Operation Manual

ADP 0700

0322ED00182

2022

Preface

Dear Customer,

May we kindly thank you for your confidence in our company and products.

We have done everything to supply you with the installation specially engineered for your requirements and which as to quality and performance will meet your and our high expectations.

The operation manual in hand is containing tips, details and instructions in order to handle this installation safely, economically and conventionally. The consideration of the operation manual helps to avoid situations of danger, cost of repair, and to minimize down times as well as to increase the reliability and life time of the installation.

For a safe and trouble-free operation of the installation, please kindly look through the operation manual in hand carefully and pay attention to all advices, instructions and recommendations for operation and maintenance. It is compulsory to gain access of this manual to your maintenance and operational staff and to keep a copy the manual on the place of installation.

In case of non-observance of all herein mentioned advices, instructions and recommendations for the operation and maintenance, we will not be able to abide the agreed warranty. In case of changes within the installation or usage for a different purpose as provided your claim for warranty will expire as well.

In case of such an event we kindly ask you to check respectively coordinate this with the manufacturer first.

It goes without saying that our customer service will be available on request at any time in order to support you in a professional commissioning, maintenance and service.

The manufacturer reserves the right to carry out changes without prior notice.

BERG Kompressoren GmbH

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1. The Manufacturer

Manufacturer of this Unit is the Company:

BERG Kompressoren GmbH
47807 Krefeld, Deutschland

Phone: +49 (0)2151 56 895 50

Internet: www.berg-kompressoren.de
Email: info@berg-kompressoren.de

Questions to the operation manual respectively further information on the supplied unit will be answered by the manufacturer. Whether in writing or by phone please always let us have the following data:

Order-No.: 21020343
Serial-No.: 0322ED00182

The mentioned data could be found at the dryer on the touch panel at page “Info screen”, as well as the type plate of the adsorption dryer unit. The type plate is mounted on the side panel of the switch board.

2. Safety Instructions

2.1 Used Symbols

With the symbols listed below we especially want to make you aware about the danger described in the technical documentation.
The used symbols are defined as follows:

General Attention / Caution
This symbol labels general advices

Danger due to hot Surfaces
This symbol labels dangers due to hot surfaces

Danger from Compressed Air
This symbol labels dangers due to pressure

Danger from electrical Energy
This symbol labels dangers from electrical energy

Safety Sign Dust
This symbol advises to carry a mask

Safety Sign Ear Protection
This symbol advises you to carry ear protection

Information Sign Environment
This symbol refers to advices about environmental protection

2.2 Safety Information for Operation

Non-observance of the security advices can lead to physical injuries and damages to properties. Basic requirement for a safe handling and a trouble-free operation of this unit is the knowledge and compliance of the national working, operation and safety rules!

Please always leave a copy of this operation manual at the place of installation!!

2.2.1 General Safety Instructions

- The unit may only be used to operate after notice of this operation manual.
- The unit may be used for its intended purpose only, i.e. as described in the operation manual.
- **The unit must be flown through by compressed air only. The allowed operation pressure mentioned on the type plate may not be exceeded. Operation of the unit with different media and above the allowed operation pressure is not intended and therefore not permitted.**
- The medium to be dried must not contain any corrosive components which could cause corrosion of the material of the pressure retaining parts in an inadmissible way. Corrosion potentially also caused by conventional use is taken into account by providing an additional corrosion allowance of 1 mm.
- The installations are designed and constructed acc. to the generally recognised regulations, especially the pressure equipment directive 2014/68/EU, the directive of machinery 2006/42/EC as well as the low voltage directive 2014/35/EU. Alterations to the pressure unit result in invalidity of the declaration of conformity according to the European Directives.

- The operator has to make sure that:
- Only trained, skilled and authorized staff carries out the start-up,
- Only adequate educated / skilled staff will carry out maintenance and/or service work,
- The installation is only operated in a failure safe condition,
- An operation manual is available at the place of installation,
- During operation of the unit and in connection with other components of the complete installation (compressor, filters, receiver tank, compressed air network,....) the permitted operating data of the installation may not be exceeded,
- All persons handling the installation are aware of the danger and must also consider the safety instructions,
- The local safety regulations and rules for accident prevention are respected.

- The unit must be taken out of operation and must not be under voltage or pressure for maintenance or service work on components. Prevent the unit from being switched on again accidentally.

- The installation has to be checked in regularly with regard to externally observable damages.

- Breakdowns or faults which influence the safety have to be fixed immediately.

- In case of malfunction all described instructions must be considered. If all measures described do not lead to fix the malfunction please contact the manufacturer.

- Constructional changes on the unit may only be carried out by the manufacturer or after consultation the manufacturer.

- Necessary maintenance, repair work and constructional changes must be carried out by trained, skilled and authorized staff only. All legal national and internal safety instructions must be followed.

- Modifications on the pressure vessels and pipelines, like additional welding, constructional changes or different assembling as well as modifications in the electrical system of the installation without prior consultation of the manufacturer will result in invalidity of the warranty.

- Modifications on all pressure vessels and pipelines are prohibited and will result in invalidity of the declaration of conformity.

- The unit is not designed for forces generated by wind, snow, earthquakes and traffic.

2.2.2 Danger due to Hot Surfaces

During operation the surface temperature at some sections or components of the adsorption dryer can exceed 60°C. These sections should be equipped with insulation for personal protection which must not be removed during operation. Even after switching off the adsorption dryer some sections could remain hot.

- If heat insulation is provided (Option) the insulation is designed for process supporting function and moreover provides a personal protection to components with a large surface.

- Components with large surfaces which are not insulated and eventually do have a high surface temperature are labelled with a warning notice.

2.2.3 Danger due to Discharging of Hot Air

The regeneration air of blower type adsorption dryers is released via the regeneration air outlet to the atmosphere. The released regeneration air is wet and hot (up to 120°C). Ensure that the wet and hot regeneration air is exhausted to the atmosphere out of the building at a safe location not easy to touch.

2.2.4 Danger from Compressed Air

Ensure that the operating pressure does not exceed the permissible operating pressure stated on the various name plates of the components of the unit.

The installations are not equipped with safety valves to protect the system from exceeding the permissible operating pressure**. The user is responsible to install suitable safety devices to avoid that relevant operating data (pressure, temperature, flow) are not exceeded.** This for instance can be done by installation of safety valves on the compressor and/or in the connected compressed air network.

The system design ensures that the operating temperature cannot exceed the max. permissible operating temperature of each single component. The user must ensure that the temperature of the compressed air does not exceed the permitted operating temperature of the installation.

Pressure vessels: periodic examinations / demands in variation in stress

The operator has to consider the local and national legal regulations at the place of installation. In Germany an internal (visual) inspection of vessels has to be made after five years of operation, a strength test (pressure test) after ten years at the latest. The examination periods have to be coordinated with the responsible authorities.
There are cyclic pressure loadings at each vessel (except HOC-Dryers). After 10 years of operation the inspector has to define the period for re-inspection based on the results of his examination.

Please do not release the pressure manually during operation. Prior of dismounting of pressure retaining parts please make sure that the unit is effectively separated from all sources of pressure. Furthermore, carry out a pressure release of the complete system. Ensure that no pressure can be built up again during servicing the installation.

2.2.5 Danger from Fire and Explosion

In case there are potential fire loads at the place of installation, the user must take care about relevant protective measures. A sufficient safety distance to these fire loads has to be met.

The unit is not designed for installation in a hazardous area.

2.2.6 Danger from electrical Energy

The electrical supply has to be in acc. with the DIN / IEC / VDE-Regulations as well as to the regulations of the local power supply company and has to be carried out by an authorized and qualified person.

The switch and control panel has to be kept closed and locked. Access is permitted to authorized staff only.

For working on current carrying parts a second person is mandatorily required to switch off the main circuit breaker in case of danger. Make sure that the working area is safely blocked off and equipped with warning signs.

2.2.7 Danger from Desiccant

Desiccants are chemicals and therefore subject to the common safety measures (refer to the EN-safety data sheet). The desiccant used in the unit is not subject to any marking requirement acc. to the Hazardous Substances Ordinance.

The desiccant is stored in such areas where only skilled and authorized persons have access to.

Risk of injury through eye contact! In case the eyes get into contact with desiccant, rinse them with plenty amount of fresh and clear water. Consult a doctor immediately in any case.

Risk of injury if swallowed! Consult a doctor immediately.

In case of fire there is a strong reaction with water or foam used as extinguishing agent.

In case of spillage, pick up the desiccant by minimizing the amount of dust as much as possible.

A dust mask must be worn if the MAK value of 6 mg/m³ (fine dust) is exceeded.

2.2.8 Safety Measures for the Service and Operating Staff

All persons involved with maintenance and operation of the unit must have read and understood the operation manual.

All types of workings must be carried out by especially trained personnel.

Please do not use inflammable solvents for cleaning components.

The manufacturer is not liable for damages caused by incorrect installation and operation of the unit. This user is solely responsible in such cases.

Arrange for maintenance and inspection within the recommended periods by contacting the after sales service of the manufacturer.

For workings at the unit which have to be carried out not under pressure and voltage please take care of:

- The unit is shut down in the correct manner.
- The main circuit breaker is in zero position. Lock it and put up a warning sign to prevent from being switched on again.

By removing of heat insulation (personal protection), please make sure the respective surfaces are cooled down sufficiently before starting the maintenance work. Reinstall the heat insulation again prior to restart the unit.

Exchange the wearing parts within the recommended period.

Please only use original components and spare parts of the manufacturer. There is high risk that non-original spare parts and components are not designed and produced to meet the operational and safety requirements of the installation - warranty will expire if such parts are used.

Parts and components which are damaged have to be replaced. Damages on pressure devices are a big safety risk. They must be taken out of operation immediately.

When replacing larger components or modules fasten them carefully to suitable lifting gears. Ensure that the lifting equipment has a suitable lifting capacity.

For workings above head height use adequate ascension aids and working platforms. Do not use parts of the unit as an ascension aid. For maintenance work above 1,80 meters use safety lines to protect against falling.

2.2.9 Protection of the Environment

Applying waste separation for used materials for disposal assists to recycle them.

It is necessary that the desiccant is disposed of in a professional manner (hazardous waste).

2.3 Duties of the User

The user is responsible to ensure that the unit is operated by persons who are familiar with the safety instructions and with the handling of the complete installation. In detail the following skills are mandatorily required:

Safety

- Accident preventive regulations
- Safety advices about the unit
- Safety installations and concepts about the unit
- Measures in case of emergencies

Operation of the Unit

- Approach to start-up the installation
- Behaviour in case of malfunction
- Shut-down of the installation

2.4 Liabilities of the operating Staff

All persons involved in operating, maintaining and servicing the unit are committed to:

- Follow the rules for job safety and accident prevention
- Have read and understood the operation manual
- Follow the instructions and activities mentioned in the operation manual

2.5 Warranty and Liability

Claims for warranty and liability with regard to bodily injury and/or damage to property must be excluded if they were caused by the following causes:

- Non-intended use of the unit
- Unprofessional installation, start-up, operation and maintenance
- Operation of the unit in spite of defects
- Non-consideration of the instructions mentioned in the operation manual regarding transport, storage, installation, start-up and maintenance.
- Any constructional changes
- Insufficient monitoring of parts and components of the unit which are subject to wear and tear
- Improper service
- Usage of non-original parts.

3. Transport and Installation

3.1 Packaging

This unit is usually supplied without packaging. The switch board and the instruments are wrapped in a plastic foil to protect them against moisture and mechanical damage.

Dispose the plastic foil in a professional manner and for recycling.

3.2 Transport

Take special care and attention during transport and loading/unloading of the unit.

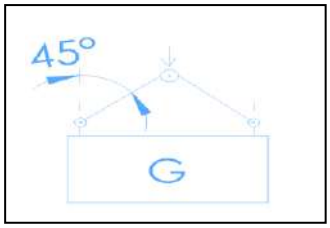
- For lifting of the installation please always use appropriate hoisting devices which comply with the local safety instructions. Do not exceed the maximum permissible load of the hoisting device. Transport the unit vertically.
- Keep the unit always vertically – do not tilt or lay down the unit
- Prior to lifting remove resp. secure all loose parts
- It is strictly forbidden to remain or stay in the area of hooked loads.
- Danger due to unequally distributed loads! During transport with hoisting devices the risk of accident and heavy injuries is high!
- The lifting device (rope / belt / chain) must only be attached to the lifting gear by the lifting lugs provided on the unit.

- Never change or modify the lifting lugs!

- Hemp ropes must have built-in metal eyebolts. Use snap hooks to connect the lifting lugs and ropes.

- The angel from the vertical to the lifting device (rope / belt / chain) must be 45° or less. Do not lift or transport the unit by the piping.

Lifting advise:



3.3 Installation

The user is responsible for a professional installation and execution of the mechanical and electrical integration of the unit.

Remove existing packaging material carefully.

Damages happened during transport and/or missing of components must be advised to the manufacturer and the transport company without delay.

If not agreed otherwise, civil works, erecting of working platforms, moving-in, installation and interconnecting piping, electrical connection into the power system and the mounting of pre- and after filters as well as other additional components are not part of the scope of supply and services.

3.3.1 Place of Installation

When selecting the place for installation please also consider sufficient space around the unit for maintenance and service and make sure to have sufficient access from all sides.

The unit may never be installed in areas or locations where it is possible to suck-in inflammable or explosive gases or vapours. To expose the unit to a dusty area is not permitted and should be avoided.

Make sure that the floor for installation is sustainable to carry the weight of the unit. The floor must be on a flat and horizontal level.

In order to avoid transmittance of vibration and pulsation to the unit vibration compensators are recommended to be installed downstream the compressor before the unit.

3.3.2 Pipe Work Connections

Do not transmit additional forces and torques to the unit via the connected pipe work. The forces and torques which will appear due to the thermal expansion have to be compensated by the connected pipe work.

3.3.3 Bypass Line

It is recommendable to install a bypass line on site to be able to bypass the unit in case of malfunction or maintenance work. This will ensure that the points of use will always be supplied with compressed air.

3.3.4 Connections for Cooling Water [1]

Installations of shut-off and safety devices for the operation of the coolers according to the regulations have to be made on site.

3.3.5 Regeneration – Discharge Pipeline [2]

For the regeneration air a discharge pipeline has to be installed. The hot air saturated with moisture has to be conducted out of the building. The discharge pipeline must have a piping size which is in minimum one nominal size bigger than the regeneration air outlet at the dryer. The length of the pipeline should be not more than 25 m. A horizontally conducted pipeline mandatorily requires an incline towards the discharge outlet. It is absolutely necessary to pay attention that no condensate can flow back into the installation, a draining port of size ½" permanently open have to be installed at the lowest point. Water pockets have to be strictly avoided.

3.3.5.1 Cooling Air Removal [2,3]

The warm but dry cooling air can be discharged into the room. Please make sure that there is sufficient ventilation. During the cooling phase approx. 75% of the installed heater power will be released into the room. In case there is no sufficient ventilation available, the cooling air must be led off the building via an additional discharge pipe. Also this discharge pipe should be bigger in diameter, e.g. same size like the regeneration air discharge pipe. The discharge pipes must have a minimum distance of two meters to each other at the exhaust.

3.3.6 Steam and Condensate Connections [4]

Piping systems for steam have to be planned with condensate traps and the respective drains for the condensate which will accrue. Steam filters have to be installed close to the steam/air heat exchanger.

The return of the condensate has either to be made via a return system or has to be cooled down to a temperature below the evaporating temperature by means of a condensate cooler.

Never dispose steam condensate directly into the atmosphere!

3.3.7 Prefilter / Separator

To each adsorption dryer a prefilter should resp. a high efficiency separator has to be installed. Without separating condensed water resp. oil the degree of efficiency of the drying unit will be reduced.

Prefilter / Separator has to be installed close to the unit!

3.3.8 Afterfilter (Dust Filter)

The abrasion of the desiccant dust into the compressed air can cause serious problems downstream in the application. Therefore, we recommend to install an afterfilter/dustfilter.

3.4 Electrical Supply Line

Workings on the electrical power supply have to be carried out according to DIN / IEC / VDE or similar national regulations. Also the regulations of the local power supply company have to be considered. Such work has to be carried out by an authorized and qualified person only.
Instruments and field devices within the installation are completely connected by the manufacturer. The electric feeder and the signal line to the unit have to be connected locally by the user. The respective instructions are outlined in the circuit diagrams. The circuit diagrams are also located inside the switch board.

3.5 Compressor Contact [5]

The regeneration of units of the type HOC (Heat of Compression) are depending on the compressor. There is no regeneration possible when the installation is not flown through with compressed air. To ensure synchronisation between operational times and the process of regeneration the PLC program of the unit will be stopped in case of compressor downtimes. Therefore a compressor load/unload signal is mandatorily required to be connected to the potential-free contact of the control system according to the circuit diagram.

3.6 Notice of Malfunction

The unit also provides a potential-free contact for transmittance of a common fault signal. It is essential to connect the potential-free contact in order to announce faults and malfunctions to the control room.

[1] valid for internal / external cooler

[2] not required at HOC-dryers

[3] not required at dryers with internal cooler / Cool-Mode via compressed air

[4] valid for dryers with “Steam Heat Exchanger” as an Option

[5] required at HOC-dryers

4. Functional Description

4.1 Process Description

The content of moisture of the ambient air sucked in by the compressor will be multiplied by the compression factor. When the compressed air is cooled by the compressor after cooler, or in the air receiver, a part of this moisture condenses and will then be drained by a water separator from the compressed air system.

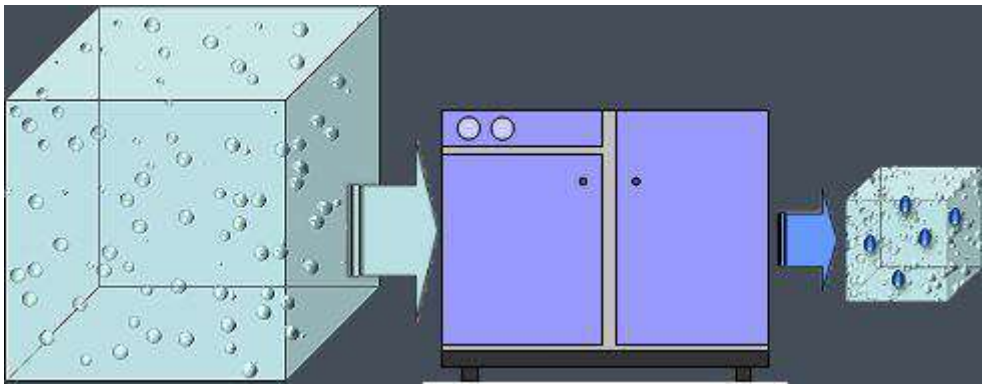


Image 4.1

When the compressed air (100% saturated) is cooled further down in the piping system, a considerable amount of condensate is formed again.
Negative effects are corrosion in the pipe work, high maintenance cost, intolerable loss in production and product quality, as well as glaciations at temperatures below the freezing point.

Therefore, an adequate drying system is an essential part in any compressed air application.

The right selection of the adequate drying system is mainly depending on the application. Refrigeration dryers can achieve pressure dew points of about +3°C, but if lower pressure dew points, for example -20°C to -40°C or even lower are required, a desiccant dryer has to be applied.

4.2 Description of the adsorption process

Adsorption means the agglomeration of a substance, the adsorbate (here water vapour), on the inner surface of a solid, the adsorbent. This causes the agglomeration of the physical bonding forces.

Absorbents, also named desiccant in the drying technology, are spherical shaped or granulate solids. They are covered by a multitude of finest pores and thus consisting of a hugh inner surface.

Adsorption

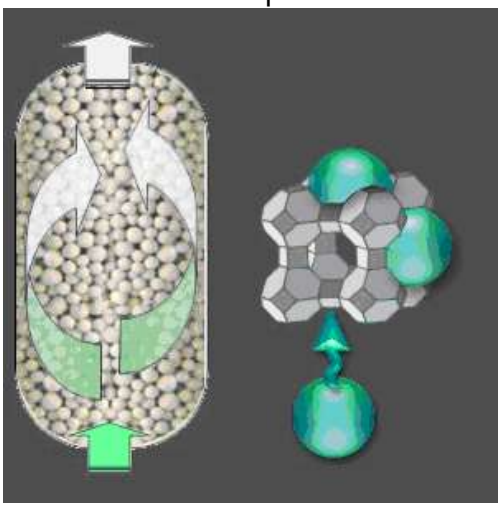


Image 4.2

Desorption

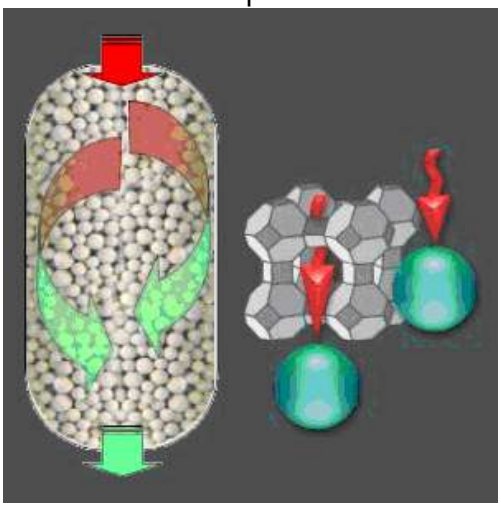


Image 4.3

Desiccant adsorption dryers

Continuously operating desiccant adsorption dryers are working according to the dynamical adsorption principle.
That means that compressed air which needs to be dried will flow through a desiccant bed. During the flow through the desiccant bed the moisture will be adsorbed. As the drying capacity of the desiccant is limited, a switch over takes place prior to a full saturation. Due to the changeover working principle of the desiccant vessels a continuous supply of dried compressed air to the point of use is guaranteed.

There is always one desiccant vessel available for the drying process.
The vessel saturated with moisture will be activated again through the regeneration process.
The time of regeneration is always shorter than the time of saturation of the operative vessel.

4.3. Functional Sequence

4.3.1 Adsorption Process

Water saturated compressed air enters the dryer inlet and flows through valve **K1** into the desiccant vessel **AD1**. The flow distributor ensures an even distribution of the wet air. Whilst the wet compressed air stream passes upwards through the desiccant vessel **AD1**, the vaporized water is adsorbed by the desiccant. The dried compressed air flows via the outlet valve **R1** and the dryer outlet to the point of use. The adsorption process is time or dew point controlled (optional).

The adsorption process takes place from bottom to top

4.3.2 Desorption Process by means of blower at pressure operation

Whilst the compressed air is dried in the desiccant vessel **AD1**, the desiccant vessel **AD2**, saturated with moisture, is regenerated. Before regeneration starts, the pressure in the desiccant vessel **AD2** is slowly reduced to atmospheric pressure. Desiccant adsorption dryers of this series use ambient air for the desorption process. The regeneration blower conveys the ambient air to the downstream heater, where the blower air is heated to the required desorption temperature. **Temperature increase** from the regeneration blower has a positive effect on the power demand of the heater.

The blower air passes via the valve **R4** into the desiccant vessel **AD2** for desorption. The moisture adsorbed by the desiccant vaporizes and will be transported by the blower air stream and via the valves **K4** into the atmosphere.
The desorption takes place by a counter current flow, which is energy optimised. Through this the moisture is leaving the unit on the shortest way into the atmosphere.

Due to the evaporation of the water, the heated ambient air cools down when flowing through the vessel. The outlet temperature of the desorption air is not much higher than the evaporation temperature (approx. 40 – 60°C). As the desorption process is reducing the moisture content of the desiccant, the temperature of the desorption air rises. The desorption process is finished as soon as the required process temperature is reached.

After reaching the final temperature there is an additional heating phase from ten minutes to assure a complete regeneration.

Desorption in counter current flow to the adsorption direction from top to bottom

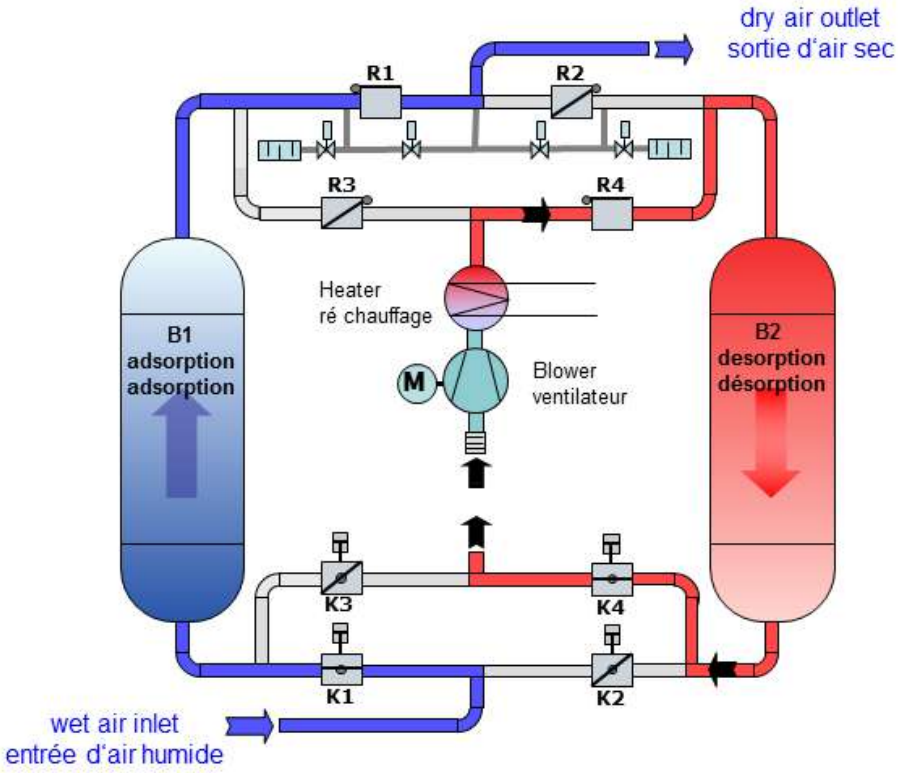


Image 4.4

4.3.3 Cooling Process by purge air

In order to avoid temperature and dew point peaks after the change over, the stored heat in the desiccant will be discharged by means of dry air stream.
The cooling air flows downwards similarly as during the desorption process, from top to bottom.
After the cooling phase, the regeneration valves **K4** is closing and the regenerated desiccant vessel **AD2** is slowly pressurized.
After pressure equalization the system is in the stand-by phase.

Cooling in the same direction of flow like the desorption process, from top to bottom

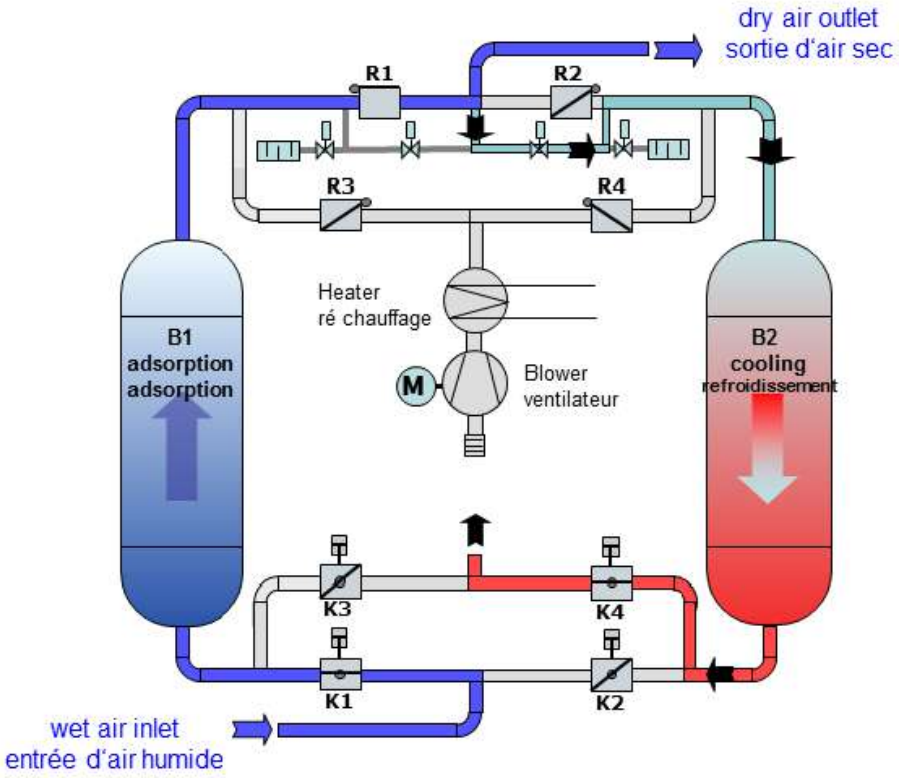


Image 4.5

4.3.4 Standby Operation

If the adsorption cycle is controlled and terminated by a dew point measuring device, the duration of the standby phase is depending on the saturation of the desiccant in the vessel (here **AD1**). As soon as the drying capacity of the desiccant is reached (increase of the pressure dew point) the switch-over procedure will be initialized.
If the adsorption cycle is time controlled, the switch over procedure is initialized upon expiration of a pre-set time cycle.

4.3.5 Parallel Operation

Before the switch over process of the desiccant vessels (here **AD1** to **AD2**) is initialized, both vessels are switched in parallel function through opening the inlet valve (here **K2**). For about 10 minutes (individual adjustable) the compressed air flows through both desiccant vessels.

4.3.6 Switch over Procedure

After the parallel operation is terminated, the regenerated desiccant vessel is switched over in following steps:

1. Closing of the inlet valve (here **K1**) at the saturated desiccant vessel (here **AD1**)
2. Opening of the pressure release valve (here **V1**) for the desiccant vessel to be regenerated
3. Opening of the regeneration valve (here **K3**)
4. Switch-on of blower and heater

Now the moisture saturated desiccant vessel **AD1** is in the desorption phase, whilst the desiccant vessel **AD2** is drying the compressed air.

4.4 Overview of the functional sequence

Total cycle		Vessel AD1	Vessel AD2
	Cycle time	Adsorption	Adsorption
		Adsorption	Pressure release
		Adsorption	Desorption
		Adsorption	Cooling
		Adsorption	Pressure build up
		Adsorption	Stand-By
	Cycle time	Adsorption	Adsorption
		Pressure release	Adsorption
		Desorption	Adsorption
		Cooling	Adsorption
		Pressure build up	Adsorption
		Stand-By	Adsorption

5. Controller S7-1200 with CPU 1212C –V3.8.x

5.1 The CPU

The installation is controlled by a Siemens S7-1200
CPU 1212C programmable logic controller.

Image 5.1

5.1.1 Status LEDs

The current CPU operating status is shown using three status LEDs.

LED RUN/STOP LED

Green: The CPU is in the RUN operating status and is continuously processing the program.

Yellow: The CPU is in the STOP operating status and is not processing the program.

Green Yellow flashing: The CPU is in the STARTUP operating status and is processing the start-up logic.

LED ERROR

Red continuous: A hardware component is defective.

Red flashing: There is an error, e.g. internal error in the CPU, an error on the memory card (if fitted) or a configuration error (non-matching modules).

LED MAINT

Yellow flashing: A memory card is inserted. The CPU changes to STOP operating mode. Please contact the manufacturer for more information.

5.1.2 Communication interface

The CPU 1212C is fitted with a RJ45 port for communication via a PROFINET network.
The LED LINK (located under the bottom cover) illuminates **green** as soon as the connected ethernet cable links the CPU with another device.
The LED Tx/ Rx illuminates **yellow** if data is being transmitted or received via the port.

5.2 Touch panel

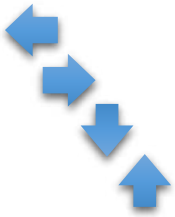
Interaction between the operator and the equipment takes place using the touch panel. It enables switching between operating modes, changing equipment parameters and resetting error messages.

Furthermore, the equipment status, the status of all inputs and outputs, the program times and sequences of temperature and dew point (if fitted) in addition to an overview of all the error messages which have occurred can be called up.

Image 5.2

Function keys F1 – F8

- F1 – activation of start screen
- F2 – without use
- F3 – activation of left-hand screen
- F4 – activation of right-hand screen
- F5 – activation of downwards screen
- F6 – activation of upwards screen
- F7 – without use
- F8 – acknowledgement of all messages



5.3 Login

A password is required to change values and parameters.

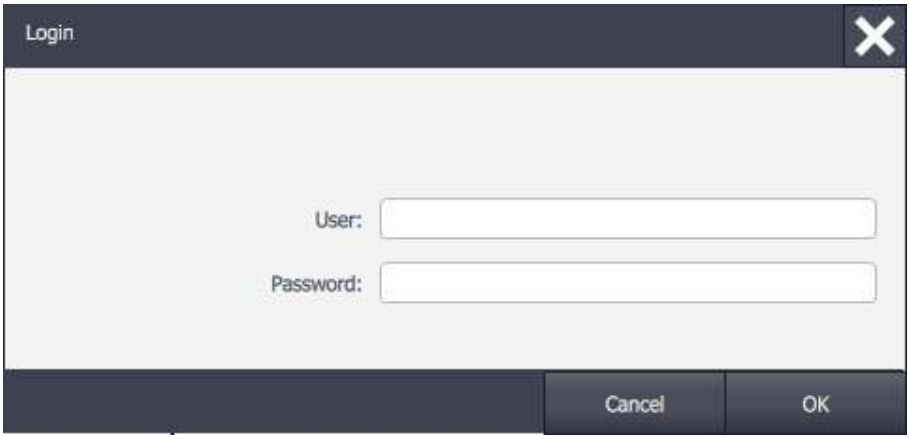


Image 5.3

Click the user input field.

Enter the user name (e.g. "Service") using the screen keyboard and confirm the entry with the enter key.

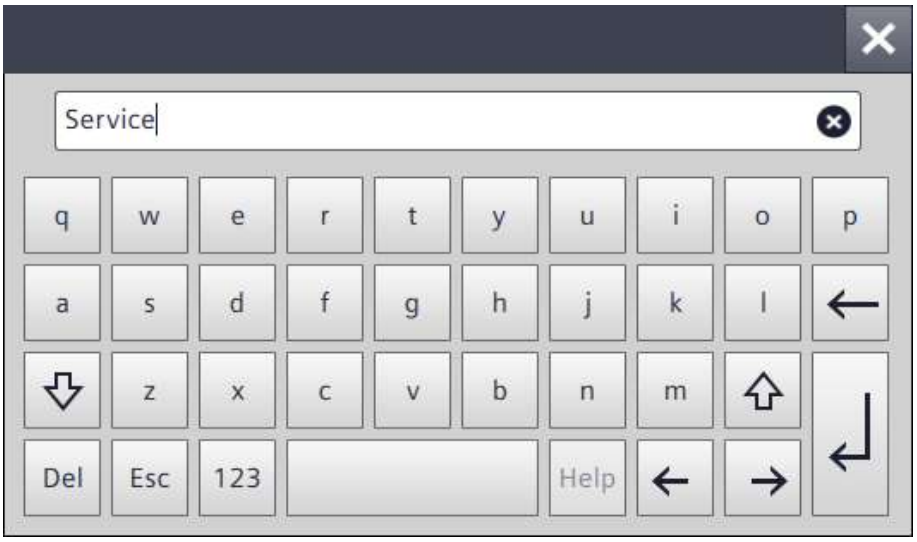


Image 5.4

Enter the password and confirm it using the enter key.

Complete your entry by pressing the "OK" key.

If no operating action is carried out on the panel over a period of more than five minutes, the user is automatically logged off.

There are 2 users who have differing rights.

User name: **User**
Password: **1312**

Authorised to carry out the following functions:

- changing the operating mode (with the exception of test controller)
- carrying out optimisation on the PID controller
- changing the PID controller operating mode
- changing date and time

User name: **Service**
Password: **Please contact the manufacturer!**

Authorised to carry out the following functions:

- carrying out the operation mode “test control” (see also 5.5 Status bar and operation modes)
- deactivating/activating additional sensors/functions
- changing all parameters
- changing the sensor scale
- resetting the maintenance hour counter
- touch panel settings (e.g. brightness)

The following functions are also possible without logging in:

- language changeover (German - English)
- carrying out the lamp test
- activating "cleaning mode"
- calibrating the touch panel

5.4 User menu

A range of master and submenus can be called up using the navigation keys starting at the start screen. The menu structure is set up as follows:

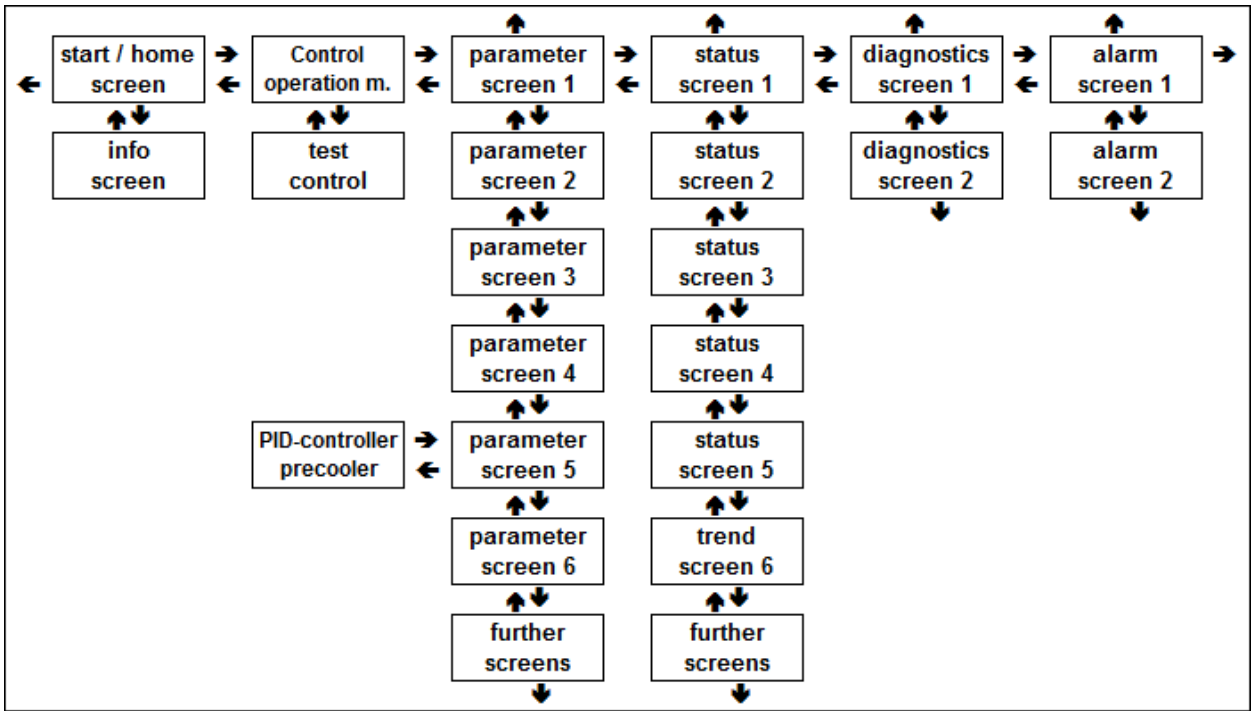


Image 5.5

The "test control", “PID-controller precooler” and “PID-controller blower” screen can be called up using the labeled button at the associated screen.

5.5 Status bar and operation modes

A status bar which is standard in all screens is located at the top edge of the screen.

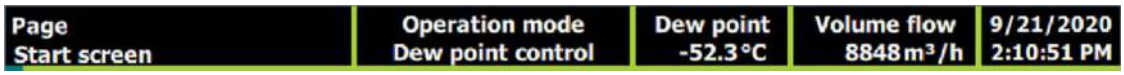


Image 5.6

The bar shows the current page, the current operating mode in addition to date and time.
Dew point and volume flow are only displayed after activation has taken place.

The following operating mode displays are possible:

- **Off**
  The dryer has completed the program after conclusion of the regeneration. Switchover is prevented using the operating mode selection or an external stop signal.

- **Scheduled stop**
  The equipment is deactivated as described above. After regeneration is concluded, the dryer will change to the stop mode and switchover is prevented.

- **Time control**
  The dryer works in the fixed time cycle, switching over takes place after a preset time.

- **Dew point control**
  The equipment is working in a flexible cycle, switching over takes place based on the outlet dew point or after a maximum adsorption time. In this operating mode, the adsorption, regeneration and cooling times are flexibly adapted to the current conditions.
  This operating mode offers the highest operational reliability in addition to optimum energy usage and should therefore always be selected.

- **Test mode**
  The test mode is activated and can be used now. If the test mode is selected but not used, the equipment will continue to work in timer control without further effects. If during the regeneration process no other operation mode is chosen, the dryer remains stop mode at the end of the cycle. Program steps can be shortened in test mode
  This operation mode switch automatically into "Off"-mode if the adsorption cycle finished.

5.6 Start and Info screen

Start screen

The start screen shows an overview of the equipment with all the relevant parameters and status of the vessels and flaps.

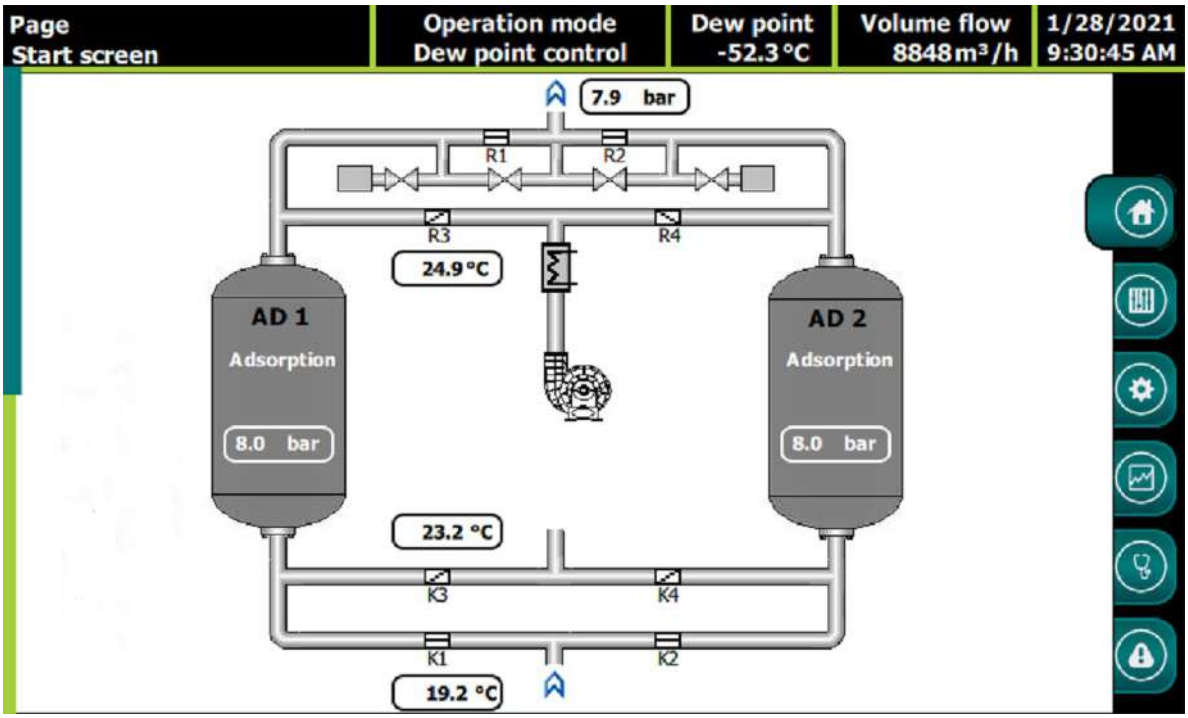


Image 5.7

Info screen

The info screen shows all the information which are also contained on the nameplate.
In addition, the visualisation version currently being used is displayed.

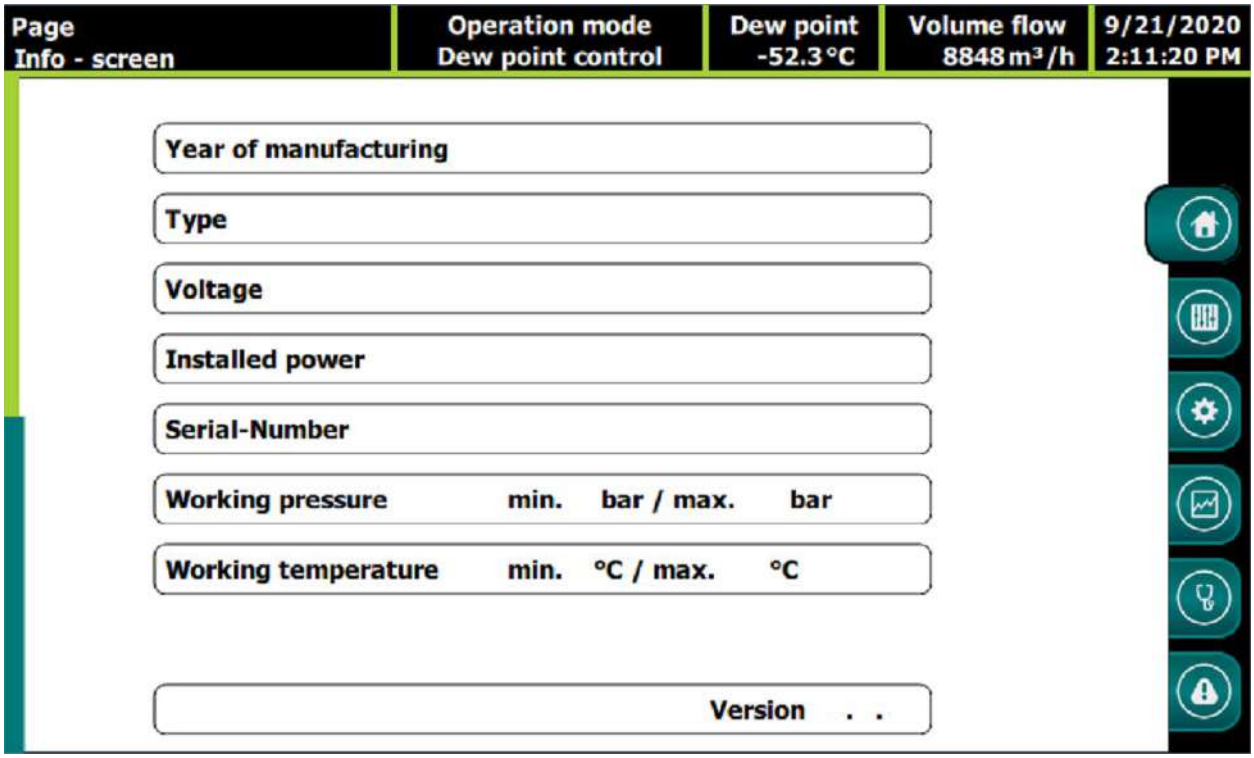


Image 5.8

5.7 Control screens

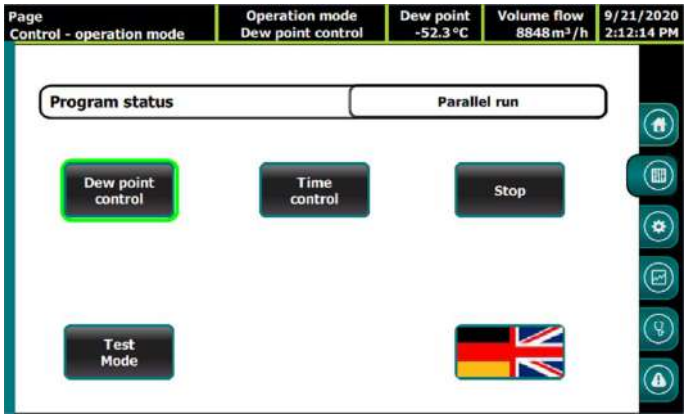


Image 5.9

Page – Control
Operation mode

Display of the current program status

Selection of the operation mode

Selection of user language

NOTE: To release the pressure of the vessels at "Stand-By" press the button "Test Modus". The operation mode will not activated.

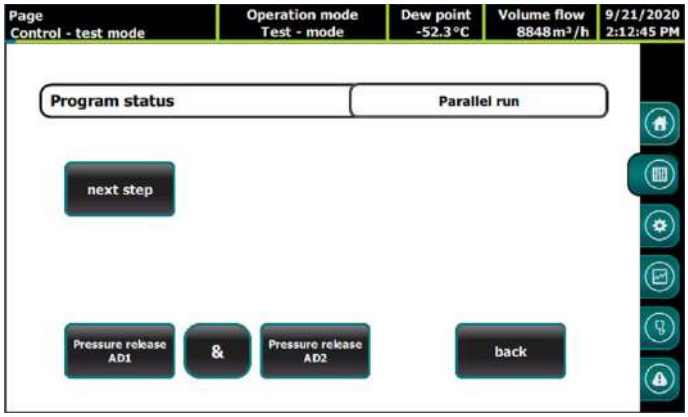


Image 5.10

Page – Control
Test mode

Display of the currently program status

Activation of the next step for testing and time minimization (function blocked for safety steps)

Possibility to release pressure via buttons (e.g. for maintenance)

If you press the "back" button you will return to the screen before.

5.8 Parameter screens

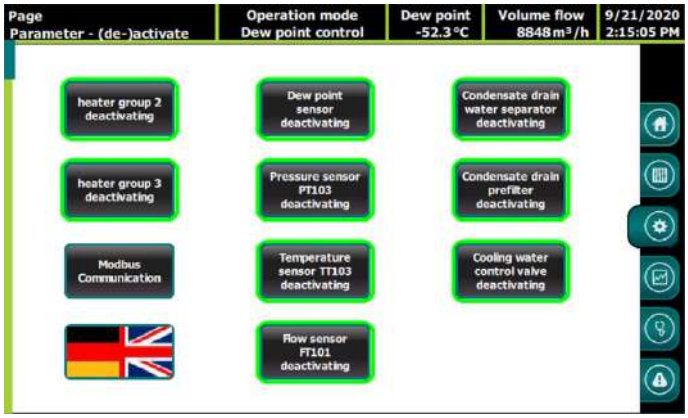


Image 5.11

Page – Parameter
Parameter (de-) activate

Selection / Activation of:

- user language
- further heater groups
- additional sensors
- PLC-Communication network (e.g. Modbus TCP)
- monitoring of condensate drains
- option cooling with purge air
- option cooling water control valve (additional equipment required)

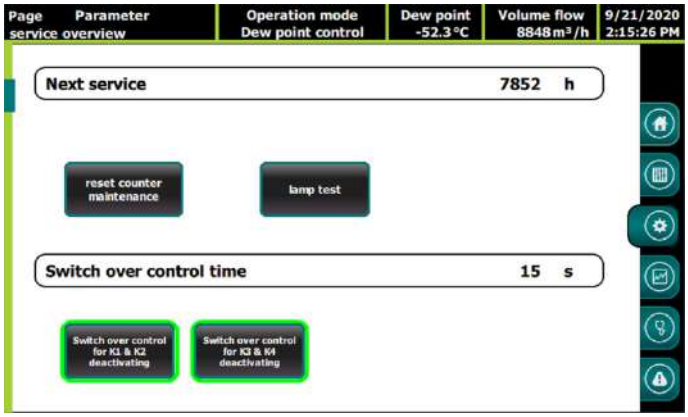


Image 5.12

Page – Parameter
Service overview

Maintenance counter - display of the hours remaining until maintenance is required.

Lamp test - 10 seconds

The (de-) activation of valve switchover control and setting of monitoring delay period.

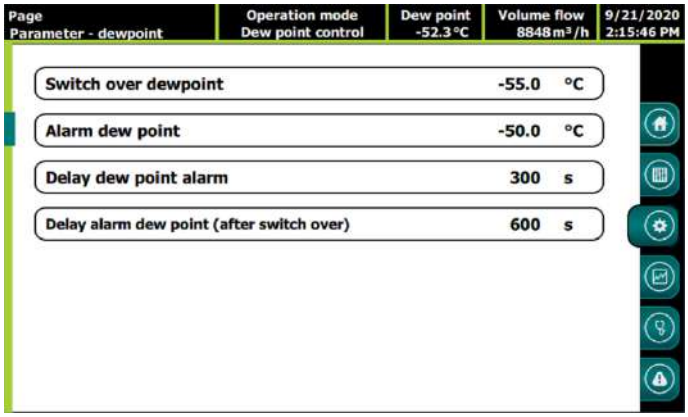


Image 5.13

Page – Parameter
Dewpoint

Setting of:

- Switchover dew point
- Alarm limit dew point
- Delay dew point alarm
- Delay dew point alarm at beginning of new cycle (parallel phase)

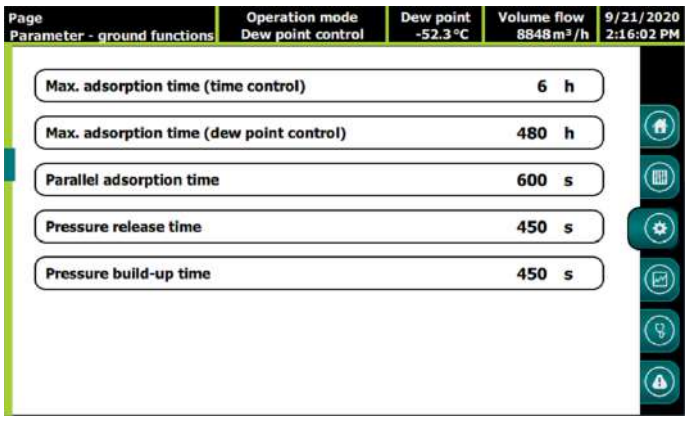


Image 5.14

Page – Parameter Ground functions

Setting of:

- max. length cycle
- length parallel running
- length pressure release
- length pressure build-up

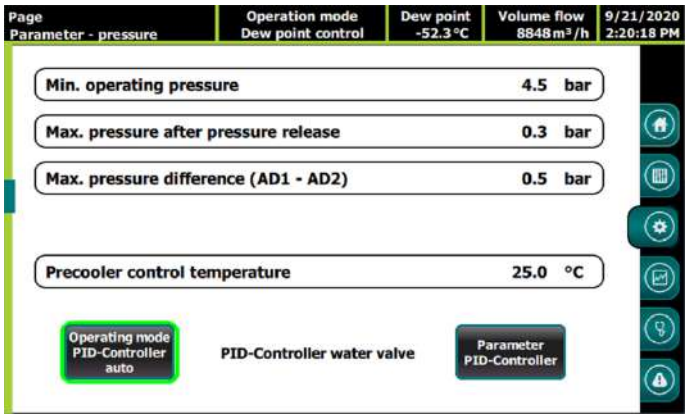


Image 5.15

Page – Parameter Pressure

Setting of:

- min. operating pressure
- max. pressure after release
- max. pressure difference (AD1 to AD2) in standby and parallel phase
- controlling temperature (at TT103) for precooler

Selection of the operation mode “auto” and entering of parameter settings for PID-controller

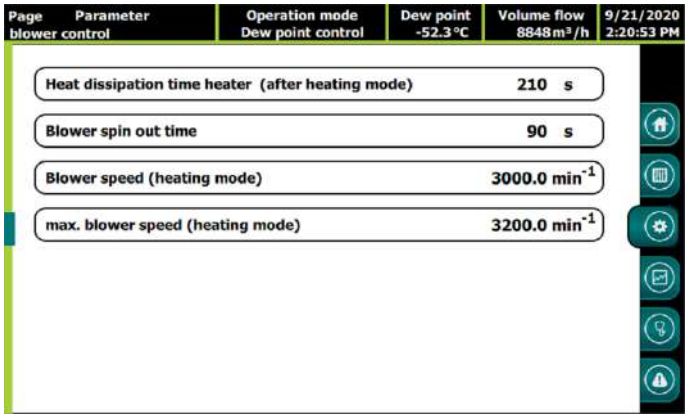


Image 5.16

Page – Parameter Blower control

Setting of:

- length dissipation heater
- length blower spin-out
- speed (at heating mode)
- max. speed (at heating mode)

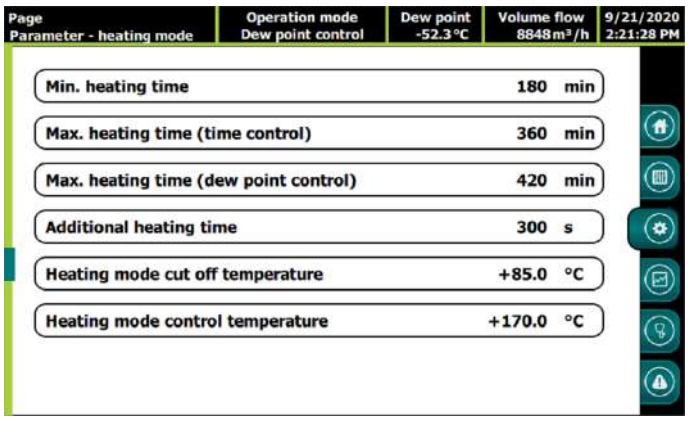


Image 5.17

Page – Parameter
Heating mode

Setting of:

- min. length heating
- max. length heating for time- and dew point control
- length additional heating
- heat mode cut off temperature (at TT102)
- heat mode control temperature (at TT101)

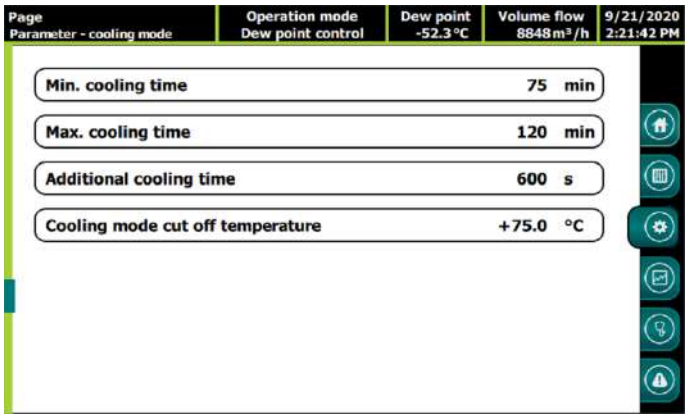


Image 5.18

Page – Parameter
Cooling mode

Setting of:

- min. length cooling
- max. length cooling
- length additional cooling
- Cool mode cut off temperature (at TT102)

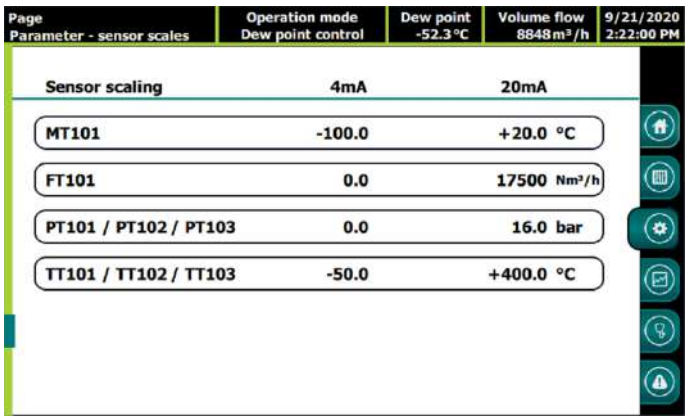


Image 5.19

Page – Parameter
Sensor scales

Scaling of:

- dew point sensor (if activated)
- volume flow sensor (if activated)
- all pressure sensors
- all temperature sensors

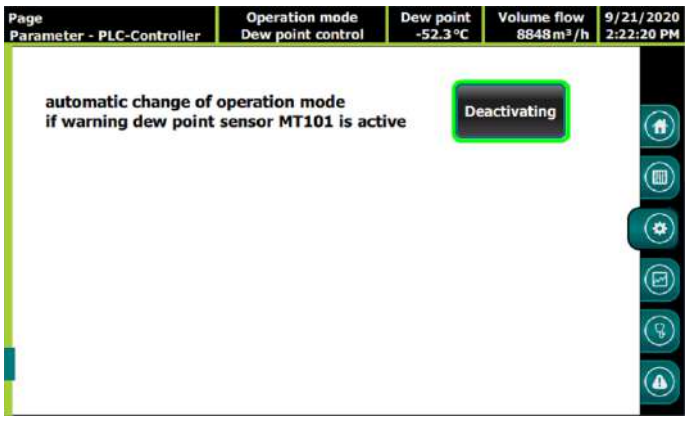


Image 5.20

Page – Parameter PLC-Controller

Automatic changeover of the operation mode from dew point to time control, if a warning at the dew point sensor is active.

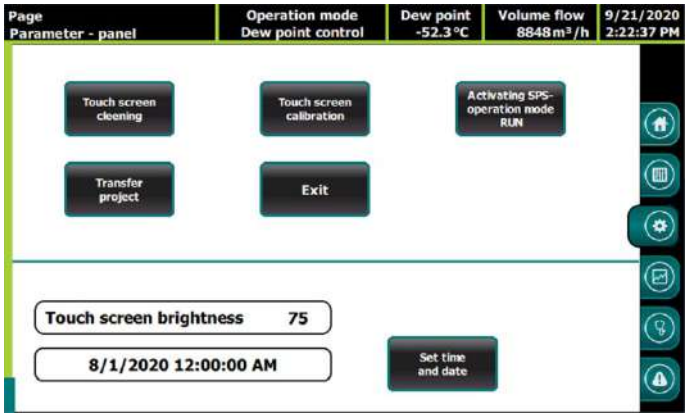


Image 5.21

Page – Parameter Panel

Clean (for 30 seconds) or calibrate touch panel

Activation SPS operating mode RUN

Activation of facility for program transfer (only for manufacturer!)

Exit visualization

Changing brightness of touch panel

Input option for date and time

5.8.1 Additional parameter screens

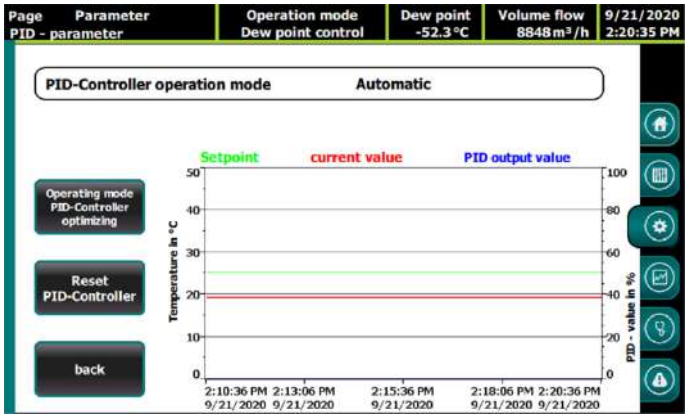


Image 5.22

If you press the "back" button you will return to the screen before.

Page – Parameter

PID-Parameter (water valve) (OPTION)

Display of the current operation mode of the PID controller.
For the operation mode “optimization” additional display of the progress.

Activation of the operation mode “optimization” for the PID-controller
Reset of the PID-controller

Display of set point, current value and PID output value in °C, resp. % during the period of 15min.

To get further information to the functionality of the PID-Controller see chapter 5.13 PID-Controller.

5.9 Status / Trend screens

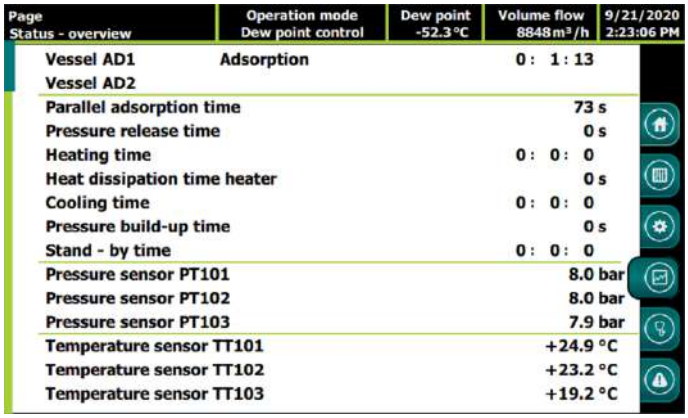


Image 5.23

Page – Status
Overview

Display of:

- current cycle time of adsorption vessel
- time for individual steps in current cycle
- values for all pressure sensors
- values for all temperature sensors

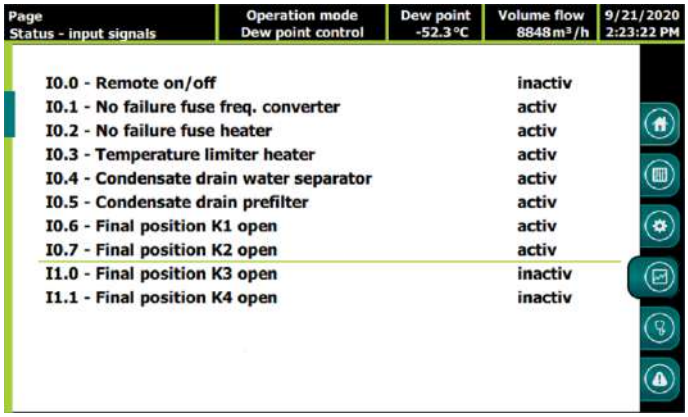


Image 5.24

Page – Status
Input signals

Current status for all inputs used from byte DI 0 and DI 1.

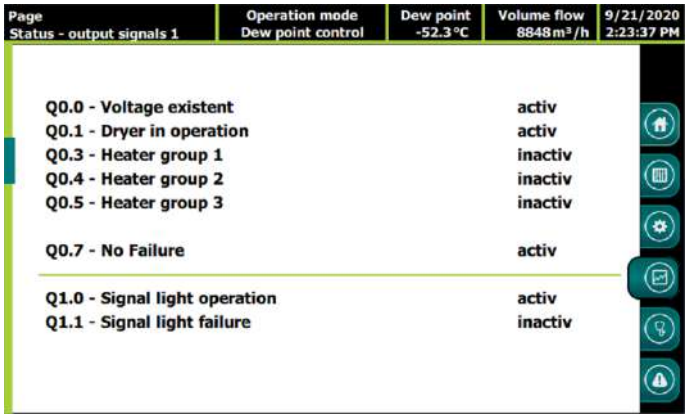


Image 5.25

Page – Status
Output signals 1

Current status for all outputs used from byte DQ 0 and DQ 1.

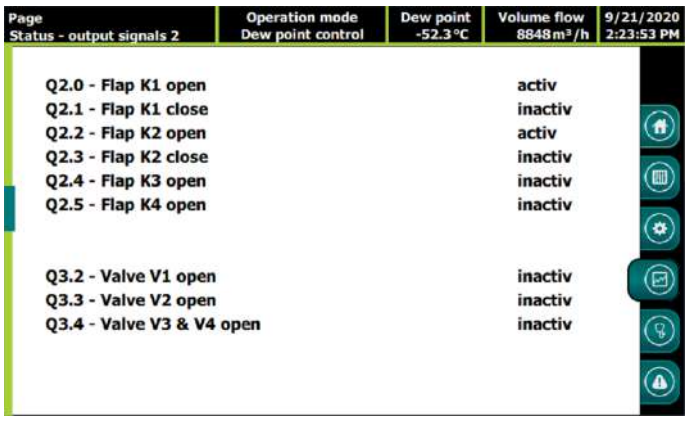


Image 5.26

Page – Status
Output signals 2

Current status for all outputs used from byte DQ 2 and DQ 3.

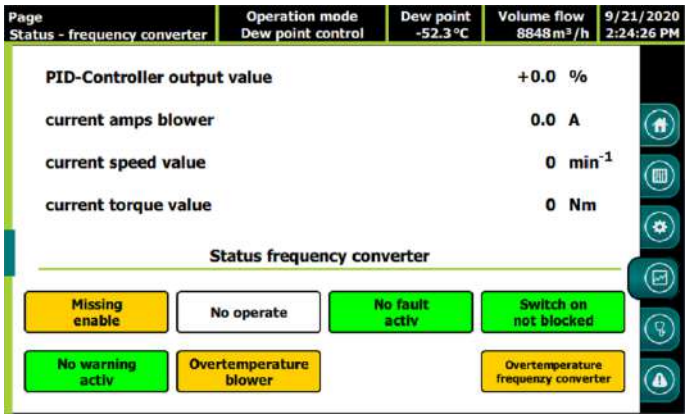


Image 5.27

Page – Status
Frequency converter

Display of:

- current PID controller output value
- current values of the frequency converter
- Frequency converter status

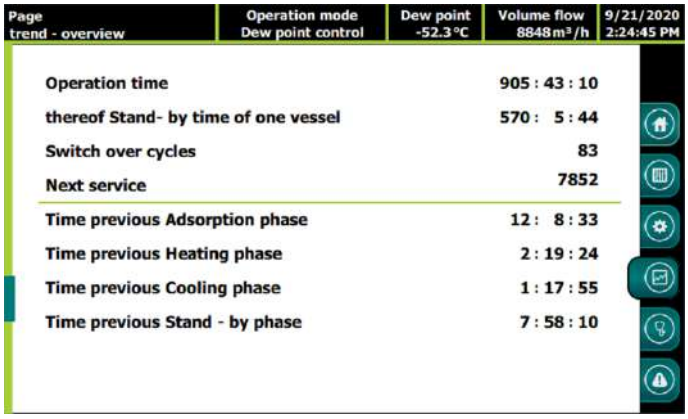


Image 5.28

Page – Trend
Overview

Display of:

- Complete operating and standby times
- total number of switchover cycles
- remaining hours until next maintenance
- all main cycle times of the last cycle

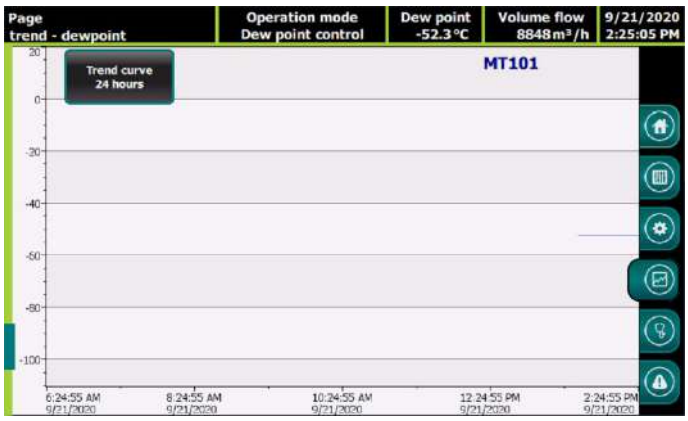


Image 5.29

Page – Trend Dewpoint

Display of trend curve from dew point sensor (MT101)

Timeframe: 8 or 24 hours

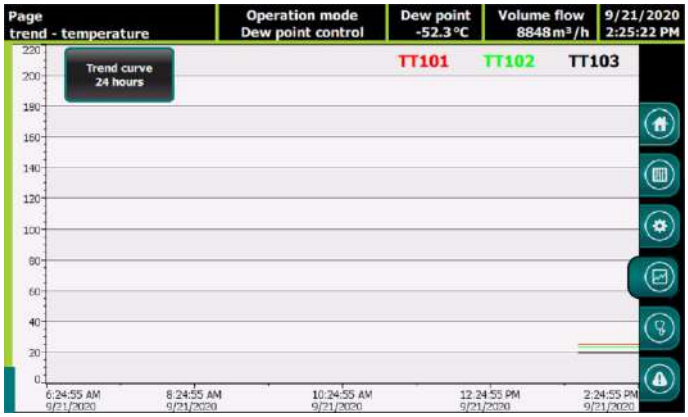


Image 5.30

Page – Trend Temperature

Display of trend from all activated temperature sensors (TT101, TT102, ...)

Timeframe: 8 or 24 hours

5.10 Diagnostics screens

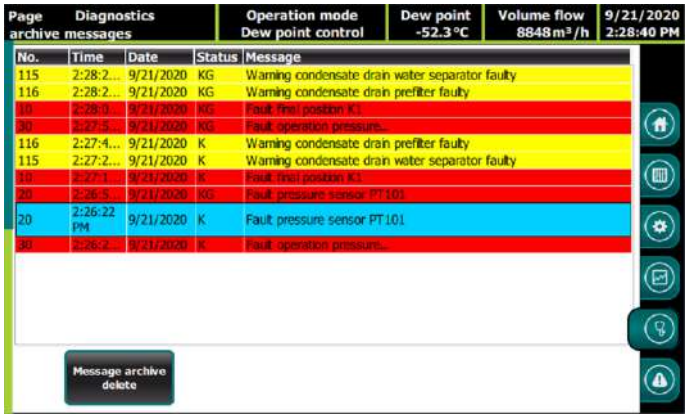


Image 5.31

Page – Diagnostics
Archive messages

Display of messages occurred incl. message number, time, date, status and message text

Faults are red colored
Warnings are yellow colored
Marked lines are blue colored

K = message arrived
KG = message left

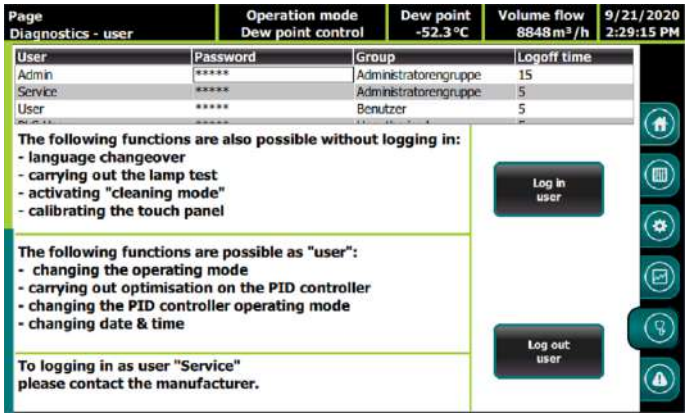


Image 5.32

Page – Diagnostics
User

Possibility of log in and out for all user

Overview of the allowed actions per user

5.11 Alarm screens

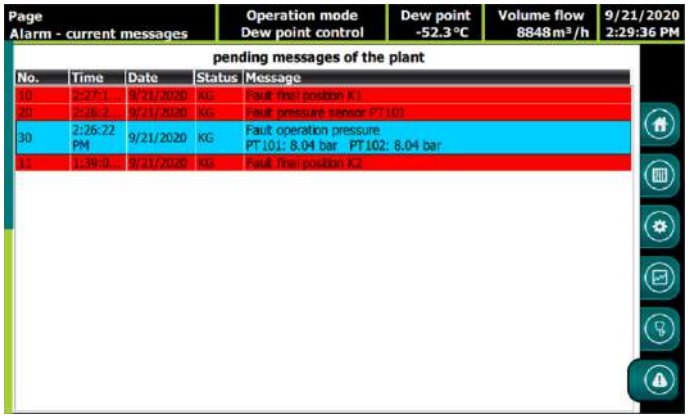


Image 5.33

Page – Alarm
Current messages

Display of all active and finally acknowledged messages incl. message number, time, date, status and message text

Faults are red colored
Warnings are yellow colored
Marked lines are blue colored

K = message arrived
KG = message left

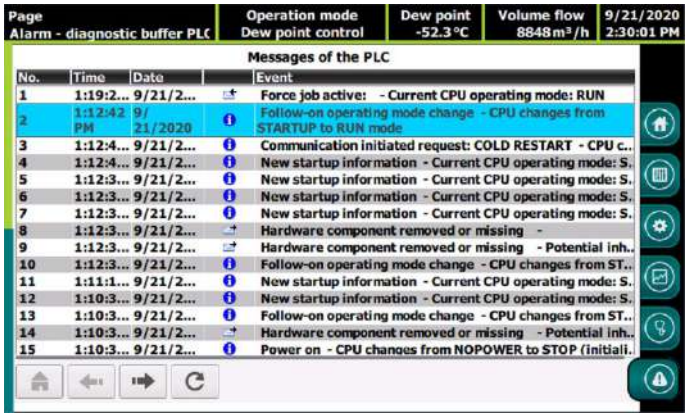


Image 5.34

Page – Alarm
Diagnostic buffer PLC

Display of messages occurred at the PLC system incl. message number, time, date, status and message text

Tap at the message to get further information

5.12 Faults and Warnings

Explanation to the messages of the dryer program:

Message text shown at the touch panel[2]			
050[1]	**Heating / Cooling[3]**	Cause for the warning or fault message.	Remedial action to eliminate message.
051[1]	**all other phases[4]**		

[1]: Message number for identification at touch panel

[2]: Messages which are depend to a measured value of an installed sensor displaying the current value at the moment of occurrence.

[3]: The red marked line show the message no. of a fault and explain the phase were these fault can occur. At the example the fault can occur during the heating or cooling phase (based at normal operation).
A fault will be interrupt the program sequence and continued at the same point after the message has been eliminated.

[4]: The yellow marked line show the message no. of a warning and explain the phase were these warning can occur. At the example the warning can occur in each phase except the heating and cooling phase (based at normal operation).
A warning has no effect to the program sequence – the dryer continues to work.

NOTE: A warning can result in a fault if components are affected which relevant for special phases during the program sequence. While the warning exists the user have the possibility to solve the problem without an automatically stop of the dryer.

