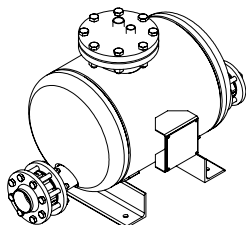
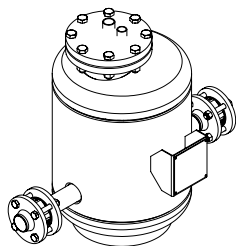


Steam-Powered
Condensate-Return Unit

FPS 11



FPS 14



FPS 23

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Foreword

This Installation & Operating Manual will help ensure proper, safe and cost-efficient use of the following types of vessel:

- ▶ Steam-powered condensate-return unit FPS 11
- ▶ Steam-powered condensate-return unit FPS 14
- ▶ Steam-powered condensate-return unit FPS 23

Referred to below simply as 'equipment'.

This Installation & Operating Manual is intended for all persons bringing this equipment into service, and operating, using, servicing, cleaning or disposing of the equipment. In particular, the Installation & Operating Manual is aimed at service technicians, trained specialist personnel, and qualified and authorised operating personnel.

Each of the above must have read and understood the content of this Installation & Operating Manual.

Following the instructions in the Installation & Operating Manual helps to avoid danger and increases the reliability and service life of the equipment. In addition to the instructions in this Installation & Operating Manual, compliance with the applicable binding rules on accident prevention in the country and location of use, and with the generally recognised technical regulations for safe and proper working, is essential.

Availability

Always keep this Installation & Operating Manual together with the system documentation. Make sure that the Installation & Operating Manual is available to the operator.

The Installation & Operating Manual is part of the equipment package. Hand over this Installation & Operating Manual if you sell or pass on the equipment to a third party.

Formatting features in the document

Different types of information in the Installation & Operating Manual are formatted in different ways.

This helps you to distinguish easily between the following types of information:

Normal text

Cross references

▶ Lists

▶ Bullet points in lists

➤ Action to be taken.



These tips contain additional information, e.g. about cost-efficient use of the equipment.

Security

Usage for the intended purpose

The FPS equipment uses booster steam to collect and transport condensate at intervals that vary depending on the level. The transport intervals are controlled by a special float valve.

The equipment may only be used within the admissible pressure and temperature ratings, with due consideration of chemical and corrosive influences.

Usage for the intended purpose also includes reading and adhering to all instructions in this manual, particularly the safety notes.

Any other use of the equipment shall be considered as improper use.

Improper use also includes using equipment made of materials that are unsuitable for the fluid used.

Basic safety notes

Risk of serious injury

- ▶ The equipment can become hot during operation. Only bring the equipment into service if contact with hot surfaces is prevented by insulation or other protection.
- ▶ The equipment is under pressure and can get hot. Only perform work on the equipment if the following conditions are satisfied:
 - ▶ The pipes must not be under pressure.
 - ▶ All fluid must be thoroughly removed from pipes and the equipment.
 - ▶ Before carrying out any work, the higher-level system must be switched off and secured so it cannot be switched back on prematurely.
 - ▶ The pipes and equipment must have cooled to around 20 °C (lukewarm).
- ▶ For equipment used in contaminated areas, there is a risk of serious or fatal injury from harmful substances on the equipment. Only perform work on the equipment when it has been thoroughly decontaminated. Wear the protective clothing specified for the contaminated zone during all work.
- ▶ The equipment may only be used with fluids that are not aggressive in contact with its material and gaskets. Otherwise, leaks may occur and hot or toxic fluid may escape.
- ▶ The equipment and its components may only be installed or removed by specialist personnel. Specialist personnel must have knowledge and experience in the following areas:
 - ▶ Producing pipe connections.
 - ▶ Selecting suitable lifting gear for the product, and using it safely.
 - ▶ Working with hazardous (contaminated, hot or pressurised) fluids.
- ▶ If the admissible pressure and temperature ratings are exceeded, the equipment may be destroyed and hot or pressurised fluid may escape. Make sure that the equipment is always used within the admissible pressure and temperature ratings. You can find information on the pressure and temperature ratings on the name plate.

