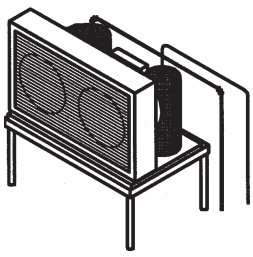
System Book

Closed tanks, DX Milk Cooling Tank w Hygenius



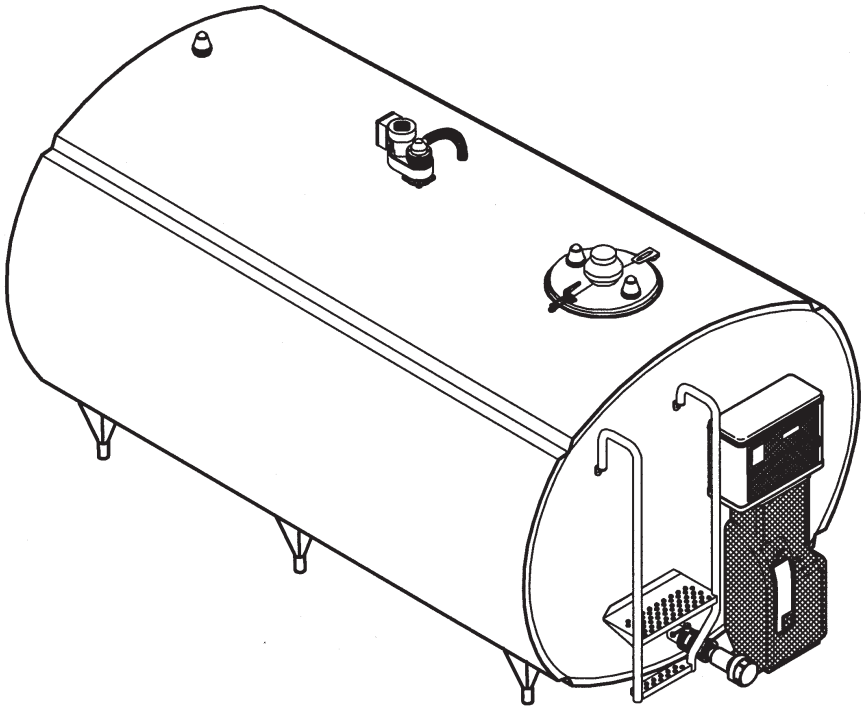


Table of contents

Closed tanks, DX with Hygenius 17
Safety precautions 17
General 17
Cleaning 18
Electrical 18
Cooling 19
Others 19

Closed tanks, DX with Hygenius 21
Safety precautions 21
Type plate, supplement sticker and CE-mark 23

Closed tanks, DX cooling tank with Hygenius 25
General description 25
Major parts 25
Function 26
Main functions 26
Direct expansion system 26
Refrigeration circuit 27
Milk flow 27
Reducing energy consumption 28

Closed tanks, DX/CE cooling tank with Hygenius 29
Planning 29
General 29
Farm condition (recommendations) 29
Performance 29
Installation 29
Tank with matching condensing unit 30
Performance of the installation 30
Selection of tank/condensing unit for 3 x 400V+N 32
Selection for 2 milkings 32
Selection of tank/condensing unit for 3 x 400V+N 33
Selection for 4 milkings 33
Selection of tank/condensing unit for 3 x 400V+N 34
Selection for 2 milkings 34
Selection of tank/condensing unit for 3 x 400V+N 35
Selection for 4 milkings 35
Selection of tank/condensing unit . . . . . for 3 x 400V+N
36
Selection for 6 milkings 36
Selection of tank/condensing unit for 3 x 400V+N 37
Selection for 2 milkings 37
Selection of tank/condensing unit for 3 x 400V+N 38

Selection for 4 milkings 38
Selection of tank/condensing unit 3 x 400V+N 39
Selection for 4 milkings 39
Selection of tank/condensing unit for 1 x 230V+N 40
Selection for 4 milkings 40
Positioning of the tank and condensing unit 42
Tank / milk plant connection 43

Closed tanks, DX/CEH cooling tank with Hygenius 44

Planning 44
General 44
Farm condition (recommendations) 44
Performance 44
Installation 44
Tank with matching condensing unit 45
Performance of the installation 45
Selection of tank/condensing unit for 3 x 400V+N 47
Selection for 2 milkings 47
* on request
** the mentioned switch boxes are selectable for both types of condensing units 47
Selection of tank/condensing unit for 3 x 400V+N 48
Selection for 4 milkings 48
* on request
** the mentioned switch boxes are selectable for both types of condensing units 48
Selection of tank/condensing unit for 3 x 400V+N 49
Selection for 2 milkings 49
* on request
** the mentioned switch boxes are selectable for both types of condensing units 49
Selection of tank/condensing unit for 3 x 400V+N 50
Selection for 4 milkings 50
* on request
** the mentioned switch boxes are selectable for both types of condensing units 50
Selection of tank/condensing unit . . . . . for 3 x 400V+N 51
Selection for 6 milkings 51
* on request
** the mentioned switch boxes are selectable for both types of condensing units 51
Selection of tank/condensing unit for 3 x 400V+N 52
Selection for 2 milkings 52
* on request
** the mentioned switch boxes are selectable for both types of condensing units 52
Selection of tank/condensing unit for 3 x 400V+N 53
Selection for 4 milkings 53

* on request
** the mentioned switch boxes are selectable for both types of condensing units 53
Selection of tank/condensing unit 3 x 400V+N 54
Selection for 4 milkings 54
* on request
** the mentioned switch boxes are selectable for both types of condensing units 54
Selection of tank/condensing unit for 1 x 230V+N 55
Selection for 4 milkings 55
* on request
** the mentioned switch boxes are selectable for both types of condensing units 55
Positioning of the tank and condensing unit 56
Tank / milk plant connection 57

DXCEM, milk cooling tank 58

Planning 58
General 58
Farm condition (recommendations) 58
Performance 58
Installation 58
Tank with matching condensing unit 59
Performance of the installation 59
Selection of tank/condensing unit for 3 x 400V+N 61
Selection for 2 milkings 61
Selection of tank/condensing unit for 3 x 400V+N 61
Selection for 4 milkings 61
* on request
** the mentioned switch boxes are selectable for both types of condensing units 61
Selection of tank/condensing unit for 3 x 400V+N 62
Selection for 2 milkings 62
Selection of tank/condensing unit for 3 x 400V+N 62
Selection for 4 milkings 62
* on request
** the mentioned switch boxes are selectable for both types of condensing units 62
Selection of tank/condensing unit . . . . . for 3 x 400V + N 63
Selection for 6 milkings 63
Selection of tank/condensing unit for 3 x 400V+N 63
Selection for 2 milkings 63
* on request
** the mentioned switch boxes are selectable for both types of condensing units 63
Selection of tank/condensing unit for 3 x 400V+N 64
Selection for 4 milkings 64
Selection of tank/condensing unit 3 x 400V+N 64

Selection for 4 milkings 64
* on request
** the mentioned switch boxes are selectable for both types of condensing units
. 64
Positioning of the tank and condensing unit 65
Tank / milk plant connection 66

Condensing units 68

Planning 68
Remarks on the position of the condensing unit 68
Size air intake 69

DX/CEH Milk cooling tank with Hygenius 70

Product data 70
Description 70
Technical data 70
General 70
Cooling system 71
Requirements 72

DX/CEH Milk cooling tank 74

Product data 74
Article number 74
Description 74
Technical data 75
General 75
Cooling system 75
Requirements 76

DX/CE Milk cooling tank with Hygenius 78

Product data 78
Description 78
Technical data 78
General 78
Cooling system 79
Requirements 80

DX/CE Milk cooling tank 84

Product data 84
Article number 84
Description 84
Technical data 85
General 85
Cooling system 86
Requirements 86

DX/CEM Milk cooling tank with Hygenius 90

Product data . . . 90
Description . . . 90
Technical data . . . 90
General . . . 90
Cooling system . . . 91
Requirements . . . 92

DX/CEM Milk cooling tank . . . 94

Product data . . . 94
Article number . . . 94
Description . . . 94
Technical data . . . 95
General . . . 95
Cooling system . . . 95
Requirements . . . 96

T100 cleaning / controlling unit . . . 98

Product data . . . 98
Description . . . 98
Cooling menu . . . 100
Cleaning menu . . . 100
Programming menu . . . 101
Technical data . . . 101

T200 cleaning / controlling unit . . . 104

Product data . . . 104
Description . . . 104
Cooling menu . . . 106
Cleaning menu . . . 106
Programming menu . . . 107
Technical data . . . 107

Automatic liquid dosing . . . 110

Product Data . . . 110
Article numbers . . . 110
Description . . . 110
Technical Data . . . 111

Outlet valve position check device . . . 112

Product data . . . 112
Article numbers . . . 112
Description . . . 112
Technical data . . . 112

DeLaval condensing units . . . 114

Product data . . . 114
Article numbers . . . 114

Description 116
Compliant scroll 116
Crankcase oil versus refrigerant 117
Technical Data: 118
Specifications
Copeland 3 x 400 V + N 119
Specifications
Copeland 3 x 230 V. 120
Specifications
Copeland 1 x 230 V + N 121
Specifications
L'Unité 1 x 230 V + N 122
Specifications
Copeland 3 x 208 V. 123
Dimensions (PRR Copeland, 3 x 400 V+N) 124
DeLaval condensing units with receiver 124
Dimensions (PRB Copeland, 3 x 400 V+N) 125
DeLaval condensing units basic execution,
(suitable for capillair systems) 125
Dimensions (PRR Copeland, 1 x 230 V + N) 126
DeLaval condensing units with receiver 126
Dimensions (PRR Copeland, 3 x 208 V, 60 Hz) 127
DeLaval condensing units with receiver. 127
Dimensions L'Unité Hermétique. 128
DeLaval condensing units with receiver (PRR L'Unité Hermétique, 1 x 230 V + N) 128
. 128
DeLaval condensing units basic execution (PRB L'Unité Hermétique, 1 x 230 V + N) 128

H-Box 130

Product data. 130
Article numbers 130
Description 131
Technical data. 132

AH-Box 134

Product data. 134
Article numbers 134
Description 134
Technical data. 135

DH-Box 136

Product data. 136
Article numbers 136
Description 136
Technical data. 137

Refrigeration copper kits (R22) 138
Product data 138
Copper kits for maintenance cooling or interval cooling 138
Article numbers expansion valves 139
Description 139
Soldering adaptors for flare equipment 140
Article numbers 140
Description 140
Sight glass 140
Article numbers 140

Refrigeration copper kits (R404A) 142
Product data 142
Copper kits for maintenance cooling or interval cooling 142
Side connection 143
Article numbers expansion valves 143
Description 143
Soldering adaptors for flare equipment 144
Article numbers 144
Description 144
Sight glass 144
Article numbers 144

Level start for Hygenius 146
Product data 146
Article number 146
Description 146
Technical data 146

Hygenius T100 cleaning/controlling unit 148
Function 148
Cleaning 148
Hygenius cleaning and controlling device 148
Hygenius Cleaning program 149
Pre-rinse (see figure A, B, C) 150
Washing (see figure D, E, F) 151
After-rinse (see figure G, H, I) 152
Disinfection (see figure J, K, L) 153

Hygenius T200 cleaning/controlling unit 154
Function 154
Cleaning 154

Hygenius cleaning program . . . 155
Pre-rinse (see figure A, B). . . . 156
Washing (see figure C,D,E) . . . 157
After-rinse
(see figure F, G, H) . . . 158
Disinfection
(see figure I, J, K) . . . 159

Closed tanks, DX with T100 / T200 . . . 160

Installation . . . 160
Installation overview . . . 160
Positioning tank . . . 160
Refrigeration system . . . 160
Water . . . 160
Electricity . . . 160
Environmental precautions . . . 160
1 Tank handling. . . . 161
Package of the tank . . . 161
Lifting the tank from the truck. . . . 161
2 Tank levelling . . . 162
Width direction . . . 162
Length direction . . . 162
3 Global overview of the whole installation . . . 163
4 Pipe work and positioning of the cooling equipment . . . 164
5 Overview of the installation . . . 165
6 Details for pipe work. . . . 166
Examples and recommendations. . . . 166
Piping routine . . . 167
7a Leak test. . . . 168
7b Making the installation air and moisture free . . . 168
7c Filling with refrigerant. . . . 169
8 Connections to the water supply . . . 170
Device for external connections. . . . 170
Requirements on the farm . . . 170
9 Water Quantity . . . 171
10 Overview of the water installation . . . 172
11 Electrical connections . . . 173
Main supply to the switch box . . . 173
Cable between switch box and pre-box . . . 174
Two or four separate condensing units in one installation . . . 174

Automatic liquid dosing for Hygenius . . . 176

Installation . . . 176
Positioning dosing pumps . . . 176
Positioning 3rd dosing pump . . . 179
Calibration liquid dosing pumps . . . 180
Calibration of dosing capacity . . . 180
Determine dosing volume P31, P32 and P33 . . . 182
Current situation . . . 184

Outlet valve position check device 186
Installation 186
Positioning position check device 186
Wiring diagram 187
. 187

Level start device 188
Installation 188
Wiring diagram 190

Wiring diagram 192
Wiring diagram Hygenius T100 + Pre-Box 3 x 400 V + N manual (powder) dosing only 192
Wiring diagram Hygenius T100 + Pre-Box 3 x 400 V + N automatic (liquid) dosing only 193
Wiring diagram Hygenius T100 + Pre-Box 3 x 230 V + N manual (powder) dosing only 194
Wiring diagram Hygenius T100 + Pre-Box 3 x 230 V + N automatic (liquid) dosing only 195
Wiring diagram Hygenius T100 + Pre-Box 1 x 230 V + N manual (powder) dosing only 196
Wiring diagram Hygenius T100 + Pre-Box 1 x 230 V + N automatic (liquid) dosing only 197
Wiring diagram Hygenius T200 + Pre-Box 3 x 400 V + N manual (powder) dosing only 198
Wiring diagram Hygenius T200 + Pre-Box 3 x 400 V + N automatic (liquid) dosing only 199
Wiring diagram Hygenius T200 + Pre-Box 3 x 230 V + N manual (powder) dosing only 200
Wiring diagram Hygenius T200 + Pre-Box 3 x 230 V + N automatic (liquid) dosing only 201
Wiring diagram Hygenius T200 + Pre-Box 1 x 230 V + N manual (powder) dosing only 202
Wiring diagram Hygenius T200 + Pre-Box 1 x 230 V + N automatic (liquid) dosing only 203

Hygenius tanks + ProfiCool 2000 204
Wiring Diagram 204
H-Box, 3 x 400 V + N 204
Selection condensing unit & wiring diagram 204
AH-Box, 3 x 400 V + N 205
Selection condensing unit & wiring diagram 205
DH-Box, 3 x 400 V + N 205
Selection condensing unit & wiring diagram 205
List of abbreviations 206
Switch box H-Box 209
The main supply is to be connected to the switch (MS) terminals N, L1, L2 L3. 209

Wiring diagram Hygenius tanks + ProfiCool 2000 210
H-Box, 1 fan (1 phase), without receiver 210
Wiring diagram Hygenius tanks + ProfiCool 2000 211
H-Box, 2 fans (1 phase), without receiver 211
Wiring diagram Hygenius tanks + ProfiCool 2000 212
H-Box, 2 fans (1 phase), thermistor control unit, without receiver 212
Wiring diagram Hygenius tanks + ProfiCool 2000 213
H-Box, 1 fan (1 phase), with receiver 213
Wiring diagram Hygenius tanks + ProfiCool 2000 214
H-Box, 2 fans (1 phase), with receiver 214
Wiring diagram Hygenius tanks + ProfiCool 2000 215
H-Box, 2 fans (1 phase), thermistor control unit, with receiver 215
Wiring diagram Hygenius tanks + ProfiCool 2000 216
H-Box, 1 fan (1 phase), with receiver 216
Switch box AH-Box 217
The main supply is to be connected to the main switch (MS) terminals N, L1, L2, L3. 217
Wiring diagram Hygenius tanks + ProfiCool 2000 218
AH-Box, 1 fan (1 phase), with receiver 218
Wiring diagram Hygenius tanks + ProfiCool 2000 219
AH-Box, 2 fans (1 phase), with receiver 219
Wiring diagram Hygenius tanks + ProfiCool 2000 220
AH-Box, 2 fans (1 phase), thermistor control unit, with receiver 220
Switch box DH-Box 221
The main switch is to be connected to the main supply (MS) N, L1, L2, L3. . 221
. 221
Wiring diagram Hygenius tanks + ProfiCool 2000 222
DH-Box, 4 fans (1 phase), with receivers 1(2) 222
Wiring diagram Hygenius tanks + ProfiCool 2000 223
DH-Box, 4 fans (1 phase), with receivers 2(2) 223
Wiring diagram Hygenius tanks + ProfiCool 2000 224
AH-Box, 4 fans (1 phase), thermistor control unit, with receivers 1(2) 224
Wiring diagram Hygenius tanks + ProfiCool 2000 225
AH-Box, 4 fans (1 phase), thermistor control unit, with receivers 2(2) 225

Hygenius tanks + ProfiCool 2000 226

Wiring Diagram 226
H-Box, 1 x 230 V + N 226
Selection condensing unit & wiring diagram 226
DH-Box, 1 x 230 V + N 226
Selection condensing unit & wiring diagram 226
List of abbreviations 227
Switch box H-Box 229
The main supply is to be connected to the main switch (MS) terminals N, L1, L2, L3. 229
Wiring diagram Hygenius tanks + ProfiCool 2000 230
H-Box, 1 fan (1 phase), with receiver 230
Switch box DH-Box 231
The main supply is to be connected to the main terminals N, L1, L2, L3. 231

. 231
Wiring diagram Hygenius tanks + ProfiCool 2000 232
DH-Box, 2 fans (1 phase), with receiver 1(2). 232
Wiring diagram Hygenius tanks + ProfiCool 2000 233
DH-Box, 2 fans (1 phase), with receiver 2(2). 233

Closed tanks, DX with Hygenius 234

Start-up 234
General 234
Parameter settings 234
Cooling. 235
Cleaning 236
Start-up cleaning 236
Final check. 237
Instructions. 237
Additional 237

Closed tanks, DX with Hygenius 238

Routines. 238
Warning signs 240
Indicator lights 240
Filling. 241
Actions for the filling routine. 241
Cooling 242
Actions of the cooling routine
(first milking). 242
Quick start cooling (feature for last milking). 243
Emptying the tank 244
Requirements. 244
Routines of emptying the tank 244
Cleaning 245
Cleaning routine. 246
Manual running dosing pumps. 247

Closed tanks, DX with Hygenius 248

Safety precautions 248
General 248
Cleaning 249
Electrical 249
Cooling 250
Others 250

Closed DX, Cooling tanks 252

Service 252
Agitator. 252
Replacing agitator motor or shaft. 252
Re-assembling 253
. 253

Checking the direction of rotation 253

Closed tanks, DX cooling tank with Hygenius 254

Service 254
Maintenance schedule 254
Care and maintenance 255
Remarks on the cleaning unit
(only for manual dosing) 255
Remarks on the condensing unit 255
How to enter the tank 256
General recommendations for entering the tank. 256
Entering the tank 257

Hygenius, cleaning / controlling device 258

Service 258
General 258
Changing parameter settings 258
Function button: 258
F: Digital display. 258
Indicator lights: 258
Error messages. 261
Set "Real Time". 261

T100/T200 cleaning / controlling unit 262

Service 262
Numerical parameters Cooling 263
Function parameters Cleaning. 264
Default settings, tank filling (T100) systems 265
Default settings, buffer filling (T200) system 266
Miscellaneous function parameters. 267
Test function 267
Security code 268
Force digital output 269
Check digital input(s). 270
Calibration of temperature indication 271
Opening top box 271
Printed circuit boards 272
1. Human Interface Board 273
CPU-BOARD CONNECTIONS 274
Exchanging the EPROM 275
Reset cleaning / controlling 275
2. Power/output module 276
Fuses 276
IN- OUTPUT MODULE 278

Closed tanks, DX with T100 / T200 280

Trouble shooting 280

Closed tanks, DX with T100 / T200 282
Trouble shooting 282
General 284
Cooling 286
Cleaning 286

Closed tanks, DX with Hygenius

Safety precautions

General



Warning! *Make sure that children and unauthorised persons do not come into contact with any part of the system!*

The installation of the equipment must be carried out by authorized mechanics.

Before the milk cooling tank and the condensing unit will be brought into use, carefully read the instructions.

It is the responsibility of the owner/user to take the necessary measures to prevent the ambient temperature around the milk cooling installation from dropping to-or below freezing point. DeLaval can not take responsibility for any damage resulting from frost.

No responsibility will be accepted for damage resulting from faulty installation, operation or for improper or inadequate care and maintenance.

Responsibility will only be accepted for milk cooling equipment supplied by DeLaval.

Never use the machine for any other purpose than the one specified.

Cleaning



Warning! *Always wear gloves when filling the containers with cleaning chemicals because these substances could cause skin irritation!*



Warning! *Never mix detergent and acid cleaning agent. This could cause chemical reactions creating dangerous gasses!*

Close the containers well, so no cleaning chemicals will spout out of the containers during the cleaning process.

Before starting the cleaning program, the manhole lid has to be closed and the two milk inlets have to be covered, so no hot water or cleaning agent can come out. This could cause skin irritation.

Electrical

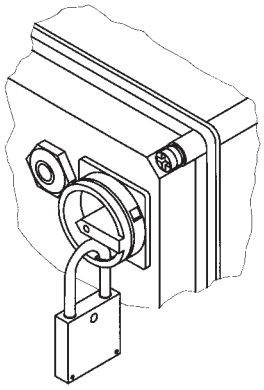


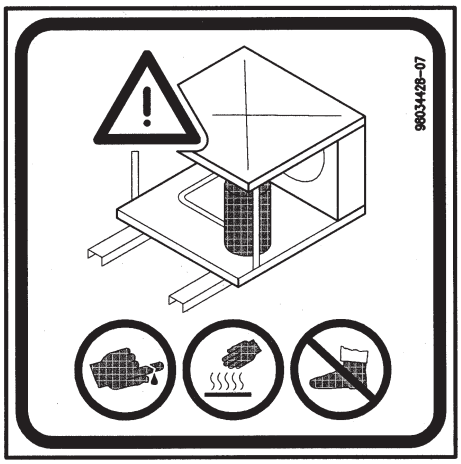
Warning*! Opening of the control boxes and work on the electrical equipment is only allowed to authorized electricians!*



Warning*! Never clean the milk cooling installation with a high pressure cleaner or any other jet of water!*

The safety switch on the switch box of the condensing unit has to be locked before entering the tank or during inspection, adjustment or maintenance of the installation. So that the installation cannot be started while work is in progress.





Cooling

Keep fingers away from the condensing unit (risk of burning or cutting) even when the tank is not running.

– Be careful of the fins of the heat exchanger.

– Be careful of the cover of the condensing units and possible hot components.

– Do not put anything on the cover.

– Never step on the condensing unit, on the tank or on any piping.

Others

Never enter the tank when nobody is standing by to render emergency assistance.

The collecting truck driver should be clearly instructed by the farmer about all specific handlings and safety precautions concerning this routines.

DeLaval

Closed tanks, DX with Hygenius

Safety precautions

Before installing the equipment, carefully read the installation instructions!

Because of the environmental risks concerning the refrigeration, all recommendations and regulations should be considered.

No responsibility is accepted for damage resulting from faulty transport, tank handling, installation, operation or for improper or inadequate care and maintenance.



Warning!
During soldering/brazing the copper pipes, be aware of the fire hazard!

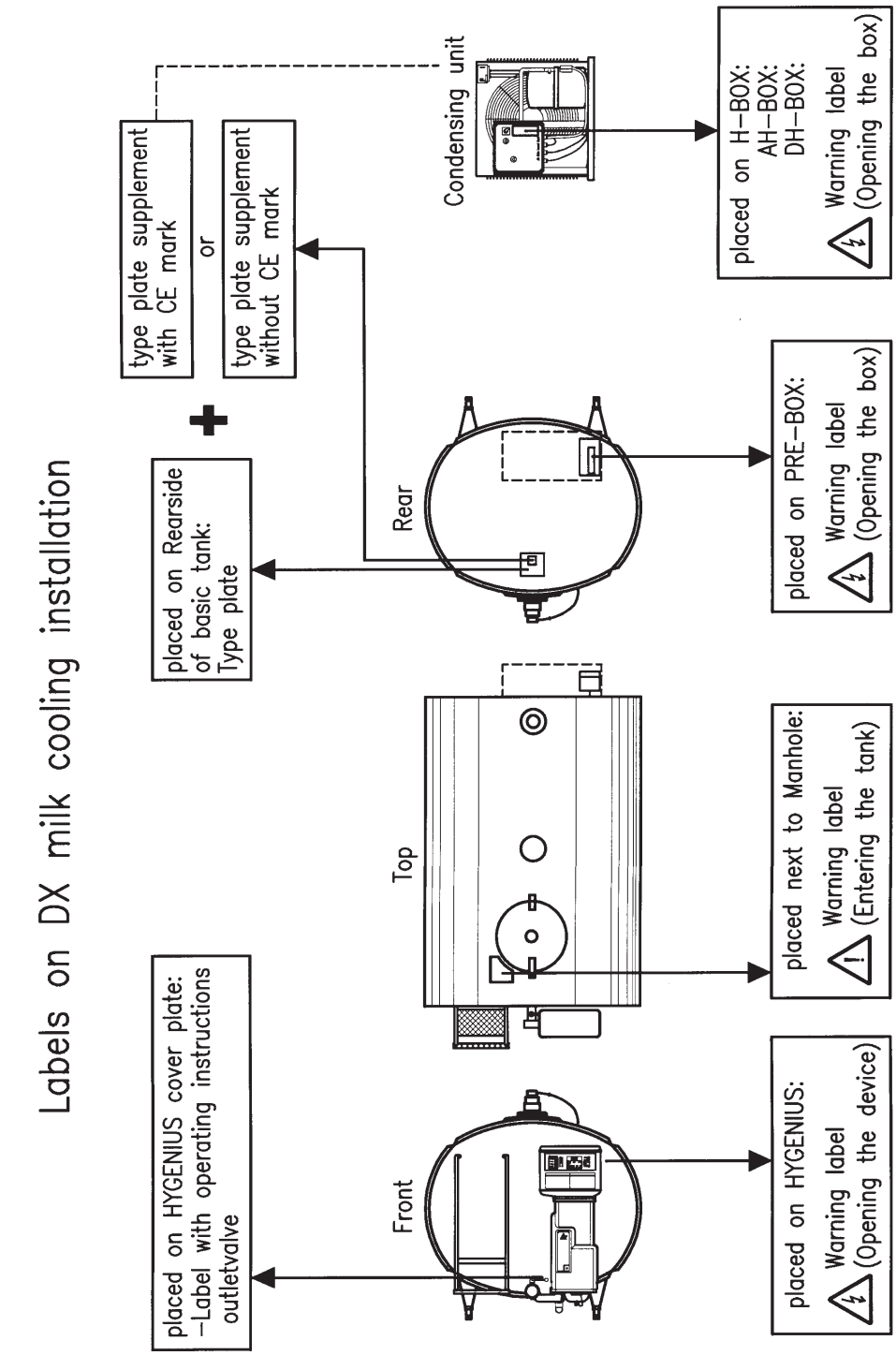


Warning!
Prevent that during soldering/brazing at the backside of the tank the insulation gets too hot. This could cause chemical reactions creating dangerous gasses!

Before the tank is filled, be sure that the tank has been levelled according to the instructions.

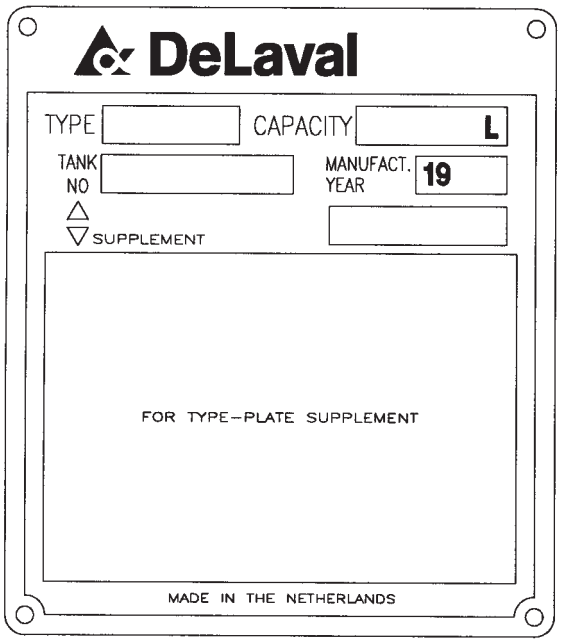
Before the first start-up of the installation, the water, electrical and pipe connections have to be checked.

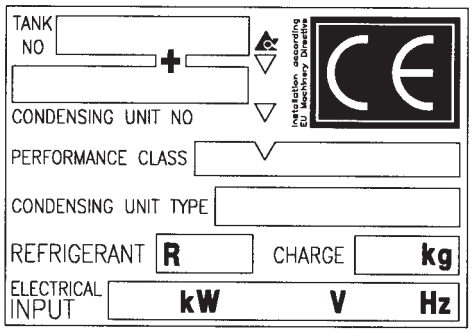
After installation of the tank the farmer has to be supplied with simple and clear instructions, with detailed safe operational and effective cleaning routines.

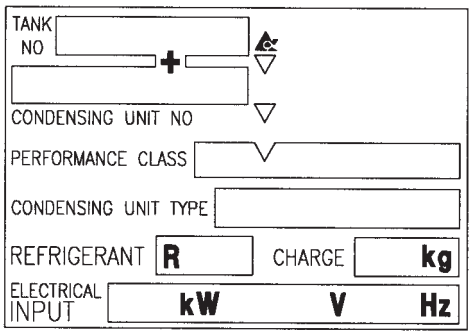

Labels on DX milk cooling installation
Condensing unit
type plate supplement with CE mark
or
type plate supplement without CE mark
placed on H–BOX:
AH–BOX:
DH–BOX:
Warning label
(Opening the box)
placed on Rearside of basic tank: Type plate
Rear
placed on PRE–BOX:
Warning label
(Opening the box)
Top
placed next to Manhole:
Warning label
(Entering the tank)
placed on HYGENIUS cover plate:
–Label with operating instructions outletvalve
Front
placed on HYGENIUS:
Warning label
(Opening the device)

Type plate, supplement sticker and CE-mark

On the back side of the tank a type plate has been placed. This plate contains information about the installation.







TYPE PLATE INFORMATION

TYPE	=	Type of the tank
CAPACITY	=	Maximum capacity of the tank
TANK NO	=	Unique tank number
MANUFACT. YEAR	=	Year the tank is build

On this type plate space has been left for a supplement sticker. On this sticker information has to be filled in which in general is not known at the time the tank has been manufactured. There are two types of supplement stickers; A - with CE-mark and B - without CE-mark. The supplement sticker with the CE-mark will be supplied if DeLaval delivers a complete installation (DX milk cooling tank with condensing unit). In this case a declaration of conformity will be submitted.

The supplement sticker without CE-mark will be supplied with a manufacturers declaration. The CE-mark on the supplement sticker only covers the cooling equipment supplied by DeLaval Groningen. The stickers must be filled in completely and then be attached to the tank.

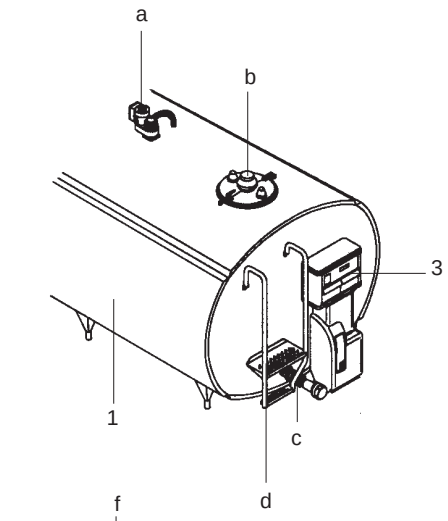
SUPPLEMENT STICKER INFORMATION

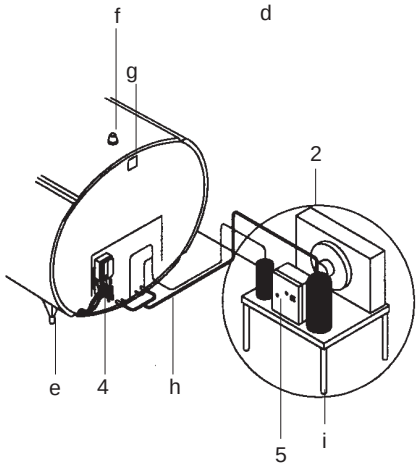
TANK NO: The same unique tank number as stated on the type plate. So the right sticker will be placed on the type plate.
CONDENSING UNIT NO: The number on the type plate of the condensing unit.
PERFORMANCE CLASS: The performance class gives information about the ambient temperature, milk cooling time and number of milkings. For information about the classes see chapter Planning.
CONDENS. UNIT TYPE: The type of condensing unit.
REFRIGERANT: The type of refrigerant used in the system.
CHARGE: The quantity of refrigerant in the system.
ELECTRICAL INPUT: The total power consumption used by the complete cooling installation.

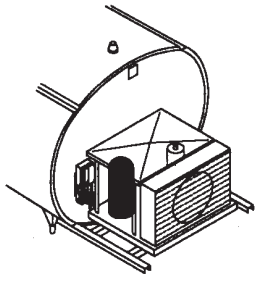
DeLaval

Closed tanks, DX cooling tank with Hygenius

General description







The DX cooling tanks consist of a milk cooling tank and a condensing unit. Regarding the safety aspects the installation complies with the EC Machinery Directive.

On the front there is a built up Hygenius controlling/cleaning device. The condensing unit must be placed close to the rear side of the tank. The installation engineer has to take care of the connections between tank and condensing unit and he has to do the electrical connections and the water supply.

1 DX milk cooling tank.

2 Condensing unit
for the DX/CEH and DX/CE (up to 8000 litres) a built on condensing unit can be ordered.

3 Hygenius cleaning / controlling device.

4 Hygenius connection box,
called ‘PRE-BOX’.

5 H-, AH-, or DH-BOX condensing unit switch box.

Major parts

The DX cooling tanks comply with the EC Machinery Directive.

a Agitator motor.

b Manhole (cover) with inlet, air vent, holder for dipstick.

c Platform/ ladder.

d Double outlet .

e Adjustable legs.

f Second milk inlet.

g Type plate of the installation.

h Refrigeration piping.

i Condensing unit platform (needed for base plate version).

The closed DX cooling tanks can, up to 8000 litres, be delivered with a built-on condensing unit.

The built-on execution is equipped with a condensing unit mounted on the back side of the tank supported by two beams.

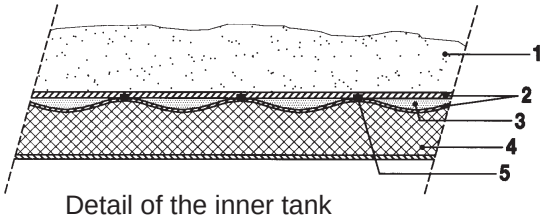
Function

Main functions

The milk cooling tank installation has two main functions. First all milkings have to be stored and second the milk must be cooled during filling of the tank.

This cooling period is restricted to a certain time in which the temperature of the contents must be cooled down from approx. 35 °C to 4 °C.

These two functions can be fulfilled with a tank which is designed for a direct expansion system, like the DX cooling tank.



Detail of the inner tank

Direct expansion system

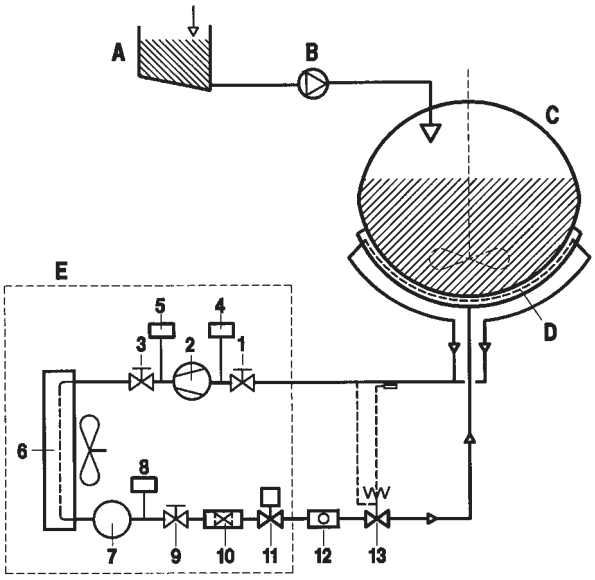
The milk (1) and the refrigerant (3) are separated by the tank wall. The bottom part of the inner tank is double plated and completely insulated by foam (4). These plates have been spot-welded (5) together and are called the evaporator (2). There is a regulated expansion valve at the inlet of this evaporator. This thermostatic expansion valve injects the refrigerant. The quantity is regulated by the heat of the out coming gas measured near the evaporator outlet.

The liquid refrigerant takes the heat of the milk during evaporation and becomes gas.

The compressor is connected to the outlet of the evaporator and sucks the heated gas out of the evaporator.

The compressor compresses the gas and presses it through the condenser.

The condenser is the cooling part for the refrigerant and exists of copper tubes with fins. The gas should be cooled down by an air flow or cold water and condensates to liquid, after which it will be stored and injected again.



Refrigeration circuit

In the figure the components E (1-11),12 and 13 and D are placed in the circuit:

- Premounted condensing unit (E).

1. Compressor Rotalock at suction side.
2. Compressor.
3. Compressor Rotalock at discharge side.
4. Low pressure pressostat.
5. High pressure pressostat.
6. Condenser.
7. Liquid receiver (optional).

8.. High pressure fan pressostat (optional).

9. Liquid receiver Rotalock (optional).
10. Filter/drier.
11. Solenoid valve (optional).

- Components mounted to the tank.

12. Spy glass.
13. Thermostatic expansion valve.

- Evaporator (D), part of the inner tank.

Milk flow

The milk enters the tank (C) via the end unit (A) and the milk pump (B).

In this system the milk pump pumps the warm milk directly into the tank.

In this system the evaporator cools the whole amount of milk and all the heat of the milk is given to the air.

Reducing energy consumption

There are two main possibilities to save energy during the cooling process.

Possibility 1
Pre-cooling with a plate cooler (P30). Before the milk enters the tank it will be cooled down to approx. 15 °C by a cold water flow. The tank with the condensing unit must cool it further to 4 °C.

Possibility 2
Heat recovery with a water-cooled condenser. Now the air-cooled condenser (5) is replaced by a water-cooled condenser (heat exchanger). The continuing hot water flow of approx. 55 °C can be stored in an insulated vessel and can be used for all purposes.

Closed tanks, DX/CE cooling tank with Hygenius

Planning

General

Before installation can take place three main aspects should be considered: farm condition, performance and installation.

Farm condition (recommendations)

- Be sure that the room is big enough to accommodate the tank and condensing unit in such a way that one can walk around the cooling system and that there is space above the tank for maintenance.
- Be sure that the size of the door is adequate to enter and remove the tank.
- Be sure that the room has adequate lighting, drainage and ventilation.
- Be sure that the truck has easy access to the farm and has sufficient space to turn should this be necessary. The surface of the farm yard must be firm enough to support the weight of the truck.

Performance

- The dimensions of the chosen tank. The type and size of the condensing unit (eventually with pre-cooling and heat recovery).

Installation

- The electrical power supply and the requirements.
- The water supply and the regulations.
- Regulations about refrigeration systems.
- Regulation about draining wasted water.

Tank with matching condensing unit

The closed DX/CE tanks are usually delivered with a separate condensing unit. The choice of the type of condensing unit depends on the capacity of the tank, the number of milkings, the ambient conditions and the recommendations and requirements of the country of destination. Some of these variable specifications are coded in a performance classification number. The performance class must be written on the type plate of the milk cooling tanks when the total installation is completed.

Performance of the installation

(conform prEN CEN/TC 153/WG8)
The performance of the installation can be specified according to the following 3 different values. These 3 values must be placed behind each other.

1 The number of milkings
2, 4 or 6 milkings

2 The ambient temperature classification
A = performance temperature 38°C (safe operating temp. 43°C)

B = performance temperature 32°C (safe operating temp. 38°C)

C = performance temperature 25°C (safe operating temp. 32°C)

3 The milk cooling time classification (hour for all milkings 35°C to 4°C)

0 = maximum acceptable cooling time of 2 hours

I = maximum acceptable cooling time of 2,5 hours

II = maximum acceptable cooling time of 3 hours

III = maximum acceptable cooling time of 3,5 hours

Most commonly DX/CE tanks are equipped with a type of condensing unit which meets the performance class 4BII being 4 milking by an ambient temperature of 32°C and cooled down within 3 hour. When other performance classes are needed the type or capacity of the condensing units can be specified on request.

Selection of tank/condensing unit for 3 x 400V+N

Selection for 2 milkings

Condensing units for closed DX/CE tanks by performance classification 2AII (2 milkings (ED), 38°C ambient temperature and 3 hours cooling time)					
DX/CE	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1150	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1300	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1600	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-03 98034003-03
2000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-04 98034003-04
2500	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-04 98034003-04
3000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
3500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
4000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
4500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
5000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
6000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
6750	2 x (9.6/13.0))	98037008-10 98037008-39	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
7500	2 x (9.6/13.0)	98037008-10 98037008-39	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
8000	2 x (9.6-13.0)	98037008-10 98037008-39	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
8600	4 x (5.5/7.5)	98037008-08 98037008-37	4 x 98053769-89 2 x 98053772-94	AH-Box DH-Box	98034001-15 98034003-15
9700	4 x (5.5/7.5)	98037008-08 98037008-37	4 x 98053769-89 2 x 98053772-94	AH-Box DH-Box	98034001-15 98034003-15
11000	4 x (7.5/10.0)	98037008-09 98037008-38	4 x 98053769-89 2 x 98053772-94	AH-Box DH-Box	98034001-15 98034003-15
12000	4 x (7.5/10.0)	98037008-09 98037008-38	4 x 98053769-89 2 x 98053772-94	AH-Box DH-Box	98034001-15 98034003-15

Selection of tank/condensing unit for 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CE tanks by performance classification 4AII (4 milkings (AD), 38°C ambient temperature and 3 hours cooling time)					
DX/CE	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	**Copperkit**
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1150	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1300	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1600	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-01 98034003-01
2000	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-01 98034003-01
2500	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
3000	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3500	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
4000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05
4500	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05
5000	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-05 98034003-05
6000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
6750	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
7500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
8000	9.6/13.0	98037008-10 98037008-39	1 x 98053769-90 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
8600	2 x (4.4/7.5)	98037008-07 98037008-36	2 x 98053769-88 1 x 98053772-93	AH-Box DH-Box	98034001-14 98034003-14
9700	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14
11000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14
12000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14

Selection of tank/condensing unit for 3 x 400V+N

Selection for 2 milkings

Condensing units for closed DX/CE tanks by performance classification 2BII (2 milkings (ED), 32°C ambient temperature and 3 hours cooling time)					
DX/CE	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	**Copperkit**
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1150	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1300	2.6/3.5	98037008-04 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1600	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
2000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-04 98034003-04
2500	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-04 98034003-04
3000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
3500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
4000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
4500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
5000	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
6000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
6750	2 x (7.5/10.0))	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
7500	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
8000	2 x (9.6/13.0)	98037008-10 98037008-39	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-07 98034003-07
8600	4 x (4.4/6.0)	98037008-07 98037008-36	4 x 98053769-88 2 x 98053772-93	AH-Box DH-Box	98034001-15 98034003-15
9700	4 x (5.5/7.5)	98037008-08 98037008-37	4 x 98053769-89 2 x 98053772-94	AH-Box DH-Box	98034001-15 98034003-15
11000	4 x (5.5/7.5)	98037008-08 98037008-37	4 x 98053769-89 2 x 98053772-94	AH-Box DH-Box	98034001-15 98034003-15
12000	4 x (7.5/10.0)	98037008-09 98037008-38	4 x 98053769-89 2 x 98053772-94	AH-Box DH-Box	98034001-15 98034003-15

Selection of tank/condensing unit for 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CE tanks by performance classification 4BII (4 milkings (AD), 32°C ambient temperature and 3 hours cooling time)					
DX/CE	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	**Copperkit**
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1150	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1300	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1600	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
2000	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-01 98034003-01
2500	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
3000	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3500	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
4000	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
4500	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
5000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05
6000	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-05 98034003-05
6750	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
7500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
8000	9.6/13.0	98037008-10 98037008-39	1 x 98053769-90 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
8600	2 x (4.4/6.0)	98037008-07 98037008-36	2 x 98053769-88 1 x 98053772-93	AH-Box DH-Box	98034001-14 98034003-14
9700	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14
11000	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14
12000	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14

Selection of tank/condensing unit for 3 x 400V+N

Selection for 6 milkings

Condensing units for closed DX/CE tanks by performance classification 6BII (6 milkings (AD), 32°C ambient temperature and 3 hours cooling time)					
DX/CE	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	**Copperkit**
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1150	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1300	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1600	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
2000	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
2500	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
3000	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-06 98034003-06
3500	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-06 98034003-06
4000	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
4500	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
5000	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
6000	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
6750	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05
7500	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05
8000	5.5/7.5	98037008-08 98037008-37	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
8600	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053772-89	H-Box AH-Box	98034001-18 98034003-18
9700	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053772-89	H-Box AH-Box	98034001-13 98034003-13
11000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053772-89	H-Box AH-Box	98034001-13 98034003-13
12000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053772-89	H-Box AH-Box	98034001-13 98034003-13

Selection of tank/condensing unit for 3 x 400V+N

Selection for 2 milkings

Condensing units for closed DX/CE tanks by performance classification 2CII (2 milkings (ED), 25°C ambient temperature and 3 hours cooling time)					
DX/CE	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	**Copperkit**
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1150	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-01 98034003-01
1300	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1600	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
2000	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-03 98034003-03
2500	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-04 98034003-04
3000	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-05 98034003-05
3500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
4000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
4500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
5000	2 x (4.4/6.0)	98037008-07 98037008-36	2 x 98053769-88 1 x 98053772-93	AH-Box DH-Box	98034001-10 98034003-10
6000	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
6750	2 x (7.5/10.0))	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
7500	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
8000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-10 98034003-10
8600	4 x (4.4/6.0)	98037008-07 98037008-36	4 x 98053769-88 2 x 98053772-93	AH-Box DH-Box	98034001-15 98034003-15
9700	4 x (4.4/6.0)	98037008-07 98037008-36	4 x 98053769-88 2 x 98053772-93	AH-Box DH-Box	98034001-15 98034003-15
11000	4 x (5.5/7.5)	98037008-08 98037008-37	4 x 98053769-89 2 x 98053772-94	AH-Box DH-Box	98034001-15 98034003-15
12000	4 x (5.5/7.5)	98037008-08 98037008-37	4 x 98053769-89 2 x 98053772-94	AH-Box DH-Box	98034001-15 98034003-15

Selection of tank/condensing unit for 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CE tanks by performance classification 4CII (4 milkings (AD), 25°C ambient temperature and 3 hours cooling time)					
DX/CE	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	**Copperkit**
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1150	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1300	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1600	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
2000	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-01 98034003-01
2500	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-01 98034003-01
3000	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3500	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
4000	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
4500	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
5000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05
6000	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-05 98034003-05
6750	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
7500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
8000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
8600	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-13 98034003-13
9700	2 x (4.4/6.0)	98037008-07 98037008-36	2 x 98053769-88 1 x 98053772-93	AH-Box DH-Box	98034001-14 98034003-14
11000	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14
12000	2 x 7(5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14

Selection of tank/condensing unit 3 x 400V+N

Selection for 4 milkings

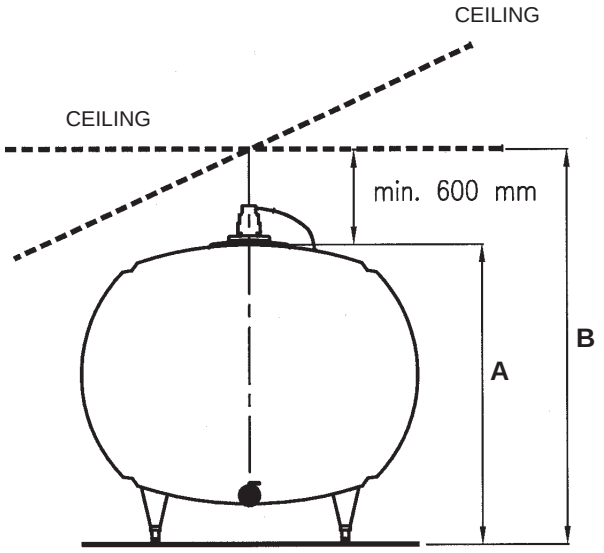
Condensing units for closed DX/CE tanks by performance classification 4CI (4 milkings (AD), 25°C ambient temperature and 2½ hours cooling time)					
DX/CE	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	**Copperkit**
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1150	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1300	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1600	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-01 98034003-01
2000	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-01 98034003-01
2500	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
3000	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3500	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
4000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05
4500	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05
5000	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-05 98034003-05
6000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
6750	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
7500	2 x (4.4/6.0)	98037008-07 98037008-36	2 x 98053769-88 1 x 98053772-93	AH-Box DH-Box	98034001-10 98034003-10
8000	9.6/13.0	98037008-10 98037008-39	1 x 98053769-90 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
8600	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14
9700	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14
11000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14
12000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98053769-89 1 x 98053772-94	AH-Box DH-Box	98034001-14 98034003-14

Selection of tank/condensing unit for 1 x 230V+N

Selection for 4 milkings

Condensing units for closed DX/CE tanks by performance classification 4BII (4 milkings (AD), 32°C ambient temperature and 3 hours cooling time)					
DX/CE	**Condensing unit**	**Condensing unit**	**Article number switch box**	**Switch box**	**Copperkit**
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1150	1.5/2.0	98037008-60	1 x 98055083-91	H-Box	98034001-02 98034003-02
1300	1.5/2.0	98037008-60	1 x 98055083-91	H-Box	98034001-02 98034003-02
1600	1.5/2.0	98037008-60	1 x 98055083-91	H-Box	98034001-02 98034003-02
2000	1.75/2.25	98037008-61	1 x 98055083-91	H-Box	98034001-01 98034003-01
2500	2.9/3.9	98037008-64	1 x 98055083-92	H-Box	98034001-01 98034003-01
3000	2.9/3.9	98037008-64	1 x 98055083-92	H-Box	98034001-01 98034003-01
3500	2.9/3.9	98037008-64	1 x 98055083-92	H-Box	98034001-01 98034003-01
4000	2 x (2.0/2.7)	98037008-62	1 x 98055083-97	DH-Box	98034001-12 98034003-12
4500	2 x (2.0/2.7)	98037008-62	1 x 98055083-97	DH-Box	98034001-12 98034003-12
5000	2 x (2.4/3.2)	98037008-63	1 x 98055083-97	DH-Box	98034001-12 98034003-12
6000	2 x (2.9/3.9)	98037008-64	1 x 98055083-97	DH-Box	98034001-12 98034003-12
6750	on request				
7500	on request				
8000	on request				
8600	4 x (2.4/3.2)	98037008-63	2 x 98055083-97	DH-Box	on request
9700	4 x (2.9/3.9)	98037008-64	2 x 98055083-97	DH-Box	on request
11000	4 x (2.9/3.9)	98037008-64	2 x 98055083-97	DH-Box	on request
12000	4 x (2.9/3.9)	98037008-64	2 x 98055083-97	DH-Box	on request

* on request
** the mentioned switch boxes are selectable for both types of condensing units



Positioning of the tank and condensing unit

When the final execution of the tank and condensing unit is known the needed space in the tank room can be planned.

On the following pages three situations are shown; the difference is the spot of the condensing unit, caused by the needed space for the air-flow.

The following minimal distances can be planned: A-between front and door 1,2 metre, B-between tank side and wall 0,5 metre. Between side and path 1 metre and between rear side and condensing unit or wall 1 metre. There must be a minimal free space of 0,6 metre above the tank.

At these minimal sizes the dimensions of the basic tanks must be added. They can be found in the index of the tank dimension sketch. These recommendations are necessary in order to create sufficient free space for operation, cleaning and service of the installation.

In cases where the installation or the milk room will be supplied with permanent components for heat recovery, re-use of cleaning water or a pipeline cleaner with sink, additional space has to be considered.

At the front of the tank near the outlet a drain sport has to be provided.

		A	B			A	B
DX/CE	1150	1350	1950	DX/CE	5000	1825	2425
	1300	1350	1950		6000	1825	2425
	1600	1350	1950		6750	1815	2425
	2000	1350	1950		7500	1815	2425
	2500	1350	1950		8000	1875	2475
	3000	1710	2310		8600	2045	2645
	3500	1710	2310		9700	2100	2700
	4000	1710	2310		11000	2100	2700
	4500	1710	2310		12000	2100	2700

Tank / milk plant connection

The milk plant should be connected to the milk cooling tanks in order to collect the milk. For this there are four major possibilities:

1. With a hose from the end unit to one of the two tank milk inlets.
2. With a pipeline which can swing from the wall to above the milk inlet.
3. By a tank connection device with a removable inlet pipe (for smaller tanks).
4. By an adapted outlet/inlet piece (for larger tanks).

The last two possibilities permit the milk to enter the tank in the most gentle way and are recommended. All above mentioned equipment should be cleaned during the cleaning process of the milk plant.

Closed tanks, DX/CEH cooling tank with Hygenius

Planning

General

Before installation can take place three main aspects should be considered: farm condition, performance and installation.

Farm condition (recommendations)

- Be sure that the room is big enough to accommodate the tank and condensing unit in such a way that one can walk around the cooling system and that there is space above the tank for maintenance.
- Be sure that the size of the door is adequate to enter and remove the tank.
- Be sure that the room has adequate lighting, drainage and ventilation.
- Be sure that the truck has easy access to the farm and has sufficient space to turn should this be necessary. The surface of the farm yard must be firm enough to support the weight of the truck.

Performance

- The dimensions of the chosen tank. The type and size of the condensing unit (eventually with pre-cooling and heat recovery).

Installation

- The electrical power supply and the requirements.
- The water supply and the regulations.
- Regulations about refrigeration systems.
- Regulation about draining wasted water.

Tank with matching condensing unit

The closed DX/CEH tanks are usually delivered with a separate condensing unit. The choice of the type of condensing unit depends on the capacity of the tank, the number of milkings, the ambient conditions and the recommendations and requirements of the country of destination. Some of these variable specifications are coded in a performance classification number. The performance class must be written on the type plate of the milk cooling tanks when the total installation is completed.

Performance of the installation

(conform prEN CEN/TC 153/WG8)
The performance of the installation can be specified according to the following 3 different values. These 3 values must be placed behind each other.

1 The number of milkings
2, 4 or 6 milkings

2 The ambient temperature classification
A = performance temperature 38°C (safe operating temp. 43°C)

B = performance temperature 32°C (safe operating temp. 38°C)

C = performance temperature 25°C (safe operating temp. 32°C)

3 The milk cooling time classification (hour for all milkings 35°C to 4°C)

0 = maximum acceptable cooling time of 2 hours

I = maximum acceptable cooling time of 2,5 hours

II = maximum acceptable cooling time of 3 hours

III = maximum acceptable cooling time of 3,5 hours

Most commonly DX/CEH tanks are equipped with a type of condensing unit which meets the performance class 4BII being 4 milking by an ambient temperature of 32°C and cooled down within 3 hour. When other performance classes are needed the type or capacity of the condensing units can be specified on request.

Selection of tank/condensing unit for 3 x 400V+N

Selection for 2 milkings

Condensing units for closed DX/CEH tanks by performance classification 2AII (2 milkings (ED), 38°C ambient temperature and 3 hours cooling time)					
DX/CEH	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1100	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1400	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1650	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-03 98034003-03
2000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-04 98034003-04
2500	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-05 98034003-05
3000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
3500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
4000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit for 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CEH tanks by performance classification 4AII (4 milkings (AD), 38°C ambient temperature and 3 hours cooling time)					
DX/CEH	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1100	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1400	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1650	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-01 98034003-01
2000	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-01 98034003-01
2500	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3000	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3500	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
4000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit for 3 x 400V+N

Selection for 2 milkings

Condensing units for closed DX/CEH tanks by performance classification 2BII (2 milkings (ED), 32°C ambient temperature and 3 hours cooling time)					
DX/CEH	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1100	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1400	2.6/3.5	98037008-04 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1650	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
2000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-04 98034003-04
2500	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-05 98034003-05
3000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
3500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
4000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit for 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CEH tanks by performance classification 4BII (4 milkings (AD), 32°C ambient temperature and 3 hours cooling time)					
DX/CEH	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1100	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1400	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1650	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
2000	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-01 98034003-01
2500	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3000	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3500	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
4000	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit for 3 x 400V+N

Selection for 6 milkings

Condensing units for closed DX/CEH tanks by performance classification 6BII (6 milkings (AD), 32°C ambient temperature and 3 hours cooling time)					
DX/CEH	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1100	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1400	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1650	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
2000	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
2500	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	* *
3000	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-06 98034003-06
3500	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-06 98034003-06
4000	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit for 3 x 400V+N

Selection for 2 milkings

Condensing units for closed DX/CEH tanks by performance classification 2CII (2 milkings (ED), 25°C ambient temperature and 3 hours cooling time)					
DX/CEH	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1100	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-01 98034003-01
1400	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
1650	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-01 98034003-01
2000	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-03 98034003-03
2500	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05
3000	5.5/7.5	98037008-08 98037008-37	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-05 98034003-05
3500	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07
4000	7.5/10.0	98037008-09 98037008-38	1 x 98053769-85 1 x 98053769-89	H-Box AH-Box	98034001-07 98034003-07

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit for 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CEH tanks by performance classification 4CII (4 milkings (AD), 25°C ambient temperature and 3 hours cooling time)					
DX/CEH	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1100	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1400	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1650	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
2000	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-01 98034003-01
2500	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-06 98034003-06
3000	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3500	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
4000	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CEH tanks by performance classification 4CI (4 milkings (AD), 25°C ambient temperature and 2½ hours cooling time)					
DX/CEH	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1100	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1400	1.5/2.0	98037008-01 98037008-30	1 x 98053769-97	H-Box	98034001-02 98034003-02
1650	1.7/2.25	98037008-02 98037008-31	1 x 98053769-97	H-Box	98034001-01 98034003-01
2000	2.0/2.75	98037008-03 98037008-32	1 x 98053769-97	H-Box	98034001-01 98034003-01
2500	2.6/3.5	98037008-04 98037008-33	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3000	2.9/4.0	98037008-05 98037008-34	1 x 98053769-98 1 x 98053769-87	H-Box AH-Box	98034001-06 98034003-06
3500	3.7/5.0	98037008-06 98037008-35	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-06 98034003-06
4000	4.4/6.0	98037008-07 98037008-36	1 x 98053769-99 1 x 98053769-88	H-Box AH-Box	98034001-05 98034003-05

* on request

** the mentioned switch boxes are selectable for both types of condensing units

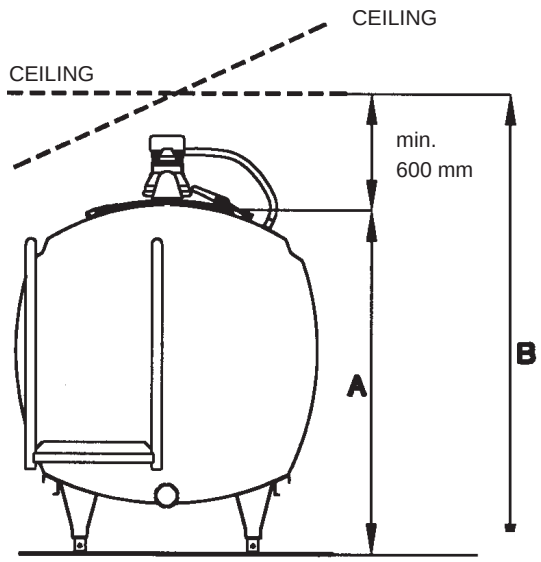
Selection of tank/condensing unit for 1 x 230V+N

Selection for 4 milkings

Condensing units for closed DX/CEH tanks by performance classification 4BII (4 milkings (AD), 32°C ambient temperature and 3 hours cooling time)					
DX/CEH	**Condensing unit**	**Condensing unit**	**Article number switch box**	**Switch box**	**Copperkit**
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
1100	1.5/2.0	98037008-60	1 x 98055083-91	H-Box	98034001-02 98034003-02
1400	1.5/2.0	98037008-60	1 x 98055083-91	H-Box	98034001-02 98034003-02
1650	1.5/2.0	98037008-60	1 x 98055083-91	H-Box	98034001-02 98034003-02
2000	1.75/2.25	98037008-61	1 x 98055083-91	H-Box	98034001-01 98034003-01
2500	2.9/3.9	98037008-64	1 x 98055083-92	H-Box	98034001-06 98034003-06
3000	2.9/3.9	98037008-64	1 x 98055083-92	H-Box	98034001-06 98034003-06
3500	2.9/3.9	98037008-64	1 x 98055083-92	H-Box	98034001-06 98034003-06
4000	2 x (2.0/2.7)	98037008-62	1 x 98055083-97	DH-Box	98034001-12 98034003-12

* on request

** the mentioned switch boxes are selectable for both types of condensing units



Positioning of the tank and condensing unit

When the final execution of the tank and condensing unit is known the needed space in the tank room can be planned.

On the following pages three situations are shown; the difference is the spot of the condensing unit, caused by the needed space for the air-flow.

The following minimal distances can be planned: A-between front and door 1,2 metre, B-between tank side and wall 0,5 metre. Between side and path 1 metre and between rear side and condensing unit or wall 1 metre. There must be a minimal free space of 0,6 metre above the tank.

At these minimal sizes the dimensions of the basic tanks must be added. They can be found in the index of the tank dimension sketch. These recommendations are necessary in order to create sufficient free space for operation, cleaning and service of the installation.

In cases where the installation or the milk room will be supplied with permanent components for heat recovery, re-use of cleaning water or a pipeline cleaner with sink, additional space has to be considered.

At the front of the tank near the outlet a drain sport has to be provided.

		A	B
DX/CEH	1100	1388	1988
	1400	1388	1988
	1650	1388	1988
	2000	1388	1988
	2500	1524	2124
	3000	1524	2124
	3500	1524	2124
	4000	1524	2124

Tank / milk plant connection

The milk plant should be connected to the milk cooling tanks in order to collect the milk. For this there are four major possibilities:

1. With a hose from the end unit to one of the two tank milk inlets.
2. With a pipeline which can swing from the wall to above the milk inlet.
3. By a tank connection device with a removable inlet pipe (for smaller tanks).
4. By an adapted outlet/inlet piece (for larger tanks).

The last two possibilities permit the milk to enter the tank in the most gentle way and are recommended. All above mentioned equipment should be cleaned during the cleaning process of the milk plant.

DXCEM, milk cooling tank

Planning

General

Before installation can take place three main aspects should be considered: farm condition, performance and installation.

Farm condition (recommendations)

- Be sure that the room is big enough to accommodate the tank and condensing unit in such a way that one can walk around the cooling system and that there is space above the tank for maintenance.
- Be sure that the size of the door is adequate to enter and remove the tank.
- Be sure that the room has adequate lighting, drainage and ventilation.
- Be sure that the truck has easy access to the farm and has sufficient space to turn should this be necessary. The surface of the farm yard must be firm enough to support the weight of the truck.

Performance

- The dimensions of the chosen tank. The type and size of the condensing unit (eventually with pre-cooling and heat recovery).

Installation

- The electrical power supply and the requirements.
- The water supply and the regulations.
- Regulations about refrigeration systems.
- Regulation about draining wasted water.

Tank with matching condensing unit

The closed DX/CEM tanks are usually delivered with a separate condensing unit. The choice of the type of condensing unit depends on the capacity of the tank, the number of milkings, the ambient conditions and the recommendations and requirements of the country of destination. Some of these variable specifications are coded in a performance classification number. The performance class must be written on the type plate of the milk cooling tanks when the total installation is completed.

Performance of the installation

(conform prEN CEN/TC 153/WG8)
The performance of the installation can be specified according to the following 3 different values. These 3 values must be placed behind each other.

1 The number of milkings
2, 4 or 6 milkings

2 The ambient temperature classification
A = performance temperature 38°C (safe operating temp. 43°C)

B = performance temperature 32°C (safe operating temp. 38°C)

C = performance temperature 25°C (safe operating temp. 32°C)

3 The milk cooling time classification (hour for all milkings 35°C to 4°C)

0 = maximum acceptable cooling time of 2 hours

I = maximum acceptable cooling time of 2,5 hours

II = maximum acceptable cooling time of 3 hours

III = maximum acceptable cooling time of 3,5 hours

Most commonly DX/CEM tanks are equipped with a type of condensing unit which meets the performance class 4BII being 4 milking by an ambient temperature of 32°C and cooled down within 3 hour. When other performance classes are needed the type or capacity of the condensing units can be specified on request.

