VYMPEL

Precision | Economy | Safety

CONG Prima 2M

Dew point transducer

Operating Manual

Dear Customer,

We're pleased that you have chosen our Cong Prima 2M dew point analyzer.

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The manufacturer guarantees that the product delivered conforms with the technical data presented in this manual and all of the necessary safety and quality standards.

***

***

Please read through this manual carefully and note in particular the limitations, instructions, and recommendations described therein.

***

Please contact us if you have any problems, for example with the function, design or handling of the equipment. We would also appreciate any suggestions you may have for information to include in the operating.

We wish you much success!

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Table of Contents

This handbook provides a description of the construction and functional principle of the “Cong Prima 2M” dew point analyzer (also referred to as the CP 2M, transducer, analyzer or DPA).

The CP 2M is a through-flow automatic hygrometer. It takes direct measurements with the aid of a thermostatically controlled mirror. Dew point (dp) is established by monitoring the reflectivity of the mirror. As the temperature of the mirror is lowered, the surface becomes less reflective due to the formation of condensation. The temperature at which condensation occurs is the dew point.

1 Description of the CP 2M

1.1 Intended use of the CP 2M

The CP2M is designed to automatically measure the dew point of water (dpW) and the dew point of hydrocarbons (dpHC) at gas measuring facilities. It is also suitable for use in various operations and procedures where gas quality must be monitored.

The analyzer can **measure the dew point of hydrocarbons** when the gas being examined is free of water vapor that would condense at a higher temperature than that of hydrocarbons.

The analyzer can **measure the dew point of water** without regard to hydrocarbon condensation temperature.

1.2 Measurement principle

The CP 2M makes use of the “total refraction” effect to determine the dpW.

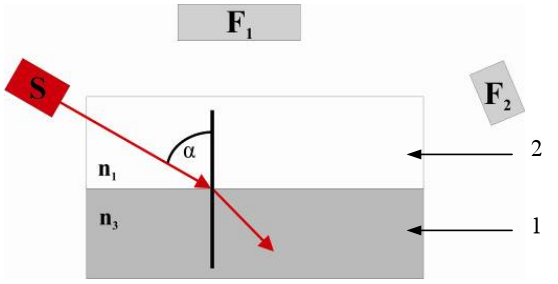
Total refraction occurs when polarized light, with a particular orientation, passes through the interface between a heterogeneous media (gas) and a reflective surface (thermostatically controlled mirror) at a specific angle of incidence know as Brewster’s Angle.

When total refraction occurs no light is reflected.

The analyzer uses a laser as a source of polarized light.

The reflective surface is a dielectric condensation mirror made of silicone.

When the mirror is clean, that is when no condensation is present, as the beam of light from the laser encounters the gas/mirror interface it is completely refracted. As a result, no light is reflected onto the photo detector, which therefore registers a null signal.



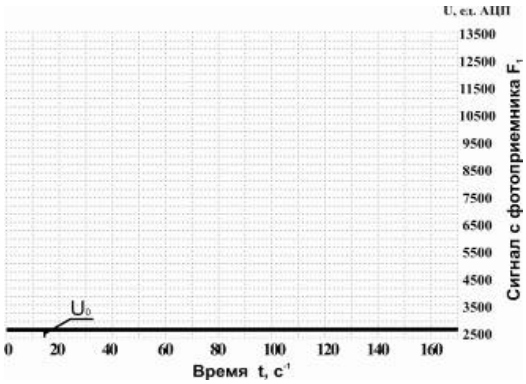
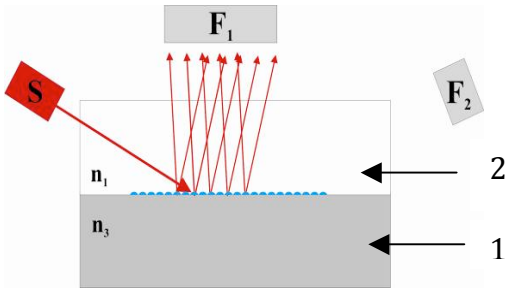


Illustration 1.1 **Illustration 1.2**

α – Brewster's angle; 1 – dielectric chilled mirror; 2 – sample medium (gas); S – laser-emitting diode; F1 and F2 – photo detectors of the registration system; U_0 – Zero signal from the photo sensor.

As the mirror is chilled, droplets of water condensation begin to form on the mirror's surface. The rays of polarized light emitted from the laser diode are scattered when they strike these droplets and are registered by the photo detectors (F1).

The signal created by photons hitting the detector (Illus. 2.1) is boosted and registered by the detection system (Illus. 2.1). The signal intensity is dependent on the amount of water condensation on the chilled mirror's surface.



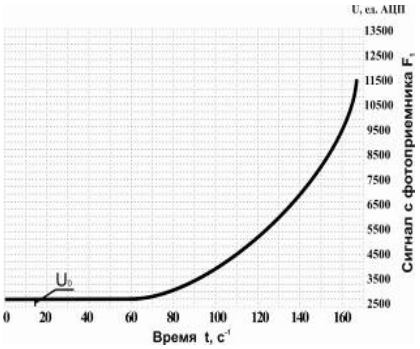


Illustration 2.1 **Illustration 2.2**

Light scattered by water condensation on the surface of the chilled;
1– chilled dielectric mirror; 2 – sample medium (gas)

In the absence of water vapor, hydrocarbons in the sample gas condense onto the surface of the chilled mirror. Instead of droplets, this condensation forms a smooth film. The build up of a cohesive film on the mirror's surface alters the angle of incidence at which the polarized light rays encounter the surface of the mirror.

As the light strikes the gas/condensation film interface it is partially reflected.

At the same time, due to the transparency of the condensate film, some of the light will only be reflected at the next boundary, the interface of the condensation film with the mirror's

surface. As a result, the photo detector F2 receives two sets of reflected light rays, which are slightly out of phase.

The light signal registered by the detection system produces a characteristic interference pattern.

The intensity of the light received by the photo detector is directly dependent on the amount of hydrocarbon condensation on the mirror's surface. As more hydrocarbons precipitate onto the mirror the film becomes thicker, this in turn means that the distance between the two upper and lower boundary interfaces becomes greater. This increase in distance correlates to a greater phase discrepancy between the two reflected rays that increases the signal strength.

The registration of the hydrocarbon dew point temperature occurs as soon as the condensation film reaches a thickness of 5 – 10nm (default setting).

In this way, these two separate modalities generate two separate signals: the signal from photo detector F1 is used to establish the dpW and the signal from photo detector F2 to establish the dpHC (Illus. 3.1 and 3.2).

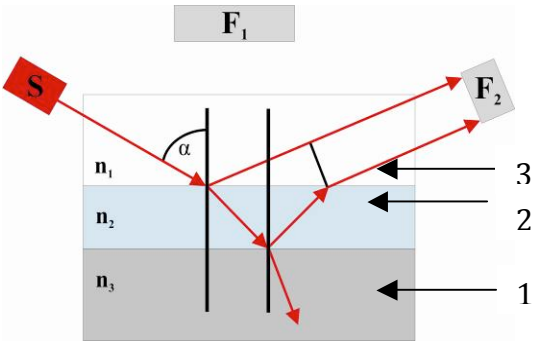


Illustration 3.1

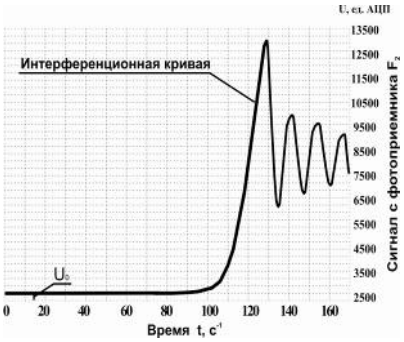


Illustration 3.2

Diagram of the light scatter from a hydrocarbon film (2) on a mirror with a reflection index of n2.
1 – chilled dielectric mirror;
2– hydrocarbon condensate;
3 – sample medium (ex. gas)

1.3 CP 2M provision for explosion protection

The CP2M is certified as compliant with the requirements of EN 60079-0:2009, EN 60079-1:2007. It carries the explosion protection marking Ⓔx II 2G EEx d IIA + H_2 T5.
This marking identifies the CP 2M as a "flameproof enclosure" as per the requirements stated in EN 60079-1:2007.

Explosion protection is provided by encasing the electrical elements of the electronics unit in an enclosure that is mechanically robust and meets the standards of EN 60079-0:2009. This enclosure can withstand explosion pressures and prevent combustion from escaping into an ambient explosive environment.

Integrity of the flameproof enclosure is maintained through the use of threaded and cylindrical flameproof joints. A drawing of the explosion protection measures (Appendix C)

identifies these connections as “Explosion” and lists the allowable explosion protection tolerances according to EN 60079-1:2007.

The removable enclosure lids have an inscribed warning:
«ОТКРЫВАТЬ, ОТКЛЮЧИВ ОТ СЕТИ ~ DO NOT OPEN WHEN ENERGIZED ».

1.4 Analogue and digital connection ports

In order to connect the Cong Prima 2M to a technical-information measuring system or facility, the analyzer is equipped with a serial interface.

The interface installed can be for the transmission of either analogue or digital signals depending on the customer’s requirements.

- digital port → RS 485 Modbus
- analogue port → 4 – 20 mA.

The selection of either a digital or analogue information transfer port is made when the CP 2M is originally ordered.

If no specification is made with regard to interface preference, the analyzer will be delivered with an analogue port (4 – 20 mA).

Digital port: RS485:

The digital port provides for the transfer of measurement data to an external system using the Modbus / RTU protocol (see Appendix O).

The interface is galvanically insulated (up to 500 V DC).

Analogue port 4 – 20 mA:

Depending on the measurement mode selected, either the dpW or dpHC values are sent to the interface port. The maximum impedance load on each output should not exceed 400 ohms.

The port is passive, meaning that the power supply for the CP 2M is delivered from an external source. This connection is galvanic insulated up to 500 V DC.

The digital and analogue signals for measured dew point values (dp) correspond to the following equation:

$$dp = 3.75\ (I - 4) - 30$$

$$I = 0.267\ (TP + 30) + 4$$

(for water and hydrocarbons in the temperatures range: –30 °C to +30 °C)

⇒ the value **4 mA** corresponds to a dew point temperature (dp) of **–30°C**

⇒ the value **20 mA** corresponds to a dew point temperature (dp) of **+30°C**

1.5 Identification and user interface

To operate the CP 2M, a magnetic key is used to select, alter, and enter parameter values. The arrows above, below, and to both sides of the display located on the front of the analyzer indicate the location of the buttons that are activated by the magnetic key. The magnetic key is included with delivery of the analyzer.

Illustration 5:
CP 2M user display

The orientation of the magnetic key is shown in illustration 6.

a b

Illustration 6:

magnetically activated control buttons

(a) left - right (b) up – down

Navigating the menu:

▲	Page through the menu,
▼	Change the displayed unit value up and down;
►	Menu point: enter (Change between menu capitals)
◄	Leave the current menu (Return to the higher menu point) scroll through digits when entering a value

The menu of the Cong Prima 2M is cyclically organized, in order to make the search for capitals or parameters simpler.

The CP 2M's menu consists of seven main headings, corresponding to the analyzer's most important functions (illus. 7).

When switching on the CP 2M, be sure to allow the software to fully load before taking dew point measurements.

The software must also be fully loaded before making any menu selections.

«measure: HC»

In this mode, the CP 2M measures the value of dew point of hydrocarbons (dpHC).

Confirm this selection by touching the «►» button with the magnetic key.

To end this selection, touch the «◄» button.

«measure: W»

In this mode, the CP 2M measures the dew point of water (dpW).

Confirm this selection by touching the «►» button.

To end this selection, touch the «◄» button.

«measure: W & HC»

In this mode, the CP2M alternately determines the dpHC and the dpW.

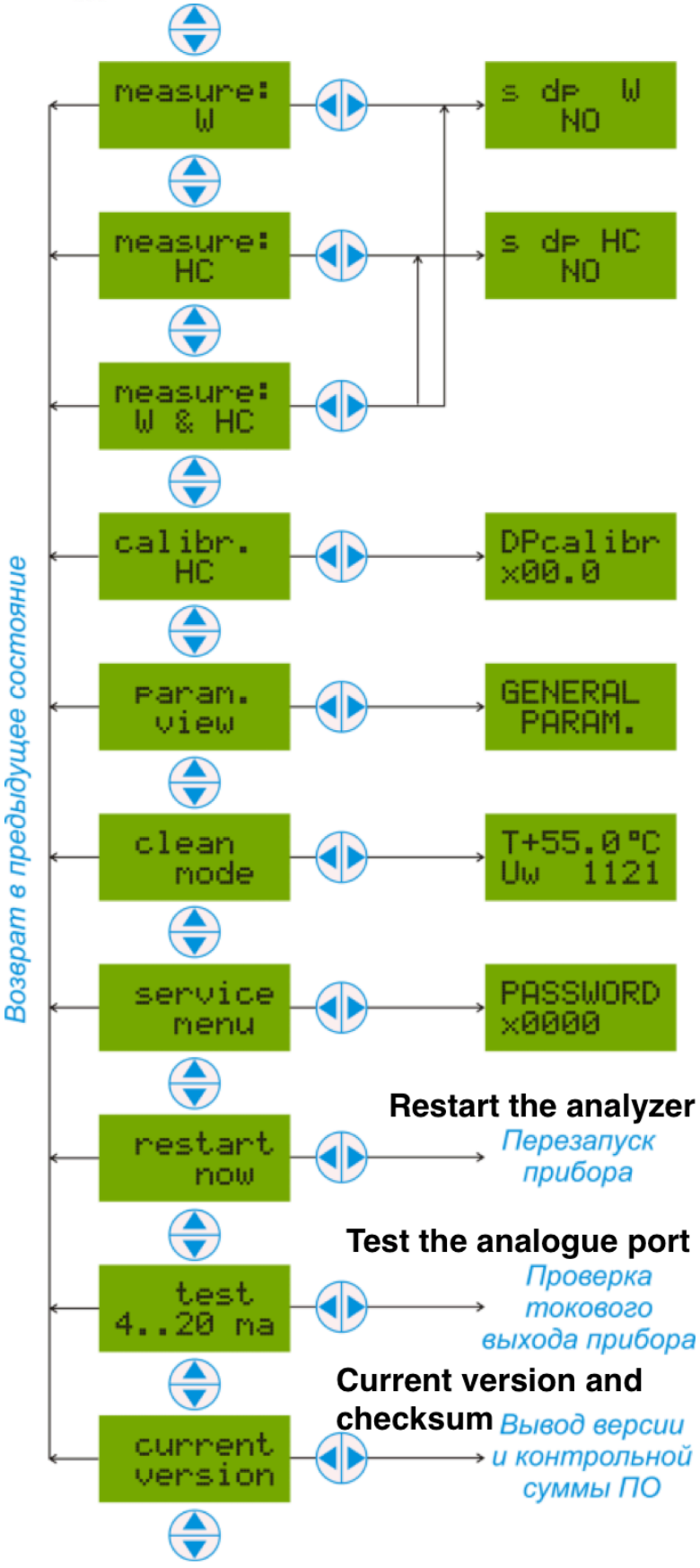
Confirm this selection by touching the «►» button.

