refrigerating systems

EPTAGLOO

INSTALLATION, USER AND MAINTENANCE MANUAL

READ CAREFULY
AND KEEP WITH THE MACHINE

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Epta

INSTALLATION, USE AND MAINTENANCE MANUAL

010 - GENERAL INFORMATION/TABLE OF CONTENTS

This manual has been compiled in a simple and easy-to-read manner so that the equipment can be properly installed, set up and serviced. **Please read its contents carefully and keep it near the machine at all times.**

The following points are of capital importance:

- The equipment must be installed, tested and serviced by skilled and legally qualified personnel.
- Local safety regulations applicable at the time of installation must be observed.
- The refrigerating equipment must only ever be used for the purpose for which it was designed. Uses other than those specified shall in no way be binding for the Manufacturer.
- Any packaging components included (plastic bags, polystyrene, wood, etc.) represent a potential hazard. They must be kept out of the reach of children and disposed of in compliance with local applicable regulations.
- Power supply specifications must comply with the details shown on the serial plate of the machine.
- In the event of a fault or of faulty operation, always switch off the machine.
- Modifications to the power system or unauthorized alterations in general, which are not envisaged in this manual, shall invalidate the warranty.
- To service or repair the machine, always contact an authorized Costan after-sales service center and ask for original spare parts. Failure to do so could jeopardize machine and operator safety.

THE MANUFACTURER DISCLAIMS ALL LIABILITY FOR DIRECT OR INDIRECT DAMAGE TO PROPERTY OR INJURY TO PERSONS RESULTING FROM FAILURE TO COMPLY WITH THE INSTRUCTIONS CONTAINED IN THIS MANUAL.

Table of contents

This manual consists of the following sections representing an integral part thereof and which must not therefore be separated.

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[1] The wiring diagrams and settings sheets attached are integral with the present manual and must be kept with this.

020 – DESCRIPTION / TECHNICAL DETAILS

General information

Eptagloo refrigerating units are available in a three and a four-compressor version, with parallel-connected semi-hermetic Bitzer compressors of the "Octagon" series. These compressor packs are appropriate for positive and negative-temperature applications using R404a refrigerant, to be installed indoors in suitable plant rooms or outdoors with the appropriate casing, which is capable of protecting it from the atmospheric elements.
The range was designed and constructed to the applicable laws and EU Directives. It is available in a base version for indoor installation, including the components strictly required to guarantee total reliability and correct performance of the machine, in compliance with Epta's renowned quality standards: On-board electrical board for compressor control and regulation, compressors installed on a stout galvanized and painted metal-sheet undercarriage, suction manifold designed to ensure the return of oil to the compressors, suction filter, filter dryer on the liquid line with liquid and humidity indicator, liquid receiver vessel. High customizability stems from the possibility to have - as an option for the base version – as many as five different types of electronic controllers and a power board that can be fitted with overload protection or overload plus residual current protection. Installation type (indoor for plant rooms or outdoor) depends on the type of fairing selected, which is fitted with the relevant soundproofing. Accessories range from the sole inspectable oil-separator option, directly discharging into the suction line, to the complete oil-return option including separator, oil reserve, distribution manifold and float regulators. Pulse dampers are featured on each compressor (muffler), as well as outer pressure-gauge connections, glycerin-dip high and low pressure meters, compressor power-factor correction, liquid subcooling for low-temperature systems (when installed with a positive-temperature unit).

Main features (standard version)

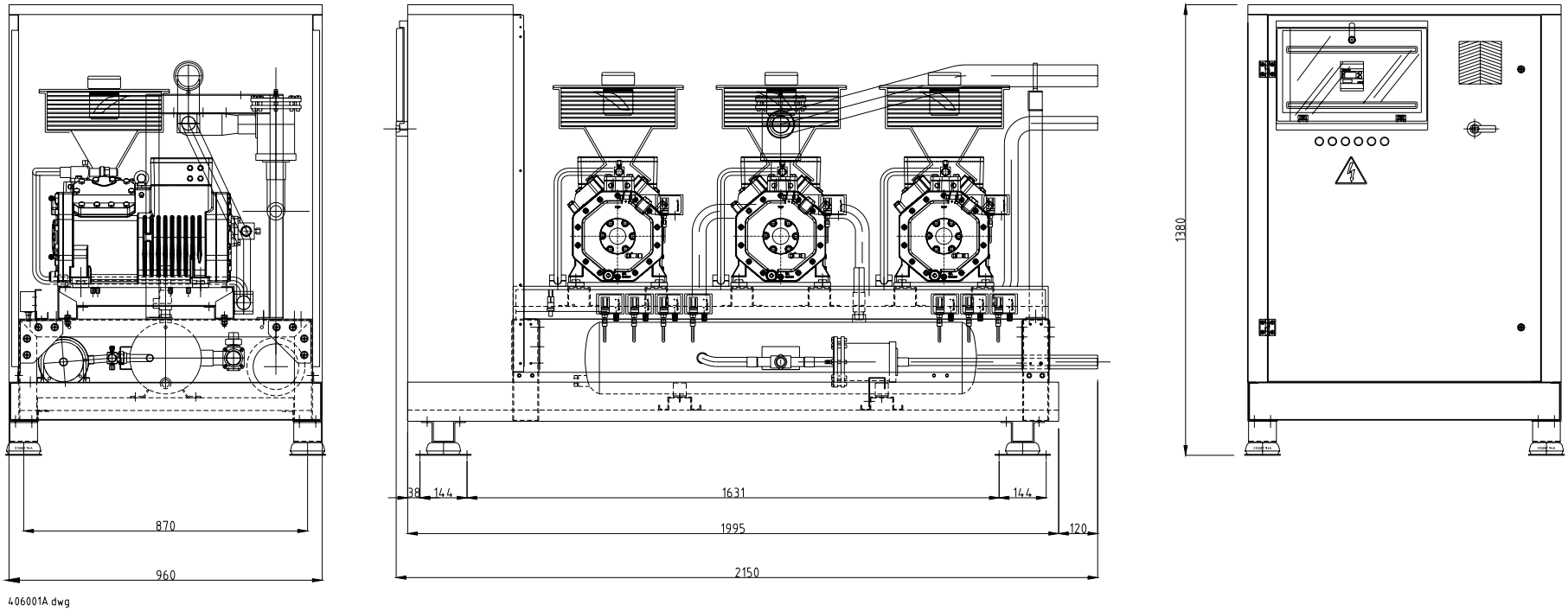
- Electrical power supply panel constructed pursuant to EN 60204-1, integrated in the equipment and pre-wired. It undergoes functional testing at the factory before delivery. Master circuit-breaking handle on the outside.
- controller unit pull-out box, with access door from outside. Controller type to be selected among five different alternatives.
- Suction manifold also acting as anti-liquid bottle, insulation of the entire suction line and of circuit suction stretches (manifold – compressor) and of the suction filters.
- Replaceable mechanical-cartridge filter on the suction line, upstream of the suction manifold (two filters for four-pack systems).
- On-board liquid receiver complying with the requirements of EU Directive 97/23 EC., capacity 40L. (for three packs) and 60L. (for four packs),
- Safety valve complying with EU Directive 97/23/EC to protect the liquid receiver from high pressure caused by external heat (fire)
- High-capacity anti-acid drier filter with replaceable cartridge on the liquid line, with liquid and moisture indicator.
- Pressure-switch and probe panel including:

Two high-pressure switches (manual-reset for system safety) to protect from high pressure due to mismanouvers or other causes. When commissioned as per operational instruction QOP019110A, correct tripping of safety pressure-switches was simulated and verified
one high pressure switch for each compressor (compressor safety)
one low pressure switch for compressor/system safety
one back-up low pressure-switch
one back-up high pressure-switch (including high-pressure control electronics only)
three or four high pressure switches to control condenser fans (including low-pressure control electronics only)
low pressure transducer (probe) and, depending on the controller, high pressure transducer

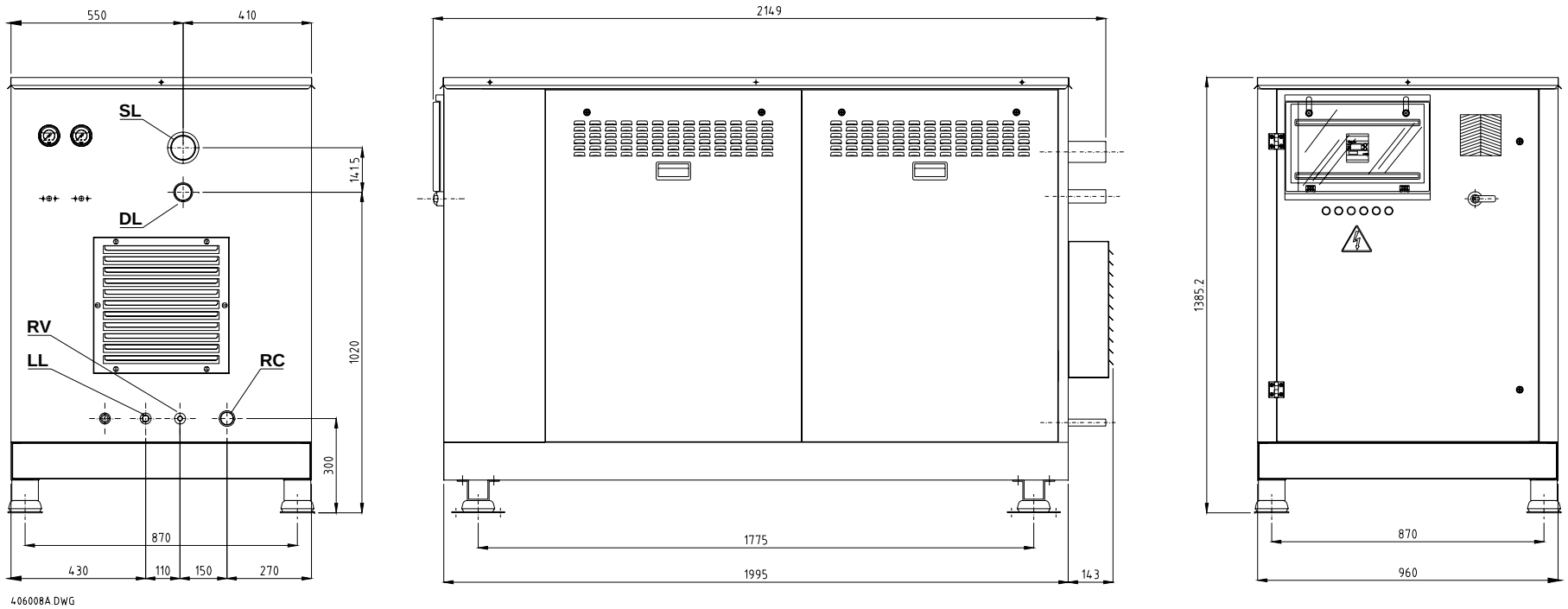
Accessories

Housing for indoor installation, with standard sound-proofing (lining of housing made of double-layer expanded polyurethane sheet embossed on the outside plus bituminous coating). Easy-to-remove panels fitted with 90° angle tabs and fall-proof pins.
Housing suitable for outdoor installation with standard sound-proofing (housing lining made of double-layer expanded polyurethane sheet embossed on the outside and bituminous coating). Easily-to-remove panels fitted with 90° angle tabs and fall-proof pins. Implemented to ensure IP44.
Forced-ventilation by helical extracting fan; fan control by electric thermostat with programmable set point. Temperature probe in the compressor compartment.
¼" SAE HP and LP pressure-gauge connections (available only when the machine is supplied with housing)
External HP and LP glycerin-dip pressure meters (available only when the machine is supplied with housing)
Inspectable-type oil separator discharging into the suction line
Complete oil-return system (inspectable-type oil separator, reserve, manifold, float regulators)
Optical liquid-level sensor on the receiver vessel.
Discharge muffler (one per compressor)
Compressor power-factor correction.
Liquid subcooling for low-temperature systems.
HT-treatment certified wood packing.

Dimensional diagrams – Three-pack systems

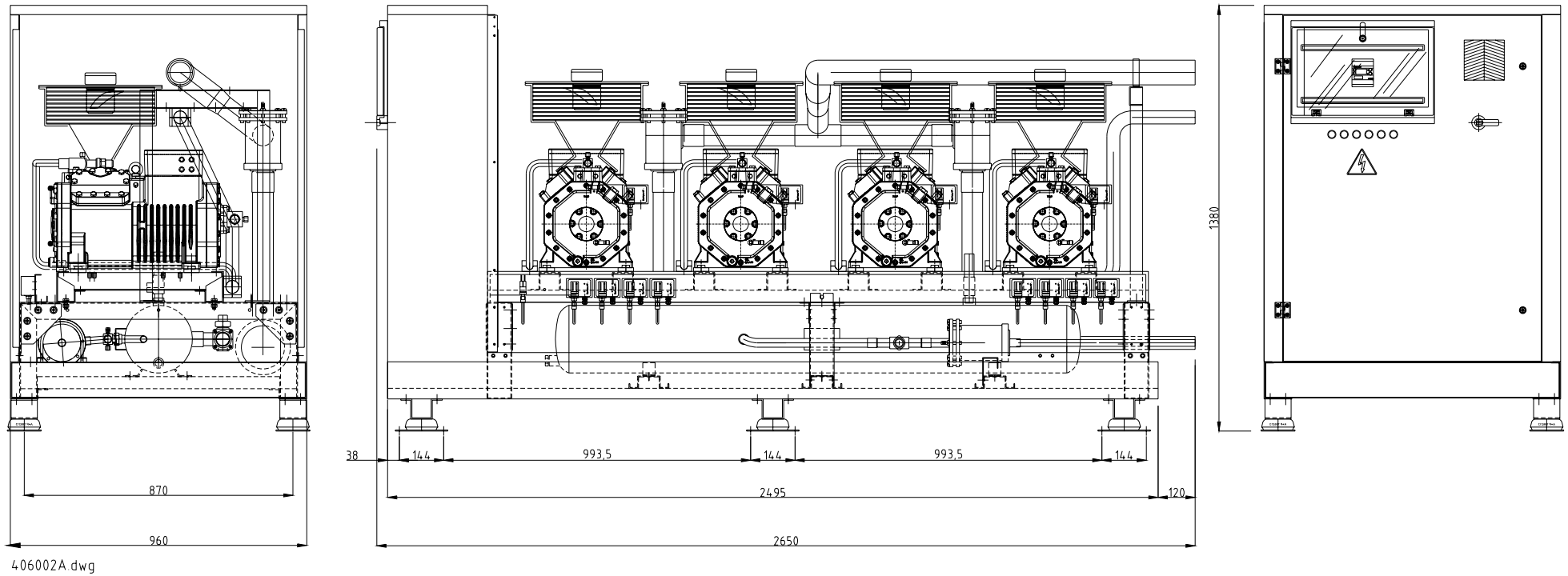


Dimensional diagrams – Three-pack systems including housing

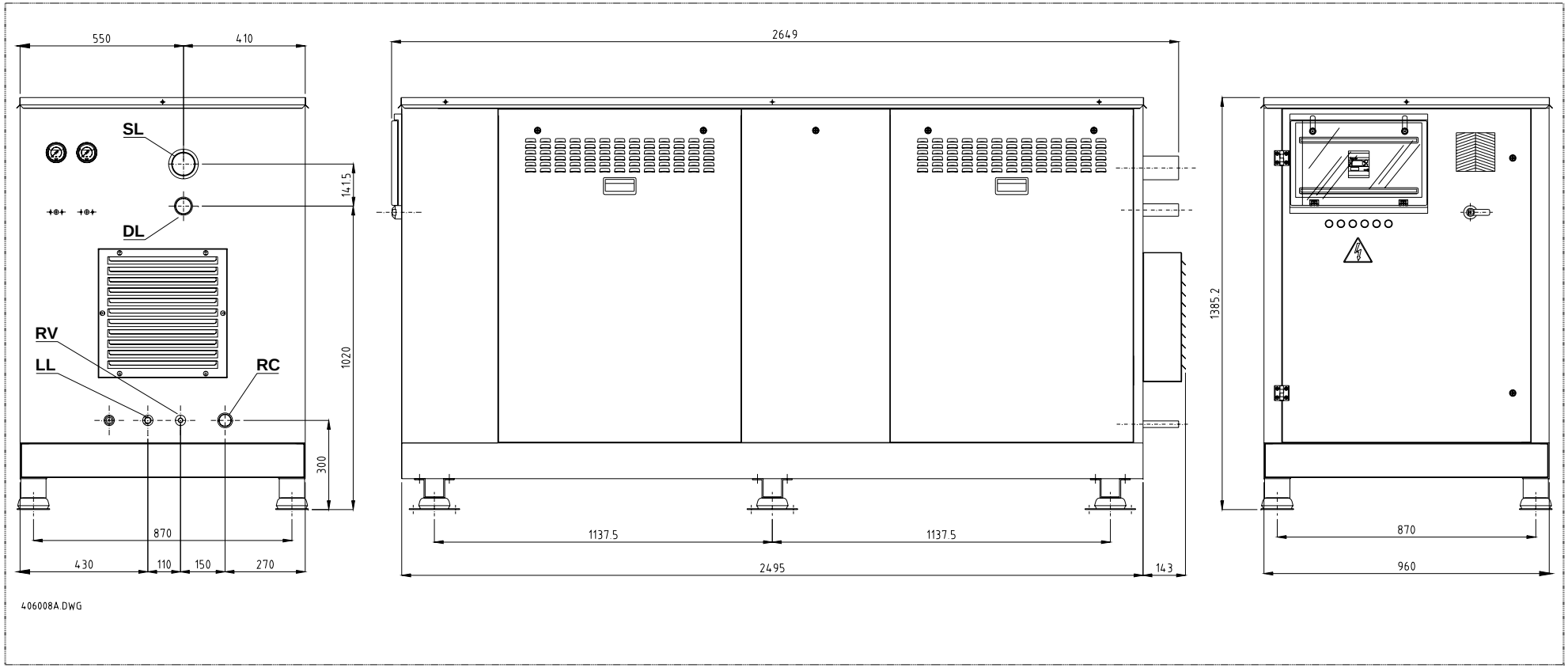


NOTE the position for the system-connecting piping is the same in both versions. The air-expelling fan on the right side is featured as an optional extra.

Dimensional diagrams – Four-pack systems



Dimensional diagrams – Four-pack systems including housing



NOTE the position for the system-connecting piping is the same in both versions. The air-expelling fan on the right side is featured as an optional extra.

High-temperature (positive-temperature) applications – 3 compressors

TAB.1

Machine model	3X 2EC-2.2Y	3X 2DC-2.2Y	3X 2CC-3.2Y	3X 4FC-3.2Y
Rated output (HP)	2	2	3	3
Power voltage	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50
Refrigerant	R404A	R404A	R404A	R404A
Heat extraction rate (W)	17900	20900	26000	28600
Power input (W)	7650	8820	10700	12300
Maximum power (W)	9750	11190	13770	15450

Piping				
Diameter of cond. discharge line (mm)	22	28	28	28
Diameter of condenser return line (mm)	22	22	28	28
Diameter of suction line (mm)	42	42	42	42

Dimensions and weights				
Length (mm)	2070	2070	2070	2070
Width (mm)	990	990	990	990
Height (mm)	1380	1380	1380	1380
Weight (kg)[1]	691	692	699	735

Compressor				
Type	semi-hermetic reciprocating	semi-hermetic reciprocating	semi-hermetic reciprocating	semi-hermetic reciprocating
Brand	Bitzer	Bitzer	Bitzer	Bitzer
Series	Octagon	Octagon	Octagon	Octagon
Bitzer lube	BSE 32	BSE 32	BSE 32	BSE 32
Power input under operation (A)	4,59	5,55	6,46	7,48
Max. power input (A)	5,7	6,9	8,5	9,2

Liquid receiver vessel				
Volume (L)	40	40	40	40
Diameter of liquid line (mm)	22	22	22	22

Electrical board (400/3/50)				
Code of el.brd with overload cutout: UQ39..	..1AM6E	..1AM7E	..1AM8E	..1AM8E
Code of el.brd with RCBO: UQ39..	..1AD6E	..1AD7E	..1AD8E	..1AD8E
Range of thermomagnetic cutout switch	(4,5 - 6,3)A	(5,5 - 8)A	(7 - 10)A	(7 - 10)A

TAB.2

Machine model	3X 4EC-4.2Y	3X 4DC-5.2Y	3X 4CC-6.2Y	3X 4VCS-6.2Y
Rated output (HP)	4	5	6	6
Power voltage	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50
Refrigerant	R404A	R404A	R404A	R404A
Heat extraction rate (W)	35600	43600	52300	56000
Power input (W)	14800	17900	21500	22400
Maximum power (W)	18390	22200	27300	24420

Piping				
Diameter of cond. discharge line (mm)	35	35	35	42
Diameter of condenser return line (mm)	35	35	35	42
Diameter of suction line (mm)	54	54	54	66

Dimensions and weights				
Length (mm)	2070	2070	2070	2070
Width (mm)	990	990	990	990
Height (mm)	1380	1380	1380	1380

[1] The weights in the table refer to the version with housing and complete oil circuit

Machine model	3X 4EC-4.2Y	3X 4DC-5.2Y	3X 4CC-6.2Y	3X 4VCS-6.2Y
Weight (kg)	742	756	771	889

Compressor				
Type	semi-hermetic	semi-hermetic	semi-hermetic	semi-hermetic
	reciprocating	reciprocating	reciprocating	semi-hermetic
Brand	Bitzer	Bitzer	Bitzer	reciprocating
Series	Octagon	Octagon	Octagon	Bitzer
Bitzer lube	BSE 32	BSE 32	BSE 32	Octagon
Power input under operation (A)	8,34	10,47	13,24	12,14
Max. power input (A)	10,7	13,5	15,9	14

Liquid receiver vessel				
Volume (L)	40	40	40	40
Diameter of liquid line (mm)	22	22	22	22

Electrical board (400/3/50)				
Code of el.brd with overload cutout: UQ39..	..1AM9E	..1AMAE	..1AMBE	..1AMAE
Code of el.brd with RCBO: UQ39..	..1AD9E	..1ADAE	..1ADBE	..1ADAE
Range of thermomagnetic cutout switch	(9 - 12,5)A	(11 - 16)A	(14 - 20)A	(11 - 16)A

TAB.3

Machine model	3X 4TCS-8.2Y	3X 4PCS-10.2Y	3X 4NCS-12.2Y
Rated output (HP)	8	10	12
Power voltage	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50
Refrigerant	R404A	R404A	R404A
Heat extraction rate (W)	68400	79500	91800
Power input (W)	27200	31400	37000
Maximum power (W)	30180	34710	41070

Piping			
Diam. of cond. discharge (mm)	42	42	42
Diameter of condenser return line (mm)	42	42	42
Diameter of suction line (mm)	66	66	66

Dimensions and weights			
Length (mm)	2070	2070	2070
Width (mm)	990	990	990
Height (mm)	1380	1380	1380
Weight (kg)	904	919	925

Compressor			
Type	semi-hermetic	semi-hermetic	semi-hermetic
	reciprocating	reciprocating	reciprocating
Brand	Bitzer	Bitzer	Bitzer
Series	Octagon	Octagon	Octagon
Bitzer lube	BSE 32	BSE 32	BSE 32
Power input under operation (A)	14,70	17,22	20,6
Max. power input (A)	17	21	24

Liquid receiver vessel			
Liquid-receiver vessel (L)	40	40	40
Diameter of liquid line (mm)	22	22	22

Electrical board (400/3/50)			
Code of el.brd with overload cutout: UQ39..	..1AMBE	..1AMCE	..1AMCE
Code of el.brd with RCBO: UQ39..	..1ADBE	..1ADCE	..1ADCE
Range of thermomagnetic cutout switch	(14 - 20)A	(20 - 25)A	(20 - 25)A

Low temperature (negative temperature) applications – 3 compressors

TAB.4

Machine model	3X 4EC-4.2Y	3X 4DC-5.2Y	3X 4CC-6.2Y
Rated output (HP)	4	5	6
Power voltage	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50
Refrigerant	R404A	R404A	R404A
Heat extraction rate (W)	10350	12750	15720
Power input (W)	7950	9660	11820
Maximum power (W)	18390	22200	27300

Piping			
Diam. of cond. discharge (mm)	22	22	28
Diameter of condenser return line (mm)	22	22	28
Diameter of suction line (mm)	54	54	66

Dimensions and weights			
Length (mm)	2070	2070	2070
Width (mm)	990	990	990
Height (mm)	1380	1380	1380
Weight (kg)	741	745	761

Compressor			
Type	semi-hermetic	semi-hermetic	semi-hermetic
	reciprocating	reciprocating	reciprocating
Brand	Bitzer	Bitzer	Bitzer
Series	Octagon	Octagon	Octagon
Bitzer lube	BSE 32	BSE 32	BSE 32
Power input under operation (A)	5,17	6,84	9,36
Max. power input (A)	10,7	13,5	15,9

Liquid receiver vessel			
Volume (L)	40.	40	40
Diameter of liquid line (mm)	22	22	22

Electrical board (400/3/50)			
Code of el.brd with OCPD: UQ39..	..1AM9E	..1AMAE	..1AMBE
Code of el.brd with RCBO: UQ39..	..1AD9E	..1ADAE	..1ADBE
Range of OCPD	(9 - 12,5)A	(11 - 16)A	(14 - 20)A

Low temperature (negative temperature) applications – 3 compressors

TAB.5

Machine model	3X 4TCS-8.2Y	3X 4PCS-10.2Y	3X 4NCS-12.2Y
Rated output (HP)	8	10	12
Power voltage	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50
Refrigerant	R404A	R404A	R404A
Heat extraction rate (W)	19560	22560	26220
Power input (W)	13980	15900	18570
Maximum power (W)	30180	34710	41070

Piping			
Diam. of cond. discharge (mm)	28	35	35
Diameter of condenser return line (mm)	28	28	35
Diameter of suction line (mm)	66	66	66

Dimensions and weights			
Length (mm)	2070	2070	2070
Width (mm)	990	990	990
Height (mm)	1380	1380	1380
Weight (kg)	891	907	923

Compressor			
Type	semi-hermetic	semi-hermetic	semi-hermetic
	reciprocating	reciprocating	reciprocating
Brand	Bitzer	Bitzer	Bitzer
Series	Octagon	Octagon	Octagon
Bitzer lube	BSE 32	BSE 32	BSE 32
Power input under operation (A)	8,43	10,31	12,47
Max. power input (A)	17	21	24

Liquid receiver vessel			
Volume (L)	40	40	40
Diameter of liquid line (mm)	22	22	22
Electrical board (400/3/50)			
Code of el.brd with OCPD: UQ39..	..1AMBE	..1AMCE	..1AMCE
Code of el.brd with RCBO: UQ39..	..1ADBE	..1ADCE	..1ADCE
Range of OCPD (overcurrent protection device)	(14 - 20)A	(20 - 25)A	(20 - 25)A

High-temperature (positive-temperature) systems on R404A with 4 compressors

TAB.6

Machine model	4X 4TCS-8.2Y	4X 4PCS-10.2Y	4X 4NCS-12.2Y
Rated output (HP)	8	10	12
Power voltage	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50
Refrigerant	R404A	R404A	R404A
Heat extraction rate (W)	91800	106000	122400
Power input (W)	36200	41800	49320
Maximum power (W)	40240	46280	54760

Piping			
Diameter of cond. discharge line (mm)	42	54	54
Diameter of condenser return line (mm)	42	42	42
Diameter of suction line (mm)	80	80	80

Dimensions and weights			
Length (mm)	2570	2570	2570
Width (mm)	990	990	990
Height (mm)	1380	1380	1380
Weight (kg)	1184	1210	1218

Machine model	4X 4TCS-8.2Y	4X 4PCS-10.2Y	4X 4NCS-12.2Y

Compressor			
Type	semi-hermetic	semi-hermetic	semi-hermetic
	reciprocating	reciprocating	reciprocating
Brand	Bitzer	Bitzer	Bitzer
Series	Octagon	Octagon	Octagon
Bitzer lube	BSE 32	BSE 32	BSE 32
Power input under operation (A)	14,70	17,22	20,6
Max. power input (A)	17	21	24

Liquid receiver vessel			
Volume (L)	60	60	60
Diameter of liquid line (mm)	28	28	28

Electrical board (400/3/50)			
Code of el.brd with OCPD: UQ39..	..1DMBE	..1DMCE	..1DMCE
Code of el.brd with RCBO: UQ39..	..1DDBE	..1DDCE	..1DDCE
Range of OCPD	(14 - 20)A	(20 - 25)A	(20 - 25)A

Low temperature (negative temperature) systems – 4 compressors

TAB.7

Machine model	4X 4PCS-10.2Y	4X 4NCS-12.2Y
Rated output (HP)	10	12
Power voltage	400 / 3 / 50	400 / 3 / 50
Refrigerant	R404A	R404A
Heat extraction rate (W)	30080	34960
Power input (W)	21200	24760
Maximum power (W)	46280	54760

Piping		
Diameter of cond. discharge line (mm)	35	35
Diameter of condenser return line (mm)	28	35
Diameter of suction line (mm)	80	80

Dimensions and weights		
Length (mm)	2570	2570
Width (mm)	990	990
Height (mm)	1380	1380
Weight (kg)	1206	1214

Compressor		
Type	semi-hermetic	semi-hermetic
	reciprocating	reciprocating
Brand	Bitzer	Bitzer
Series	Octagon	Octagon
Bitzer lube	BSE 32	BSE 32
Power input under operation (A)	10,31	12,47
Max. power input (A)	21	24

Liquid receiver vessel		
Liquid-receiver vessel (L)	60	60
Diameter of liquid line (mm)	28	28

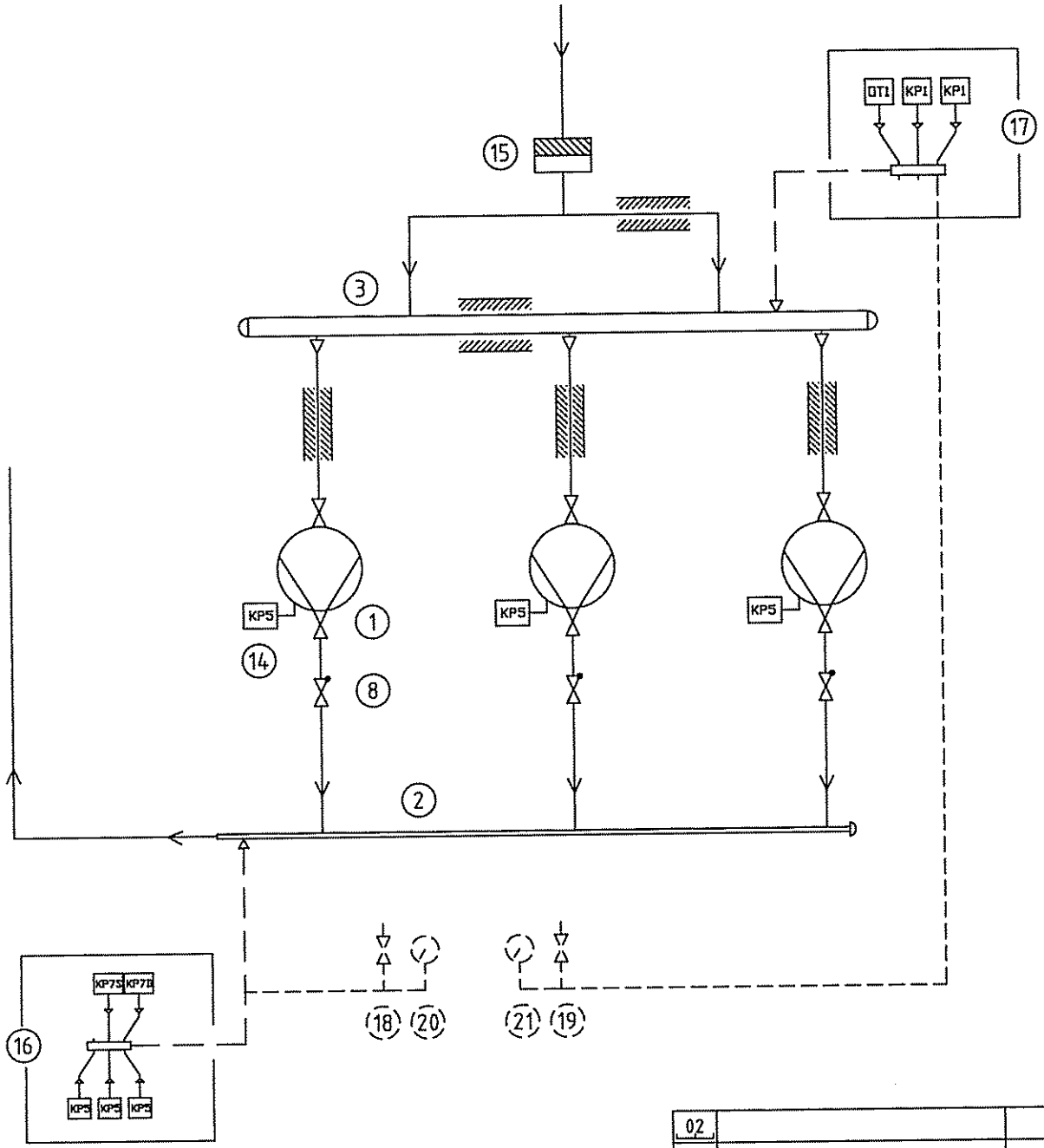
Electrical board (400/3/50)		
Code of el.brd with OCPD: UQ39..	..1DMCE	..1DMCE
Code of el.brd with RCBO: UQ39..	..1DDCE	..1DDCE
Range of OCPD	(20 - 25)A	(20 - 25)A

Refrigerating system diagrams – 3 compressors

Danfoss controller EKC331/T			Danfoss Controller EKC531 D1		
UVF300100	UVF300200	UVF300300	UVF300400	UVF300500	UVF300600
Carel Controller IR32 Z3			Carel Controller mRack (micro Rack)		
UVF300700	UVF300800	UVF300900	UVF301000	UVF301100	UVF301200
Carel Controller PCO2					
UVF301300	UVF301400	UVF301500			

Refrigerating system diagrams – 4 compressors

Danfoss controller EKC331/T			Danfoss Controller EKC531 D1		
UVF301600	UVF301700	UVF301800	UVF301900	UVF302000	UVF302100
Carel Controller IR32 Z3			Carel Controller mRack (micro Rack)		
UVF302200	UVF302300	UVF302400	UVF302500	UVF302600	UVF302700
Carel Controller PCO2					
UVF302800	UVF302900	UVF303000			



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13				
12				
11				
10				
9				
8		3		VALV.RIT.NRVH...
7				
6				
5				
4				
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

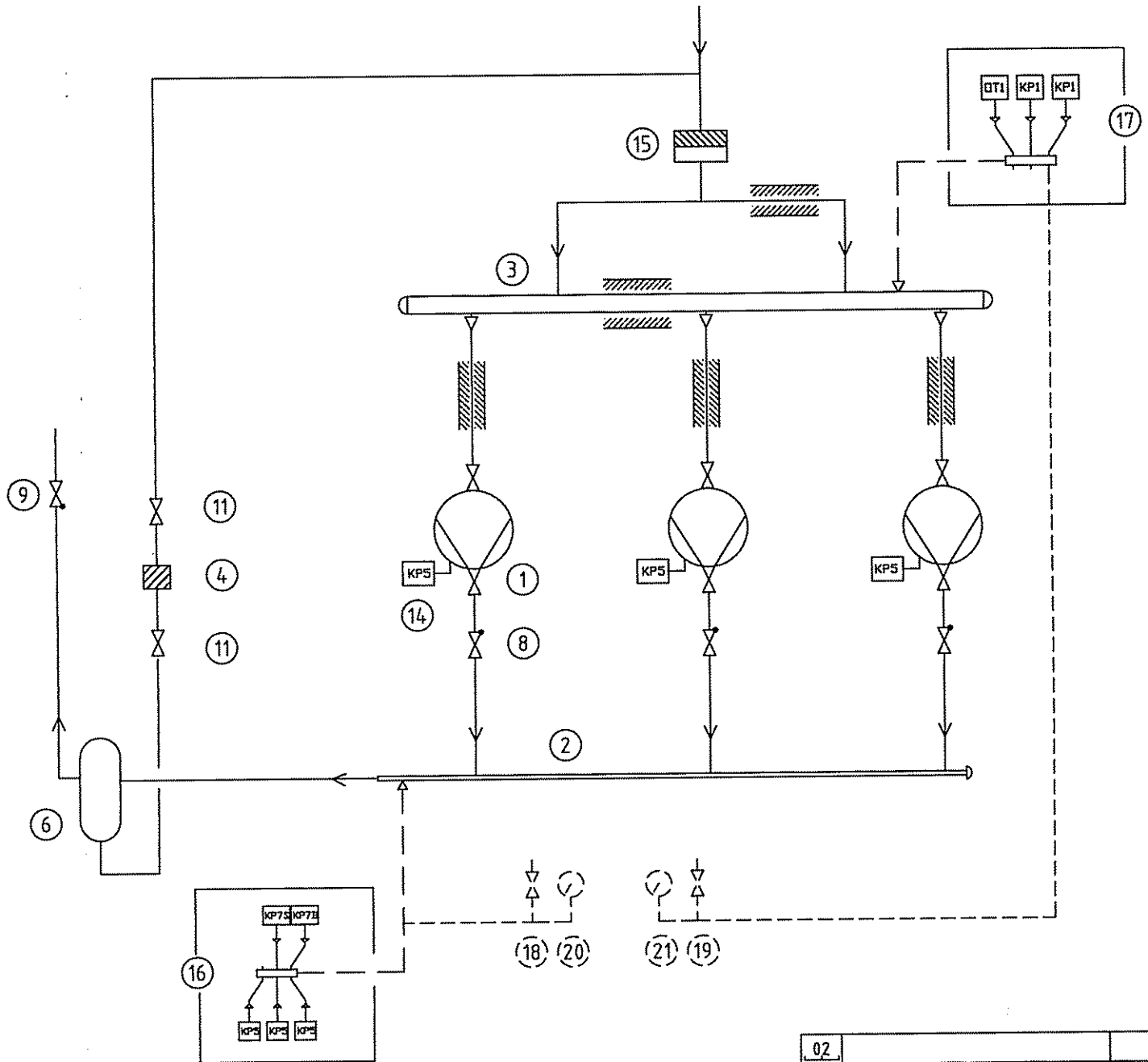
Pos.	Descrizione / Modifica	data/dis
02		
01		

Data 03.2007
Scala
Tratt.am.
Verifica

Famiglia Cube Cooler
DTF-RO DZanin

Descrizione
CUBE COOLER 3GR. EKC331/T

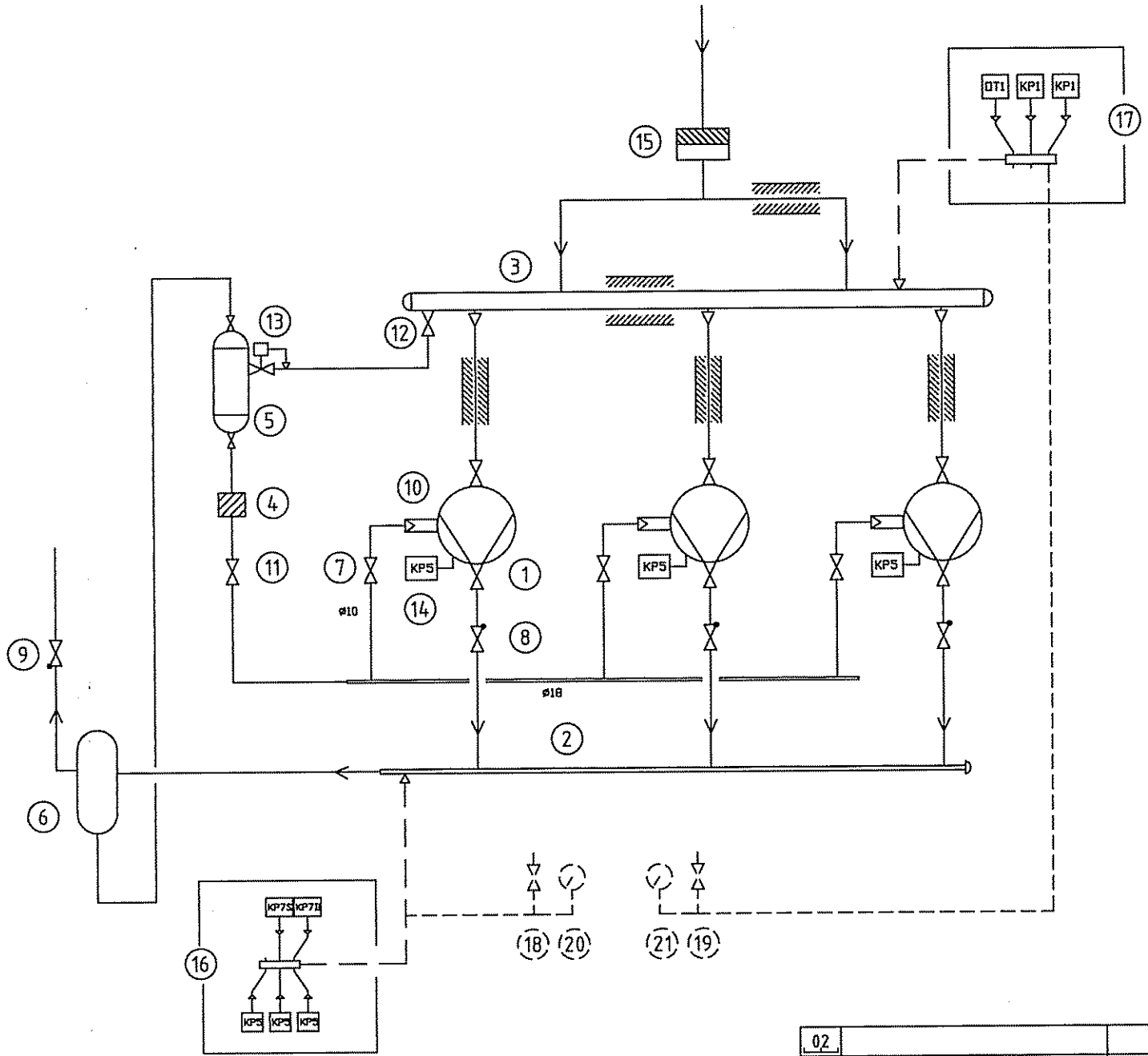
Codice disegno **UVF300100**



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPRESS.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler
DTF-RD: DZanin
Data: 03.2007
Scala:
Tratt.am.:
Verifica:
Descrizione: CUBE COOLER 3GR. EKC331/T
Codice disegno: UVF300200



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		1		RUBINETTO A CAPPELLOTTO
10		3		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7		3		RUBINETTO PER REGOLAT. OLIO
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis.
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

