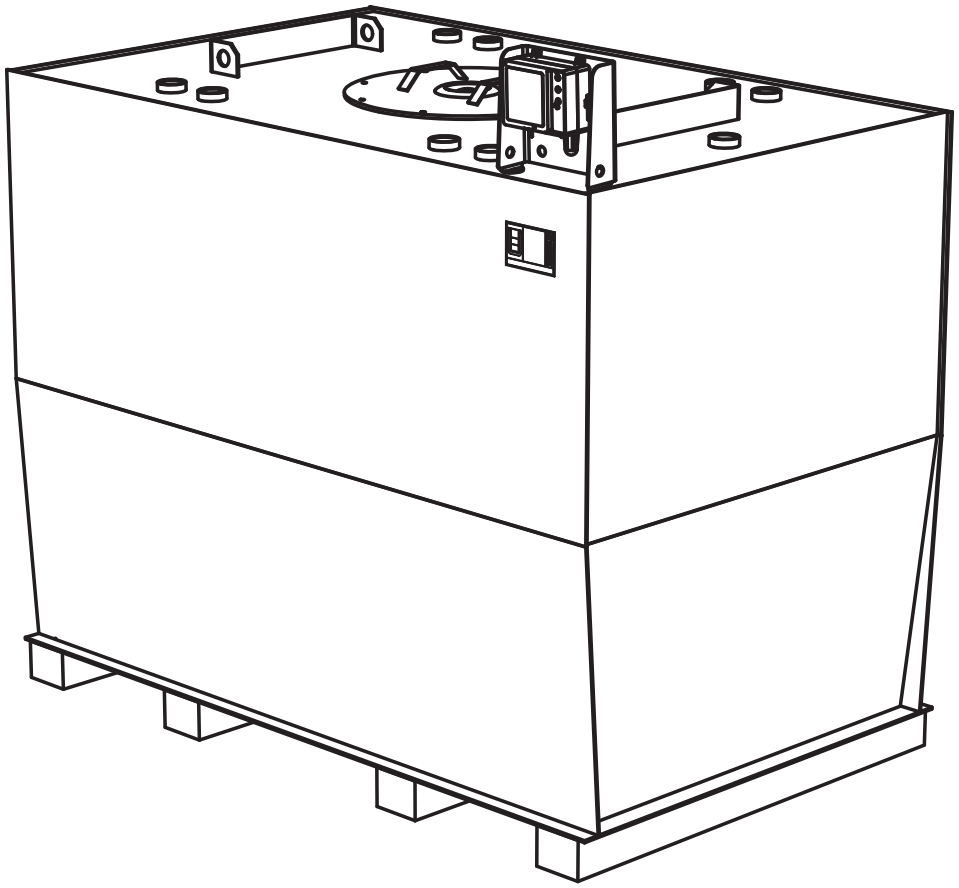
Operating and Installation Instructions (OII)
KTD Storage Tank System for Diesel, Heating Oil and Mineral Oil (Fresh and Waste Oil)

Krampitz® TANKSYSTEM GMBH



Type KTD: _____

Tank No.: _____

Year of Construction: _____

Issue 05/2010

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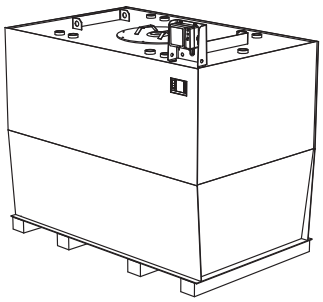
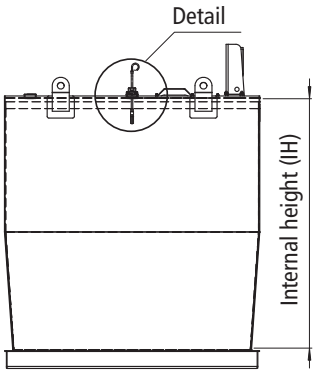
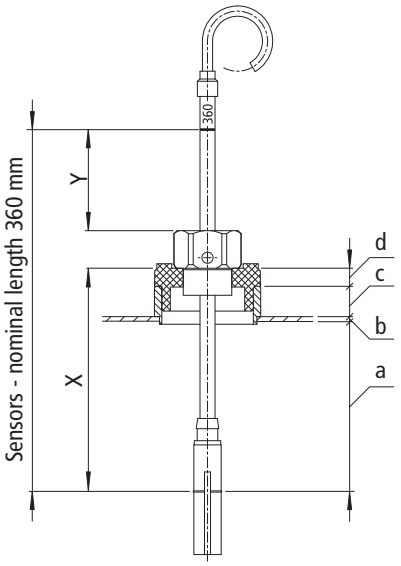
Setting the Limit Indicator for the Storage Tank KTD

KTD - storage tank





Limit indicator detail, setting measurements



Type of tank	IH	b	X-GWG	Y
	mm	mm	**mm**	mm
KTD 950	1,478	4	**110**	225
KTD 1500	1,478	4	**110**	225
KTD 2000	1,478	4	**110**	225
KTD 2500	1,478	4	**110**	225
KTD 3000	1,478	4	**110**	225
KTD 4000	1,478	4	**110**	225
KTD 6000	1,492	4	**111**	224
KTD 9000	1,492	4	**111**	224
KTD 12000	1,987	4	**135**	200
from KTD 15000	1,987	4	**135**	200

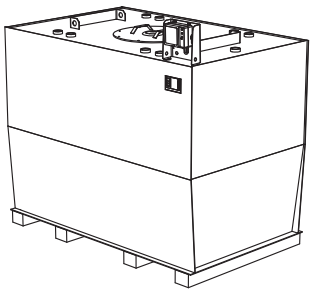
X-GWG = a + b + c + d
Y = 360 - 25 - X-GWG
a = IH - (IH*0,95)

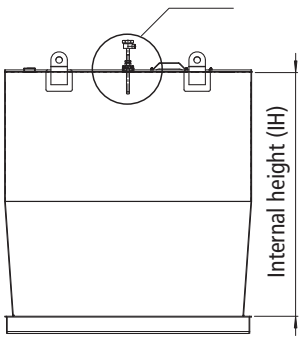
a - height between tank roof and limit indicator contact point
b - roof thickness, (see table)
c - sleeve height (20 mm)
d - reduction height (12 mm)

IH - Internal height
X-GWG - setting measurement for limit indicator
Y - monitoring (control) scale

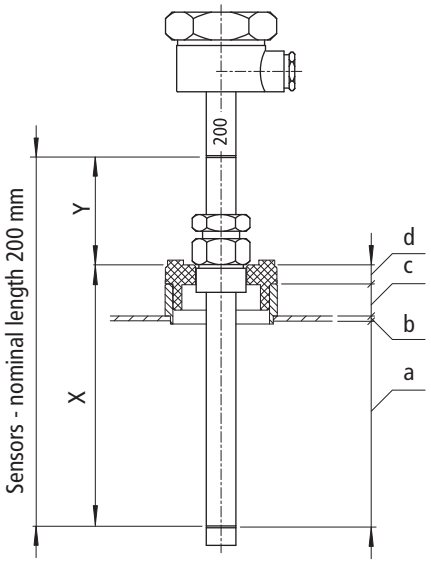
Setting the Overfill Prevention Control for the Storage Tank KTD

KTD - storage tank





Overfill prevention control detail, setting measurements



Type of tank	IH	b	X-ÜSI	Y
	mm	mm	**mm**	mm
KTD 950	1,478	4	**110**	90
KTD 1500	1,478	4	**110**	90
KTD 2000	1,478	4	**110**	90
KTD 2500	1,478	4	**110**	90
KTD 3000	1,478	4	**110**	90
KTD 4000	1,478	4	**110**	90
KTD 6000	1,492	4	**111**	89
KTD 9000	1,492	4	**111**	89
KTD 12000	1,987	4	**135**	65
from KTD 15000	1,987	4	**135**	65

X-ÜSI = a + b + c + d
Y = 200 - X-ÜSI
a = IH - (IH*0,95)

a - height between tank roof and overfill prevention control contact point
b - roof thickness, (see table)
c - sleeve height (20 mm)
d - reduction height (12 mm)

IH - Internal height
X-ÜSI - setting measurement for overfill prevention control
Y - monitoring (control) scale

Subject to technical changes!

PRELIMINARY REMARKS

- These technical operating and installation instructions (OII) describe the „KTD Storage Tank for Heating Oil, Diesel and Mineral Oil". They give descriptions and instructions required by the operator to ensure correct operation, proper material maintenance and compliance with safety and occupational health and safety regulations.
- Tank system designation: The KTD storage tank for heating oil, diesel and mineral oil is hereafter referred to as KTD for reasons of simplicity.
- The table of contents provides an outline of the OII and gives the chapters and sub-sections including page numbers.
- Important instructions regarding technical safety and occupational health and safety are highlighted using the pictograms below.

CAUTION Operating procedures which must be strictly respected to avoid bodily injuries.

ATTENTION Operating procedures which must be strictly respected to avoid damages to or destruction of the system.

NOTE Technical requirements which must be particularly respected by the operator.

LIST OF ABBREVIATIONS

KTD	- double-wall compact tank
OII	- operating and installation instructions
TRbF	- German technical guidelines for flammable liquids
VAwS	- German ordinance on installations for handling of substances hazardous to water and on specialist companies
VDE	- Association for Electrical, Electronic & Information Technologies
VDS	- German Association of Property Insurance Carriers
WHG	- Federal German Water Act

1. SAFETY GUIDELINES AND REGULATIONS

1.1 Safety Quidelines

CAUTION Maintenance and repair work on overfill prevention control and leakage warning devices may be carried out by authorised specialists only in accordance with § 19 l WHG.

CAUTION After connecting up the electronic components to the mains source, the installation will conduct potentially fatal electric voltages. Before commencing work on the electrical components, the main power cable connection must be disconnected.

CAUTION The tank may be only be entered via the opening provided for that purpose. The container must be completely emptied, cleaned and degassed. The person entering the tank must wear the appropriate protective equipment – in accordance with the requirements of the Law on Work and Health Protection.

WARNING No work such as drilling, welding, burning or grinding may be performed on the body of the tank, as it is enclosed by metal sheeting.

WARNING Operating errors or disregarding the information in the OAI, as well as the health and working safety provisions guidelines will lead to damage to the installation and the environment, harm to people, as well as to the expiry of the warranty claims.

The KTD and its accessory and equipment parts must be maintained on a regular basis after they were taken into operation for the first time.

1.2 Operating Regulations

1.2.1 General Regulations and Usage

The KTD may only be used for water hazardous, non-inflammable liquids with a flash point > 55°C, such as diesel, extra light heating oil etc. The reliability and stability for diesel and extra light heating oil has been proven. In the event of using other liquids (including combustible or lightly combustible liquids), additional equipment is required.
The tank must be provided with all the accessory and equipment components in accordance with legal requirements. Any required components not contained within the scope of delivery must be assembled before commissioning the tank.
The maximum operating temperature of the tank is 50° C. For diesel or extra light heating oil with a flash point > 55°C, the return temperature may not exceed 40°C, otherwise fuel cooling or explosion protection measures are necessary. The KTD is designed for outdoor use and correspondingly equipped: please ensure that the load bearing capacity of the ground beneath the installation has been established according to the local conditions. An indoor installation is also possible as long the legal requirements are adhered to.

1.2.2 General Operating Regulations

Initial commissioning
Prior to the initial commissioning, the KTD plus any needed equipment must be checked for any visible damage. The leak detecting gauges must be checked for any pressure loss.

Operational readiness
During use, the power supply must not be cut off. The installation must be continuously monitored, in order that any malfunctioning in the course of operation can be determined as early as possible, thus avoiding any further damage. Monitoring and correcting of malfunctions or faults must be undertaken by suitably qualified and trained personnel.

Temporary taking out of service
For a temporary taking out of service, the power supply to the KTD must be disconnected.

Restarting the installation
To restart the installation, the KTD must be checked to be working properly.
The following components must be checked: - the leak detecting devices,
- the electrical connections,
- the container and supply pipes for leak tightness.

1.2.3 Conduct Regulations

1. The operator is obliged to maintain the KTD in proper working order, carry out any necessary repair work without delay and take any required safety measures according to the circumstances.
2. In the event of the operator being unable to determine the condition of the installation or effect the repairs, he must either seek advice from a qualified expert or conclude a maintenance contract with an approved qualified company.
3. The installation must not be used while in a defective condition, which could cause a hazard or danger.
4. Measures to eliminate or lessen any dangerous situations are to be immediately undertaken.
5. The prescribed safety installations are to be used.
6. The safety installations must be operated and maintained in such a way, that their function and effectiveness remain unimpaired.
7. Safety installations must especially not be by-passed or completely or even partially rendered inoperative.
8. Only approved water hazardous, non-inflammable liquids may be stored in the KTD. The approved liquids are indicated on the identification plate.
9. Filling the KTD must be carried out in such a way, that overfilling is avoided. Before filling, the level of the liquid in the tank interior must be checked. The amount of liquid required to fill the KTD must be determined.
10. The KTD filling and emptying processes using a tanker or drum must be constantly controlled by the operator. Only containers approved for such liquids may be used.
11. Any liquid spill or leak in the course of the above processes must be cleaned up immediately, as well as measures taken to prevent any further such spilling or leaking. Duty of disclosure on the spill or leak of water hazardous liquids must be observed.
12. The legal requirements valid for dealing with water hazardous liquids must be observed.

1.2.4 Instruction of the Operating Personnel

The operators must acquaint themselves with how to start and operate the KTD and with the content of the operating instructions.
Before operating the system for the first time, operators must be trained on the possible hazards of storing and filling liquids hazardous to water and on the measures for preventing these. The training must be repeated on a regular basis, at least once a year, and must be documented.

1.2.5 Repair Work and Maintenance

During maintenance works, the KTD must neither be filled nor emptied.
Before repair work on the electrical system, make sure the entire system is dead (zero potential).

1.2.6 Technical Safety Inspections

Duty of disclosure:
tanks and installations used for water hazardous, non-inflammable liquids are subject to the duty of disclosure regulation. Any exceptions to this regulation will be dealt with by the competent VAwS of the appropriate Federal State.
Inspections:
the necessity and scope of the technical safety checks and inspections will be determined by the "Inspection before Commissioning" and may differ from the information given in the table. For installation in water conservation areas, separate regulations apply.

Guidelines for technical safety inspections

Name of inspecting authority	Inspected by	Date	Inspection certificate
Inspection before commissioning	Qualified expert from VAwS	Before commissioning	Certification
Visual inspection of tank	User	weekly	Certification
Visual inspection for tightness of connections to tank	User	weekly	Certification
Interior inspection of tank container – for volumes from 10,000 litres upwards	Qualified expert from VAwS	ca. every 5 years depending on classification	Certification
Inspection of safety components	Qualified expert from VAwS	ca. every 5 years depending on classification	Certification
Functional testing of leak detecting device	For specialist use in accordance with § 19l WHG*	Yearly***	Certification
Functional testing of limit indicator	For specialist use in accordance with § 19 l WHG	Yearly***	Certification
Functional testing of overfill protection control**	For specialist use in accordance with § 19 l WHG	Yearly***	Certification
Functional testing of liquid level gauge**	Electrical professional or qualified personnel	Yearly***	Certification

* Following instruction from manufacturer
** Special equipment (if appropriate)
*** Observe the manufacturer's guidelines

1.2.7 Handling Diesel, Heating and Mineral Oil

When handling diesel, heating and mineral oil, the generally applicable safety regulations as well as the particular operating instructions of the individual owner / user are to be followed.

GIn accordance with VAwS and operating safety regulations, operating instructions including a monitoring, repair and alarm plan are basically to be adhered to. Exceptions to this are regulated by VAwS of the respective Federal State, e.g.:

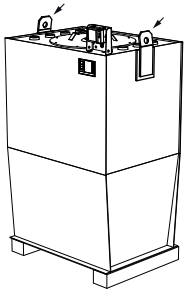
- operating instructions are not required for hazard level A installations according to VawS and installations using heating oil
- installations using heating oil
- "Operating and Conduct Regulations when Handling water hazardous liquids" leaflets (according to an announcement from the Ministry on the Environment) are permanently put up in easily visible places near the installation

2. COMMISSIONING

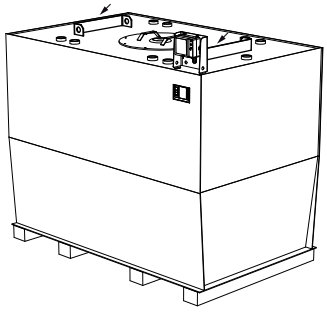
2.1 Transporting the KTD

A suitable means of transport must be used, and the applicable legal requirements are to be observed and maintained. During the transport, the tank is to be protected against moisture, damage and becoming dirty. Storing the tank is permitted both indoors and outdoors.

