DRAFT

Service Manual

PCO^2 Controller for Large Chillers

For M series

Software version V2.5M6

Part 1   Functional Description

Introduction   This part gives more detailed information on the functions and controls in the unit. This information is used as background information for troubleshooting. An extensive overview of the functioning of the controller is also given in this part. Prior knowledge of the controller is essential in detecting information for servicing and troubleshooting.

What is in this part?   This part contains the following chapters:

1

1 Functional Control

1.1   What Is in This Chapter

Introduction   This chapter will give more detailed information on the functions used to control the system. Understanding these functions is vital when diagnosing a malfunction, which is related to functional control.

Overview   This chapter covers the following topics:

1.2 Digital output

The following table shows the different types and their digital outputs, the digital outputs can be selected in the service menu:

WW / AW	DO1	DO2	100% capacity	2nd Evap pump	Evap. Heatertape	Gen. Operation	Free cooling	Condenser Pump	REV. Valve(C/H)
CO	/	x	x	x	x	X	x	/	/
HO	x	x	x	x	x	X	x	x	x
HR	x	x	x	x	x	X	x	x	x
HP	x	x	x	x	/	X	/	x	x
RC	x	x	x	x	x	X	x	/	/
CA	x	x	x	x	x	X	/	/	/

WW: Water water cooled
AW: Air water cooled

HO: Heating only
CO: cooling only
HP: Heatpump
HR: Heat recovery
RC: Remote condenser
CA: ER

Overview of the possible functions

100% CAPACITY: switches a contact when unit has reached 100%.

2nd EVAP. PUMP: this output handles the dual evaporator pump control.
- To switch from one pump to another after a number of working hours. In this situation the compressors are not switched off during switchover.
- This function is also used to switch from one pump to another in case of a flow error. In this situation the compressors are switched off during switchover.

EVAP. HEATERTAPE: this activates a function to protect the evaporator against freezing when the pump is switched off.

GEN. OPERATION: when this function is activated a contact closes when the system is on.

FREE COOLING: this activates the free cooling function. For more details on free cooling please refer to page 29.

CONDENSER PUMP:
- In cooling mode: the condenser pump contact will close on of the thermostat function.
- In other mode (heating/double thermostat): the condenser pump contact will close if the evaporator pump contact is closed.

REV. VALVE (C/H): this function allows to switch a reversing valve by closing a contact in heating mode and opening the contact in cooling or double thermostat mode.

1.3   Thermostatic control

Introduction   The unit is equipped with a thermostat, which controls the cooling or heating capacity of the unit.
Three different types of control exist:
¦   manual control mode or a control of the capacity by the operator
¦   inlet water setpoint evaporator control mode or a control using the entering evaporator water temperature.
¦   Outlet water setpoint evaporator control mode or a control using the leaving evaporator water temperature.

Manual mode versus automatic mode   The following table shows the difference between manual and automatic mode:

If…	then there is…
Manual capacity control (=fixed capacity step control)	No thermostat control.
Automatic control	An inlet/outlet thermostat control.

Automatic control

The default value and the upper limit of the thermostat parameters are listed in the table below.

INLET CONTROL		Default value	Lower limit	Upper limit
Steplength - a	(K)	1.5	0.4	2.0
Load-up time	(sec)	180	15	300
Load-down time	(sec)	20	15	300
Setpoint	(°C)	12.0	7.0	23.0

OUTLET CONTROL		Default value	Lower limit	Upper limit
Steplength - a	(K)	0.6	0.4	2.0
Step difference - b	(K)	0.2	0.2	0.8
Load-up time	(sec)	30	15	300
Load-down time	(sec)	15	15	300
Setpoint	(°C)	7.0	4.0	16.0

Inlet Evaporator control
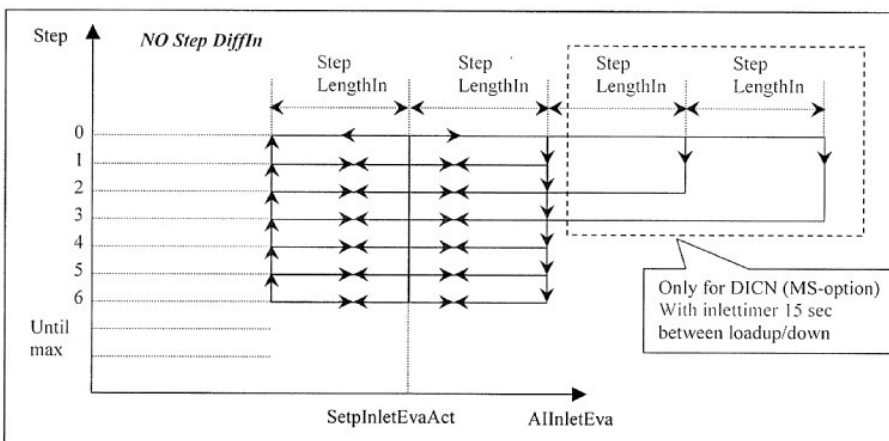
Fig. Inlet evaporator control (Cooling)

In DICN the controller will calculate how many steps are necessary and will then decide (on priority settings) whether the unit will raise the steps in a short time (15s between loadup/down) or divide the steps among the slave units.

4

Outlet evaporator control
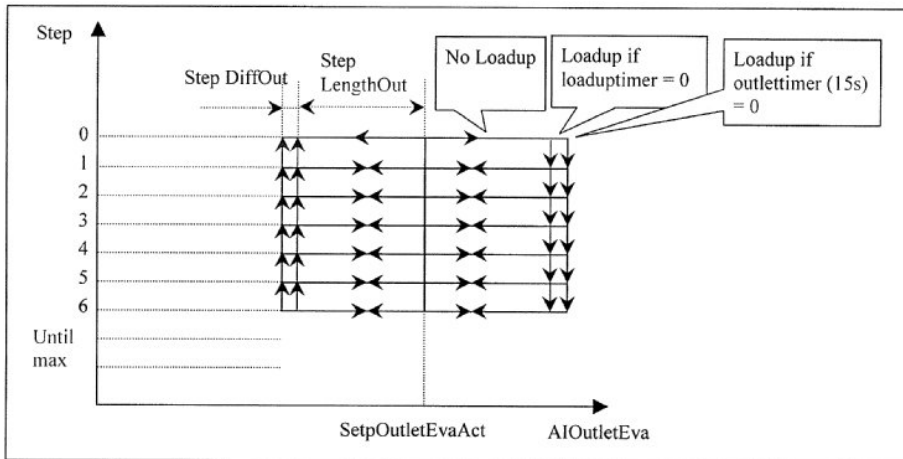
Fig. Outlet evaporator control (Cooling)

Controller   Screen 3 of the user setting menu provides the ability to modify the thermostat parameters

Line n°	Display	Description	Lower limit	Upper limit	Step	Default
1	THERMOST.SETTINGS	screen title				
2	STEPLENGTH	Step length (°C)	0.4	2.0	0.1	1.5
3	STEPDIFFERENCE	Step difference (°C)	0.2	0.8	0.1	0.6
4a	LOADUP	Load up time (s)	15	300	1	180
4b	LOADDOWN	Load down (s)	15	300	1	20

1.4   Setting of MOW

It will be possible to change the MOW in the service menu. Thus the installer can change the MOW if necessary (e.g. in case of a glycol treated unit this means no extra option is needed because the installer can adjust the MOW himself).

General overview

The following table shows a general view of freeze-up temperatures in case of protection and prevention.

	Minimum outlet water (M.O.W.)	FP set (Freeze-up protection)	FP Solution	Glycol percentage
Standard	4°C	2.5°C	0°C	0%
ZH	-5°C	-6.5°C	-16°C	30%
ZL	-10°C	-11.5°C	-22°C	40%

With FP Set: DDC-software of the freezing point equal to M.O.W.
With FP Solution: actual freeze-point value of the water glycol solution.

1.5   Freeze-up control

Introduction   Freeze-up control is used to protect the evaporator against accidentally freezing. Depending on the unit range there are two kinds of freeze-up controls.

- The freeze up prevention will reduce the capacity step of the circuit to avoid freeze-up of the evaporator.
- The freeze-up protection will stop the compressor to avoid possible freeze-up of the evaporator.

These functions are available on all large chillers.

Freeze up prevention

Characteristics	Freeze up prevention
Control device	Sensor
Diagram name	R3T, R4T
Activation	Outlet water temperature < M.O.W.-1K
Result	Loaddown of 1 thermostat step
Reset	Outlet water temperature > M.O.W.
Result	Normal mode

Freeze up protection

Characteristics	Freeze up protection
Control device	Sensor
Diagram name	R3T, R4T
Activation	Outlet water temperature < M.O.W.-1.5K (= 2.5°C for standard unit)
Result	unit disabled + register inlet water temperature
Reset	Manual reset if inlet temperature is raised with 1.5K (= 1 thermostat step) [1]
Result	unit enabled

(1) Alarm is held and must be reset manually. It can only be reset when the temperature rises with 1 thermostat step.

The following table shows a general view of freeze-up temperatures in case of protection and prevention

	Minimum outlet water (M.O.W.)	Freeze-up protection	Freeze-up prevention
Standard	4°C	2.5°C	3°C
	2°C	0.5°C	1°C
	0°C	-1.5°C	-1°C
ZH	-5°C	-6.5°C	-6°C
ZL	-10°C	-11.5°C	-11°C

Freeze-up control   It is possible to disable the freeze-up alarm when the unit is switched off.
This can be done in the service menu.

Line N°	Display	Setting	Description	Explanation
1	FREEZE UP	DIS. ONLY	Disable only	No alarm indication after Freeze up. After defrost the unit will restart automatically.
1	FREEZE UP	DIS&SAFETY (default)	Disable and safety	Alarm indication after expire of programmed number of freeze-ups

The number of allowed freeze-ups, without shutdown of the unit, during a certain period can be set in the menu.

Line N°	Display	Description	Lower limit	Upper limit	Step	Default
2.1	SAFETY:	Number of freeze-ups	1	5	1	4
2.2	IN	Period (minutes)	5	180	1	60
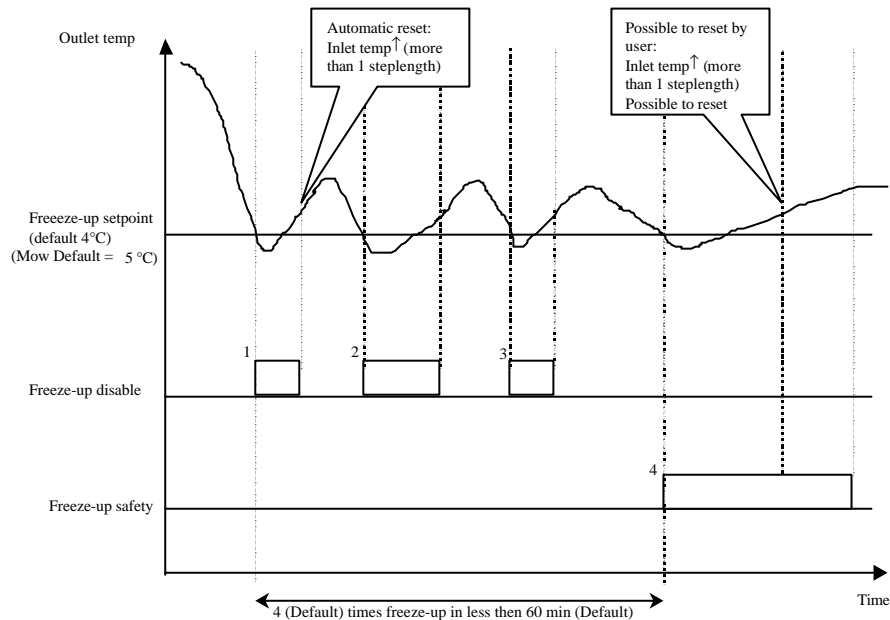
The system has also the possibility to check the inlet water temperature before reset. If the setting is put on Y, then the system will look at the evaporator outlet water temperature as well as at the evaporator inlet water temperature. If the setting is put on N then the system will only look to the evaporator outlet water temperature.

Line N°	Display	Description	Possibility	Default
3	INL CHECK AT RESET	Evaporator inlet water temperature check before reset	Y/N	N

When you use inlet check at reset not only the outlet water must rise with 1 steplength but also the evaporator inlet water temperature must rise with 1 steplength

1.6   Lead-lag Control

Introduction   The lead-lag mode determines which circuit starts up first in case of a capacity demand. It prevents the unit from always starting up the same circuit.

Possible modes:
- **Automatic**: The controller decides whether circuit 1 or circuit 2 starts up first.
- **Manual C1 > C2**: Circuit 1 starts up before circuit 2. If circuit 1 is de-activated due to a failure, circuit 2 will start up instead.
- **Manual C1 < C2**: Circuit 2 starts up before circuit 1. If circuit 2 is de-activated due to a failure, circuit 1 will start up instead.

Lead-lag hours in automatic mode   When the lead-lag control is done automatically, the software calculates the differences in operation time between the circuits. When this time is higher than the preset lead-lag hour value, the start sequence of both circuits is swapped.
The limit values of the lead-lag hours are the following:

¦   lower limit: 100 hours
¦   upper limit: 1000 hours
¦   default value: 1000 hours

i   This value is important for maintenance purposes. It should be set high enough so that the two compressors (if double circuit) do not require maintenance at the same time and that at least one compressor can remain constantly active.

Equal start up compressors

Yes: both circuits will try to go up in capacity alternating.
No: the leading circuit will try to go to full capacity before the lagging circuit can start up.

1.7 Capacity Limitation

Introduction

This function allows you to limit the capacity of the chiller.
Depending on the adjusted mode, it is possible to control the capacity limitation via remote digital input or via a programmable schedule timer.

Remote digital input mode

The circuit that should be able to run can be set in the user setting menu. There are four different possible setting (L1CIR1 CIR2, L2 CIR1 CIR2, L3 CIR1 CIR2 and L4 CIR1 CIR2). If you want to activate these contacts the Digital Inputs (DI1, DI2, DI3 and DI4) in the service menu should be set as CAP. LIMIT 1, 2,3 or 4.

Schedule timer mode

The schedule timer screen of the user settings menu allows the user to define the capacity limitation setting according to a programmed time.

¦   MON, TUE, WED, THU, FRI, SAT and SUN: used to define to which group each day of the week belongs (-/G1/G2/G3/G4).
¦   For each of the four groups up to nine actions can be set, each with their respective timing.
¦   Beside these four groups there is also a holiday period group which is set the same way as the other groups. Up to 12 holiday periods can be entered in the HD PERIOD screen. During these periods the schedule timer will follow the settings of the holiday period group.

1.8   Pump Control

Introduction   To prevent the chiller to start up without flow, two safety checks are performed.
First there is a check to make sure that water flows through the system.
Another safety is the double evaporator pump control, in case of failure of one pump
the other one takes over.
Another advantage of this control is the fact that the system switches from one pump
to the other in case failure during operation.
The status of the condenser pump can also be indicated via the changeable relay
outputs.

Pump lead/lag time   The PUMPCONTROL of the user settings menu allows the user to define the
pump-lead time and pump-lag time.

Line n°	Display	Description	Default value	Limit value
1	PUMP CONTROL	Screen title		
2	PUMPLEADTIME	Time the water pump will run before starting up the chiller	020 s	020-180 s
3	PUMPLAGTIME	Time the water pump will keep running after stopping the chiller	000 s	000-180 s

Remark: the default value for the PUMPLAGTIME is 0 s but it is recommended to set the lag time to
120s. This is to prevent the evaporator from freezing up.

Automatic pump startup The user will get the choice to perform a pump start every day to prevent obstruction
of the pump and to increase its lifetime. Everyday at pump start time, which can be
set in the timers menu, the pump will be started automatically for a short period (5s)
if the unit is not on.

Line n°	Display	Description	Default value	Limit value
4	DAILY ON	Activation of daily pump start	N	N-Y
4	AT	Daily pump start up time	12h00	00h00-24h60

**Dual evaporator
pump control**

When dual pump control is allowed an extra digital output is needed (see Service Menu). In total four choices will be possible: one pump (default), two pumps with automatic rotation (by running hours and with a certain offset), priority pump 1 and priority pump 2.

Line n°	Display	Possible setting	Description
1	DUAL EVAP. PUMP		
2a	MODE	AUTOM. ROTATION	The controller decides whether pump 1 or pump 2 starts up first
2b	MODE	PUMP 1>PUMP 2	Pump 1 starts up before pump 2
2c	MODE	PUMP 2>PUMP 1	Pump 2 starts up before pump 1

When the dual evaporator pump control is set in automatic rotation, the software calculates the differences in operation time between the two pumps. When this time exceeds the chosen offset time, the pump will shut down and the other pump will start up, during this the unit keeps running. The switchover will happen immediately, there is no transition time.

Line n°	Display	Description	Default value	Limit value
3	OFFSET ON RH	Running hours offset value	048h	001h-999h

i

In case two pumps are present (any setting) and the running pump fails then the unit is stopped and started up again with the other pump. When the first pump fails a visible warning will be given. The failed pump can not start up before this warning is reset. If the running pump fails while the other pump is already in warning a unit alarm will be given.

**Condenser pump
control**

It is possible to let the condenser pump work on thermostat control. With this regulation the condenser pump will only be switched on when the unit is cooling (thermostat/compressor on). When no cooling is necessary the condenser pump will be switched off.
When condenser pump control is allowed an extra digital output is needed (see Service Menu)

1.9   Floating setpoint

The floating setpoint can be used to modify the setpoint in function of the ambient temperature.
The user is able to choose to use the floating setpoint or not. The result of using the floating setpoint is that the unit will be used more efficiently and that the modified setpoint will be displayed under the normal setpoint.

1.   Source of the floating setpoint outdoor temperature = **floating_source**
2.   A reference at which the floating setpoint value is equal to zero = **floating_min** (zero on screen)
3.   A reference at which the floating setpoint value is maximum = **floating_max**
4.   The maximum floating setpoint value = **floating_maxvalue** (max. value on screen)

Value added to active setpoint

5°
(slope)

3°
floating
max value

0°

10°
floating max

20°
floating min

Ambient T°
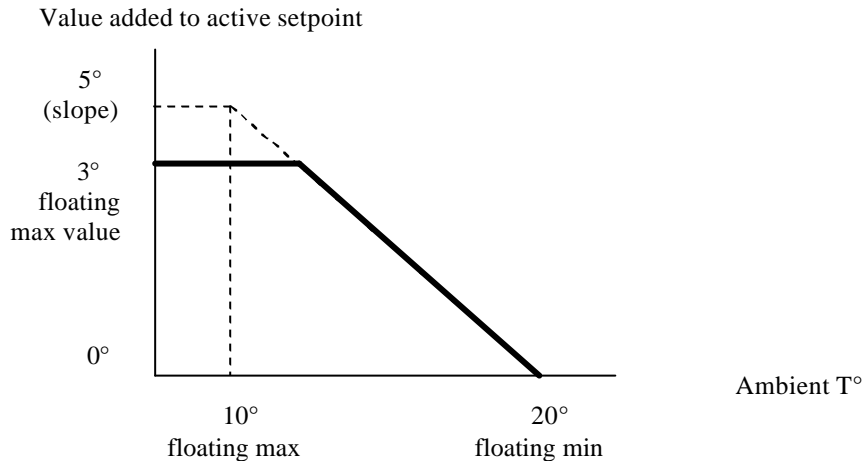
Explanation:
When the load of the unit drops (by drop in outdoor temperature) then the setpoint will be changed upwards by the floating setpoint value. Because of this the unit will evaporate at a higher temperature and thus the performance of the unit will be better.

i   When you use floating setpoint, the value of the setpoint on the readout and set point menu can be different. The readout screen will show the calculated value and the setpoint screen the set value.

