

User's Guide

CTS6000 BACnet



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MARKEDSFØRENDE ERHVERVS- OG BOLIGVENTILATION MED VARMEGENVINDING

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Introduction

Please check that the following documents have been supplied with the unit: Installation instructions User's Guide for CTS6000 BACnet (this document) Wiring diagram Warranty certificate

The purpose of this guide is to provide a clear, detailed description of the possibilities offered by CTS6000 BACnet.

The guide may contain functions and facilities which are not available on your system.

For technical information on the possibilities provided by CTS6000 BACnet, please refer to "User's Guide CTS6000 WebControl".

Introduction to CTS6000

CTS6000 is a control unit for commercial ventilation systems supplied by Nilan A/S. CTS6000 was developed in Denmark and is also produced there. CTS6000 is designed to meet future requirements on improving the possibility of optimizing ventilation systems and reducing running costs.

As the name suggests, CTS6000 BACnet is an Internet-based monitoring program. The program is pre-installed in the unit and there is thus no need for software other than an Internet browser capable of running Java applications. If the unit is connected to the Internet, it is possible to log into the system from a PC anywhere in the world.

Reading instructions

This instruction manual contains five main sections.

"Quick startup" describes the log-in procedure and how to start the unit for the first time.

"CTS6000 WebControl settings" describes the functions associated with the monitoring program.

Appendices can be found at the end of the manual.

Figures are numbered consecutively throughout the manual.

Function location is given as shown in the following example: "System setup -> Filter guard", where "System setup" is an option in the main options bar along the top of the window and "Filter guard" is an option in the "System setup" menu, see Figure 1.



Figure 1 Example of menu options

Quick startup

CTS6000 WebControl is an Internet-based monitoring program designed as a Java application. It must therefore be possible to run Java applications on the computer used to log into the system.

If this is not possible, Java can be downloaded via: http://www.java.com/en/download/index.jsp

To allow direct communication with the unit, the computer's IP address must be 10.1.10.xxx. (where xxx is a number between 0 and 255 which differs from the last part of the unit's IP address). See details on changing your PC's network settings.

The computer must be connected to the control unit via a crossover patch cable (supplied with CTS6000).

The control unit is equipped with a port for the cable on the PCB located in the ventilation unit's electrical panel. The small PCB raised above the larger one contains an RJ45 port, see Figure 2 bottom left.



Figure 2 CTS6000 PCB with network port

Open a browser, e.g. Internet Explorer, and enter the control unit's IP address in the address field. Unless otherwise stated, the address is "10.1.10.240". The computer will begin to retrieve data from the control unit. A dialogue box with three fields will then open, see Figure 3.

\$	
	Enter Username and Password
IP PORT	Username Password
Quit	ОК

Figure 3 Log-in window

It is possible to log in on various levels. Enter the control unit's IP address in the uppermost left field. Enter the username and password and click OK to log in. A logging-in dialogue box will then appear. The "Port" field is used if several units have the same IP address.

Java GUI Settings

For BACnet system control Java GUI not older than 1.48

🛃 About	
CTS6000 Remote control	
Nilan A/S	
Software version 1.0093 (27/01/16)	
GUI VERSION: 1.48	
You are logged on as : Administrator	
	Close

Figure 4 SW version

In order to select BACnet control enter Communication \rightarrow External control menu.



Figure 5 External control

When selected, the corresponding message will be shown in PI-diagram.



References

1. BACNet Integration Description

20150929-MIS-30030016_BacNet_Integration_Description_3.odt

2. Visual Test Shell

http://sourceforge.net/projects/vts/

3. BACnet Stack Implementation

http://bacnet.sourceforge.net/

Abbreviations and Terms

Abbreviation/term	Description
BACnet	Building Automation and Control network
NPDU	Network layer Protocol Data Unit
VTS	Visual Test Shell for BACnet
GUI	Graphical User Interface
BMS	Building Management System

Introduction

This document describes BACnet usage in CTS6000 system.

Connection and basics of data communication are described.

Installation

BACnet protocol support multiple physical level implementations.

In CTS6000 system BACnet over IP is used. This means that connection is done via Ethernet port. As Ethernet port is an integral part of the system no additional HW is required.

Not all CTS6000 SW version support BACnet communication.

Now only one version supports BACnet -1.0093.

Same IP address is used as for other types of communication (Web-access, GUI access).

CTS6000 BACnet implementation uses these settings for connection:

Protocol	UDP
Port	0xBAC0

The stated settings are standard ones and in most cases don't need to be changed.

It's compatible with BACnet SW and was tested with Visual Test Shell.

BACnet Supported Requests and Properties

These standard requests are implemented and ca be used by BMS

UNCONFIRMED WHO IS

UNCONFIRMED WHO HAS

CONFIRMED_READ_PROPERTY

CONFIRMED_READ_PROP_MULTIPLE

CONFIRMED WRITE PROPERTY

CONFIRMED WRITE PROP MULTIPLE

CONFIRMED READ RANGE

All the CTS6000 parameters can be requested using value types:

- Analog_in
- Analog_value
- Multistate_value
- Binary_value.

Several functions are defined for work with parameters:

- get present value returning current parameter value;
- set present value allowing to change current parameter value;
- value name returning friendly description of the parameter.