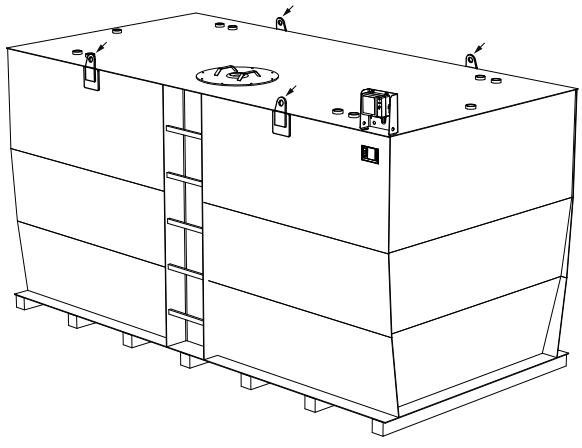
WARNING During the transport, the appropriate, applicable safety regulations are to be observed and the tank protected from damage. In the event of paint damage, the corrosion protection is to be properly restored.



KTD 950
with lifting brackets



KTD with roof reinforcement
with lifting brackets
1,500 to 4,000 litres



KTD with four lifting brackets
welded on the outside walls
larger than 6,000 litres

The KTD can be easily transported by fork lift or hand lift. The KTD with a capacity of 950 litres is equipped with two lifting brackets on its front wall. These lifting brackets allow for moving the tank with a crane. For KTDs of capacities ranging from 1,500 to 4,000 litres, roof reinforcements with integrated lifting brackets are used. KTDs exceeding these capacities can be moved using the four lifting brackets on the outside of the tank side walls.
he lifting and loading is to be carried out via the four crane eyelets or ISO corners located in the area of the roof. In doing this, the load on the crane eyelets must remain equally spread. A diagonal pull of more than 30° from the vertical is not permitted.
Any damage to the packing materials or the tank is to be recorded and reported to the manufacturer. Damage to the packing materials is to repaired in a professional manner, repairs to the tank or any equipment components, however, is not permitted without agreement from the manufacturer.

2.2 Assembling the KTD

The KTD is equipped with feet (height 100 mm). These prevent reliably the formation of condensation water on the outer tank bottom and also ensure good visibility.
The KTD must only be placed on even and load-bearing floor space (minimum quality B 15 or equal). A stress analysis must be performed and presented.
In order to maintain the manufacturer's warranty, the storage tanks are – for the period up to commissioning – to be permanently and reliably protected against moisture, dirt and other damaging influences.
The following individual requirements then apply:

- temperature between +5°C and +30°C; max. humidity 75%
- no aggressive atmosphere
- no dirt accumulation from exposure to the construction work
- no flying sparks or other adverse effects from metal working or welding
- protecting the tank from unauthorised use and from damage

2.2.1 Assembly of the KTD in a Machine Room

Basically, storage tanks with maximum storage volume of 5,000 litres may be operated in a machine room. For tanks with a larger volume, a separate tank storage room is required. (cf. chapter 3.5.4 Ventilation and 3.5.3 Filling connections)

2.2.2 Installation of KTD outside of a Machine Room

Outside of a machine room, up to 100,000 litres may be stored in a KTD in atank storage room.

2.2.3 Outdoor Installation of KTD

For the outdoor installation of KTD a sufficiently stable and level area is required. The tank is to be secured against impact from an external source and against slipping. On-site proof is to be provided. The tank must be equipped for outdoor assembly.

NOTE If the KTD is to be set up outdoors, a weatherproof coating of the tank container is required.

2.3 Initial Commissioning

Before the KTD is filled the first time, the following point are to checked:

1. Proper mounting / assembly of the tank
2. Tightness and stability of the pipe connections and dome lid
3. Proper connection of the sensors –
   a. Liquid level gauge b. Overfill prevention control
   c. Vacuum leak gauge d. Limit indicator
4. Stable base for the sealing plugs

2.4 Operating Sequence

- Check the ball valves. The ball valves on the delivery pipe must be closed.
- Connecting the power. This starts the sensors working.

WARNING The overfill prevention control will register an alarm in the first few seconds, since the PTC thermistor for the liquid level gauge has first to be heated up.

- Filling from a tanker:

1. As the volume of liquid in the tank increases, the switching point settings can be checked (if available these are: MIN-MIN, MIN, MAX, MAX-MAX).
2. As the limit indicator is wetted, the filling process will be automatically interrupted. The filling via a filling line from a tanker is prescribed for a volume size greater than 1,000 litres. This means that the day fuel tank may also be filled by means of the automatic cut-off nozzle directly from the tanker (dead man's switch principle).

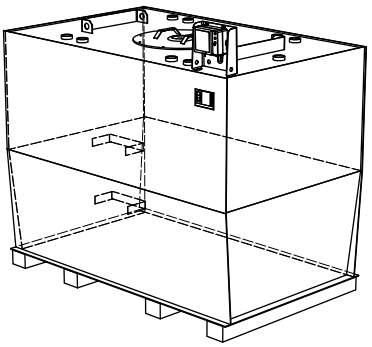
- Filling with installation pump:

1. As the volume of liquid in the tank increases, the switching point settings can be checked (if available these are: MIN-MIN. MIN, MAX, MAX-MAX).
2. As the limit indicator is wetted, the pump must be automatically switched off.

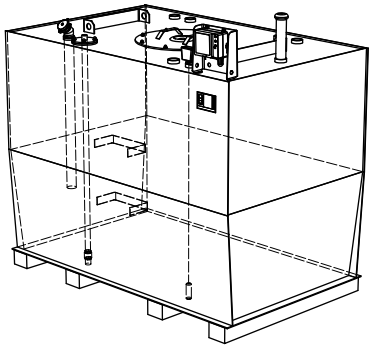
- check pipe connections for tightness
- open ball valves on delivery pipe, as appropriate
- the KTD is ready for operation

3.1 Graphical Representation of the KTD Tank Fittings

KTD with leak indicator without tank fittings

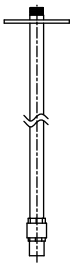


KTD with leak indicator and tank fittings

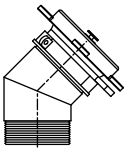


Tank fittings
(optional)

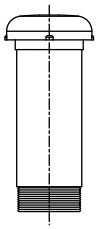
Mechanical level indicator



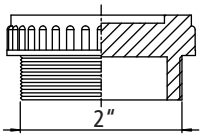
Suction pipe with flanged foot valve



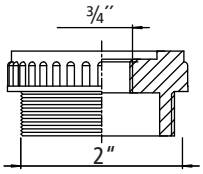
Filler neck



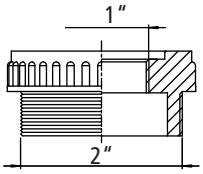
Vent cap with pipe socket



Blind plug 2″



Adapter 2″ x ¾″



Adapter 2″ x 1″

3.2 Purpose of the KTD

The function of the KTD is to store non-inflammable, water hazardous liquids, such as heating oil, diesel or mineral oil (new and old oil). The KTD is designated a storage tank. Its double-walled steel construction meets the highest safety requirements. The cubic-shaped design guarantees the optimum utilisation of space.
The KTD is suitable both for indoor and outdoor operation. The installation area must be level and stable. It may only be set up in areas where additional hazards or requirements do not exist. For operation under special conditions (e.g. in a water conservation area, ex-zone, with non-inflammable liquids) the appropriate applicable regulations are to be followed.
The KTD is normally manufactured according to the general Building Supervisory Approval no. Z-38.12-23.

WARNING The KTD may only be transported in an emptied and clean condition.

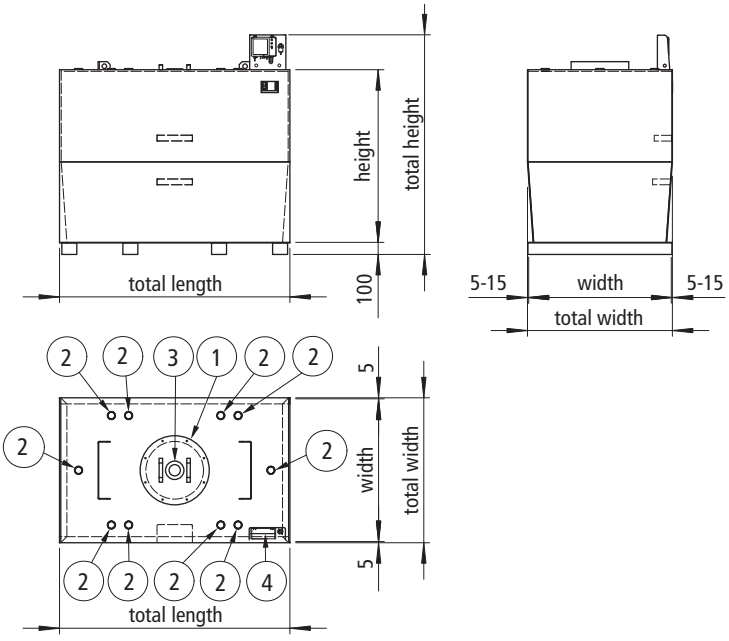
3.3 Technical Data of the KTD

3.3.1 Views and Connections of the KTD

The KTD is manufactured in 15 standard sizes. Special dimensions regarding length, width and height can be realised on request. Transportability is the only limit.

Connections of the KTD

1 manhole DN 500
2 connecting sleeve 2″
3 pressure relief device
4 leak indicator connection



The KTD is equipped with the connections below:
Ten 2˝ connecting sleeves on the roof for the optional installation of level sensors, over-fill protection, system flow and return, filling by pump, filling by tank lorry and ventilation.
A dome cover DN 500 with integrated NBR pressure relief is located in the centre of the tank roof. It serves as a safety device which relieves in case of overpressure. When disassembling the device, the opening can be used as a hand hole and inspection opening. When the dome cover is removed, the opening is used as a manhole for internal inspection and for cleaning the tank. The capacity of the individual tank types can be found in the table below. The number included in the tank type name provides a reference value and indicates the type.

3.3.2 Dimensions and Volume of the KTD

Tank type	Volume 100%	Volume 95%	Length	Width	Total width	Height	Total height	Weight
Art.-no.	Litres	Litres	mm	mm	mm	mm	mm	kg
KTD 950	990	930	1.000	750	760	1.500	1.950	450
KTD 1.500	1.520	1.440	1.500	750	760	1.500	1.950	560
KTD 2.000	2.040	1.930	1.500	1.000	1.010	1.500	1.950	680
KTD 2.500	2.750	2.640	2.000	1.000	1.010	1.500	1.950	795
KTD 3.000	3.500	3.300	2.000	1.250	1.260	1.500	1.950	920
KTD 4.000	4.150	3.950	2.000	1.500	1.510	1.500	1.950	1.080
KTD 6.000	6.000	5.700	3.000	1.500	1.530	1.500	1.950	1.460
KTD 9.000	9.350	8.900	3.400	2.000	2.030	1.500	1.950	1.840
KTD 12.000	12.500	11.800	3.500	2.000	2.030	2.000	2.450	2.280
KTD 15.000	14.300	13.600	4.000	2.000	2.030	2.000	2.450	2.490
KTD 20.000	19.800	18.700	5.500	2.000	2.030	2.000	2.450	3.460
KTD 25.000	25.100	23.800	7.000	2.000	2.030	2.000	2.450	4.200
KTD 30.000	28.900	27.400	8.000	2.000	2.030	2.000	2.450	4.750
KTD 40.000	46.000	43.600	10.500	2.400	2.430	2.000	2.450	6.800
KTD 50.000	52.600	49.900	12.000	2.400	2.430	2.000	2.450	7.600

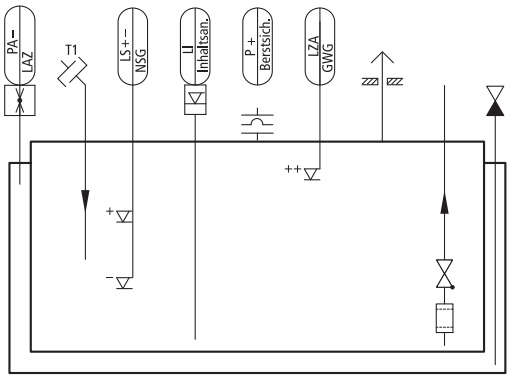
NOTE The maximum filling volume is 95 percent of the container height according to the building authority permit Z-38.12-23.

3.3.3 KTD Filling and Suction Rate When Filled by Tank Lorry

KTD type	Filling rate	Suction rate
KTD 950	150 litres/min – only with petrol pump nozzle	600 litres/min
from KTD 1.500	600 litres/min – with tank lorry hose	600 litres/min

The storage tank is filled using the tank lorry connection. Tanks with a capacity of up to 1,000 litres can also be filled with a petrol pump nozzle with a dead man's switch.

3.3.4 System Schematic



KTD - double-wall storage tank

standard container with tank fittings
container with standard equipment and special accessories ready for operation

Legend symbols in accordance with DIN 2481

Tanker connection filling


Bursting disc (overpressure)


Foot valve


Filter / dirt trap


Liquid level gauge

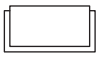

Ventilation to outside

Information on conveying direction

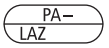

Leak detection gauge


Leak detection sucking nozzle

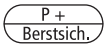

Level indicator, switch contacts for upper and lower limit levels


Container double-walled

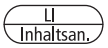
Legend - designations in accordance with DIN 19227



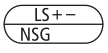
Vacuum leakage warning device - type approved (LAZ-04/1)



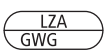
Overpressure relief bursting disc



Local level indicator mechanical level indicator



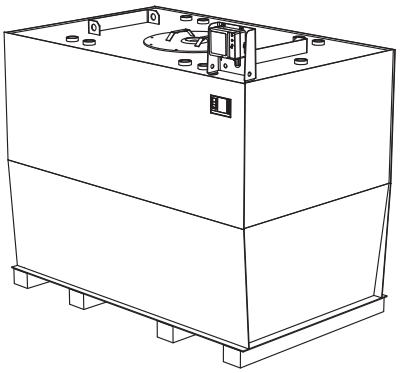
Float switch



Overfill safety limit indicator - type approved

3.4. Components of the KTD - Standard Equipment

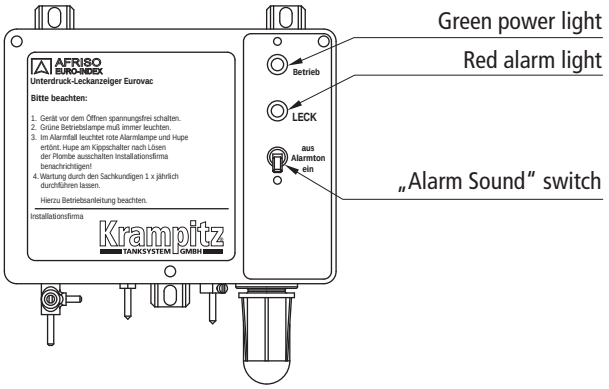
3.4.1 The Tank Container



The double-walled, cubic design is characteristic for the tank container.
It allows for high safety and effective use of space.
The KTD tank container is normally made of steel (S235 JRG2).
On the outside, the tank container is coated with a 2-component lacquer finish (RAL 7032) to protect it from corrosion.
The inside wall is untreated and oiled.

NOTE If desired, the manufacturer can apply an internal coating before delivery to the owner to protect the inside wall from corrosion.

3.4.2 The Electronic Leak Indicator (Installed) (AE-350)



The leak indicator consists of the indicating and control elements, a vacuum pump, a pressure switch, a conductor plate with electro-magnetic components for the output signal, a filter and three hose connections for the pneumatic connection with the tank control room, covered by a shock-resistant plastic case.
As soon as the required operating voltage (230 V, 50 Hz) and a vacuum are available, the green power light is illuminated.

The leak indicator creates a permanent negative pressure (approx. -400 mbar) in the control room of the tank and enables the alarm if the negative pressure decreases (= increase of pressure) (below approx. -340 mbar).
The alarm is visible (red alarm light) and audible and can be tapped via a potential-free relay contact (1 switch). The alarm sound can be turned off using the „Alarm Sound" switch after removing the sealing.
The alarm is not triggered by a power outage. After power is available again, the system is immediately ready to use. A leak which could have occurred in the meantime would be indicated.

A visual inspection of the leak indicator must be conducted after

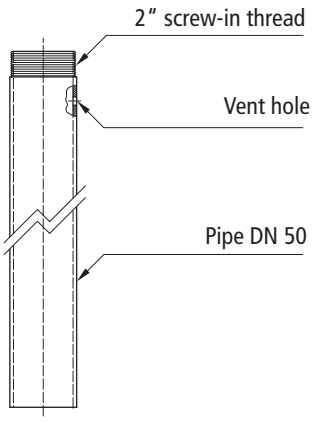
- every transport
- every change of place
- every initial operation
- every time the system is put into operation again
- every temporary shutdown.