- ▶ Incorrect handling of lifting gear or the use of unsuitable lifting gear can cause the equipment or its parts to fall.
 - ▶ Only allow specialist personnel to lift the equipment or its components.
 - ▶ Make sure that there are never any persons below suspended loads.
 - ▶ Make sure that the lifting gear has sufficient load-bearing capacity for the load to be lifted, and that the load is sufficiently secured. Please consult the manufacturer for information about component weight and safe lifting points.
 - ▶ Ensure compliance with all locally applicable safety and accident prevention regulations.

Risk of minor injury

- ▶ There is a risk of cuts from sharp-edged internal parts of the equipment. Always wear protective gloves when working on the equipment.
- ▶ If the equipment is inadequately supported during installation, there is a risk of crushing if it falls. Secure the equipment during installation so it cannot fall. Wear sturdy safety boots.

Information on material damage or malfunctions

- ▶ Installing the equipment against the specified direction of flow or in the wrong location will result in malfunctions. This could cause damage to the equipment or the higher-level system. Install the equipment in the pipe in the direction of flow stated in this Installation & Operating Manual.
- ▶ Equipment made from materials that are unsuitable for the fluid used will wear faster. This can cause fluid to escape. Make sure the material is suitable for the fluid used.

- ▶ Using the equipment in systems with the wrong operating conditions can lead to material damage or malfunctions. Always ensure the following operating conditions are complied with:
 - ▶ An air venting pipe must always be installed.
 - ▶ The steam pressure of the system must always be higher downstream of the FPS than upstream of it.
 - ▶ The minimum height difference must be complied with.
 - ▶ The condensate line upstream of the equipment must be sufficiently large to act as a reservoir for condensate arising during the pumping process. A pipe elbow must be installed immediately upstream of the equipment, to allow the vertical accumulation of fluid.

Personnel qualifications

Specialist personnel must have knowledge and experience in the following areas:

- ▶ Explosion and fire protection provisions applicable at the site of installation
- ▶ Work on pressure equipment
- ▶ Producing pipe connections
- ▶ Working with hazardous (hot or pressurised) fluids
- ▶ Lifting and transporting loads
- ▶ All information in this Installation & Operating Manual and other applicable documentation

Protective clothing

The required protective clothing depends on the regulations at the place of work and the fluids used. You will find information on suitable protective clothing and PPE in the safety data sheet for the fluid used.

The protective clothing basically consists of the following items:

- ▶ Safety helmet as per EN 397
- ▶ Safety boots as per EN ISO 20345
- ▶ Sturdy leather gloves as per EN 388
- ▶ Safety goggles as per DIN EN 166

Formatting features for warnings in the document



DANGER

Instructions with the word DANGER warn of a dangerous situation that will result in death or serious injury.



WARNING

Instructions with the word WARNING warn of a dangerous situation that may possibly result in death or serious injury.



CAUTION

Instructions with the word CAUTION warn of a situation that may result in minor or moderate injury.

Warnings of material and environmental damage

Attention!

These notices warn of a situation resulting in material or environmental damage.

Description

Product package and description of equipment

Scope of supply

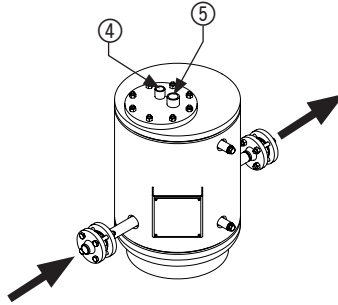
The equipment is packaged ready for installation.

