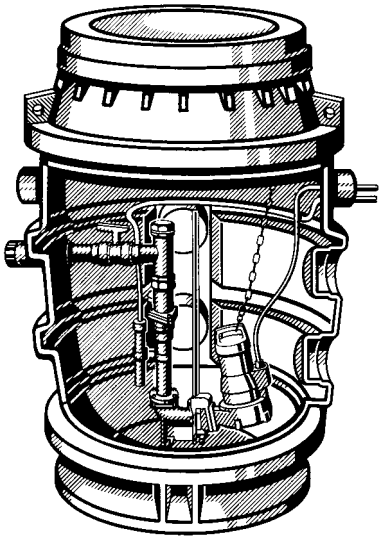
# CK – Packaged Pumping Chamber

**Installation Instructions**
**2334.84/2/GB**

**Ready to Connect Packaged Pumping Station**



**These Operating Instructions contain important information and hazard/danger warnings. It is imperative to read these instructions prior to installation, making electrical connections and commissioning. Additional operating instructions and wiring diagrams are packed with the relevant equipment and need to be read in conjunction with these.**

**In principle if any work has to be carried out to the plant, all electrical supplies should be disconnected and care taken to safeguard against accidental starting.**

**All site work should be undertaken by qualified personnel only.**

KSB Limited · 2 Cotton Way · Loughborough · Leics. · LE11 5TF
Telephone: 01509 231872 · Telefax: 01509 215228
Company Registration No. 188357 VAT Registration No. GB 374 3530 53

**Contents**

## 1 General

This KSB system is developed to technical standards, assembled with great care and supported by a constant quality control system.
The following operating instructions should make it possible to get to know the system and to make use of its specific installation capabilities.
The operating instructions include important advice on how to operate the system safely, properly and economically. Attention to this will ensure the reliability and life expectancy of the system, and avoid dangers.
The operating instructions do not reflect specific site requirements - these are the responsibility of the user.
These instructions must not be used in preference to values laid out in the technical documents relating to the pumped fluid, flow, speed, density, pressure and temperature, as well as motor performance or other instructions included in the operating instructions or contract documentation.
The manufacturer's nameplate gives the pump type/ size, the most important duty data, and the works number/ serial number, which should always be quoted on any queries, repeat orders, and in particular on orders for spare parts.
Where further information or advice is required, or in the case of damage, please contact your local KSB customer service office.

## 2 Safety

These operating instructions contain fundamental advice, which is to be observed during installation, operation and maintenance. Consequently, these operating instructions must be read by the installer and the responsible technician/ user before installation and commissioning, and must always be available at the installation site of the machine.
As well as safety advice described in this safety section, special safety advice detailed in other sections of these operating instructions should also be observed.

### 2.1 Warning symbols in the operating instructions

Safety advice detailed in these operating instructions, which could endanger personnel if not observed, is marked with the general danger symbol

Safety sign according to DIN 4844 – W9,

for warning of electrical current:

Safety sign according to DIN 4844 – W8

For safety advice, which could cause damage to the machine and its functioning if not observed, the word **ATTENTION** is inserted.

Advice marked directly on the machine, for example:
Direction of rotation arrow
Symbol for fluid connection
Must be observed, and maintained in a completely legible state.

### 2.2 Personnel qualification and training.

Service, maintenance, inspection and installation personnel must all have the corresponding qualifications for the work. Areas of responsibility and supervision must be precisely set out by the user. If the personnel do not have the necessary knowledge, then they must be trained. This can, if the manufacturer/ supplier, of the contract with the machine user/owner carry out necessary. Furthermore, the user should ensure that personnel have fully understood the content of the operating instructions.

### 2.3 Dangers of not observing the safety advice

Failure to observe the safety advice can endanger personnel, the machine and the environment. Failure to observe safety advice leads to the invalidation of any compensation claim.

In particular, non-observance of the examples of dangers following can lead to:
- Failure of important functions of the machine/ system
- Failure of prescribed methods for maintenance
- Endangering of persons through electrical, mechanical and chemical effects.
- Endangering the environment through leakage of dangerous materials

### 2.4 Safety conscious working

The safety advice described in the operating instructions, which comprise national regulations for the prevention of accidents as well relevant internal working, operating and safety regulations, are to be observed.

### 2.5 Safety advice for the user

If hot or cold machine components are dangerous, they must be protected from being touched by the customers.
Guards around moving parts (e.g. coupling) may not be removed from machines, which are in service.
Leakage (e.g. the shaft seal) of dangerous pumped products (e.g. explosive, poisonous, hot) must be channeled so that no dangers to persons and the environment ensue. Legal requirements are to be observed.
Danger from electrical energy must be eliminated. (For details of this see the specific regulations of the country and the regulations of the local energy supply business).

### 2.6 Safety advice for maintenance, inspection and assembly

The user should ensure that all maintenance, inspection and assembly work is carried out by authorised specialists, who have informed themselves sufficiently through careful study of the operating instructions

It is fundamental that work on the machine is only carried out at stand still. The method of stopping the machine set out in the operating instructions must be adhered to.

All safety and protective devices must be reactivated immediately after completion of the work. Before putting back into service, the points described in the start up paragraph should be observed.

**2.7 Unauthorised modification and manufacture of spare parts**

Modifications or alterations to the machine are only permissible with the agreement of the manufacturer. Original spare parts and accessories authorised by the manufacturer promote safety. Use of others parts can invalidate liability for any resulting consequences.

**2.8 Improper operation**

The operational safety of the pump supplied is only guaranteed for use within specified parameters. The limiting values given in the data sheets may not be exceeded under any circumstances.

**2.9 Safety requirements (on explosion protection)**

For installations in Zone 1 [danger of explosion] areas, (our submersible pump motor sets Amarex…/Y are built for these zones), the regulations of the PTB test certificate must be adhered to. The PTB test certificate must be kept at site (e.g. caretaker's office, etc).

**3. Transport**

Inland delivery to inland to private house/ installation site excluding off-loading. A sufficiently firm, all weather access with HGV turning facility must be guaranteed. Should the vehicle become stuck, additional costs must be borne by the customer.