Technical data	
Dimensions (L x W x H) in mm	215 x 165 x 100
Required space (L x W x H) in mm	250 x 170 x 999
Weight in kg	1,7
Supply voltage	230 V AC +/-10% 50/60 Hz
Rated power	95 VA
Line fuse	0.8 A slow
Output relay	1 switch
Switching capacity of the output relay	max. 250 V, 2 A, ohmic load
Relay contact fuse protection	2 A slow
Switch point „Alarm On" in mbar	-325 to -355
Switch point „Alarm Off" in mbar	-380 (approximate value, determined by switching hysteresis)
Switch point „Pump On" in mbar	-380 (approximate value, determined by switching hysteresis)
Switch point „Pump Off" in mbar	-410 to -450
Hose connection, diameter in mm	5
Connecting hose	PVC hose 4 x 2 mm, 6 x 2 mm
Permitted ambient temperature in °C	-5 to +50
Safety class	11 EN 60730
Protection class	IP 30 EN 60529
Radio interference suppression	according to EN 50081-1
Noise immunity	according to EN 50082-2

ATTENTION
The leak indicator operates with a voltage of 230 V, 50 Hz. This voltage can cause severe burns. Contact with voltage can be fatal.
Before opening the leak indicator and before maintenance and cleaning works, disrupt the power supply (disable the fuse!).

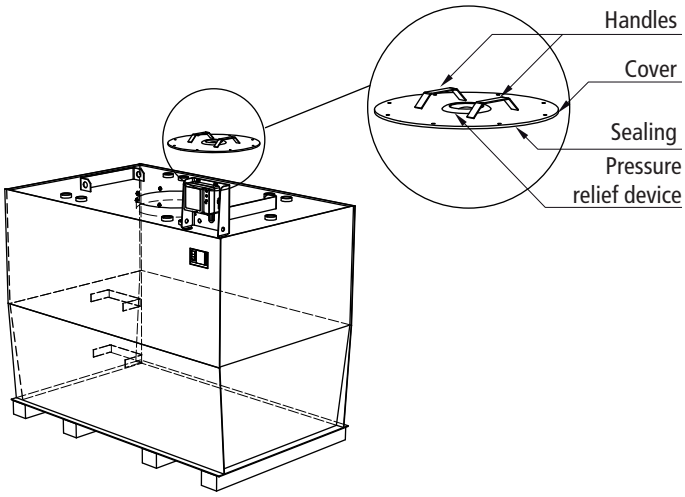
3.4.3 The Filling Pipe (Installed)

The filling pipe DN 50 is located inside the KTD.
It is attached to the tank roof via a 2˝ sleeve. This sleeve also serves to install the filler neck (see 3.5.3).
The filling pipe prevents swirling of the fluid when the tank is filled and when the fluid flows directly through the filler neck on the tank roof into the container.



3.4.4 The Manhole (Installed)

The manhole DN 500 is located in the centre of the tank roof.
The opening serves as a manhole for internal inspection and for cleaning the tank container. The pressure relief device is located in the centre of the manhole. Tanks with a volume less than 2,000 litres have instead of the manhole a inspection and cleaning opening from DN 500 or rather DN 600.

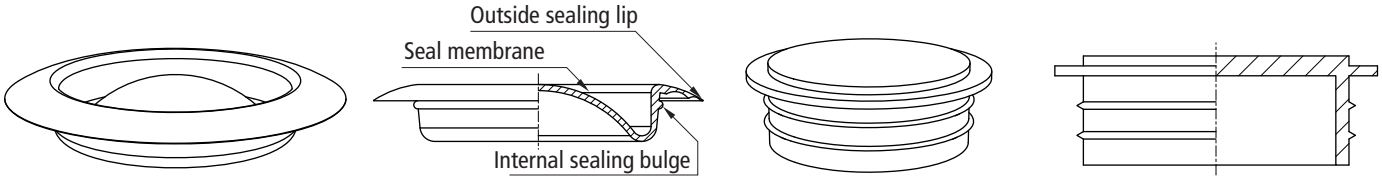


3.4.5 The Pressure Relief Device (Installed) (AM-595)

The pressure relief device is installed in the centre of the manhole on the tank roof. In the event of a sudden excess pressure, it opens to avoid that the tank bursts. The opening for the pressure relief device serves at the same time as a hand hole and inspection opening. The burst disk is made of oil-resistant material (NBR).

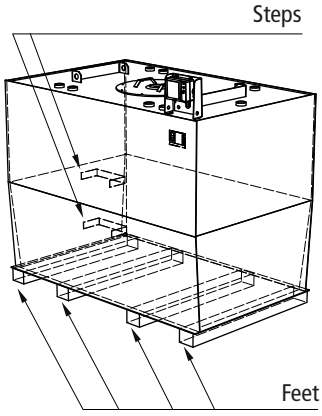
3.4.6 Transport Stoppers (Installed) (AM-948)

There are plastic transport stoppers in all sleeves of the tank container. They serve as corrosion protectors during transport. Before installing the fittings, taking the KTD into operation or any of its fittings, all transport stoppers must be removed. Unused sleeves must be closed using blind plugs.

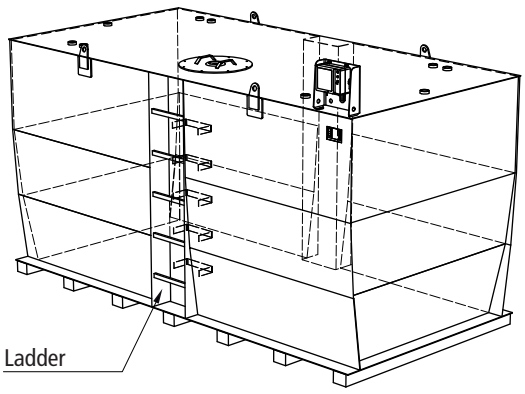


3.4.7 The Steps and Feet (Installed)

To facilitate inspections, there are steps on the inside wall of the KTD.
Tanks higher than 2000 mm are also equipped with steps on the outside wall of the KTD for climbing the roof.
The KTD is equipped with feet (height 100 mm). These prevent reliably the formation of condensation water on the outer tank bottom. They also ensure good visibility and transportability by industrial trucks.



Application Sample KTD 3.000



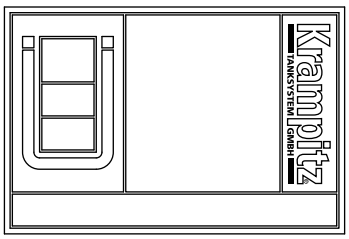
Application Sample KTD 15.000

3.4.8 Corrosion Protection When Placed Inside

Every KTD storage tank is normally coated with a 2-component textured lacquer. The standard colour of Krampitz Tanksystem GmbH for this series is RAL 7032 (pebble grey). Further RAL colours are available upon request for an extra charge. The inside of the tank is untreated and a thin oily protective film protects it from corrosion.

3.4.9 The Manufacturer's Plate

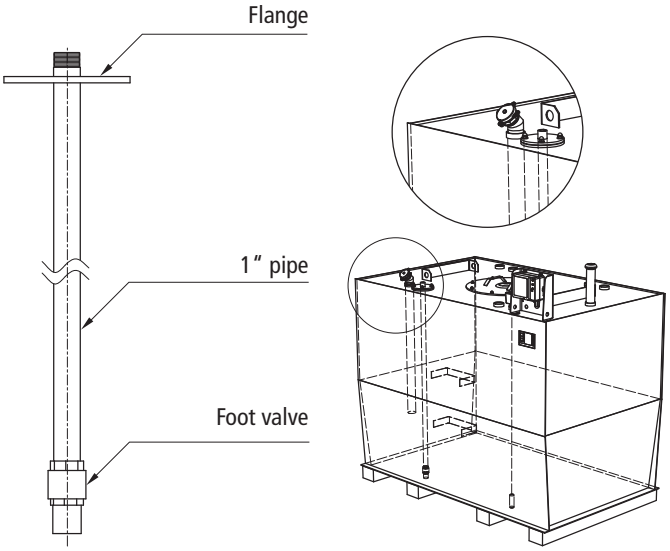
Every KTD storage tank carries a manufacturer's plate in compliance with building authority permit Z-38.12-23. On the right-hand side of the manufacturer's plate, the logo of the manufacturer, Krampitz Tanksystem GmbH, is attached. In the centre of the plate, all relevant data regarding the tank can be found (serial number, year of manufacture, test pressure, capacity, material, etc.). On the left-hand side, the mark of conformity with the EC directive for containers (short: CE mark) is affixed. The manufacturer's name, the building authority permit number and the organisation observing the manufacturer are also listed again. The manufacturer's plate is fixed on the long side of the tank. After successful inspection, the manufacturer's plate receives the inspector's mark according to DIN 6600 (bottom right).



3.5. KTD Components - Special Equipment

3.5.1 The Suction Pipe - System Flow (AM-920)

The suction pipe is installed on the roof using a flange. After successful installation of the suction pipe including the foot valve, it is connected with the system flow.

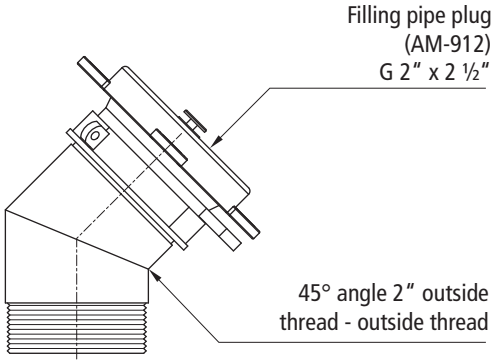


3.5.2 The System Return

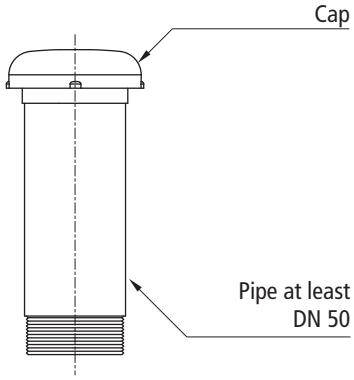
The system return can be easily installed using one of the 2˝ sleeves on the roof via a 2˝ x ¾˝ connection adapter.

3.5.3 The Filler Neck and Filling pipe plug (AM-912)

Every KTD must be equipped with a filling connection (see also TRbF 20). The 2˝ x 2 ½˝ tank lorry connection is installed using a 2˝/45° angle in a 2˝ sleeve on the tank roof. In the event that the connection is displaced from the system on-site, the connection can also be installed outside on a wall.



3.5.4 The Vent Connection with Cap (AM-911)



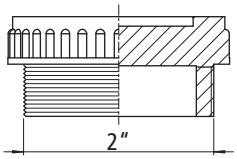
The 2˝ vent pipe is installed on the tank roof using a 2˝ connecting sleeve. If the tank is filled through the tank lorry connection by a road tank vehicle, the vent pipe must be as high above the tank roof as the filling connection used by road vehicles.
For tanks placed below the ground level (for example in the cellar), the vent connection must be installed at least 500 mm above the connection for the filling by road tank vehicles and at least 500 mm above the ground level. The vent connection must not end in closed rooms.
Exception: individual surface tanks for diesel and heating oil smaller than 1,000 litres (see TRbF 20).

3.5.5 The Adapter Set

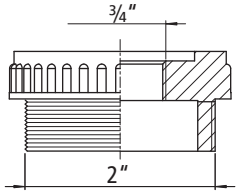
The adaptor set ensures the connection of socket fittings. The adaptors are not suitable for connecting pipes.

The adaptor set consists of:

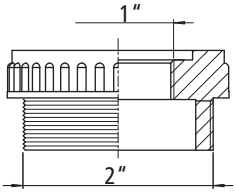
AM-099-81
6x blind plug outside thread 2"



AM-960-22P
2x reduction outside thread 2" x
inside thread ¾"

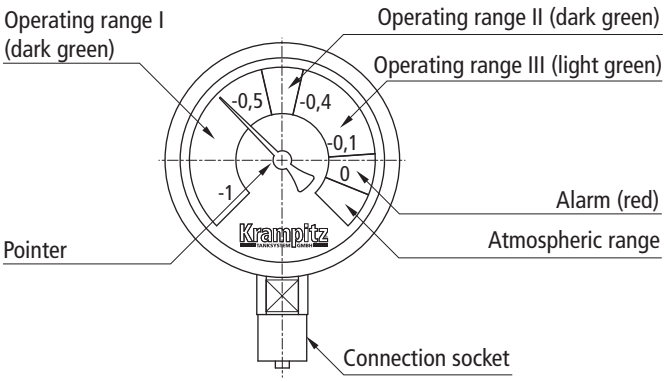


AM-960-21P
2x reduction outside thread 2" x
inside thread 1"



The 2˝ sealing plug and reduction are made of High Density Polyethylene (PE-HD). A sealing ring is used to seal the plug. Simply screw the plug tightly into the appropriate 2˝sleeve on the tank roof by hand. The knurled outside edge of the plug makes it very easy to grasp and turn.

3.5.6 The Static Vacuum Leak Indicator (AM-359)

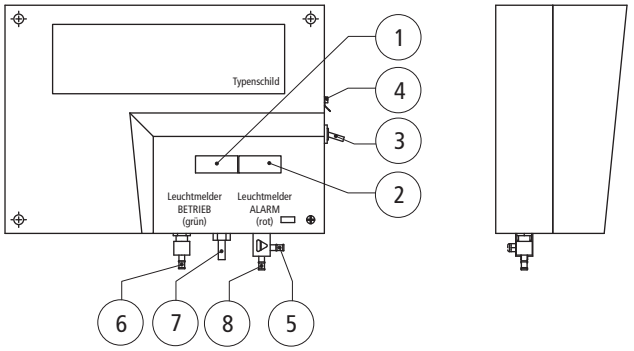


The static vacuum leak indicator is designed for tank systems without stationary power supply. It consists of a shock-resistant stainless steel case with a capsule-type pressure gauge and glycerine filling. A pointer visually indicates the alarm.
The vacuum is created by an external pump in the leak control room and secured in a vacuum-proof manner. When the negative pressure drops, the pointer enters the red field, thus indicating the alarm.

A visual inspection of the leak indicator must be conducted

- on a regular basis during operation and especially after
- every transport
- every change of place
- every initial operation
- every time the system is put into operation again
- every temporary shutdown.

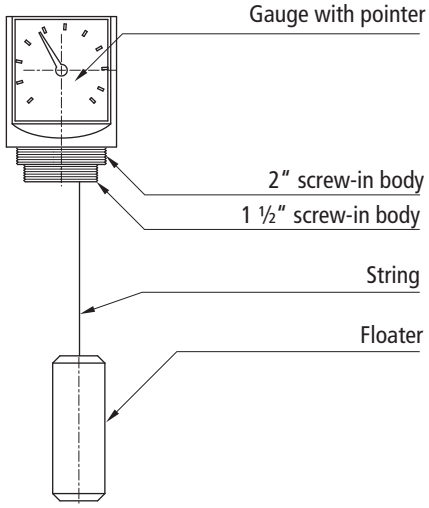
3.5.7 The electronic Vacuum Leakage Indicator (AE-354)



1 Green operating lamp
2 Red alarm lamp
3 Toggle switch
4 Seal mount
5 Check valve
6 Suction line connection
7 Exhaust line connection
8 Measuring line connection

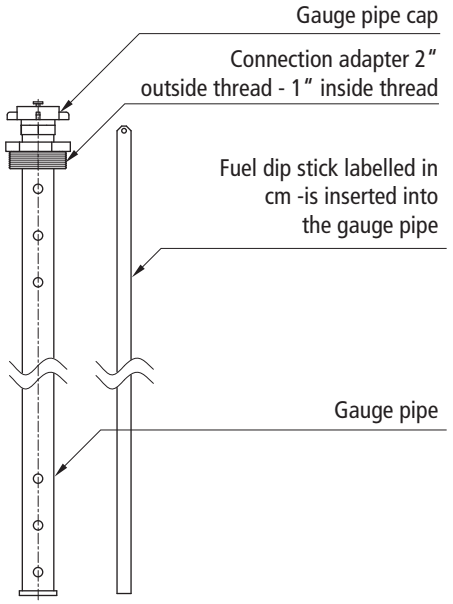
Vacuum leakage indicator for monitoring double wall tanks. The leakage indicator establishes and maintains vacuum in the monitored space of the double wall tank. If a gas leak occurs, air or fumes is taken in the monitored space and causes a vacuum drop.
Minor leaks are compensated by starting the pump. Major leaks cannot be compensated by the pump because the pump capacity is insufficient for this. In this case, vacuum will be reduced further. When the vacuum alarm threshold is obtained, visual and audible alarms are triggered.
If a liquid leakage occurs, stored medium or ground water will be taken in the monitored space. Vacuum drops and the pump starts working to restore the operating vacuum level.
After some time, stored medium or ground water will be taken in the monitored space. The liquid barrier closes and separates the pump from the monitored space.
The pump cannot produce more vacuum. Vacuum remaining in the monitored space and the measuring line is consumed by the entry of more liquid.
When the alarm threshold is obtained, visual and audible alarms are triggered. Vacuum remaining when alarm is triggered is sufficient to prevent the entry of stored medium in the environment.