1.10 Fan management

1. Purpose
To regulate high pressure

Condenser fans: Number of fansteps   →   single circuit: 3 fansteps

                                               →   double circuit: 2x3 fansteps

Possible functions	1.Aircooled cooling only	2.Evaporaterless unit	3.Watercooled unit	4.Condenserless units
	EUWA	ER	EUW	EUWL
	CO	CA	HP	RC
Fan management	x	x	--	x

2. Function description

<u>The fans will work according to following regulation (for three fansteps) :</u>
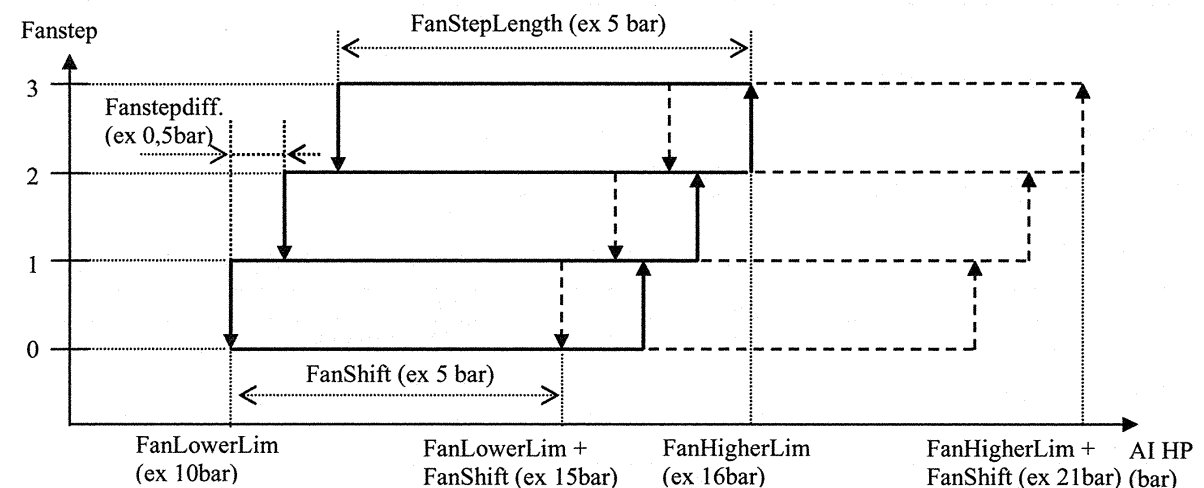
- The high pressure boundaries (FanLowerLim and FanHigherLim) for the fan control are defined by choice of refrigerant and can be set in the service menu.

- The **fanstepdifference** has a default value of 0,5 bar and can be changed. The **fansteplength** is then calculated by using following formula:

$$\textbf{fansteplength} = (FanHigherLim - FanLowerLim) - (n\text{-}1).\textbf{fanstepdifference}$$
$$\text{(with n = number of fansteps, default = 3).}$$

- By choosing the fansteplength big enough, hunting or unstable operation will be avoided.

- With the **fan_timer** (see service menu) it is possible to choose a minimum time between transitions (loadup/loaddown).The default value is 10 seconds. This options is used to increase flexibility and to avoid unstable operation.
  Although it is preferred not to work with timers, but with a difference in high pressure, to avoid to high or to low pressures before the controller can react.

- If a changeable digital input is selected as FanSetpoint Shift, following function will be active:
  If digital input (RemoteFanShift Yes) is closed , then:
  Minimum = FanLowerLim + FanShift
  &
  Maximum = FanHigherLim + FanShift
  Remark:
  Maximum Fanshift-value is determined as follows: FanHigherLim + FanShift = HPSetback – 0.5°C.
  If this is not the case then FanShift = HPSetback – 0.5°C – FanHigherLim.

1.11 EEV driver

1.11.1 *Applicable units*

All large chillers with pCO²-controller & EEV driver
EUW(L)*80-100MXY
EUW(L)*140-200MXY

1.11.2 *Basic unit setup*

The basic unit is set up to be used in a pLAN network. The customer can add a remote terminal.
A) Basic unit setup (= as standalone)

Remote terminal
Address **02**

Optional for customer

Electronic
Expansion Valve
driver (EEV1)
Address **03**

Electronic
Expansion Valve
driver (EEV2)
Address **04**

PCO² MEDIUM or LARGE with
built-in display Address **01**
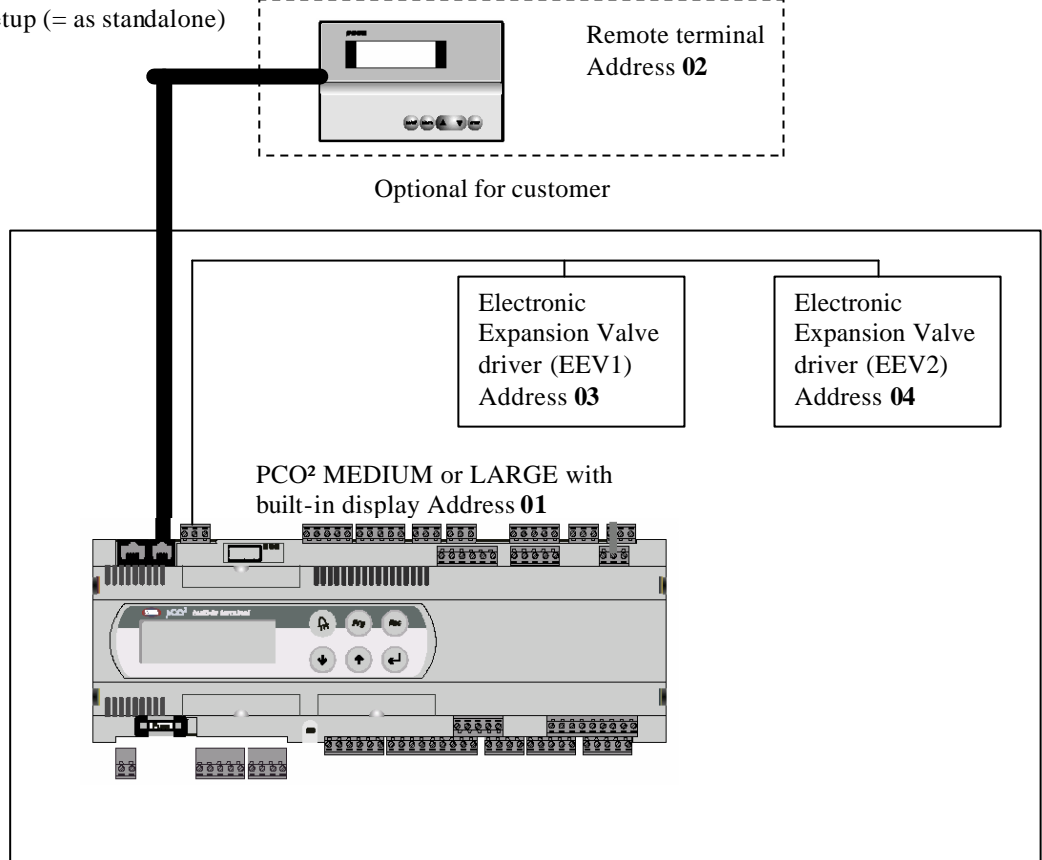
Example of dipswitch setting
Address 1= 100000
Address 2= 010000
Address 3= 110000
Address 4= 001000

Overview of address of EEV setup:

		PCB (pCO² medium or large)	User terminal (optional)	EEV1 (if present)	EEV2 (if present)
Unit 1	Master	1	2	3	4
Unit 2	Slave 1	5	6	7	8
Unit 3	Slave 2	9	10	11	12
Unit 4	Slave 3	13	14	15	16

1.11.3   *Applicable Parts*

	Daikin reference	Description	code	rev	How to check revision
PCO2 controller	4SW01021-2 A	PCO2 medium	PCO2DA0BM0	1.209	Sticker on back
	4SW01021-2 C	PCO2 medium	PCO2DA0BM0	1.309 or 1.409	
	4SW01021-3 A	PCO2 large	PCO2DA0BL0	1.209	
	4SW01021-3 C	PCO2 large	PCO2DA0BL0	1.309 or 1.409	
EEV driver	4SW01071-1	EEV driver	EVD0000000	1.015	Sticker on back
	4SW01071-1 A	EEV driver	EVD0000000	1.018 or 1.019	Or info menu pCO2

How to check EEV driver revision in info menu of pCO2 controller:

EEV driver	Revision	Info menu pCO2 EEV1&2: AAA= hardware version AAABBB BBB=software version
	1.011	EEV1:160010 (-> this version is not logic software mistake!)
	1.014	EEV1:160014
	1.015	EEV1:160015
	1.018	EEV1:160018
	1.019	EEV1:160019
	1.022	EEV1:160022

1.11.4   *Applicable software*

	Daikin reference	Description	code	rev	How to check revision
PCO2 software large chillers	4PW13326-x-x	PCO2 software large chillers	FLDKNMCHLA	V1.0M6	Info menu nr 3 controller
	4PW13326-x-x	PCO2 software large chillers	FLDKNMCHLA	V2.0M6	
	4PW13326-x-x	PCO2 software large chillers	FLDKNMCHLA	V2.1M6	
	4PW13326-x-x	PCO2 software large chillers	FLDKNMCHLA	V2.2M6	
	4PW13326-x-x	PCO2 software large chillers	FLDKNMCHLA	V2.3M6	
	4PW13326-x-x	PCO2 software large chillers	FLDKNMCHLA	V2.4M6	

1.11.5   *Related Software menus*

	Title	Item
Readout menu	ACT. PRESSURES C1	LP1
	ACT. PRESSURES C2	LP2
Service menu	EEV SERVICE MENU	
	EEV DRIVER C1(03)	EEV1status
	EEV DRIVER C2(04)	EEV2status
Alarm menu	1A9: EEV *** ERR	
	2A9: EEV *** ERR	
Info menu	UNIT INFORMATION	EEV1 version parameter
	UNIT INFORMATION	EEV2 version parameter
I/O status menu	EEV1 IN/OUTPUTS	Battery1 status & Valve position
	EEV2 IN/OUTPUTS	Battery2 status & Valve position

1.11.6 *Related LEDs*

PCO2 controller (Next to pLAN connection - can be consulted with small mirror on Unit)
pLAN LEDS

Label	Color	On	Off
	RED	Error	No error
	ORANGE	Communication between pCO2 and 1 or 2 EEV drivers	No communication
	GREEN	Communication between pCO2 and 1 or 2 EEV drivers	No communication

EEV driver (front of EEV driver)

Label	Color	On	Off	Blinking
Power	green	Power supply to EEV driver is present	No power supply to EEV	EEV battery problem active
Valve Opening	green		No valve opening	Valve is opening (not continuously)
Valve Closing	green		No valve closing	Valve is closing (not continuously)
Alarm	Red	Alarm is present	No alarm is present	Alarm present (EEV NOT CLOSED Error)
pLAN	Green	pLAN operates correctly	pLAN does not operate (no communication)	pLAN does not operates correctly (or busy to initialize)

If alarm LED & Valve Opening & Valve Closing LED are continuously blinking then the "EEV NOT CLOSED"-alarm is present.

Legend:

   Normal operation

1.11.7 *Overview alarms*

Circuit Alarms (Circuit will NOT be able to startup)		
CIRCUIT1 SAFETY	CIRCUIT2 SAFETY	
1A9:EEV DRIVER ERROR	2A9:EEV DRIVER ERROR	EEV driver is not found
1A9:EEV NOT CLOSED	2A9:EEV NOT CLOSED	EEV Valve did not close during stop (for example during power off) Refer to "8. Reset procedure for EEV NOT CLOSED"
1A9:EEV SUPERHEAT ER	2A9:EEV SUPERHEAT ER	EEV Superheat to low
1A9:EEV EEPROM ERR	2A9:EEV EEPROM ERR	EEV EEPROM problem
1A9: ST.MOTER ERR	2A9: ST.MOTER ERR	EEV Step motor problem
1A9:EEV PROBE ERR	2A9:EEV PROBE ERR	EEV Sensor out of range (LP probe or NTC probe)

Network Alarms (Unit will be able to startup)		
NETWORK SAFETY		
0U4:PCB COMM.PROBLEM		Status of the pLAN network is nok.

Warnings (Unit/Circuit will be able to startup)		
CIRCUIT1 SAFETY	CIRCUIT2 SAFETY	
1A9:EEV BATTERY ERR	2A9:EEV BATTERY ERR	EEV Battery problem

1.11.8   *Reset procedures for EEV NOT CLOSED alarm*

(refer also to installation manual)

EEV NOT CLOSED ALARM
Because an "EEV NOT CLOSED" alarm can have a dangerous situation for the unit there is a special
procedure to reset this alarm.
1.   The service man must check if there is no problem to start the unit (no liquid into the compressor? …)
2.   The service man can consult the reason for the EEV NOT CLOSED alarm in the service menu
       Ex.
       EEV DRIVER C1(03)
       SYSTEM WAITING FOR:
       VALVE OPEN
       GO AHEAD: NO
3.   After this the service man can give a "go ahead" by changing the "NO" into "YES" and confirm (= push
      ENTER)

After this action the EEV NOT CLOSED alarm can be reset in the ALARM MENU

1.11.9   *Remarks*

A)   EEV errors are delayed after power ON of unit with timer (set in service menu: default 90sec)
       This to avoid that an autorestart is prevented by an alarm that happens to fast at the power on of the unit.
B)   PLAN= Internal network between pCO2 controller / Userterminals & EEV drivers (tx+/tx-/GND)
C)   Change of address is only noticed after power off/on by software (for pCO2 controller & EEV driver)
D)   Possible to read present pLAN address by using external userterminal (confirm first address setting)
       push up/down & enter simultaneous for 10 sec (or 5 sec 2 times after each-other)
       (or first 3 menu buttons)
       (pCO2 controller or EEV-driver = square, Userterminal is smaller square)
E)   EEV additional info screens can be activated in service menu

Additional info:
READOUT MENU: Superheat , suction temp.
SETPOINT MENU: Superheat setpoint, pressure setpoint

1.11.10   *Check wiring*

According to wiring diagram of unit
Check especially following items:
1.   Tx+/tx- of pLAN connection between pCO2 controller & EEV1 & EEV2 drivers
2.   Power supply VG0 & VG1 of pLAN of EEV driver (VG0 & VG1 -> measure 24 VAC)

1.12   Network hardware overview

1.12.1   *Unit setup*

The basic unit is setup to be used in a pLAN network. The customer can add a remote terminal.
Basic unit setup (=master)

The optional board to connect the units to the gateway is the Address card EKAC200A

1.12.2   *External connections setup.*

MODBUS or BACnet connection

The following setups can be used to connect units to a BMS-system through a BMS gateway.

i   For more explanation about MODBUS see service manual "BMS option for Daikin network chillers"
ESIE99-03

▪   Multidrop: The gateway can be connected to the BMS making use of the RS485 connection
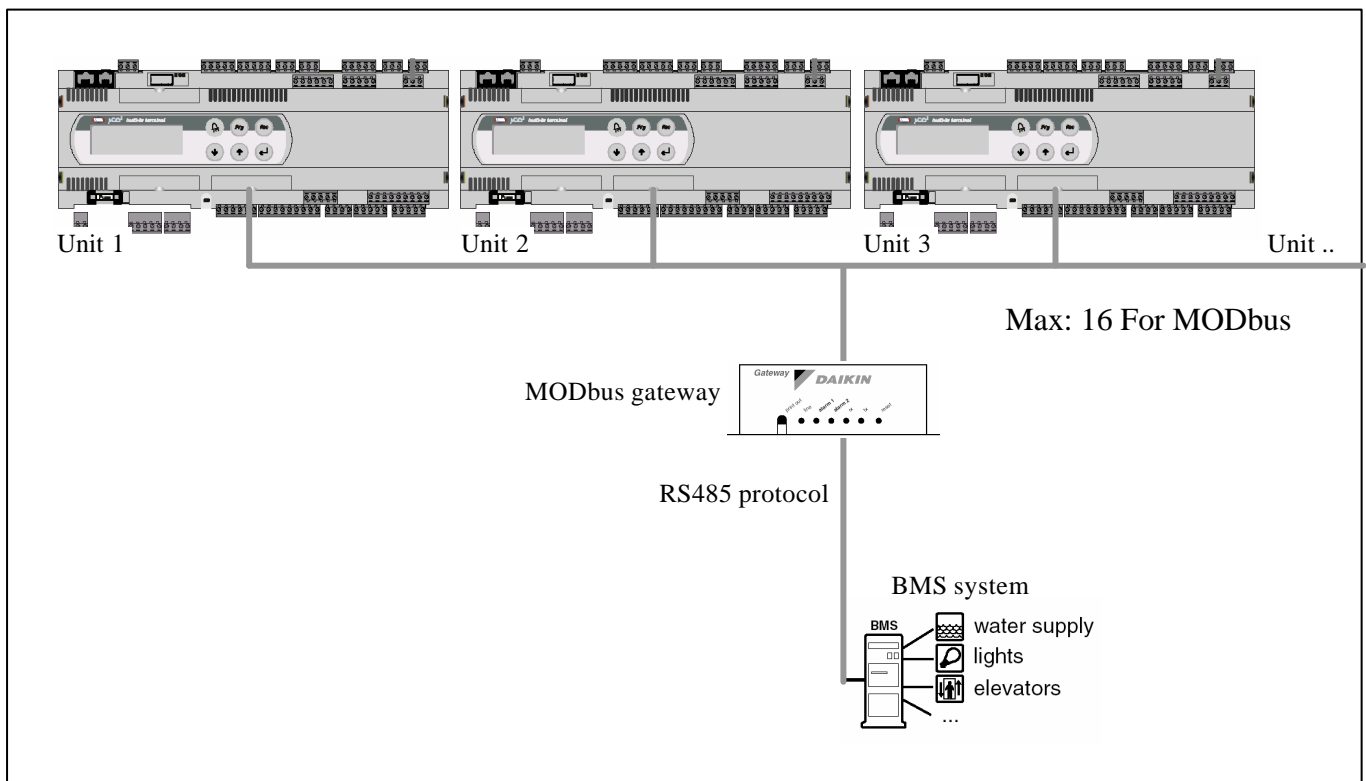
Fig 3.Multidrop for MODbus

- Point to point: A gateway can be connected to the BMS making use of the RS232 connection
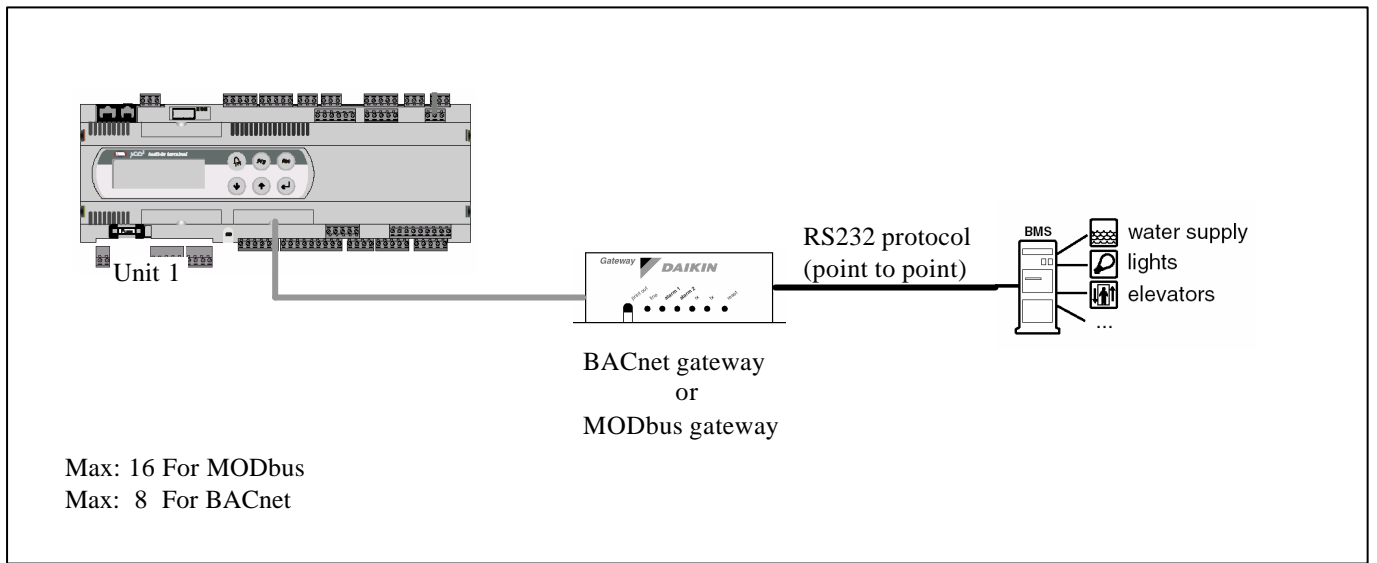
Fig 4. Point to point connection

1.13 DICN (network) Overview

DICN = Daikin Integrated Chiller Network
Also referred to as master-slave system

Remark: In a DICN system (Master-Slave), all the pCO^2-controllers must have the same software & code & bios and boot version!