The system is delivered in component form for assembly at site:

1 pallet with complete CK tank, fitted with duckfoot bends, gate valve, non return valve, pipework, (including mounted clamps) and float switches

1 pallet with:

1 cover plate with seat ring

1 box per pump

1 claw per pump

1 chain per pump

1 box with switch gear

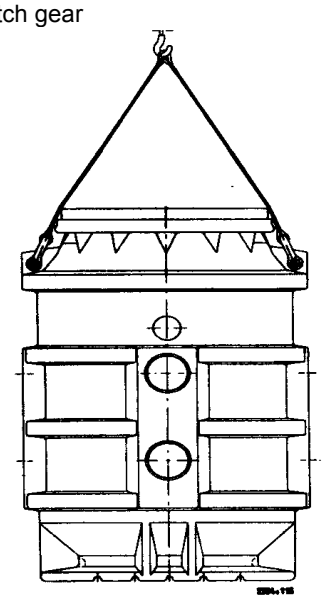


Fig. 1 Transport of pump tank.

**Weight of pumping station**

| | Single pumping station kg | Dual pumping station kg |
|---|---|---|
| Total weight | 302 [1] – 346 [2] | 352 [1] – 440 [2] |
| Heaviest component | Approx. 170 | Approx. 188 |

[1] With Ama-Porter [2] with Amarex

Check for transit damage before assembly and installation of pump components.

**4. Description**

**4.1 General description**

The description and instructions in these operating instructions relate to standard design with original KSB control devices. Additional switchgear from other manufacturers is not covered.

The use of devices from other manufacturers invalidates the guarantee and product liability for these parts of the pumping station.

The CK Pumping Station is designed for domestic sewage disposal. It can be positioned in stable ground on a firm base without any concrete work.

Systems with submersible pump types Amarex S and Ama-Porter S (macerator pumps) are designed for handling sewage.

Submersible pump types Amarex F and Ama-Porter (vortex pumps) are for handling fluids with particles and stringy waste.

**The pump type series Ama-Porter are not explosion proof**

Please refer to DIN 1986, part 5.

**The following, among others, must not be allowed to enter the chamber:**

**Hard solids, fibrous matter, tar, sand, cement, ash, cardboard, refuse butchery waste, grease, oil and sewage containing chemicals.**

**For installations to handle sewage containing grease, a grease trap must be incorporated in the drainage layout**

**4.2 Designation (off the shelf program)**

Pumpstation CK E S 50 – 4 .3 ex

Pump Type
Pumping station E = single, D = double
S = cutter design
F = vortex impeller

Pump DN ID

S 50 Amarex S 50
F 50 Amarex F 50
PS 50 Ama-Porter S 545 ND
PF 50 Ama-Porter 5 … ND
Index

Ex = with explosion protection (no data entered = without)

### 4.3 Construction

Ready to connect single or dual pump stations in compact design with Polyethylene tank for below ground installation. Complete with one or two high performance submersible motor pumps Amarex, (explosion proof design) or with Ama-Porter (without explosion protection).
Tank design corresponds with DIN 1986 and DIN 19 549. Complete galvanised steel discharge pipework (option of 1.4571) with isolating valve, ball non-return valve, and option for flush connection. Including clamps for further PE-HD pipes.
Polyethylene **Pump Tank** with built in concrete base plate, anti lifting device, accessible according to DIN 1986.

| | |
|---|---|
| Tank diameter | 1000m |
| Tank depth | 1700mm (with cover) |
| Water capacity | 360 l (base to inlet) |
| Tank cover | 600 mm in accordance with DIN 1229/ EN 124 Class “A15” (accessible) |
| Inlet | 6 Inlet sockets, DN 150,closed |
| Discharge pipe | connection DN 50, clamps and routed in single pumping station DN 40, clamp |

2 off ventilation/cable duct sockets DN 100

### 4.4 Scope of supply

The scope of supply for the off the shelf program includes everything for the operation of the switch and control devices required by the pumping station, as well as warning equipment (see also 3 - Transport).
The two manufacturer’s nameplates (see 9.4) included with the operating instructions should be mounted to be clearly visible outside the pump tank (E.g. switch gear).

### 4.5 Accessories

Accessories for the ready to connect pumping station can be ordered from KSB Ltd. - Loughborough.

#### 4.5.1 Tank

Tank extension 400 mm, PE-LLD
Flush connection G1 ½ Storz C, STTZN
Flush connection Perrot 1 ½ /50, STTZN
Vacuum breaker, STTZN
Top connection extension, 1.4301 for ET 1700, 2100 and 2500 mm.

#### 4.5.2 Control

In order to ensure straightforward functioning of the CK pumping station, we recommend the use of KSB controls.

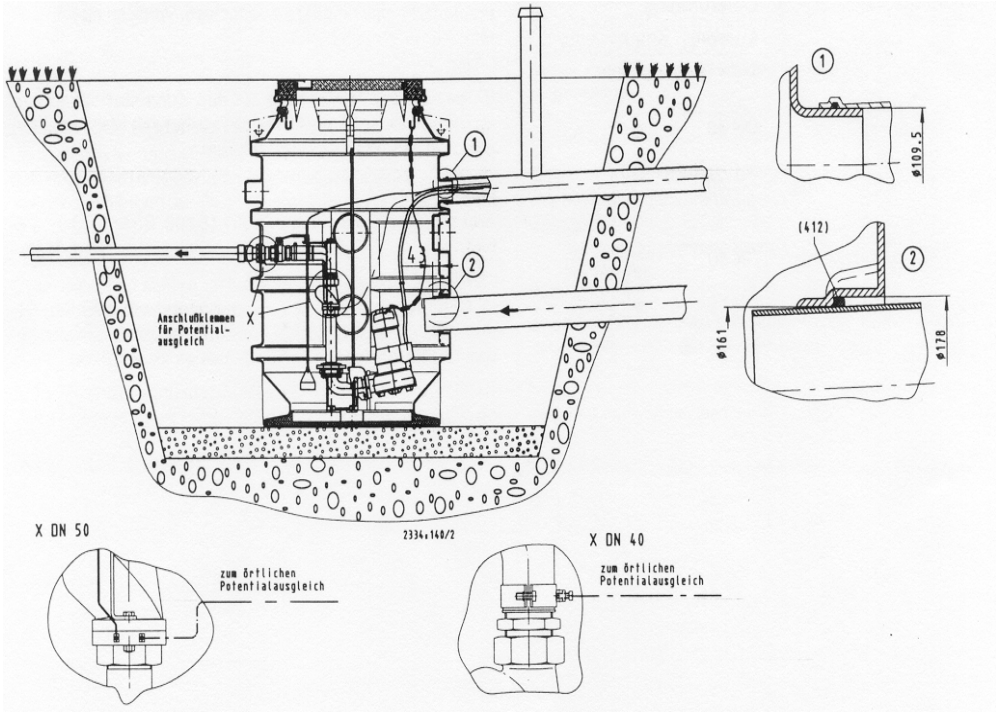
The basic functions of switch and warning gear can be extended in the selection program through additional fittings.