3.5.8 The Mechanical Level Indicator (AM-001)



The mechanical level indicator is a float level indicator.
This permanent indicator shows the volume in percent relating to the total tank height. The level indicator consists of a screw-in body with 2´´-1 ½´´ double thread. The floater can be easily lowered into the tank using one of the 2´´ sleeves on the tank roof. Also use the sleeve to fasten the screw-in body.
The mechanical level indicator is suitable for KTDs of heights ranging from 900 to 2,000 mm.

3.5.9 The Fuel Dip Stick (AM-006)



By pulling the fuel dip stick out of the gauge pipe on the tank roof, the filling level can be determined based on the wetting level of the stick.
In order to allow for an accurate reading, the dip stick is labelled in cm.

3.5.10 Bearing charts

3.5.10.1 Bearing charts for KTD 950, KTD 1500, KTD 2000

Bearing charts - KTD 950

Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	5,46	0,7%	510	306,22	34,2%	1.010	652,38	67,7%
20	10,94	1,3%	520	312,81	34,8%	1.020	659,38	68,3%
30	16,44	2,0%	530	319,42	35,5%	1.030	666,37	69,0%
40	21,96	2,7%	540	326,06	36,2%	1.040	673,37	69,7%
50	27,50	3,4%	550	332,72	36,9%	1.050	680,37	70,4%
60	33,06	4,0%	560	339,40	37,5%	1.060	687,37	71,0%
70	38,65	4,7%	570	346,11	38,2%	1.070	694,37	71,7%
80	44,26	5,4%	580	352,84	38,9%	1.080	701,36	72,4%
90	49,88	6,0%	590	359,60	39,5%	1.090	708,36	73,0%
100	55,53	6,7%	600	366,38	40,2%	1.100	715,36	73,7%
110	61,20	7,4%	610	373,18	40,9%	1.110	722,36	74,4%
120	66,90	8,0%	620	380,00	41,5%	1.120	729,36	75,0%
130	72,61	8,7%	630	386,85	42,2%	1.130	736,35	75,7%
140	78,35	9,4%	640	393,72	42,9%	1.140	743,35	76,4%
150	84,11	10,1%	650	400,62	43,6%	1.150	750,35	77,1%
160	89,89	10,7%	660	407,54	44,2%	1.160	757,35	77,7%
170	95,69	11,4%	670	414,49	44,9%	1.170	764,35	78,4%
180	101,51	12,1%	680	421,45	45,6%	1.180	771,34	79,1%
190	107,36	12,7%	690	428,45	46,2%	1.190	778,34	79,7%
200	113,22	13,4%	700	435,44	46,9%	1.200	785,34	80,4%
210	119,11	14,1%	710	442,44	47,6%	1.210	792,34	81,1%
220	125,03	14,7%	720	449,44	48,2%	1.220	799,33	81,7%
230	130,96	15,4%	730	456,44	48,9%	1.230	806,33	82,4%
240	136,91	16,1%	740	463,43	49,6%	1.240	813,33	83,1%
250	142,89	16,8%	750	470,43	50,3%	1.250	820,33	83,8%
260	148,89	17,4%	760	477,43	50,9%	1.260	827,33	84,4%
270	154,91	18,1%	770	484,43	51,6%	1.270	834,32	85,1%
280	160,96	18,8%	780	491,43	52,3%	1.280	841,32	85,8%
290	167,03	19,4%	790	498,42	52,9%	1.290	848,32	86,4%
300	173,11	20,1%	800	505,42	53,6%	1.300	855,32	87,1%
310	179,23	20,8%	810	512,42	54,3%	1.310	862,32	87,8%
320	185,36	21,4%	820	519,42	54,9%	1.320	869,31	88,4%
330	191,52	22,1%	830	526,42	55,6%	1.330	876,31	89,1%
340	197,69	22,8%	840	533,41	56,3%	1.340	883,31	89,8%
350	203,90	23,5%	850	540,41	57,0%	1.350	890,31	90,5%
360	210,12	24,1%	860	547,41	57,6%	1.360	897,31	91,1%
370	216,37	24,8%	870	554,41	58,3%	1.370	904,30	91,8%
380	222,64	25,5%	880	561,41	59,0%	1.380	911,30	92,5%
390	228,93	26,1%	890	568,40	59,6%	1.390	918,30	93,1%
400	235,24	26,8%	900	575,40	60,3%	1.400	925,30	93,8%
410	241,58	27,5%	910	582,40	61,0%	1.410	932,30	94,5%
420	247,94	28,1%	920	589,40	61,6%	1.420	939,29	95,1%
430	254,32	28,8%	930	596,40	62,3%	1.430	946,29	95,8%
440	260,73	29,5%	940	603,39	63,0%	1.440	953,29	96,5%
450	267,16	30,2%	950	610,39	63,7%	1.450	960,29	97,2%
460	273,61	30,8%	960	617,39	64,3%	1.460	967,28	97,8%
470	280,09	31,5%	970	624,39	65,0%	1.470	974,28	98,5%
480	286,58	32,2%	980	631,38	65,7%	1.480	981,28	99,2%
490	293,11	32,8%	990	638,38	66,3%	1.490	988,28	99,8%
500	299,65	33,5%	1.000	645,38	67,0%			

Bearing charts - KTD 1500

Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	8,66	0,7%	510	478,15	34,2%	1.010	1.006,27	67,7%
20	17,35	1,3%	520	488,29	34,8%	1.020	1.016,92	68,3%
30	26,07	2,0%	530	498,45	35,5%	1.030	1.027,58	69,0%
40	34,81	2,7%	540	508,65	36,2%	1.040	1.038,24	69,7%
50	43,58	3,4%	550	518,88	36,9%	1.050	1.048,90	70,4%
60	52,39	4,0%	560	529,13	37,5%	1.060	1.059,56	71,0%
70	61,21	4,7%	570	539,42	38,2%	1.070	1.070,21	71,7%
80	70,07	5,4%	580	549,73	38,9%	1.080	1.080,87	72,4%
90	78,96	6,0%	590	560,08	39,5%	1.090	1.091,53	73,0%
100	87,87	6,7%	600	570,46	40,2%	1.100	1.102,19	73,7%
110	96,81	7,4%	610	580,86	40,9%	1.110	1.112,85	74,4%
120	105,78	8,0%	620	591,30	41,5%	1.120	1.123,50	75,0%
130	114,78	8,7%	630	601,77	42,2%	1.130	1.134,16	75,7%
140	123,81	9,4%	640	612,27	42,9%	1.140	1.144,82	76,4%
150	132,87	10,1%	650	622,80	43,6%	1.150	1.155,48	77,1%
160	141,95	10,7%	660	633,35	44,2%	1.160	1.166,13	77,7%
170	151,06	11,4%	670	643,94	44,9%	1.170	1.176,79	78,4%
180	160,20	12,1%	680	654,56	45,6%	1.180	1.187,45	79,1%
190	169,37	12,7%	690	665,21	46,2%	1.190	1.198,11	79,7%
200	178,57	13,4%	700	675,87	46,9%	1.200	1.208,77	80,4%
210	187,80	14,1%	710	686,53	47,6%	1.210	1.219,42	81,1%
220	197,06	14,7%	720	697,19	48,2%	1.220	1.230,08	81,7%
230	206,34	15,4%	730	707,84	48,9%	1.230	1.240,74	82,4%
240	215,65	16,1%	740	718,50	49,6%	1.240	1.251,40	83,1%
250	225,00	16,8%	750	729,16	50,3%	1.250	1.262,06	83,8%
260	234,37	17,4%	760	739,82	50,9%	1.260	1.272,71	84,4%
270	243,77	18,1%	770	750,48	51,6%	1.270	1.283,37	85,1%
280	253,20	18,8%	780	761,13	52,3%	1.280	1.294,03	85,8%
290	262,66	19,4%	790	771,79	52,9%	1.290	1.304,69	86,4%
300	272,14	20,1%	800	782,45	53,6%	1.300	1.315,35	87,1%
310	281,66	20,8%	810	793,11	54,3%	1.310	1.326,00	87,8%
320	291,21	21,4%	820	803,77	54,9%	1.320	1.336,66	88,4%
330	300,78	22,1%	830	814,42	55,6%	1.330	1.347,32	89,1%
340	310,38	22,8%	840	825,08	56,3%	1.340	1.357,98	89,8%
350	320,02	23,5%	850	835,74	57,0%	1.350	1.368,64	90,5%
360	329,68	24,1%	860	846,40	57,6%	1.360	1.379,29	91,1%
370	339,37	24,8%	870	857,05	58,3%	1.370	1.389,95	91,8%
380	349,09	25,5%	880	867,71	59,0%	1.380	1.400,61	92,5%
390	358,84	26,1%	890	878,37	59,6%	1.390	1.411,27	93,1%
400	368,62	26,8%	900	889,03	60,3%	1.400	1.421,92	93,8%
410	378,43	27,5%	910	899,69	61,0%	1.410	1.432,58	94,5%
420	388,27	28,1%	920	910,34	61,6%	1.420	1.443,24	95,1%
430	398,14	28,8%	930	921,00	62,3%	1.430	1.453,90	95,8%
440	408,04	29,5%	940	931,66	63,0%	1.440	1.464,56	96,5%
450	417,96	30,2%	950	942,32	63,7%	1.450	1.475,21	97,2%
460	427,92	30,8%	960	952,98	64,3%	1.460	1.485,87	97,8%
470	437,91	31,5%	970	963,63	65,0%	1.470	1.496,53	98,5%
480	447,92	32,2%	980	974,29	65,7%	1.480	1.507,19	99,2%
490	457,97	32,8%	990	984,95	66,3%	1.490	1.517,85	99,8%
500	468,05	33,5%	1.000	995,61	67,0%			

Bearing charts - KTD 2000

Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	11,96	0,7%	260	321,14	17,4%	510	650,51	34,2%	760	999,82	51,0%	1.010	1.354,47	67,7%	1.260	1.709,11	84,5%
20	23,94	1,3%	270	333,93	18,1%	520	664,11	34,9%	770	1.014,01	51,6%	1.020	1.368,65	68,4%	1.270	1.723,30	85,1%
30	35,96	2,0%	280	346,74	18,8%	530	677,75	35,5%	780	1.028,19	52,3%	1.030	1.382,84	69,1%	1.280	1.737,48	85,8%
40	48,01	2,7%	290	359,59	19,4%	540	691,42	36,2%	790	1.042,38	53,0%	1.040	1.397,02	69,7%	1.290	1.751,67	86,5%
50	60,10	3,4%	300	372,47	20,1%	550	705,13	36,9%	800	1.056,56	53,6%	1.050	1.411,21	70,4%	1.300	1.765,86	87,2%
60	72,21	4,0%	310	385,38	20,8%	560	718,86	37,5%	810	1.070,75	54,3%	1.060	1.425,40	71,1%	1.310	1.780,04	87,8%
70	84,35	4,7%	320	398,33	21,5%	570	732,63	38,2%	820	1.084,94	55,0%	1.070	1.439,58	71,7%	1.320	1.794,23	88,5%
80	96,53	5,4%	330	411,31	22,1%	580	746,44	38,9%	830	1.099,12	55,6%	1.080	1.453,77	72,4%	1.330	1.808,41	89,2%
90	108,74	6,0%	340	424,32	22,8%	590	760,28	39,6%	840	1.113,31	56,3%	1.090	1.467,95	73,1%	1.340	1.822,60	89,8%
100	120,98	6,7%	350	437,36	23,5%	600	774,15	40,2%	850	1.127,49	57,0%	1.100	1.482,14	73,8%	1.350	1.836,78	90,5%
110	133,25	7,4%	360	450,43	24,1%	610	788,05	40,9%	860	1.141,68	57,7%	1.110	1.496,32	74,4%	1.360	1.850,97	91,2%
120	145,55	8,0%	370	463,54	24,8%	620	801,99	41,6%	870	1.155,86	58,3%	1.120	1.510,51	75,1%	1.370	1.865,16	91,9%
130	157,89	8,7%	380	476,68	25,5%	630	815,97	42,2%	880	1.170,05	59,0%	1.130	1.524,70	75,8%	1.380	1.879,34	92,5%
140	170,25	9,4%	390	489,86	26,1%	640	829,97	42,9%	890	1.184,24	59,7%	1.140	1.538,88	76,4%	1.390	1.893,53	93,2%
150	182,65	10,1%	400	503,06	26,8%	650	844,02	43,6%	900	1.198,42	60,3%	1.150	1.553,07	77,1%	1.400	1.907,71	93,9%
160	195,08	10,7%	410	516,30	27,5%	660	858,09	44,3%	910	1.212,61	61,0%	1.160	1.567,25	77,8%	1.410	1.921,90	94,5%
170	207,54	11,4%	420	529,58	28,2%	670	872,20	44,9%	920	1.226,79	61,7%	1.170	1.581,44	78,4%	1.420	1.936,09	95,2%
180	220,04	12,1%	430	542,88	28,8%	680	886,34	45,6%	930	1.240,98	62,4%	1.180	1.595,63	79,1%	1.430	1.950,27	95,9%
190	232,56	12,7%	440	556,22	29,5%	690	900,52	46,3%	940	1.255,17	63,0%	1.190	1.609,81	79,8%	1.440	1.964,46	96,5%
200	245,12	13,4%	450	569,59	30,2%	700	914,71	46,9%	950	1.269,35	63,7%	1.200	1.624,00	80,5%	1.450	1.978,64	97,2%
210	257,71	14,1%	460	582,99	30,8%	710	928,89	47,6%	960	1.283,54	64,4%	1.210	1.638,18	81,1%	1.460	1.992,83	97,9%
220	270,33	14,8%	470	596,43	31,5%	720	943,08	48,3%	970	1.297,72	65,0%	1.220	1.652,37	81,8%	1.470	2.007,01	98,6%
230	282,99	15,4%	480	609,90	32,2%	730	957,26	48,9%	980	1.311,91	65,7%	1.230	1.666,55	82,5%	1.480	2.021,20	99,2%
240	295,67	16,1%	490	623,40	32,9%	740	971,45	49,6%	990	1.326,09	66,4%	1.240	1.680,74	83,1%	1.490	2.035,39	99,9%
250	308,39	16,8%	500	636,94	33,5%	750	985,63	50,3%	1.000	1.340,28	67,0%	1.250	1.694,93	83,8%			

