ➢ Check proper hanging of all guns ➢ Check, if the fuel consumption at the dispenser has been paid at the cash desk ➢ If the dispenser is in a manual mode, try unblocking it with a remote IR controller (push the "0" key) ➢ Turn the dispenser counter power off and on. ➢ Check the power supply to the dispenser – after switching the power on, the display must undergo a test sequence ➢ Check the position of the single phase 230 V power circuit breaker of the dispenser at the main distributor of the station. ➢ If the dispenser is connected to a controlling computer, the blocking of the dispenser may be caused by the control system, which fails to release the dispenser to allow fuel drawing or blocks the dispenser. Turn the power to the dispenser off and on and change its mode from automated to manual mode – see 4.1.14., or 4.2.3. If the dispenser operates in manual mode, the problem must be in the controlling computer.
After lifting the dispensing gun the display is reset, but the pump fails to start up
It means the electromotor of the dispenser was not started. It may be due to a turned off circuit breaker in the electromotor's power supply. It is on the main distributor. Or the protection of the electromotor inside the dispenser may be disconnected. ➢ At the main distributor of the station, check the position of the circuit breaker of the three phase power supply to the dispenser motor
The dispenser's display shows the error code "**E18**" (counters PDEX, TBELTx) or "**F10**" (counters ADP, ADPMPD)
It is an error message of the dispenser, which informs about loss of communication between the dispenser and the control unit (computer, station controller, control console etc.). ➢ Check proper function of the control unit (turn on the computer, turn on the data converter etc.) ➢ Check the connection of the data cable
At the beginning of the fuel drawing the customer lifts the dispensing gun, but he does not start drawing the fuel immediately (e.g. while he is opening his car's fuel tank). After a moment the dispenser's pump turns off. The display shows the message **"STOP"**.
This message means, that fuel drawing was terminated due to an interruption longer than 60 seconds. Hang the gun back and start new fuel drawing.
You interrupt fuel drawing for some time (e.g. to change the canisters) and after a moment the pump turns off. The displays show the message **"STOP"**.
This message means, that fuel drawing was suspended due to interruption longer than 60 seconds. Hang the gun back and start new fuel drawing.
After lifting the dispensing gun, the dispenser's display shows the error message **"E30"** (counters PDEX, TBELTx), **"F30"** (counters ADP, ADPMPD)
This error code means that the unit price of the fuel is zero. ➢ If the dispenser operates in manual mode with no remote control, it means the unit price is wrongly set. You need to set the fuel's unit price, see chapter 4.1.7., 4.2.1. and 4.4.1. ➢ If the dispenser operates in a remote controlled mode, you need to check the setting of the fuel unit prices in the control unit of the station (computer, controller). Before every fuel drawing, the fuel unit price is automatically transmitted to the dispenser.

6.2.1. ERROR MESSAGES IN DISPENSERS WITH THE PDEX OR TBELTX COUNTER

After each error of a dispenser with a PDEX or TBELTX counter, the fuel drawing is suspended and the display shows an error ("E" + error code). Based on the message type, either the whole dispenser gets blocked (fatal error) or only the part is blocked, where the error occurred.

The important error messages are recorded in the counter's memory, from where they can be recalled using the P06 (Error history) and P13 (Error statistics) parameter.

Table 26 – Types of error message of PDEX and TBELTX counters

Message type	Method of dispenser blocking	Method of dispenser unblocking
LOCK (operational blocking)	Blocks only a part of the dispenser	Hang the dispensing gun back and the message will disappear from the display
ALERT (warning)	Blocks only the part of the dispenser, where the error occurred. The message code is recorded in the history and statistics	The message disappears from the display once you repair the cause of the error
NFAT (non-fatal error)	Blocks only the part of the dispenser, where the error occurred. The message code is recorded in the history and statistics	Hang the dispensing gun back and the message disappears from the display. It is possible to unblock the dispenser and cancel the error by means of a remote controller. Or by unblocking the dispenser via the data line.
FATAL (fatal error)	Blocks the whole dispenser and the message code is recorded in the history and statistics	The cause of the error must be repaired. The power supply to the dispenser's counter must be turned off and on.

