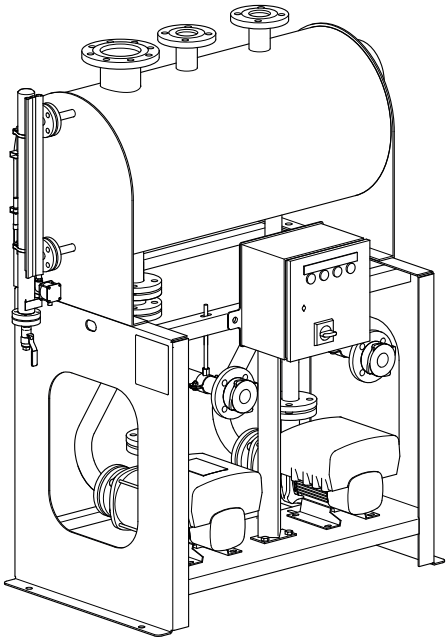
IM-P746-01-EN-ISS2
CMGT

Condensate Recovery and Return Systems (VSD pumps)

SDL 200 and 500 Compact



EN
English

Original Installation Instructions
850926-01

Contents

1 Safety information

2 General product information

3 Installation

4 Commissioning

5 Storage, shutdown and equipment protection

6 Maintenance and repairs

1 Safety information

Safe operation of this product can only be guaranteed if it is properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

General safety precautions

Please observe all site safety regulations and recommendations at all times.

Maintenance personnel must be suitably qualified in working with equipment containing hazardous live voltages.

Ensure correct installation. Safety may be compromised if the installation of the product is not carried out as specified in this manual.

Wiring should be carried out in accordance with IEC 60364 or equivalent.

Do not leave this equipment unattended with the controls enclosure door open and with the mains supply power switched on.

The open vent and overflow connections must not be fitted with isolation valves and must not be capped or plugged.

Under normal operating conditions this equipment will have hot external surfaces and will contain hot fluid at a temperature approaching 100 °C (212 °F). Do not install in locations, or in such a manner, where unauthorised personnel or members of the public can come into contact with the equipment.

Do not work on the installation whilst it is operating under pressure and/or at high temperature. Always ensure the installation and its fluid contents have cooled to a safe temperature and the equipment has been isolated from all incoming or return fluid flow and pressure sources.

Pump(s) must not be operated without water inside the collection vessel and until the pump has been fully filled with condensate, or water and purged of entrapped air. Do not run a pump with a closed suction valve or with an open end discharge pipe, or against a closed discharge valve for more than a few seconds. Never run a pump without water inside the casing and without fully flooding the pump shaft seal.

The equipment should be drained down to a safe location only and only when the fluid has cooled to the maximum allowable temperature for the drainage or sewerage system.

Intended use 1.1

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application. The SDL 200 and 500 Compact Series fully complies with the directives and standards shown on the GESTRA Declaration of Conformity. This product is not a pressurised vessel and is designed to operate at atmospheric pressure and is therefore outside the scope of the European Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations.

i) **The product has been specifically designed for use on hot condensate. The products' use on other fluids may be possible but, if this is contemplated, GESTRA should be contacted to confirm the suitability of the product for the application being considered.**

ii) **Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous over-pressure or over-temperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.**

iii) **Determine the correct installation situation and direction of fluid flow.**

iv) **GESTRA products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.**

v) **Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.**

Access 1.2

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

Lighting 1.3

Ensure adequate lighting, particularly where detailed or intricate work is required.

Hazardous liquids or gases in the pipeline 1.4

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

Hazardous environment around the product 1.5

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery. The system must not be used in potentially explosive atmospheres.

The system 1.6

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?
Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure.
Consider double isolation (double block and bleed) and the locking or labelling of closed valves.
Do not assume that the system has depressurised even when the pressure gauge indicates zero.

1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine GESTRA replacement parts.

1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person.
Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.
Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.
Post 'warning notices' if necessary.

1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of these products may reach temperatures of 100 °C (212 °F).
This product is not self-draining. Take due care when dismantling or removing the product from an installation.