3.5.10.2 Bearing charts for KTD 2500, KTD 3000, KTD 4000

Bearing charts - KTD 2500

Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	16,59	0,7%	510	896,02	34,2%	1.010	1.855,14	67,7%
20	33,22	1,3%	520	914,62	34,9%	1.020	1.874,46	68,4%
30	49,89	2,0%	530	933,27	35,5%	1.030	1.893,77	69,1%
40	66,59	2,7%	540	951,95	36,2%	1.040	1.913,08	69,7%
50	83,33	3,4%	550	970,68	36,9%	1.050	1.932,39	70,4%
60	100,12	4,0%	560	989,45	37,5%	1.060	1.951,71	71,1%
70	116,94	4,7%	570	1.008,25	38,2%	1.070	1.971,02	71,7%
80	133,80	5,4%	580	1.027,10	38,9%	1.080	1.990,33	72,4%
90	150,70	6,0%	590	1.045,99	39,6%	1.090	2.009,64	73,1%
100	167,64	6,7%	600	1.064,93	40,2%	1.100	2.028,95	73,8%
110	184,61	7,4%	610	1.083,90	40,9%	1.110	2.048,27	74,4%
120	201,63	8,0%	620	1.102,91	41,6%	1.120	2.067,58	75,1%
130	218,68	8,7%	630	1.121,97	42,2%	1.130	2.086,89	75,8%
140	235,78	9,4%	640	1.141,06	42,9%	1.140	2.106,20	76,4%
150	252,91	10,1%	650	1.160,20	43,6%	1.150	2.125,51	77,1%
160	270,08	10,7%	660	1.179,38	44,3%	1.160	2.144,83	77,8%
170	287,29	11,4%	670	1.198,60	44,9%	1.170	2.164,14	78,5%
180	304,54	12,1%	680	1.217,86	45,6%	1.180	2.183,45	79,1%
190	321,83	12,7%	690	1.237,16	46,3%	1.190	2.202,76	79,8%
200	339,16	13,4%	700	1.256,47	46,9%	1.200	2.222,07	80,5%
210	356,53	14,1%	710	1.275,78	47,6%	1.210	2.241,39	81,1%
220	373,94	14,8%	720	1.295,09	48,3%	1.220	2.260,70	81,8%
230	391,38	15,4%	730	1.314,40	48,9%	1.230	2.280,01	82,5%
240	408,87	16,1%	740	1.333,72	49,6%	1.240	2.299,32	83,1%
250	426,39	16,8%	750	1.353,03	50,3%	1.250	2.318,64	83,8%
260	443,96	17,4%	760	1.372,34	51,0%	1.260	2.337,95	84,5%
270	461,56	18,1%	770	1.391,65	51,6%	1.270	2.357,26	85,2%
280	479,21	18,8%	780	1.410,97	52,3%	1.280	2.376,57	85,8%
290	496,89	19,4%	790	1.430,28	53,0%	1.290	2.395,88	86,5%
300	514,61	20,1%	800	1.449,59	53,6%	1.300	2.415,20	87,2%
310	532,37	20,8%	810	1.468,90	54,3%	1.310	2.434,51	87,8%
320	550,18	21,5%	820	1.488,21	55,0%	1.320	2.453,82	88,5%
330	568,02	22,1%	830	1.507,53	55,7%	1.330	2.473,13	89,2%
340	585,90	22,8%	840	1.526,84	56,3%	1.340	2.492,44	89,8%
350	603,82	23,5%	850	1.546,15	57,0%	1.350	2.511,76	90,5%
360	621,78	24,1%	860	1.565,46	57,7%	1.360	2.531,07	91,2%
370	639,79	24,8%	870	1.584,77	58,3%	1.370	2.550,38	91,9%
380	657,83	25,5%	880	1.604,09	59,0%	1.380	2.569,69	92,5%
390	675,91	26,2%	890	1.623,40	59,7%	1.390	2.589,01	93,2%
400	694,03	26,8%	900	1.642,71	60,3%	1.400	2.608,32	93,9%
410	712,19	27,5%	910	1.662,02	61,0%	1.410	2.627,63	94,5%
420	730,39	28,2%	920	1.681,34	61,7%	1.420	2.646,94	95,2%
430	748,63	28,8%	930	1.700,65	62,4%	1.430	2.666,25	95,9%
440	766,91	29,5%	940	1.719,96	63,0%	1.440	2.685,57	96,6%
450	785,24	30,2%	950	1.739,27	63,7%	1.450	2.704,88	97,2%
460	803,60	30,8%	960	1.758,58	64,4%	1.460	2.724,19	97,9%
470	822,00	31,5%	970	1.777,90	65,0%	1.470	2.743,50	98,6%
480	840,44	32,2%	980	1.797,21	65,7%	1.480	2.762,81	99,2%
490	858,93	32,9%	990	1.816,52	66,4%	1.490	2.782,13	99,9%
500	877,45	33,5%	1.000	1.835,83	67,1%			

Bearing charts - KTD 3000

Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	21,19	0,7%	510	1.135,09	34,2%	1.010	2.335,49	67,7%
20	42,43	1,3%	520	1.158,47	34,9%	1.020	2.359,64	68,4%
30	63,70	2,0%	530	1.181,90	35,5%	1.030	2.383,79	69,1%
40	85,02	2,7%	540	1.205,37	36,2%	1.040	2.407,94	69,7%
50	106,38	3,4%	550	1.228,88	36,9%	1.050	2.432,09	70,4%
60	127,78	4,0%	560	1.252,44	37,5%	1.060	2.456,23	71,1%
70	149,23	4,7%	570	1.276,05	38,2%	1.070	2.480,38	71,7%
80	170,71	5,4%	580	1.299,69	38,9%	1.080	2.504,53	72,4%
90	192,24	6,0%	590	1.323,38	39,6%	1.090	2.528,68	73,1%
100	213,81	6,7%	600	1.347,12	40,2%	1.100	2.552,83	73,8%
110	235,43	7,4%	610	1.370,90	40,9%	1.110	2.576,98	74,4%
120	257,08	8,0%	620	1.394,72	41,6%	1.120	2.601,12	75,1%
130	278,78	8,7%	630	1.418,59	42,2%	1.130	2.625,27	75,8%
140	300,52	9,4%	640	1.442,51	42,9%	1.140	2.649,42	76,4%
150	322,30	10,1%	650	1.466,47	43,6%	1.150	2.673,57	77,1%
160	344,13	10,7%	660	1.490,47	44,3%	1.160	2.697,72	77,8%
170	366,00	11,4%	670	1.514,52	44,9%	1.170	2.721,87	78,5%
180	387,91	12,1%	680	1.538,61	45,6%	1.180	2.746,01	79,1%
190	409,86	12,7%	690	1.562,75	46,3%	1.190	2.770,16	79,8%
200	431,86	13,4%	700	1.586,89	46,9%	1.200	2.794,31	80,5%
210	453,89	14,1%	710	1.611,04	47,6%	1.210	2.818,46	81,1%
220	475,97	14,8%	720	1.635,19	48,3%	1.220	2.842,61	81,8%
230	498,10	15,4%	730	1.659,34	48,9%	1.230	2.866,76	82,5%
240	520,27	16,1%	740	1.683,49	49,6%	1.240	2.890,91	83,1%
250	542,47	16,8%	750	1.707,64	50,3%	1.250	2.915,05	83,8%
260	564,73	17,4%	760	1.731,78	51,0%	1.260	2.939,20	84,5%
270	587,02	18,1%	770	1.755,93	51,6%	1.270	2.963,35	85,2%
280	609,36	18,8%	780	1.780,08	52,3%	1.280	2.987,50	85,8%
290	631,74	19,4%	790	1.804,23	53,0%	1.290	3.011,65	86,5%
300	654,17	20,1%	800	1.828,38	53,6%	1.300	3.035,80	87,2%
310	676,63	20,8%	810	1.852,53	54,3%	1.310	3.059,94	87,8%
320	699,15	21,5%	820	1.876,67	55,0%	1.320	3.084,09	88,5%
330	721,70	22,1%	830	1.900,82	55,7%	1.330	3.108,24	89,2%
340	744,30	22,8%	840	1.924,97	56,3%	1.340	3.132,39	89,8%
350	766,94	23,5%	850	1.949,12	57,0%	1.350	3.156,54	90,5%
360	789,62	24,1%	860	1.973,27	57,7%	1.360	3.180,69	91,2%
370	812,35	24,8%	870	1.997,42	58,3%	1.370	3.204,83	91,9%
380	835,12	25,5%	880	2.021,56	59,0%	1.380	3.228,98	92,5%
390	857,93	26,2%	890	2.045,71	59,7%	1.390	3.253,13	93,2%
400	880,79	26,8%	900	2.069,86	60,3%	1.400	3.277,28	93,9%
410	903,69	27,5%	910	2.094,01	61,0%	1.410	3.301,43	94,5%
420	926,63	28,2%	920	2.118,16	61,7%	1.420	3.325,58	95,2%
430	949,62	28,8%	930	2.142,31	62,4%	1.430	3.349,72	95,9%
440	972,65	29,5%	940	2.166,45	63,0%	1.440	3.373,87	96,6%
450	995,73	30,2%	950	2.190,60	63,7%	1.450	3.398,02	97,2%
460	1.018,84	30,8%	960	2.214,75	64,4%	1.460	3.422,17	97,9%
470	1.042,01	31,5%	970	2.238,90	65,0%	1.470	3.446,32	98,6%
480	1.065,21	32,2%	980	2.263,05	65,7%	1.480	3.470,47	99,2%
490	1.088,46	32,9%	990	2.287,20	66,4%	1.490	3.494,61	99,9%
500	1.111,76	33,5%	1.000	2.311,34	67,1%			

Bearing charts - KTD 4000

Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	25,65	0,7%	260	681,80	17,4%	510	1.366,87	34,2%	760	2.080,29	51,0%	1.010	2.801,25	67,7%	1.260	3.522,21	84,5%
20	51,35	1,3%	270	708,64	18,1%	520	1.394,89	34,9%	770	2.109,12	51,6%	1.020	2.830,09	68,4%	1.270	3.551,05	85,2%
30	77,09	2,0%	280	735,53	18,8%	530	1.422,95	35,5%	780	2.137,96	52,3%	1.030	2.858,92	69,1%	1.280	3.579,89	85,8%
40	102,88	2,7%	290	762,47	19,4%	540	1.451,06	36,2%	790	2.166,80	53,0%	1.040	2.887,76	69,7%	1.290	3.608,72	86,5%
50	128,72	3,4%	300	789,45	20,1%	550	1.479,21	36,9%	800	2.195,64	53,6%	1.050	2.916,60	70,4%	1.300	3.637,56	87,2%
60	154,60	4,0%	310	816,48	20,8%	560	1.507,42	37,5%	810	2.224,48	54,3%	1.060	2.945,44	71,1%	1.310	3.666,40	87,8%
70	180,52	4,7%	320	843,56	21,5%	570	1.535,67	38,2%	820	2.253,32	55,0%	1.070	2.974,28	71,7%	1.320	3.695,24	88,5%
80	206,49	5,4%	330	870,68	22,1%	580	1.563,97	38,9%	830	2.282,15	55,7%	1.080	3.003,12	72,4%	1.330	3.724,08	89,2%
90	232,51	6,0%	340	897,85	22,8%	590	1.592,31	39,6%	840	2.310,99	56,3%	1.090	3.031,95	73,1%	1.340	3.752,92	89,8%
100	258,57	6,7%	350	925,06	23,5%	600	1.620,71	40,2%	850	2.339,83	57,0%	1.100	3.060,79	73,8%	1.350	3.781,75	90,5%
110	284,68	7,4%	360	952,32	24,1%	610	1.649,15	40,9%	860	2.368,67	57,7%	1.110	3.089,63	74,4%	1.360	3.810,59	91,2%
120	310,83	8,0%	370	979,63	24,8%	620	1.677,64	41,6%	870	2.397,51	58,3%	1.120	3.118,47	75,1%	1.370	3.839,43	91,9%
130	337,03	8,7%	380	1.006,99	25,5%	630	1.706,18	42,2%	880	2.426,35	59,0%	1.130	3.147,31	75,8%	1.380	3.868,27	92,5%
140	363,28	9,4%	390	1.034,39	26,2%	640	1.734,77	42,9%	890	2. 455,19	59,7%	1.140	3.176,15	76,4%	1.390	3.897,11	93,2%
150	389,57	10,1%	400	1.061,84	26,8%	650	1.763,40	43,6%	900	2.484,02	60,3%	1.150	3.204,99	77,1%	1.400	3.925,95	93,9%
160	415,90	10,7%	410	1.089,33	27,5%	660	1.792,08	44,3%	910	2.512,86	61,0%	1.160	3.233,82	77,8%	1.410	3.954,79	94,5%
170	442,29	11,4%	420	1.116,88	28,2%	670	1.820,81	44,9%	920	2.541,70	61,7%	1.170	3.262,66	78,5%	1.420	3.983,62	95,2%
180	468,71	12,1%	430	1.144,46	28,8%	680	1.849,59	45,6%	930	2.570,54	62,4%	1.180	3.291,50	79,1%	1.430	4.012,46	95,9%
190	495,19	12,7%	440	1.172,10	29,5%	690	1.878,42	46,3%	940	2.599,38	63,0%	1.190	3.320,34	79,8%	1.440	4.041,30	96,6%
200	521,71	13,4%	450	1.199,78	30,2%	700	1.907,25	46,9%	950	2.628,22	63,7%	1.200	3.349,18	80,5%	1.450	4.070,14	97,2%
210	548,28	14,1%	460	1.227,51	30,8%	710	1.936,09	47,6%	960	2.657,05	64,4%	1.210	3.378,02	81,1%	1.460	4.098,98	97,9%
220	574,89	14,8%	470	1.255,29	31,5%	720	1.964,93	48,3%	970	2.685,89	65,0%	1.220	3.406,85	81,8%	1.470	4.127,82	98,6%
230	601,55	15,4%	480	1.283,12	32,2%	730	1.993,77	48,9%	980	2.714,73	65,7%	1.230	3.435,69	82,5%	1.480	4.156,65	99,2%
240	628,25	16,1%	490	1.310,99	32,9%	740	2.022,61	49,6%	990	2.743,57	66,4%	1.240	3.464,53	83,1%	1.490	4.185,49	99,9%
250	655,00	16,8%	500	1.338,91	33,5%	750	2.051,45	50,3%	1.000	2.772,41	67,1%	1.250	3.493,37	83,8%			

3.5.10.3 Bearing charts for KTD 6000, KTD 9000

Bearing charts - KTD 6000

Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	37,65	0,7%	510	1.988,48	34,2%	1.010	4.048,04	67,7%
20	75,34	1,3%	520	2.028,89	34,9%	1.020	4.089,40	68,4%
30	113,09	2,0%	530	2.069,35	35,5%	1.030	4.130,77	69,1%
40	150,90	2,7%	540	2.109,87	36,2%	1.040	4.172,14	69,7%
50	188,76	3,4%	550	2.150,44	36,9%	1.050	4.213,50	70,4%
60	226,67	4,0%	560	2.191,07	37,5%	1.060	4.254,87	71,1%
70	264,63	4,7%	570	2.231,75	38,2%	1.070	4.296,24	71,7%
80	302,65	5,4%	580	2.272,49	38,9%	1.080	4.337,60	72,4%
90	340,72	6,0%	590	2.313,28	39,6%	1.090	4.378,97	73,1%
100	378,85	6,7%	600	2.354,13	40,2%	1.100	4.420,34	73,8%
110	417,03	7,4%	610	2.395,04	40,9%	1.110	4.461,70	74,4%
120	455,26	8,0%	620	2.436,00	41,6%	1.120	4.503,07	75,1%
130	493,54	8,7%	630	2.477,02	42,2%	1.130	4.544,44	75,8%
140	531,88	9,4%	640	2.518,09	42,9%	1.140	4.585,80	76,4%
150	570,27	10,1%	650	2.559,22	43,6%	1.150	4.627,17	77,1%
160	608,72	10,7%	660	2.600,41	44,3%	1.160	4.668,54	77,8%
170	647,22	11,4%	670	2.641,65	44,9%	1.170	4.709,91	78,5%
180	685,78	12,1%	680	2.682,94	45,6%	1.180	4.751,27	79,1%
190	724,38	12,7%	690	2.724,30	46,3%	1.190	4.792,64	79,8%
200	763,04	13,4%	700	2.765,66	46,9%	1.200	4.834,01	80,5%
210	801,76	14,1%	710	2.807,03	47,6%	1.210	4.875,37	81,1%
220	840,53	14,8%	720	2.848,40	48,3%	1.220	4.916,74	81,8%
230	879,35	15,4%	730	2.889,76	48,9%	1.230	4.958,11	82,5%
240	918,23	16,1%	740	2.931,13	49,6%	1.240	4.999,47	83,1%
250	957,16	16,8%	750	2.972,50	50,3%	1.250	5.040,84	83,8%
260	996,15	17,4%	760	3.013,86	51,0%	1.260	5.082,21	84,5%
270	1.035,19	18,1%	770	3.055,23	51,6%	1.270	5.123,57	85,2%
280	1.074,28	18,8%	780	3.096,60	52,3%	1.280	5.164,94	85,8%
290	1.113,43	19,4%	790	3.137,96	53,0%	1.290	5.206,31	86,5%
300	1.152,63	20,1%	800	3.179,33	53,6%	1.300	5.247,67	87,2%
310	1.191,89	20,8%	810	3.220,70	54,3%	1.310	5.289,04	87,8%
320	1.231,20	21,5%	820	3.262,06	55,0%	1.320	5.330,41	88,5%
330	1.270,56	22,1%	830	3.303,43	55,7%	1.330	5.371,78	89,2%
340	1.309,98	22,8%	840	3.344,80	56,3%	1.340	5.413,14	89,8%
350	1.349,46	23,5%	850	3.386,17	57,0%	1.350	5.454,51	90,5%
360	1.388,99	24,1%	860	3.427,53	57,7%	1.360	5.495,88	91,2%
370	1.428,57	24,8%	870	3.468,90	58,3%	1.370	5.537,24	91,9%
380	1.468,21	25,5%	880	3.510,27	59,0%	1.380	5.578,61	92,5%
390	1.507,90	26,2%	890	3.551,63	59,7%	1.390	5.619,98	93,2%
400	1.547,65	26,8%	900	3.593,00	60,3%	1.400	5.661,34	93,9%
410	1.587,45	27,5%	910	3.634,37	61,0%	1.410	5.702,71	94,5%
420	1.627,31	28,2%	920	3.675,73	61,7%	1.420	5.744,08	95,2%
430	1.667,22	28,8%	930	3.717,10	62,4%	1.430	5.785,44	95,9%
440	1.707,18	29,5%	940	3.758,47	63,0%	1.440	5.826,81	96,6%
450	1.747,20	30,2%	950	3.799,83	63,7%	1.450	5.868,18	97,2%
460	1.787,28	30,8%	960	3.841,20	64,4%	1.460	5.909,54	97,9%
470	1.827,41	31,5%	970	3.882,57	65,0%	1.470	5.950,91	98,6%
480	1.867,60	32,2%	980	3.923,93	65,7%	1.480	5.992,28	99,2%
490	1.907,84	32,9%	990	3.965,30	66,4%	1.490	6.033,65	99,9%
500	1.948,13	33,5%	1.000	4.006,67	67,1%			