Selection of tank/condensing unit for 3 x 400V+N

Selection for 2 milkings

Condensing units for closed DX/CEM tanks by performance classification 2AII (2 milkings (ED), 38°C ambient temperature and 3 hours cooling time)					
DX/CEM	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
14000	2 x (9.6/13.0)	98037008-10 98037008-39	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
16000	2 x (9.6/13.0)	98037008-10 98037008-39	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
18000	on request				
20000	on request				
24000	on request				
32000	on request				

Selection of tank/condensing unit for 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CEM tanks by performance classification 4AII (4 milkings (AD), 38°C ambient temperature and 3 hours cooling time)					
DX/CEM	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
14000	4 x (4.4/6)	98037008-07 98037008-36	4 x 98037009-66 2 x 98037009-90	H-Box DH-Box	98034001-15 98034003-15
16000	4 x (4.4/6)	98037008-07 98037008-36	4 x 98037009-66 2 x 98037009-90	H-Box DH-Box	98034001-15 98034003-15
18000	4 x (5.5/7.5)	98037008-08 98037008-37	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
20000	on request				
24000	4 x (7.5/10)	98037008-09 98037008-38	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
32000	4 x (11/15)	98037008-11 98037008-40	4 x 98037009-68 2 x 98037009-92	H-Box DH-Box	98034001-15 98034003-15

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit for 3 x 400V+N

Selection for 2 milkings

Condensing units for closed DX/CEM tanks by performance classification 2BII (2 milkings (ED), 32°C ambient temperature and 3 hours cooling time)					
DX/CEM	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
14000	4 x (7.5/10.0)	98037008-09 98037008-38	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
16000	4 x (9.6/13.0)	98037008-10 98037008-39	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
18000	4 x (9.6/13.0)	98037008-10 98037008-39	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
20000	4 x (11/15)	98037008-11 98037008-40	4 x 98037009-68 2 x 98037009-92	H-Box DH-Box	98034001-15 98034003-15
24000	on request				
32000	on request				

Selection of tank/condensing unit for 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CEM tanks by performance classification 4BII (4 milkings (AD), 32°C ambient temperature and 3 hours cooling time)					
DX/CEM	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
14000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
16000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
18000	2 x (9.6/13.0)	98037008-10 98037008-39	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
20000	2 x (9.6/13.0)	98037008-10 98037008-39	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
24000	4 x (7.5/10.0)	98037008-09 98037008-38	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
32000	4 x (9.6/13.0)	98037008-10 98037008-39	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit for 3 x 400V + N

Selection for 6 milkings

Condensing units for closed DX/CEM tanks by performance classification 6BII (6 milkings (AD), 32°C ambient temperature and 3 hours cooling time)					
DX/CEM	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
14000	2 x (4.4/6)	98037008-07 98037008-36	2 x 98037009-66 1 x 98037009-90	H-Box DH-Box	98034001-14 98034003-14
16000	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-13
18000	2 x (5.5/7.5)	98037008-08 98037008-37	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-13
20000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-13
24000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-13
32000	2 x (11/15)	98037008-11 98037008-40	2 x 98037009-68 1 x 98037009-92	H-Box DH-Box	98034001-14 98034003-13

Selection of tank/condensing unit for 3 x 400V+N

Selection for 2 milkings

Condensing units for closed DX/CEM tanks by performance classification 2CII (2 milkings (ED), 25°C ambient temperature and 3 hours cooling time)					
DX/CEM	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
14000	4 x (7.5/10.0)	98037008-09 98037008-38	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
16000	4 x (9.6/13.0)	98037008-10 98037008-39	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
18000	4 x (9.6/13.0)	98037008-10 98037008-39	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-15 98034003-15
20000	on request				
24000	on request				
32000	on request				

* on request

** the mentioned switch boxes are selectable for both types of condensing units

Selection of tank/condensing unit for 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CEM tanks by performance classification 4CII (4 milkings (AD), 25°C ambient temperature and 3 hours cooling time)					
DX/CEM	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
14000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
16000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
18000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
20000	2 x (9.6/13.0)	98037008-10 98037008-39	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
24000	2 x (11/15)	98037008-11 98037008-40	2 x 98037009-68 1 x 98037009-92	H-Box DH-Box	98034001-14 98034003-14
32000	4 x (7.5/10.0)	98037008-09 98037008-38	4 x 98037009-67 2 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14

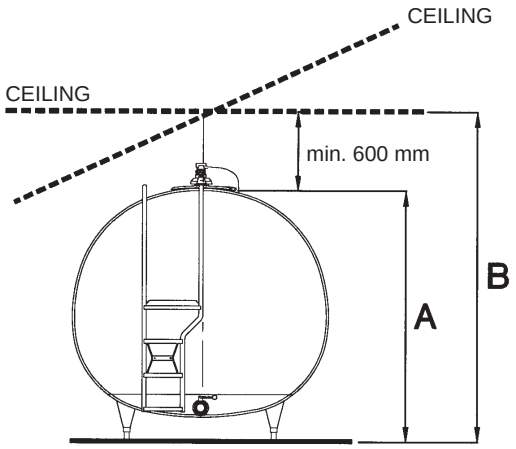
Selection of tank/condensing unit 3 x 400V+N

Selection for 4 milkings

Condensing units for closed DX/CEM tanks by performance classification 4CI (4 milkings (AD), 25°C ambient temperature and 2½ hours cooling time)					
DX/CEM	**Condensing unit**	**Condensing unit**	**Article number switch box ****	**Switch box**	
Capacity	**kW/ Hp**	**- without receiver - with receiver**		**H-, AH-, DH-Box**	**- R22 - R404A**
14000	2 x (7.5/10.0)	98037008-09 98037008-38	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
16000	2 x (9.6/13.0)	98037008-10 98037008-39	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
18000	2 x (9.6/13.0)	98037008-10 98037008-39	2 x 98037009-67 1 x 98037009-91	H-Box DH-Box	98034001-14 98034003-14
20000	on request				
24000	on request				
32000	on request				

* on request

** the mentioned switch boxes are selectable for both types of condensing units



Positioning of the tank and condensing unit

When the final execution of the tank and condensing unit is known the needed space in the tank room can be planned.

On the following pages three situations are shown; the difference is the spot of the condensing unit, caused by the needed space for the air-flow.

The following minimal distances can be planned: A-between front and door 1,2 metre, B-between tank side and wall 0,5 metre. Between side and path 1 metre and between rear side and condensing unit or wall 1 metre. There must be a minimal free space of 0,6 metre above the tank.

At these minimal sizes the dimensions of the basic tanks must be added. They can be found in the index of the tank dimension sketch. These recommendations are necessary in order to create sufficient free space for operation, cleaning and service of the installation.

In cases where the installation or the milk room will be supplied with permanent components for heat recovery, re-use of cleaning water or a pipeline cleaner with sink, additional space has to be considered.

At the front of the tank near the outlet a drain sport has to be provided.

		A	B
DX/CEM	14000	2353	2953
	16000	2391	2991
	18000	2391	2991
	20000	2737	3337
	24000	2737	3337
	32000	2749	3349

Tank / milk plant connection

The milk plant should be connected to the milk cooling tanks in order to collect the milk. For this there are four major possibilities:

1. With a hose from the end unit to one of the two tank milk inlets.
2. With a pipeline which can swing from the wall to above the milk inlet.
3. By a tank connection device with a removable inlet pipe (for smaller tanks).
4. By an adapted outlet/inlet piece (for larger tanks).

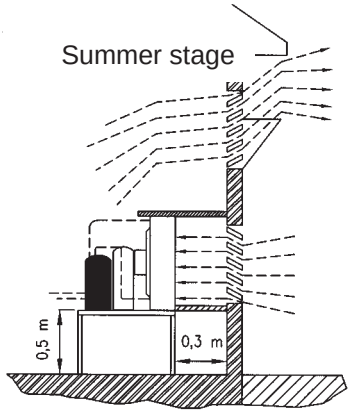
The last two possibilities permit the milk to enter the tank in the most gentle way and are recommended. All above mentioned equipment should be cleaned during the cleaning process of the milk plant.

DeLaval

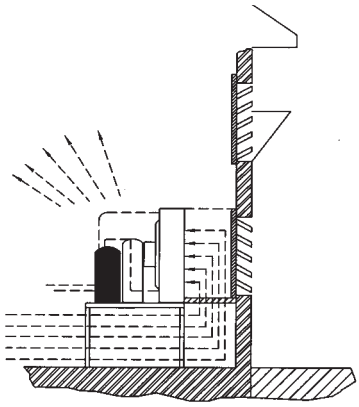
Condensing units

Planning

Summer stage



Winter stage



Remarks on the position of the condensing unit

If an air cooled condensing unit will be used, it is important to arrange the air flow very well. There should be a free entrance and a free exit of air.

The condensing unit works trouble free under normal ambient temperature conditions, but it is preferable to position the unit in such a way that it faces a direction from which an unrestricted flow of clean air is guaranteed throughout the whole year.

In general it should be avoided that fresh air is sucked in by the fan(s) and than circulates through the condenser. Air that has taken up warmth in the condenser should be ventilated out of the room directly.

For the condensing unit a summer and winter stage must be considered. When the distance between the wall and condensing unit is about 30 cm, it is recommended to construct a tunnel out of board with a grill at the wall side. The top board should have an oversize so that it can also be used to cut off the air stream in the winter position.

The opening through which outside air is drawn towards the condenser should be covered by a fine-meshed grill keeping the condenser from being blocked. This grill should be cleaned regularly.

The condensing unit should be positioned on a concrete platform or on a steel frame of at least 50 cm height. This in order to avoid humid and to obtain better maintenance conditions. Standard steel frame:
50 cm height.
It should be avoided that oil fumes from the vacuum pump exhaust are drawn through the condenser.

Important! The main switch of the condensing unit has to be easy accessible in all situations, in order to switch off the electrical supply in case of calamity.

Size air intake

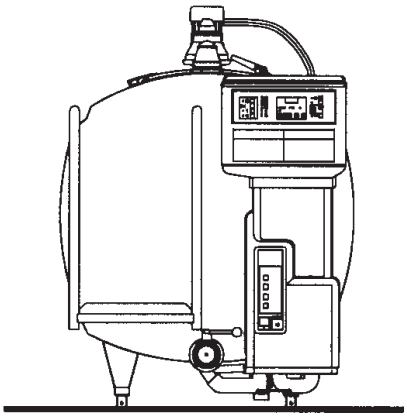
In order to ensure a sufficient flow of air through the condenser, the size of the air intake opening should be foreseen to have the same size (length and height) as the condenser. These dimensions can be found in the table below.

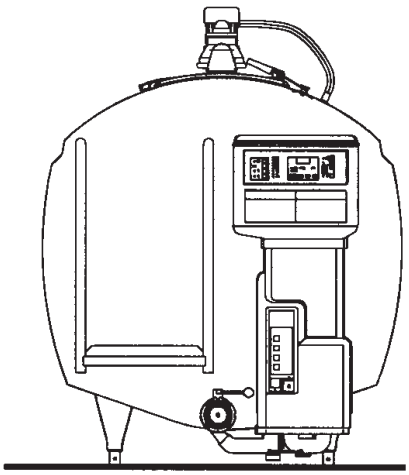
A restricted-, or otherwise insufficient air flow can have a negative influence on the cooling performance of the condensing unit.

	Condensing unit type code		Con-denser type	Dimensions condenser (lxh)	Airflow (m^3 /h)
Copeland condensing units with ZS compressor	PRB/1/H8/S14/4	PRR/1/H8/S14/4	H8	735 x 533	3276
	PRB/1/H8/S19/4	PRR/1/H8/S19/4	H8	735 x 533	3276
	PRB/1/H8/S21/4	PRR/1/H8/S21/4	H8	735 x 533	3276
	PRB/1/M8/S26/4	PRR/1/M8/S26/4	M8	735 x 708	3348
	PRB/1/M8/S30/4	PRR/1/M8/S30/4	M8	735 x 708	3348
	PRB/1/H9/S38/4	PRR/1/M9/S38/4	M9	735 x 708	4464
	PRB/2/S9/S45/4	PRR/2/H9/S45/4	S9	1130 x 708	5832
	PRB/2/S9/S56/4	PRR/2/H9/S56/4	S9	1130 x 708	5832
	PRB/2/V6/S75/4	PRR/2/V6/S75/4	V6	1329 x 835	9468
	PRB/2/W9/S92/4	PRR/2/W9/S92/4	W9	1640 x 869	9936
	PRB/2/W9/S11/4	PRR/2/W9/S11/4	W9	1640 x 869	9936
	PRB/CAJ4519/5		356/8600	510 x 435	2250
	PRB/FH4524/5		356/8600	510 x 450	2480
Copeland condensing unit with ZR compressor	-	PRR/1/H8/R22/5	H8	735 x 533	3276
	-	PRR/1/H8/R28/5	H8	735 x 533	3276
	-	PRR/1/H8/R34/5	H8	735 x 533	3276
	-	PRR/1/M8/R40/5	M8	735 x 708	3348
	-	PRR/1/M8/R47/5	M8	735 x 708	3348
Tecumseh condensing units	PRB/CAE9460/5	PRR/CAE9460/5	300/3000	350 x 300	1130
	PRB/CAJ9480/5	PRR/CAJ9480/5	300/4600	430 x 340	980
	PRB/CAJ9510/5	PRR/CAJ9510/5	320/5500	510 x 400	1180
	PRB/CAJ4517/5	PRR/CAJ4517/5	356/6500	510 x 435	2200

DX/CEH Milk cooling tank with Hygenius

Product data





Description

Closed atmospheric tank designed for storage and cooling of milk and suitable for installations for 2, 4 or 6 milkings.

Standard the DX/CEH tanks are equipped with a Hygenius cleaning/controlling device and are suitable for an electrical supply of 3 x 400 V + N, 3 x 230 V, 1 x 230 V, 50 Hz / 60 Hz.

The Hygenius has a double outlet system which is meant to simplify the cleaning function. A closed cleaning circuit can be created just by putting a 3" blind cap on the double outlet. When this cap is disconnected the storage of milk during the cooling function is guaranteed safe.

The tank is executed with one agitator for stirring the milk homogeneously. There are spray nozzles on the agitator shaft, just below the blades, designed for a powerful cleaning of the inner tank during the cleaning function.

All external connections for electrical and water supply and also for the condensing unit are placed at the rear side of the tank.

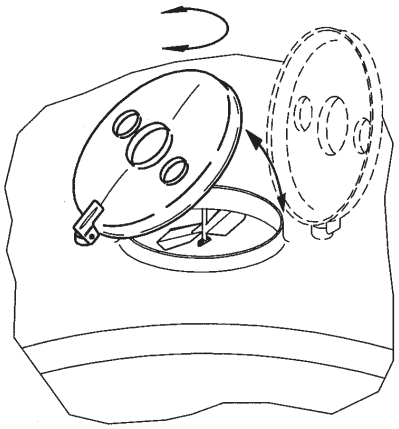
Technical data

General

Material:
Inner and outer tank of stainless steel: AISI 304. Outer tank plates are smoothly grinded.

Evaporator:
Dimple plate, part of the lower inner tank.

Insulation:
PUR foam between inner and outer tank.



Manhole:
On the top, size 480 mm, double revolving.
The symmetric design of the manhole cover offers the possibility to open the manhole to the left as well as to the right.

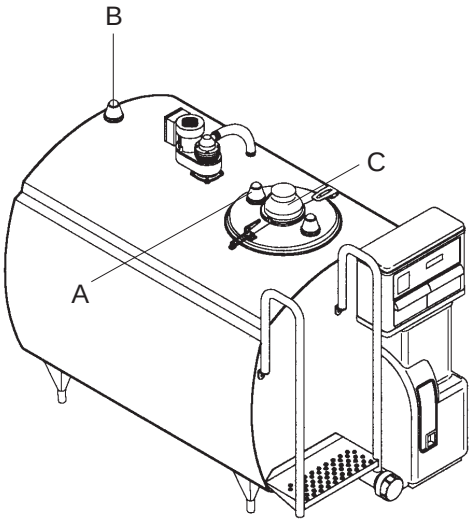
Outlet:
Valve with at the end 3" tanker connection piece.

Double outlet Hygenius:
2" DIN milk outlet and 3" cleaning outlet.

Inlets:
The DX/CEH is standard executed with 2 Ø 3" milk inlets. One inlet is placed in the manhole cover (A), the second is placed on top at the back of the tank (B).

Agitator motor:
Sirem P = 145 W, 230 V AC rotation speed 21 r.p.m.

Air vent:
4" positioned in the centre of the manhole lid (C).



Legs:
4 adjustable stainless steel legs.

Measurements:
Dipstick and milk quantity table (indication).
For a more accurate reading: calibration list.
Both tables are usable at a slope of 3%.

Cooling system

Designed for direct expansion system.

Refrigerants:
R404 A, R22 or R134 A or substitutes (R407 C).

Evaporator:
IN (12mm) and OUT (1") pipes at the rear side of the tank.

Requirements

Electrical supply:
In PRE-BOX on rear side tank,
3 x 400 V + N, 3 x 230 V, 1 x 230 V,
50 Hz / 60 Hz, max. power consumption
P = from 0,6 kW to 1,25 kW (cleaning/controlling).

Note! *Lockable main switch must be provided in the switch box of the condensing unit or nearby.*

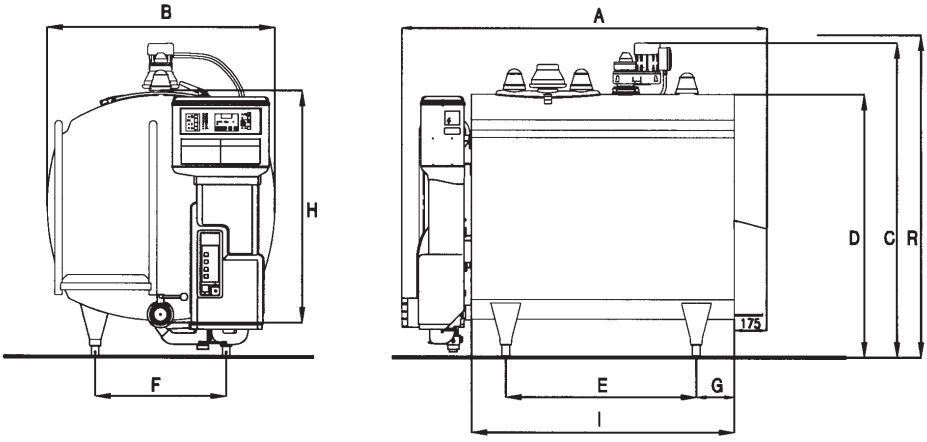
Water supply:
Below PRE-BOX on rear side, 1/2" hose pillars for hot and cold water. Temperature of hot water close to 80°C.

Drain spot:
Drain spot can be positioned near the tank outlet.

STANDARD PACKAGE OF THE TANK
The tank will be supplied on a wooden pallet and covered by foil.

The dipstick and drainpipe are packed on a pallet.

The pallet can be lifted by a fork-lift truck in the length direction.

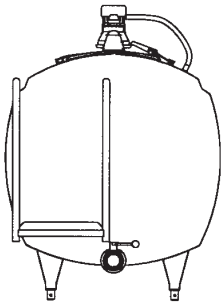


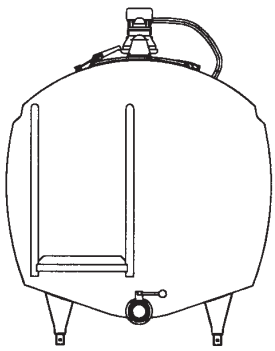
Milk cooler DX/CEH rated capacity	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R
1100	1935	1200	1640	1431	1000	690	200	1207	1385	-	1	4	3"	2"	-	1	1661
1400	2230	1200	1640	1369	1300	690	200	1219	1680	-	1	4	3"	2"	-	1	1661
1650	2550	1200	1654	1386	1620	690	200	1219	2000	-	1	4	3"	2"	-	1	1669
2000	2985	1200	1641	1371	2050	690	200	1219	2435	-	1	4	3"	2"	-	1	1672
2500	2750	1400	1777	1506	1520	830	352	1335	2200	-	2	4	3"	2"	-	1	1798
3000	3234	1400	1777	1506	2000	830	352	1335	2684	-	2	4	3"	2"	-	1	1812
3500	3635	1400	1777	1506	2400	830	352	1335	3085	-	2	4	3"	2"	-	1	1816
4000	4034	1400	1777	1506	2800	830	352	1335	3484	-	2	4	3"	2"	-	1	1821

J max. filling capacity in litres (without agitation)
K number of evaporators
L number of feet
M size of outlet valve
N size of outlet
O nett weight in kg.
P number of agitators
R height (tank at 3%)

DX/CEH Milk cooling tank

Product data





Article number

Basic DX/CEH tanks with 3" DIN outlet valve and agitator.

98033805-00	DX/CEH 1100
98033810-00	DX/CEH 1400
98033815-00	DX/CEH 1650
98033820-00	DX/CEH 2000
98033830-00	DX/CEH 2500
98033835-00	DX/CEH 3000
98033840-00	DX/CEH 3500
98033845-00	DX/CEH 4000

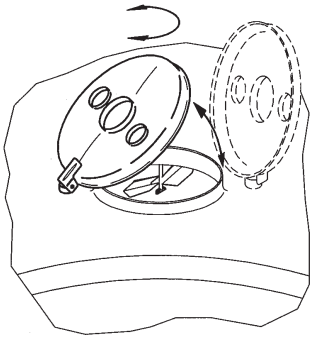
Description

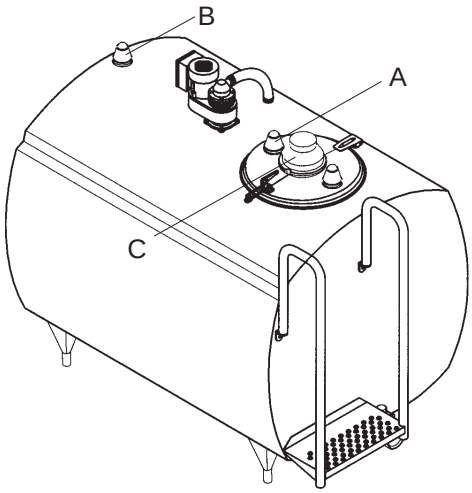
Closed atmospheric tank designed for storage and cooling of milk and suitable for installations for 2, 4 or 6 milkings.

The DX/CEH tanks are suitable for an electrical supply of 3 x 400 V + N, 3 x 230 V, 1 x 230 V, 50 Hz / 60 Hz.

The tank is executed with one agitator for stirring the milk homogeneously. There are spray nozzles on the agitator shaft, just below the blades, designed for a powerful cleaning of the inner tank during the cleaning function.

All external connections for electrical and water supply and also for the condensing unit are placed at the rear side of the tank.





Technical data

General

Material:
Inner and outer tank of stainless steel: AISI 304. Outer tank plates are smoothly grinded.

Evaporator:
Dimple plate, part of the lower inner tank.

Insulation:
PUR foam between inner and outer tank.

Manhole:
On the top, size 480 mm, double revolving.
The symmetric design of the manhole cover offers the possibility to open the manhole to the left as well as to the right.

Outlet:
Valve with at the end 3" tanker connection piece.

Inlets:
The DX/CEH is standard executed with 2 ∅ 3" milk inlets. One inlet is placed in the manhole cover (A), the second is placed on top at the back of the tank (B).

Agitator motor:
Sirem P = 145 W, 200/240 V AC rotation speed 21 r.p.m.

Air vent:
4" positioned in the centre of the manhole lid (C).

Legs:
4 adjustable stainless steel legs.

Measurements:
Dipstick and milk quantity table (usable at a slope of 3%).

Cooling system

Designed for direct expansion system.

Refrigerants:
R404 A, R22 or R134 A or substitutes (R407 C).

Evaporator:
IN (12 mm) and OUT (1") pipes at the rear side of the tank.

Requirements

Electrical supply:
In PRE-BOX on rear side tank,
3 x 400 V + N, 3 x 230 V, 1 x 230 V,
50 Hz/ 60 Hz, max. power consumption
P = 145 W.

Note! *Lockable main switch must be provided in the switch box of the condensing unit or near by.*

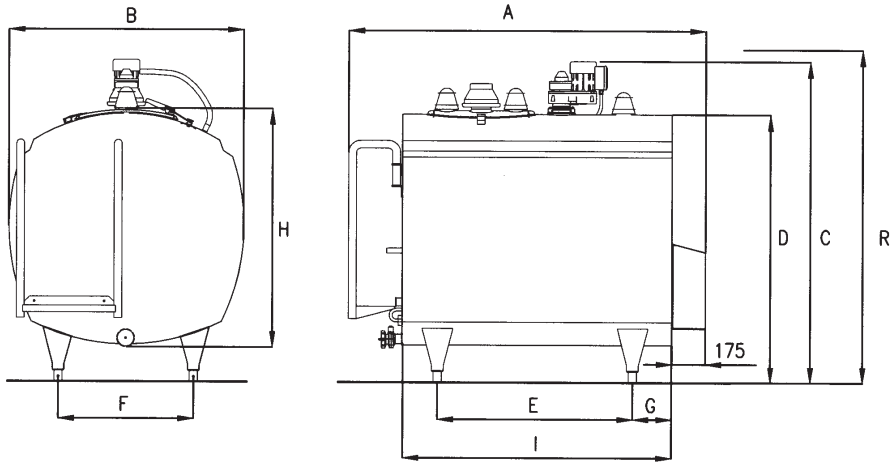
Water supply:
Below PRE-BOX on rear side, 1/2" hose pillars for hot and cold water. Temperature of hot water close to 80°C.

Drain spot:
Drain spot can be positioned near the tank outlet.

STANDARD PACKAGE OF THE TANK
The tank will be supplied on a wooden pallet and covered by foil.

The dipstick is packed on a pallet.

The pallet can be lifted by a fork-lift truck in the length direction.

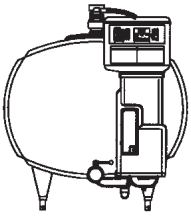


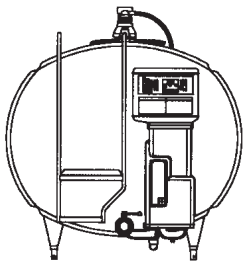
Milk cooler DX/CEH rated capacity	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R
1100	1837	1200	1640	1431	1000	690	200	1207	1385	-	1	4	3"	2"	-	1	1661
1400	2132	1200	1640	1369	1300	690	200	1219	1680	-	1	4	3"	2"	-	1	1661
1650	2452	1200	1654	1386	1620	690	200	1219	2000	-	1	4	3"	2"	-	1	1669
2000	2887	1200	1641	1371	2050	690	200	1219	2435	-	1	4	3"	2"	-	1	1672
2500	2652	1400	1777	1506	1520	830	352	1335	2200	-	2	4	3"	2"	-	1	1798
3000	3136	1400	1777	1506	2000	830	352	1335	2684	-	2	4	3"	2"	-	1	1812
3500	3537	1400	1777	1506	2400	830	352	1335	3085	-	2	4	3"	2"	-	1	1816
4000	3936	1400	1777	1506	2800	830	352	1335	3484	-	2	4	3"	2"	-	1	1821

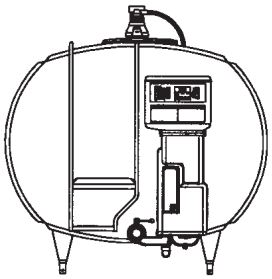
J max. filling capacity in litres (without agitation)
K number of evaporators
L number of feet
M size of outlet valve
N size of outlet
O nett weight in kg.
P number of agitators
R height (tank at 3%)

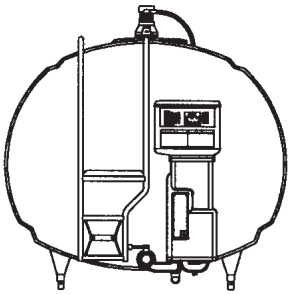
DX/CE Milk cooling tank with Hygenius

Product data









Description

Closed atmospheric tank designed for storage and cooling of milk and suitable for installations for 2, 4 or 6 milkings.

Standard the DX/CE tanks are equipped with a Hygenius cleaning/controlling device and are suitable for an electrical supply of 3 x 400 V + N, 3 x 230 V, 1 x 230 V, 50 Hz / 60 Hz.

The Hygenius has a double outlet system which is meant to simplify the cleaning function. A closed cleaning circuit can be created just by putting a 3" blind cap on the double outlet. When this cap is disconnected the storage of milk during the cooling function is guaranteed safe.

The tank is executed with one agitator for stirring the milk homogeneously. There are spray nozzles on the agitator shaft, just below the blades, designed for a powerful cleaning of the inner tank during the cleaning function.

Up to 8000 litres, one can choose to build the condensing unit on the tank. This creates a space saving solution in the tank room.

All external connections for electrical and water supply and also for the condensing unit are placed at the rear side of the tank.

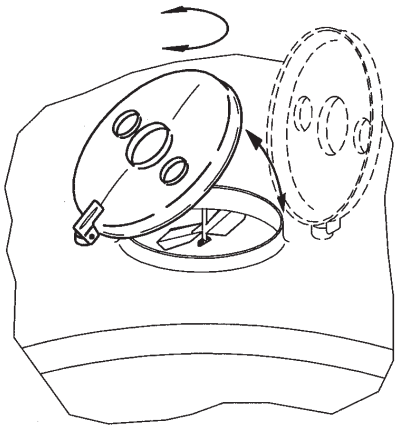
Technical data

General

Material:
Inner and outer tank of stainless steel: AISI 304. Outer tank plates are smoothly grinded.

Evaporator:
Dimple plate, part of the lower inner tank.

Insulation:
PUR foam between inner and outer tank.



Manhole:
On the top, size 480 mm, double revolving.
The symmetric design of the manhole cover offers the possibility to open the manhole to the left as well as to the right.

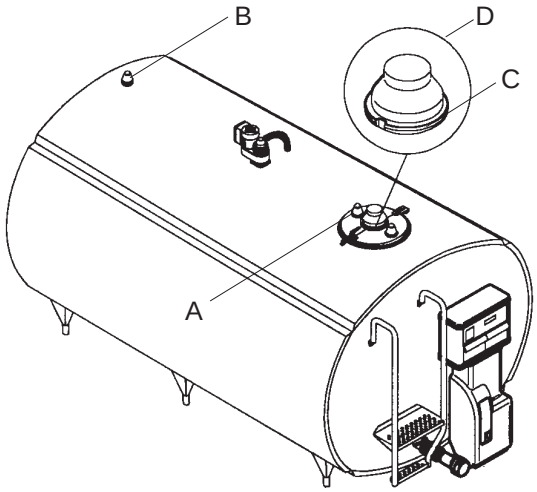
Outlet:
Valve with at the end 3" tanker connection piece.

Double outlet Hygenius:
2" DIN milk outlet and 3" cleaning outlet.

Inlets:
The DX/CE is standard executed with 2 Ø 3" milk inlets. One inlet is placed in the manhole cover (A), the second is placed on top at the back of the tank (B).

Agitator motor:
Sirem P = 145 W, 230 V AC rotation speed 21 r.p.m.

Air vent:
4" positioned in the centre of the manhole lid (C), with dish for condense water (D).



Legs:
4 to 8 adjustable stainless steel legs.

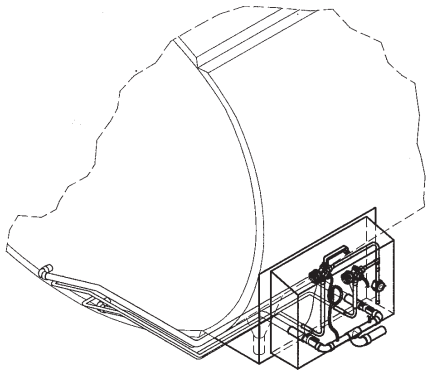
Measurements:
Dipstick and milk quantity table (indication).
For a more accurate reading: calibration list.
Both tables are usable at a slope of 3%.

Cooling system

Designed for direct expansion system.

Refrigerants:
R404 A, R22 or R134 A or substitutes (R407 C).

Evaporator:
IN (12 mm) and OUT (1") pipes at the rear side of the tank.



Side connections:
The evaporator tubes can be extended to the side of the tank to a stainless steel plate. Here the refrigeration copper kit and the Pre-Box can be mounted. In this way the tank can be positioned very close to the back wall .

Tank type	Side connection (excluding copper kit)	
	Left (seen from back)	**Right**
1150 - 2500	98034303-06	98034303-01
3000 - 4500	98034303-16	98034303-11
5000 - 8000	98034303-26	98034303-21
8600 -12000	98034303-40	98034303-31

Requirements

Electrical supply:
In PRE-BOX on rear side tank,
3 x 400 V + N, 3 x 230 V, 1 x 230 V,
50 Hz / 60 Hz, max. power consumption
P = from 0,6 kW to 1,25 kW (cleaning/controlling).

Note! *Lockable main switch must be provided in the switch box of the condensing unit or nearby.*

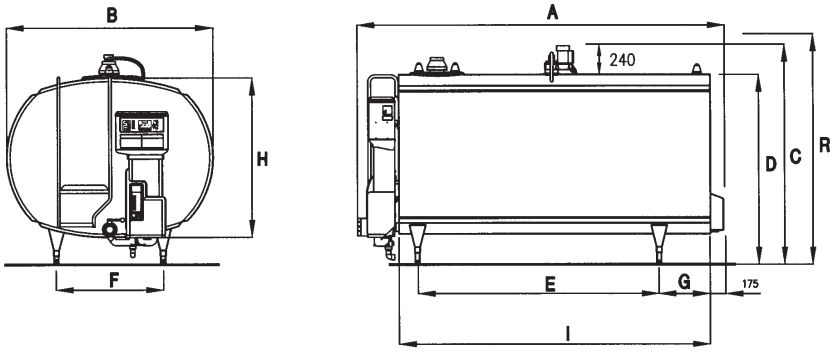
Water supply:
Below PRE-BOX on rear side, 1/2" hose pillars for hot and cold water. Temperature of hot water close to 80°C.

Drain spot:
Drain spot can be positioned near the tank outlet.

STANDARD PACKAGE OF THE TANK
The tank will be supplied on a wooden pallet and covered by foil.

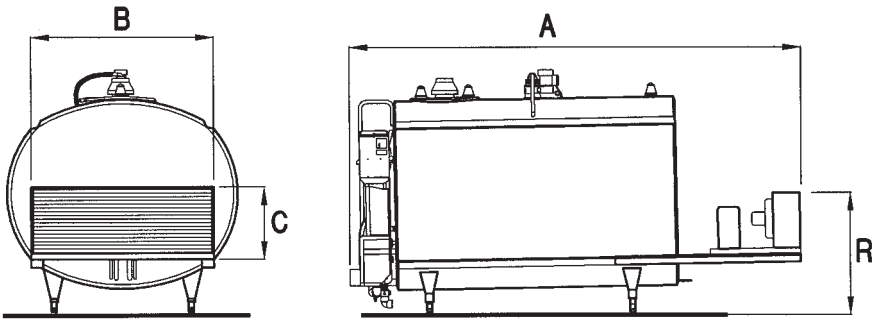
The dipstick and drainpipe are packed on a pallet.

The pallet can be lifted by a fork-lift truck in the length direction.



Milk cooler DX/CE rated capacity	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R
1150	1950	1400	1540	1351	1015	830	200	1080	1400	1275	1	4	3"	2"	340	1	1549
1300	2115	1400	1536	1351	1080	830	250	1080	1565	1441	1	4	3"	2"	360	1	1545
1600	2445	1400	1535	1351	1410	830	250	1080	1895	1774	1	4	3"	2"	390	1	1539
2000	2885	1400	1535	1351	1850	830	250	1080	2335	2213	1	4	3"	2"	425	1	1538
2500	3435	1400	1536	1351	2400	830	250	1080	2885	2756	1	4	3"	2"	470	1	1546
3000	2435	1800	1889	1704	1290	1070	350	1480	1885	3242	2	4	3"	2"	500	1	1895
3500	2735	1800	1889	1704	1590	1070	350	1480	2185	3796	2	4	3"	2"	550	1	1891
4000	3035	1800	1889	1704	1890	1070	350	1480	2485	4351	2	4	3"	2"	600	1	1893
4500	3335	1800	1889	1704	2190	1070	350	1480	2785	4907	2	4	3"	2"	650	1	1895
5000	3105	2000	2002	1824	1870	1035	500	1539	2555	5335	2	4	3"	2"	750	1	2006
6000	3585	2000	2002	1824	2350	1035	500	1539	3035	6379	2	4	3"	2"	850	1	2013
6750	3900	2000	2000	1813	2522	1035	491	1539	3350	7093	2	4	3"	2"	890	1	2016
7500	4220	2000	2023	1814	2x1650	1035	200	1539	3670	7798	2	6	3"	2"	930	1	2023
8000	4550	2000	2044	1814	2x1810	1035	200	1539	4000	8449	2	6	3"	2"	-	1	2108
8600	4155	2150	2214	2045	2x1500	1300	350	1748	3605	8872	4	6	3"	2"	1400	1	2233
9700	4555	2150	2234	2096	2x1700	1300	350	1748	4005	9945	4	6	3"	2"	1500	1	2253
11000	5105	2150	2236	2096	3x1315	1300	350	1748	4555	11357	4	8	3"	2"	1600	1	2247
12000	5555	2150	2236	2096	3x1465	1300	350	1748	5005	12417	4	8	3"	2"	1700	1	2254

J max. filling capacity in litres (without agitation)
K number of evaporators
L number of feet
M size of outlet valve
N size of outlet
O nett weight in kg.
P number of agitators
R height (tank at 3%)

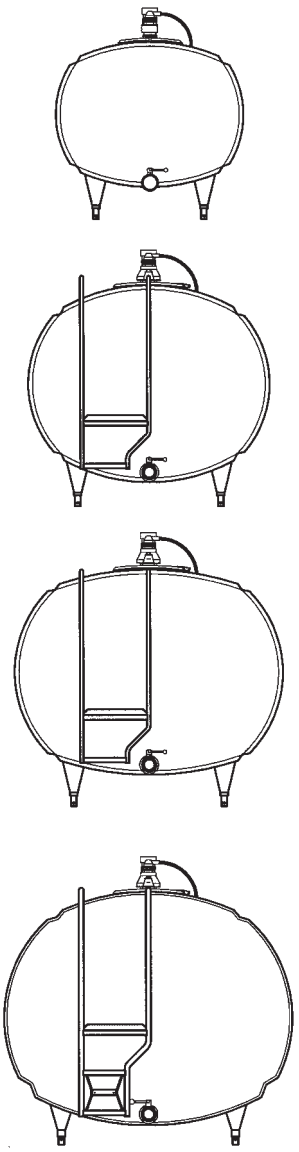


Tank	Performance class								Dimensions			
	2AII	4AII	2BII	4BII	6BII	2CII	4CII	4CI	A	B	C	R
1150		x		x	x	x	x	x	2770	735	533	984
	x		x						2770	735	708	1159
Weight	427	413	427	413	413	426	413	413				
1300		x		x	x		x	x	2935	735	533	980
	x		x			x			2935	735	708	1155
Weight	459	433	447	433	433	446	433	433				
1600		x		x	x		x	x	3265	735	533	982
	x		x			x			3265	735	708	1156
Weight	492	464	489	463	463	489	463	464				
2000		x		x	x		x	x	3705	735	533	987
						x			3705	735	708	1162
	x		x						3705	1130	708	1162
Weight	541	511	541	499	498	527	499	498				
2500					x		x		4255	735	533	1003
		x		x				x	4255	735	708	1178
						x			4255	1130	708	1178
	x		x						4255	1130	708	1178
Weight	653	557	653	557	543	586	556	557				

Tank	Performance class								Dimensions			
	2AII	4AII	2BII	4BII	6BII	2CII	4CII	4CI	A	B	C	R
3000					x				3255	735	533	998
		x		x			x	x	3255	735	708	1172
						x			3255	1130	708	1172
	x		x						3255	1130	708	1299
Weight	714	599	714	599	574	683	587	599				
3500					x				3555	735	533	998
		x		x			x	x	3555	735	708	1173
	x		x			x			3555	1329	835	1300
Weight	764	652	764	649	636	764	649	652				
4000				x	x		x		3855	735	708	1179
		x						x	3855	1130	708	1179
	x		x			x			3855	1329	835	1306
Weight	814	716	824	702	686	814	702	716				
4500				x	x		x		4155	735	708	1186
		x						x	4155	1130	708	1186
	x		x			x			4155	1329	835	1313
Weight	764	666	764	652	636	764	652	666				
5000					x				3925	735	708	1170
				x			x		3925	1130	708	1170
		x						x	3925	1130	708	1170
Weight		933		866	849		866	933				
6000					x				4405	735	708	1184
				x			x		4405	1130	708	1184
		x						x	4405	1329	835	1311
Weight		1064		1033	952		1033	1064				
6750					x				4720	1130	708	1192
		x		x			x	x	4720	1329	835	1318
Weight		1104		1104	1006		1104	1104				
7500					x				5040	1130	708	1203
		x		x			x		5040	1329	835	1330
Weight		1144		1144	1046		1144					
8000		x		x				x	5370	1640	869	1454
							x		5370	1329	835	1420
					x				5370	1130	708	1293
Weight		1178		1178	1138		1169	1178				

DX/CE Milk cooling tank

Product data



Article number

Basic DX/CE tanks with 3" DIN outlet valve and agitator.

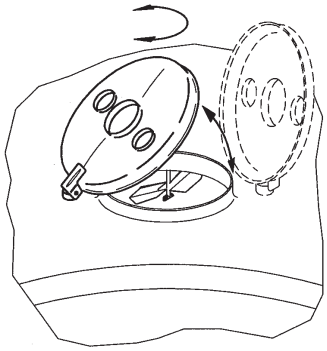
98055003-96	DX/CE	1150
98055008-96	DX/CE	1300
98055013-96	DX/CE	1600
98055018-96	DX/CE	2000
98055023-96	DX/CE	2500
98055028-96	DX/CE	3000
98055033-96	DX/CE	3500
98055038-96	DX/CE	4000
98055043-96	DX/CE	4500
98055048-96	DX/CE	5000
98055053-96	DX/CE	6000
98057758-96	DX/CE	6750
98055058-96	DX/CE	7500
98033918-80	DX/CE	8000
98036005-81	DX/CE	8600
98036000-81	DX/CE	9700
98036010-81	DX/CE	11000
98036015-81	DX/CE	12000

Description

Closed atmospheric tank designed for storage and cooling of milk and suitable for installations for 2, 4 or 6 milkings.

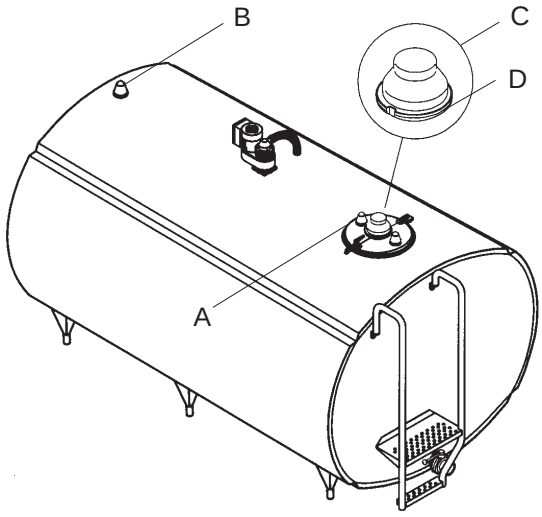
The DX/CE tanks are suitable for an electrical supply of 3 x 400 V + N, 3 x 230 V, 1 x 230 V, 50 Hz / 60 Hz.

The tank is executed with one agitator for stirring the milk homogeneously. There are spray nozzles on the agitator shaft, just below the blades, designed for a powerful cleaning of the inner tank during the cleaning function.



Up to 8000 litres, one can choose to build the condensing unit on the tank. This creates a space saving solution in the tank room.

All external connections for electrical and water supply and also for the condensing unit are placed at the rear side of the tank.



Technical data

General

Material:
Inner and outer tank of stainless steel: AISI 304. Outer tank plates are smoothly grinded.

Evaporator:
Dimple plate, part of the lower inner tank.

Insulation:
PUR foam between inner and outer tank.

Manhole:
On the top, size 480 mm, double revolving. *The symmetric design of the manhole cover offers the possibility to open the manhole to the left as well as to the right.*

Outlet:
Valve with at the end 3" tanker connection piece.

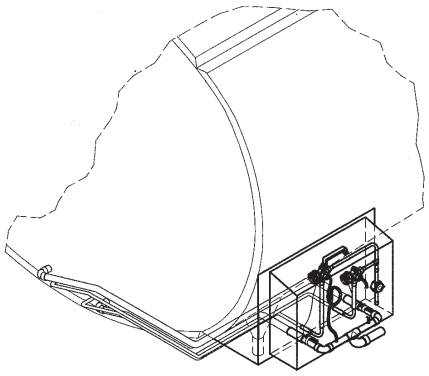
Inlets:
The DX/CE is standard executed with 2 ∅ 3" milk inlets. One inlet is placed in the manhole cover (A), the second is placed on top at the back of the tank (B).

Agitator motor:
Sirem P = 145 W, 200-240 V AC rotation speed 21 r.p.m.

Air vent:
4" positioned in the centre of the manhole lid (D), with dish for condense water.

Legs:
4 to 8 adjustable stainless steel legs.

Measurements:
Dipstick and milk quantity table (usable at a slope of 3%).



Cooling system

Designed for direct expansion system.

Refrigerants:
R404 A, R22 or R134 A or substitutes (R407 C).

Evaporator:
IN (12 mm) and OUT (1") pipes at the rear side of the tank.

Side connections:
The evaporator tubes can be extended to the side of the tank to a stainless steel plate. Here the refrigeration copper kit and the Pre-Box can be mounted. In this way the tank can be positioned very close to the back wall .

Tank type	Side connection (excluding copper kit)	
	Left (seen from back)	**Right**
1150 - 2500	98034303-06	98034303-01
3000 - 4500	98034303-16	98034303-11
5000 - 8000	98034303-26	98034303-21
8600 -12000	98034303-40	98034303-31

Requirements

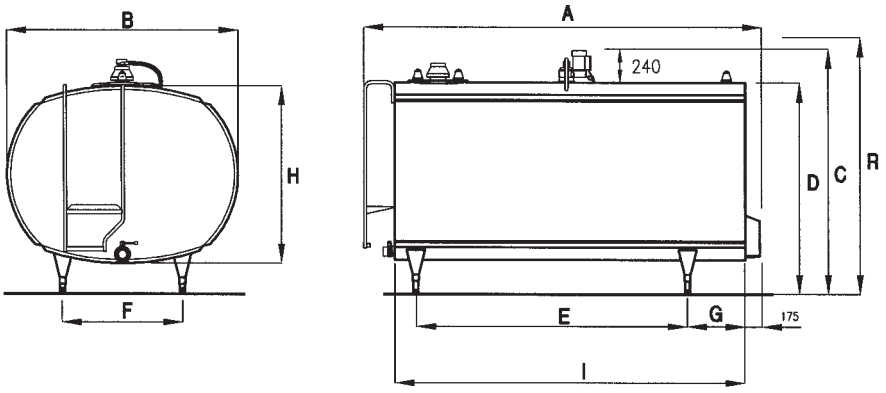
Electrical supply:
In PRE-BOX on rear side tank,
3 x 400 V + N, 3 x 230 V, 1 x 230 V,
50 Hz/ 60 Hz, max. power consumption
P = 145 W

Note! *Lockable main switch must be provided in the switch box of the condensing unit or nearby.*

Water supply:
Below PRE-BOX on rear side, 1/2" hose pillars for hot and cold water. Temperature of hot water close to 80°C.

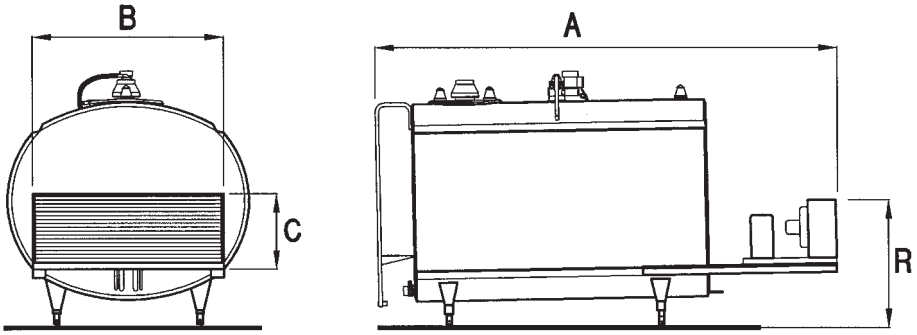
Drain spot:
Drain spot can be positioned near the tank outlet.

STANDARD PACKAGE OF THE TANK
The tank will be supplied on a wooden pallet and covered by foil. The dipstick is packed on a pallet. The pallet can be lifted by a fork-lift truck in the length direction.



Milk cooler DX/CE rated capacity	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R
1150	1685	1400	1540	1351	1015	830	200	1080	1400	1275	1	4	3"	2"	310	1	1549
1300	1850	1400	1536	1351	1080	830	250	1080	1565	1441	1	4	3"	2"	330	1	1545
1600	2180	1400	1535	1351	1410	830	250	1080	1895	1774	1	4	3"	2"	360	1	1539
2000	2620	1400	1535	1351	1850	830	250	1080	2335	2213	1	4	3"	2"	395	1	1538
2500	3170	1400	1536	1351	2400	830	250	1080	2885	2756	1	4	3"	2"	440	1	1546
3000	2335	1800	1889	1704	1290	1070	350	1480	1885	3242	2	4	3"	2"	470	1	1895
3500	2635	1800	1889	1704	1590	1070	350	1480	2185	3796	2	4	3"	2"	520	1	1891
4000	2935	1800	1889	1704	1890	1070	350	1480	2485	4351	2	4	3"	2"	570	1	1893
4500	3235	1800	1889	1704	2190	1070	350	1480	2785	4907	2	4	3"	2"	620	1	1895
5000	3005	2000	2002	1824	1870	1035	500	1539	2555	5335	2	4	3"	2"	720	1	2006
6000	3485	2000	2002	1824	2350	1035	500	1539	3035	6379	2	4	3"	2"	720	1	2013
6750	3800	2000	2000	1813	2522	1035	491	1539	3350	7093	2	4	3"	2"	860	1	2016
7500	4120	2000	2023	1814	2x1650	1035	200	1539	3670	7798	2	6	3"	2"	900	1	2023
8000	4450	2000	2044	1814	2x1810	1035	200	1539	4000	8449	2	6	3"	2"	-	1	2108
8600	4055	2150	2214	2045	2x1500	1300	350	1748	3605	8872	4	6	3"	2"	1370	1	2233
9700	4455	2150	2234	2096	2x1700	1300	350	1748	4005	9945	4	6	3"	2"	1470	1	2253
11000	5005	2150	2236	2096	3x1315	1300	350	1748	4555	11357	4	8	3"	2"	1570	1	2247
12000	5455	2150	2236	2096	3x1465	1300	350	1748	5005	12417	4	8	3"	2"	1670	1	2254

J max. filling capacity in litres (without agitation)
K number of evaporators
L number of feet
M size of outlet valve
N size of outlet
O nett weight in kg.
P number of agitators
R height (tank at 3%)



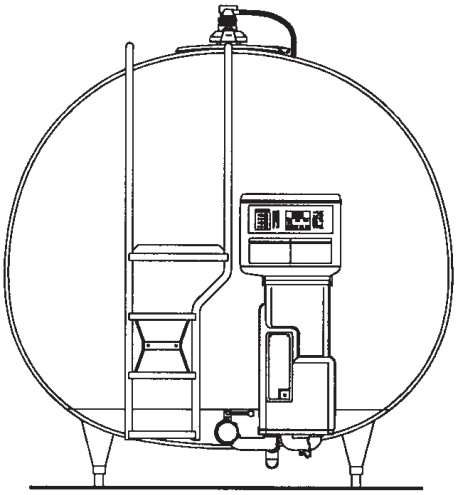
Tank	Performance class								Dimensions			
	2AII	4AII	2BII	4BII	6BII	2CII	4CII	4CI	A	B	C	R
1150		x		x	x	x	x	x	2505	735	533	984
	x		x						2505	735	708	1159
Weight	397	383	397	383	383	396	383	383				
1300		x		x	x		x	x	2670	735	533	980
	x		x			x			2670	735	708	1155
Weight	429	403	417	403	403	416	403	403				
1600		x		x	x		x	x	3060	735	533	982
	x		x			x			3060	735	708	1156
Weight	462	434	459	433	433	459	433	434				
2000		x		x	x		x	x	3440	735	533	987
						x			3440	735	708	1162
	x		x						3440	1130	708	1162
Weight	511	481	511	469	468	497	469	468				
2500					x		x		3990	735	533	1003
		x		x				x	3990	735	708	1178
						x			3990	1130	708	1178
	x		x						3990	1130	708	1178
Weight	623	527	623	527	513	556	526	527				



Tank	Performance class								Dimensions			
	2AII	4AII	2BII	4BII	6BII	2CII	4CII	4CI	A	B	C	R
3000					x				3155	735	533	998
		x		x			x	x	3155	735	708	1172
						x			3155	1130	708	1172
	x		x						3155	1130	708	1299
Weight	684	569	684	569	544	653	557	569				
3500					x				3455	735	533	998
		x		x			x	x	3455	735	708	1173
	x		x			x			3455	1329	835	1300
Weight	734	622	734	619	606	734	619	622				
4000				x	x		x		3755	735	708	1179
		x						x	3755	1130	708	1179
	x		x			x			3755	1329	835	1306
Weight	784	686	784	672	656	784	672	686				
4500				x	x		x		4055	735	708	1186
		x						x	4055	1130	708	1186
	x		x			x			4055	1329	835	1313
Weight	734	636	734	622	606	734	622	636				
5000					x				3825	735	708	1170
				x			x		3825	1130	708	1170
		x						x	3825	1130	708	1170
Weight		903		836	819		836	903				
6000					x				4305	735	708	1184
				x			x		4305	1130	708	1184
		x						x	4305	1329	835	1311
Weight		1034		1003	922		1003	1034				
6750					x				4620	1130	708	1192
		x		x			x	x	4620	1329	835	1318
Weight		1074		1074	976		1074	1074				
7500					x				4940	1130	708	1203
		x		x			x		4940	1329	835	1330
Weight		1114		1114	1016		1114					
8000		x		x				x	5270	1640	869	1454
							x		5270	1329	835	1420
					x				5270	1130	708	1293
Weight		1173		1173	1133		1164	1173				

DX/CEM Milk cooling tank with Hygenius

Product data



Description

Closed atmospheric tank designed for storage and cooling of milk and suitable for installations for 2, 4 or 6 milkings.

Standard the DX/CEM tanks are equipped with a Hygenius cleaning/controlling device and are suitable for an electrical supply of 3 x 400 V + N, 3 x 230 V, 1 x 230 V, 50 Hz / 60 Hz.

The Hygenius has a double outlet system which is meant to simplify the cleaning function. A closed cleaning circuit can be created just by putting a 3" blind cap on the double outlet. When this cap is disconnected the storage of milk during the cooling function is guaranteed safe.

The tank is executed with two agitators for stirring the milk homogeneously. There are spray nozzles on the agitator shaft, just below the blades, designed for a powerful cleaning of the inner tank during the cleaning function.

All external connections for electrical and water supply and also for the condensing unit are placed at the rear side of the tank.

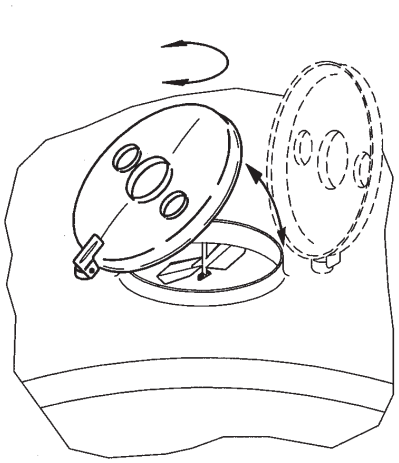
Technical data

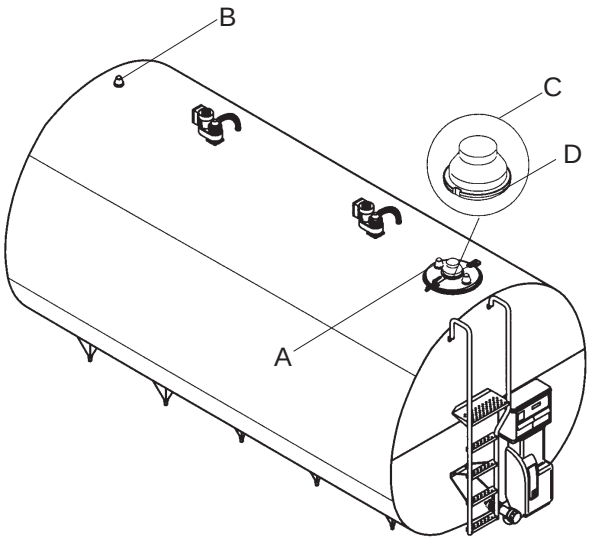
General

Material:
Inner and outer tank of stainless steel: AISI 304. Outer tank plates are smoothly grinded.

Evaporator:
Dimple plate, part of the lower inner tank.

Insulation:
PUR foam between inner and outer tank.





Manhole:
On the top, size 480 mm, double revolving.
The symmetric design of the manhole cover offers the possibility to open the manhole to the left as well as to the right.

Outlet:
Valve with at the end 3" tanker connection piece.

Double outlet Hygenius:
2" milk outlet and 3" cleaning outlet.

Inlets:
The DX/CEM is standard executed with 2 Ø 3" milk inlets. One inlet is placed in the manhole cover (A), the second is placed on top at the back of the tank (B).

Agitator motor:
Sirem P = 330 W, 230 V AC rotation speed 21 r.p.m.

Air vent:
4" positioned in the centre of the manhole lid (C), with dish for condense water (D).

Legs:
8 to 10 adjustable stainless steel legs.

Measurements:
Dipstick and milk quantity table (indication).
For a more accurate reading: calibration list.
Both tables are usable at a slope of 3%.

Cooling system

Designed for direct expansion system.

Refrigerants:
R404 A, R22 or R134 A or substitutes (R407 C).

Evaporator:
IN (12 mm) and OUT (1") pipes at the rear side of the tank.

Requirements

Electrical supply:
In PRE-BOX on rear side tank,
3 x 400 V + N, 3 x 230 V, 1 x 230 V,
50 Hz / 60 Hz, max. power consumption
P = from 0,6 kW to 1,25 kW (cleaning/controlling).

Note! *Lockable main switch must be provided in the switch box of the condensing unit or nearby.*

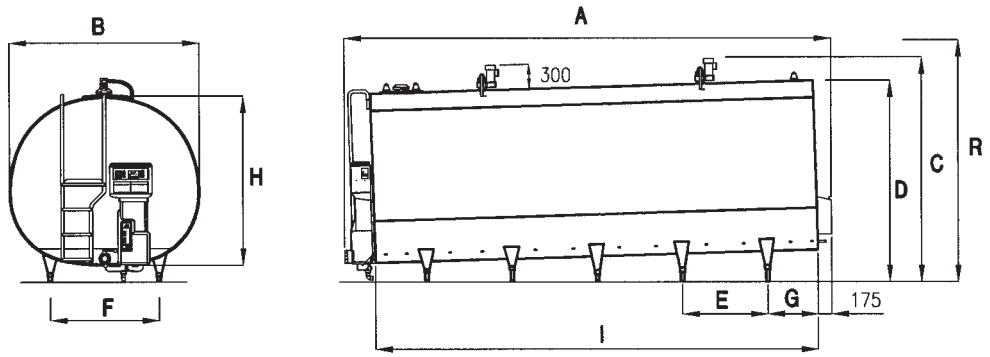
Water supply:
Below PRE-BOX on rear side, 1/2" hose pillars for hot and cold water. Temperature of hot water close to 80°C.

Drain spot:
Drain spot can be positioned near the tank outlet.

STANDARD PACKAGE OF THE TANK
The tank will be supplied on a wooden pallet and covered by foil.

The dipstick and drainpipe are packed on a pallet.

The pallet can be lifted by a fork-lift truck in the length direction.



Milk cooler DX/CEM rated capacity	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R
14000	5215	2270	2635	2353	3x1148	1300	542	2027	4665	14492	4	8	3"	2"	-	2	2628
16000	5855	2270	2643	2391	4x1020	1300	610	2027	5305	16426	4	10	3"	2"	-	2	2645
18000	6495	2270	2643	2391	4x1148	1300	676	2027	5945	18680	4	10	3"	2"	-	2	2651

J max. filling capacity in litres (without agitation)
K number of evaporators
L number of feet
M size of outlet valve
N size of outlet
O nett weight in kg.
P number of agitators
R height (tank at 3%)

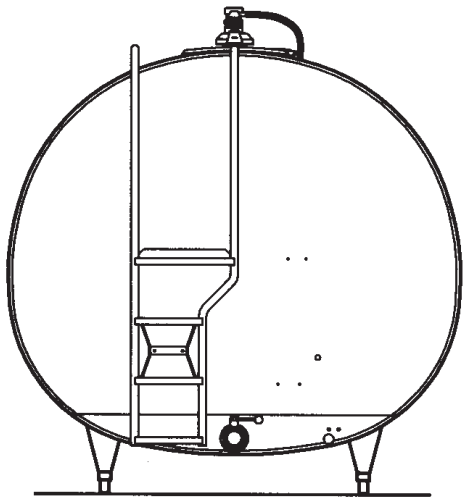
DX/CEM Milk cooling tank

Product data

Article number

Basic DX/CEM tanks with 3" DIN outlet valve and agitator.

9803602481	DX/CEM 14000
9803602981	DX/CEM 16000
9803603481	DX/CEM 18000



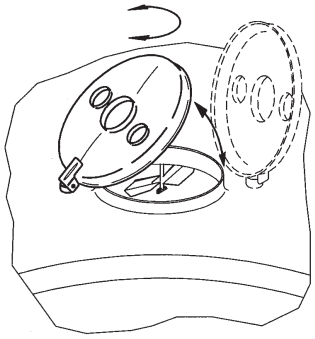
Description

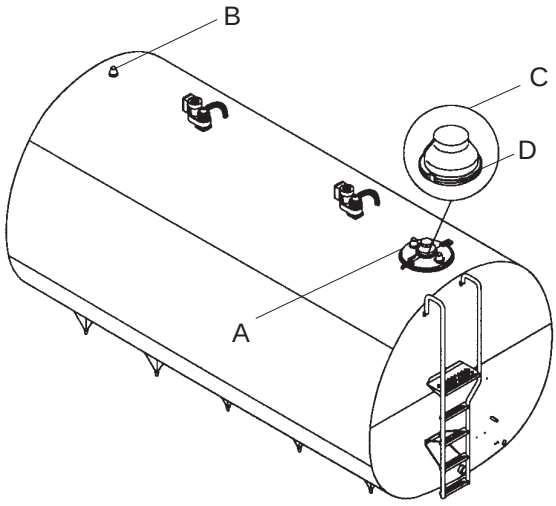
Closed atmospheric tank designed for storage and cooling of milk and suitable for installations for 2, 4 or 6 milkings.

The DX/CEM tanks are suitable for an electrical supply of 3 x 400 V + N, 3 x 230 V, 1 x 230 V, 50 Hz / 60 Hz.

The tank is executed with two agitators for stirring the milk homogeneously. There are spray nozzles on the agitator shaft, just below the blades, designed for a powerful cleaning of the inner tank during the cleaning function.

All external connections for electrical and water supply and also for the condensing unit are placed at the rear side of the tank.





Technical data

General

Material:
Inner and outer tank of stainless steel: AISI 304. Outer tank plates are smoothly grinded.

Evaporator:
Dimple plate, part of the lower inner tank.

Insulation:
PUR foam between inner and outer tank.

Manhole:
On the top, size 480 mm, double revolving. *The symmetric design of the manhole cover offers the possibility to open the manhole to the left as well as to the right.*

Outlet:
Valve with at the end 3" tanker connection piece.

Inlets:
The DX/CEM is standard executed with 2 ∅3" milk inlets. One inlet is placed in the manhole cover (A), the second is placed on top at the back of the tank (B).

Agitator motor:
Sirem P = 330 W, 200-240 V AC rotation speed 21 r.p.m.

Air vent:
4" positioned in the centre of the manhole lid (D), with dish for condense water.

Legs:
8 to 10 adjustable stainless steel legs.

Measurements:
Dipstick and milk quantity table (usable at a slope of 3%).

Cooling system

Designed for direct expansion system.

Refrigerants:
R404 A, R22 or R134 A or substitutes (R407 C).

Evaporator:
IN (12 mm) and OUT (1") pipes at the rear side of the tank.

Requirements

Electrical supply:
In PRE-BOX on rear side tank,
3 x 400 V + N, 3 x 230 V, 1 x 230 V,
50 Hz/ 60 Hz, max. power consumption
P = 145 W

Note! *Lockable main switch must be provided in the switch box of the condensing unit or near by.*

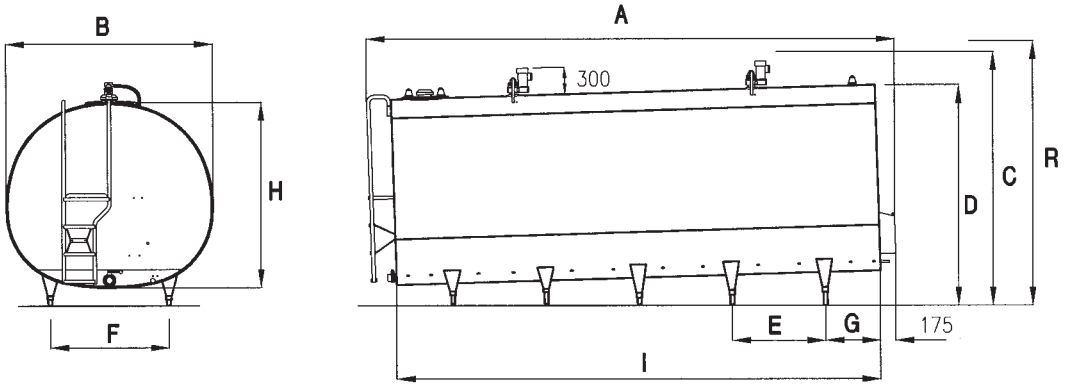
Water supply:
Below PRE-BOX on rear side, 1/2" hose pillars for hot and cold water. Temperature of hot water close to 80°C.