5.12.1 List of faults and Warnings

Fault blackout communication/ control voltage supply			
		Control voltage at frequency converter, touch panel or PLC is missing.	Check supply voltage, fuses at the control cabinet and electrical equipment of the dryer.
001	**all phases**		
	unavailable		
Fault fuse blower M1			
002	**Heating**	Fuse has triggered due to a short-circuit or overcurrent.	Check if blower is mechanical blocked. Check of the blower by an electrically qualified person.
151	**all other phases**		
Fault frequency converter			
		The frequency converter is outputting a fault. Check the error code at touch panel or frequency converter for a precise analysis.	If necessary, check connections. To start the blower manually (hand mode) see also 5.15 Manual blower start.
003	**Heating**		
152	**all other phases**		
Fault fuse heater E1			
		Fuse has triggered due to a short-circuit or overcurrent. In order to protect the heater, the blower continues running for 3 minutes.	The heater system must be checked by an electrically qualified person.
004	**Heating**		
153	**all other phases**		
Fault final position K1 / K2			
010 / 011	**Parallel / Pressuri-zation / Stand-By / Flap to regenera-tion vessel**	The limit position initiator on the inlet flap has not confirmed the opened position within the specified time.	Check flap control / pneumatic system and initiator function. Deactivate the flap control just if a correct position of the flaps are certain.
108 / 109	**all other phases / Flap to the adsorption vessel**		
Fault final position K3 / K4			
		The limit position initiator on the regeneration outlet flap has not confirmed the opened position within the specified time.	Check flap control / pneumatic system and initiator function. Deactivate the flap control just if a correct position of the flaps are certain.
012 / 013 /	**all phases**		
	unavailable		

Fault pressure sensor PT101 / PT102			
020 / 021	**all other phases**	The transmitter value is outside the valid range. Transmitter defective or connection interrupted.	Check transmitter and compare the measured value with vessel manometer.
no message at cooling			

Fault temperature sensor TT101			
		The transmitter value is outside the valid range. Transmitter defective or connection interrupted. In order to protect the heater, the blower continues running for 3 minutes	Check transmitter and measuring the signal inside the control cabinet (4-20mA).
023	**Heating**		
105	**all other phases**		

Fault temperature sensor TT102			
		The transmitter value is outside the valid range. Transmitter defective or connection interrupted.	Check transmitter and measuring the signal inside the control cabinet (4-20mA).
	unavailable		
106	**all other phases**		

Warning temperature sensor TT103			
		The transmitter value is outside the valid range. Transmitter defective or connection interrupted.	Check transmitter and measuring the signal inside the control cabinet (4-20mA).
	unavailable		
107	**all other phases**		

Fault (Warning) operation pressure			
		The set operation pressure has been fallen below the setpoint (Warning) or the minimum operating pressure (4,5 bar) has been fallen below (Fault).	Check for leakages, operation of compressor and position of installed flaps. Compare the measured value with vessel manometer.
030	**not while heating**		
119	**all phases**		

Fault pressure difference			
031	**Parallel / Stand-By**	The pressure difference between the two vessels in standby or parallel run is larger than permitted.	Check settings for pressure difference, pressure build-up valve, pressure relief valve and transmitter.
no message at other phases			

Fault pressure in regeneration vessel exceeded			
032	**Heating / Cooling**	The pressure in the vessel intended for regeneration has not been (sufficiently) released.	Check transmitter and compare the measured value with vessel manometer. Also check relief valve, muffler and the control line.
no message at other phases			

Fault pressurization AD1 / AD2			
035 / 036	Pressurization	The operating pressure has not been equalized within the specified time.	Check transmitter and compare the measured value with vessel manometer. Also check control line, pressure built up and relief valve.
no message at other phases			

Fault pressure release AD1 / AD2			
037 / 038	Pressure release	The specified pressure has not been achieved within the pressure release time.	Check transmitter and compare the measured value with vessel manometer. Also check control line, muffler and pressure release valve.
no message at other phases			

Fault overheat protection TS101			
		The safety thermostat of the heater tripped. Air flow too low. In order to protect the heater, the blower continues running for 3 minutes.	Check blower, flaps and exhaust pipework.
040	Heating		
154	all other phases		

Warning dew point sensor MT101			
	unavailable	The transmitter value is outside the valid range. Transmitter defective or connection interrupted.	Check transmitter and measuring the signal inside the control cabinet (4-20mA).
100	all phases (if activated)		

Warning flow sensor FT101			
	unavailable	The transmitter value is outside the valid range. Transmitter defective or connection interrupted.	Check transmitter and measuring the signal inside the control cabinet (4-20mA).
101	all phases (if activated)		

Warning pressure sensor PT103			
	unavailable	The transmitter value is outside the valid range. Transmitter defective or connection interrupted.	Check transmitter and measuring the signal inside the control cabinet (4-20mA).
104	all phases (if activated)		

Warning condensate drain water separator / prefilter faulty			
	unavailable	The condensate drain is reporting an error.	Check condensate outlet line and function. If necessary clean or replace the condensate drain.
115 / 116	all phases (if activated)		

Warning due for maintenance			
		The annual maintenance interval has expired. Maintenance must be arranged by trained personnel.	Reset the maintenance interval at the touch panel after successful implementation of maintenance.
	unavailable		
123	**all phases**		
Warning high dewpoint			
	unavailable	The outlet dew point has exceeded the set limit value.	Check the regeneration parameters and sequences. Also check and recalibrate transmitter.
126	**all phases (if activated)**		
Warning heater is not activ			
	unavailable	The temperature at TT101 has not been rise close to the set parameter **"Heating mode control temperature"** after 30 minutes of heating time. Connection at contactors or heater interrupted.	Check contactors inside the control cabinet and voltage / amps directly at the heater. Also check connections of wires and cables for safety heater operation.
130	**Heating**		
no message at other phases			
Warning heating temperature too low			
		The required heating control temperature at TT101 has not been achieved.	Check heating system, possibly reduce the speed of the blower.
	unavailable		
131	**Heating**		
Warning heating temperature too high			
	unavailable	The maximum heating temperature has been rise 20°C above the set parameter **"Heating mode control temperature"**.	Check heater system, possibly increase the speed of the blower or the controlled temperature.
132	**Heating**		
Warning heating time exceeded AD1 / AD2			
	unavailable	The final heating temperature (at TT102) has not been achieved within the maximum heating time.	Check heating system and speed of the blower.
133 / 134	**Heating**		
Warning cooling time exceeded AD1 / AD2			
	unavailable	The final cooling temperature (at TT101) has not been achieved within the maximum cooling time.	Check ambient conditions and temperature settings, possibly increase the amps of the blower.
143 / 144	**Cooling**		

Warning PID-Controller precooler			
		The PID controller is outputting a fault. The displayed error code will give further information.	Check the causes of displayed error code or press the “Reset” button and re-optimise PID controller. Also check parameter **“Precooler control temperature”** and change if necessary.
	unavailable		
160	**all phases (if activated)**		

Warning PID controller precooler: Input value out of valid limits.			
		The measured temperature at TT103 is out of the set limit.	Check the measured temperature at page “PID parameter “of the touch panel. If necessary, carry out actions as stated in **"160 Warning PID-Controller precooler"**.
	unavailable		
161	**all phases (if activated)**		

Warning PID controller precooler: Failure during optimisation.			
	unavailable	A fault has occurred during optimisation. Possible causes are changes to parameters during optimisation.	If necessary, carry out actions as stated in **"160 Warning PID-Controller precooler"**.
163	**all phases (if activated)**		

Warning PID controller precooler: Failure results in invalid parameters during optimisation.			
	unavailable	A fault has occurred while changing the parameter **"Precooler control temperature"**.	Press the "Reset" button and re-optimise the PID controller.
164	**all phases (if activated)**		

Warning PID controller precooler: Calculation of output value failed.			
		An error has occurred while calculating the output value.	Press the "Reset" button and re-optimise the PID controller, or acknowledge the message and activate the "auto" operation mode for the PID controller.
	unavailable		
165	**all phases (if activated)**		

5.13 PID-Controller

5.13.1 PID-Controller of the water valve (OPTION)

The PLC-Program use a PID-Controller for the operation of the water valve, installed at the precooler of the dryer. Independent to the dryer inlet temperature (TT103) and the setpoint the controller send out a variable value to the valve.

To get an efficiency operation it is essential to optimise the PID-Controller at usual conditions. The optimisation can be start at the screen “PID-Parameter” (see also chapter 5.8.1 Additional parameter screens) and will be managed automatically by the PLC. The progress will be displayed during the optimisation.

A precooler including a PID-controlled water flow at the dryer inlet have a positive effect to the adsorption phase and can reduce the power consumption during regeneration.
To realize this option professional please contact the manufacturer!

6. Start-up and Shut-down

6.1 Start-up

Mistakes made during the first start-up can cause serious damages. To ensure a maximum safety we highly recommend the first start-up to be carried out by the service team of the manufacturer.

Generally the following points have to be checked, considered and controlled:

- The pipelines must be designed according to the flow capacity and operating pressure.
- Never operate the unit above the max. permitted operating pressure.
- Control and if necessary correct all settings according to the data indicated in the technical data sheet.
- The gate valves to be installed on site have to be closed.
- The system is depressurized and disconnected from power supply.
- All required auxiliary energy resources are available in specified quantities.
  Valid at HOC (Heat of compression) dryers: It must be guaranteed that the cooling water supply is ensured. **An operation without cooling water is not permitted.**
- All connections are free from leakage.
- All fasting and mounting parts are in a proper condition.
- Remove all existing transport locks / transportation supports.
- The electrical connections have to be made safely and correct.
- The safety valves upstream or downstream the unit are in a proper condition. The pressure setting of the safety valves must not be higher than the max. permitted operating pressure of the unit.
- Never remove sound adsorbing or insulation material.
- valid at HOC dryers: The signal “Compressor load” must be connected to the compressor. The signal “remote start/stop” must be connected at the control room or need a jumper wire at the terminals inside of the control cabinet.

Image 6.1

After a successful check-up of all above mentioned points the unit has to be started-up as follows:

1. Check again that the inlet and outlet valves (not scope of supply) are closed and that the electric control (main control switch left side of the panel) is switched off.
2. Open the ball valve in the pneumatic box for the instrument air supply.
3. Check whether all circuit breakers are in position I. These are located in the control panel.
4. Put the main control switch in position ON.
5. Ensure that the CPU is in operation mode “RUN” (green light on the CPU).
6. Put the installation slowly under pressure by carefully opening the inlet valve (not scope of supply) provided on site and installed upstream the unit.

Notice: The installation will be supplied in the operation step “Stand-By” from the manufacturer.

7. After the pressure is build-up quit the malfunction notice “FAULT PRESSURE“. (not required at HOC dryers)
8. The unit switches to the operation step “STAND-BY“ and remains in “OFF” mode.
9. Push the button “TIME CONTROL” or preferably “DEW POINT CONTROL” (Option).

With activated “DEW POINT CONTROL“ the unit switches over and starts regeneration immediately, if the displayed dew point is worse than the dew point switchover setting.

If the displayed dew point is better than dew point switchover setting, the switchover setting has to be adjusted to the displayed dew point (see the description in chapter 5.) in order to force the system to switch over and to start the regeneration phase immediately.

10. After parallel operation of both adsorption vessels the pressure release of one of the vessels is initiated.
11. Check all single switching steps and temperatures of the process.
12. After automatic completion of the heating (desorption) and cooling phase the pressure build-up in the regenerated adsorption vessel takes place. HOC dryers switching directly to the stand-by phase after cooling phase is finished.
13. The changeover of the adsorption vessels has to the initiated as described in the specified chapter of this instructions.
14. During the parallel act start the flow of the installation by slowly opening of the valves provided by the user.

6.2 Start-up Instructions

The pressure build-up within the downstream pipeline has to be made slowly. The minimum allowed operating pressure and the maximum allowed flow rate have to be respected at the same time.

It is absolutely necessary that during the start-up the minimum allowed operation pressure will not be undercut and the maximum allowed flow rate will not be exceeded. If necessary a respective start-up automatic for the pressure check-up has to be controlled. (OPTION!)

Adsorption dryers are procedural installations, which need a time for stabilisation. During this period the dew point can be above the specified value.

Adjustments of time and/ or temperature have to be carried out by the user. The adjustments to be made as to the start-up phase will not influence the warranty of the manufacturer.

6.2.1 Leakages to Flange and / or Screw Connections

Heat regenerated adsorption dryers are working with changing's in temperature. There is the possibility of leakages. These will not implement a notification of defects.

6.3 Shut-down

6.3.1 Planned Shut-down with Pressure Release

In case of a shut-down for maintenance or repair the following points have to be respected:

- Push the button "stop" to switch off the control system. The status indication in the controller display will show "scheduled stop" until the system reaches the stand-by condition (not valid for HOC dryers).
- Shut-down of the installation only during the stand by phase.
- Valves provided by the user have to be closed.
- Switch off the main circuit breaker.
- Reduce the pressure of the installation via the function at the touch panel (described at chapter 5). At HOC dryers the pressure release have to be done at an external valve.

6.3.2 Scheduled Shut-down without Pressure Release and Disconnection from the Power Line

During shut-down you have to process as follows:

- Switch off the control system as described at point 6.3.1. The status indication in the controller display will show "scheduled stop" until the system reaches the stand-by condition (not valid for HOC dryers).
- Do not flow the unit anymore. When closing the valves provided by the user take care that the unit is still supplied with compressed air in order to ensure the control air supply of the pneumatic drive.

6.3.3 Unscheduled Shut-down resp. EMERGENCY SHUT-DOWN

The installation can be shut-down at the switch installed at the control panel at any time. It is absolutely necessary that the installation is not flown through by the time the control system is switched off, the valves provided by the user are to be closed.

ADVICE! Due to the switch-off of the control system the common alarm will be activated.

6.4 Re-starting

6.4.1 Re-starting after scheduled Shut-down with Pressure Release

Restart of the unit as described in item 6.1 Start-up.

6.4.2 Re-starting after scheduled Shut-down without Pressure Release and Disconnection from the Power Line

Is there no notice of malfunction, the control system can be activated by setting the controller to “TIME CONTROL” or “DEW POINT CONTROL” mode. The operation sequence starts again at the point the program had been stopped.

6.4.3 Re-starting after an unscheduled Shut-down

After clearance of the cause of the unscheduled shut-down the installation has to be put in operation again as described in item 6.1 Start-up.

7. Service and Maintenance

Regular service will extend the life time and will increase the safe operation and the performance of the system.

Applying original spare parts and components will guarantee a stable good performance of the unit during the total life time. In case original spare parts are not procured the manufacturer cannot warranty for the operation and function of the adsorption dryer.

This chapter is divided in three sections:

- The maintenance tables for the workings which have to be carried out during the operation of the installation
- The maintenance tables for the workings which will make necessary a shutdown of the installation
- Preventive Maintenance

In the following maintenance tables the service intervals are containing the activities which have to be carried out.
At chapter 9.4 the demand of material to each component is listed.

Prior to all service and maintenance works the safety instructions have to be read and respected.

7.1 Workings without Service Interruption

The service and maintenance works indicated in this chapter can be carried out when the unit is in operation mode.

(Y = yearly; M = monthly; W = weekly; T = daily)

Interval				Activity	Group of Components	Material Demand
Y	M	W	D			
			X	Check messages	Switch board	-
		X		Observation of operation cycles	Switch board	-
		X		Observation of operation parameters	Various measuring equipment	-
		X		Comparison of the temp-eratures measured and the dew point of the specific value	Switch board, measuring equipment	-
		X		Inspection of vessels and filters with regard to pressure loss	AD01, AD02 F1, ...	-
	X			Inspection of all sensors / indicating instruments	PT101, PT102, ... TT101, TT102, ... MT101, PI01, PI02	-
	X			Cleaning of the condensate drain	(KA01, ...)	Set of wear parts (see spare parts list)
	X			Cleaning and if necessary replacement of the silencer	-	Set of wear parts (see spare parts list)
	X			Cleaning and if necessary replacement of the intake filter of the blower	AF1	Set of wear parts (see spare parts list)
X				Check of leakages	All connections	Leak detection spray

7.2 Workings with Service Interruption

Shutdown the installation correctly (see chapter 6.3).

Please install a warning sign!

"Switch-on of the installation is forbidden"

- Carry out the pressure release
- Follow the safety instructions
- After maintenance re-establish the correct working order. Remount the dismantled protection devices

Interval Yearly	Activity	Group of Components	Material Demand
X	Exchange of filter elements of pre-, after-filters and filter element of control air filter	F1, ...	Filter elements (see spare parts list)
X	Inspection of all fittings and fixtures, if necessary exchange of the wear parts	K1 – K4	Set of wear parts (see spare parts list)
X	Inspection of the pneumatic actuators, if necessary exchange of the wear parts	K1 – K4	Set of wear parts (see spare parts list)
X	Inspection, cleaning and if necessary replacement of the no-return valves	R1, R2 R3, R4	Fitting (see spare parts list)
X	Inspection, cleaning and if necessary replacement of the 2/2-way-valves	V1, V2, V3, V4	Set of wear parts (see spare parts list)
X	Inspection and if necessary replacement of single valves of the magnetic valve cluster	at MV1	Spare valves (see spare parts list)
X	Inspection of the electric heater, if necessary clean them	E1	-
X	Inspection of fan	G1	-
X	Cleaning of the condensate lines	-	-

ADVICE: Please follow the separate operation manuals of the main components in chapter 11.

7.3 Preventive Maintenance

Please refer to chapter 9.4

8. Technical specifications

8. Technische Daten

8. Технические характеристики

8. Technische specificaties

8. Technique spécification

8. Fiche technique

DRYBERG® ADP 0700

8.1 Design Characteristics

- Fully automatic for continuous operation
- Desorption in counter flow direction to the adsorption process with heated blower air **(zero purge)**
- Heating by electrical heater
- Cooling by purge air
- Termination of desorption and cooling phase by temperature monitoring (energy efficiency)
- Designed for indoor installation
- Flow beneficial butterfly valves for low pressure drop

8.2 Design and Operating Conditions

Ambient Conditions:

Ambient Temperature	:	min. 5 °C / max. 40 °C
Humidity	:	max. 30 °C, 45 % r.h. blower suction condition

Inlet Conditions:

Medium	:	compressed air (free of dust, condensate and aggressive components)
Inlet Volume Flow	:	max. 600 m³/h (based on 1 bar abs., 20 °C suction conditions)
Operating Pressure	:	min. 8,0 bar (g)
Max. Permissible Pressure	:	11,0 bar (g)
Working Range	:	7,0 - 8,0 bar (g)
Inlet Temperature	:	min. 5 °C / max. 38 °C
Humidity	:	saturated at a.m. conditions

Performance:

Pressure Dew Point	:	better than - 40 °C (up to 40 °C inlet temperature)
Outlet Volume Flow	:	approx. 583 m³/h (average, based on design conditions)
Average Outlet Temperature	:	approx. 52 °C
Filtration rate	:	0,01 Micron (Option prefilter) / 1 Micron (Option afterfilter)

Cycle times (time control mode):

Total Cycle Time	:	12,00 h
Adsorption Phase	:	6,00 h
Regeneration Phase	:	4,50 h
Switch-Over Phase (parallel phase):		5 min.
Pressure Built Up / Release	:	5 min. respectively

Pressure Drop:

Adsorption Dryer	:	approx. 0,08 bar
Prefilter (Option)	:	approx. 0,08 bar (at new and clean condition)
Afterfilter (Option)	:	approx. 0,07 bar (at new and clean condition)

8.3 Energy Requirements

Electric Power:

Design	:	according to VDE / IEC regulations
Required Power Supply	:	3 Ph, 400 V, 50 Hz
Control Voltage	:	24V DC (generated by internal transformer)
Protection Class	:	IP 54, according to IEC529, non explosion proof / for non hazardous area
Permissible Voltage Fluctuations	:	+/- 10%
Installed Power (Blower)	:	2,2 kW
(Heater)	:	9,0 kW
Average Power Consumption	:	approx. 5,3 kWh/h (for blower and heater)

Compressed Air:
A very small amount of compressed air is required for operating the pneumatic driven actuators (instrument air supply) and for analysing the pressure dew point (*Option: Dew Point Meter*).

The instrument air supply is normally tapped from the dry air outlet of the system. If external instrument air supply is applied, dust-free dry compressed air at pressure of 5 – 6 bar (g) is absolutely required.

For the desorption process compressed air is **not** consumed. The cooling phase is done by purge cooling (dried compressed air is expanded to atmospheric pressure and led through the vessel to take up the heat before it is released to atmosphere). The average compressed air consumption is approx. 1,5% of the nom. inlet flow.

8.4 Connections at Battery Limit

Wet Compressed Air - Inlet	:	DN 50, DIN 2633 (DIN EN 1092-1)
Dry Compressed Air - Outlet	:	DN 50, DIN 2633 (DIN EN 1092-1)
Desorption Air – Outlet	:	DN 80, DIN 2633 (DIN EN 1092-1)

Remark:
Due to the high humidity the desorption air has to be routed out of the room / the building via an exhaust pipe. The exhaust pipe has to be enlarged to the next bigger nominal diameter at least.

9. Drawings and parts lists

9. Zeichnungen und Stücklisten

9. Рисунки и счета материалов

9. Tekeningen en onderdelenlijst

9. Dibujos y listas de materiales

9. Dessins et listes de pièces

9.1 P&I-Diagram

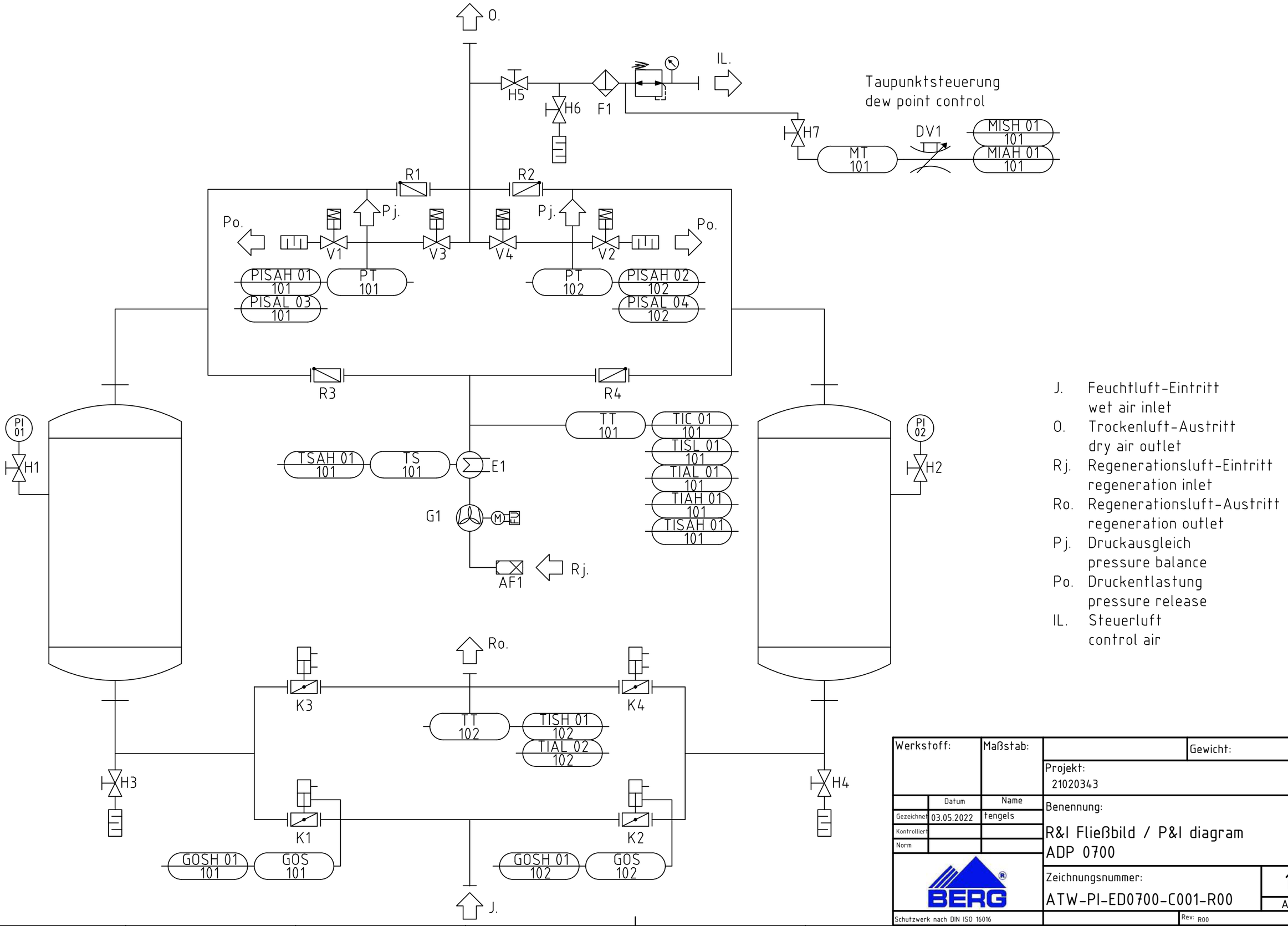
9.1 R&I-Diagramm

9.1 Трубы и инструмент схема

9.1 P&I-Diagram

9.1 Diagrama de tuberías e instrumentación

9.1 Tuyauterie et instrumentation Schéma



J. Feuchtluft-Eintritt
wet air inlet

O. Trockenluft-Austritt
dry air outlet

Rj. Regenerationsluft-Eintritt
regeneration inlet

Ro. Regenerationsluft-Austritt
regeneration outlet

Pj. Druckausgleich
pressure balance

Po. Druckentlastung
pressure release

IL. Steuerluft
control air

Werkstoff:	Maßstab:		Gewicht:
		Projekt: 21020343	
	Datum / Name	Benennung:	
Gezeichnet	03.05.2022 / tengels	R&I Fließbild / P&I diagram ADP 0700	
Kontrolliert			
Norm			
		Zeichnungsnummer: ATW-PI-ED0700-C001-R00	1 / A3
Schutzwerk nach DIN ISO 16016			Rev: R00

9.2 Drawing

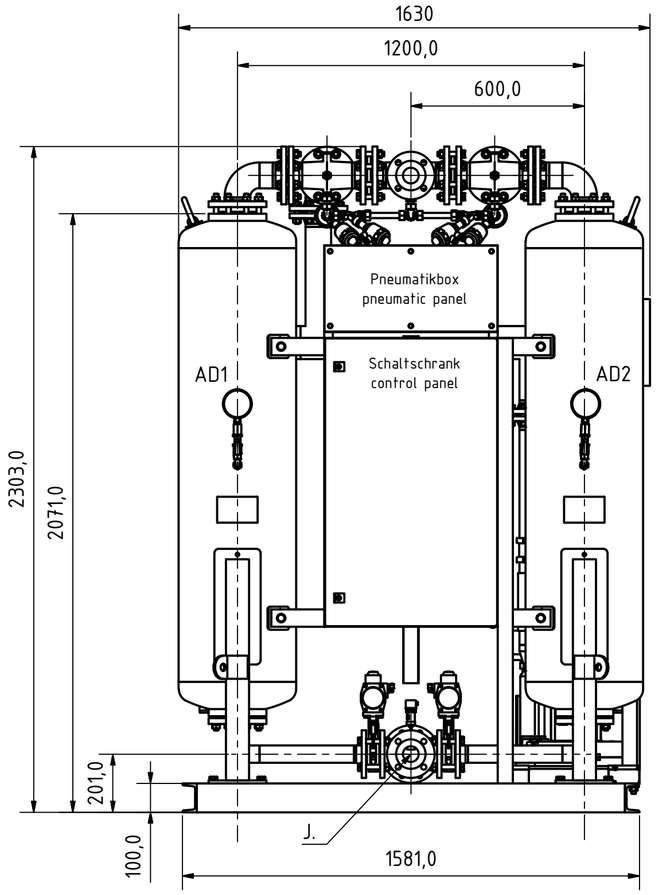
9.2 Zeichnung

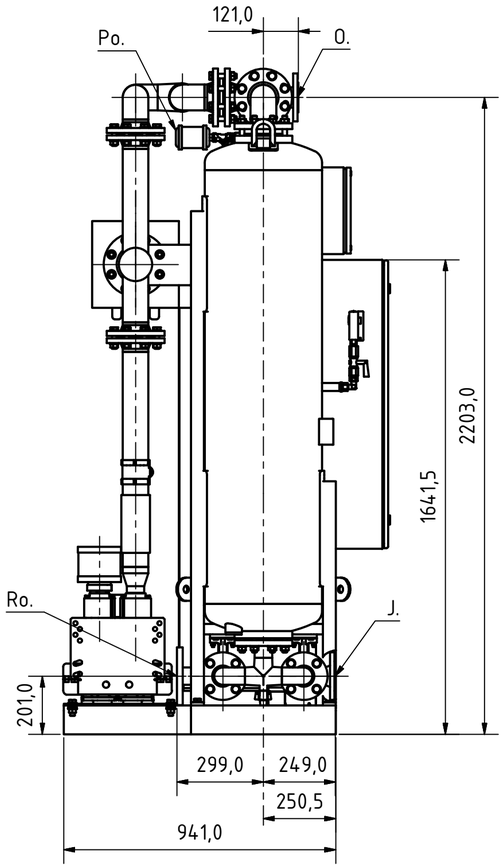
9.2 Чертеж

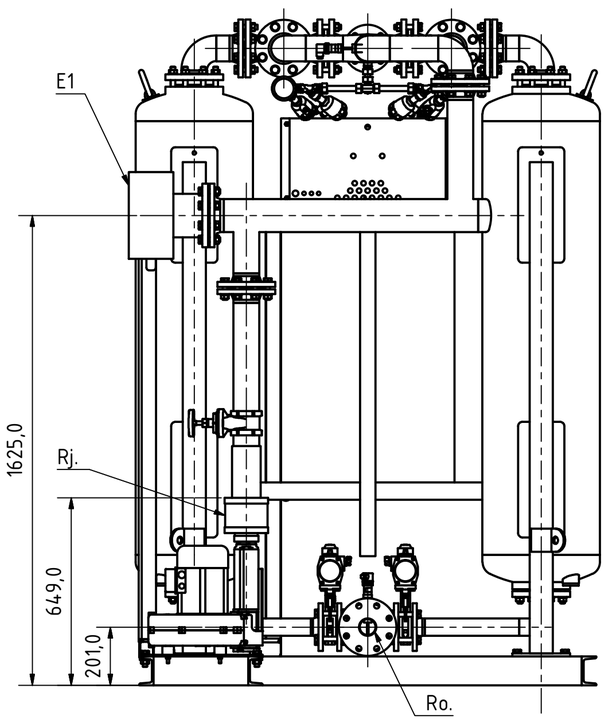
9.2 Tekening

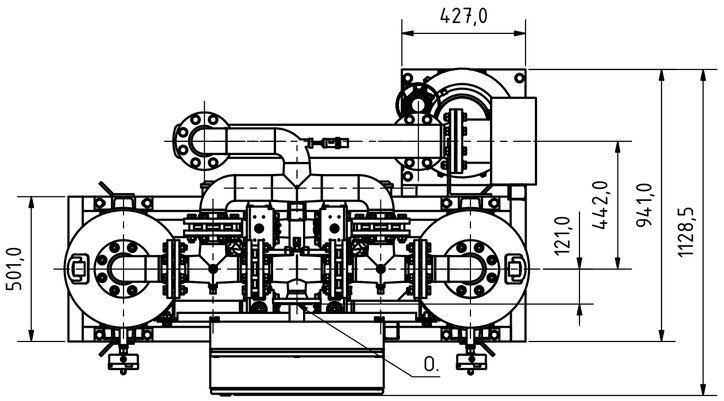
9.2 Dibujo

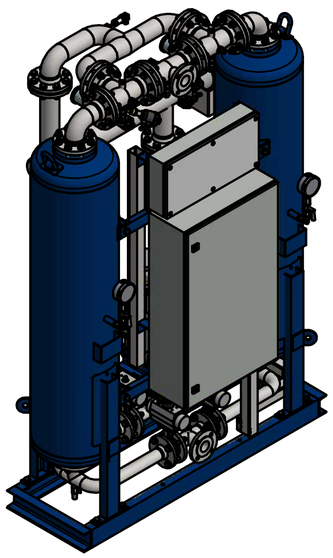
9.2 Dessin

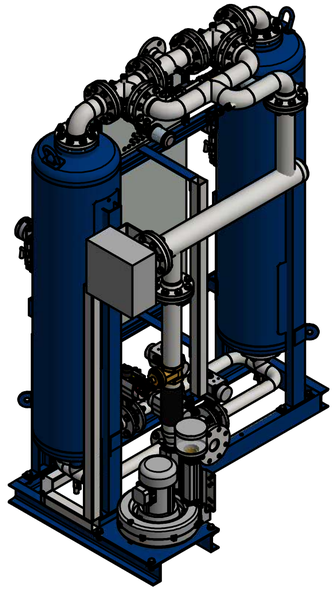












Stutzentabelle / Nozzle				
Kurzzeichen symbol	Beschreibung description	Nennweite size	Nenndruck rating	DIN standard
J.	Feuchtlufteintritt wet air inlet	DN50	PN16	EN 1092-1 / Typ 11
O.	Trockenluftaustritt dry air outlet	DN50	PN16	EN 1092-1 / Typ 11
Rj.	Regenerationsluftteintritt desorption air inlet			
Ro.	Regenerationsluftaustritt desorption air outlet	DN80	PN16	EN 1092-1 / Typ 05
Po.	Druckentlastung pressure release			

Werkstoff:

Maßstab: 1 : 15

Gewicht: 1200,0 kg

Projekt: 21020343

Art.Nr.:

Werkstückkanten nach DIN ISO 13715 -0,2 +0,2

	Datum	Name
Gezeichnet	22.03.2022	fengels
Kontrolliert		
Norm		

Benennung: Adsorption dryer ADP 0700

Maße ohne Toleranzangebe nach DIN ISO 2768-1 mK
DIN ISO 8015
Oberflächenangaben nach DIN ISO 1302

BERG

Zeichnungsnummer: ATW-ED0700-C001-R00

1 A2

Schutzwerk nach DIN ISO 16016

Rev: R00

9.3 Parts list

9.3 Stückliste

9.3 Перечень деталей

9.3 Onderdelenlijst

9.3 Lista de components

9.3 Liste des composants

ADP 0700				Main component list	
Rev. R00	0322ED00182			Order number:	21020343
	Pos.	QTY	Article number	Serial number	Description
Vessels	1	1	BH-W-DN406-PN11	22061	Behälter DN406 PN11
	2	1	BH-W-DN406-PN11	22062	Behälter DN406 PN11
	3	2	MS-16100		Manometer senkrecht Ø100 16 bar
TM	4	280	TM-AA-2-5-0001		Trockenmittel Alumina 2-5
	5	40	TM-AA-4-8-0001		Trockenmittel Alumina 4-8
Pipework incl. Valves	6	1	RLS-ED0700-C001		Rohrleitung obere Rohrbrücke DN80, C001
					Rohrleitung untere Rohrbrücke DN50, C001
					Strömungsrohr DN100, C001
					Gebläseleitung DN80 3", C001
					Gebläseaufsatz DN80 2", C001
	7	2	KLA-KG9-DN050-B-AP30DA		Pneu. Prozessklappe DN50, NBR, AP3DA
	8	2	KLA-KG9-DN050-S-AP30DA		Pneu. Prozessklappe DN50, MVQ, AP3DA
	9	4	RSK-DN80		Rückschlagklappe, DN80, standard
	10	1	MUAS-30		Muffen Absperrschieber G3" PN20 Messing
Frame	11	1	RAS-ED0700-C001		Rahmen ED0700 C001
					Schaltschrankstreben ED0700 C001
					Winkel Flanschheizkörper 220-150-140-8
Blower	12	1	G-SKV-2,2-K06MS-MOR	H02904 2022	Seitenkanalverdichter K06MS 2,2kW 50Hz
	13	0,2 m	HLS-UNI-M2P-089		Heißluft-Schlauch UNI M2/P Ø 89 mm
	14	1	KAF-0400-KL060		Kolbenansaugfilter 0400 KL60
Heater	15	1	FHK-9-400-DN100-SS-800-150	326216-1	Flanschheizkörper 9kW 400V DN100 SS
Sensors	16	1	MT-10020-UNF58	1AF0-052	Taupunktsensor EasyDew TX
	17	2	TT-50400-G12-L100		Widerstandsthermometer 100mm
	18	2	PT-016-G14	1A01QQ5TEJ5 / 1A01QQ5OG31	Druckmessumformer 0-16 bar 1/4"
Valve control	19	2	ELI-NI4		NI4 Doppelinitiator, 10-30VDC
	20	2	PUK-S		Schaltnocke PUK-S
Boxes	21	1	PNEU-ED		Pneumatik-Box ED
	22	1	E-CC-ED0700-C001		Schaltschrank ED0700 C001

9.4 Spare parts list

9.4 Ersatzteilliste

9.4 Перечень запчастей

9.4 Reserveonderdelenlijst

9.4 Lista de recambios

9.4 Liste des pièces détachées

Wearing und Spare Parts List

ADP 0700

Serial - No.:	0322ED00182	YOM :	2022
Customer :			
Person in Charge :			
Telephone :			

Remarks :

Wearing Parts

Pos.	PID Tag No.	Remark	Inst. Qty.	Art.-No.	Description
1	K 1 - K 2	DN 50 B	2	KIT-KG9-DN050-B	wearing kit butterfly valve KG9 NBR
2	K 3 - K 4	DN 50 S	2	KIT-KG9-DN050-S	wearing kit butterfly valve KG9 MVQ
3	K 1 - K 4	3 DA	4	KIT-AP30DA	wearing kit actuator
4	F1		1	SLF-05	element control air filter
5					
6					

Spare Parts

7	K 1 - K 2	DN 50 B	2	KG9-DN050-B	butterfly valve KG9 NBR
8	K 3 - K 4	DN 50 S	2	KG9-DN050-S	butterfly valve KG9 MVQ
9	K 1 - K 4	3 DA	4	AP30DA	pneum. actuator
10	R 1 - R 2	DN 80	2	RSK-DN080	non return flap
11	R 3 - R 4	DN 80	2	RSK-DN080	non return flap
12	V 1 - V 4	G 1/2	4	SSV-G12-RG	2/2 - way - valve
13	XS 1 - 2	G 1/2	2	SD-G12	silencer
14	PT 101 / 102	G 1/4	2	PT-016-G14	pressure transmitter
15	TT 101 / 102	G 1/2	2	TT-50400-G12-L100	temperature transmitter PT 100
16	Y 1 - 4		2	MV-14-J	J - spare valve for valve terminal
17	Y 5 - 6		2	MV-14-M	M - spare valve for valve terminal
18	Y 7 - 10		2	MV-14-C	C - spare valve for valve terminal
19	AF1	NW 60	1	KAF-0400-KL60	blower suction filter
20	GOS 101 / 102		2	ELI-NI4	proximity switch
21	MT 101 **)		1	MT-10020-UNF58	dew point sensor
22					
23					
24					

Preventive Maintenance Plan

Pos.	PID Tag No.	Description	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year
1	K1 - K2	Butterfly Valves			x			x
2	K3 - K4	Butterfly Valves		x		x		x
3	K1 - K4	Pneumatic Actuators					x	
10	R1 - R2	Non Return Flaps		x		x		x
11	R3 - R4	Non Return Flaps					x	
12	V1 - V4	2/2-Way-Valves				x		
13	XS 1 - 2	Silencers		x		x		x
19	AF1	Suction Filter		x		x		x
4	F1	Control air filter	x	x	x	x	x	x
21	MT 101 **)	Dew Point Sensor			x			x

Desiccant & Filters

Amount	Description	Art. No.	Rec. Service Interval
40 kg	Activated Alumina 4-8	TM-AA-4-8-	5 years
280 kg	Activated Alumina 2-5	TM-AA-2-5-	5 years
0 pcs	Prefilter Filterlement		yearly
0 pcs	Afterfilter Filterelement		yearly
0 pcs			
0 pcs			

****) OPTION dew point control and monitoring**

10. Certificates

10. Zertifikate

10. Сертификаты

10. Certificaten

10. Certificados

10. Certificats

10.1 CE-Declaration

10.1 CE-Erklärung

10.1 CE-Декларация

10.1 CE-Verklaring

10.1 CE-Declaración

10.1 CE-Déclaration

10.2 Vessel papers

10.2 Behälterpapiere

10.2 Судовые Документы

10.2 Drukvat papieren

10.2 Papeles del barco

10.2 Documentation des réservoirs sous pression

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 证书 | 인증서

TÜV AUSTRIA

EU-Baumusterprüfbescheinigung
EU-type examination certificate

Modul B: EU-Baumusterprüfung (Entwurfsmuster) nach Richtlinie 2014/68/EU
Module B: EU-type examination - design type according to Directive 2014/68/EU

Bescheinigung Nr.: 2022 - TURK – 173-20-IS-0322
Certificate No.:

Hersteller / *manufacturer:*
TANKBAU TECHNİK Basınçlı Kaplar San. Tic.Ltd.Şti.
IOSB Pik Dökümcüler San. Sit. B1 Blok No:6,
Başakşehir – ISTANBUL / TURKIYE

Hiermit wird bescheinigt, dass die Ergebnisse der an dem unten genannten Druckgerät vorgenommenen Prüfungen die Anforderungen der Richtlinie 2014/68/EU erfüllen.
This is to certify that the results of the examination of the pressure equipment mentioned below meet the requirements of the directive 2014/68/EU.

Diese Bescheinigung ist gültig bis zum 17.1.2032
This certificate is valid through 17 Jan 2032

Objekt: *Object:*	Druckbehälter / *pressure vessel*
Benennung: *Description:*	DN406, 205 Lt. Pressure vessel tank with max. 11 bar working pressure
Inspektionsbericht Nr.: *Inspection report no.:*	20-IS-0322-2022-PED-YT-026

İstanbul	17.01.2022	Hakim ÖZLÜK
Ort *place:*	**Datum** *date:*	**Freigegeben durch** *approved by*

TÜV AUSTRIA SERVICES GMBH

TÜV AUSTRIA SERVICES GMBH
Notifizierte Stelle/Notified Body 0408

Deutschstraße 10
1230 Wien / Österreich
Tel. +43 (0)5 0454
E-Mail: ine-austria@tuv.at

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 证书 | 인증서

TÜV AUSTRIA

Konformitätsbescheinigung
Certificate of Conformity

Modul F / *module F*

Konformität mit der Bauart auf der Grundlage einer Prüfung der Druckgeräte

Conformity to type based on pressure equipment verification

gemäß Richtlinie 2014/68/EU / *according to Directive 2014/68/EU*

Bescheinigung Nr.: / *Certificate No.:* PED-0504-2022-TURK-175-20-IS-0322

Hersteller / ***manufacturer:***
TANKBAU Technik Basınçlı Kaplar San. Tic. Ltd.Şti. .

Fertigungsstätte / ***place of manufacture:***
IOSB Pik Dökümcüler San. Sit. B1 Blok No:6
Başakşehir İstanbul/TURKIYE

Hiermit wird bescheinigt, dass die Ergebnisse der an dem unten genannten Objekt vorgenommenen Prüfungen die Anforderungen der Richtlinie 2014/68/EU erfüllen. Das Objekt ist mit der abgebildeten Kennzeichnung versehen:
This is to certify that the results of the examination of the object mentioned below meet the requirements of the directive 2014/68/EU. The object carries the marking as illustrated:

CE 0408

Objekt: *object:*	Druckbehälter / *pressure vessel*		
Benennung: *designation:*	DN406, 205 Lt. Pressure vessel tank with max. 11 bar working pressure		
Fabrik Nr.: *serial no.:*	22061, 22062	Baujahr: *year of manufacture:*	2022
Inspektionsbericht Nr.: *inspection report no.:*	20-IS-0322-2021-PED-IR-2206162		

İstanbul
Ort / ***place:***

15.02.2022
Datum / ***date:***

Hakim ÖZLÜK
TÜV AUSTRIA SERVICES GmbH
Notifizierte Stelle 0408
Notified Body 0408

Deutschstraße 10
1230 Wien / Österreich
Tel: +43 (0)5 0454
E-Mail: ine-austria@tuv.at

Declaration of conformity

according to Directive 2014/68/EU

for a pressure equipment

THE MANUFACTURER

TANKBAU TECHNİK BASINCLI KAPLAR SAN VE TIC LTD STI
BASINCLI KAPLAR SAN VE TIC LTD STI
Pik Dökümcüler sanayi sitesi B1 - No. 6
İkitelli İstanbul

herewith declares, that the pressure equipment

Description:	**Pressure Vessel**
Year of manufacture:	**2022**
Type-, serial, identification-No:	**ATW 406, 22061**
Chamber designation:	**Air Tank**
max. allowable pressure PS:	**11**
allowable max./min. temperature TS:	**-10 / +230**
Volume V / Diameter DN:	**V = 205 L**
Test pressure PT:	**18,78 bar**
Date of pressure test:	**02.2022**
Pressure test medium:	**water**

complies with the requirements of the Pressure Equipment Directive 2014/68/EU

Applied conformity assessment procedures:	Category III Module B + F
Applied standards and technical specifications:	AD Merkblatt 2000
The Pressure device is labeled with the identifier:	CE 0408
Engaged notified bodies /	
B Module Certificate Nr.	2022-TURK-173-20-IS-0322
F Module Certificate Nr.	PED-0504-2022-TURK-175-20-IS-0322
Examination / inspections / test during manufacturing:	TÜV AUSTRIA Service Gmbh Deutschstraße 10, 1230 Wien / Österreich, Tel:+43 (0)5 0454 e-mail: ine-austria@tuv.at

Location / date : İstanbul - 11.02.2022

Signature / stamp : Metehan YILMAZLAR / Mechanical Engineer

TBT TANKBAU TECHNİK
Basınçlı Kaplar San. Tic. Ltd. Şti.
İOSB Pik Dök.San. Sitesi B1-Blok No:6 Başakşehir-İST.
Tel.:+90(0)212 486 2607 Faks:+90(0)212 486 26 08
www.tankbautec.com.tr info@tankbautec.com.tr
İkitelli V.D. : 8200316688 Tic.Sic.No:875804

Operating Instructions

in accordance with 2014/68/EC for pressure device

Edition: Prepare by: Revision: 00 Page:1/1

manufacturer: Tankbau Technik

Website: www.tankbautec.com.tr

1. Type	**ATW 406**	**2. Charge material (fluid*)**	**Group of fluid 2**
3. Volume (V)	**205 L**	**4. Year of construction**	**2022**
5. Max. permissible pressure (PS)	**0…11bar**	**6. Category**	**III**
7. Test pressure (TP)	**18,78 bar**	**8. Date of first pressure test**	**09.02.2022**
9. Corrosion allowance	**1mm**	**10. min./max. permissible temp.(TS)**	**-10 / 230 °C**
11. Permissible location	**inside**	**12. Empty weight**	**135,5 kg**
13. Quantity and type of the fastening elements	**4 anchor bolts**		

14. Permissible startups / shutdown in acc. to AD 2000 – S1, edition 10/00 (endurance)

Min. pressure of pressure deviation range	Max. pressure of pressure deviation range	Max. permissible startups / shutdown
0 bar	16bar	14600

This pressure vessel was manufactured and delivered as individual component by manufacturer according to the manufacturer's own design specifications and based on the operating conditions of the purchaser without safety devices.
The pressure vessel may be used only within the scope of the technical data mentioned above. Any other use is prohibited for safety reasons. This applies in particular to the underlying pressure force and the correspondent stress gradient.

It is the responsibility of the provider to create an operation manuel for the supplied pressure equipment as a component of the complete system in the respective official language of the country of destination.

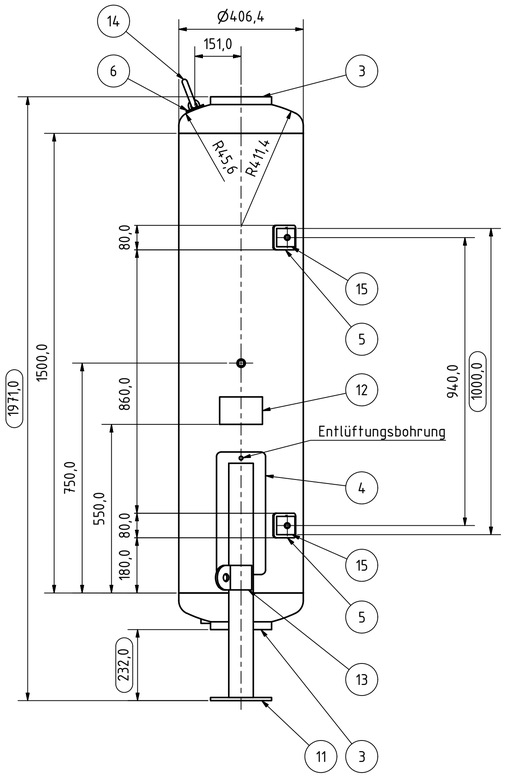
1.) Installation instructions

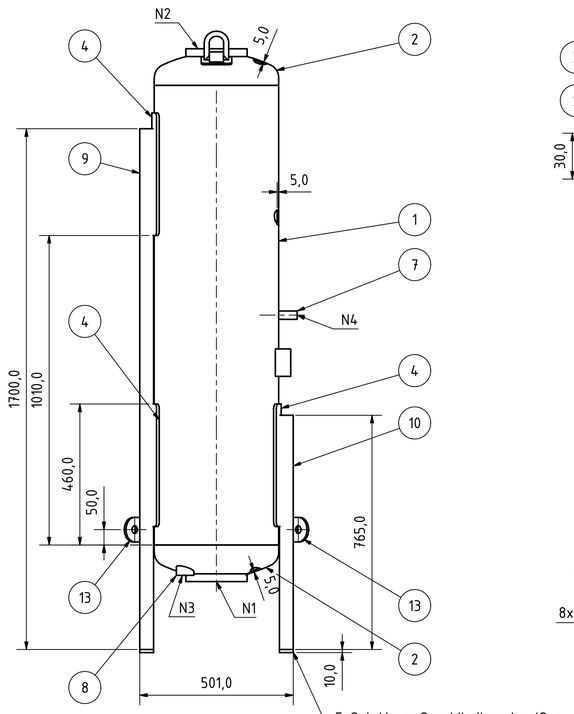
- The pressure device (as a single item) is usually delivered on a wooden pallet. This pallet is only a packaging for secure transportation and storage and has to be removed before use of the pressure device. In case of any further packaging this has to be removed too.
- Those attached to the vessel loadbearing points are suitable for loading, unloading, Transportation and installation and must be used.
- **This pressure vessel may only be installed according to the purchaser's specifications. Pressure devices that are only designed for installation in buildings (see 11. above) may not be installed outdoors**.
- The device must be installed in a way that the flange connections, fixtures, measuring points and inspection apertures are unobstructed and accesible.
- During assembly, it is to be ensured that the components are correctly assembled. In the case of flanged joints, special attention shout be paid to the size, pressure stage and quantity / quality of the screwed connections used.
- **The device must be mounted without tension and vertically or horizontally on the mounting elements provided for this purpose. When erecting in free spaces, the pressure device shout be additionally secured due to the inscreased loads (see under 13.).**
- **If the delivered pressure device is a portable vessel, the operator has to take convenient steps against rolling away**.
- No additional force may be applied to the vessel walls via the mounting elements.
- Vibration and corrosion on the vessel coming from the outside are to be prevented by suitable measures.
- **In order to protect the vessel against damage from external forces, a collision protection must be provided**.
- Welding and heat treatment of the pressure-bearing walls of the vessel are prohibited.
- **The filter of the construction have to be provided adequate means for protection for hot surfaces if the max. temperature is above 50℃.**
- **It is the responsibility of the operator to ensure that the specific temperatures, especially in case of permitted outdoor installation, are not exceeded.**

2.) Commissioning

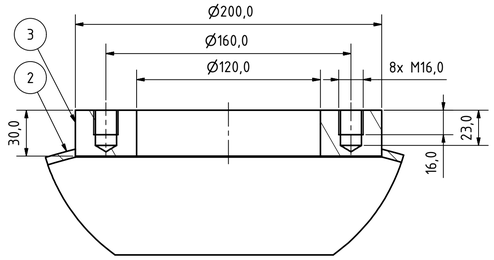
- In order to prevent the threshold values (see above) from beeing exceeded, the pressure device has to be equipped with suitable safety devices.
- These safety devices, such as equipment for pressure limitation, safety valves and equipment for temperature control are not included in the scope of delivery by the manufacturer named above.
- The safety devices must be installed on the tank by authorized personnel.
- Misuse is forbidden.
- The documents should be kept by the responsible personel for future reference.
- The periodical inspection of the tank is to be carried out according to the relevant local legislation.

TANKBAU TECHNİK Basınçlı Kaplar San. Tic. Ltd. Şti. İOSB Pik Dök.San. Sitesi B1-Blok No:6 Başakşehir-İST. Tel.:+90(0)212 486 2607 Faks:+90(0)212 486 26 08 www.tankbautec.com.tr info@tankbautec.com.tr İkitelli V.D.: 8200316568 Tic.Sic.No:875804





Detail Blockflansch oben (1 : 2)



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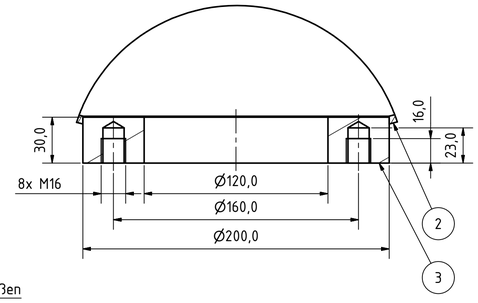
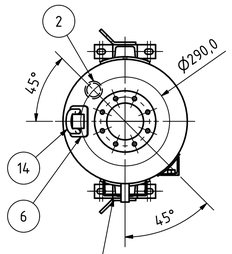


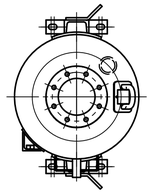
BAUTEILLISTE					
OBJEKT	ANZAHL	BESCHREIBUNG	NORM	MATERIAL	AD-MERK
1	1	Mantel Ø406.4×1500×5	DIN EN 10028-2	P265GH	3.1/W1
2	2	Klöpperboden Ø406.4×5	DIN 28011	P265GH	3.1/W1
3	2	Blockflansch DN80 PN16 (Bohrung Ø120)	DIN 28117	P250GH	3.1/W1
4	3	Verstärkungsblech 400×160×8	DIN EN 10028-2	P265GH	3.1/W1
5	2	Verstärkungsblech 100×80×5	DIN EN 10028-2	P265GH	3.1/W1
6	1	Verstärkungsblech 100×60×5	DIN EN 10028-2	P265GH	3.1/W1
7	1	Manometermuffe G1/2	DIN EN 10241	P235GH-TC1	3.1/W4
8	1	Muffe G1 1/2	DIN EN 10241	P235GH-TC1	3.1/W4
9	1	U-Profil U80 - L=1700	DIN 1026-1	S235JRG2	
10	1	U-Profil U80 - L=765	DIN 1026-1	S235JRG2	
11	2	Fußplatte 200×45×10		S235JRG2	
12	1	Typenschildbrücke für Tankbau Typenschild		S235JRG2	
13	2	Transportlasche 130×80×8 Bohrung Ø25		S235JRG2	
14	1	Tragöse VLBS 2.5U	Beistellung Everair	Stahl	
15	2	Winkel 60x60x5 - L=60	DIN EN 10056-1	S235JRG2	
16	2	Sechskantmutter M16	DIN 934	Stahl vz 5.2	

Behälter I

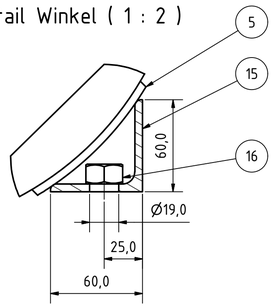


Transportlasche mit der Rundung am Rand vom U-Profil schweißen

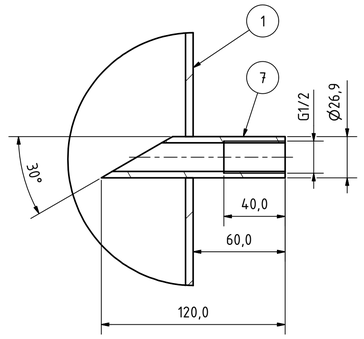
Behälter II
(spiegelbildlich)



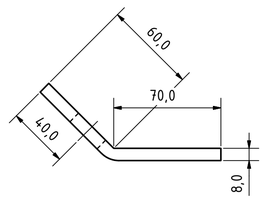
Detail Winkel (1 : 2)



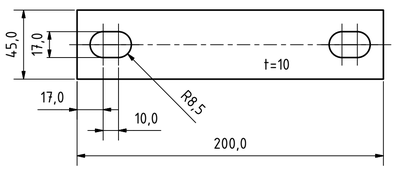
Detail Manometermuffe (1 : 2)

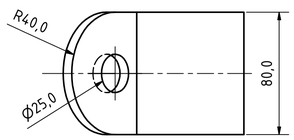


Detail Transportlasche (1 : 2)

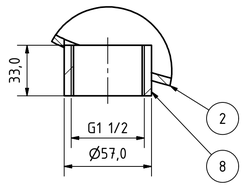


Detail Fußplatte (1 : 2)



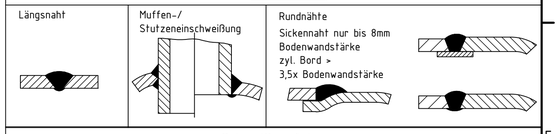


Detail Muffe (1 : 2)



Stutzentabelle / Nozzle				
Stutzen nozzle	Nennweite size	Nenndruck rating	DIN standard	Beschreibung description
N1	DN80	PN16	DIN 28117	Einritt
N2	DN80	PN16	DIN 28117	Austritt
N3	G 1 1/2		DIN EN 10241	Entleerung
N4	G 1/2		DIN EN 10241	Manometer

Nahtformen



Schweißverfahren

gültige Verfahrensprüfung nach AD2000
regelmäßige Prüfung durch die benannte Stelle
alle unbemaßten Schweißnähte: 3mm< a < 0,7s
Anschweißteile sind umlaufend zu verschweißen
beidseitig schweißen, wenn möglich

Material

Mantel/Böden	: P265GH, 3.1/AD200-W1, EN 10028-2:2003
	: Böden, DIN 28011 gemäss AD2000 HP 7/2, HP8/1
Muffen	: DIN EN 10028-2, St 35.8-I, 3.1/AD2000-W4, DIN 17175 wahlweise P235GH, 3.1/AD2000-W4, EN 10216-2
Verst.bleche von Tragösen und Füßen	: P265GH, 3.1/AD2000-W1, EN 10028-2
sonst Material	: S235JRG2
Sonderflansche	: DIN 28117, P265GH, 3.1/AD2000-W1/W9, EN 10028-2 EN-1092, P250GH/3.1/AD2000-W9, EN 10273
Rohre	: DIN 2448, St35.8-I, 3.1/AD2000-W4, DIN 17175 wahlweise P235GH, 3.1/AD2000-W4, EN 10216-2

Oberflächenbehandlung / surface

Oberflächenschutz innen surface protection inside	roh
Oberflächenschutz aussen surface protection outside	SA 2,5

Technische Daten / technical data

Zul. Betriebsdruck PS all. operating pressure PS	bar	11
Max. zul. Betriebstemperatur TS max. all. operating temperature TS	°C	230
Min. zul. Betriebstemperatur TS min. all. operating temperature TS	°C	-10
Volumen volume	Liter	205
Prüfdruck PT test pressure PT	bar	18,78
Korrosionszuschlag corrosion allowance	mm	1
Berechnungsspannung efficiency of weld		85 %
Betriebsbedingungen operating condition		Schwellbeanspruchung nach AD2000-S1
Zul. Lastspielzahl nach AD2000-S1 all. number of stress cycle		14600
Druckschwankungsbreite pressure fluctuation range		0 bar bis PS
Auslegung nach design acc.		AD2000 / DGRL 2014/68/EU
Abnahme inspection		AD2000 / DGRL 2014/68/EU
Kategorie/Modul category/module		III / H1
Fluidgruppe group of fluid		2

TÜV AUSTRIA SERVICES GMBH
TÜV AUSTRIA

Werkstoff:
Maßstab: 1 : 10
Gewicht: 135,5 kg
Projekt:
Art.Nr.: BH-W-DN406-PN11
Benennung: vessel DN 406 PN11
Zeichnungsnummer: BH-ATW-DN406-PN11-L-R00
1
A1
Rev. R00

Werkstückkanten nach DIN ISO 13715 $^{-0,2}$ $^{+0,2}$

	Datum	Name
Gezeichnet	22.12.2021	Tengels
Kontrolliert		
Norm		

Maße ohne Toleranzangabe nach DIN ISO 2768-1 mK
DIN ISO 8015
Oberflächenangaben nach DIN ISO 1302
Schutzvermerk nach DIN ISO 16016

EVERAIR
EVERAIR GmbH
Siemensring 56 - D-47877 Willich
Tel. +49 2154 89144 0 - mail@everair.com

Prüfbericht der zerstörungsfreien Prüfungen

Test Report of non destructive testings

Hersteller Manufacturer	Tankbau Technik Basınçlı Kaplar San.Tic. Ltd. Şti.	**Prüf- Nr.** Test No	**02088-22**
Besteller Ordering party	**Air**	**Auftrags-Nr.** Order No.	
Gegenstand Object	**Druckbehälter**	**Inhalt, Druckstufe, Lage** Contents, Pressurerange, Situation	**205Ltr./11bar**
Prüfgrundlage Basis of Testing	**AD 2000 HP 5/3**	**Gepr. Behälter** Examined vessel	**22061**
Losgröße Volume of Fabrication	**2**		
Prüfumfang Check extent	**2**		
Werkstoff Material	**P265GH**	**Wärmebehandlung** Heat treatment	**Keine**
Wanddicke Böden Wall thickness bottoms	**10mm**	**Wanddicke Mantel** Wall thickness shell	**10mm**

Nach AD 2000- HP5/3 Tafel 1: sind zerstörungsfreie Prüfungen nach einer Ausnutzung der Berechnungsspannung in der Fügeverbindung von 85% auszurichten.

Orientation of welding according to AD 2000-HP5/3 Table 1: nondestructive testings with a utilization of calculated stres frpm 85%.

Zu prüfende Stellen Places to test especialy	**Besonders zu prüfende stellen Nach Ad 2000-S1** Particularly places to test especialy İn acc. with AD 2000-S1	**Angewandtes Verfahren** Applied procedure	**Prüfumfang** Check extent	
			Soll Nominal value	**Ist** Is
Rundnaht		**RT**	**2%**	**25%**
Längsnaht		**RT**	**100%**	**100%**
Stoß		**RT**	**100%**	**100%**

Prüfteechnische Angaben zu den angewandten Verfahren siehe Anlagen.
Testtechnical data to the applied procedures look at plants
Prüfaufsicht und Prüfer verfügen über eine Ausbildung, Qualifizierung und Zertifizierung nach EN ISO 9712 (Prüfaufsicht Stute 2)
Test supervision and examiners order over training a qualification after EN ISO 9712 (supervision level 2)

İstanbul, den
31.01.2022

Prüfaufsicht

TBT TANKBAU TECHNIK
Basınçlı Kaplar San. Tic. Ltd. Şti.
İOSB Pik Dök.San. Sitesi B1-Blok No:6 Başakşehir-İST.
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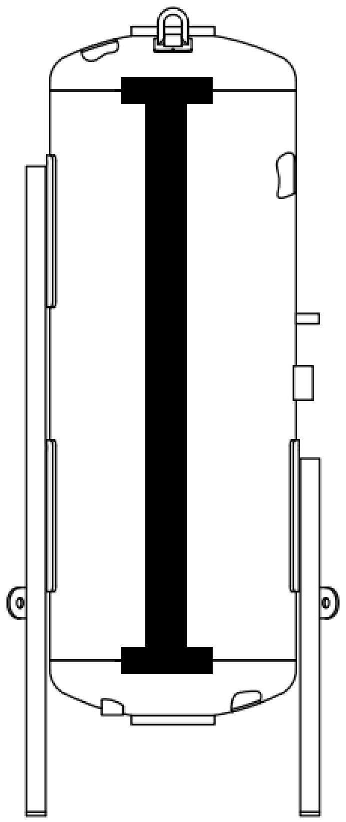
www.tankbautec.com.tr info@tankbautec.com.tr
İkitelli V.D. : 8200316693 Tic.Sic.No:875804

Filmlageplan zur Durchstrahlungsprüfung
Nach DIN EN 1435

Arrangement of RT photo admission
Acc. Driective DIN EN1435

Hersteller Manufacturer	Tankbau Technik Basınçlı Kaplar San.Tic. Ltd. Şti.	**Prüf- Nr.** Test No	**02088-22**
Besteller Ordering party	**Air**	**Auftrags-Nr.** Order No.	
Gegenstand Object	**Druckbehälter**	**Inhalt, Druckstufe, Lage** Contents, Pressurerange, Situation	**205Ltr./11bar**
Prüfgrundlage Basis of Testing	**AD 2000 HP 5/3**	**Gepr. Behälter** Examined vessel	**22061**
Filmlänge Lenght of the radiograph	**480mmx100mm**		
Auswertungsbereich Analysis range	**Circular:25%** **Long:100%**		



İstanbul, den
24.01.2022

Prüfaufsicht

TBT TANKBAU TECHNİK Basınçlı Kaplar San. Tic. Ltd. Şti.
İOSB Pik Dök.San. Sitesi B1-Blok No:6 Başakşehir-İST.
Tel.:+90(0)212 486 2607 Faks:+90(0)212 486 26 08
www.tankbautec.com.tr info@tankbautec.com.tr
İkitelli V.D.: 8200316568 Tic.Sic.No:875804

HYDROSTATIC TEST CERTIFICATE
Hydrostatisches Testzertifikat

CE 0408 TÜV AUSTRIA

Experience. Quality. Trust.

Certificate No: TBT08822
Zertifikat Nr.

Subject Thema	:	ATW 406
Customer Kunde	:	EVERAIR GmbH
Manufacturer Hersteller	:	TANKBAU TECHNİK Basınçlı Kaplar San. Tic. İOSB Pik Dök. San. Sitesi B1 Blok No:6 İkitelli / ISTANBUL
Manufacturing Date Herstellungsdatum	:	2022
Serial No. Seriennummer	:	22061
Capacity/Volume Kapazität / Volumen	:	205 Liter
Max. Allowable Working Pressure Max. Zulässiger Betriebsdruck	:	11 bar
Min./Max. Operating Temperature Min./max. Betriebstemperatur	:	-10 / 230˚C
Test Standard Teststandard	:	AD 2000
Test Date Testdatum	:	09.02.2022

Test Pressure: 18,78bar
Testdruck

Test Period: 1/2 h.
Testzeit

Medium: Water
Mittel Wasser

TBT Serial Number of the Pressure Gauge : 75536.TAN.06
TBT Seriennummer des Manometers

Result : **No leakage and permanent deformation have been observed.**
Ergebnis : Es wurde keine Leckage und bleibende Verformung beobachtet.

Notes : THIS CERTIFICATE IS VALID FOR ONE YEAR FROM THE DATE OF THE TEST.
Anmerkungen: DIESES ZERTIFIKAT IST FÜR EIN JAHR VOM TESTDATUM GÜLTIG.

İstanbul, 09.02.2022
Metehan YILMAZLAR
Mechanical Engineer

TBT TANKBAU TECHNİK
Basınçlı Kaplar San. Tic. Ltd. Şti.
İOSB Pik Dök.San. Sitesi B1-Blok No:6 Başakşehir-İST.
Tel.:+90(0)212 486 2607 Fax:+90(0)212 486 26 08
www.tankbautec.com.tr info@tankbautec.com.tr
İkitelli V.D. : 8200316568 Tic.Sic.No:675804

İmkosan Kalite Kontrol Ticaret A.Ş.
Güzelyalı mh. Akıncı sk. No:4 (34903) Pendik / İstanbul
Tel: (0212) 289 02 89 (90-91) Faks: (0216) 392 82 79

TÜRKAK

Döküman No:	F.008
Rev. No/Tarihi:	01/16.06.2021
Sayfa	1 / 1

RADIOGRAPHIC EXAMINATION REPORT
RADYOGRAFİK MUAYENE RAPORU

CUSTOMER * / *MÜŞTERİ*	TBT Tankbau Technik Basınçlı Kaplar Sanayi Tic. Ltd. Şti.	EXAMINATION STANDARD * / *MUAYENE STANDARDI*	EN 17636-1 - CLASS B	REPORT NUMBER / *RAPOR NUMARASI*	00882-22-IR
PROJECT * / *PROJE*	TBT Projeleri	ACCEPTANCE STANDARD * / *KABUL STANDARDI*	AD 2000 Code HP 5/3 - AD 2000 Code HP 5/3	CONT. REF. NR / *TEKLIF REF. NO*	TN-2019-040
EXAMINATION AREA * / *MUAYENE YERİ*	İkitelli	PROCEDURE NUMBER / *PROSEDÜR NUMARASI*	P.131	ACTIVITY NR / *FAALİYET NUMARASI*	52
JOB NAME * / *İŞ ADI*	ATW406-22061	NDT PERCENTAGE * / *MUAYENE ORANI*	%100	EXAMINATION DATE / *MUAYENE TARİHİ*	31.01.2022

TECHNICAL INFORMATIONS / *TEKNİK BİLGİLER*

MATERIAL / OBJECT * *MALZEME / CİSİM*	CS		ISOTOPE SIZE / *İZOTOP BOYU*	3x2.2 mm	Source side of the object to film / *Objenin enerji tarafı ile film mes.*	-
WAITING TIME FOR NDT (h)* / *NDT İÇİN BEKLEME SÜRESİ (saat)*						
PRODUCT FORM * / *ÜRÜN FORMU*	Welding / Kaynak ~~Wrougth / Dövme~~	~~Casting / Döküm~~	AKTİVİTE / *ACTIVITY*	20.49 Ci	EXPOSURE TIME / *POZ SÜRESİ*	140 sn
WELDING PROCESS * / *KAYNAK PROSESİ*	~~N.A~~ ~~TIG~~ ~~SAW~~ ~~FCAW~~	GMAW ~~SMAW~~ ~~MCAW~~	X ray FOCUS SIZE / *X Işını ODAK BOYU*	- mm²	FILM TYPE & CLASS / *FİLM TİP& SINIF*	KODAK T200
WELDING JOINT TYPE * / *KAYNAK BİRLEŞİM TİPİ*	~~N.A~~ Butt Weld / Alın Kaynağı	~~T-Butt-Weld/ T-Alın Kaynağı~~ ~~Fillet-Weld/Köşe Kaynağı~~	VOLTAGE / AMPERE / *GERİLİM / AMPER*	- / -	SCREEN (fs/bs) / *EKRAN (ön/arka)*	Pb (0.02mm)
HEAT TREATMENT * / *ISIL İŞLEM*	~~After / Sonrası~~ None / Yok	~~Before / Öncesi~~	SOURCE to OBJECT / *ENERJİ ile OBJE MES.*	-	FILM(S) PER CASSETTE / *KASETTEKİ FİLM SAYISI*	1
SOURCE TYPE Sr. Nr / *ENERJİ TİPİ & Seri No*	Ir 192 ~~X-Ray / X-Işını~~	~~Se-75~~	SOURCE to FILM DIS. / *ENERJİ ile FİLM MES.*	60 cm	TYPE IQI / *TİP IQI*	10 FE EN
PROCESS TECHNIC / *PROSES TEKNİK*	Manual / Elle ~~Automatic / Otomatik~~		IQI POSITION / *IQI POZİSYONU*	Source / Enerji ~~Film / Film~~	EQUIPMENT SERIAL DBN / *CİHAZIN DBN*	RT.007 / D9785

TEST ARRG. / *TEST DÜZENLEMESİ*
- 7.1.2 (Fig.1) Single Wall-Single Image / Plaka
- ~~7.1.8 (Fig.14) Double Wall-Single Image / Sarma Çekim~~
- ~~7.1.7 (Fig.12) Double Wall-Double Image / Superimpoz~~
- ~~7.1.6 (Fig.11) Double Wall-Double Image / Elips~~
- ~~7.1.4 (Fig.5) Single Wall-Single Image / Panoramik~~
- ~~7.1.8 (Fig.17) Single Wall-Single Image / Köşe Kaynağı~~

EXAMINATION INFORMATIONS / *MUAYENE BİLGİLERİ*

NO	MARKING NUMBER / *MARKALAMA NUMARASI*	EXAMINED AREA / *İNCELEME BÖLG.*	WELDER / *KAYNAKÇI*	REQ. IQI / *İSTEN. IQI*	VIS. IQI / *GÖRÜ. IQI*	DEN. / *YOĞ.*	DIA / *ÇAP*	BASE. THICK. / *KAL.*	REIN.THI / *TAK.*	TYPE OF DEFECT / *HATA TİPİ*	RESULT / *SONUÇ*	HATA A. / *DEF.AREA*	REMARK / *AÇIKLAMA*
1.	ATW406-22061 L1	0-40	--	15	15	2.7		8 mm	--		ACC		
2.	ATW406-22061 L1	40-80	--	15	15	2.5		8 mm	--		ACC		
3.	ATW406-22061 L1	80-120	--	15	15	2.5		8 mm	--		ACC		
4.	ATW406-22061 L1	110-150	--	15	15	2.5		8 mm	--		ACC		
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													
15.													
16.													
17.													
18.													

* Önemli Not: Muayene prosesi için müşteri tarafından sağlanan gerekli bilgiler,doğrulama yapıldıktan sonra raporlara aktarılmaktadır. Kaynak tamamlandıktan sonra NDT testleri için bekleme süresi çelikler için minimum 24 saat,yüksek mukavemetli çelikler için minimum 48 saat ve üzeri olacaktır.

* *Important Note: The necessary information provided by the customer for the inspection process is transferred to the reports after verification. After the welding is completed, the waiting time for NDT tests will be a minimum of 24 hours for steels and a minimum of 48 hours or more for high strength steels.*

TYPES OF DEFECT / *HATA TİPLERİ*

Aa 2011	Porosity / *Gözenek*	Ba 3012	Slag Inclusion / *Cüruf Kalıntısı*	Db 402	Incomplete Penetrat. / *Yetersiz Nüfuziyet*	E 100	Crack / *Çatlak*	Ca	Shrinkage / *Çekinti*	ACC	Accept / *Kabul*
Ab 2016	Wormholes / *Kurt Oyuğu*	Bb 3011	Slag Line / *Cüruf Hattı*	Fa 504	Excess Penetration / *Fazla Nüfuziyet*	Si	Misallignment / *Eksen Kaçıklığı*	H	Laps & Cold shuts / *Soğuk Birleşme*	REJ	Reject / *Ret*
Ac 2013	Group Porosity / *Grup Gözenek*	C 401	Lack of Fussion / *Birleşme Noksanlığı*	Fb 514	Poor Profile / *Kötü Yüzey*	R 304	Metal Inclusion / *Metal Enklüzyon*	G	Hot Tears / *Sıcak Yırtılma*	RS	Rshoot / *Yeniden*
Ad 2014	Linear Porosity / *Sıralı Gözenek*	Da 515	Root Concavity / *Kök Çukurluğu*	Fc 501	Undercut / *Yanma Oluğu*	Ff	Film Defect / *Film Hatası*	I	Insert / *Ekler*	EX	Extra Film / *Ek Film*

10x12	10x16	10x24	10x36	10x48	İMKOSAN			CLIENT	AUTHORITY
				4.00	Muayeneyi Yapan / Sertifika No	Murat Alçı (I)	0192/30/17/RT		
					Muayeneyi Onaylayan / Sertifika No	Gökhan Şimşek	0087/30/16		
					Rapor Tarihi	03.02.2022			

Gökhan ŞİMŞEK SNT-TC 1A EN ISO 9712 Level 2 NTD INSPECTOR

İmkosan Kalite Kontrol Ticaret A.Ş.
Güzelyalı mh. Alinteri sk. No:4 (34903) Pendik / İstanbul
Tel: (0212) 289 02 89 (90-91) Faks: (0216) 392 82 79

Müşteriye TS EN ISO/IEC 17020 AB-0234-M

RADIOGRAPHIC EXAMINATION REPORT
RADYOGRAFİK MUAYENE RAPORU

Döküman No: F.008
Rev. No/Tarihi: 01/16.06.2021
Sayfa 1 / 1

CUSTOMER * *MÜŞTERİ*	TBT Tankbau Technik Basınçlı Kaplar Sanayi Tic. Ltd. Şti.	**EXAMINATION STANDARD *** *MUAYENE STANDARDI*	EN 17636-1 - CLASS B	**REPORT NUMBER** *RAPOR NUMARASI*	01003-22-IR
PROJECT * *PROJE*	TBT Projeleri	**ACCEPTANCE STANDARD *** *KABUL STANDARDI*	AD 2000 Code HP 5/3 - AD 2000 Code HP 5/3	**CONT. REF. NR** *TEKLİF REF. NO*	TN-2019-040
EXAMINATION AREA * *MUAYENE YERİ*	İkitelli	**PROCEDURE NUMBER** *PROSEDÜR NUMARASI*	P.131	**ACTIVITY NR** *FAALİYET NUMARASI*	1987
JOB NAME * *İŞ ADI*	ATW406-22061	**NDT PERCENTAGE *** *MUAYENE ORANI*	%25	**EXAMINATION DATE** *MUAYENE TARİHİ*	04.02.2022

TECHNICAL INFORMATIONS / *TEKNİK BİLGİLER*

MATERIAL / OBJECT * *MALZEME / CİSİM*	CS	**ISOTOPE SIZE** *İZOTOP BOYU*	3x2.2 mm	Source side of the object to film *Objenin enerji tarafı ile film mes.*	-
WAITING TIME FOR NDT (h)* */ NDT İÇİN BEKLEME SÜRESİ (saat)*					
PRODUCT FORM * *ÜRÜN FORMU*	**Welding / Kaynak** ~~Casting / Döküm~~ **Wrought / Dövme**	**AKTİVİTE** *ACTIVITY*	34.15 Ci	**EXPOSURE TIME** *POZ SÜRESİ*	110 sn
WELDING PROCESS * *KAYNAK PROSESİ*	~~N.A~~ ~~TIG~~ **GMAW** ~~SMAW~~ **SAW** ~~FCAW~~ ~~MCAW~~	**X ray FOCUS SIZE** *X Işını ODAK BOYU*	- mm²	**FILM TYPE & CLASS** *FİLM TİPİ& SINIF*	KODAK T200
WELDING JOINT TYPE * *KAYNAK BİRLEŞİM TİPİ*	~~N.A~~ **Butt Weld / Alın Kaynağı** ~~T-Butt Weld/ T-Alın Kaynağı~~ ~~Fillet Weld/Köşe Kaynağı~~	**VOLTAGE / AMPERE** *GERİLİM / AMPER*	- / -	**SCREEN (fs/bs)** *EKRAN (ön/arc)*	Pb (0.02mm)
HEAT TREATMENT * *ISIL İŞLEM*	~~After / Sonrası~~ **None / Yok** ~~Before / Öncesi~~	**SOURCE to OBJECT** *ENERJİ ile OBJE MES.*	-	**FILM(S) PER CASSETTE** *KASETTEKİ FİLM SAYISI*	1
SOURCE TYPE Sr, Nr *ENERJİ TİPİ & Seri No*	**Ir 192** ~~Se 75~~ ~~X Ray / X Işını~~	**SOURCE to FILM DIS.** *ENERJİ ile FİLM MES.*	60 cm	**TYPE IQI** *TİP IQI*	10 FE EN
PROCESS TECHNIC *PROSES TEKNİK*	**Manual / Elle** ~~Automatic / Otomatik~~	**IQI POSITION** *IQI POZİSYONU*	**Source / Enerji** ~~Film / Film~~	**EQUIPMENT SERIAL DBN** *CİHAZIN DBN*	RT 002 / D13570
TEST ARRG. *TEST DÜZENLEMESİ*	**7.1.2 (Fig.1) Single Wall-Single Image / Plaka** ~~7.1.8 (Fig.14) Double Wall-Single Image / Sarma Çekim~~ ~~7.1.7 (Fig.12) Double Wall-Double Image / Superimpoz~~		~~7.1.6 (Fig.11) Double Wall-Double Image / Elips~~ ~~7.1.4 (Fig.5) Single Wall-Single Image / Panoramik~~ ~~7.1.8 (Fig.17) Single Wall-Single Image / Köşe Kaynağı~~		

EXAMINATION INFORMATIONS / *MUAYENE BİLGİLERİ*

NO	MARKING NUMBER *MARKALAMA NUMARASI*	EXAMINED AREA *İNCELEME BOLG.*	WELDER *KAYNAKÇI*	REQ. IQI *İSTEN. IQI*	VIS. IQI *GORU. IQI*	DEN. *YOĞ.*	DIA *ÇAP*	BASE. THICK. *KAL.*	REIN.THI *TAK.*	TYPE OF DEFECT *HATA TİPİ*	RESULT *SONUÇ*	HATA A. *DEF.AREA*	REMARK *AÇIKLAMA*
1	ATW406-22061 C1	0-40	--	15	15	2.5		8 mm	--		ACC		
2	ATW406-22061 C1	40-80	--	15	15	2.5		8 mm	--		ACC		
3	ATW406-22061 C1	80-120	--	15	15	2.5		8 mm	--		ACC		
4	ATW406-22061 C1	120-0	--	15	15	2.9		8 mm	--		ACC		
5	ATW406-22061 C2	0-40	--	15	15	2.6		8 mm	--		ACC		
6	ATW406-22061 C2	40-80	--	15	15	2.6		8 mm	--	Aa	ACC		
7	ATW406-22061 C2	80-120	--	15	15	2.6		8 mm	--	Aa	ACC		
8	ATW406-22061 C2	120-0	--	15	15	2.7		8 mm	--		ACC		
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													

* **Önemli Not:** Muayene prosesi için müşteri tarafından sağlanan gerekli bilgiler,değerlendirme yapıldıktan sonra raporların düzenlenmesinde, Kaynak tamamlandıktan sonra NDT testleri için beklenme süresi çelikler için minumum 24 saat yüksek mukavemetli çelikler için minumum 48 saat ve üzeri olacaktır.

