4.3 Compressed air consumption of the separators OSC, OSD and OTB

- The maximum compressed air consumption per separator is approx. 0.01 Nm^3/h.

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5 Product lines

5.1 General

- Pay special attention to section 1.3!
- The suction lines should be as short as possible to avoid pressure losses.
- The pipes must be installed with adequate clearance from the electronic parts.

- Water pockets must be avoided! (water must be able to flow off freely).
- When different products are run through the same separator, it must be ensured that the corresponding product lines cannot be interchanged.

5.2 Pipe cross-sections

- All pipes, valves, fittings and instruments must be laid so that an insulation of 40 mm is possible.
- Dimensioning of the pipes is specified on the respective P&ID.
- The pipes can be selected with the aid of the following diagram. The specifications on the P&IDs have priority!
- Pipe resistances must be kept as low as possible.
- Taking into account the total pressure losses, the flow velocities must be
  - between 0.5 m/s and < 1 m/s in suction lines,
  - between 1 m/s and 3 m/s in pressure lines.

5.3 Functional description

The liquid is discharged from the separator by means of a pumping device, in the following referred to as centripetal pump. At small capacities, the discharge can be without pressure; in the case of larger capacities the centripetal pump generates the required pressure to convey the liquid out of the separator through the downstream lines by immersing more deeply into the liquid.

The pressure values can differ significantly. The following rule applies: The values are lower on small separators than on large separators.
Further influencing factors are capacity, system resistances (valve position, tank position), product properties and process specifications.

5.4 Information on pressure monitoring

When the liquid is discharged from the separator under pressure, the operator knows that the separator bowl is hydraulically closed.

A discharge pressure adjusts given a constant capacity or it is adjusted to the desired value by throttling in the discharge.

In the standard application, the pressure sensor responds to falling discharge pressure, an alarm is triggered via the control system. The control system can also evaluate rising pressure and trigger an alarm.

Generally, the discharge pressure is set to 0.1 – 0.2 MPa. The pressure level can deviate from this when separator size, capacity, product properties and process specifications require. (for further information, see the order-specific documentation)

A change in the discharge pressure may be caused by the following factors:
- Change in feed capacity
- Change in product data such as temperature, density, viscosity
- Change in discharge resistance
- Leakage at the separator bowl

This represents important information for the operator.

Selection diagram

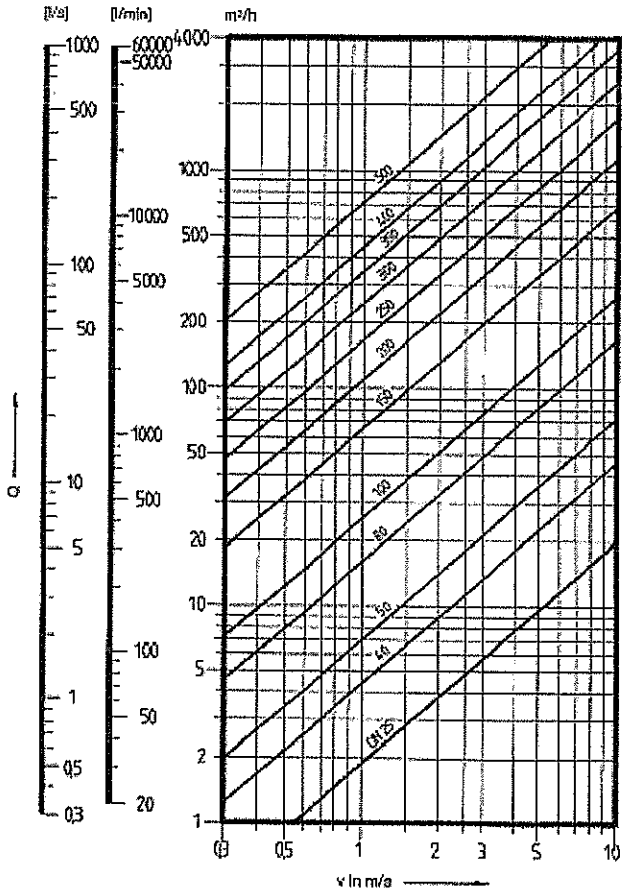


Fig. 50

Q Flow
v Velocity in m/s

Example:

A flow rate of 5 m^3/h produces a velocity of 1.2 m/s with a nominal diameter of 40.

5.5 Piping

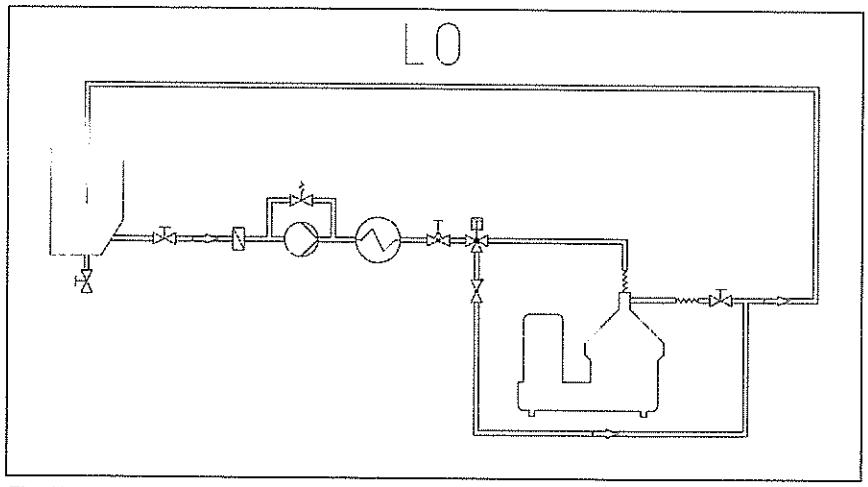


Fig. 51 Lubrication oil schematic

1 LO tank

- When separating lube oil, the return line of the 3/2-way valve **can** be led into the product discharge line of the separator.

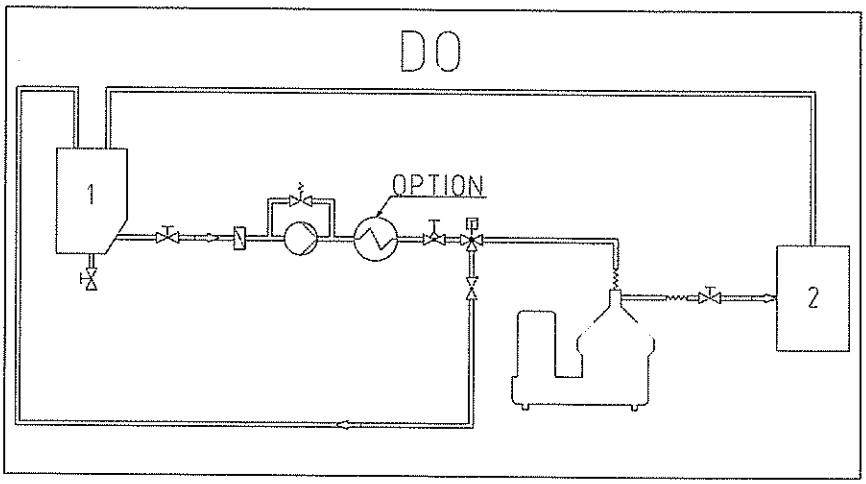


Fig. 52 Diesel oil schematic

1 DO tank
2 Service tank

- When separating diesel oil, the return line of the 3/2-way valve **must** be led into the DO tank 1.

WS does not permit leading the return line into the suction side of the pump!

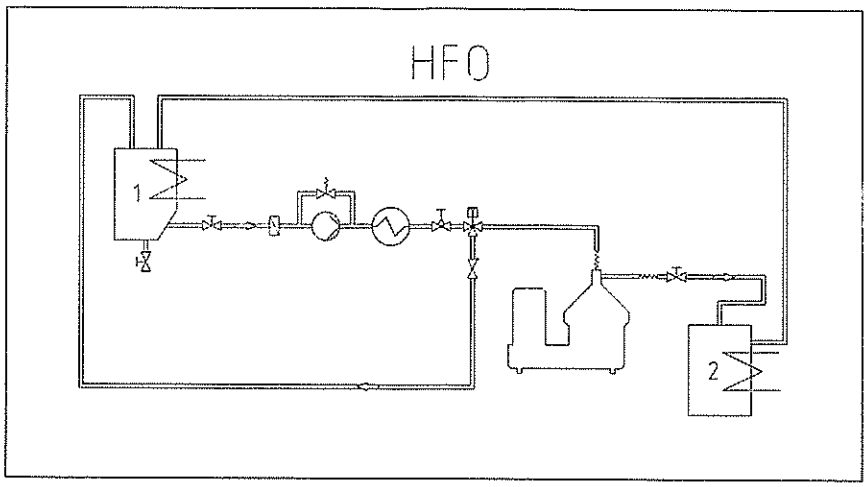


Fig. 53 Heavy fuel oil schematic

1 Settling tank
2 Service tank

- When separating heavy oil, the return line of the 3/2-way valve **must** be led into the settling tank 1.