If the master is down (= no power then the network safety and all units will work as standalone (no parameters transferred)

Basic principle:
- No ER-units in a DICN-system
- Possible to combine all air-cooled in one DICN-system
- Possible to combine all water-cooled in one DICN-system
- Max to combine 4 units in one DICN-system

	1. ER units	2. Aircooled units: 1 circuit	3. Aircooled units: 2 circuits & 1 evap	4. Aircooled units: 2 circuits & 2 evap	5. watercooled units: 1 circuit	6. watercooled units: 2 circuits & 2 evap
1. ER units	-	-	-	-	-	-
2. Aircooled units: 1 circuit	-	X	X	X	-	-
3. Aircooled units: 2 circuits & 1 evap	-	X	X	X	-	-
4. Aircooled units: 2 circuits & 2 evap	-	X	X	X	-	-
5. watercooled units: 1 circuit	-	-	-	-	X	X
6. watercooled units: 2 circuits & 2 evap	-	-	-	-	X	X

X = these units can be connected and mixed in one DICN-system

PLAN: Transfer all parameters to the different units (only if MSOption = yes)

- DICN Basic setup (= master/slave system)

In service menu, the installer must select if the units are used in a MS system or not.

pLAN connection

Unit 1
= Master

Unit 2
= Slave 1

Unit 3
= Slave 2
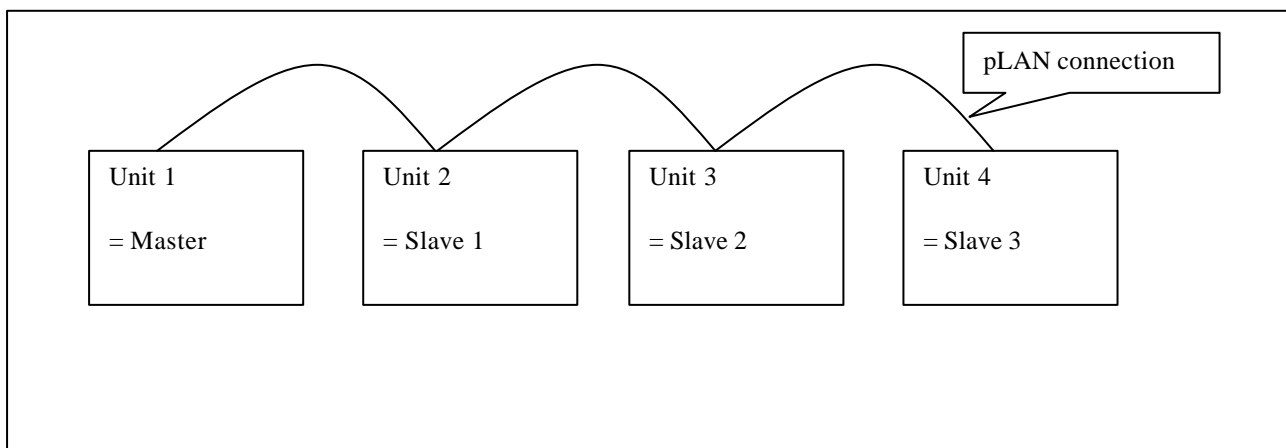
Unit 4
= Slave 3

Overview of addresses of DICN setup:

		PCB (pCO²)	Userterminal (optional)	EEV1 (if present)	EEV2 (if present)
Unit 1	Master	1	2	3	4
Unit 2	Slave 1	5	6	7	8
Unit 3	Slave 2	9	10	11	12
Unit 4	Slave 3	13	14	15	16

You can find the dipswitch of the EEV driver on the inner side of the driver. Take off the cap of the EEV driver (cap with the led's). If you have removed it, you will find on the inner side of the cap the address dipswitch. Set the dipswitch address and close the EEV driver again.

1.13.1 *On/Off management*

For DICN units (when MS option is yes):
The different units can be put in "NORMAL or STANDBY" mode or in "DISCONN. ON/OFF" mode

MSOption see page 22

	MSOption = yes (network unit)		**MSOption = no** (standalone unit)
	NORMAL or STANDBY	DISCONN.ON/OFF	
On/Off status	Equal for all units that are in "NORMAL/STANDBY" mode	Dedicated to this unit only.	Dedicated to this unit only.
Changing On/Off status	When you push the ON/OFF button on a unit that is in "NORMAL/STANDBY" mode. The status (ON/OFF) will be transferred to all the other units in "NORMAL/STANDBY" mode	Push On/Off button, the status (On/Off) is dedicated to this unit only.	Push On/Off button, the status (On/Off) is dedicated to this unit only.
Changing Remotely On/OF status	Into the service menu of the master, you can select a changeable Digital Input as "Remote On/Off"	Into the service menu of that unit, you can select a changeable Digital Input as "Remote On/Off"	Into the service menu of that unit, you can select a changeable Digital Input as "Remote On/Off"
	Remark: 1 If the master is "DISCONN.ON/OFF" then the DI will change the On/Off status of the master & all the units with "NORMAL/STNADBY" mode. 2 If a slave (=not the master) is "NORMAL/STNADBY" and the DI= "Remote On/Off" then the DI of that slave will not change the On/Off status of the unit &all the "NORMAL/STNADBY" units.		

Remark:
If you work with an REMOTE ON/OFF switch and you start up the unit. It can be that the unit doesn't start up. Only the ON/OFF button starts to blink, In that case check the REMOTE ON/OFF if he is ON. Switch ON and the Start Unit.

1.13.2   *Changeable DI management*

	MSOption = yes (network unit)	**MSOption = no** (standalone unit)
Dual setpoint	DI of Master	DI of Unit
Remote On/Off	DI of Master	DI of Unit
Remote Cooling/Heating (only for watercooled units)	DI of Master	DI of Unit
Capacity limitation 1/2/3/4	DI of unit	DI of Unit
FanSetpointShift	DI of unit	DI of unit

1.13.3   *Cooling heating Management*

Cooling mode: thermostat function on evaporator
Heating mode: thermostat function on condenser
Double thermostat: thermostat function on evaporator and condenser

	MSOption = yes (network unit)	**MSOption = no** (standalone unit)
ModeCH	Equal for all units.	Dedicated to this unit only
Changing ModeCH	When you change the ModeCH on one unit. Then the status is transferred to all units	When you change the ModeCH on a unit. Then the status is NOT transferred to other units
ModeCH status	Equal for all units	Dedicated to this unit only.
Changing remotely ModeCH status	Into the service menu of the master, you can select a changeable Digital Input as "Remote C/H"	Into the service menu of that unit, you can select a changeable Digital Input as "Remote C/H"
	Remark: If in a slave (=not the master) DI= "Remote C/H" is changed then the DI of that slave will not change the modeCH status	

1.13.4   *Schedule timer Management*

The schedule timers consists out of 5 different groups of 9 actions.
        4 different groups can be applied to a weekday.
1 group can be applied on different holiday periods.

For DICN units:
- only possible to set in master (screens not available on slave units if MSOption =yes)
- if master is down (=no power) then the schedule of master is not executed and each slave that working as stand-alone (& network alarm) in latest status.
- ***If the LIM1 is activated in the schedule timer in the master, this is transferred to all DICN units (same for LIM2/3/4/NO LIM)***

1.13.5 *Limitation management*

	MSOption = yes (network unit)	**MSOption = no** (standalone unit)
Limitation Mode	Equal for all units	Dedicated to this unit only.
Changing Limitation mode	When you change in one unit. Then the value is transferred to all units	When you change in each unit. Then the value is NOT transferred to other units
Active limitation by Schedule timer	Set schedule timer of Master. (see remark 1) Then when activation of limitation, it will be transferred to all units.	Set schedule timer of unit Dedicated to this unit only.
Enable/disable limitation By remote digital inputs	Into the service menu of each unit, you can select a changeable Digital Input. Dedicated to this unit only.	Into the service menu of each unit, you can select a changeable Digital Input. Dedicated to this unit only.
	Remark: 1. schedule timer is only available in Master	

1.13.6 *Free cooling*

When ambient temperature is low, cool water can be made easily by direct heat exchange with ambient air.
Free cooling can work on Ambient or difference between inlet water temperature and ambient temperature.
When free cooling is activated a 3 way valve will be closed.

Free cooling can only be used if the changeable digital output "free cooling" is selected.
Free cooling function only if unit is on.

With a DICN network:
If MSOption = yes then the function is executed by the master on the ambient sensor by the master.
If MSOption = no then the function is executed as a standalone unit.

Remark:
If the DO: Freecooling is selected in a slave then the function will only be executed if the MSOption = no

1.13.7 *Dual setpoint Management*

	MSOption = yes (network unit)	**MSOption = no** (standalone unit)
Setpoint value (1&2)	Equal for all units	Dedicated to this unit only.
Changing setpoint value	When you change the setpoint of one unit. Then the value is transferred to all units	When you change the setpoint of each unit. Then the value is NOT transferred to other units
Dual setpoint status	Equal for all units	Dedicated to this unit only.
Changing remotely dual setpoint status	Into the service menu of the master, you can select a changeable Digital Input as "Dual setpoint"	Into the service menu of that unit, you can select a changeable Digital Input as "Dual setpoint"
	Remark: 1. If in a slave (=not the master) DI="Dual setpoint" then the DI of that slave will not change the dual setpoint status 2. If the slave is standalone (= if MSOption = No), no setpoints are transferred and dualsetpoint from the unit changes the status	

1.13.8   *Manual Management*

In manual mode the customer can manually start up the different compressors in all capacity steps & fans in all fansteps.
In manual mode No capacity limitation & timers!
>>> No Freeze -up prevention
>>> No HP setback

	NORMAL or STANDBY	DISCONN. ON/OFF
Manual mode	Not possible	Dedicated to this unit only.
Changing to manual mode	Not possible	Possible to select in usersettings

1.13.9   *Automatic thermostat management*

General rule for inlet outlet manual mode
1.   Manual mode only possible in disconnected mode and not transferred to other units.
2.   Inlet/outlet transfer to all normal units and "disconnected units with no manual mode".

	MSOption = yes (network unit)		MSOption = no (standalone unit)
	NORMAL or STANDBY	DISCONN.ON/OFF	
Inlet/outlet mode	Equal for all units	Equal for all units	Dedicated to this unit only.
Changing to Inlet/Outlet	When you change the Inlet/outlet mode in an unit. Status is transferred to all other units Except units that are in ("DISCONN.ON/OFF" mode and manual mode)	When you change the Inlet/outlet mode in a unit. Status is transferred to all other units Except units that are in ("DISCONN.ON/OFF" mode and manual mode)	When you change the Inlet/outlet mode in that unit. No status is transferred to other units

1.13.10   *External thermostat Management*

No DICN option is possible (-->MSOPTIONSETTING=NO & not visible)

1.13.11   *Pump management*

DICN units (MSOption =yes):
1.   Pump on if "UNIT ON": closing pumpcontact when pumplead timer is running (started when unit is turned ON), open pumpcontact after pumplagtimer (pumpfunction as for standalone unit).
2.   Pump on if "COMPR ON" : close pumpcontact when pumplead timer is running (started when loadup request is yes), open pumpcontact after pumplagtimer (started when no compressors are running anymore)
DICN units (MSOption =yes): Extra pump procedure!
>>> If no pumpcontact is closed (ex all pump on if " COMPR ON" & no request to loadup) then turn on the pumpcontact of the unit with highest priority.
>>> (This is needed because the temperature sensor must be able to measure the correct water temperature.

1.13.12   *Pumpdown*

For DICN units: only possible to enter if unit is "MODE: DISCONN.ON/OFF" and unit is OFF.

1.13.13 *Priority Management*

Determine unit priority for each unit in a M/S system.

Basic rules:
- Loadup as fast as possible
- Use as less possible units

The following items are considered to determine priority
- Standby function
- According to loadup/down request possible, outlet water temp, unit priority, unit running , unit offset

Standby function:

Determine actual standby unit:

If only one unit is in "STANDBY" mode	• ActualStandby = unit in "STANDBY" mode
If more than one unit is in " STANDBY" mode	From all units in "STANDBY" mode that have step=0 • Actual Standby = Select Unit with biggest RunnHours-offset

Determine if actual standby unit is needed:

Standby needed Yes if	• All units are 100% • All units are (0% or 100%) and as the standbyunit is not equal to 0% • A unitsafety is present on a unit • A circuitsafety is present on a unit • "DISCONNECT ON/OFF" is selected on a unit	OR	Then Loadup possible (standby Unit) = yes

Determine priority for each unit according to

1. loadup request

	LOW Priority		High priority	
1. Unit Loadup possible	**NOT (Loadup possible)**		**Loadup possible**	
2. Unit Outlet water temperature	Outlet temp(unit) < MOW + steplPriority * steplenght		NOT (Outlet temp(unit) < MOW + steplPriority * steplenght)	
3. Unit priority	0 (lowest priority)	1	2	3 (highest priority)
4. Unit that are already running	NOT (unitstep<>0)		Unitstep<>0	
5. unit offset (running hours - RHOffset)	Highest (running_hours – RHOffset)	>	>	Smallest (running_hours - RHOffset

2. loaddown requested

	LOW Priority		High priority	
1. Unit Loaddown possible	**NOT (Loadup possible)**		**Loadup possible**	
2. Unit Outlet water temperature	NOT (OUTLET TEMP(Unit) < MOW		OUTLET TEMP(Unit) < MOW	
3. Unit on step 1	Unit step = 1& all other units are running on 0 or 100%	NOT (unitstep = 1)	Unit step =1	
4. Standby Unit	NOT (Unit = ActualStandby)		Unit = ActualStandby	
5. unit offset (running hours - RHOffset)	3 (lowest priority)	2	1	0 (highest priority)
6. unit offset (running hours - RHOffset)	Smallest (running_hours - RHOffset	<	<	Highest (running_hours – RHOffset)

Into the service menu you can specify the "MS PR (Unit Priority) –(StepLPriority)" this value is used to select the priority. The priority depends on different points. See above.

1.13.14 *Changeable analogue input management*

This concerns AI3 setting.
If the unit is a standalone the AI3 setting of the unit is chosen.
If the master slave option of the unit is activated, then the AI3 setting will be the AI3 setting of slave1!
Because, in DICN, the AI3 of the master will be used for the mixed outlet temperature.

1.14 Free cooling

When ambient temperature is low, cool water can be made easily by direct heat exchange with ambient air. Free cooling can work on Ambient or difference between inlet water temperature and ambient temperature. When free cooling is activated a 3 way valve will be closed.

Free cooling can only be used if the changeable digital output "free cooling" is selected.
Free cooling function only if unit is on.

1.14.1   *Free cooling on ambient temperature*

it is possible to work with indirect or direct free cooling on ambient temperature

Indirect free cooling

No free cooling
- -compressor on
- -evaporator waterpump on CHWP
- -digital output for 3-way valve opens

with a certain leadtime between opening 3-way valves
and starting of compressor
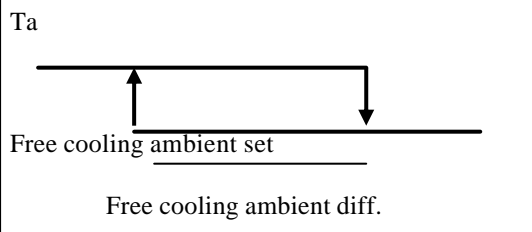
Ta

Free cooling ambient set

Free cooling ambient diff.

Free cooling
- -compressor off
- -evaporator waterpump on CHWP
- -digital output for 3-way valve closed
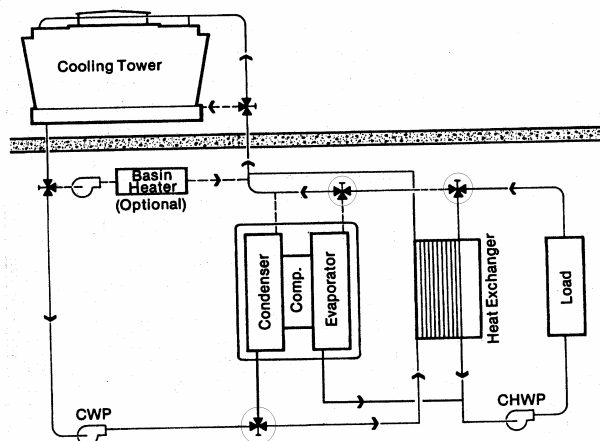
No free cooling : CHWP pumps load through evaporator of the chiller. The cooling tower is disconnected from the system through the 3-way valve.

Free cooling: CHWP pumps load through external heat exchanger. The chiller is disconnected through the 3-way valves. The cooling tower cools the heat exchanger (pump CWP is running)

Direct free cooling

No free cooling
        -compressor on
        -evaporator waterpump on CHWP
        -digital output for 3-way valve opens

With a certain leadtime between opening 3-way valves + starting of pump and starting of compressor

Ta

Free cooling ambient set

Free cooling ambient diff.
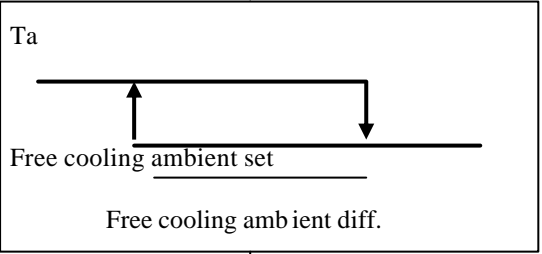
Free cooling
        -compressor off
        -evaporator water pump **off** CHWP
        -digital output for 3-way valve closed
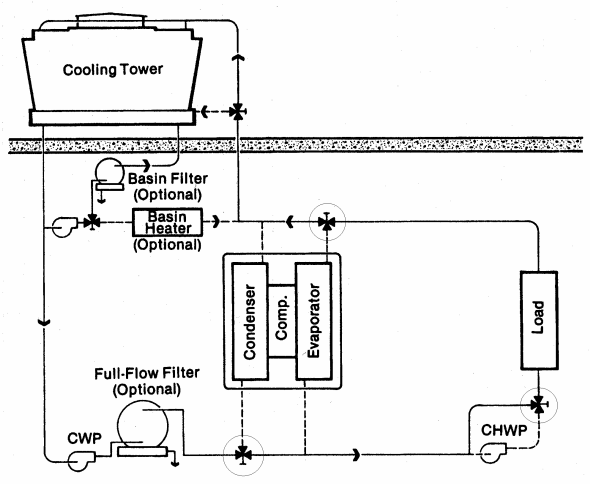
Pump CWP will work if **free cooling** is selected. Chiller is disconnected through 3-way valve. Pump CHWP is also disconnected by-passed through 3-way valve.