* *Important Note:* *The necessary information provided by the customer for the inspection process is transferred to the reports after verification. After the welding is completed, the waiting time for NDT tests will be a minimum of 24 hours for steels and a minimum of 48 hours or more for high strength steels*

TYPES OF DEFECT / *HATA TİPLERİ*

Aa 2011	**Porosity /** *Gözenek*	Ba 3012	**Slag Inclusion /** *Curuf Kalıntısı*	Db 402	**Incomplete Penetrat. /** *Yetersiz Nüfuziyet*	E 100	**Crack /** *Çatlak*	Ca	**Shrinkage /** *Çekinti*	ACC	**Accept /** *Kabul*
Ab 2016	**Wormholes /** *Kurt Oyığı*	Bb 3011	**Slag Line /** *Curuf Hattı*	Fa 504	**Excess Penetration /** *Fazla Nüfuziyet*	Si	**Misalligament /** *Eksen Kaçıklığı*	H	**Laps & Cold shuts /** *Soğuk Birleşme*	REJ	**Reject /** *Ret*
Ac 2013	**Group Porosity /** *Grup Gözenek*	C 401	**Lack of Fussion /** *Birleşme Noksanlığı*	Fb 514	**Poor Profile /** *Kötü Yüzey*	H 304	**Metal Inclusion** *Metal Enklüzyon*	G	**Hot Tears /** *Sıcak Yırtılma*	RS	**Rshoot /** *Yeniden*
Ad 2014	**Linear Porosity /** *Sıralı Gözenek*	Da 515	**Root Concavity /** *Kök Çukurluğu*	Fc 501	**Undercut /** *Yanma Oluğu*	Ff	**Film Defect /** *Film Hatası*	I	**Insert /** *Ekler*	EX	**Extra Film** *Ek Film*

10x12	10x16	10x24	10x36	10x48	İMKOSAN		CLIENT	AUTHORITY
					Muayeneyi Yapan / Sertifika No	Murat Alçı (İ) 0192/30/17/RT		
					Muayeneyi Onaylayan / Sertifika No	Gökhan Şimşek 0087/30/16		
				8.00	Gökhan ŞİMŞEK SNT - TOTA EN ISO 9712 Level 2 NDT INSPECTOR			
					Rapor Tarihi	07.02.2022		

ArcelorMittal Bremen GmbH
Postfach 210220
28222 BREMEN
Carl-Benz-Strasse 30
28237 BREMEN
Telefon 0421/6480
Telefax 0421/6482251

A02 CERTIFICATE

A03 Page: 01/ 03

20190038266-00

Test report 2.2 chem.+mech. EN 10204

A05 ORIGINATOR OF THE DOCUMENT
ArcelorMittal Bremen GmbH
Abnahme/Zeugnisschreibung
zeugnisse.bremen@arcelormittal.com
Telefon 0421/6482813

A09 DISPATCH NOTE **0000867390**
DATE 31.05.2019
SHIP
GOMERA

A08.1 MANUFACTURER'S ORDER NR **1944919**
DATE 18.04.2019
AGENCY'S ORDER NR. FH9ERIS001083

A07 CUSTOMER'S ORDER NUMBER
C190430HRCISK-BRE

A06.1 CUSTOMER
ArcelorMittal RZK Celik Servis Merk
Sanayi ve Ticaret A.S.
Levazim Mah. Zorlu Center A Blok T1
34340 Besiktas/Istanbul
Türkei

A06.2 CONSIGNEE
ArcelorMittal RZK CELIK SERVIS MERK
SAN. VE TIC. A.S.
Organize San.Böl.Büyük Tüysüz No:10
80950 Toprakkale
Türkei

PRODUCT: hot rolled unpickled coil QUALITY: **S235JR+AR** STANDARD: **EN 10025 (00-00-2004)**

TERMS OF DELIVERY: **EN 10051 (2010)**

JITZ 1.74

ArcelorMittal Bremen GmbH, Postfach 210220, 28222 BREMEN

ArcelorMittal RZK CELIK SERVIS MERK
SAN. VE TIC. A.S.
Organize San.Böl.Büyük Tüysüz No:10
80950 Toprakkale
Türkei

CE
06
0045

ArcelorMittal Bremen
Carl-Benz-Straße 30
D-28237 Bremen

0045-CPR-0527

hot rolled unpickled coil intended to be used in welded, bolted and riveted structures

Declaration of Performance(DoP)		
CE-QUALITY	**CE-STANDARD**	**DoP**
S235JR+AR	EN 10025-2:2004	HR00006_CPR2013-07-01_FC_V007

DoP-Link

http://dop.arcelormittal.net/pdf/HR00006_CPR2013-07-01_FC_V007_EN_TR.pdf

ArcelorMittal Bremen GmbH
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28222 BREMEN
Carl-Benz-Strasse 30
28237 BREMEN
Telefon 0421/6480
Telefax 0421/6482251

A02 CERTIFICATE

A03 Page: 02/ 03

20190038266-00

Test report 2.2 chem.+mech. EN 10204

A05 ORIGINATOR OF THE DOCUMENT
ArcelorMittal Bremen GmbH
Abnahme/Zeugnisschreibung
zeugnisse.bremen@arcelormittal.com
Telefon 0421/6482813

A09 DISPATCH NOTE **0000867390**
DATE 31.05.2019
SHIP
GOMERA

A08.1 MANUFACTURER'S ORDER NR **1944919**
DATE 18.04.2019
AGENCY'S ORDER NR. FH9ERIS001083

A07 CUSTOMER'S ORDER NUMBER
C190430HRCISK-BRE

A06.1 CUSTOMER
ArcelorMittal RZK Celik Servis Merk Sanayi ve Ticaret A.S.
Levazim Mah. Zorlu Center A Blok T1
34340 Besiktas/Istanbul
Türkei

A06.2 CONSIGNEE
ArcelorMittal RZK CELIK SERVIS MERK SAN. VE TIC. A.S.
Organize San.Böl.Büyük Tüysüz No:10
80950 Toprakkale
Türkei

PRODUCT: hot rolled unpickled coil QUALITY: **S235JR+AR** STANDARD: **EN 10025 (00-00-2004)**

TERMS OF DELIVERY: **EN 10051 (2010)**

JITZ 1.74

A08.2 ITEM	B09 THICKNES mm	B10 WIDTH mm
83	5.00	1500.00

A08.2 ITEM	B07.1 COILNO	B07.1 PART	B13 WEIGHT kg	B07.2 HEAT	CHEMICAL ANALYSIS C71 C %	C73 Si %	C72 Mn %	C74 P %	C75 S %	C81 Cu %	C77 Al %	C76 N %	C83 B %	C84 V %	C78 Ti %	C82 Nb %	C79 Cr %	C80 Ni %	C85 Mo %	As %	Sn %
83	**300845**	00000	17880	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300846	00000	17750	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300847	00000	17780	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300848	00000	17750	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300849	00000	17830	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300850	00000	17840	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	300851	00000	18140	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	300852	00000	18200	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	300854	00000	17960	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	300855	00000	18310	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	327955	00000	15910	**063213**	.1687	.0101	.3837	.0115	.0093	.0256	.0369	.0048	.0001	.0019	.0009	.0002	.0395	.0345	.0052	.0014	.0015
	327956	00000	15890	**063213**	.1687	.0101	.3837	.0115	.0093	.0256	.0369	.0048	.0001	.0019	.0009	.0002	.0395	.0345	.0052	.0014	.0015
	327957	00000	15940	**063213**	.1687	.0101	.3837	.0115	.0093	.0256	.0369	.0048	.0001	.0019	.0009	.0002	.0395	.0345	.0052	.0014	.0015
	327962	00000	17630	**063212**	.1572	.0169	.3806	.0111	.0033	.0282	.0334	.0054	.0001	.0023	.0011	.0003	.0383	.0349	.0041	.0017	.0016
	923830	00000	18200	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	15		263010																		
TOTAL	15		263010																		

A08.2 ITEM	B07.1 COILNO	B07.1 PART	B13 WEIGHT kg	B07.2 HEAT	TENSILE TEST C02 PR °	C04 MAZ	C03 Temp °C	C11 yield p. Re MPa	C12 strength Rm MPa	C13 A55mm %
83	**300845**	00000	17880	**062980**	90	F	20	275	425	34.5

C02 test direction
relating to rolling direction (0°= L; 90°= T)

C04 specimen condition
V:aged F:fresh N:normalised

ArcelorMittal Bremen GmbH
Postfach 210220
28222 BREMEN
Carl-Benz-Strasse 30
28237 BREMEN
Telefon 0421/6480
Telefax 0421/6482251

A02 CERTIFICATE

A03 Page: 03/ 03

20190038266-00

Test report 2.2 chem.+mech. EN 10204

A05 ORIGINATOR OF THE DOCUMENT
ArcelorMittal Bremen GmbH
Abnahme/Zeugnisschreibung
zeugnisse.bremen@arcelormittal.com
Telefon 0421/6482813

A09 DISPATCH NOTE **0000867390**
DATE 31.05.2019
SHIP
GOMERA

A08.1 MANUFACTURER'S ORDER NR **1944919**
DATE 18.04.2019
AGENCY'S ORDER NR. FH9ERIS001083

A07 CUSTOMER'S ORDER NUMBER
C190430HRCISK-BRE

A06.1 CUSTOMER
ArcelorMittal RZK Celik Servis Merk
Sanayi ve Ticaret A.S.
Levazim Mah. Zorlu Center A Blok T1
34340 Besiktas/Istanbul
Türkei

A06.2 CONSIGNEE
ArcelorMittal RZK CELIK SERVIS MERK
SAN. VE TIC. A.S.
Organize San.Böl.Büyük Tüysüz No:10
80950 Toprakkale
Türkei

PRODUCT: hot rolled unpickled coil QUALITY: **S235JR+AR** STANDARD: **EN 10025 (00-00-2004)**

TERMS OF DELIVERY: **EN 10051 (2010)**

JITZ 1.74

A08.2 ITEM	B09 THICKNES mm	B10 WIDTH mm
83	5.00	1500.00

A08.2 ITEM	B07.1 COILNO	B07.1 PART	B13 WEIGHT kg	B07.2 HEAT	TENSILE TEST C02 PR °	C04 MAZ	C03 Temp °C	C11 yield p. Re MPa	C12 strength Rm MPa	C13 A55mm %
83	**300846**	00000	17750	**062980**	90	F	20	275	427	34.5
	300847	00000	17780	**062980**	90	F	20	274	425	34.5
	300848	00000	17750	**062980**	90	F	20	279	429	34.5
	300849	00000	17830	**062980**	90	F	20	280	428	34.5
	300850	00000	17840	**062984**	90	F	20	279	427	34.5
	300851	00000	18140	**062984**	90	F	20	278	426	35
	300852	00000	18200	**062984**	90	F	20	279	427	35
	300854	00000	17960	**062984**	90	F	20	277	425	34.5
	300855	00000	18310	**062984**	90	F	20	276	424	34.5
	327955	00000	15910	**063213**	90	F	20	288	436	33.5
	327956	00000	15890	**063213**	90	F	20	284	432	33.5
	327957	00000	15940	**063213**	90	F	20	290	436	33.5
	327962	00000	17630	**063212**	90	F	20	277	425	34.5
	923830	00000	18200	**062984**	90	F	20	276	424	34.5
	15		263010							
TOTAL	15		263010							

We certify hereby that the delivery complies with the above mentioned specification.

BREMEN 31.05.2019

QUALITY DEPARTMENT
SITE EXPERT FOR INSPECTION
Kramer

Andreas Kramer

C02 test direction
relating to rolling direction (0°= L; 90°= T)

C04 specimen condition
V:aged F:fresh N:normalised

INSPECTION CERTIFICATE — NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

A02 — N° 730/0532263 — Page 1 / FIN — A09/A03

ArcelorMittal
ARCELORMITTAL MEDITERRANEE Site de FOS
13776 FOS SUR MER CEDEX - FRANCE
T:+33(0)44247-3314 F:+33(0)44247-3231
E: un.scu(a)arcelormittal.com

Sigle du producteur / Mill's identification: **FOS**

T Re=265 MINI MPA Rm=410 -530 MPA A%(5,65)=22 MINI
T Re=265 MINI MPA Rm=410 -530 MPA A%(5,65)=22 MINI
KV T - 20dgC 19 J MINI/IND 27 J MINI/MOY
(5) B03

CSC: Conforme cahier charges / According specifications
BL : Brut de laminage / As rolled
LN : Laminage normalisant / Normalisation rolling
R : Revenu / Tempering
TE : Trempé à l'eau / Water quenching
LTC : Laminé temp. contrôlée / Control rolling
TM : Laminage thermomécanique / Thermo-mechanical forming
N : Normalisé / Normalising
D : Détensionné / Stress relieving
O : Adouci par recuit / Soft annealing
(1)

Organisme et/ou service de contrôle Inspection organism	Client et/ou destinataire Customer and/or consignee	N° Commande Courtier/Client Customer's Order Nbr	N° Commande Usine Mill's Order Nbr	Nuances et spécifications techniques / Grade and technical specifications	Etat de livraison (1) Delivery condition
RECEPTION USINE A05	A06	C180701RZKHRCAUG A07	FH8HFRZ001 000019 A08	P265GH+N EN10028-2/2009 HOT ROLLED COIL, AS ROLLED B01 B02	LTC B04

Traitement de référence / Treatment of test samples (1): BL_N B05

Identification du produit / Product identification		Poste / Item	Nombre de pièces / Number of pieces	Dimensions / Sizes (mm)			Masse / Weight	Emplacement				Traction / Tensile requirements							Emplacement	Résilience / Impact testing								
Repère pièce / Plate number	Coulée / Heat			Epaisseur / Thickness	Largeur / Width	Longueur / Length	(kg) (7)	Loc (2)	S (3)	Pos Z(4)	Type	Réf Ref (5)	Temp.	ReEH	Rm	A%				Loc (2)	Réf Ref	Type	S (3)	Temp.	Pos. Z(4)	Valeurs individuelles / Individual values			Moyenne / Average
B07	B07	A07	B08	B09	B10	B11	B13	C01	C02	C082	C10		C03	C11	C12	C13	<-C14-C29		C60-C59->	C01		C40	C02	C08	C62	<- - -C42- - - ->			C43
7504017	730810340	001	1	5,000	1500,00		17760	1	T	P	PRISM	BL	20	387	472	34,3				1	BL	KV	T	- 20	P	63	61	59	61
								1	T	P	PRISM	N	20	322	439	36,7													

AC:C =0,20 MAXI MN=0,80 -1,40 P =0,025 MAXI S =0,010 MAXI SI=0,40 MAXI AL=0,020 MINI CU=0,30 MAXI NI=0,30 MAXI CR=0,30 MAXI NB=0,020 MAXI V =0,02 MAXI
TI=0,03 MAXI MO=0,08 MAXI N =0,012 MAXI CBN13=CU+NI+CR+MO =0,70 MAXI CBN39=AL/N =2,0 MINI

Meth. (6) of steel making	Repère Pièce / Plate number	N° Coulée / Heat number	* Analyse sur produit / Check analysis																								
			C%	Mn%	P%	S%	Si%	AL%	CR%	CU%	MO%	N %	NB%	NI%	TI%	V %						CBN13	CBN39				
C70/93	B07	B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91	C92	C96	C97	
O/YCC		730810340	0,15	0,97	0,011	0,004	0,02	0,035	0,02	0,02	0,01	0,003	0,000	0,02	0,02	0,00						0,06	10,1				

Emplacement/Location (2): 1 Tête / Head; 2 Pied / Bottom; 3 1/2 longueur / Length; X:Divers / Mix — C01

(3) Sens/Direction: L:Long / Longitudinal; T:Travers / Transverse; Z:Travers court / Through thick — C02

(4) Position: C:Coeur / Core sample; P:Peau / Rolled surface; D:1/3 Epais. / Thickness; Q:1/4 Epais. / Thickness; F:1/5 Epais. / Thickness; K:Divers / Mix — C62

(6)Mode élab Meth Coulée: T: Thomas M: Martin E: Electrique / Electric OIY: Oxy.put / Basic oxyg. CC: Coulée Continue / Continuous casting — C70/93

(7) Masse et nb pieces a titre indicatif. Mass and quantity of pieces as a rough guide

We hereby certify that the above cited shipment was produced according to the technical specifications of the contract and that, with inspection and tests completed, it meets those specifications as well as all norms and standards referred to in the contract.

Contrôle de marquage, d'aspect et de dimensions : satisfaisants
Inspection of markings, surface, sizes : satisfactory — D01

Date 31/08/18
Agent / Receiving Agent
F. SIXDENIERS — Z02

243

EREĞLİ DEMİR ve ÇELİK FABRİKALARI T.A.Ş.
OUTSTANDING CAPITAL : 3.500.000.000 TL
PRODUCTION PLANT : ISDEMIR

TEST CERTIFICATE
EN 10204 : 2004 TYPE 3.1

DATE :10/06/2020
CERTIFICATE NO :00741401
PAGE NO : 1

CUSTOMER :
ORDER NO :08433278006
DIMENSIONS, mm : 8.000 X 2000 X C
STANDARD & GRADE :EN 10028-2-2017 P265GH (ERDEMİR 6341)
PRODUCT TYPE & DEFINITION :RKK:HOT ROLLED, MILL EDGE COIL

CERTIFIED ACC. TO PED 2014/68/EU (2016/07/19) NUMBER 2195

PRODUCT INFORMATIONS					MECHANICAL PROPERTIES														CHEMICAL COMPOSITION, CAST ANALYSIS %									
TICKET NO	WEIGHT (MT)	HEAT NO	COIL or PLATE NO	P.S or P.P	SAM POS	TENSILE TEST YIELD STRENGTH N/MM2	TENSILE N/MM2	% EL A5	BEND TEST	Ag or BH VAL.	r VAL.	Y/T or n VAL.	HARD NESS	IMPACT TEST, joule POSITION : T 1	2	3	AVR	TEM 'C	HIGH TEMP 'C YIELD N/MM2	C %	MN %	P %	S %	SI %	AL %	CU %	CR %	NI %	MO %	CEQ %
																				V %	NB %	TI %	N PPM						
0350707860	28,090	20112326	1205579060000		TT	322.6	483.5	33						48	49	44	47	-20		0.152	1.060	0.010	0.006	0.185	0.052	0.066	0.027	0.053	0.000	0.343
																				0.003	0.002	0.003	42						
0350707861	28,410	20112326	2205579070000		TT	322.6	486.4	32						60	45	44	50	-20		0.152	1.060	0.010	0.006	0.185	0.052	0.066	0.027	0.053	0.000	0.343
																				0.003	0.002	0.003	42						
0350707865	28,360	20334719	1205579040000		TT	314.8	482.5	36						56	59	67	61	-20		0.150	1.066	0.014	0.005	0.213	0.050	0.045	0.028	0.041	0.000	0.340
																				0.003	0.001	0.001	38						

WE(THE MANUFACTURER) HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN MADE BY THE BASIC OXYGEN PROCESS AND TESTED IN ACCORDANCE WITH THE RULES OF EN 10028-2-2017 P265GH (ERDEMİR 6341) WITH SATISFACTORY RESULTS.

EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş. METALURJİ LABORATUVARI

İBRAHİM AKDÜMBEK
ENGINEER OF METALLURGICAL LABORATUARY

EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş. KALİTE METALURJİ

SERKAN DİKEÇ
QUALITY METALLURGY MANAGER

ERDEMİR

NOTE: T.Top, M:Middle, E:End, T:Transverse, L:Longitudinal, P.S:Piece of Slice, P.P:Piece of Plate
MERSIS Number(İstanbul Head Office): 0352-0006-4260-0020; Trade Registry Number(İstanbul Department): 90659; Trade Registry Number(Ereğli Department):1574/272
Head Office: İstanbul: Barbaros Mah. Ardıç Sok. No: 6 34746 Ataşehir İSTANBUL - TURKEY
www.erdemir.com.tr

MILL'S TEST CERTIFICATE

A 04

Çolakoğlu Metalurji

A 02

THE INSPECTION CERTIFICATE AS PER EN 10204 CLAUSE 3.1 CONFORMING TO THE DEFINITION IN EN 10168.

A 03

DOCUMENT NO : 0000022751
ISSUE DATE : 13.08.2017
PAGE : 1/ 1

A 01

Rüzgarlıbahçe Mahallesi Kavak Sokak No:16 Kat:5
34805 Kavacık - Beykoz / İstanbul

A 06

CUSTOMER : SAMİ SOYBAŞ DEMİR

A 07

ORDER NO : 12820/000340
PURCHASER :

A 08

MANUFACTURER : ÇOLAKOĞLU METALURJİ A.Ş.

B 01

PRODUCT: HOT ROLLED COILS | STANDARD OF ASSESEMENT OF CONFORMITY: EN 10025-1 | STANDARD OF GRADE OF PRODUCT: EN 10025-2 | DIMENSION CONTROL STANDARD: EN 10051

TEST RESULTS

DESCRIPTION OF DELIVERY						MECHANICAL PROPERTIES						CHEMICAL COMPOSITION (LADLE ANALYSIS) (%)														
B 06	B 07	B 02	B 09	B 11	B 13	C 11	C 12	C 13	C 50	C 32	C 43	C 71	C 72	C 73	C 74	C 75	C 76	C 77	C 78	C 79	C 80	C 81	C 82	C 83	C 84	C 93
Coil No	Heat No	Grade	Thick ness mm	Width mm	Weight Kg	Yield Strength N/mm2	Tensile Strength N/mm2	Elonga- tion %	Bend Test	Typeof Piece	Impact Energy Joule	%C	%Mn	%Si	%P	%S	%Cr	%Ni	%Cu	%Al	%V	%Mo	%Nb	%Ti	%N	%Ceq
G055467000	GG46111	S235JR	8.00	1500	25000	314.00	454.00	30.00	OK		0.00	0.15	0.58	0.19	0.020	0.006	0.02	0.00	0.01	0.038	0.001	0.001	0.000	0.002	0.002	0.25
G055755000	GG46108	S235JR	8.00	1500	25100	320.00	452.00	30.50	OK		0.00	0.15	0.56	0.18	0.016	0.008	0.02	0.00	0.01	0.043	0.000	0.001	0.000	0.001	0.003	0.25
G056362000	GG24826	S235JR	10.00	1500	25150	316.00	458.00	30.20	OK		0.00	0.15	0.59	0.18	0.012	0.006	0.02	0.00	0.01	0.048	0.000	0.001	0.000	0.001	0.003	0.25

Ceq : C + Mn / 6 + (Cr + V+ Mo) / 5 + (Cu + Ni) / 15

Z 04

CE
0620-CPD-58521

Z 01

CE MARKING FPC CERTIFICATE NUMBER : 0620-CPD-58521/01

WE HEREBY CERTIFY THAT THE MATERIAL HAS BEEN MADE AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND ALSO WITH THE REQUIREMENTS CALLED FOR BY THE ABOVE ORDER

Z 02

APPROVED BY
QUALITY MANAGER
RIFKI ERSOY

EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş.

ÇIKARILMIŞ SERMAYE : 3.500.000.000 TL

ÜRETİM YERİ : ERDEMİR
MÜŞTERİ ADI : MERCAN SAÇ PROFİL OTOMOTİV YAN SAN.VE TİC.A.Ş.
SİPARİŞ NO : 08233243010
EBAD , mm : 50 X 2500 X 7500 mm
STANDART ve KALİTESİ : EN 10028-2-2017 P355GH (ERDEMİR 6352)
ÜRÜN TİPİ ve AÇIKLAMASI : LKK : KENARLARI KESİLMEMİŞ, LEVHA
ŞARTNAME NO : 20080082388
LOT NO :

T E S T S E R T İ F İ K A S I

EN 10204 : 2004 TİP 3.1

CE 2195

CERTIFIED ACC TO PED 2014/68/EU (2016/07/19) NOTIFIED BODY NUMBER 2195

TARİH : 20/02/2021
SERTİFİKA NO : 21Y000027332
SAYFA NO : 1 / 1

YÜZEY KALİTESİ KONTROL STANDARDI : EN 10163 CLASS B SUBCLASS 3
ULTRASONİK TEST STANDARDI : EN 10160 CLASS / S1E1

ÜRÜN BİLGİLERİ						MEKANİK ÖZELLİKLER																										
						ÇEKME TESTİ							SERTLIK_ORT	°C	KATLAMA	DARBE TESTİ (J)					DARBE KIRILMA YÜZEYİ (%)					DWTT(%)				
									% UZAMA						KMÇ															
ETİKET NO	TONAJ (KG)	DÖKÜM NO	BOBİN NO / PAKET NO / LEVHA NO	DİLİM ADEDİ	NORMALIZE DURUMU	NUMUNE YERİ YÖNÜ	AKMA N/MM2	CEKME N/MM2	A5	AKMA_CEKME_ORAN	% Ag	n-90		Y.SIC. AKMA N/MM2	AÇI	SICAKLIK °C	1	2	3	ORT	SICAKLIK °C	1	2	3	ORT	SICAKLIK °C	1	2	ORT
1210203161679	7,710	110013	1023000237L010	1	NMZ																								
			11001320700110			BE	369	574	27.2							-20	132	130	125	129									

AE AÇIKLAMALAR

Pcm=C+Si/30+Mn/20+Cu/20+Ni/60+Cr/20+Mo/15+V/10+5B
IIW/Ceq=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15 Ceq=C+Mn/6
Ceq=C+(Mn+Si)/6
UCS: 230C*+190S+75P+45Nb-12.3Si-5.4Mn–1
AE1: Nb+V+Ti AE2: Cu+Cr+Ni
AE3: Cr+Cu+Mo+Ni AE4: Cr+Mo+Ni
AE5: Al/N AE6: Cu+Ni
AE7: P+S AE8: Si+2.5P
AE9: Ti/N AE10: Ti/B
AE11: Mn/Si AE12: Cu+Ni+Cr+Mo+V
AE13: Mo+Cr AE14: Cr+Cu+Mo
AE15: Nb+V AE16: Nb+V+Ti+B
AE17: Nb+Ti AE18: C+P
AE19: Mn+Cr+Mo AE20: Mn/C
AE21: 3.4N + 1.5S AE22: Al+Si
AE23: Mn+Si AE24: Cu+Ni+Mo

AE25: C + (Mn/5) + (5*P)-(Ni/10)-(Mo/15)+(Cu/10) (Segregasyon Endeksi)

KİMYASAL BİLEŞİM , DÖKÜM ANALİZİ

DÖKÜM NO	C	Mn	P	S	Si	Al	Cu	Cr	Ni	Mo	V	Nb	Ti	N	Pcm	Ceq(IIW)	AE3	AE5
	%	%	%	%	%	%	%	%	%	%	%	%	%	ppm	%	%	%	%
110013	0,213	1,554	0,012	0,003	0,459	0,036	0,032	0,031	0,038	0,001	0,007	0,000	0,004	51	0,314	0,484	0,102	7,059

EREĞLİ DEMİR ve ÇELİK FABRİKALARI T.A.Ş. BU MALZEMENİN BAZİK OKSİJEN METODU İLE YAPILMIŞ OLDUĞUNU VE EN 10028-2-2017 P355GH (ERDEMİR 6352)

KAİDELERİNE UYGUN OLARAK TEST EDİLDİĞİNİ YUKARIDAKİ DEĞERLERİ İLE TEVSİK EDER .

SERKAN DİKEÇ
KALİTE METALURJİ MÜDÜRÜ

KAAN TANRIÖVER
METALURJİ LABORATUVARI BAŞMÜHENDİSİ

NOT: B : Baştan , O : Ortadan , S : Sondan , E : Enine , L : Boyuna, KMÇ: Katlama Mandrel Çapı
Bu test sertifikası, EN 10204 : 2004 Bölüm 5'e göre uygun bir veri işleme sistemi tarafından hazırlanmış ve imza olmadan geçerlidir.
NMZ : NORMALIZE YAPILMIŞTIR, NR : NORMALIZEYE ESDEGER HADDELENMISTIR. DARBE NUMUNE EBATLARI, KALINLIK ARALIĞINA GÖRE t≥6-8 MM / 8 ≤ t < 10 MM / t≥10 MM, NUMUNE ÖLÇÜLERİ, KALINLIĞA BAĞLI 10X5X55 / 10X7,5X55 / 10X10X55 MM

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 证书 | 인증서

TÜV AUSTRIA

EU-Baumusterprüfbescheinigung
EU-type examination certificate

Modul B: EU-Baumusterprüfung (Entwurfsmuster) nach Richtlinie 2014/68/EU
Module B: EU-type examination - design type according to Directive 2014/68/EU

Bescheinigung Nr.: 2022 - TURK – 173-20-IS-0322
Certificate No.:

Hersteller / *manufacturer:*
TANKBAU TECHNİK Basınçlı Kaplar San. Tic.Ltd.Şti.
IOSB Pik Dökümcüler San. Sit. B1 Blok No:6,
Başakşehir – ISTANBUL / TURKIYE

Hiermit wird bescheinigt, dass die Ergebnisse der an dem unten genannten Druckgerät vorgenommenen Prüfungen die Anforderungen der Richtlinie 2014/68/EU erfüllen.
This is to certify that the results of the examination of the pressure equipment mentioned below meet the requirements of the directive 2014/68/EU.

Diese Bescheinigung ist gültig bis zum 17.1.2032
This certificate is valid through 17 Jan 2032

Objekt: *Object:*	Druckbehälter / *pressure vessel*
Benennung: *Description:*	DN406, 205 Lt. Pressure vessel tank with max. 11 bar working pressure
Inspektionsbericht Nr.: *Inspection report no.:*	20-IS-0322-2022-PED-YT-026

İstanbul	17.01.2022	Hakim ÖZLÜK
Ort *place:*	**Datum** *date:*	**Freigegeben durch** *approved by*

TÜV AUSTRIA SERVICES GMBH

TÜV AUSTRIA SERVICES GMBH
Notifizierte Stelle/Notified Body 0408

Deutschstraße 10
1230 Wien / Österreich
Tel. +43 (0)5 0454
E-Mail: ine-austria@tuv.at

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 证书 | 인증서

TÜV AUSTRIA

Konformitätsbescheinigung
Certificate of Conformity

Modul F / *module F*

Konformität mit der Bauart auf der Grundlage einer Prüfung der Druckgeräte

Conformity to type based on pressure equipment verification

gemäß Richtlinie 2014/68/EU / *according to Directive 2014/68/EU*

Bescheinigung Nr.: / *Certificate No.:* PED-0504-2022-TURK-175-20-IS-0322

Hersteller / ***manufacturer:***
TANKBAU Technik Basınçlı Kaplar San. Tic. Ltd.Şti. .

Fertigungsstätte / ***place of manufacture:***
IOSB Pik Dökümcüler San. Sit. B1 Blok No:6
Başakşehir İstanbul/TURKIYE

Hiermit wird bescheinigt, dass die Ergebnisse der an dem unten genannten Objekt vorgenommenen Prüfungen die Anforderungen der Richtlinie 2014/68/EU erfüllen. Das Objekt ist mit der abgebildeten Kennzeichnung versehen:
This is to certify that the results of the examination of the object mentioned below meet the requirements of the directive 2014/68/EU. The object carries the marking as illustrated:

CE 0408

Objekt: *object:*	Druckbehälter / *pressure vessel*		
Benennung: *designation:*	DN406, 205 Lt. Pressure vessel tank with max. 11 bar working pressure		
Fabrik Nr.: *serial no.:*	22061, 22062	Baujahr: *year of manufacture:*	2022
Inspektionsbericht Nr.: *inspection report no.:*	20-IS-0322-2021-PED-IR-2206162		

İstanbul
Ort / ***place:***

15.02.2022
Datum / ***date:***

Hakim ÖZLÜK
TÜV AUSTRIA SERVICES GmbH
Notifizierte Stelle 0408
Notified Body 0408

Deutschstraße 10
1230 Wien / Österreich
Tel: +43 (0)5 0454
E-Mail: ine-austria@tuv.at

Declaration of conformity

according to Directive 2014/68/EU

for a pressure equipment

THE MANUFACTURER

TANKBAU TECHNİK BASINCLI KAPLAR SAN VE TIC LTD STI
BASINCLI KAPLAR SAN VE TIC LTD STI
Pik Dökümcüler sanayi sitesi B1 - No. 6
İkitelli İstanbul

herewith declares, that the pressure equipment

Description:	**Pressure Vessel**
Year of manufacture:	**2022**
Type-, serial, identification-No:	**ATW 406, 22062**
Chamber designation:	**Air Tank**
max. allowable pressure PS:	**11**
allowable max./min. temperature TS:	**-10 / +230**
Volume V / Diameter DN:	**V = 205 L**
Test pressure PT:	**18,78 bar**
Date of pressure test:	**02.2022**
Pressure test medium:	**water**

complies with the requirements of the Pressure Equipment Directive 2014/68/EU

Applied conformity assessment procedures:	Category III Module B + F
Applied standards and technical specifications:	AD Merkblatt 2000
The Pressure device is labeled with the identifier:	CE 0408
Engaged notified bodies /	
B Module Certificate Nr.	2022-TURK-173-20-IS-0322
F Module Certificate Nr.	PED-0504-2022-TURK-175-20-IS-0322
Examination / inspections / test during manufacturing:	TÜV AUSTRIA Service Gmbh Deutschstraße 10, 1230 Wien / Österreich, Tel:+43 (0)5 0454 e-mail: ine-austria@tuv.at

Location / date : İstanbul - 11.02.2022

Signature / stamp : Metehan YILMAZLAR / Mechanical Engineer

TBT TANKBAU TECHNİK
Basınçlı Kaplar San. Tic. Ltd. Şti.
İOSB Pik Dök.San. Sitesi B1-Blok No:6 Başakşehir-İST.
Tel.:+90(0)212 486 2607 Faks:+90(0)212 486 26 08
www.tankbautec.com.tr info@tankbautec.com.tr
İkitelli V.D. : 8200316568 Tic.Sic.No:875804

Operating Instructions

in accordance with 2014/68/EC for pressure device

Edition: Prepare by: Revision: 00 Page:1/1

manufacturer: Tankbau Technik
Website: www.tankbautec.com.tr

1. Type	**ATW 406**	**2. Charge material (fluid*)**	**Group of fluid 2**
3. Volume (V)	**205 L**	**4. Year of construction**	**2022**
5. Max. permissible pressure (PS)	**0…11bar**	**6. Category**	**III**
7. Test pressure (TP)	**18,78 bar**	**8. Date of first pressure test**	**09.02.2022**
9. Corrosion allowance	**1mm**	**10. min./max. permissible temp.(TS)**	**-10 / 230 °C**
11. Permissible location	**inside**	**12. Empty weight**	**135,5 kg**
13. Quantity and type of the fastening elements	**4 anchor bolts**		

14. Permissible startups / shutdown in acc. to AD 2000 – S1, edition 10/00 (endurance)

Min. pressure of pressure deviation range	Max. pressure of pressure deviation range	Max. permissible startups / shutdown
0 bar	16bar	14600

This pressure vessel was manufactured and delivered as individual component by manufacturer according to the manufacturer's own design specifications and based on the operating conditions of the purchaser without safety devices.
The pressure vessel may be used only within the scope of the technical data mentioned above. Any other use is prohibited for safety reasons. This applies in particular to the underlying pressure force and the correspondent stress gradient.

It is the responsibility of the provider to create an operation manuel for the supplied pressure equipment as a component of the complete system in the respective official language of the country of destination.

1.) Installation instructions

- The pressure device (as a single item) is usually delivered on a wooden pallet. This pallet is only a packaging for secure transportation and storage and has to be removed before use of the pressure device. In case of any further packaging this has to be removed too.
- Those attached to the vessel loadbearing points are suitable for loading, unloading, Transportation and installation and must be used.
- **This pressure vessel may only be installed according to the purchaser's specifications. Pressure devices that are only designed for installation in buildings (see 11. above) may not be installed outdoors**.
- The device must be installed in a way that the flange connections, fixtures, measuring points and inspection apertures are unobstructed and accesible.
- During assembly, it is to be ensured that the components are correctly assembled. In the case of flanged joints, special attention shout be paid to the size, pressure stage and quantity / quality of the screwed connections used.
- **The device must be mounted without tension and vertically or horizontally on the mounting elements provided for this purpose. When erecting in free spaces, the pressure device shout be additionally secured due to the inscreased loads (see under 13.).**
- **If the delivered pressure device is a portable vessel, the operator has to take convenient steps against rolling away**.
- No additional force may be applied to the vessel walls via the mounting elements.
- Vibration and corrosion on the vessel coming from the outside are to be prevented by suitable measures.
- **In order to protect the vessel against damage from external forces, a collision protection must be provided**.
- Welding and heat treatment of the pressure-bearing walls of the vessel are prohibited.
- **The filter of the construction have to be provided adequate means for protection for hot surfaces if the max. temperature is above 50℃.**
- **It is the responsibility of the operator to ensure that the specific temperatures, especially in case of permitted outdoor installation, are not exceeded.**

2.) Commissioning

- In order to prevent the threshold values (see above) from beeing exceeded, the pressure device has to be equipped with suitable safety devices.
- These safety devices, such as equipment for pressure limitation, safety valves and equipment for temperature control are not included in the scope of delivery by the manufacturer named above.
- The safety devices must be installed on the tank by authorized personnel.
- Misuse is forbidden.
- The documents should be kept by the responsible personel for future reference.
- The periodical inspection of the tank is to be carried out according to the relevant local legislation.

TANKBAU TECHNİK Basınçlı Kaplar San. Tic. Ltd. Şti.
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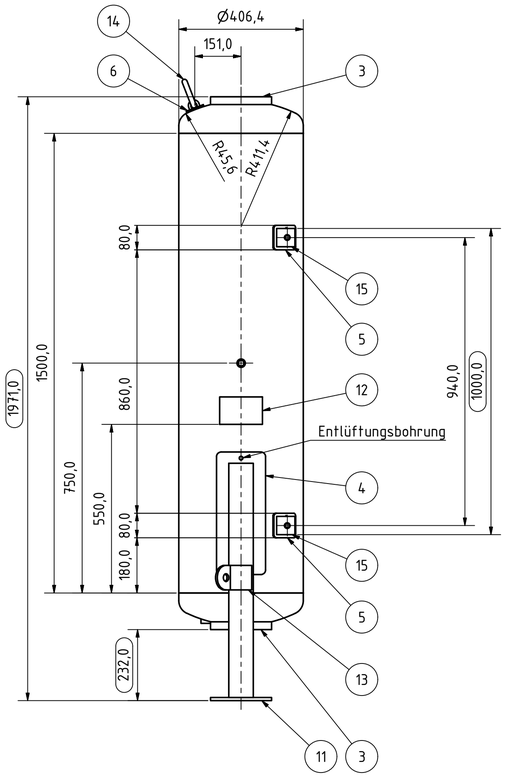
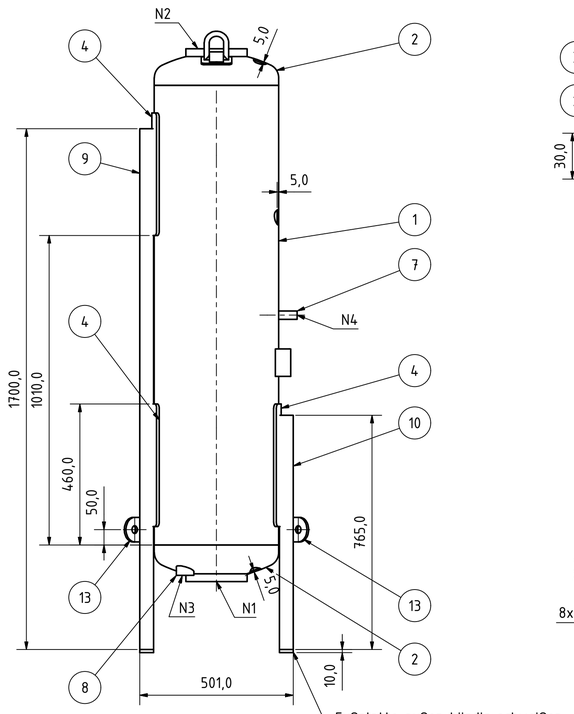
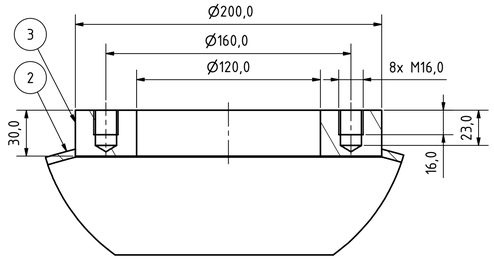
www.tankbautec.com.tr info@tankbautec.com.tr
İkitelli V.D.: 8200316659 Tic.Sic.No:875804

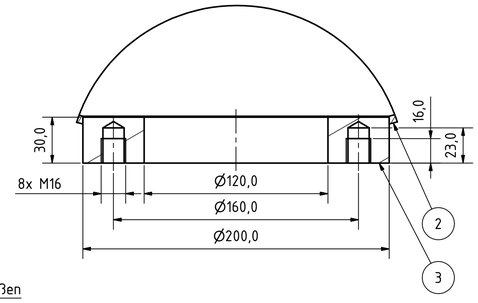




Detail Blockflansch oben (1 : 2)

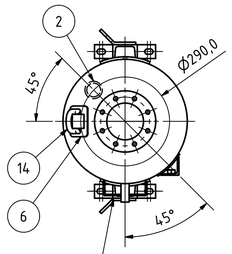


Detail Blockflansch unten (1 : 2)



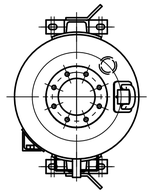
BAUTEILLISTE					
OBJEKT	ANZAHL	BESCHREIBUNG	NORM	MATERIAL	AD-MERK
1	1	Mantel Ø406.4×1500×5	DIN EN 10028-2	P265GH	3.1/W1
2	2	Klöpperboden Ø406.4×5	DIN 28011	P265GH	3.1/W1
3	2	Blockflansch DN80 PN16 (Bohrung Ø120)	DIN 28117	P250GH	3.1/W1
4	3	Verstärkungsblech 400×160×8	DIN EN 10028-2	P265GH	3.1/W1
5	2	Verstärkungsblech 100×80×5	DIN EN 10028-2	P265GH	3.1/W1
6	1	Verstärkungsblech 100×60×5	DIN EN 10028-2	P265GH	3.1/W1
7	1	Manometermuffe G1/2	DIN EN 10241	P235GH-TC1	3.1/W4
8	1	Muffe G1 1/2	DIN EN 10241	P235GH-TC1	3.1/W4
9	1	U-Profil U80 - L=1700	DIN 1026-1	S235JRG2	
10	1	U-Profil U80 - L=765	DIN 1026-1	S235JRG2	
11	2	Fußplatte 200×45×10		S235JRG2	
12	1	Typenschildbrücke für Tankbau Typenschild		S235JRG2	
13	2	Transportlasche 130×80×8 Bohrung Ø25		S235JRG2	
14	1	Tragöse VLBS 2.5U	Beistellung Everair	Stahl	
15	2	Winkel 60x60x5 - L=60	DIN EN 10056-1	S235JRG2	
16	2	Sechskantmutter M16	DIN 934	Stahl vz 5.2	

Behälter I

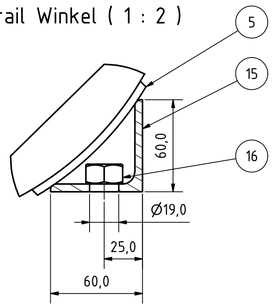


Transportlasche mit der Rundung am Rand vom U-Profil schweißen

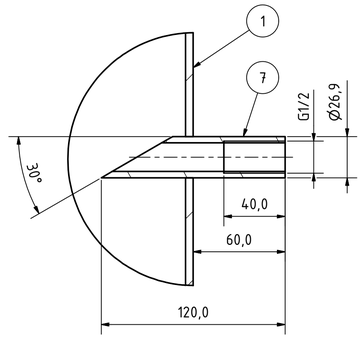
Behälter II
(spiegelbildlich)



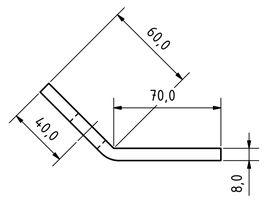
Detail Winkel (1 : 2)



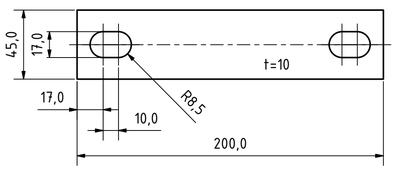
Detail Manometermuffe (1 : 2)

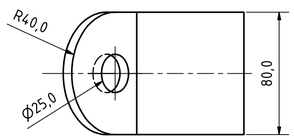


Detail Transportlasche (1 : 2)

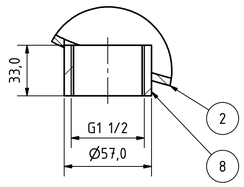


Detail Fußplatte (1 : 2)



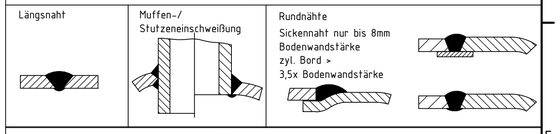


Detail Muffe (1 : 2)



Stutzentabelle / Nozzle				
Stutzen nozzle	Nennweite size	Nenndruck rating	DIN standard	Beschreibung description
N1	DN80	PN16	DIN 28117	Einritt
N2	DN80	PN16	DIN 28117	Austritt
N3	G 1 1/2		DIN EN 10241	Entleerung
N4	G 1/2		DIN EN 10241	Manometer

Nahtformen



Schweißverfahren

gültige Verfahrensprüfung nach AD2000
regelmäßige Prüfung durch die benannte Stelle
alle unbemaßten Schweißnähte: 3mm< a < 0,7s
Anschweißteile sind umlaufend zu verschweißen
beidseitig schweißen, wenn möglich

Material

Mantel/Böden	: P265GH, 3.1/AD200-W1, EN 10028-2:2003
	: Böden, DIN 28011 gemäss AD2000 HP 7/2, HP8/1
Muffen	: DIN EN 10028-2, St 35.8-I, 3.1/AD2000-W4, DIN 17175 wahlweise P235GH, 3.1/AD2000-W4, EN 10216-2
Verst.bleche von Tragösen und Füßen	: P265GH, 3.1/AD2000-W1, EN 10028-2
sonst Material	: S235JRG2
Sonderflansche	: DIN 28117, P265GH, 3.1/AD2000-W1/W9, EN 10028-2 EN-1092, P250GH/3.1/AD2000-W9, EN 10273
Rohre	: DIN 2448, St35.8-I, 3.1/AD2000-W4, DIN 17175 wahlweise P235GH, 3.1/AD2000-W4, EN 10216-2

Oberflächenbehandlung / surface

Oberflächenschutz innen surface protection inside	roh
Oberflächenschutz aussen surface protection outside	SA 2,5

Technische Daten / technical data

Zul. Betriebsdruck PS all. operating pressure PS	bar	11
Max. zul. Betriebstemperatur TS max. all. operating temperature TS	°C	230
Min. zul. Betriebstemperatur TS min. all. operating temperature TS	°C	-10
Volumen volume	Liter	205
Prüfdruck PT test pressure PT	bar	18,78
Korrosionszuschlag corrosion allowance	mm	1
Berechnungsspannung efficiency of weld		85 %
Betriebsbedingungen operating condition		Schwellbeanspruchung nach AD2000-S1
Zul. Lastspielzahl nach AD2000-S1 all. number of stress cycle		14600
Druckschwankungsbreite pressure fluctuation range		0 bar bis PS
Auslegung nach design acc.		AD2000 / DGRL 2014/68/EU
Abnahme inspection		AD2000 / DGRL 2014/68/EU
Kategorie/Modul category/module		III / H1
Fluidgruppe group of fluid		2

TÜV AUSTRIA SERVICES GMBH
TÜV AUSTRIA

Werkstoff:
Maßstab: 1 : 10
Gewicht: 135,5 kg
Projekt:
Art.Nr.: BH-W-DN406-PN11
Benennung: vessel DN 406 PN11
Zeichnungsnummer: BH-ATW-DN406-PN11-L-R00
1
A1
Rev. R00

Werkstückkanten nach DIN ISO 13715 $^{-0,2}$ $^{+0,2}$

	Datum	Name
Gezeichnet	22.12.2021	Tengels
Kontrolliert		
Norm		

Maße ohne Toleranzangabe nach DIN ISO 2768-1 mK
DIN ISO 8015
Oberflächenangaben nach DIN ISO 1302
Schutzvermerk nach DIN ISO 16016

EVERAIR
EVERAIR GmbH
Siemensring 56 - D-47877 Willich
Tel. +49 2154 89144 0 - mail@everair.com

Prüfbericht der zerstörungsfreien Prüfungen

Test Report of non destructive testings

Hersteller Manufacturer	Tankbau Technik Basınçlı Kaplar San.Tic. Ltd. Şti.	**Prüf- Nr.** Test No	**02089-22**
Besteller Ordering party	**Air**	**Auftrags-Nr.** Order No.	
Gegenstand Object	**Druckbehälter**	**Inhalt, Druckstufe, Lage** Contents, Pressurerange, Situation	**205Ltr./11bar**
Prüfgrundlage Basis of Testing	**AD 2000 HP 5/3**	**Gepr. Behälter** Examined vessel	**22062**
Losgröße Volume of Fabrication	**2**		
Prüfumfang Check extent	**2**		
Werkstoff Material	**P265GH**	**Wärmebehandlung** Heat treatment	**Keine**
Wanddicke Böden Wall thickness bottoms	**10mm**	**Wanddicke Mantel** Wall thickness shell	**10mm**

Nach AD 2000- HP5/3 Tafel 1: sind zerstörungsfreie Prüfungen nach einer Ausnutzung der Berechnungsspannung in der Fügeverbindung von 85% auszurichten.

Orientation of welding according to AD 2000-HP5/3 Table 1: nondestructive testings with a utilization of calculated stres frpm 85%.

Zu prüfende Stellen Places to test especialy	**Besonders zu prüfende stellen Nach Ad 2000-S1** Particularly places to test especialy İn acc. with AD 2000-S1	**Angewandtes Verfahren** Applied procedure	**Prüfumfang** Check extent	
			Soll Nominal value	**Ist** Is
Rundnaht		**RT**	**2%**	**25%**
Längsnaht		**RT**	**100%**	**100%**
Stoß		**RT**	**100%**	**100%**

Prüfteechnische Angaben zu den angewandten Verfahren siehe Anlagen.
Testtechnical data to the applied procedures look at plants
Prüfaufsicht und Prüfer verfügen über eine Ausbildung, Qualifizierung und Zertifizierung nach EN ISO 9712 (Prüfaufsicht Stute 2)
Test supervision and examiners order over training a qualification after EN ISO 9712 (supervision level 2)

İstanbul, den
31.01.2022

Prüfaufsicht

TBT TANKBAU TECHNIK Basınçlı Kaplar San. Tic. Ltd. Şti.
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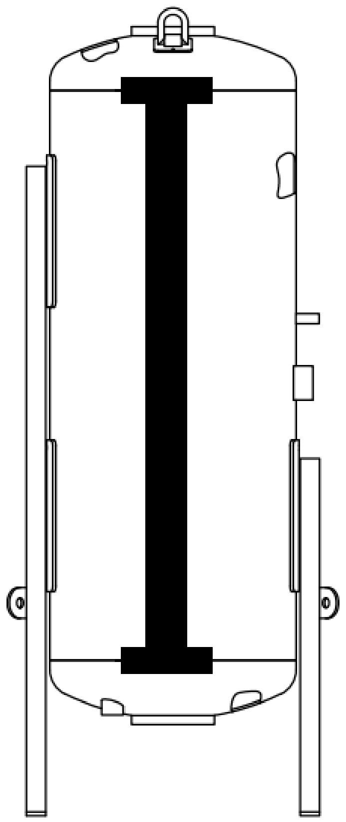
İkitelli V.D. : 8200316693 Tic.Sic.No:875804

Filmlageplan zur Durchstrahlungsprüfung
Nach DIN EN 1435
Arrangement of RT photo admission
Acc. Driective DIN EN1435

TBT TANKBAU TECHNIK

Hersteller Manufacturer	Tankbau Technik Basınçlı Kaplar San.Tic. Ltd. Şti.	**Prüf- Nr.** Test No	**02089-22**
Besteller Ordering party	**Air**	**Auftrags-Nr.** Order No.	
Gegenstand Object	**Druckbehälter**	**Inhalt, Druckstufe, Lage** Contents, Pressurerange, Situation	**205Ltr./11bar**
Prüfgrundlage Basis of Testing	**AD 2000 HP 5/3**	**Gepr. Behälter** Examined vessel	**22062**
Filmlänge Lenght of the radiograph	**480mmx100mm**		
Auswertungsbereich Analysis range	**Circular:25%** **Long:100%**		



İstanbul, den
24.01.2022

Prüfaufsicht

TBT TANKBAU TECHNİK
Basınçlı Kaplar San. Tic. Ltd. Şti.
İOSB Pik Dök.San. Sitesi B1-Blok No:6 Başakşehir-İST.
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www.tankbautec.com.tr info@tankbautec.com.tr
İkitelli V.D. : 8200316... Tic. Sic. No:875804

HYDROSTATIC TEST CERTIFICATE
Hydrostatisches Testzertifikat

CE 0408 TÜV AUSTRIA

Experience. Quality. Trust.

Certificate No: TBT08922
Zertifikat Nr.

Subject Thema	:	ATW 406
Customer Kunde	:	EVERAIR GmbH
Manufacturer Hersteller	:	TANKBAU TECHNİK Basınçlı Kaplar San. Tic. İOSB Pik Dök. San. Sitesi B1 Blok No:6 İkitelli / ISTANBUL
Manufacturing Date Herstellungsdatum	:	2022
Serial No. Seriennummer	:	22062
Capacity/Volume Kapazität / Volumen	:	205 Liter
Max. Allowable Working Pressure Max. Zulässiger Betriebsdruck	:	11 bar
Min./Max. Operating Temperature Min./max. Betriebstemperatur	:	-10 / 230˚C
Test Standard Teststandard	:	AD 2000
Test Date Testdatum	:	09.02.2022

Test Pressure: Testdruck	18,78bar	**Test Period:** Testzeit	1/2 h.	**Medium:** Mittel	Water Wasser

TBT Serial Number of the Pressure Gauge : 75536.TAN.06
TBT Seriennummer des Manometers

Result : **No leakage and permanent deformation have been observed.**
Ergebnis : Es wurde keine Leckage und bleibende Verformung beobachtet.

Notes : THIS CERTIFICATE IS VALID FOR ONE YEAR FROM THE DATE OF THE TEST.
Anmerkungen: DIESES ZERTIFIKAT IST FÜR EIN JAHR VOM TESTDATUM GÜLTIG.

İstanbul, 09.02.2022
Metehan YILMAZLAR
Mechanical Engineer

TBT TANKBAU TECHNİK
Basınçlı Kaplar San. Tic. Ltd. Şti.
İOSB Pik Dök.San. Sitesi B1-Blok No:6 Başakşehir-İST.
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www.tankbautec.com.tr info@tankbautec.com.tr
İkitelli V.D. : [illegible] Tic.Sic.No:675804

İmkosan Kalite Kontrol Ticaret A.Ş.
Güzelyalı mh. Ahmeri sk. No:4 (34903) Pendik / İstanbul
Tel: (0212) 289 02 89 (90-91) Faks: (0216) 392 92 79

TÜRKAK

Döküman No:	F.008
Rev. No/Tarihi:	01/16.06.2021
Sayfa	1 / 1

RADIOGRAPHIC EXAMINATION REPORT
RADYOGRAFİK MUAYENE RAPORU

CUSTOMER * *MÜŞTERİ*	TBT Tankbau Technik Basınçlı Kaplar Sanayi Tic. Ltd. Şti.	**EXAMINATION STANDARD *** *MUAYENE STANDARDI*	EN 17636-1 - CLASS B	**REPORT NUMBER** *RAPOR NUMARASI*	00883-22-IR
PROJECT * *PROJE*	TBT Projeleri	**ACCEPTANCE STANDARD *** *KABUL STANDARDI*	AD 2000 Code HP 5/3 - AD 2000 Code HP 5/3	**CONT. REF. NR** *TEKLİF REF. NO*	TN-2019-040
EXAMINATION AREA * *MUAYENE YERİ*	İkitelli	**PROCEDURE NUMBER** *PROSEDÜR NUMARASI*	P 131	**ACTIVITY NR** *FAALİYET NUMARASI*	52
JOB NAME * *İŞ ADI*	ATW406-22062	**NDT PERCENTAGE *** *MUAYENE ORANI*	%100	**EXAMINATION DATE** *MUAYENE TARİHİ*	31.01.2022

TECHNICAL INFORMATIONS / *TEKNİK BİLGİLER*

MATERIAL / OBJECT * *MALZEME / CİSİM*	CS			**ISOTOPE SIZE** *İZOTOP BOYU*	3x2.2 mm	**Source side of the object to film** *Objenin enerji tarafı ile film mes.*	-
WAITING TIME FOR NDT (h)* *NDT İÇİN BEKLEME SÜRESİ (saat)*							
PRODUCT FORM * *ÜRÜN FORMU*	**Welding / Kaynak** ~~Wrought / Dövme~~	~~Casting / Döküm~~		**AKTİVİTE** *ACTIVITY*	20.49 Ci	**EXPOSURE TIME** *POZ SÜRESİ*	140 sn
WELDING PROCESS * *KAYNAK PROSESİ*	~~N.A~~ ~~SAW~~	~~TIG~~ ~~FCAW~~	**GMAW** ~~SMAW~~ ~~MCAW~~	**X ray FOCUS SIZE** *X Işını ODAK BOYU*	- mm²	**FILM TYPE & CLASS** *FİLM TİPİ & SINIFI*	KODAK T200
WELDING JOINT TYPE * *KAYNAK BİRLEŞİM TİPİ*	~~N.A~~ **Butt Weld / Alın Kaynağı**	~~T-Butt-Weld/ T-Alın Kaynağı~~ ~~Fillet-Weld/Köşe Kaynağı~~		**VOLTAGE / AMPERE** *GERİLİM / AMPER*	- / -	**SCREEN (fs/bs)** *EKRAN (ön-arka)*	Pb (0.02mm)
HEAT TREATMENT * *ISIL İŞLEM*	~~After / Sonrası~~ **None / Yok**	~~Before / Öncesi~~		**SOURCE to OBJECT** *ENERJİ ile OBJE MES.*	-	**FILM(S) PER CASSETTE** *KASETTEKİ FİLM SAYISI*	1
SOURCE TYPE Sr. Nr *ENERJİ TİPİ & Seri No*	**Ir 192** ~~X-Ray / X-Işını~~	~~Se 75~~		**SOURCE to FILM DIS.** *ENERJİ ile FİLM MES.*	60 cm	**TYPE IQI** *TİP IQI*	10 FE EN
PROCESS TECHNIC *PROSES TEKNİK*	**Manual / Elle** ~~Automatic / Otomatik~~			**IQI POSITION** *IQI POZİSYONU*	**Source / Enerji** ~~Film / Film~~	**EQUIPMENT SERIAL DBN** *CİHAZIN DBN*	RT 007 / D9785
TEST ARRG. *TEST DÜZENLEMESİ*	**7.1.2 (Fig.1) Single Wall-Single Image / Plaka** ~~7.1.8 (Fig.14) Double Wall-Single Image / Sarma Çekim~~ ~~7.1.7 (Fig.12) Double Wall-Double Image / Süperimpoz~~			~~7.1.6 (Fig.11) Double Wall-Double Image / Elips~~ ~~7.1.4 (Fig.5) Single Wall-Single Image / Panoramik~~ ~~7.1.8 (Fig.17) Single Wall-Single Image / Köşe Kaynağı~~			

EXAMINATION INFORMATIONS / *MUAYENE BİLGİLERİ*

NO	MARKING NUMBER *MARKALAMA NUMARASI*	EXAMINED AREA *İNCELEME BÖLG.*	WELDER *KAYNAKÇI*	REQ. IQI *İSTEN. IQI*	VIS. IQI *GÖRÜ. IQI*	DEN. *YOĞ.*	DIA *ÇAP*	BASE. THICK. *KAL.*	REIN.THI *TAK*	TYPE OF DEFECT *HATA TİPİ*	RESULT *SONUÇ*	HATA A. *DEF.AREA*	REMARK *AÇIKLAMA*
1.	ATW406-22062 L1	0-40	--	15	15	2.5		8 mm	--		ACC		
2.	ATW406-22062 L1	40-80	--	15	15	2.7		8 mm	--		ACC		
3.	ATW406-22062 L1	80-120	--	15	15	2.5		8 mm	--		ACC		
4.	ATW406-22062 L1	110-150	--	15	15	2.5		8 mm	--		ACC		
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													
15.													
16.													
17.													
18.													

* **Önemli Not:** Muayene prosesi için müşteri tarafından sağlanan gerekli bilgiler, doğrulama yapıldıktan sonra raporlara aktarılmaktadır. Kaynak tamamlandıktan sonra NDT testleri için bekleme süresi çelikler için minimum 24 saat, yüksek mukavemetli çelikler için minimum 48 saat ve üzeri olacaktır.

* *Important Note:* The necessary information provided by the customer for the inspection process is transferred to the reports after verification. After the welding is completed, the waiting time for NDT tests will be a minimum of 24 hours for steels and a minimum of 48 hours or more for high strength steels

TYPES OF DEFECT / *HATA TİPLERİ*

Aa 2011	Porosity / *Gözenek*	Ba 3012	Slag Inclusion / *Cüruf Kalıntısı*	Db 402	Incomplete Penetrat. / *Yetersiz Nüfuziyet*	E 100	Crack / *Çatlak*	Ca	Shrinkage / *Çekme*	ACC	Accept / *Kabul*
Ab 2016	Wormholes / *Kurt Oyuğu*	Bb 3011	Slag Line / *Cüruf Hattı*	Fa 504	Excess Penetration / *Fazla Nüfuziyet*	Si	Misalligoment / *Eksen Kaçıklığı*	H	Laps & Cold shuts / *Soğuk Birleşme*	REJ	Reject / *Ret*
Ac 2013	Group Porosity / *Grup Gözenek*	C 401	Lack of Fussion / *Birleşme Noksanlığı*	Fb 514	Poor Profile / *Kötü Yüzey*	H 304	Metal Inclusion *Metal Enklüzyon*	G	Hot Tears / *Sıcak Yırtılma*	RS	Rshoot / *Yeniden*
Ad 2014	Linear Porosity / *Sıralı Gözenek*	Da 515	Root Concavity / *Kök Çukurluğu*	Fc 501	Undercut / *Yanma Oluğu*	Ff	Film Defect / *Film Hatası*	I	Insert / *Ekler*	EX	Extra Film *Ek Film*

10x12	10x16	10x24	10x36	10x48	İMKOSAN			CLIENT	AUTHORITY
				4.00	Muayeneyi Yapan / Sertifika No	Murat Alçı (I)	0192/30/17/RT		
					Muayeneyi Onaylayan / Sertifika No	Gökhan Şimşek	0087/30/16		
					Rapor Tarihi	03.02.2022			

Gökhan ŞİMŞEK SNT - TC - 1A EN ISO 9712 RT Level 2 NTD INSPECTOR

İmkosan Kalite Kontrol Ticaret A.Ş.
Güzelyalı mh. Alınteri sk. No:4 (34903) Pendik / İstanbul
Tel: (0212) 289 02 89 (90-91) Faks: (0216) 392 82 79

RADIOGRAPHIC EXAMINATION REPORT
RADYOGRAFİK MUAYENE RAPORU

Döküman No: F.008
Rev. No/Tarihi: 01/16.06.2021
Sayfa: 1 / 1

CUSTOMER * *MÜŞTERİ*	TBT Tankbau Technik Basınçlı Kaplar Sanayi Tic. Ltd. Şti.	**EXAMINATION STANDARD *** *MUAYENE STANDARDI*	EN 17636-1 - CLASS B	**REPORT NUMBER** *RAPOR NUMARASI*	01004-22-JR
PROJECT * *PROJE*	TBT Projeleri	**ACCEPTANCE STANDARD *** *KABUL STANDARDI*	AD 2000 Code HP 5/3 - AD 2000 Code HP 5/3	**CONT. REF. NR** *TEKLİF REF. NO*	TN-2019-040
EXAMINATION AREA * *MUAYENE YERİ*	İkitelli	**PROCEDURE NUMBER** *PROSEDÜR NUMARASI*	P.131	**ACTIVITY NR** *FAALİYET NUMARASI*	1987
JOB NAME * *İŞ ADI*	ATW406-22062	**NDT PERCENTAGE *** *MUAYENE ORANI*	%25	**EXAMINATION DATE** *MUAYENE TARİHİ*	04.02.2022

TECHNICAL INFORMATIONS / *TEKNİK BİLGİLER*

MATERIAL / OBJECT * *MALZEME / CİSİM*	CS	**ISOTOPE SIZE** *İZOTOP BOYU*	3x2.2 mm	**Source side of the object to film** *Objenin enerji tarafı ile film mes.*	-
WAITING TIME FOR NDT (h)* *NDT İÇİN BEKLEME SÜRESİ (saat)*					
PRODUCT FORM * *ÜRÜN FORMU*	**Welding / Kaynak** ~~Casting / Döküm~~ **Wrought / Dövme**	**AKTİVİTE** *ACTIVITY*	34.15 Ci	**EXPOSURE TIME** *POZ SÜRESİ*	110 sn
WELDING PROCESS * *KAYNAK PROSESİ*	~~N.A~~ ~~TIG~~ **GMAW** ~~SMAW~~ **SAW** ~~FCAW~~ ~~MCAW~~	**X ray FOCUS SIZE** *X ışını ODAK BOYU*	- mm²	**FILM TYPE & CLASS** *FİLM TİPİ & SINIF*	KODAK T200
WELDING JOINT TYPE * *KAYNAK BİRLEŞİM TİPİ*	~~N.A~~ **Butt Weld / Alın Kaynağı** ~~T-Butt-Weld/ T-Alın Kaynağı~~ ~~Fillet-Weld/Köşe Kaynağı~~	**VOLTAGE / AMPERE** *GERİLİM / AMPER*	- / -	**SCREEN (fş/bs)** *EKRAN (ön/arka)*	Pb (0.02mm)
HEAT TREATMENT * *ISIL İŞLEM*	~~After / Sonrası~~ **None / Yok** ~~Before / Öncesi~~	**SOURCE to OBJECT** *ENERJİ ile OBJE MES.*	-	**FILM(S) PER CASSETTE** *KASETTEKİ FİLM SAYISI*	1
SOURCE TYPE Sr. Nr *ENERJİ TİPİ & Seri No*	**Ir 192** ~~Se-75~~ ~~X-Ray / X-Işını~~	**SOURCE to FILM DIS.** *ENERJİ ile FİLM MES.*	60 cm	**TYPE IQI** *TİP IQI*	10 FE EN
PROCESS TECHNIC *PROSES TEKNİK*	**Manual / Elle** ~~Automatic / Otomatik~~	**IQI POSITION** *IQI POZİSYONU*	**Source / Enerji** Film / Film	**EQUIPMENT SERIAL DBN** *CİHAZIN DBN*	RT.002 / D13570

TEST ARRG. *TEST DÜZENLEMESİ*

7.1.2 (Fig.1) Single Wall-Single Image / Plaka
~~7.1.5 (Fig.14) Double Wall-Single Image / Sarma Çekim~~
~~7.1.7 (Fig.12) Double Wall-Double Image / Süperimpoz~~
~~7.1.6 (Fig.11) Double Wall-Double Image / Elips~~
~~7.1.4 (Fig.5) Single Wall-Single Image / Panoramik~~
~~7.1.8 (Fig.17) Single Wall-Single Image / Köşe Kaynağı~~

EXAMINATION INFORMATIONS / *MUAYENE BİLGİLERİ*

NO	MARKING NUMBER *MARKALAMA NUMARASI*	EXAMINED AREA *İNCELEME BÖLG.*	WELDER *KAYNAKÇI*	REQ. IQI *İSTEN. IQI*	VIS. IQI *GÖRÜ. IQI*	DEN. *YOĞ.*	DIA *ÇAP*	BASE. THICK. *KAL.*	REIN.THI *TAK.*	TYPE OF DEFECT *HATA TİPİ*	RESULT *SONUÇ*	HATA A. *DEF.AREA*	REMARK *AÇIKLAMA*
1.	ATW406-22062 C1	0-40	--	15	15	2.7		8 mm	--		ACC		
2.	ATW406-22062 C1	40-80	--	15	15	2.6		8 mm	--		ACC		
3.	ATW406-22062 C1	80-120	--	15	15	2.6		8 mm	--		ACC		
4.	ATW406-22062 C1	120-0	--	15	15	2.6		8 mm	--		ACC		
5.	ATW406-22062 C2	0-40	--	15	15	2.5		8 mm	--	Aa	ACC		
6.	ATW406-22062 C2	40-80	--	15	15	2.5		8 mm	--	Aa	ACC		
7.	ATW406-22062 C2	80-120	--	15	15	2.7		8 mm	--		ACC		
8.	ATW406-22062 C2	120-0	--	15	15	2.7		8 mm	--		ACC		
9.													
10.													
11.													
12.													
13.													
14.													
15.													
16.													
17.													
18.													

* **Önemli Not:** Muayene prosesi için müşteri tarafından sağlanan gerekli bilgiler,doğrulama yapıldıktan sonra raporlara aktarılmaktadır. Kaynak tamamlandıktan sonra NDT testleri için bekleme süresi çelikler için minimum 24 saat,yüksek mukavemetli çelikler için minimum 48 saat ve üzeri olacaktır.