Freezing 1.14

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

Disposal 1.15

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

Returning products 1.16

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to GESTRA they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

2 General product information

2.1 Description

The GESTRA SDL 200 and 500 Compact condensate recovery and return units with VSD (variable speed drive) pumps are designed to handle hot flashing condensate, which is commonly used as boiler feed water. The pumps have variable speed drives which provide significant energy saving over traditional fixed speed pumps.
The standard range can handle quantities up to 20 m³/hr, duty/assist up to 98 °C (receiver temperature) with varying delivery heads up to 49 m. For duties outside these parameters please contact GESTRA.
The package comprises of receiver, frame, pumps, valves and level controls. The finished unit is leak tested.
Note: System head regulation valves are not supplied as part of this unit.
It is recommended that a regulation valve is incorporated into the discharge pipework.

2.2 Receiver

Receivers are manufactured from 304 stainless steel. They are fitted with an adequately sized vent, overflow and inlet connections flanged to PN16. A water level gauge is fitted as standard, with integrated level control and high alarm.

2.3 Frame

The frames are manufactured from stainless steel 304.

2.4 Pumps (variable speed drive)

Pump housing and impellers are constructed from stainless steel and are designed for low NPSH conditions to handle hot condensate with the minimum of flooded suction.
There is a graphical display on the “primary” pump providing system performance data. On the “secondary” pump there is a visual status indicator.
The pumps include a frequency converter and PI controller, this enables continuously variable control of the motor speed, to maintain a constant level within the receiver.
The motor efficiency is classified as IE5 in accordance with IEC 60034-30-2.
IP Protection: Pump enclosure IP55.
Electrical supply: 380 V 4 wire 3 phase 50/60 Hz. <16 A.

2.5 Control

The units are preconfigured to provide a plug and a play solution. Receivers are fitted with Colima Viscorol level indicator providing a 4-20 mA level signal. The system offers duty/assist control of the pumps to maintain a factory set constant level within the receiver. The control system will alternate the duty cycle and provide equal usage on each pump. To achieve the maximum stated condensate load both pumps will need to operate together. Should one pump fail the other will continue to operate and attempt to maintain a steady level in the receiver. Dry Run protection is included to shut off the pumps in the event of the receiver being completely emptied , thus preventing pump damage. The unit includes lamps (Power on, warning, alarm, and high level)to display its operational health, plus volt free contacts for remote indication.
Electrical supply: 380 V 4 wire 3 phase 50/60 Hz. <16 A.
Volt free contacts: 3-off double throw relay outputs, maximum switching voltage is 250 Vac or 125 Vdc. Switching current 10 A Max.
IP Protection: Control panel enclosure IP65.

2.6 Pump fitting

The motors and pumps are mounted under the receiver and are each connected to suction pipework incorporating isolation valves. Each pump discharge is fitted with a non-return valve suitable to connect to a PN16 flange.

Temperature and humidity 2.7

Maximum humidity: 95%
Temperature limits: 0 to 50 °C

Standards 2.8

This product fully complies with the following directives

- European Machinery Directive 2006/42/EC.
- European Electromagnetic Compatibility Devices Directive 2014/30/EU.

The receiver is not a pressurised vessel and is designed to operate at atmospheric pressure and therefore falls outside the scope of European Pressure Directive/UK Pressure Equipment (Safety) Regulations.

Certification 2.9

A declaration of conformity EN 10204 2.1 is available on request.
Note: For further product data see the Data Sheet.

