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NE' UTILIZZARE IL CONTENUTO O RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA AUTORIZZAZIONE ESPLICITA. OGNI INFRAZIONE COMPORTA IL RISARCIMENTO DEI DANNI SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
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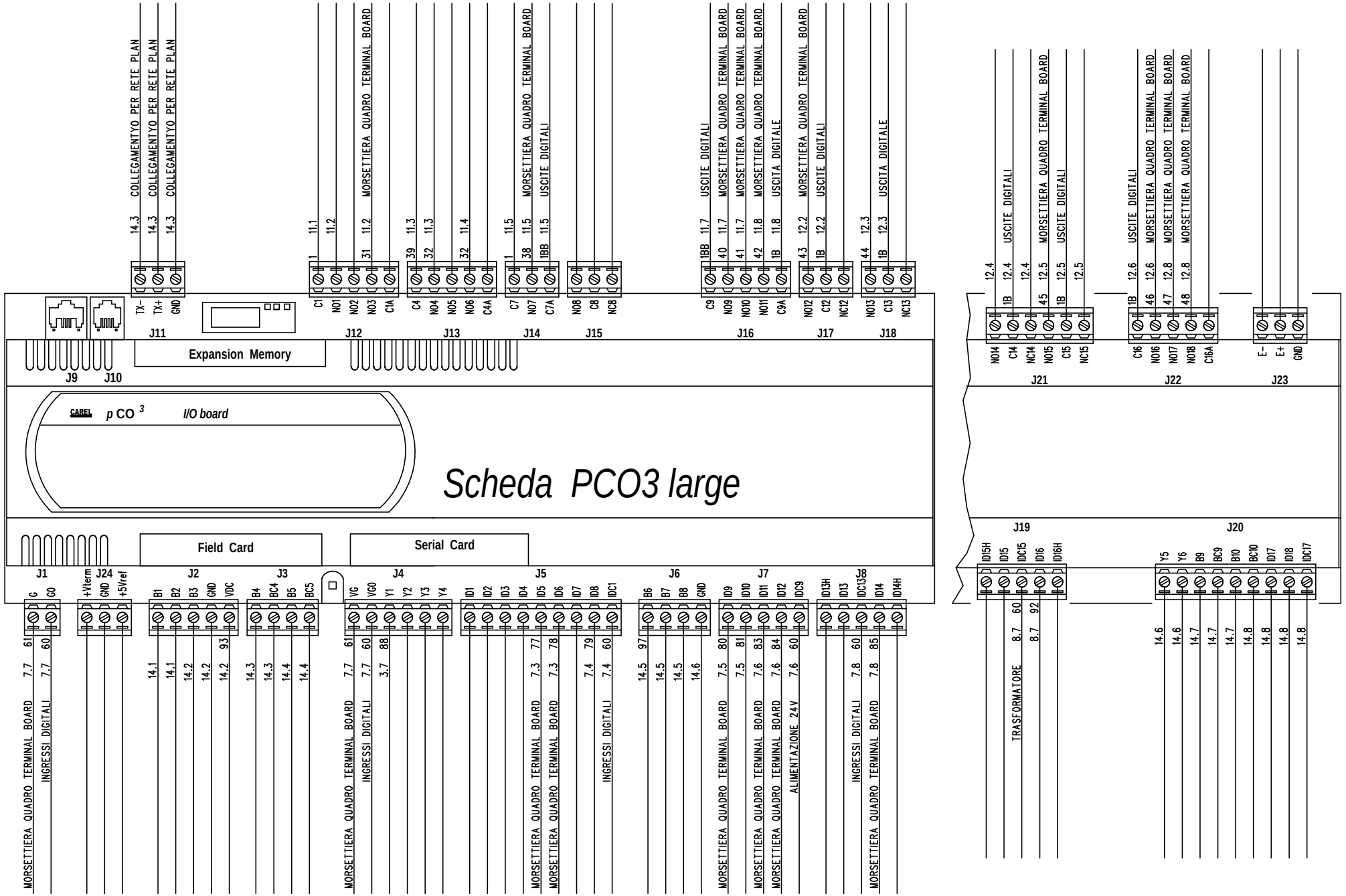

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					DATA	23/11/2011
					DISEGN.	Crivellaro
					DATA	23/11/2011
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

PCO3 LARGE
PCO3 LARGE

NSGF BIC. FUS. S.piccola

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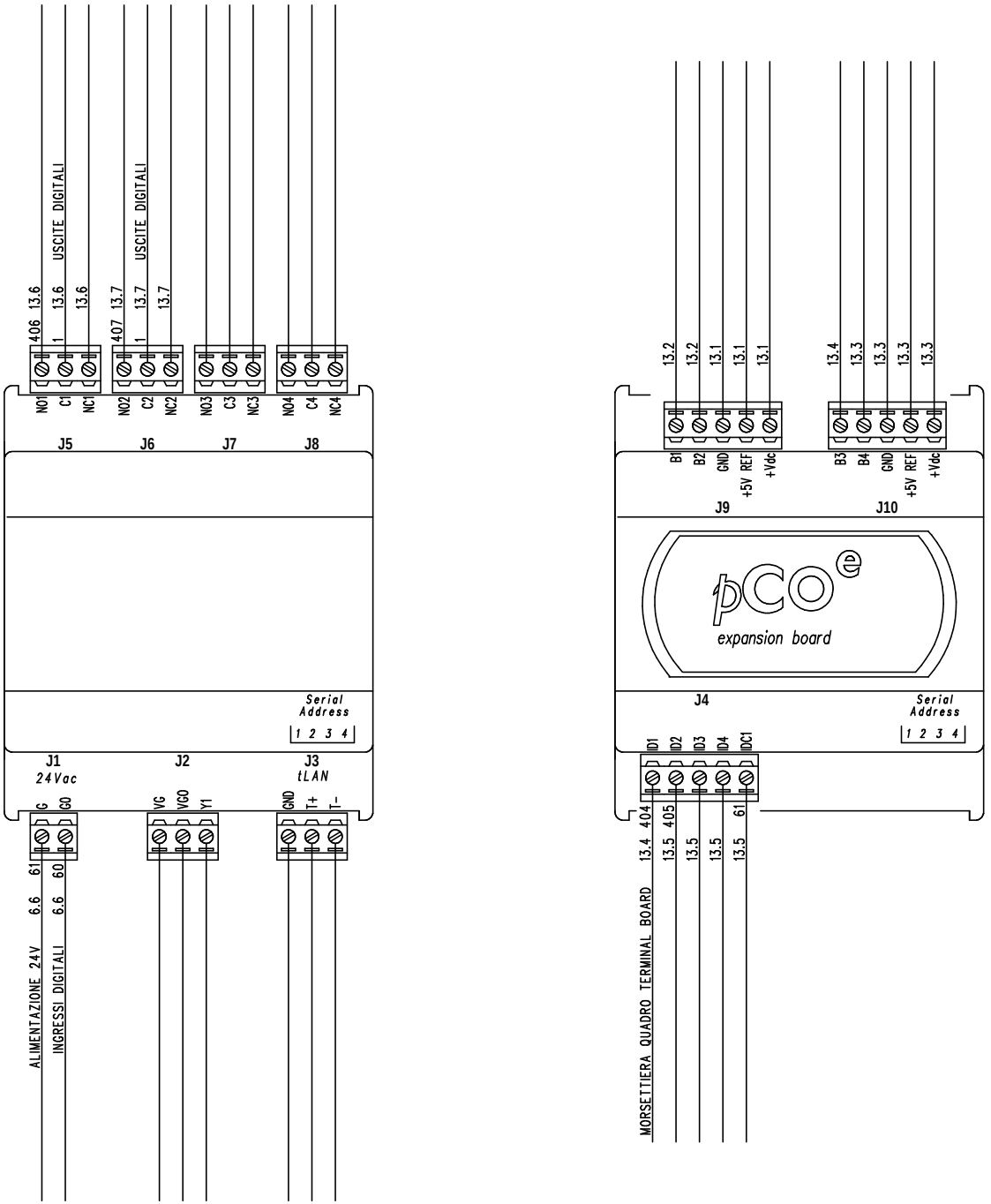

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PROGETTO:
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REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO

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DATA	23/11/2011
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AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

SCHEDA PCOe Espansione

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DI 31

St Georges Court

PERFORMANCE AND ACOUSTIC WITNESS TEST

NS 2202XBEAK & NS3602XEAK AIR-COOLED WATER CHILLERS

PRELIMINARY DOCUMENT

INDEX

Description	Page
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Customer Witness Operational Performance Test	6
Customer Witness Factory Acoustic Test	7
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Test Report Sheet	9
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INTRODUCTION

PROJECT: St Georges Court

CUSTOMER: Gratte

MANUFACTURER: AERMEC SpA
Via Roma 44-37040
Bevilacqua (Verona) Italy

EQUIPMENT: 1-off NS2202XBEAK & 1 off NS3602XEAK

This project involves the supply and commissioning of 4-off NS type air-cooled water chillers. The chillers are manufactured by AERMEC and one of each type shall be run tested in the factory prior to delivery to site to verify performance. The chiller shall be performance witness tested in accordance with this document and witnessed by client's representatives at AERMEC's production facilities in Italy.

The test shall be carried out in three parts. Firstly, the chiller shall go through a functional pre-test and set-up procedure involving Aermec personnel. Then, on the date identified herein, the chiller shall go through a performance witness test followed by an acoustic test.

A. Functional pre-test (Aermec)

Complete a physical inspection of the unit and accessories. Check the integrity of the refrigerant circuit by pressure testing with nitrogen. Charge the unit and review operation of the refrigerant circuit. Measure the inlet and outlet water temperatures, flow rates and electrical performance of the chiller.

B. Witness performance test (Aermec + customers)

Run the chiller for one hour to achieve steady state conditions at 100% full load. The performance test is to be conducted 35°C ambient in the Production Test Chamber. Test operation of alarms. Simulate summer design operating conditions.Verify chiller performance against technical schedule. Issue a test certificate for customer approval.

C. Acoustic test (Aermec + customers)

The acoustic test is conducted outside the test chamber to eliminate the influence of the chamber fan noise and prepare it for the sound test run in the evening when the background noise is at a minimum. The chiller will be complete with both circuits running at full load.

ITINERARY

Witness Testing of AERMEC NS air-cooled water chillers

PROJECT: St Georges Court

Attendees

- TBC
- TBC
- TBC
- TBC
- Ray Miller – Aermec UK

Schedule

- TBC
- TBC
- TBC
- TBC
- TBC
- TBC
- TBC
- TBC
- TBC

METHOD STATEMENT

STANDARD FACTORY PERFORMANCE TEST

Equipment: 1 No. NS2202XBEAK air cooled water chiller
1 No. NS3602XEAK air cooled water chiller

Ref: Production Test Facility – Production Test Chamber

Standard Functional Test (carried out prior to witness test)

1. Pre-charge unit with nitrogen for checking purposes
2. Test for leakage
3. Discharge the circuit
4. Establish a vacuum to remove all gas and to eliminate moisture inside the refrigerant circuit
5. Charge the unit with R134a refrigerant
6. Control gas charge through the sight glass and pressure gauges
7. Connect the inlet and outlet water connections to the testing room plant
8. Set the water flow to the correct flow rate
9. Cable up the power to the unit
10. Carry out test of voltage and frequency on the electrical panel
11. Program the microprocessor control with basic working parameters
12. Set up the expansion valves and trim the refrigerant charge
13. Start up each compressor and test electrical data
14. Set up all the pressure switches
15. Initiate a controlled start-up of each condenser fan
16. Calibrate the various temperature and pressure probes on the circuit

Customer Witness Operational Performance Test

1. Test the alarms on the microprocessor:-
    a. High pressure alarm
    b. Low pressure alarm
    c. Compressors alarm
    d. Evaporator freeze alarm
    e. Flow switch alarm
2. Test of probe failure
3. Set the design set-point and configure the unit for design working conditions
4. Run the chiller in the Production Test Chamber at full load conditions at design conditions:-

	NS 3602XE AK	NS 2202XBE AK
a. Chilled water:	6 °C / 12 °C	6 °C / 12 °C
b. Flow rate:	29.7 l/s	16.01 l/s
c. Glycol:	n/a	n/a
d. Design Ambient:	35°C	35°C

5. Record the performance data on the test report sheet
6. Run the chiller at full load conditions for one hour to reach steady state full load condition
7. Print a copy of the test report for customer approval
8. Test to be in accordance with ISO14511

WITNESS FACTORY ACOUSTIC TEST (AERMEC+CUSTOMER)

The Total Sound Power data declared for the NS 2202XBE AK is 90 dB(A)

The Total Sound Power data declared for the NS 3602XE AK is 92 dB(A)

Acoustic Test Procedure

1) Position the unit outside the test chamber to eliminate the influence of the chamber fan noise and prepare it for the sound test run

2) Prepare and calibrate the test instrument
   Sound Intensity Analyser : BRUEL & KJAER PULSE
   Measured Sound Level : Sound Power
   Filter : A

3) Measure the sound intensity levels from one module within 1 metre from the unit all round and above in accordance with ISO 9614-2.2, Acoustics. All octave band readings to be taken simultaneously.

4) Shut down the chiller and measure the background noise level.

5) Record the results.

6) Calculate the sound pressure levels in accordance with ISO 3744:1994 Acoustics and Eurovent tolerances

Issue a test certificate for customer approval and signature

Model: NS2202XB°E AK°°°00

COOLING		
Total cooling capacity	kW	401.00
Input power	kW	152.67
Input current	A	273.88
E.E.R.	W/W	2.62
Dry bulb air inlet temperature	°C	35.00
Inlet water temperature	°C	12.00
Change in water temperature	°C	6.00
Outlet water temperature	°C	6.00
Glycol mix	%	0
Water flow rate	l/s	16.01
Pressure drops	kPa	40.0
Refrigerant		R134a
Compressor type		Screw
Number of compressors	n.	2
Number of refrigerant circuits	n.	2
Refrigerant gas charge	kg	85.0 per circuit
Evaporator type		Shell and tube
Number of evaporators	n.	1
Evaporator water connections		4"
Total air flow rate	m^3/s	33.33
Maximum full load current	A	409.00
Starting current	A	437.00
Power supply		400V - 3 - 50 Hz
FREE COOLING		
Cooling capacity (reduced air flow)	kW	248.0
Input power	kW	25.3
E.E.R.	W/W	9.8
Dry bulb ambient air temperature	°C	0.00
Inlet water temperature	°C	12.00
Change in water temperature	°C	4.84
Outlet water temperature	°C	7.16
Glycol mix	%	30
Sound data		
Sound pressure @ 1 Metre to EN ISO 3744	dB(A)	64.4
Dimensional data		
Height	mm	2450
Width	mm	2200
Depth	mm	5750
Net Weight	kg	5790

Model: NS 3602XE AK°°°00

Cooling

Total cooling capacity	kW	746.00
Input power	kW	268.00
Input current	A	437.00
E.E.R.	W/W	2.78
E.S.E.E.R.	W/W	4.06
Dry bulb air inlet temperature	°C	35.00
Inlet water temperature	°C	12.00
Change in water temperature	°C	6.00
Outlet water temperature	°C	6.00
Glycol mix	%	0
Water flow rate	l/s	29.7
Pressure drops	kPa	25.5

Refrigerant		R134a
Compressor type		Screw
Number of compressors	n.	2
Number of cooling circuits	n.	2
Refrigerant gas charge	kg	TBA
Evaporator type		Shell and tube
Number of evaporators	n.	2
Evaporator water connections		4”
Total air flow rate	m^3/s	52.22
Maximum full load current	A	676.00
Maximum Starting current	A	661.00
Power supply		400V - 3 - 50 Hz

Sound data

Sound pressure @ 1 metre to EN ISO 3744	dB(A)	65.2

- Sound pressure in unrestricted range on reflecting plane (directivity factor Q = 2).

Dimensional data

Height	mm	2,450
Width	mm	2,200
Depth	mm	9,140
Net weight (operating)	kg	8,836

Data according to UNI EN 14511:2011

TEST REPORT SHEET

Production Test Certificate

AERMEC S.p.A. TEST REPORT
AIR/WATER and WATER/WATER CHILLERS
(Customer copy)

TESTING ROOM N°		TYPE	
SERIAL NUMBER			
CIRCUIT N°			
TEST MANAGER		DATE	

NOMINAL CONDITIONS 1°

EVAPORATOR WATER FLOW		l/h
EVAPORATOR WATER IN TEMPERATURE		°C
EVAPORATOR WATER OUT TEMPERATURE		°C
EVAPORATOR GLYCOL %		%
CONDENSER WATER FLOW*		m^3/h
CONDENSER WATER IN TEMPERATURE*		°C
CONDENSER WATER OUT TEMPERTURE*		°C

MEASURED PERFORMANCES

HEATING CAPACITY [ ] kW

ELECTRICAL MEASURED DATA

INPUT POWER		Kw
VOLTAGE		V

	PHASE R	PHASE S	PHASE T
CURRENT	A	A	A

NB: *only for water/water and heating mode in heat pumps air/water chillers
** only for air/water chillers

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London
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e uksales@aermec.co.uk
w www.aermec.co.uk

Gratte Brothers
2, Regents Wharf
All Saints St.
London
N1 9RL

Attention: Mr Andrew Rogers

19th October 2012

Dear Andrew

RE: St. Georges Court – Chillers

With reference to our quotation Q12138-01J dated 13th September 2012, we are pleased to confirm the following:

1) The chillers proposed are generally in compliance with the amended Blyth and Blyth schedules as submitted by yourself via e-mail on 11th September, with the exception only of some of the data on the Office chillers due to reselection to a different type of chiller i.e. Screw chiller instead of Turbocor.
2) The chillers proposed are in compliance with the acoustic criteria detailed in the Hann Tucker report reference 17797/BS Rev C dated 10th August 2012.

Yours sincerely
on behalf of Aermec UK

Rex J. Murden

GRATTE BROTHERS

TECHNICAL SUBMITTAL SHEET

Project Name:	ST Georges Court Bloomsbury Holborn				
Project No:	GB5236	Sheet Ref:	TS008	Rev:	0
Issued to:	Kier Construction/Blyth and Blyth			Issue date:	19th Oct 12
				Approval date:	
Description of equipment:	2No Office Screw Chiller units Type NS3602XE-AK				
Locations where equipment is to be used:	Roof Level within acoustic screen				
Manufacturer / Supplier:	Aermec UK Limited				
Specification clause references and deviations:	Blyth and Blyth Mechanical Specification Document Revision 7				
Drawing details:	Blyth and Blyth Layout drawing Roof LM20592-59-R001				
Enclosures / samples attached:	AERMEC Technical Submittal Specification Document Chiller selection Technical Guide Certified Layout drawing Operation and Maintenance Manual Control User Guide BMS Module 485 Wiring Details Dual pressure Relief Valve Specification Refrigeration Gas Monitoring system specification Ant Vibration instructions and specification of models Factory Inspection Itinerary and Method Scope document Electrical wiring diagrams				

Project Name:	ST Georges Court Bloomsbury Holborn				
Project No:	GB5236	Sheet Ref:	TS008	Rev:	0
Additional information:	Full roof coordinated layout drawing in progress for plant exact position to follow : AK Package is manufactured as integral part of the chillers and consists of internal panelling and high density acoustic foams surrounding the Compressors				

TECHNICAL SUBMITTAL SHEET

Project Name:					
Project No:		Sheet Ref:		Rev:	

APPROVALS

Company	Date	Status (A-B-C)	Comments

MAIN CONTRACTOR:	
STATUS A-B-C	COMMENTS

Signature: ……..	Date: …….

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EC2M 4QP

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e uksales@aermec.co.uk
w www.aermec.co.uk

17th Oct 2012

TECHNICAL SUBMISSION

PROJECT: **St Georges Court**

CONTRACTOR : **Gratte Brothers**

MANUFACTURER: **AERMEC**

Refrigeration Plant : **Qty 2 off Aermec NS 3602XE-AK ~ Office chillers**

AERMEC ~ NS SERIES
Air to water chillers

Series
Supply and delivery of the latest generation NS series air to water chiller unit. The machine is suitable for outdoor installation and has an IP24 protection level.

Cooling circuit
Two cooling circuits each with one screw compressor, exchanger and evaporator function. The cooling circuits are independent . (dual evaporators)

Description of the cooling circuit
Manufactured from copper pipe with welded joints in silver alloy including the following products. Thermostatic valve that modulates the flow of gas depending on the cooling capacity or electronic valve supplied as accessory. Dehydrator filter: with removable cartridge, it can withhold the impurities and eventual traces of humidity in the cooling circuit. Liquid indicator: used to check the refrigerant gas load and the eventual presence of humidity in the cooling circuit. Liquid and discharge line taps: allows to interrupt the refrigerant in the case of extraordinary maintenance. Solenoid valve: it closes when the compressor switches off, blocking the flow of refrigerant gas to the evaporator.

Operational fields
Possibility of producing cooled water with outdoor temperature up to 48 °C.

Refrigerant
The NS series is characterised by high efficiency ratios (EER) and seasonal efficiency ratios (ESEER) using R134a refrigerant,

Version
E: High efficiency version , with condenser coils of large surface and low noise operation. The unit is equipped with a fan speed adjustment device and compressor discharge muffler as standard.

Support frame
Made in hot galvanised sheet steel with suitable thickness and painted with polyester powders able to resist atmospheric agents through time.
All NS versions have an acoustic protection cover on the compressor as standard supply: it is made up of a thick galvanised steel compartment and has a sound-absorbent lining. Allows to reduce the sound power level emitted by the unit and also protects the compressors from atmospheric agents.

Compressor
Compressor, volumetric, with double screw rotor in steel alloy with ratio of 5:6 between the sections. Semi-hermetic construction with electric motor cooling by means of intake gas.
The compressor mounted on the NS units is optimised to function with R134a refrigerant. It is characterised by an extremely compact structure, double wall rotor casing with pressure compensation system, integrated oil separator structure in stages with relative oil management system, oil discharge temperature control, long-lasting bearings with pressure reduction device, non-return valve on exit of the delivery gas, intake gas filter with large surface and thin mesh to prevent the passage of impurities present inside the chiller circuit, indicator for controlling the level of the oil in the sump, anti-vibrating device for the reduction of the vibrations transmitted.
The electric motor has 2 poles of the squirrel cage type with circuit breaker protection against overloading of the motor and star-delta switching starting, managed by the circuit board, for the reduction of the peak current at every start up.
Power adjustment takes place by continuous modulation of the slide valve, moved hydraulically to check the power according to the load requested.
The compressor is always equipped with electric resistance for heating the oil: this prevents excessive liquefaction of the refrigerant in the oil with reduction of viscosity and is fed automatically during machine shutdown.

Thermostatic valve
X: Electronic thermostatic valve. It has a larger adjustment capacity with respect to traditional mechanical valves and with much quicker reaction times. This allows to work with minimum temperature of the water produced of -6 °C and with the possibility of modulation from 100% to 25% of the nominal capacity of each compressor.

Evaporator
Shell and tube direct expansion refrigerant-water exchanger, suitably dimensioned to obtain high performance. It is made up from a steel case with closed cell expanded elastomer anti-condensation covering; the shell and tube is made from copper pipes with a special profile that allows high exchange associated to efficient draining. The attachments are the Victaulic type. Respect the PED standard. Maximum working pressure: 16 bar.

Coils
°: The air-refrigerant exchangers with condenser function are coils with louvered fins, copper pipes and aluminum hydrophilic louvered fins, fixed by mechanical expansion of the pipes.
Air-water exchangers with free-cooling function made up from louvered fin coils with smooth copper pipes and corrugated aluminum louvered fins.

Condenser fans
Fans are statically and dynamically balanced helical type, activated directly by electric motors, which are protected electrically by magnet-circuit breakers and mechanically by anti-intrusion metal grids, according to IEC EN 60335-2-40 Standard and fixed on the upper part of the framework.

Electric Control Board
Contains the power section and the management of controls and safety devices. It is in compliance with the IEC 60204-1 standard and the Directives regarding electromagnetic compatibility EMC 89/336/CEE and 92/31/CEE. Moreover, all cables are numbered for immediate recognition of all electric components.
Equipped with a door-lock isolating switch: the electric control board can be accessed by removing the voltage. Act on the opening lever of the control board itself. This lever can be locked using one or more padlocks during maintenance interventions to prevent the machine being powered up accidentally. Inside the control board is a control keyboard that allows complete control of the appliance.

Power supply
°: Three-phase + neutral power supply, 400V, 50Hz with fuses.

Safety devices and protections
The following devices are present in the chiller. Differential pressure gauge with IP54 protection level: it has the task of controlling that there is correct circulation of water; on the contrary block the unit.
Double high pressure switch (manual + tool) calibrated in the factory, positioned on the high pressure side of the chiller circuit, stops compressor functioning in the case of anomalous working pressures.
Chiller circuit safety valve, calibrated at 22 bar for the high pressure side and at 16.5 bar for the low pressure side: they intervene by discharging the overpressure in the case of anomalous pressures.
Always present are: the electric control board access door interlock system, fuses or magnet-circuit breakers for compressor protection, the magnet-circuit breakers protecting the fans and the magnet-circuit breakers protecting the auxiliary circuit.

Transducers
The unit is supplied complete with: input and output water temperature probe. A low pressure transducer is also present (one per circuit): this allows to view the compressor intake value on the board display; this is installed on the low pressure side of the chiller circuit and stop functioning of the compressor in the case of anomalous working pressures. The chiller also has a high pressure transducer (one per circuit): this allows to view the compressor intake value on the board display; this is installed on the low pressure side of the chiller circuit and stop functioning of the compressor in the case of anomalous working pressures.

Electronic adjustment
The electronic adjustment on NS chillers is made up of a control board for every compressor connected to each other in a network and a control panel with display. In the case of multi-compressor models the board that controls compressor n°1 is the “master" board while the others are “slaves”. Transducers, loads and alarms relative to the control compressor are connected to each board, while the general machine ones are only connected to the master board.
The microprocessor has the following functions:

- remote ON/OFF with external contact without voltage.
- Multi-language menu.
- Phases sequence control.
- Independent control of the individual compressors.
- Amperometric transformer.
- Cumulative faults block signal.

- Historical alarms function.
- Daily/weekly programming.
- Temperature display of the input and output water.
- Alarms display.
- Integral proportional adjustment of the output water temperature (precision up to ±0.1K).
- Programmable timer function.
- Function with double set-point linked to an external contact.
- Fan adjustment.
- Can be interfaced with MODBUS protocol. (Accessory)
- Pump unit check.
- Compressor rotation management.
- "Always Working" Function. In the case of critical conditions (e.g. an environmental temperature that is too high) the machine does not stop but can adjust itself and supply the maximum power in those conditions.
- Self-adapting "Switching Hysteresis" work differential to always ensure the correct functioning times of the compressors even in plants with low water content or insufficient capacities. This system decreases compressor wear.
- AFFP "Anti Freezing Fan Protection" system that periodically switches the fans on when external temperatures are very low.
- PDC "Pull Down Control" system for preventing the activation of the power steps when the temperature of the water quickly approaches the set-point. Optimises machine functioning when working normally and in the presence of load variation, ensuring the best efficiency of the machine in all situations.
- "Compensation of the set-point" on the basis of the external temperature or from external analogue signal (4-20 mA).
- "Demand Limit": allows to limit electric absorption of the machine in the case of peak loads or generator interventions. Machine absorption can be limited to a specified value by acting on an analogue input from 4 to 20mA: it is useful in the moments of insufficient electric power available from the mains.

Options included, **per chiller**

- AK acoustic package
- Refrigerant leak detection equipment
- Dual pressure relief valves
- Evaporator trace heater
- Electronic expansion valves
- AER 485 – BMS interface
- Anti vibration mounts ~ supplied loose

Chiller Conformity

The installation and user manual is present inside every appliance, complete with declaration of conformity with reference to the appliance's serial number. The data plate must have the CE mark.

AERMEC, NS series chiller unit mark, is in compliance with the following harmonised standards:

- IEC EN 61000-6-2 and IEC EN 61000-6-4 (Immunity and emission standard for industrial environments);
- EN378 (Refrigerating system and heat pumps - Safety and environmental requirements);
- EN12735 (Copper and copper alloys - Seamless, round copper tubes for air conditioning and refrigeration);
- UNI1285-68 calculation of metal tubes resistance to inside pressure;
- EN60204-1 (Safety of Machinery - Electrical equipment of machines).

They therefore satisfy the essential requisites of the following Directives:

- LVD Directive: 2006/95/CE
- Electromagnetic Compatibility Directive 2004/108/CE
- Machinery Directive 98/37/CE
- PED Directive regarding pressurised equipment 97/23/CE

The product, in agreement with Directive 97/23/CE, satisfies the Total quality Guarantee procedure (form H) with certificate n.06/270-QT3664 Rev.0 issued by the notified body n.1131: CEC, via Pisacane 46, Legnano (MI) - Italy.

Q12138-01J

TECHNICAL SCHEDULE
OFFICE CHILLERS

Model: NS 3602XE AK°°°00

Cooling

Total cooling capacity	kW	746.00
Input power	kW	268.00
Input current	A	437.00
E.E.R.	W/W	2.78
E.S.E.E.R.	W/W	4.06
Dry bulb air inlet temperature	°C	35.00
Inlet water temperature	°C	12.00
Change in water temperature	°C	6.00
Outlet water temperature	°C	6.00
Glycol mix	%	0
Water flow rate	l/s	29.7
Pressure drops	kPa	25.5
Refrigerant		R134a
Compressor type		Screw
Number of compressors	n.	2
Number of cooling circuits	n.	2
Refrigerant gas charge	kg	TBA
Evaporator type		Shell and tube
Number of evaporators	n.	2
Evaporator water connections		4”
Total air flow rate	m^3/s	52.22
Maximum full load current	A	676.00
Maximum Starting current	A	661.00
Power supply		400V - 3 - 50 Hz

Sound data

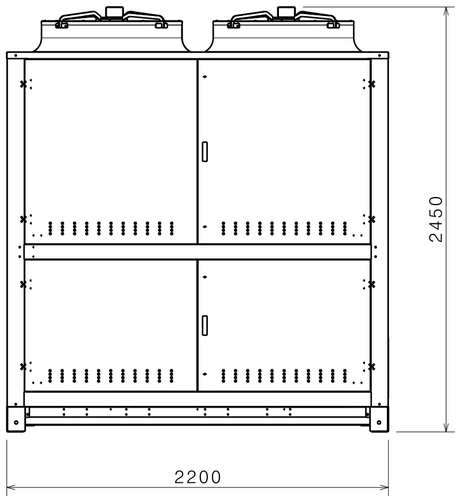
Sound pressure @ 1 metre to EN ISO 3744	dB(A)	65.2

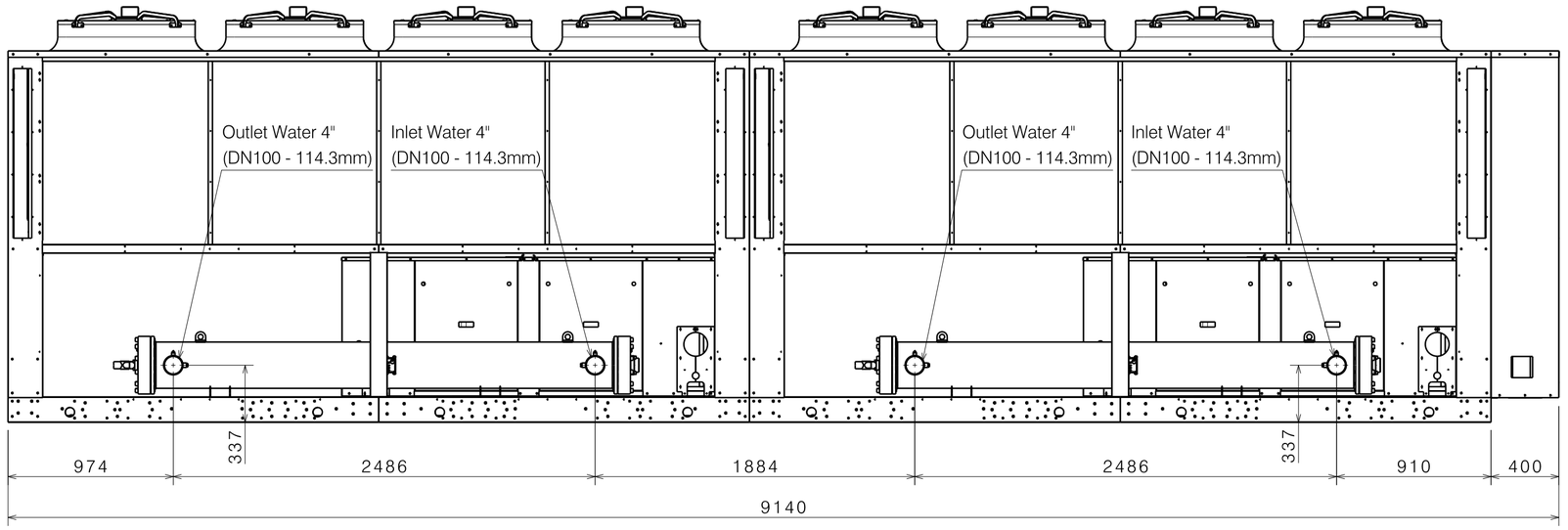
- Sound pressure in unrestricted range on reflecting plane (directivity factor Q = 2).

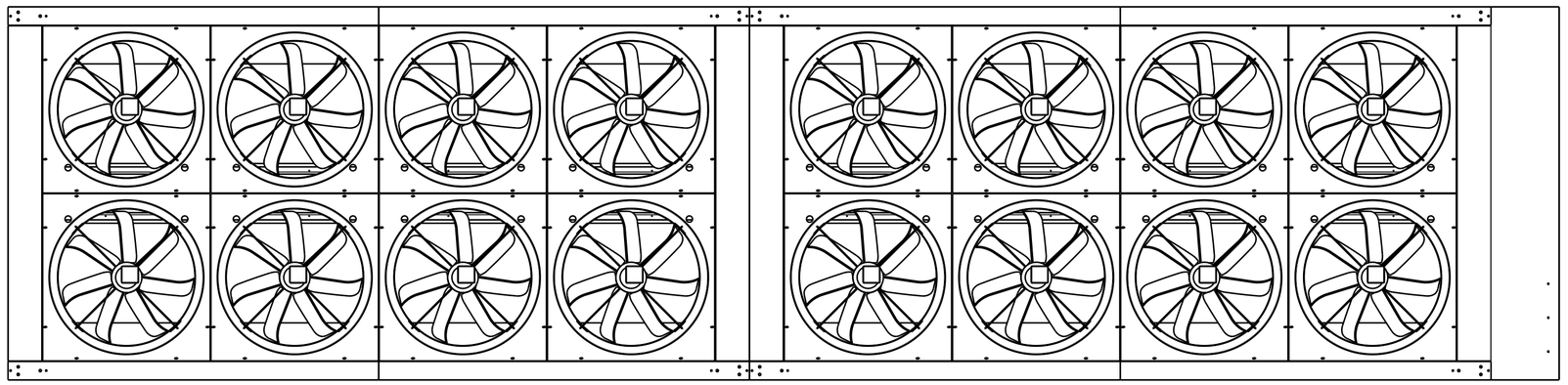
Dimensional data

Height	mm	2,450
Width	mm	2,200
Depth	mm	9,140
Net weight (operating)	kg	8,836

Data according to UNI EN 14511:2011







MODIFICHE/TESTO ACQUISTO				
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	VERIFICATO			
	DISEGNATO			
	DATA			

INDICE MODIFICA/TESTO ACQUISTO	SOSTITUISCE	MATERIALE	SVILUPPO
0	SOSTITUITO		

	Disegnato	Verificato	QUOTE SENZA INDICAZIONE DI TOLLERANZA	SCALA	PROIEZ.
Data	12/11/10		GRADO DI PRECISIONE MEDIO UNI EN 22768	%	
Firma	ROSSETTO C.				

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

MODELLO NS3602X**E***00

PARTICOLARE CONNECTION

CODICE LAYOUT

FOGLIO 1/1

A termini delle vigenti leggi sui diritti di autore il presente disegno non potra' essere copiato, riprodotto o consegnato a terzi o Ditte concorrenti

UNI A2

AERMEC

air conditioning

R134a

FREE COOLING

CPU

RS485

Installation Manual

NS
FREE COOLING

- CHILLER COOLING ONLY
- EXTERNAL UNIT
- HIGH EFFICIENCY
- SCREW COMPRESSOR

AERMEC
COMPANY QUALITY SYSTEM
ICIM
ISO 9001:2008 - Cert. n° 0128
CISQ IQNet
AERMEC S.P.A.

CE

EN

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FOR THE INSTALLER

1. SELECTION AND PLACE OF INSTALLATION

Before beginning the installation process, decide with the client where the unit is to be installed, whilst paying attention to the following:

- the support surface must withstand the weight of the unit;
- the safe distances (fig.2) between the units and other appliances or structures must be strictly complied with for the inlet and outlet air from the fans to circulate freely.
- The unit must be installed by a qualified technician in compliance with national laws in the country of destination.

The unit must be installed by a qualified and suitably trained technician, in compliance with the national legislation in force in the country of destination .

AERMEC will not assume any responsibility for damage due to failure to follow these instructions.

Before beginning any operation, READ THESE INSTRUCTIONS CAREFULLY AND CARRY OUT THE SAFETY CHECKS TO REDUCE ALL RISK OF DANGER TO A MINIMUM. All the personnel involved must have thorough knowledge of the operations and any dangers that may arise at the moment in which the installation operations are carried out.

2. POSITIONING

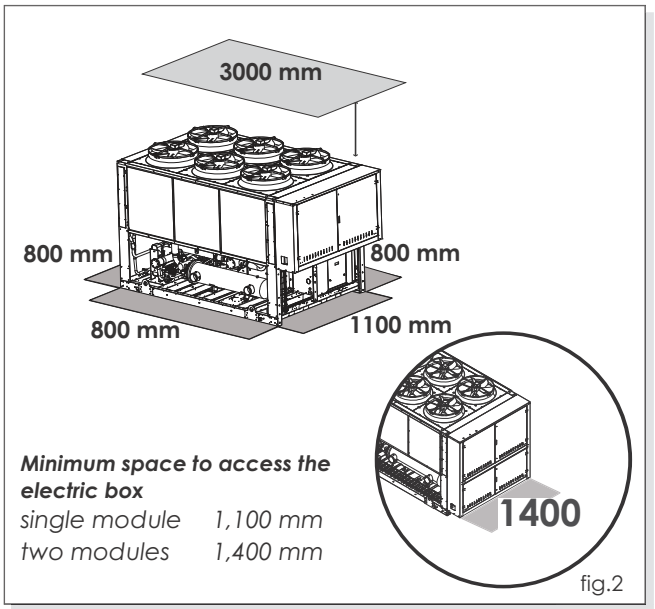
The machine is wrapped in estincoil before being dispatched from the factory.
Before handling the unit, verify the lifting capacity of the machines used. After removing the packaging, the unit must be handled by qualified and adequately equipped personnel. To handle the machine:

- hook the lifting belts to the eyebolts (see fig.3).

ATTENTION: ALWAYS USE ALL THE EYEBOLTS AVAILABLE

- To ensure that the structure of the unit is not damaged, place protections between the lifting belts and the machine. It is strictly prohibited to stand beneath the unit.
- Remember that whilst the chiller is running, it can transmit vibrations; therefore, it is recommended to fasten anti-vibration mounts (AVX accessories) to the holes on the base according to the assembly layout.
- It is mandatory to foresee the necessary technical space in order to allow ROUTINE AND EXTRAORDINARY MAINTENANCE interventions
- Fasten the unit whilst verifying it is level. Make sure that the hydraulic and electric parts can be easily reached.

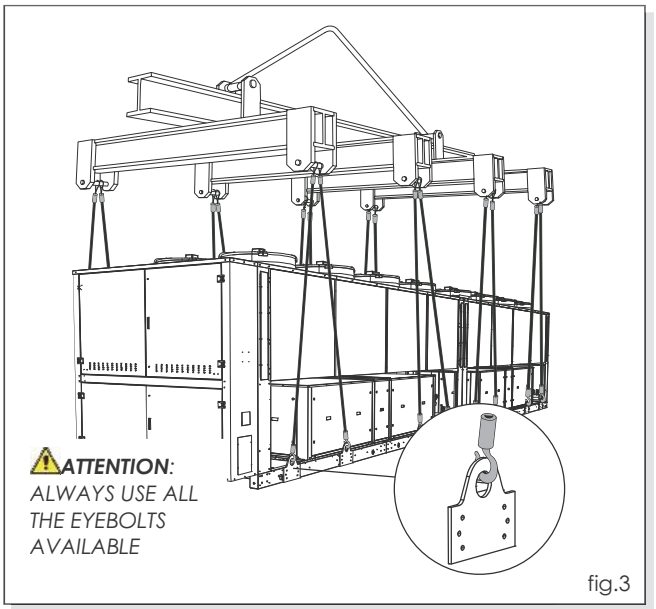
2.1. MINIMUM TECHNICAL SPACES (mm)



Minimum space to access the electric box

single module 1,100 mm
two modules 1,400 mm

fig.2



ATTENTION:
ALWAYS USE ALL THE EYEBOLTS AVAILABLE

fig.3

7.1. ELECTRICAL DATA

The cable sections shown in the table are recommended for maximum lengths of 50m.
For longer lengths or different cable laying, it is up to the PLANNER to calculate the appropriate line switch, the power supply line as well as the connection to the earth wire and connection cables depending on:

- the length
- the type of cable
- the absorption of the unit and the physical location, and the ambient temperature.

ATTENTION
Check the tightening of all power wire clamps on commissioning and after 30 days from start-up. Subsequently, check the tightening of all the power clamps every six months. Loose terminals can cause overheating of the cables and components.

7.2. ELECTRIC POWER CONNECTION TO THE ELECTRICAL MAINS

1. Before connecting the unit to the power supply mains , ensure that the isolating switch is open.
2. Open the front panel.
3. Use the holes for the main electric power supply cable and for the cables of the other external connections under the responsibility of the installer.
4. It is forbidden to access with electric cables in positions not specifically envisioned in this manual.
5. Avoid direct contact with non insulated copper piping and with compressor.
6. Identify the clamps for the electric connectionand always refer to the wiring diagram supplied with the unit.
7. For the functional connection of the unit, take the power supply cable to the electric control board inside the unit and connect to clamps L1-L2-L3 and PE respectingthe polarities.
8. L1-L2-L3 asphases, and PE as earth **(fig.2)**.
9. Re-position the inspection panels.
10. Ensure that all protections removed for the electric connection have been restored before powering the unit.
11. Place the system master switch (external to the appliance) at **"ON"(Fig 1)**.

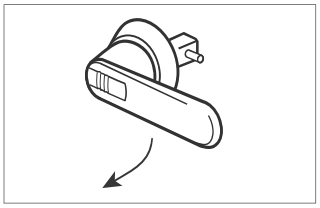


Fig. 1

Fig. 2

ATTENTION
For installation of the **remote control (PRV3)** *keep the following in mind:*

1. *do not exceed the maximum distance, that varies according to the type of accessory (PRV3 = 150 m).*
2. *place cables away from power cables or cables with diverse pressures that emit elettromagnetic disturbances.*
3. *avoid placing the cable in the vicinity of appliances that can create elettromagnetic interferences.*
4. *the shielded cable should be connected to earthing not subjected to disturbances.*
5. *The entire length of the cable must be shielded.*

8. CONTROL AND COMMISSIONING

8.1. PREPARATION FOR COMMISSIONING

Please note that, on request by the Aermec customer or the legitimate owner of the machine, the units in this series can be started up by the AERMEC After-Sales Service in your area (valid only on Italian territory). The start of operation must be scheduled in advance based on the time frame for the completion of works for the system. Prior to the intervention, all other works (electrical and hydraulic hook-ups, priming and bleeding of air from the system) must have been completed.

8.2. AUXILIARY CONNECTIONS IF ENVISIONED, BY THE INSTALLER

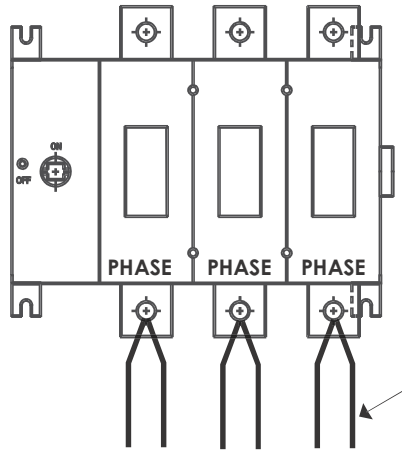
The terminal board connected to the PCO3 board, mounted on the NS-FREECOOLING units, offers the possibility of connecting the following auxiliary devices (according to the particular unit question):

–Enabling the second set (SET)
–Remote switch-on/off (0/1)
–Multifunction auxiliary exclusion (AMF)
–Season changeover (E/I)
–Recuperator flow meter connection (FLR)
–Connection to control the pump (MPO)
–External peripheral connections (e.g. computers, with a max power supply of 230V50Hz)
–Compressor exclusion (ECP)
–Multifunction input (MULTI IN):
a multifunction input is available where it is possible to select 4 different functions, but only 1 can be set:
1 - 0-10V variable set-point
2 - Max. power requested (0-10V) power from 0 to 100%
3 - Min. power limit (0-10V) power from 0 to 100%
4 - Compensation set-point
–Low pressure switch (BP)
–Evaporator pump circuit breaker protection (TMP)

ATTENTION
Before carrying out the controls indicated below, make sure that the unit is disconnected from the power mains. Make sure that the master switch is locked in the OFF position and an appropriate sign is affixed. Before starting the operations, check that there is no voltage present using a voltmeter or a phase indicator.