All switch and warning gear should be mounted safe from flooding in ventilated space. They are not explosion proof and may therefore only be used outside the hazardous area.

### 5. Installation

The pump station is installed outside a building. The installation is designed for use in areas, which can only be used by pedestrians and cyclists. (DIN EN 124, Group 1, permissible traffic burden 5kN/m$^2$).
Fig 2 is representative only. See also 9.1 Installation tips.

Fig 2 Installation



### 5.1 Excavation of the foundations

The foundations should be excavated according to the regulations of DIN 4124/ IN 18 3000 and VOB

A minimum working space of 50 cm should be maintained on all sides at the base of the foundation.
The foundations must be dry during building work.

### 5.2 Installation of the Plastic Tank

A 15 cm depth of sand should be laid in the bottom of the excavation and compressed.
Lower the tank into the foundation with appropriate lifting gear (digger or crane) see fig. 1 and align.

Install the ready to use tank so that the tank cover is level with the ground. With tank extension (available as accessory) and/ or max. 3 industrial leveling rings DIN 4034-AR 625 x 100 can increase installation depth up to max. 2.5m (see 9.1 installation).

### 5.3 Connection of the pipework

**Attention!**
When connecting inlet & outlet pipework, avoid passing on pipework stress to the tank. The pipework should be laid in a frost-free environment. See also paragraph 9.

#### 5.3.1 Discharge pipe

The tank is fitted with a male threaded BSP the same size as the pump discharge (i.e. either 50mm or 65mm)

#### 5.3.2 Inlet pipe DN 150 for uPVC pipe.

Variable connection options are available through 6 height settings of inlet sockets DN 150 and DN 100. All inlet sockets are closed when the plastic tank is delivered. The chosen inlet connection must be cut open.

Clean inlet pipe.

Push the round sealing ring on to the connecting end of the inlet pipe. Then push the inlet pipe carefully into the inlet socket until the round sealing rings connects. The pipe end should stick into the tank by about 50mm.
As an option a 110mm or 160mm diameter inlet stack is available to cater for different inlet depths and directions.

**Contact KSB Ltd**

#### 5.3.3 Venting connection DN 100 for uPVC Pipe

Cut open the chosen DN 100 ventilation socket.

Connect the ventilation pipe with appropriate connecting parts and put in place in the tank at a slight gradient. This also functions as the cable duct for motor and control cables (if required).

**Attention**
**A 30º bend makes it easier to pull the draw wire.**

### 5.4 Backfill of the foundations

**Attention!**
The concrete ring (part no. 89-9) should be installed on the tank before back-filling the foundations.
Back-fill the foundations according to DIN 4124/ DIN 18 300 and VOB.

A backfill layer of sand of about 300mm should be used for the protection of the plastic tank. Use sand with a maximum particle size of 8mm.

**Attention**
Carefully fill the space round the contours of the tank with a spade or similar, and compress by hand.

The rest of the foundations can be back filled with the excavated material, provided this does not contain any sharp particles, pebbles or rocks.

The backfill should be layered in levels of up to 30 cm and compressed at each level. Compress with a light tamper according to DIN 4033.

**Attention**
Pressure on one side of the plastic tank is to be avoided, if necessary, to prevent this fill the tank with water before hand in order to rectify any misshape.
Remove any earth, gravel or sand from inside the tank.
Carry out work according to DIN 18 300, Page 10, 3.11.

**Attention**
**In areas with high ground water levels, or where there is high clay content, we recommend the tank be layered from outside with concrete (min 1 $m^3$).**

Where a groundwater lowering system is installed, this should not be switched off until after the foundations have been refilled and compressed.

### 5.5 Level Control by Float Switches

The float switch type level controls are supplied ready installed in the tank and simply require pulling through the cable duct and connecting to the control panel (by a qualified electrician)

### 5.6 Protective Multiple Earthing

**In areas with explosion risk, PME bonding is required in order to avoid inflammable sparks:**

- On the pipework, according to VDE 01656 with 6 $mm^2$ cable
  The Connection clamp (Fig 2) should be connected to the site PME bonding with 6 $mm^2$ single wire
- On the pump according to EN 50 014 or VDE 0170/0171 with 4 $mm^2$ Cu cable.
- The PME bonding cable should be checked for continuity.

For pump connection see Amarex operating instructions.

### 5.7 Electrical connections

#### 5.7.1 General

Electrical work should only be carried out by a professional tradesman in accordance with the site regulations.
VDE 0100 is recommended, and VDE 0165 for explosion protection.

For electrical connections, refer to the pump O & M instructions (supplied with the pump) and the O & M Instructions found inside the control panel.

.
See also installation example 9.3.

### 5.8 Installation of the pump/s

Place the pumps over the upper guide wire holder and lower slowly. After lowering, the pump fixes itself to the duckfoot, and is thereby attached to the discharge pipework ready for operation.
It should be ensured that enough free cable length is left in the pump tank, so that the pumps can be safely pulled out for maintenance work making sure that this is secured at the top of the chamber and cannot be drawn into the pump suction.

## 6 Start up/ Shut down

For the start up/ shut down of the pump, refer to the pump operating instructions

These are the only components included and should additionally be found in the document pack CK pump station operating instructions.

### 6.1 Limits of operation

#### 6.1.1 Operation pressure.

The maximum pressure of the system may not exceed 4 bar.