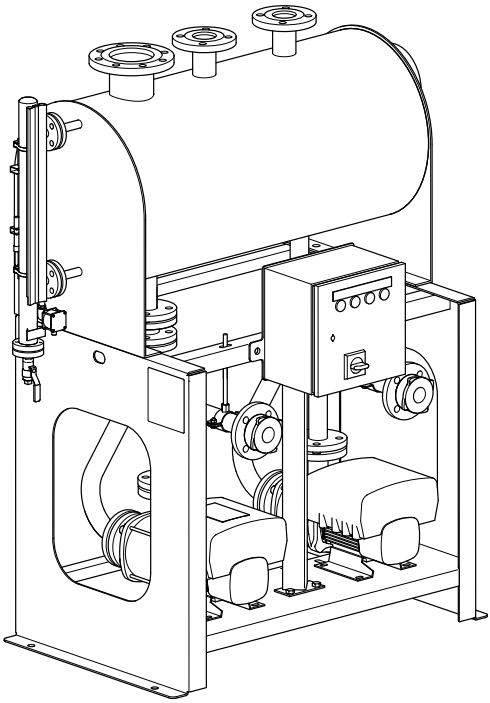


Fig. 1

2.10 Dimensions (approximate) in mm

SDL 200 Compact	D	E	K	L	Q	R
SDL200-2D-CME33-VSD-SS	685	990	255	485	750	850
SDL200-4D-CME102-VSD-SS					730	
SDL 500 Compact						
SDL500-4D-CME102-VSD-SS	750	1250	375	550	845	900
SDL500-5D-CME151-VSD-SS					830	
SDL500-5D-CME152-VSD-SS						

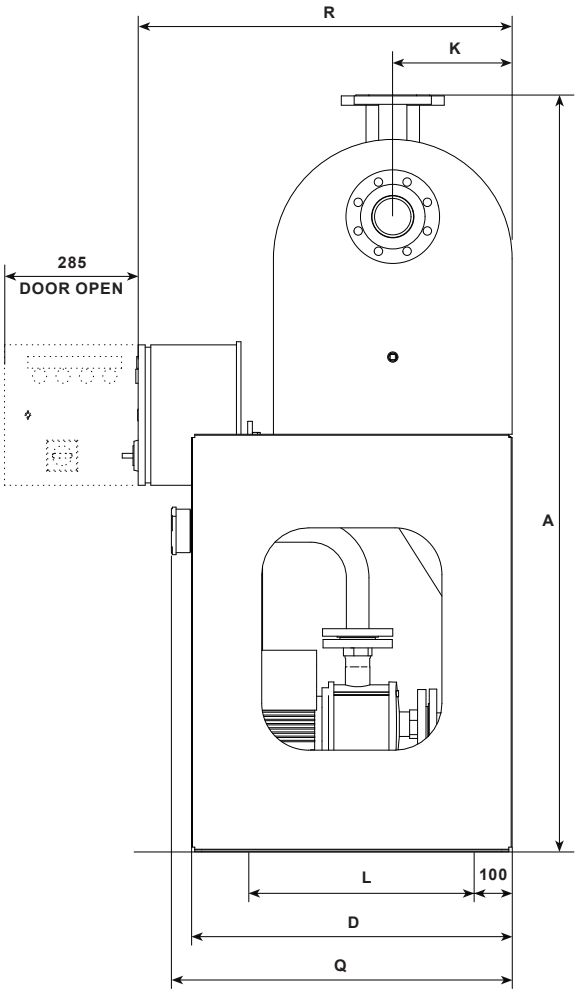


Fig. 2

Dimensions (approximate) in mm (continued)

SDL 200 Compact	A	B	C	E	F	G	H	J	P
SDL200-2D-CME33-VSD-SS	1595	600	1335	990	180	250	275	1310	520
SDL200-4D-CME102-VSD-SS		665							
SDL 500 Compact									
SDL500-4D-CME102-VSD-SS	2100	665	1835	1250	205	350	300	1570	650
SDL500-5D-CME151-VSD-SS									
SDL500-5D-CME152-VSD-SS		680							