8.3. DATA OF ELECTRIC VERSIONS «A/E»

NS	VERSION	n° power supply	Formed by:	SECTION A				SEC B mm²	Earth mm²	IL A
				n° cables per phase	single cable sec. mm²	total n° cables	n° phases			
1251	A - E	1		1	150	3	3	1.5	70	250
1401		1		1	185	3	3	1.5	95	315
1601		1		1	240	3	3	1.5	120	315
1801		1		1	240	3	3	1.5	120	400
2101		1		2	150	6	3	1.5	150	630
2401		1		2	185	6	3	1.5	185	630
1402		1		1	185	3	3	1.5	95	315
1602		1		1	240	3	3	1.5	120	400
1802		1		1	240	3	3	1.5	120	400
2002		1		2	150	6	3	1.5	150	630
2202		1		2	150	6	3	1.5	150	630
2352		1		2	185	6	3	1.5	185	630
2502		1		2	185	6	3	1.5	185	630
2652		1		2	185	6	3	1.5	185	630
2802		1		2	240	6	3	1.5	240	630
3002		1		3	150	9	3	1.5	2x120	630
3202		1		3	185	9	3	1.5	2x150	630
3402		1		3	185	9	3	1.5	2x150	800
3602		1		3	240	9	3	1.5	2x185	800
3902		1		3	240	9	3	1.5	2x185	800
4202		1		4	185	12	3	1.5	2x185	800
4502		1		4	240	12	3	1.5	2x240	1000
4802		1		4	240	12	3	1.5	2x300	1000
5002		1		4	240	12	3	1.5	2x240	1000
5202		1		5	240	15	3	1.5	3x240	1250
5402		1		6	240	18	3	1.5	3x240	1250
5702		1		7	240	21	3	1.5	4x240	1600
6003		2	3602	3	240	9	3	1.5	2x185	800
			2401	2	185	6	3	1.5	185	630
6303		2	3902	3	240	9	3	1.5	2x185	800
			2401	2	185	6	3	1.5	185	630
6603		2	4202	4	185	12	3	1.5	2x185	800
			2401	2	185	6	3	1.5	185	630
6903		2	4502	4	240	12	3	1.5	2x240	1000
			2401	2	185	6	3	1.5	185	630
7203		2	4802	4	240	12	3	1.5	2x240	1000
			2401	2	185	6	3	1.5	185	630



Example of electric connection

Example of NS 2101 A/E
3 phases
2 cables per phase
150 mm² single cable sec.
6 cables in all

KEY

SEC.A	*Power supply*
SEC.B	*Remote panels*
EARTH	*Earth wire to connect to unit*
IL	*Master switch*

ATTENTION
For electric connections
use the cables with double insulation according to the Standards in force on this subject in the countries where the unit is installed.

ALWAYS REFER TO THE WIRING DIAGRAM SUPPLIED WITH THE MACHINE

AERMEC
air conditioning

Interfaccia seriale per schede chiller • Serial interface for chiller cards
Interface série pour cartes chiller • Serielle Schnittstelle Für Chiller-Steuerung
Interface serie para tarjetas congelador

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AER485P1_6876423_02

Gentile cliente,
La ringraziamo per aver preferito nell'acquisto un prodotto AERMEC. Esso è frutto di pluriennali esperienze e di particolari studi di progettazione, ed è stato costruito con materiali di primissima scelta e con tecnologie avanzatissime.
La marcatura CE, inoltre, garantisce che gli apparecchi rispondano ai requisiti della Direttiva Macchine Europea in materia di sicurezza. Il livello qualitativo è sotto costante sorveglianza, ed i prodotti AERMEC sono pertanto sinonimo di Sicurezza, Qualità e Affidabilità.

I dati possono subire modifiche ritenute necessarie per il miglioramento del prodotto, in qualsiasi momento senza obbligo di preavviso.

Nuovamente grazie.
AERMEC S.p.A

AERMEC S.p.A. si riserva il diritto, in ogni momento, di effettuare qualsiasi modifica al fine di migliorare il proprio prodotto, e non è obbligata ad aggiungere tali modifiche a macchine precedentemente fabbricate, già consegnate o in fase di costruzione.

Fig.3

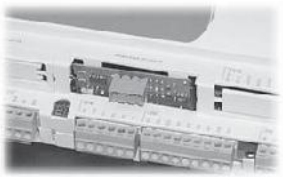


Fig.4

Fig.5

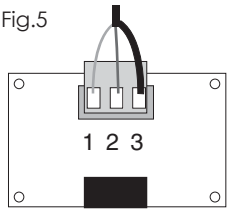
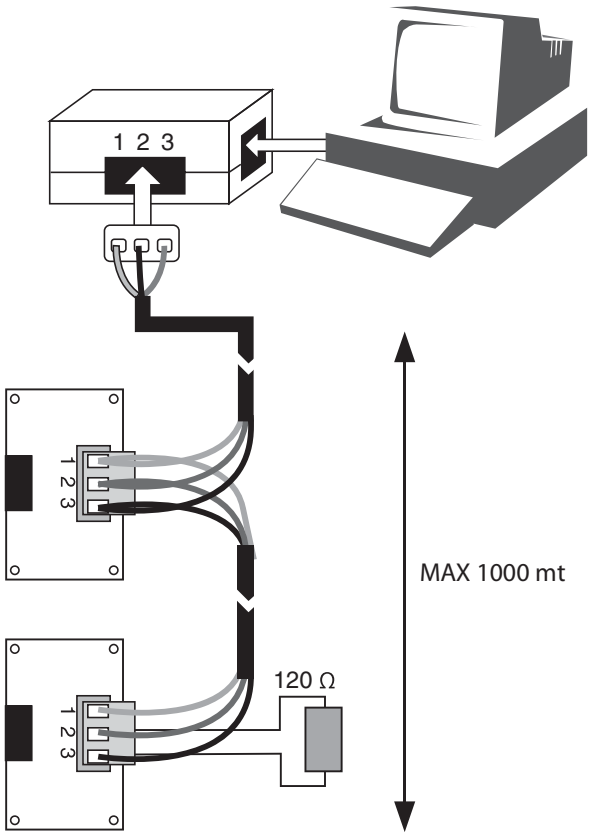


Fig.6

Pin	Significato Meaning
1	GND
2	RX+/TX+
3	RX-/TX

Fig.7



Guida di riferimento per protocollo modaer

Il protocollo di comunicazione Modaer rappresenta lo standard di comunicazione reso disponibile da Aermec per il collegamento tra chiller e sistemi di supervisione o controlli centralizzati (consultare la guida prodotti Aermec per vedere su quali macchine è disponibile questo protocollo).
Il protocollo permette il collegamento sia punto a punto (macchina * supervisore), sia di piu' macchine (max 255) su uno stesso bus di collegamento verso un supervisore, in quanto prevede la gestione di un indirizzo per ogni macchina.
La modalità di comunicazione è del tipo master-slave, quindi il sistema di supervisione è master mentre la macchina è slave.
Questo significa che la macchina risponde solamente alle interrogazioni fatte dal supervisore

Configurazione seriale:

- 1200 to 19200 baud
- 1 bit di start
- no parity
- 2 bit di shigh

Codificazione dati:

Ogni parola di 8 bit (1 byte) contenuta nel messaggio è costituita da due caratteri hex codificati con 4 bit ciascuno (0-9, A-F).

Formato del messaggio:

I campi che compongono il messaggio sono riportati in Tabella 1.
Il messaggio inizia con un intervallo di silenzio lungo almeno 3,5 caratteri (indicati nella Tabella 1 come tempo di silenzio).
La durata di tale intervallo dipende dal baud rate.
Il primo dato ad essere trasmesso è l'indirizzo della macchina; successivamente il tipo di richiesta (tipo di lettura o di scrittura), i dati relativi alla richiesta, il checksum e infine un
intervallo di silenzio della stessa lunghezza di quello iniziale.

Tab. 1

START	tempo di silenzio
INDIRIZZO	1 byte
COMADO	1 byte
DATO	n x byte
CHECKSUM	2 byte
SHigh	tempo di silenzio

Indirizzo:	è l'indirizzo della macchina e può essere compreso tra 1 e 255.
Comando :	è l'operazione che si vuole eseguire, l'elenco è in "Tab.2. pagi.2 "
Checksun :	è un controllo di sicurezza per verificare la correttezza del dato trasmesso ed è calcolato di volta in volta da chi sta trasmettendo il messaggio; chi lo riceve deve ricalcolarlo e confrontarlo con quello ricevuto per avere la sicurezza che i dati ricevuti sono corretti.

Il checksum viene calcolato considerando tutti i campi tranne il campo checksum e considerando solo gli 8 bit di dati per ogni byte (escludendo bit di start e di shigh).
Il checksum è un dato a 16 bit ed è ottenuto nel modo seguente:

1. settare il dato checksum a 16 bit con tutti 1 (0xffff in hex)
2. eseguire l'exor con il successivo byte del messaggio (partendo dal primo e cioè l'indirizzo)
3. eseguire lo shift di un bit (verso il bit meno significativo) con inserimento di uno 0 sul bit piu' significativo
4. controllo sul bit meno significativo estratto dopo lo shift (bit di carry)
5. se il bit è 1 fare l'exor con il dato fisso hex 0xA001
6. ripetere le operazioni dal punto 3 fino ad effettuare 8 shift
7. ripetere le operazioni dal punto 2 per ogni byte che compone il messaggio.

Tipologia di comandi:

Tab. 2

Comando	Operazione Master
01	Read dati digitali (dati 1 bit)
05	Write dati digitali (dati 1 bit)
03	Read dati analogici (dati 16 bit)
06	Write dati analogici (dati 16 bit)

Formato dei comandi :

Comando 01: Read Dati Digitali

Con questo comando si possono richiedere uno o piu' variabili
digitali a partire dall'indirizzo specificato. I dati in risposta vengono raggruppati in byte (8 dati per ogni byte).
Il primo byte ricevuto corrisponde agli 8 dati con indirizzo piu' basso, il bit meno significativo di ogni byte corrisponde al dato con indirizzo piu' basso.
ESEMPIO:

RICHIESTA

Campo	hex
Indirizzo macchina	01
Comando	01
Indirizzo di partenza (byte high)	00
Indirizzo di partenza (byte low)	00
N° di dati (parte high)	00
N° di dati (parte low)	0A
Checksum	...

RISPOSTA

Campo	hex
Indirizzo macchina	01
Comando	01
Numero di byte dati in risposta	02
Dati (0-7)	0E
Dati (8-9)	03
Checksum	...

Comando 05: Write Digitali
Per assegnare 1 ad un indirizzo digitale bisogna trasmettere il dato hex 0xFF00;
per assegnare 0 bisogna trasmettere il dato hex 0x0000.
Ogni altro tipo di dato viene gestito come errore.
La risposta normale è un echo della richiesta se l'assegnazione del dato è andata a buon fine.
ESEMPIO:

RICHIESTA

Campo	hex
Indirizzo macchina	01
Comando	05
Indirizzo (byte high)	00
Indirizzo (byte low)	00
Dato nuovo (parte high)	FF
Dato nuovo (parte low)	00
Checksum	...

RISPOSTA

Campo	hex
Indirizzo macchina	01
Comando	05
Indirizzo (byte high)	00
Indirizzo (byte low)	00
Dato nuovo (parte high)	FF
Dato nuovo (parte low)	00
Checksum	...

Comando 03: Read Dati Analogici

Con questo comando si possono richiedere uno o piu' variabili analogiche e intere a partire dall'indirizzo specificato. La codifica adottata è binaria in complemento a 2. Le variabili analogiche vengono rappresentate in decimi (ad esempio il valore 10,0 viene trasmesso come 0064h = 100d)., le intere sono trasferite con il valore effettivo (ad esempio 100 viene trasmesso come 0064h = 100d).
Le variabili intere sono quelle con indirizzo maggiore di 128.
Il numero di dati richiesti si intende a partire dall'indirizzo
ESEMPIO:

RICHIESTA

Campo	(hex)
Indirizzo macchina	01
Comando	03
Indirizzo di partenza (byte high)	00
Indirizzo di partenza (byte low)	00
N° di dati richiesti (parte high)	00
N° di dati richiesti (parte low)	02
Checksum	...

RISPOSTA

Campo	hex
Indirizzo macchina	01
Comando	03
Numero di byte dati in risposta	04
Byte hight dato 0	0c
Byte low dato 0	03
Checksum	...

Comando 06: Write Dati Analogici

Con questo comando si può scrivere una variabile analogica o intera.
La codifica adottata è binaria in complemento a 2.
Le variabili analogiche vengono rappresentate in decimi (ad esempio il valore 10,0 viene trasmesso come 0064h = 100d)., le intere sono trasferite con il valore effettivo (ad esempio 100 viene trasmesso come 0064h = 100d).
Le variabili intere sono quelle con indirizzo maggiore di 128.
La risposta normale è un echo della richiesta se l'assegnazione del dato è andata a buon fine.
ESEMPIO:

RICHIESTA

Campo	(hex)
Indirizzo macchina	01
Comando	06
Indirizzo (byte high)	00
Indirizzo (byte low)	00
Dato nuovo (parte high)	1B
Dato nuovo ((parte low)	00
Checksum	...

RISPOSTA

Campo	hex
Indirizzo macchina	01
Comando	06
Indirizzo (byte high)	00
Indirizzo (byte low)	00
Dato nuovo (parte high)	1B
Dato nuovo ((parte low)	00
Checksum	...

GESTIONE TIMEOUT ED ERRORI DI COMUNICAZIONE
Di seguito si analizzano i possibili casi in cui puo' evolversi la comunicazione e il comportamento previsto dal master e dallo slave come protocollo.

1. Lo slave riceve la richiesta senza errori di comunicazione : slave : risponde come previsto master : deve prevedere un timeout sulla risposta dello slave di almeno 500mS per dare allo slave la possibilità di elaborare i dati.
2. Lo slave non riceve la richiesta per un errore di comunicazione slave : non dà nessuna risposta master : deve prevedere un timeout

sulla risposta

3. Lo slave riceve la richiesta, ma c'è un errore di comunicazione (es. checksum) slave : non dà nessuna risposta master : deve prevedere un timeout sulla risposta
4. Lo slave riceve la richiesta senza errori di comunicazione ma i dati della richiesta non sono corretti (es. comando non previsto, richiesta numero dati eccedente, indirizzi non previsti, valore dato in scrittura fuori range) slave : risponde normalmente con il suo indirizzo sul primo campo, sul campo comando risponde aggiungendo 0x80 al codice del comando e come terzo byte risponde con un codice di errore che identifica l'errore riscontrato. (vedere esempio seguente)

I codici di errore sono i seguenti :

01	Comando non valido
02	Indirizzo dato non valido
03	Valore dato (in modo write) fuori range

ESEMPIO 1

Errore di comunicazione	RICHIESTA
Campo	hex
Indirizzo macchina	01
Comando	07 (comando non valdo)
Indirizzo macchina	00
Indirizzo (byte high)	00
Dato nuovo (parte high)	1B
Dato nuovo (parte low)	00
Checksum	...

ESEMPIO 2

Errore di comunicazione	RISPOSTA
Campo	hex
Indirizzo macchina	01
Comando	87
Codice errore	01 (codice di errore comando non valido)
Checksum	...

TABELLE INDIRIZZI

Di seguito vengono illustrati gli indirizzi previsti dal protocollo e il significato corrispondente dal punto di vista della macchina. Gli indirizzi non riportati sono riservati o non utilizzati; pertanto non è consentito utilizzare comandi relativi a indirizzi non riportati in quanto ciò potrebbe comportare malfunzionamenti o rotture della macchina.

Gli indirizzi contrassegnati dal simbolo ✓sono da utilizzare solamente con la scheda master.
CONFIGURAZIONE di serie della scheda pCO3:

Per configurare la comunicazione seriale della scheda pCO3 con la velocità di trasmissione, l'indirizzo di rete e il tipo di protocollo richiesto, selezionare le seguenti maschere nel menu utente (Prog. chiave):

Indirizzo per le autorità di vigilanza	**001**
Baudrate9600	**(RS485)**
Protocollo	**Modbus**

NOTE RIGUARDANTI LETTURA/SCRITTURA DATI TIMER E STORICO DA SUPERVISORE:
Timer :

Per impostare da Supervisore le seguenti fasce:

Giorno	MARTEDI'		
Start Fascia 1	03:15	Shigh Fascia 1	12:30
Start Fascia 2	14:30		
Shigh Fascia 2	20:00		

Operazioni da eseguire:

- impostare a '3' la variabile analogica 166 (1=Domenica; 2=Lunedi'; …7=Sabato)
- impostare il valore '3' alla variabile analogica 158
- impostare il valore '15' alla variabile analogica 159
- impostare il valore '12' alla variabile analogica 160
- impostare il valore '30' alla variabile analogica 161
- impostare il valore '14' alla variabile analogica 162
- impostare il valore '30' alla variabile analogica 163
- impostare il valore '10' alla variabile analogica 164
- impostare il valore '00' alla variabile analogica 165
- settare la variabile digitale 74 che memorizza le singole impostazioni.

Viceversa, se l'impostazione fosse stata:

Giorno	MARTEDI'
Start Fascia 1	13:15
Shigh Fascia 1	12:30
Start Fascia 2	14:30
Shigh Fascia 2	20:00

In questo caso la variabile digitale 75 andra' a '1'
anche quando:
lo SHigh Fascia 1 e' MINORE dello START Fascia 1;
lo SHigh Fascia 2 e' MINORE dello START Fascia 2;
lo SHigh Fascia 2 e' MINORE dello START Fascia 1.

N.B.: Nel caso in cui si voglia disabilitare una o piu' Fasce e' sufficiente impostare lo START e lo SHigh fascia a 00:00 - 00:00.

STORICO ALLARMI:
Per interrogare da Supervisore lo storico.
Operazioni da eseguire:

- Settare la variabile digitale 79 in modo da ricevere tutte le informazioni su DATA, TEMP. IN, TEMP. OUT,..... riguardo l'ultimo allarme registrato dal PCO3;
- settare la variabile digitale 78 per richiedere dati relativi all'evento di allarme precedente quello visualizzato
- settare la variabile digitale 77 per richiedere dati relativi all'evento di allarme successivo quello visualizzato

A questo punto leggendo le variabili analogiche 32, 33 e da 167 a 172 si ottengono tutte le informazioni relative all'allarme selezionato.

Per resettare lo Storico da Supervisore:

- settare la variabile digitale 76.

REGOLAZIONE ORA
Per regolare l'ora da Supervisore.
Operazioni da eseguire:

- impostare l'ORA nuova sulla variabile analogica 149;
- impostare i MINUTI nuovi sulla variabile analogica 151;
- impostare il GIORNO nuovo sulla variabile analogica 153 (1=Domenica; 2=Lunedi'; …7=Sabato);
- impostare il MESE nuovo sulla variabile analogica 155
- impostare l'ANNO nuovo sulla variabile analogica 157 (2 cifre);
- settare la variabile digitale 56 che copia le variabili appena impostate.

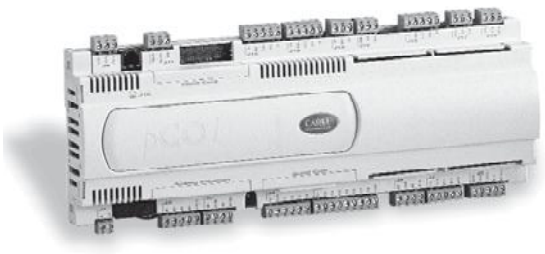


Fig.1

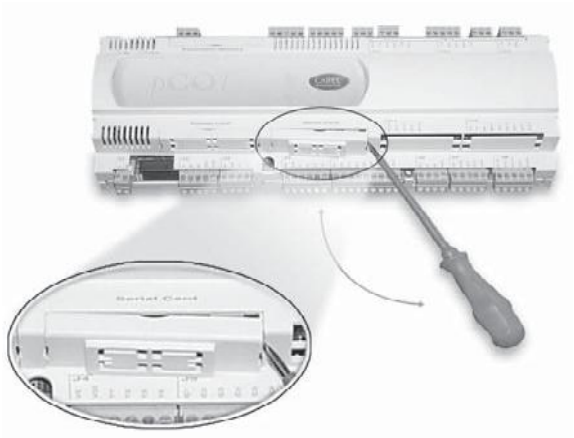
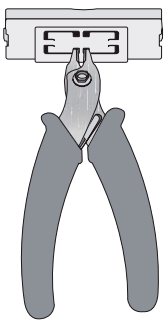
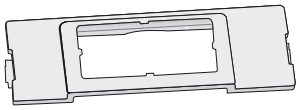


Fig.2





EN

DESCRIPTION

The AER485P1 card is an accessory for the entire PCO3 control series (PCO3B excluded), which allows the direct interface of an RS485 network. The card provides the optical isolation of the controller in relation to the RS485 serial network. The maximum achievable baud rate is 19200 baud (settable via software).

ASSEMBLY

With reference to Figs. 1 ... 4, the connection to the PCO3 is obtained
following this procedure:

1. remove the "serial card" of the electronic controller with a screwdriver (see Figure 1);
2. with a pair of nippers, remove the plastic knockout section from the cover, obtaining the opening for the 3-way connector (see Figure 2);
3. insert the optional card into the corresponding comb connector, taking care that the card is correctly inserted and to is in contact with the two plastic supports of the PCO3 container (see Figure 3);
4. close the cover with a screwdriver, lining up the connector of the serial card with the hole on the cover (Fig. 4).

The connection to the RS485 network is obtained using the connector with removable terminals on the card.
The meanings of the pins on the connector (Fig. 5) are indicated by the serigraphy on the card and listed in Fig. 6.
If the card occupies the last position in the serial supervision line, a terminating line resistor with a value of 120 Ω - 1/4 W is connected to the terminals of pins 2 and 3 as in the diagram of Figure 7.

Technical characteristics

Cable section:	use AWG20/22 twisted two wire shielded cable with a 2 mm sections at the terminals: min. 0.2 - max. 2.5.
Operating conditions:	-10T60 °C; 90 % RH.
Storage conditions:	-20T70 °C; 90 % RH.
Degree of pollution:	normal.
Dimensions (mm)	60x29x20, (60x29: terminal strip, 20: overall width of components).

Warnings. Care in handling the card

Electrical damage may occur on electronic components is almost always due to electrostatic discharge caused by the operator. It is therefore necessary take suitable steps for these type of components, in particular:

- before handling any electronic component or card, touch a grounded object (trying to avoid touching a component is not sufficient as a discharge of 10,000 V, which is quite easily achieved by static electricity, produces an arc of about 1 cm);
- the materials must remain in their original packaging as far as possible. If necessary, remove the card from its package and place it in an antistatic bag, without touching the back of the card with the hands;
- the use of plastic, polystyrene or non antistatic bags should be strictly avoided;
- avoid at all cost the direct handling of the card from one operator to another (to avoid electrostatic induction and discharges).

Fig.3

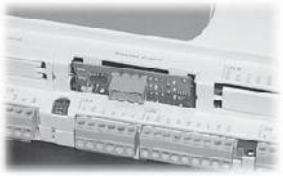


Fig.4

Fig.5

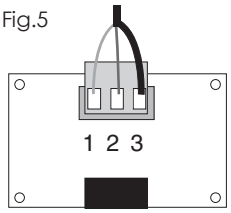
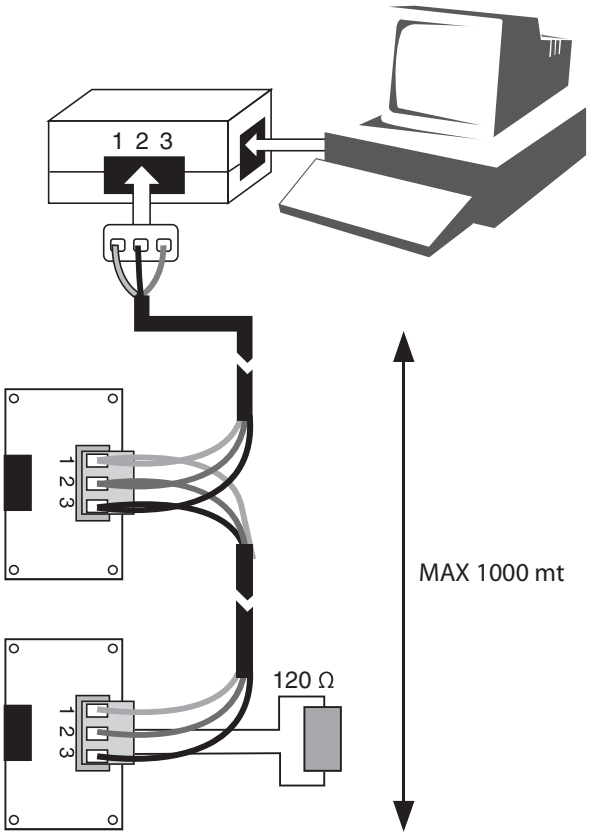


Fig.6

Pin	Meaning Meaning
1	GND
2	RX+/TX+
3	RX-/TX

Fig.7



Reference guide for Modaer protocol

The Modaer communication protocol is the communication standard made available by Aermec for the connection between chillers and centralised supervision or control systems (see the Aermec products guide to see on which machine this protocol is available).
The protocol allows both the point to point connection (machine * supervisor), as well as several machines (max 255) on the same bus link to a supervisor, because it manages one address for each machine.
The system uses a master-slave communication mode, therefore the supervision system is master and the machine slave.
This means that the machine only responds to the enquiry made by the supervisor.

Serial configuration:

- 1200 to 19200 baud
- 1 start bit
- no parity
- 2 shigh bits

Data configuration:

Each 8 bit word (1 byte) in the message is comprised of two coded hex characters with 4 bits each (0-9, A-F).

Message format:

The fields that comprise the message are shown in Table 1.
The message begins with a dead interval of at least 3.5 characters long (indicated in Table 1 as a dead period).
The duration of this interval depends on the baud rate.
The first data to be transmitted is the address of the machine; then the type of request (read or write type), data relating to the request, the checksum and then a dead interval with the same length as that at the beginning .

Tab.1

START	dead time
ADDRESS	1 byte
COMMAND	1 byte
DATA	n x byte
CHECKSUM	2 bytes
SHigh	dead time

Address:	this is the machine address and can be comprised between 1 and 255.
Command:	this is the operation you want to perform, the list is in "Tab.2. page 2 "
Checksum:	this is a safety check to verify the correctness of the data being transmitted and is calculated from time to time by the sender of the message; the receiver has to recalculate and compare it with the one received in order to be sure that all information received is correct.

The checksum is calculated by considering all areas except the checksum field and considering only the 8 bits of data for each byte (excluding start and shigh bits).
The checksum is a 16-bit data and is obtained as as follows:

1. set the 16 bit checksum data with all 1 (0xffff in hex)
2. run the Exor with the next byte of the message (starting from the first, i.e. the address)
3. run the shift of a bit (toward the least significant bit) by inserting a 0 on the more significant bit
4. control on the least significant bit extracted after the shift (carry bit)
5. if the bit is 1 perform the exor with the fixed data hex 0xA001
6. repeat the operations from point 3 until 8 shifts have been made
7. repeat the operations from point 2 for each byte that comprises the message.

1. The slave receives the request, but there is a slave communication error (e.g. checksum): no master reply is given: there should be a timeout on the response
2. The slave receives the request without communication errors but the data of the request are incorrect (e.g. command not expected, excess data number request, address not provided, the written value given out of range) slave: normally responds with its address on the first field, responds on the command field by adding 0x80 to the command code and as the third byte responds with an error code that identifies the error found. (see following example)

The error codes are as follows:

01	Invalid command
02	Invalid data address
03	Data value (in write mode) out of range

EXAMPLE 1

Communication error Hex field	REQUEST
Machine address	01
Command	07 (invalid command)
Machine address	00
Address (byte high)	00
New data (high part)	1B
New data (low part)	00
Checksum	...

EXAMPLE 2

Communication error Hex field	REPLY
Machine address	01
Command	87
Error code	01 (invalid command error code)
Checksum	...

FAMILIES: RV - NW - NS - NSB - WS - WF
TABLE OF ADDRESSES
Below are the addresses foreseen by the protocol and the corresponding meaning in terms of the machine.
Addresses not indicated are reserved or unused; therefore the use of commands related to addresses not listed are not permitted as this could lead to malfunctions or failures of the machine.

Addresses marked by ✓ are for use with the master card only.

SERIAL CONFIGURATION OF THE PCO3 CARD:

To configure the serial communication of the PCO^3 card with the Baud rate, the network address and the type of protocol required, select the following masks in the user menu (Prog. key):

Address for supervisor	001
Baud rate9600	(RS485 only)
Protocol	Modbus

NOTES CONCERNING READ/WRITE OF SUPERVISOR TIMER AND LOG DATA :
Timer :

To set the following slots from the supervisor:

Day	TUESDAY
Start Slot 1	03:15 Shigh Slot 1 12:30
Start Slot 2	14:30
Shigh Slot 2	20:00

Operations to perform:

- set the analogue variable 166 to '3' (1=Sunday; 2=Monday; … 7=Saturday)
- set the value '3' to the analogue variable 158
- set the value '15' to the analogue variable 159
- set the value '12' to the analogue variable 160
- set the value '30' to the analogue variable 161
- set the value '14' to the analogue variable 162
- set the value '30' to the analogue variable 163
- set the value '10' to the analogue variable 164
- set the value '00' to the analogue variable 165
- set the digital variable 74 that save the individual settings.

Vice versa, if the setting has been made:

Day	TUESDAY
Start Slot 1	13:15
Shigh Slot 1	12:30
Start Slot 2	14:30
Shigh Slot 2	20:00

In this case the digital variable 75 will go to '1' even when:
SHigh Slot 1 is LESS than the START Slot 1;
SHigh Slot 2 is LESS than the START Slot 2;
SHigh Slot 2 is LESS than the START Slot 1.

N.B.: In case one or more 'Slots need to be disabled simply set the START and SHigh slot to 00:00 - 00:00.

ALARMS LOG:
To interrogate the Log from the Supervisor.
Operations to perform:

- Set the digital variable 79 to receive all DATE, IN TEMP. OUT TEMP. information,..... concerning the last alarm recorded by the PCO3;
- set the digital variable 78 to request data concerning the alarm prior to that displayed;
- set the digital variable 77 to request data concerning the alarm after that displayed.

At this point, reading the analogue variables 32, 33 and from 167 to 172, all the alarm information relating to the alarm selected is obtained.

To reset the Log from the Supervisor.

- set the digital variable 76.

HOUR ADJUSTMENT
To adjust the hour from the Supervisor.
Operations to perform:

- set the new HOUR on the analogue variable 149;
- set the new MINUTES on the analogue variable 151;
- set the new DAY on the analogue variable 153 (1=Sunday; 2=Monday; … 7=Saturday);
- set the new MONTH on the analogue variable 155
- set the new YEAR on the analogue variable 157 (2 digits);
- set the digital variable 56 that copies the variables just set.

FR

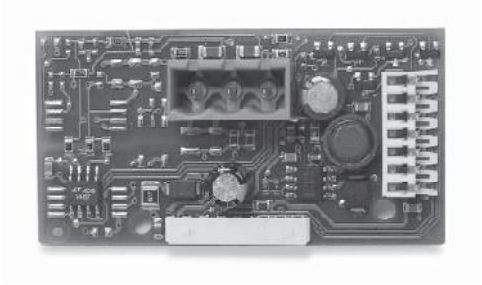
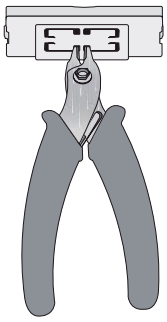
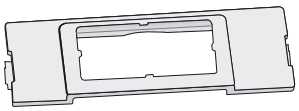


Fig. 1

Fig. 2





DESCRIPTION

La carte AER485P1 est un accessoire de toute la famille de contrôles PCO3 (sauf PCO3B) qui permet l'interface directe à un réseau RS485. La carte garantit l'opto-isolation du contrôleur par rapport au réseau sériel RS485. Le baud rate maximum qui peut être obtenu est 19 200 baud (réglable à l'aide du logiciel).

MONTAGE

Pour les Figures 1...4, la connexion au PCO3 se fait en suivant cette procédure :

1. avec un tournevis, ôter le cache "serialcard" du contrôle électronique (voir fig. 1) ;
2. avec un ciseau, éliminer la partie pré-coupée en plastique du cache, de manière à obtenir le trou correspondant à la sortie à 3 voies (voir Figure 2) ;
3. introduire la carte optionnelle dans le connecteur peigne correspondant en veillant à ce que la carte soit correctement insérée et qu'elle bute contre les deux appuis en plastique faisant partie du boîtier du PCO3 (voir figure 3) ;
4. refermer le cache avec le tournevis en faisant coïncider le connecteur exposé de la carte sérielle avec le trou qui a été fait sur le cache (voir figure 4).

La connexion au réseau RS485 s'obtient par l'intermédiaire du connecteur à bornes extractibles qui se trouve sur la carte.
Les sens de pins sur ce connecteur (Fig. 5) sont mis en évidence par la sérigraphie qui se trouvent sur la carte et énumérés à la figure 6.
Si la carte occupe la dernière position dans la ligne sérielle de supervision, aux extrémités des pins 2 et 3, il faut brancher une résistance de fermeture de ligne, de la valeur de 120 Ω - 1/4 W comme d'après le schéma de la Figure 7

Caractéristiques techniques

Section du câble :	utiliser un câble retord et blindé à deux fils AWG20/22 avec une section, aux bornes de mm 2 : min. 0,2 - max. 2,5.
Conditions de fonctionnement :	-10 T60 °C ; 90 % HR
Conditions d'entreposage :	-20T70 °C ; 90 % HR
Degré de pollution :	normal.
Dimensions (mm) :	60x29x20, (60x29 : plaque à bornes, 20 : largeur composants hors tout).

Avertissements. Précautions pour manipuler la carte

Les inconvénients électriques qui se vérifient sur les composants électroniques arrivent presque tous à cause des décharges électrostatiques provoquées par l'opérateur. Il est donc nécessaire de prendre des mesures adéquates pour que ces catégories de composants, et notamment :

- avant de manipuler tout composant électronique ou carte, toucher une mise à terre (le fait même d'éviter de toucher un composant n''est pas suffisant car une décharge de 10000 V, tension très facile à atteindre avec l'électricité statique, provoque un arc d'environ 1 cm) ;
- Les matériaux doivent rester autant que possible dans leurs emballages d'origine. Si nécessaire, prélever la carte de son conditionnement et placer le produit dans un emballage antistatique sans toucher le verso de la carte avec les mains ;
- éviter absolument d'utiliser des sachets en plastique, polystyrène ou des éponges non antistatiques ;
- éviter absolument le passage direct entre opérateurs (pour éviter des phénomènes d'induction électrostatique et les décharges correspondantes).

Fig. 3

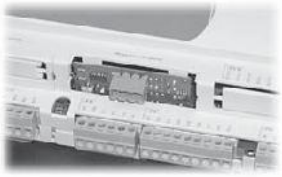


Fig. 4

Fig. 5

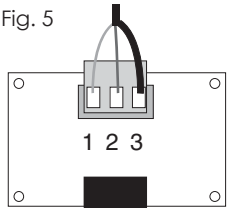
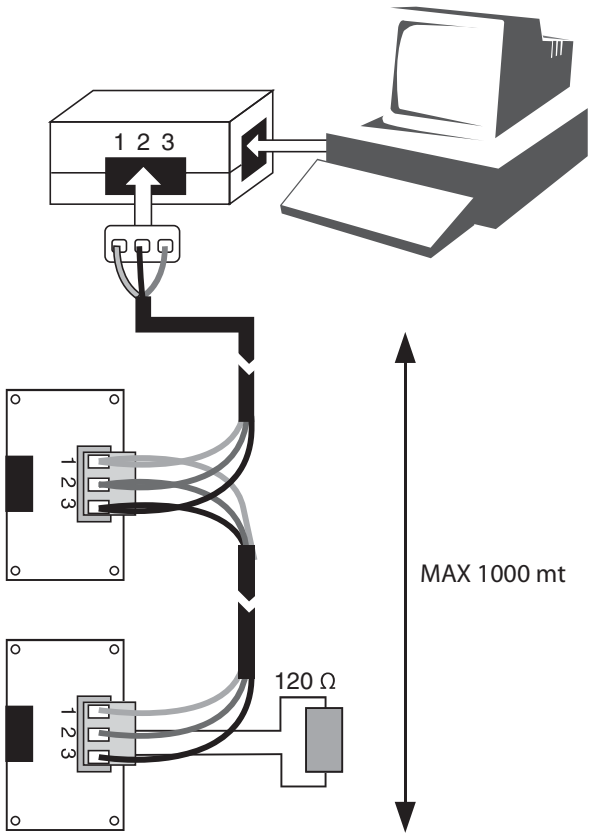


Fig. 6

Pin	Signification Meaning
1	GND
2	RX+/TX+
3	RX-/TX

Fig. 7



Guide de référence pour protocole modaer

Le protocole de communication Modaer représente le standard de communication réseau Aermec pour la connexion entre chillers et les systèmes de supervision ou contrôle centralisés (consulter le catalogue de produits Aermec pour savoir quels appareils acceptent ce protocole).
Le protocole permet la connexion point à point (appareil * superviseur) de plusieurs appareils (max. 255) sur un même bus de liaison vers un superviseur, car il prévoit la gestion d'une adresse pour chaque appareil.
Le mode de communication est de type master-slave, le système de supervision fonctionnant en master, l'appareil en slave.
Cela signifie que l'appareil répond seulement aux requêtes du superviseur.

Configuration série :

- 1200 to 19200 baud
- 1 bit de départ
- aucune parité
- 2 bit d'arrêt

Codification données :

Chaque mot de 8 bits (1 octet) contenu dans le message est constitué de deux caractères hex codifiés avec 4 bits chacun (0-9, A-F).

Format du message :

Les champs qui composent le message sont indiqués dans le Tableau 1.
Le message commence par un intervalle de silence d'au moins 3,5 caractères (indiqués dans le Tableau 1 comme temps de silence).
La durée de cet intervalle dépend du baud rate.
La première donnée transmise est l'adresse de la machine ; ensuite le type de demande (type de lecture ou d'écriture), les données relatives à la demande, le checksum et enfin un
intervalle de silence de la même longueur que celui initiale .

Tab.1

START	temps de silence
ADRESSE	1 byte
COMMANDE	1 byte
DONNEE	n x octet
CHECKSUM ...	2 byte
SHigh	temps de silence

Adresse :	est l'adresse de la machine et peut être comprise entre 1 et 255.
Commande	est l'opération que l'on veut exécuter, la liste est en "Tab. 2. page 2"
Checksun :	est un contrôle de sécurité pour vérifier la justesse de la donnée transmise et est calculé chaque fois que le message est transmis ; qui le reçoit doit le recalculer et le comparer avec celui reçu pour être sûr que les données reçues soient correctes.

Le checksum est calculé en considérant tous les champs sauf le champ checksum et en considérant seulement les 8 bits de données pour chaque octet (en excluant le bit de start et de shigh).
Le checksum est une donnée de 16 bits et est obtenu comme suit :

1. régler la donnée checksum à 16 bits avec tous 1 (0xffff in hex)
2. exécuter l'exor avec le octet du message successif (en partant du premier c'est-à-dire de l'adresse)
3. exécuter le shift d'un bit (vers le bit moins significatif) avec insertion d'un 0 sur le bit plus significatif
4. contrôle sur le bit le moins significatif extrait après le shift (bit di carry)
5. si le bit est 1 faire l'exor avec la donnée fixe hex 0xA001
6. répéter les opérations du point 3 jusqu'à effectuer 8 shift
7. répéter les opérations du point 2 pour chaque octet qui compose le message.

Typologie de commandes :

Tab.2

Commande	Opération Master
01	Lecture données numériques (données 1 bit)
05	Écriture données numériques (données 1 bit)
03	Lecture données numériques (données 16 bit)
06	Écriture données numériques (données 16 bit)

Format des commandes :

Commande 01 : Lectures Données Numériques

Avec cette commande l'on peut demander une ou plusieurs variables numériques à partir de l'adresse spécifiée. Les données en réponse sont regroupées en octet (8 données par octet).
Le premier octet reçu correspond aux 8 données avec l'adresse la plus basse, le bit le moins significatif de chaque octet correspond à la donnée avec l'adresse la plus basse.
EXEMPLE :

DEMANDE Champ	hex
Adresse machine	01
Commande	01
Adresse de départ (byte high)	00
Adresse de départ (byte low)	00
N° de données (partie high)	00
N° de données (partie low)	0A
Checksum	...
REPONSE Champ	hex
Adresse machine	01
Commande	01
Numéro de octet donnés en réponse	02
Données (0-7)	0E
Données (8-9)	03
Checksum	...

Commande 05 : Écritures Numériques

Pour attribuer 1 à une adresse numérique il faut transmettre la donnée hex 0xFF00 ;
pour attribuer 0 il faut transmettre la donnée hex 0x0000.
Tout autre type de donnée est gérée comme erreur.
La réponse normale est un écho de la réponse si l'attribution de la donnée est allée à bonne fin.
EXEMPLE :

DEMANDE Champ	hex
Adresse machine	01
Commande	05
Adresse (byte high)	00
Adresse (byte low)	00
Nouvelle donnée (partie high)	FF
Nouvelle donnée (partie low)	00
Checksum	...
REPONSE Champ	hex
Adresse machine	01
Commande	05
Adresse (byte high)	00
Adresse (byte low)	00
Nouvelle donnée (partie high)	FF
Nouvelle donnée (partie low)	00
Checksum	...

Commande 03 : Lectures Données Analogiques

Avec cette commande l'on peut demander une ou plusieurs variables analogiques et entières à partir de l'adresse spécifiée. L'encodage adopté est binaire en complément à 2. Les variables analogiques sont représentées en dixièmes (par exemple la valeur 10,0 est transmise comme 0064h = 100d)., les entières sont transférées avec la valeur effective (par exemple 100 est transmis comme 0064h = 100d).
Les variables entières sont celles avec l'adresse supérieure à 128.
Le nombre de données demandées s'entend à partir de l'adresse
EXEMPLE :

DEMANDE Champ	(hex)
Adresse machine	01
Commande	03
Adresse de départ (byte high)	00
Adresse de départ (byte low)	00
N° de données demandées (partie high)	00
N° de données demandées (partie low)	02
Checksum	...
REPONSE Champ	hex
Adresse machine	01
Commande	03
Numéro de octets donnés en réponse	04
Octet high donné 0	0c
octet low donné 0	03
Checksum	...

Commande 06 : Écritures Données Analogiques

Avec cette commande l'on peut écrire une variable analogique ou entière. L'encodage adopté est binaire en complément à 2.
Les variables analogiques sont représentées en dixièmes (par exemple la valeur 10,0 est transmise comme 0064h = 100d)., les entières sont transférées avec la valeur effective (par exemple 100 est transmis comme 0064h = 100d).
Les variables entières sont celles avec l'adresse supérieure à 128.
La réponse normale est un écho de la réponse si l'attribution de la donnée est allée à bonne fin.
EXEMPLE :

DEMANDE Champ	(hex)
Adresse machine	01
Commande	06
Adresse (byte high)	00
Adresse (byte low)	00
Nouvelle donnée (partie high)	1B
Nouvelle donnée (partie low)	00
Checksum	...
REPONSE Champ	hex
Adresse machine	01
Commande	06
Adresse (byte high)	00
Adresse (byte low)	00
Nouvelle donnée (partie high)	1B
Nouvelle donnée (partie low)	00
Checksum	...

GESTION TEMPORISATION ET ERREURS DE COMMUNICATION

Ci-après sont analysés les cas possibles où la communication peut évoluer ainsi que le comportement prévu de master et de slave comme protocole.

1. Le slave reçoit la demande sans erreurs de communication : slave : répond comme prévu master : doit prévoir une temporisation sur la réponse du slave d'au moins 500mS pour donner au slave la possibilité d'élaborer les données.
2. Le slave ne reçoit pas la demande pour une erreur de communication slave : il ne donne aucune réponse master : il doit prévoir une temporisation sur la réponse.

1. Le slave reçoit la demande, mais il y a une erreur de communication (ex. checksum) slave : il ne donne aucune réponse master : il doit prévoir une temporisation sur la réponse
2. Le slave reçoit la demande sans erreurs de communication mais les données de réponse ne sont pas correctes (ex. commande non prévue, demande nombre de données excédante, adresses non prévues, valeur données en écriture hors gamme) slave : il répond normalement avec son adresse sur le premier champ, sur le champ commande il répond en ajoutant 0x80 au code de la commande et comme troisième octet il répond avec un code d'erreur qui identifie l'erreur. (voir exemple suivant)

Les codes d'erreur sont les suivants :

01	Commande non valide
02	Adresse donnée non valide
03	Valeur donnée (en mode écriture) hors gamme

EXEMPLE 1

Erreur de communication	DEMANDE
Champ	hex
Adresse machine	01
Commande	07 (commande non valide)
Adresse machine	00
Adresse (byte high)	00
Nouvelle donnée (partie high)	1B
Nouvelle donnée (partie low)	00
Checksum	...

EXEMPLE 2

Erreur de communication	RÉPONSE
Champ	hex
Adresse machine	01
Commande	87
Code erreur	01 (code d'erreur commande non valide)
Checksum	...

FAMILLE: RV - NW - NS - NSB - WS - WF
TABLEAUX ADRESSES
Ci-après sont indiquées les adresses prévues par le protocole et la signification correspondante du point de vue de l'appareil. Les adresses non reportées sont réservées ou non utilisées ; par conséquent il n'est pas permis d'utiliser de commandes relatives à des adresses non indiquées car cela pourrait provoquer de mauvais fonctionnements ou des ruptures de la machine.

Les adresses identifiées par le symbole ✓sont à utiliser seulement avec la carte master.

CONFIGURATION SÉRIELLE DE LA CARTE PCO3 :

Pour configurer la communication sérielle de la carte PCO^3 avec le Baud rate, l'adresse de réseau et le type de protocole voulu sélectionner les masques suivants du menu utilisateur (touche Prog.) :

Address for supervisor	001
Baud rate9600	(RS485 only)
Protocol	Modbus

REMARQUES CONCERNANT LA LECTURE/ÉCRITURE DONNÉES TEMPORISATEUR ET HISTORIQUE DE SUPERVISEUR :
Temporisateur :

Pour régler du Superviseur les tranches suivantes:

Jour	MARDI		
Start Tranche 1	03:15	Shigh Tranche 1	12:30
Start Tranche 2	14:30		
Shigh Tranche 2	20:00		

Opérations à effectuer :

- régler sur '3' la variable analogique 166 (1=Dimanche ; 2=Lundi ; … 7=Samedi)
- Régler la valeur '3' à la variable analogique 158
- Régler la valeur '15' à la variable analogique 159
- Régler la valeur '12' à la variable analogique 160
- Régler la valeur '30' à la variable analogique 161
- Régler la valeur '14' à la variable analogique 162
- Régler la valeur '30' à la variable analogique 163
- Régler la valeur '10' à la variable analogique 164
- Régler la valeur '00' à la variable analogique 165
- régler la variable numérique 74 qui mémorise chaque réglage.

