Technical Description + Installation Instructions

RØ-KA SILO
MILK COOLING TANKS

10.000-40.000 Liters
5.000-24.000 Liters

RØ-KA
INDUSTRI A/S

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General description

RO-KA Silo Tanks have been constructed based on the experience with the well-known RKC Milk Cooling Tanks produced over decades.

RO-KA Silo Cooling Tanks are closed tanks designed as vertical cylinders with a conical bottom to ensure a perfect discharge of the tank.

The tanks are produced in sizes from 10.000 to 40.000 liters in standard dimensions with diameter 3,000mm. Since 2016 we are also producing silo tanks in sizes from 5.000 to 24.000 l in diameter 2,300mm.

The type description corresponds to the nominal content in liters of the tank.

All metal parts consist of stainless steel of quality EN 1.4301 – AISI 304. The inside container is made of 2.0mm stainless steel and the outside jacket is made of 2.0mm stainless steel, too.

The tanks are fitted with a manhole on the side of the tank. A 4" ventilation pipe leads from the top of the tank into the milking room. Milk is pumped into the tank through the outlet pipe of the tank.

The tank outlet is fitted with a 3" butterfly valve which can be equipped with various types of threads or couplings 2", 2½" or 3" to ensure it fits the suction hose of the individual tank truck. The outlet pipe is a twin-jacket cooling pipe with glycol to ensure the cooling of the milk in the outlet pipe. The outlet pipe is available in lengths up to 2.500mm. The standard length is 1.500mm. External connections have to be sealed and all pipes need insulation against cold and heat.

RO-KA Silo Tanks are insulated with 100 mm polyurethane foam between the inner tank and the outer jacket. Top of silo with 100mm and bottom of silo with 300mm. All connection pipes for the cooling agents are in stainless steel and lead through the side of the outer jacket at the bottom of the tank.

The evaporator plate is welded two-fold to the inside tank and pressed onto a channelling plate. The conical bottom of the tank is one big cooling surface and there is an additional evaporator at 50 cm on the lower side of the tank wall. Option increased side evaporator of 100 cm to increase cooling capacity. The two cooling systems can be equipped with one or two cooling units.

The evaporator system has been tested at 30 bars. All silo tanks are equipped with 3 meters of cable for the agitator and for connecting an agitator guard.

Agitator

RO-KA Silo tanks are fitted with an agitator, which is mounted on top of the silo tank. The shaft passes through a stainless steel pipe leading all the way up to the gear motor. This ensures an optimal sealing between tank and motor. The agitator shaft has a guide control in the bottom to ensure optimal stability.

Silo Tanks: Diameter 3000 mm

Motor:

Type:	YE2-90S/2
Voltage:	3*400v - 50 Hz
Power input:	1.1 kW
RPM N1	1430 RPM
RPM N2	25 RPM
Sealing:	IP 55
Shaft diameter:	35 mm
Material:	Cast iron

Silo Tanks: Diameter 2300 mm

Motor:

Type:	R 1C 245 NSB
Voltage:	1*230 v - 50 Hz
Power input:	125 W
RPM N1	2750 RPM
RPM N2	25 RPM
Sealing:	IP 55
Shaft diameter:	M28/2 Threaded pin
Material:	Alu.

Safety

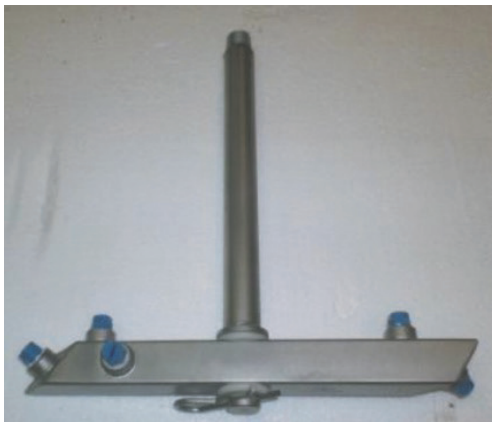
All Silo Tanks have to be equipped with a safety switch-off.

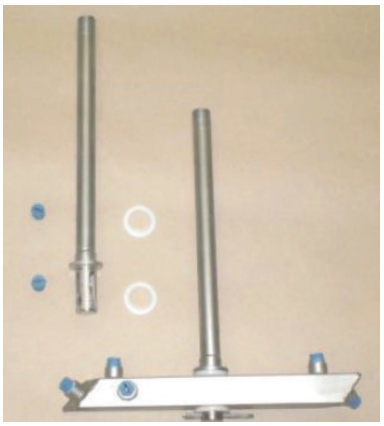
It will cut off the supply voltage for the agitator during inspections or works inside the tank.

The safety switch-off has to be secured with the lock for the manhole.

Cleaning the Silo Tank

All Silo tanks are equipped with sprinklers and built-in pipes for connecting the washing unit.





Washing unit 9500 MULTI:

The picture shows a left mounted washing units. However, these are also available for right mounting. Then the inlet pipe will be installed on the other side.

The washing unit 9500 MULTI is produced in different versions, for wall mounting or for installation on the ground. The cleaning device can be ordered with or without heater. Heaters are available with 5 or 10 KW. Level Sensor and Tank Guard included in 9500MULTI as options.

Volume of water

Temp. Tank	8-10° Pre-clean Cold	88° Pre-cleaning Cleaning	88° ** Warm	8-10° Rinsing Cold	8-10° Disinfec-tion Cold	8-10° Final rinse Cold
		Warm	Warm			
Time	3 min.	3 min.	7 min.	3 min.	3 min.	7 min.
10.000 L	50 L	100 L	100 L	50 L	50 L	50 L
15.000 L	50 L	115 L	115 L	50 L	50 L	50 L
20.000 L	50 L	125 L	125 L	50 L	50 L	50 L
25.000 L	50 L	135 L	135 L	50 L	50 L	50 L
30.000 L	50 L	150 L	150 L	50 L	50 L	50 L
35.000 L	50 L	170 L	170 L	50 L	50 L	50 L
40.000 L	50 L	185 L	185 L	50 L	50 L	50 L

** Duration min. 5 minutes at 65° C. Final temperature min. 42 -48° C.

Detergents and disinfectants

Never use hypoclorite!

RØ-KA Industri A/S recommends products such as e.g. ECOLAB and NOVADAN.
If other detergents are used, they have to meet the same characteristics.