Bearing charts - KTD 9000

Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	59,39	0,7%	510	3113,73	34,2%	1.010	6.301,73	67,7%
20	118,85	1,3%	520	3.176,52	34,9%	1.020	6.365,71	68,4%
30	178,38	2,0%	530	3.239,39	35,5%	1.030	6.429,69	69,1%
40	237,97	2,7%	540	3.302,32	36,2%	1.040	6.493,66	69,7%
50	297,63	3,4%	550	3.365,32	36,9%	1.050	6.557,64	70,4%
60	357,35	4,0%	560	3.428,39	37,5%	1.060	6.621,61	71,1%
70	417,14	4,7%	570	3.491,53	38,2%	1.070	6.685,59	71,7%
80	477,00	5,4%	580	3.554,74	38,9%	1.080	6.749,56	72,4%
90	536,92	6,0%	590	3.618,01	39,6%	1.090	6.813,54	73,1%
100	596,90	6,7%	600	3.681,35	40,2%	1.100	6.877,52	73,8%
110	656,96	7,4%	610	3.744,76	40,9%	1.110	6.941,49	74,4%
120	717,08	8,0%	620	3.808,24	41,6%	1.120	7.005,47	75,1%
130	777,26	8,7%	630	3.871,79	42,2%	1.130	7.069,44	75,8%
140	837,51	9,4%	640	3.935,41	42,9%	1.140	7.133,42	76,4%
150	897,83	10,1%	650	3.999,09	43,6%	1.150	7.197,40	77,1%
160	958,22	10,7%	660	4.062,84	44,3%	1.160	7.261,37	77,8%
170	1.018,67	11,4%	670	4.126,66	44,9%	1.170	7.325,35	78,5%
180	1.079,18	12,1%	680	4.190,55	45,6%	1.180	7.389,32	79,1%
190	1.139,77	12,7%	690	4.254,51	46,3%	1.190	7.453,30	79,8%
200	1.200,42	13,4%	700	4.318,49	46,9%	1.200	7.517,27	80,5%
210	1.261,13	14,1%	710	4.382,46	47,6%	1.210	7.581,25	81,1%
220	1.321,92	14,8%	720	4.446,44	48,3%	1.220	7.645,23	81,8%
230	1.382,76	15,4%	730	4.510,41	48,9%	1.230	7.709,20	82,5%
240	1.443,68	16,1%	740	4.574,39	49,6%	1.240	7.773,18	83,1%
250	1.504,66	16,8%	750	4.638,36	50,3%	1.250	7.837,15	83,8%
260	1.565,71	17,4%	760	4.702,34	51,0%	1.260	7.901,13	84,5%
270	1.626,83	18,1%	770	4.766,32	51,6%	1.270	7.965,10	85,2%
280	1.688,01	18,8%	780	4.830,29	52,3%	1.280	8.029,08	85,8%
290	1.749,26	19,4%	790	4.894,27	53,0%	1.290	8.093,06	86,5%
300	1.810,58	20,1%	800	4.958,24	53,6%	1.300	8.157,03	87,2%
310	1.871,96	20,8%	810	5.022,22	54,3%	1.310	8.221,01	87,8%
320	1.933,41	21,5%	820	5.086,19	55,0%	1.320	8.284,98	88,5%
330	1.994,93	22,1%	830	5.150,17	55,7%	1.330	8.348,96	89,2%
340	2.056,51	22,8%	840	5.214,15	56,3%	1.340	8.412,93	89,8%
350	2.118,16	23,5%	850	5.278,12	57,0%	1.350	8.476,91	90,5%
360	2.179,88	24,1%	860	5.342,10	57,7%	1.360	8.540,89	91,2%
370	2.241,67	24,8%	870	5.406,07	58,3%	1.370	8.604,86	91,9%
380	2.303,52	25,5%	880	5.470,05	59,0%	1.380	8.668,84	92,5%
390	2.365,44	26,2%	890	5.534,03	59,7%	1.390	8.732,81	93,2%
400	2.427,42	26,8%	900	5.598,00	60,3%	1.400	8.796,79	93,9%
410	2.489,48	27,5%	910	5.661,98	61,0%	1.410	8.860,77	94,5%
420	2.551,60	28,2%	920	5.725,95	61,7%	1.420	8.924,74	95,2%
430	2.613,79	28,8%	930	5.789,93	62,4%	1.430	8.988,72	95,9%
440	2.676,04	29,5%	940	5.853,90	63,0%	1.440	9.052,69	96,6%
450	2.738,37	30,2%	950	5.917,88	63,7%	1.450	9.116,67	97,2%
460	2.800,76	30,8%	960	5.981,86	64,4%	1.460	9.180,64	97,9%
470	2.863,22	31,5%	970	6.045,83	65,0%	1.470	9.244,62	98,6%
480	2.925,74	32,2%	980	6.109,81	65,7%	1.480	9.308,60	99,2%
490	2.988,34	32,9%	990	6.173,78	66,4%	1.490	9.372,57	99,9%
500	3.051,00	33,5%	1.000	6.237,76	67,1%			

3.5.10.4 Bearing charts for KTD 12000, KTD 15000

Bearing charts - KTD 12000

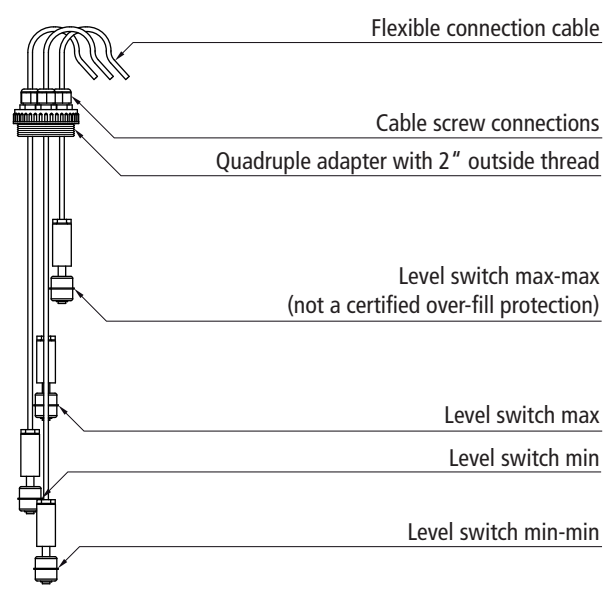
Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	54,21	0,5%	670	3.918	33,7%	1.330	8.179	67,0%
20	108,55	1,0%	680	3.980	34,2%	1.340	8.245	67,5%
30	163,02	1,5%	690	4.043	34,7%	1.350	8.311	68,0%
40	217, 61	2,0%	700	4.105	35,2%	1.360	8.377	68,5%
50	272,33	2,5%	710	4.168	35,8%	1.370	8.443	69,0%
60	327,18	3,0%	720	4.231	36,3%	1.380	8.509	69,5%
70	382,15	3,5%	730	4.294	36,8%	1.390	8.575	70,0%
80	437,26	4,0%	740	4.357	37,3%	1.400	8.641	70,5%
90	492,49	4,5%	750	4.419	37,8%	1.410	8.707	71,0%
100	547,85	5,0%	760	4.482	38,3%	1.420	8.773	71,5%
110	603,33	5,5%	770	4.546	38,8%	1.430	8.839	72,0%
120	658,95	6,0%	780	4.609	39,3%	1.440	8.905	72,5%
130	714,69	6,5%	790	4.672	39,8%	1.450	8.971	73,0%
140	770,57	7,0%	800	4.735	40,3%	1.460	9.037	73,5%
150	826,57	7,6%	810	4.798	40,8%	1.470	9.103	74,0%
160	882,70	8,1%	820	4.862	41,3%	1.480	9.169	74,5%
170	938,96	8,6%	830	4.925	41,8%	1.490	9.235	75,0%
180	995,35	9,1%	840	4.989	42,3%	1.500	9.300	75,5%
190	1.051,87	9,6%	850	5.052	42,8%	1.510	9.366	76,0%
200	1.108,51	10,1%	860	5.116	43,3%	1.520	9.432	76,5%
210	1.165,29	10,6%	870	5.180	43,8%	1.530	9.498	77,0%
220	1.222,20	11,1%	880	5.244	44,3%	1.540	9.564	77,5%
230	1.279,24	11,6%	890	5.308	44,8%	1.550	9.630	78,0%
240	1.336,41	12,1%	900	5.372	45,3%	1.560	9.696	78,6%
250	1.393,70	12,6%	910	5.436	45,8%	1.570	9.762	79,1%
260	1.451,13	13,1%	920	5.500	46,3%	1.580	9.828	79,6%
270	1.508,69	13,6%	930	5.564	46,8%	1.590	9.894	80,1%
280	1.566,38	14,1%	940	5.628	47,3%	1.600	9.960	80,6%
290	1.624,20	14,6%	950	5.692	47,8%	1.610	10.026	81,1%
300	1.682,16	15,1%	960	5.757	48,3%	1.620	10.092	81,6%
310	1.740,24	15,6%	970	5.821	48,8%	1.630	10.158	82,1%
320	1.798,46	16,1%	980	5.886	49,3%	1.640	10.224	82,6%
330	1.856,81	16,6%	990	5.950	49,8%	1.650	10.290	83,1%
340	1.915,28	17,1%	1.000	6.015	50,4%	1.660	10.356	83,6%
350	1.973,90	17,6%	1.010	6.080	50,9%	1.670	10.422	84,1%
360	2.032,64	18,1%	1.020	6.144	51,4%	1.680	10.488	84,6%
370	2.091,51	18,6%	1.030	6.209	51,9%	1.690	10.554	85,1%
380	2.150,52	19,1%	1.040	6.274	52,4%	1.700	10.620	85,6%
390	2.209,66	19,6%	1.050	6.339	52,9%	1.710	10.685	86,1%
400	2.268,94	20,1%	1.060	6.404	53,4%	1.720	10.751	86,6%
410	2.328,34	20,6%	1.070	6.469	53,9%	1.730	10.817	87,1%
420	2.387,88	21,1%	1.080	6.534	54,4%	1.740	10.883	87,6%
430	2.447,56	21,7%	1.090	6.600	54,9%	1.750	10.949	88,1%
440	2.507,36	22,2%	1.100	6.665	55,4%	1.760	11.015	88,6%
450	2.567,30	22,7%	1.110	6.730	55,9%	1.770	11.081	89,1%
460	2.627,38	23,2%	1.120	6.796	56,4%	1.780	11.147	89,6%
470	2.687,58	23,7%	1.130	6.861	56,9%	1.790	11.213	90,1%
480	2.747,93	24,2%	1.140	6.927	57,4%	1.800	11.279	90,6%
490	2.808,40	24,7%	1.150	6.993	57,9%	1.810	11.345	91,1%
500	2.869,01	25,2%	1.160	7.058	58,4%	1.820	11.411	91,6%
510	2.930	25,7%	1.170	7.124	58,9%	1.830	11.477	92,1%
520	2.991	26,2%	1.180	7.190	59,4%	1.840	11.543	92,6%
530	3.052	26,7%	1.190	7.256	59,9%	1.850	11.609	93,2%
540	3.113	27,2%	1.200	7.322	60,4%	1.860	11.675	93,7%
550	3.174	27,7%	1.210	7.388	60,9%	1.870	11.741	94,2%
560	3.236	28,2%	1.220	7.454	61,4%	1.880	11.807	94,7%
570	3.297	28,7%	1.230	7.520	61,9%	1.890	11.873	95,2%
580	3.359	29,2%	1.240	7.586	62,4%	1.900	11.939	95,7%
590	3.421	29,7%	1.250	7.652	62,9%	1.910	12.005	96,2%
600	3.483	30,2%	1.260	7.718	63,4%	1.920	12.070	96,7%
610	3.544	30,7%	1.270	7.784	63,9%	1.930	12.136	97,2%
620	3.607	31,2%	1.280	7.850	64,5%	1.940	12.202	97,7%
630	3.669	31,7%	1.290	7.915	65,0%	1.950	12.268	98,2%
640	3.731	32,2%	1.300	7.981	65,5%	1.960	12.334	98,7%
650	3.793	32,7%	1.310	8.047	66,0%	1.970	12.400	99,2%
660	3.855	33,2%	1.320	8.113	66,5%	1.980	12.466	99,7%