Pump CHWP will work if **no free cooling** is selected. Cooling tower is disconnected through 3-way valve.

1.14.2 *Free cooling on difference between entering water evaporator and ambient temperature.*

| No free cooling |
| -digital output for 3-way valve open |

| When EWT > Ta + Free cooling inlet set ── enter free cooling |
| When EWT < Ta + Free cooling inlet set – free cooling inlet difference ── leave free cooling |

| Free cooling |
| -digital output for 3-way valve closed |
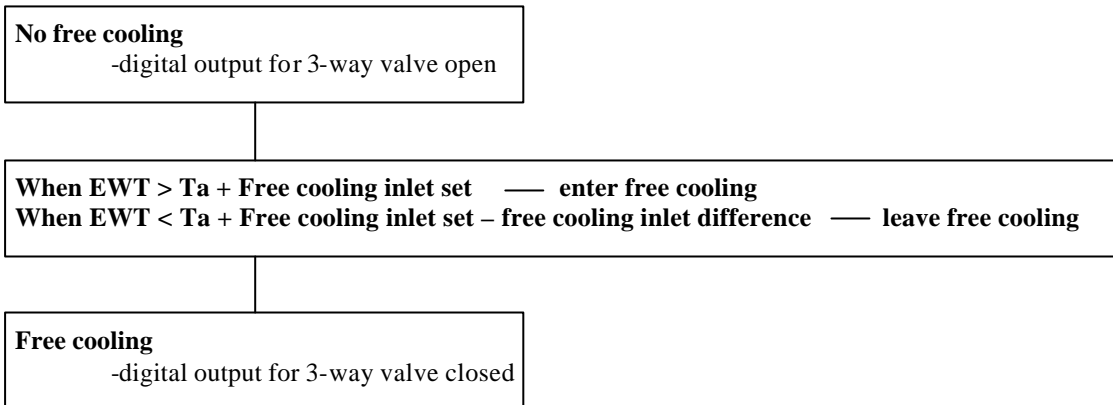
1.15 Changeable analogue input.

This function is similar to the floating setpoint function, in that way that it also modifies the setpoint. But this time the modification is function of an electrical signal and not the ambient temperature. Possible signals are: 0/1 V; 0/10 V; 0/20mA; 4/20mA

Function description
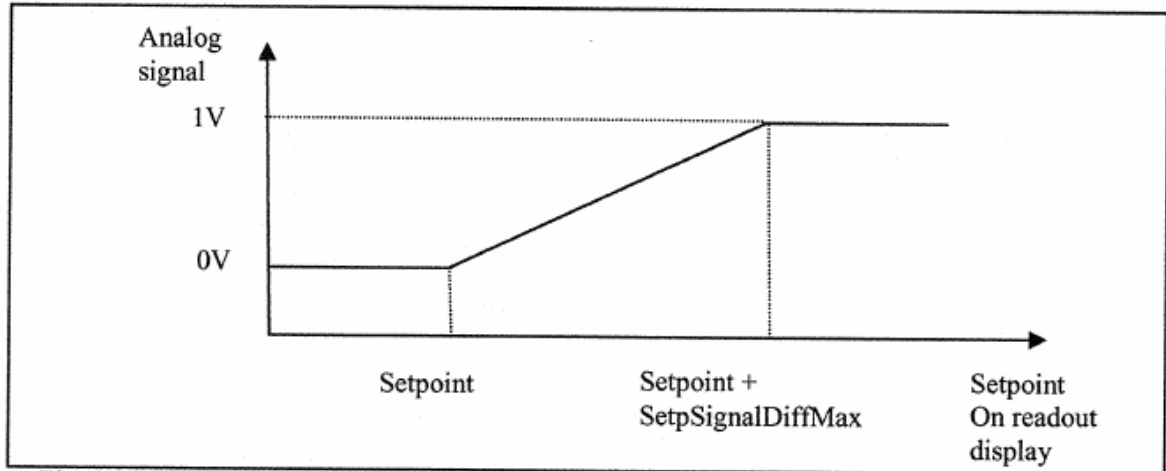
Fig. example setp.signal 0-1V

- The function can be activated in the service menu
        Not active: Analogue signal is not used.
        Active: Analogue signal is used to change user setpoint.
- When the function is activated you can set the maximum setpoint signal difference. Default this is set to 0 and it can be set to a value from -50 to 50.
Example for 0-1V signal:
        If analogue input AI3 is 1V then SetpSignalDiff is equal to SetpsignalDiffMax
        If analogue input AI3 is 0V then SetpSignalDiff is equal to 0

Remark:
The actual setpoint displayed in the readout menu is the result of the combination of following functions:
- Dual setpoint function
- C/H Mode and inlet/outlet mode
- Setpoint signal mode.

Example :

Situation (setp.signal 0-1V)		Calculation	Result
Cooling inlet mode, SetpSignalDiffMax= 8,0°C	Setpoint1(inlet,evap)=12.0°C AI = 0.5 V	SetpSignalDiff= 4.0 °C	Setpoint=16,0°C

2 The digital Controller for the Large Chillers

2.1   What Is in This Chapter

Introduction   In this chapter you will learn to work with the controller pCO^2 for the chiller types.

Overview   This chapter covers the following topics:

2.2 The Controller

Digital controller　The EUW(A)(L)40~200M(Z)(X) units are equipped with a digital controller offering a user-friendly way to configure, use and maintain the unit. The digital controller consists of:

¦　A alphanumeric LCD display
¦　6 keys (4 of them are colored when activated

Front panel　　The illustration below shows the front panel of the controller.
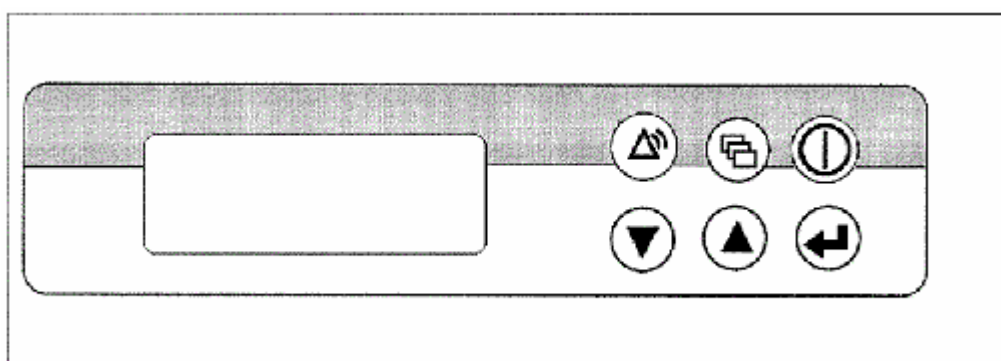
key	Description	LED Color
⚠	Key to enter the safeties menu or to reset an alarm	Red
🗗	Key to enter the main menu	Green
⏻	Key to start up or to shut down the unit	Green
▼ ▲	Key to scroll through the screens of a menu (only in case v, : or ^ appears) or to rise, respectively lower a setting.	-
↵	Key to confirm a selection or a setting	Green

How to switch between Screens　　Each menu contains a number of screens. You can switch between screening using the ▼ or ▲ keys. In the upper-left corner of the screen you will find a screen indicator, indicating whether there is a previous or next screen. An overview is given below:

The screen indicator	Indicates that you can
^	return to the previous screen
v	go tot the next screen
/	either return to the previous or go to the next screen

i note : Temperature read out tolerance : $\pm\,1°$

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Screen detail   Each screen contains 4 lines which give information about a setting (a description and an entry field). The entry fields can be adjusted using the ▲ and The ▼ keys. The cursor is marked by the sign _ . You can move the cursor between the screen indicator and the entry fields using the ⏎ key. You can move the cursor directly to the screen indicator by pressing ⊚

Cursor   screen indicator

_	/		l	i	n	e	1	:	**T**	**I**	**T**	**L**	**E**					
			l	i	n	e	2		v	a	l	u	e	1	:	**1**	**0**	
			l	i	n	e	3		v	a	l	u	e	2	:	**2**	**0**	
			l	i	n	e	4		v	a	l	u	e	3	:	**3**	**0**	

information   Entry field
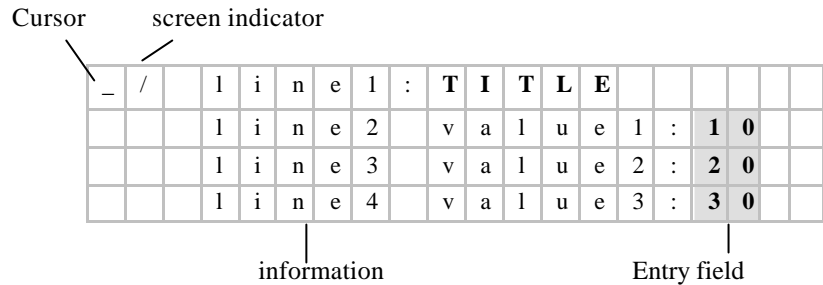
i note: Make sure that the cursor is at the screen indicator position when scrolling through the screens.

2.2.1   *Version of software.*

Software version:	X x.xM6 (date)	X: "V" = Final software, "A"= Alfa software, "B" = Beta software x.x: progressive number "M" = Multilanguage "6" = Hardware code for pCO²
Software code:	FLDKNMCHLA	"FL" = software for pCO² "DKN" = Daikin Europe NV "M" = Multilanguage "CHL" = Large Chiller applications "A" = Setup code for pCO²
Boot version:	V x.xx (date)	x.xx: progressive number
Bios version:	V x.xx (date)	x.xx: progressive number

Remark: In a DICN system (Master-slave), all the pCO²-controllers must have the same software code & bios & boot version!

The manual is based on the software version V2.4 M6
Other software versions can have different displays

2.2.2 *Range of application.*

▪ **Large aircooled chillers :**

-   Single circuit (PCO² MEDIUM) 3step compr. :   EUWA*40-60MZY
                                                   EUWA*40-60MXY
                                                   ER*40-60MZY

-   Single circuit (PCO² MEDIUM) 4step compr. :   EUWA*80-120MZY
                                                   EUWA*140MZY

-   Double circuit (PCO² LARGE) single evaporator :   EUWA*80-120MXY

-   Double circuit (PCO² LARGE) double evaporator :   EUWA*160-200MZY
                                                       EUWA*160-200MXY

▪ **Large watercooled chillers :**

-   EUW single circuit (PCO² MEDIUM) :   EUW*40-60MXY
                                          EUW*80-100MXY

-   EUW double circuit (PCO² LARGE) :   EUW*120MXY
                                         EUW*140MXY
                                         EUW*160-200MXY

▪ **Large condenserless chillers :**

-   EUWL single circuit (PCO² MEDIUM) :   EUWL*40-60MXY
                                           EUWL*80-100MXY

-   EUWL double circuit (PCO² LARGE) :   EUWL*120MXY
                                          EUWL*140MXY
                                          EUWL*160-200MXY

2.2.3 *General features of the medium and large controller*

Remark:

Features common to all the versions
- 16-bit microprocessor, 14 MHz, internal registers and 32 bit operation, 512 Byte internal RAM;
- up to 6 MByte FLASH MEMORY per program;
- 256 kByte static RAM, upon prior request expandable to 1 MByte;
- 1 RS485 serial port for pLAN;
- ready for connection to RS485 supervisory network;
- clock with replaceable lithium battery;
- 56 Byte of battery backed-up RAM;
- selection of address and LEDs for pLAN and LED power signal.;
- DIN plastic case for installation on omega rail;
- 24Vac/Vdc power supply;
- telephone connector for pCO terminals and synoptic;

pCO² LARGE (18 DIN modules)
- 14 optically-isolated digital inputs, 24Vac 50/60Hz or 24Vdc;
- 4 optically-isolated digital inputs, 24Vac/Vdc or 230Vac (50/60Hz);
- 18 relay digital outputs (3 of which with changeover contacts);
- 4 analogue inputs, selectable between NTC, PT1000, ON/OFF;
- 6 analogue inputs, selectable between NTC, 0÷1V, 0÷10V, 0÷20 mA, 4÷20mA;
- 6 analogue outputs, 0÷10 V;
- 1 serial port for I/O expansion.

pCO² MEDIUM (18 DIN modules)
- 12 optically-isolated digital inputs, 24Vac 50/60Hz or 24Vdc;
- 2 optically-isolated digital inputs, 24Vac/Vdc or 230Vac (50/60Hz);
- 13 relay digital outputs (3 of which with changeover contacts);
- 2 analogue inputs, selectable between NTC, PT1000, ON/OFF;
- 6 analogue inputs, selectable between NTC, 0÷1V, 0÷10V, 0÷20 mA, 4÷20mA;
- 4 analogue outputs, 0÷10 V.

2.2.4   *Procedure : software upload/download*

Copy from key to pCO^2
- Switch off the pCO^2 and remove the "expansion memory" cover with a screwdriver (*see Fig. 2*)
- Set the key selector on
- Insert the key in the corresponding pin connector as shown. (*see Fig. 3*)
- Press simultaneously the buttons UP an DOWN then supply power to the pCO^2

- Check the LED on the key is on (red color   )
- Wait until the request of copying appears on the LCD display, then release the buttons and confirm by pressing ENTER.
- The data transfer operation takes about 50s using the 1MB key and 100s using the 2MB one.the display will show a progressive series of numbers.
- Once copied the application program starts, then switch off the pCO^2, remove the key, put the cover in its place and switch on the pCO^2 again,
- Now the pCO^2 works with the program transferred by the key.

Copy from pCO^2 to key
- Switch off the pCO^2 and remove the "expansion memory" cover with a screwdriver (*see Fig. 2*)
- Set the key selector on
- Insert the key in the corresponding pin connector as shown. (*see Fig. 3*)
- Press simultaneously the buttons UP an DOWN then supply the pCO^2

- Check the LED on the key is on (green color   )
- Wait until the request of copying appears on the LCD display, then release the buttons and confirm by pressing ENTER.
- If the application includes a password to protect the software, use the UP and DOWN buttons on the terminal to enter the correct password. Then press enter.
- The data transfer operation takes about 50s using the 1MB key and 100s using the 2MB one.the display will show a progressive series of numbers.
- Once copied the application program starts, then switch off the pCO^2, remove the key, put the cover in its place and switch on the pCO^2 again,
- Now the key has the program transferred by the pCO^2.

Copy from WinLoad32 to Key
Optional: Carel RS Converter (software Winload + drivers : Will be available on intranet)

- Switch off the pCO^2 and remove the "expansion memory" cover with a screwdriver (*see Fig. 2*)
- Set the key selector on   (from key to pCO^2)
- Insert the key in the corresponding pin connector as shown. (*see Fig. 3*)
- Prepare the connection for downloading the program for WinLoad32.

- Supply power to the pCO^2 (check the red LED o   .e key   is on)
- Make the upload
- Once finished, switch off the pCO^2, remove the key and put the cover in its place.
- Now the key has the program transferred from WinLoad32.
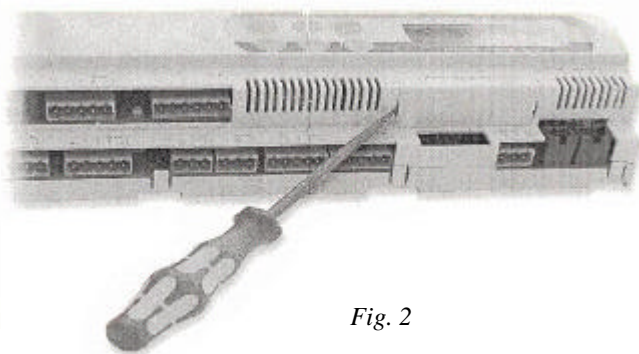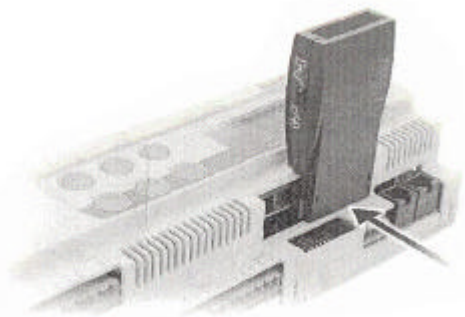
Fig. 2   Fig. 3

2.3   Start/Stop, Cool/Heat and Temperature Settings

Power on
    ¦   The initialization takes 10 seconds
    ¦   The controller automatically goes to the menu overview.

Remote start/stop
The procedure to start or stop the unit depends on the settings of the remote start/stop,

i note The remote start/stop is field supply.

How to start or stop

Local key	Remote Switch	Unit	⏻ LED
ON	ON	ON	ON
ON	OFF	OFF	Flashing
OFF	ON	OFF	OFF
OFF	OFF	OFF	OFF

How to cool or heat
To change from cooling to heating (or visa versa) you have to enter the Cooling/Heating menu through the main menu.

Emergency stop
In event of emergency, switch of the unit by pushing the emergency button.

Temperature setting
To adjust the inlet or outlet water temperature, go to the Set Points menu through the main menu.

Remark
To prevent the unit from starting up at 100%, the unit will always loaddown to 12% and operate at this capacity for a couple of seconds before shutting down.

2.4   What Happens in Case of an Alarm or a Warning

Introduction   The units are equipped with four kinds of safety devices: unit safeties, Circuit safeties, network safeties and dual pump safety.

Overview safeties

Unit safety	Description	Safety possible if unit is off?
1. Inlet Condenser sensor error	+Er / -Er readout by sensor	Y
2. Inlet Evaporator sensor error	+Er / -Er readout by sensor	Y
3. Reverse phase protector	Safety is activated if digital input is closed	Y
4. Flow stopped	Safety is activated if digital input is longer open then 5 seconds	N

circuit safety	Description	Safety possible if unit is off?
1. Outlet Evaporator sensor error	+Er / -Er readout by sensor	Y
2. General module safety	Safety is activated if digital input is opened	Y
3. Freeze-up module safety	Safety is activated if digital input is closed	Y

Network safety	Description	Safety possible if unit is off?
1. PCB Communication problems	Safety is activated if network status is not OK. (Only possible if a network of different controllers exist)	Y

Dual pump safety	Description	Safety possible if unit is off?
1. Flow stopped	Safety is activated if digital input is longer open then 5 seconds	N

i note   Press the ⊘ key when the alarm is activated.

The appropriate safety screen with the basic information appears. Press the ⏎ key to see the detailed information.

If more than one kind of safety is active (indicated by means of ^,v or ÷), use the ▲ and ▼ keys to consult them.