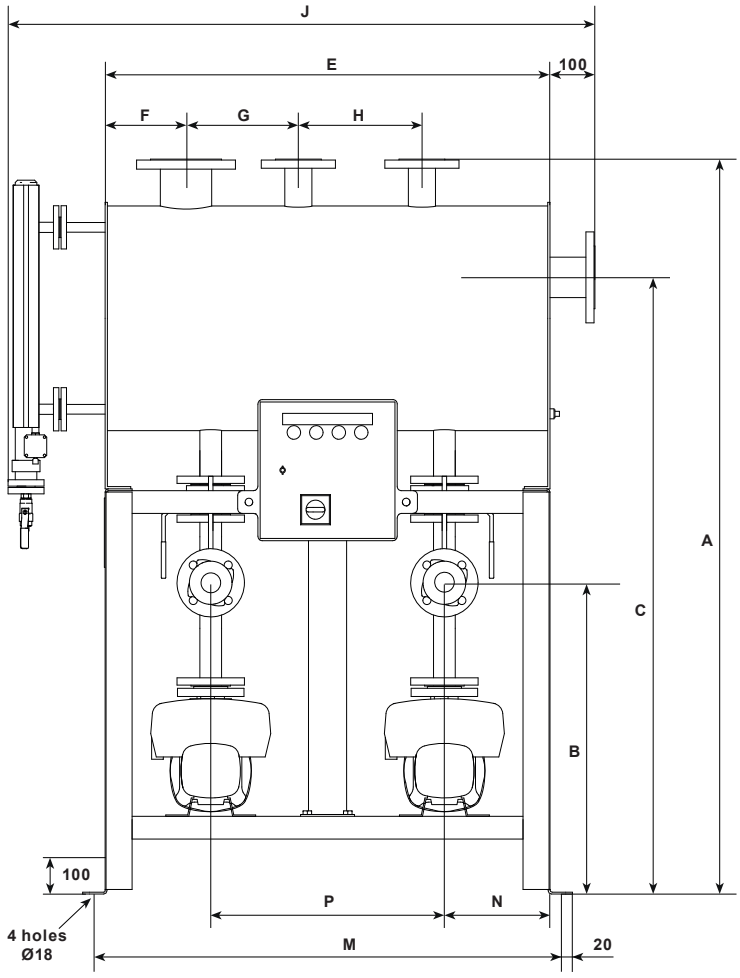


Fig. 3

2.11 Inlet and outlet connection and weights (approximate in kg)

SDL 200 Compact	Connections	V	W	X	Y	Z	Weight
		Outlet	Overflow	Vent	Inlet	Inlet	
SDL200-2D-CME33-VSD-SS	PN16	DN25	DN50	DN80	DN40	DN40	TBA
SDL200-4D-CME102-VSD-SS		DN40	DN80	DN100	DN50	DN50	TBA
SDL 500 Compact							
SDL500-4D-CME102-VSD-SS	PN16	DN40	DN80	DN100	DN80	DN80	TBA
SDL500-5D-CME151-VSD-SS		DN50	DN80	DN100	DN80	DN80	TBA
SDL500-5D-CME152-VSD-SS		DN50	DN80	DN100	DN80	DN80	TBA

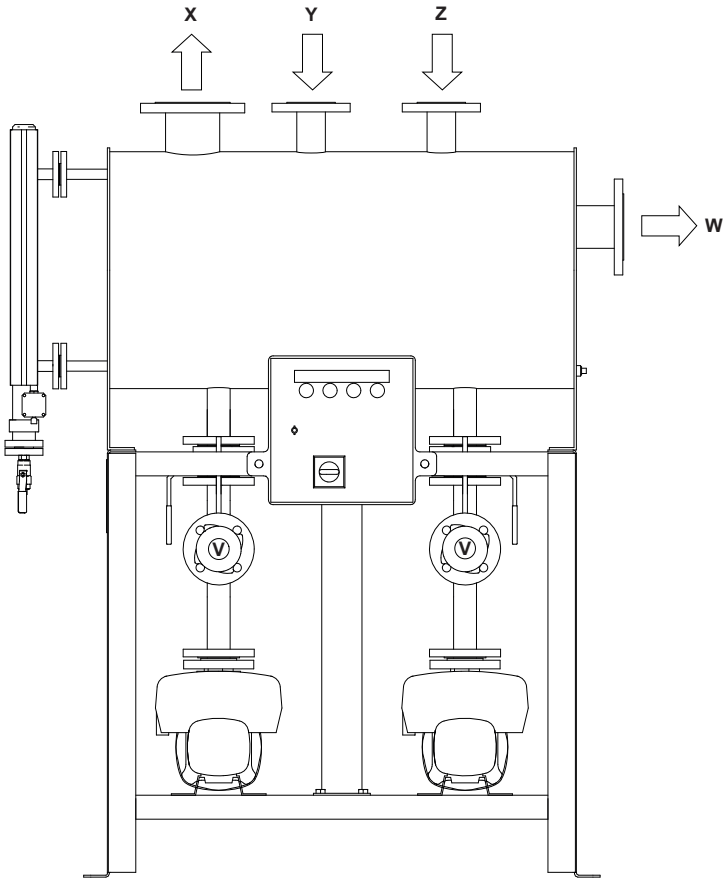


Fig. 4

Note: Before actioning any installation observe the 'Safety Information' in Section 1.