Description of equipment

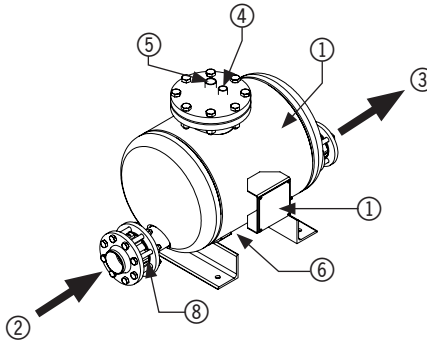
The equipment features the following connections:

- ▶ Condensate inlet
- ▶ Condensate outlet
- ▶ Booster steam
- ▶ Vent
- ▶ Drain (if applicable)

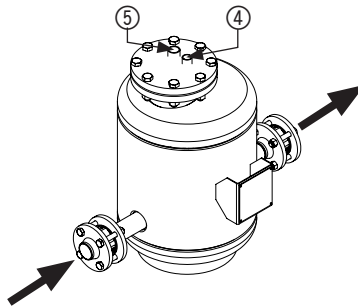
FPS 11



FPS 14



FPS 23



| No. | Designation |
|-----|-------------------------------|
| 1 | Vessel |
| 2 | Connection: Condensate inlet |
| 3 | Connection: Condensate outlet |
| 4 | Connection: Booster steam |

| No. | Designation |
|-----|----------------------------|
| 5 | Connection: Vent |
| 6 | Connection: Drain (FPS 14) |
| 7 | Name plate |
| 8 | Non-return valve |

Connections

Connection for condensate line:

- ▶ Butt-weld end of welding neck flange

Connection for booster steam venting pipe:

- ▶ Screwed socket

Name plate

On the name plate, you will find the following information:

- ▶ Manufacturer
- ▶ Type designation
- ▶ Minimum operating temperature
- ▶ Maximum operating temperature
- ▶ Maximum service pressure
- ▶ Mark, e.g. CE, UKCA (if required)
- ▶ Year of production
- ▶ Serial number
- ▶ Type of vessel
- ▶ Weight
- ▶ Applicable rules
- ▶ Test pressure
- ▶ Date of test
- ▶ Volume

Purpose and function

Purpose

FPS equipment is used to discharge condensate from steam in steam-heated consumers.

In the equipment, the condensate is transported by booster steam.

This means that the equipment can also discharge condensate if the steam pressure is so low that condensate can no longer be removed by conventional steam traps.

FPS units are cyclical condensate-return units. They require the upstream pressure to be lower than the back pressure.

Function

Condensate fills the equipment, causing the ball float to rise.

At the upper switchpoint, the ball float actuates the valve control. This opens the booster steam supply and closes the vent valve.

The booster steam forces the condensate out of the equipment and the ball float falls.

During this pumping process, the flow of condensate builds up in the supply line.

When the ball float reaches the lower switchpoint, the valve control stops the supply of booster steam and the vent valve opens.

The flow of condensate accumulates in the equipment and the process is repeated.

The non-return valve in the inlet prevents condensate and booster steam from flowing back through the condensate inlet. The non-return valve in the outlet prevents any return flow in the condensate outlet.

Application of European Directives

Pressure Equipment Directive

The equipment conforms to this directive (see “Manufacturer’s Declaration” section) and can be used for the following fluids:

- ▶ Group 2 fluids

ATEX Directive

The equipment does not have a potential ignition source and as such is not subject to this directive (see “Manufacturer’s Declaration” section).

Static electricity: Static electricity can be produced in the system if the equipment is installed between pipe flanges.

If the equipment is used in potentially explosive atmospheres, the discharge or prevention of possible electrostatic charging is the responsibility of the manufacturer or operator of the system.

Storing and transporting the equipment

Attention!

Storing or transporting the equipment incorrectly can damage it.

- Seal off all openings with the supplied covers, or comparable ones.
- Make sure the equipment remains dry and is protected against corrosive atmospheres.
- Please contact the manufacturer if you wish to transport or store the equipment in different conditions.

Storing the equipment

- Store the equipment solely in the following conditions:
 - ▶ Store the equipment for no more than 12 months.
 - ▶ Seal off all openings on the equipment with the supplied plugs or comparable covers.
 - ▶ Connecting and sealing surfaces must be protected against mechanical damage.
 - ▶ The equipment and all components must be protected against jolts and impacts.
 - ▶ Only store the equipment in closed rooms in the following ambient conditions:
 - ▶ Air humidity below 50%, non-condensing
 - ▶ Clean room air, not salty or corrosive in other ways
 - ▶ Temperature 5–40 °C.
- Make sure that these conditions are constantly maintained throughout storage.
- Please contact the manufacturer if you wish to store the equipment in different conditions.