* *Important Note:* *The necessary information provided by the customer for the inspection process is transferred to the reports after verification. After the welding is completed, the waiting time for NDT tests will be a minimum of 24 hours for steels and a minimum of 48 hours or more for high strength steels.*

TYPES OF DEFECT / *HATA TİPLERİ*

Aa 2011	**Porosity /** *Gözenek*	Ba 3012	**Slag Inclusion /** *Cüruf Kalıntısı*	Db 402	**Incomplete Penetrat. /** *Yetersiz Nüfuziyet*	E 100	**Crack /** *Çatlak*	Ca	**Shrinkage /** *Çekinti*	ACC	**Accept /** *Kabul*
Ab 2016	**Wormholes /** *Kurt Oyuğu*	Bb 3011	**Slag Line /** *Cüruf Hattı*	Fa 504	**Excess Penetration /** *Fazla Nüfuziyet*	Si	**Misalignment /** *Eksen Kaçıklığı*	H	**Laps & Cold shuts /** *Soğuk Birleşme*	REJ	**Reject /** *Ret*
Ac 2013	**Group Porosity /** *Grup Gözenek*	C 401	**Lack of Fussion /** *Birleşme Noksanlığı*	Fb 514	**Poor Profile /** *Kötü Yüzey*	H 304	**Metal Inclusion** *Metal Enklüzyon*	G	**Hot Tears /** *Sıcak Yırtılma*	RS	**Rshoot /** *Yeniden*
Ad 2014	**Linear Porosity /** *Sıralı Gözenek*	Da 515	**Root Concavity /** *Kök Çukurluğu*	Fc 501	**Undercut /** *Yanma Oluğu*	Ff	**Film Defect /** *Film Hatası*	I	**Insert /** *Ekler*	EX	**Extra Film** *Ek Film*

10x12	10x16	10x24	10x36	10x48
				8.00

İMKOSAN		
Muayeneyi Yapan / Sertifika No	Murat Alçı (İ)	0192/30/17/RT
Muayeneyi Onaylayan / Sertifika No	Gökhan Şimşek	0087/30/16
Rapor Tarihi	07.02.2022	

Gökhan ŞİMŞEK SNT - TC 1A EN ISO 9712 Revizyon 2 NDT INSPECTOR

CLIENT	AUTHORITY

ArcelorMittal Bremen GmbH
Postfach 210220
28222 BREMEN
Carl-Benz-Strasse 30
28237 BREMEN
Telefon 0421/6480
Telefax 0421/6482251

A02 CERTIFICATE

A03 Page: 01/ 03

20190038266-00

Test report 2.2 chem.+mech. EN 10204

A05 ORIGINATOR OF THE DOCUMENT
ArcelorMittal Bremen GmbH
Abnahme/Zeugnisschreibung
zeugnisse.bremen@arcelormittal.com
Telefon 0421/6482813

A09 DISPATCH NOTE **0000867390**
DATE 31.05.2019
SHIP
GOMERA

A08.1 MANUFACTURER'S ORDER NR **1944919**
DATE 18.04.2019
AGENCY'S ORDER NR. FH9ERIS001083

A07 CUSTOMER'S ORDER NUMBER
C190430HRCISK-BRE

A06.1 CUSTOMER
ArcelorMittal RZK Celik Servis Merk
Sanayi ve Ticaret A.S.
Levazim Mah. Zorlu Center A Blok T1
34340 Besiktas/Istanbul
Türkei

A06.2 CONSIGNEE
ArcelorMittal RZK CELIK SERVIS MERK
SAN. VE TIC. A.S.
Organize San.Böl.Büyük Tüysüz No:10
80950 Toprakkale
Türkei

PRODUCT: hot rolled unpickled coil QUALITY: **S235JR+AR** STANDARD: **EN 10025 (00-00-2004)**

TERMS OF DELIVERY: **EN 10051 (2010)**

JITZ 1.74

ArcelorMittal Bremen GmbH, Postfach 210220, 28222 BREMEN

ArcelorMittal RZK CELIK SERVIS MERK
SAN. VE TIC. A.S.
Organize San.Böl.Büyük Tüysüz No:10
80950 Toprakkale
Türkei

CE
06
0045

ArcelorMittal Bremen
Carl-Benz-Straße 30
D-28237 Bremen

0045-CPR-0527

hot rolled unpickled coil intended to be used in welded, bolted and riveted structures

Declaration of Performance(DoP)		
CE-QUALITY	**CE-STANDARD**	**DoP**
S235JR+AR	EN 10025-2:2004	HR00006_CPR2013-07-01_FC_V007

DoP-Link

http://dop.arcelormittal.net/pdf/HR00006_CPR2013-07-01_FC_V007_EN_TR.pdf

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A02 CERTIFICATE

A03 Page: 02/ 03

20190038266-00

Test report 2.2 chem.+mech. EN 10204

A05 ORIGINATOR OF THE DOCUMENT
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Abnahme/Zeugnisschreibung
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Telefon 0421/6482813

A09 DISPATCH NOTE **0000867390**
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A08.1 MANUFACTURER'S ORDER NR **1944919**
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34340 Besiktas/Istanbul
Türkei

A06.2 CONSIGNEE
ArcelorMittal RZK CELIK SERVIS MERK SAN. VE TIC. A.S.
Organize San.Böl.Büyük Tüysüz No:10
80950 Toprakkale
Türkei

PRODUCT: hot rolled unpickled coil QUALITY: **S235JR+AR** STANDARD: **EN 10025 (00-00-2004)**

TERMS OF DELIVERY: **EN 10051 (2010)**

JITZ 1.74

A08.2 ITEM	B09 THICKNES mm	B10 WIDTH mm
83	5.00	1500.00

A08.2 ITEM	B07.1 COILNO	B07.1 PART	B13 WEIGHT kg	B07.2 HEAT	CHEMICAL ANALYSIS C71 C %	C73 Si %	C72 Mn %	C74 P %	C75 S %	C81 Cu %	C77 Al %	C76 N %	C83 B %	C84 V %	C78 Ti %	C82 Nb %	C79 Cr %	C80 Ni %	C85 Mo %	As %	Sn %
83	**300845**	00000	17880	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300846	00000	17750	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300847	00000	17780	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300848	00000	17750	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300849	00000	17830	**062980**	.1692	.0146	.3895	.0122	.0047	.0066	.0306	.0036	.0001	.0041	.0013	.0001	.0178	.0249	.0013	.0009	.0005
	300850	00000	17840	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	300851	00000	18140	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	300852	00000	18200	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	300854	00000	17960	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	300855	00000	18310	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	327955	00000	15910	**063213**	.1687	.0101	.3837	.0115	.0093	.0256	.0369	.0048	.0001	.0019	.0009	.0002	.0395	.0345	.0052	.0014	.0015
	327956	00000	15890	**063213**	.1687	.0101	.3837	.0115	.0093	.0256	.0369	.0048	.0001	.0019	.0009	.0002	.0395	.0345	.0052	.0014	.0015
	327957	00000	15940	**063213**	.1687	.0101	.3837	.0115	.0093	.0256	.0369	.0048	.0001	.0019	.0009	.0002	.0395	.0345	.0052	.0014	.0015
	327962	00000	17630	**063212**	.1572	.0169	.3806	.0111	.0033	.0282	.0334	.0054	.0001	.0023	.0011	.0003	.0383	.0349	.0041	.0017	.0016
	923830	00000	18200	**062984**	.1606	.0120	.3810	.0121	.0039	.0148	.0318	.0043	.0001	.0025	.0009	.0001	.0592	.0402	.0055	.0008	.0006
	15		263010																		
TOTAL	15		263010																		

A08.2 ITEM	B07.1 COILNO	B07.1 PART	B13 WEIGHT kg	B07.2 HEAT	TENSILE TEST C02 PR °	C04 MAZ	C03 Temp °C	C11 yield p. Re MPa	C12 strength Rm MPa	C13 A55mm %
83	**300845**	00000	17880	**062980**	90	F	20	275	425	34.5

C02 test direction
relating to rolling direction (0°= L; 90°= T)

C04 specimen condition
V:aged F:fresh N:normalised

ArcelorMittal Bremen GmbH
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28222 BREMEN
Carl-Benz-Strasse 30
28237 BREMEN
Telefon 0421/6480
Telefax 0421/6482251

A02 CERTIFICATE

A03 Page: 03/ 03

20190038266-00

Test report 2.2 chem.+mech. EN 10204

A05 ORIGINATOR OF THE DOCUMENT
ArcelorMittal Bremen GmbH
Abnahme/Zeugnisschreibung
zeugnisse.bremen@arcelormittal.com
Telefon 0421/6482813

A09 DISPATCH NOTE **0000867390**
DATE 31.05.2019
SHIP
GOMERA

A08.1 MANUFACTURER'S ORDER NR **1944919**
DATE 18.04.2019
AGENCY'S ORDER NR. FH9ERIS001083

A07 CUSTOMER'S ORDER NUMBER
C190430HRCISK-BRE

A06.1 CUSTOMER
ArcelorMittal RZK Celik Servis Merk
Sanayi ve Ticaret A.S.
Levazim Mah. Zorlu Center A Blok T1
34340 Besiktas/Istanbul
Türkei

A06.2 CONSIGNEE
ArcelorMittal RZK CELIK SERVIS MERK
SAN. VE TIC. A.S.
Organize San.Böl.Büyük Tüysüz No:10
80950 Toprakkale
Türkei

PRODUCT: hot rolled unpickled coil QUALITY: **S235JR+AR** STANDARD: **EN 10025 (00-00-2004)**

TERMS OF DELIVERY: **EN 10051 (2010)**

JITZ 1.74

A08.2 ITEM	B09 THICKNES mm	B10 WIDTH mm
83	5.00	1500.00

A08.2 ITEM	B07.1 COILNO	B07.1 PART	B13 WEIGHT kg	B07.2 HEAT	TENSILE TEST C02 PR °	C04 MAZ	C03 Temp °C	C11 yield p. Re MPa	C12 strength Rm MPa	C13 A55mm %
83	**300846**	00000	17750	**062980**	90	F	20	275	427	34.5
	300847	00000	17780	**062980**	90	F	20	274	425	34.5
	300848	00000	17750	**062980**	90	F	20	279	429	34.5
	300849	00000	17830	**062980**	90	F	20	280	428	34.5
	300850	00000	17840	**062984**	90	F	20	279	427	34.5
	300851	00000	18140	**062984**	90	F	20	278	426	35
	300852	00000	18200	**062984**	90	F	20	279	427	35
	300854	00000	17960	**062984**	90	F	20	277	425	34.5
	300855	00000	18310	**062984**	90	F	20	276	424	34.5
	327955	00000	15910	**063213**	90	F	20	288	436	33.5
	327956	00000	15890	**063213**	90	F	20	284	432	33.5
	327957	00000	15940	**063213**	90	F	20	290	436	33.5
	327962	00000	17630	**063212**	90	F	20	277	425	34.5
	923830	00000	18200	**062984**	90	F	20	276	424	34.5
	15		263010							
TOTAL	15		263010							

We certify hereby that the delivery complies with the above mentioned specification.

BREMEN 31.05.2019

QUALITY DEPARTMENT
SITE EXPERT FOR INSPECTION
Kramer

Andreas Kramer

C02 test direction
relating to rolling direction (0°= L; 90°= T)

C04 specimen condition
V:aged F:fresh N:normalised

INSPECTION CERTIFICATE — NF EN 10204-3.1/DIN 50049-3.1.B/ISO 10474

A02 — N° 730/0532263 — Page 1 / FIN — A09/A03

ArcelorMittal
ARCELORMITTAL MEDITERRANEE Site de FOS
13776 FOS SUR MER CEDEX - FRANCE
T:+33(0)44247-3314 F:+33(0)44247-3231
E: un.scu(a)arcelormittal.com

Sigle du producteur / Mill's identification: **FOS**

T Re=265 MINI MPA Rm=410 -530 MPA A%(5,65)=22 MINI
T Re=265 MINI MPA Rm=410 -530 MPA A%(5,65)=22 MINI
KV T - 20dgC 19 J MINI/IND 27 J MINI/MOY
(5) B03

CSC: Conforme cahier charges / According specifications
BL : Brut de laminage / As rolled
LN : Laminage normalisant / Normalisation rolling
R : Revenu / Tempering
TE : Trempé à l'eau / Water quenching
LTC : Laminé temp. contrôlée / Control rolling
TM : Laminage thermomécanique / Thermo-mechanical forming
N : Normalisé / Normalising
D : Détensionné / Stress relieving
O : Adouci par recuit / Soft annealing
(1)

Organisme et/ou service de contrôle Inspection organism	Client et/ou destinataire Customer and/or consignee	N° Commande Courtier/Client Customer's Order Nbr	N° Commande Usine Mill's Order Nbr	Nuances et spécifications techniques / Grade and technical specifications	Etat de livraison (1) Delivery condition
RECEPTION USINE A05	A06	C180701RZKHRCAUG A07	FH8HFRZ001 000019 A08	P265GH+N EN10028-2/2009 HOT ROLLED COIL, AS ROLLED B01 B02	LTC B04

Traitement de référence / Treatment of test samples (1): BL_N B05

Identification du produit / Product identification		Poste / Item	Nombre de pièces / Number of pieces	Dimensions / Sizes (mm)			Masse / Weight	Emplacement				Traction / Tensile requirements							Emplacement	Résilience / Impact testing								
Repère pièce / Plate number	Coulée / Heat			Epaisseur / Thickness	Largeur / Width	Longueur / Length	(kg) (7)	Loc (2)	S (3)	Pos Z(4)	Type	Réf Ref (5)	Temp.	ReEH	Rm	A%				Loc (2)	Réf Ref	Type	S (3)	Temp.	Pos. Z(4)	Valeurs individuelles / Individual values			Moyenne / Average
B07	B07	A07	B08	B09	B10	B11	B13	C01	C02	C082	C10		C03	C11	C12	C13	<-C14-C29		C60-C59->	C01		C40	C02	C08	C62	<- - -C42- - - ->			C43
7504017	730810340	001	1	5,000	1500,00		17760	1	T	P	PRISM	BL	20	387	472	34,3				1	BL	KV	T	- 20	P	63	61	59	61
								1	T	P	PRISM	N	20	322	439	36,7													

AC:C =0,20 MAXI MN=0,80 -1,40 P =0,025 MAXI S =0,010 MAXI SI=0,40 MAXI AL=0,020 MINI CU=0,30 MAXI NI=0,30 MAXI CR=0,30 MAXI NB=0,020 MAXI V =0,02 MAXI
TI=0,03 MAXI MO=0,08 MAXI N =0,012 MAXI CBN13=CU+NI+CR+MO =0,70 MAXI CBN39=AL/N =2,0 MINI

Meth. (6) of steel making	Repère Pièce / Plate number	N° Coulée / Heat number	* Analyse sur produit / Check analysis																								
			C%	Mn%	P%	S%	Si%	AL%	CR%	CU%	MO%	N %	NB%	NI%	TI%	V %						CBN13	CBN39				
C70/93	B07	B07	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91	C92	C96	C97	
O/YCC		730810340	0,15	0,97	0,011	0,004	0,02	0,035	0,02	0,02	0,01	0,003	0,000	0,02	0,02	0,00						0,06	10,1				

Emplacement/Location (2): 1 Tête / Head; 2 Pied / Bottom; 3 1/2 longueur / Length; X:Divers / Mix — C01

(3) Sens/Direction: L:Long / Longitudinal; T:Travers / Transverse; Z:Travers court / Through thick — C02

(4) Position: C:Coeur / Core sample; P:Peau / Rolled surface; D:1/3 Epais. / Thickness; Q:1/4 Epais. / Thickness; F:1/5 Epais. / Thickness; K:Divers / Mix — C62

(6)Mode élab Meth Coulée: T: Thomas M: Martin E: Electrique / Electric OIY: Oxy.put / Basic oxyg. CC: Coulée Continue / Continuous casting — C70/93

(7) Masse et nb pieces a titre indicatif. Mass and quantity of pieces as a rough guide

We hereby certify that the above cited shipment was produced according to the technical specifications of the contract and that, with inspection and tests completed, it meets those specifications as well as all norms and standards referred to in the contract.

Contrôle de marquage, d'aspect et de dimensions : satisfaisants
Inspection of markings, surface, sizes : satisfactory — D01

Date 31/08/18
Agent / Receiving Agent
F. SIXDENIERS — Z02

243

EREĞLİ DEMİR ve ÇELİK FABRİKALARI T.A.Ş.
OUTSTANDING CAPITAL : 3.500.000.000 TL
PRODUCTION PLANT : ISDEMIR

TEST CERTIFICATE
EN 10204 : 2004 TYPE 3.1

DATE :10/06/2020
CERTIFICATE NO :00741401
PAGE NO : 1

CUSTOMER :
ORDER NO :08433278006
DIMENSIONS, mm : 8.000 X 2000 X C
STANDARD & GRADE :EN 10028-2-2017 P265GH (ERDEMİR 6341)
PRODUCT TYPE & DEFINITION :RKK:HOT ROLLED, MILL EDGE COIL

CERTIFIED ACC. TO PED 2014/68/EU (2016/07/19) NUMBER 2195

PRODUCT INFORMATIONS					MECHANICAL PROPERTIES														CHEMICAL COMPOSITION, CAST ANALYSIS %									
TICKET NO	WEIGHT (MT)	HEAT NO	COIL or PLATE NO	P.S or P.P	SAM POS	TENSILE TEST YIELD STRENGTH N/MM2	TENSILE N/MM2	% EL A5	BEND TEST	Ag or BH VAL.	r VAL.	Y/T or n VAL.	HARD NESS	IMPACT TEST, joule POSITION : T 1	2	3	AVR	TEM 'C	HIGH TEMP 'C YIELD N/MM2	C %	MN %	P %	S %	SI %	AL %	CU %	CR %	NI %	MO %	CEQ %
																				V %	NB %	TI %	N PPM						
0350707860	28,090	20112326	1205579060000		TT	322.6	483.5	33						48	49	44	47	-20		0.152	1.060	0.010	0.006	0.185	0.052	0.066	0.027	0.053	0.000	0.343
																				0.003	0.002	0.003	42						
0350707861	28,410	20112326	2205579070000		TT	322.6	486.4	32						60	45	44	50	-20		0.152	1.060	0.010	0.006	0.185	0.052	0.066	0.027	0.053	0.000	0.343
																				0.003	0.002	0.003	42						
0350707865	28,360	20334719	1205579040000		TT	314.8	482.5	36						56	59	67	61	-20		0.150	1.066	0.014	0.005	0.213	0.050	0.045	0.028	0.041	0.000	0.340
																				0.003	0.001	0.001	38						

WE(THE MANUFACTURER) HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN MADE BY THE BASIC OXYGEN PROCESS AND TESTED IN ACCORDANCE WITH THE RULES OF EN 10028-2-2017 P265GH (ERDEMİR 6341) WITH SATISFACTORY RESULTS.

EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş. METALURJİ LABORATUVARI

İBRAHİM AKDÜMBEK
ENGINEER OF METALLURGICAL LABORATUARY

EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş. KALİTE METALURJİ

SERKAN DİKEÇ
QUALITY METALLURGY MANAGER

ERDEMİR

NOTE: T.Top, M:Middle, E:End, T:Transverse, L:Longitudinal, P.S:Piece of Slice, P.P:Piece of Plate
MERSIS Number(İstanbul Head Office): 0352-0006-4260-0020; Trade Registry Number(İstanbul Department): 90659; Trade Registry Number(Ereğli Department):1574/272
Head Office: İstanbul: Barbaros Mah. Ardıç Sok. No: 6 34746 Ataşehir İSTANBUL - TURKEY
www.erdemir.com.tr

MILL'S TEST CERTIFICATE

A 04

Çolakoğlu Metalurji

A 02

THE INSPECTION CERTIFICATE AS PER EN 10204 CLAUSE 3.1 CONFORMING TO THE DEFINITION IN EN 10168.

A 03

DOCUMENT NO : 0000022751
ISSUE DATE : 13.08.2017
PAGE : 1/ 1

A 01

Rüzgarlıbahçe Mahallesi Kavak Sokak No:16 Kat:5
34805 Kavacık - Beykoz / İstanbul

A 06

CUSTOMER : SAMİ SOYBAŞ DEMİR

A 07

ORDER NO : 12820/000340
PURCHASER :

A 08

MANUFACTURER : ÇOLAKOĞLU METALURJİ A.Ş.

B 01

PRODUCT: HOT ROLLED COILS | STANDARD OF ASSESEMENT OF CONFORMITY: EN 10025-1 | STANDARD OF GRADE OF PRODUCT: EN 10025-2 | DIMENSION CONTROL STANDARD: EN 10051

TEST RESULTS

DESCRIPTION OF DELIVERY						MECHANICAL PROPERTIES						CHEMICAL COMPOSITION (LADLE ANALYSIS) (%)														
B 06	B 07	B 02	B 09	B 11	B 13	C 11	C 12	C 13	C 50	C 32	C 43	C 71	C 72	C 73	C 74	C 75	C 76	C 77	C 78	C 79	C 80	C 81	C 82	C 83	C 84	C 93
Coil No	Heat No	Grade	Thick ness mm	Width mm	Weight Kg	Yield Strength N/mm2	Tensile Strength N/mm2	Elonga- tion %	Bend Test	Typeof Piece	Impact Energy Joule	%C	%Mn	%Si	%P	%S	%Cr	%Ni	%Cu	%Al	%V	%Mo	%Nb	%Ti	%N	%Ceq
G055467000	GG46111	S235JR	8.00	1500	25000	314.00	454.00	30.00	OK		0.00	0.15	0.58	0.19	0.020	0.006	0.02	0.00	0.01	0.038	0.001	0.001	0.000	0.002	0.002	0.25
G055755000	GG46108	S235JR	8.00	1500	25100	320.00	452.00	30.50	OK		0.00	0.15	0.56	0.18	0.016	0.008	0.02	0.00	0.01	0.043	0.000	0.001	0.000	0.001	0.003	0.25
G056362000	GG24826	S235JR	10.00	1500	25150	316.00	458.00	30.20	OK		0.00	0.15	0.59	0.18	0.012	0.006	0.02	0.00	0.01	0.048	0.000	0.001	0.000	0.001	0.003	0.25

Ceq : C + Mn / 6 + (Cr + V+ Mo) / 5 + (Cu + Ni) / 15

Z 04

CE
0620-CPD-58521

Z 01

CE MARKING FPC CERTIFICATE NUMBER : 0620-CPD-58521/01

WE HEREBY CERTIFY THAT THE MATERIAL HAS BEEN MADE AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND ALSO WITH THE REQUIREMENTS CALLED FOR BY THE ABOVE ORDER

Z 02

APPROVED BY
QUALITY MANAGER
RIFKI ERSOY

EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş.

ÇIKARILMIŞ SERMAYE : 3.500.000.000 TL

ÜRETİM YERİ : ERDEMİR
MÜŞTERİ ADI : MERCAN SAÇ PROFİL OTOMOTİV YAN SAN.VE TİC.A.Ş.
SİPARİŞ NO : 08233243010
EBAD , mm : 50 X 2500 X 7500 mm
STANDART ve KALİTESİ : EN 10028-2-2017 P355GH (ERDEMİR 6352)
ÜRÜN TİPİ ve AÇIKLAMASI : LKK : KENARLARI KESİLMEMİŞ, LEVHA
ŞARTNAME NO : 20080082388
LOT NO :

T E S T S E R T İ F İ K A S I

EN 10204 : 2004 TİP 3.1

CE 2195

CERTIFIED ACC TO PED 2014/68/EU (2016/07/19) NOTIFIED BODY NUMBER 2195

TARİH : 20/02/2021
SERTİFİKA NO : 21Y000027332
SAYFA NO : 1 / 1

YÜZEY KALİTESİ KONTROL STANDARDI : EN 10163 CLASS B SUBCLASS 3
ULTRASONİK TEST STANDARDI : EN 10160 CLASS / S1E1

ÜRÜN BİLGİLERİ						MEKANİK ÖZELLİKLER																										
						ÇEKME TESTİ							SERTLIK_ORT	°C	KATLAMA	DARBE TESTİ (J)					DARBE KIRILMA YÜZEYİ (%)					DWTT(%)				
									% UZAMA						KMÇ															
ETİKET NO	TONAJ (KG)	DÖKÜM NO	BOBİN NO / PAKET NO / LEVHA NO	DİLİM ADEDİ	NORMALIZE DURUMU	NUMUNE YERİ YÖNÜ	AKMA N/MM2	CEKME N/MM2	A5	AKMA_CEKME_ORAN	% Ag	n-90		Y.SIC. AKMA N/MM2	AÇI	SICAKLIK °C	1	2	3	ORT	SICAKLIK °C	1	2	3	ORT	SICAKLIK °C	1	2	ORT
1210203161679	7,710	110013	1023000237L010	1	NMZ																								
			11001320700110			BE	369	574	27.2							-20	132	130	125	129									

AE AÇIKLAMALAR

Pcm=C+Si/30+Mn/20+Cu/20+Ni/60+Cr/20+Mo/15+V/10+5B
IIW/Ceq=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15 Ceq=C+Mn/6
Ceq=C+(Mn+Si)/6
UCS: 230C*+190S+75P+45Nb-12.3Si-5.4Mn–1
AE1: Nb+V+Ti AE2: Cu+Cr+Ni
AE3: Cr+Cu+Mo+Ni AE4: Cr+Mo+Ni
AE5: Al/N AE6: Cu+Ni
AE7: P+S AE8: Si+2.5P
AE9: Ti/N AE10: Ti/B
AE11: Mn/Si AE12: Cu+Ni+Cr+Mo+V
AE13: Mo+Cr AE14: Cr+Cu+Mo
AE15: Nb+V AE16: Nb+V+Ti+B
AE17: Nb+Ti AE18: C+P
AE19: Mn+Cr+Mo AE20: Mn/C
AE21: 3.4N + 1.5S AE22: Al+Si
AE23: Mn+Si AE24: Cu+Ni+Mo

AE25: C + (Mn/5) + (5*P)-(Ni/10)-(Mo/15)+(Cu/10) (Segregasyon Endeksi)

KİMYASAL BİLEŞİM , DÖKÜM ANALİZİ

DÖKÜM NO	C	Mn	P	S	Si	Al	Cu	Cr	Ni	Mo	V	Nb	Ti	N	Pcm	Ceq(IIW)	AE3	AE5
	%	%	%	%	%	%	%	%	%	%	%	%	%	ppm	%	%	%	%
110013	0,213	1,554	0,012	0,003	0,459	0,036	0,032	0,031	0,038	0,001	0,007	0,000	0,004	51	0,314	0,484	0,102	7,059

EREĞLİ DEMİR ve ÇELİK FABRİKALARI T.A.Ş. BU MALZEMENİN BAZİK OKSİJEN METODU İLE YAPILMIŞ OLDUĞUNU VE EN 10028-2-2017 P355GH (ERDEMİR 6352)

KAİDELERİNE UYGUN OLARAK TEST EDİLDİĞİNİ YUKARIDAKİ DEĞERLERİ İLE TEVSİK EDER .

SERKAN DİKEÇ
KALİTE METALURJİ MÜDÜRÜ

KAAN TANRIÖVER
METALURJİ LABORATUVARI BAŞMÜHENDİSİ

NOT: B : Baştan , O : Ortadan , S : Sondan , E : Enine , L : Boyuna, KMÇ: Katlama Mandrel Çapı
Bu test sertifikası, EN 10204 : 2004 Bölüm 5'e göre uygun bir veri işleme sistemi tarafından hazırlanmış ve imza olmadan geçerlidir.
NMZ : NORMALIZE YAPILMIŞTIR, NR : NORMALIZEYE ESDEGER HADDELENMISTIR. DARBE NUMUNE EBATLARI, KALINLIK ARALIĞINA GÖRE t≥6-8 MM / 8 ≤ t < 10 MM / t≥10 MM, NUMUNE ÖLÇÜLERİ, KALINLIĞA BAĞLI 10X5X55 / 10X7,5X55 / 10X10X55 MM

SGS TÜV SAAR

ZERTIFIKAT

SGS-TÜV Saar GmbH
bescheinigt hiermit, dass das Unternehmen

Flumatec Rohrleitungs + Montage GmbH
Am Hausplatz 8
D-57258 Freudenberg

den Nachweis über die Erfüllung der Voraussetzungen nach

ISO 3834-3:2006
AD 2000 Merkblatt HP100R

erbracht hat.

Die Voraussetzungen für eine sachgemäße Fertigung entsprechend den vorgenannten Normen sind gegeben.

Insbesondere verfügt das Werk über:

- Fertigungs- und Schweißeinrichtungen
- Schweiß- und Schweißaufsichtspersonal
- Prüfeinrichtungen
- Prüf- und Prüfaufsichtspersonal
- Personal für die Übertragung von Kennzeichnungen

in dem als Anlage zum Prüfbericht Nr. 71 201 20 Q 20640 0015
vom 05.06.2020 beschriebenen Umfang.

Zertifikat Nr.: **71 201 20 QZ 20640 0015**
Sulzbach, 05.06.2020

SGS-TÜV Saar GmbH
Anlagentechnik Herstellung

Gültig bis: 04.06.2023

Dipl.-Ing. (FH) O. Schäfer

SGS-TÜV SAAR GmbH · SGS TÜV SAAR · Technische Überwachung

SGS-TÜV Saar GmbH
Am TÜV 1
D-66280 Sulzbach

Tel. +49 6897 506 330
Fax +49 6897 506 279
E-mail info@sgs-tuev.de

Mitglied der CEOC
CONFÉDÉRATION EUROPÉENNE D'ORGANISMES DE CONTRÔLE

10.3 Safety data sheet desiccant

10.3 Sicherheitsdatenblatt Trockenmittel

10.3 Паспорт безопасности Осушитель

10.3 Veiligheidsinformatieblad droogmiddel

10.3 Desecante de la hoja de datos de seguridad

10.3 Déshydratant la fiche de données de sécurité

Safety data sheet

Reach regulation (EC) n° 1907/2006 - n° 435/2010

Version: 2.3
Date: 13-09-2013

SECTION 1: Identification of the substance/mixture and of the company/undertaking		
1.1	Product identifier: Product code:	**AxSorb D** 22600
1.2	Relevant Identified used of the substance or mixture and uses advised against:	Adsorbent for gas and liquid treatment. (For further information, refer to the product technical data sheet). Doped Alumina sodium monoxyde. **Use descriptor system (REACH) :** PROC 5 / PROC 4 / PROC 10 / PROC 11 / PROC 13 / PROC 19 / PROC 7 / PROC 9 / PROC 8a / PROC 8b / PROC 2 / PROC 23 / PROC 24 / PROC 25 / PROC 14 / PROC 3 ERC 8e / ERC 7 / ERC 3 / ERC 2 / ERC 11a / ERC 4 / ERC 8a / ERC 8d / ERC 5 / ERC 10a / ERC 1 PC 20 / PC 29 / PC 38 / PC 32 / PC 35 / PC 31 / PC 2 / PC 16 / PC 15 / PC 14 / PC 3 / PC 1 / PC 0 SU 10 / SU 12 / SU 13 / SU 14 / SU 17 / SU 8 / SU 9

SECTION 2: Hazards identification		
2.1	Classification of the substance or mixture according to regulation (EC) No 1272/2008: Classification according to 67/548/EEC or 1999/45/EC:	This mixture does not present a physical hazard. Refer to the recommendations regarding the other products present on the site. This mixture does not present a health hazard with the exception of possible occupational exposure thresholds (see paragraphs 3 and 8). This mixture does not present an environmental hazard. No known or foreseeable environmental damage under standard conditions of use. This mixture does not present a physical hazard. Refer to the recommendations regarding the other products present on the site. This mixture does not present a health hazard with the exception of possible occupational exposure thresholds (see paragraphs 3 and 8). This mixture does not present an environmental hazard. No known or foreseeable environmental damage under standard conditions of use.

2.2 Label elements Labelling according to Regulation (EC) No 1272/2008 Information concerning particular hazards for human and environment:	None **Safety phrases:** 22 Do not breathe dust
2.3 Other hazards	The mixture does not contain any substances classified as 'Substances of Very High Concern' (SVHC) by the European CHemical s Agency (ECHA) under article 57 of REACH: http://echa.europa.eu/fr/candidate-list-table The mixture satisfies neither the PBT nor the vPvB criteria for mixtures in accordance with annexe XIII of the REACH regulations EC 1907/2006. Avoid the formation or spread of dust in the atmosphere.

SECTION 3: Composition/information on ingredients

3.1 Substances

No substances fulfil the criteria set forth in annexe II section A of the REACH regulation (EC) n° 1907/2006.

Composition				
Identification	(EC) 1272/2008	67/548/EEC	Note	%
INDEX: 1344_28_1 CAS: 1344-28-1 EC: 215-691-6 REACH: 01-2119529248-35 ALUMINIUM OXIDE			[1]	50<= x % 100

Information on ingredients:

[1] Substance for which maximum workplace exposure limits are available

SECTION 4: First aid measures

4.1 Description of first aid measures General information: After inhalation: After skin contact:	 As a general rule, in case of doubt or if symptoms persist, always call a doctor. NEVER induce swallowing by an unconscious person. Move the affected person away from the contaminated area and into the fresh air. I Watch out for any remaining product between skin and clothing, watches, shoes, etc. Rinse with plenty of water.

After eye contact: After swallowing:	Wash thoroughly with soft, clean water for 15 minutes holding the eyelids open. If there is any redness, pain or visual impairment, consult an ophthalmologist. Seek medical attention, showing the label. Rinse mouth out with water.
4.2 Most important symptoms and effects, both acute and delayed	The main symptoms and effects known are described in the label (§ 2) and / or in section 11.
4.3 Indication of any immediate medical attention and special treatment needed	Symptomatic treatment.

SECTION 5: Firefighting measures	
5.1 Suitable extinguishing agents	All extinguishing agents can be used. If there is a fire close by, use suitable extinguishing agents.
5.2 Special hazards arising from the substance or mixture	A fire will often produce a thick black smoke. Exposure to decomposition products may be hazardous to health. Do not breathe in smoke. In the event of a fire, the following may be formed : - Carbon Dioxide (CO2)
5.3 Advice for firefighters	No data avaible

SECTION 6: Accidental release measures	
6.1 Personal precautions, protective equipment and emergency procedures:	Consult the safety measures listed under headings 7 and 8. Since the product is in the form of balls, it can cause the floor to be very slippery.
6.2 Environmental precautions:	Prevent any material from entering drains or waterways.
6.3 Methods and material for containment and cleaning up:	Retrieve the product by mechanical means (sweeping/vacuuming). If necessary, wash with water following recovery.
6.4 Reference to other sections	No data available.

SECTION 7: Handling and storage

7.1	Precautions for safe handling	Always wash hands after handling. Does not require any specific or particular measures. Avoid the formation or spread of dust in the atmosphere. Ventilation. Do not mix with incompatible materials (See list section 10).
	Information about fire - and explosion protection:	Prevent access by unauthorised personnel. No smoking, eating or drinking in areas where the mixture is used.
7.2	Conditions for safe storage, including any incompatibilities	Keep away from incompatible materials. Keep the container tightly closed in a cool, well ventilated place. To guarantee the quality and properties of the product keep : - protected from humidity and bad weather conditions.
	Packaging	Always keep in packaging made of an identical material to the original
7.3	Specific end use(s)	No further relevant information available.

SECTION 8: Exposure controls/personal protection

Occupational exposure limits:

- ACGIH TLV (American Conference of Governmental Industrial Hygienists, Threshold Limit Values, 2010) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	-	-	-	-

- Australia (NOHSC: 3008, 1995) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	-	-	-	-

- Belgium (Order of 19/05/2009, 2010) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	-	-	-	-

- Canada / Alberta (Occupational health and safety code, 2009) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	-	-	-	-

- Canada / British Colombia (2009) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	20 mg/m³	-	-	-

- Canada / Quebec (Regulations on occupational health and safety) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	-	-	-	T

- China (GBZ 2.1, 2007) :

CAS	TWA :	STEL :	ANM :	TWA :	STEL :
1344-28-1	10 mg/m³	6 mg/m³	-	-	T

- Denmark (2007) :

CAS	TWA :	TWA	ANM:		
1344-28-1	10 mg/m³	5 mg/m³	-		

- France (INRS – ED984 :2008) :

CAS	VME-ppm:	VME-mg/m³:	VLE-ppm:	VLE-mg/m³:	Notes:
1344-28-1	-	10	-	-	-

- Hong Kong (Code of practice on control of air impurities in the workplace, 04/2002)

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	-	-	-	I

- Ireland (Code of practice for the safety, Health and Welfare at Work, 2010) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	4 mg/m³	-	-	-	R

- Japan (JSOH, 20/05/2009) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	0.5 mg/m³	-	-	-	R

- Malaysia :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	-	-	-	-

- Norway (Veiledning om administrative normer for forurensning i arbeidsatmosfære, May 2007) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	-	-	-	-

- Sweden (AFS 2007:2) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	2 mg/m³	-	-	-	R

- USA / OSHA PEL (Occupational Safety and Health Administration, Permissible Exposure limits) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	5 mg/m³	-	-	-	R

- UK / WEL (Workplace exposure limits, EH40/2005, 2007) :

CAS	TWA :	STEL :	Ceiling :	Definition :	Criteria :
1344-28-1	10 mg/m³	-	-	-	TI

Derived no effect level (DNEL) or derived minimum effect level (DMEL):
ALUMINA/BOEHMITE : DNEL : 3000 µg/m3 (in Al2O3)

Predicted no effect concentration (PNEC):
ALUMINIUM OXIDE (CAS: 1344-28-1)
Environmental compartment: Fresh water.
PNEC : 0.0749 mg/l

Environmental compartment: Waste water treatment plant.
PNEC : 20 mg/l

Personal protection measures, such as personal protective equipment

Pictogram(s) indicating the obligation of wearing personal protective equipment (PPE) :.

Use personal protective equipment that is clean and has been properly maintained.
Store personal protective equipment in a clean place, away from the work area.
Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using. Ensure that there is adequate ventilation, especially in confined areas.

- Eye / face protection
Avoid contact with eyes.
Before handling powders or dust emission, wear mask goggles in accordance with standard EN166.
Safety spectacles with side shields.

- Hand protection
Wear suitable protective gloves in the event of prolonged or repeated skin contact.
Type of gloves recommended :
- Natural latex
- Nitrile rubber (butadiene-acrylonitrile copolymer rubber (NBR))

- Neoprene® (Polychloroprene)
- PVC (polyvinyl chloride)

Recommended properties :
- Impervious gloves in accordance with standard EN374

- Body protection
Work clothing worn by personnel shall be laundered regularly.
After contact with the product, all parts of the body that have been soiled must be washed.
Protective clothing with elasticated cuffs and closed neck.

- Respiratory protection
Avoid breathing dust.
Type of FFP mask : Wear a disposable half-mask dust filter in accordance with standard EN149.
Category :
- FFP1

Particle filter according to standard EN143 :
- P1 (White)

SECTION 9: Physical and chemical properties

9.1	Information on basic physical and chemical properties	
	General information Form:	Solid in granules
	Colour:	White
	Important health, safety and environmental information	

pH :	Not relevant
Boiling point / boiling range :	Not relevant
Flash point interval :	Not relevant
Vapour pressure (50°C) :	Not relevant
Density :	< 1
Water solubility :	Insoluble
Melting point / melting range :	2000°C
Self-ignition temperature :	Not relevant
Decomposition point / decomposition range	Not relevant

9.2	Other information:	No data available

SECTION 10: Stability and reactivity

10.1. Reactivity
No data available.

10.2. Chemical stability
This mixture is stable under the recommended handling and storage conditions in section 7.

10.3. Possibility of hazardous reactions
No data available.

10.4. Conditions to avoid

Avoid formation of dust

10.5. Incompatible materials

Keep away from :
- strong acids
- strong bases
- strong oxidising agents

10.6. Hazardous decomposition products

The thermal decomposition may release/form :
- carbon monoxide (CO)
- carbon dioxide (CO2)

SECTION 11: Toxicological information

11.1. Information on toxicological effects

No data available.

11.1.1. Substances

Acute toxicity :

ALUMINIUM OXIDE (CAS: 1344-28-1)	
Oral route :	DL50 > 2000 mg/kg Species : Rat OCDE Ligne directrice 401 (Toxicité aiguë par voie orale)
Inhalation route :	LC50 > 2.3 mg/l Species : Rat OCDE Ligne directrice 403 (Toxicité aiguë par inhalation)

11.1.2. Mixture

The product has not been tested. The indication is based on the properties of the different components.

Acute toxicity :

negative

Skin corrosion/skin irritation :

Prolonged or repeated exposure may cause skin irritation and dermatisis due to the defatting properties of the product.

Serious damage to eyes/eye irritation :

May cause irritation to eyes due to the presence of a foreign body.

Respiratory or skin sensitisation :

negative

Germ cell mutagenicity :

negative

Carcinogenicity :

negative

Reproductive toxicant :

negative

Specific target organ systemic toxicity - single exposure :

negative

Specific target organ systemic toxicity - repeated exposure :

negative

Symptoms related to the physical, chemical and toxicological characteristics

no data

SECTION 12: Ecological information

12.1. Toxicity

Not harmful to aquatic life

12.1.1. Substances

ALUMINIUM OXIDE (CAS: 1344-28-1)	
Fish toxicity	LC50 > 100 mg/l Species : Salmon trutta Duration of exposure : 96h OCDE Ligne directrice 203 (Poisson, essai de toxicité aiguë)
Crustacean toxicity	EC50 > 100 mg/l Species : Daphnia magna Duration of exposure : 48h OCDE Ligne directrice 202 (Daphnia sp., essai d'immobilisation immédiate)
Algae toxicity	ECr50 > 100 mg/l Species : Selanastrum capricornutum Duration of exposure : 72h OCDE Ligne directrice 201 (Algues, Essai d'inhibition de la croissance)

12.1.2. Mixtures

The product has not been tested. The indication is based on the properties of the different components.

12.2. Persistence and degradability

Slightly degradable product.

12.2.1. Substances

ALUMINIUM OXIDE (CAS: 1344-28-1)

Biodegradability: no degradability data is available, the substance is considered as not degrading quickly.

12.3. Bioaccumulative potential

No data

12.4. Mobility in soil

Partly dissolves, but significant proportion will remain. If product enters soil, one or more constituents will be mobile and may contaminate groundwater.

12.5. Results of PBT and vPvB assessment

Complies with annexe XIII of regulation CE 1907/2006 (REACH): not applicable to inorganic substances

12.6. Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1	Waste treatment methods	Do not pour into drains or waterways.
	Waste disposal key:	Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals. Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector or company. Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

	The exhausted catalysts may have different risks and properties compared to the original product. This safety data sheet is not applicable to exhausted catalysts.
Soild packaging:	Empty container completely. Keep label(s) on container. Empty containers should be taken to local recyclers for disposal. Refer to local regulations.
Codes of waste:	**(Decision 2001/573/EC, Directive 2006/12/EEC, Directive 94/31/EEC on hazardous waste):** 06 03 16 metallic oxides other than those mentioned in 06 03 15

SECTION 14: Transport information		
14.1	Exempt from transport classification and labelling.	Transport product in compliance with provisions of the ADR for road, RID for rail, IMDG for sea and ICAO/IATA for air transport (ADR 2013 - IMDG 2012 - ICAO/IATA 2013).

SECTION 15: Regulatory information		
15.1	Safety, health and environmental regulations / legislation specific for the substance or mixture:	Substance(s) listed on the following regulatory lists: - Australia Exposure Standards - Australian Inventory of Chemical Substances (AICS): - Australia High Volume Industrial Chemical List (HVICL) - OECD List of High Production Volume (HPV) Chemicals - International Council of Chemical Associations (ICCA) - High Production Volume List 1344-28-1 - Aluminium oxide : ---------- None of the ingredients is listed on the following regulatory lists: - Montreal Protocol (Ozone depleting substances) - The Stockholm Convention (Persistent Organic Pollutants) - The Rotterdam Convention (Prior Informed Consent) Waste catalysts containing principally inorganic constituents, which may contain metals (and organic materials) are concerned by the Basel Convention (Hazardous Waste).
	Classification and labelling information included in section 2 :	The following regulations have been used: - Directive 67/548/EEC and its adaptations - Directive 1999/45/EC and its adaptations - Regulation EC 1272/2008 modified by regulation EC 618/2012
	Container information :	No data available.
	Particular provisions :	No data available.
15.2	Chemical safety assessment	No data available

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on national and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Abbreviations :

PNEC : Predicted No-Effect Concentration
ADR : European agreement concerning the international carriage of dangerous goods by Road.
IMDG : International Maritime Dangerous Goods.
IATA : International Air Transport Association.
ICAO : International Civil Aviation Organisation
RID : Regulations concerning the International carriage of Dangerous goods by rail.
WGK : Wassergefahrdungsklasse (Water Hazard Class).
PROC : Process Category
ERC : Environmental Release Category
PC : Market sector by type of Chemical Product
SU : Sector of end Use

11. Documentation of main components

11. Dokumentation der Hauptkomponenten

11. Документация по основным компонентам

11. Documentatie van de belangrijkste componenten

11. Documentación de los componentes principales

11. Documentation des principaux composants

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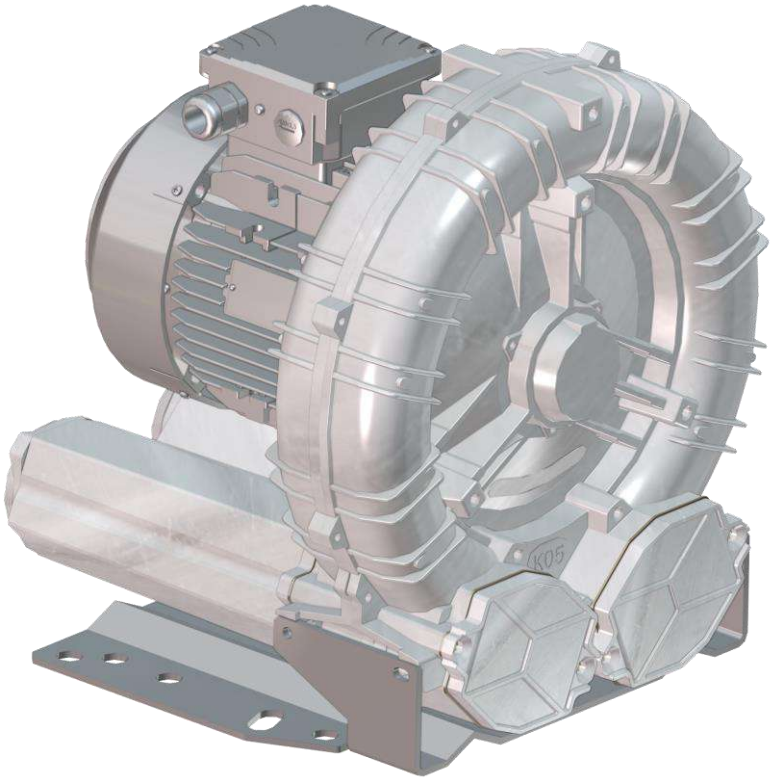
COMPRESSORI-ASPIRATORI A CANALE LATERALE **ISTRUZIONI** **I**
LATERAL CHANNEL BLOWERS-EXHAUSTERS **INSTRUCTIONS** **GB**

WARNING

Leggere e seguire le istruzioni prima dell'uso e conservare il manuale come riferimento per il futuro. Il mancato rispetto di tutte le istruzioni del produttore, inclusa l'installazione impropria o l'uso improprio del prodotto, le alterazioni del prodotto e/o il mancato utilizzo del prodotto in conformità al presente manuale, possono causare danni, lesioni gravi o morte. I

Read and follow all instructions before use and keep manual for future reference. Failure to comply with all manufacturer's instructions, including improper installation or use of the product, alterations to the product, and/or failure to use the product in accordance with this manual can result in property damage, serious injury or death. *GB*



Per ulteriori informazioni o assistenza all'installazione, prego contattare:
For further information or assistance with installation, please contact:

@ service@fpz.com +39 039 690981

COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =

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1 GENERAL INFORMATION

Read the manual for safety information on correct installation, operation and maintenance.

1.1 PURPOSE OF MANUAL

- The purpose of the manual is to complete the information contained in the *operative instructions* (Figure 1*)* supplied with the blower in order to give "instructions for use" to the skilled operator to prevent and minimize risks during the interaction between man and machine.
- For safe installation, carefully read this manual before installing the product and follow all instructions exactly as shown.
- The information was prepared by the manufacturer in the original language (ITALIAN) considering the content communication effectiveness for the interested parties also depending on the operator's qualifications and perspicacity.
- Keep the *operative instructions* (Figure 1*)* for the entire service life of the unit in a known and easy to access place to make it always at hand for reference.
- Any observations made by recipients can be an important contribution to improve the after-sales services provided by the manufacturer.
- The information contained in this manual is intended for use by specialized operators whose definition is contained in the document MAN_PIC (Figure 2).

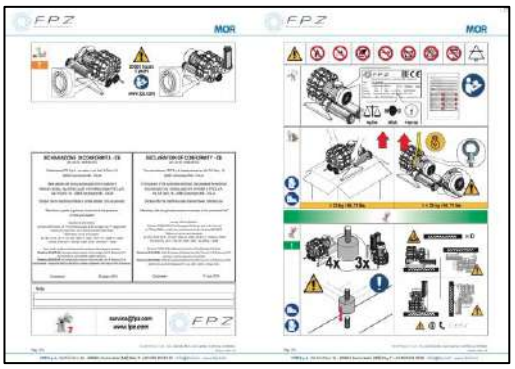


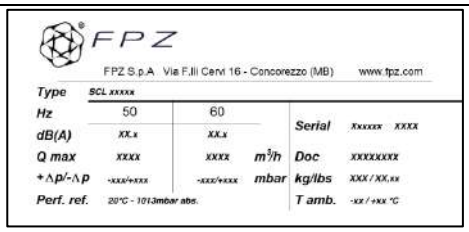
Figure 1 – *Operating Instruction*

Figure 2 - Document MAN_PIC

1.1 TECHNICAL DATA – NAMEPLATE

On the product nameplate are stated:

• Unit description
• Performance (Noise [dB], Flow [m^3/h] and Pressure [mbar]) at 50 Hz and 60 Hz frequency referring to 20°C and 1013 mbar abs.
• Serial number and year of manufacture
• Reference Doc. (*Operating Instruction)*
• Weight [kg/lbs]
• Reference temperature for the working blower (T. amb)



It is strictly forbidden to remove or tamper with the product label.

1.1 TESTING, WARRANTY AND LIABILITY

Testing and inspection

- The entire unit is sent to the customer ready for installation, after passing the tests and inspections required by the manufacturer, in conformity with the applicable laws and the mandatory technical standards.

Warranty

- Warranties are defined in the general terms and conditions of sale.

Liability

- See document MAN_PIC.

2 SAFETY RULES

2.1 IMPORTANT SAFETY INFORMATION

WARNING **The instructions listed below must be read carefully and become a fundamental part of daily procedures in the normal use and maintenance of all the equipment, in order to prevent any kind of personal or domestic animals (even serious) injury (or death) or damage to equipment.**

- Do not start the unit until its operation is clearly understood.
- All installation, commissioning and maintenance operations must be carried out by specialized operators only (see doc MAN_PIC).
- Keep the area around the unit constantly free of obstructions.
- Use appropriate PPE (Personal Protective Equipment) such as boots, gloves, goggles and work clothes.
- Pay attention to all danger and caution signs placed on the unit.
- Do not wear clothes, jewelry or accessories that can get caught in the cooling fan of the electric motor or that can be sucked into the blower.
- Do not modify the electrical connections on the unit.
- Observe all local, state and national electrical codes.
- Before starting the unit and/or with weekly frequency, the operator must check the efficiency of the devices that ensure the operation of the unit and any other unit defects. In case of any defects, immediately notify FPZ S.p.A.
- Devices that ensure the operation of the unit must never be removed or rendered useless.
- During maintenance or repair work, it may be necessary to exclude some mentioned devices from the service. This operation must be carried out by specialized operators only (see doc MAN_PIC).
- Always apply and enforce the safety rules; in case of any doubts, always consult this manual before acting.

WARNING **Non-compliant installation with the unit's intended use can cause personal (even serious) injury (or death) or damage to equipment.**

The unit must only be started:

- in conformity with the purposes of use, transport and handling specified in "FORESEEN USE";
- respecting the values given in the nameplate data.

2.2 PROHIBITIONS

WARNING **Failure to comply the following PROHIBITIONS can cause personal (even serious) injury (or death) or damage to equipment.**

- NEVER suck up and convey aggressive, corrosive, and/or harmful fluids.
- NEVER use the unit under conditions that differ from those indicated on the nameplate.
- NEVER use the unit without having installed a suction filter.
- NEVER operate with the suction and/or delivery openings closed.
- NEVER make conversions or changes to the unit, maintenance or repair work on one's own initiative or not envisaged in the manual. Maintenance work can be carried out only in compliance with what is described in this user manual, exclusively by specialized operators (see document MAN_PIC).
- NEVER use the unit in places where ATEX classification does not comply with Annex II of Directive 1999/92/EC.
- NEVER use the unit without having first installed and connected the sensors and/or regulators required to the plant and correctly installed and checked the seal system of the machine.
- NEVER use the unit with ambient temperatures below -15°C (+5°F) and above +40°C (+104°F).
- NEVER use the unit before ensuring correspondence between grid voltage and motor label voltage.

3 PROPER AND IMPROPER USE

3.1 OPERATING CONDITIONS

WARNING **Failure to observe the temperature, altitude, differential pressure and filtering modes for design and operation specifications there can be an impeller break which can cause personal (even serious) injury (or death) or damage to equipment .**

- The maximum permissible differential pressure indicated on the product nameplate must never be exceeded.
- It is important to install the unit at a maximum altitude of 1000 m (3300 ft.) above sea level, for higher altitudes contact FPZ.
- The unit is designed to operate at ambient temperature between -15°C (+5°F) and +40°C (+104°F).
- In case of suction in the environment or on the plant, protect the suction pipe using a suitable filter with a maximum degree of filtration of 25µm. Contact FPZ for filters with a different filtration degree. Check the compliance with the data of maximum pressure/vacuum listed on the nameplate. For ATEX blower we recommend an ATEX filter with a filtration degree of 20 µm / 25 µm.
- Installation, operation and maintenance of the blower must be carried out by specialized operators (see document MAN_PIC). Due to incorrect maintenance or an unauthorized modification, a non-compliant condition of use is determined, so the responsibility lies with the customer or end user.

NOTICE If installed outdoors, protect the unit against exposure to sunlight and to atmospheric agents.
If the flow rate has to be reduced, use a draw-off valve rather than throttling back the suction or delivery lines.

3.2 STANDARD SIDE CHANNEL BLOWER

FPZ side channel blowers / exhausters are designed to generate vacuum and overpressure for conveying non-explosive, non-flammable, non-dangerous gases and air in continuous use in a non-explosive environment. Side channel blowers are not designed to transport dusts of any grain size.

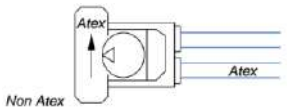
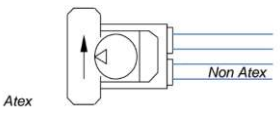
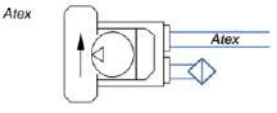
FPZ side channel blowers / exhausters are designed and built for use in industrial plants and are equipped with three-phase or single-phase asynchronous bipolar electric motors in compliance with IEC 60034-1.

3.3 ATEX BLOWERS (Category 3GD – Category 2G)

Atex blowers are designed and built in accordance with 2014/34/UE Directive and European standards EN 1127-1, EN 13463, EN 14986, considering the compatibility of unit components with treated fluids (contact FPZ for components compatibility details). Accessories and monitoring systems linked to the unit have to be compliant with 2014/34/UE Directive.
It is recommended that the connections and suction and delivery pipes are in metal or antistatic material.

Units are group II devices for use in environments classified as explosive for the presence of Gas (G) zone 1/2 and/or Dust (D) zone 22.

- If not specifically indicated, the ATEX label refers to the equipment “indoor” and “outdoor” area.
- In the case of a double indication separated by the “/” symbol, the first number indicates the “indoor” category (internal surface of the blower), the second number the “outdoor” category (outside of the blower, including the electric motor).
- The blower protection mode is constructive (“EX **c**”).
- Electric motors have different protection modes depending on the category and the environment they are designed for.
- All “2G” e “3/2G” configurations have explosion-proof motors (EX d protection).
- Classification of work zones:

1	Use of blower for conveying flammable gas	**Equipment with internal potentially explosive atmospheres, intended for use in areas that are not classified**	
2	Use of blower for conveying non-hazardous fluids in ATEX classified environment	**Equipment with internal non-explosive atmospheres and intended for use in areas that are classified**	
3	Use of blower with suction of ambient air and operating in a classified zone	**Equipment with internal explosive atmospheres, interfaced with process atmospheres and intended for use in areas that are classified**	

3.4 IMPROPER USE AND ASSOCIATED RISKS

WARNING	**Non-compliance with the unit's intended use or with prohibitions/obligations can cause personal (also serious) injury (or death) or equipment damage.**

- Listed below are some improper uses, identified through risk assessment and experiences. Improper uses are subdivided according to the conditions that they may generate.
- The list is a non-exhaustive and representative example of improper use and associated risks.

IMPROPER USE	POSSIBLE CONSEQUENCES	RISKS
IMPROPER USE LINKED TO NORMAL OPERATION		
Absence of cyclic monitoring and control.	Anomalous operation not detected / hidden.	Risk of damage to the unit, with possible injury (or death) for the operator if present nearby.
Different installation with respect to manufacturer's suggestion.	Yielding / break of fastening points.	Risk of damage to the unit, with possible injury (or death) for the operator if present nearby. The unit may fall or be subject to damage due to incorrect load at support.
Operation outside the performance indicated on the blower and electric nameplate.	Seizure of the impeller.	Risk of damage to the unit, with possible injury (or death) for the operator if present nearby. The unit may break.
Proceeding at all stages without consulting the *operating instructions* and this manual.	Using the unit for unforeseen purposes and without considering the associated risk factors.	Risk of damage to the unit, with possible injury (or death) for the operator if present nearby.
IMPROPER USE LINKED TO METHODS OF USE		
Use of a fluid different from that indicated / forbidden.	Incorrect workload.	Risk of damage to the unit, with possible injury (or death) for the operator if present nearby. The unit may break.
Physical load applied to the machine (no element excluded).	Breakage and/or presence of leakage of fluid collected.	Risk of damage to the unit, with possible injury (or death) for the operator if present nearby due to inhalation of harmful substances.
IMPROPER USE LINKED TO THE STOPPAGE OF A BLOWER		
Manipulation of the machine still rotating / moving.	Direct contact of the operator with moving parts and with the surface unit still hot.	Risk of possible injury for the operator such as burns and entanglement.
Disconnecting the unit from the electricity with the voltage inserted.	Direct contact of the operator with the live parts.	Risk of possible injuries for the operator through electrocution.
IMPROPER USE LINKED TO MAINTENANCE WORK		
Handling the machine differently from instructions for use.	Falling or sudden movement of the unit.	Risk of damage to the unit, with possible injury for the operator if present nearby.
Use of liquid during unit cleaning operations.	In case of stagnation, characteristics of the material may be compromised.	Risk of damage to the unit, with possible injury for the operator if present nearby.
Use of types of spare parts different to those supplied by FPZ.	Different performance from design (pressure, noise, vibration, sealing).	Risk of damage to the unit, with possible injury for the operator if present nearby.
BREAKDOWN AND EMERGENCY CONDITIONS		
Not stopping the machine when it is making an unusual noise.	Seizure of the impeller and overheating of the unit and of the electric motor.	Risk of damage for the unit, with possible injury (or death) for the operator if present nearby. The unit may break down.

4 STORAGE AND TRANSPORT

4.1 RECEIPT AND CHECK OF THE PACKAGE

- When receiving the unit, it is necessary to check that the packaging is intact and free from signs of damage due to transport or storage conditions.
- In the case of damage to the packaging, immediately inform the shipping agent and the manufacturer.

4.2 HANDLING AND TRANSPORT

Danger of crushing and / or impacting various parts of the body

During the transport and handling phases due to the sudden drop or displacement of the packaging, there may be a risk of crushing and / or impacting various parts of the body. During the activities around the unit, the operator may fall due to stumbling or slipping.
Use equipment compliant with the laws and follow the handling and manual handling procedures described in the operating manual, based on the weight indications on the packaging and in accordance with applicable regulations in the state in which this activity takes place. Use safety shoes during this phase.

4.3 STORAGE

- Store in a dry place, possibly keeping the machine in the packaging.
- Do not remove the protective covers of the openings.
- In the event of long-term storage, remove dust deposits on external surfaces and, before commissioning, check the unit's functional status with a startup test.

5 INSTALLATION

5.1 INSTALLATION CONDITIONS

Commissioning and operation must only take place under the following installation conditions:

- The unit must be completely assembled and intact (not damaged or tampered).
- Silencers must be connected to the pipe system (see *operating instructions*); if silencers are not present, make sure that the connection is made by flexible sleeve.
- The machine must be securely fastened to the predetermined site and in the recommended modes (see *operating instructions*).
- The motor must be connected to a suitable control panel.
- Ensure the visibility of the unit installed from the position of the control elements.

Danger of ejection of objects

The entry of foreign bodies into the unit, even if very small, can cause personal serious injury (or death) and/or equipment damage with probable breakage of the impeller blades, including the danger of debris can be thrown out of the machine violently.
Remove the closure caps from the silencers and connect the pipes of the system, making sure to carry out the operation in a non-dusty area to prevent the entry of foreign bodies.

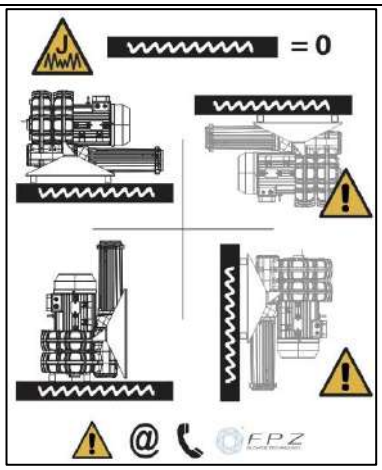
Danger of crushing and / or impacting various parts of the body

During the installation phase due to the sudden drop or displacement of the packaging, there may be a risk of crushing and / or impacting various parts of the body. During work around the unit, the operator may fall due to stumbling or slipping. Use the appropriate device (eg. toe) to hook and lift the unit properly.

Danger of injury to upper limbs

The risk of injury to upper limbs may arise due to a combination of hazards during the mechanical assembly phase and the connection of the machine to the piping. Observe the operating manual to install the unit safely.

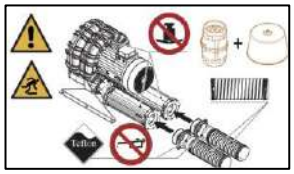
- The support surface of the unit must be flat, robust, stable and absolutely levelled.
- It is important that the unit is installed on supports that do not transmit vibration for example structures or antivibration (supplied with K07÷K12 models).

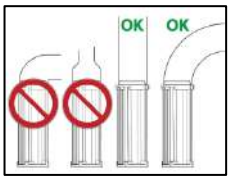


- Connect the pipes with flexible sleeves and avoid the unit bears pipes weight; except for the filter in the case of suction in the environment.

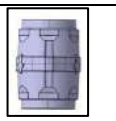
Size the pipes and choose accessories that minimize the load losses, therefore:

- do not fit pipes with diameters smaller than those of the machine's outlets and inlets;
- install multiple machines in parallel, sizing the manifold and main line proportionally;
- do not use angle-pipe, but bends with a large radius of curvature;
- do not install valves with passages smaller than the nominal value and check valves with a stopper pushed by a spring (the check valve with the lowest load loss is the type with a light disc);
- in the case of use for oxygenation, choose low-resistance diffusers (low load loss).

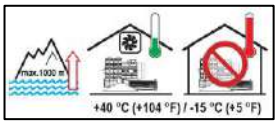




⚠WARNING	To avoid overloads caused by pressure variations, it's recommended that you install a relief valve on aspiration in the case of operation as suction, and on discharge in the case of operation as a compressor.
⚠WARNING	If you need to reduce the flow rate, use a branch valve instead of throttling the suction or discharge.
⚠WARNING	Protect the intake duct with a suitable filter with a filtration degree of 25 µm. Foreign bodies are: dust, sand, calcite, impurities in the pipes, cutting blades and shavings, drops and waste from welding, metal burrs, and residues of sealants produced during connection of pipes. Replace the filters regularly.



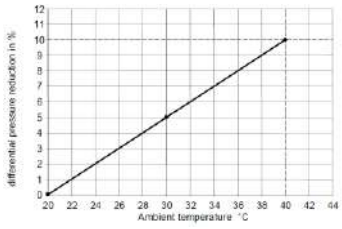
- When installing outdoors, protect the unit against direct exposure to the sun and atmospheric agents. For outdoor installations without the use of protections contact FPZ S.p.A..
- Ventilation of the motor must not be hampered by obstacles placed in the immediate vicinity. For this purpose, the electric motor air intake must remain free and a minimum distance between the electric motor fan cover and any other structure as defined by the manufacturer of electric motor.
- The unit must be installed at a maximum height of 1000 m a.s.l., for different conditions contact FPZ S.p.A..



The ambient temperature, and the conveyed gas intake temperature, is permissible inside the range -15°C (+5°F) ÷ +40°C (+104°F) with the following provisions:

- For ambient temperature +30°C (+86°F) **reduce** the maximum pressure differential given in the Data Sheet by 5%;
- For ambient temperature +40°C (+104°F) **reduce** the maximum pressure differential given in the Data Sheet 10%.

The graph on the right has to be used to reduce the maximum pressure differential in case of ambient temperature between +21°C and +40°C (+70°F and +104°F)



- Check dimensions to allow adequate space for installing the unit with its accessories and ensure sufficient ventilation of the electric motor.

⚠WARNING	In the case of ATEX side channel blower intended for classified areas, the unit must be installed outdoors or in an air conditioned environment.

5.2 BLOWER WITHOUT ELECTRIC MOTOR (GOR – GVR EXECUTION)

NOTICE

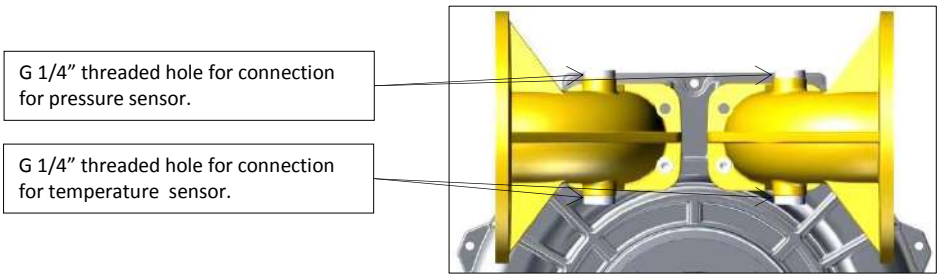
Units supplied without an electric motor, GOR execution (with horizontal coupling) or GVR (with vertical coupling) are considered as partly completed machinery, so the designer has to check the compatibility of the electric motor chosen with the data in the data sheets downloadable from the website.
During installation and maintenance, to install or dismantle the elastomeric coupling; it is recommended not to use a hammer, but pushers or extractors, to fit or remove the coupling flanges from the shaft. . Percussion can damage the slope of the bearings by reducing their durability. Coupling requires axial and angular alignment accuracy. Also refer to the coupling instruction manual.

5.3 ATEX 2G BLOWER (EXCLUDED TMD VERSION)

The blower is arranged for the installation of measurement/control systems in order to prevent machine faults that can produce potential sources of triggering:

- pressure sensor
- temperature sensor.

Danger of explosion. The unit is designed to convey flammable gas and is sealed. Do not start the machine before connecting and activating the unit and surveillance system



Pressure sensor

ALWAYS use a pressure sensor

Given the likelihood of an explosive atmosphere, the use of pressure measuring instruments is compulsory in order to check that the difference between the delivery and suction pressures respects the levels given in the "specifications" and on the machine's rating plate.

NOTICE

The use of an alarm and stop device (non-automatic reset) that automatically shuts off the power to the machine is advisable.

Temperature sensor

A possible temperature sensor is deemed functional for the customer's measurement needs, but can in any way replace the pressure sensor for monitoring any dangerous machine conditions.

WARNING

All the sensors must be protected against possible impacts, damage and atmospheric agents.

5.4 GOR TMD ATEX 2G BLOWER

The blower is designed for the installation of control systems which must be set up by the installer for the purpose of monitoring machine breakdowns which could produce possible sources of combustion:

- vibration sensor;
- pressure switch / vacuum switch;
- thermostat.

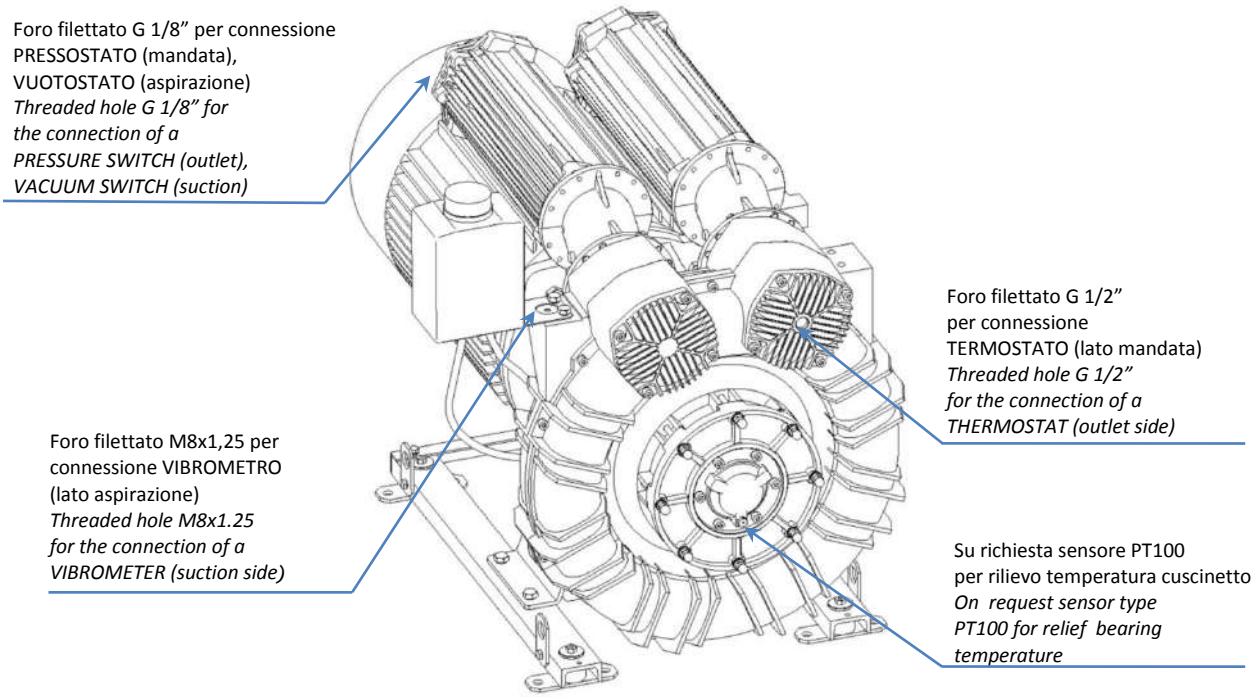
The mechanical seal installed also requires the following operations:

- refilling of the oil tray, as indicated below;
- connection of the oil level sensor.

If necessary, in order to avoid overloads caused by pressure variations, provide a vent device in conformity with EN 1127-1 branching off from the suction pipe, in the case of operation as a suction pump, and on the delivery pipe, in the case of operation as a compressor.

5.4.1 INSTALLATION OF SENSOR GOR TMD ATEX 2G BLOWERS

Install the machine on the plant. Fit the sensors (suitable for the purpose and especially for the Atex environment in question) in their places and connect them to the control system as specified in the instructions provided with the sensors and as required in the plant diagram:



- Vibration sensor

The signal from the sensor must monitor the vibrations of the machine constantly. This signal must be connected to an alarm and block device with manual reset, which automatically interrupts the power supply to the compressor/suction pump at the moment the level of the vibration signal exceeds the predetermined limits.

Effective vibration velocity value [mm/s]	***Class I*** (≤ 15kW)
a<**2.2**	***A***

Effective vibration velocity value [mm/s]	***Class II*** (> 15kW)
a<**3.5**	***A***

- Pressure switch and vacuum switch

The pressure or vacuum switch installed must be calibrated to the maximum pressure or vacuum level specified on the plate of the machine or in accordance with the operating limits of the plant.
The signal must be connected to an alarm and block device, with manual reset, that automatically interrupts the power supply to the machine.

- Thermostat

The thermostat must be set to come on at a temperature not exceeding 125°C to interrupt the power supply to the machine automatically.
The signal must be connected to an alarm and block device, with manual reset, that automatically interrupts the power supply to the machine.

⚠WARNING **All sensors installed must be protected against impact, damage and weathering**. FPZ can supply a protective casing, on request and after receiving the dimensions of the sensors installed.

5.4.2 CONNECTION OF THE MECHANICAL SEAL FOR GOR TMD ATEX 2G BLOWER

Danger of slipping

Oil spills can make the floor slippery. Clean the floor with absorbent and /or degreasing products.

Danger of electrostatic charges

Do not clean or rub the oil reservoir with dry clothes.

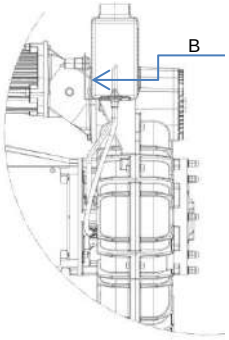
- Refilling the cooling oil tray

Refill the cooling circuit of the mechanical seal. For good circulation of the cooling liquid, it is important not to have air bubbles inside the circuit. To achieve this, refill by pouring the liquid into the vessel repeatedly in small amounts without exceeding level (B) of the return line. Top up completely only when the level at the return line has covered the bottom of the vessel.

The cooling liquid must be kept at least 10 mm above the level of the return line (B); top up as necessary.

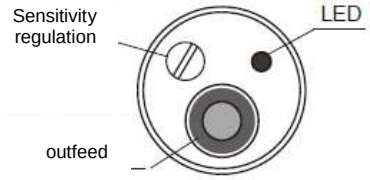
Recommended cooling liquid:	SAE 10W-40 oil Or SAE 5W-40 oil
First filling quantity:	Approx. 1,5 kg

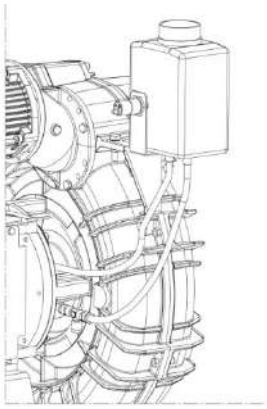
A small leak of fluxing liquid is normal, especially when the seals are settling down.



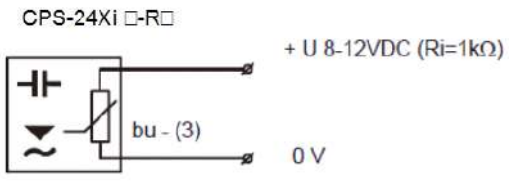
- Connection of the cooling oil level sensor

The capacitive oil level sensor consists of a stainless steel cylindrical body and is suitable for use in explosion risk zones. It is fitted with a potentiometer to regulate sensitivity and a LED display on the back end, which is normally on.





This sensor must be connected to an alarm and block system with manual reset which automatically interrupts the power supply to the machine. Connect the sensor to the control system following the specific instructions enclosed with this manual.



Note: the connection cable must not be cut or tampered with.

5.5 ELECTRIC MOTOR

WARNING **Comply with safety measures and instructions indicated in the instruction manual for the electric motor.**

Before starting working on the unit or system, the following precautions must be taken:
- make sure that the unit is NOT connected to electrical power mains;
- take precautions to prevent electricity from being reconnected;
- open the terminal box only after making sure that there is absolutely no live current.

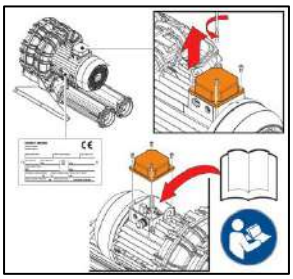
Danger due to electricity

- If connecting operations are carried out without removing the voltage from the electrical system or without setting up a system to avoid reinsertion, direct contact between the operator and the live parts can occur. This can also cause personal serious injury (or death).
- Work on electrical equipment (installation and maintenance) has to be done only by specialized operators (see document MAN_PIC), wearing PPE.
- In the event of contact with a defective unit there is a risk of electrocution. Always have seals and electrics checked regularly by a specialized operator (see document MAN_PIC).
- The terminal box must not contain foreign bodies, impurities or humidity. Close the terminal box with the cover, and seal the cable gland openings to prevent dust, water and humidity from getting inside.

NOTICE In the case of several motor starts during an hour, there is a limitation of 6 start-ups per hour, evenly distributed; failure to respect this can severely damage the unit.

5.5.1 ELECTRIC CONNECTION

Incorrect motor connection may seriously damage the unit.



- Check that the details on the data plate are compatible with the line voltage and frequency.
- Always connect the motor's earth cable to the relevant terminal marked with this symbol before connecting to the mains supply and check the dispersion capacity. The earth cable can be recognized by its color (yellow/green).
- Connect the machine to the earth system too, using the specific hole (marked with the relative symbol) located on the base of the unit. Connection to the power grid must be carried out in compliance with what is shown in the diagram inside the terminal box.
- Use the cable gland openings to allow power supply cables to pass into the terminal box.
- Proceed to tighten the power supply cables, taking the section of the electrical cables into account each time.
- The terminal boards for the electrical connections must be tightened properly to avoid high contact resistances and resulting overheating.
- Check that the insulation gaps between the various conductors are kept in the air and between surfaces, as indicated in the standards.
- All the screws used to close the terminal board must be tightened properly. Damaged screws must be replaced immediately, using screws of the same or better quality.

The connection must guarantee:
- long-lasting safety;
- that no wire ends are sticking out;
- protection with a (thermal or amperometric) trip switch is essential for dealing with risks of overloading, a loss of one phase in the mains supply, excessive voltage fluctuations, or the rotor getting stuck;
- that the motor trip switch have to be set using the current level shown on the nameplate as a maximum.

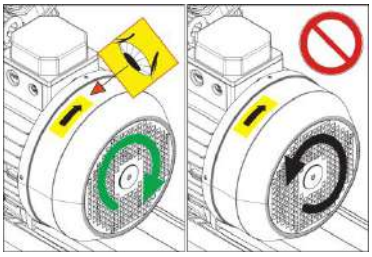
5.5.2 ELECTRIC MOTOR POWERED BY FREQUENCY CONVERTER

The unit's nominal pressure or vacuum characteristics for service at mains frequency cannot be maintained if the unit is powered via a frequency converter. Contact FPZ S.p.A. for information about unit powered by a frequency converter performance.

When power is supplied with a frequency converter, the installer is responsible for:
- respecting the laws;
- checking with FPZ assistance if the motor can be powered by a frequency converter, if it doesn't appear on data sheet;
- checking and making any measures necessary to comply with the immunity and emission limits set by the standards;
- checking the suitability of the plant and the frequency converter for operation with standard motors (class F), or the need to use specific motors for these types of operation.

5.5.3 ROTATION DIRECTION

The machines must be used respecting the rotation direction indicated by the arrow on the electric motor fan cover.



- To check the rotation direction, switch the motor on briefly and observe the fan.
- To change the rotation direction, invert the power cable connections, leaving the earth connection unchanged.

Refer to the connection diagram located inside the terminal box and to this section.

6 START UP AND NORMAL OPERATION

6.1 PRELIMINARY CHECKS

WARNING! Before starting the machine for use, carry out the following preliminary checks:

- if the unit has not been started up for some time, check its condition and, if necessary, remove any dust from the external surfaces, to avoid compromising the heat dissipation during the unit work;
- deactivate/open any pipe closing devices (shut-off valves, solenoid valves, etc.) before starting the unit;
- never start and operate the unit with the inlet and/or outlet ports closed;
- make sure the ambient and conveyed gas suction temperatures come within the levels: -15°C (+5 °F)÷ +40°C (+104 °F);
- check the operation of any flow control/limiting devices (not supplied).

6.2 OPERATION

- If the side channel blower is put into operation without being fixed to a surface, a sudden displacement of the starting torque on ignition of the electric motor may occur.
- The information on the product nameplate must always be considered when commissioning and operating.

The unit can be started for use after carrying out the preliminary checks

- Start the unit by switching on the power to the electric motor.
- Respect the values given in the "specifications" and the electric motor rating data. Pressure losses in the pipes are often underestimated but are decisive factors for the operating differential pressure.
- Measure the motor absorption and check compliance with the rated value

Non-compliance with the unit's use or with prohibitions/obligations can cause personal (also serious) injury (or death) or equipment damage

Danger of burns

Danger of burns caused by contact with hot surfaces of the unit, which at startup and operation may reach high surface temperatures, as specified on the product nameplate.
Apply adequate PPE against the risk of burns.

Danger of suction

Danger of injury due to depression, which can cause a sudden suction of objects, hair and clothes.
Start the machine only if it is properly connected to the system.

Danger of vibration

Regularly check that the unit is firmly fixed to the support frame.
Excessive vibration of the unit can cause serious damage to the machine, such as the seizure of the impeller.

Danger due to noise

Some machines can produce loud noise, even over 80 dB (A).
Reference levels are shown on the table of characteristic data that does not consider environmental reverb.
Warning to be taken:
Measure the acoustic pressure of the machine in the installation environment.
In the case of levels above the threshold defined by local standards:

- report the noise hazard
- prepare the use of PPE
- isolate the environment

Danger of ejection of objects

- Danger due to exceeding performance levels that may cause seizure of the impeller.
  Check that operating conditions are in accordance with values declared on the nameplate.
  Avoid operating with the inlet and/or outlet ports closed even temporarily.
  Install a limit valve or equivalent circuit that can avoid excessive vacuum and / or overpressure and allow the compliance with levels shown on the product plate
- Danger of injury due to objects and fluids aspirated and thrown at high speed (injury to the skin or eyes).
  Only start the unit (first start) if it is properly connected and check it accurately.
  In the case of unusual noise from the impeller, switch off the unit immediately and check it accurately.

Danger of injury to upper limbs

During the start-up (first start) phase due to a combination of hazards, the risk of injury to upper limbs may arise.