#### 6.1.2 Pumped product temperature and external temperature

| | | |
|---|---|---|
| Amarex… Type Y | **with** explosion protection | 40 ºC |
| Ama-Porter… | **without** explosion protection | 40 ºC |

## 7 Maintenance/ upkeep

### 7.1 General advice

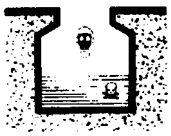
The user should ensure that maintenance, inspection and assembly work is carried out by authorised and qualified specialists, who have informed themselves sufficiently through careful study of the operating instructions.
The use of a maintenance plan with minimum of maintenance effort promotes the avoidance of expensive repairs and smooth and reliable operation of the pump/s.
**Pump stations and the associated components should be inspected and maintained at least once a year.**
**Fundamentally, work on the machine should only be carried with unplugged electrical connections. The pump system should be secured from being accidentally switched on using the lockable isolator on the control panel.**
**The pump should be lifted out of the tank for maintenance work.**

#### 7.1.1 Access into the tank.

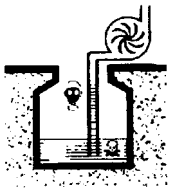
**When accessing the tank, always follow the following safety instructions!**

**Attention! Secure the tank opening!**

**Life endangering gases.**



**Gases are heavier than air and may lie at the bottom of the tank.**



**Do not climb into the tank until all gases have been removed.**

**Use a safety harness when accessing the tank. Work together with an observer.**

### 7.2 Flush connection

The flush connection allows the option of freely flushing the pipework. It is found inside the plastic tank on the pipework, and is closed with a threaded plug (731.3).
The pressure flush can be carried out using external water or air. Before flushing, the pump must be switched off and the isolating valve in the discharge pipe is closed, since otherwise the entire contents of the discharge pipe will be emptied through the flush connection. Open the isolating valve only when the flush pipe has a pressure of at least 3 bar.
Close the isolating valve again after flushing. Do not open until the flush connection is closed with the threaded plug.

### 7.3 Inspection and maintenance contract

According to DIN 1986, Part 3, 30 and 31, drainage systems must be so maintained, that accumulated dirty water can be piped away properly, and that any discrepancies can be quickly recognised and rectified. The maintenance contract offered by KSB is recommended.

## 8. Section drawing/ parts list

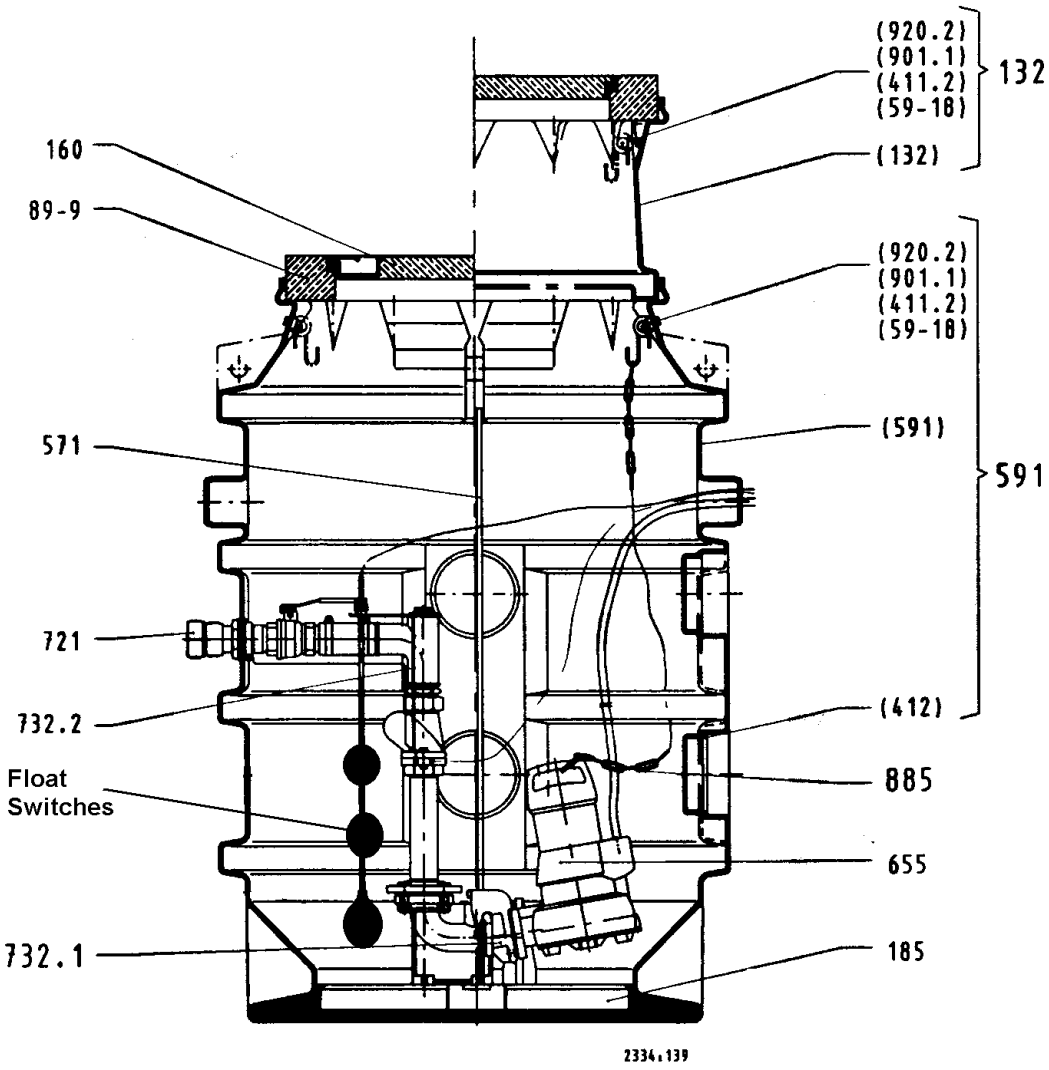
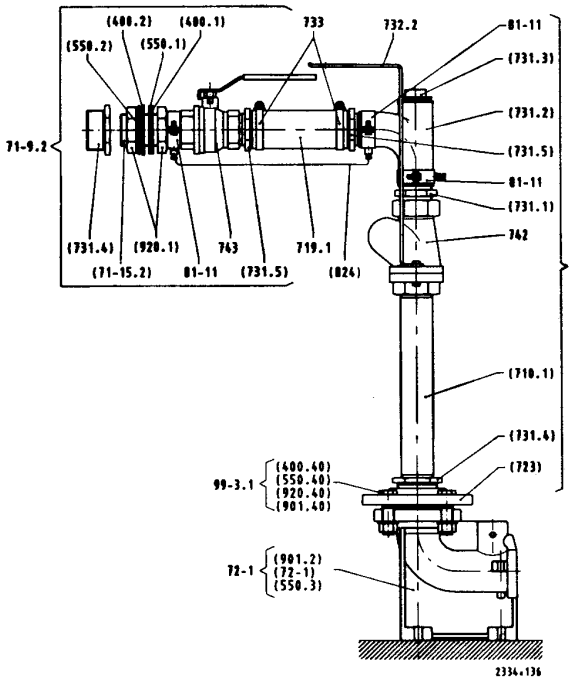
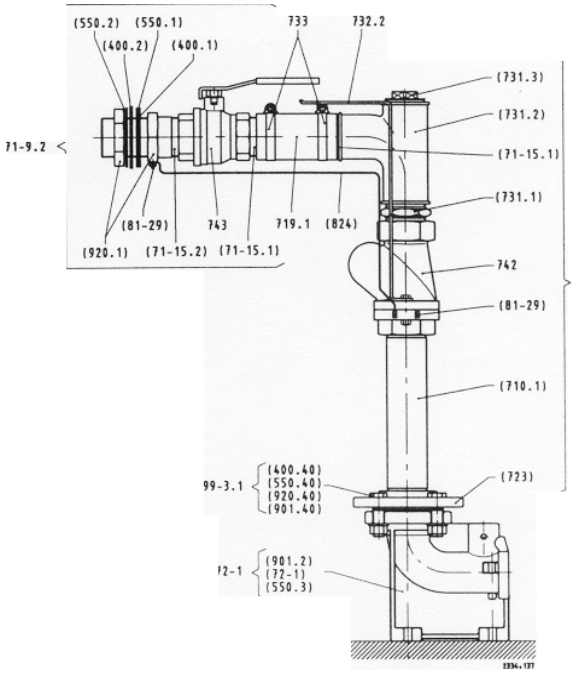