Parameters Description

CTS6000 Outputs

Analogue Inputs

Parameter	Description	Formula
Τ1	Outdoor air temperature after heat pipe.	Temperature = recorded value/ 100
Т2	Inlet air temperature after heat pump.	Temperature = recorded value/ 100
Т3	Exhaust air temperature	Temperature = recorded value/ 100
T4	Outlet air temperature	Temperature = recorded value/ 100
Т5	Temperature evaporator / condenser.	Temperature = recorded value/ 100
Т6	Temperature evaporator / condenser.	Temperature = recorded value/ 100
Τ7	Inlet air temperature.	Temperature = recorded value/ 100
Т8	Out door air temperature.	Temperature = recorded value/ 100
Т9	Temperature of aux. heater.	Temperature = recorded value/ 100
Т10	Compressor 1 hot gas temperature.	Temperature = recorded value/ 100
T11	Compressor 2 hot gas temperature.	Temperature = recorded value/ 100
T12	Compressor 3 hot gas temperature.	Temperature = recorded value/ 100

Parameter	Description	Formula
T13	Unused / Shared compressor hot gas temperature cooling unit	Temperature = recorded value/ 100
T14	Unused / Temperature AUX. heater return water	Temperature = recorded value/ 100
T15	Unused / Evaporator pre cooling unit	Temperature = recorded value/ 100
T16	Unused / Condenser pre cooling unit	Temperature = recorded value/ 100
Tpanel	Unused / User panel temperature	Temperature = recorded value/ 100
High pressure cool	Contains the pressure level at the high pressure side of the compressor (cooling)	Pressure (bar) = (recorded value) / 100000
Low pressure cool	Contains the pressure level at the low pressure side of the compressor (cooling)	Pressure (bar) = (recorded value) / 100000
High pressure heat	Contains the pressure level at the high pressure side of the compressor (heating)	Pressure (bar) = (recorded value) / 100000
Low pressure cool	Contains the pressure level at the low pressure side of the compressor (heating)	Pressure (bar) = (recorded value) / 100000
Pressure drop over inlet filter	Contains the pressure drop over the inlet filter.	Pressure (Pa) = (recorded value)
Pressure drop over outlet filter	Contains the pressure drop over the outlet filter.	Pressure (Pa) = (recorded value)
Pressure inlet duct	Contains the actual pressure level in the inlet duct.	Pressure (Pa) = (recorded value)
Pressure outlet duct	Contains the actual pressure level in the outlet duct.	Pressure (Pa) = (recorded value)

Analogue Values

Parameter	Description	Formula
Heat Out Primary	Heat output primary, %	
Heat Out Secondary	Heat output secondary, %	
Cool Out	Cool output, %	
Econ out	Econ output, %	
Fan Out	Total fan output, %	
Outlet fan capacity	This value contains the actual capacity of the outlet fan	This value contains the actual capacity of the outlet fan
Inlet fan capacity	This value contains the actual capacity of the inlet fan	Capacity in % = (recorded value) / 2
Water valve capacity	This value contains the actual capacity of the water valve	Capacity in % = (recorded value) / 2
Capacity of capacity regulated compressor	This value contains the actual capacity of the outlet fan	Capacity in % = (recorded value) / 2

Binary Value

Parameter	Description
Compressor 1	Compressor 1 (1 = On ; 0 = Off)
Compressor 2	Compressor 2 (1 = On ; 0 = Off)
Compressor 3	Compressor 3 (1 = On ; 0 = Off)
Bypass valve heat	Bypass valve heat $(1 = Open; 0 = Closed)$
4-way valve	4-way valve (0 = Heat mode ; 1 = Cooling mode)
Electric heater st. 1	Electric heater step 1 (1 = On ; 0 = Off)
Electric heater st. 2	Electric heater step 2 (1 = On ; 0 = Off)
Electric heater st. 3	Electric heater step 3 (1 = On ; 0 = Off)
Pump status	Pump status for water heating element $(1 = On; 0 = Off)$
Active cooling	Active cooling $(1 = \text{the unit is running active cool}; 0 = \text{the unit is running in heat mode})$
Common alarm	Common Alarm (1 = there is no alarms ; $0 =$ there is an alarm on the unit)
Ex. fan st 1	Exhaust fan step 1 (1 = On ; 0 = Off)
Ex. fan st 2	Exhaust fan step 2 (1 = On ; 0 = Off)
In fan st 1	Inlet fan step 1 (1 = On ; 0 = Off)
In fan st 2	Inlet fan step 2 (1 = On ; 0 = Off)
Bypass valve cooling	Bypass valve Cooling (1 = Open ; 0 = Closed)

Multi-state Values

Parameter	Description
Mode	System status with listed states: 1 - HVAC_AUTO 2 - HVAC_HEAT 3 - HVAC_MRNG_WARMUP 4 - HVAC_COOL 5 - HVAC_COOL 5 - HVAC_OFF 7 - HVAC_FAN_ONLY 8 - HVAC_FREE_COOL
Alarm	Current active alarm

Analogue Values

Parameter	Description	Formula
Setpoint	Contains the temperature setpoint, i.e. the required temperature.	Value = Temperature * 100 If a temperature of 21.0° C is wanted, then the value written to 40257 must be $21.00 * 100 = dec2100 \rightarrow$ 834 hex Setpoint must be set, if"Controlling sensor" (265) is changed.
Set point offset	Contains the temperature offset value of the controlling temperature sensor.	Value = Temperature offset * 100
Min. inlet temperature summer	Contains value for Min. inlet summer	Value = Temperature * 100
Min. inlet temperature winter	Contains value for Min. inlet winter	Value = Temperature * 100
Max. inlet temperature	Contains value for Max. inlet temperature	Temperature = Temperature * 100 Max. inlet specifies the maximum permissible value.
Pressure set point outlet duct.	Contains the pressure set point for the outlet duct if a pressure transmitter is connected to the unit.	Value = Pressure set point
Pressure set point inlet duct.	Contains the pressure set point for the inlet duct if a pressure transmitter is connected to the unit.	Value = Pressure set point
Outlet fan speed	Contains the fan speed set point for the outlet fan if the fans is VLT controlled or fixed speed fans.	Value = Fan speed
Inlet fan speed	Contains the fan speed set point for the inlet fan if the fans is VLT controlled or fixed speed fans.	Value = Fan speed

Multi-state Values

Parameter	Description
Controlling sensor	Contains the value who decides which sensor is the controlling sensor. $0 - T7$ 1 - T3
Application mode (Start / stop).	 HVAC_AUTO HVAC_HEAT HVAC_MRNG_WARMUP HVAC_COOL HVAC_NIGHT_PURGE HVAC_OFF HVAC_FAN_ONLY HVAC_FREE_COOL To start the HVAC unit write value 0 at address 40270 byte 1 for automatic operation. To stop the HVAC unit write value 6 at address 40270 byte 1.

