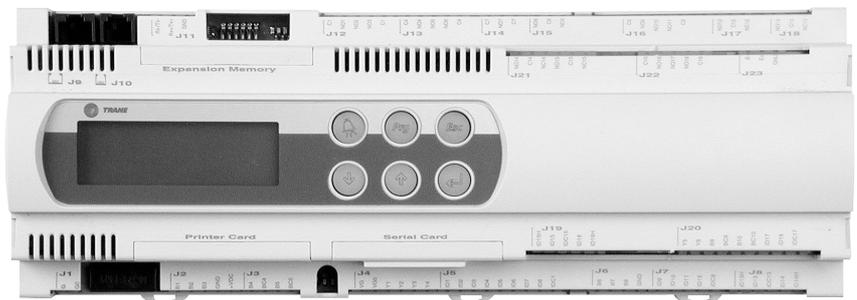# TRACER CH532
Chiller controller
User guide

AquaStream² ®

General information

Foreword

These Installation Operation and Maintenance instructions are given as a guide to good practice in the installation, start-up, operation and periodic maintenance by the user of TRACER CH532 chiller controller. They do not contain the full service procedures necessary for the continued successful operation of this equipment. The services of a qualified service technician should be employed, through the medium of a maintenance contract with a reputable service company.

Warranty

Warranty is based on the general terms and conditions of the constructor. The warranty is void if the equipment is modified or repaired without the written approval of the constructor, if the operating limits are exceeded, or if the control system or the electrical wiring is modified.
Damage due to misuse, lack of maintenance, or failure to comply with the manufacturer's instructions, is not covered by the warranty obligation.
If the user does not conform to the rules of "Maintenance", it may entail cancellation of warranty and liabilities by the constructor.

Reception

When the unit arrives on site, check it has not been damaged in any way during transport. If damage is observed, or even merely suspected, notify the carrier within 24 hours by registered letter. Notify the local Trane Sales office at the same time. The unit should be totally inspected within 3 days of delivery. If damage is observed, notify the last carrier by registered letter and notify the local sales office.

General information

About this manual

Cautions appear at appropriate places in this instruction manual. Your personal safety and the proper operation of this machine require that you follow them carefully. The constructor assumes no liability for installations or servicing performed by unqualified personnel.

Contents

TRACER CH532 Presentation

Important note: This document describes all the functions available on TRACER CH532 with software version 2.0 and explains how to program it.

Certain parameters must only be modified by qualified personnel. Before changing any parameter, always check that the change does not affect the good and safe operation of the equipment. Operation must always stay in the catalogued limits.

Built-in control terminal features:
An LCD display (1), 4 lines x 20 characters with back lighting
6 buttons (2) to (7)

Figure 1 - TRACER CH532 user interface
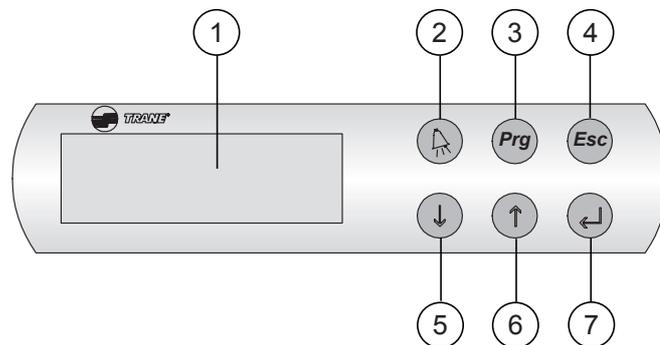
2. **Alarm button:**
Used for displaying or manually resetting the alarms. The red LED lights up , when at least one alarm has been detected.

3. **Program button:**
Allows the various operating parameters to be set (safety parameters, thresholds).

4. **Escape button:**
Allows the return to default display

5. 6. **Downward and Upward arrows**
Allows management of currently displayed screen and setting of values of control parameters

7. **Validation button**
Allows to move from line to line in the currently displayed screen and to confirm the set data.

Hardware architecture

Figure 2 - TRACER CH532 inputs and outputs

Hardware architecture

Table 1 - TRACER CH532 General description

Item	Description
1	24 V Power supply (G+,GO-)
2	Yellow LED (Power on)
	Red LED (Alarm)
3	Fuse (2A , 5x20)
4	Universal Analog inputs: NTC,0/1V,0/10V,0/20mA, 4/20mA)
5	Passive Analog Inputs (NTC,PT1000 , ON/OFF)
6	Analog Outputs (0/10V)
7	Digital Inputs (24Vac / Vdc)
8	Digital Inputs (230Vac or 24Vac / Vdc)
9	Relays digital output
10	User interface
11	Communication interface

Hardware architecture

Table 2 - Inputs and output summary list

	TRACER CH532 Medium Single circuit units	TRACER CH532 Large Dual circuit units
AI: Leaving water temperature sensor	**B3**: NTC	**B3**: NTC
AI: Entering water temperature sensor	**B4**: NTC	**B4**: NTC
AI: Ambient temperature sensor	**B5**: NTC	**B5**: NTC I
AI: Suction pressure circuit 1 - LP1 transducer	**B1**: 4..20mA	**B1**: 4..20mA
AI: Suction pressure circuit 2 - LP2 transducer		**B6**: 4..20mA
AI: Discharge pressure circuit 1 - HP1 transducer	**B2**: 4..20mA	**B2**: 4..20mA
AI: Discharge pressure circuit 2 - HP2 transducer		**B7**: 4..20mA
AI: External water setpoint reset (option)	**B8**: 0..10V-0..20mA	**B8**: 0..10V-0..20mA
AI: Unused	**B6**, B7	**B9, B10**
DI: Compressor C circuit 1 fault	**ID1**: 24Vac	**ID1**: 24Vac
DI: Compressor C circuit 2 fault		**ID17**: 24Vac
DI: Compressor A circuit 1 fault	**ID3**: 24Vac	**ID3**: 24Vac
DI: Compressor B circuit 1 fault	**ID4**: 24Vac	**ID4**: 24Vac
DI: Compressor A circuit 2 fault		**ID11**: 24Vac
DI: Compressor B circuit 2 fault		**ID12**: 24Vac
DI: High pressure Cut-out circuit 1 - HP1 switch	**ID14H**: 230Vac	**ID14H**: 230Vac
DI: High pressure Cut-out circuit 2 - HP2 switch		**ID15H**: 230Vac
DI: Auxiliary set point On/Off	**ID8**: 24Vac	**ID8**: 24Vac
DI: Fans circuit 1 fault	**ID5**: 24Vac	**ID5**: 24Vac
DI: Fans circuit 2 fault		**ID18**: 24Vac
DI: Circuit 1 On/Off (or Unit On/Off CH 532 medium)	**ID13H**: 230Vac	**ID13H**: 230Vac
DI: Circuit 2 On/Off		**ID16H**: 230Vac
DI: Water flow control input	**ID2**: 24Vac	**ID2**: 24Vac
DI: Water pump 1 fault	**ID9**: 24Vac	**ID9**: 24Vac
DI: Water pump 2 fault	**ID10**: 24Vac	**ID10**: 24Vac
DI: Faults external reset	**ID6**: 24Vac	**ID6**: 24Vac
DI: Cooling/Heating mode switch	**ID7**: 24Vac	**ID7**: 24Vac
DI: Unused	**ID11, ID12**	-
DO: Compressor A circuit 1 output	**NO7**: NO-230Vac	**NO7**: NO-230Vac
DO: Compressors B and C circuit 1 output	**NO8**: NO-230Vac	**NO8**: NO-230Vac
DO: Compressor A circuit 2 output		**NO13**: NO-230Vac
DO: Compressors B and C circuit 2 output		**NO14**: NO-230Vac
DO: Fan 1 output Wye (Y) contactor - circuit 1	**NO3**: NO-230Vac	**NO3**: NO-230Vac
DO: Fan 1 output Delta (D) contactor - circuit 1	**NO4**: NO-230Vac	**NO4**: NO-230Vac
DO: Fan 2 output circuit 1	**NO5**: NO-230Vac	**NO5**: NO-230Vac
DO: Fan 3 output circuit 1	**NO6**: NO-230Vac	**NO6**: NO-230Vac
DO: Fan 1 output Wye (Y) contactor - circuit 2		**NO15**: NO-230Vac
DO: Fan 1 output Delta (D) contactor - circuit 2		**NO16**: NO-230Vac
DO: Fan 2 output circuit 2		**NO17**: NO-230Vac
DO: Fan 3 output circuit 2		**NO18**: NO-230Vac
DO: Water pump 1	**NO1**: NO-230Vac	**NO1**: NO-230Vac
DO: Water pump 2	**NO2**: NO-230Vac	**NO2**: NO-230Vac
DO: Antifreeze heater	**NC12**: NO-230Vac	**NC12**: NO-230Vac
DO: Circuit 1 fault	**NO9**: NO-230Vac	**NO9**: NO-230Vac
DO: Circuit 2 fault		**NO11**: NO-230Vac
DO: Unit status or additional heating demand	**NO10**: NO-230Vac	**NO10**: NO-230Vac
DO: Unused	**NO11, NO13**	-
AO: Speed inverter - fan circuit 1 - HP1 output	**Y1**: 0..10V	**Y1**: 0..10V
AO: Speed inverter - fan circuit 2 - HP2 output		**Y2**: 0..10V
AO: 4-way valve circuit 1	**Y3**: 0..10V + **CONVONOFF**	**Y3**: 0..10V + **CONVONOFF**
AO: Unused	**Y4**	**Y4**
AO: 4-way valve circuit 2		**Y5**: 0..10V + **CONVONOFF**
AO: Unused		**Y6**
AO: Unused	**Y2**	**Y2**