fig. 4




Discharge pipe single pump station DN 40

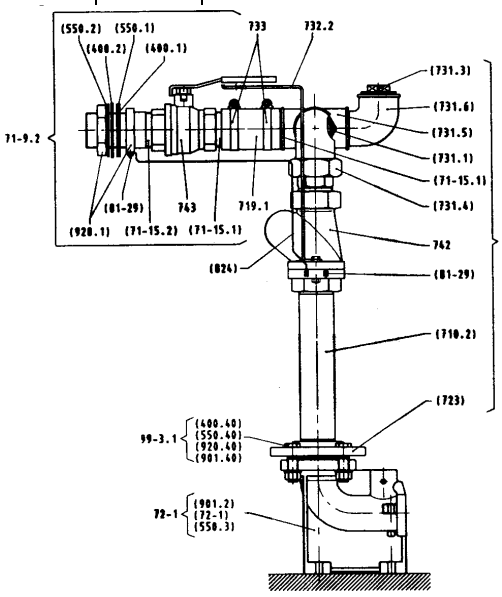



Discharge pipe single pump station DN 50

( ) not available as individual spare parts.

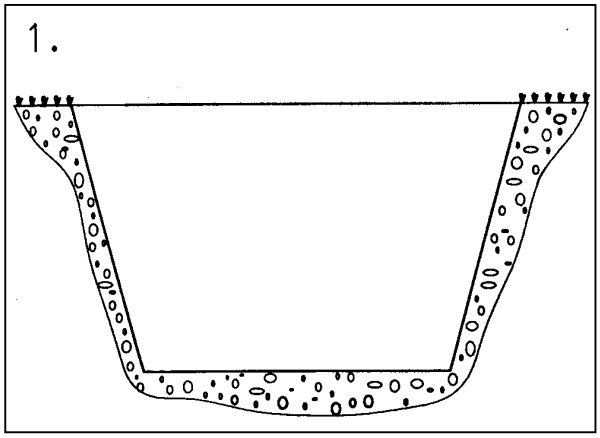
**Parts overview**

| Part No | Includes | Description | Qty CK E | Qty CK D |
|---|---|---|---|---|
| 132 | | Tank extension (complete) | 1 | 1 |
| | 132 | Tank extension | (1) | (1) |
| | 59-18 | Hook | (1) | (1) |
| | 411.2 | O Ring | (2) | (2) |
| | 901.1 | Hex bolt | (2) | (2) |
| | 920.2 | Nut | (2) | (2) |
| 160 | 160 | Cover | 1 | 1 |
| 89-9 | 89-9 | Frame | 1 | 1 |
| 185 | 185 | Baseplate | 1 | 1 |
| 571 | 571 | Clamp | 1 | 2 |
| 591 | | Complete Tank | 1 | 1 |
| | 591 | Tank | (1) | (1) |
| | 59-18 | Hook | (1) | (1) |
| | 411.2 | O ring | (1) | (1) |
| | 412 | Round sealing ring | (2) | (2) |
| | 901.1 | Hex bolt | (1) | (1) |
| | 920.2 | Nut | (2) | (2) |
| 655 | | Submersible motor pump | 1 | 2 |
| | | | | |
| 721 | 721 | Clamp connection | 1 | 1 |
| 732.1 | | Complete claw for Amarex | 1 | 2 |
| | 732 | Claw | (1) | (2) |
| | 410 | Profile joint | (1) | (2) |
| | 550.5 | Washer | (4) | (8) |
| | 901.35 | Hex bolt | (4) | (8) |
| | 920.5 | Nut | (4) | (8) |
| 732.1 | | Complete claw for Ama-Porter | 1 | 2 |
| | 732 | Claw | (1) | (2) |
| | 550.35 | Washer | (1) | (2) |
| | 914.35 | Hex socket head cap screw | (1) | (2) |
| 885 | | Complete chain | 1 | 2 |
| | 885 | Chain | (1) | (2) |
| | 59-17 | Shackle | (1) | (2) |
| | 59-18 | Hook | (1) | (2) |

