TATSUNO EUROPE a.s.

DISPENSERS

OCEAN CNG

Installation, operation and maintenance

BMP 4000

OCEAN

Document:	Dispensers OCEAN CNG; Installation, operation and maintenance
File:	IN028-EN_00_OceanCNGInstalRev01
Revision & Date:	Revision 01 from October 1nd 2016
Number of pages:	102 (including cover)
Created by:	Ing. Milan Berka
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INTRODUCTION

This manual is intended for users of CNG dispensers of the OCEAN series and for design agencies engaged in designing fuel stations. TATSUNO recommends thorough reading of this manual including all appendices. The manual must be available to the dispenser attendant during installation and regular maintenance of dispensers.

- Keep this manual together with all appendices for the entire operation period of the device.
- Make it available to other owners and users.
- Perform updates of regulations and manuals – see http://www.tatsuno-europe.com/_en/download/

The contents of the manual at the time of its release corresponds to reality. The manufacturer reserves the right to alter the technical specifications of the device or its properties without written notice, due to its development and continuous improvement.

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Document revisions

Revision No. / Date	Changes	Made by
Revision 00 / 1. 9. 2016	Basic version of the document	Ing. Milan Berka
Revision 01 / 1. 10. 2016	Text correction, plans of BMP4034.OED/CNG-4C and BMP4034.OED/CNG-4C/HE added	Ing. Milan Berka

1. INTRODUCTORY INFORMATION

Symbols used in this manual:

Warning

Explosion hazard

Attention! Electrical device

Smoking forbidden

Open flame use forbidden

Use of mobile phones forbidden

Terms used in this manual requiring special attention:

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

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

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

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

1.1. IMPORTANT NOTICE

Read and understand appropriate sections of the Installation and User Manual before the dispenser installation and operation. Consider all hazards, notices and notes stated in the manual. Information stated in this manual are binding and the manufacturer shall not be responsible for damage caused by failure to observe it.

This manual was prepared by the manufacturer and forms and integral part of dispenser accessories.

The user is fully responsible for using of this manual; all operations not described herein shall be considered forbidden. The attendant performing such operations shall be fully responsible for the results of his/her actions. The manual is arranged in individual sections that are further divided into subsections so that each topic is independent and corresponds to the operating logic (learn – prepare – use – maintain). The manual reliably reflects the technical condition at the time of dispenser sale and it is not possible to consider it non-corresponding due to subsequent changes and updates performed based on the latest's facts.

The CNG dispenser within the set of the fuel station is considered a part of a reserved gas appliance which is subject to checks and inspections according to applicable regulations that are incorporated into the fuel station operating rules and regulations. The dispenser was manufactured with high precision and care to ensure reliable and safe operation in the long term. During its installation, it is necessary to observe basic safety rules that primarily protect the user from potential injuries but also the dispenser from damage.

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

CAUTION *OCEAN CNG dispensers are designed and manufactures for maximum input operating pressure of 30.0 MPa (300 bar). The station operator shall ensure that this maximum pressure at the device input is not exceeded (by installation of overpressure valves at the input pipes, etc.).*

The dispenser must not be installed at the environment with explosion hazard – i.e. 0, 1, 2 zones in compliance with EN 60079-10!

External influences for dispensers according to the Czech Technical Standard ČSN 332000-3:

- Ambient temperature: AA2, AA7
- Atmospheric ambient conditions: AB2, AB7
- Altitude: AC1
- Water presence: AD3

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

IMPORTANT INSTRUCTIONS FOR INSTALLATION AND OPERATION

- ⚠ *Thoroughly read the Operation and Maintenance Manual, Installation Manual and other manufacturer materials that form the dispenser accessories before handling of the dispenser.*
- ⚠ *Check the dispenser delivery completeness and immediately inform the manufacturer in case of any discrepancies or damage.*
- ⚠ *During the period before the dispenser installation at the fuel station ensure its proper storage in a **dry and protected place**.*
- ⚠ *Before the dispenser installation check completeness of the fuel station technology according to the applicable project, check connecting dimensions of the base frame including the pipe system openings.*
- ⚠ ***Regarding the operation safety, it is necessary to place the dispenser during its installation by connecting a hose towards the exit from the fuel station.***
- ⚠ *Perform electrical connection of the dispenser and its inspection.*
- ⚠ *Perform the pressure test of the fuel station piping according to ČSN 386420; the pressure test of the compressed natural gas distribution including the dispenser according to ČSN 130020.*
- ⚠ *Perform the inspection of the dispenser piping system.*
- ⚠ *The dispenser commissioning is performed according to section 5.2.*
- ⚠ *Perform functional testing and metrological verification by the Metrology Institute employee.*
- ⚠ *Normal operation may start after meeting these conditions and after obtaining an approval from the state supervision authority and the Metrology Institute.*
- ⚠ *Service interventions may only be performed by trained employees of the service company. The procedure of the service intervention is described in section 14.*

NOTICE *Keep this manual and attached documents for the entire period of device operation for any potential future reference!*

1.2. USE

Dispensers of the OCEAN CNG type series are intended for outdoor installation for stationary positioning (according to OIML D11 - C) and serve to refilling motor vehicles with compressed natural gas with the filling performance of 30 or 70 kg/min.

OCEAN CNG dispensers enable single-sided or double-sided simultaneous CNG dispensing from one, two or four filling nozzles.

Compressed natural gas is supplied to the dispenser from the system of fuel station technological facility which is connected to the natural gas source (gas pipeline) and is formed by a unit for gas drying, compressor, pressure vessels and a system of shut-off, control and safety devices and fittings – see the basic diagram of the fuel station technological facility – see Appendix 3.1.

CNG dispensers are primarily intended for installation to road fuel stations, to car fleet operations, etc. Dispensers are ready to be connected to electronic control and information systems of the fuel station and may be operated in automatic or manual modes.

To ensure safe and environmentally friendly operation of the fuel station the CNG dispenser may be fitted with gas leak sensors that are connected to the evaluation unit located in the fuel station kiosk.

1.3. INSTRUCTIONS FOR OCCUPATIONAL SAFETY

While refilling motor vehicles with compressed natural gas (CNG) is if forbidden to smoke and use open flame within a radius of 10 m – applies also to passengers inside the vehicle. This ban must be in a visible place. Safety labels and symbols are used according to ČSN 018013. A visible notice about switching off the engine of the refilled vehicle and its auxiliary heating with a combustion chamber must be located at the dispenser. The vehicle must be secured against spontaneous setting in motion. A carbon-dioxide extinguisher or dry-powder extinguisher with a filling of at least 6 kg must be located at each device. The device that is out of order must be secured against its misuse by an unauthorized person.

1.3.1. DEVICE DESIGN SAFETY

DEVICE DESIGN SAFETY IS GUARANTEED BY THE MANUFACTURER

The dispenser design meets the requirements of ČSN EN 13463-1 and ČSN EN 60079-0 standards and is designed for operation in environments designated by symbols Ex II 2G IIA T3 stated on the type label of the dispenser.

With regard to the operation safety in the potentially explosive environment, dispenser compliance assessment was performed and documentation archiving was carried out according to article 10, par. 1b(2) of the Government Decree No. 116/2016 Coll. (article 13, par. 1b(ii) of the European Parliament and Council Directive No. 2014/34/EU) in a Physical-Technical Testing Institute in Ostrava – Radvanice, notified entity No. 1026 with the archive number A484 -16.

In terms of pressure safety, ES verification of the unit (Procedure G) was performed at the CNG dispenser according to the Appendix No. 3, point 11 of the Government Decree No. 26/2003 Coll. as amended (Appendix No. III, point 10 of the European Parliament and Council Directive No. 2014/68/EU) by the notified entity No. 1017 TÜV SUD Czech s.r.o., Novodvorská 994, 142 21 Prague 4.

1.3.2. OPERATING SAFETY

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

Attendant's responsibilities:

- Keep the operated devices in a safe and proper condition.
- Observe operating rules and regulations and operating instructions of gas devices.
- Immediately inform the operator about each failure, defect or abnormality during the gas device operation and immediately decommission the device in case of danger of delay.
- Permanently keep the gas device tidy and clean and ensure that no unauthorized persons are nearby the device.

- Immediately inform the operator about circumstances that impede the device operation for the attendant (in case of sudden indisposition).

Write down the records into the operation logbook about the shift start and finish, inspections performed by the attendant and maintenance work, repairs, inspections and audits.

- The fuel station and CNG dispenser attendant must not perform any repairs of the machinery and modify the settings of safety fittings on his/her own.

A special case is performing service interventions.

A service worker must not violate the operating safety during repairs and other activities. He/she must pay special attention to removing the covers of the dispenser not to cause any injury of him nor a casual customer.

While handling of electrical components, he/she must ensure safe disconnecting of electrical energy supply. Only approved components may be used for part replacements. All parts subject to approval must be always put into condition which is prescribed by technical documentation (airtightness, grounding, electrostatically conductive delivery hoses, etc.).

1.3.3. ENVIRONMENTAL SAFETY

The OCEAN EURO CNG dispenser and the filling unit may be fitted with sensors of the gas leak detector (they are not a standard part of the dispenser delivery) which can be connected to the evaluation unit. In case of gas leak (low concentration) the unit shall automatically signal the leak and in case of danger (higher concentration) it shall immediately decommission the whole system. In case of a small gas leak the attendant of the fuel station shall check the system and if he/she does not find any defect, leaked gas shall be ventilated and the system shall be put again into operation (small leak while connecting and disconnecting the delivery hose, influence of exhaust fumes). In case of higher concentrations of leaked gas, the evaluation unit shall disconnect the electrical system from operation. The fuel station attendant shall decommission the fuel station and announce the defect to a specialized company that shall perform the repair.

1.3.4. HYGIENE

CNG dispensers are hygienically harmless for the attendant and operator. It is advisable to protect hands, e.g. by wearing gloves, while performing regular maintenance and refilling motor vehicles with compressed natural gas (CNG).

1.3.5. FIRST-AID PRINCIPLES

- **Avoid inhaling natural gas vapours while refilling motor vehicles with CNG. There is a risk of suffocation.** The affected person must be carried out from the dangerous area to fresh air. Pay attention to your own safety and be aware of the risk of fire and explosion. Comfortably lay the affected person down, loosen his/her clothing and keep him/her calm (he/she must not talk nor walk). Call medical help or transport the affected person to the hospital. In case of breathlessness or pulmonary arrest provide the affected person with oxygen or start mouth-to-mouth resuscitation.

- **In case of natural gas affecting eyes** a small amount of water must be immediately poured onto eyes, carefully open eyelids and rinse eyes with a huge amount of running water (for approx. 15 minutes) and then seek for medical advice.
- **In case of skin contact with natural gas** it is necessary to rinse the affected place with a huge amount of water, take off clothes and shoes affected by natural gas (be careful about the risk of fire or explosion) and rinse the affected skin parts with running water (for approx. 15 minutes).
- **In case of burning** it is advisable to immediately cool the affected place with cold water (for approx. 15 minutes). Do not lubricate the affected place and seek for medical help. Apply only sterile dressing as an emergency bandage. In case of extensive burns wrap the affected person into a clean bed sheet – **do not take off clothes!** If the clothes start burning, **do not run** (fire becomes more intense), extinguish with water, put out flames with a blanket – coat, rolling on the ground. If someone appears to be in the middle of fire, **lie down immediately.** Flames that reach a face may cause life-threatening burns of the respiratory system.

1.4. BRIEF CHARACTERISTICS OF THE USED MEDIUM

CNG is a business name for **C**ompressed **N**atural **G**as. Natural gas is formed by 92–99 % of methane and the rest is formed by inert gases.

Table 1 - Physical properties of CNG and their comparison to other fuels

	CNG	Petrol	Diesel	LPG
Octane number, range	128	91 - 98	-	100 - 110
Cetane number, range	-	-	51-55	-
Flash temperature [°C]	**152**	- 20	55	-69 to -60
Burning temperature [°C]	650	- 20	80	-40
Ignition temperature [°C]	537	340	250	400-450
Boiling temperature [°C]	- 161.6	30 - 210	180-370	-42 to -0.5
Density at 15 °C [kg/m^3]	0.678	720 -775	800-845	502 - 579
Min. heating value of gaseous phase [MJ/m^3] or liquid phase [MJ/kg]	34	43.5	41.8	46.5 94
Explosive limit in air mixture [%]	**4.4 to 15**	0.6 to 8	0.6 to 6.5	1.5 to 9.5
Hazard class	IV	I	III	I

The table means the following:

- CNG is, compared to liquid fuels (petrol, diesel, LPG), lighter than air.
- The flashpoint of petrol and air mixtures is significantly lower than natural gas and air mixtures which increases the potential of the risk at petrol drives compared to natural gas drives.
- Natural gas has the most favourable explosive limit in the air mixture of all fuels.
- In terms of fire safety, CNG is less risky than petrol or diesel.

Natural gas is not dangerous for human health. It has no toxic or poisonous effects. In high concentrations, it may cause suffocation because it reduces the amount of oxygen in inhaled air. When natural gas is accumulated in a closed room or in an open space under windless conditions an explosive mixture may be formed (within the range of 4.4 ÷ 17 vol. %) and an explosion may occur after initiation (by open flame,

spark, electric discharge). In rapid expansion from the higher pressure above approx. 15 bar cooling occurs and water vapour in the vicinity of the discharge opening may freeze – frostbite hazard.

Condensate is flammable and saturated with methane at the moment of discharge. The recommended extinguishing agent is a dry-powder extinguisher.

2. OCEAN CNG DISPENSERS

2.1. DESCRIPTION OF THE OCEAN CNG DISPENSER

OCEAN CNG dispensers are manufactured in two design versions:

- **EURO version**, type BMP40xx.OEx /CNG

- **SMART version**, type BMP40xx.OSx /CNG

both versions differ only by the shape of the counter case and by the case for placing the distribution boxes. The EURO version copies the design of OCEAN dispensers for liquid fuels. The pressure part of the dispenser and columns of delivery hoses are the same at both versions.

The design of the OCEAN CNG dispenser is self-supporting. The dispenser is made of painted steel sheet metal, galvanized steel sheet metal and stainless steel sheet metal. The standard colour design of dispensers is white (RAL9016) and silver (RAL9006) with a black dispenser base (RAL9005). The dispenser is in a single-product model with maximum 2 delivery hoses or a two-product model with maximum 4 delivery hoses. The design of models differs in the length of the dispenser while keeping the same height and width, with a possibility of left-sided, right-sided or double-sided delivery.

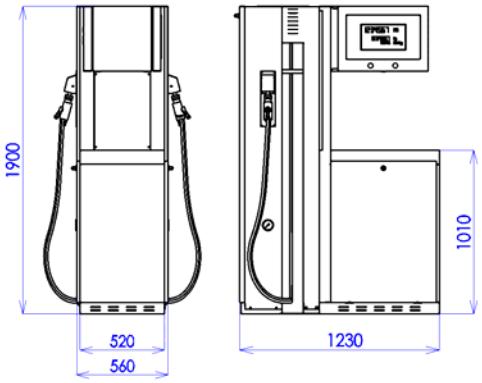


Figure 1 – Single-product OCEAN EURO dispenser

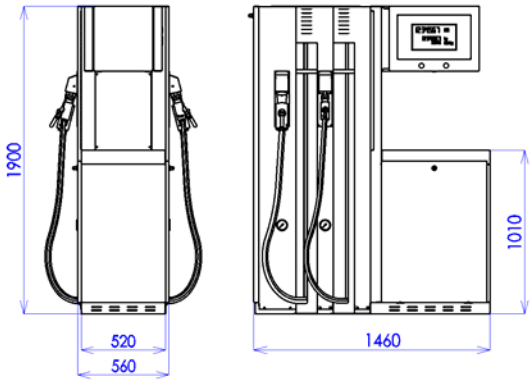


Figure 2 – Two-product OCEAN EURO dispenser

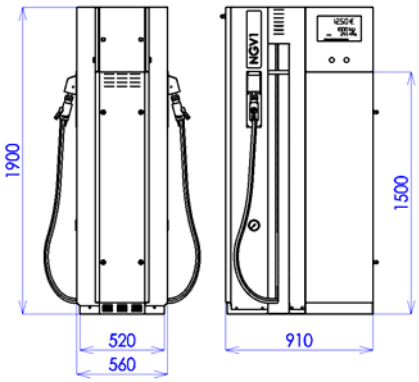


Figure 3 – Single-product OCEAN SMART dispenser

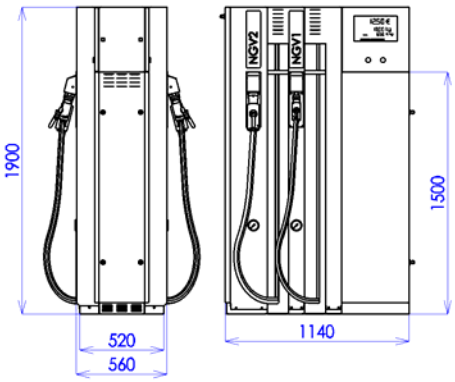


Figure 4 – Two-product OCEAN SMART dispenser

At the two-product model another part, a product column, is placed between the inner column and the pressure module column. The base of the dispenser is mutually screwed together. The inner column is screwed to the base of the dispenser and together with the case support and reinforcement it forms a fixed part of the dispenser, the hoses holder is screwed over the roof to the inner column as well as the hydraulics column. At the two-product model, the product column is screwed between the inner column and the hydraulics column. The pressure module column is an enclosed space where the pressure section of the dispenser is located and the column has a removable lid. Left-sided, right-sided or double-sided delivery is designed based on correct placement and attachment of delivery hoses. At single-sided models the side without delivery hoses is fitted with cover sheet metal without opening for attaching delivery hoses. All removable lids, covers and masks are grounded and secured with locks. Masks of the electronic counter case may be opened to the side after unlocking and this position allows easy access to electronic equipment located inside the case.

The pressure section of the dispenser is fitted with certified stainless components made of a stainless material. The access to the CNG pressure system is fitted with a **lever-closable ball valve**, then **input filters** to protect pressure component and equipment. Gas filling is regulated by **electromagnetic valves** and secured with **check valves**. The amount of gas flown through is measured with a **mass meter** the input of which is fitted with an electronic **pressure sensor** and **mechanical pressure gauge** (manometer). All such pressure connections are performed by using stainless or galvanized steel pipes with a high-quality connection system (two rings). All fixtures and brackets in the pressure section are made of galvanized sheet metal. The output of the pressure module and fixture of delivery hoses is secured with a fixed connection to which a **delivery hose** is connected which is fitted with a **safety breakaway coupling** that shuts the gas flow through the delivery hose on both sides in forcible tension stress with following disconnection. The delivery hose ends with a **delivery nozzle**. The pressure section of the CNG dispenser may be further equipped with a **temperature sensor** for measuring the ambient temperature. Installation of the temperature sensor allows activation of the **filling temperature compensation** function Filling with temperature compensation ensures that the vehicle storage tank is always filled with a maximum amount of gas while observing the condition of maximum pressure in the tank of 20 MPa at 15 °C – see TPG 304 02 art. 4.5.4. The standard equipment of OCEAN CNG dispensers is an **electronic counter** of TBELTM type which is mounted into the counter case. The electronic counter processes data from the mass meter and transfers it to the **display** which shows mass of gas delivered, total price and price per mass unit. In case of power failure, the data on the display remains visible for at least 15 minutes. Dispenser may be operated either in a manual mode without a control system or in an automatic mode connected via a communication line to the payment terminal of the fuel station.

2.1.1. BASIC PARTS OF THE DISPENSER – COVERS

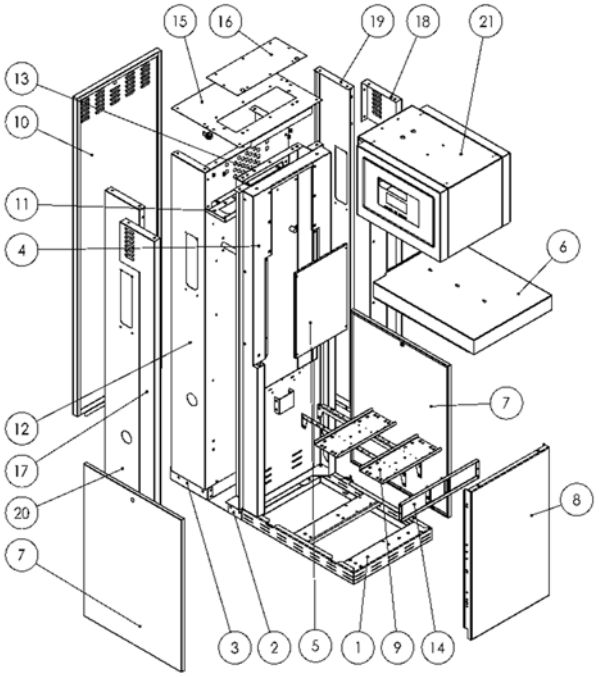


Figure 5 - Dispenser covers - EURO version

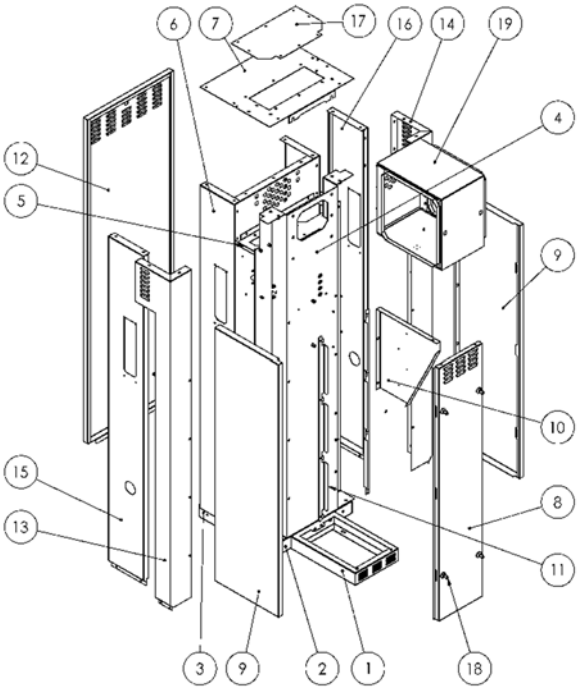


Figure 6 - Dispenser covers - SMART version

Position	Description
1	Base
2	Column base
3	Column base
4	Inner column
5	Column cover
6	Roof
7	Door
8	Column front
9	Meter holder
10	Column lid
11	Column intermediate piece
12	Column
13	Column side
14	Holder of meter bracket
15	Roof
16	Column lid
17	Side slat – left
18	Side slat – right
19	Column cover – right
20	Column cover – left
21	Counter case

Position	Description
1	Base
2	Column base
3	Column base
4	Column side
5	Column intermediate piece
6	Column
7	Roof
8	Case support
9	Lid support
10	Case reinforcement
11	Lock slat
12	Lid
13	Side slat – left
14	Side slat – right
15	Column cover – left
16	Column cover – right
17	Column lid
18	Lock
19	Counter case

2.1.2. BASIC PARTS OF THE DISPENSER – PRESSURE MODULE

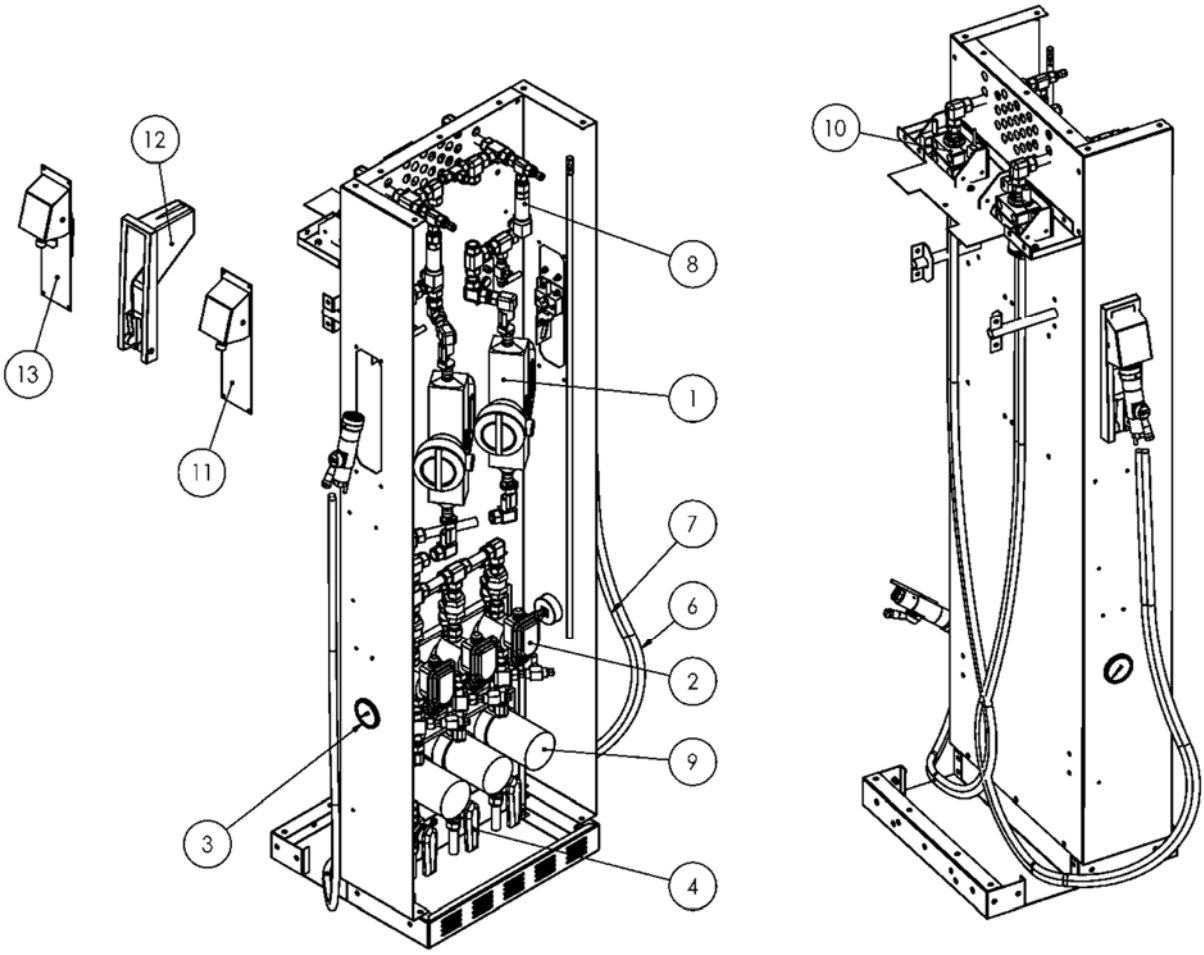


Figure 7 – Hydraulic module of the OCEAN CNG dispenser

Position	Description
1	CNG mass meter
2	CNG electromagnetic valve
3	Manometer 400 bar
4	Input ball valve
5	CNG nozzle (delivery nozzle or filling end piece)
6	CNG hose, filling
7	CNG hose, ventilating
8	Pressure sensor
9	CNG filter
10	Breakaway coupling
11	Nozzle cover, stainless, without a switch
12	Nozzle cover, plastic, with a switch
13	Nozzle cover, stainless, with a switch

2.2. CERTIFICATES & APPROVALS

OCEAN CNG dispensers comply with all European standards of metrology and safety.

2.2.1. METROLOGY

The device has been certified by the Czech Metrology Institute Brno, notified body No. 1383. Compliance of the device has been tested according to the Metrology Act No. 505/1990 Coll. A **type certificate** No. **TCM 143/15-5321** has been issued for CNG dispensers. Type tests have been carried out in accordance with the international recommendation OIML R139-1, R139-2 and OIML R139-3. Based on the type tests the **OIML BASIC CERTIFICATE OF CONFORMITY** No. **R139/2014-CZ-16.01** has been issued for OCEAN CNG dispensers.

Each delivery hose is tested during operating tests of the finished CNG dispenser for delivery accuracy by a procedure according to OIML R139-2 art. 2.2.7.2 and art. 2.2.7.3 (accuracy test in delivery of V_r = 100L with sequence filling and accuracy test in delivery of a minimum amount). The result of both tests is a report.

2.2.2. SAFETY

With regard to the operation safety in the potentially explosive environment, dispenser **compliance assessment was performed** and **documentation archiving** was carried out according to article 10, par. 1b (2) of the Government Decree No. 116/2016 Coll. (article 13, par. 1b(ii) of the European Parliament and Council Directive No. 2014/34/EU) in a Physical-Technical Testing Institute in Ostrava – Radvanice, notified entity No. 1026 with the archive number A484 -16.

In terms of pressure safety, ES verification of the unit (Procedure G) is performed at each CNG dispenser according to the Appendix No. 3, point 11 of the Government Decree No. 26/2003 Coll. as amended (Appendix No. III, point 10 of the European Parliament and Council Directive No. 2014/68/EU) by the notified entity No. 1017 TÜV SUD Czech s.r.o., Novodvorská 994, 142 21 Prague 4.

During its production, each CNG dispenser undergoes electric tests (cohesion of connections, insulation resistance, high-voltage test, filling end piece resistance to the dispenser ground terminal), pressure tests (hydrostatic pressure test with 430 bar, nitrogen leak test at 6 bar) and operating pressure test with natural gas at 220 bar. The result of all tests is a report.

2.2.3. ELECTROMAGNETIC COMPATIBILITY (EMC)

The counter of OCEAN CNG dispensers of TBELTM type has been tested by the Czech Metrology Institute, notified body No. 1383, in a testing laboratory TESTCOM Praha, Hvožďanská 3, Prague 4. A Test Report No. 8551-PT-E0037-15 has been issued. The tests have been performed according to OIML R 117-1, OIML R 139 and ČSN EN 55022.

2.3. BASIC TECHNICAL PARAMETERS

2.3.1. PRESSURE MODULE OF CNG DISPENSERS

Pumping performance (Q_{max}):	- standard	30 $kg.min^{-1}$
	- increased /H	70 $kg.min^{-1}$
Accuracy class:		± 1.0 % (European recommendation OIML R139-1 = ± 1.5%)
Minimum flow rate Q_{min}:		2 $kg.min^{-1}$ for Micro Motion meter – type CNG050,
		0.8 $kg.min^{-1}$ for Endress+Hauser meter – type CNGmass
Minimum delivery - MMQ:		2 kg
Delivered medium type:		compressed natural gas (CNG)
Maximum gas operating pressure p_{max}:		30.0 MPa (300 bar)
Maximum gas pressure in reservoirs p_{st}:		30.0 MPa (300 bar)
Minimum gas operating pressure p_{min}:		2.0 MPa (20 bar)
Gas testing pressure p_z:		43.0 MPa (430 bar)
Electromagnetic valves:		+24VDC , max. 1A
Gas filtration	- input filter	mechanical particles > 25 µm

2.3.2. ELECTRONIC COUNTER

Power supply:		230 VAC; +10 % -15 %; 50 Hz ± 5 Hz
Performance:		max. 300 VA
Scale division (mass measuring)		0.01 kg or 0.001 kg
Display units (display):	- volume	from 0.001 to 1999.999 kg
	- amount	from 0.1 to 999999.9 Euro
	- unit price	from 0.01 to 999.99 Euro/kg

2.3.3. AMBIENT CONDITIONS

Ambient temperature range:	from -25 °C to +55 °C for a standard dispenser model
	from -40 °C to +70 °C for a special model
Medium temperature range:	from -25 °C to +55 °C for Micro Motion meter – CNG050,
	from -40 °C to +70 °C for Endress+Hauser meter – CNGmass
M**echanical environment class:**	M1
Electromagnetic environment class:	E1
Relative humidity:	from 5 % to 95 %, non-condensing

Figure 8 – CNGmass meter

Figure 9 – CNG050 meter

2.4. DISPENSER MODEL IDENTIFICATION

This section explains the marking method (codes) of OCEAN CNG dispensers.

The basic form of the dispenser business identification is

BMP40ab.Oxy /CNG

y... dispenser orientation on refuge island from incoming vehicle viewpoint:
D... double-sided dispenser,
R... single-sided dispenser, right-sided
L... single-sided dispenser, left-sided

x... dispenser version - design
x = E is the EURO version
x = S is the SMART version;

O... marks OCEAN model dispenser line;

b... number of delivery hoses located in dispenser (b = 1, 2, 3 or 4);

a... number of pressure reservoirs – sections, connected to the dispenser input, with sequence filling regulation (a = 1, 2 or 3);

40... marks OCEAN dispenser line;

BMP... marks all dispensers of TATSUNO EUROPE.

2.4.1. COMPLEMENTARY ABBREVIATIONS IN DISPENSER MARKINGS

The basic dispenser code may be followed by the following abbreviations:

Abbrev.	Description
/H	Filling with higher flow rate Qmax up to 70 kg/min (NGV2) for one delivery hose.
/H2	Filling with higher flow rate Qmax up to 70 kg/min (NGV2) for two delivery hoses.
-2C	2 simultaneous deliveries on a single-sided dispenser
-4C	4 simultaneous deliveries on a double-sided dispenser (i.e. 2 + 2)

Example:

- BMP4032.OSD/CNG/H2 is a two-hose, double-sided dispenser with three inputs for pressure reservoirs with sequence three-level filling regulation for compressed natural gas and with higher filling performance Qmax ≤ 70 kg/min., OCEAN CNG line in SMART design version.