Legend:
AI: Analog Input
DI: Digital Input
AO: Analog Output
DO: Digital Output
CONVONOFF: ON/OFF converter

Hardware architecture

TRACER CH532 offers customer the possibility to use inputs or outputs in order to:
- use an external water setpoint reset using an analog input (refer to figure 3)
- use an auxiliary setpoint
- connect a remote on/off of the unit or a circuit
- reset faults
- connect a remote Cooling/Heating switch
- return a circuit fault

Note: External water setpoint
Based on a external signal input, it will be possible to offset the active setpoint from 0°C to 20°C. This function can be used in conjunction with the automatic setpoint reset function.

Figure 3
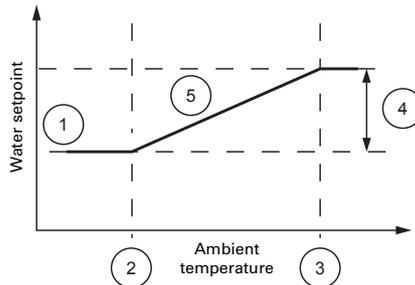
1. Leaving water temperature setpoint
2. Minimum value
3. Maximum value
4. Reset = 20°C
5. Active setpoint

Table 3: Customer Inputs and output summary list

		TRACER CH532 Medium Single circuit units	TRACER CH532 Large Dual circuit units
AI	External water setpoint reset (option)	**B8:** 0..10V-0..20mA	
DI	Auxiliary setpoint On/Off	**ID8:** 24Vac	
DI	Circuit 1 On/Off (or Unit On/Off for single circuit units)	**ID13H:** 230Vac	
DI	Circuit 2 On/Off	-	**ID16H:** 230Vac
DI	Faults external reset	**ID6:** 24Vac	
DI	Cooling/Heating mode switch	**ID7:** 24Vac	
DO	Circuit 1 fault	**NO9:** NO-230Vac	
DO	Circuit 2 fault	-	**NO11:** NO-230Vac
DO	Unit status or additional heating demand	**NO10:** NO-230Vac	

Legend:
AI: Analog Input
DI: Digital Input
DO: Digital Output

Starting/stopping the unit

Once the unit is powered on (main disconnect switch closed) **TRACER CH532** returns to the following display:

```
TRACER CH532            V2.0
   01/05/04             00:00
Water Temp            20.0°C
OFF BY KEYB.
```

Line 2 gives current date and time
Line 3 gives current leaving water temperature
Line 4 gives the unit status:
> **OFF BY KEYB** = Local stop
> **UNIT ON =** Unit running

Pressing (Esc) from any screen will return to this screen.

1. Starting the unit:

1. Press (↵)
2. Following screen will be displayed:

```
Status Unit
OFF BY KEYB.


Switch on unit ?          N
```

3. Press (↵)

4. Press (↓) or (↑) to change from "N" to "Y"

5. Press (↵) . Following screen will be displayed:

```
TRACER CH532            V2.0
   01/05/04             00:00
Water Temp            20.0°C
UNIT ON
```

2. Stopping the unit

1. Press (Esc) to exit from any menu and return to default display.

2. Press (↵) for 3 seconds unit will stop, and following screen will be displayed:

```
          Unit Switched Off
```

3. Press (Esc) to return to default display

Note: In case of power failure unit will restart in the state (operating mode, setpoints…) it was in before the power failure and default screen will be displayed.

Menus

TRACER CH532 allows the user to access 4 menus to display or adjust operation parameters:

- "**Data display**" menu - This menu allows the user to visualize all operation parameters:
  - Water and air temperatures
  - Refrigerant pressures
  - Saturated refrigerant temperatures
  - Compressors status
  - Compressor running hours
  - Number of compressors starts
  - Unit operating mode
  - Compressors failures counters

- "**Settings**" menu - This menu is password protected. It allows access to the settings of:
  - Setpoints
  - Offset of cooling and heating setpoints
  - Unit operation validation
  - Customer inputs and outputs

- "**Clock**" menu - This menu is password protected. It allows access to the settings of:
  - Day of the week, hour, date
  - Daily or weekly program
  - Hourly zone program

- "**Configuration**" menu - This menu is password protected. It allows to adjust or change:
  - Unit definition
  - Compressors timers
  - High pressure control
  - Dead band, antifreeze and heater setpoints
  - Type of sensors and transducers
  - Operation protections
  - Cooling mode limitations
  - Defrost parameters
  - Compressor alarms

Accessing the menus
From any screen displayed, press

(Esc) , **TRACER CH532** will then display the following screen:

> **Data Display**
> **Settings**
> **Clock**
> **Configuration**

1. (↓) or (↑) allow the cursor to move from line to line thus selecting one of the 4 menus.

Note: The selection is displayed in capital characters
2. Once one line is selected,

   press (↵) to validate the choice.

3. Pressing (Esc) will exit the menu selection mode and return to default display.

Display menu: "Data display"

From the menu screen, select "**Data Display**" then press ⏎

Pressing ⬇ or ⬆ will allow navigation from screen 1 to 8 as shown hereafter:

The menu is looped making it possible to scroll from the first item in the menu to the last item.