Vice-versa, si le réglage avait été :

Jour	MARDI'
Start Tranche 1	13:15
Shigh Tranche 1	12:30
Start Tranche 2	14:30
Shigh Tranche 2	20:00

Dans ce cas la variable numérique 75 ira à '1' même quand :
le SHigh Tranche 1 est INFÉRIEUR au START Tranche 1 ;
le SHigh Tranche 2 est INFÉRIEUR au START Tranche 2 ;
le SHigh Tranche 2 est INFÉRIEUR au START Tranche 1 ;

N.B.: Si l'on veut désactiver une ou plusieurs Tranches il suffit de régler le START et le SHigh tranche sur 00:00 - 00:00.

HISTORIQUE DES ALARMES :
Pour interroger l'historique du Superviseur.
Opérations à effectuer :

- Régler la variable numérique 79 afin de recevoir toutes les informations sur DATE, TEMP. IN, TEMP. OUT,..... concernant la dernière alarme enregistrée du PCO3 ;
- régler la variable numérique 78 pour demander des données relatives à l'évènement d'alarme précédent celui affiché
- régler la variable numérique 77 pour demander des données relatives à l'évènement d'alarme précédent celui affiché

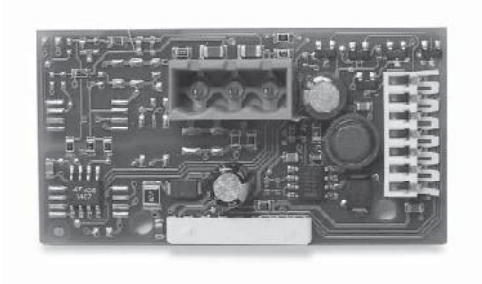
Maintenant en lisant les variables analogiques 32, 33 et de 167 à 172 l'on obtient toutes les informations relatives à l'alarme sélectionné.

Pour réarmer l'Historique du Superviseur :

- régler la variable numérique 76

RÉGLAGE HEURE
Pour régler l'heure du Superviseur.
Opérations à effectuer :

- régler la nouvelle HEURE sur la variable analogique 149 ;
- régler les nouvelles MINUTES sur la variable analogique 151 ;
- régler le nouveau JOUR sur la variable analogique 153 (1=Dimanche ; 2=Lundi ; …7=Samedi) ;
- régler le nouveau MOIS sur la variable analogique 155 ;
- régler la nouvelle ANNÉE sur la variable analogique 157 (2 chiffres) ;
- régler la variable numérique 56 qui copie les variables à peine réglées.



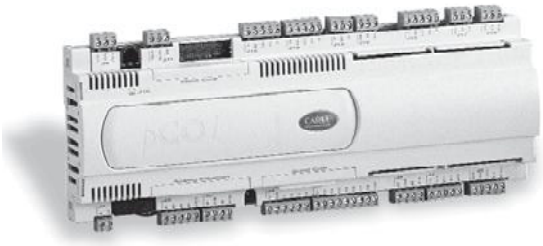


Abb. 1

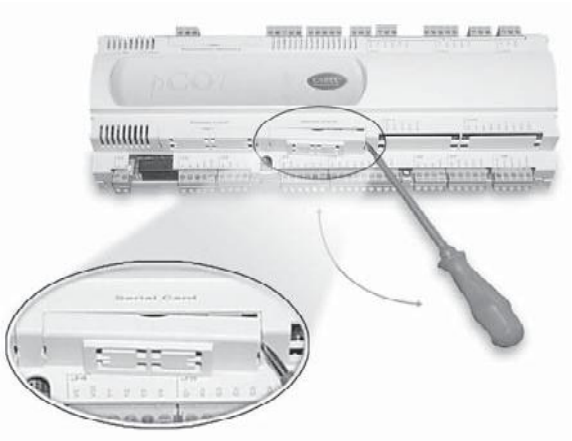
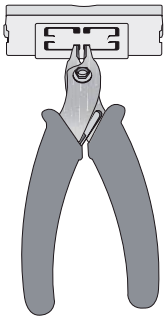
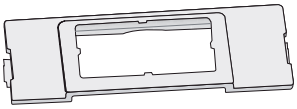


Abb. 2





DE

BESCHREIBUNG

Die Platine AER485P1 ist ein Zubehörteil und gehört zur Familie der PCO3 (ausgenommen PCO3B) Kontrollen, sie dient als direkte Schnittstellenverbindung zu einem RS485 Netz. Die Platine gewährleistet die Optoisolierung des Controllers hinsichtlich des seriellen Netzes RS485. Die maximale erzielbare Baudrate beträgt 19 200 baud (einstellbar über die Software).

MONTAGE

Unter Bezugnahme auf die Abb. 1...4, erfolgt der Anschluss an die Steuerkarte PCO3 wie folgt:

1. die Klappe "Serialcard" des elektronischen Controllers mit einem Schraubendreher abnehmen (siehe Abb. 1);
2. den perforierten Kunststoffteil der Klappe mit einer Trennschere entfernen, wodurch eine Öffnung übereinstimmend mit dem Ausgang des 3-fach Steckverbinders entsteht (siehe Abb. 2);
3. die als Zubehör erhältliche Platine in den dementsprechenden Kammverbinder stecken, darauf achten, dass sie gut steckt und an den beiden Kunststoffstützen am Behälter der Platine PCO3 gut aufsitzt (siehe Abb. 3);
4. die Klappe mithilfe eines Schraubendrehers wieder so schließen, dass der frei liegende Verbinder der seriellen Platine mit der Öffnung an der Klappe übereinstimmt (siehe Abb. 4).

Der Anschluss an das RS485-Netz erfolgt über den an der Platine vorhandenen Steckverbinder mit abnehmbaren Klemmen.
Die Bedeutungen der Stifte auf diesem Steckverbinder (Abb. 5) sind am Siebdruck auf der Platine erkennbar und werden in Abb. 6 aufgelistet.
Sollte die Platine die letzte Position in der seriellen Überwachungsleitung einnehmen, wird an die Endstücke der Stifte 2 und 3 ein Leitungsabschlusswiderstand mit einem Wert von 120 Ω - 1/4 W angeschlossen, wie im Plan aus Abb. 7 ersichtlich

Technische Eigenschaften

Kabelquerschnitt:	ein gedrehtes und geschirmtes 2-drahtiges Kabel AWG20/22 mit Querschnitten an den Klemmen zwischen min. 0,2 und max. 2,5 mm2 verwenden.
Betriebsbedingungen:	-10T60 °C; 90 % RF
Lagerungs-bedingungen:	-20T70 °C; 90 % RF
Verschmutzungsgrad:	normal.
Abmessungen (mm):	60x29x20, (60x29: Sockel, 20: größte Außenbreite der Bauteile).

Hinweise. Vorsicht bei der Handhabung der Platine

Die elektrischen Beschädigungen an den elektronischen Bauteilen erfolgen fast immer durch elektrostatische Entladungen, ausgelöst durch den Bediener. Bei diesen Kategorien von Bauteilen ist daher entsprechende Vorsicht geboten, insbesondere:

- bevor man einen elektronischen Bauteil oder die Platine angreift, muss Masse berührt werden (die Absicht einen elektronischen Bauteil nicht berühren zu wollen alleine reicht nicht aus, da eine Entladung von 10000 V, eine Spannung, die mit der statischen Elektrizität sehr leicht erreicht wird, bewirkt einen ca. 1 cm großen Spannungsbogen);
- die Materialien müssen so weit wie möglich in ihren Originalverpackungen verbleiben. Ggf. die Platine aus einer Verpackung nehmen und das Produkt in eine antistatische Verpackung geben, ohne die Rückseite der Platine mit den Händen zu berühren;
- die Verwendung von Plastiksäcken, Polystyrol oder nicht antistatischen Schwämmen ist strikt zu vermeiden;
- die direkte Übergabe der Platine zwischen Bedienern ist absolut zu vermeiden (zur Vermeidung von elektrostatischer Induktion und daraus resultierende Entladungen).

Abb. 3

Abb. 4

Abb. 5

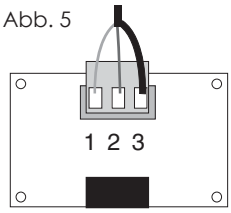
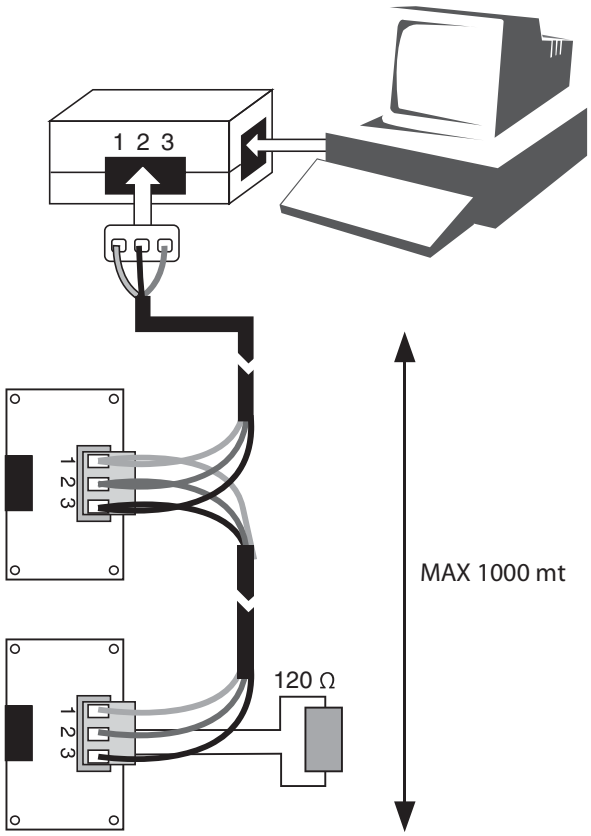


Abb. 6

Pin	Bedeutung Bedeutung
1	GND
2	RX+/TX+
3	RX-/TX

Abb. 7



Anleitung zum Modaer-Protokoll
Das Kommunikationsprotokoll Modaer ist die von Aermec bereitgestellte Standardkommunikation für die Verbindung zwischen Kaltwassersätzen und zentralgesteuerten Überwachungs- oder Steuerungssystemen (zur Feststellung auf welchen Maschinen dieses Protokoll verfügbar ist, verweisen wir auf den Aermec-Produkt-Katalog).
Durch die Verwaltung von einer Adresse pro Maschine ermöglicht das Protokoll sowohl die Punkt-zu-Punkt Verbindung (Maschine * Überwachungssystem) als auch die Verbindung mehrerer Maschinen (max. 255) über denselben Verbindungsbus zu einem Überwachungssystem.
Der Kommunikationsmodus entspricht dem Typ Master-Slave, das Überwachungssystem ist also der Master, die Maschine ist der Slave.
Das bedeutet, dass die Maschine nur auf Anfragen des Überwachungssystems reagiert

Konfiguration der seriellen Schnittstelle:
- 1200 bis 19200 Baud
- 1 Start-Bit
- no parity
- 2 Shighp-Bit

Datencodierung:
Jedes in der Meldung enthaltene 8-Bit-Datenwort (1 Byte) besteht aus 2 kodierten Hex-Zeichen mit je 4 Bit (0-9, A-F).

Meldungsformat:
Die Felder, aus denen die Meldung besteht, sind in Tabelle 1 angeführt.
Die Meldung beginnt mit einer mindestens 3,5 Zeichen langen Ruhezeit (in der Tabelle 1 als Ruhezeit angegeben).
Die Dauer dieser Ruhezeit hängt von der Baudrate ab.
Als erstes wird die Maschinenadresse übertragen; danach der Anfragetyp (Lese- oder Schreibtyp), die die Anfrage betreffenden Daten, die Prüfsumme und schließlich eine Ruhezeit in derselben Länge wie am Anfang.
Tab.1

START	Ruhezeit
ADRESSE	1 Byte
BEFEHL	1 Byte
WERT	n x Byte
PRÜFSUMME	2 Byte
SHighP	Ruhezeit

Adresse:	Maschinenadresse, die zwischen 1 und 255 liegen kann.
Befehl :	Schritt, den man ausführen möchte, die Aufstellung finden Sie in "Tab.2. Seite 2 "
Prüfsumme :	Sicherheitskontrolle zur Überprüfung ob der Datenwert ordnungsgemäß übertragen wurde, sie wird jedes Mal vom Meldungssender neu kalkuliert; um sicherzustellen, dass die empfangenen Daten korrekt sind, muss der Empfänger den Datenwert nochmals berechnen und mit dem erhaltenen vergleichen.

Bei der Berechnung der Prüfsumme werden alle Felder berücksichtigt mit Ausnahme des Prüfsummenfelds und es werden nur die 8 Bit-Daten pro Byte berücksichtigt (Start- und Shighpbit werden nicht berücksichtigt).
Die Prüfsumme ist ein 16-Bit-Wert und wird wie folgt ermittelt:

1. den 16-Bit Prüfsummenwert ausschließlich mit 1 einstellen (0xffff in Hex)
2. Exor mit dem darauf folgenden Meldungsbyte ausführen (ausgehend vom ersten, also der Maschinenadresse)
3. Verschiebung eines Bits (zum niederwertigen Bit hin) mit der Eingabe einer 0 am höherwertigen Bit
4. Kontrolle am nach dem Shift erhaltenen niederwertigen Bit (Übertragungsbit)
5. Ist das Bit gleich 1, Exor mit dem festen Datenwert hex 0xA001 ausführen
6. Die Schritte ab Punkt 3 wiederholen, bis 8 Verschiebungen durchgeführt wurden
7. Für jedes Byte, aus dem die Meldung besteht, die Schritte ab Punkt 2 durchführen.

Typologie der Befehle:

Tab.2

Steuerung	Maßnahme Master
01	Read digitale Daten (1-Bit-Daten)
05	Write digitale Daten (1-Bit-Daten)
03	Read analoge Daten (16-Bit-Daten)
06	Write analoge Daten (16-Bit-Daten)

Befehlsformat :

Befehl 01: Read Digitale Daten

Beginnend mit der spezifischen Adresse können mit diesem Befehl können eine oder mehrere digitale Variablen angefragt werden. Die Antwort-Daten werden in Bytes zusammengefasst (8 Daten pro Byte).
Das erste empfangene Byte entspricht den 8 Daten mit niedrigerer Adresse, das niederwertige Bit eines jeden Bytes entspricht dem Datenwert mit niedrigerer Adresse.
BEISPIEL:

ANFRAGE Feld	hex
Maschinenadresse	01
Befehl	01
Start-Adresse (Byte high)	00
Start-Adresse (Byte low)	00
Datenanzahl (Bereich high)	00
Datenanzahl (Bereich low)	0A
Prüfsumme	...

ANTWORT Feld	hex
Maschinenadresse	01
Befehl	01
Byteanzahl der Antwortdaten	02
Daten (0-7)	0E
Daten (8-9)	03E
Prüfsumme	...

Befehl 05: Write Ditigale Daten
Um einer digitalen Adresse den Wert 1 zuzuteilen, muss der Hex -Datenwert 0xFF00 übertragen werden;
für die Zuteilung von 0 muss der Hex-Datenwert 0x0000 übertragen werden.
Andere Daten werden als Fehler verwaltet.
Ist die Datenzuteilung erfolgreich verlaufen, ist die normale Antwort ein Echo auf die Anfrage.
BEISPIEL:

ANFRAGE Feld	hex
Maschinenadresse	01
Befehl	05
Adresse (byte high)	00
Adresse (byte low)	00
Neuer Wert (Bereich high)	FF
Neuer Wert (Bereich low)	00
Prüfsumme	...

ANTWORT Feld	hex
Maschinenadresse	01
Befehl	05
Adresse (byte high)	00
Adresse (byte low)	00
Neuer Wert (Bereich high)	FF
Neuer Wert (Bereich low)	00
Prüfsumme	...

Befehl 03: Read Analoge Daten

Beginnend mit der spezifischen Adresse können mit diesem Befehl eine oder mehrere analoge und ganze Variablen angefragt werden. Es wird die Binärcodierung in Ergänzung auf 2 angewendet. Die analogen Variablen werden in Zehntel dargestellt (z.B. wird der Wert 10,0 als 0064h = 100d übertragen), die ganzen Variablen werden mit dem effektiven Wert übertragen (z.B. 100 wird als 0064h = 100d übertragen.
Die Adresse für ganze Variablen ist höher als 128.
Die Anzahl angeforderter Daten wird ab der angegebenen Adresse berechnet
BEISPIEL:

ANFRAGE Feld	(hex)
Maschinenadresse	01
Befehl	03
Start-Adresse (byte high)	00
Start-Adresse (byte low)	00
Anzahl angefragter Daten (Bereich high)	00
Anzahl angefragter Daten (Bereich low)	02
Checksum	...

ANTWORT Feld	hex
Maschinenadresse	01
Befehl	03
Byteanzahl der Antwortdaten	04
Byte high Datenwert 0	0c
Byte low Datenwert 0	03
Checksum	...

Befehl 06: Write Analoge Daten

Mit diesem Befehl kann eine analoge oder eine ganze Variable geschrieben. Es wird die Binärcodierung in Ergänzung auf 2 angewendet. Die analogen Variablen werden in Zehntel dargestellt (z.B. wird der Wert 10,0 als 0064h = 100d übertragen), die ganzen Variablen werden mit dem effektiven Wert übertragen (z.B. 100 wird als 0064h = 100d übertragen.
Die Adresse für ganze Variablen ist höher als 128.
Ist die Datenzuteilung erfolgreich verlaufen, ist die normale Antwort ein Echo auf die Anfrage.
BEISPIEL:

ANFRAGE Feld	(hex)
Maschinenadresse	01
Befehl	06
Adresse (byte high)	00
Adresse (byte low)	00
Neuer Wert (Bereich high)	1B
Neuer Wert (Bereich low)	00
Checksum	...

ANTWORT Feld	hex
Maschinenadresse	01
Befehl	06
Adresse (byte high)	00
Adresse (byte low)	00
Neuer Wert (Bereich high)	1B
Neuer Wert (Bereich low)	00
Checksum	...

TIMEOUT-VERWALTUNG UND KOMMUNIKATIONSFEHLER
Im Folgenden werden die verschiedenen Möglichkeiten des Kommunikationsverlaufes und die vorgesehenen Reaktionen von Master und Slave als Protokoll analysiert.

1. Der Slave empfängt die Anfrage ohne Kommunikationsfehler:
   Slave: antwortet wie vorgesehen Master : muss ein Timeout für die Antwort des Slave von min.
   500 ms einberechnen, um dem Slave die Möglichkeit der Datenverarbeitung zu geben.
2. Wegen eines Kommunikationsfehlers empfängt der Slave die Anfrage nicht: er gibt keine Antwort Master : muss ein Timeout für die Antwort einberechnen

1. Der Slave empfängt die Anfrage, aber es liegt ein Kommunikationsfehler vor (z.B. Prüfsumme) Slave : gibt keine Antwort Master : muss ein Timeout für die Antwort einberechnen
2. Der Slave empfängt die Anfrage ohne Kommunikationsfehler, aber die Anfragedaten sind nicht korrekt (z.B. nicht vorgesehener Befehl, Anfrage der Datenanzahl zu hoch, Adressen nicht vorgesehen, Write-Datenwert außerhalb der Bandbreite) Slave : antwortet normal mit eigener Adresse auf dem ersten Feld, auf dem Befehlsfeld antwortet er durch Hinzufügen von 0x80 an den Befehlscode, und als drittes Byte antwortet er mit Fehlercode, der den aufgetretenen Fehler identifiziert. (siehe folgendes Beispiel)

Die Fehlercodes lauten :

01	Ungültiger Befehl
02	Ungültige Datenadresse
03	Datenwert (im Write-Modus) außerhalb der Bandbreite

BEISPIEL 1:

Kommunikationsfehler	ANFRAGE
Feld	hex
Maschinenadresse	01
Befehl	07 (ungültiger Befehl)
Maschinenadresse	00
Adresse (byte high)	00
Neuer Wert (Bereich high)	1B
Neuer Wert (Bereich low)	00
Checksum	...

BEISPIEL 2

Kommunikationsfehler	ANTWORT
Feld	hex
Maschinenadresse	01
Befehl	87
Fehlercode	01 (Fehlercode ungültiger Befehl)
Checksum	...

FAMILIEN: RV - NW - NS - NSB - WS - WF
ADRESSTABELLEN
Nachstehend werden die vom Protokoll vorgesehenen Adressen und ihre Bedeutung aus der Maschinensicht dargestellt.
Die nicht aufgeführten Adressen sind reserviert oder nicht verwendet; es ist daher unzulässig, Befehle von nicht aufgeführten Adressen zu verwenden. Dies könnte zu Fehlfunktionen oder zu schweren Defekten der Maschine führen.

Die Adressen, die mit dem Symbol ✓gekennzeichnet sind, dürfen nur mit der Masterplatine verwendet werden.

SERIELLE KONFIGURATION DER PC03-PLATINE:

Zur Konfiguration der PCO^3 Platine mit der Baud-Rate, der Netzadresse und dem gewünschten Protokolltyp sind aus dem Anwendermenü (Prog-Taste) folgende Masken auszuwählen:

Address for supervisor	001
Baud rate9600	(nur RS485)
Protocol	Modbus

HINWEISE ZUM LESEN/SCHREIBEN DER TIMER- UND ALARMÜBERSICHTSDATEN VOM ÜBERWACHUNGSSYSTEM AUS :
Zeitschalter :

Einstellung der nachfolgenden Zeitspannen aus dem Überwachungssystem:

Tag	DIENSTAG		
Beginn der Zeitspanne 1	03:15	Ende der Zeitspanne 1	12:30
Beginn der Zeitspanne 2	14:30		
Ende der Zeitspanne 2	20:00		

Auszuführende Schritte:

- die analoge Variable 166 auf '3' einstellen (1=Sonntag; 2=Montag; … 7=Samstag)
- die analoge Variable 158 auf '3' einstellen
- die analoge Variable 159 auf '15' einstellen
- die analoge Variable 160 auf '12' einstellen
- die analoge Variable 161 auf '30' einstellen
- die analoge Variable 162 auf '14' einstellen
- die analoge Variable 163 auf '30' einstellen
- die analoge Variable 164 auf '10' einstellen
- die analoge Variable 165 auf '00' einstellen
- die digitale Variable 74 einstellen, die die einzelnen Einstellungen speichert.

Umgekehrt, wenn die Einstellung wie folgt gelautet hätte:

Tag	DIENSTAG
Beginn der Zeitspanne 1	13:15
Ende der Zeitspanne 1	12:30
Beginn der Zeitspanne 2	14:30
Ende der Zeitspanne 2	20:00

würde in diesem Fall die digitale Variable 75 auf '1' eingestellt werden, auch wenn :
das ENDE der Zeitspanne 1 NIEDRIGER ist als der BEGINN der Zeitspanne 1;
das ENDE der Zeitspanne 2 NIEDRIGER ist als der BEGINN der Zeitspanne 2;
das ENDE der Zeitspanne 2 NIEDRIGER ist als der BEGINN der Zeitspanne 1.

Auch wenn während der Planung der Serie UR eine entsprechende Risikoanalyse durchgeführt wurde, vereinfacht die Anwendung der unten angeführten Bildzeichen das Lesen des Handbuchs, da die Aufmerksamkeit des Lesers unverzüglich auf die Gefahrensituationen gelenkt wird, die nicht verhindert bzw. auch durch Anwendung von technischen Maßnahmen und Schutzvorrichtungen nicht ausreichend beschränkt werden konnten. Sollen eine oder mehrere Zeitspannen deaktiviert werden, muss nur der BEGINN und das ENDE der Zeitspanne auf 00:00 - 00:00 eingestellt werden.

ALARMÜBERSICHT:
Für die Abfrage der Alarmübersicht aus dem berwachungssystem.
Auszuführende Schritte:

- Die digitale Variable 79 so einstellen, dass man alle Informationen zu DATUM, EINTRITTSTEMP., AUSTRITTSTEMP.... in Bezug auf den letzten von der PC03-Platine registrierten Alarm erhält;
- die digitale Variable 78 zur Abfrage von Daten zum Alarmereignis, das vor dem angezeigten stattgefunden hat, einstellen;
- die digitale Variable 77 zur Abfrage von Daten zum Alarmereignis, das nach dem angezeigten stattgefunden hat, einstellen.

Werden nun die analogen Variablen 32, 33 und 167 bis 172 gelesen, erhält man alle Informationen zum ausgewählten Alarm.

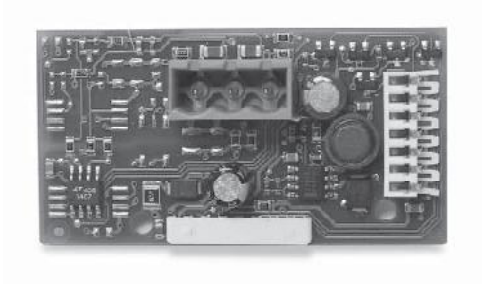
Zum Rückstellen der Alarmübersicht aus dem Überwachungssystem:

- die digitale Variable 76 einstellen.

EINSTELLUNG DER STUNDE
Einstellung der Stunde aus dem Überwachungssystem.
Auszuführende Schritte:

- die neue STUNDE in der analogen Variablen 149 eintragen;
- die neuen MINUTEN in der analoge Variablen 151 eintragen;
- den neuen TAG in der analogen Variablen 153 eintragen (1=Sonntag; 2=Montag; … 7=Samstag)
- das neue MONAT in der analogen Variablen 155 eintragen
- das neue JAHR in der analogen Variablen 157 eintragen (2 Ziffern);
- die digitale Variable 56 einstellen, die die soeben eingestellten Variablen kopiert.

ES



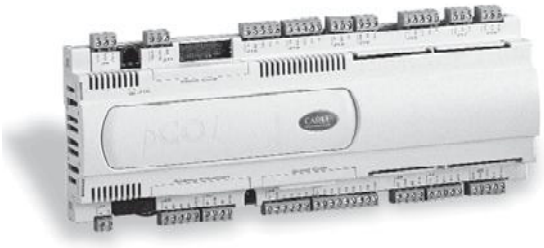


Fig. 1

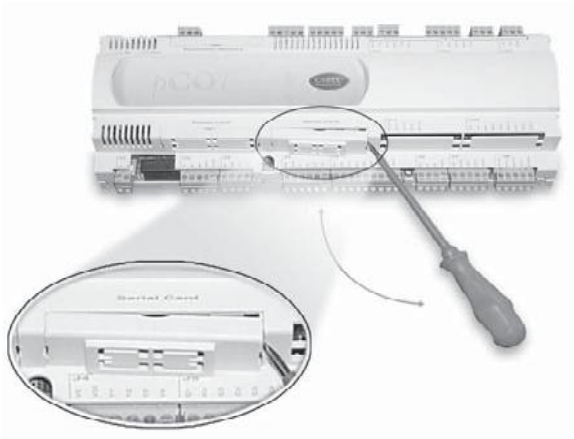
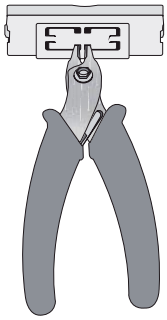
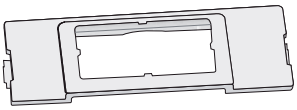


Fig. 2





DESCRIPCIÓN

La tarjeta AER485P1 es un accesorio de toda la familia de controles PCO3 (PCO3B excluidos) que permite la interfaz directa a una red RS485. La tarjeta garantiza el optoaislamiento del controlador con respecto a la red serial RS485. El baud rate máximo que se puede obtener es de 19.200 baudios (configurable vía software).

MONTAJE

En referencia a las Figs. 1 a 4, la conexión al PCO3 se obtiene siguiendo este procedimiento:

1. con un destornillador quitar la tapa "serial card" del controlador electrónico (véase la Fig. 1);
2. con unas tijeras de cortar metal, eliminar la parte de plástico pre-cortada de la tapa, consiguiendo así el orificio correspondiente a la salida del conector de 3 vías (véase la Fig. 2);
3. introducir la tarjeta opcional en el conector de rastrillo correspondiente asegurándose de que la tarjeta haya sido introducida correctamente y bien encajada en las dos bases de plástico conectadas al contenedor del PCO3 (véase la Fig. 3);
4. cerrar la puerta con tornillos haciendo coincidir el conector expuesto de la tarjeta serial con el orificio realizado en la tapa (véase la Fig. 4).

La conexión a la red RS485 se obtiene mediante el conector de terminales extraíbles presente en la tarjeta.
Los significados de los pines en dicho conector (Fig. 5) se evidencian por la serigrafía de la tarjeta y enumerados en la fig. 6.
Si la tarjeta ocupa la última posición en la línea serial de supervisión, en los extremos de los pines 2 y 3 se conecta una resistencia de cierre de línea de valor 120 Ω - 1/4 W como se indica en el esquema de la Fig. 7

Características técnicas

Sección del cable:	usar cable trenzado y protegido de dos hilos AWG20/22 con secciones, en los terminales de mm2: mín. 0,2 - máx. 2,5.
Condiciones de funcionamiento:	-10T60 °C; 90 % HR.
Condiciones de almacenamiento:	-20T70 °C; 90 % HR.
Grado de contaminación:	normal.
Dimensiones (mm)	60x29x20, (60x29: barra, 20: ancho máximo de los componentes).

Advertencias. Precauciones al manejar la tarjeta

Los daños eléctricos que se comprueban en los componentes electrónicos se producen casi siempre a causa de descargas electrostáticas provocadas por el operador. Por lo tanto, se deben tomar las precauciones adecuadas para estas categorías de componentes y en particular:

- antes de manipular cualquier componente electrónico o tarjeta, tocar una puesta a tierra (el hecho de evitar tocar un componente no es suficiente, por cuanto una descarga de 10.000 V, tensión que se alcanza fácilmente con la electricidad estática, provoca un arco de aproximadamente 1 cm);
- los materiales deben permanecen dentro de sus envases originales mientras se pueda. Si es necesario, retirar la tarjeta del envase y transferirla en un embalaje antiestático sin tocar la parte trasera de la tarjeta con las manos;
- por todos los medios evitar usar bolsas de plástico, poliestireno o esponjas que no sean antiestáticas;
- por todos los medios evitar el paso directo entre operadores (para evitar fenómenos de inducción electrostática o descargas).

Fig. 3

Fig. 4

Fig. 5

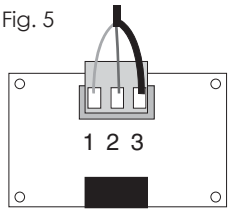
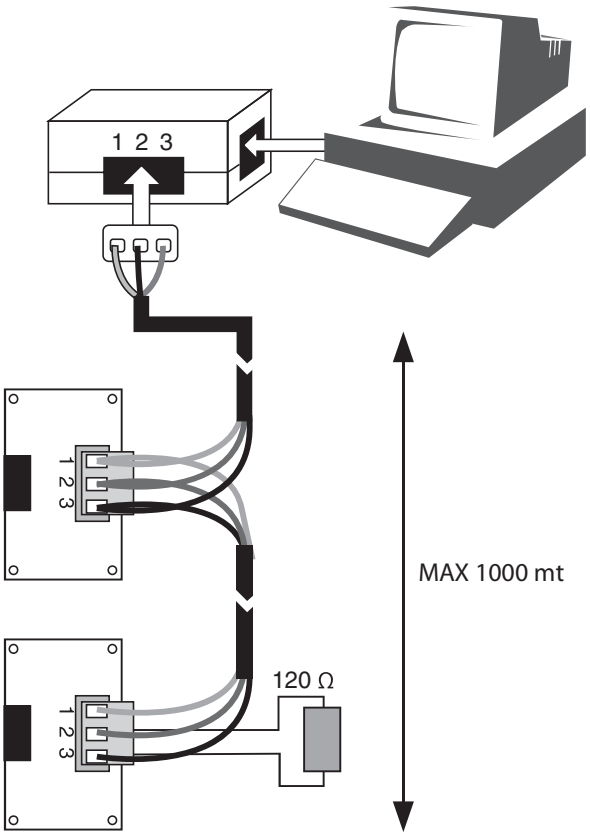


Fig. 6

Pin	Significado Meaning
1	GND
2	RX+/TX+
3	RX-/TX

Fig. 7



Guía de referencia para el protocolo modaer
El protocolo de comunicación Modaer representa el estándar de comunicación puesto a disposición por Aermec para la conexión entre refrigeradores y los sistemas de supervisión o controles centralizados (consultar la guía de productos Aermec para las máquinas en las cuales está disponibles este protocolo).
El protocolo permite la conexión tanto punto a punto (máquina * supervisor) como de varias máquinas (máx. 255) en un mismo bus de conexión hacia un supervisor, por cuanto prevé la gestión de una dirección para cada máquina.
La modalidad de comunicación es tipo master-slave, por lo tanto el sistema de supervisión es master mientras que la máquina es slave.
Esto significa que la máquina responde solamente a las consultas que hace el supervisor

Configuración serial:
- 1.200 a 19.200 baudios
- 1 bit de start
- sin paridad
- 2 bits de shigh

Codificación de datos:
Cada palabra de 8 bits (1 byte) contenida en el mensaje está constituida por dos caracteres hex codificados con 4 bits cada uno (0-9, A-F).

Formato del mensaje:
Los campos que componen el mensaje se indican en la Tabla 1.
El mensaje inicia con un intervalo de silencio de por lo menos 3,5 caracteres de longitud (indicados en la Tabla 1 como tiempo de silencio).
La duración de dicho intervalo depende del baud rate.
El primer dato que se transmite es la dirección de la máquina; sucesivamente el tipo de solicitud (tipo de lectura o de escritura), los datos referidos a la solicitud, el checksum y finalmente un intervalo de silencio de la misma longitud del inicial.

Tab.1

START	tiempo de silencio
DIRECCIÓN	1 byte
MANDO	1 byte
DATO	n x byte
CHECKSUM	2 bytes
SHigh	tiempo de silencio

Dirección:	es la dirección de la máquina y puede estar comprendida entre 1 y 255.
Mando:	es la operación que se quiere realizar, la lista está en "Tab. 2. Pág. 2 "
Checksum:	es un control de seguridad para verificar que el dato transmitido sea correcto, y se calcula cada vez que se está transmitiendo el mensaje; quien lo recibe lo debe recalcular y comparar con el recibido para tener la seguridad que los datos recibidos son correctos.

El checksum se calcula considerando todos los campos excepto el campo checksum y considerando sólo los 8 bits de datos para cada byte (excluyendo bit de start y de shigh).
El checksum es un dato de 16 bits y se obtiene del siguiente modo:

1. programar el dato checksum de 16 bits con todos 1 (0xffff en hex)
2. realizar el exor con el sucesivo byte del mensaje (partiendo del primero, es decir la dirección)
3. realizar el shift de un bit (hacia el bit menos significativo) introduciendo un 0 en el bit más significativo
4. control en el bit menos significativo que se extrae luego del shift (bit de carry)
5. si el bit es 1, realizar el exor con el dato fijo hex 0xA001
6. repetir las operaciones desde el punto 3 hasta efectuar 8 shifts
7. repetir las operaciones desde el punto 2 para cada byte que compone el mensaje.

Tipo de mandos:

Tab.2

Mando	Operación MASTER
01	Read datos digitales (datos 1 bit)
05	Write datos digitales (datos 1 bit)
03	Read datos analógicos (datos 16 bit)
06	Write datos analógicos (datos 16 bit)

Formato de los mandos:

Mando 01: Read Datos Digitales

Con este mando se pueden solicitar una o más variables digitales a partir de la dirección especificada. Los datos de respuesta se agrupan en byte (8 datos por cada byte).
El primer byte recibido corresponde a los 8 datos con dirección más baja, el bit menos significativo de cada byte corresponde al dato con dirección más baja.
EJEMPLO:

SOLICITUD

Campo	hex
Dirección de la máquina	01
Mando	01
Dirección de partida (byte high)	00
Dirección de partida (byte low)	00
N° de datos (parte high)	00
N° de datos (parte low)	0A
Checksum	...

RESPUESTA

Campo	hex
Dirección de la máquina	01
Mando	01
Número de bytes dados en respuesta	02
Datos (0-7)	0E
Datos (8-9)	03E
Checksum	...

Mando 05: Write Digitales
Para asignar 1 a una dirección digital se debe transmitir el dato hex 0xFF00; para asignar 0 se debe transmitir el dato hex 0x0000.
Cualquier otro tipo de dato se gestiona como un error.
La respuesta normal es un eco de la solicitud si la asignación del dato ha finalizado con éxito.
EJEMPLO:

SOLICITUD

Campo	hex
Dirección de la máquina	01
Mando	05
Dirección (byte high)	00
Dirección (byte low)	00
Dato nuevo (parte high)	FF
Dato nuevo (parte low)	00
Checksum	...

RESPUESTA

Campo	hex
Dirección de la máquina	01
Mando	05
Dirección (byte high)	00
Dirección (byte low)	00
Dato nuevo (parte high)	FF
Dato nuevo (parte low)	00
Checksum	...

Mando 03: Read Datos Analógicos

Con este mando se pueden solicitar una o más variables y enteras a partir de la dirección especificada. La codificación adoptada es binaria en complemento a 2. Las variables analógicas se representan en décimos (por ejemplo: el valor 10,0 se transmite como 0064h = 100d), las enteras se transfieren con el valor efectivo (por ejemplo: 100 se transmite como 0064h = 100d).
Las variables enteras son aquéllas con dirección mayor de 128.
El número de datos solicitados se entiende a partir de la dirección.
EJEMPLO:

SOLICITUD

Campo	(hex)
Dirección de la máquina	01
Mando	03
Dirección de partida (byte high)	00
Dirección de partida (byte low)	00
N° de datos solicitados (parte high)	00
N° de datos solicitados (parte low)	02
Checksum	...

RESPUESTA

Campo	hex
Dirección de la máquina	01
Mando	03
Número de bytes dados en respuesta	04
Byte hight dato 0	0c
Byte low dato 0	03
Checksum	...

Mando 06: Write Datos Analógicos

Con este mando se puede escribir una variable analógica o entera.
La codificación adoptada es binaria en complemento a 2.
Las variables analógicas se representan en décimos (por ejemplo: el valor 10,0 se transmite como 0064h = 100d), las enteras se transfieren con el valor efectivo (por ejemplo: 100 se transmite como 0064h = 100d).
Las variables enteras son aquéllas con dirección mayor de 128.
La respuesta normal es un eco de la solicitud si la asignación del dato ha finalizado con éxito.
EJEMPLO:

SOLICITUD

Campo	(hex)
Dirección de la máquina	01
Mando	06
Dirección (byte high)	00
Dirección (byte low)	00
Dato nuevo (parte high)	1B
Dato nuevo (parte low)	00
Checksum	...

RESPUESTA

Campo	hex
Dirección de la máquina	01
Mando	06
Dirección (byte high)	00
Dirección (byte low)	00
Dato nuevo (parte high)	1B
Dato nuevo (parte low)	00
Checksum	...

GESTIÓN DE TIMEOUT Y ERRORES DE COMUNICACIÓN
A continuación se analizan los posibles casos en los que puede producirse la comunicación y el comportamiento previsto por el master y por el slave como protocolo.

1. El slave recibe la solicitud sin errores de comunicación: slave: responde come lo ha programado el master : debe prever un timeout en la respuesta del slave de por lo menos 500 mS para darle la posibilidad de elaborar los datos.
2. El slave no recibe la solicitud por un error de comunicación del slave: no da ninguna respuesta al master: debe prever un timeout en la respuesta.

1. El slave recibe la solicitud, pero existe un error de comunicación (por ej.: checksum), el slave: no da ninguna respuesta al master: debe prever un timeout en la respuesta.
2. El slave recibe la solicitud sin errores de comunicación, pero los datos son incorrectos (por ej.: mando no previsto, solicitud de número de datos excedente, direcciones no previstas, valor dado en la escritura fuera de rango) el slave: responde normalmente con su dirección en el primer campo, en el campo mando responde agregando 0x80 al código del mando y como tercer byte responde con un código de error que identifica el error detectado. (véase el siguiente ejemplo).

Los códigos de error son los siguientes:

01	Mando no válido
02	Dirección dada no válida
03	Valor dado (en modo write) fuera de rango

EJEMPLO 1

Error de comunicación SOLICITUD	
Campo	hex
Dirección de la máquina	01
Mando	07 (mando no válido)
Dirección de la máquina	00
Dirección (byte high)	00
Dato nuevo (parte high)	1B
Dato nuevo (parte low)	00
Checksum	...

EJEMPLO 2

Error de comunicación RESPUESTA	
Campo	hex
Dirección de la máquina	01
Mando	87
Código de error	01 (código de error mando no válido)
Checksum	...

FAMILIAS: RV - NW - NS - NSB - WS - WF
TABLAS DE DIRECCIONES
A continuación se indican las direcciones previstas por el protocolo y el correspondiente significado desde el punto de vista de la máquina.
Las direcciones no detalladas son reservadas o no se utilizan; por lo tanto, no está permitido utilizar mandos referidos a direcciones no detalladas por cuanto esto podría provocar fallos o roturas de la máquina.

Las direcciones identificadas con el símbolo ✓sólo se deben utilizar con la tarjeta master.

CONFIGURACIÓN SERIAL DE LA TARJETA PCO3:

Para configurar la comunicación serial de la tarjeta PCO^3 con el Baud rate, la dirección de red y el tipo de protocolo deseado seleccionar las siguientes pantallas en el menú del usuario (tecla Prog.):

Address for supervisor	001
Baud rate9600	(RS485 only)
Protocol	Modbus

NOTAS REFERIDAS A LA LECTURA/ESCRITURA DE DATOS TIMER E HISTORIAL COMO SUPERVISOR:
Temporizador:

Para configurar como Supervisor las siguientes franjas:

Días	MARTES		
Start Franja 1	03:15	Shigh Franja 1	12:30
Start Franja 2	14:30		
Shigh Franja 2	20:00		

Operaciones a realizar:

- configurar en '3' la variable analógica 166 (1=Domingo; 2=Lunes; …7=Sábado)
- configurar el valor '3' en la variable analógica 158
- configurar el valor '15' en la variable analógica 159
- configurar el valor '12' en la variable analógica 160
- configurar el valor '30' en la variable analógica 161
- configurar el valor '14' en la variable analógica 162
- configurar el valor '30' en la variable analógica 163
- configurar el valor '10' en la variable analógica 164
- configurar el valor '00' en la variable analógica 165
- programar la variable digital 74 que memoriza cada configuración.

Por el contrario, si la configuración hubiera sido:

Días	MARTES
Start Franja 1	13:15
Shigh Franja 1	12:30
Start Franja 2	14:30
Shigh Franja 2	20:00

En este caso la variable digital 75 se configurará en '1' aun cuando:
SHigh Franja 1 es MENOR que START Franja 1;
SHigh Franja 2 es MENOR que START Franja 2;
SHigh Franja 2 es MENOR que START Franja 1;

ATENCIÓN: Si se desea deshabilitar una o más Franjas basta configurar START y SHigh franja en 00:00 - 00:00.

HISTORIAL DE ALARMAS:
Para consultar el historial como Supervisor.
Operaciones a realizar:

- Programar la variable digital 79 para recibir las informaciones sobre FECHA, TEMP. IN, TEMP. OUT,... con respecto a la última alarma registrada por el PCO3;
- programar la variable digital 78 para solicitar datos referidos al evento de alarma anterior al visualizado;
- programar la variable digital 77 para solicitar datos referidos al evento de alarma siguiente al visualizado.

En este punto, leyendo las variables analógicas 32, 33 y de 167 a 172 se obtiene la información referida a la alarma seleccionada.

Para programar el Historial como Supervisor.

- programar la variable digital 76.

REGULACIÓN DE LA HORA
Para regular la hora como Supervisor.
Operaciones a realizar:

- configurar la HORA nueva en la variable analógica 149;
- configurar los MINUTOS nuevos en la variable analógica 151;
- configurar el DÍA nuevo en la variable analógica 153 (1=Domingo; 2=Lunes; …7=Sábado);
- configurar el MES nuevo en la variable analógica 155;
- configurar el AÑO nuevo en la variable analógica 157 (2 cifras);
- programar la variable digital 56 que copia las variables que se han configurado.