2.5 Menu Overview

Introduction This chapter gives an overview of the screens provided by the different menus.
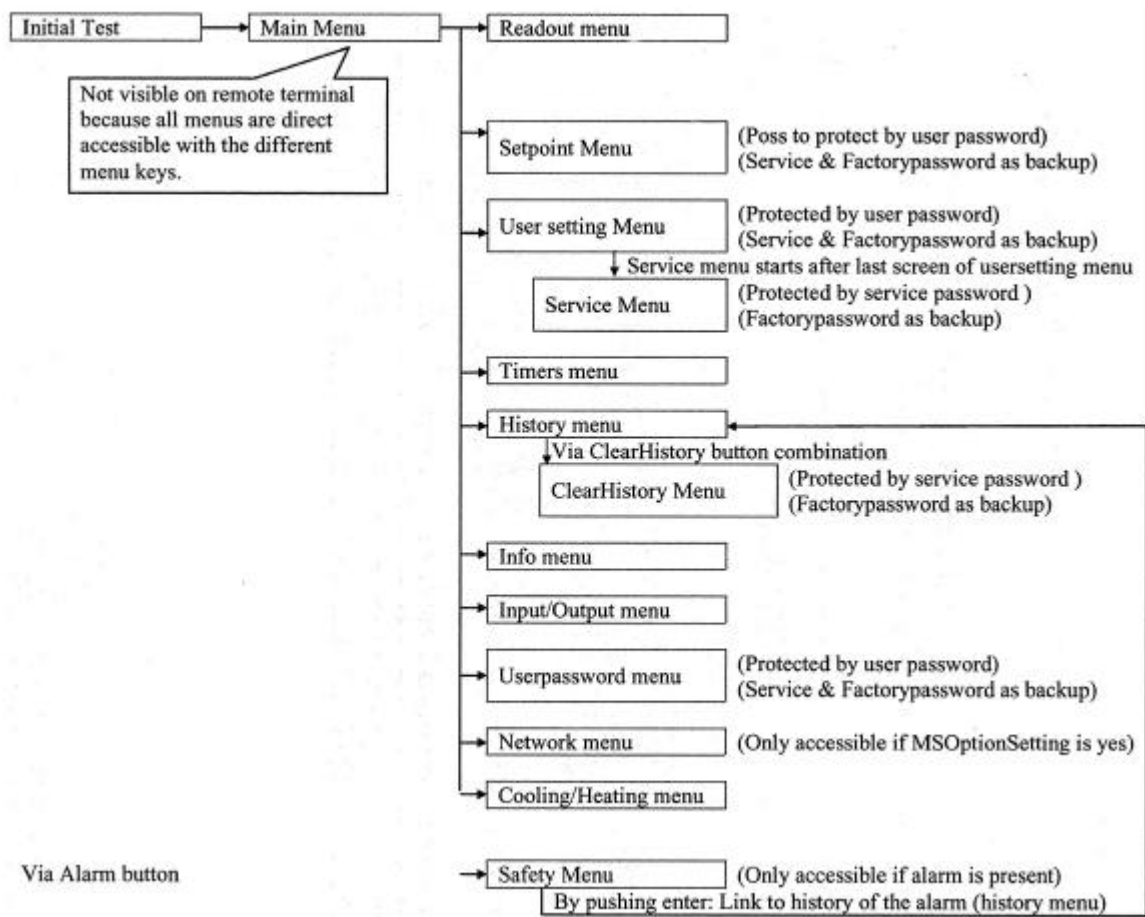
2.6 How to Read or Adjust Parameter Settings: the Programming Procedure

Programming procedure The following flow chart explains the way to program:

```
                    ┌──────────────────────────────────────┐
                    │              Begin (*)               │
                    └──────────────────────────────────────┘
                                      │
                    ┌──────────────────────────────────────┐
                    │          Press the (⌂)key.           │
                    └──────────────────────────────────────┘
                                      │
                    ┌──────────────────────────────────────┐
                    │ Select the desired menu with the ▼ ▲ keys. │
                    └──────────────────────────────────────┘
                                      │
                    ┌──────────────────────────────────────┐  NO
                    │ Does the controller prompt you to give the password? │───┐
                    └──────────────────────────────────────┘              │
                               │ YES                                      │
                    ┌──────────────────────────────────────┐              │
                    │ Enter the password using the ▼ or ▲ key. │          │
                    └──────────────────────────────────────┘              │
                                      │                                   │
                    ┌──────────────────────────────────────┐              │
                    │          Press the (↵) key.          │              │
                    └──────────────────────────────────────┘              │
                                      │◄──────────────────────────────────┘
                    ┌──────────────────────────────────────┐
                    │ Select the desired screen using the ▼ or ▲ key. │
                    └──────────────────────────────────────┘
                                      │
          NO        ┌──────────────────────────────────────┐
          ┌─────────│ Do you want to adjust a parameter setting? │
          │         └──────────────────────────────────────┘
          │                    │ YES
          │         ┌──────────────────────────────────────┐
          │         │ Select the parameter by using the (↵) key. │
          │         └──────────────────────────────────────┘
          │                    │
          │         ┌──────────────────────────────────────┐
          │         │ Adjust the value using the ▼ or ▲ key. │
          │         └──────────────────────────────────────┘
          │                    │
          │         ┌──────────────────────────────────────┐  NO
          │         │ Do you want to save the modifications? │───┐
          │         └──────────────────────────────────────┘   │
          │                    │ YES                           │
          │         ┌──────────────────────────────────────┐   │
          │         │          Press the (↵)key.           │   │
          │         └──────────────────────────────────────┘   │
          │  YES     │                                          │
          └─────────│ Do you want to adjust another parameter in the same screen? │
                    └──────────────────────────────────────┘
                               │ NO ◄─────────────────────────┘
                    ┌──────────────────────────────────────┐
                    │          Press the (⌂) key.          │
                    └──────────────────────────────────────┘
                                      │
                    ┌──────────────────────────────────────┐  YES
                    │ Do you want to adjust a parameter in another screen? │
                    └──────────────────────────────────────┘
                                      │ NO
```

(*): The display shows the last screen used

2.7 Read-out Menu

Operational information Using this menu you can read the operational information, such as the cooling set points, the inlet and outlet water temperature, the circuit status, etc. This menu allows access to several screens. The number of screens depends on the unit type and the options

Screen 1 This screen shows information about the operation mode, the set points and the temperatures: Line 4 is only visible if the unit is a "HP". No line 2, 3, 4 if unit type is a "CA"

Line n°	Display	Description
1a	INLSETP1 (2) E	Evaporator inlet water temperature setpoint 1 (or setpoint 2 in case of dual setpoint setting).
1b	OUTSETP1 (2) E	Evaporator outlet temperature setpoint 1 (or setpoint 2 in case of dual setpoint setting).
1c	MANUAL MODE	If the controller is programmed in manual control
1d	INLSETP1 (2) C	Condenser inlet temperature setpoint 1 (or setpoint 2 in case of dual setpoint setting).
1e	SP1(2)E: C:	Set point 1 Evaporator: Condenser: (or setpoint 2 in case of dual setpoint setting) .
1f	THERMOSTAT	The unit works on thermostat control
2	INL WATER E	Actual evaporator inlet water temperature.
3	OUTL WATER E	Actual evaporator outlet water temperature.
4	INL WATER C	Actual condenser inlet water temperature

Note: You can select setpoint 1 or 2 with an input from a switch. Into the service menu you can select which input you want to use for the selection. Choose an input and select DUAL SETPOINT

Screen 2 This screen shows information about the evaporator outlet water temperature:

Line n°	Display	Description
1	EVAPORATOR	Evaporator related data.
2	OUT WATER C1	Actual evaporator outlet water temperature of circuit 1
3	OUT WATER C2	Actual evaporator outlet water temperature of circuit 2.
4	THERMOSTAT STEP	Indicates the actual capacity step (number of steps is programmable)

Screen 3   This screen shows information about the status of compressors C1 or C2

Line n°	Display	Description
1	UNIT STATUS	Compressor status data
2	C1	Actual status of compressor 1
3	C2	Actual status of comp ressor 2
4	UNITCAPACITY	Indicates the actual capacity use.

The possible status of a compressor can be:

Display	Description
OFF-CAN STARTUP	The compressor is ready to start up when extra cooling is requested.
OFF-TIMER BUSY.	One of the software timers is counting. Compressor cannot start up.
ON-12% STAR	Compressor works on 12% in star
ON – XX% DELTA	Compressor works on XX% on delta
ON – YY% (LIMIT)	Compressor works on YY% and reaches the limit specified in user settings menu
OFF–SAFETY ACTIVE.	One of the safeties prevents starting of the compressor.
OFF–0% LIMIT	Compressor is disabled, to limit the unit capacity. This can be activated with a schedule timer or as a remote digital input.
OFF–FREEZEUP DIS	The compressor is shut off due to freeze up problems.

> **i**   Possible values for XX are 12%, 25%(if available), 40%, 70%, 100%
> Possible values for YY are 25% (if available), 40%, 70%, 100%

Screen 4   This screen shows information about the pressures of circuit 1:

Line n°	Display	Description
1	ACT. PRESSURES C1	Pressure data of circuit 1
2	HP1: b = °C	Actual high pressure and corresponding temperature
3	LP1: b = °C	Actual low pressure and corresponding temperature

Screen 5   This screen shows information about the pressures of circuit 2:

Line n°	Display	Description
1	ACT. PRESSURES C2	Pressure data of circuit 2
2	HP2: b = °C	Actual high pressure and corresponding temperature
3	LP2: b = °C	Actual low pressure and corresponding temperature

Screen 6   This screen shows information about the compressor running hours:
Line 4 will only be visible if unit type <>"HP"

Line n°	Display	Description
1	EXTRA READOUT	Compressor running hours.
2.1	RH 1	Total running hours of compressor 1
2.2	CS 1	Total amount of start-ups of compressor 1.
3.1	RH 2	Total running hours of compressor 2
3.2	CS 2	Total amount of start-ups of compressor 2.
4	AMBIENT	Actual ambient temperature

Screen 7 and 8   These screens shows information about the EEV.
Only visible if EEV screens = YES and EEV = YES

Line n°	Display	Description
1	EEV 1 (2) READOUT	Readout off EEV driver of circuit 1 or 2
2	SUCTION TEMP:	Actual suction temperature (unity: 0.1°C)
3	SUPERHEAT:	Actual superheat temperature (unity: 0.1°C)

2.8 Set Points Menu

Screen 1: password   Depending on the settings in screen 14 of the user settings menu explained on page 59, the system may require the password to enter the screens in this menu.
Visible if password Setpoint menu = YES.

Line n°	Display	Description
1	ENTER PASSWORD	Screen title
3	PASSWORD: 0000	Enter the correct password

i note   the units leave the factory with the password 0000

Screen 2   This menu allows you to set the inlet and outlet water temperature of the evaporator of circuit 1 and 2. These set points will not be active in the Manual Control Mode.

Line n°	Display	Description	Default value	Limit value	Step value
1	INLSETP1 E	Inlet water temp. set point 1 evaporator	12.0 °C	(MOW+3) – 23 °C	0.1 K
1a	INLSETP1 C	Inlet water temp. set point 1 Condenser	12.0 °C	15 – 50 °C	0.1 K
2	INLSETP2 E	Inlet water temp. set point 2 evaporator	12.0 °C	(MOW+3) – 23 °C	0.1 K
2b	INLSETP2 C	Inlet water temp. set point 2 Condenser	12.0 °C	15 – 50 °C	0.1 K
3	OUTLSETP1 E	outlet water temp. set point 1 evaporator	7.0 °C	MOW – 16°C	0.1 K
4	OUTLSETP2 E	outlet water temp. set point 2 evaporator	7.0 °C	MOW – 16°C	0.1 K

Line 1, 2, 3, 4: Water and Aircooled units: Cooling mode(Inlet/Outlet/Manual)
Line 1a, 2a: only for Water Cooled units: Heating mode(Inlet/Manual)
Line 1, 2, 1a, 2a: only for water cooled units: Double thermostat (Inlet/manual)

You can select set point 1 or 2 by remote dual set point switch (Digital Input) if installed.

I note

¦ The limit values mentioned in the upper table is valid for the standard MOW (Minimum Outlet Water) setting of 5°C.
¦ For glycol units the lower limit of the cooling temperature set point depends on the MOW setting. The possible MOW settings for glycol units are: 2°C, 0°C, -5°C and -10°C.

Screen 3   This menu allows you to set the EEV set points.
Only visible if EEV screen = Yes

Line n°	Display	Description	Default value	Limit value	Step value
1	EEV SETPOINTS				
2	SH SP1: 2:	Superheat setpoint	5 °C	0 – 9.9 °C	0.1 °C
3	PR SP1: 2:	Pressure setpoint of superheat	3.5 bar	0 – 7 bar	0.1 bar

Screen 4   This menu allows you to set the EEV set points.
                      Only visible if EEV screen = Yes

Line n°	Display	Description	Default value	Limit value	Step value
1	EEV SETPOINTS				
2	MINOP1: 2:	Min operation pressure	0 bar	0 – MAXOP bar	0.1 bar
3	MAXOP1: 2:	Max operation pressure	6.5 bar	MINOP – 30 bar	0.1 bar

Between the min and the max operation pressures the unit will regulate on superheat setpoint.

- EVV basic operation
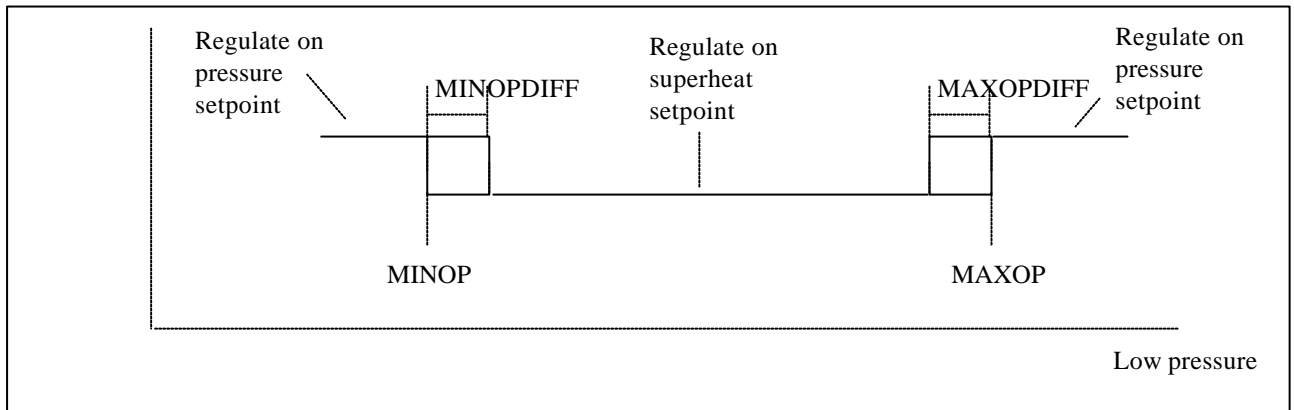
2.9 User Settings & ServiceMenu

2.9.1 *User Settings Menu*

Screen 1: password   You need the password to enter this menu. The unit leaves the factory with password 0000.

Line n°	Display	Description
1	ENTER PASSWORD	Screen title
3	PASSWORD: 0000	Enter the correct password

i note   the units leave the factory with the password 0000

To create your own password, refer to

Screen 2   This screen allows modification of the control settings:

Line n°	Display	Description	Possible settings
1	CONTROL SETTINGS	screen title	
2	MODE:	to select the control mode	MANUAL CONTROL INL WATER STEP OUTL WATER STEP EXTERNAL THERM
3	CIR1: CIR2:	status of corresponding compressor (only for manual mode)	0% 25% 40% 70% 100%
4	F1*: F2*:	status of corresponding fan speed (only for manual mode)	OFF / LOW / MED / HIGH

For more information about selecting the control mode read the explanation of manual versus automatic control in 'Thermostatic Control' on

Screen 3   This screen allows you to modify the thermostat parameters:
Line 3 only visible if mode = "outlet water step"

Line n°	Display	Description	Default	Lower limit	Upper limit	Step
1	THERMOST.SETTINGS	screen title				
2	STEPLENGTH	Step length (°C)	1.5	0.4	2.0	0.1
3	STEPDIFFERENCE	Step difference (°C)	0.2	0.2	0.8	0.1
4.1	LOADUP	Load up time (s)	180	15	300	1
4.2	DWN	Load down (s)	20	15	300	1

Screen 4   This screen allows you to change the start up priority of the circuits in case of capacity demand:

Line n°	Display	Description	Default	Lower limit	Upper limit	Step
1	LEAD-LAG SETTINGS	screen title				
2	LEAD-LAG MODE	To select the automatic or manual lead-lag mode *	AUTO			--
3	LEAD-LAG HOURS	To select the difference in operation time between the compressors (automatic mode)	1000	100	1000	100
4	EQUAL STARTUP	Startup both compressors and raise the capacity of both compressors with the same value	NO	NO	YES	--

➡️ If you select NO for equal start-up the first compressor will go to 100%, and then the second Compressor will start-up and go to 100%

In case of 2 compressors:

Possible manual setting 1	Possible manual setting 2
C1>C2	C2>C1

➡️ For more information about selecting the lead-lag mode read the explanation of 'Lead-lag Control' on page 9

Screen 5   This screen allows you to change the capacity limitation setting of the circuits via a digital input (remote switch or timer) or via the schedule timer:

Line n°	Display	Description	Possible settings
1	CAP. LIM. SETTINGS	screen title	
2	MODE:	to select the capacity limitation mode	REMOTE DIG INP. SCHEDULE TIMER
3	L1CIR1 CIR2:	Limitation setting 1	0% (25%)
4	L2CIR1 CIR2:	Limitation setting 2	40% 70% 100%

i note   If the controller is set to REMOTE DIG INP. mode, than this setting has priority on the capacity limitation settings programmed in the SCHEDULE TIMER, and vice versa.

You have 4 limitation settings, where you can put a limit on the capacity of the compressor(s).

Screen 6

Line n°	Display	Description	Possible settings
1	CAP. LIM. SETTINGS	screen title	
2	L3CIR1 CIR2:	Limitation setting 3	0% (25%) 40% 70% 100%
3	L4CIR1 CIR2:	Limitation setting 4	

For more information about the programming and use of the schedule timer, refer to screen 8 on this page.

Screen 7   This screen allows you to force the pump via the chiller controller and to adjust the pump lead and lag time.

Line n°	Display	Description		Default	Lower limit	Upper limit	Step
1	PUMPCONTROL	1.2.9.1.1.1	screen title				
2	PUMPLEADTIME	1.2.9.1.1.2	Time to run the water pump before starting up the chiller	020 sec	020 sec	180 sec	1 sec
3	PUMPLAGTIME	1.2.9.1.1.3	Time to keep the pump on, after stopping the chiller	000 sec	000 sec	180 sec	1 sec
4.1	DAILY ON	1.2.9.1.1.4	To activate a daily pump start up	N	N	Y	---
4.2	AT	1.2.9.1.1.5	Pump start time	00h00	00h00	24h00	1 min

i note   The user will get the choice to perform a pump start every day to prevent obstruction of the pump and to increase the lifetime of the pump. Every day at pump start time, which can be set, the pump will be started automatically for a short time period (5s) when the unit is not on.

Remark: the default value for the PUMPLAGTIME is 0 sec, but it is recommend to set the lag time to   120s. This is to prevent that the evaporator freezes up when there is no flow.

Screen 8   This screen allows you to enable or disable the schedule timer and the holiday period timer. Screen visible if (MS Option = No) or (MS Option Setting = Yes and Unit = master)

Line n°	Display	Description	Possible settings
1	SCHEDULE TIMER	**screen title**	
2	ENABLE TIMER	**To get the possibility to work with the programmable schedule timer**	N Y
3	ENABLE HOLIDAY PER	**To get the possibility to work with the programmable holiday period timer**	N Y

i note   New screens will be available if one or both timer possibilities are put on Yes.
When the user has selected to work with a schedule timer it will be possible to define up to four groups. Days can then be appointed to one of these groups.
Each group can have up to nine different actions (time periods, capacity limitation, set points, cooling/heating selection).
If Timer and Holiday Period are both set as enable then the Holiday period will get the priority.

Screen 8a1   This additional screen appears when ENABLE TIMER is set to Yes
Screen visible if Enable timer =Yes and (MS Option = No or if (MS Option setting = Yes and Unit = Master)

Line n°	Display	Description	Possible settings
1	SCHEDULE TIMER	screen title	
2	MON: THU: SAT:	To allocate a certain group to one of these days	-, G1, G2, G3 or G4
3	TUE: FRI: SUN:	To allocate a certain group to one of these days	-, G1, G2, G3 or G4
4	WED:	To allocate a certain group to this day	-, G1, G2, G3 or G4

For all groups mentioned in the above table up to 4 additional screens will follow.
(Example: see screen 8b1).