2.4.2. STANDARD MODELS OF OCEAN CNG DISPENSERS

All OCEAN CNG fuel dispenser models may be divided into several groups:

a) by access to the dispenser
   - **double-sided dispensers**; access to the dispenser from two sides (TWO-SIDED)
   - **single-sided dispensers**; access to the dispenser from one side (ONE-SIDED)

b) by the number of delivery hoses
   1, 2 or 4 delivery hoses
   - each delivery point of the dispenser is equipped with one or two delivery hoses ended with delivery nozzles. The dispenser may contain 1, 2 or 4 delivery hoses/nozzles.

c) by the dispenser design
   - **EURO version**
   - **SMART version**

2.4.3. OCEAN SMART CNG STANDARD DISPENSERS

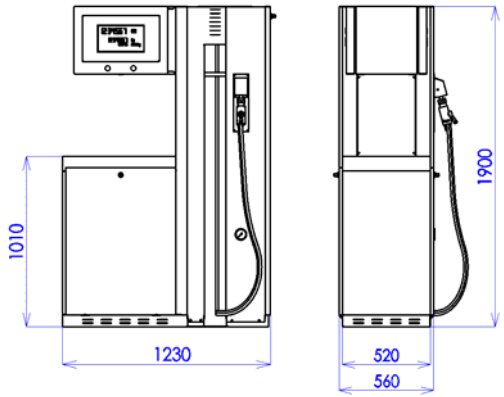
	Access to the dispenser *(2-double-sided, 1-single-sided)*	**Number of inlets** *(number of pressure reservoirs)*	**Number of meters**	**Number of delivery nozzles** *(number of delivery hoses)*	**Number of main displays** *(number of simultaneous deliveries)*	**Standard filling performance** *[kg/min]**
BMP4011.OSL(R) /CNG	1	1	1	1	1	1 x 30
BMP4011.OSL(R) /CNG /H	1	1	1	1	1	1 x 70
BMP4012.OSD /CNG	2	1	2	2	2	2 x 30
BMP4012.OSD /CNG/H	2	1	2	2	2	1 x 30 + 1 x 70
BMP4012.OSD /CNG/H2	2	1	2	2	2	2 x 70
BMP4012.OSL(R) /CNG/H	1	1	1	2	1	1 x 30 + 1 x 70
BMP4014.OSD /CNG/H2	2	1	2	4	2	2 x 30 + 2 x 70
BMP4021.OSL(R) /CNG	1	2	1	1	1	1 x 30
BMP4021.OSL(R) /CNG /H	1	2	1	1	1	1 x 70
BMP4022.OSD /CNG	2	2	2	2	2	2 x 30
BMP4022.OSD /CNG/H	2	2	2	2	2	1 x 30 + 1 x 70
BMP4022.OSD /CNG/H2	2	2	2	2	2	2 x 70
BMP4022.OSL(R) /CNG/H	1	2	1	2	1	1 x 30 + 1 x 70
BMP4024.OSD /CNG/H2	2	2	2	4	2	2 x 30 + 2 x 70
BMP4031.OSL(R) /CNG	1	3	1	1	1	1 x 30
BMP4031.OSL(R) /CNG /H	1	3	1	1	1	1 x 70
BMP4032.OSD /CNG	2	3	2	2	2	2 x 30
BMP4032.OSD /CNG/H	2	3	2	2	2	1 x 30 + 1 x 70
BMP4032.OSD /CNG/H2	2	3	2	2	2	2 x 70
BMP4032.OSL(R) /CNG/H	1	3	1	2	1	1 x 30 + 1 x 70
BMP4034.OSD /CNG/H2	2	3	2	4	2	2 x 30 + 2 x 70

2.4.4. OCEAN EURO CNG STANDARD DISPENSERS

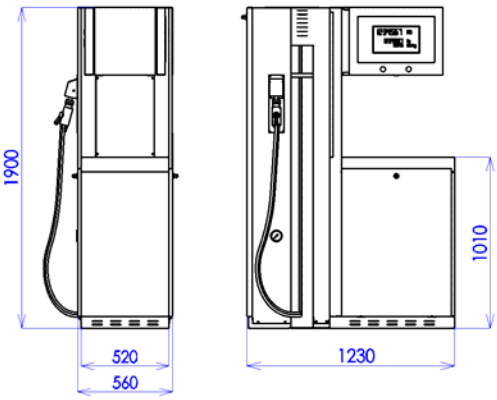
	Access to the dispenser *(2-double-sided, 1-single-sided)*	**Number of inlets** *(number of pressure reservoirs)*	**Number of meters**	**Number of delivery nozzles** *(number of delivery hoses)*	**Number of main displays** *(number of simultaneous deliveries)*	**Standard filling performance** *[kg/min]**
BMP4011.OEL(R) /CNG	1	1	1	1	1	1 x 30
BMP4011.OEL(R) /CNG /H	1	1	1	1	1	1 x 70
BMP4012.OED /CNG	2	1	2	2	2	2 x 30
BMP4012.OED /CNG/H	2	1	2	2	2	1 x 30 + 1 x 70
BMP4012.OED /CNG/H2	2	1	2	2	2	2 x 70
BMP4012.OEL(R) /CNG/H	1	1	1	2	1	1 x 30 + 1 x 70
BMP4012.OEL(R) /CNG-2C	1	1	2	2	2	2 x 30
BMP4012.OEL(R) /CNG/H-2C	1	1	2	2	2	1 x 30 + 1 x 70
BMP4012.OEL(R) /CNG/H2-2C	1	1	2	2	2	2 x 70
BMP4014.OED /CNG/H2	2	1	2	4	2	2 x 30 + 2 x 70
BMP4014.OED /CNG-4C	1	1	1	2	4	4 x 30
BMP4021.OEL(R) /CNG	1	2	1	1	1	1 x 30
BMP4021.OEL(R) /CNG /H	1	2	1	1	1	1 x 70
BMP4022.OED /CNG	2	2	2	2	2	2 x 30
BMP4022.OED /CNG/H	2	2	2	2	2	1 x 30 + 1 x 70
BMP4022.OED /CNG/H2	2	2	2	2	2	2 x 70
BMP4022.OEL(R) /CNG/H	1	2	1	2	1	1 x 30 + 1 x 70
BMP4022.OEL(R) /CNG-2C	1	2	2	2	2	2 x 30
BMP4022.OEL(R) /CNG/H-2C	1	2	2	2	2	1 x 30 + 1 x 70
BMP4022.OEL(R) /CNG/H2-2C	1	2	2	2	2	2 x 70
BMP4024.OED /CNG/H2	2	2	2	4	2	2 x 30 + 2 x 70
BMP4024.OED /CNG-4C	1	2	1	2	4	4 x 30
BMP4031.OEL(R) /CNG	1	3	1	1	1	1 x 30
BMP4031.OEL(R) /CNG /H	1	3	1	1	1	1 x 70
BMP4032.OED /CNG	2	3	2	2	2	2 x 30
BMP4032.OED /CNG/H	2	3	2	2	2	1 x 30 + 1 x 70
BMP4032.OED /CNG/H2	2	3	2	2	2	2 x 70
BMP4032.OEL(R) /CNG/H	1	3	1	2	1	1 x 30 + 1 x 70
BMP4032.OEL(R) /CNG-2C	1	3	2	2	2	2 x 30
BMP4032.OEL(R) /CNG/H-2C	1	3	2	2	2	1 x 30 + 1 x 70
BMP4032.OEL(R) /CNG/H2-2C	1	3	2	2	2	2 x 70
BMP4034.OED /CNG/H2	2	3	2	4	2	2 x 30 + 2 x 70
BMP4034.OED /CNG-4C	1	3	1	2	4	4 x 30

**Note: The filling performance depends on the actual conditions at the fuel station - on the quality and length of the piping, operating pressure, volume and number of pressure reservoirs, compressor, etc.*

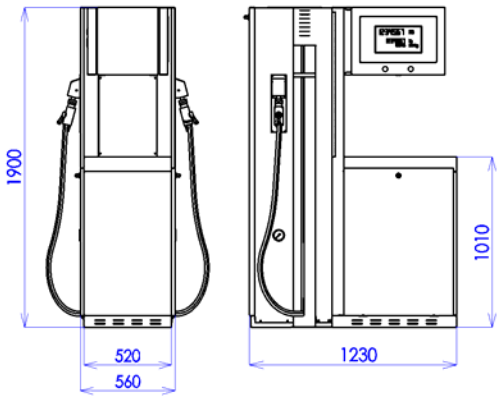
2.4.5. BASIC DIMENSIONS AND DISPENSER PICTURES



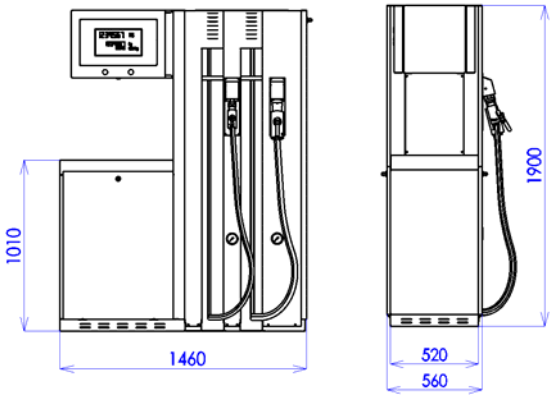
BMP4011.OER /CNG, BMP4011.OER /CNG/H
BMP4021.OER /CNG, BMP4021.OER /CNG/H
BMP4031.OER /CNG, BMP4031.OER /CNG/H
(single-hose single-sided - right)



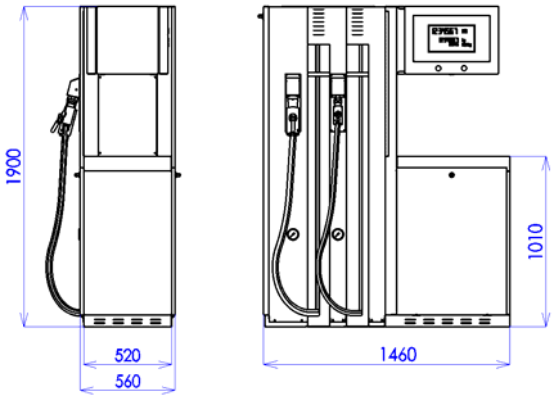
BMP4011.OEL /CNG, BMP4011.OEL /CNG/H
BMP4021.OEL /CNG, BMP4021.OEL /CNG/H
BMP4031.OEL /CNG, BMP4031.OEL /CNG/H
(single-hose single-sided - left)



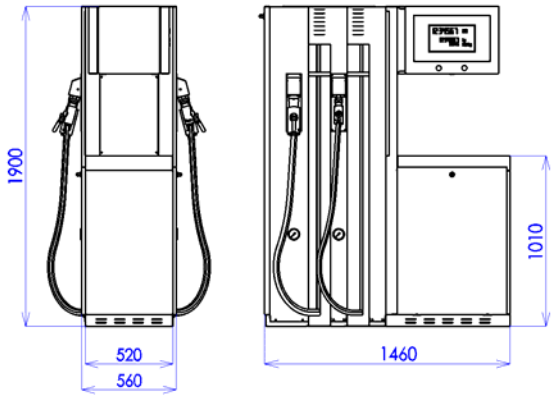
BMP4012.OED /CNG, BMP4012.OED /CNG/H2
BMP4022.OED /CNG, BMP4022.OED /CNG/H2
BMP4032.OED /CNG, BMP4032.OED /CNG/H2
(two-hose double-sided dispenser)



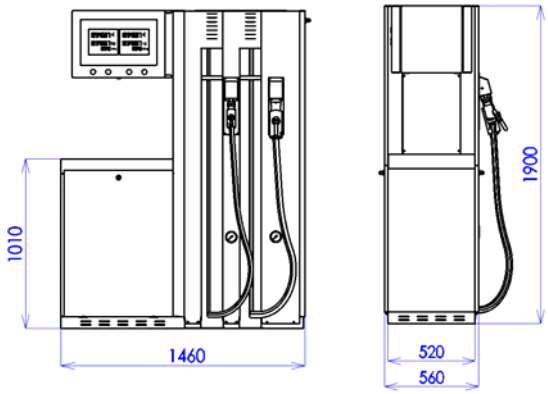
BMP4012.OER /CNG/H
BMP4022.OER /CNG/H
BMP4032.OER /CNG/H
(two-hose single-sided dispenser - right)



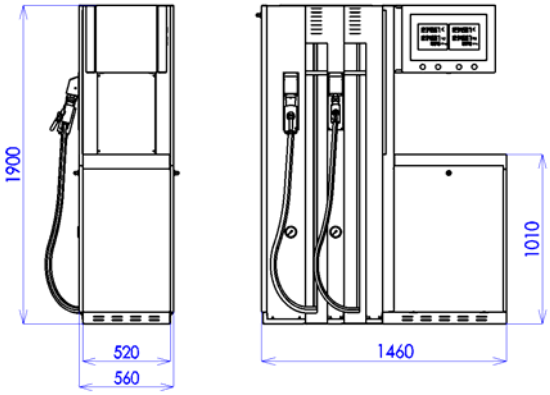
BMP4012.OEL /CNG/H
BMP4022.OEL /CNG/H
BMP4032.OEL /CNG/H
(two-hose single-sided dispenser - left)



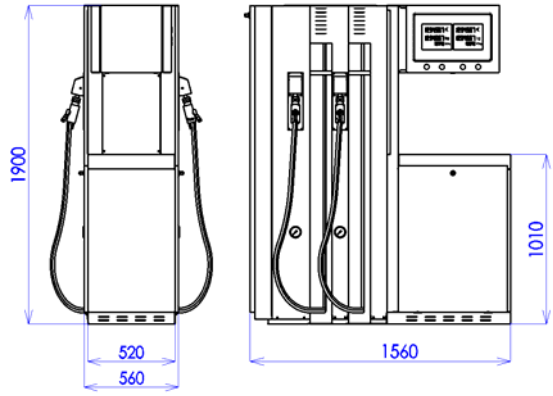
BMP4014.OED /CNG/H2
BMP4024.OED /CNG/H2
BMP4034.OED /CNG/H2
(four-hose double-sided dispenser)



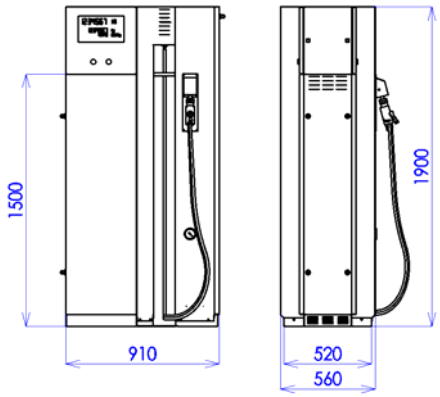
BMP4012.OER /CNG/H-2C
BMP4022.OER /CNG/H-2C
BMP4032.OER /CNG/H-2C
(two-hose single-sided dispenser - right, two simultaneous deliveries)



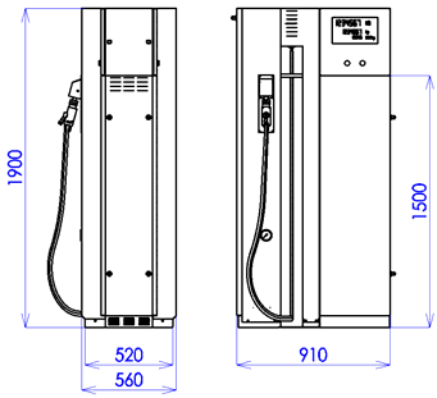
BMP4012.OEL /CNG/H-2C
BMP4022.OEL /CNG/H-2C
BMP4032.OEL /CNG/H-2C
(two-hose single-sided dispenser - left, two simultaneous deliveries)



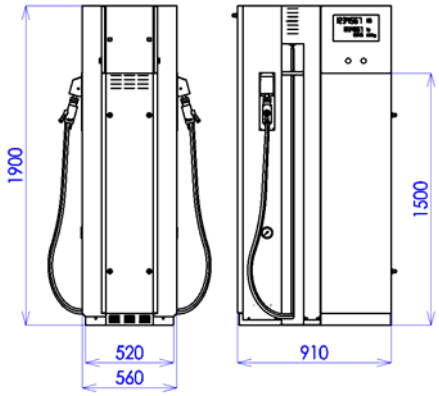
BMP4014.OED /CNG-4C
BMP4024.OED /CNG4C
BMP4034.OED /CNG-4C
(four-hose double-sided dispenser - four simultaneous deliveries)



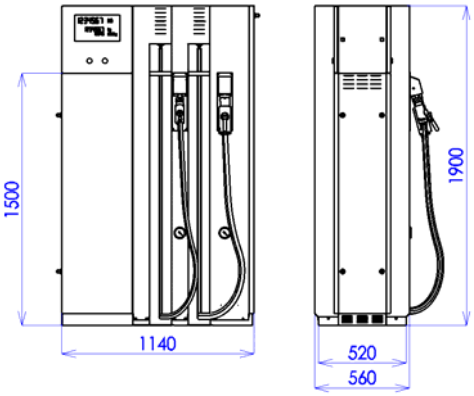
BMP4011.OSR /CNG, BMP4011.OSR /CNG/H
BMP4021.OSR /CNG, BMP4021.OSR /CNG/H
BMP4031.OSR /CNG, BMP4031.OSR /CNG/H
(single-hose single-sided - right)



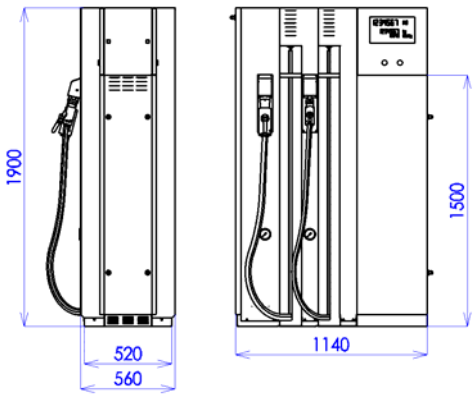
BMP4011.OSL /CNG, BMP4011.OSL /CNG/H
BMP4021.OSL /CNG, BMP4021.OSL /CNG/H
BMP4031.OSL /CNG, BMP4031.OSL /CNG/H
(single-hose single-sided - left)



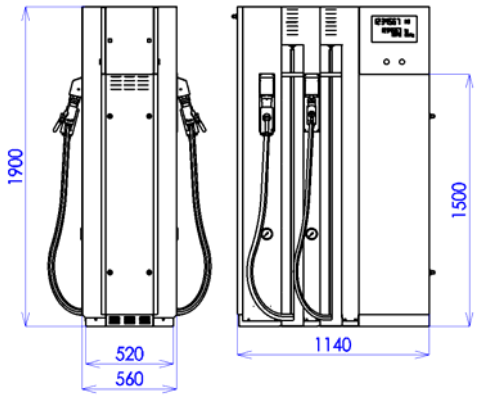
BMP4012.OSD /CNG, BMP4012.OSD /CNG/H2
BMP4022.OSD /CNG, BMP4022.OSD /CNG/H2
BMP4032.OSD /CNG, BMP4032.OSD /CNG/H2
(two-hose double-sided dispenser)



BMP4012.OSR /CNG/H
BMP4022.OSR /CNG/H
BMP4032.OSR /CNG/H
(two-hose single-sided dispenser - right)



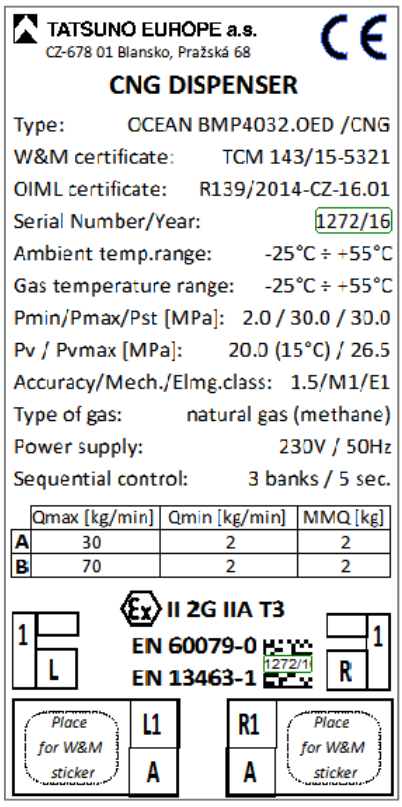
BMP4012.OSL /CNG/H
BMP4022.OSL /CNG/H
BMP4032.OSL /CNG/H
(two-hose single-sided dispenser - left)



BMP4014.OSD /CNG/H2
BMP4024.OSD /CNG/H2
BMP4034.OSD /CNG/H2
(four-hose double-sided dispenser)

2.5. TYPE LABEL

Each OCEAN CNG dispenser is fitted with a dispenser type label. The type label contains all data about the dispenser in terms of metrology and safety according to WELMEC 10.5 standard. At the same time, the label serves to metrology inspection for sticking the metrology marking stating execution of measuring system verification.


TATSUNO EUROPE a.s.
CZ-678 01 Blansko, Pražská 68
CE
CNG DISPENSER

Type:	OCEAN BMP4032.OED /CNG
W&M certificate:	TCM 143/15-5321
OIML certificate:	R139/2014-CZ-16.01
Serial Number/Year:	1272/16
Ambient temp.range:	-25°C ÷ +55°C
Gas temperature range:	-25°C ÷ +55°C
Pmin/Pmax/Pst [MPa]:	2.0 / 30.0 / 30.0
Pv / Pvmax [MPa]:	20.0 (15°C) / 26.5
Accuracy/Mech./Elmg.class:	1.5/M1/E1
Type of gas:	natural gas (methane)
Power supply:	230V / 50Hz
Sequential control:	3 banks / 5 sec.

	Qmax [kg/min]	Qmin [kg/min]	MMQ [kg]
A	30	2	2
B	70	2	2

Ex II 2G IIA T3
EN 60079-0 1272/1
EN 13463-1
1 L
1 R
Place for W&M sticker
L1 A
R1 A
Place for W&M sticker

Figure 10 - Type label

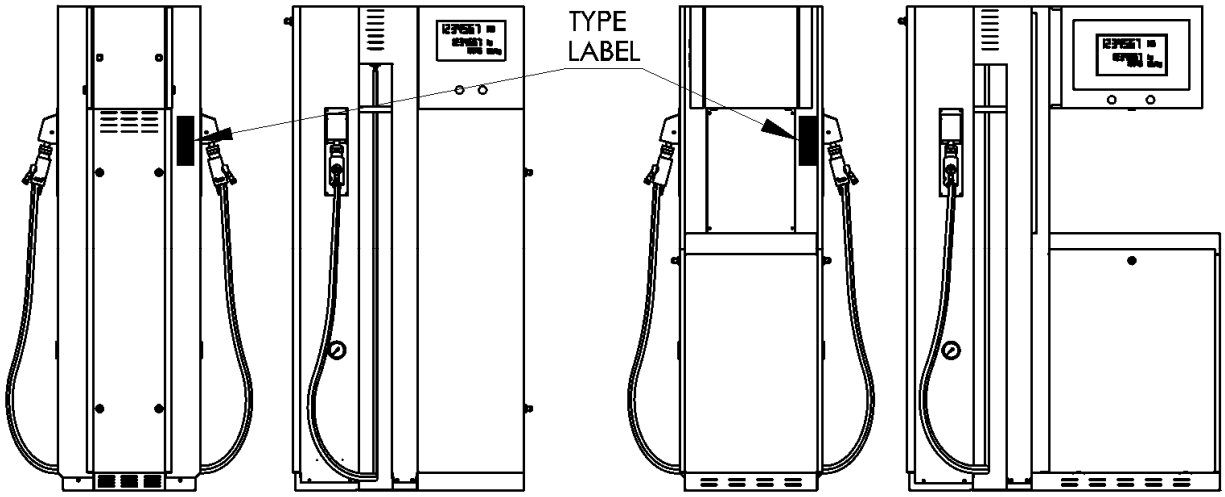


Figure 11 - Type label location on the dispenser

Table 2 - Information on the dispenser type label

TATSUNO EUROPE a.s. CZ-67801 Blansko, Pražská 68	Name and address of dispenser manufacturer
CE	CE marking means that the dispenser is designed, manufactured and marked in compliance with the European Parliament and Council Directives No. 2014/34/EU (ATEX), 2014/68/EU (PED), 2014/30/EU (EMC).
CNG DISPENSER	Device identification
Type	Type identification of the dispenser
W&M certificate	Number of the metrology type certificate approving the meter type
OIML certificate	Number of the certificate according to the international recommendation OIML
Serial number	Serial number of the dispenser (seq. number / year of production)
Ambient temperature range	Range of ambient temperature for which the dispenser was designed and approved
Gas temperature range	Range of gas (CNG) temperature for which the dispenser was designed and approved
Pmin/Pmax/Pst	Minimum and maximum operating pressure, Pst is a maximum pressure in gas reservoirs.
Pv/Pvmax	Maximum pressure in a vehicle recalculated to 15°C, Maximum pressure in a vehicle.
Accuracy class/mech/elm.	Accuracy class / Mechanical class / Electromagnetic class
Type of gas	Gas type
Power supply	Power supply and power supply frequency of the dispenser - 230V / 50Hz
Sequential control	Number of reservoirs during sequence filling
Qmax / Qmin / MMQ	Maximum flow rate [kg/min], Minimum flow rate [kg/min], Minimum amount [kg]
Ex II 2G IIA T3	Identification of the protection method of a non-explosive electrical device: **II 2** – device for environment with an explosion hazard other than subsurface mines, probability of explosive atmosphere occurrence – zone 1 **G** – explosive atmosphere is formed by gases, vapours or mists **IIA** – gas group – the least dangerous **T3** – maximum temperature of an electrical device that could cause ignition of the ambient atmosphere (200°C)
EN 13463-1, EN 60079-0	Numbers of European standards according to which the dispenser was designed and which the dispenser is in compliance with
L1 / R1	Place for a metrology sticker to verify the dispenser at the fuel station

3. DISPENSER INSTALLATION

CAUTION ***Installation of the dispenser may only be performed by a company authorized by the manufacturer!***

Carefully read section 1.1 Important notice before dispenser installation.

CAUTION ***The dispenser may only be connected to technological facility (compressed gas source - compressor, pressure reservoirs and pipeline system) that meets the conditions given for this purpose and is perfectly tight and clean. The supplier of the technological facility is responsible for its cleanliness and tightness. However, the responsible person is the fuel station operator during its operation.***

3.1. RECEIPT, TRANSPORT, PACKAGING, STORAGE

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

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

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

NOTICE

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

3.2. DISPENSER LOCATION

NOTICE *Dangerous zones are determined according to ČSN EN 60079-10 in the vicinity of the dispenser. OCEAN CNG dispensers must not be located in a dangerous zone. Electronic counters used in these dispensers are in an unprotected design. They are in the space without explosion hazard and separated from other spaces by a divider of 1 type according to EN 13617-1.*

The space for dispenser installation must be structurally secured so that the possibility of dispenser damage by an incoming car and following CNG leakage into atmosphere is avoided as best as possible.

Therefore, it is necessary to:

- Secure the access to the refilling position in straight direction
- Install the dispenser onto an elevated refuge with the following parameters
  - refuge elevation above the surrounding road at least 15 mm
  - refuge width at least 1,500 mm / refuge length at least 4,000 mm
- In case of dispenser installation directly onto the surface without a refuge it is necessary to secure the dispenser against collision with a vehicle by using a tube guard with the following parameters:
  - guard width at least 1,500 mm (refuge width) / length 2,000 mm
  - height of the upper edge of the tube above the road at least 450 mm

Example of CNG dispenser location at the fuel station - see Figure 12.

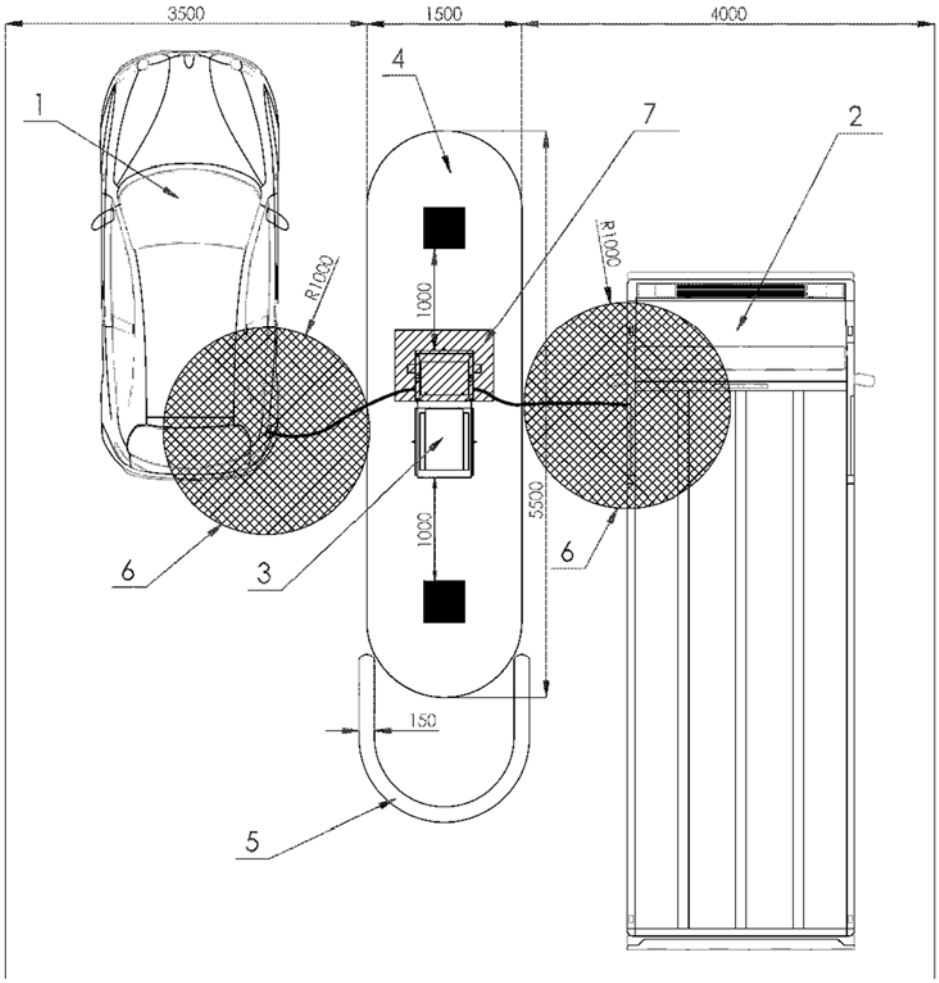


Figure 12 – Example of dispenser location at the CNG fuel station

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

If there is any fixed obstacle (column, wall, etc.) nearby the dispenser, the minimum separation distance of the dispenser from such obstacles must be observed due to safe operation and maintenance – see Figure 13.

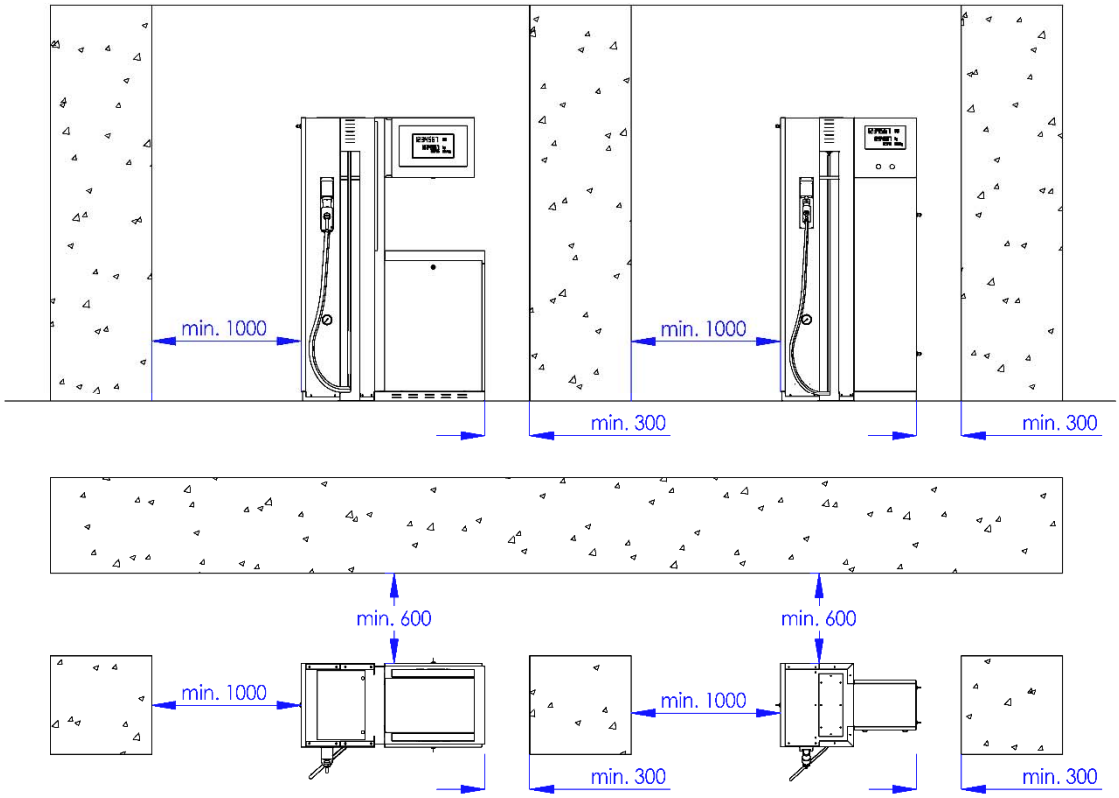


Figure 13 – Minimum separation distance of the dispenser from a fixed obstacle

3.3.1. DISPENSER ORIENTATION AND SINGLE-SIDED DISPENSERS

Dispenser orientation is determined by a view of the dispenser from the vehicle arrival direction - see Figure 14, Figure 15 and Figure 16. Single-sided dispensers are identified by letters "L" and "R" ("L"-left and "R"-right) after the identification of the dispenser type, e.g. BMP4011.OE**L** /CNG is a single-sided dispenser - left and BMP4022.OE**R** /CNG is a single-sided dispenser - right – see Figure 15 and Figure 16.

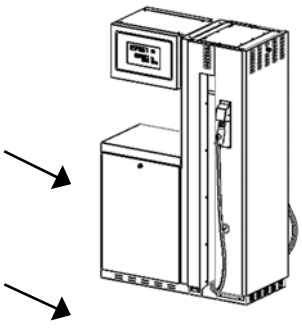


Figure 14
Double-sided dispenser BMP4012.OED/CNG
(arrows show the recommended arrival direction)

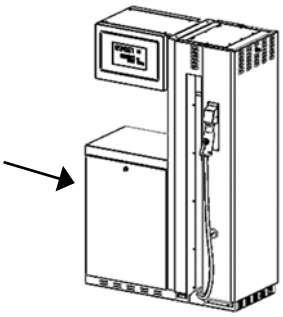


Figure 15
Right-sided dispenser BMP4011.OER/CNG
(arrow shows the recommended arrival direction)

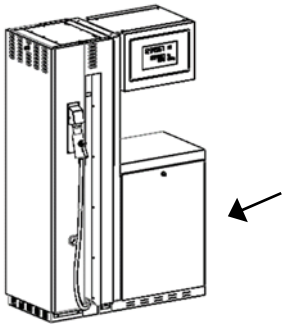


Figure 16
Left-sided dispenser BMP4011.OEL/CNG
(arrow shows the recommended arrival direction)

3.3. MECHANICAL ATTACHMENT OF THE DISPENSER

Dispensers are attached to special foundation frames by using anchor bolt supplied with the dispenser. The foundation frame of the dispenser is not a past of dispenser standard equipment but is may be ordered separately. The foundation frame is concreted into the refuge (island) where the inlet CNG pipeline leads to. The front and rear covers of the dispenser are removed; the dispenser is placed onto the foundation frame and attached by the anchor bolts.

The inlet pipeline of the outer diameter ø12 mm (standard delivery) or ø16 mm (higher delivery /H) is inserted to the interconnecting threaded joint with a screw ring located under the ball shut-off valve on the dispenser and then the threaded joint is tightened.

The inlet pipeline must be fitted with shut-off valves before its entrance to the shaft space under the dispenser for potential disassembly of the dispenser.

CAUTION ***Joint design must ensure perfect tightness up to the pressure of 400 bar.***

CAUTION ***The inlet pipeline of the dispenser must be secured by overpressure protection (overpressure valve, etc.) against pressure higher than the permissible maximum operating pressure.***

3.4. ELECTRICAL CONNECTION OF THE DISPENSER

For electrical connection of OCEAN CNG dispensers, it is necessary to perform protection against touch voltage (according to ČSN 33 2000-4-41“Electrical engineering regulations - Electrical devices - Part 4: Safety - Section 41: Protection against electrical shock”, issued: August 2007, which follows an international standard HD 60364-4-41:2007) and applicable electrical cables must be then routed to each dispenser.

It is necessary that all dispensers at the fuel station are interconnected by a grounding wire and connected to the grounding system. As a grounding wire, you can use a yellow-green cable with a section of at least **4 mm^2** or a special grounding strap. The grounding wire must be connected to a central grounding terminal of the dispenser located on the foundation (bolt M10) marked with a mark for grounding.

CAUTION *All electrical cables must be chemically durable and must have good insulating properties because they are exposed to an aggressive explosive atmosphere for a long period. In dangerous zones, it is* ***necessary to use only power and data cables that follow the requirements of EN 60079-14 and HD 21.13 S1, or EN 60079-14 and HD22.4 S4 (see EN 14678-1, article 4.1.3 and EN 13617-1, article 5.3.2.4).*** *For these purposes, the manufacturer recommends using harmonised cables of H05VV5-F and H05VVC4V5-K types. Example of dispenser’s connection - see Figure 18.*

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

NOTE *In dangerous zones of the OCEAN CNG dispenser the harmonised power and data cables of H05VV5-F (power) and H05VVC4V5-K (data) types are used which are in compliance with the requirements of EN 60079-14 and HD 21.13 S1.*

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

Power cables:

- power supply of the electronic counter and electronic devices located in the dispenser
- TOTAL STOP button signal
- control of valves in pressure sections located outside the dispenser
  (install only if the valves of the controlling pressure section are outside the dispenser)

Signal cables:

- data line
- collective signal of the dispenser defect ("Collective Alarm")
- additional service lines
  (install only for special purposes – pulse outputs for the payment terminal, etc.)

3.4.1. COUNTER'S POWER SUPPLY AND ELECTRONIC DEVICES OF THE DISPENSER

Power supply is performed by a **3-wire H05VV5-F 3G1.5 power cable** (see Table 3) which is routed from the main switchboard of the booth to the power supply distribution box XP14 of the dispenser - see Figure 19. Power supply is led by the H05VV5-F 3x1.5 cable from the distribution box to the counter case of the dispenser where it provides power supply of the electronic counter, switching elements, meters and all other electronic devices located inside the dispenser, or also of additional heat elements.

Table 3 - Identification of wires in the power supply cable for the counter and switching elements

Identification of wires in the H05VV5-F 3G1.5 cable		
identification	colour	description
L	black1	phase
N	black2 (blue)	neutral wire
PE	yellow-green	protection wire

From the dispenser, the power supply cable is led to the main switchboard where it is connected to the 230V (230V, 10A) circuit breaker and a common bus for all dispensers. From this point the power supply for all dispensers is led to the stabilized backup power source which will supply the dispenser electronic devices for 3-5 minutes in case of power failure.

NOTICE *To ensure trouble-free operation of dispensers, the dispenser manufacturer recommends backing up the stabilized power supply of the dispenser by a UPS (Uninterruptible Power Supply). Very frequent phenomena in the electricity network are power failures, strong interference or voltage fluctuations in voltage peaks (especially in winter season). All such phenomena may be eliminated by using a correct backup UPS. There are basically two*

*types of backup power supply sources for dispensers: **UPS of a line-interactive type** and **UPS of an on-line type**. For fuel stations connected to a stable electricity network (without voltage fluctuations and interference) UPS of a line-interactive type is sufficient. In other cases, it is necessary to use UPS of an on-line type. Interference and fluctuations or power failures may cause frequent blocking of dispensers, communication errors between a computer and dispenser, computer failures (data loss), etc.*

3.4.2. TOTAL STOP BUTTON SIGNAL

For leading the TOTAL STOP button signal a **3-wire H05VV5-F 3G1.5 power cable** (see Table 4) which is routed from the main switchboard of the booth to the power supply distribution box XP14 of the dispenser - see Figure 19. The H05VV5-F 3G1.5 cable is routed from the distribution box directly to the TOTAL STOP button.