5.6 Maximum suction head

- The suction head of the feed pump (gear pump) is max. 0.04 Mpa.
- The suction head of the feed pump (screw pump) is max. 0.05 MPa.
- The viscosity of the oil to be conveyed must be kept < 1 000 cSt, if necessary by adequate pre-heating and trace heating.
- When dimensioning the suction line, it must be ensured that the total pressure loss in the pipe does not exceed the maximum suction head of the pump.
- The maximum feed pressure in the suction line must not exceed 0.05 MPa.

5.6.1 Pressure line

- The pressure head of the feed pump is set to approx. 0.3 MPa.
- The pressure line from the feed pump via the pre-set valve, the pre-heater and the 3/2-way valve to the separator must be kept as short as possible.
- When dimensioning the pressure line, it must be ensured that the total pressure loss in the pipes does not exceed the maximum pressure head of the pump.

5.6.2 Pre-filter

- The pre-filters are fitted in the suction line of the feed pump to protect it from coarse impurities.
- During the installation, special attention must be paid to the operability.

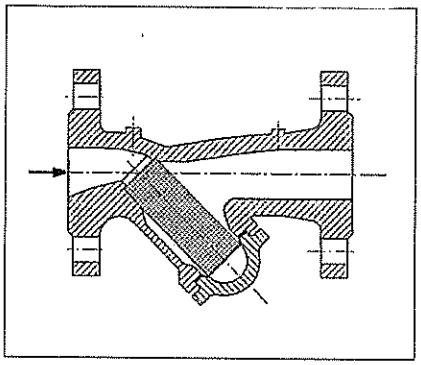


Fig. 54

- Use only strainers with a mesh width of the strainer insert of **1 to 1.25 mm**.
- Pay special attention to section 1.3!

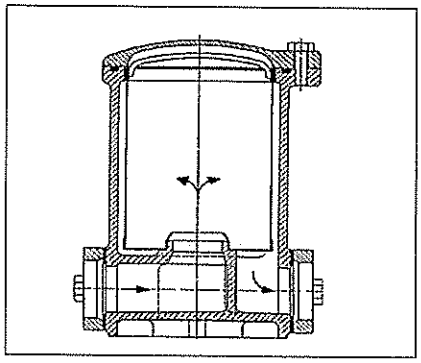


Fig. 55

- Use only pre-strainers with a mesh width of the strainer insert of **0.63 mm**.

5.7 Feed pump

To prevent the pre-heater from overheating,
- a pump post-running time must be programmed for pump units and product pre-heating.

5.8 Oil pre-heater

- It must be installed so that there is no heat dissipation to the control cabinet.

To prevent a risk of accidents when venting due to discharging hot vapours and liquids,
- the discharge lines from vent valves must be laid at least to floor plate height.

- **Discharge lines of safety valves must be laid so that there is no danger of accident when the valve responds due to discharging liquid.**
- The discharge line must be laid so that it can always be observed. It must not be concealed by pipes, valves or other units!

- Steam traps
  - must be fitted **horizontally** between two unions.
  - should not be insulated to assure correct functioning.
  - must be installed so that no condensate accumulation can occur on the pre-heaters.

5.9 Installation examples

The following sections show installation examples for

- Tubular heat exchanger
- Steam-heated plate heat exchanger with PI controller
- Steam-heated tubular heat exchanger with PI controller
- Thermal oil-heated plate heat exchanger with PI controller
- Thermal-oil-heated tubular heat exchanger with PI controller

5.9.1 Steam-heated plate heat exchanger with PI controller

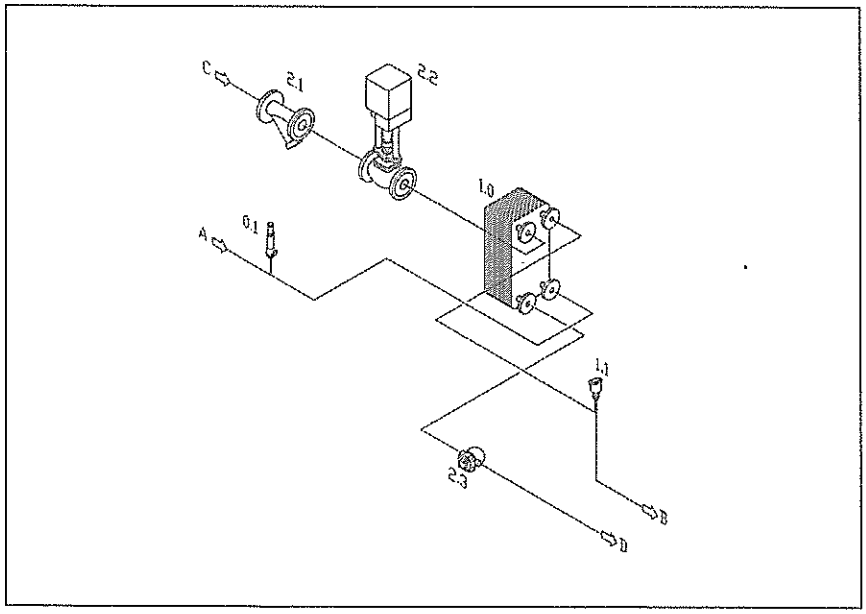


Fig. 56

A Oil inlet
B Oil outlet
C Steam inlet
D Condensate outlet

0.1 Spring safety valve
1.0 Plate heat exchanger
1.1 Resistance thermometer (PT 100)
2.1 Strainer
2.2 Motor control valve
2.3 Ball float condensate trap

5.9.2 Steam-heated tubular heat exchanger with PI controller

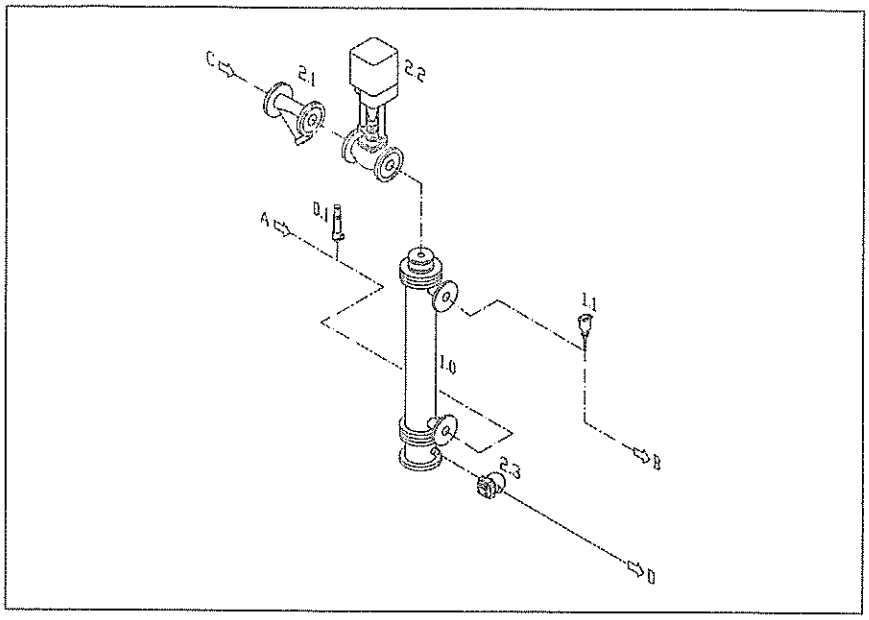


Fig. 57

A Oil inlet
B Oil outlet
C Steam inlet
D Condensate outlet

0.1 Spring safety valve
1.0 Tubular heat exchanger
1.1 Resistance thermometer (PT 100)
2.1 Strainer
2.2 Motor control valve
2.3 Ball float condensate trap