Tabella parametri supervisione: RV - NW - NS - NSB - WS - WF / Parameters table oversight: RV - NW - NS - NSB - WS - WF

DIGITAL READ (code 01)					
BMS address	**Description**	**UOM**	**Min.**	**Max**	**Read/Write**
1	✓ Remote On/Off input status				r
2	✓ Remote Summer/Winter input status				r
3	✓ Double setpoint input status				r
4	Serious alarm input status				r
5	Evaporator flow switch input status				r
6	Evaporator pump alarm input status				r
7	Voltage monitor alarm input status				r
8	High pressure alarm input status				r
9	Low pressure alarm input status				r
10	Compressor thermal alarm input status				r
11	Fan thermal alarm input status				r
12	Oil differential alarm input status				r
13	Recovery flow switch alarm input status				r
14	ID14 digital input status NOT USED				r
15	ID15 digital input status NOT USED				r
16	Evaporator pump output status				r
17	Antifreeze heater output status				r
18	Liquid solenoid valve output status				r
19	Liquid injection valve output status				r
20	Alarms summary output status				r
21	Capacity control valve output status 1				r
22	Fan output status				r
23	Reverse cycle valve output status				r
24	Bypass solenoid valve output status				r
25	Recovery 3-way valve output status				r
26	VR recovery valve output status				r
27	VB recovery valve output status				r
28	✓ Unit On/Off from SPV				r
29	Reset alarm				r
48	Reset evaporator pump operating hours				r
49	Reset condenser pump operating hours				r
50	Reset compressor hours				r
73	Read the setting of the time slots after setting CHOICE_DAY				r
75	1 if there is an error after saving the settings for the time slots				r
81	Alarm summary, unit 1				r
82	✓ Select Sum/Win from SPV (if EN_SPV_SUM_WIN is enabled and EN_DIG_SUM_WIN disabled)				r
83	Serious alarm				r
84	Evaporator pump heating alarm				r
87	Pump maintenance alarm				r
88	Compressor maintenance alarm				r
89	Probe failure alarm B1				r
90	Probe failure alarm B2				r
91	Probe failure alarm B3				r
92	Probe failure alarm B4				r
93	Probe failure alarm B5				r
94	Probe failure alarm B6				r
95	Probe failure alarm B7				r
96	Probe failure alarm B8				r
97	Probe failure alarm B9				r
98	Probe failure alarm B10				r
99	Phase monitor alarm				r
100	Antifreeze alarm				r
101	Unit 1 not connected alarm				r
102	✓ Unit 2 not connected alarm				r
103	✓ Unit 3 not connected alarm				r
104	✓ Unit 4 not connected alarm				r
105	Compressor thermal alarm				r
106	Evaporator flow switch alarm				r
107	Oil pressure switch alarm				r
108	Oil press. diff. low alarm				r
109	High pressure switch alarm				r
110	Transducer high press. alarm				r
111	Low pressure switch alarm				r
112	Transducer low pressure alarm				r
113	Pressing temperature alarm				r
114	Fan thermal alarm				r
115	Fan thermal alarm 2				r
116	✓ Alarm summary, unit 2				r
117	✓ Alarm summary, unit 3				r
118	✓ Alarm summary, unit 4				r
119	✓ CP Master consent (triangular output)				r
120	✓ CP Slave 1 consent (triangular output)				r
121	✓ CP Slave 2 consent (triangular output)				r
122	✓ CP Slave 3 consent (triangular output)				r

DIGITAL WRITE (code 05)					
BMS address	**Description**	**UOM**	**Min.**	**Max.**	**Read/Write**
28	✓ Unit On/Off from supervisor (SPV)				r/w
29	Reset the alarm after acting on address 80				r/w
40	✓ Double setpoint enabling				r/w
56	Save the time by the SPV set with the var. LHOUR / LMINUTE / ….				r/w
73	✓ Read the setting of the time slots after setting CHOICE_DAY				r/w
74	✓ Confirm / Save the settings of the time slots after having set				r/w
77	View the next alarm in the Log				r/w
78	View the previous alarm in the Log				r/w
79	Display the previous alarm in the Log on Log				r/w
80	Reset Buzzer from SPV				r/w
82	✓ Select Summer/Winter				r/w
123	✓ Reset Slave 1				r/w
124	✓ Reset Slave 2				r/w
125	✓ Reset Slave 3				r/w
126	✓ Reset buzzer Slave 1				r/w
127	✓ Reset buzzer Slave 2				r/w
128	✓ Reset buzzer Slave 3				r/w

ANALOGUE READ (Code 03)					
BMS address	**Data description**	**UOM**	**Min.**	**Max**	**read/write**
5	✓ Temperature adjustment range				r
6	✓ Total recovery set				r
7	✓Total recovery differential				r
16	✓ Summer adjustment setpoint				r
17	✓ Winter adjustment setpoint				r
18	✓ Summer adjustment double external setpoint				r
19	✓ Winter adjustment double external setpoint				r
20	✓Setpoint used				r
21	High pressure				r
22	Low pressure				r
23	✓Water inlet temperature				r
24	Compressor delivery temperature				r
25	Water output temperature				r
26	Outside air temperature				r
27	Liquid temperature				r
29	Heat recovery unit inlet temperature				r
30	Heat recovery unit outlet temperature				r
31	Inverter output voltage				r
32	H2O In temperature on alarms log				r
33	H2O Out temperature on alarms log				r
34	High pressure on alarms log				r
35	Low pressure on alarms log				r
36	Discharge gas temperature on alarms log				r
37	Working set on alarms log				r
38	Working set range on alarms log				r
39	Antifreeze set on alarms log				r
140	Evaporator pump operating hours high				r
141	Evaporator pump operating hours low				r
142	Condenser pump operating hours high				r
143	Condenser pump operating hours low				r
144	Compressor operating hours high				r
145	Compressor operating hours low				r
148	Display current HOUR of the PCO^3				r
150	Display the current MINUTES of the PCO^3				r
152	Display the current DAY of the PCO^3 (1=Sunday; 2=Monday; … 7=Saturday)				r
154	Display the current MONTH of the PCO^3				r
156	Display the current YEAR of the PCO^3 (2 digits)				r
158	✓ START HOURS slot 1				r
159	✓ START MINUTES slot 1				r
160	✓ SHigh HOURS slot 1				r
161	✓ SHigh MINUTES slot 1				r
162	✓ START HOURS slot 2				r
163	✓ START MINUTES slot 2				r
164	✓ SHigh HOURS slot 2				r
165	✓ SHigh MINUTES slot 2				r
166	✓ Select DAY for display / change of the time slot				r
167	Sequence number that identifies an alarm (refer to the respective table)				r
168	HOUR of event on alarm log				r

169	MINUTES of event on alarm log				r
170	DAY of event on alarm log				r
171	MONTH of event on alarm log				r
172	YEAR of event on alarm log				r
174	✓ Working hours compressor 2 high				r
175	✓ Working hours compressor 2 low				r
176	✓ Working hours compressor 3 low				r
177	✓ Working hours compressor 3 low				r
178	✓ Working hours compressor 4 high				r
179	✓ Working hours compressor 4 low				r
203	VERSION				r

ANALOGUE WRITE (Code 06)					
Addres	**Data description**	**UOM**	**Min.**	**Max**	**read/write**
5	✓ Temperature adjustment range				r/w
6	✓ Total recovery set				r/w
7	✓ Total recovery differential				r/w
16	✓ Summer adjustment setpoint				r/w
17	✓ Winter adjustment setpoint				r/w
18	✓ Summer adjustment double external setpoint				r/w
19	✓ Winter adjustment double external setpoint				r/w
149	Set new HOUR (then confirm with SAVE_HOUR)				r/w
151	Set MINUTES (then confirm with SAVE_HOUR)				r/w
153	Set DAY (then confirm with SAVE_HOUR)				r/w
155	Set MONTH (then confirm with SAVE_HOUR)				r/w
157	Set MONTH (then confirm with SAVE_HOUR)				r/w
158	✓ START HOURS slot 1				r/w
159	✓ START MINUTES slot 1				r/w
160	✓ SHigh HOURS slot 1				r/w
161	✓ SHigh MINUTES slot 1				r/w
162	✓ SHigh MINUTES slot 1				r/w
163	✓ START MINUTES slot 2				r/w
164	✓ START MINUTES slot 2				r/w
165	✓ SHigh MINUTES slot 2				r/w
166	✓ Select the DAY to display/change the time slots				r/w

Tabella parametri supervisione modello TW110 / Parameters table oversight model TW110

DIGITAL READ (code 01)						
BMS Address	**Description**	**UOM**	**Digital/Analog**	**Min.**	**Max**	**Read/Write**
31	On/Standby	1=On	D			R/W
29/R 30/W	Cooling/Heating	1=heating	D			R/W
28	Summary Alarm	1= alarm	D			R
33	Reset Alarm	1=reset	D			W
23	Cooling setpoint		A			R/W
30	Heating setpoint		A			R/W
44	Outlet water tempe-rature		A			R
	ALARMS					
104	Flowswitch		D			R
112	Condenser pump overload		D			R
113	Evaporator pump overload		D			R
103	Compressor overload		D			R
108/109	Low pressure	109 pressostat	D			R
106/107	High pressure	107 pressostat	D			R
102	Anti freeze		D			R
111	Fans overload		D			R
101	phase current		D			R
100	Automatic reset alarm		D			R
117	Probe 1 Alarm		D			R
118	Probe 2 Alarm		D			R
119	Probe 3 Alarm		D			R
120	Probe 4 Alarm		D			R
121	Probe 5 Alarm		D			R
122	Probe 6 Alarm		D			R
123	Probe 7 Alarm		D			R
124	Probe 8 Alarm		D			R
110	Discharge temperature		D			R
125	C pressure alarm		D			R
126	low pressure LOW		D			R
131	Inverter Temp	Turbocor alarm	D			R
132	Discharge temp	Turbocor alarm	D			R
133	Suction pressure	Turbocor alarm	D			R
134	Discharge pressure	Turbocor alarm	D			R
135	Phase current	Turbocor alarm	D			R
136	Cavity temp	Turbocor alarm	D			R
137	Leaving water	Turbocor alarm	D			R
138	Compressor ratio	Turbocor alarm	D			R
139	Bearing Motor	Turbocor alarm	D			R
140	SCR temp	Turbocor alarm	D			R
141	Locked	Turbocor alarm	D			R
142	Calibration	Turbocor alarm	D			R
143	Startup	Turbocor alarm	D			R
144	Axial disp.	Turbocor alarm	D			R
145	Axial load	Turbocor alarm	D			R
146	Fraddispx	Turbocor alarm	D			R
147	Fraddispy	Turbocor alarm	D			R
148	Fradloadx	Turbocor alarm	D			R
149	Fradloady	Turbocor alarm	D			R
150	Braddispx	Turbocor alarm	D			R
151	Braddispy	Turbocor alarm	D			R

152	BradLoadx		D			R
BMS Address	**Description**	**UOM**	**Digital/Analog**	**Min.**	**Max**	**Read/Write**
153	BradLoady		D			R
154	Overcurrent		D			R
155	Dchighvoltage		D			R
156	Highcurrent		D			R
157	CurrentWarning		D			R
158	IGBTerror		D			R
159	HighcurrentStartup		D			R
160	BearingError		D			R
161	BearingWarning		D			R
162	NoCurrIGBT		D			R
163	AVCData		D			R
164	EMFLow		D			R
165	Eprom		D			R
166	GeneratorMode		D			R
167	SCRPhase		D			R
95	WARNING DP		D			R
96	ALLARME COM TURBO		D			R
145	Condenser antifreeze		D			R
146	Condenser flowswitch		D			R
147	Battery EEV		D			R
148	Overload pump glicole free		D			R
149	Flowswitch glicole free		D			R
150	No probe		D			R
	Analog input					
43	ERWT (ev. ret. water. Temp)		A			R
44	ELWT (ev. leav. water temp)		A			R
54	TAE		A			R
51	TL C1		A			R
56	CRWT (con. ret. water. Temp)		A			R
55	CLWT (con. leav. water temp)		A			R
40	HP		A			R
41	LP		A			R
50	DGT (disch. Gas temp.)		A			R
42	SGT (Suct. Gas temp.)		A			R
47	Suction pressure		A			R
48	Discharge pressure		A			R
49	Suction temp		A			R
45	Subcooling		A			R
46	Superheating		A			R
	Varie					
149	AmpTrifase		I			R
150	RPM		I			R

Tabella parametri supervisione modello NXW / Model parameters table oversight NXW

Analog variables

ANALOGUE WRITE (Code 06)					
BMS Address	**Description**	**UOM**	**Min**	**Max**	**Read/Write**
1	SUW - Temp, evaporator outlet 1	°C	-3276,8	3276,7	R
2	SIW - Temp, evaporator inlet, 1	°C	-3276,8	3276,7	R
3	Outlet water condensator temp,	°C	-3276,8	3276,7	R
4	Inlet water condensator temp,	°C	-3276,8	3276,7	R
5	SUR1 - Temp, output recovery circ,1	°C	0	99,9	R
6	SIR - Temp, input recovery	°C	-99,9	99,9	R
7	TAP1 - high pressure circ,1	BarG	-3276,8	3276,7	R
8	TBP1 - low pressure circ,1	BarG	-3276,8	3276,7	R
9	TAP2 - high pressure circ,2	BarG	-3276,8	3276,7	R
10	TBP2 - low pressure circ,2	BarG	-3276,8	3276,7	R
11	TAE - Temp, outside air 1	°C	-3276,8	3276,7	R
18	Actual setpoint	°C	-999,9	999,9	R
19	multi-function input	---	-3276,8	3276,7	R
20	Outlet water temperature total recovery circuit 2 (DK units only)	°C	-99,9	99,9	R
21	Outlet water temperature total recovery policy (DK units only)	°C	-99,9	99,9	R
22	SUW2 - Evaporator water outlet probe 2 (DK units only)	°C	-99,9	99,9	R
23	SUCE - Common outlet evaporator probe (DK units only)	°C	-99,9	99,9	R
24	SUWH2 - Probe output capacitor 2 (DK units only)	°C	-99,9	99,9	R
25	SUCC - Probe common output capacitor (unit only DK)	°C	-99,9	99,9	R
197	Active differential system	°C	-99,9	99,9	R
199	Setpoint 1 total recovery	°C	-3276,8	3276,7	R/W
201	Differential total recovery	°C	-3276,8	3276,7	R/W
202	Differential summer planting	°C	0	3276,7	R/W
203	Differential winter planting	°C	0	3276,7	R/W
204	Set point 1, summer	°C	-999,9	999,9	R/W
205	Set point 2, summer	°C	-999,9	999,9	R/W
206	Setpoint 1, winter	°C	-999,9	999,9	R/W
207	Setpoint 2, winter	°C	-999,9	999,9	R/W
209	Chiller Mode State: Heat = 1 , Cool =2		-3276,8	3276,7	R NXW **Software version ≥ 2,2**
210	Chiller Mode Request: Heat = 1 , Cool =2		-3276,8	3276,7	R/W **Software version ≥ 2,2**
216	Counter high, evaporator pumps1	1000h	0	999	R
217	Counter low evaporator pumps 1	h	0	999	R
218	Counter low, pump capacitor 1	1000h	0	999	R
219	Counter high, pump capacitor 1	h	0	999	R
220	Counter high, comp, 1 circuit, 1	1000h	0	999	R
221	Counter low, comp, 1 circuit, 1	h	0	999	R
222	Counter high, comp, 2 circuit 1	1000h	0	999	R
223	Counter low, comp, 2 circuit 1	h	0	999	R
224	Hour counter high, compressor 3 circuit 1	1000h	0	999	R
225	Counter low, compressor 3 circuit 1	h	0	999	R
226	Counter high, pressure, 1 circuit, 2	1000h	0	999	R
227	Counter the low pressure 1, circuit 2	h	0	999	R
228	Hour counter high, 2 pressure, circuit 2	1000h	0	999	R
229	Counter the low pressure 2, circuit 2	h	0	999	R
230	Counter high, 3 pressure, circuit 2	1000h	0	999	R
231	Counter the low pressure 3, circuit 2	h	0	999	R

232	Thermostat %	%	0	1000	R
233	Modulating pump evaporator	0.01V	0	1000	R
234	Modulating pump condensator	0.01V	0	1000	R
235	Fan speed 1 (0,, 1000)	0.01V	0	1000	R
236	Fan speed 2 (0,, 1000)	0.01V	0	1000	R
237	Counter high, evaporator pump 2	1000h	0	999	R
238	Counter low evaporator pump 2	h	0	999	R
239	Counter low, pump capacitor 2	h	0	999	R
240	Counter high condenser pumps 2	1000h	0	999	R
241	Actual Power Capacity	%	0	1000	R **Software version ≥ 2,2**
414	Limit (0-100%) (must be disabled to enter multi-purpose input B8)	%	0	100	R/W
415	Demand (0-100%) (must be disabled to enter multi-purpose input B8) (must be enabled digital address 7)	%	0	100	R/W

DIGITAL READ (code 01)

BMS Address	Description	UOM	Min	Max	Read/Write
1	On / off control unit (120-sec delay)	---	0	1	R/W
2	Summer / Winter (0 = production, cold water)	---	0	1	R/W
3	Alarm reset (1 = reset)	---	0	1	R/W
4	Request power unit input, digital	---	0	1	R
5	Request cold / hot plant input, digital	---	0	1	R
6	State On / Off	---	0	1	R **Software version ≥ 2,2**
7	BMS enables thermostat	---	0	1	R/W **Software version ≥ 2,2**
30	Evaporator pump 1	---	0	1	R
31	Evaporator pump 2	---	0	1	R
32	Condenser Pump 1	---	0	1	R
33	Condenser Pump 2	---	0	1	R
36	CCP1 - Compressor 1 circuit 1	---	0	1	R
37	CCP1A - Compressor 2 circuit 1	---	0	1	R
39	CCP2 - Compressor 1 circuit 2	---	0	1	R
40	CCP2A - Compressor 1 circuit 2	---	0	1	R
42	CV - 1 fan	---	0	1	R
43	CV1 - fan 2	---	0	1	R
44	VIC- reversing valve, circuit 1	---	0	1	R
45	VIC- reversing valve, circuit 2	---	0	1	R
46	VS1 - 1 liquid solenoid valve, circuit 1	---	0	1	R
47	VS1 - 1 liquid solenoid valve, circuit 2	---	0	1	R
54	Total recovery bypass valve circuit 1	---	0	1	R
55	Total recovery bypass valve circuit 2	---	0	1	R
56	Spillage from recovery circuit 1	---	0	1	R
57	Spillage from capacitor circuit 1	---	0	1	R
58	Spillage from recovery circuit 2	---	0	1	R
59	Spillage from capacitor circuit 2	---	0	1	R
100	Summary alarm	---	0	1	R
101	ALP40 - Evaporator flow switch alarm pump 1	---	0	1	R
102	AL46 -Condenser flow switch alarm pump 1	---	0	1	R
103	ALP42 - Evaporator pump 1 thermal alarm	---	0	1	R
104	ALP43 - Evaporator pump 2 thermal alarm	---	0	1	R
105	AL63 - Heat pump condenser alarm 1	---	0	1	R
106	AL64 - Alarm heat pump condenser 2	---	0	1	R
109	ALC30 - Thermal alarm compressor 1 circuit 1	---	0	1	R
110	ALC30 - Compressor 2 thermal alarm circuit 1	---	0	1	R

111	ALC30 - Compressor 3 thermal alarm circuit 1	---	0	1	R
112	ALC30 - Compressor 1 thermal alarm circuit 2	---	0	1	R
113	ALC30 - Compressor 2 thermal alarm circuit 2	---	0	1	R
114	ALC30 - Compressor 3 thermal alarm circuit 2	---	0	1	R
115	AL65 - Fan 1 thermal alarm	---	0	1	R
116	AL66 - Allarme termico ventilatore 2	---	0	1	R
117	ALU50 - Fan 2 thermal alarm	---	0	1	R
118	not used		0	1	
119	ALB34 - Alarm low pressure circuit 1	---	0	1	R
120	ALB34 - Alarm low pressure circuit 2	---	0	1	R
121	ALB35 - Low pressure alarm circuit 1	---	0	1	R
122	ALB35 - Low pressure alarm circuit 2	---	0	1	R
123	AL75 - Severe low pressure alarm circuit 1	---	0	1	R
124	AL76 - Severe low pressure alarm circuit 2	---	0	1	R
125	ALB36 - High pressure alarm circuit 1	---	0	1	R
126	ALB36 - High pressure alarm circuit 2	---	0	1	R
127	ALB37 - High pressure alarm circuit 1	---	0	1	R
128	ALB37 - High pressure alarm circuit 2	---	0	1	R
129	ALR03 Phase monitor alarm	---	0	1	R
130	ALA15 - Alarm output Evaporator probe failure, 1	---	0	1	R
131	ALA13 - Evaporator inlet probe failure alarm, 1	---	0	1	R
132	ALA20 - Alarm output capacitor faulty probe 1		0	1	
133	ALA14 - Alarm input capacitor faulty probe 1		0	1	
134	AL91 - Alarm output faulty probe recovery 1	---	0	1	R
135	AL90 - Alarm Input faulty probe recovery 1	---	0	1	R
136	ALA05 - Alarm sensor fails high pressure circuit 1	---	0	1	R
137	ALA09 - Alarm sensor fails low pressure circuit 1	---	0	1	R
138	ALA06 - Allarm sensor fails high pressure circuit 2	---	0	1	R
139	ALA10 - Alarm sensor fails low pressure circuit 2	---	0	1	R
140	ALA25 - Outside temperature probe failure alarm	---	0	1	R
147	ALP41 - Evaporator flow switch alarm pump 2	---	0	1	R
148	ALP47 - Condenser flow switch alarm pump 2	---	0	1	R
149	Not used - Free	---	0	1	R
150	ALO04 Slave offline	---	0	1	R
151	ALA07 - High pressure circuit 3 probe broken or not connected (SLAVE)	---	0	1	R
152	ALA08 - High pressure circuit 4 probe broken or not connected (SLAVE)	---	0	1	R
153	ALA11 - Low pressure sensor circuit 3 broken or not connected (SLAVE)	---	0	1	R
154	ALA12 - wave low pressure circuit 4 broken or not connected (SLAVE)	---	0	1	R
155	ALA17 - Evaporator outlet water temperature sensor, 2 broken or not connected (SLAVE)	---	0	1	R
156	ALA18 - Evaporator outlet water temperature sensor, 3 broken or not connected (SLAVE)	---	0	1	R
157	ALA19 - Evaporator outlet water temperature sensor, 4 broken or not connected (SLAVE)	---	0	1	R
158	ALA21 - Condenser outlet water temperature sensor, 2 broken or not connected (SLAVE)	---	0	1	R
159	ALA22 - Condenser outlet water temperature sensor, 3 broken or not connected (SLAVE)	---	0	1	R
160	ALA23 - Condenser outlet water temperature sensor, 4 broken or not connected (SLAVE)	---	0	1	R
161	ALT26 - Maintenance fans required	---	0	1	R
162	ALT27 - Manutenzione ventilatori richiesta	---	0	1	R
163	ALT28 - Condenser pump maintenance required	---	0	1	R
164	ALT29 - Evaporator pump maintenance required	---	0	1	R

165	ALB48 -Antifreeze alarm circuit 1	---	0	1	R
166	ALB48 -Antifreeze alarm circuit 2	---	0	1	R
167	ALP67 - Evaporator flow switch alarm pump 1 (Slave)	---	0	1	R
168	ALP68 - Evaporator flow switch alarm pump 2 (SLAVE)	---	0	1	R
169	ALP71 - Condenser flow switch alarm pump 1 (SLAVE))	---	0	1	R
170	ALP72 - Condenser flow switch alarm pump 2 (SLAVE)	---	0	1	R
171	AL77 - Alarm Circuit Low BP 3 (SLAVE)	---	0	1	R
172	AL78 - Alarm Circuit Low BP 4 (SLAVE)	---	0	1	R
173	AL79 - Alarm heat pump evaporator 1 (SLAVE)	---	0	1	R
174	AL80 - Alarm heat pump evaporator 2 (SLAVE)	---	0	1	R
175	AL81 - Evaporator water outlet temperature sensor, faulty or not connected (SLAVE)	---	0	1	R
176	AL82 - Temperature sensor, evaporator outlet water town, Route or not connected (SLAVE)	---	0	1	R
177	AL83 - Temperature sensor, water common output capacitor, Route or not connected (SLAVE)	---	0	1	R
178	AL84 - Alarm condenser heat pump 1 (Slave)	---	0	1	R
179	AL85 - Evaporator pump 2 thermal alarm (SLAVE)	---	0	1	R
180	AL86 - Evaporator inlet water temperature sensor, broken or not connected (SLAVE)	---	0	1	R
181	AL87 - Condenser water inlet temperature sensor, broken or not connected (SLAVE)	---	0	1	R
182	AL88 - Condenser outlet water temperature sensor, broken or not connected (SLAVE)	---	0	1	R
183	AL89 - Total recovery pCOe Offline	---	0	1	R
184	AL93 - Total recovery pCOe - probe input channel 3 faulty or not connected	---	0	1	R
185	AL94 - Total recovery pCOe - Input channel 4 probe failed or not connected	---	0	1	R
186	AL95 - Total recovery pCOe Offline (SLAVE)	---	0	1	R
187	AL96 - pCOe Total recovery (SLAVE) - probe input channel 1 failed or not connected	---	0	1	R
188	AL97 - pCOe Total recovery (SLAVE) - Sensor Input Channel 2 fails or is not connected	---	0	1	R
189	AL98 - pCOe Total recovery (SLAVE) - Sensor Input Channel 3 fails or is not connected	---	0	1	R
190	AL99 - pCOe Total recovery (SLAVE) - Sensor Input Channel 4 fails or is not connected	---	0	1	R
191	AL101 - pCOe number 2 - Offline (DK units)	---	0	1	R
192	AL102 - pCOe number 2 - (DK units) probe input channel 1 failed or not connected	---	0	1	R
193	AL103 - pCOe number 2 - (DK units) probe input channel 2 failed or not connected	---	0	1	R
194	AL104 - pCOe number 2 - (DK units) probe input channel 3 failed or not connected	---	0	1	R
195	AL105 - pCOe number 2 - (DK units) probe input channel 4 faulty or not connected	---	0	1	R
196	ALB48 - Frost alarm circuit 3	---	0	1	R
197	ALB48 - Frost alarm circuit 4	---	0	1	R

Tabella parametri supervisione modello WRL / Model parameters table oversight WRL

Addr	Mask	Humidifier set point	UOM	Min	Max	R/ W
1	D01	B11 - TAP - High pressure transducer	°C	-999.9	999.9	R
2	D01	B9 - SGP - Temp.uscita compressor	°C	-999.9	999.9	R
3	o15,D02	B12 - TBP - low pressure transducer	°C	-999.9	999.9	R
4	r54,D05	SLV - Alarms sent	°C	-999.9	999.9	R
5		SLV - System status / sanitary	°C	-999.9	999.9	R
6		SLV - hours of work units (top)	°C	-999.9	999.9	R
8	B21	SLV - hours of work units (bottom)	°C	0	99.9	R/W
9		SLV - not used	°C	-999.9	999.9	R
10	:	MST - Ambient air temperature	°C	-999.9	999.9	R
11		MST-Temperature Water Health	K	-999.9	999.9	R
12		MST - requested facility	°C	-99.9	99.9	R
13		MST - DHW demand	°C	-99.9	99.9	R
14		MST - second sent by the master (sign of life)	°C	-99.9	99.9	R
15		Setpoint used by the master. Sanitary	°C	-999.9	999.9	R
16		Differential used by the master. Sanitary	°C	0	999.9	R/W
17		Setpoint used by the master. plant	°C	0	999.9	R/W
18		Differential used by the master. plant	°C	0	999.9	R/W
19		Differential active plant	°C	0	999.9	R/W
20		Current setpoint Chiller	°C	-999.9	999.9	R
21		B11 - Condensing pressure	BAR	-999.9	999.9	R
22	o12	B12 - Pressure Evaporation	BAR	-999.9	999.9	R
23	D03	B4 - system return water temperature	°C	-999.9	999.9	R
24	D06	B9 - gas compressor discharge temperature	°C	-999.0	999.0	R
25	D05	B7 - System water outlet temperature	°C	-999.9	999.9	R
26	D04	B6 - Ambient air temperature	°C	-999.9	999.9	R
27		B10 - SAC temperature evaporation	°C	-999.9	999.9	R
29	o18	Setpoint of the valve which regulates geothermal	---	-99.9	99.9	R
30	Z81	Minimum limitation of setpoint air in winter	°C	-999.9	999.9	R/W
31	Z81	Maximum setpoint air in summer	°C	-999.9	999.9	R/W
32	A57	Zone alarm setpoint for minimum temp. water	°C	-999.9	999.9	R/W
33	A57	Setpoint alarm zones for maximum temp. water	°C	-999.9	999.9	R/W
34	B21	Setpoint Hysteresis temperature freecooling	°C	0	9.9	R/W
35		B6 - SAE - ambient air temperature	°C	-99.9	99.9	R
36	Z81	Maximum setpoint air in winter	°C	-999.9	999.9	R/W
37	Z81	Minimum limitation of setpoint air in summer	°C	-999.9	999.9	R/W
38	o18	band on which adjusts the valve geothermal	---	-99.9	99.9	R
39	o18	value that adjusts the valve geothermal	---	-999.9	999.9	R
40		Set point health	°C	0	999.9	R/W
41		Active Set Point Room 1	°C	0	999.9	R/W
42	r15	Active Set Point Room 2	°C	0	999.9	R/W
43	r24	Active Set Point Room 3	°C	0	999.9	R/W
44	r33	Active Set Point Room 4	°C	0	999.9	R/W
45	r42	Active Set Point Room 5	°C	0	999.9	R/W
46		Differential on Chiller setpoint	°C	-99.9	99.9	R
51		STA - Humidity measured from room No. 1	%rH	0	99.9	R
52		STA-air temperature room n ° 2	°C	-999.9	999.9	R
53		STA - Humidity measured from room No. 2	%rH	0	99.9	R
54		STA-air temperature room n ° 3	°C	-999.9	999.9	R
55		STA - Humidity measured from room No. 3	%rH	0	99.9	R
56		STA-air room temperature n ° 4	°C	-999.9	999.9	R
57		STA - Humidity measured from room No. 4	%rH	0	99.9	R
58		STA-air temperature room n ° 5	°C	-999.9	999.9	R
59		STA - Humidity measured from room n ° 5	%rH	0	99.9	R
81	r57,D08	Water temperature discharge zone 2 (pCOe1)	°C	-999.9	999.9	R
82	r60,D08	Water temperature discharge zone 3 (pCOe2)	°C	-999.9	999.9	R
88	r48	Set point in dehumidification mode comfort zone 1	%rH	0	100.0	R
91	r48	Dehumidification set point in economy mode zone 1	%rH	0	100.0	R
92	r48	Set point in dehumidification mode comfort zone 2	%rH	0	100.0	R

93	r48	Set point in dehumidification mode Economy Zone 2	%rH	0	100.0	R
94	r48	Set point in dehumidification mode comfort zone 3	%rH	0	100.0	R
95	r48	Set point in dehumidification mode Economy Zone 3	%rH	0	100.0	R
96	r51	Humidifier set point	%rH	0	100.0	R
97	D07	B11 - TAP - High pressure transducer	BAR	-99.9	99.9	R
98		B9 - SGP - Temp.uscita compressor	°C	-999.9	999.9	R
99		B12 - TBP - low pressure transducer	BAR	-999.9	999.9	R
100		SLV - Alarms sent	---	-99.9	999.9	R
101		SLV - System status / sanitary	---	-3276.8	3276	R
102		SLV - hours of work units (top)	h	0	3276	R
103		SLV - hours of work units (bottom)	h	0	3276	R
104		SLV - not used	---	0	3276	R
105		MST - Ambient air temperature	°C	-999.9	999.9	R/W
106		MST-Temperature Water Health	°C	-999.9	999.9	R/W
107		MST - requested facility	---	0	999.9	R/W
108		MST - DHW demand	---	0	999.9	R/W
109		MST - second sent by the master (sign of life)	---	0	999.9	R/W
111	o30	Setpoint used by the master. Sanitary	---	-32768	32767	R/W
112	o30	Differential used by the master. Sanitary	---	-99.9	99.9	R/W
113	o30	Setpoint used by the master. plant	°C	-999.9	999.9	R/W
114	o30	Differential used by the master. plant	---	-99.9	99.9	R/W
197		Differential active plant	°C	0	99.9	R

Modbus	Addr	Mask	Description	UOM	Min	Max	R/ W
209	1		Y4 - Analog output humidifier	---	0	9999	R
210	2		Y3 - Current position of the valve area 1	---	0	9999	R
211	3		Y1 - Current position valve sanitary pump	---	0	9999	R
212	4		Y2 - Current geothermal pump valve position	---	0	9999	R
213	5		Number of zones managed by the machine	---	0	3	R/W
214	6		Number of devices in Zone 1	---	0	1	R/W
215	7	Q12	Pause time waiting for reversing valve sanitary	---	0	999	R
216	8	E21	Time estimates for low load	---	0	9999	R
217	9		Current minute	---	0	59	R
218	10		Current month	---	1	12	R
219	11		pCOe 11 - Y1 - Analog Zone 2 Valve 3-WAY	---	0	9999	R
220	12		pCOe 11 - Y1 - Analog Zone 3 Valve 3-WAY	---	0	9999	R
221	13		State Compr.2 (Off, On, Min.On; Min.Off, Manual, Alarm)	---	-1000	-1000	R
224	16		State WRL (0 = On, 1 = Chiller, 2 = sanitary, 3 = PC + 4 = Ch St)	---	0	9	R
225	17	H21	Total Number Compressors	---	1	2	R/W
226	18		Number of devices in zone 2	---	0	2	R/W
227	19		Mode of operation machine	---	0	99	R
228	20		Y1 - Forcing sanitary modulated pump	V	0	1000	R/W
229	21		Y2 - forcing modulating pump geothermal	V	0	1000	R/W
230	22		Y3 - forcing modulating valve area 1	V	0	1000	R/W
231	23		Y4 - forcing modulating output Y4	---	0	1000	R/W
232	24		software version	---	-32768	32767	R
233	25	P21	selection of type of geothermal pump adjustment	---	0	3	R/W
234	26		Day of week (0 ---, 1: Monday, 2: Tuesday, 3: Wednesday, 4: Thursday, 5: Friday, 6: Saturday, 7: Sunday;)	---	1	7	R
235	27		State compr.1 (Off, On, Min.On; Min.Off, Manual, Alarm)	---	-1000	1000	R
236	28	o12	EEV than more	---	0	999	R
237	29	o15	Working mode of Sanitary	---	0	9	R
239	31		Mode of operation from room 2	---	0	9	R
240	32		Method of Operating Room 1	---	0	9	R
241	33		Mode of operation from room 3	---	0	9	R
242	34		Mode of operation from room 4	---	0	9	R

243	35		Mode of operation from room 5	---	0	9	R
244	36		DHW demand	%	0	9999	R
245	37		Select On / Off (OFF, ON, "ECONOMY" AUTO;)	---	0	3	R/W
246	38		request facility	%	0	999	R
247	39		Boiler / heating, solar icons	---	0	9	R
248	40		Compressor icons (1 = 1 active comp, freecoling = 2, 3 = 2 comp on)	---	0	9	R
249	41		Select type chiller (cooling only, cooling / heating, heating only)	---	0	2	R/W
250	42		Sanitary type (desuperheater, priority, priority valve, double pump)	---	0	4	R/W
251	43		Select integration with the system (NO; BOILER, HEATING AND.)	---	0	9	R/W
252	44		Select Integration with ACS (NO; BOILER, HEATING AND.)	---	0	9	R/W
260	52		New day	---	1	31	R/W
261	53		New month	---	1	12	R/W
262	54		New year	---	0	99	R/W
263	55		New hour	h	0	23	R/W
264	56		New minute	---	0	59	R/W
265	57		Select Summer Winter (“ONLY SANITARY”, SUMMER, WINTER; By External temperature	---	0	3	R/W
266	58		Current year	---	0	99	R
267	59		Numero di dispositivi della zona 3	---	0	2	R/W
268	60		WRL codice - Size	---	0	18	R/W
269	61		WRL codice - Model	---	0	3	R/W
270	62		WRL codice - Filed Use	---	0	3	R/W
271	63		WRL codice - Version	---	0	2	R/W
272	64		WRL codice - Recovery	---	0	3	R/W
273	65		WRL codice - Pump Plant	---	0	3	R/W
274	66		WRL codice - Pump Geo	---	0	6	R/W
275	67		WRL codice - Sanitary	---	0	2	R/W
276	68		WRL codice - PowerSupply	---	0	4	R/W
277	69		WRL codice - Soft start	---	0	2	R/W
279	71		Current day	---	1	31	R
289	81		Current hour	h	0	23	R

Addr	Mask	Description	R/ W
1		Economy mode activated	R
2		Clearing alarms from BMS	R/W
3	B24	Enabling presence BMS	R/W
4		Been active plant	R/W
5	o30	State Sanitary active	R
6		POC - Pump Geothermal	R
7		POE - System pump	R
8		Mode system (chiller-cooling / heat pump-Winter)	R
9		Valve state sanitary	R/W
10	o15	State resistance saniatrio	R
11		NO1 - Force ON compressor 1	R/W
12		NO2 - Come On Pump Geothermal	R/W
13		NO3 - Come On pump system	R/W
14		NO4 - Come On DHW pump	R/W
15		NO5 - On Strength dryer zone 1	R/W
16		NO6 - On Force resistance system	R/W
17		NO7 - AE - General Alarm	R/W
18		NO8 - Come On Resistance sanitary	R/W
19		NO9 - Forza Compressor 2 ON	R/W
20		NO10 - Force ON reversing valve VIC	R/W
21		NO11-Force ON freecooling V3V	R/W
22		NO12 - Come On Pump Zone 1	R/W
23		Offline WRL an optional 2	R
24		AL029 - Alarm anitgelo DHW	R
25		Antifreeze AL044-air room 5	R
26		Antifreeze AL043-air room 4	R
27	D25	AL084 - Alarm Heat Pump Zone 2	R
28		Come On / Off by BMS	R/W
29		Request from the room 1	R
30	D25	AL085 - Alarm heat pump zone 3	R
31		Selecting off on Room 1	R/W
32		AL021 - Alarm system flow	R
33		AL99 - Alarm low yield plant	r
34	r15	Selecting off on Room 2	R/W
35		Antifreeze AL042-air room 3	R
36	r24	Selecting off on Room 3	R/W
37		Antifreeze AL041-air room 2	R
38	r33	Selecting off on Room 4	R/W
39	r42	Selecting off on Room 5	R/W
40		Offline WRL an optional 3	R
41		Offline WRL an optional 4	R
42		AL083 - probe failure alarm zone 2 2 pCOE	R
43		AL014 - High pressure alarm from probe	R
44		AL040-1 Antifreeze room air	R
45		AL052 - Alarm faulty probe pCOE 2 Zone 3	R
46		AL015 alarm - Low pressure probe	R
47		Enable Freecooling geothermal	R/W
48		Enable solar kit	R/W
51		AL096 - EEV driver Warning offline	R
52		Type system integration (integration at the PDC, replacing PdC)	R/W
53		AL099 - Low battery EEV	R
54		AL101 - Alarm offline solar kit	R
57		AL013 - High pressure	R
61		AL016 - Thermal switch compressor 1	R
62		AL017 - Compressor 2 thermal alarm	R
63		History - prox item to view	R/W
64		Type of units selected (0 = ON, 1 = Anglo-Saxon)	R
65		AL033-Offline Terminal 2 bedroom zone 2	R
66		Type of intervention in the Health Care Integration (integration PdC; replacement PdC)	R/W
67		AL019 - Geothermal flow alarm	R
68		AL020 - Alarm heat pumps	R
69		AL022 - Alarm boiler / heating integr. plant	R
70		AL023 - Zone 1 Alarm dehumidifier	R
71		ID1 - FLH - Geothermal flow was	R
72		ID2 - MTCP - state thermal compressor 1	R
73		ID3 - RAP - was high pressure switch	R
74		ID4 - COPD - heat pumps was	R
75		ID5 - ALDE0 - alarm status dehumidifier	R
76		ID6 - ALSAN - Thermal resistance state health	R
77		ID7 - ACR-state resistance Alarm system	R
78		ID8 - Digital Input On / Off Remote	R
79		ID9 - MTCPA-state thermal compressor 2	R
80		ID10 - FL - flow system was	R
81		At least one active alarm	R
82		BMS forcing summer / winter	R/W
83		AL035-3 Offline Terminal Room	R
84		AL036-terminal probe failed to room 4	R
85		AL037-end room 4 Offline	R
86		AL038-terminal probe failed to room 5	R
87		AL039-end room 5 Offline	R
88		AL056 - Hour meter geothermal pump	R
89		AL057 - Hours System pump	R
90		AL058 - Hours DHW pump	R
91		AL059 - Hours Pump Zone 1	R
92		AL060 - Hours Pump Zone 2	R
93		AL061 - Hours pump zone 3	R
94		AL064 - water temperature alarm zone 1	R
95		AL065 - low water temperature alarm zone 3	R
96		AL066 - water temperature alarm zone 2	R
97		AL067 - low water temperature alarm zone 2	R
98		AL068 - water temperature alarm zona3	R
99		AL069 - low water temperature alarm zone 3	R
100		AL024 - Alarm boiler / heating integr.sanitario	R
101		AL071 high humidity alarm zone 1	R
102		AL026-severe low pressure alarm sensor	R
103		AL073 Alarm high humidity zone 2	R
104		AL027 - Alarm anitgelo side geothermal	R
105		AL074 Alarm high humidity zone 3	R
106		AL076 - Alarm Offline pCOE zone 2	R
107		AL077 - Alarm Offline pCOE Zone 3	R
108		AL078 - Alarm faulty probe pCOE 1 Zone 2	R
109		AL079 - Alarm sondaguasta 1 pCOE Zone 3	R
110		AL080 - Dehumidifier alarm zone 1	R
111		AL081 - Zone 2 Alarm Dehumidifier	R
112		AL081 - Zone 3 Alarm Dehumidifier	R
113		AL086 - High Alarm temparetura health	R
114		AL087 - High temperature solar panels	R
115		AL089 - Alarm probes EEV driver	R
116		AL090 - Alarm LowSH (low heat)	R
117		AL091 - Alarm LOP (low evaporation temperature)	R
118		AL092 - MOP alarm (high evaporation temperature)	R
119		CCP - Compressor 1	R
120		ACFA - Compressor 2	R
121		AL095 - Alarm Error EEV engine	R
122		AL097 - Alarm Low suction temperature EEV	R
123		On-Off from digital input	R

124		AL028 - Alarm system side anitgelo	R
125		POE - Pump Implant	R
126	o15	MPO3 - sanitary pump	R
127		AL034-terminal probe failed to room 3	R
128		Request dehumidifier zone 1	R
129		On boiler / heating Integ. plant	R
130		General alarm digital output	R
131		Resistance build-up on Domestic Hot Water	R
132		Digital output 4 way reverse cycle valve	R
133	r54	Pump on zone 1	R
134		On free cooling valve	R
135	H27	Enable electronic valve	R/W
136	H27	The driver is internal EEV (0) or external (1)	R/W
137		Selecting sanitary on / off	R/W
138		AL100 - Alarm low yield plant	R
139		AL094 - Alarm Eeprom EEV	R
141		set date time	R/W
142		AL054 - timer threshold Compressor 1	R
143		AL001 - Alarm sensor fails - discharge geothermal	R
144		AL002 - Alarm sensor defect - Return geothermal	R
145		AL003 - Alarm sensor defect - Temp.Sanitario	R
146		AL004 - Alarm faulty probe - temp. return system	R
147		AL005 - Alarm sensor defect - B5	R
148		AL006 - Alarm sensor defect - outdoor air temperature	R
149		AL007 - Alarm sensor defect - Temp.Mandata facility	R
150		AL008 - probe failure alarm - zone 1 Temp.mix	R
151		AL009 - Alarm sensor defect - Temp.Gas pressing	R
152		AL010 - Alarm sensor defect - Temp. aspirazione	R
153		AL011 - Alarm sensor defect - Press.mandata	R
154		AL012 - Alarm sensor defect - Press. aspirazione	R
155		AL018 - External Alarm by ingr.digitale	R
156		Al025 - Offline pCOe an optional expansion	R
157		AL045 - Alarm legionella cycle not completed	R
158		AL055 - timer threshold Compressor 2	R
159		AL030-1 probe failed to terminal room	R
160		AL031-1 Offline terminal room zone 1	R
161		AL032-terminal probe failed to room 2	R
207		Clearing the alarm log	R/W

Tabella parametri supervisione SW multichiller 1.6 / Parameters table oversight multichiller SW 1.6

MULTICHILLER (ANALOG VARIABLE 129 = 0 = default value)						
BMS address	**Description**	**UOM**	**Min**	**Max**	**A=Analogic D= Digital**	**Read / Write**
1	In (Common Inlet water temperature read by multichiller)				A	R
2	Out (Common Outlet water temperature read by multichiller)				A	R
3	Global Chiller Cooling Setpoint				A	R/W
4	Global Chiller Heating Setpoint				A	R/W
5	Global Actual Cooling Setpoint				A	R
6	Global Actual Heating Setpoint				A	R
7	Global Chiller 2° Cooling Setpoint				A	R/W
8	Global Chiller 2° Heating Setpoint				A	R/W
9	Delta temperature chiller full load				A	R/W
10	Delta setpoint in setpoint reset Off				A	R/W
11	Delta setpoint in setpoint reset On				A	R/W
12	Leaving water temp. start chiller (on cooling)				A	R/W
13	Return water temp. shigh chiller 2 (on cooling)				A	R/W
14	Return water temp. shigh chiller 3 (on cooling)				A	R/W
15	Return water temp. shigh chiller 4 (on cooling)				A	R/W
16	Return water temp. shigh chiller 5 (on cooling)				A	R/W
17	Return water temp. shigh chiller 6 (on cooling)				A	R/W
18	Return water temp. shigh chiller 7 (on cooling)				A	R/W
19	Return water temp. shigh chiller 8 (on cooling)				A	R/W
20	Return water temp. shigh chiller 9 (on cooling)				A	R/W
21	Leaving water temp. start chiller (on heating)				A	R/W
22	Return water temp. shigh chiller 2 (on heating)				A	R/W
23	Return water temp. shigh chiller 3 (on heating)				A	R/W
24	Return water temp. shigh chiller 4 (on heating)				A	R/W
25	Return water temp. shigh chiller 5 (on heating)				A	R/W
26	Return water temp. shigh chiller 6 (on heating)				A	R/W
27	Return water temp. shigh chiller 7 (on heating)				A	R/W
28	Return water temp. shigh chiller 8 (on heating)				A	R/W
29	Return water temp. shigh chiller 9 (on heating)				A	R/W
30	Setpoint compensation 1 On (On cooling)				A	R/W
31	Setpoint compensation 2 On (On cooling)				A	R/W
32	Setpoint compensation 3 On (On cooling)				A	R/W
33	Setpoint compensation 4 On (On cooling)				A	R/W
34	Setpoint compensation 5 On (On cooling)				A	R/W
35	Setpoint compensation 6 On (On cooling)				A	R/W
36	Setpoint compensation 7 On (On cooling)				A	R/W
37	Setpoint compensation 8 On (On cooling)				A	R/W
38	Setpoint compensation 1 On (On heating)				A	R/W
39	Setpoint compensation 2 On (On heating)				A	R/W
40	Setpoint compensation 3 On (On heating)				A	R/W
41	Setpoint compensation 4 On (On heating)				A	R/W
42	Setpoint compensation 5 On (On heating)				A	R/W
43	Setpoint compensation 6 On (On heating)				A	R/W
44	Setpoint compensation 7 On (On heating)				A	R/W
45	Setpoint compensation 8 On (On heating)				A	R/W
46	TUA2 Outlet water temperature sensor SUW2 read by multichiller				A	R
47	TUA3 Outlet water temperature sensor SUW3 read by multichiller				A	R
48	Actual Load % (based on Load regulation)				A	R