Drain spot:
Drain spot can be positioned near the tank outlet.

STANDARD PACKAGE OF THE TANK
The tank will be supplied on a wooden pallet and covered by foil.

The dipstick is packed on a pallet.

The pallet can be lifted by a fork-lift truck in the length direction.

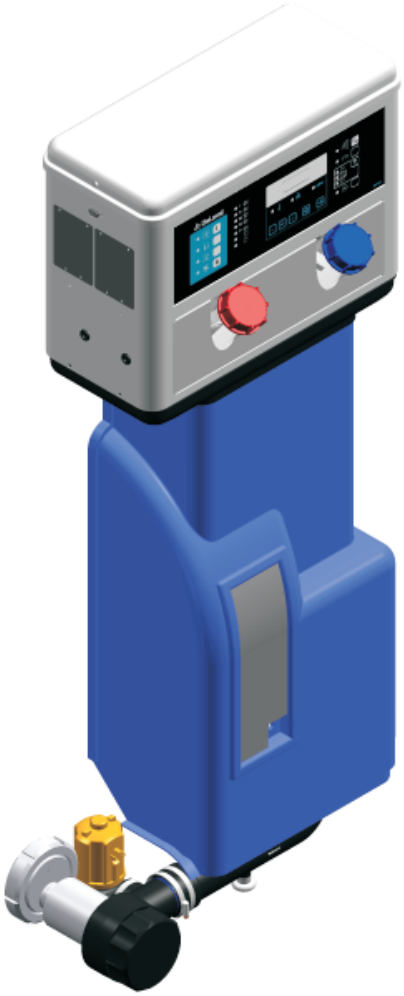


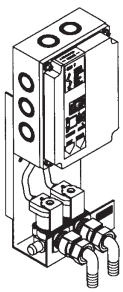
Milk cooler DX/CEM rated capacity	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R
14000	5115	2270	2635	2353	3x1148	1300	558	2027	4665	-	4	8	3"	2"	-	2	2641
16000	5755	2270	2643	2391	4x1020	1300	610	2027	5305	-	4	10	3"	2"	-	2	2669
18000	6395	2270	2643	2391	4x1148	1300	676	2027	5945	-	4	10	3"	2"	-	2	2657

J max. filling capacity in litres (without agitation)
K number of evaporators
L number of feet
M size of outlet valve
N size of outlet
O nett weight in kg.
P number of agitators
R height (tank at 3%)

T100 cleaning / controlling unit

Product data





Description

The T100 is an advanced - micro-processor controlled - device, which is meant for the cleaning and controlling of closed milk cooling tanks. As a standard, the T100 is available in two versions. One with manual powder dosing and the other with automatic liquid dosing. By choosing the liquid dosing, manual dosing will not be possible and vice versa. Mounted on the front-side of the tank, the T100 has been developed to provide a comfortable operation and easy accessibility for servicing and maintenance.
The T100 stores several cleaning programs and can be optimized to the different farm conditions.

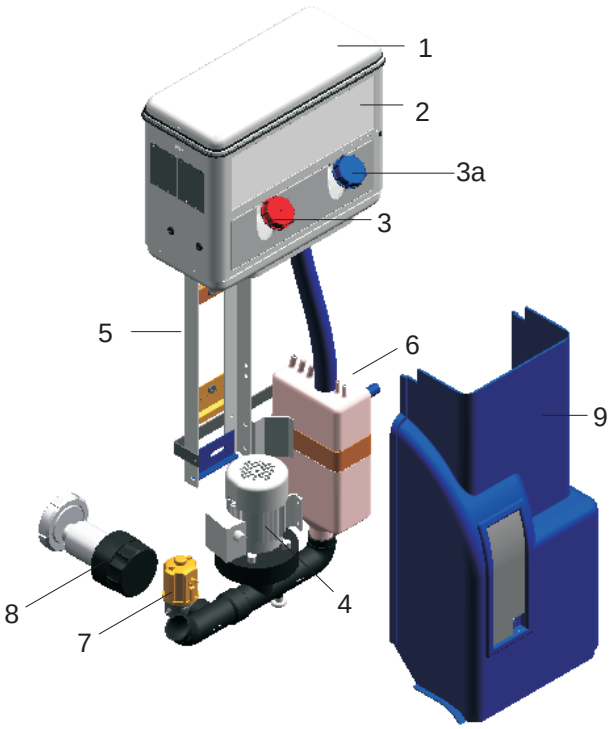
The complete cleaning/controlling device consists of three parts:

- the main housing which contains the operating panel, the electrical components for cleaning and controlling, the containers or dosing pumps for the cleaning agent and the cleaning pump,
- the double outlet,
- the box for external connections, called PRE-BOX.

A special “time-filling” system is applied to guarantee that a correct amount of water is used in the cleaning cycle.

This cleaning cycle operates according the circulation cleaning principle, which is characteristic for the T100.

The PRE-BOX is mounted at the rear-side if the tank and is used to make the connections to external sources and to provide the cleaning unit with water and electrical supply.



For the cleaning / controlling unit T100 the following main components can be distinguished

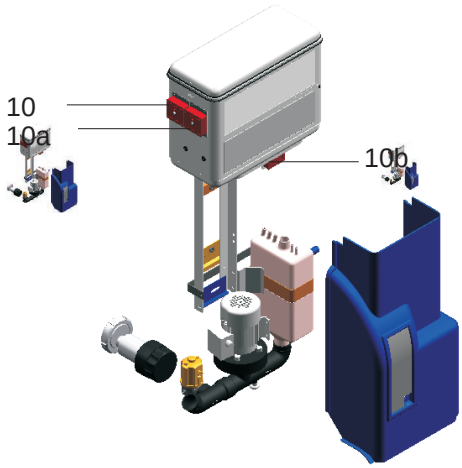
1. Upper housing
2. Operation panel
3. Detergent powder container (left)

3a. Disinfectant powder container (right)

4. Cleaning pump
5. Tank mounting frame
6. Water inlet house
7. Drain valve
8. Double outlet piece
9. Protection cover
10. Dosing pump alkaline

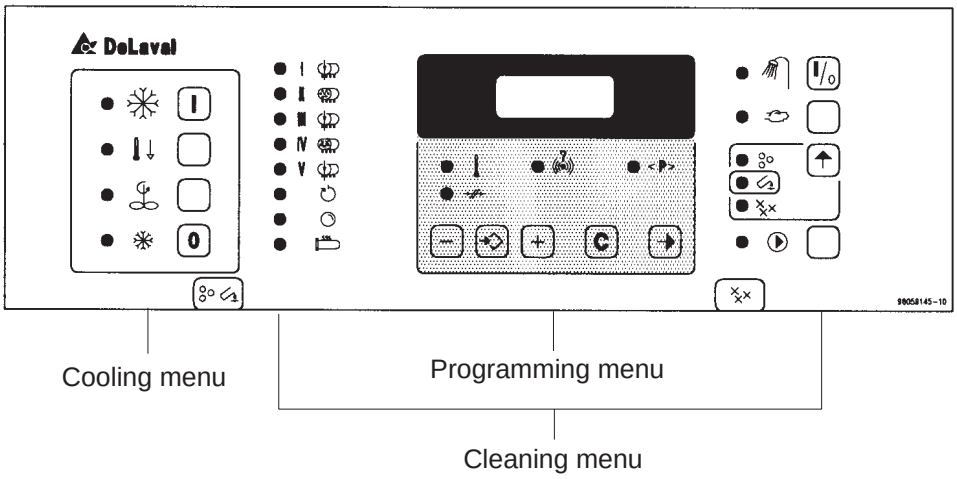
10a. Dosing pump acid

10b. Dosing pump disinfectant



The T100 cleaning and controlling device for closed milk cooling tanks complies fully with the EC Machinery Directive.

For a safe and easy operation the operating panel has been conveniently arranged. It consists of three menus:



Cooling menu

The cooling menu offers the possibility to select the following functions (from top to bottom):

- Cooling “ON”, Quick-start cooling, Stirring before collecting and Cooling “OFF”.

Regarding the cooling functions, the T100 has been designed and programmed to meet today’s high market demands: two set points can be selected, the cooling can be started immediately or delayed, the stirring time and stirring interval can be adjusted to the specific requirements. The cooling time will be monitored as well as the milk temperature.

Cleaning menu

The cleaning menu offers the possibility to select the following functions (from top to bottom):

- Cleaning “ON/OFF”, automatic or manual selection of detergent, selection of detergent in manual mode (alkaline, acid or disinfection) and manual running of dosing pumps.

Note! *The T100 is equipped either with two containers suitable for powder or with dosing pumps for automatic (liquid) dosing.*

Warning! *Never pour liquid cleaning agent in the powder containers. Liquid can only be used with dosing pumps.*

Programming menu

This menu is used to view, select and change the various system parameters.

On the digital display the milk temperature can be shown as well as each parameter setting and any alarm messages.Authorisation is needed to gain access to the parameters that are essential.

The T100 factory-settings include 5 standard programs for the cleaning cycle (see table).

Prog. nr.	Pre-rinse	Cleaning	After rinse 1	Disinfection	After rinse 2
1	Luke warm	Hot	Cold	-	Cold
2	Luke warm	Hot	Cold	Cold	Cold
3	Luke warm	Hot	Cold	-	-

Specific cleaning program according North American standards				
Prog. nr.	**Pre-rinse**	**Cleaning**	**After rinse 1**	**Disinfection**
4	Cold & Hot	Hot	Cold	Cold

Specific cleaning program according Japanese standards							
Prog. nr.	**Pre-rinse**	**Cleaning**	**After rinse 1**	**Acid**	**After rinse 2**	**Disinfection**	**After rinse 3**
5	Cold & Hot	Hot	Cold	Cold	Cold	Cold	Cold

Technical data

Type:
T100
Device for cleaning and controlling of a closed milk cooling tank.

Functions:
Cooling function, programming functions and cleaning functions.

Dimensions:
Box: (w x h x d) approx. 50 x 45 x 30
Total panel: (w x h x d) apprx.. 65 x 145 x 30

Fixation:
The panel is fixed to the tank with a special hinge-construction which provides easy accessibility for servicing.

Water supply:
From PRE-BOX, through 1/2" hoses.

Safety component:
3/4" KIWA certified non-return valves on both water inlets (conform Eureau Document).

Water consumption:
Adjusted to each tank capacity.

Cleaning agent:
Two containers suitable for powder or two / three dosing pumps suitable for liquid.

Tank / pump / buffer:

DXCE	1150-12000	FCP-55 / 3L buffer
DXCEH	1100- 4000	FCP-55 / 3L buffer
DXCEM	14000-32000	FCP-110/5L buffer

Cleaning pump:
Type FCP 55 P = 0,55 kW
Suction diameter = 2"
Discharge diameter = 1"
FCP 55, 2 executions
1. suitable for 3x400 V+N / 3x230 V
2. suitable for 1x230 V

Type FCP 110 P = 1,1 kW
Suction diameter = 2"
Discharge diameter = 1"
FCP 110, 2 executions
1. suitable for 3x400 V+N / 3x230 V
2. suitable for 1x230 V

For adjustment thermic control see list below:

Execution		**Value**
FCP 55	3x400 V+N	1,6A
	3x230 V	2,5A
	1x230 V	3,5A
FCP 110	3x400 V+N	2,9A
	3x230 V	4,8A
	1x230 V	7,5A

(The thermic control will automatically reset if a failure has occurred.)

Drain valve:
2 way, solenoid valve DN40 (NC)
Supply 230 V single phase, 50 Hz / 60 Hz.
Outlet connection = 1¼" G male part pointing towards ground.

Double outlet:

- Tank connection:
  – 3" DIN
- Truck connection:
  – 2" DIN, 2" RJT, 2" DS, 2" SMS or 2" IDF male part with 2" blind nut
- Cleaning connection:
  – With 3" blind cap

Enclosure class:
IP 45

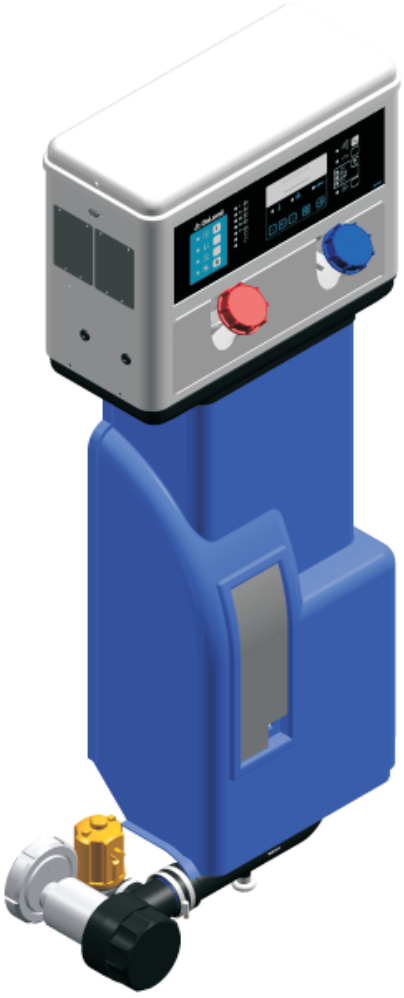
Electrical connections:

- Agitator (230 V single phase) on terminal.
- PRE-BOX external connection box on terminal (supply for T100).

Electrical supply:
Executions for: 3 x 400V + N, 3 x 230V and 1 x 230V, 50/60 Hz.

T200 cleaning / controlling unit

Product data



Description

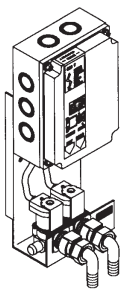
The T200 is an advanced - micro-processor controlled - device, which is meant for the cleaning and controlling of closed milk cooling tanks. As a standard, the T200 is available in two versions. One with manual powder dosing and the other with automatic liquid dosing. By choosing the liquid dosing, manual dosing will not be possible and vice versa. Mounted on the front-side of the tank, the T200 has been developed to provide a comfortable operation and easy accessibility for servicing and maintenance. The T200 stores several cleaning programs and can be optimized to the different farm conditions.

The complete cleaning/controlling device consists of three parts:

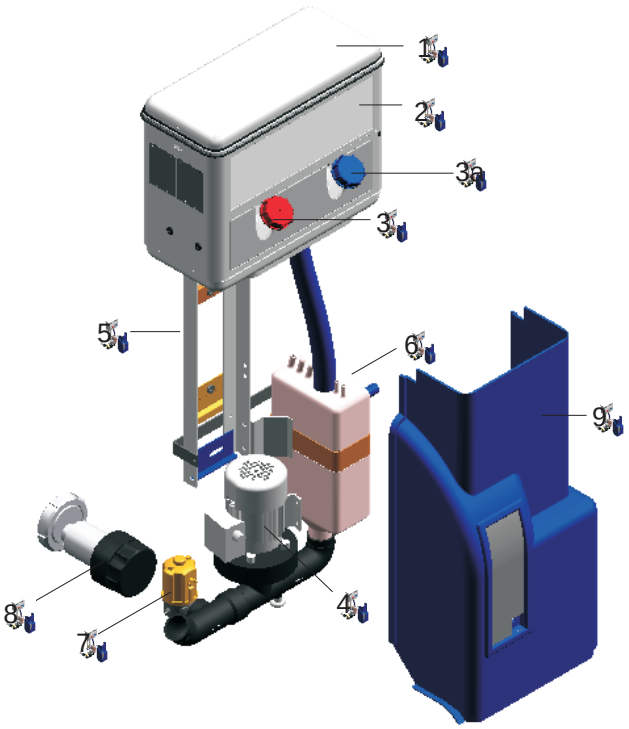
- the main housing which contains the operating panel, the electrical components for cleaning and controlling, the containers or dosing pumps for the cleaning agent and the cleaning pump,
- the double outlet,
- the box for external connections, called PRE-BOX.

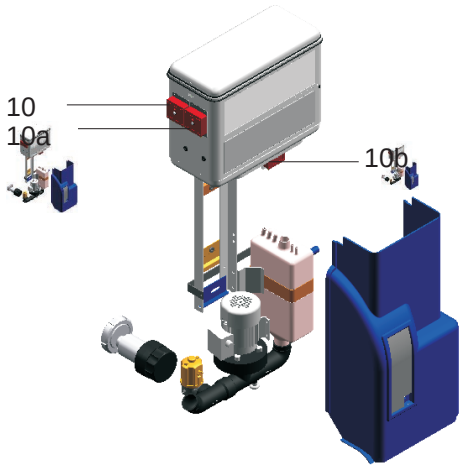
A special “level-filling” system is applied to guarantee that a correct amount of water is used in the cleaning cycle.

This cleaning cycle operates according the “direct to drain rinsing” principle, which is characteristic for the T200.



The PRE-BOX is mounted at the rear-side of the tank and is used to make the connections to external sources and to provide the cleaning unit with water and electrical supply.





For the cleaning / controlling unit T200 the following main components can be distinguished

1. Upper housing
2. Operation panel
3. Detergent powder container (left)

3a. Disinfectant powder container (right)

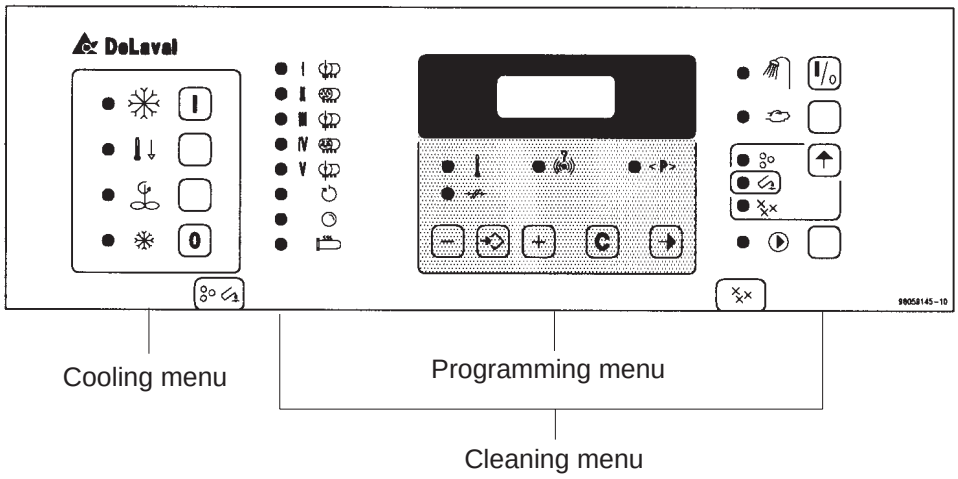
4. Cleaning pump
5. Tank mounting frame
6. Water inlet
7. Drain valve
8. Double outlet piece
9. Protection cover
10. Dosing pump detergent

10a. Dosing pump acid

10b. Dosing pump disinfectant

The T200 cleaning and controlling device for closed milk cooling tanks complies fully with the EC Machinery Directive.

For a safe and easy operation the operating panel has been conveniently arranged. It consists of three menus:



Cooling menu

The cooling menu offers the possibility to select the following functions (from top to bottom):

- Cooling “ON”, Quick-start cooling, Stirring before collecting and Cooling “OFF”.

Regarding the cooling functions, the T200 has been designed and programmed to meet today’s high market demands: two set points can be selected, the cooling can be started immediately or delayed, the stirring time and stirring interval can be adjusted to the specific requirements. The cooling time will be monitored as well as the milk temperature.

Cleaning menu

The cleaning menu offers the possibility to select the following functions (from top to bottom):

- Cleaning “ON/OFF”, Automatic or manual selection of detergent, Selection of detergent in manual mode (alkaline, acid or disinfection) and manual running of dosing pumps.

Note! *The T200 is equipped either with two containers suitable only for powder or with dosing pumps for automatic (liquid) dosing.*

Warning! *Never pour liquid cleaning agent in a powder container. Liquid can only be used with dosing pumps.*

Programming menu

This menu is used to view, select and change the various system parameters.

On the digital display the milk temperature can be shown as well as each parameter setting and any alarm messages.

Authorisation is needed to gain access to the parameters that are essential.

The T200 factory-settings include 5 standard programs for the cleaning cycle (see table).

Prog. nr.	Pre-rinse	Cleaning	After rinse 1	Disinfection	After rinse2
1	Luke warm	Hot	Cold	-	Cold
2	Luke warm	Hot	Cold	Cold	Cold
3	Luke warm	Hot	Cold	-	-

Specific cleaning program according North American standards				
Prog. nr.	**Pre-rinse**	**Cleaning**	**After rinse 1**	**Disinfection**
4	Cold & Hot	Hot	Cold	Cold

Specific cleaning program according Japanese standards							
Prog. nr.	**Pre-rinse**	**Cleaning**	**After rinse 1**	**Acid**	**After rinse 2**	**Disinfec-tion**	**After rinse 3**
5	Cold & Hot	Hot	Cold	Cold	Cold	Cold	Cold

Technical data

Type:
T200
Device for cleaning and controlling of a closed milk cooling tank.

Functions:
Cooling function, programming functions and cleaning functions.

Dimensions:
Box: (WxHxD) approx. 50 x 45 x 30
Total panel: (WxHxD) approx. 65 x 145 x 30

Fixation:
The panel is fixed to the tank with a special hinge-construction which provides easy accessibility for servicing.

Water supply:
From PRE-BOX, through 1/2" hoses.

Safety component:
3/4" KIWA certified non-return valves on both water inlets (conform Eureau Document).

Water consumption:
Adjusted to each tank capacity.

Cleaning agent:
Two containers suitable for powder or two / three dosing pumps suitable for liquid.

Tank / pump / buffer:

DXCE	1150-12000	FCP-55/ 3L buffer
DXCEH	1100- 4000	FCP-55/ 3L buffer
DXCEM	14000-32000	FCP-110/5L buffer

Cleaning pump:
Type FCP 55 P = 0,55 kW
Suction diameter = 2"
Discharge diameter = 1"
FCP 55, 2 executions
1. suitable for 3x400 V+N / 3x230 V
2. suitable for 1x230 V

Type FCP 110 P = 1,1 kW
Suction diameter = 2"
Discharge diameter = 1"
FCP 110, 2 executions
1. suitable for 3x400 V+N / 3x230 V
2. suitable for 1x230 V

For adjustment thermic control see list below:

Execution		**Value**
FCP 55	3x400 V+N	1,6A
	3x230 V	2,5A
	1x230 V	3,5A
FCP110	3x400 V+N	2,9A
	3x230 V	4,8A
	1x230 V	7,5A

(The thermic control will automatically reset if a failure has occurred.)

Drain valve:
2 way, solenoid valve DN40 (NC)
Supply 230 V single phase, 50 Hz / 60 Hz.
Outlet connection = 1¼" G male part pointing towards ground.

Double outlet:

- Tank connection:
  – 3" DIN
- Truck connection:
  – 2" DIN, 2" RJT, 2" DS, 2" SMS or 2" IDF male part with 2" blind nut
- Cleaning connection:
  – With 3" blind cap

Enclosure class:
IP 45.

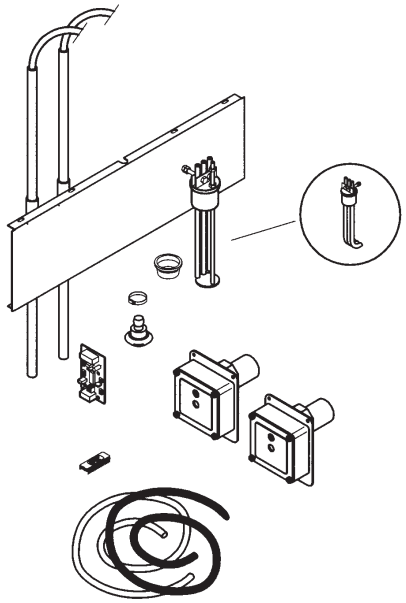
Electrical connections:

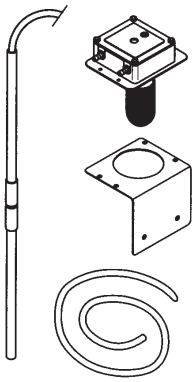
- Agitator (230 V single phase) on terminal.
- PRE-BOX external connection box on terminal (supply for T200).

Electrical supply:
Executions for: 3 x 400V + N, 3 x 230V and 1 x 230V, 50/60 Hz.

Automatic liquid dosing

Product Data





Article numbers

98059149-48	Dosing set including two pumps (acid and alkaline) with dosing detection and suction pipes.
98059149-47	Dosing set including three pumps (acid, alkaline and disinfectant) with dosing detection and suction pipes.
98059146-41	Upgrade kit, to provide an existing automatic dosing system with the detection feature.

Description

The automatic liquid dosing set is available as an additional feature for the cleaning / controlling unit type T. Application of this set enables an automatic and accurate dosing of liquid cleaning agent. It also reduces the number of actions that need to be taken with the aggressive chemicals.

The cleaning/controlling units are provided with two sealing-plates on the left side of the main housing (seen from the front). Removal of these plates will reveal openings which are meant to accommodate two dosing pumps. Below these openings two lead-through rubbers are placed in the housing. These rubbers lead the discharge houses from the dosing pumps into the pump buffer.

The third pump (disinfectant) is mounted on the frame inside the housing. The discharge house runs directly to the pump buffer. All the peristaltic dosing pumps are operated via and controlled by the cleaning/controlling unit. Because these pumps are self-priming, the possibilities for positioning the container(s) with cleaning chemicals, in view of safety aspects and the use of space, are nearly unlimited.

Per dosing set a dosing detector is included. This detector monitors if the cleaning agent is brought into the system. An alarm will be given if the cleaning agent is not added and the corresponding led will blink.

Technical Data

Type pump:
Self-priming peristaltic dosing pump.

Housing:
White polycarbonate pump housing with suction- and discharge connection.

Dimensions:
77 x 74 x 30 (W x H x D)

Fixation:
Four holes of ∅ 5 mm are provided so that the pump can be bolted to the cleaning / controlling unit housing. A gasket is placed between the pump and the housing.
The third pump (disinfection) can be mounted by drilling holes and bolting it onto the frame.

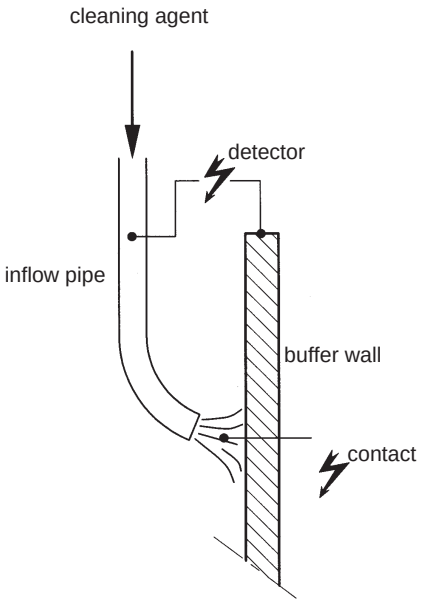
Pump capacity:
Approximately 33 cc per minute.

Lubrication:
By means of silicon grease.

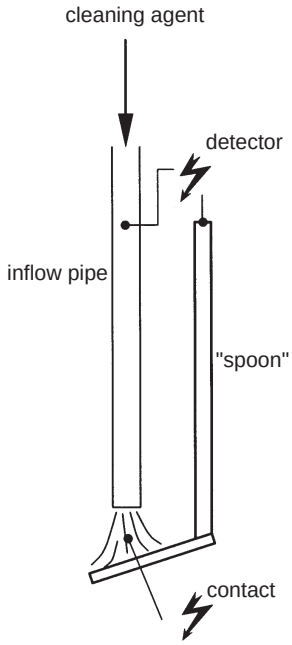
Enclosure class:
IP 55.

Hoses:
Suction side:
transparent PVC hose, ∅ 8/5 L=5000
Discharge side (acid):
red PVC hose, ∅ 8/5 L=1050
Discharge side (alkaline):
blue PVC hose, ∅ 8/5 L=1050
Discharge side (disinfection):
transparent PVC hose, ∅ 8/5 L1000

Dosing detector:
Solid plug with two or three inflow pipes for cleaning agent.
Length of cable approximately 1200 m.



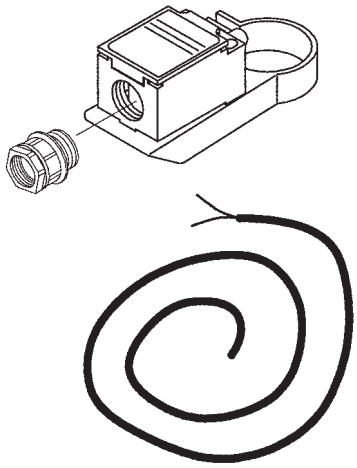
old system



new system

Outlet valve position check device

Product data



Article numbers

98059149-87	Sensor set including support and mounting material for 2” or 2 1/2” valves
98059150-93	Sensor set including support and mounting material for 3” valves

Description

The outlet valve position check device is available as an additional feature for the Hygenius cleaning/controlling devices. Application of this set enables an automatic position check of the outlet valve. It prevents that the cleaning is started when the outlet valve is closed.

It also gives a warning signal when the valve is open during cooling. This is indicated by a green blinking LED (cooling ON)

Per set a support is included. This support is mounted on the outlet valve and fixates the sensor. This ensures a correct functioning of the sensor.

Technical data

Dimensions:
30 x 59 x 30 (H x W x D)

Fixation:
2 holes of Ø 4 mm are provided so that the sensor can be mounted on the support. The support is clamped on the butterfly valve.

Maximum switch capacity:
500V, 10A

Supply voltage:
maximum 9V

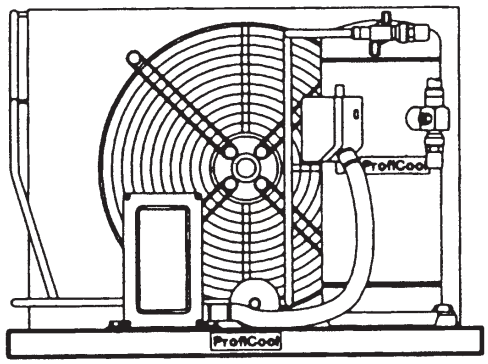
Wiring:
2 x 1,5 mm, L= 2000 mm

Enclosure class:
IP65

DeLaval

DeLaval condensing units

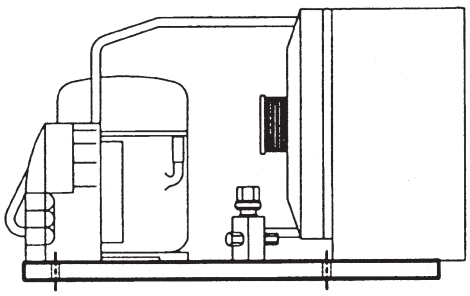
Product data



Article numbers

Scroll types 3 x 400 V, 50 Hz without pump-down		
Art. number	**type**	**HP/kW**
98037008-01	PRB/1/H8/S14/4	2/1.5
98037008-02	PRB/1/H8/S19/4	2.25/1.7
98037008-03	PRB/1/H8/S21/4	2.75/2
98037008-04	PRB/1/M8/S26/4	3.5/2.6
98037008-05	PRB/1/M8/S30/4	4/2.9
98037008-06	PRB/1/M9/S38/4	5/3.7
98037008-07	PRB/2/S9/S45/4	6/4.4
98037008-08	PRB/2/S9/S56/4	7.5/5.5
98037008-09	PRB/2/V6/S75/4	10/7.5
98037008-10	PRB/2/W9/S92/4	13/9.6
98037008-11	PRB/2/W9/S11/4	15/11

Scroll types 3 x 400 V, 50 Hz. (with pump-down)		
Art. number	**type**	**HP/kW**
98037008-30	PRR/1/H8/S14/4	2/1.5
98037008-31	PRR/1/H8/S19/4	2.25/1.7
98037008-32	PRR/1/H8/S21/4	2.75/2
98037008-33	PRR/1/M8/S26/4	3.5/2.6
98037008-34	PRR/1/M8/S30/4	4/2.9
98037008-35	PRR/1/M9/S38/4	5/3.7
98037008-36	PRR/2/S9/S45/4	6/4.4
98037008-37	PRR/2/S9/S56/4	7.5/5.5
98037008-38	PRR/2/V6/S75/4	10/7.5
98037008-39	PRR/2/W9/S92/4	13/9.6
98037008-40	PRR/2/W9/S11/4	15/11



Scroll types 3 x 230 V 50 Hz. (with pump-down)		
Art. number	**type**	**HP/kW**
98037010-06	PRR/1/H8/S14/3	2/1.5
98037010-07	PRR/1/H8/S19/3	2.25/1.7
98037010-08	PRR/1/H8/S21/3	2.75/2
98037010-05	PRR/1/M8/S26/3	3.5/2.6
98037010-01	PRR/1/M8/S30/3	4/2.9
98037010-02	PRR/1/M9/S38/3	5/3.7
98037010-03	PRR/2/S9/S45/3	6/4.4
98037010-04	PRR/2/S9/S56/3	7.5/5.5

Scroll types 1 x 230 V 50 Hz. (with pump-down)		
Art. number	**type**	**HP/KW**
98037008-60	PRR/1/H8/R22/5	2/1.5
98037008-61	PRR/1/H8/R28/5	2.25/1.7
98037008-62	PRR/1/H8/R34/5	2.75/2
98037008-63	PRR/1/M8/R40/5	3.25/2.4
98037008-64	PRR/1/M8/R47/5	4/2.9
98037008-66	PRR/2/S9/B42/5	5.5/4.1

Scroll types 3 x 208 V 60 Hz. (with pump-down)		
Art. number	**type**	**HP/KW**
98037010-41	PRR/2/R7/S30/6	4/2.9
98037010-42	PRR/2/V5/S45/6	6/4.4

Piston types 1 x 230 V 50 Hz. (without pump-down)		
Art. Number	**type**	**HP/kW**
98037008-80	PRB/CAE9460/5	0.50/0.4
98037008-81	PRB/CAJ9480/5	0.75/0.6
98037008-82	PRB/CAJ9510/5	1/0.7
98037008-83	PRB/CAJ4517/5	1.25/0.9
98037008-84	PRB/CAJ4519/5	1.5/1
98037008-85	PRB/FH4524/5	2/1.5

Piston types 1 x 230 V 50 Hz. (with pump-down)		
Art. number	**type**	**HP/kW**
98037008-90	PRR/CAE9460/5	0.50/0.4
98037008-91	PRR/CAJ9480/5	0.75/0.6
98037008-92	PRR/CAJ9510/5	1/0.7
98037008-93	PRR/CAJ4517/5	1.25/0.9

Description

Air-cooled condensing unit equipped for use in on-farm milk refrigeration systems. The units are suitable for refrigerants: R22, R404A, R407C or R507.
DeLaval condensing units are available in a power range from 0,4 kW up to 11 kW.

In the lower section of this range refrigeration is performed by units equipped with piston compressors (L'Unité Hermétique), for the bigger units scroll compressors are applied (Copeland). A choice can be made between the following two systems:
- Basic (B) execution: suitable for a capillary system,
- Receiver (R) execution: suitable for a pump-down system.

Compliant scroll



This principle of displacing gasses makes use of two identical scrolls. One scroll is placed on top of an eccentric shaft. When the motor drives this shaft, the result is a revolving motion of the scroll. This motion is performed inside a second -fixed- scroll. In this way a series of small gas-pockets are formed between the two scrolls. While these pockets are pushed towards the centre of the scrolls, their volume decreases, thus increasing the pressure. Since the pockets are formed nearly simultaneously through almost the whole length of the "channel" between the scrolls, the process of suction, compression and discharge is almost continuous.



Crankcase oil versus refrigerant

DeLaval condensing units are charged with poly ester oil.
This makes them suitable for the use of the following refrigerants: R22 (*), R404A, R507, R407C (**).

(*) In view of DeLaval's environmental policy, BU Cooling advises against the use of R22 in newly installed refrigeration systems.
This refrigerant should only be applied in already existing systems.

Note! *When exchanging a compressor or complete condensing unit* ***made by Copeland****, following should be noted:*
It is possible to apply an ester oil charged compressor in a refrigeration system that has previously been run with mineral oil. However this is only possible when a mineral oil based refrigerant (R22, Isecon 59) is used.

In all other cases the same type of crankcase oil should be refilled as previously used.

*(**) **Note!** The use of refrigerant type R407C in condensing units made by **Tecumseh / L' Unité Hermetique** is not covered by the warranty regulations of this supplier.*

Recommended grade of oil for:	Poly ester	Mineral oil
Copeland	Mobil EAL Arctic 22CC, 0,95L **98034427-85**	"White oil", 1L **4781174501**
L'Unité Hermetique	(R134A, R507, R404A): Oil for L'Unite 205145, 1L **98034427-86**	(R22) ref. 2444RC: Shell 2444RC, 2L **4783200238**

Technical Data:

Type: (e.g.) PRB/1/H8/S14/4

PR- ProfiCool 2000
B - execution (B = basic, R = receiver)
1 - number of fans
H8 - condenser type
S14 - compressor type
(S=ZS type scroll, R=ZR type scroll)
4 - voltage (3 = 3 x 230 V;
4 = 3 x 400 V + N;
5 = 1 x 230 V + N;
6 = 3 x 208 V, 60 Hz)

(For the L'Unité Hermétique range one complete code is used for fans, condenser and compressor e.g. PRB/CAJ9510/5).

Refrigerant:
Suitable for R22, R404A or substitutes.

Compressor:

– Piston type (L'Unité Hermétique).

– Scroll type (ZR or ZS) (Copeland).

– Suction- and discharge Rotalock valves with pressure gauge connection (Copeland).

– Suction Rotalock (L'Unité Hermétique).

– Crankcase heater (Copeland).

Fan motor:
Mounted and protected in a guard.
Applicable for speed control.

– Except for PRR/2/R7/S30/6
PRR/2/V5/S45/6.

Pressostats:

– L'Unité Hermétique: low pressure on PPR (receiver version) only.

– Copeland: standard low pressure and high pressure.

Electrical wiring:
Condensing unit components pre-fitted to connection box.

Switch box:
To be ordered separately. Can be mounted to the wall or on the condensing unit (built-on version).

Filter/drier:
Pre-mounted on units.

Specifications
Copeland 3 x 400 V + N

This page contains the technical specifications for the DeLaval condensing units (Copeland).

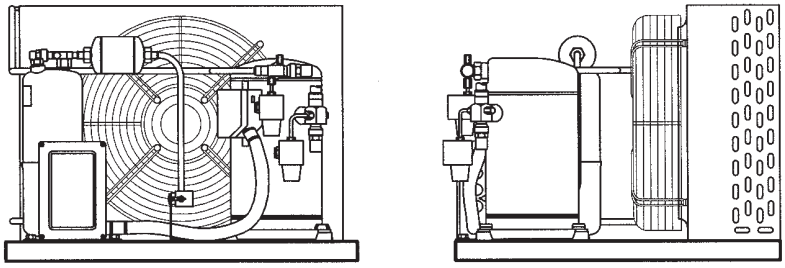
PRB - Basic (B) execution suitable for capillary systems. Adapted with floor plate, condenser with fan(s), ZS Scroll compressor with oil sight-glass (types 2 - 11 kW), Rotalock valves and thermistor control unit (types 5.5 - 11 kW), crankcase heating, filter drier, low and high pressure pressostats and electrical connection box.

PRR - As basic execution but with receiver (R) and solenoid valve, suitable for pump down systems.

Electrical supply: 3 x 400V + N.

Table shown below is related to refrigerant R404A (nom. cooling capacity at 0°C ev./ 32°C ambient temperature).

The figure shows type PRR/1/H8/S14/4.



Condensing unit type		Compressor type	Power kW	Capacity nom.	Input pow. nom.	Current Amps	Max. Amps	Fan (complete)
PRB/1/H8/S14/4	**PRR/1/H8/S14/4**	ZS 14 K4E	1.5	4.46 kW	1.70 kW	2.63	3.0	1 / 280 W
PRB/1/H8/S19/4	**PRR/1/H8/S19/4**	ZS 19 K4E	1.7	5.48 kW	2.23 kW	3.44	3.9	1 / 280 W
PRB/1/H8/S21/4	**PRR/1/H8/S21/4**	ZS 21 K4E	2.0	6.42 kW	2.83 kW	3.89	4.5	1 / 280 W
PRB/1/M8/S26/4	**PRR/1/M8/S26/4**	ZS 26 K4E	2.6	8.37 kW	3.33 kW	4.62	5.3	1 / 280 W
PRB/1/M8/S30/4	**PRR/1/M8/S30/4**	ZS 30 K4E	2.9	9.52 kW	3.75 kW	6.17	7.3	1 / 280 W
PRB/1/M9/S38/4	**PRR/1/M9/S38/4**	ZS 38 K4E	3.7	11.69 kW	5.11 kW	7.75	9.1	1 / 630 W
PRB/2/S9/S45/4	**PRR/2/S9/S45/4**	ZS 45 K4E	4.4	14.37 kW	5.62 kW	8.75	10.4	2 / 280 W
PRB/2/S9/S56/4	**PRR/2/S9/S56/4**	ZS 56 K4E	5.5	16.62 kW	7.12 kW	12.54	14.1	2 / 280 W
PRB/2/V6/S75/4	**PRR/2/V6/S75/4**	ZS 75 K4E	7.5	23.05 kW	10.90 kW	17.45	20.2	2 / 630 W
PRB/2/W9/S92/4	**PRR/2/W9/S92/4**	ZS 92 K4E	9.6	29.41 kW	11.90 kW	18.36	21.8	2 / 630 W
PRB/2/W9/S11/4	PRR/2/W9/S11/4	ZS 11 M4E	11.0	32.07 kW	14.96 kW	22.04	27.86	2 / 630 W

Specifications
Copeland 3 x 230 V

This page contains the technical specifications for the DeLaval condensing units (Copeland).

PRR - Execution with receiver and solenoid valve, suitable for pump down systems. Adapted with floor plate condenser with fan(s), ZS Scroll compressor with oil sight-glass (types 2 - 5.5 kW), Rotalock valves and thermistor control unit (type 5.5 kW), crankcase heating, filter drier, low and high pressure pressostats and electrical connection box.

Electrical supply: 3 x 230 V

Table shown below is related to refrigerant R404A (nom. cooling capacity at 0°C ev./ 32 °C ambient temperature).

Condensing unit type	Compressor type	Power kW	Capacity nom.	Input pow. nom.	Current Amps	Max. Amps	Fan (complete)
PRR/1/H8/S14/3	14 K4E	1.5	4.46 kW	1.70 kW	4.52	5.1	1 / 280 W
PRR/1/H8/S19/3	19 K4E	1.7	5.48 kW	2.23 kW	5.92	6.7	1 / 280 W
PRR/1/H8/S21/3	21 K4E	2.0	6.42 kW	2.83 kW	6.69	7.8	1 / 280 W
PRR/1/M8/S26/3	26 K4E	2.6	8.37 kW	3.33 kW	7.95	9.1	1 / 280 W
PRR/1/M8/S30/3	30 K4E	2.9	9.52 kW	3.75 kW	10.61	12.6	1 / 280 W
PRR/1/M9/S38/3	38 K4E	3.7	11.69 kW	5.11 kW	13.33	15.7	1 / 280 W
PRR/1/S9/S45/3	45 K4E	4.4	14.37 kW	5.62 kW	15.05	17.9	1 / 280 W
PRR/1/S9/S56/3	56 K4E	5.5	16.62 kW	7.12 kW	21.57	24.3	1 / 280 W

Specifications
Copeland 1 x 230 V + N

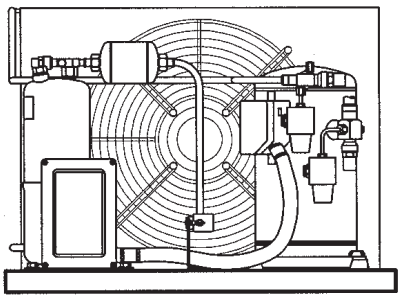
This page contains the technical specifications for the DeLaval condensing units (Copeland).

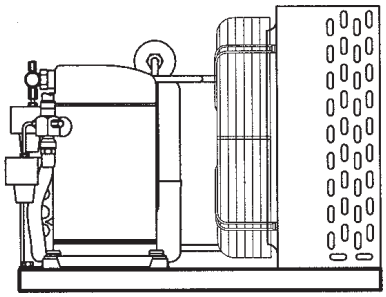
PRR - suitable for pump down systems. Adapted with floor plate, condenser with fan, ZR compressor, Rotalock valves, crankcase heating, filter-drier, low and high pressure pressostats, electrical connection box, receiver (R), and solenoid valve.

Electrical supply: 1 x 230 V + N, 50Hz.

Table shown below is related to refrigerant R404A (nom. cooling capacity at 0°C ev. / 32°C ambient temperature).

The figure shows type PRR/1/H8/R22/5.





Condensing unit type	Compressor type	Power kW	Capacity nom.	Input pow. nom.	Current Amps	Max. Amps	Fan (complete)
PRR/1/H8/R22/5	ZR 22 K3E	1.5	4.46 kW	1.70 kW	8.24	9.00	1/280 W
PRR/1/H8/R28/5	ZR 28 K3E	1.7	5.48 kW	2.23 kW	10.36	11.40	1/280 W
PRR/1/H8/R34/5	ZR 34 K3E	2.0	6.25 kW	2.78 kW	11.41	13.62	1/280 W
PRR/1/M8/R40/5	ZR 40 K3E	2.4	7.82 kW	3.02 kW	12.23	14.66	1/280 W
PRR/1/M8/R47/5	ZR 47 K3E	2.9	9.19 kW	3.54 kW	14.40	17.20	1/280 W
PRR/2/S9/B42/5	ZB 42 PFJ	4.1	13.46 kW	4.92 kW	21.80	29.16	2/280 W

Specifications
L'Unité 1 x 230 V + N

This page contains the technical specifications for the DeLaval condensing units (L'Unité Hermétique).

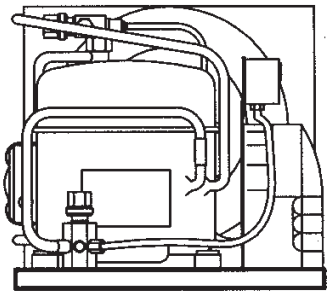
PRB - Basic (B) execution suitable for capillary systems. Adapted with floor plate, condenser with fan, piston compressor and electrical connection box.

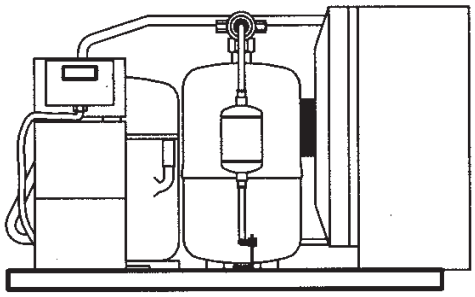
PRR - As basic execution but with receiver (R) and low pressure pressostat, suitable for pump down systems.

Electrical supply: 1 x 230 V + N, 50Hz.

Table shown below is related to refrigerant R404A (nom. cooling capacity at 0°C ev. / 32°C ambient temperature).

The figure shows type PRR/CAE9460/5.





Condensing unit type		Compressor type	Power kW	Capacity nom.	Input pow. nom.	Current Amps	Max. Amps	Fan (complete)
PRB/CAE9460/5	PRR/CAE9460/5	CAE9460/5	0.4 kW	1.36 kW	0.69 kW	3.55 A	4.77 A	1/22 W
PRB/CAJ9480/5	PRR/CAJ9480/5	CAJ9480/5	0.6 kW	1.89 kW	0.88 kW	4.01 A	7.23 A	1/22 W
PRB/CAJ9510/5	PRR/CAJ9510/5	CAJ9510/5	0.7 kW	2.22 kW	1.06 kW	4.87 A	7.72 A	1/25 W
PRB/CAJ4517/5	PRR/CAJ4517/5	CAJ4517/5	0.9 kW	3.53 kW	1.43 kW	6.64 A	8.80 A	1/120 W
PRB/CAJ4519/5	-	CAJ4519/5	1.0 kW	4.45 kW	1.93 kW	8.84 A	12.1 A	1/120 W
PRB/FH4524/5	-	FH4524/5	1.5 kW	4.46 kW	2.30 kW	10.2 A	13.5 A	1/120 W

Specifications
Copeland 3 x 208 V

This page contains the technical specification for the DeLaval condensing units (Copeland).

PRR - suitable for pump down systems. Adapted with floor plate, condenser with fan. ZS compressor, Rotalock valves, crankcase heating, filter-drier, low and high pressure pressostats.electrical connection box, receiver (R), and solenoid valve.

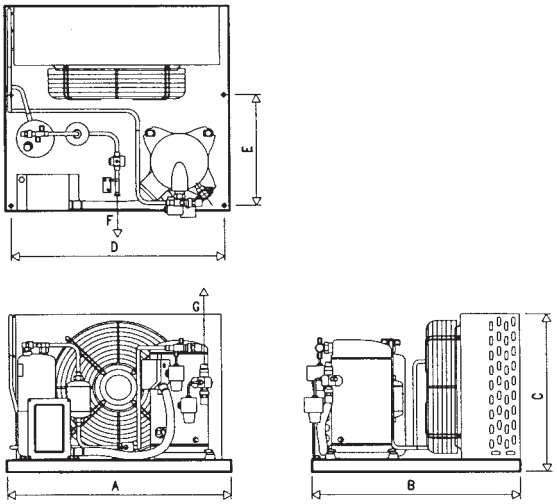
Electrical supply: 3 ~ 208 V, 60 Hz.

Table shown below is related to refrigerant R22 (nom. cooling capacity at 0°C ev. / 32°C ambient temperature).

Condensing unit type	Compressor type	Power kW	Capacity nom.	Input pow. nom.	Current Amps	Max. Amps	Fan (complete)
PRR/2/R7/S30/6	ZS30	2.9	9.75 kW	3.05 kW	12.5	14.1	2 x 270 W
PRR/2/V5/S45/6	ZS45	4.4	14.44 kW	4.60 kW	19.8	20.5	2 x 270 W

Dimensions (PRR Copeland, 3 x 400 V+N)

DeLaval condensing units with receiver

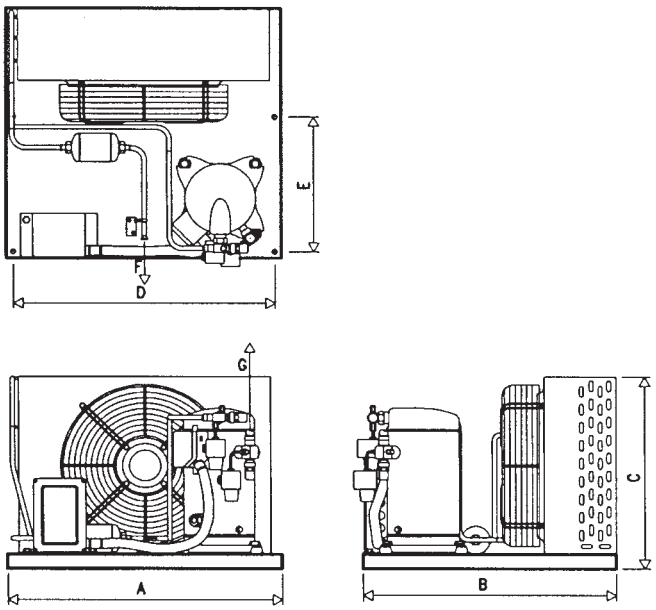


Condensing unit type code	A	B	C	D	E	F	G	R	W
PRR/1/H8/S14/4 *	735	680	533	700	370	∅ 1/2"	∅ 7/8"	3,7	48
PRR/1/H8/S19/4 *	735	680	533	700	370	∅ 1/2"	∅ 7/8"	3,7	49
PRR/1/H8/S21/4 *	735	680	533	700	370	∅ 1/2"	∅ 7/8"	3,7	61
PRR/1/M8/S26/4 *	735	730	708	700	390	∅ 1/2"	∅ 7/8"	3,7	62
PRR/1/M8/S30/4 *	735	730	708	700	390	∅ 1/2"	∅ 7/8"	7,5	74
PRR/1/M9/S38/4	735	730	708	700	390	∅ 1/2"	∅ 7/8"	7,5	77
PRR/2/S9/S45/4	1130	680	708	1095	350	∅ 1/2"	∅ 7/8"	7,5	91
PRR/2/S8/S56/4	1130	820	708	1095	475	∅ 5/8"	∅ 1 1/8"	11,5	158
PRR/2/V6/S75/4	1329	820	835	1294	475	∅ 5/8"	∅ 1 1/8"	14	189
PRR/2/W9/S92/4	1640	820	869	1605	475	∅ 5/8"	∅ 1 1/8"	14	198
PRR/2/W9/S11/4	1640	820	869	1605	475	∅ 5/8"	∅ 1 1/8"	14	205

* also for types with ZR compressor
F liquid line (out)
G suction valve (in)
R receiver capacity (litres)
W condensing unit weight (kg.)

Dimensions (PRB Copeland, 3 x 400 V+N)

DeLaval condensing units basic execution,
(suitable for capillair systems)

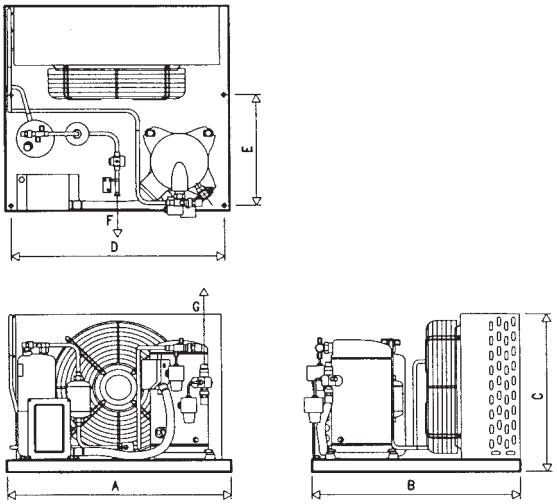


Condensing unit type code								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**W**
PRB/1/H8/S14/4	735	680	53	700	370	∅ 1/2"	∅ 7/8"	
PRB/1/H8/S19/4	735	680	3533	700	370	∅ 1/2"	∅ 7/8"	
PRB/1/H8/S21/4	735	680	533	700	370	∅ 1/2"	∅ 7/8"	
PRB/1/M8/S26/4	735	730	708	700	390	∅ 1/2"	∅ 7/8"	
PRB/1/M8/S30/4	735	730	708	700	390	∅ 1/2"	∅ 7/8"	
PRB/1/M9/S38/4	735	730	708	700	390	∅ 1/2"	∅ 7/8"	
PRB/2/S9/S45/4	1130	680	708	1095	350	∅ 1/2"	∅ 7/8"	
PRB/2/S9/S56/4	1130	820	708	1095	475	∅ 5/8"	∅ 1 1/8"	
PRB/2/V6/S75/4	1329	820	835	1294	475	∅ 5/8"	∅ 1 1/8"	
PRB/2/W9/S92/4	1640	820	869	1605	475	∅ 5/8"	∅ 1 1/8"	
PRB/2/W9/S11/4	1640	820	869	1605	475	∅ 5/8"	∅ 1 1/8"	

F liquid line (out)
G suction valve (in)
W condensing unit weight (kg.)

Dimensions (PRR Copeland, 1 x 230 V + N)

DeLaval condensing units with receiver

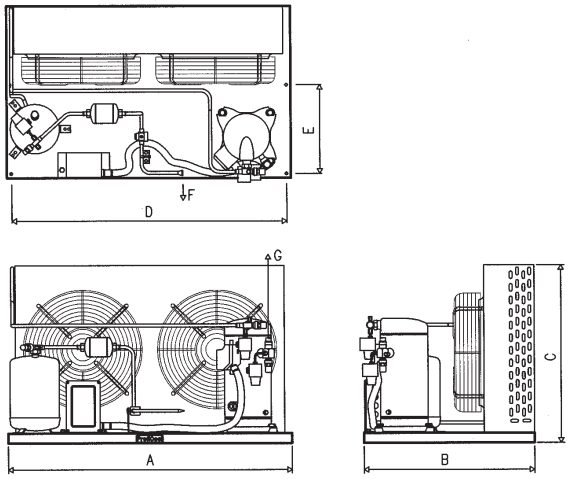


Condensing unit type code	A	B	C	D	E	F	G	R	W
PRR/1/H8/R22/5	735	680	533	700	370	∅ 1/2"	∅ 7/8"	3,7	48
PRR/1/H8/R28/5	735	680	533	700	370	∅ 1/2"	∅ 7/8"	3,7	49
PRR/1/H8/R34/5	735	680	533	700	370	∅ 1/2"	∅ 7/8"	3,7	61
PRR/1/M8/R40/5	735	730	708	700	390	∅ 1/2"	∅ 7/8"	3,7	62
PRR/1/M8/R47/5	735	730	708	700	390	∅ 1/2"	∅ 7/8"	3,7	74
PRR/2/S9/B42/5	1130	680	708	1095	350	∅ 1/2"	∅ 7/8"	7,5	91

F liquid line (out)
G suction valve (in)
R receiver capacity (litres)
W condensing unit weight (kg.)

Dimensions (PRR Copeland, 3 x 208 V, 60 Hz)

DeLaval condensing units with receiver



Condensing unit type code									
	A	**B**	**C**	**D**	**E**	**F**	**G**	**R**	**W**
PRR/2/R7/S30/6	1130	680	633	1095	350	∅ 1/2"	∅ 7/8"	7.5	96.5
PRR/2/V5/S45/6	1329	820	835	1294	475	∅ 1/2"	∅ 7/8"	11.5	137

F liquid line (out)
G suction valve (in)
R receiver capacity (litres)
W condensing unit net weight (kg.)

Dimensions L'Unité Hermétique

DeLaval condensing units with receiver (PRR L'Unité Hermétique, 1 x 230 V + N)

Condensing unit type code									
	A	**B**	**C**	**D**	**E**	**F**	**G**	**R**	W
PRR/CAE9460/5	350	495	300	280	345	∅ 1/4"	∅ 3/8"	2,35	29
PRR/CAJ9480/5	430	485	340	385	310	∅ 3/8"	∅ 1/2"	2,35	41
PRR/CAJ9510/5	510	615	400	190	326	∅ 3/8"	∅ 5/8"	2,35	43
PRR/CAJ4517/5	510	615	435	190	326	∅ 3/8"	∅ 5/8"	2,35	50

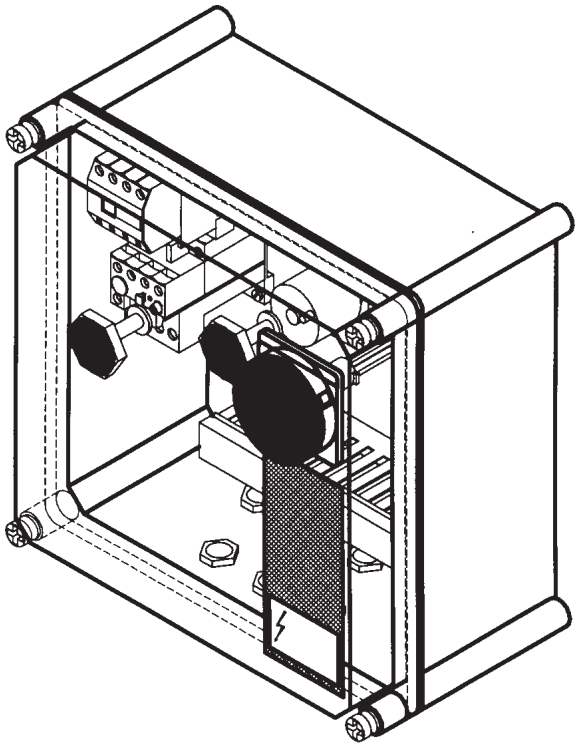
DeLaval condensing units basic execution (PRB L'Unité Hermétique, 1 x 230 V + N)

Condensing unit type code								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**W**
PRB/CAE9460/5	350	495	300	280	345	∅ 1/4"	∅ 3/8"	
PRB/CAJ9480/5	430	485	340	385	310	∅ 3/8"	∅ 1/2"	
PRB/CAJ9510/5	510	615	400	190	326	∅ 3/8"	∅ 5/8"	
PRB/CAJ4517/5	510	615	435	190	326	∅ 3/8"	∅ 5/8"	
PRB/CAJ4519/5	510	615	435	190	326	∅ 3/8"	∅ 5/8"	
PRB/FH4524/5	510	630	450	190	430	∅ 3/8"	∅ 5/8"	

DeLaval

H-Box

Product data



Article numbers

Product range for supply 3 x 400 V + N:

98053772-80	H-BOX without thermal control
98053769-97	H-BOX with thermal control ZOO-6 (4-6 A)
98053769-98	H-BOX with thermal control ZOO-10 (6-10 A)
98053769-99	H-BOX with thermal control ZOO-16 (10-16 A)
98053769-85	H-BOX with thermal control ZOO-24 (16-24 A)

Product range for supply 230 V single phase:

98055083-93	H-BOX without thermal control
98055083-90	H-BOX with thermal control ZOO (10A)
98055083-91	H-BOX with thermal control ZOO (16A)
98055083-92	H-BOX with thermal control ZOO-24 (16-24 A)

Product range for supply 3 x 230 V:

98053772-95	H-BOX with thermal control (6A)
98053772-96	H-BOX with thermal control (10A)
98053772-97	H-BOX with thermal control (16A)
98053772-98	H-BOX with thermal control (24A)

Description

This switch box, called H-Box, is meant for controlling and operating of the electrical components of the condensing unit and is equipped with a main switch.

The H-Box should be placed at or near the condensing unit. This box or another type (AH- or DH-Box) is an option for condensing units ordered from DeLaval (see Product Data RCO).

The electrical supply for the whole installation, milk cooling tank with cleaning device and condensing unit, can be controlled by this switch box. The main switch can be locked during service.
At the front, next to the main switch there are two reset buttons. One to switch on again after a failure of the fuse of the control current and one for the thermal control of the compressor.

Technical data

Type:
H-BOX
Range 4 to 24A for 3 x 400 V+N or 3 x 230 V.
Range 6 to 24A for 230 V single phase.

Housing:
A grey polyester housing with a transparent polycarbonate cover.

Dimensions:
300 x 175 x 300 mm (W x D x H).

Fixation:
Four small brackets can be put at the back of the grey housing in order to bring the fixation outside the box.

Equipped with:

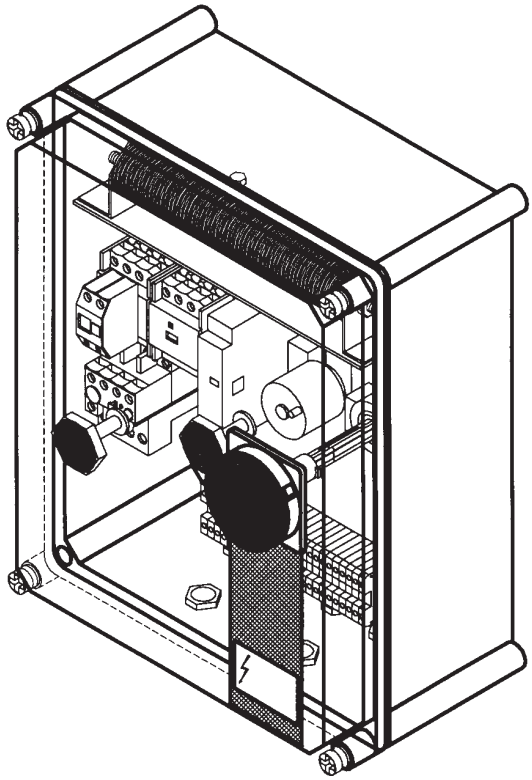
- Contactor with thermal control for compressor and fan(s).
- The thermal control is set on H (manual).
- Relay for pump-down system, 230 V.
- Resettable fuse 6 A for control current.
- Lockable main switch L1, L2, L3 and N, 25/32 A.
- Cable terminals with numbers on the mounting plate + PE.
- Cable nuts on the bottom side.
- Warning label on cover.

Enclosure class:
IP 54.



AH-Box

Product data



Article numbers

Product range for supply 3 x 400 V + N or 3 x 230 V:

98053769-87	AH-Box with thermal control ZOO (6-10 A)
98053769-88	**AH-Box with thermal control ZOO (10-16 A)**
98053769-89	AH-Box with thermal control ZOO-24 (16-24 A)

Description

This switch box, called AH-Box, is meant for controlling and operating of the electrical components of the condensing unit and is equipped with a main switch.

The AH-Box should be placed at or near the condensing unit. This box or another type (H- or DH-Box) is an option for the from DeLaval ordered condensing units (see Product Data RCO).

The electrical supply for the whole installation, milk cooling tank with cleaning device and condensing unit, can be controlled by this switch box. The main switch can be locked during service of the installation.

At the front, next to the main switch, are two reset buttons. One to switch on again after a failure of the fuse of the control current and one for the thermal control of the compressor.

Technical data

Type:
AH-BOX with starting resistances
Range 6 to 24 A for 3 x 400 V+N or 3 x 230 V

Housing:
A grey polyester housing with a transparent polycarbonate cover.

Dimensions:
300 x 175 x 375 mm (W x D x H)

Fixation:
Four small brackets can be put at the back of the grey housing in order to bring the fixation outside the box.