Binary Value

Parameter	Description
Alarm reset	Resets the alarm flag and marks an alarm as action taken. State : 0 inactive, $1 = active$ Setting : $0 = OFF$, $200 = ON$
Auxiliary heat	Allows the AUX. heater to be active. Value = $1,200,0 = ON : 0,0,0 = OFF$ (see Alarm reset) This variable indicates whether auxiliary heat has been enabled or disabled. If auxiliary heat is enabled, it is allowed in the heating mode.

Appendix A. List of Supported Features

Services

Service	State
AcknowledgeAlarm	Unsupported
ConfirmedCOVNotification	Unsupported
ConfirmedEventNotification	Unsupported
GetAlarmSummary	Unsupported
GetEnrollmentSummary	Unsupported
SubscribeCOV	Unsupported
AtomicReadFile	Unsupported
AtomicWriteFile	Unsupported
AddListElement	Unsupported
RemoveListElement	Unsupported
CreateObject	Unsupported
DeleteObject	Unsupported
ReadProperty	Supported
ReadPropertyConditional	Unsupported
ReadPropertyMultiple	Supported
WriteProperty	Supported
WritePropertyMultiple	Supported
DeviceCommunicationControl	Unsupported
ConfirmedPrivateTransfer	Unsupported
ConfirmedTextMessage	Unsupported
ReinitializeDevice	Unsupported
VT-Open	Unsupported
VT-Close	Unsupported
VT-Data	Unsupported
Authenticate	Unsupported
RequestKey	Unsupported
I-Am	Unsupported
I-Have	Unsupported
UnconfirmedCOVNotification	Unsupported

Subject to alteration without notice.

Service	State
UnconfirmedEventNotification	Unsupported
UnconfirmedPrivateTransfer	Unsupported
UnconfirmedTextMessage	Unsupported
TimeSynchronization	Unsupported
Who-Has	Supported
Who-Is	Supported
ReadRange	Supported
UtcTimeSynchronization	Unsupported
LifeSafetyOperation	Unsupported
SubscribeCOVProperty	Unsupported
GetEventInformation	Unsupported

Object Types

Object Type	State
analog-input	Implemented
analog-output	Implemented
analog-value	Implemented
binary-input	Implemented
binary-output	Implemented
binary-value	Implemented
calendar	Not Implemented
command	Not Implemented
device	Implemented
event-enrollment	Not Implemented
file	Not Implemented
group	Not Implemented
Іоор	Not Implemented
multi-state-input	Implemented
multi-state-output	Implemented
notification-class	Not Implemented
program	Not Implemented
schedule	Not Implemented
averaging	Not Implemented
multi-state-value	Implemented
trend-log	Not Implemented
life-safety-point	Not Implemented
life-safety-zone	Not Implemented
accumulator	Not Implemented

Object Type	State
pulse-converter	Not Implemented
event-log	Not Implemented
global-group	Not Implemented
trend-log-multiple	Not Implemented
load-control	Not Implemented
structured-view	Not Implemented
access-door	Not Implemented
objtype-31	Not Implemented
access-credential	Not Implemented
access-point	Not Implemented
access-rights	Not Implemented
access-user	Not Implemented
access-zone	Not Implemented
credential-data-input	Not Implemented
network-security	Not Implemented
bitstring-value	Not Implemented
characterstring-value	Not Implemented
date-pattern-value	Not Implemented
date-value	Not Implemented
datetime-pattern-value	Not Implemented
datetime-value	Not Implemented
integer-value	Not Implemented
large-analog-value	Not Implemented
octetstring-value	Not Implemented
positive-integer-value	Not Implemented
time-pattern-value	Not Implemented
time-value	Not Implemented