Lvg Wat Temp	08.0°C
Ret Wat Temp	12.0°C
Amb Temp	28.0°C
Active StP	07.0°C

1. Water and air temperatures
Lvg Wat Temp = Leaving water temperature
Ret Wat Temp = Entering water temperature
Amb Temp = Ambient air temperature
Active StP = Active water setpoint

HP ckt1	00.0 bar
HP ckt2	00.0 bar
LP ckt1	00.0 bar
LP ckt2	00.0 bar

2. Refrigerant pressures
HP ckt1 = Condensing Pressure circuit 1
HP ckt2 = Condensing Pressure circuit 2 (dual circuit units only)
LP ckt1 = Evaporating Pressure circuit 1
LP ckt2 = Evaporating Pressure circuit 2 (dual circuit units only)

3. Refrigerant saturated temperatures

Sat Temp CDS1	00.0°C
Sat Temp CDS2	00.0°C
Sat Temp EVP1	00.0°C
Sat Temp EVP2	00.0°C

Sat Temp CDS1 = Condensing temperature circuit 1
Sat Temp CDS2 = Condensing temperature circuit 2 (dual circuit units only)
Sat Temp EVP1 = Evaporating temperature circuit 1
Sat Temp EVP2 = Evaporating temperature circuit 2 (dual circuit units only)

Legend for screens 4,5 and 6:
Cmp A1 = Compressor A/circuit 1
Cmp B1/C1 = Compressor B and C/circuit 1
Cmp A2 = Compressor A/circuit 2 (dual circuit units only)
Cmp B2/C2 = Compressor B and C/circuit 2 (dual circuit units only)

Cmp A1	Off
Cmp B1 C1	Off
Cmp A2	Off
Cmp B2 C2	Off

4. Compressors status
Possible Status:
Off = Compressor stopped
On = Compressor running
Rec.On = Compressor will start after anti-short cycle
Rec.Off = Compressor will stop after anti-short cycle

Cmp A1	000000 Hrs
Cmp B1 C1	000000 Hrs
Cmp A2	000000 Hrs
Cmp B2 C2	000000 Hrs

5. Compressors running time
Hrs indicates the number of full hours compressor has been working since its first start.

6. Number of compressors starts

Cmp A1	000000 Starts
Cmp B1 C1	000000 Starts
Cmp A2	000000 Starts
Cmp B2 C2	000000 Starts

Starts indicates the number of compressor starts since first start-up.

7. Operating mode

Mode		Cooling
Stp	Local	07.0°C
Ckt1		Enable
Ckt2		Enable

Mode = Running mode
  - **Cooling =** Cold water production
  - **Heating =** Hot water production (Reversible chillers only)
Stp   Local   07.0°C
  - **Stp =** Current setpoint
  - **Local =** Source of Setpoint
        Local = Cooling or heating setpoint defined locally
        Extern = Auxiliary setpoint or operating mode by external contact
        Auto = setpoint by the automatic reset or the daily/weekly program
        Remote = Setpoint by supervisor

Ckt1/Ckt 2 = Operational circuits
  - **Enable =** Circuit is operational
  - **Disable =** Circuit is not operational

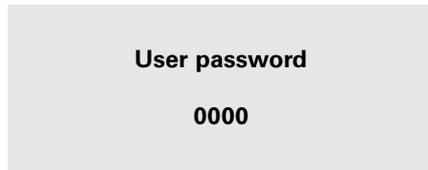**8. Compressors failures counters**

Nb of CMP faults		
Cpt A1:0		Cpt A 2:0
Cpt B1:0		Cpt B 2:0
Cpt C1:0		Cpt C 2:0

This menu indicates the number of compressors failure regardless of the history.

Customer settings menu: "Settings"

From the menu screen, select

"**Settings**" then press ⏎ .
Following screen will appear:

> **User password**
>
> **0000**

Enter password:"0000" (factory-set)

Press ⏎ and cursor will move to

first field of password. Pressing ↓

or ↑ will change the value from 0

to 9999. Keeping pressure on ↓ or

↑ will move the numbers fast.

Press ⏎ to confirm password.

Pressing ↓ ↑ will allow
navigation from screen 1 to 5 as
shown hereafter:

1. Setpoints

Cooling Stp	**07.0°C**
Heating Stp	**45.0°C**
Aux Wat Stp	**10.0°C**
Aux Wat	**Disable**

To access one of the parameters

displayed, press ⏎ and change

value using ↓ or ↑ . Confirm the

value by pressing ⏎

Cooling StP	**07.0°C**
Heating StP	**45.0°C**
Aux Wat StP	**10.0°C**
Aux Wat	**Disable**

Cooling Stp = Cold water setpoint
(-12 to 20°C - factory setting: 7°C)
Heating Stp = Hot water setpoint
(20 to 60°C - factory setting: 45°C)
Aux Wat Stp = Auxiliary setpoint
(-12 to 60°C - factory setting: 10°C)
Aux Wat = Auxiliary setpoint from
external source:
Enable = Auxiliary setpoint validated
Disable = Auxiliary setpoint non-
validated

. Automatic cooling and heating mode setpoints reset

TRACER CH532 offers the possibility
to offset cold and/or hot water
setpoints according to ambient air
temperature.
The automatic setpoint reset
program will allow you to change
the water temperature setpoint
(cooling and heating mode) with the
ambient temperature. This function
can be used in conjunction with the
external setpoint reset function.

Figure 4
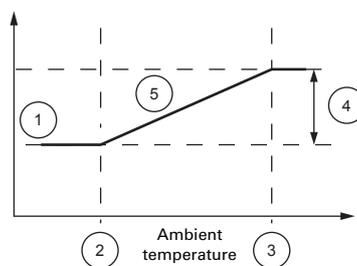
1. Leaving water temperature setpoint
2. Starting point
3. Ending point
4. Reset delta
5. Active set point

Below the reset starting point, the
water temperature setpoint will be
the normal setting. Between the
starting and ending point the
setpoint will vary proportionally with
the ambient temperature. After the
ending point, the setpoint will stay
at its maximum or minimum value.

2.1 Cooling mode setpoint reset
To access one of the parameters

displayed, press ⏎ and change

value using ↓ or ↑ . Confirm the

value by pressing ⏎

Cold water reset	**N**
Start Point	**20.0°C**
End Point	**30.0°C**
Reset Delta	**10.0°C**

Cold Water Reset: Ambient
temperature based cold water
setpoint offset
      Y = Enabled
      N = Disabled (factory setting)
Start Point: Starting point (-15 to 50°C
- factory setting: 20°C)
End Point: Ending point (-15 to 60°C
- factory setting: 30°C)
Reset Delta: Reset amplitude (-15 to
15°C - factory setting: 10°C)

3. Heating mode setpoint reset (Reversible chillers only)
To access one of the parameters

displayed, press ⏎ and change

value using ↓ or ↑ . Confirm the

value by pressing ⏎

Hot water reset	**N**
Start Point	**20.0°C**
End Point	**30.0°C**
Reset Delta	**10.0°C**

Hot Water Reset: Ambient
temperature based hot water
setpoint offset
      Y = Enabled
      N = Disabled (Factory setting)
Start Point: Starting point
(-15 to 50°C - factory setting: 20°C)
End Point: Ending point
(-15 to 60°C - factory setting: 30°C)
Reset Delta: Reset amplitude
(-15 to 15°C - factory setting: 10°C)

Customer settings menu: "Settings"

---

4. Operating mode

To access one of the parameters displayed, press ⏎ and change value using ↓ or ↑. Confirm the value by pressing ⏎

Mode	Cooling
Comp seq	**Auto**
Ckt1	**Enable**
Ckt2	**Enable**

Mode: Operating mode
 Cooling: Cold water production (default factory setting)
 Heating: Hot water production (Reversible chillers only)
 Extern: (external control)
Note: When switching from cooling to heating mode or from heating to cooling mode, unit will stop for 15 s before restarting.
To allow chiller waterflow rate adjustment disable circuit 1 and 2, then start the unit.