BMS address	Description	UOM	Min	Max	A=Analogic D= Digital	Read / Write
131	Delay filter for request demand condition				A	R/W
132	Delay between start next chiller				A	R/W
133	Delay between shigh next chiller				A	R/W
134	% Load Minimum				A	R/W
135	% Load Chiller to start next				A	R/W
136	% Load Chiller to shigh next				A	R/W
137	Delay for setpoint reset before Off				A	R/W
138	Delay for setpoint reset after Off				A	R/W
139	Delay for setpoint reset before On				A	R/W
140	Delay for setpoint reset after On				A	R/W
141	Standby chiller				A	R/W
142	Input Selection				A	R
143	Function Selection				A	R
144	Max number chiller demand				A	R
145	Max number chiller limit				A	R
146	Min number chiller limit				A	R
147	N° min chiller On (On cooling)				A	R/W
148	N° min chiller On (On heating)				A	R/W
149	State of Chiller1					
0=NONE; 1=ON; 2=OFF; 3=AL-LARME						
4=HalfALARM_ OFF; 5=NOT CONNECTED 6=HalfALARM_ ON	A				R	
150	State of Chiller2				A	R
151	State of Chiller 3				A	R
152	State of Chiller 4				A	R
153	State of Chiller r5				A	R
154	State of Chiller 6				A	R
155	State of Chiller 7				A	R
156	State of Chiller 8				A	R
157	State of Chiller 9				A	R
158	Running % of total capacity Chiller 1				A	R
159	Running % of total capacity Chiller 2				A	R
160	Running % of total capacity Chiller 3				A	R
161	Running % of total capacity Chiller 4				A	R
162	Running % of total capacity Chiller 5				A	R
163	Running % of total capacity Chiller 6				A	R
164	Running % of total capacity Chiller 7				A	R
165	Running % of total capacity Chiller 8				A	R
166	Running % of total capacity Chiller 9				A	R
167	Running % of total capacity of all Chillers				A	R
1	Multichiller Enable				D	R/W
2	Global On/Off				D	R/W
3	Global Mode C/F				D	R/W
4	Chiller 1 On/Off				D	R/W
5	Chiller 2 On/Off				D	R/W
6	Chiller 3 On/Off				D	R/W
7	Chiller 4 On/Off				D	R/W
8	Chiller 5 On/Off				D	R/W
9	Chiller 6 On/Off				D	R/W
10	Chiller 7 On/Off				D	R/W

11	Chiller 8 On/Off				D	R/W
12	Chiller 9 On/Off				D	R/W
13	Reset Allarm Chiller 1				D	W
14	Reset Allarm Chiller 2				D	W
15	Reset Allarm Chiller 3				D	W
16	Reset Allarm Chiller 4				D	W
17	Reset Allarm Chiller 5				D	W
18	Reset Allarm Chiller 6				D	W
19	Reset Allarm Chiller 7				D	W
20	Reset Allarm Chiller 8				D	W
21	Reset Allarm Chiller 9				D	W
22	Selection Load or Temperature Regulation type				D	R/W
23	Chiller rotation Fixed 1 to 9 or By work hours				D	R/W
24	Enable expansion (PCO3E)				D	R
25	Enable Heat Pump Chiller				D	R
26	Enable double setpoint				D	R
27	Global Alarm Chiller 1				D	R
28	Global Alarm Chiller 2				D	R
29	Global Alarm Chiller 3				D	R
30	Global Alarm Chiller 4				D	R
31	Global Alarm Chiller 5				D	R
32	Global Alarm Chiller 6				D	R
33	Global Alarm Chiller 7				D	R
34	Global Alarm Chiller 8				D	R
35	Global Alarm Chiller 9				D	R
36	Global Alarm PCO3E				D	R
In the table below the simbol X in the right columns means if data are available in that chiller series						
CHILLER (ANALOG VARIABLE 129 = 1 to 9)						
BMS address	**Description**		**Min**	**Max**	**A=Analogic D= Digital**	**Read / Write**
1	TIA Evaporator inlet water temperature				A	R
2	TUA C1 Evaporator oulet water temperature Circuit 1				A	R
3	TUA C2 Evaporator oulet water temperature Circuit 2				A	R
4	TAE Ambient temperature				A	R
5	TL C1 Liquid temperaure circuit 1				A	R
6	TL C2 Liquid temperaure circuit 1				A	R
7	TIAH Condenser inlet water temperature				A	R
8	TUAH C1 Condenser outlet water temperature circuit 1				A	R
9	TUAH C2 Condenser outlet water temperature circuit 2				A	R
10	TIR Recovery exchanger inlet water				A	R
11	TUR 1 Recovery exchanger outlet water circuit 1				A	R
BMS address	**Description**		**Min**	**Max**	**A=Analogic D= Digital**	**Read / Write**
12	TUR 2 Recovery exchanger outlet water circuit 2				A	R
13	AP 1 High pressure circuit 1				A	R
14	AP 2 High pressure circuit 2				A	R
15	BP 1 Low pressure circuit 1				A	R
16	BP 2 Low pressure circuit 2				A	R
17	TEV1 Evaporator gas temperature circuit1				A	R
18	TEV2 Evaporator gas temperature circuit2				A	R
19	SAC Tank water temperature				A	R
20	SFC inlet Freecooling exchanger water temperature				A	R
21	Discharge temperature				A	R

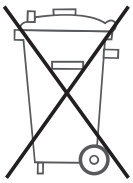
22	Single chiller Cooling setpoint				A	R
23	Single chiller Heating setpoint				A	R
24	Chiller capacity (0-100%)				A	R
25	Pf_Master (0-100%)					
Only for NSB,WS	A				R	
26	Pf_Slave1 (0-100%)					
Only for NSB,WS	A				R	
27	Pf_Slave2 (0-100%)					
Only for NSB,WS	A				R	
28	Pf_Slave3 (0-100%)					
Only for NSB,WS	A				R	
29	Steps_active Master					
Only for RV NW	A				R	
30	Steps_active Slave 1					
Only for RV NW	A				R	
31	Steps_active Slave 2					
Only for RV NW	A				R	
32	Steps_active Slave 3					
Only for RV NW	A				R	
33	Suction temperature				A	R
34	TIA TW110 Not used				A	R
35	TUA TW110 Not used				A	R
36	BP turbo Low pressure circuit				A	R
37	AP turbo High pressure circuit				A	R
38	Suction temperature TW110				A	R
39	Subcooling				A	R
40	Superheating				A	R
41	Power Demand				A	R
42	Reg Demand (Regulation demand)				A	R
BMS address	**Description**		**Min**	**Max**	**A=Analogic D= Digital**	**Read / Write**
43	TurboAmp (Supply Current TW110)				A	R
44	Earthcurrent				A	R
45	Turbopower				A	R
46	IGVOpen				A	R
47	Cavitytemp				A	R
48	Invertertemp				A	R
49	SCRtemp				A	R
131	Work hour Compressor CP1					
(data low)	A				R	X
132	Work hour Compressor CP1 (data high)				A	R
133	Work hour Compressor CP2 (data low)				A	R
134	Work hour Compressor CP2 (data high)				A	R
135	Work hour Compressor CP1A (or CP3) (data low)				A	R
136	Work hour Compressor CP1A (or CP3) (data high)				A	R
137	Work hour Compressor CP2A (or CP4) (data low)				A	R
138	Work hour Compressor CP2A (or CP4) (data high)				A	R
139	Work hour Compressor CP1B				A	R
140	Work hour Compressor CP2B				A	R
141	Supply Voltage Vac 3ø				A	R
142	Supply Current A 3ø				A	R
143	Act RPM (Actual RPM)				A	R
144	Des RPM (Desired RPM)				A	R
145	Min RPM				A	R
146	Max RPM				A	R

147	Solenoid Status				A	R
1	On/Off				D	R
2	Cooling / Heating				D	R
3	RA1 (Summary alarm C1)				D	R
4	RA2 (Summary alarm C2)				D	R
5	RA3 (Summary alarm C3)				D	R
6	RA4 (Summary alarm C4)				D	R
7	CP1 (State Compressor 1)				D	R
8	CP2 (State Compressor 2)				D	R
9	CP1A (or CP3) (State Compressor 3)				D	R
10	CP2A (or CP4) (State Compressor 4)				D	R
11	CP1B (State Compressor 1B)				D	R
12	CP2B (State Compressor 2B)				D	R
13	Alarm Flowswitch				D	R
14	Alarm condensator pump				D	R
15	Alarm evaporator pump				D	R
16	Alarm low capacity				D	R
17	Alarm compressor 1				D	R
18	Alarm low pressure C1 (by pressure switch for screw comp.)				D	R
19	Alarm low pressure C1 (transducers for screw comp.)				D	R
20	Alarm high pressure C1 (by pressure switch for screw comp.)				D	R
21	Alarm high pressure C1 (transducers for screw comp.)				D	R
22	Alarm antifreeze C1				D	R
23	Alarm fan C1				D	R
24	Alarm oil pressure switch C1				D	R
BMS address	**Description**		**Min**	**Max**	**A=Analogic D= Digital**	**Read / Write**
25	Alarm sensor C1				D	R
26	Alarm compressor 2				D	R
27	Alarm low pressure C2				D	R
28	Alarm high pressure C2				D	R
29	Alarm antifreeze C2				D	R
30	Alarm fan C2				D	R
31	Alarm oil pressure switch C2				D	R
32	Alarm sensor C2				D	R
33	Alarm phase monitor				D	R
34	Alarm pumpdown C1				D	R
35	Alarm pumpdown C2				D	R
36	Alarm eeprom				D	R
37	Alarm clock calendar				D	R
38	Alarm compressor 1A				D	R
39	Alarm compressor A				D	R
40	Alarm evaporator pump 1				D	R
41	Alarm evaporator pump 2				D	R
41	Alarm evaporator pump 3				D	R
43	Alarm antifreeze gas evaporator C1				D	R
44	Alarm antifreeze gas evaporator C2				D	R
45	Alarm compressor 1B				D	R
46	Alarm compressor 2B				D	R
47	Alarm automatic reset				D	R
48	Alarm maintenance ev.pump				D	R
49	Alarm maintenance compressor				D	R
50	Allarme sensor B1				D	R
51	Allarme sensor B2				D	R

52	Allarme sensor B3				D	R
53	Allarme sensor B4				D	R
54	Allarme sensor B5				D	R
55	Allarme sensor B6				D	R
56	Allarme sensor B7				D	R
57	Allarme sensor B8				D	R
58	Allarme sensor B9				D	R
59	Allarme sensor B10				D	R
60	Alarm Unit 1 Not connected				D	R
61	Alarm Unit 2 Not connected				D	R
62	Alarm Unit 3 Not connected				D	R
63	Alarm Unit 4 Not connected				D	R
64	Alarm oil pressure				D	R
64	Alarm discharge temperature				D	R
66	Alarm Condenser pressure				D	R
67	Alarm lo pressure low				D	R
68	Alarm sensor B11				D	R
69	Alarm sensor B12				D	R
70	Alarm expansion board				D	R
71	Alarm antifreeze by digital input				D	R
72	Alarm increase relè				D	R
73	Alarm decrease relè				D	R
74	Alarm amperometric transformer				D	R
75	relè PARZ 1 (70%)				D	R
76	relè PARZ 2 (50%)				D	R
77	PARZ 3 (25%)				D	R
BMS address	**Description**		**Min**	**Max**	**A=Analogic D= Digital**	**Read / Write**
78	Alarm Inverter Temp (Allarme)				D	R
79	Alarm Discharge temp				D	R
80	Alarm Suction pressure				D	R
81	Alarm Discharge pressure				D	R
82	Alarm Phase current				D	R
83	Alarm Cavity temp				D	R
84	Alarm Leaving water				D	R
85	Alarm Compressor ratio				D	R
86	Alarm Bearing Motor				D	R
87	Alarm SCR temp				D	R
88	Alarm Locked				D	R
89	Alarm Calibration				D	R
90	Alarm Startup				D	R
91	Alarm Axial disp.				D	R
92	Alarm Axial load				D	R
93	Alarm Fraddispx				D	R
94	Alarm Fraddispy				D	R
95	Alarm Fradloadx				D	R
96	Alarm Fradloady				D	R
97	Alarm Braddispx				D	R
98	Alarm Braddispy				D	R
99	Alarm BradLoadx				D	R
100	Alarm BradLoady				D	R
101	Alarm Overcurrent				D	R
102	Alarm Dchighvoltage				D	R
103	Alarm Highcurrent				D	R
104	Alarm CurrentWarning				D	R
105	Alarm IGBTerror				D	R
106	Alarm HighcurrentStartup				D	R

107	Alarm BearingError				D	R
108	Alarm BearingWarning				D	R
109	Alarm NoCurrIGBT				D	R
110	Alarm AVCData				D	R
111	Alarm EMFLow				D	R
112	Alarm Eprom				D	R
113	Alarm GeneratorMode				D	R
114	Alarm SCRPhase				D	R
115	Alarm Inverter Temp (Prealarm)				D	R
116	Alarm Discharge temp				D	R
117	Alarm Suction pressure				D	R
118	Alarm Discharge pressure				D	R
119	Alarm Phase current				D	R
120	Alarm Cavity temp				D	R
121	Alarm Leaving water				D	R
122	Alarm Compressor ratio				D	R
123	Alarm Bearing Motor				D	R
124	Alarm SCR temp				D	R
125	Alarm Calibration				D	R
126	Alarm Startup				D	R
127	Alarm Axial disp.				D	R
128	Alarm Axial load				D	R
129	Alarm Fraddispx				D	R
BMS address	**Description**		**Min**	**Max**	**A=Analogic D= Digital**	**Read / Write**
130	Alarm Fraddispy				D	R
131	Alarm Fradloadx				D	R
132	Alarm Fradloady				D	R
133	Alarm Braddispx				D	R
134	Alarm Braddispy				D	R
135	Alarm BradLoadx				D	R
136	Alarm BradLoady				D	R
137	Alarm Overcurrent				D	R
138	Alarm Dchighvoltage				D	R
139	Alarm Highcurrent				D	R
140	Alarm CurrentWarning				D	R
141	Alarm IGBTerror				D	R
142	Alarm HighcurrentStartup				D	R
143	Alarm BearingError				D	R
144	Alarm BearingWarning				D	R
145	Alarm NoCurrIGBT				D	R
146	Alarm AVCData				D	R
147	Alarm EMFLow				D	R
148	Alarm Eprom				D	R
149	Alarm GeneratorMode				D	R
150	Alarm SCRPhase				D	R
151	Alarm WARNING DP				D	R
152	Alarm communication				D	R
153	state output evaporator pump				D	R
154	state output antifreeze rehearter				D	R
155	state output fan				D	R
156	state output solenoid valve				D	R
157	state output economizer				D	R
158	state output VSBS				D	R
159	state output Interlock				D	R
160	state output summary alarm				D	R
161	state output 4 way valve				D	R

162	state output C10				D	R
163	state output C11				D	R
164	state output C12				D	R
165	state output C13				D	R
166	state 3 way freecooling valve				D	R



Smaltimento del prodotto
L'apparecchiatura (o il prodotto) deve essere oggetto di raccolta separata in conformità alle vigenti normative locali in materia di smaltimento.
Product Disposal
The device (or product) must be disposed of separately in accordance with local regulations regarding disposal.
Élimination du produit
L'appareillage (ou le produit) doit faire l'objet d'une collecte séparée conformément aux réglementations locales en vigueur en matière d'élimination.
Entsorgung des Produkts
Das Gerät (oder das Produkt) muss entsprechend den lokalen Entsorgungsvorschriften getrennt entsorgt werden.
Eliminación del producto
El equipo (o el producto) debe ser objeto de recogida selectiva acorde a lo especificado por las normativas locales vigentes en materia de eliminación.

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I dati tecnici riportati sulla seguente documentazione non sono impegnativi. L'Aermec si riserva la facoltà di apportare in qualsiasi momento tutte le modifiche ritenute necessarie per il miglioramento del prodotto

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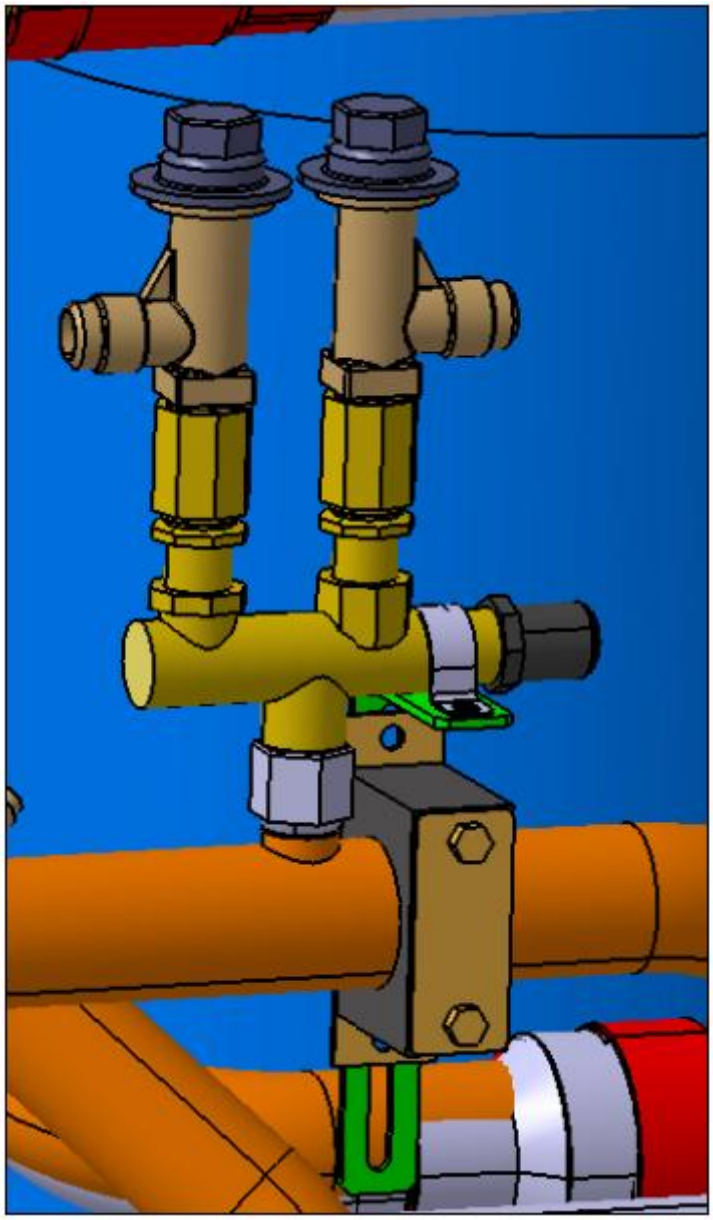
ST GEORGES COURT

SAMPLE of DUAL PRESSURE RELIEF VALVE INSTALLATION

Each refrigerant circuit to include dual pressure relief valves .

Configured to permit independent isolation and periodic testing of each valve .



Issued for information by : Simon Groombridge 17-10-12

Gas monitoring solutions

TQ4200 INFRA-RED REFRIGERANT GAS DETECTION SYSTEM

TQ Environmental plc

FEATURES

- Cutting costs through ultra low level detection
- ECA approved, Automated Refrigerant Leak Detection System
- F-gas compliant for systems containing 300kg refrigerant
- No recalibration required in service
- Highly stable infra-red gas analyser
- Self-zeroing and failsafe
- Highly specific to target gas
- Multi-point sampling capability for up to 24 points
- Automatic pressure & temperature compensation
- MODBUS enabled for remote monitoring of multiple sites
- Can be integrated into third party data monitoring systems

Qualified for Energy Technology List www.eca.gov.uk

The **TQ4200** is a compact, low cost solution to multipoint refrigerant gas leak detection. The system is available with a range of advanced ultra stable infra-red gas analysers, which require NO CALIBRATION in service. Pre programmed with several refrigerant gas types that can easily be changed in the field.

With proven reliability and minimal maintenance the **TQ4200** is designed for both industrial and commercial use e.g. Supermarkets, IT server farms, battery back-up rooms, food processing, storage & refrigeration, air conditioning and industrial cooling facilities. The TQ 4200 Provids F-gas solutions for larger installations and exceptional leak detection for all applications.

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E-Mail: sales@tqplc.com Web: www.tqplc.com

TQ Environmental plc

APPLICATIONS

- Retail Refrigeration
- Refrigerant machinery areas
- Air conditioning systems
- Chilled water plants
- Provision stores
- IT Server Farms

The **4200** system has been independently tested for inclusion in the ECA scheme, as an Automated Refrigerant Leak Detection System. Mandatory under the F-gas regulations for any refrigeration plant containing 300kg of refrigerant.

The System has a modulated broadband infra-red source to enable the detection of CFC's, HCFC's and their replacement, HFC's allowing the 4200 to accurately monitor different gas types simultaneously from a single detection panel.

Gases detected include:- **R22, R134A, R404A, R407C, R422D,** and **R507** with many more available upon request including **NH_3**. Providing an ideal solution when upgrading from **R22** applications.

TQ Environmental Plc, operate a policy of continual product development which means the specification is subject to change without prior notice. For full assistance with your application contact TQ Environmental.

D2-4200-0809

Gas monitoring solutions

The 4200 samples from up to 24 points and analyses the gas sequentially from each point. Each gas sample is conditioned by passing it over particulate filters and water catch pots, to ensure that the reliability of the infra-red analyser is not compromised. Accurate multiple calibration allows sampling from independent refrigeration plants containing different refrigerant gases.
The system requires a universal 100-250 Vac power supply rated at 5 amps. Connection of the sample lines completes the self contained operation.

SPECIFICATION	
Dimensions	w: 350 d: 200 h: 450mm
Weight	12kg
Tubing Connection	6mm/4mm flexible
Sample Gas Flow	0-8 litres/minute
Electrical Supply	Universal 100-250 Vac
Detection Technique	Non-Dispersive Infra-red
Gases Measured	HFC's, CFC's and HCFC's
Measurement Ranges	Typical range 0-1000 ppm
Accuracy	Minimum detection level 10 ppm Minimum Alarm point 20 ppm
Response Times	T90 <7s
Display	2 line alpha-numeric 40 LCD
Controls	Programmable zone ID, Red/Green LED's, front panel push buttons
Alarm Signals	3 Configurable SPCO Volt free alarm relays and fault relay
Output Signals	2 x 4-20mA analogue linear outputs, MODBUS serial communications
Temperature	-10^0 C to $+45^0$ C
Humidity	0-95%RH (Non-condensing)
Pressure/Temp Compensation	Internal automatic

PARTS LIST	
8 Channel, Bottom entry	370-502
16 Channel, Bottom entry	370-500
24 Channel, Bottom entry	370-503
6mm OD Sample Tubing	100-053
End of Line Filter	420-030

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E-Mail: sales@tqplc.com Web: www.tqplc.com

TQ Environmental plc

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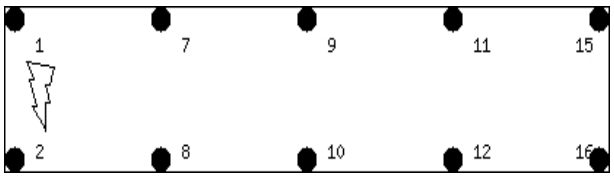
DISTRIBUZIONE ANTIVIBRANTI-SUPPORTS DISTRIBUTION

AVX513

(I) Istruzioni per la corretta installazione dei supporti antivibranti a molla

(GB) *How to correctly install the vibration clampening springs supports*

- Il kit prevede 10 supporti antivibranti a molla dotati di piastre in acciaio e relativi martinetti M16. Il martinetto viene utilizzato quando è necessario registrare : il livello della macchina sospesa, piani di appoggio sconnessi e/o errori nel prevedere il carico incidente.
- *The kit comprises 10 antivibration spring mounts provided with steel-plate and relevant M16 jacks.. The jack is used to adjust:the level of the suspended machine, disconnected support surfaces and/or in case of mistakes in calculating the incident load.*



POS	MOD.	POS	MOD.
1	RZ612-120P	2	GVr620-133Pr
7	GVr622-1305Pr	8	GVr630-133P
9	RZ602-105Pr	10	RZ602-108Pr
11	GVr630-1305P	12	GVr7301P
15	RX602-Z108Pr	16	RZ608-112Pr

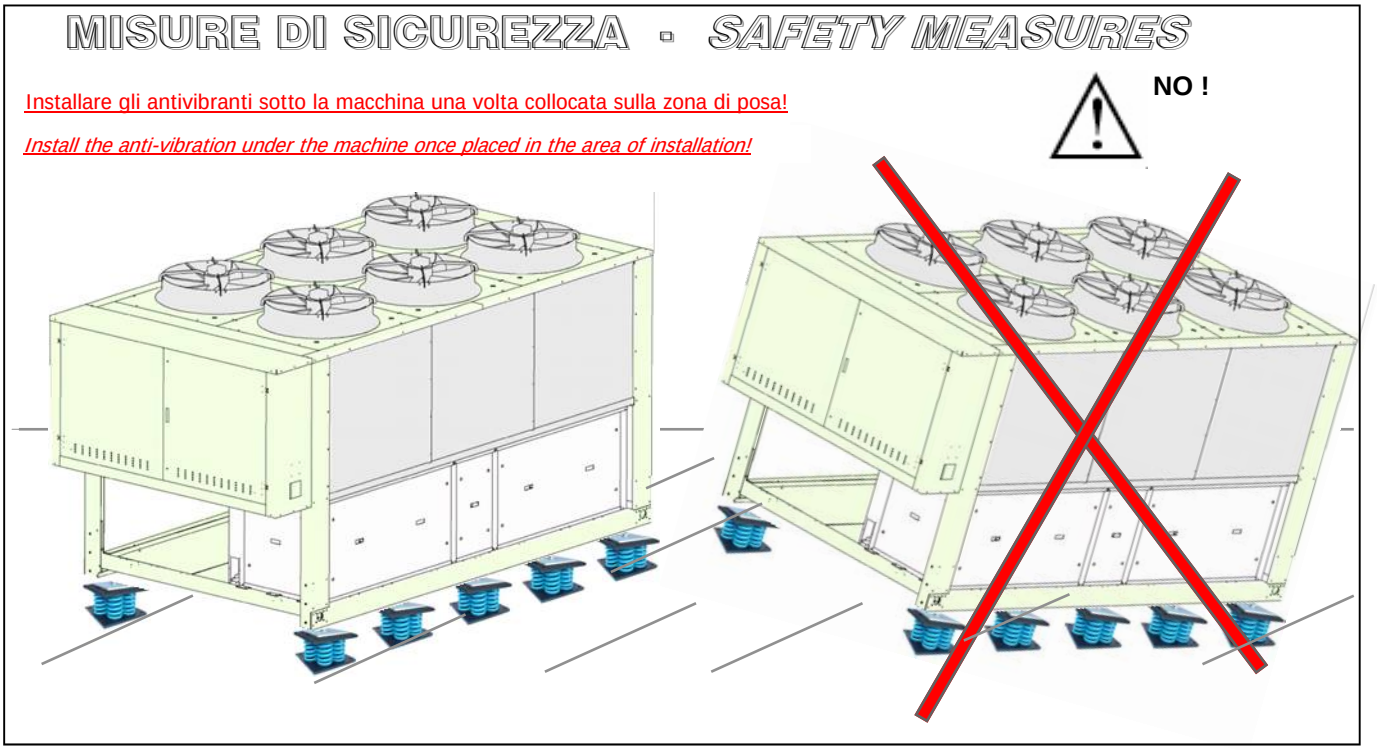
La collocazione dei Supporti Antivibranti e relativi interassi è riportata sul manuale tecnico e d'installazione "refrigeratori NSB."

The position of the antivibration mounts and relevant centre distances is shown in the technical and installation manual "NSB refrigerators"

MISURE DI SICUREZZA - SAFETY MEASURES

Installare gli antivibranti sotto la macchina una volta collocata sulla zona di posa!

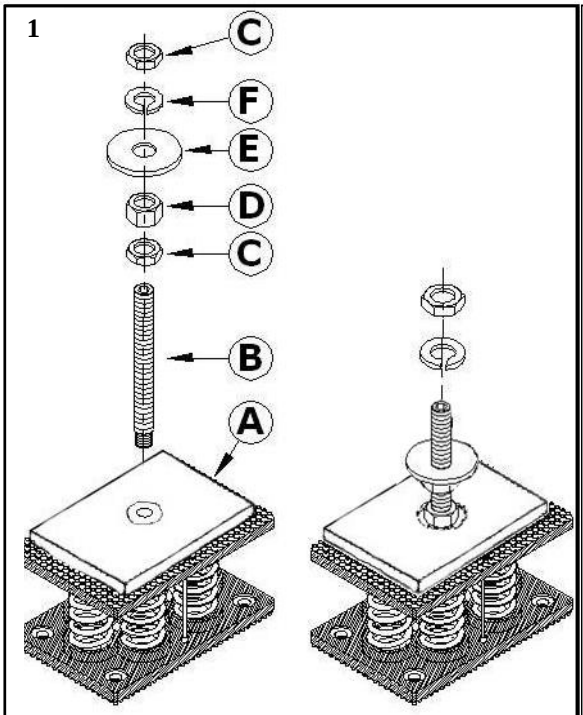
Install the anti-vibration under the machine once placed in the area of installation!



- Accertarsi che ad ogni punto di appoggio corrisponda il modello di antivibrante selezionato.
- Assicurarsi che la macchina completa di Supporti Antivibranti venga posizionata a terra perpendicolarmente rispetto al piano di appoggio.

- Make sure that the selected antivibration model corresponds to each support point.
- Make sure the machine complete with antivibration mounts is positioned on the ground right angles to the support surface.

1



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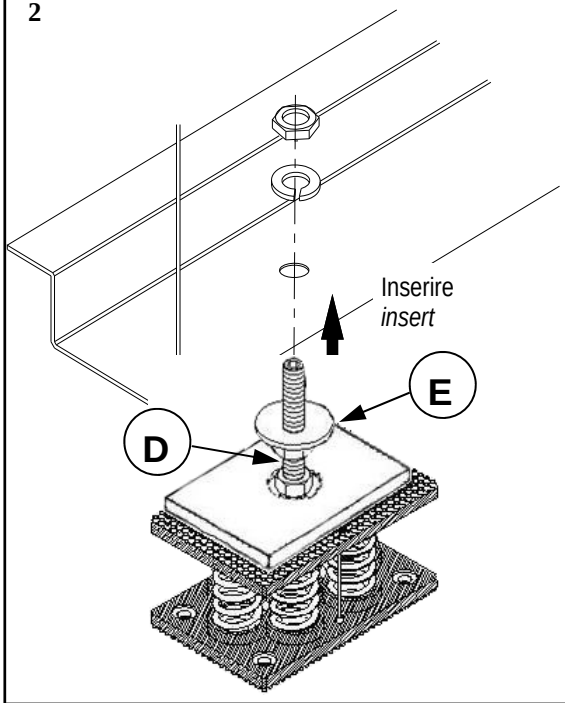

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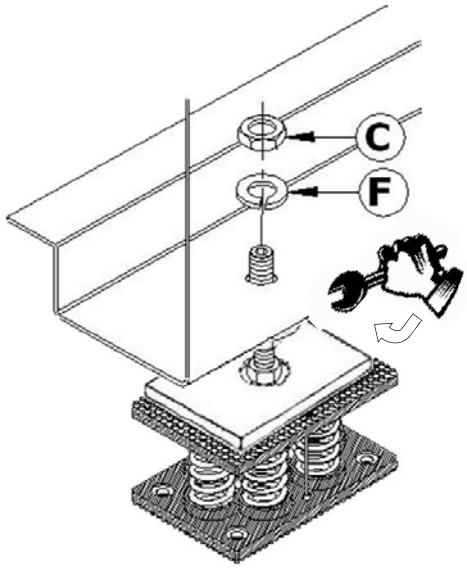


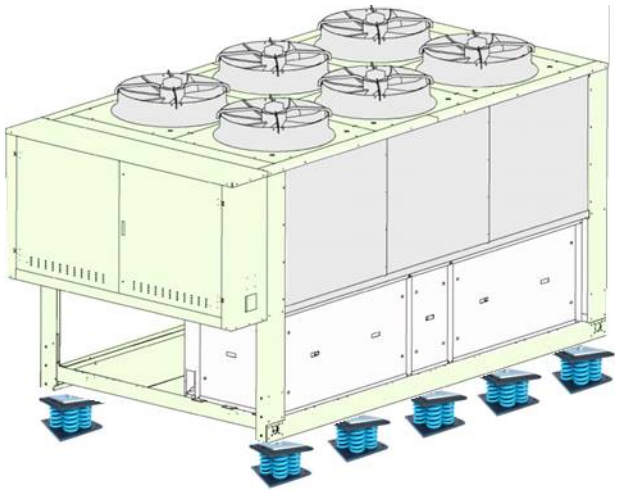
(I) Installazione del Supporto Antivibrante con l'utilizzo del martinetto :

(GB) *Fitting the Antivibration Mount using the jack :*

- fig. 1) Procedere con l'assiemaggio dei componenti il martinetto.
- fig. 2) Inserire il martinetto nella sede filettata predisposta sulla piastra superiore dell'antivibrante. Inserire sucessivamente il martinetto montato sull'antivibrante, nel foro predisposto sul basamento della macchina.
- fig. 3) Accertarsi che il basamento della macchina sia appoggiato sulla rondella piana (pos.E) del martinetto. Per compensare eventuali dislivelli, agire sul dado alto (pos.D), utilizzando una chiave 24.
  Bloccare la posizione ottenuta con rondella grower (pos.F) e rispettivo dado basso (pos.C).
  Al termine dell'operazione controllare che la macchina sia libera da vincoli.

- *fig. 1) Proceed to assemble the jack components.*
- *fig. 2) Fit the jack in the threaded housing on the upper plate of the antivibration mount. Next fit the jack mounted on the antivibration mount in the hole in the machine base.*
- *fig. 3) Make sure the machine base is resting on the flat washer (pos. E) of the jack. To offset any levelling problems, adjust the top nut (pos.D) using a 24 spanner.*
  Lock in position with grower washer (pos.F) and low nut (pos.C).
- *At the end of this operation, make sure the machine is free of restraints.*

4 La tipologia di macchina configurata è indicativa. *The type of machine shown is approximate.*



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DISTRIBUTION PLOTS ANTIVIBRATOIRES - POSITIONIERUNG DER SCHWINGUNGSDÄMPFER

AVX513

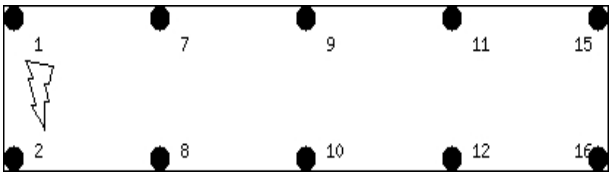
NSB 3402 A&E - FC

(F) Instruction pour une correcte installation des plots antivibratoires à ressort

(D) *Anleitung zur korrekten Montage der Schwingungsdämpfer-Federn*

- Le kit prévoit 10 plots à ressort doués de palques en acier et vérins correspondants M16. Le vérin est utilisé : lorsqu' il est nécessaire de régler le niveau de la machine suspendue; en cas de plans d'appui disjoints et/ou d'erreurs dans le calcul de la charge d'incidence.

- *Das Set umfaßt 10 Schwingungsdämpfer-Federn mit Platten im Stahl und zugehörigen Winden M16. Die Winden werden für folgende Einstellungen verwendet: zur Nivellierung der angehobenen Maschine, bei unebenen Auflageflächen und/oder Fehlern bei der Einschätzung der auftretenden Belastung.*



POS	MOD.	POS	MOD.
1	RZ612-120P	2	GVr620-133Pr
7	GVr622-1305Pr	8	GVr630-133P
9	RZ602-105Pr	10	RZ602-108Pr
11	GVr630-1305P	12	GVr7301P
15	RX602-Z108Pr	16	RZ608-112Pr

La disposition des plots et des entraxes relatifs est indiquée dans le manuel technique et d'installation "refroidisseurs NSB".

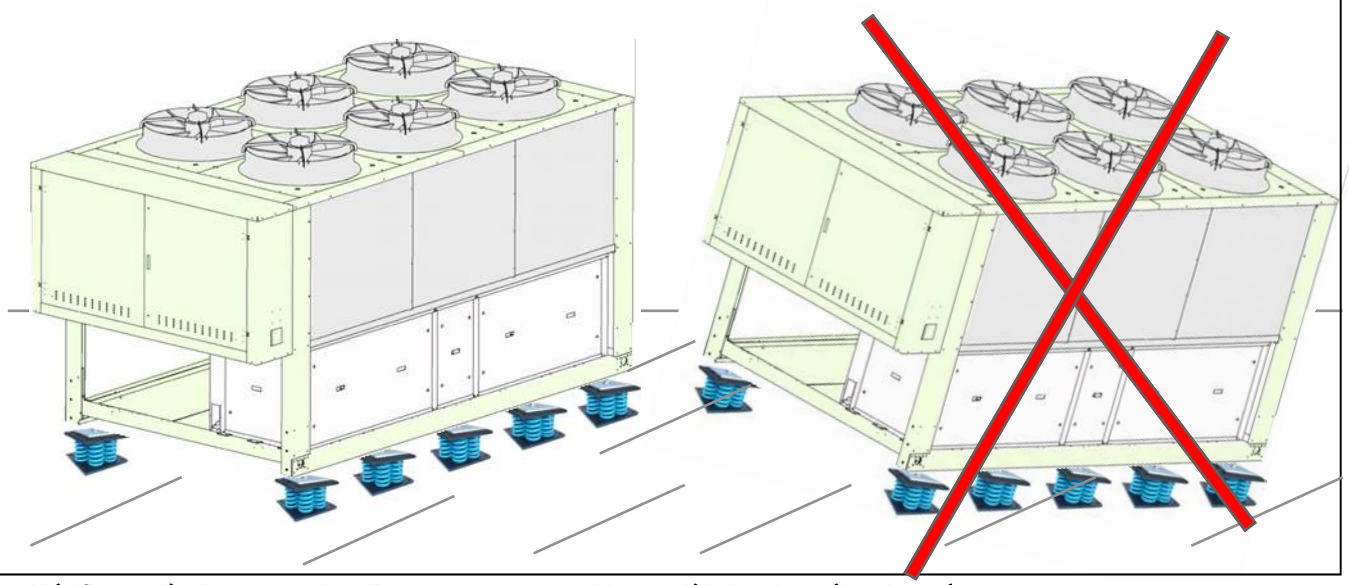
Die positionen und zugehörige Abstände der Schwingungsdämpfer sind im technischen und Installationshandbuch "kühler NSB" angegeben.

DE SECONSIGNES URITE - *MONTAGE DER SCHWINGUNGSDÄMPFER*

Installer les anti-vibration sous la machine une fois placés dans le domaine de l'installation!

Installieren Sie Anti-Vibration unter dem machine einmal im Bereich der Installation platziert!

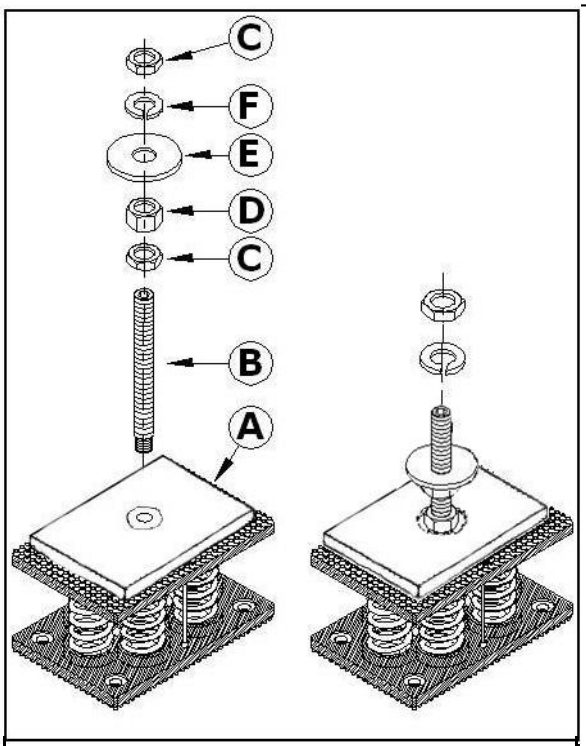
NON !
NEIN !



- Vérifier qu'à chaque point d'appui correspond le modèl de plot sélectionné
- Vérifier que la machine avec les plots soit positionnée à terre perpendiculairement au plan d'appui.

- ***Sicherstellen, daß das gewünschte Schwingungsdämpfermodell mit den jeweiligen Auflagestellen übereinstimmt.***
- ***Sicherstellen, daß die mit Schwingungsdämpfern ausgestattete Maschine lotrecht zur Auflagefläche auf dem Boden positioniert wird.***

INSTALLATION DES PLOTS ANTIVIB. - MONTAGE DER SCHWINGUNGSDÄMPFER



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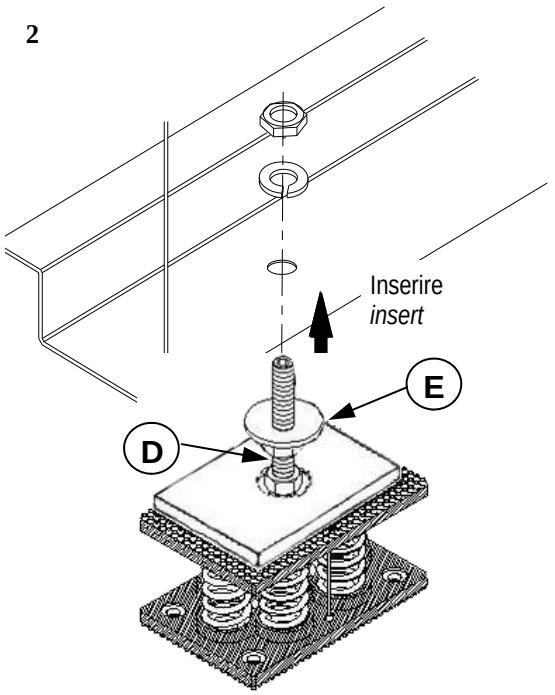

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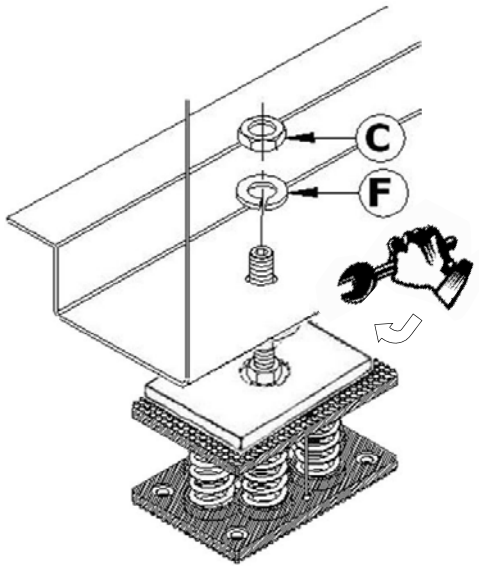


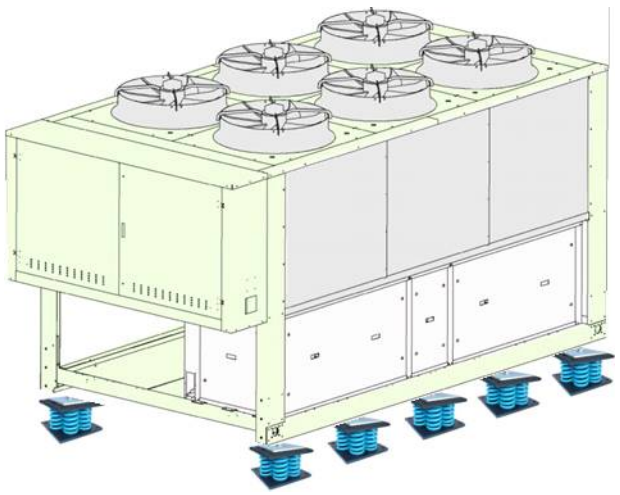
(F) Installation du plot Antivibratoire avec l'emploi du vérin

(D) *Montage der Schwingungsdämpfer unter Einsatz der Winden*

- fig. 1) Assembler les éléments du verin.
- fig. 2) Insérer le vérin dans le logement fileté prévu sur la plaque supérieure du plot. Puis insérer le vérin monté sur le plot dans le trou prévu sur le bâti de la machine.
- fig. 3) Vérifier que le bâti de la machine repose sur la rondelle plate (pos.E) du vérin. Pour compenser les dénivelés éventuels, agir sur l'écrou haut (pos.D), en utilisant une clé 24.
  Bloquer la position abtenue avec la rondelle grower (pos.F) et l'écrou bas correspondant (pos.C).
  A la fin de l'opération, contrôler que la machine soit libre de tout lien

- *abb. 1) Die Komponenten der Winde montieren.*
- *abb. 2) Die Winde in den Gewindesitz der oberen Schwingungsdämpferplatte einführen. Anschließend die auf dem Schwingungsdämpfer angebrachte Winde in die Bohrung im Maschinenuntergestell einführen.*
- *abb. 3) Sicherstellen, daß das Untergestell der Maschine auf der flachen Scheibe (pos.E) der Winde aufliegt. Zum Ausgleich eventueller Höhenunterschiede mit Hilfe einer 24 er-Schlüssels die große Mutter (pos.D), einstellen.*
  Die so erzielte Position mit einer Federscheibe (pos.F) und zugehöriger flacher Mutter (pos.C) blockieren.
  Nach Beedingung des Arbeitschrittes sicherstellen, daß die Maschine nicht gebunden ist.

4 Le type de machine représentée est indicatif.
Die abgebildete Maschinentypologie dient lediglich als Beispiel.

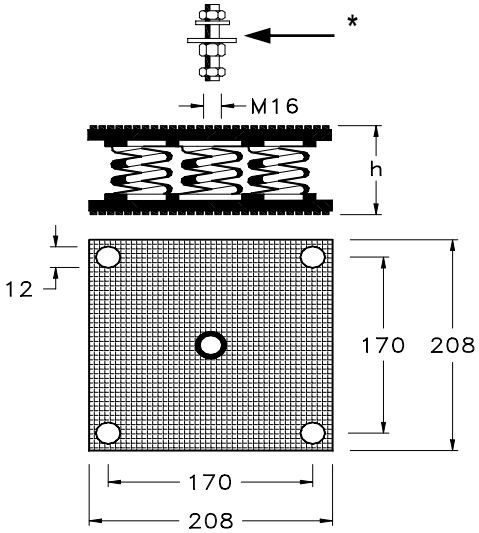


antivibranti serie G...

...alcune combinazioni...

antivibrating line G...

...some models...



(I) **Per identificare il modello adatto ad isolare le frequenze in campo, consultare il nomogramma a pag. 1.**

Il supporto antivibrante G... è formato da:

- **M**olle in acciaio armonico UNI 7900 con superficie protetta da trattamento cataforetico
- **2** corpi di contenimento molle, formati da piastre in acciaio da 5 mm di spessore, trattate con processo elettrolitico di zinco giallo. Ogni piastra è fornita di guanto-cuscinetto in elastomero antiolio; le superfici del guanto-cuscinetto presentano cilindretti deformabili antiscivolo
- **C**uscinetti in materiale plastico interposti tra molle e piastre in acciaio interrompono la continuità del suono
- **2** tiranti in nylon da 2,5 mm e speciali bussolette cromate, assicurano il bloccaggio delle molle tra i corpi di contenimento

A richiesta:.