Appendices

Description of alarms

Alarm name	Description	Remedy
Door open	Door to fans is open. Ventilation unit	Close door and reset alarm.
ID 32 Level - 4	stops in order to prevent personal injury.	
Fire alarm	The unit is equipped with two fire	Reset fire thermostats in unit
	thermostats: one in the inlet duct, the	and reset alarm.
	other in the exhaust duct. If temperature	
	becomes excessive, the thermostats are	
ID 33 Level - 4	activated.	
Smoke alarm	Smoke detectors can be fitted in the	Check smoke detector and
	unit. One of these smoke detectors has	reset alarm.
ID 30 Level - 4	sensed smoke.	-
Thermal relay	Motor protector has cut out; Klixon in	Reset motor protector or
	compressor motor or fan motor has cut	remedy error in frequency
	out; or error has occurred in frequency	converter and reset alarm.
ID 34 Level - 4	CONVERTER.	Departure of the element
High pressure	A nigh pressure alarm can be activated	Reset alarm. If the alarm
alarm	If there is insufficient air flow through the	repeatedly occurs for no
	filters loose V belts or dampers which	apparent leason, can service.
	have not opened	
	Low pressure alarm 1 can be activated if	The controls stop the
alarm 1	there is insufficient air flow through the	compressor itself until the
	unit This may be caused by blocked	pressure switch is reset Max 5
	filters loose V-belts or dampers which	times an hour however
$ID_3 = 6$ Level - 2	have not opened	
Condenser high	Upper limit(2) for cooling circuit pressure	Reset alarm If the alarm
pressure	set under "Pressure limits" has been	repeatedly occurs for no
procedie	exceeded. The alarm can be activated	apparent reason, call service.
	by insufficient air flow through the unit.	
	This may be caused by blocked filters,	
	loose V-belts or dampers which have	
ID 8 – 11 Level - 4	not opened.	
Evaporator low	Lower limit(2) for cooling circuit	The controls stop the
pressure 1	pressure, which is set under "Pressure	compressor until pressure is
	limits", has been exceeded. The alarm	regained. Max. 5 times an hour,
	can be activated by insufficient air flow	however.
	through the unit. This may be caused by	
	blocked filters, loose V-belts or dampers	
ID 9 – 12 Level - 3	which have not opened.	
Evaporator low	Evaporator low pressure 2 is activated if	Reset alarm. If the alarm
pressure 2	Evaporator low pressure 1 has been	repeatedly occurs for no
ID 10–13 Level - 4	activated 5 times within the last hour.	apparent reason, call service.
Condenser	Condenser temperature (15) setting	Reset alarm. If the alarm
overneated	under "Pressure limits" too nign. The	repeatedly occurs for no
	alarm can be activated by insufficient air	apparent reason, call service.
	now unough the unit. This may be	
	or dampers which have not oppoind	
Evaporator too cold	Evaporator temporaturo (T6) cotting	Reset alarm If the alarm
	under "Pressure limits" too low The	repeatedly occurs for po
	alarm can be activated by insufficient air	annarent reason call service
	flow through the unit This may be	apparent reason, can service.
	caused by blocked filters loose V-belts	
ID 21 Level - 4	or dampers which have not opened.	