Comp seq: Compressor sequencing

1-2: fix order

Single circuit	Dual circuit	
Start order	A1,B1	A1, A2, B1, B2
Stop order	B1, A1	B2, B1, A2, A1

2-1: fix order

Single circuit	Dual circuit	
Start order	B1,A1	A2, A1, B2, B1
Stop order	A1, B1	B1, B2, A1, A2

Rotation

Single circuit	Dual circuit	
Start order	A1,B1	A1, A2, B1, B2
Stop order	A1,B1	A1, A2, B1, B2

Auto (default factory setting)

The Auto sequence intend to have equivalent numbers of starts and stops and an equivalent number of compressor working hours. The compressor start order will prioritize the compressors which have the least number of working hours.
Ckt1/2: Circuit 1/2 operation
 Enable: circuit operational
 Disable: circuit non-operational
Note: It is possible to disable both circuit 1 and 2. Water pump will be kept in operation

5. Customer Inputs and Outputs

To access one of the parameters displayed, press ⏎ and change value using ↓ or ↑. Confirm the value by pressing ⏎

Analog Input	0..10V
Ana. Input	**Disable**

Analog Input: Signal type
 0..10V (factory setting)
 0..1V
 0..20mA
 4..20mA
Note: the total amplitude corresponds to reset delta of +20°C between 0%(0V,OA or 4 mA) and 100% (10V,1V, or 20 mA)

Ana. Input External setpoint reset
 Y = Enabled
 N = Disabled
Pump Timer: Time between unit stop (by keyboard or external contact) and stop of the pump
(1 to 10 min - factory setting = 1 min)

6. Customer outputs configuration

Alarm Out:	MR only
State Out:	**Unit state**
Pump Timer:	**01 min**

Default I/O: (NO9 / NO11)
This output will be used to give an information about the circuit status: A configuration parameter will allow to choose between the following three indications concerning this circuit:
 ALL: All alarms (manual and automatic reset)
 ALL But LA: All alarms but without Low Ambient alarm
 MR only: Manual reset alarms only (factory setting)
Status output: (NO10)
 Add Heat: indicate an additionnal heat demand
 Unit State Send data telling that at least one compressor is ON (factory setting)

Customer settings menu: "Settings"

7. Remote Mode

To access one of the parameters displayed, press ⏎ and change value using ↓ or ↑. Confirm the value by pressing ⏎

Chiller control Mode:
                    Local
                    Remote

Local: Setpoints are entered on the module. Orders sent from the BMS are not taken into account.

Remote: Orders sent from the BMS are taken into account.

Clock Setting menu: "Clock"

From the menu screen, select

"**Clock**" then press ⏎ .
Following screen will appear:

> **User password**
>
> **0000**

Enter default password:"0000"
(factory set)

Press ⏎ and cursor will move to

first field of password. Pressing ⏬

or ⏫ will increment the value from

0 to 9999. Keeping pressure on ⏬

or ⏫ will move the numbers fast.

Press ⏎ to confirm password.

Pressing ⏬ or ⏫ will allow
navigation from screen 1 to 3 as
shown hereafter:

1. Clock setting
To access one of the 4 parameters
displayed, press and change value

using ⏬ or ⏫. Confirm the value

by pressing ⏎
Mon: Weekday

> **Clock**
>
> **Mon**
> **Hour**   **00:00**
> **Date**   **00/00/00**
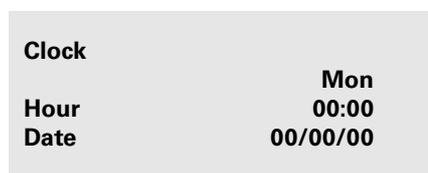
> **Mon:** Monday (factory setting)
> **Tue:** Tuesday
> **Wed:** Wednesday
> **Thu:** Thursday
> **Fri:** Friday
> **Sat:** Saturday
> **Sun:** Sunday

Hour: Time (hours/minutes)
Date: Date setting (day/month/year)

2. ON/OFF program type
When enabled, this program will
control the unit operation (On/Off).
This program will allow the user to:
- Make a choice between the daily
  and/or the weekly operation
- Define the operational days and
  hours
- Define the operating setpoints for
 each mode (cooling and heating)
The operating mode selected by the
operator or by the external control
will be taken into account.
Example:

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
00:00						
02:00						
04:00						
06:00						
08:00			Example			
10:00	Operation enable					
12:00	▪ from Monday to Friday					
14:00	▪ from 8:00 to 18:00					
16:00						
18:00						
20:00						
22:00						

To access one of the parameters

displayed, press ⏎ and change

value using ⏬ or ⏫. Confirm the

value by pressing ⏎

> **Program**
> **On/Off Unit**
> **Weekly**   **N**
> **Daily**   **N**
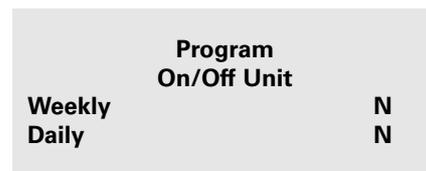
Weekly: Weekly program
> **Y**: Enabled
> **N**: Disabled (factory setting)

Daily: Daily program
> **Y**: Enabled
> **N**: Disabled (factory setting)

Clock Setting menu: "Clock"

2.1 Weekly program
To access one of the parameters displayed, press ↵ and change value using ↓ or ↑. Confirm the value pressing ↵

	Program Weekly	
Start		**Mon**
Stop		**Fri**

Start: Starting day
Stop: Ending day

2.2 Daily program
To access one of the parameters displayed, press ↵ and change value using ↓ or ↑. Confirm the value by pressing ↵

	Program Daily	
Start		**00:00**
Stop		**00:00**

Start: Start time
Stop: Stop time

3. Hourly Zone
The Daily/weekly program will allow you to define the cooling mode and heating mode setpoints. It will be possible to define within a day, four operating zones with different setpoint as follows:
Example:

To validate hourly zone program, press ↵ and change value using ↓ or ↑. Confirm the value by pressing ↵

Program Hourly zone
Disable

Disable: No program
Enable: Program used

3.1 Defining Zones
To access one of the parameters displayed, press ↵ and change value using ↓ or ↑. Confirm the value by pressing ↵

	Zone #1	
Start		**00:00**
Cooling Stp		**07.0°C**
Heating Stp		**45.0°C**

Start: Beginning Time
Cooling StP: Cooling mode setpoint (-20 to 20°C - factory setting: 7°C)
Heating StP: Heating mode setpoint - Reversible chillers only (20 to 60°C factory setting: 45°C)

Press ↓ or ↑ to reach zones 2,3 and 4. Proceed the same way as above for programming parameters.

Time	Std setpoint	Zone 1	Zone 2	Zone 3	Zone 4	Setpoint
07:00						
08:00						**Std Stp**
09:00						
10:00	Operating					**Stp 1**
11:00	hours	Starting at	Starting at			**Stp 2**
12:00	8:00-18:00	10:00	11:00			
13:00				Starting at		**Stp 3**
14:00				13:00		
15:00						
16:00					Starting at	**Stp 4**
17:00					16:00	
18:00						

Note: The automatic or external setpoint compensation or the external setpoint will change the standard setpoint only but will not affect the setpoints defined for the hourly zones 1, 2, 3 or 4.

Unit configuration menu: "Configuration"

From the menu screen, select "**Configuration**" then press ↵ . Following screen will appear:

User password

0000

Enter default password:"0000" (factory-set)

Press ↵ and cursor will move to

first field of password. Pressing ↓

or ↑ will increment the value from

0 to 9999. Keeping pressure on ↓

or ↑ will move the numbers fast.

Press ↵ to confirm password.

Pressing ↑ or ↓ will allow navigation from screen 1 to 11 as shown hereafter:

1. Unit definition
To access one of the 4 parameters

displayed, press ↵ and change

value using ↓ or ↑ . Confirm the

value by pressing ↵

Unit type:	**Chiller**
Refrg	**R407C**
Fans/ckt	**3**
Water pump	**Single**

Unit Type: Unit type
      Chiller: Cooling only
      Heat pump: Reversible chiller
Refrg: Refrigerant R407C, R134a, R410A or R22
Fans/ckt: Number of fans per circuit: 1, 2, or 3
Note: Setting number of fans at 0, will stop all the fans, but will allow the compressors to run before being stopped by HP switch.
Water Pump: Water pump type
      Single: Single pump control
      Dual: Dual pump control
Note: Pump operation
The water pumps can be single or dual. A timer is used to delay the pump shut down in normal operating conditions. The timer is reset at each unit start.