To end this selection, touch the «◄» button.

«calibr: HC»

This activates the calibration mode of the hydrocarbon measurement channel.

Using this function, the operational sensitivity of the dpHC measurement channel can be adjusted as desired.


measure:
W
s dP W
NO
measure:
HC
s dP HC
NO
measure:
W & HC
calibr.
HC
DPcalibr
x00.0
param.
view
GENERAL
PARAM.
clean
mode
T+55.0°C
Uw 1121
service
menu
PASSWORD
x0000
restart
now
Restart the analyzer
Перезапуск прибора
test
4..20 ma
Test the analogue port
Проверка токового выхода прибора
current
version
Current version and checksum
Вывод версии и контрольной суммы ПО
Возврат в предыдущее состояние

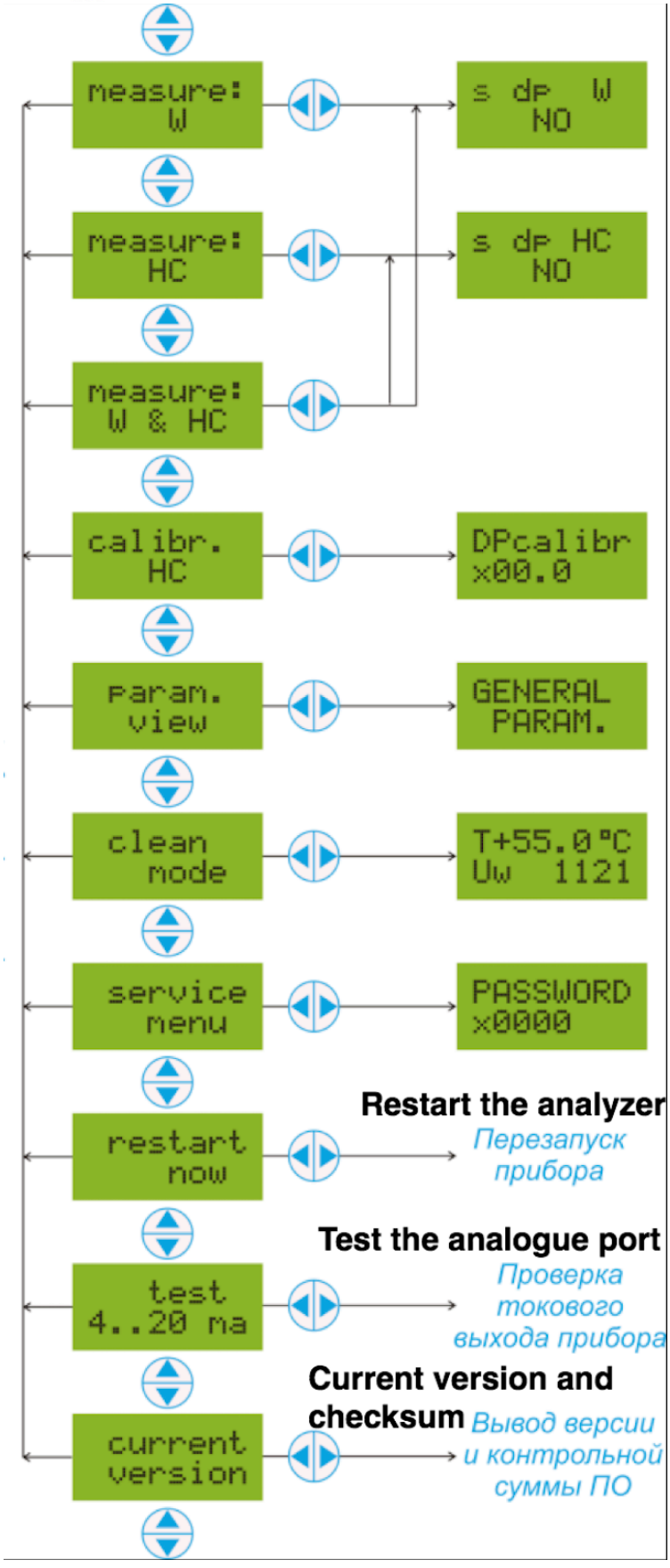


Illustration 7: CP 2M main menu

«param. view»

In the “param. view” function, the current operational parameters of the CP 2M can be checked and adjusted.

This sub-point has four configuration options for operating parameter groups that directly affect the accuracy of the measurement process and the information displayed. The operating parameter groups are selected by touching the «▲» and «▼» buttons with the magnetic key, and activated by touching the «►» button.

Touch the «◄» button to return to the main menu.

	**Warning!** Each modification of the CP 2M parameters can permanently compromise the analyzer’s performance.

The parameters are subdivided into the following function groups:

«**GENERAL PARAM.**»	Parameter group for the algorithm that defines the general operation of the CP 2M;
«**W CYCLE PARAM.**» (Water cycle)	Parameter group for the algorithm that defines the measurement of the dew point of water (dpW);
«**HC CYCLE PARAM.**» (Hydrocarbon cycle)	Parameter group for the algorithm that defines the measurement of the dew point of hydrocarbons (dpHC);
«**LINK PARAM**» (Parameter transfer)	Parameter group that defines the transfer of data via ModBus/RTU protocol;

The following parameters are preset:

Baud rate	- data transmission rate = 38,400
Parity	- none
Stop bits	- 1
Address	- corresponds to the address of the device – 100

(In networks with multiple devices, the analyzer's address can be set at a value of 1 to 247.)

A complete list of all the factory default settings for the various parameters of the CP 2M can be found in Appendix E.

Use the «▲» or «▼» button to select a specific parameter within a particular sub-menu. Confirm the selection by touching the «►» button.

Changes in parameter values can be made using the following control commands:

►	open/ close a menu for making adjustments to parameters (a blinking "x" appears in the display)
◄	Change the type of parameter (move the cursor)
▲ (▼)	Change the parameter value
►	Confirm the new value (the cursor "x" doesn't blink)
◄	Return to the menu point one step higher in the hierarchy

Please note:

A password is required to access the menu point for changing parameter settings. The window in which to enter the password appears in the display when a change to a parameter value is entered. The password access window also appears when the service menu is opened.

In addition, the password is required when the CP 2M started or restarted.

«Cleaning mode»

This mode triggers the cleaning of the thermostatically controlled mirror.

Cleaning the mirror involves heating of the mirrors surface to a set temperature (Parameter T(°C) – i.d.R. +55°C).

In this mode the display shows the following information: (illus. 7):

current temperature of the CP 2M's mirror **T**;

current signal value for water **Uw**;

current signal value for hydrocarbons **Uhc**;

current housing temperature of the CP 2M **B**.

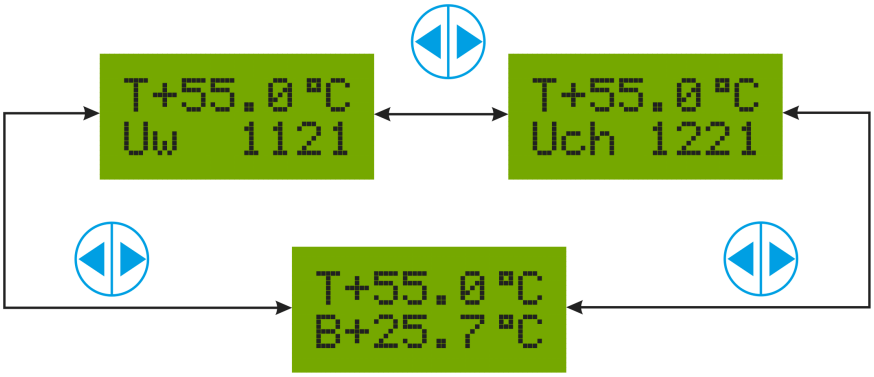


Illustration 7:

Cleaning mode menu

Select the respective sub-menu point using the «◄» button.

To exit the cleaning mode, touch the «►» button.

Finally, select the **«measure: W»** to determine the dpW value or the **«measure: HC»** mode to determine the dpHC value.

«Service Menu»

The «Service Menu» provides the operator with access to the CP 2M's service functions. A password is required in order to access this (illus. 8 -10).

Illustration 8:

Password entry

The factory default service menu password code is **«11111».**

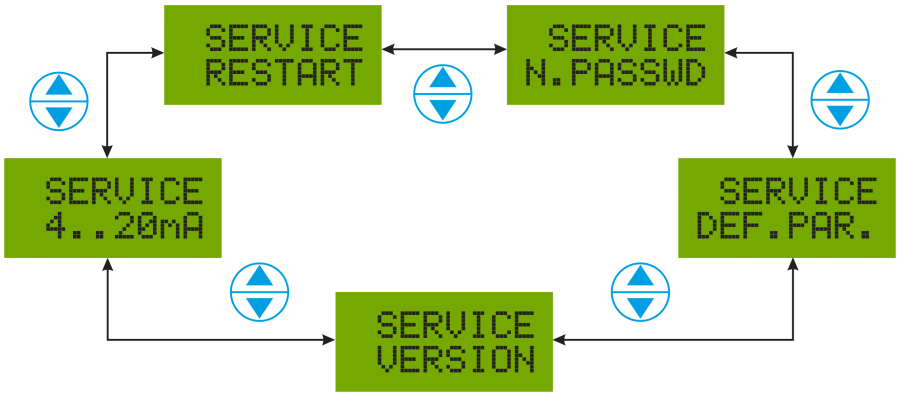


Illustration 9: «Service menu» sub-menus

«Restart now»

The “Restart now” function initiates a pre-programmed re-start of the analyzer.

Warning!
If the password is lost, the analyzer must be returned to the manufacturer for reprogramming to restore access to the service menu.

«Service Def.Par»

This function resets the analyzer to the factory settings. When the operator selects and confirms this function the message: «FACTORY DEFAULTS» is shown on the display.

In order to save the current parameter settings to the CP 2M’s memory select «PARAM. SET» using the «►» button and to confirm the selection touch the «►» button a second time.

Please note that the current CP 2M parameters may be different from the factory settings (default parameters).

«Current version»

This function serves to check the version of the software and the check-sum of the CP 2M.

In this mode, the software version and the software check-sum are shown on the display. (illus. 10):

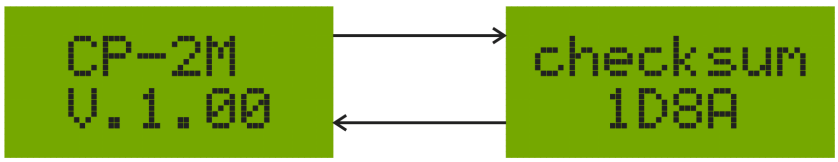


Illustration 10: Software version and software checksum

«Test 4 … 20mA»

The “Test 4…20mA” function is used to check and adjust the CP 2M analogue data port.

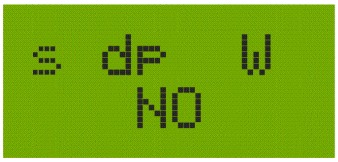
Use the «▲» and «▼» buttons to set the output value (between 3.5 and 24 mA). The setting can be adjusted gradually in 0.5 mA increments.

2 Taking dew point measurements

The Cong Prima 2M requires a secure power supply of 24V, connected to the analyzer at terminal block 1 and 2 (Appendix A).

Once the analyzer is connected to the power supply and switched on, the operating software immediately begins to load.

After the start-up sequence is completed, the CP 2M is ready for operation and is automatically set to the main menu (illus. 11).



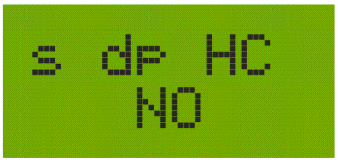


Illustration 11

(a) for dpW measurements (b) for dpHC measurements

Depending on whether the target value is the dew point of water dpW (a) or hydrocarbons dpHC(b).

Until the first dew point measurement is made and a dp value is determined, “NO” will be shown on the display. (illus. 10)

In the case of both water and hydrocarbons, the initial electrical signal at the analogue 4…20 mA data port is 3.5 mA for a value of “NO”.

A small flashing letter is shown in the upper left-hand corner of the display. This letter provides information about the operation currently underway within a given mode.

d	Diagnostic cycle for elements of the dew point measurement channel;
s	Mirror heating during the measurement cycle and temperature stabilization;
c	Mirror cooling;
h	Mirror heating;
cal	Calibrating the dpHC measurement channel;

After the measurement cycle is completed, the registered value for the dew point of water dpW or hydrocarbons dpHC will be presented on the display (illus. 12).

The Cong Prima 2M then switches to “mirror cleaning” mode automatically.

(a) dpHC (b) dpW

Illustration 12

Examples of the display after the first measurement cycle.

After the “mirror cleaning” cycle is completed, the analyzer carries out a self-diagnostic cycle. Then, when this cycle is complete, the unit repeats the measurement cycle starting from the beginning.

If the measured dew point value lies below the CP 2M’s measurement range, the following message will be shown on the display (illus. 13):

Illustration 13

CP 2M display for a dpW outside the analyzer’s measurement range.

In the hydrocarbon measurement mode (dpHC), if water condenses before hydrocarbon condensation can be registered, the analyzer’s display shows the following message:

Illustration 14

CP 2M display for dpHC outside the analyzer’s available measurement range.

At this point, the CP 2M automatically ends the measurement cycle and switches to the mirror-cleaning mode.

Subsequently, the analyzer starts the next measurement cycle.

3 Description and construction of the Cong Prima 2M

The Cong Prima 2M dew point analyzer comprises the sensor cell (1), the housing (2), lids A (3) and B (4), the gas supply line (5) and an electronics unit, which is located within the housing (2) (see Appendix B).

The analyzer is equipped with four magnetically activated buttons, which are arranged above, below, and to either side of the display screen. These buttons are operated using a specially designed magnetic key.