Danger of sudden leakage and/or aspiration of fluids (even harmful ones)

They could cause damage to the respiratory system due to the leakage of gas while the unit is in use and/or the slowing down of connection to the gas flow circuit.

Danger due to a limited view of the place in which the unit is installed.

Make sure you always have the unit installed in your sight while carrying out any activities close to it.

6.3 STOPPING

- The unit must be stopped by switching off the power supply to the motor.
- On shutdown, make sure to operate the unit with open outlet (suction / delivery) for about 20 minutes. This operation allows the removal of any condensation inside.

7 MAINTENANCE

In order to prevent faults and damage it is important to check periodically the units in operation; therefore it is advisable to adopt a maintenance plan in line with this manual, providing for:

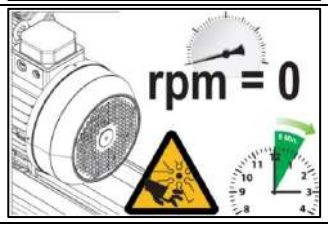
- periodical checks;
- periodical maintenance.

7.1 MAINTENANCE AND FAILURE CONDITIONS

WARNING **Before starting any maintenance, either periodical or due to malfunction, take the following safety measures in order to prevent personal (also serious) injury (or death) or equipment damage:**

- unplug the unit from the power supply by unplugging the main switch;
- apply a sign to the system and to the control unit **"DANGER! Maintenance work in progress";**
- cool the unit for at least 15 minutes;

- wait until the unit has completely stopped, checking through the motor fan that the impeller is not rotating;



- make sure that there is no depression or overpressure in the unit through a pressure gauge and make sure that no fluid can escape from the unit (through its stopping) and / or the system (through its insulation).

Danger due to electricity

- If connecting operations are carried out without removing the voltage from the electrical system or without setting up a system to avoid reinsertion, a direct contact of the operator with live parts can occur. This can also cause personal serious injury (or death).
- Work on electrical equipment (installation and maintenance) must be done only by specialized operators (see document MAN_PIC), wearing PPE.
- In the event of contact with a defective unit there is a risk of electrocution.

Danger of moving parts

High risk of cuts caused by rotating impellers. By removing the manifolds or blind flanges, it is possible to access the rotating impeller through the openings of the body and the cover of the side channel blower.
Never put your hands or objects through the openings.

Danger of burns

Danger of burns caused by contact with hot surfaces of the unit, which at startup and in operation may reach high surface temperatures, as specified on the product nameplate.
Apply adequate PPE against the risk of burns.

Danger of injury to upper limbs

During the maintenance phase due to use of improper tools, lack of PPE, bad illumination of the workplace or unauthorized startup, the operator fails to perform the required procedures, the machine can be put into unmanaged operation, and the risk of injury to upper limbs may arise.

Danger due to noise

Some machines can produce loud noise, even over 80 dB (A) therefore the operator may be subject to acoustic pressure which may cause buzzing in the headset and reduced attention.

WARNING **Danger of sudden spillage of gas (also harmful) suction**

Respiratory damage could occur due to gas leakage during operation and / or loosening of the connections to the gas flow circuits.

7.2 PERIODICAL CHECKS

In order to avoid any defects that may directly or indirectly cause damage, it is important that the unit is inspected by specialized operators (see document MAN_PIC).

A) When the unit is running, routinely carry out the following checks:

- delivery temperature;
- operating pressure and/or vacuum;
- electric motor current absorption;
- vibrations;
- state of the filter and related load loss.

WARNING

Danger of seizure of the impeller due to excess vibration. Vibrations above the threshold (see table below) are considered NOT eligible and can cause damage to the machine and consequently personal injury even serious (or death) and / or damage to things.
In the event of unusual noise and / or vibration over parameters, that may indicate the possibility the impeller is seizing up, turn off the unit immediately.

Class I (Blower with electric motor of power ≤15kW)	Class II (Blower with electric motor of power >15kW)
a > 2,2	a > 3,5
a = effective vibration speed level [mm/s]	

Changes to normal working conditions (power ups, abnormal noise, vibrations, excessive overheating of the service fluid) are indications that the units is not working properly.

B) With the unit stopped and cooled, periodically carry out the following checks:

- dust: check and remove deposits from the external surfaces of the unit;
- suction filter (if fitted): every 10-15 days, check and clean or replace the filter cartridge. The dirty cartridge creates strong suction resistance and consequently a higher pressure differential, power absorption and operating temperature;
- for unit supplied with elastic joint, check the condition of the elastic joint as indicated in its operating manual;
- condensation discharge (if present): every 8-10 days, turn the yellow valve counterclockwise 90° to allow draining of the condensation that has built up inside the blower;
- check for oil leaks (TMD version) near the joint; if leaks are found, maintenance work must be scheduled to replace the seals.

7.3 ROUTINE MAINTENANCE REPAIR OF BREAKDOWNS

See the following chapter “TROUBLESHOOTING” for identifying possible critical situations and types of breakdowns.
Always disconnect the unit and remove it from the plant to do routine maintenance, cleaning and replacing components and in the event of a breakdown.

WARNING

Danger due to residual overpressure or drop in pressure:

- with residual overpressure, process fluids can leak, with the risk of injury to the skin and eyes;
- with a drop in pressure there is the risk that hair and clothes can be trapped;
- disconnect the unit only after closing and bleeding the system connected to it.

7.4 LIFESPAN OF BEARINGS

Under normal operating conditions, the bearings of the unit must be replaced by a specialized operator (see document MAN_PIC), after a time fixed by the manufacturer (see details in the table below).

Non Atex Blower	25000 hours or 3 years	**Atex Blower**	18000 hours or 3 years

NOTICE

Replace the bearings of the unit only if you have all the instructions, the parts list and the section/explosion of the unit

7.5 DISMANTLING AND DEMOLITION

Danger of crushing and / or impacting various parts of the body

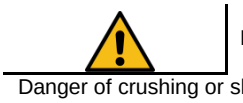
During the dismantling and demolition phases due to the sudden drop or displacement of the packaging, there may be a risk of crushing and / or impacting various parts of the body. During work around the unit, the operator may fall due to stumbling or slipping.

8 RESIDUAL RISKS

During the design of the machines or system on which the blower will be installed, the following residual risks should be considered.

Danger during the transport phase

Danger of crushing or slipping during the unit transport steps. The *operating instructions* (attached to the unit) and this manual describe how to carry out safe transport operations according to tested procedures.



Danger during the installation phase

Danger of crushing or slipping during the installation phases of the unit. The *operating instructions* (attached to the unit) and this manual describes how to carry out safe installation operations and according to tested procedures.

Danger during the startup and operating phase

Danger of electrocution, burns, noise, unauthorized startup of the unit, and ejection of objects or fluids during the start-up and operation phases of the unit. The *operating instructions* (attached to the unit) and this manual describe how to perform the operations mentioned safely and according to tested procedures.

Danger during maintenance and dismantling phases

Danger of electrocution, burns, noise, unauthorized startup of the unit, and ejection of objects or fluids during the maintenance and dismantling phases of the unit. The *operating instructions* (attached to the unit) and this manual describe how to perform the operations mentioned safely and according to tested procedures.

9 TROUBLESHOOTING

Problem	Seriousness	Cause	Solution	Precaution
The unit does not start	F	Electrical wiring incorrect	The electrical connection has to be checked by a technician referring to the wiring diagram contained in the terminal board box	Turn off the power to the electrical system or set up a system that avoids reinsertion
	F	Power supply voltage unsuitable	Check that the power supply voltage, measured at the motor terminals, is within +/- 10% of the rated voltage	Use PPE against the electrical hazards
	G	The impeller is stuck	Call FPZ assistance to repair the unit	
No or insufficient air flow	G	The suction filter is clogged	A specialized operator (see MAN_PIC) has to clean or replace the cartridge	Avoid entering foreign bodies into the unit
	G	Wrong frequency (for units powered through an inverter)	Correct the frequency	Check the rating plate
	G	Profile of the impeller blades modified (due to deposits on the profile)	Call FPZ assistance personnel to check the impeller	
No or insufficient pressure differential	F	Incorrect direction of rotation	The direction of rotation has to be inverted by a specialized operator (see MAN_PIC) switching two of the electrical power supply wires.	Turn off the power to the electrical system or set up a system that avoids reinsertion
	G	Leaks in the plant	Locate the leak and seal	Use proper sealants
Current absorption exceeding the admissible level	F	Electrical wiring incorrect	The electrical connection has to be checked by a technician referring to the wiring diagram contained in the terminal board box	Take off the power to the electrical system or set up a system that avoids reinsertion
	F	Drop in mains supply voltage	The power supply voltage has to be restored by a specialized operator (see MAN_PIC) at the terminals and at the established values.	
	G	The suction filter is clogged	The cartridge has to be cleaned or replaced by a specialized operator (see MAN_PIC)	Avoid entering foreign bodies into the unit.
	G	The unit has accumulated deposits inside	Call FPZ assistance personnel to clean the inside of the unit	Avoid entering foreign bodies into the unit.
	G	The unit is operating at a pressure and/or vacuum that exceeds the admissible level	Adjust the system and/or the regulating valve to lower pressure differentials.	Use appropriate PPE to operate near the unit
High delivery air temperature	G	The suction filter is clogged	Adjust the system and/or the regulating valve to lower pressure differentials.	Use appropriate PPE (surge protectors, gloves) to operate near the unit
	G	The suction filter is clogged	The cartridge has to be cleaned or replaced by a specialized operator (see MAN_PIC)	Avoid entering foreign bodies into the unit.
	G	The unit has accumulated deposits inside	The unit has to be cleaned inside by a specialized operator (see MAN_PIC).	Avoid entering foreign bodies into the unit.
	G	Suction and/or delivery piping obstructed.	Obstructions have to be removed by a specialized operator (see MAN_PIC).	Avoid entering foreign bodies into the unit.
	G	Suction air temperature exceeds 40°C (+104°F)	Use heat exchangers to reduce the suction air temperature	
Abnormal noise	F	The soundproofing material is damaged	Soundproofing cloth has to be replaced by a technician.	Avoid entering foreign bodies into the unit.
	G	The impeller scrapes against the casing. - The unit is operating at a pressure and/or vacuum that exceeds the admissible level	Reduce the pressure differentials in the plant	Use appropriate PPE (surge protectors, gloves) to operate near the unit
	G	- Reduction of assembly tolerances due to internal deposits (dust, impurities in the pipes, process residues, etc.)	The unit has to be cleaned inside by a specialized operator (see MAN_PIC).	Avoid entering foreign bodies into the unit.
	G	Worn bearing	Bearings have to be replaced by a specialized operator (see MAN_PIC).	
	F	Unit's installation position unsuitable	The unit has to be installed by a technician on structures that cannot transmit or amplify noise (tanks, steel plating, etc.)	Use proper anti-vibration and move the units according to local regulations

Abnormal vibrations	G	The impeller is damaged	The impeller has to be replaced by a specialized operator (see MAN_PIC).	
	G	The impeller has accumulated deposits	The unit has to be cleaned inside by a specialized operator (see MAN_PIC).	Avoid entering foreign bodies into the unit
	G	Unit anchored without anti-vibration insulators	The unit has to be anchored with anti-vibration insulators by specialized operator (see MAN_PIC).	Use proper anti-vibration and move the units according to local regulations
	F	Rigid connection to the plant	Flexible hoses between the unit and the piping have to be fitted by a specialized operator (see MAN_PIC).	Carry out the activity only if the unit is disconnected to the power supply.
	G	Bearing on the blower or motor side defective	Bearings have to be replaced by a specialized operator (see MAN_PIC).	

Leaks	G	Defective silencer gaskets	Gaskets have to be checked by a specialized operator (see MAN_PIC), and if necessary have to be replaced.	Avoid entering foreign bodies into the unit.
	G	Defective casing gaskets	Gaskets have to be cleaned by a specialized operator (see MAN_PIC), and if necessary have to be replaced.	Avoid entering foreign bodies into the unit.

Seriousness: F for functional fault and G for serious fault.

10 REFERENCES

Documents quoted:

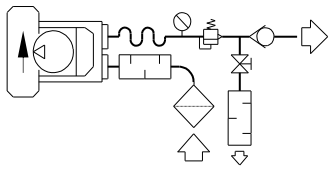
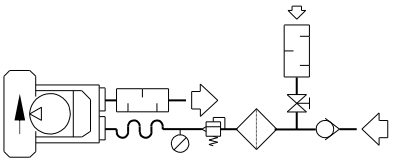
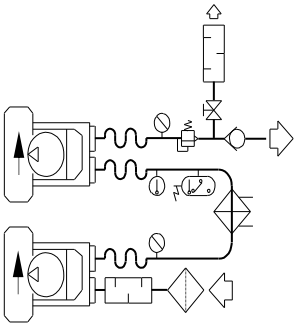
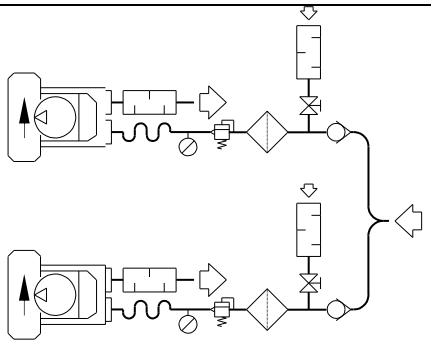
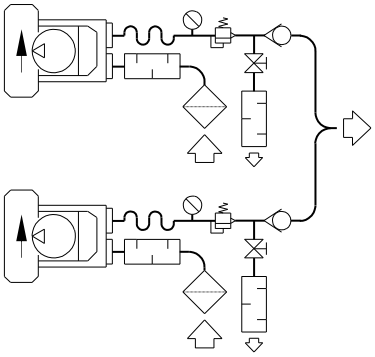
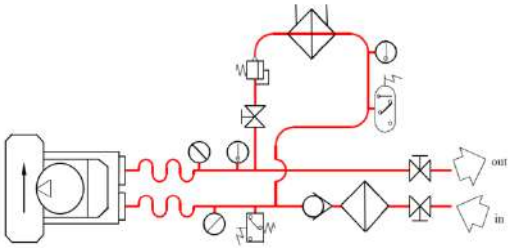
- Operating Instruction: supplied with the blower
- MAN_PIC: document with pictogram definitions
- Instruction manual of elastic joint
- Instruction manual of electric motor

Standards and directives:

- Directive 2006/42/CE
- Directive 2014/34/UE, (Valid only for Atex Version)
- EN 1127-1:2011
- EN 1127-2:2014
- EN 13237:2012
- EN ISO 80079-36:2016
- EN ISO 80079-37:2016
- EN 14986:2017,
- IEC 60034-1:2017

11 INSTALLATION DIAGRAMS

SCHEMI DI INSALLAZIONE I
INSTALLATION DIAGRAM GB

COMPRESSORE PRESSURE SERVICE	ASPIRATORE VACUUM SERVICE
	
COMPRESSORE IN SERIE SERIAL PRESSURE SERVICE	ASPIRATORE IN PARALLELO PARALLEL VACUUM SERVICE
	
COMPRESSORE IN PARALLELO PARALLEL PRESSURE SERVICE	ATEX BLOWERS SCHEMA D'INSTALLAZIONE INSTALLATION DIAGRAM
	

LEGENDA, KEY – ACCESSORIES

Item Item		Denominazione Name	Item Item		Denominazione Name
1		Filtro - Filtro in linea Filter - Inline filter	7		Valvola di ritegno Check valve
(2)		Silenziatore Silencer	8		Valvola Valve
3		Manicotto flessibile Flexible sleeve	(9)		Scambiatore Cooler
4		Manometro – Vuotometro Pressure gauge - Vacuum gauge	(10)		Termometro Thermometer
5		Pressostato – Vuotostato Pressure switch – Vacuum switch	(11)		Termostato Thermostat
6		Valvola limitatrice Pressure relief valve	(x) SE NECESSARIO (x) IF NECESSARY		

JEVI Ω **Flange Heater** Version

Specifications for Flange Heater, IOM references and Guidelines

T: +45 75830211 E-mail: Jevi@jevi.dk www.jevi.com

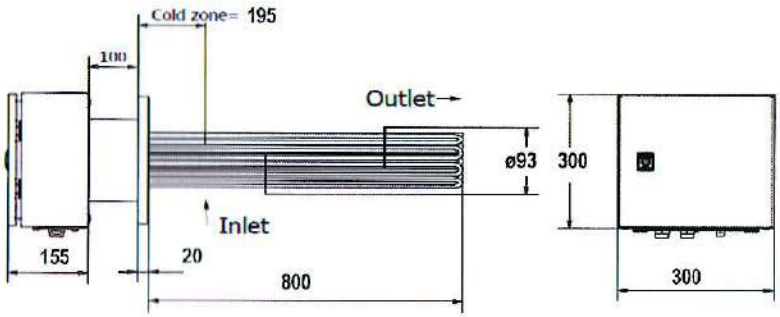
Flange Heater	Art No: 21208238	Prepared by: CLA	Order No:
	Customer item: FHK-9-400-DN100-SS-800-150	Prepared date: 26-01-2022	Quote No:

Produced and installed acc. to EN 60335-1. Meas. Tol. DS/EN ISO 13920-B and DS/EN 22768-C

Surface load 3,1 Wcm²

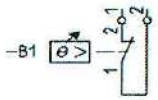
Specification

Voltage	:	3 X 400	
Power kW	:	9	
Degree of Protection	:	IP 66	
Flange	:	DN 100 PN16 AISI316	
H. Element Material	:	AISI 316L	
Medium	:	Air	
Flow l/s	:		0
Incoming temp	:	65	°C
Outcoming temp	:	175	°C
Maximum pressure	:	0,5	bar(g)



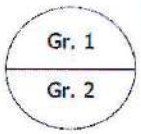
		Grp. 1	Grp. 2
Gland	:	M25 Ø11-17	M25 Ø11-17
Power (kW)	:	6,00	3,00
Current (A)	:	8,7	4,3
Ohm [Ω]	:	51,7	103,5

TSH: Auto Limiter 100-580°C

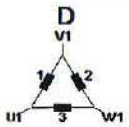


TSH Gland: M25 Ø11-17

Connection outline



Connection diagram all groups



TSHH:

IOM Manual

Scan QR code for IOM download, or visit www.jevi.com/en/downloads for IOM and EU-declaration.

IOM - Installation, Operation, and Maintenance manual

08099912 - IOM Flange heater + Flange resistor Non-Hazardous

WARNING!! – Proper use of JEVI product

Proper transport, storage, installation, assembly, commissioning, operation, and maintenance is required to ensure that the product operates safely and without any problems. The permissible ambient conditions must be adhered too. Observe the information in the relevant documentation.

IMPORTANT!!

The IOM should be read thoroughly before installation and operation. All warnings and precautions should be observed for both personal safety and for proper equipment performance and longevity. Failure to follow these instructions could result in equipment failure and/or serious injury to personnel

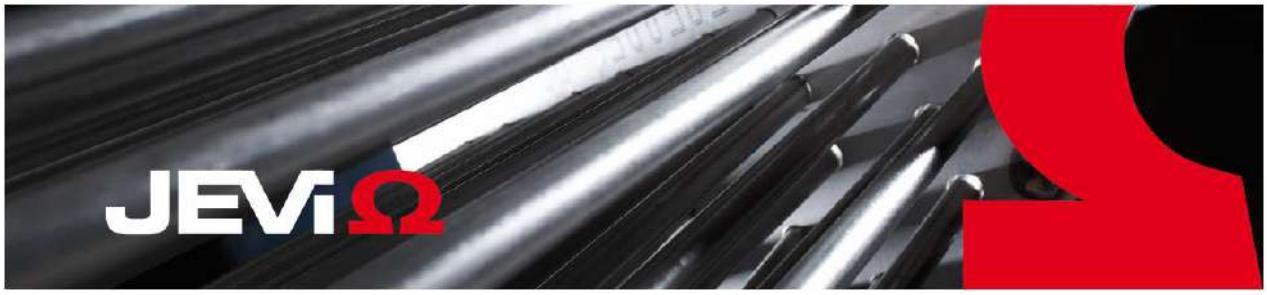
CAUTION!!

- During storage, prior to installation the unit must be stored dry with a relative humidity <60 %, temperature >15°C.
- Replace desiccant bag in junction boxes and enclosures (if any) every 6 months. Keep a log of the replacements as documentation.
- The Anti-condensation heater, if any, must be powered up and connected at all time.
- Heating elements may NOT be used for lifting, this causes damage on the elements

NOTICE!!

Before switching the flangeheater on, check that the rated process flow is running.
The construction materials used are chosen in accordance with the operating conditions specified.
Should the heater be operated with other media or temperatures than those specified, warranty expires immediately.

If the insulation resistance has changed as a result of improper or prolonged storage, it is recommended:
a) To open the junction box in a dry area and let the element-connections dry-out using a hot air blower. (note: air < 80°C).
b) Run the flangeheater at a lower voltage until all moisture is evaporated and the insulation resistance has reached its desired value.



IOM -
INSTALLATION, OPERATION AND MAINTENANCE MANUAL FOR FLANGE HEATER AND FLANGE RESISTOR

For installation in Non-hazardous areas

JEVI A/S | GODTHÅBSVEJ 7 | DK-7100 VEJLE | T: +45 75 83 02 11 | JEVI@JEVI.DK | WWW.JEVI.COM

Safety information

In order to secure your personal safety, as well as prevent damages to property, this manual contains notices you have to observe. The notices referring to your personal safety

 **DANGER**	Indicates that death or severe personal injury will result if proper precautions are not taken
 **WARNING**	With a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken
CAUTION	Without a safety alert symbol, indicates that property damage can result if proper precautions are not taken
NOTICE	Indicates that an unintended result or situation can occur if the corresponding information is not considered

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety symbol may also include a warning relating to property damage.

Qualified Personnel

Only personnel qualified for the specific task in accordance with the relevant documentation for the specific task, in particular its warning notices and safety instructions may operate the product described in this documentation. Qualified personnel are those who, based on their training and experience, can identify risks and avoiding potential hazards when working with these products/systems.

Proper use of JEVI products

 **WARNING**	Proper transport, storage, installation, assembly, commissioning, operation and maintenance is required to ensure that the product operates safely and without any problems. The permissible ambient conditions must be adhered too. Observe the information in the relevant documentation.

Disclaimer

JEVI A/S assumes no responsibility for any additions placed by the customer that can inflict our product. Additions or alterations implemented by the customer are not covered by our warranty.

IMPORTANT: These instructions should be read thoroughly before installation and operation. All warnings and precautions should be observed for both personal safety and for proper equipment performance and longevity. Failure to follow these instructions could result in equipment failure and/or serious injury to personnel.

NB! THIS IOM IS A STANDARD DOCUMENT AND IS NOT PROJECT SPECIFIC.

The English IOM is JEVI's standard version

List of abbreviations

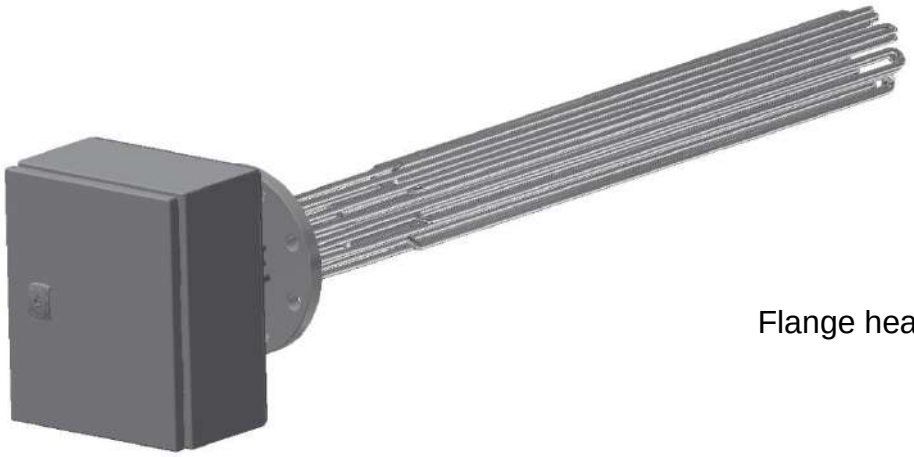
ACBR	- Air Cooled Braking Resistor
CoG	- Centre of Gravity
EF…	- Electrical Duct heater
GA	- General Arrangement (Drawing)
HVAC	- Heating, ventilation, Air Conditioning
IOM	- Installation, Operating and Maintenance Manual
JB	- Junction Box
VLE	- Fan heater with integrated controls for temperature control
VLEx	- Fan heater for explosive areas
WCBR	- Water Cooled Braking Resistor
TSH	- Temperature Switch High
TSHH	- Temperature Switch High High

1.0 Introduction

This manual is valid for flange heaters and flange resistors.

The purpose of this document is to introduce a reader to installation, operation and maintenance procedure and most importantly to general safety precautions, which are not necessarily related to any specific part or procedure, and do not necessarily, appear elsewhere in the publication. These precautions must be thoroughly understood and applied to in all phases of operation and maintenance.

Descriptions in this manual are generic and are not project specific Pictures may show other equipment and options than in the actual project.



Flange heater/ flange resistor

2.0 Description of product

The heaters are designed for heating liquids, gases or solids.

Reference is made to the general drawing of this item for the intended use:

Drawing no.	: Refer to equipment drawing GA
Electric supply	: See electrical diagram
Voltage	: See electrical diagram
Ref. number	: Same as order number and item number

2.1 Flange heater/resistor

The Flange heater/resistor consists of an enclosure, containing; electric heating elements, terminals and/or copper bars mounted on bus bar.

A protective device with manual reset (TSHH). The TSHH is nonadjustable.

In case of no flow the TSHH will cut off the heater.

3.0 Packing

All packing is in accordance to the specific requirements of the individual purchase order or contract as well as to the regulations of the country of destination.

3.1 Choice of the Packing Type

The choice of the packing type and the requirement of particular protections depend on characteristics of the equipment and material to be packed, its handling requirements and kind of transport chosen.
The packing provides both mechanical and environmental protection.

3.2 Wood treatment

All solid wood, used for packing (including wooden pallets) is treated (heat treatment or fumigation) according to the international standard ISPM 15 (IPPC), latest revision.
As these rules are not the same for all countries, the procedure is to meet the demands of a country of final destination.

3.3 Pallets

Equipment is packed on pallets that provide adequate load support during transportation and storage. The pallets have a dynamic load capacity, enough to carry the mass loaded on the pallet.
Where feasible the top surface of the pallet must be flat.
The pallet must be tight on all sides with steel or synthetic straps on each side.
Bolts, clamps, supporting beams, etc. will properly fix all equipment and materials.
Fragile, easily damageable and loose parts will be pertaining to the equipment securely and properly packed in a separate case.

3.4 Handling

Under no circumstances may the equipment itself be used as a platform for gaining access to installation and construction areas above. If such access is required then suitable scaffolding must be established, the equipment may not be used as a support.

3.5 Centre of gravity

If required, large and heavy equipment are marked with Centre of Gravity (COG).

3.6 Labelling and tagging of equipment / Identification

If no specific identification is required, (see the Purchase Order for the technical specifications) the labeling is in accordance to JEVI standard.
On demand the identification label is in accordance with the final packing list/delivery note.

3.7 Shipping marks / labelling

All packages are marked or labelled in accordance with the data shown in the packing list/delivery note

4.0 Transportation

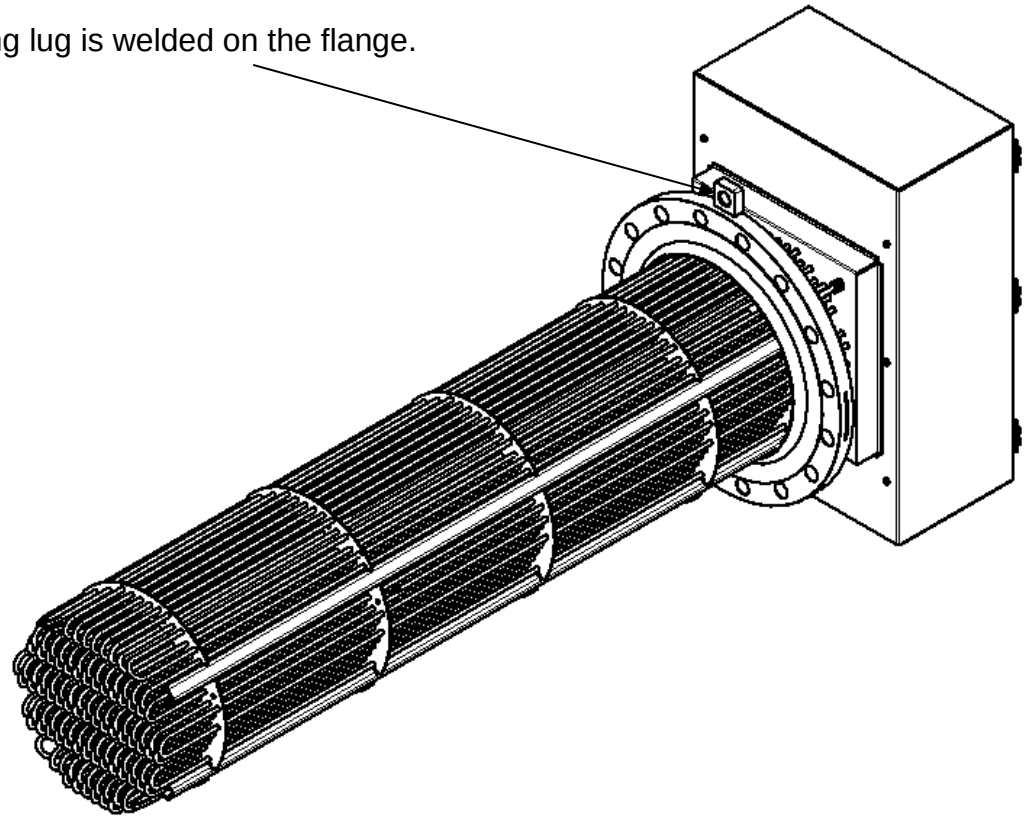
The product is packed according to agreement, with indication of CoG if required by customer.
The product is packed on pallets. The packing is easily moved either by forklift or by use of crane, handled by authorised personnel.

For lifting lugs, see GA
For weight, see GA or rating plate
For COG, see GA

CAUTION	Heating elements must NOT be used for lifting, this causes damage on the elements

4.1 Flange heater / resistor

Lifting lug is welded on the flange.



5.0 Storage and preservation

The purpose of this chapter is to specify how to handle and preserve a product from the day of shipment until the equipment is installed and commissioned.

Following conditions shall be observed for the installation/construction period.

CAUTION	During storage, prior to installation the unit must be stored dry with a relative humidity <60 %, temperature >15ºC.
CAUTION	Replace desiccant bag in junction boxes and enclosures (if any) every 6 months. Keep a log of the replacements as documentation.
CAUTION	The Anti condensation heater, if any, must be powered up and connected at all time.

5.1 Preservation during the transportation and pre-installation period

The packaging provides both mechanical and environmental protection. If the equipment is intended for service in an outdoor environment, to avoid any risk of harmful metallic dust during storage it is protected with enveloping plastic foil.
All openings such as cable entry holes are adequately sealed.

Packages must not be opened, or their integrity disturbed during the transport.
Packing may only be opened when the equipment has been taken from storage and has been transported to its intended location of installation, or to connect the anti-condensation heater, after which the packing must be resealed. Storage preservation measures are immediately invalidated as soon as the packaging is disturbed.

One shall inspect packages on receipt at the storage warehouse and at regular monthly intervals during the storage period in regard to external damages. Any visible damage that may have a consequence to the condition of the contents or integrity of the preservation must be immediately documented and reported. In case of such an event, the supplier must be contacted immediately for advice

5.2 Preservation during the installation/construction period

The product must be unpacked only when the equipment is to be installed, or to connect the anti-condensation heater. It is recommended to maintain the integrity of the packaging during transport from the storage warehouse to the installation site.
Inspect the equipment within each package for damage and condition as soon as the package is opened. Report and document any damage immediately. In case of such an event, the supplier must be contacted immediately for advice.

Installation and handling of the equipment once unpacked must be performed in accordance with the relevant elements of the documentation for the equipment delivered.

Damages caused by bad workmanship or failure to adhere to the installation instructions are not covered by the equipment warranty.

If the equipment is installed in an area where ongoing construction work of a nature that causes airborne pollution or other adverse conditions take place, the equipment must be suitably protected**.** Under no circumstances can the equipment be placed in the vicinity of any activity, which involves grinding, welding, painting, fireproofing, spraying, etc. without taking necessary precautions to protect it.
When cable termination is completed, a fresh desiccant bag must be placed in the enclosure. The desiccant bag must be replaced every 6 month or until commissioning, has been initiated.

All openings such as cable entry holes must be adequately sealed until the interfacing cables or pipes are installed.

During installation, always keep the equipment in a clean condition. Remove debris from cable installation activities at once. Take precautions to avoid any small pieces of a conductive nature from being left in the termination enclosures.

Under no circumstances may the equipment itself be used as a platform for gaining access to installation and construction areas above. If such access is required then suitable scaffolding must be established, the equipment may not be used as a support.

During installation the equipment must be thoroughly inspected at regular weekly intervals with regards to external damages, cleanliness and internal condition. Report and document immediately if any visible damage or adverse condition occurs. In case of such an event, the supplier must be contacted immediately for advice.

On completion of the installation work the condition of the equipment must be inspected. Report and document any damage immediately if any visible damage. In case of such an event, the supplier must be contacted immediately for advice.

CAUTION	It is extremely important that no debris enters the vessel as this may lead to a blockage of the return, or overflow pipes**.**

5.3 Suggestion for preservation specification & record:

PRESERVATION SPECIFICATION & RECORD								
Record No.:		Tag No.:	Description:					**Record page 1 of 1**
Activity No.:	Intervals (Months)	Description of Preservation Activity	Recommended Preservative	Initial Preservation	Date/Sign Preserved (2)	Date/Sign Preserved (3)	Date/Sign Preserved (4)	Date/Sign Preserved (5)
1	1	Check that protection structure is undamaged.						
2	6	The desiccant bag inside the Junction boxes replaced.						
3	1	Check the storage conditions. Relative humidity < = 60 %, temp. > = 15˚C						
4	12	If stored for more than one year from packing date, then the supplier must be contacted for advice regarding renewal of the desiccant bag.						
5	12	Check the paintwork.						
6	12	Check that there are no visual damages to the equipment.						
7	12	Verify that the general condition of the equipment is satisfactory.						
8	12	All openings such as cable entry holes are adequately sealed. Junction Boxes as well.						
9	12	All loose items/removed parts preserved, stored and marked.						
10	6	Verify no water leakages, condensation or moisture where applicable.						
11	6	The Anti-condensation heater in the equipment must be powered up and connected at all times.						
Comments:								
Performed by: Date/Sign:			Accepted by: Date/Sign:					

Note: *These procedures are considered normal maintenance and are performed at the owner's expense.*

* Depending on the environment, inspection frequency can vary.

6.0 Installation instructions

6.1 General

The user must ensure that his employees are fully trained and supervised in the proper working procedures in order to ensure their safety. The plant must be maintained in a safe condition.
Ensure that the equipment is correctly installed in a suitable location by technically qualified personnel.
Installation has to meet the requirements of EN/IEC 60335-1, EN/IEC 60335-30.

6.2 Flange heater/resistor installation

Before unpacking the equipment ensure that all items are available and that all crates / or packages are in good condition and undamaged. Any damages must be reported to the site manager and subsequently to JEVI A/S.
After removing the packing material, check all items for damage. If any damages; report this to the site manager and subsequently to JEVI A/S.
For installation mounting and sealing materials have to be used which are suitable for the medium to be heated and the prevailing temperatures that will occur. Please refer to the GA-drawing for precise data and indications of fitting positions.

1. Open the junction box.

2. Connect the electric power cables to the terminals or bus bar system as indicated on the electrical diagram and connect the earth provisions on the mounting plate.

3. Connect the protective conductor to the earth terminal.

Follow the instructions provided by the supplier of the cable glands if these are present and/or applicable.
Close the cover.

 **WARNING**	Do not open the junction box when energized.

CAUTION	During storage, prior to installation the unit must be stored dry with a relative humidity <60 %, temperature >15ºC.
CAUTION	If applicable, connect and switch on the space heater. When dismantled it is advisable to place a desiccant bag inside the junction box.

7.0 Start up

Remove desiccant bag from JB before starting up.

7.1 Start-up

Before the initial start-up of the flange heater/resistor, the following must be checked

1. The flange heater/resistor is correctly installed as described in the GA drawing and if necessary, a leakage test has been performed.

2. The protective conductor (PE) has been connected and, if necessary, the external connection between housing and ground has been effected, e.g. for avoiding electrostatic discharging.

3. The earth connection is effected and properly secured.

4. The electrical connections are performed in accordance with the relevant regulations and wiring schematics.

5. The flange heater/resistor is properly installed, and all studs and nuts are properly tightened.

6. Electrical connections between control panel and immersion heater are correctly installed e.g. power cable, temperature transmitter.

7.2 Before energizing the heating elements

1. Check the supply voltage.

   Check the control voltage.
   Voltages are specified on the wiring diagrams of this equipment.

2. Check whether the monitoring system has been actuated e.g. ‘Overheat Protection’. (PT100 or thermocouple sensor fixed to an element sheath).

3. Check setting of temperature controller for overheat protection (Temperature setting is stated on wiring diagram)

4. Check setting of temperature controller for medium temperature.

5. Energize the heater elements for approx. 2 minutes and monitor the element skin temperature om the temperature controller. If element skin temperature is not responding shut down the system and check instrumentation and wiring.

6. Run the system on working conditions, e.g. pressure, flow and temperature. Wait until the system has reached the stable temperature and set the overheat protection controller at a level that will cause the heater to trip. If the heater does switch off shut down the system and check for errors.

7.3 Shutting down the flange heater/resistor

1. De-energize the flange heater/resistor before shutting down the flow.

2. Re-tighten the stud bolts after the heater has cooled down.

8.0 Operating instructions

Before initial start-up of the flange heater/resistor it should be checked whether:

1. The flange heater/resistor is properly installed and, if necessary, a leakage test must be conducted.

2. The electrical connection is performed in accordance with the relevant rules and regulations.

3. The protective conductor (PE) has been connected and, if necessary, the external earth connection between housing and ground has been effected, e.g. for avoiding electrostatic discharge.

4. Monitoring systems have been actuated e.g., “Flow Monitoring” and “Overheat Protection”.

5. The medium to be heated, is in accordance with the heater/resistor design.

6. At the cable entries temperatures exceeding 70°C are not admissible. The minimum temperature rating for all incoming cables is 70°C

NOTICE	Before switching the flange heater/resistor on, check that the rated process flow is running. The construction materials used are chosen in accordance with the operating conditions specified. Should the flange heater/resistor be operated with other media or temperatures than those specified, warranty expires immediately!

9.0 Maintenance instructions

The one-year service interval only applies if the flange heater/resistor is installed in a dry and clean environment. If installed in environment which does not meet these requirements, the service intervals might have to be reduced.
The responsible for the maintenance must ensure that his employees are fully trained and supervised in the proper working procedures to ensure their safety.

1. Check the ceramic insulators on the elements for damage.

2. Check the insulation resistance of the heating elements. Connect the Megger to an earth bolt and one of the phases U1, V1 or W1. If the measured value is less than 2 Mega ohms, each heating element will have to be checked separately. Minimum value is 2 Mega ohms at 1000 volts.

3. Cleaning all surfaces. On heating elements, salt crystals, carbon or calcium layers must be removed from the sheath of the heating elements by means of a non-metal tool, e.g. wood.

4. Ensure terminations are securely connected to the terminals or bus bars. Heating element connections are to be tightened properly.

5. Check the functioning of the space heater in the junction box (if there is one incorporated). The space heater is fitted with an integrated thermostat situated inside the connection cable, which is factory set to frost guard temperatures. The space heater is maintenance free. If the space heater does not function; it will have to be replaced.

NOTICE	If the insulation resistance has changed as a result of improper or prolonged storage, it is recommended: a) to open the junction box in a dry area and let the element-connections dry-out using a hot air blower. (note: air<80°C). b) run the Flange heater/resistor at a lower voltage until all moisture is evaporated and the insulation resistance has reached its desired value.

9.1 Recommended maintenance and service plan

- ○ Check or clean
- ● Spare/replacements parts

System	Item	Periodic maintenance interval			
		Weekly (first 4 weeks)	**Every 6 months**	**Every 12 months**	**Every 36 months**
Whole	Visual inspection the exterior	○	○	○	○
	All nuts and bolts including mounting hardware must be tight	○		○	
Electrical system	Measurement of Ohm values according to test record (max deviation 10%)			○	
	Measurement of insulation resistance <3 m Ohm at 1000 VDC			○	
	Inspect all terminal connections, tighten loose connections	○		○	
	The interiors of each enclosure must be clean, dry and free of foreign material	○		○	○
	JB cooling fan filters	○			

Note: *These procedures are considered normal maintenance and are performed at the owner's expense.*
* Depending on the environment, inspection frequency can vary.

CAUTION	Fan filter cleaning intervals are strongly dependent on environment. It is recommended to initially check them on weekly basis, the first 4 weeks, and clean them if necessary. If no cleaning was required in initial 4 weeks period, maintenance interval can be changed to monthly basis. If in doubt contact JEVI A/S

10.0 Trouble shooting

 **WARNING**	Do not open the junction box when energized.

Disconnect all power sources prior to any inspection, service, or cleaning. Hazard for electric shock exists while the equipment is connected.

For maintenance requiring repair or replacement of components, contact the factory immediately for further instruction. Only the functions within the scope of normal maintenance are listed below. This manual cannot list all the malfunctions that may occur or the corrective actions that must be carried out. If a malfunction is not listed contact JEVI A/S.

If there is no heating function do the following:

1. Open the junction box and press the reset button on the TSHH thermal cut out
2. Wait app. 15 minutes and repeat pressing the reset button.
3. Close the junction box

If this does not remedy the heating function, contact qualified personnel for supervision.

Problem	Possible cause	Possible correction
Heater/Resistor failure	Loose bus bar	Tighten failed resistor bank.
	Heater/Resistor element burned out	Disconnect element and use spare
Temperature switch trip	Heater/Resistor over temperature	Ensure air intake and exhaust are clear of foreign particles or blockage.
		Check fan operation
Pressure differential trip	Loose connections.	Check all connections.
	Intake obstruction	Remove and clean.

11.0 Disposal instructions

Equipment containing electrical components shall not be disposed together with domestic waste. Collect separately with other electrical and electronic waste, according to local legislation.

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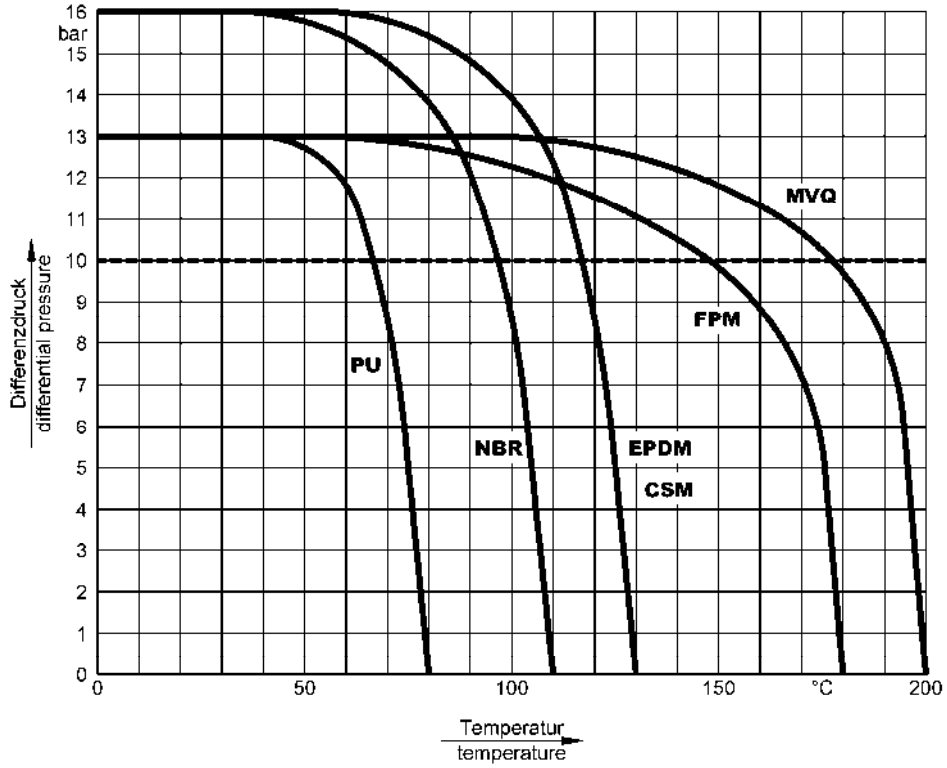
Operating instructions Installation / Operation soft-seated butterfly valve series K

Introduction

The following information and instructions are important for perfect installation and safe operation of the valve. Prior to installation and initial use of the valve, the qualified staff in charge of installing and operating the valve has to be instructed according to this information.

Proper use

The soft-seated butterfly valve series K may only be used to stop, throttle and control media flows within the permissible pressure/temperature limits.



For a differential pressure of more than 13 bar valves > DN 200 have to be equipped with a seat having a higher shore hardness.

The following series are suitable up to a maximum differential pressure of 10 bar:

K11: DN 50-DN150
KG9 Body stainless steel: DN200-DN300
KG2/KG4 and valves ≥ DN 600

When installing the lug type butterfly valve as end-in-line valve, the max. differential pressure is 6 bar. The free port must be secured by a counter flange.

Series K optional vacuum tight up to 1x10-2 mbar

The suitability of the product-related parts used and their chemical resistance properties have to be clarified before start-up of the plant. The usual flow rate must not be exceeded. Vibrations, water hammers and cavitation as well as abrasive components result in damage of the valve and affect its service life.

Valves must not be used to support the pipeline nor as a step-up.
This includes the different kinds of operation like hand levers, gear operators, actuators, feedback and control systems.

When using a hand lever, handwheel and manual emergency operation, take care that there is enough space for a proper operation.

Earthing the valve

If the butterfly valve is supplied with anti-static device and used in potentially explosive zones, the earthing strap supplied with the valve must be connected effectively at site with the potential compensation cable before the valve is put into operation.

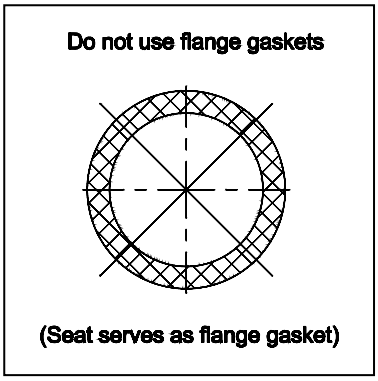
Transport and storage

The valve must be transported and stored dry and clean.
In humid rooms, a drying material or heating must be used to avoid condensation.
During transport and intermediate storage the butterfly valve should not be outside a temperature range of -15°C and +30°C.
The transport packaging protects the valve against soiling and damage. Impact and vibrations must be avoided.
The outer paintwork (coating) must remain undamaged, otherwise the faulty spots must be repaired immediately.
The factory-adjusted basic setting (position of the disc at delivery) must not be changed.

Conditions for mounting the valve

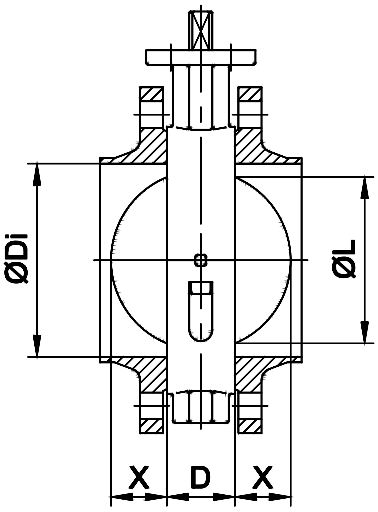
The soft-seated butterfly valve series K is installed between pipeline flanges acc. to DIN2501 or ANSI B16.5.
The pipeline must not have any axial or angular offset, since otherwise the disc could be damaged and the seat can become deformed, which is not permitted.

The seat of the GEFA butterfly valve has a sealing lip.
Due to this seat design the butterfly valve is "self-sealing" to the flanges and does not require additional flange gaskets.
Pre-condition: The flange sealing surfaces have been checked to make sure that they have a smooth surface structure.
Residues (welding beads) must be removed.
No cross marks may be visible.



The "clearance" of the mating flanges - including inner coating- has to be sufficient to allow the disc to be fully opened without touching (ØDi ≥ ØL + 6 mm). This must be checked before the valve is installed and compared with the space necessary for the valve according to the table.

DN	D	ØL	X
50	43	33	6
65	46	48	10
80	46	64	17
100	52	91	27
125	56	117	37
150	56	137	46
200	60	190	70
250	68	240	91
300	78	290	111
350	78	330	131
400	102	377	144
500	127	475	182
600	149	567	215
700	169	665	255
800	189	763	295
900	209	859	334
1000	229	967	378



Transport packaging

Transport packaging protects the interior of the valve from soiling and damage.
Do not remove the packaging until the valve is going to be installed.

Installation position

Basically the butterfly valve series K can be installed in any position. The recommended position, however, is with the shaft being horizontal.
The lower disc edge should open in flow direction.

Installation

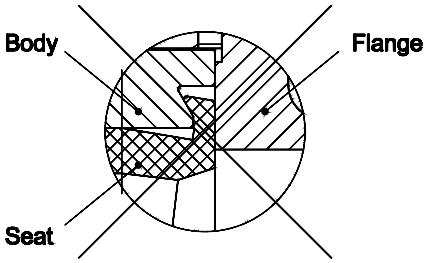
The soft-seated butterfly valve series K has to be switched to a slightly angled position.
The position of the disc must be within the face-to-face dimension of the valve.

Spread the mating flanges and insert the valve carefully between the flanges.

If the pipeline is to be welded at site, temporary fitting blocks should be installed instead of the butterfly valve, since flying sparks and welding residues can damage the seat due to high temperatures.
Never leave the butterfly valve installed when welding of the pipeline/flanges has to be completed.

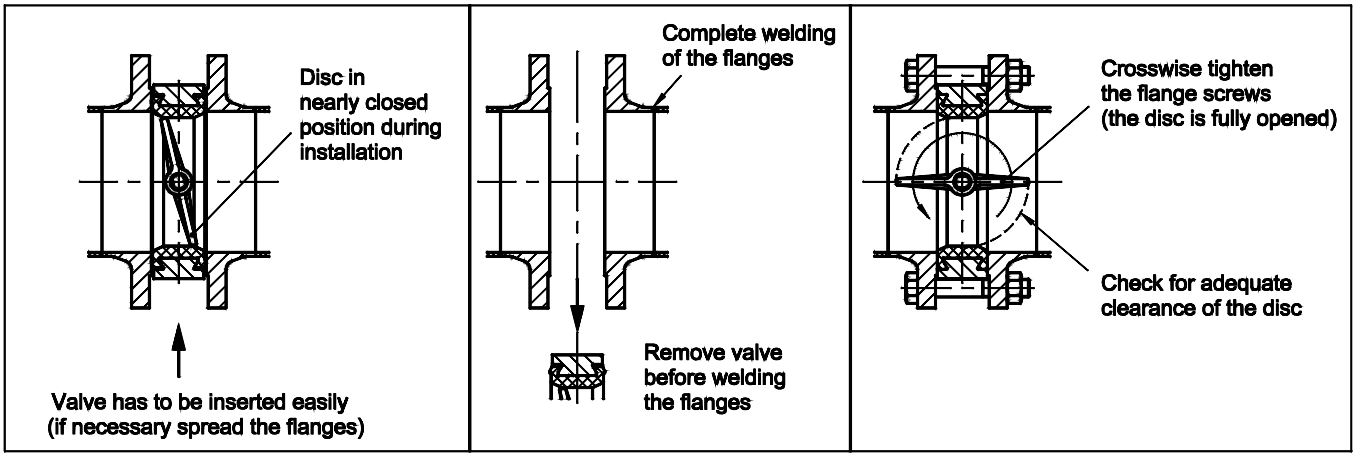
Center the butterfly valve using the flange screws. The outside diameter of the valve body is used for full centering!

NOTE!
If the valve is inserted incorrectly between the flanges, the seat can become displaced and destroyed.



Remove the flange-spreaders and tighten the flange screws slightly and evenly crosswise with the disc fully opened.
During this procedure, check that the valve is centered between the mating flanges.
Open and close the valve several times and cross-tighten the flange screws once again with the disc in closed position. (Tightening torque: please refer to below table).
Check that the disc has adequate clearance.

When installing the lug type butterfly valve as end-in-line valve, the free port must be secured by a blind flange.



Tightening torque for flange screws

DN	40	50	65	80	100	125	150	200	250	300	350	400	500	600	700	800	900	1000
NPS	1 ½"	2"	2 ½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	20"	24“	28“	32“	36“	40”
Tightening torque [Nm]	85	85	85	85	85	85	165	165	165	165	165	285	285	415	415	570	570	760

Mounting of actuators

It must be ensured that the actuator is centred on the valve shaft.
The weight of a mounted actuator must not place a one-sided load on the shaft of the valve:
if necessary actuators must be supported without fixing.
External loads must not be applied to actuators, this can damage or destroy the valve.

Initial operation

The butterfly valve has been tested for leakage using air or water. Residues of the test medium may still be on the contact surfaces of the valve. Possible reactions with the operating medium must be observed.
Prior to initial operation, the pipeline must be flushed effectively with the valve fully opened to eliminate soiling and to avoid damage to the sealing surfaces. The valve must not be switched during the flushing process.

During a system pressure test the following pressures must not be exceeded:

1,5 x PN with disc in open position
1,1 x PN with disc in closed position

Impermissible operation

Never operate the butterfly valve without actuating devices and/or locking of the shaft.
Do not operate the valve in the cavitation area.
Do not exceed the pressure/temperature range.
Avoid all foreign particles on the sealing surfaces.

Removing the valve

Before removing the butterfly valve make sure that the pipe section is depressurised and evacuated.
In case of toxic, caustic and other outgasing media the pipe section must also be ventilated.
Safety classification is the responsibility of the system operator.

The butterfly valve is removed by loosening the flange screws and sufficient spreading of the mating flanges.
The valve disc must be closed at an angle within the face-to-face dimension of the valve to prevent damage to the disc. Actuators either have to be dismounted before the valve is removed or they have to be secured against unauthorized or unintentional operation.

Disposal / repair of the valve

After having removed the valve it has to be disassembled and cleaned to prevent injuries caused by residues of the medium.
If the valve is returned to the manufacturer, a safety data sheet relating to the media must be included.

Subject to modifications without notice.

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Operating instructions Maintenance / Mounting butterfly valve series K two-piece body DN 25 – DN 500

Maintenance

- The valves do not require any special maintenance.

Disassembly

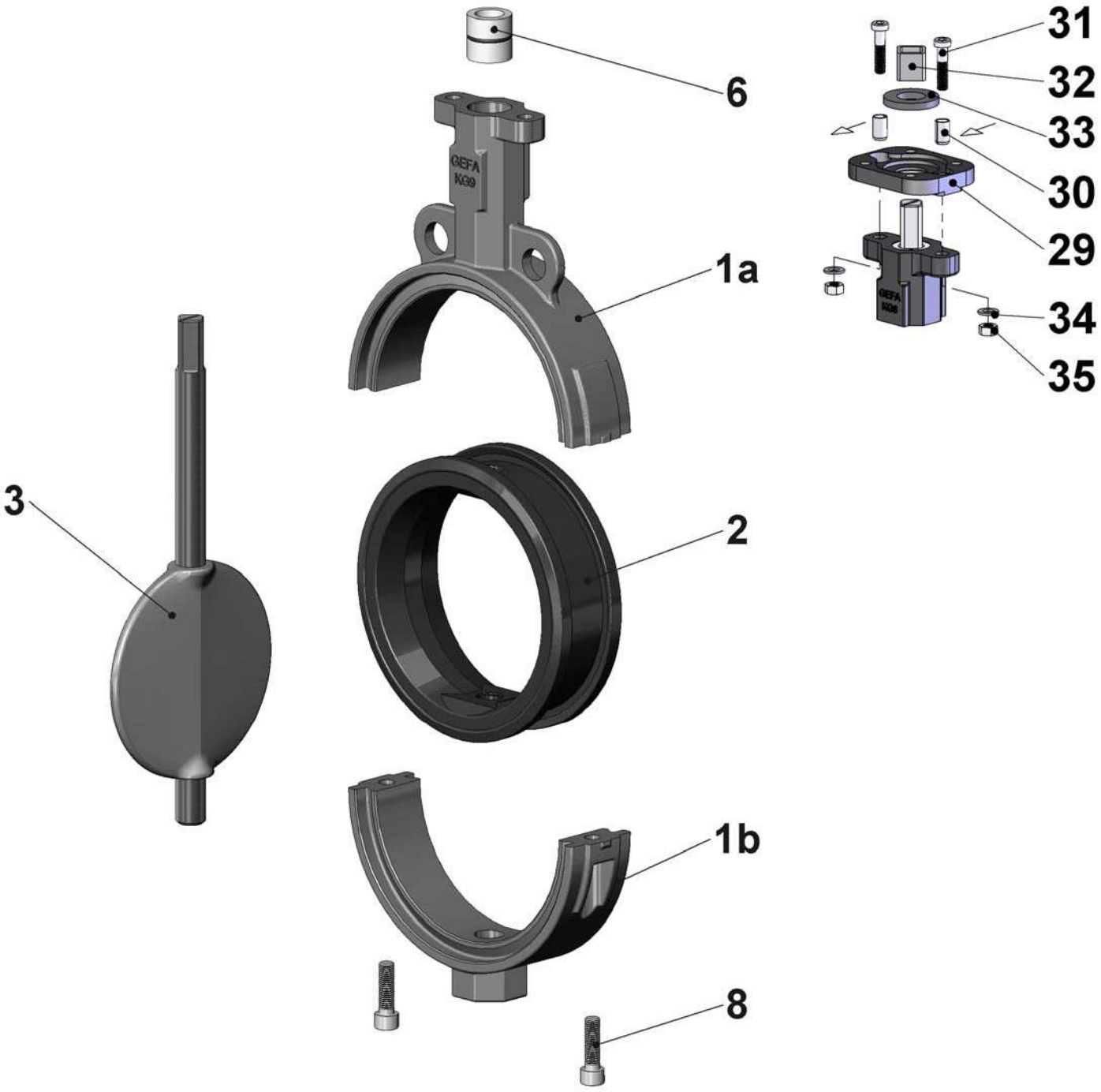
- Valves with hand lever:
  Loosen the lateral screw joint of the hand lever and pull the hand lever off the valve stem (3).
  If only the seat (2) or the disc (3) have to be replaced, the throttle plate can be left mounted.
  Remove the throttle plate by loosening the screws to replace the bearing (6).
- Valves with actuator:
  Loosen the fastening screws between the MULTITOP mounting plate (29) and the actuator or between the valve and the bracket and remove the actuator to replace the bearing (6).
  Remove the MULTITOP mounting plate (29) from the valve by loosening the fastening screws (31) and the clamping sleeves (30).
  If only the seat (2) or the disc (3) has to be replaced, the actuator may remain on the valve.
- Turn the disc to "OPEN" position.
- Loosen and remove the two body screws (8).
- Pull off the lower part of the body (1b). Once the body screws (8) have been removed, this is only held by the dovetail of the seat (2). Use two screwdrivers in the body splits to pull off the bottom part with a rotating motion.
- Pull the disc (3) and seat (2) out of the upper part of the body (1a).
- In order to remove the disc (3) from the seat (2), deform the seat into a long oval until the short end of the shaft can be cleared. Using a rotating motion the long end of the shaft can now be removed from the seat shaft hole.
- Check all part for flawless condition and renew them, if required. Only use original GEFA spare parts.

Assembly

- Thoroughly clean all parts and check them for wear. Parts that show wear or corrosion must be replaced to ensure operational safety in future.If possible use silicone oil for assembly.
- Insert the long end of the valve shaft (3) into a shaft hole of the seat (2) by using a rotating motion.
- Turn the disc (3) to "OPEN" position and deform the seat again into a long oval until the short end of the shaft can be inserted easily into the shaft hole of the seat.
- Insert the long shaft end of the "disc-shaft-seat unit" (2+3) into the upper part of the body (1a). Push the dovetail of the seat into the body's contour of the dovetail.
- Assemble the upper and lower part of the body (1a/1b) and fasten them with the body screws (8).
  Each body half has a small moulded cam at the body split that shows the correct position of the body halves in relation to each other.
- Insert the bearing with the O-rings (6) into the upper body part (1a) if the bearing has to be replaced.
- After the assembly the disc has to be switched for several times (at least 4x) by 180°.
- Check the seat and the stem tightness. Test pressure 1.1 times nominal pressure.
- Valves with hand lever:
  Fix the throttle plate loosely on the top flange. Insert the hand lever onto the shaft and position the throttle plate. Tighten the screws of the throttle plate and fix the lever in place using the collateral screw joint.
- Valves with actuator:
  Place the complete actuator unit in position, align and fix by using the screws.

Mounting of the MULTITOP mounting plate.

- Position the mounting plate (29) on the body.
- Insert the spring dowel sleeves (30) through the mounting plate into the body. The slot in the spring dowel sleeve must point in the force direction (see arrow in the assembly drawing) to achieve a rigid connection. Do not insert the mounting plate without using spring dowel sleeves, as the transverse forces cannot be absorbed by the screws.
- Insert the cylinder screws (31) and tighten them.
- Slide a square adapter (32) onto the stem, if required. Prevent the square adapter from sliding down the stem by using the attached washer (33), if required.



1a	Upper part of the body	29	MULTITOP mounting plate
1b	Lower part of the body	30	Spring dowel sleeve
2	Seat	31	Cylinder screw
3	Disc	32	Square adapter
6	Bearing with O-ring	33	Retaining washer
8	Body screw	34	Washer
		35	Hexagonal nut

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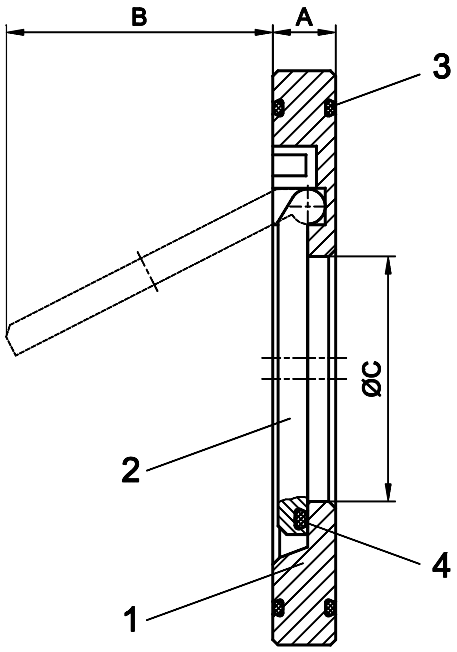
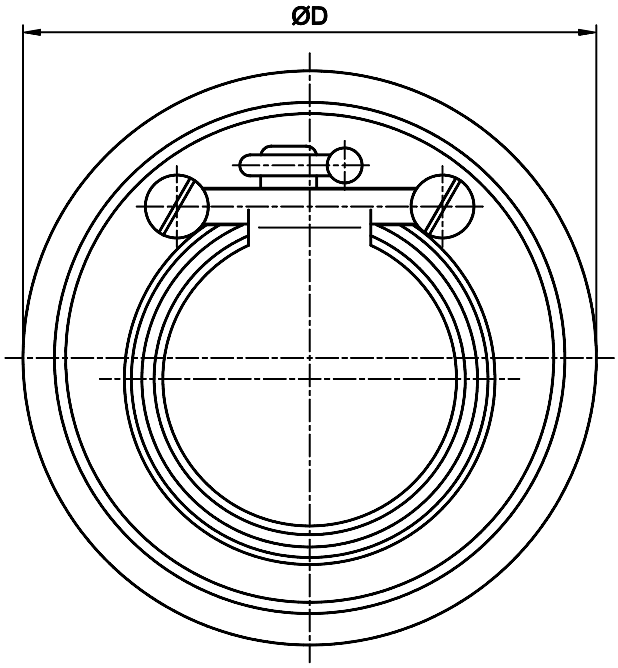
Metall Rückschlagklappe Serie C
Metal swing check valve series C
DN 32 - DN 500 PN 10/16





Wahlweise mit Rückstellfeder lieferbar
Option: valve with reset spring

Maße / dimensions:

DN	32	40	50	65	80	100	125	150	200	250	300	350	400	500
A	15	16	14	14	14	18	18	20	22	26	32	38	44	58
B	22	25	37	50	61	77	98	120	160	190	220	250	290	390
ØC	18	22	32	40	54	70	92	112	154	192	227	266	310	400
ØD (PN6)	79	89	98	118	134	154	184	209	264	319	375	425	475	580
ØD (PN10)	85	95	109	129	144	164	195	220	275	330	380	440	491	596
ØD (PN16)	85	95	109	129	144	164	195	220	275	331	386	446	499	621
kg (PN10)	0,5	0,8	1,0	1,4	1,8	2,9	3,9	4,5	7,5	13,0	23,0	33,5	52,0	94,0

Größere Nenndurchmesser und andere Druckstufen auf Anfrage.
Larger nominal diameters and other pressure ratings on request.

Werkstoffe / materials:

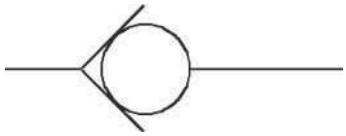
Teil Nr. Part no.	Bezeichnung	Description	Material		
			C 4444 E	C 4466 E	C 6666 E
1	Gehäuse	Body	Stahl / steel	Stahl / steel	Edelstahl Stainless steel
2	Scheibe	Disc	Stahl / steel	Edelstahl Stainless steel	Edelstahl Stainless steel
3+4 *	O-Ring	O-Ring	EPDM (E), NBR (B) FPM (V), PTFE (T) FPM + PTFE (TV)	EPDM (E), NBR (B) FPM (V), PTFE (T) FPM + PTFE (TV)	EPDM (E), NBR (B) FPM (V), PTFE (T) FPM + PTFE (TV)

* = Verschleißteile / Wearing parts

Wahlweise andere Werkstoffe lieferbar
Other materials available

Änderungen vorbehalten
Subject to changes.

Beschreibung, Funktion und Anwendungszweck
Description, function and application purpose



Rückschlagklappe unbelastet
Swing check valve, no load

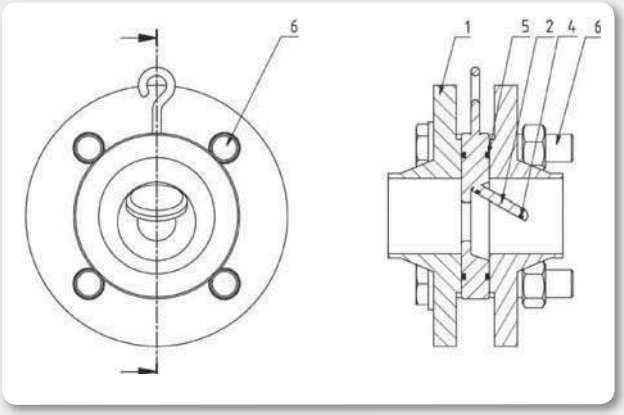
Rückschlagklappe federbelastet (Option)
Spring-actuated swing check valve (optional)

Beschreibung und Anwendungszweck

Rückschlagklappen sind Armaturen (Ventile) zur Rückflussverhinderung in Rohrleitungssystemen. GEFA-Rückschlagklappen zeichnen sich durch ihren einfachen Aufbau und ihre kurzen Baulängen aus. Sie sind konzipiert für den direkten Einbau zwischen DIN-Flanschen.
GEFA-Rückschlagklappen der Baureihe C
eignen sich für den industriellen Einsatz in Rohrleitungssystemen zum Transport von flüssigen und gasförmigen Fluiden der Gruppen 1 (explosionsgefährlich, entzündlich, giftig, brandfördernd) und 2 (alle anderen) nach Druckgeräterichtlinie 97/23/EG. Für Feststoffe sind sie nicht geeignet.

Description and application purpose

Swing check valves are armatures (valves) for return flow prevention in piping systems. Easy structures and short dimensions are the remarkable features of GEFA swing check valves. They are constructed to be mounted directly between flanges acc. to DIN. GEFA swing check valves of type C are suitable for industrial employment in piping systems for transport of liquid and gaseous fluids of group 1 (explosive, inflammable, toxic, incendiary) and group 2 (all other) according to Pressure Equipment Directive 97/23/EC. They are not suitable for media with solid components.



Funktion

Durch den angepassten Außendurchmesser des Gehäuses wird die Armatur beim Einbau zwischen den Schrauben (Pos. 6) der Flansche zentriert. Über eine Dichtung (Pos. 5) wird die Armatur nach außen abgedichtet. Wir empfehlen daher, Flansche mit glatten Dichtflächen zu verwenden.
GEFA-Rückschlagklappen benötigen einen geringen Öffnungsdruck. Die daraus entstehende Öffnungskraft lenkt die Klappe gegen eine Feder[1] (Seite 5, DN 32 – 40, Pos. 7) und die Gewichtskraft der Klappe (Pos. 2) aus, so dass das Medium freigegeben wird.
Übersteigt der Ausgangsdruck den Eingangsdruck, so schließt die Klappe und dichtet durch den O-Ring[2] (Pos. 5) gegen das Medium ab.

GEFA - Rückschlagklappen sind wartungsfrei.

Function

The swing check valves are automatically held in a central position by the flange connection screws (pos. 6). An O-ring (pos. 5) seals the equipment and protects it from external effects. Therefore, we recommend to use flanges with clean sealing surfaces. GEFA swing check valves require a low opening pressure. The resulting opening power directs the valve against a spring[1] (page 5, DN 32 – 40, pos. 7) and the valve's weight power (pos. 2), so that the media is released. If the initial pressure is higher than the entrance pressure, the valve closes and is sealed by the O-ring[2] (pos. 5) to protect it from the media.

GEFA swing check valves do not require maintenance.

[1] **nur Ausführung mit Feder**
only design with spring
[2] **nur Ausführung mit O-Ring sonst metallisch dichtend /**
only design with O-ring otherwise metal seated

Beschreibung, Funktion und Anwendungszweck
Description, function and application purpose

Ebenfalls zur Anpassung an die Verträglichkeit mit dem zu fördernden Fluid werden Dichtungen in 5 Werkstoffvarianten angeboten:

To guarantee the compatibility with the fluid we offer 5 variants of seal material:

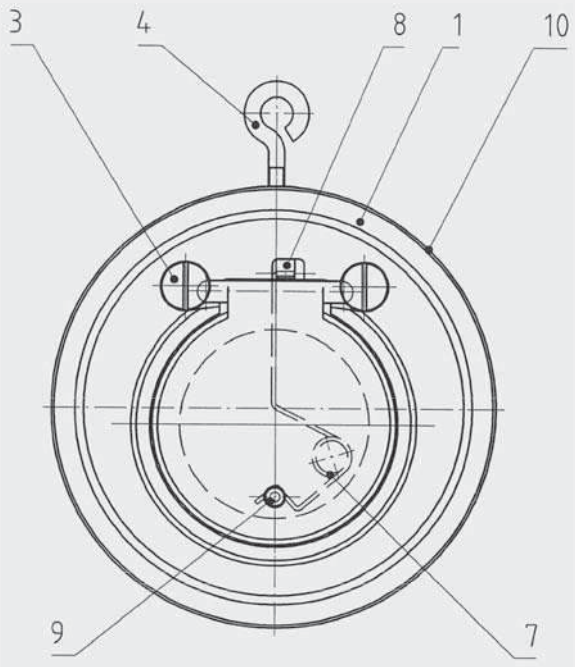
	Max. Betriebstemperatur / *Max. working temperature*
N = NBR	-10 bis/*to* +90°C
E = EPDM	-10 bis/*to* +120°C
F = FPM (Viton)	-10 bis/*to* +150°C
T = PTFE	-10 bis/*to* +200°C
M = metallisch/ *metal seated*	-10 bis/*to* +300°C

Baugrößen, Druckbereiche
Dimensions, pressure range

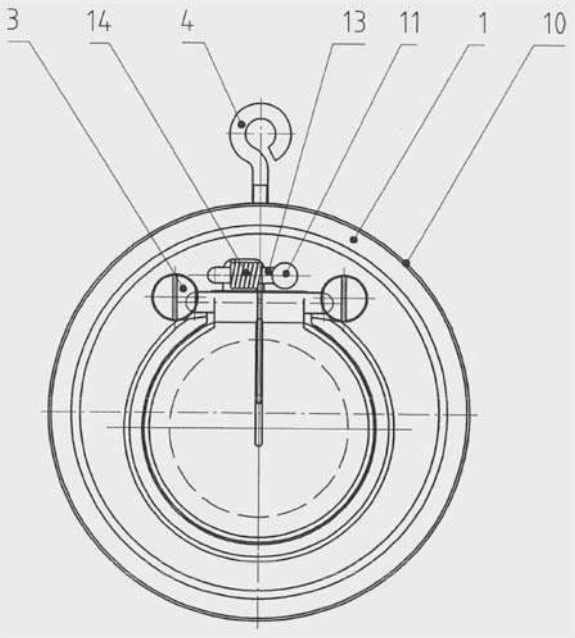
PS 16 = DN 32 / 40 / 50 / 65 / 80 / 100 / 125 / 150 / 200 / 250 / 300
PS 10 = DN 350 / 400 / 500 / 600

Abmessungen
Dimensions

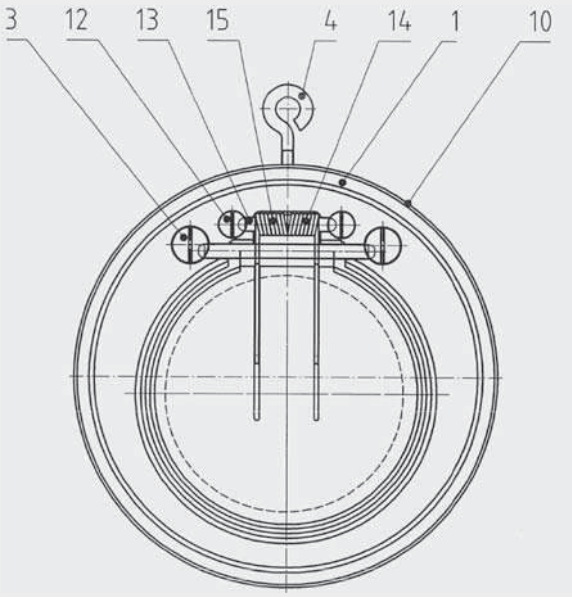
DN 32 bis/*to* DN 40



DN 50 bis/*to* DN 125



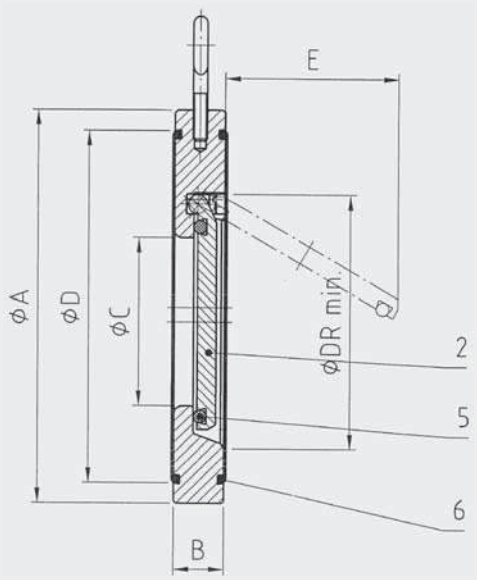
ab DN 150 bis DN 300 / from DN 150 to DN 300



Ersatzteilliste
List of spare parts

1. Gehäuse / *Body*
2. Klappe / *Disc*
3. Schraube / *Screw*
4. Ringschraube / *Ring screw*
5. O-Ring / *O-ring*
6. O-Ring / *O-ring*
7. Feder / *Spring*
8. Aufnahmezapfen / *Pivot*
9. Haltebolzen / *Jig*
10. Typenschild / *Plate*
11. Haltebolzen für Stift / *Jig for pin*
12. Schrauben / *Screws*
13. Stift für Feder / *Pin for spring*
14. Feder rechts / *Spring right*
15. Feder links / *Spring left*

Maße
Dimensions



	Flanschanschluss / *Flange connection*								ohne Feder / *without spring*	mit Feder / *with spring*				
	PN 6	PN 10	PN 16	PN 25	PN 40	PN 64	ANSI 150	ANSI 300						
DN	A	A	A	A	A	A	A	A	B	B	C	D	E	DR
32	79	85	85	85	85	-	74	85,9	15	15	18	59	22	37
40	89	95	95	95	95	106	83	98,6	16	16	22	72	25	43
50	98	109	109	109	109	115	105	114,4	14	14	32	86	37	54
65	118	129	129	129	129	140	124	133,7	14	14	40	109	50	70
80	134	144	144	144	144	150	137	152,4	14	14	54	119	61	82
100	154	164	164	170	170	176	175	184,5	18	18	70	146	77	106
125	184	195	195	196	196	214	197	219,3	18	18	92	173	98	131
150	209	220	220	226	226	251	222	254	20	20	112	197	120	159
200	264	275	275	286	294	313	279	311,2	22	22	154	255	160	207
250	319	330	331	344	356	368	340	365	26	26	192	312	190	260
300	375	380	386	404	421	428	410	245,6	32	32	227	363	220	309
350	425	440	446	461	478	490	451	489	38	-	266	416	250	341
400	475	491	499	518	550	547	514	543,1	44	-	310	467	290	392
450	-	541	558	-	-	-	549	600,3	52	-	350	520	340	442
500	580	596	621	628	632	-	606	657,4	58	-	400	550	390	493
600	681	698	738	735	-	-	718	777,7	62	-	486	660	470	595

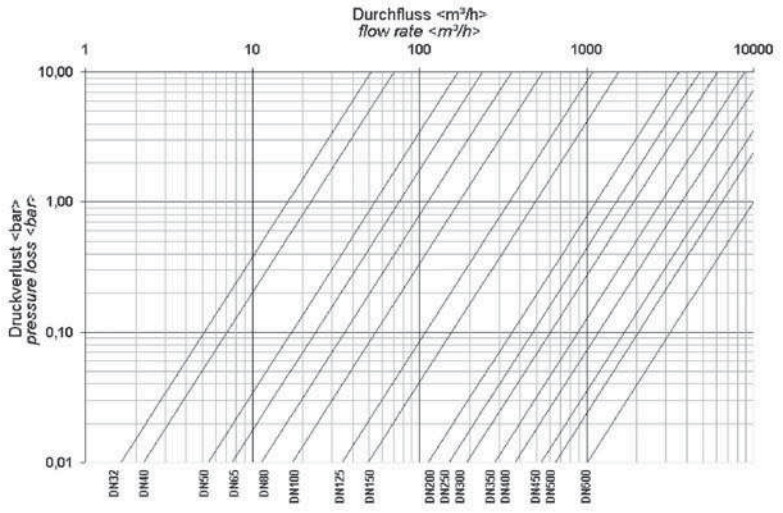
Min. Öffnungsdruck
Min. opening pressure

DN (mm)	Kv-Wert *Kv-value* (m^3/h)	Öffnungsdruck in <mbar> bei Durchflussrichtung *Opening pressure in <mbar> at flow direction*			
		←→ ohne Feder *without spring*	←→ mit Feder *with spring*	↑ ohne Feder *without spring*	↑ mit Feder *with spring*
32	16,2	~ 2	~ 15	~ 10	~ 25
40	22,2	~ 2	~ 15	~ 10	~ 25
50	54	~ 2	~ 15	~ 10	~ 25
65	75	~ 2	~ 15	~ 10	~ 25
80	112	~ 2	~ 15	~ 10	~ 25
100	172	~ 2	~ 15	~ 10	~ 25
125	342	~ 2	~ 15	~ 10	~ 25
150	490	~ 2	~ 15	~ 10	~ 25
200	1.128	~ 4	~ 17	~ 14	~ 25
250	1.500	~ 4	~ 17	~ 14	~ 25
300	2.290	~ 4	~ 17	~ 14	~ 25
350	2.890	~ 6	~ 18	~ 18	~ 27
400	3.700	~ 6	~ 18	~ 18	~ 28
450	5.000	~ 6	~ 18	~ 18	~ 28
500	6.550	~ 6	~ 18	~ 24	~ 34
600	9.500	~ 6	~ 18	~ 26	~ 36

Dichtheit / *Tightness*

Für die Dichtheit der Rückschlagklappe ist ein Gegendruck von mindestens 0,3 bar notwendig.
A minimum back pressure of 0,3 bar is required to keep the swing check valves tight.