ECOLAB – detergent for food industries

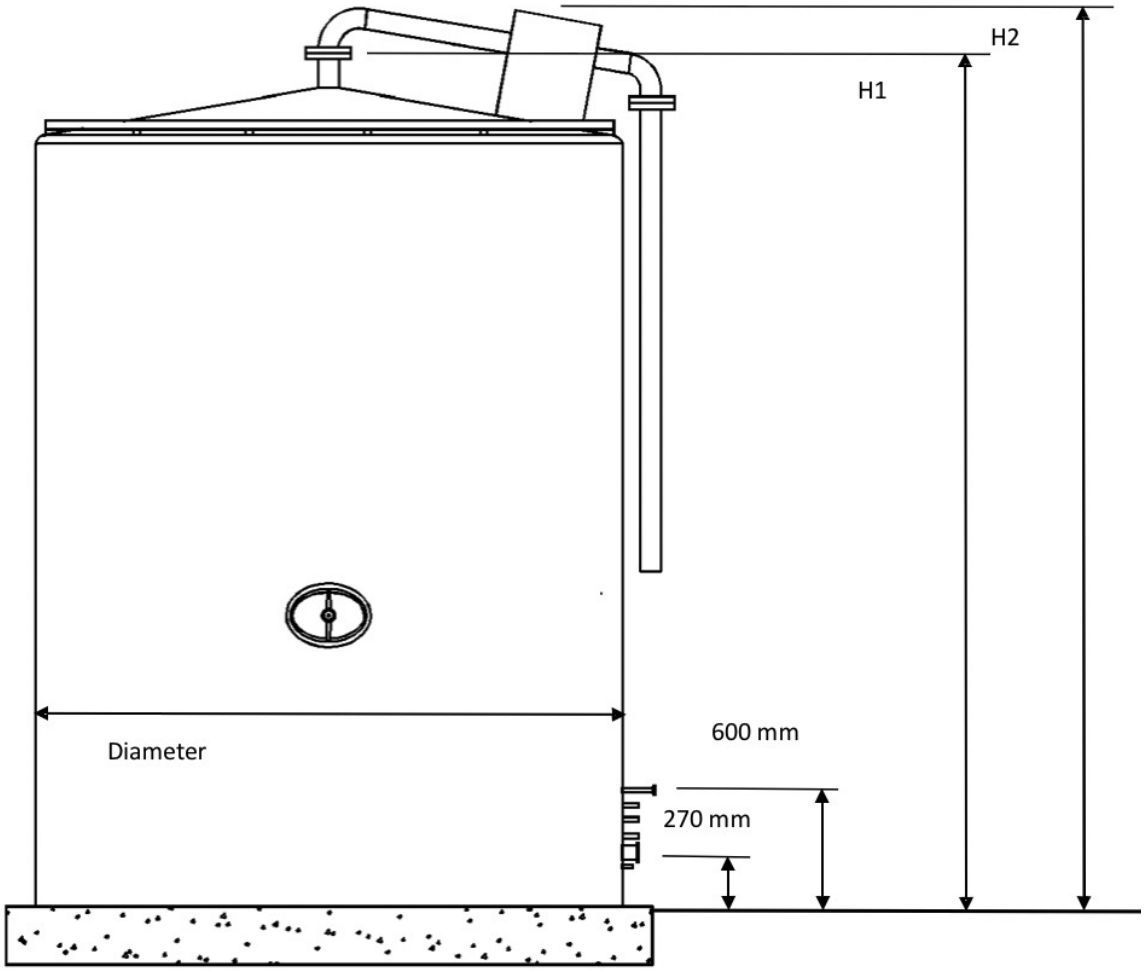
Alkaline detergent	Type:	P3-mip CIP
Acid detergent	Type:	P3-horolith CIP

NOVADAN – detergents for agriculture and food industries

Alkaline detergent with chlorine	Type:	VIP 1
Alkaline detergent without chlorine	Type:	CIP Alka 95
Acid detergent	Type:	ACIR

Warning!
NEVER mix an alkaline and an acid detergent, this produces chloric gas = danger of life!

Silo Tanks Ø3.000 mm



Type	Diameter	Height – H1	Height – H2
10.000 L	3.000 mm	2.600 mm	2.830 mm
15.000 L	3.000 mm	3.450 mm	3.680 mm
18.000 L	3.000 mm	3.900 mm	4.130 mm
20.000 L	3.000 mm	4.260 mm	4.490 mm
25.000 L	3.000 mm	5.072 mm	5.302 mm
30.000 L	3.000 mm	5.900 mm	6.130 mm
35.000 L	3.000 mm	6.700 mm	6.930 mm
40.000 L	3.000 mm	7.500 mm	7.730 mm

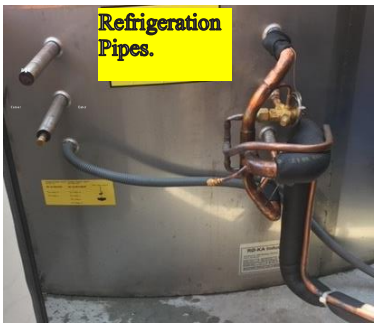
Silo Tanks Ø2300 mm

Type	Diameter	Height – H1	Height – H2
5.000 L	2.300 mm	2.230 mm	2.250 mm
6.000 L	2.300 mm	2.530 mm	2.850 mm
7.000 L	2.300 mm	2.830 mm	3.150 mm
8.000 L	2.300 mm	3.130 mm	3.450 mm
9.000 L	2.300 mm	3.430 mm	3.750 mm
10.000 L	2.300 mm	3.730 mm	4.050 mm
12.000 L	2.300 mm	4.330 mm	4.650 mm
14.000 L	2.300 mm	4.930 mm	5.250 mm
15.000 L	2.300 mm	5.230 mm	5.550 mm
16.000 L	2.300 mm	5.530 mm	5.850 mm
18.000 L	2.300 mm	6.030 mm	6.350 mm
20.000 L	2.300 mm	6.630 mm	6.950 mm
22.000 L	2.300 mm	7.230 mm	7.550 mm
24.000 L	2.300 mm	7.800 mm	8.150 mm

Pipes and connections

Silo Tanks 10.000-40.000 Liter

Cooling unit for
side evaporator.



Cooling unit for bottom evaporator.
2 cooling units also possible.

Height 810 mm

Pump and
glycol container

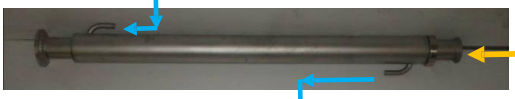
25 mm pipe for sprinkler nozzles.

Temperature sensorNI100.

4x1.5 mm cable.
Agitator soft-starter
3x400~ 50Hz

2-wire cable for agitator guard
connection for tank guard.

Tank base



Glycol system for tank inlet/outlet.

½ " T for drainage

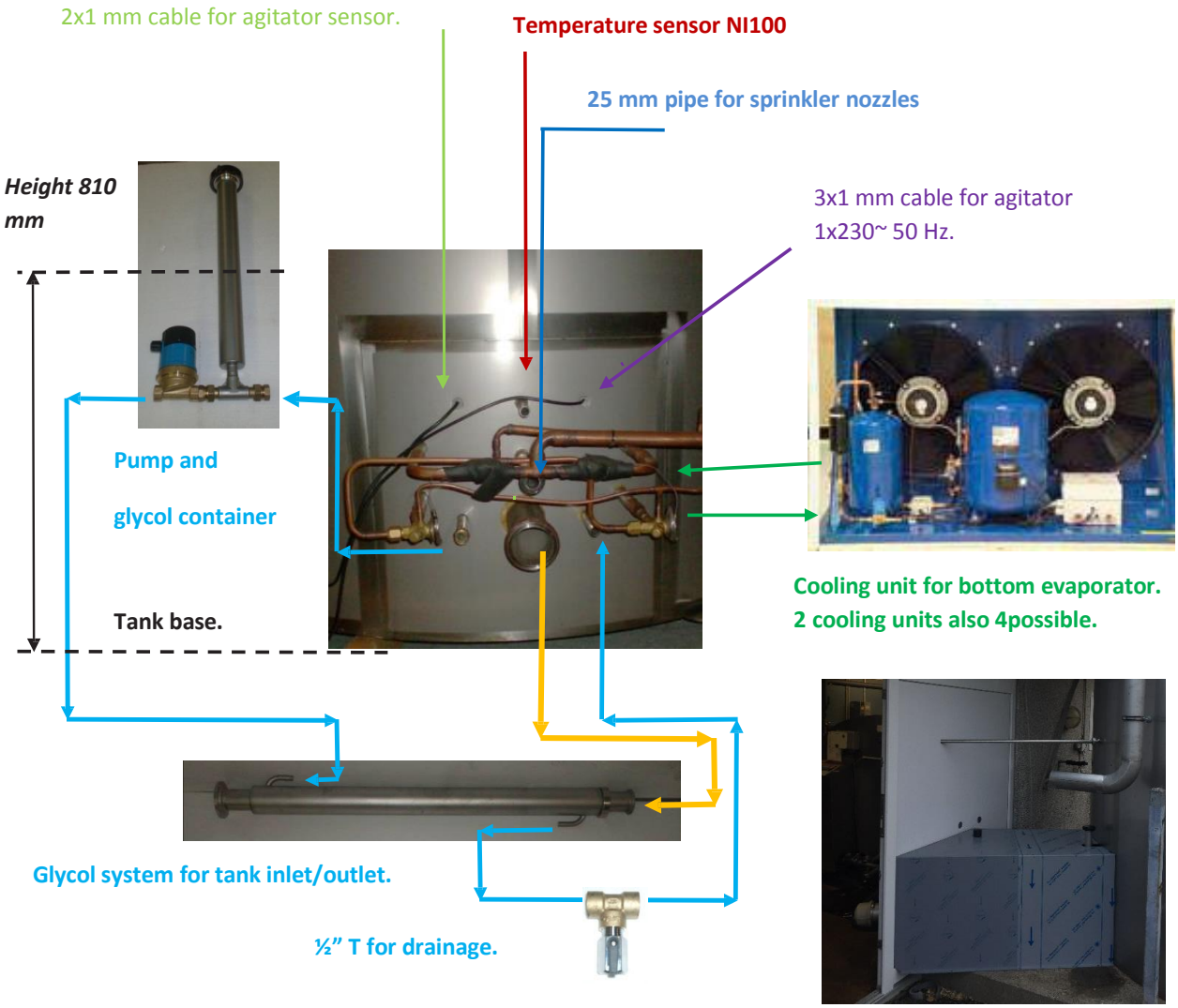
Example for cower – Glycol system.