Figure 5 - Single pump operation
Note: figures 5 to 8, Unit Off means that the unit is stopped by keyboard or by an external contact
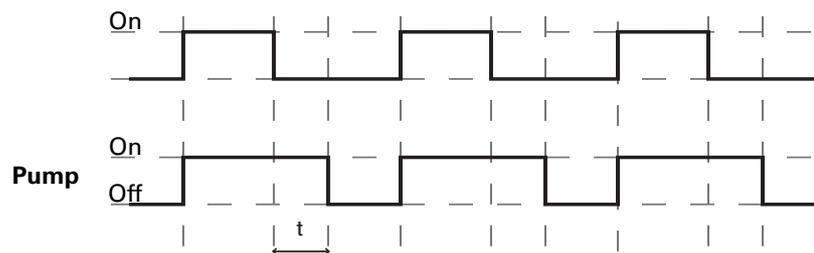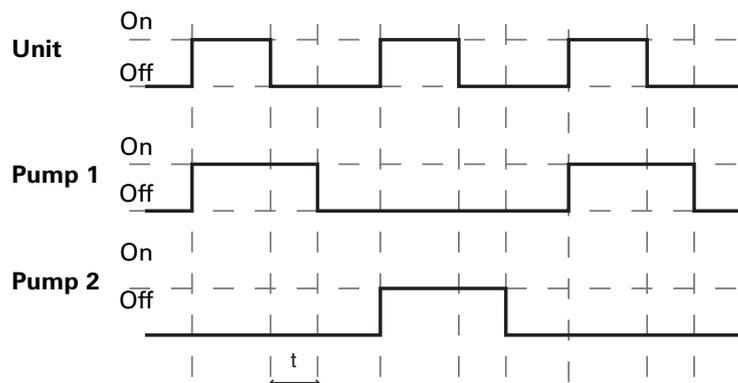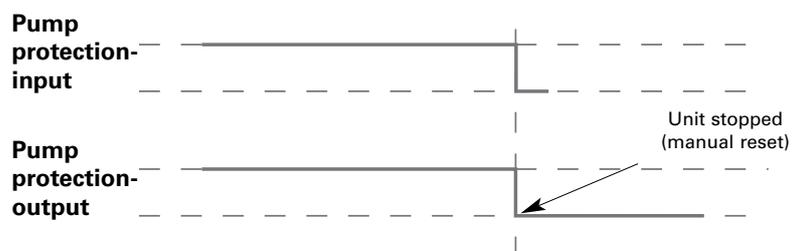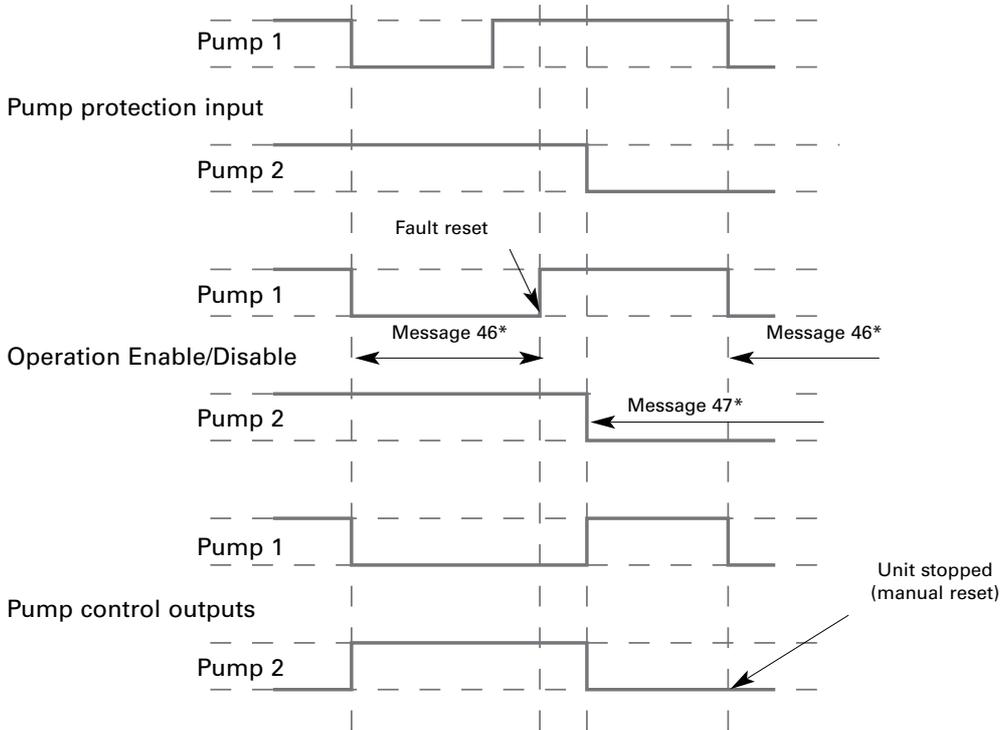

Figure 6 - Dual pump operation

When twin pumps are used, a pump switch will occur at each start and also in case of fault on the pump in operation.

Figure 7 - Single pump protection

Figure 8 - Dual pump protection

Fault reset

Message 46*   Message 46*

Message 47*

Unit stopped
(manual reset)

Pump 1
Pump protection input
Pump 2

Pump 1
Operation Enable/Disable
Pump 2

Pump 1
Pump control outputs
Pump 2

* refer to "alarms" section for
meaning of message

Unit configuration menu: "Configuration"

2. Compressors timers

To access one of the parameters displayed, press ↵ and change value using ↓ or ↑. Confirm the value by pressing ↵

ACC 1st Start	**2 min**
ACC On-On	**5 min**
Min On-On	**060 s**
Min Off-Off	**015 s**

ACC 1st Start: Short cycle compressor at first start (0 to 60 min - factory setting: 2min)
ACC On-On: Short cycle between 2 starts of the same compressor (2 to 10 min - factory: 5 min)
Min On-On: Minimum time to add compressor (5 to 240 s - factory setting: 60s)
Min Off-Off: Minimum time to remove compressor (1 to 120 s factory setting 15s)

3. HP Control

To access one of the parameters displayed, press ↵ and change value using ↓ or ↑. Confirm the value pressing ↵

Fan control	**1Speed**
Fan Ctrl Stp	**15.0 b**
Dead band Fan	**06.0 b**

Fan Control: Fan type:
    1 speed: 1 Speed fan
    2 speed: 2 Speed fan
    Invert: Inverter
Fan Ctrl StP: Fan control setpoint (10 to 30 bar - factory setting: 15 bar)
Dead band Fan: Fans regulation dead band (2 to 8 bar - factory setting: 5 bar)

4. Control dead bands

To access one of the parameters displayed, press ↵ and change value using ↓ or ↑. Confirm the value by pressing ↵

Dead band Cmp	**03.0°C**
Antifreeze	**02.0°C**
Heater	**03.0°C**

Dead band Cmp: Compressors regulation dead band around water temperature (0.4 to 8.0°C - factory setting: 3.0°C)
AntiFreeze: Cold water temperature limit (-15 to 10°C - factory setting: 2°C)
Heater: Evaporator heater setpoint according to ambient air temperature (0 to 10°C - factory setting: 3°C)

5. Winter Freeze Protection

CW High Limit	**15°C**
Pmp Cycle OFF	**10 min**
WinFreezeProtPmp	**Yes**
Ctrl Pump Required	

Chilled water high limit: (15 to 25°C: factory setting 15°C)
Water pump cycle OFF: (5 to 15 min: factory setting 10min)
Winter Freeeze protection with pump:

    No ➡ Heater or Ethylene Glycol Required
    Yes ➡ Ctrl Pump Required

Unit configuration menu: "Configuration"

6. Sensors and transducers

To access one of the parameters displayed, press ⏎ and change value using ↓ or ↑. Confirm the value by pressing ⏎

Temp probe	**NTC**
Press probe	**4..20mA**
Min Press	**0.0bar**
Max Press	**30.0bar**