Druckverlustdiagramm
Pressure loss diagram



Die Diagrammwerte gelten für Wasser bei 20°C. Für die Berechnung anderer Fluide setzen Sie sich bitte mit unserem Haus in Verbindung.

The values in the diagram refer to water at 20°C. If you need information on other fluids, please contact us.

Betriebsanleitung Rückschlagklappen
Operating instructions for swing check valves

1. Bestimmungsgemäße Verwendung

GEFA-Rückschlagklappen sind ausschließlich dazu bestimmt, nach Einbau in ein Rohrleitungssystem Medien innerhalb der zugelassenen Druck- und Temperaturgrenzen einseitig abzusperren (s. Datenblatt). Sie dürfen nur für Medien verwendet werden, gegen die das Material und die Dichtungen der Rückschlagklappe beständig sind. Für Medien mit Feststoffen sind sie nicht geeignet.

Appropriate use in accordance to designed capabilities

GEFA swing check valves are designed to block media on one side of the pipe within allowable pressure and temperature limits (see data sheet) and to be installed in a pipe system only. They are only to be used with media, which the material and the seals are resistant to. They are not suitable for media with solid components.

2. Sicherheitshinweise

Allgemeine Sicherheitshinweise
Für die Rückschlagklappen gelten dieselben Sicherheitsvorschriften wie für das Rohrleitungssystem, in das sie eingebaut werden.

Safety advices

General safety advices
The safety advices for the pipe system, in which the valves are to be mounted, are to be followed. The same applies to the swing check valves.

Anforderungen an den Anwender
Für Rohrleitungssysteme, in denen unsere Rückschlagklappen eingebaut sind, ist der Planer/Installateur und der Betreiber verantwortlich, daß

- die Rückschlagklappe nur wie unter Punkt 1 verwendet wird.
- das Rohrleitungssystem fachgerecht verlegt ist und dessen Funktion regelmäßig überprüft wird.
- nur fachlich qualifiziertes Personal die Rückschlagklappe einbaut, ausbaut und repariert. Das Personal muss regelmäßig in allen zutreffenden Vorschriften für Arbeitssicherheit und Umweltschutz, insbesondere für druckführende Leitungen unterwiesen werden.
- dieses Personal die Betriebsanleitung kennt und die darin enthaltenen Hinweise beachtet.

Demands on the user
In pipe systems, where our swing check valves are to be used, the planning/installing person and the operator are responsible for the following issues:

- *The swing check valves is to be used according to the regulation in p.1.*
- *The pipe system is to be installed correctly and its operation is to be checked regularly.*
- *The swing check valves is to be mounted, removed and repaired by qualified personnel only. The staff is to be regularly instructed according to all relevant regulations concerning working safety and environmental protection, especially in the field of pipes under pressure.*
- *These staff members have to be informed about the manual and the advices included.*

Besondere Arten von Gefahren
Vor dem Ausbau der Rückschlagklappe muss der Druck in der Anlage komplett abgebaut sein, um ein unkontrolliertes Austreten des Mediums zu vermeiden. Eventuell sich in der Leitung befindliche Flüssigkeit muß abgelassen werden. Die beim Ausbau austretende Restflüssigkeit ist aufzufangen. Bei gefährlichen Restflüssigkeiten oder Gasen notwendige Schutzmaßnahmen treffen.

Special risks
Before the swing check valve is being removed, pressure has to be completely taken off the plant to avoid media escaping from the pipe. Fluid being left in the pipe must be drained off. Fluid, which has remained in the valve and comes out during removal, is to be collected. If hazardous fluids or gases are left in the valves, the safety measurements required must be taken.

3. Lagerung und Transport
Storage and transport

Lagerung:

- Rückschlagklappen sind in der Originalverpackung zu transportieren und an einem sauberen Ort zu lagern.
- Rückschlagklappen enthalten Dichtelemente aus organischen Werkstoffen, die auf Umwelteinflüsse reagieren. Sie müssen daher auch möglichst kühl, trocken und dunkel gelagert werden.
- Die Stirnseiten der Rückschlagklappen dürfen mechanisch nicht beschädigt werden

Storage:

- *Swing check valves are to be transported in their original packaging and to be stored in a clean location.*
- *Swing check valves include sealing elements consisting of organic material, that reacts to environmental effects. Therefore, they are to be stored in a place, which is also to be kept as cool, dry and dark as possible.*
- *The front and back sides of the swing check valves must not be mechanically damaged.*

Betriebsanleitung Rückschlagklappen
Operating instructions for swing check valves

Transport:
Vor allem bei großen Rückschlagklappen (>DN 100) muß beim Auspacken und anschließendem Transport darauf geachtet werden, daß die Rückschlagklappe waagrecht so gehalten wird, daß sich die Klappe nur nach oben öffnen kann. Dies verhindert, daß die Klappe unbeabsichtigt durch die Gewichtskraft nach unten fällt und dabei beschädigt wird.

Transport:
The personnel must pay special attention, when big swing check valves (>DN 100) are unpacked and transported. The valve is to be held in a horizontal position in a way, that it can open at the top only. This is to avoid, that the valve unintentionally drops down and is damaged.

richtige Handhabung
correct handling

falsche Handhabung
improper handling

4. Einbauvorschriften, Inbetriebnahme

Beim Einbau der Rückschlagklappen sind folgende Punkte zu beachten :

- Die Rückschlagklappe und O-Ringe vor dem Einbau auf eventuelle Beschädigungen prüfen. Die Beweglichkeit der Klappe überprüfen. Beschädigte Teile dürfen nicht eingebaut werden.
- Sicherstellen, daß nur Rückschlagklappen eingebaut werden, deren Druckklasse, chemische Beständigkeit, Anschluß und Abmessungen den Einsatzbedingungen entsprechen.
- vor und hinter der Rückschlagklappe eine gerade Rohrstrecke von mindestens 5 x Nenndurchmesser vorsehen (s. Seite 10).
- Die Verwendung von Austrittshilfen ermöglichen einen größeren Öffnungswinkel und somit auch höhere Durchflußwerte.
- keine direkte Montage auf einen Pumpenflansch.
- pulsierende Strömungsverhältnisse und Druckschläge sind zu vermeiden.
- bei vertikalem Durchfluß ist der Einbau nur zulässig, wenn sich die Klappe nach oben öffnen kann.
- wird die Rückschlagklappe horizontal durchströmt, so muss die Ringschraube nach oben stehen (s. Seite 10).
- die Durchflussrichtung beachten (siehe Pfeil auf Typenschild)!
- mittels der Ringschraube wird die Rückschlagklappen zwischen den Flanschen eingeführt. Die Zentrierung erfolgt mit dem Gehäuse-Außendurchmesser auf die Innenseite der Flansch-Schrauben.
- Flansch-Schrauben kreuzweise mit dem entsprechenden Drehmoment (s. Datenblatt) anziehen.

Bei einer anschließenden Druckprobe sind die Anschlüsse auf Dichtheit zu prüfen.

Installation instructions, start-up

The following aspects are to be considered during the installation of swing check valves:

- Possible damages to the swing check valves and O-rings are to be checked prior to installation. Check if the valve can be moved. Damaged parts must not be installed.
- Make sure that only those swing check valves are being installed, that meet the operational requirements regarding pressure category, chemical resistance, connection and dimensions.
- Make sure to install a minimum of 5 x nominal diameter of straight pipeline in front of and behind the swing check valve.
- Exit supports allow a greater opening angle and higher throughput values (see page 10).
- Do not install the valves directly onto a pump flange.
- Avoid pulsation and pressure impact.
- Vertical throughput is allowable only if the valve can open at the top.
- In case of horizontal throughput, the ring screw must be at the top (see page 10).
- Watch throughput direction (see arrow on the plate) !
- The swing check valves are placed between the flanges by means of a ring screw. They are put in their central position according to the outer diameter of the case and the flange screw inner side.
- Tighten the flange screws crosswise regarding the torque required (see data sheet).

After the installation is finished, check the tightness of the connections by a pressure check.

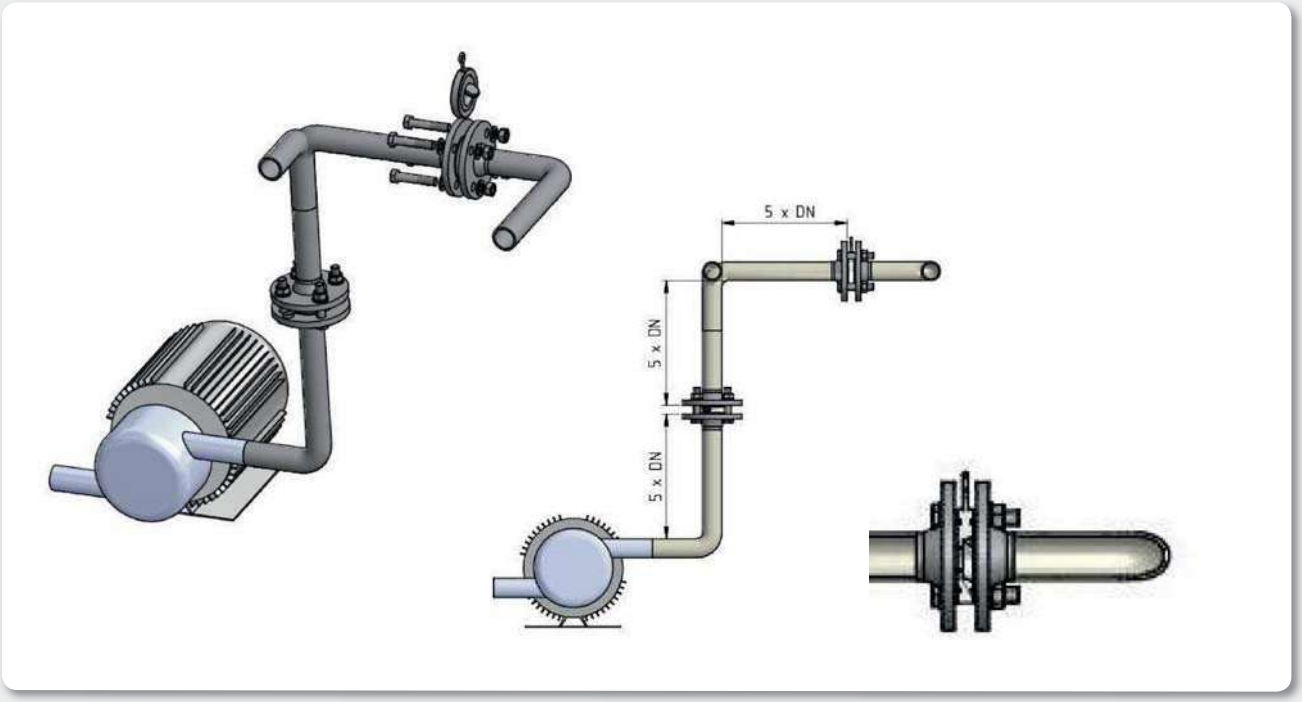
5. Hilfe bei Störungen, Reparatur

Vor dem Ausbau unbedingt Sicherheitshinweise (Punkt 2) beachten! Die Flansch-Schrauben lösen und die Rückschlagklappe mittels Ringschraube herausziehen. Ersatzteile sind mit vollständiger Angabe des Typenschilds bei uns zu bestellen. Es dürfen nur GEFA-Originalersatzteile eingebaut werden. Zum Ausbau der Klappe die Feder (Option) aushängen und die 2 Schrauben herausdrehen. Nun kann der O-Ring oder die Klappe getauscht werden. Der Einbau der Klappe erfolgt in umgekehrter Reihenfolge.

Assistance in case of malfunctions, repair

It is absolutely necessary to read and follow the safety advices before removing the valves (p. 2)! Loosen the flange screws and pull out the swing check valve by means of the ring screw. Spare part orders are to be placed at our company and must include the complete data, listed on the plate. Original GEFA spare parts are to be installed only. Take off the spring (option) and unscrew the 2 screws. Then, the O-ring or the valve can be replaced. To install the valve, follow the instructions in reversed order.

Betriebsanleitung Rückschlagklappen
Operating instructions for swing check valves



Zu 4. Einbauvorschriften, Inbetriebnahme
Installation instructions, start-up

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Operating instructions Installation / Maintenance Pneumatic actuator Series AP/APM

General

Please read these operating instructions carefully and keep them for maintenance and repair works nearby the actuator.
The actuator parts are subject to normal wear and tear and must be checked and exchanged whenever necessary. The service life of the actuator depends on the application and the environmental conditions.

- Medium to operate the actuator: dry or lubricated, filtered air. For other fluids such as non corrosive gases, water or hydraulic oil consult GEFA Processtechnik GmbH. In case of single acting actuators it is recommended to use a filter for the free bore of the spring chamber to avoid the contamination of the inside of the cylinder by dust or dirt.
- When fully depressurized the actuator can be optionally operated by handle or gear box.
- All actuators have a 90° stroke, adjustable by +/-3° in open position (+/-5° for series APM - in open/closed position).

Safety measures

- Never exceed the maximum pressure stated on the identification plate.
- Ensure that the compressed air supply is correctly connected to guarantee the proper function of the actuator - especially after maintenance works on the actuator.
- Disconnect the pneumatic actuator from the compressed air and power supply before starting maintenance or repair works. Bleed the actuator. Then remove the actuator from the valve.
- Don't try to dismantle the spring units, as this can lead to serious injuries. Replace the complete spring units only if they are defective.

Mounting the actuator on the valve

- Verify that distances between centres and holes of the actuator correspond to those of the valve or that of the mounting unit.
- The actuator can be mounted in any position. Before mounting the actuator on the valve, make sure that the pinion of the actuator and the stem of the valve are properly aligned to avoid any friction.
- If the valve has already been installed between the flanges, make sure that there is no pressure in the tubing so that the disc will not accidentally be opened or closed.
- Mounting of the actuator on the valve can be carried out directly (figures 1A and 1B) or by using a mounting bracket (figures 2A and 2B).

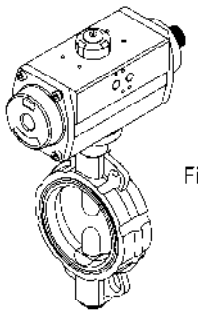


Fig. 1A

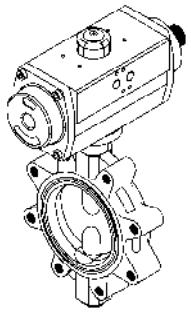


Fig. 1B

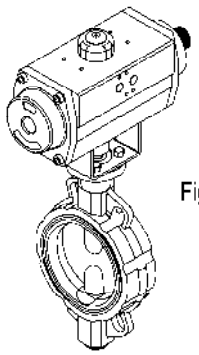


Fig. 2A

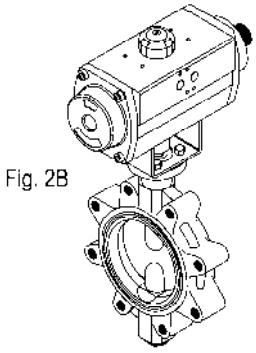


Fig. 2B

Mounting the actuator directly on the valve (Fig. 1A and Fig. 1B)

- Position the actuator over the top plate of the valve.
- Insert the square of the valve shaft into the square shaped connector of the actuator and position the actuator until it comes to rest against the top plate of the valve.
- Centre the holes of the top plate with those of the holes of the actuator. Insert and turn screws several turns. Do not yet tighten the screws.
- Open and close the valve two or three times. If no problems arise, tighten the screws.
- If necessary adjust the travel stop: please see next chapter.

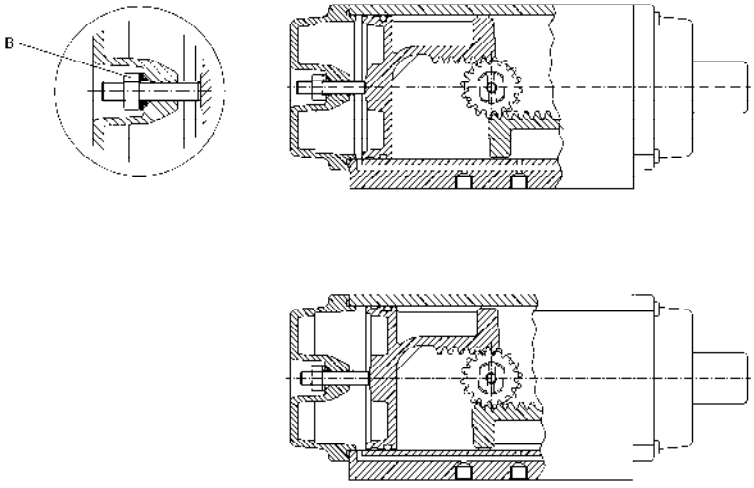
Mounting the actuator on the valve by using a mounting bracket (Fig. 2A and Fig. 2B)

- Insert the adapter in the square of the actuator.
- Position the mounting bracket over the adapter. Align the bores of the mounting bracket and those of the actuator. Hand-tighten the screws.
- Take the entire block, consisting of the actuator and the mounting kit, and place it on top of the valve.
- Insert the square end of the shaft into the adapter and move the mounting bracket until it comes into contact with the top plate of the valve.
- Centre the holes of the top plate with those of the mounting kit, insert the screws. Manually tighten the nuts and washers. Do not yet tighten them completely.
- Open and close the valve two or three times. If no problems arise, tighten the screws.
- If necessary adjust the travel stop: please see next chapter.

Travel stop adjustment

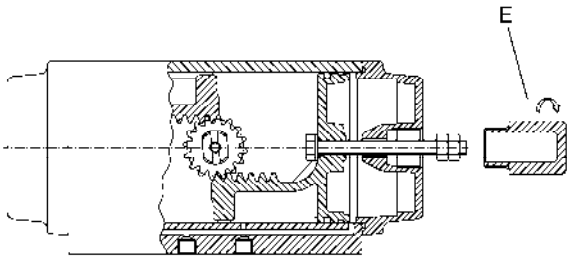
“Open”-position of valve
(actuator pistons move outward)

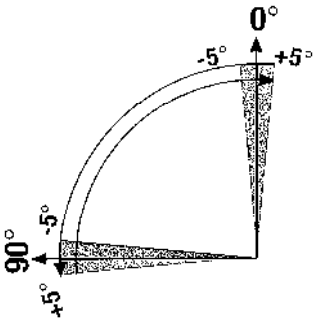
- Close the valve, so that nut B for the travel stop adjustment is free to be tightened or loosened.
- Loosen nut B by a couple of turns.
- Tightening the grub screw effects a travel stop adjustment to an opening angle of less than 90°. Loosening the grub screw by a couple of turns allows an adjustment of the travel stop to obtain an opening angle of more than 90° (see pictures).
- After having tightened or loosened the grub screw based on whether you require increased or limited opening, verify the position of the valve. If the required position has not been reached, repeat above procedure.
- Once having found the desired position, open the valve and tighten nut B.

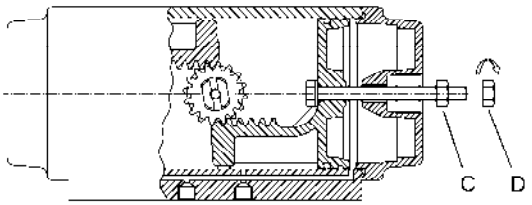


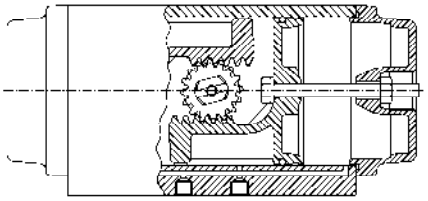
“Closed”-position of valve
(for series APM only)
(actuator pistons move inward)

- Open the valve, so that the two nuts C and D are free to be tightened or loosened.
- Remove the aluminium end cap (E).
- Loosen the nut D and take it out.
- Loosening nut C means an adjustment of the travel stop to an angle between 0° and +5°. Tightening nut C leads to an adjustment of the travel stop to an angle of -5°C to 0° (please see pictures).









- After having done the adjustment check for correct position of the valve. If the required position has not been reached, repeat above procedure.
  Once having determined the correct position, open the valve and tighten nut D until it comes to rest against nut C. Tighten both nuts paying careful attention that nut C does not alter position when placed against counter nut.
- Screw on the aluminium end cap.

Maintenance

The lubrication of the actuators carried out at the factory will last for their entire service life under normal operating conditions, but the actuators should be checked at regular intervals.
The guide rods and seals should be exchanged after approximately 500.000 switch cycles under normal operating and environmental conditions. In case of extreme working and environmental conditions the intervals have to be shortened.
GEFA Processtechnik GmbH recommends to use only original spare parts and to do maintenance by competent and qualified personal.

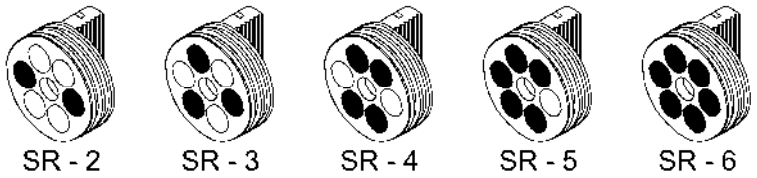
Important

Before starting maintenance works, take care that the pneumatic actuator has been disconnected from the compressed air and power supply and that it has been bled if necessary.
For single acting actuators loosen the screws (18) located at the end caps (3), loosen the end cap screws (18) crosswise and step by step. Slowly unbend the springs. Take the springs/the spring cartridge out.
If the actuator was equipped with a reduced number of springs, mount the springs as shown on the next page.

Disassembly:

- Remove the screws (18) from the end caps (3).
- Remove the aluminium cap (24) and replace the O-ring (25). Unscrew the counter nut and nut (17).
- Remove the end caps (3) and replace O-rings (19 and 15).
- Rotate pinion (4) in anticlockwise direction until pistons (2) move out of the body (1). Replace O-ring (21) and piston guide ring (20).
- Remove the snap ring (10) from the pinion (4).
- Remove pinion (4) from the lower part of the body (1) simply finger pressing from above. Replace O-rings (7 and 9) and the pinion guide rings (6 and 8).

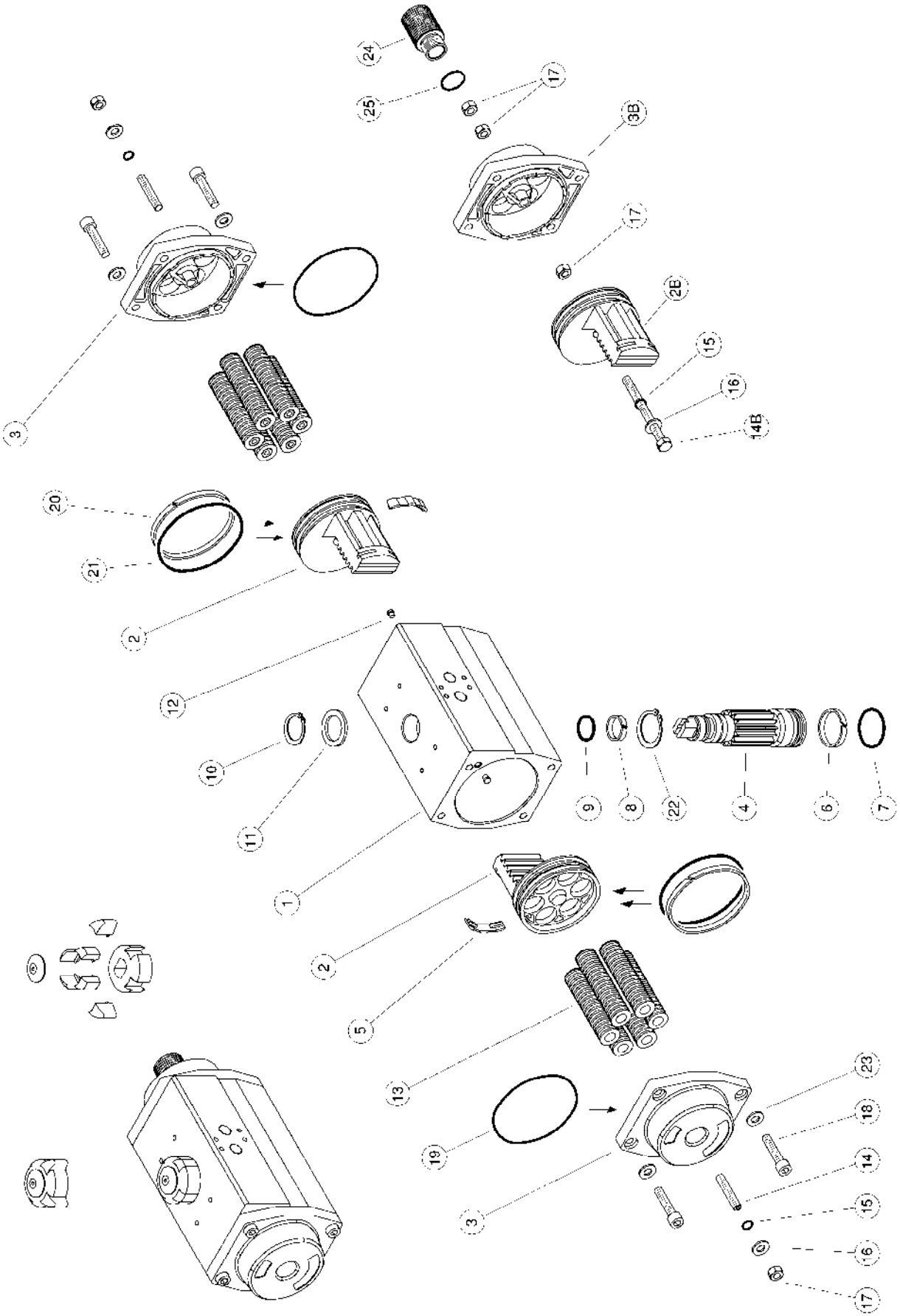
Actuator parts, pinion and guide rings should be lubricated with silicone-free Lithium-based grease.



For reassembly follow above procedure in reverse steps.

Item	Description	Qty
1	Body	1
2	Piston	2*2)
2B	Piston for type APM	1
3	End cap	2*2)
3B	End cap for type APM	1
4	Pinion	1
5*1)	Piston guide	2
6*1)	Pinion guide ring	1
7*1)	O-ring	1
8*1)	Pinion guide ring	1
9*1)	O-ring	1
10	Snap ring	1
11	Nylon washer	1
12*1)	Plug	2
13	Spring	4-12
14	Screw for travel stop adjustment	2*2)
14B	Screw for travel stop adjustment for type APM	1
15*1)	O-ring	2
16	Washer	2
17	Nut	2*3)
18	Screw for end cap	8
19*1)	O-ring	2
20*1)	Piston guide ring	2
21*1)	O-ring	2
22	Snap ring	1
23	Washer	8
24	Aluminium cap for type APM	1
25*1)	O-ring for type APM	1

*1) Suggested spare parts for maintenance
*2) for type APM only one piece necessary
*3) for type APM three pieces necessary


24
25
17
3B
17
2B
15
16
14B
3
20
21
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17

Attachment

Supplementary safety instructions for the utilisation of the AP and APM series pneumatic actuators in potentially-explosive atmospheres (2014/34/EU ATEX Directive)

1. Before carrying out any operation, carefully read the Manual for Use and Installation supplied together with the actuator, including the following supplementary instructions on the use of pneumatic actuators in potentially explosive environments.

2. Verify that the product received fully complies with the prerequisites of the application in which it must be installed.

3. Check that the packaging, at the time of being received, is intact and free of damage caused by knocks or falls occurring during transport. Should any damage be present, check the integrity of the product.

4. If the actuator is to be stored for a long period of time, it is best not to remove it from its packaging. For storage, it is recommended to select locations that are clean, free from dust and/or humidity, with temperatures ranging from -10°C and +60°C. Whilst still in their original packaging, in the case it is necessary to leave the actuators in the open air for a short time (e.g., a few days in a worksite pending mounting), ensure that all is covered and sheltered from dust, rain or snow.

5. Please note that each individual actuator is thoroughly checked and tested prior to shipping. A few simple precautions, such as those listed above, will keep maintain integrity and functionality for a long period of time.

ACTUATOR MARKINGS and CLASSIFICATION

An identifying plate is attached to the body of the actuator, indelibly reporting the following information:

- the manufacturer's name
- the model of the AP actuator
- number of springs
- CR code of production
- traceability
- production ties
- mounting variations
- maximum working pressure
- ambient temperature limits within which the use of actuator is permitted
- markings containing the data inherent to the information for use in potentially explosive atmospheres
- the CE symbol of conformity with the regulations/directives

An example of a data plate is shown subsequently.

- Brand and address of the manufacturer, responsible for releasing the product on the market within the EU.

- Model of the actuator, number of springs, year of production, CR* code, year of production, installation options.
  NOTE (*) The CR traceability code is a number that identifies a homogeneous batch of products related to the internal manufactuer order from which it is possible to check the registration of compliance checks during production, assembly and testing, as well as the sales order.

- CE certificate no. issued by the certifying body responsible for storing the technical file according to the provisions of the ATEX Directive.

- Markings with the data concerning the information for use in potentially explosive atmospheres: class of conformity according to the regulations, protection level 'C', TX temperature class.

The information relative to the ambient temperature at which the actuator should be used is stated both on the label and in this Manual.

CE	Compliance with European directives, CE marking.
Ex	Marking for materials in hazardous atmosphere
II	Group II (equipment intendend for surface use)
2	Categ. 2 (INTERMITTENT presence of hazardous atmospheres)
G	Explosive atmospheres with gases or vapours
D	Explosive atmospheres with dust
C	Means of protection (constructional safety)
TX	Temperature class (TX)
Tamb	Environmental temperature -20°C to +80°C
CE Zertifikat	Technical dossier submission certificate

Temperature class TX

The surface temperature class is not indicated in that the actuators do not have their own internal heat sources and indeed reach a temperature close to that of the surrounding environment or to that of the fluid utilised to operate them, in accordance with whichever is higher. The temperature range for utilisation is -20°C to +80°C for the standard versions. Only for special implementations supplied upon request, the temperature range is -50°C to +100°C or +20°C to +150°C, with these special executions being duly marked on the data plate of the actuators. Demanding use of the actuator, in which it is pushed to its maximum operating speed limits and without taking breaks between one cycle and the next, can generate an increase in the maximum temperature of the external surfaces of the actuator by 5°C in respect of the normal temperatures resulting from the environmental temperature or from the fuel temperature

Correspondent fluid/environmental temperature and class

Fluid T_{max}/Environmental T_{max}	**Temperature Class**
a) 80°C	T6
b) 95°C	T5
125°C	T4
c) 145°C	T3
a) with gaskets in NBR (BUNA-N)	
b) with gaskets in VMQ (Silicone)	
c) with gaskets in FKM (Viton)	

It should also be remembered that:
- The maximum surface temperature is not dependent on the pneumatic actuator but predominantly on the temperature of the fuel and/or the temperature of the environment in which it is found.
- The temperature range indicated on the data plate of the actuator is valid both in terms of the ambient temperature and the fuel temperature.
- Before installing the actuator in potentially hazardous atmospheres containing gases or dusts, **ascertain if the minimum ignition temperatures of the gases or dusts themselves are greater than that of the maximum surface temperatures of the actuators.** Such maximum temperatures are clearly shown on the data plates of the actuators under the 'Tamb' listing.

The AP and APM series actuators are suitable for use in hazardous areas with the presence of gas and/or combustible dusts (**group II, category 2GD, zone 1 and zone 2 for gas and zone 21 and zone 22 for dusts**).
The pneumatic actuators are designed and manufactured in accordance with the requirements of the following regulations:

EN1127-1 / EN13463-1 / EN13463

Correspondence between hazardous areas, substances and categories under the 94/9/CEATEX Directive

Substance	Dangerous area	Category
Gases, vapours or mists	Area 0	1G
Gases, vapours or mists	Area 1	2G or 1G
Gases, vapours or mists	Area 2	3G, 2G or 1G
Dusts	Area 20	1D
Dusts	Area 21	2D or 1D
Dusts	Area 22	3D, 2D or 1D

SAFETY INSTRUCTIONS for Installation in potentially DANGEROUS AREAS

1) The pneumatic actuators are defined without their own functionality, with their conditions of application and use being innumerable. It is therefore essential that the user carries out a thorough risk analysis aimed towards the specific use so as to reduce the risk to an acceptable level for the category of use.

2) It is recommended to always operate in safely conditions throughout all phases of installation, use and maintenance.

3) Always observe the general safety instructions laid down in the various areas of work. Always wear personal protective equipment (PPE).

4) The actuator is not suitable for containing potentially explosive mixtures, being for use in operations with exclusively NON-corrosive and NON-explosive fluids. These fluids must be clean and filtered (max. filter dimensions of 20 microns).

5) The actuator is supplied with sufficient lubrication for use in normal working conditions. If the actuator is subjected to heavy use, it is recommended to utilise a fuel that is LUBRICATED with substances that tend not to carbonise and become explosive. The fluid must be aspirated into a SAFE AREA, as with for the spring compartment fluid for the simple-function actuators (AP SR - APM SR). It is recommended to use pilot valves equipped with ETS (Exhaust To Spring) function or to keep the spring chambers pressurised at a pressure of 0.2-0.3 bar to prevent the actuator aspirating the surrounding air.

WARNING:
It is the duty and responsibility of the user to create the power supply circuit in such a way as to ensure that no explosive mixtures form inside the actuator.
In the event that the fuel is a gas in the IIA group (such as methane), the battery compartment must be pressurised by utilising the same gas used as operating fluid.

In the case the actuator uses a group IIA gas as its fuel, prior to each act of maintenance, effectuate a number of reclamation cycles with inert gas, in the SR version, even in the chambers in which there are springs.
Utilisation of places the pneumatic actuator under stress and processes of deterioration the integrity of the seals (O-rings) and guides.

This can impair the functionality of the actuator, causing pressure losses and thus lower the torques developed.
It is necessary that checks and maintenance of the actuators are scheduled and executed periodically. The higher the risk class of the intercepted fluid, the more maintenance work must be carefully and frequently undertaken over time.

6) As foreseen by the regulations of EN 1127-1 REF. 6.4.4 note 3, the rotating elements, so as to avoid the ignition of dust/air mixtures due to sparks of a mechanical origin, must have peripheral speeds less than or equal to 1 m/s (100 cm/s).
The AP and APM series actuators satisfy such requirements in that during the evaluation phase, they have obtained peripheral speeds from 1.5 cm/s for the smaller APO actuator model, to 3.6 cm/s for the larger model AP10 actuator.

7) Direct installation of the actuator on the valve. Be careful to avoid the connection between the actuator and valve being airtight. In fact, the fluid intercepted from the valve, in the case in which there is a leak from the stem, must be able to flow freely in the actuator-valve area and exit towards the outside. Otherwise the fluid, connected in the actuator-valve coupling, could become pressurised, reaching the pressure present in the tubes, and thus penetrate the cylinder chambers, reaching potential sources of ignition.

8) **Always check that the actuator is grounded.** Utilise the actuator only and exclusively with valves equipped with an antistatic device. For further instructions, see point 23.

9) The presence or the subsequent application of coatings (i.e. paint) must not be:
> of 2 mm in case of gas and/or vapours in the IIB and IIB group
> of 0.02 mm in the case of gas and/or vapours in the IIC group

10) Dust deposits that remain for long periods between the interstices of the moving parts could become a potential cause of ignition over time, even if the moving parts have a very low rotation speed.
The upper part of the stem that deviates from the body of the actuator, does not present any particular cavities or crevices that are difficult to access. As such, a simple periodic cleaning (in accordance with the conditions of dustiness in the environment) can be carried out in order to maintain a high standard of safety.
In the case of particularly severe conditions with regards to the level of environmental dust and/or difficulty in accessing the actuator to effectuate cleaning operations (due to cramped spaces or inaccessible elevated heights), it is recommended the user protect the pneumatic cylinder and perimeter of connection between valve and actuator (pin and framework) with caps or other covers. It should be noted, however, that the join of an actuator to a valve, both having declarations of conformity with the ATEX 2014/34/EU Directive, does NOT absolve the operator from carrying out the assessment of the coupling risks caused by the mechanical interface applied to the devices, in compliance with the directive and relevant coordinated standards.

11) **Opening of the actuator:** each operation or intervention on the actuator must be carried out by qualified and specialised persons, having been duly trained. Ensure that there is no supply pressure present in the device and that the valve connected to it is in a secure condition (open or closed, depending on the specific usage). If the actuator is of a spring return SR type, ensure that the actuator is a position so that these are NOT in a process of compression, but of distention.

WARNING: even without compressed air, a simple-acting SR actuator may be found in the condition to have compressed springs due to the valve connected to it being blocked mechanically or due to any device that prevents free rotation in the position of the elongated springs.
Effectuate all maintenance operations in a safe area.

If the intervention must be effectuated in an environment with the possible presence of explosive mixtures, AVOID the use of tools and/or work processes that could generate triggering causes.
The device, if not pressurised and with springs extended, has no ignition source even when open.

12) Do not modify or tamper with the actuator in any way.

13) Only use genuine spare parts supplied by the manufacturer.

14) Utilise suitable moving, handling and support systems for large-scale actuators.

15) Before you install the actuator in seismic risk areas or in extreme weather conditions, contact the technical service of the manufacturer.

16) Apply electrical and other accessories only if compliant with the 2014/34/EU ATEX Directive, equipped with declarations of compliance and showing appropriate classification for the installation area. Check each added accessory whereby the execution of risk analysis is necessary, in accordance with ATEX Directives.

17) If the actuator is installed in environments with extreme conditions (very high or very low temperatures), it is the responsibility of the user to arrange for and apply adequate insulation coverings.

18) The installation of the actuators must be well executed in order to not place the device under linear, bending or torsional stresses not intended within the range of normal use of the actuator.

19) Do not use the actuator beyond the environmental and operational conditions nor beyond the performance characteristics declared by the manufacturer.

20) Use proper equipment to protect the actuators against any possible excessive pressures caused by the utilisation of unstable fuels or from any possible overpressure which could cause a fire.

21) In the case of fire, the actuator soon loses its operational capabilities, unless considering special protection or insulation in order to keep it operational in the event of a fire.

22) The actuator is not a safety device. It must be monitored and checked by other devices specially designed and approved as such.

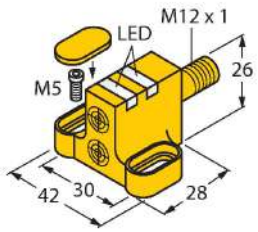
23) **DANGER of explosion due to Electrostatic Discharge**
To avoid the accumulation of electrostatic loads on the metallic parts of the actuators, the actuators themselves and all the surrounding metallic parts must be electrically connected to each other and to the general earthing system. Effectuate the earthing using insulated conductors with ring terminals. It is recommended to use eyelets with dimensions able to allow the insertion between at least one of the screws that secure the heads to the actuator cover.
CAUTION: Use the actuator only with valves equipped with antistatic devices; effectuate the mechanical joining between the actuator shaft and valve shaft via electro-conductive materials. **Verify that there is a smooth conduction between the actuator shaft and the valve body connected**, both during the initial installation phase and via the means of preventive-maintenance operations to be carried out at least every 6 months. Ensure that the valve body is properly connected to the equipotential grounding line.
After having effectuated the grounding of the actuator, check the electrical continuity of the connection between the cylinder and the point of connection to the earthing system and between the latter and the dispersion.
Verify the continuity between the parts connected to the ground and any eventual parts connected together through isolating joints and, if necessary, add metal jumpers to short-out these parts.
As much as possible, avoid having non-metallic objects near the device. If this is not possible, take measures to avoid that these objects may become electrostatically charged. This is all the more important the wider the surface of the non-metallic objects and the more likely the presence of environmental conditions with low humidity. In order to prevent and/or reduce the risk of ignition, assure that the electrical resistance between the connections and the actuator is a maximum of 10 Ohms, as foreseen by the UNI EN 12266- 2 regulation.

WARNING:
Any modification not expressly authorised by the manufacturer made to the product after its being placed on the market, shall result in the forfeiture of the presumption of conformity with the 2014/34/EU ATEX Directive as well as of the warranty itself.
The data and features described within this manual may be changed for the purposes of technical improvement also without prior notice and, therefore, are not binding for the purposes of the validity of the provision.

Technical data are subject to modifications without notice.

19.07.2018

NI4-DSC26-2AP6X2-H1141
Inductive Sensor – For Rotary Actuators



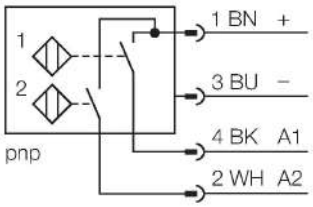
Technical data

Type	NI4-DSC26-2AP6X2-H1141
Ident. no.	1650087
Rated switching distance	4 mm
Mounting conditions	Non-flush
Correction factors	St37 = 1; Al = 0.3; stainless steel = 0.7; Ms = 0.4
Repeat accuracy	≤ 2 % of full scale
Temperature drift	≤ ± 10 %
Hysteresis	3…15 %
Ambient temperature	-25…+70 °C
Operating voltage	10…30 VDC
Residual ripple	≤ 10 % U_{ss}
DC rated operational current	≤ 200 mA
No-load current	≤ 15 mA
Residual current	≤ 0.1 mA
Isolation test voltage	≤ 0.5 kV
Short-circuit protection	yes / Cyclic
Voltage drop at I_e	≤ 1.8 V
Wire breakage/Reverse polarity protection	Complete
Output function	4-wire, NO contact, PNP
Switching frequency	0.05 kHz
Design	Dual sensor for rotary actuators, DSC26
Dimensions	28 x 42 x 26 mm
Housing material	Plastic, PP
Active area material	Plastic, PP
Electrical connection	Connectors, M12 × 1
Vibration resistance	55 Hz (1 mm)

Features

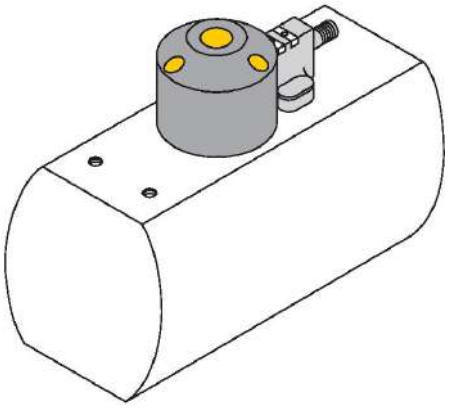
- Rectangular, housing DSC26
- Plastic, PP
- Two outputs for monitoring the position of rotary actuators
- Mounting on all standard actuators
- 2 x NO contact, PNP output
- DC 4-wire, 10…30 VDC

Wiring diagram



Functional principle

Inductive sensors detect metal objects contactless and wear-free. Dual sensors are especially designed for position detection in rotary actuators. They combine the reliability of non-contact inductive sensors with the flexibility of a modular housing system.

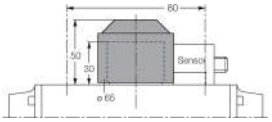


Technical data

Shock resistance	30 g (11 ms)
Protection class	IP67
MTTF	2283 years acc. to SN 29500 (Ed. 99) 40 °C
Switching state	2 × LEDs, Yellow/Red

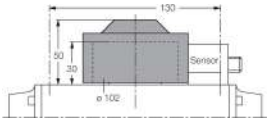
Accessories

BTS-DSC26-EB2 6900223



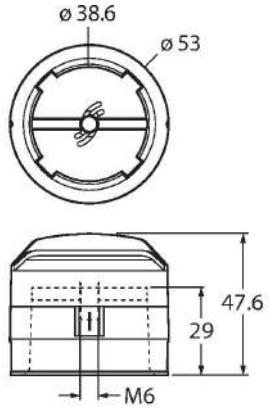
Actuation kit (puck) for dual sensors; end position damped; hole pattern on receptacle surface: 80 x 30 mm and 130 x 30 mm; connection shaft (shaft extension) height: 30 mm/Ø: max. 50 mm

BTS-DSC26-EB3 6900224



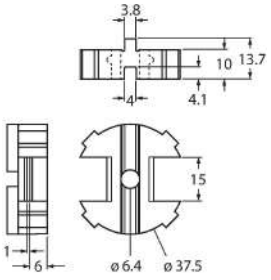
Actuation kit (puck) for dual sensors; end position damped; hole pattern on receptacle surface: 30 x 130 mm; connection shaft (shaft extension) height: 30 mm/Ø: max. 85 mm

BTS-DSC26-EB20 100002102



Actuator (puck) for dual sensors; end position damped; hole pattern on flange: 80 x 30 mm and 130 x 30 mm; connection shaft (shaft extension) height: 30 mm/Ø: max. 35 mm; available as an option: Spacer BTS-DSC26-UR10 for 20-mm-high connection shafts (shaft extension)

BTS-DSC26-UR10 100002103



Spacer for dual sensor actuation kitBTS-DSC26-EB20

Accessories

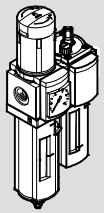
Dimension drawing	Type	Ident. no.	
	RKC4.4T-2/TEL	6625013	Connection cable, female M12, straight, 4-pin, cable length: 2 m, sheath material: PVC, black; cULus approval; other cable lengths and qualities available, see www.turck.com

MSB..-...

Wartungsgeräte-Kombination ..... de
Typ MSB..-...

Service unit combination ..... en
type MSB..-...

气源处理单元组合 ..... zh
型号 MSB..-...



FESTO

Bedienungsanleitung
Operating instructions
操作指南

Original: de

Festo AG & Co. KG
Postfach
D-73726
Esslingen
Phone:
+49/711/347-0

1203a

8004214

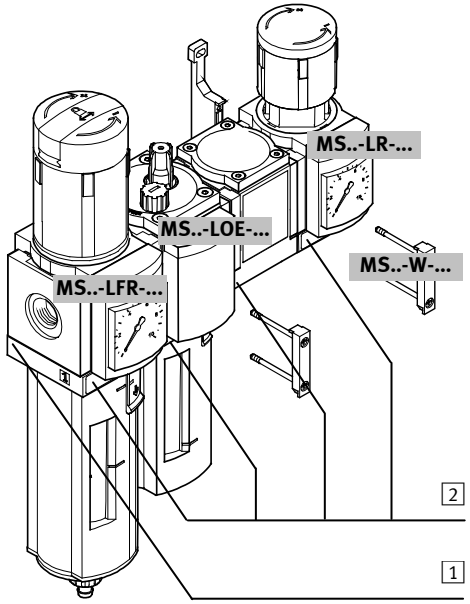


Bild 1 / Fig. 1 / 图 1

Hinweis

Einbau und Inbetriebnahme nur von autorisiertem Fachpersonal, gemäß Bedienungsanleitung. Diese Produkte sind ausschließlich zur Verwendung mit Druckluft vorgesehen. Zur Verwendung mit anderen Medien (Flüssigkeiten oder Gasen) sind sie nicht geeignet.

1 Anwendung

- Beachten Sie, dass die Bedienungsanleitung der Warungsgeräte-Kombination aus meherern Einzelanleitungen bestehen kann, wie z. B.:
- MS..-LFR-/LR(B)-... und MS..-LF(M)-/LFX-...für die Beschreibung der Filter- und Reglerfunktionen.
- MS..-LOE-... für die Beschreibung der Ölerfunktion
- MS..-W... für die Montage der Befestigungselemente.

Die MSB..-... ist wie folgt gekennzeichnet (siehe Bild 1):

Gerät	Ort (siehe Bild 1)	Beispiel
Kombination	Klebeschild auf der linken Seite des ersten Geräts [1]	530244
Komponente	Klebeschild [2] auf der Frontseite	MS4-LFR-1/2

2 Einbau

- Stellen Sie sicher, dass das Gewicht der Wartungsgeräte-kombination von der Haltevorrichtung getragen werden kann.

3 Technische Daten

- Beachten Sie folgende Punkte:
- Der Durchfluss der Wartungsgerätekombination ist im Vergleich zu den Einzelgeräten geringer.
- Die Komponente mit dem engsten zulässigen Wertebereich bestimmt den zul. Druck- und Temperaturbereich der Wartungsgerätekombination (zul. Wertebereiche siehe Typenschilder der Komponenten [2]).
- Die Gesamtleckage ist größer als die Summe der Leckage der Einzelgeräte.

Note

Fitting and commissioning are to be carried out only by qualified personnel in accordance with the operating instructions. These products are intended for use only with compressed air. They are not suitable for use with other media (liquids or gases).

1 Application

- Note that the operating instructions for service unit combinations may consist of several individual sets of instructions, e.g.:
- MS..-LFR-/LR(B)-... and MS..-LF(M)-/LFX-... for the descriptions of the filter and controller functions.
- MS..-LOE-... for the description of the lubricator function.
- MS..-W... for fitting the fastening elements.

The MSB..-... is marked as follows (see Fig. 1):

Device	Location (see Fig. 1)	Example
Combination	Adhesive label on the left-hand side of the first unit [1]	530244
Components	Adhesive label [2] on the front	MS4-LFR-1/2

2 Fitting

- Make sure that the holding device can support the weight of the service unit combination.

3 Technical specifications

- Observe the following points:
- the flow of the service unit combination is low compared to the individual units
- the component with the lowest permitted value range determines the permitted pressure and temperature range of the service unit combination (permitted value ranges see type plates of the components [2])
- the total leakage is greater than the sum of the leakage of the individual units.

注意

仅允许由经授权的专业人员依据操作指南进行安装和调试。 本产品仅可使用压缩空气。 本产品不适于使用其它介质（液体或气体）。

1 应用

- 请您注意，本气源处理单元组合的操作指南由多个独立说明书构成，例如：
- MS..-LFR-/LR(B)-... 和 MS..-LF(M)-/LFX-...用于说明过滤器和调压阀功能。
- MS..-LOE-... 用于说明油雾器功能
- MS..-W... 用于说明安装紧固件。

MSB..-... 如下标识（参见图 1）：

设备	位置（参见图 1）	示例
组合	粘性标签 [1] 位于第一个设备的左侧	530244
部件	粘性标签 [2] 位于前端	MS4-LFR-1/2

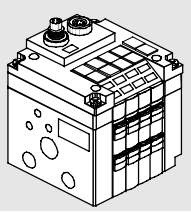
2 安装

- 请您确保固定装置能够承受气源处理单元组合的重量。

3 技术参数

- 请注意以下几点：
- 气源处理单元组合的流量相比单个设备更低。
- 这些部件通过允许的最低数值范围，确定了气源处理单元组合允许的压力和温度范围。（允许的数值范围参见部件 [2] 的型号铭牌）。
- 整体漏气量超过单个设备的泄漏量总和。

CPV10-CPI/CPV14-CPI



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Phone:
+49/711/347-0
www.festo.com

Kurzbeschreibung
Brief description
Kort beskrivning

Original: de

0701NH

705 988

Hinweis, Please note, Notera

de Einbau und Inbetriebnahme nur von qualifiziertem Fachpersonal, gemäß Bedienungsanleitung.

en Fitting and commissioning to be carried out by qualified personnel only in accordance with the operating instructions.

sv Montering och idrifttagning får endast utföras av auktoriserad fackkunnig personal i enlighet med denna bruksanvisning.

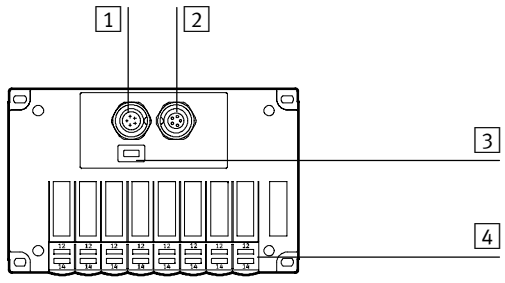
CPV-Ventilinsel mit CPI-Anschaltung ..... de

Warnung

Stellen Sie bei Verwendung als explosionsgeschütztes Betriebsmittel sicher, dass:
- elektrische Anschlüsse **nicht** unter Spannung getrennt werden.
- die komplett installierte Ventilinsel mit allen verwendeten Steckern, Adaptern und Schutzkappen mindestens die Schutzart IP64 aufweist.

1 Funktion

Die Ventilinsel CPV...-CPI ist ausschließlich zur Steuerung von pneumatischen Aktuatoren bestimmt. Die CPV...-CPI (graue elektrische Anschlussplatte) unterstützt CPI-Systeme mit erweiterter Funktionalität. Die CPV...-CPI ist ein Slave am CPI-System von Festo.



Elektrische Anschlussplatte einer CPV-Ventilinsel
1 CPI-Anschluss ankommend
2 CPI-Anschluss weiterführend
3 Grüne LED
leuchtet: kein Fehler
blinkt: allgemeiner Fehler
4 Gelbe LEDs für Ventilmagnetspulen

2 Anwendung

Es sind die angegebenen Grenzwerte für Drücke, Temperaturen, elektrische Daten, Drehmomente usw. einzuhalten.

3 Einbau und Inbetriebnahme

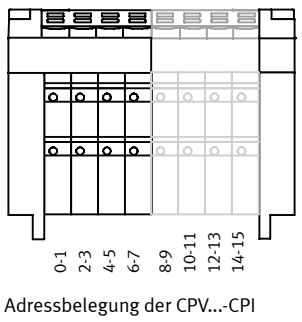
Hinweis

Schalten Sie vor Installations- und Wartungsarbeiten folgendes aus:
– Druckluftversorgung
– Betriebs- und Lastspannungsversorgung

Wenn Sie in einem CP-Strang eine CPV-Ventilinsel ohne erweiterte Funktionalität (schwarze elektische Anschlussplatte) durch eine CPV-**CPI**-Ventilinsel (graue elektische Anschlussplatte) ersetzen wollen:
- CPV mit schwarzer Anschlussplatte durch CPV-CPI mit grauer Anschlussplatte ersetzen.
- Spannungsversorgung einschalten, falls ausgeschaltet.
- Automatische Erkennung der Strangbelegung am CPI-Master mit SAVE-Taste oder DIL-Schalter durchführen. Beachten Sie die Anwenderdokumentation des Masters.

Hinweis

Nur beim CPX-CP-Interface:
Nach Austausch einer CPV durch eine CPV-CPI an einem CP-Strang:
- Nach dem Drücken der SAVE-Taste **immer** einen zusätzlichen Neustart durchführen (Power OFF/ON).



Adressbelegung der CPV...-CPI

Ein Ventilplatz belegt **immer** 2 Adressen, daraus folgt:
Eine CPV...-CPI belegt immer 16 Ausgangsadressen, unabhängig davon, mit wievielen Ventilmagnetspulen sie bestückt ist.
Es gilt:
– Bistabiles Ventil: Vorsteuermagnet 14 = niederwertige Adresse, Vorsteuermagnet 12 = höherwertige Adresse
– Monostabiles Ventil: die höherwertige Adresse ist belegt, aber ungenutzt

4 Technische Daten

Typ	CPV-CPI
Belegte Ausgangsadressen	immer 16
Technische Daten der Ventile	siehe Pneumatik-Beschreibung Typ
Anzeige CPI-Kommunikations-Status	grüne LED
Anzeige Schaltzustand der Ventile	gelbe LEDs
Schutzart (Steckverbinder gesteckt oder mit Schutzkappe)	IP65
Schutz gegen elektrischen Schlag (direktes und indirektes Berühren nach IEC/DIN EN 60204-1)	durch PELV-Stromkreis
Schutz gegen Explosion	siehe ATEX-Dokumentation
Elektromagnetische Verträglichkeit (Industrie)	– Störaussendung geprüft nach DIN EN 61000-6-4 – Störfestigkeit geprüft nach DIN EN 61000-6-2
Schwingung und Schock	geprüft nach DIN/IEC 68/ EN 60068 Teil 2-6 und 2-27
Netzausfall-Überbrückungszeit	10 ms
Zulässige Umgebungstemperatur – Betrieb – Lagerung	 -5 ... +50 °C -20 ... +70°C
Relative Luftfeuchtigkeit	95 %, nicht kondensierend

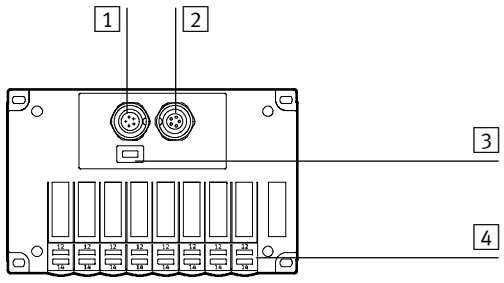
CPV valve terminal with CPI module ..... en

Warning

If to be used as an explosion-protected operating device, make sure that:
- electrical contacts are not disconnected under tension
- the completely fitted valve terminal with all plugs, adapters and protective caps complies at least with protection class IP64.

1 Function

The CPV...-CPI has been designed exclusively for controlling pneumatic actuators. The CPV...-CPI (grey electrical sub-base) supports CPI systems with extended functions.
The CPV...-CPI is a slave on the Festo CPI system.



Electrical sub-base of a CPV valve terminal
1 CPI connection incoming
2 CPI connection continuing
3 Green LED
lights up: no fault
flashes: general fault
4 Yellow LEDs for valve solenoid coils

2 Application

The maximum values specified for pressures, temperatures, electrical data, torques etc. must be observed.

3 Installation and commissioning

Please note

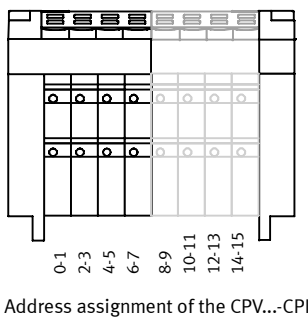
Before carrying out installation and maintenance work, switch off the following:
– the compressed air supply
– the operating and load voltage supplies

If you wish to replace a CPV valve terminal without extended functions (black electrical sub-base) in a CP string by a CPV-**CPI** valve terminal (grey electrical sub-base):
- Replace CPV with black sub-base by a CPV-CPI with grey sub-base.
- Switch on the power supply if this has been switched off.
- Carryy out automatic recogniton of the string assignment on the CPI master with the SAVE button or the DIL switch. Observe the instructions in the user documentation for the master.

Please note

Only with the CPX-CP interface:
After replacement of a CPV by a CPV-CPI on a CP string:

- After pressing the SAVE button you must **always** cary out a new start (Power OFF/ON).



Address assignment of the CPV...-CPI

A valve location **always** occupies 2 addresses, therefore:
A CPV...-CPI always occupies 16 output addresses, irrespective of the number of valve solenoid coils with which it is fitted. The following applies:
– Double solenoid valve: pilot solenoid 14 = lower-value address, pilot solenoid 12 = higher-value address,
– Single solenoid valve: the higher-value addresse is occupied but not used

4 Technical specifications

Type	CPV-CPI
Assigned output addresses	always 16
Technical specificat. of the valves	see Pneumatics Manual type
Display CPI communication status	green LED
Display switching status of the valves	yellow LEDs
Protection type (plug connector inserted or with protective cap)	IP65
Protection against electric shock (direct and indirect contact as per IEC/DIN EN 60204-1)	by means of a PELV circuit
Protection against explosion	see ATEX documentation
Electromagnetic compatibility (industry)	– Interference emission tested as per DIN EN 61000-6-4 – Resist. to interference tested as per DIN EN 61000-6-2
Vibration and shock	tested as per DIN/IEC 68/ EN 60068 part 2-6 and 2-37
Power failure bridging time	10 ms
Perm. ambient temperatures – Operation – Storage	 -5 ... +50 °C -20 ... +70°C
Relative air humidity	95 %, non-condensing

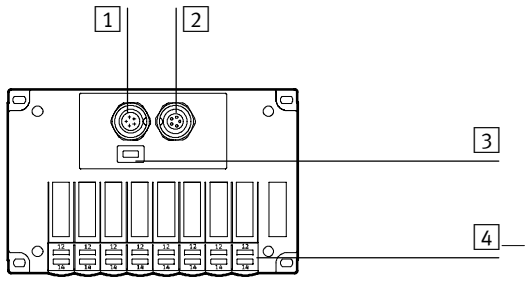
CPV-ventilterminal med CPI-anslutning ..... sv

Varning

Säkerställ vid användning som explosionsskyddat driftmedel att:
- elanslutningar inte dras ur under spänning!
- komplett installerad ventilterminal med alla använda hankontakter, adaptrar och skyddskåpor minst motsvarar skyddsklass IP64.

1 Funktion

Ventilterminal CPV...-CPI är uteslutande avsedd för styrning av pneumatiska aktuatorer. CPV...-CPI (grå elektrisk grundenhet) stödjer CPI-system med utökad funktionalitet. CPV...-CPI är en slav på Festos CPI-system.



Elektrisk grundenhet på en CPV-ventilterminal
1 CPI-anslutning inkommande
2 CPI-anslutning vidareledning
3 Grön LED
lyser: inget fel
blinkar: allmänt fel
4 Gula LED:n för ventilspolar

2 Användning

Följ angivna gränsvärden för tryck, temperaturer, elektriska data, vridmoment etc.

3 Montering och idrifttagning

Notera

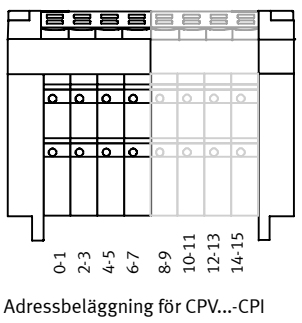
Koppla från följande innan installations- och underhållsarbeten påbörjas:
– Tryckluftsmatning
– Matningsspänningsförsörjning

Om du i en CP-slinga vill byta ut en CPV-ventilterminal utan utökad funktionalitet (svart elektrisk grundenhet) mot en CPV-**CPI**-ventilterminal (grå elektrisk grundenhet):
- Byt ut CPV med svart grundenhet mot CPV-CPI med grå grundenhet.
- Koppla till spänningsmatningen, om den varit frånkopplad.
- Utför automatisk registrering av slingbeläggningen på CPI-mastern med knappen SAVE eller DIL-omkopplare. Följ manualen för mastern.

Notera

Endast vid CPX-CP-gränssnitt:
När en CPV bytts mot en CPV-CPI på en CP-slinga:

- Starta **alltid** om ytterligare en gång (Power OFF/ON) när du tryckt på knappen SAVE.



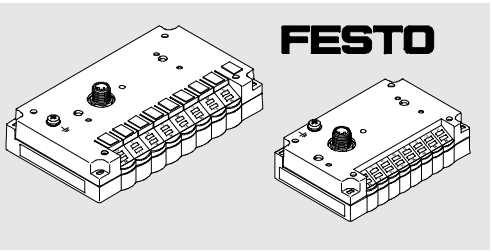
Adressbeläggning för CPV...-CPI

En ventilplats belägger **alltid** 2 adresser.
En CPV...-CPI belägger därmed alltid 16 utgångsadresser, oberoende av hur många ventilspolar den är bestyckad med.
Följande gäller:
– Bistabil ventil: pilotventil 14 = adress med lägre värde, pilotventil 12 = adress med högre värde
– Monostabil ventil: adressen med högre värde är belagd, men används inte

4 Tekniska data

Typ	CPV-CPI
Belagda utgångsadresser	alltid 16
Tekniska data för ventilerna	se pneumatikmanual
Indikering av CPI-kommunikations-status	grön LED
Indikering av ventilernas kopplingsläge	gula LED:n
Kapslingsklass (anslutnings-kontakten kopplad eller försedd med skyddsplugg)	IP65
Skydd mot elektriska stötar (direkt och indirekt beröring enligt IEC/DIN EN 60204-1)	genom PELV-krets
Skydd mot explosion	se ATEX-dokumentation
Elektromagnetisk kompatibilitet (industri)	– Emission kontrollerad enligt DIN EN 61000-6-4 – Immunitet kontrollerad enligt DIN EN 61000-6-2
Vibrationer och stötar	kontrollerad enligt DIN/IEC 68/ EN 60068, del 2-6 och 2-27
Överbryggningstid vid nätbortfall	10 ms
Tillåten omgivningstemperatur – Drift – Lagring	 -5 ... +50 °C -20 ... +70°C
Relativ luftfuktighet	95 %, ej kondenserande

CPV10-GE-PT-8
CPV14-GE-PT-8



(de) Kurzbeschreibung
(en) Brief description
(zh) 简要说明

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Postfach
D-73726 Esslingen
Phone:
+49/711/347-0
www.festo.com

1205NH
Original: de

758243

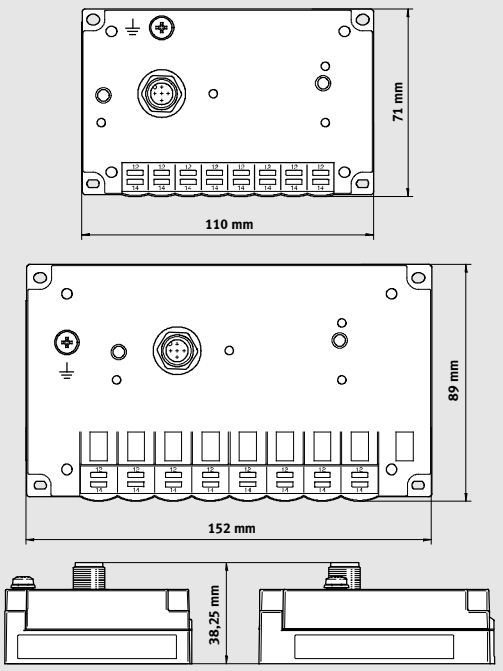
→ ..... **Hinweis, Note, 注意**

Einbau und Inbetriebnahme nur von qualifiziertem Fachpersonal, gemäß dieser Kurzbeschreibung.

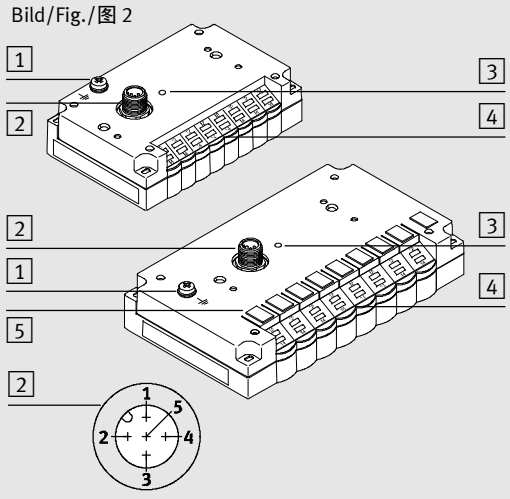
Installation and commissioning is to be carried out only by qualified specialists in accordance with this brief description.

只能由具有专业资质的人员根据本简短说明进行安装和调试。

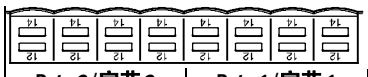
Bild/Fig./图 1



Bild/Fig./图 2



Bild/Fig./图 3



Byte 2/字节 2 Bit/位								Byte 1/字节 1 Bit/位								Ventil/Vorsteuermagnet Valve/pilot solenoid coil 阀/先导电磁线圈
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	
														X	X	0/14 0/12[1]
												X	X			1/14 1/12[1]
										X	X					2/14 2/12[1]
								X	X							3/14 3/12[1]
						X	X									4/14 4/12[1]
					X											5/14 5/12[1]
			X	X												6/14 6/12[1]
X	X															7/14 7/12[1]

[1] Bei monostabilen Ventilen ist dieses Bit belegt, wird aber nicht genutzt.
[1] With monostable valves, this bit is assigned but not used.
[1] 单电控阀同样占用这些位元，只是没有加以使用。

CPV10-GE-PT-8/CPV14-GE-PT-8 ..... Deutsch

1 Funktion

Die Ventilinselansteuerungen CPV10-GE-PT8 und CPV14-GE-PT8 sind ausschließlich bestimmt für die Ansteuerung von CPV Ventilinseln der Größen 10 und 14 mit jeweils 8 Einheiten.
Zur Anbindung an eine übergeordnete Steuerung ist ein I-Port Master von Festo, z. B. CTEL-Master, oder ein direkt auf der Ventilinselansteuerung montierbarer Feldbusknoten (CTEU-...) vorgesehen. Alternativ ist eine Anbindung über einen IO-Link Master möglich (siehe „IO-Link Modus“).
Die Ventilinselansteuerungen sind nur folgendermaßen zu benutzen:
– bestimmungsgemäß
– im Originalzustand, ohne eigenmächtige Veränderungen
– in technisch einwandfreiem Zustand

2 Anwendung

Es sind die angegebenen Grenzwerte für Drücke, Temperaturen, elektrische Daten, Drehmomente usw. einzuhalten.

3 Einbau und Inbetriebnahme

→ ..... **Hinweis**

Schalten Sie vor Installations- und Wartungsarbeiten folgendes aus:
– Druckluftversorgung
– Betriebs- und Lastspannungsversorgung.

Bild 1 zeigt die Maße der Ventilinselansteuerungen.

Bild 2 zeigt die Komponenten der Ventilinselansteuerung:

Pos.	Bezeichnung	Zusatz
1	Erdungsschraube (M4)	FE
2	I-Port Anschluss (Stecker, 5 polig, M12, A-codiert)	Pin 1: 24 V PS (Elektronik) Pin 2: 24 V PL (Ventile) Pin 3: 0 V PS (Elektronik) Pin 4: C/Q (Komm.-Signal) Pin 5: 0 V PL (Ventile)
3	Status-LED I-Port Kommunikation	siehe „Diagnose“
4	Status-LEDs Ventile	Aus: Ventil inaktiv[1] An: Ventil aktiv[1]
5	Bezeichnungsschilder	
[1] positive Logik		

3.1 Montage an einer CPV-Ventilinsel

- Ventilinselansteuerung lagerichtig auf Ventilinsel setzen.
- Ventilinselansteuerung mit Schrauben auf der Ventilinsel montieren (Anzugsdrehmoment 0,7 Nm).

3.2 Verbindung mit einem I-Port Master

- I-Port Verbindungsleitung anschließen bzw. CTEU-Feldbus-Modul auf Ventilinselansteuerung montieren.
- Spannungsversorgung des I-Port Masters einschalten, angeschlossene Devices werden automatisch erkannt. Beachten Sie zudem die Anwenderdokumentation des jeweiligen I-Port Masters.

3.3 IO-Link Modus

Die Ventilinselansteuerung kann auch als IO-Link-Device betrieben werden. Dabei wird der I-Port-Anschluss in einem IO-Link-Modus verwendet. Die dazu benötigte IODD-Konfigurationsdatei kann unter www.festo.com heruntergeladen werden.

→ ..... **Hinweis**

Bei Verwendung eines IO-Link Masters muss in der Regel die Lastspannungsversorgung separat bereit gestellt werden.

4 Adressierung

Die Ventilinselansteuerung belegt im I-Port bzw. IO-Link Master immer 2 Byte Ausgangsadressen (2 Bit je Ventileinheit, monostabil und bistabil). Das jeweils höherwertige Bit ist dem Vorsteuermagnet 12 zugeordnet, das niederwertige Bit dem Vorsteuermagnet 14.
Bild 3 zeigt die Zuordnung der Bitpaare zu den Ventileinheiten.

5 Erdungsanschluss

Erden Sie die Ventilinselansteuerung über die Erdungsschraube 1 (siehe Bild 2; Anzugsdrehmoment 0,5 Nm).

6 Diagnose

Die Ventilinselansteuerung besitzt eine Diagnosefunktion zur Überwachung der I-Port Kommunikation und der Lastspannungsversorgung.

6.1 I-Port

LED	Funktion	Zustand	Bedeutung
X1 3 (rot/grün)	Anzeige I-Port-Kommunikationsstatus	leuchtet grün	Kommunikation OK Lastspannungsversorgung OK
		blinkt grün (1 Hz)	Kommunikationsfehler Lastspannung OK
		leuchtet rot	Kommunikations- und Lastspannungsfehler
		blinkt rot/grün (1 Hz)	Kommunikation OK Lastspannungsfehler

6.2 Lastspannungsversorgung

Die Ventilinselansteuerung überwacht die Lastspannungsversorgung und reagiert auf Unterspannung durch Übertragung eines 2 Byte langen Event-Codes (MSB:51h, LSB:12h) an den I-Port Master.

7 Technische Daten

Bezeichnung	Erläuterung/Werte
Belegte Ausgangsadressen	2 Byte (16 Bit)
Max. Leitungslänge	20 m ungeschirmt (Verbindungsleitungen › 5 m müssen mindestens 1 mm² Adernquerschnitt haben)
Kommunikationsprotokoll	I-Port, IO-Link
IO-Link-Eigenschaften – Operating Mode – Revision	 COM 3 (230,4 kBit) COM 2 (38,4 kBit) 1.0
Nennbetriebsspannung	verpolungssicher Elektronik: 24 V DC (±25 %) Ventile: 24 V DC (±10 %)
Eigenstromaufnahme Elektronik	35 mA
Maximale Stromaufnahme Ventile	700 mA
Schutzart (bei komplett montierter Ventilinsel)	IP65
Schutz gegen elektrischen Schlag (direktes und indirektes Berühren nach IEC/DIN EN 60204-1)	durch PELV-Stromkreis
Elektromagnetische Verträglichkeit (Industrie)	siehe Konformitätserklärung (www.festo.com)
Netzausfall-Überbrückungszeit	10 ms
Zulässige Umgebungstemperatur – Betrieb – Lagerung	 –5 ... +50 °C –20 ... +70 °C
Relative Luftfeuchtigkeit	93 %, nicht kondensierend, 40 °C

CPV10-GE-PT-8/CPV14-GE-PT-8 ..... English

1 Function

The valve terminal controls CPV10-GE-PT8 and CPV14-GE-PT8 are intended exclusively for control of CPV valve terminals of sizes 10 and 14 with 8 units each.
For connection to a higher-order controller, an I-Port Master from Festo, e.g. CTEL Master, or a fieldbus node (CTEU-...) mountable directly on the valve terminal control is intended. Alternatively, a connection via an IO-Link Master is possible (see “IO-Link mode”).
The valve terminal controls may only be utilized as follows:
– as intended
– without any modifications by the user.
– in perfect technical condition

2 Application

The limit values specified for pressures, temperatures, electrical data, torques, etc. must be complied with.

3 Installation and commissioning

→ ..... **Note**

Before carrying out installation and maintenance work, switch off the following:
– Compressed air supply
– Operating and load voltage supplies.

Fig. 1 shows the dimensions of the valve terminal controls.

Fig. 2 shows the components of the valve terminal control:

Item	Designation	Additional information
1	Earthing screw (M4)	FE
2	I-Port connection (Plug, 5-pin, M12, A-coded)	Pin 1: 24 V PS (electronics) Pin 2: 24 V PL (valves) Pin 3: 0 V PS (electronics) Pin 4: C/Q (comm. signal) Pin 5: 0 V PL (valves)
3	Status-LED I-Port communication	see “Diagnostics”
4	Status LEDs for valves	Off: valve inactive[1] On: valve active[1]
5	Inscription labels	
[1] positive logic		

3.1 Mounting to a CPV valve terminal

- Set the valve terminal control correctly positioned on the valve terminal.
- Mount the valve terminal control with screws on the valve terminal (tightening torque 0.7 Nm).