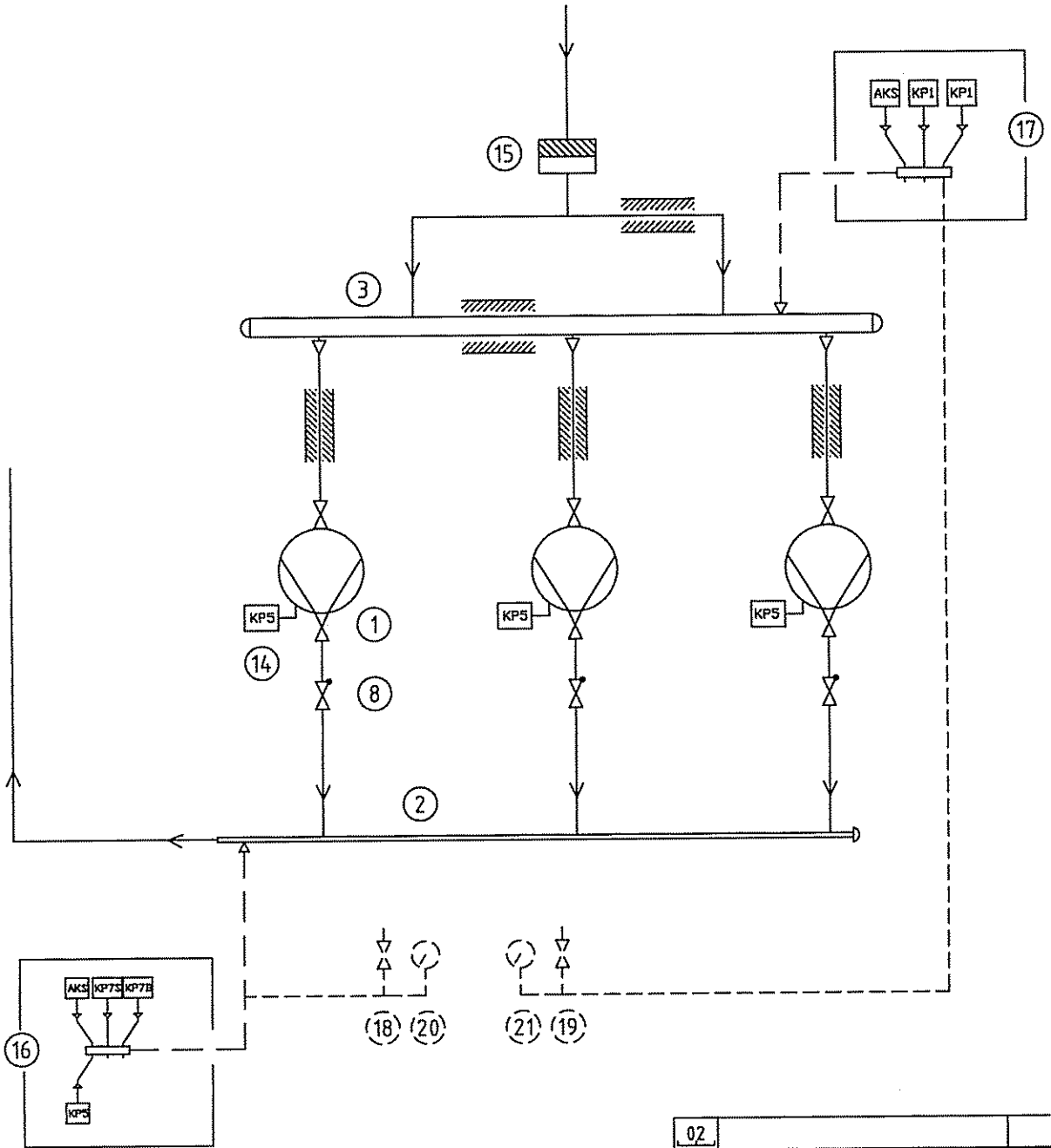
Scala:

Tratt.am.:

Verifica:

Descrizione: **CUBE COOLER 3GR. EKC331/T**

Codice disegno: **UVF300300**



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESS. E SONDA A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13				
12				
11				
10				
9				
8		3		VALV.RIT.NRVH...
7				
6				
5				
4				
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RB: DZanin

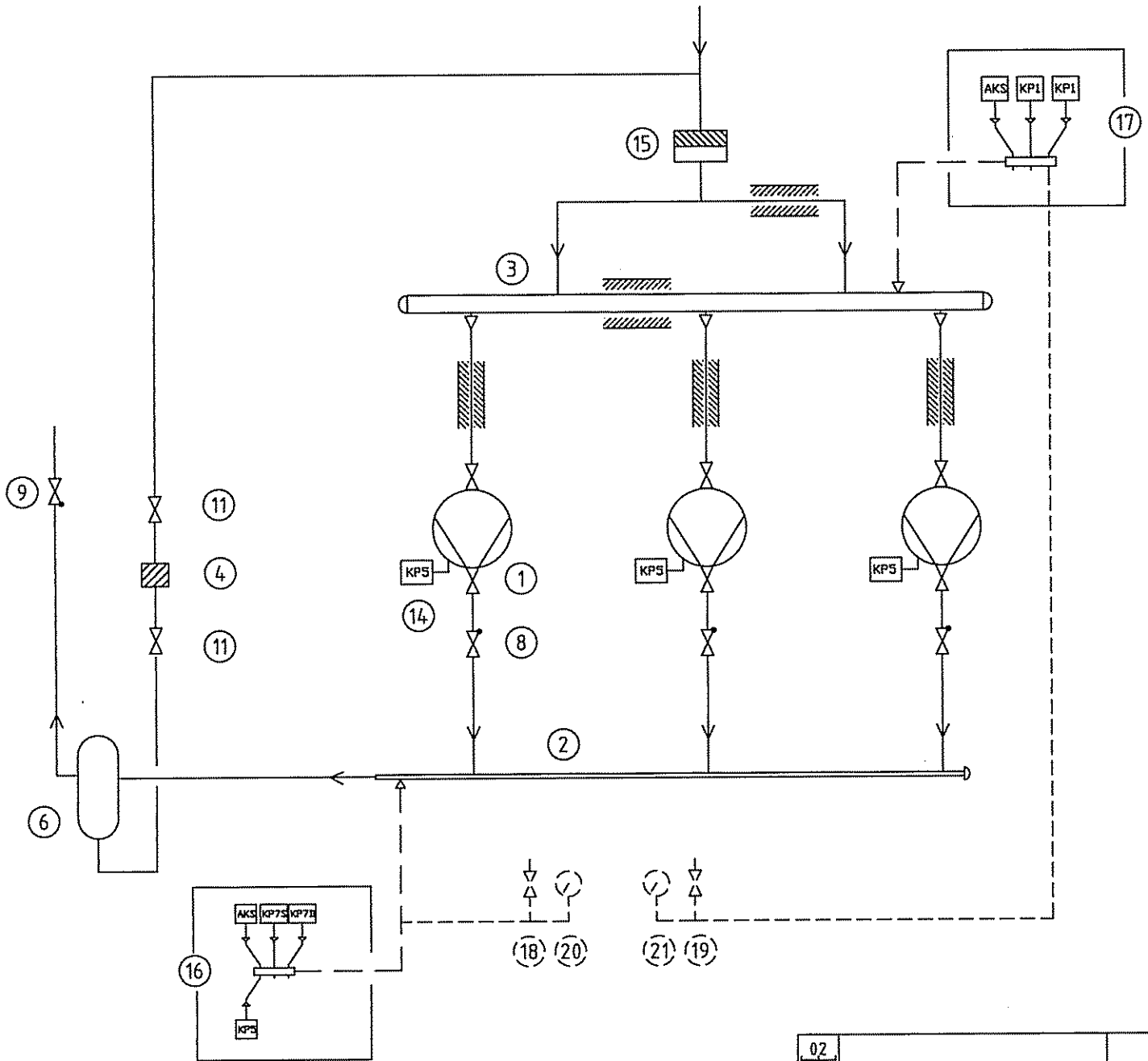
Scala:

Tratt.am.:

Verifica:

Descrizione: **CUBE COOLER 3GR. EKC531 D1**

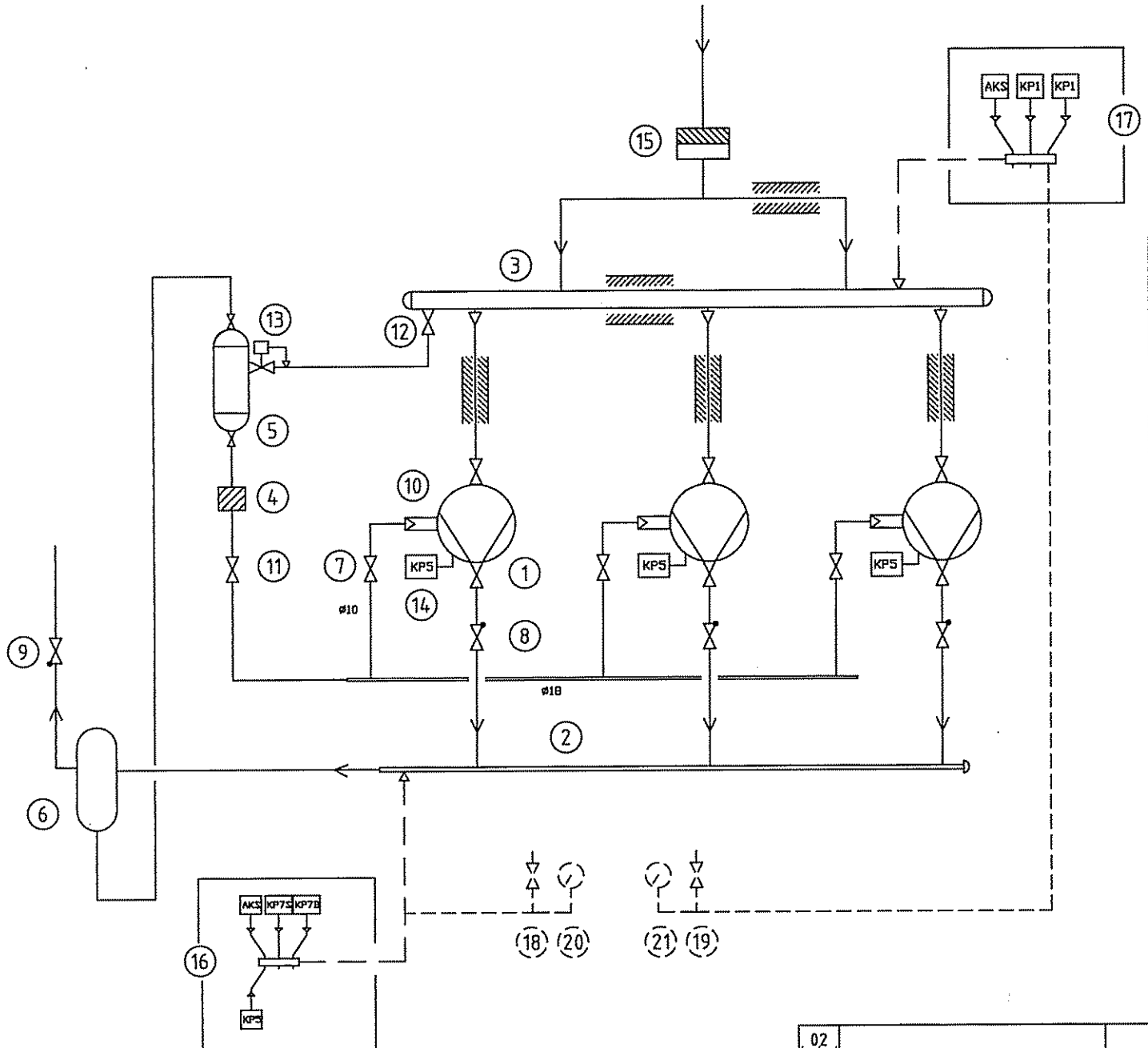
Codice disegno: **UVF300400**



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESS. E SONDA A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler
Data: 03.2007
DTF-RD: DZanin
Scala:
Tratt.:
Verifica:
Descrizione: CUBE COOLER 3GR. EKC531 D1
Codice disegno: UVF300500



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESS. E SONDA A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS. SICUREZZA COMPR.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		1		RUBINETTO A CAPPELLOTTO
10		3		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7		3		RUBINETTO PER REGOLAT. OLIO
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

Scala:

Tratfam.:

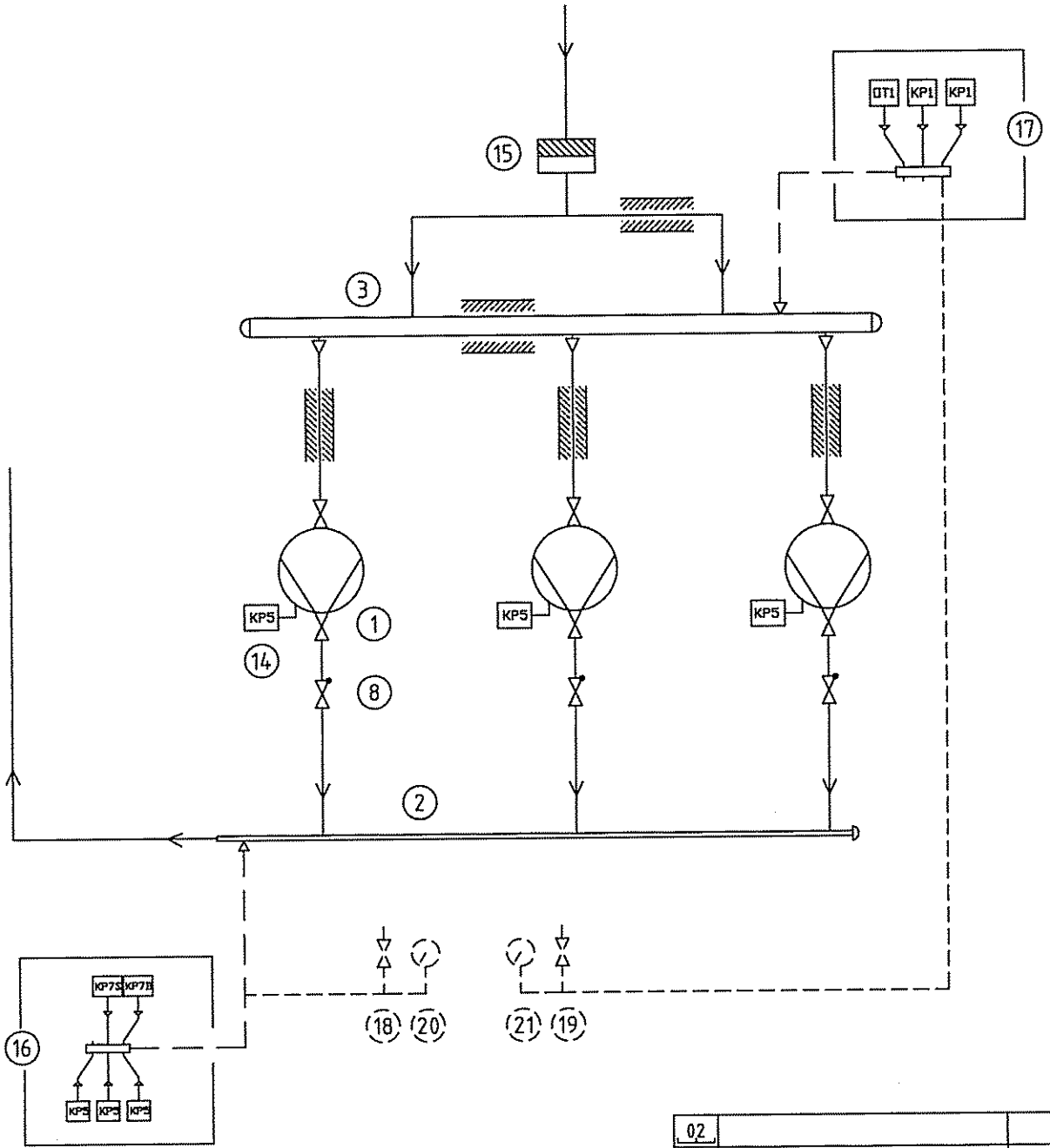
Verifica:

Descrizione

CUBE COOLER 3GR. EKC531 D1

Codice disegno: UVF300600

6 grezzo/a
1 grezzo/i
2 verso/a
4 verso/i



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13				
12				
11				
10				
9				
8		3		VALV.RIT.NRVH...
7				
6				
5				
4				
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RO: DZanin

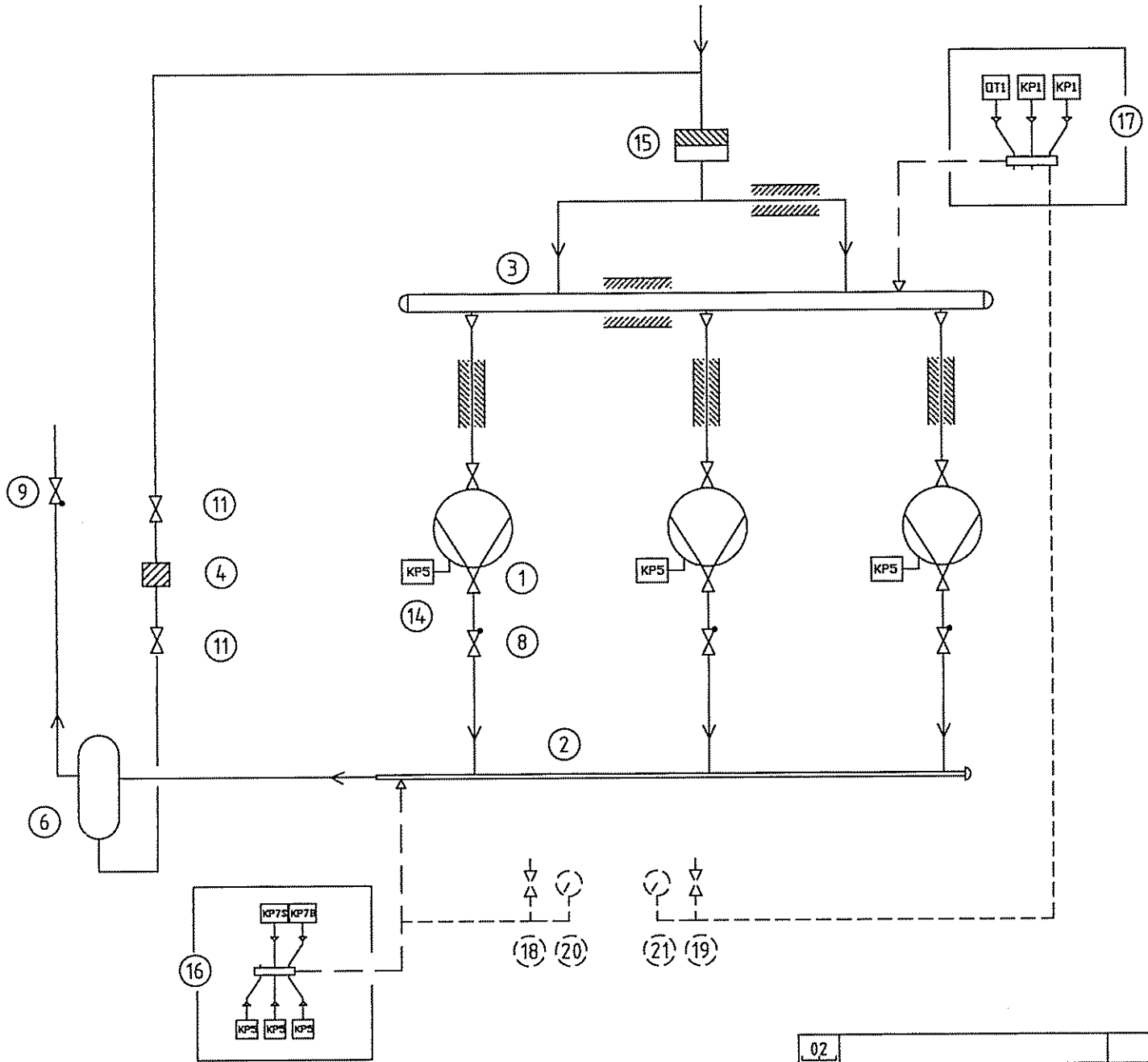
Scala:

Tratt.:

Verifica:

Descrizione: CUBE COOLER 3GR. IR32 Z3

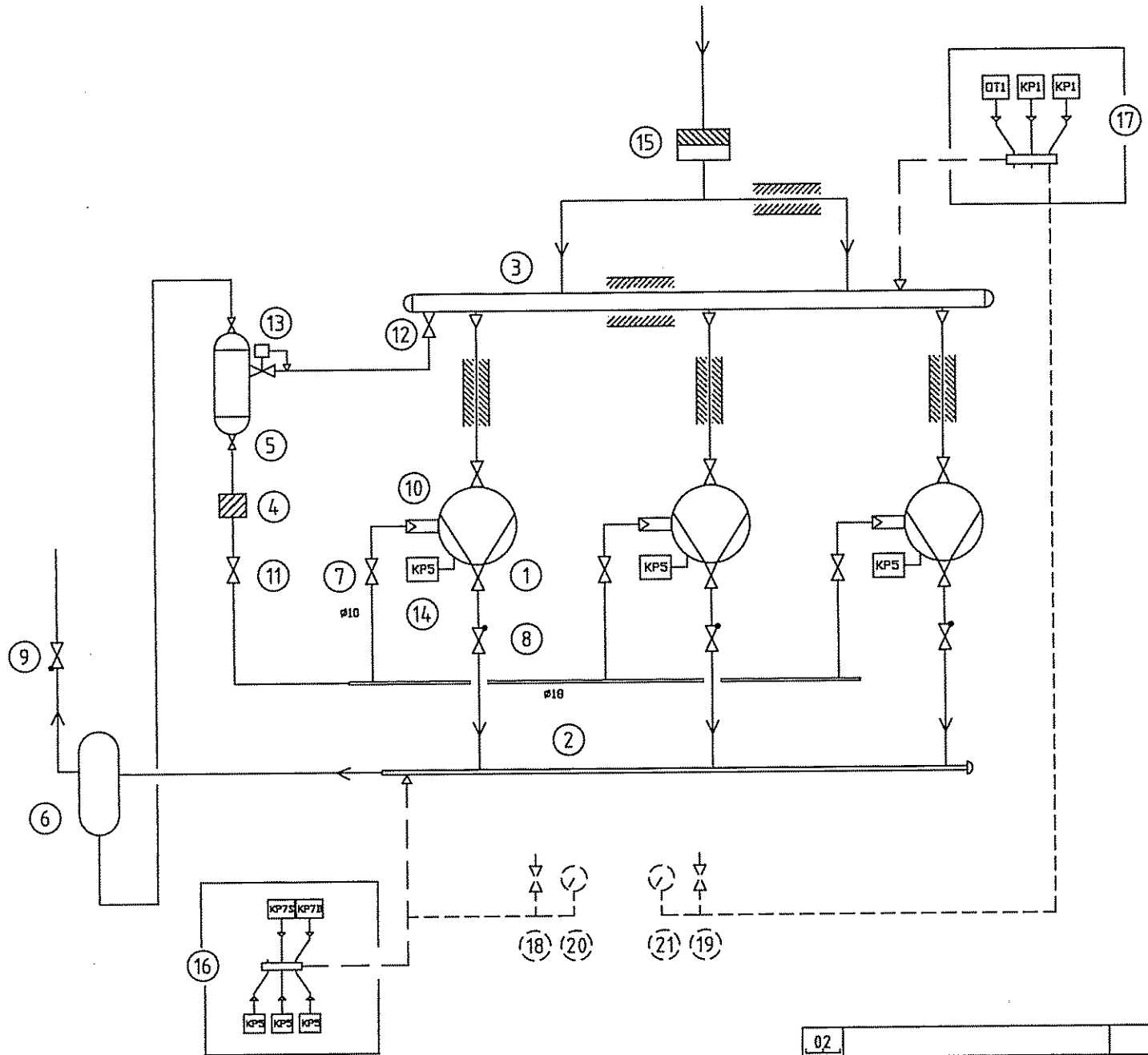
Codice disegno: UVF300700



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

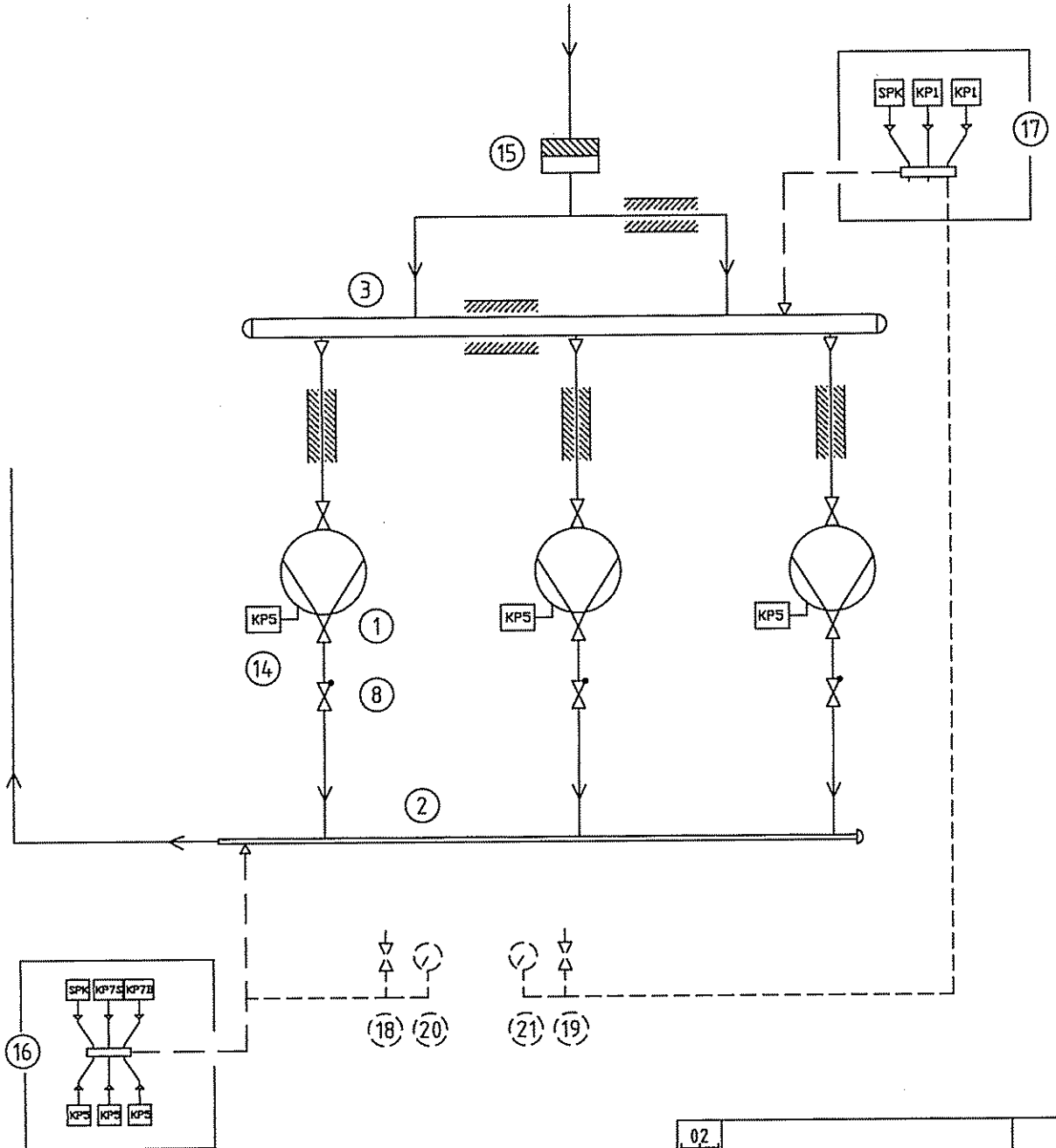
Famiglia: Cube Cooler
Data: 03.2007
DTF-RD: DZanin
Scala:
Tratt.am.:
Verifica:
Descrizione: CUBE COOLER 3GR. IR32 Z3
Codice disegno: UVF300800



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		1		RUBINETTO A CAPPELLOTTO
10		3		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7		3		RUBINETTO PER REGOLAT. OLIO
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler
Data: 03.2007
DTF-RD: DZanin
Scala:
Trattam.:
Verifica:
Descrizione: CUBE COOLER 3GR. IR32 Z3
Codice disegno: UVF300900



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13				
12				
11				
10				
9				
8		3		VALV.RIT.NRVH...
7				
6				
5				
4				
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

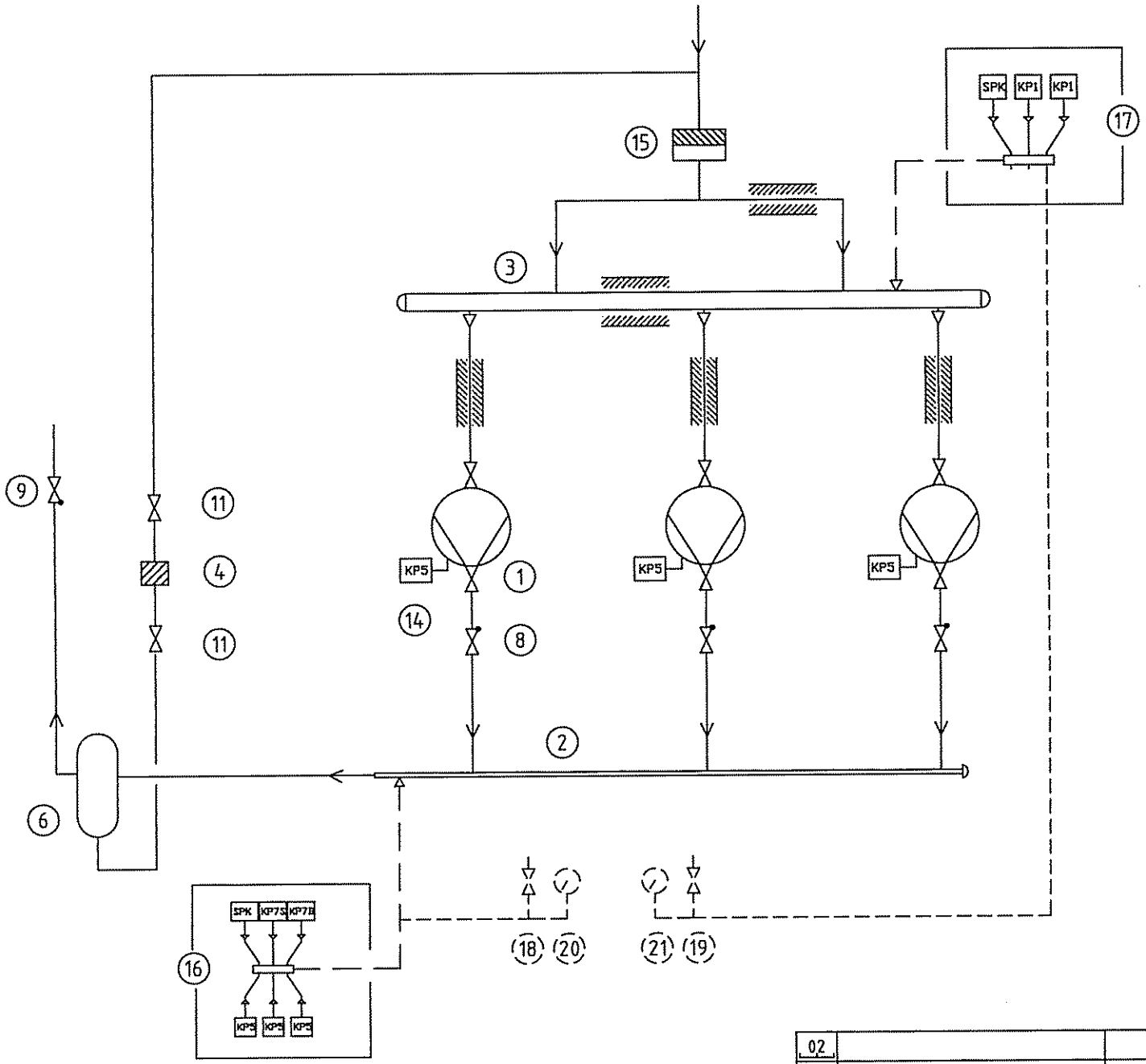
Scala:

Trattam.:

Verifica:

Descrizione: CUBE COOLER 3GR. mRACK

Codice disegno: UVF301000

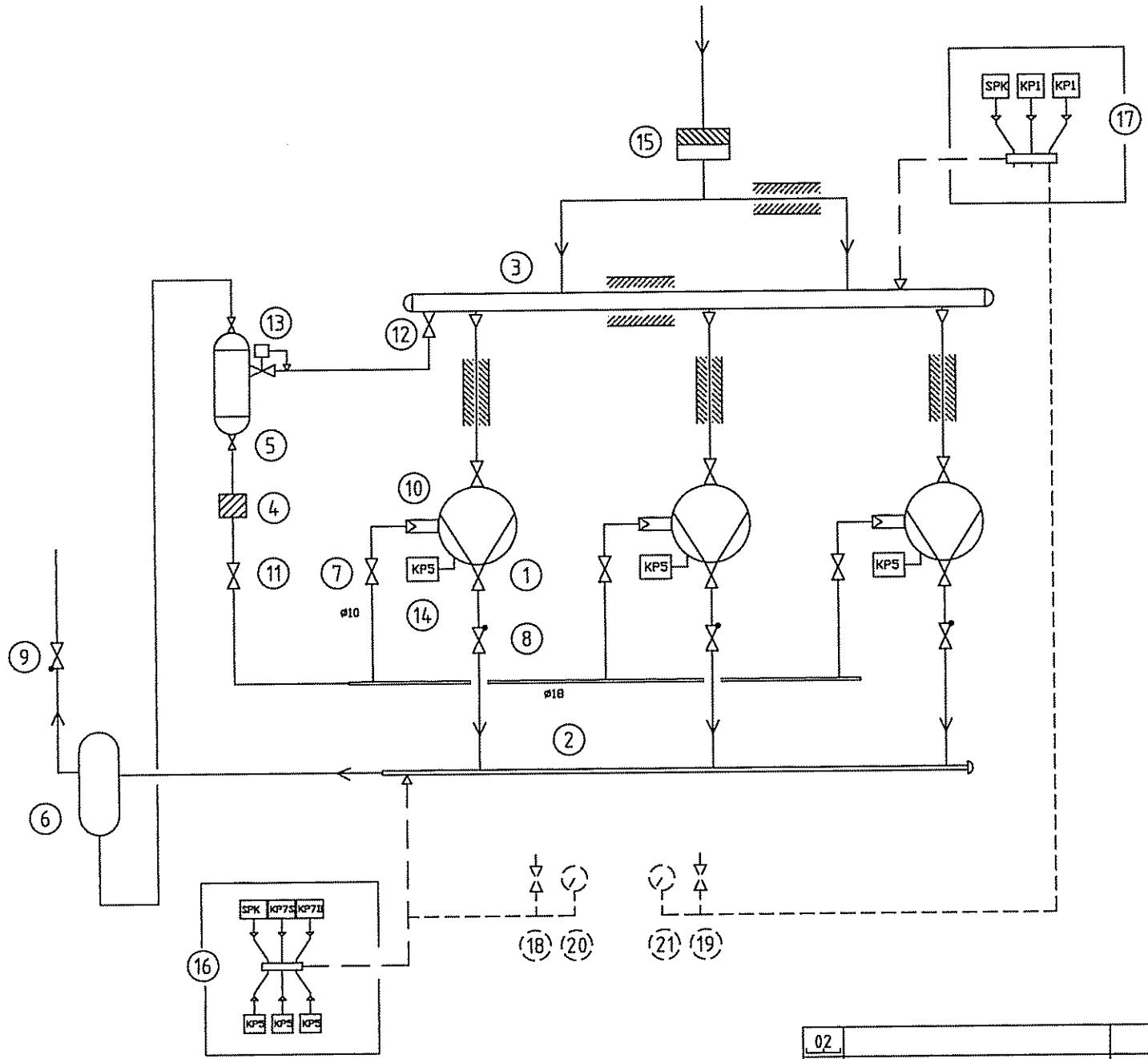


21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.

17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPRESS.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO
Pos.	Codice	Pz		Materiale / Componenti

		Famiglia	Cube Cooler
Data	03.2007	DTF-RD	DZanin
Scala		Descrizione	CUBE COOLER 3GR. mRACK
Trattam.			
Verifica		Codice disegno	UVF301100

02			
01			
Pos.	Descrizione / Modifica	data/dis	



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		1		RUBINETTO A CAPPELLOTTO
10		3		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7		3		RUBINETTO PER REGOLAT. OLIO
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

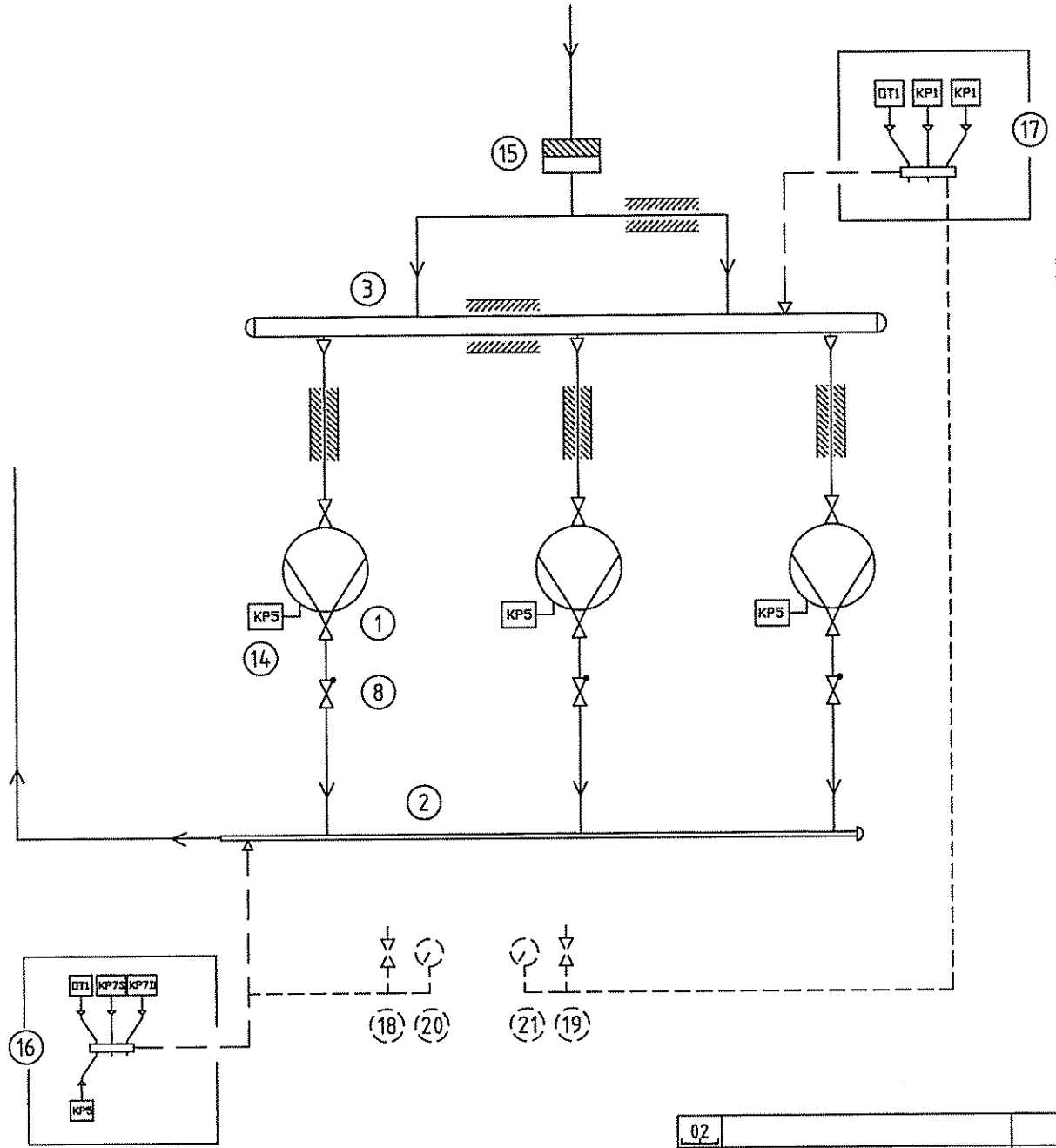
Scala:

Tratt.am.:

Verifica:

Descrizione: **CUBE COOLER 3GR. mRACK**

Codice disegno: **UVF301200**

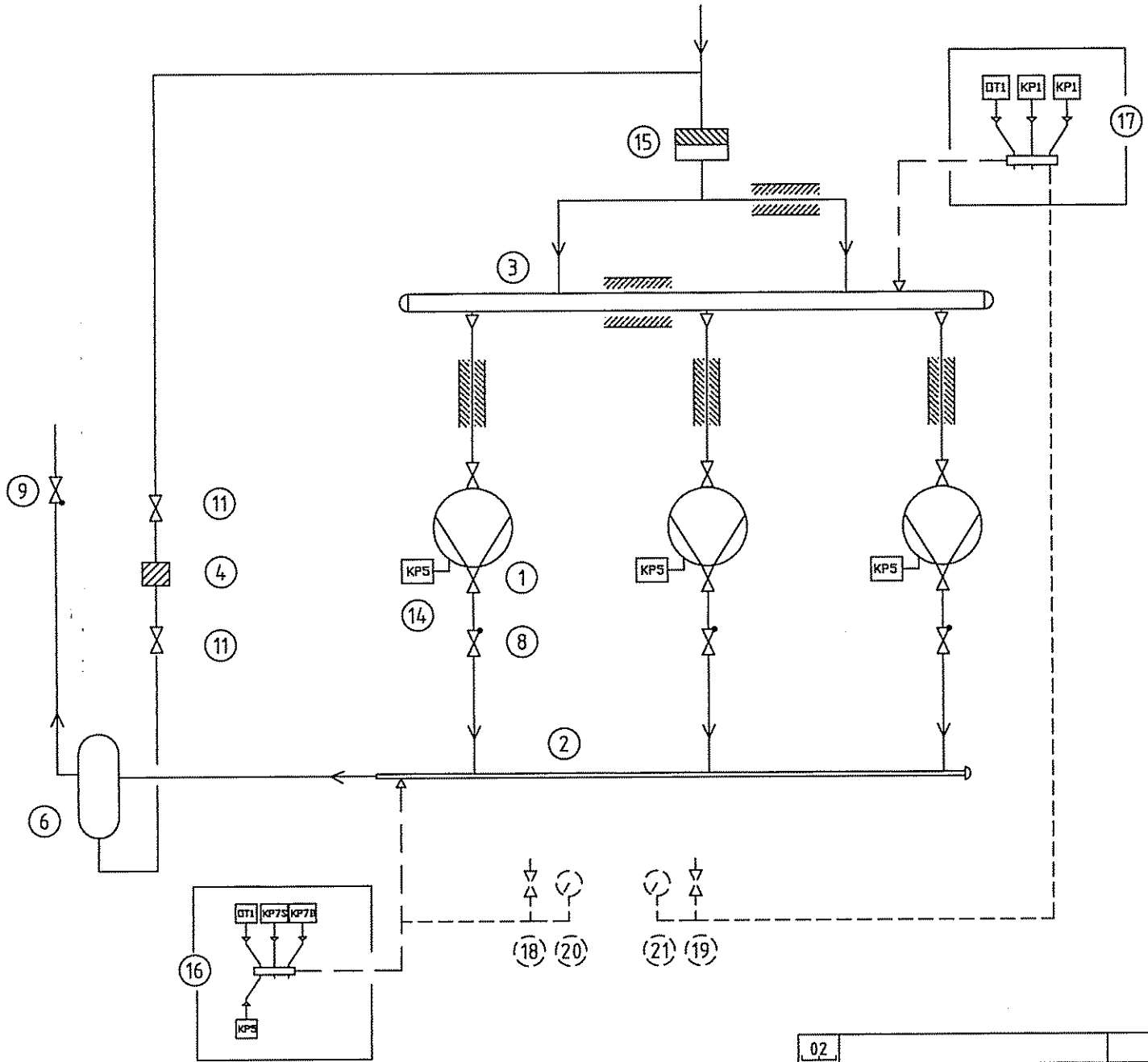


21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.