Table 4 - Identification of wires in the TOTAL STOP button cable

Identification of wires in the H05VV5-F 3G1.5 cable		
identification	colour	description
ST	black1	STOP signal
ST	black2	STOP signal
PE	yellow-green	protection wire

The TOTAL STOP button has two functions in the dispenser. It disconnects the dispenser from the supply voltage and send a signal to the fuel station switchboard after pressing the button. Safeguard circuits in the switchboard shall ensure disconnecting the dispenser from high pressure.

CAUTION ***The switching contact of the TOTAL STOP button may be loaded with 230 VAC / max. 6A, possibly 24 VDC /max. 3A.*** *Always consult dispenser manufacturer about the use of any other voltage and current.*

3.4.3. REGULATION OF VALVES IN PRESSURE SECTIONS LOCATED OUTSIDE THE DISPENSER

If the valves from high-pressure sections are located at the fuel station outside the dispenser around pressure reservoirs and compressor, then their switching is performed by a **5-wire H05VV5-F 5G1.5 cable** (see Table 5). The cable from valves regulation is routed from the main switchboard in the booth to the supply distribution box XP17 of the dispenser - see Figure 19. The H05VV5-F 5G1.5 cable is routed from the distribution box to the counter case to the outputs that ensure the valves regulation.

Table 5 - Identification of wires in the cable for regulating the valves in CNG pressure sections

Identification of wires in the H05VV5-F 5x1.5 cable		
identification	colour	description
V1	black 1	valve 1 regulation
V2	black 2	valve 2 regulation
V3	black 3	valve 3 regulation
VC	black 4	common wire for valves
PE	yellow-green	protection wire

CAUTION ***In order to regulate external valves the dispenser outlets are used that use the voltage of 24V DC with maximum current-carrying capacity of 0.8 A for switching****. Always consult dispenser manufacturer about the use of any other control voltage and current.*

3.4.4. DATA LINE

The data line is used for controlling the dispenser and remote data transfer from the dispenser in a so-called automatic mode of the dispenser. The dispenser is controlled with a single-purpose bracket, station regulator or directly by a computer located in the fuel station booth. If the dispenser works in a manual mode it is not necessary to install the data line.

In order to install the data line the manufacturer recommends routing the **5-wire shielded H05VVC4V5-K 5G0.5 communication cable** (see Table 6) to each dispenser at the fuel station. The data cable must be routed radially from the fuel station control point (booth, service counter) to the communication distribution box XS15 - see Figure 20. The data line is route by the H05VVC4V5-K 5G0.5 cable from the communication distribution box to the counter case of the dispenser.

Table 6 - Identification of wires in the data line

Identification of wires in the H05VVC4V5-K 5G0.5 cable		
identification	colour	description
A	black1	data A
B	black2	data B
-	black3	reserve
-	black4	reserve
	yellow-green	unused
ST	shield	shield

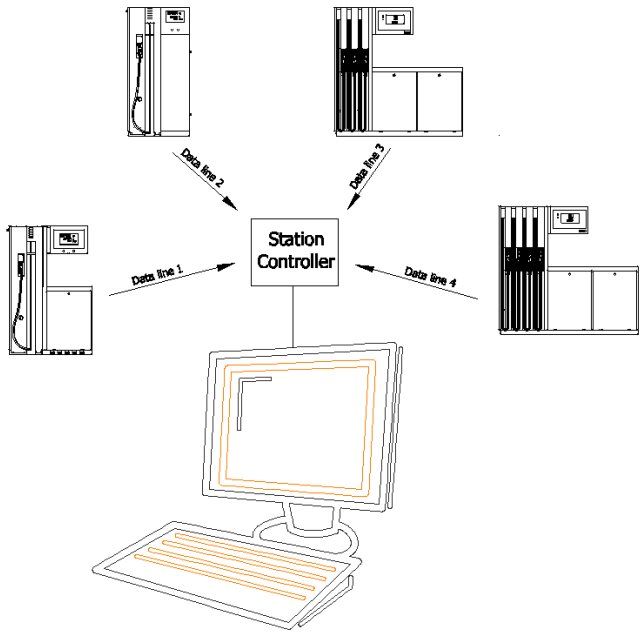


Figure 17 - Radial data line from dispensers

NOTE *For some type of data line a 2-wire or 3-wire cable would be sufficient - see Table 7. Since the data line type may change during operation depending on the used control system, we recommend using a 5-wire cable.*

The OCEAN CNG dispensers are standardly equipped with a PDE data line which is the RS485 line with the PDE communication protocol. However, it is possible on customer's demand to add a data converter to the dispenser counter which will concert the PDE data line to a line of another type and communication protocol, e.g. PUMA LAN, ER4, IFSF-LON, TATSUNO Party Line, etc. This also changes the meaning of wires in the data cable. Identification of wires for the most used types of data lines is described below - see Table 7.

Table 7 - Identification of wires for different types of data lines

Identification of wires in the H05VVC4V5-K 5G0.5 cable for different types of data lines							
wire 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	-	reserve	0V	LL0	ZB	-	Rx-
yellow-green	unused	unused	unused	LL1	unused	unused	unused
shield	ST	ST	ST	ST	ST	ST	ST

3.4.5. COLLECTIVE SIGNAL OF THE DISPENSER DEFECT ("COLLECTIVE ALARM")

For leading the collective error signal of the dispenser defect a **2-wire H05VV5-F 2X0.5 cable** is used (see Table 8) which is routed from the main switchboard in the booth to the communication distribution box XS15 of the dispenser - see Figure 19. The H05VV5-F 2x0.5 cable is routed from the distribution box to the counter case to relay contacts. Relay contacts shall close in each CNG dispenser defect and open after the defect is removed.

Table 8 - Identification of wires in the line of a collective signal of the dispenser defect

Identification of wires in the H05VV5-F 2X0.5 cable		
identification	colour	description
ER	black1	ERR signal
ER	black2	ERR signal

CAUTION ***Maximum current-carrying capacity of relay contacts for signalling the dispenser defect is 250V and 2A.*** *Always consult dispenser manufacturer about the use of any other control voltage and current.*

Note: *In case of the OCEAN CNG dispenser defect, the delivery is interrupted and the display shows the defect code which corresponds to the defect type – e.g. broken hose, leak in the vehicle storage tank, meter failure, etc. At the same time, the relay of a collective dispenser defect is activated/switched on which informs the control centre of the fuel station about the dispenser defect. The relay automatically deactivates/switches off after the defect is removed.*

3.4.6. SERVICE LINES

Service lines serve for special purposes. These lines are not necessary for the immediate dispenser operation but they are also used in cases when it is necessary to remotely control some of the dispenser functions or lead some signals out of the dispenser. Always consult the engineers of TATSUNO EUROPE, a.s. about the necessity to install service lines. For service lines, we recommend using multi-wire shielded H05VVC4V5-K cables (0.5 mm^2).

3.4.7. CABLE CHARACTERISTICS

For installations, it is necessary to use cables resistant to common chemicals, oils and with sufficient thermal and mechanical resistance. For example, the harmonised H05VV5-F and H05VVC4V5-K cables, e.g. ÖLFLEX 140, ÖLFLEX 150 and ÖLFLEX 140 CY types, correspond to these conditions. Main cable characteristics are shown in Table 10.

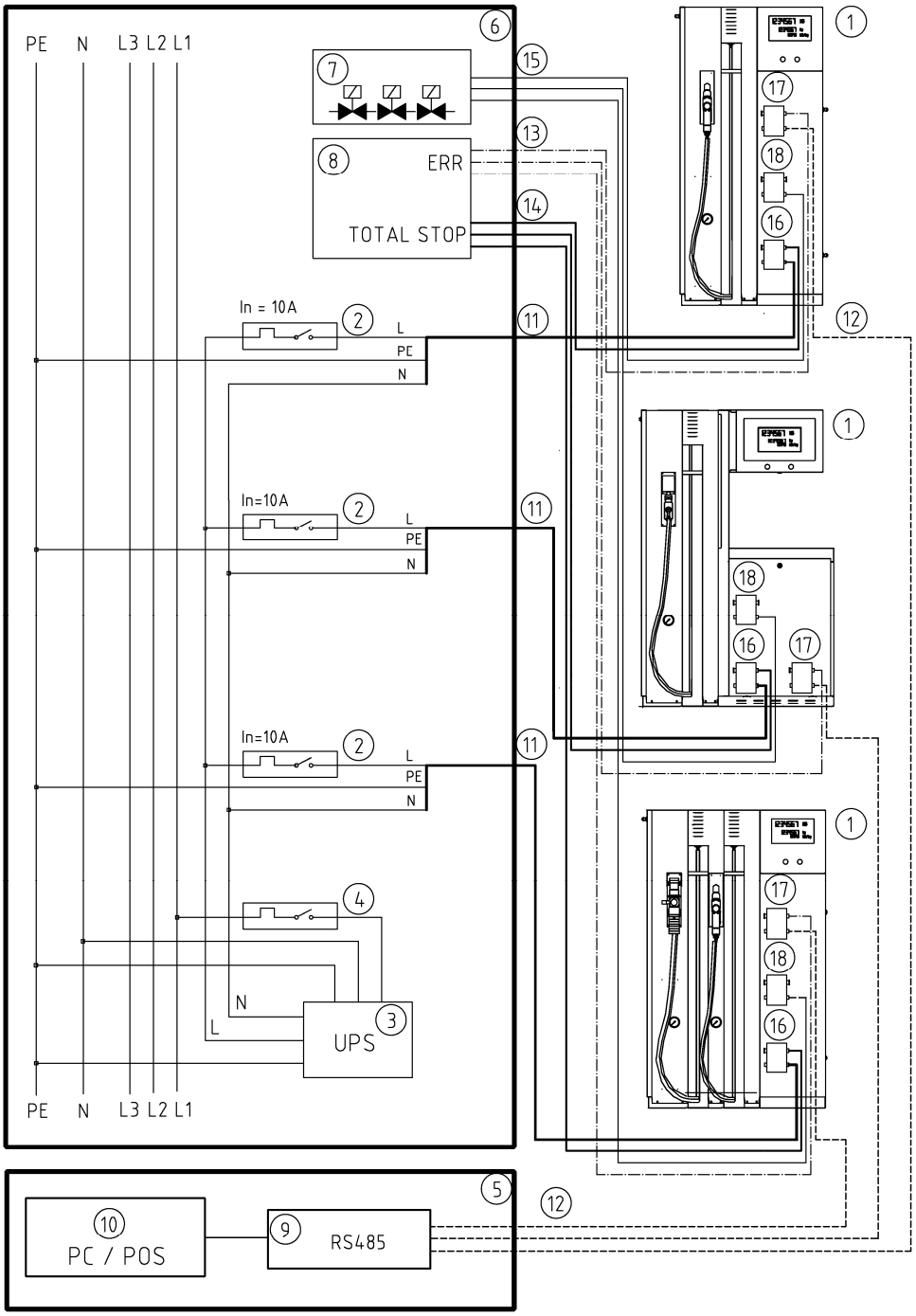
Table 9 - Cable characteristics

Cable type	Function	No. of wires	Wire section [mm^2/AWG]	D_{Anom} [mm]
H05VV5-F 2X0,5	collective error signal	2	0.5 / 20	5.9
H05VV5-F 3G1,5	counter power supply, TOTAL STOP button signal	3	1.5 / 16	7.4 – 9.4
H05VV5-F 5G1,5	control of pressure section valves	5	1.5 / 16	9.1 – 11.4
H05VVC4V5-K 5G0,5	data line	5	0.5 /20	9.3 – 11.6

Legend: D_{Anom} - cable outer diameter

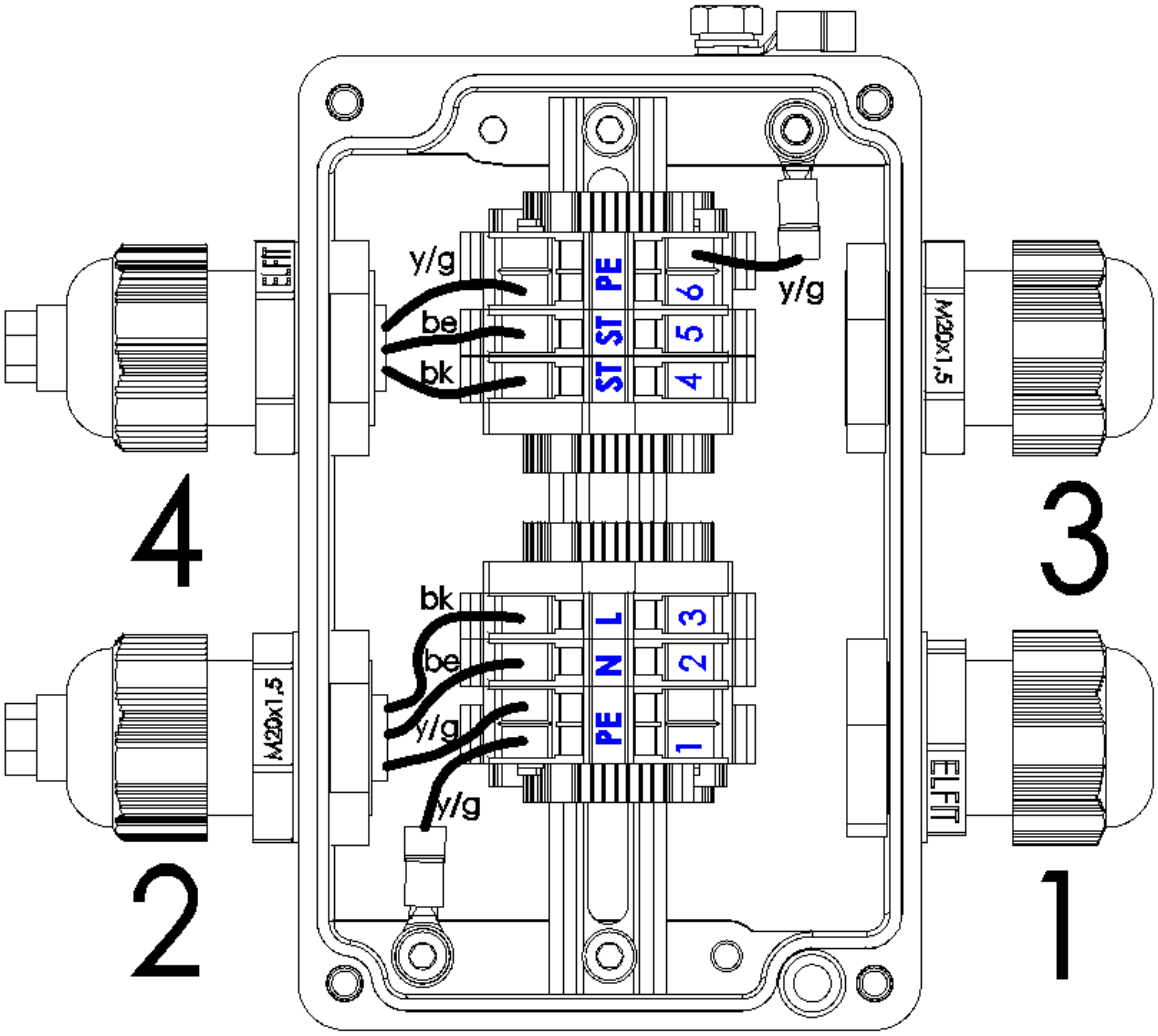
NOTICE *Pulse overvoltage may occur in any line due to the strike of lightning up to the distance of several kilometres or due to any industrial activity. The size of pulses formed by lightning induction is sufficient to a total damage of electrical equipment. For these reasons the overvoltage protection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

EMERGENCY STOP *Dispensers must be disconnectable from one safe place which is reachable at any time! Electrical devices located in the place with explosion hazard must be disconnectable by an emergency stop button (STOP button, TOTAL STOP...) located outside the environment with explosion hazard! Location of the emergency button must be clearly marked! In case of emergency situation when the emergency button may not be used in the delivery space of the fuel station it is necessary to use a button for normal operation located in the main switchboard of the fuel station.*



Pos.	Description	Pos.	Description
1	OCEAN CNG dispenser	10	Control device (PC, payment terminal, POS, bracket)
2	Circuit breaker for counter power supply - In=10A	11	Cable for counter power supply, H05VV5-F 3G1.5
3	Backup UPS with power supply stabilization	12	Cable for communication line, H05VVC4V5-K 5G0.5
4	Circuit breaker of the backup UPS	13	TOTAL STOP button cable, H05VV5-F 3G1.5
5	Attendant workplace (booth/kiosk)	14	Cable for a collective error signal, H05VV5-F 2X0.5
6	Main switchboard of the fuel station technology	15	Cable for controlling the valves of press. sections, H05VV5-F 5G1.5
7	Control of pressure reservoirs	16	Power supply distribution box XP14
8	Safeguarding circuits	17	Data distribution box XS15
9	Data converter (RS485) or controller	18	Distribution box for controlling the valves of press.sections XP17

Figure 18 – Example of electrical connection of OCEAN CNG dispensers



Output

4	**TOTAL STOP button cable** Type: H05VV5-F 3G1.5 Connection: XP14 <---> counter case of the dispenser	
ST	STOP button contact	black 1 (bk)
ST	STOP button contact	black 2 (be)
PE	protection wire	yellow-green (y/g)
PE lug M4	protection wire	yellow-green (y/g)

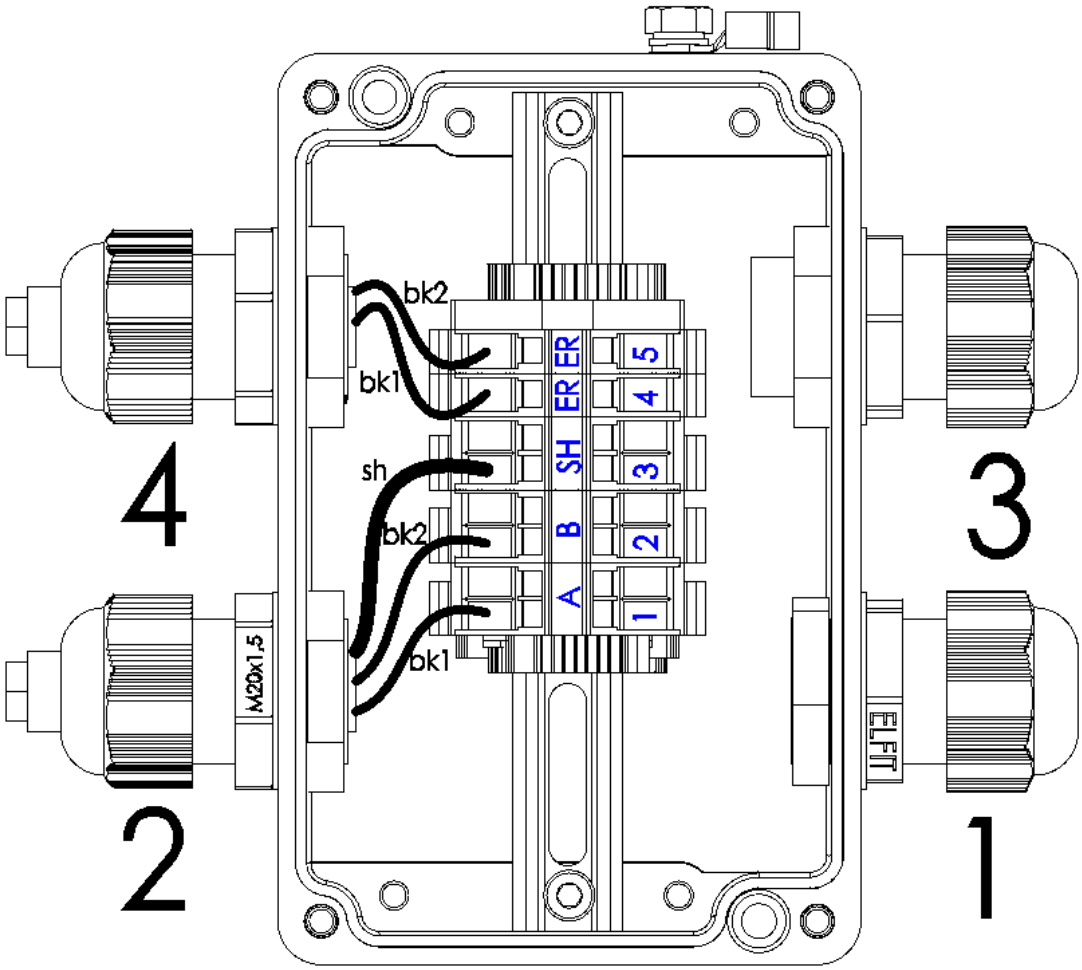
2	**Power cable for electronic counter power supply** Type: H05VV5-F 3G1.5 Connection: XP14 <---> counter case of the dispenser	
L	power supply phase	black (bk)
N	power supply neutral wire	blue (be)
PE	protection wire	yellow-green (y/g)
PE lug M4	protection wire	yellow-green (y/g)

Input

3	**TOTAL STOP button cable** Type: H05VV5-F 3G1.5 (recommended) Connection: main switchboard <---> XP14	
4	STOP button contact	black (bk)
5	STOP button contact	black 2 (be)
6	protection wire	yellow-green (y/g)

1	**Power cable for electronic counter power supply** Type: H05VV5-F 3G1.5 (recommended) Connection: main switchboard <---> XP14	
3	power supply phase	black (bk)
2	power supply neutral wire	blue (be)
1	protection wire	yellow-green (y/g)

Figure 19 – Connection of the power supply distribution box XP14



Output Input

4	**TOTAL STOP button cable** Type: H05VV5-F 2XG0.5 Connection:XS15 <---> counter case of the dispenser	
ER	ERR signal	black 1 (bk1)
ER	ERR signal	black 2 (bk2)

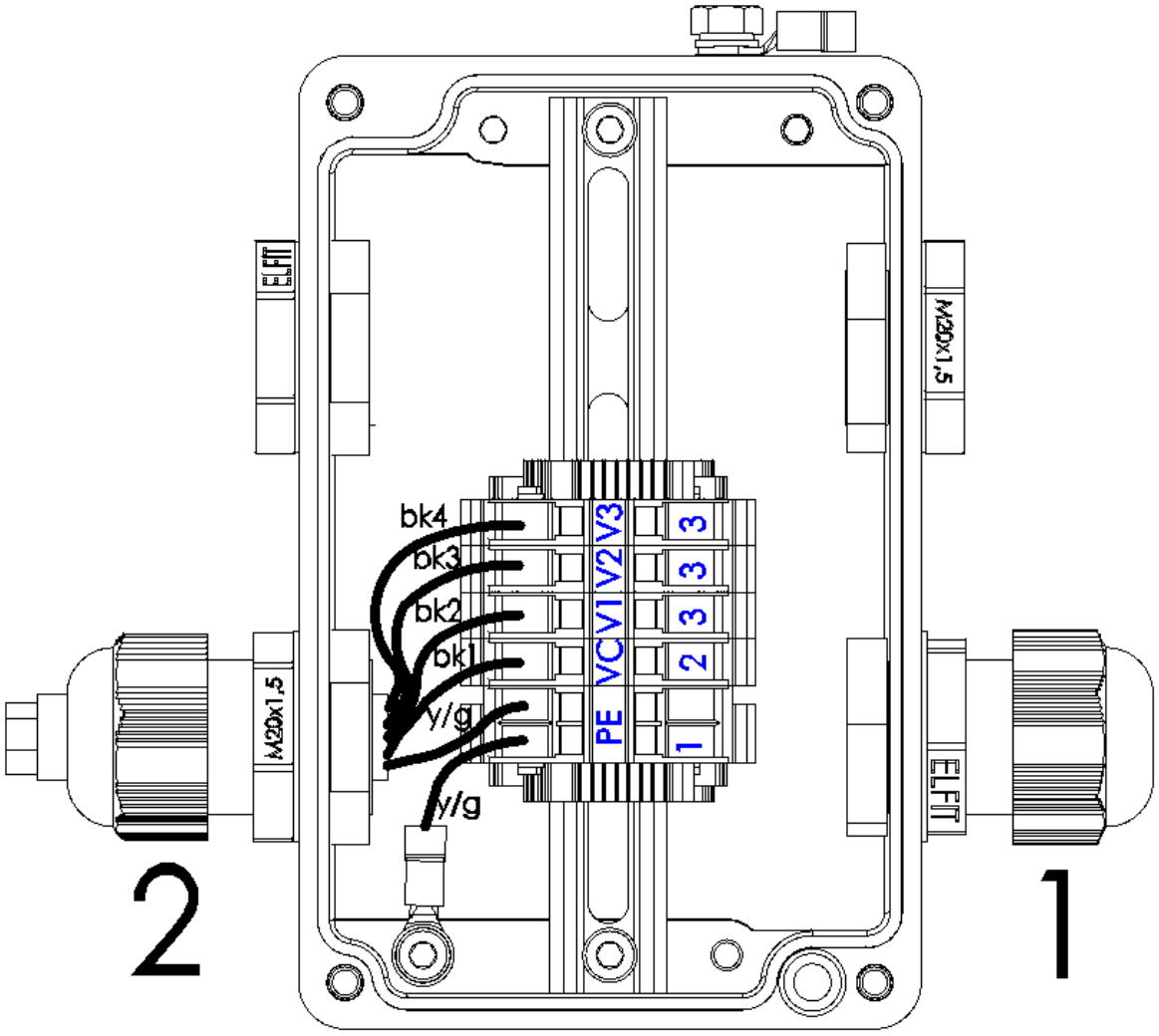
3	**TOTAL STOP button cable** Type: H05VV5-F 2X0.5 (recommended) Connection: main switchboard <---> XS15	
4	ERR signal	black 1 (bk1)
5	ERR signal	black 2 (bk2)

1	**Communication cable for a data line** Type: H05VVC4V5-K 5G0.5 (recommended) Connection: XS15 <--->counter case of the dispenser	
A	signal 1	black 1 (bk1)
B	signal 2	black 2 (bk2)
SH	shield	shield (sh)
-	signal 3 (unused - backup)	black 3 (-)
-	signal 4 (unused - backup)	black 4 (-)

2	**Communication cable for a data line (PDE line)** Type: H05VVC4V5-K 5G0.5 Connection: kiosk <---> XS15	
1	signal 1	black 1 (bk1)
2	signal 2	black 2 (bk2)
3	shield	shield (sh)

Figure 20 – Connection of the data distribution box XS15 (for communication PDE&DART]

NOTE *Description of the box connector depends on the data line type. Standardly the data line with PDE protocol is used, see Table 7.*



Output Input

2	**Cable for controlling pressure section valves** Type: H05VV5-F 5G1.5 Connection: XP17 <---> counter case of the dispenser	
V3	valve V3 regulation	black (bk4)
V2	valve V2 regulation	black (bk3)
V1	valve V1 regulation	black (bk2)
VC	common wire for valves	black (bk1)
PE	protection wire	yellow-green (y/g)
PE lug M4	protection wire	yellow-green (y/g)

1	**Cable for controlling pressure section valves** Type: H05VV5-F 5G1.5 (recommended) Connection: main switchboard <---> XP17	
5	valve V3 regulation	black (bk4)
4	valve V2 regulation	black (bk3)
3	valve V1 regulation	black (bk2)
2	common wire for valves	black (bk1)
1	protection wire	yellow-green (y/g)

Figure 21 – Connection of the distribution box for controlling pressure section valves XP17

NOTE *RK003/6 and RK002/6 distribution boxes are in Ex II 2G Ex e II T6 Gb design and the European type certificate FTZÚ12ATEX0152 and FTZÚ02ATEX0021 is issued for them. The maximum load of one connection terminal is 2A/550V with the wire section of 0.5 mm^2 or 12A/550V with the wire section of 2.5 mm^2. Approved wire sections are within the range from 0.5 to 2.5 mm^2. The length of uninsulated wire part is at least 9 mm and max. 10 mm. Cable glands M12 x 1.5, M16 x 1.5 or M20 x 1.5 are in IP66/68 design.*

3.5. COMMISSIONING OF THE CNG DISPENSER AFTER INSTALLATION

After installing the dispenser at the refuge of the fuel station and performing its electrical connection (see sections above) is is necessary to carry out a pressure test of the entire pipeline system by gradual increase of testing pressure up to a value of maximum operating pressure PN 25MPa (or 30MPa). After pressurizing the system, it is necessary to perform the inspection of all connections by using tools for detecting leaks or by foaming agents.

It is necessary to perform the inspection of electrical installation of dispensers. All tests and inspections must be carried out under the supervision of the inspector from the Technical Inspection Institute who shall make a report about the tests and inspections performed. The inspection of electrical inspection and pressure test of the CNG dispenser may only be carried out by a person having an authorization for this purpose issued by the state supervision authority.

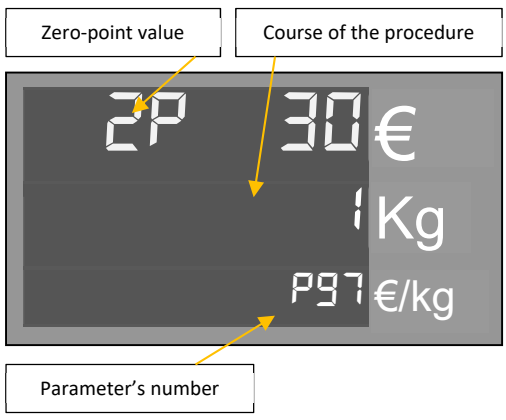
In case of positive test results and results of the initial inspection it is possible to perform filling of the pressure system by compressed natural gas and carry out the filling functional test.

Before commissioning the CNG dispenser for public, a metrology measurement must be performed by an authorized metrology employee (CMI).

3.5.1. SETTING OF DISPENSER ZERO-POINT

All mas flow meters based on the principle of the Coriolis effect are sensitive to the setting of zero (zero flow rate) because with a decreasing flow rate the measuring error increases. The setting of zero must be carried out after every dispenser installation and every meter exchange. The dispenser counter allows carrying out the procedure of setting the zero-point using the service remote controller. The following procedure is only intended for authorized service engineers:

1. Close valves at the dispenser inlet and hang the delivery nozzles onto the dispenser (delivery nozzles and hoses must remain at rest during the process)
2. The calibration switch SW1-1 must be in the OFF position.
3. Set the parameter P97 to value 1, which activates the procedure for setting the zero point.
4. The total price display shows the current value of the zero point. The quantity display shows the course of the zero-point setting procedure.
   - In the CNGmass (Endress&Hauser) meter, the course of the procedure is signalled by an increasing number 1 - 99. After reaching the value 99, the process is finished and the message "done" is shown.
   - In the CNG050 (Micro Motion) meter, the course is signalled by the number 1 on the quantity display. After finishing the zero-point setting procedure, the message "done" is shown.



4. BASIC DISPENSER FUNCTIONS AND SETTINGS

Dispenser setting is performed by the set of setting parameters via which it is possible to control functional parameters of the dispenser, totally change e and behaviour of the dispenser in different situations. According to the type of the installed electronic counter the values of parameters may be viewed and changed by the IR (infrared) remote controller. The following section will describe basic functions and settings of the OCEAN CNG dispenser counter, TBELTM type.

4.1. TBELTM COUNTER

The TBELTM electronic counter for dispensers, the manufacturer of which is TATSUNO EUROPE, a.s., is set by the IR remote controller. The yellow service remote controller PDERT-5S is intended for service engineers authorized by the dispenser manufacturer. This remote controller allows to perform complete settings of all dispenser parameters. The white remote controller PDERT-5O is intended for fuel station managers and this remote controller allows them to perform:

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

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

- ***Attendant mode*** which is intended to fuel station attendants – it only allows them to read values of electronic totalizers and values of dispenser basic parameters. Their values may not be reset or changed.
- ***Manager mode*** which is intended for the fuel station manager – it allows him to read values from dispensers, reset daily totalizers and set basic operating parameters of the dispenser. The access to the Manager mode is protected by password.

4.1.1. DESCRIPTION OF PDERT REMOTE CONTROLLER

The dispensers equipped with the TBELTM counter must be used with the IR remote controller for reading values from the dispenser display (totalizers), changing the operating mode of the dispenser or for setting different counter parameters. The keypad of the remote controller has the following key and arrangement (see Figure 22):

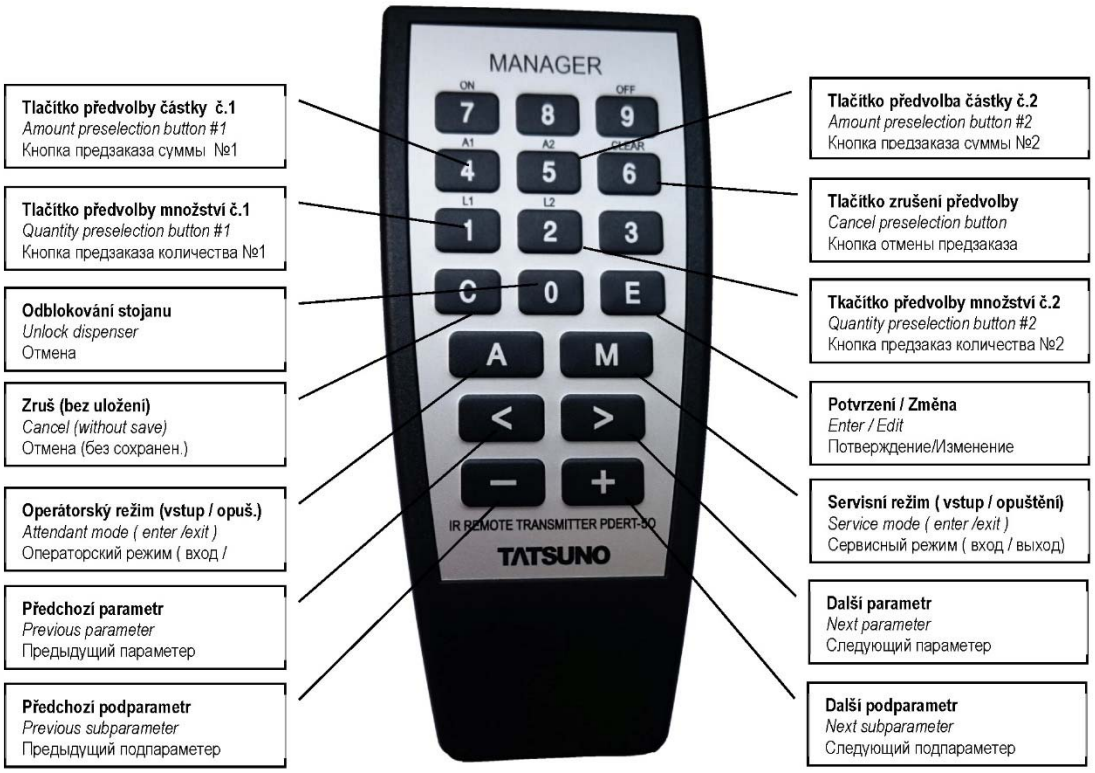


Figure 22 - Description of keys of the manager remote controller PDERT-5O

While using the IR remote controller it is necessary to move the remote controller closer to the distance of approx. 1 meter from the centre of the dispenser display - see Figure 23. The setting mode is started by pressing the <M> button – Manager mode, or <A> button – Attendant mode. The set and read values are displayed directly on the dispenser display.

NOTE *In addition to setting and reading values it is possible to use A1, A2, L1, L2 and CLEAR keys to set presets on the dispenser. The <0> key may be used to unblock the dispenser after error or in the operating mode with blocking after delivery.*

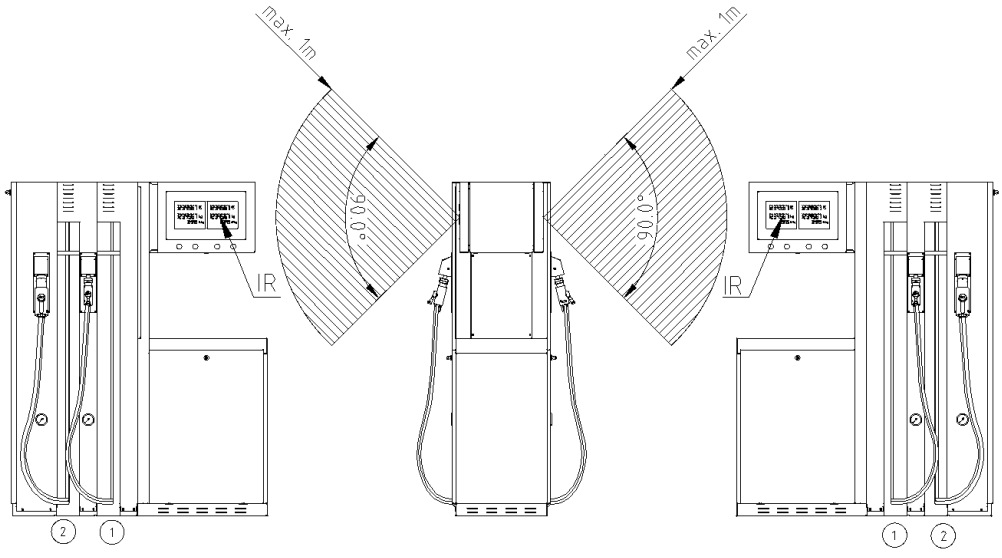
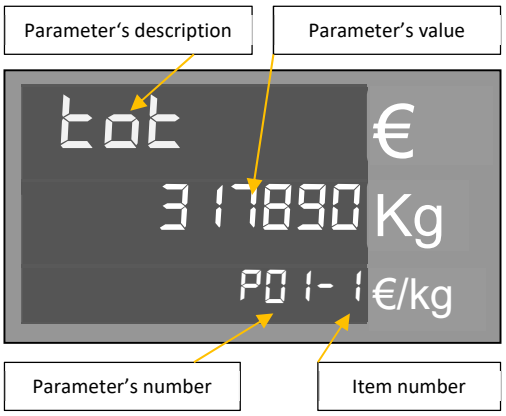


Figure 23 - Minimum active range of the dispenser remote controller

4.1.2. DISPLAYING DATA IN THE SETTING MODE

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

No. of parameter: P01
Item No.: 1 (e.g. delivery hose number)
Parameter value: 1234567890 (amount in grams)



4.1.3. ATTENDANT MODE

The Attendant mode is started by pointing the IR remote controller at the dispenser display (from the distance of approx. 1m from the dispenser display centre) and pressing the <**A**> button. **All delivery nozzles on the dispenser must be hung in advance and the sale on the dispenser must be finished (paid).** After calling up the Attendant mode the value of the first parameter P01 is displayed. Parameters and their items may be switched by using the <**>**> and <**+**> keys (see Figure 22).