Table 27 – Error message codes in a dispenser with PDEX or TBELTX counter

Message code	Message type	Cause of the error message	Remedy for the error message
OFF	FATAL	Supply power blackout Supply power blackout longer than approx. 3-5 periods, t > 100ms	The power supply to the dispenser's counter must be turned off for approx. 10 seconds and then turned on.
STOP	LOCK	Maximum time for pumping suspension exceeded	The message disappears once you hang the dispensing gun back.
E 1	NFAT	Error of display – malfunctioning LCD display segment or error of an electromechanical display reel	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service
E 2	FATAL	Error of display – discrepancy between the real qty of displays and the set qty in the P31 parameter	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service.
E 3	NFAT	Fume exhaust error Fume exhaust flow sensor error on side A	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service
E 4	NFAT	Fume exhaust error Fume exhaust flow sensor error on side B	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service
E 5	ALERT	Error of display – error in communication with the display or with the electromechanical meter	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service

Message code	Message type	Cause of the error message	Remedy for the error message
E 6	NFAT	Error of the electromechanical meter	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service.
E10	NFAT	Error of the thermal sensor	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service.
E11	NFAT	Invalid value of fuel density	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service.
E12	FATAL	Error of the thermal adjustment appliance The PDEINP unit is not connected or its checksum is wrong	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service.
E13	FATAL	Programme error – error of the metrology or programme checksum	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service.
E16	ALERT	Credit unit error Error in the communication between the counter and the PDECRE credit unit	Turn the power supply to the dispenser off and on. If the error persists, call the authorised service..
E17	NFAT	Data line error. Error in the serial communication line. The control computer fails to send confirmation in time <ACK>	Check if two dispensers do not have the same address. Check the mechanical connection of the data line. Check the function and setting of the data converter. Use the monitor to check the communication progress.
E18	ALERT	Data line error Error in the serial communication line, loss of communication	Controlling computer is not connected or the communication cable is not connected properly. Check the setting of parameter P76. Check the data converter function. Use the monitor to check the communication progress.
E20	NFAT	Loss of power supply during fuel drawing. The latest fuel drawing was terminated unexpectedly due to a power blackout or due to processor reset caused by an interference	Check power supply to the dispenser and any interferences (in power supply).
E22	FATAL	Data initialisation Faulty data in the RAM and EEPROM memory – invalid checksum	Call the authorised service
E25	FATAL	Error of electronic meters Electronic meters are wrong. The checksum is wrong	Call the authorised service.
E26	ALERT	The TOTAL STOP key is pressed	The message disappears once the button is unblocked.
E27	FATAL	The producer blocked the fuel dispenser	In parameter 16 enter the authorisation code. Turn the power supply to the dispenser off and on If the error persists – call the authorised service.
E29	NFAT	Wrong password. Wrong password was used to enter the manager mode	Enter the correct manager password. If the error persists – call the authorised service.
E30	LOCK	The fuel unit price is zero	Set the fuel unit price at the cash desk (P12=0), or in parameter P3 (P12=3).
E31	NFAT	Pulser error – error in channel of pulser 1 (1A)	Several times lift the gun and put it back. Turn the supply power to the dispenser off and on. If the error persists – call the authorised service.
E32	NFAT	Pulser error – error in channel of pulser 2 (2A)	
E33	NFAT	Pulser error – error in channel of pulser 3 (3A)	
E34	NFAT	Pulser error – error in channel of pulser 4 (4A)	

Message code	Message type	Cause of the error message	Remedy for the error message
E35	NFAT	Pulser error – error in channel of pulser 5 (1B / 5A)	
E36	NFAT	Pulser error – error in channel of pulser 6 (2B / 6A)	
E37	NFAT	Pulser error – error in channel of pulser 7 (3B / 7A)	
E38	NFAT	Pulser error – error in channel of pulser 8 (4B)	
E41	NFAT	Pulser error – wrong connection of pulser 1 (1A)	Several times lift the gun and put it back. Turn the supply power to the dispenser off and on. If the error persists – call the authorised service.
E42	NFAT	Pulser error – wrong connection of pulser 2 (2A)	
E43	NFAT	Pulser error – wrong connection of pulser 3 (3A)	
E44	NFAT	Pulser error – wrong connection of pulser 4 (4A)	
E45	NFAT	Pulser error – wrong connection of pulser 5 (1B / 5A)	
E46	NFAT	Pulser error – wrong connection of pulser 6 (2B / 6A)	
E47	NFAT	Pulser error – wrong connection of pulser 7 (3B / 7A)	
E48	NFAT	Pulser error – wrong connection of pulser 8 (4B)	
E51	NFAT	Pump filled with air The aeration sensor of the pump is active	Check the fuel level in the storage tank and leakage of the supply fuel pipe. If the error persists – call the authorised service.
E52	NFAT	Pump filled with air The maximum qty of tests of separation exceeded	Check the fuel level in the storage tank and leakage of the supply fuel pipe. If the error persists – call the authorised service.

6.2.2. ERROR MESSAGES IN DISPENSERS WITH ADP OR ADPMPD COUNTERS

Any detected error of a dispenser with an ADP or ADPMPD counter:

- Will terminate the fuel drawing (on one side or on both sides of the dispenser, based on the error type)
- Will show the error code on the unit price display of the side. The error is in the format "**Xnnn**", where "**X**" represents the letter **E** or **F** and "**nnn**" represents the error number.