- **M**artinetto disponibile in acciaio zincato o inox, raccomandato per la registrazione della quota macchina

MODELLO COD. MODEL / CODE	K Kg/mm	*Carico statico max* Max static load Kg	*Defles. massima* Max deflection mm	h mm
GWr 702	3,5	133	38	
GWr 704	7,0	245	35	
GWr 705	11,2	369	33	
GWr 706	14,7	485	33	
GWr 708	19,6	607	31	
GWr 709	27,3	819	30	
GWr 712	35,0	980	28	
GVr 714	44,1	1102	25	
GVr 720	52,5	1404	27	**104**
GVr 722	67,2	1747	26	
GVr 730	82,6	2065	25	
GVr 7300	93,8	2251	24	
GVr 7301	105,0	2310	22	
GVr 7305	115,5	2541	22	
GVr 731	126,0	2520	20	
GVr 745	157,5	2992	19	
GVr 748	189,0	3591	19	
GVr 750	203,0	3857	19	
GVr 7501	220,5	3748	17	
GVr 7510	238,0	4046	17	

(GB) ***To indentify the model suitable for the insulation of the frequencies in use, refer to the nomograph on page 1.***

The antivibrating mount line G... is formed of:

- **S**prings in harmonic steel UNI 7900 with surface protected by cataphoretic treatment
- **2** steel plates 5 mm thick treated with electrolytic process of yellow zinc. Each plate is provided with an anti-oil bearing; the bearing surfaces have anti-skid deformable rolls
- **P**lastic bearings between the spring and the plates avoid the sound transmission
- **2** nylon braces 2,5 mm thick and special bushings assure the locking of the springs between the plates

On request:

- **J**ack available in stainless steel or steel coated with zinc, it is recommended to gauge the machine

A richiesta **On request :** *

CODICE CODE	*Descrizione* Description
0000MRM20M16/	*martinetto M20* - jack M20
0000MRM16/000	*martinetto M16* - jack M16

Le dimensioni e le caratteristiche delle attrezzature riportate nel presente, non vincolano la Soleco engineering s.r.l. e possono essere variati senza alcun preavviso

The dimensions and the features of the equipments mentioned in this price list can be changed by Soleco engineering s.r.l. without notice.

Soleco engineering srl Via Masaccio, 12 - 20096 Pioltello (MI) ITALY - tel. + 39 - 02 9244311 fax + 39 - 02 92103168 / 02 92591676 e-mail: soleco@solecosrl.com

antivibranti serie R...

...alcune combinazioni...

(I) **Per identificare il modello adatto ad isolare le frequenze in campo, consultare il nomogramma a pag. 1.**

Il supporto antivibrante R... è formato da:

- **M**olle in acciaio armonico UNI 7900 con superficie protetta da trattamento cataforetico
- **2** corpi di contenimento molle "placche" formati da piastre in acciaio da 5 mm di spessore, rivestite di mescola elastomera antiolio mediante vulcanizzazione. Le superfici di contatto dei corpi presentano cilindretti deformabili antiscivolo, che permettono al supporto di stazionare per attrito. Ogni molla è fissata con adesivo sulla placca, nell'appropriata sede

A richiesta:

- **M**artinetto disponibile in acciaio zincato o inox, raccomandato per la registrazione della quota macchina

(GB) ***To indentify the model suitable for the insulation of the frequencies in use, refer to the nomograph on page 1.***

The antivibrating mount line R... is formed of:

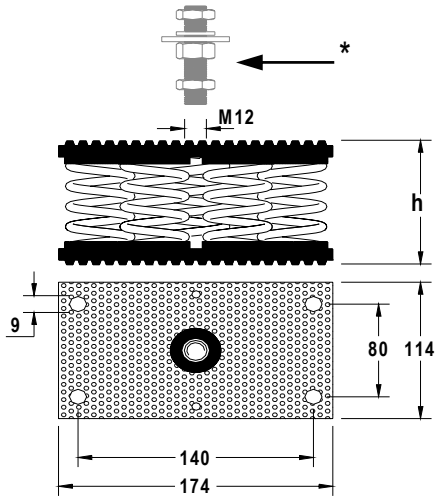
- **S**prings in harmonic steel UNI 7900 with surface protected by cataphoretic treatment
- **2** steel plates 5 mm thick coated through vulcanisation with anti-oil elastomer. The plate surface is provided with anti-skid deformable rolls for a frictional standing of the mount. Each spring is fastened on the plate with adhesive

On request:

- **J**ack available in stainless steel or steel coated with zinc, it is recommended to gauge the machine

antivibrating line R...

...some models...



MODELLO / COD. MODEL / CODE	K Kg/mm	*Carico statico max* Max static load Kg	*Defles. massima* Max deflection mm	h mm
RZ 600	2,4	86	36	
RZ 700	2,8	101	36	
RZ 601	4,02	144	36	
RZ 701	4,69	169	36	
RZ 602	6,0	210	35	
RZ 702	7,0	245	35	
RZ 603	10,38	332	32	
RZ 703	12,11	387	32	
RX 601	15,0	435	29	
RX 701	17,5	507	29	
RZ 705	21,0	588	28	**94**
RX 702	25,9	725	28	
RX602/103	28,2	677	24	
RZ 708	32,55	814	25	
RX602/107	34,0	646	19	
RZ608/120	38,5	731	19	
RX 703	42,0	966	23	
RX606/Z120	46,6	885	19	
RZ 712	50,4	1058	21	
RZ612/X107	55,0	1045	19	
RX 704	63,0	1197	19	

***A richiesta* - On request : ***

CODICE CODE	*Descrizione* Description
0000MRM16M12/	*martinetto M16* - jack M16
0000MRM12/000	*martinetto M12* - jack M12

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antivibranti serie R...

...alcune combinazioni...

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- **2** corpi di contenimento molle "placche" formati da piastre in acciaio da 5 mm di spessore, rivestite di mescola elastomera antiolio mediante vulcanizzazione. Le superfici di contatto dei corpi presentano cilindretti deformabili antiscivolo, che permettono al supporto di stazionare per attrito. Ogni molla è fissata con adesivo sulla placca, nell'appropriata sede

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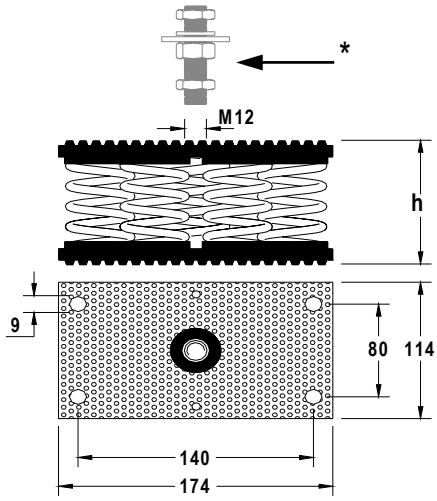
...some models...



MODELLO / COD. MODEL / CODE	K Kg/mm	*Carico statico max* Max static load Kg	*Defles. massima* Max deflection mm	h mm
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St Georges Court

PERFORMANCE AND ACOUSTIC WITNESS TEST

NS 2202XBEAK & NS3602XEAK AIR-COOLED WATER CHILLERS

PRELIMINARY DOCUMENT

INDEX

Description	Page
Introduction	3
Itinerary	4
Method Statement - Standard Factory Performance Test	5
Customer Witness Operational Performance Test	6
Customer Witness Factory Acoustic Test	7
Technical Schedule	8
Test Report Sheet	9
General Assembly Drawing	10

INTRODUCTION

PROJECT: St Georges Court

CUSTOMER: Gratte

MANUFACTURER: AERMEC SpA
Via Roma 44-37040
Bevilacqua (Verona) Italy

EQUIPMENT: 1-off NS2202XBEAK & 1 off NS3602XEAK

This project involves the supply and commissioning of 4-off NS type air-cooled water chillers. The chillers are manufactured by AERMEC and one of each type shall be run tested in the factory prior to delivery to site to verify performance. The chiller shall be performance witness tested in accordance with this document and witnessed by client's representatives at AERMEC's production facilities in Italy.

The test shall be carried out in three parts. Firstly, the chiller shall go through a functional pre-test and set-up procedure involving Aermec personnel. Then, on the date identified herein, the chiller shall go through a performance witness test followed by an acoustic test.

A. Functional pre-test (Aermec)

Complete a physical inspection of the unit and accessories. Check the integrity of the refrigerant circuit by pressure testing with nitrogen. Charge the unit and review operation of the refrigerant circuit. Measure the inlet and outlet water temperatures, flow rates and electrical performance of the chiller.

B. Witness performance test (Aermec + customers)

Run the chiller for one hour to achieve steady state conditions at 100% full load. The performance test is to be conducted 35°C ambient in the Production Test Chamber. Test operation of alarms. Simulate summer design operating conditions.Verify chiller performance against technical schedule. Issue a test certificate for customer approval.

C. Acoustic test (Aermec + customers)

The acoustic test is conducted outside the test chamber to eliminate the influence of the chamber fan noise and prepare it for the sound test run in the evening when the background noise is at a minimum. The chiller will be complete with both circuits running at full load.

ITINERARY

Witness Testing of AERMEC NS air-cooled water chillers

PROJECT: St Georges Court

Attendees

- TBC
- TBC
- TBC
- TBC
- Ray Miller – Aermec UK

Schedule

- TBC
- TBC
- TBC
- TBC
- TBC
- TBC
- TBC
- TBC
- TBC

METHOD STATEMENT

STANDARD FACTORY PERFORMANCE TEST

Equipment: 1 No. NS2202XBEAK air cooled water chiller
1 No. NS3602XEAK air cooled water chiller

Ref: Production Test Facility – Production Test Chamber

Standard Functional Test (carried out prior to witness test)

1. Pre-charge unit with nitrogen for checking purposes
2. Test for leakage
3. Discharge the circuit
4. Establish a vacuum to remove all gas and to eliminate moisture inside the refrigerant circuit
5. Charge the unit with R134a refrigerant
6. Control gas charge through the sight glass and pressure gauges
7. Connect the inlet and outlet water connections to the testing room plant
8. Set the water flow to the correct flow rate
9. Cable up the power to the unit
10. Carry out test of voltage and frequency on the electrical panel
11. Program the microprocessor control with basic working parameters
12. Set up the expansion valves and trim the refrigerant charge
13. Start up each compressor and test electrical data
14. Set up all the pressure switches
15. Initiate a controlled start-up of each condenser fan
16. Calibrate the various temperature and pressure probes on the circuit

Customer Witness Operational Performance Test

1. Test the alarms on the microprocessor:-
    a. High pressure alarm
    b. Low pressure alarm
    c. Compressors alarm
    d. Evaporator freeze alarm
    e. Flow switch alarm
2. Test of probe failure
3. Set the design set-point and configure the unit for design working conditions
4. Run the chiller in the Production Test Chamber at full load conditions at design conditions:-

	NS 3602XE AK	NS 2202XBE AK
a. Chilled water:	6 °C / 12 °C	6 °C / 12 °C
b. Flow rate:	29.7 l/s	16.01 l/s
c. Glycol:	n/a	n/a
d. Design Ambient:	35°C	35°C

5. Record the performance data on the test report sheet
6. Run the chiller at full load conditions for one hour to reach steady state full load condition
7. Print a copy of the test report for customer approval
8. Test to be in accordance with ISO14511

WITNESS FACTORY ACOUSTIC TEST (AERMEC+CUSTOMER)

The Total Sound Power data declared for the NS 2202XBE AK is 90 dB(A)

The Total Sound Power data declared for the NS 3602XE AK is 92 dB(A)

Acoustic Test Procedure

1) Position the unit outside the test chamber to eliminate the influence of the chamber fan noise and prepare it for the sound test run

2) Prepare and calibrate the test instrument
   Sound Intensity Analyser : BRUEL & KJAER PULSE
   Measured Sound Level : Sound Power
   Filter : A

3) Measure the sound intensity levels from one module within 1 metre from the unit all round and above in accordance with ISO 9614-2.2, Acoustics. All octave band readings to be taken simultaneously.

4) Shut down the chiller and measure the background noise level.

5) Record the results.

6) Calculate the sound pressure levels in accordance with ISO 3744:1994 Acoustics and Eurovent tolerances

Issue a test certificate for customer approval and signature

Model: NS2202XB°E AK°°°00

COOLING		
Total cooling capacity	kW	401.00
Input power	kW	152.67
Input current	A	273.88
E.E.R.	W/W	2.62
Dry bulb air inlet temperature	°C	35.00
Inlet water temperature	°C	12.00
Change in water temperature	°C	6.00
Outlet water temperature	°C	6.00
Glycol mix	%	0
Water flow rate	l/s	16.01
Pressure drops	kPa	40.0
Refrigerant		R134a
Compressor type		Screw
Number of compressors	n.	2
Number of refrigerant circuits	n.	2
Refrigerant gas charge	kg	85.0 per circuit
Evaporator type		Shell and tube
Number of evaporators	n.	1
Evaporator water connections		4"
Total air flow rate	m^3/s	33.33
Maximum full load current	A	409.00
Starting current	A	437.00
Power supply		400V - 3 - 50 Hz
FREE COOLING		
Cooling capacity (reduced air flow)	kW	248.0
Input power	kW	25.3
E.E.R.	W/W	9.8
Dry bulb ambient air temperature	°C	0.00
Inlet water temperature	°C	12.00
Change in water temperature	°C	4.84
Outlet water temperature	°C	7.16
Glycol mix	%	30
Sound data		
Sound pressure @ 1 Metre to EN ISO 3744	dB(A)	64.4
Dimensional data		
Height	mm	2450
Width	mm	2200
Depth	mm	5750
Net Weight	kg	5790

Model: NS 3602XE AK°°°00

Cooling

Total cooling capacity	kW	746.00
Input power	kW	268.00
Input current	A	437.00
E.E.R.	W/W	2.78
E.S.E.E.R.	W/W	4.06
Dry bulb air inlet temperature	°C	35.00
Inlet water temperature	°C	12.00
Change in water temperature	°C	6.00
Outlet water temperature	°C	6.00
Glycol mix	%	0
Water flow rate	l/s	29.7
Pressure drops	kPa	25.5

Refrigerant		R134a
Compressor type		Screw
Number of compressors	n.	2
Number of cooling circuits	n.	2
Refrigerant gas charge	kg	TBA
Evaporator type		Shell and tube
Number of evaporators	n.	2
Evaporator water connections		4”
Total air flow rate	m^3/s	52.22
Maximum full load current	A	676.00
Maximum Starting current	A	661.00
Power supply		400V - 3 - 50 Hz

Sound data

Sound pressure @ 1 metre to EN ISO 3744	dB(A)	65.2

- Sound pressure in unrestricted range on reflecting plane (directivity factor Q = 2).

Dimensional data

Height	mm	2,450
Width	mm	2,200
Depth	mm	9,140
Net weight (operating)	kg	8,836

Data according to UNI EN 14511:2011

TEST REPORT SHEET

Production Test Certificate

AERMEC S.p.A. TEST REPORT
AIR/WATER and WATER/WATER CHILLERS
(Customer copy)

TESTING ROOM N°		TYPE	
SERIAL NUMBER			
CIRCUIT N°			
TEST MANAGER		DATE	

NOMINAL CONDITIONS 1°

EVAPORATOR WATER FLOW		l/h
EVAPORATOR WATER IN TEMPERATURE		°C
EVAPORATOR WATER OUT TEMPERATURE		°C
EVAPORATOR GLYCOL %		%
CONDENSER WATER FLOW*		m^3/h
CONDENSER WATER IN TEMPERATURE*		°C
CONDENSER WATER OUT TEMPERTURE*		°C

MEASURED PERFORMANCES

HEATING CAPACITY [ ] kW

ELECTRICAL MEASURED DATA

INPUT POWER		Kw
VOLTAGE		V

	PHASE R	PHASE S	PHASE T
CURRENT	A	A	A

NB: *only for water/water and heating mode in heat pumps air/water chillers
** only for air/water chillers

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
NE' UTILIZZARE IL CONTENUTO O RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA
AUTORIZZAZIONE ESPLICITA. OGNI INFRAZIONE COMPORTA IL RISARCIMENTO DEI DANNI
SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

AERMEC S.P.A.
BEVILACQUA (VERONA)
ITALY

SCHEMA ELETTRICO
WIRING DIAGRAM
NS BIC. FUS. S.grande

PROGETTAZIONE		TENSIONE ESERCIZIO	400V
SERIE		TENSIONE COMANDI	230V
CODICE	43745.00	TENSIONE SEGNALI	24V
COMMITTENTE			
PROGETTATO CON SISTEMA CAD/CAE	Sabik		

NORME	C.E.I.	PROTEZIONE
+ UBICAZIONE = NOME LOGICO		

REV.	DESCRIZIONE REVISIONE	DATA	DISEGNATORE

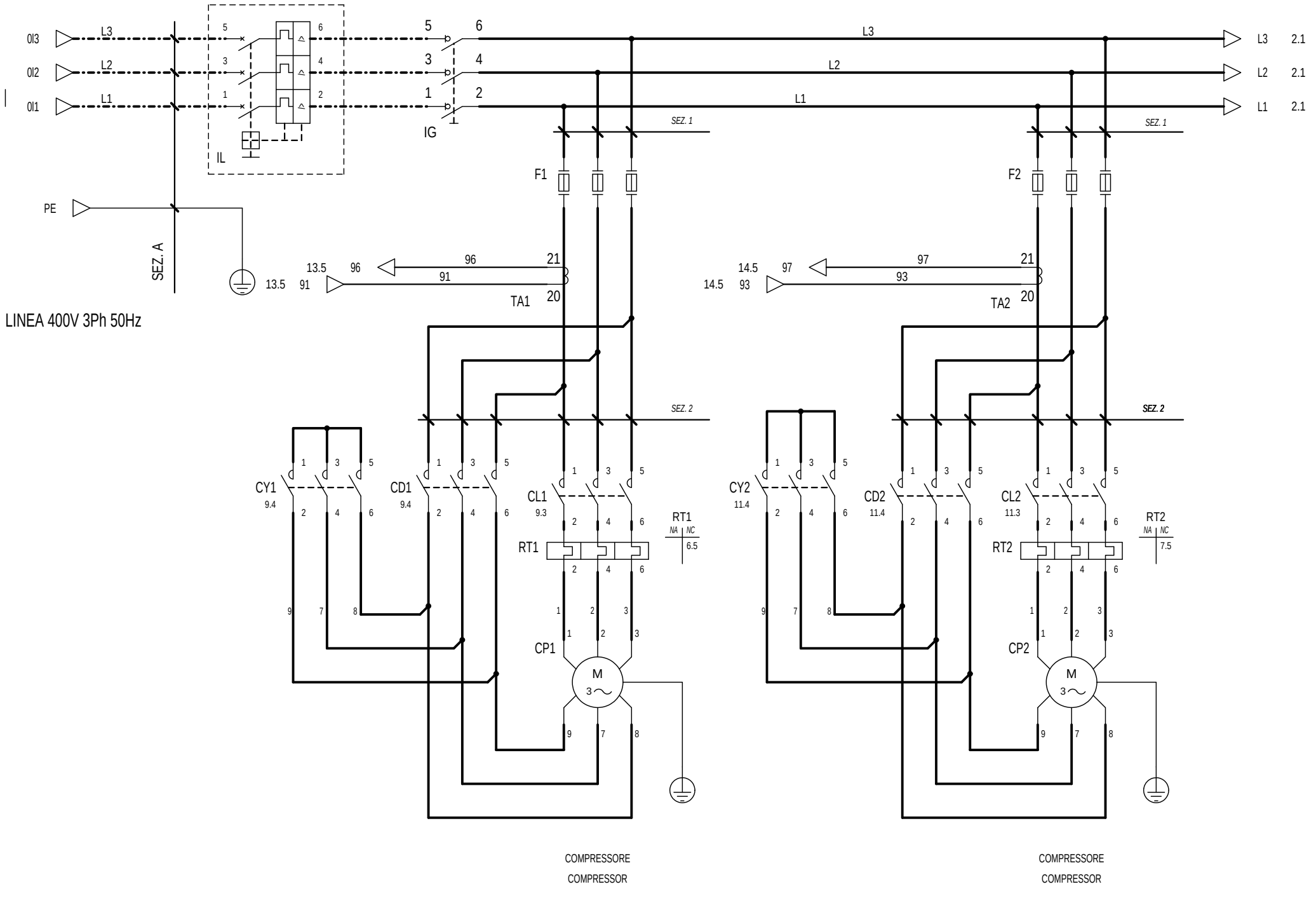
	DATA	FIRME
DIS.	04/07/2012	
VISTO	04/07/2012	
APPROV.	04/07/2012	

SCHEMA FUNZIONALE
TABELLE DI RIEPILOGO
MORSETTIERE, CAVI E DISPOSITIVI GENERICI
DISTINTA BASE
LEGENDA PAGINE
LEGENDA SIMBOLI

NS BIC. FUS. S.grande

FOGLIO 0
T.F. 26

SOST. DA:	SOST. IL:	ORIGINE



NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO NE' UTILIZZARE IL CONTENUTO O RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA AUTORIZZAZIONE ESPLICITA. OGNI INFRAZIONE COMPORTA IL RISARCIMENTO DEI DANNI SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO		
					DATA	22/06/2009
					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

POTENZA
POWER

NS BIC. FUS. S.grande

43745.00

0

FOGL. 1
DI 26

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
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PROGETTO:
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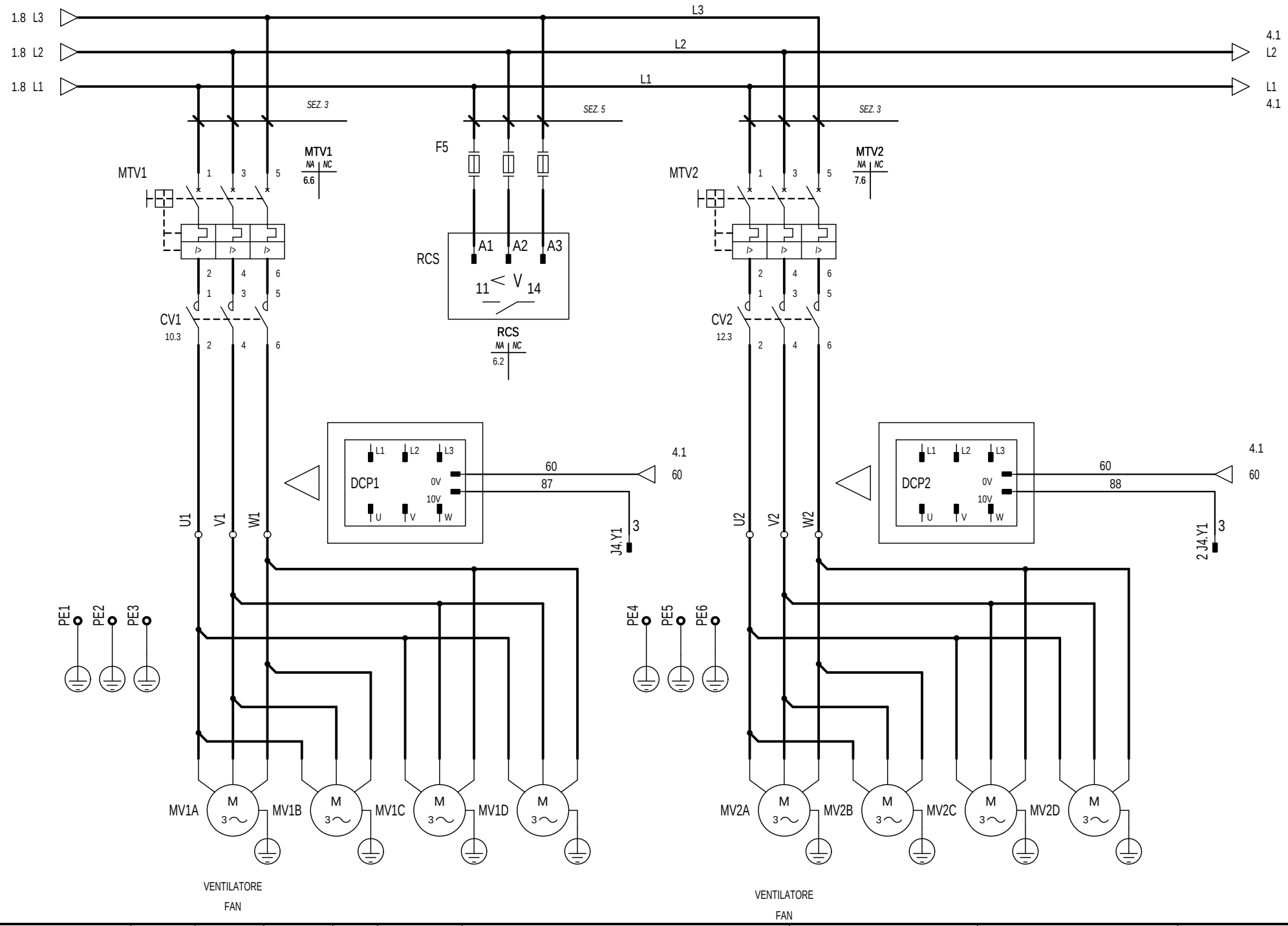

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO		
					DATA	22/06/2009
					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

POTENZA
POWER

NS BIC. FUS. S.grande

43745.00

0

FOGL. 2
DI 26

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PROGETTO:
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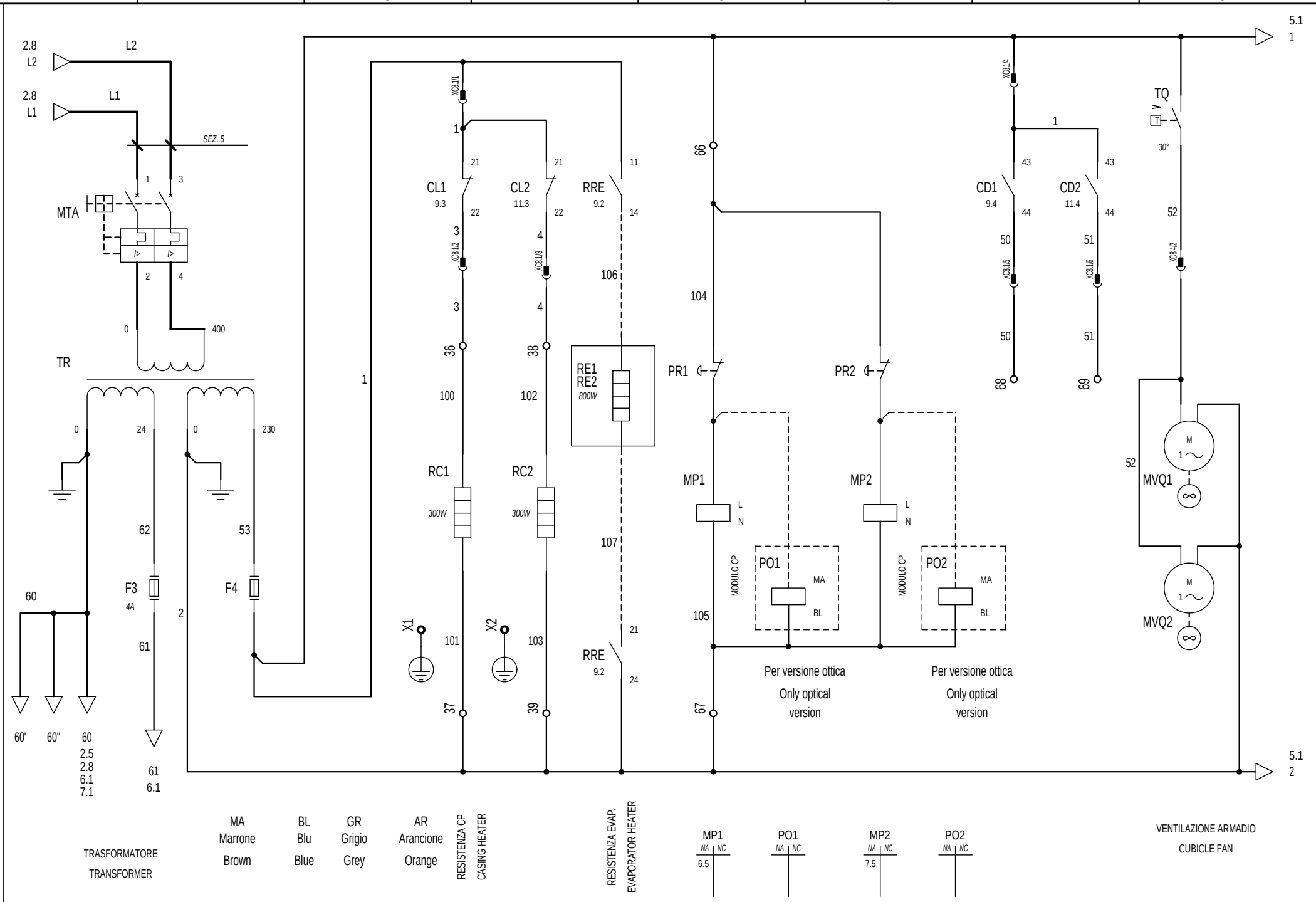

TRASFORMATORE
TRANSFORMER

MA	BL	GR	AR
Marrone	Blu	Grigio	Arancione
Brown	Blue	Grey	Orange

RESISTENZA CP
CASING HEATER

RESISTENZA EVAP.
EVAPORATOR HEATER

MP1	PO1	MP2	PO2
NA NC	NA NC	NA NC	NA NC
6.5		7.5	

VENTILAZIONE ARMADIO
CUBICLE FAN

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO
				DATA 22/06/2009
				DISEGN. Crivellaro
				DATA 22/06/2009
				APPROV. De Togni

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BEVILACQUA (VERONA) ITALY

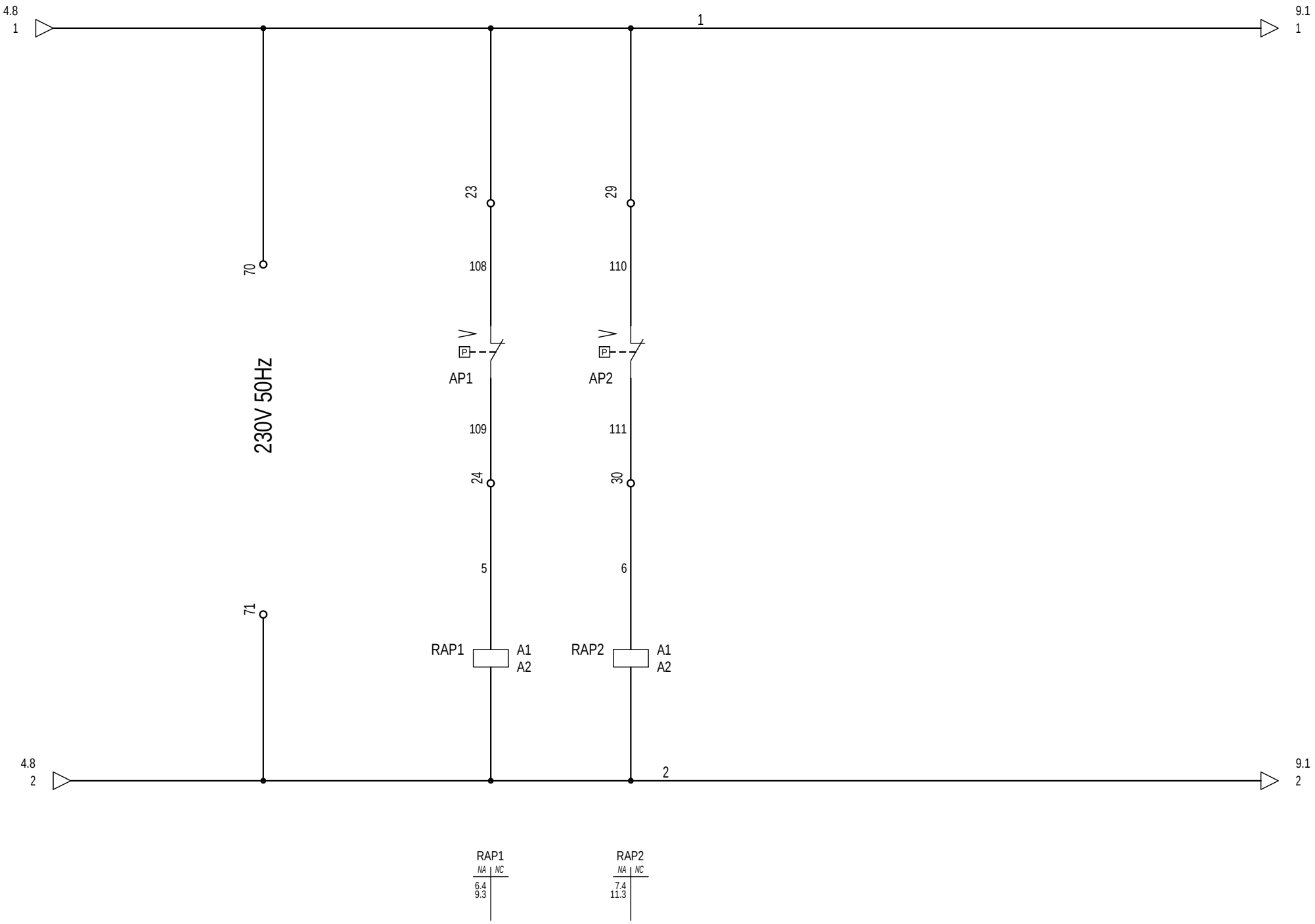
CIRCUITO AUSILIARIO
Auxiliary circuit

NS BIC. FUS. S.grande

43745.00

4

FOGL. 4
DI 26



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					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

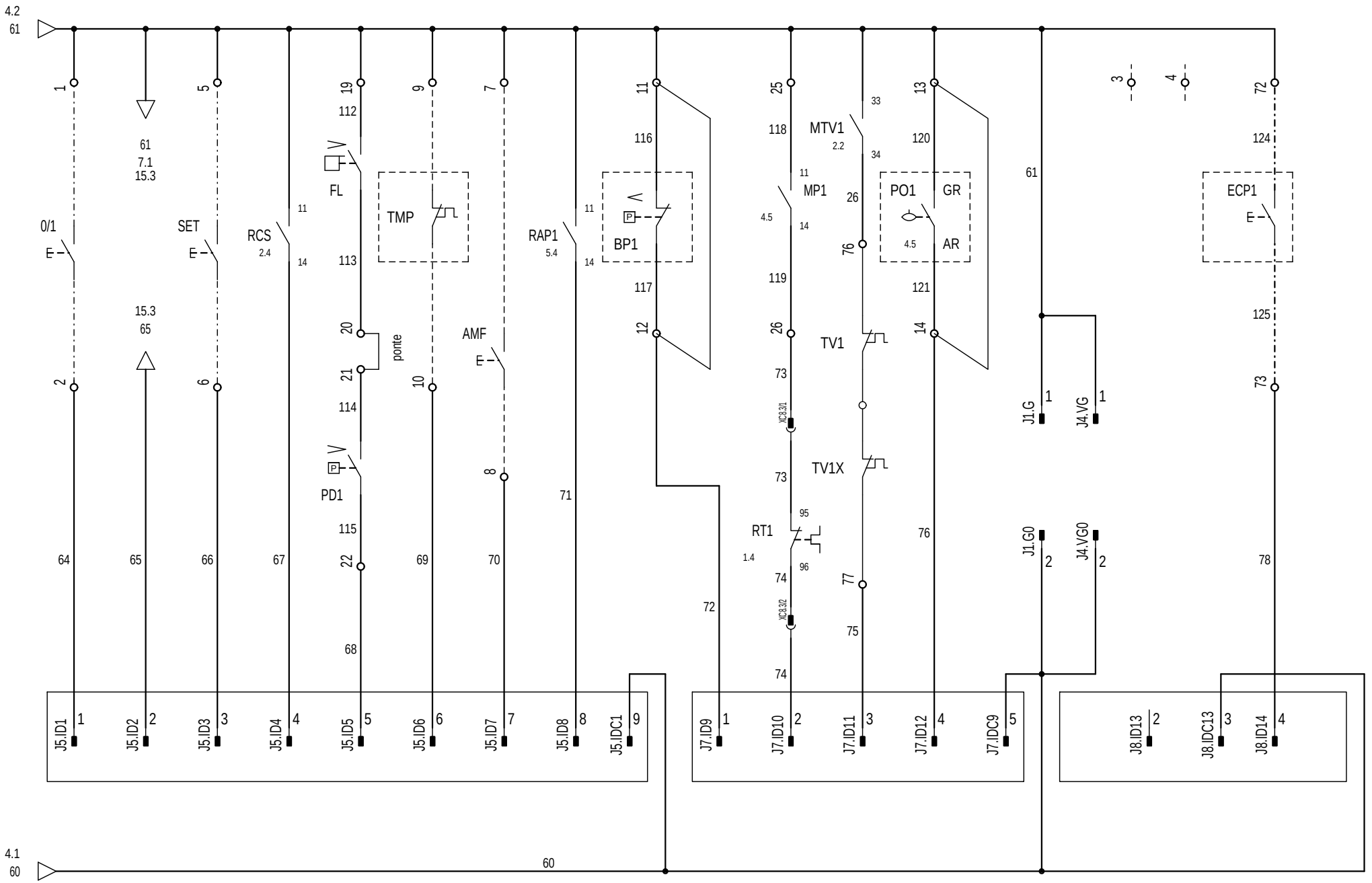
SICUREZZE
SAFETY

NS BIC. FUS. S.grande

43745.00

0

FOGL. 5
DI 26



MASTER

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					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

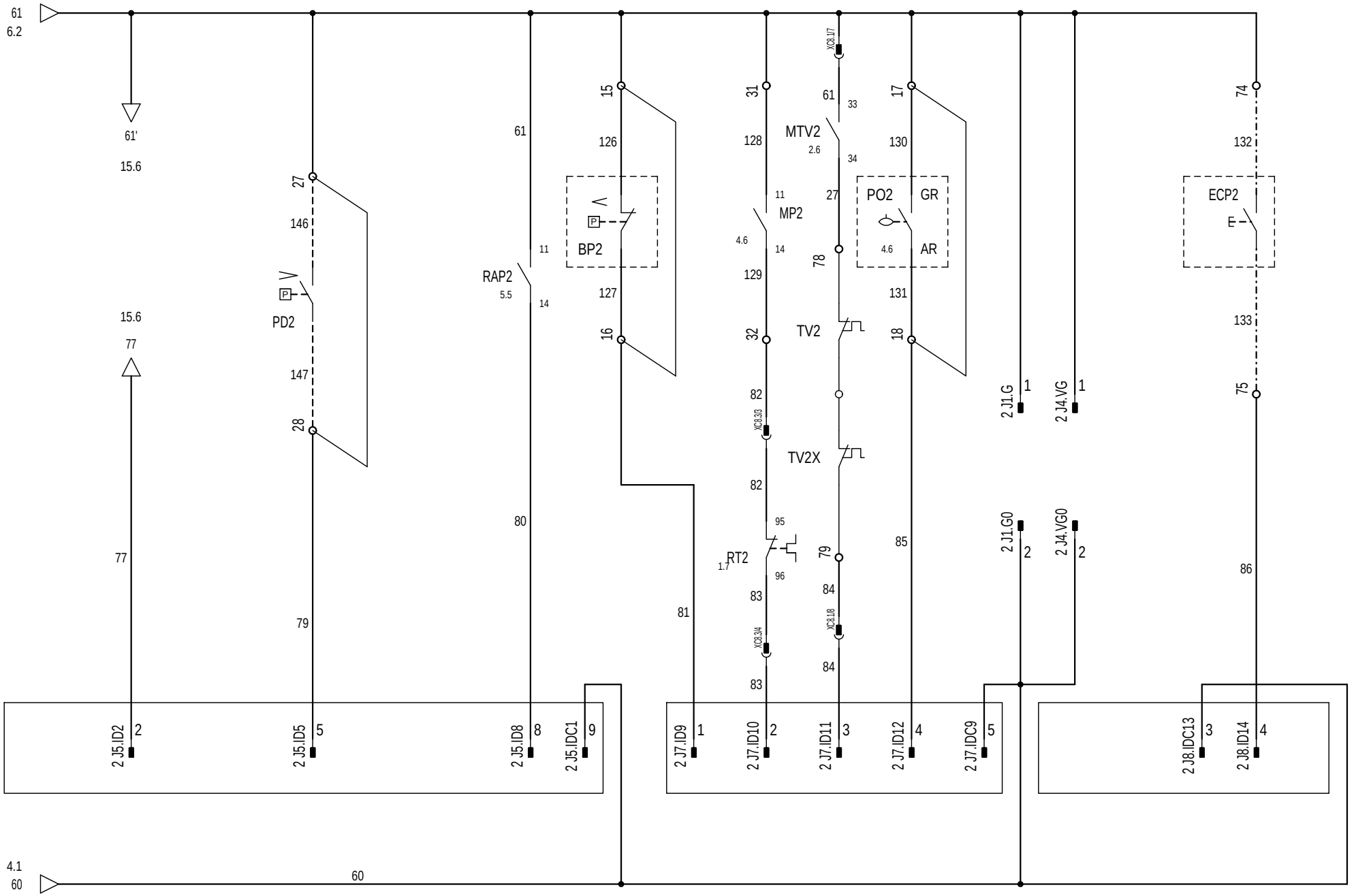
COMANDI E SICUREZZE
COMAND END SAFETY

NS BIC. FUS. S.grande

43745.00

0

FOGL. 6
DI 26



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PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

SLAVE

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO		
					DATA	22/06/2009
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					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

COMANDI E SICUREZZE
COMAND END SAFETY

NS BIC. FUS. S.grande

43745.00

0

FOGL. 7
DI 26

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
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PROGETTO:
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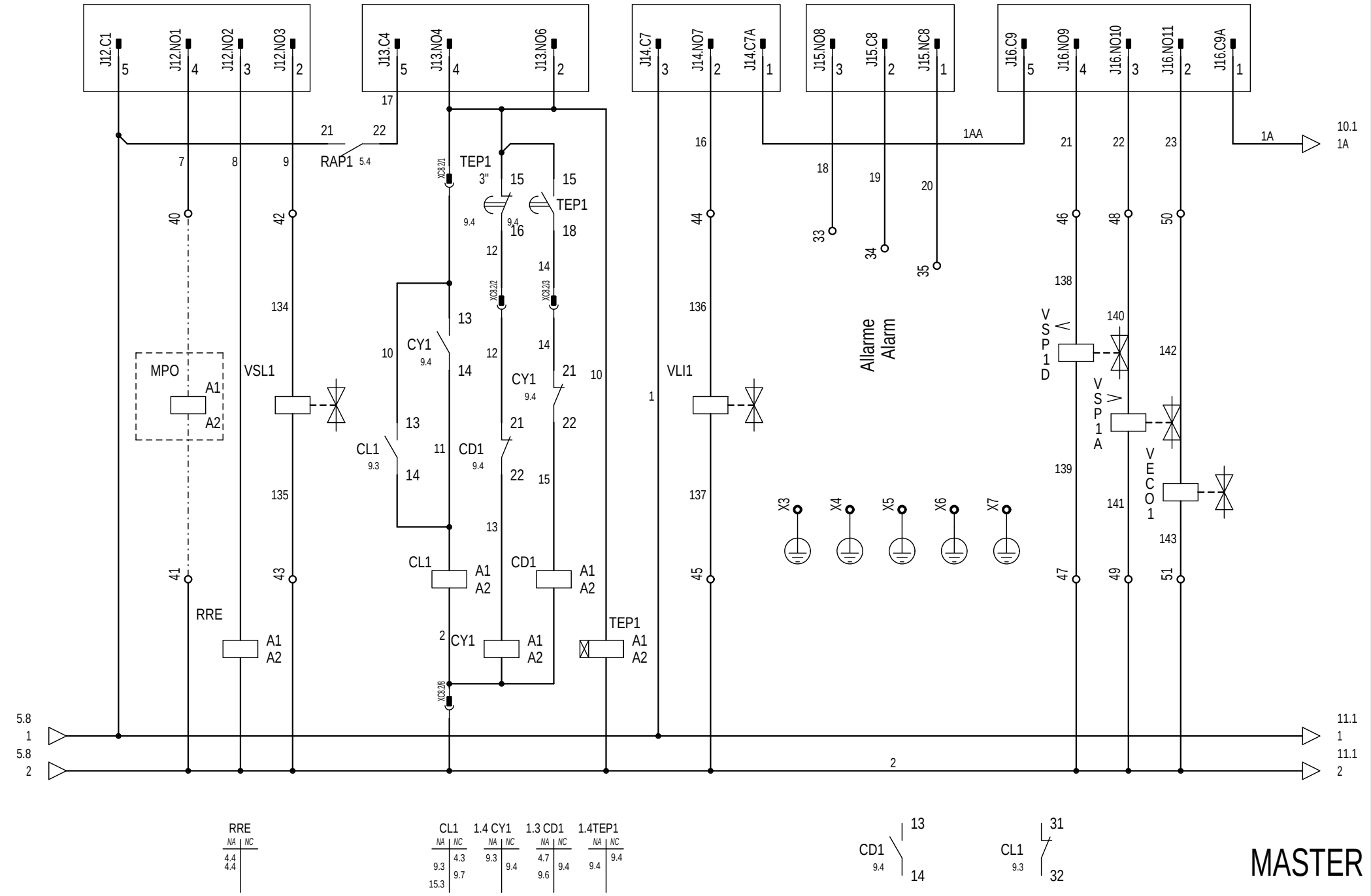

MASTER

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					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