The Attendant mode allows to view **but not change** the values of all parameters listed below - see Table 10.

Table 10 - List of parameters for setting in the Attendant mode

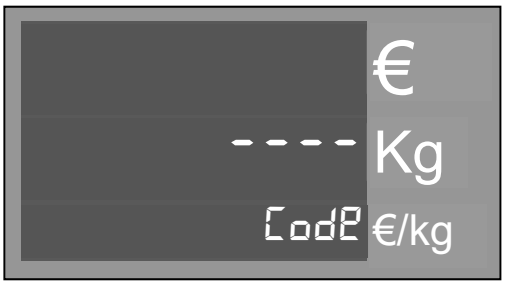
Parameter	Description
01	Non-resettable amount totalizers
02	Daily amount totalizers (resettable)
03	Product unit prices (in manual mode)
04	Current time and date
05	Counter program version and check sums
06	Error message history
07	Latest delivery history

Individual parameters will be described in the following section.

The Attendant mode is finished by pressing the <**A**> key. The mode is also finished automatically if no remote controller button is pressed for 60 seconds.

4.1.4. MANAGER MODE

The Manager mode is started by pointing the IR remote controller at the dispenser display (from the distance of approx. 1 m from the dispenser display centre) a pressing the <**R**> key. **All delivery nozzles on the dispenser must be hung in advance and the sale on the dispenser must be finished (paid).** After calling up the Manager mode the dispenser display shows a prompt for entering the 4-digit access password:



Due to keeping the password confidential the digits entered are shown as dashes. The following default access password is set in the factory: “1111”.

Example:

Press <**1**><**1**><**1**><**1**> and <**ENT**> keys

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

After entering the valid access password, the display shows the value of the first parameter 01. Now it is possible to browse parameters by using the <**>**> key or by entering the **number of searched parameter** and confirm with the <**ENT**> key to go directly to the desired parameter.

The Manager mode allows to view and change the values of parameters listed below - see Table 11.

Table 11 - List of parameters in the Manager mode

Parameter	Description
01	Non-resettable volume totalizers
02	Daily volume and financial totalizers (resettable)
03	Product unit prices (in manual mode)
04	Current time and date
05	Program version and check sums
06	Error message history
07	Latest delivery history
08	Access password for the Manager mode
09	Maintenance history
10	Serial numbers of connected electronic units
11	- reserved -
12	Dispenser controlling mode
13	Defects statistics
14	Current operating temperature
15	Resetting daily totalizers

The Manager mode is finished by pressing **<R>** or **<A>** keys. The mode is also finished automatically if no remote controller button is pressed for 60 seconds.

4.1.5. NON-RESETTABLE TOTALIZERS (CODE P01)

Electronic totalizers for one or two delivery hoses (nozzles) are saved in the memory of the electronic counter. These totalizers are ***non-resettable*** and state what total amount of gas was delivered by individual delivery hoses from the start of the dispenser operation.

Table 12 - Description of values of P01 parameter

Parameter	Meaning
P01-1	amount of gas flown through the hose 1 in hundredths of kilogram (x 0.01kg)
P01-2	amount of gas flown through the hose 2 in hundredths of kilogram (x 0.01kg)

NOTE *Number of totalizers of delivery hoses shown in the P01 parameter is conditioned by the configuration of the dispenser. The identification system of delivery hoses and products is described in Figure 23.*

4.1.6. DAILY TOTALIZERS (CODE P02)

Electronic daily totalizers for all delivery hoses (nozzles) are saved in the memory of the electronic counter. **These totalizers may be reset at any time by using the P15 parameter** (see description below). They state what total amount of gas was delivered by individual delivery hoses from the moment of their last resetting.

Table 13 - Description of values of P02 parameter

Parameter	Meaning
P02-1	amount of gas flown through the hose 1 in hundredths of kilogram (x 0.01kg)
P02-2	amount of gas flown through the hose 2 in hundredths of kilogram (x 0.01kg)

NOTE *Number of totalizers of delivery hoses shown in the P02 parameter is conditioned by the configuration of the dispenser. The identification system of delivery hoses and products is described in Figure 23.*

4.1.7. PRODUCT UNIT PRICE (CODE P03)

This function allows to show and set the unit price of the product refilled (i.e. the price of one kilogram of gas). A new unit price is shown on the display at the first lift of the delivery nozzle and reset f the display if the dispenser works in the **manual mode**. Setting is made by pressing the **<Ent>** key and entering the price in the **PPP** format and confirming by the **<Ent>** key. The decimal point is not entered. E.g. the price 26.50 Euro/kg is set as 2650, the price 34,15 Euro/kg as 3415, etc. To switch for setting the price for hose 2 press the **<+>** button. P03-2 appears. By pressing **<Ent> + PPPP + <Ent>** set the unit price for the hose 2.

Table 14 - Description of values of P03 parameter

Parameter	Meaning	Factory setting
P03-1	product unit price hose 1	0.00 Euro / kg
P03-2	product unit price hose 2	0.00 Euro / kg

NOTE *Number of fuel products shown in the P03 parameter is conditioned by the configuration of the dispenser. The identification system of delivery hoses and products is described in Figure 23. if you change the unit price, such change will be reflected after a subsequent lift of the delivery nozzle.*

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

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

4.1.8. CURRENT TIME AND DATE (CODE P04)

This function allows to show and set current time and date. The P04-1 parameter shows and sets time in the **"HHMMSS"** format (hours, minutes, seconds), the P04-2 parameter shows and sets date in the **"DDMMYY"** format (day, month, year) - example 15:35:11 24.12.2011. Setting is made by pressing the **<Ent>** key and entering the time/date in the correct format and confirming by the **<Ent>** key. You can switch between time and date setting by pressing the **<+>** or **<->** key.

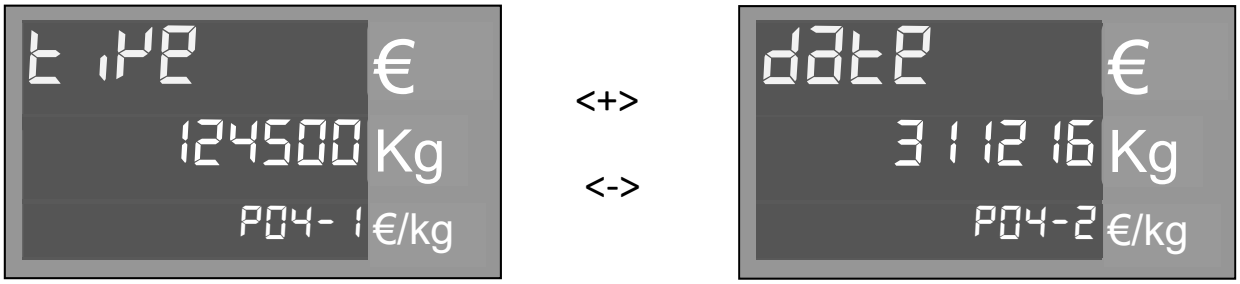


Table 15 - Description and setting of values of P04 parameter

Parameter	Meaning	Factory setting
P04-1	Time setting - HHMMSS format (e.g. 124500 = 12:45:00)	0.00
P04-2	Date setting - DDMMYY format (e.g. 311216 = 31. 12. 2016)	1. 1. 2001

NOTE *The time and date information is used in P06 and P07 parameters for recording time of defect occurrence and time of delivery finish.*

NOTICE *48 hours after disconnecting the electrical power supply of the dispenser the internal clock will be reset. Time and date values will switch to factory setting and must be set again!*

4.1.9. DISPLAYING THE PROGRAM VERSION AND CHECK SUMS (CODE P05)

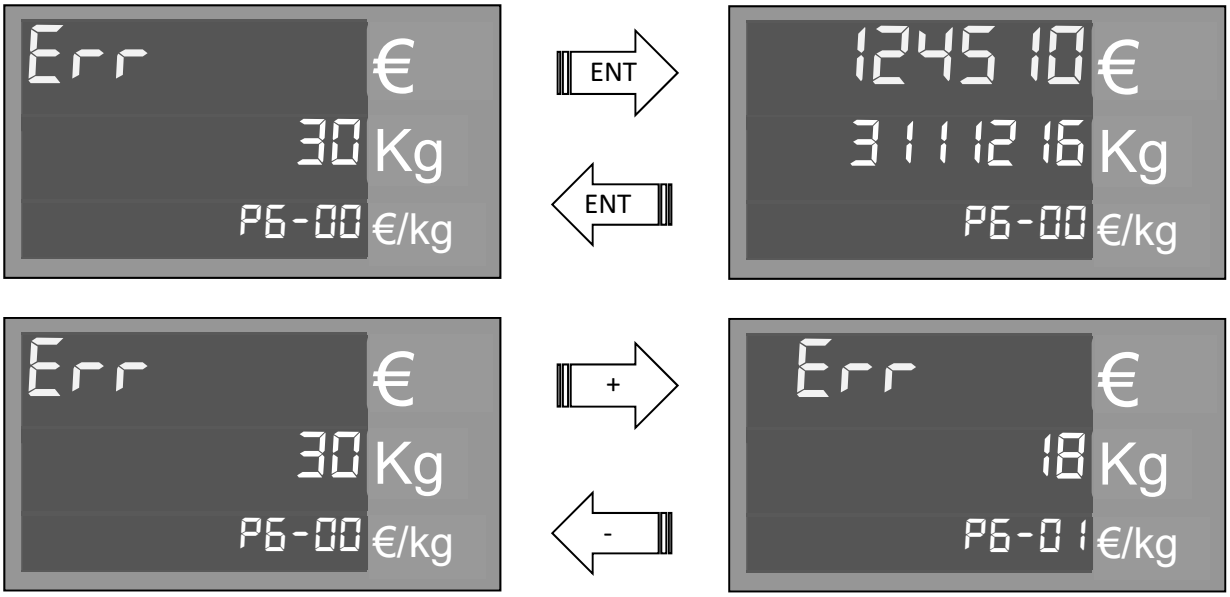
This function shows the number of the program version of the dispenser counter and different check sums. These values are intended for metrology authorities and authorized service engineers. The values may be only displayed, not changed. You can browse values by using **<+>** or **<->** keys.

Table 16 - Description of values of P05 parameter

Parameter	Meaning
P05-1	Version of program's metrology parts
P05-2	Metrology check sum of the program
P05-3	Release number (C + number), program version
P05-4	Total check sum of the program
P05-5	Check sum of the parameter memory
P05-6	Check sum of the device for temperature compensation
P05-7	Time and date of program creation (e.g. 07:56:17, 19. 07. 2011)

4.1.10. HISTORY OF ERROR MESSAGES (CODE P06)

This function is intended to show history of last 100 error codes of defect in the order in which they occurred in the dispenser. The table of error messages is shown in section 9.2.2.



After switching to the P06 parameter the display shows the code of the last error message (e.g. 30 – E30 zero fuel unit price). After pressing the **<ENT>** key the display shows time and date of defect occurrence (12:45:10, 31.12.2016 shown in the figure). After pressing the **<+>** key the display shows the code of the last but one error message on the given side of the dispenser (18 – E18 loss of communication with the payment terminal), see Table 17.

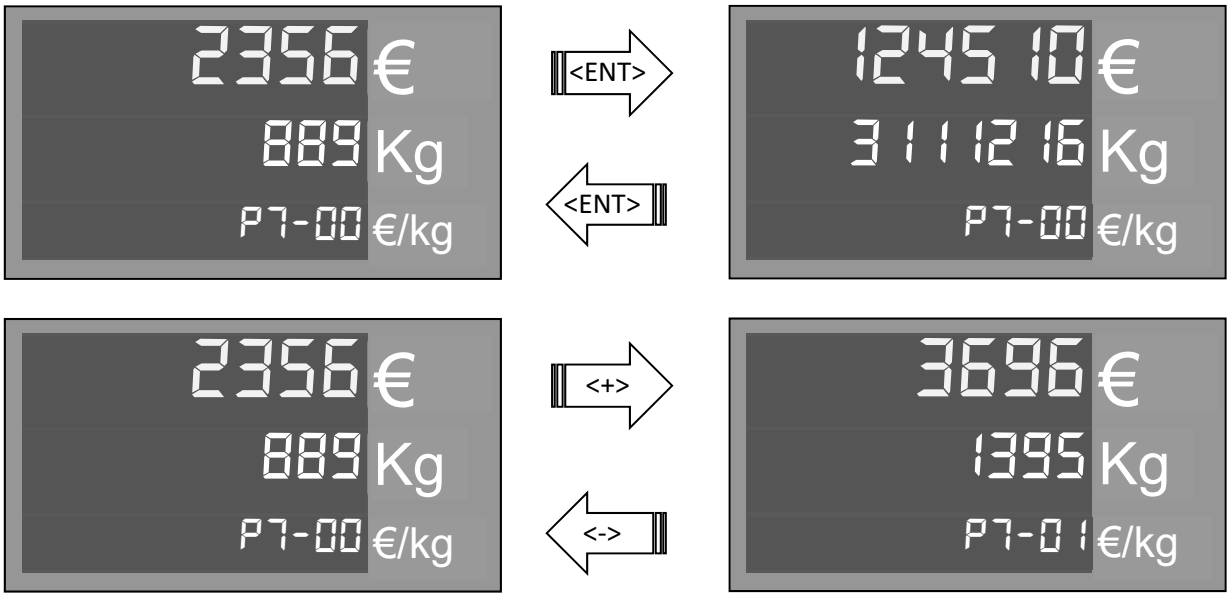
Table 17 - History of error messages P06

Parameter	Meaning
P6-00	code of the last dispenser error (the latests)
P6-01	code of the last but one dispenser error
…	…
P6-98	code of the 99th dispenser error in the order
P6-99	code of the 100th dispenser error in the order (the oldest)

NOTE *If two errors of the same type with the same error code occur in sequence, only one - the latest - error will be stored in the counter memory (there may not be two or more same errors stored in sequence).*

4.1.11. HISTORY OF LAST DELIVERIES (CODE P07)

This function is intended to show history of last 50 deliveries of the dispenser. This parameter has the following arrangement of data on the display:



After switching to the P07 parameter the display shows the code of the last delivery (P7-00) and the delivered amount, quantity and price (23.56 Euro / 8.89 kg / 26.50 Euro/kg). The unit price per kilogram alternates on the display with the parameter number. After pressing the **<ENT>** key the display shows time and date of delivery finish. After pressing the **<+>** key the display shows the code of the last but one delivery (36.96 Euro / 13.95 kg / 26.50 Euro/kg). See more in Table 18.

Table 18 - History of last deliveries P07

Parameter	Meaning
P7-00	last delivery of the dispenser (the latests)
P7-01	last but one delivery of the dispenser
…	…
P7-49	49th delivery of the dispenser
P7-50	50th delivery of the dispenser (the oldest)

4.1.12. ACCESS PASSWORD FOR THE MANAGER MODE (CODE P08)

This function allows to show and change the access password for the Manager mode – 4 digits. Setting of the new password is made by pressing the **<Ent>** key and entering the password in the **CCCC** format and confirming by the **<Ent>** key.

The default access password "1111" is set in the factory.

NOTICE *If the fuel station manager forgets the set password, call the authorized service.*

4.1.13. HISTORY OF MAINTENANCE (CODE P09)

This function allows to show codes of the last 50 service remote controllers used to set the counter parameters – see Table 19.

Table 19 - History of maintenance P07

Parameter	Meaning
P7-00	code of the service controller of the last entry to the setting
P7-01	code of the service controller of the last but one entry to the setting
…	…
P7-49	code of the service controller of the 49th entry to the setting
P7-50	code of the service controller of the 50th entry to the setting

NOTE *If two entries to the counter setting occur with the same service remote controller, only one controller code will be stored in the counter memory (there may not be two same entries stored in sequence).*

4.1.14. SERIAL NUMBERS OF PERIPHERAL DEVICES (CODE P10)

This function allows to show serial numbers of connected electronic devices – see figure S/N 1600057. The change in the electronic device configuration may be only made by a service engineer. After an illegal exchange of any electronic device, as mentioned in Table 20, the dispenser will be blocked and error E80 to E84 will be displayed.

Table 20 – Table of peripheral devices P10

Parameter	Meaning
P10-1	Serial number of the processor unit
P10-2	Serial number of the main displaying unit (master display)
P10-3	Serial number of the auxiliary displaying unit (slave display)
P10-4	Serial number of the unit of electromechanical totalizers
P10-5	Serial number of the heat sensor unit (PDEINP)
P10-6	Serial number of the mass meter

4.1.15. OPERATING MODE OF THE DISPENSER (CODE P12)

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

Table 21 - Operating mode of the dispenser P12

Parameter	Meaning
P12 = 0	Automatic mode with dispenser remote control
P12 = 3	Manual mode

The parameter value may be 0 and 3.

- If the parameter value **P12 equals 0** then the dispenser works in solely automatic mode, i.e. connected to the control computer via a data line. The dispenser is completely controlled by a remote control unit (PC, control counter, …) – dispenser release for delivery, dispenser blocking, setting the product price and maximum amount/volume for each delivery, etc. Shortly after interrupting communication

between the computer and the dispenser the display shows the error message E18. After communication recovery, the E18 message disappears automatically.

- If the parameter value **P12 equals 3** then the dispenser works in solely manual mode. The dispenser is completely independent – not controlled remotely. The data line is blocked. Product unit prices are controlled by the P03 parameter. If no special manual mode with blocking after delivery or a mode with RELEASE signal control is set, the delivery starts immediately after lifting the delivery nozzle and resetting the display.

A detailed description of operating modes is in section 5.3.6. Setting is made by pressing the **<Ent>** key and entering the **mode number** (1 or 3) and confirming by the **<Ent>** key.

4.1.16. ERROR STATISTICS (CODE 13)

This function is intended for showing statistics of errors (defects) occurred on the dispenser from the moment of initialization or resetting the counter. This parameter has different arrangement of data on the display:

The first line of the display shows the dispenser error code (E30), the second line shows frequency of error occurrence from dispenser commissioning or from resetting the statistics by the service engineer (2x).

You can browse the error statistics by using **<+>** or **<->** keys. The table of defect messages is shown in section 9.2.2.

4.1.17. CURRENT OPERATING TEMPERATURE (CODE 14)

This function shows current operating temperature measured by the heat sensor located on the processor board of the counter, possibly a current temperature of the heat sensor Pt100 located in the dispenser pressure module.

This parameter has the following arrangement of data on the display:

The first line of the display shows the temperature on the processor unit of the counter in tenths of Celsius degrees (26°C). The second line shows an average ambient temperature in the dispenser pressure module in tenths of Celsius degrees (25.9°C).

4.1.18. RESETTING DAILY TOTALIZERS (CODE 15)

This function is intended for resetting all daily totalizers of delivery hoses/nozzles.

After setting the parameter to **1** and confirming (**<ENT> + <1> + <ENT>**) all totalizers that are a part of the P02 parameter will be **reset**.

5. OPERATION

5.1. INSTRUCTIONS FOR SAFE OPERATION

Smoking forbidden

Open flame use forbidden

Use of mobile phones forbidden

CAUTION

- ⚠ *Technical and technological devices must correspond to approved conditions together with regulations for safe operation and maintenance as well as solutions of emergencies. The device must be fitted with carbon-dioxide extinguishers according to the fire-safety solution.*
- ⚠ *The CNG fuel station may only be operated by demonstrably trained persons.*
- ⚠ *The dispenser is equipped with the "STOP button" for emergencies. The procedure in case of fire or emergency is precisely defined in local operating rules and regulations – the attendant must be demonstrably trained with regard to this.*
- ⚠ *It is necessary to observe defined terms to perform regular checks and inspections of all installed technical devices. Do not allow persons without appropriate professional qualification to tamper the installed technology including the gas devices.*

CAUTION

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

CAUTION

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

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

5.2. DISPENSER COMMISSIONING

After the installation of the dispenser, see section 3, or after the pressure drop inside the pressure module (pressure information is provided by a manometer located on the dispenser column) we can perform the CNG dispenser filling.

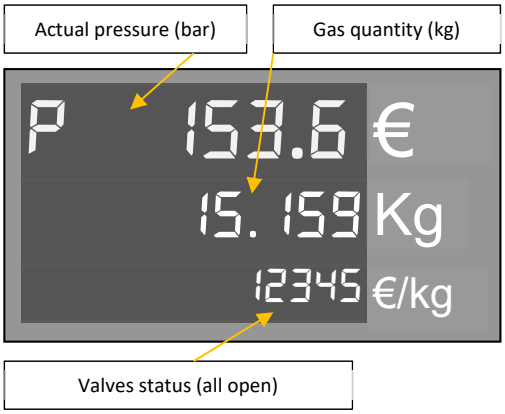
5.2.1. CNG DISPENSER FILLING

- switch on the power supply of the dispenser in the switchboard (electronic power supply);
- slightly open the shut-off ball valves at the inlet pipeline to approx. 1/3 of their opening range, press the green START button and fill the pressure section of the dispenser with compressed natural gas. Then fully open the shut-off ball valves;
- check tightness of pipeline joints in the pressure module and pressure on the dispenser manometer

In case that not leaks or other non-standard facts are detected, the dispenser is ready for operation.

NOTICE ***While filling the pressure module of the dispenser with compressed natural gas the inlet ball valves must not be fully opened. The pressure impact could cause disconnecting the safety clamps on filling hoses.***

If the service engineer from the authorized company is present, it is possible to perform dispenser filling by opening all electromagnetic valves by using a **service mode of the counter with valve manual control (P60=4).** In this mode it is possible to manually control electromagnetic valves with the remote controller. Valve outputs V1 – V5 are controlled by keys 1 – 5 on the remote controller. If the unit price row shows digits 1, 2, 3, 4 or 5, the corresponding valve output is active. If a zero is shown, the output is inactive (the valve is closed). In this mode, neither non-airtightness detection nor automatic temperature compensation are active.



5.2.2. SWITCHING ON THE CNG DISPENSER

- switch on the CNG dispenser power supply (electronics power supply) in the fuel station switchboard;
- the display illumination switches on and the display test is performed = displaying all display segments (eights) for approx. 1 second;

- a 10-second test of the TBELTM counter is performed. The amount display gradually counts down 9, 8... 1.0. The quantity display shows the metrology check sum of the counter program (4573). The price display shows the status of switches SX-1 to SW1-4 located on the processor board (0-OFF, 1-ON);

- the display shows the last data that was on the display before the last display switching off.

Now the dispenser is ready for delivery.

If the dispenser works in the manual mode, it is then possible to immediately start new delivery after lifting the delivery nozzle and pressing the START button. If the dispenser is in the automatic mode, it waits until communication with the controlling computer is established and - if necessary - until the transaction is finished (paid), in case it has not been finished properly before switching off.

5.3. CNG DELIVERY TO MOTOR VEHICLES

5.3.1. DELIVERY START

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

The operation of the dispenser itself is ensured by the employee of the fuel station who lifts the delivery nozzle from the dispenser and connects it to the storage tank of the vehicle which must be secured against moving. Immediately after the nozzle is lifted the display test is performed – displaying all segments – and then it is reset and the product unit price is displayed.

After pressing the START button located on the counter case the electromagnetic valve opens at the inlet of the first pressure section and the pressure storage tank of the vehicle is filled with compressed natural gas. At the moment when the delivery speed decreases under the defined limit, the electronic counter automatically switches delivery to the second section and then potentially to the third pressure section – depending on the dispenser and fuel station configuration.

NOTE *Some dispensers, especially those non-public - company dispensers, are not fitted with the sensors of delivery nozzle lifting. At such dispensers the display test is performed after pressing the START button.*

5.3.2. DELIVERY TERMINATION

The delivery may be terminated for various causes. Possible causes of delivery termination and corresponding messages shown on the display are mentioned in Table 22.

Table 22 - Causes for delivery termination

Event	Indication on display
1. Pressing the STOP button by the customer/attendant during the delivery	**STOP**
2. Attaining the pre-set sum, quantity or limit values of the dispenser	**STOP**
3. STOP command received from the superior system (payment terminal)	**STOP**
4. Gas flow rate drop under the value set on the dispenser (e.g. < 2kg/min)	**FULL**
5. Attaining the maximum possible mass calculated by temperature compensation	**FULL**
6. Detection of an error event	**Exx**

The most frequent delivery termination is during filling the full storage tank when the gas flow rate drops under the set value (4) at dispensers without temperature compensation and delivery termination by attaining the maximum possible gas mass calculated by temperature compensation (5). In both cases delivery termination is signalled by the "FULL" message on the product unit price display.

Delivery is finished by hanging the delivery nozzle to the dispenser.

NOTE
DELIVERY WITH TEMPERATURE COMPENSATION *is performed so that the dispenser shall verify the situation in the vehicle storage tank by a small amount of gas at the beginning of delivery and calculates the maximum gas mass which it can deliver under given ambient temperature. After attaining the maximum mass, it finishes the delivery and shows the "FULL" message.*
According to technical rules of TPG 304 02 art. 4.5.4 the limit values in the Czech Republic for calculating maximum gas mass in the vehicle are as follows:
a) maximum gas pressure converted to 15 °C – 20.0 MPa
b) attain maximum overpressure in a vehicle 26.5 MPa
c) attaining maximum gas temperature in a vehicle 82 °C

NOTE *According to ISO/DIS 16923, par. 7.5 CNG dispensers must be equipped with a breakaway coupling located between the delivery nozzle and the dispenser. This breakaway coupling disconnects the gas flow rate at both ends in case of emergency. The force that causes breaking the coupling must be higher than 220N and lower than 600N. OCEAN CNG dispensers are standardly equipped with a breakaway coupling with a magnetic sensor of breaking. After breaking the hose the delivery is immediately terminated (magnetic valves are closed) and the display shows the error message E67.*

RESPONSIBILITIES OF CNG DISPENSER ATTENDANTS

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

EQUIPMENT OF ATTENDANTS

- **soap (foaming) solution + brush for detecting leaks**
- **leather gloves**
- **the fuel station booth must contain a first-aid kit, log book, writing materials, operating and safety regulations, fittings diagram and extinguisher**

5.3.3. OCCUPATIONAL SAFETY WHILE WORKING WITH THE CNG DISPENSER

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

In terms of structure, all dispenser components that could be sources of explosion initiation are approved according to the European standard ATEX. After detecting possible gas leak the detector sensors may be located in the dispenser area. However, these sensors are not included in the basic offer. In terms of hygiene, the given device is harmless for attendants and operators. While performing operation and maintenance it is advisable to protect your hands by wearing gloves and wear safety goggles.

5.3.4. POWER SUPPLY FAILURE DURING DELIVERY

If the power supply fails during delivery, the dispenser counter detects a drop in the power supply voltage and saves into the memory the last data shown on the display, along with the current state of the dispenser, closes valves and turns off. After the power supply is restored, the dispenser display again shows the delivery status before shutdown and waits until the nozzle is hanged back into the dispenser. For every power supply failure during delivery, the error message E20 is stored in the memory of the dispenser counter, and it can then be read in the error history and in the error statistics - see the description of parameters P06 (sec. 4.1.10) and P13 (sec. 4.1.16).

5.3.5. ELECTROMECHANICAL TOTALIZERS

On demand, OCEAN CNG dispensers are equipped with electromechanical totalizers for monitoring the total amount of gas flown through each delivery hose. Totalizers are located on the dispenser display. Each delivery hose or nozzle has one seven-digit electromechanical totalizer that shows the **number of complete kilograms flown through the appropriate delivery hose.**

5.3.6. DISPENSER OPERATING MODES

There are two basic dispenser's operating modes:

1) manual mode
2) automatic (remote) mode

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

Delivery progress: The customer arrives to the dispenser. The fuel station attendant inserts the delivery nozzle into the vehicle storage tank and presses the START button. Displays are reset (approx. 1.5 sec) and the delivery starts. After the delivery is finished – see section 5.3.2, the attendant hangs the delivery nozzle back onto the dispenser and the customer pays for refilled gas. The dispenser is immediately ready for next delivery. Since the dispenser is not controlled in any way in the manual mode, it is necessary to manually set the fuel unit price on the dispenser – see section 4.1.7. The amount of gas delivered during one shift is determined by the difference of values from electronic totalizers – see section 4.1.5 and 4.1.6, possibly from electromechanical totalizers at the beginning and at the end of the shift.

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

Delivery progress: The fuel station attendant inserts the delivery nozzle into the vehicle storage tank and presses the START button. Displays are reset (approx. 1.5 sec) and the delivery starts. After the delivery finishes – see section 5.3.2, the attendant hangs the delivery nozzle back onto the dispenser and the customer pays the required amount in the booth where he/she receives the tax document (receipt) for the delivered gas. After the payment, the dispenser is immediately ready for next deliveries. Since the dispenser is remotely controlled in the automatic mode, it is not necessary to manually set the fuel unit price on the dispenser. The correct unit price is automatically set by the control computer to all dispensers at the fuel station.

Switch from the automatic to the manual mode. By default, the dispensers are connected and set as it is expected they should work at the fuel station, i.e. if the fuel station is equipped with a control system, the dispensers will be set to the automatic mode; if the fuel station is without the control system, the dispensers are set to the manual mode by default.

In case it is necessary to switch dispensers from the automatic mode to the manual mode – e.g. due to the emergency in the control system, it is necessary to perform a change in the P12 parameter from 0 to 3 by using the IR remote controller, see section 4.1.15, and perform the check of unit price settings in the P03 parameter, see section 4.1.7.

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

5.3.7. SIGNAL LIGHTS

OCEAN CNG dispensers may be equipped with signal lights that are located on the counter case and that signal the function/status of the CNG dispenser. It is possible to use two signal lights – red and green, or one – red, possibly no signal light and use the output for a signal light for signalling the error.

Table 23 – Modes of signal lights

Dispenser status	Mode 1		Mode 2		Mode 3	
	G	R	G	R	G	R
idle	1	0	1	0	1	0
nozzle taken out, waiting for START button	1	0	0	1	flashing	0
filling	1	0	0	1	0	1
filling finished, nozzle not returned	1	0	0	1	0	flashing
nozzle returned, waiting for payment	0	1	0	1	0	1

One of the following modes may be set at each dispenser:

Mode 1 – mode of the fuel station dispenser signalling the payment necessity. In this case the green light signals that the dispenser is in operation or is currently delivering and the delivery has not been finished. The red-light signals for the attendant that the delivery has finished at the dispenser and the customer has to pay.

Mode 2 – mode of the fuel station dispenser signalling occupancy of the dispenser. In this case the green light signals that the dispenser is free for another customer. The red-light signals that the dispenser is occupied – either delivery is in progress or the dispenser is waiting for payment.

Mode 3 – mode of the fuel station dispenser with emphasis on the dispenser attendant. In this case the green light is on when the dispenser is free. If it flashes, it warns the customer/attendant it is necessary to press the START button to start CNG delivery. The red-light signals that the dispenser is occupied – either delivery is in progress or the dispenser is waiting for payment. If the red-light flashes, it warns the customer that it is necessary to hang the delivery nozzle onto the dispenser after the delivery finishes.

Mode 4 – Remote control of the lights. In this mode switching the lights on and off is completely controlled via the data line from the controlling computer or payment terminal. After turning the dispenser on, the lights are off. The red-light switches on and off after the command comes via the data line. The green light switches on after receiving the command via the data line and switches off automatically upon finishing the delivery. This mode is often used in case the dispenser is controlled by

the payment terminal and it is necessary for the dispenser to signal the status when it is ready (authorized) to start the delivery.

Mode 5 – Signalling a non-returned nozzle. The connected light (red or green) only flashes when filling is completed and the nozzle has not been completely returned onto the dispenser. After hanging the nozzle onto the dispenser, the light switches off.

Mode 6 – Error event signalling. The light (red or green) switches on on the dispenser only in case of any error event.

Mode 7 – Fatal error event signalling. The light (red or green) switches on on the dispenser only in case of a fatal error event – i.e. serious error which may only be removed by switching the dispenser power supply on and off. The list of fatal errors is in section 6.2.

NOTE *Modes 6 and 7 are used wherever the control system of CNG technology (compressor room) needs any error signal from the dispenser. So-called "Collective alarm" – i.e. a signal from the dispenser signalling any error of the dispenser is led directly from the dispenser via the data distribution box – details in section 3.4.5.*

5.3.8. PRESET KEYPAD

OCEAN CNG dispensers may be equipped with a so-called pre-set keypad enabling pre-setting the amount or quantity by the customer directly on the dispenser. The customer may decide before he/she starts the delivery with what quantity of gas or for what amount of money he/she wants to refill the storage tank.

The pre-set value may be cancelled by pressing the <**Cancel**> button at the moment when the delivery has not started yet. It is then possible to set another pre-set value or fill the storage tank in a classic way without using the pre-set.

NOTE *In case the pre-set keypads are used, it is necessary that the dispensers ate equipped with deceleration valves that ensure safe deceleration of fuel flow rate before the target pre-set value.*

a) Example of entering the pre-set in currency units

- The customer arrives to the dispenser and wants to refill gas for 10 Euro.
- The dispenser attendant pre-sets the value 10 on the pre-set keypad – presses the **<€ 5>** button twice.
- The attendant lifts the delivery nozzle from the dispenser, inserts it into the vehicle storage tank and presses the START button.
- The dispenser refills gas into the tank precisely for the sum the customer selected and then it automatically stops (STOP on the display).
- The attendant hangs the delivery nozzle back onto the dispenser. The customer goes to the payment terminal to pay the amount.

b) Example of pre-setting the quantity

- The customer arrives to the dispenser and wants to refill 20 kilograms of gas.
- The dispenser attendant pre-sets the value 20 by using the pre-set keypad – presses the **<10 kg>** button twice.
- The attendant lifts the delivery nozzle from the dispenser, inserts it into the vehicle storage tank and presses the START button.
- The dispenser refills the tank with the precise gas amount the customer selected and then it automatically stops (STOP on the display).
- The attendant hangs the delivery nozzle back onto the dispenser. The customer goes to the payment terminal to pay for the refilled volume.

5.3.9. AUTOMATIC TEMPERATURE COMPENSATION

Temperature compensation ensures safety during vehicle tank filling, and as well as subsequent vehicle operation, by not allowing exceeding the maximum allowed filled quantity of the vehicle tank. It also disallows exceeding the pressure of 20 MPa at temperature 15°C in the vehicle tank. At the end, the filled tank must not exceed the pressure of 26.5 MPa and the gas temperature of 82°C.

Using temperature compensation is dependent on national regulations and standards. Temperature compensation can be activated and deactivated using the electronic counter parameter.

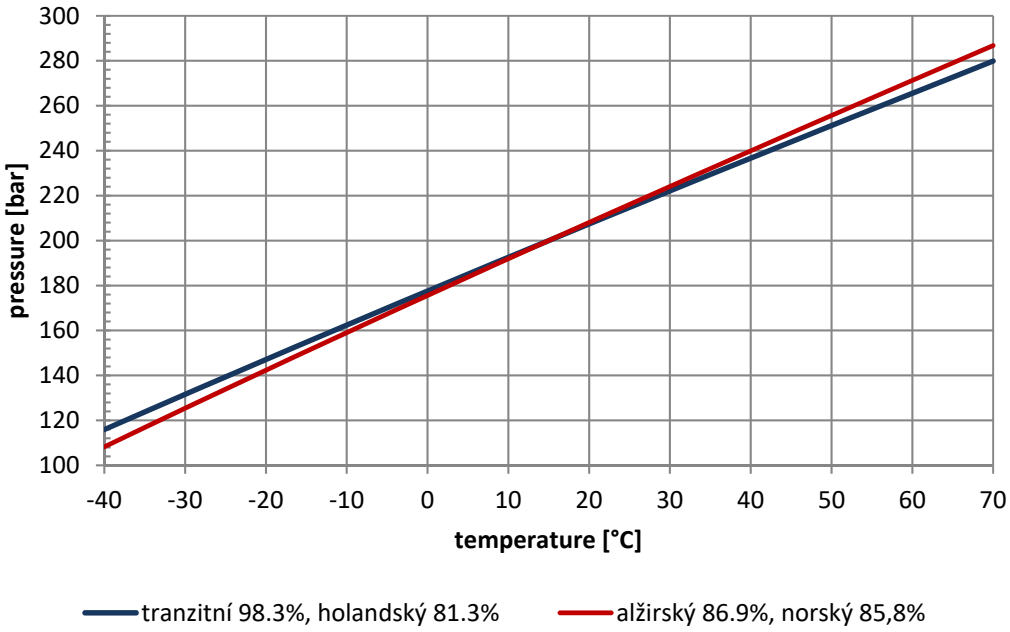


Figure 24 – Tank pressure and temperature dependency

Since the dependency of pressure on the temperature is affected by the natural gas composition – see Figure 24, the correct type of natural gas must be set in the counter parameter. If the temperature compensation is to be used, it is necessary to supply the unit PDEINP and a thermal sensor PT100 that measures ambient temperature in addition to the counter.