5.9.3 Thermal oil-heated plate heat exchanger with PI controller

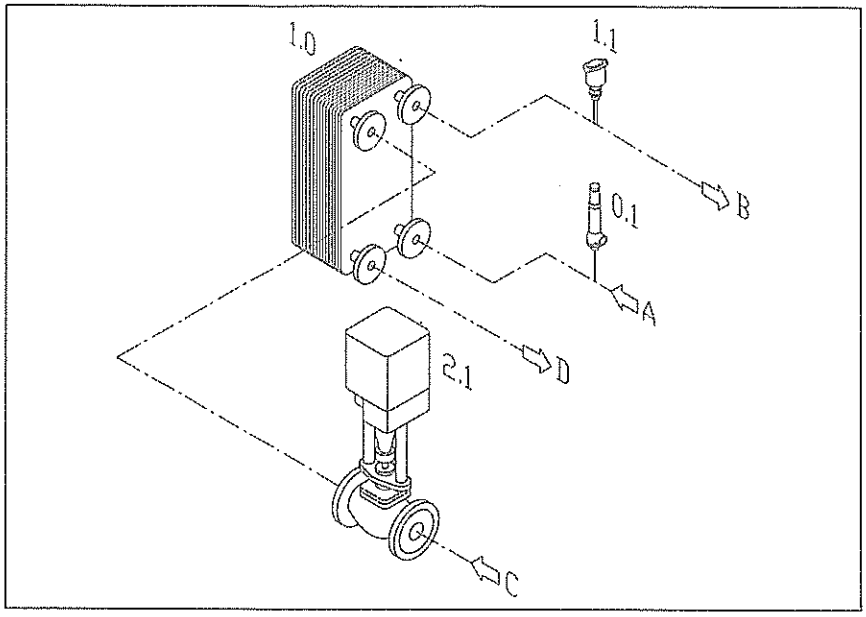


Fig. 58

A Oil inlet
B Oil outlet
C Thermal oil inlet
D Thermal oil outlet

0.1 Spring safety valve
1.0 Plate heat exchanger
1.1 Resistance thermometer (PT 100)
2.1 Motor control valve

5.9.4 Thermal-oil-heated tubular heat exchanger with PI controller

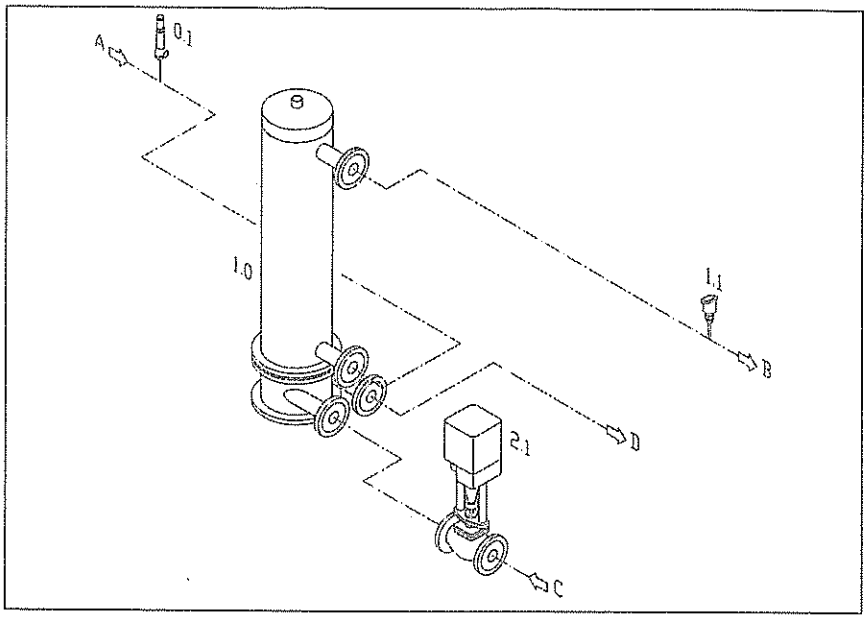


Fig. 59

A Oil inlet
B Oil outlet
C Thermal oil inlet
D Thermal oil outlet

0.1 Spring safety valve
1.0 Tubular heat exchanger
1.1 Resistance thermometer (PT 100)
2.1 Motor control valve

5.10 Securing plate heat exchangers

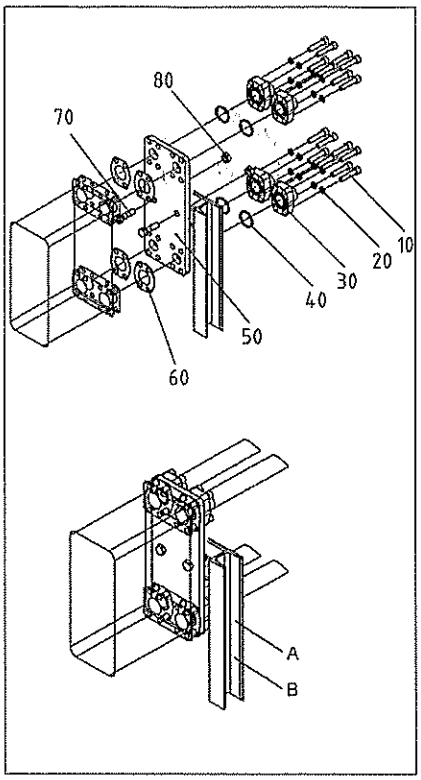


Fig. 60

Assembly instructions for soldered plate heat exchanger

- Prepare an assembly plate support and weld it to the foundation.
- Fasten assembly plate 50 with screws 70 and nuts 80 to the assembly plate support.
  The assembly plate must be installed **vertically** relative to the pipe axis.
  IMPORTANT:
  Welding the assembly plate to the support is not permitted.
- Fasten heat exchanger with gaskets 40, 60, counterflanges 30, lock washers 20 and screws 10 to the assembly plate.
- Attach the pipes to the counterflanges by tack-welding.
- Dismantle the heat exchanger and gaskets.
- Completely weld the pipes to the counterflanges.
- Finally, re-assemble the parts as per instruction.

A The illustrated channel steel must be provided by the shipyard.
B Westfalia Separator recommendation as example channel steel according to DIN1026-1-50.

IMPORTANT:
Distortion or warping or other stress of the soldered connection points **must** be avoided!
Pipelines must be correspondingly arrested.

Pos./ type	10 Allen screw	20 Lock washer	30 Groove-faced flange	40 Gasket	50 Plate	60 Gasket	70 Hex head screw	80 Hexagon nut
B 10	ISO 4762 - M10 x 45 (16 x)	DIN127 - B10 (16 x)	1 in - SAE3000P SI (4 x)	32.92 x 3.53 (4 x)	313 x 125 x 12 (1 x)	59 x 70 x 1.5 (4 x)	ISO 4017 - M12 x 40 (2 x)	ISO 3032 - M12 (2 x)
B 35	ISO 4762 - M12 x 55 (16 x)	DIN127 - B12 (16 x)	2 in - SAE3000P SI (4 x)	56.74 x 3.53 (4 x)	427 x 264 x 12 (1 x)	97 x 102 x 1.5 (4 x)	ISO 4017 - M12 x 40 (2 x)	ISO 3032 - M12 (2 x)
B 45	ISO 4762 - M12 x 55 (16 x)	DIN127 - B12 (16 x)	2 in - SAE3000P SI (4 x)	56.74 x 3.53 (4 x)	559 x 264 x 12 (1 x)	97 x 102 x 1.5 (4 x)	ISO 4017 - M12 x 40 (2 x)	ISO 3032 - M12 (2 x)

5.11 Safety valve

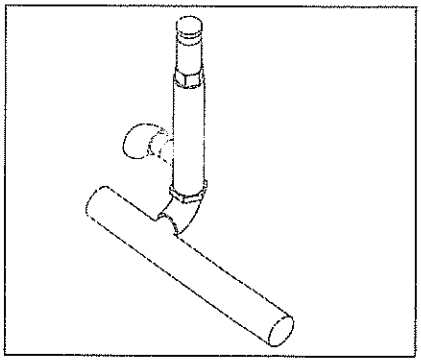


Fig. 61

Safety valve in vertical fitting position

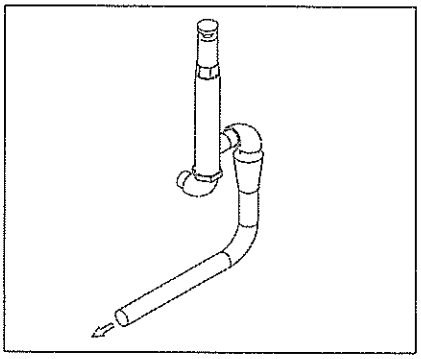


Fig. 62

- The safety valve outlet should be led via a funnel (pos. "1").
  A discharge line is welded to the funnel via which the medium can be discharged.

IMPORTANT:

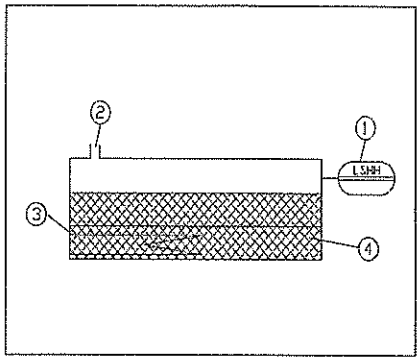
- **Do not use galvanized components and hoses.**

6 Solids tank

6.1 Recommended criteria for solids tank

Note:
This information does not apply to sludge transfer units on compact units.

- There should always be separate solids tanks for lube oil and fuel systems.
- Tank heating should be installed in dependence of the viscosity or ambient temperature.
- The general designs and constructions are subject to the valid regulations.



1 Monitoring
2 Venting
3 Tank heating
4 Utilizable volume

Fig. 63

Minimum solids tank volume		
Separator model	**Volume [l]**	**Maximum utilizable volume [%]**
OSC 5	200	60
OSC 15	200	60
OSC 30	300	60
OSC 50	300	60
OSD 2	80	60
OSD 6	200	60
OSD 18	200	60
OSD 35	300	60
OSD 60	300	60

6.1.1 Tank vent

- In the case of one or more separators which are connected to a solids tank, the nominal widths **DN** to be used are given in the table below:

Note:
Connect the tank vent to the on-board venting system.

Separators per solids tank	Tank vent DN in mm				
		OSC 5	OSC 15	OSC 30	OSC 50
1		100	100	125	125
2		100	125	150	150
≥3		2x125	2x150	2x150	2x150
	OSD 2	OSD 6	OSD 18	OSD 35	OSD 60
1	50	80	80	125	125
2	50	100	100	150	150
≥3	80	125	125	150	150

- In the case of a combination of separator models on one solids tank
  - the total number of all separators must be taken as a basis
  - and the nominal width of the largest model used.

The following criteria must be taken into consideration when venting the tank:

- Installation in accordance with the guidelines of the classification societies
- Controlled discharge of oil vapours
- An uncontrolled discharge of the sludge must be avoided.
- The vent lines must be laid so that a chimney effect develops.
- All possible loops in the vent lines must be stepwise.