17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESS. E SONDA A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13				
12				
11				
10				
9				
8		3		VALV.RIT.NRVH...
7				
6				
5				
4				
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO
Pos.	Codice	Pz		Materiale / Componenti

		Famiglia	Cube Cooler
Data	03.2007	DTF-RD	DZanin
Scala		Descrizione	CUBE COOLER 3GR. PCO2
Trattam.			
Verifica		Codice disegno	UVF301300

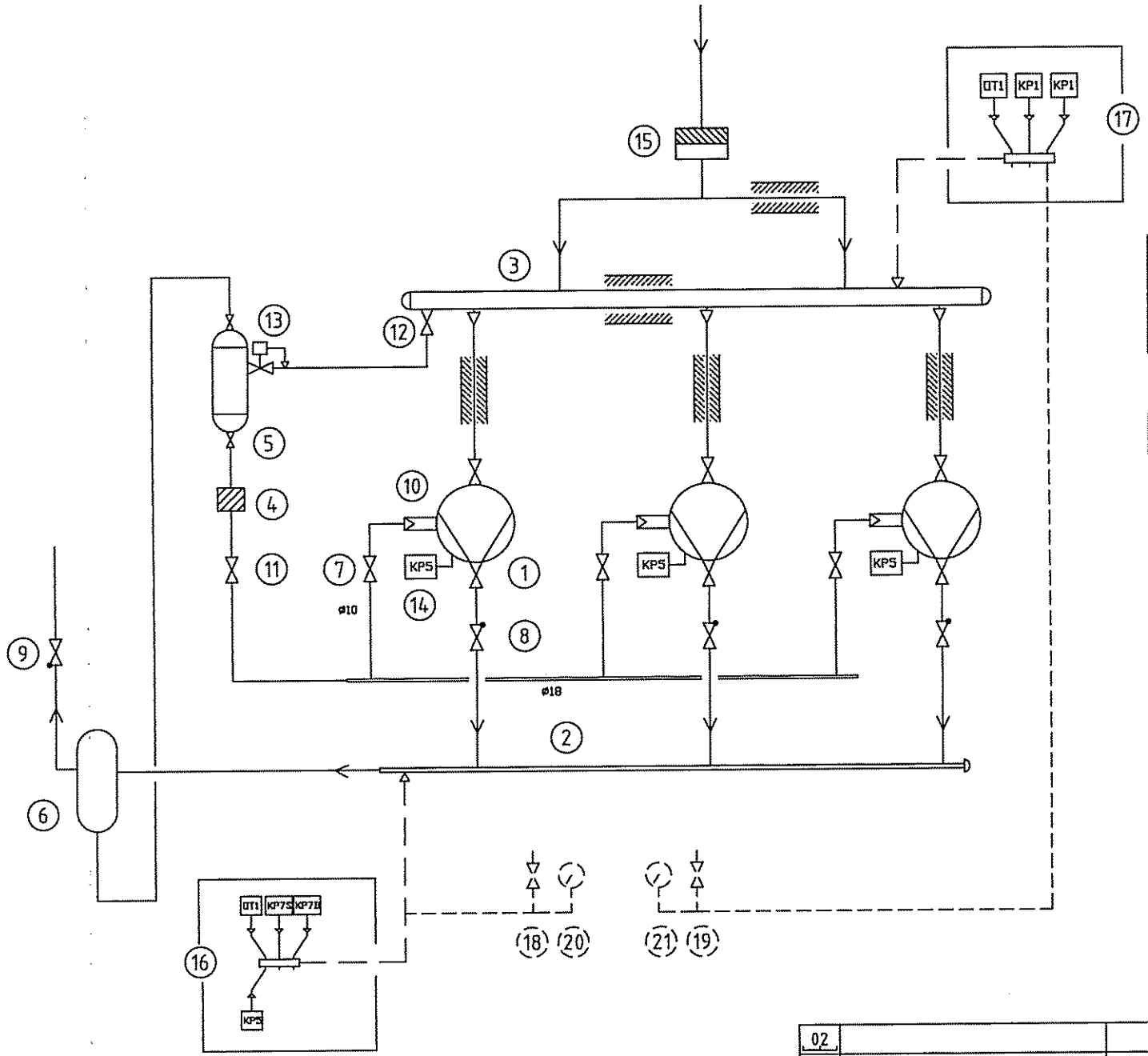
Pos.	Descrizione / Modifica	data/dis
02		
01		



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESS. E SONDA A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SUCIREZZA COMPRESS.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler
Data: 03.2007
DTF-RO: DZanin
Scala:
Tratt.am.:
Verifica:
Descrizione: CUBE COOLER 3GR. PCO2
Codice disegno: UVF301400

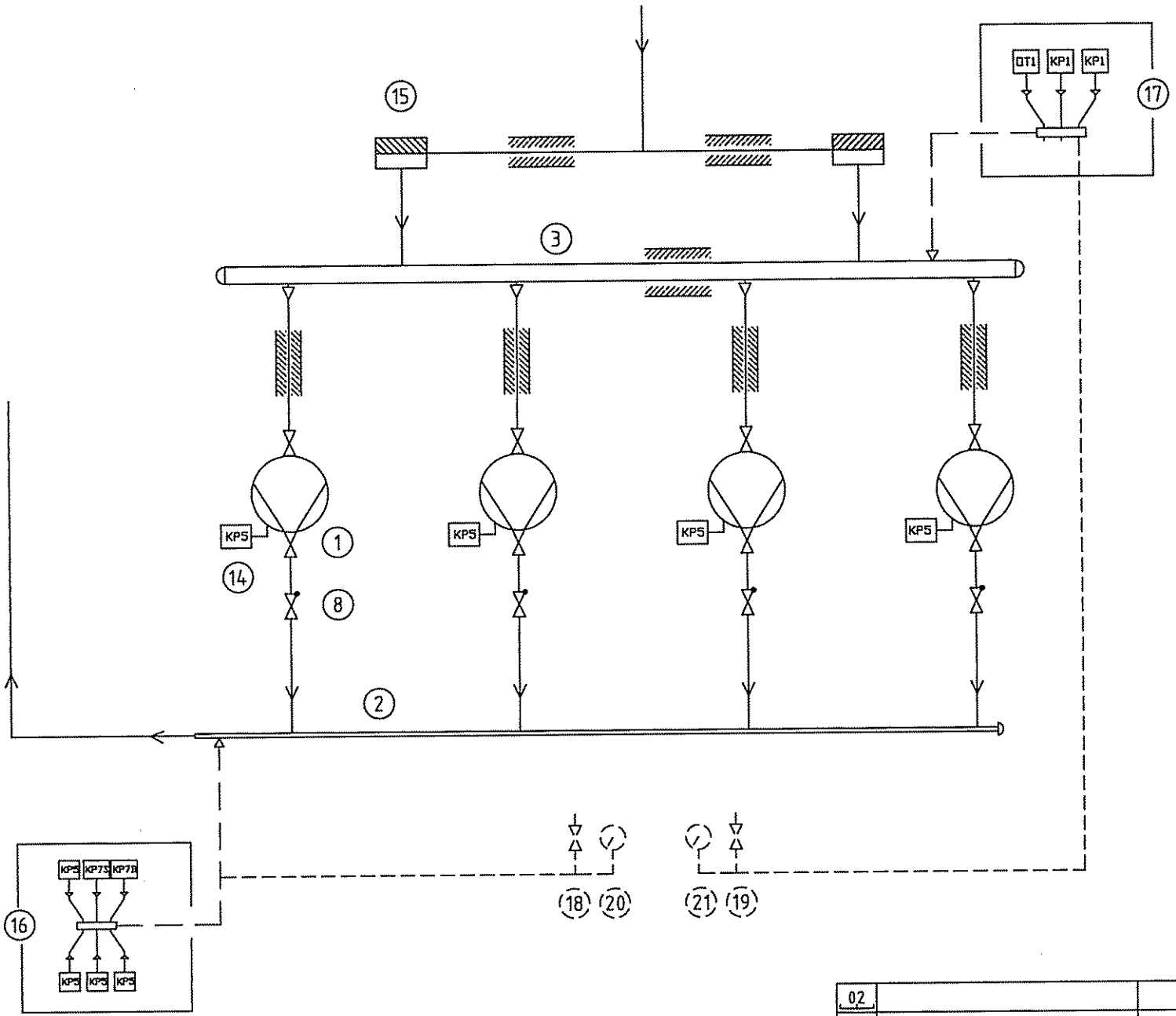


21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.

17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESS. E SONDA A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		3		PRESS. SICUREZZA COMPR.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		3		RUBINETTO A CAPPELLOTTO
10		3		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		3		VALV.RIT.NRVH...
7		3		RUBINETTO PER REGOLAT. OLIO
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		3		COMPRESSORE SEMIERMETICO
Pos.	Codice	Pz		Materiale / Componenti

		Famiglia	Cube Cooler
Data	03.2007	DTF-RD	DZanin
Scala		Descrizione	CUBE COOLER 3GR. PCO2
Trattam.			
Verifica		Codice disegno	UVF301500

Pos.	Descrizione / Modifica	data/dis.
02		
01		

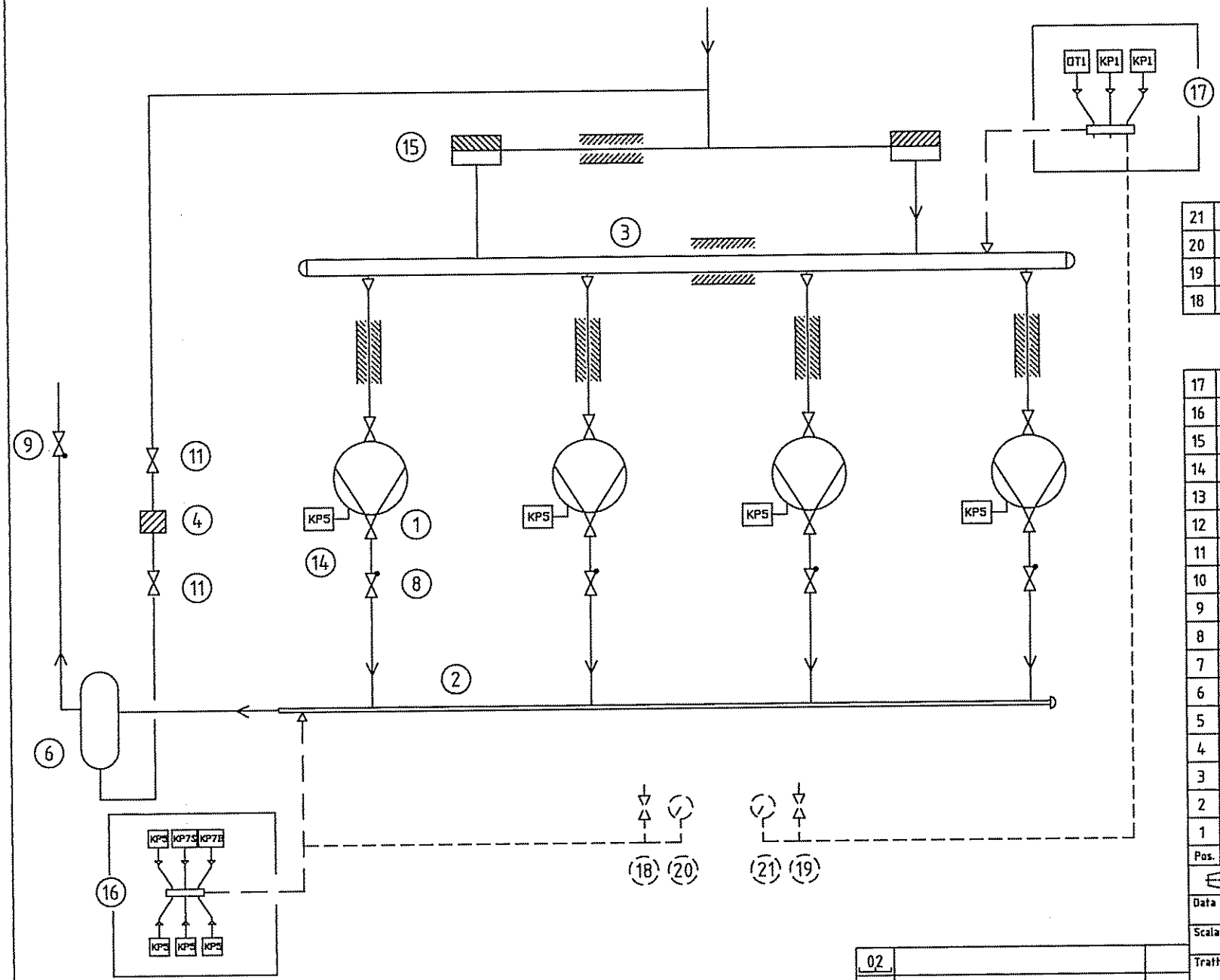


21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.

17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		2		FILTRO ASPIRAZIONE CASTEL
15		4		PRESS.SICUREZZA COMPRESS.
13				
12				
11				
10				
9				
8		4		VALV.RIT.NRVH...
7				
6				
5				
4				
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO
Pos.	Codice	Pz		Materiale / Componenti

		Famiglia	Cube Cooler
Data	03.2007	DTF-RD	DZanin
Scala		Descrizione	CUBE COOLER 4GR. EKC331/T
Trattam.			
Verifica		Codice disegno	UVF301600

Pos.	Descrizione / Modifica	data/dis
02		
01		



Pos.	Codice	Pz		Materiale / Componenti
21		1		MANOMETRO ESTERNO B.P.
20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		2		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS.SICUREZZA COMPR.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

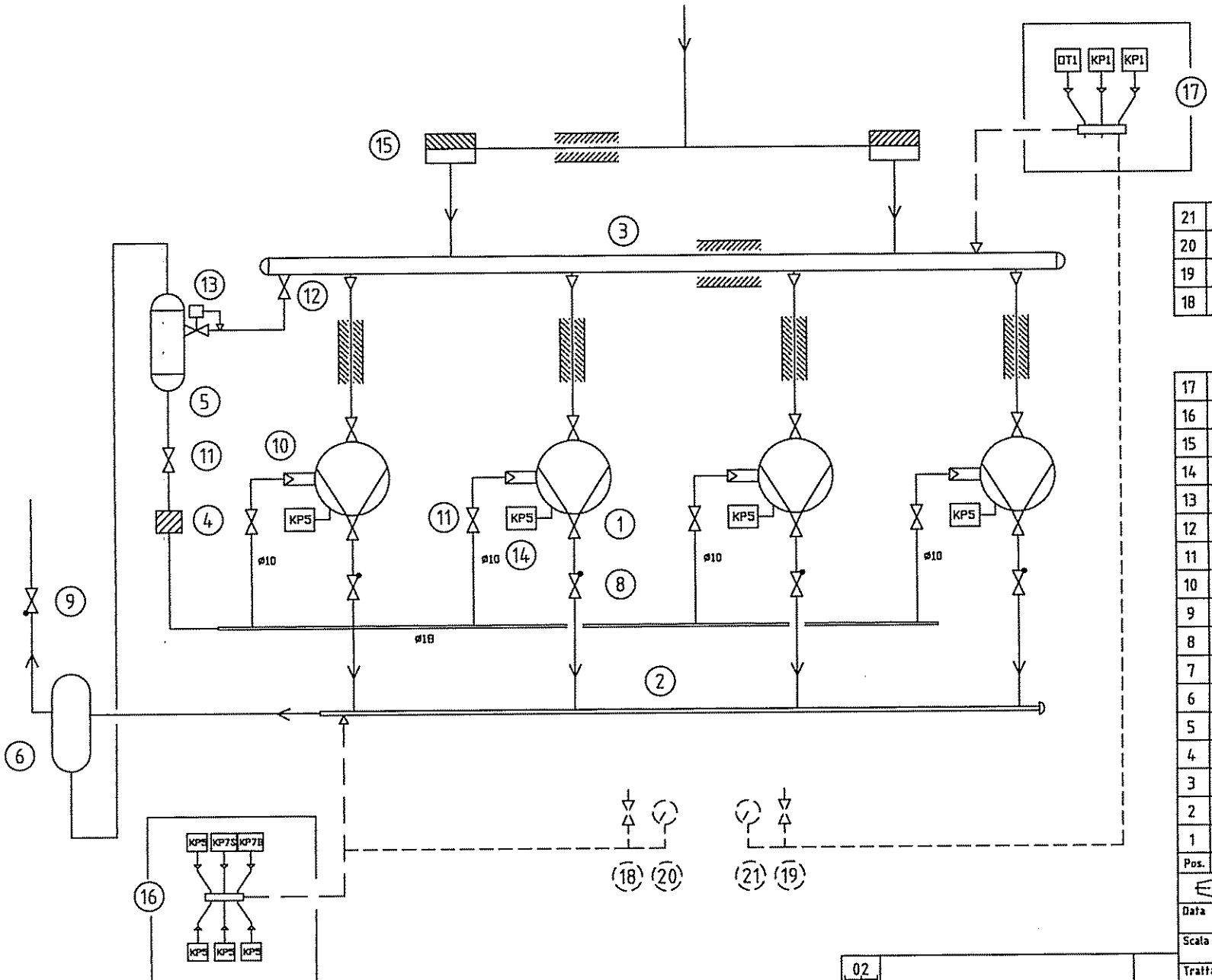
Scala:

Tratt.am.:

Verifica:

Descrizione: **CUBE COOLER 4GR. EKC331/T**

Codice disegno: **UVF301700**



Pos.	Codice	Pz		Materiale / Componenti
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18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS. SICUREZZA COMPRESS.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		4		RUBINETTO A CAPPELLOTTO
10		4		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

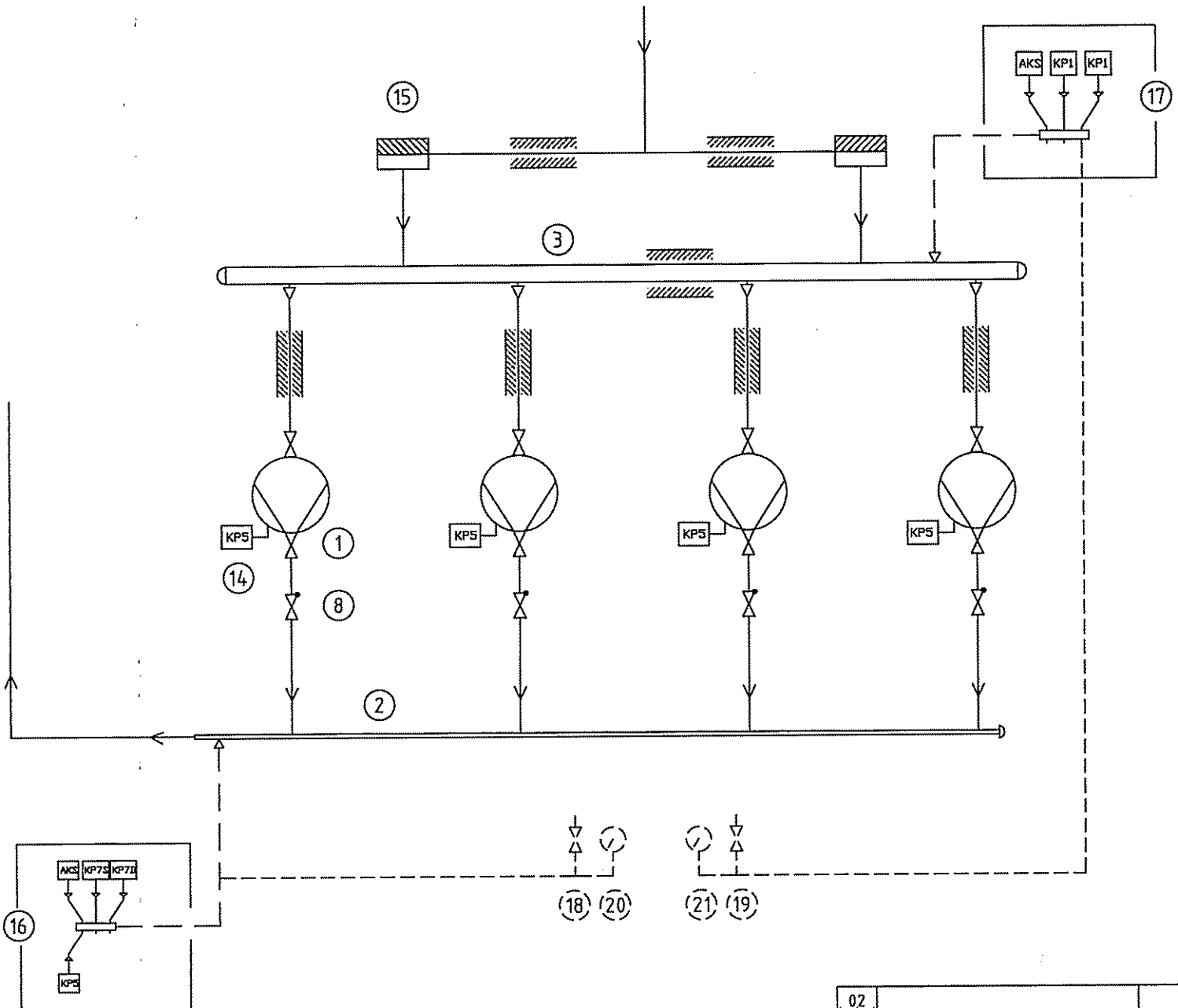
Scala:

Tratt.am.:

Verifica:

Descrizione: **CUBE COOLER 4GR. EKC331/T**

Codice disegno: **UVF301800**



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2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

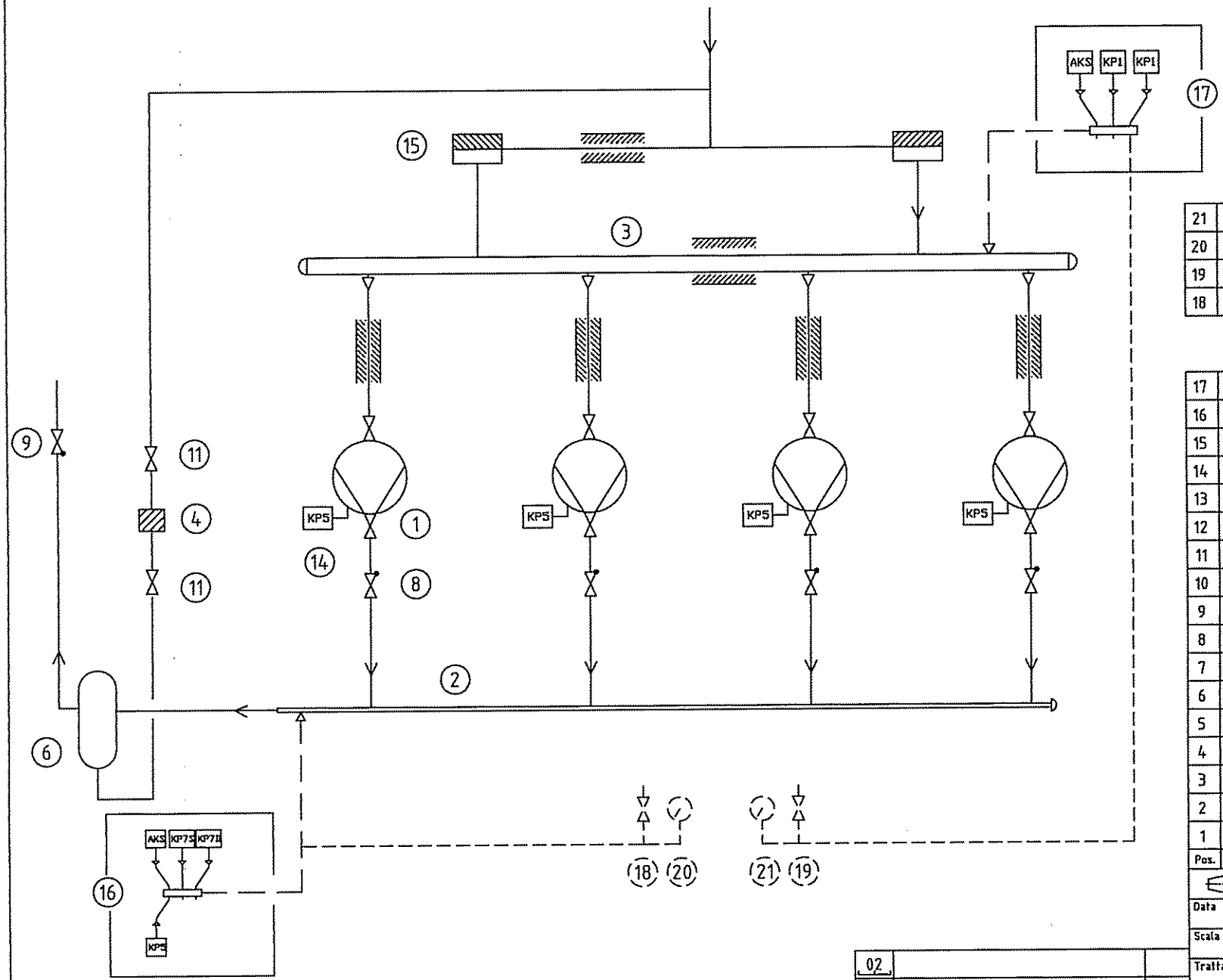
Scala:

Tratt.am.:

Verifica:

Descrizione: CUBE COOLER 4GR. EKC531 D1

Codice disegno: UVF301900



Pos.	Codice	Pz		Materiale / Componenti
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18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		2		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS.SICUREZZA COMPR.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

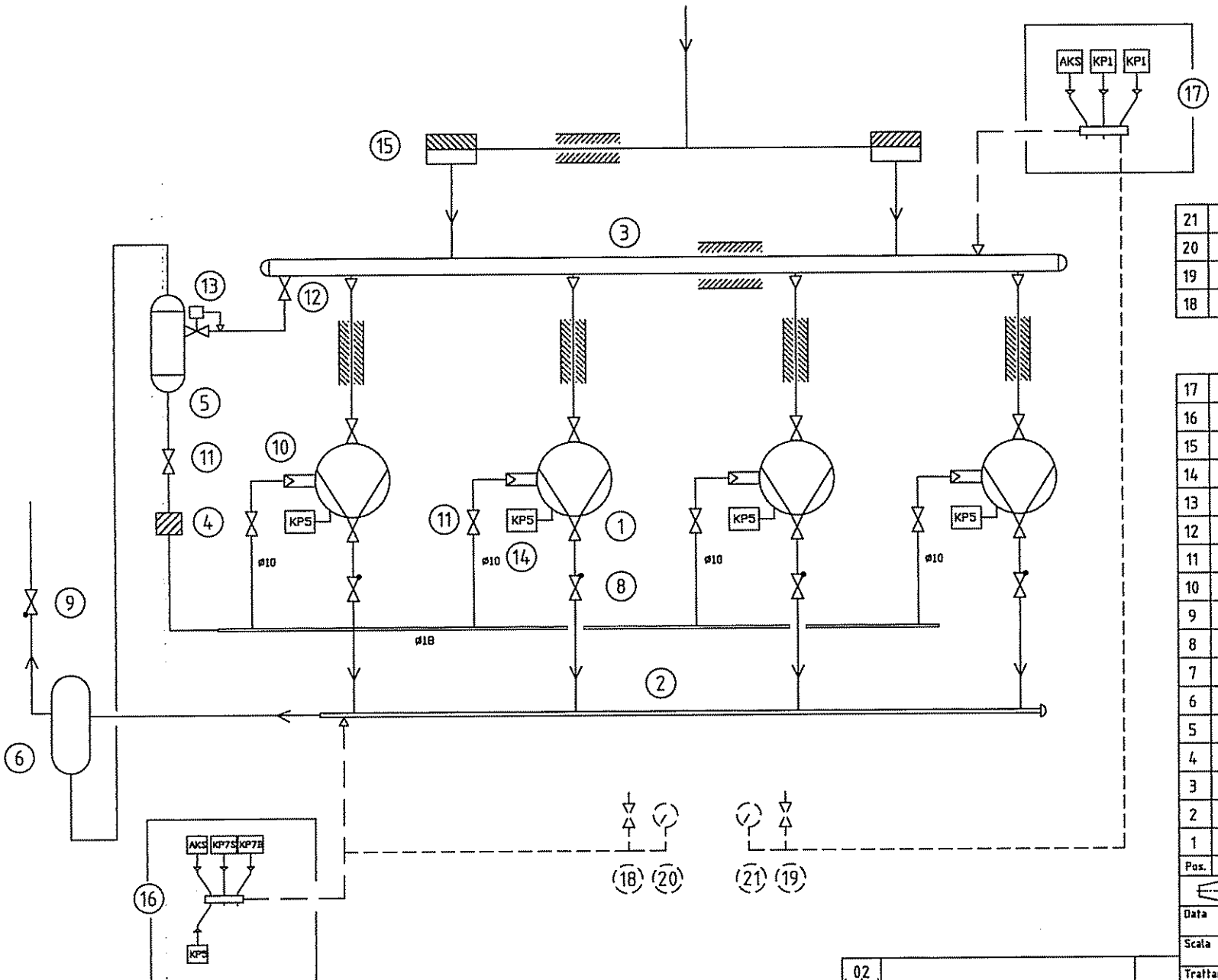
Scala:

Tratt.am.:

Verifica:

Descrizione: **CUBE COOLER 4GR. EKC531 D1**

Codice disegno: **UVF302000**



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18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS. SICUREZZA COMPRESS.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		4		RUBINETTO A CAPPELLOTTO
10		4		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

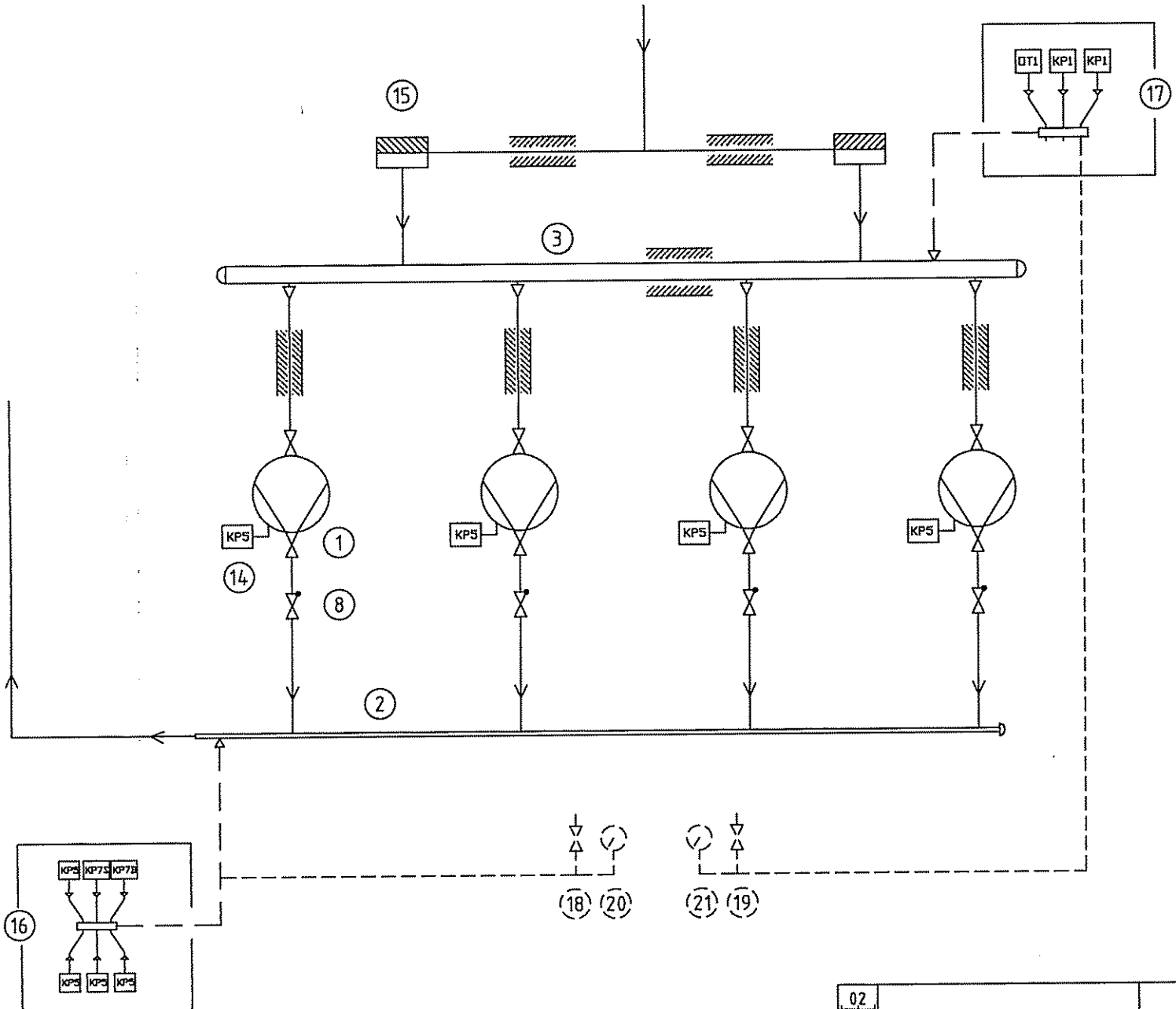
Scala:

Tratt.am.:

Verifica:

Descrizione: **CUBE COOLER 4GR. EKC531 D1**

Codice disegno: **UVF302100**



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20		1		MANOMETRO ESTERNO A.P.
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18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		2		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS.SICUREZZA COMPRESS.
13				
12				
11				
10				
9				
8		4		VALV.RIT.NRVH...
7				
6				
5				
4				
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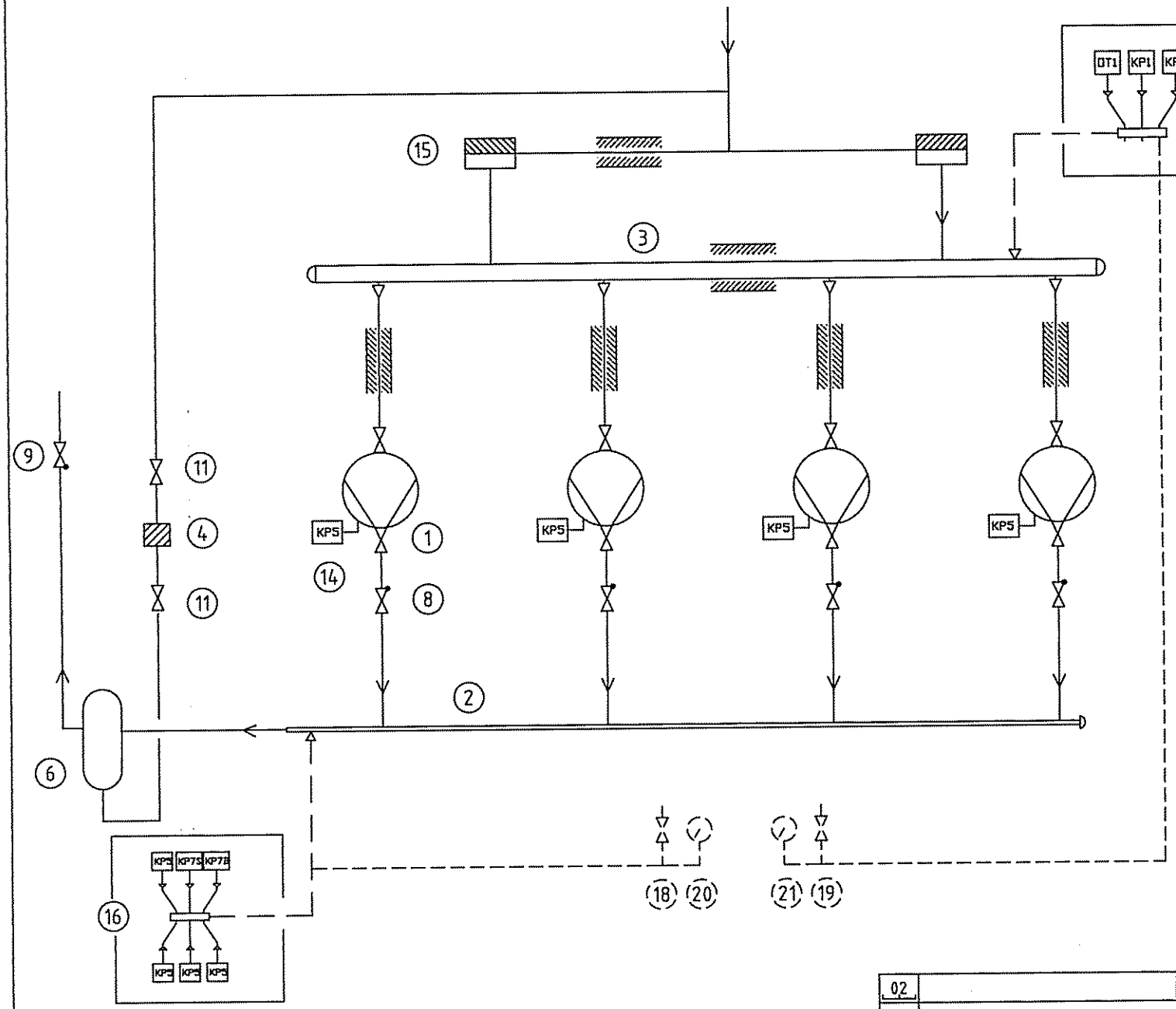
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Data 03.2007
Famiglia Cube Cooler
DTF-RD DZanin
Scala
Trattam.
Verifica
Descrizione
CUBE COOLER 4GR. IR32 Z3
Codice disegno UVF302200



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18		1		PRESA DI PRESSIONE EST. A.P.
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16		1		COMPL. PRESSOSTATI A.P.
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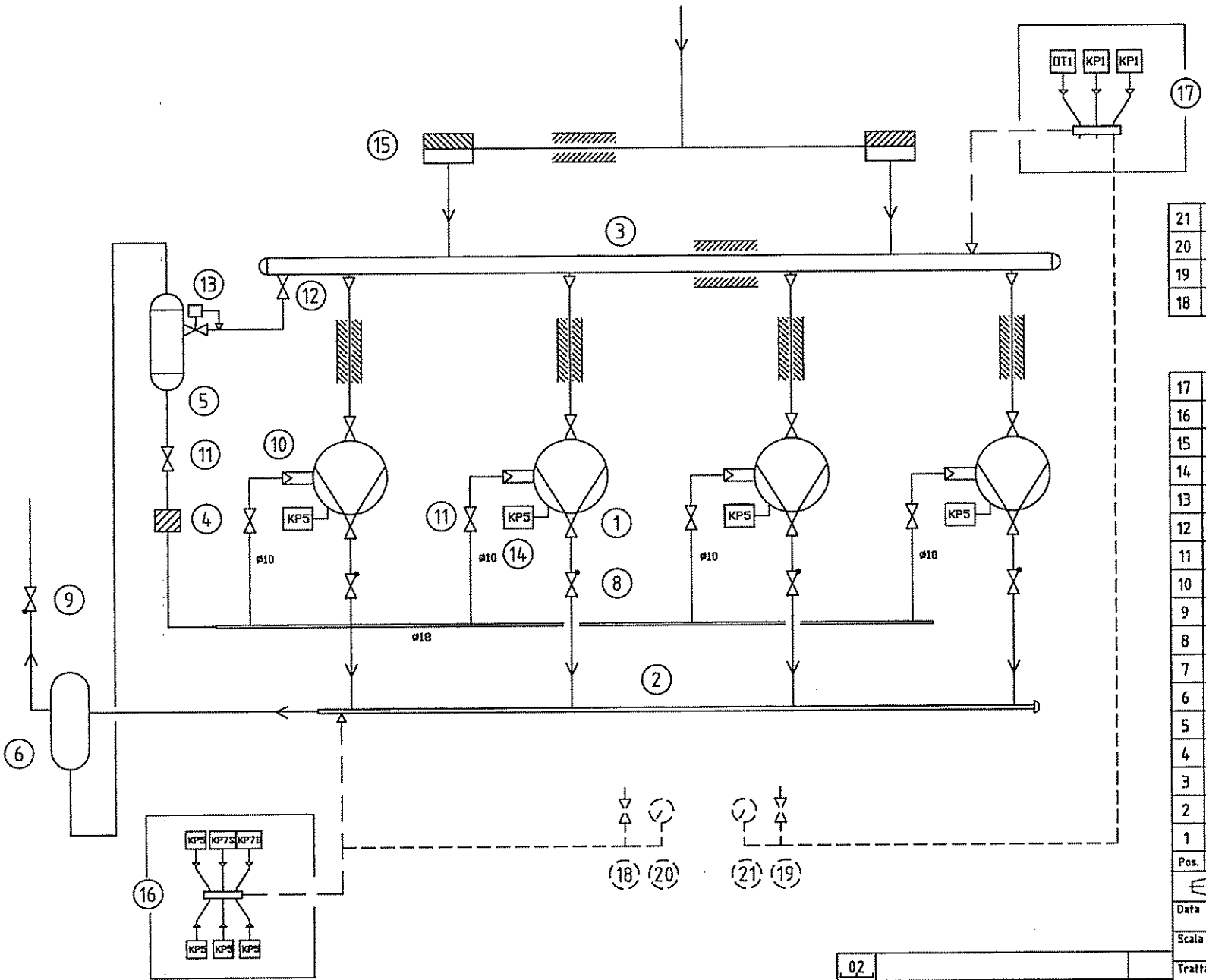
14		4		PRESS.SICUREZZA COMPR.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis.
02		
01		

Famiglia: Cube Cooler
Data: 03.2007
OTF-RD: DZanin
Scala:
Tratt.:
Verifica:
Descrizione: CUBE COOLER 4GR. IR32 Z3
Codice disegno: UVF302300



Pos.	Codice	Pz		Materiale / Componenti
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18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS. SICUREZZA COMPRESS.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		4		RUBINETTO A CAPPELLOTTO
10		4		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

OTF-RD: DZanin

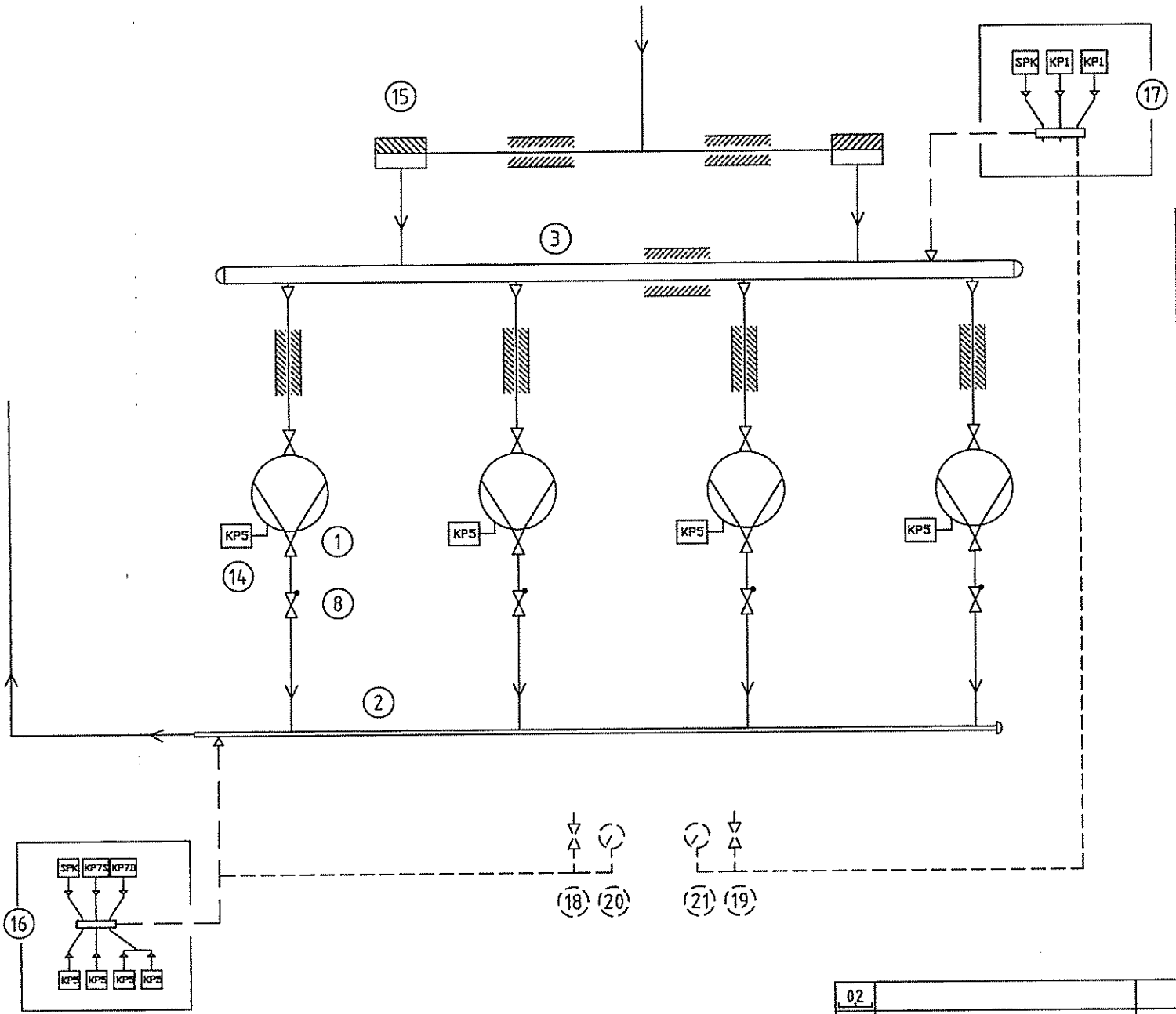
Scala:

Tratt.am.:

Verifica:

Descrizione: CUBE COOLER 4GR. IR32 Z3

Codice disegno: UVF302400



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8		4		VALV.RIT.NRVH...
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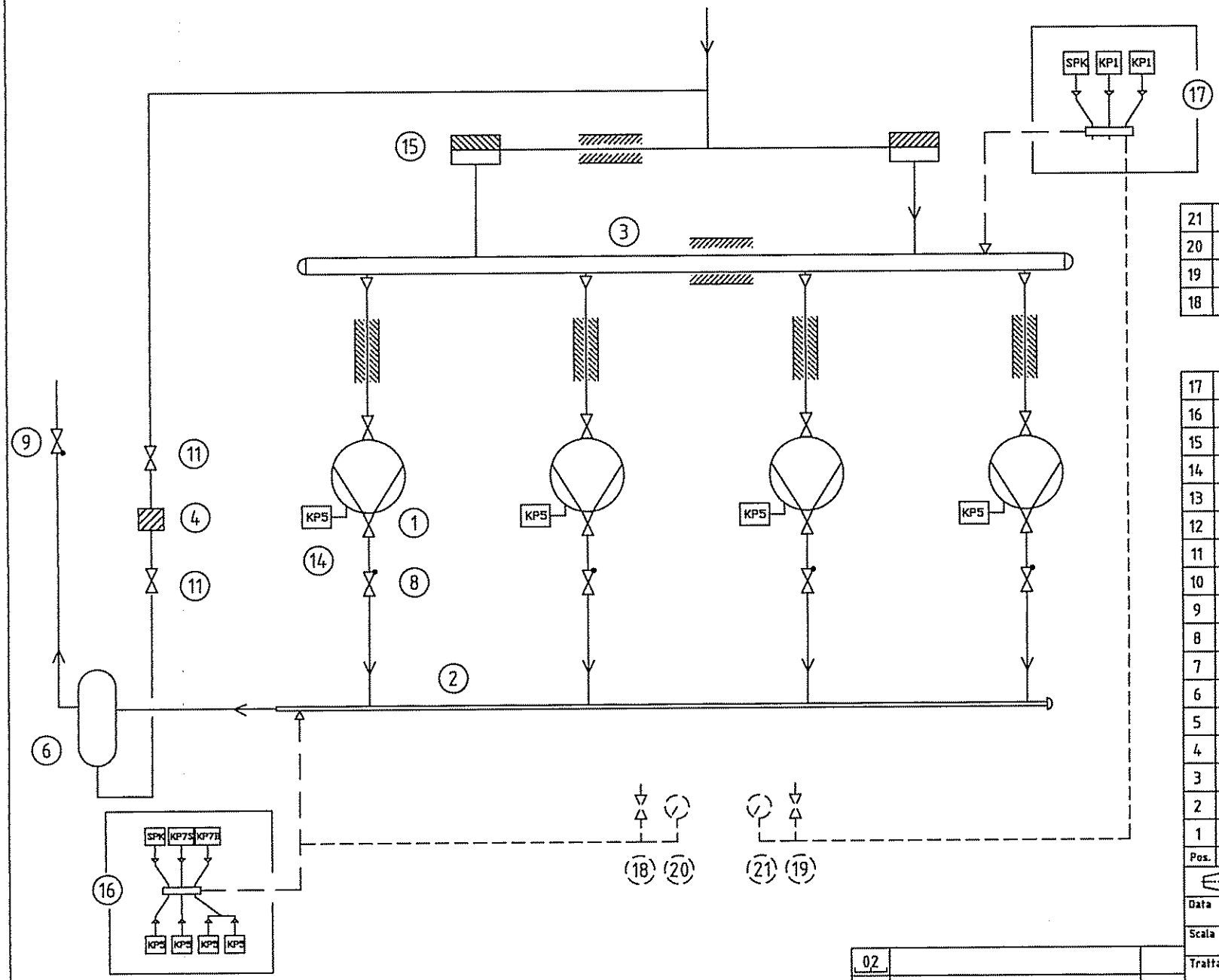
1		4		COMPRESSORE SEMIERMETICO
Pos.	Codice	Pz		Materiale / Componenti

		Famiglia	Cube Cooler
Data	03.2007	DTF-RD	DZanin
Scala		Descrizione	CUBE COOLER 4GR. mRACK
Trattam.			
Verifica		Codice disegno	UVF302500

Pos.	Descrizione / Modifica	data/dis
02		
01		



Pos.	Codice	Pz		Materiale / Componenti
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18		1		PRESA DI PRESSIONE EST. A.P.
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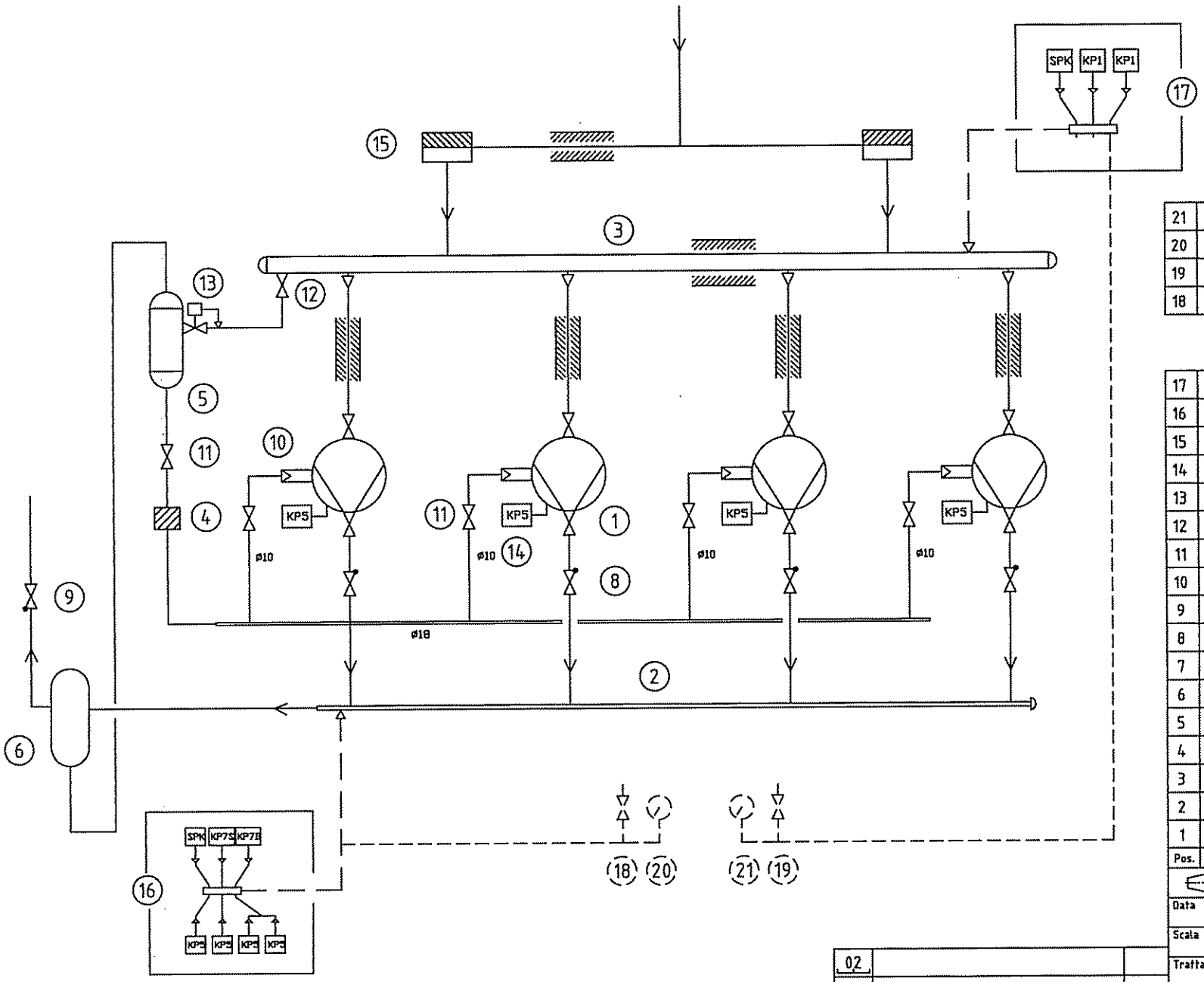
16		1		COMPL. PRESSOSTATI A.P.
15		2		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS.SICUREZZA COMPR.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler
Data: 03.2007
DTF-RD: DZanin
Scala:
Tratt.:
Verifica:
Descrizione: CUBE COOLER 4GR. mRACK
Codice disegno: UVF302600



Pos.	Codice	Pz		Materiale / Componenti
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15		1		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS. SICUREZZA COMPRESS.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		4		RUBINETTO A CAPPELLOTTO
10		4		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RD: DZanin

Scala:

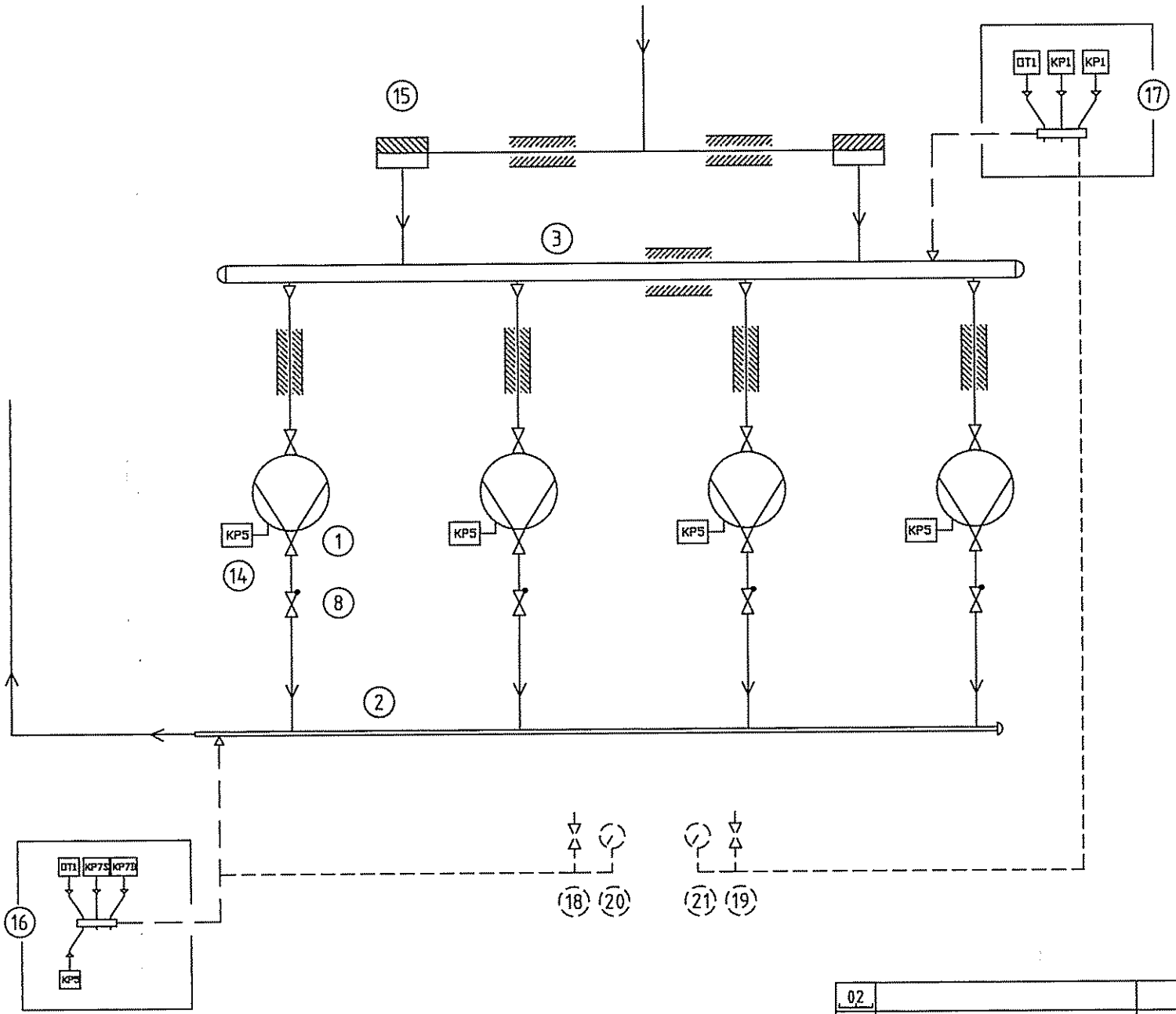
Tratt.am.:

Verifica:

Descrizione

CUBE COOLER 4GR. mRACK

Codice disegno: UVF302700



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17		1		COMPL. PRESS. E SONDA B.P.
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7				
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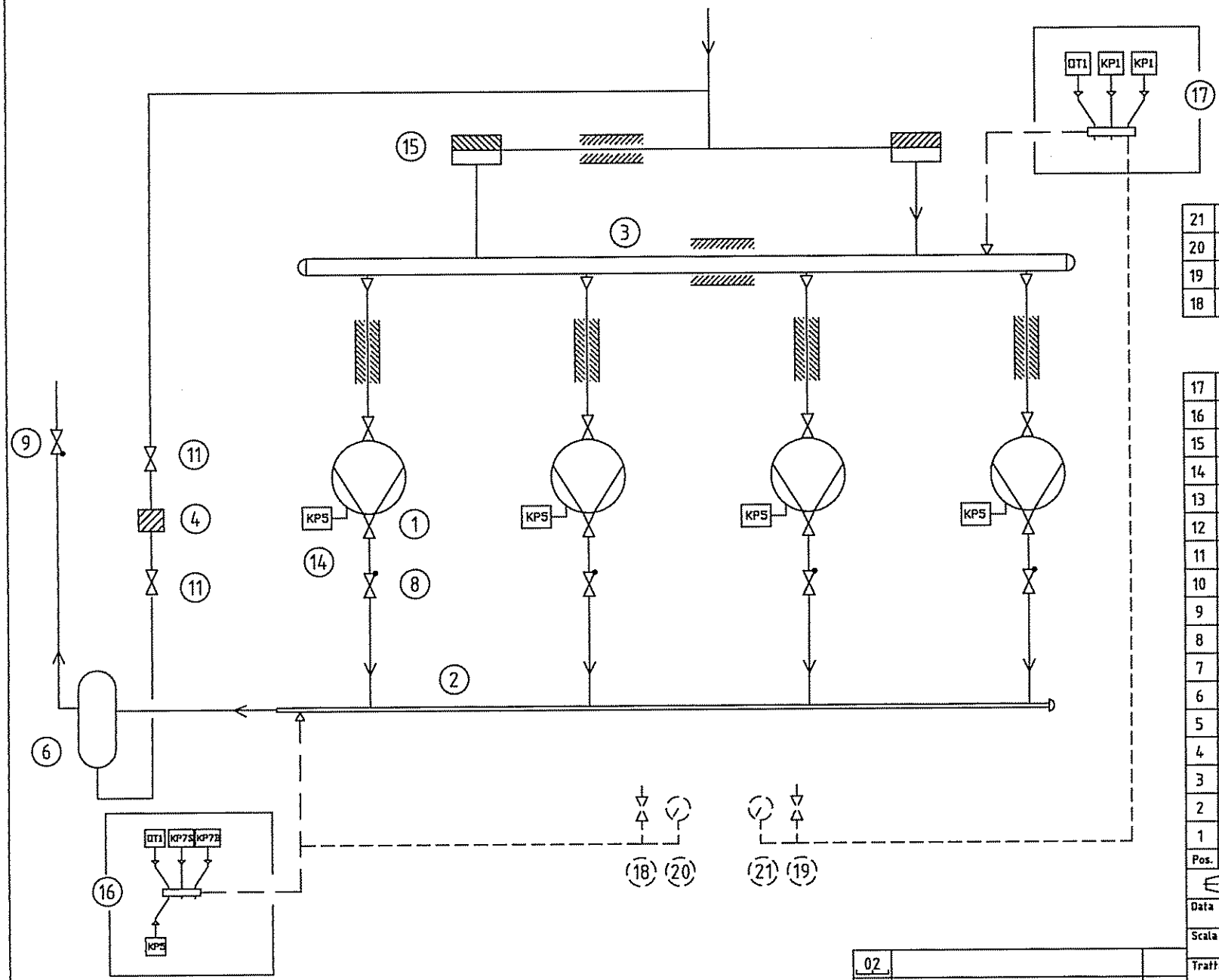
5				
4				
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO
Pos.	Codice	Pz		Materiale / Componenti

		Famiglia	Cube Cooler
Data	03.2007	DTF-RD	DZanin
Scala		Descrizione	CUBE COOLER 4GR. PCO2
Trattam.			
Verifica		Codice disegno	UVF302800

Pos.	Descrizione / Modifica	data/dis
02		
01		



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19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.

17		1		COMPL. PRESS. E SONDA B.P.
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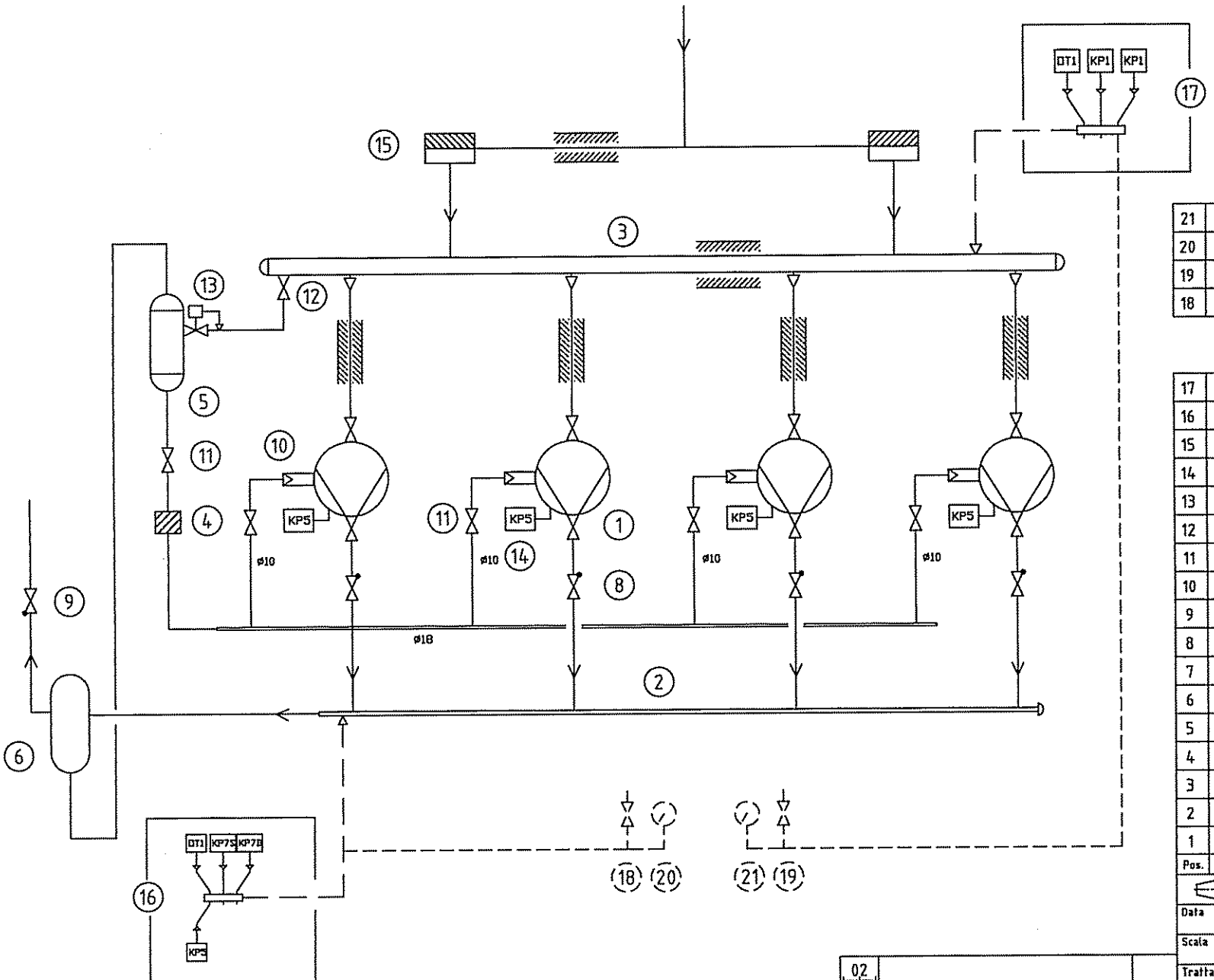
14		4		PRESS.SICUREZZA COMPR.
13				
12				
11		2		RUBINETTO A CAPPELLOTTO
10				
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6				
5				
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO
Pos.	Codice	Pz		Materiale / Componenti

		Famiglia	Cube Cooler
Data	03.2007	DTF-RO	DZanin
Scala		Descrizione	CUBE COOLER 4GR. PCO2
Trattam.			
Verifica		Codice disegno	UVF302900

Pos.	Descrizione / Modifica	data/dis
02		
01		



Pos.	Codice	Pz		Materiale / Componenti
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20		1		MANOMETRO ESTERNO A.P.
19		1		PRESA DI PRESSIONE EST. B.P.
18		1		PRESA DI PRESSIONE EST. A.P.
17		1		COMPL. PRESS. E SONDA B.P.
16		1		COMPL. PRESSOSTATI A.P.
15		1		FILTRO ASPIRAZIONE CASTEL
14		4		PRESS. SICUREZZA COMPRESS.
13		1		VALV.DI PRESSIONE HCYCT1
12		1		RUB.CASTEL 6110/44
11		4		RUBINETTO A CAPPELLOTTO
10		4		REGOL.LIVELLO OLIO
9		1		VALV.RIT.NRVH...
8		4		VALV.RIT.NRVH...
7				
6		1		SEPARATORE OLIO
5		1		RISERVA OLIO HCYR
4		1		FILTRO OLIO
3		1		COLLETTORE ASPIRAZIONE
2		1		COLLETTORE MANDATA
1		4		COMPRESSORE SEMIERMETICO

Pos.	Descrizione / Modifica	data/dis.
02		
01		

Famiglia: Cube Cooler

Data: 03.2007

DTF-RO: DZanin

Scala:

Trattam.:

Verifica:

Descrizione: **CUBE COOLER 4GR. PCO2**

Codice disegno: **UVF303000_**

030 - HANDLING AND POSITIONING

For correct machine handling and positioning, the following precautions will have to be taken, bearing in mind that all the operations indicated below must be carried out by authorized personnel only and in conformity with the applicable safety regulations in terms of both handling equipment and operating procedures.

Steps to be taken:

- Upon receiving the unit, make sure that this has not been damaged. If it has, contact your nearest Epta after-sales service center;
- When delivered, the standard unit is fastened to wood skids; check that these are firmly secured to the unit before starting to lift.
- Make sure the carrying capacity of the fork-lift truck is suitable for the weight of the unit in question
- Slide the forks of the truck into the space between the undercarriage and the wood pallet as in FIGG. 1 and 2; check that the unit is balanced before starting to lift and move. The maximum overall dimensions including the wood pallet are those shown on FIG.2

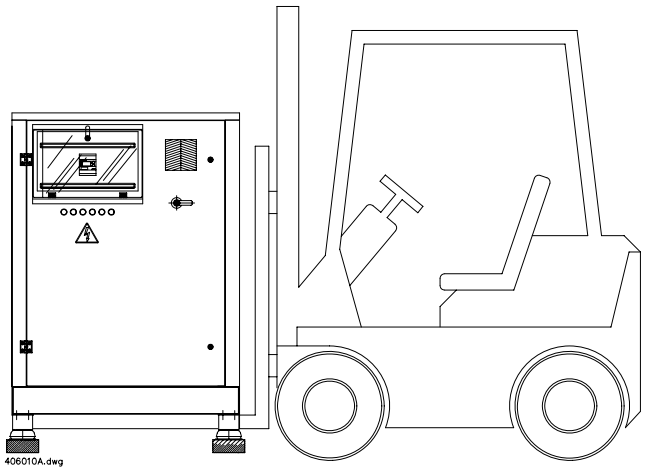


FIG.1

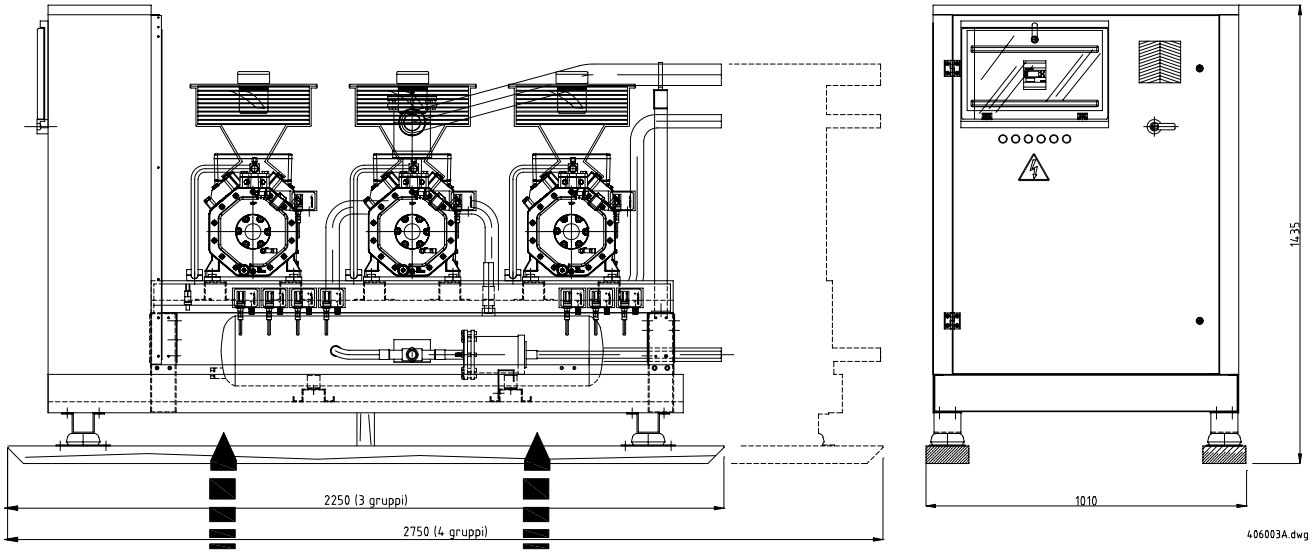


FIG.2

If handling is carried out using a crane, proceed as shown in FIG.3. Insert two round-section steel bars thorugh the the vibration-dampening supports; place appropriate lifting slings at the ends of the bars (ensure that the slings can handle the weight in question beforehand) and position spacers (e.g. wood shims) between the slings and the unit in order to stop the slings from chafing against the panels of the equipment.

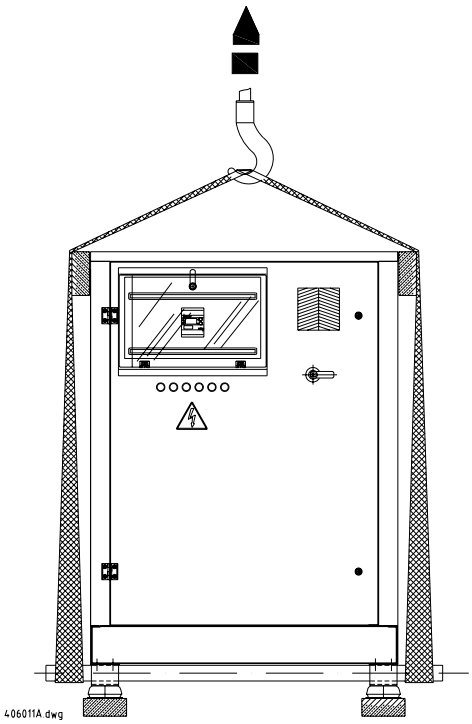


FIG.3

Keep off the area in which handling takes place during the lifting procedure.

Indoor/outdoor installation

If the equipment is not immediately installed in its service position but it is temporarily stored in the open, take the following precautions:
Store it in a dry, conveniently sheltered place.
Do not place any heavy objects on top of the unit.
The top sheet-metal panels function as a cover and are not designed to bear heavy loads.
Do not step on top of the unit. This is dangerous and may damage the panels, which could get deformed and lose their ability to close properly.

Weights – 3-compressor version

Model TN 3GR	EGL 2EC-2.2Y R404A	EGL 2DC-2.2Y R404A	EGL 4CC-3.2Y R404A	EGL 4FC-3.2Y R404A	EGL 4EC-4.2Y R404A	EGL 2DC-5.2Y R404A
Weight of unit (kg)[1]	691	692	699	735	742	756

Model TN 3GR	EGL 4CC-6.2Y R404A	EGL 4VCS-6.2Y R404A	EGL 4TCS-8.2Y R404A	EGL 4PCS-10.2Y R404A	EGL 4NCS-12.2Y R404A
Weight of unit (kg)	771	889	904	919	925

[1] The weights in the table refer to the version with panelling and complete oil circuit without housing.

Model BT 3GR	EGL 4EC-4.2Y R404A	EGL 4DC-5.2Y R404A	EGL 4CC-6.2Y R404A	EGL 4TCS-3.2Y R404A	EGL 4PCS-10.2Y R404A	EGL NCS-12.2Y R404A
Weight of unit (kg)	741	745	761	891	907	923

Weights – 4 compressor version

Model TN 4GR	EGL 4TCS-8.2Y R404A	EGL 4PCS-10.2Y R404A	EGL 4NCS-12.2Y R404A
Weight of unit (kg)	1189	1210	1218

Model BT 4GR	EGL 4PCS-10.2Y R404A	EGL 4NCS-12.2Y R404A
Weight of unit (kg)	1206	1214

Functional clearance

Correct unit operation and servicing can be ensured by proper placement.
Sufficient clearance must therefore be allowed for maintenance purposes, with a view to protecting authorized operators.
Make certain that the grids and slots providing ventilation to the plant room are unobstructed and that any mechanical air devices are in perfect working order.

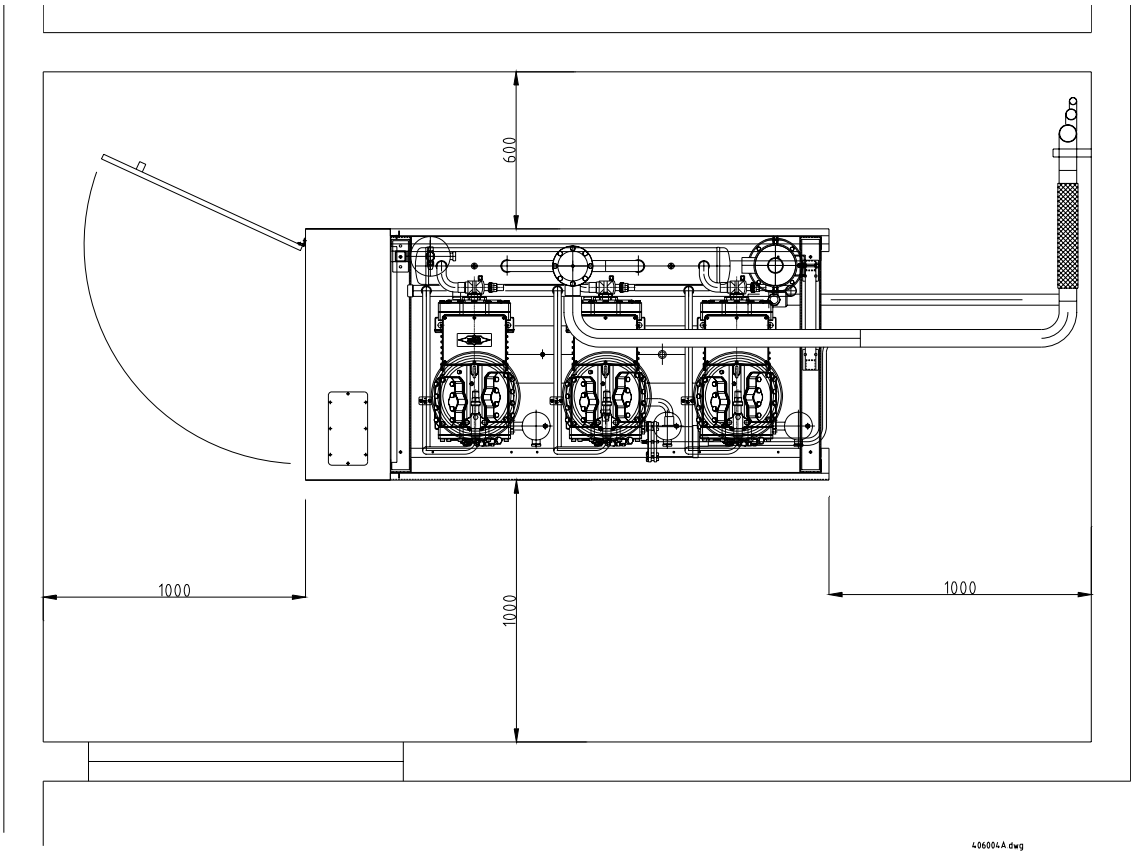


FIG. 4

040 - INSTALLATION

Take the protective cardboard packaging (if provided) off the equipment and position this wherever it is to be installed. Then remove both handling skids. Being potentially hazardous, packaging components (plastic bags, polystyrene, cardboard, nails, etc.) must never be left within the reach of children, and must be disposed of in accordance with applicable regulations.

For correct operation it is important to lay the machine horizontally.
Use shims to correct any unevenness existing on the laying surface. Take the housing panels (if any) off the equipment and then check that this is level by resting a spirit level on the support of the suction manifold .
Then secure the system to the base stiffly using screw anchors and the fastening holes on the machine's vibration dampening pads.

Put the housing panels back in place.

Installation in machine rooms

Special plant rooms must satisfy the requirements established by standards EN 378-3. The provisions concerning dimensions, construction, accessibility and ventilation must be especially complied with.
If the plant room enjoys natural ventilation, the total area of natural ventilation outlets must be at least (EN378-3:2002 5.5):

$$A = \quad 0{,}14 \times m^{1/2}$$

where:

A = is a free opening in square meters;
m = is the mass in kilos of the refrigerant fluid with the greatest charge, having one part whatsoever in the special plant room;
0,14= is the ratio between the area and the mass – in square meters – divided by the square root of the kilos

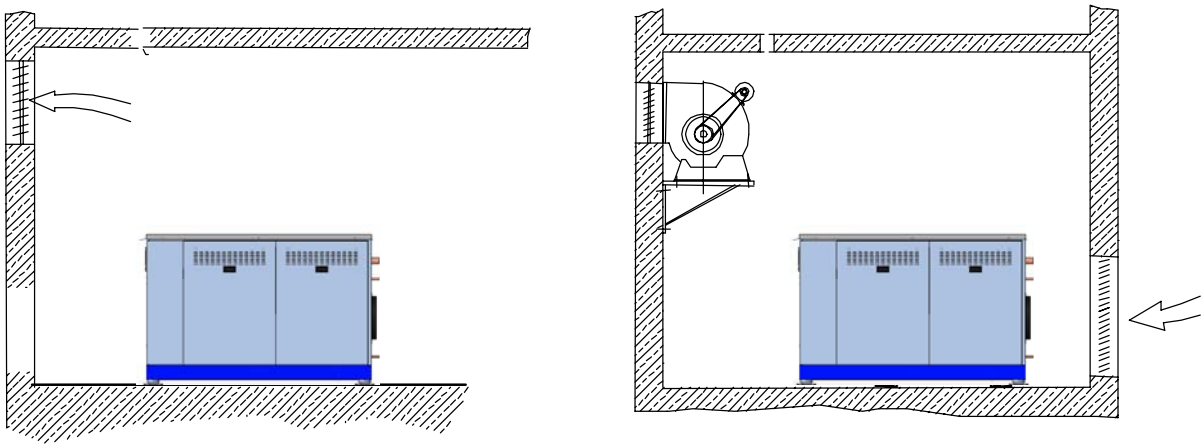
The free flow of air from windows, grids and outlets or pipes must not be impaired by walls or barriers, enclosing walls, buildings or other obstruction means. Mind the density of the refrigerating fluid.
Mechanical ventilation, if any, must be ensured by fans able to exchange the air in the plant room, and at least:

$$V = \quad 14 \times m^{2/3}$$

where:

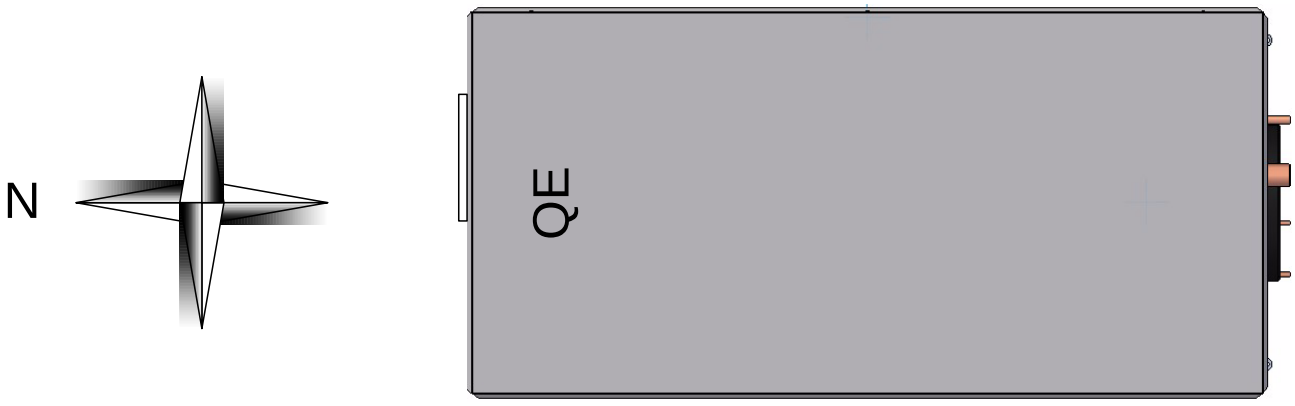
V = is the air flow rate in litres per second;
m = is the mass in kilos of the refrigerant fluid with the greatest charge, having one part whatsoever in the special plant room;
14 = is the conversion factor

The ventilation system must renew the air in the room 15 times per hour.
It must be possible to operate the fans from both inside and outside the plant room, and when the special plant room is installed in a basement, the outside plant room control switch must be on ground floor.



Outdoor installation

If installation is outdoors it will be necessary to carefully select the position of the equipment, in order to avoid noise pollution and fire hazards.
To minimize noise pollution, position the equipment as far from houses as possible and far from possible noise-reflecting sources.
To minimize fire hazards, do not position the equipment next to flammable material. A fire event would raise the pressure in the liquid receiver vessel and consequently cause a discharge of refrigerant in the atmosphere.
Positioning the equipment with the electrical panel facing north will make reading the controller display easier and will protect the polycarbonate casing.



Detectors and alarm

When plant rooms are near areas in which people are present on a regular basis, restricted areas of difficult evacuation, detectors and alarms must be installed as established by standards EN378-3 in order to speedily give warning of any hazardous concentration of cooling fluid vapor in the air. Such devices must operate an attended alarm and/or a noticeable alarm that may enable the consequent actions by the personnel.

Machine accessibility

To access the system's internal parts in versions with indoor and outdoor housing, it is necessary to remove the housing panels using the appropriate key.
To set or service the electronic door module (controller box), open the door using the appropriate key that only the authorized technical personnel has.

Power connections

The electrical board was designed to operate on 380V-400V/3Ph/50-60Hz and 220V-230V/3Ph/50-60Hz.
To select operating voltage it is necessary to relocate the jumpers on the auxiliary transformer as appropriate.
The electrical board must be supplied power using a cable with a cross-section suitable for the equipment's power rating and for the laying conditions existing in the place of installation.

The serial number plate on the machine shows, among other details, maximum electrical power. This value is also indicated in the performance table of the DESCRIPTION / TECHNICAL DETAILS section of this manual. It is the electrician's duty to size the wiring and earthing systems in accordance with applicable regulations 64-8 (Italian Law 46 - 5 March 1990).

For equipment installed indoor, power cables must enter the board from above, through a hole drilled on the appropriate plate, which is located above the master switch.
For equipment installed outdoors the power cables must enter from below, using the plate at the bottom of the electrical board (the plate is on the right and is accessed by opening the electrical board).

For the purposes of maintaining the electrical board's protection rating it is necessary to use the appropriate grommet.

COSTAN disclaims all liability for incorrectly set-up wiring systems or which are not in conformity with the applicable CEI standards.

All machine parts are connected to the earth system lead (yellow-green).

The fitter must connect the machine to the earthing system of the building.

Short-circuit hazard: when drilling the hole through which cables are going to run it is neccessary to exercise maximum caution and prevent metal chips from entering the electrical panel.

Machines not featuring electrical panels with RCBO (residual current circuit breaker with overcurrent protection), if a differential relay needs to be installed, this must be done ahead of the power line. The differential relay must be appropriate for electrical motors (breaking capacity for AC3 loads, device against untimely tripping etc.). Differential relay setting must never be below 3% of the compressor's rated current.

COSTAN disclaims all liability for untimely triggering due to incorrect differential relay setting or accidents caused by lack of coordination between the differential relay setting and the earthing system.

For a detailed description of the electrical components, reference is made to the "ELECTRICAL BOARD TECHNICAL SPECIFICATIONS" section.

Ensure that the cables not having spring-terminals (e.g. motor power cables connected to contactors) are tightly secured to the terminal-strip. During transportation and handling vibrations may have loosened them. Check electrical board wiring and make sure that the cable sheaths do not touch the refrigerant pipes or the compressor. Also ensure that no component undergoes wear due to friction.

Refrigerating connection

The equipment is supplied including;

- set of filtering elements (cartridges)
- pressurized dry-air in the refrigerating circuit.

The pipes for connection to the system are located at the rear of the equipment. The discharge pipe leading to the condenser is blocked; all other valves leading to the open are closed. Take off the copper disks, open the taps and scavenge the pressurized air before connecting the unit up to the system. Use a stiff annealed copper pipe suitable for refrigeration systems.
Certain basic rules have to be followed when making R404A systems. Brazing must be done in nitrogen gas atmosphere to prevent the formation of system-damaging residue. It is most important that the fitter keep to the following instructions:

- Use nitrogen gas suitable for refrigeration purposes, marked "R".
- Connect one end of the pipe to be brazed to the nitrogen tank using a pressure-reducing valve. To adjust the pressure correctly, remember that the flow of nitrogen must be only just perceived by the palm of the hand. Braze as usual.

Place BOA flexible vibration absorbers between the equipment and the system’s fixed pipes; install shutoff valves on the discharge and condenser return lines, on the liquid line and on the suction line, referring to the connection diagrams contained in the equipment’s technical literature and to the instructions in the Use and Maintenance Instructions for refrigerating systems QSM000446A_ (for systems serviced by Epta).
Fit one pressure intake connection (Schrader valve) on the suction stretch and one on the liquid line for scavenging (vacuum) operations and the leak test.
Introduce an initial amount of oil into the oil reserve through the filling connection 1/4”SAE located on the inlet valve (shut the valve beforehand) until the oil level reaches the upper viewer. The approximate amount to be let in ranges from 6 to 16 liters, depending on the reserve model installed (HCYR 80, HCYR 120 or HCYR 200). Then open the valve. The safety valves, when located outdoors, must be adequately protected to avoid their getting soiled and damaged by the elements;
The position of outdoor-leading exhaust pipes starting from the safety valves must ensure that no obstruction hazard exists and must avoid any personal or property damage during the exit of refrigerant
Complete suction line insulation.