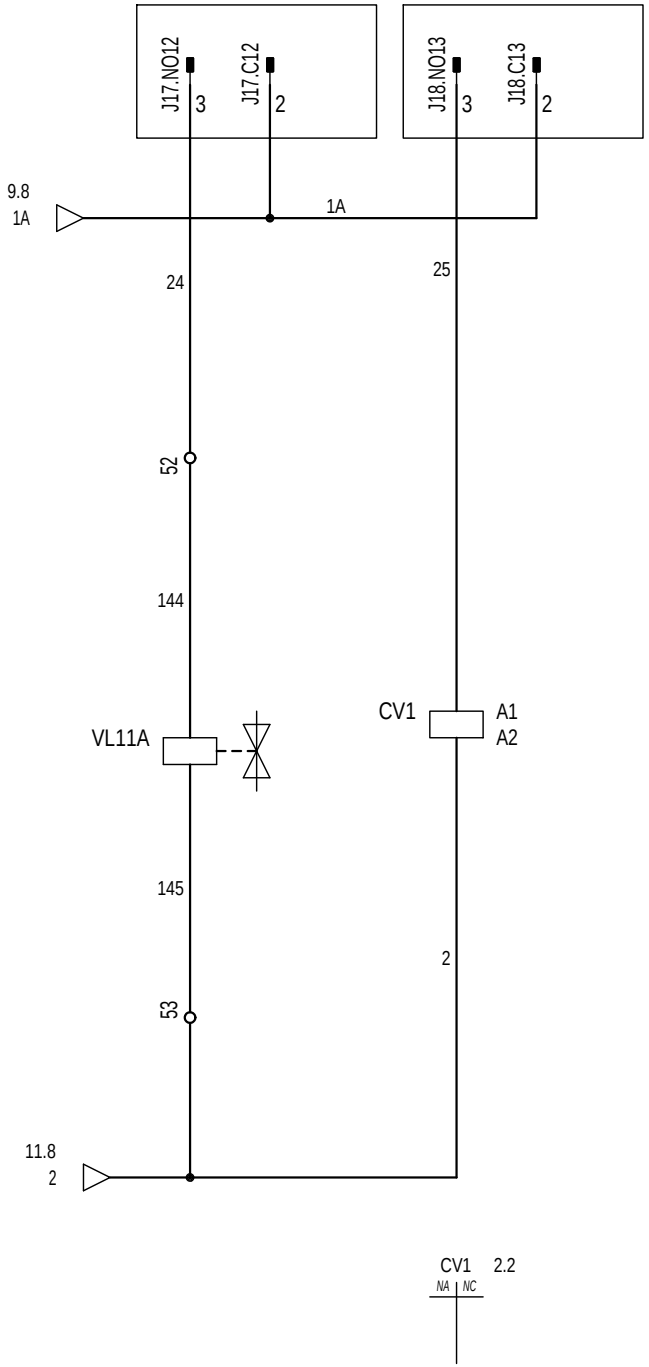
USCITE DIGITALI
Digital outputs

NS BIC. FUS. S.grande

43745.00

0

FOGL. 9
DI 26



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PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

MASTER

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO
				DATA 22/06/2009
				DISEGN. Crivellaro
				DATA 22/06/2009
				APPROV. De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

USCITE DIGITALI
Digital outputs

NS BIC. FUS. S.grande

43745.00 | 0 | FOGL. 10 | DI 26

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
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PROGETTO:
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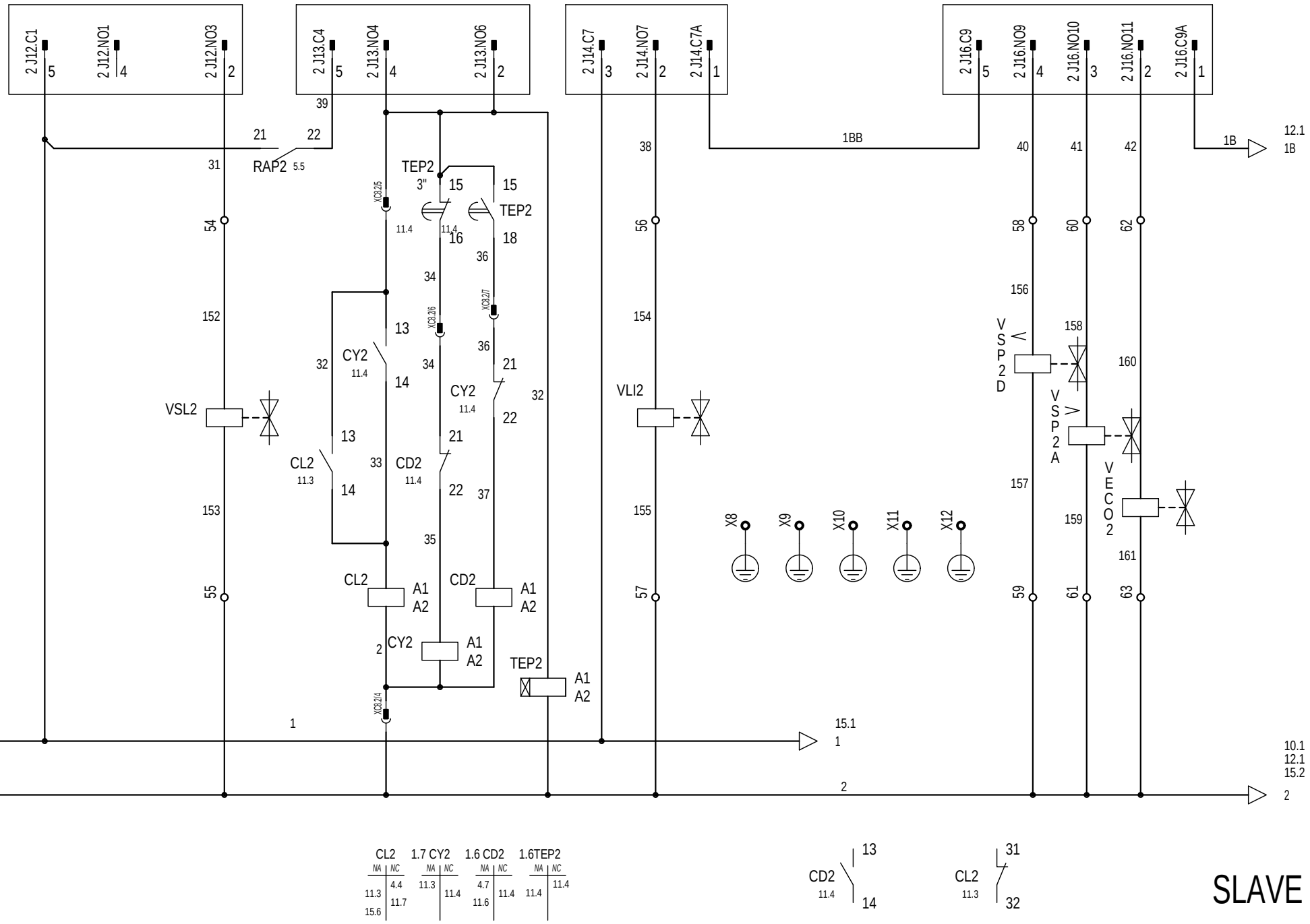

SLAVE

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					DATA	22/06/2009
					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

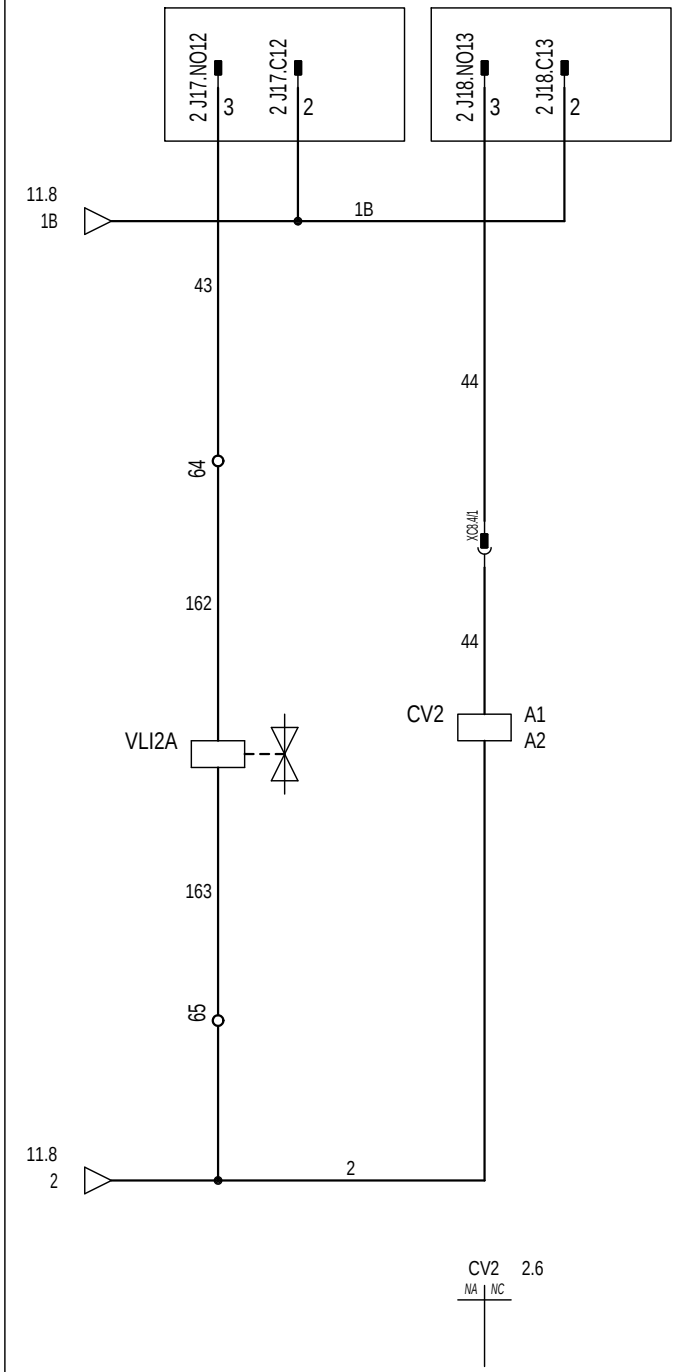
USCITE DIGITALI
Digital outputs

NS BIC. FUS. S.grande

43745.00

0

FOGL. 11
DI 26



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PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

SLAVE

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO
				DATA 22/06/2009
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				DATA 22/06/2009
				APPROV. De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

USCITE DIGITALI
Digital outputs

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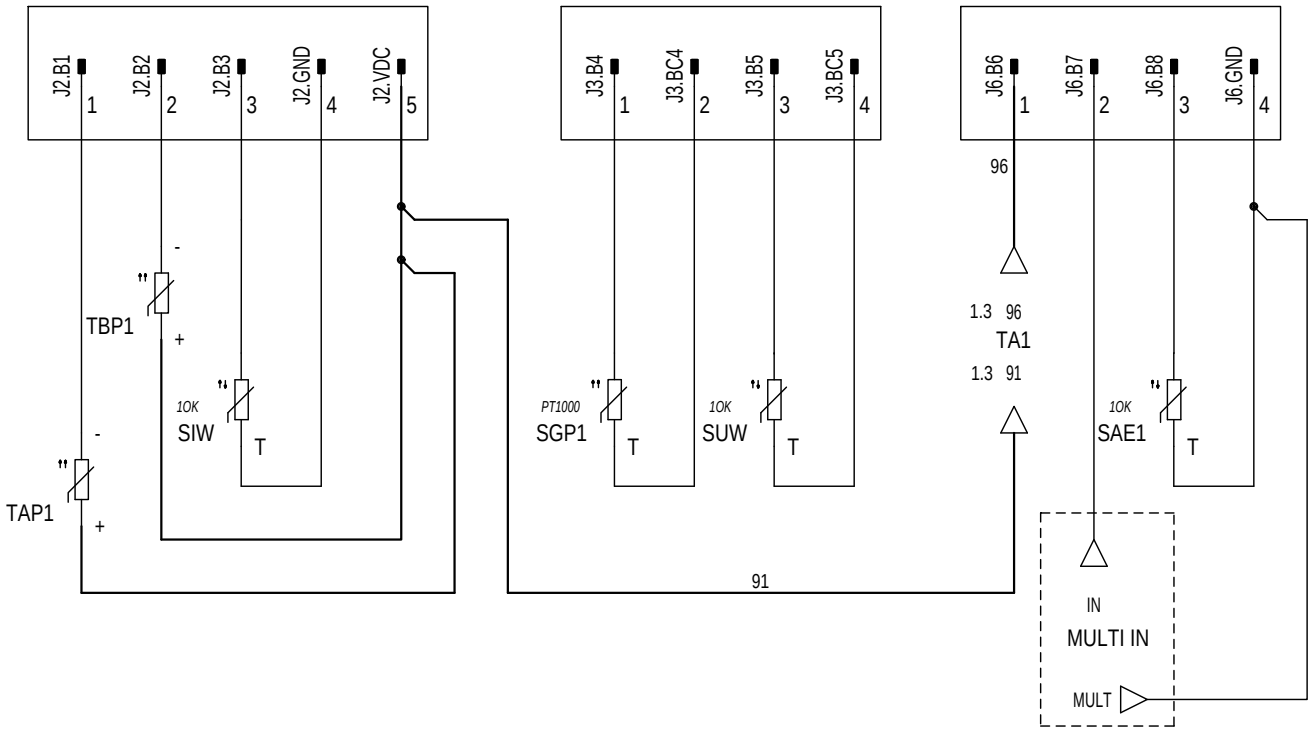
43745.00 | 0 | FOGL. 12 | DI 26



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NOME FILE: *4374500.sch*
TIPICO:

MASTER

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO		
					DATA	22/06/2009
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					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

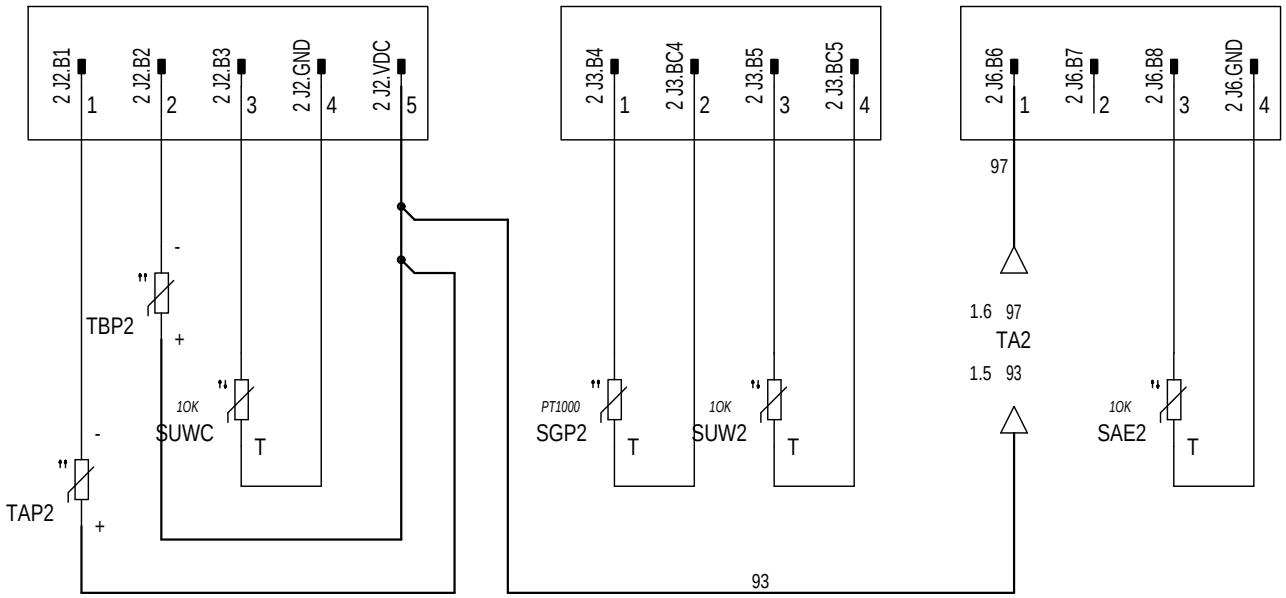
INGRESSI ANALOGICI
ANALOGUE INPUTS

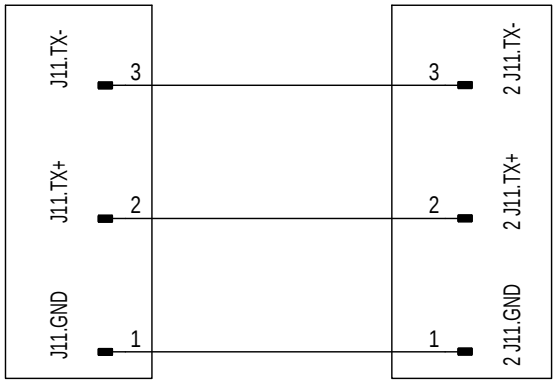
NS BIC. FUS. S.grande

43745.00

0

FOGL. 13
DI 26





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PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

SLAVE

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					DATA	22/06/2009
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AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

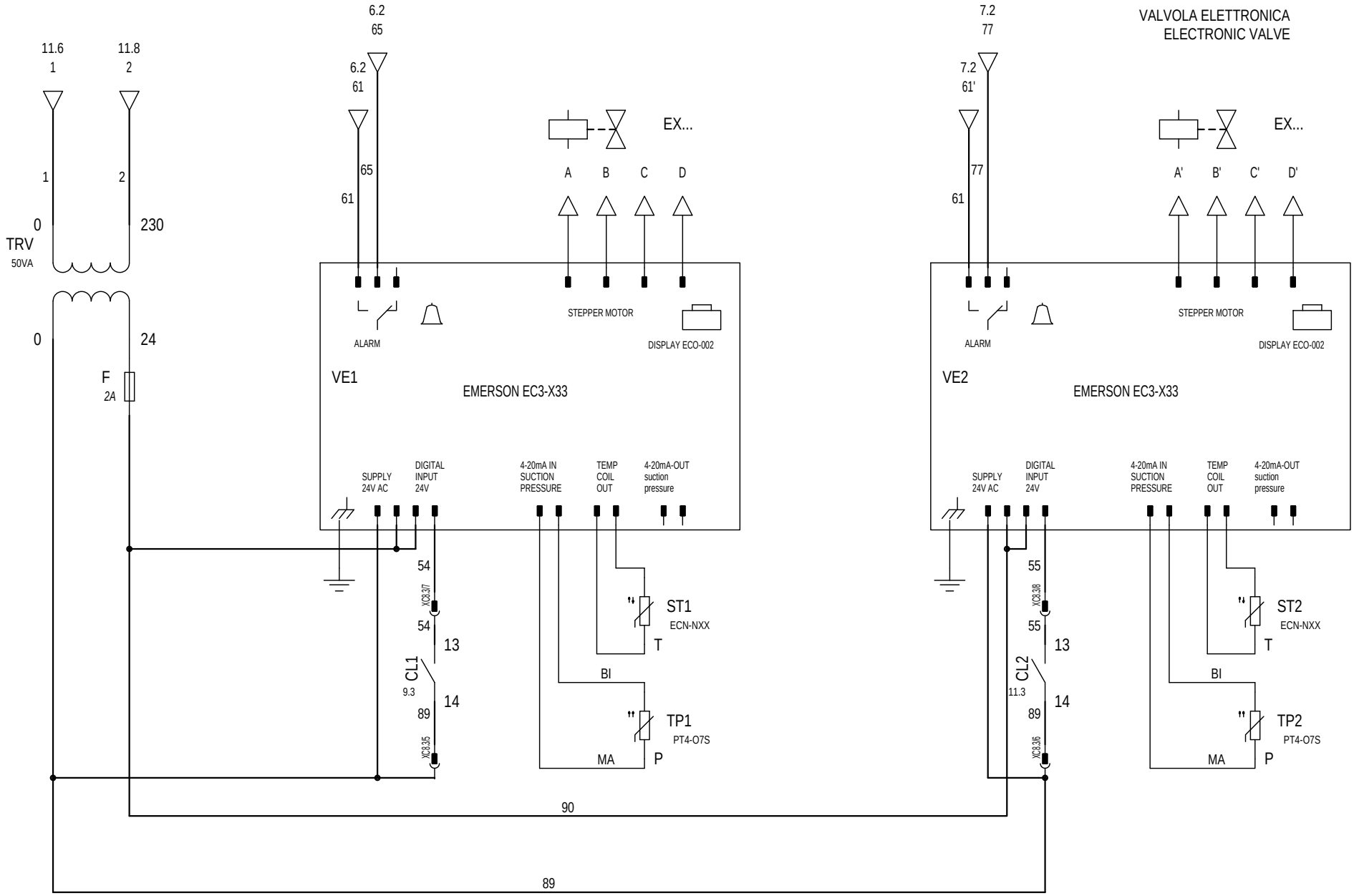
INGRESSI ANALOGICI
ANALOGUE INPUTS

NS BIC. FUS. S.grande

43745.00

1

FOGL. 14
DI 26



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AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

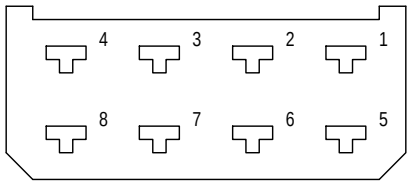
VALVOLA ELETTRONICA
Electronic valve

NS BIC. FUS. S.grande

43745.00

0

FOGL. 15
DI 26



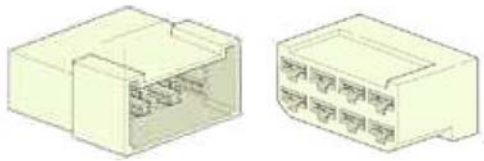
8 VIE

XC8.1

RRE	1	1	1	MORSETTIERA QUADRO TERMINAL BOARD	4.3
CL1	3	2	3		4.3
CL2	4	3	4	MORSETTIERA QUADRO TERMINAL BOARD	4.4
MORSETTIERA QUADRO TERMINAL BOARD 66	1	4	1		4.7
CD1	50	5	50		4.7
CD2	51	6	51		4.7
	61	7	61		7.6
MORSETTIERA QUADRO TERMINAL BOARD 79	84	8	84		7.6

XC8.3

26	73	1	73		6.5
RT1	74	2	74		6.5
32	82	3	82		7.5
RT2	83	4	83		7.5
CL1	89	5	89		15.3
CL2	89	6	89		15.6
VE1	54	7	54		15.3
VE2	55	8	55		15.6



XC8.2

USCITE DIGITALI J13.NO4	10	1	10		9.3
TEP1	12	2	12		9.4
TEP1	14	3	14		9.4
CL2	2	4	2		11.3
USCITE DIGITALI 2 J13.NO4	32	5	32		11.3
TEP2	34	6	34		11.4
TEP2	36	7	36		11.4
CY1	2	8	2		9.3

XC8.4

USCITE DIGITALI 2 J18.NO13	44	1	44		12.3
TQ	52	2	52		4.8
		3			
		4			
		5			
		6			
		7			
		8			

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AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

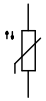
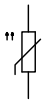
MORSETTIERA 8 POLI
8 POLE THERMINAL

NS BIC. FUS. S.grande

43745.00

2

FOGL. CON-8V-001
DI 26

SIMBOLO *SYMBOL*	NOME SIMBOLO *SYMBOL NAME*	DESCRIZIONE *DESCRIPTION*	SIGLA *DESIGNATION*	ESTENS. *EXT.*
	021308C	Pulsante di emergenza NC EMERGENCY PUSH-BUTTON NC	SB...	
	021403A	Contatto NA con comando da una portata di fluido NO contact operated by fluid flow	S...	
	030202	Morsetto Terminal		
	030202-PE	Morsetto PE PE terminal		
	030202A	Morsetto Terminal		
	030303-AER	Polo connettore maschio Male contact plug		
	030305	Connettore femmina e maschio Plug and socket		
	040104-NTC	Resistore variabile NTC Variable resistance NTC	M	
	040104-PTC	Resistore variabile PTC Variable resistance PTC	M	
	040112	Elemento riscaldante Heating element	E...	

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AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

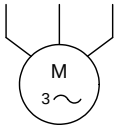
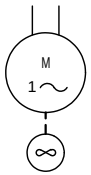
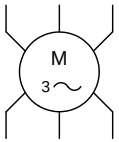
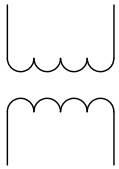
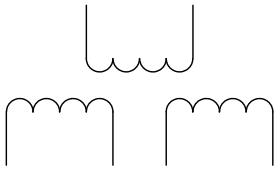
RIEPILOGO SIMBOLI SCHEMA
SYMBOLS SUMMARY

NS BIC. FUS. S.grande

43745.00

1

FOGL. LS-1
DI 26

SIMBOLO *SYMBOL*	NOME SIMBOLO *SYMBOL NAME*	DESCRIZIONE *DESCRIPTION*	SIGLA *DESIGNATION*	ESTENS. *EXT.*
	060801B	Motore ventilatore Fan motor	M...	
	060801VM	Ventilatore monofase Single-phase fan	EV...	
	060803ST	Motore trifase stella triangolo Star-delta trifase motor	M...	
	060902	Trasformatore a due avvolgimenti Transformer with two windings	TM...	
	060905	Trasformatore a tre avvolgimenti Transformer with three windings	TM...	
	060911	Trasformatori di corrente Current transformer	T...	
	070201	Contatto NA NO contact		

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
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SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO	DATA	22/06/2009
					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

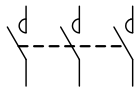
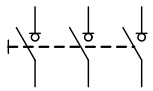
RIEPILOGO SIMBOLI SCHEMA
SYMBOLS SUMMARY

NS BIC. FUS. S.grande

43745.00

1

FOGL. LS-2
DI 26

SIMBOLO *SYMBOL*	NOME SIMBOLO *SYMBOL NAME*	DESCRIZIONE *DESCRIPTION*	SIGLA *DESIGNATION*	ESTENS. *EXT.*
	070201E	Contatto NA azionato da effetto livello liquido NO contact operated by liquid level	SA...	
	070203	Contatto NC NC contact		
	070501	Contatto NA ritardato all'eccitazione NO CONTACT DELAYED ON CLOSING WHEN ACTIVATED		
	070503	Contatto NC ritardato alla eccitazione NC contact delay to pickup		
	070701P	Contatto NA sensibile alla pressione NO contact actuated by pressure	SP...	
	070701PC	Contatto NC sensibile alla pressione NC contact actuated by pressure	SP...	
	070701TNA	Termostasto di sicureza NA - chiude all'aumentare Safety thermostat NO - close un rise	TE$	
	070702	Pulsante NA NO push-button	SB...	
	070903	Contatto NC azionato da effetto termico NC self-operating thermal switch		
	070903B	Contatto NC di relè termico THERMAL RELAY NC CONTACT		
	071302-3F	Contattore tripolare di potenza NA Three-pole NO contact of a contactor		
	071308-3F	Interruttore sezionatore tripolare Three-pole switch disconnector	QS...	

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PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

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					DATA 22/06/2009
					DISEGN. Crivellaro
					DATA 22/06/2009
					APPROV. De Togni

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RIEPILOGO SIMBOLI SCHEMA
SYMBOLS SUMMARY

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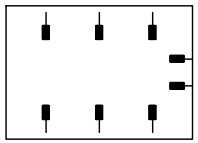
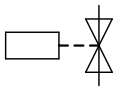
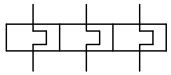
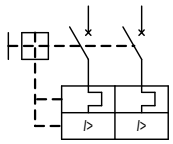
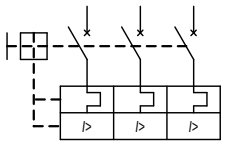
FOGL. LS-3
DI 26

SIMBOLO *SYMBOL*	NOME SIMBOLO *SYMBOL NAME*	DESCRIZIONE *DESCRIPTION*	SIGLA *DESIGNATION*	ESTENS. *EXT.*
	071403A	Regolatore di tensione trifase Three-fase tension regulator	RE	
	071501	Bobina relè Relay coil	KA...	/...
	071501T	Bobina contattore Contactor coil	KM...	
	071502B	Elettrovalvola chiusa Closed solenoid valve	YV...	
	071508	Relè ritardato all'eccitazione Relay delayed on excitation	KT...	/...
	071521A-3F	Termica Trifase THREE-POLE THERMAL	FR...	
	071601F	Interruttore bip. autom. con protezione termica e max corrente Two-pole Circuit breaker with autom. release operated by thermal effect and max. current	QF...	
	071601G	Interruttore trip. autom. con protezione max corr. e termica Three-pole circuit break with magneto-thermal	QM...	

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PROGETTO:
NOME FILE: *4374500.sch*
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REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO	DATA	22/06/2009
					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

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RIEPILOGO SIMBOLI SCHEMA
SYMBOLS SUMMARY

NS BIC. FUS. S.grande

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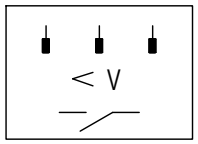
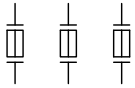
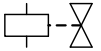
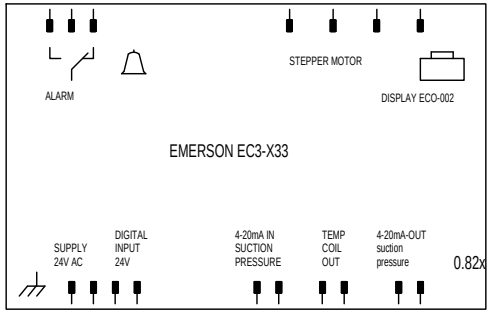
1

FOGL. LS-4
DI 26

SIMBOLO *SYMBOL*	NOME SIMBOLO *SYMBOL NAME*	DESCRIZIONE *DESCRIPTION*	SIGLA *DESIGNATION*	ESTENS. *EXT.*
	071708A	Relè sequenza fase Sequenzer fase relay	RCS	
	072101	Fusibile Fuse	FU...	
	072101S	Fusibile sezionabile Fuse disconnector	FU...	
	072101S-3F	Fusibile sezionabile tripolare Three-pole fuse disconnector	FU...	
 	VAL_ELETT	Valvola elettronica Electronic valve	VE	

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
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PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO

DATA	22/06/2009
DISEGN.	Crivellaro
DATA	22/06/2009
APPROV.	De Togni

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RIEPILOGO SIMBOLI SCHEMA
SYMBOLS SUMMARY

NS BIC. FUS. S.grande

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FOGL. LS-5
DI 26

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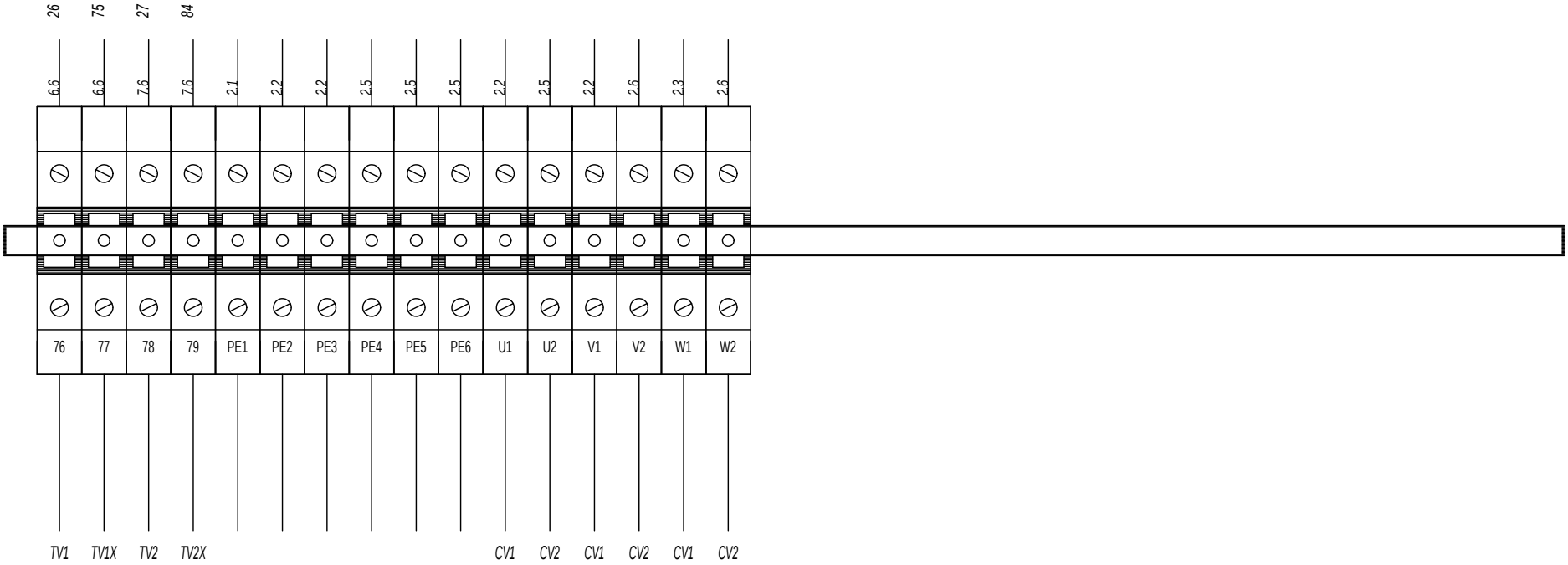
PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:



M1

MORSETTIERA QUADRO

TERMINAL BOARD

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO		
					DATA	22/06/2009
					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

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AERMEC

RIEPILOGO MORSETTI
Summary terminals

NS BIC. FUS. S.grande

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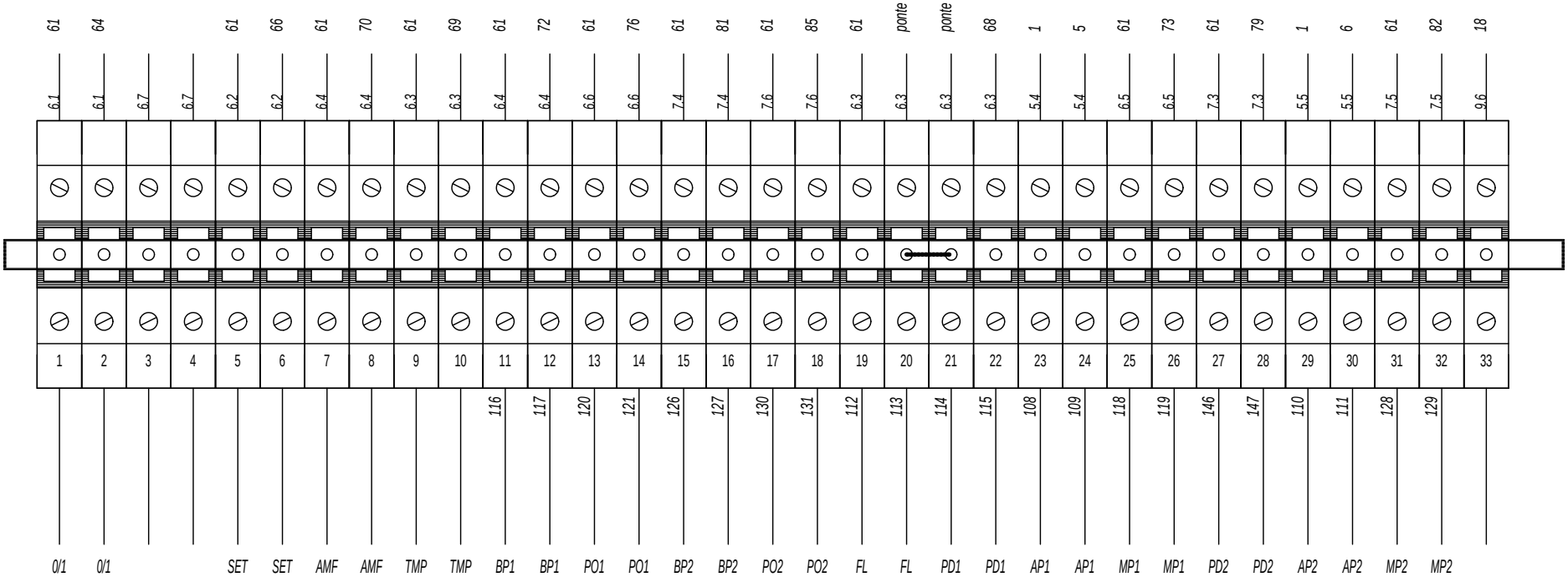
1

FOGL. M1-001
DI 26



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PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

M

MORSETTIERA QUADRO

TERMINAL BOARD

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO	DATA	22/06/2009
					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

RIEPILOGO MORSETTI
Summary terminals

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FOGL. M-001
DI 26

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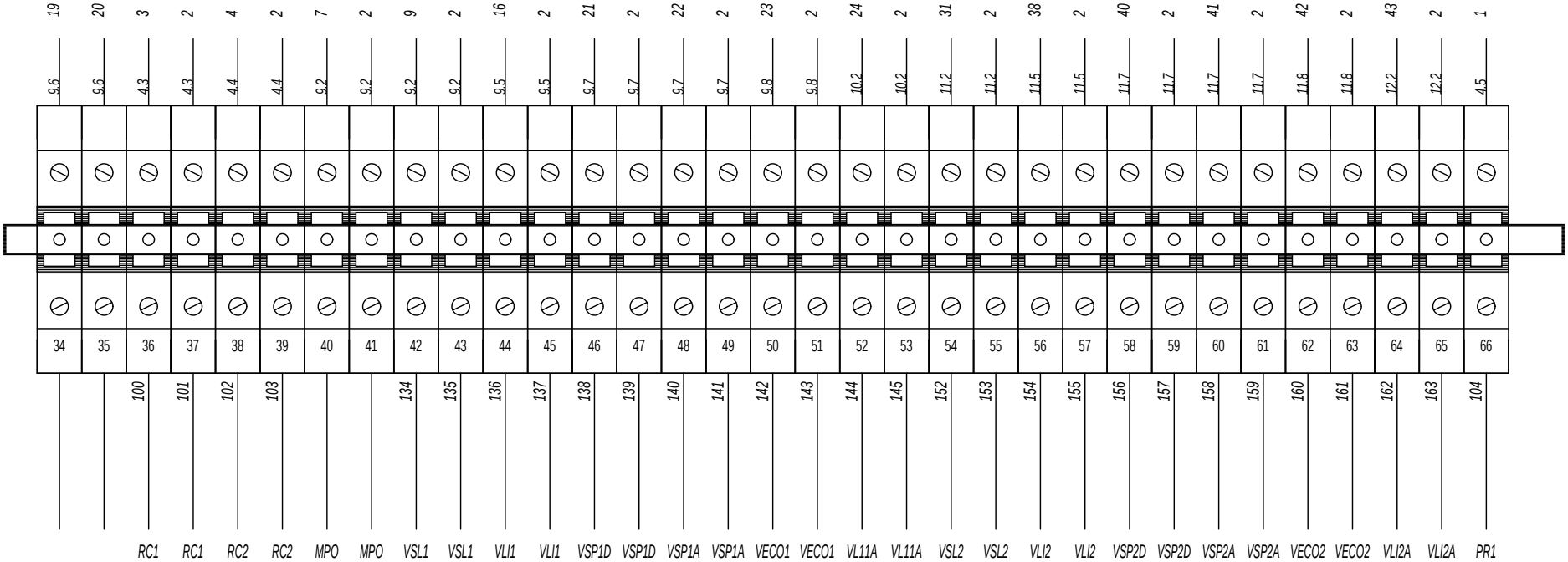
PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:



M

MORSETTIERA QUADRO

TERMINAL BOARD

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO	DATA	22/06/2009
					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

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RIEPILOGO MORSETTI
Summary terminals

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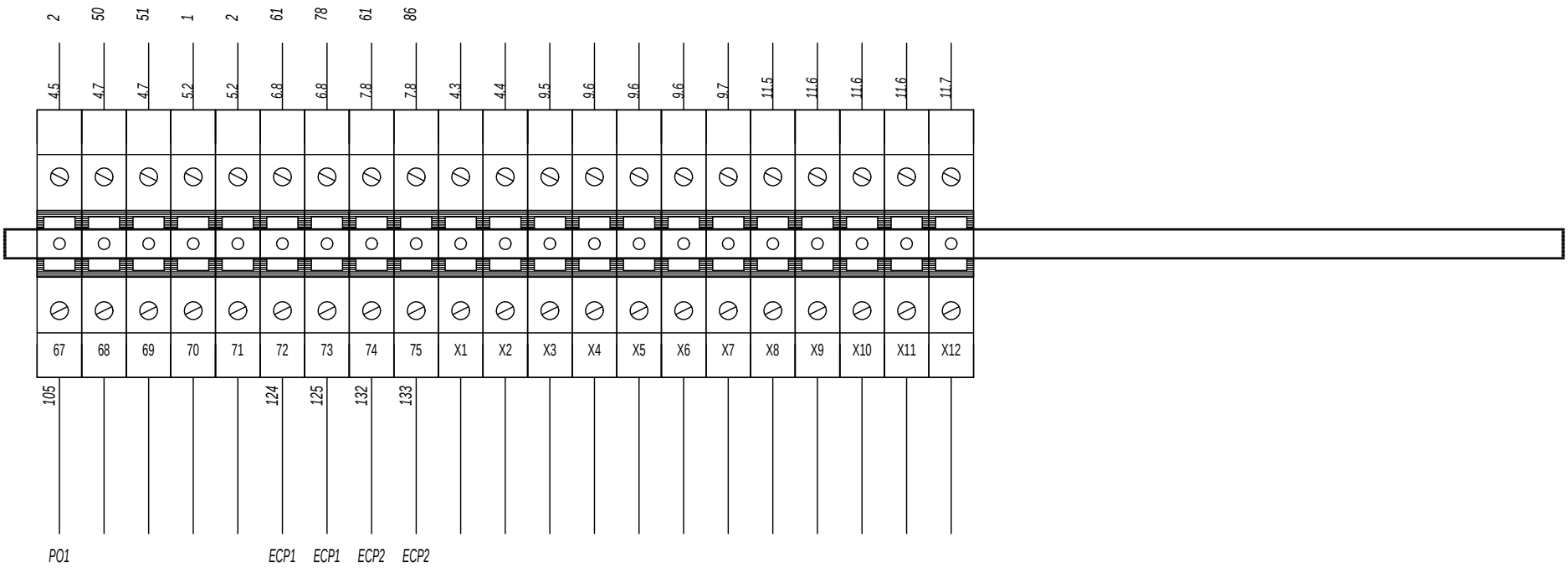
1

FOGL. M-002
DI 26



M

MORSETTIERA QUADRO

TERMINAL BOARD

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PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO		
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					DISEGN.	Crivellaro
					DATA	22/06/2009
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AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

RIEPILOGO MORSETTI
Summary terminals

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FOGL. M-003
DI 26

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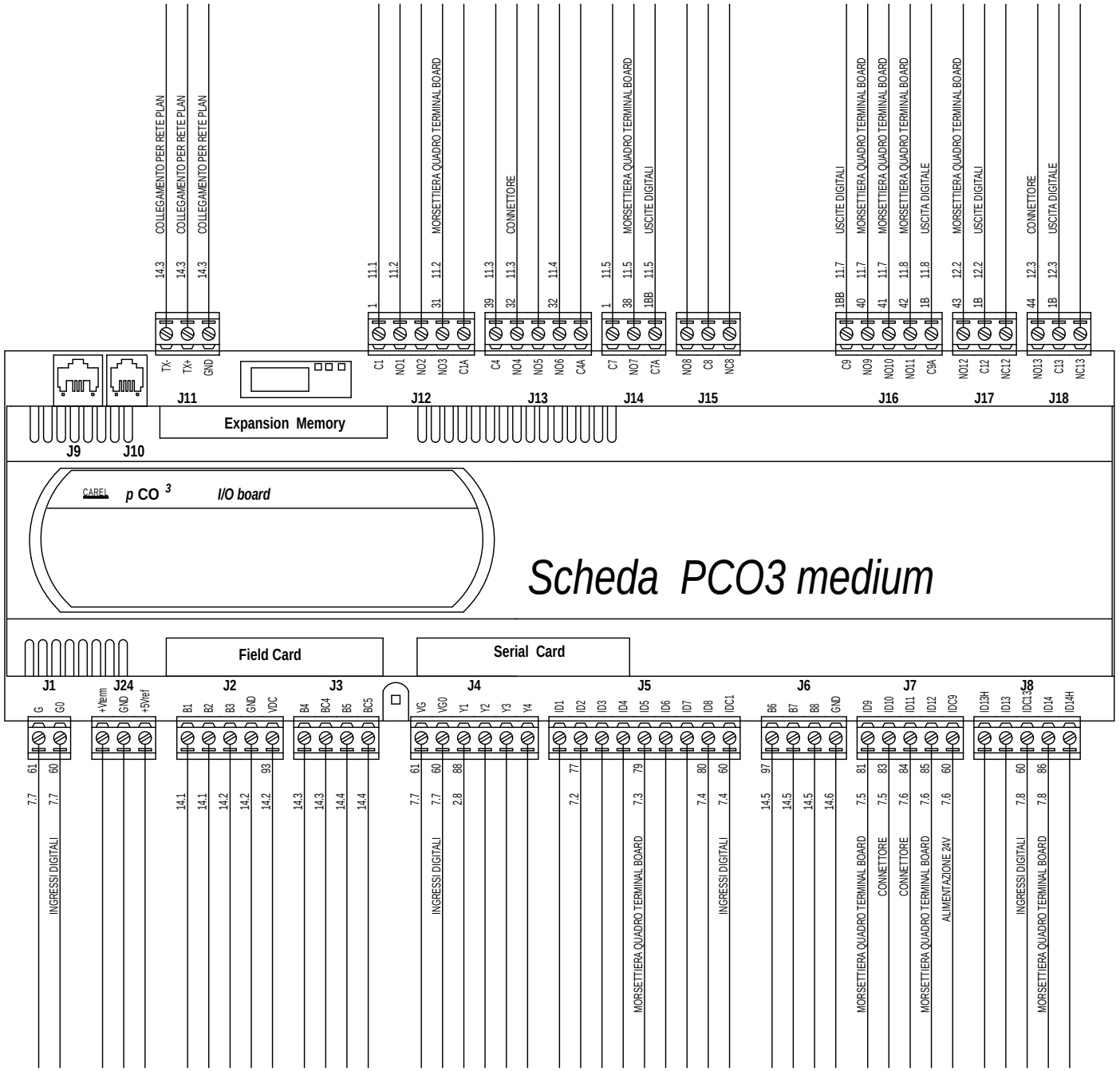
PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:



REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO		
					DATA	22/06/2009
					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

PCO3 MEDIUM
PCO3 Medium

NS BIC. FUS. S.grande

43745.00

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FOGL. PCO3 MED SLAVE 1-001
DI 26