6.1.2 Set-up of the solids tank venting

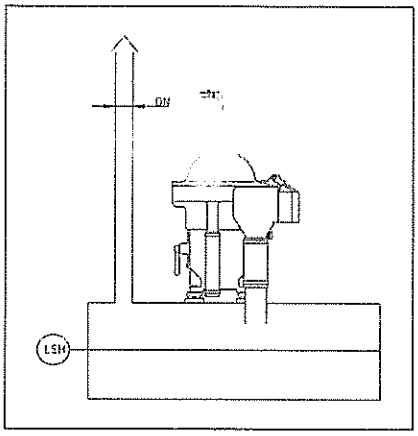


Fig. 64

Solids tank with one separator

- The nominal width **DN** is given in the table above (section 6.1.1).

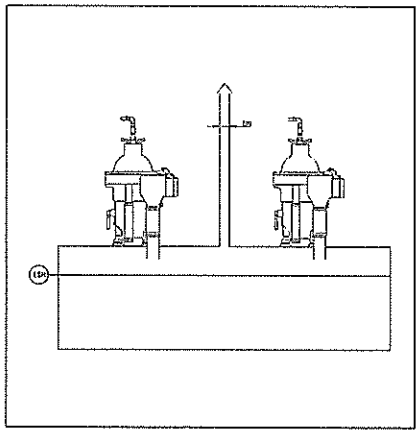


Fig. 65

Solids tank with several separators

- The nominal width **DN** is given in the table above (section 6.1.1).

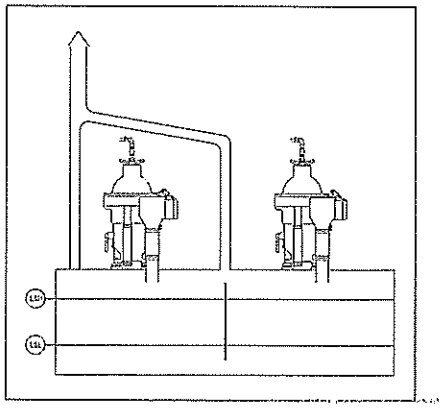


Fig. 66

Solids tank with wash plates

A solids tank with wash plates is required when movements of the ship cause faulty functioning of the level monitoring.

- When using wash plates, each section must be vented.
- The vent lines must be brought together.

6.2 Solids discharge lines

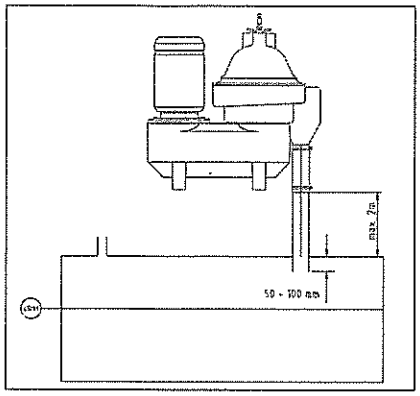


Fig. 67

- The solids discharge lines should *always* be vertical if possible.
- The solids discharge must always end **50 – 100 mm** below the tank top.
- The maximum level in the solids tank must be monitored by means of a float switch.
- The piping for the solids discharge should be without reduction and with vibration compensators.
- The length of **2 m** may not be exceeded without trace heating.

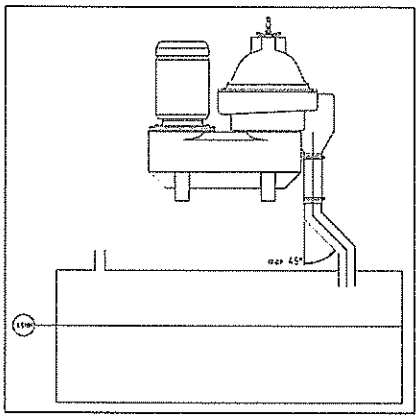


Fig. 68

- If there is a deviation from the vertical, an angle of **45°** must not be exceeded.

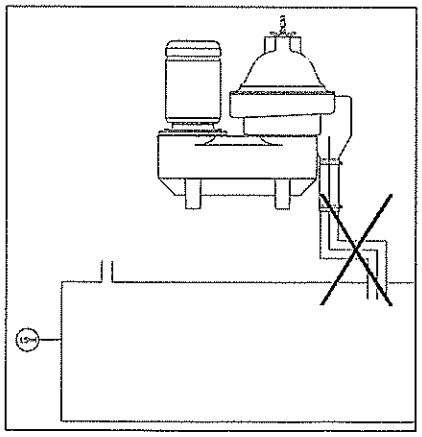


Fig. 69

IMPORTANT:
- This piping arrangement is **not admissible!**

6.2.1 Solids discharge lines with shut-off flap

- A shut-off flap in the solids discharge line prevents the penetration of vapours into a stationary separator during the desludging of another separator.
- If more than one separator is used for a sludge tank, a shut-off flap **must** be installed in the sludge discharge at the shipyard.
- Shut-off flaps are not included in the standard scope of supply of Westfalia Separator but can be ordered from Westfalia Separator.
- CIP units or modules supplied by Westfalia Separator and equipped with more than one separator are always delivered with shut-off flaps.

6.2.2 Standard installation of shut-off flaps

Separators of the C-generation

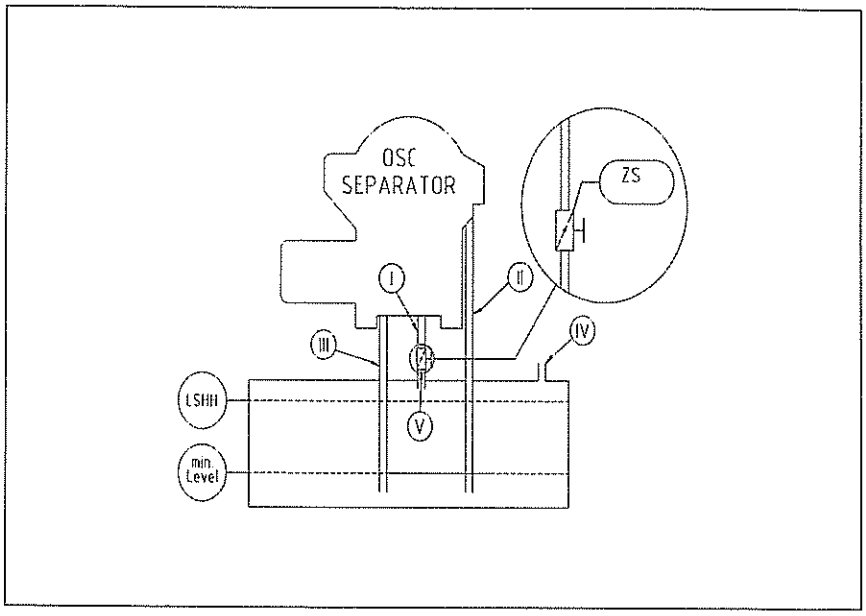


Fig. 70

I	Solids discharge	IV	Tank vent
II	Hood outlet	V	Shut-off flap
III	Frame drain		

- Discharges I, II and III must be configured as illustrated in Fig. 74).
- See section 6.1.1, table IV for tank vent connection.

Separators of the D-generation

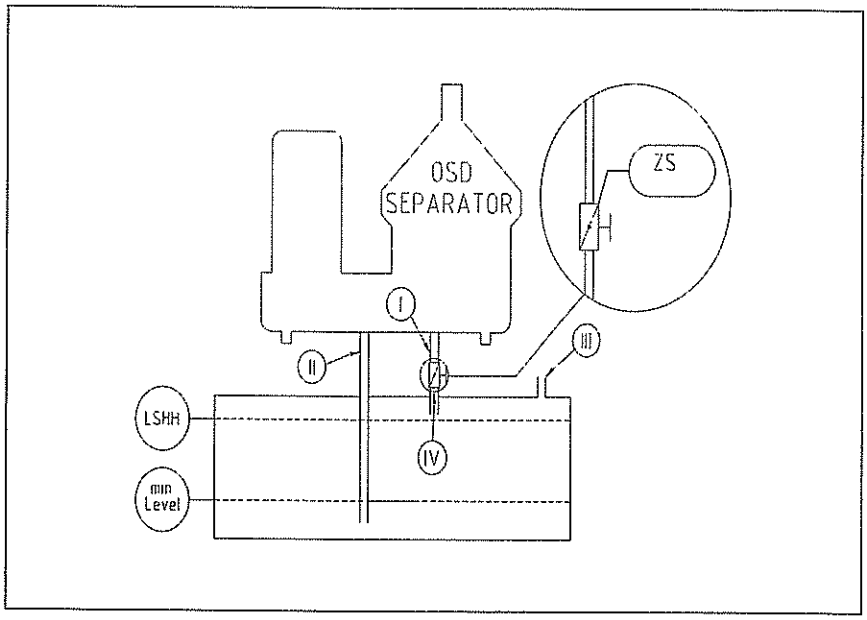


Fig. 71

I	Solids discharge	III	Tank vent
II	Hood and frame drain	IV	Shut-off flap

- Discharges I, and III must be configured as illustrated in Fig. 76).
- See section 6.1.1, table.

ATTENTION!
It must be ensured that the shut-off flaps are open during separator operation.