Below are some regulations covering the installation of systems that use POE oils and R404A gas refrigerant. For more detailed information and in case of doubt, contact the Epta after-sales service.

	**The semi-hermetic compressors used on the R404A Eptagloo equipment use polyester oil as lubricant (POE). A drawback of this oil, which is compatible with chlorine-free refrigerants (HFC), is that it is very sensitive to environmental humidity (strong hygroscopicity), which means that certain rules**

	have to be observed as regards use, in order not to jeopardize its functional characteristics. **All oil containers must stay sealed until the oil has to be introduced into the compressor.** **Avoid leaving the inside of the compressors and parts of the refrigeration circuit in contact with the outside environment even during routine system maintenance.** **Never pour left-over lubricant into damp-permeable containers (e.g. plastic containers) but keep it in its original metal can.**

Visual inspection of the equipment

All permanent connections must be individually appraised by duly qualified and experienced personnel.

Pressure-tightness test

The dimensions of the safety valve were chosen in order to avoid excessive pressure rise in the vessels not protected by safety pressure switch due to a fire event, as per the instructions in European standards EN 13136.

This must be performed after visual inspection.

Before and during the test, every measure to prevent hazards to persons and property in case of explosion must be taken.

The pressure-tightness test is performed with equal pressure values on both sides of the system:

- High pressure side: test pressure = 16 bar *(PSa=28 bar)*
- low pressure side: test pressure = 16 bar *(PSb=17 bar)*

In order to achieve test pressure it is necessary to:

- shut off all those components that may be damaged (low pressure-switches, low-pressure transducers, low-pressure meters);
- open all taps and automatic valves and keep them open;

The minimum overpressure time for the system undergoing the pressure-resistance test is 6 hours (system leakage check).
The pressure-tightness test may be performed, if this is considered useful, also for system sections shut off by taps (partial tests). The pressure test is finished when both sides of the system have been put to overpressure and no works are needed on permanent joints.
The outcome of the test must be recorded by the person in charge of the jobs.

Preparation of filters and vacuum test

When the machine is delivered, filter internal parts are not mounted. These are supplied in air-tight containers, in numbers appropriate for initial startup and first replacement.
At first place the supplied dryer cartridges Castel 4490/A on both filters (liquid and suction). **Dryer cartridges 4490/A must be placed in the filter using the appropriate holding device (mesh inner**

tube, cap and spring); cartridges 4495/C (on the suction line) only use a top cap, a bottom cap and a spring according to the instructions on the filter's packaging.
Close the circuit, connect up the vacuum pump and scavenge the system and/or affected stretches. In case of systems containing charges above 20 kg of halides or hydrocarbons, the system must be dried and scavenged to a vacuum below 270 Pa absolute (same value for both sides, high and low pressure). Vacuum must be kept for at least 30 minutes and then dry nitrogen must be introduced. Then scavenge again to vacuum below 270 Pa absolute. Keep the system in this condition for at least 6h. Then ensure that the pressure was actually kept and introduce the system refrigerating fluid. The vacuum test may be performed, if this is considered necessary or useful, also for system sections shut off by taps (partial tests).
The charge will only be filled up when the appliances fed have reached their operating temperature.

Checking pressure switches, filling and starting up the system

The system's safety pressure switches KP7S and KP7B have a sticker on the outside, that indicates tripping pressure and serial number. Pressure switches KP7S are marked red and factory-set for a pressure of 28bar whereas pressure switches KP7B are marked blue and factory-calibrated for a pressure of 27bar. After being calibrated, the adjustment screw is sealed with lead to prevent tampering. Both pressure switches are manual-*reset* type. to *reset* pressure switch KP7B just remove the upper lid and push the green lever inwards; to reset pressure switch KP7S it is necessary to open the pressure switch (the reset button is up in the right corner).

!	**Check that the lead seals are intact; do not tamper with the adjustment screw of safety pressure switches.**

!	**Prior to resetting safety switches manually (KP7S or KP7B), identify and remove the causes that have led to system failure.**

The high pressure switches protecting the compressors are set to trip value at 26.5bar. Set the system/compressor safety low pressure switch. Set the high pressure switches for fan capacity operation and the electromechanical security (duty cycle) low pressure switch.
Perform an initial charge of refrigerant in liquid condition on the line downstream from the receiver (liquid line) using tanks with liquid-gas tap or overturning the container if this is equipped with a standard valve. These steps are necessary to prevent any change in the relative concentration of refrigerant components.
Before starting up the machine it is necessary to power the crankcase outer heater (oil heater) for at least 6-8 hours. Ensure that the discharge and suction taps are open. Then start one compressor at a time (for multi compressor packs), supervising the relevant equipment (pressure-meter) and operating pressure on both the discharge side (compression) and on the return side (suction).

!	**Jobs requiring the electrical board to be live and open may be carried out only by qualified and expert personnel. When the electrical board is open and energized, this is visually signaled by an alarm/danger red intermittent light. The person in charge of these jobs must absolutely not leave the machine when the safety devices provided by the manufacturer are disabled.**

Check rotation of the remote condenser fans (the fans must expel air from the condenser battery). Then, if necessary, correct high pressure switch settings.
Top up with refrigerant through the suction line following the instructions above and modulating the amount of refrigerant.
Check the oil level in the oil reserve and in each compressor (while the compressor is off). The oil level in the float regulator must reach 3/8 of the viewer, whereas in the oil reserve it must be at the upper viewer after the system has run for a couple of days. If this is not the case, top up the initial charge until the prescribed levels are reached, strictly following the above instructions. **Do not add oil unless the oil level has dropped below the lower viewer's mid-line.** After a certain operation time-span (about 12 hours), or when a remarkable increase in leaks through the suction filters is detected, stop the plant. Shut both filters off and replace the filtering cartridges: place a mechanical filtering cartridge (Castel 4495/C) in the suction filter and a dryer cartridge (Castel 4490/C) in the liquid line filter using the supplies. Evacuate the affected pipe stretches and then restart the system. Check the oil level in the compressors and in the oil reserve again. **The oil level in the reserve must never reach below the lower viewer.**
NOTE: If the oil reserve should be replaced in a system that has already worked, add oil very carefully. Top up again only after the system has worked for a whole day (which is enough for oil to get back to the oil reserve). If the oil level does not reach the upper viewer, add the necessary amount. Conversely, if the oil level should exceed the upper viewer, it is absolutely indispensable to empty the excess, which may be done through the bottom valve[1].

Overcurrent circuit breakers

I.D.	SETTING
QM1	Compressor rated current (In)
QM2	Compressor rated current (In)
QM3	Compressor rated current (In)
QM4	Compressor rated current (In)

[1] As stated in Carly literature 13.3 (6/95)

Pressure switch for compressor mechanical backup operation

Low pressure side		TN		BT	
I.D.	FUNCTION	R404A bar[1] (°C)[2]	R22 bar (°C)	R404A bar (°C)	R22 bar (°C)
PSB[3] UTQ39040 - SHEET 4	COMPRESSOR SHUTDOWN	2,6 (-15)	1,9 (-15)	0,5 (-37)	0,2 (-37)
	DIFFERENTIAL	1,0	1,0	0,7	0,7

Pressure switches for fan control (for versions featuring the following controllers: Danfoss EKC331T / Carel IR32Z3 / Carel Micro Rack)

High pressure side		TN		BT	
I.D.	FUNCTION	R404A bar (°C)	R22 bar (°C)	R404A bar (°C)	R22 Bar (°C)
PV1 (VC1)[4] UTQ39080 - SHEET 8	START OF FAN #1	13,9 (+32,0)	11,5 (+32,0)	13,9 (+32,0)	11,5 (+32,0)
	DIFFERENTIAL	3,0	3,0	3,0	3,0
PV2 (VC2) {UTQ39080 - SHEET 8	START OF FAN #2	15,0 (+35,0)	12,5 (+35,0)	15,0 (+35,0)	12,5 (+35,0)
	DIFFERENTIAL	3,0	3,0	3,0	3,0
PV3 (VC3) UTQ39080 SHEET 8	START OF FAN #3	16,3 (+38,0)	13,6 (+38,0)	16,3 (+38,0)	13,6 (+38,0)
	DIFFERENTIAL	3,0	3,0	3,0	3,0
PV4 (VC4) UTQ39080 - SHEET 8	START OF FAN #4	17.0 (+40,0)	14,3 (+40,0)	17,0 (+40,0)	14,3 (+40,0)
	DIFFERENTIAL	3,0	3,0	3,0	3,0

[1] Bar relative.
[2] The saturation temperature corresponding to calibration pressure is shown in brackets.
[3] Low pressure switch, automatic-reset, adjustable-calibration type, for mechanical back-up operation in the event of controller failure (compressor cycling).
[4] High pressure switch KP5, automatic-reset, adjustable-calibration type, for mechanical back-up operation (condenser fan cycling).

SAFETY PRESSURE SWITCHES

Low pressure side		TN		BT	
I.D.	FUNCTION	R404A bar (°C)	R22 bar (°C)	R404A Bar (°C)	R22 Bar (°C)
PLP[1] UTQ39030 - SHEET 3	SYSTEM PROTECTION	1,5 (-25)	1,0 (-25)	0 (-46)	-0,2 (-46)
	DIFFERENTIAL	1,0	1,0	0,7	0,7

High pressure side		TN		BT	
I.D.	FUNCTION	R404A bar (°C)	R22 bar (°C)	R404A Bar (°C)	R22 Bar (°C)
PHP-1[7] UTQ39030-SHEET 3	SYSTEM PROTECTION	27 (+59)	27 (+66,7)	27 (+59)	27 (+66,7)
	DIFFERENTIAL	fixed 4,0	fixed 4,0	fixed 4,0	fixed 4,0
PHP-2 UTQ39030-SHEET 3	SYSTEM PROTECTION	28 (+60,6)	28 (+68,4)	28 (+60,6)	28 (+68,4)
	DIFFERENTIAL	fixed 4,0	fixed 4,0	fixed 4,0	fixed 4,0
PHP-C UTQ39070 - SHEET 3	COMPRESSOR PROTECTION	26,5 (+58,1)	26,5 (+65,9,1)	26,5 (+58,1)	26,5 (+65,9,1)
	DIFFERENTIAL	6,0	6,0	6,0	6,0

DELAY DEVICES

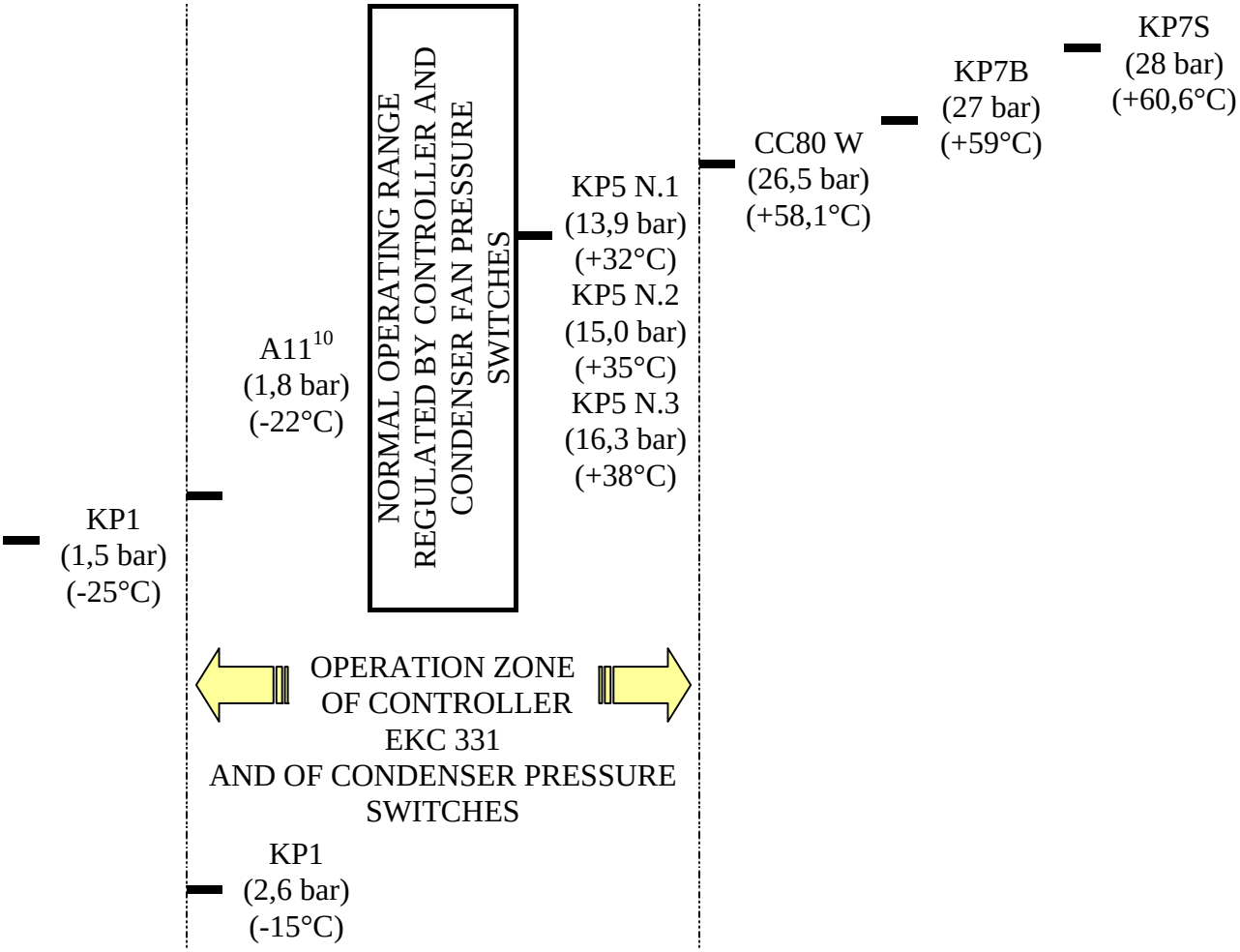
DESCRIPTION	I.D.	TIME (MIN)
LIQUID LEVEL (if any)	RLL	30
ACTUATION OF EMERGENCY BACK-UP REGULATION	R0	40-50
BACK-UP CUT-IN FOR COMPRESSOR #1	R1	1
BACK-UP CUT-IN FOR COMPRESSOR #2	R2	2
BACK-UP CUT-IN FOR COMPRESSOR #3	R3	3

[1] System-protection low-pressure switch KP1, automatic-reset, adjustable-calibration type.
[8] System-protection high pressure switch KP7S, manual-reset type (factory-calibrated at Costan's).

ON-SITE TESTING AND INSPECTION ADVICE.

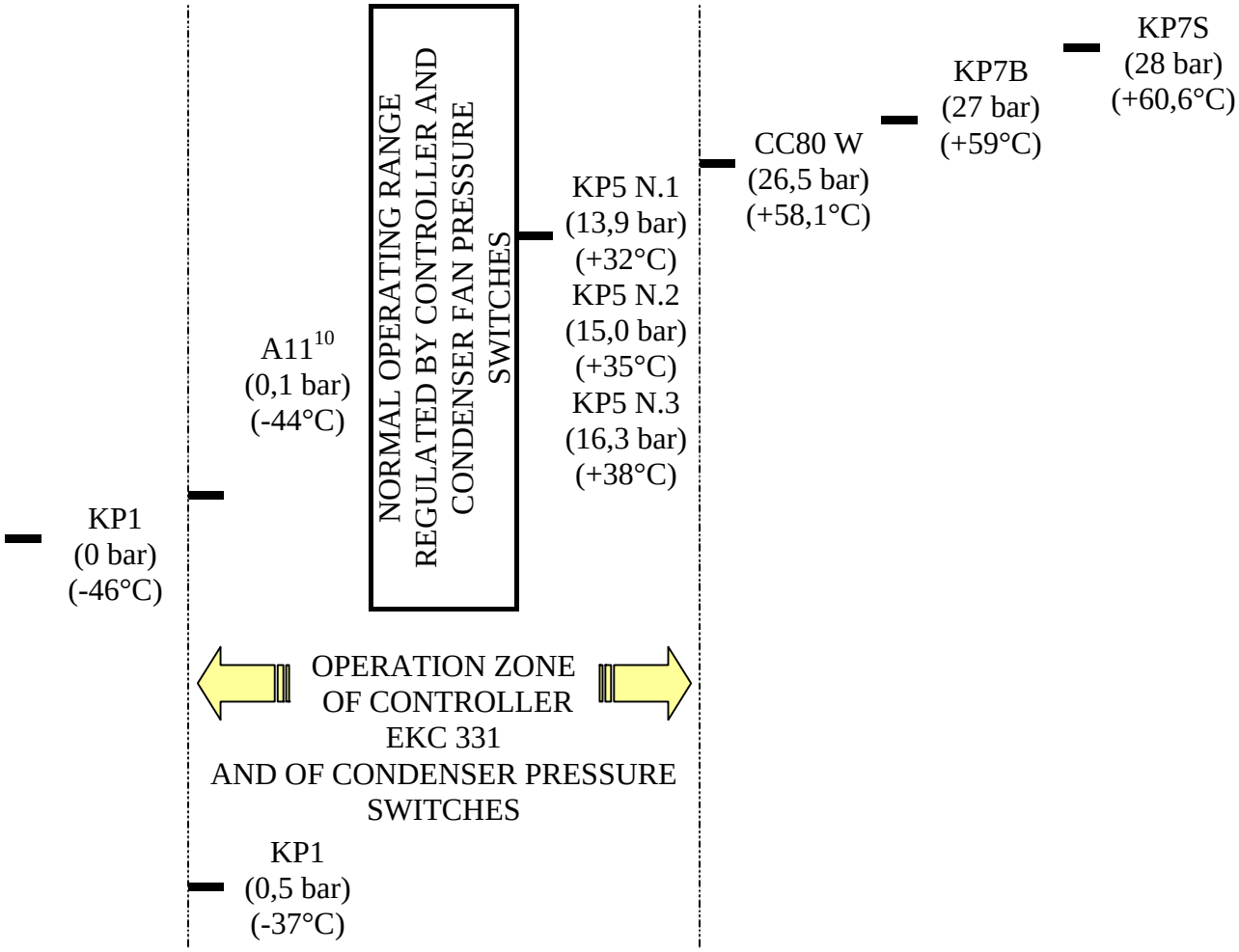
1. All the settings in these tables must be verified.2. All pressure switches and delay devices must be tested and test-operated.3. Pressure switches are factory-calibrated by Quality Control Dept. following procedure OP00144Q. They must be attached an I.D. label including calibration values and date, as well as the ID of the person who performed the calibration. Their lead seal must be intact. When commissioned as per operational instruction QOP019110A, correct tripping of safety pressure-switches was simulated and verified

Actuation diagram for safety electronic and electromechanical devices – TN application using R404A.



[10] Controller parameter to be configured as explained in the setting procedure TP00155Q or in the "REGULATION" section of the Use and Maintenance manual.

Diagram sketching the behavior of safety electronic and electromechanical devices – BT application using R404A.



050 - ELECTRICAL BOARD TECHNICAL SPECIFICATIONS

1.Overview.

1.1 On-board electrical panel for the control of **3/4** compressors and **3/4** condenser fans.

2.Reference standards

2.1 **EN 60204-1** in force (Electrical equipment of machines)

2.2 **EN 60439-1** in force (Low-voltage switchgear)

3.Power supply and operating voltage

3.1 **380V-400V/3Ph/50-60Hz**

3.2 **220V-230V/3Ph/50-60Hz**

3.3 As for auxiliary voltage adjustment, cfr. chap.6.

3.4 Observe the wiring inlet position

For equipment to be installed indoors, cables must enter the board from above, through a hole drilled on the appropriate plate, which is located above the master switch. For equipment to be installed outdoors, it is advisable to have cables enter from below, through a hole drilled on the appropriate plate, and then lead them to the master switch along the proper raceway.

For the purposes of maintaining the electrical board's protection rating it is necessary to use the appropriate grommet.

Short-circuit hazard: when drilling the hole through which cables are going to run it is necessary to exercise maximum caution and prevent metal chips from entering the electrical panel.

3.5 Power wires must be directly connected to terminals L1-L2-L3 of the master switch, observing the cyclic direction of phases.

3.6 **The earthing wire must be connected to the earthing terminal marked PE.**
This must be connected before the phases.

4. Master circuit breaker and power distribution: Diagram # UTQ39010/sheet 1.

4.1 General circuit breaker with fuses: ABB series OS from 32A up to 250A including terminal-covering caps.

4.2 Yellow-red handle that can be padlocked (emergency) assembled onto the door.

When servicing the equipment the circuit breaker must be OFF

5.Distribution.

5.1 Bus bar feeder system SIEMENS SIRIUS 3R, distance between bars 60mm.

5.2 Overcurrent switches on compressors and fans are connected to the contactors by way of accessories that afford safe current transmission.

5.3. The overcurrent switch/contactor set is fastened to a suitable plate that can be fitted onto the bars by spring terminals, thus ensuring secure electrical transmission.

6.Auxiliary circuit

6.1.1 Power supply and operating voltage **230V/50-60Hz. / Diagram #UTQ39020/sheet 2.**

6.1.2 230V auxiliary voltage from transformer LEGRAND 230V-400V/230V.
C34C-3compressors : mod. **044266** (400VA) / C34C-4 compressors :mod. **044267** (630VA).

The electrical panel was mounted on the machine following the power voltage requested at the time of ordering. Before powering up the machine, verify that the auxiliary transformer's primary voltage setting suits the equipment's voltage (400V or 230V) and ensure that the transformer's secondary output is **230V** . Transformer output voltage can be adjusted by +/-15V: for effective 230V output, adjusting the transformer's primary is capital.
Adjustment is dependent on the voltage supplied by the Electricity Company.

The transformer is delivered ready for operation on 400V/50-60Hz.

6.3 **Red** colour wires.
6.4 Cable numbering as per diagram.
6.5 Line start fuses for auxiliary circuits with fuses 5x20 (250Vac).
6.6 Timers: FINDER 0.11
6.7 Auxiliary relays: FINDER 55.34
6.8 Warning lights: SIEMENS SB3 diameter 22.
6.9 of Auxiliary circuit distribution 230V through shielded LEGRAND bars art. 004880 / 004881.

6.10 **Safety by PED- compliant general low low-pressure and high pressure switches in diagram 004880 / 004881/sheet 3.**

6.10.1 System shutdown in case of low pressure emergency by pressure-switch KLP (Danfoss KP1).
6.10.2 System shutdown in case of high pressure emergency by pressure-switches KHP1 (Danfoss KP7B) and KHP2 (Danfoss KP7S).
These pressure-switches are pre-set at the factory and need to be re-engaged manually after they have tripped and after the cause of the fault has been removed.

6.11 **Emergency back-up regulation: Diagram UTQ039040/sheet 4**
Mechanical back-up operation in case of failure of the high and low -pressure electronic control.

6.11.1 **Low-pressure mechanical back-up**.

Performed by pressure switch PSB (Danfoss KP1) and delay devices R0-1-2-3.
Operation: when the electronic controller fails, all compressors stay off.
If the off time is higher that the setting assigned to timer R0 (40-50 min.) safety pressure switch PSB comes on and delay device R1 starts to count. This starts compressor n°.1 and actuates delay devices R2/3 which relate to the compressors to be started next. Compressors under backup operation are controlled through pressure switch PSB and delay devices. PSB must be set to an average operating value, thereby avoiding any possible interference with the KLP security low pressure switch (Danfoss KP1).
The compressors to come on when in back-up operation are all but one. This means that one compressor is excluded from back-up operation.

6.11.2 **High-pressure mechanical back-up** (only featured with high-pressure electronic controller)

This is provided only when high pressure is controlled by the electronic regulator. It is performed by safety pressure switch PSA (Danfoss KP2).
Operation: upon reaching its actuation threshold, pressure switch PSA turns all condenser fans on. its setting must be above the electronic processor's threshold, but below the high pressure value of security pressure switches KHP1/2, as per PED Directive (Danfoss KP7B/S). PSA differential must be assigned a setting that may allow condenser cooling.

Back-up regulation, low-pressure especially, is an emergency condition that does not optimise compressor and pressure management. Therefore regulation by the electronic control must be restored as soon as possible.

6.12 Alarms: **Diagram UTQ039050/sheet 5.**
6.12.1 Red alarm warning lamps on the front of the electrical board.
6.12.2 Remote transmission by clean contacts on the terminal board: Alarm contacts are closed when in operation and open when in alarm status.

6.12.3 **Only clean contacts and voltage below 50V can be led to the alarm terminal and respective contacts.**

For details on alarm signals, cfr. chapter 15 - Warning lamps .

6.13 **Liquid level and general liquid injection: Diagram UTQ039060/sheet 6.**
7.13.1 The refrigerant liquid level undergoes monitoring; alarm signaling is delayed by a timer.
7.13.2 Liquid injection on low temperature equipment. Control of general liquid-injecting valve through auxiliary contacts in parallel with all the compressors.

7. Compressor circuit: Diagram UTQ39070/sheet 7.

7.1 Compact system SIEMENS SIRIUS S0/2

7.1.1 Overcurrent cutout (Overload cutout) and circuit breaker that can be padlocked when jobs are carried out on the compressor (Siemens series S0/2)

7.1.2 Electrical board versions with residual current device **Merlin Gerin RH99M+tore 30** operate the overload cutout by way of a coil that ensures AC23 maneuvers and cuts off the electrical circuit.

7.1.3 Contactors: Siemens series S0/2, coordinated with their respective overcurrent device following the tables supplied by SIEMENS

7.1.4 compressors are protected by overcurrent cutout switches performing the following functions:

- protection against shortcircuit
- protection against overcurrent
- protection against phase failure
- protection against phase imbalance: this trips when current input differs by 30%-50% between phases.

7.1.5 Poor oil level switch protection circuit. by pressure-switch or oil electronic detector.

7.1.6 Overheating-protection circuit monitored by thermistor probes connected to probe monitor KRIWAN INT69VS / SE-BE according to DIN 44081 standards.

7.1.7 Maneuvers and life of contactors

Motor contactors have been designed for a million maneuvers on average (1 maneuver = 1on+1off) with the maximum rated current in category AC3. Considering that the limit of an average compressor is 10-12 starts per hour, the useful life of a contactor will be **10** years if their starts occur under the severest conditions (continuous breakaway - maximum compressor load - rated current). Considering that in systems including several compressors, these are made turn over by the electronic controller, that under normal operation conditions electric motors are used by 50-40% of their rated nominal current and considering also that systems have neutral zone periods (in which systems are stable and compressors are not required to go on or off), contactor life must necessarily be longer than the length they were designed for.
(Details on contactor life taken from catalogue SIEMENS SIRIUS 3R).
It is worth underlining and bearing in mind that in our case, the life of a <u>contactor is not determined by the number of manoeuvres it performs</u> (which, considering the rated current in category AC3 may total 250 manoeuvres/hour) but by the compressor: for small/medium compressors max. 10-15 maneuvers/hour; large compressors: max. 6-7 maneuvers/hour. Exceeding the compressor manoeuvres/hour physical limit may damage the equipment itself and even cause short circuit in the electric motor.

Short circuit is prevented by the overcurrent device protecting the compressor.

<u>After a short-circuit has occurred, both the overcurrent cutout and the contactor will have to be replaced.</u>

(cfr. chapter 23 “important notice”).

8. Condenser fan circuit Diagram UTQ039080/sheet 8.

8.1 Compact system SIEMENS SIRIUS S0.

8.1.1 For electrical boards with overcurrent protection: fan protection by fuse-fitted circuit breakers 10,3X38 and the relevant aM fuses.

8.1.2 For optional electrical boards with RCBO (residual current+overcurrent protection): overcurrent cutout Siemens Sirius series S0 with release coil actuated by residual current device **Merlin Gerin RH99M+tore 30**.

8.1.3 Contactor SIEMENS S00/0.

8.2 Wire the fan power circuit strictly following the phase sequence L1-L2-L3.

9. Control circuit to operate the machine-cooling fans and the machine-room air expeller: Diagram UTQ039090/sheet 9.

9.1 Fuses for machine-cooling fans (if any)

9.2 Fuses for the power board: machine-room air-expellers.

10.Control electronics diagram #UTQ039E_0/sheet 10/E.

10.1 Controllers

10.1.1 box under Costan code **UQ39E001E** wired to **DANFOSS EKC331/T**

Low-pressure electronic regulation by the dead zone principle. High pressure regulation by pressure-switches.

10.1.2 box under Costan code **UQ39E002E** wired to **CAREL IR32Z3**
Low-pressure regulation by electronic pressure-switch and the stepper principle. High pressure regulation by pressure-switches.

10.1.3 box under Costan code **UQ39E003E** wired to **DANFOSS EKC531D1**
Low and high pressure electronic regulation by the dead zone principle.

10.1.2 box under Costan code **UQ39E004E** wired to **CAREL PCO-2 BILT-IN MEDIUM PC02CF051K**
Low and high pressure electronic regulation by the dead zone principle.

10.1.5 box under Costan code **UQ39E005E** wired to **CAREL uRack (micro Rack)**
Low-pressure electronic regulation by the dead zone principle.

10.2 Controller wiring

10.2 Controllers are wired in an appropriate box that can be removed by unscrewing the bolts that fasten it and disconnecting the clamp plugs.

As for controller features, cfr. the Regulation chapter.

11. <u>OPTIONAL</u> residual current circuit protection against indirect contact:
Diagrams UTQ039110/sheet 11 - UTQ039112/sheet 12 - UTQ039113/sheet 13.

11.1 Diagram UTQ039110/sheet 11 n.2 residual current devices for overall safety and service

11.1.1 residual current device n.1 protects the PED pressure-switch circuits and back-up operation regulation

11.1.2 residual current device n.2 protects secondary auxiliary circuits, liquid level, alarm and the electronic regulation box.

The two residual current devices never shut down the machine due to failure of secondary services.

11.1 ~~Diagram UTQ039120/sheet 12 residual current devices for compressor protection~~

Each compressor has a residual current device, so that when one compressor fails this does not affect the others.

11.3 Diagram UTQ039130/sheet 12 residual current devices to protect condenser fans

Each condenser fan control has a residual current device, which means that when one fan control circuit fails it does not affect the others.

The setting for residual current devices must not be below a current of ID of 300mA. Tripping time must not be below 150mS.
Residual current devices must be test-operated regularly, using the appropriate push-button.

12. Terminal strip.

12.0 Phoenix spring terminals organised in terminal strips as below:

12.1 ***Terminal strip 1: machine compressor connection:*** horizontal lower position.

12.1 This terminal strip is where all auxiliary, control and compressor mechanisms are connected.
These devices are connected at the factory.

12.2 Terminal strip 2: ***Conedenser fans and machine-room air expeller:*** **side/vertical position. Connections to be made on site.**

12.2.1 This terminal strip is where all machine external services and accessories are connected, i.e condenser fans, machine room air expeller and alarms.
These accessories need to be connected on site.

12.2.2 To lead the wires in use the appropriate raceway on the right side of the electrical board.

12.2.3 All the mechanisms must be connected to the earthing system using the appropriate earthing bar.

12.3 ***Terminal strip 2: Alarms:*** **side/vertical position. Connections to be made on site.**

12.3.1 the contacts in the alarm terminal strip for remote-transmission must be cold (clean)

12.3.2 **<u>Do not</u> lead voltage above 50V to the alarm terminal strip.**

12.4 ***Terminal strip 3 (fast-connection): Connection of regulation box:*** top left/horizontal.

12.3.1 to replace the regulation box remove the clamp connectors (mind that the electrical board is off) and unscrew the bolts fastening the box itself.

13.Wiring.

13.1 Wiring as per reference EN-IEC standards.
13.2 All wires are flame-proof type.
13.3 The electrical board was designed for an estimated internal temperature of 50°C.

14. Earthing connections.

14.1 The bottom plate, door and all other metal parts are connected to the earthing system.
14.2 Each terminal strip is fitted with two adequate-diameter copper bars for earthing connection.
14.3 To connect mechanisms to the earthing system on-site (condenser fans, machine-room expeller etc..) use the earthing bar under the vertical terminal strip.

15. Warning lamps

15.1 Warning lamps are diameter d=22, ingress protection rating IP65.
15.2 Bulbs are 230V neon-type.
15.3 Warning lamp colour: alarm = red
operation = white
15.4 each lamp is marked as in the wiring diagram; a plate with the inscription indicating the relevant function is at the top front.
15.6 Detail of warning lamps

Type	*colour*	*I.D.*	*name*	*function*
operation	white	**H230**	**Voltage**	The auxiliary circuit is hot. This warning lamp must be on at all times.
alarm	red	**HLP**	**Low pressure**	Low-pressure alarm on the general circuit. The system is shut down.
alarm	red	**HHP**	**high pressure**	High-pressure alarm on the general circuit Pressure switches KP7B / KP7S have tripped.
alarm	red	**HLL**	**level liquid**	Low refrigerant liquid level in the circuit.
alarm	red	**H3**	**back-up regulation**	Mechanical back-up regulation has come on due to failure of the electronic control.
alarm	red	**HAC**	**compressors**	General compressor alarm due to the tripping of: overcurrent cutout, thermistor probes (Kriwan), compressor high-pressure switch, oil-level pressure switch or detector.
alarm	red	**HEC**	**Controller**	**On the controller box front.** To be used in case the controller has an external alarm signalling contact. Goes on in the event of any controller alarm.

16. Lay-out of components / drilling.

16.1 The component lay-out is determined by ergonomic principles, with the power section separated from the regulation section.

17. Electrical board cooling

17.1 On models with overcurrent cutouts only, the electrical board is cooled statically by an opening with a protecting grid.

17.2 Models including residual current devices are fitted with a 16W fan Lume art. 17710 with grid and filter.

The air filter must be replaced regularly according to the dustiness in the installation site.

18. Component trademarks / models

18.1 Unchanging components: as listed in the key to the wiring diagrams.
18.2 Variable components, size as per Costan's table (QE-C34C-03-2006.xls).

19. Accessories included.

19.1 Handle for the replacement of general fuses.
19.2 Spare fuses: n.1 per type supplied in a cellophane envelope.

20. Inspection and testing.

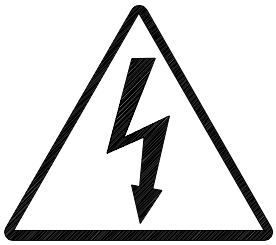
20.1 The equipment undergoes electrical testing before delivery, including all the tests prescribed by the reference standards: **EN 60439-1** and **EN 60204-1**.

21.Attached documents and certifications.

21.1 Wiring diagrams including relevant key.
21.2 Declaration that the equipment complies with the relevant standards.
21.3 Equipment manual
21.4 All the documents above are attached to the equipment and delivered in the relevant document compartment.

22. Danger signs

22.1 "Caution voltage" triangle, black thunderbolt on yellow background near the master switch handle.



22.2 Manufacturer sticker identifying the electrical board, at the right lower corner inside the panel. It contains the name of the manufacturer, the electrical board code, the serial number and manufacturing date. When failure is reported all these details must be provided to Costan Quality Department.

23. Important notice

Breaking capacity of electrical board

The circuit-breaking capacity (Icu) of the electrical board is 50kA.

This information must be carefully considered when installing the equipment.
(Icu=rated ultimate circuit-breaking capacity).

Coordinating power equipment

The devices protecting compressors (overcurrent cutout-contactor) and condenser fans (overcurrent circuit-breaker and contactor) must be coordinated according to standards DIN VDE 0660, part 102/IEC947-4-1.
Coordination can be of two types: type one and type two. Costan electrical boards are designed for coordination type 1 (one): **this means that the overcurrent cutout and relevant contactor must be replaced after short circuit has occurred downstream from the contactor (e.g. winding of compressor electric motor).**

060 - WIRING DIAGRAMS

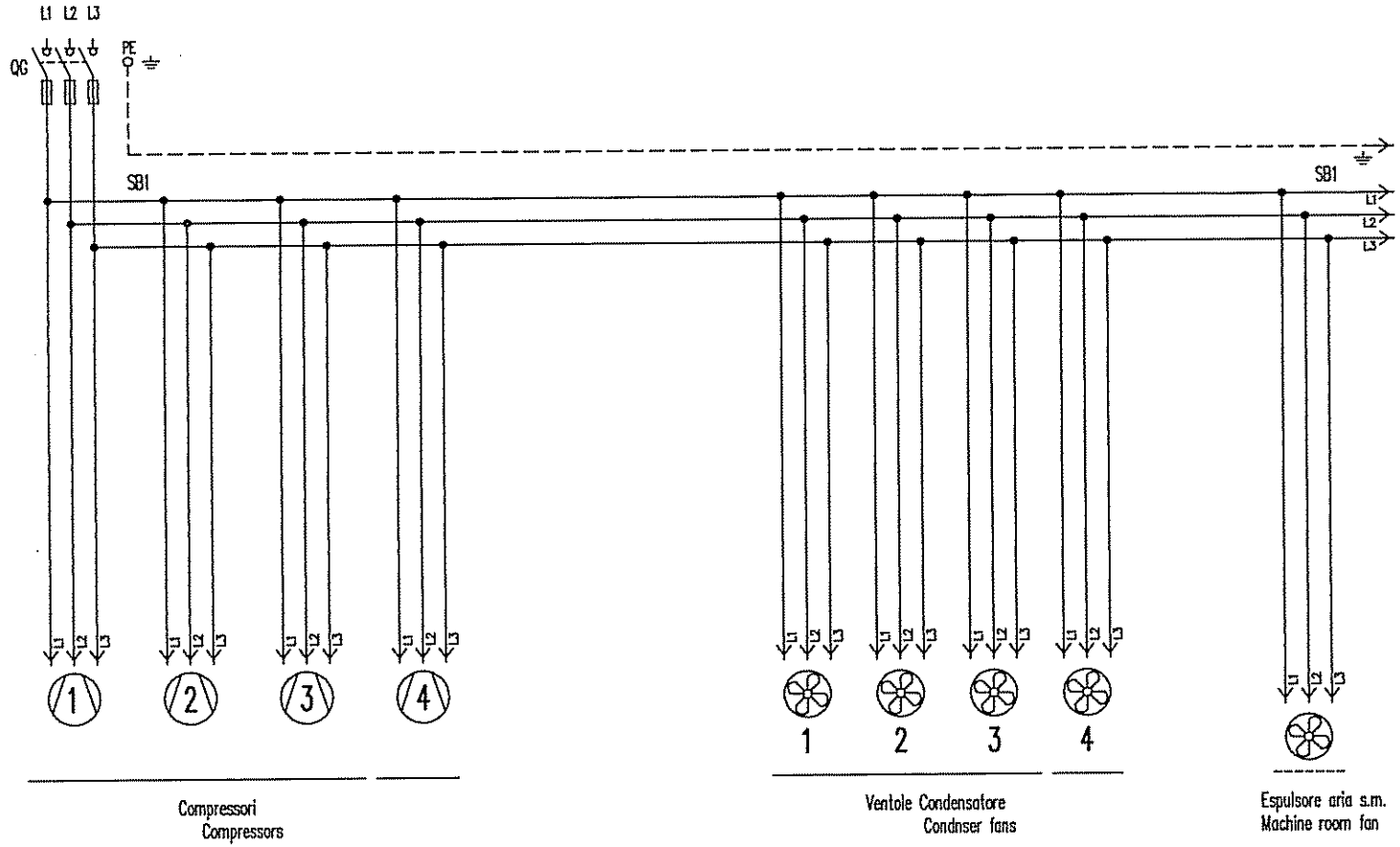
List of diagrams attached to the manual, as being an integral part thereof.