Screen 8b1   This additional screen appears when ENABLE TIMER is set to Yes and if a group is allocated to a certain day.

Screen example for group 1 (G1):

Line n°	Display	Description
1a	GROUP 1:01 TO 03	To set action 1 to 3 for one of the four groups.
1b	GROUP 1:04 TO 06	To set action 4 to 6 for one of the four groups.
1c	GROUP 1:07 TO 09	To set action 7 to 9 for one of the four groups.
2	X:00h00 - 00.0	To set one of the nine times and actions
3	X:00h00 - 00.0	And specify a setpoint or capacity limitation.
4	X:00h00 - 00.0	(see below for possibilities)

Screen visible if Enable timer Yes=1 and (MS Option = No or if (MS Option setting = Yes and Unit = Master)

Possible operation time settings:

Lower limit	Upper limit	Step	Default
00h00	23h59	1 min	00h00

Possible ON/OFF settings:

Possible settings	Description
-	No action
ON	Unit on
OFF	Unit off
ON COOL	Unit works in cooling
ON HEAT	Unit works in heating

Possible SETPOINT settings:

Possible settings	Description	Default	Lower limit	Upper limit	Step
ISP1(2) E	Evaporator inlet water setpoint 1	12.0°C	MOW +3°C	23.0°C	0.1°C
OSP1(2) E	Evaporator output water setpoint 1	7°C	MOW	16°C	0.1°C
ISP1 C	Condenser inlet water setpoint 1	23.0°C	15.0°C	50.0°C	0.1°C
ISP2 C	Condenser inlet water setpoint 2	23.0°C	15.0°C	50.0°C	0.1°C

i note :   the value of ISP1 E ~ ISP2 C are different from the values described into the setpoints menu.

Possible CAPACITY LIMITATION settings:

Possible settings	Description
LIM1	Capacity limitation 1
LIM2	Capacity limitation 2
LIM3	Capacity limitation 3
LIM4	Capacity limitation 4
NO-LIM	No capacity limitation

Screen 8a2   This additional screen appears when ENABLE HOLIDAY is set to Yes.
Screen visible if Enable Holiday Yes and (MS Option = No or if (MS Option setting = Yes and Unit = Master)

Line n°	Display	Description
1a	HD PERIOD:01 TO 03	To set holiday period 1 to 3.
1b	HD PERIOD:04 TO 06	To set holiday period 4 to 6.
1c	HD PERIOD:07 TO 09	To set holiday period 7 to 9.
1d	HD PERIOD:10 TO 12	To set holiday period 10 to 12.
2	X:00/00 TO 00/00	To set one of the twelve holiday periods
3	X:00/00 TO 00/00	To set one of the twelve holiday periods
4	X:00/00 TO 00/00	To set one of the twelve holiday periods

Screen 8b2   This additional screen appears when ENABLE HOLIDAY is set to Yes.
And you choose HOLIDAY in screen 8b1(= screen with group settings).

Line n°	Display	Description
1a	HOLIDAY:01 TO 03	To select the programmed holiday period 1to 3.
1b	HOLIDAY:04 TO 06	To select the programmed holiday period 4 to 3.
1c	HOLIDAY:07 TO 09	To select the programmed holiday period 7 to 9.
2	X:00h00 - 00.0	To set one of the nine times and actions And specify a setpoint or capacity limitation.
3	X:00h00 - 00.0	
4	X:00h00 - 00.0	

For possible operation times and action settings, see the possible settings for the
schedule timer on the previous pages.

i note   Only 1 group of settings is possible for all programmed holidays (max. 12).

Schedule timer example

MARCH													
MON		TUE		WED		THU		FRI		SAT		SUN	
1	G1	2	G1	3	G2	4	G1	5	G1	6	G3	7	G3
8	G1	9	G1	10	G2	11	G1	12	G1	13	G3	14	G3
15	G1	16	G1	17	G2	18	G1	19	G1	20	G3	21	G3
22	G1	23	H	24	H	25	H	26	H	27	H	28	H
29	H	30	G1	31	G2								

To come to the schedule above following settings have to be made:

```
_ʋ        SCHEDULE TIMER
MON:G1  THU:G1  SAT:G3
TUE :G1  FRI:G1  SUN:G3
WED:G2
```

⋮

```
_ʋ        HO PERIOD:01 TO 03
01:23/03 TO 29/03
02:00/00 TO 00/00
03:00/00 TO 00/00
```

All days assigned to the same group will work according to the settings of this group.

In this example setting:

■ all Mondays, Tuesdays, Thursdays and Fridays will work according to the settings in group 1 (G1),

■ all Wednesdays will work according to the settings in group 2 (G2),

■ all Saturdays and Sundays will work according to the settings in group 3 (G3),

■ all holiday days will work according to the settings in the holiday group (H).

All group settings of groups G1, G2, G3, G4 and H work similar as following example (settings for group 1):
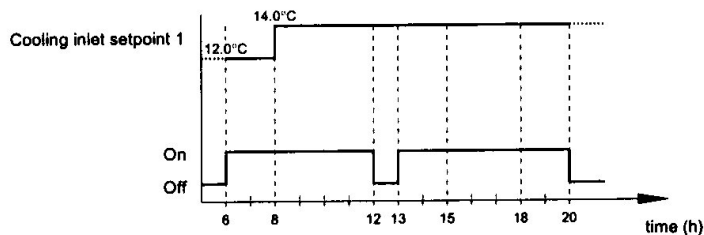

```
_ʋ        GROUP1:01 TO 03     Screen 1
1:06H00 ISP1 E: 12.0
2:06H00 ON
3:08H00 ISP1 E: 14.0
```

⋮

```
_ʋ        GROUP1:04 TO 06     Screen 2
4:12H00 OFF
6:13H00 ON
8:20H00 OFF
```

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Screen 9

This screen will only be visible if in service menu (screen 20) Dual Evap. Pump is selected as digital output
Visible if DO1Cha="2ND EVAP" or DO2Cha="2ND EVAP"

Line n°	Display	Description	Possible settings
1	DUAL EVAP. PUMP	screen title	
2	MODE	Select the start-up mode	AUTOM. ROTATION PUMP2 > PUMP1 PUMP1 > PUMP 2
3	OFFSET ON RH	Running hours offset value (default value 048h)	001h-999h

For more information on pump control, refer to 'Pump Control' on page 11

Screen 10

This screen allows you to set the floating setpoint.
Only available on a Cooling only unit or RC unit

Line n°	Display	Description	Possible settings
1	FLOATING SETPOINT	screen title	
2	MODE		NOT ACTIVE AMBIENT

Screen 10a

When you choose ambient mode the following settings will appear.

Line n°	Display	Description	Default	Lower limit	Upper limit	Step
1	FLOATING SETPOINT	screen title				
2	MODE :	Selected mode				
3	MAX VALUE :	Max value of floating setpoint correction	3°C	0°C	5°C	0.1°C
4.1	ZERO:	Here the setpoint value will be equal to 0.	20°C	20°C	43°C	0.1°C
4.2	SLOPE	This parameter is necessary to draw the angle of the curve	5°C	0°C	10°C	0.1°C

Screen 11 This screen allows you to modify the display settings.

Line n°	Display	Description	Possible settings
1	DISPLAY SETTINGS	screen title	
2	LANGUAGE	To select the desired language	ENGLISH DEUTSH FRANCAIS ESPANGNOL ITALIANO
3	TIME	To set the actual time	00h00–23h59
4	DATE	To set the actual date	MON-SUN 01/01/00-31/12/99

Screen 12

This screen will only be visible if in service menu (screen 20) Free cooling is selected as digital output
Only visible if unit type = "CO or RC"

Line n°	Display	Description	Possible settings
1	FREE COOLING	screen title	
2	MODE:	Choose mode to regulate the free cooling on	NOT ACTIVE INLET-AMBIENT AMBIENT

Ambient: free cooling is based on ambient temperature
Inlet-Ambient: free cooling is based on the difference between inlet water temperature and ambient temperature

Screen 12a

When you choose (Inlet -)ambient mode the following settings will appear.

Line n°	Display	Description	Default	Lower limit	Upper limit	Step
1	FREE COOLING	screen title				
2	MODE :	Selected mode				
3.1	SP:	Define setpoint of free cooling	5°C	-30°C	25°C	0.1°C
3.2	DI:	Setting of the free cooling difference	1.0°C	1.0°C	5.0°C	0.1°C
4.1	PUMP:	Depends on free cooling application. See Free cooling page 29.	OFF	OFF	ON	
4.2	LEAD :	The time the pump CHWP has to run before the chiller can start up no free cooling.	0s	0s	999s	1s

Line 4 will only be visible if Ambient is selected.

Screen 13

Additional screens if DICN is selected.

i When used in DICN option, the Schedule Timer (screens 8…) will only be available on the master unit

Screens on the master unit.

Only visible if MS Option setting = Yes & unit = Master

Line n°	Display	Description	Possible settings
1	MASTER SETTING	screen title	
2	NR OF SLAVES:	Enter the number of slaves you want to use on the DICN network	0 / 1 / 2 / 3

Screen 13a

Only visible if MS Option setting = Yes

Line n°	Display	Description	Possible settings
1	MASTER SETTING	screen title	
2	MODE	Normal: the unit works normally. Standby: if the unit is in standby it will only start-up in case of the other DICN units has to little capacity. Disconnected: the unit is disconnected of the DICN Unit.	NORMAL DISCONN. ON/OFF STANDBY
3	OFFSET	After the adjusted hours the units will change the sequence of start-up.	0h till 9000h
4	PUMP ON IF:	Select when the pump must start	UNIT ON COMPR ON

Screen 13b

Screen on the slave unit :

1.2.9.1.1.	1.2.9.1.1.7 Display	1.2.9.1.1.8 Description	1.2.9.1.1.9 Possible settings
1	SLAVE # SETTING	1.2.9.1.1.10 screen title	SLAVE 1 / 2 / 3
2	MODE	Normal: the unit works normally. Standby: if the unit is in standby it will only start-up in case of the other DICN units has to little capacity. Disconnected: the unit is disconnected of the DICN Unit.	NORMAL DISCONN. ON/OFF STANDBY
3	OFFSET	1.2.9.1.1.11 After the adjusted hours the units will change the sequence of start-up.	0h till 9000h
4	PUMP ON IF:	1.2.9.1.1.12 Select when the pump must start. This selection is for the unit only	UNIT ON COMPR ON

Screen 14   This screen allows you to protect the access of the setpoint menu by password.

Line n°	Display	Description	Possible settings
1	SETPOINT PASSWORD	screen title	
2	PASSWORD NEEDED TO	Depending on the setting the system may require the password to enter the setpoint menu.	No Yes
3	CHANGE SETPOINT		

2.9.2   *Service Menu*

Screen 15   You need the password to enter this menu. The unit leaves the factory with password 1914.

Line n°	Display	Description
1	ENTER SERVICE	Screen title
3	PASSWORD: 0000	Enter the correct password

i note   when the unit is running it is not possible to enter the service menu.

Screen 16   This screen allows you to modify the minimum outlet water, the BMS communication
interval and the master-slave option
Line 4 is not visible for unit type = "ER" Unit

Line n°	Display	Description	Possible settings	Default
1	SERVICE MENU	Screen title		
2	MIN. OUTL. WATER	To select the minimum outlet water temperature	-15°C -10°C -5°C 0°C 2°C 4°C 5°C 8°C	4°C
3	FINETUNE(BMS)	To select the communication interval	From 0s till 60s	30s
4	MS OPTION	To select master-slave option yes or no	Y or N	N

Screen 17   This screen allows you to modify the low pressure bypass timer, the low pressure setpoint and
delay network error.
Line 4 is only visible if MS Option setting = Yes

Line n°	Display	Description	Possible settings	Default
1	SERVICE MENU	Screen title		
2.1	LP SETPOINT	Specify the low pressure limit	02bar till 3.5bar	**
2.2	PDWN	Low pressure setpoint for pumpdown.	0.2bar till 3.5bar	0.2bar
3	LP BYPASSTIMER	To set the low pressure bypass timer	From 0s till 180s	120s
4	DELAY NETW. ERR.	To set the delay of the network error	From 30s till 600s	120s

** Default setpoint depends on refrigerant type:
  1 bar for R134a
  1,5 bar for R407c

Screen 18   This screen allows you to modify the compressor running hours and number of start-ups (e.g. after replacing a compressor).

Line n°	Display	Description	Possible settings
1	SERVICE MENU	Screen title	
2	RUN.HRS-COMPR STARTS	Screen title	
3.1	RH1:	Readout of actual running hours of compressor 1	Changeable from 00000h to 99999h
3.2	CS1:	Readout of actual number of starts of compressor 1	Changeable from 00000h to 99999h
4.1	RH2:	Readout of actual running hours of compressor 2	Changeable from 00000h to 99999h
4.2	CS2:	Readout of actual number of starts of compressor 2	Changeable from 00000h to 99999h

Screen 19   This screen allows you to set the changeable digital inputs.

Line n°	Display	Description	Possible settings
1	CHANG.INP/OUTPUTS	Screen title	
2	DI1:	To set the digital input 1	NONE DUAL SETPOINT REMOTE ON/OFF
3	DI2:	To set the digital input 2	REMOTE COOL/HEAT CAP. LIMIT 1 CAP. LIMIT 2
4	DI3:	To set the digital input 3	CAP. LIMIT 3 CAP. LIMIT 4 FANSETP SHIFT

When you want to program on of these inputs, you have to check the field wiring to see if this input is installed.

Screen 20   This screen allows you to set the changeable digital in- and output.

Line n°	Display	Description	Possible settings
1	CHANG.INP/OUTPUTS	Screen title	
2	DI4:	To set the digital input 1	NONE DUAL SETPOINT REMOTE ON/OFF REMOTE COOL/HEAT CAP. LIMIT 1 CAP. LIMIT 2 CAP. LIMIT 3 CAP. LIMIT 4 FANSETP SHIFT
3	DO1:		REV. VALVE(C/H) 2ND EVAP PUMP
4	DO2:	To set the digital output	CONDENSER PUMP 100% CAPACITY FREE COOLING EVAP.HEATERTAPE GEN.OPERATION

When you want to program one of these outputs, you have to check the field wiring and output terminals to see if it is installed.
For more info on these digital outputs refer to Digital output on page 3.

Screen 21   This screen allows you to set a changeable analogue input

Line n°	Display	Description		Possible settings
1	CHANG.IN/OUTPUTS	1.2.9.2.1.1	Screen title	
2	AI3	To set a floating setpoint with an electrical signal.		NONE SETP.SIGN.0/1V SETP.SIGN.0/10V SETP.SIGN.0/20mA SETP.SIGN.4/20mA
3	MAX SETP.DIF:	1.2.9.2.1.2	Maximum difference between setpoints.	1.2.9.2.1.3 Between -50°C and 50°C

See page 32 for more info on this function.

Screen 22   This screen allows you to adjust the offset of the probe.
Line 2 not visible in case of 'ER' unit type

Line n°	Display	Description	Default	Lower limit	Upper limit	Step
1	PROBE OFFSET	Screen title				
2	AI4 INLET E :	To set the accuracy of the evaporator inlet water temperature	0.0°C	-0.5°C	0.5°C	0.1°C
2	AI5 OUTLET E :	To set the accuracy of the evaporator outlet water temperature	0.0°C	-0.5°C	0.5°C	0.1°C
3	AI6 AMBIENT :	To set the accuracy of the ambient temperature	0.0°C	-0.5°C	0.5°C	0.1°C

Screen 23   This screen allows you to adjust the BMS settings.

Line n°	Display	Description	Default	Possible settings
1	BMS SETTINGS	Screen title		
2	SER. BOARD:	To select the communication protocol between the BMS and the gateway	NONE	NONE RS485 RS422
3	PROTOCOL:	Indicates the commu nication protocol	CAREL	CAREL
4	BAUD RATE:	To select the baud rate for communication between the BMS card and the gateway (RS485)	1200 bps	1200 2400 4800 9600 19200
		To select the baud rate for communication between the BMS card and the gateway (RS422)	1200 bps	1200 2400 4800

Screen 24   This screen allows you to activate the PC control mode and to modify the BMS settings.

Line n°	Display	Description	Default	Possible settings
1	BMSBOARD SETTINGS	Screen title		
2	BMSCONTROL ALLOWED:	To allow BMS control	NO	NO /YES
3	BMS ADDRESS PCB:	Used to address circuits of the unit towards the gateway	01	01 till 32
4	ON LINE:	Indicates if there is communication between controller and computer.	NO	YES - NO

Refer to the BMS manual for more information

Screen 25   This screen allows you to customize the flow indication after start up.

Line n°	Display	Description	Default	Possible settings
1	SERVICE MENU	Screen title		
2/3	IF NO FLOW AFTER PUMPLEADTIME:	To select if the unit should go into alarm or standby status if there is no flow after start up.	ALARM	ALARM/STANDBY
4	MANUAL TEST PUMP:	To be able to check the operation of the pump manually. This means that when the unit is off the pump can also be turned on at any time to check the pump.	OFF	ON/OFF

i note   The pump can only be switched on manually by changing the parameter, do not enter it! When you enter on the parameter then it will automatically change to N again and the pump will be switched off. This is done in order to eliminate the possibility that the pump remains on without being checked.

Screen 26   This screen allows you to customize the freeze up safety.

Line n°	Display	Description	Default	Possible settings
1	SERVICE MENU	Screen title		
2	FREEZE UP:	To select one of the freeze up set tings.	DIS&SAFETY	DIS&SAFETY/ DIS. ONLY
3.1	SAFETY:	Number of allowed freeze ups during a specified time before the circuit would stop.	4	1/2/3/4/5
3.2	IN	To select the time in which a specified number of freeze ups is allowed.	60	5 till 180min
4	INL CHECK AFTER RESET:	To select if the unit should check the inlet water temperature before reset.	N	Y/N

i note   DISABLE ONLY:
The circuit will shut off after every freeze up protection (activated from MOW-1,5K) and will reset automatically if evaporator outlet temperature = MOW. There will be no fault indication on the controller.

DISABLE & SAFETY:
The circuit will shut off after every freeze up protection (activated from MOW-1K) and give a fault indication after the number of allowed freeze ups during a specified time has expired. The safety must be reset manually.

Screen 27   This screen allows you to customize the fan safety.

Line n°	Display	Description	Default	Lower limit	Upper limit	Step
1	SERVICE MENU	Screen title				
2.1	FAN UP:	Delay timer until the fans go up after Fan HP is reached	10s	0s	180s	1s
2.2	DOWN :	Delay timer until the fans switch off after Fan LP is reached	180s	0s	180s	1s
3.1	FAN LP :	Fan lower Limit, when pressure is reached the fan down timer starts counting(R134a)	5.5bar	5.5bar	8.7bar	0.1bar
	FAN LP :	Fan lower Limit, when pressure is reached the fan down timer starts counting (R407c)	10bar	10bar	15bar	0.1bar
3.2	HP :	Fan higher Limit, fans start when pressure is reached(R134a)	8bar	8bar	11.2bar	0.1bar
	HP :	Fan higher Limit fans start when pressure is reached (R407c)	14bar	14bar	19bar	0.1bar
4	DIFF :	Fan step difference	0.5bar	0.5bar	3bar	0.1bar
4.2	SHIFT	To set fanshift	5.0bar	0	**	0.1bar

** Maximum fanshift = HPSETB – HP – 0.5 bar.
HPSETB can be found on next screen.

Screen 28   Line 4 only visible if MS Option setting = Yes

Line n°	Display	Description	Default	Lower limit	Upper limit	Step
1	SERVICE MENU	Screen title				
2.1	C12%:	Set the timer to run in 12% mode	20s	20s	180s	1s
2.2	START:	Timer to set the compressor to the first capacity step	20s	20s	360s	1s
3.1	STOP:	Timer to set to 12% before stop.	8s	0s	99s	1s
3.2a	HP SETBACK :	(R134a) fan control to assure a minimum high pressure when the ambient temperature is low	15.5bar	15.5 bar	17 bar	0.1bar
3.2b	HP SETBACK :	(R407c) fan control to assure a minimum high pressure when the ambient temperature is low	24.5bar	23.5 bar	26 bar	0.1bar
4.1	MS PR :	Unit priority –stepL Priority	0-2	0-0	3-4	1-1
4.2	AI3:	Accuracy of analogue input 3	0°C	-0.5°C	+0.5°C	0.1°C

When the high pressure rises above the high pressure setback value the unit will be limited on 70% maximum and the fans will all work for as long as the high pressure setback timer (200s) is counting down.