6.2.3 Installation recommendation for shut-off flaps

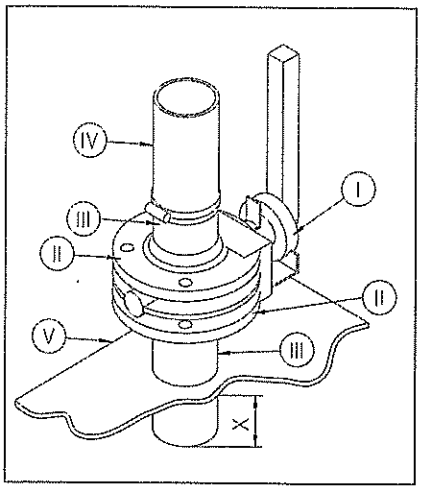


Fig. 72

- The solids discharge must always end below the tank top.
- For dimension **X**, see section 6.2, Fig. 67.

I Shut-off flap
II Flange
III Pipe
IV Hose (supplied with separator)
V Solids tank cover

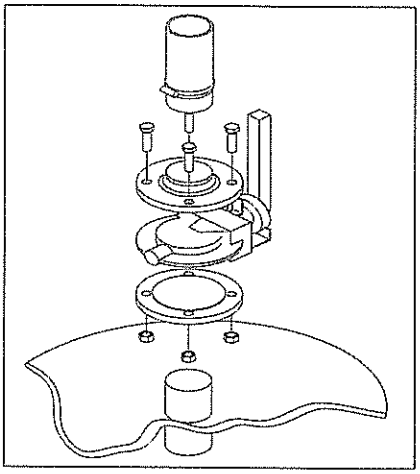


Fig. 73

6.3 Operating and dirty water discharge lines

- The discharges for operating and dirty water can be conveyed into a separate tank for oily water.
- The piping for the operating and dirty water discharge should be **vertical**, without reduction and with vibration compensators. There is no upper length limit.

IMPORTANT:
Operating and dirty water discharges may not be discharged into public canals, draining ditches and waters!

6.3.1 Separators of the C-generation

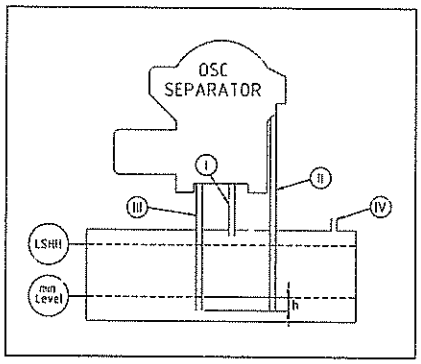


Fig. 74

- The water discharges must be submerged under all conditions (roll/pitch).
- Dimension **h** is:
  - min. 50 mm for shipboard operation,
  - min. 20 mm for stationary plants.

I Solids discharge
II Hood outlet
III Frame drain
IV Tank vent

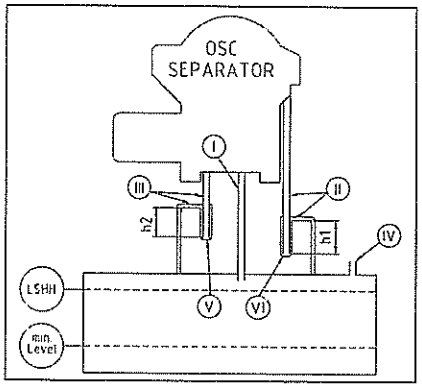


Fig. 75

- When a siphon is installed, the frame drain need not be submerged below the minimum level because a liquid seal is assured.
- Dimensions **h1** and **h2** are given in the table below.

I Solids discharge
II Hood outlet
III Frame drain
IV Tank vent
V Siphon for frame drain
VI Siphon for hood outlet

Table for defining siphon length, dimension "h1" and "h2":

Separator model	Siphon length [mm]	
	h2	h1
OSC 5 / OSC 15	250	500
OSC 30 / OSC 50	300	800

6.3.2 Separators of the D-generation

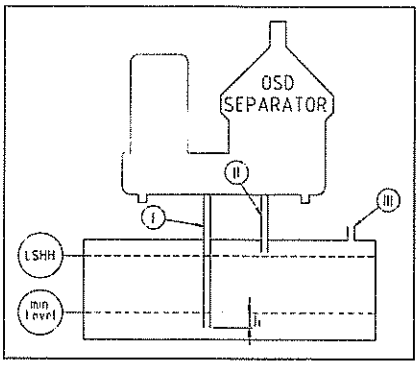


Fig. 76

- The water discharges must be submerged under all conditions (roll/pitch).
- Dimension **h** is:
  – min. 50 mm for shipboard operation,
  – min. 20 mm for stationary plants.

I Hood and frame drain
II Solids discharge
III Tank vent

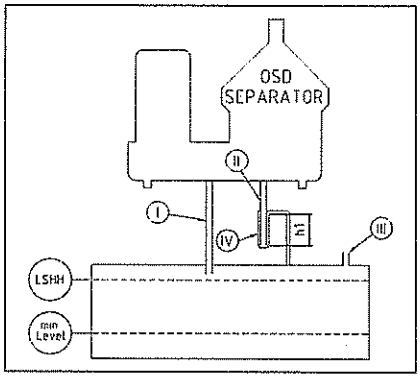


Fig. 77

- When a siphon is installed, the frame drain need not be submerged below the minimum level because a liquid seal is assured.
- Dimension **h1** is given in the table below.

I Solids discharge
II Hood and frame drain
III Tank vent
IV Siphon for hood and frame drain

Table for defining siphon length, dimension "h1"

Separator model	Siphon length [mm]
	h1
OSD 6 / OSD 18	500
OSD 35 / OSD 60	800

7 Electrical installation

7.1 Control cabinet

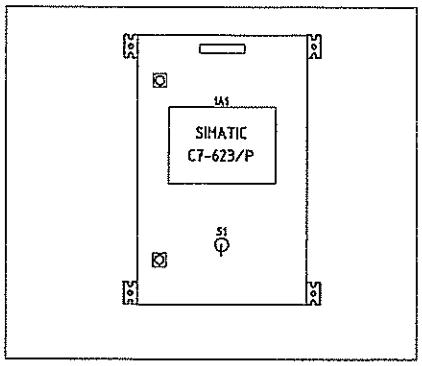


Fig. 78 Front view

Control cabinet configuration

1A1 Control unit
S1 Main switch

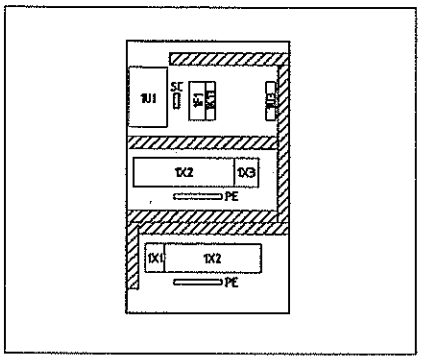


Fig. 79 Interior view

SC Screening
PE Earthed conductor

1U1 Power supply unit
1F1 Safety cut-out
1U3 Measuring transducer
1K11 Interface relay
1X... Strip terminals

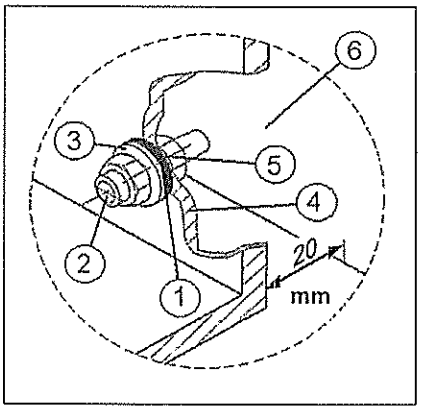


Fig. 80

Mounting example

1 Gasket 10,5x23x5
2 Threaded bolt M 8 (embedded in the wall)
3 Washer
4 Rear panel of control cabinet
5 Washer
6 Wall

- The control cabinet
  - must be allocated to the corresponding separator by means of its designation.
  - must be mounted on a frame or wall in the vicinity of the separator.
  - conforms to enclosure IP 54.
- It must be possible to open the control cabinet door wide so that the door latch can lock into place.

- Select the installation site so that
  - it can be easily operated and observed.
  - an ambient temperature of 50 °C (122 °F) is not exceeded. If necessary, make sure there is an adequate supply of fresh air.

- If the control cabinet is mounted on a wall, a wall clearance of 20 m must be observed to achieve a vibration-free fastening arrangement.

- Although buttons and switches and the electronic control unit are protected against moisture by protective foil and door seal, the cabinet must nevertheless not be installed in an excessively humid environment or damp area.

- To keep the temperature inside the unit constant after commissioning, the main switch should be kept turned on even when the separator is at a standstill.

7.1.1 Electrical connection

- The control unit is designed for a connected voltage as indicated on the nameplate inside the control cabinet.
- In the case of a version without motor starter, the rated connection voltage is 115 VAC or 230 VAC which must be protected by a 6 A slow-blow fuse.

7.1.2 External voltages

- The voltage-free contacts of the output modules
  - **carry external voltage (even when the main switch is off!).**
  - can be identified by the orange coloured wiring.
  - can be used in external control systems up to 250 VAC.
- A cross-section of 1.5 mm^2 Cu is adequate for all control and interlocking lines.