Transporting the equipment



DANGER

Risk of crushing from falling equipment or components.

- Always use suitable lifting gear when lifting, moving and working on the equipment and its components.
- Make sure that the equipment cannot tip over.
- Make sure that there are never any persons below suspended loads.

➤ During transport, maintain the same conditions as during storage.

➤ Insert the plugs into the connections before transport.



If you do not have the supplied plugs, seal the connections with comparable covers.

➤ Over distances of a few metres, you may transport the equipment unpackaged.

➤ Over longer distances, use the original packaging for transport.

➤ If the original packaging is not available, pack the equipment so that it is protected against corrosion and mechanical damage.



The equipment can be transported for short periods at temperatures below 0 °C, provided that it has been thoroughly drained and dried.

Installing and connecting the equipment

Preparing for installation



DANGER

Risk of crushing from falling equipment or components.

- Always use suitable lifting gear when lifting, moving and working on the equipment and its components.
- Make sure that the equipment cannot tip over.
- Make sure that there are never any persons below suspended loads.

➤ Remove the equipment from the transport packaging.

➤ Inspect the equipment for damage sustained during transport.

➤ If you find any such damage, please contact the manufacturer.

Connections may be sealed with plugs on delivery.

Connecting the equipment



DANGER

Incorrectly connected equipment can result in accidents with extremely severe injuries or death.

- Make sure that only specialist personnel connect the equipment to the pipe.
- Remove the plugs before installation.
- Store the plugs and packaging for later use.



DANGER

Risk of severe injury or death due to burns or intoxication during work on pipes.

- Make sure there are no hot or hazardous fluids in the equipment or pipes.
- Make sure the pipes to the equipment are not under pressure.
- Make sure the system is switched off and secured so that it cannot be switched back on prematurely.
- Make sure the equipment and pipes have cooled to a lukewarm temperature.
- Wear suitable protective clothing for the fluid, and use suitable PPE if necessary.

You will find information on suitable protective clothing and PPE in the safety data sheet for the fluid used.

- Drain the pipes.
- Switch off the system and secure so that it cannot be switched back on prematurely.

Specialist personnel must have knowledge and experience of producing the type of pipe connection used.

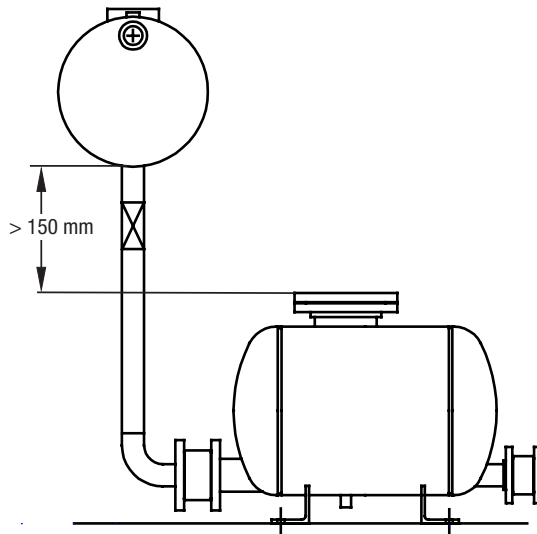
Attention!

The equipment can be damaged if connections are too weak.