Temp probe: Sensor type:
  NTC (factory setting)
  PT100
Press probe: Pressure transducer:
  0..10V
  0..1V
  0..20mA
  4..20mA (factory setting)
Min Press: Pressure at 0V, 0mA or 4 mA (-1.0 to 0.0 bar - factory setting: 0.0 bar)
Max Press: Pressure at 10V, 1V or 20 mA (16 to 50 bar - factory setting: 30bar)

7. Operation limits

To access one of the parameters displayed, press ⏎ and change value using ↓ or ↑. Confirm the value by pressing ⏎

LP (Sat Temp)	**-4°C**
Timer LP	**60 s**
HP Cool Stp	**28.0 bar**
HP Heat Stp	**28.0 bar**

LP (Sat Temp): Low evaporating pressure limit (-25 to 0°C - factory setting: -4°C)
Timer LP: Low pressure fault timer after compressor start (0 to 300 s - factory setting: 60s)
HP Cool StP: High pressure limit in cooling mode (15 to 40 bar - factory setting: 28 bar)
HP Heat StP: High pressure limit in heating mode (15 to 40 bar - factory setting: 28 bar)

8. Analog Output (for speed inverter)

Note: This screen is displayed only if "Invert" has been selected in the HP control menu (refer to §3)
To access one of the parameters displayed, press ⏎ and change value using ↓ or ↑. Confirm the value by pressing ⏎

Analog output		
Low	**0V**	**08.0 bar**
High	**10V**	**16.0 bar**

Low   0V: Minimum fan speed (0 to 10 bar - factory setting: 8 bar)
High   10V: Maximum fan speed (11 to 40 bar - factory setting: 16 bar)

Unit configuration menu: "Configuration"

9. Operating limits (cooling)

Low Amb Cooling	**On**
Low Amb Limit	**-10.0°C**
CW High Limit	**On**
CW High Limit	**15.0°C**

Low ambient temperature limitation:
> **On:** (factory setting) Low ambiant limited
> **Off:** Low ambient temperature not limited

Low ambient limit: -20 to 20°C: factory setting -10°C

Chilled water high limitation:
> **On:** High water temperature limited (factory setting)
> **Off:** High water temperature not limited

Chilled water high limit: 10 to 20 °C: Factory setting 15°C

10. Defrost demand setpoint

Low Amb Heat	**-10.0°C**
StP Min Temp	**10.0°C**
Defrost Max	**12.0°C**
StP Max Temp	**22.0°C**

Low ambient heating: -20 to 20°C, factory setting -10°C
Setpoint at minimum ambient: 1 to 30°C, (factory setting 10°C)
Maximum ambient: -20 to 20°C: (factory setting 12°C)
Setpoint at maximum ambient: 1 to 30°C, (factory setting 22°C)

11. Defrost cycle termination
To access one of the parameters displayed, press ⏎ and change value using ↓ or ↑. Confirm the value by pressing ⏎

Term Stp	**20.0 bar**
Drying time	**12 s**
Max Defrost	**7 min**
Min cycle	**25 min**

Term StP: Defrost termination setpoint (10 to 30bar - factory setting: 20 bar)
Drying time: Drying time (5 to 30 seconds - factory setting: 12s)
Max Defrost: Maximum defrost time (5 to 30 minutes - factory setting: 7 min)
Min cycle: Minimum time between defrost cycle (15 to 60min - factory setting: 25 min)

Note: Dual circuits have two independent refrigerant circuits. Defrost cycle will only occur on the circuit that needs it. The other circuit will continue its normal operation if required.

12. Compressor alarm
To access one of the parameters displayed, press ⏎ and change value using ↓ or ↑. Confirm the value by pressing ⏎

Compressor alarm	**00000 h**
Default parameters?	**N**

Compressor alarm: Operating hours for a warning (0 to 999000 hours by 1000 hours)
> Setting compressor alarm at 000000 h will disable the function.

Note: Total operating hours = compressor running hours + 3 x compressor starts
Default parameters?: Set the default parameters
Y: Reset all parameters
N: Keep all parameters

Note: When resetting, all parameters programmed on site will be definitively lost. Only factory default set parameters will be kept. Full configuration of the unit will have to be checked.

Alarms

1. Alarms display and Resetting

A fault on a unit will be shown through the user interface or through 2 digital outputs, one for each refrigerant circuit.

The alarms are divided into 3 categories:
- **Warning.** Shows that something is wrong on the unit but unit can be kept in operation. A message is displayed on the user interface screen. These messages are not recorded in the history list.
- **Fault with automatic reset:** when the cause of the fault disappears, the fault is cancelled and unit operation will return to normal. The messages displayed on the user interface screen disappear but are recorded in the history list of faults. The fault is relayed through the digital output if I/O parameter is set to show a circuit fault.
- **Fault with manual reset:** when the cause of the fault disappears, a manual reset is required to restart the unit. The messages displayed on the user interface screen disappear and are recorded in the history list of faults. The fault is relayed through the digital output if I/O parameter is set to show a circuit fault.

Should an alarm occur, ⓐ will be lit in red.

Pressing ⓐ once will display the alarm message (refer to table 4 for possible messages)
When alarm message is displayed

press ⓐ to reset the default if necessary.

2. Alarms history
200 events can be recorded by TRACER CH532. Each record will give the fault description, the reset type, the order and the day and time of occurrence.

Maintaining ⓐ for 5 seconds give will access to the last event recorded.

Then using ⓓ ⓤ allows the user to view the complete history. (refer to table 5 for possible messages)