Lifting 3.1

The SDL 200 and 500 Compact units should be lifted by a suitable forklift truck from underneath the frame, placed in position and securely bolted to the floor.

Warning:

On no account is the SDL to be lifted by any other part other than the frame (see Figure 5).

Note: Sufficient space should be provided around the unit location to allow access for maintenance.

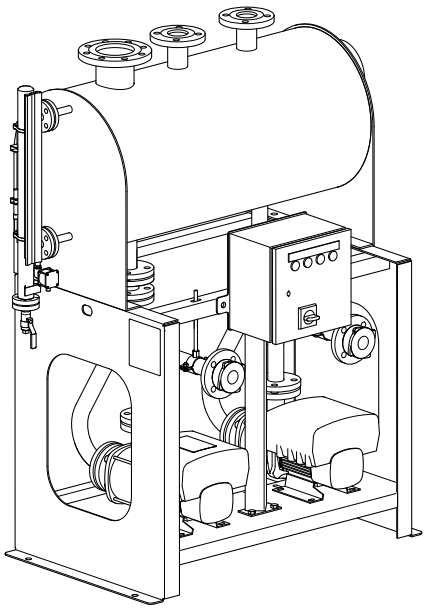


Fig. 5

3.2 General installation

SDL 200 and 500 Compact Condensate Recovery and Return Systems (VSD pumps) are designed for open vented operation only and must be installed with an unrestricted open vent. The vent should be as short as possible and taken to a safe, high level location and a vent head may be installed providing no backpressure is induced at the condensate collection vessel.

The overflow connection should be provided with a GESTRA 'U' water seal at the same size as the vessel connection and should always be piped away, unrestricted, to a safe drain point or gully. If the drain point connects to a public sewer system the maximum permissible discharge temperature into the public sewer system should be considered.

Overflow and vent connections must never be fitted with isolation valves or be capped off.
Before installing and making the final piping connections to and away from the condensate recovery and pump set, service piping must be fully purged to ensure foreign matter and installation debris has been removed.

If a potential exists for debris carry over into a condensate vessel, strainers can be considered for installation into the vessel inlet piping. It is essential that a correctly sized strainer is selected which offers minimal pressure loss; It is important that the strainer screens are cleaned regularly, ideally within the scope of a planned maintenance programme.

Do not connect a power supply to a SDL 200 and 500 Compact unit before first checking the voltage, frequency and electrical supply cable size making sure that the site electrical supply corresponds with the requirements stated on the name-plate.

Check the stated control circuits voltage corresponds with that required on site. Connection of this equipment to a site electrical installation should only be carried out by qualified and competent personnel and must comply with current electrical regulations and standards.

3.3 Nozzle loading

It is the customers' responsibility to support piping connected to this unit to ensure no additional loads are placed on the connection nozzles.

3.4 Vent pipework sizing

Consideration should be given to increasing the Vent Pipework from the receiver to prevent excessive back pressure and loss of the Overflow water seal. This is particularly important where the Vent Pipe run is longer than 10 m, has more than two elbows in the run or where there is known to be a substantial amount of Flash Steam in the condensate return pipework to the receiver.
Based on a 10 m equivalent length (including fittings) Vent Pipe capacities are shown in the table below;

Flash steam up to (kg/hr)	Vent pipework nb (mm)
150	80
200	100
400	125
500	150
1000	200
1500	250

Thermal insulation and cladding 3.5

GESTRA Condensate Recovery and Return Systems can be thermally insulated to reduce heat losses and for protection against personal injury from contact with hot surfaces. However, we recommend that unless the condensate in the receiver is consistently below the maximum stated temperature of 98°C, lagging should not be applied to the pump inlet pipework. Excessively high temperature condensate at the pump inlets will result in pump cavitation (indicated by noise within the pump casing during operation) and will shorten the working life of the unit.