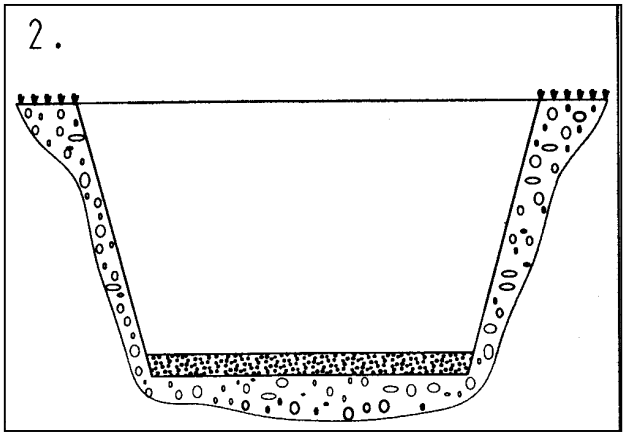



| Part No | Includes | Description | Qty CK E | Qty CK D |
|---|---|---|---|---|
| 71-9.1 | | Complete pipe set DN 40 | 1 | |
| | 710.1 | Discharge pipe | (1) | |
| | 723 | Flange | (1) | |
| | 731.1 | Double nipple | (2) | |
| | 731.2 | T Bend | (1) | |
| | 731.3 | Stopper | (1) | |
| | 731.4 | Reducing nipple | (1) | |
| | 742 | Non-return valve | 1 | |
| | 81-11 | Earthing connection | 2 | |
| 71-9.1 | | Complete pipe set DN 50 | 1 | |
| | 710.1 | Discharge pipe | (1) | |
| | 71-15.1 | Connecting pipe | (1) | |
| | 723 | Flange | (1) | |
| | 731.1 | Double nipple | (1) | |
| | 731.2 | T Bend | (1) | |
| | 731.3 | Stopper | (1) | |
| | 742 | Non-return valve | 1 | |
| | 81-29 | Earthing clamp | (2) | |
| 71-9.2 | | Complete pipe set DN 40 | 1 | |
| | 400.1 | Gasket | (1) | |
| | 400.2 | Seal | (1) | |
| | 500.1/2 | Washer | (2) | |
| | 71-15.2 | Connecting pipe | (1) | |
| | 731.1 | Double nipple | (1) | |
| | 731.4 | Reducing nipple | (1) | |
| | 743 | Isolating valve | 1 | |
| | 81-11 | Earthing connection | 1 | |
| | 920.1 | Nut | (2) | |
| 71-9.2 | | Complete pipe set DN 50 | 1 | 1 |
| | 400.1 | Gasket | (1) | (1) |
| | 400.2 | Seal | (1) | (1) |
| | 500.1/2 | Washer | (2) | (2) |
| | 71-15.1 | Connecting pipe | (1) | (1) |
| | 71-15.2 | Connecting pipe | (1) | (1) |
| | 743 | Isolating valve | 1 | 1 |
| | 81-29 | Earthing clamp | (1) | (1) |
| | 920.1 | Nut | (2) | (2) |
| 719.1 | 719.1 | Pipe | 1 | 1 |
| 733 | 733 | Pipe clamp | 2 | 4 |
| 824 | 824 | Potential balancer (cable) | (1) | (1) |
| 72-1 | | Complete duckfoot | 1 | 2 |
| | 72-1 | Duckfoot | (1) | (2) |
| | 550.3 | Washer | (2) | (4) |
| | 901.2 | Hex bolt | (2) | (4) |
| 99.3.1 | | Flange accessory set | 1 | 2 |
| | 400.40 | Seal | (1) | (2) |
| | 550.40 | Washer | (4) | (8) |
| | 920.40 | Hex nut | (4) | (8) |
| | 901.40 | Hex bolt | (4) | (8) |
| 71-11 | | Complete set Y pipes DN 50 | | 2 |
| | 710.2 | Discharge pipe | | (2) |
| | 71-15.1 | Connecting pipe | | (1) |
| | 723 | Flange | | (2) |
| | 731.1 | Double nipple | | (2) |
| | 731.3 | Stopper | | (1) |
| | 731.4 | L connector | | (2) |
| | 731.5 | Cross | | (1) |
| | 731.6 | Angle | | (1) |
| | 742 | Non-return valve | | 2 |
| | 81-29 | Earthing clamp | | (2) |