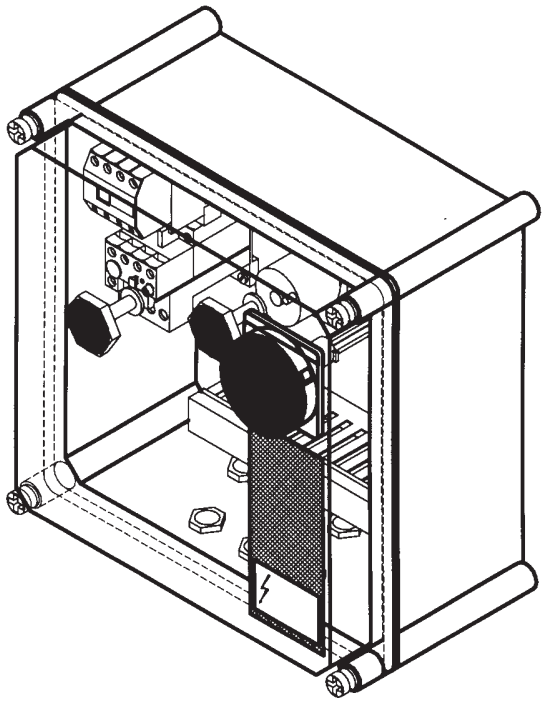
Equipped with:

- Contactor with thermal control for compressor and fan(s).
  The thermal control is set on H (manual).
- Contactor for compressor during starting.
- Three starting resistances of max. 9 kW, controlled by klixon (thermal).
- Time delay relay for starting procedure.
  Set to 0,3 seconds.
- Relay for pump-down system, 230 V.
- Resettable fuse 6 A for control current.
- Lockable main switch L1, L2, L3 and N, 25/32 A.
- Cable terminals with numbers on the mounting plate + PE.
- Cable nuts on the bottom side.
- Warning label on cover.

Enclosure class:
IP 54.

DH-Box

Product data



Article numbers

Product range for supply 3 x 400 V + N or 3 x 230 V:

98053772-90	DH-Box 4A
98053772-91	DH-Box 6A
98053772-92	DH-Box 10A
98053772-93	DH-Box 16A
98053772-94	DH-Box 24A

Product range for supply 230 V single phase:

98055083-96	DH-Box 16A
98055083-97	DH-Box 24A

Description

This switch box, called DH-Box, is meant for controlling and operating of the electrical components of the condensing unit and is equipped with a main switch.

The DH-Box should be placed at or near the condensing unit. This box or another type (AH- or H-Box) is an option for the from DeLaval ordered condensing units (see Product Data RCO).

The electrical supply for the whole installation, milk cooling tank with cleaning device and two condensing units, can be controlled by this switch box. The main switch can be locked during service of the installation.

At the front, next to the main switch, are three reset buttons. One to switch on again after a failure of the fuse of the control current and two for the thermal control of the compressor.

Technical data

Type:
DH-BOX
Range 4 to 24 A for 3 x 400 V+N or 3 x 230 V
Range 16 to 24 A for 230 V single phase.

Housing:
A grey polyester housing with a transparent polycarbonate cover.

Dimensions:
300 x 175 x 300 mm (W x D x H).

Fixation:
Four small brackets can be put at the back of the grey housing in order to bring the fixation outside the box.

Equipped with:

- Contactor with thermal control for compressor and fan(s).
- The thermal control is set on H (manual).
- Relay for pump-down system, 230V.
- Resettable fuse 6 A for control current.
- Lockable main switch L1, L2, L3 and N, 25/32 A.
- Cable terminals with numbers on the mounting plate + PE.
- Cable nuts on the bottom side.
- Warning label on cover.

Enclosure class:
IP 54.

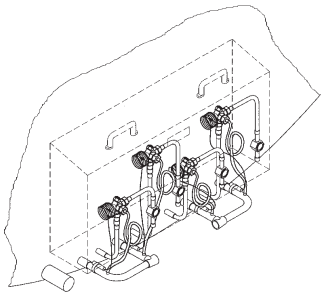
Refrigeration copper kits (R22)

Product data

Copperkit mounted	Copperkit set in box	Number and type of valves
98034001-01	98034001-41	1 x TEX 2-4.5
98034001-02	98034001-42	1 x TEX 2-3
98034001-03	98034001-43	1 x TCLE 500 HW
98034001-04	98034001-44	1 x TCLE 500 HW
98034001-05	98034001-45	2 x TEX 2-4.5
98034001-06	98034001-46	2 x TEX 2-3
98034001-07	98034001-47	2 x TCLE 500 HW
98034001-09	98034001-49	2 x TCLE 500 HW
98034001-10	98034001-50	2 x TCLE 750 HW
98034001-12	98034001-52	2 x TEX 2-4.5
98034001-13	98034001-53	4 x TEX 2-4.5
98034001-14	98034001-54	4 x TEX 2-4.5
98034001-15	98034001-55	4 x TCLE 750 HW
98034001-16	98034001-71	4 x TCLE 500 HW
98034001-17	98034001-72	4 x TCLE 1000 HW
98034001-18	98034001-73	4 x TEX 2-3

Copper kits for maintenance cooling or interval cooling

Copper kit mounted	Copper kit set in box	Number and type of valves
98034001-76	98034001-78	1 x TCLE 750 HW
98034001-77	98034001-79	2 x TEX 2 - 4.5



As an option the expansion valves can be delivered pre-mounted on the tank together with the sight glasses. This is an advantage, because it creates a minimum of soldering on the farm.

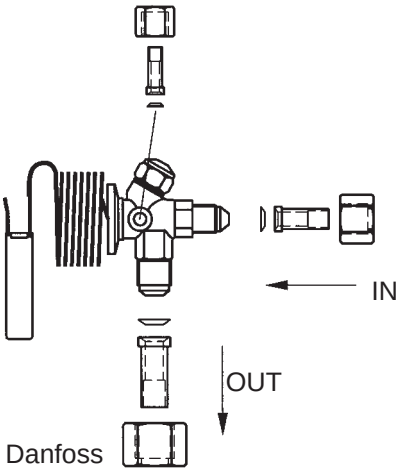
Article numbers expansion valves

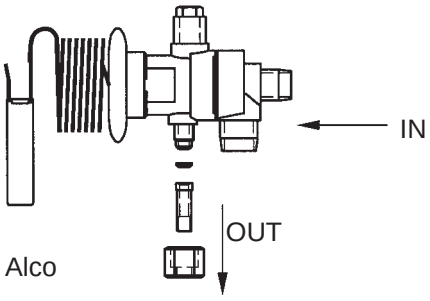
98045042-57	TEX 2-3 , R22, flare, Orifice no.5
98045042-50	TEX 2-4,5 , R22, flare, Orifice no.6
98045044-73	TCLE 500 HW, R22, flare + soldering
98045042-76	TCLE 750 HW, R22, flare + soldering
98045044-75	TCLE 1000 HW, R22, flare + soldering

TEX = Danfoss; TCLE = Alco

TEX: IN = 3/8", OUT = 1/2", External equalizer = 1/4"

TCLE:IN = 1/2", OUT = 5/8", External equalizer = 1/4"

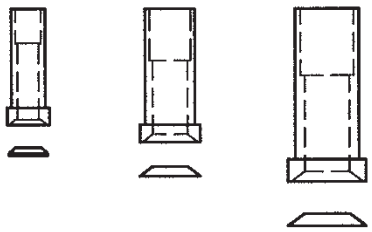




Description

This thermostatic expansion valve is a control valve and is placed directly at the inlet of the evaporator. It operates at temperature and pressure and will inject a regulated amount of refrigerant in the evaporator. The control bulb is attached to the outlet of the evaporator.

This threaded (flare) valve has to be installed with the required soldering adaptors (art.nrs. are without the shown soldering adaptors)



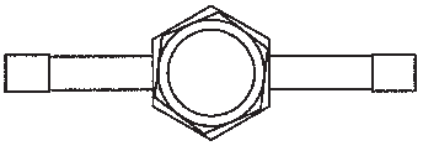
Soldering adaptors for flare equipment

Article numbers

98045044-37	Soldering piece 1/4" ODF for flare SAE 1/4"
98045044-38	Soldering piece 3/8" ODF for flare SAE 3/8"
98045044-39	Soldering piece 1/2" ODF for flare SAE 1/2"

Description

These soldering adaptors replace the traditional flare connections in new installations and can be used for flare equipment like the thermostatic expansion valve and the filter/drier.



Sight glass

Article numbers

98045042-64	3/8" soldering spy glass
98045042-65	1/2" soldering spy glass



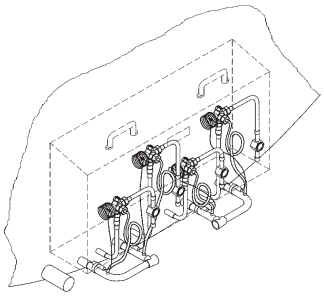
Refrigeration copper kits (R404A)

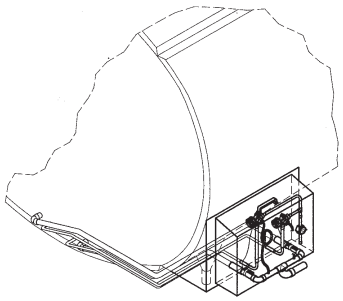
Product data

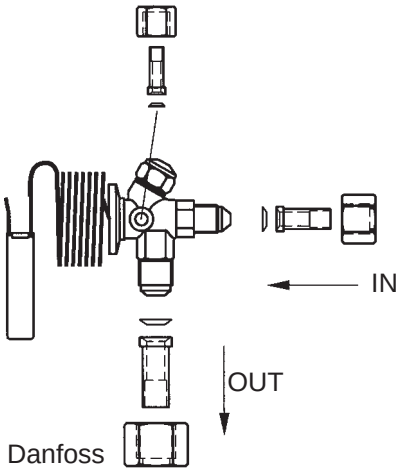
Copperkit mounted	Copperkit set in box	Number and type of valves
98034003-01	98034003-41	1 x TCLE 400 SW
98034003-02	98034003-42	1 x TES 2-2.6
98034003-03	98034003-43	1 x TCLE 600 SW
98034003-04	98034003-44	1 x TCLE 600 SW
98034003-05	98034003-45	2 x TCLE 400 SW
98034003-06	98034003-46	2 x TES 2-2.6
98034003-07	98034003-47	2 x TCLE 600 SW
98034003-09	98034003-49	2 x TCLE 600 SW
98034003-10	98034003-50	2 x TCLE 850 SW
98034003-12	98034003-52	2 x TCLE 400 SW
98034003-13	98034003-53	4 x TCLE 400 SW
98034003-14	98034003-54	4 x TCLE 400 SW
98034003-15	98034003-55	4 x TCLE 850 SW
98034003-16	98034003-71	4 x TCLE 600 SW
98034003-17	98034003-72	4 x TCLE 1000 SW
98034003-18	98034003-73	4 x TES 2-2.6

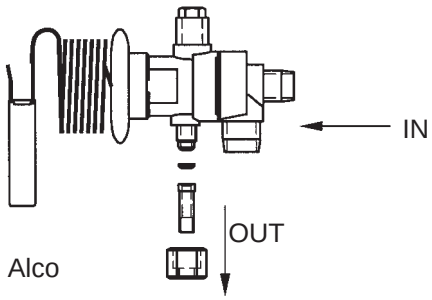
Copper kits for maintenance cooling or interval cooling

Copper kit mounted	Copper kit set in box	Number and type of valves
98034003-76	98034003-78	1 x TCLE 850 SW
98034003-77	98034003-79	2 x TCLE 400 SW









As an option the expansion valves can be delivered pre-mounted on the tank together with the sight glasses. This is an advantage, because it creates a minimum of soldering on the farm.

Side connection

When a lack of space in the tank room calls for space saving solutions, the refrigeration kits can also be mounted on the side of the cooling tank (see Product Data Closed tanks).

Article numbers expansion valves

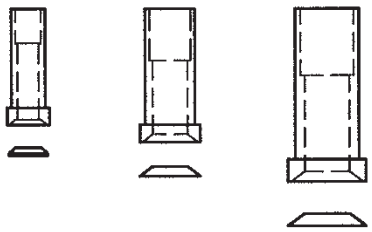
98045044-80	TES 2-2.6 , R404A, IN: = 3/8", flare OUT: = 1/2", flare Orifice no. 6
98045044-76	TCLE 400 SW , R404A, IN: = 1/2", soldering OUT: = 5/8", soldering
98045044-77	TCLE 600 SW , R404A, IN: = 1/2", soldering OUT: = 5/8", soldering
98045044-78	TCLE 850 SW , R404A, IN: = 1/2", soldering OUT: = 5/8", soldering
98045044-79	TCLE 1000 SW , R404A, IN: = 5/8", soldering OUT: = 7/8", soldering

TES = Danfoss; TCLE = Alco

External equalizers = 1/4" flare

Description

This thermostatic expansion valve is a control valve and is placed directly at the inlet of the evaporator. It operates at temperature and pressure and will inject a regulated amount of refrigerant in the evaporator. The control bulb is attached to the outlet of the evaporator.



This threaded (flare) valve has to be installed with the required soldering adaptors (art.nrs. are without the shown soldering adaptors)

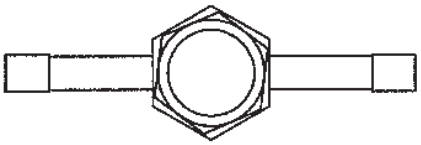
Soldering adaptors for flare equipment

Article numbers

98045044-37	Soldering piece 1/4" ODF for flare SAE 1/4"
98045044-38	Soldering piece 3/8" ODF for flare SAE 3/8"
98045044-39	Soldering piece 1/2" ODF for flare SAE 1/2"

Description

These soldering adaptors replace the traditional flare connections in new installations and can be used for flare equipment like the thermostatic expansion valve and the filter/drier.



Sight glass

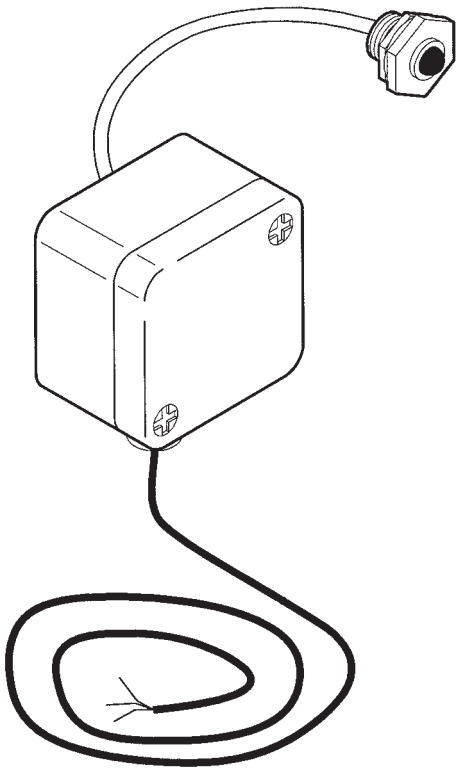
Article numbers

98045042-64	3/8" soldering spy glass
98045042-65	1/2" soldering spy glass



Level start for Hygenius

Product data



Article number

98059150-91 Level start for Hygenius

Description

The level start set is available as an additional feature for the Hygenius cleaning/controlling devices.
Application of this set enables the possibility to automatically start the cooling when there is sufficient milk in the main storage tank.

The sensor has a two-piece housing that allows for testing or servicing of its electronics without the possibility of the milk leaking from the tank. Its simple design and absence of moving parts result in high reliability.

Light generated by an internal LED and impinging on a glass prism is “read” by the sensor at a single point. In the absence of milk, the light is internally reflected by the prism and detected by the sensor. If the prism is submerged, the light passes through the prism into the liquid, and the lack of reflection causes the sensor to “switch.”

When the cleaning programme has finished, the cooling will start automatically when the sensor is reached by the milk.

Technical data

Dimensions:
50 x 52 x 35 (H x W x D)

Fixation:
Sensor: through the front inner bottom of the tank.
Box: 2 holes of 5 mm are provided to fixate the box.

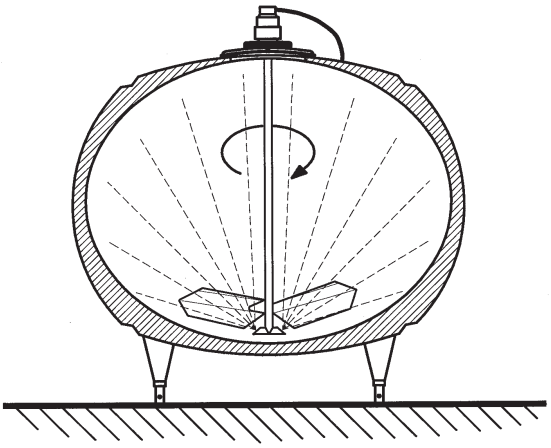
Supply voltage:
Maximum 17 VDC

Wiring:
3 x 0,5 mm; L=1800 mm



Hygenius T100 cleaning/controlling unit

Function



Cleaning

It is recommendable to clean the tank directly after it has been emptied. By doing this milk residues do not have time to stick to the tank wall and can be removed easily.

Hygenius cleaning and controlling device.

All closed tanks can be equipped with automatic cleaning. For this, these tanks are built up with a spraying component. DeLaval's range of closed milk cooling tanks are all fitted with a patented spraying system, which has proven to be the most effective of all. In this system the agitator is constructed with a hollow shaft that has double spray-nozzles at the end.

During the circulation of (cleaning)water by the powerful cleaning pump, the agitator motor is running, thus creating a rotating jet of cleaning water. Through the centralised position of the agitator (see figure) the whole inner tank wall can easily be covered.

The Hygenius T100 has three main components that take part in the effective cleaning process:

- The main housing containing: the operating panel, electrical components and the cleaning pump,
- The double outlet,
- The box for external connections, called PRE-BOX.

These components make it possible to fill the tank with water, let it circulate and drain it at the end.

For every tank capacity, DeLaval has prepared a specific cleaning program. The Hygenius T100 cleaning program functions according the circulation cleaning principle. This program can consist of the following steps: Pre-rinse, Cleaning, First after-rinse, Disinfection and Second after-rinse.

Within each of these program-steps several parameters can be altered according to the specific ambient circumstances and requirements.

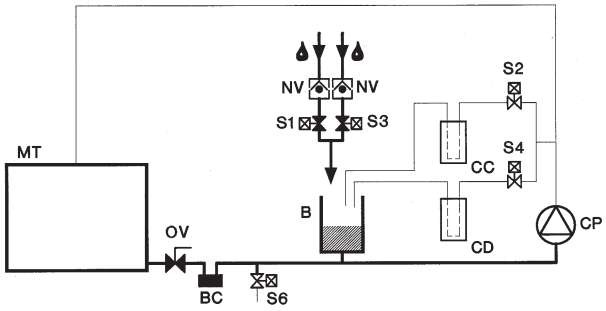
After preparing the tank and switching cleaning “ON” (see chapter “ROUTINES”) the program will independently finish the whole cleaning cycle.

Hygenius Cleaning program

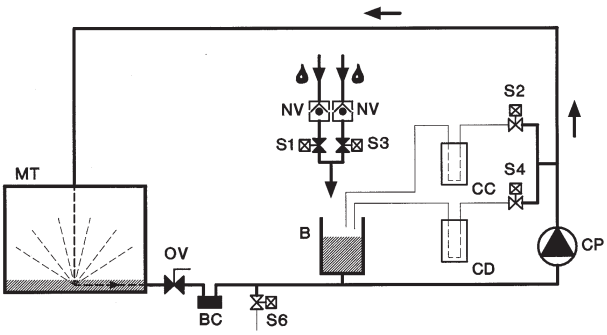
Symbols in flowcharts:

MT	Milk cooling tank
OV	Outlet valve
BC	3" Blind cap for cleaning
S1	Hot water valve
S2	Valve for cleaning agent
S3	Cold water valve
S4	Valve for disinfectant
S6	Drain valve
NV	Non return valve
B	Water buffer
CC	Container for cleaning agent
CD	Container for disinfectant
CP	Cleaning pump

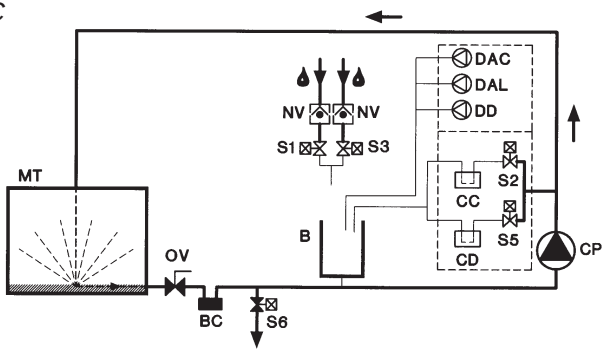
A



B



C



Thin line	*pipe without any flow*
Thick line	*pipe with flow*
Lined arrow	*no flow*
Solid arrow	*flow*
Lined valve	*valve closed*
Solid valve	*valve open*

Pre-rinse (see figure A, B, C)

Before the cleaning is started, the 3" blind cap BC has to be screwed on and the outlet valve has to be opened.

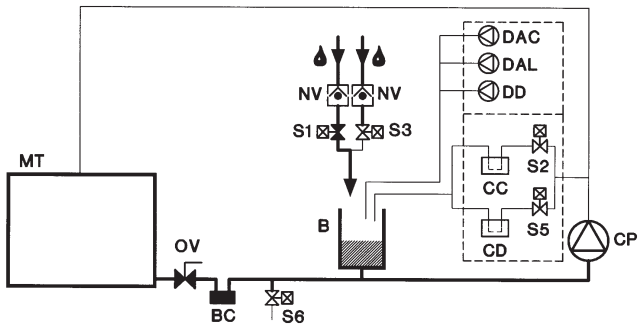
The cleaning program starts with the pre-rinse-step. This step is meant to remove the milk residues from the tank wall. This is done with lukewarm water, so that the tank wall is already warmed up for the next step.

A
The hot- (S1) and cold water valve (S3) are opened alternately to let lukewarm water flow into the tank via the buffer (B). The drain valve (S6) is closed.

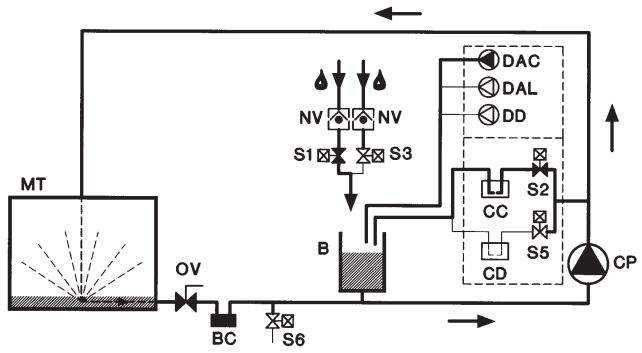
B
After a certain time, when there is sufficient water in the tank to circulate, the cleaning pump starts running. Simultaneous with the pump, the agitator motor will be running. Both water valves (S1 and S3) will keep opening/closing alternately for a (pre-adjusted) time until the required amount of pre-rinse water has been let into the tank.

C
The water will circulated through the tank as long as is necessary to rinse most of the milk residues off the tank wall. After this the pump will stop and the drain valve (S6) will open. When all of the polluted water has been drained from the tank, the drain valve will close again.

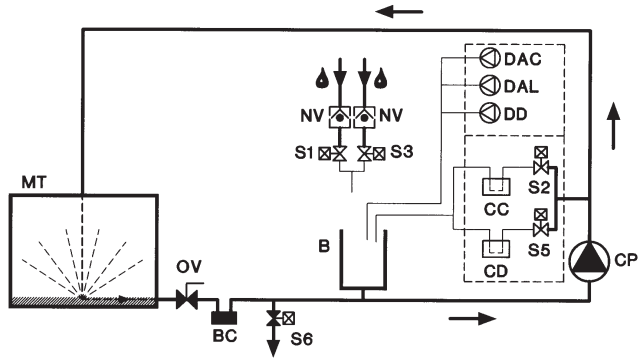
D



E



F



Washing (see figure D, E, F)

The second step of the program is the “main cleaning” or “washing” step. With hot water and cleaning agent the milk-fat residues are dissolved from the tank wall.

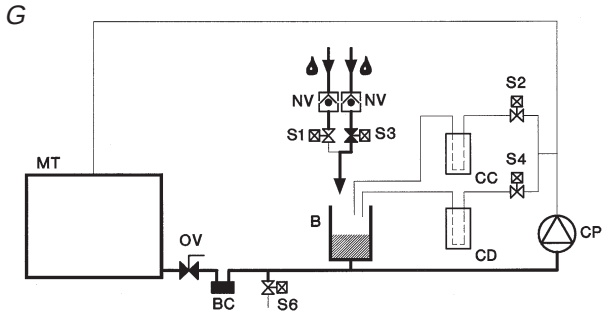
D
The hot water valve (S1) is opened to let hot water flow into the tank via the buffer. The drain valve (S6) is closed.

E
After a certain time, when there is sufficient water in the tank to circulate, the cleaning pump starts running. Simultaneous with the pump the agitator will be running. Valve S1 will remain opened for a (pre-adjusted) time until the required amount of hot water has been let into the tank. While the hot water circulates through the system the valve for the cleaning agent (S2) is opened. In this way a part of the hot water, coming from the pump, washes through the container for cleaning agent (CC) taking the cleaning agent into the system.

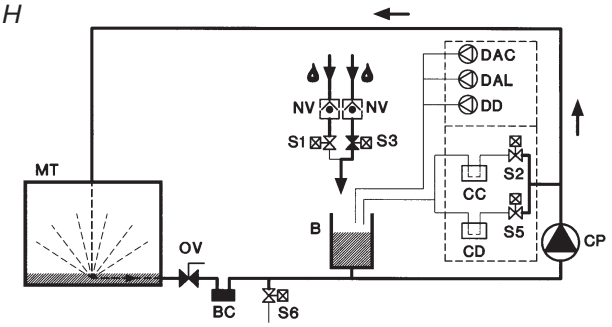
F
Through the contact with the inner tank wall the solvent will cool down. To be ensured of an optimum cleaning result the temperature of the solvent, at the end of the washing step, must be at least 40 °C.
The Hygenius will check the end temperature and automatically give an alarm signal when the temperature has dropped below 40 °C.

When the milk-fat residues have been dissolved from the inner tank wall and taken up by the cleaning water, the drain valve (S6) will open. When all the water has been drained from the tank, the drain valve will close again.

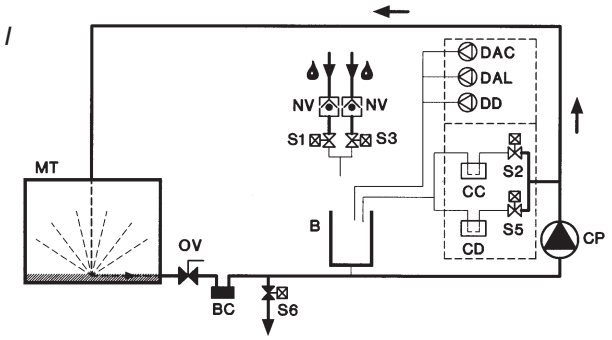
G



H



I



After-rinse (see figure G, H, I)

The third step of the program is the “(first) after-rinse”. During this step the last residues of milk and/or solvent are washed from the inner tank wall.

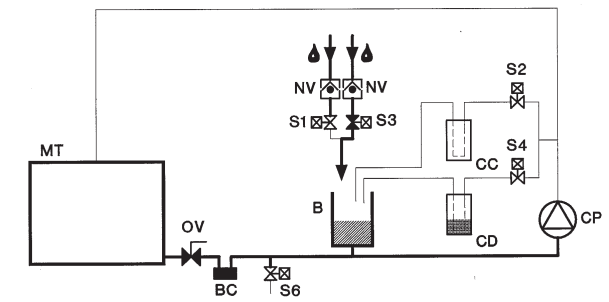
G
The cold water valve (S3) is opened to let cold water flow into the tank via the buffer. The drain valve (S6) is closed.

H
After a certain time, when there is sufficient water in the tank to circulate, the cleaning pump starts running. Simultaneous with the pump the agitator will be running. Valve S3 will remain opened for a (pre-adjusted) time until the required amount of cold water has been let into the tank.

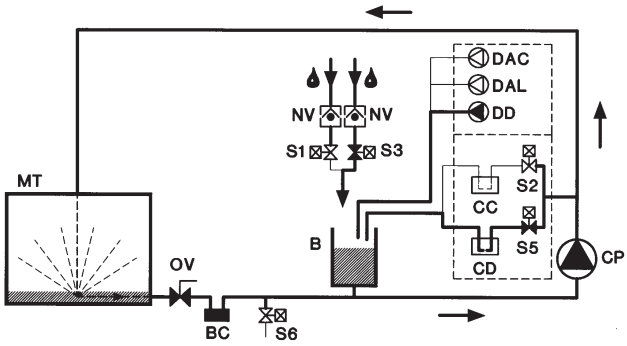
I
After some time, during which the circulating water absorbs all remaining cleaning solvent, the drain valve (S6) opens. When all cleaning water is drained from the tank the drain valve closes again.

If required a second after-rinse can be carried out. This step will follow the same order as the after-rinse mentioned above.

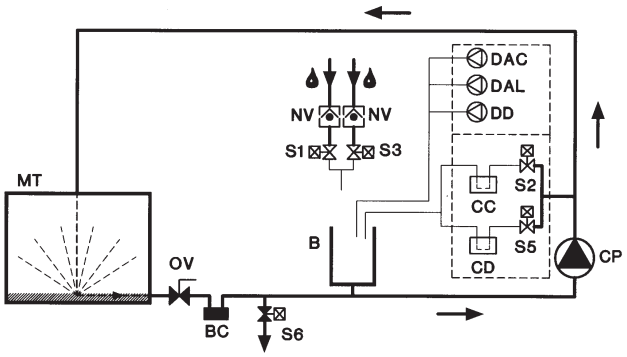
J



K



L



Disinfection (see figure J, K, L)

In some cases a disinfection step is added after the first after-rinse as extra assurance for a hygienic inner tank.

J
The cold water valve (S3) is opened to let cold water flow into the tank via the buffer. The drain valve (S6) is closed.

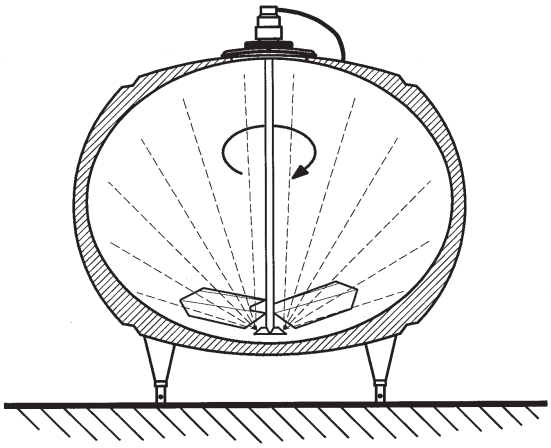
K
After a certain time, when there is a sufficient amount of water in the tank, the cleaning pump starts running. Simultaneous with the pump the agitator will be running. Valve S3 will remain opened for a (pre-adjusted) time until the required amount of cold water has been let into the tank. While the cold water circulates through the system the valve for the disinfectant (S4) is opened. In this way a part of the cold water, coming from the pump, washes through the container for the disinfectant (CD) taking the disinfectant into the system.

L
After some time, when the whole surface of the inner-tank wall has been covered with disinfectant, the drain valve (S6) opens. When all water is drained from the tank the drain valve closes again.

After the disinfection step another after-rinse is executed. This step will follow the same order as the after-rinse mentioned above.

Hygenius T200 cleaning/controlling unit

Function



Cleaning

It is recommendable to clean the tank directly after it has been emptied. By doing this, milk residues do not have time to stick to the tank wall and can be rinsed off easily.

Hygenius Cleaning and controlling device.

All closed tanks can be equipped with automatic cleaning. For this, these tanks are built up with a spraying component.
DeLaval's range of closed milk cooling tanks are all fitted with a patented spraying system, which has proven to be the most effective of all. In this system the agitator is constructed with a hollow shaft that has double spray-nozzles at the end.

During the circulation of (cleaning)water by the powerful cleaning pump, the agitator motor is running, thus creating a rotating jet of cleaning water. Through the centralised position of the agitator (see figure) the whole inner tank wall can easily be covered.

The Hygenius T200 has three main components that take part in the effective cleaning process:

- The main housing containing: the operating panel, electrical components and the cleaning pump.
- The double outlet.
- The box for external connections, called PRE-BOX.

These components make it possible to fill the tank with (cleaning)water, let it circulate and drain it at the end.

For every tank capacity, DeLaval has prepared a specific cleaning program setting. The Hygenius T200 cleaning program functions with “direct to drain” rinses and a “circulation-cleaning” step. Four standard programs are available for the Hygenius T200. In these programs a selection was made between the following steps: Pre-rinse, Cleaning, First after-rinse, Disinfection and Second after-rinse (see chapter “Product Data”).

Within each of these program-steps several parameters can be altered to the specific ambient circumstances and requirements.

After preparing the tank and switching cleaning “ON” (see chapter “ROUTINES”) the program will independently finish the whole cleaning cycle.

Hygenius cleaning program

Symbols in flowcharts:

MT	Milk cooling tank
OV	Outlet valve
BC	3" Blind cap for cleaning
S1	Hot water valve
S2	Valve for cleaning agent
S3	Cold water valve
S5	Valve for disinfectant
S6	Drain valve
HL	High level sensor
LL	Low level sensor
NV	Non return valve
B	Water buffer
CC	Container for cleaning agent
CD	Container for disinfectant
CP	Cleaning pump
DAC	Dosing pump acid
DAL	Dosing pump liquid
DD	Dosing pump disinfection

Pre-rinse (see figure A, B)

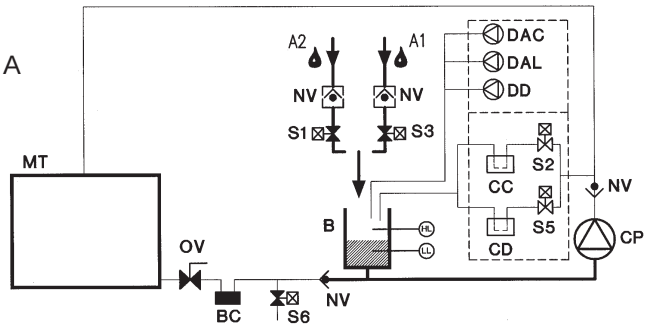
Before the cleaning is started, the 3" blind cap BC has to be screwed on and the outlet valve has to be opened.

The cleaning program starts with the pre-rinse-step. This step is meant to remove the milk residues from the tank wall. This is done firstly with an amount of cold water (A1) and secondly with an amount of hot water (A2), so that the tank wall is already warmed up for the next step.

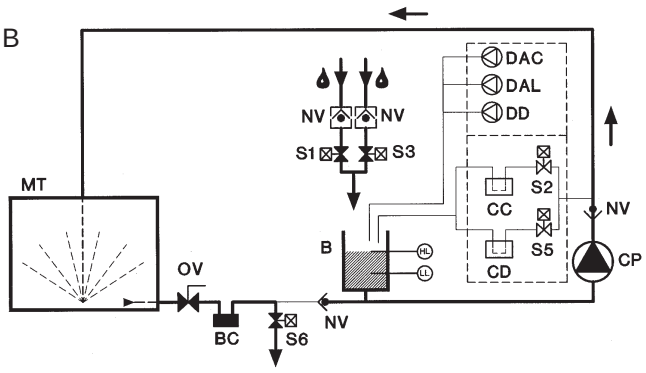
A
Firstly the cold water valve (S3) is opened to fill the buffer (B) with batches of cold water for a number of times (A1). After that this procedure will be repeated with hot water that will enter the buffer through the hot water valve (S1) (A2). Since the drain valve (S6) is opened, a non-return valve (NV) is applied to prevent that the water can flow away the wrong way immediately.

B
When the water level reaches the high level sensor (HL) the cleaning pump (CP) starts running. When the water level drops below the low level sensor (LL) the pump stops. After each batch of water has rinsed the inner-tank with a powerful jet, it is drained away immediately without circulating through the system. In this way, several batches of (firstly cold and then hot) water are used. The amount of water in each batch is fixed but the number of batches is programmable and depends on the tank size and the farm requirements.

A



B

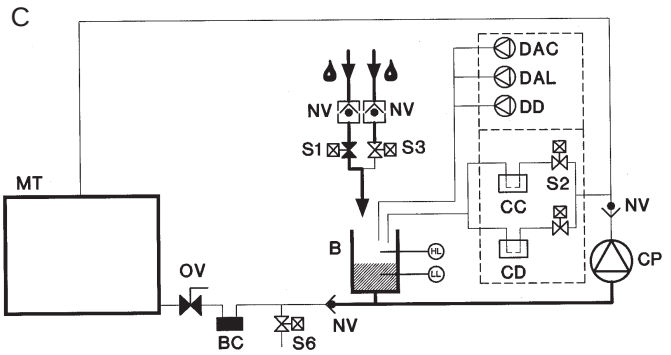


Thin line *pipe without any flow*
Thick line *pipe with flow*
Lined arrow *no flow*
Solid arrow *flow*
Lined valve *valve closed*
Solid valve *valve open*

Washing (see figure C,D,E)

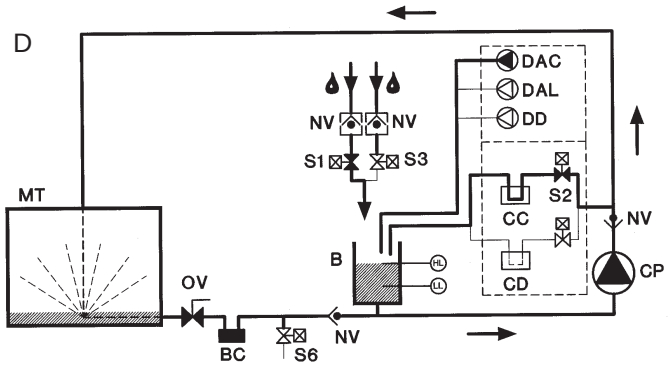
The second step of the program is the “main cleaning” or “washing” step. With hot water and cleaning agent the milk-fat residues are dissolved from the tank wall.

C



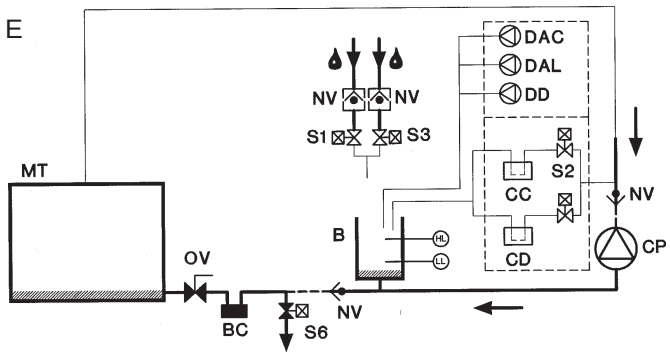
The hot water valve (S1) is opened to let hot water flow into the buffer. The drain valve (S6) is closed. The non-return valve (NV) prevents that the water flows into the tank immediately.

D



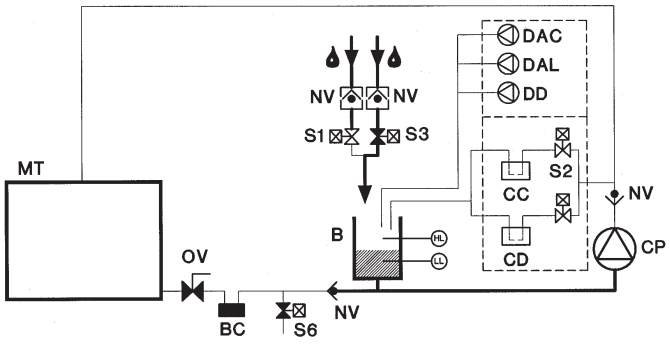
When the water reaches the high level sensor (HL) the cleaning pump (CP) starts running. The pump will run until the water level drops below the low level sensor (LL). In this way several batches of hot water are pumped into the tank. When the amount of water in the system is sufficient to circulate, the pump will start running continuously. The hot water valve (S1) stays open until the total required amount of water, needed in this step, is in the system. Simultaneous with the start of the circulation the valve for the cleaning agent (S2) is opened. Because of this a part of the hot water can wash through the container for cleaning agent (CC), taking the cleaning agent into the system. In cases where automatic dosing is applied the liquid cleaning agent will be brought into the system by the alkaline dosing pump (DAL).

E

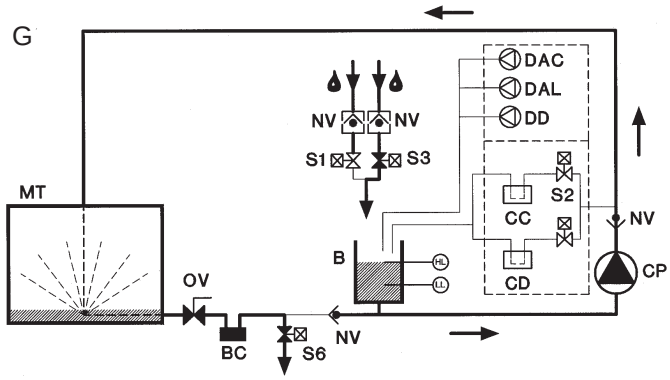


Through the contact with the inner tank wall the solvent will cool down. To be ensured of an optimum cleaning result the temperature of the solvent, at the end of the washing step, must be at least 45 °C.
The Hygenius will check the end temperature and automatically give an alarm signal when the temperature has dropped below 45 °C. For situations where the temperature of the supplied hot water is too low an (optional) booster heater is available.The cleaning water will circulate for some time to let the milk-fat residues dissolve from the inner tank wall. After this the drain valve (S6) will open. When all the water has been drained from the tank, the drain valve will close again.

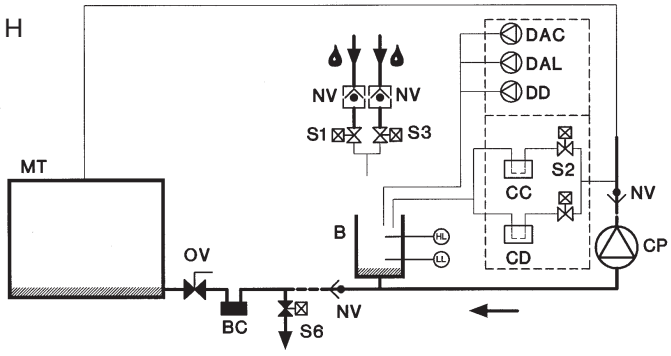
F



G



H



After-rinse (see figure F, G, H)

The third step of the program is the “(first) after-rinse”. During this step the last residues of milk and/or solvent are rinsed off the inner tank wall.

F
The cold water valve (S3) is opened to let cold water flow into the buffer (B). Since the drain valve (S6) is opened, a non-return valve (NV) is applied to prevent that the water can flow away the wrong way immediately.

G
When the water level reaches the high level sensor (HL) the cleaning pump (CP) starts running. When the water level drops below the low level sensor (LL) the pump stops. After this batch of water has rinsed the inner-tank with a powerful jet, it is drained away immediately without circulating through the system. In this way, several batches of water are used. The amount of water in each batch is fixed, but the number of batches is programmable and depends on the tank size and the farm requirements. The cold water valve (S3) will remain opened until the required amount of water has been let into the system. When the last batch of water has been pumped into the tank and the water level drops below the low level sensor (LL) the pump stops.

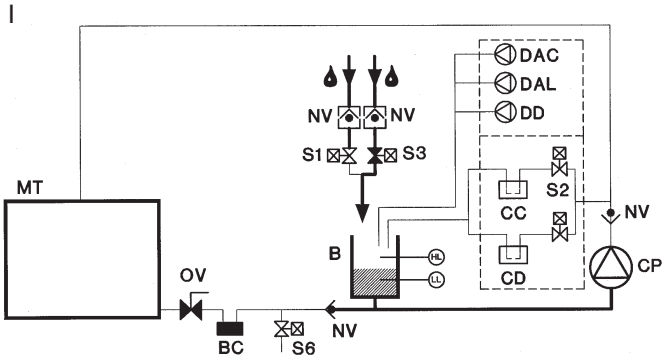
H
The small amount of water that was left in the system can flow away through a small hole in the non-return valve (NV) when the drain valve (S6) opens. When all cleaning water is drained from the tank the drain valve closes again.

If required a second after-rinse can be carried out. This step will follow the same order as the after-rinse mentioned above.

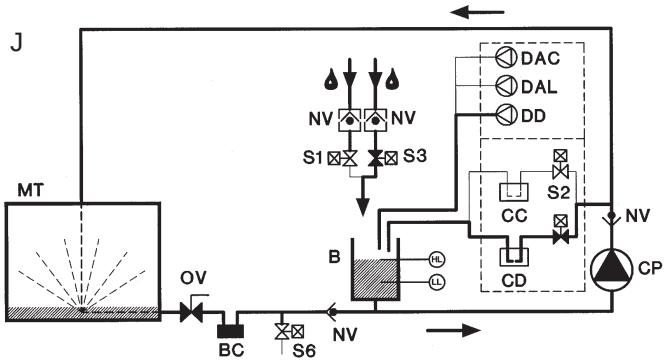
Disinfection (see figure I, J, K)

In some cases a disinfection step is added after the first after-rinse as extra assurance for a hygienic inner tank.

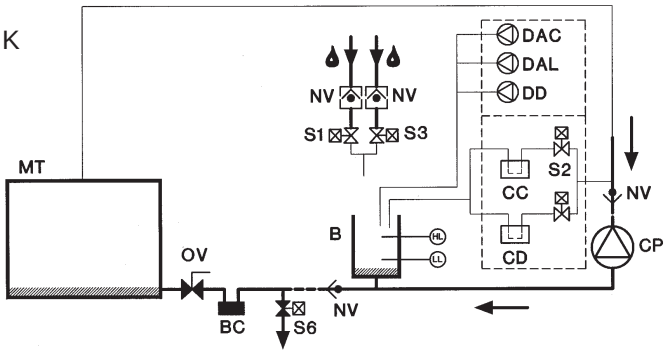
I



J



K



I
The cold water valve (S3) is opened to let cold water flow into the buffer. The drain valve (S6) is closed. The non-return valve (NV) prevents the water from flowing into the tank directly.

J
When the water reaches the high level sensor (HL) the cleaning pump (CP) starts running. The pump will run until the water level drops below the low level sensor (LL). In this way several batches of water are pumped into the tank. When the amount of water in the system is sufficient to circulate, the pump will start running continuously. The cold water valve (S3) stays open until the total required amount of water, needed in this step, is in the system. Simultaneous with the start of the circulation the valve for the disinfectant (S5) is opened. Because of this a part of the water can wash through the container for the disinfectant (CD), taking the disinfectant into the system. In cases where automatic dosing is applied the liquid disinfectant will be brought into the system by the disinfection dosing pump (DD).

K
After some time, when the whole surface of the inner-tank wall has been covered with disinfectant, the drain valve (S6) opens. When all water is drained from the tank the drain valve closes again.

After the disinfection step another after-rinse is executed. This step will follow the same order as the after-rinse mentioned above.

Closed tanks, DX with T100 / T200

Installation

Installation overview

Positioning tank

1 Tank handling.

2 Tank levelling.

3 Global overview of the whole installation (figure).

Refrigeration system

4 Pipe work and positioning of the cooling equipment.

5 Overview of the installation.

6 Details for good pipe work.

7a Leak test.

7b Making the installation air and moisture free.

7c Filling with refrigerant

Water

8 Connection to the water supply.

9 Changing the water quantity.

10 Overview of the water installation.

Electricity

11 Electrical connections to be made.

Environmental precautions

To increase the flexibility, the DX-tanks are usually delivered with a separate condensing unit. In these cases the tank and the condensing unit will have to be installed on the farm.
DX/CEH and DX/CE tanks up to 8000 litres can be delivered in a space saving execution, with a built-on condensing unit.

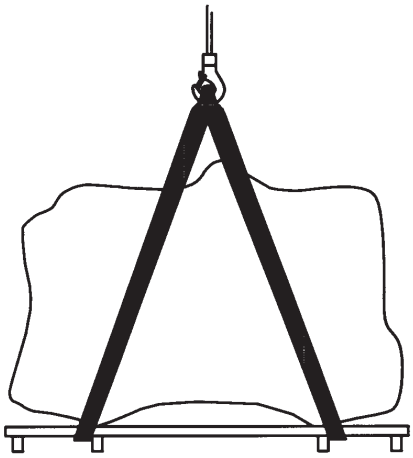
Because of the environmental risks concerning the refrigerant, all recommendations and regulations have to be considered.

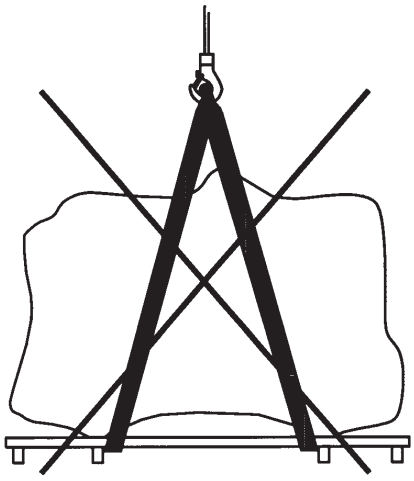
1 Tank handling

Package of the tank

The tank will be delivered on a wooden pallet covered with a protective foil. The dipstick and drain pipe are packed on a pallet. This pallet is suitable for a fork lift truck executed with extended forks in the length direction.

Lifting the tank from the truck





– Notice the weight of the tank (see chapters Product Data).

– It is recommendable to lift the tank from the truck by means of hoisting with strings. The truck with a crane must be well equipped for hoisting.

– Put two strings of sufficient length around the tank and pallet, according to the figure.

– Bring the pallet with tank carefully to the ground.

– Put the tank in to the milk room.

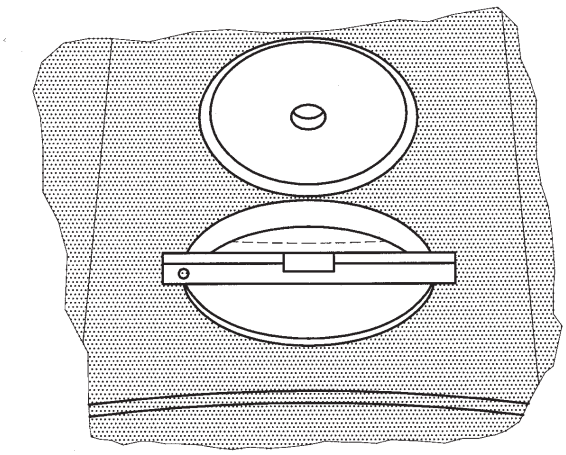
– Keep the tank covered with the protective foil as long as possible.

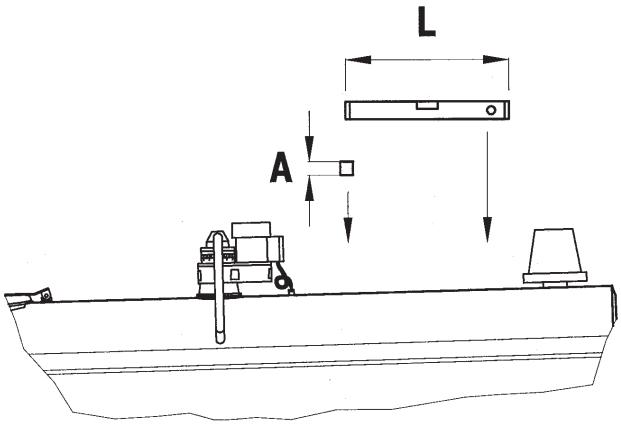
– If the recommended farm conditions are taken care of (see chapter Planning), the tank can easily enter the milk room through the door.

– The tank should enter the milk room by pushing or pulling it in an acceptable and proper way (be cautious not to damage the fragile cleaning equipment placed at the front of the tank).

– If the tank is on the planned spot, remove the pallet. This has to be done very carefully by means of a reliable jack. Place this jack in the middle below the “front/back bottom” of the tank. To prevent damage, a wooden log should be placed between the tank and the jack.

Note! *Before installation check the tank for damages and see if the ordered equipment is complete!*





2 Tank levelling

Note! *Do not level the tank when it has been filled with milk!*

After positioning the milk cooling tank on the right spot the tank has to be levelled in two directions: first in the width and then in the length direction. This procedure has to be repeated until the results of both directions are satisfactory. If the floor area is not solid or stable, it is advisable to use base plates or something similar.

The value on the dipstick (in mm) refers to the quantity of milk on the table which is attached to the tank. A table has been made for every tank capacity and not for every tank individually. In spite of this the table gives a good starting point.
For a more accurate reading a calibration list should be ordered.

Width direction

– Remove the rubber ring from the manhole.

– Put the levelling instrument on the flange of the manhole.

– Adjust the legs of the tank in such a way that it levels the tank in the width direction.

Length direction

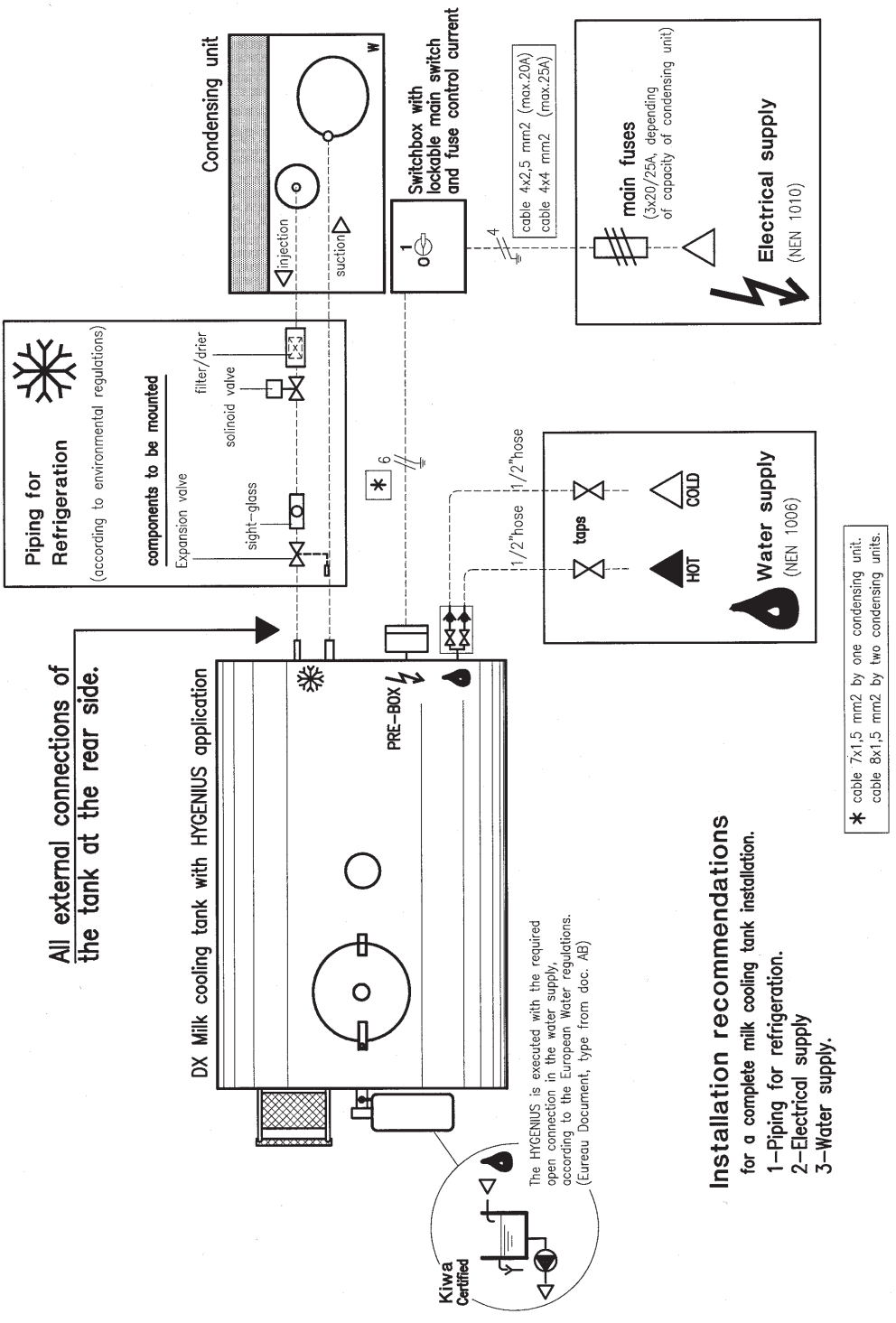
– The tank has to be adjusted to a slope of 3% in the direction of the outlet. So the last milk quantity and later on the cleaning water can flow away easily.

– Start with a levelling instrument of e.g. 50 cm length and put it on top of the tank behind the agitator.

– Put a distance piece of 15 mm. (size A) under the end of the levelling instrument (on the side of the agitator). (Size A, the height of the distance piece depends on the length of the levelling instrument. For example L = 600, A = 18 mm or L = 700, A = 21 mm).

– Adjust the legs (especially those at the rear side) in such a way that they level the length direction.

3 Global overview of the whole installation



4 Pipe work and positioning of the cooling equipment

If the tank and the condensing unit are placed on the right spot, a plan for piping has to be made. The refrigeration piping has to be fitted in such a way that there is sufficient space around the tank and that the condensing unit is easy accessible.

The figure on the next page gives a clear position of the pipes. If the tank is placed in the middle of the milk room, it is better to let the pipes go up to the ceiling and come down above the condensing unit.

Normally the tank will be executed with a pump-down system. In this case the following equipment is needed:

1 Thermostatic expansion valve.

2 Sight glass.

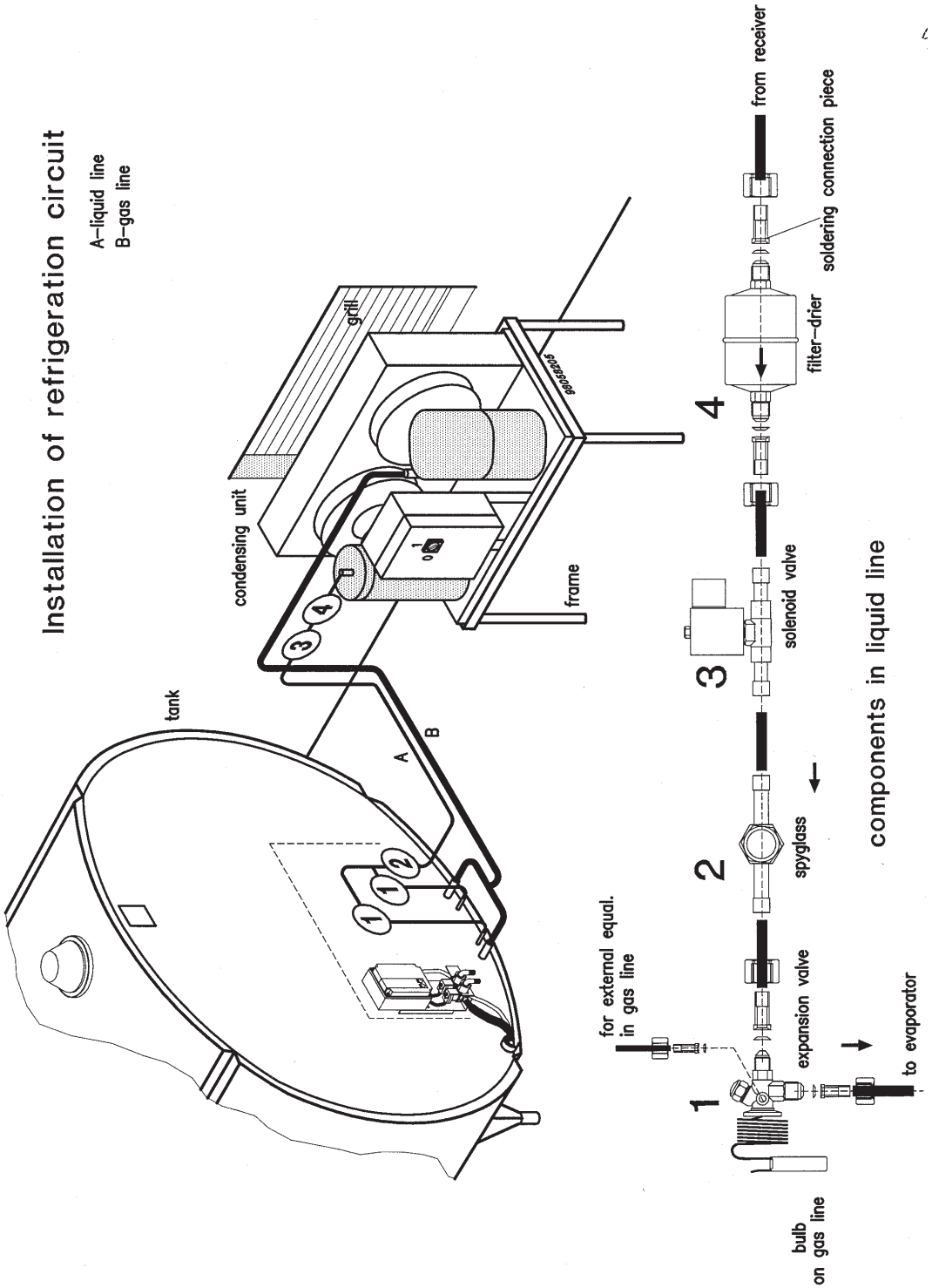
3 Solenoid valve.

4 Filter-drier.

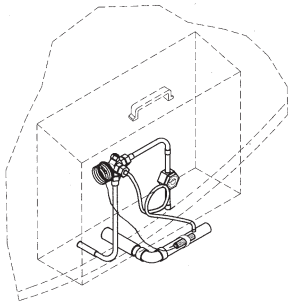
The type of the thermostatic expansion valve depends on the required performance of the tank. The thermostatic expansion valve and the sight glass should be mounted at the out coming pipes of the tank and preferable under the cover. Most milk cooling tanks are already standard equipped with these components. The solenoid valve and the drier should be mounted near the condensing unit. In many cases the condensing units have the filter/drier pre-mounted on the base plate.

Having pre-mounted components reduces the installation work for the refrigeration circuit to connecting tank and condensing unit with a liquid- and a suction line (resp. A and B).

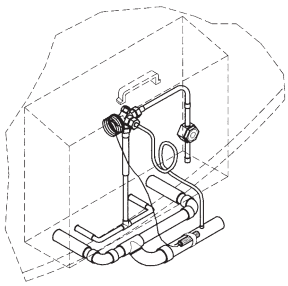
5 Overview of the installation



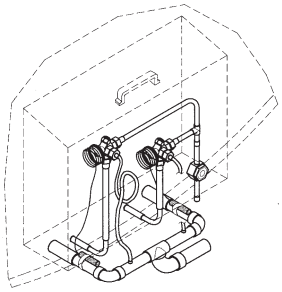
1



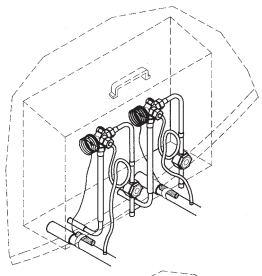
2



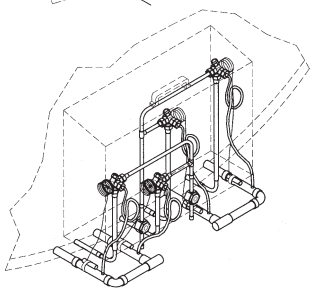
3



4



5



6 Details for pipe work

The closed DX milk cooling tanks are constructed with up to four evaporators (see chapters Product Data). Usually, these tanks are pre-equipped with the necessary refrigeration equipment and -piping. In some cases it is unknown how much space is available or what type(s) of condensing units will be installed. For these situations, it is necessary to install the refrigeration equipment on the farm. The figure on the left shows some examples of how the piping can be fitted. The expansion valve and the sight glass should be positioned at the rear side of the tank, in such a way that these are protected by the stainless steel cover.

Examples and recommendations

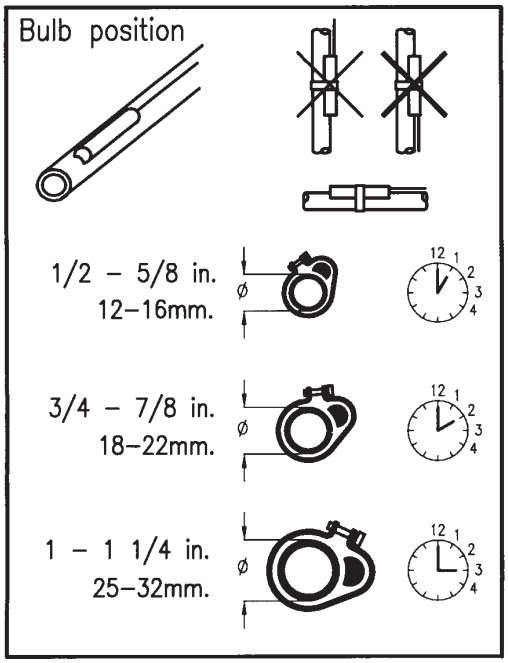
The top figure shows the smallest series of tanks. These tanks have only one evaporator with one suction- and one discharge pipe.

In the second figure the tanks has two evaporators. The suction and the discharge lines have been coupled. In this way only one thermostatic expansion valve and one sight glass are needed.

The tanks that are somewhat larger will have piping like it is shown in figure 3.
Again there are two evaporators with coupled suction- and discharge pipes. In this situation however two expansion valves are applied.