The CP 2M's display screen shows the current dew point measurement values, dpW or dpHC, and other information about the status of the device.

The terminal block of the analyzer's transformer is covered by lid B. The RS485 or 4 –20 mA data ports are located in the terminal block, which is also the pint of connection for the four-conductor power cable. The power cable passes through the housing into the electronics unit by way of the cable inlet (8).

The numbers and uses of the terminals are given in appendix A.

The CP 2M is attached to the gas supply line with eight stainless steel M8 screws (6). The construction of the analyzer permits easy access to the thermostatically controlled mirror for cleaning and maintenance purposes. Gas delivery to the CP 2M's measurement chamber must be interrupted for the duration of these procedures.

3.1 Cong Prima 2M configuration options

The Cong Prima 2M dew point analyzer is available in three versions with different configurations.

3.1.1 KRAY 2.848.015-01 version

(Appendix B)

The KRAY 2.848.015-01 version consists of a measurement module with no pre-installed system for gas delivery, filtration or outflow.

This module is particularly suited for applications in laboratories and industrial areas where gases are characterized by a high degree of purity.

The KRAY 2.848.015-01 version can also be installed as a dew point analyzer in measurement systems that are already installed.

3.1.2 KRAY 2.848.015 version equipped with insertable sampling probe

(Appendix C)

Some configurations of the Cong Prima 2M dew point analyzer are equipped with an insertable gas-sampling probe.

The insertable sampling probe makes it possible to mount the analyzer directly onto the gas line (min. ø 200mm) and ensures that the gas sample is clean.

This version of the analyzer is suitable for use in gas transport facilities and other installations where the composition of the gas does not include liquid contaminants (aerosols).

The gas delivery unit is outfitted with a cut-off valve. Thank to this valve, it is not necessary to interrupt pipeline gas flow when the analyzer is temporarily uninstalled, for example for maintenance procedures.

In addition, the KRAY 2.848.015 version has a fine-tuning valve used to adjust the volume flow of sample gas to the CP 2M's measurement chamber.

a) Insulated hood

b) Weather shade

Illustration 14:

CP 2M protective equipment for outdoor installations

For outdoor installations, it is recommended that the CP 2M KRAY 2.848.015 be outfitted with the insulated hood or weather shade included with delivery, in order to protect it from the effects of inclement weather. The insulated hood prevents excessive cooling of the CP 2M's measurement chamber and sample delivery pipe by retaining the heat generated by the measurement process as well as ambient heat within the gas pipeline (illus. 14). The insulated hood and weather shade are included with delivery in the KRAY 2.848.015 version of the Cong Prima 2M.

3.1.3 KRAY 2.848.015-01 version with SGA 003 gas preparation system

(Appendix E)

The CP 2M dew point analyzer can be delivered with the SGA 003 gas preparation system already installed.

This system is suitable for heated indoor spaces and block boxes.

Areas of application for which the SGA 003 is appropriate include the transportation, storage, and processing of various gases.

3.2 Description and construction of the CP 2M with the SGA 003 gas preparation system

The SGA 003 gas preparation system ensures that the sample gas is free of various mechanical and aerosol contaminants.

The revolutionary principle behind our patented gravity filter (Appendix E, position 2) is one of the core elements of the SGA 003. This type of filtration eliminates the need for any kind of filter membrane or cartridge, which, due to the unpredictable consequences of wear, are the weak points of other gas preparation systems.

In contrast to traditional filter systems, gravity filtration avoids causing changes to gas sample conditions due to a compromised or clogged filter element. In other words, our SGA system permanently provides the highest standard of sample gas preparation.

The SGA's design makes it possible to establish the dew point of water (dpW) at operating pressure, and the dew point of hydrocarbons (dpHC) at reduced pressures — for example, 27 bar.

The SGA 003 gas preparation is the first universal solution for all of the typical gas sector problems associated with dew point measurement.

This system is able to take measurements at various working pressures, at contractually defined pressures, and at any other pressures as desired, up to 160 bar.

The SGA 003's innovative reference module is another special feature of this gas preparation system. This system makes it possible to quickly mount a "Hygrovision" series analyzer as a control instrument. With the control instrument in place, the operator can obtain information about all of the processes in the sample gas with absolute certainty, and he or she can quickly and inexpensively check the validity of the present measurement results at any time, or when documentation requires.

In order to simplify attachment of the "Hygrovision" reference instrument, the SGA has a foldout mounting arm as well as the necessary gas delivery lines. The SGA unit also has an additional power connection for the reference analyzer (Appendix E, position 16). Data transfer via a 4 – 20 mA interface is also supported by this connection.

All of the SGA components are mounted onto an assembly plate. This plate is designed be mounted vertically, on a wall say, or in a specially designed cabinet.

Four M8 threaded bolts (not included with delivery) are required to attach the assembly board to the wall or other vertical surface. Further specifications can be found in Appendix F.

Connecting sleeves (Swagelok/ DK-Lok) with an outer diameter of 6 mm are used to connect the SGA 003 to the gas line.

Refer to the manometer or the pressure transmitter to read the pressure conditions at the control outlet.

If desired, the SGA can also be outfitted with a module to carry out reference measurements, or “reference module”.

All of the necessary quick-connection couplers required for connecting the reference module to the SGA 003 are included in delivery.

3.3 dpW and dpHC module

The function of this module is to ensure that gas reaches the measurement chamber of the analyzer in the SGA system under operating pressure. At the same time, the module guarantees that gas is delivered to the installed reference instrument at operating pressure (or other pressure conditions as desired).

For a description of the dpW and dpHC module see Appendix F, which also includes an installation schematic.

The dpW and dpHC module ensures that the sample gas is examined at operating pressure, independent of the process-switch settings (see Appendix C).

By turning the process switch, which is located at the control output, is possible to test the dew point at:

operating pressure (position “W”)

reduced pressure (position “HC”).

The manometer (6) and the pressure transmitter (28) display the current operating pressure.

3.3.1 High-pressure outflow module

The outflow module ensures that the sample gases coming from the reference instrument are passed to the main outflow line.

It is not necessary to reduce the operating pressure of the gas upstream of this module as it can handle pressures of up to 160 bar.

The outflow module is attached at the outlet of the T-joint in place of the shutoff valve (Appendix E, position 19).

The high-pressure outflow module will be delivered pre-installed on the SGA 003 gas preparation system, when the module is included in the order for the SGA 003.

3.3.2 Pipe connection module

The pipe connection module is for installation on pipelines or pipeline segments that are not outfitted with permanent sampling probes.

The module consists of:

Sample extraction apparatus

Dielectric mounting insert DEU6M-E4M-LT-S

Connecting pipe with heating element

Heated pipe element DEKORON 2E56-N7

Installation of the sample extractor

(Appendix H)

Place the connecting sleeve (pos.1) on the intended sampling site and weld it in place. Carefully screw the sample extraction apparatus into the mounting bushing using the O-ring to ensure an airtight seal.

The flow of sample gas can be controlled using the ball valve on the sample extraction apparatus.

When the handle of the valve is in position A, sample gas is allowed to flow into the Cong Prima 2M analyzer.

When the handle of the valve is in position B, sample gas is **not** allowed to flow into the Cong Prima 2M analyzer.

The outflow nozzle of the sample extraction apparatus is designed to accept a ø 6X1mm (Swagelok/ DK-Lok) stainless-steel pipe connector. No additional expansion of the pipe end is necessary in order to make this attachment.

Connecting pipe

The connecting pipe transports the sample gas from the extraction site to the SGA 003 gas preparation system. When ordering, please specify the desired length for the connecting pipe (Appendix H).

The connecting pipe, which is supplied by Swagelok or DK-Lok, is made of a stainless steel pipe with a diameter (ø) of 6mm and the interior surface of the pipe is chemically polished. Swagelok or DK-Lok connectors (respectively) are used to attach the pipe

Dielectric inserts

(Appendix H, position 4)

The use of dielectric inserts ensures the electrical insulation between the connecting pipe and the gas pipeline, and is mounted immediately before the SGA.

3.4 Functional description of the SGA

For the electrical, pneumatic, and SGA mounting schematics see Appendices K, I, and E.

The sample extraction device removes gas samples from the gas pipeline at operating pressure.

Gradually open the shutoff valve (1) in order to evenly fill the SGA with sample gas. In this way the system can adjust to the operating pressure conditions.

The manometers (6 and 8) make it possible for the operator to continuously monitor this process.

After passing through the shutoff valve (1), the sample gas enters the SGA's gravitational filter. The construction of the filter has one gas inlet and two gas outlets. One of the two outlets is used to purge filter. The gas that is used to purge the filter flows through the heating unit (21), the manometer (8), the rotameter (11), and exits the system through the gas outlet port (14). The gas flow volume in this bypass line can be adjusted using the rotameter (11). Here, the recommended flow rate is 6 – 10 Nl/min. The heating unit ensures that the gas temperature remains stable, thereby avoiding the Joule - Thomson effect.

There are two gas pipes within the heating unit (21): the 6mm diameter bypass line for purging the filter and the 3mm diameter sample gas line that passes through the T-connector (23) and the heating unit to pressure reduction unit (3).

Depending on the position of the process switch (4), the filtered sample gas flows to the CP 2M's measuring chamber and/or the inlet port of reference analyzer.

If the process switch is set to "W", the filtered gas exits the pressure reduction unit at operating pressure and flows to the CP 2M's measuring chamber or to the reference instrument. The pressure reduction unit has one inlet and three interconnected outlets. The outlets are connected to the process switch (4), the shutoff valve for the reference analyzer connection, and the CP 2M's measuring chamber.

If the process switch is set to "HC", the filtered sample gas passes through T-connection to the heating unit (21) and from there to the pressure reduction unit (3). The pressure reduction unit can be set to reduce the gas pressure to the desired parameters in a range from 1 – 80 bar. The current pressure conditions can be monitored on the manometer (6).

After the gas passes out of the pressure reduction unit it flows to the measuring chamber of the CP 2M. After the gas leaves the measuring chamber it undergoes further pressure reduction. The gas flow volume in the analyzer's measuring chamber can be set to the desired flow rate using the rotameter (9). The recommended rate here is 0.3 – 0.5 Nl/min. Subsequently, the sample gas is released into the atmosphere through the SGA's outlet.

4 Cong Prima 2M Installation and Mounting

Tools and accessories required for the installation and mounting of the analyzer are listed in table 1:

Table 1

Tool	Standard size	Notes
Hexagonal or Allen wrench	6 mm	used in attaching the CP 2M to the gas sample extraction device
Hexagonal or Allen wrench	5 mm	used for tightening the bushing
Screwdriver	2.5 mm	used for tightening electrical terminal connections
Special wrench		used to open the CP 2M's front and read covers CP 2M (included in delivery)

4.1 General instructions

When (un)installing pressurizable equipment onto the gas extraction device or the gas preparation system (SGA), the working pressure is to be reduced to the level of the ambient atmosphere.

The analyzer is joined by eight threaded bolts that guarantee rupture resistance up to 8300 bar.

Electrical installation of the CP M is to be carried out in accordance with Appendix A.

The sample gas release outlets (Appendix E, position 13 and 14) must be separately connected to a collector that releases this gas to the atmosphere. The collector must have a minimum inner diameter of 20mm.

4.2 Sample extraction site requirements:

The CP 2M's sample extraction device must be located on a straight length of pipe. There must be at least five pipe-diameter widths of straight pipe upstream of the extraction site and three pipe-diameter widths downstream of the extraction site. There must not be any bottlenecks of obstructions within this section.

The gas sample must be taken from near the center of the gas flow.

A pipe for venting sample gas to the atmosphere must be present to ensure a constant flow rate through the measuring chamber.

4.3 Connecting the Cong Prima 2M

The Cong Prima 2M is ready to begin taking dew point measurements at atmospheric pressure immediately upon being connected to the power supply.

You will find detailed information about the installation of the Cong Prima 2M in Appendix B.

Affix the gas delivery element of the CP 2M perpendicular to a horizontal surface using four M8 bolts (see Appendix B, perspective A).

Attach the CP 2M to the gas delivery element using eight M8 bolts (included in delivery).

Gradually open the shutoff valve of the sample extraction device. The sample gas will now flow into the sample extraction device through the (IN) inlet and then flow out again through the (Out).

Set the gas flow volume rate to 0.2 – 0.3 Nl/min.

Check the seals of the connection elements. To do this, fill the measuring chamber of the analyzer at operating pressure (including the gas delivery lines). Next, coat all of the connecting elements with a soapy emulsion. If small bubbles form, it indicates a leak or a bad seal. This connection must be resealed.

Complete the electrical installation of the CP 2M in accordance with Appendix A.

Ground the analyzer. To do this, connect the grounding terminal of the analyzer with the ground bus at the installation site. This requires an insulated copper conductor with a cross-section of at least 1.5mm^2 (or 4mm^2 for a copper conductor that is not insulated).

To uninstall the Cong Prima 2M complete the preceding steps in the reverse order.

4.4 Connecting the Cong Prima 2M equipped with a retractable sampling device

The installation of the CP 2M with a retractable sampling device is a two-step process. First, attach the gas feed unit to the sampling site. Next, mount the analyzer to the gas feed unit. (refer to Appendix D)

To attach the gas supply line follow these steps:

Weld the mounting bushing onto the gas pipeline at the sampling site. The bushing must be oriented within 10° of perpendicular and have threading of M33x2;

Carefully screw the gas feed unit into the mounting bushing (14) until it is fully seated;

Adjust the position of the gas feed unit so that the direction of the arrows on the unit correspond to the gas flow. To make this adjustment, turn the gas feed element counter clockwise no more than one full turn;

Finally, tighten the lock nut (13);

Ensure that the handle of the sampling device is in the closed position;

Open the gas feed and check the seal integrity of the connecting elements. Spread a soapy emulsion between the lock nut (13) and the mounting bushing (14). If small bubbles form, it is an indication that the seal is not airtight and must be reseated.

