AEROCONNECT

N 08.132 B

11 - 2008

Installation
Fonctionnement
Mise en service
Maintenance

Installation
Operation
Commissioning
Maintenance

Montage-
Betriebs-und
Wartungs-
Anweisung

CIAT

Contents

Sections — Page

General

Board functions

Integrated in an electrical panel, this board performs the following functions:

- temperature or pressure control,
- operation parameter monitoring,
- communication with CIAT chillers,
- diagnostics and fault storage,
- communication with the remote control console, ancillary boards, and customer BMS (bus).

Limits of use

Ambient air:
During operation: min./max. temperatures = -25°C/40°C
Stored: min./max. temperatures = -40°C/80°C

Single-phase fluid: min./max. adjustment temperature = 5/90°C (up to 150°C optional)

Refrigerant: min./max. set pressure: 5/45 bar

Electrical

Board supply voltage: 230 V $^{+6\%}_{-10\%}$

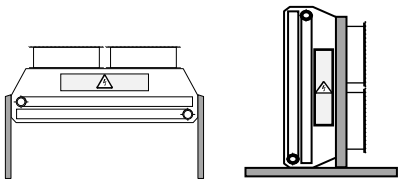
Compatible equipment

The AeroConnect board is used to control the dry coolers and air-cooled condensers

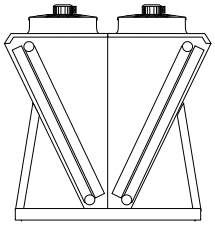
Possible configurations and identification conventions:

Flatbed or V-type coils

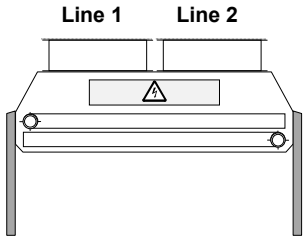
Flatbed

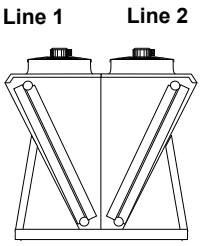


V-type

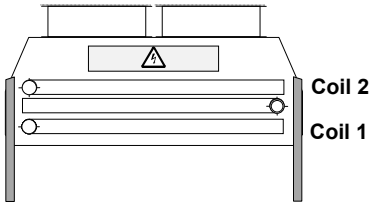


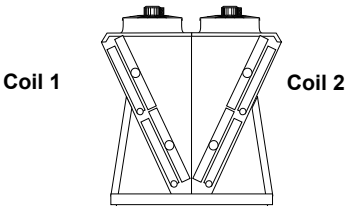
Unit with one or two fan lines



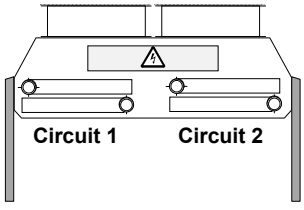


Unit with one or two coils



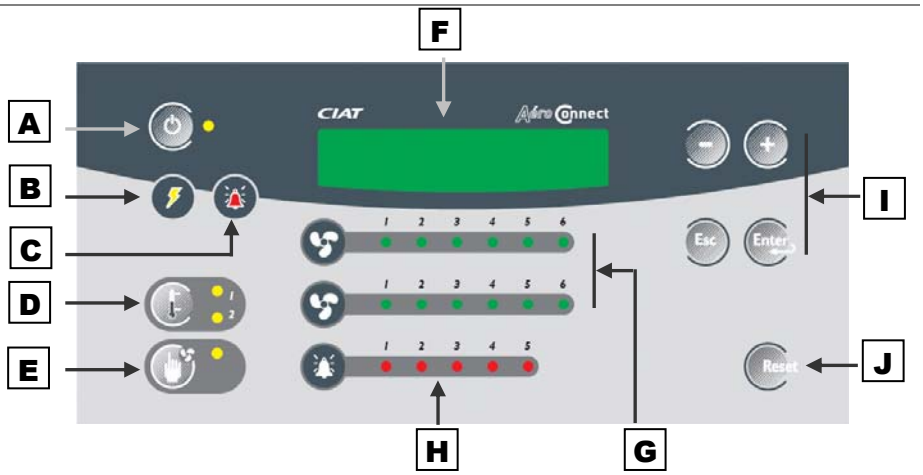


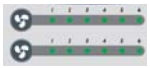
Unit with one or two circuits



Control console

Description of control console (local and remote)



Letter	Illustration	Function
A		Power **button** **LED** / **Meaning** **Off** – Machine off **On** – Machine on **Flashing** – Machine shut off by automatic control
B		LED on = system **energised**.
C		LED flashing = **fault**
D		Press this button to select setpoint 1 or 2. The corresponding LED lights up.
E		Press this button to activate or deactivate the fan manual override. Flashing LED = manual override on.
F		Display screen.
G		Status of the fan stages: • Top row = Fan line 1 • Bottom row = Fan line 2 **LED** / **Meaning** **Off** – Stage off **On** – Stage on **Flashing** – Stage fault
H		**Measurement faults** **LED No.** / **Meaning** **1** – Circuit 1 coil 1 **2** – Circuit 2 coil 1 **3** – Circuit 1 coil 2 **4** – Circuit 2 coil 2 **5** – Outdoor temperature
I		Menu navigation buttons: see the Navigation section.
J		Reset button for certain faults. Does not work with the remote control console.

Control console (continued)

Display

Two-line LCD – Displays system readings and controls.

Menu tree structure

There are **seven main menus** for controlling the system.
Each menu contains different parameters.

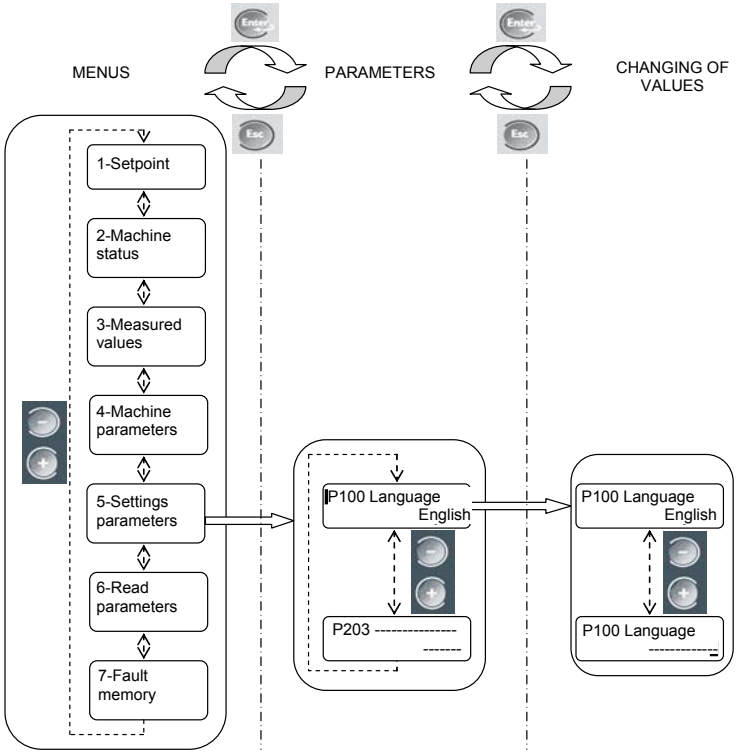
Menu list

MENUS	Description
1-Setpoints	Change setpoints - Menu not displayed if the unit is run with a CIAT chiller.
2-Machine status	Default menu. Contains read-only information on the operation of the machine.
3-Measured values	Displays read-only temperature and pressure values.
4-Machine parameters	Machine configuration parameters.
5-Settings parameters	Parameters set for the control and various options.
6-Reading parameters	Displays the status of the inputs, outputs, counters, etc. (read-only).
7-Fault memory	Shows the nine most recent faults (read-only).

Structure of the menus

All information in the menus is displayed in a tree structure.

This tree structure is split into three levels, as shown by the diagram below.



Navigation

Navigating through the menus

Four buttons are available for navigating through the menus:

Each button is described in the table below:

➔ **Press these buttons firmly!**

Button	Level Menus	Level Parameters	Level Values
		Back to Menus level	Back to Parameters level
	Select menu	Select parameter	Confirm value and go back to parameters
	Scroll through the menus	Scroll through the parameters	Lower the parameter value or scroll through the values
			Raise the parameter value or scroll through the values
		Pressing and holding the '+' or '-' buttons will cause the display to scroll faster.	

When the machine is turned on, the "machine off – on/off" menu **[2-Machine status]** screen appears. Press  to go back to the menu list.

If the control console is not used for one hour, the **[2-Machine status]** menu reappears. Press  to go back to the menu list.