Standard electrical board

Function	Diagram n°	sheet
Master switch power	UTQ39010	1
Auxiliary transformers	UTQ39020	2
PED-compliant pressure-switches	UTQ39030	3
Mechanical back-up regulation	UTQ39040	4
Alarms	UTQ39050	5
Auxiliary services	UTQ39060	6
Control of compressors	UTQ39070	7
Control of condenser fans	UTQ39080	8
Machine-cooling fans	UTQ39090	9

Electrical board option with RCD (residual current device)

Function	Diagram n°	sheet
Auxiliary transformers	UTQ39220	2
General RCD	UTQ39110	11
Compressor RCDs	UTQ39120	12
Condenser fan RCDs	UTQ39130	13
Settings for RCDs	TA-dI	14



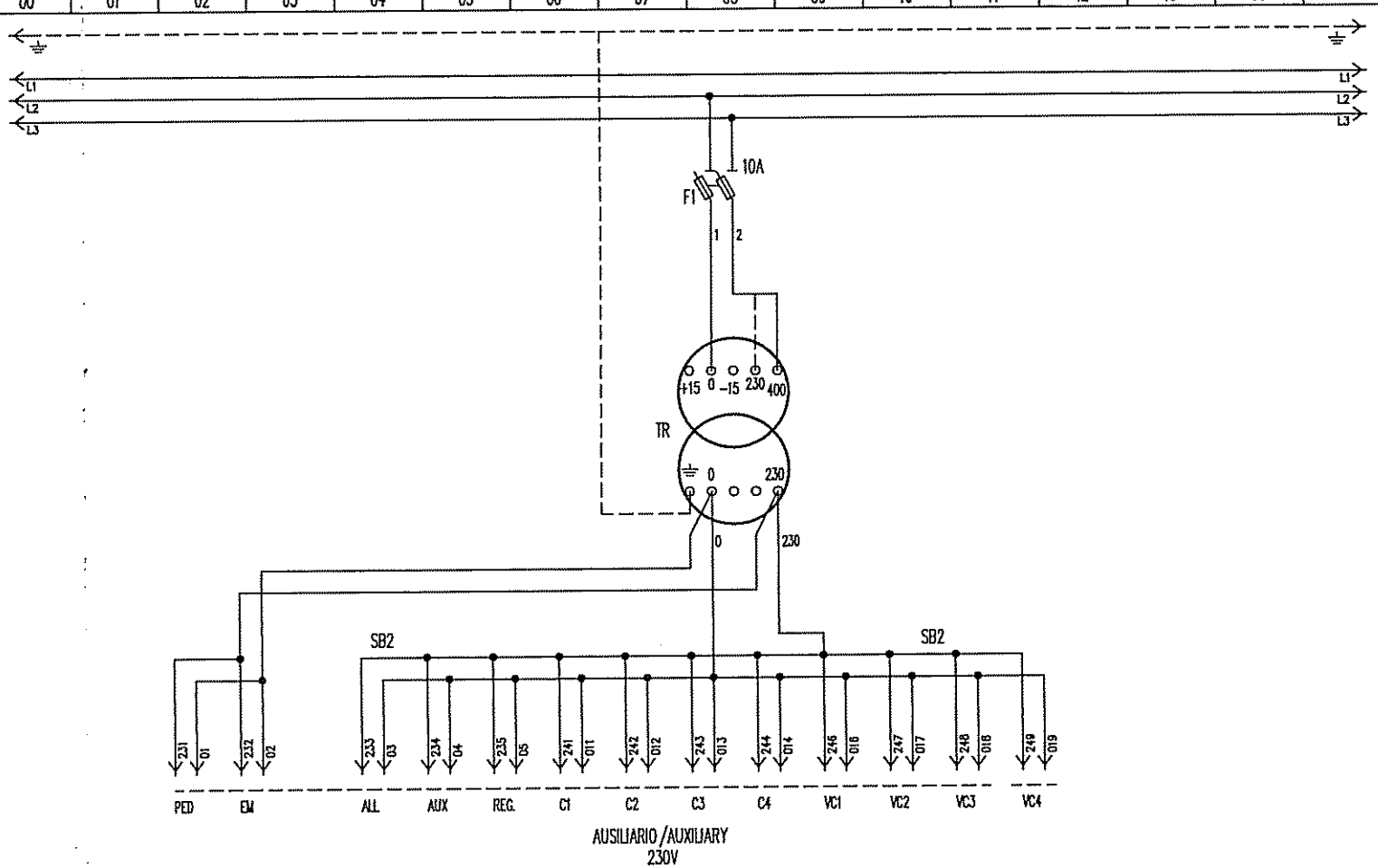
QG = Interruttore Generale — Main switch
ABB OS ____A

FG = Fusibili generali — Main fuses
aM ____A

SB1 = Sbarre di potenza — Power bus bar
SIEMENS SYSTEM SIRIUS 3R

Note / Modifiche :

Tensione/Voltage/Spannung	380V–400V/3Ph/50–60Hz 220V–230V/3Ph/50–60Hz
N.O. / N.C.	Fan. C34C Aux. voltage 230Vac
Data 23/11/2005	DTF DIREZIONE TECNOLOGIE DEL FREDDO — Dwg 97649
Scala 1 : X	I INTERRUTTORE GENERALE
Disk NET	GB MAIN SWITCH
Dis. A.Tibalia	D HAUPTSCHALTER
Verifica A.Tibalia	Dis.n°. UTQ 3901 0 — Fog. 1



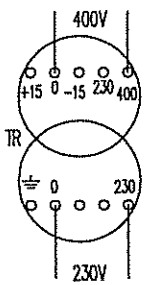
F1 = Fusibile trasformatore / Transformer fuses
LEGRAND 05828 — 10,3x38 — aM 10A

TR = Trasformatore / Transformer
LEGRAND — VA

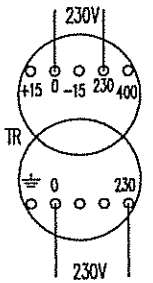
SB2 = Sbaree ausiliarie / Auxiliary Bus Bar
LEGRAND 04881

Tensione/Voltage

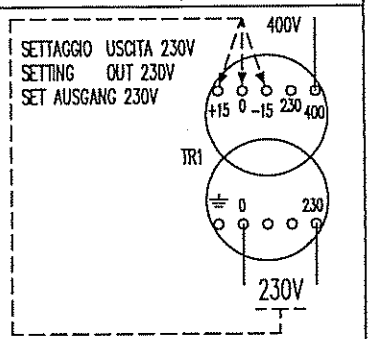
380-400V/3Ph/50-60Hz



220-230V/3Ph/50-60Hz

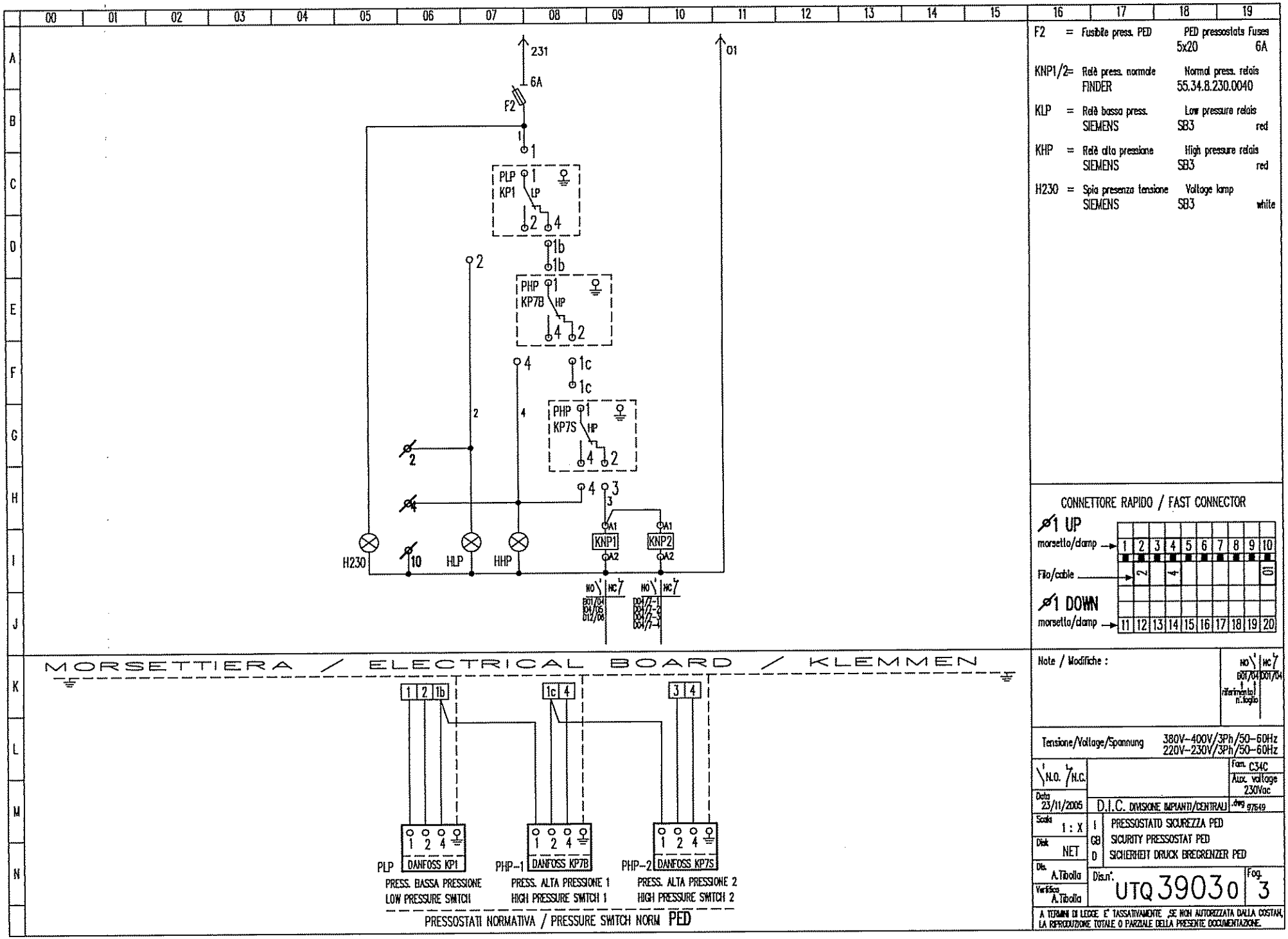


REGOLAZIONE USCITA 230V / OUT 230V REGULATION



Note / Modifiche :

Tensione/Voltage/Spannung	380V-400V/3Ph/50-60Hz 220V-230V/3Ph/50-60Hz
N.O. / N.C.	Fam. C34C — Aux. voltage 230Vac
Data 23/11/2005	DTF DIREZIONE TECNOLOGIE DEL FREDDO — Dwg. 97649
Scala 1 : X	I GB D TRASFORMATORE E DISTRIBUZIONE AUSILIARIO / TRANSFORMER AND AUXILIARY
Disk NET	
Dis. A.Tibolla	Dis.n°. UTQ 3902 0 — Fog. 2
Verifica A.Tibolla	



F2	=	Fusibile press. PED	PED pressostats Fuses 5x20 6A
KNP1/2	=	Relè press. normale FINDER	Normal press. relais 55.34.8.230.0040
KLP	=	Relè bassa press. SIEMENS	Low pressure relais SB3 red
KHP	=	Relè alta pressione SIEMENS	High pressure relais SB3 red
H230	=	Spia presenza tensione SIEMENS	Voltage lamp SB3 white

Note / Modifiche :

Tensione/Voltage/Spannung 380V–400V/3Ph/50–60Hz
220V–230V/3Ph/50–60Hz

N.O. / N.C.

Fan. C34C
Aux. voltage 230Vac

Data 23/11/2005

D.I.C. DIVISIONE IMPIANTI/CENTRALI .dwg 97649

Scala 1 : X

Disk NET

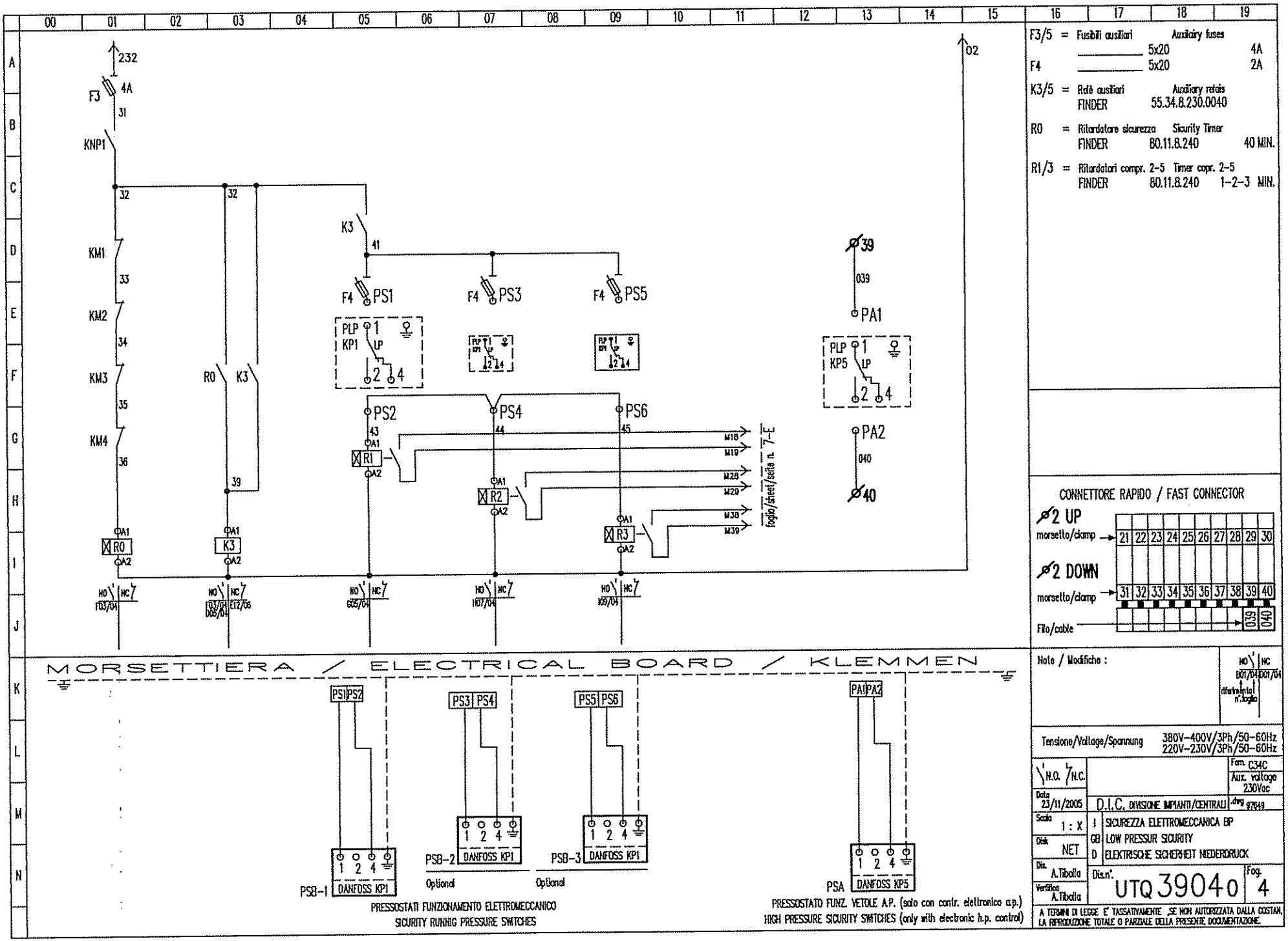
I PRESSOSTATO SICUREZZA PED
GB SECURITY PRESSOSTAT PED
D SICHERHEIT DRUCK BREGRENZER PED

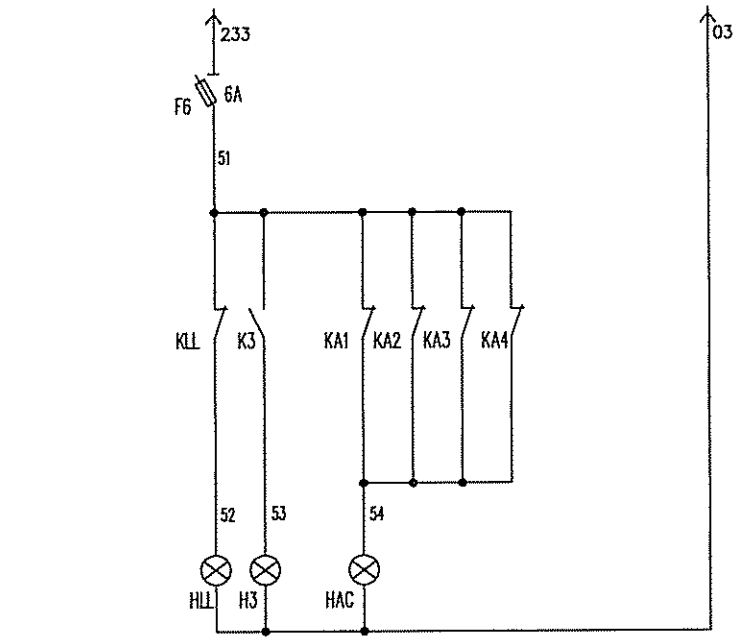
Dis. A.Tibolla

Verifica A.Tibolla

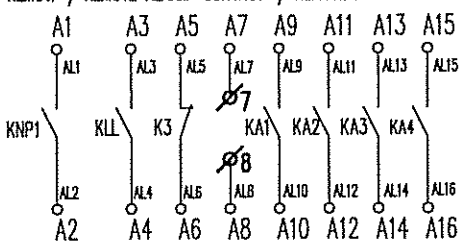
Dis.n°. UTQ 39030

Fog. 3

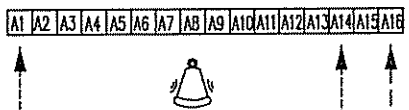

F3/5 = Fusibili ausiliari Auxiliary fuses 5x20 4A
F4 5x20 2A
K3/5 = Relè ausiliari Auxiliary relais FINDER 55.34.8.230.0040
R0 = Ritardatore sicurezza Sicurity Timer FINDER 80.11.8.240 40 MIN.
R1/3 = Ritardatori compr. 2-5 Timer copr. 2-5 FINDER 80.11.8.240 1-2-3 MIN.
CONNETTORE RAPIDO / FAST CONNECTOR
2 UP
morsetto/clamp
2 DOWN
morsetto/clamp
Filo/cable
MORSETTIERA / ELECTRICAL BOARD / KLEMMEN
PSB-1
PSB-2
PSB-3
Optional
Optional
PSA
PRESSOSTATI FUNZIONAMENTO ELETTROMECCANICO
SICURITY RUNNIG PRESSURE SWITCHES
PRESSOSTATO FUNZ. VETOLE A.P. (solo con contr. elettronico a.p.)
HIGH PRESSURE SICURITY SWITCHES (only with electronic h.p. control)
Note / Modifiche :
Tensione/Voltage/Spannung 380V-400V/3Ph/50-60Hz 220V-230V/3Ph/50-60Hz
Data 23/11/2005
D.I.C. DIVISIONE IMPIANTI/CENTRALI
Scala 1 : X
Disk NET
Dis. A.Tibolla
Verifica A.Tibolla
I SICUREZZA ELETTROMECCANICA BP
GB LOW PRESSUR SICURITY
D ELEKTRISCHE SICHERHEIT NIEDERDRUCK
Dis.n°. UTQ 39040
Fog. 4
A TERMINI DI LEGGE E' TASSATIVAMENTE VIETATA LA RIPRODUZIONE TOTALE O PARZIALE DELLA PRESENTE DOCUMENTAZIONE.



ALLARMI REMOTI / REMOTE ALARM CONTACT / REMOTE ALARM KLEMMEN



MORSETTIERA / ELECTRICAL BOARD / KLEMMEN



serie chiusa=funzionamento O.K. / serie aperta=ALLARME / portare solo 24V
series closed=running O.K. / series open=ALARM / connect only 24V

F6 = Fusibile allarmi — Alarm fuse 5x20 — 6 A

H__ = Spie allarme SIEMENS — Alarm lamps SB3

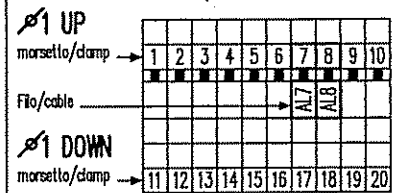
SPIA ALLARME/ALARMS LAMP / ALARME LAMPEN
ROSSA RED ROT

SPIA ALLARME ALARMS LAMP ALARM LAMPE	TIPO ALLARME ALARM TYPE ALARM	RELE' RELAIS	MORSETTI ELECTRICAL B. KLEMMEN
HLP	LP/sheet 3	KNP	A1–A2
HHP	HP/sheet 3		
HLL	LL	KLL	A3–A4
H3	EM	K3	A5–A6
HEC	EC	KEC	A7–A8
HAC	MC "1"	KA1	A9–A10
	MC "2"	KA2	A11–A12
	MC "3"	KA3	A13–A14
	MC "4"	KA4	A15–A16

ATTENZIONE CONTATTI ALLARMI REMOTI:
APERTO=ALLARME / CHIUSO=FUNZIONAMENTO O.K.

DANGER: REMOTE ALARMS CONTACT:
OPEN=ALARM / CLOSED =RUNNING O.K.

CONNETTORE RAPIDO / FAST CONNECTOR



Note / Modifiche :

NO / NC
B01/04 B01/04
riferimento n°foglio

Tensione/Voltage/Spannung 380V–400V/3Ph/50–60Hz
220V–230V/3Ph/50–60Hz

N.O. / N.C.

Fam. C34C
Aux. voltage 230Vac

Data 23/11/2005

D.I.C. DIVISIONE IMPIANTI/CENTRALI Ang 97849

Scala 1 : X

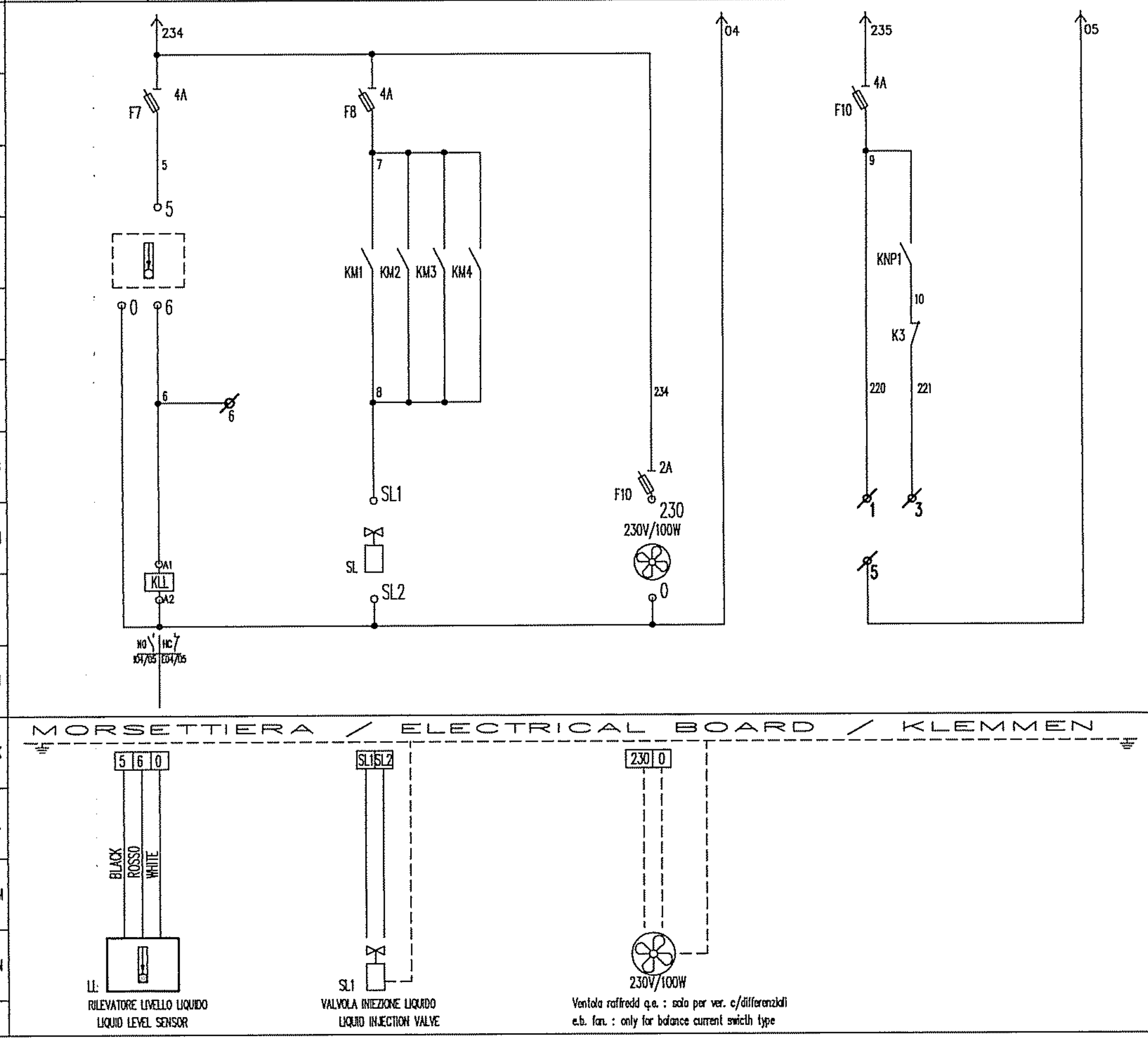
Dis. NET

Dis. A.Tibolla

Verifica A.Tibolla

I ALLARMI
GB ALARMS PANEL
D ALARME STROMKREIS

Dis.n°. UTQ 3905 0 Fog. 5



F7/11 = Fusibili ausiliary 5x20 — Auxiliary fuses 4A

KLL = Relè livello liquido — Liquid level relais
FINDER 55.34.8.230.0040

CONNETTORE RAPIDO / FAST CONNECTOR

Ø1 UP morsetto/clamp	1	2	3	4	5	6	7	8	9	10
Filo/cable	220		221		05	6				
Ø1 DOWN morsetto/clamp	11	12	13	14	15	16	17	18	19	20

Note / Modifiche :

NO NC 001/04 D01/04 riferimento n.foglio

Tensione/Voltage/Spannung 380V–400V/3Ph/50–60Hz 220V–230V/3Ph/50–60Hz

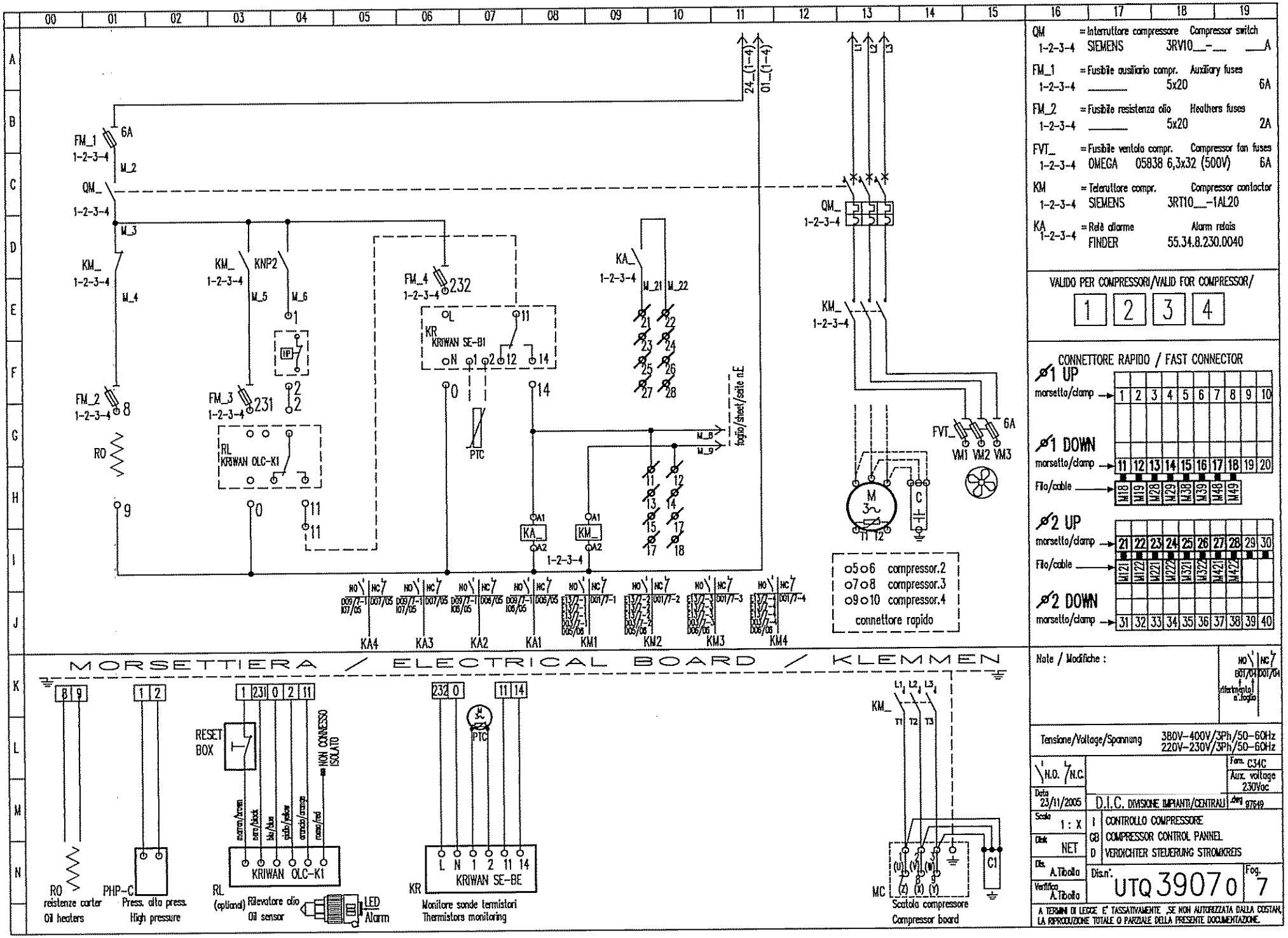
N.O. N.C. — Fam. C34C — Aux. voltage 230Vac

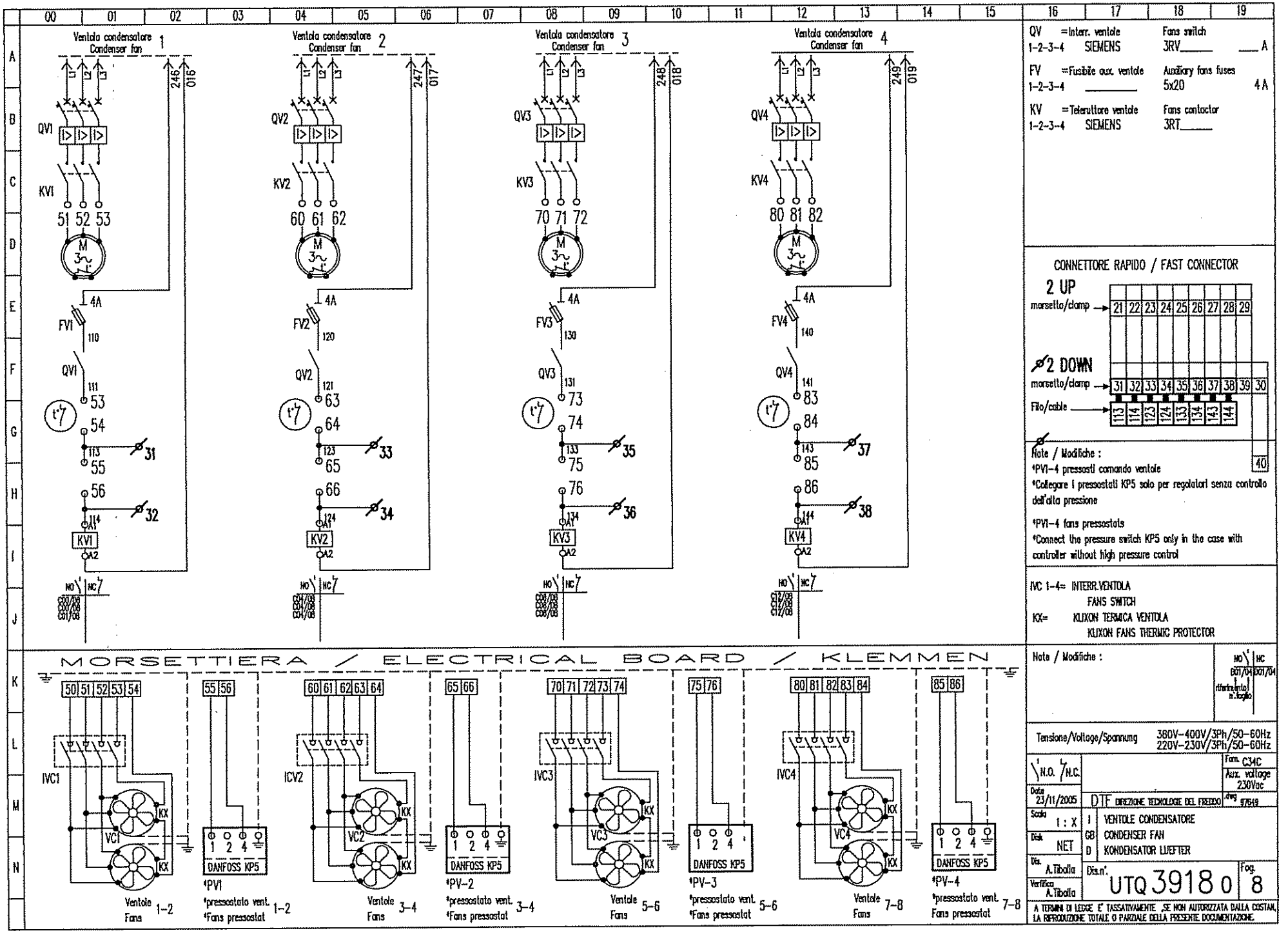
Data 23/11/2005 — D.I.C. DIVISIONE IMPIANTI/CENTRALI — dwg 97649

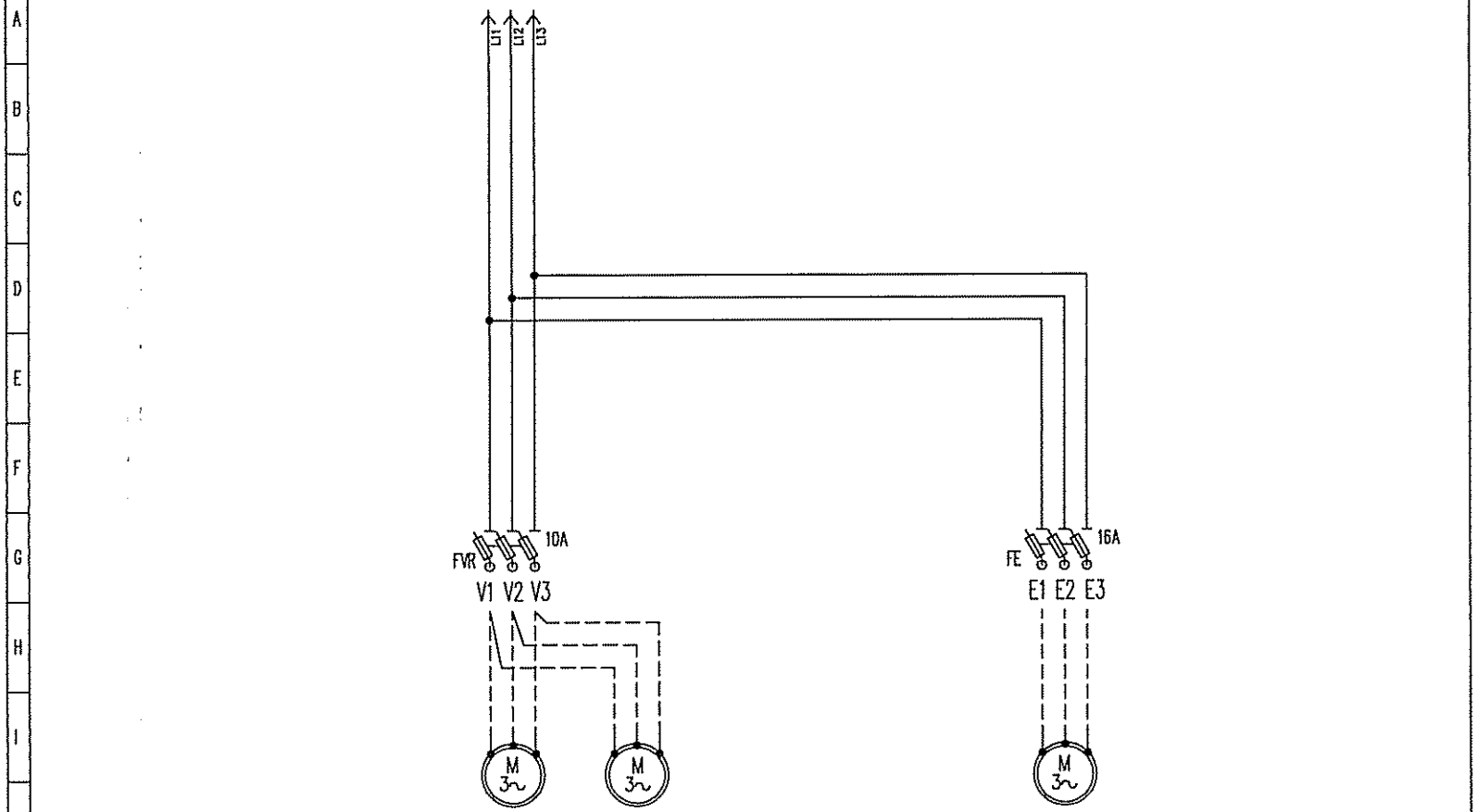
Scala 1 : X
I LIV.LIQ./VALV.INIEZIONE LIQUIDO/SERVIZI AUX. 230V
GB LIQUID LEVEL/LIQUID INJECTION V./AUXILIARY 230V
D KAELTEMITTEL MANGEL / 230V STROMKREIS

Disk NET
Dis. A.Tibolla
Verifica A.Tibolla
Dis.n°. UTQ 3906 0 — Fog. 6

A TERMINI DI LEGGE E' TASSATIVAMENTE ,SE NON AUTORIZZATA DALLA COSTAN, LA RIPRODUZIONE TOTALE O PARZIALE DELLA PRESENTE DOCUMENTAZIONE.


QM = Interruttore compressore Compressor switch
1-2-3-4 SIEMENS 3RV10__-__ __A
FM_1 = Fusibile ausiliario compr. Auxiliary fuses
1-2-3-4 _____ 5x20 6A
FM_2 = Fusibile resistenza olio Heathers fuses
1-2-3-4 _____ 5x20 2A
FVT_ = Fusibile ventola compr. Compressor fan fuses
1-2-3-4 OMEGA 05838 6,3x32 (500V) 6A
KM = Teleruttore compr. Compressor contactor
1-2-3-4 SIEMENS 3RT10__-1AL20
KA = Relè allarme Alarm relais
1-2-3-4 FINDER 55.34.8.230.0040
VALIDO PER COMPRESSORI/VALID FOR COMPRESSOR/
1 2 3 4
CONNETTORE RAPIDO / FAST CONNECTOR
1 UP
morsetto/clamp
1 DOWN
morsetto/clamp
Filo/cable
2 UP
morsetto/clamp
Filo/cable
2 DOWN
morsetto/clamp
MORSETTIERA / ELECTRICAL BOARD / KLEMMEN
RESET BOX
KRIWAN OLC-K1
KRIWAN SE-BE
RO
reistenze carter
Oil heaters
PHP-C
Press. alta press.
High pressure
RL
(optional)
Rilevatore olio
Oil sensor
LED
Alarm
KR
Monitore sonde termistori
Thermistors monitoring
MC
Scatola compressore
Compressor board
o5o6 compressor.2
o7o8 compressor.3
o9o10 compressor.4
connettore rapido
Note / Modifiche :
Tensione/Voltage/Spannung 380V-400V/3Ph/50-60Hz
220V-230V/3Ph/50-60Hz
Data 23/11/2005
D.I.C. DIVISIONE IMPIANTI/CENTRALI
Scala 1 : X
Disegno NET
Dis. A.Tibolla
Verifica A.Tibolla
I CONTROLLO COMPRESSORE
GB COMPRESSOR CONTROL PANNEL
D VERDICHTER STEUERUNG STROMKREIS
Dis.n°. UTQ 3907 0
Fog. 7
A TERMINI DI LEGGE E' TASSATIVAMENTE VIETATA SE NON AUTORIZZATA DALLA COSTAN, LA RIPRODUZIONE TOTALE O PARZIALE DELLA PRESENTE DOCUMENTAZIONE.

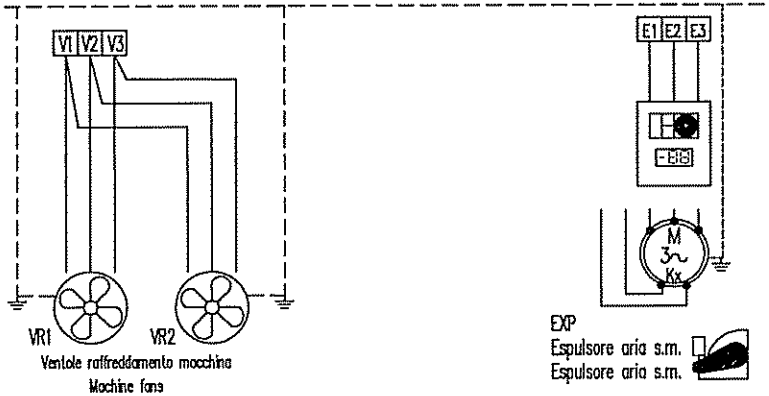

Ventola condensatore 1
Condenser fan
Ventola condensatore 2
Condenser fan
Ventola condensatore 3
Condenser fan
Ventola condensatore 4
Condenser fan
QV1
QV2
QV3
QV4
KV1
KV2
KV3
KV4
51 52 53
60 61 62
70 71 72
80 81 82
FV1
FV2
FV3
FV4
4A
110
120
130
140
111
121
131
141
53
63
73
83
54
64
74
84
113
123
133
143
31
33
35
37
55
65
75
85
56
66
76
86
32
34
36
38
246
247
248
249
016
017
018
019
A1
A2
KV1
KV2
KV3
KV4
NO
NC
C00/08
C01/08
C02/08
C03/08
C04/08
C05/08
C06/08
C07/08
C12/08
C13/08
QV Interr. ventole SIEMENS 1-2-3-4
Fans switch 3RV____ ___A
FV =Fusibile aux. ventole 1-2-3-4 _____
Auxiliary fans fuses 5x20 4A
KV =Teleruttore ventole 1-2-3-4 SIEMENS
Fans contactor 3RT_____
CONNETTORE RAPIDO / FAST CONNECTOR
2 UP
morsetto/clamp
21 22 23 24 25 26 27 28 29
2 DOWN
morsetto/clamp
31 32 33 34 35 36 37 38 39 30
Filo/cable
113 114 123 124 133 134 143 144
40
Note / Modifiche :
*PV1-4 pressostati comando ventole
*Collegare i pressostati KP5 solo per regolatori senza controllo dell'alta pressione
*PV1-4 fans pressostats
*Connect the pressure switch KP5 only in the case with controller without high pressure control
IVC 1-4= INTERR.VENTOLA FANS SWITCH
KX= KLIXON TERMICA VENTOLA KLIXON FANS THERMIC PROTECTOR
MORSETTIERA / ELECTRICAL BOARD / KLEMMEN
50 51 52 53 54
55 56
60 61 62 63 64
65 66
70 71 72 73 74
75 76
80 81 82 83 84
85 86
IVC1
ICV2
IVC3
IVC4
KX
VC1
VC2
VC3
VC4
1 2 4
DANFOSS KP5
*PV1
*PV-2
*PV-3
*PV-4
Ventole Fans 1-2
*pressostato vent. *Fans pressostat 1-2
Ventole Fans 3-4
*pressostato vent. *Fans pressostat 3-4
Ventole Fans 5-6
*pressostato vent. *Fans pressostat 5-6
Ventole Fans 7-8
*pressostato vent. *Fans pressostat 7-8
Nota / Modifiche :
NO NC
C01/04 C01/04
Tensione/Voltage/Spannung 380V-400V/3Ph/50-60Hz 220V-230V/3Ph/50-60Hz
N.O. N.C.
Fan. C34C
Aux. voltage 230Vac
Data 23/11/2005
DTF DIREZIONE TECHNOLOGIE DEL FREDDO
.dwg 97649
Scala 1 : X
Disk NET
Dis. A.Tibalia
Verifica A.Tibalia
I VENTOLE CONDENSATORE
GB CONDENSER FAN
D KONDENSATOR LUFTER
Dis.n°. UTQ 3918 0
Fog. 8
A TERMINI DI LEGGE E' TASSATIVAMENTE VIETATA LA RIPRODUZIONE TOTALE O PARZIALE DELLA PRESENTE DOCUMENTAZIONE, SE NON AUTORIZZATA DALLA COSTAN.



FVR = Fusibile ventilazione comp. Compr. fan fuses
OMEGA 6,3x32 (500V) 6 A

FE = Fusibile espulsore s.m. Machine room fan fuses
SIEMENS 10,3x38 aM 16 A

MORSETTIERA / ELECTRICAL BOARD / KLEMMEN



Ventole raffreddamento macchina
Machine fans

EXP
Espulsore aria s.m.
Espulsore aria s.m.

Note / Modifiche :

NO / NC
B01/64 D01/54
riferimento a foglio

Tensione/Voltage/Spannung 380V-400V/3Ph/50-60Hz
220V-230V/3Ph/50-60Hz

N.O. / N.C.