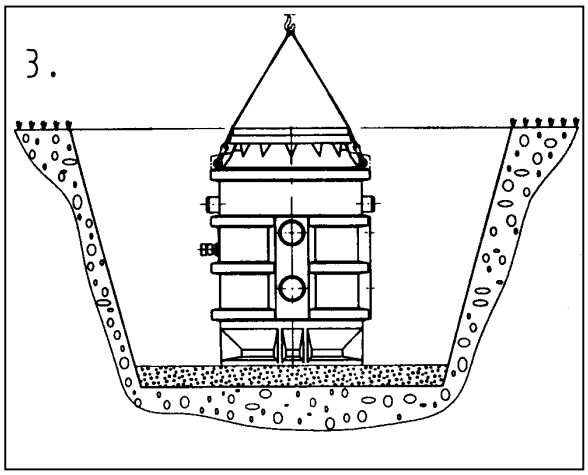
# 9 Appendix
## 9.1 Installation advice



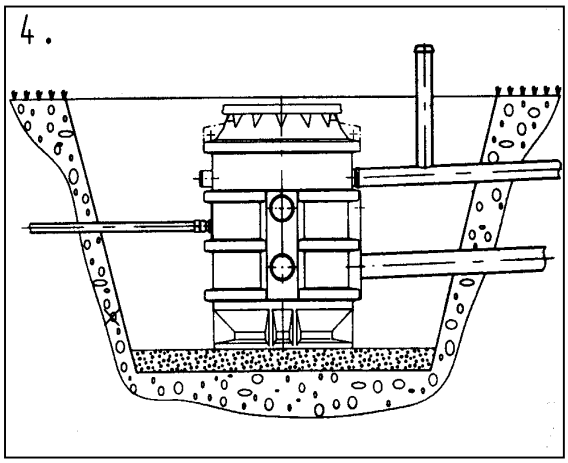

Excavate foundations



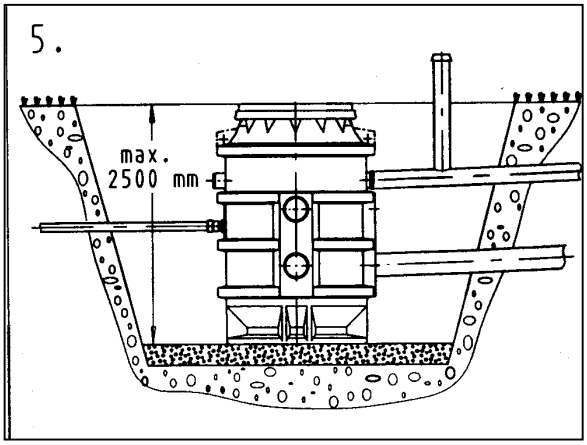

Fill with about 150 mm of sand or fine pebbles, make level and compress



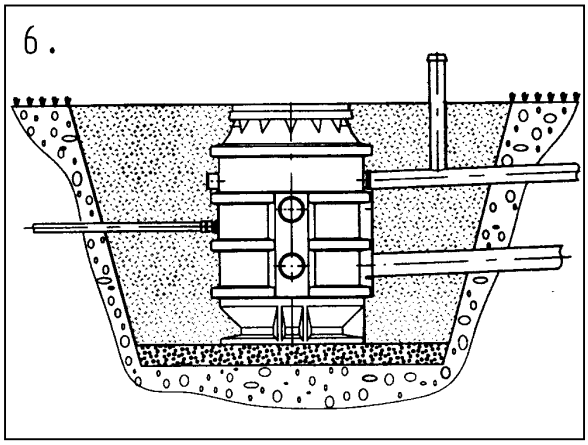

- Open the necessary inlet socket (DN150 or 100) and ventilation socket (DN 100).
- Position the ready assembled pump station.



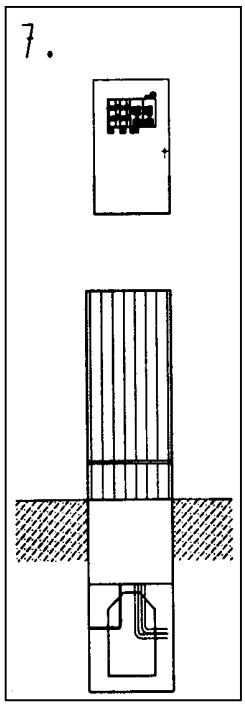

Connect the discharge pipe DN40/DN50, Lay the Inlet DN150/100 and cable duct/ ventilation DN100 with gradient to tank and connect.



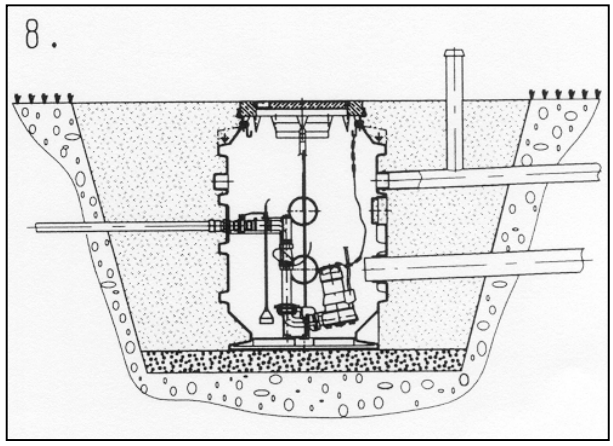

Match the tank cover to the surrounding land either with tank extension and/or max. 3 leveling rings.



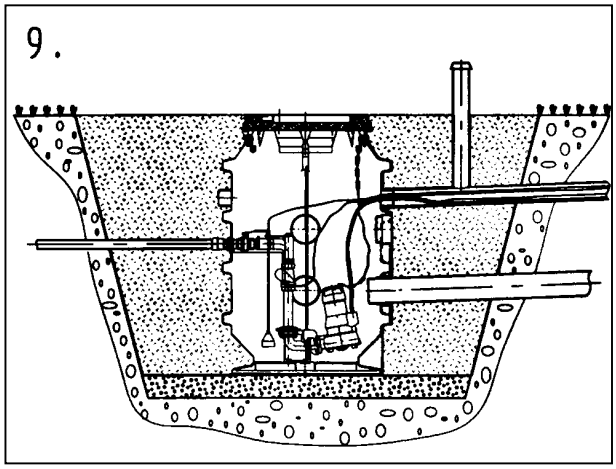

Fill foundations with 300mm layers and compress simultaneously. (If necessary, fill the tank with water before hand)
5.4, Backfill of the Foundations.




- Wall mount control panel inside at appointed position.
- Distance (cable length) between control and pump max 10m (unless KSB notified at order stage).
- Option: 20m Cable length
- Power supply 3 ~ 400V or 1 ~ 230v
- If the control panel is to be mounted externally then a weatherproof kiosk needs to be provided.
- Lay the power connection from the building to the control panel.

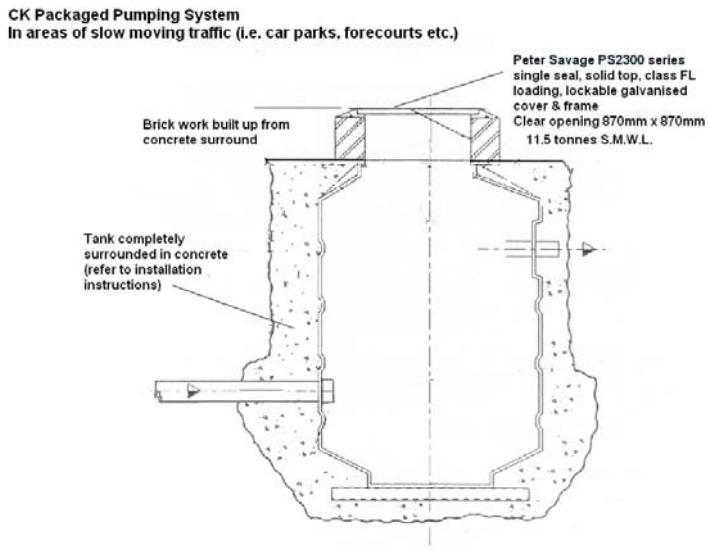



Install pump(s). Connect the PME bonding for explosion protection, see Fig 2.