Arrows on the right of the screen indicate that additional information is available. To see this information, press the '+' or '-' buttons.

Example

COIL PRESSURE ↑
20.7 B↓

The active line in a menu is shown by a flashing box to the left of the menu number.

Example

▮100 LANGUAGE
ENGLISH

Control choices

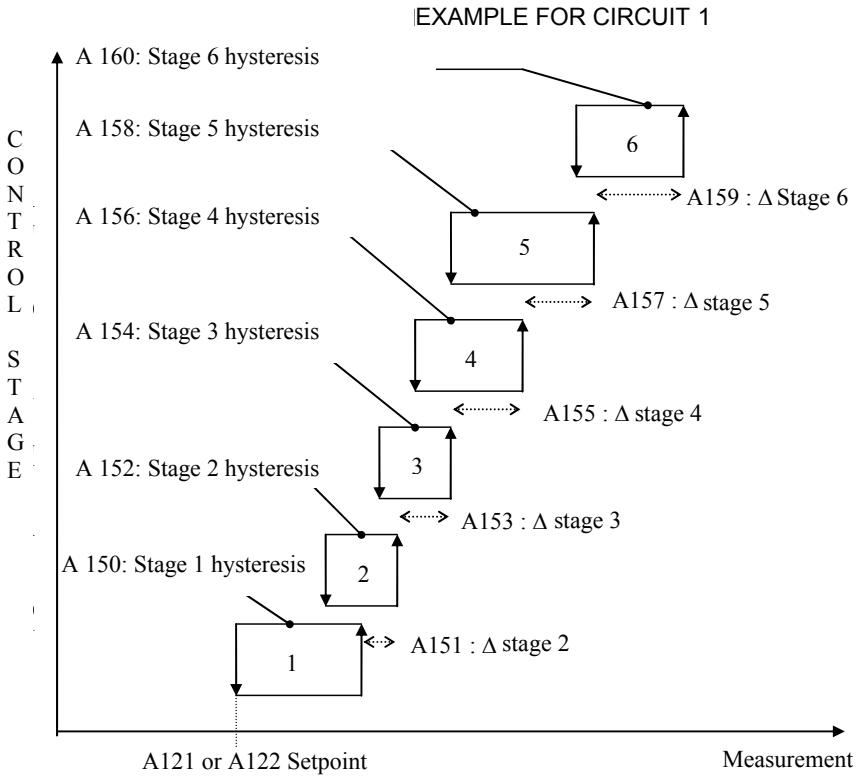
Three types of control are possible. Refer to your order acknowledgement to see which type you have selected:

- **On/Off:** Cascade control by activation of fan stages.
- **Speed control**: Fan speed control.
- **Mixed**: Speed control on stage 1, cascade control for the following stages.

On/Off control

Used for **cascade control** of fan stages:

The diagram below illustrates this type of control:

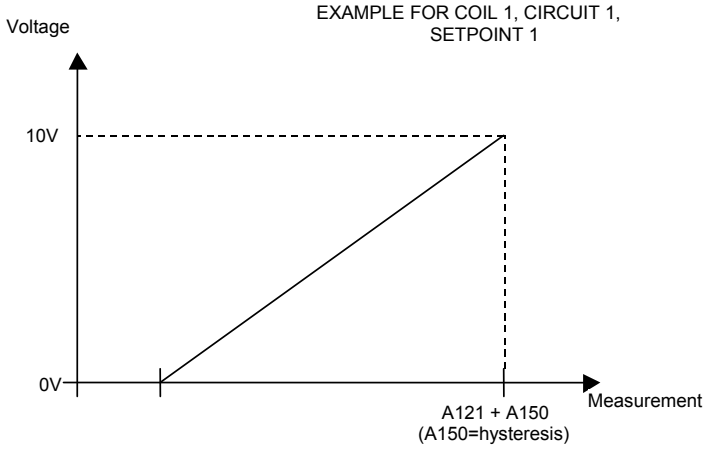


Speed control

Used to adjust the speed of all the fans.

With a speed drive (option)

The diagram below illustrates this type of control:



Board functions: descriptions (continued)

Control choices (continued)

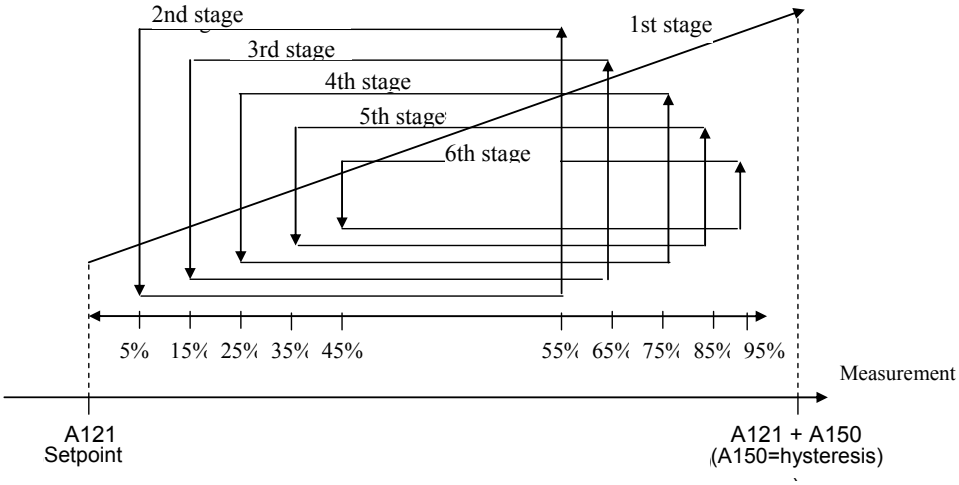
Mixed control

With a speed drive (option)

Used to **adjust the speed on stage 1**. Cascade control is used for the other fan stages.

The diagram below illustrates this type of control:

EXAMPLE FOR CIRCUIT 1



Automatic machine operation control

Used to remotely authorise or prohibit the operation of the machine.
The machine is on when the contact is closed.

Manual override

Used to turn on all the fans. The machine is in override mode when the contact is closed.
Manual override can be activated and deactivated either directly on the unit or remotely.

Two setpoints

Used, for example, for summer/winter or day/night operation. Each circuit can have up to two control setpoints. These setpoints can be switched via the dry contact (On/Off), the console or over a BMS.

Stage runtime balancing

The running time of each fan stage is balanced by a time counter.

Spray (units with spray ducts)

Used to increase the efficiency of the AeroConnect by spraying very fine droplets of water into the ambient air to cool it through evaporation.

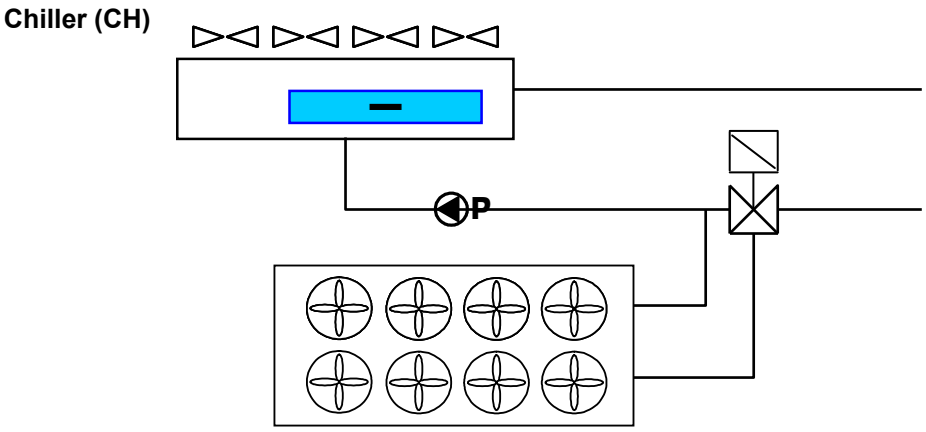
Two options:

- Optimised water consumption: the water spray does not start until all the stages are on and the setpoint is exceeded.
- Optimised electricity consumption: the water spray does not come on until the outdoor temperature reaches a preset value.

Free cooling

During free cooling, the dry cooler is run with a CIAT chiller. Both units are controlled by the board.

The three-way valve can be controlled by the board provided the maximum current is 3 A and the maximum voltage is 230 V. Refer to the chiller pump curve to size the valve.



Link with CIAT chiller

The following information is exchanged between the dry cooler (DC) or the condenser (CO) and the chiller (CH):

CH > (DC / CO)	(DC / CO) > CH
• Chiller on/off	• DC or CO on/off
• Setpoint (CO)	• Free cooling
• Pressure value (CO)	• Fan stage fault
	• Sensor fault

BMS link

With the exception of the language, control type (local, remote), communication mode and bus number, all the parameters can be accessed in read and write modes.