Electrical supply 3.6

All electrical wiring and connections should be carried out in accordance with National Regulations.
A lockable isolator/switch disconnect should be fitted adjacent to the unit. Mains supply is directly connected to the primary side of the incoming control panel isolator and mains earth terminal as shown in Figure 6.

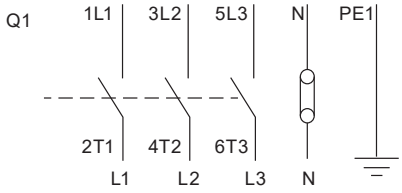


Fig. 6

Electrical cable requirement:
Always comply with local regulations as to cable cross-sections.
For the supply conductors it is recommended to use 2.5 mm2 (AWG 14).

Electrical specifications 3.7

Electrical supply: Check that the supply voltage and frequency correspond to the values stated on the nameplate.
Control panel supply voltage: 380-500V 4 wire 3 phase 50/60 Hz.
Full load current: < 16 A.

Electrical connections 3.8

The following are available for customer connections to the GESTRA SDL if required:

	Terminal designation	Description
Volt free contacts	X2, 1 and 2	Warning, 1 x N.O. contact
	X2, 3 and 4	Alarm, 1 x N.O. contact
	X2, 5 and 6	High level, 1 x N.O. contact

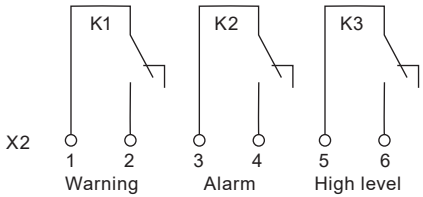


Fig. 7

4 Commissioning

4.1 Re-installing the level gauge

Remove the bottom flange from the level gauge and take the float from the plastic bag. Refit the float to the level gauge (note alignment direction arrow to upwards) and assemble the flange, ensuring the 'O' ring is not damaged before fitting.

4.2 Start-up

If the unit is not intended to be put into service for a significant period of time please refer to Section 5. The system is preconfigured to provide a plug and play solution. After completion of all checks in Section 3 and connecting all piping and electrical services, fully open all isolating valves and allow the vessel to fill with condensate. If condensate cannot be made available and a unit has to be immediately commissioned, or functionally tested, the vessel can be pre-charged with clean, cold water. After testing however, if a unit is not to be left operating in normal service, the mains electrical supply to the controls enclosure should be switched off and the door interlocked isolator switch security locked to prevent inappropriate operation of the equipment.

Before turning on the electrical supply, check each pump has been fully flooded with condensate by opening the filling hole on the pump casing. Refer to the pump manufacturer's hand-book for the correct procedure.

To ensure the correct duty point (head imposed against pumping rate) is achieved for optimum operation it may be necessary to adjust the system head imposed by regulating a valve in the delivery pipework. Correct setting would reduce the possibility of cavitation and noise.

To start the automated condensate return system, turn on the electrical supply. The lamp indicator on the front of the panel, “24 VDC power” will light. The pumps will power up and their indicator/displays on the top of the pumps will activate. The system will respond to the level of condensate in the receiver, pumping the condensate away to maintain a pre-set constant level.

For detailed pump operation please refer to manufacturers literature;
http://net.grundfos.com/qr/i/98358864

4.3 Inadvertent operation

If the SDL is inadvertently operated, there are three main scenarios that will occur:

Scenarios	Initial response	Final outcome
Receiver is empty	The SDL system will detect the level is low. The pumps will not operate	The pumps remain off
Receiver contains condensate	The SDL system will operate the pumps to maintain the level in the receiver	Condensate will be pumped out of the package until the receiever is empty. The pumps will then switch off
Receiver contains condensate but isolation valves to pumps are closed	The SDL system will operate the pumps, but with the valves shut there is no flow	The pumps will be operating against a deadhead and will stop when the motor temperature is too high

Alarms and warnings

The SDL pump system is configured with alarms and warnings, to indicate receiver level exceeded, signal failure, and also mechanical failure of the pump.