When unit is stopped the compressor is forced to 12% before it is shut down. This is done to avoid start-ups at 100%.

i   *Unity priority – stepL Priority*

The first digit of the Master Slave Priority refers to the Unit priority. With this digit you can give each unit a certain start up priority.

The second digit refers to the Step Length priority. This setting reacts only on load up steps and avoids that one of the DICN units goes into freeze-up alarm because the common leaving water is still to high. (See page 27)

Screen 29   This screen allows you to choose whether a password is needed to reset safeties.

Line n°	Display	Description	Possible settings
1	SERVICE MENU	Screen title	
2	PASSWORD NEEDED TO		
3	RESET SAFETIES:		
4		Indication of the password needed to reset safeties.	NONE USER PASSWORD SERVICE PASSWORD

Screen 30   This screen allows you to adjust the EEV settings
        Only visible if EEV1 or EEV2 is present

Line n°	Display	Description	Possible settings
1	EEV SERVICE MENU	Screen title	
2	SCREENS :	Enabling additional screens (see screen 7 Readout menu) EEV readout	N or Y
2.1	BATTERY :	Enable battery (if present)	N or Y
3	POWER ON,NO SAF:	Set delay timer before safety will be displayed (default 90s)	10 – 120 s

Screen 31a   This screen allows you to adjust the EEV settings
        Only visible if EEV1 or EEV2 is present

Line n°	Display	Description
1	EEV DRIVER C1(2)	Screen title
3	NO WARNINGS	No warnings on EEV driver

Screen 31b   This screen allows you to see and reset the warning
        Only visible if EEV1 or EEV2 is present

Line n°	Display	Descripti on	Possible settings
1	EEV DRIVER C1(2)	Screen title	
2	SYSTEM WAITING FOR:		
3	VALVE OPEN		
4	GO AHEAD:		N - Y

After setting GO AHEAD on Y you will be able to reset the Valve Open error on the Error menu

Screen 31c   This screen allows you to see if the battery is charged
        Only visible if EEV1 or EEV2 is present

Line n°	Display	Description	Possible settings
1	EEV DRIVER C1(2)	Screen title	
3	BATTERY CHARGED	Indicates if battery is charged	
4		Status	N – Y

2.10 Timers Menu

Software timers   Using this menu you can read the actual value of the software timers. This menu displays four screens.

Screen 1   This screen shows the actual value of the general timers:
Line 2 not visible if unit is a "ER" unit

Line n°	Display	Description
1	GENERAL TIMERS	Screen title
2a.1	LOADUP:	Delay timer for loading up; during countdown, the unit is unable to enter a higher thermostat step (default 180s)
2a.2	-DWN:	Delay timer for loading down; during countdown, the unit is unable to enter a lower thermostat step (default 20s)
3a	PUMPLEAD:	The time the pump has to run before the chiller can start up.
3b	PUMPLAG:	The time the pump still has to run after stopping the chiller. (appears when PUMPLEAD TIME =0)
3c	PUMPDAILY:	Countdown timer, counts if the daily pump start is activated and if the start time is reached. (See PUMPCONTROL page.11)
4	FLOWSTOP:	Delay timer that starts counting when the water flow through the evaporator stops during normal operation; if the water flow has not started during the countdown, the unit will shut down (default: 5s)

Screen 2   This screen shows the actual value of the startup difference timer:

Line n°	Display	Description
1	COMPRESSOR TIMERS	Screen title
2	COMPR. STARTED	Startup difference timer (5s). If more then one compressor starts up at the same time than there has to be 5 seconds between startups.
3a		
3b	CIRCUIT PI RUNTIME:	
4a		
4b	1: s- 2: s	Timers for circuit 1 and circuit 2

Screen 3   This screen shows the actual value of the compressor timers:

Line n°	Display	Description
1	COMPRESSOR TIMERS	Screen title
2	GRD1: s AREC1: s	Guard timer & Anti recycling timer for compressor of circuit 1
3	GRD2: s AREC2: s	Guard timer & Anti recycling timer for compressor of circuit 2

i note   Guard timer: delay timer to prevent compressor from restarting after a shutdown (default 60s).

Anti recycling timer: AREC timer is used to limit the starts per hour, means counting after starting the compressor. Screw compressor = 600sec (6 starts/hour)

Screen 4   This screen shows the actual value of the compressor timers:

Line n°	Display	Description
1	COMPRESSOR TIMERS	Screen title
2.1	START1:	Delay timer to limit compressor capacity to 40% (25% if present) during the countdown (default: 140s)
2.2	STOP:	
3.1	START 2:	Delay timer to limit compressor capacity to 40% (25% if present) during the countdown (default: 140s)
3.2	STOP	

The following view shows an example of the working of the timers
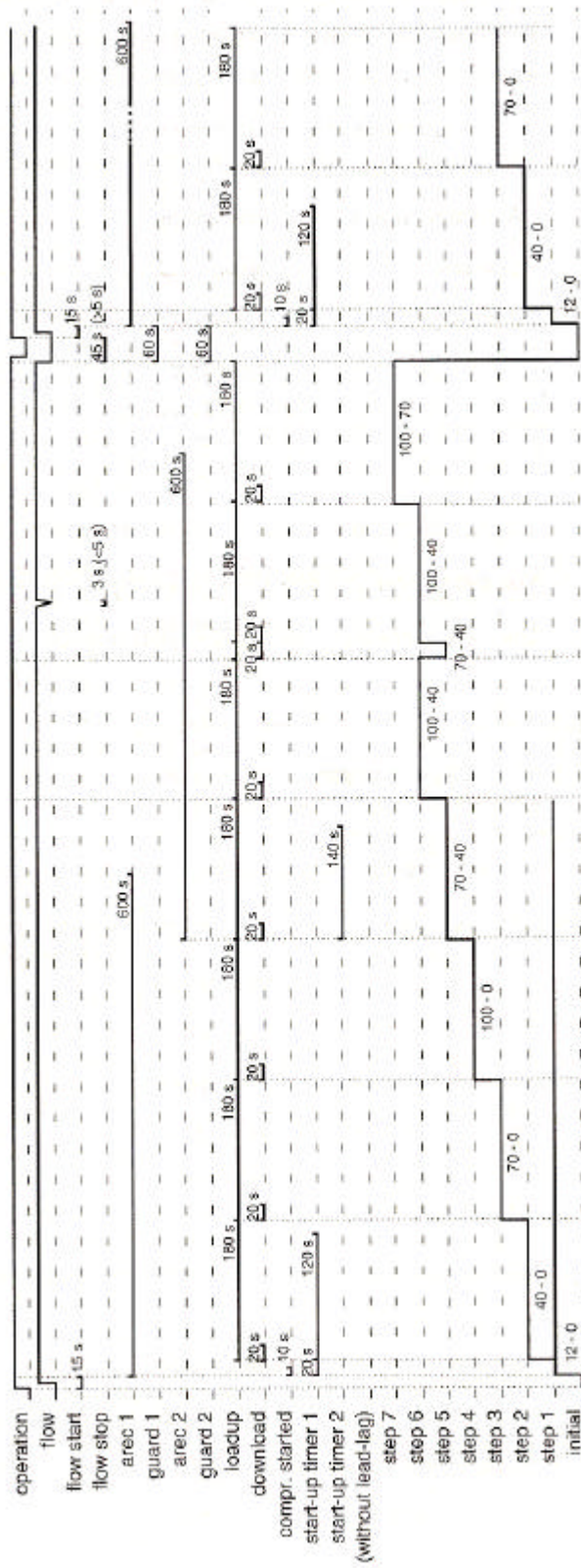
The startup time depends on the setting of the timer of the 40% step (or 25% step if present).
The startup time is 20s + the time of the first step. Default 140s

2.11 Safety & History Menu

Safety Information

The Safeties Menu appears when a unit/circuit/network/dual pump safety is activated. The kind of safety will be displayed with a code, followed by its description.

The access to the safeties menu can be restricted with a password.

The safety menu is linked to the history screen. By pushing the enter key you jump to the history menu where, along with the basic information, more detailed data screens can be consulted, by pressing the ↵ key.

Screen layout

Line n°	Display	Descripti on
1a	UNIT SAFETY CIRCUIT SEFETY NETWORK SAFETY DUAL PUMP SAFETY	Indicates if you have a unit, pump or network safety. (Not possible to reset, safety is still present)
1b	RESET UNIT SAFETY RESET C1 SAFETY RESET C2 SAFETY RESET NETW SAFETY RESET D PUMP SAFETY	After solving the problem, the alarm key starts blinking and the display indicates that resetting is possible. (possible to reset)
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.

History information

The History menu contains all the information concerning the latest shutdowns. The structure of those menus is identical to the structure of the safety menu. Whenever a failure is solved and the operator performs a reset, the concerning data from the safety menu is copied into the history menu. The user will be able to go back and check up to 20 occurred faults. Warnings are also recorded.

Additionally the number of safeties that already occurred can be consulted on the first line of the history screens.

Screen overview Press the **¿** key to get the status of the complete unit at the time of the safety.

Screen 1

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX PUMP HISTORY :XXX EEV1 HISTORY :XXX EEV2 HISTORY :XXX	Indicates the safety. XXX is the serial number of the alarm.
2	XXX:XXXXXXXXXXX	Indicates the safety code and its description.
3	XXhXX – XX/XX/XX	Indicates time and date of safety.
4	INLSETP1 E: XXX°C or INLSETP2 E: XXX°C or OUTSETP1 E: XXX°C or OUTSETP2 E: XXX°C or INLSETP1 C: XXX°C or INLSETP2 C: XXX°C or SP1E: C: or SP2E: C: or THERMOSTAT or MANUAL MODE	Indicates the mode and set point at the moment of shutdown.

You can go from one sub-screen to another and from a screen to a sub-screen using the ↵ key.

i note   The sub-screens automatically disappear after 5 seconds.

Screen 1.1   Push the ↵ key to enter the first sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX PUMP HISTORY :XXX EEV1 HISTORY :XXX EEV2 HISTORY :XXX	Indicates if it was a unit, circ 1, circ2, network or pump safety. XXX is the serial number of the alarm.
2	XXX:XXXXXXXXXXX	Indicates the safety code and its description.
3	INL.E: XXX°C	Actual measured evaporator inlet temperature at the moment of shutdown.
4	OUT.E: XXX°C	Actual measured evaporator outlet temperature at the moment of shutdown.

Screen 1.2   Push the ↵ key to enter the second sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX PUMP HISTORY :XXX EEV1 HISTORY :XXX EEV2 HISTORY :XXX	Indicates if it was a unit, circ 1, circ2, network or pump safety. XXX is the serial number of the alarm.
2	XXX:XXXXXXXXXXX	Indicates the safety code and its description.
3a	OUTC1: XXX°C	Actual measured evaporator outlet temperature of circuit 1 at the moment of shutdown.
3b	STEP:	Indicates capacity step at the moment of shutdown.
4	OUTC2: XXX°C	Actual measured evaporator outlet temperature of circuit 2 at the moment of shutdown.

Screen 1.3   Push the ↵ key to enter the third sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX PUMP HISTORY :XXX EEV1 HISTORY :XXX EEV2 HISTORY :XXX	Indicates if it was a unit, circ 1, circ2, network or pump safety. XXX is the serial number of the alarm.
2	XXX:XXXXXXXXXXX	Indicates the safety code and its description.
3	C1:	Actual status of the compressor of circuit 1 at the moment of shutdown.
4	C2:	Actual status of the compressor of circuit 2 at the moment of shutdown.

Screen 1.4   Push the ↵ key to enter the fourth sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX PUMP HISTORY :XXX EEV1 HISTORY :XXX EEV2 HISTORY :XXX	Indicates if it was a unit, circ 1, circ2, network or pump safety. XXX is the serial number of the alarm.
2	XXX:XXXXXXXXXXX	Indicates the safety code and its description.
3	HP1: = °C	Actual status of the high pressure of circuit 1 at the moment of shutdown.
4	LP1: = °C	Actual status of the low pressure of circuit 1 at the moment of shutdown.

Screen 1.5 Push the ↵ key to enter the fifth sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX PUMP HISTORY :XXX EEV1 HISTORY :XXX EEV2 HISTORY :XXX	Indicates if it was a unit, circ 1, circ2, network or pump safety. XXX is the serial number of the alarm.
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.
3	HP2: = °C	Actual status of the high pressure of circuit 2 at the moment of shutdown.
4	LP2: = °C	Actual status of the low pressure of circuit 2 at the moment of shutdown.

Screen 1.6 Push the ↵ key to enter the sixth sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX PUMP HISTORY :XXX EEV1 HISTORY :XXX EEV2 HISTORY :XXX	Indicates if it was a unit, circ 1, circ2, network or pump safety. XXX is the serial number of the alarm.
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.
3	RH 1:	Actual running hours of the compressor of circuit 1 at the moment of shutdown.
3a	AMB.T	Actual ambient temperature at the moment of shutdown.
4	RH 2:	Actual running hours of the compressor of circuit 2 at the moment of shutdown.

2.12 Info Menu

Additional unit information   Using this menu you can consult additional information about the unit. There are four screens.

Screen 1   This screen shows you the actual time and date.

Line n°	Display	Description
1	TIME INFORMATION	Screen title
2	TIME: XXhXX	Actual time
3	DATE:XXX XX/XX/XX	Actual day en date

➡️   Refer to the "User Settings & Service Menu" to adjust the correct time, day and date. See screen 11 on page 56.

Screen 2   This screen shows you the unit type.

Line n°	Display	Description
1	UNIT INFORMATION	Screen title
2	UNITTYPE: AW-CO-XX	Unit type (40, 50, 60, 80, 100, 120, 140, 160, 180, 200)
3	CIRC: EVAP:	Indicates the quantity of circuits and Evaporators
3	REFRIGERANT : XXXX	Refrigerant type (R407C / R134a)

i unit type explanation :   WW : Water water cooled
  AW : Air water cooled

  CO : cooling only
  HP : Heatpump
  HR: Heat recovery
  RC : Remote condenser
  CA : ER

Screen 3   This screen shows you the used software version.
Line 4 only visible if EEV1 = Yes or EEV2 = Yes

Line n°	Display	Description
1	UNIT INFORMATION	Screen title
2	SW:	Indicates the software version and date.
3	SW CODE:	Indicates the software code.
4 EEV1: -2:	XXXXXX	The hardware (first 3 digits) and software version (last 3 digits) of the EEV driver

Screen 4   This screen shows you PCB information.

Line n°	Display	Description
1	PCB INFORMATION	Screen title
2	BOOT:	Indicates boot version and date.
3	BIOS:	Indicates bios version and date.
4	pLAN ADDRESS :	Gives the address that is set on the dipswitch (For DICN)

2.13 Input/Output Status Menu

Reading the status of inputs and outputs

Using this menu you can read the status of the digital inputs and the status of the relay outputs.

- ■ Screen 1 to 7 provides the status of the digital inputs.
- ■ Screen 8 to 16 provides the status of the relay outputs.

Screen 1

This screen shows you the status of the emergency stop and the flowswitch.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	EMERGENCY STOP:	Status of emergency stop	OK/NOK
3	FLOWSWITCH:	Status of flow switch	FLOW OK/NO FLOW

i

A Unit safety can be a high or low pressure safety, a discharge thermal protector safety or an over current safety.

Screen 2

This screen shows you the status of digital inputs of circuit 1.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	C1 HIGH PR. SW.	Status of high pressure switch of circuit 1	OK/NOK
3	C1 REV.PH.PROT.:	Status of reverse phase protector of circuit 1	OK/NOK
4	C1 OVERCURRENT	Status of overcurrent switch of circuit 1	OK/NOK

Screen 3

This screen shows you the status of digital inputs of circuit 1.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	C1 DISCH. TH. PR.	Status of discharge temperature protection switch of circuit 1	OK/NOK
3	C1 COMPR. TH. PR.	Status of compressor temperature protection of circuit 1	OK/NOK

Screen 4   This screen shows you the status of digital inputs of circuit 2.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	C2 HIGH PR. SW.	Status of high pressure switch of circuit 2	OK/NOK
3	C2 REV.PH.PROT.:	Status of reverse phase protector of circuit 2	OK/NOK
4	C2 OVERCURRENT	Status of overcurrent switch of circuit 2	OK/NOK

Screen 5   This screen shows you the status of the digital inputs of circuit 2.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	C2 DISCH. TH. PR.	Status of discharge thermal protection switch of circuit 2	OK/NOK
3	C2 COMPR. TH. PR.	Status of compressor thermal protection of circuit 2	OK/NOK

Screen 6   This screen shows you the status of the digital inputs.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	THERMOSTAT STATUS		
2	25% : 40% :	Indicates at which capacity step the unit is operating	N-Y
3	70% : 100% :		N-Y

Screen 7   This screen shows you the status of the flow switch and the reverse phase protector.