Timeout for prevention function The prevention function for high or low 20 minutes but pressure is still outside the limits. This may be caused by blocked filters, loose V-beits or dampers which have not opened. Reset alarm. If the alarm repeatedly occurs for no apparent reason, call service. ID 42–43 Level -4 Temperature of hydraulic after-heating coil too low. The controls open the water valve and start the pump to keep the heating coil free of ice. Fatal frost alarm Temperature of hydraulic after-heating coil remains too low despite prevention attempts. The controls open the water valve and start the pump to keep the heating coil free of ice. Flow alarm Insufficient air flow across electric after- heating coil for coil to cut in. This may be caused by blocked filters, loose V- belts or dampers which have not opened. Reset alarm. If the alarm repeatedly occurs for no apparent reason, call service. Compressor starts A Compressor has started 12 times within one hour. Set compressor minimum off time to at least 6 minutes and reset the alarm. ID 40 Level - 2 Compressor si soverheated. Alarm is activated if T11, T12, T13 (ID 51-53) Set compressor and do not allow it to responded to the 5 leavenet the control unit and the Netavent unit has been selected as the last requests. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) to responded to the statest requests Reset alarm. If the alar	Alarm name	Description	Remedy
prevention function pressure alarms has run for more than repeatedly occurs for no apparent reason, call service. 1D 42–43 Level - 4 which have not opened. apparent reason, call service. Frost alarm Temperature of hydraulic alter-heating coil too low. The controls open the water valve and start the pump to keep the heating coil free of ice. Fatal frost alarm Temperature of hydraulic after-heating coil remains too low despite prevention attempts. Reset alarm. If the alarm repeatedly occurs for no apparent reason, call service. Flow alarm Instriction at flow across electric after heating coil for coil to cut in. This may be caused by blocked filters, loose V-belts or dampers which have not opened. Reset alarm. If the alarm repeatedly occurs for no apparent reason, call service. ID 36 Level - 2 opened. Set compressor minimum off time to at least 5 minutes and reset the alarm. ID 40 Level - 2 Pressure pipe Pressure pipe temperature on compressor 1/2/3/4 has exceeded 10 compressor and do not allow it to restart before the tomperature has dropped below 50°C. Pressure pipe Compressor is overheated. Alarm is a larvice. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. 1D 11 Level - 2 Compressor is overheated. Alarm is a larvice. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. 1D 41 Level - 4	Timeout for	The prevention function for high or low	Reset alarm. If the alarm
20 minutes but pressure is still outside the limits. This may be caused by blocked filters, loose V-belts or dampers which have not opened. apparent reason, call service. ID 42-43 Level - 4 the preature of hydraulic after-heating coil too low. The controls open the water valve and start the pump to keep the heating coil free of ice. Fatal frost alarm Temperature of hydraulic after-heating coil treanins too low despite prevention attempts. The unit is stopped. Check the after-heating coil free of ice. Flow alarm Insufficient air flow across electric after- heating coil for coil to cut in. This may be caused by blocked filters, loose V- belts or dampers which have not opened. Reset alarm. If the alarm repeatedly occurs for no apparent reason, call service. Compressor starts A compressor has started 12 times within one hour. Set compressor minimum off time to at least 5 minutes and reset the alarm. ID 41 Level - 2 Pressure pipe Pressure pipe temperature on activated if T11, T12, T13 (ID 51-53) tates requests The controls stop the tall service. ID 54 Level - 4 Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) tatest requests The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 4 A communication error has occurred between the control unit and the VLT x has of controlling sensor Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 <t< td=""><td>prevention function</td><td>pressure alarms has run for more than</td><td>repeatedly occurs for no</td></t<>	prevention function	pressure alarms has run for more than	repeatedly occurs for no
the limits. This may be caused by biocked filters, loose V-belts or dampers which have not opened. Frost alarm Temperature of hydraulic after-heating coil too low. ID 35 Level - 2 Flaal frost alarm Flow alarm Flow alarm Insufficient air flow across electric after heating coil for coil to cut in. This may be caused by blocked filters, loose V- belts or dampers which have not to aparent reason, call service. ID 36 Level - 2 Pressure pipe activated it T11, T12, T13 (ID 51-53) to 51 - 52 - 53 VLT x has not responded to the 5 heater operation error has occurred the parent is set as the U111 Level - 2 Pressure pipe activated it T11, T12, T13 (ID 51-53) to 111 Level - 4 Netavent unit x has controlling sensor the last 5 requests ID 110 Level - 2 T3 is set as the controlling sensor the last 5 requests ID 110 Level - 2 T3 is set as the controlling sensor the last 5 requests ID 110 Level - 2 Ta last 5 requests ID 111 Level - 4 A versent unit to has been selected as controlling sensor the control ling sensor, but communication error has occurred between the control unit and the VLTs. Level - 4 Ta is set as the controlling sensor the control ling sensor, but communication error has occurred between the control unit and the vLTs. Level - 4 Ta is set as the lot 110 Level - 2 Ta is set as the controlling sensor the control ling sensor, but communication error has occurred between the control unit and the vLTs. Latest requests ID 110 Level - 4 Ta is set as the lot 111 Level - 4 Ta last the control unit and the vatavents. ID 112 Level - 4 Ta is not allow with the first 15 minutes after power up, or defrosting not finished the control ling sensor, but communication with the unit concerned after power up, or defrosting not finished the control ling sensor, but communication with the unit concerned after power up, or defrosting not finished the control ling sensor, but communication er or has o		20 minutes but pressure is still outside	apparent reason, call service.
ID 42-43 Level - 4 which have not opered. Frost alarm Temperature of hydraulic after-heating coil too low. The controls open the water valve and start the pump to keep the heating coil free of ice. Fatal frost alarm Temperature of hydraulic after-heating coil free of ice. The unit is stopped. Check the after-heating coil for coil to cut in. This may be caused by blocked filters, loose V. The unit is stopped. Check the after-heating coil for coil to cut in. This may be caused by blocked filters, loose V. Flow alarm Insufficient air flow across electric after heating coil for coil to cut in. This may be caused by blocked filters, loose V. Reset alarm. If the alarm repeatedly occurs for no apparent reason, call service. Compressor starts A compressor has started 12 times within one hour. Set compressor minimum off time to at least 6 minutes and reset the alarm. ID 40 Level - 2 Pressure pipe Pressure pipe Pressure pipe Pressure pipe Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) to communication error has occurred between the control unit and the VLTs. The unit tops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) to communication error has occurred between the control unit and the Net alarm repeatedly occurs, call service. The unit tops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110		the limits. This may be caused by	
Tors alarm Temperature of hydraulic after-heating coil too low. The controls open the water valve and start the pump to valve and start the alarm. ID 29-39 Level - 2 Temperature of hydraulic after-heating coil. Reset alarm. If the alarm is too low despite prevention apparent reason, call service. Flow alarm Insufficient air flow across electric after heating coil for coil to cut in. This may be caused by blocked filters, loose V belts or dampers which have not opened. Reset alarm. If the alarm is too low despite prevation apparent reason, call service. Compressor starts A compressor has started 12 times within one hour. Set compressor minimum off time to at least 6 minutes and reset the alarm. ID 40 Level - 2 Pressure pipe Pressure pipe temperature or opressor 1/2/3/4 has exceeded compressor and do not allow it to restart before the targe between the control unit and the VLTs. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 4 Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) happen 5 times during 24 hours. Reset alarm. If the alarm repeatedly occurs, call service. </td <td>ID 42-43 evel - 4</td> <td>which have not opened</td> <td></td>	ID 42-43 evel - 4	which have not opened	