7.1.3 Shipboard operation

- For shipboard operation
  - only armoured lines type "MGCH" according to DIN 89 158 may be used.
  - brass unions according to DIN 89 280 must be used.
  - load and control lines can be laid jointly without clearance.
- In the case of HFO separators in series operation, the signal exchange between the control cabinets as per the terminal diagram for the connecting cable must be taken into account (see section 7.2).

Cable glands for shipboard installation			
Female thread	∅ Cable outer [mm]	Cable gland	Earthing device + Inner parts design
M 20 x 1.5	7,0 – 8,5	M 24 x 1.5	for data cable without screen
M 20 x 1.5	8,5 – 10,5	M 24 x 1.5	A4 + Z10
M 20 x 1.5	10,5 – 12,5	M 24 x 1.5	A6 + Z12
M 20 x 1.5	12,5 – 14,5	M 24 x 1.5	A6 + Z14
M 25 x 1.5	14,5 – 16,5	M 24 x 1.5	A7 + Z16
M 25 x 1.5	16,5 – 17,5	M 24 x 1.5	A8 + Z17
M 25 x 1.5	17,5 – 18,5	M 30 x 2	A9 + Z18
M 32 x 1.5	18,5 – 20,5	M 30 x 2	A10 + Z20
M 32 x 1.5	20,5 – 22,5	M 36 x 2	A 11 + Z22
M 40 x 1.5	22,5 – 24,5	M 36 x 2	A12 + Z24
M 40 x 1.5	24,5 – 26,5	M 36 x 2	A13 + Z26
M 40 x 1.5	27 – 28,5	M 45 x 2	A14 + Z28
M 40 x 1.5	30,5 – 32,5	M 45 x 2	A15 + Z32
M 50 x 1.5	39,0 – 41,5	M 56 x 2	A17 + Z41

7.1.4 Onshore operation

- The local rules and regulations of the operator must be observed!
- for onshore operation
  - Normally, armoured "ölflex" cables are used and "NSSHÖU" for outside installation.
  - commercially available cable glands can be used.
  - separate cable routing must be used for the load and control lines.
- Cable entries with plastic or metal glands are admissible.

7.2 Electro-magnetically compatible installation

- The control cabinet is designed to be electro-magnetically compatible.
- The following must be taken into account with electro-magnetically compatible installations:
  - Earthing straps
  - Voltage equalization
  - Screening lines
  - Separate line routing
  - Use of erase elements in case of inductance.

In the case of HFO series operation, proceed in accordance with the following wiring diagram:

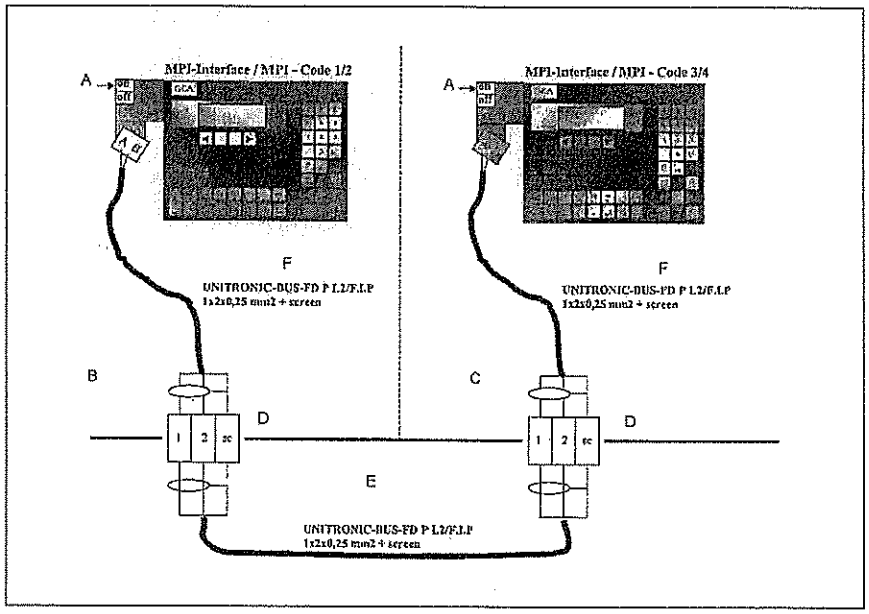


Fig. 81

A Switch ON
B Control cabinet HFO No. 1
C Control cabinet HFO No. 2
D Connecting terminals
F Cable type
E Customer shipboard installation

IMPORTANT:

- Use only data cable UNITRONIC-BUS-FD P L2/F.I.P (1 x 2 x 0.25 mm² + Screen).
- Do **not** lay data cables directly next to load cables as this can cause problems with electromagnetic compatibility.
- Pay attention to the different software status on the C7 units:
  - 1. unit has the MPI addresses 1 / 2
  - 2. unit has the MPI addresses 3 / 4
  - 3. unit has the MPI addresses 5 / 6
- Faulty or broken cable connections are displayed with error code no. 551.
- Check all connections.

7.3 Valves

Only original valves from Westfalia Separator with integrated suppressor diode and reverse battery protection in the connection head may be used in filling, displacement and operating water lines.

7.3.1 Solenoid valve block

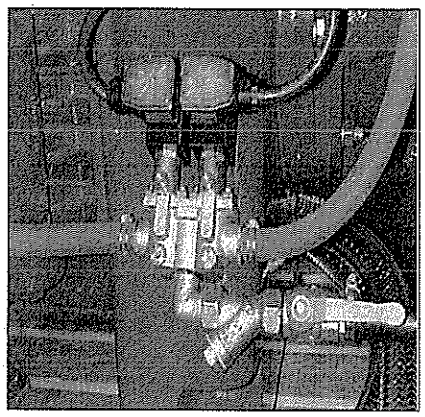


Fig. 82

This diagram shows an original valve block from Westfalia Separator which is used in filling, displacement and operating water lines.

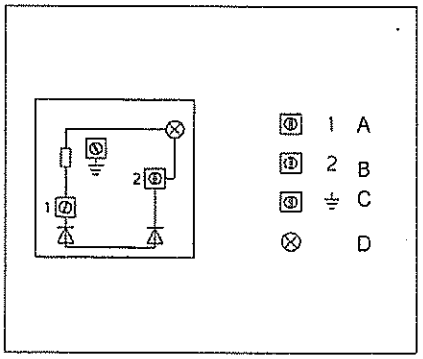


Fig. 83

Connections

A Connecting terminal + 24 V DC
B Connecting terminal + 0 V DC
C Earth
D Status LED

7.3.2 Terminal box

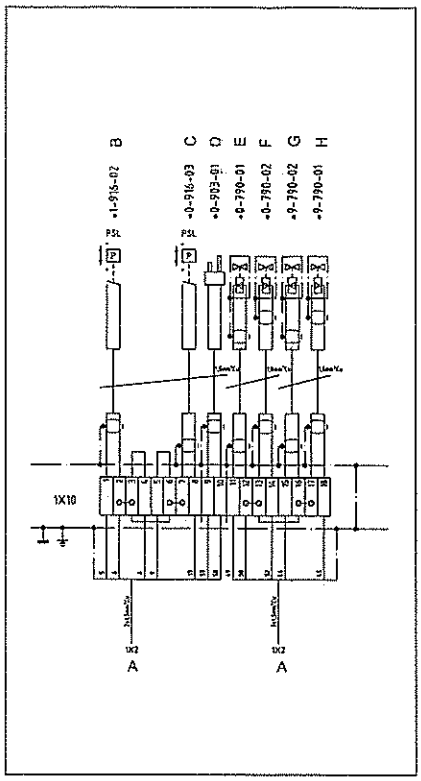


Fig. 84

All valves and monitoring instruments are installed ready-to-connect on a local terminal box **at the separator**.

- The connection to the control cabinet must be carried out by means of a joint cable in accordance with the adjacent connection diagram.

A Control cabinet
B Product discharge pressure
C "Self-Think" system
D Water sensor
E Circuit valve
F Water discharge valve
G Filling, displacement water valve
H Operating water valve

7.3.3 Separator with UNITROL monitoring function

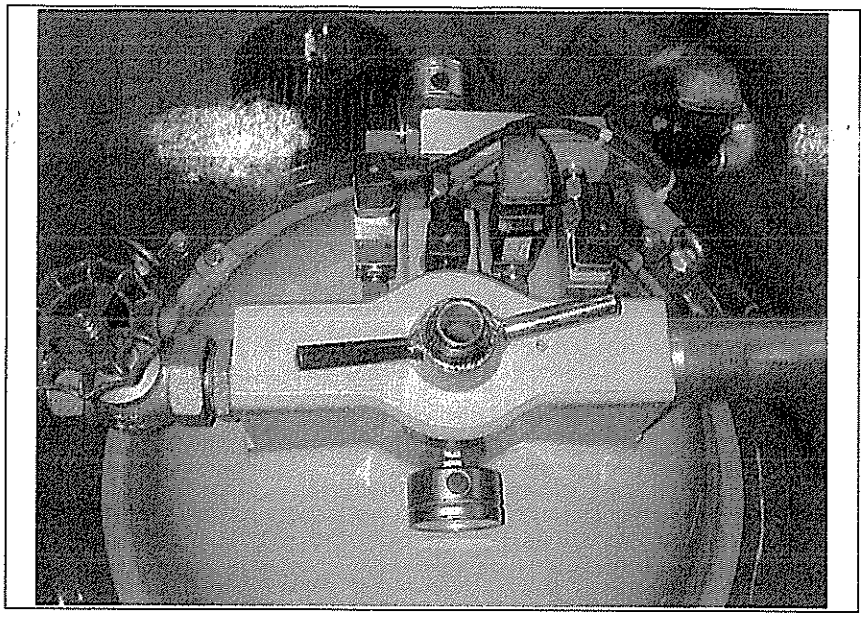
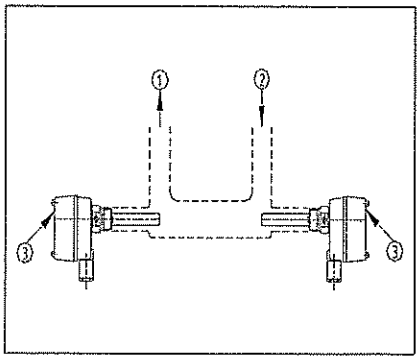


Fig. 85

When using separators with UNITROL system for fuel oil treatment (WMS/SMS monitoring functions), the components on the hood are wired to the distribution box.