Line n°	Display	Description	Possible settings	Possible status
1	CHANG. DIG. INPUTS	Screen title		
2	DI1 XXXX:XXX	Changeable digital input 1 + status of input	NONE DUAL SETPOINT REMOTE ON/OFF	SETP.1/SETP.2 ON/OFF
3	DI2 XXXX:XXX	Changeable digital input 2 + status of input	REMOTE COOL/HEAT CAP. LIMIT 1	COOL/HEAT NO LIM/LIMIT
4	DI3 XXXX:XXX	Changeable digital input 3 + status of input	CAP. LIMIT 2 CAP. LIMIT 3 CAP. LIMIT 4 FANSETP.SHIFT	NO LIM/LIMIT NO LIM/LIMIT NO LIM/LIMIT N/Y

Screen 8　　　　　　This screen shows you the status of the compressor relays of circuit 1.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	CIRCUIT 1 ON:	Indicates the status of the compressor	NO/YES
3	CIRCUIT 1 STAR:	Indicates if the compressor is in star	NO/YES
4	CIRCUIT 1 DELTA:	Indicates if the compressor is in delta	NO/YES

Screen 9　　　　　　This screen shows you the status of the compressor relays of circuit 2.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	CIRCUIT 2 ON:	Indicates the status of the compressor	NO/YES
3	CIRCUIT 2 STAR:	Indicates if the compressor is in star	NO/YES
4	CIRCUIT 2 DELTA:	Indicates if the compressor is in delta	NO/YES

Screen 10　　　　　This screen shows you the status of the relay outputs of the compressor.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	C1(12%):　　C1(25%):	Indicates the status of the compressor of circuit 1	Y or N
3	C1(40%):　　C1(70%):	Indicates the status of the compressor of circuit 1	Y or N

Screen 11　　　　　This screen shows you the status of the relay outputs of the compressor.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	C2(12%):　　C2(25%):	Indicates the status of the compressor of circuit 2	Y or N
3	C2(40%):　　C2(70%):	Indicates the status of the compressor of circuit 2	Y or N

Screen 12 This screen shows you the status of the relay outputs of the fans from circuit 1.
Only for Aircooled

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	C1 FANSTEP 1	Indicates the status of the fan contactor of circuit 1	Open / closed
3	C1 FANSTEP 2	Indicates the status of the fan contactor of circuit 1	Open / closed
4	C1 FANSTEP 3	Indicates the status of the fan contactor of circuit 1	Open / closed

Screen 13 This screen shows you the status of the relay outputs of the fans from circuit 2.
Only for Aircooled

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	C2 FANSTEP 1	Indicates the status of the fan contactor of circuit 2	Open / closed
3	C2 FANSTEP 2	Indicates the status of the fan contactor of circuit 2	Open / closed
4	C2 FANSTEP 3	Indicates the status of the fan contactor of circuit 2	Open / closed

Screen 14 This screen shows you the status of the general alarm and the pump contacts.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	GEN. ALARM:	Indicates the status of the general alarm contact	OPEN/CLOSED
3	PUMP/GEN OPER:	Indicates the status of the pump contact	OPEN/CLOSED
4	AI3:	Indicates the type of signal on analogue input 3	NONE SETP.SIGN. mV SETP.SIGN. V SETP.SIGN. mA

Screen 15 This screen shows you the status of the changeable digital output.
If unit type = ER then disable line 2

Line n°	Display	Description	Possible settings	Possible status
1	CHANG. INP/OUTPUTS	Screen title		
2	DI4 XXXX:XXXX	Changeable digital input 4 + status of input	NONE DUAL SETPOINT REMOTE ON/OFF REMOTE COOL/HEAT CAP. LIMIT 1 CAP. LIMIT 2 CAP. LIMIT 3 CAP. LIMIT 4	SETP.1/SETP.2 ON/OFF COOL/HEAT NO LIM/LIMIT NO LIM/LIMIT NO LIM/LIMIT NO LIM/LIMIT
3	DO1 XXXXXXX	Changeable digital output 1 + status of output	2ND EVAP PUMP EVAP.HEATERTAPE GEN.OPERATION FREE COOLING 100% CAPACITY REV.VALVE COND PUMP	O/C (Open/Closed)
4	DO2 XXXXXXX	Changeable digital output 1 + status of output	2ND EVAP PUMP EVAP.HEATERTAPE GEN.OPERATION FREE COOLING 100% CAPACITY REV.VALVE COND PUMP	O/C (Open/Closed)

Screen 16 This screen shows you to see the status of the In/Outputs of the EEV
Only if EEV SCREEN = Yes and EEV1(2) = Yes

Line n°	Display	Description	Possible settings
1	EEV1 (2) IN/OUTPUTS	Screen title	
2	BATTERY:	Status of the battery	DISCONNECTED HIGH INT.RES NOT RECHARGE
3	VALVE POSITION	The position of the valve	0 - 9999

2.14 User password Menu

Password The password protects the access to:

  ¦ the user settings menu
  ¦ the set points menu

The password is a 4-digit number between 0000 and 9999.

The units leave the factory with use password 0000. The service password is 1914 this password overrides the user password (in case you don't know it or forgot it).

Screen 1 In this screen you have to set the current password to change it to another one.

Line n°	Display	Description	Possible settings
1	ENTER PASSWORD	Screen title	
3	PASSWORD: 0000	To set the current password	From 0000 till 9999

Screen 2 In this screen you can change the password.

Line n°	Display	Description	Possible settings
1	ENTER PASSWORD	Screen title	
2	NEW PASSWORD:	To set the new password	From 0000 till 9999
3	CONFIRM:	To confirm the new password	From 0000 till 9999

2.15 Cool/Heat Menu

Screen 1   This screen allows you to choose between cooling and heating.

Line n°	Display	Description	Possible settings
1	COOLING/HEATING	Screen title	
3	MODE:	To select cooling or heating mode	COOLING (EVAP) HEATING (COND) DOUBLE THERM.

i   Cool/Heat Menu is only available on water cooled chillers

The cooling or heating mode can be selected via a changeable digital input (see 'Service Menu' screen 19, page 60) or directly via the controller display.

2.16 Network Menu

Network menu is only accessible when MS OPTION (service menu) is yes

Screen 1   Line2, 3, 4 only visible if MSOption = Yes

Line n°	Display	Description	Possible settings
1	NETWORK		
2	XXXXXXX	Gives the setpoint you selected to use (usersettings menu and dual setpoint if selected)	MANUAL MODE INLSETP1(2) E OUTSETP1(2) E INLETSP1(2) C SP1(2) E: C: THERMOSTAT
3	INL WATER E	Inlet temperature of the inlet water on the master unit.	°C
4	OUTL WATER E	Gives the temperature of the outlet water of all units together	°C

Line 4 is only visible if in usersettings menu the control setting mode is "OUTL WATER STEP".
An extra temperature sensor (optional) measures the temperature of the water of all units together. This is not the outlet water temperature of a unit but the temperature of outletwater of all units (installation is field supplied)
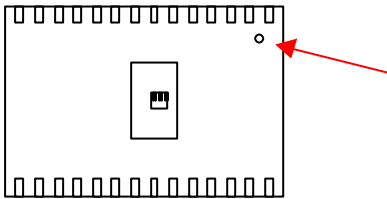
Screen 2

Line n°	Display	Description	Possible settings
1.1	¨M :	Displays status of Master (as selected in usersettings menu)	NORMAL / STANDBY DISCONN / SAFETY
1.2	ST :	Displays the Step of the master	
2.1	SL1:	Displays status of the slave (as selected in usersettings menu)	NORMAL / STANDBY DISCONN / SAFETY
2.2	ST :	Displays the Thermostat Step of the slave	
3.1	SL2:	Displays status of the slave (as selected in usersettings menu)	NORMAL / STANDBY DISCONN / SAFETY
3.2	ST :	Displays the Thermostat Step of the slave	
4.1	SL3:	Displays status of the slave (as selected in usersettings menu)	NORMAL / STANDBY DISCONN / SAFETY
4.2	ST :	Displays the Thermostat Step of the slave	

2.17 To adjust the contrast of the display

Built-in display	Remote terminal
1. Press 1st Enter Key and hold 2. Press 2nd OnOff Key and hold 3. Keep the two buttons pressed, and use the Up and Down Key to adjust the contrast	Not possible

When you use a pCO controller as a remote controller on a pCO^2 it is possible that you don't see anything on the pCO controller.
On the upper left corner of the back of the pCO controller you will find a hole. There you can adjust the brightness of the pCO controller with a small screw driver.

2.18 To enter the pumpdown menu

Built-in display	Remote terminal
1. Go to the second screen of the userpassword menu ("change password") 2. Press Enter Key and Menu Key at the same time and hold them for 5 seconds.	1. In Password2 display 2. Press Enter Key and Menu Key at the same time and hold them for 5 seconds.

To execute a pumpdown follow instructions on screens.

Screen 1

Line n°	Display	Description	Possible settings
1	CIRCUIT 1(2) :	Displays circuit to pump down. (Select between C1 or C2)	PUMPDOWN
2	CLOSE LIQUIDE LINE		
3	STOPVALVE		
4	(ENTER WHEN READY)		

Screen 2

Line n°	Display	Description	Possible settings
1	_PUMPDOWN		
2	PUT UNIT 'ON' TO		
3	START PUMPDOWN		
4	PROCEDURE		

Screen 3

Line n°	Display	Description	Possible settings
1	_PUMPDOWN BUSY	Number indicate the number of start-up cycles of the compressor	1 2 3
2	CLOSE THE DISCHARGE		
3	STOPV.IF PUMPDOWN IS		
4	FINISHED LP:	Displays the low pressure	bar

The compressor will execute 3 pumpdown cycles. See upper line in controller screen 'PUMPDOWN BUSY123' (compressor stops at LP<0.2bar and starts again at LP>0.2bar)

Screen 4

Line n°	Display	Description	Possible settings
1	_PUMPDOWN FINISHED		
2	PRESS ENTER TO STOP		
3	PUMPDOWN		
4			

Part 2   Trouble shooting

Introduction   When a problem occurs, you have to check all possible faults. This chapter gives a
general idea of where to look for faults. Furthermore the general procedures for
refrigeration circuit repair and for electrical circuit repair are explained.

i   Not all repair procedures are described. Some procedures are considered common
practice.

What is in this part?   This part contains the following chapters:

Overview of Fault Indications and Safeties.

In the first stage of trouble shooting sequence it is important to interpret the fault indication on
the controller display. This will help you to find the cause of the problem.

**What happens in
the event of an
alarm**   The units are equipped with three kinds of safety devices.

	Unit alarm	Circuit alarm	Dual Pump alarm
Function	Protects the unit in general	Protects the individual circuit	Indicates dual evaporator pump status
Description	¦ All compressors are shut down. ¦ The red LED inside the key lights up	¦ The compressor of the corresponding circuit is shut down. ¦ The red LED inside the key lights up	¦ Malfunction of one of the two evaporator pumps
Action to take	Press ⚠ to acknowledge the alarm	Press ⚠ to acknowledge the alarm	Press ⚠ to acknowledge the alarm
Display example	OAE:FLOW HAS STOPPED OU1:REVERESE PHASE PR	1CA:OUT E SENSOR ERR 1EO:GENERAL SAFETY 1A4:FREEZE –UP PROT.	OAE:FLOW HAS STOPPED

What to do in the event of an alarm

In event of an alarm or a warning, the following happens:

Step	Action	Result
1	Press ⚠ to acknowledge the alarm.	¦ The ⚠ LED lights up ¦ An unit, circuit, network, or dual pump safety is displayed.
2	Find the cause of the alarm and correct it.	The system is repaired.
3	You have found the cause and correct it	The ⚠ LED start blinking. Now it is possible to reset
3	Press ⚠ to reset the alarm.	¦ The ⚠ LED goes out and the alarm screen is deactivated. ¦ The main menu screen is displayed automatically. Remark: if in the service menu the option "password needed to reset safeties" is activated, you will be asked to enter the correct password to reset the safety. *i* After resetting the alarm you can consult the safety information only using the history menu on page 68
4	If all circuits were shutdown , switch on the unit by pressing ⏻ .	The units starts again.

1. Unit and Circuit Errors

Overview of codes   The following alarm and warning codes may appear on the screen:

Safety devices

Safety indication	Activation	Reset
Dual pump Safety	Malfunction of one of the two evaporator pumps	Manual software reset
Network safety	Malfunction or disconnected network	Manual software reset
Circuit 1 (2) safety	Indicates that there is a safety in the indicated circuit.	You can only reset when the problem on that circuit is solved
Unit safety	Unit safety, unit is switching off	Manual software reset

Alarm devices

Alarm description	Alarm indication	Activation	Reset	Wiring code	Device
Emergency stop	0F0: EMERGENCY STOP	When emergency stop button is pushed.	Manual software reset. After reset of the emergency stop switch.		
Flow switch or pump contact	0AE:FLOW HAS STOPPED	No flow after 5 seconds	Manual software reset	S8L (field supply	Contact closed on flow
Outlet evaporator error	0CA: OUT E SENSOR ERR	• Out of range • Broken / disconnected	Manual software reset		NTC sensor
Inlet evaporator error	0C9: INL E SENSOR ERR	• Out of range • Broken / disconnected	Manual software reset	R3T	NTC sensor
PCB communication error	0U4: PCB COMM.PROBLEM	Network isn't OK ▪ Check cable (wrong / disconnected.) ▪ Check dip switch address	Manual software reset		PCO^2 controller
Outlet evaporator error	1/2CA: OUT E SENSOR ERR	• Out of range • Broken / disconnected	Manual software reset	R4T R6T (Cir 1 Cir 2)	NTC sensor

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Low pressure transmitter error	1/2JC: LP TRANSM ERR	• The transferred value of the transmitter is out of range • Transmitter gives no signal (broken)	Manual software reset	B1P B4P (Cir 1 Cir 2)	LP Transmitter
High pressure transmitter error	1/2JA: HP TRANSM ERR	• The transferred value of the transmitter is out of range • Transmitter gives no signal (broken)	Manual software reset	B2P B5P (Cir 1 Cir 2)	HP Transmitter
Low pressure error	1/2E4: LOW PRESSURE	Low Pressure is <0.2 Bar (Programmable)	Manual software reset	B1P B4P (Cir 1 Cir 2)	LP Transmitter
Discharge thermal protection	1/2F3: DISCH THERM PROT	High compressor discharge temperature >135°C	Manual software reset if temperature <115°C	S3T S4T (Cir 1 Cir 2)	Bimetal on/off
Overcurrent	1/2E6: OVERCURRENT	overcurrent	Manual software reset and if overcurrent relay is in manual mode manual reset on relay in switch box	K17S K18S (Cir 1 Cir 2)	Bimetal on off
High pressure switch	1/2E3: HIGH PRESSURE SW	High pressure is > 26 bar (R407c) High pressure is > 17 bar (R134a)	Manual software reset	S1PH S2PH (Cir 1 Cir 2)	HP switch
Reverse phase protection	1/2U1: REV PHASE PROT	• Single phasing • Imbalance of more than 20% between the phases • Reversed phases • No power	Correct phase sequence, switch power back on	R1P R2P (Cir 1 Cir 2)	Contact on/off
Freeze-up	1/2A4: FREEZE UP 0A4: FREEZE UP	• Number of allowed freeze-up in a period is reached (see 1.5 freeze up control on page 7)	Manual reset only if temperature is raised with 1.5K		NTC sensor
Inlet condenser error	0HC: INL C SENSOR ERR	• Out of range • Broken / disconnected	Manual software reset		NTC sensor
Ambient temperature error	0H9: AMB T SENSOR ERR	• Out of range • Broken / disconnected	Manual software reset	R5T	NTC sensor

Remark:

• 1 or 2 in the fault code gives an indication of the circuit
 0 in the fault code gives an indication of the Unit

• The overcurrent relay can be set to manual or automatic reset. When the relay is set to manual reset, the overcurrent relay must be reset in the switch box. After reset, only alarm button is flashing. The controller can now be reset.

2. EEV Driver Error list

For units with EEV drivers																
A) present for units with 1 EEV driver	pCO2 controller															
B) present for units with 2 EEV drivers																
(start) only if error is present during power on	Display															
(or) pLAN LED can be on or flashing																
Symptom when switching power on / Cause	Alarm menu No error message	Alarm menu CIRCUIT1/2 SAFETY 1/2E4: LOW PRESSURE	Alarm menu CIRCUIT1/2 SAFETY 1/2A9:EEV DRIVER ERR	Alarm menu CIRCUIT1/2 SAFETY 1/2A9:EEV NOT CLOSED	Alarm menu CIRCUIT1/2 SAFETY 1/2A9:EEV SUPERHEAT ER	Alarm menu CIRCUIT1/2 SAFETY 1/2A9:EEV EEPROM ERR	Alarm menu CIRCUIT1/2 SAFETY 1/2A9:EEV ST.MOTOR ERR	Alarm menu CIRCUIT1/2 SAFETY 1/2A9:EEV PROBE ERR	Alarm menu EEV1/2 SAFETY 1/2A9:EEV BATTERY ERR	Alarm menu NETWORK SAFETY 0U4: PCB COMM. PROBLEM	READOUTMENU ACT. PRESSURES C1/2 LP1/2: 00.0 b=-36.2 °C	READOUTMENU ACT. PRESSURES C1/2 LP1/2: -2.06 b=-ER °C	INFO MENU UNIT INFORMATION EEV1/2:000000	SERVICE MENU EEV1/2 DRIVER(03/04) NO WARNINGS	SERVICE MENU EEV1/2 DRIVER(03/04) SYSTEM WAITING FOR: VALVE OPEN GO AHEAD:NO	I/O STATUS MENU EEV1/2 IN/OUTPUTS BATTERY: DISCONNECTED
1) EEV driver circuit 1/2 has no power		(start)	x						(start)	x	(start)		(start)	x		(start)
2) pLAN (tx-/tx+) is not connected		(start)	x						(start)	x	(start)		(start)	x		(start)
3) pLAN (tx-/tx+) of this EEV driver is reversed connected		(start)	x						(start)	x	(start)		(start)	x		(start)
4) pLAN (tx-/tx+) of another EEV driver is reversed connected		(start)	x						(start)	x	(start)		(start)	x		(start)
5) pLAN address setting of driver is equal to address setting of pCO2 controller (ex PCO2=1 & EEV1=1)		(start)	x						(start)	x	(start)		(start)	x		(start)
6) pLAN address setting of driver is not correct and different from pCO2 controller (ex PCO2=1 & EEV1=4)		(start)	x						(start)	x	(start)		(start)	x		(start)
7) pLAN address setting of drivers are equal and diff from pCO2 controller (ex PCO2=1 & EEV1=3 & EEV2=3)		(start)	x						(start)	x	(start)		(start)	x		(start)
8) pLAN VG0(24V) EEV-driver is disconnected																
9) pLAN VG1(24V) EEV-driver is disconnected		(start)	x						x	x	x		x	x		x
10) EEV pressure probe not connected								x					x			
11) EEV pressure probe broken								x								
12) EEV NTC sensor not connected								x								
13) EEV NTC sensor broken								x								
14) EEV Eprom is broken						x										
15) EEV superheat to low					x											
16) Valve did not close during stop (for example during power off)		(start)		x							(start)				x	
17) EEV driver is new (has never been used before)		(start)		x							(start)				x	
18) EEV battery disconnected									x							

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Cause \ Symptom	pCO2 controller PLAN LEDS			EEV-driver LEDS											
	PLAN LEDS orange & green light up (normal operation)(=communication)	pLAN LEDS shortly flashes after power On of unit & then shut off (=no communication)	pLAN LEDS light up for 4 sec(=communication) after this shut off for 4 sec(=no communication) This happens continue	Alarm LED: does not light up	Alarm LED: light up	Alarm LED: blinking	valve opening LED: blinking	valve closing LED: blinking	pLAN LED: light up (normal operation)	pLAN LED: does never light up	pLAN LED: shortly flashes (4/5 times) after power ON of unit & then shut off	pLAN LED: flashes (continue)	power LED: light up	power LED: blinking	power LED: off
1) EEV driver circuit 1/2 has no power	(B)	(A)(B)		x						x					x
2) pLAN (tx-/tx+) is not connected	(B)	(A)(B)		x						x			x		
3) pLAN (tx-/tx+) of this EEV driver is reversed connected		x		x							x		x		
4) pLAN (tx-/tx+) of another EEV driver is reversed connected		x		x							x		x		
5) pLAN address setting of driver is equal to address setting of pCO2 controller (ex PCO2=1 & EEV1=1)		x		x					(or)			(or)	x		
6) pLAN address setting of driver is not correct and different from pCO2 controller (ex PCO2=1 & EEV1=4)	(B)	(A)(B)		x					(or)			(or)	x		
7) pLAN address setting of drivers are equal and diff from pCO2 controller (ex PCO2=1 & EEV1=3 & EEV2=3)			x	x								x	x		
8) pLAN VG0(24V) EEV-driver is disconnected	x			x									x		
9) pLAN VG1(24V) EEV-driver is disconnected	(B)	(A)(B)	x							x			x		
10) EEV pressure probe not connected					x				x				x		
11) EEV pressure probe broken					x				x				x		
12) EEV NTC sensor not connected					x				x				x		
13) EEV NTC sensor broken					x				x				x		
14) EEV Eprom is broken					x				x				x		
15) EEV superheat to low				x					x				x		
16) Valve did not close during stop (for example during power off)						x	x	x	x				x		
17) EEV driver is new (has never been used before)						x	x	x	x				x		
18) EEV battery disconnected				x					x				x		

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