Safety:

A safety switch-off must be installed in the cable for the agitator near the manhole or next to the manhole. The safety switch must be locked during inspections or works in the tank.

Pipes and connections

Silo Tanks 5.000-24.000 Liter



Example for cower . glycol system.

Safety:

A safety switch-off must be installed in the cable for the agitator near the manhole or next to the manhole. The safety switch must be locked during inspections or works in the tank.

Foundation and Pipe Recess

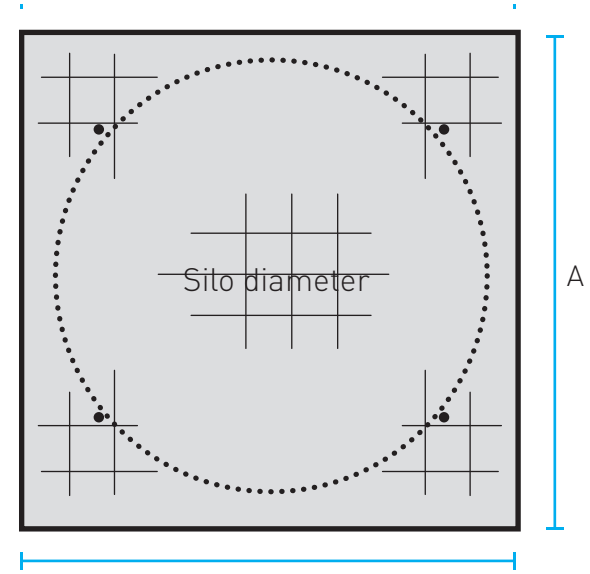
Before casting a foundation, please contact RO-KA for static calculations.

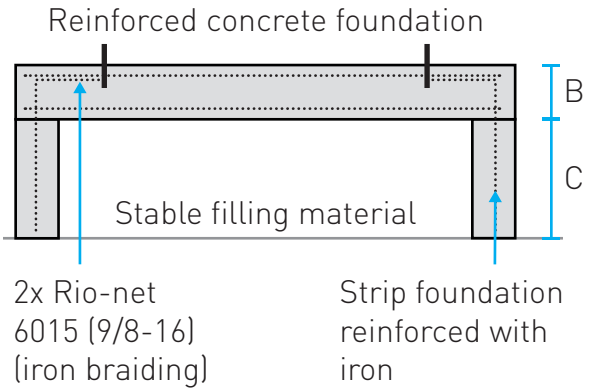
Silo tanks have to be mounted on a concrete foundation. The surface of the foundationtion must be in level to have equal pressure of the tank on the foundation. The silo frame must not be sealed to the foundation but allow condensing water to leave the tank.

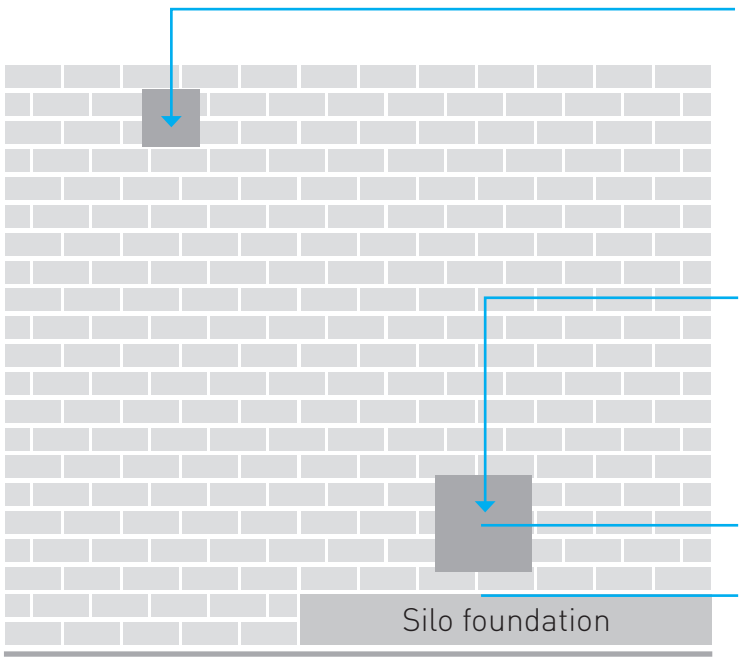
Ø/mm	A size	B size	C size
2.300	2.600	300	600
3.000	3.300	300	750

All measurements are lower limits.
Please observe the height of the overhang.

Base height has to be 250 mm above the floor of the milking room.







Placing of the Silo Tanks

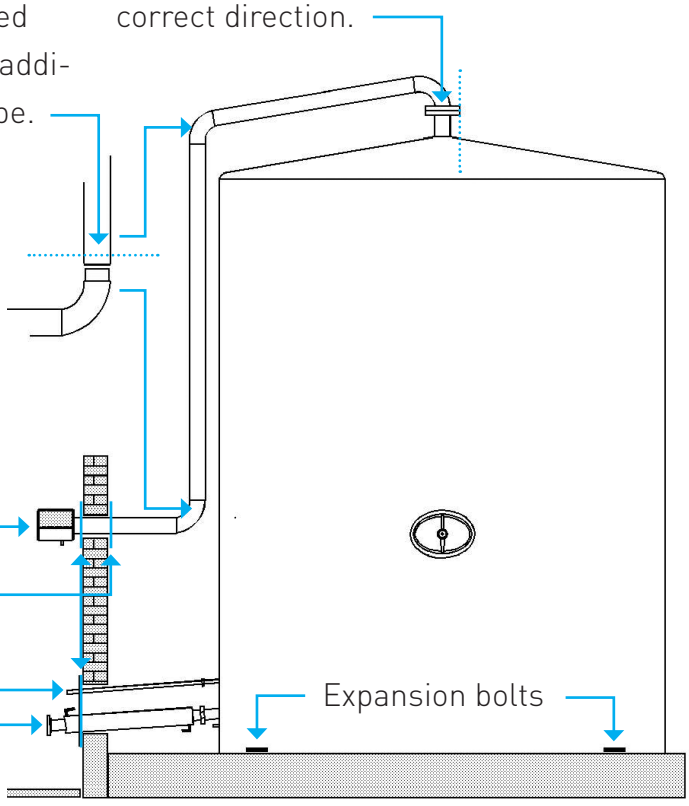
The silo tank will be lifted from the transport truck and is lowered to a convenient height for removing the transport fittings. The silo tank will then be lifted into a vertical position by means of a working reach. The silo tank is now placed on the foundation. It is very important that the tank is placed correctly with regards to the outlet etc. Finally the silo tank will be bolted to the foundation with M20 expansion bolts.