7.4 Temperature guard

The temperature guard (min./max.) serves to monitor the temperature of the dirty oil after the pre-heater.



Fitting proposal

1 Dirty oil to 3-way piston control valve
2 Dirty oil to pre-heater
3 Temperature guard

Fig. 86

- The temperature guard must be fitted
  - before the 3-way piston control valve.
  - in such a way that the immersion sleeve is always flushed with oil.

7.5 Dual-purpose thermometer

- The dual-purpose thermometer is used
  – to monitor the temperature of the dirty oil after the pre-heater and
  – for local temperature indication.

ATTENTION!

- The dual-purpose thermometer is used only in conjunction with a C7 control system.

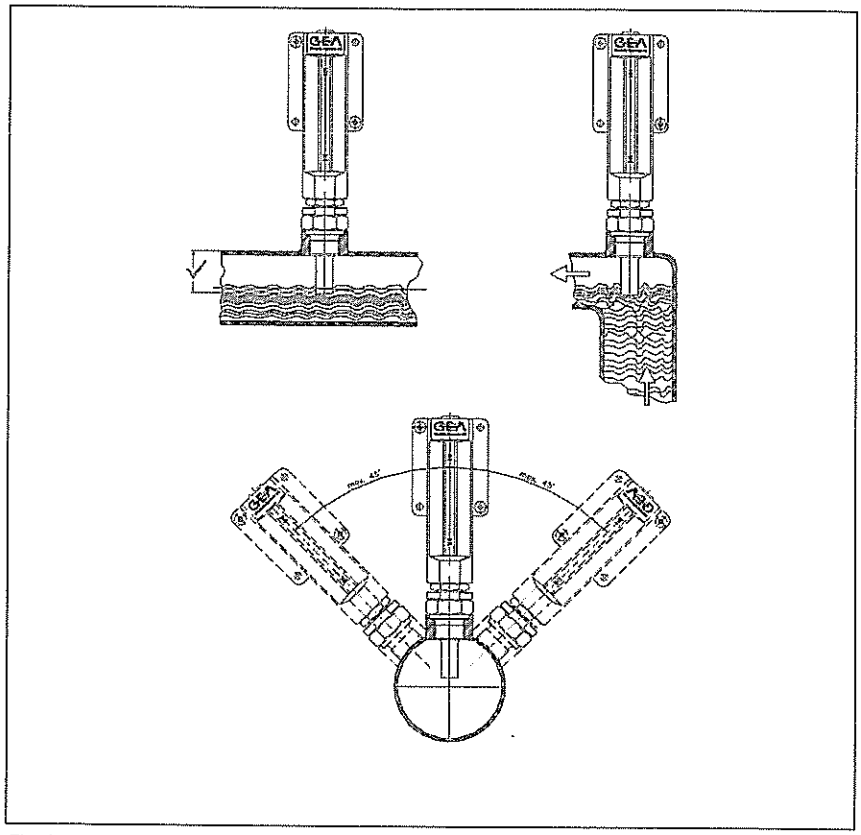


Fig. 87 Fitting proposals

- The dual-purpose thermometer must always be fitted before the 3-way piston control valve.
- All sensors must be installed so that they are continuously flushed with oil.

7.5.1 Electrical connection

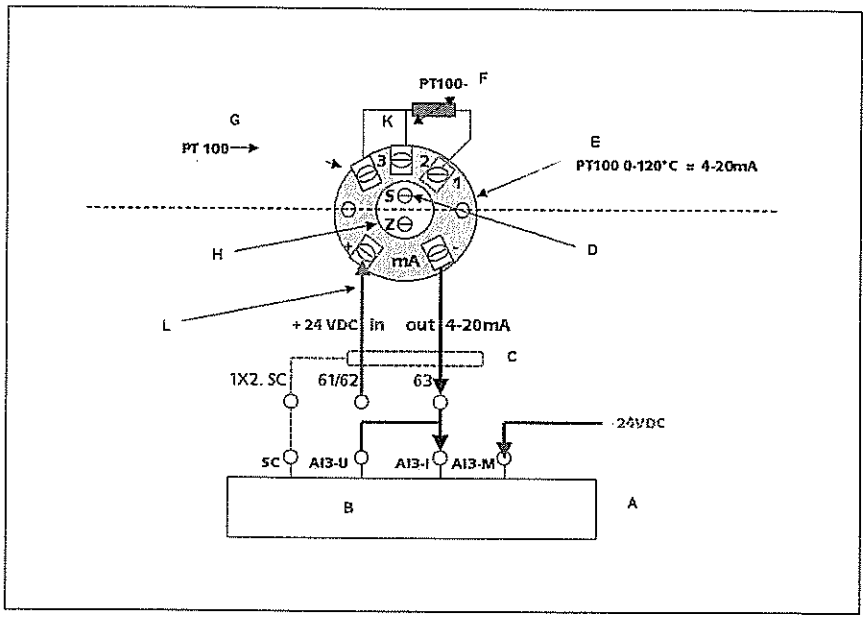


Fig. 88

A C7-control unit
B Analogue input A1-3 for product temperature monitoring
C Screened line
D Potentiometer for max. temperature adjustment
E Measuring transducer PT-00 / 4 – 20 mA
F Feelers
G Internal connection
H Potentiometer for max. temperature adjustment
K Bridge
L **IMPORTANT:** Pay attention to polarity!

- **Use only screened cable and pay attention to correct connection of the measuring transducer in accordance with the connection diagram.**

- Follow the wiring instructions in the circuit diagrams and connection diagram on the terminal box of the thermometer.

- When replacing the thermometer, be sure to turn off the main switch on the unit.
  Otherwise the analogue inputs will be destroyed by bonding with the connecting lines (wiring 24 VDC!)

7.6 Electrical installation of transmitters and electric motors

- The connection of motors and transmitters by means of cable loop enables easy replacement and function testing of the components.

Example 1

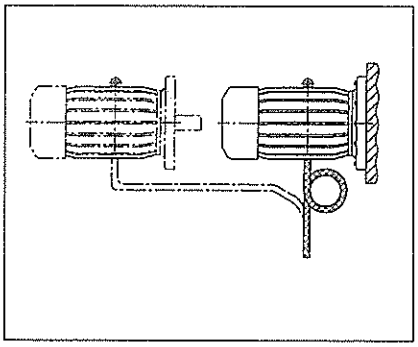


Fig. 89

Example 2

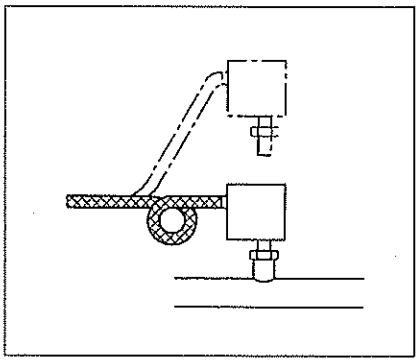


Fig. 90

7.7 Electrical execution

The electrical execution must be in accordance with the following standards and recommendations in so far as specifications and standards issued by the classification societies do not have to be met.

The applicable standards at Westfalia Separator are

- the European standard EN 60 204 – Part 1 or
- VDE 0113 – Part 1

7.7.1 Earthing the separator

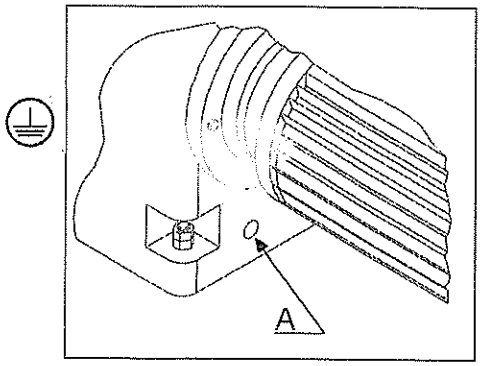


Fig. 91

- The separator must always be earthed.

The earthing connection **A** is always located on the motor side beneath the motor flange.