3.2 Connection with an I-Port Master

- Connect the I-Port connecting cable or mount the CTEU fieldbus module to the valve terminal control.
- Switch on the power supply of the I-Port Master; connected devices are automatically detected. Also observe the user documentation for the respective I-Port Master.

3.3 IO-Link mode

The valve terminal control can also be operated as an IO-Link device. Here, the I-Port connection is used in an IO-Link mode. The IODD configuration file required for this can be downloaded at www.festo.com.

→ ..... **Note**

If an IO-Link Master is used, the load voltage supply must normally be provided separately.

4 Addressing

The valve terminal control is always assigned 2 bytes of output addresses in the I-Port or IO-Link Master (2 bits per valve unit, monostable and bistable). The respective high-order bit is assigned to the pilot solenoid coil 12, the low-order bit to the pilot solenoid coil 14.
Fig. 3 shows the allocation of the bit pairs to the valve units.

5 Earth terminal

Earth the valve terminal control via the earthing screw 1 (see Fig. 2; tightening torque 0.5 Nm).

6 Diagnostics

The valve terminal control has a diagnostic function for monitoring the I-Port communication and load voltage supply.

6.1 I-Port

LED	Function	Status	Meaning
X1 3 (red/green)	Display I-Port communication status	Lights up green	Communication OK Load voltage supply OK
		Flashes green (1 Hz)	Communication errors Load voltage OK
		Lights up red	Communication and load voltage error
		Flashes red/green (1 Hz)	Communication OK Load voltage error

6.2 Load voltage supply

The valve terminal control monitors the load voltage supply and reacts to undervoltage through transmission of a 2-byte-long event code (MSB:51h, LSB:12h) to the I-Port Master.

7 Technical data

Designation	Explanation/values
Assigned output addresses	2 byte (16 bit)
Max. cable length	20 m unscreened (Connecting cables › 5 m must have at least 1 mm² wire cross-section)
Communication protocol	I-Port, IO-Link
IO-Link characteristics – Operating mode – Revision	 COM 3 (230.4 kBit) COM 2 (38.4 kBit) 1.0
Nominal operating voltage	Reverse polarity protected Electronics: 24 V DC (±25 %) Valves: 24 V DC (±10 %)
Intrinsic current consumption of electronics	35 mA
Maximum current consumption of valves	700 mA
Protection class (for completely mounted valve terminal)	IP65
Protection against electric shock (direct and indirect contact in accordance with IEC/DIN EN 60204-1)	By means of PELV power circuit
Electromagnetic compatibility (industry)	See declaration of conformity (www.festo.com)
Power failure bridging time	10 ms
Permissible ambient temperature – Operation – Storage	 –5 ... +50 °C –20 ... +70 °C
Relative air humidity	93 %, non-condensing, 40 °C

CPV10-GE-PT-8/CPV14-GE-PT-8 ..... 中文

1 功能

阀岛控制部件 CPV10-GE-PT8 和 CPV14-GE-PT8 只可用于控制分别装有 8 片规格为 10 和 14 的阀片的 CPV 阀岛。
为了连接到上一级控制器，已安装了一个 Festo I-Port 主机，例如：CTEL-主机，或者一个可直接安装在阀岛控制部件上的现场总线节点 (CTEU-...)。
也可以通过一个 IO-Link 主机连接（参见“IO-Link 模式”）。
阀岛控制部件只能在下列条件下使用：
- 按照设计用途
- 在原装状态下使用，不得擅自改动
- 在技术性能完好的状态下使用

2 应用

必须遵守压力、温度、电气数据、转矩等规定的极限值。

3 安装和调试

→ ..... **注意**

在实施安装和保养作业之前，请您关断：
- 压缩空气气源
- 工作电压和负载电压。

图 1 显示阀岛控制部件的尺寸。

图 2 显示阀岛控制部件的构成元件：

项号	名称	附录
1	接地螺丝 (M4)	FE
2	I-Port 接口（插头，5 针，M12，A-编码）	针 1：24 V PS（电子元件） 针 2：24 V PL（阀） 针 3：0 V PS（电子元件） 针 4：C/Q（通讯信号） 针 5：0 V PL（阀）
3	状态指示灯 I-Port 通讯	参见“诊断”
4	阀状态指示灯	熄灭：阀未动作[1] 亮起：阀已动作[1]
5	标牌	
[1] 正逻辑电路		

3.1 安装在一个 CPV-阀岛上

- 将阀岛控制部件放到阀岛的正确位置上。
- 用螺丝将阀岛控制部件紧固在阀岛上（拧紧力矩 0.7 Nm）。

3.2 连接到一个 I-Port 主机上

- 接上 I-Port 连接电缆或将 CTEU 现场总线模块安装到阀岛控制部件上。
- 接通 I Port 主机的电源，自动识别已连接的设备。此外，请注意各 I Port 主机的用户文档。

3.3 IO-Link 模式

阀岛控制部件也可以作为 IO-Link 设备运行。 此时 I-Port 接口以 IO-Link 模式运行。 可从 www.festo.com 下载所需要的 IODD 配置文件。

→ ..... **注意**

使用 IO-Link 主机时，通常情况下必须单独供给负载电压。

4 地址设定

阀岛控制部件在 I-Port 主机和 IO-Link 主机中所占的输出地址始终为 2 字节（每个阀单元为 2 位，单电控或双电控）。 已将各高值位分配给先导电磁线圈 12，低值位分配给先导电磁线圈 14。
图 3 显示的是阀单元的双位关系。

5 接地端口

请通过接地螺丝 1 使该阀岛控制部件接地（见图 2；拧紧力矩为 0.5 Nm）。

6 诊断

该阀岛控制部件具有诊断功能，可对 I Port 通讯和负载电压的供给情况进行监控。

6.1 I-Port

LED	功能	状态	含义
X1 3 （红色/绿色）	I Port 通讯状态显示	绿灯亮	通讯正常 负载电压供给正常
		绿灯闪烁 (1 Hz)	通讯故障 负载电压正常
		红灯亮	通讯故障及 负载电压故障
		呈红绿色交替闪烁 (1 Hz)	通讯正常 负载电压故障

6.2 负载电压供给

通过阀岛控制部件监控负载电压的供给情况，并通过一个长度为 2 字节的事件代码 (MSB:51h, LSB:12h) 将欠压情况反映到 I-Port 主机上。

7 技术参数

名称	解释/值
占用的输出地址	2 字节 (16 Bit)
最大导线长度	20 m 未屏蔽（长度 › 5 m 的连接电缆的芯线截面必须至少为 1 mm²）
通信协议	I-Port, IO-Link
IO-Link 属性 – 运行模式 – 修正	 COM 3 (230.4 kBit) COM 2 (38.4 kBit) 1.0
额定工作电压	极性容错保护 电子元件：24 V DC (±25 %) 阀：24 V DC (±10 %)
电子元件自身的电流消耗	35 mA
阀的最大电流消耗	700 mA
防护等级（完全装配好的阀岛）	IP65
电击防护（直接或间接接触符合 IEC/DIN EN 60204-1 标准）	通过 PELV 电路
电磁兼容性（工业）	见一致性声明（www.festo.com）
停电-跨接时间	10 ms
允许的环境温度 – 运行 – 存放	 -5 ... +50 ° C -20 ... +70 ° C
相对空气湿度	93 %，未凝结，40 ° C

CERTIFICATE OF CALIBRATION

The under-mentioned item has been calibrated at the following points in the Michell Instruments Humidity Calibration Laboratory against test equipment traceable to the NATIONAL PHYSICAL LABORATORY, Middlesex, United Kingdom and to the NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY, Gaithersburg, Maryland, USA.
Dew point traceability to National Physical Laboratory: -90 to +90 °C.
Dew point traceability to National Institute of Standards & Technology : -75 to +20°C.

Certificate Number	731837	**Reference Number**	A97197
Test Date	27 January 2022	**Test Equipment**	Q0575
Sensor Serial No	1AF0-052	**Instrument Serial No**	
Model	EA2-TX-100		

Sensor Characterisation Table

Data Obtained by comparison against a Michell Instruments S4000 Precision Dewpointmeter

Generated Dew point °C	Measured Dew point °C	Generated Dew point °C	Measured Dew point °C
-100.0	-100.0	-30.0	-30.0
-89.6	-89.7	-20.5	-20.4
-80.0	-80.0	-10.4	-10.4
-69.9	-69.9	-1.4	-1.5
-58.9	-59.0	10.6	10.6
-49.8	-49.9	18.0	18.0
-39.9	-39.9		

Comments:

Calibration PASS. The Results are within specification of the sensor at the measured points detailed

Calibration Work Instruction used: 274

Sensor Accuracy: +/- 2°C from -100°C to +20°C DP.

The measurement uncertainty for the measured dew point increases linearly from 0.20 to 0.40°C over the range +20 to -60°C. +/- 0.40 to +/- 0.73°C over the range -60 to -80°C, +/- 0.73 to +/- 1.13°C over the range -80 to -90°C and +/- 1.13 to 1.72°C over the range -90 to -100°C (NOT Traceable).

The uncertainties are based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

Checked By Teresa Kierlanczyk **08 February 2022**

Michell Instruments Ltd.
www.michell.com

MICHELL Instruments

Easidew Dew-Point Transmitter User's Manual

97504 Issue 2
May 2018

Please fill out the form(s) below for each instrument that has been purchased.

Use this information when contacting Michell Instruments for service purposes.

Transmitter	
Code	
Serial Number	
Invoice Date	
Location of Instrument	
Tag No	

Transmitter	
Code	
Serial Number	
Invoice Date	
Location of Instrument	
Tag No	

Transmitter	
Code	
Serial Number	
Invoice Date	
Location of Instrument	
Tag No	

Easidew

For Michell Instruments' contact information please go to
www.michell.com

Contents

Figures

Appendices

Safety

The manufacturer has designed this equipment to be safe when operated using the procedures detailed in this manual. The user must not use this equipment for any other purpose than that stated. Do not apply values greater than the maximum value stated.

This manual contains operating and safety instructions, which must be followed to ensure the safe operation and to maintain the equipment in a safe condition. The safety instructions are either warnings or cautions issued to protect the user and the equipment from injury or damage. Use competent personnel using good engineering practice for all procedures in this manual.

Electrical Safety

The instrument is designed to be completely safe when used with options and accessories supplied by the manufacturer for use with the instrument.

Pressure Safety

DO NOT permit pressures greater than the safe working pressure to be applied to the instrument. The specified safe working pressure is 45 MPa (450 barg / 6500 psig). Refer to the Technical Specifications in Appendix A.

Toxic Materials

The use of hazardous materials in the construction of this instrument has been minimized. During normal operation it is not possible for the user to come into contact with any hazardous substance which might be employed in the construction of the instrument. Care should, however, be exercised during maintenance and the disposal of certain parts.

Repair and Maintenance

The instrument must be maintained either by the manufacturer or an accredited service agent. For Michell Instruments' contact information please go to www.michell.com.

Calibration

The recommended calibration interval for this instrument is 12 months unless it is to be used in a mission-critical application or in a dirty or contaminated environment in which case the calibration interval should be reduced accordingly. The instrument should be returned to the manufacturer, Michell Instruments Ltd., or one of their accredited service agents for re-calibration.

Safety Conformity

This product meets the essential protection requirements of the relevant EU and US standards and directives. Further details of applied standards may be found in the Technical Specifications in Appendix A.

Abbreviations

The following abbreviations are used in this manual:

barg	pressure unit (=100 kP or 0.987 atm) gauge
ºC	degrees Celsius
ºF	degrees Fahrenheit
DC	direct current
ft-lbs	foot-pound force
g	grams
in	inch(es)
µm	micrometer
m/sec	meters per second
mA	milliampere
max	maximum
mm	millimetres
MPa	megapascal
Nl/min	normal liters per minute
Nm	Newton meter
oz	ounces
ppm_V	parts per million by volume
psig	pounds per square inch
RH	relative humidity
scfh	standard cubic feet per hour
scfs	standard cubic feet per second
T	temperature
V	Volts
Ω	Ohms
ø	diameter

Warnings

The following general warning listed below is applicable to this instrument. It is repeated in the text in the appropriate locations.

Where this hazard warning symbol appears in the following sections it is used to indicate areas where potentially hazardous operations need to be carried out.

1 INTRODUCTION

The Michell Instruments Easidew is a 4-20mA loop-powered dew-point transmitter, designed to make dew point measurements in a flowing sample. The Easidew transmitter is available with 3 different process connections:

- 5/8" - 18 UNF : Easidew 2-wire, Easidew M12
- 3/4" - 16 UNF : Easidew 34, Easidew M12
- G1/2 : Easidew M12

The Easidew 2-wire is available with a choice of electrical connections:

- DIN 43650 Form C
- M12 5-Pin

2 INSTALLATION

2.1 Unpacking the Instrument

On delivery, please check that all the following standard components are in the packing tube:

- Easidew Transmitter
- Certificate of Calibration
- Connector (for sensor/cable)

The Transmitter will also be supplied with a process seal, which will be fitted to the unit. Depending on the version, this will either be a bonded seal (5/8" or G1/2" thread versions) or an o-ring seal (3/4" thread versions).

Unpack the dew-point transmitter tube as follows:

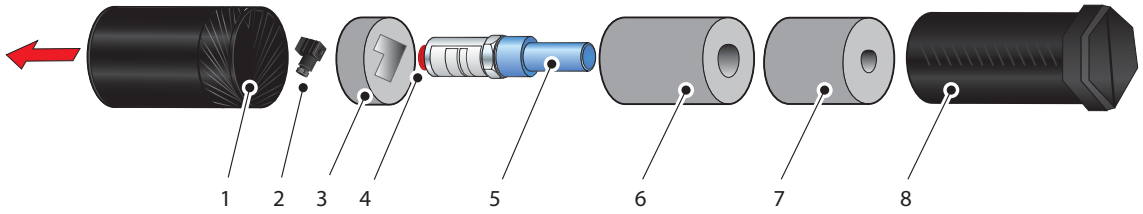


Figure 1 *DIN43650 Transmitter Unpacking Method*

1. Unscrew the cap (1) from the packing tube (8).
2. Remove the foam block (3) containing the connector (2).
3. Pull out the transmitter (5) from the tube, complete with the two foam covers (6) and (7) and the red protective cap (4).
4. Remove the foam covers from the transmitter but leave the blue plastic protective cover (5) and the red cap (4) in place until ready for installation.

NOTE: The transmitter sensing element is protected while in transit by a blue cover containing a small desiccant capsule. The connection pins are protected by a red plastic cap. None of these plastic items are required for the operation of the transmitter.

NOTE: Keep the connector (2) in a safe place until the transmitter is ready for wiring.

2.2 Preparation of the Sensor Cable

The sensor cable is NOT supplied as standard. Cables can be obtained by contacting your local Michell Instruments representative (see www.michell.com for details).

DIN 43650 Version

Cable connection to the Easidew transmitter is made via the removable connector. Removing the central screw enables the connector terminal block to be removed from the outer housing by using a small screwdriver to prise it clear.

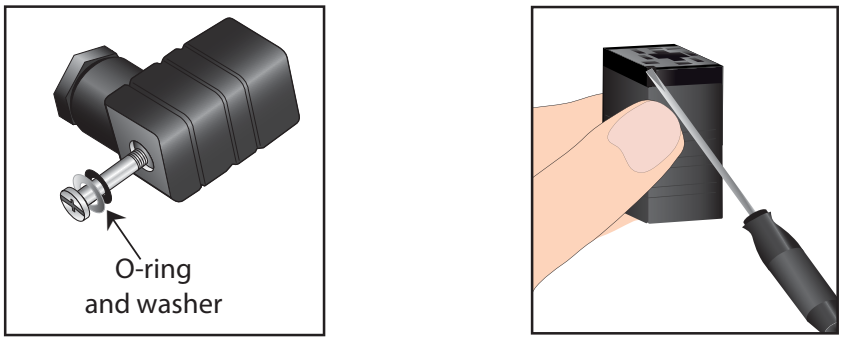


Figure 2 *Connector Terminal Block Removal*

Caution: When removing the central screw ensure that the small sealing O-ring and the washer are retained on the screw and are present during re-installation.

The sensor cables are terminated as per the following diagram:

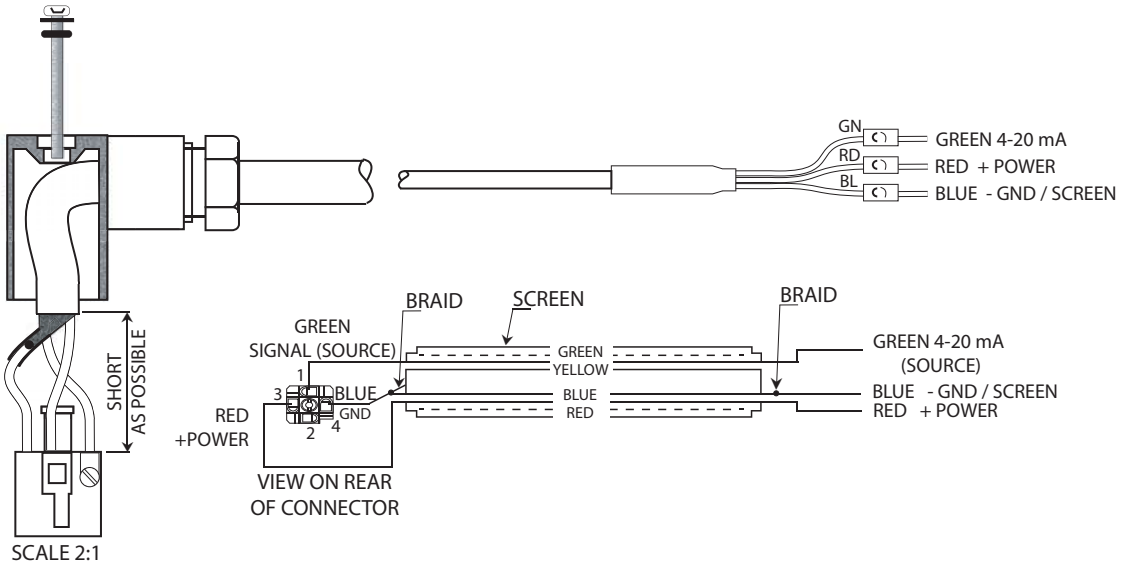


Figure 3 *Wiring Connections*

Note: The screen should only be connected to a ground point at either the transmitter installation side, or at the receiving equipment. Failure to observe this precaution can result in ground loops and equipment malfunction.

. 

Always connect the 4-20 mA return signal to a suitable load (see *Figure 3)* before the power is applied. Without this connection, the transmitter may be damaged if allowed to operate for prolonged periods.

M12 5-Pin Version

Cables with moulded M12 connectors are available from Michell Instruments in the following lengths:

- 0.8m
- 2m
- 5m

4-20 mA 2-wire	
PIN 1	Modbus B
PIN 2	Modbus A
PIN 3	4-20 mA
PIN 4	Power supply
PIN 5	0V

Figure 4 *Sensor Connector Installation*

The other end of the sensor cable is unterminated, for straightforward connection into the desired monitoring system.

	CABLE ASSEMBLY CONNECTIONS	
FUNCTION	PIN	WIRE COLOUR
MODBUS B	1	BROWN
MODBUS A	2	WHITE
4 - 20 mA	3	BLUE
POWER SUPPLY	4	BLACK
Ov	5	GREY

Figure 5 *Cable connections*

If longer cable runs are required, off-the-shelf 5-pin M12 cables can be connected between the Easidew transmitter and the cable provided by Michell Instruments.

Note: The screen should only be connected to a ground point at either the transmitter installation side, or at the receiving equipment. Failure to observe

this precaution can result in ground loops and equipment malfunction.

2.3 Cable Connection

DIN 43650 Version

To ensure the specified ingress protection is achieved, when installing the connector, the securing screw (with the O-ring and washer) must be tightened to a minimum torque of 3.4 Nm (2.5 ft-lbs). The sensor cable used must be a minimum diameter of 4.6mm (0.2").

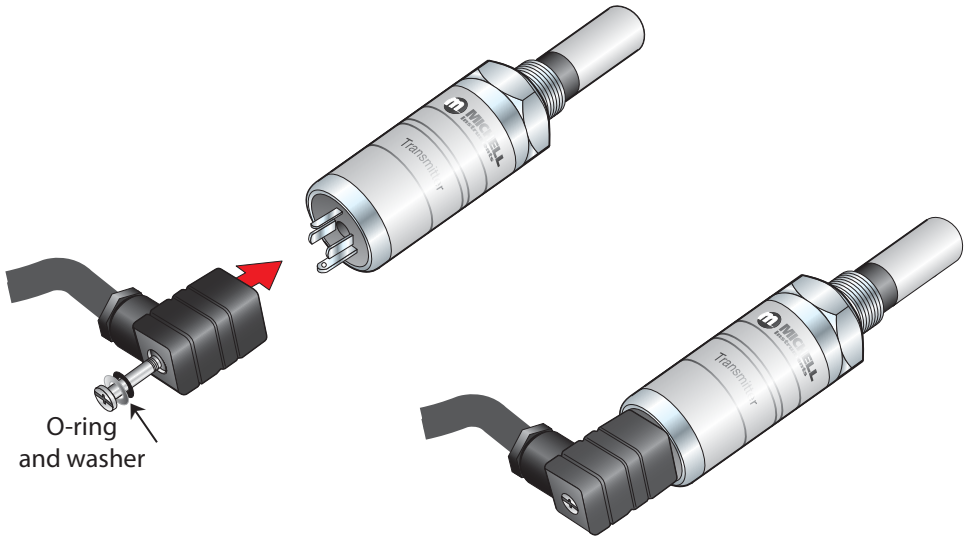


Figure 6 *Connector Installation*

M12 5-Pin Version

The connector should be installed by aligning the locating pin on the transmitter with the slot on the cable. The connector can then be pushed into place and rotated until finger-tight.

2.4 Electrical Schematic

Note: The screen should only be connected to a ground point at either the transmitter installation side, or at the receiving equipment. Failure to observe this precaution can result in ground loops and equipment malfunction.

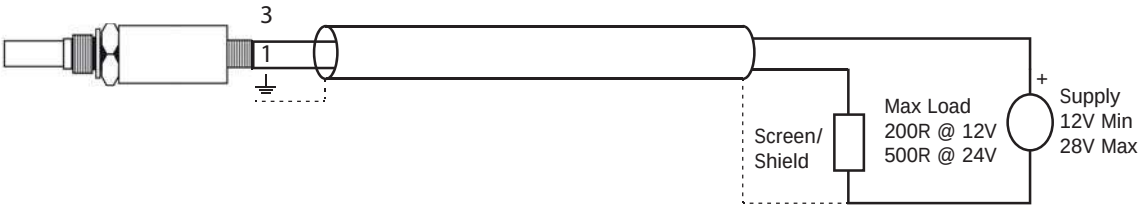


Figure 7 *2-Wire Connection Diagram*

2.4.1 Electrical Boundaries

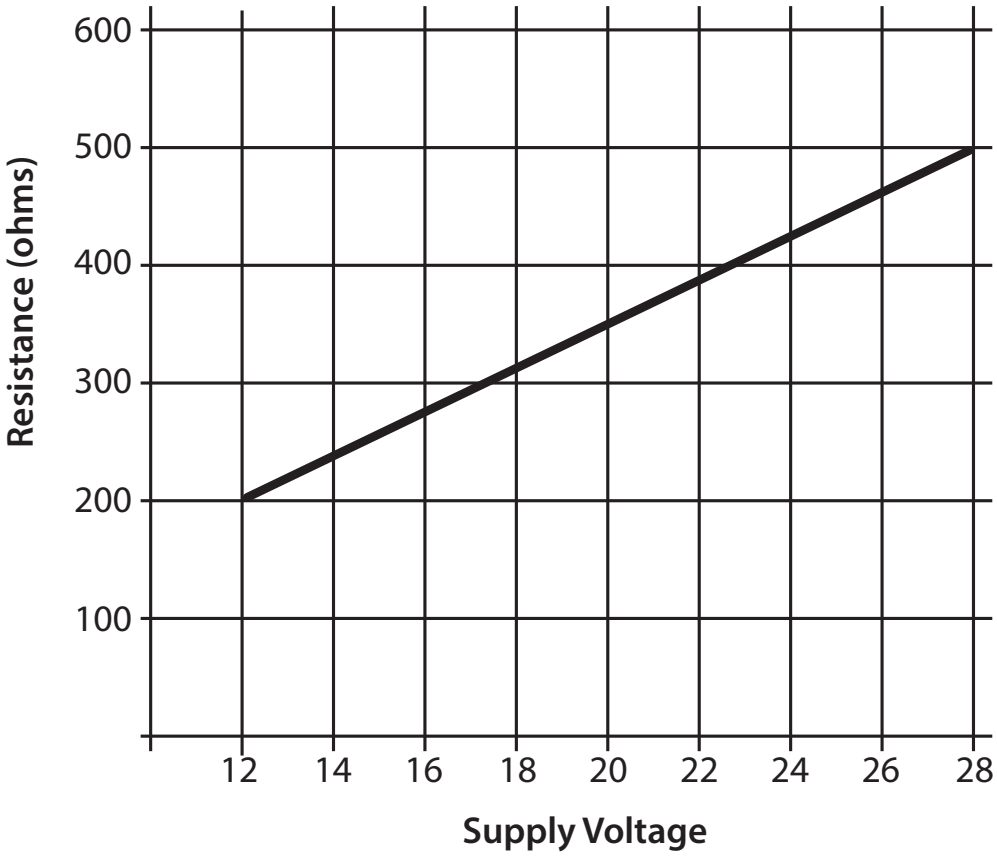


Figure 8 *Maximum Load of Easidew - Including Cable Resistance*

2.4.2 Digital Communication (M12 Version only)

Modbus RTU over RS485 communication is available on the Easidew M12, and can be used simultaneously with the 2-wire current output. Section 2.2 describes the electrical connections to the transmitter.

The Modbus register map can be found at the end of this manual.

2.5 Transmitter Installation

2.5.1 Sampling Considerations

There are two basic methods of measuring a sample with the Easidew Transmitter:
In-situ measurements are made by placing the transmitter inside the environment to be measured.
Extractive measurements are made by installing the sensor into a block within a sample handling system, and flowing the sample outside of the environment to be measured through this system.

Extractive measurements are recommended when the conditions in the environment to be measured are not conducive to making reliable measurements with the product.

Examples of such conditional limitations are:

- Excessive flow rate
- Presence of particulates matter
- Presence of entrained liquids
- Excessive sample temperature

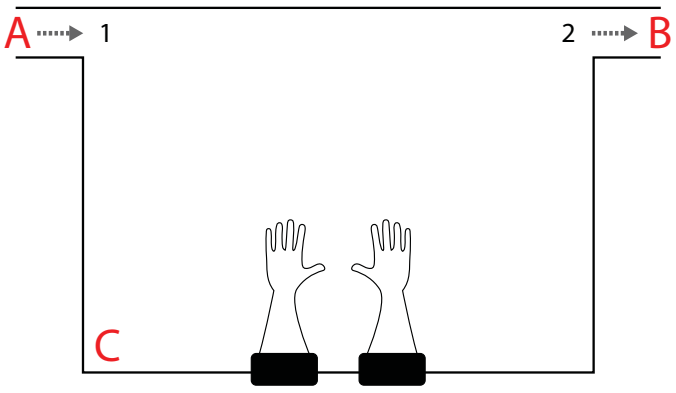
The basic considerations for each measurement type are as follows:

In-Situ

1. **Dew-Point Sensor Position** – will the sensor see an area of the environment that is representative of what you want to measure?

For example, if the sensor is to be mounted into a glove box, there are three different positions in which it could be installed – each giving a different measurement:

- Position A is on the purge inlet. In this position the sensor will confirm the dew point of the gas entering the glove box, but will not detect any leaks in the glove box itself, or any moisture released from the work piece.
- Position B is on the gas outlet. In this position the sensor will be exposed to the gas leaving the glove box, and will therefore be detecting any moisture which has entered into the system (e.g. ingress/leaks), or has been released by the work piece.
- Position C is in the glovebox itself, in this position the sensor will be only detecting any moisture in its immediate vicinity. Leaks not in close proximity to the measurement point may not be detected as this moisture could be drawn directly to the outlet.



1. Purge Inlet
2. Gas Outlet

Figure 9 *Installation Location*

If the transmitter is to be mounted directly into a pipe or duct, then consider that the installation point should not be too close to the bottom of a bend where oil or other condensate may collect.

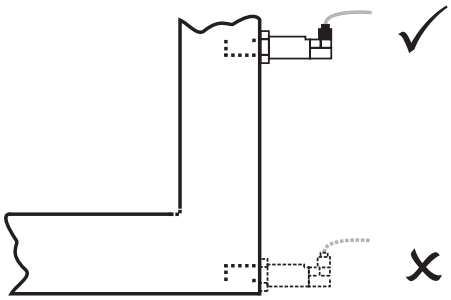


Figure 10 *Installation Location*

2. **Gas speed** – if you are planning on installing the sensor in a duct, consider how fast the sample gas is moving through it.

   If the gas speed is very low, or occasionally static, then the moisture content through the length (and width, if it is more than a few cm across) of the duct is unlikely to be uniform.

   Extremely high gas speeds can cause damage to the sensor. Direct insertion is not recommended in gas speeds in excess of 10m/s (32.8ft/s).

3. **Particulates** – Particulates travelling at speed can cause severe and irreversible damage to the sensor. At low velocity they can cling to the sensor, reducing its' surface area, and therefore response speed.

   The sensor is provided with a basic level of particulate protection in the form of a sintered guard; either HDPE (10µm pore size) or Stainless Steel (80µm pore size). If the sample stream contains smaller particulates than this, or generally large amounts of dust; extractive measurement is recommended to accommodate proper in-line filtration.

4. **Sample Temperature** – Although the Easidew can be operated at sample temperatures up to 70°C, it is advisable to keep the sample temperature as close to ambient, and as stable as possible to keep adsorption & desorption characteristics as consistent as possible (see section X.X Sampling Hints for more information).

Extractive

If the sensor is to be mounted into a sample conditioning system, then the above points are still of relevance, but it is important to consider the extraction point itself – make sure that the chosen extraction point is representative of the process, i.e. that the sample of interest is flowing past the extraction point, and it is not being pulled from a dead volume.

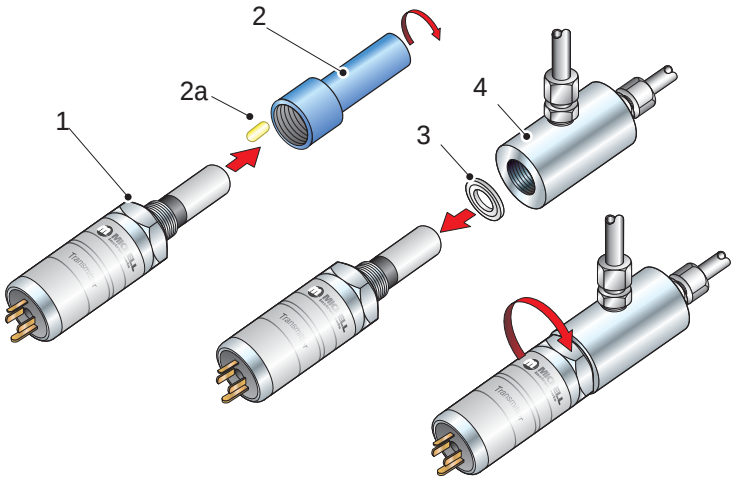


Figure 11 *Transmitter Mounting - Sensor Block*

2.5.2 Sampling Hints

Measurement of moisture content is a complex subject, but does not need to be difficult. This section aims to explain the common mistakes made in measurement situations, the causes of the problem, and how to avoid them. Mistakes and bad practices can cause the measurement to vary from the expectation; therefore a good sampling technique is crucial for accurate and reliable results.

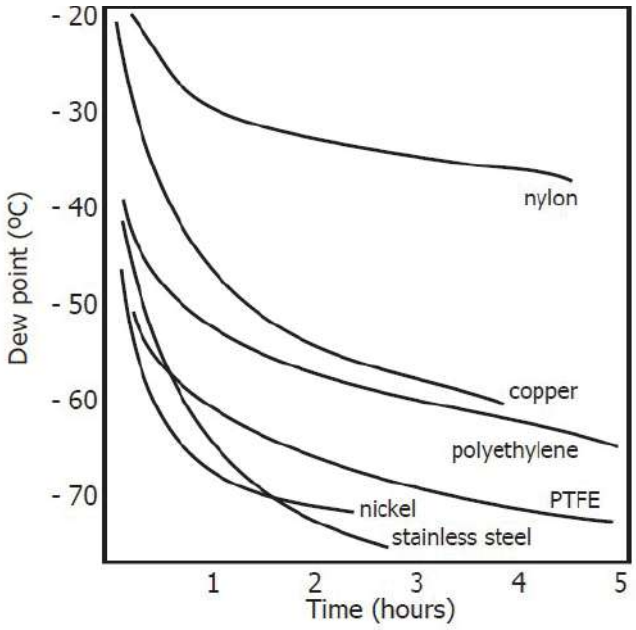


Figure 12 *Material Permeability Comparison*

All materials are permeable to water vapour, as the water molecule is extremely small compared to the structure of solids, even when compared to the crystalline structure of metals. The graph above shows the dew point inside tubing of different materials when purged with very dry gas, where the exterior of the tubing is in the ambient environment.

Many materials contain moisture as part of their structure, particularly organic materials (natural or synthetic), salts (or anything which contains them) and anything which has small pores. It is important to ensure that the materials used are suitable for the application.

If the partial water vapour pressure exerted on the outside of a compressed air line is higher than on the inside, the atmospheric water vapour will naturally push through the

porous medium causing water to migrate into the pressurised air line. This effect is called transpiration.

Adsorption and Desorption
Adsorption is the adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to the surface of a material, creating a film. The rate of adsorption is increased at higher pressures and lower temperatures.

Desorption is the release of a substance from or through the surface of a material. In constant environmental conditions, an adsorbed substance will remain on a surface almost indefinitely. However, as the temperature rises, so does the likelihood of desorption occurring.

In practical terms, as the temperature of the environment fluctuates, water molecules are adsorbed and desorbed from the internal surfaces of the sample tubing, causing small fluctuations in the measured dew point.

Sample Tubing Length
The sample point should always be as close to the critical measurement point as possible, in order to obtain a truly representative measurement. The length of the sample line to the sensor or instrument should be as short as possible. Interconnection points and valves trap moisture, so using the simplest sampling arrangement possible will reduce the time it takes for the sample system to dry out when purged with dry gas.

Over a long tubing run, water will inevitably migrate into any line, and the effects of adsorption and desorption will become more apparent. It is clear from the graph shown above that the best materials to resist transpiration are stainless steel and PTFE.

Trapped Moisture
Dead volumes (areas which are not in a direct flow path) in sample lines, hold onto water molecules which are slowly released into the passing gas; this results in increased purge and response times, and wetter than expected readings. Hygroscopic materials in filters, valves (e.g. rubber from pressure regulators) or any other parts of the system can also trap moisture.

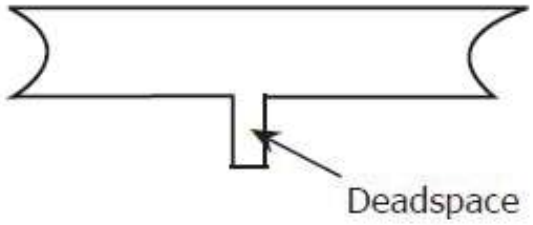


Figure 13 *Dead volume*

Sample Conditioning
Sample conditioning is often necessary to avoid exposure of sensitive measuring components to liquids and other contaminants which may cause damage or affect the accuracy over time, depending on the measurement technology.

Particulate filters are used for removing dirt, rust, scale and any other solids that may be in a sample stream. For protection against liquids, a coalescing filter should be used.

The membrane filter is a more expensive but highly effective alternative to a coalescing filter. It provides protection from liquid droplets, and can even stop flow to the analyser completely when a large slug of liquid is encountered.

Condensation and Leaks
Maintaining the temperature of the sample system tubing above the dew point of the sample is vital to prevent condensation. Any condensation invalidates the sampling process as it changes the water vapour content of the gas being measured. Condensed liquid can alter the humidity elsewhere by dripping or running to other locations where it may re-evaporate.

The integrity of all connections is also an important consideration, especially when sampling low dew points at an elevated pressure. If a small leak occurs in a high pressure line, gas will leak out but vortices at the leak point and a negative vapour pressure differential will also allow water vapour to contaminate the flow.

Flow Rates
Theoretically flow rate has no direct effect on the measured moisture content, but in practice it can have unanticipated effects on response speed and accuracy. The optimal flow rate varies depending on the measurement technology, and can always be found in the instrument or sensor manual.

An inadequate flow rate can:

- Accentuate adsorption and desorption effects on the gas passing through the sampling system.
- Allow pockets of wet gas to remain undisturbed in a complex sampling system, which will then gradually be released into the sample flow.
- Increase the chance of contamination from back diffusion: ambient air that is wetter than the sample can flow from the exhaust back into the system. A longer exhaust (sometimes called a pigtail) can also help alleviate this problem.
- Slow the response of the sensor to changes in moisture content.

2.5.3 Transmitter Mounting

Once an installation location has been chosen, this point will require a thread to match the transmitter thread. Fixing dimensions are shown in Figure 6. For circular pipework, to ensure the integrity of a gas tight seal, a mounting flange will be required on the pipework in order to provide a flat surface to seal against.

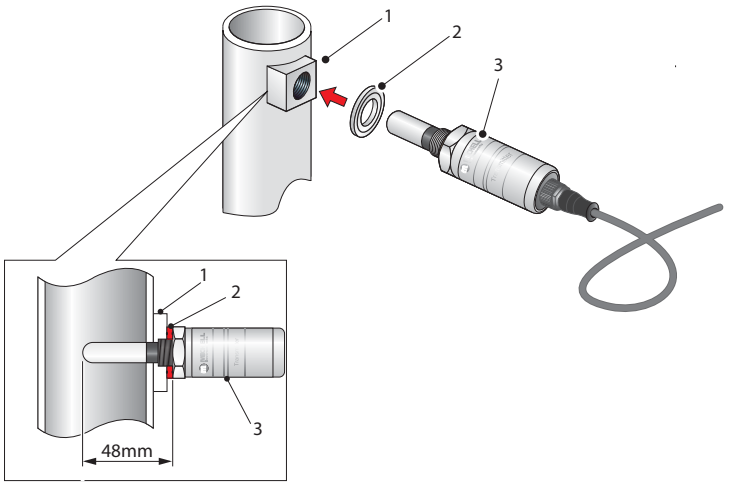


Figure 14 *Transmitter Mounting - Pipe or Duct*

2.5.3.1 5/8" 18 UNF Version

1. Remove the protective cover and desiccant capsule from the transmitter and retain for future use
2. Prevent any contamination of the sensor before installation by handling the transmitter by the main body only, avoiding contact with the sensor guard.
3. Pass the bonded seal over the 5/8"- 18 UNF mounting thread.
4. Screw the transmitter into the sampling location or sample block by hand using the wrench flats only. **DO NOT grip and twist the sensor cover when installing the sensor.**
5. When installed, fully tighten using a wrench to a torque setting of 30.5 Nm (22.5 ft-lbs)

2.5.3.2 3/4" - 16 UNF Version

1. Remove the protective cover and desiccant capsule from the transmitter and retain for future use.
2. Prevent any contamination of the sensor before installation by handling the transmitter by the main body only, avoiding contact with the sensor guard.
3. Ensure that the O-ring is seated in the recess at the top of the transmitter body.
4. Screw the transmitter into the sampling location or sample block by hand using the wrench flats only. **DO NOT grip and twist the sensor cover when installing the sensor.**
5. When installed, fully tighten using a wrench to a torque setting of 40 Nm (29.5 ft-lbs).

2.5.3.3 G1/2" BSPP Version

1. Remove the protective cover and desiccant capsule from the transmitter and retain for future use
2. Prevent any contamination of the sensor before installation by handling the transmitter by the main body only, avoiding contact with the sensor guard.
3. Pass the bonded seal over the G1/2" mounting thread.
4. Screw the transmitter into the sampling location or sample block by hand using the wrench flats only. **DO NOT grip and twist the sensor cover when installing the sensor.**
5. When installed, fully tighten using a wrench to a torque setting of 30.5 Nm (22.5 ft-lbs)

2.5.3.4 Installation using Additional Thread Adaptor

1. Remove the protective cover and desiccant capsule from the transmitter and retain for future use
2. Prevent any contamination of the sensor before installation by handling the transmitter by the main body only, avoiding contact with the sensor guard.
3. Pass the bonded seal over the 5/8"- 18 UNF mounting thread.
4. Screw the transmitter into the adaptor, and tighten to 30.5 Nm (22.5 ft-lbs)
5. **NOTE: Use the flats of the hexagonal nut and not the sensor body.**
6. Screw the transmitter (1) with its seal (3) and adapter (4) into the sampling location block (and fully tighten using a wrench to the following torque settings:

- G 1/2" BSP 56 Nm (41.3 ft-lbs)
- 3/4" - 16 UNF ` 40 Nm (29.5 ft-lbs)
- 1/2" NPT Use a suitable sealant e.g. PTFE tape using correct taping procedures

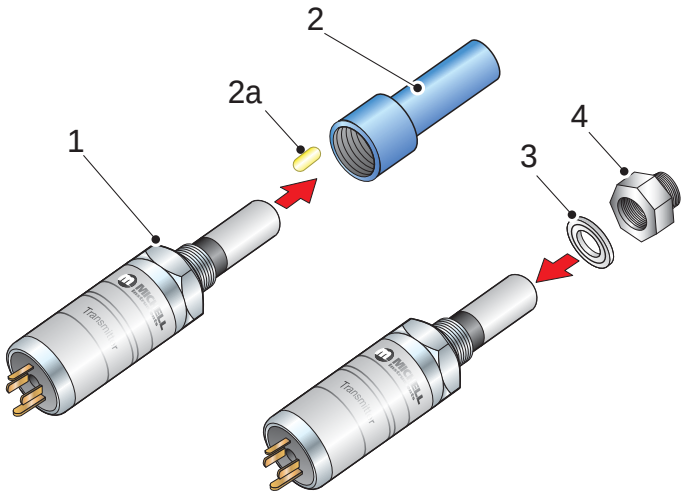


Figure 15 *Transmitter Mounting with Adapter*

MAINTENANCE

Calibration

Annual recalibration of the Easidew is recommended to maintain the performance. Calibration services traceable to the UK *National Physical Laboratory* (NPL) and the US *National Institute of Standards and Technology* (NIST) are provided by Michell Instruments.

Michell Instruments offers a variety of re-calibration and exchange sensor schemes to suit specific needs. A Michell representative can provide detailed, custom advice (for Michell Instruments' contact information go to www.michell.com).

Sensor Guard Replacement

The sensor is supplied with a white HDPE guard (standard) or a stainless steel guard (if specified at time or order).

The sensor guard should be replaced if the surface shows any damage or signs of discolouration. When replacing a guard, make sure to wear clkean disposable gloves, and handle by the threaded base section only.

Replacement HDPE or stainless steel guards can be ordered from your Michell Instruments representative.

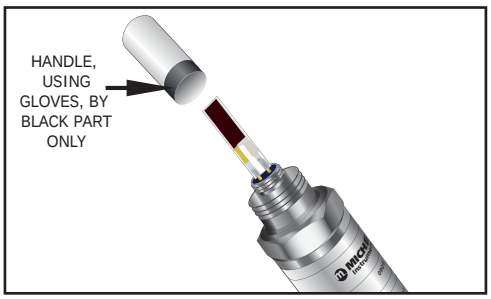


Figure 16 *Replacement of HDPE Guard*

Bonded Seal

If the supplied bonded seal is damaged or lost, a pack of 5 replacement bonded seals

can be obtained by your Michell Instruments representative.

O-ring Seal

If the supplied O-ring seal is damaged or lost a pack of 5 replacement bonded seals can be obtained by contacting your Michell Instruments representative.

Appendix A

Technical Specifications

Appendix A Technical Specifications

Product	Easidew, Easidew M12 and Easidew 34 Transmitter	Easidew I.S. Transmitter
Performance Specifications		
Measurement range	–110 to +20°C dew point; –100 to +20°C dew point; non standard ranges available on request	
Accuracy	±2°C dew point*	
Response time	5 mins to T95 (dry to wet)	
Repeatability	0.5°C dew point	
Calibration	Traceable 13 point calibration certificate	
Electrical Specifications		
Output signal	4–20 mA (2-wire connection, current source); User configurable over range **Easidew M12:** Modbus RTU over RS485	
Output	Dew point or moisture content	
Analog output scaled range	**Dew point:** –110 up to +20°C; **Moisture content in gas:** 0– up to 3000 $ppm_{v;}$	
Supply voltage	12 to 28 V DC	
Load resistance	Max 250 Ω @ 14 V (500 Ω @ 24 V)	
Current consumption	23 mA max, depending on output signal	
CE conformity	2014/30/EU	
UL approval	Approved	
UL61010-1 & CAN/CSA C22.2 No. 61010-1		
Operating Specifications		
Operating temperature	–40 to +60°C	
Compensated temperature range	-20 to +50°C	
Storage Temperature	-40 to +60°C	
Operating pressure	45 MPa (450 barg) maximum	
Flow rate	1 to 5 Nl/min mounted in standard sampling block; 0 to 10 m/sec direct insertion	
Mechanical Specifications		
Ingress protection	IP66 in accordance with standard BS EN 60529:1992; NEMA 4 protection in accordance with standard NEMA 250–2003 **Easidew M12**: IP65	
Intrinsically safe area certificates		ATEX: II 1 G Ex ia IIC T4 Ga (-20 to +70 °C) IECEx: EX ia IIC T4 Ga (-20 to +70 °C) TC TR@ 0Ex ia IICT4 Ga (-20 to +70 °C) FM: Class I, Division 1, Groups A B C D, T4 $_{c}CSA_{US}$: Class I, Division 1, Groups A B C D, T4
Oxigen service	**Optional: cleaned for enrichedoxygen service**	
Housing material	316 stainless steel	
Dimensions	MiniDIN 43650 form C L=132mm x ø45mm (with connector cable) **Easidew M12:** M12 5 pin L = 155mm x ø45mm (with connector cable)	
Filter (sensor protection)	**Standard:** HDPE <10µm **Optional:** 316 stainless steel sintered guard <80µm	
Process connection	**Easidew:** 5/8" - 18 UNF **Easidew:** G1/2" BSPP **Easidew 34:** 3/4" - 16 UNF **Easidew M12:** 5/8" -18 UNF, 3/4" - 16 UNF, G1/2" BSP	
Weight	150g	
Electrical connections	**Easidew:** MiniDIN 43650 form C **Easidew M12:** M12 5 Pin (A coded)	
Mating Electrical Connectors	Mating connector supplied as standard **Easidew M12:** optional 0.8, 2, 5 metre M12 A coded connector/cable available	
Diagnostic conditions (factory programmed)	**Conditions** Sensor fault Under-range dew point Over-range dew point **Output** 23 mA 4 mA 20 mA	
Approved galvanic isolators		KFD2-CR-EX1.20200 KFD2-CR-EX1.30200 KFD0-CS-EX1.50P KFD0-CS-EX2.50P KFD2-STC4-EX1.H MTL5041 MTL5040

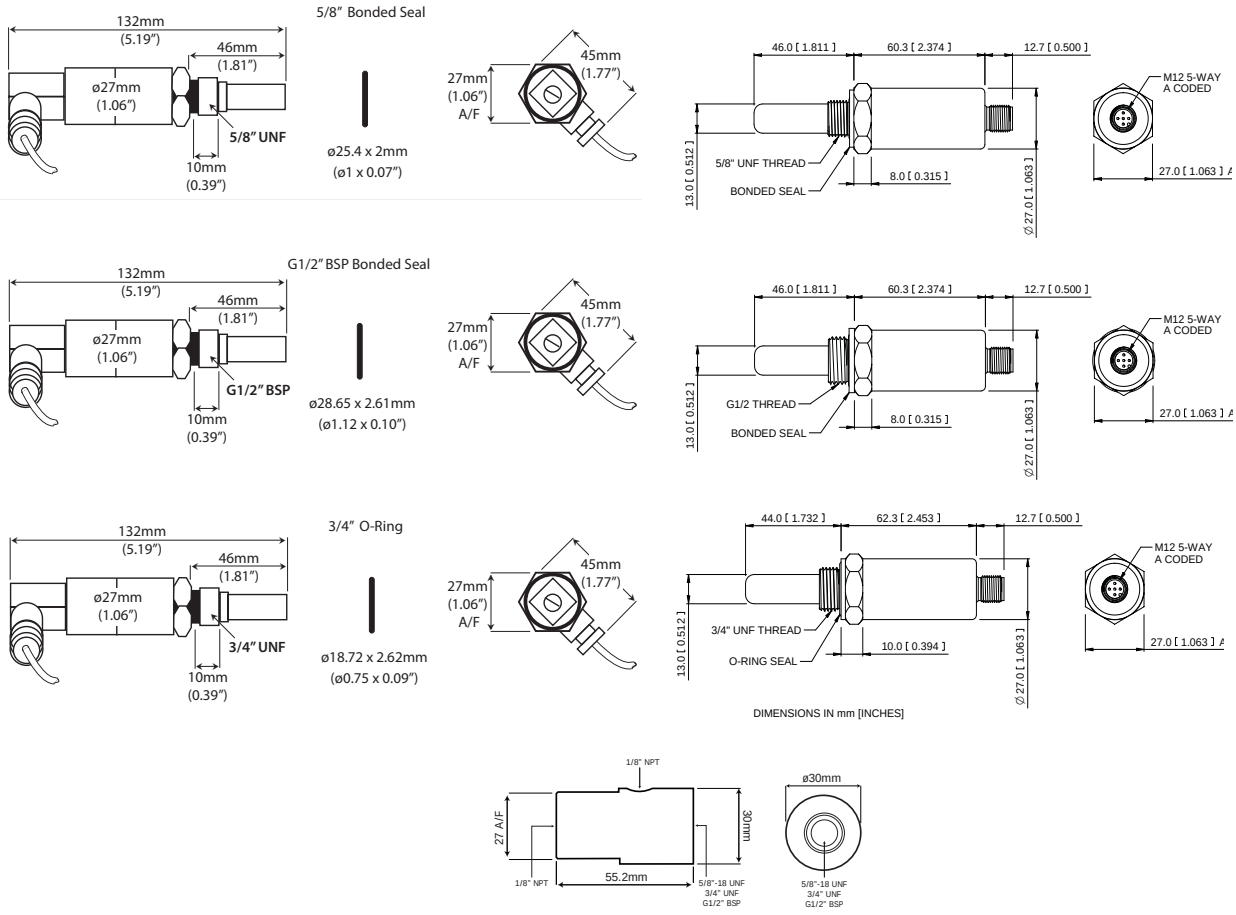
NOTES * Over Compensated Temperature Range

Dimensions

Product Dimensions

Easidew

Easidew M12



Optional Sample Block
(see accessories and spare parts)

Figure 6 *Dimensions - Easidew*

Appendix B

Quality, Recycling & Warranty Information

Appendix B Quality, Recycling & Warranty Information

Michell Instruments is dedicated to complying to all relevant legislation and directives. Full information can be found on our website at:

www.michell.com/compliance

This page contains information on the following directives:

- ATEX Directive
- Calibration Facilities
- Conflict Minerals
- FCC Statement
- Manufacturing Quality
- Modern Slavery Statement
- Pressure Equipment Directive
- REACH
- RoHS2
- WEEE2
- Recycling Policy
- Warranty and Returns

This information is also available in PDF format.

Appendix C

Return Document & Decontamination Declaration

Appendix C Return Document & Decontamination Declaration

Decontamination Certificate

IMPORTANT NOTE: Please complete this form prior to this instrument, or any components, leaving your site and being returned to us, or, where applicable, prior to any work being carried out by a Michell engineer at your site.

Instrument			Serial Number	
Warranty Repair?	YES	NO	Original PO #	
Company Name			Contact Name	
Address				
Telephone #			E-mail address	
Reason for Return /Description of Fault:				

Has this equipment been exposed (internally or externally) to any of the following? Please circle (YES/NO) as applicable and provide details below		
Biohazards	YES	NO
Biological agents	YES	NO
Hazardous chemicals	YES	NO
Radioactive substances	YES	NO
Other hazards	YES	NO

Please provide details of any hazardous materials used with this equipment as indicated above (use continuation sheet if necessary)		
Your method of cleaning/decontamination		
Has the equipment been cleaned and decontaminated?	YES	NOT NECESSARY

Michell Instruments will not accept instruments that have been exposed to toxins, radio-activity or bio-hazardous materials. For most applications involving solvents, acidic, basic, flammable or toxic gases a simple purge with dry gas (dew point <-30°C) over 24 hours should be sufficient to decontaminate the unit prior to return.
Work will not be carried out on any unit that does not have a completed decontamination declaration.

Decontamination Declaration

I declare that the information above is true and complete to the best of my knowledge, and it is safe for Michell personnel to service or repair the returned instrument.

Name (Print)		Position	
Signature		Date	

MICHELL Instruments

F0121, Issue 2, December 2011

Appendix D

Modbus Register Map

Appendix D Modbus Register Map

All the data values relating to the Easidew are stored in 16-bit wide holding registers. Registers can contain either measured or calculated values (dew-point, temperature, etc.), or configuration data (output settings).

Modbus RTU Implementation

This is a partial implementation of the Modbus RTU Standard with the following codes implemented:

Function Code	Description
3	Read Holding Register
6	Write Holding Register
16	Write Multiple Holding Registers

Register Types

Data Type	Description
uint16	16 bit unsigned integer, can contain options list e.g. 0 = Dew Point, 1 = Temperature.
int16	16 bit signed integer.
int32	32 bit signed integer, stored across 2 16 bit registers.
special	Refer to register description/comments for data structure.

Serial Port Settings (RS485)

9600 Baud Rate, 8 Data Bits, No Parity, 1 Stop Bit, No Flow Control

	http://www.simplymodbus.ca/FAQ.htm is an excellent resource covering the basics of the Modbus protocol. Full descriptions of the function codes (FC03/FC06/FC16) can be found in the sidebar.
	https://www.scadacore.com/tools/programming-calculators/online-hex-converter/ is an excellent resource for determining register types/byte order issues in raw received Modbus data.

Register Address

Dec	Hex	Access	Data Type	Description	Comment
0	0000	R/W	uint16	Instrument Modbus Address	1-255
3	0003	R	special	Status/Fault Indication	
				bit0, Sensor short circuit bit1, Sensor open circuit bit2, Thermistor short circuit bit3, Thermistor open circuit bit4, Sensor over range bit5, Sensor under range bit6, Thermistor over range bit7, Thermistor under range	
4	0004	R/W	special	Output Configuration	
				<u>Sensor fault output</u> bit0, 4mA bit1, 20mA bit2, 23mA bit3, 3mA <u>Dew-point under-range output</u> bit4, 4mA bit5, 20mA bit6, 23mA bit7, 3mA <u>Dew-point over-range output</u> bit8, 4mA bit9, 20mA bit10, 23mA bit11, 3mA <u>Output parameter</u> bit12, Temperature bit13, ppmV bit14, ppmW bit15, Natural gas	Only one bit can be set for each parameter, for example 'sensor fault' can be EITHER 4mA OR 20mA OR 23mA OR 3mA. If bits 13 – 16 are not set, then the output will be dew point. Natural gas parameter set in register 78.
8	0008	R	special	Transmitter Firmware Version	0x0100 = 1.0
10	000A	R/W	int16	Measurement Range Low	10x multiplier, i.e. -1000 = -100.0
11	000B	R/W	int16	Measurement Range High	10x multiplier, i.e. 200 = 20.0
15	000F	R	special	Sensor Batch Number	Batch 0xA123 Serial 0x0001 Complete sensor serial would be A123-001
16	0010	R	special	Sensor Serial Number	
17	0011	R/W	special	Year of Calibration	0x2018 = 2018
18	0012	R/W	special	Month & Day of Calibration	0x317 = March 17th
54	0036	R/W	int16	Pressure value for ppmV (barg)	10x multiplier, i.e. 100 = 10.0

78	004E	R/W	special	Natural Gas Configuration & Precision Select	Natural gas configuration bit1, 0=IGT, 1=ISO bit2, lb/MMscf bit3, ppmV NG bit4, mg/m^3 NG Precision Select bit15, 0=1 Decimal Place, 1=4 Decimal Places

Register configuration in 1 decimal place precision mode

Dec	Hex	Access	Data Type	Description	Comment
1	0001	R	int16	Humidity Parameter	Default dew-point, selected with register 4 (and 78 for Natural gas) 10x multiplier, i.e. -811 = -81.1
2	0002	R	int16	Ambient Temperature	10x multiplier, i.e. 214 = 21.4

Register configuration in 4 decimal place precision mode

Dec	Hex	Access	Data Type	Description	Comment
1	0001	R	special	Humidity Parameter (Low Word)	Default dew-point, selected with register 4 (and 78 for Natural gas) 1000x multiplier, i.e. 14321 = 1.4321
2	0002	R	special	Humidity Parameter (High Word)	
7	0007	R	int16	Ambient Temperature	10x multiplier, i.e. 214 = 21.4

EU Declaration of Conformity

Manufacturer: Michell Instruments Limited

Address: 48 Lancaster Way Business Park
Ely, Cambridgeshire
CB6 3NW. UK.

CE

Equipment Type: **Easidew PRO I.S. Dew-point Transmitter**

2014/34/EU ATEX Directive

Provisions of the Directive fulfilled by the Equipment:

Group II Category 1G Ex ia IIC T4 -20°C ≤ Ta ≤ +70°C

Notified Body for EC-Type Examination and Production (QAN):

Baseefa, Buxton. UK. Notified Body No. 1180

EC-Type Examination Certificate:

Baseefa06ATEX0330X

Standards used:

EN 60079-11:2012
EN 60079-0:2012
On 7th October 2016 this standard will cease to have harmonised status. **EN60079-0:2012/A11:2013** has now superseded. A technical review of this standard against the old standard showed that the equipment remains in conformance with all relevant clauses and that the State of the Art is maintained. The Essential Health & Safety Requirements of the Directive is still maintained with no changes necessary for the safe and reliable functioning and operation of the product with respect to the risks of explosion).

IECEx

Certificate of Conformity No.

IECEx BAS 06.0090X Ex ia IIC T4 (-20°C ≤ Ta ≤ +70°C)

IEC60079-11:2011
IEC60079-0:2011

Other Directives Is in conformity with the following Standard(s) or Normative Document(s):
2014/30/EU EMC Directive
EN61326-1:1997 *Electrical equipment for measurement, control and laboratory use - EMC requirements. Class B (emissions) and Industrial Locations (immunity).*
2011/65/EU Restriction of Hazardous Substances Directive (RoHS2)
RoHS2 EU Directive 2011/65/EU (Article 3, [24]) states, *"industrial monitoring and control instruments means monitoring and control instruments designed exclusively for industrial or professional use".*
(mandatory compliance effective date 22nd July 2017).

On behalf of the above named company, I declare that, on the date the equipment accompanied by this declaration is placed on the market, the equipment conforms with all technical and regulatory requirements of the above listed directives.

Andrew M.V. Stokes, Technical Director
December 2016

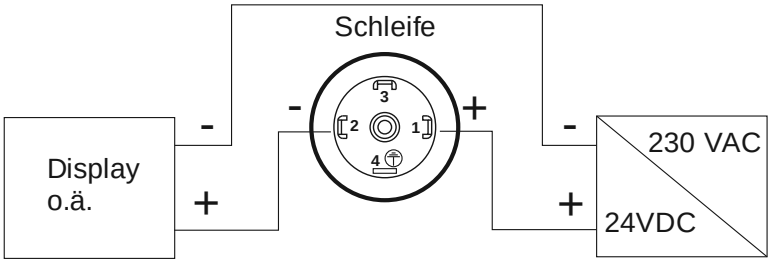
Operating Instruction

Resistance Thermometer Type 8022

1. *Applications*
   Resistance thermometers can preferential be used in the industry in rooms, devices and plants.
   These are passive components and they therefore always need a junction for auxiliary power (electrical low voltage). Beyond you need a device for the measurement and the evaluation of the measured values. The temperature dependence of the material platinum forms the basis for the temperature measurement. The resistance value indicates the temperature and their change. The dependence between resistance and temperature is fixed in the standard DIN EN 60751.
   Same applies to the permissible measured value deviation (errors) and the working temperature ranges.

2. *Assembly and disassembly*
   Resistance thermometer of type 8022 have a thread (fro example M12x1,5 or G1/2A) to connection it with the object, which is to be measured (devices, plants, pipings and others).
   The following connection diagrams give some indications:

   Connection diagram for Type 8022



   When disassembling resistance thermometers which come into contact with high media pressure when installed, the relevant parts of the system must be depressurised.

   If only the measuring insert should be changed, please unlock the screw a bit on top of GSM connector and pull the GDM head until the plastic cap nut is free. Now fix the GSP and the protective tube and unlock carefully only the cap nut, but please don't turn the measuring insert to avoid damages of connecting wires.

3. *Putting into operation*
   The resistance thermometer is able to work after making the connection to the process by screwing in and the connection between the terminals clamps and the contacts of the evaluation device by suitable measurement wires. In order to ensure the degree of protection IP 65 it is necessary to close the cover carefully.
   The electrical parameters of the evaluation device must agree with those of the resistance thermometer. In detail are these:

   • type and number of sensor elements
   • Nominal and temperature coefficient value
   • internal circuit with 2-, 3- or 4-wires

4. *Maintenance and repair*
   Resistance thermometers work maintenance-free. On disturbances of the interior structure the measurement insert is to send back to the manufacturer for repairing. Concerned plant components are to be made positive pressure-free.

5. *Electrical characteristics*
   In order to avoid self-heating and associated faulty measurements it is advisable to operate resistance thermometers with small root-mean-square ≤ 3 mA.

6. *Operating and ambient temperatures*
   The operating temperatures are dependent on the used sensors (standard: -60…+250°C). For type 8022 they should be adjusted top the measuring range of the transmitter. The ambient temperatures must not exceed 85°C.

7. *Transport*
   Resistance thermometers contain ceramic components. Therefore they must be treated carefully on transport and installation.

WIKA **Test Report**

Type A-10

Pressure range:	0 ... 16 bar rel
Signal:	4 ... 20 mA
Power supply:	8 ... 30 V
Pin assignment:	Ub:1 0V:2
Non-linearity	0.5% BFSL
Product No.:	14324344
Serial No.:	1A01QQ5TEJ5

Pressure [bar]	Signal [mA]	Error [%]
0.000	3.98	-0.13
8.000	11.975	-0.16
16.000	20.027	0.17

Max. Non-linearity: -0.18 %

www.wika.com

This test report is available for download via:

https://portal.wika.com/serial/?s=1A01QQ5TEJ5

WIKA **Test Report**

Type A-10

Pressure range:	0 ... 16 bar rel
Signal:	4 ... 20 mA
Power supply:	8 ... 30 V
Pin assignment:	Ub:1 0V:2
Non-linearity	0.5% BFSL
Product No.:	14324344
Serial No.:	1A01QQ5OG31

Pressure [bar]	Signal [mA]	Error [%]
0.000	3.979	-0.13
8.000	11.974	-0.16
16.000	20.024	0.15

Max. Non-linearity: -0.17 %

www.wika.com

This test report is available for download via:

https://portal.wika.com/serial/?s=1A01QQ5OG31

Operating instructions
Betriebsanleitung
Mode d'emploi
Manual de instrucciones

Pressure transmitter, model A-10 — EN

Druckmessumformer, Typ A-10 — DE

Transmetteur de pression, type A-10 — FR

Transmisor de presión, modelo A-10 — ES

Pressure transmitter model A-10

WIKA
Part of your business

Prior to starting any work, read the operating instructions!
Keep for later use!

Vor Beginn aller Arbeiten Betriebsanleitung lesen!
Zum späteren Gebrauch aufbewahren!

Lire le mode d'emploi avant de commencer toute opération !
A conserver pour une utilisation ultérieure !

¡Leer el manual de instrucciones antes de comenzar cualquier trabajo!
¡Guardar el manual para una eventual consulta!

11218720.15 07/2018 EN/DE/FR/ES

Contents

EN

Declarations of conformity can be found online at www.wika.com

11218720.15 07/2018 EN/DE/FR/ES

1. General information

EN

- The instrument described in the operating instructions has been designed and manufactured using state-of-the-art technology. All components are subject to stringent quality and environmental criteria during production. Our management systems are certified to ISO 9001 and ISO 14001.
- These operating instructions contain important information on handling the instrument. Working safely requires that all safety instructions and work instructions are observed.
- Observe the relevant local accident prevention regulations and general safety regulations for the instrument's range of use.
- The operating instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time. Pass the operating instructions on to the next operator or owner of the instrument.
- Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.
- The general terms and conditions contained in the sales documentation shall apply.
- Subject to technical modifications.
- Further information:
  - Internet address: www.wika.de / www.wika.com
  - Relevant data sheet: PE 81.60
  - Application consultant: Tel.: +49 9372 132-0
Fax: +49 9372 132-406
info@wika.com

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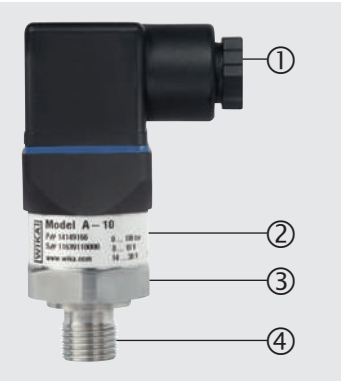
2. Design and function

EN

2.1 Overview



① Electrical connection (depending on version)
② Case; product label
③ Process connection, spanner flats
④ Process connection, thread

2.2 Scope of delivery

- Pressure transmitter
- Operating instructions

Cross-check scope of delivery with delivery note.

11218720.15 07/2018 EN/DE/FR/ES

3. Safety

EN

3.1 Explanation of symbols

WARNING!
... indicates a potentially dangerous situation that can result in serious injury or death, if not avoided.

CAUTION!
... indicates a potentially dangerous situation that can result in light injuries or damage to property or the environment, if not avoided.

Information
... points out useful tips, recommendations and information for efficient and trouble-free operation.

3.2 Intended use

The pressure transmitter is used for measuring pressure. The measured pressure is output as an electrical signal.

This is a class B instrument for emissions and is intended for use in industrial environments. In other environments, e.g. residential or commercial installations, it can interfere with other equipment under certain conditions. In such circumstances the operator is expected to take the appropriate measures.

Only use the pressure transmitter in applications that lie within its technical performance limits (e.g. max. ambient temperature, material compatibility, ...).

→ For performance limits see chapter 9 “Specifications”.

The instrument has been designed and built solely for the intended use described here, and may only be used accordingly.

The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

11218720.15 07/2018 EN/DE/FR/ES

3. Safety

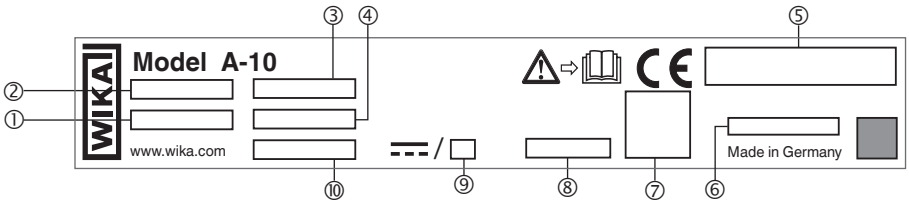
3.3 Personnel qualification

Skilled personnel
Skilled personnel, authorised by the operator, are understood to be personnel who, based on their technical training, knowledge of measurement and control technology and on their experience and knowledge of country-specific regulations, current standards and directives, are capable of carrying out the work described and independently recognising potential hazards.

EN

3.4 Labelling, safety marks

Product label



① S# Serial no.
② P# Product no.
③ Measuring range
④ Output signal
⑤ Approvals
⑥ Coded manufacture date
⑦ Pin assignment
⑧ Non-linearity
⑨ Total current consumption
⑩ Power supply

Before mounting and commissioning the instrument, ensure you read the operating instructions!

DC voltage

11218720.15 07/2018 EN/DE/FR/ES

4. Transport, packaging and storage

EN

4.1 Transport

Check the pressure transmitter for any damage that may have been caused during transportation.
Obvious damage must be reported immediately.

4.2 Packaging and storage

Do not remove packaging until just before mounting.
Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, sending for repair).

Permissible conditions at the place of storage:

- Storage temperature: -40 ... +70 °C
- Humidity: 45 ... 75 % relative humidity (no condensation)

11218720.15 07/2018 EN/DE/FR/ES

5. Commissioning, operation

EN

5.1 Mounting the instrument

Only use the pressure transmitter if it is in perfect condition with respect to safety.
Prior to commissioning, the pressure transmitter must be subjected to a visual inspection.

- Leaking fluid is indicative of damage.

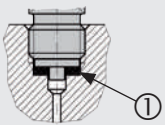
Requirements for mounting point

The mounting point must meet the following conditions:

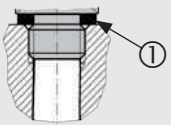
- Sealing faces are clean and undamaged.
- Sufficient space for a safe electrical installation.
- For information on tapped holes and welding sockets, see Technical information IN 00.14 at www.wika.com.
- Permissible ambient and medium temperatures remain within the performance limits. Consider possible restrictions on the ambient temperature range caused by mating connector used.
  → For performance limits see chapter 9 “Specifications”

Sealing variants

Parallel threads
Seal the sealing face ① with flat gasket, lens-type sealing ring or WIKA profile sealing.

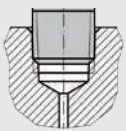


per EN 837



per DIN 3852-E

Tapered threads
Wrap threads with sealing material (e.g. PTFE tape).


NPT, R and PT

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5. Commissioning, operation

Mounting the instrument

The max. torque depends on the mounting point (e.g. material and shape). If you have any questions, please contact our application consultant.
→ For contact details see chapter 1 “General information” or the back page of the operating instructions.

1. Seal the sealing face (→ see “Sealing variants”).
2. At the mounting point, screw the pressure transmitter in hand-tight.
3. Tighten with a torque spanner using the spanner flats.

5.2 Connecting the instrument to the electric system

Requirements for voltage supply
→ For power supply see product label

The power supply for the pressure transmitter must be made via an energy-limited electrical circuit in accordance with section 9.3 of UL/EN/IEC 61010-1, or an LPS per UL/EN/IEC 60950-1, or class 2 in accordance with UL1310/UL1585 (NEC or CEC). The voltage supply must be suitable for operation above 2,000 m should the pressure transmitter be used at this altitude.

Requirements for electrical connection
- Cable diameter matches the cable bushing of the mating connector.
- Cable gland and seals of the mating connector are correctly seated.
- With cable outlets, no humidity can ingress at the cable end.

Requirement for shielding and grounding
The instrument must be connected to the equipotential bonding of the plant. The connection is made via the process connection of the instrument.

Connecting the instrument

1. Assemble the mating connector or cable outlet.
   → For pin assignments see product label
2. Establish the plug connection.

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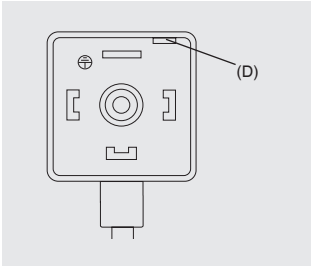
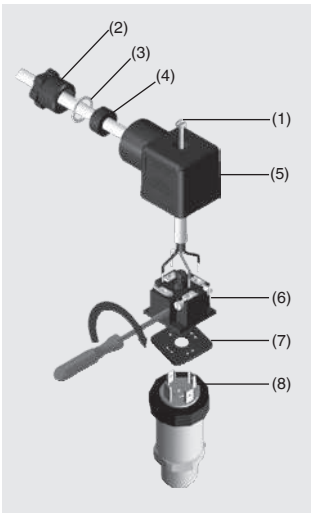
5.3 Fitting a DIN 175301-803 angular connector



1. Loosen the screw (1).
2. Loosen the cable gland (2).
3. Pull the angular connector (5) + (6) away from the instrument.
4. **CAUTION!**
   Improper mounting
   The seal of the angle housing will be damaged.
   ► Do not try to push the terminal block (6) out using the screw hole (1) or the cable gland (2).

   Via the mounting hole (D), lever the terminal block (6) out of the angle housing (5).



5. Slide the cable through the cable gland (2), the ring (3), the sealing (4) and the angle housing (5).
6. Connect the cable ends to the terminal blocks (6) in accordance with the connection diagram.
7. Press the angle housing (5) onto the terminal block (6).
8. Make sure that the seals are not damaged and that the cable gland and seals are correctly seated in order to ensure ingress protection.
9. Tighten the cable gland (2) around the cable.
10. Place the flat gasket (7) over the instrument's connection pins.
11. Push the angular connector (5) + (6) onto the instrument.
12. Tighten the screw (1).

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6. Faults

EN

CAUTION!

Physical injuries and damage to property and the environment

If faults cannot be eliminated by means of the listed measures, the pressure transmitter must be taken out of operation immediately.

- ► Ensure that pressure or signal is no longer present and protect against accidental commissioning.
- ► Contact the manufacturer.
- ► If a return is needed, please follow the instructions given in chapter 8.2 “Return”.

WARNING!

Physical injuries and damage to property and the environment caused by hazardous media

Upon contact with hazardous media (e.g. oxygen, acetylene, flammable or toxic substances), harmful media (e.g. corrosive, toxic, carcinogenic, radioactive), and also with refrigeration plants and compressors, there is a danger of physical injuries and damage to property and the environment.

- ► Should a failure occur, aggressive media with extremely high temperature and under high pressure or vacuum may be present at the instrument.
- ► For these media, in addition to all standard regulations, the appropriate existing codes or regulations must also be followed.
- ► Wear the requisite protective equipment (see chapter 3.4 “Personal protective equipment”).

For contact details see chapter 1 “General information” or the back page of the operating instructions.

In the event of any faults, first check whether the pressure transmitter is mounted correctly, mechanically and electrically. If complaint is unjustified, the handling costs will be charged.

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6. Faults

Faults	Causes	Measures
No output signal	Cable break	Check the continuity
Deviating zero point signal	Overload safety exceeded	Observe the permissible overload safety
Deviating zero point signal	Too high/low working temperature	Observe the permissible temperatures
Constant output signal upon change in pressure	Mechanical overload caused by overpressure	Replace instrument; if it fails repeatedly, contact the manufacturer
Signal span varies	EMC interference sources in the environment; for example, frequency converter	Shield instrument; cable shield; remove source of interference
Signal span varies/inaccurate	Too high/low working temperature	Observe the permissible temperatures
Signal span drops/too small	Mechanical overload caused by overpressure	Replace instrument; if it fails repeatedly, contact the manufacturer

If complaint is unjustified, we will charge you the complaint processing fees.

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7. Maintenance and cleaning

EN

7.3.1 Maintenance

This pressure transmitter is maintenance-free.
Repairs must only be carried out by the manufacturer.

7.3.2 Cleaning

CAUTION!
Unsuitable cleaning agents
Cleaning with unsuitable cleaning agents may damage the instrument and the product label.

- ▶ Do not use any aggressive cleaning agents.
- ▶ Do not use any hard or pointed objects.
- ▶ Do not use any abrasive cloths or sponges.

Suitable cleaning agents

- Water
- Conventional dishwashing detergent

Cleaning the instrument

1. Depressurise and de-energise the pressure transmitter.
2. Wipe the instrument surface using a soft, damp cloth.

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8. Dismounting, return and disposal

EN

8.1 Dismounting

WARNING!

Physical injuries and damage to property and the environment caused by hazardous media

Upon contact with hazardous media (e.g. oxygen, acetylene, flammable or toxic substances), harmful media (e.g. corrosive, toxic, carcinogenic, radioactive), and also with refrigeration plants and compressors, there is a danger of physical injuries and damage to property and the environment.

- ► Should a failure occur, aggressive media with extremely high temperature and under high pressure or vacuum may be present at the instrument.
- ► Wear the requisite protective equipment.

Dismounting the instrument

1. Depressurise and de-energise the pressure transmitter.
2. Disconnect the electrical connection.
3. Unscrew the pressure transmitter with a spanner using the spanner flats.

8.2 Return

Strictly observe the following when shipping the instrument:

All instruments delivered to WIKA must be free from any kind of hazardous substances (acids, bases, solutions, etc.) and must therefore be cleaned before being returned.

WARNING!

Physical injuries and damage to property and the environment through residual media

Residual media in the dismounted instrument can result in a risk to persons, the environment and equipment.

- ► With hazardous substances, include the material safety data sheet for the corresponding medium.
- ► Clean the instrument, see chapter 7.2 “Cleaning”.

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8. Dismounting, return

When returning the instrument, use the original packaging or a suitable transport packaging.

EN

Information on returns can be found under the heading “Service” on our local website.

8.3 Disposal

Incorrect disposal can put the environment at risk.
Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.

Do not dispose of with household waste. Ensure a proper disposal in accordance with national regulations.