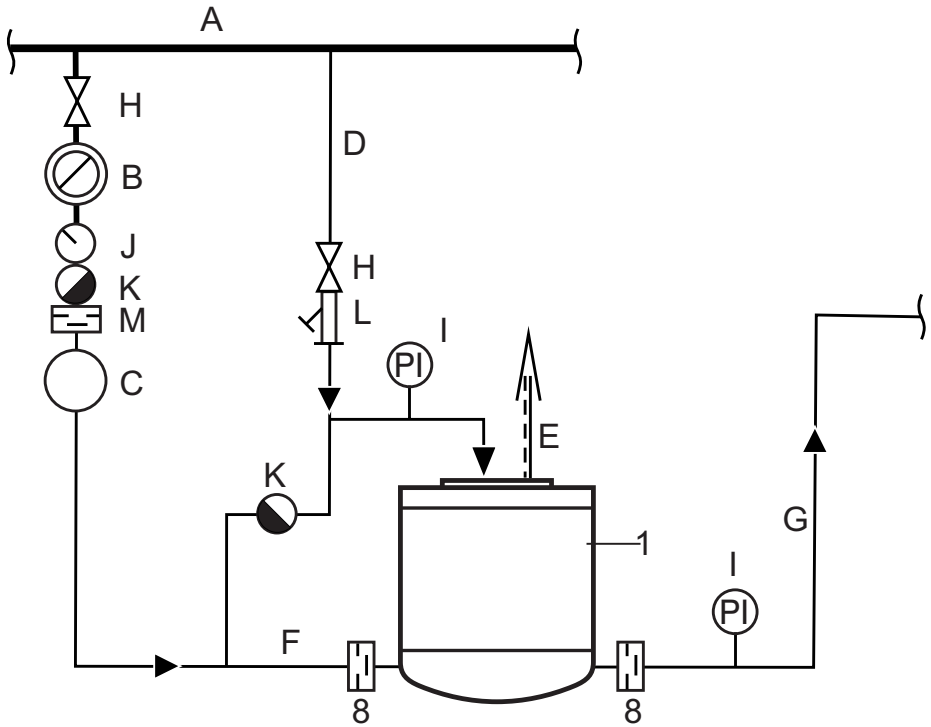
- Make sure that the connected equipment is not subjected to any forces or torques.

The plant operator is responsible for making sure that the equipment and sealing material are suitable for the fluid used.

- Make sure that the materials of all equipment components are suitable for the fluid used.
- If you require further information, please contact the manufacturer.
- Inspect all gaskets before installation to ensure they are in perfect condition.
- Make sure the system pipework is clean.
- Make sure the equipment is free of foreign matter.
- Install the equipment lower than the consumer, to ensure the correct height difference. The minimum height difference between the FPS and consumer should be approx. 150 mm.



Example installation:



| | |
|---|--------------------------|
| 1 | FPS |
| A | Steam line |
| B | Consumer |
| C | Reservoir |
| D | Booster steam line |
| E | Vent |
| F | Condensate inflow to FPS |

| | |
|---|----------------------------|
| G | Condensate to boiler house |
| H | Shut-off valve |
| I | Pressure gauge |
| J | Sight glass |
| K | Steam trap |
| L | Dirt trap |
| M | Non-return valve |

- Make sure the condensate inflow and outflow lines satisfy the following conditions:
 - ▶ The minimum height difference must be complied with. Smaller height differences will diminish the pump capacity.
 - ▶ The condensate line upstream of the equipment must be sufficiently large to act as a reservoir for condensate arising during the pumping process. If surges of condensate are produced, we recommend a condensate header.
 - ▶ The pressure upstream of the equipment must be lower than downstream of it. Otherwise, live steam leakage may occur.
- Connect the condensate inflow line to the condensate inlet.
- Connect the condensate discharge line to the condensate outlet.
- Make sure that the booster steam and vent lines satisfy the following conditions:
 - Lines must be routed so as to avoid water pockets.

Minimum cross-section of lines:

- ▶ Booster steam DN 15 (½")
- ▶ Vent DN 25 (1")
 - ▶ An air venting pipe must be installed.
 - ▶ The booster steam line must be drained at its lowest point.
- Make sure the equipment is securely installed and all connections are correct and secure.
- At operating temperature, check that flange connections are tight.

If flange connections are not tight, proceed as follows:

- Power down the system and wait until the vessel and pipes are cool enough to touch.
- Re-tighten threaded joints.
- Power the system up again.
- Check once again at operating temperature that flange connections are tight.

The surface of the equipment becomes hot during operation. There is a risk of burns.

- Insulate the surface of the equipment with suitable material.

Operation

You cannot perform work on the equipment during operation.

After operation



DANGER

For equipment used in contaminated areas, there is a risk of serious or fatal injury from harmful substances on the equipment.