Options

Relay boards

The boards must be installed in a cabinet.

Main board

It has dry contacts for displaying three parameters: unit operation, sensor faults and fan stage faults.

Additional board

For units with a motherboard and a daughterboard. It has dry contacts for displaying two parameters: sensor faults and fan stage faults.

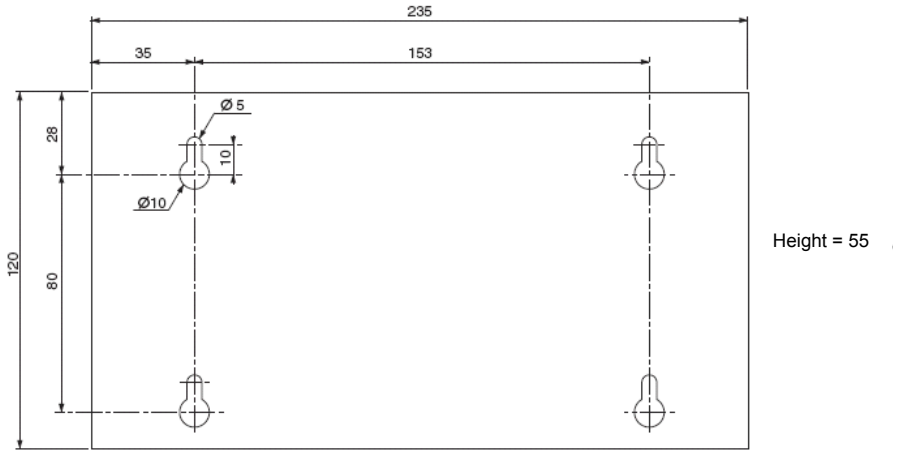
Remote control console

Used to view and control the operation of the unit from a distance.

Maximum distance of 1000 m.

Must be installed indoors.

Console mounting dimensions (mm)



Electrical connections

General

Communication bus connection

Single-pair shielded cable required. Capacitance between wire and shield: 120 pF/m – Resistance of 56 Ω/km.

Examples: Filotex FMA 2P or Filotex IBM 7 362 211.

The shield must be connected at each end to the 0 V line (terminal 3 on J13 or J12) on the units and the earth to the PLC end. The shielding braid must be as short as possible (2 cm max.).

The cables must be routed at a distance of at least 30 cm from the power cables. However, if a power cable intersects with a computer cable, they must do so at a right angle.

On/Off input connections (automatic operation control, manual override, changeover of two setpoints)

For distances of less than 30 metres, use a shielded cable and keep it at least 30 cm away cm from all lines that could generate interference.
For distances of over 30 metres, install a relay for each input near the board.

Analogue output connections

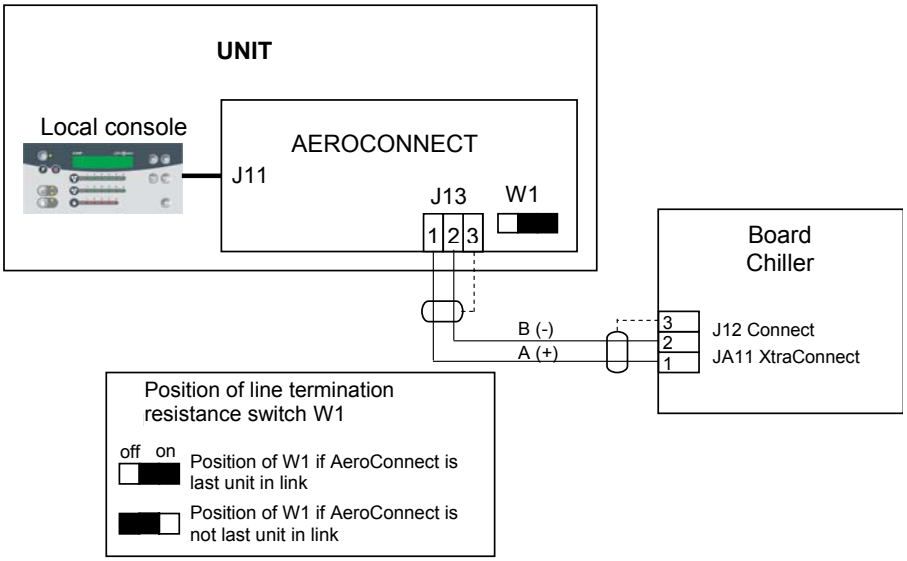
Signal output of 0/10 V. Minimum VFD input impedance of 1 kΩ. Shielded cable connections. Shield connected at both ends to earth. Minimum cross-section of 0.32 mm^2 (1.5 mm^2 max.).

On/Off output connections (General operation signal, general fault signal)

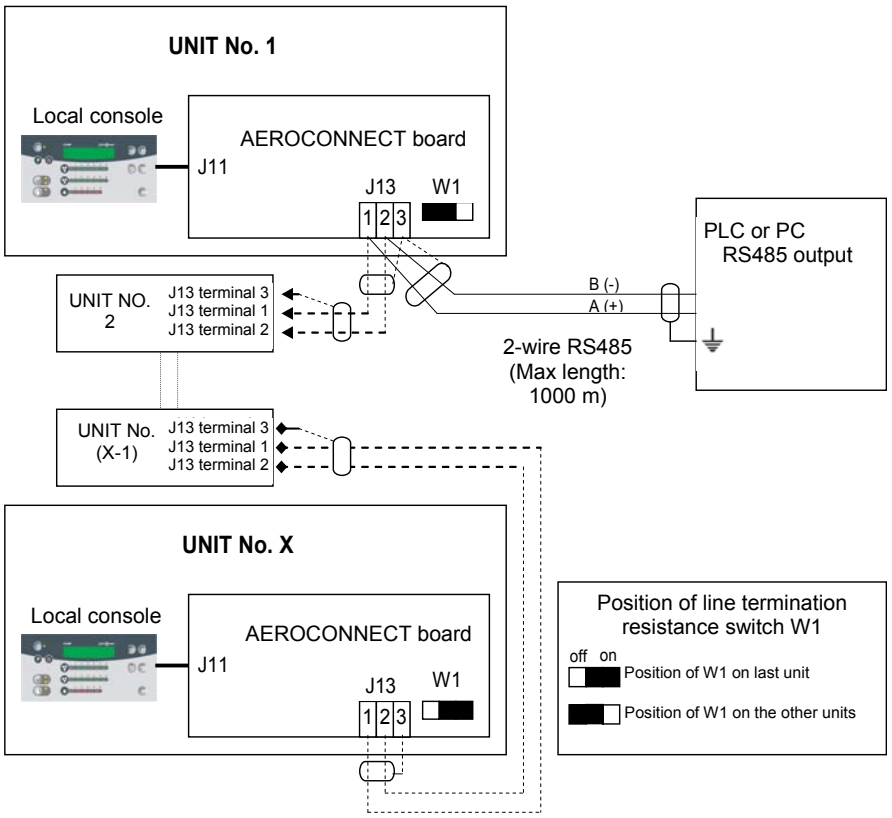
Potential-free dry contacts. Maximum current of 10 A (AC1 load), minimum of 5 mA. Voltage of 12 to 230 V AC. Maximum connection cross-section of 2.5 mm^2.