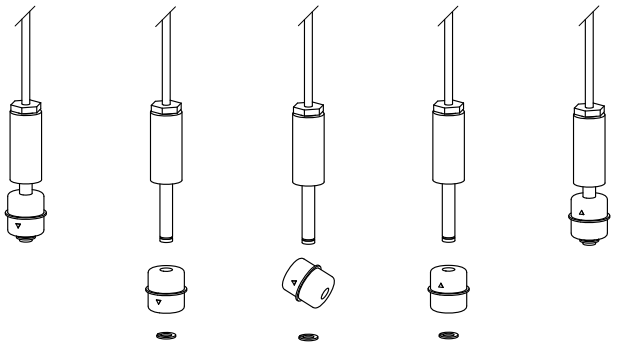
Bearing charts - KTD 15000

Level mm	Content Liter	Level %	Level mm	Content Liter	Level %	Level mm	Content Liter	Level %
10	62,76	0,5%	670	4.521	33,7%	1.330	9.419	67,0%
20	125,66	1,0%	680	4.593	34,2%	1.340	9.495	67,5%
30	188,70	1,5%	690	4.665	34,7%	1.350	9.571	68,0%
40	251,89	2,0%	700	4.737	35,2%	1.360	9.647	68,5%
50	315,21	2,5%	710	4.809	35,8%	1.370	9.722	69,0%
60	378,68	3,0%	720	4.882	36,3%	1.380	9.798	69,5%
70	442,28	3,5%	730	4.954	36,8%	1.390	9.874	70,0%
80	506,03	4,0%	740	5.026	37,3%	1.400	9.950	70,5%
90	569,93	4,5%	750	5.099	37,8%	1.410	10.025	71,0%
100	633,96	5,0%	760	5.171	38,3%	1.420	10.101	71,5%
110	698,13	5,5%	770	5.244	38,8%	1.430	10.177	72,0%
120	762,45	6,0%	780	5.316	39,3%	1.440	10.253	72,5%
130	826,91	6,5%	790	5.389	39,8%	1.450	10.328	73,0%
140	891,52	7,0%	800	5.462	40,3%	1.460	10.404	73,5%
150	956,26	7,6%	810	5.535	40,8%	1.470	10.480	74,0%
160	1.021,15	8,1%	820	5.608	41,3%	1.480	10.556	74,5%
170	1.086,19	8,6%	830	5.681	41,8%	1.490	10.631	75,0%
180	1.151,36	9,1%	840	5.754	42,3%	1.500	10.707	75,5%
190	1.216,68	9,6%	850	5.827	42,8%	1.510	10.783	76,0%
200	1.282,14	10,1%	860	5.900	43,3%	1.520	10.858	76,5%
210	1.347,75	10,6%	870	5.973	43,8%	1.530	10.934	77,0%
220	1.413,50	11,1%	880	6.047	44,3%	1.540	11.010	77,5%
230	1.479,40	11,6%	890	6.120	44,8%	1.550	11.086	78,0%
240	1.545,44	12,1%	900	6.194	45,3%	1.560	11.161	78,6%
250	1.611,62	12,6%	910	6.267	45,8%	1.570	11.237	79,1%
260	1.677,95	13,1%	920	6.341	46,3%	1.580	11.313	79,6%
270	1.744,43	13,6%	930	6.415	46,8%	1.590	11.389	80,1%
280	1.811,04	14,1%	940	6.489	47,3%	1.600	11.464	80,6%
290	1.877,81	14,6%	950	6.563	47,8%	1.610	11.540	81,1%
300	1.944,72	15,1%	960	6.637	48,3%	1.620	11.616	81,6%
310	2.011,77	15,6%	970	6.711	48,8%	1.630	11.692	82,1%
320	2.078,97	16,1%	980	6.785	49,3%	1.640	11.767	82,6%
330	2.146,32	16,6%	990	6.859	49,8%	1.650	11.843	83,1%
340	2.213,81	17,1%	1.000	6.933	50,4%	1.660	11.919	83,6%
350	2.281,45	17,6%	1.010	7.008	50,9%	1.670	11.995	84,1%
360	2.349,23	18,1%	1.020	7.082	51,4%	1.680	12.070	84,6%
370	2.417,16	18,6%	1.030	7.157	51,9%	1.690	12.146	85,1%
380	2.485,24	19,1%	1.040	7.231	52,4%	1.700	12.222	85,6%
390	2.553,46	19,6%	1.050	7.306	52,9%	1.710	12.297	86,1%
400	2.621,83	20,1%	1.060	7.381	53,4%	1.720	12.373	86,6%
410	2.690,35	20,6%	1.070	7.455	53,9%	1.730	12.449	87,1%
420	2.759,02	21,1%	1.080	7.530	54,4%	1.740	12.525	87,6%
430	2.827,83	21,7%	1.090	7.605	54,9%	1.750	12.600	88,1%
440	2.896,79	22,2%	1.100	7.680	55,4%	1.760	12.676	88,6%
450	2.965,90	22,7%	1.110	7.755	55,9%	1.770	12.752	89,1%
460	3.035,15	23,2%	1.120	7.831	56,4%	1.780	12.828	89,6%
470	3.104,55	23,7%	1.130	7.906	56,9%	1.790	12.903	90,1%
480	3.174,11	24,2%	1.140	7.981	57,4%	1.800	12.979	90,6%
490	3.243,81	24,7%	1.150	8.057	57,9%	1.810	13.055	91,1%
500	3.313,65	25,2%	1.160	8.132	58,4%	1.820	13.131	91,6%
510	3.384	25,7%	1.170	8.208	58,9%	1.830	13.206	92,1%
520	3.454	26,2%	1.180	8.283	59,4%	1.840	13.282	92,6%
530	3.524	26,7%	1.190	8.359	59,9%	1.850	13.358	93,2%
540	3.595	27,2%	1.200	8.435	60,4%	1.860	13.434	93,7%
550	3.665	27,7%	1.210	8.511	60,9%	1.870	13.509	94,2%
560	3.736	28,2%	1.220	8.586	61,4%	1.880	13.585	94,7%
570	3.807	28,7%	1.230	8.662	61,9%	1.890	13.661	95,2%
580	3.878	29,2%	1.240	8.738	62,4%	1.900	13.736	95,7%
590	3.949	29,7%	1.250	8.814	62,9%	1.910	13.812	96,2%
600	4.020	30,2%	1.260	8.889	63,4%	1.920	13.888	96,7%
610	4.092	30,7%	1.270	8.965	63,9%	1.930	13.964	97,2%
620	4.163	31,2%	1.280	9.041	64,5%	1.940	14.039	97,7%
630	4.235	31,7%	1.290	9.116	65,0%	1.950	14.115	98,2%
640	4.306	32,2%	1.300	9.192	65,5%	1.960	14.191	98,7%
650	4.378	32,7%	1.310	9.268	66,0%	1.970	14.267	99,2%
660	4.450	33,2%	1.320	9.344	66,5%	1.980	14.342	99,7%

3.5.11 The Level Sensor

3.5.11.1 The Filling Level Switch (Mini Detector) (AE-100-E)





unplug turn 180° plug back on

The level switch is made of stainless steel and is equipped with a flexible, oil-proof cable. The permissible temperature range for the cable is between -5°C and +50°C. The 5-meter-long connection cable is directly connected to the system control.

Level sensors detect the level filling level of a fluid in a tank. Two systems can be distinguished:
a.) a switching system with level switches and
b.) an electronic measuring system with sensors.

Level switches allow for using signals for automatic control, adjustment or signalling. An electronic measuring system converts the signal from the sensor into the respective switch signal and filling level using the pertaining evaluation electronics. If a level sensor of an electronic over-fill protection is used, the evaluation electronics convert the sensor signal into the respective switch signal.

Technical data		
Switching voltage	max. 200 V DC / max. 120 V AC	
Switching capacity	max. 10 W	
Contact resistance	max. 0.5 mOhm	
Switching current	max. 0.5 A	
Cable size	2 x 0.5 mm^2 x 5,000 mm	
Material	floater, weight, shaft	stainless steel
	cable	PVC

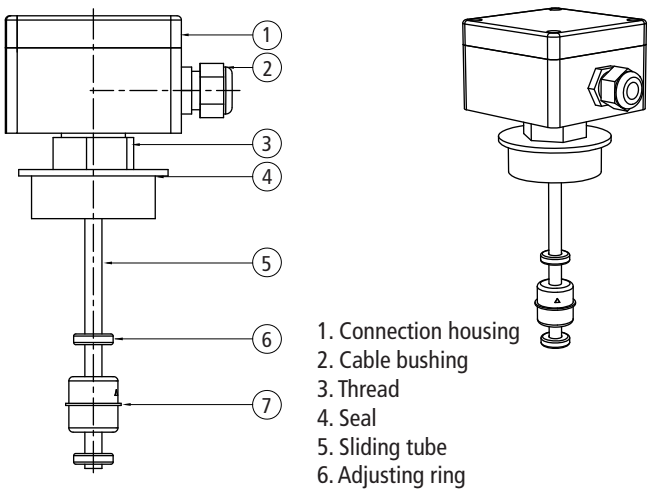
ATTENTION Observe the technical data of the switch.

The electronic level switch (mini detector) serves the control and indication of accurately defined filling levels of the tank. When using a 4-cable screw connection, up to four level switches can be installed in a tank. A certified level switch is not required because it is only used as an operating contact within tank systems, for example for the pump controls „Pump On" (minimum contact) or „Pump Off" (maximum contact). For the alarm switch point „Overfilled" (max-max) only certified over-fill protections must be used.
The level switch can also be used to detect leaks.

The cable screw connections of the quadruple adapter allow for adjusting the desired level of the level switch and fastening it on this level. By turning the floater by 180° on the switch shaft, the level switch can be easily converted from a normally-closed contact into a normally-open contact.

3.5.11.2 Tank Level Indicator with Stable Floater Sliding Tube (AE-111)

Tank level indicators are usually used for the automatic switching on and off of pumps, if the prescribed maximum or minimum levels in tanks are violated. In addition, remote signalling or automatic emergency shutdowns – in (for example) the case that the tank level falls below the minimum level prescribed – are possible. There are two types of tank level indicators - fixed and flexible. Fixed level indicators have a massive metal sliding tube (normally of brass or stainless steel), on which a floater with an integrated magnetic ring glides in the sliding tube via an electrical reed contact switch – the magnetic ring serving to open or close the reed contact, as appropriate.

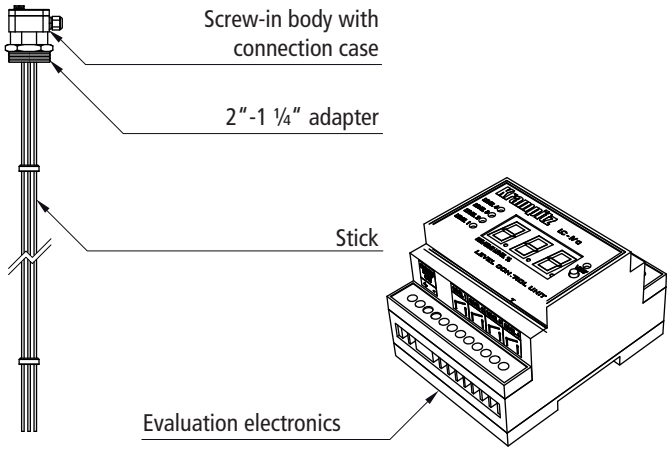


1. Connection housing
2. Cable bushing
3. Thread
4. Seal
5. Sliding tube
6. Adjusting ring
7. Floater

Contact function: changeover switch
Max. voltage: 250 V AC/DC
Switching current: 1 A, AC / 0.5 A DC
Switching capacity: 40 VA; cos fi > 0.7 / 5 W

Assembly and operation
Screw-in thread (insert from above). Several switching points are possible per floater magnetic switch (up to 4 on the standard model; a higher number available on request). Length of sliding tube up to 2,000 m per piece (sliding tubes longer than 2,000 mm are available on request).
Area of application
Suitable for nearly all liquids. With special models, layer separation level measuring is possible.
Output
S' switch: closes on floater rising
O' switch: opens on floater rising
U' switch: change-over contact (SPDT - simple changer).

3.5.12 The Electronic Level Indicator (AE-115-VI)



For a comfortable detection of the filling level, the KTD can be equipped with an electronic level indicator.
The electronic level indicator Level Control VI is a complete measuring system for detecting filling levels of containers. The system allows to adjust the tank height and to set up to four limiting values. The relay contacts are galvanically isolated from the system. The evaluation unit of the system shows the filling level in percent.
The electronic level indicator is certified and calibrated before delivery.

3.5.13 The Over-Fill Protection

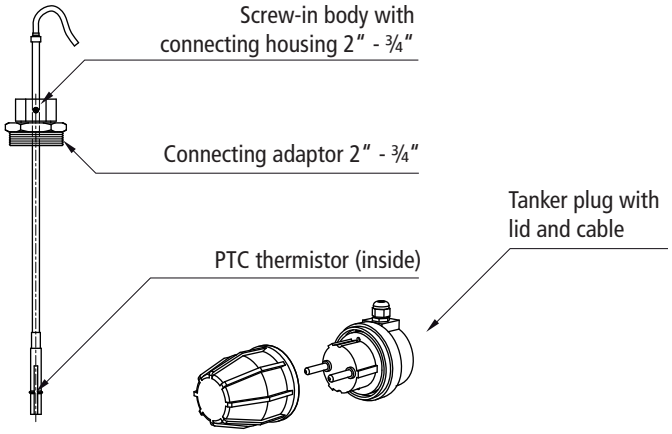
Every tank for the storage of diesel fuel or heating oil, which is filled via a tank lorry connection, must be equipped with an overfill protection which interrupts the filling process or triggers an alarm sound before reaching the permissible filling level.
This does not apply to surface tanks with a capacity below 1,000 litres which are manually filled via nozzle without stationary connection.
Tanks with a capacity of more than 1,000 litres for the storage of diesel fuel or heating oil which are filled by road tank vehicles or through demountable tanks must be equipped with a limiting value transmitter, which serves as an overfill protection (see also TRbF 20 article 5.3).

Tanks for the storage of other liquids hazardous to water and flammable substances, such as mineral oil, which are filled automatically, must be equipped with a certified overfill protection.
The over-fill protection must not be used as an operational switch point for controlling the refill device.

NOTE The used overfill protection must be certified for the respective storage tank.

NOTE Tanks must not be filled exceeding the permissible filling level. The permissible filling level depends on the tank type (cubic expansion coefficient; see also TRbF 20, article 5.3) and is 95% of the tank height in case of the KTD.

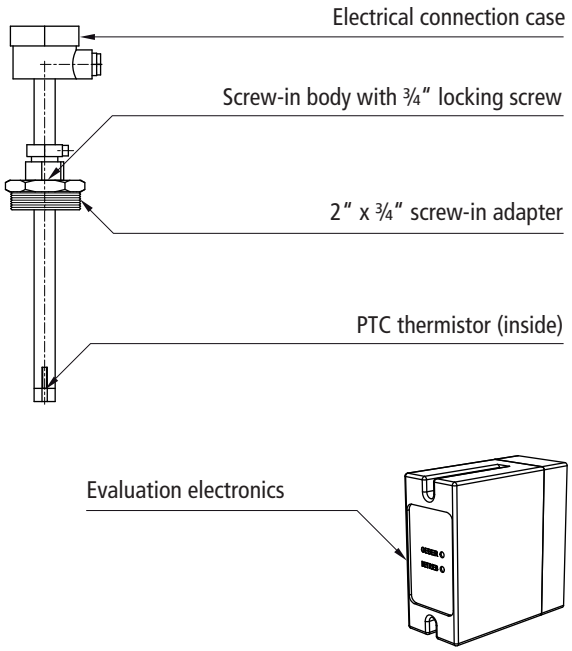
3.5.13.1 The Limiting-Value Transmitter with PTC Thermistor - Only for Diesel Fuel and Heating Oil (AE-250)



The tank level indicator based on a PTC thermistor for the approved over-fill protection is installed using a 2˝ x ¾ ˝ connection adaptor in a 2˝ sleeve in the tank roof.
In combination with the over-fill protection (evaluation electronics) on road tank vehicles, the limiting-value transmitter is a device preventing the overfilling of stationary tanks.
Stationary tanks for the storage of diesel fuel or heating oil which are filled by road tank vehicles must be equipped with a limiting-value transmitter.
Exception: tanks with a capacity less than 1,000 litres (see also installation instructions for limiting-value transmitter).

3.5.13.2 The Overfill Protection (AE-200) with Evaluation Electronics (AE-201)

The PTC thermistor-based level sensor of the certified overfill protection is installed via a 2˝ x ¾ ˝ connection adapter and a 2˝ connecting sleeve in the tank roof (see section about connection adapter).
A certified over-fill protection must always be installed if the tank is filled through an electric pump and stationary connections (also see installation instructions for over-fill protection).
The over-fill protection must be adjusted to the maximum allowed filling height of the tank.

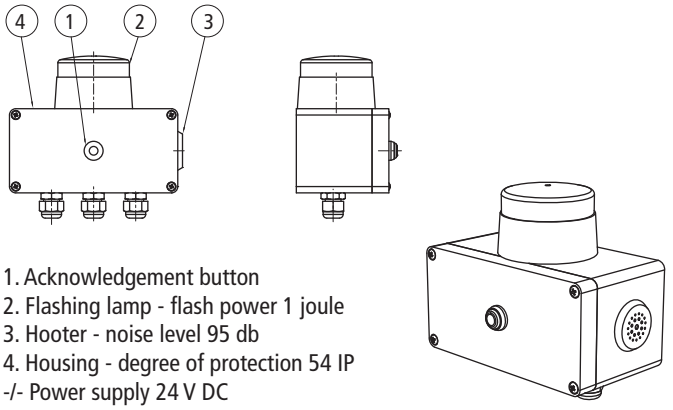


3.5.13.3 Overview: Switch Points and Control Commands

Filling level symbol	Designation	Filling level in percent	Level sensor type	Control command
++	max-max	95	limiting-value transmitter/ over-fill protection in case of export application: mini detector	over-fill alarm - pump off
+	max	70	mini detector	operating contact: pump off
−	min	40	mini detector	operating contact: pump on and signal indicating the repeat order of fuel
−−	min-min	10	mini detector	low-level alarm - system off

3.5.13.4 Overfill Acknowledgement Module (B-AE-100)

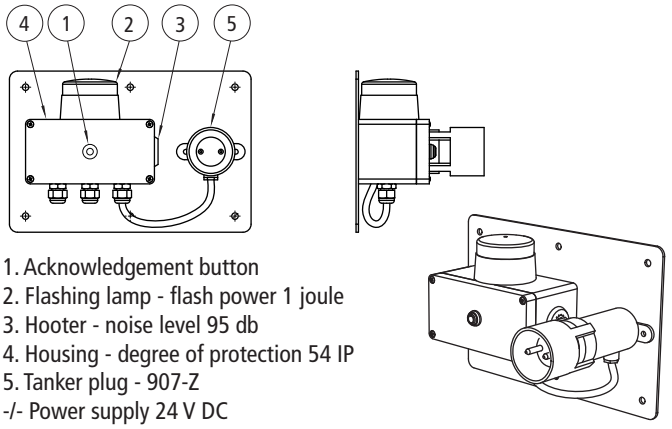
Explanation:
The B-AE-110 is used to signal or sound the overfill protection alarm to the tanker driver while the tank is being filled. The tanker driver is responsible for switching off the tanker pump. By pressing the acknowledgement button, the driver can switch off the overfill protection warning hooter. The flashing lamp is extinguished when the overfill protection non-wetting state is reached.
Area of use: optical and acoustical alarm box as signal for overfill protection.