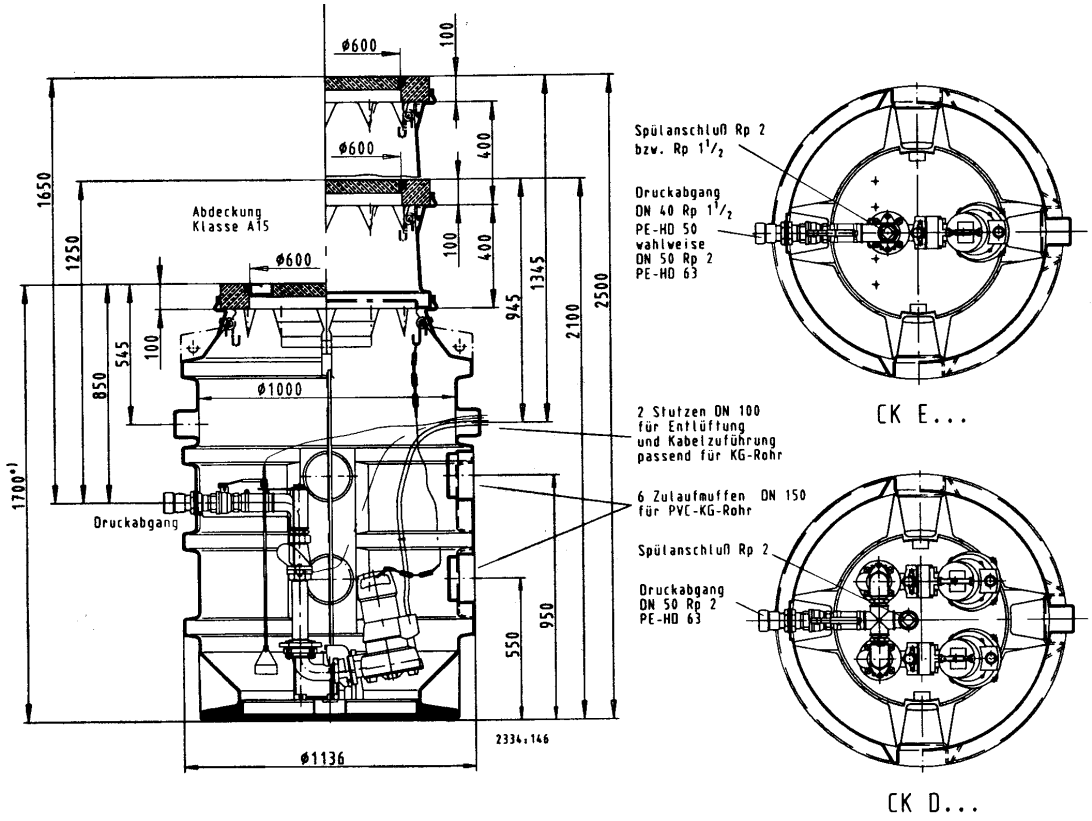



Pull the pump and float switch cable through the cable duct/ventilation pipe and connect to the control panel, including the PME bonding for Explosion protection.

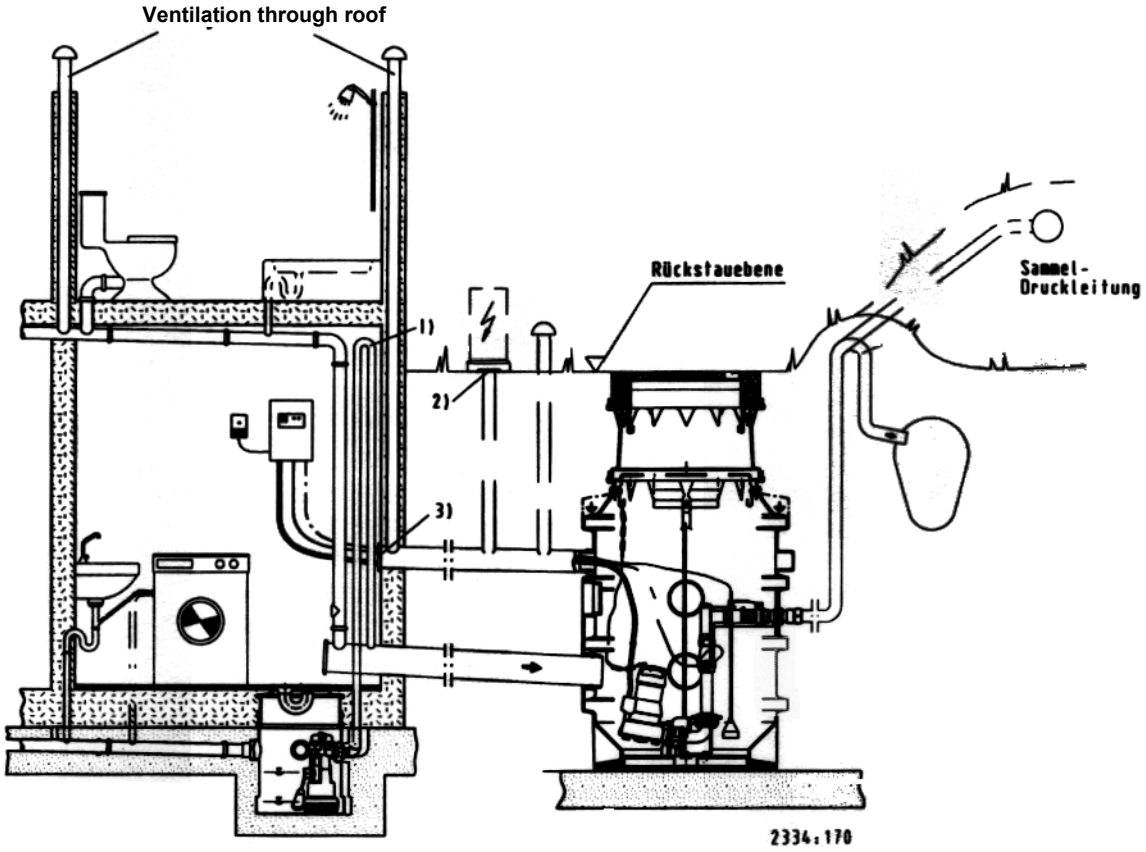
**Option for Installation in areas of slow moving traffic**
**(E.g. car parks garage for courts, driveways etc.)**



**Dimension Table**



## 9.3 Installation Example




Where the discharge pipe is laid outside, we recommend the following alternative sites for protection against frost.

On the slope of a hill
Under a planted bank
In a heated outdoor control cupboard
In outbuildings, etc

Please observe the specific site regulations as well as DIN 1986.

## 9.4 Nameplate

The plate is located in the tank (591) next to the Nut (920.2)

## 9.5 Recycling

The complete pumpset is made out of materials, which can separately be reused. The materials are marked according to DIN 54 840.