7.7.2 Voltage equalisation of the separator

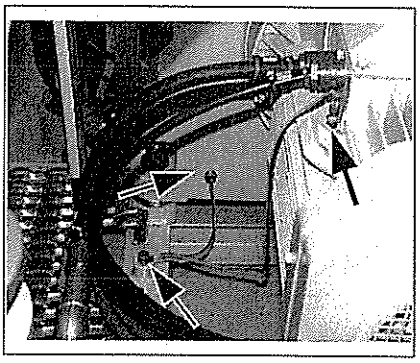


Fig. 92

Including the insulated installed separator in the voltage equalisation of the installation is done via the voltage equalisation connection on the motor side. This applies always.

If there is no protective conductor in multi-core cables and leads (e.g. in the armoured marine cable), the drive motor must likewise be included in the voltage equalisation.
The same applies for pump motors and electric pre-heaters.

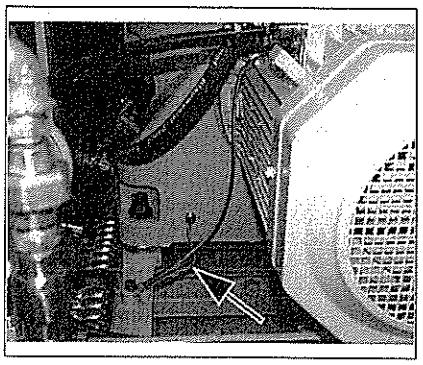


Fig. 93

The cross-section of the voltage equalisation conductor, normally insulated green-yellow, is dimensioned to the largest external conductor on the respective consumer.

In practice, table 1 in EN 60204-1 is used for this.

Westfalia Separator selects:
10 mm^2 < S < 25 mm^2 Cu

7.7.3 Voltage equalization of the electric heater

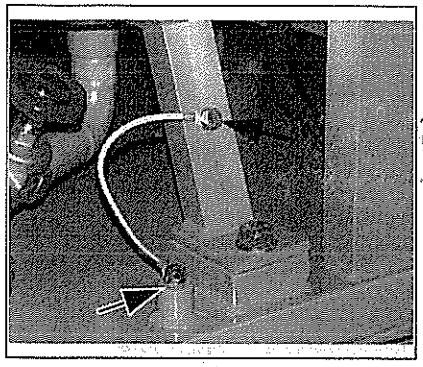
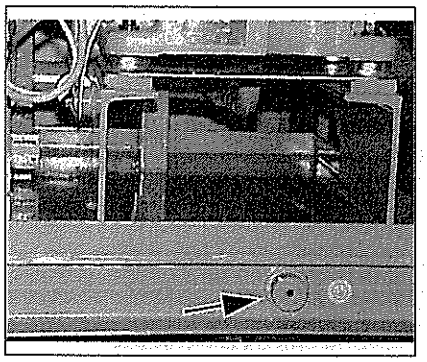


Fig. 94

7.7.4 Voltage equalization of the foundation frame



- The foundation frame must be fitted with a marked connecting bolt for voltage equalisation by the customer.

Fig. 95

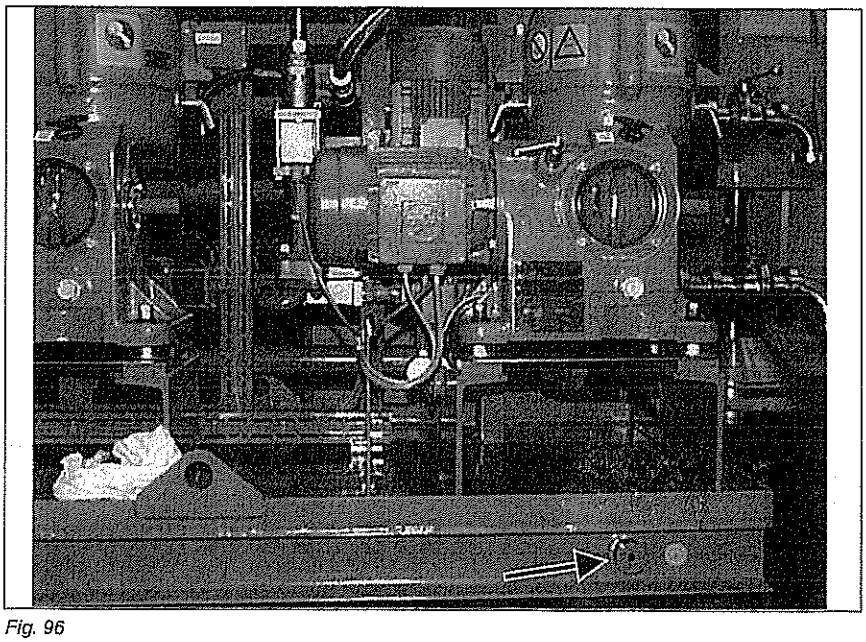
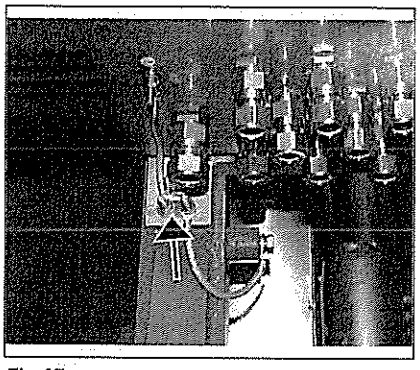


Fig. 96

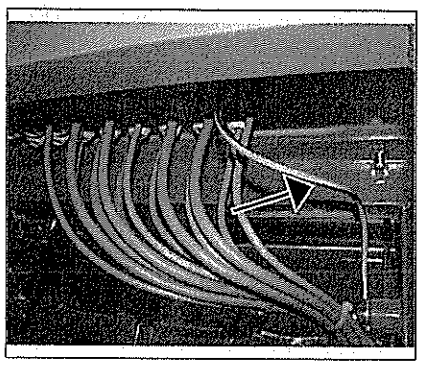
7.7.5 Voltage equalisation of the control cabinet

- The connection is via the PE-bar or terminal inside the cabinet to the frame connection.



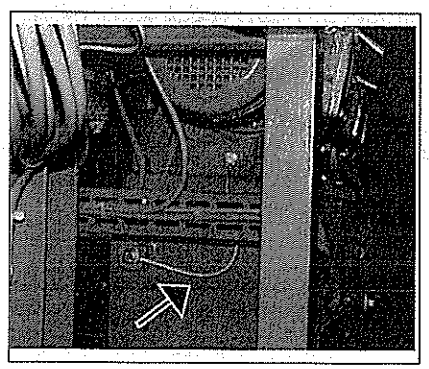
PE connection

Fig. 97



PE connection

Fig. 98



PE connection

Fig. 99

7.8 Electric motors procured by the customer

- When the motors are procured by the customer, they must have the following specifications and comply with the following standards:

Design	IM B5* according to IEC 34 – Part 7	
Rating	Classification according to IEC 72 – Part 2	
Enclosure	IM B5 according to IEC 34 – Part 5	
Vibration severity	Quality stage N * / S *according to IEC 34 – Part 14, Full key balanced * / Half key balanced *	
Synchronous speed	50 Hz 3000 * / 1500 *	60 Hz 3600 * / 1800 *
Type of cooling	1C411 according to IEC 34 – Part 6	
Flange dimensions	according to IEC 72	
Shaft dimensions	according to IEC 72	
Direction of rotation	according to IEC 34 – Part 8	
Insulation material class	F according to IEC 34 – Part 1	
Motor protection	PTC thermistors as full motor protection	
	• The PTC resistors mist be fitted in the end windings – one per strand. • PTC resistors – temperature feelers which are mounted on the winding package from the outside are not acceptable!	
Operating mode	SI according to IEC 34 – Part 1	
* dependent on separator model		

ATTENTION!
Consequential damage on the separator caused by motors procured by the customer cannot be accepted as a warranty claim by Westfalia Separator.

7.9 Installation and operation of control units

IMPORTANT:

- Outdoor exposure is not admissible!
- Select the installation site so that
  - the control unit is not exposed to dust and aggressive atmosphere.
  - the control unit is not installed in an excessively humid environment or damp area.
  - the sun cannot shine on the control panel or displays making operation and observation more difficult.
  - heating up of the control unit is avoided.
- Where appropriate, check screw-type and plug-type connectors for secure contact.
- Connect thermostatically controlled cabinet heating to external voltage and switch it on.
- The control cabinet heating must switch on before the temperature drops below the dew point.

- Bedewing can occur during the night which is not good for electronic apparatus.
- Check that the line voltage and frequency conform to the connection data of the control unit (see nameplate).
- Pay attention to admissible installation and operating data:

Voltage fluctuations	+/- 10 % of the line voltage
Frequency fluctuations	+/- 2 % of the line voltage
Ambient temperatures	+ 5 to + 45 °C (41 to 113 °F)
Atmospheric humidity	max. 50 % at 40 °C (104 °F)
	max. 90 % at 20 °C (68 °F)
Installation height	above sea level up to 1000 m
Transport temperatures	– 25 to + 55 °C (–13 to 131 °F)

ATTENTION!
Improper installation and operation discharges the supplier from the warranty obligation.

Westfalia Separator
Mineraloil Systems GmbH

Take the Best – Separate the Rest

A company of GEA Group

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