There can occure three types of error:

Fatal error of the counter (shown in the form of Fnnn)

This error leads to immediate termination of fuel drawing on both sides and the dispenser is blocked. This involves the errors found during automated dynamic tests carried out by the counter's processor and side displays (error numbers higher than 100). In case of such type of error, the user should contact the service and inform them about the error number. The only solution is to disconnect the counter from the electricity network and then turn it on again (the cause of this type of error may disappear, when the counter is turned on again)

Fatal error on one side of the fuel dispenser (shown in the form Fnnn)

This error stops fuel drawing on the given side and this side gets blocked. In case of an Ennn type error, which has an adjustable maximum number of recurrence (see below) and if the error repeats in a sequence more times than the limit allows, an Fnnn error will be displayed with the same error code as Ennn error, which was repeated. Unblocking of this side of the dispenser is possible only by its turning off and on again.

Soft error on one side of the dispenser (shown in the format Ennn)

This type of error leads to termination of fuel dispensing on the respective side. By hanging the gun back and lifting it again the error will be erased. The recurrence of this error leads to a fatal error of the side.

Table 28 – Error message codes of a dispenser with an ADP or ADPMPD counter

Message	Error message cause
F010	Error in communication with the cash desk
F020	STOP transmitted from the cash desk
F021	Wrong pulser channels
F023	Pulser channels – missing
F024	Pulser channels – short circuit
F025	Exceeded max. time of fuel drawing
F026	Exceeded max. time without a pulse
E027	Exceeded max. pre-set from the cash desk
E028	Exceeded max. pre-set of keys
E029	Exceeded max. value of fuel drawing
F030	Zero fuel price
F031	Non defined product
F032	max. pre-set values = 0
F040	Power blackout
F041	Exceeded max. freq. for the meter
F042	Wrong recording into EEPROM
F043	Wrong CRC of EEPROM
F044	Wrong data in EEPROM
F045	Wrong data version
F047	Improper start-up progress
F049	Improper start-up progress
F050	Wrong CRC of parameters
F051	Wrong CRC of unit prices

Message	Error message cause
F052	Wrong CRC -9,10,20,21,22,23
F053	Wrong CRC of parameters
F054	Wrong CRC of parameters ADP2
F055	Wrong control data
F056	Wrong data of measurement calibration
F057	Wrong data of EEPROM calibration
F058	Wrong data of thermal calibration
F059	Wrong data of exhaust calibration
F060	Wrong CRC of exhaust calibration
F061	Missing data from ATC EEPROM
F063	Wrong CRC of EEPROM for PINs
F064	Max. attempts of PIN parameters
F065	Max. attempts of unit price PINs
F066	ID error of the main display A
F067	ID error of the main display A
F068	ID error of the main display B
F069	ID error of the main display B
F070	ID error of the main display A
F072	ID error of the main display B
F097	Error of data structure to display
F098	Error of CRC from processor to display
F099	Communication with the display interrupted

6.3. SERVICE

The company TATSUNO EUROPE a.s. offers regular annual reviews of the petrol station in the scope of Table 25.

Table 29 – Scope of activities performed during the annual review

Scope of activities performed during the annual review of petrol station according to ČSN EN 650202 article 8. 8. and 8. 9.	Done YES/NO	Note
Fuel tank shafts		
Dismantle, clean and conserve the corner safeties		
Tighten the screws of all connections and tank fitting flanges		
Check the leakage in end screws of tank fittings		
Check the presence of water, using an indication paste		
Visual check of shaft leakage		
Check the paint and prescribed labels in the individual shafts		
Check the hinges of shaft lids, including the greasing		
Visual check of seals in the distribution cable channels		
Check the grounding of shaft lids		
Fuel drawing shaft		
Dismantle, clean and conserve the recuperation safeties		
Check the leakage of end point screws, replace if necessary		
Check the colour marking and labels on products		
Check and grease the shaft lid hinges, repair if needed		
Fuel tank ventilation		
Dismantle, clean and conserve the end point safeties		
Leakage indication		
Check the functionality of the tank leakage indication system		
Check the functionality of the pipe leakage indication system		
Warning labels and tables		
Check the warning labels prescribed by ČSN EN		
Distribution pipes		
Check leakage of all single-jacket product piping		
Dispensers		
Check leakage of hydraulics and exhaust connections		
Tighten the connections of electric conductors of the electronic counter		
Check leakage of cable bushings and glands		
Check marking and binding of cables		
Check and strain the antistatic V-belts, replace if necessary		
Check the measurement of 20 l of product from each dispensing hose		
- if the dispensing shows any deviation out of permissible tolerance – readjust the meters		
Check and adjust the efficiency of petrol fume exhaust		
Distributor		
Tighten the conductor connections, check the terminal boards		
Check the cable marking and description of the individual electric circuits		
Check the completeness of documentation prescribed according to ČSN		
Grounding point		
Check the marking prescribed by ČSN		
Overfilling signalisation		
Check and test the tank maximum level and tank overfilling signalisation system		

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