The dew point analyzer is mounted as follows:

Attach the CP 2M using the eight M8 bolts included with delivery;

Close the fine-control valve (9) using a screwdriver (illus. 15, pos. 2). This requires removal of the protective cap (illus. 15, pos.1);

Slowly move the handle of the sampling device to the open position;

Check the seal of the connecting elements. To do this, fill the measuring chamber of the analyzer with sample gas under operating pressure. Next spread a soapy emulsion on all of the connecting elements. If small bubbles begin to form it is an indication that the seal at that point is not airtight and must be reseated;

Complete electrical installation in accordance with Appendix A;

Ground the analyzer. Connect the grounding terminal of the CP 2M to the grounding bus using an insulated copper conductor with a minimum cross-section of 1.5mm$^{2;}$

Connect a rotameter to the outlet of the fine control valve (9). The rotameter is not included with delivery and must be ordered separately. Using the rotameter as a reference, set the gas flow to 0.3–0.5 Nl/min. The outlet (Swagelok/ Dk-Lok) ,is outfitted to accept an locking tube connection with an outer diameter of 6mm

Remove the rotameter and attach a locking tube (not included with delivery) in its place providing a pathway for the sample gas flow. Replace the protective cap on the fine-control valve (illus. 15, pos.1);

Erect the sunshade or protective hood in accordance with the climate conditions.

	Attention! If the composition of the gas has very little liquid aerosols and accompanying substances or has already been filtered, outflow through the fine control valve may be dispensed with.

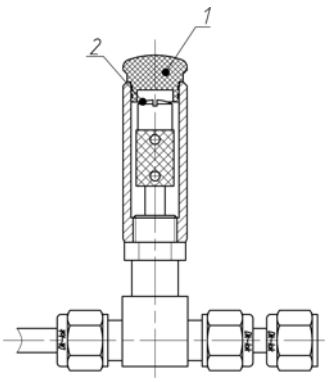


Illustration 15: fine-control valve;

pos.1 protective cap; pos.2 slot for screwdriver blade

To uninstall the Cong Prima 2M, follow these steps in the reverse order. After the analyzer has been removed the gas feed element must be protected from dirt, dust, and water by covering it with the protective lid (included with delivery).

4.5 Installation and activation of the Cong Prima 2M with the SGA 003 system

In this configuration, the analyzer and the SGA 003 are delivered already assembled.

The analyzer (5), pressure transmitter (28), and the heating element (21) are connected to the explosion-proof terminal boxes (16, 17, and 18). All of the SGA's connection seals are tested to a pressure of 160 bar at the factory.

Complete the installation of the SGA 003 as follows:

Affix the SGA 003 to a vertical wall of purpose-built vertical stand using four M(bolts (not included in delivery).

Complete the electrical installation of the SGA 003 in accordance with Appendix K.

Ground the SGA 003. To do this, connect the SGA's grounding terminal with the ground bus at the installation site. This requires an insulated copper conductor with a cross-section of at least 1.5mm^2 (or 4mm^2 for an copper conductor that is not insulated).

Connect the gas outlets (13 and 14) to a collector for sample release to the atmosphere. Close the ball valve at position 19.

Close the flow control regulator on the rotameters (9 and11)

Close the pressure valves (3 and10). To do this, turn the regulator on the valve all the way counterclockwise.

Set the process switch (4) to the desired position.

For "W the dew point is measured at operating pressure.

For "HC" the dew point is measured at reduced pressure.

Complete the electrical installation of the heating unit (21)

Open the SGA's gas delivery shutoff valve (1) gradually and evenly.

Refer to the manometer (8) to monitor the increasing pressure in the system.

Use the by-pass line rotameter to set the gas flow rate at from 6 – 10 Nl/min.

If the process switch (4) is set to "W", fully open the pressure valve by turning the knob on the valve all the way clockwise.

Use the rotameter (9) to set a sample gas flow rate of from 0.2 – 0.3 Nl/min.

If the process switch (4) is set to "HC", the operator can use the pressure regulator valve (3) to adjust the sample gas pressure as desired.

The current pressure in the measurement chamber (5) is displayed by the manometer (6).

When the pressure regulator valve is fully open, the sample-gas flow rate is in the 0.2 – 0.3 Nl/min range.

Connect the power supply.

Important!

If the composition of the gas has very little liquid aerosols and accompanying substances or has already been filtered, outflow through the bypass outlet may be dispensed with.

For superior gas convection and a more active dew point measurement, the manufacturer recommends a through-flow in the bypass line of around 1Nl/min.

4.6 Installation and connection of a reference analyzer

The SGA 003 is designed to facilitate the mounting of a reference instrument.

A foldout console (20) is permanently attached to the SGA 003. A second dew point analyzer from the “Hygrovision” series can be easily mounted on this console as a reference instrument (see Appendix E).

Pull the handle (25) to bring the console (20) into the working position. Release the locking device (26) and bring the mounting plate for attaching the reference instrument into a horizontal position.

Hygrovision series analyzers have a threaded hole in their housings that matches the mounting bolt set into the horizontal plate of the foldout console.

To affix the reference analyzer to the SGA, first screw the mounting bolt in the console plate (27) into the threaded hole by turning clockwise. Then lock the analyzer in place by means of the locking device (26).

Connect the measurement chamber of the reference unit to the control outlets using high-pressure hoses.

Alternately, if this process is taking place under supervision, the outflow from the reference instrument may be connected to a flexible low-pressure hose when taking control measurements.

Fill the measurement chamber of the analyzer by means of the shut-off valve (7). Control the outflow by operating the valve on the SGA unit (19).

Warning!

A high-pressure hose MUST be used for connecting the reference module outflow to the SGA unit when measurements / control measurements are carried out that are not supervised.

5 CP 2M error messages

Under specific conditions, the following error messages may be shown on the analyzer's display during operation of the CP 2M.

Possible problems, their causes, and recommended remedial actions are listed in table 4.

Table 4

	Situation	Display	Description of the problem	Remedial action
1)	During **dpW** and/or **dpHC** measurement a dew point value of –30 °C is shown preceded by the **"<"** symbol.		The dew point value measured is outside the analyzer's measurement range.	Check the value using a reference hygrometer.
2)	During **dpHC** measurement a "W" symbol is displayed preceded by the "**>**" symbol.		Water condensation was registered prior to the detection of hydrocarbon condensation.	Measure the **dpW** of the present sample gas using a reference hygrometer.
3)	The photo signal is below the preset level: Err 01 – Direct channel Err 02 – Back channel Err 03 – Interference channel Err 12 – Direct and back channel	  	a) defective laser or the laser is not activated b) defective photo sensor (n)	1) Visually check to confirm that the laser diode is activated. This requires that the CP 2M be unmounted from the gas sampling element; 2) Check the data signal value in the **Clean mode»**. If the laser diode is inactive or the signal is less than 50 conventional units, the CP 2M must be returned to the factory for servicing
4)	Periodically (every few seconds) the message Err 04 appears on the display in place of the measurement value	 	a) The outside temperature value is outside of the acceptable range b) Defective temperature sensor	Check the temperature of the CP 2M's housing in **«Clean Mode»**. The housing temperature should be within the range +10 – +45 °C.

5)	Malfunction in the CP 2M's mirror temperature measurement channel	 	Defective temperature sensor	The CP 2M must be returned to the manufacturer for servicing.
6)	Malfunction of the thermoelectric battery (TEB)	 	There is no effective heating or cooling of the condensation mirror	The CP 2M must be returned to the manufacturer for servicing.
7)	Sensor contamination	 	The level of the data signal for water or hydrocarbons exceeds the allowable range	Clean the CP 2M's mirror.
8)	Malfunction of the laser diode	 	The temperature of the laser diode is below the allowable range	If the housing temperature (T_B) is ≥ - 20°C return the analyzer to the manufacturer for servicing.
9)	Contamination still present after the cleaning mode cycle is complete		No evaporation of condensate residue after three successive cycles of the cleaning mode have been completed	Turn off the analyzer for at least one hour. Should the error message be displayed at the conclusion of this period, the analyzer must be returned to the manufacturer for servicing.

If any of the listed error messages appear, it is recommended that the corresponding remedial action be taken.

If, after taking the appropriate remedial action, the Cong Prima 2M does not function properly, it will be necessary to return the analyzer to the manufacturer for servicing.

5.1 Cleaning the mirror

When the condensation mirror is contaminated, the error message “Err 07” will be shown on the Cong Prima 2M’s display.

The analyzer will then automatically switch to the mirror-cleaning mode.

If the mirror is still contaminated after three successive cycles in the mirror-cleaning mode, it will be necessary to clean the mirror manually.

Warning!
Manual cleaning of the condensation mirror should only take place in an explosion-proof area!

Please observe the following procedure when cleaning the mirror manually:

Switch off the CP 2M’s power supply;

Unmount the CP 2M from the sample extraction device;

Place the cover (KRAY8.046.155 – included in delivery) on the analyzer and bring it to an explosion-proof area;

Reconnect the CP 2M’s power supply and activate the mirror-cleaning mode;

In cleaning mode, the thermostatically controlled condensation mirror is automatically heated to +55 °C. During this procedure, the analyzer’s display shows information about the photodiode signal level (see 1.5, illus. 7);

Monitor the effectiveness of the cleaning by referring to the U_W or U_{HC} value depending on whether the last measurement mode was dpW or dpHC;

Use a cotton swab dipped in the cleaning fluid to manually clean the surface of the condensation mirror. Be careful to exert the absolute minimum amount of pressure when cleaning the mirror;

Re-mount the CP 2M on the sample extraction device and switch it on as described in chapter 4 of the manual.

Illustration 16: Cleaning the mirror

Should there still be residual contamination after manual cleaning has been completed, the cleaning procedure, as described above, can be repeated using acetone in place of the cleaning fluid delivered with the analyzer.

Warning!

Please use the utmost caution when cleaning the condensation mirror manually.
Damage such as scratches or etching significantly reduce the analyzer's performance.
Mechanical damage to the condensation mirror is not covered under the warrantee.

5.2 Cong Prima 2M technical information

Dew point measurement range	
dpW	$T_{(Housing)}$ ≥ -40 °C
dpHC	$T_{(Housing)}$ ≥ -40 °C
Absolute error limit of dew point measurements	
dpW	± 0.5 °C
dpHC	± 0.5 °C
Measurement cycle duration period	
dpW	10 – 30 min
dpHC	10 – 30 min
Gas sampling conditions:	
Pressure	≤ 160 bar
Temperature	–20 – +50 °C
Technical data of the CP 2M:	
Electrical connection	Conductors: 4 x 0.75 mm^2 (ø 8 – 11.5 mm)
Material in contact with the sample gas	Stainless steel 12X18H10T; PTFE 4; Glass; Silicone
Average sample-gas flow volume	≤ 0.3 – 0.5 Nl/min [1)]
Explosion protection	Ex IIG EEx d IIA T5.

Housing type	IP54	
Data ports	Digital	RS 485 /Modbus /RTU
	Analogue	4 – 20mA output, max. 400 Ohm, Insulation 500 V
Power supply	20 – 27 V	
Power consumption	≤ 25 W	
Input cable threading	M 20 x 1.5	

Weight	CP 2M	6.5 kg
	CP 2M with SGA 003	25 kg
	Power supply DR-60-24	≤ 0.69 kg
Dimensions	CP 2M	207 x 112 x 235 mm
	CP 2M with SGA 003	510 x 510 x 172 mm
	Power supply DR-60-24	80 x 90 x 60 mm
Environmental conditions required for operation		
Ambient temperature	between +10° and +40 °C [2)]	
Relative humidity	≥ 98 % at +35 °C; the ratio between humidity and temperature may not be such as to allow precipitation in the area	
Barometric pressure	84 – 106.7 kPa	
Maximum distance between the CP 2M and the power supply	1000 m [3)]	
Service life	10 years [4)]	
Constant magnetic fields or alternating current fields that have a technical spectrum intensity of more than 400 A /m is not permitted.		

1) – Sample gas flow rate units are Normal liters per minute (Nl/min) and are understood to be measured at a gas pressure of 0.1 MPa

2) – The temperature of the dew point analyzer, the gas preparation system, and the sample extraction lines should be a minimum of 10 °C warmer than the expected dew point temperature

3) – The resistance of the power-supply conductor that connects the Cong Prima 2M to its power supply should not exceed 2.5 Ohms.

4) – The service life of the transducer (as a component of the CP 2M) is a minimum of three years.

6 Markings

The markings on the analyzer's housing provide information about:

- Trademark and name o the manufacturer
- Description of the device
- Ignition protection markings
- Certifying authority and certificate number
- Markings about the type of protection against solid contaminants and water in accordance with IEC 60529:1992(IP54)
- Dew point measurement range
- Operating pressure tolerance
- Operating temperature of the device
- Serial number
- Country of origin

7 Packing

The component parts of the analyzer must be properly conserved before they are packed for shipping or storage.

The device is to be packed in a closed, well-ventilated rooms with an ambient temperature of +15 °C – +40 °C and with a relative humidity of up to 80%.

The ambient air must not contain any aggressive constituents.

The packaging protects the device against climatic influences and mechanical stresses during loading and unloading, transport, and storage.

The operating documents are located under the cover in the upper half of the transport case. The devices accompanying documentation are in watertight packaging and are also found in the compartment in the transport case cover.

8 Storage

Analyzers are only to be stored in the containers designated for that purpose by the manufacturer. These containers protect the instruments from mechanical damage, contamination, and the effects of aggressive media.

For transport purposes, analyzers may be temporarily stored for up to six months in the purpose-built transport packaging.

9 Transportation

Transport requirements:

Analyzers are only to be transported in closed containers carried in hermetically tempered vehicles.

When in use, the analyzer must be transported in the carrier that is included in delivery.

10 Recycling

The materials and work pieces used in the manufacture of the Cong Prima 2M dew point analyzer are environmentally friendly. They present no health threat and can be considered harmless to production and storage areas.

A CP 2M, which is no longer in service, may be disposed of in any way deemed fit by the user.

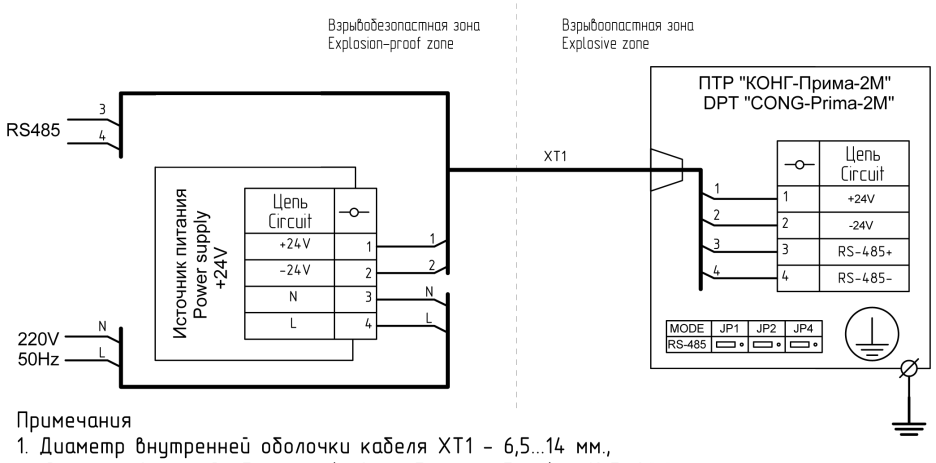
Old batteries are to be disposed of by appropriately licensed companies.