For milk cooling installations that require two (or more) condensing units, it is necessary to create a separate refrigeration circuit for each condensing unit. The tank in figure 4 has two evaporators and requires two condensing units. To keep two separate circuits the liquid-and suction lines coming from both evaporators have no mutual connections. Each of the circuits has one expansion valve and one sight glass.

The largest cooling tanks will have four evaporators. Figure 5 shows a tank with evaporator pipes that have been coupled in such a way that two refrigeration circuits are created. This enables the application of two condensing units.



Piping routine

– Cut the end-piece from the liquid line of the condensing unit.

– Prepare the complete piping and all parts as shown on the related figures.

– Make the piping if possible out of one piece.

– Put the fragile cooling parts and piping (pipe of external equalizer) close to the tank in such a way that they are covered by the cap. Check this seriously before soldering/brazing.

– Reserve enough free space (at least 7 cm) on the added copper pipe of the suction line for the bulb of the thermostat expansion valve.

– Preferable for the suction line is to lay it on the liquid line if possible, when doing so the efficiency of the evaporator will improve.

– Remove all burrs and be sure that the pipe line is clean before soldering/brazing.

– Connect a cylinder of nitrogen N2 to the measure connection of Rotalock of the compressor (suction side). Open another measure connection of the Rotalock of the liquid receiver.

– Let the inert gas flow through the pipeline. The N2 will remove the air from the pipe and the soldering is well protected. It will avoid the forming of copper oxide.

– If the equipment cannot stand the heat wrap a wet cloth around it.

– Braze all soldering connections as rapidly as possible and finish them well.

– Use for stainless steel/copper connections silver brazing filler metals.

– Fix the bulb of the expansion valve on the suction pipe with the clamp. At the figure beside, the bulb is put on different positions by the several diameters of the suction pipe. Wrap insulation around it.

– The pressure equalizer pipe must be mounted directly behind the sensor in the direction of the compressor.

– Connect the suction line to the liquid line with tie wraps.

7a Leak test

– After all brazing is done a leak test has to be carried out.

– The complete installation must be filled with nitrogen with a pressure of 10 bar.

– All connections must be tested with a soap solution.

– If an electronic tester is available, the evaporators have to be filled with a mixture of gas and nitrogen according to the instructions of the tester.

– This test has to be carried out according to the local regulations.

7b Making the installation air and moisture free

– When all leakages are stopped or no leaking occurs, a vacuum pump has to be connected.

– The pump should be connected to the measure connections of both compressor Rotalocks valves at the same time.

– These Rotalock valves must be opened to the neutral position. Also open the Rotalock valve of the receiver.

– The vacuum pump removes all air and moisture out of the installation.

– Let the pump run as long as possible, at least 1 hour (P < 270 kPa).

– Check now and then if the pressure drops and if it is low enough. This can indicate a leakage.

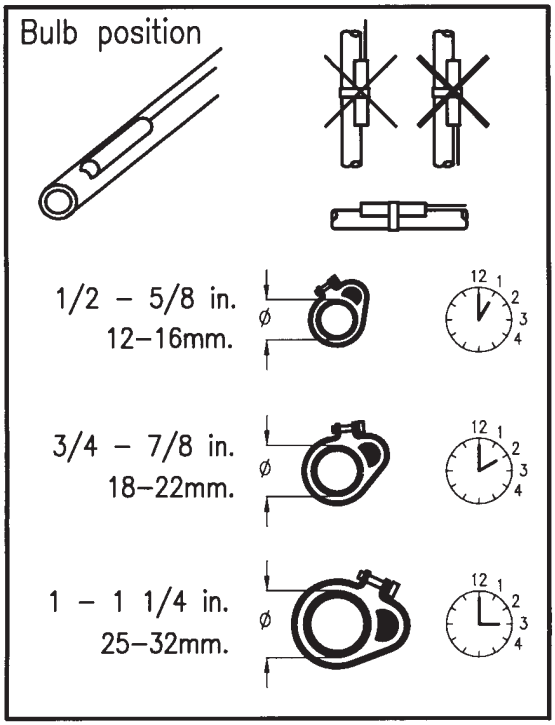
Note! *During the time that the installation is put under vacuum, electrical connections and the connections to the water supply can be carried out.*

7c Filling with refrigerant.

- If the total installation is finished, filling of refrigerant can be started.
- Close the outlet valve and put on the grey blind nut.
- Fill the tank with cold tap water through a hose in the tank until the whole evaporator has contact with the contents (approx. 50%)
- Fill approx. 5 kg of refrigerant as liquid into the receiver. This can be done during filling the tank with water.
- Close the valve of the receiver and after that the one on the cylinder.
- Start the condensing unit by pushing "COOLING ON" at the panel and watch the sight glass. If the sight glass stays clear, the amount if refrigerant is sufficient.
- Connect a cylinder with refrigerant to the suction Rotalock if the sight glass is not bubble free. If this is the case, add the refrigerant step by step.
- Open the Rotalock for 30 second and give it two minutes to balance. Repeat this procedure until the sight glass stays clear.

Note! *If the installation is switching off and on because of low pressure, block the pressostat during filling.*

If the filling is completed, check the complete installation with a soap solution or, if available with an electronic tester.



8 Connections to the water supply

The applied Hygenius cleaning device is executed with an open connection between the water supply and the cleaning system. This is according to the European Water Regulations and it is certified by the Dutch KIWA authority.

It is now allowed to connect the device directly to the water supply, without any further safety components.

Device for external connections

The Hygenius cleaning device of the DX milk cooling tank should be connected to the water supply on the farm.

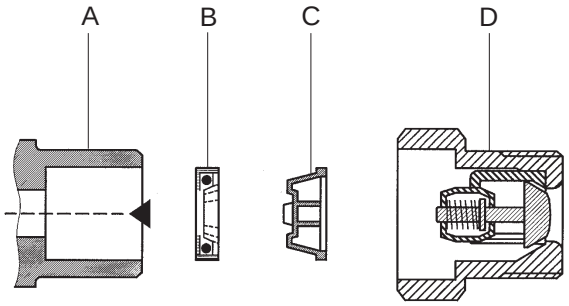
At the rear side of the tank, covered by the stainless steel cap, there are two hose pillars for hot and cold water, suitable for 1/2" hoses below the Pre-Box.

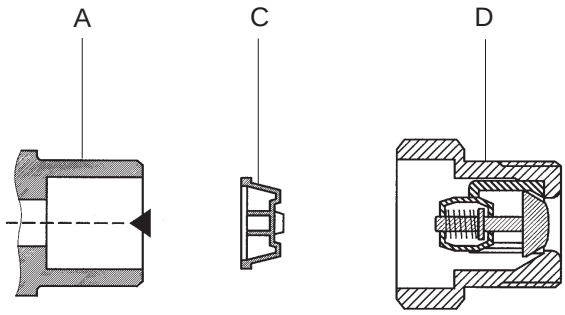
Requirements on the farm

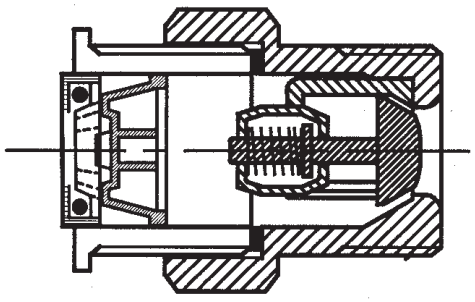
Two water taps should be provided on the wall. The copper pipe to these taps must have a diameter of 15 x 1 mm. It is recommended to fix the taps, hot to the left side and cold to the right side, with a distance of 15 cm from each other and at a height of 1.2 metre close to the rear side of the tank (see for the recommended free spaces around the tank, chapter Planning).

These water taps should be provided with 1/2" hose pillars.

The temperature of the supplied hot water must be close to 80°C in order to create a circulation end temperature of at least 45°C. If the end temperature is less than 45°C the cleaning process is not ultimately effective and can cause hygienic problems.







9 Water Quantity

Note! *The required water quantity of each cooling tank capacity is pre-adjusted to a certain value. Under normal circumstances there is no need for additional adjustment.*

The Hygenius T100 uses a system in which the valves for water supply are opened for a certain time. To be able to determine the amount of supplied water, a fixed flow of water is required. A flow controller placed inside the PRE-BOX at the rear end of the tank, ensures a steady flow of water. The factory setting for the flow-rate is 15 l/min., other types of flow controllers are available.

Flow controller	Colour	Art. No.
8 l/min.	Black	996847-02
10 l/min.	White	996847-03
12 l/min.	Orange	996847-04
15 l/min.	Violet	996847-06

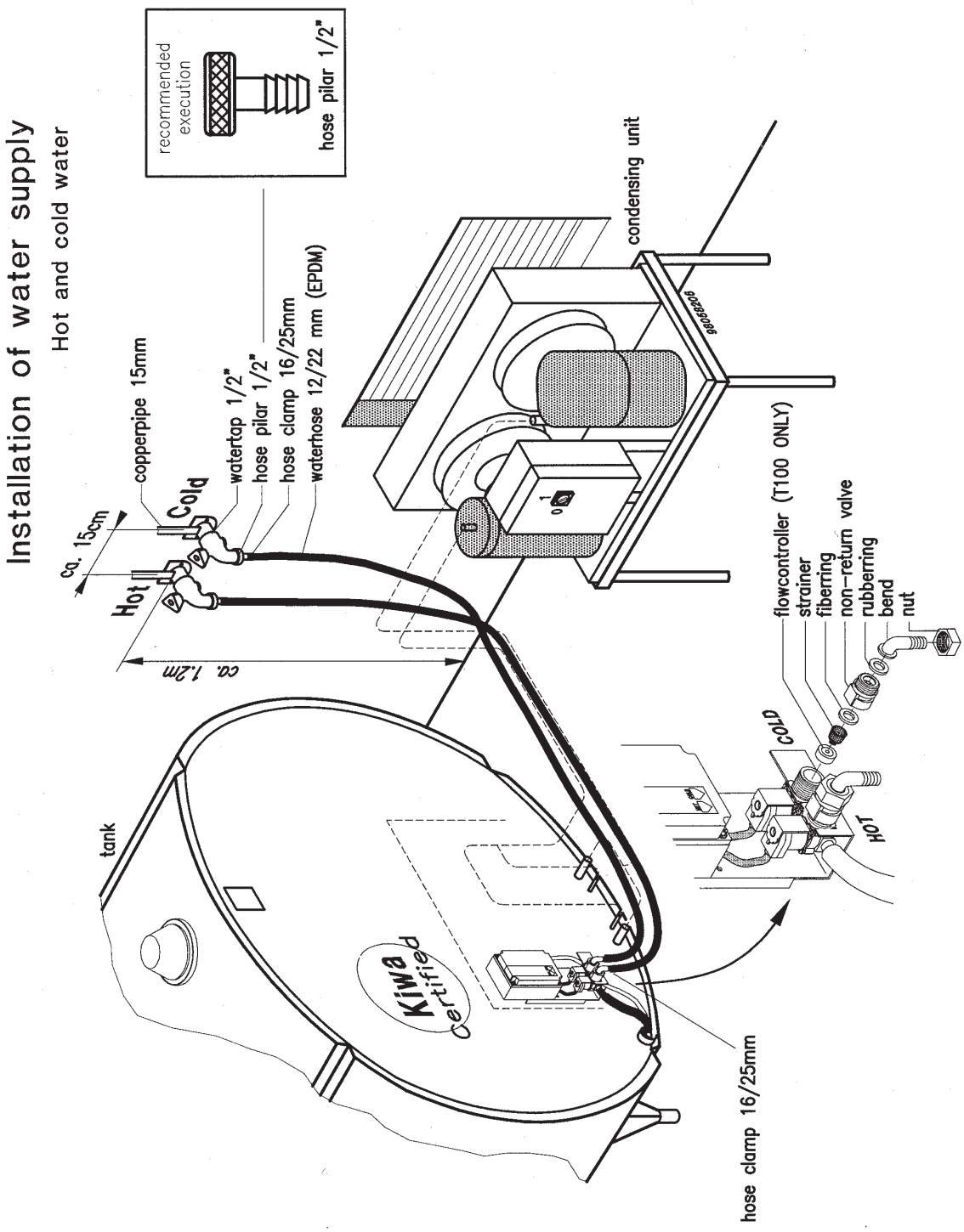
These flow controllers are designed to function when the water pressure is at least 2 bar. If the water pressure is lower, both flow controllers should be removed all together.

Note! *The Hygenius T200 functions according a level filling system, therefor it does not require flow controllers.*

The figures to the left show how the flow controllers should be installed in the Hygenius T100 and -T200,
(A = valve inlet; B = flow controller;
C = strainer; D = non-return valve).

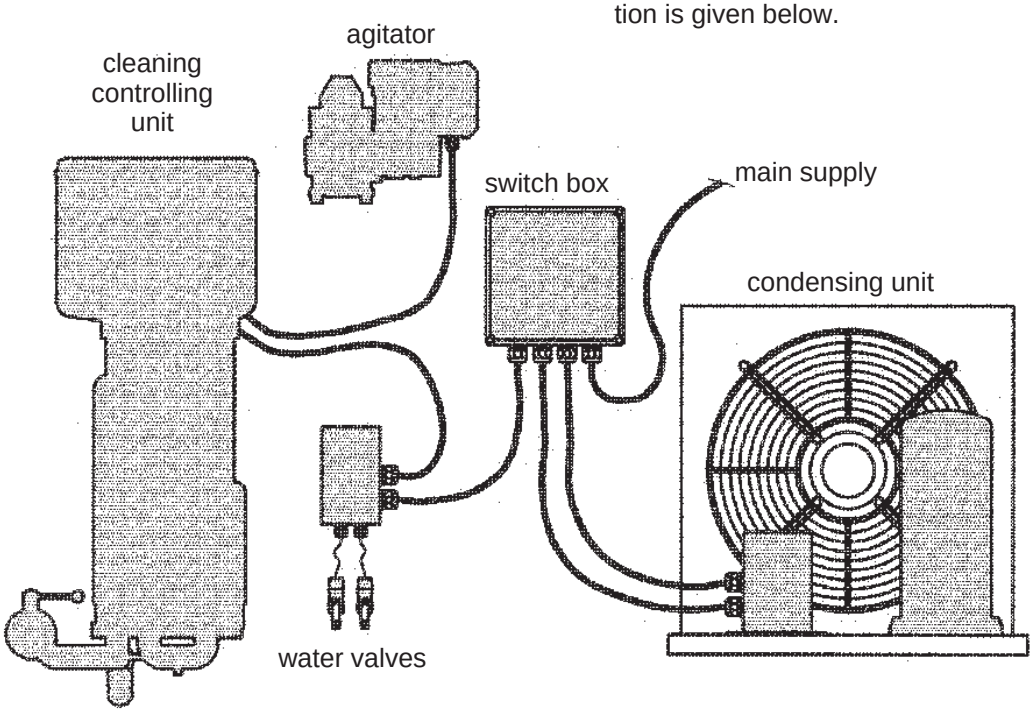
The Pre-Box is standard equipped with two non-return valves. These valves prevent detergent being sucked into the water supply, should there be a pressure drop in the conduit pipes.

10 Overview of the water installation



11 Electrical connections

After the tank and the condensing unit are positioned and all the pipe work has been done, the electrical connections can be made. The installation should be connected to a separate power supply on the farm. An electrical connection overview of the installation is given below.

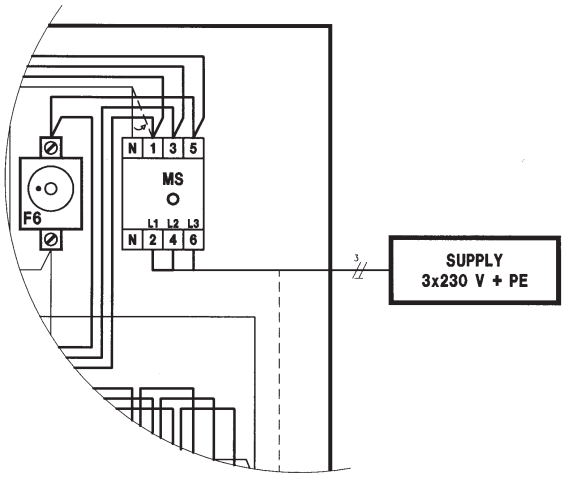


Note! *A circuit breaker must be present in this electrical circuit.*

It is important to have this power supply free of voltage during the installation process to avoid electrical shock. All connections should be made according the local regulations.

Main supply to the switch box

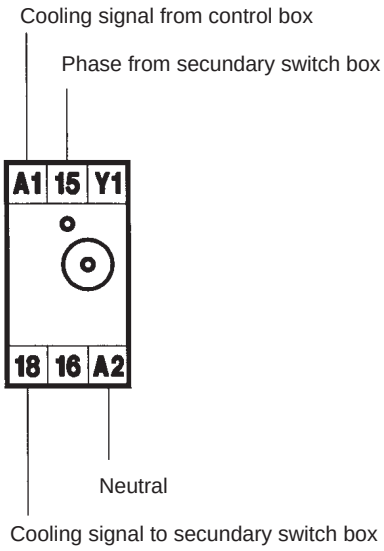
The switch box is mounted on the tank or on the wall of the milkroom and must be connected to the power supply on the farm. These connections must be made according to the diagrams. If a second switch box is used, a separate power supply to this box is needed.



Note! *With a main supply of 3 x 230 V, the neutral wire on contact N of the main switch should be moved to contact 1 (phase L1).*

Cable between switch box and pre-box

A cable with 2,5 mm² wires must be used between the switch box and the pre-box. The wires should be mounted on to the terminals inside the boxes according to the diagrams. If the cleaning/controlling unit is equipped with a heater a secondary supply cable has to be used. The cables can be fixed together with the insulated piping of the refrigeration system.



Two or four separate condensing units in one installation

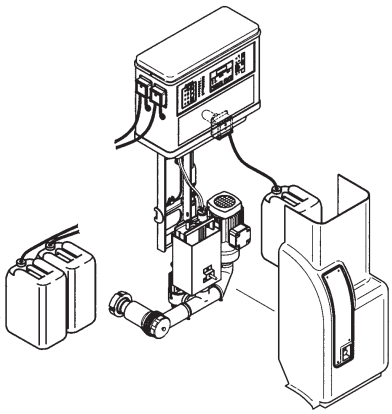
When using two condensing units it is possible to use one DH-box or two H- or AH-boxes. If two condensing units are used in combination with two switch boxes, each switch box must be connected to a separate cooling signal coming from the cleaning/controlling unit.

When using four condensing units it is possible to use two DH-boxes or four H- or AH-boxes. If four condensing units are used in combination with four switch boxes, each secondary switch box has to be supplied with a delayed cooling signal, this to avoid a too high starting current. This is done by adding a time relay (art. no. 9804342434) to the primary switch boxes. This time relay controls the startup of the secondary condensing units.

DeLaval

Automatic liquid dosing for Hygenius

Installation



Positioning dosing pumps

Two different sets with liquid dosing pumps are available. One for alkaline and acid dosing, and one for alkaline, acid and disinfectant dosing.

In addition to this, there is an "upgrade" kit, meant to provide existing automatic dosing systems with a "dosing detection" feature.

For positioning the set, follow this routine.

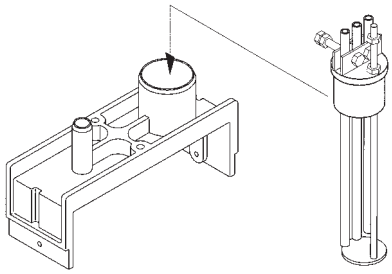
– When following this routine, it is advisable to list the current parameter settings, because the EPROM has to be exchanged.

– Switch off the electrical power and lock the main switch.

– Open the top cover of the Hygenius.

– Remove the two sealing-plates on the left side of the top housing.

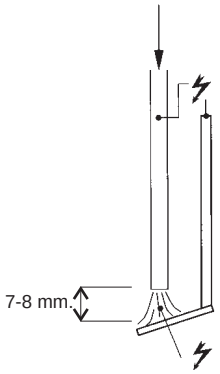
– Remove blue plastic cover.



– Remove the large grey hose between the funnel and the buffer.

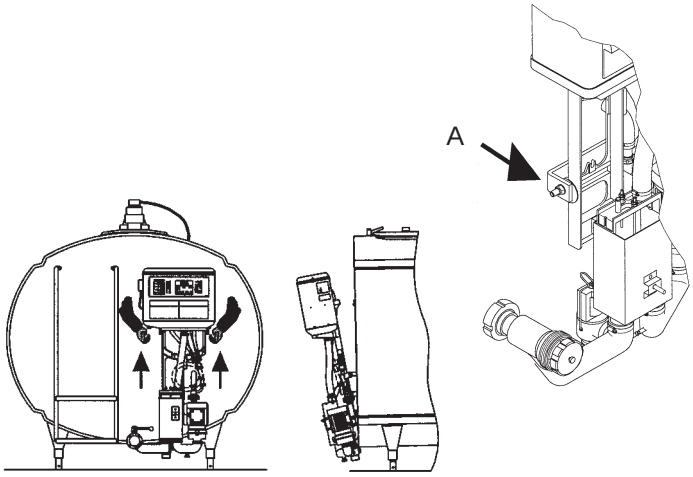
– If present, remove the stainless steel tube clamped in the buffer inlet.

– Place the plug with inflow pipes in the buffer bridge (as shown).



– Make sure the distance between the inflow pipes and the "spoon" is 7-8 mm.

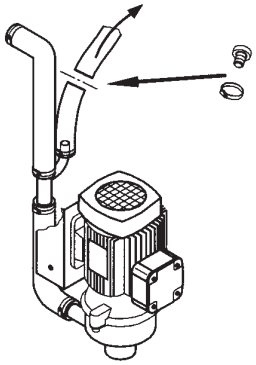
– Drill a hole through the plug and the buffer bridge.



– Fix the plug by means of a screw.

– Loosen the nut of the Hygenius support (A).

– Lift the Hygenius off the mounting plate.



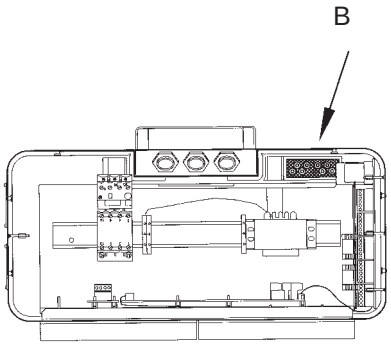
– Cut the hose coming from the T-piece to approx. 10 cm.

– Place the blind plug in the open end, coming from the T-piece, and fasten it with a hose clamp.

– Install the level circuit board on the inside left to the front of the top box by means of distance nuts.

– Connect the board according to the wiring diagram.

– Lead the cables coming from the detection sensor through the rubber to the top box (B).



– Replace the Hygenius on the mounting plate.

– Fasten nut of the Hygenius support.

– Mount the 2 dosing pumps next to each other on the left side of the top housing. The pump for the alkaline on the left with blue hoses, the pump for acid on the right with red hoses.

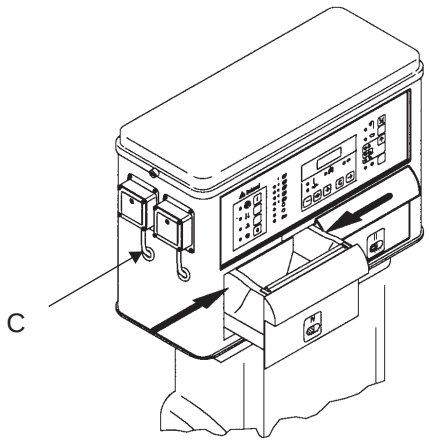
– Place a seal (986072-02) between the pump and the housing.

– Connect the wires according to the wiring diagram.

– Remove the containers for manual dosing.

– Drill ∅ 8 mm holes in the plastic plug for the hoses coming form the dosing pumps.

– Insert the plug from the inside in the opening of the funnel.



– Lead the discharge hoses through the rubbers in the housing (C) through the plug in the cleaning-funnel to the inflow pipes.

– Connect the hoses to the inflow pipes.

– Connect the hoses of the suction side to the pumps.

– Exchange the EPROM with the new one, version 2.02.

– Replace the cover of the top box (remember to fasten the earth connection).

– Close off the opening for the detergent containers with the stainless steel plate.

– Put the power back on.

– Program the parameter “P63” to “3”.

– Lead the tubes to the containers with cleaning agent.

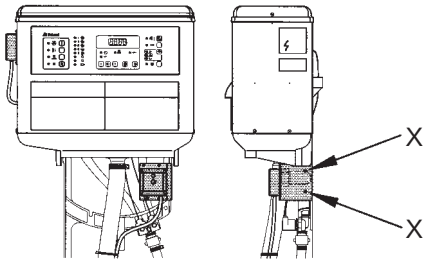
– Although the pumps are self-priming, it is recommended to position the drums with the cleaning chemicals as close to the Hygenius as conveniently possible.

– Check the dosing detector for proper functioning.
Parameter P91 with input signal:
DI 6 detergent detection

– Program “P31” and “P32” (for detailed dosing instructions see package cleaning agent and “P24” for water quantity).

– Program “P34”, number of alkaline cleanings before acid cleaning.

– Set "P42" & "P43".



Positioning 3rd dosing pump

– Mark the holes for mounting the disinfectant pump on the frame (arrows marked X).

– Drill holes of ∅ 6,5 mm.

– Mount the disinfectant pump on the frame.

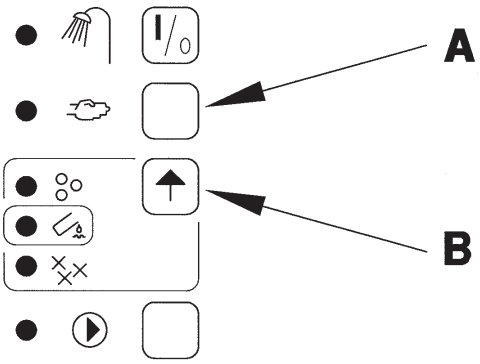
– Lead the discharge hose to the free inflow pipe on the buffer.

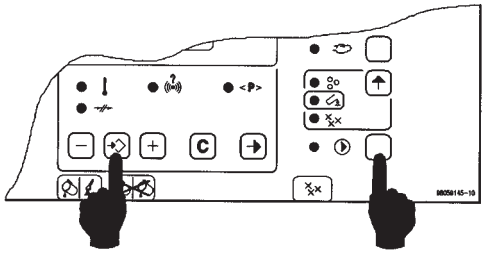
– Program "P61" to "2".

– Program “P33” (for detailed dosing instructions see package cleaning agent and “P39”).

– Check “P40”.

– Set "P44".





Calibration liquid dosing pumps

Calibration of dosing capacity

"P42" Alkaline cleaning agent

– Press “Manual selection of detergent” (A).

– Select with button B “Alkaline cleaning agent” LED’s from top to bottom:
  Alkaline
  Acid
  Disinfectant.

– Remove the blue cover.

– Pull the (blue) discharge hose of the alkaline pump off the inflow pipe.

– Place a CLEAN measuring jug under the hose.

– Press “Manual running dosing pumps” (C) and then “Store”(D).

– Keep pressing both buttons at the same time and let the pump run for 1 minute.

– Measure the amount of alkaline cleaning agent that was discharged (e.g. 400 ml).

– This value should be entered for parameter P42.

– The value in P42 is only valid for the alkaline dosing pump.

– Pour the cleaning agent from the jug back into the proper container with cleaning agent. Make sure to clean the measuring jug very well with clean water.

"P43" Acid cleaning agent

– Put dosing back to automatic by pressing (A).

– Start cleaning for 10 sec.

– Press "manual selection of detergent" (A).

– Select “Acid cleaning agent”.

– Pull the (red) discharge hose of the acid pump off the inflow pipe.

– Place a CLEAN measuring jug under the hose.

– Press “Manual running dosing pumps” and then “Store”.

– Keep pressing both buttons at the same time and let the pump run for 1 minute.

– Measure the amount of acid cleaning agent that was discharged (e.g. 350 ml).

– This value should be entered for parameter "P43".

– The value in "P43" is only valid for the acid dosing pump.

– Pour the cleaning agent from the jug back into the proper container with cleaning agent. Make sure to clean the measuring jug very well with clean water.

"P44" Disinfectant

– Put dosing back to automatic by pressing (A).

– Start cleaning for 10 sec.

– Press "manual selection of detergent" (A)

– Select “Disinfectant”.

– Pull the discharge hose of the disinfectant pump off the inflow pipe.

– Place a CLEAN measuring jug under the hose.

– Press “Manual running dosing pumps” and then “Store”.

– Keep pressing both buttons at the same time and let the pump run for 1 minute.

– Measure the amount of disinfectant that was discharged (e.g. 300 ml).

– This value should be entered for parameter "P44".

– The value in "P44" is only valid for the disinfection dosing pump.

– Pour the cleaning agent from the jug back into the proper container with disinfectant. Make sure to clean the measuring jug very well with clean water.

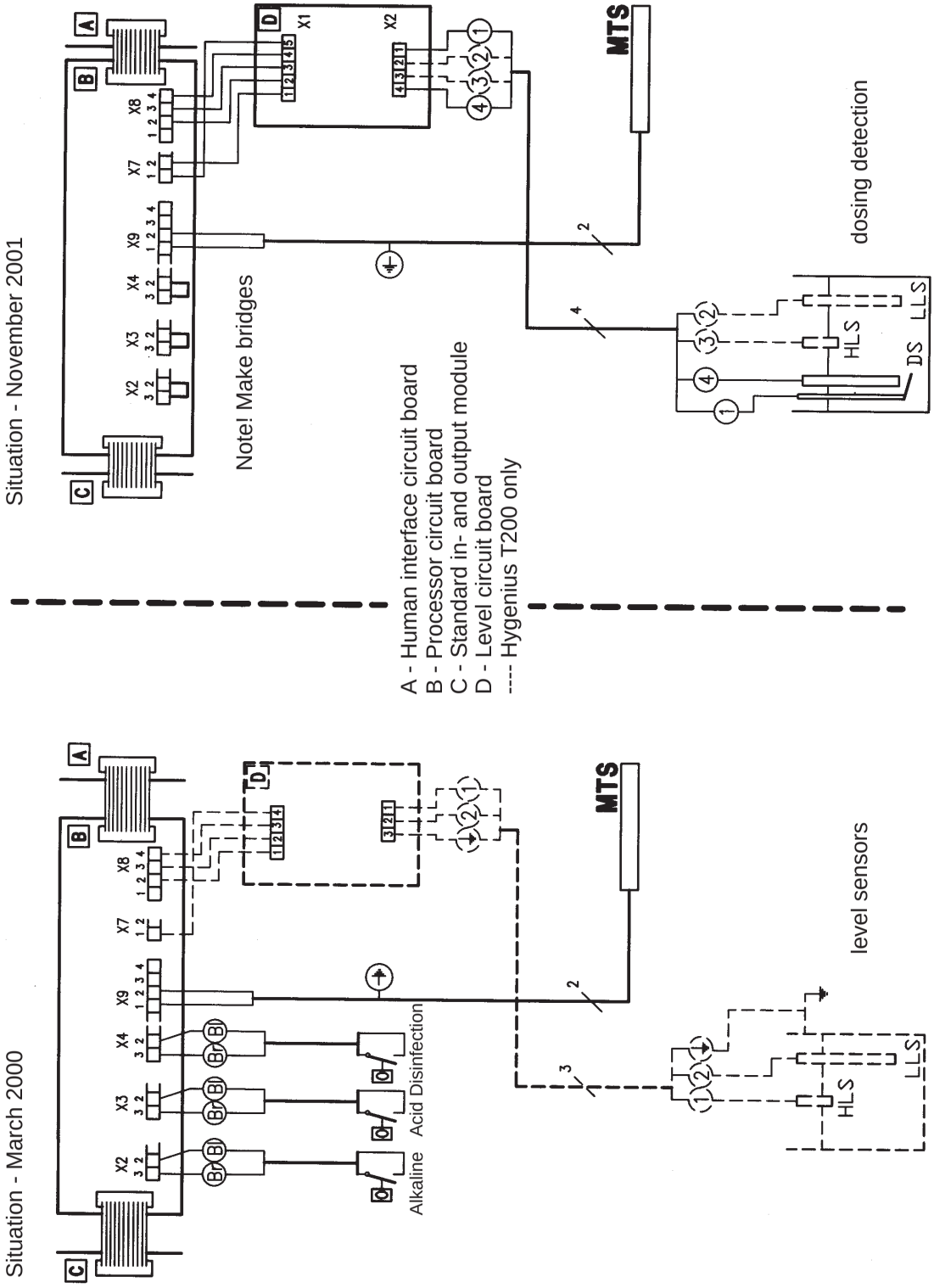
Determine dosing volume P31, P32 and P33

– Read the instructions on the packaging of the cleaning agent first.

– Dosing volume alkaline P31.
e.g. Suppose the required solution of the alkaline agent is 0,5%, tank size is 3500 L (set P65 to option 6), and cleaning volume P24=39 L of water.
Dosing volume alkaline = 39 x 0,5% = 0,195 ≈ 200 ml.
Set P31 to 200.

– Dosing volume acid P32.
The dosing volume for acid cleaning agent is calculated from the difference (in terms of percentage) between the discharged amount of alkaline and acid cleaning agent (see above).
e.g. Discharged amount alkaline:
400 ml/min. (measured) = 100%
Discharged amount acid:
350 ml/min. (measured) = 87%
Dosing volume acid = 200/87 x 100 = 230 ml.
Set P32 to 230.

– Dosing volume disinfectant P33.
The dosing volume for disinfectant should be established according the local regulations and the instructions on the packaging.

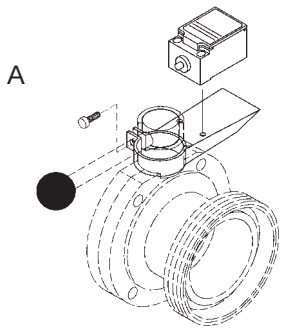

Situation - November 2001
Note! Make bridges
A - Human interface circuit board
B - Processor circuit board
C - Standard in- and output module
D - Level circuit board
---- Hygenius T200 only
MTS
dosing detection
HLS
LLS
DS
Situation - March 2000
Alkaline
Acid
Disinfection
level sensors

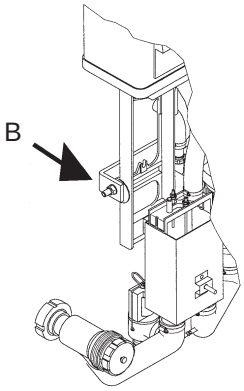
Current situation

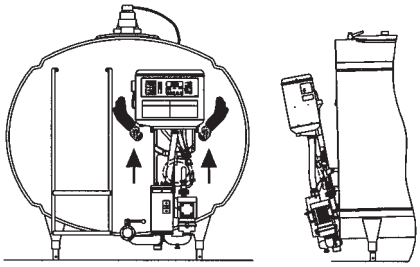
DeLaval

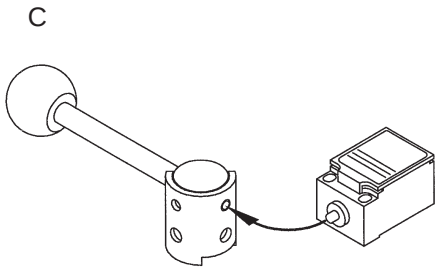
Outlet valve position check device

Installation









Positioning position check device

Switch off the electrical power

Remove the front cover of the Hygenius.

Mount the sensor with the support onto the valve (A)

Loosen the support (B)

Remove the cover of the top box

Lift Hygenius off the mounting plate

Replace one shutter in the top box with a cable socket (PG11)

Lead the cable through to the top box

Connect the cables according to the wiring diagram

Replace Hygenius on the mounting plate

Fasten support

Replace front cover

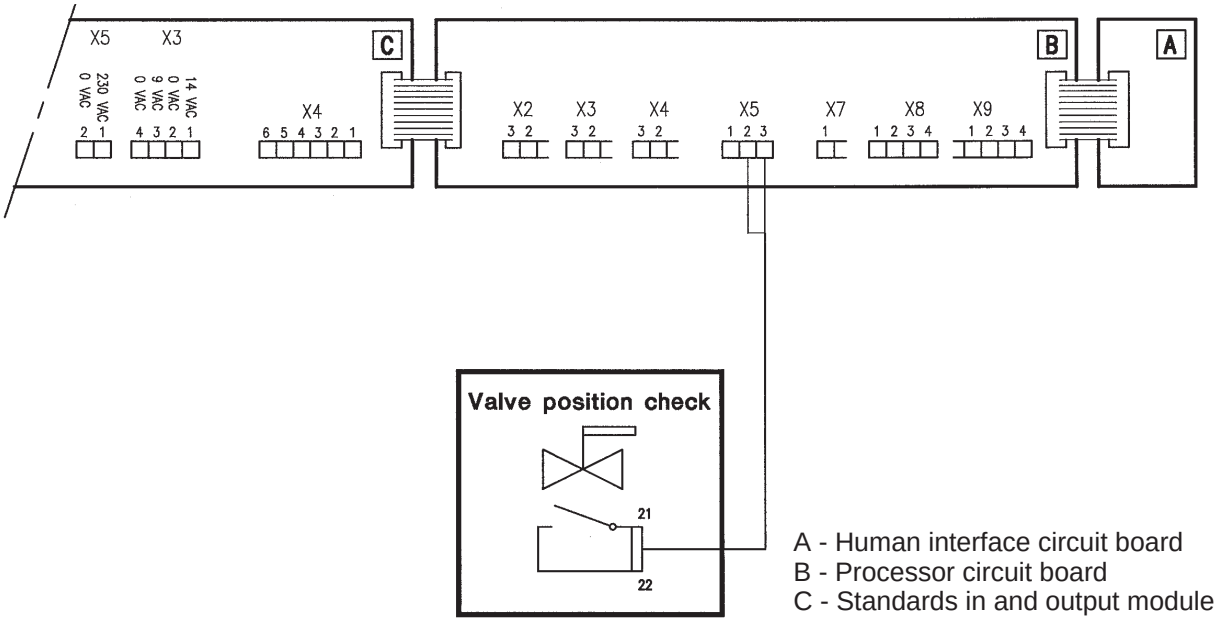
Switch power on

Program “P54” to “1”

Check function “4” of “P91”, open = 1, closed = 0

Make sure that the pin of the switch is properly operated by the handle (C)

Wiring diagram



A - Human interface circuit board
B - Processor circuit board
C - Standards in and output module

Level start device

Installation

Make sure the tank has been emptied before installing the level start device.

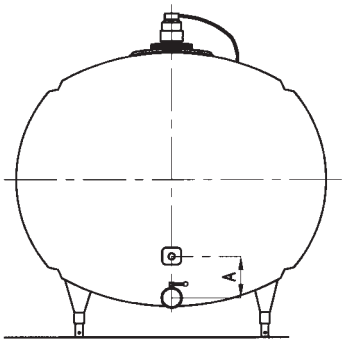
– Mark the position of the sensor on the front bottom (see table).

Tank type	
DX/CEH	A
1100	244
1400	240
1650	250
2000	256
2500	234
3000	241
3500	247
4000	253

Tank type	
DX/CE	A
1150	171
1300	171
1600	175
2000	181
2500	190
3000	177
3500	182
4000	186
4500	191

Tank type	
DX/CE	A
5000	184
6000	191
6750	196
7500	202
8000	205
8600	263
9700	269
11000	277
12000	284

Tank type	
DX/CEM	A
14000	243
16000	249
18000	252
20000	261
24000	266
32000	281



– Drill a hole in the front bottom of approximately 26 mm.

– Remove the insulation that blocks the way to the inner bottom.

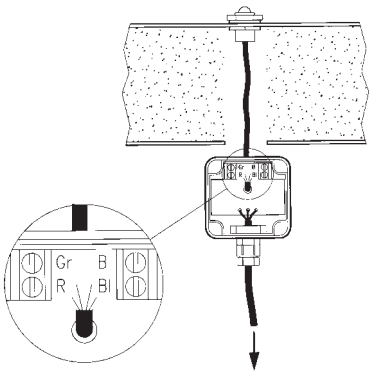
– Drill a hole of 13 mm in the inner bottom.

– Remove any burrs at the hole in the inner bottom.

– Lead the cable of the sensor through the hole from the inside out. Do not forget to place the seal at the inner side of the tank.

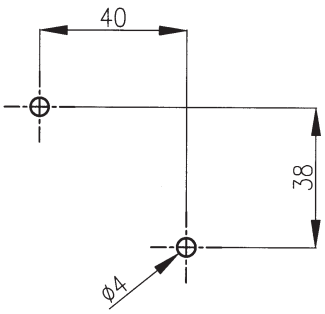
– Carefully fasten the screw, do not over tight!

– Check the connection for leakage.



– Connect the out coming wires to the electric box.

to Hygenius

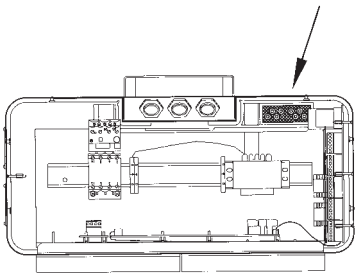


– Mark the holes for the attachment of the box to the tank as shown.

– Put some isolating material in the hole to the sensor.

– Fasten the electric box to the tank.

– Connect the wires coming from the box to the top-box of the Hygenius cleaning/controlling device (see diagram).

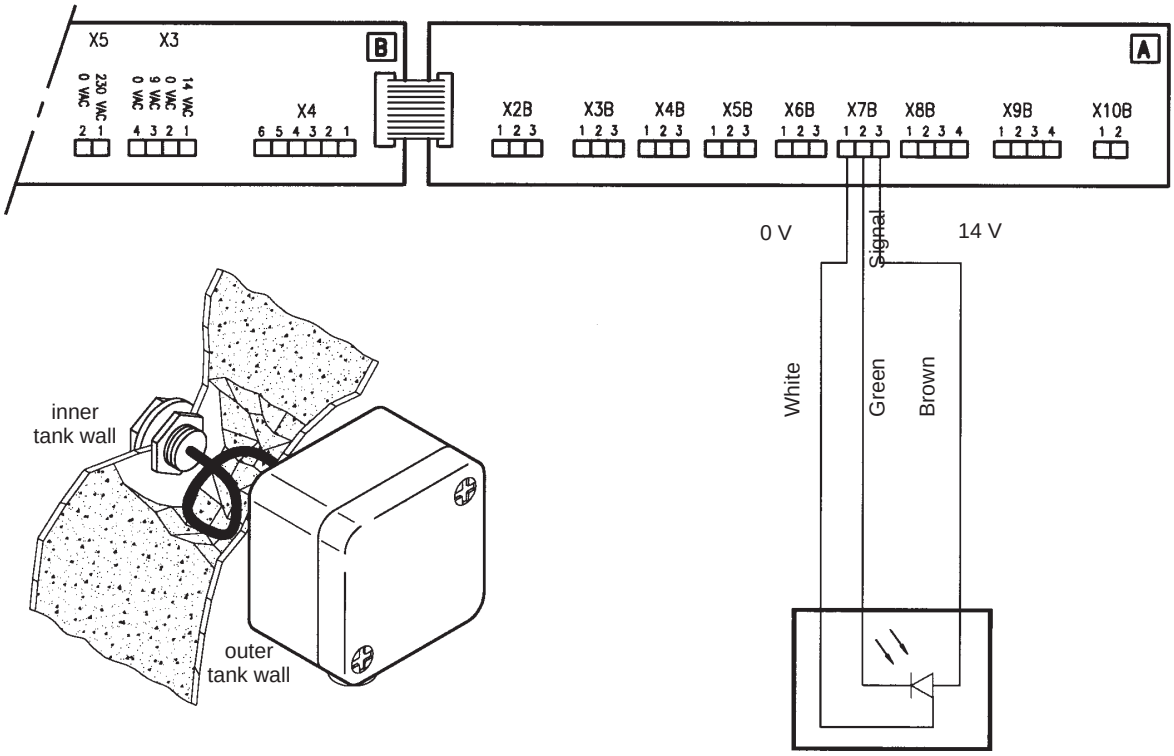


The cable can be lead through the rubber in the right backside of the top-box.

– Program parameter P50 to 3.

– Check the function with P91 DI3 (1 = activated).

Wiring diagram

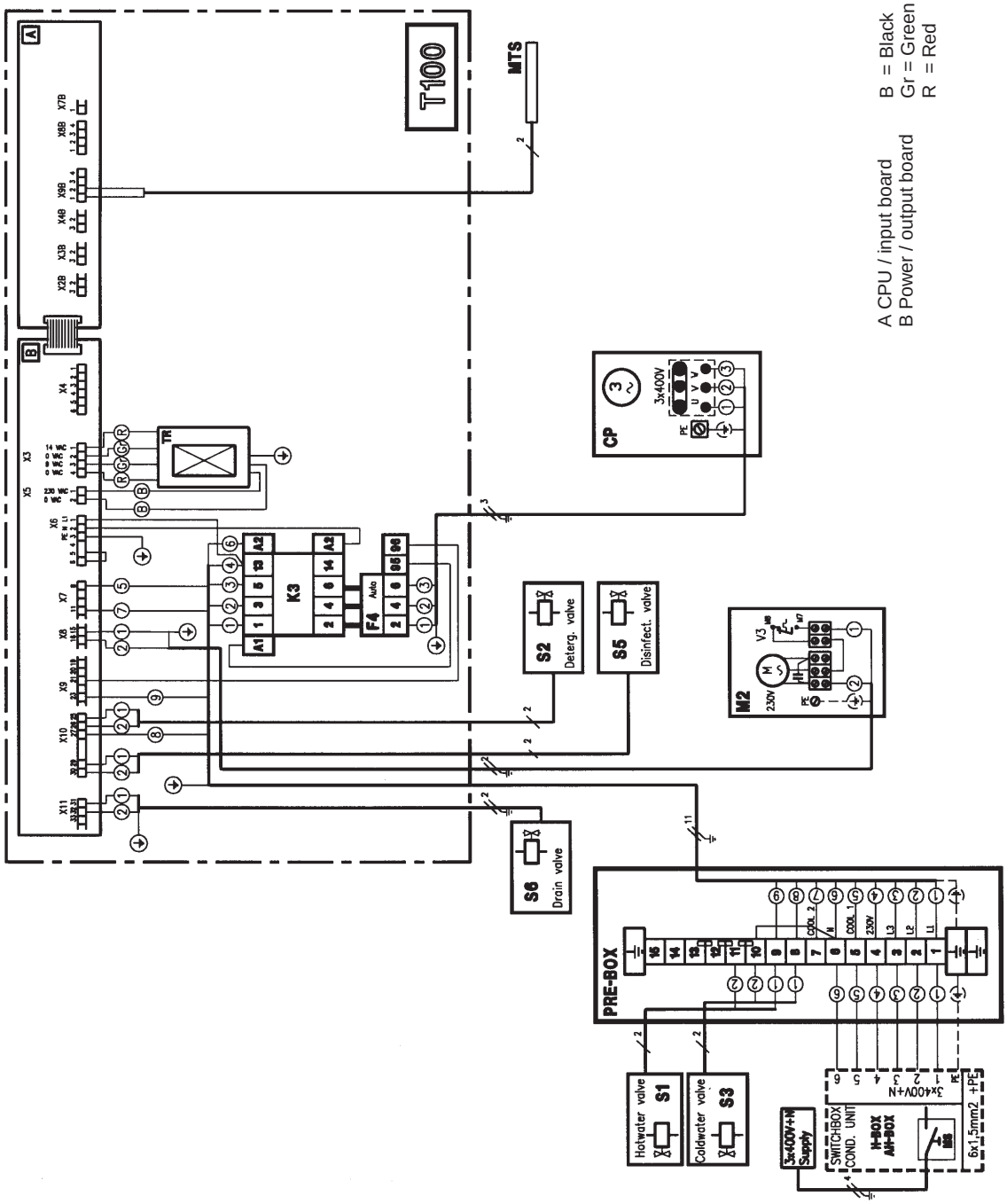


A - Human interface circuit board
B - Processor circuit board
C - Standard in- and output mod-

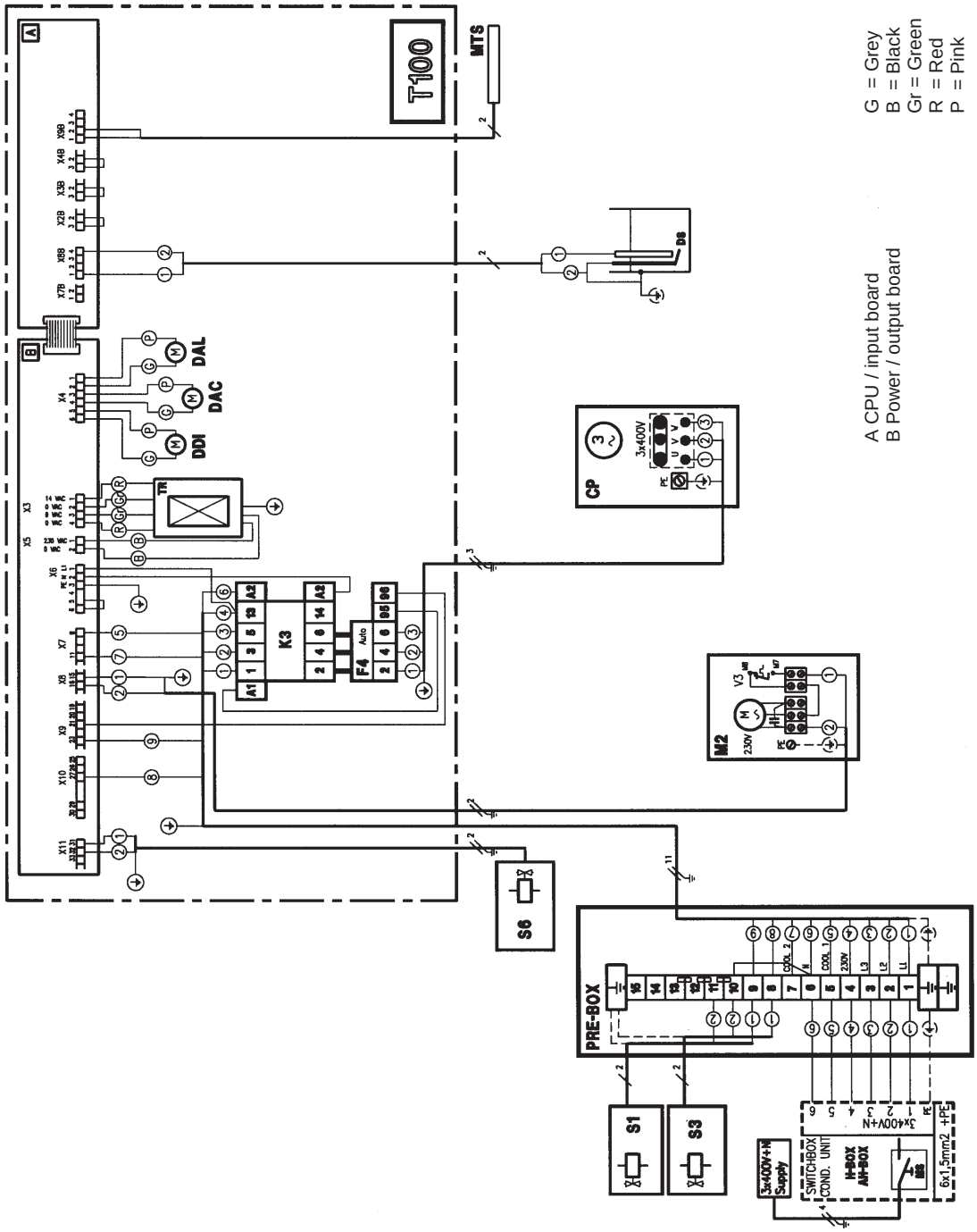


Wiring diagram

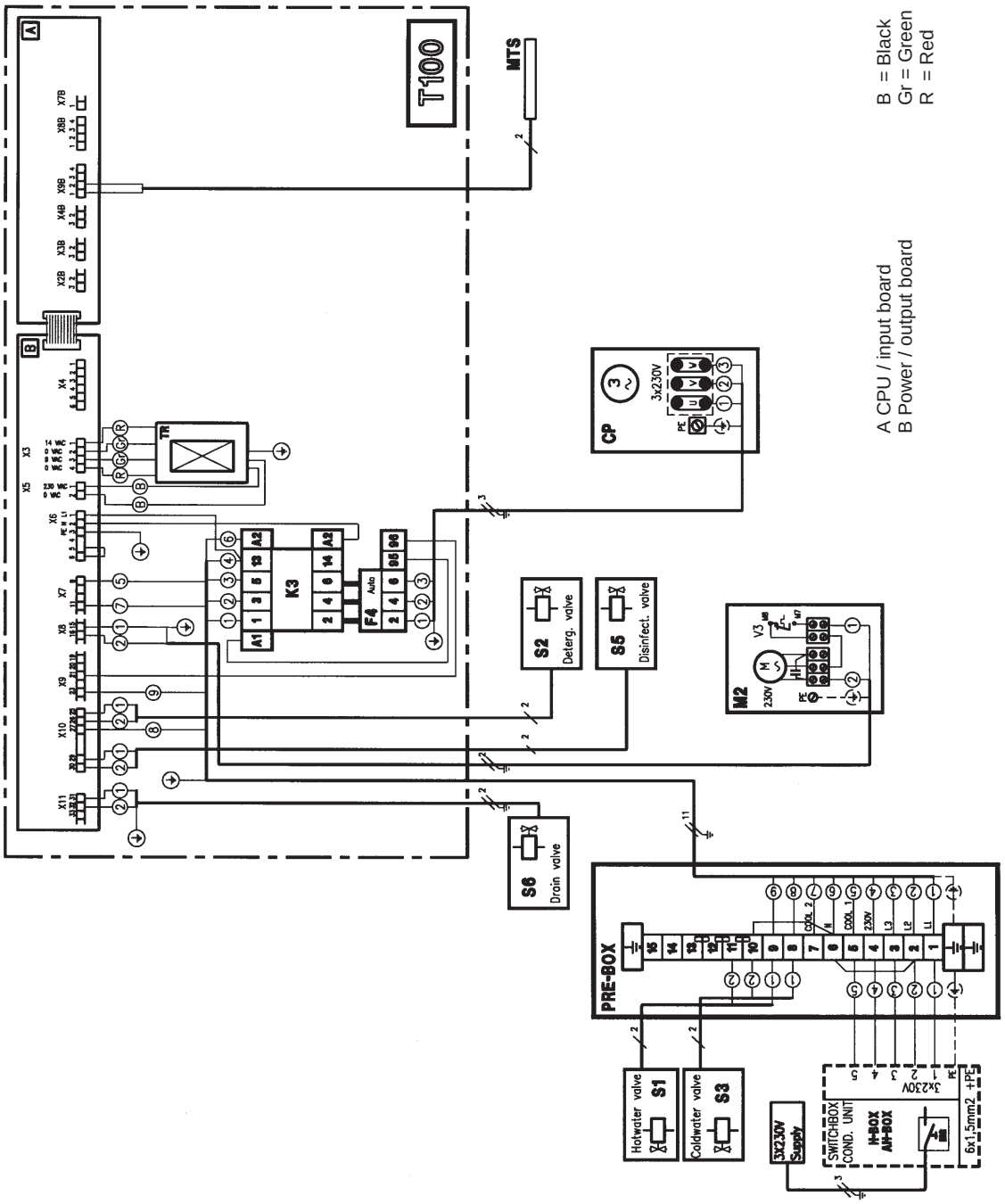
Wiring diagram Hygenius T100 + Pre-Box 3 x 400 V + N
manual (powder) dosing only



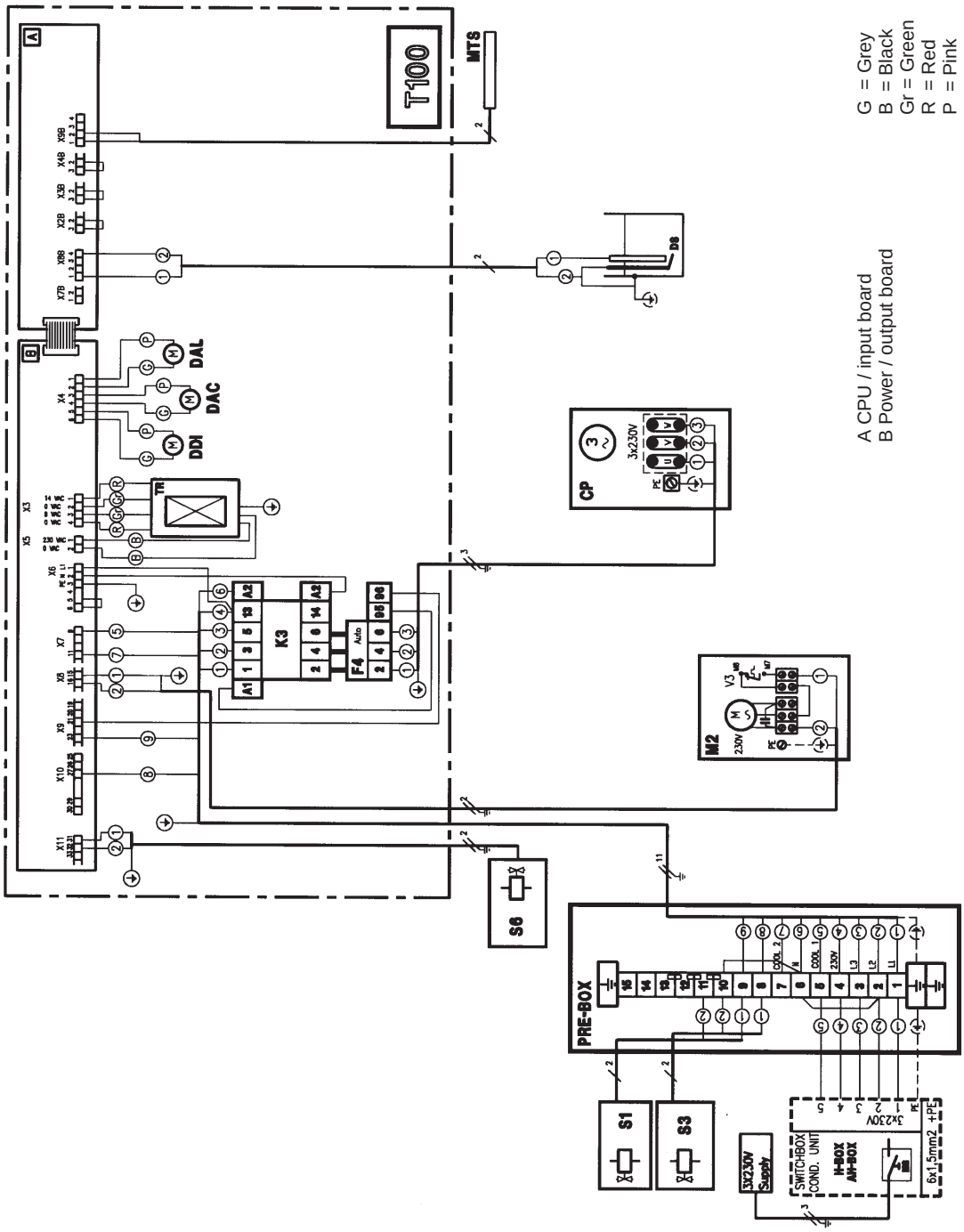
Wiring diagram Hygenius T100 + Pre-Box 3 x 400 V + N automatic (liquid) dosing only



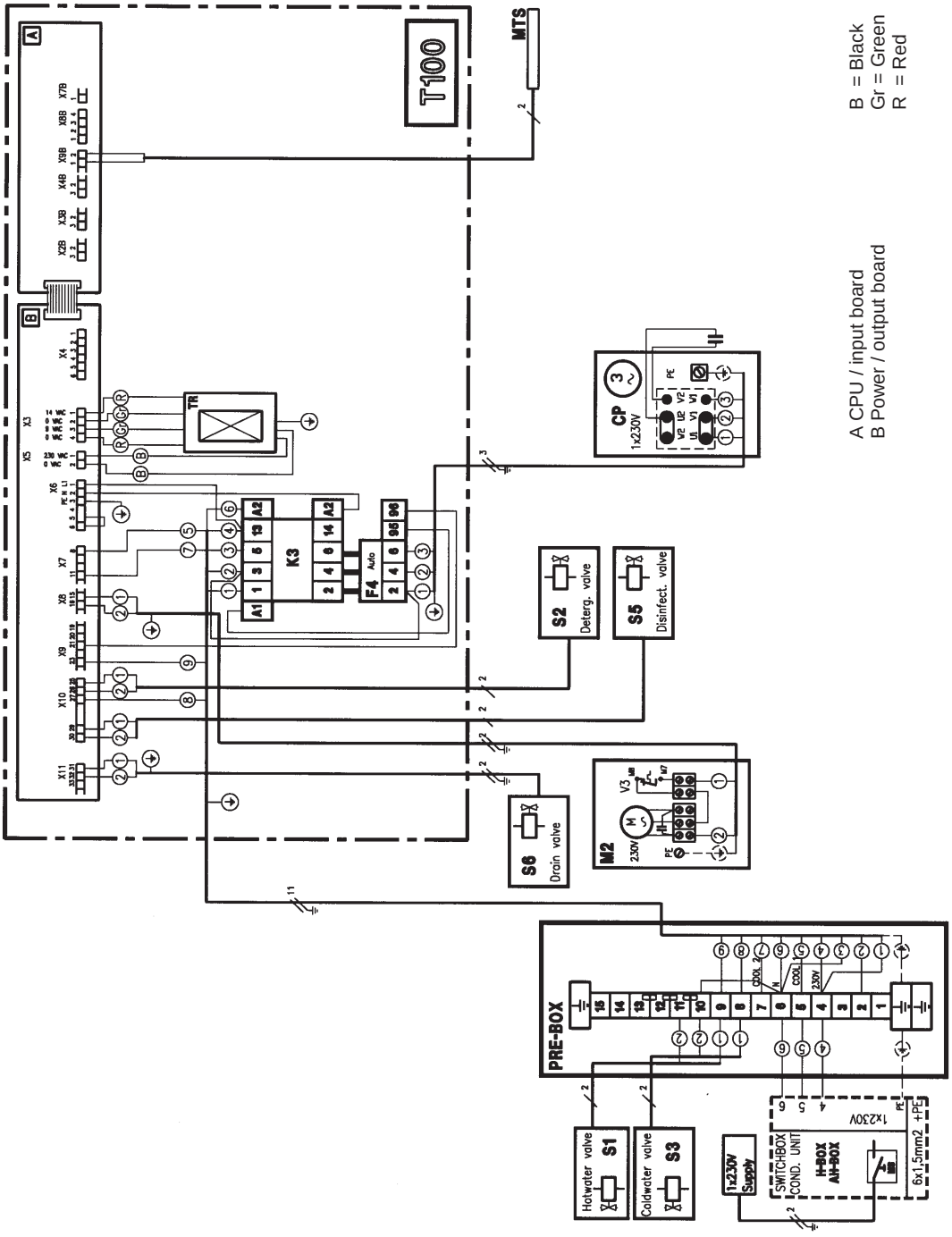
Wiring diagram Hygenius T100 + Pre-Box 3 x 230 V + N manual (powder) dosing only



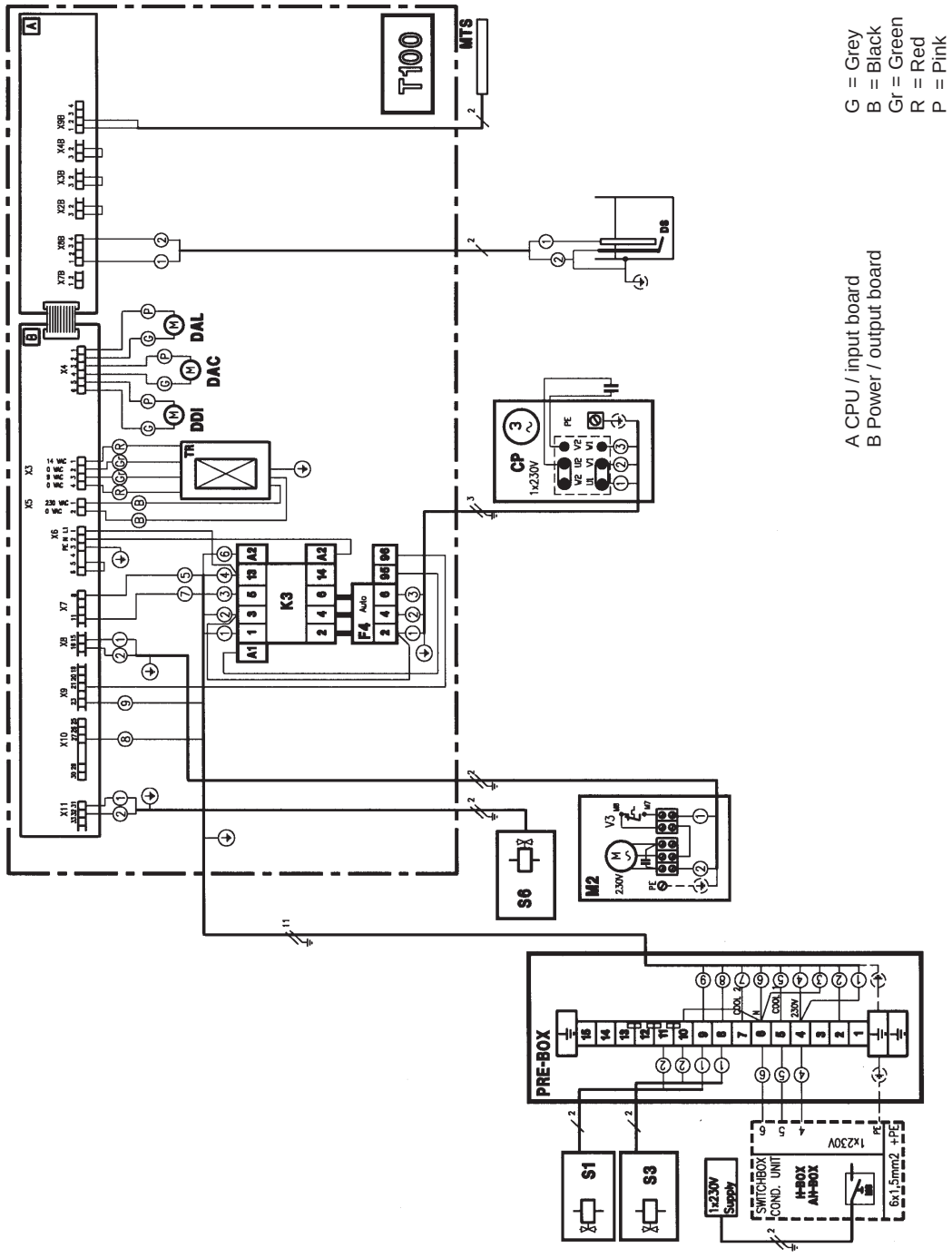
Wiring diagram Hygenius T100 + Pre-Box 3 x 230 V + N automatic (liquid) dosing only