The receiver level exceeded warning will activate when the level in the receiver rises above a set value. The display on the pump will show “Limit 1 exceeded (190)”, the panel “warning” lamp will light, and the “warning” volt free contacts will close. The pumps will continue working to reduce the level during this time.

The system also includes an independent high level alarm which will activate at a level above the receiver level warning. When this happens the panel “High level” lamp will light and the volt free contact will close. The pumps will continue working to reduce the level during this time.

To ensure the pumps do not run when there is no condensate in the receiver, the SDL includes dry running protection. When the SDL pump system detects a set low level in the receiver the pump will be switched to shut off mode, the pump display will show “Dry running (57)”, the panel will activate the “alarm” lamp, and the “alarm” volt free contacts will close.

If an error occurs with the level signal, the pump display will show “Sign. Outs. range, ana.1 (165)”, both “warning” and “alarm” lamps will light, both volt free contacts for “warning” and “alarm” will close, and the pumps will stop pumping.

The table below shows error conditions for the SDL:

Condition	Outcome	Light indication		
		Warning	Alarm	High level
Lead pump mechanically fails.	Secondary pump will take over.		X	
Secondary pump mechanically fails.	Lead pump will take over.	X		
Both pumps mechanically fail.	Both pumps not functioning.	X	X	X*
Viscorol level gauge output exceeds 20mA.	Both pump will stop.	X	X	X*
Viscorol level gauge output drops to 0mA (open circuit).	Both pump will stop.	X	X	X*
Viscorol level gauge output to Lead pump is open circuit.	Both pumps will continue to function as normal.		X	
Viscorol level gauge output to secondary pump is open circuit.	Both pumps will continue to function as normal.			
Viscorol low level switch activates.	Both pumps will stop.		X	
Level exceeded alarm in both pumps.	Both pumps will continue to function as normal	X		
Viscorol high level switch activates.	Both pumps will continue to function as normal	X		X
Control panel overloads for one of the pumps is tripped.	The other pump will continue functioning.			X*
Control panel overloads for both pumps are tripped.	Both pumps will stop.			X*

***** : The “High level” alarm will be triggered, indicated by the high level lamp and volt free contacts.
WARNING: The receiver will overflow if condensate continues to be returned into it.

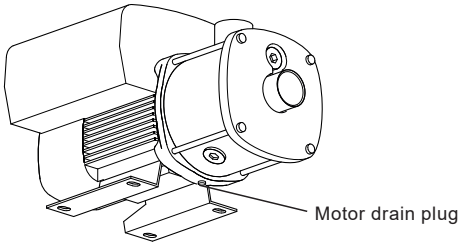
4.5 Fault finding

Fault	Possible cause	Remedial action
Lamp '24VDC power', not lit	Loss of incoming supply	Check incoming supply
	Door interlocked isolator	Switched to on
	Internal fuse blown	Check F1 and F2
Pumps not powering up	Internal circuit breakers have tripped	Check Q5 and Q6 in panel
	Pump overload protection	Refer to manufacturers literature
	Pump over temperature protection	
	Over/under voltage protection	
Condensate not pumping	Isolation valves before pumps are closed	Open isolation valves
	System in alarm condition	Check pump display for error message
	Low condensate level in receiever	Look at gauge to the check level in receiever is sufficient

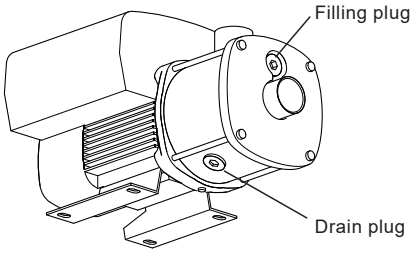
As delivered, there may be residual water remaining in the pump piping and pump casing from the factory testing procedures. If the equipment is to be held in storage before installation ensure it is protected from sub-zero temperature conditions to prevent mechanical damage from freezing.