Alarms

Table 4 - Status, warnings and alarm messages

No	Message	Reset Type	Unit status	Description
1	No Alarm	-	Unit On	See unit status on Main display
2	Ext. Ckt1 Stop	-	Circuit 1 Off	Circuit 1 Off by Digital Input (Dual circuit units)
3	Ext. Ckt2 Stop	-	Circuit 2 Off	Circuit 2 Off by Digital Input (Dual circuit units)
4	User Ckt1 Stop	-	Circuit 1 Off	Circuit 1 Disable by Settings (via keyboard)
5	User Ckt2 Stop	-	Circuit 2 Off	Circuit 2 Disable by Settings (via keyboard)
6	Remote Ckt1 Stop	-	Circuit 1 Off	Circuit 1 Disable by Supervision
7	Remote Ckt2 Stop	-	Circuit 2 Off	Circuit 2 Disable by Supervision
8	Clock Unit Stop	-	Unit Off	Unit Off by Program (Hourly, Weekly)
9	Operator Stop	-	Unit Off	Unit Off by Operator (via keyboard)
10	Ckt1 Defrost	-	Unit On	Circuit 1 under defrosting
11	Ckt2 Defrost	-	Unit On	Circuit 2 under defrosting
12	Warning Comp.1 Maintenance	Manual	Unit On	
13	Warning Comp.2 Maintenance	Manual	Unit On	Compressor running hours above the threshold defined in unit
14	Warning Comp.3 Maintenance	Manual	Unit On	configuration. Each compressor start is equal to 3 running hours.
15	Warning Comp.4 Maintenance	Manual	Unit On	
16	Alarm Air Sensor	Auto	Unit Off	Defective Air sensor -
17	Alarm Ckt 1 Fault	Manual	Circuit 1 Off	Simultaneous manual reset faults CMP A1 and (B1 or C1)
18	Alarm Ckt 2 Fault	Manual	Circuit 2 Off	Simultaneous manual reset faults CMP A2 and (B2 or C2)
19	Alarm Ckt1 HP Limit	Auto	Unit On	Compressor B1C1 Off for high HP ckt1
20	Alarm Ckt1 Limiting	Auto	Unit On	Compressor B1C1 Off for Hot water or low LP ckt1
21	Alarm Ckt2 HP Limit	Auto	Unit On	Compressor B2C2 Off for high HP ckt2
22	Alarm Ckt2 Limiting	Auto	Unit On	Compressor B2C2 Off for Hot water or low LP ckt2
23	Alarm Comp. A1 Fault	Auto/Manual	CMP A1 Off	Manu if CMP A1 failure > 35 min or 6 failures within 3 hours 30 min
24	Alarm Comp. B1 Fault	Auto/Manual	CMP B1 Off	Manu if CMP B1 failure > 35 min or 6 failures within 3 hours 30 min
25	Alarm Comp. C1 Fault	Auto/Manual	CMP C1 Off	Manu if CMP C1 failure > 35 min or 6 failures within 3 hours 30 min
26	Alarm Comp. A2 Fault	Auto/Manual	CMP A2 Off	Manu if CMP A2 failure > 35 min or 6 failures within 3 hours 30 min
27	Alarm Comp. B2 Fault	Auto/Manual	CMP B2 Off	Manu if CMP B2 failure > 35 min or 6 failures within 3 hours 30 min
28	Alarm Comp. C2 Fault	Auto/Manual	CMP C2 Off	Manu if CMP C2 failure > 35 min or 6 failures within 3 hours 30 min
29	Alarm Ext. Setpoint Signal	Auto	Unit Off	Defective device or bad device configuration
30	Alarm Fan Protection 1	Auto	Unit On	Defective fan on the circuit 1
31	Alarm Fan Protection 2	Auto	Unit On	Defective fan on the circuit 2
32	Alarm HP Ckt1 Fault	Manual	Circuit 1 Off	High Pressure Cut-Out circuit 1
33	Alarm HP Ckt2 Fault	Manual	Circuit 2 Off	High Pressure Cut-Out circuit 2
34	Alarm HP Sensor Ckt1	Auto	Circuit 1 Off	Defective pressure sensor HP1
35	Alarm HP Sensor Ckt2	Auto	Circuit 2 Off	Defective pressure sensor HP2
36	Alarm Low Ambient	Auto	Unit Off	Ambient temperature too low for unit operation
37	Alarm Low Water Temp	Manual	Unit Off	LWT < antifreeze or INT (antifreeze-EWT)<=10°Cxsecond
38	Alarm LP Ckt1 Fault	Auto/Manual	Circuit 1 Off	Suction pressure too low on circuit 1
39	Alarm LP Ckt2 Fault	Auto/Manual	Circuit 2 Off	Suction pressure too low on circuit 2
40	Alarm LP Sensor Ckt1	Auto	Circuit 1 Off	Defective pressure sensor LP1
41	Alarm LP Sensor Ckt2	Auto	Circuit 2 Off	Defective pressure sensor LP2
42	Alarm Unit Fault	Manual	Unit Off	All the compressors are defectives
43	Alarm Water Flow (**)	Auto	Unit Off	No water flow. Reset by unit Off/On when pump Off
44	Alarm Water In Sensor	Auto	Unit On	Defective Return water sensor
45	Alarm Water Out Sensor	Auto	Unit Off	Defective Leaving water sensor
46	Alarm Water Pump1	Manual	Unit On	Defective water pump 1
47	Alarm Water Pump2	Manual	Unit On	Defective water pump 2

(**) When the unit is shut down after a waterflow alarm for more than 1 minute, it is necessary to switch the unit Off and On again to reset the fault. The fault will automatically reset if the water pump is still running.

Alarms

Table 5 - History events record

No Message	Reset Type	Unit status	Description
No History	Auto	Unit On	No alarm was recorded
Air Sensor	Auto	Unit Off	Faulty sensor, out of range -30..+80°C (short circuit or open circuit)
Water In Sensor	Auto	Unit On	Faulty sensor, out of range -30..+80°C (short circuit or open circuit)
Water Out Sensor	Auto	Unit Off	Faulty sensor, out of range -30..+80°C (short circuit or open circuit)
Lp Sensor Ckt1	Auto	Circuit 1 Off	Faulty sensor, out of range 0..10V, 0..1V,0..20mA or 4..20mA following configuration
Hp Sensor Ckt1	Auto	Circuit 2 Off	Faulty sensor, out of range 0..10V, 0..1V,0..20mA or 4..20mA following configuration
Lp Sensor Ckt2	Auto	Circuit 1 Off	Faulty sensor, out of range 0..10V, 0..1V,0..20mA or 4..20mA following configuration
Hp Sensor Ckt2	Auto	Circuit 2 Off	Faulty sensor, out of range 0..10V, 0..1V,0..20mA or 4..20mA following configuration
Fan Protection 1	Auto	Unit On	A fan on the circuit 1 is faulty
Fan Protection 2	Auto	Unit On	A fan on the circuit 2 is faulty
Lp Ckt1 fault	Auto or Manual	Circuit 1 Off	Lp circuit 2 is below the setpoint. Manual reset after 3 faults within 1 hour
Lp Ckt2 fault	Auto or Manual	Circuit 2 Off	Lp circuit 1 is below the setpoint. Manual reset after 3 faults within 1 hour
Low Water Temp	Manual	Unit Off	LWT < antifreeze or INT (antifreeze-EWT)<=10°Cxsecond
Comp. A1 Fault	Auto or Manual	CMP A1 Off	Manual reset if CMP A1 failure > 35 min or 6 failures within 3 hours 30 min
Comp. B1 Fault	Auto or Manual	CMP B1 Off	Manual reset if CMP B1 failure > 35 min or 6 failures within 3 hours 30 min
Comp. C1 Fault	Auto or Manual	CMP C1 Off	Manual reset if CMP C1 failure > 35 min or 6 failures within 3 hours 30 min
Comp. A2 Fault	Auto or Manual	CMP A2 Off	Manual reset if CMP A2 failure > 35 min or 6 failures within 3 hours 30 min
Comp. B2 Fault	Auto or Manual	CMP B2 Off	Manual reset if CMP B2 failure > 35 min or 6 failures within 3 hours 30 min
Comp. C2 Fault	Auto or Manual	CMP C2 Off	Manual reset if CMP C2 failure > 35 min or 6 failures within 3 hours 30 min
Hp Ckt1 Fault	Manual	Circuit 1 Off	High pressure switch Cut-Out circuit 1
Hp Ckt2 Fault	Manual	Circuit 2 Off	High pressure switch Cut-Out circuit 2
Ckt1 Fault	Manual	Circuit 1 Off	Simultaneous faults compressor A1 and (B1 or C1)
Ckt2 Fault	Manual	Circuit 2 Off	Simultaneous faults compressor A2 and (B2 or C2)
Unit Fault	Manual	Unit Off	Simultaneous faults on all the compressors
Ext Setpoint Signal	Auto	Unit Off	Faulty sensor, out of range 0..10V, 0..1V,0..20mA or 4..20mA following configuration
Low Ambient	Auto	Unit Off	Air temperature below the setpoint while unit On
Water Pump 1	Manual	Unit On	Fault on water pump #1
Water Pump 2	Manual	Unit On	Fault on water pump #2
Water Flow	Auto	Unit Off	Loss of water flow for more than 4 sec when the system is On. Pump restarts by a manual unit Off and On
Defrost Ckt1	Auto	Unit On	Defrost on circuit 1
Defrost Ckt2	Auto	Unit On	Defrost on circuit 2

LonTalk® option

Description

The Lon interface uses an Echelon FTT-10 transceiver, which is approved to be used on the TP/FT-10 channel.
This channel is characterized by the following main features:
• It consists of up to 60 nodes on a single network segment
• Data rate : 78 125 kbps
• Maximum distance : 1400 meters
• Recommended topology : daisy chain with double end terminator (105 ohms)
For futher details, refer to the official documentation LonWorks® FTT-10A free topology transeiver user's guide and to the official LonWorks® guidelines LonMark® layer 1-6 interoperability guidelines version 3.0.
These documents and additional information are available on the internet site www.lonmark.org

Figure 9
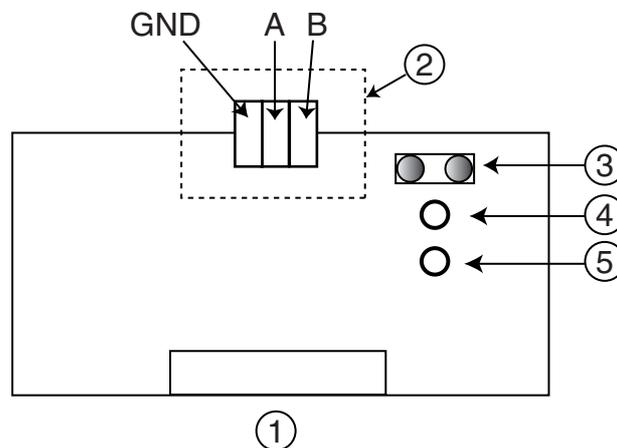
1. Connection to the Tracer CH532
2. Terminal block to the LonWorks® network (GND,A,B)
3. Service pin
4. Green status LED
5. Red service LED

To activate the service pin, simply short circuit the two pins for a moment using the tip of a screwdriver or similar tool. The service pin is available only in the node installation phase. When the pin is activated, the node sends a broadcast message in the LonWorks® containing the necessary information in order to be identified.