coil too low. coil too low. valve and start the pump to keep the heating coil remains too low despite prevention coil remains too low despite prevention the unit subped. Check the after-heating coil. Flow alarm Insufficient air flow across electric after-heating coil. The unit is subped. Check the after-heating coil. Flow alarm Insufficient air flow across electric after-heating coil. Reset alarm. If the alarm repeatedly occurs for no apparent reason, call service. D 36 Level - 2 Opened. Reset alarm. Compressor starts A compressor has started 12 times within one hour. Set compressor minimum off time to at least 6 minutes and reset the alarm. D 40 Level - 2 Pressure pipe Pressure pipe temperature or compressor 1/2/3/4 has exceeded 125°C. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. Pressure pipe Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) the alarm repeatedly occurs, call service. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. VLT x has not responded to the 5 tast streage the control unit and the VLTs. A communication error has occurred het control unit and the VLTs. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 111 Level - 2 If a Netavent unit has been selected as the controlling sensor, but co	Frost alarm	Temperature of hydraulic after-heating	The controls open the water
ID 35 Level - 2 keep the heating coil free of ice. Fatal frost alarm Temperature of hydraulic after-heating coil. The unit is stopped. Check the alarm after-heating coil. ID 29-39 Level - 4 Instruction of the alarm presention after-heating coil. The unit is stopped. Check the alarm. Flow alarm Instruction of the alarm presention of the alarm present leases of the alarm. Reset alarm. If the alarm repeatedly occurs for no aparent reason, call service. ID 36 Level - 2 Opened. Set compressor minimum off time to at least 5 minutes and reset the alarm. Compressor starts A VLT compressor has started 11 times within one hour. Set compressor minimum off time to at least 6 minutes and reset the alarm. ID 41 Level - 2 Pressure pipe Pressure pipe temperature on temperature The unit stops. Reset alarm. If the alarm reset before the temperature activated if T11, T12, T13 (ID 51-53) The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 4 A communication error has occurred between the control unit and the VLTs. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 111 Level - 4 A communication error has occurred between the control unit and the Netwents. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 If a Netave		coil too low.	valve and start the pump to
Fatal frost alarm ID 29-39 Level - 4Temperature of hydraulic after-heating coil remains too low despite prevention after-heating coil for coil to cut in. This may be caused by blocked filters, loose V- belts or dampers which have not 1D 36 Level - 2The unit is stopped. Check the after-heating coil for coil to cut in. This may be caused by blocked filters, loose V- belts or dampers which have notReset alarm. If the alarm repeatedly occurs for no aparent reason, call service.ID 36 Level - 2 Opened.A Compressor has started 12 times within one hour.Set compressor minimum off time to at least 5 minutes and reset the alarm.ID 41 Level - 2A VLT compressor has started 11 times within one hour.Set compressor minimum off time to at least 6 minutes and reset the alarm.ID 41 Level - 2Pressure pipe temperature pereature pipe Level - 4Pressure pipe activated if T11, T12, T13 (ID 51-53) happen 5 times during 24 hours.The unit stops. Reset alarm. If the alarm repeatedly occurs, call service.VLT x has not responded to the 5 latest requests ID 110 Level - 2A communication error has occurred between the control unit and the VLTs.Reset alarm. If the alarm repeatedly occurs, call service.ID 110 Level - 2If a Netavent unit has been selected as the last 5 requestsA communication error has occurred peretore.Reset alarm. If the alarm repeatedly occurs, call service.ID 111 Level - 1If a Netavent unit has been selected as the last 5 requestsA communication error has occurred peretore.Reset alarm. If the alarm repeatedly occurs, call service.ID 110 Level - 2Defrost signal within the first 1	ID 35 Level - 2		keep the heating coil free of ice.
ID 29-39 Level-4 after-heating coil. Flow alarm Insufficient air flow across electric after-heating coil for coil to cut in. This may be caused by blocked filters, loose V. Reset alarm. If the alarm repeatedly occurs for no apparent reason, call service. ID 36 Level-2 opened. Set compressor minimum off time to at least 5 minutes and reset the alarm. VLT compressor starts A compressor has started 11 times within one hour. Set compressor minimum off time to at least 5 minutes and reset the alarm. ID 40 Level-2 Pressure pipe Pressure pipe temperature or pressor 1/2/3/4 has exceeded 125°C. The controls stop the temperature has dropped below 50°C. Pressure pipe temperature responded to the 5 latest requests 1D 51 - 52 - 53 latest requests Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. VLT x has not responded to the 5 latest requests A communication error has occurred between the control unit and the VLTs. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. VLT x has not responded to the 5 latest requests A communication error has occurred between the control unit and the VLTs. Reset alarm. If the alarm repeatedly occurs, call service. ID 1110 Level - 2 The unit stop	Fatal frost alarm	Temperature of hydraulic after-heating	The unit is stopped. Check the
ID 29-39 Level - 4 attempts. Flow alarm Insufficient air flow across electric after- heating coil for coil to cut in. This may be caused by blocked filters, loose V- belts or dampers which have not opened. Reset alarm. If the alarm repeatedly occurs for no apparent reason, call service. ID 36 Level - 2 opened. Set compressor minimum off time to at least 5 minutes and reset the alarm. Compressor starts A compressor has started 11 times within one hour. Set compressor minimum off time to at least 6 minutes and reset the alarm. ID 41 Level - 2 Pressure pipe tants Pressure pipe temperature on compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) happen 5 times during 24 hours. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. VLT x has not the lasts requests ID 111 Level - 4 A communication error has occurred between the control unit and the VLTs. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 A communication error has occurred between the control unit and the Netavents. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 A communication error has occurred cannot be established, the control unit switches instead to T3 (exhaust Reset alarm. ID 111 Level - 1 Ta Netavent unit has been selected canor be established, the control unit switch		coil remains too low despite prevention	after-heating coil.
Flow alarm Insumicent air now across electric arter- heating coil for coil to cui n. This may be caused by blocked filters, loose V- belts or dampers which have not opened. Image: construct and the set of the set o	ID 29-39 Level - 4	attempts.	Depart players if the players
Inearing Control Contr	Flow alarm	Insufficient air flow across electric after-	Reset alarm. If the alarm
Decision of y books minus, have not opened.ID 36Level - 2Compressor starts VLT compressor startsA compressor has started 12 times within one hour.Set compressor minimum off time to at least 5 minutes and reset the alarm.VLT compressor Pressure pipe temperature 1D 50 - 51 - 52 - 53 Level - 2A VLT compressor 1/2/3/4 has exceeded to restart before the temperature temperature temperatureThe controls stop the compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) happen 5 times during 24 hours.The unit stops. Reset alarm. If the alarm repeatedly occurs, call service.VLT x has not tha source of the temperature temperatureA communication error has occurred between the control unit and the VLTs.The unit stops. Reset alarm. If the alarm repeatedly occurs, call service.VLT x has not tha source the tasts requests ID 111 Level - 2A communication error has occurred between the control unit and the VLTs.Reset alarm. If the alarm repeatedly occurs, call service.ID 110 Level - 2If a Netavent unit has been selected as the controlling sensorReset alarm.ID 110 Level - 2If a Netavent unit has been selected as the controlling sensor, but communication with the unit concerned cannot be established, the control unit switches instead to T3 (exhaust temperature).Compressor-Stop for appliance with heater = heater ON System - Stop for appliance with heater.Defrost alarmFilter time out - 90daysClean filter and reset AlarmID 31-38 Level - 2Alarm time / dateWrong time or date		be caused by blocked filters loose V-	apparent reason call service
ID 36 Level - 2 opened. Compressor starts A compressor has started 12 times within one hour. Set compressor minimum off time to at least 5 minutes and reset the alarm. ID 40 Level - 2 VLT compressor starts A VLT compressor has started 11 times within one hour. Set compressor minimum off time to at least 5 minutes and reset the alarm. ID 41 Level - 2 Pressure pipe Pressure pipe temperature on compressor 1/2/3/4 has exceeded 125°C. The controls stop the tompressor and do not allow it to restart before the temperature has dropped below 50°C. Pressure pipe Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) to 54 Level - 4 NLT x has not responded to the 5 between the control unit and the VLTs. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. NEtavert unit x has A communication error has occurred the last 5 requests between the control unit and the VLTs. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 Evenentia control unit and the VLTs. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 Evenentia controling sensor but communication with the unit concerned cannot be established, the control unit switches instea		belts or dampers which have not	