Connection diagram

Link with CIAT chiller



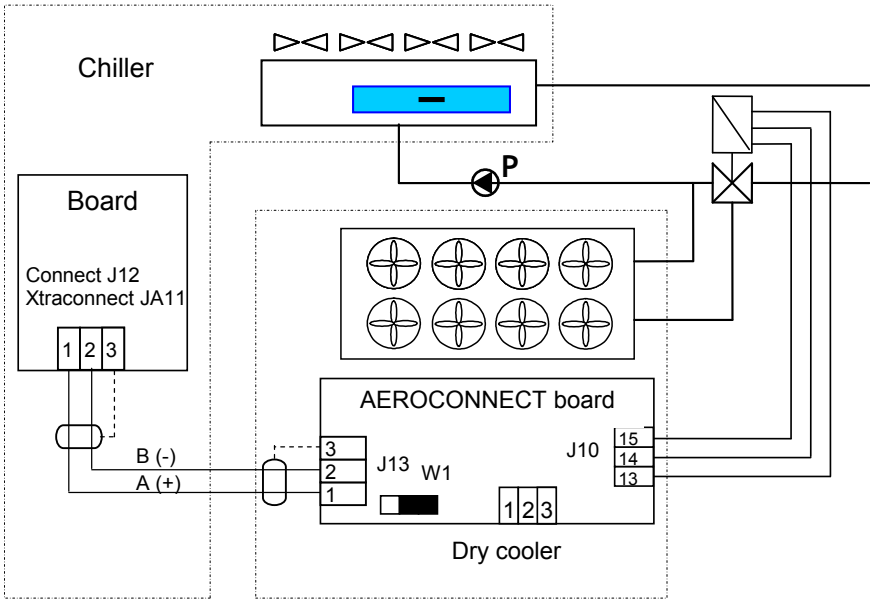
BMS link



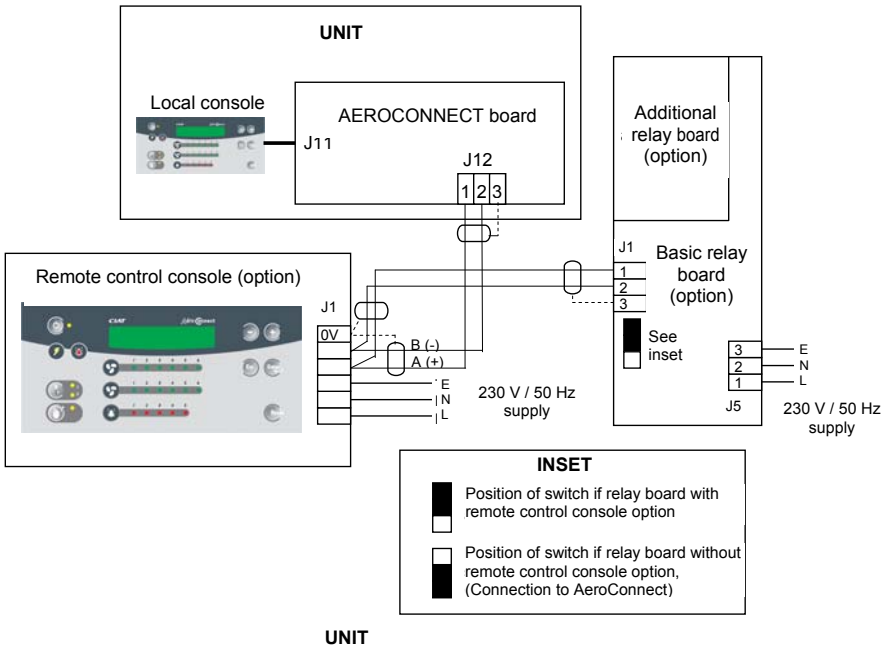
Electrical connections (continued)

Connection diagram

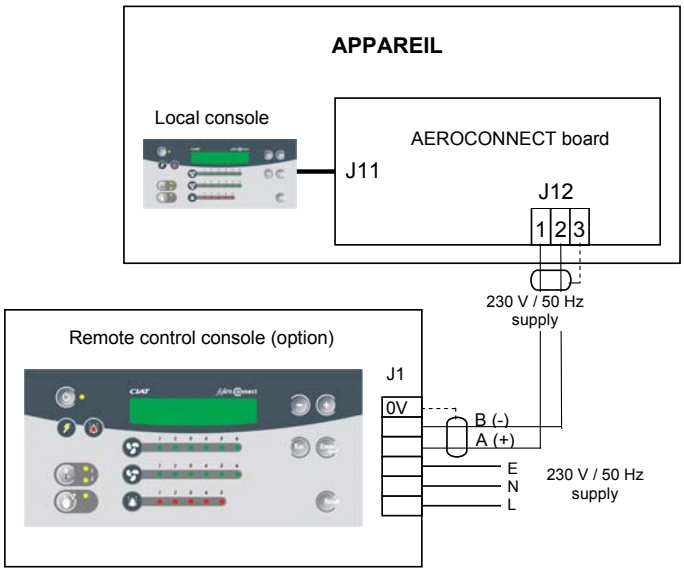
Free Cooling



Relay boards



Remote control console

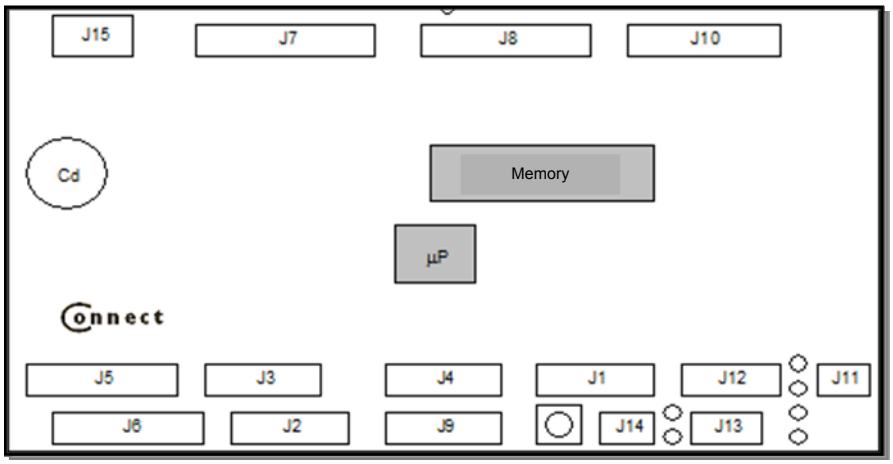


Electrical connections (continued)

Board connections

Motherboard

The structure of the motherboard is illustrated in the diagram below:



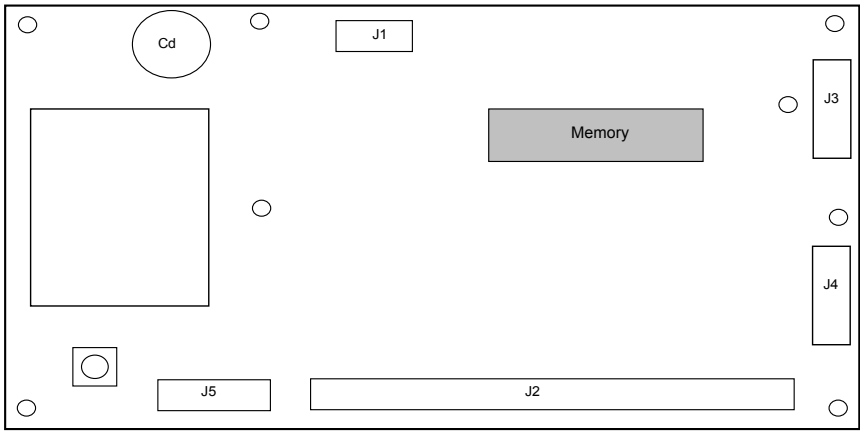
CONNECTOR / TERMINALS	DESCRIPTION	DIRECTION OF ACTION
On/Off inputs		
J6 terms. 1-2	Automatic operation control	The machine stops when the contact opens
J6 terms. 2-3	Fan manual override	The fans turn on when the contact closes
J6 terms. 4-5	Setpoint 1 / Setpoint 2 selection	Setpoint 2 is enabled when the contact is closed
On/Off outputs		
J7 terms. 1-2	Operation signal	The contact closes when the unit is on
J7 terms. 3-4	Fault signal	The contact opens when a fault appears
J8 terms. 1-2	Chiller in free cooling mode	The authorisation is sent to the chiller when the contact closes
J10 terms. 4-5	Free cooling three-way valve control	See wiring diagram
Analogue inputs		
J2 terms. 1-2	Temperature sensor, coil 1, circuit 1	
J2 terms. 2-3	Temperature sensor, coil 1, circuit 2	
J3 terms. 1-2	Outdoor temperature sensor.	
J3 terms. 2-3	Temperature sensor, coil 2, circuit 1	
J3 terms. 4-5	Temperature sensor, coil 2, circuit 2	
J12 terms. 1-2-3	Bus power supply connected by shielded cable to J1 on relay board or J1 on remote control console (terminal 1 to terminal 1, terminal 2 to terminal 2 and the shield to terminals 3).	
J13 terms. 1-2-3	Bus power supply connected by shielded cable to J12 on the CONNECT board, or JA11 on the XTRACONNECT board (terminal 1 to terminal 1, terminal 2 to terminal 2 and the shield to terminals 3) or the customer BMS.	

Electrical connections (continued)

Board connections

To be installed by the customer in his main electrical cabinet.