1. Acknowledgement button
2. Flashing lamp - flash power 1 joule
3. Hooter - noise level 95 db
4. Housing - degree of protection 54 IP
-/- Power supply 24 V DC

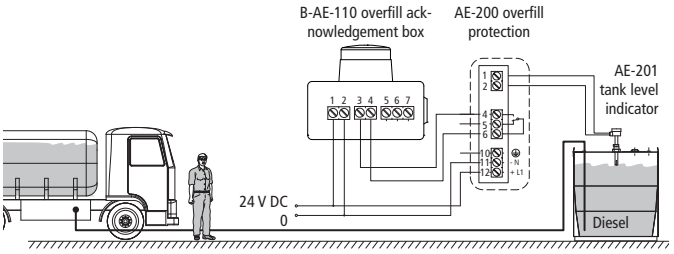
3.5.13.5 Overfill Acknowledgement Box with Tanker Plug (B-AE-907-Z)

Explanation:
The BA-AE-907-Z is used to automatically switch off the pump on the tanker or to signal the tanker driver while the tank is being filled. By pressing the acknowledgement button, the driver can switch off the overfill protection warning hooter. The flashing lamp is extinguished when the overfill protection non-wetting state is reached.
Area of use: optical and acoustical alarm box as signal for overfill protection with tanker cut-off.

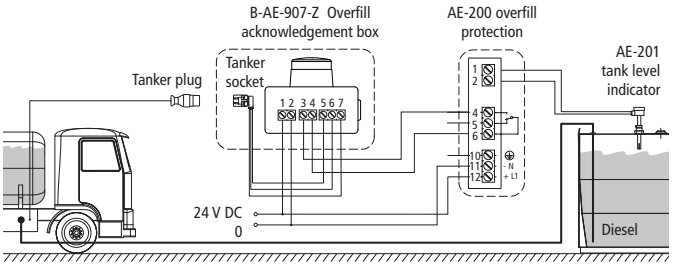


1. Acknowledgement button
2. Flashing lamp - flash power 1 joule
3. Hooter - noise level 95 db
4. Housing - degree of protection 54 IP
5. Tanker plug - 907-Z
-/- Power supply 24 V DC

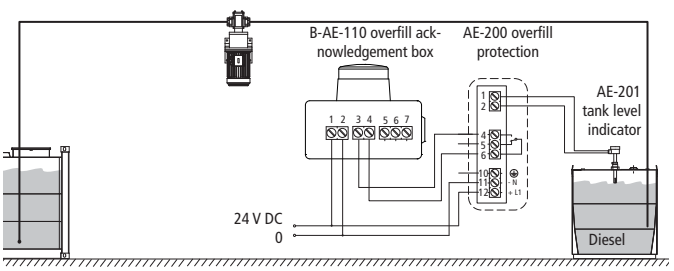
Examples of use / terminal diagram: for tankers without tanker plug, for diesel



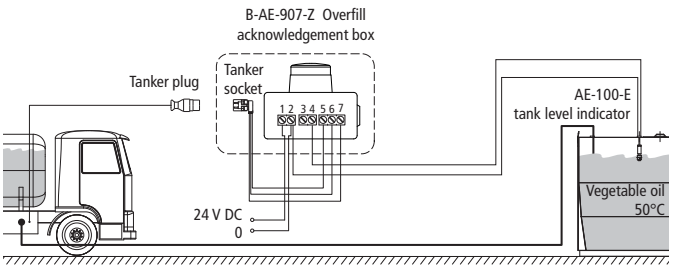
Examples of use / terminal diagram: for diesel



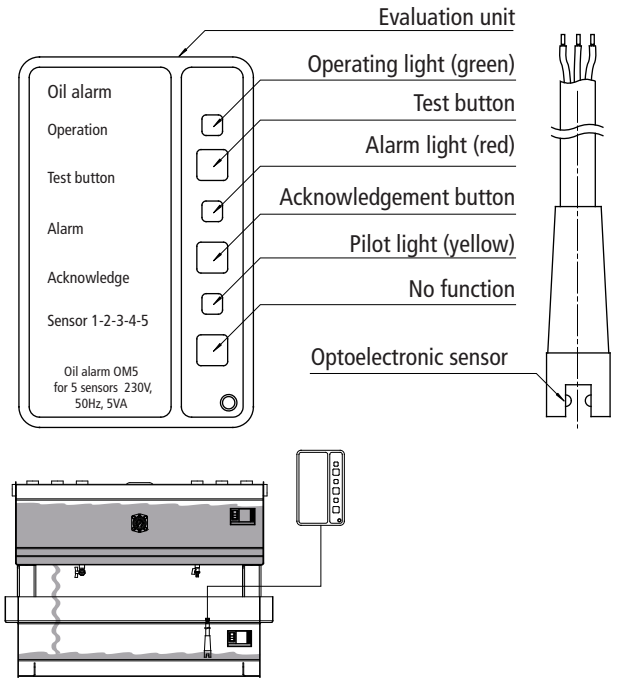
Examples of use / terminal diagram: for diesel



Examples of use / terminal diagram: for vegetable oil



3.5.14 The Oil Warning Sensor (AE-303) with Detector and Evaluation Unit



3.5.14.1 Function of Oil Alarm Unit

The oil alarm unit is an approved leakage detection warning system. Up to 5 sensors may be attached to one evaluation unit. The unit is used to quickly register any leakages of water or hazardous liquids (in accordance with VawS). If a sensor is immersed in liquid, the signal component registers the changed signal from the sensor, produces an optical and acoustic alarm and, in addition, activates the relay for the output signal.

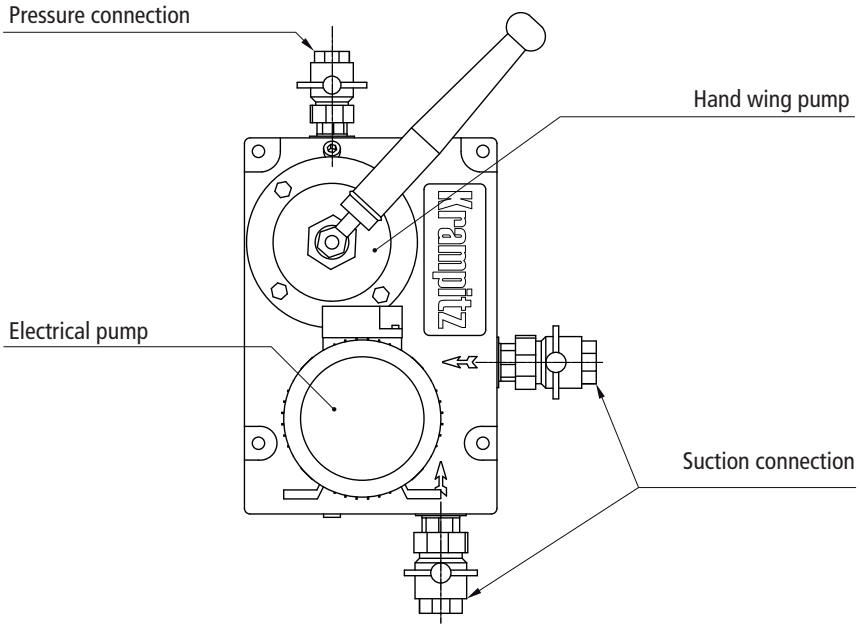
The oil alarm unit's sensor registers the different behaviour of air and liquids. It is installed at the lowest point of the monitoring room. The integrated signal component constantly monitors the sensor's electrical output signals. The green light is on when it is in operation. If the sensor is in air, its signal component registers normal operating conditions: the green operating light is on, the red alarm light is off, and the relay is closed. If the sensor is immersed in oil, a leak (alarm) is registered: the red operation light comes on, the acoustic alarm is sounded and the relay is opened. In the event of alarm, the acoustic alarm signal may be switched off by pressing the "acknowledgement" button. Pressing this button a second time will reactivate it.
By the use of several sensors on one evaluation unit, the affected sensors may be closed by means of the number of the yellow monitoring light's flashing pulses. The successive flashing sequence comprises a period of approx. three seconds.
In the case of a power failure, the alarm will not be triggered. When power is restored the device is immediately operable. Any leakage occurring in the meantime will be registered.
The green operating light will come on as soon as power is supplied to the oil alarm unit. The test button enables a functional monitoring by simulating the alarm event.

3.5.14.2 Oil Alarm Unit Assembly

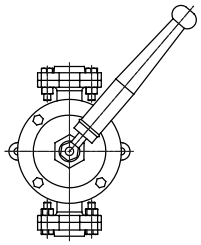
The oil alarm unit consists of a signal component and up to five sensors. The signal component and sensors are connected to each other by a three-wire cable up to 10 metres in length.
The unit's sensor consists of an infra-red transmitter and infra-red receiver, set at a fixed distance from each other. Together, they make up a photoelectric barrier. If there is air between the transmitter and receiver, most of the transmitted signals will reach the receiver – the optocoupler principle.
Contained in a shock-resistant plastic housing, the signal component consists of the display and operating elements as well as all the electronic components for evaluating the sensor's signals and converting them into a digital output signal. The output signal is then available as a potential-free relay contact (change-over).

3.5.15 The Pump Combination

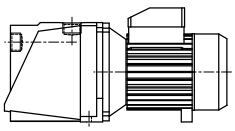
The pump combination uses the KTD storage tank to supply remote daily tanks.
The pump combination contains an electrical pump and a hand wing pump in one case.
In the event of a failure or defect of the electrical pump, the hand pump ensures that the system can be operated without interruption. It also serves the ventilation of the suction pipe (for further details see the operating instructions for the pump combination).



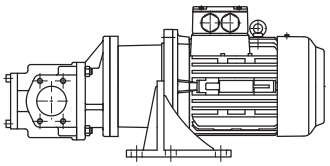
Further Pumps from the Product Range of Krampitz Tanksystem GmbH



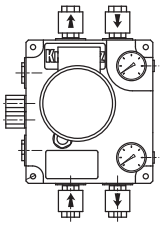
hand wing pump
from 20 litres/min
to 100 litres/min
Example: 20 litres/min



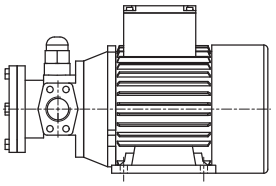
electrical centrifugal pump
from 45 litres/min
to 1,000 litres/min
Example: 80 litres/min



gear pump
from 6 litres/min
to 200 litres/min
Example: 200 litres/min

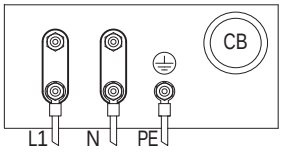


block pump unit
from 6 litres/min
to 26 litres/min
Example: 26 litres/min

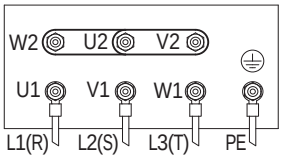


Gerotor pump
from 6 litres/min
to 26 litres/min
Example: 26 litres/min

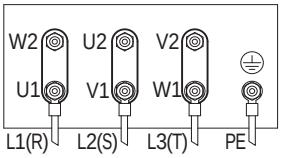
Connection schemes for electropumps



Connection scheme 230 V/AC
Alternating current (single-phase)
CB operating capacitor
(internally connected to motor,
no internal bridge required!)



Connection scheme 380-420 V
Rotary current (three-phase)
Star connection



Connection scheme 220-240 V
Rotary current (three-phase)
Delta connection

3.5.16 Tank Heater (AE 800, AE 810)

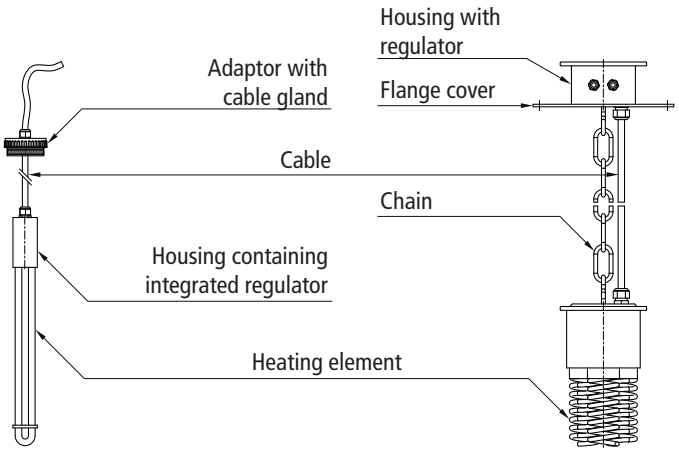
The use of a tank heating with integrated temperature control between 8°C to 12°C and temperature limiter prevents reliably the paraffin precipitation of the light heating oil and diesel when temperatures sink. Thus, the pump and nozzle viscosity of the oil and diesel in the suction area is retained.

NOTE Not allowed/approved for media of hazard classes F and F+.

Power	Tank volume	Voltage
220 W	to 2,000 Liters	230 V, 50 Hz
1.500 W	to 8,000 Liters	230 V, 50 Hz
3 kW	to 15,000 Liters	400 V, 50 Hz
6 kW	to 25,000 Liters	400 V, 50 Hz

Tank heater (AE 800) up to
1,500 W / up to 8,000 litres

Tank heater greater (AE 800)
than 1,500 W / from 8,000 litres



3.5.17 Krampitz Sealfix M

Krampitz Sealfix M is a thread sealant for oil-proof threaded connections. Sealfix M is applied to the cleaned thread area. The threaded connection is closed. After 15 to 30 minutes, Sealfix M has cured to a finger-tight degree.

Example:
10 ml bottle

NOTE The cleaned thread area must be totally free from grease and oil.

3.5.18 Corrosion Protection When Placed Outside

In the event that the KTD is planned to be placed outside, the tank must be coated with a weather-resistant lacquer finish. This finish requires sand blasting (SA 2.5), a priming coat and a 2-component lacquer coating (coat thickness respectively 80 micrometers). The standard colour of Krampitz Tanksystem GmbH for this series is RAL 7032 (pebble grey).
Further RAL colours are available.
For further details and prices please contact us.

4. DOCUMENTS

The KTD storage tanks are delivered with the documents below:

- inspection sheet in German language (two copies)
- drawing (simply)
- building authority permit Z-38.12-23 (simply)
- operating instructions for the individual module components, such as level sensor, over-fill protection, pump combination

These documents are sent to the customer by mail. Only the delivery note is delivered together with the tank to avoid that important documents get lost at the construction site.

The permit book contains an inspection table for the respective tank. This inspection table holds the tank dimensions, the tank type, the date of the first inspection as well as further inspection dates. The person conducting the further inspections can sign in the book to acknowledge the inspections.

5. WARRANTY

Article 1 Warranty Scope

(1) The warranty covers system defects throughout the warranty period which occur during proper operation and use of the system and circuitry and which don't result from external causes of any kind, mechanical damages or non-compliance of regulations regarding the use of the system or circuitry.
(2) In addition, the warranty doesn't cover damages resulting from improper maintenance and repair work.

Article 2 Warranty Period

(1) In the event that defects occur during the warranty period, warranty claims must be made immediately, at the latest within two weeks, in writing.
(2) Only Krampitz Tanksystem GmbH is authorised to accept warranty claims.

Article 3 Handling

The warranty period begins when the system is taken into operation on-site. Any warranty claims made within the warranty period are reviewed. This only applies to the tank system. The warranty period is 24 months.
For fittings and devices (mechanical, electromechanical, electrical and electronic), supplied by external manufacturers, the warranty period is 6 months.

Article 4 Warranty Exclusion

Warranty claims cannot be made:

a. if the system, the circuitry or parts of the circuitry was damaged or destroyed by causes of force majeure or causes resulting from the unintended use of the system, in particular external or chemical mechanical causes;
b. in the event of damages resulting from improper treatment, in particular from non-observance of the provided operating instructions;
c. if the circuitry or parts of the circuitry weren't repaired or maintained by authorised representatives, staff or agent of Krampitz Tanksystem GmbH;
d. if the circuitry or parts of the circuitry are mechanically damaged

Article 5 Supplementary Provisions

(1) If a warranty case occurs, the legal relationship with us is exclusively governed by the afore-mentioned provisions. Further claims, in particular compensations for damage and loss of any kind caused by the system, circuitry, parts of the circuitry or their use, are excluded.
(2) The burden of proof for the proper operation and use of the system, circuitry or of parts of the circuitry according to the provided operating instructions shall be carried by the buyer.
3) Place of Performance, Governing Law and Place of Jurisdiction

The place of performance for the delivery is the place of destination, the place of performance for the payment is the contracting body's office. Supplementary to these terms and conditions of purchase, the German law applies. However, the application of the UN Convention on Contracts for the International Sale of Goods is excluded.

The sole place of jurisdiction - provided the contractor is a merchant who has been entered in the commercial register - is Lüneburg for all disputes arising directly or indirectly from this contract. In the event that the contractor is not a merchant who has been entered in the commercial register, the place of jurisdiction for claims asserted through legal dunning proceedings is Lüneburg. In the event that one or more provisions of this contract are or become to any extent invalid, then the remainder of these provisions shall continue in full force and effect.

NOTES

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