- Only allow specialist personnel to perform work on contaminated equipment.
- Wear the protective clothing specified for the contaminated zone during all work.
- Make sure that the equipment is fully decontaminated before any work.
- Follow the instructions for handling the harmful substances in question.

Attention!

Frost damage can occur when the system is not in operation.

- Drain the equipment if there is a risk of frost.

Removing external dirt

- Remove dirt from the equipment with clean water and a lint-free cloth.
- Remove stubborn dirt with a cleaning agent suitable for the material and a lint-free cloth.

Servicing the equipment

The equipment does not require any particular maintenance work.

The plant operator may need to adapt the intervals for internal inspections for corrosion and deposits, depending on the conditions at the site.

- Check the function and condition of the equipment at regular intervals.
- Clean the equipment when necessary.

Use only genuine spare parts for the equipment.

- Replace damaged equipment with new.

Taking out of service

Removing harmful substances

DANGER



For equipment used in contaminated areas, there is a risk of serious or fatal injury from harmful substances on the equipment.

- Only allow specialist personnel to perform work on contaminated equipment.
- Wear the protective clothing specified for the contaminated zone during all work.
- Make sure that the equipment is fully decontaminated before any work.
- Follow the instructions for handling the relevant harmful substances here.

Specialist personnel must have knowledge and experience in the following areas:

- The applicable local regulations for handling harmful substances
- Special regulations for handling the harmful substances present
- The use of the prescribed protective clothing.

Attention!

Risk of environmental damage due to toxic fluid residues.

- Prior to disposal, make sure the equipment is cleaned and free of any fluid residues.
- Dispose of all materials in accordance with the regulations at the location of use.

- Remove all residues from the equipment.
- Dispose of all residues in accordance with the regulations at the location of use.

Dismantling the equipment

DANGER



Risk of severe injury or death due to burns or intoxication during work on pipes.

- Make sure there are no hot or hazardous fluids in the equipment or pipes.
- Make sure the pipes to the equipment are not under pressure.
- Make sure the system is switched off and secured so that it cannot be switched back on prematurely.
- Make sure the equipment and pipes have cooled to a lukewarm temperature.
- Wear suitable protective clothing for the fluid, and use suitable PPE if necessary.

You will find information on suitable protective clothing and PPE in the safety data sheet for the fluid used.



DANGER

Risk of crushing from falling equipment or components.

- Always use suitable lifting gear when lifting, moving and working on the equipment and its components.
- Make sure that the equipment cannot tip over.
- Make sure that there are never any persons below suspended loads.

- Detach the equipment connections from the pipes.
- Place the equipment on a suitable surface.
- Store the equipment as described in the “Storing the equipment” section.

Reusing the equipment after storage

Observe the following conditions when dismantling the equipment and using it at a different location:

- ▶ Make sure that all fluid residues have been removed from the equipment.
- ▶ Make sure that the connections are in perfect condition.
- Only use the equipment in the operating conditions specified for new equipment.

Returning the equipment

You can return the equipment to your contractual partner.

- Register the return delivery with your contractual partner before returning the equipment.
 - Make sure that all harmful substances are removed from the equipment.
 - Follow the instructions in the “Transporting the equipment” section.

- Send the completed and signed decontamination declaration together with the equipment. The decontamination declaration must be attached to the packaging so that it is accessible from outside.

The transport packaging must protect the equipment from damage in the same way as the original packaging.

Disposal of the equipment



DANGER

Risk of environmental damage due to toxic fluid residues.

- Prior to disposal, make sure the equipment is clean and free of any fluid residues.
- Dispose of all materials in accordance with the regulations at the location of use.

The equipment is made of welded sheet steel/ stainless steel.

Technical data

Weights

You can find the relevant figures for your equipment on the name plate.

Pressure and temperature ratings

You can find the relevant figures for your equipment on the name plate.

Manufacturer's Declaration

You can find details on the conformity of the equipment in our Declaration of Conformity or Manufacturer's Declaration.

You can download the latest Declaration of Conformity or Manufacturer's Declaration

at www.gestra.com or request it from the address below:

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Website www.gestra.com

Modifications to the equipment not approved by us will invalidate this Declaration.



You can find our authorised agents around the world at: www.gestra.com

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