Basic relay board



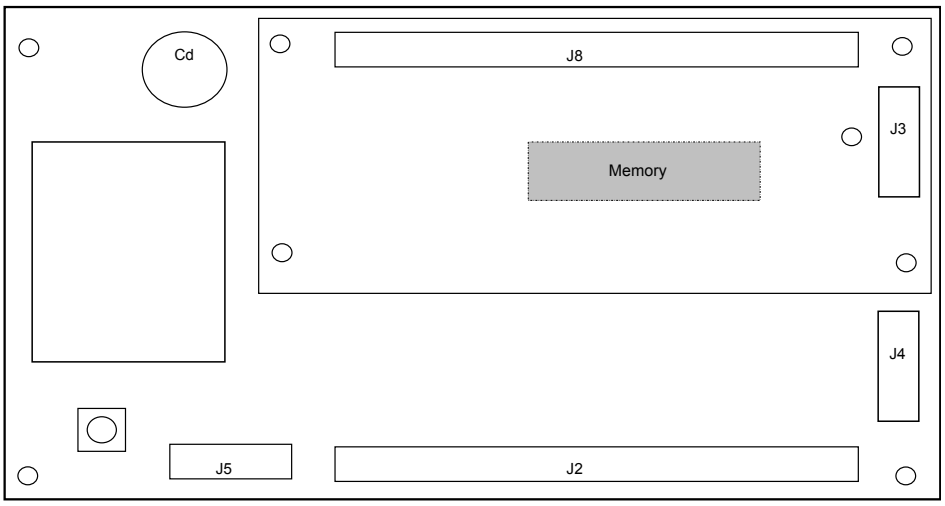
CONNECTOR / TERMINALS	DESCRIPTION	DIRECTION OF ACTION
J1 terms. 1-2-3	Bus power supply connected by shielded cable to J12 on AeroConnect board (terminal 1 to terminal 1, terminal 2 to terminal 2 and the shield to terminals 3).	
J5 terms. 1-2-3	Single-phase 230 V power supply. (L - N T)	Term. 1 Neutral Term. 2 Live Term. 3 Earth
J2 terms. 1-2	Unit running	The contacts are closed when the unit is running without any faults.
J2 terms. 3-4	Sensor fault, coil 1, circuit 1	
J2 terms. 5-6	Sensor fault, coil 2, circuit 1	
J2 terms. 7-8	Fan fault, stage 1 / Fan fault, stage 1, line 1	
J2 terms. 9-10	Fan fault, stage 2 / Fan fault, stage 2, line 1	
J2 terms. 11-12	Fan fault, stage 3 / fan fault, stage 3, line 1	
J2 terms. 13-14	Fan fault, stage 4 / fan fault, stage 4, line 1	
J2 terms. 15-16	Fan fault, stage 5 / fan fault, stage 5, line 1	
J2 terms. 17-18	Fan fault, stage 6 / fan fault, stage 6, line 1	

Board connections

Additional relay board

Its dry contacts allow the following parameters to be viewed from a distance:

To be installed on the main board by the customer.



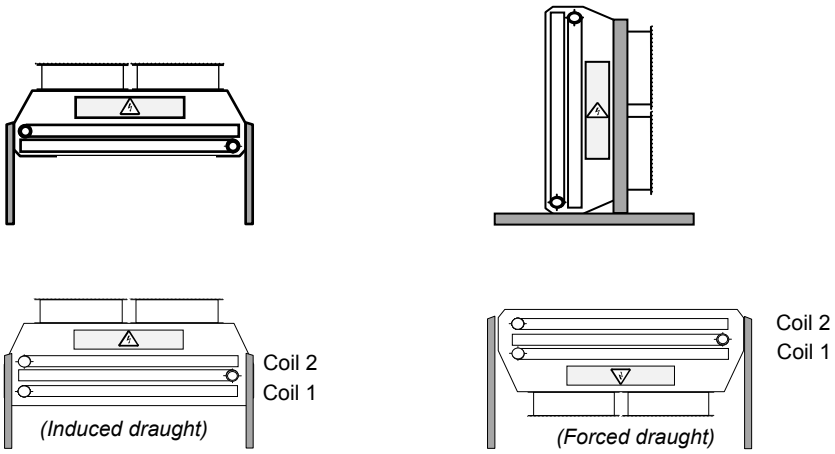
CONNECTOR / TERMINALS	DESCRIPTION	DIRECTION OF ACTION
J8 terms. 19-20	Sensor fault, coil 1, circuit 2	The contacts are closed when the unit is running without any faults.
J8 terms. 21-22	Sensor fault, coil 2, circuit 2	
J8 terms. 23-24	Fan fault, stage 1, line 2	
J8 terms. 25-26	Fan fault, stage 2, line 2	
J8 terms. 27-28	Fan fault, stage 3, line 2	
J8 terms. 29-30	Fan fault, stage 4, line 2	
J8 terms. 31-32	Fan fault, stage 5, line 2	
J8 terms. 33-34	Fan fault, stage 6, line 2	

DRY COOLER configuration

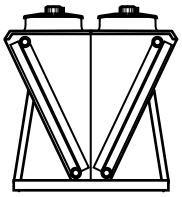
Configurations

Application: dry cooler with one or two coils

Flatbed unit



V-type unit



Commissioning and configuration

❶ **Turning on the unit:**
The screen displays "machine off - on/off" in the **[2-Machine status]** menu
Press ESC to go back to the menu list.

❷ **Main parameters to be set:** select the **[5-Settings parameters]** menu.

For information on navigating, go to the Control console / Navigation section.

Parameter No.	Description	Default values	Display conditions
Menu 5: Settings parameters			
A100	**Language**	FR	
A103	**Control mode: local or remote**	local	
A104	**Communication mode (baud)**	9600	BMS
A105	**Bus number**	1	BMS
A110	**Stage runtime balancing**	yes	Control = On/Off (stages) or mixed
A111	**Free cooling**	no	V-type or 1-coil unit/flatbed unit without spray
A112	**Selection air temperature** The parameter is disabled if set to a value of less than 5. Press to re-enable it.	10	Free cooling
A113	**Optimisation of water or electricity consumption**	Water optimisation	Spray
A116	**Link with CIAT chiller**	yes	
A120	**No. of setpoints per coil**	1	

	Parameter No.	Default values	Default values	Display conditions
Not available in free cooling mode with CIAT chillers	A121	**Setpoint 1**	60°C	V-type or 1-coil unit/flatbed unit
		Setpoint 1, coil 1		2 coils + flatbed unit
	A122	**Setpoint 2**	50°C	2 setpoints + V-type or 1-coil unit/flatbed unit
		Setpoint 2, coil 1		2 setpoints + 2 coils/flatbed unit
	A125	**Setpoint 1, coil 2**	60°C	2 coils/flatbed unit
	A126	**Setpoint 2, coil 2**	50°C	2 setpoints + 2 coils/flatbed unit
	A150	**Stage 1 hysteresis: 1 to 20°C**	5°C	V-type or 1-coil unit/flatbed unit
		Stage 1 hysteresis, coil 1: 1 to 20°C		2 coils/flatbed unit
	A151	**Difference between stages 1 and 2: 1 to 5°C**	2°C	Control = On/Off + No. of stages ≥ 2 + V-type or 1-coil unit/flatbed unit
		Difference between stages 1 and 2 of coil 1: 1 to 5°C		Control = On/Off + No. of stages ≥ 2 +2 coils/flatbed unit
	A152 to A160	**Hysteresis of stages 2, 3, 4, 5 or 6: 1 to 10°C** **Delta of stages 2, 3, 4, 5 or 6: 1 to 5°C**	5°C	Control = On/Off + based on No. of stages + V-type or 1-coil unit/flatbed unit
		Hysteresis of stages 2, 3, 4, 5 and 6 of coil 1: 1 to 10°C **Delta of stages 2, 3, 4, 5 and 6 of coil 1: 1 to 5°C**		Control = On/Off + based on No. of stages +2 coils/flatbed unit
	A172	**Stage 1 hysteresis, coil 2: 1 to 20°C**	5°C	2 coils/flatbed unit
	A173	**Difference between stages 1 and 2 of coil 2: 1 to 5°C**	2°C	Control = On/Off + No. of stages ≥ 2 +2 coils/flatbed unit
	A174 to A182	**Hysteresis of stages 2, 3, 4, 5 and 6 of coil 2: 1 to 10°C** **Delta of stages 2, 3, 4, 5 and 6 of coil 2: 1 to 5°C**		Control = On/Off + based on No. of stages +2 coils/flatbed unit
	A199	**Outdoor spray temperature**	35°C	Spray / elec. optimisation
	A200	**Spray stage difference**	2°C	Spray / water optimisation + V-type or 1-coil unit/flatbed unit
		Spray stage difference, coil 1		Spray / water optimisation + 2 coils/flatbed unit
	A202	**Spray stage difference, coil 2**	2°C	Spray / water optimisation + 2 coils/flatbed unit

❸ Turning on the unit: Power button

To change the setpoint values rapidly: go directly to the **[1- Setpoint]** menu.