The air relief pipe will be shortened to the correct length and is connected either by TIG welding or by using 4 S/S self-cutting screws. When mounted with screws, the pipes have to be additionally sealed with aluminium tape.

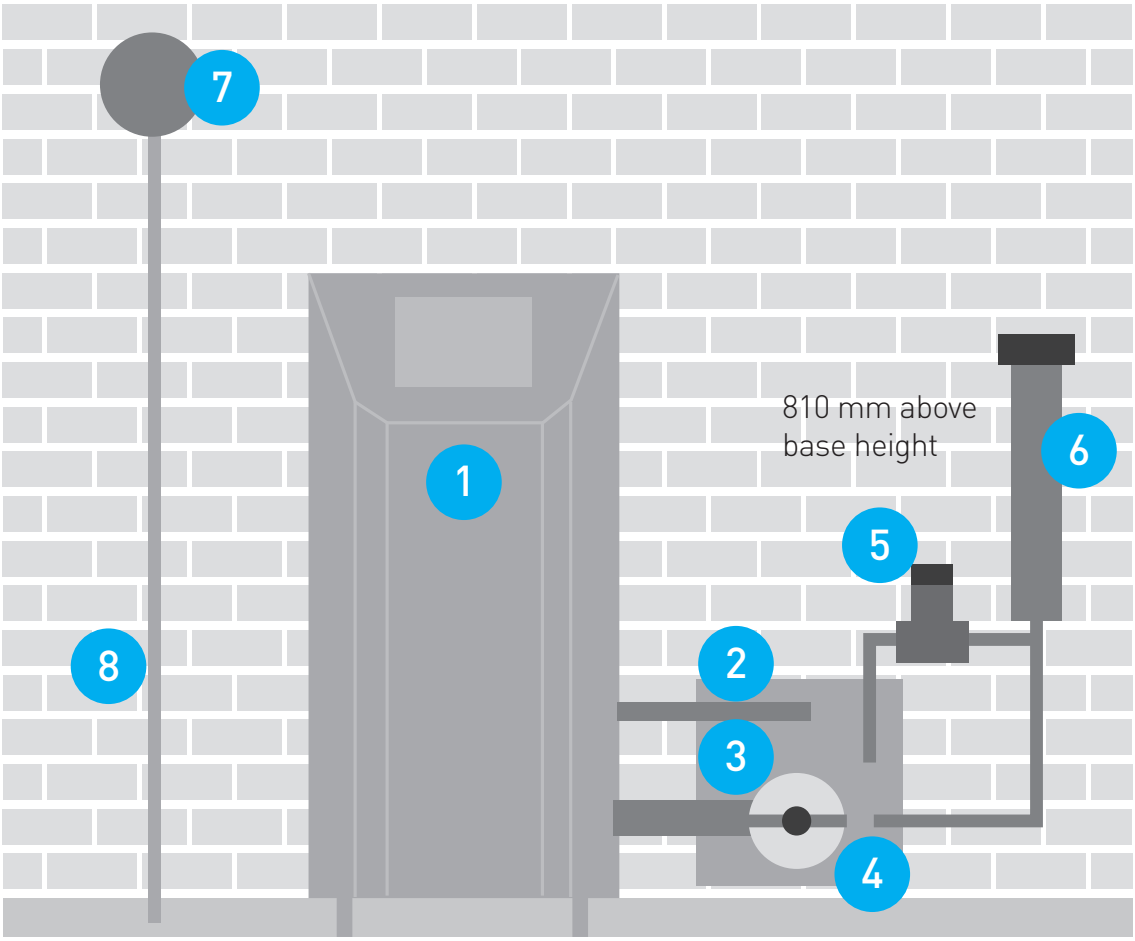
The air relief pipe will be mounted with 8 each 10 x 40 mm bolts. Please check that the air relief pipe is placed in the correct direction.

Air relief pipe with drainage:

If the ventilation is placed at the ceiling, drainage with a hose to the floor has to be installed. Never cover the outlet of the air relief pipe.



Outdoor installation with Milk Chamber

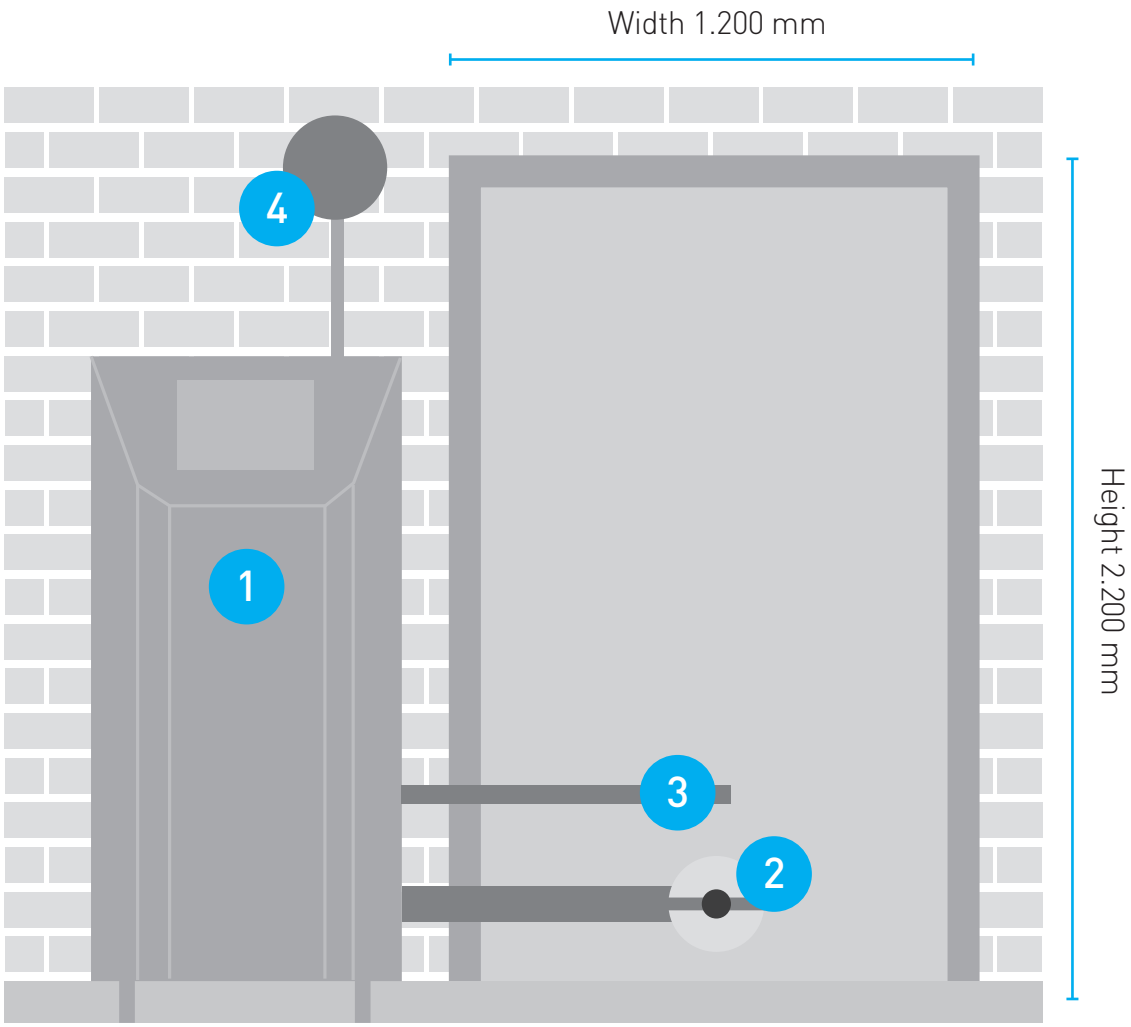


1: Washing Unit
2: Rinsing pipe, Ø25 mm stainless steel
3: 3" Outlet cock
4: Rinsing pipe with cap
5: Glycol pump
6: Glycol container
7: Air relief
8: PVC hose