11 Appendices

Appendix A

Cong Prima 2M interface ports

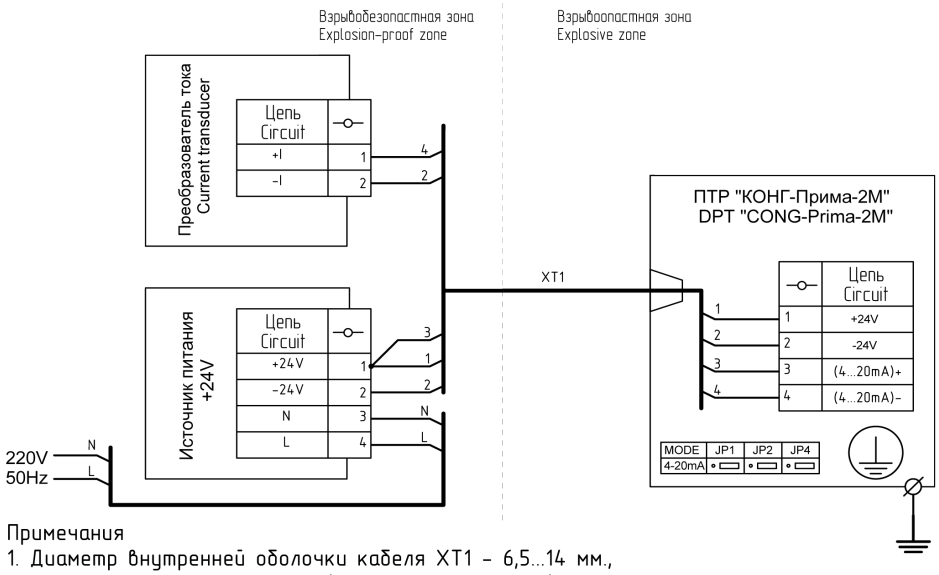
Dew point transducer «Cong Prima 2M» with digital output:



Примечания
1. Диаметр внутренней оболочки кабеля XT1 – 6,5...14 мм.,
   диаметр внешней оболочки (поверх брони кабеля) – 12,5...20,9 мм.
2. Сечение любого из проводников кабеля XT1 – 1,5...2,5 кв.мм.

Note
1. Diameter of inner sheath cable XT1 – 6,5 ... 14 mm.,
   diameter of the outer shell (over the cable armor) – 12,5...20,9 mm.
2. Any cross-section of the cable XT1 conductors – 1,5...2,5 sq.mm.

Dew point transducer «Cong Prima 2M» with analogue output (passive output 4...20 мА):



Примечания
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   диаметр внешней оболочки (поверх брони кабеля) – 12,5...20,9 мм.
2. Сечение любого из проводников кабеля XT1 – 1,5...2,5 кв.мм.

Note
1. Diameter of inner sheath cable XT1 – 6,5 ... 14 mm.,
   diameter of the outer shell (over the cable armor) – 12,5...20,9 mm.
2. Any cross-section of the cable XT1 conductors – 1,5...2,5 sq.mm.

Illustration I

Appendix B

Dimensions and connection sizes of the CP 2M dew point analyzer

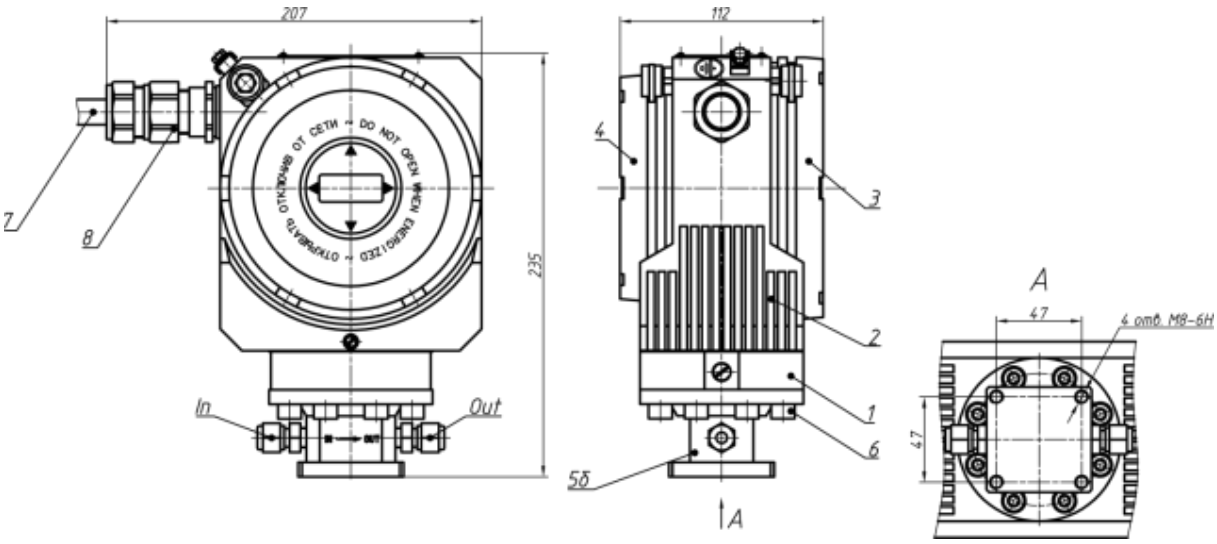


Illustration II

Pos.	Designation	Description	Number
1	KRAY5.910.005	Transducer	1
2	KRAY8.034.113	Housing	1
3	KRAY6.172.035	Cover A	1
4	KRAY8.046.172	Cover B	1
5б	KRAY6.457.068	Gas delivery element	1
6	A4-80 DIN912	Bolts M8x25	8
7		Power cable	1
8	20E1FU1RA	Power cable coupling	1
IN		Sample gas inlet	1
OUT		Sample gas outlet	1

Appendix C

Dimensions and connection sizes of the Cong Prima 2M dew point analyzer

(Version: KRAY 2.848.015)

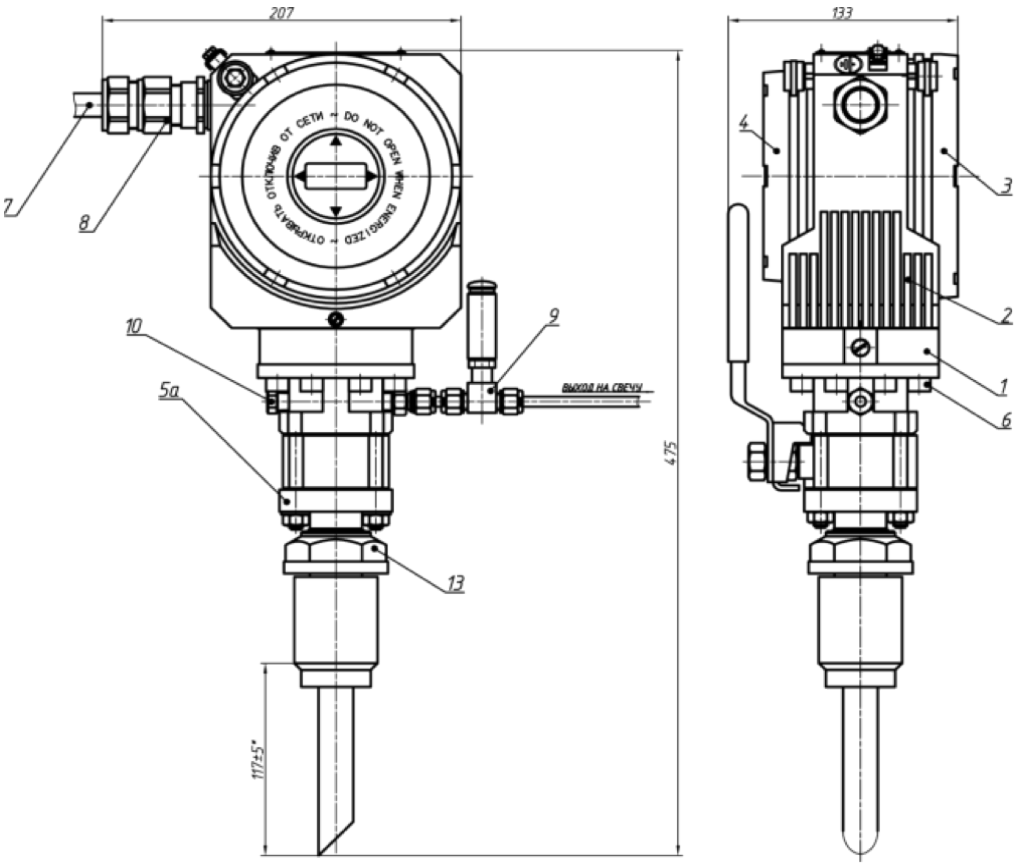


Illustration III

Pos.	Designation	Description	Number
1	KRAY5.910.005	Transducer	1
2	KRAY8.034.113	Housing	1
3	KRAY6.172.035	Cover A	1
4	KRAY8.046.172	Cover B	1
5a	KRAY6.457.020-01	Gas delivery element	1
6	A4-80 DIN912	Bolts M8x25	8
7		Power cable	1
8	20E1FU1RA	Power cable coupling	1
9	VYMP6.451.001	Shutoff valve	1
10	DMD-2N	Process outlet	1
13	KRAY 8.930.006	Lock nut	1

Appendix D

Installation of the Cong Prima 2M dew point analyzer

(Version: KRAY 2.848.015)

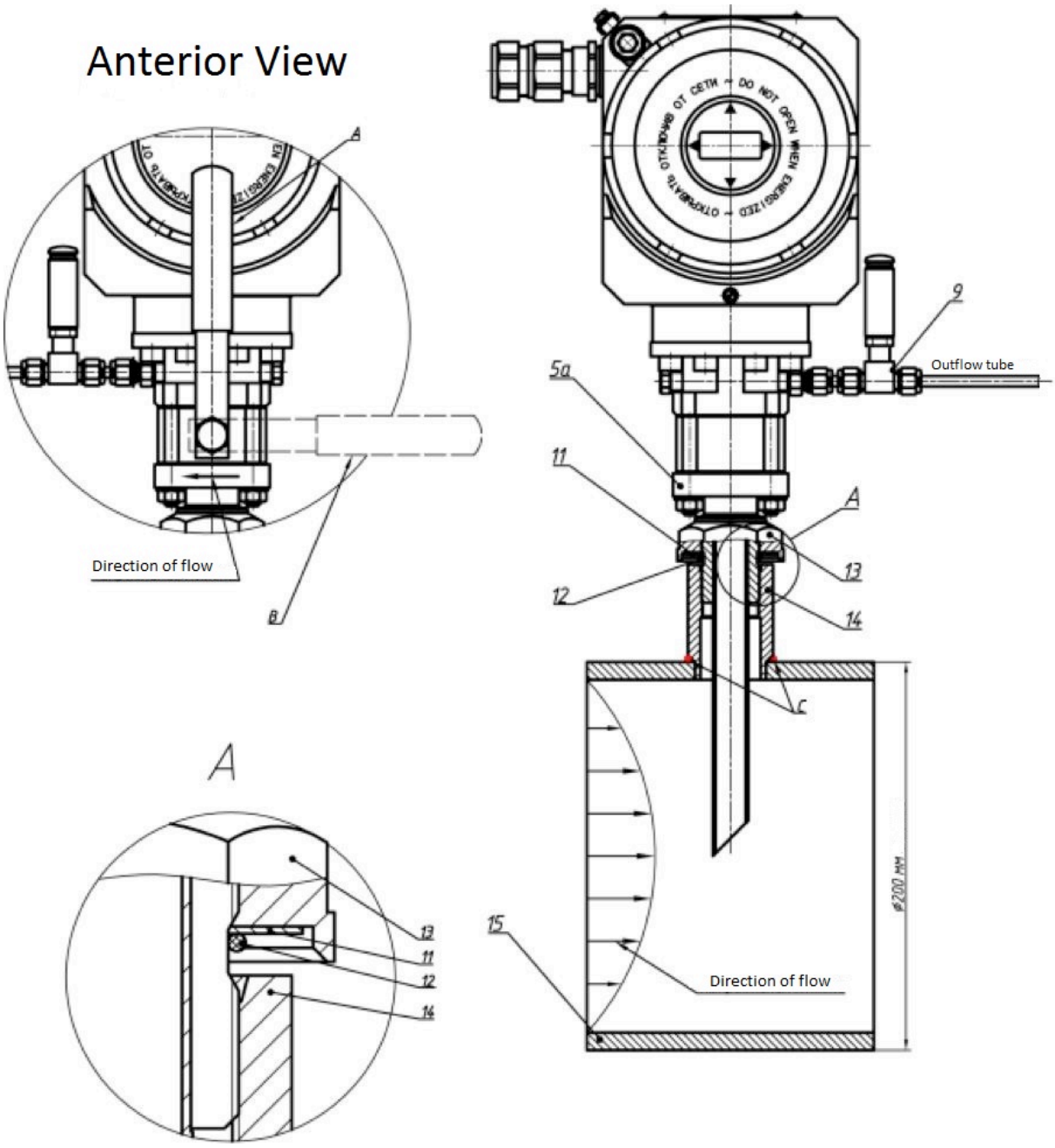


Illustration IV

Pos.	Designation	Description	Number
5a	KRAY6.457.020-01	Gas delivery element	1
9	VMPL6.451.001	Shutoff valve	1
11	KRAY8.942.009	Washer	1
12	030-035-30-2-2 GOST 18829-73 16ST V19-OR-0916	O-ring	1
13	KRAY8.930.006	Lock nut	1
14	KRAY8.223.027 – 01	Installation bushing	1
15		Gas pipeline	1
A		Two position stopcock (OPEN)	
B		Two position stopcock (CLOSED)	
C		Weld points	

Appendix E

SGA 003 gas preparations system

(Installation schematic)