Information available while the unit is running

[2-Machine status] ***menu:*** appears if the control console is not used for one hour.

Fault	Information
No faults	Setpoint and measurement values displayed.
Sensor fault	The general fault LED and measurement fault LED flash and a message appears stating which sensor is faulty and the terminal references
Fan fault	The general fault LED and stage status LED flash and a message appears stating which stage is faulty

[3-Measured values] ***menu:***

Parameter	Description	Display conditions
Outdoor temperature	Value displayed	Free cooling or spray
Coil temperature	Value displayed	V-type or 1-coil unit/ Flatbed unit
Coil 1 temperature	Value displayed	2 coils/flatbed unit
Coil 2 temperature	Value displayed	2 coils/flatbed unit

[6-Reading parameters] ***menu:***

Parameter No.	Description	Display conditions
A250	LED test: press Enter to check the operation of the LEDs	
A252	Outdoor air temperature	Free cooling or spray
A253	Value of coil 1 setpoint	
A255	Value of coil 2 setpoint	2 coils/flatbed unit
A257	Value of coil 1 temperature	
A261	Value of coil 2 temperature	2 coils/flatbed unit
A270 to A275	Running time of each stage	
A299	Spray time	Spray
A300	Free cooling time	Free cooling
A400 to A421	Status (open or closed) of the logic inputs on the board	
A430 to A451	Status (open or closed) of the logic outputs on the board	
A460	Fan speed in %	Control = mixed or speed control
A555	CPU board version No.	
A556	Control console version No.	
A557	Daughter board version No.	

The **[7-Fault memory]** menu contains the nine most recent faults on the fan stages or outdoor temperature sensors.

To scroll through the faults, press  .

Factory-set parameters

[4-Machine parameters] menu

The **[4-Machine parameters]** menu contains the parameters used to configure the machine. They were set in the factory and are locked. The  symbol appears at the top left of the screen.

In certain rare cases (such as adding the spray function) it may be necessary to update a parameter. The parameters may be unlocked by changing parameter A99. However, do not modify any parameters other than those that require changing.

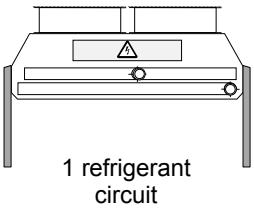
Parameter No.	Parameter description	Display condition
A01	Unit type (flatbed or V-coil)	
A02	Number of coils (1 or 2)	Flatbed unit
	Parallel coil (yes)	V-type unit
A03	Coil type 1 (1 LP or HT water circuit)	
A05	Coil type 2 (1 LP or HT water circuit)	2 coils/flatbed unit
A07	Control type: On/Off (stages), speed control or mixed	
A08	Number of stages (1 to 6)	Control = On/Off or mixed
A10	Spray (yes or no)	
A99	Lock parameters (yes)	

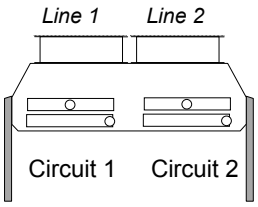
CONDENSER configuration

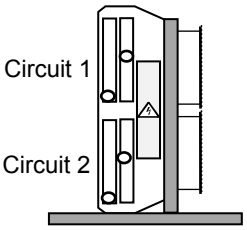
Configurations

Application: condenser with one or two refrigerant circuits

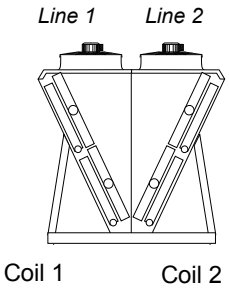
Flatbed unit







V-type unit



2 refrigerant circuits

Commissioning and configuration

❶ **Turning on the unit:**
The screen displays "machine off - on/off" in the **[2-Machine status]** menu.
Press ESC to go back to the menu list.

❷ **Main parameters to be set:** select the **[5-Settings parameters]** menu.

For information on navigating, go to the Control console / Navigation section.

Parameter No.		Description	Default values	Display conditions
Menu 5: Settings parameters				
A100		**Language**	FR	
A103		**Control mode: local or remote**	local	
A104		**Communication mode (baud)**	9600	BMS
A105		**Bus number**	1	BMS
A110		**Stage runtime balancing**	yes	Control = On/Off (stages) or mixed
A113		**Optimisation of water or electricity consumption**	Water optimisation	Spray
A116		**Link with CIAT chiller**	yes	
A120		**No. of setpoints per circuit or coil**	1	
A121		**Setpoint 1, circuit or coil 1**	12 bar	
A122		**Setpoint 2, circuit or coil 1**	12 bar	2 setpoints
or	A123	**Setpoint 1, circuit 2**	12 bar	2 refrigerant circuits + flatbed unit
	A125	**Setpoint 1, coil 2**		V-type unit
or	A124	**Setpoint 2, circuit 2**	12 bar	2 setpoints & 2 refrigerant circ. + flatbed unit
	A126	**Setpoint 2, coil 2**		2 setpoints + V-type unit

Not available for CIAT chillers

Parameter No.	Default values	Default values	Display conditions
A150	**Stage 1 hysteresis, circuit or coil 1: 2 to 6 bar**	3.5 bar	
A151	**Difference between stages 1 and 2, circuit or coil 1: 0.5 to 3 bar**	0.5 bar	Control = On/Off + No. of stages ≥2
A152 to A160	**Hysteresis and difference of stages 2, 3, 4, 5 or 6, circuit or coil 1**	3.5 bar	Control = On/Off + based on No. of stages
A161	**Stage 1 circuit 2 hysteresis: 2 to 6 bar**	3.5 bar	2 refrigerant circuits + flatbed unit
A162	**Difference between stages 1 and 2, circuit 2: 0.5 to 3 bar**	0.5 bar	Control = On/Off + No. of stages ≥2 + 2 refrigerant circuits + flatbed unit
A163 to A171	**Hysteresis and difference of stages 2, 3, 4, 5 or 6, circuit 2**	3.5 bar	Control = On/Off + based on No. of stages + 2 refrigerant circuits + flatbed unit
A172	**Stage 1 hysteresis, coil 2: 2 to 6 bar**	3.5 bar	Flatbed unit
A173	**Difference between stages 1 and 2, coil 2: 0.5 to 3 bar**	0.5 bar	Control = On/Off + No. of stages ≥2 + V-type unit
A174 to A182	**Hysteresis and difference of stages 2, 3, 4, 5 or 6, coil 2**	3.5 bar	Control = On/Off + based on No. of stages + V-type unit
A199	**Outdoor spray temperature**	35°C	Spray / elec. optimisation
A200	**Spray stage difference**	0.5 bar	Spray / water optimisation & 1 refrigerant circuit
	Spray stage difference, circuit or coil 1		Spray / water optimisation & 2 refrigerant circuits
A201	**Spray stage difference, circuit or coil 2**	0.5 bar	Spray / water optimisation & 2 refrigerant circuits

❸ Turning on the unit: Power button

To change the setpoint values rapidly: go directly to the **[1- Setpoint]** menu.

Information available while the unit is running

[2-Machine status] menu: appears if the control console is not used for one hour.

Fault	Information
No faults	setpoint and measurement values displayed.
Sensor fault	The general fault LED and measurement fault LED flash and a message appears stating which sensor is faulty and the terminal references
Fan fault	The general fault LED and stage status LED flash and a message appears stating which stage is faulty

[3-Measured values] ***menu:***

Parameter	Description	Display conditions
Outdoor temperature	Value displayed	Spray
COIL PRESSURE	Value displayed	1 refrigerant circuit
Pressure, circuit or coil 1	Value displayed	2 refrigerant circuits
Pressure, circuit or coil 2	Value displayed	2 refrigerant circuits

Information available while the unit is running (continued)

[6-Reading parameters] ***menu:***

Parameter No.	Description	Display conditions
A250	LED test: press Enter to check the operation of the LEDs	
A252	Outdoor air temperature	Spray
A253	Value of circuit or coil 1 setpoint	
A254	Value of circuit 2 setpoint	2 refrig. circuits + flatbed unit
A255	Value of coil 2 setpoint	V-type unit
A258	Value of circuit or coil 1 pressure	
A260	Value of circuit 2 pressure	2 refrig. circuits + flatbed unit
A262	Value of coil 2 pressure	V-type unit
A270 to A275	Running time of each stage	1 refrigerant circuit or 1 fan line
A280 to A295	Running time of each stage on each line	2 refrigerant circuits + 2 fan lines
A299	Spray time	Spray
A400 to A421	Status (open or closed) of the logic inputs on the board	
A430 to A451	Status (open or closed) of the logic outputs on the board	
A460	If 1 refrigerant circuit = Fan speed in % If 2 refrigerant circuits and 2 fan lines = Line 1 fan speeds	Control = mixed or speed control
A461	Speed (in %) of fans on line 2	Control = mixed or speed control + 2 refrigerant circuits + 2 fan lines
A555	CPU board version No.	
A556	Control console version No.	
A557	Daughter board version No.	