Fam. C34C
Aux. voltage 230Vac

Data 23/11/2005

D.I.C. DIVISIONE IMPIANTI/CENTRALI

dwg 97649

Scala 1 : X

Disk NET

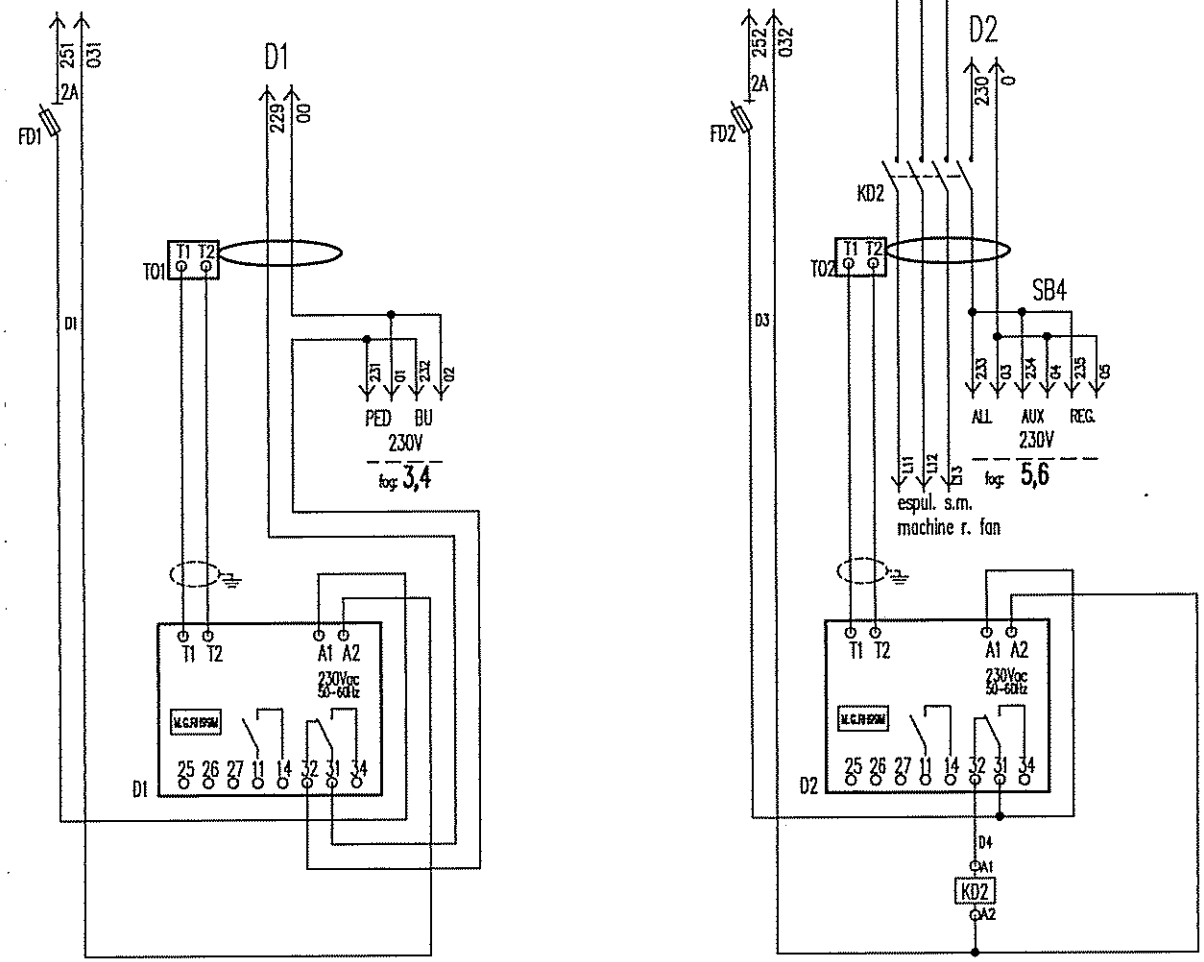
Dis. A.Tibalia

Verifica A.Tibalia

I VENTOLE RAFFREDDAMENTO MACCHINA
GB CONDENSER UNIT COOLING FANS
D LUEFTERS

Dis.n°. UTQ 3909 0

Fog. 9



D 1-2 = Differenziale circ. aux — Residual current device
MERLIN-GERIN RH99M

T 1-2 = Trasf. toroide — Transformer
MERLIN-GERIN TORE TA30 4A

FD 1-2 = Fusibile differenziale — Residual curr.d. fuse
5x20 2A

KD 2 = Relè aux. differenziale — Residual curr.d. relais
SIEMENS 3RT1016-1AP01

SB4 = Sbaree ausiliarie — Auxiliary Bus Bar
LEGRAND 04880

RELE' DIFFRERENZIALI / BALANCE CURRENT RELAIS

D1

foglio sheet	fili cable		
3	231-01	Press. sicurezz. PED	Sicurity pressost. PED
4	232-02	Sicurezza elettronecc. back-up control	

D2

foglio sheet	fili cable		
5	233-03	Allarmi	Alarms
6	234-04	Livello liquido	Liquid level
	234-04	Solenoide sottoraffredd.	Undercooling valve
	234-04	Alimentazione 230V	Supply 230V
	235-05	Aliment. controllore	Regulation Supply

Note/Modifiche

Tensione/Voltage/Spannung 380V-400V/3Ph/50-60Hz
220V-230V/3Ph/50-60Hz

N.O. / N.C.

Form. C34C
Aux. voltage 230Vac

Data 23/11/2005

DTF DIREZIONE TECNOLOGIE DEL FREDDO

Dwg. 97649

Scala 1 : X

Disk NET

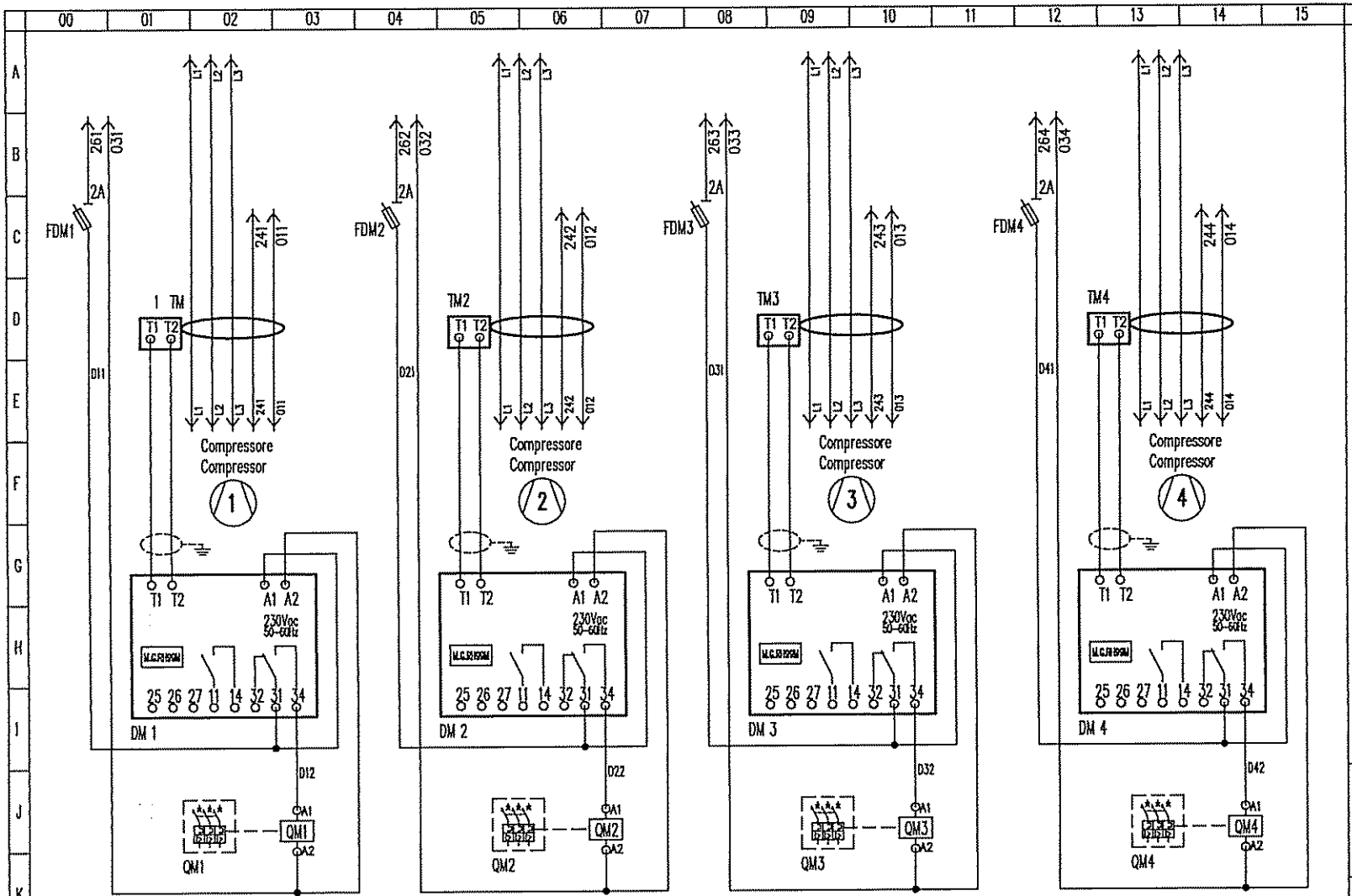
I RELE' DIFFERENZIALI GENERALI D1 - D2
GB MAIN RESIDUAL CURRENT DEVICE
D HUAPT SCHUTZFEHLSTROM

Dis. A.Tibolla

Verifica A.Tibolla

Dis.n°. UTQ 3911 0

Fog. 11



DM 1-4 = Differenziale compr. — Comp. residual curr.dev.
MERLIN-GERIN RH99M

TM 1-4 = Trasf. toroide — Transformer
MERLIN-GERIN TORE TA30 4A

FDM 1-4 = Fusibile differenziale — Residual curr.d. fuse
5x20 2A

QM 1-4 = Interruttore compressore — Compressor switch
bobina di sgancio — off bobbin
SIEMENS 3RV1902-1DP0

siglature / sealing
Compressore / Compressor

1	2	3	4

Note/Modifiche
01-06-2005: Sostituzione di RH328A con RH99M

Tensione/Voltage/Spannung 380V-400V/3Ph/50-60Hz
220V-230V/3Ph/50-60Hz

N.O. / N.C.

Fam. C34C
Aux. voltage 230Vac

Data 23/11/2005

DTF DIREZIONE TECNOLOGIE DEL FREDDO dwg 97649

Scala 1 : X

Disk NET

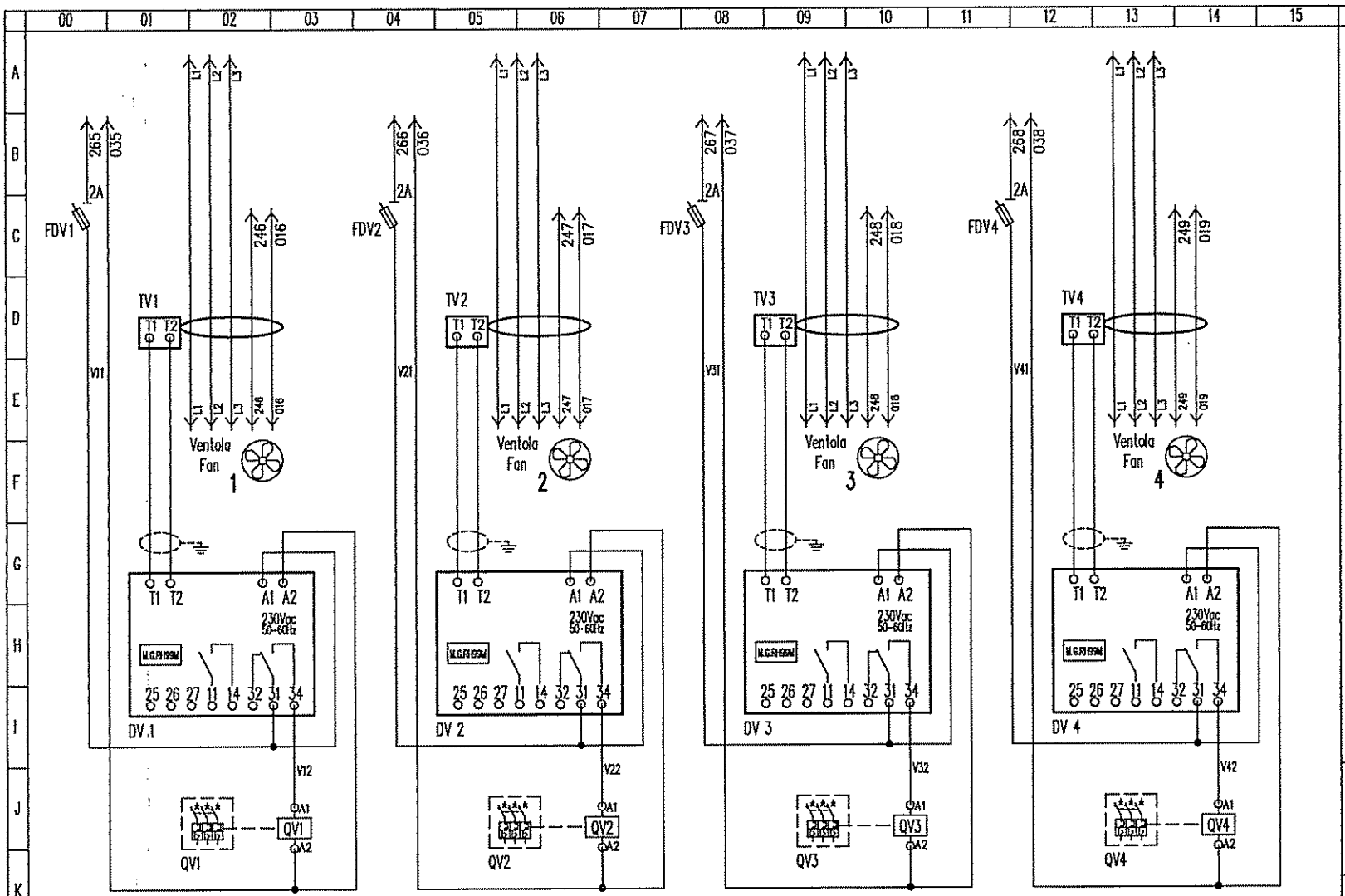
I RELE' DIFFERENZIALI COMPRESSORI
GB COMPRESSOR RESIDUAL CURRENT DEVICE
D VERDICHTER FEHLSTROM RELAIS

Dis. A.Tibolla

Verifica A.Tibolla

Dis.n°. UTQ 3912 0

Fog. 12



DV 1-4 = Differenziale compr. MERLIN-GERIN — Comp. residual curr.dev. RH99M

TV 1-4 = Trasf. toroide MERLIN-GERIN TORE TA30 — Transformer 4A

FDV 1-4 = Fusibile differenziale 5x20 — Residual curr.d. fuse 2A

QV 1-4 = Interruttore compressore Compressor switch
bobina di sgancio off bobbin
SIEMENS 3RV1902-1DP0

siglature / sealing
Ventola / Fans

1	2	3	4

Note/Modifiche
01-06-2005: Sostituzione di RH328A con RH99M

Tensione/Voltage/Spannung 380V-400V/3Ph/50-60Hz
220V-230V/3Ph/50-60Hz

N.O. / N.C.

Fam. C34C
Aux. voltage 230Vac

Data 23/11/2005

DTF DIREZIONE TECNOLOGIE DEL FREDDO dwg 97649

Scala 1 : X

Disk NET

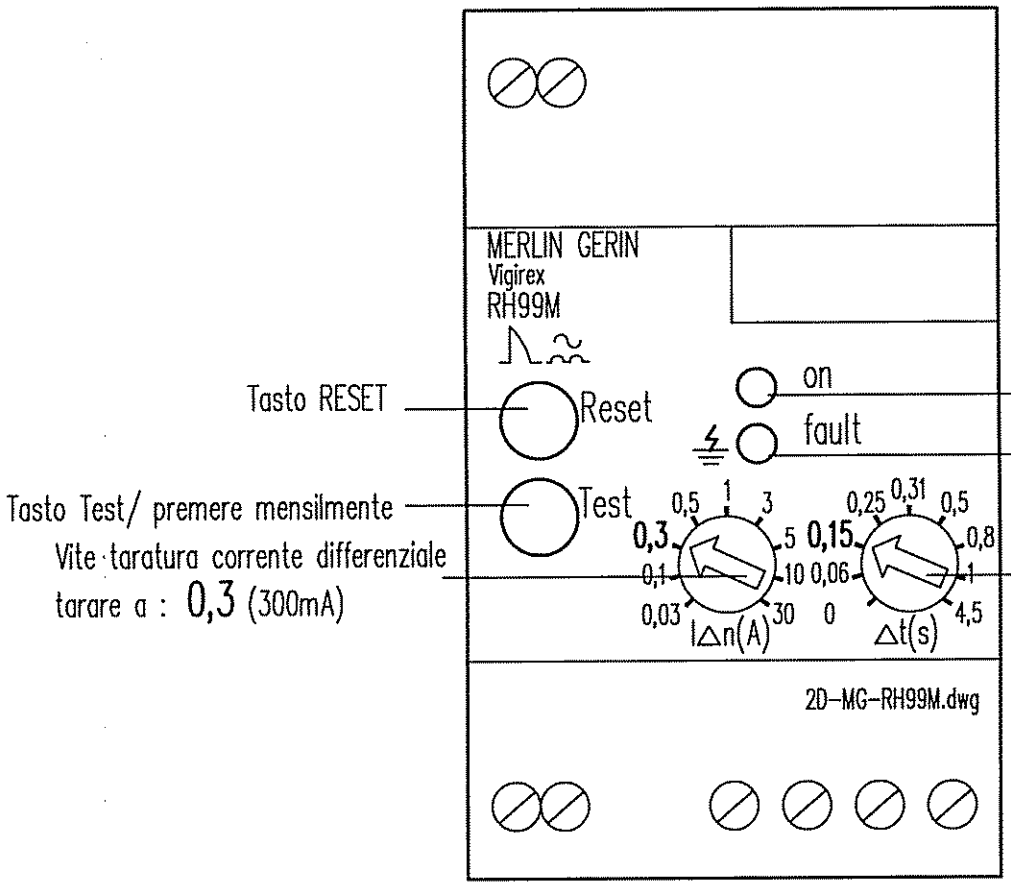
I RELE' DIFFERENZIALI COMPRESSORI
GB COMPRESSOR RESIDUAL CURRENT DEVICE
D VERDICHTER FEHLSTROM RELAIS

Dis. A.Tibolla

Verifica A.Tibolla

Dis.n°. UTQ3913 0

Fog. 13



Tasto RESET

Tasto Test/ premere mensilmente

Vite taratura corrente differenziale
tarare a : 0,3 (300mA)

LED differenziale acceso

LED segnalazione guasto
(intervento differenziale)

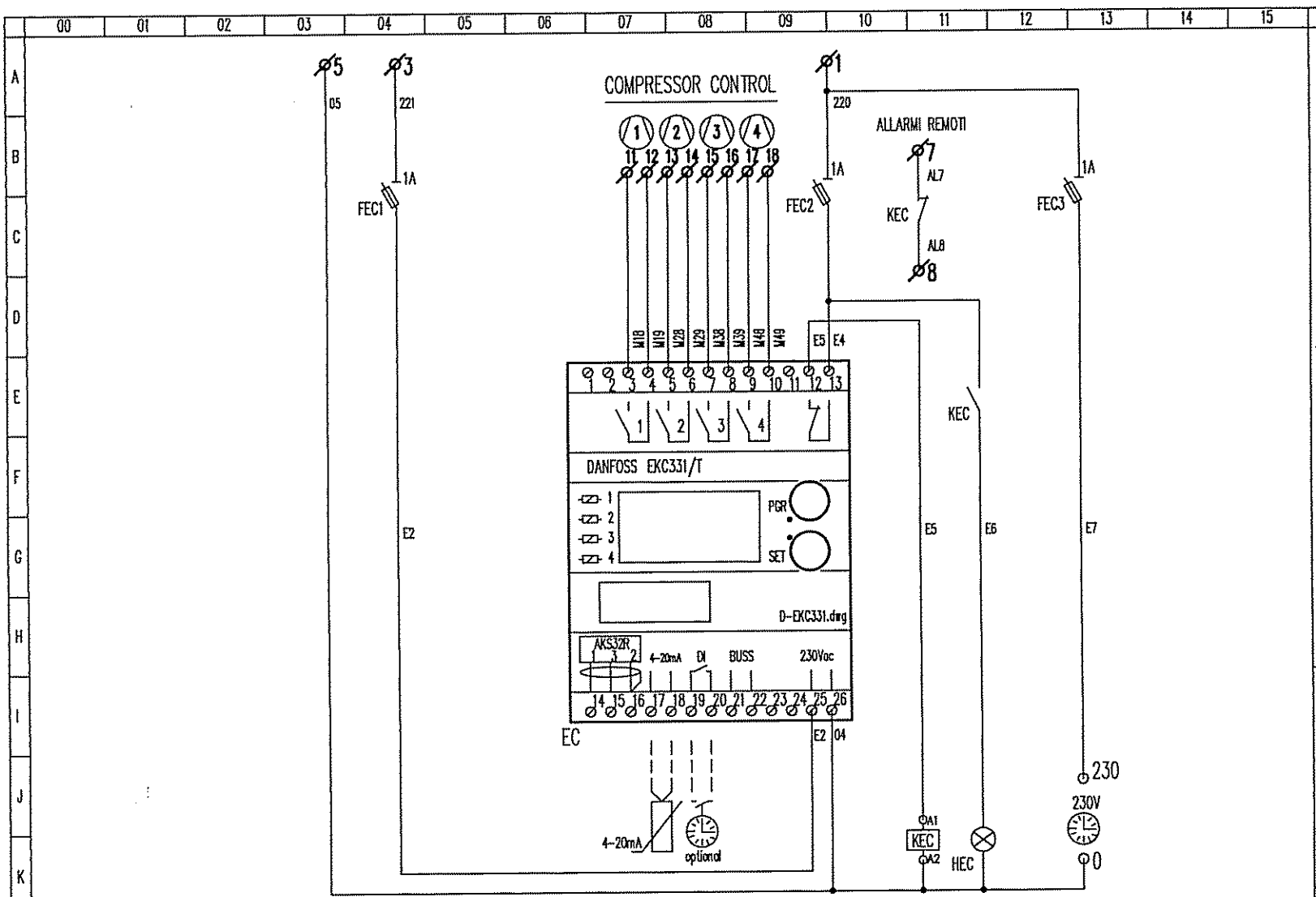
Vite taratura ritardo intervento
tarare a : 0,15 (150mS)

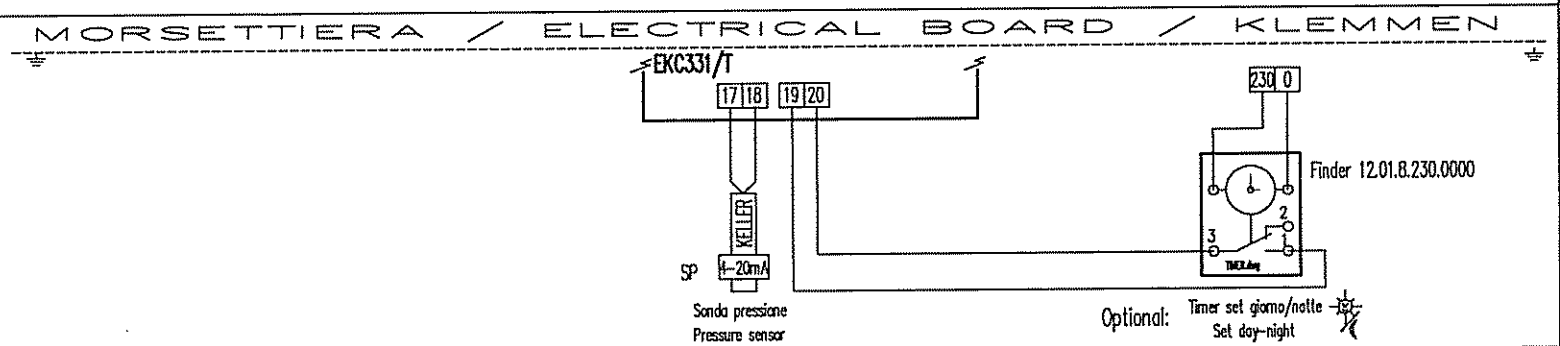
Tensione/Voltage/Spannung	380V-400V/3Ph/50-60Hz 220V-230V/3Ph/50-60Hz	
N.O. / N.C.		Fam. C34C Aux. voltage 230Vac
Data 10/09/2006	D.I.C. DIVISIONE IMPIANTI/CENTRALI	dwg 97649
Scale 1 : X	I TARATURA DIFFERENZIALE MG RH99M GB SET BALANCE CURRENT RELAIS D	
Dis. NET		
Des. A.Tibalia	Dis.n°. TA-MG-RH99M	Fog. dl
Verifica A.Tibalia		

070 – REGULATION/SETTINGS

Regulation electrical boards

Function	Diagram n° / table	sheet
DANFOSS EKC331T	UTQ39E10	E
Settings for EKC331T	TA-EKC331T-06-1.xls	E/2
CAREL IR32Z3	UTQ39E20	E
Settings for IR32Z3	TA-IR32Z3-2006.xls	E/2
DANFOSS EKC531D1	UTQ39E30	E
Auxiliary regulation relays	UTQ39E50	E/2
Table of settings for EKC331T	TA-EKC531D1-06-1-3_6G-3-5V.xls	E/3
CAREL PCO2	UTQ39E20	E
Auxiliary regulation relays	UTQ39E50	E/2
Table of settings for PCO2	Ta-pco2-02_2005-ver1.5-WIKA.xls	E/3
CAREL uRack (micro Rack)	UTQ39E60	
Table of settings for uRack	Ta-uRack-ver1.0.xls	





FEC1-3 = Fusibili ausiliari — Auxiliary fuses 1A 5x20

KEC = Relè allarme — Alarm relais FINDER 55.34.8.230.0040

HEC = Spia allarme — Alarm lamp SIEMENS SB3

EC = Controllore — Regulation DANFOSS EKC331/T 084B7105

VARIAZIONE SET-POINT / CHANGE SET-POINT

PREMERE CONTEMPORANEAMENTE I BOTTONI
PUSH THE TWO BUTTONS SIMULTAEOUSLY

CAMBIARE IL VALORE / CHANGE THE VALUE — SALVARE IL VALORE / SAVES A CHANGE

ACCESSO LISTA PARAMETRI/PARAMETERS LIST ACCESS

PREMERE IL BOTTONE SUPERIORE PER 5 SEC.
PUSH THE THE UPPER BUTTON FOR 5 SEC.

COMPARE LA LISTA PARAMETRI PARAMETRI LIST

USARE I DUE BOTTONI PER SCORRERE LA LISTA
USE THE TWO BOTTONS FOR THE PARAMETR LIST

PREMERE ENTRAMBI I BOTTONI PER ENTRARE NEL PARAM.
GIVES ACCESS TO CHANGES

SPOSTARE I VALORI / UP-DOWN VALUE — SALVARE / SAVES A CHANGE

PER USCIRE DALLA PROGRAMMAZIONE ASPETTARE CIRCA 30 SEC.
EXIT TO THE MENU, WAIT 30 SEC.
PER PROGRAMMAZIONE CONSULTARE LISTA PARAMETRI
FOR PROGRAMMATIONE SEE TABEL **T-MNS01-EKC331-I.XLS**

CONNETTORE RAPIDO / FAST CONNECTOR

1 UP
morsetto/clamp: 1 2 3 4 5 6 7 8 9 10
Filo/cable: 220 221 05 AL7 AL8

1 DOWN
morsetto/clamp: 11 12 13 14 15 16 17 18 19 20
Filo/cable: M18 M19 M28 M29 M38 M39 M48 M49

cod. UQ39E001E

Tensione/Voltage/Spannung	380V-400V/3Ph/50-60Hz 220V-230V/3Ph/50-60Hz
N.O. / N.C.	Fan. C34C Aux. voltage 230Vac
Data 18/02/06	D.I.C. DIVISIONE IMPIANTI/CENTRALI — dwg 97649
Scala 1 : X	I REGOLAZIONE ELETTRONICA GB ELECTRONIC REGULATION D ELEKTRONISCHE STEUERUNG DANFOSS EKC331/T
Disk NET	
Dis. A.Tibolla	Dis.n°. UTQ 39E1 0 — Fog. E
Verifica A.Tibolla	

regolatore elettronico/electronic regulation

ver.1.1marzo 2006

TARATURE SETTINGS	DANFOSS EKC331/T	cantrali a 3-4 compressori 3-4 compressors packs

	FUNCTION	FUNZIONE	PARAM.	MIN	MAX	Centrali / Packs TN	BT
1	shows the signal from the pressure transmitter		-	°C		°C	

	REFERENCE	LIMITI DI RIFERIMENTO					
2	set the regulation's pressure reference	set di lavoro	-	-60°C	50°C	-13°C	-36°C
3	neutral zone	ampiezza zona neutra	r01	0.1K	20K	4K	3K
4	Max. limitation of pressure setting	limite impostabile massimo della pressione	r02	-60°C	50°C	0°C	-20°C
5	Min. limitation of pressure setting	limite impostabile minimo della pressione	r03	-60°C	50°C	-18°C	-40°C
6	Correction of signal from the sensor	correzione segnale sonda	r04	-20K	20K	0°C	0°C
7	select unit (0=bar / 1 psig)	selezione unità di misura (0=bar / 1 psig)	r05	C-b	F-P	C-b	C-b
8	Reference displacement by signal at DI imput	spostamento set-point con segnale DI	r13	-50K	50K	3K	5K

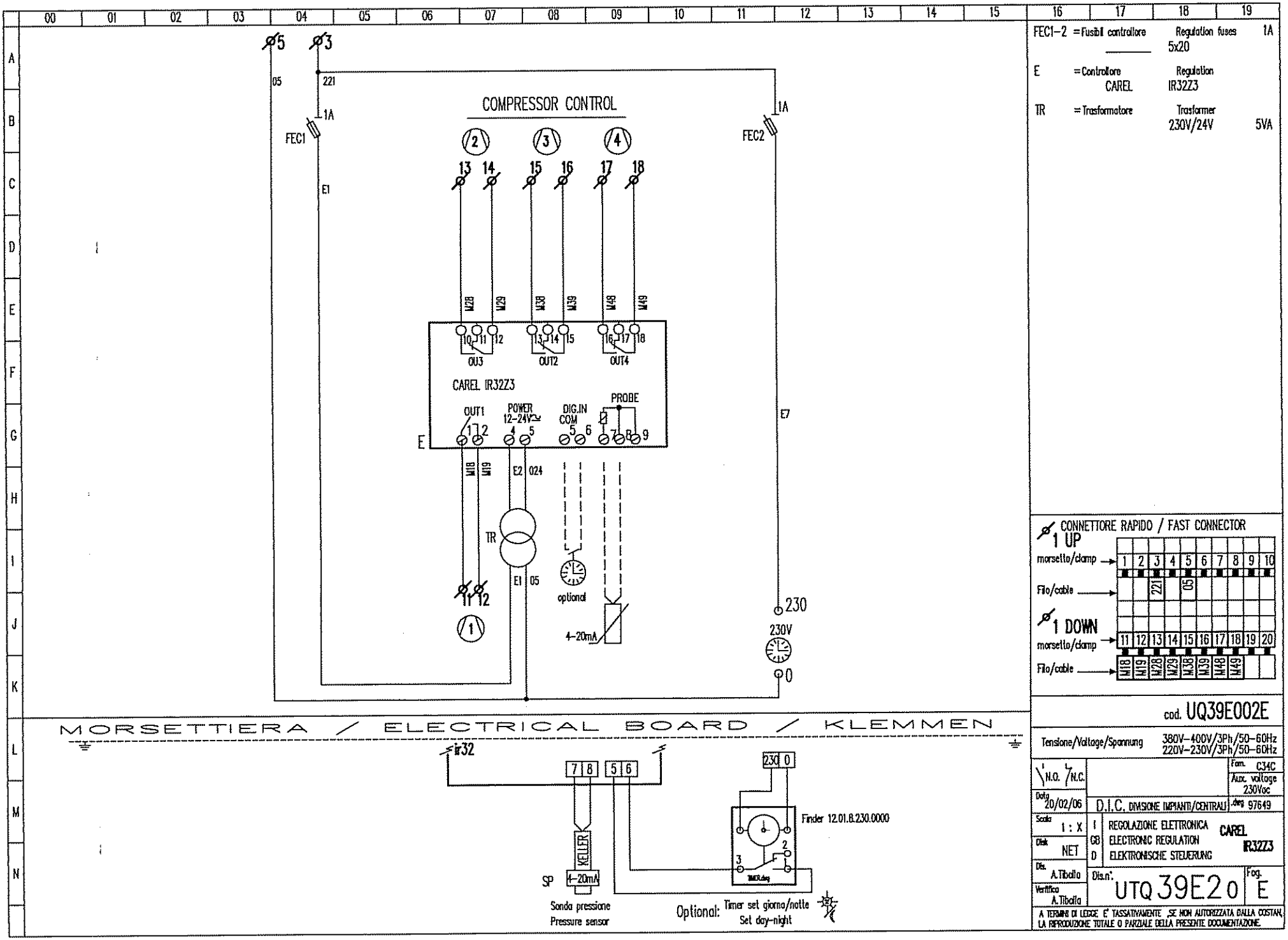
	CAPACITY	REGOLAZIONE					
9	min. On time for relays	tempo minimo accensione relè	c01	0 min.	30 min.	2 min	2 min
10	min. time period between cutins of same relay	tempo minimo tra due accensioni dello stesso	c07	0 min.	30 min.	5 min.	5 min.
11	definition of regulation mode	relè definizione del modo di regolazione					
	1:sequential	1: sequenziale	c08	1	3	2	2
	2:cyclic	2: ciclico					
	3: cyclic with unloaders	3: ciclico con parzializzazioni					
12	If the unloaders mode 3 has been selected,the	nel caso del modo 3(ciclico con parzializzazioni)					
	relays for the unloaders can be defined to:	definire i relè delle parzializzazioni.	c09	0	1	//	//
	0: cut in when more capacity is required	0: accensione quando è richiesta più capacità					
	1: cut out when more capacity is required	1: spegnimento quando è richiesta più capacità					
13	regulation parameter for +Zone	regolazione parametri + zona	c10	0.1K	20K	3 K	2 K
14	regulation parameter for +Zone min.	regolazione parametri + zona min.	c11	0.1min	60 min	3 min	2 min
15	regulation parameter for ++Zone seconds	regolazione parametri ++ zona secondi	c12	1 sec	180 sec	90 sec	60 sec
16	regulation parameter for -Zone	regolazione parametri - zona	c13	0 K	20 K	3 K	2 K
17	regulation parameter for -Zone min.	regolazione parametri - zona min.	c14	0.1 min	60 min	1 min	0.5 min
18	regulation parameter for -Zone seconds	regolazione parametri -- zona secondi	c15	1 sec	180 sec	15 sec	5 sec

	ALARM	ALLARMI					
19	alarm's time delay	ritardo di allarme	A03	0 min.	90 min.	60 min.	60 min
20	upper alarm limit (absolute value)	limite allarme superiore	A10	-50 °C	80 °C	5°C	-15°C
21	lower alarm limit (absolute value)	limite allarme inferiore	A11	-50 °C	80 °C	-22°C	-44°C

	MISCELLANEUS	VARIE					
22	controllers adress	indirizzo controllore	o03*	1	60	-	-
23	on/off switches (service pin message)	on/off microinterruttori (messaggi pin)	o04*	-	-	-	-
24	access code	codice di accesso	o05	off(-1)	100	off	off
25	define input signal / regulation stopped	definizione del segn.di ingresso/fermata regolaz.					
	1: 4-20mA pressure trasmitter - compressor reg.	1: 4-20mA sonda press.: regolaz.compressore					
	2: 4-20mA pressure trasmitter - condenser reg.	2: 4-20mA sonda press.: regolaz.condensatore					
	3: AKS 32Rpressure trasmitter - compressor reg.	3: AKS 32Rsonda press.: regolaz.compressore.					
	4: AKS 32Rpressure trasmitter - condenser reg.	4: AKS 32Rsonda press.: regolaz.condensatore					
	5: 0-10V relay module	5: 0-10V modulazione relay	o10	0	11	1	1
	6: 0-5V relay module	6: 0-5V modulazione relay					
	7: 5-10V relay module	7: 5-10Vmodulazione relay					
	8: Pt 1000 ohm sensor - compressor reg.	8: Pt 1000 ohm sonda - regolazione compressori					
	9: Pt 1000 ohm sensor - condenser reg.	9: Pt 1000 ohm sonda - regolazione condensatore					
	10: Ptc 1000 ohm sensor - compressor reg.	10: Ptc 1000 ohm sensor - regolazione compressori					
	11: Ptc 1000 ohm sensor - condenser reg.	11: Ptc 1000 ohm sensor - regolazione condensatore					
22	set supply voltage frequency	settaggio frequenza di alimentazione	o12	50hz	60hz	50/60	
23	manual operation with "x" relays	azionamento manuale dei relè	o18	0	4	0	
24	define number of output relays	definizione numero dei relè	o19	1	4	3 (3 compressors) 4 (4 compressors)	
25	Pressure trasmitter's working range - min. value	range minimo della sonda di press.di aspirazione	o20	-1bar	0bar	-1bar	
26	Pressure trasmitter's working range - max. value	range massimo della sonda di press.di mandata	o21	1bar	40bar	7bar	
27	Define DI input:	Definizione DI input					
	0: not used	0: non usato	o22	0	2	1	1
	1: Contact displaces reference	1: spostamento set tarmite contatto					
	2: Start and stops regulation	2: Start and stop della regolazione					
28	Operating hours of relay1 (value times 100)	contaore relè n.1	o23	0h	100h		
29	Operating hours of relay2 (value times 100)	contaore relè n.2	o24	0h	100h		
30	Operating hours of relay3 (value times 100)	contaore relè n.3	o25	0h	100h		
31	Operating hours of relay4 (value times 100)	contaore relè n.4	o26	0h	100h		

32	setting of refrigerant 1=R12. 2=R22. 3=R134A. 4=R502. 5=R717 6=R13. 7=R13B1. 8=R23. 9=R500. 10=R503 11=R114. 12=R142B. 13=user defined. 14=32R 15=R227. 16=R401A. 17=R507. 18=R402A. 19=R404A. 20=R047C. 21=R407A. 22=R407B. 23=R410A. 24=R170. 25=R290. 26=R600. 27=R600A. 28=R744(CO2) 29=R1270. 30=R417A	scelta refrigerante:	o30	1	30	19 (R404A) 2 (R22)

Note :	Note :
*This setting will only be possible if a data communication moduel has been installed in the controller	*questo parametro è da impostare se nel controllore è stato inserito il modulo di comunicaziuone (es. echelon ftt10)



FEC1-2 = Fusibil controllore — Regulation fuses 1A 5x20

E = Controllore CAREL — Regulation IR32Z3

TR = Trasformatore — Trasformer 230V/24V 5VA

CONNETTORE RAPIDO / FAST CONNECTOR

1 UP morsetto/clamp — Filo/cable

1 DOWN morsetto/clamp — Filo/cable

cod. UQ39E002E

Tensione/Voltage/Spannung	380V-400V/3Ph/50-60Hz 220V-230V/3Ph/50-60Hz
N.O. / N.C.	Fam. C34C
	Aux. voltage 230Vac
Data 20/02/06	D.I.C. DIVISIONE IMPIANTI/CENTRALI Dwg 97649
Scala 1 : X	I REGOLAZIONE ELETTRONICA / GB ELECTRONIC REGULATION / D ELEKTRONISCHE STEUERUNG — CAREL IR32Z3
Disk NET	
Dis. A.Tibaldo	Dis.n°. UTQ39E20 — Fog. E
Verifica A.Tibaldo	

Taratura / Settings CUBE COOLER 3-4 compressori/compressors

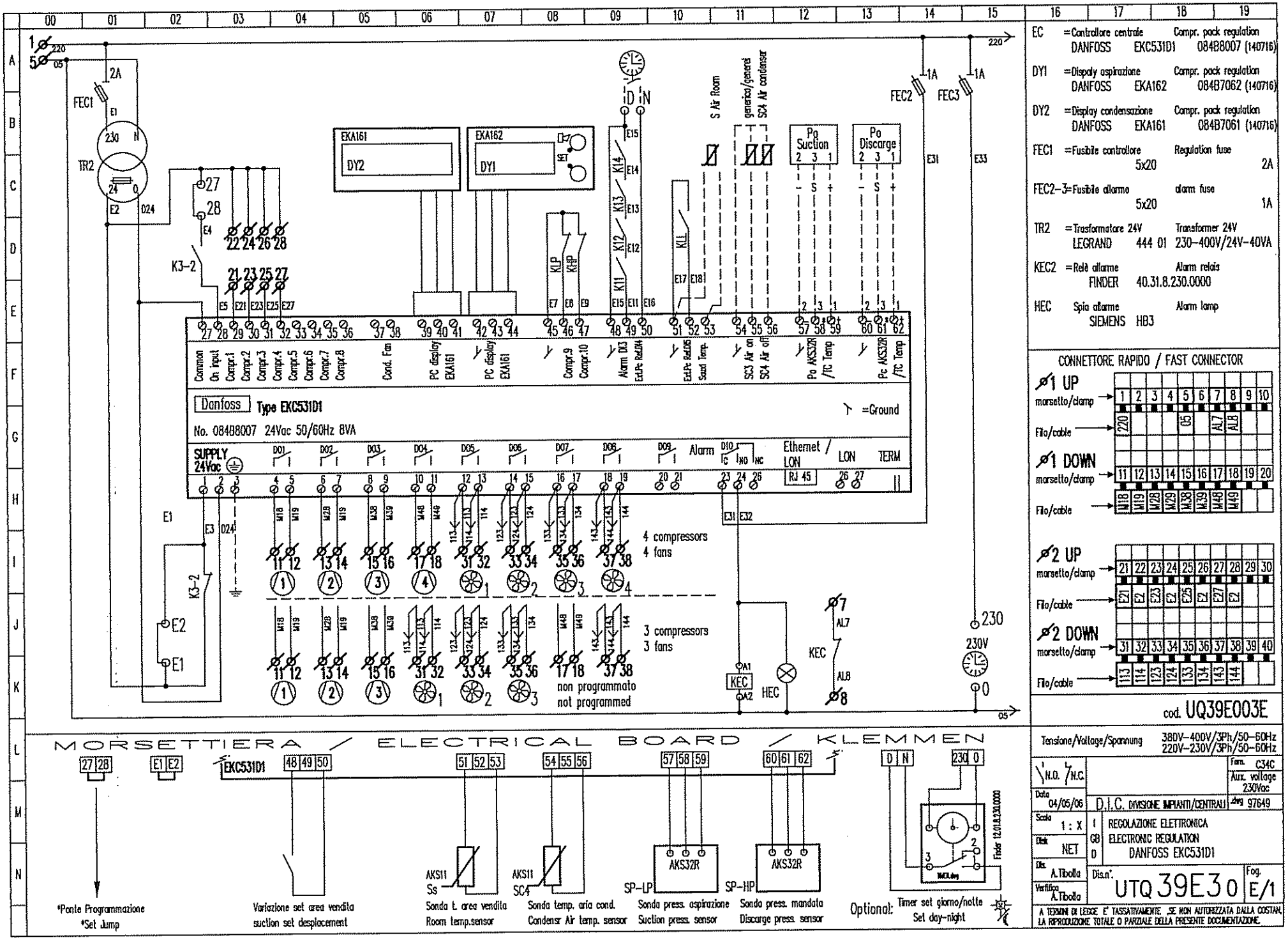
Controllore / Capacitor CAREL IR32Z3 +Sonda di pressione / Pressure sensor KELLER 4-20mA (-1.0 / 7 Bar)

ver.1.1 | 27/05/2006

person: Adriano Tibolla

	Programmazione:	Settings		CAREL Ir32		Centrali			
	a) premere contemporaneamente i tasti PRG-mute + SEL per 5sec.	a) press "prg-mute"+"SEL" simultaneously for 5 seconds.				R404A		R22	
	b) sul display compare 0	b) the display shows 0;							
	c) impostare la password 77 con il tasto (freccia su)	c) select the password "77" by (arrow up)							
	d) premere il tasto SEL per confermare la password	d) press "SEL" to confirm the password							
	e) se la password è corretta compare il parametro C0	e) if the select password is correct, the display shows C0							
	f) procedere nella programmazione come sotto	f) to modify the valuew of the parameter follow the procedure described abov							
Par.	Descrizione	Description	unità m.	default		TN	BT	TN	BT
C0	Modo di funzionamento	function mode	BAR	2		7	7	7	7
P1	Differenziale set-point 1	Hysteresis of set-point 1	BAR	2.0		0.6	0.4	0.6	0.4
P2	Differenziale set-point 2	Hysteresis of set-point 2	BAR	2.0		0.6	0.4	0.6	0.4
C4	Autorità	autority		//		//	//	//	//
C5	Tipo di regolazione	Control action		0		0	0	0	0
C6	Ritardo tra gli inserimenti relè diversi (compressori)	Delay beteween on routines off different out	SEC	5		60	30	60	30
C7	Tempo minimo tra le accensioni dello stesso relè (compressore)	Minimum time between on routines of the same output	MIN	0		5	5	5	5
C8	Tempo minimo di spegnimento dello stesso relè (compressore)	Minimum off time off the same output	MIN	0		2	2	2	2
C9	Tempo minimo di accensione stesso relè (compressore)	Minimum on time of the same output	MIN	0		2	1	2	1
C10	Stato relè in caso di allarme:	status of the ouputs with probe alalrm		0		0	0	0	0
C11	Rotazione uscite	output rotation		0		1	1	1	1
C12	Tempo di ciclo funzionamento PWM	Time off PWM cicle		//		//	//	//	//
C13	Tipo di sonda	Probe type		0		0	0	0	0
P14	Calibrazione sonda offset	Probe calibration or offset	°C	0.0		0.0	0.0	0.0	0.0
C15	Valore minimo per ingresso I e V	Min.value for scaling of analog input	SEC	0.0		-1.0	-1.0	-1.0	-1.0
C16	Valore massimo per ingresso I e V	Max.value for scaling of analog input	SEC	100		7	7	7	7
C17	Velocità risposta sonda (filtro antidisturbi)	Probe response time (noise filter)	SEC	5		5	5	5	5
C18	Selezione unità sonda 0°=C, 1=°F	temperature units: 0=°C / 1=°F		0		0	0	0	0
C19	Funz. 2° sonda : solo versione NTC	2nd probe: NTC only, Mode 1or 2		//		//	//	//	//
C21	Valore minimo set-point 1	Minimum Set-point 1 limit	BAR	min. sonda		2.3	0.4	1.7	0.2
C22	Valore massimo set-point 1	Maximum Set-point 1 limit	BAR	max. sonda		4.0	1.5	3.0	1.0
C23	Valore minimo set-point 2	Minimum Set-point 2 limit	BAR	min. sonda		2.5	0.6	1.9	0.4
C24	Valore massimo set-point 2	Maximum Set-point 2 limit	BAR	max. sonda		4.2	1.7	3.2	1.2
P25	Set allarme di bassa (assoluto)	Low absolut alarm set-point	BAR	min. sonda		1.7	0.2	1.2	0.0
P26	Set allarme di alta (assoluto)	High absolut alarm set-point	BAR	max. sonda		5.0	2.7	4.0	2.0
P27	Differenziale di allarme	Alarm Hysteresis	°C	2.0		0.5	0.5	0.5	0.5
P28	Tempo di ritardo attuazione di allarme	Alarm delay	MIN	60		45	30	45	30
C29	Gestione ingresso digitale 1	Config of digital input 1		0		4	4	4	4
C30	Gestione ingresso digitale 2	Digital input 2		0		0	0	0	0
C31	Stato uscite in caso di allarme da ingresso digitale	Status of the outputs in case of alarm condition detected via digital input		0		0	0	0	0
C32	Indirizzo per connessione seriale	Adress of unit for serial connection		1		1	1	1	1
C33	Non modificare questo parametro	Do NOT modify this parameter		0		0	0	0	0
C50	Abilitazione tastiera (TS) e telecomando (TC)	Activation of Keypad and remote Control		1		1	1	1	1
C51	Codice per abilitazione comando	Code to activate the IR remote control		0		0	0	0	0
	Set-point: Per impostare set-point premere tasto "SEL" per 5sec.	**Set-point : press "SEL" for 5 seconds for change set-points**							
St1	Set-point 1	Set-point 1	BAR	20		2.8(-14°C)	0.6(-36°C)	2,1(-14°C)	0.3(-36°C)
St2	Set-point 2	Set-point 2	BAR	40		3.3(-10°C)	1.1(-30°C)	2,6(-10°C)	0.7(-30°C)