Pos.	Designation	Description	Number
1	V15B-D-6M-R-S	Shutoff valve	1
2	THT-3R60-12-1-T	Seamless gravity-filter fall out tube	1
3	BB-13AH2KE99-053	Pressure regulator	1
4	VL82A-D-3M-S	Process switch	1
5	KRAY2.848.015-01	Dew point analyzer (Cong Prima 2M)	1
6	Model 213.53.50	Manometer	1
7	V15B-D-6M-R-S	Shutoff valve	1
8	Model 213.53.50	Manometer	1
9	VMPL5.132.001	Intrinsically Safe Pressure Transmitter	1
10	DK 32	Float-type through-flow meter	1
11	DK 32	Float-type through-flow meter	1
12	DFBA-D-6M-SA	Quick-coupling connection for the reference analyzer housing: gas inlet	1
13	DUB-6M-SA	Sleeve with mounting screw	1
14	DBL-6M-S	Mounting bracket with mounting screw	1
15	VMPL8.942.001	Backing plate	1
16	BPGC02.00-002 BO	Terminal box	1
17	BPGC01.00-028 BO	Terminal box	1
18	BPGC01.00-029 BO	Terminal box	1
19	VL82A-D-6M-S	Ball valve	1
20	VMPL6.354.002	Foldout arm	1
21	VMPL5.863.002	Heating unit	1
22	VMPL8.658.001-02	Measurement chamber gas line: in	1
23	DT-3M-SA	T-connection	1
24	DT-6M-SA	T-connection	1
25	VMPL8.220.005	Pivot joint	1
26		Locking device	1
27		Mounting plate for the reference instrument	1

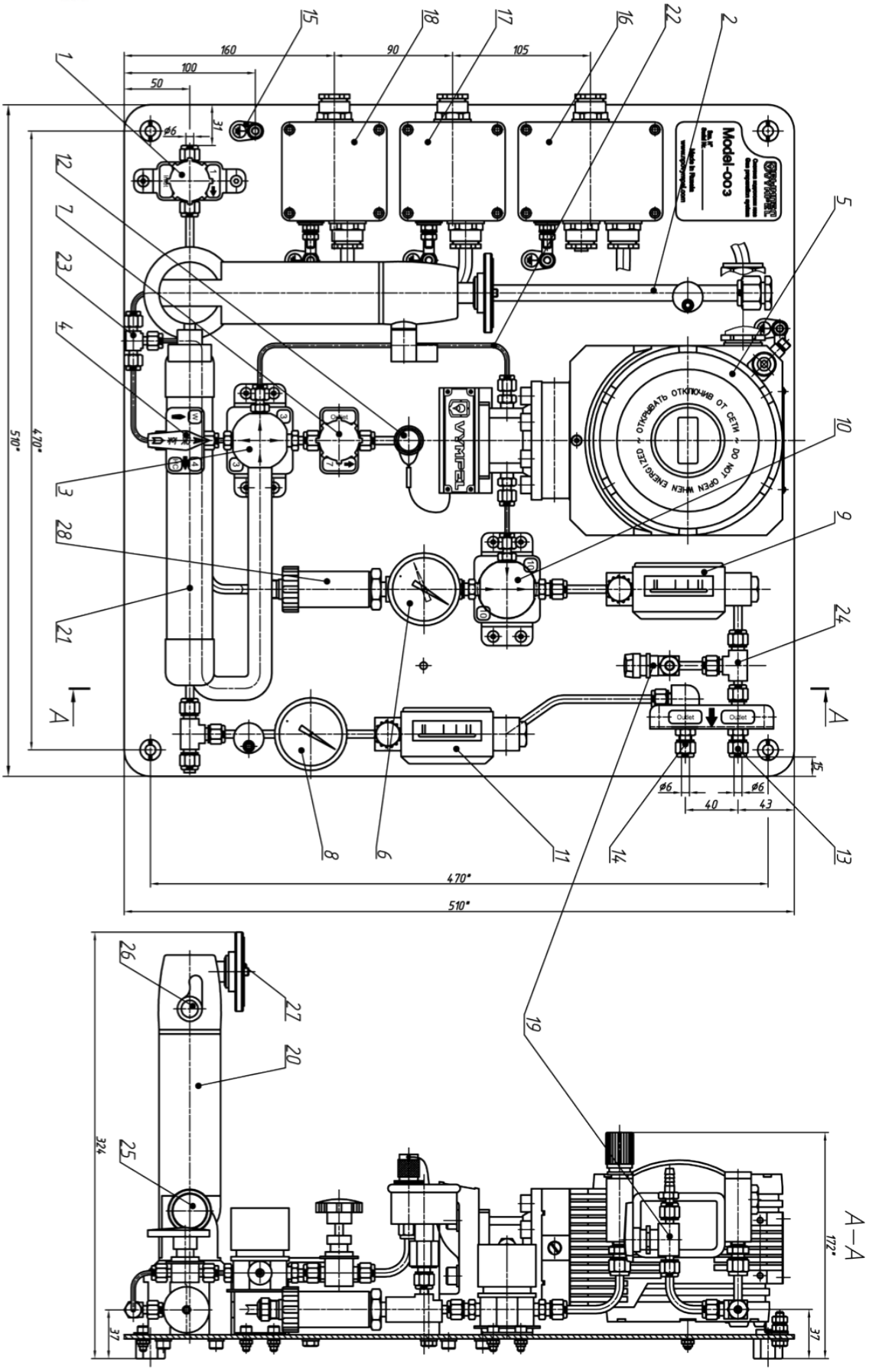
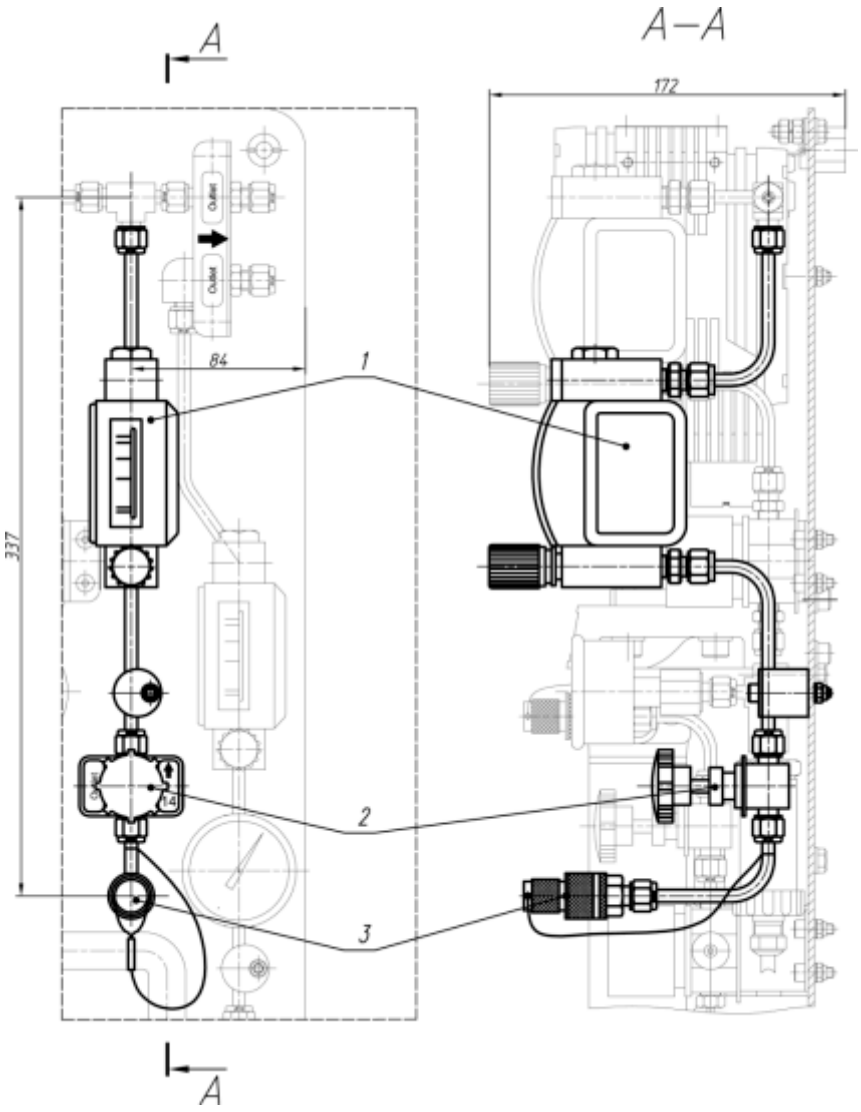


Illustration V

Appendix F

High pressure outflow module

(Installation schematic)



Pos.	Designation	Description	Number
1	DK 32	Float-type through-flow meter (Sample media: methane; measurement range 0.33 – 2 Nl/min; connection G1/4")	1
2	V15B-D-6M-R-S	Shutoff valve	1
3	DFBA-D-6M-SA	Quick-coupling connector	1

Appendix G

dpW and dpHC measurement module

(Installation schematic)

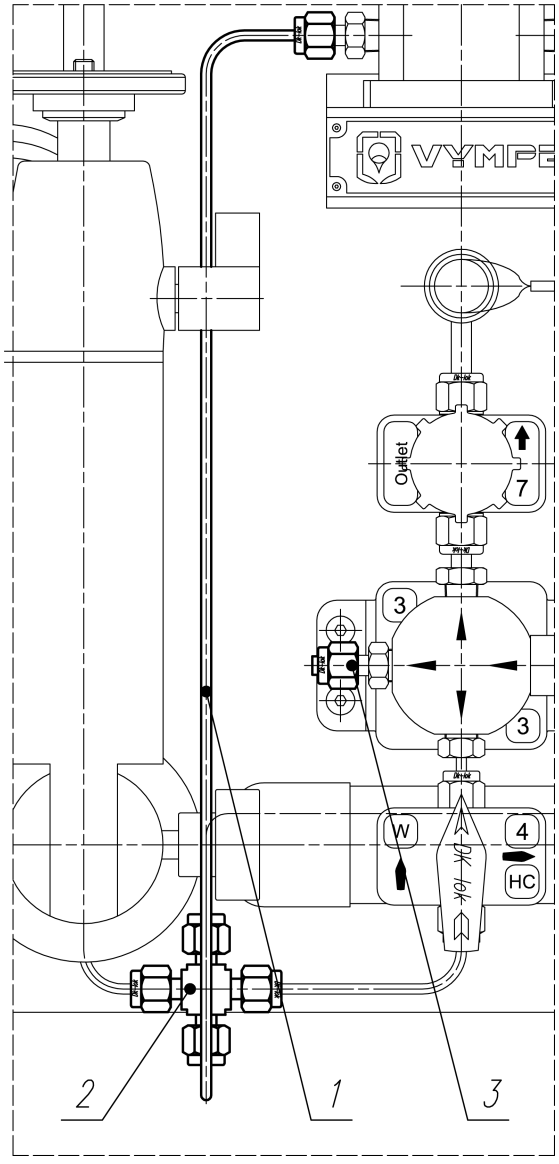


Illustration VI

Pos.	Designation	Description	Number
1	YMP8.658.001-04	Gas pipeline connection	1
2	DX-3M-SA	Crosspiece	1
3	DP-3M-SA	Locking connection	1

Appendix H

Set for connecting the SGA 003 to the gas pipeline

(Installation schematic)

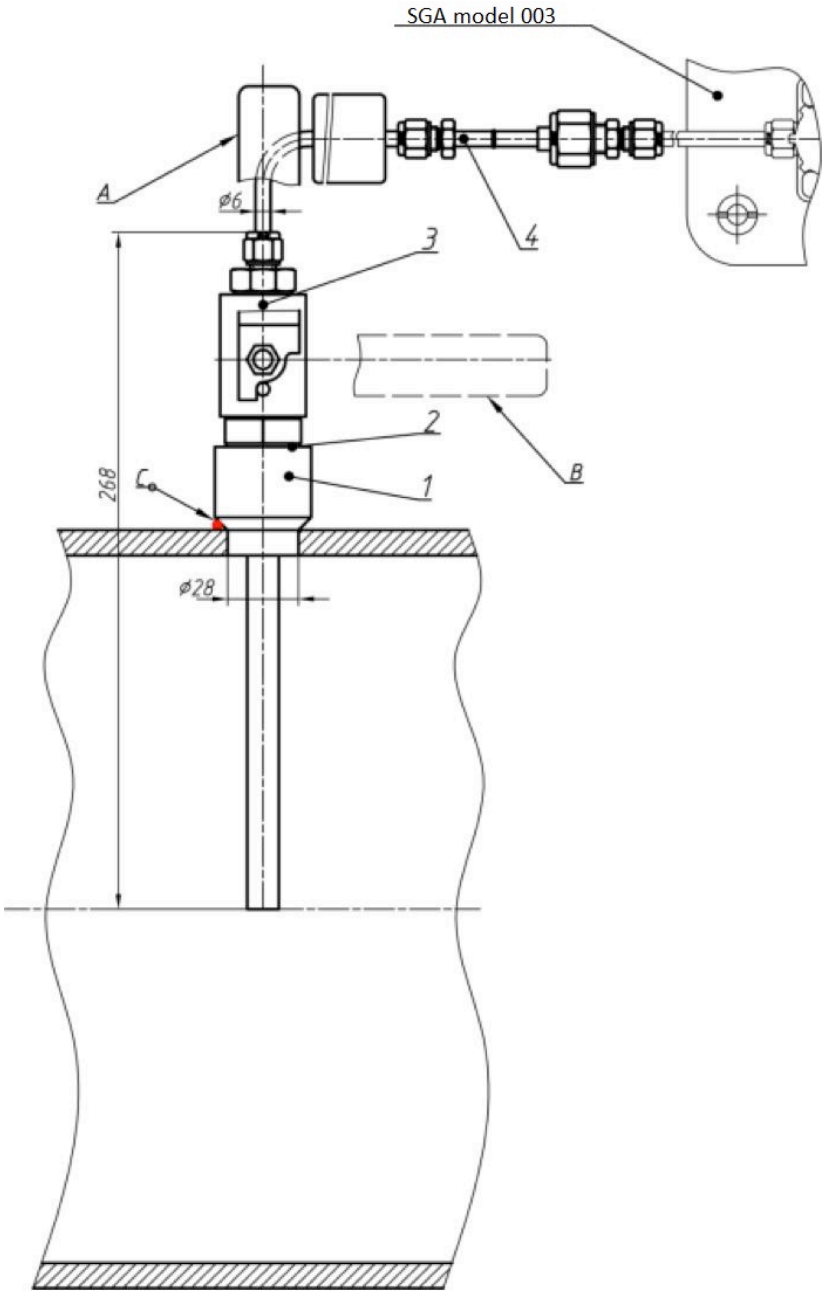


Illustration VII

Pos.	Designation	Description	Number
1	VYMP8.223.012	Installation sleeve	1
2	VYMP 8.248.004	Backing disk	1
3	VYMP 6.457.005	Sample extraction device	1
4	DEU6M-E4M-LT-S	Insulating spacer	1