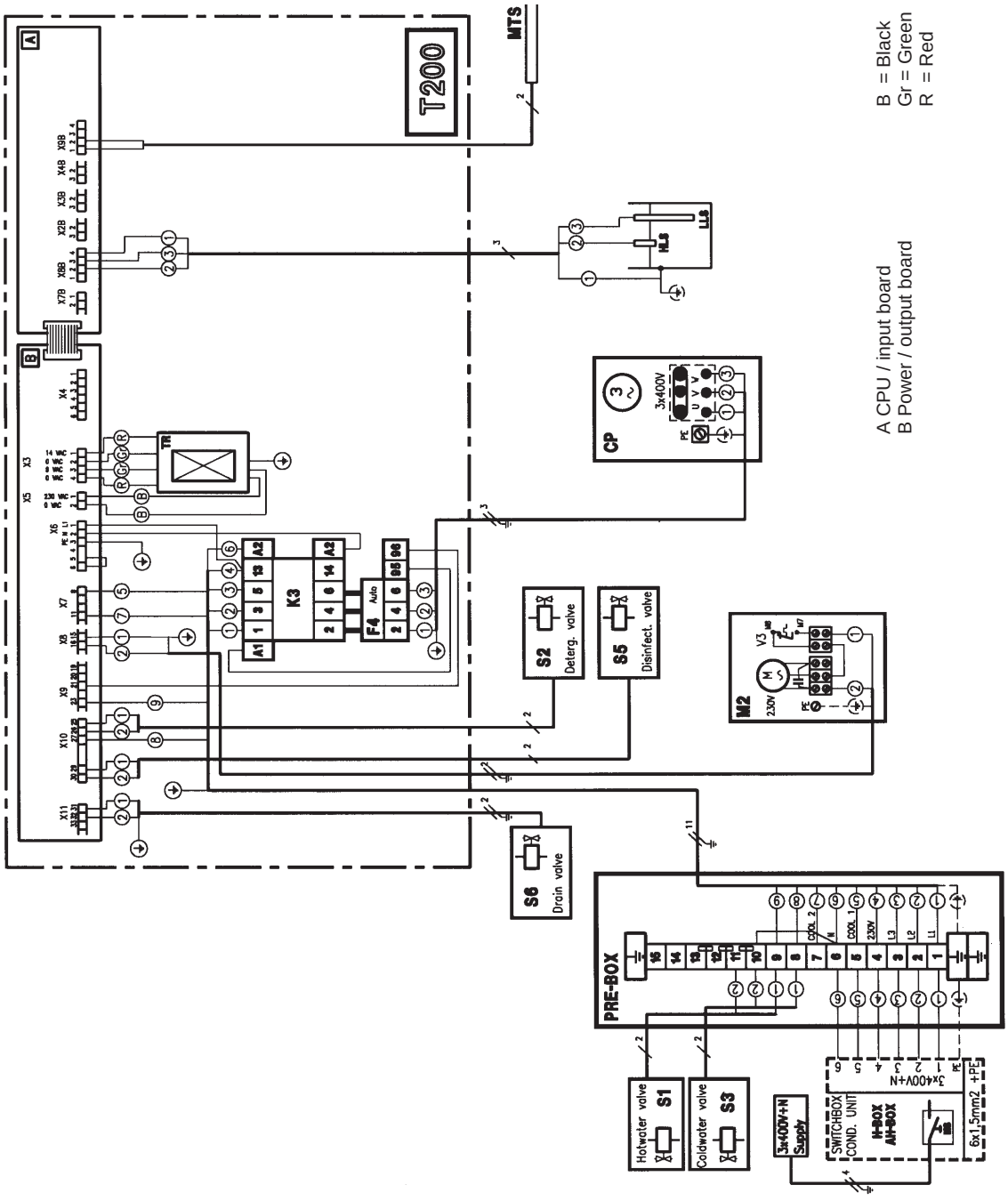
Wiring diagram Hygenius T100 + Pre-Box 1 x 230 V + N manual (powder) dosing only



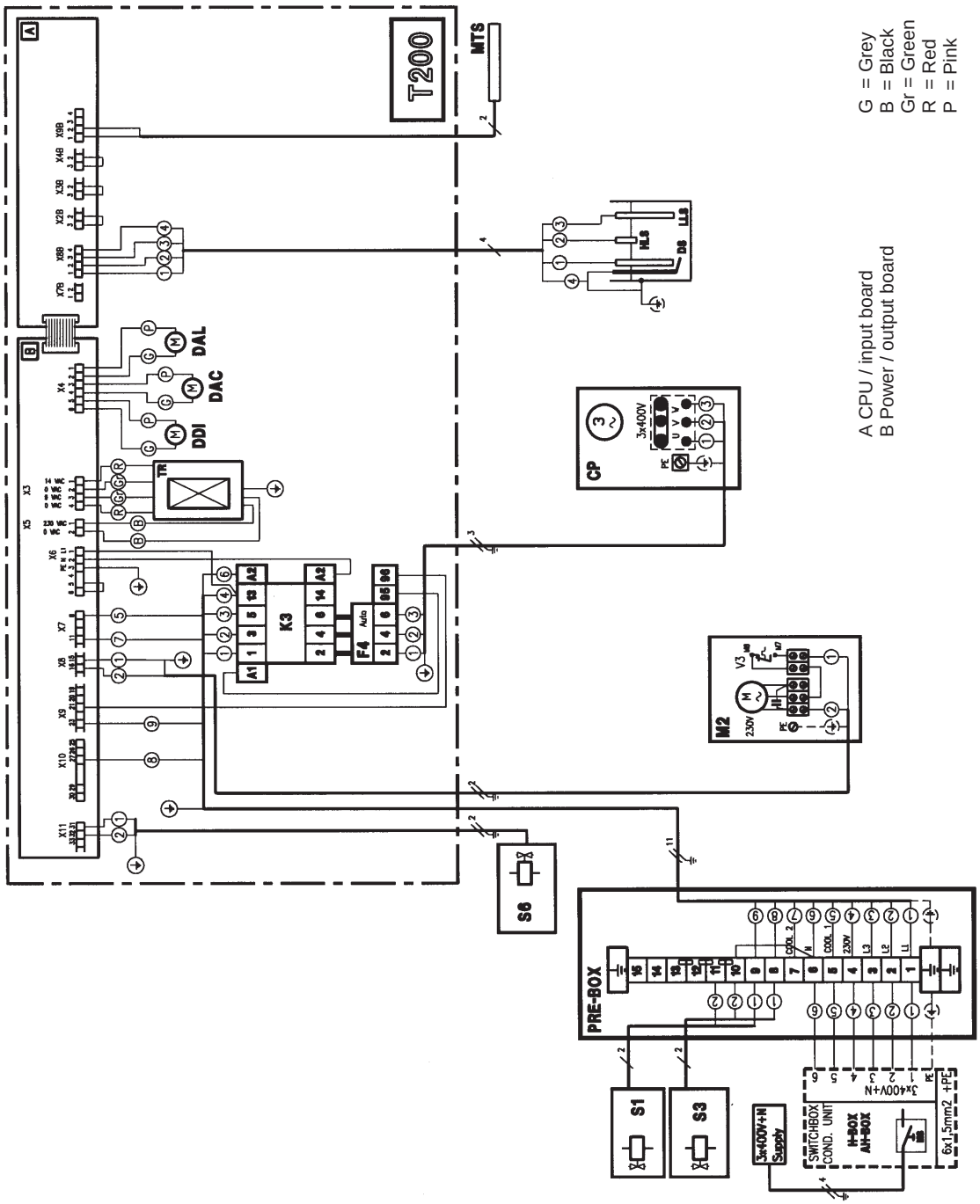
Wiring diagram Hygenius T100 + Pre-Box 1 x 230 V + N automatic (liquid) dosing only



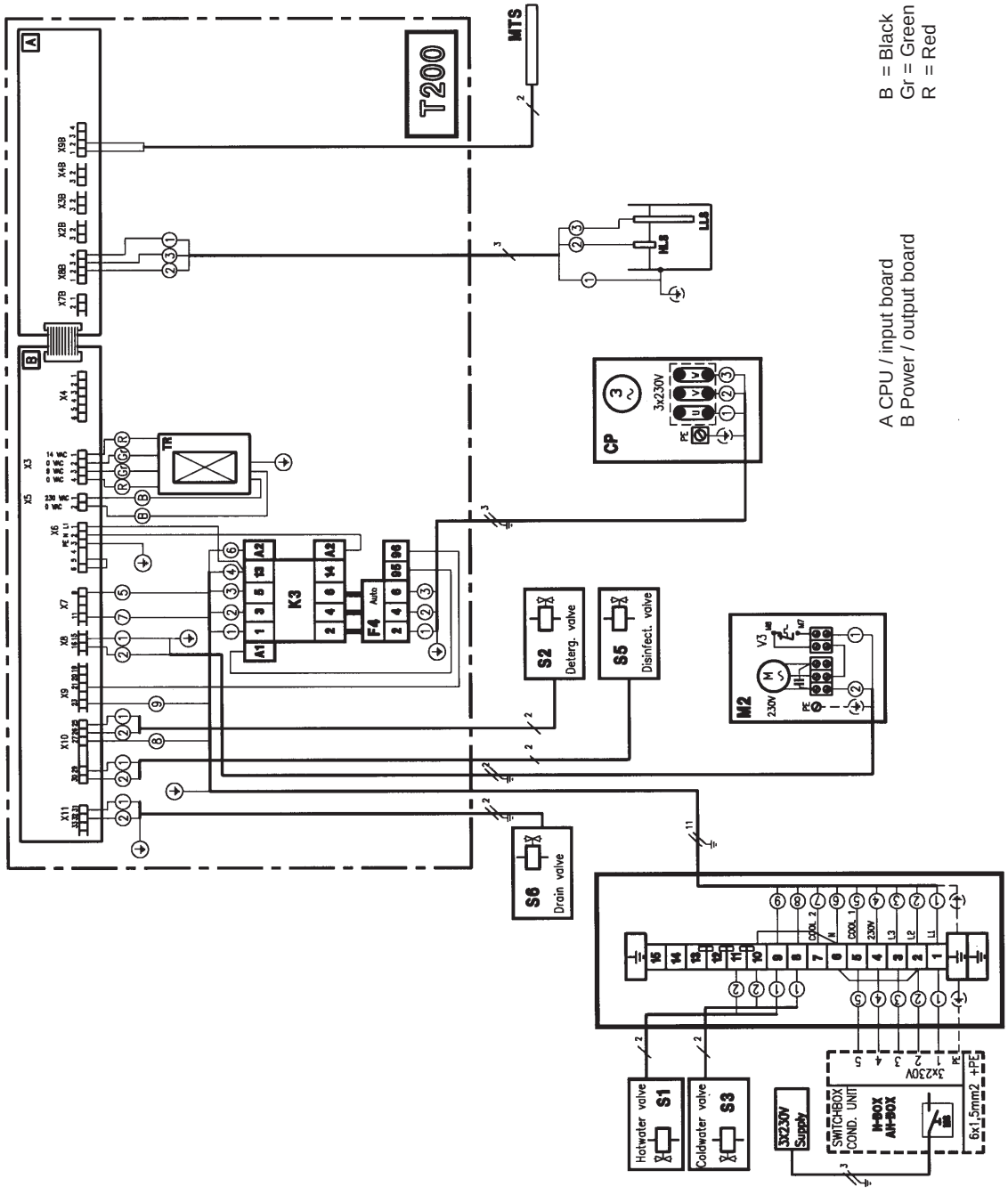
Wiring diagram Hygenius T200 + Pre-Box 3 x 400 V + N manual (powder) dosing only



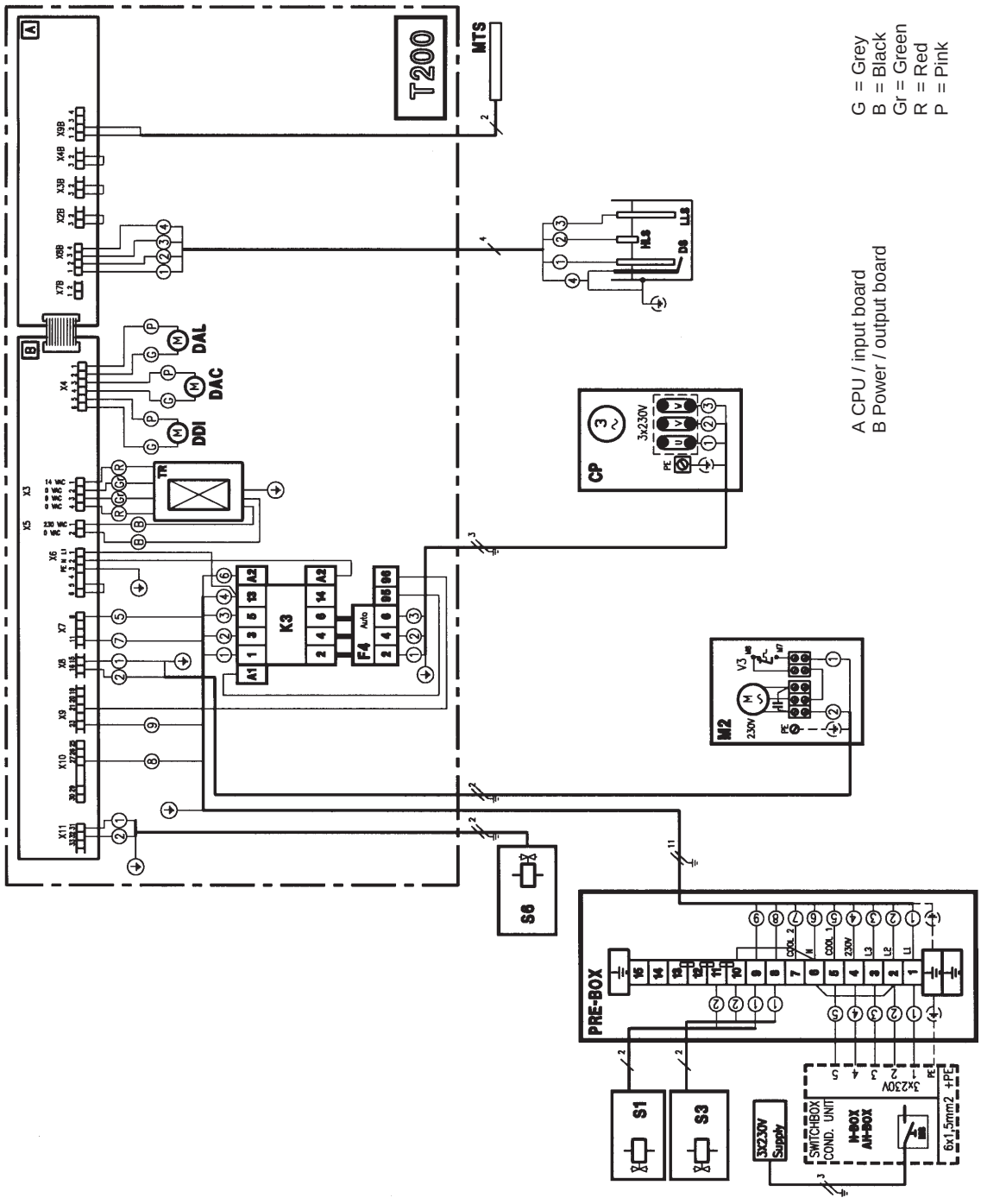
Wiring diagram Hygenius T200 + Pre-Box 3 x 400 V + N automatic (liquid) dosing only



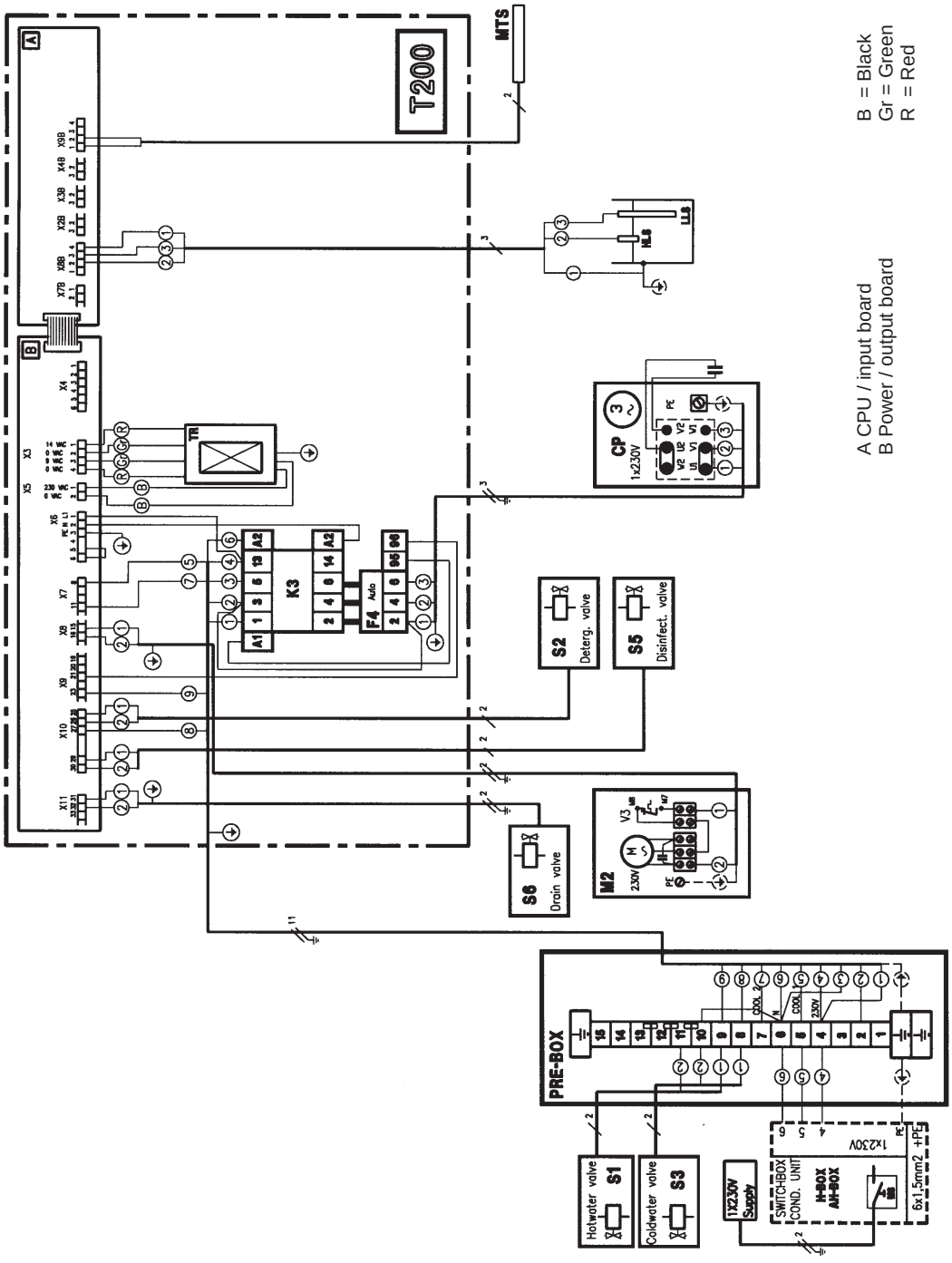
Wiring diagram Hygenius T200 + Pre-Box 3 x 230 V + N manual (powder) dosing only



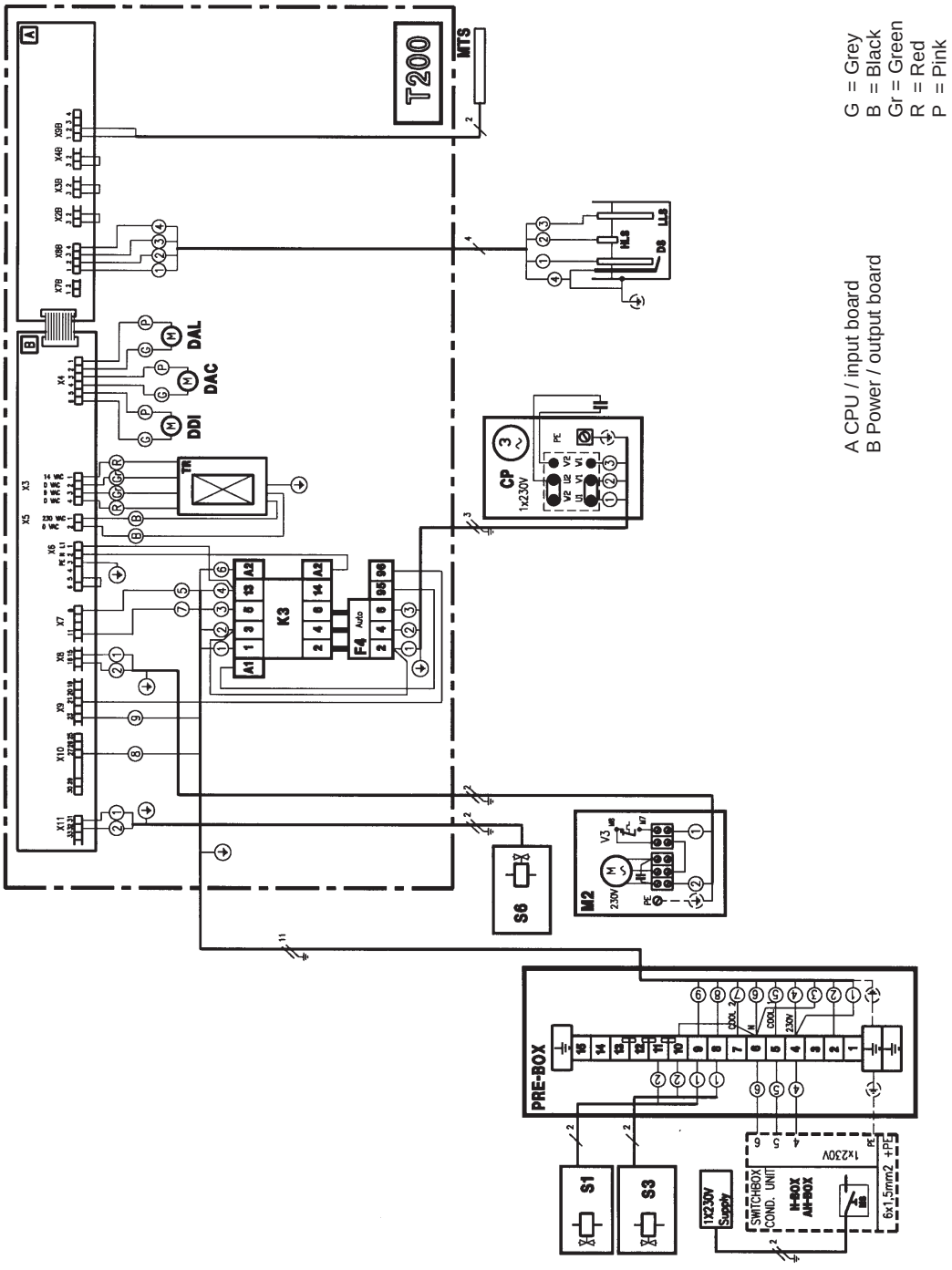
Wiring diagram Hygenius T200 + Pre-Box 3 x 230 V + N automatic (liquid) dosing only



Wiring diagram Hygenius T200 + Pre-Box 1 x 230 V + N
manual (powder) dosing only



Wiring diagram Hygenius T200 + Pre-Box 1 x 230 V + N automatic (liquid) dosing only



Hygenius tanks + ProfiCool 2000

Wiring Diagram

H-Box, 3 x 400 V + N

Selection condensing unit & wiring diagram

Condensing unit	Wiring Diagram H-Box
PRB/1/H8/S14/4	H-Box,1 fan (1 phase), without receiver
PRB/1/H8/S19/4	H-Box,1 fan (1 phase), without receiver
PRB/1/H8/S21/4	H-Box,1 fan (1 phase), without receiver
PRB/1/M8/S26/4	H-Box,1 fan (1 phase), without receiver
PRB/1/M8/S30/4	H-Box,1 fan (1 phase), without receiver
PRB/1/M8/S38/4	H-Box,1 fan (1 phase), without receiver
PRB/2/S9/S45/4	H-Box, 2 fans (1 phase), without receiver
PRB/2/S9/S56/4	H-Box, 2 fans (1 phase), thermistor control unit, without receiver
PRB/2/V6/S75/4	H-Box, 2 fans (1 phase), thermistor control unit, without receiver
PRB/2/W9/S92/4	H-Box, 2 fans (1 phase), thermistor control unit, without receiver
PRR/1/H8/S14/4	H-Box, 1 fan (1 phase), with receiver
PRR/1/H8/S19/4	H-Box, 1 fan (1 phase), with receiver
PRR/1/H8/S21/4	H-Box, 1 fan (1 phase), with receiver
PRR/1/M8/S26/4	H-Box, 1 fan (1 phase), with receiver
PRR/1/M8/S30/4	H-Box, 1 fan (1 phase), with receiver
PRR/1/M9/S38/4	H-Box, 1 fan (1 phase), with receiver
PRR/2/S9/S45/4	H-Box, 2 fans (1 phase), with receiver
PRR/2/S9/S56/4	H-Box, 2 fans (1 phase), thermistor control unit, with receiver
PRR/2/V6/S75/4	H-Box, 2 fans (1 phase), thermistor control unit, with receiver
PRR/2/W9/S92/4	H-Box, 2 fans (1 phase), thermistor control unit, with receiver



AH-Box, 3 x 400 V + N

Selection condensing unit & wiring diagram

Condensing unit	Wiring Diagram AH-Box
PRR/1/H8/S14/4	AH-Box, 1 fan (1 phase), with receiver
PRR/1/H8/S19/4	AH-Box, 1 fan (1 phase), with receiver
PRR/1/H8/S21/4	AH-Box, 1 fan (1 phase), with receiver
PRR/1/M8/S26/4	AH-Box, 1 fan (1 phase), with receiver
PRR/1/M8/S30/4	AH-Box, 1 fan (1 phase), with receiver
PRR/1/M9/S38/4	AH-Box, 1 fan (1 phase), with receiver
PRR/2/S9/S45/4	AH-Box, 2 fans (1 phase), with receiver
PRR/2/S9/S56/4	AH-Box, 2 fans (1 phase), thermistor control unit, with receiver
PRR/2/V6/S75/4	AH-Box, 2 fans (1 phase), thermistor control unit, with receiver
PRR/2/W9/S92/4	AH-Box, 2 fans (1 phase), thermistor control unit, with receiver

DH-Box, 3 x 400 V + N

Selection condensing unit & wiring diagram

Condensing unit	Wiring Diagram DH-Box
PRR/1/H8/S14/4	DH-Box, 2 fans (1 phase), with receivers
PRR/1/H8/S19/4	DH-Box, 2 fans (1 phase), with receivers
PRR/1/H8/S21/4	DH-Box, 2 fans (1 phase), with receivers
PRR/1/M8/S26/4	DH-Box, 2 fans (1 phase), with receivers
PRR/1/M8/S30/4	DH-Box, 2 fans (1 phase), with receivers
PRR/1/M9/S38/4	DH-Box, 2 fans (1 phase), with receivers
PRR/2/S9/S45/4	DH-Box, 4 fans (1 phase), with receivers
PRR/2/S9/S56/4	DH-Box, 4 fans (1 phase), thermistor control unit, with receivers
PRR/2/V6/S75/4	DH-Box, 4 fans (1 phase), thermistor control unit, with receivers
PRR/2/W9/S92/4	DH-Box, 4 fans (1 phase), thermistor control unit, with receivers



List of abbreviations

Needed for the explanation of the electrical diagrams.

Supply and control **Old codes**		
BU1	Contactor cleaning in MTR-30	
BU2	Contactor cooling in MTR-30	
BU3	Contactor stirring in MTR-30	
F	Fuse control current	
L1	Phase 1 (230 V of 400 V)	
L2	Phase 2 (230 V of 400 V)	
L3	Phase 3 (230 V of 400 V)	
N(SL)	Neutral	
PE	Earth connection	
MS	Main switch	
MF	Main fuse	
TS	Sensor MTR-30	
TR	Transformer	
Cooling		
Rs	Starting resistances	AW
BHP	Booster heater pressostat	
BHS	Booster heater sensor	
BP(1)(2)	Low pressure pressostat	
K1	Contactor for compressor	C1
K1	Contactor for compressor 1	1C1
K7	Contactor for compressor 1 via starting resistances	1C3
K5	Contactor for compressor 2	2C1
2C3	Contactor for compressor 2 via starting resistances	
C6	Contactor fan(s) (used by heat recovery)	
C7	Contactor for water chiller pump	
CBP	Circulation pump (used by heat recovery)	
CO(1)(2)	Compressor	
CSC(1)(2)	Compressor start contactor	
K2	Pump down relay	D1
D7		
K8	Timer 2nd condensing unit	D9
K4	Timer starting resistances	D10



1E1	Thermic control compressor 1
F7	
1E2	Thermic control compressor 2
F5	
1E7	Thermic control water chiller pump
FA(1)(2)	Fan motor
FC(1)(2)	Fan contactor
(1)(2)	Solenoid valve (refrigeration)
HP(1)(2)	High pressure pressostat
(1)(2)	Fan pressostat
MK	Kriwan module
MTS	Milk temperature sensor
P	Pressostat high/low
R	Carter heating compressor
ST	Thermostat
V(1)(2)	Thermic protection fan
V4	Thermic protection (in switch box with starting resistances)
WCP	Water chiller pump

Cleaning

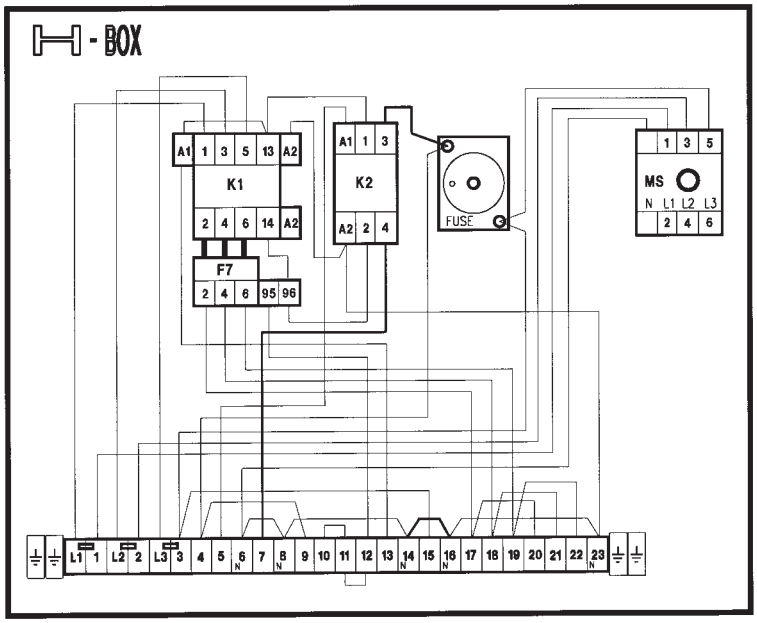
CP	Cleaning pump
DS	Dosing switch (Alkaline/Acid)
F1	Fuse cleaning unit
F4	Thermic control cleaning pump
H1	Control lamp - cleaning in operation
HLS	High level sensor
LLS	Low level sensor
M2	Agitator motor
M3	Program timer cleaning
K3	Contactor for cleaning pump
K6	Contactor for booster heater
S1	Hot water valve
S2	Detergent valve
S3	Cold water valve
S5	Disinfection valve
S6	Drain valve
S7	Alkaline valve Everclean
S8	Acid valve Everclean



V3	Thermic protection for agitator motor

Components	
AH-BOX	Switch box with starting resistances and main switch for 1 compressor
DH-BOX	Switch box with main switch for 2 compressors
H-BOX	Switch box with main switch for 1 compressor
MTR-30/5	Box for controlling and operation
	Cleaning/controlling device
PRE-BOX	External connection box
TWA-PLUS	Cleaning unit

Switch box H-Box

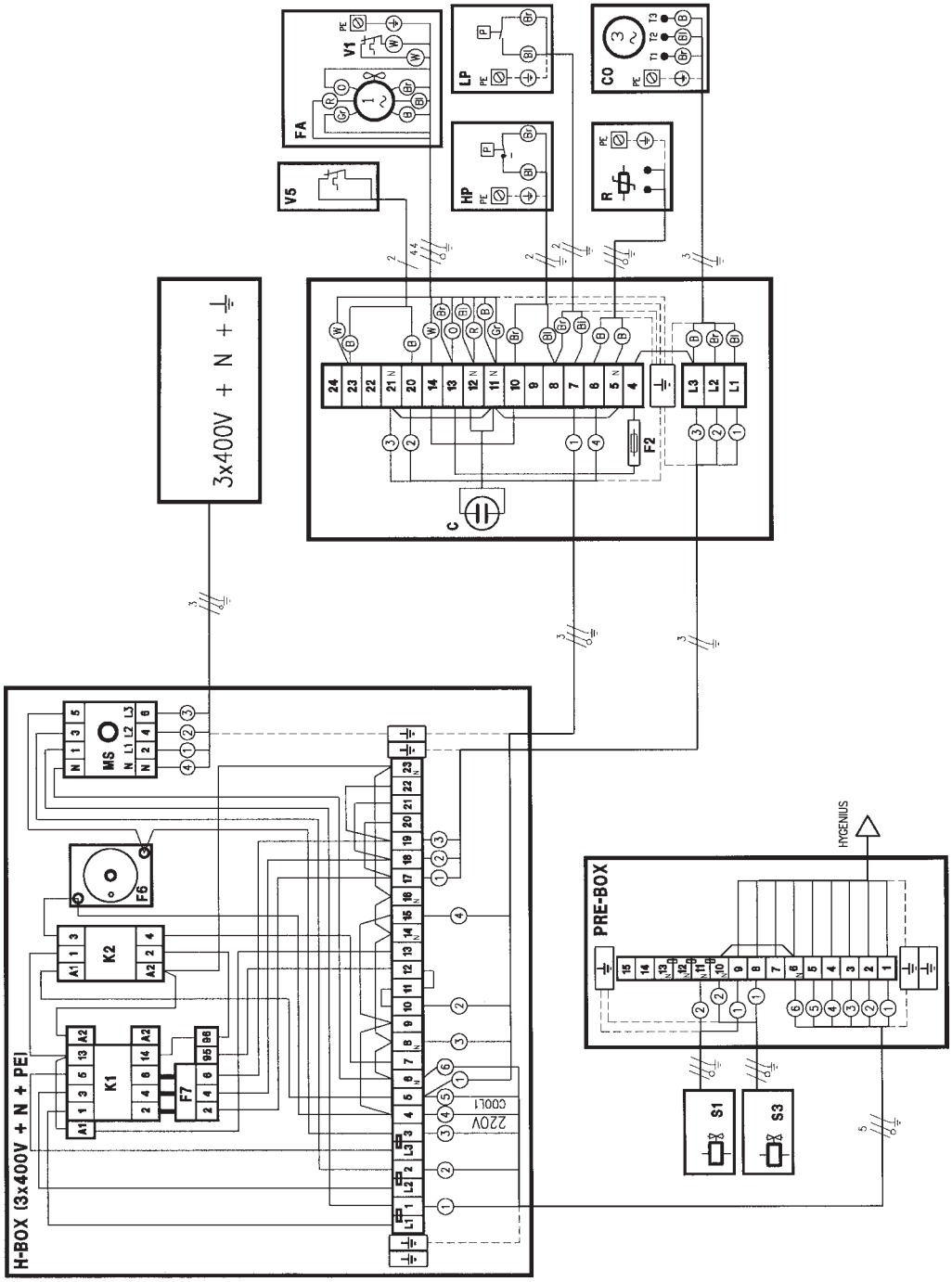


Terminal Nr	Connection for	Terminal Nr	Connection for
L1		11	Pressostat
1		12	
L2		13	Possible water pump (heat recovery)
2		14	
L3		15	Crankcase heater
3		16	
4	Control current (via fuse)	17	Compressor
5	Cooling signal	18	
6	Neutral phase	19	
7	Solenoid valve	20	Compressor)
8		21	
9		22	Fan motor(s)
10		23	Neutral phase

The main supply is to be connected to the switch (MS) terminals N, L1, L2 L3.

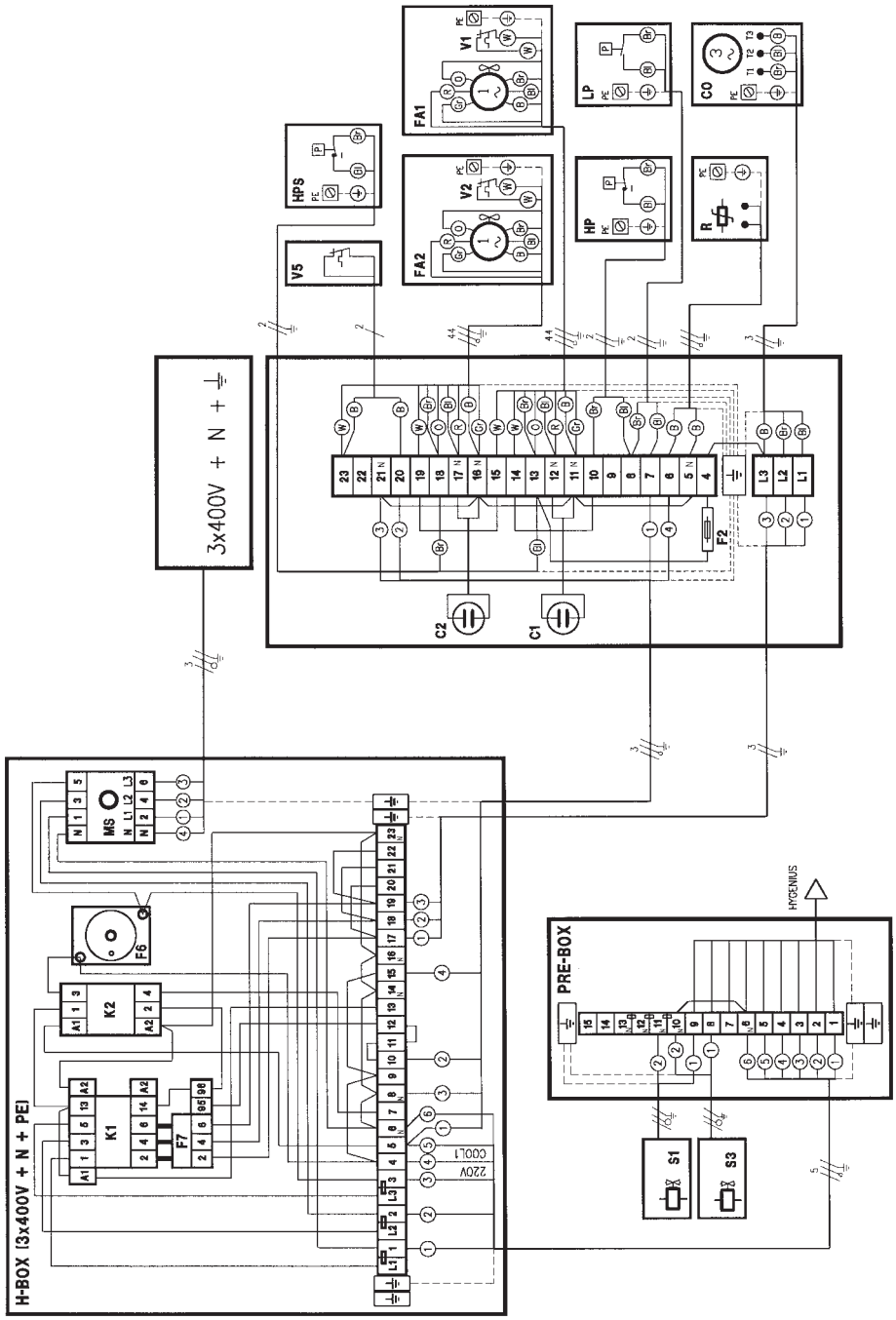
Wiring diagram Hygenius tanks + ProfiCool 2000

H-Box, 1 fan (1 phase), without receiver



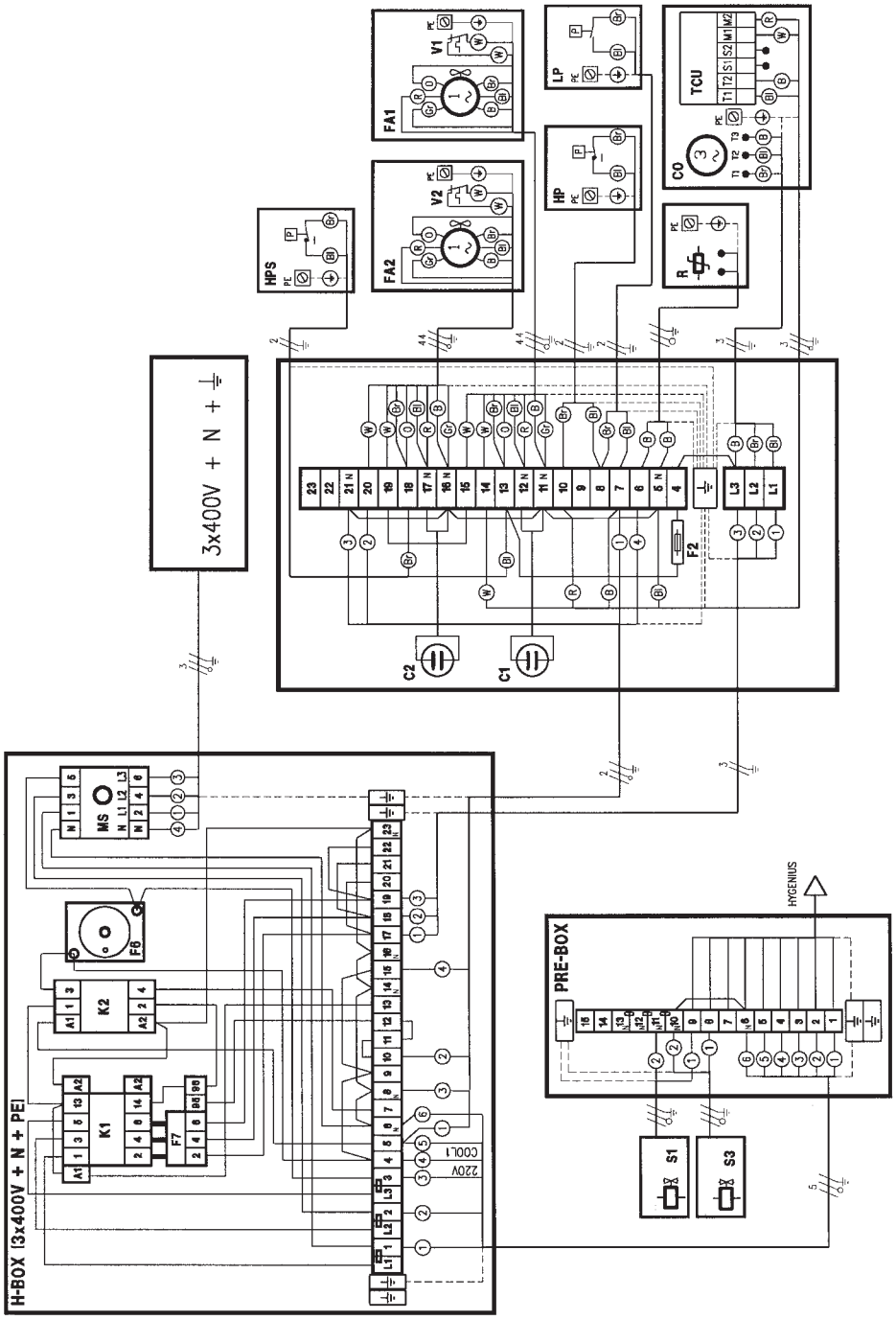
Wiring diagram Hygenius tanks + ProfiCool 2000

H-Box, 2 fans (1 phase), without receiver



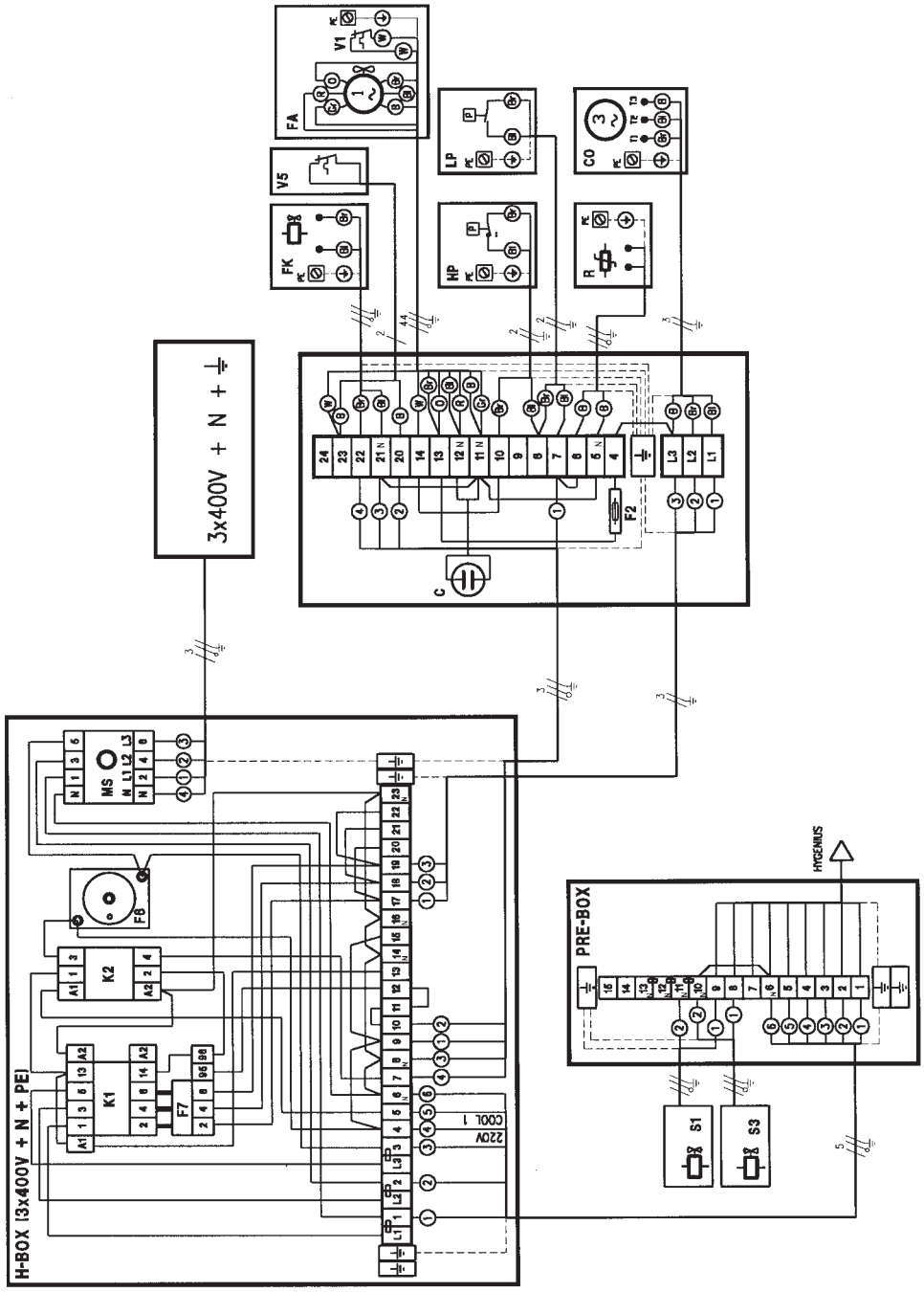
Wiring diagram Hygenius tanks + ProfiCool 2000

H-Box, 2 fans (1 phase), thermistor control unit, without receiver



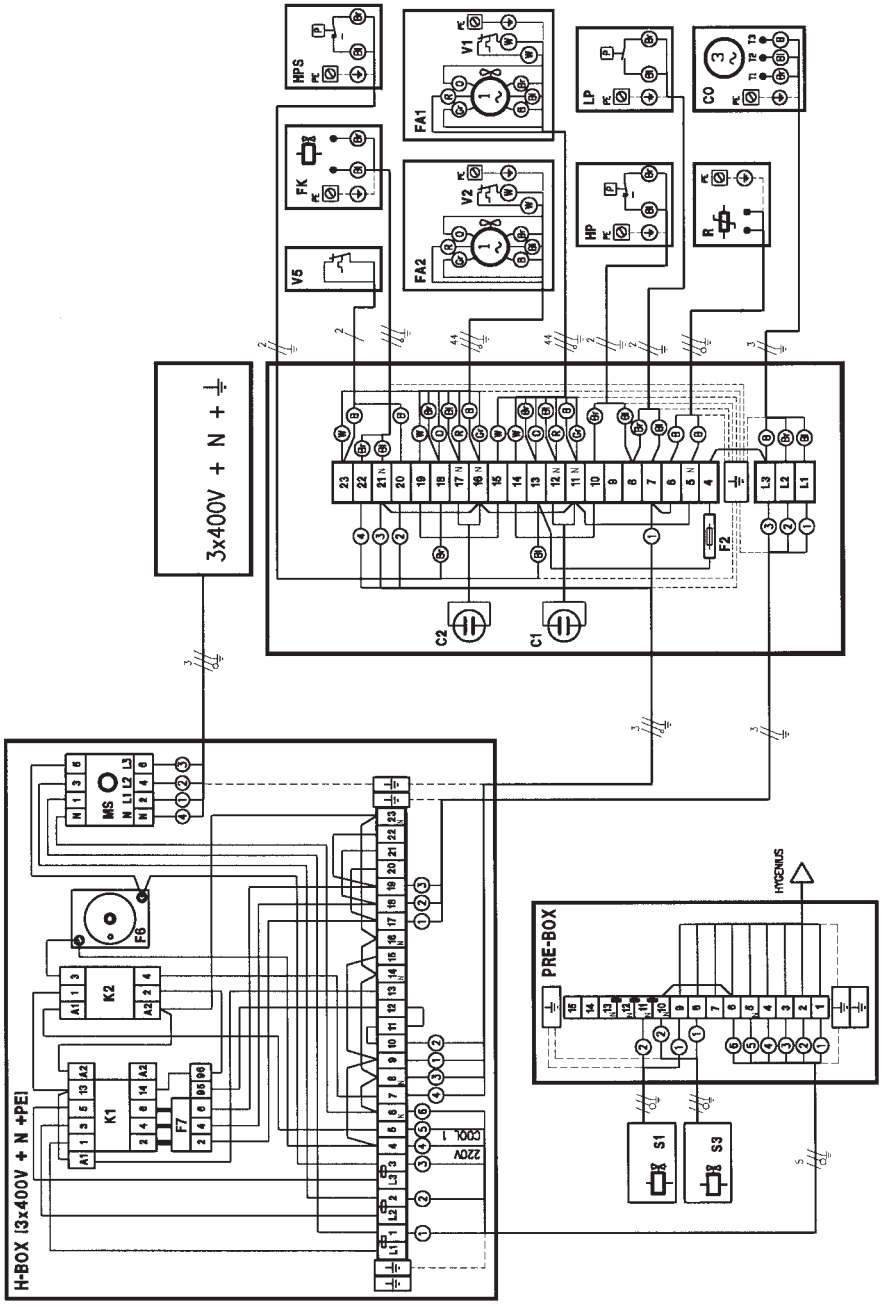
Wiring diagram Hygenius tanks + ProfiCool 2000

H-Box, 1 fan (1 phase), with receiver



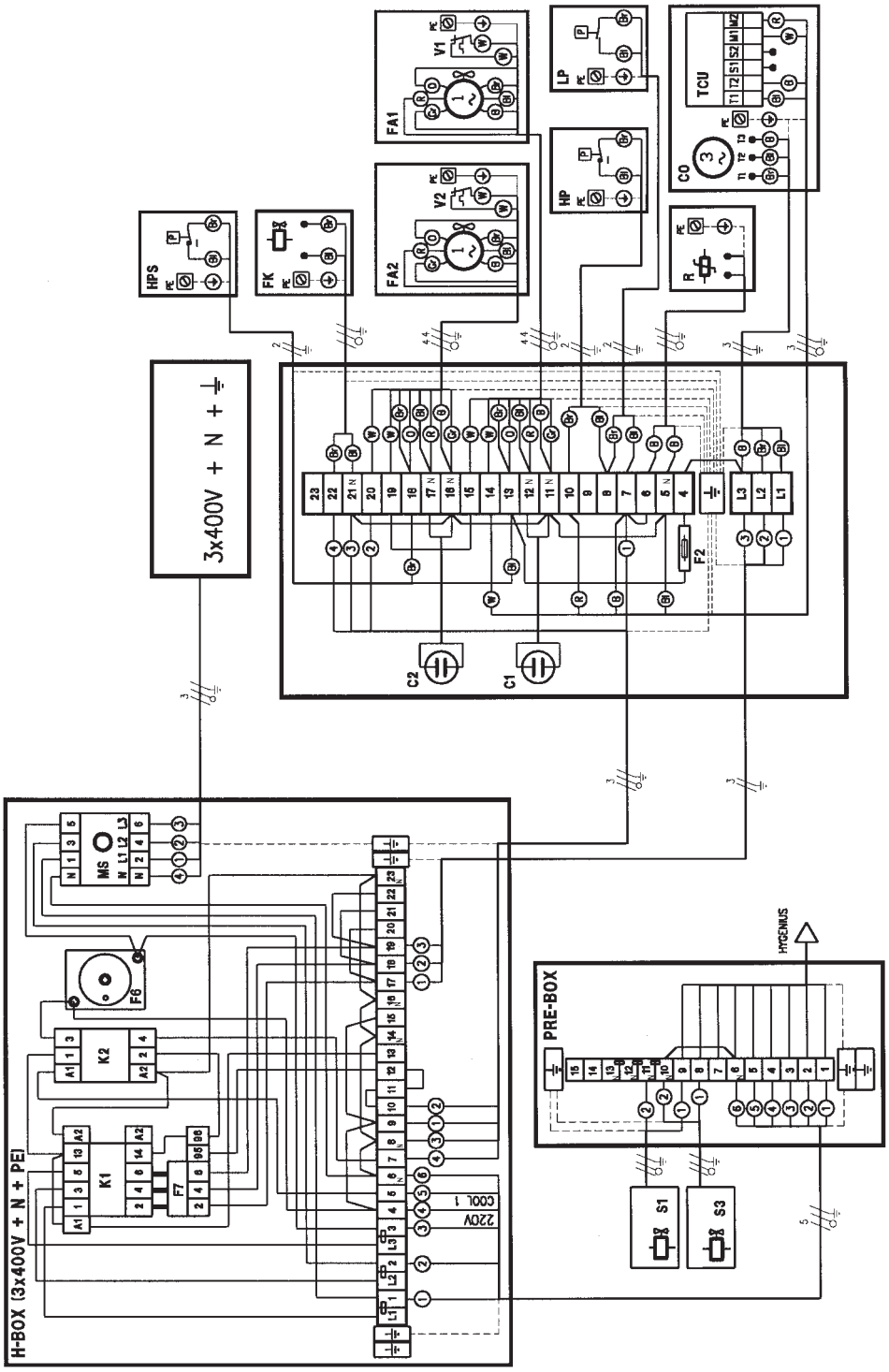
Wiring diagram Hygenius tanks + ProfiCool 2000

H-Box, 2 fans (1 phase), with receiver



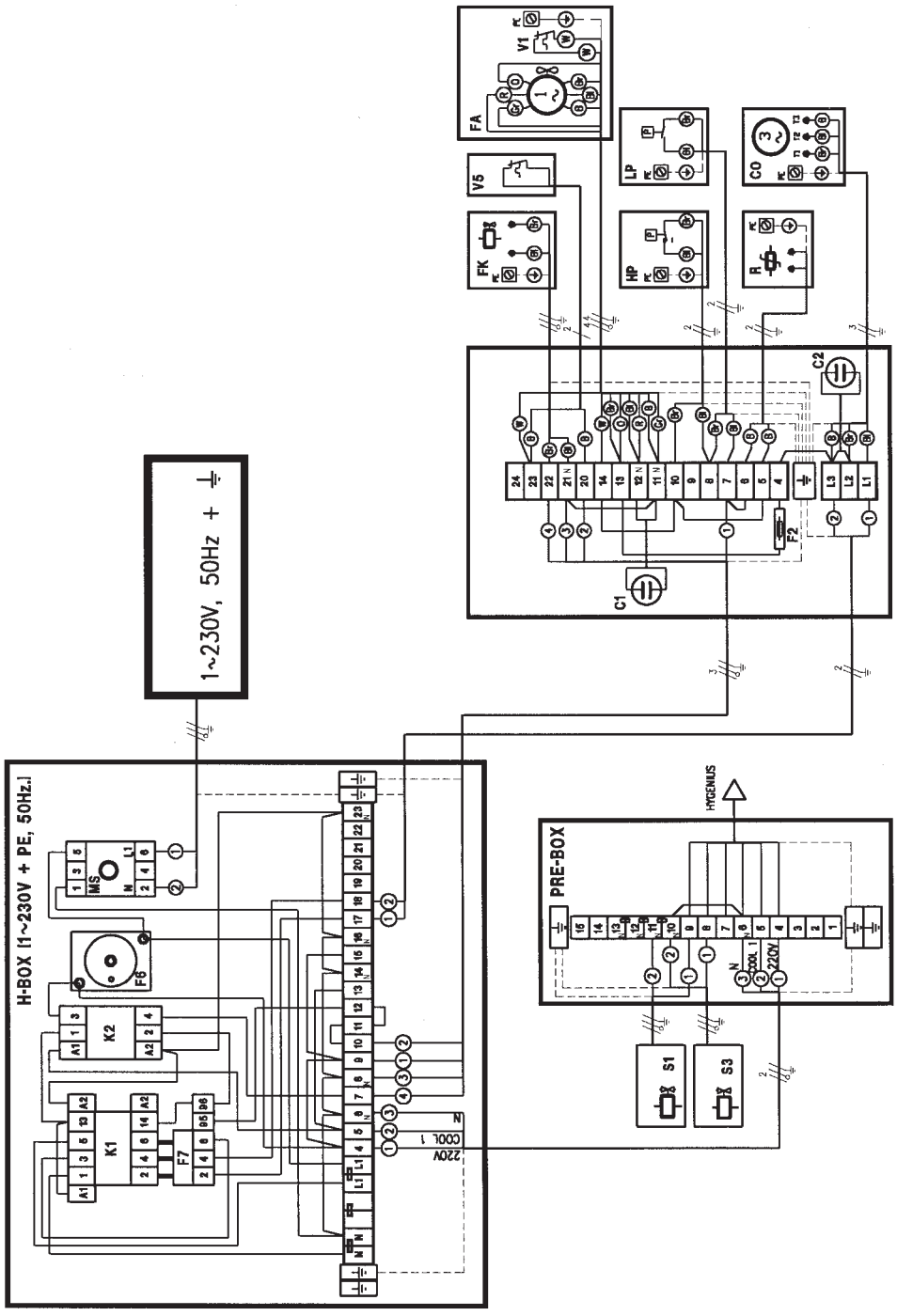
Wiring diagram Hygenius tanks + ProfiCool 2000

H-Box, 2 fans (1 phase), thermistor control unit, with receiver

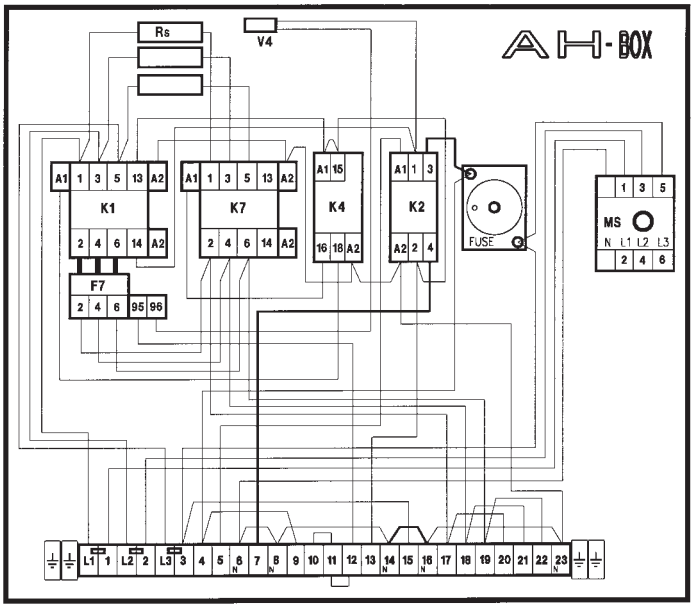


Wiring diagram Hygenius tanks + ProfiCool 2000

H-Box, 1 fan (1 phase), with receiver



Switch box AH-Box

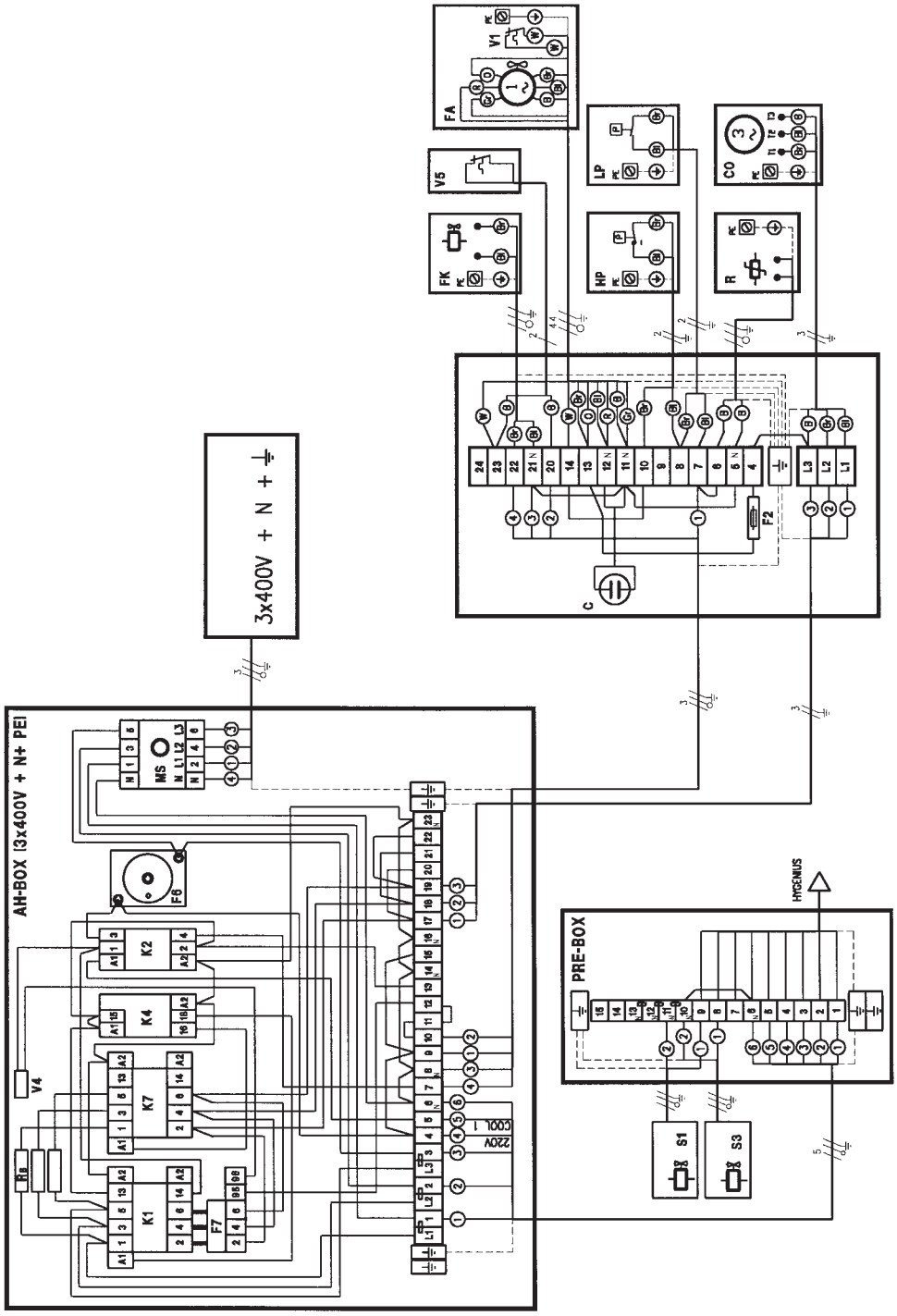


Terminal Nr	Connection for	Terminal Nr	Connection for
L1		11	Pressostat
1		12	
L2		13	Possible waterpump (heatrecovery)
2		14	
L3		15	Crankcase heater
3		16	
4	Control current (via fuse)	17	Compressor
5	Cooling signal	18	
6	Neutral phase	19	
7	Solenoid valve	20	Compressor)
8		21	
9		22	Fan motor(s)
10		23	Neutral phase

The main supply is to be connected to the main switch (MS) terminals N, L1, L2, L3.