5.3.10. INTELLIGENT SWITCHING OF PRESSURE SECTIONS

At OCEAN CNG dispenser with sequence filling the vehicle filling always starts with opening the valve in the first pressure section. The number of pressure sections is customizable from 1 to 3. Switch to a higher pressure section occurs if the mas flow rate is lower than the set value in the counter (e.g. 2kg/min) for a defined period (e.g. 2 sec).

Apart from the above mentioned switching of pressure sections, it is possible to activate an intelligent algorithm that respects the ratio of individual reservoir sizes of individual sections in the station technology. This method of control is active only if the automatic temperature compensation is active. The ratio of the reservoir sizes of individual pressure sections may be set in the counter. The algorithm of temperature compensation calculates the maximum mass of gas that can be filled into the vehicle tank. This value is then divided between the individual sections in the set ratio.

Intelligent switching of pressure sections shall ensure better use of all pressure reservoirs, thus faster fluctuation of vehicles at the fuel station.

Example: *individual pressure sections are set in the counter in the 60:40:40 ratio. After the delivery starts, the algorithm of automatic temperature compensation calculates max. gas mass for refilling to 28 kg. Valve control of individual pressure sections will be performed so that the amount of gas delivered from individual sections is as follows: 1st section 12 kg, 2nd section 8 kg, 3rd section 8 kg.*

5.4. DISPENSER DECOMMISSIONING

5.4.1. SWITCHING OFF THE CNG DISPENSER

- switch off the CNG dispenser power supply (electronics power supply) in the fuel station switchboard;
- displaying the "OFF" message on the unit price display and switching the display illumination off. The last data is shows on the display for at least 15 minutes after the power supply disconnection. After elapsing this period and "erasing" the display the display status is saved into the counter memory and will be shown after the power supply is connected again – see the previous section.

Now the dispenser is out of order.

6. MAINTENANCE AND SERVICE

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

CAUTION **DO NOT OPEN THE DISTRIBUTION BOX LOD IF THE DISPENSER IS LIVE!**

CAUTION **The interventions into electrical and electronic parts may only be performed by a specialist who is responsible for device safety. The wires must be repositioned to their original position after finishing the service intervention. ATTENTION! Tightness of pressure sections must be inspected in every service intervention and possible leaks must be removed.**

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

THE OPERATOR OF THE DISPENSER IS OBLIGED TO:

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

PRINCIPLES OF CNG DISPENSER INSPECTIONS

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

- Review of dispenser pressure system tightness by soap solution.
- The inspection, calibration and official verification of the CNG dispenser is performed by the national metrology office according to applicable regulations.

The inspection is preceded by cleaning the entire device from dust, removal of water and other impurities from tanks.

6.1. MAIN PRINCIPLES OF DISPENSER MAINTENANCE

- keep all functional units of the dispenser clean so that any potential unexpected defect may be easily identified and quickly removed
- inspect the condition of the delivery nozzle, hose and breakaway coupling and decide on repair or replacement, if necessary, according to the type and size of the defect

- care for external cleanliness of the dispenser, pay special attention to counter window cleanliness

6.1.1. MAINTENANCE OF DISPENSER COVERS

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

Recommended maintenance of painted covers:

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

Recommended maintenance of stainless covers:

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

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

NOTICE ***DO NOT WAS STAINLESS COVERS WITH DETERGENTS.***

6.1.2. LEVER-SHUT-OFF BALL VALVE

It is located in the lower part of the pressure module on the inlet pipeline – identification OVI, OVM and OVH on the dispenser diagram – see Appendices 3.2, 3.3 and 3.4. The ball valve is intended for immediate shut off the media flow rate in case of emergency or service of the dispenser. At multi-level systems of filling the inlet pipeline of each pressure level has its own shut-off ball valve. The valve is normally maintenance-free. Potential defects are solved by replacement. Replacement may only be performed by an employee of the authorized service company.

6.1.3. FILTER

It is located in the lower part of the pressure module behind the shut-off valve – identification FI, FM and FH on the dispenser diagram – see Appendices 3.2, 3.3 and 3.4. It is intended for filtering mechanical impurities from the flowing media. At multi-level systems of filling the inlet pipeline of each pressure level has its own filter. The

filter is normally maintenance-free. Potential defects are solved by replacement. Replacement of a complete filter may only be performed by an employee of the authorized service company.

⚠ We recommend performing inspection of the inner filter cartridge and its potential cleaning or replacement at least **once a year.** Filter cartridge cleaning may be performed in water solution of a detergent. After thorough drying it is advisable to blow the filter cartridge with pressurized air. Since the disassembly and inspection of the filter cartridge is conditioned by media drainage from the pressure module of the CNG dispenser, these activities may only be performed by an employee of the authorized service company.

6.1.4. CHECK VALVE

It is located in several parts of the pressure module wherever it is necessary to avoid return flow of media to the area with currently lower pressure – BVxx identification in the dispenser diagram – see Appendices 3.2, 3.3 and 3.4. Check valves are normally maintenance-free. Potential defects are solved by replacement. Replacement may only be performed by an employee of the authorized service company.

6.1.5. DISCHARGE NEEDLE VALVE

It is located in such parts of the pressure module from which the media must be discharged in case on maintenance or service – NVxx identification in the dispenser diagram – see Appendices 3.2, 3.3 and 3.4. Discharge needle valves are normally maintenance-free. Potential defects are solved by replacement. Replacement may only be performed by an employee of the authorized service company.

6.1.6. MASS METER

OCEAN CNG dispensers are equipped with premium electronic meters of mass flow. The meter is formed by the measuring sensor itself, which works on the principle of Coriolis force, and the microprocessor unit which, in addition to setting measurement and calibration parameters, ensured data connection to the electronic counter of the dispenser. The mass meter is set and adjusted by the manufacturer. Repairs and potential changes in setting may only be performed by an expert of the authorized service company in the presence of metrology employee who shall perform the following accuracy inspection and official verification. CMI is obliged to regularly inspect the electronic meter based on statutory regulations.

6.1.7. ELECTROMAGNETIC CONTROL VALVE

It is located in a part of the pressure module behind the filter, possibly behind the mass meter – EVxx identification in the dispenser diagram – see Appendices 3.2, 3.3 and 3.4. Electromagnetic valve opening and closing is controlled by the electronic counter of the dispenser. Electromagnetic valves are normally maintenance-free. Potential defects are solved by replacement. Replacement may only be performed by an employee of the authorized service company.

6.1.8. MANOMETER

It is located in the lower part of the pressure module column – Gxx identification in the dispenser diagram – see Appendices 3.2, 3.3 and 3.4. The measuring range is from 0 to 400bar. It displays current filling pressure. It contains glycerine filling for dampening pressure impacts. The manometer is maintenance-free. Potential defects are solved by replacement. Replacement may only be performed by an employee of the authorized service company.

6.1.9. PIPELINE SYSTEM AND THREADED JOINTS (FITTINGS)

Compressed natural gas is distributed within the OCEAN CNG dispenser by stainless or galvanized steel pipes 16x2.0, 12x1.5 a 6x1.0. Pipes are connected via threaded connections with screw rings.

⚠ We recommend checking tightness of joints at least **once a month** by using a foaming agent. When detecting the pipeline system leak, close the inlet ball valves, disconnect the dispenser from power supply and contact the authorized service. the repair of pipeline system leaks, replacement of sealing or other damaged components may only be performed by an employee of the authorized service company.

6.1.10. FILLING AND VENTILATION HOSES

The filling hose with an internal diameter of 9.9 mm and 12.7 mm is intended for transporting compressed natural gas from the dispenser to the vehicle. The ventilation hose with an internal diameter of 6.4 mm is intended for transporting residual gas from the neck area of the delivery nozzle. Both hoses are supplied in a standard length of 3M. At one side they end with a delivery nozzle and at the other side they end with a breakaway coupling.

⚠ It is necessary to check mechanical wear of the hose at least **once a week.** The damaged hose must be immediately replaced! Replacement may only be performed by an employee of the authorized service company.

⚠ It is necessary to check tightness of the hose at least **once a month** by using a foaming agent.

⚠ It is necessary to check hose conductivity at least **once per 6 months** – i.e. resistance between the end of the filling end piece and the central grounding terminal of the dispenser must be lower than 1 MΩ (testing voltage of 500V) in a pressurized operating condition and also without pressure.

6.1.11. FILLING END PIECE (DELIVERY NOZZLE, FILLING NOZZLE)

The filling end piece is intended for connecting the delivery hose to the pressure tank of the vehicle. The filling end piece is formed by the filling neck and a three-way valve mechanism controlled by a lever. The filling neck ensures perfect connection with the end piece (connector) of the vehicle pressure tank. The filling end piece is made so that it is not possible to connect is incorrectly and no high physical force is needed for the attendant. The three-way valve server to open and close the gas flow rate and also to transport residual gas (overpressure) from the filling neck of the nozzle. The delivery nozzle is

not repairable. In case of its defect it is replaced. Replacement may only be performed by an employee of the authorized service company.

⚠ It is necessary to visually check mechanical wear of the end piece and check its tightness by using a foaming agent at least **once a month.** The damaged filling end piece must be immediately replaced! Replacement may only be performed by an employee of the authorized service company.

⚠ We recommend lubricating the fastening mechanism of the end piece neck with silicon oil **once per 3 months.** This activity may be performed by the fuel station attendant.

⚠ It is necessary to check conductivity of the breakaway coupling-hose-end piece set at least **once per 6 months** – i.e. resistance between the end of the filling end piece and the central grounding terminal of the dispenser must be lower than 1 MΩ (testing voltage of 500V) in a pressurized operating condition and without pressure.

6.1.12. SAFETY DISCONNECTING COUPLING (BREAKAWAY COUPLING)

The safety disconnecting coupling is intended for disconnecting the filling hose in case of its extreme tensile stress. It is fitted with two valves that prevent gas from leaking from both ends of the breakaway coupling after its disconnecting. Breakaway couplings used at OCEAN CNG dispensers allow up to 100 repetitive disconnections and connections. Connection may only be performed by an employee of the authorized service company by using a special tool.

⚠ It is necessary to visually check mechanical wear of the breakaway coupling and check its tightness by using a foaming agent at least **once a month.** The damaged breakaway coupling must be immediately replaced! Replacement may only be performed by an employee of the authorized service company.

⚠ It is necessary to check conductivity of the breakaway coupling-hose-end piece set at least **once per 6 months** – i.e. resistance between the end of the filling end piece and the central grounding terminal of the dispenser must be lower than 1 MΩ (testing voltage of 500V) in a pressurized operating condition and without pressure.

Table 24 - Maintenance intervals (ISO/DIS 16923)

Maintenance activity	weekly	monthly	6 months
Inspection of filling end piece damage		**X**	
Inspection of hose damage	**X**		
Visual inspection of the breakaway coupling		**X**	
Tightness test of the filling end piece		**X**	
Tightness test of the breakaway coupling		**X**	
Tightness test of pipeline systems and threaded joints		**X**	
Conductivity test of the set of breakaway coupling-hose-end piece			**X**

6.2. ERROR MESSAGES OF THE DISPENSER

In every defect of the OCEAN CNG dispenser equipped with the TBELTM counter, delivery is interrupted and the display shows an error message ("E" + error code). Depending on the message type, either the whole dispenser is blocked (fatal error), or only the part where the fault appeared is blocked. Important error messages are saved in the counter memory, where they can be shown using parameter P06 (Error history) and P13 (Error statistics).

9.2.1. ERROR MESSAGE TYPES

Table 25 - Error message types

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

9.2.2. ERROR MESSAGE CODES

Table 26 - Code of error messages of the dispenser equipped with the TBELTM counter

Code of message	Type of message	Cause of error message	Removing error message
OFF	FATAL	**Failure of powering voltage**	It is necessary to turn off the dispenser counter power source for approx. 5 seconds and then turn the source back on.
STOP	LOCK	**The STOP button was pressed, but the nozzle was not returned.**	Return the nozzle, possibly press the STOP button.
E 1	NFAT	**Display error** - error of LCD segment.	Display replacement necessary. Call an employee of the authorized service company.
E 5	NFAT	**Display error** - error of display communication.	Display connection error. Call an employee of the authorized service company.
E 6	NFAT	**Error of electromechanical totalizer**	The totalizer is disconnected, or does not communicate. Call an employee of the authorized service company.
E 7	NFAT	**Error of electromechanical totalizer coil**	Totalizer replacement necessary. Call an employee of the authorized service company.

Code of message	Type of message	Cause of error message	Removing error message
E10	NFAT	**Error of temperature sensor**	Pt100 temperature sensor connection error. Call an employee of the authorized service company.
E12	FATAL	**Error of temperature compensation device** The PDEINP unit is disconnected or has a wrong check sum	Check the cable, or exchange the PDEINP unit. Call an employee of the authorized service company.
E13	FATAL	**Program error** - different CRC of program memory. Error message detail: 1 - Non-metrology part of program damaged 2 - Metrology part of program damaged	Carry out reprogramming of the counter or exchange the processor unit. Call an employee of the authorized service company.
E15	FATAL	**Maximum gas flow rate exceeded**	Check the value of parameter P65. Call an employee of the authorized service company.
E17	NFAT	**Data line error** Error of serial communication line, faulty communicated data. Controlling computer does not send the confirmation <ACK> in the required time period.	Call an employee of the authorized service company.
E18	ALERT	**Data line error** Defect of serial communication line, loss of communication.	Controlling computer not connected, or communication cable not connected correctly. Check the function of the data converter. When the error is repeated, call an employee of the authorized service company.
E20	NFAT	**Loss of power during delivery** The last delivery was interrupted due to a power loss.	Check the dispenser power supply and interference effects (power source). When the error is repeated, call an employee of the authorized service company.
E21	NFAT	**Incorrect position of switches SW1-1 & SW1-4**	Call an employee of the authorized service company.
E22	FATAL	**Damaged values of configuration parameters in memory FRAM** Error message detail: 1 - Different CRC values of configuration parameters 2 - Value of a parameter is out of range	Call an employee of the authorized service company.
E23	FATAL	**Damaged values of last delivery in FRAM** Different CRC of values of latest delivery.	Call an employee of the authorized service company.
E24	FATAL	**Damaged values of decimal remains of electromechanical totalizers in FRAM** Different CRC of values of latest remains of electromechanical totalizers.	Turn the counter off and on. If the error message appears again, call an employee of the authorized service company.
E25	FATAL	**Damaged values of electronic totalizers in FRAM** Different CRC of values of electronic totalizers.	Turn the counter off and on. If the error message appears again, call an employee of the authorized service company.
E26	ALERT	**TOTAL STOP button pressed**	Just let go of the button.
E28	NFAT	**Unauthorized service controller** An unauthorized service controller was used to access the service mode.	Unauthorized service controller.
E29	NFAT	**Wrong password** A wrong password was entered to access the service mode.	Enter the correct manager password. If you forgot the password, call an employee of the authorized service company.
E30	NFAT	**Product unit price is zero**	Set the non-zero product unit price on the POS (when P12=0), or in parameter P03 (when P12=3).

Code of message	Type of message	Cause of error message	Removing error message
E60	NFAT	**Pressure system not airtight**	Check tightness of the pressure system. If the error repeats, call an employee of the authorized service company.
E61	NFAT	**Insufficient increase of pressure during airtightness test**	Check tightness of the pressure system. If the error repeats, call an employee of the authorized service company.
E64	NFAT	**Insufficient increase of pressure during test dose of temperature compensation.**	Check tightness of the pressure system. If the error repeats, call an employee of the authorized service company.
E66	NFAT	**Disconnected or faulty pressure sensor**	Check the connection of the pressure sensor. If the error repeats, call an employee of the authorized service company.
E67	FATAL	**Hose broken off**	Carry out repair of breakaway coupling. After cancelling the error message, it is necessary to turn the counter powering off and on. Call an employee of the authorized service company.
E70	NFAT	**Meter error - no response**	Check the mass meter connection and setting the meter communication parameters. Call an employee of the authorized service company.
E71	NFAT	**Error in communication with meter - time to receive response expired**	Check the connection of the mass meter. Check the settings on the meter's communication parameters. Call an employee of the authorized service company.
E72	NFAT	**Internal meter error**	Call an employee of the authorized service company.
E73	NFAT	**Meter resetting error** The meter failed to reset before commencing delivery.	The error can be caused by the product flowing even before delivery commences. Check the dispenser's internal pressure pipework. If the error repeats, call an employee of the authorized service company.
E74	NFAT	**Meter configuration error** The meter configuration does not comply with the TBELTM counter requirements.	Call an employee of the authorized service company.
E75	NFAT	**Failure of setting of meter zero point** The current value of the meter zero point does not match the value saved in the counter.	Call an employee of the authorized service company.
E76	NFAT	**Damaged saved value of meter's zero point** Saved value of meter's zero point doesn't match	Call an employee of the authorized service company.
E80	NFAT	**Wrong serial number of main display** The main display serial number is different than the saved one.	Call an employee of the authorized service company.
E81	NFAT	**Wrong serial number of slave display** The secondary (slave) display serial number is different than the saved one.	Call an employee of the authorized service company.
E82	NFAT	**Wrong serial number of electromechanical totalizer** The electromechanical totalizer serial number is different than the saved one.	Call an employee of the authorized service company.
E83	NFAT	**Wrong serial number of temperature measuring unit PDEINP** The temperature measuring unit PDEINP serial number is different than the saved one.	Call an employee of the authorized service company.
E84	NFAT	**Wrong serial number of mass meter** The mass meter serial number is different than the saved one.	Call an employee of the authorized service company.

9.2.3. EVENT LOGGER

Each TBELTM counter includes an event recording device - i.e. LOGGER. This is an external memory (SD card), which saves all important events concerning the operation of the electronic counter and the dispenser. The logging device is located on the TBELTM board and access to the medium is protected by a cover that can be secured against unauthorized removal with a safety sticker. Logged events serve for service technicians to identify any problem and quickly detect its cause. The logger arranges information into folders by type.

The logger contains the following information:

CONFIG - all changes related to counter parameter settings and dispenser configuration settings
ERROR - log of all errors
FUELING - log of all deliveries
SERVICE - log of all accesses into service mode, service password changes etc.
SYSTEM - log of events concerning turning powering off and on, counter resets etc.
CNG - log of calculations of temperature compensation and airtightness tests

6.3. SERVICE OF OCEAN CNG DISPENSERS

The service of dispensers that are installed in Czech Republic is ensured by:

SPEED CZECH SERVICE, s.r.o.
Pražská 2325/68
678 01 Blansko, Czech Republic
info@speedcz.com, www. speedcz.com

HOT-LINE: +420 602 562 277

The service of dispensers that are installed abroad is ensured by authorized service company.

6.3.1. WARRANTY AND COMPLAINTS

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

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

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

6.3.2. DISPENSER ACCESSORIES AND DOCUMENTATION

- Installation and User Manual
- Certificate on quality and completeness
- Certificate of Warranty
- EU - Declaration of conformity
- Data Sheet of CNG dispenser
- Certificates of all measurement transducer (meters)
- Inspection certificates 3.1 of CNG filters, if installed
- TÜV certificates of CNG filters acc. 2014/68/EU (PED), if installed
- CNG dispenser Inspection certificate - hydrostatic pressure test (430 bar)
- CNG dispenser performance tests protocols according the OIML R139
- TÜV certificate of CNG dispenser acc. 2014/68/EU (PED)
- IR controller for counter operation and setting
  (may be ordered with dispensers equipped with the TBELTM counter)
- Foundation frame (may be specially ordered)

Spare parts catalogue

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

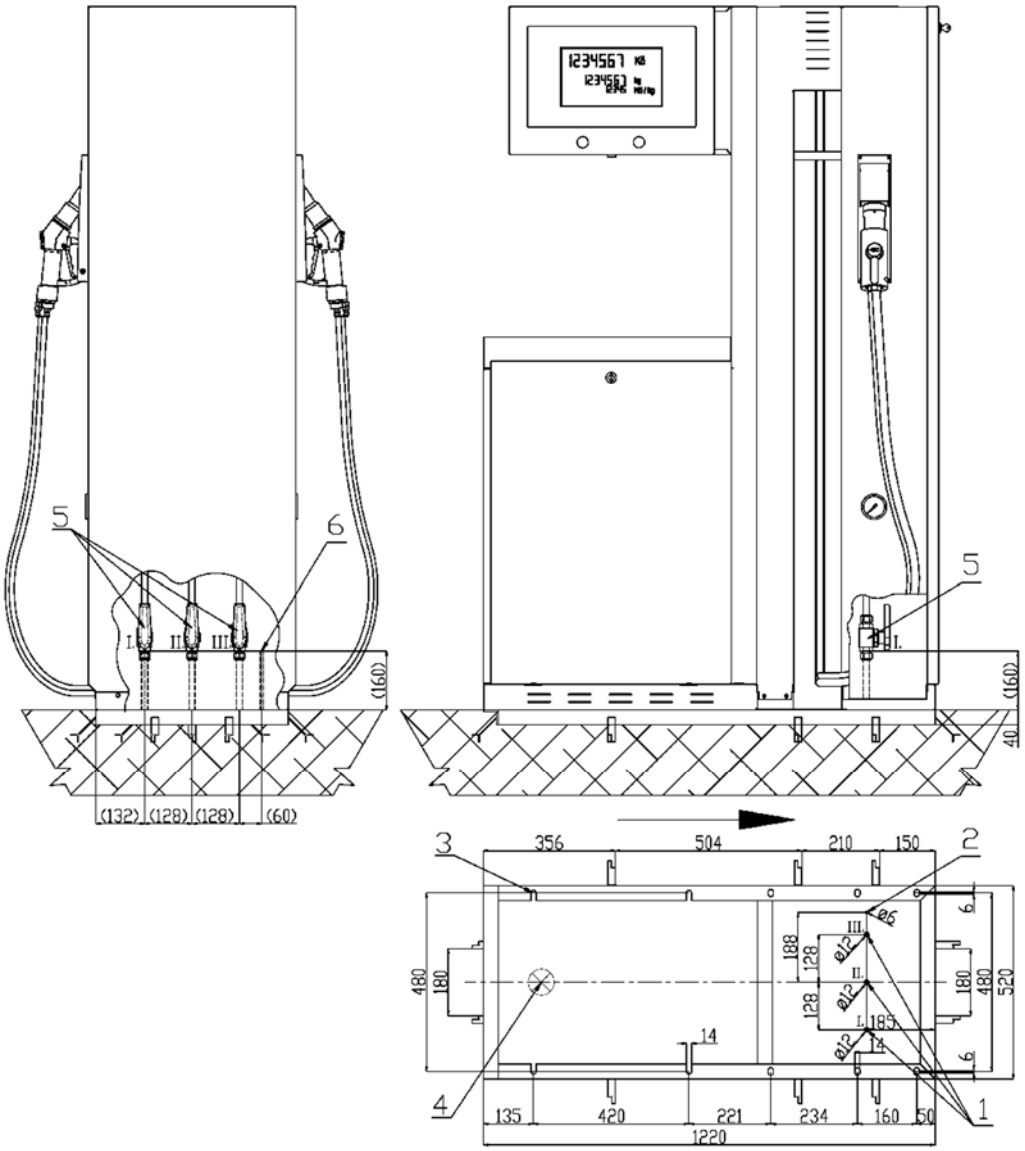
NOTES:

APPENDIX 1 - FOUNDATION PLANS

APPENDIX 1.1 – FOUNDATION PLANS OF OCEAN EURO CNG DISPENSERS

APPENDIX 1.1.1 – PLAN OF BMP4032.OED/CNG & BMP4031.OER(L)/CNG

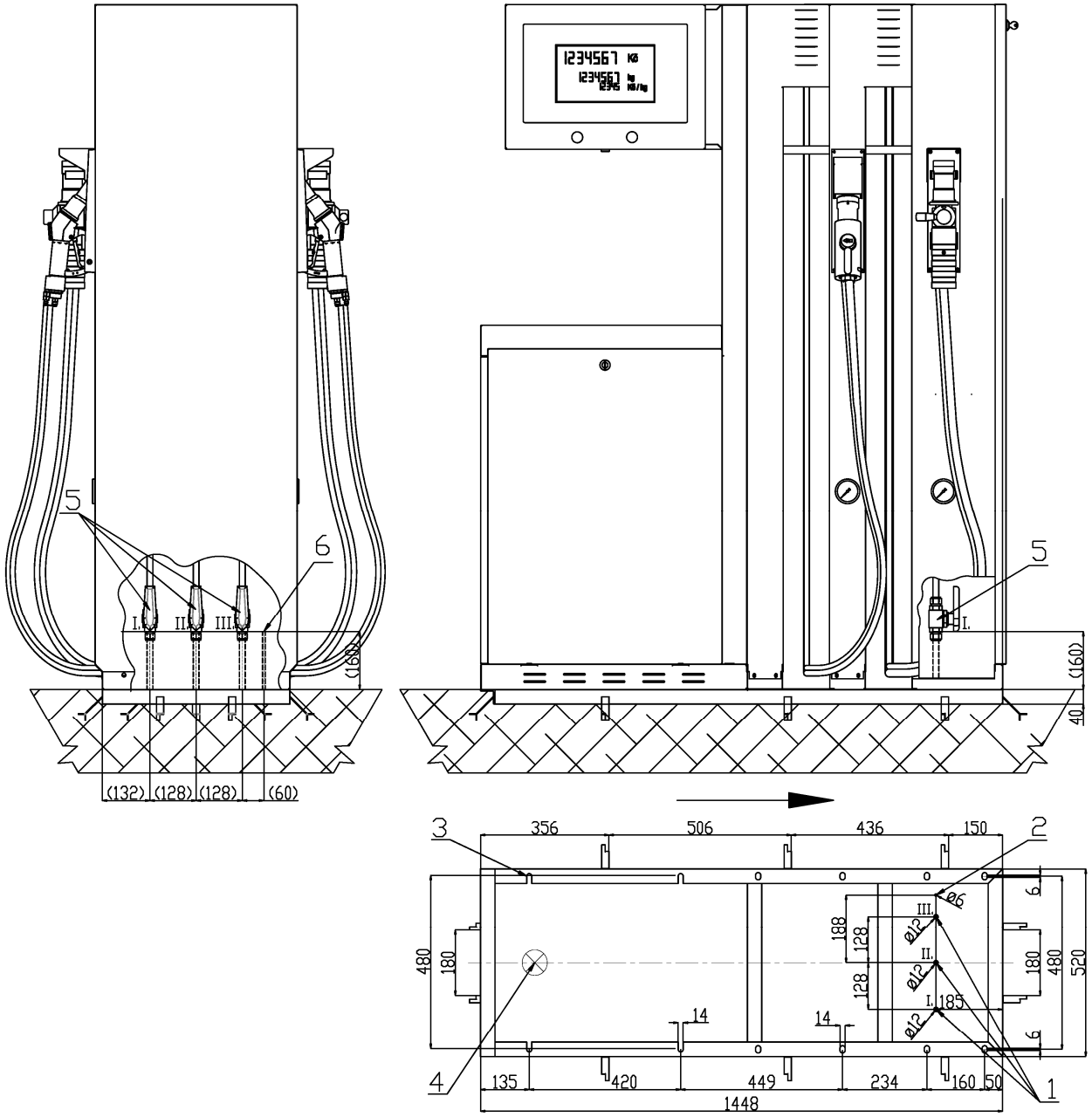
Plan is valid for following dispenser's types too:
BMP4012.OED/CNG & BMP4011.OER(L)/CNG – dispensers connected to one pressure pipeline of pressure section I. only
BMP4022.OED/CNG & BMP4021.OER(L)/CNG – used pipeline of pressure sections I. and II. only



Pos.	Description	Pos.	Description
1	Axis of the inlet filling pressure pipeline with ø12 or ø16 (high flow delivery /H) for pressure sections I, II and III (I – low, II – medium, III - high pressure)	4	Output of electrical and data cables
		5	Input ball valve for filling pipeline with an outer diameter of ø12 (standard delivery) or ø16 (high flow delivery /H). The valve is a part of the dispenser.
2	Axis of the return ventilation pipeline with ø6 (outer diameter) for the discharge of residual gas from the filling end piece after its disconnection from the vehicle storage tank.	6	Output ventilation pipeline with ø6 (outer diameter)
3	Dispenser anchoring – anchoring holes	⇨	Recommended vehicle arrival direction to the dispenser

APPENDIX 1.1.2 – PLAN OF BMP4034.OED/CNG/H2 & BMP4032.OER(L)/CNG/H

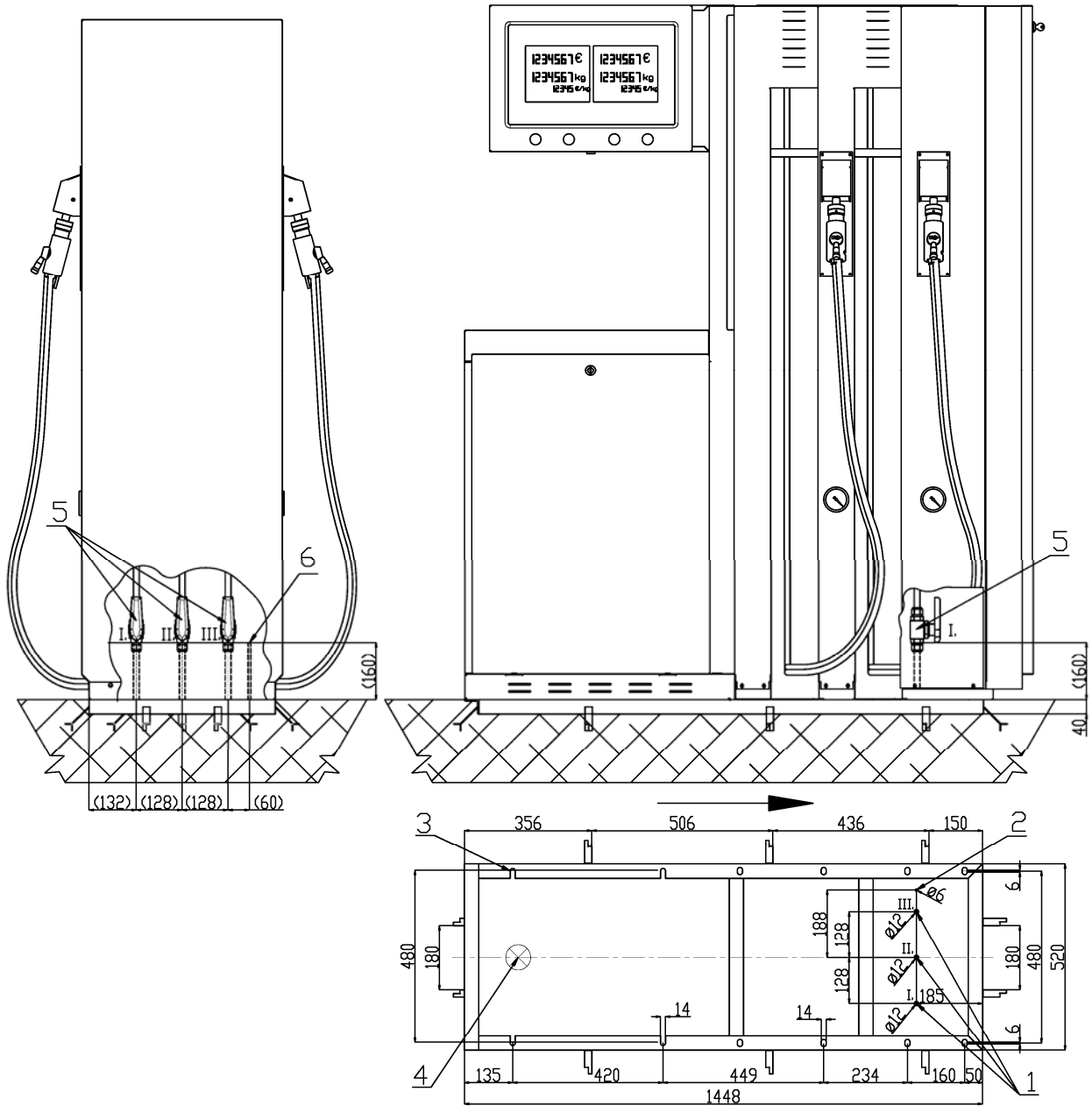
Plan is valid for following dispenser's types too:
BMP4014.OED/CNG/H2 & BMP4012.OER(L)/CNG/H – used pipeline of pressure section I. only
BMP4024.OED/CNG/H2 & BMP4022.OER(L)/CNG/H – used pipeline of pressure sections I. and II. only



Pos.	Description	Pos.	Description
1	Axis of the inlet filling pressure pipeline with ø12 or ø16 (high flow delivery /H) for pressure sections I, II and III (I - low; II - medium; III - high pressure)	4	Output of electrical and data cables
		5	Input ball valve for filling pipeline with an outer diameter of ø12 (standard delivery) or ø16 (high flow delivery /H). The valve is a part of the dispenser.
2	Axis of the return ventilation pipeline with ø6 (outer diameter) for the discharge of residual gas from the filling end piece after its disconnection from the vehicle storage tank.	6	Output ventilation pipeline with ø6 (outer diameter)
		⇨	Recommended vehicle arrival direction to the dispenser
3	Dispenser anchoring – anchoring holes		

APPENDIX 1.1.3 – PLAN OF BMP4034.OED/CNG-4C & BMP4032.OER(L)/CNG-2C

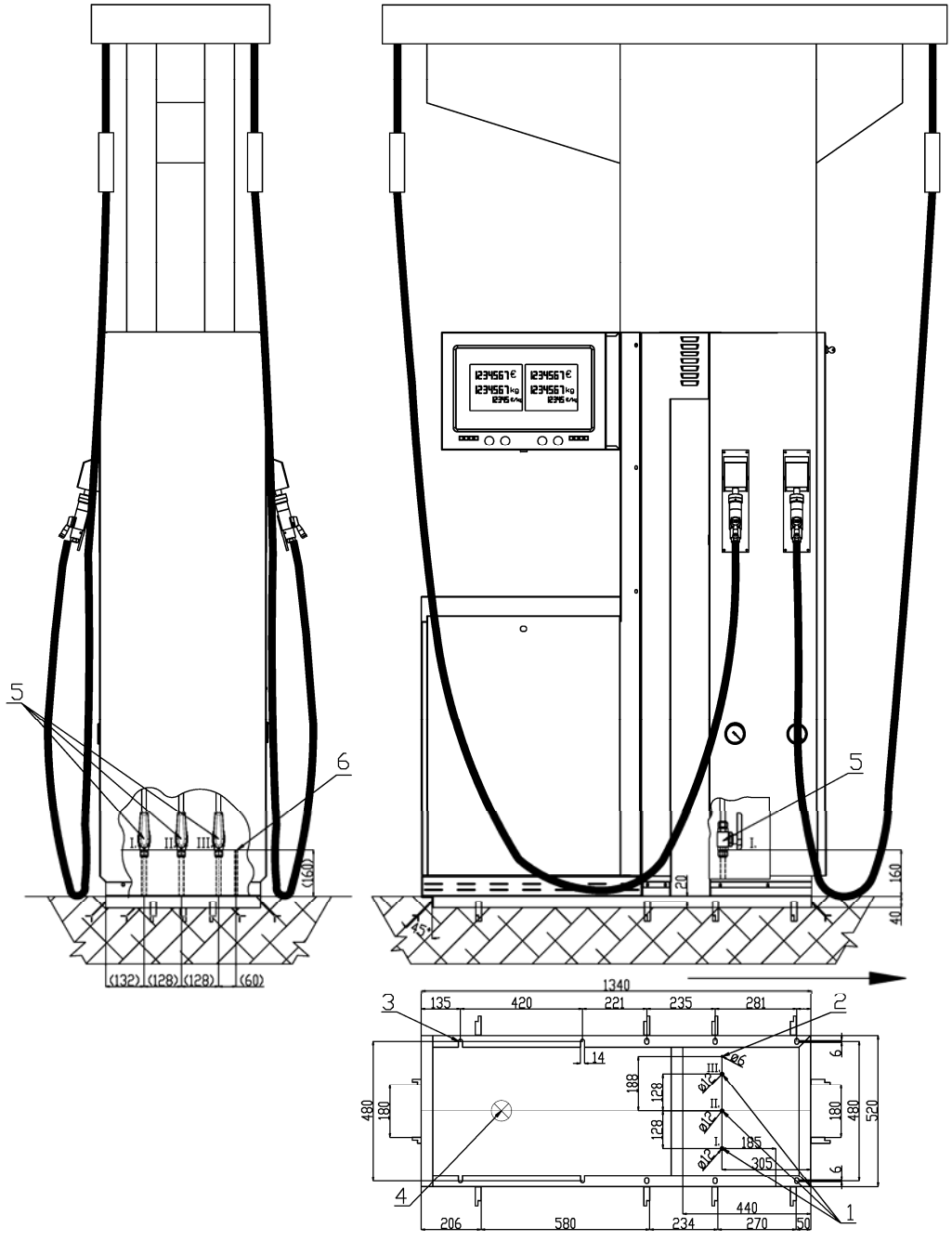
Plan is valid for following dispenser's types too:
BMP4014.OED/CNG-4C & BMP4012.OER(L)/CNG-2C – used pipeline of pressure section I. only
BMP4024.OED/CNG-4C & BMP4022.OER(L)/CNG-2C – used pipeline of pressure sections I. and II. only