Installation Kit for Outdoor Silo:

Outlet pipe 3“ 1,5 m	1 each
25 mm pipe with merger for water connection	1.5 m
Air relief pipe TOP	1 each
Air relief pipe VERTICAL	1 each
Air relief pipe HORIZONTAL	1 each
Cover case for outlet, 2-part	1 each
Cover case for agitator motor	1 each
Cover plate 400 x 400 x ø105 mm, divided	1 each
Cover plates 300 x 300 x ø115 mm	2 each
Throttle valve + handle	1 each
Air relief cap – SILO	1 each
Rubber cap 2“	1 each
Outlet Ø 3-2,5“ DS / NW 65	1 each
Gasket for outlet 2,5“ DS / NW	1 each
Spring strap	1 each
PVC – sleeve, grey	1 each
Gasket 161 x127 17/10	1 each
Rubber sleeve 51 x 51	1 each
Sensor	1 each
Container for Glycol	1 each
Vortex pump	1 each
Pipe bushing, brass, ½“	1 each
Pipe bushing for welding ½“ x 35 mm	2 each
Transparent hose, 3/4“	3,0 m
Clip 16 – 22 mm	6 each
Bolts 10 x 35 mm	8 each
Nuts 10 mm	8 each
Flange for ventilation pipe, diam. 235mm	1 each
Gasket for 3” SMS connector	1 each
Gasket for 1” connector	1 each
Gasket for 2 DS/NW	1 each
Holder for glycol container	2 each
T-part, ½” stainless steel	1 each
Ballofix ½”	1 each
Optional cover box for heater	1 each
Technical Description and Installation Instruction	1 pc.

Silo Installation for Alcoves

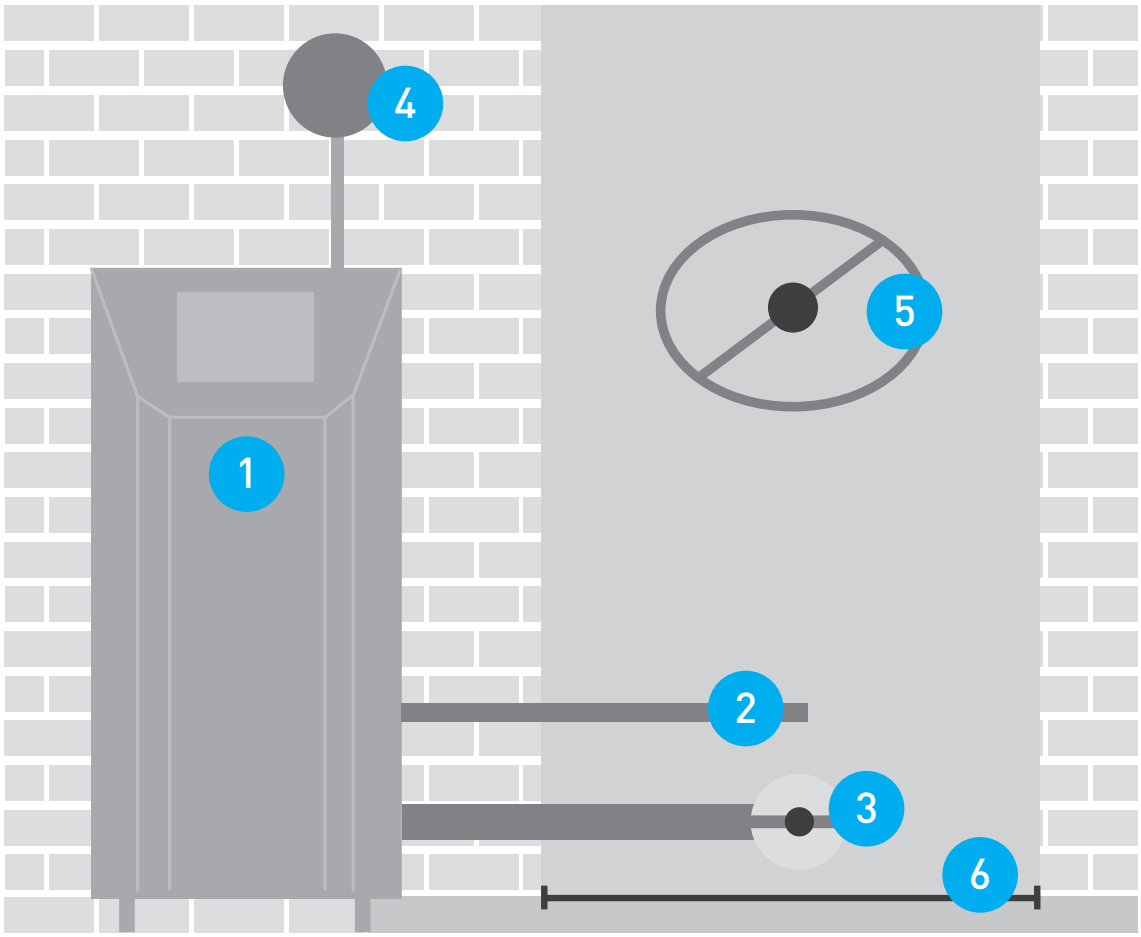


1: Washing Unit
2: 3" Outlet cock
3: Rinsing pipe, Ø25 mm stainless steel
4: Air relief

Installation Kits for Alcoves

25 mm pipe with merger for water connection	1,5 m
Air relief pipe TOP	1 each
Air relief pipe VERTICAL	1 each
Air relief pipe HORIZONTAL	1 each
Cover case with hole for outlet pipe	1 each
Cover case for agitator motor	1 each
Throttle valve + handle	1 each
Air relief cap – SILO	1 each
Rubber cap 2"	1 each
Outlet Ø 3-2,5" DS / NW 65	1 each
Gasket for outlet 2,5" DS / NW	1 each
Spring strap	1 each
PVC – sleeve, grey	1 each
Gasket 161 x127 17/10	1 each
Rubber sleeve 51 x 51	1 each
Sensor	1 each
Bolts 10 x 35 mm	8 each
Nuts 10 mm	8 each
Flange for ventilation pipe, diam. 235mm	1 each
Cover board 300x300x115 mm	1 each
Gasket for 3" SMS connector	1 each
Gasket for 1" connector	1 each
Gasket for 2 DS/NW	1 each
Optional cover box for heater	1 each
Technical Description and Installation Instruction	1 pc.