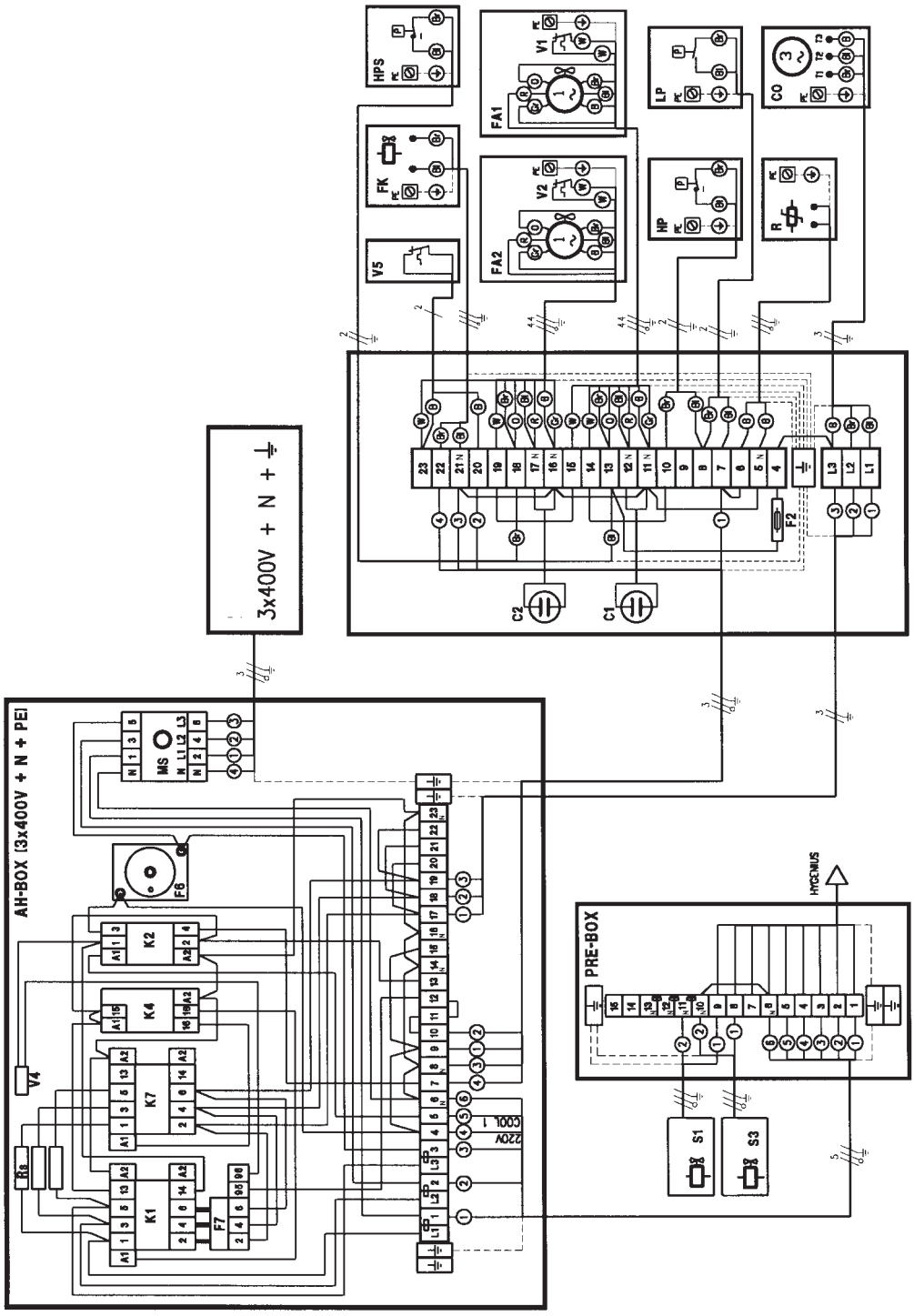
Wiring diagram Hygenius tanks + ProfiCool 2000

AH-Box, 1 fan (1 phase), with receiver



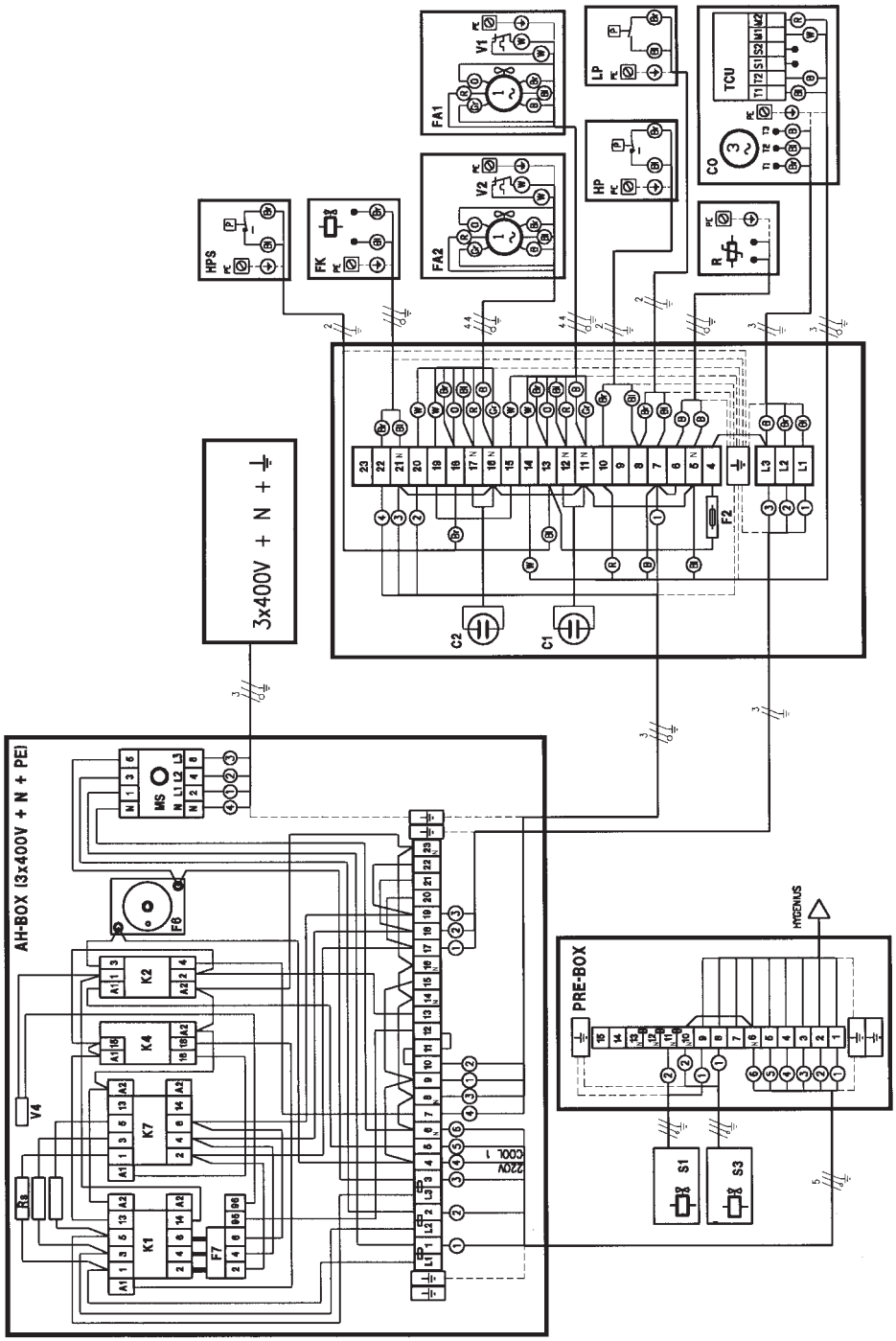
Wiring diagram Hygenius tanks + ProfiCool 2000

AH-Box, 2 fans (1 phase), with receiver

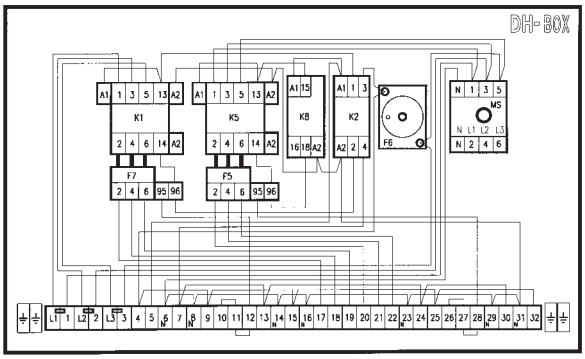


Wiring diagram Hygenius tanks + ProfiCool 2000

AH-Box, 2 fans (1 phase), thermistor control unit, with receiver



Switch box DH-Box

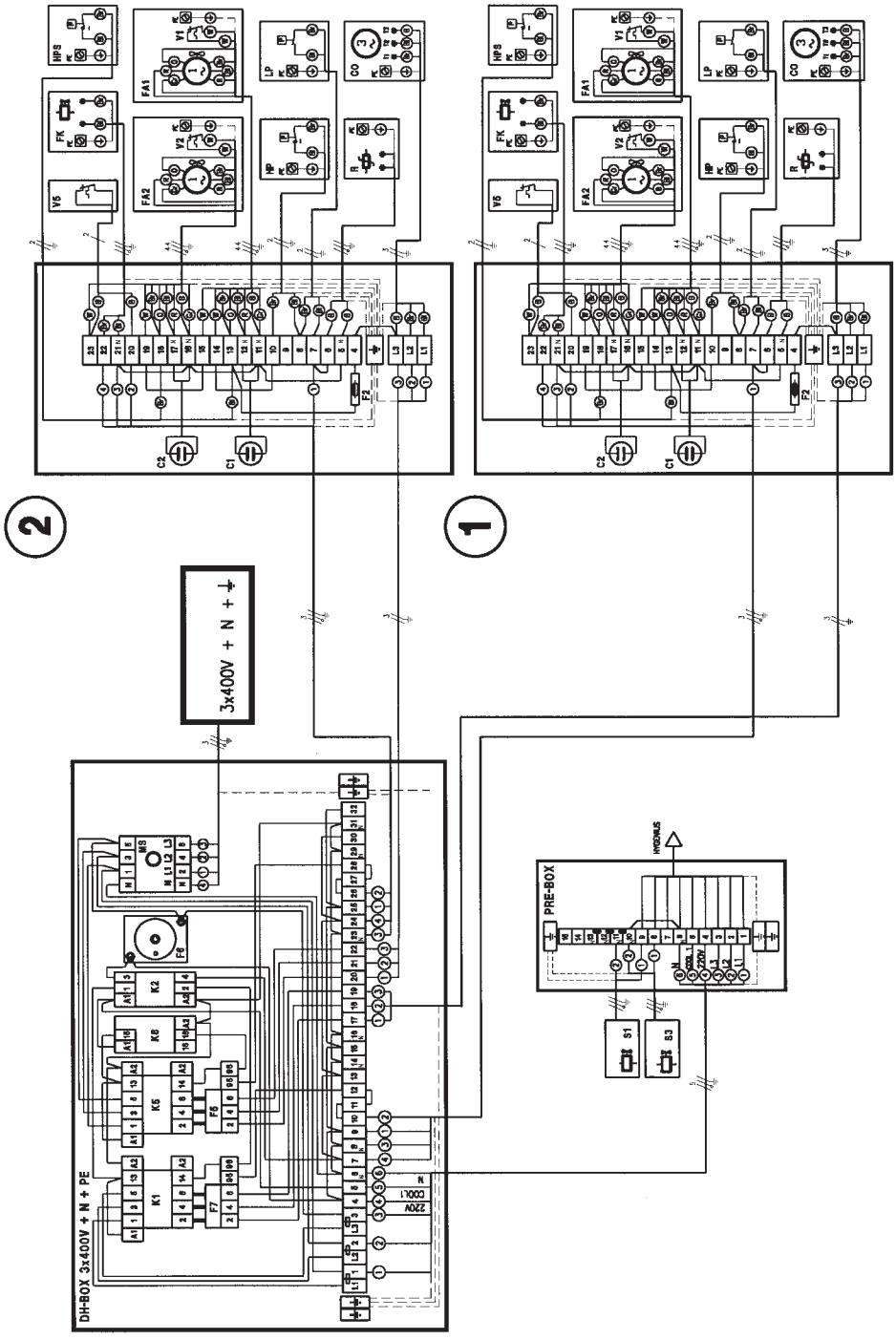


Terminal Nr	Connection for	Terminal Nr	Connection for
L1		17	Compressor CU I
1		18	
L2		19	Compressor CU II
2		20	
L3		21	
3		22	
4	Control current (via fuse)	23	Solenoid valve CU II
5	Cooling signal	24	LP pressostat CU II
6	Neutral phase	25	
7	Solenoid valve CU I	26	Thermic protection CU II
8		27	
9	LP pressostat CU I	28	
10	Thermic protection CU I	29	
11		30	
12		31	
13		32	
14		33	
15			
16			

The main switch is to be connected to the main supply (MS) N, L1, L2, L3.

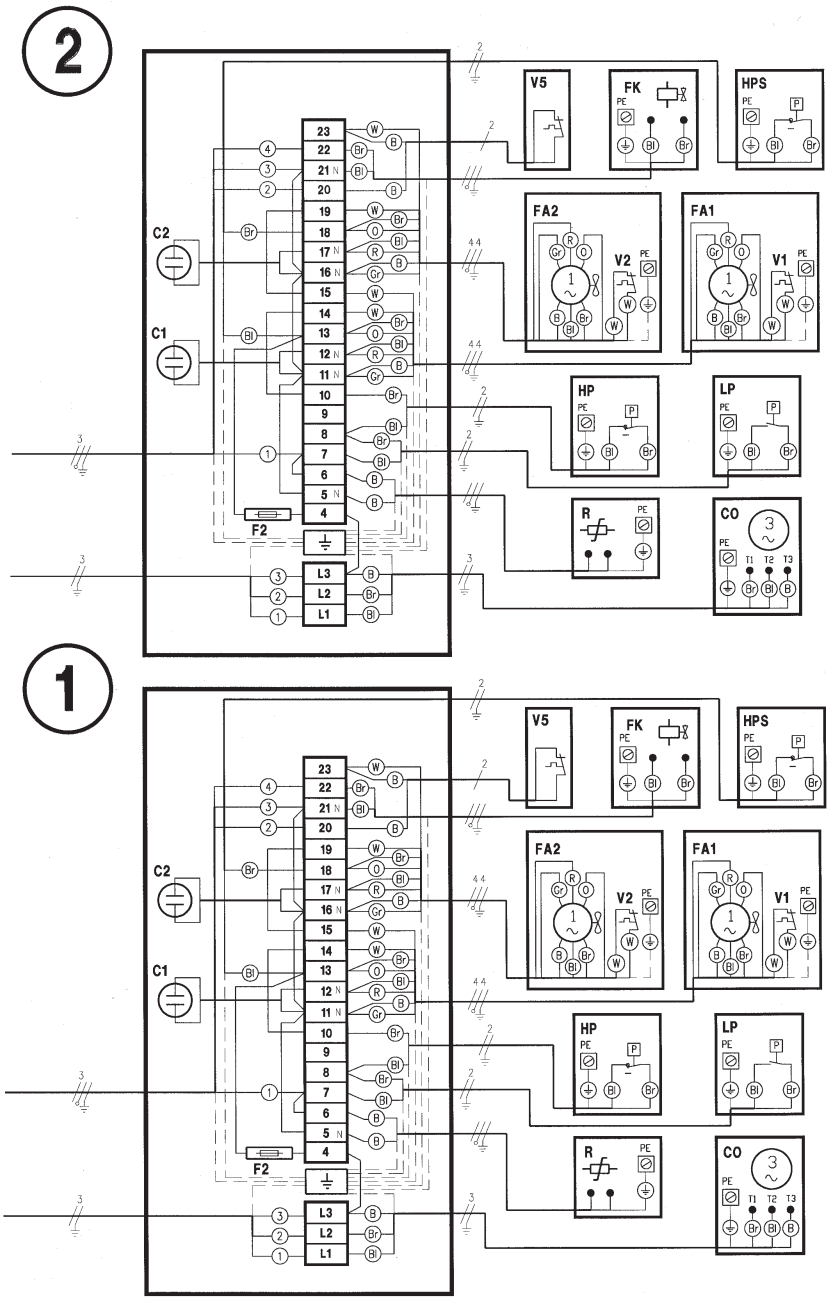
Wiring diagram Hygenius tanks + ProfiCool 2000

DH-Box, 4 fans (1 phase), with receivers 1(2)



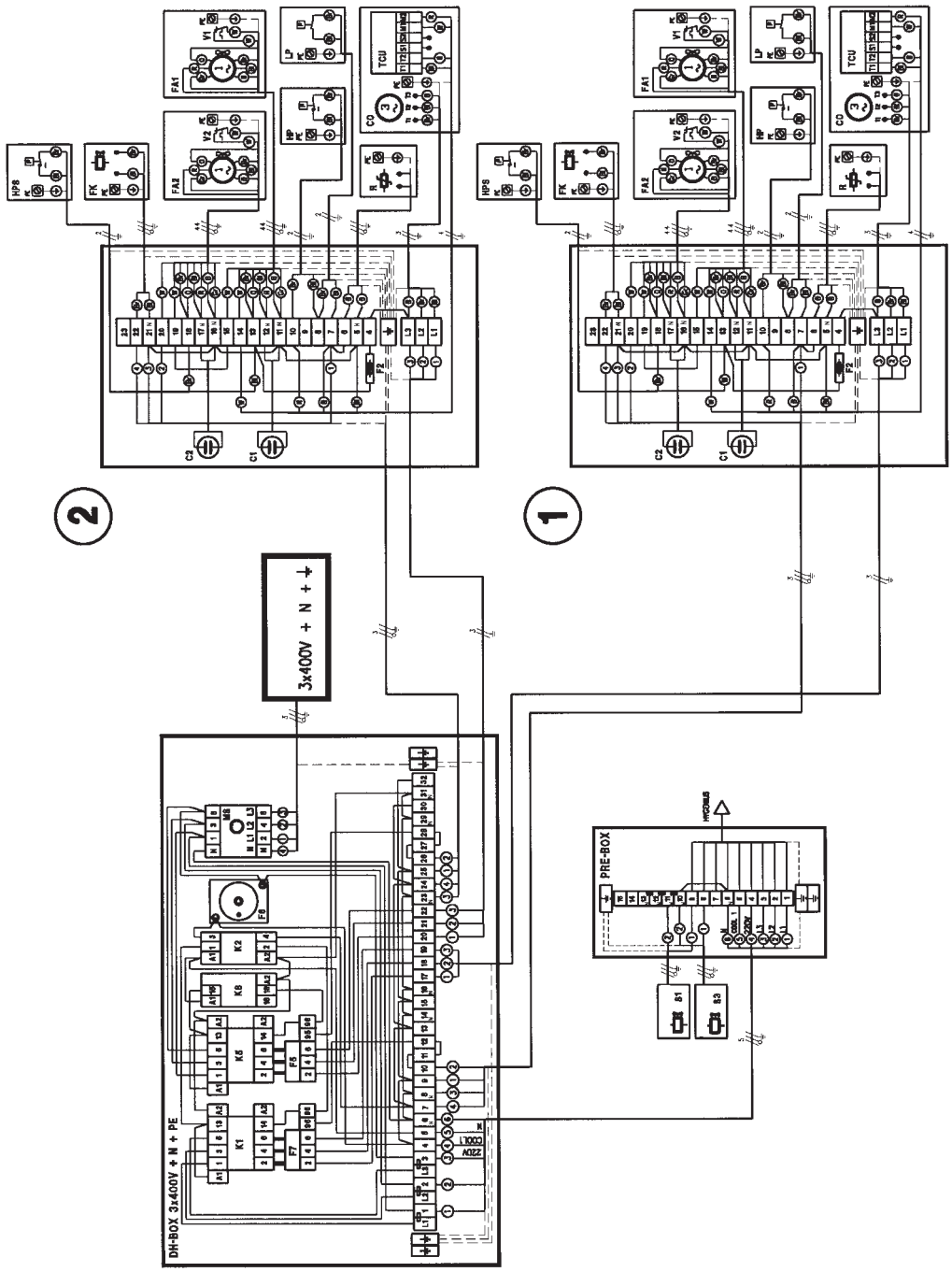
Wiring diagram Hygenius tanks + ProfiCool 2000

DH-Box, 4 fans (1 phase), with receivers 2(2)



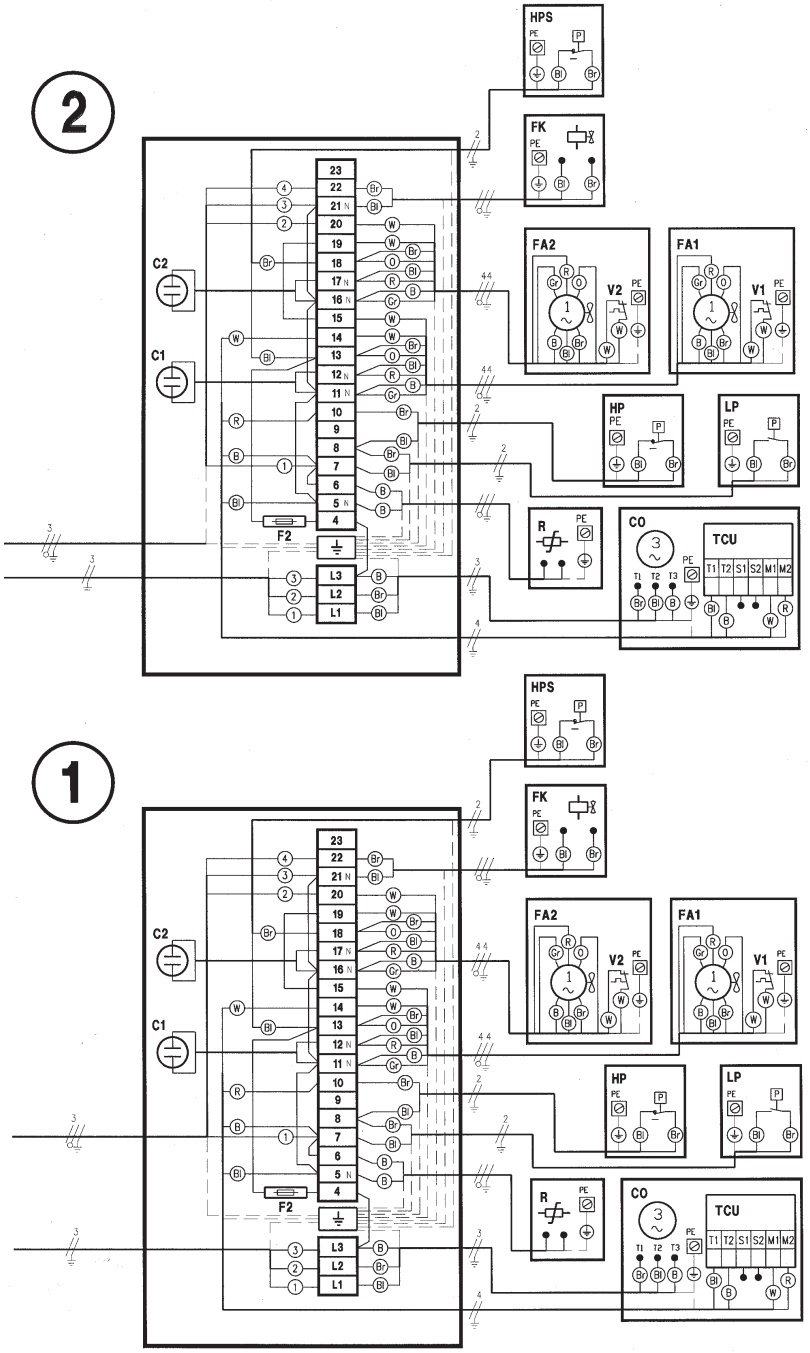
Wiring diagram Hygenius tanks + ProfiCool 2000

AH-Box, 4 fans (1 phase), thermistor control unit, with receivers 1(2)



Wiring diagram Hygenius tanks + ProfiCool 2000

AH-Box, 4 fans (1 phase), thermistor control unit, with receivers 2(2)



Hygenius tanks + ProfiCool 2000

Wiring Diagram

H-Box, 1 x 230 V + N

Selection condensing unit & wiring diagram

Condensing unit	Wiring Diagram H-Box
PRR/1/H8/R14/5	H-Box, 1 fan (1 phase), with receiver
PRR/1/H8/R28/5	H-Box, 1 fan (1 phase), with receiver
PRR/1/H8/R34/5	H-Box, 1 fan (1 phase), with receiver
PRR/1/M8/R40/5	H-Box, 1 fan (1 phase), with receiver
PRR/1/M8/R47/5	H-Box, 1 fan (1 phase), with receiver

DH-Box, 1 x 230 V + N

Selection condensing unit & wiring diagram

Condensing unit	Wiring Diagram H-Box
PRR/1/H8/R14/5	DH-Box, 2 fans (1 phase), with receivers
PRR/1/H8/R28/5	DH-Box, 2 fans (1 phase), with receivers
PRR/1/H8/R34/5	DH-Box, 2 fans (1 phase), with receivers
PRR/1/M8/R40/5	DH-Box, 2 fans (1 phase), with receivers
PRR/1/M8/R47/5	DH-Box, 2 fans (1 phase), with receivers



List of abbreviations

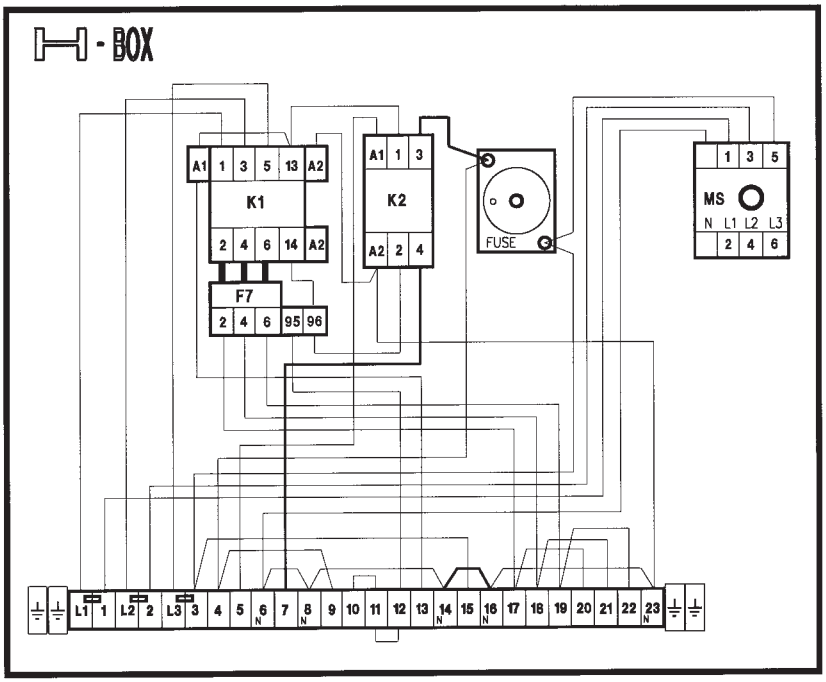
Needed for the explanation of the electrical diagrams.

Supply and control **Old codes**		
BU1	Contactor cleaning in MTR-30	
BU2	Contactor cooling in MTR-30	
BU3	Contactor stirring in MTR-30	
F	Fuse control current	
L1	Phase 1 (230 V of 400 V)	
L2	Phase 2 (230 V of 400 V)	
L3	Phase 3 (230 V of 400 V)	
N(SL)	Neutral	
PE	Earth connection	
MS	Main switch	
MF	Main fuse	
TS	Sensor MTR-30	
TR	Transformer	
Cooling		
	Starting resistances	AW
BHP	Booster heater pressostat	
	Booster heater sensor	
BP(1)(2)	Low pressure pressostat	
K1	Contactor for compressor	C1
K1	Contactor for compressor 1	1C1
K7	Contactor for compressor 1 via starting resistances	1C3
K5	Contactor for compressor 2	2C1
2C3	Contactor for compressor 2 via starting resistances	
C6	Contactor fan(s) (used by heat recovery)	
C7	Contactor for water chiller pump	
	Circulation pump (used by heat recovery)	
CO(1)(2)	Compressor	
CSC(1)(2)	Compressor start contactor	
K2	Pump down relay	D1
D7		
K8	Timer 2nd condensing unit	D9
K4	Timer starting resistances	D10
1E1	Thermic control compressor 1	
F7		
1E2	Thermic control compressor 2	
F5		
1E7	Thermic control water chiller pump	
FA(1)(2)	Fan motor	



FC(1)(2)	Fan contactor
(1)(2)	Solenoid valve (refrigeration)
HP(1)(2)	High pressure pressostat
(1)(2)	Fan pressostat
MK	Kriwan module
MTS	Milk temperature sensor
P	Pressostat high/low
R	Carter heating compressor
ST	Thermostat
V(1)(2)	Thermic protection fan
V4	Thermic protection (in switch box with starting resistances)
	Water chiller pump
Cleaning	
CP	Cleaning pump
DS	Dosing switch (Alkaline/Acid)
F1	Fuse cleaning unit
F4	Thermic control cleaning pump
H1	Control lamp - cleaning in operation
	High level sensor
	Low level sensor
M2	Agitator motor
M3	Program timer cleaning
K3	Contactor for cleaning pump
K6	Contactor for booster heater
S1	Hot water valve
S2	Detergent valve
S3	Cold water valve
S5	Disinfection valve
S6	Drain valve
S7	Alkaline valve Everclean
S8	Acid valve Everclean
V3	Thermic protection for agitator motor
Components	
AH-BOX	Switch box with starting resistances and main switch for 1 compressor
DH-BOX	Switch box with main switch for 2 compressors
H-BOX	Switch box with main switch for 1 compressor
MTR-30/5	Box for controlling and operation
	Cleaning/controlling device
PRE-BOX	External connection box
TWA-PLUS	Cleaning unit

Switch box H-Box

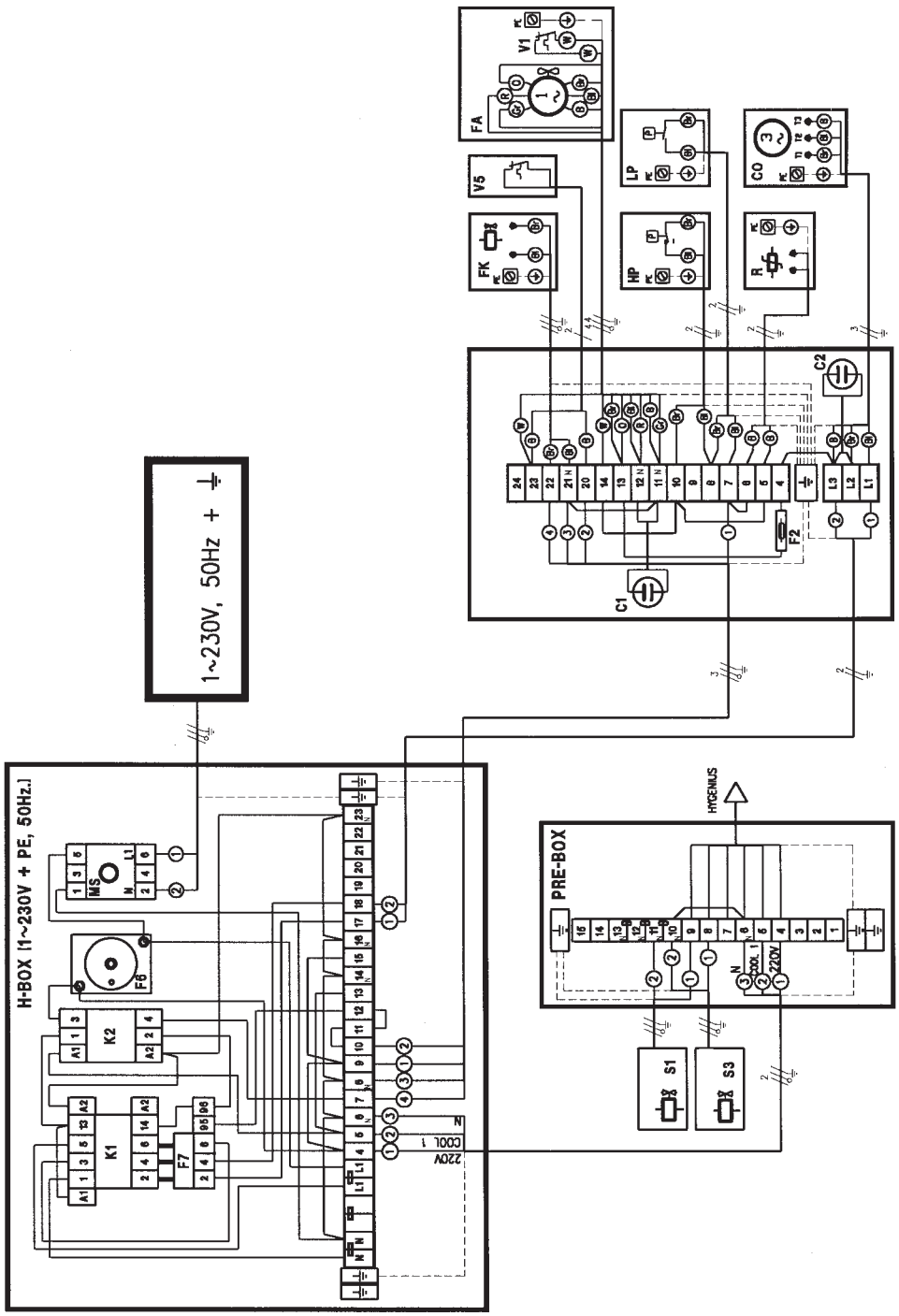


Terminal Nr	Connection for	Terminal Nr	Connection for
L1		11	Pressostat
1		12	
L2		13	Possible water pump (heat recovery)
2		14	
L3		15	Crankcase heater
3		16	
4	Control current (via fuse)	17	Compressor
5	Cooling signal	18	
6	Neutral phase	19	
7	Solenoid valve	20	Compressor)
8		21	
9		22	Fan motor(s)
10		23	Neutral phase

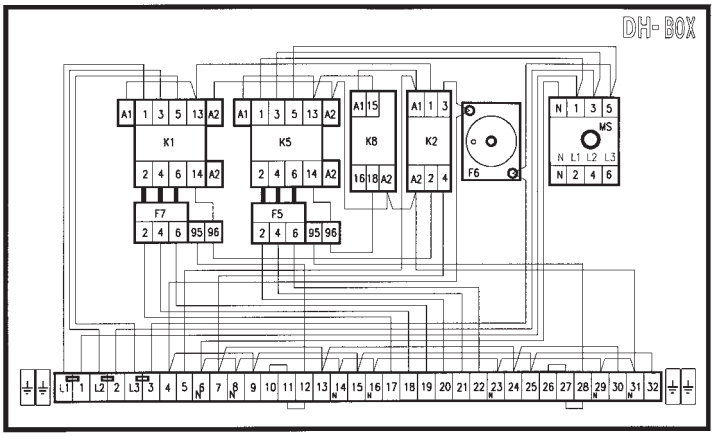
The main supply is to be connected to the main switch (MS) terminals N, L1, L2, L3.

Wiring diagram Hygenius tanks + ProfiCool 2000

H-Box, 1 fan (1 phase), with receiver



Switch box DH-Box

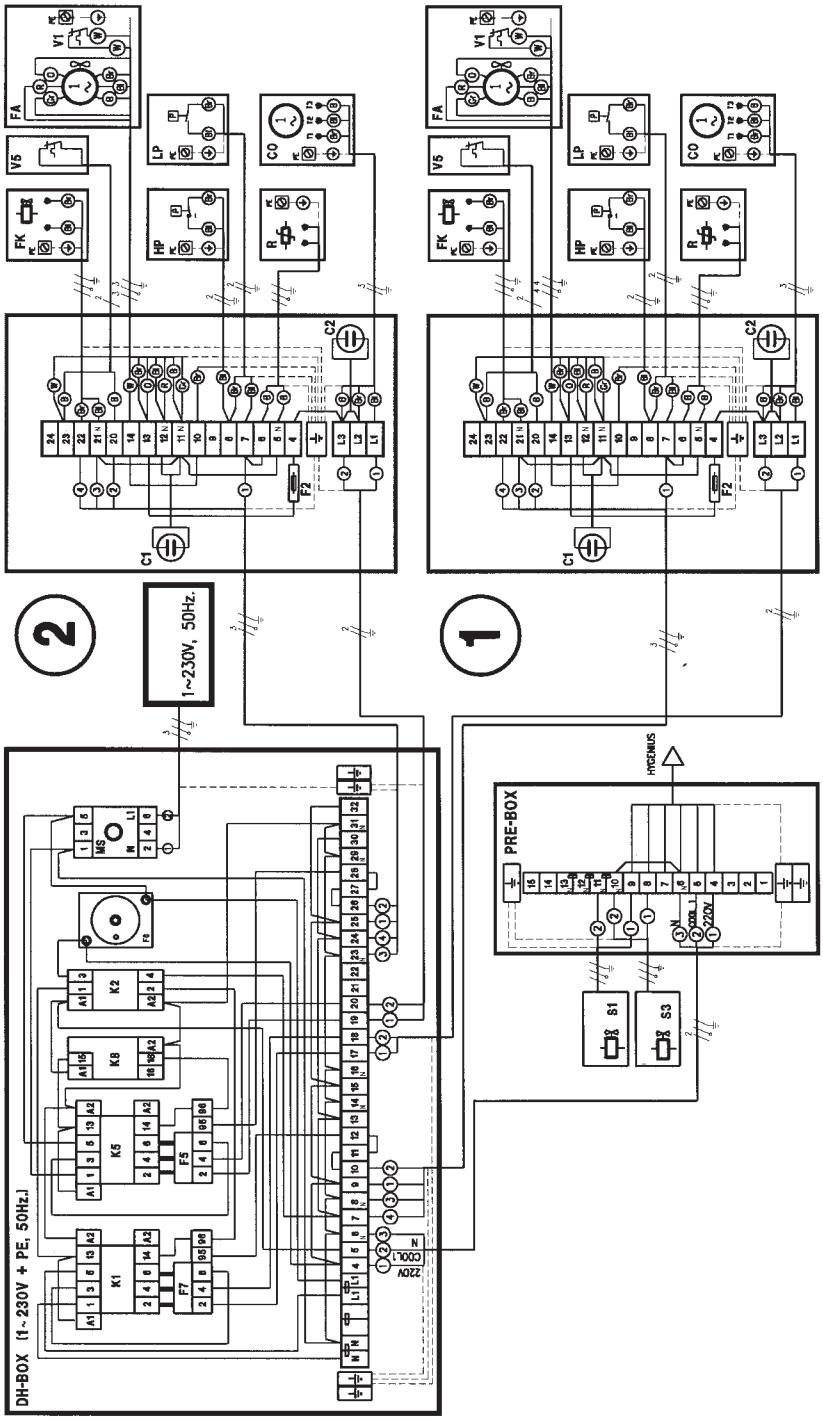


Terminal Nr	Connection for	Terminal Nr	Connection for
L1		17	Pressostat
1		18	
L2		19	Possible water pump (heat recovery)
2		20	
L3		21	Crankcase heater
3		22	
4	Control current (via fuse)	23	Compressor
5	Cooling signal	24	
6	Neutral phase	25	
7	Solenoid valve	26	Compressor)
8		27	
9		28	Fan motor(s)
10		29	
11		30	
12		31	
13		32	
14		33	
15			Neutral phase
16			

The main supply is to be connected to the main terminals N, L1, L2, L3.

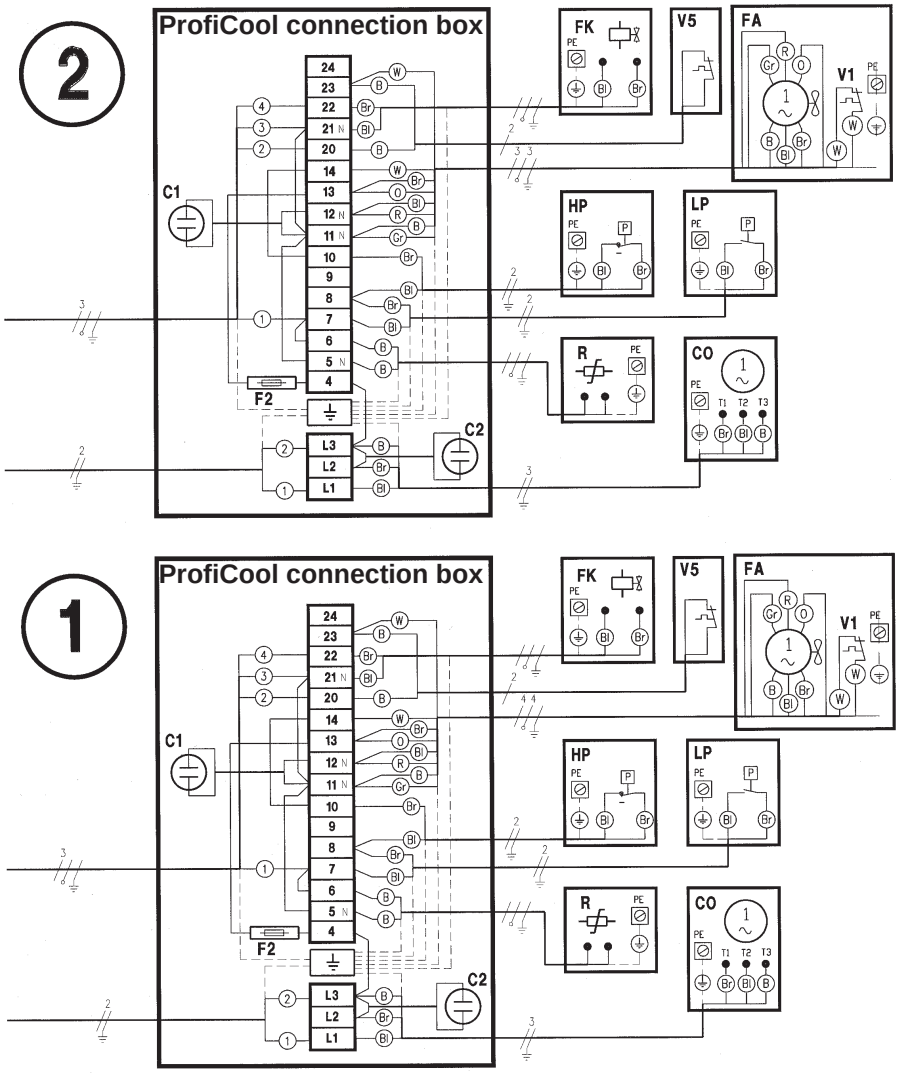
Wiring diagram Hygenius tanks + ProfiCool 2000

DH-Box, 2 fans (1 phase), with receiver 1(2)



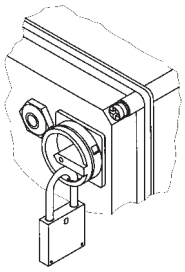
Wiring diagram Hygenius tanks + ProfiCool 2000

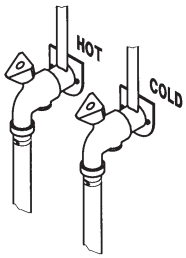
DH-Box, 2 fans (1 phase), with receiver 2(2)



Closed tanks, DX with Hygenius

Start-up





General

Before the first start-up of the installation, the water, electrical and pipe connections have to be checked.

General procedure for a new installation

The installation must be provided with the electrical supply first.

– Switch the main switch to 1 (ON). The temperature is indicated on the display of the Hygenius.

– Open the water taps. When there is no frost risk the water taps can stay open during the whole year.

The tank is now ready for start-up cooling and cleaning. Fill the installation with refrigerant, make adjustments and check the functions.

Parameter settings

The following parameters are set and tested in the factory.These settings do not have to be altered during field installation.

P27 Buffer size
P50 Cooling start
P52 Number of compressors
P53 Number of agitators
P54 Outlet position check
P60 Cleaning system
P61 Cleaning program
P62 Heater
P63 Type cleaning agent
P65 Tank size

Accordingly with P65 the following parameters are set: P20-P24, P26 and P39. These settings include standard filling volumes and drain times, but can be set individually.All the inputs are checked for correct functioning (P91).The pumps, the valves and the agitator motor are tested for their function (P90).The system is ready for on-site programming. See chapter “service” for individual parameter functions and settings.

Cooling

– Note that the tank is still filled with water.

– Start the condensing unit by pushing Cooling ‘ON’ at the panel and watch the sight glass. If the sight glass stays clear, the amount of refrigerant is sufficient.

In case the sight glass is not bubble free, connect a cylinder refrigerant to the suction Rotalock. Add the refrigerant step by step. Open the Rotalock for 30 seconds and give it two minutes to balance. Repeat this until the sight glass stays clear

Note! *Block the pressostat during filling if the installation starts to switch off and on because of a low pressure.*

For “scroll” condensing units the direction of rotation of the compressor has to be checked. The easiest way to do this is to place pressure gauges on the Rotalocks. There shall be no reading.
Wrong connection produces also higher noise level. The suction line should get cold, if all connections are correct.

– Adjust the thermostatic expansion valve.

– Connect a pressure gauge to the measuring connection (low pressure side) of the compressor.

– Connect a thermometer on the suction line near the bulb of the thermostatic expansion valve.

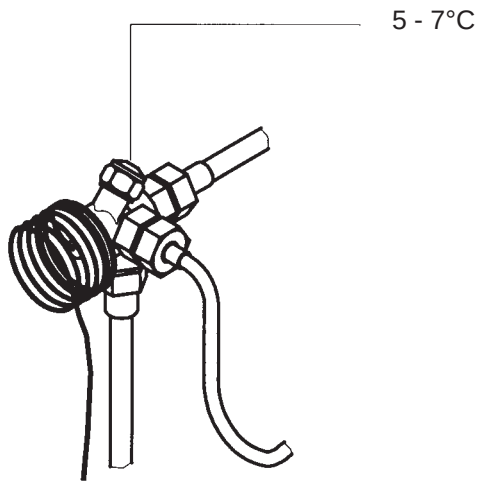
– Measure the pressure and convert this value with the help of boiling-point table into temperature.

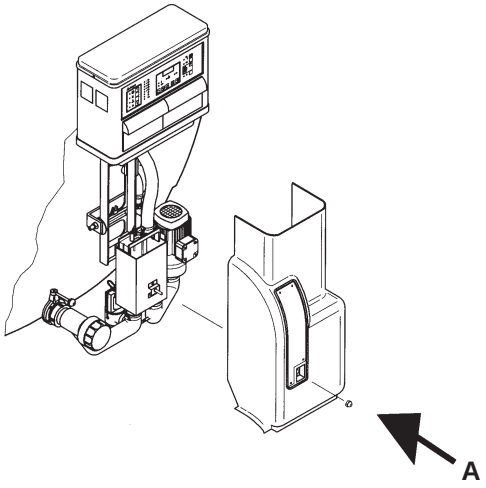
– Measure the specific temperature at the bulb on the suction line. The difference between these temperatures must be 5 to 7°C. This is called the “super heating” and it can be adjusted with the screw covered by the cap nut. If turning clockwise the super heating will increase.

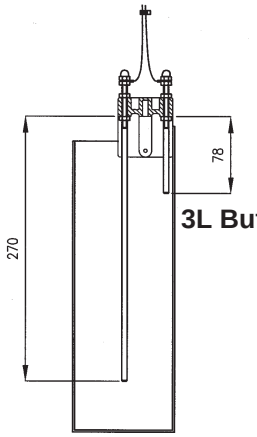
– Calibrate the temperature indication on the display (see chapter Service Hygenius).

– Adjust or check the cooling temperature at the set points P1 and P2 and make a registration of the tank setting (see chapter Service Hygenius).

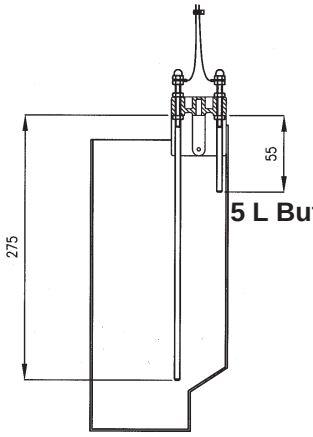
– Check all cooling functions (Operation).







3L Buffer, T200



5 L Buffer, T200

– Check the direction of the rotation of the agitator (clockwise from the top)**.**
This can easily be checked by sticking a small piece of paper through the grid of the fan guard

– Drain the test contents (water) out of the tank by opening the outlet valve.

Cleaning

Start-up cleaning

– Open the outlet valve and put the black blind cap on. Close the manhole lid.

– Remove cover (A) by unscrewing the nut.

– Put the required cleaning agent in the container and shut it well.

– Check the adjustment of the sensors in the buffers (see drawing Hygenius T200). Make sure that the nuts holding the sensors do not touch the buffer bridge, to prevent a short circuit.

– Start cleaning by pushing ‘Cleaning’ at the panel.

– The functions of the cleaning program should be checked globally. In some cases when certain components need to be tested more specifically, it is necessary to remove the top cover of the Hygenius (see chapter Service).

– Check the direction of the rotation when the cleaning pump starts running. This can be done for instance by holding a small and thin piece of paper in the fan cover. The direction must be clockwise, seen from the top.

– Switch off the power and lock the main switch in the OFF position if indicated.

– The electrical supply of the whole installation is now broken.

– If the direction is not correct remove the cover from the connection box at the side of the pump and change two electrical phases.

– Unlock the main switch and switch the electrical supply to ON.

– Check the direction of the rotation again.

– If correct, switch the electrical supply to OFF and lock again.

– Re-assemble all removed covers.

– Unlock the main switch and switch the electrical supply to ON again. Proceed with checking the cleaning program.

Final check

Carry out a final functioning check according to chapter Operation.

Instructions for the customer
The milk cooling tank is now installed and ready for use.

Instructions

The farmer has to be supplied with simple and clear instructions, with detailed safe operational and effective cleaning routines.

The above instructions must include at least the following:

- A warning that it is essential to stop and isolate the agitator before entering the inner tank.
- Mode of operation, including inspection requirements prior to commencement of milking.
- Method of tank cleaning, including details and maximum/minimum cleaning water temperature, together with recommended quantities of cleaning agent.

Additional

– According to the EC Machinery Directive (see chapter Safety Precautions) the farmer should receive an Instruction book in the language of the country of destination.

– Also a Users Card must be supplied. This card must be placed either on the tank or in a prominent position in the milk tank room.

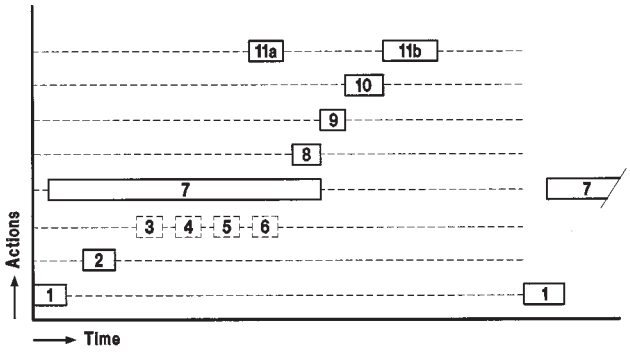
Closed tanks, DX with Hygenius

Routines

For the daily operation of the closed DX milk cooling installation we have to consider four different main routines:

- Filling
- Cooling
- Emptying the tank
- Cleaning the tank

The actions of these routines are shown in the schedule below. The whole cycle is repeated after a short pause.



Filling

1. First milking into the tank.
2. Second milking.
3. Third milking.
4. Fourth milking.
5. Fifth milking.
6. Sixth milking.

Cooling

7. Cooling of the milkings.

Empty the tank

8. Stirring of the milk.
9. Taking a sample of the milk.
10. Collecting of all milkings.

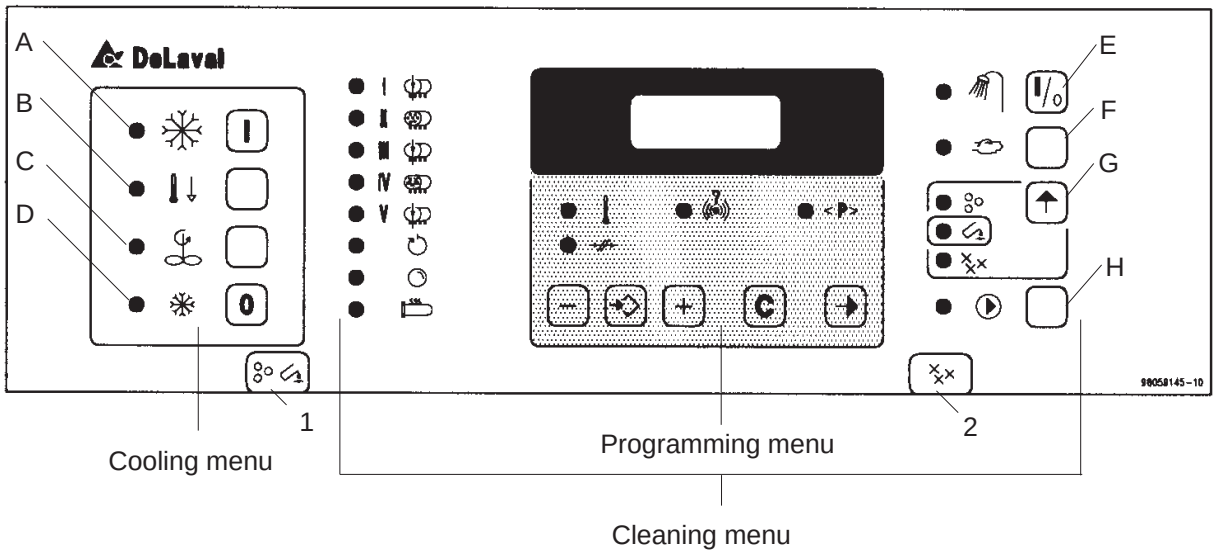
Cleaning

11. a. Filling the container with cleaning agent (only manual dosing).
11. b. Cleaning of the tank (program).

The operation panel of the Hygenius fulfils a major role in the handlings that are required for the day to day operation of the DX milk cooling installation.

The panel has been conveniently arranged into three menu's: the cooling menu, the cleaning menu and the programming menu.

The figure below shows the function buttons and the indicator lights



Function buttons

A Start cooling

B Quick start cooling

C Stirring for collection

D Stop cooling

E Start/stop cleaning

F Manual or automatic selection of detergent.

G Selection of detergent in manual mode (respectively: alkaline, acid or disinfectant)

H Manual running of dosing pumps.

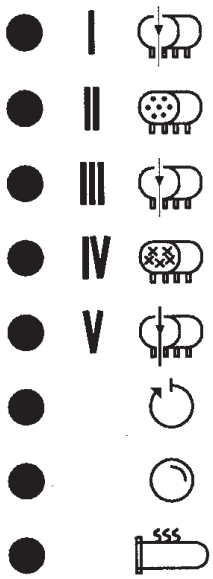
Warning signs

1. Left-hand side container for manual dosing is to be used (alternately) for alkaline and acid cleaning agents. Be sure though, never to mix two different cleaning chemicals. Dangerous gasses can be created in this way.
2. Right-hand side container for manual dosing is to be used for disinfectant. Even when no separate disinfectant is used, a dosing container should be placed here, such as to close the opening in the housing preventing cleaning water from splashing out.

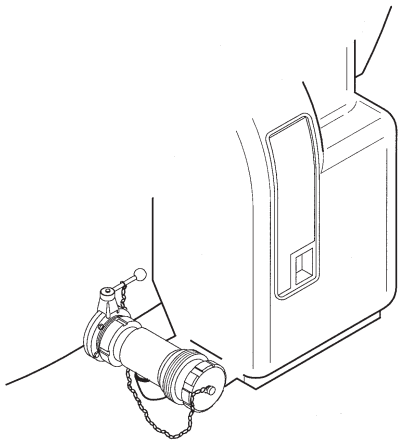
Indicator lights

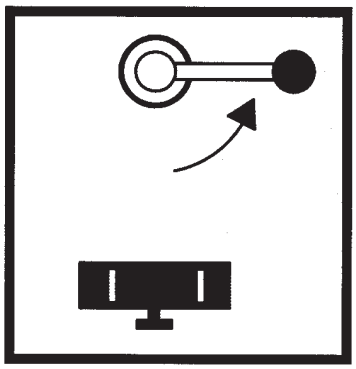
When any of the functions mentioned above is active, the corresponding indicator light will be lit.

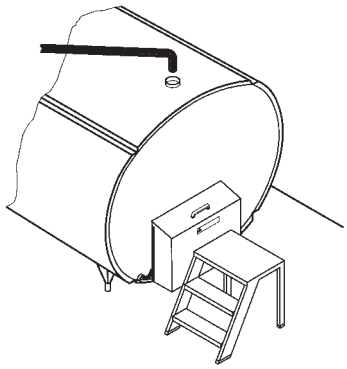
The cleaning menu includes a number of LEDS which indicate the active cleaning steps (see figure).



1. Pre-rinse
2. Cleaning
3. After-rinse
4. Disinfection
5. 2nd After-rinse
6. Cleaning finished
7. Timer start
8. Heater ON





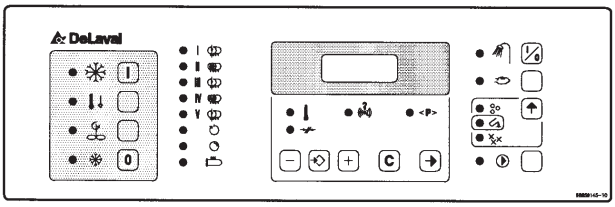


Filling

Actions for the filling routine

1. Before filling the tank it is preferable to look through the manhole to inspect the tank. Be sure that the tank has been cleaned.
2. The remaining cleaning water will flow out by changing the black blind cap for the grey blind nut.
3. Close the outlet valve (1).
4. Connect the milk inlet pipe from the milk plant to the tank. There are two inlet possibilities on the tank. The first is placed in the manhole cover and the second is placed on the top at the back of the tank. It is recommended to use the second milk inlet because of its accessibility. For the larger tanks a reliable stepladder for an easy and safe operation is needed (see figure).

Cooling



Note! *When by mistake the button “Cleaning ON” (E) been pushed instead of “Cooling ON” (A), immediately press button “Cleaning ON/OFF” (E) again to switch OFF the cleaning. Close the hot- and cold water taps to make sure no water will enter the tank.*

Actions of the cooling routine (first milking)

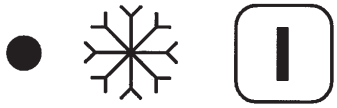
Automatic level start

When level start is applied, the cooling will automatically start when the sensor is reached by the milk.

If the cooling is activated by level, pressing the "Cooling ON" button results in no action.

When the milk level is below the sensor, "Cooling ON" will directly start the cooling.

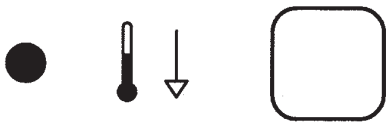
If the milk drops below the level of automatic cooling start, the cooling will automatically switch off. This applies to manual started cooling as well as automatically started cooling.



1. When there is sufficient milk for stirring (the agitator blades are touching the milk), push cooling 'ON' button (A) once. Cooling temperature T2 can be reached by pushing the button twice (if second temperature is switched on with P51). Normally the start delay function (P50) of the operation panel has been adjusted to 0 minutes. When the time needed from start milking until the moment there is sufficient milk in the tank is roughly known, the start delay can be adjusted to this specific value (P8). The operator can then push cooling 'ON' immediately when he starts milking.

2. The condensing unit is now running and will be running until the cooling temperature is reached. The indicator light Stirring and Condensing unit running are lit. During cooling the agitator will stir the milk continuously. When the required temperature (T1 or T2) is reached, the condensing unit will stop and the agitator will stir each half hour (adjustable P3) for 2 minutes (adjustable P4). The condensing unit will now automatically switch ON and OFF in order to keep the milk at the right temperature (also after adding the other milkings).

Note! *When a start delay is adjusted but during milking the operator finds that he has forgotten to switch on cooling. The cooling button must be pushed twice and cooling will start immediately.*



Quick start cooling (feature for last milking)

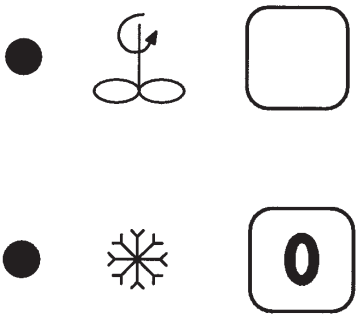
With the quick start cooling button (B) the condensing unit can be activated immediately, while the adjusted temperature is already reached.

This function is switched on for half an hour, by which time the milk temperature can fall with a maximum of one degree. This function can, for instance be used when the cooling period of the last milking has to be shortened, so that the tank can be emptied sooner.

Emptying the tank

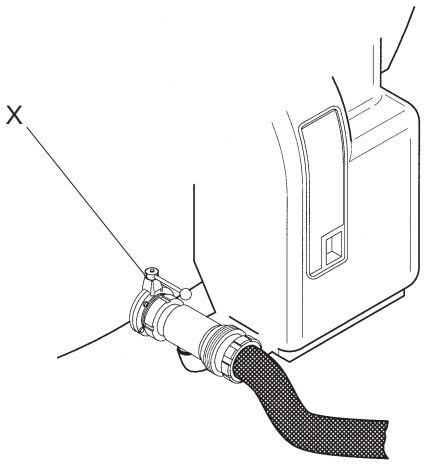
Requirements

The collecting truck driver should get clear instructions from the farmer about all specific handling's and safety precautions concerning this routine.



Routines of emptying the tank

1. The milk has to be stirred before a sample can be taking. Button (C) on the operation panel can be used. The agitator is switched on for 2 minutes (adjustable P5).
2. After stirring, switch OFF cooling (D). All indicators are off now.
3. The truck driver can take a sample of the milk via the manhole.
4. Remove the grey blind cap from the outlet (the outlet valve (X) is still closed).
5. Connect the hose of the collecting truck to the 2" outlet.
6. Open the outlet valve (X). Empty the tank.



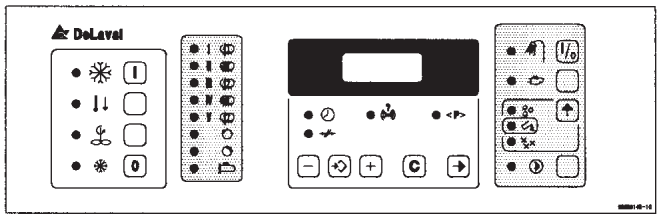
Cleaning



Warning!
Never mix a detergent with an acid cleaning agent. This could cause chemical reactions creating dangerous gasses. Always wear gloves when filling the container with cleaning agent, because these substances can cause skin irritation. Close the container well so no detergent can spout out of the container during the cleaning process. Before starting the cleaning program, the manhole lid should be closed and the milk inlets should be covered, so no hot water or cleaning agent can come out. This can cause skin irritation.

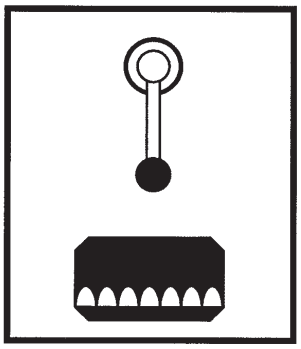


Warning!
Never pour liquid cleaning agent into containers meant for powder.



Cleaning routine

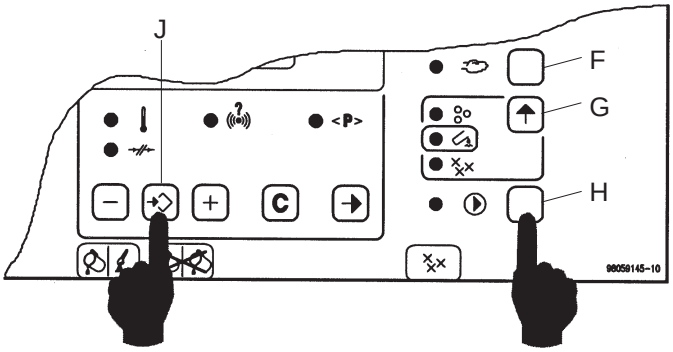
The tank has to be cleaned after it is emptied. Therefore some cleaning agent has to be added to the system. In cases of manual powder dosing, it is recommendable to fill the container already before the collecting truck driver arrives on the farm. When automatic dosing is applied, cleaning agents will be dosed automatically. In most cases the farmer allows the truck driver to put the black blind cap on the outlet and start the cleaning. Of course the truck driver must be well instructed.