Appendix I

SGA 003 gas preparation system

(Pneumatic schematic)

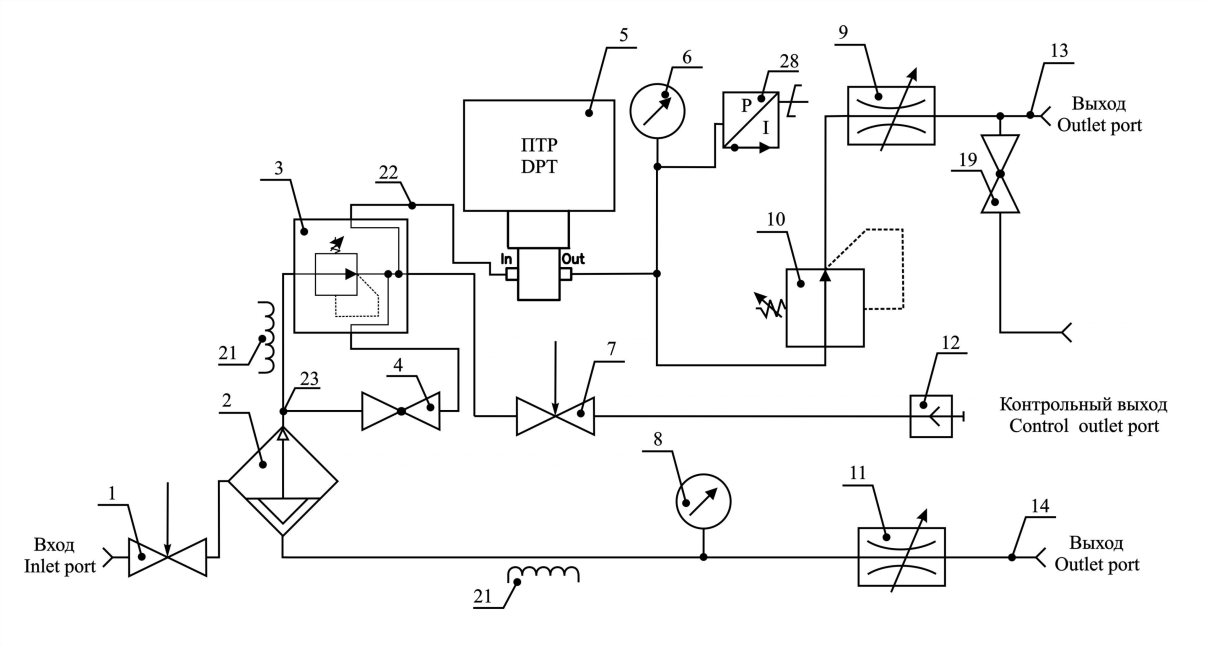


Illustration VIII

Pos.	Description	Number
1	Needle valve	1
2	Filter	1
3	Pressure control valve	1
4	Process switch	1
5	Dew point analyzer	1
6	Manometer 0 – 160 bar	1
7	Needle valve	1
8	Manometer 0 – 160 bar	1
9	Float-type through-flow meter	1
10	Pressure control valve	1
11	Float-type through-flow meter	1
12	Control outlet	1
13	Out flow (sample gas)	1
14	Out flow (bypass line, filter)	1
19	Ball valve	1
21	Heating unit	1
22	Gas delivery line	1
23	T-connection	1
28	Intrinsically safe pressure transmitter	1

Appendix J

SGA 003 gas preparation system (including a reference instrument)

(Pneumatic schematic)

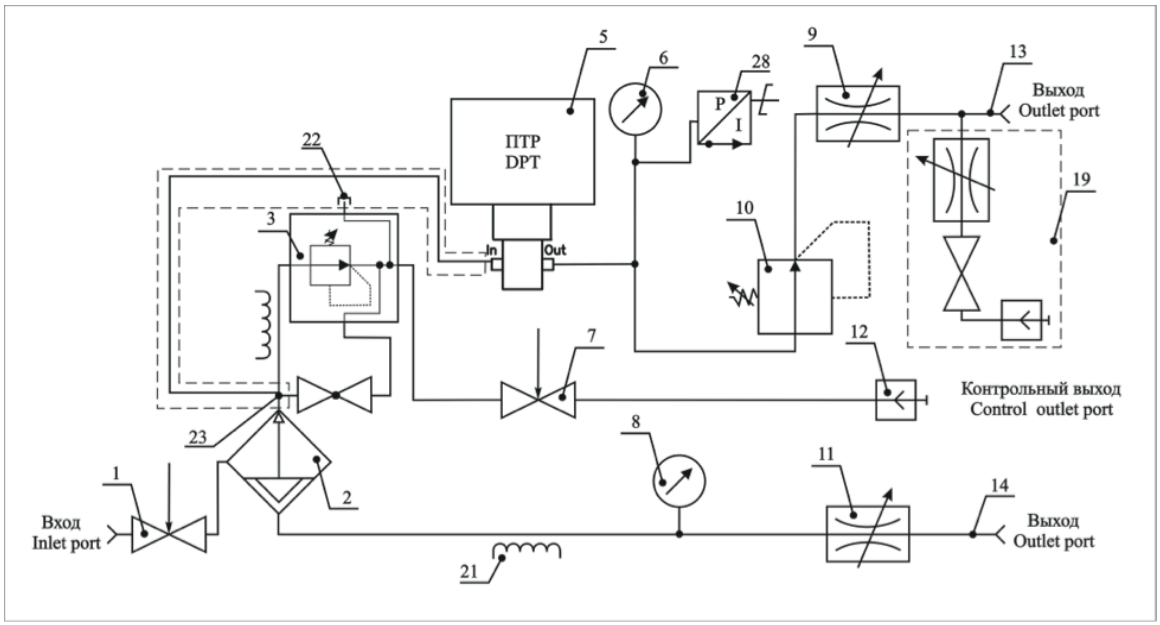


Illustration IX

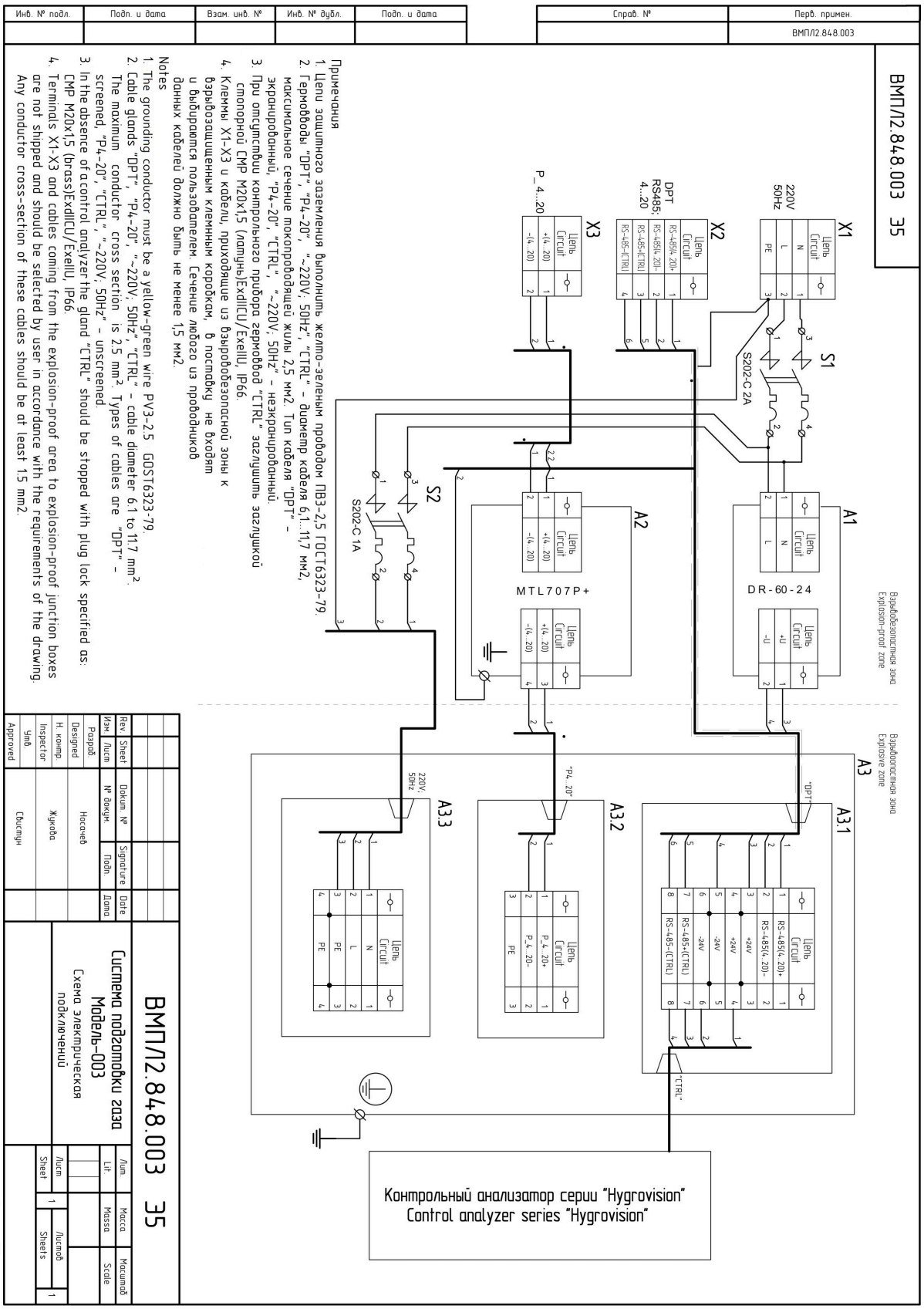
Pos.	Description	Number
1	Needle valve	1
2	Filter	1
3	Pressure control valve	1
4	Process switch	1
5	Dew point analyzer	1
6	Manometer 0 – 160 bar	1
7	Needle valve	1
8	Manometer 0 – 160 bar	1
9	Float-type through-flow meter	1
10	Pressure control valve	1
11	Float-type through-flow meter	1
12	Control outlet	1
13	Out flow (sample gas)	1
14	Out flow (bypass line, filter)	1
19	Outflow line (reference instrument)	1
21	Heating unit	1
22	Gas delivery line	1
23	T-connection	1
28	Intrinsically safe pressure transmitter	1

Appendix K

SGA 003 gas preparation system

(Circuitry)

Position	Description	Number	Notes
X1.1 – X1.3	Connection terminal UT-4	3	Phoenix contact
X2.1 – X2.4	Connection terminal UT-4	4	Phoenix contact
X3.1 – X3.2	Connection terminal UT-4	2	Phoenix contact
X4	Connection terminal UT-4	1	Phoenix contact
S1	Circuit breaker S202- C2A	1	ABB
S1	Circuit breaker S202- C1A	1	ABB
A1	Power source DR-60-24	1	Mean Weel
A2	Insulating barrier MTL707P+	1	MTL Instruments
A3	SGA 003 gas preparation system	1	Vympel
A3.1-3.3	Explosion-proof housing (BPG series)	3	ABTECH



Примечания

1. Цепи защитного заземления выполнить желто-зеленым проводом ПВ3-2,5 ГОСТ6323-79.
2. Гермовводы "DPT", "P4-20", "~220V; 50Hz", "CTRL" - диаметр кабеля 6,1..11,7 мм2, максимальное сечение токопроводящей жилы 2,5 мм2. Тип кабеля "DPT" - экранированный, "P4-20", "CTRL", "~220V; 50Hz" - неэкранированный.
3. При отсутствии контрольного прибора гермоввод "CTRL" заглушить заглушкой стопорной СМР М20х1,5 (латунь)ExdIICU/ExeIIU, IP66.
4. Клеммы X1-X3 и кабели, приходящие из взрывобезопасной зоны к взрывозащищенным клеммным коробкам, в поставку не входят и выбираются пользователем. Сечение любого из проводников данных кабелей должно быть не менее 1,5 мм2.

Notes

1. The grounding conductor must be a yellow-green wire PV3-2.5 GOST6323-79.
2. Cable glands "DPT", "P4-20", "~220V; 50Hz", "CTRL" - cable diameter 6.1 to 11.7 mm^2. The maximum conductor cross section is 2.5 mm^2. Types of cables are "DPT" - screened, "P4-20", "CTRL", "~220V; 50Hz" - unscreened.
3. In the absence of a control analyzer the gland "CTRL" should be stopped with plug lock specified as: СМР М20х1,5 (brass)ExdIICU/ExeIIU, IP66.
4. Terminals X1-X3 and cables coming from the explosion-proof area to explosion-proof junction boxes are not shipped and should be selected by user in accordance with the requirements of the drawing. Any conductor cross-section of these cables should be at least 15 mm2.