Indoor installation



1: Washing Unit
2: Rinsing pipe, Ø25 mm stainless steel
3: 3" Outlet cock
4: Air relief
5: Manhole
6: Expansion bolts, 4 each

Installation Kit, Indoor

25 mm pipe with merger for water connection	1,5 m
Air relief pipe TOP	1 each
Air relief pipe VERTICAL	1 each
Air relief pipe HORIZONTAL	1 each
Cover case with hole for outlet pipe	1 each
Cover case for agitator motor	1 each
Throttle valve + handle	1 each
Air relief cap – SILO	1 each
Rubber cap 2"	1 each
Outlet Ø 3-2,5" DS / NW 65	1 each
Gasket for outlet 2,5" DS / NW	1 each
Spring strap	1 each
PVC – sleeve, grey	1 each
Gasket 161 x127 17/10	1 each
Rubber sleeve 51 x 51	1 each
Sensor	1 each
Bolts 10 x 35 mm	8 each
Nuts 10 mm	8 each
Flange for ventilation pipe, diam. 235mm	1 each
Cover board 300x300x115 mm	1 each
Gasket for 3" SMS connector	1 each
Gasket for 1" connector	1 each
Gasket for 2 DS/NW	1 each
Optional cover box for heater	1 each
Technical Description and Installation Instruction	1 pc.

Receiving and Unwrapping

Upon receipt, please check all parts of the silo tank for transport damages.
If damages or deficiencies can be found, they have to be noted immediately on the freight warrant or the truck driver has to be notified.
The plastic foil will be removed shortly before the actual placing and installation of the tank on the foundation. Type and scope of delivery will be checked against the original order.

Refrigeration Installation

Direct Expansion
The cooling units will be mounted in such a way that they have the best possible ventilation and are as close to the tank connections as possible.
It is optimal to install the cooling units onto an outside foundation. They shall only be placed inside the technical room, if there is sufficient ventilation.
For devices with heat recovery systems it is important, that the cooling units and the heat exchanger are close to each other, and if possible on the same level.

Ice Water Generator / Glycol
Inlets and outlets will be connected with pipe conducts in the size of the ice water generator.
Inlets and outlets at the tank will be connected with 25mm hoses or pipes.

Refrigeration installation and dismounting shall only be performed by authorized specialists.

Electrical Installation

Only authorized specialized technicians shall connect the system to an existing electrical installation.

Standard Power Supply: 3 x 400/0-J. 50 Hz.
The systems need correct earthing.
If desired, the systems can also be manufactured for other power supplies.

Maintenance

If the tank comes with glycol-cooling through the outlet pipe, the amount of glycol has to be checked every three months.

Annual Service

Tank

- Dismount sprinkler and check for wear and tear; clean nozzles.
- Exchange ground bearing for the agitator.
- Check agitator for sound and leakage.
- Check manhole and gasket: clean/exchange.
- Visually check tank and outlet.
- Check glycol cooling at outlet pipe: Pump, glycol and tightness.
- Check of safety and special accessories.

Washing Unit

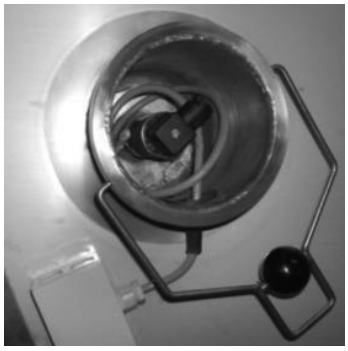
- Exchange dosage hoses of pumps. Clean filters of water valves.
- Check volume of water and dosage of detergents.
- Check rinsing pump and drainage pump.
- Check tightness.
- Check hose connections.
- Check electrical joints and connections.
- Check course of program including washing temperature.

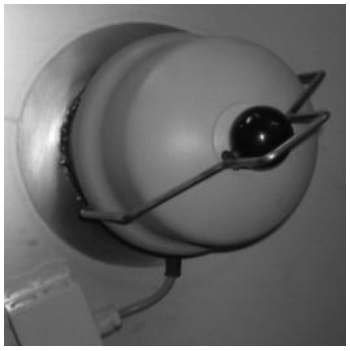
Cooling

- Check that optimal cooling is provided.
- Check function of thermostat: start/stop.
- Check breaks of agitator and duration.
- Check manual cooling function.

Please note the guiding rules and regulations for annual service and maintenance etc.

Special Accessories and Equipment

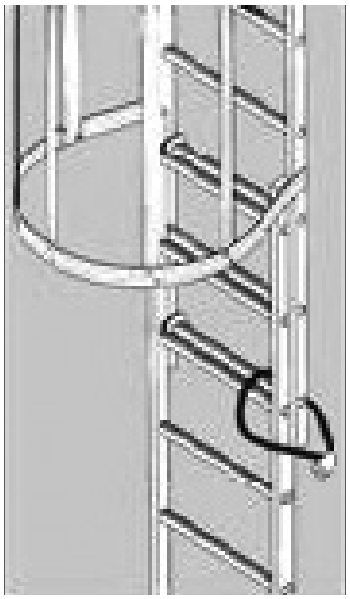




Full-indicator: mounted on top of the tank.

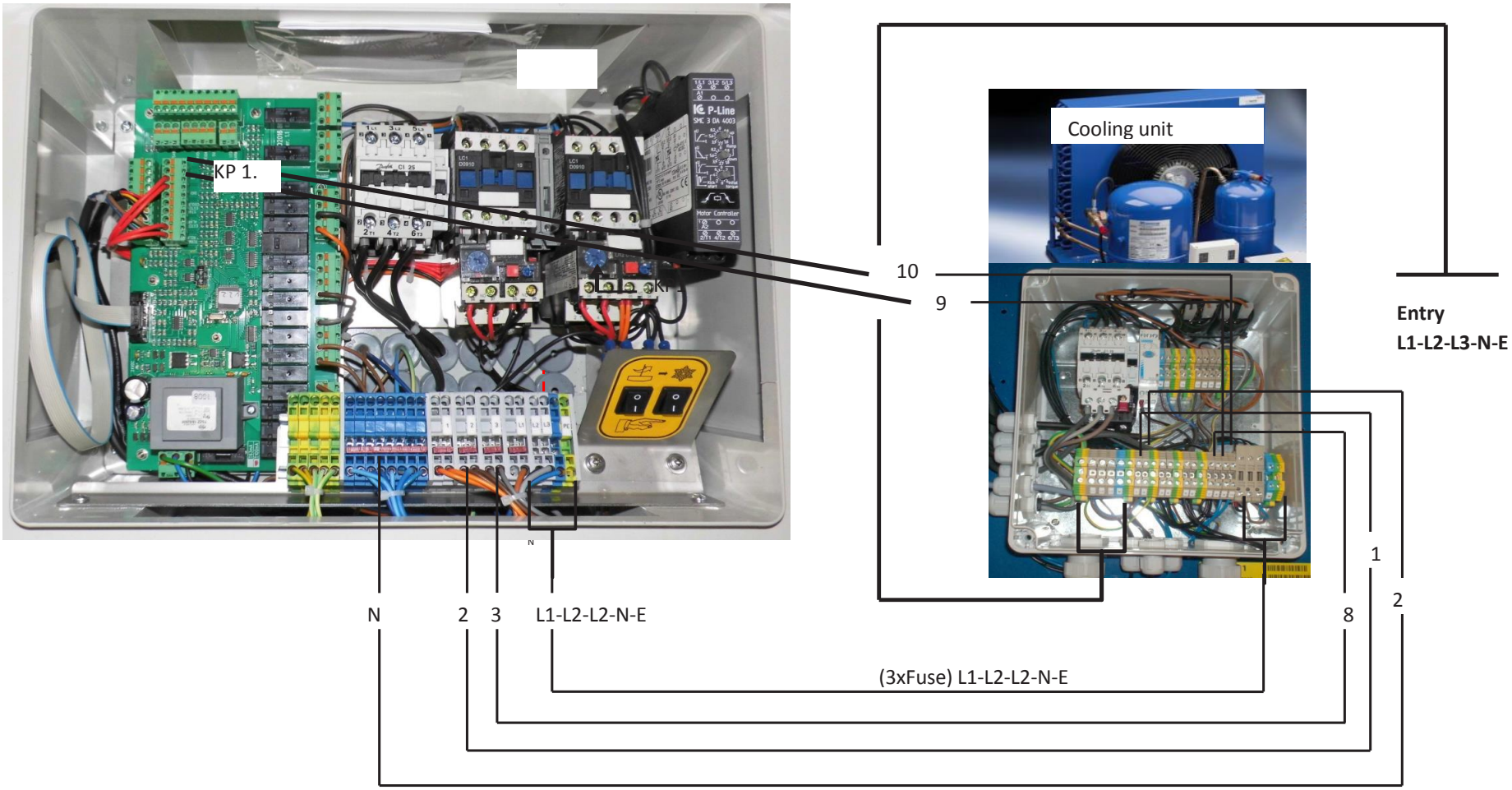
Level sensor for 9500 MULTI

Sample extractor: mounted on manhole.