Normal sequence

1. Keep the outlet valve (X) open.
2. Put the black blind cap on the outlet.
3. Close the manhole cover and cover the milk inlets.
4. Only for manual dosing.
   Fill the container with the required amount of cleaning agent and close it well.
   Depending on the hardness of the water on the location and the capacity of the milk cooling tank the right amount of cleaning agent for all circumstances should be calculated.
   Usually the packaging of the cleaning agent gives further instructions on this.
5. Push Cleaning ‘ON’ button (E) to start the cleaning program. The program runs automatically and will finish the cleaning cycle independently.
   Start the Filling routine again.





Manual running dosing pumps

(The next instructions are only for installations that are fitted with automatic liquid dosing). In certain cases it can be necessary to have the dosing pumps running manually for a short while.
This can be the case, for instance, when a drum with cleaning agent has been exchanged and pockets of air have formed in the hose between drum and pump.

– Press button (F) "Manual selection of detergent".

– Press button (G) "Selection of detergent in manual mode" to select the cleaning agent in question. (LED's top to bottom: alkaline, acid and disinfection).

– Press and hold button (H) "Manual running dosing pumps", now press (J) "Store" as well.

– The selected pump will now run until the buttons are released.

– When a second, or third, pump has to run manually the same routine should be followed. However, between the running of the successive pumps, the cleaning has to be started for about 10 seconds to avoid alarm AL8 (mixing of detergents).



Warning! *While running the pumps manually, it should be avoided that larger quantities of cleaning agent accumulate in the system. It may accidentally react with a second agent. Such chemical reactions can create dangerous gasses.*

Closed tanks, DX with Hygenius

Safety precautions

General



Warning! *Make sure that children and unauthorised persons do not come into contact with any part of the system!*

The installation of the equipment must be carried out by authorized mechanics.

Before the milk cooling tank and the condensing unit will be brought into use, carefully read the instructions.

It is the responsibility of the owner/user to take the necessary measures to prevent the ambient temperature around the milk cooling installation from dropping to-or below freezing point. DeLaval can not take responsibility for any damage resulting from frost.

No responsibility will be accepted for damage resulting from faulty installation, operation or for improper or inadequate care and maintenance.

Responsibility will only be accepted for milk cooling equipment supplied by DeLaval.

Never use the machine for any other purpose than the one specified.

Cleaning

Warning! *Always wear gloves when filling the containers with cleaning chemicals because these substances could cause skin irritation!*

Warning! *Never mix detergent and acid cleaning agent. This could cause chemical reactions creating dangerous gasses!*

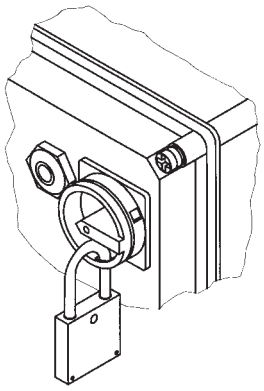
Close the containers well, so no cleaning chemicals will spout out of the containers during the cleaning process.

Before starting the cleaning program, the manhole lid has to be closed and the two milk inlets have to be covered, so no hot water or cleaning agent can come out. This could cause skin irritation.

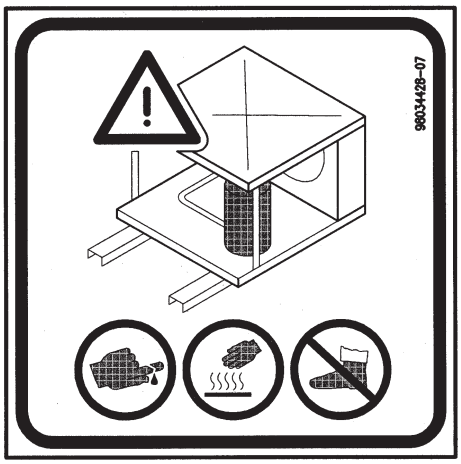
Electrical

Warning*! Opening of the control boxes and work on the electrical equipment is only allowed to authorized electricians!*

Warning*! Never clean the milk cooling installation with a high pressure cleaner or any other jet of water!*



The safety switch on the switch box of the condensing unit has to be locked before entering the tank or during inspection, adjustment or maintenance of the installation. So that the installation cannot be started while work is in progress.



Cooling

Keep fingers away from the condensing unit (risk of burning or cutting) even when the tank is not running.

– Be careful of the fins of the heat exchanger.

– Be careful of the cover of the condensing units and possible hot components.

– Do not put anything on the cover.

– Never step on the condensing unit, on the tank or on any piping.

Others

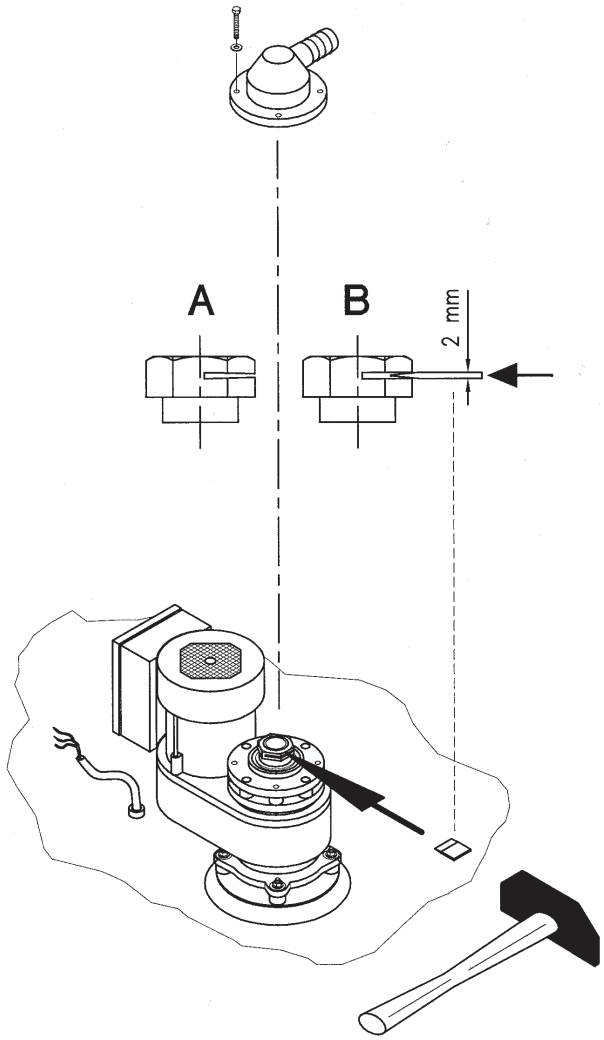
Never enter the tank when nobody is standing by to render emergency assistance.

The collecting truck driver should be clearly instructed by the farmer about all specific handlings and safety precautions concerning this routines.

DeLaval

Closed DX, Cooling tanks

Service



Agitator

Disassembling the agitator parts

– Switch off the supply voltage of the installation and lock the main switch.

– The stirring device consists of two main parts: the agitator motor placed on the tank and the shaft with blades in the inner tank.

Replacing agitator motor or shaft

– The electrical cable of the motor must be disconnected and pulled out. Remember the position of the wires.

– On top of the motor is a black cap. This cap should be screwed off.

– In one side of the shaft nut there is a split. A special pointed steel plate created by the service man should be put in.

– Preferable dimensions are: 2 mm thick and approx. 30 mm square. This plate must neutralise the clamping tension of the nut in such a way that it can be screwed off easily.

– The shaft will fall down on the bottom of the inner tank (only a few centimetres).

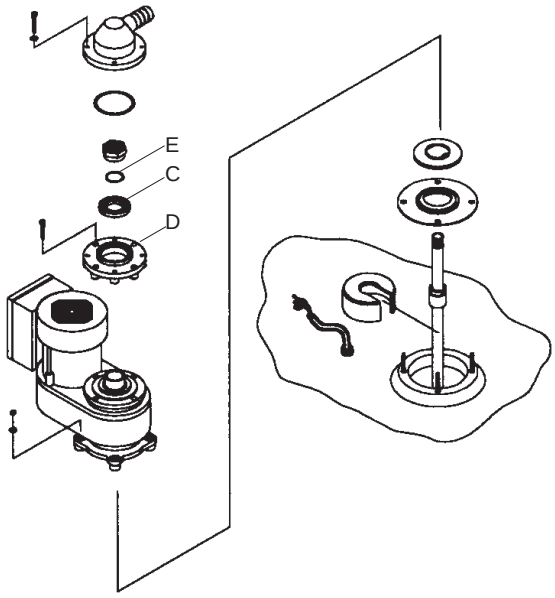
– Unscrew the four flange nuts of the motor and take the motor away.

– If the present shaft has to be replaced, climb in the tank (see recommendations) and change the shaft with required assistance.

– Remember the position of the shaft and put the new shaft through the manhole opening in the same way.

– If some parts of the motor have to be replaced, climb down the tank with the motor this to prevent it falling down from the tank.

Re-assembling



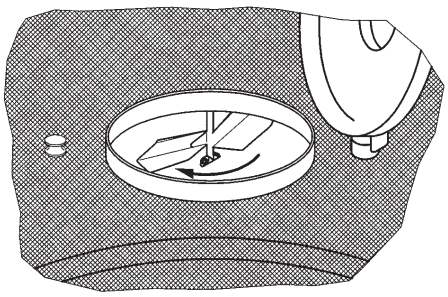
Note! *Always replace the O-ring (pos. E) below the shaft-nut, when the nut has been loosened.*

Note! *When the seal ring in pos. C is worn or damaged, always replace both the seal and the seat (D).*

The two disks between the motor and the tank are meant to keep splash water out of the agitator motor. When removing the motor inspect the rubber of the lower disk for wear and tear. Clean the disk before placing it back in it's position

With the use of a special tool, positioned below the welded collar, the motor can easily be replaced and mounted to the shaft. The shaft-nut with the small plate still in position, can now be screwed back on in order to fasten the shaft. After tightening the nut well, remove the small plate.

– Re-assemble and fasten all further parts.



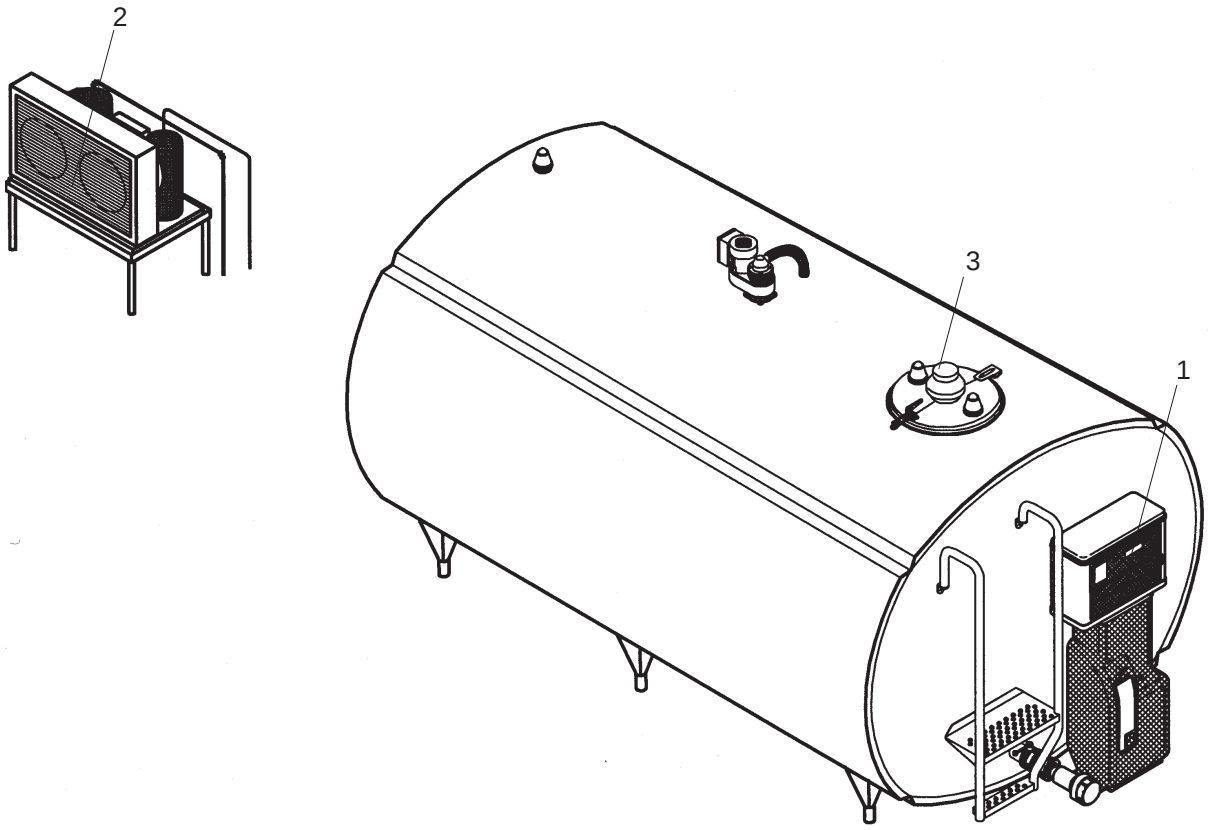
Checking the direction of rotation

After making the electrical connection of the motor the supply voltage can be switched on again. The direction of the rotation must be clockwise, seen from the top.

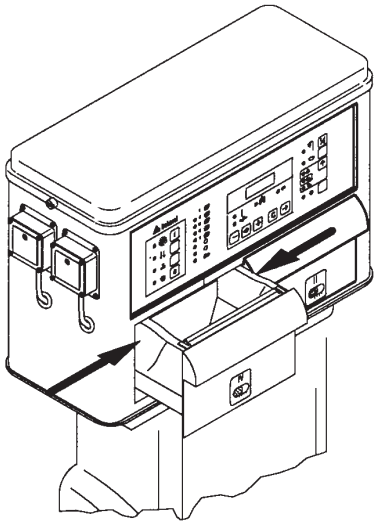
Closed tanks, DX cooling tank with Hygenius

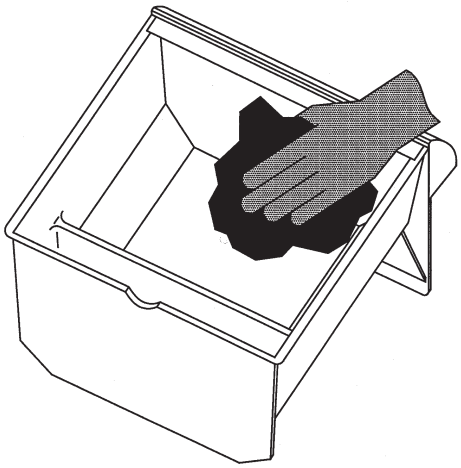
Service

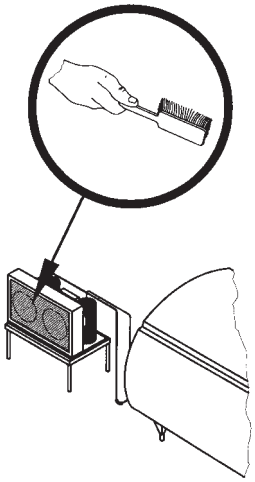
Maintenance schedule



	Check point	Maintenance intervals		Notes
		Monthly	Annually	
1.	Clean the cleaning agent container.	X		See below
2.	Clean the condenser.		X	See below
3.	Clean the air vent		X	
4.	Clean the outside of the tank.		X	







Care and maintenance

To prevent the tank from corrosion do not grind steel close to the tank.

Never use solvents on any part of the installation.

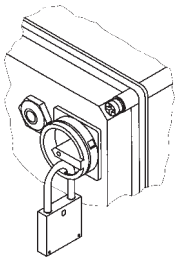
It is recommended to use only DeLaval cleaning agents for the automatic cleaning device to be sure of the required hygiene quality.

Remarks on the cleaning unit (only for manual dosing)

- To totally remove the container from the panel, pull the container forward all the way. Pinch the top edges of the container towards each other. By pulling the container simultaneously, it can be taken out now.
- Residues of dried-up cleaning agent on the bottom of the container must be removed regularly.
- The required amount of cleaning agent is usually mentioned on the packaging.

Remarks on the condensing unit

- The front of the condenser must be cleaned frequently to avoid blocking of the airflow. This must be done carefully with a soft brush.





How to enter the tank

The main switch of the condensing unit switch box should be locked before entering the tank for inspection or maintenance. In this way the installation can not be started while work is in progress.

Never enter the tank when nobody is standing by to render emergency assistance.

General recommendations for entering the tank

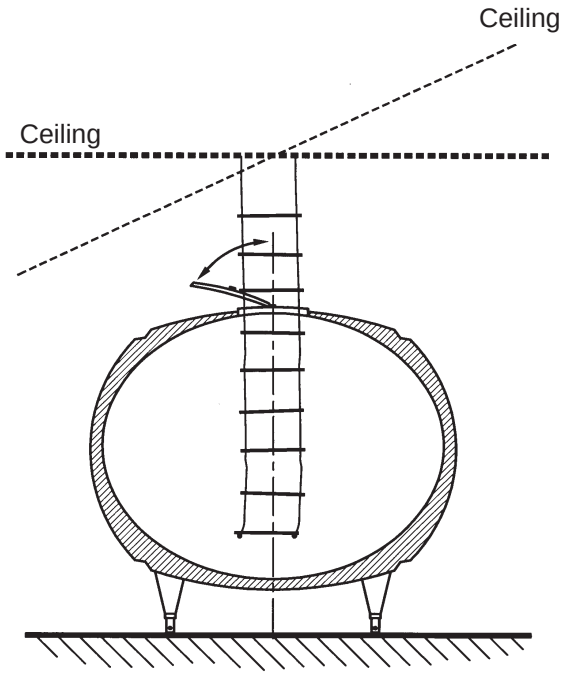
Before entering the tank lock the main switch and take the key with you.

Do not enter the tank with dirty shoes or boots. Dirt or small sharp objects could damage the surface of the inner vessel or the cleaning pump.

When a ladder is used to climb on the tank let somebody hold the ladder to prevent it from slipping away. Do not place a ladder against the Hygenius cleaning/controlling devices. Be careful on or in the tank because the surface is very slippery.

Before starting the installation again check if there is nothing left in the tank.

After leaving the tank, unlock the main switch and clean the inside of the tank with the cleaning device.



Entering the tank

– Climb on the tank.

– Open the manhole lid and take away the manhole gasket to prevent it from falling on the ground or damaging.

– Take away the dipstick.

– Turn the manhole lid a quarter to the left and lay it on the tank.

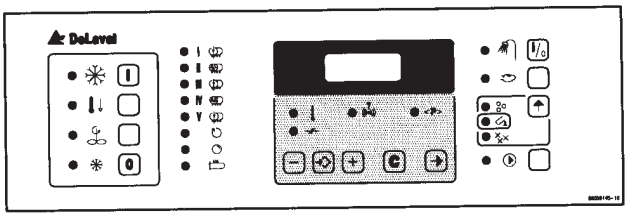
– The best way of entering a tank is to use a rope-ladder connected to a solid beam above the manhole. Also use the rope-ladder to leave the tank.

– After climbing out the tank remove the rope ladder, replace the manhole gasket and climb down.

– Close the manhole lid.

Hygenius, cleaning / controlling device

Service



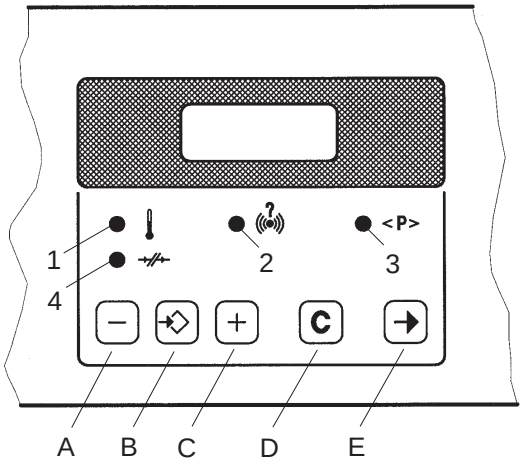
General

The Hygenius is a device which is used for the controlling and cleaning of closed milk cooling tanks. Since each cooling tank has its own specific requirements, regarding milk-temperature control and cleaning, the Hygenius has a large number of parameters that offer the opportunity to adapt the cooling installation closely to the farm requirements and ambient conditions.

Changing parameter settings

Access to the parameters and the parameter-settings is via the programming menu.

The programming menu contains the following indicator lights and function buttons:



Function button:

A: Decrease

B: Store

C: Increase

D: Clear

E: Select

F: Digital display

Indicator lights:

1: Temperature

2: Alarm

3: Program

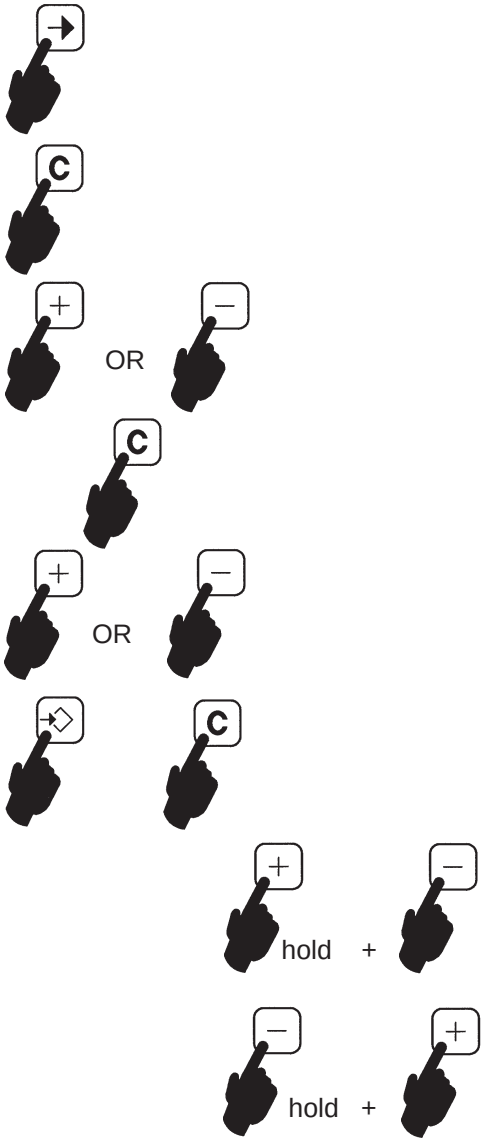
4: Bus activity

The table below shows the list of parameters, for which the user/owner has authorisation to make changes.

Note! *The default parameter settings should be regarded as the most optimum setting for each specific parameter.*
DeLaval will not take responsibility for damage resulting from faulty or improper adaptations to any parameter setting, when made independently and without consulting an authorised DeLaval service man.

No.	Auth.	Function	Range	Unit	Default	Tank setting
P 1	Open	Set point 1	2.0-49.9	°C/°F	4.0	
P 2	Open	Set point 2	2.0-49.9	°C/°F	4.0	
P 3	Open	Agitator, interval stop time	0-99	min	30	
P 4	Open	Agitator, interval run time	0-99	min	2	
P 5	Open	Agitator, manual run time	0-99	min	2	
P 6	Open	Collection trig time agitator	0000-2359,OFF	-	OFF	
P 7	Open	Collection run time agitator	0-240	min	30	
P 8	Open	Cooling start delay	0-50	min	0	
P 9	Open	Compressor 2 start delay	10-60	sec	10	
P 10	Open	Collection interval	1-4	days	1	
P 11	Open	Collection interval start delay	0-3	days	0	
P 12	Open	Milktemp monitoring time	30-600	min	180	

No.	Auth.	Function	Range	Unit	Default	Tank setting
P 31	Open	Dosing volume alkaline	0-8000	ml	100	
P 32	Open	Dosing volume acid	0-8000	ml	100	
P 33	Open	Dosing volume disinfectant	0-8000	ml	0	
P 34	Open	Alternated cleaning	0-20	no°	1	
P 35	Open	Cleaning, start delay	0-300	min	0	
P 36	Open	Timer start second after rinse	0000-2359,OFF	-	OFF	
P 37	Open	Timer start second after rinse	0000-2359,OFF	-	OFF	
P 38	Open	Timer start second after rinse	0000-2359,OFF	-	OFF	
P 40	Open	Disinfection, circulation time	4-6	min	4	
P 45	Open	Hot water amount in luke water	1-99	%	50	



Before changing parameters, switch off cooling or cleaning and clear any alarm-codes.

To be able to make changes to the parameter settings, the Hygenius has to be switched to the “programming-mode”. To do this, press “Select” until the indicator light “Program” is lit.

Press button “Clear”.

Press “Increase” or “Decrease” to find the required parameter .

Press button “Clear”.

Press “Increase” or “Decrease” to set the value.

Press “Store” to save this setting.

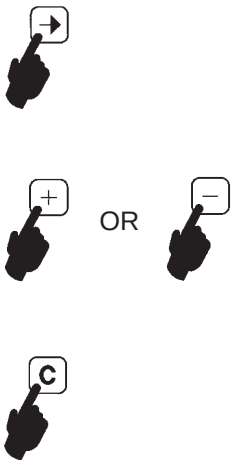
Or press “Clear” to abandon the changes.

A faster way to increase a certain value is to press and hold button “Increase” and then push button “Decrease”. This way the value will increase with TEN, when button “Decrease” is pushed.

A faster way to decrease a certain value is to press and hold button “Decrease” and then push button “Increase”. This way the value will decrease with TEN, when button “Increase” is pushed.

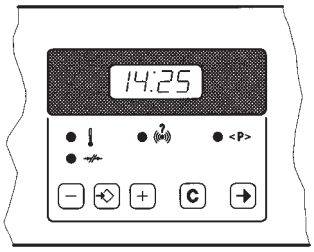
Note! *Some parameters can only be altered after entering a security-code. Changing these settings is only allowed to authorised DeLaval service men. DeLaval will not take responsibility for damage resulting from un-authorised alterations to these parameters.*

Changes to the coded parameters may seriously hamper the cooling and/or cleaning performance of the installation.



Error messages

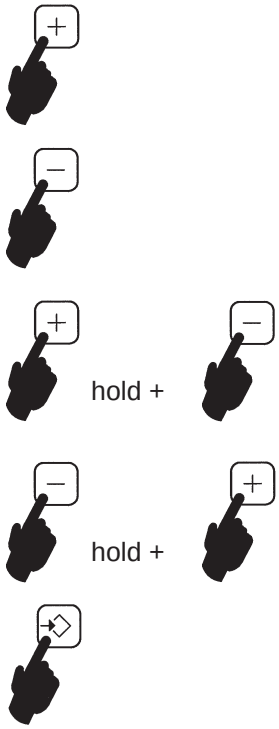
Should the case arise that an error occurs while the Hygenius is performing the cooling- or cleaning function, this will be indicated by a flickering red alarm-light.
To view the activated error message, press "Select" until the display shows: "AL", followed by a number. It is possible that more error messages are activated at the same time.
To go through them, press "Select" until the display shows the error messages. Press "Increase" or "Decrease" to respectively view the next or the previous message.
In chapter "Troubleshooting" the meaning of the error messages and the actions that should be taken to solve them are explained.



After taking away the cause of the failure, press "Clear" to remove the error message.

Set "Real Time"

The Hygenius has the possibility to use a "real time" clock. When the device is in idle position this time is shown on the display.



To adjust this time:

- Press "Increase" to raise the minute count.
- Press "Decrease" to lower the minute count.
- Press and hold "Increase" and then "Decrease" to raise the hour count.
- Press and hold "Decrease" and then "Increase" to lower the hour count.

While changing the time the separating dots are blinking.

- Press "Store" to set the adjusted time.

The real time clock can be used e.g. to start the 2 minute stirring function before collection, when the tanker truck arrives at the farm at a fixed time.

T100/T200 cleaning / controlling unit

Service

Parameters listed below are for authorised DeLaval service people only.

Note! *The default parameter settings should be regarded as the most optimum setting for each specific parameter.*
DeLaval will not take responsibility for damage resulting from faulty or improper adaptations to any parameter setting, when made independently and without consulting an authorised DeLaval service man.

Note! *Some parameters can only be altered after entering a security-code. Changing these settings is only allowed to authorised service men. DeLaval will not take responsibility for damage resulting from unauthorised alterations to these parameters. Changes to the coded parameters may seriously hamper the cooling and/or cleaning performance of the installation.*

No.		**Function**	**Range**	**Unit**	**Default**	**Tank setting**
P 13	Coded	Calibration milk temp. sensor	2.0-49.9	°C/°F	2.0	
P 20 3)	Coded	Min. volume circulation	5-30	litres	20	
P 21 3)	Coded	Rinsing, filling volume	10-70	litres	24	
P 22 2)	Coded	Rinsing, circulation time	4-6	min	4	
P 23 3)	Coded	Rinsing, drain time	10-180	sec	30	
P 24 3)	Coded	Cleaning, filling volume	20-300	litres	43	
P 25	Coded	Cleaning, circulation time	5-30	min	7	
P 26 3)	Coded	Cleaning, drain time	30-600	sec	65	
P 27 1)	Coded	Filling buffer volume	3-6	litres	3	
P 28 2)	Coded	Incoming water flow	1-30	litres/min.	8	
P 29	Coded	Temp limit heating water	30-140		45	
P 30	Coded	Temp limit end of cleaning	30-140		40	
P 39	Coded	Disinfection, water volume	10-80	litres	24	
P 41	Coded	Disinfection drain time	30-600	sec	90	
P 42	Coded	Dosing capacity alkaline	200-1000	ml/min.	330	
P 43	Coded	Dosing capacity acid	200-1000	ml/min.	330	
P 44	Coded	Dosing capacity disinfection	200-1000	ml/min.	330	
P 46	Coded	Version number	0000-9999	vv.rr	--.--	
P 47	Coded	Node address	5-125	-	75	

Numerical parameters Cooling

Nr		Function	Option	Meaning	Default	Tank setting
P 50	Coded	Cooling	0	No		
			1	Manual start	Manual start	
			2	Delayed start		
			3	Level start		
P 51	Coded	Set points	1	One	One	
			2	Two		
P 52	Coded	Compressors	1	One	One	
			2	Two		
P 53	Coded	Agitators	1	One	One	
			2	Two		
P 54	Coded	Outlet valve switch	0	No	No	
			1	Yes		

Function parameters Cleaning

Nr		Function	Option	Meaning	Default	Tank set-ting
P 60	Coded	Cleaning system	1	Buffer filling	Buffer filling	
			2	Tank filling		
P 61	Coded	Application program	0	OFF		
			1	Program 1		
			2	Program 2		
			3	Program 3	Program 3	
			4	Program 4		
P 62	Coded	Heater	0	No	No	
			1	Yes		
			2	Ext. Boiler		
P 63	Coded	Automatic dosing	0	Powder dosing	0	
			1	Manual liquid dosing		
			2	Automatic dosing with container level control		
			3	Automatic dosing with dosing check		
P64	Coded	Drain valves	1	One	One	
			2	Two		
P 65	Coded	Tank volumes	1	1000 litres		
			2	1500 litres	1500 litres	
			3	2000 litres		
			4	2500 litres		
			5	3000 litres		
			6	3500 litres		
			7	4000 litres		
			8	4500 litres		
			9	5000 litres		
			10	5500 litres		
			11	6000 litres		
			12	6500 litres		
			13	7000 litres		
			14	7500 litres		
			15	8000 litres		
			16	10000 litres		
			17	12000 litres		
			18	14000 litres		
			19	16000 litres		
			20	18000 litres		
			21	20000 litres		
			22	25000 litres		

			23	30000 litres		

Default settings, tank filling (T100) systems

P 65 size (tank volume)	P 20 litres (min. volume circulation)	P 21 litres (rinsing, filling volume)	P 23 sec. (rinsing drain time)	P 24 litres (cleaning, filling volume)	P 26 sec. (cleaning drain time)	P 39 litres (disinfection filling volume)
1. (1000)	15	15	53	20	90	18
2. (1500)	15	16	54	24	96	18
3. (2000)	15	17	56	28	102	18
4. (2500)	15	18	57	32	108	18
5. (3000)	20	19	59	36	114	24
6. (3500)	20	20	60	39	119	24
7. (4000)	20	22	63	43	125	24
8. (4500)	20	24	66	47	131	24
9. (5000)	20	25	68	49	134	24
10.(5500)	20	27	70	53	140	24
11.(6000)	20	29	74	57	146	24
12.(6500)	20	30	75	59	149	24
13.(7000)	20	31	77	61	152	24
14.(7500)	20	33	80	66	159	24
15.(8000)	25	36	84	71	167	30
16.(10000)	25	45	98	89	194	30
17.(12000)	25	50	105	106	219	30
18.(14000)	30	53	110	123	245	40
19.(16000)	30	56	114	131	255	40
20.(18000)	30	59	119	140	270	40
21.(20000)	35	62	123	150	285	50
22.(25000)	35	70	135	200	360	50
23.(30000)	35	78	147	250	435	50

Default settings, buffer filling (T200) system

P 65 size (tank volume)	P 20 litres (min. volume circulation)	P 21 litres (rinsing, filling volume)	P 23 sec. (rinsing drain time)	P 24 litres (cleaning, filling volume)	P 26 sec. (cleaning drain time)	P 39 litres (disinfection filling volume)
1. (1000)	15	15	30	20	30	18
2. (1500)	15	15	30	24	36	18
3. (2000)	15	18	30	28	42	18
4. (2500)	15	18	30	32	48	18
5. (3000)	20	24	30	36	54	24
6. (3500)	20	24	30	39	59	24
7. (4000)	20	24	30	43	65	24
8. (4500)	20	24	30	47	71	24
9. (5000)	20	24	30	49	74	24
10.(5500)	20	24	30	53	80	24
11.(6000)	20	24	30	57	86	24
12.(6500)	20	24	30	59	89	24
13.(7000)	20	24	30	61	92	24
14.(7500)	20	24	30	66	99	24
15.(8000)	25	30	30	71	107	30
16.(10000)	25	30	30	89	134	30
17.(12000)	25	30	30	106	159	30
18.(14000)	30	40	30	123	185	40
19.(16000)	30	40	30	130	195	40
20.(18000)	30	40	30	140	210	40
21.(20000)	35	50	30	150	225	50
22.(25000)	35	50	30	200	300	50
23.(30000)	35	50	30	250	375	50

Miscellaneous function parameters

Nr		Function	Option	Meaning	Default	Tank setting
P 80	Coded	Alcom	0	Stand Alone	Stand Alone	
			1	System		
P 81	Coded	Temperature unit	1	Celsius	Celsius	
			2	Fahrenheit		
P 82	Coded	Authorization	0	No	No	
			1	Yes		
P 83	Coded	Reset configuration	0	No	No	
			1	Config		
			2	System		
P 84	Coded	Collection timer function	1	Agitator	Agitator	
			2	Ext. Boiler		

Test function

Nr		Function	Range	Meaning	Default	Tank setting
P 90	Coded	Force digital output	0-24	DO Nr	0	
P 91	Open	Display digital input	1-9	DI Nr	1	

1) Buffer filling (T200) system
2) Tank filling (T100) system
3) This parameter will automatically be set to a default value when P 65 is changed. See table below for default settings.

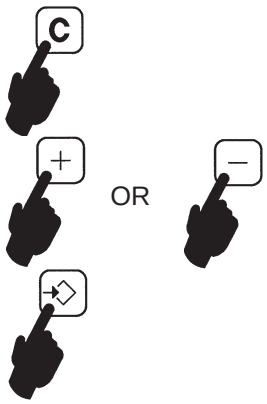
Security code



Numerical parameters that are essential for a proper functioning of the milk cooling installation have been secured by a special code. When this security is activated (P82) the display will show: [COde] when “Clear” is pressed.



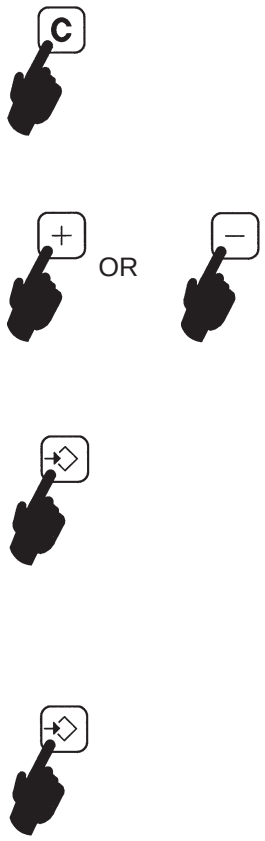
By pressing “Store” it is possible to by-pass all parameters that are secured by the code and immediately step ahead to the parameters without security.



When it is necessary to alter the setting of a coded parameter the correct security code has to be introduced. This is done by pressing “Clear” again, the display will show: [C 0], now the code can be entered by stepping to the right value with “Increase” and “Decrease”. When the required code is reached, this should be confirmed by pressing “Store”. Immediate access to all parameters is achieved when the correct code is introduced. If the code is wrong the display will show: [COde] again.



To abandon the security code set-up menu, press “Select” when the display shows [COde]. Now the real time will be shown on the display.



Force digital output

In order to check the functioning of several components and the digital output signal towards these components, it is possible to force these signals manually. To do this, the unit has to be switched to the programming mode.

Select parameter P90.

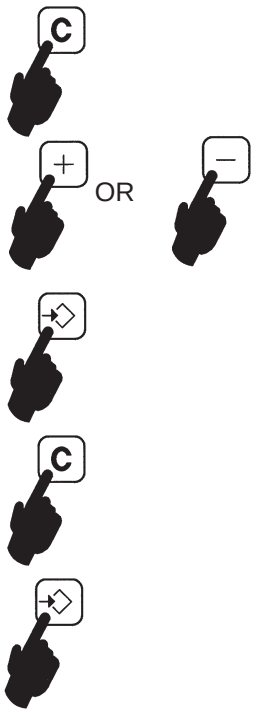
Press button “Clear”.

Press button “Increase” or “Decrease” to select the digital output number corresponding to the component in question (number can be found in the table below).

By pressing “Store” the output signal will be activated. It is possible to have several output signals active at the same time. All output will be stopped simultaneously by pressing “Clear” followed by “Store”.

Standard output board

DO 1.	Compressor 1
DO 2.	Compressor 2
DO 3.	Agitator 1
DO 4.	Agitator 2
DO 5.	Booster heater
DO 6.	Cleaning pump
DO 7.	Hot water valve
DO 8.	Detergent valve
DO 9.	Cold water valve
DO10.	Disinfectant valve
DO11.	Drain valve 1
DO12.	Drain valve 2
DO13.	Alarm output
DO14.	Dosing pump alkaline
DO15.	Dosing pump acid
DO16.	Dosing pump disinfectant
DO23.	Reserved
DO24.	Reserved



Check digital input(s)

Switch unit to programming mode.

Select parameter P91.

Press button “Clear”.

Press button “Increase” or “Decrease” to select the digital input number corresponding to the component in question (numbers can be found in the table below).

Press “Store” to activate the selected input number. When, for instance, input number 1 was chosen (buffer level low), the display will show: 1 - 0. The 0 indicates that no signal is received. By making contact between the low level sensor and the buffer, this sensor will give a signal. Now the display should show: 1 - 1.

Press “Clear” followed by “Store” to exit parameter P91.

Digital Input signal

DI 1 Buffer level low

DI 2 Buffer level high

DI 3 Milk tank level

DI 4 Outlet valve position interlock

DI 5 Reserved

DI 6 Dosing detection

DI 7 Reserved

DI 8 Reserved

DI 9 Reserved

Analogue Input signal

AI 1 Water temperature

AI 2 Milk temperature

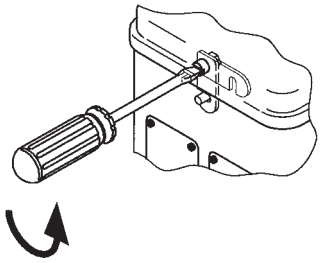
Calibration of temperature indication

In order to have a reliable indication of the actual milk temperature, it may sometimes be necessary to calibrate the temperature indication on the display. When doing this, the tank should be filled with water (or milk) to at least 5% of its maximum contents. This is to ensure a sufficient contact between the temperature sensor and the contents of the tank.

The most precise temperature indication is required at (or close to) 4°C. Therefor the calibration should be performed with water (or milk) as close as possible to this temperature. This should be checked with a calibrated (or other precise) thermometer.

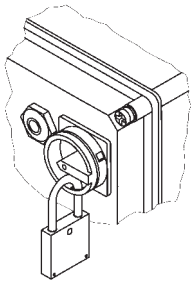
Hang this thermometer in the water (milk) for a while and then read the indicated value.

This exact value should be entered into the parameter P13.



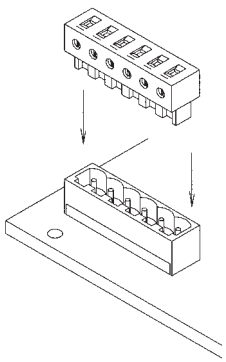
Opening top box

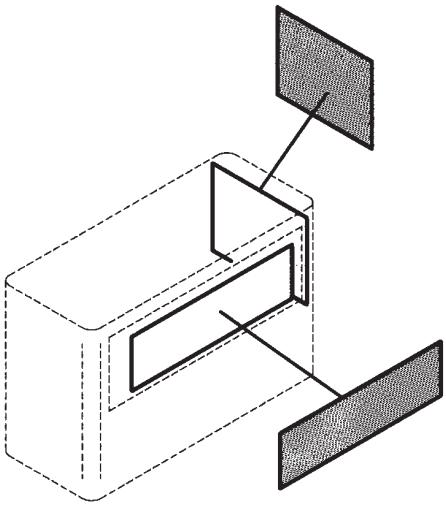
Use a screwdriver as illustrated to open the top box.



Warning! *Disconnect power before opening the box.*

Note! *When placing the cable plugs in their sockets, make sure they fit properly.*
The notches on one side are rectangular, whilst on the other side they are curved.
Improperly placed plugs can destroy the circuit board!





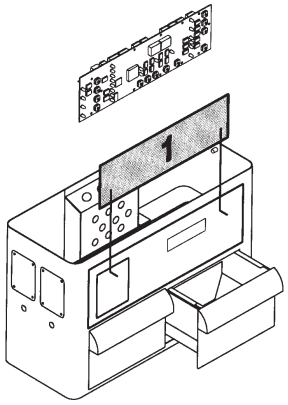
Printed circuit boards

The top box of the cleaning/ controlling unit contains 3 (manual dosing) or 4 (automatic dosing) printed circuit boards.

1. CPU / input board
2. Power / output board



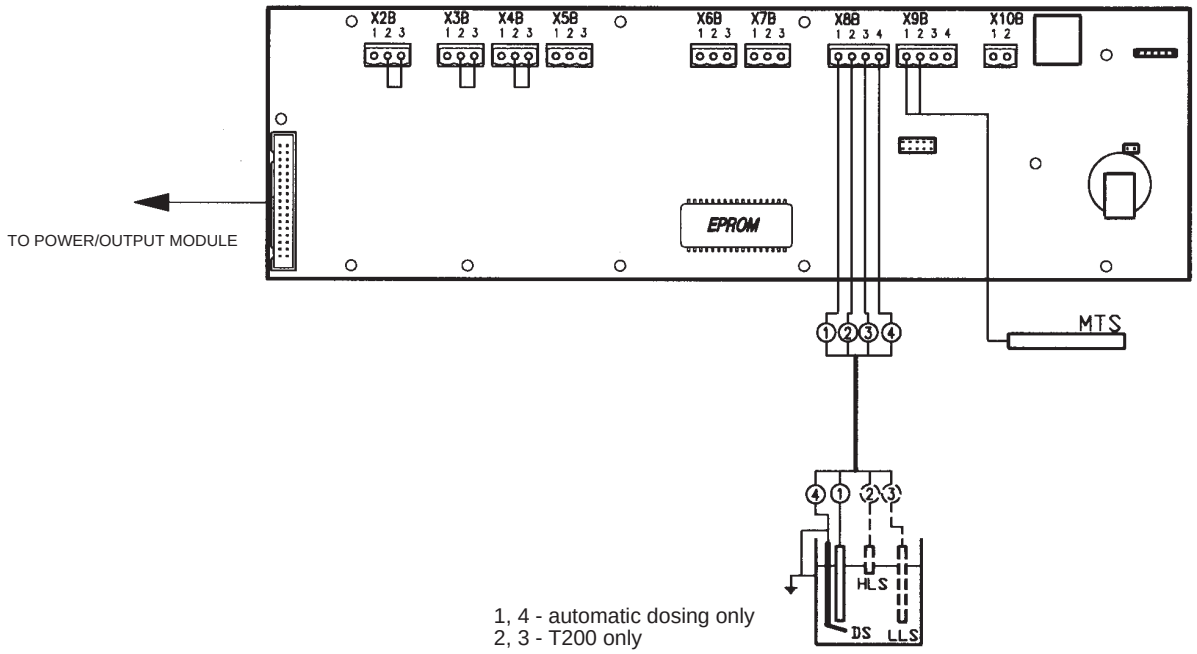
Note! *Static electricity can destroy the circuit boards. Before handling any of the boards or the EPROM, make sure to earth yourself well e.g. by means of a special bracelet.*



1. Human Interface Board

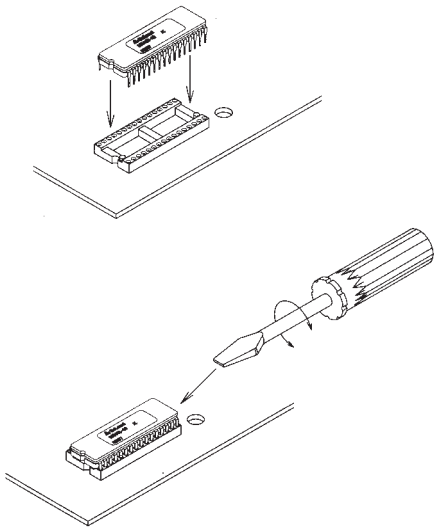
This circuit board is fitted at the front interior of the top box. It contains all the components required for operating the unit and the data display. Openings in the stainless steel housing reveals the touch sensitive buttons, the 4-digit display and the indicator LEDS.

The CPU can be considered the brain of the Hygenius, since it holds the EPROM (Erasable Programmable Read Only Memory), which stores the program(s) and parameters for cleaning and cooling control.



CPU-BOARD CONNECTIONS

SOCKET	TERMINAL	CONNECTION	
X2B	1		
	2	Bridge X2-3	
	3	Bridge X2-2	
X3B	1		
	2	Bridge X3-3	
	3	Bridge X3-2	
X4B	1		
	2	Bridge X4-3	
	3	Bridge X4-2	
X5B	1	Outlet valve position check device (blue)	(optional)
	2	Outlet valve position check device (black)	(optional)
	3	Outlet valve position check device (brown)	(optional)
X6B	1		
	2		
	3		
X7B	1		
	2		
	3		
X8B	1		
	2	Dosing detection (T200 and/or automatic dosing only) high level sensor	
	3	Dosing detection (T200 and/or automatic dosing only) low level sensor	
	4	Dosing detection (T200 and/or automatic dosing only) dosing detection	
X9B	1	Sensor milk temperature (brown)	
	2	Sensor milk temperature (white)	
	3	Sensor booster heater (blue)	(optional)
	4	Sensor booster heater (black)	(optional)
X10B	1		
	2		



Exchanging the EPROM

When replacing the EPROM following should be observed.

The EPROM can be removed from the board by carefully twisting and turning a small screwdriver, between the EPROM and the socket.

– Both the EPROM and the socket have a half round notch on one end. To bring the EPROM in the right position both notches must point in the same direction.

– Make sure the legs are not bent or broken. The legs have to be aligned accurately to ensure a secure fit in the socket.

– Press the EPROM in a firm but controlled manner, so that the legs enter the socket as far as possible and the EPROM is levelled with the board.

Note! *An improperly placed EPROM may blow a fuse on the circuit board.*

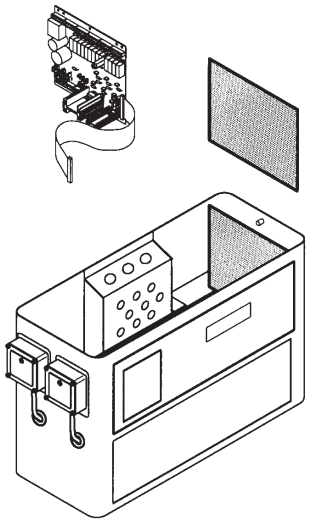
Reset cleaning / controlling

Before entering the parameter values for the specific tank type / size into the memory, it is advisable to let the cleaning / controlling unit make a complete reset to avoid that the program starts working with incorrect values.

- Open parameter P83
- Enter option 2
- Press “Store”

Now the system has made a complete reset and is ready to be programmed.

With P83 option 1, only the parameters will be reset to their default values.



2. Power/output module

The power/output board is fitted to the right hand side (seen from the front) wall. This board acts as the "nerve centre" for the intake of signals from external sensors and/or switches and the distribution of signals to external equipment (e.g.
cleaning pump, agitator).

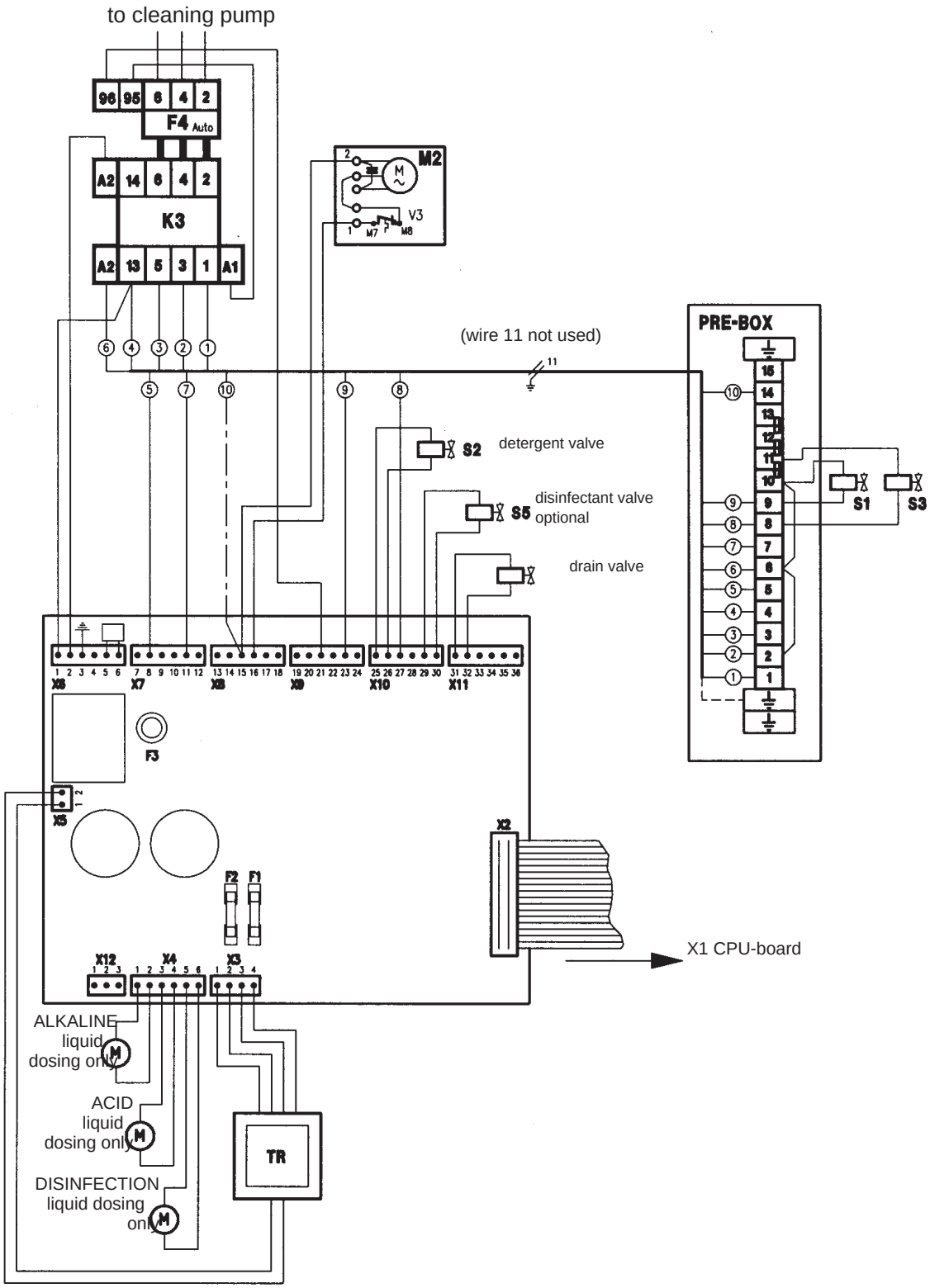
Fuses

There are three glass fuses on the board.

F1 1,6 A slow
Secures sensor and temperature inputs on CPU/Input board.

F2 2A slow
Secures motors dosing pumps.

F3 6,3A slow
Secures all non-electronic parts such as valves, motors, compressors.


to cleaning pump
96 95 6 4 2
F4 Auto
A2 14 6 4 2
K3
A2 13 5 3 1 A1
M2
V3
M7
M8
(wire 11 not used)
PRE-BOX
S2
detergent valve
S5
disinfectant valve
optional
drain valve
S1
S3
X6
X7
X8
X9
X10
X11
F3
X5
X2
F2
F1
X12
X4
X3
X1 CPU-board
ALKALINE
liquid
dosing only
ACID
liquid
dosing only
DISINFECTION
liquid dosing
only
TR

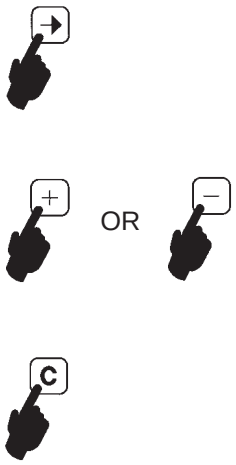
IN- OUTPUT MODULE

SOCKET	**TERMINAL**	**CONNECTION**		
X3	1	Trafo 14 VAC (red)		
	2	Trafo 0 VAC (green)		
	3	Trafo 9 VAC (green)		
	4	Trafo 0 VAC (red)		
X4	1	Alkaline pump (pink)	liquid dosing only	
	2	N Alkaline pump (grey)	liquid dosing only	
	3	Acid pump (pink)	liquid dosing only	
	4	N acid pump (grey)	liquid dosing only	
	5	Disinfection pump (grey)	liquid dosing only	(optional)
	6	N Disinfection pump (grey)	liquid dosing only	(optional)
X5	1	230 VAC (black)		
	2	0 VAC (black)		
X6	1	L1 230 VAC 50-60 Hz		
	2	N		
	3	PE		
	4			
	5	Safety switch (black)		
	6	Safety switch (black)		
X7	7			
	8	Cool signal 1 PRE-BOX 5		
	9	N		
	10			
	11	Cool signal 2 PRE-BOX 7		
	12	N		
X8	13	Extra output board (black)		(optional)
	14	N extra output board (BLUE)		(optional)
	15	Agitator 1 (red)		
	16	N Agitator 1 (blue)		

	17	Agitator 2 (red)	
	18	N Agitator 2 (blue)	
X9	19	Control current booster heater	(optional)
	20	N control current booster heater (via pressostat)	(optional)
	21	Control current cleaning pump	
	22	N	
	23	Hot water valve PRE-BOX 9	
	24	N	
X10	25	Detergent valve (brown) powder dosing only	
	26	N Detergent valve (blue powder dosing only	
	27	Cold water valve PRE-BOX 8	
	28	N	
	29	Disinfection valve (brown) powder dosing only	
	30	N Disinfection valve (blue) powder dosing only	
X11	31	Drain valve 1 (red)	
	32	N Drain valve 1 (blue)	
	33	Drain valve 2 (red)	(optional)
	34	N Drain valve 2 (blue)	(optional)
	35	Audio alarm (red)	(optional)
	36	N Audio alarm (blue)	(optional)
X12	1		
	2		
	3		

Closed tanks, DX with T100 / T200

Trouble shooting



A flickering red alarm-light during the cleaning or cooling function indicates that a failure has occurred. To view the activated error message, press “Select” until the display shows: “AL”, followed by a number. It is possible that several error messages are activated at the same time. To go through them, press “Select” until the display shows the error message. Press “Increase” or “Decrease” to respectively view the next or the previous message.
In the table below the possible failure-codes can be seen, together with their meaning and the necessary action(s) to solve the failure.

After taking away the cause of the failure, press “Clear” to remove the error message.

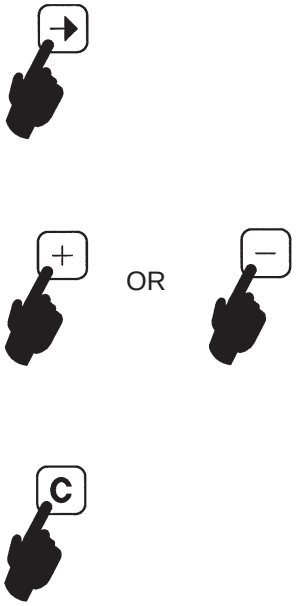
Failure		Cause	Action
AL 1	Water temperature too low (cleaning program will continue).	- Temperature of hot water supply may be too low. - Supply valve for hot water may be closed. - The amount of available hot water may be insufficient.	- Check boiler. - Open valve. - Check supply.
AL 2	Chemical container empty (cleaning program will continue). Correspondig led is blinking.	- Level sensor in container has detected no/too low level of detergent.	- Exchange container. - Check positioning of level sensors. - Check supply hoses for cleaning agent.
AL 3	Excessive heat. Water temperature exceeds 80ºC / 176°F		- Call service man
AL 4	Cleaning watchdog time-out. The program waits for a process signal and the time-out time has expired (cleaning does not continue).	- Water supply is obstructed. - Parts of the system may be frozen (pump, water supply).	- Open the water supply. - Thaw the concerned parts, maintain room temperature well above freezing point.
AL 5	Error in parameter memory (program continues, using default values).		- Call service man

Failure		Cause	Action
AL 6	Error in program memory (Hygenius switches to stand-by mode).		- Call service man
AL 7	The temperature inputs are not calibrated.		- Call service man
AL 8	Possible detergent mixing (program can not be started until alarm has been cleared).	- It was attempted to dose a detergent (manually or automatically) when this was already done with another type of detergent.	- Stop the cleaning. - Rinse the system manually. - Drain the water from the system. - Start the cleaning again.
AL 9	Power failure during cleaning (program does not continue when the power has failed for more than 30 sec.).	- The electrical supply has been cut-off for more than 30 seconds.	- Remove remaining water from the tank manually. Start the cleaning again.
AL10	External interlock alarm (only when valve position sensor is applied).	- It was attempted to start cooling or cleaning, while the outlet valve was not in the right position.	- Put the outlet valve in the correct position.
AL11	CPU watchdog reset.	- A thunderstorm or poor electrical supply has caused the micro-processor to fail. It has re-started automatically.	- Call service man
AL12	*Not applicable*		
AL13	Milk temperature too low.	- The milk temperature has dropped below 1,5ºC.	- Call service man
AL14	Cooling is too slow.	- The cooling time is longer than the adjusted time.	- Check the condenser for dust. - Check the ventilation of the tank room.
AL15	Power failure during cooling.	- The electrical supply has been cut-off for more than 3 hours, while the milk temperature was higher than 10ºC.	- Press (evt.) reset buttons on the condensing unit switch box. - Re-start cooling. - Check the milk quality.
AL16	Analogue sensor performance.	- Milk temperature sensor gives a signal out of range.	- Call service man

When the failure is not corrected by carrying out the matching action, call the DeLaval service man.

Closed tanks, DX with T100 / T200

Trouble shooting



Always try to isolate the error by studying smaller parts of the system. The points below may help in finding a solution for eventual failures.

If a problem seems inexplicable, check for sources of interference that may affect any part of the system.

A flickering red alarm-light during the cleaning or cooling function indicates that a failure has occurred. To view the activated error message, press “Select” until the display shows: “AL”, followed by a number. It is possible that several error messages are activated at the same time. To go through them, press “Select” until the display shows the error message. Press “Increase” or “Decrease” to respectively view the next or the previous message. In the table below the possible failure-codes can be seen, together with their meaning and the necessary action(s) to solve the failure.

After taking away the cause of the failure, press “Clear” to remove the error message.

Failure		Cause	Action
AL 1	Water temperature too low (cleaning program will continue).	- Temperature of hot water supply may be too low. - Supply valve for hot water may be closed (T100). - The coil of the solenoid valve (S1) may be broken. - The holes in the valve membrane may be blocked. - Involved parameters may be adjusted falsely. - Poor contact temperature sensor.	- Check boiler. - Open valve. - Replace coil. - Carefully open the holes with a needle. - Check parameters: P24, P25, P28 (T100), P29, P30, P81. - Remove sensor, check for obstacles and place again, using “contact paste”.

Failure		Cause	Action
AL 2	Detergent container empty (cleaning program will continue). Corresponding led is blinking.	- Level sensor in container has detected no/too low level of detergent. - No dosing of liquid is detected.	- Exchange container. - Check positioning of level sensors. - Check supply hoses for cleaning agent. - Adjust dosing detector. - Check if dosing pump is running properly (no slow pulsation).
AL 3	Excessive heat. Water temperature exceeds 80ºC (only actual when booster heating is applied).	- Involved parameters may be adjusted falsely. - Contactor may not be functioning properly.	- Turn off main switch for heater. - Check parameters: P29, P81. - Check contactor.
AL 4	Cleaning watchdog time-out. The program waits for a process signal and the time-out time has expired (cleaning does not continue).	- Water supply is obstructed. - The cleaning pump is not pumping. - The non-return valve in the buffer may be leaking. - Poor earth connection on buffer. - Parts of the system may be frozen (pump, water supply).	- Open the water supply. - Check if the motor is running and/or if the impeller is blocked/broken. - Exchange valve. - Clean earth connection use protective grease afterwards. - Thaw the concerned parts, maintain room temperature well above freezing point. - Remove failure-code, start cleaning again and check visually to see where the error occurs.
AL 5	Checksum error in parameter memory (program continues, using default values).	- Some parameters in the memory are damaged.	- Check parameters and replace incorrect values (see manual for correct values).
AL 6	Checksum error in program memory (Hygenius switches to stand-by mode).	- Program in the EPROM is damaged.	- Replace EPROM.
AL 7	The temperature inputs are not calibrated.	- Calibration data may be damaged. - CPU board may be damaged.	- Exchange CPU board.
AL 8	Possible detergent mixing (program can not be started until alarm has been cleared).	- It was attempted to dose a detergent (manually or automatically) when this was already done with another type of detergent.	- Stop the cleaning. - Rinse the system manually. - Drain the water from the system. - Start the cleaning again.

Failure		Cause	Action
AL 9	Power failure during cleaning (program does not continue when the power has failed for more than 30 sec.).	- The electrical supply has been cut-off for more than 30 seconds.	- Remove remaining water from the tank manually. Start the cleaning again.
AL10	External interlock alarm (only when valve position sensor is applied).	- It was attempted to start cooling or cleaning, while the outlet valve was not in the right position.	- Put the outlet valve in the correct position.
AL11	CPU watchdog reset.	- A thunderstorm or poor electrical supply has caused the micro-processor to fail. It has re-started automatically.	- Check if the adjusted values of the parameters are still correct.
AL12	*Not applicable*		
AL13	Milk temperature too low.	- The milk temperature has dropped below 1,5ºC.	- Switch off main switch. - Check the solenoid valve in the refrigeration circuit. - Check adjustment thermostat. - Check connection of sensor.
AL14	Cooling is too slow.	- The cooling time is longer than the adjusted time.	- Check parameter P12. - Check the cooling system.
AL15	Power failure during cooling.	- The electrical supply has been cut-off for more than 3 hours, while the milk temperature was higher than 10ºC.	- Check the milk quality.
AL16	Analogue sensor performance.	- Milk temperature sensor gives a signal out of range.	- Check electrical connection. - Replace sensor.

General

Problem	**Cause**	**Action**
1. Total failure, no LED or function is working.	a. Main fuse is blown. b. Fuse(s) on output board blown.	a. Replace main fuse. b. Replace fuse.
2. All the LEDs are lit, but no function is working.	a. EPROM has not been placed. b. EPROM was damaged. c. EPROM was placed in the wrong way.	a. Place EPROM. b. Replace EPROM. c. Carefully remove EPROM and place again according instructions.
3. No display, but functions are working.	Fuse F1 on output boards blown.	Replace fuse.

Cooling

Problem	Cause	Action
1. Cooling time too long.	a. Airflow over the condenser partly blocked. b. Shortage of refrigerant or other.	a. Clean front of the condenser. b. Contact a qualified refrigeration technician.
2. Milk temperature is above set point but condensing unit does not start.	a. Main fuses are blown. b. Overload protector is switched off. c. Pressostat will not switch on because the refrigerant has gone. d. Low temperature and falsely adjusted pressostat.	a. Replace main fuses. b. Reset overload protector and find out what caused the switch-off. c. Refill with refrigerant. d. Check the setting of the low pressostat.
3. The displayed milk temperature deviates from the real temperature.	a. Temperature display is not properly calibrated.	a. Calibrate the milk temperature display according to the instructions.

Cleaning

Problem	Cause	Action
1. The hot water flows into the tank, the pump runs but the cleaning agent stays in the container after cleaning.	a. The coil of the solenoid valve (S2) is broken.	a. Replace coil.
2. The inner tank is not cleaned well. There are some brown spots on the inside of the tank wall.	a. The detergent quantity is not sufficient. b. The spray- balls are partly blocked.	a. Check dosing pumps, check dosing P31 - P32 b. Open the spray-balls.
3. The water does not circulate during the cleaning process. The pump runs, but the water does not come out of the spray-balls.	a. The pump impeller is broken.	a. Replace impeller.

International English edition - 01
Tumba 2002

DeLaval
Box 39
S–147 21 Tumba
SWEDEN