The **[7-Fault memory]** menu contains the nine most recent faults on the fan stages, pressure sensors or outdoor temperature sensor. To scroll through the faults, press  .

Factory-set parameters

[4-Machine parameters] menu

The **[4-Machine parameters]** menu contains the parameters used to configure the machine. They were set in the factory and are locked. The symbol appears at the top left of the screen.

In certain rare cases (such as adding the spray function) it may be necessary to update a parameter. The parameters may be unlocked by changing parameter A99. However, do not modify any parameters other than those that require changing.

Parameter No.	Parameter description	Display condition
A01	Unit type (flatbed or V-coil)	
A02	Number of coils (1)	Flatbed unit
	Parallel coil (no)	V-type unit
A03	Coil 1 type (1 refrigerant circuit, 2 refrigerant circuits)	
A04	Coil circuit type (balanced or unbalanced)	Flatbed unit & 2 refrigerant circuits
A05	Coil 2 type (1 refrigerant circuit)	V-type unit
A07	Control type: On/Off (stages), speed control or mixed	
A08	Number of stages (1 to 6)	Control = On/Off or mixed
A09	Number of fan lines (1 or 2)	Flatbed unit & 2 refrig. circ.
A10	Spray (yes or no)	
A30	Top of sensor range - circuit or coil 1	
A31	Bottom of sensor range - circuit or coil 1	
A32	Top of sensor range - circuit 2	2 refrigerant circuits
A33	Bottom of sensor range - circuit 2	2 refrigerant circuits
A34	Top of sensor range - coil 2	2 refrigerant circuits
A35	Bottom of sensor range - coil 2	2 refrigerant circuits
A99	Lock parameters (yes)	

BMS communication protocol

Communication interface

RS485

3-pin connector, terminal block J13:
Terminal 1: A or +
Terminal 2: B or –
Terminal 3: for a shield

The line termination resistance can be configured with jumper W1:

Two lights provide information on the status of the transmission of date:

- D11: incoming light. Usually off; flashes when a message is received by the board. If this light is continuously on, the bus is reversed. In this case, swap terminals 1 and 2 on J9.
- D14: outgoing light. Usually off; lights up when the CPU sends a message over the bus.

Transmission mode

Serial, asynchronous, half duplex

- 1 start bit, 8 data bits, no parity bits, 1 stop bit.
- The bit rate can be set in parameter P104 to 4800 baud or 9600 baud.

Analogue value endcoding

Standard IEEE 32-bit format (2 registers)

Order of values:

- if P108 = 9600 or 4800	low order, high order
- if P108 = Jbus	high order, low order

Codes of functions used

1 or 2:	read n bits
3 or 4:	read multiple registers (16 bits)
5:	write one bit
6:	write register function
8:	read diagnostics counters
11:	read event counter
15:	write n bits
16:	write multiple registers (16 bits)

Note: Functions 15 and 16 are possible if parameter P103 is set to "Remote, BMS…"

Error codes:

1	function code unknown
2	wrong address
3	data error

Remote signalling register (read-only)

Register 1: Board type

Bits 0 to 7: Board type for AeroConnect = 32

Bits 8 to 15 0

Register 2: Operating status

Bit 0:	On/off (1 = on => on and CA closed)
Bit 1:	Spray status 1 = on
Bit 2:	Free cooling status 1 = on

Remote alarm register (read-only)

Register 10: FAN FAULTS (1 = fault detected)

Bit		Bit	
0	Fan fault, stage 1, line 1	8	Fan fault, stage 1, line 2
1	Fan fault, stage 2, line 1	9	Fan fault, stage 2, line 2
2	Fan fault, stage 3, line 1	10	Fan fault, stage 3, line 2
3	Fan fault, stage 4, line 1	11	Fan fault, stage 4, line 2
4	Fan fault, stage 5, line 1	12	Fan fault, stage 5, line 2
5	Fan fault, stage 6, line 1	13	Fan fault, stage 6, line 2
6	N.U..	14	N.U..
7	N.U.	15	N.U..

Register 11: FAN FAULTS (1 = fault detected)

Bit		Bit	
0	Sensor or pressure fault, coil 1, circuit 1	8	Sensor or pressure fault, coil 2, circuit 1
1	Sensor or pressure fault, coil 1, circuit 2	9	Sensor or pressure fault, coil 2, circuit 2
2	N.U.	10	N.U.
3	N.U.	11	N.U.
4	N.U.	12	N.U.
5	N.U.	13	N.U.
6	N.U.	14	N.U..
7	N.U.	15	N.U..

Remote measurement register (read-only)

Registers		Registers	
100 and 101	Control setpoint, coil 1, circuit 1	**108 and 109**	Temperature or pressure, coil 1, circuit 1
102 and 103	Control setpoint, coil 1, circuit 2	**110 and 111**	Temperature or pressure, coil 1, circuit 2
104 and 105	Control setpoint, coil 2, circuit 1	**112 and 113**	Temperature or pressure, coil 2, circuit 1
106 and 107	Control setpoint, coil 2, circuit 2	**114 and 115**	Temperature or pressure, coil 2, circuit 2
		116 and 117	Outdoor temperature

Fault memory

Register 200: Fault 9 memory
Register 201: Fault 8 memory
Register 202: Fault 7 memory
Register 203: Fault 6 memory
Register 204: Fault 5 memory
Register 205: Fault 4 memory
Register 206: Fault 3 memory
Register 207: Fault 2 memory
Register 208: Fault 1 memory

0: Fault memory empty
0x010: Fan fault, stage 1, line 1
0x011: Fan fault, stage 2, line 1
0x012: Fan fault, stage 3, line 1
0x013: Fan fault, stage 4, line 1
0x014: Fan fault, stage 5, line 1
0x015: Fan fault, stage 6, line 1
0x016: Fan fault, stage 1, line 2
0x017: Fan fault, stage 2, line 2
0x018: Fan fault, stage 3, line 2
0x019: Fan fault, stage 4, line 2
0x01A: Fan fault, stage 5, line 2
0x01B: Fan fault, stage 6, line 2
0x080: Temperature sensor fault, coil 1, circuit 1
0x081: Temperature sensor fault, coil 1, circuit 2
0x082: Temperature sensor fault, coil 2, circuit 1
0x083: Temperature sensor fault, coil 2, circuit 2
0x084: Temperature sensor fault, coil 1, circuit 1
0x085: Temperature sensor fault, coil 1, circuit 2
0x086: Temperature sensor fault, coil 2, circuit 1
0x087: Temperature sensor fault, coil 2, circuit 2

Counters (read-only)

Registers 300 and 301: Fan runtime, stage 1, line 1
Registers 302 and 303: Fan runtime, stage 2, line 1
Registers 304 and 305: Fan runtime, stage 3, line 1
Registers 306 and 307: Fan runtime, stage 4, line 1
Registers 308 and 309: Fan runtime, stage 5, line 1
Registers 310 and 311: Fan runtime, stage 6, line 1
Registers 312 and 313: Fan runtime, stage 1, line 2
Registers 314 and 315: Fan runtime, stage 2, line 2
Registers 316 and 317: Fan runtime, stage 3, line 2
Registers 318 and 319: Fan runtime, stage 4, line 2
Registers 320 and 321: Fan runtime, stage 5, line 2
Registers 322 and 323: Fan runtime, stage 6, line 2
Register 324 to 398: Reserved

Remote configuration register (read and write)

Register 399: Unit type (A01) 0 => Flatbed, 1 => V

Register 400: If A01 = V type: A02 parallel coil 0 = NO, 1 = YES
If A01 = flatbed P02 = number of coils

Register 401: Coil 1 type (A03)
0 => 1 low-temperature water circuit
1 => 2 low-temperature water circuits
2 => 1 high-temperature water circuit
3 => 2 high-temperature water circuits
4 => 1 refrigerant circuit
5 => 2 refrigerant circuits

Register 402: A04: Circuit type, coil 1
0 => balanced circuit
1 => unbalanced circuit

Register 403: A05**:** Coil 2 type
0 => 1 low-temperature water circuit
1 => 2 low-temperature water circuits
2 => 1 high-temperature water circuit
3 => 2 high-temperature water circuits
4 => 1 refrigerant circuit
5 => 2 refrigerant circuits