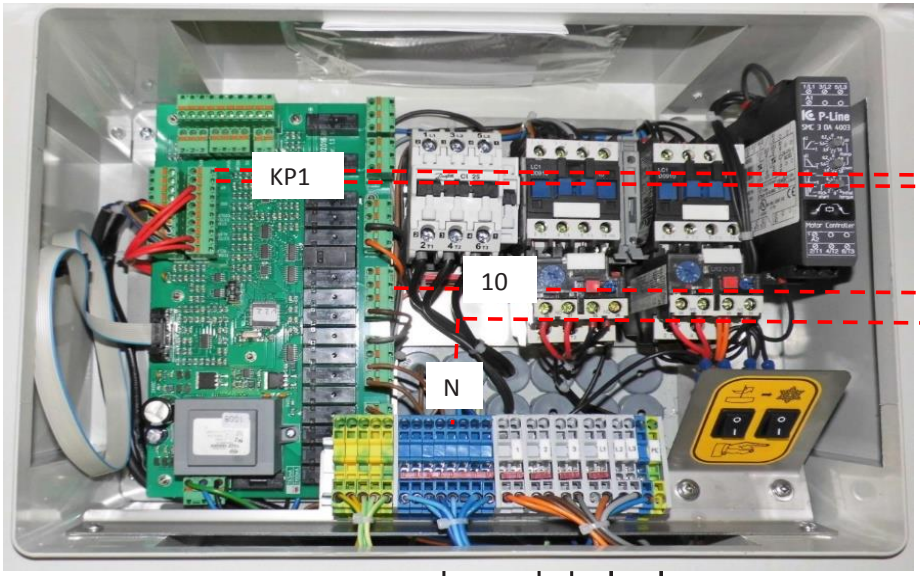
Safety ladder for silo tanks.

Circuit Diagram for
1 Cooling Unit. Danfoss HGZ



Circuit Diagram for 2 Cooling Units. Danfoss HGZ

Delayed start: 4 sec. for cooling unit



Cooling unit 2
Slave

Cooling unit 1

1
2
8
9
10

L1-L2-L3-N-E

N
2
3

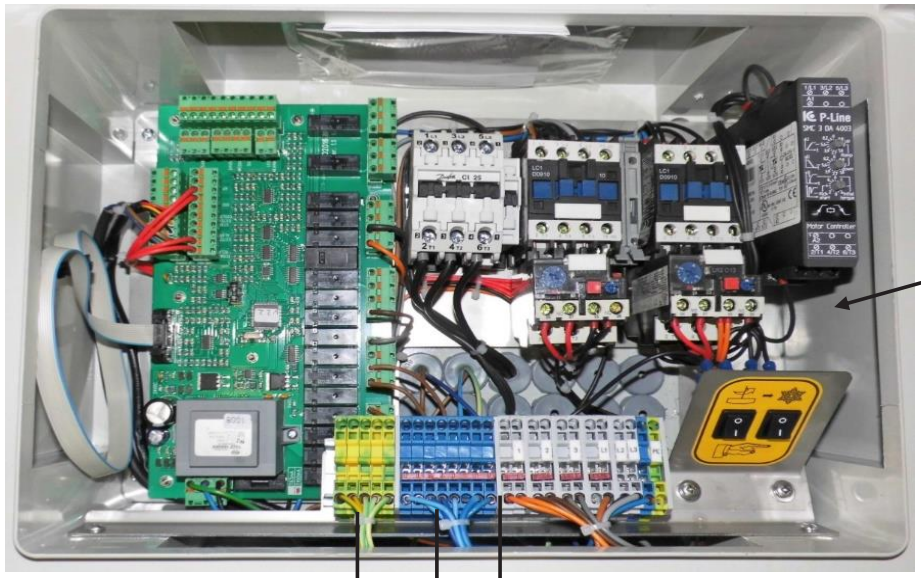
(3xFuse) L1-L2-L2-N-E

Entry
L1-L2-L3-N-E

Wirring unit 2.