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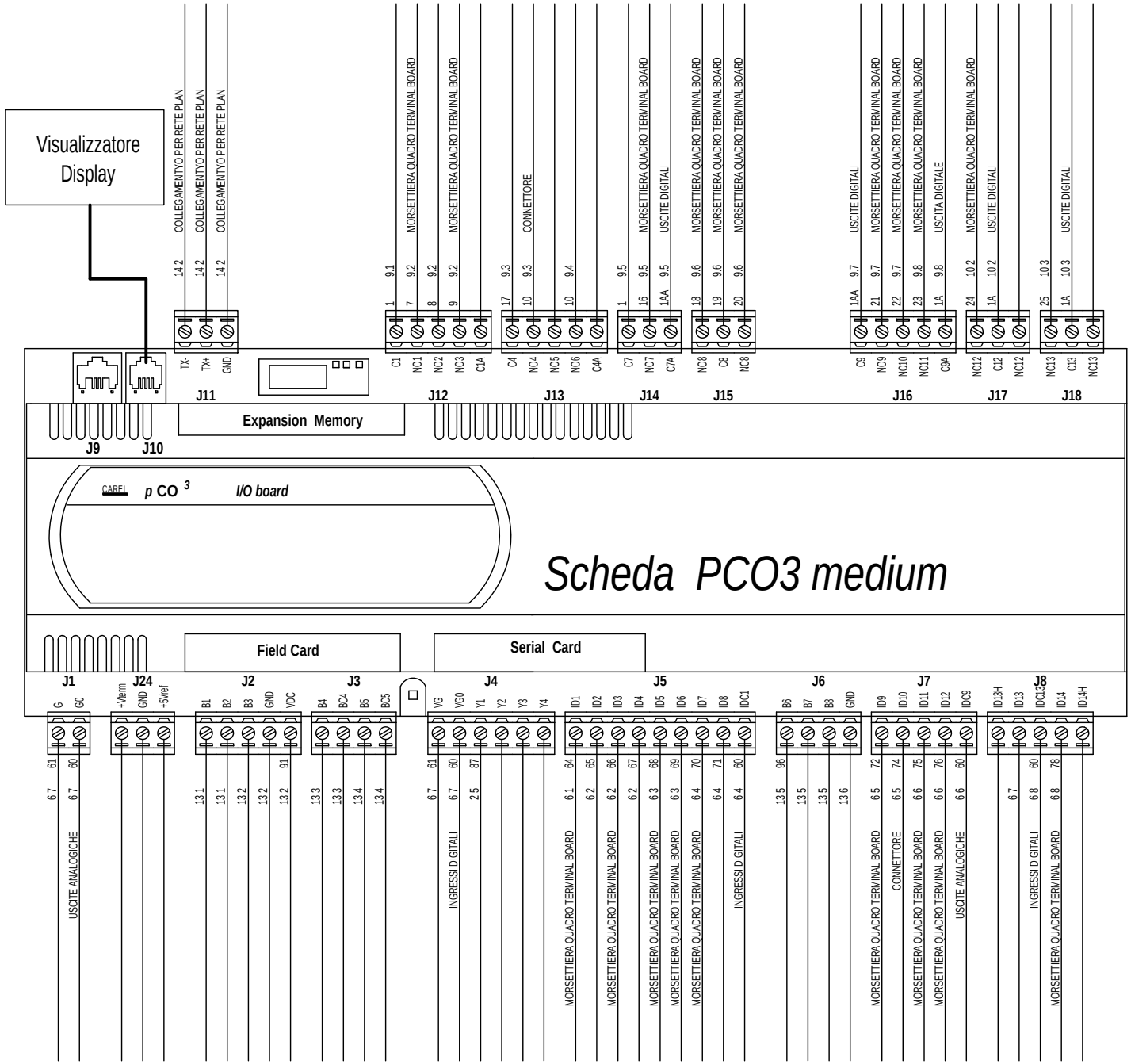
PROGETTO:
NOME FILE: *4374500.sch*
TIPICO:



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					DISEGN.	Crivellaro
					DATA	22/06/2009
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

PCO3 MEDIUM
PCO3 Medium

NS BIC. FUS. S.grande

43745.00

1

FOGL. PCO3 MEDIUM-001
DI 26

Legenda per serie NS – WS - WF

05/05/11

0/1	INTERRUTTORE ACCESO / SPENTO	SWITCH ON / OFF	INTERRUPTEUR ON/OFF	SCHALTER EIN/AUS
AE	ALLARME ESTERNO	REMOTE ALARM	ALARME EXTERIEUR	FERNSTOERMELDUNG
AMF	AUSILIARIO ESCLUSIONE MULTIFUNZIONE	MULTIFUNCTION EXCLUSION	AUXILIAIRE EXCLUSION MULTIFONCTION	STEUERSTROMKREIS MULTIFUNCTION DEAKTIVIERUNG
AP	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE CONTROL	PRESSOSTAT HAUTE PRESSION	HOCHDRUCKPRESSOSTAT
BP	PRESSOSTATO BASSA PRESSIONE	LOW PRESSURE CONTROL	PRESSOSTAT BASSE PRESSION	NIEDERDRUCKPRESSOSTAT
CD	CONTATTORE CP TRIANGOLO	DELTA CP CONTACTOR	CONTACTEUR COMPRESSEUR TRIANGLE	KOMPRESSORSCHÜTZ - DREIECK
CL	CONTATTORE CP LINEA	LINE CP CONTACTOR	CONTACTEUR COMPRESSEUR LIGNE	LEITUNGSSCHÜTZ - KOMPRESSOR
CP	COMPRESSORE	COMPRESSOR	COMPRESSEUR	KOMPRESSOR
CPG	CONTATTORE POMPA GLICOLE	CONTACTOR GLYCOL PUMP	CONTACTEUR POMPE À GLYCOL	CONTACTOR GLYCOLPUMPE
CV	CONTATTORE VENTILATORE	FAN CONTACTOR	CONTACTEUR VENTILATEUR	VENTILATORSCHÜTZ
CY	CONTATTORE CP STELLA	CP STAR CONTACTOR	CONTACTEUR COMPRESSEUR ETOILE	KOMPRESSORSCHÜTZ - STERN
DCP	DISPOSITIVO BASSE TEMPERATURE	LOW AMBIENT TEMPERATURE DEVICE	DISPOSITIF POUR BASSE TEMPERATURE	WINTERREGELUNG
DEV	SELETTORE	SELECTOR SWITCH	SELECTEUR	WAHLSCHALTER
E/I	INTERRUTTORE CALDO - FREDDO	SWITCH HOT-COLD	INTERRUPTEUR CHAUD - FROID	UMSCHALTER - WARM/KALT
ECP	ESCLUSIONE CP	COMPRESSOR EXCLUSION	EXCLUSION COMPRESSOR	KOMPRESSOR DEAKTIVIERUNG
F	FUSIBILE	FUSES	FUSIBLE	SICHERUNGEN
FFC	FLUSSOSTATO FREE-COOLING	FREE-COOLING FLOW SWITCH	FLUXOSTAT FREE-COOLING	STRÖMUNGSWÄWTER-FREIEKÜHLUNG
FL	FLUSSOSTATO	FLOW SWITCH	FLUXOSTAT	STRÖMUNGSWÄCHTER
FLC	FLUSSOSTATO CONDENSATORE	CONDENSER FLOW SWITCH	FLUXOSTAT	STROEMUNGSWAECHTER
FLR	FLUSSOSTATO RECUPERATORE	RECOVERY FLOW SWITCH	FLUXOSTAT RECUPERATEUR	STRÖMUNGSWÄCHTER - WÄRMERÜCKGEWINNER
IG	INTERRUTTORE GENERALE	MAIN SWITCH	INTERRUPTEUR GENERAL	HAUPTSCHALTER
IL	INTERRUTTORE DI LINEA	LINE MAIN SWITCH	INTERRUPTEUR GENERAL LIGNE	HAUPTSCHALTER-NETZEINSPEISUNG
IN MULT	INGRESSO MULTIFUNZIONE	MULTIFUNCTION INLET	ENTREE MULTIFONCTION	DIGITAL EINGANG MULTIFUNCTION
M	MORSETTIERA	CONTROL BOARD	BOITE A BORNES	KLEMMELEISTE
MP	MODULO PROTEZIONE COMPRESSORE	COMPRESSOR PROTECTION MODULE	MODULE DE PROTECTION COMPRESSEUR	KOMPRESSORSCHUTZMODUL
MPG	MOTOPOMPA GLICOLE	GLYCOL PUMP	POMPE À GLYCOL	GLYCOLPUMPE
MPO	MOTOPOMPA	MOTOR-PUMP	MOTOPOMPE	PUMPE
MTA	MAGNETOTERMICO AUSILIARIO	MAGNETO-THERMAL SWITCH	MAGNETO-THERMIQUE	ÜBERSTROMAUSLÖSER STEUERSTROMKREIS
MTC	MAGNETOTERMICO CP	COMPRESSOR MAGNETO-THERMAL	MAGNETHO-THERMIQUE COMPRESSEUR	MOTORSCHUTZSCHALTER-KOMPRESSOR
MTG	MAGNETOTERMICO MPG	PUMP MAGNETO-THERMAL	MAGNETO-THERMIQUE MOTOPOMPE	MOTORSCHUTZSCHALTER - PUMPE
MTP	MAGNETOTERMICO MPO	PUMP MAGNETO-THERMAL	MAGNETO-THERMIQUE MOTOPOMPE	MOTORSCHUTZSCHALTER - PUMPE
MTV	MAGNETOTERMICO VENTILATORE	FAN MAGNETO-THERMAL	MAGNETO-THERMIQUE VENTILATEUR	MOTORSCHUTZSCHALTER VENTILATOR
MV	MOTORE VENTILATORE	FAN MOTOR	MOTEUR VENTILATEUR	VENTILATORMOTOR
PD	PRESSOSTASTO DIFFERENZIALE	DIFFERENZIAL PRESSURE SWITCH	PRESSOSTAT DIFFERETIEL	DIFFERENTIAL PRESSOSTAT
PO	PRESSO STATO OLIO	OIL PRESSURE SWITCH	PRESSOSTAT HUILE	OIL DRUCK DIFFERENZ SCHALTER
PR	PULSANTE DI RIPRISTINO	RESTORE BUTTON	POUSSOIR DE REARMEMENT	WIEBEREINSCHALTUNG
R	RELE	RELAY	RELAIS	RELAIS
RC	RESISTENZA OLIO COMPRESSORE	COMPRESSOR OIL HEATER	RESISTANCE HUILE CP	KUBELWANNENHEIZUNG
RCS	RELE SEQUENZA FASI	PHASE - SEQUENCE RELAY	RELAIS SEQUENCIEL	RELAIS PHASENREIHENFOLGE
RE	RESISTENZA ANTI GELO EVAPORATORE	EVAPORATOR ANTI FREEZE HEATER	RESISTANCE ANTIGEL EVAPORATEUR	E-HEIZUNG – VERDAMPFER
RRE	RELE RESISTENZA EVAPORATORE	EVAPORATOR ANTI FREEZE RELAY	RELAIS RESISTANCE ANTIGEL	RELAIS - E-HEIZUNG
RT	RELE TERMICO COMPRESSORE	COMPRESSOR THERMAL PROTECTION	RELAIS THERMIQUE COMPRESSEUR	THERMORELAIS – KOMPRESSOR
SAE	SONDA ARIA ESTERNA	AMBIENT AIR SENSOR	SONDE AIR EXTERIEUR	AUSSENLUFTFÜHLER
SC	SCHEDA DI CONTROLLO	CONTROL ELECTRIC CARD	PLATINE DE CONTROLE	STEUERPLATINE
SET	INSERIMENTO SECONDO SET	INSERT SECOND SET	INSERTION SECOND POINT CONSIGNE	ZWEITE SOLLWERT EINSTELLUNG
SEV	SONDA EVAPORATORE	EVAPORATOR PROBE	SONDE EVAPORATEUR	FUEHLER – VERDAMPFER
SFC	SONDA FREE-COOLING	FREE-COOLING SENSORS	SONDE FREE-COOLING	FÜHLER- FREIEKÜHLUNG
SGP	SONDA PREMENTE	DISCHARGE PIPE SENSOR	SONDE SUR REFOULEMENT	FÜHLER- DRUCKLEITUNG
SIA	SCHEDA INTERFACCIA ALLARMI	SAFETIES INTERFACE CARD	PLATINE INTERFACE ALARMES	ALARM-SCHNITTSTELLE

SIR	SONDA INGRESSO RECUPERO	RECOVERY INLET PROBE	SONDE ENTREE RECUPERATEUR	FUHLER EINTRITT ENTHITZER
SIW	SONDA INGRESSO ACQUA	WATER INLET PROBE	SONDE ENTREE EAU	FÜHLER- WASSEREINTRITT
SIWH	SONDA INGRESSO ACQUA CALDA	HOT WATER INLET PROBE	SONDE ENTREE EAU CHAUDE	FUHLER WARMWASSER EINTRITT
SL	SONDA LIQUIDO	LIQUID PROBE	SONDE LIQUIDE	FÜHLER- FLÜSSIGKEIT
SRU	SONDA RITORNO UTENZE	WATER RETUR SENSOR	SONDE RETOUR RESEAU	WASSEREINTRITTFUEHLER
SUCC	SONDA USCITA ACQUA COLLETTORE	WATER OUTLET COLLECTOR PROBE	SONDE SORTIE EAU COLLEC	FUHLER WASSERAUSTRITT SAMMLEROHRE
SUCE	SONDA USCITA ACQUA COLLETTORE	WATER OUTLET COLLECTOR PROBE	SONDE SORTIE EAU COLLEC	FUHLER WASSERAUSTRITT SAMMLEROHRE
SUR	SONDA USCITA RECUPERO	WATER OUTLET RECOVERY	SONDE SORTIE RECUPERATION	FÜHLER-RÜCKGEWINNUNGS
SUW	SONDA USCITA ACQUA	WATER OUTLET PROBE	SONDE SORTIE EAU	FÜHLER- WASSERAUSTRITT
SUWH	SONDA USCITA ACQUA CALDA	OUTLET HOT WATER PROBE	SONDE SORTIE EAU CHAUDE	FUHLER WARMWASSER AUSTRITT
TA	TRASFORMATORE AMPEROMETRICO	CURRENT TRASFORMER	TRASFORMATEUR AMPEROMETRIQUE	INDUKTIVES AMPERMETER
TAP	TRASDUTTORE ALTA PRESSIONE	HIGH PRESSURE TRANSDUCER	TRANSDUCTEUR HAUTE PRESSION	HD-DRUCKTRANSMITTER
TBP	TRASDUTTORE BASSA PRESSIONE	LOW PRESSURE TRANSDUCER	TRANSDUCTEUR BASSE PRESSION	ND-DRUCKTRANSMITTER
TCP	PROTEZIONE TERMICA COMPRESSORE	COMPRESSOR THERMAL PROTECTION	PROTECTION THERMIQUE COMPRESSEUR	THERMISCHER SCHUTZ - KOMPRESSOR
TEP	TEMPORIZZATORE	TIMER	TEMPORISATEUR	TIMER
TMP	PROTEZIONE TERMICA POMPA	PUMP THERMAL PROTECTION	PROTECTION THERMIQUE POMPE	THERMISCHER SCHUTZ – PUMPE
TQ	TERMOSTATO QUADRO	BOX TERMOSTAT	BOITIER THERMOSTAT	RAUMTEMP. THERMOSTAT-SCHALTSCHRANK
TR - TRV	TRASFORMATORE	FEEDING VOLTAGE TRASFORMER	TRANSFORMATEUR D' ALIMENTATION	TRANSFORMATOR
TV	TERMICA VENTILATORE	FAN THERMAL PROTECTION	PROTECTION THERMIQUE VENTILATEUR	THERMISCHER SCHUTZ VENTILATOR
V2VA	VALVOLE RECUPERO	RECOVERY VALVE	VANNES RECUPERATION	RÜCKGEWINNUNGSVENTILE
V2VB	VALVOLE BATTERIA	COIL VALVE	VANNE BATTERIE	KONDENSATORVENTILE
V3V	VALVOLA 3 VIE	THREE – WAY VALVE	VANNE 3 VOIES	3-WEGE- VENTIL
VA	ELETTROVALVOLA PREMENTE	DISCARGE VALVE	VANNE REFOULEMENT	MAGNETVENTIL-DRUCKLEITUNG
VB	VALVOLA BATTERIA	COIL VALVE	VANNE BATTERIE	VENTIL – WÄRMETAUSCHER
VBP	VALVOLA BY PASS.	BY-PASS VALVE	VANNE DE BY-PASS	BYPASS MAGNETVENTIL
VECO	VALVOLA ECONOMIZZATORE	ECONOMIZER VALVE	VANNE ECONOMISEUR	ECONOMIZER VENTILE
VIC	VALVOLA INVERSIONE CICLO	REVERSE CYCLE VALVE	VANNE INVERSION DE CYCLE	UMKEHRVENTIL
VLI	VALVOLA INIEZIONE LIQUIDO	LIQUID INJECTION VALVE	VANNE INJECTION LIQUIDE	KÄLTEMITTEL-EINSPRITZVENTIL
VR	VALVOLA RECUPERO	HEAT RECOVERY VALVE	VANNE RECUPERATION	WÄRMERÜCKGEWINNUNGSVENTIL
VSBY	VALVOLA SOLENOIDE BY PASS.	BY-PASS SOLENOID VALVE	VANNE SOLENOIDE DE BY-PASS	BYPASS MAGNETVENTIL
VSL	VALVOLA INTERCETTAZIONE LIQUIDO	LIQUID GATE SOLENOID VALVE	VANNE SOLENOIDE CLAPET LIQUIDE	MAGNETVENTIL FLÜSSIGKEITSLEITUNG
VSP	VALVOLA DI PARZIALIZZAZIONE CP	PART LOAD SOLENOID VALVE	VANNE SOLENOIDE DE PARTIALISATION	MAGNETVENTIL ZUR LEISTUNGSREGELUNG

	COMPONENTI FORNITI OPTIONAL	OPTIONAL COMPONENTS	COMPOSANTS FOURNIS EN OPTION	AUF ANFRAGE LIEFERBARE TEILE
	COMPONENTI NON FORNITI	COMPONENTS NOT SUPPLIED	COMPOSANTS NON FOURNIS	NICHT LIEFERBARE TEILE
	COLLEGAMENTI DA ESEGUIRE IN FASE DI INSTALLAZIONE	CONNECTIONS TO BE WIRED ON JOB SITE	RACCORDEMENTS A EFFECTUER SUR CHANTIER	BAUSEITIG DURCHZUFÜHRENDE VERDRAHTUNG

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
NE' UTILIZZARE IL CONTENUTO O RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA
AUTORIZZAZIONE ESPLICITA. OGNI INFRAZIONE COMPORTA IL RISARCIMENTO DEI DANNI
SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

AERMEC S.P.A.
BEVILACQUA (VERONA)
ITALY

SCHEMA ELETTRICO
WIRING DIAGRAM
Valvola elettronica NS/WS

PROGETTAZIONE		TENSIONE ESERCIZIO	230V
SERIE		TENSIONE COMANDI	24V
CODICE	4916320_01	TENSIONE SEGNALI	24V
COMMITTENTE	Carel VITE		
PROGETTATO CON SISTEMA CAD/CAE	Sabik		

NORME	C.E.I.	PROTEZIONE	
+ UBICAZIONE	= NOME LOGICO		

		DATA	FIRME
DIS.		23/09/2010	
VISTO		23/09/2010	
APPROV.		23/09/2010	

SCHEMA FUNZIONALE
TABELLE DI RIEPILOGO
MORSETTIERE, CAVI E DISPOSITIVI GENERICI
DISTINTA BASE
LEGENDA PAGINE
LEGENDA SIMBOLI

REV.	DESCRIZIONE REVISIONE	DATA	DISEGNATORE
01	cambiato modulo batteria	30/03/2010	Civellaro

Valvola elettronica NS/WS

Carel VITE

FOGLIO 0
T.F. 8

SOST. DA:

SOST. IL:

ORIGINE

N.ro pag.	Nome	Descrizione	Indice Modifica	REVISIONI 0	1	2	3	4	5	6	7	8	9
1 / 3	0	INTESTAZIONE	0	01									
2 / 3	0-LP-001	RIEPILOGO PAGINE CON REVISIONE	0	01									
3 / 3	1	Valvola elettronica	0	01									

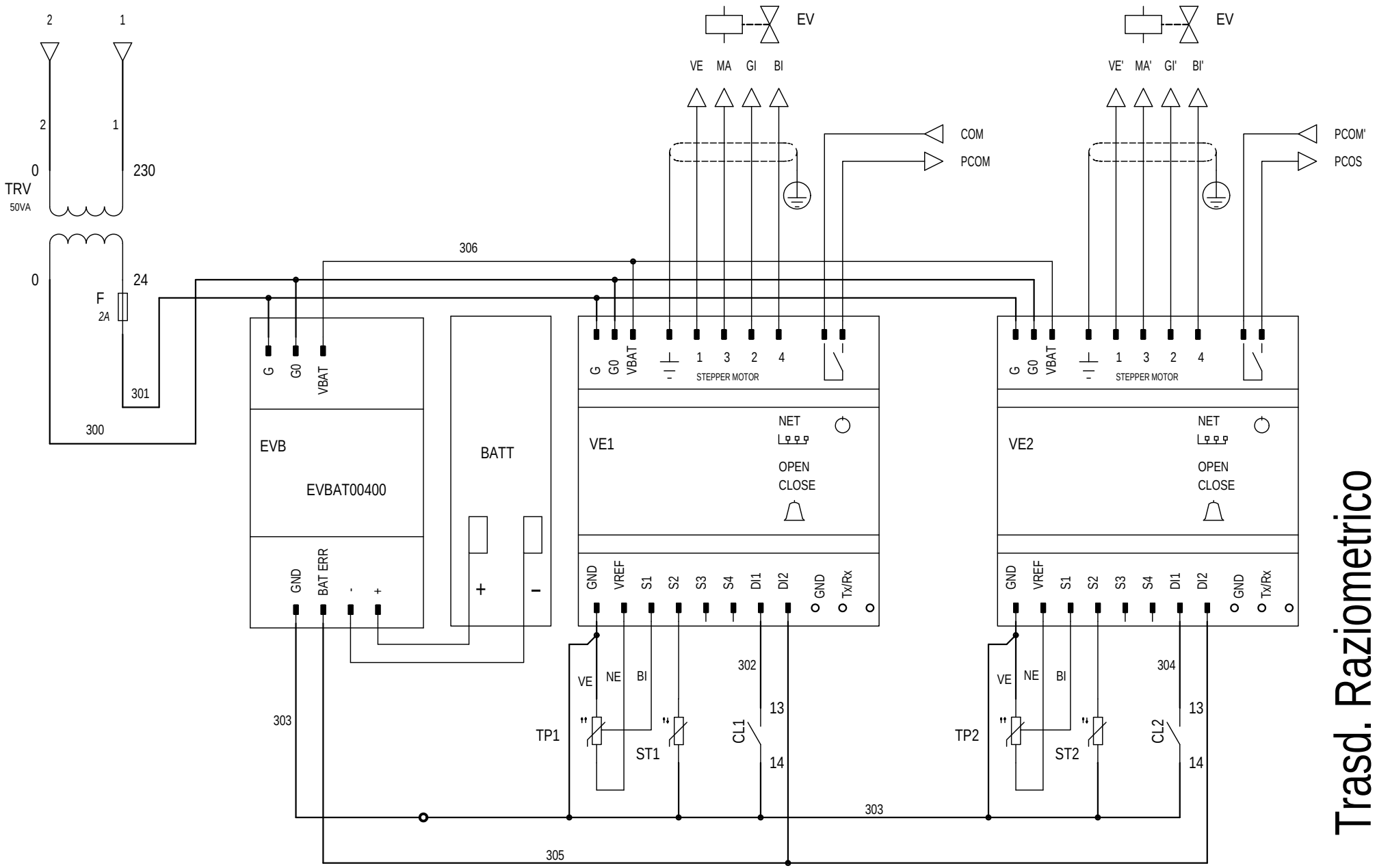
N.ro pag.	Nome	Descrizione	Indice Modifica	REVISIONI 0	1	2	3	4	5	6	7	8	9

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
NE' UTILIZZARE IL CONTENUTO O RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA
AUTORIZZAZIONE ESPLICITA. OGNI INFRAZIONE COMPORTA IL RISARCIMENTO DEI DANNI
SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
NOME FILE: *4916320_01-NS.sch*
TIPICO:

REVISIONI	01	DATA	30/03/2010			RIEPILOGO PAGINE CON REVISIONE SHEETS SUMMARY	Valvola elettronica NS/WS Electronic valve = +
DATA ULTIMA REVISIONE	30/03/2010	DISEGN.	Crivellaro				
NUMERO MODIFICHE PAGINA	0	CONTR.					4916320_01 FOGL. 0-LP-001
VERSIONE SABIK	Ver. 14.00	APPROV.		SOST. IL:	SOST. DA:	ORIGINE:	1 F.S.

Per modelli NS/WF



Trasd. Raziometrico

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
NE' UTILIZZARE IL CONTENUTO O RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA
AUTORIZZAZIONE ESPLICITA. OGNI INFRAZIONE COMPORTA IL RISARCIMENTO DEI DANNI
SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
NOME FILE: *4916320_01-NS.sch*
TIPICO:

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO		
01	cambiato modulo batteria	30/03/2010	Crivellaro		DATA	11/03/2010
					DISEGN.	Crivellaro
					DATA	11/03/2010
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

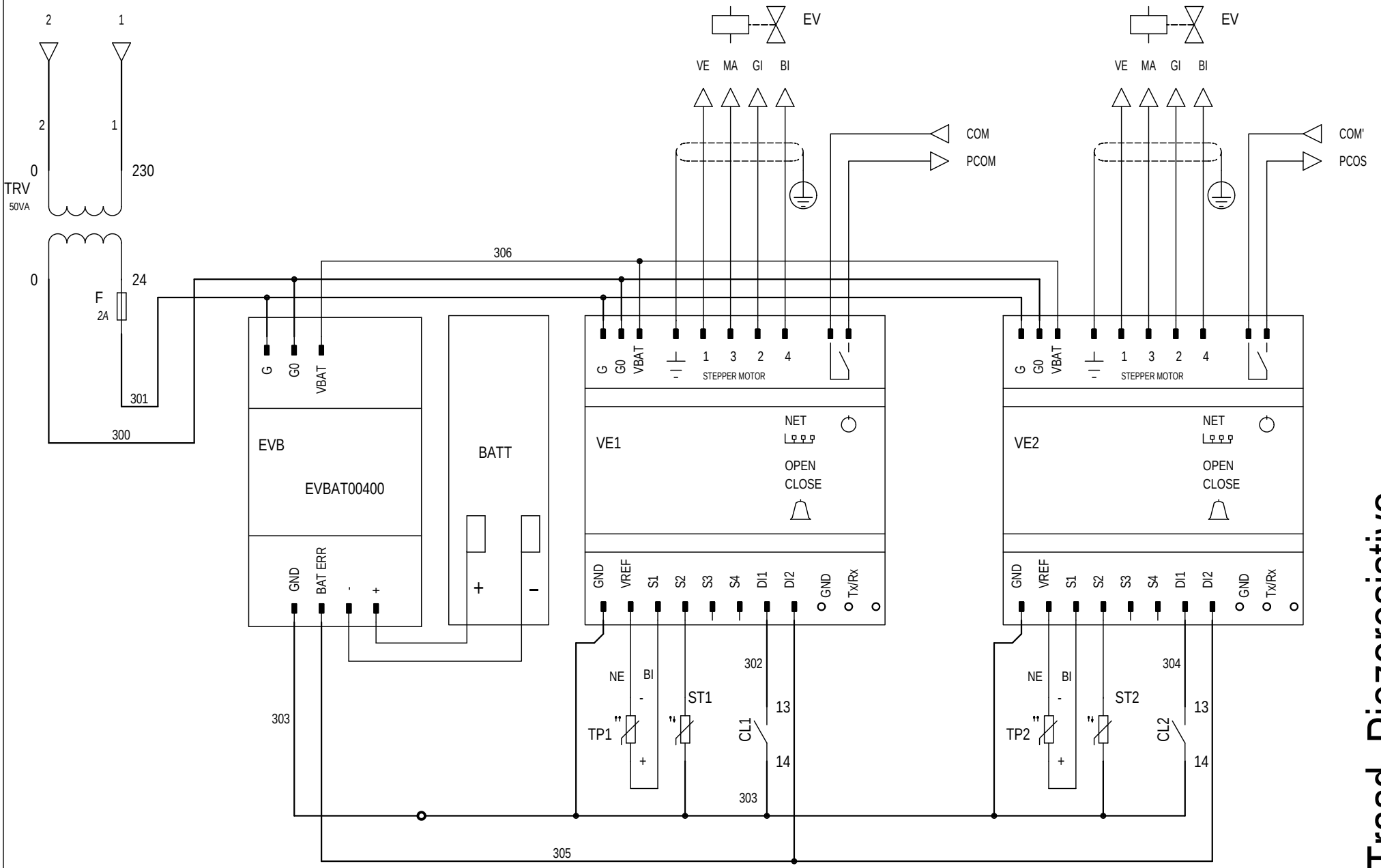
Trasd. raziometrici
Electronic valve

Valvola elettronica NS/WS
Electronic valve

4916320_01

15 | FOGL. 1 | DI 3

Per modelli NS/WF



NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO NE' UTILIZZARE IL CONTENUTO O RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA AUTORIZZAZIONE ESPLICITA. OGNI INFRAZIONE COMPORTA IL RISARCIMENTO DEI DANNI SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
NOME FILE: *4916320_01-NS.sch*
TIPICO:

Trasd. Piezoresistivo

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO		
01	cambiato modulo batteria	30/03/2010	Crivellaro		DATA	11/03/2010
					DISEGN.	Crivellaro
					DATA	11/03/2010
					APPROV.	De Togni

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

Trasd. piezoresistivi

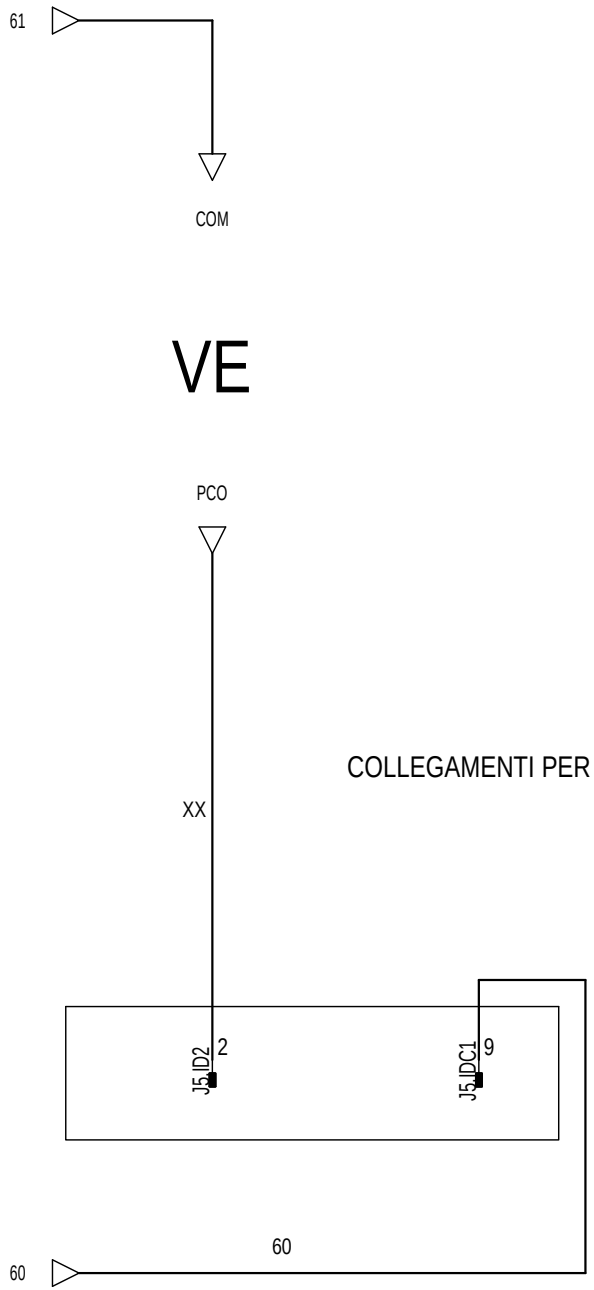
Valvola elettronica NS/WS
Electronic valve

4916320_01

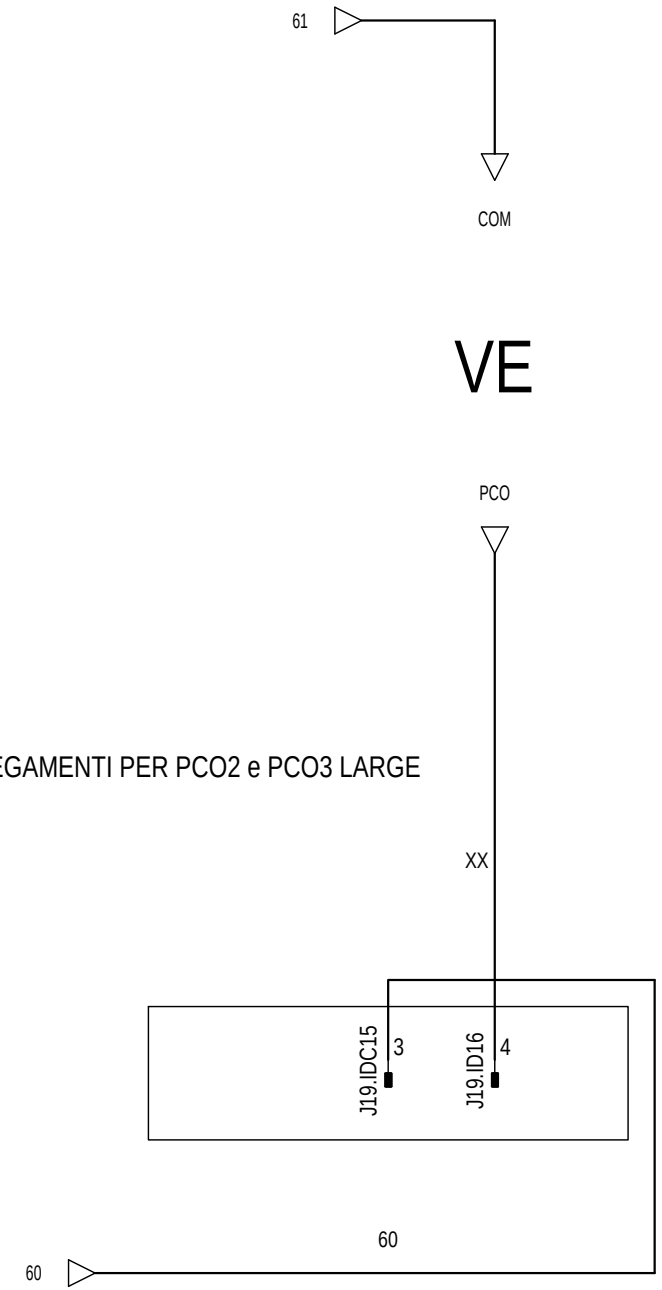
14 | FOGL. 2 | DI 4

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
NE' UTILIZZARE IL CONTENUTO O RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA
AUTORIZZAZIONE ESPLICITA. OGNI INFRAZIONE COMPORTA IL RISARCIMENTO DEI DANNI
SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
NOME FILE: *4916320_01-NS.sch*
TIPICO:



COLLEGAMENTI PER PCO3 MEDIUM



COLLEGAMENTI PER PCO2 e PCO3 LARGE

REV.	MODIFICA	DATA	DISEGNATO	VERIFICATO	APPROV.	DATA
01	cambiato modulo batteria	30/03/2010	Crivellaro		DATA	11/03/2010
					DISEGN.	Crivellaro
					DATA	11/03/2010

AERMEC S.P.A.
BEVILACQUA (VERONA) ITALY

AERMEC

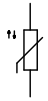
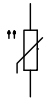
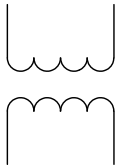
COLLEGAMENTI

Valvola elettronica NS/WS
Electronic valve

4916320_01

9

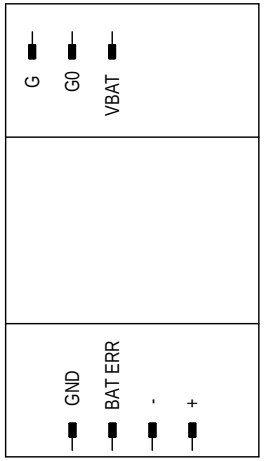
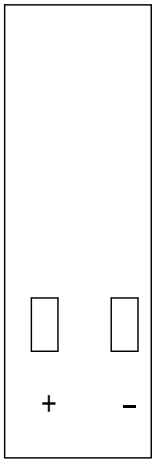
FOGL. 3
DI 5

SIMBOLO *SYMBOL*	NOME SIMBOLO *SYMBOL NAME*	DESCRIZIONE *DESCRIPTION*	SIGLA *DESIGNATION*	ESTENS. *EXT.*
	030202-PE	Morsetto PE PE terminal		
	040104-NTC	Resistore variabile NTC Variable resistance NTC	M	
	040104-TRASD	Trasduttore di pressione 3 fili Pressure trasducer 3 wires	M	
	060902	Trasformatore a due avvolgimenti Transformer with two windings	TM...	
	070201	Contatto NA NO contact		
	072101	Fusibile Fuse	FU...	

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
NE' UTILIZZARE IL CONTENUTO O RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA
AUTORIZZAZIONE ESPLICITA. OGNI INFRAZIONE COMPORTA IL RISARCIMENTO DEI DANNI
SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
NOME FILE: *4916320_01-NS.sch*
TIPICO:

REVISIONI		DATA	30/03/2010			RIEPILOGO SIMBOLI SCHEMA SYMBOLS SUMMARY	Valvola elettronica NS/WS Electronic valve = +
DATA ULTIMA REVISIONE		DISEGN.	Crivellaro				
NUMERO MODIFICHE PAGINA	1	CONTR.					4916320_01 FOGL. LS-1 LS-2 F.S.
VERSIONE SABIK	Ver. 14.00	APPROV.		SOST. IL:	SOST. DA: ORIGINE:		

SIMBOLO *SYMBOL*	NOME SIMBOLO *SYMBOL NAME*	DESCRIZIONE *DESCRIPTION*	SIGLA *DESIGNATION*	ESTENS. *EXT.*
	ALIM-BATT TWIN	Alimentatore batteria Battery power	VE	
	BATT	Batteria Battery	VE	

NON E' PERMESSO CONSEGNARE A TERZI O RIPRODURRE QUESTO DOCUMENTO
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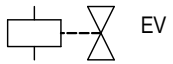
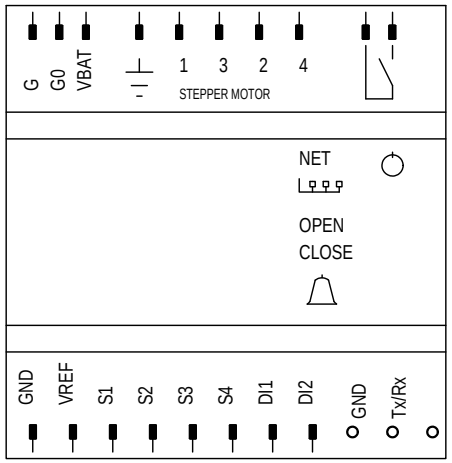
SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
NOME FILE: *4916320_01-NS.sch*
TIPICO:

REVISIONI		DATA	30/03/2010				RIEPILOGO SIMBOLI SCHEMA SYMBOLS SUMMARY	Valvola elettronica NS/WS Electronic valve	=
DATA ULTIMA REVISIONE		DISEGN.	Crivellaro						+
NUMERO MODIFICHE PAGINA	1	CONTR.						4916320_01	FOGL. LS-2
VERSIONE SABIK	Ver. 14.00	APPROV.		SOST. IL:	SOST. DA:	ORIGINE:			LS-3 F.S.

SIMBOLO *SYMBOL*	NOME SIMBOLO *SYMBOL NAME*	DESCRIZIONE *DESCRIPTION*	SIGLA *DESIGNATION*	ESTENS. *EXT.*
 	VAL-CAREL	Valvola elettronica Electronic valve	VE	

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SUBITI. E' FATTA RISERVA DI TUTTI I DIRITTI DERIVANTI DA BREVETTI O MODELLI

PROGETTO:
NOME FILE: *4916320_01-NS.sch*
TIPICO:

REVISIONI		DATA	30/03/2010				RIEPILOGO SIMBOLI SCHEMA SYMBOLS SUMMARY	Valvola elettronica NS/WS Electronic valve	=
DATA ULTIMA REVISIONE		DISEGN.	Crivellaro						+
NUMERO MODIFICHE PAGINA	1	CONTR.						4916320_01	FOGL. LS-3
VERSIONE SABIK	Ver. 14.00	APPROV.		SOST. IL:	SOST. DA:	ORIGINE:			F.S.

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e uksales@aermec.co.uk
w www.aermec.co.uk

Gratte Brothers
2, Regents Wharf
All Saints St.
London
N1 9RL

Attention: Mr Andrew Rogers

19th October 2012

Dear Andrew

RE: St. Georges Court – Chillers

With reference to our quotation Q12138-01J dated 13th September 2012, we are pleased to confirm the following:

1) The chillers proposed are generally in compliance with the amended Blyth and Blyth schedules as submitted by yourself via e-mail on 11th September, with the exception only of some of the data on the Office chillers due to reselection to a different type of chiller i.e. Screw chiller instead of Turbocor.
2) The chillers proposed are in compliance with the acoustic criteria detailed in the Hann Tucker report reference 17797/BS Rev C dated 10th August 2012.

Yours sincerely
on behalf of Aermec UK

Rex J. Murden

GRATTE BROTHERS

TECHNICAL SUBMITTAL SHEET

Project Name:	ST Georges Court, Bloomsbury Way, Holborn WC1A				
Project No:	GB5236	Sheet Ref:	TS010	Rev:	C
Issued to:	Kier Construction/Blyth and Blyth			Issue date:	11/11/2013
				Approval date:	18/11/2013
Description of equipment:	Supply fans, extract fans and associated attenuators manufactured by Nuaire Ltd and listed on attached fan schedule				
Locations where equipment is to be used:	See attached schedule				
Manufacturer / Supplier:	Nuaire Limited Western Industrial Estate, Caephilly, CF83 1NA Telephone 02920858200				
Specification clause references and deviations:	Blyth and Blyth Mechanical Specification Document 2.3 Mechanical Equipment Schedule_I8_290113 See also Blythe & Blythe comments on previous Technical Submission.				
Drawing details:					
Enclosures / samples attached:	Specific Technical Specification Documents				
Additional information:	All units technically comply to Blyth and Blyth Specification				

Project Name:	ST Georges Court, Bloomsbury Way, Holborn WC1A				
Project No:	GB5236	Sheet Ref:	TS010	Rev:	C

APPROVALS

Company	Date	Status (A-B-C)	Comments
B & B Comment	22/07/2013	B	AHU/G/01. • Efficiency and on/off temperatures to be confirmed. • BMS interface to be confirmed.
GBL/Nuaire Response	**08/11/2013**		• **Actual efficiency of the heat exchanger is dependent on a number of factors, but based on 'normal' operating conditions we would expect it to be between 75 & 80%.** • **The unit is equipped with 0-10V connections for fan speed control and VFCs for run/fault to facilitate BMS connection.**
B & B Comment	22/07/2013	B	EF/G/01, 02 & 03 • Hann Tucker to confirm attenuator selection. • BMS interface to be confirmed.
GBL/Nuaire Response	**08/11/2013**		• **Await Hann Tucker Report** • **The unit is equipped with 0-10V connections for fan speed control and VFCs for run/fault to facilitate BMS connection.**
B & B Comment	22/07/2013	B	EF/R/01 & 03 • Has required duty been verified. • SFP/Eff does not comply with Building Regulations • Why has this been changed from approved fan selection.
GBL/Nuaire Response	**08/11/2013**		• **System pressure loss is correct** • **To achieve an SFP of 0.6 W/l/s, the external pressure should be reduced to approx. 80Pa. It has been adversely affected by the addition of the matched silencers. If it is feasible to only utilise a room side silencer, the figure of 120Pa is acceptable.**

B & B Comment	22/07/2013	B	EF/R/02 • Has required duty been verified.
GBL/Nuaire Response	**08/11/2013**		• **System pressure loss is correct**
B & B Comment	22/07/2013	B	EF/R/04 • Basement refuse appears to have been omitted.
GBL/Nuaire Response	**08/11/2013**		**The Basement unit has been relocated to roof level – refer to GBL working drawings.**
B & B Comment	22/07/2013	B	SF/G/01 • Has required duty been verified. • SFP/Eff does not comply with Building Regulations • Hann Tucker to confirm attenuator selection. • Pressure drop and noise reduction figures to be issued • BMS interface to be confirmed.
GBL/Nuaire Response	**08/11/2013**		• **System pressure loss is correct** • **The SFP requirement for a supply fan with heater (Part L 2010) is 1.2W/l/s, therefore we believe that this selection is compliant.** • **Await Hann Tucker Report** • **Pressure drop across the attenuators in negligible, and noise reduction is as shown on data sheets.** • **The unit is equipped with 0-10V connections for fan speed control and VFCs for run/fault to facilitate BMS connection.**
B & B Comment	22/07/2013	B	SF/B/01 • Has required duty been verified. • Flow rate to be upgraded to 400 L/s to comply with Building Control
GBL/Nuaire Response	**08/11/2013**		• **System pressure loss is correct** • **The selected fan will achieve the required air-flow rate (0.4 m3/s), with a SFP of 1.0 W/l/s – revised data sheet attached.**

B & B Comment	22/07/2013	B	EF/B/05 a & b • Quantity 2 No. • We note fans have been selected for 50%-50% operation. Total per fan 935 L/s – total A/F 1892 L/s. • Confirmation required of fan arrangement and pressures. • Attenuator to be fire rated. • Hann Tucker to confirm attenuator selection.
GBL/Nuaire Response	**08/11/2013**		• **We have included 2 fans. Attenuators are fire rated to the same spec as fans (300 deg.C for 2 hours – one-off operation)** • **Await Hann Tucker Report**
B & B Comment	22/07/2013	B	EF/B/06 a & b • Quantity 2 No. • Single speed notation – is this inverter driven for 6 a/c & 10 a/c. • SFP to be based on 6 a/c operation. • Attenuator to be fire rated. • Confirmation required of fan arrangement and pressures. • Under Smoke Mode inverter to be bypassed by hard wiring to the fan. Inverter location to be confirmed.
GBL/Nuaire Response	**08/11/2013**		• **We have included 2 fans. Both are inverter controllable (inverters to be supplied by Controls specialist). Based on 'day-to-day' duties (1.11m3/s, the external resistance will be reduced to 106Pa – calculated using fan laws), the SFP will be 0.3 W/l/s.** • **Attenuators are fire rated to the same spec as fans (300 deg.C for 2 hours – one-off operation)** • **Noted – will be actioned by BMS sub-contractor**

B & B Comment	22/07/2013	B	EF/R/07 a & b • Quantity 2 No. • SFP/Eff does not comply with Building Regulations • 2 No fans 50% - 50% dual fan operation. Each fan 214 L/s • Fan configuration to be confirmed.
GBL/Nuaire Response	**08/11/2013**		• **We have included 2 fans. It is Nuaire's understanding that dedicated smoke extract fans are exempt from the SFP requirements of Part L (and current ErP directives).**
MAIN CONTRACTOR:			
STATUS A-B-C	COMMENTS		
Signature: ……..		Date: …….	