Shutting down the equipment

1. Turn off the electrical supply and security lock the door interlocked isolator switch.
2. Close the pump suction and outlet valves.
3. If the SDL 200 and 500 Compact series is being taken out of service, protect the pumps from frost damage due to the residual condensate that is left inside the pumps.
4. Drain down the condensate collection vessel and piping to a safe drain point, using the drain nozzle provided.
5. Drain down pump casing as necessary, to a safe drain point, referring to the pump manual.
6. Prior to a long period of inactivity, flush the pump with clean water to prevent corrosion and deposits in the pump. Use acetic acid to remove possible lime deposits from the pump. Pumps which are not being used during periods of frost must be drained to avoid damage. Remove the filling and drain plugs from the pump.



Do not refit the plugs until the pump is taken into operation again.



If there is a risk of condensation in the motor, remove the motor drain plug before start up and keep the drain hole open during operation

6 Maintenance and repairs

Note: Before actioning any maintenance programme observe the 'Safety information' in Section 1.

Before carrying out maintenance and repairs, disconnect the electrical supply allow the fluid contents to cool to a safe temperature (below 25 °C or 77 °F), and isolate from incoming and outgoing condensate flow and pressure.

If a pump requires repair or servicing, refer to the pump manufacturer's manual. Contact GESTRA to order spare parts.

Periodically inspect the level indicator, with its mA transmitter and switch assembly, and also both pumps. Excessive amounts of suspended material / debris in the condensate will reduce the service life of the pump.

Also check the serviceability of the rollers/indicator. Please refer to GESTRA for more information regarding the level indicator assembly.

Pumps

Mechanical seals

Mechanical seal failure is usually indicated by fluid leakage from that area of the pump assembly. The usual cause is dry running the pump, lubrication of the seal being dependent upon the fluid being pumped. Multi-stage pumps have the shaft seal at the top of the casing and are especially vulnerable if the mechanical seal has not been fully flooded due to incorrect pump casing venting after ventilation.

Fluid cavitation

Cavitation occurs because of, (a) insufficient pump suction pressure for the liquid (condensate) temperature at the pump suction port, or, (b) because the condensate flowrate and discharge pressure does not correspond with the selected duty point on the pump performance curve, or a combination of (a) and (b). In simple terms, because there is insufficient suction pressure at the condensate temperature, the pressure in the pump casing can reduce sufficiently for the condensate to partly 'flash' into a vapour and condensate mixture, the total liquid state of the condensate not being sustainable at the reduced pressure and elevated temperature. The result is commonly known as cavitation, which if not corrected will damage the pump internals.

Cavitation invariably results in excessive operating noise inside the pump, will ultimately lead to a serious mechanical failure of the pump and/or impeller(s) and should always be eliminated.

If cavitation occurs, the following should be reviewed.

i. The duty conditions specified for the pump selection and if the correct condensate pumping unit had been selected for the actual duty conditions.

ii. Whether the actual condensate temperature at the pump suction port is higher than that specified for the pump selected.

iii. Is the pump discharge pressure requirement less than that specified for the pump selected?

iv. If the condensate temperature is significantly higher than that specified, check the condensate returns systems for high pressure/temperature condensate discharge from any item of plant and, especially, for faulty steam traps.

v. If regulating valve sets have been included in the condensate set package, check they have they been adjusted as recommended above.

vi. Adjust the recommended pump discharge flow/pressure regulating valve sets to control the condensate flow and discharge pressure at the selected pump duty point.

Outlet check valves

The Outlet Check valves prevent reverse flow into the receiver when only one pump is operational and back flow from the return pipework under no, or very low, load conditions. They should be monitored/ checked regularly for evidence of wear or failure. Blockage or seizure will result in poor performance resulting in receiver Overflow at peak loads or reverse flow back into the receiver through the non-duty pump(s). They should be examined for excessive wear or damage if there is excessive vibration or noise during pumping cycles.

Agencies all over the world: **www.gestra.com**

GESTRA GmbH

Münchener Straße 77
28215 Bremen Deutschland
Telefon +49 421 3503-0
Telefax +49 421 3503-393
E-mail info@de.gestra.com
Web www.gestra.com

UK Importer:
GESTRA UK Ltd

Unit 1 Sopwith Park, Royce Close,
West Portway Business Park, Andover,
Hampshire SP10 3TS
United Kingdom

850926-01/08-2026sxsmw · © GESTRA Bremen