Appendix L

Examples of reference instrument installations
using “Hygrovision” series analyzers

Illustration X: “SGA 003” equipped with a “Hygrovision BL” as the reference analyzer

Illustration XI: “SGA 003” equipped with a “Hygrovision mini” as the reference analyzer

Appendix M

CP 2M explosion protection

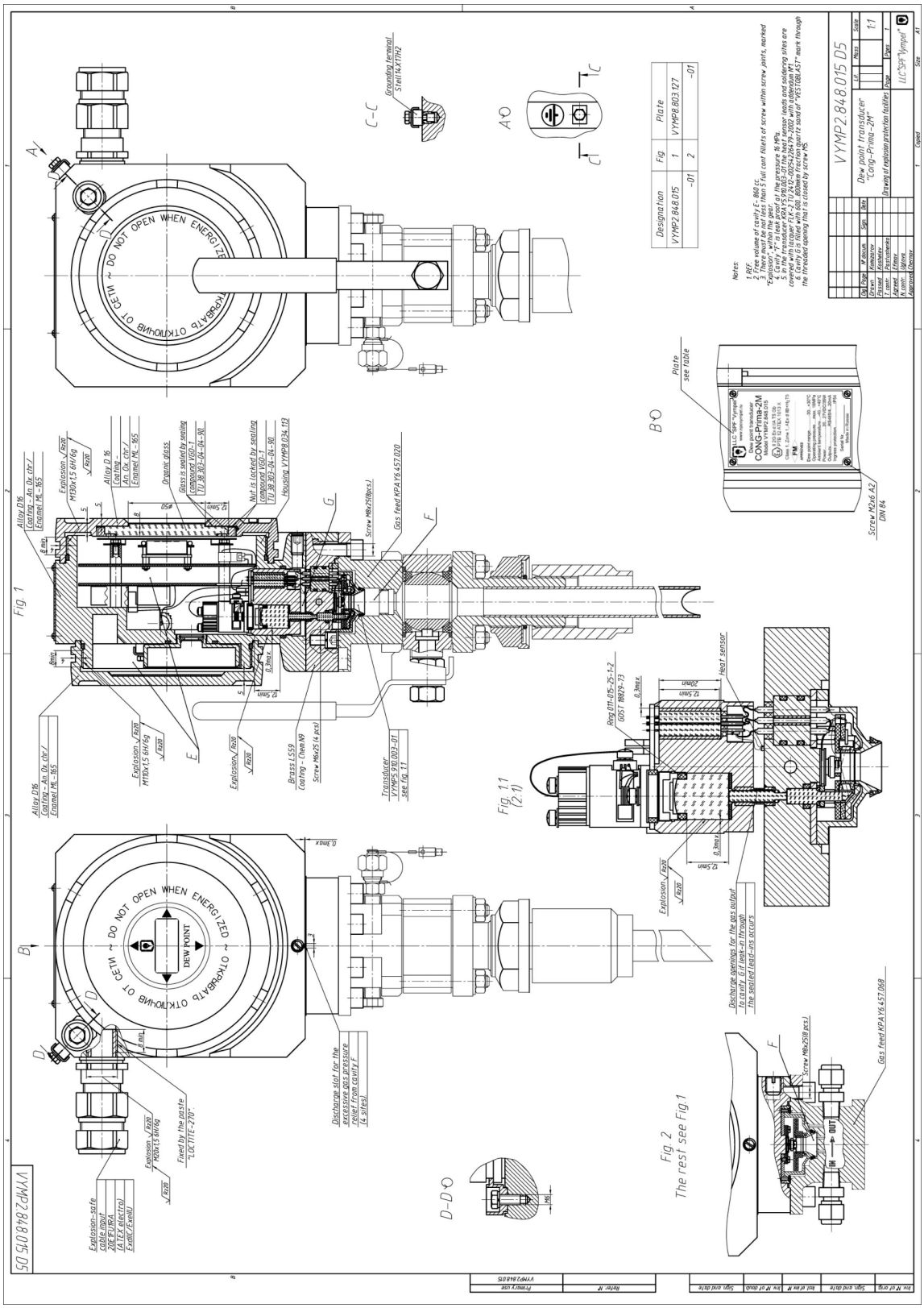


Illustration XII

Appendix N

Cong Prima 2M dew point analyzer

Description of the Modbus register

ModBus/RTU protocol parameters:	
Baud rate	38400
Parity	no
Stop-Bit	1

Register address	Type	Parameter description
0-1		Name of the device
17	float	Housing temperature in °C
Measured dew point value of hydrocarbons		
21-22	float	DPT (in °C)
25	uint16_t	DPT Flags
Measured dew point value of hydrocarbons		
28-29	float	DPT (in °C)
32	uint16_t	DPT Flags
78	Uint32_t	Error code

DPT Flags contain the following data:

Bit-Number	Designation	
8	DP Measurement mode:	0 – Hydrocarbon measurement
		1 – Water measurement
14	More than 4 hours after the dew point measurement	

Modbus Address	100

Appendix O

Cong Prima 2M dew point analyzer

Design certification (Russia)

ФЕДЕРАЛЬНОЕ АГЕНТСТВО
ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ

СВИДЕТЕЛЬСТВО

об утверждении типа средств измерений

RU.C.31.002.A № 46432

Срок действия до 11 мая 2017 г.

НАИМЕНОВАНИЕ ТИПА СРЕДСТВ ИЗМЕРЕНИЙ
Преобразователи точки росы "КОНГ-Прима-2М" КРАУ2.848.015

ИЗГОТОВИТЕЛЬ
Общество с ограниченной ответственностью "Научно-производственная фирма "Вымпел" (ООО "НПФ "Вымпел"), г. Саратов

РЕГИСТРАЦИОННЫЙ № **49830-12**

ДОКУМЕНТ НА ПОВЕРКУ
КРАУ2.848.015МП

ИНТЕРВАЛ МЕЖДУ ПОВЕРКАМИ **1 год**

Тип средств измерений утвержден приказом Федерального агентства по техническому регулированию и метрологии от **11 мая 2012 г. № 328**

Описание типа средств измерений является обязательным приложением к настоящему свидетельству.

Заместитель Руководителя
Федерального агентства — Е.Р.Петросян

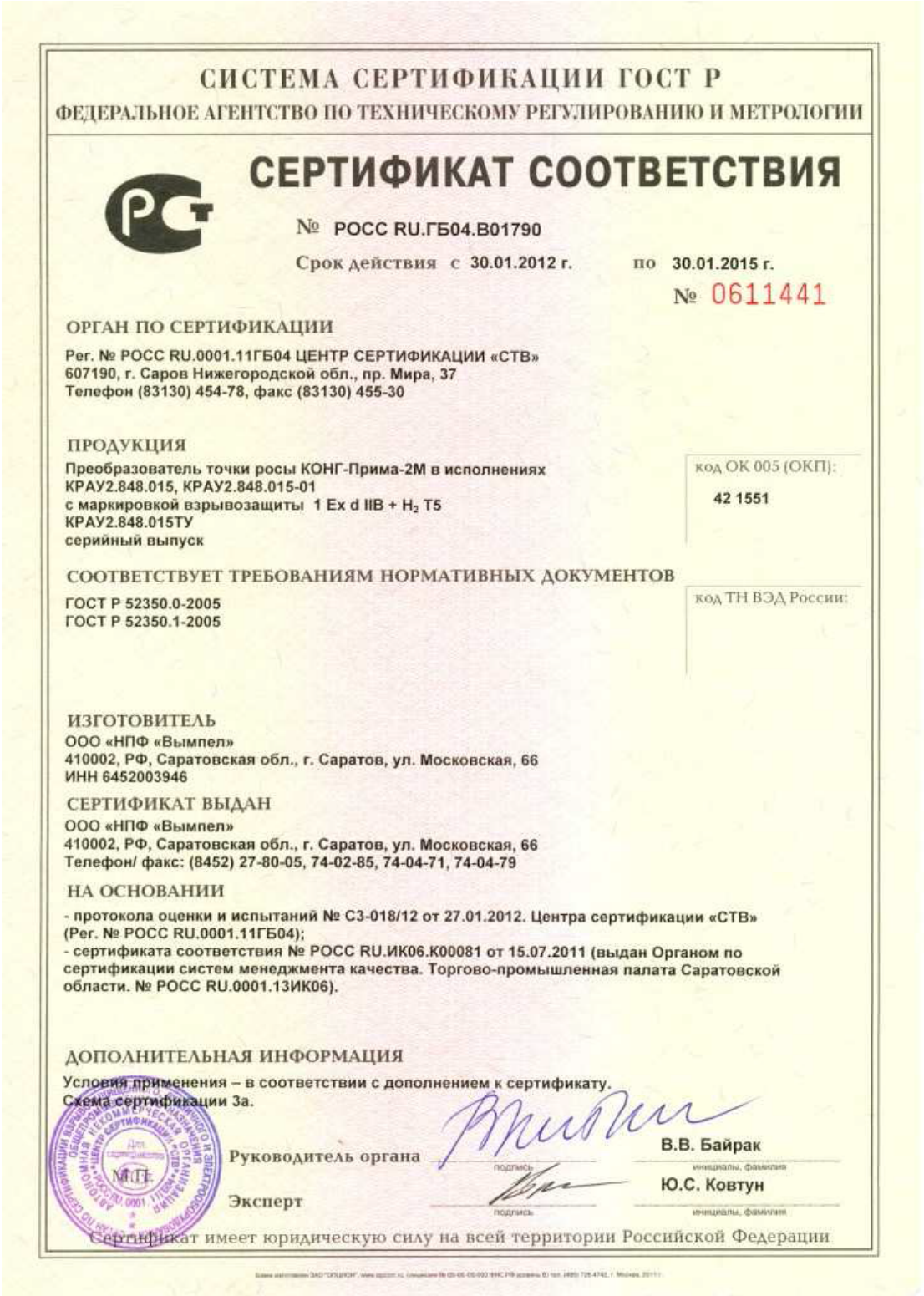
"07" 06 2012 г.

Серия СИ — № 004617

Appendix P

Cong Prima 2M dew point analyzer

Declaration of conformity (Russia)



СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р

ФЕДЕРАЛЬНОЕ АГЕНТСТВО ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ РОСС RU.ГБ04.В01790

Срок действия с 30.01.2012 г. по 30.01.2015 г.

№ 0611441

ОРГАН ПО СЕРТИФИКАЦИИ

Рег. № РОСС RU.0001.11ГБ04 ЦЕНТР СЕРТИФИКАЦИИ «СТВ»
607190, г. Саров Нижегородской обл., пр. Мира, 37
Телефон (83130) 454-78, факс (83130) 455-30

ПРОДУКЦИЯ

Преобразователь точки росы КОНГ-Прима-2М в исполнениях
КРАУ2.848.015, КРАУ2.848.015-01
с маркировкой взрывозащиты 1 Ex d IIB + H_2 T5
КРАУ2.848.015ТУ
серийный выпуск

код ОК 005 (ОКП): 42 1551

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ НОРМАТИВНЫХ ДОКУМЕНТОВ

ГОСТ Р 52350.0-2005
ГОСТ Р 52350.1-2005

код ТН ВЭД России:

ИЗГОТОВИТЕЛЬ

ООО «НПФ «Вымпел»
410002, РФ, Саратовская обл., г. Саратов, ул. Московская, 66
ИНН 6452003946

СЕРТИФИКАТ ВЫДАН

ООО «НПФ «Вымпел»
410002, РФ, Саратовская обл., г. Саратов, ул. Московская, 66
Телефон/ факс: (8452) 27-80-05, 74-02-85, 74-04-71, 74-04-79

НА ОСНОВАНИИ

- протокола оценки и испытаний № С3-018/12 от 27.01.2012. Центра сертификации «СТВ» (Рег. № РОСС RU.0001.11ГБ04);
- сертификата соответствия № РОСС RU.ИК06.К00081 от 15.07.2011 (выдан Органом по сертификации систем менеджмента качества. Торгово-промышленная палата Саратовской области. № РОСС RU.0001.13ИК06).

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Условия применения – в соответствии с дополнением к сертификату.
Схема сертификации 3а.

Руководитель органа — подпись — В.В. Байрак (инициалы, фамилия)

Эксперт — подпись — Ю.С. Ковтун (инициалы, фамилия)

Сертификат имеет юридическую силу на всей территории Российской Федерации

Appendix Q

Cong Prima 2M dew point analyzer Prototype certification (Germany)

Physikalisch-Technische Bundesanstalt

PTB

Braunschweig und Berlin

(1) **EC-TYPE-EXAMINATION CERTIFICATE**

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 12 ATEX 1013 X

(4) Equipment: Dew-point measuring unit, type CONG-Prima-2M

(5) Manufacturer: Wissenschaftliche Produktionsfirma „Vympel" SPF, Ltd.

(6) Address: Moskovskaya Street 66, 410002 Saratov, Russia

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential test report PTB Ex 12-12103.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2009 **EN 60079-1:2007**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

Ex II 2 G Ex d IIA T5 Gb

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Braunschweig, May 14, 2012

Dr.-Ing. U. Klausmeyer
Direktor und Professor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

ZSEx10100e.dotm

sheet 1/3

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt.
In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • GERMANY

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(13) **SCHEDULE**

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 12 ATEX 1013 X**

(15) Description of equipment

The CONG-Prima-2M dew-point measuring unit is used for determining the moisture and hydrocarbon dew points in gases, preferably natural gas. The unit uses the condensation method, in which cooling makes the gas layer that borders on the measuring surface change to the saturated phase at the corresponding operating pressure.

The installed electronic system converts the measured value into an amperage signal of 4 - 20 mA.

Technical data

Supply voltage	18 to 42 V DC
Power dissipation:	max. 25 VA
Output signal	analogue 4 - 20 mA DC

(16) Test Report PTB Ex12-12103

(17) Special conditions for safe use

Repairs on flameproof joints may only be performed in accordance with the manufacturer's design specifications. Repair on the basis of the values in tables 1 and 2 of EN 60079-1 is not permitted.

Additional notes for safe operation

Components attached or installed (terminal compartments, bushings, Ex-type cable glands, connectors) shall be of a technical standard that at least complies with the specifications on the cover sheet, and they shall have a separate examination certificate. The operating conditions specified in the component certificates must be complied with.

Connection conditions

1 The CONG-Prima-2M dew-point measuring unit shall be connected with suitable cable glands or conduit systems that meet the requirements set forth in EN 60079-1, sections 13.1 and 13.2, and for which a separate test certificate has been issued. If the CONG-Prima-2M dew-point measuring unit is connected to conduit systems, the required sealing device shall be provided immediately at the enclosure.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 12 ATEX 1013 X

2. Cable glands (Pg type glands) and blanking plugs of a simple design must not be used.
3. Openings that are not used shall be closed in compliance with the specifications in EN 60079-1, section 11.9.
4. If connection is made in the potentially explosive area, the connecting cable (unconnected cable end) of the CONG-Prima-2M dew-point measuring unit shall be connected in an enclosure that meets the requirements of an approved type of protection in accordance with EN 60079-0, section 1.
5. The connecting cable of the CONG-Prima-2M shall be fixed and routed so it will be adequately protected against mechanical damage.
6. If the temperature at the input parts exceeds 70 °C, temperature-resistant connecting cables shall be used.
7. The CONG-Prima-2M dew-point measuring unit shall be included in the local equipotential bonding system of the potentially explosive area.

These notes and instructions shall accompany each device in an adequate form.

Minimum ambient temperature

The minimum ambient temperature of the unit is -40 °C.

(18) Essential health and safety requirements

Met by compliance with the afore-mentioned Standards.

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Dr.-Ing. U. Klausmeyer
Direktor und Professor

Braunschweig, May 14, 2012