Connection of Agitator

Gear motor R1C245 NSB



Gear motor: Type YE2-90S/4

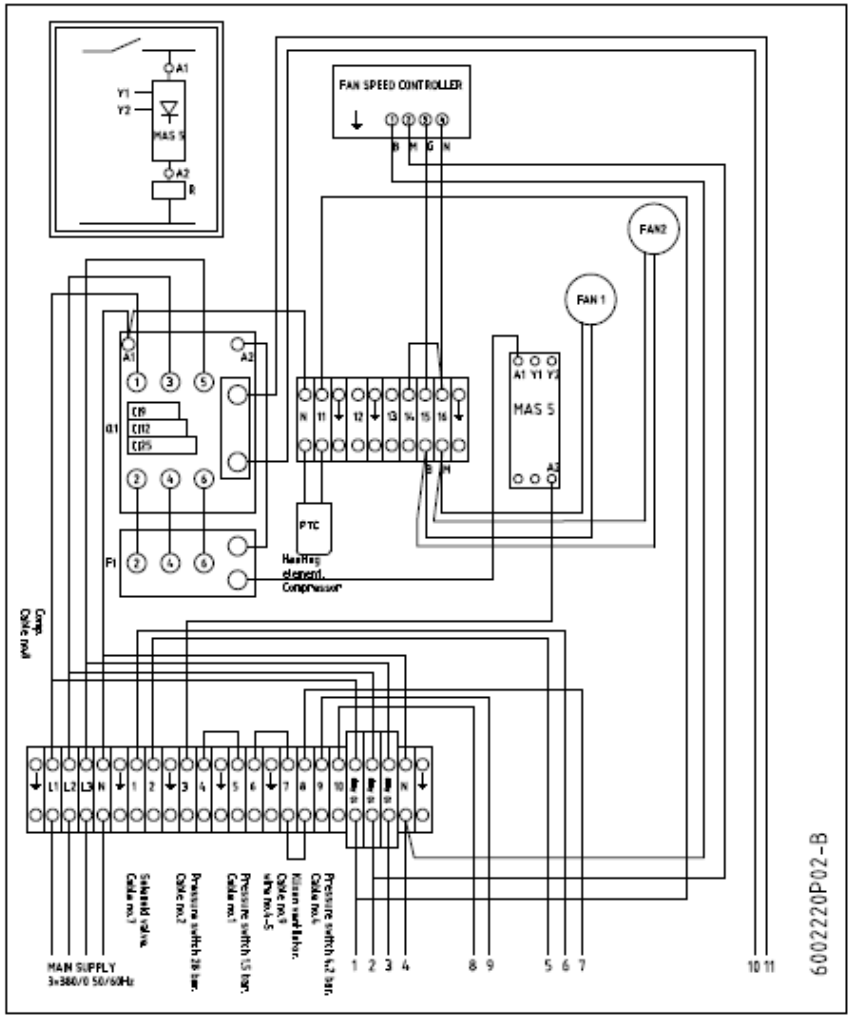
E

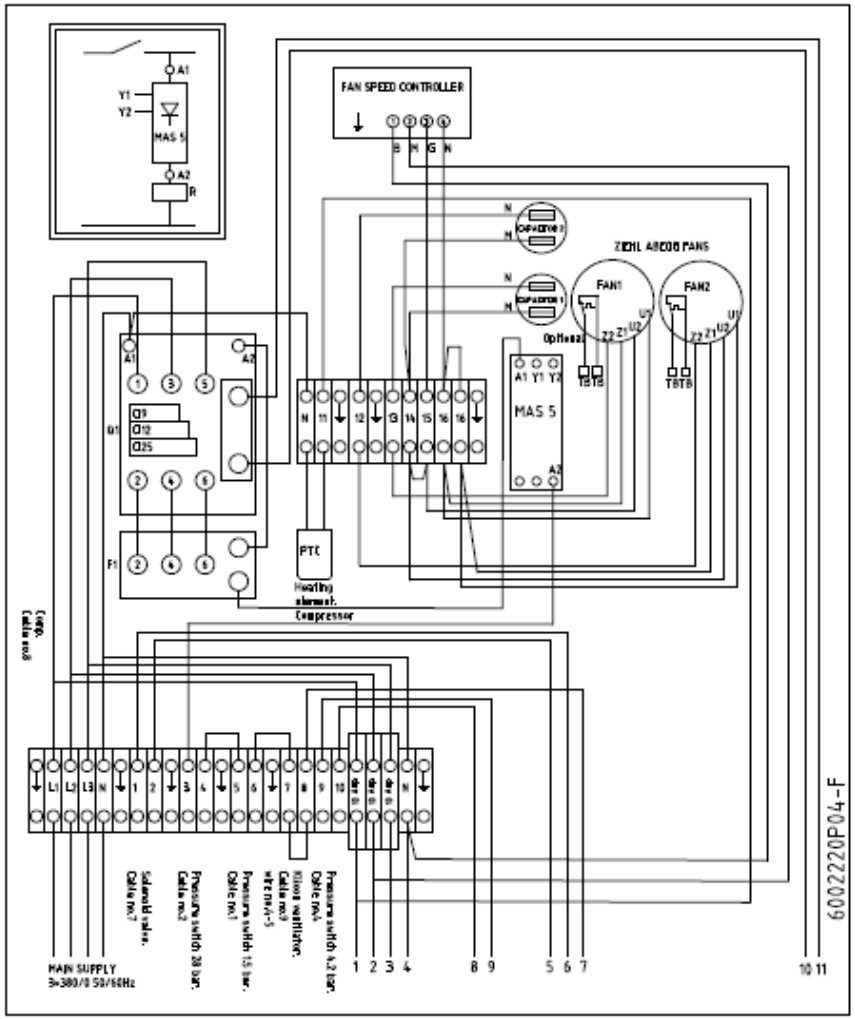
N

1

1 x 230 v¨ 50 Hz.

Circuit diagram Danfoss cooling unit





About RØ-KA

RØ-KA Industri has for many years accumulated valuable know-how and expertise in the production of bulk milk tanks.

The factory, which was founded in 1950, began production of the first generation of RØ-KA bulk milk tanks in 1967, and is today a well-known supplier to quality-conscious dairy farmers in many countries.

RØ-KA is renowned for high quality craftsmanship and the possibility of individual sizing of most tank dimensions.

RØ-KA exports a large number of tanks, and sales are supported by service teams in all countries. Besides standard bulk milk tanks, our product range includes silo tanks, iced-water cooling and heat recovery systems as well as refrigerated tanks for other liquids, blood for instance.

RØ-KA tanks can be connected to refrigeration units that use alternative refrigerants such as ammonia or iced water, and can be supplied with electric equipment as required.

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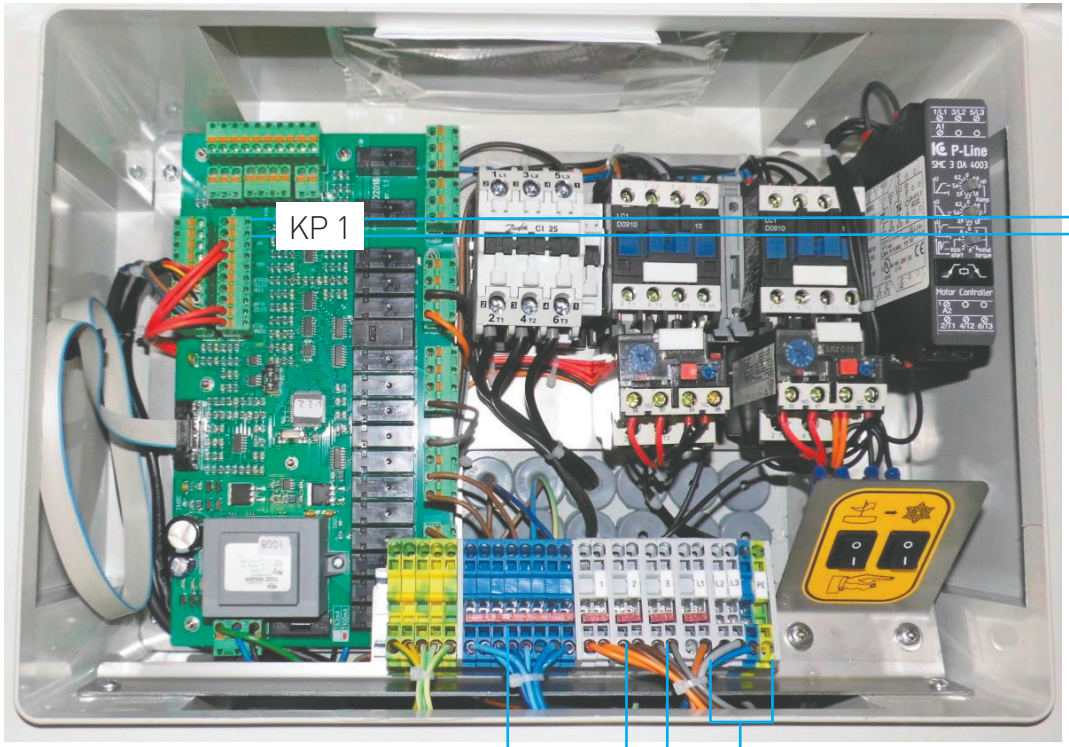
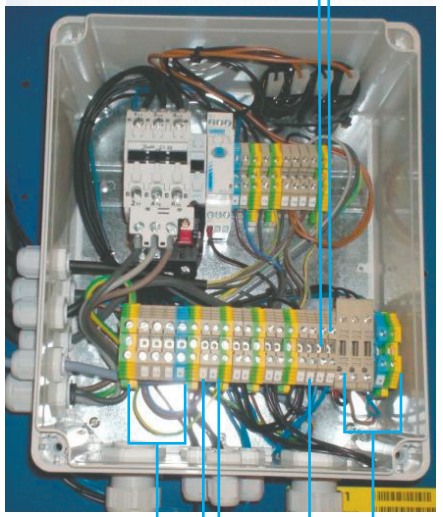
Circuit Diagram for 1 Cooling Unit. Danfoss HGZ



Cooling unit



10
9

N 2 3 L1-L2-L2-N-E

Entry L1-L2-L3-N-E 1 2 8

(3xFuse) L1-L2-L2-N-E