LonTalk® option

LED meaning and function

Green Status LED

LED status	Meaning/Function
LED is OFF continuously.	• Normal condition • Broken hardware • No power
LED is ON. .	• Broken hardware • During the activation of the service pin • The node is Applicationless
LED blinks 1second then always OFF	• When receiving a WINK command from the network (1)
LED blinks ½ second ON then always OFF	• Normal operation (usually after a reset)
LED flashes once every second	• The node card is not configured • The node card is in continuous reset

(1) By sending a request, you can request the controller's green status LED to blink ("wink"), a notification that the controller received the signal and is communicating.

Red Service LED

LED status	Meaning/Function
LED is ON for 20 seconds when power is applied to the controller	• The controller is in a reset phase
LED is OFF continuously	• The controller is operating normally • Broken hardware
LED is ON during 2 seconds then always OFF	• When power is applied to the controller • After a reset
LED is ON continuously	• The controller is not working properly • Broken hardware • Problems of connection with the CH532 module

Object details

Figure 10

Chiller Controller 8040

Mandatory network variables

| nv1 | nviChillerEnable snvt_switch | | nv3 | nvoOnOff snvt_switch |
| nv2 | nviCoolSetpt snvt_temp_p | | nv4 | nvoActiveSetpt snvt_temp_p |

Optional network variables

nv7	nviMode Snvt_hvac_mode		nv11	nvoLvgCHWTTemp snvt_temp_p
nv8	nviHeatSetpt snvt_temp_p		nv12	nvoEntCHWTTemp snvt_temp_p
			nv13	nvoEntCndWTemp snvt_temp_p
			nv15	nvoAlarmDescr snvt_str_asc
			nv16	nvoChillerStat snvt_chlr_status

Note: BAS intergrators requiring .xif file need to contact their local sales representative.
Other optional network variables are not supported.

LonTalk® option

Nv1   0=off
        1=on
nv2 range -12.2°C 48.8°C
nv3   0=chiller off
        1=chiller on
nv4 range -40°C 93°C
nv7   1=heat mode
        3=cooling mode
nv8 range 10°C 93°C
nv11 range -40°C 118°C
nv12 range -40°C 118°C
nv13 range -40°C 118°C
nv15   manual reset alarm
        auto reset alarm
        informational warning
        circuit 1 fans fault
        circuit 2 fans fault
        compressor A1 fault
        compressor B1 fault
        compressor C1 fault
        compressor A2 fault
        compressor B2 fault
        compressor C2 fault
        pump 1 fault
        pump 2 fault
nv16 chlr_off=0, chlr_run=2
        HVAC_HEAT=1, HVAC_COOL=3
        Chiller state 0=No alarm, 1=In alarm
        Run _enable 0=Chiller not allowed to start, 1=Chiller can start
        Local 0=Values can be changed remotely, 1=Values cannot be changed remotely
        Limited (Not used)
        CHW_flow 0=No water flow, 1=Water flow detected
        CONDW_flow (Not used)
        All other bits unused

Configuration properties
nc73   ChillerEnable (m)
nc52   inSendTime (m)
nc4   MaxSendTime (m)
nc7   CoolSetpt (m)
nc74   Mode (o)
nc78   HeatSetpt (o)
nc48   Heartbeat (o)

(m) = mandatory
(o) = optional

LonTalk® option

Cable characteristics

Level 4 cable may be used with TP/FT-10 channels. The level 4 cable specification used by Echelon and as originally defined by the National Electrical Manufacturers Association (NEMA) differs from the Category 4 specification proposed by the Electronic Industries Association / Telecommunication Industries Association (EIA / TIA). The following specifications can be used by cable suppliers to identify a compliant Level 4 cable.

Specifications apply to shield or unshielded 22AWG (0.65mm²) cable	
D-C resistance (ohms/1000 feet at 20°C) maximum for a single copper conductor regardless of whether it is solid or stranded and is or is not metal coated	18.0
D-C resistance unbalance (percent) maximum	5
Mutual capacitance of a pair (pF/foot) maximum	17
Pair to ground capacitance unbalance (pF/1000 feet) maximum	1000
Characteristic impedance (ohms)	
772 kHz	102+/- 15%
1.0 MHz	100 +/- 15%
4.0 MHz	100 +/- 15%
8.0 MHz	100 +/- 15%
10.0 MHz	100 +/- 15%
16.0 MHz	100 +/- 15%
20.0 MHz	100 +/- 15%
Attenuation (dB/1000 feet at 20°C) maximum	
772 kHz	4.5
1.0 MHz	5.5
4.0 MHz	11
8.0 MHz	15
10.0 MHz	17
16.0 MHz	22
20.0 MHz	24

Worst pair to pair near end crosstalk (dB) minimum. Values are shown for information only. The minimum NEXT coupling loss for any pair combination at room temperature is to be greater than the value determined using the formula NEXT (F MHz)>NEXT (0.772)-15log10(F MHz / 0.772) for all frequencies in the range of 0.772 MHz for a length of 1000 feet.

772 kHz	58
1.0 MHz	56
4.0 MHz	47
8.0 MHz	42
10.0 MHz	41
16.0 MHz	38
20.0 MHz	36

For the TP/FT-10 channel operating in a bus topology , the maximum bus length of level 4 22AWG (0.65 mm²) cabling is 1400 meters with a maximum stub length of 3 meters.
It is recommended to use shielded cable if high amplitude modulation noise exist or transient protection is required.

Notes

Notes

Notes

Safety recommendations

To avoid accidents and damage, the following recommendations should be observed during maintenance and service visits:

1. The maximum allowable pressures for system leak testing on low and high pressure side are given in the chapter "Installation". Always provide a pressure regulator.
2. Disconnect the main supply before any servicing on the unit.
3. Service work on the refrigeration system and the electrical system should be carried out only by qualified and experienced personnel.

Maintenance contract

It is strongly recommended that you sign a maintenance contract with your local Service Agency. This contract provides regular maintenance of your installation by a specialist in our equipment. Regular maintenance ensures that any malfunction is detected and corrected in good time and minimizes the possibility that serious damage will occur. Finally, regular maintenance ensures the maximum operating life of your equipment. We would remind you that failure to respect these installation and maintenance instructions may result in immediate cancellation of the warranty.

Training

The equipment described in this manual is the result of many years of research and continuous development. To assist you in obtaining the best use of it and maintaining it in perfect operating condition over a long period of time, the manufacturer has at your disposal a refrigeration and air conditioning service school. The principal aim of this is to give operators and technicians a better knowledge of the equipment they are using, or that is under their charge. Emphasis is particularly given to the importance of periodic checks on the unit operating parameters as well as on preventive maintenance, which reduces the cost of owning the unit by avoiding serious and costly breakdown.

For additional information, contact:
Distributor/Installer stamp

Quality Management
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