Pos.	Description	Pos.	Description
1	Axis of the inlet filling pressure pipeline with ø16 for pressure sections I, II and III (I - low; II - medium; III - high pressure)	4	Output of electrical and data cables
		5	Input ball valve for filling pipeline with an outer diameter of ø16. The valve is a part of the dispenser.
2	Axis of the return ventilation pipeline with ø6 (outer diameter) for the discharge of residual gas from the filling end piece after its disconnection from the vehicle storage tank.	6	Output ventilation pipeline with ø6 (outer diameter)
		⇨	Recommended vehicle arrival direction to the dispenser
3	Dispenser anchoring – anchoring holes		

APPENDIX 1.1.4 – PLAN OF BMP4034.OED/CNG-4C/HE & BMP4032.OER(L)/CNG-2C/HE

Plan is valid for following dispenser's types too:
BMP4014.OED/CNG-4C/HE & BMP4012.OER(L)/CNG-2C/HE – used pipeline of pressure section I. only
BMP4024.OED/CNG-4C/HE & BMP4022.OER(L)/CNG-2C/HE – used pipeline of pressure sections I. and II. only

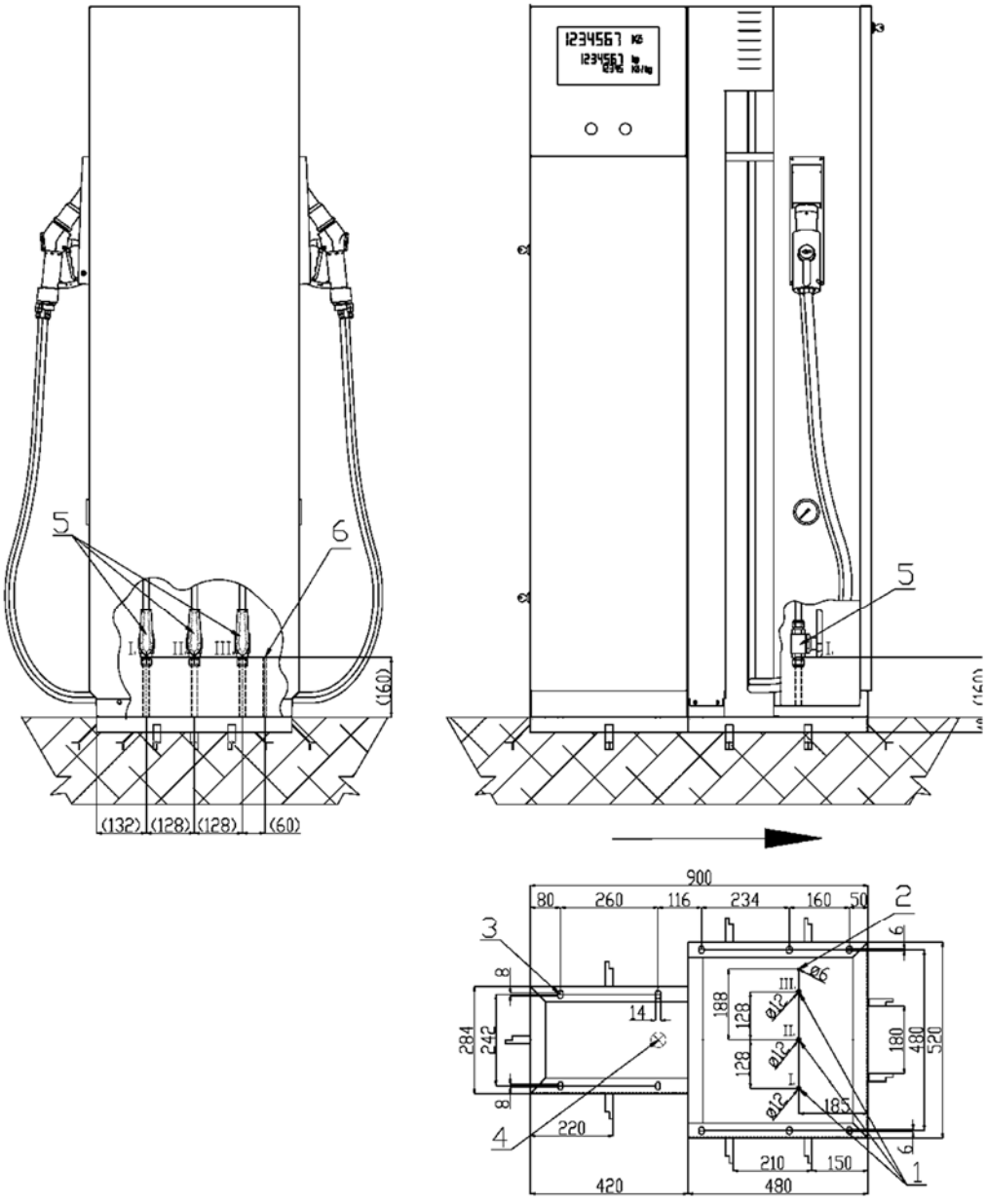


Pos.	Description	Pos.	Description
1	Axis of the inlet filling pressure pipeline with ø16 for pressure sections I, II and III (I - low; II - medium; III - high pressure)	4	Output of electrical and data cables
		5	Input ball valve for filling pipeline with an outer diameter of ø16. The valve is a part of the dispenser.
2	Axis of the return ventilation pipeline with ø6 (outer diameter) for the discharge of residual gas from the filling end piece after its disconnection from the vehicle storage tank.	6	Output ventilation pipeline with ø6 (outer diameter)
		⇨	Recommended vehicle arrival direction to the dispenser
3	Dispenser anchoring – anchoring holes		

APPENDIX 1.2 – FOUNDATION PLANS OF OCEAN SMART CNG DISPENSERS

APPENDIX 1.2.1 – PLAN OF BMP4032.OSD/CNG & BMP4031.OSR(L)/CNG

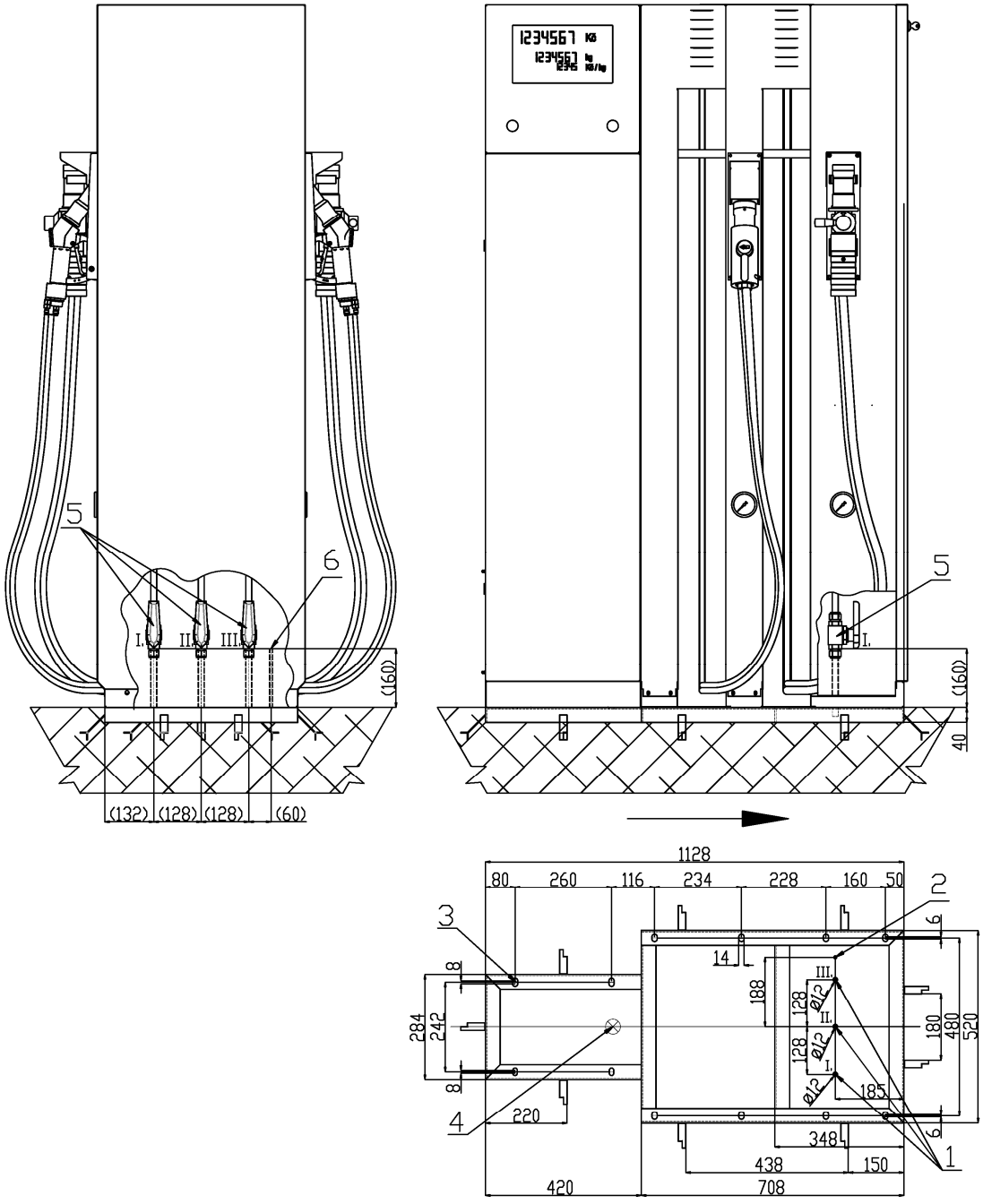
Plan is valid for following dispenser's types too:
BMP4012.OSD/CNG & BMP4011.OSR(L)/CNG – used pipeline of pressure section I. only
BMP4022.OSD/CNG & BMP4021.OSR(L)/CNG – used pipeline of pressure sections I. and II. only



Pos.	Description	Pos.	Description
1	Axis of the inlet filling pressure pipeline with ø12 or ø16 (high flow delivery /H) for pressure sections I, II and III (I - low ; II - medium ; III - high pressure)	4	Output of electrical and data cables
		5	Input ball valve for filling pipeline with an outer diameter of ø12 (standard delivery) or ø16 (high flow delivery /H). The valve is a part of the dispenser.
2	Axis of the return ventilation pipeline with ø6 (outer diameter) for the discharge of residual gas from the filling end piece after its disconnection from the vehicle storage tank.	6	Output ventilation pipeline with ø6 (outer diameter)
3	Dispenser anchoring – anchoring holes	⇨	Recommended vehicle arrival direction to the dispenser

APPENDIX 1.2.2 – PLAN OF BMP4034.OSD/CNG/H/H & BMP4032.OSR(L)/CNG/H

Plan is valid for following dispenser's types too:
BMP4014.OED/CNG/H2 & BMP4012.OER(L)/CNG/H – used pipeline of pressure section I. only
BMP4024.OED/CNG/H2 & BMP4022.OER(L)/CNG/H – used pipeline of pressure sections I. and II. only

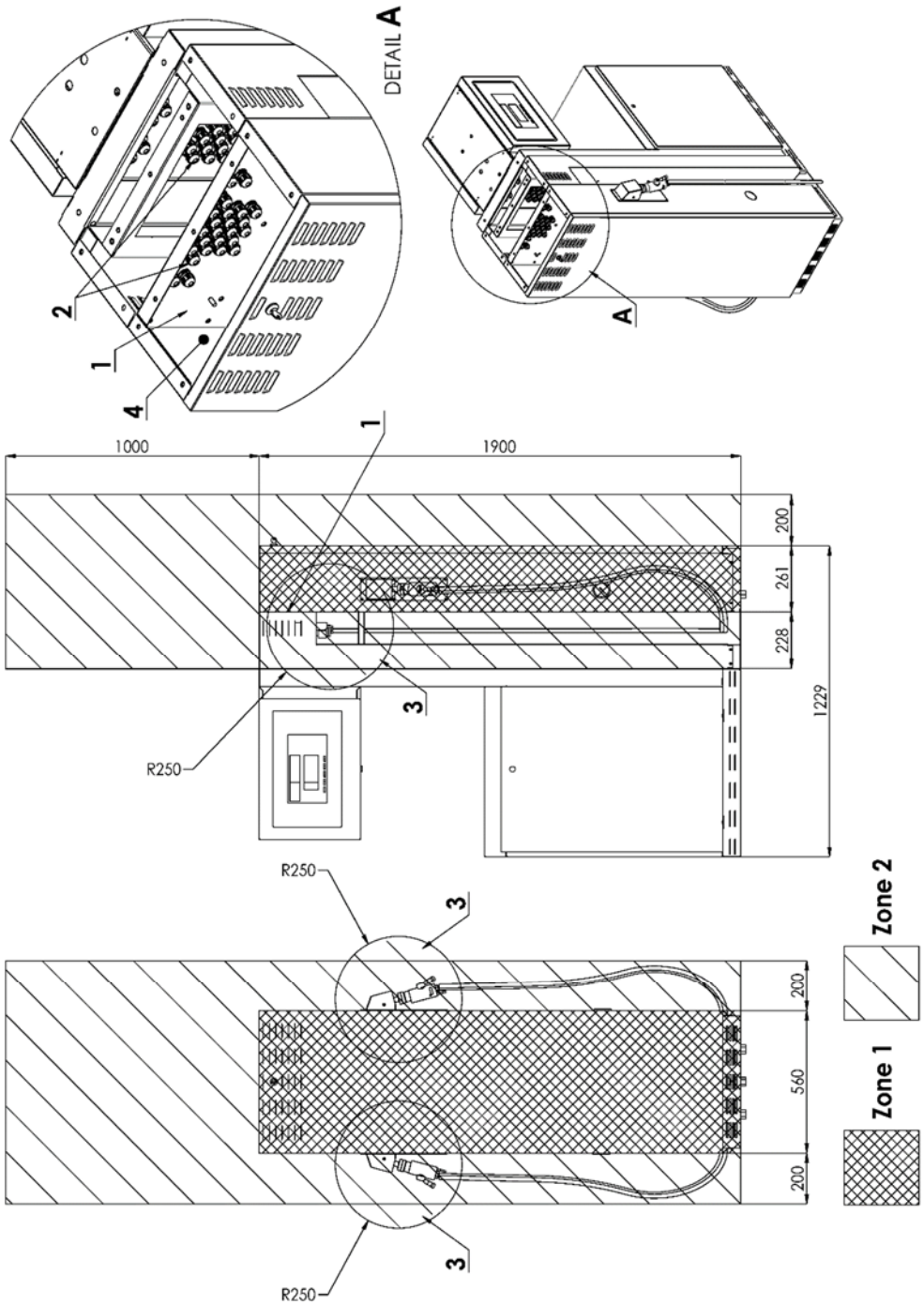


Pos.	Description	Pos.	Description
1	Axis of the inlet filling pressure pipeline with ø12 or ø16 (high flow delivery /H) for pressure sections I, II and III. (I - low ; II - medium ; III - high pressure)	4	Output of electrical and data cables
		5	Input ball valve for filling pipeline with an outer diameter of ø12 (standard delivery) or ø16 (high flow delivery /H). The valve is a part of the dispenser.
2	Axis of the return ventilation pipeline with ø6 (outer diameter) for the discharge of residual gas from the filling end piece after its disconnection from the vehicle storage tank.	6	Output ventilation pipeline with ø6 (outer diameter)
		⇨	Recommended vehicle arrival direction to the dispenser
3	Dispenser anchoring – anchoring holes		

APPENDIX 2 - CLASSIFICATION OF DISPENSER ZONES ACCORDING TO EN 60079-10-1

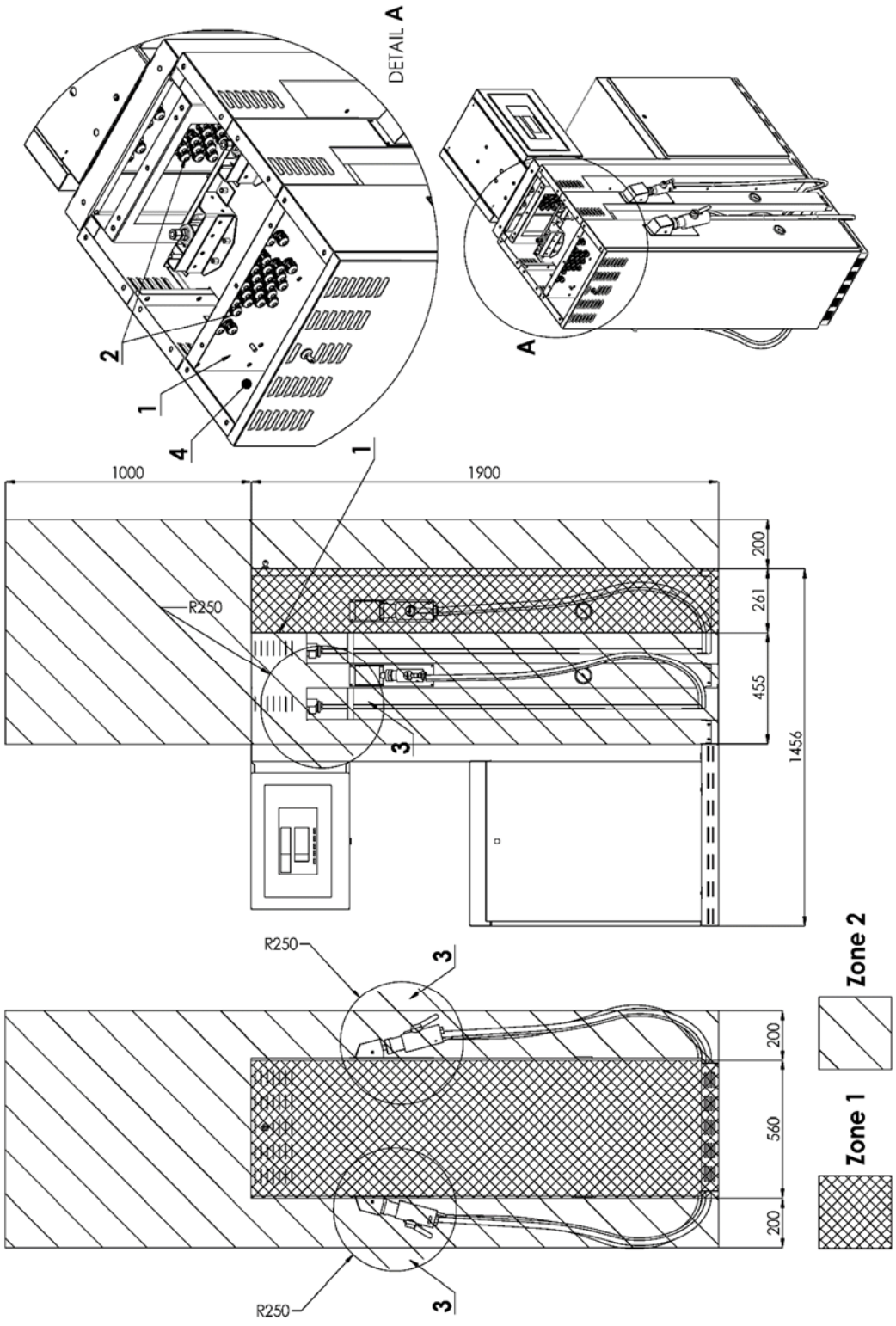
APPENDIX 2.1 – ZONES OF OCEAN EURO CNG DISPENSERS

APPENDIX 2.1.1 – ZONES OF OCEAN EURO CNG DISPENSERS IN BMP4012.OED /CNG MODEL



Pos.	Description	Pos.	Description
1	Vertical vapour barrier - type 1 (according to EN 13617-1)	3	ZONE 2 appears in the vicinity of the hose hanger, filling end piece and breakaway coupling only during CNG delivery
2	Non-explosive cable gland Ex e II (IP67)	4	Inner space of CNG aggregate – ZONE 1

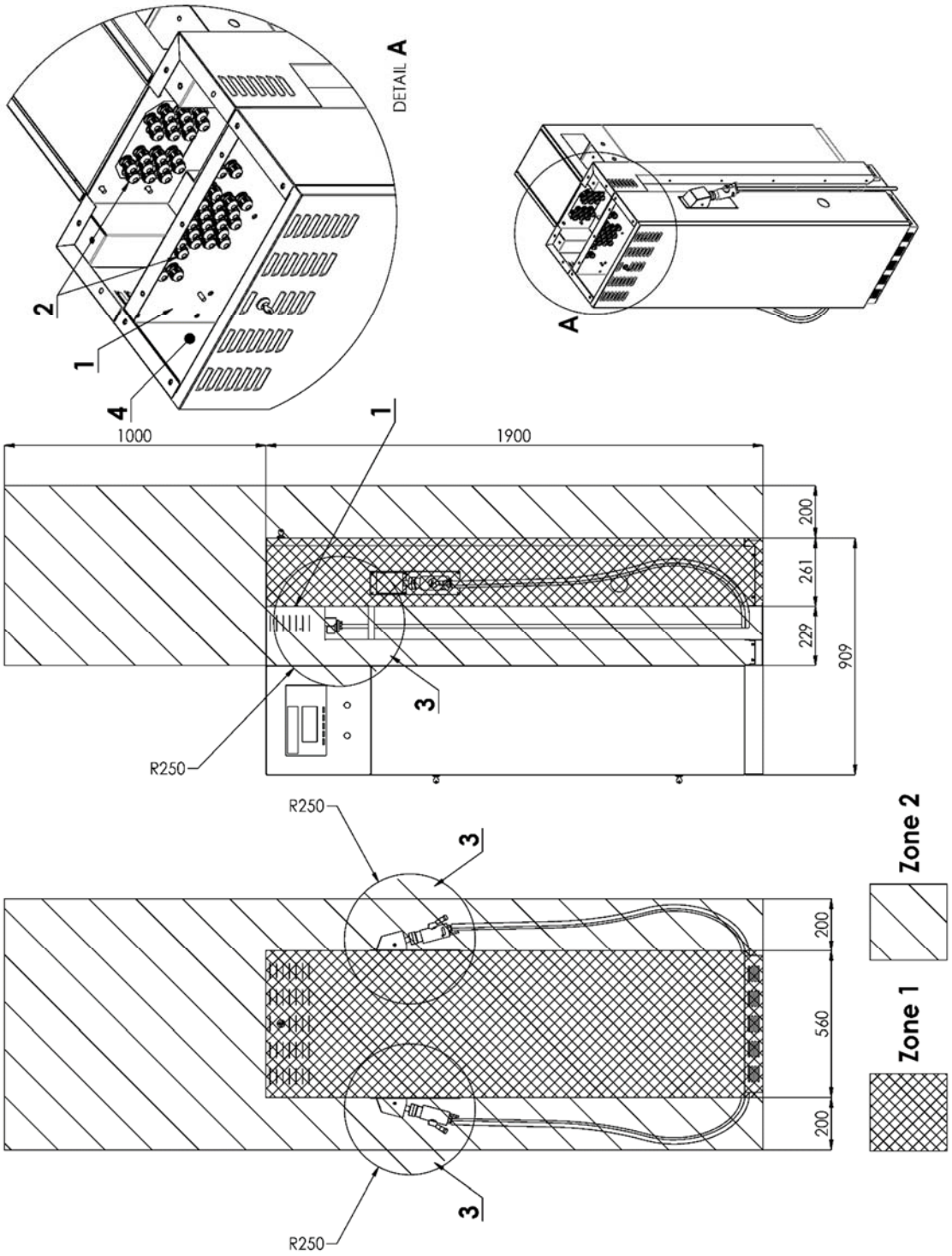
APPENDIX 2.1.2 – ZONES OF OCEAN EURO CNG DISPENSERS IN BMP4024.OED /CNG MODEL



Pos.	Description	Pos.	Description
1	Vertical vapour barrier - type 1 (according to EN 13617-1)	3	ZONE 2 appears in the vicinity of the hose hanger, filling end piece and breakaway coupling only during CNG delivery
2	Non-explosive cable gland Ex e II (IP67)	4	Inner space of CNG aggregate – ZONE 1

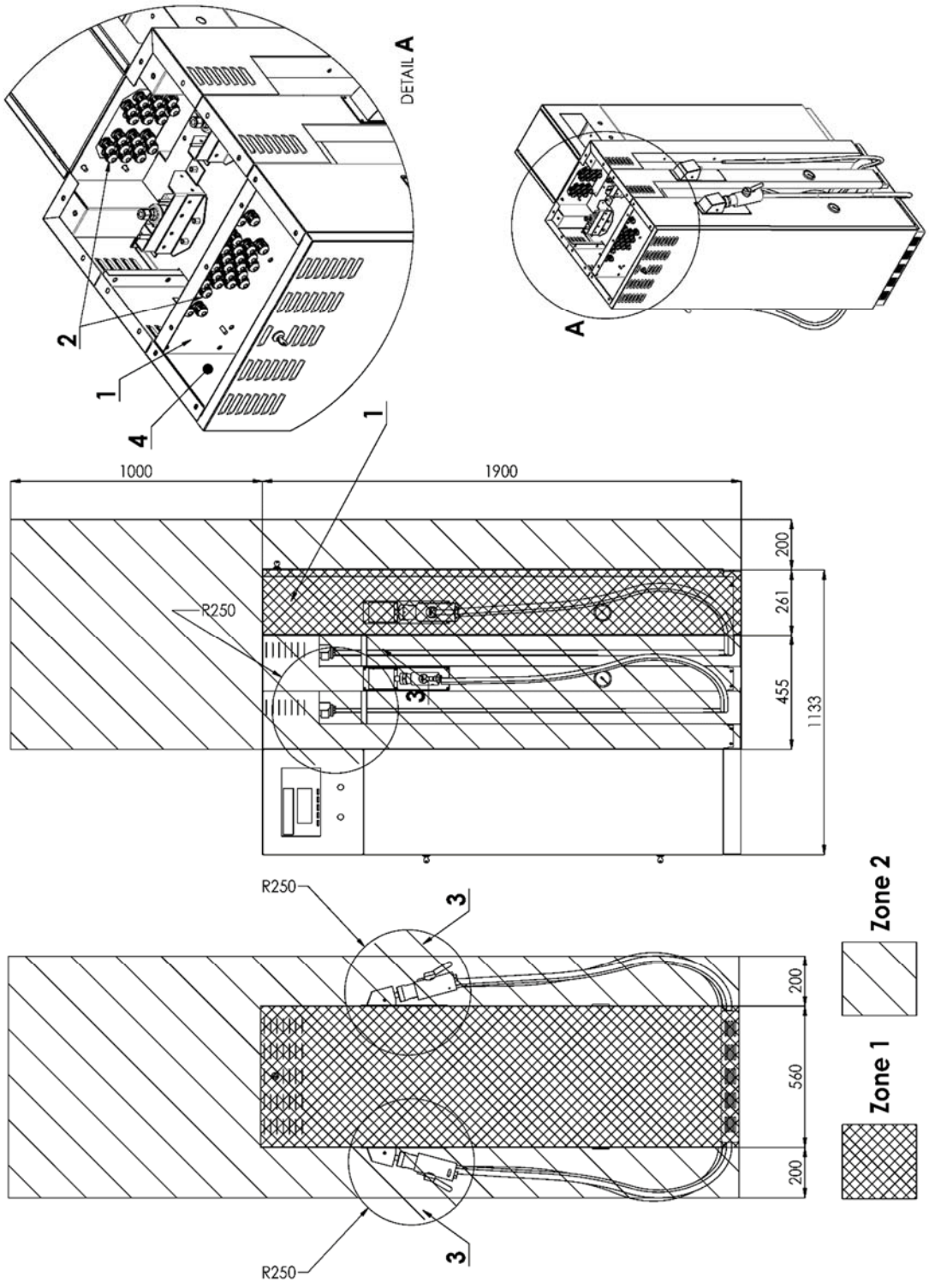
APPENDIX 2.2 – ZONES OF OCEAN SMART CNG DISPENSERS

APPENDIX 2.2.1 – ZONES OF OCEAN SMART CNG DISPENSERS IN BMP4012.OSD /CNG MODEL



Pos.	Description	Pos.	Description
1	Vertical vapour barrier - type 1 (according to EN 13617-1)	3	ZONE 2 appears in the vicinity of the hose hanger, filling end piece and breakaway coupling only during CNG delivery
2	Non-explosive cable gland Ex e II (IP67)	4	Inner space of CNG aggregate – ZONE 1

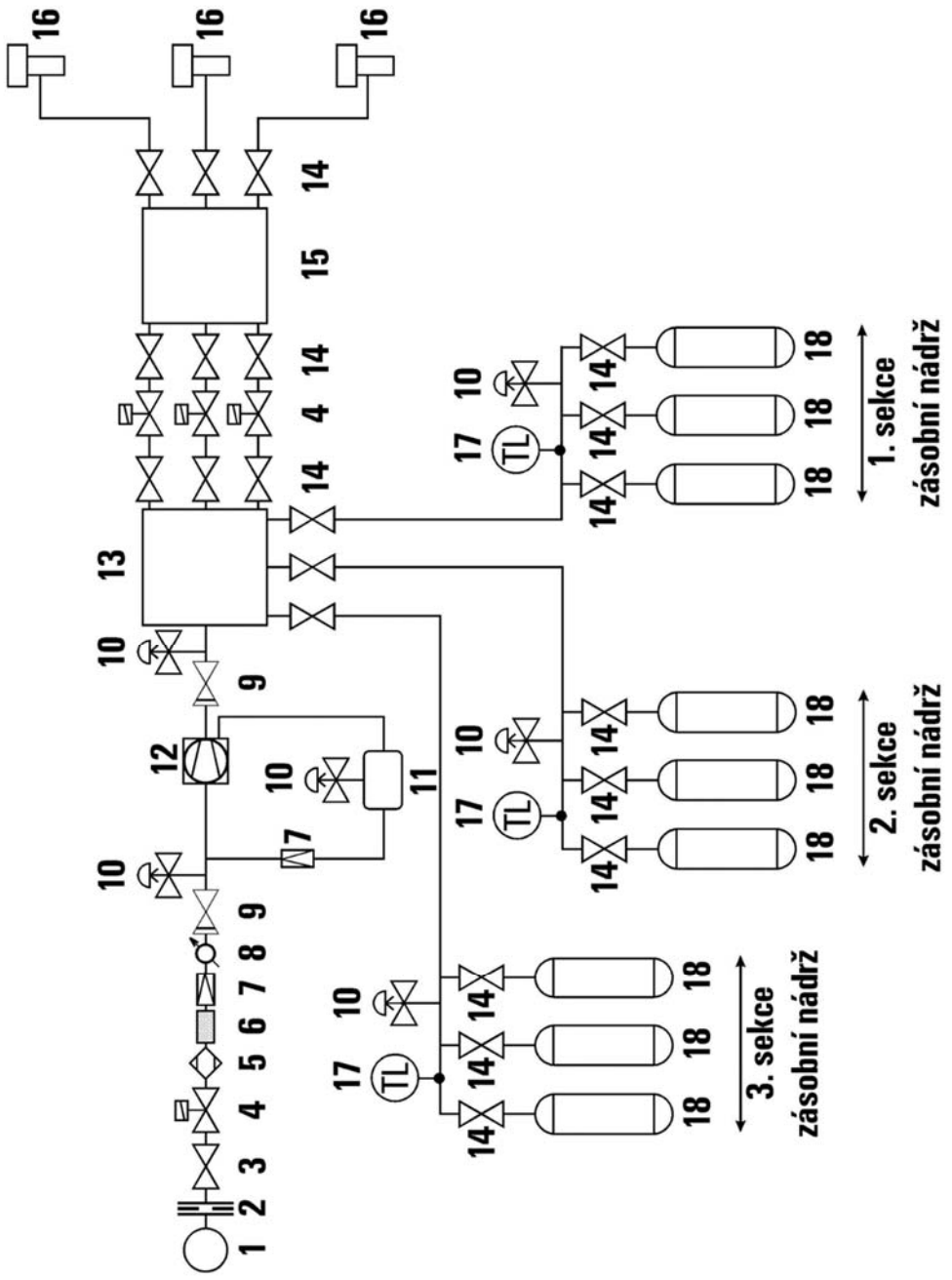
APPENDIX 2.2.2 – ZONES OF OCEAN SMART CNG DISPENSERS IN BMP4024.OSD /CNG MODEL



Pos.	Description	Pos.	Description
1	Vertical vapour barrier - type 1 (according to EN 13617-1)	3	ZONE 2 appears in the vicinity of the hose hanger, filling end piece and breakaway coupling only during CNG delivery
2	Non-explosive cable gland Ex e II (IP67)	4	Inner space of CNG aggregate – ZONE 1

APPENDIX 3 – TECHNOLOGICAL DIAGRAMS

APPENDIX 3.1 – TECHNOLOGICAL DIAGRAM OF THE CNG FUEL STATION

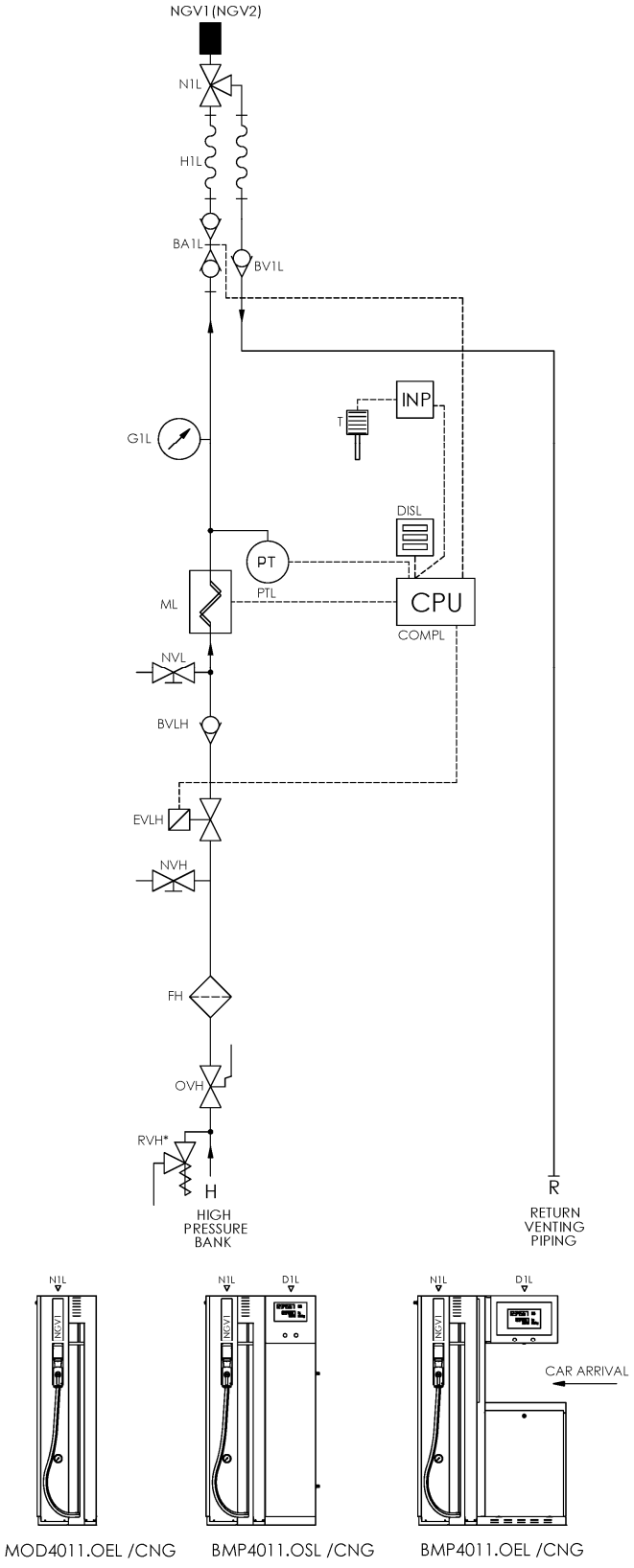


Legend:

1. Gas pipeline
2. Insulating joint
3. Main gas shut-off valve
4. Automatic shut-off valve
5. Gas drying
6. Filter
7. Regulator
8. Gas meter
9. Return fitting
10. Safety valve
11. Expansion tank
12. Compressor
13. Distributor in front of the storage tank
14. Gas shut-off valve
15. Distributor in front of the dispenser
16. Dispenser
17. Pressure gauge
18. Pressure vessel (reservoir, cylinder)

APPENDIX 3.2 – DIAGRAMS OF DISPENSERS CONNECTED TO ONE PRESSURE RESERVOIR

APPENDIX 3.2.1 – DIAGRAM OF BMP4011.OEL/CNG(/H) & BMP4011.OSL/CNG(/H)

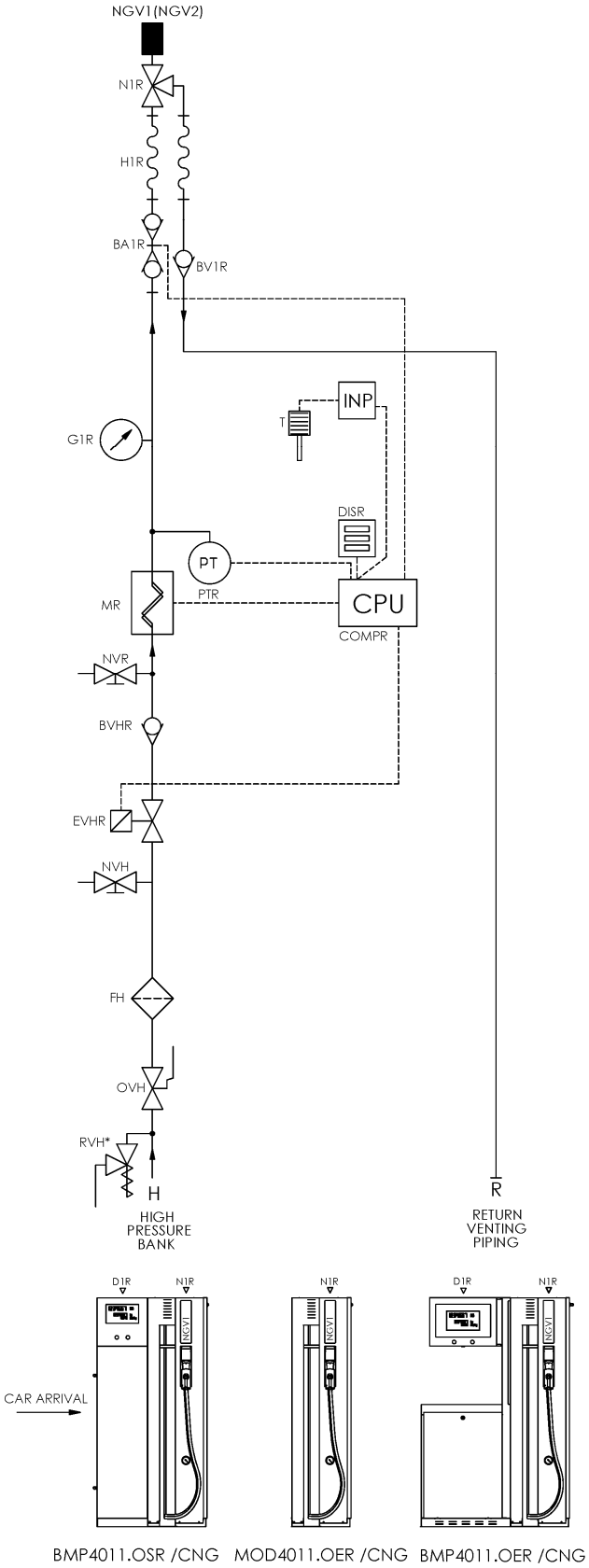


Legend:

H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVH	Inlet shut-off valve (inlet to the dispenser)
FH	Inlet mechanical filter
NVH, NVL, NV1L	Needle discharge valve
EVHR	Electromagnetic control valve
BVHL, BV1L	Check valve
ML	Mass meter
PTL	Electronic pressure sensor
G1L	Manometer
BA1L	Breakaway coupling
H1L	Delivery hose
N1L	Delivery nozzle
COMPL	Electronic counter
DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.2.2 – DIAGRAM OF BMP4011.OER/CNG(/H) & BMP4011.OSR/CNG(/H)

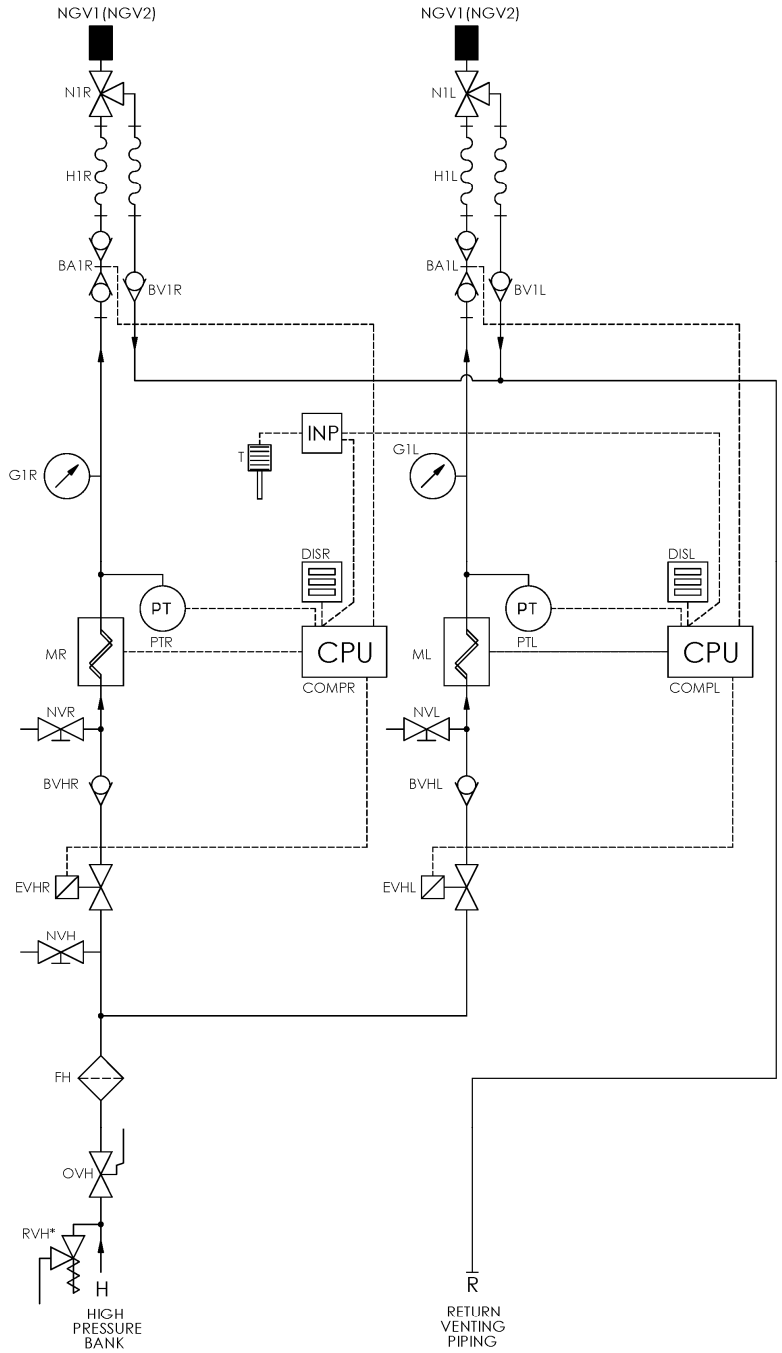


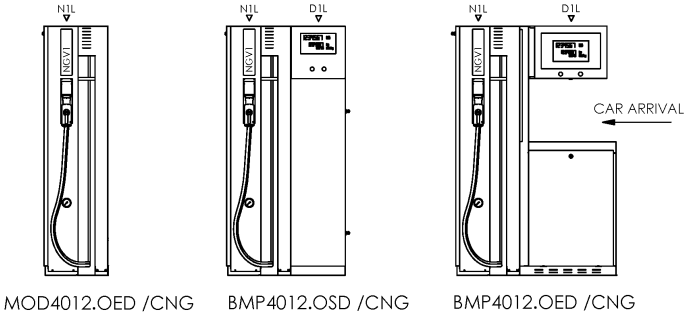
Legend:

H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVH	Inlet shut-off valve (inlet to the dispenser)
FH	Inlet mechanical filter
NVH, NVR, NV1R	Needle discharge valve
EVHR	Electromagnetic control valve
BVHR, BV1R	Check valve
MR	Mass meter
PTR	Electronic pressure sensor
G1R	Manometer
BA1R	Breakaway coupling
H1R	Delivery hoses
N1R	Delivery nozzles
COMPR	Electronic counter
DISR	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.2.3 – DIAGRAM OF BMP4012.OED/CNG(/H) & BMP4012.OSD/CNG(/H)



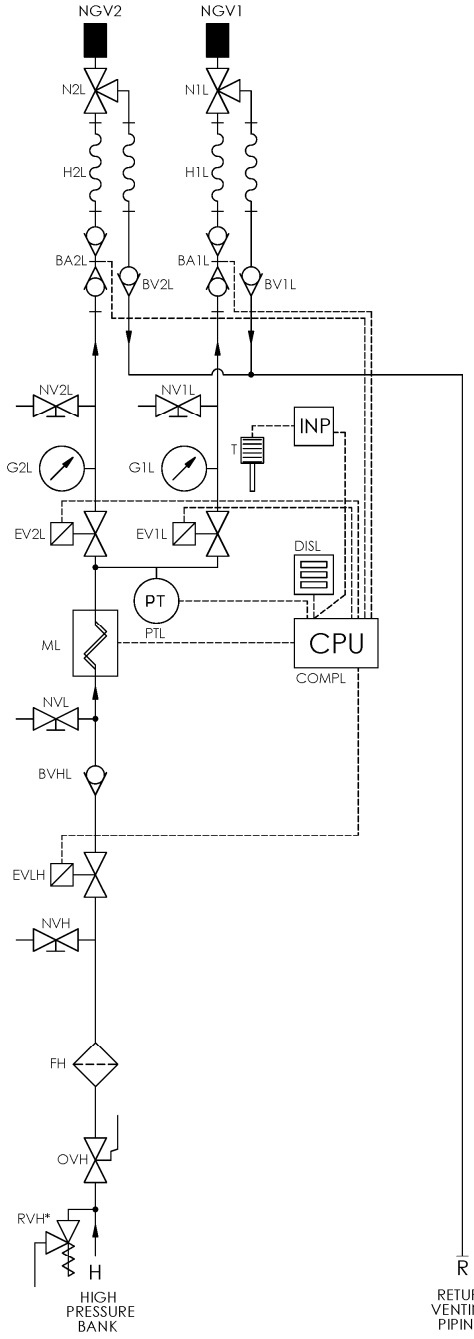


Legend:

H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVH	Inlet shut-off valve (inlet to the dispenser)
FH	Inlet mechanical filter
NVH, NVR, NVL, NV1R, NV1L	Needle discharge valve
EVHR, EVHL	Electromagnetic control valve
BVHR, BVHL, BV1R, BV1L	Check valve
MR, ML	Mass meter
PTR, PTL	Electronic pressure sensor
G1R, G1L	Manometer
BA1R, BA1L	Breakaway coupling
H1R, H1L	Delivery hoses
N1R, N1L	Delivery nozzles
COMPR, COMPL	Electronic counter
DISR, DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

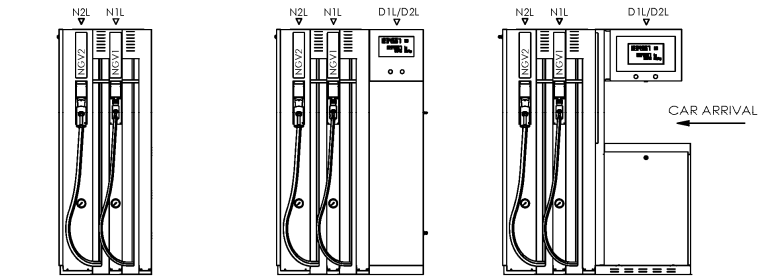
APPENDIX 3.2.4 – DIAGRAM OF BMP4012.OEL/CNG/H & BMP4012.OSL/CNG/H



Legend:

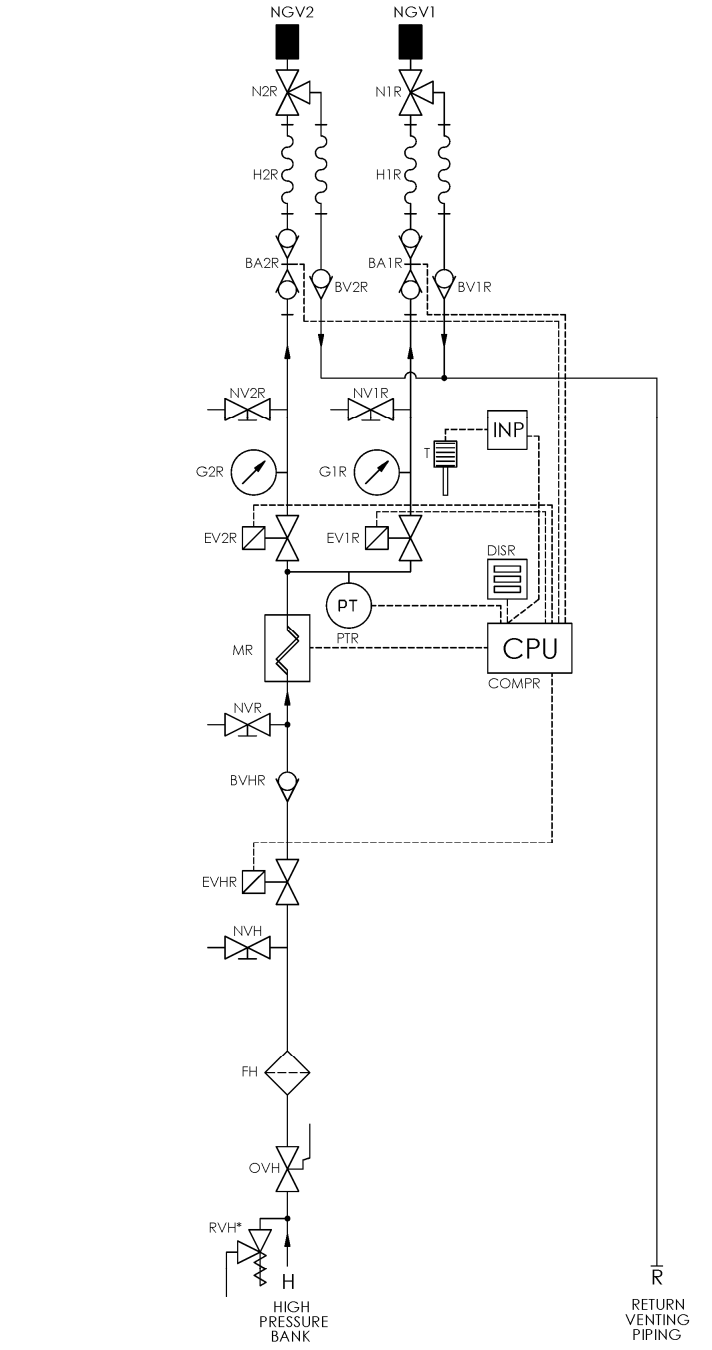
H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVH	Inlet shut-off valve (inlet to the dispenser)
FH	Inlet mechanical filter
NVH, NVL, NV2L, NV1L	Needle discharge valve
EVHL, EV2L, EV1L	Electromagnetic control valve
BVHL, BV2L, BV1L	Check valve
ML	Mass meter
PTL	Electronic pressure sensor
G2L, G1L	Manometer
BA2L, BA1L	Breakaway coupling
H2L, H1L	Delivery hoses
N2L, N1L	Delivery nozzles
COMPL	Electronic counter
DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

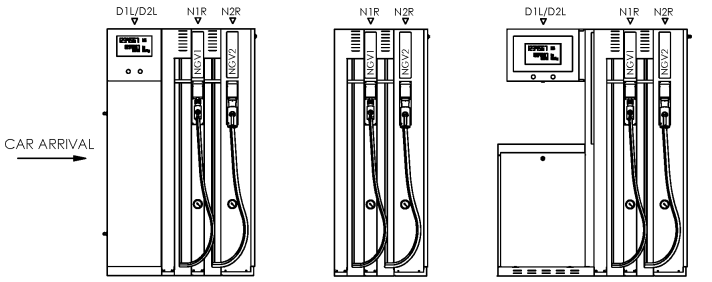
Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).



MOD4012.OEL /CNG/H | BMP4012.OSL /CNG/H | **BMP4012.OEL /CNG/H**

APPENDIX 3.2.5 – DIAGRAM OF BMP4012.OER/CNG/H & BMP4012.OSR/CNG/H





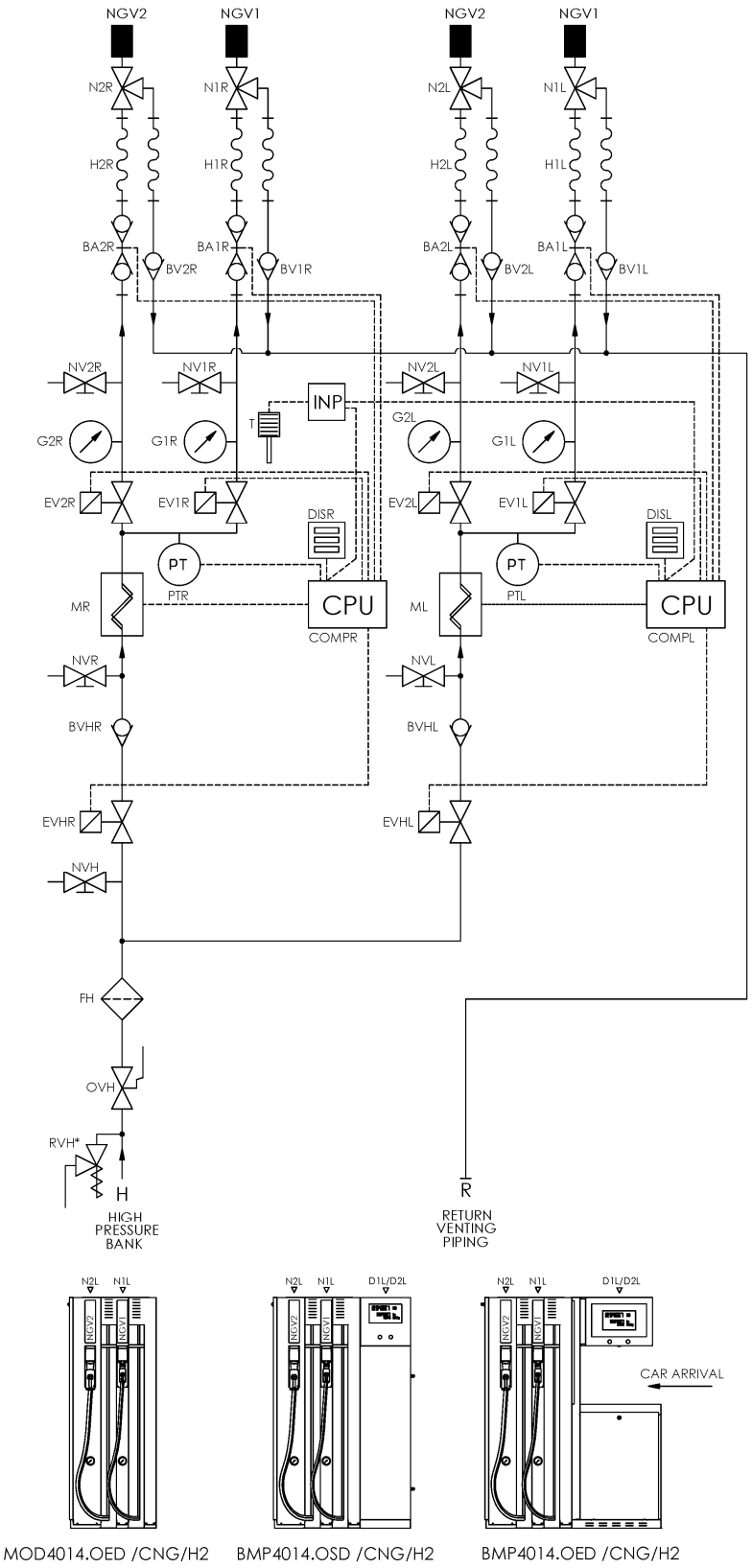
BMP4012.OSR /CNG/H MOD4012.OER /CNG/H BMP4012.OER /CNG/H

Legend:

H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVH	Inlet shut-off valve (inlet to the dispenser)
FH	Inlet mechanical filter
NVH, NVR, NV2R, NV1R	Needle discharge valve
EVHR, EV2R, EV1R	Electromagnetic control valve
BVHR, BV2R, BV1R	Check valve
MR	Mass meter
PTR	Electronic pressure sensor
G2R, G1R	Manometer
BA2R, BA1R	Breakaway coupling
H2R, H1R	Delivery hoses
N2R, N1R	Delivery nozzles
COMPR	Electronic counter
DISR	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.2.6 – DIAGRAM OF BMP4014.OED/CNG/H/H & BMP4014.OSD/CNG/H/H



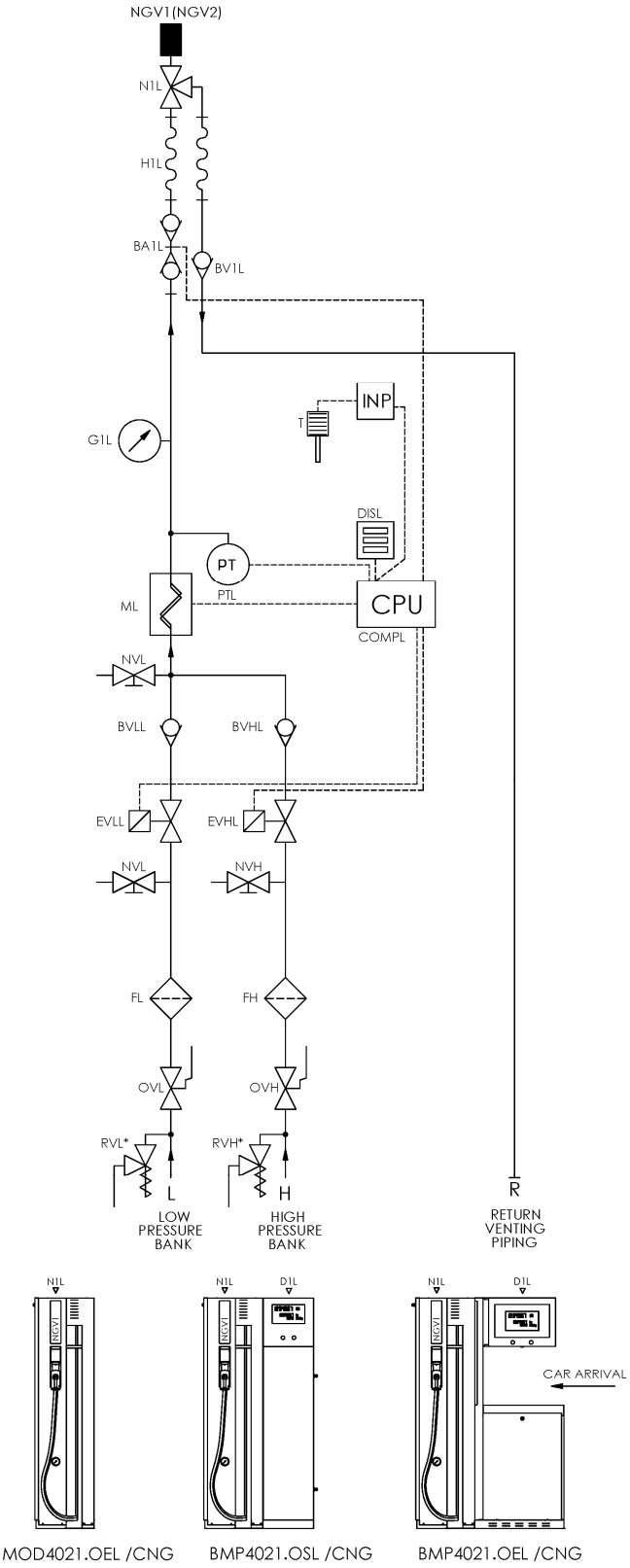
Legend:

H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVH	Inlet shut-off valve (inlet to the dispenser)
FH	Inlet mechanical filter
NVL, NVR, NV2R, NV1R, NV2L, NV1L	Needle discharge valve
EVHR, EVHL, EV2R, EV1R, EV2L, EV1L	Electromagnetic control valve
BVHR, BVHL, BV2R, BV1R, BV2L, BV1L	Check valve
MR, ML	Mass meter
PTR, PTL	Electronic pressure sensor
G2R, G1R, G2L, G1L	Manometer
BA2R, BA1R, BA2L, BA1L	Breakaway coupling
H2R, H1R, H2L, H1L	Delivery hoses
N2R, N1R, N2L, N1L	Delivery nozzles
COMPR, COMPL	Electronic counter
DISR, DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.3 – DIAGRAMS OF DISPENSERS CONNECTED TO TWO PRESSURE RESERVOIRS

APPENDIX 3.3.1 – DIAGRAM OF BMP4021.OEL/CNG(/H) & BMP4021.OSL/CNG(/H)

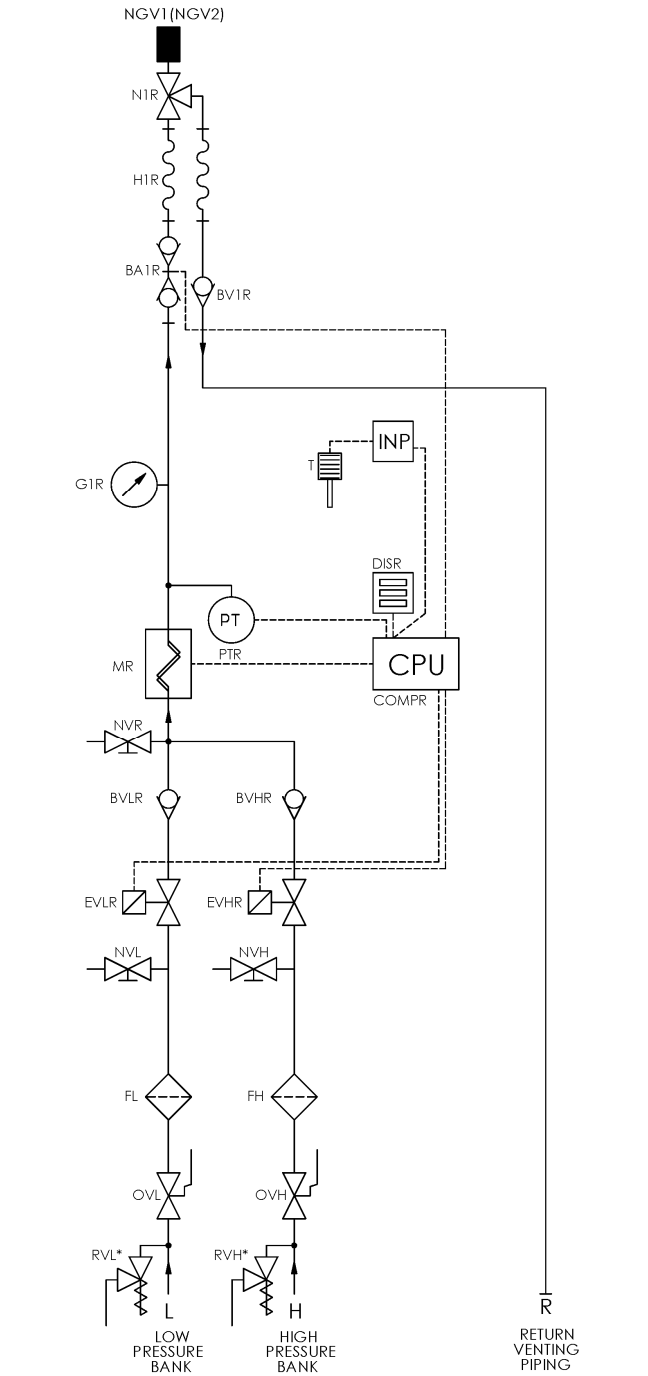


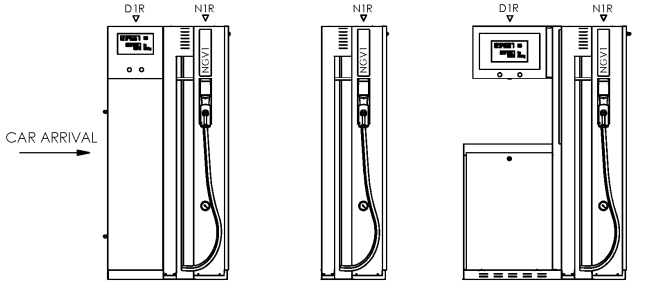
Legend:

L, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FH	Inlet mechanical filter
NVL, NVH, NVLL, NV1L	Needle discharge valve
EVLL, EVHL	Electromagnetic control valve
BVLL, BVHL, BV1L	Check valve
ML	Mass meter
PTL	Electronic pressure sensor
G1L	Manometer
BA1L	Breakaway coupling
H1L	Delivery hoses
N1L	Delivery nozzles
COMPL	Electronic counter
DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.3.2 – DIAGRAM OF BMP4021.OER/CNG(/H) & BMP4021.OSR/CNG(/H)





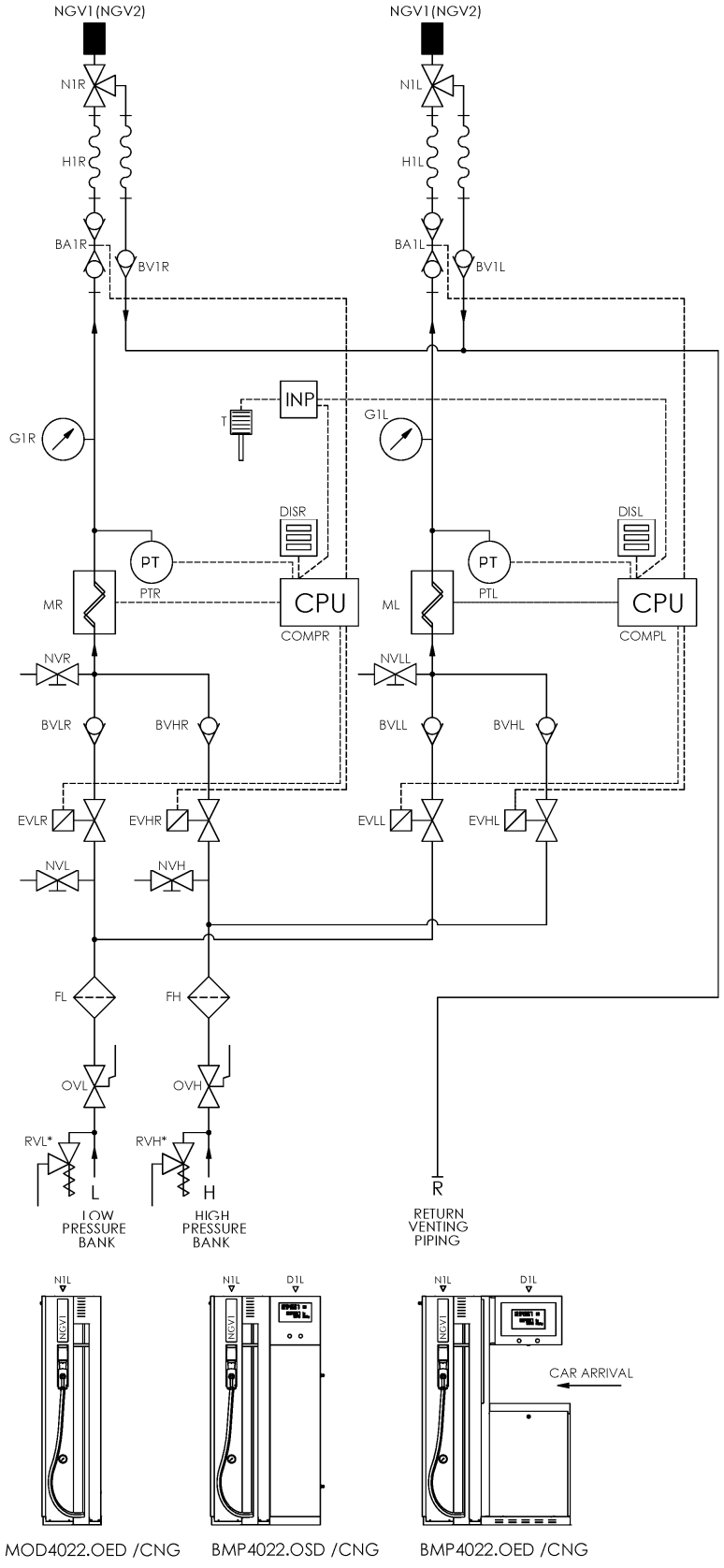
BMP4021.OSR /CNG MOD4021.OER /CNG BMP4021.OER /CNG

Legend:

L, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FH	Inlet mechanical filter
NVL, NVH, NVR, NV1R	Needle discharge valve
EVLR, EVHR	Electromagnetic control valve
BVLR, BVHR, BV1R	Check valve
MR	Mass meter
PTR	Electronic pressure sensor
G1R	Manometer
BA1R	Breakaway coupling
H1R	Delivery hoses
N1R	Delivery nozzles
COMPR	Electronic counter
DISR	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.3.3 – DIAGRAM OF BMP4022.OED/CNG (/H) & BMP4022.OSD/CNG (/H)

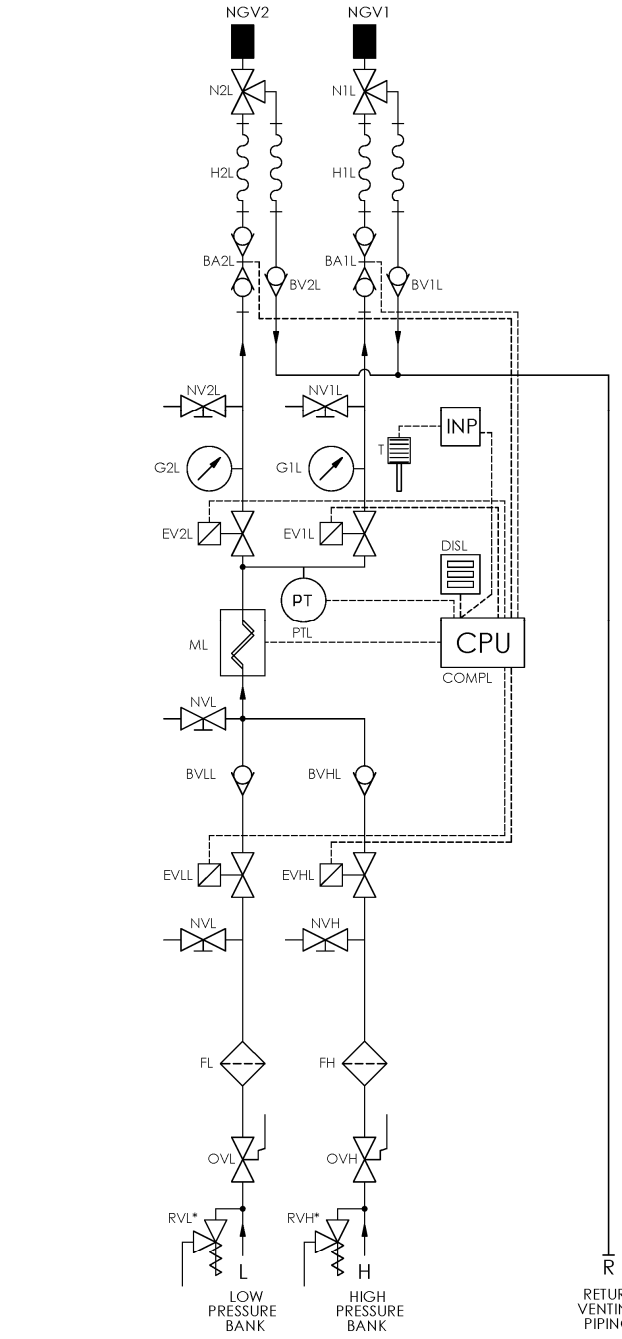


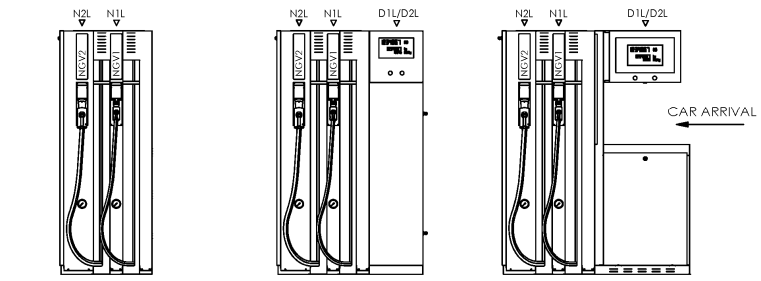
Legend:

L, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FH	Inlet mechanical filter
NVL, NVH, NVR, NVLL, NV1R, NV1L	Needle discharge valve
EVLR, EVHR, EVLL, EVHL,	Electromagnetic control valve
BVLR, BVHR, BVLL, BVHL, BV1R, BV1L	Check valve
MR, ML	Mass meter
PTR, PTL	Electronic pressure sensor
G1R, G1L	Manometer
BA1R, BA1L	Breakaway coupling
H1R, H1L	Delivery hoses
N1R, N1L	Delivery nozzles
COMPR, COMPL	Electronic counter
DISR, DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.3.4 – DIAGRAM OF BMP4022.OEL/CNG/H & BMP4022.OSL/CNG/H





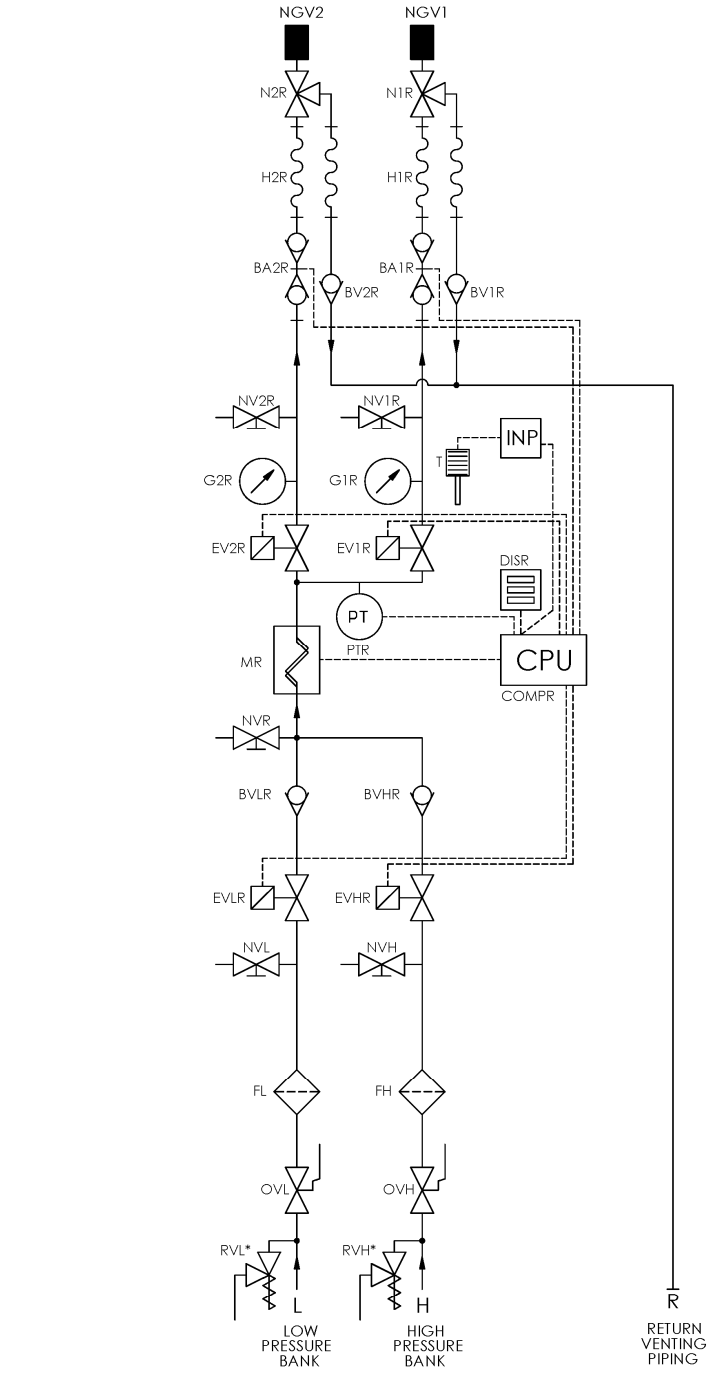
MOD4022.OEL /CNG/H BMP4022.OSL /CNG/H **BMP4022.OEL /CNG/H**

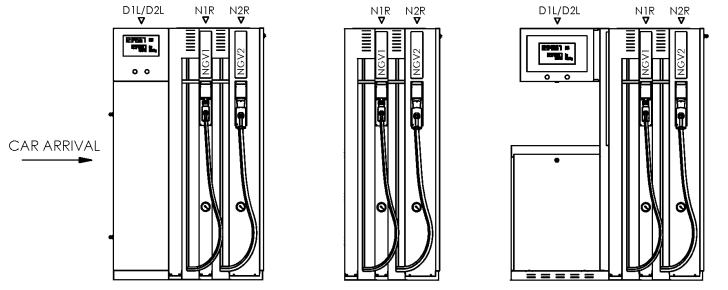
Legend:

L, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FH	Inlet mechanical filter
NVL, NVH, NV2L, NV1L	Needle discharge valve
EVLR, EVHR, EV2L, EV1L	Electromagnetic control valve
BVLR, BVHR, BV2L, BV1L	Check valve
ML	Mass meter
PTL	Electronic pressure sensor
G2L, G1L	Manometer
BA2L, BA1L	Breakaway coupling
H2L, H1L	Delivery hoses
N2L, N1L	Delivery nozzles
COMPL	Electronic counter
DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.3.5 – DIAGRAM OF BMP4022.OER/CNG/H & BMP4022.OSR/CNG/H





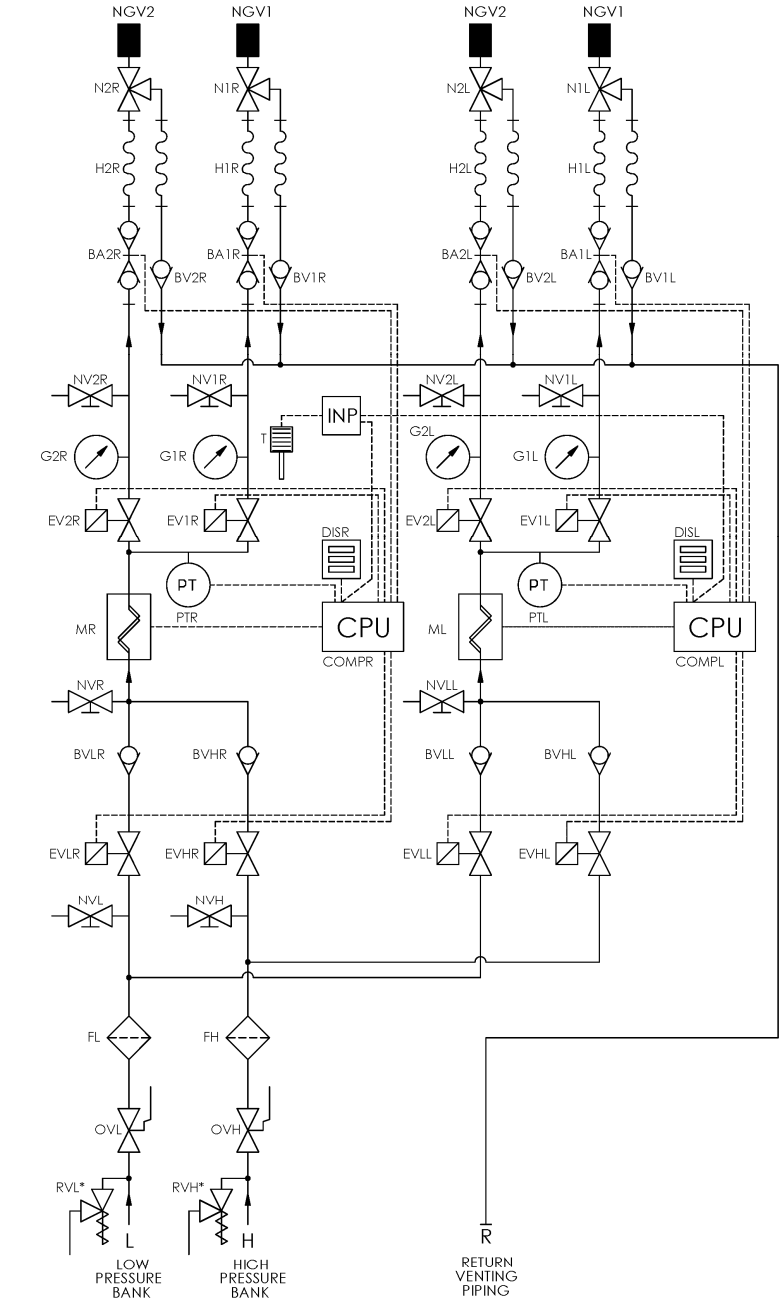
BMP4022.OSR /CNG/H MOD4022.OER /CNG/H BMP4022.OER /CNG/H

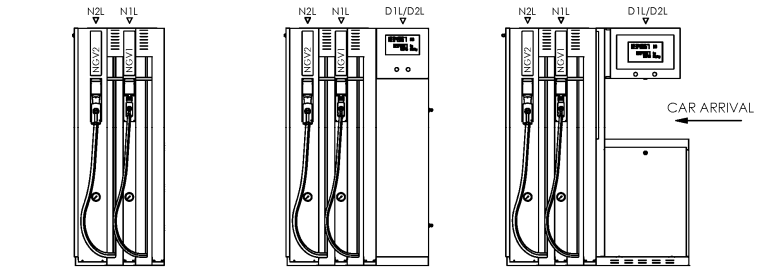
Legend:

L, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FH	Inlet mechanical filter
NVL, NVH, NVR, NV2R, NV1R	Needle discharge valve
EVLR, EVHR, EV2R, EV1R	Electromagnetic control valve
BVLR, BVHR, BV2R, BV1R	Check valve
MR	Mass meter
PTR	Electronic pressure sensor
G2R, G1R	Manometer
BA2R, BA1R	Breakaway coupling
H2R, H1R	Delivery hoses
N2R, N1R	Delivery nozzles
COMPR	Electronic counter
DISR	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.3.6 – DIAGRAM OF BMP4024.OED/CNG/H/H & BMP4024.OSD/CNG/H/H





MOD4024.OED /CNG/H2 BMP4024.OSD /CNG/H2 BMP4024.OED /CNG/H2

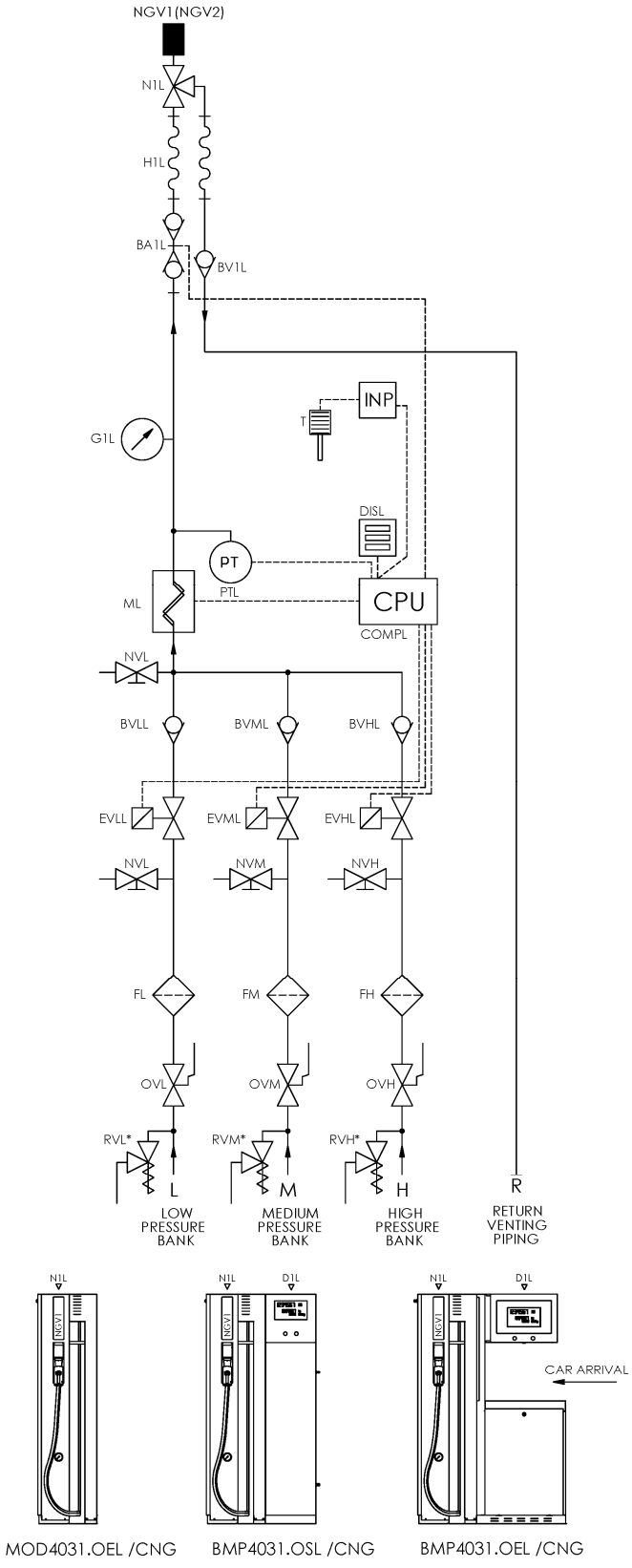
Legend:

L, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FH	Inlet mechanical filter
NVL, NVH, NVR, NVLL, NV2R, NV1R, NV2L, NV1L	Needle discharge valve
EVLR, EVHR, EVLL, EVHL, EV2R, EV1R, EV2L, EV1L	Electromagnetic control valve
BVLR, BVHR, BVLL, BVHL, BV2R, BV1R, BV2L, BV1L	Check valve
MR, ML	Mass meter
PTR, PTL	Electronic pressure sensor
G2R, G1R, G2L, G1L	Manometer
BA2R, BA1R, BA2L, BA1L	Breakaway coupling
H2R, H1R, H2L, H1L	Delivery hoses
N2R, N1R, N2L, N1L	Delivery nozzles
COMPR, COMPL	Electronic counter
DISR, DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.4 – DIAGRAMS OF DISPENSERS CONNECTED TO THREE PRESSURE RESERVOIRS

APPENDIX 3.4.1 – DIAGRAM OF BMP4031.OEL/CNG (/H) & BMP4031.OSL/CNG (/H)

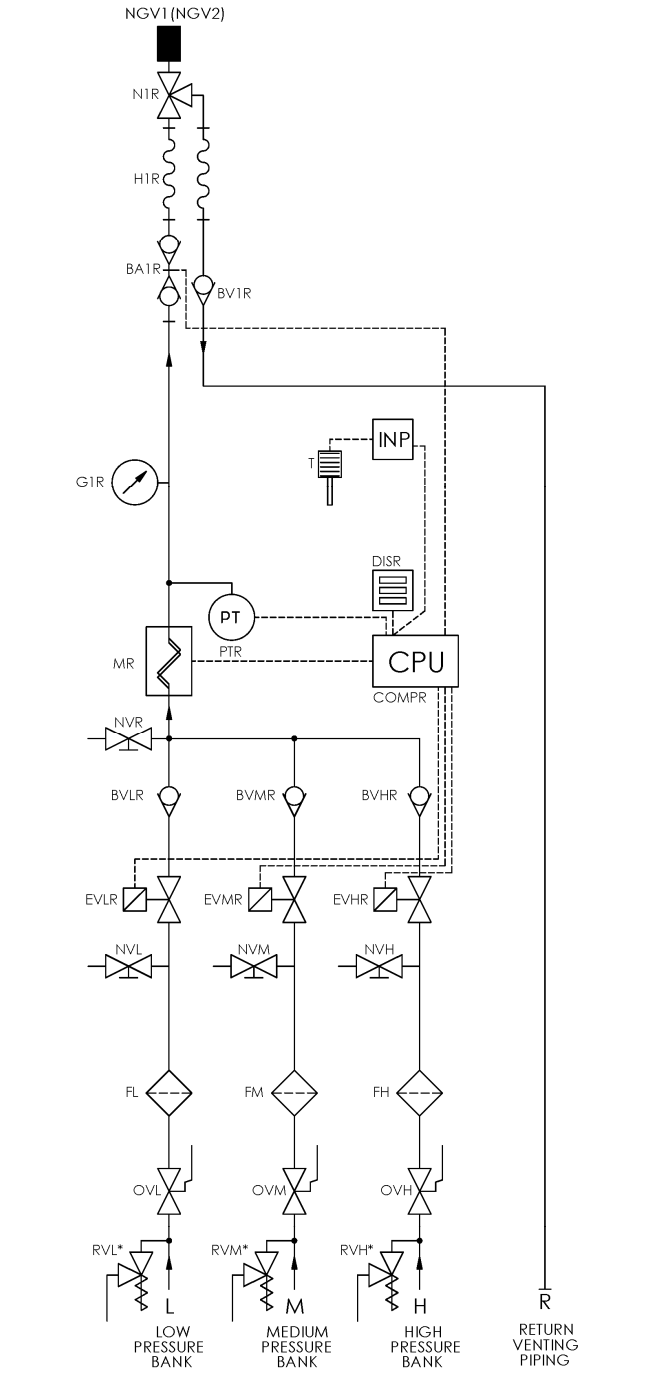


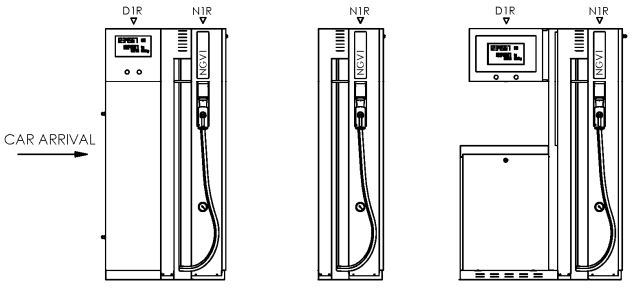
Legend:

L, M, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVM, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVM, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FM, FH	Inlet mechanical filter
NVL, NVM, NVH, NVLL, NV1L	Needle discharge valve
EVLL, EVML, EVHL	Electromagnetic control valve
BVLL, BVML, BVHL, BV1L	Check valve
ML	Mass meter
PTL	Electronic pressure sensor
G1L	Manometer
BA1L	Breakaway coupling
H1L	Delivery hoses
N1L	Delivery nozzles
COMPL	Electronic counter
DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.4.2 – DIAGRAM OF BMP4031.OER/CNG(/H) & BMP4031.OSR/CNG(/H)





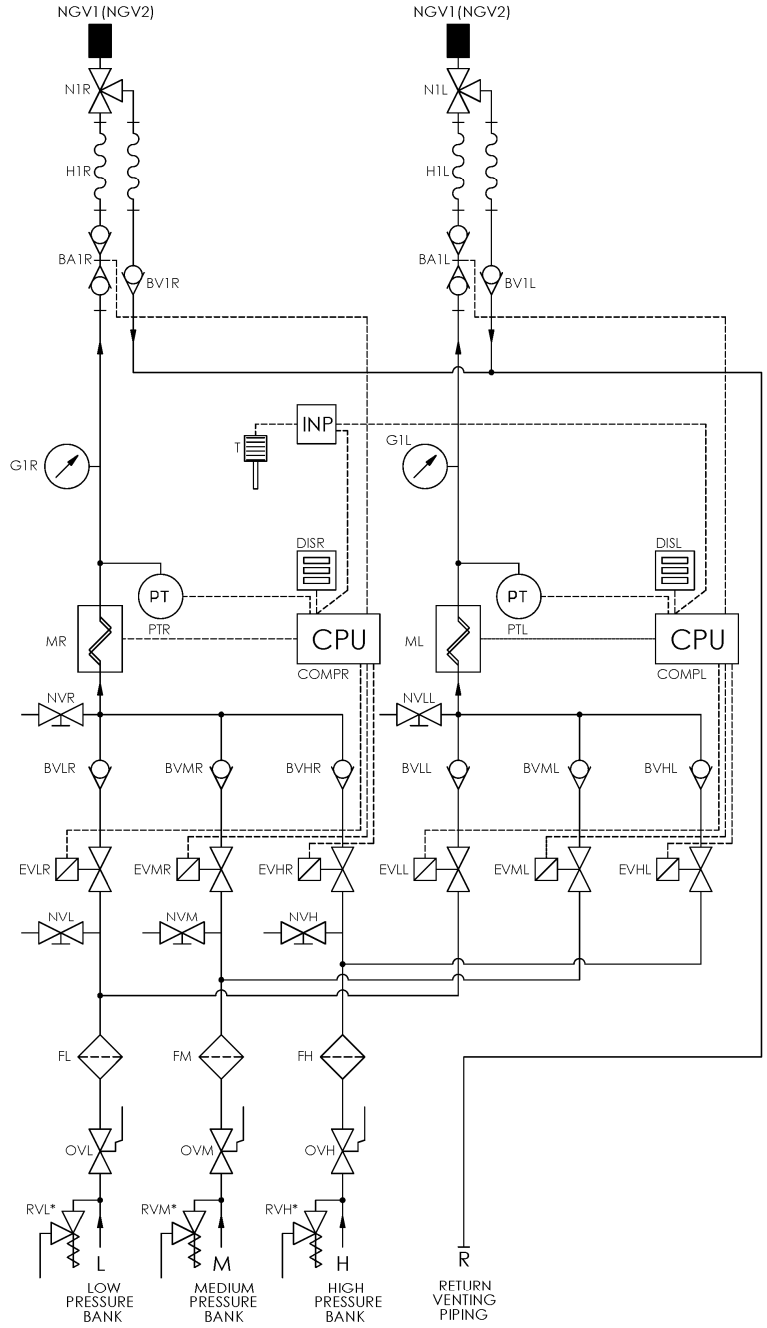
BMP4031.OSR /CNG MOD4031.OER /CNG BMP4031.OER /CNG

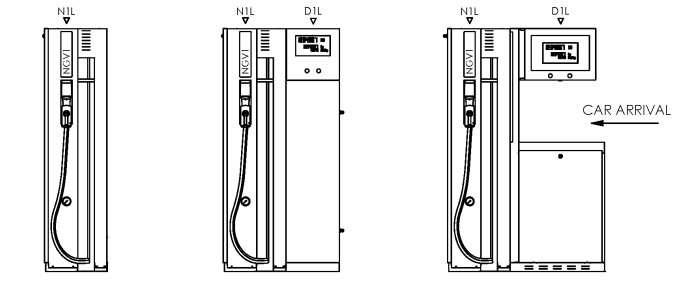
Legend:

L, M, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVM, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVM, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FM, FH	Inlet mechanical filter
NVL, NVM, NVH, NVR, NV1R	Needle discharge valve
EVLR, EVMR, EVHR, EV1R	Electromagnetic control valve
BVLR, BVMR, BVHR, BV1R	Check valve
MR	Mass meter
PTR	Electronic pressure sensor
G1R	Manometer
BA1R	Breakaway coupling
H1R	Delivery hoses
N1R	Delivery nozzles
COMPR	Electronic counter
DISR	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.4.3 – DIAGRAM OF BMP4032.OED/CNG (/H) & BMP4032.OSD/CNG (/H)





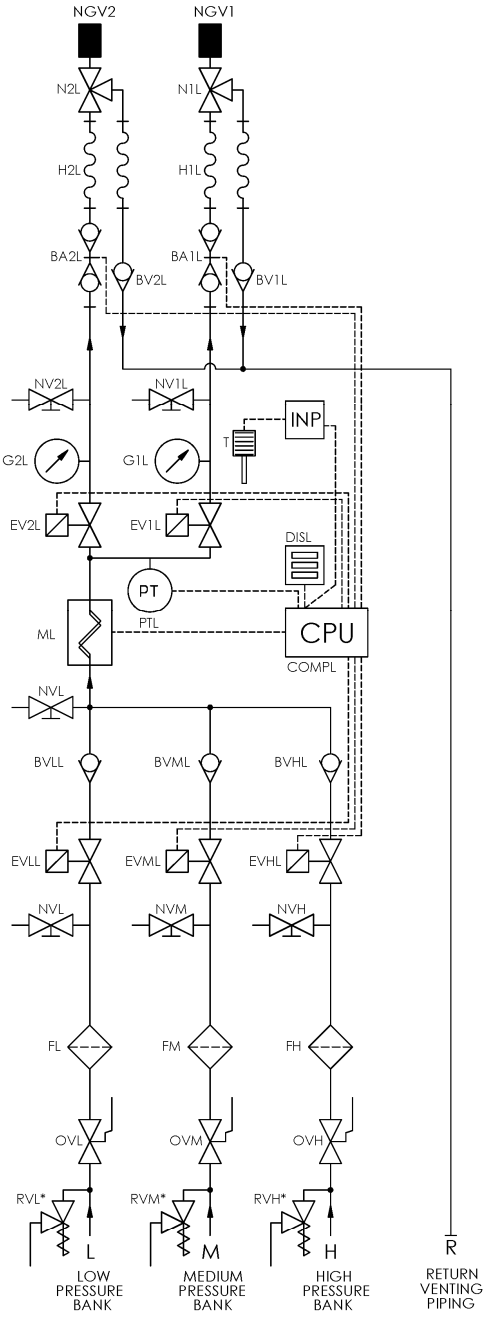
MOD4032.OED /CNG BMP4032.OSD /CNG BMP4032.OED /CNG

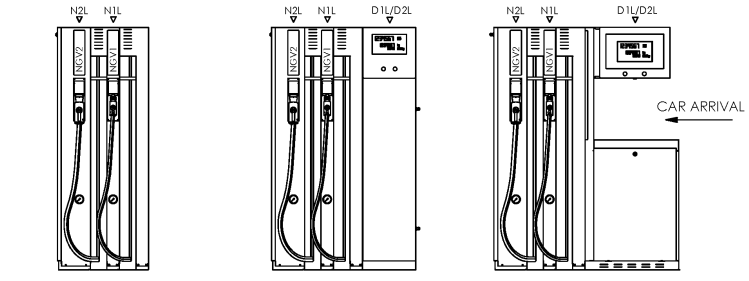
Legend:

L, M, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVM, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVM, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FM, FH	Inlet mechanical filter
NVL, NVM, NVH, NVR, NVLL, NV1R, NV1L	Needle discharge valve
EVLR, EVMR, EVHR, EVLL, EVML, EVHL,	Electromagnetic control valve
BVLR, BVMR, BVHR, BVLL, BVML, BVHL, BV1R, BV1L	Check valve
MR, ML	Mass meter
PTR, PTL	Electronic pressure sensor
G1R, G1L	Manometer
BA1R, BA1L	Breakaway coupling
H1R, H1L	Delivery hoses
N1R, N1L	Delivery nozzles
COMPR, COMPL	Electronic counter
DISR, DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.4.4 – DIAGRAM OF BMP4032.OEL/CNG/H & BMP4032.OSL/CNG/H





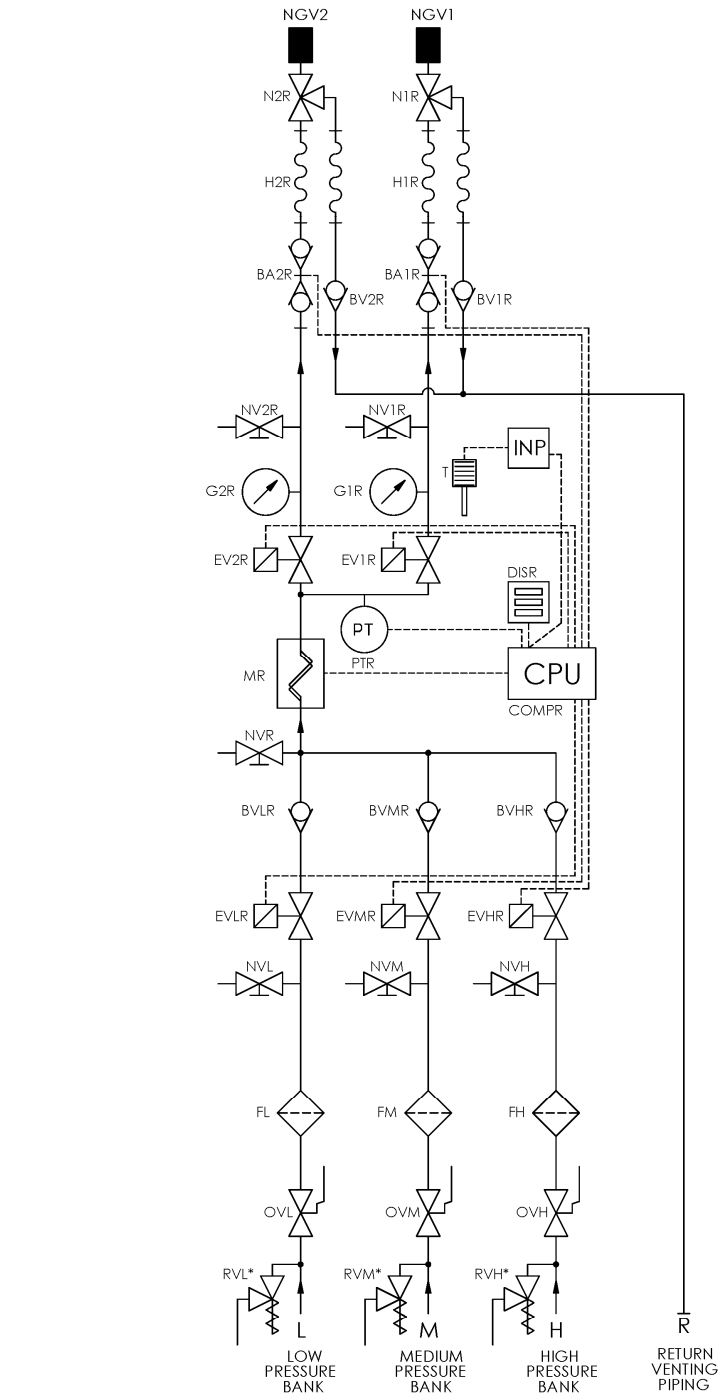
MOD4032.OEL /CNG/H BMP4032.OSL /CNG/H **BMP4032.OEL /CNG/H**

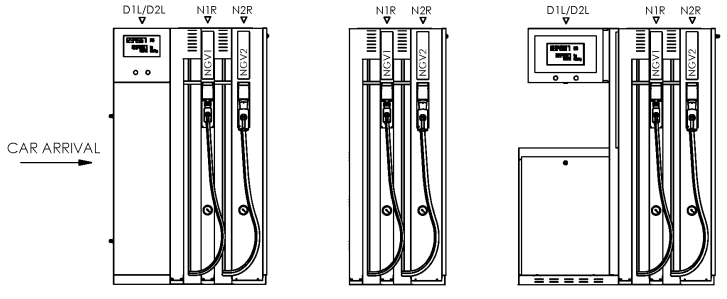
Legend:

L, M, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVM, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVM, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FM, FH	Inlet mechanical filter
NVL, NVM, NVH, NVLL, NV2L, NV1L	Needle discharge valve
EVLL, EVML, EVHL, EV2L, EV1L	Electromagnetic control valve
BVLL, BVML, BVHL, BV2L, BV1L	Check valve
ML	Mass meter
PTL	Electronic pressure sensor
G2L, G1L	Manometer
BA2L, BA1L	Breakaway coupling
H2L, H1L	Delivery hoses
N2L, N1L	Delivery nozzles
COMPL	Electronic counter
DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.4.5 – DIAGRAM OF BMP4032.OER/CNG/H & BMP4032.OSR/CNG/H





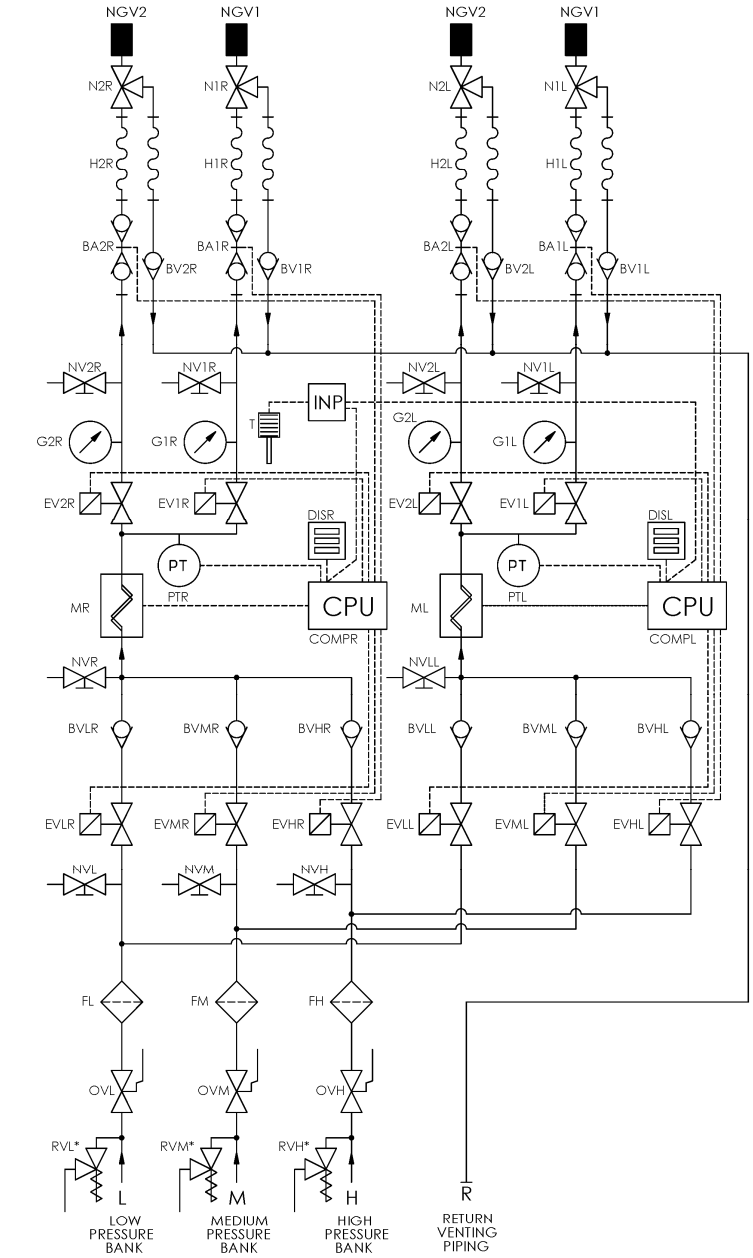
BMP4032.OSR /CNG/H MOD4032.OER /CNG/H BMP4032.OER /CNG/H

Legend:

L, M, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVM, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVM, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FM, FH	Inlet mechanical filter
NVL, NVM, NVH, NVR,	Needle discharge valve
EVLR, EVMR, EVHR, EV2R, EV1R	Electromagnetic control valve
BVLR, BVMR, BVHR, BV2R, BV1R	Check valve
MR	Mass meter
PTR	Electronic pressure sensor
G2R, G1R	Manometer
BA2R, BA1R	Breakaway coupling
H2R, H1R	Delivery hoses
N2R, N1R	Delivery nozzles
COMPR	Electronic counter
DISR	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).

APPENDIX 3.4.6 – DIAGRAM OF BMP4034.OED/CNG/H/H & BMP4034.OSD/CNG/H/H



Legend:

L, M, H	Pressure pipeline to the dispenser
R	Return pipeline for gas discharge from the filling end piece
RVL, RVM, RVH	Safety valve at the inlet pipeline (not included in the dispenser)
OVL, OVM, OVH	Inlet shut-off valve (inlet to the dispenser)
FL, FM, FH	Inlet mechanical filter
NVL, NVM, NVH, NVR, NVL, NV2R, NV1R, NV2L, NV1L	Needle discharge valve
EVLR, EVMR, EVHR, EVLL, EVML, EVHL, EV2R, EV1R, EV2L, EV1L	Electromagnetic control valve
BVLR, BVMR, BVHR, BVLL, BVML, BVHL, BV2R, BV1R, BV2L, BV1L	Check valve
MR, ML	Mass meter
PTR, PTL	Electronic pressure sensor
G2R, G1R, G2L, G1L	Manometer
BA2R, BA1R, BA2L, BA1L	Breakaway coupling
H2R, H1R, H2L, H1L	Delivery hoses
N2R, N1R, N2L, N1L	Delivery nozzles
COMPR, COMPL	Electronic counter
DISR, DISL	Display
TR	Temperature sensor for ambient temperature
INP	Temperature sensor unit
NGV1, NGV2	Type of the nozzle connector NGV1 = ISO 14469-1 & 3 (for passenger cars) NGV2 = ISO 14469-2 (buses, trucks)
CAR ARRIVAL	Car arrival direction to the dispenser or dispensing module

Note:
The safety valve of the inlet pipeline RVx is not included in the dispenser delivery. Input pipeline must be secured against pressure higher than 30.0 MPa (300 bar).