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ID 40Level - 2within one hour.time to at least 5 minutes and reset the alarm.VLT compressorA VLT compressor has started 11 times within one hour.Set compressor minimum off time to at least 6 minutes and reset the alarm.ID 41Level - 2The controls stop the compressor 1/2/3/4 has exceeded to restart before the to mpressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) happen 5 times during 24 hours.The unit stops. Reset alarm. If the alarm repeatedly occurs, call service.VLT x has not responded to the 5 hats 5 requestsA communication error has occurred between the control unit and the VLTs.The unit stops. Reset alarm. If the alarm repeatedly occurs, call service.ID 110Level - 2A communication error has occurred between the control unit and the VLTs.Reset alarm. If the alarm repeatedly occurs, call service.ID 110Level - 2If a Netavent unit has been selected as the controlling sensor, within 2 hours in spite of defrosting attempts.Reset alarm.ID 112Level - 1Defrost signal within the first 15 minutes attempts.Compressor-Stop for appliance with no heater.ID 25Level - 2Within 2 hours in spite of defrosting attempts.Compressor-Stop for appliance with no heater.ID 31-38Evel - 2AurFilter time out – 90daysClean filter and reset Alarm	Compressor starts	A compressor has started 12 times	Set compressor minimum off
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starts within one hour. time to at least 6 minutes and reset the alarm. ID 41 Level - 2 Pressure pipe Pressure pipe temperature on trul/11/12/13 The controls stop the compressor and do not allow it to restart before the temperature has dropped below 50°C. ID 50 - 51 - 52 - 53 Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) happen 5 times during 24 hours. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. VLT x has not responded to the 5 between the control unit and the VLTs. latest requests A communication error has occurred between the control unit and the Netavents. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 If a Netavent unit has been selected as the controling sensor, but communication with the unit concerned cannot be established, the control unit switches instead to T3 (exhaust the more rule). Reset alarm. Defrost alarm Defrost signal within the first 15 minutes after power up, or defrosting not finished with 2 hours in spite of defrosting not finished atterny ts. Compressor-Stop for appliance with no heater. Filter Alarm Filter time out – 90days Clean filter and reset Alarm ID 31–38 Level - 2 More the ord attern time / date Wrong time or date	VLT compressor	A VLT compressor has started 11 times	Set compressor minimum off
ID 41 Level - 2 The controls stop the compressor and do not allow it to restart before the temperature 125°C. Pressure pipe temperature 10 50 - 51 - 52 - 53 125°C. The controls stop the compressor and do not allow it to restart before the temperature has dropped below 50°C. Pressure pipe temperature 10 54 Level - 2 Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) happen 5 times during 24 hours. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. VLT x has not temperature 10 5111 Level - 4 A communication error has occurred between the control unit and the VLTs. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. VLT x has not responded to the last 5 requests A communication error has occurred between the control unit and the Netavent unit x has acontrol unit and the Netavents. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 To munication with the unit concerned cannot be established, the control unit switches instead to T3 (exhaust temperature). Reset alarm. Defrost alarm Defrost signal within the first 15 minutes after power up, or defrosting not finished with no heater. Compressor-Stop for appliance with no heater. Filter Alarm Filter time out – 90days Clean filter and reset Alarm ID 31–38 Level - 2 Alarm time / date Wrong time or date <td>starts</td> <td>within one hour.</td> <td>time to at least 6 minutes and</td>	starts	within one hour.	time to at least 6 minutes and
ID 141 Level + 2 Pressure pipe Pressure pipe temperature 125°C. ID 50 - 51 - 52 - 53 Level - 2 Level - 2 Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. VLT x has not A communication error has occurred the last 5 requests A communication error has occurred between the control unit and the VLTs. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 4 A communication error has occurred between the control unit and the Netavents. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 Ta set as the controlling sensor, but communication with the unit concerned cannot be established, the control unit switches instead to T3 (exhaust temperature). Reset alarm. Defrost alarm Defrost signal within the first 15 minutes after power up, or defrosting not finished with 0 alarm 50 (exhaust temperature). Compressor-Stop for appliance with heater = heater ON System - Stop for appliance with no heater. Filter Alarm Filter time out - 90days Clean filter and reset Alarm ID 31-38 Level - 2 Alarm time / date Wrong time or date			reset the alarm.
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T10/11/12/13 ID 50 - 51 - 52 - 53 Level - 2125°C.to restart before the temperature has dropped below 50°C.Pressure pipe temperature ID 54 Level - 4Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) happen 5 times during 24 hours.The unit stops. Reset alarm. If the alarm repeatedly occurs, call service.VLT x has not responded to the 5 latest requests ID 111 Level - 4A communication error has occurred between the control unit and the VLTs.The unit stops. Reset alarm. If the alarm repeatedly occurs, call service.ID 110 Level - 2A communication error has occurred between the control unit and the Netavents.Reset alarm. If the alarm repeatedly occurs, call service.ID 110 Level - 2If a Netavent unit has been selected as the controlling sensor, but communication with the unit concerned cannot be established, the control unit switches instead to T3 (exhaust temperature).Reset alarm.Defrost alarm ID 25 Level - 3 ID 26 Level - 4Filter time out – 90daysCompressor–Stop for appliance within 2 hours in spite of defrosting attempts.Compressor–Stop for appliance with no heater.Filter AlarmFilter time out – 90daysClean filter and reset AlarmID 31–38 Level - 2Mrong time or dateSet date and timeID 120-121Level - 4Wrong time or dateSet date and time	temperature	compressor $1/2/3/4$ has exceeded	compressor and do not allow it
ID 50 - 51 - 52 - 53 Level - 2 temperature has dropped below 50°C. Pressure pipe temperature ID 54 Level - 4 Compressor is overheated. Alarm is activated if T11, T12, T13 (ID 51-53) happen 5 times during 24 hours. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. VLT x has not responded to the 5 latest requests ID 111 Level - 4 A communication error has occurred between the control unit and the VLTs. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 A communication error has occurred between the control unit and the vhetavents. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 If a Netavent unit has been selected as the controlling sensor Reset alarm. ID 112 Level - 1 If a Netavent unit has been selected as ther power up, or defrosting not finished within 2 hours in spite of defrosting ID 25 Level - 3 Compressor–Stop for appliance within 2 hours in spite of defrosting attempts. Filter Alarm Filter time out – 90days Clean filter and reset Alarm ID 31–38 Level - 2 Alarm time / date Wrong time or date	T10/11/12/13	125°C.	to restart before the
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ID 34 Level - 4 Inappent's times during 24 hours. Can service. VLT x has not responded to the 5 latest requests ID 111 A communication error has occurred between the control unit and the VLTs. The unit stops. Reset alarm. If the alarm repeatedly occurs, call service. ID 111 Level - 4 Netavent unit x has not responded to the last 5 requests A communication error has occurred between the control unit and the Netavents. Reset alarm. If the alarm repeatedly occurs, call service. ID 110 Level - 2 If a Netavent unit has been selected as the controlling sensor, but communication with the unit concerned cannot be established, the control unit switches instead to T3 (exhaust Reset alarm. ID 112 Level - 1 temperature). Compressor-Stop for appliance within 2 hours in spite of defrosting 1D 26 Compressor-Stop for appliance with no heater. Filter Alarm Filter time out – 90days Clean filter and reset Alarm ID 31–38 Level - 2 ID 120-121Level - 4		activated if 111, 112, 113 (ID 51-53)	the alarm repeatedly occurs,
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	ID120-1211 evel - 4		