Register 404: A06: Circuit type, coil 2
0 => balanced circuit
1 => unbalanced circuit

Register 405: A07: Type of control
0 => On/Off
1 => speed control
2 => mixed, energy

Register 406: A08: Number of fan stages

Register 407: A09: Number of fan lines

Register 408: A10: Spray (0 = NO, 1 = YES)

Registers 409 and 410: A30: High value, HP sensor, coil 1, circuit 1

Registers 411 and 412: A31: Low value, HP sensor, coil 1, circuit 1

Registers 413 and 414: A32: High value, HP sensor, coil 1, circuit 2

Registers 415 and 416: A33: Low value, HP sensor, coil 1, circuit 2

Registers 417 and 418: A34: High value, HP sensor, coil 2, circuit 1

Registers 419 and 420: A35: Low value, HP sensor, coil 2, circuit 1

Registers 421 and 422: A36: High value, HP sensor, coil 2, circuit 2

Registers 423 and 424: A37: Low value, HP sensor, coil 2, circuit 2

Register 425: A99: Lock
0 => no
1 => yes

Register 450: A110: Optimised fan operation
0 => no
1 => yes

Register 451: A120: Number of setpoints
0 => 1 setpoint
1 => 2 setpoints via BMS or console
2 => 2 setpoints per On/Off input

Remote configuration register (read and write)

Registers 452 and 453:	A121: Setpoint 1, coil 1, circuit 1
Registers 454 and 455:	A122: Setpoint 2, coil 1, circuit 1
Registers 456 and 457:	A123: Setpoint 1, coil 1, circuit 2
Registers 458 and 459:	A124: Setpoint 2, coil 1, circuit 2
Registers 460 and 461:	A125: Setpoint 1, coil 2, circuit 1
Registers 462 and 463:	A126: Setpoint 2, coil 2, circuit 1
Registers 464 and 465:	A127: Setpoint 1, coil 2, circuit 2
Registers 466 and 467:	A128: Setpoint 2, coil 2, circuit 2
Registers 468 and 469:	A150: Hysteresis, stage 1, coil 1, circuit 1
Registers 470 and 471:	A151: Setpoint difference, stage 2, coil 1, circuit 1
Registers 472 and 473:	A152: Hysteresis, stage 2, coil 1, circuit 1
Registers 474 and 475:	A153: Setpoint difference, stage 3, coil 1, circuit 1
Registers 476 and 477:	A154: Hysteresis, stage 3, coil 1, circuit 1
Registers 478 and 479:	A155: Setpoint difference, stage 4, coil 1, circuit 1
Registers 480 and 481:	A156: Hysteresis, stage 4, coil 1, circuit 1
Registers 482 and 483:	A157: Setpoint difference, stage 5, coil 1, circuit 1
Registers 484 and 485:	A158: Hysteresis, stage 5, coil 1, circuit 1
Registers 486 and 487:	A159: Setpoint difference, stage 6, coil 1, circuit 1
Registers 488 and 489:	A160: Hysteresis, stage 6, coil 1, circuit 1
Registers 490 and 491:	A161: Hysteresis, stage 1, coil 1, circuit 2
Registers 492 and 493:	A162: Setpoint difference, stage 2, coil 1, circuit 2
Registers 494 and 495:	A163: Hysteresis, stage 2, coil 1, circuit 2
Registers 496 and 497:	A164: Setpoint difference, stage 3, coil 1, circuit 2
Registers 498 and 499:	A165: Hysteresis, stage 3, coil 1, circuit 2
Registers 500 and 501:	A166: Setpoint difference, stage 4, coil 1, circuit 2
Registers 502 and 503:	A167: Hysteresis, stage 4, coil 1, circuit 2
Registers 504 and 505:	A168: Setpoint difference, stage 5, coil 1, circuit 2
Registers 506 and 507:	A169: Hysteresis, stage 5, coil 1, circuit 2
Registers 508 and 509:	A170: Setpoint difference, stage 6, coil 1, circuit 2
Registers 510 and 511:	A171: Hysteresis, stage 6, coil 1, circuit 2
Registers 512 and 513:	A172: Hysteresis, stage 1, coil 2, circuit 1
Registers 514 and 515:	A173: Setpoint difference, stage 2, coil 2, circuit 1
Registers 516 and 517:	A174: Hysteresis, stage 2, coil 2, circuit 1
Registers 518 and 519:	A175: Setpoint difference, stage 3, coil 2, circuit 1
Registers 520 and 521:	A176: Hysteresis, stage 3, coil 2, circuit 1
Registers 522 and 523:	A177: Setpoint difference, stage 4, coil 2, circuit 1
Registers 524 and 525:	A178: Hysteresis, stage 4, coil 2, circuit 1
Registers 526 and 527:	A179: Setpoint difference, stage 5, coil 2, circuit 1
Registers 528 and 529:	A180: Hysteresis, stage 5, coil 2, circuit 1
Registers 530 and 531:	A181: Setpoint difference, stage 6, coil 2, circuit 1
Registers 532 and 533:	A182: Hysteresis, stage 6, coil 2, circuit 1
Registers 534 and 535:	A183: Hysteresis, stage 1, coil 2, circuit 2
Registers 536 and 537:	A184: Setpoint difference, stage 2, coil 2, circuit 2
Registers 538 and 539:	A185: Hysteresis, stage 2, coil 2, circuit 2
Registers 540 and 541:	A186: Setpoint difference, stage 3, coil 2, circuit 2
Registers 542 and 543:	A187: Hysteresis, stage 3, coil 2, circuit 2
Registers 544 and 545:	A188: Setpoint difference, stage 4, coil 2, circuit 2
Registers 546 and 547:	A189: Hysteresis, stage 4, coil 2, circuit 2
Registers 548 and 549:	A190: Setpoint difference, stage 5, coil 2, circuit 2

Remote configuration register (read and write)

Registers 550 and 551:	A191: Hysteresis, stage 5, coil 2, circuit 2
Registers 552 and 553:	A192: Setpoint difference, stage 6, coil 2, circuit 2
Registers 554 and 555:	A193: Hysteresis, stage 6, coil 2, circuit 2
Register 560:	A199: Outdoor temperature for start of spraying
Registers 561 and 562:	A200: Spray difference, coil 1, circuit 1
Registers 563 and 564:	A201: Spray difference, coil 1, circuit 2
Registers 565 and 566:	A202: Spray difference, coil 2, circuit 1
Registers 567 and 568:	A203: Spray difference, coil 2, circuit 2
Register 569:	A113: Spray type (0: water optimisation, 1: electricity optimisation)

Function 1, 2: read n bits

Remote alarm and operating status (read-only)

(1 = Fault)

Bit 1:	Fan fault, stage 1, line 1
Bit 2:	Fan fault, stage 2, line 1
Bit 3:	Fan fault, stage 3, line 1
Bit 4:	Fan fault, stage 4, line 1
Bit 5:	Fan fault, stage 5, line 1
Bit 6:	Fan fault, stage 6, line 1
Bit 7:	Fan fault, stage 1, line 2
Bit 8:	Fan fault, stage 2, line 2
Bit 9:	Fan fault, stage 3, line 2
Bit 10:	Fan fault, stage 4, line 2
Bit 11:	Fan fault, stage 5, line 2
Bit 12:	Fan fault, stage 6, line 2
Bit 13:	Temperature or pressure sensor fault, coil 1, circuit 1
Bit 14:	Temperature or pressure sensor fault, coil 1, circuit 2
Bit 15:	Temperature or pressure sensor fault, coil 2, circuit 1
Bit 16:	Temperature or pressure sensor fault, coil 2, circuit 2
Bit 17:	On/off (1 = on => on and CA closed)
Bit 18:	Spray status 1 = on
Bit 19:	Free cooling status 1 = on
Bits 20 to 30:	Reserved

Remote control

Read and write

Bit 31:	On/Off (0 = off; 1 = on)
Bit 32:	Setpoint 1/setpoint 2 control (0 = Setpoint 1; 1 = Setpoint 2)

Remote diagnostics Function 8

Read-only

Subfunction 0A:	Reset counters (No response)
Subfunction 0B:	Frame received without CRC errors
Subfunction 0C:	Frame received with CRC errors
Subfunction 0D:	Number of exception responses
Subfunction 0E:	Non-broadcast frame
Subfunction 0F:	Broadcast request received
Subfunction 10:	Not used
Subfunction 12:	Unprocessed character

Event counters Function 11

Read-only

Glossary

Description	Meaning
STP	Setpoint
HYST	Hysteresis
CH	Chiller
N.U.	Not used
On/Off	Stage cascade control

Notes

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