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9. Specifications

Measuring ranges and overload safetys (gauge pressure)							
bar	Measuring range	0 ... 0.05	0 ... 0.1	0 ... 0.16	0 ... 0.25	0 ... 0.4	0 ... 0.6
	Overload safety	0.2	0.2	1	1	1	3
	Measuring range	0 ... 1	0 ... 1.6	0 ... 2.5	0 ... 4	0 ... 6	0 ... 10
	Overload safety	3	3.2	5	8	12	20
	Measuring range	0 ... 16	0 ... 25	0 ... 40	0 ... 60	0 ... 100	0 ... 160
	Overload safety	32	50	80	120	200	320
	Measuring range	0 ... 250	0 ... 400	0 ... 600	0 ... 1,000		
	Overload safety	500	800	1,200	1,500		
inWC	Measuring range	0 ... 20	0 ... 40	0 ... 60	0 ... 80	0 ... 100	0 ... 120
	Overload safety	84	84	400	400	400	400
	Measuring range	0 ... 150	0 ... 200	0 ... 250	0 ... 400		
	Overload safety	400	400	1,200	1,200		
psi	Measuring range	0 ... 1	0 ... 5	0 ... 15	0 ... 25	0 ... 30	0 ... 50
	Overload safety	3	14.5	45	60	60	100
	Measuring range	0 ... 100	0 ... 160	0 ... 200	0 ... 300	0 ... 500	0 ... 1,000
	Overload safety	200	290	400	600	1,000	1,740
	Measuring range	0 ... 1,500	0 ... 2,000	0 ... 3,000	0 ... 5,000	0 ... 10,000	
	Overload safety	2,900	4,000	6,000	10,000	17,400	

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9. Specifications

EN

Measuring ranges and overload safetys (absolute pressure)								
bar	Measuring range	0 ... 0.1	0 ... 0.16	0 ... 0.25	0 ... 0.4	0 ... 0.6	0 ... 1	0 ... 1.6
	Overload safety	1	1	1	1	3	3	3.2
	Measuring range	0 ... 2.5	0 ... 4	0 ... 6	0 ... 10	0 ... 16	0 ... 25	
	Overload safety	5	8	12	20	32	50	
inWC	Measuring range	0 ... 40	0 ... 60	0 ... 80	0 ... 100	0 ... 120	0 ... 150	0 ... 200
	Overload safety	400	400	400	400	400	400	400
	Measuring range	0 ... 250	0 ... 400					
	Overload safety	1,200	1,200					
psi	Measuring range	0 ... 5	0 ... 15	0 ... 25	0 ... 30	0 ... 50	0 ... 100	0 ... 150
	Overload safety	14.5	45	60	60	100	200	290
	Measuring range	0 ... 200	0 ... 300					
	Overload safety	400	600					

Measuring ranges and overload safetys (vacuum and +/- measuring ranges)						
bar	Measuring range	-0.025 ... +0.025	-0.05 ... 0	-0.05 ... +0.05	-0.05 ... +0.15	-0.05 ... +0.2
	Overload safety	±0.2	±0.2	±0.2	1	1
	Measuring range	-0.05 ... +0.25	-0.1 ... 0	-0.1 ... +0.1	-0.15 ... +0.15	-0.16 ... 0
	Overload safety	1	±0.2	1	1	1
	Measuring range	-0.2 ... +0.2	-0.25 ... 0	-0.25 ... +0.25	-0.3 ... +0.3	-0.4 ... 0
	Overload safety	1	1	1	3	1
	Measuring range	-0.5 ... +0.5	-0.6 ... 0	-1 ... 0	-1 ... +0.6	-1 ... +1.5
	Overload safety	3	3	3	3.2	5
	Measuring range	-1 ... +3	-1 ... +5	-1 ... +9	-1 ... +15	-1 ... +24
	Overload safety	8	12	20	32	50

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9. Specifications

Measuring ranges and overload safetys (vacuum and +/- measuring ranges)						
inWC	Measuring range	-10 ... +10	-20 ... 0	-20 ... +20	-40 ... 0	-40 ... +40
	Overload safety	±80	±80	±80	±80	±80
	Measuring range	-50 ... +50	-60 ... 0	-75 ... +75	-80 ... 0	-100 ... 0
	Overload safety	400	400	400	400	400
	Measuring range	-100 ... +100	-120 ... 0	-125 ... +125	-150 ... 0	-200 ... +200
	Overload safety	400	400	1,200	400	1,200
	Measuring range	-250 ... 0				
	Overload safety	1,200				
psi	Measuring range	-1 ... 0	-30 inHg ... 0	-30 inHg ... +15	-30 inHg ... +30	-30 inHg ... +60
	Overload safety	3	45	60	60	150
	Measuring range	-30 inHg ... +100	-30 inHg ... +160	-30 inHg ... +200	-30 inHg ... +300	
	Overload safety	250	350	450	600	

Specifications		
Vacuum tightness	Yes (for restrictions see overload safety)	
Output signal	see product label	
Load	Current (2-wire)	≤ (power supply - 8 V) / 0.02 A
	Voltage (3-wire)	> maximum output signal / 1 mA
	Ratiometric (3-wire)	> 10k
Power supply	see product label	
Total current consumption	Current (2-wire)	Signal current, max. 25 mA
	Voltage (3-wire)	8 mA
	Ratiometric (3-wire)	8 mA

EN

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9. Specifications

EN

Specifications		
Non-repeatability	Measuring range ≤ 0.1 bar: ≤ ±0.2 % of span Measuring range > 0.1 bar: ≤ ±0.1 % of span	
Signal noise	≤ ±0.3 % of span	
Temperature error at 0 ... 80 °C	Typical: ≤ ±1 % of span Maximum: ≤ ±2.5 % of span	
Reference conditions	Ambient temperature	15 ... 25 °C
	Atmospheric pressure	860 ... 1,060 mbar
	Humidity	45 ... 75 % r. h.
	Power supply	DC 24 V
	Mounting position	as required
Settling time	Measuring range ≥ 0.4 bar: < 4 ms Measuring range ≥ 0.05 bar: < 1 min	
Switch-on time	Measuring range ≥ 0.4 bar: < 15 ms Measuring range ≥ 0.05 bar: < 1 min	
Ingress protection	The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.	
	Angular connector DIN 175301-803 A	IP65
	Angular connector DIN 175301-803 C	IP65
	Circular connector M12 x 1	IP67
	Cable outlet	IP67
Shock resistance	500 g (IEC 60068-2-27, mechanical) 100 g at -40 °C	
Service life	Measuring range > 0.1 bar: 100 million load cycles Measuring range ≤ 0.1 bar: 10 million load cycles	
Short-circuit resistance	S+ vs. 0V	
Reverse polarity protection	U_B vs. 0V no reverse polarity protection with ratiometric output signal	

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9. Specifications

Specifications		
Insulation voltage	DC 500 V	
Wetted parts	Measuring range < 10 bar	Stainless steel 316L
	Measuring range ≥ 10 bar	Stainless steel 316L and PH grade steel
	Measuring range ≤ 0 ... 25 bar abs.	Stainless steel 316L
Non-wetted parts	Stainless steel 316L, HNBR, PA, cable from PUR	
Pressure transmission medium	Measuring range < 0 ... 10 bar gauge	Synthetic oil
	Measuring range ≤ 0 ... 25 bar absolute	Synthetic oil
	Measuring range ≥ 0 ... 10 bar gauge	Dry measuring cell

For further specifications see WIKA data sheet PE 81.60 and the order documentation.

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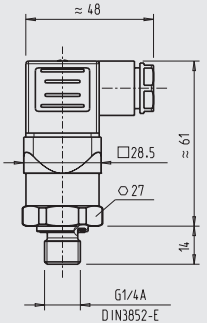
9. Specifications

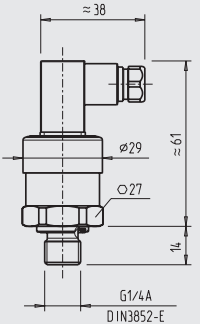
Dimensions in mm

Angular connector form A



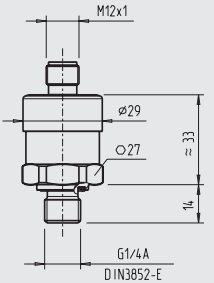
Weight: approx. 80 g

Angular connector form C



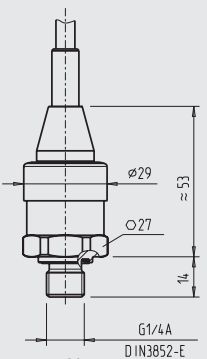
Weight: approx. 80 g

Circular connector M12 x 1



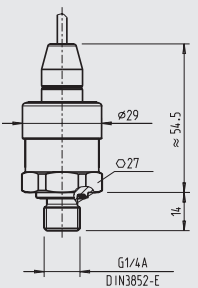
Weight: approx. 80 g

Standard cable outlet, unshielded



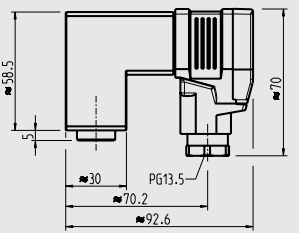
Weight: approx. 80 g

Cable outlet OEM version, unshielded



Weight: approx. 80 g

Angular connector form A, flange connection



Weight: approx. 350 g

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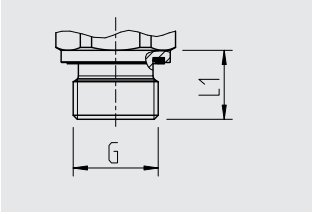
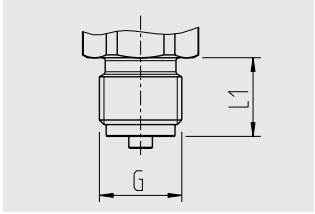
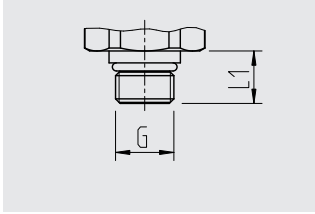


G	L1
G ¼ A DIN 3852-E	14
G ½ A DIN 3852-E	17
M14 x 1.5	14

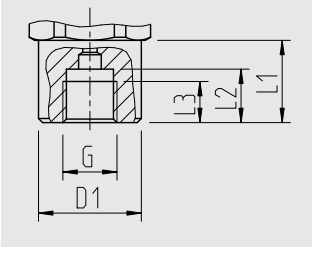


G	L1
G ¼ B EN 837	13
G ⅜ B EN 837	16
G ½ B EN 837	20
M20 x 1.5	20



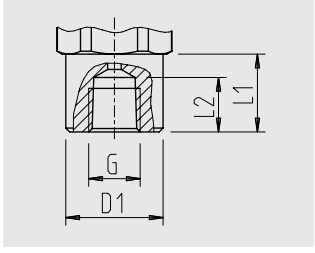
G	L1
7/16-20 UNF BOSS	12.85

Female thread

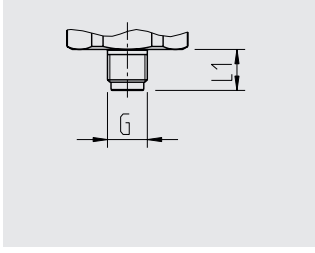


G	L1	L2	L3	D1
G ¼ EN 837	20	13	10	Ø 25

Female thread



G	L1	L2	D1
¼ NPT	20	14	Ø 25



G	L1
G ⅛ B EN 837	10

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9. Specifications

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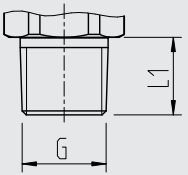

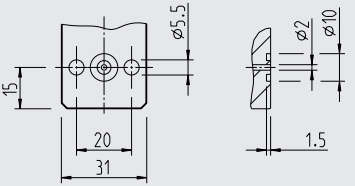

G	L1
⅛ NPT	10
¼ NPT	13
½ NPT	19
R ¼	13
R ⅜	15
R ½	19
PT ¼	13
PT ⅜	15
PT ½	19

G ¼ female, with flange connection	For dimensions see drawing

For special models A-10000 or special version A-10, other technical specifications apply. Please note the specifications stated on the order confirmation and the delivery note.
For further specifications see WIKA data sheet PE 81.60 and the order documentation.

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12. Electrical diagram

12. Elektrischer Schaltplan

12. Электрическая схема

12. Elektrisch Schema

12. Diagrama de cableado eléctrico

12. Schéma électrique

Manufacturer	BERG Kompressoren GmbH
Project description	ADP 0700
Project number	21020343
Serial number	0322ED00182

Supply	400V / 50Hz	Control box	AX1090.000
Supply cable	min. 4x4mm² / max. 4x10mm²	Year of construction	2022
Control voltage	24 VDC		
special feature	-		

Last edit date	23.03.2022	Editor (sign)	cgraf	Number of pages	39

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-U1 3x400/50Hz

-U1.1

-U1.2

-U2

-Q1M
7...10A
setpoint: 9A
1/L1 3/L2 5/L3 13 21 C1
14 22 C2
/7.2 /13.1
2/T1 4/T2 6/T3

-Q2M
3,5...5A
setpoint: 4,7A
1/L1 3/L2 5/L3 13 21 C1
14 22 C2
/7.2 /13.2
2/T1 4/T2 6/T3

-Q5M
4,5...6,3A
setpoint: 5,5A
1/L1 3/L2 5/L3 13 21
14 22
/7.1
2/T1 4/T2 6/T3

BK 4²

BK 2,5²

BK 2,5²

BK 2,5²

-Q0
25A
L1 1 L2 3 L3 5
2 4 6

-K1M
/8.4
1 3 5
2 4 6

-K2M
/8.5
1 3 5
2 4 6

-G5M
/8.1
1 3 5
2 4 6

BK 2,5²

BK 2,5²

BK 2,5²

GND3
door box
1

GND1
control box
1

4.0
PE_T1

PE / 4.0

-X1 1 2 3

4 5 6 7

8 9 10 11

12 13 14 15

-W1.1
H07RN-F
4G2,5 mm²
heater group 1
BN BK GY GNYE

-W1.2
H07RN-F
4G2,5 mm²
heater group 2
BN BK GY GNYE

-W2
H07RN-F
4G2,5 mm²
blower
BN BK GY GNYE

+R01

+U02

-E1.1
6,0kW/~8,7A
heater group 1
L1 L2 L3 PE
U1 U2 U3

-E1.2
3,0kW/~4,4A
heater group 2
L1 L2 L3 PE
U1 U2 U3

-M1
2,2kW
4,6-4,9AY
50Hz
U1 V1 W1
M
3~
PE

L1 L2 L3

PE

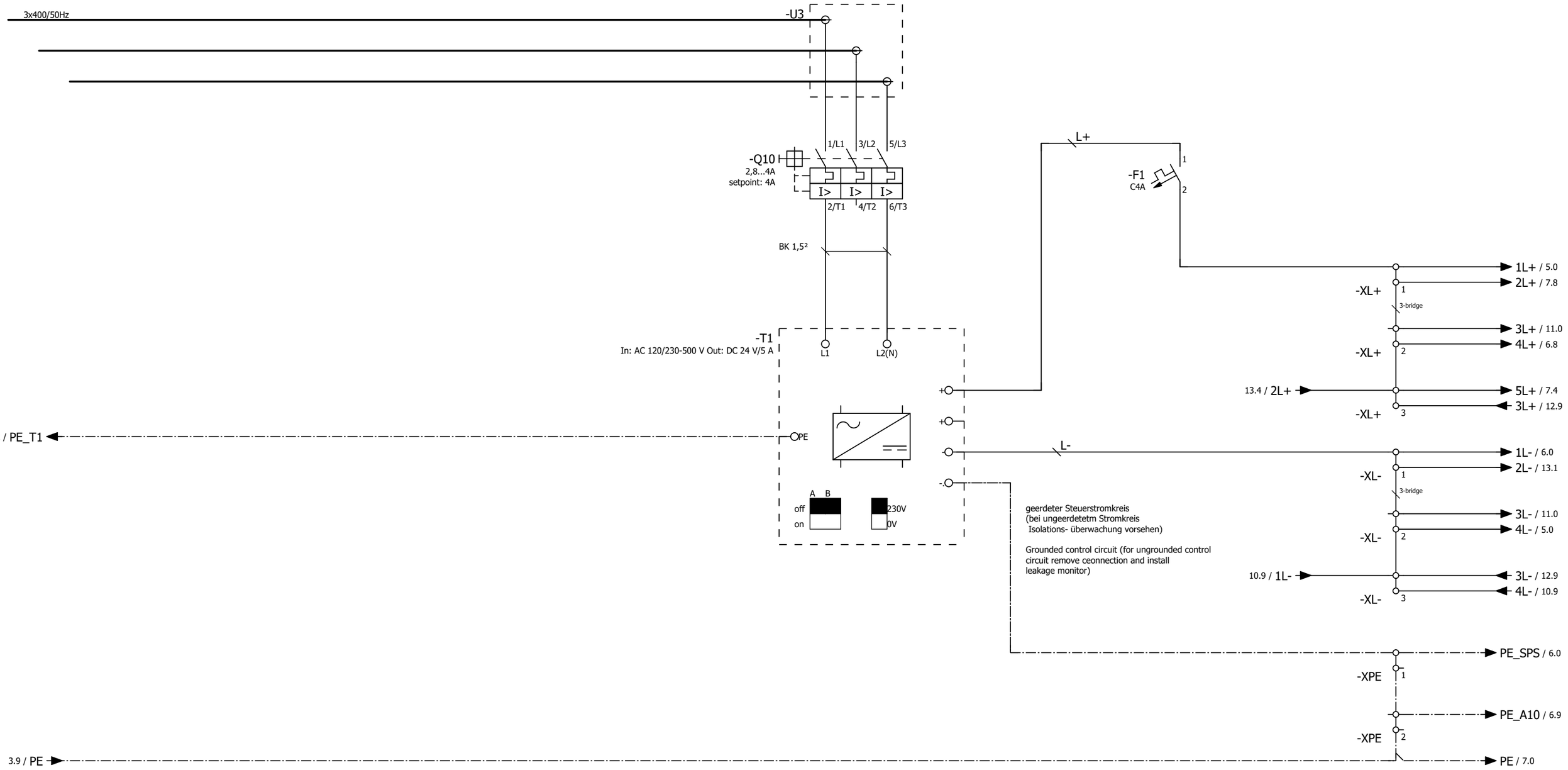
PE_SHLD
11.0

GND2
mounting
plate
1

main supply
400V/3~/PE/50Hz
ca. 12kW / 19A

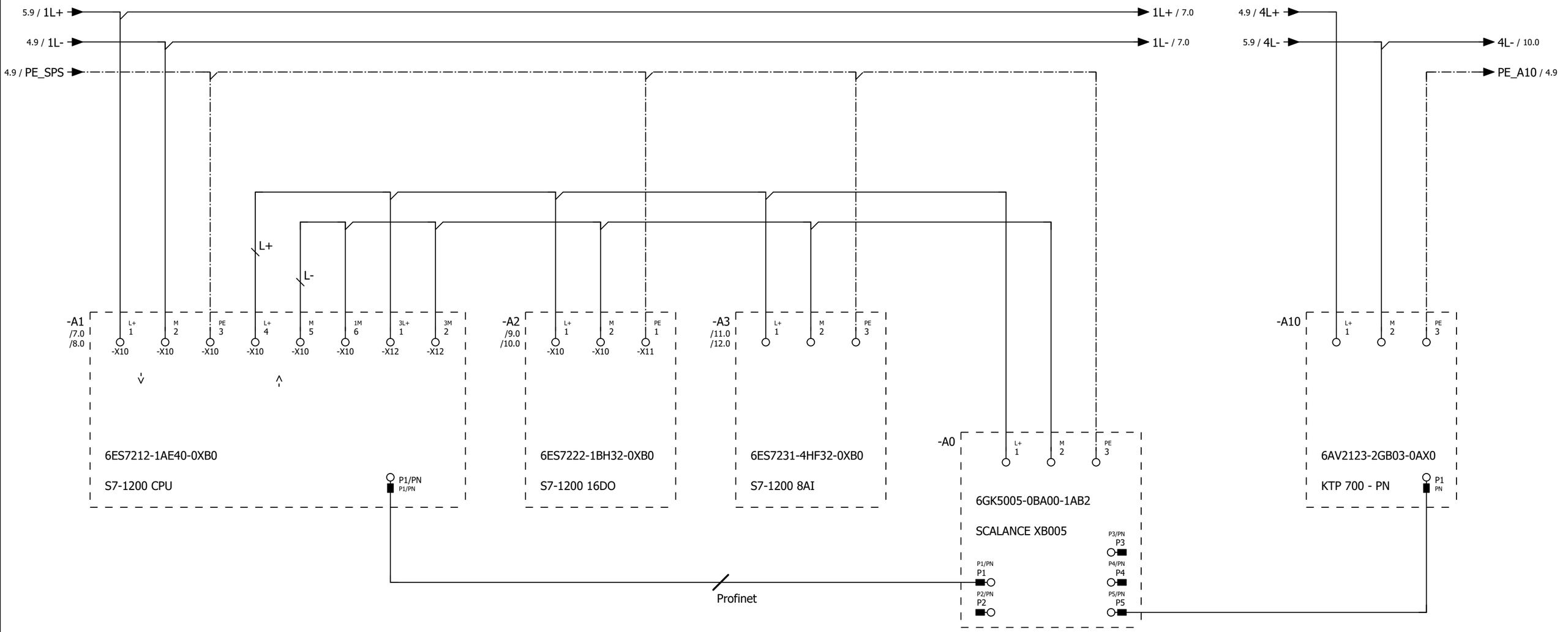
prefuse : 25A

			Date	23.03.2022	0322ED00182		main supply	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 3
Edit	Date	Name			Refer to protection notice ISO 16016				Page 3 / 39

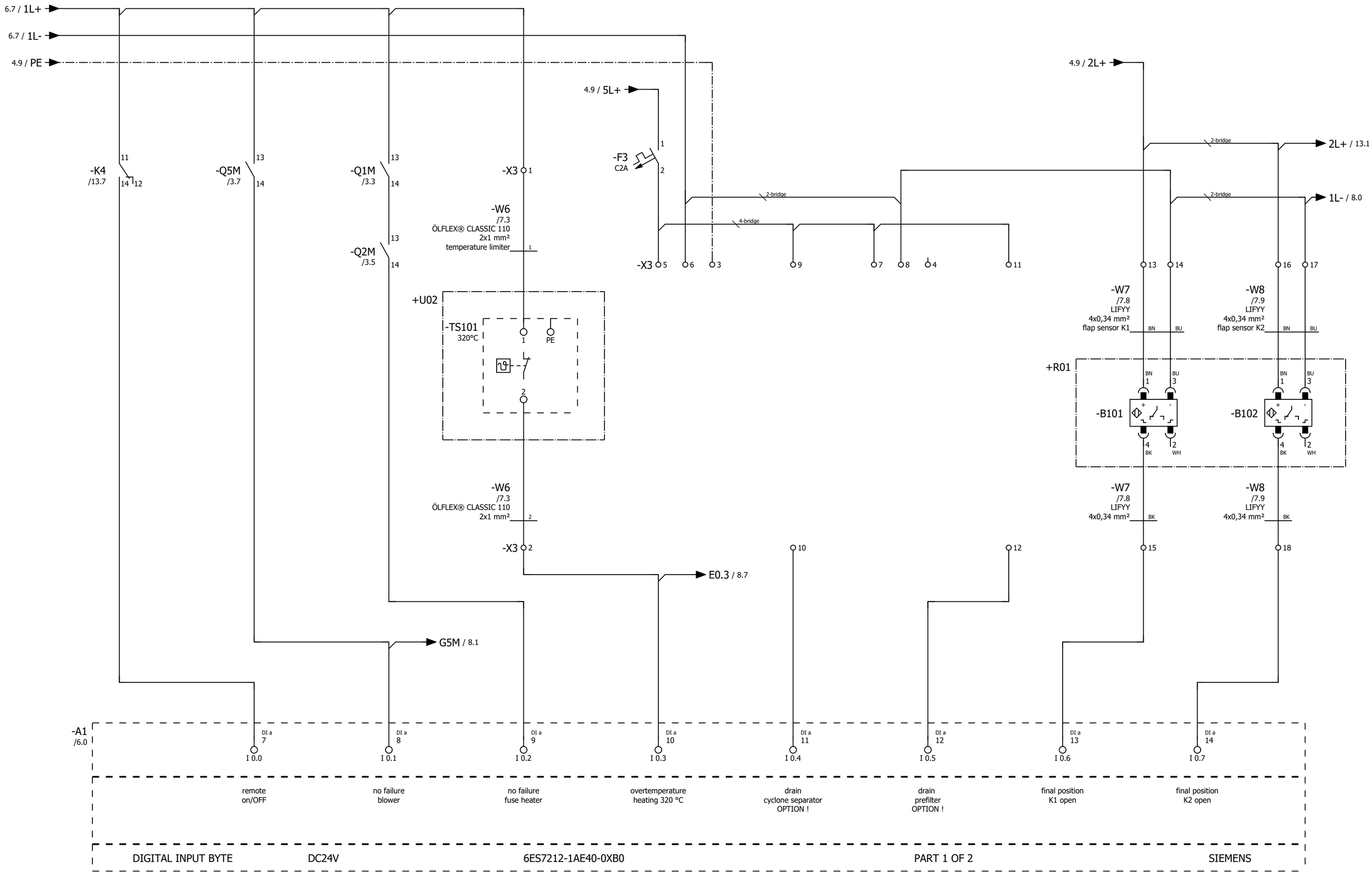


			Date	23.03.2022	0322ED00182		control voltage	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 4
Edit	Date	Name			Refer to protection notice ISO 16016				Page 4 / 39

			Date	23.03.2022	0322ED00182		cabinet cooler	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 5
Edit	Date	Name			Refer to protection notice ISO 16016				Page 5 / 39



			Date	23.03.2022	0322ED00182		overview PLC	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 6
Edit	Date	Name			Refer to protection notice ISO 16016				Page 6 / 39



			Date	23.03.2022	0322ED00182		digital input DI 0.0 - DI 0.7	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 7
Edit	Date	Name			Refer to protection notice ISO 16016				Page 7 / 39

-A1
/6.0

OUTPUT BYTE | DC24V | 6ES7212-1AE40-0XB0 | PART 2 OF 2 | SIEMENS

blower right direction	dryer operation	heating group 1	heating group 2	shunt release	failure
Q 0.0	Q 0.1	Q 0.2	Q 0.3	Q 0.4	Q 0.5
3 DQ a	4 DQ a	5 DQ a	6 DQ a	7 DQ a	8 DQ a

7.3 / G5M

-G5M
6,5A
3,0KW/400V
A1 IN1
A2

-K2
/8.7
12 14
11

-K1M
AC-3
4,0KW/400V
DC 24V
A1 U
A2

-K2
/8.7
22 24
21

-K2M
AC-3
3,0KW/400V
DC 24V
A1 U
A2

-K1
24 V
A1
A2

7.5 / E0.3

-K2
24 V
A1
A2

-K3
24 V
A1
A2

7.9 / 1L-

1L- / 10.0

blower right direction	dryer operation	heating group 1	heating group 2	shunt release	over heat protection	failure
		1/L1 2/T1 3/L2 4/T2 5/L3 6/T3 13 14	1/L1 2/T1 3/L2 4/T2 5/L3 6/T3 13 14	14 12 11 /13.1 24 22 21 /13.2 34 32 31 44 42 41	14 12 11 /8.4 24 22 21 /8.5 34 32 31 44 42 41	14 12 11 /13.5

			Date	23.03.2022	0322ED00182	digital output DQ 0.0 - DQ 0.5	21020343
			Editor	cgraf			
					ADP 0700		
Edit	Date	Name			Refer to protection notice ISO 16016		

=
+ F01

-A2
/6.3

OUTPUT BYTE | DC24V | 6ES7222-1BH32-0XB0 | PART 1 OF 2 | SIEMENS

Q 2.0	Q 2.1	Q 2.2	Q 2.3	Q 2.4	Q 2.5	Q 2.6	Q 2.7
flap K1 open adsorption entry AD1	flap K1 close adsorption entry AD1	flap K2 open adsorption entry AD2	flap K2 close adsorption entry AD2	flap K3 open regeneration discharge AD1	flap K4 open regeneration discharge AD2	spare	spare
4 DQ a	5 DQ a	6 DQ a	7 DQ a	4 DQ a	5 DQ a	6 DQ a	7 DQ a

-X4 1 2 3 4 5 6

-W13
/10.3
18x0,25 mm²
WH GN YE GY PK RD

+U01

-MV1
/10.2
2J2M2C

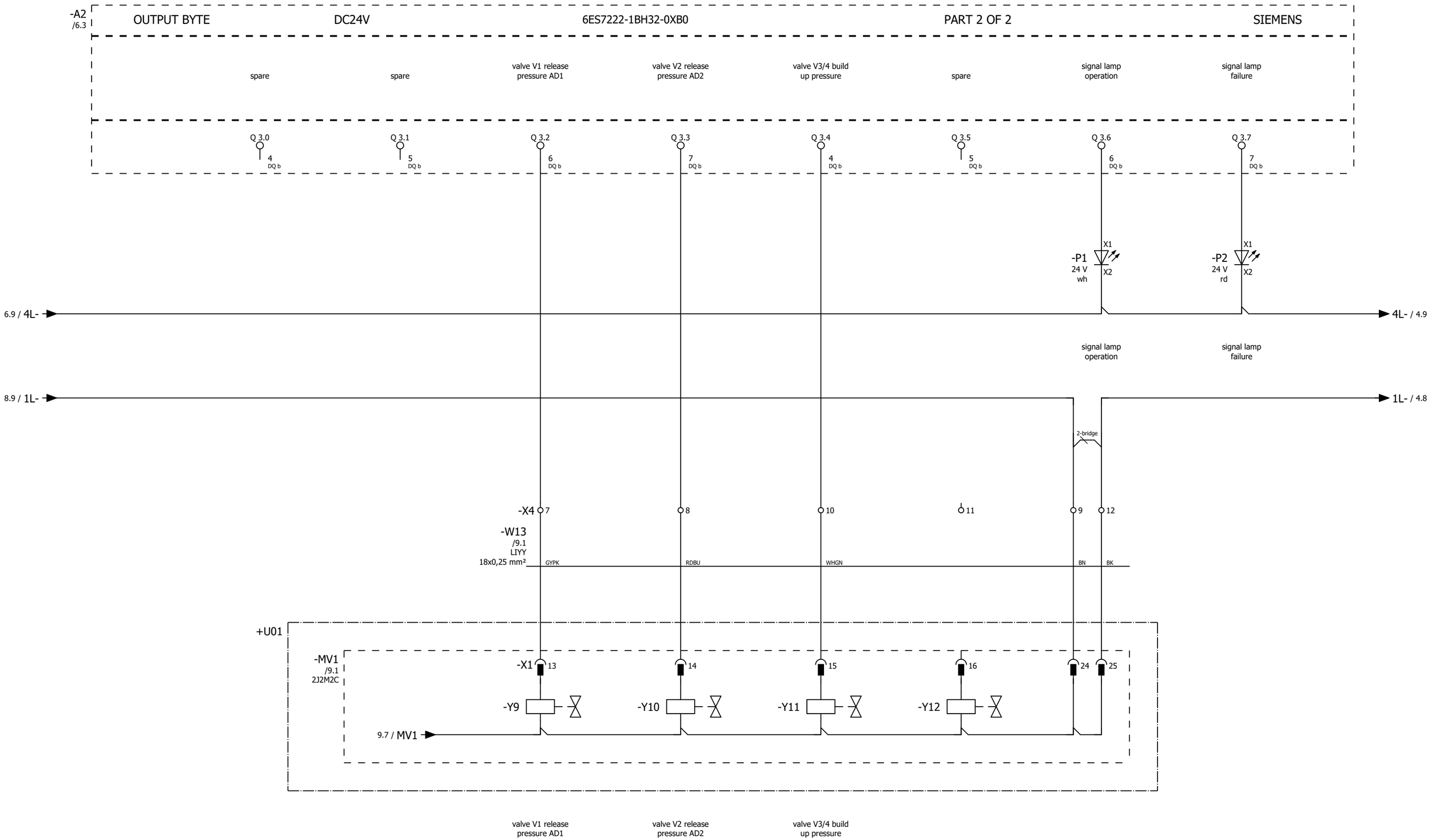
-X1 1 2 3 4 5 6 7 8

-Y1 -Y2 -Y3 -Y4 -Y5 -Y7

MV1 / 10.3

flap K1 open adsorption entry AD1	flap K1 close adsorption entry AD1	flap K2 open adsorption entry AD2	flap K2 close adsorption entry AD2	flap K3 open regeneration discharge AD1	flap K4 open regeneration discharge AD2

			Date	23.03.2022	0322ED00182		digital output DQ 2.0 - DQ 2.7	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 9
Edit	Date	Name			Refer to protection notice ISO 16016				Page 9 / 39



			Date	23.03.2022	0322ED00182		digital output DQ 3.0 - DQ 3.7	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 10
Edit	Date	Name			Refer to protection notice ISO 16016				Page 10 / 39

+U01

-MT101
-100-+20°C / 4-20mA

+R01

-TT101
-50-+400°C / 4-20mA

-TT102
-50-+400°C / 4-20mA

-W14
LIYCY
2x0,34 mm²
dew point sensor
BN WH SH

-W15
LIYCY
2x0,34 mm²
temperature sensor
BN WH SH

-W16
LIYCY
2x0,34 mm²
temperature sensor
BN WH SH

-X2 1 2 3 4 5 6 7 8

-SHLD1:0
-SHLD1:1
-SHLD1:2
-SHLD1:3
-SHLD1:4

8-bridge

4.9 / 3L+ → 3L+ / 12.0

4.9 / 3L- → 3L- / 12.0

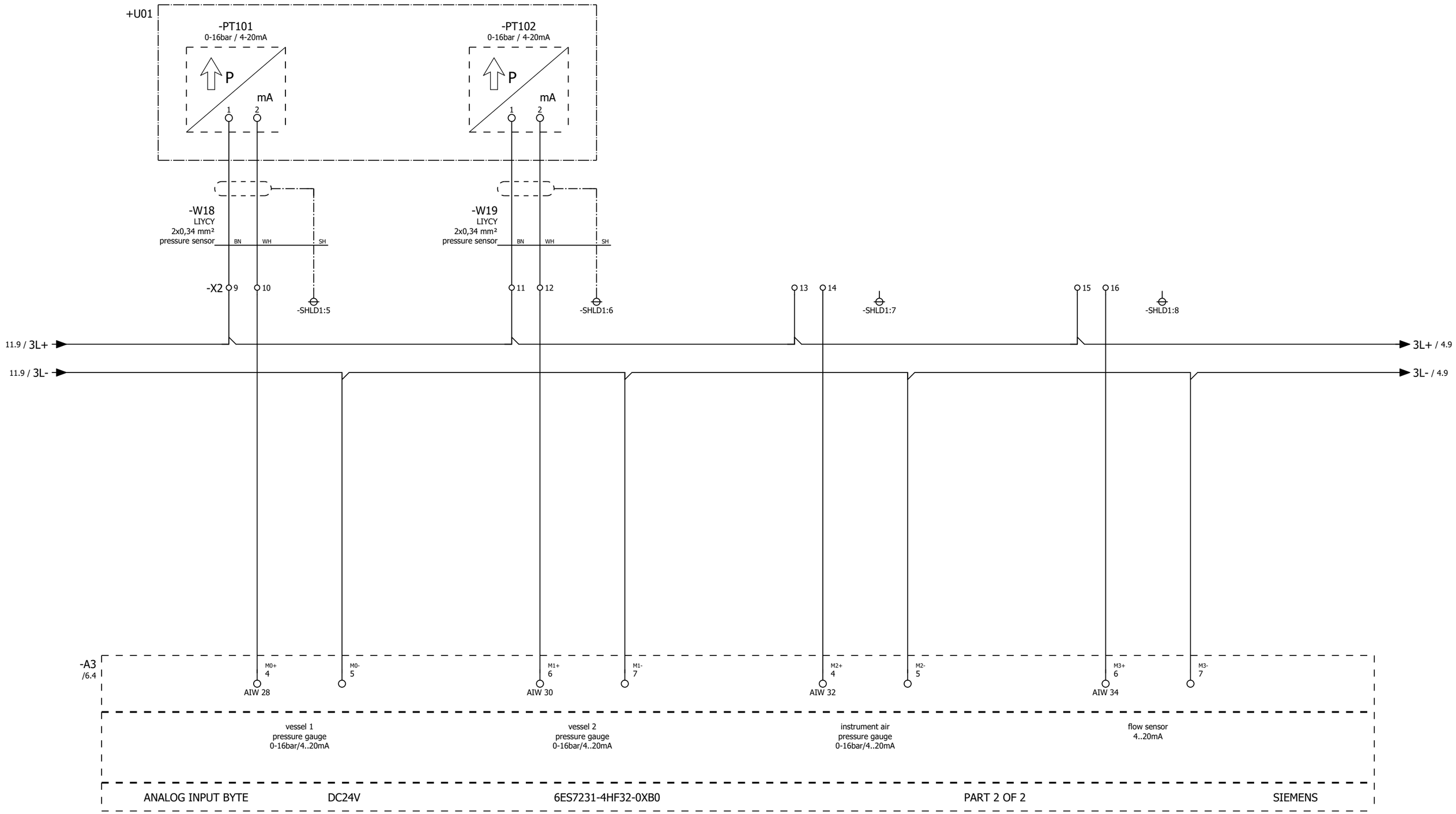
.2 / PE_SHLD →

-A3
/6.4

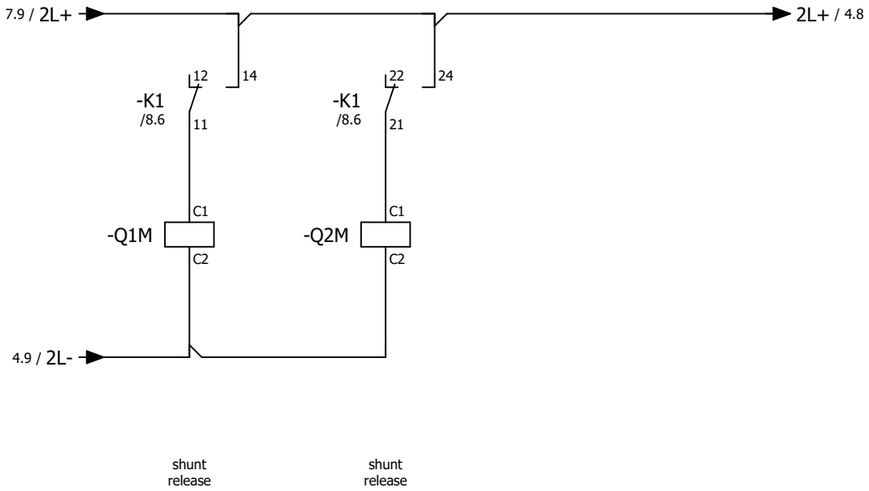
	M0+	M0-	M1+	M1-	M2+	M2-	M3+	M3-
	4	5	6	7	4	5	6	7
	AIW 20		AIW 22		AIW 24		AIW 26	
	dew point sensor +20 to -100°C/4..20mA		above temperature sensor -50- +400°C/4..20mA		below temperature sensor -50- +400°C/4..20mA		inlet temperature sensor -50- +400°C/4..20mA	

ANALOG INPUT BYTE DC24V 6ES7231-4HF32-0XB0 PART 1 OF 2 SIEMENS

			Date	23.03.2022	0322ED00182	analog input AIW 20 - AIW 26	21020343
			Editor	cgraf			=
					ADP 0700		+ F01
Edit	Date	Name			Refer to protection notice ISO 16016		Page 11 / 39

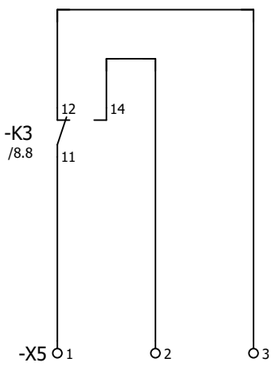


			Date	23.03.2022	0322ED00182		analog input AIW 28 - AIW 34	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 12
Edit	Date	Name			Refer to protection notice ISO 16016				Page 12 / 39

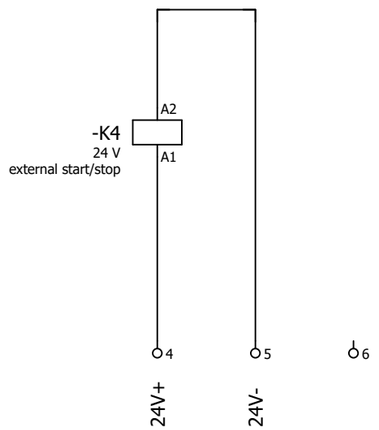


shunt release

shunt release



failure potentialfree for customer



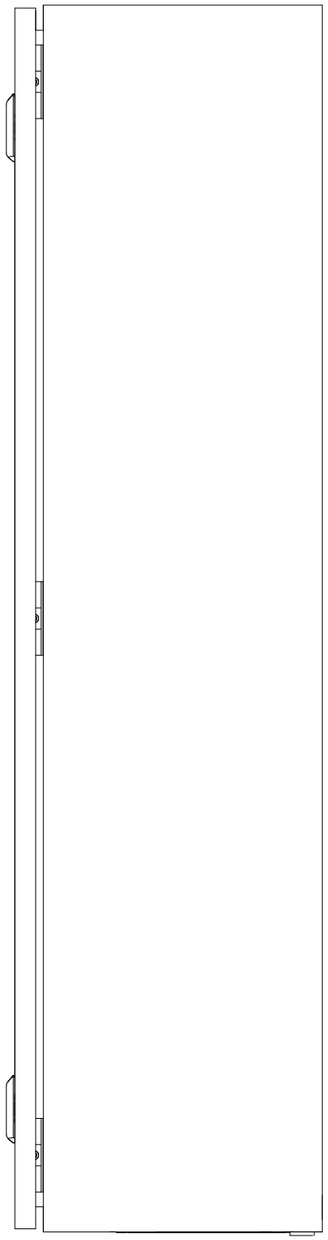
external start / stop 24VDC potentialfree for customer

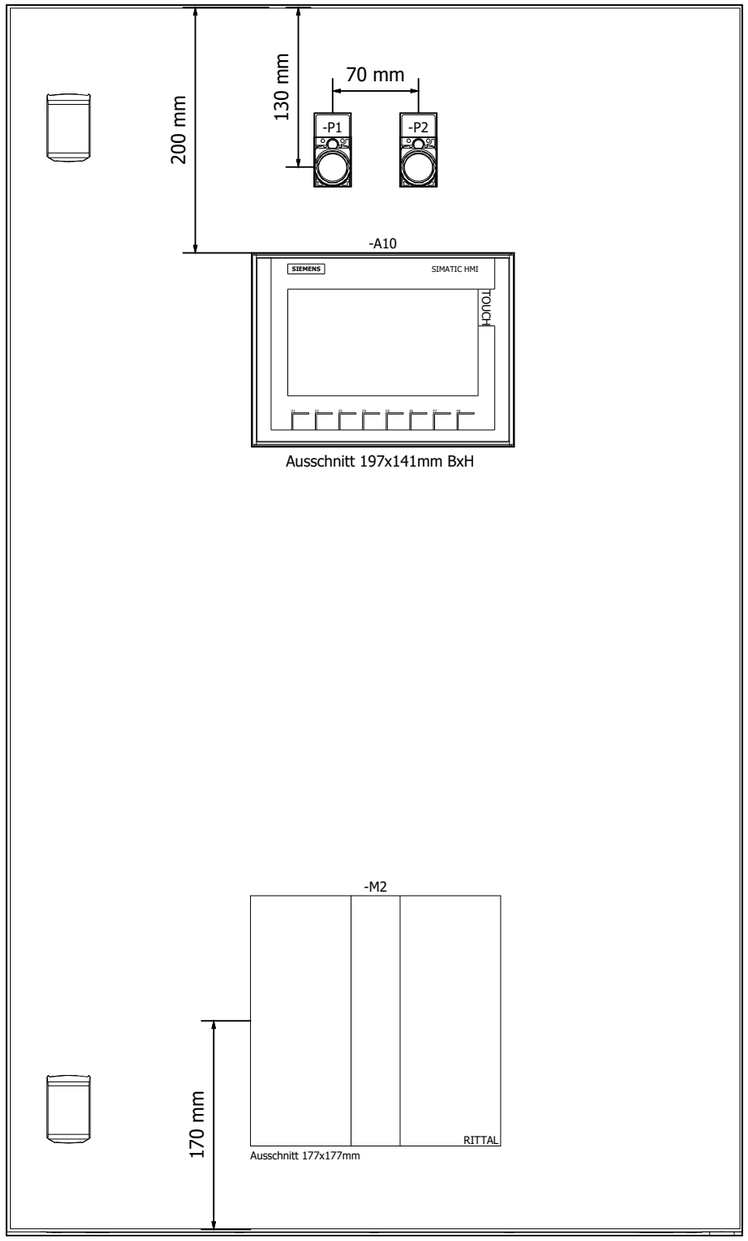
13 14 /7.2
21 22

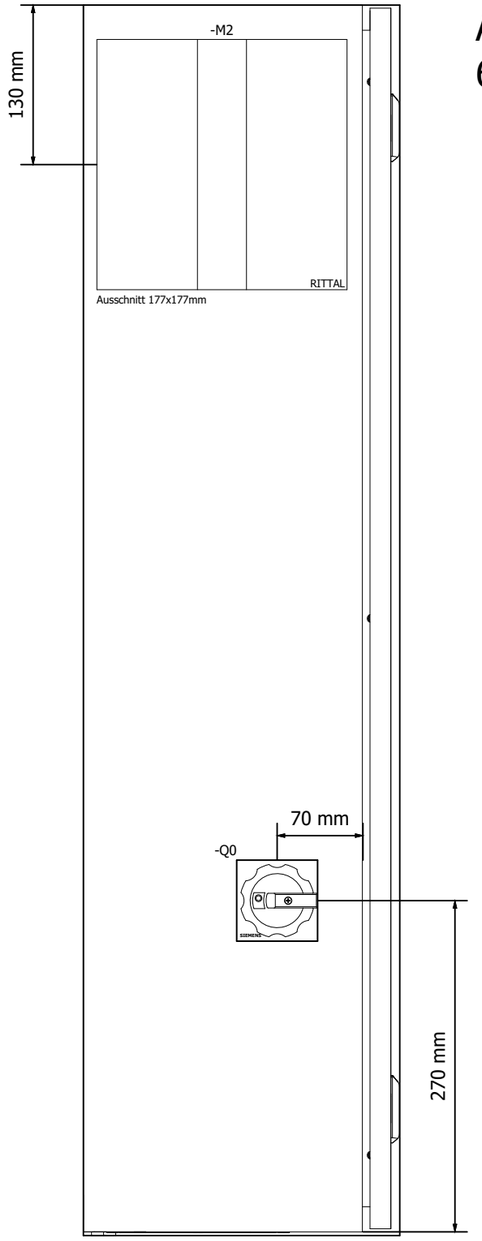
13 14 /7.2
21 22

14 11 /7.0
12

			Date	23.03.2022	0322ED00182		potentialfree contact for customer	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 13
Edit	Date	Name			Refer to protection notice ISO 16016				Page 13 / 39







AX1090.000
600x1000x250mm

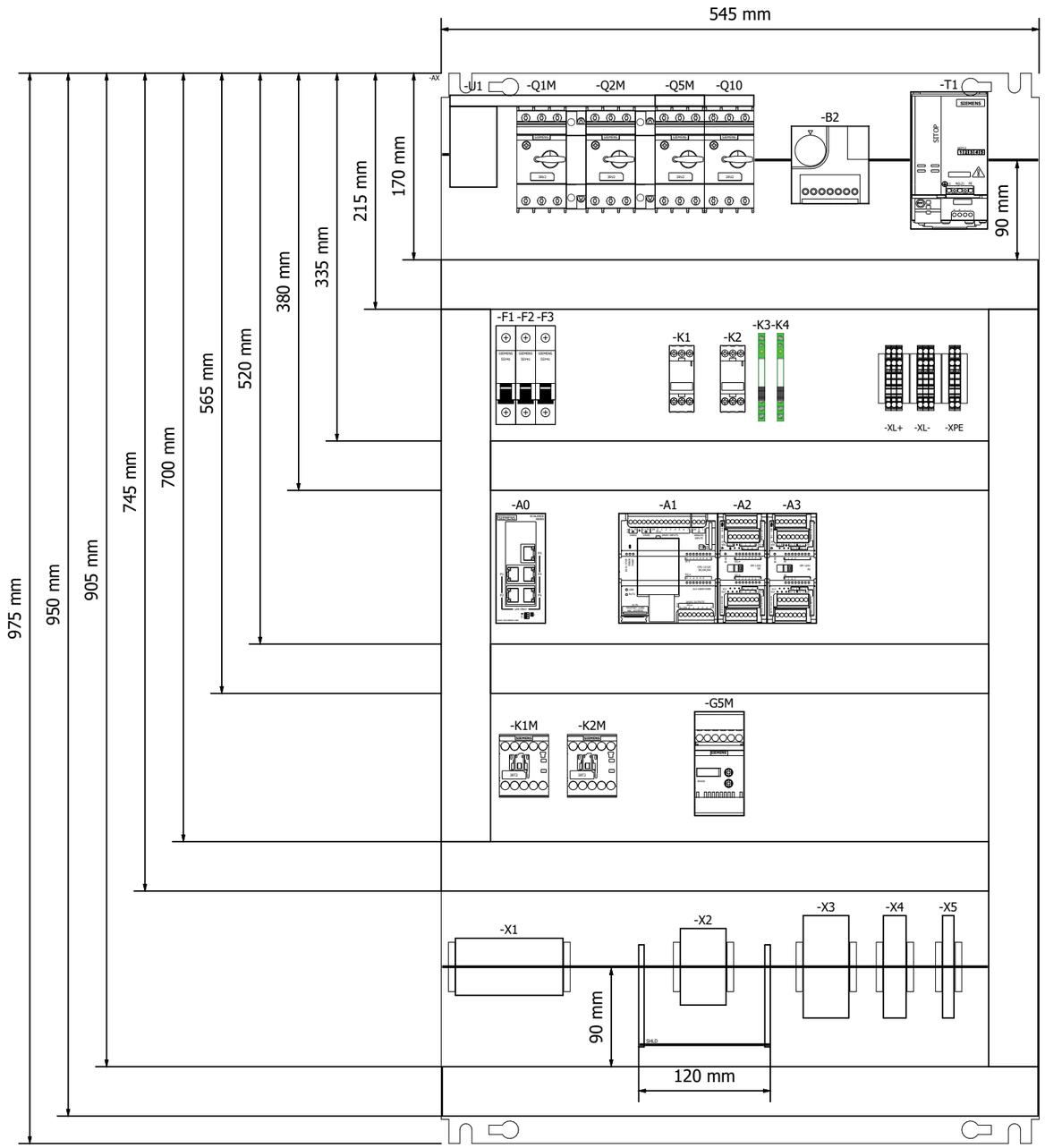
Gerät mittig wenn kein Maß angegeben!

Seitenwand rechts

Vorderansicht

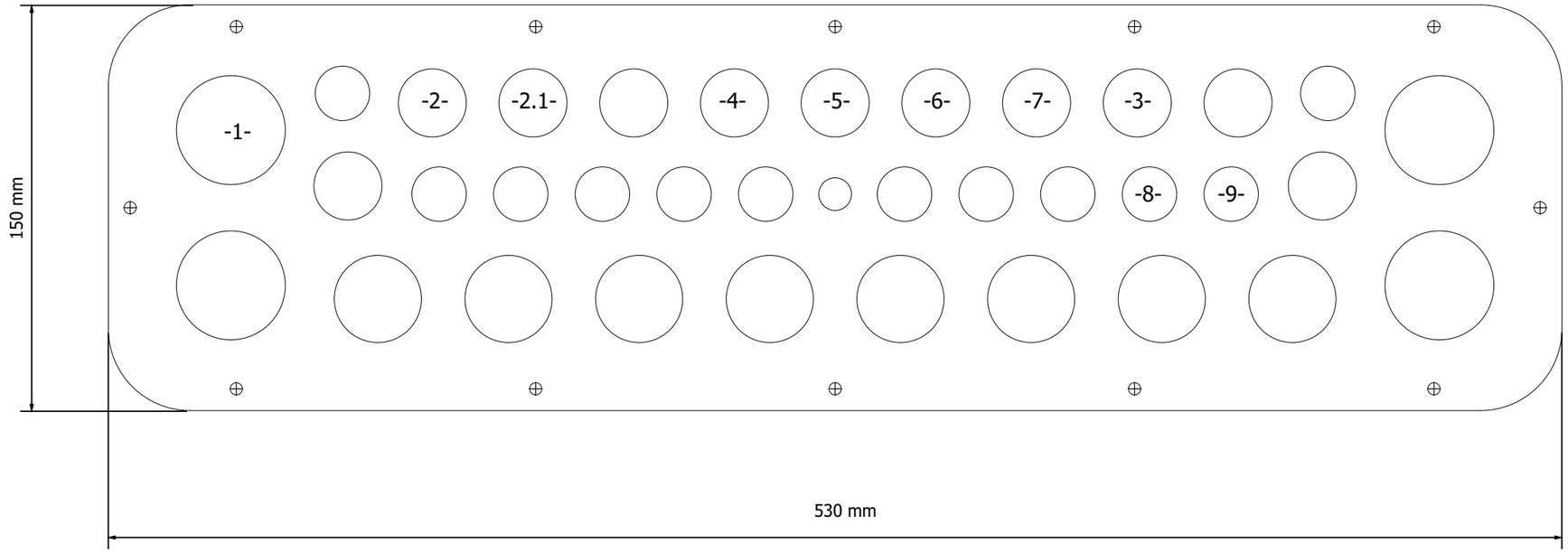
Seitenwand links

			Date	23.03.2022	0322ED00182		cabinet overview	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 14
Edit	Date	Name			Refer to protection notice ISO 16016				Page 14 / 39



Bohrungen:
Kabelkanäle: 6,5mm
Hutschienen: 4,0mm
Hohe Hutschiene (15mm) für Klemmleisten -X1 bis -X5!
Hutschienen mittig im Feld sofern nicht anderweitig bemaßt!

			Date	23.03.2022	0322ED00182		cabinet inside view	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 15
Edit	Date	Name			Refer to protection notice ISO 16016				Page 15 / 39



-1- M40 (Supply)
-2- M25 (E1.1, -W1.1)
-2.1- M25 (E1.2, -W1.2)
-3- M25 (M1, -W2)
-4- M25x2 (MT101, -W14/ TS101, -W6)
-5- M25x2 (TT101, -W15/ TT102, -W16)
-6- M25x2 (PT101, -W18/ PT102, -W19)
-7- M25x2 (B101, -W7/ B102, -W8)
-8- M20 (MV1, -W13)
-9- M20 (connection for customer)

			Date	23.03.2022	0322ED00182		cabinet cable glands	21020343	=
			Editor	cgraf					+ F01
					ADP 0700				Page 16
Edit	Date	Name			Refer to protection notice ISO 16016				Page 16 / 39

Parts list

En_F01_003

Part number	Qty.	Description	BMK	Function
E-S712-SCAXB-5	1	Simatic S7-1200, SCALANCE XB005, Switchmodul, 5 RJ45 ports	A0	
E-CABLE-IE-2RJ45-0,5	1	PROFINET cable 4x2 (0,5m)	A0	
E-CABLE-IE-2RJ45-2	1	PROFINET cable 4x2 (2m)	A0	
E-S712-CPU1212C-3DC-4.0	1	Simatic S7-1200 CPU 1212C, DC/DC/DC, V4.0	A1	
E-S712-SM1222-DO16TR-3.2	1	Simatic S7-1200 SM1222, 16DO	A2	
E-S712-SM1231-AI8-12-3.2	1	Simatic, S7-1200 SM 1231, 8AI	A3	
E-HMI-KTP-700-PN-2B	1	Simatic Basic Touchpanel KTP700 7" PN	A10	
E-CC-AX-61025-7035-1	1	Control cabinet AX 1090.000 (600x1000x250mm)	AX	
E-CCA-AX-4-7035-M	1	Gland plate, for AX, size 4, RAL7035, with metric knockouts	AX	
E-VT-SKR-560-7035-24230	1	Rittal thermal switch	B2	
E-CIB-5SY4-C4-1	1	Circuitbreaker 1ph, 10KA, C, 4A	F1	C4A
E-CIB-5SY4-C2-1	1	Circuitbreaker 1ph, 10KA, C, 2A	F2	C2A
E-CIB-5SY4-C2-1	1	Circuitbreaker 1ph, 10KA, C, 2A	F3	=
E-SS-3RW3-3-24-S00	1	Soft starter, 3,0KW/400V, AC 200-480V, 24V DC, size S00	G5M	blower right direction
E-REL-LZS-24-4	1	Coupling relais, 24V AC/DC, 4W	K1	shunt release
E-CON-3RT2-4,0-24-S00	1	Contactor, AC-3, 4,0kW/400V, 1S, 24V DC, size S00	K1M	heating group 1
E-VAR-3RT2-24482470-S00	1	Overvoltage limiters, varistor, 24 - 48V AC, 24 - 70V DC, size S00	K1M	=
E-REL-LZS-24-4	1	Coupling relais, 24V AC/DC, 4W	K2	failure
E-CON-3RT2-3,0-24-S00	1	Contactor, AC-3, 3,0kW/400V, 1S, 24V DC, size S00	K2M	heating group 2
E-VAR-3RT2-24482470-S00	1	Overvoltage limiters, varistor, 24 - 48V AC, 24 - 70V DC, size S00	K2M	=
E-REL-PLCIF-24-1	1	Relay module, 24V DC, 1W	K3	failure
E-REL-PLCIF-24-1	1	Relay module, 24V DC, 1W	K4	external start/stop
E-VT-SK-105-7035-24	1	Rittal cabinet fan, 105m³/h, 24VDC	M2	cabinet cooler
E-VT-SK-105-7035	1	Rittal exhauster, 105m³/h	M2	=
E-INL-ACT-22-WH-24-PA	1	Indicator light, 22mm, color white, 24V AC/DC	P1	wh
E-LAB-SDH-2727-SW-R	1	SIRIUS ACT Shield holder for indicator lights, buttons, ...	P1	
E-INL-ACT-22-RD-24-PA	1	indicator light, 22mm, color red, 24V AC/DC	P2	rd
E-LAB-SDH-2727-SW-R	1	SIRIUS ACT Shield holder for indicator lights, buttons, ...	P2	
E-MS-3LD-3-25-RDYE-F	1	Main- and Emergency switch, 25A / 690V 400V / 9,5KW	Q0	
E-CIB-3RV2-7010-S-S00	1	Circuit breaker, 7,0 - 10,0A, size S00	Q1M	setpoint: 9A
E-SWI-3RV2-1S1OE	1	Auxiliary switch 1C+1O diag	Q1M	=
E-CIBA-3RV2-2070-S-S00S3	1	Shunt release 3RV2, S00 - S3, 20 - 70V	Q1M	=
E-CIB-3RV2-3550-S-S00	1	Circuit breaker, 3,5 - 5,0A, size S00	Q2M	setpoint: 4,7A
E-SWI-3RV2-1S1OE	1	Auxiliary switch 1C+1O diag	Q2M	=
E-CIBA-3RV2-2070-S-S00S3	1	Shunt release 3RV2, S00 - S3, 20 - 70V	Q2M	=
E-CIB-3RV2-4563-S-S00	1	Circuit breaker, 4,5 - 6,3A, size S00	Q5M	setpoint: 5,5A
E-SWI-3RV2-1S1OE	1	Auxiliary switch 1C+1O diag	Q5M	=
E-CIB-3RV2-2840-S-S00	1	Circuit breaker, 2,8 - 4,0A, size S00	Q10	setpoint: 4A

Parts list

En_F01_003

Part number	Qty.	Description	BMK	Function
E-TF-SIT-120230500-24-5A	1	Sitop PSU200M, transformator, input: 120 / 230 - 500V, output: 24V / 5 A	T1	
E-BAR-3RV1-PB	1	3 phase input terminal (bottom), size S0 / S00	U1	
E-BAR-3RV1-63-4	1	3 phase bus bar, 4 connections, 63mm distance, size S0 / S00	U1	
E-BAR-3RV1-45-2	1	3 phase bus bar, 2 connections, 45mm distance, size S0 / S00	U1	
E-TER-284-10-GNYE-C	2	Main current PE-Terminal block, up to 10mm²	X1	
			X1	
E-TER-281-4-GNYE-C	4	Main current PE-Terminal block, up to 4mm²	X1	
			X1	
			X1	
			X1	
E-TER-281-4-GY-C	9	Main current terminal block, up to 4mm², grey	X1	
			X1	
			X1	
			X1	
			X1	
			X1	
			X1	
			X1	
			X1	
E-TER-200222-2,5-GY-C-LL	8	Double-deck terminal block, type 2002, grey	X2	dew point sensor +20 to -100°C/4..20mA
			X2	above temperature sensor -50- +400°C/4..20mA
			X2	below temperature sensor -50- +400°C/4..20mA
			X2	inlet temperature sensor -50- +400°C/4..20mA
			X2	vessel 1 pressure gauge 0-16bar/4..20mA
			X2	vessel 2 pressure gauge 0-16bar/4..20mA
			X2	instrument air pressure gauge 0-16bar/4..20mA
			X2	flow sensor 4..20mA
E-TER-200222-2,5-GY-C-LL	5	Double-deck terminal block, type 2002, grey	X3	overtemperature heating 320 °C
			X3	drain cyclone separator OPTION !
			X3	drain prefilter OPTION !
			X3	drain cyclone separator OPTION !
			X3	drain prefilter OPTION !
E-TER-200222-2,5-GNYE-C	1	Double-deck PE-Terminal block, type 2002, green-yellow	X3	drain cyclone separator OPTION !
E-TER-200232-2,5-GY-C-LLL	2	Triple-deck terminal block, type 2002, grey	X3	final position K1 open
			X3	final position K2 open
E-TER-200232-2,5-GY-C-LLL	4	Triple-deck terminal block, type 2002, grey	X4	flap K1 open adsorption entry AD1
			X4	flap K2 close adsorption entry AD2
			X4	valve V1 release pressure AD1

Parts list

En_F01_003

Part number	Qty.	Description	BMK	Function
			X4	valve V3/4 build up pressure
E-TER-200232-2,5-GY-C-LLL	2	Triple-deck terminal block, type 2002, grey	X5	failure potentialfree for customer
			X5	external start / stop 24VDC potentialfree for customer
E-TER-200213-2,5-GY-C	3	3-conductor terminal block, type 2002, grey	XL+	
			XL+	
			XL+	
E-TER-200213-2,5-GY-C	3	3-conductor terminal block, type 2002, grey	XL-	
			XL-	
			XL-	
E-TER-200213-2,5-GNYE-C	2	3-conductor PE-Terminal block, type 2002, green-yellow	XPE	
			XPE	

Cable plan

EN_F09_002

Cable designation	=+F01-W1.1		Cable type	H07RN-F				
Function text	heater group 1		Number of wires	4G		Cross section	2,5 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
	&STR/4.3	-X1	4	BN	+U02-E1.1	L1	&STR/4.3	heater group 1
	&STR/4.3	-X1	5	BK	+U02-E1.1	L2	&STR/4.3	
	&STR/4.3	-X1	6	GY	+U02-E1.1	L3	&STR/4.3	
	&STR/4.4	-X1	7	GNYE	+U02-E1.1	PE	&STR/4.4	

Cable plan

EN_F09_002

Cable designation	=+F01-W1.2		Cable type	H07RN-F				
Function text	heater group 2		Number of wires	4G		Cross section	2,5 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
	&STR/4.5	-X1	8	BN	+U02-E1.2	L1	&STR/4.5	heater group 2
	&STR/4.5	-X1	9	BK	+U02-E1.2	L2	&STR/4.5	
	&STR/4.6	-X1	10	GY	+U02-E1.2	L3	&STR/4.6	
	&STR/4.6	-X1	11	GNYE	+U02-E1.2	PE	&STR/4.6	

Cable plan

EN_F09_002

Cable designation	=+F01-W2		Cable type	H07RN-F				
Function text	blower		Number of wires	4G		Cross section	2,5 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
	&STR/4.7	-X1	12	BN	+R01-M1	U1	&STR/4.7	
	&STR/4.8	-X1	13	BK	+R01-M1	V1	&STR/4.7	
	&STR/4.8	-X1	14	GY	+R01-M1	W1	&STR/4.7	
	&STR/4.8	-X1	15	GNYE	+R01-M1	PE	&STR/4.7	

Cable plan

EN_F09_002

Cable designation	=+F01-W6		Cable type	ÖLFLEX® CLASSIC 110					
Function text	temperature limiter		Number of wires	2		Cross section	1 mm²	cable lenght	
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text	
overtemperature heating 320 °C	&STR/8.3	-X3	1	1	+U02-TS101	1	&STR/8.3	no failure fuse heater	
=	&STR/8.3	-X3	2	2	+U02-TS101	2	&STR/8.3	overtemperature heating 320 °C	

Cable plan

EN_F09_002

Cable designation	=+F01-W7		Cable type	LIFYY				
Function text	flap sensor K1		Number of wires	4		Cross section	0,34 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
final position K1 open	&STR/8.8	-X3	15	BK	+R01-B101	4	&STR/8.8	
=	&STR/8.8	-X3	13	BN	+R01-B101	1	&STR/8.8	
=	&STR/8.8	-X3	14	BU	+R01-B101	3	&STR/8.8	

Cable plan

EN_F09_002

Cable designation	=+F01-W8		Cable type	LIFYY				
Function text	flap sensor K2		Number of wires	4		Cross section	0,34 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
final position K2 open	&STR/8.9	-X3	18	BK	+R01-B102	4	&STR/8.9	
=	&STR/8.9	-X3	16	BN	+R01-B102	1	&STR/8.9	
=	&STR/8.9	-X3	17	BU	+R01-B102	3	&STR/8.9	

Cable plan

EN_F09_002

Cable designation	=+F01-W13		Cable type					
Function text	flap K1 open adsorption entry AD1		Number of wires	18		Cross section	0,25 mm²	cable lenght 5
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
signal lamp operation	&STR/11.7	-X4	12	BK	+U01-MV1-X1	25	&STR/11.7	signal lamp operation
spare	&STR/11.7	-X4	9	BN	+U01-MV1-X1	24	&STR/11.7	spare
flap K1 close adsorption entry AD1	&STR/10.2	-X4	2	GN	+U01-MV1-X1	2	&STR/10.2	flap K1 close adsorption entry AD1
flap K2 close adsorption entry AD2	&STR/10.4	-X4	4	GY	+U01-MV1-X1	4	&STR/10.4	flap K2 close adsorption entry AD2
valve V1 release pressure AD1	&STR/11.3	-X4	7	GYPK	+U01-MV1-X1	13	&STR/11.3	valve V1 release pressure AD1
flap K3 open regeneration discharge AD1	&STR/10.5	-X4	5	PK	+U01-MV1-X1	5	&STR/10.5	flap K3 open regeneration discharge AD1
flap K4 open regeneration discharge AD2	&STR/10.6	-X4	6	RD	+U01-MV1-X1	7	&STR/10.6	flap K4 open regeneration discharge AD2
valve V2 release pressure AD2	&STR/11.4	-X4	8	RDBU	+U01-MV1-X1	14	&STR/11.4	valve V2 release pressure AD2
flap K1 open adsorption entry AD1	&STR/10.1	-X4	1	WH	+U01-MV1-X1	1	&STR/10.1	flap K1 open adsorption entry AD1
valve V3/4 build up pressure	&STR/11.5	-X4	10	WHGN	+U01-MV1-X1	15	&STR/11.5	valve V3/4 build up pressure
flap K2 open adsorption entry AD2	&STR/10.3	-X4	3	YE	+U01-MV1-X1	3	&STR/10.3	flap K2 open adsorption entry AD2

Cable plan

EN_F09_002

Cable designation	=+F01-W14		Cable type	LIYCY				
Function text	dew point sensor		Number of wires	2x		Cross section	0,34 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
dew point sensor +20 to -100°C/4..20mA	&STR/12.1	-X2	1	BN	+U01-MT101	3	&STR/12.1	dew point sensor +20 to -100°C/4..20mA
=	&STR/12.1		SH	SH	-SHLD1	1	&STR/12.2	
=	&STR/12.1	-X2	2	WH	+U01-MT101	1	&STR/12.1	

Cable plan

EN_F09_002

Cable designation	=+F01-W15		Cable type	LIYCY				
Function text	temperature sensor		Number of wires	2x		Cross section	0,34 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
above temperature sensor -50- +400°C/4..20mA	&STR/12.3	-X2	3	BN	+R01-TT101	1	&STR/12.3	above temperature sensor -50- +400°C/4..20mA
=	&STR/12.3		SH	SH	-SHLD1	2	&STR/12.4	
=	&STR/12.3	-X2	4	WH	+R01-TT101	2	&STR/12.3	

Cable plan

EN_F09_002

Cable designation	=+F01-W16		Cable type	LIYCY				
Function text	temperature sensor		Number of wires	2x		Cross section	0,34 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
below temperature sensor -50- +400°C/4..20mA	&STR/12.5	-X2	5	BN	+R01-TT102	1	&STR/12.5	below temperature sensor -50- +400°C/4..20mA
=	&STR/12.5		SH	SH	-SHLD1	3	&STR/12.6	
=	&STR/12.5	-X2	6	WH	+R01-TT102	2	&STR/12.5	

Cable plan

EN_F09_002

Cable designation	=+F01-W18		Cable type	LIYCY				
Function text	pressure sensor		Number of wires	2x		Cross section	0,34 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
vessel 1 pressure gauge 0-16bar/4..20mA	&STR/13.1	-X2	9	BN	+U01-PT101	1	&STR/13.1	vessel 1 pressure gauge 0-16bar/4..20mA
=	&STR/13.1		SH	SH	-SHLD1	5	&STR/13.2	
=	&STR/13.1	-X2	10	WH	+U01-PT101	2	&STR/13.1	

Cable plan

EN_F09_002

Cable designation	=+F01-W19		Cable type	LIYCY				
Function text	pressure sensor		Number of wires	2x		Cross section	0,34 mm²	cable lenght
Function text	Page / Column	Target description from	Connection	Wire	Target description to	Connection	Page / Column	Function text
vessel 2 pressure gauge 0-16bar/4..20mA	&STR/13.3	-X2	11	BN	+U01-PT102	1	&STR/13.3	vessel 2 pressure gauge 0-16bar/4..20mA
=	&STR/13.3		SH	SH	-SHLD1	6	&STR/13.4	
=	&STR/13.3	-X2	12	WH	+U01-PT102	2	&STR/13.3	

Terminal diagram

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Function						-W2	-W1.2	-W1.1	Cablename	Rail =+F01-X1 Target descrption	Connection	Terminal	Bridge	Target description	Connection	Cablename					Page/Column
						H07RN-F	H07RN-F	H07RN-F	Cabletype							Cabletype					
										PE		1	,	-GND1	1						&STR/4.1
										-GND2	1	2	,	-GND3	1						&STR/4.1
										-SHLD1	0	3	,	-T1	PE						&STR/4.2
								BN		+U02-E1.1	L1	4	,	-K1M	2						&STR/4.3
								BK		+U02-E1.1	L2	5	,	-K1M	4						&STR/4.3
								GY		+U02-E1.1	L3	6	,	-K1M	6						&STR/4.3
								GNYE		+U02-E1.1	PE	7	,								&STR/4.4
							BN			+U02-E1.2	L1	8	,	-K2M	2						&STR/4.5
							BK			+U02-E1.2	L2	9	,	-K2M	4						&STR/4.5
							GY			+U02-E1.2	L3	10	,	-K2M	6						&STR/4.6
							GNYE			+U02-E1.2	PE	11	,								&STR/4.6
						BN				+R01-M1	U1	12	,	-G5M	2						&STR/4.7
						BK				+R01-M1	V1	13	,	-G5M	4						&STR/4.8
						GY				+R01-M1	W1	14	,	-G5M	6						&STR/4.8
						GNYE				+R01-M1	PE	15	,	-XPE	2						&STR/4.8

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Terminal diagram

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Function				-W19	-W18	-W16	-W15	-W14	Cablename	Rail =+F01-X2 Target descrption	Connection	Terminal	Bridge	Target description	Connection	Cablename					Page/Column
				LIYCY	LIYCY	LIYCY	LIYCY	LIYCY	Cabletype							Cabletype					
dew point sensor +20 to -100°C/4..20mA								BN		+U01-MT101	3	1		-XL+	2						&STR/12.1
=								WH		+U01-MT101	1	2		-A3	-X10:4						&STR/12.1
above temperature sensor -50- +400°C/4..20mA							BN			+R01-TT101	1	3									&STR/12.3
=							WH			+R01-TT101	2	4		-A3	-X10:6						&STR/12.3
below temperature sensor -50- +400°C/4..20mA						BN				+R01-TT102	1	5									&STR/12.5
=						WH				+R01-TT102	2	6		-A3	-X11:4						&STR/12.5
inlet temperature sensor -50- +400°C/4..20mA												7									&STR/12.7
=												8		-A3	-X11:6						&STR/12.7
vessel 1 pressure gauge 0-16bar/4..20mA					BN					+U01-PT101	1	9									&STR/13.1
=					WH					+U01-PT101	2	10		-A3	-X10:4						&STR/13.1
vessel 2 pressure gauge 0-16bar/4..20mA				BN						+U01-PT102	1	11									&STR/13.3
=				WH						+U01-PT102	2	12		-A3	-X10:6						&STR/13.3
instrument air pressure gauge 0-16bar/4..20mA												13									&STR/13.5
=												14		-A3	-X11:4						&STR/13.5
flow sensor 4..20mA												15		-XL+	3						&STR/13.7
=												16		-A3	-X11:6						&STR/13.7

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Terminal diagram

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Rail

=+F01-X3

Function	-W8	-W7	-W6	Cablename	Cabletype	Target descrption	Connection	Terminal	Bridge	Target description	Connection	Cablename	Cabletype	Page/Column
			ÖLFLEX® CLASSIC 110											
overtemperature heating 320 °C			1			+U02-TS101	1	1		-Q1M	13			&STR/8.3
=			2			+U02-TS101	2	2		-A1	-X10:10			&STR/8.3
drain cyclone separator OPTION !								3		-XPE	2			&STR/8.5
drain prefilter OPTION !								4						&STR/8.6
drain cyclone separator OPTION !								5		-F3	2			&STR/8.4
=								6		-A1	-X10:2			&STR/8.4
drain prefilter OPTION !								7						&STR/8.6
=								8						&STR/8.6
drain cyclone separator OPTION !								9						&STR/8.5
=								10		-A1	-X10:11			&STR/8.5
drain prefilter OPTION !								11						&STR/8.7
=								12		-A1	-X10:12			&STR/8.7
final position K1 open		BN				+R01-B101	1	13		-XL+	1			&STR/8.8
=		BU				+R01-B101	3	14						&STR/8.8
=		BK				+R01-B101	4	15		-A1	-X10:13			&STR/8.8
final position K2 open	BN					+R01-B102	1	16		-K1	14			&STR/8.9
=	BU					+R01-B102	3	17		-G5M	A2			&STR/8.9
=	BK					+R01-B102	4	18		-A1	-X10:14			&STR/8.9

Terminal diagram

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Function	-W13	LIYY	Cablename	Cabletype	Rail =+F01-X4 Target descrption	Connection	Terminal	Bridge	Target description	Connection	Cablename	Cabletype	Page/Column
flap K1 open adsorption entry AD1	WH				+U01-MV1-X1	1	1		-A2	-X10:4			&STR/10.1
flap K1 close adsorption entry AD1	GN				+U01-MV1-X1	2	2		-A2	-X10:5			&STR/10.2
flap K2 open adsorption entry AD2	YE				+U01-MV1-X1	3	3		-A2	-X10:6			&STR/10.3
flap K2 close adsorption entry AD2	GY				+U01-MV1-X1	4	4		-A2	-X10:7			&STR/10.4
flap K3 open regeneration discharge AD1	PK				+U01-MV1-X1	5	5		-A2	-X11:4			&STR/10.5
flap K4 open regeneration discharge AD2	RD				+U01-MV1-X1	7	6		-A2	-X11:5			&STR/10.6
valve V1 release pressure AD1	GYPK				+U01-MV1-X1	13	7		-A2	-X12:6			&STR/11.3
valve V2 release pressure AD2	RDBU				+U01-MV1-X1	14	8		-A2	-X12:7			&STR/11.4
spare	BN				+U01-MV1-X1	24	9		-K3	A2			&STR/11.7
valve V3/4 build up pressure	WHGN				+U01-MV1-X1	15	10		-A2	-X13:4			&STR/11.5
spare							11						&STR/11.6
signal lamp operation	BK				+U01-MV1-X1	25	12		-XL-	3			&STR/11.7

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Function	Cablename	Cabletype	Target descrption	Connection	Terminal	Bridge	Target description	Connection	Cablename	Cabletype	Page/Column
			Rail =+F01-X5								
failure potentialfree for customer					1		-K3	11			&STR/14.5
=					2		-K3	14			&STR/14.5
=					3		-K3	12			&STR/14.6
external start / stop 24VDC potentialfree for customer					4		-K4	A1			&STR/14.7
=					5		-K4	A2			&STR/14.7
=					6						&STR/14.7

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Terminal diagram

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Rail

=+F01-XL+

Function	Cablename / Cabletype	Target descrption	Connection	Terminal	Bridge	Target description	Connection	Cablename / Cabletype	Page/Column
		-F2	1	1	●	-F1	2		&STR/5.8
		-X3	13		│				
		-X2	1	2	●				&STR/5.8
		-A10	-X80:1		│				
		-F3	1	3	●	-K1	24		&STR/5.8
		-X2	15						

Terminal diagram

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Rail

=+F01-XL-

Function	Cablename / Cabletype	Target descrption	Connection	Terminal	Bridge	Target description	Connection	Cablename / Cabletype	Page/Column
		-A1	-X10:2	1	●	-T1	-		&STR/5.8
		-Q1M	C2		│				
		-A3	-X10:5	2	●				&STR/5.8
		-M2	2		│				
		-A3	-X11:7	3	●	-X4	12		&STR/5.8
		-P2	X2						

Terminal diagram

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Rail
=+F01-XPE

Function	Cablename / Cabletype	Target descrption	Connection	Terminal	Bridge	Target description	Connection	Cablename / Cabletype	Page/Column
		-A1	-X10:3	1	'	-T1	-.		&STR/5.8
		-A10	-X80:3	2	'	-X1	15		&STR/5.8
						-X3	3		