User's Guide for CTS6000 BACnet

24 Volt D	C supply	24 Vo transmi	lt DC tters is n	supply nissing.	for	pressure	Check 24 reset Ala	4 Volt rm	DC s	upply	and
ID 123	Level - 4			-							
LON		No sign	al from L	ON = ID	113		Check LC	DN con	nectio	n.	
communio	cation						Change	LON	card	to	right
ID 113	Level - 4	Wrong	_ON ver	sion = ID1	114		version.				
ID 114	Level - 2	_									

Username and password for CTS6000

Level:	Username:	Password:		
User	User	user*		
* the necessary and each he changed within the existence				

* the password can be changed within the system.

Log-in data for Technician level is given in the test report or diagram.

Description of sensors and components

Sensor/component	Description
Temperature sensor	
T1	Inlet sensor after heat pipe
T2	Inlet sensor after heat pump
Т3	Exhaust sensor
T4	Discharge sensor
T5	Upper evaporator/condenser sensor
T6	Lower evaporator/condenser sensor
Τ7	Inlet sensor after inlet fan and after-heating coil (if any)
Τ8	Fresh air sensor
Т9	Sensor in hydronic after-heating coil
T10	Pressure pipe sensor compressor 1
T11	Pressure pipe sensor compressor 2
T12	Pressure pipe sensor compressor 3
T13	Pressure pipe sensor compressor 4-5-6 (extern cooling unit)
T14	Temperature return water aux. heater
T15	Unused
T16	Unused
Tpanel (T17)	Temperature sensor in control panel
Sensors	
Air flow in	Air flow sensor in inlet duct
Air flow out	Sensor for measuring air flow in exhaust duct
Humidity sensor	Air humidity sensor in ventilated area
Pressure transmitter inlet	Air pressure sensor in inlet duct
Pressure transmitter exhaust	Air pressure sensor in exhaust duct
Pressure transmitter intake filter	Sensor for measuring pressure drop across fresh air intake filter
Pressure transmitter exhaust filter	Sensor for measuring pressure drop across exhaust filter
Pressure transmitter high	Sensor for measuring pressure-side pressure in cooling circuit of
pressure	main module
Pressure transmitter low pressure	Sensor for measuring suction-side pressure in cooling circuit of main module
Pressure transmitter high	Sensor for measuring pressure-side pressure in cooling circuit of
pressure cooling module	cooling module
Pressure transmitter low pressure	Sensor for measuring suction-side pressure in cooling circuit of
cooling module	cooling module
Active components	
Compressors 1-3	Compressors in main unit
Compressors 4-6	Compressors in cooling module
Fan in	Inlet fan
Fan out	Exhaust fan
Bypass valve cooling	Hot gas bypass valve, cooling
Bypass valve heating	Hot gas bypass valve, heating
Modulating hot gas bypass valve	Modulating hot gas bypass valve, in both cooling and heating
Four-way valve	Valve for switching heat pump status between heating and cooling
Electric heating coil	7-step electric after-heating coil
Water valve	Modulating water valve in hydronic after-heating coil
Water pump	Circulation pump for hydronic after-heating coil
Damper in	Shut-off damper in inlet duct
Damper out	Shut-off damper in exhaust duct
Damper recirculation	Damper for exhaust air recirculation
Damper supplementary	Supplementary damper in exhaust duct
Passive components	
Heat pipe	Passive heat recovery