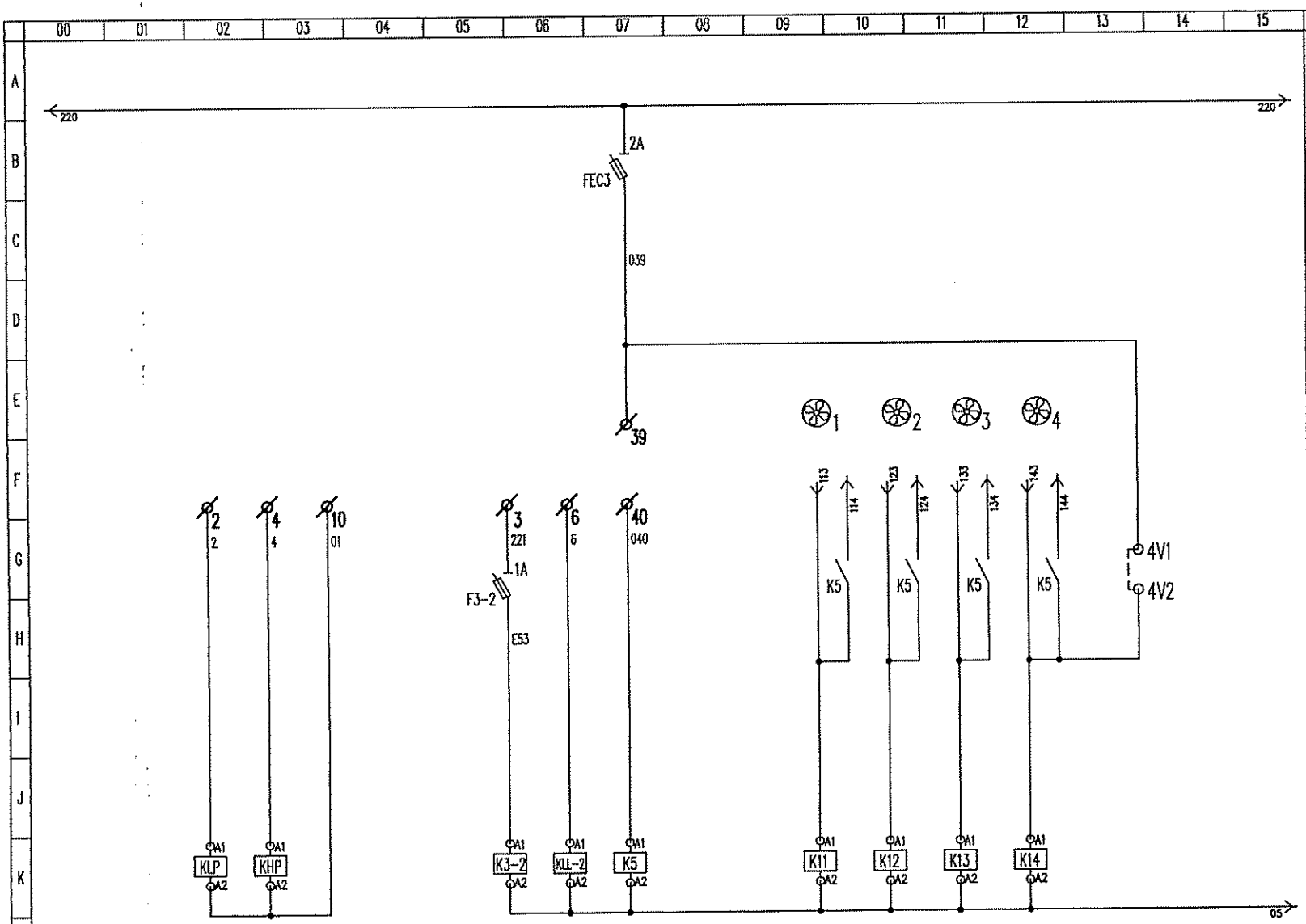
Nota:	Con la programmazione C0=77 lo strumento è predisposto per il funzionamento con 2 set point:	With the parameter C0=7, the capacitor is setting with 2 set-point running:
	a) set point 1 = diurno ; attivo quando l'ingresso digitale è aperto - morsetti q.e. C1-D1 (standard)	a) set-point 1 = day ; is activen when if open the digital input (clamps electrical board C1-D1)
	b) set point 2 = notturno ; attivo quando l'ingresso digitale è chiuso - morsetti q.e. C1-D1 (segnale esterno)	b) set-point 2 = night ; is activen when if closed the digital input (external signal)



EC	=Controllore centrale DANFOSS EKC531D1	Compr. pack regulation 084B8007 (140716)	
DY1	=Dispaly aspirazione DANFOSS EKA162	Compr. pack regulation 084B7062 (140716)	
DY2	=Display condensazione DANFOSS EKA161	Compr. pack regulation 084B7061 (140716)	
FEC1	=Fusibile controllore 5x20	Regulation fuse	2A
FEC2-3	=Fusibile allarme 5x20	alarm fuse	1A
TR2	=Trasformatore 24V LEGRAND 444 01	Transformer 24V	230-400V/24V-40VA
KEC2	=Relè allarme FINDER 40.31.8.230.0000	Alarm relais	
HEC	Spia allarme SIEMENS HB3	Alarm lamp	

cod. UQ39E003E

Tensione/Voltage/Spannung	380V-400V/3Ph/50-60Hz 220V-230V/3Ph/50-60Hz
N.O. / N.C.	Fam. C34C Aux. voltage 230Vac
Data 04/05/06	D.I.C. DIVISIONE IMPIANTI/CENTRALI dwg 97649
Scala 1 : X	I REGOLAZIONE ELETTRONICA GB ELECTRONIC REGULATION D DANFOSS EKC531D1
Dis. NET	
Ds. A.Tibolla	Dis.n°. UTQ39E30 Fog. E/1
Verifica A.Tibolla	



MORSETTIERA / ELECTRICAL BOARD / KLEMMEN

4V1 4V2

ponte con n.3 comandi ventole
jump with n.3 fans comand

4V1 4V2

con n.4 comandi ventole
with n.4 fans comand

FEC3 =Fusibile ausiliario — Auxiliary fuse
5x20 2A

K32 =Segnale ON regolazione — relais ON regulation
FINDER 40.31.8.230.0000

KLP =Relè bassa pressione — Low pressure relais
FINDER 40.31.8.230.0000

KHP =Relè alta pressione — High pressure relais
FINDER 40.31.8.230.0000

KLL-2 =Relè livello liquido — liquid level relais
FINDER 40.31.8.230.0000

K11-13=Relè allarme ventole — Fans alarm relais
FINDER 40.31.8.230.0000

K5 =Relè sicurezza alta pr. — High pressure sicur. relais
FINDER 55.34.8.230.0040

CONNETTORE RAPIDO / FAST CONNECTOR

ø1 UP
morsetto/clamp
1 2 3 4 5 6 7 8 9 10
2 221 4 6 10
Filo/cable
ø1 DOWN
morsetto/clamp
11 12 13 14 15 16 17 18 19 20

ø3
morsetto/clamp
21 22 23 24 25 26 27 28 29 30

ø4
morsetto/clamp
31 32 33 34 35 36 37 38 39 39 40
039 040
Filo/cable

Tensione/Voltage/Spannung 380V-400V/3Ph/50-60Hz
220V-230V/3Ph/50-60Hz

N.O. N.C.

Fam. C34C
Aux. voltage 230Vac

Data 05/05/06
D.I.C. DIVISIONE IMPIANTI/CENTRALI
dwg 97649

Scala 1 : X
Dis. NET
Dis. A.Tibolla
Verifica A.Tibolla

I REGOLAZIONE ELETTRONICA
GB ELECTRONIC REGULATION
D DANFOSS EKC531D1

Dis.n°: UTQ39E50
Fog. E/2

	regolatore elettronico/electronic regulation ver.1.0 giugno / june 2005
TARATURE SETTINGS	DANFOSS EKC531D1 084B8007 - sw 1.22 centrali / compressors pack CNS 3/6G-3/6V

	FUNCTION	FUNZIONE	PAR.	MIN	MAX	TN-r404a	BT-r404a
1	shows Po in EKA 162 (display with bottons)	visualizza la Po - aspirazione (display a tasti)	-	°C			
2	shows Pc in EKA 161	visualizza la Pc - condensazione		°C			
	PO REFERENCE	PO REGOLAZIONE ASPIRAZIONE					
3	neutral zone	zona neutra	r01	0.1°C	20°C	3	2
4	correction signal from PO sensor	correzione segnale sonda PO (aspirazione)	r04	-10°C	10°C	0	0
5	select unit (0=bar / 1 psig)	selezione unità di misura (0=bar / 1 psig)	r05	0	1	0	0
6	start/stop regulation	start/stop regolazione	r12	OFF	ON	ON	ON
7	reference offset for PO	offset notturno per PO (con definizione DI4)	r13	-20°C	20°C	4	2
8	Set regulation setpoint for PO	setpoint per PO	r23	-99°C	30°C	-10	-35
9	Shows total PO reference	visualizzazione riferimento PO	r24	°C			
10	Limitation : PO reference max. value*	PO:limite impostabile massimo	r25	-99°C	30°C	0	-20
11	Limitation : PO reference min. value*	PO:limite impostabile minimo	r26	-99°C	0°C	-15	-39
12	manual displacement of PO(ON=active "r13")	variazione manuale set-point (ON=attivo "r13")	r27	OFF	ON	OFF	OFF
	PC REFERENCE	PC REGOLAZIONE MANDATA					
13	Set regulation setpoint for PC	Set point PC	r28	-25°C	75°C	32	32
14	Shows total PC reference	visualizzazione PC	r29	°C			
15	Limitation : PC reference max. value	limite impostabile massimo della temp PC	r30	-99°C	99°C	45,0	45,0
16	Limitation : PC reference min. value	limite impostabile minimo dellatemp.e PC	r31	-99°C	99°C	20,0	20,0
17	correction signal from PC sensor	correzione segnale sonda PC	r32	-10°C	10°C	0,0	0,0
18	PC reference variation	Caratteristiche variabile regolazione PC					
19	1 and 2 are PI-regulation	1 e 2 regolazione PI					
20	1: Fixed reference "r28" is used	1: da selezionare nel caso si usi il param."r28"					
21	2: variable reference :out door temoperature (Sc3)	2: da impostare nel caso si usi il set variable	r33				
22	included in the reference	con temperatura esterna (Sc3)		1	4	1	1
23	3: As 1, but with P - regulation	3: come 1 però con regolazione P					
24	4: As 2, but with P - regulation	4: come 2 però con regolazione P					
25	Reference offset for PC	Riferimento offset per PC	r34	-20°C	20°C	0,0	0,0
	COMPRESSOR CAPACITY	REGOLAZIONE COMPRESSORI					
26	min. On time for relays	tempo minimo accensione relè	c01	0 min.	30 min.	2	2
27	min. time period between cutins of same relay	tempo minimo tra due accensioni dello stesso	c07	0 min.	60 min.	6	6
28	definition of regulation mode	relè definizione del modo di regolazione					
29	1:sequential (step mode / FILO)	1: sequenziale (step mode / FILO)	c08	1	3	2	2
30	2:cyclic (step mode / FIFO)	2: ciclico (step mode / FIFO)					
31	3: cyclic with unloaders	3: ciclico con parzializzazioni					
32	If the unloaders mode 3 has been selected,the	Nel caso del modo 3 (ciclico con parzializzaz.)					
33	relays for the unloaders can be defined to:	definire i relè delle parzializzazioni.	c09	0	1	//	//
34	0: cut in when more capacity is required	0: accensione quando è richiesta più capacità					
35	1: cut out when more capacity is required	1: spegnimento quando è richiesta più capacità					
36	Regulation parameter for + Zone	ampiezza banda + Zone	c10	0,1 K	20 K	3	2
37	Regulation parameter for + Zone min.	ritardo inserimento in +Zone min.	c11	0,1 min	60 min.	3	2
38	Regulation parameter for ++ Zone min.	ritardo inserimento in ++Zone min.	c12	0,1 min	3,0 min.	1	0,5
39	Regulation parameter for - Zone	ampiezza banda - Zone	c13	0,1 K	20 K	3	2
40	Regulation parameter for - Zone min.	ritardo spegnimento in -Zone min.	c14	0,1 min	60 min.	0,5	0,3
41	Regulation parameter for -- Zone seconds	ritardo spegnimanto in -Zone secondi	c15	0,02 min	20 min.	0,2	0,1
42	Definition of compressor connections.	definizione connessioni compressori	c16	0	26	3 compr.= 3	
	Se the options on page 10 EKC531D1 Manual	*vedi le opzioni a pg.10 manuale EKC531D1*				4 compr.= 4	
						5 compr.= 9	
						6 compr.=10	
43	*The follwing "c17" to "c28" is only relevant if "c16" has been select to 0. A code will then have to be set for the relais that are to be ON at the different steps.*	*I parametri da "c17" a "c28" devono essere se nel parmetro "c16" è stato impostato a "0"*	c17	0	15	//	//
44	Step 1 (M&M operation)	Uscita - gradino 1 (operazione manuale)					
45	Step 2 (M&M operation)	Uscita - gradino 2 (operazione manuale)	c18	0	15		
46	Step 3 (M&M operation)	Uscita - gradino 3 (operazione manuale)	c19	0	15		
47	Step 4 (M&M operation)	Uscita - gradino 4 (operazione manuale)	c20	0	15		
48	Step 5 (M&M operation)	Uscita - gradino 5 (operazione manuale)	c21	0	15		
49	Step 6 (M&M operation)	Uscita - gradino 6 (operazione manuale)	c22	0	15		
50	Step 7 (M&M operation)	Uscita - gradino 7 (operazione manuale)	c23	0	15		
51	Step 8 (M&M operation)	Uscita - gradino 8 (operazione manuale)	c24	0	15		
52	Step 9 (M&M operation)	Uscita - gradino 9 (operazione manuale)	c25	0	15		
53	Step 10 (M&M operation)	Uscita - gradino 10 (operazione manuale)	c26	0	15		
54	Step 11 (M&M operation)	Uscita - gradino 11 (operazione manuale)	c27	0	15		
55	Step 12 (M&M operation)	Uscita - gradino 12 (operazione manuale)	c28	0	15		
56	Definition of fan connection and number:	definizione connessione ventole	c29	0/off	9	3 fans.= 3	
57	1-8 :Total Number of fans	1-8:num.totale delle ventole				4 fans.= 4	
58	9 :Only via analog output and frequency converter	9 :uscita analogica per il comando con inverter				5 fans.= 5	
59	Amplification factor Xp for (P=100/Xp)	Amplificazione fattore Xp (P=100/Xp) per	n04	0,2 K	40K	10	10
60	condenser regulation	regolazione condensatore					
61	I: Integration time Tn for condenser regulation	I: Tempo integrazione TN per reg.condensatore	n05	30 s	600 s	150	150
	ALARM	ALLARMI					
62	Delay time for a "Housing" alarm	ritardo di allarme	A03	0 min	90 min	90	90
63	Low alarm limit for PO	limite allarme inferiore per PO	A11	-99°C	30°C	-25	-42
64	Delay time for a DI1 alarm	ritardo per allarme DI1	A27	0 sec	600s/off	599	
65	Delay time for a DI2 alarm	ritardo per allarme DI2	A28	0 sec	600s/off	599	

65	Delay time for a DI3 alarm	ritardo per allarme DI3	A29	0 sec	600s/off	599	
67	Upper alarm limit for Pc	limite allarme superiore per PC	A30	0 °C	99 °C	53,0	53,0
68	Upper alarm limit for sensor "Housing"		A32	0° C/off	100°C	100	100

	MISCELLANEUS	VARIE					
69	controllers adress	indirizzo controllore	o03*	1	60	-	-
70	on/off switches (service pin message)	on/off microinterruttori (messaggi pin)	o04*	-	-	-	-
71	access code	codice di accesso	o05	off(-1)	100	off	off
72	Used sensor type for Sc3; Sc4 and "Housing"		o06	0	1	1	1
73	0=PT1000, 1=PTC1000						
74	set supply voltage frequency	settaggio frequenza di alimentazione	o12	50hz	60hz	50/60	50/60
75	manual operation with "x" relays	azionamento manuale dei relè					
76	0: no ovveride	0: no azionato					
77	1-10: 1=will cut in relay; 2 relay 2 etc..	1-10 prova relè : 1=inserimento relè 1; 2 ecc...	o18	1	18	0	0
78	11-18: Gives voltage signal on the analog output	11-18 :da tensione in volt sulle uscite analogiche					
79	(11 gives 1.25V, and so on in the steps of 1.25V)	(11 da 1.25V e cosi per le uscite a 1.25V					
80	Po Pressure trasmitter's working range - min. value	range min. della sonda di press.di aspirazione	o20	-1bar	0bar	-1	-1
81	Po Pressure trasmitter's working range - max. value	range max. della sonda di press.di mandata	o21	1bar	40bar	9 (12)**	9 (12)**
82	Define DI4 input:	Definizione DI input					
83	0: not used	0: non usato	o22	0	2	1	1
84	1: PO displacement	1: spostamento set tarmite contatto					
85	2: alarm function. Alarm="A31"	2: Start and stop della regolazione					
86	Operating hours of relay1 (value times 100)	contaore relè n.1	o23	0h	100h		h
87	Operating hours of relay2 (value times 100)	contaore relè n.2	o24	0h	100h		h
88	Operating hours of relay3 (value times 100)	contaore relè n.3	o25	0h	100h		h
89	Operating hours of relay4 (value times 100)	contaore relè n.4	o26	0h	100h		h
90	setting of refrigerant 1=R12. 2=R22. 3=R134A. 4=R502. 5=R717 6=R13. 7=R13B1. 8=R23. 9=R500. 10=R503 11=R114. 12=R142B. 13=user defined. 14=32R 15=R227. 16=R401A. 17=R507. 18=R402A. 19=R404A. 20=R047C. 21=R407A. 22=R407B. 23=R410A. 24=R170. 25=R290. 26=R600. 27=R600A. 28=R744(CO2) 29=R1270. 30=R417A	settaggio refrigeranti	o030	0	30	19	19
91	Define DI5 input:	Definizione input DI5					
	0: not used	0: non usato	o37	0	2	2=liquid level / livello liquido	
	1: Pc displacement	1: spostamento set tarmite contatto					
	2: alarm function. Alarm="A32" (liquid level)	2: alarme generico ALARM ="A32" (livello liquido)					
92	Pc Pressure trasmitter's working range - min. value	range min. della sonda di press.di mandata	o47	-1bar	0bar	-1	-1
93	Pc Pressure trasmitter's working range - max. value	range max. della sonda di press.di mandata	o48	1bar	40bar	34	34
94	Read temperature at sensor Housing	lettura temperatura alla sonda Housing	o49				
95	Operating hours of relay5 (value times 100)	contaore relè n.5	o50	0h	100h		h
96	Operating hours of relay6 (value times 100)	contaore relè n.6	o51	0h	100h		h
97	Operating hours of relay7 (value times 100)	contaore relè n.7	o52	0h	100h		h
98	Operating hours of relay8 (value times 100)	contaore relè n.8	o53	0h	100h		h
99	Operating hours of relay9 (value times 100)	contaore relè n.8	o54	0h	100h		h
100	Operating hours of relay10 (value times 100)	contaore relè n.9	o55	0h	100h		h

	SERVICE	FUNZIONE				
101	Read temperature at sensor "Sc3"	visualizza la temperatura del sensore "Sc3"	u44	°C		
102	Read temperature at sensor "Sc4"	visualizza la temperatura del sensore "Sc4"	u45	°C		

The controller can give the following messagges	Il controllore segnala i seguenti mess. di errore	
Error message : fault in controller	errore controllore	E1
Error message : regulation is outside the range,	il controllore è al di fuori del range	E2
or the control signal is defective	o il controllo del segnale è difettoso	
Alarm message	**Messaggi di allarme**	
Low PO	Bassa pressione	A2
Refrigerant not selected	refrigerante non selezionato	A11
High PC	Alta pressione	A17
Compressor 1 alarm: Terminal 29 is open.	Allarme compressore 1: il morsetto 29 è aperto	A19
Compressor 2 alarm: Terminal 30 is open.	Allarme compressore 2: il morsetto 30 è aperto	A20
Compressor 3 alarm: Terminal 31 is open.	Allarme compressore 3: il morsetto 31 è aperto	A21
Compressor 4 alarm: Terminal 32 is open.	Allarme compressore 4: il morsetto 32 è aperto	A22
Compressor 5 alarm: Terminal 33 is open.	Allarme compressore 5: il morsetto 33 è aperto	A23
Compressor 6 alarm: Terminal 34 is open.	Allarme compressore 6: il morsetto 34 è aperto	A24
Compressor 7 alarm: Terminal 35 is open.	Allarme compressore 7: il morsetto 35 è aperto	A25
Compressor 8 alarm: Terminal 36 is open.	Allarme compressore 8: il morsetto 36 è aperto	A26
Room temperture alarm (housing temp.)	Allarme temperatura ambiente	A27
DI1 alarm. Terminal 46 interrupted	Allarme DI1. Morsetto 46 aperto	A28
DI2 alarm. Terminal 47 interrupted	Allarme DI2. Morsetto 47 aperto	A29
DI3 alarm. Terminal 49 interrupted	Allarme DI3. Morsetto 49 aperto	A30
DI4 alarm. Terminal 50 interrupted	Allarme DI4. Morsetto 50 aperto	A31
DI5 alarm. Terminal 52 interrupted	Allarme DI5. Morsetto 52 aperto	A32
Regulation stopped	Stop regolazione	A45
Status Message	**Messaggio di stato**	
Wait for "c01"	Aspetta per "c01"	S2
Wait for "c07"	Aspetta per "c07"	S5
Wait for "c11" or "c12"	Aspetta per "c11" o "c12"	S8
Wait for "c14" or "c15"	Aspetta per "c14" o "c15"	S9
Refrigeration stopped by the terminal or external start/stop function	Refrigeraz. fermata tramite ingr. digitale esterno start-stop	S10
Manual control of output	controllo manuale delle uscite	S25

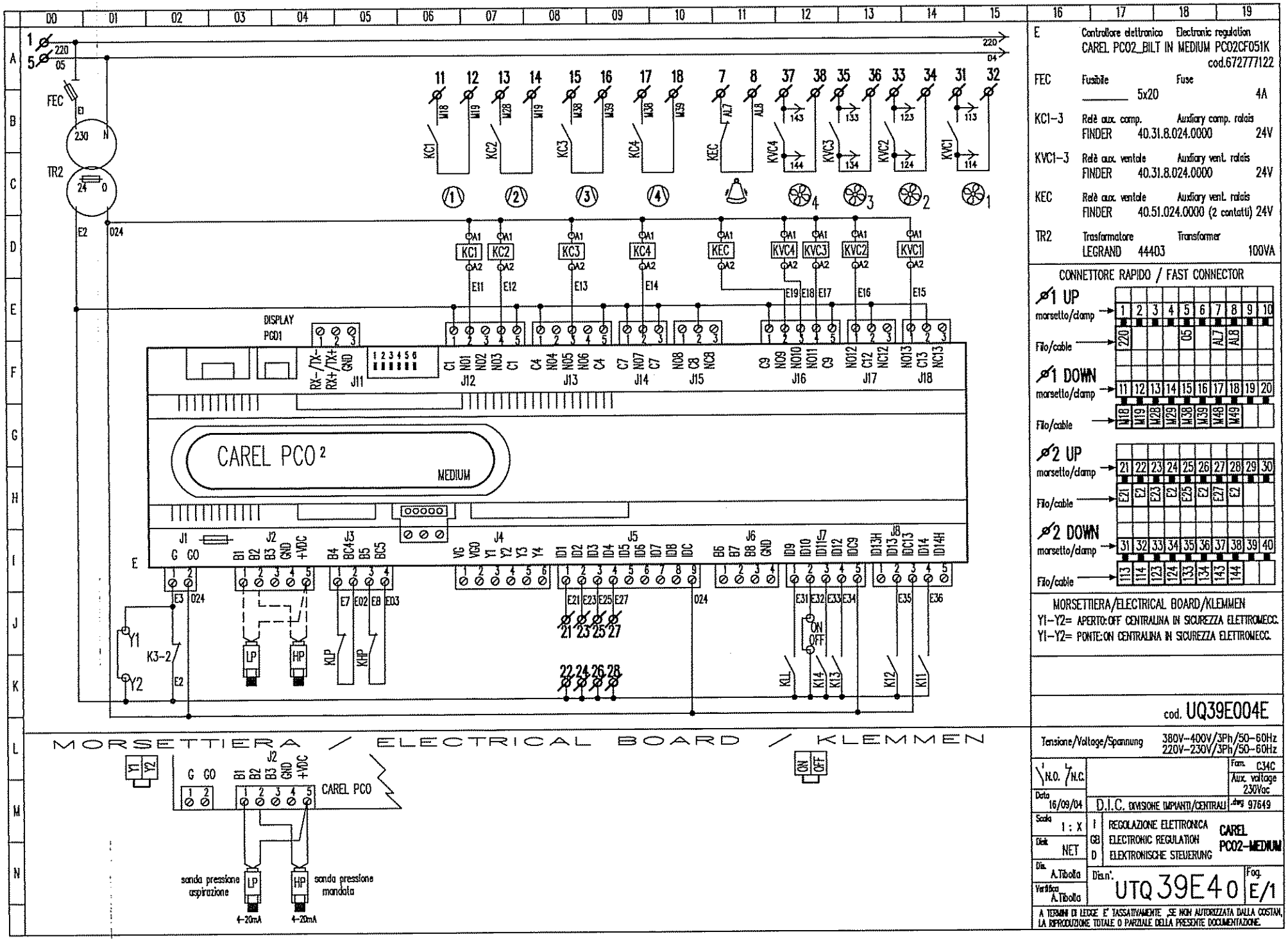
NOTE:

**** suction transducer -1...9 bar = 9**

**** suction transducer -1...12 bar = 12**

**** sonda aspirazione -1...9 bar = 9**

**** sonda aspirazione -1...12 bar = 12**



E Controllore elettronico Electronic regulation
CAREL PCO2_BILT IN MEDIUM PCO2CF051K
cod.6727777122

FEC Fusibile Fuse
5x20 4A

KC1-3 Relè aux. comp. Auxiliary comp. relais
FINDER 40.31.8.024.0000 24V

KVC1-3 Relè aux. ventole Auxiliary vent. relais
FINDER 40.31.8.024.0000 24V

KEC Relè aux. ventole Auxiliary vent. relais
FINDER 40.51.024.0000 (2 contatti) 24V

TR2 Trasformatore Transformer
LEGRAND 44403 100VA

CONNETTORE RAPIDO / FAST CONNECTOR

ø1 UP
morsetto/clamp 1 2 3 4 5 6 7 8 9 10
Filo/cable 220 05 AL7 AL8

ø1 DOWN
morsetto/clamp 11 12 13 14 15 16 17 18 19 20
Filo/cable M18 M19 M28 M29 M38 M39 M48 M49

ø2 UP
morsetto/clamp 21 22 23 24 25 26 27 28 29 30
Filo/cable E21 E22 E23 E24 E25 E26 E27 E28

ø2 DOWN
morsetto/clamp 31 32 33 34 35 36 37 38 39 40
Filo/cable 113 114 123 124 133 134 143 144

MORSETTIERA/ELECTRICAL BOARD/KLEMMEN
Y1-Y2= APERTO:OFF CENTRALINA IN SICUREZZA ELETTROMECC.
Y1-Y2= PONTE:ON CENTRALINA IN SICUREZZA ELETTROMECC.

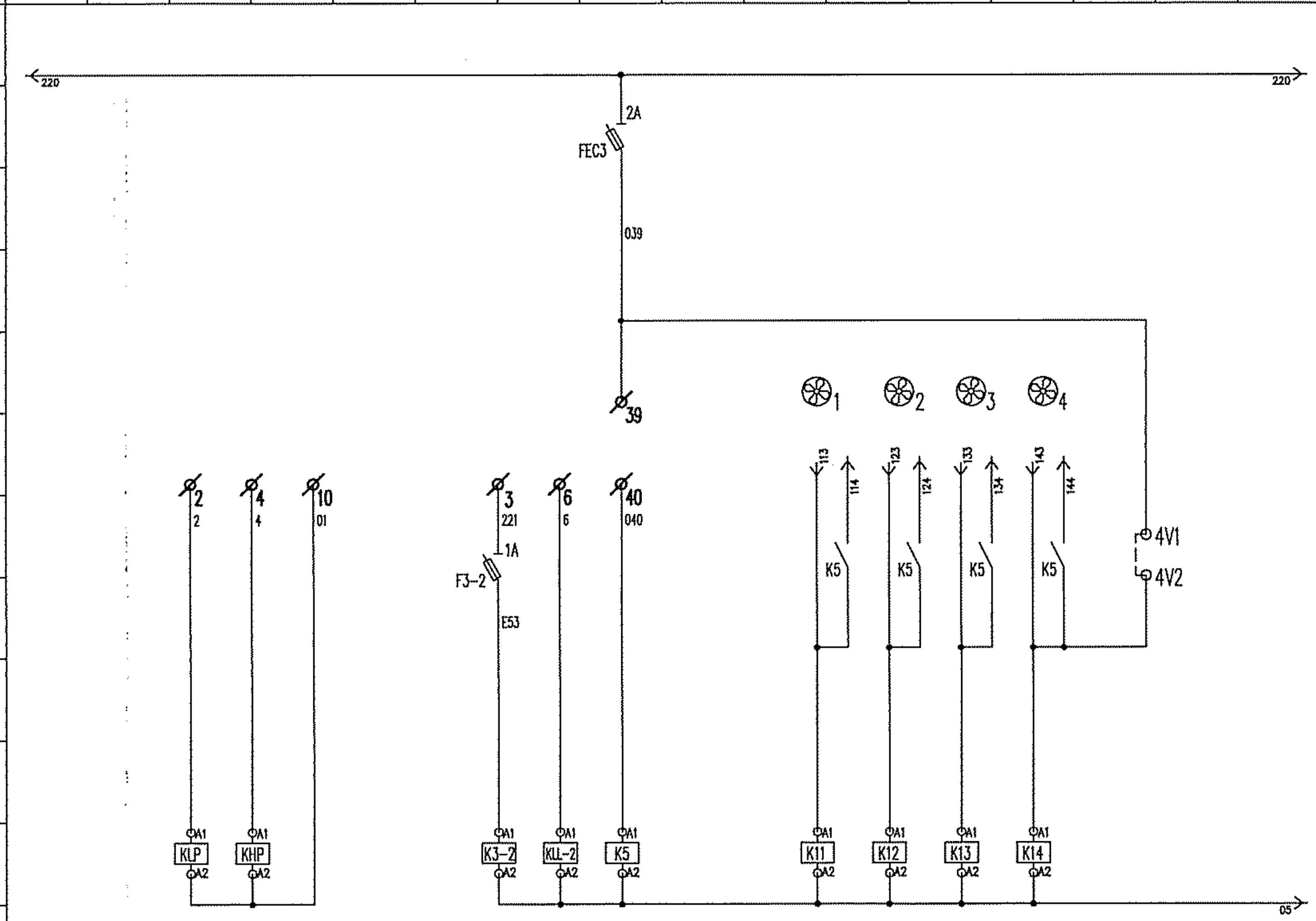
cod. UQ39E004E

Tensione/Voltage/Spannung 380V~400V/3Ph/50-60Hz
220V~230V/3Ph/50-60Hz

N.O. / N.C. Fam. C34C
Aux. voltage 230Vac
Data 16/09/04 D.I.C. DIVISIONE IMPIANTI/CENTRALI dwg 97649
Scala 1 : X
Disk NET
Dis. A.Tibolla
Verifica A.Tibolla

I REGOLAZIONE ELETTRONICA
GB ELECTRONIC REGULATION
D ELEKTRONISCHE STEUERUNG
CAREL PCO2-MEDIUM

Dis.n°. UTQ39E40 Fog. E/1



MORSETTIERA / ELECTRICAL BOARD / KLEMMEN

FEC3	=Fusibile ausiliario 5x20	Auxiliary fuse	2A
K32	=Segnale ON regolazione FINDER 40.31.8.230.0000	relais ON regulation	
KLP	=Relè bassa pressione FINDER 40.31.8.230.0000	Low pressure relais	
KHP	=Relè alta pressione FINDER 40.31.8.230.0000	High pressure relais	
KLL-2	=Relè livello liquido FINDER 40.31.8.230.0000	liquid level relais	
K11-13	=Relè allarme ventole FINDER 40.31.8.230.0000	Fans alarm relais	
K5	=Relè sicurezza alta pr. FINDER 55.34.8.230.0040	High pressure sicur. relais	

CONNETTORE RAPIDO / FAST CONNECTOR

Ø1 UP morsetto/clamp	1	2	3	4	5	6	7	8	9	10
Filo/cable		2	221	4		6				10
Ø1 DOWN morsetto/clamp	11	12	13	14	15	16	17	18	19	20
Ø3 morsetto/clamp	21	22	23	24	25	26	27	28	29	30
Ø4 morsetto/clamp	31	32	33	34	36	37	38	39	39	40
Filo/cable									039	040

4V1 4V2 ponte con n.3 comadi ventole / jump with n.3 fans comand

4V1 4V2 con n.4 comadi ventole / with n.4 fans comand

Tensione/Voltage/Spannung	380V-400V/3Ph/50-60Hz 220V-230V/3Ph/50-60Hz	
N.O. / N.C.		Fam. C34C Aux. voltage 230Vac
Data 05/05/06	D.I.C. DIVISIONE IMPIANTI/CENTRALI	dwg 97649
Scala 1 : X	I REGOLAZIONE ELETTRONICA / GB ELECTRONIC REGULATION / D DANFOSS EKC531D1	
Disk NET		
Dis. A.Tibolla	Dis.n°. UTQ 39E5 0	Fog. E/2
Verifica A.Tibolla		

Parameter	Type	Pos.	DESCRIPTION	U. of M.	Range	Default value	TN	BT
				ref. person:	A.Tibolla		25/02/2005	
	xls n° Ta-pco2-02_2005-ver_5.xls							

SETTING PROCEDURE FOR CONTROLLER CAREL PCO2 SOFTWARE FLSTDMFC0A ver.1.5

document n° **QTP000161A-2**

Main screens

Parameter	Type	Pos.	DESCRIPTION	U.of M.	Range	Default value	System TN	BT
M0,1,..,6 Main menu branch - Menu key								
PressSuct.	R	M0	Pressure measured by the intake sensor on the compressors (suction), pressing ENTER displays the value in degrees Celsius or Fahrenheit.	bar	Screen Cc		Value reading	
Disch.Press.	R	M0	Pressure measured by the outlet sensor on the compressors (discharge), pressing ENTER displays the value in degrees Celsius or Fahrenheit.	bar	Screen Cd			
Suct. Temp.	R	M0	Temperature measured by the intake sensor on the compressors (suction), pressing ENTER displays the value in degrees Celsius, Fahrenheit or bar	°C / F	(-40¸+90)°C			
Disch. Temp.	R	M0	Temperature measured by the outlet sensor on the compressors (discharge), pressing ENTER displays the value in degrees Celsius, Fahrenheit or bar	°C / F	(-40¸+90)°C			
Compressor status	R	M1	View compressor status					
Fan Status	R	M2	View fan status					
Fan inverter status	R	M3	Fan inverter status	%	0¸100			
Compressor inverter status	R	M3	Compressor inverter status	%	0¸100			
Auxiliary room temperature probe	R	M4	Auxiliary room temperature probe	°C	(-40¸ +90)°C			
Auxiliary outside temperature probe	R	M4	Auxiliary outside temperature probe	°C	(-40¸+90)°C			
Auxiliary probe (configurable)	R	M4	Auxiliary probe (can be configured as a temperature probe in C° or for detecting gas)	°C / ppM				
Unit Status	R	M5	With built-in terminal, this screen appears and describes unit status (1: OFF from alarm; 2: OFF from supervisor, 3: Restart after Blackout, 4: OFF from remote input, 5: OFF from button, 6:>>Manual oper.<<; 7: Install. default","OFF from screen.)		1,2,..,9			
unit?	R/W	M5	Used to switch the unit on when using a built-in terminal		No/Yes			

Clock screens

Parameter	Type	Pos.	DESCRIPTION	U. of M.	Range	Default value	System TN	BT
K0,k1,..,k4 clock branch: press the clock key								
Change time	R/W	K0	Set hour, minutes		(0,23)		set date/clock	
					(0,59)			
Change date	R/W	K0	Set day, month, year		(1,31)			

					(1,12,)		
					(0,99)		
Daily time zones with setpoint variation enabled:	R/W	K1	Enable time band with set point variation		N / S		
Time band 1,2,..,4	R/W	K2	Set time band 1,2,..4		(0,23)	7	
00h 00m			hours minutes		(0,59)		
Set 1,2,..,4	R/W	K2	Set Point di lavoro durante fascia oraria (1,2,..4)		min,max set comp.		
Clock not installed	R	K4	Display				

Status screens

Parameter	Type	Pos.	DESCRIPTION	U. of M.	Range	Default value	System TN	BT
I0,I1,..,Im input/output branch; press i/o key								
Digital inputs (O) open-(C)closed 01: 06: 11: 16:	R	I0	Status of digital inputs 1..16				**Display state Visualizzazione stato ingressi / uscite / sonde**	
			(C) = closed (A) = open					
Probes input: Suct Temp Disch Temp	R	I1	Status of the suction and discharge probes	bar/°C / F	Screen Cc and Cd			
Auxiliary probes – Room Temp :	R	I2	Status of auxiliary probe	°C	(-40,+90)°C			
Auxiliary probes – Outside Temp :	R	I2	Status of auxiliary probe	°C	(-40,+90)°C			
Configurable auxiliary probes:	R	I2	Status of auxiliary probe	°C /	(-40,+90)°C o masc. Cg			
Input of probe B3 Instant power input	R	I3	Reading of Probe S3: If enabled, instant power input	ppM kw	Screen			
Inputs b4 - b5 (O) open-(C) b4 :C b5 :C	R	I4	Status of analog inputs used as digital		Cf C / O			
			(C) = closed (O) = open					
Inputs b9 - b10 (A) open - (C) closed b9 :C b10 :C	R	I5	Status of analog inputs used as digital (LARGE card); (C) = closed, (O) = open		C / O			
Digital outputs (A) open-(C) closed 01: 06:11:16:	R	I6	Status of digital outputs 1..16		O / C			
			(O) = open (C) = closed					
Inverter Y1	R	I7	Fan inverter status		0 , 1000			
Inverter Y2	R	I7	Compressor inverter status		0 , 1000			
Input/output board configuration:	R	I8	Displays type of board used		Small, Medium, Large			
Relay Output config. k1,k2..k18:	R	I9,Ia, Ie	Relay output configuration k1, k2, ..k18					
Input configuration b4,b5..b6 : 0	R	If	Configuration of inputs b4,b5,..b6					
Input configuration ID1,ID2,..ID18	R	Ig,Ih,..Il	Configuration of inputs ID1, ID2,.. ID18					
Input configuration b9,b10	R	Im	Configuration of inputs b9,b10					

Set-point screens

Parameter	Type	Pos.	DESCRIPTION	U. of M.	Range	Default value	System TN	System BT
S0,S1,..,Sc Set Point branch: premere tasto Set point								
Set. PROPORTIONAL BAND	R	S0	Shows whether compressors work in dead band or proportional band and reads the working set-point					
Diff.	R	S0	Reads compressor differential					
Fans PROPORTIONAL BAND set	R/W	S1	Enter fans set-point	bar / °C	min¸max fan set	15.5	**14 (+32)**	
Diff.	R	S1	Reads fan differential					
Compressors PROPORTIONAL BAND set	R/W	S2	Enter compressors set-point	bar / °C	min¸max comp. set	1.0	**3,0 (-12)**	**0,6 (-36)**
Compressor inverter PROPORTIONAL BAND set	R/W	S3	Enter compressor inverter set-point	bar / °C	min¸max comp. set	1.0	-	-
Fan Inverter PROPORTIONAL BAND set	R/W	S4	Enter fan inverter set-point	bar / °C	min¸max fan set	15.5	-	-
Enter setpoint password:	R/W	S5	Enter setpoint password		0 ¸ 9999	0	-	-
Compressor inverter Offset :	R/W	S6	Compressor inverter offset setting	bar / °C	min¸max comp. set		-	-
Climb up inverter time :	R/W	S6	Time taken by the inverter to reach full output	V	0 ¸ 10.0	2	-	-
Fan inverter Offset :	R/W	S7	Fan inverter offset setting	bar / °C	min¸max fan set		-	-
Climb up inverter time:	R/W	S7	Time taken by the inverter to reach full output	V	0 ¸ 10.0	1.0	-	-
Set compressor diff:	R/W	S8	Settings compressor differential	bar /°C	0 ¸ 20.0	0.5	**0,5 (4°C)**	**0,5 (4°C)**
Set fan diff:	R/W	S8	Settings compressor differential	bar /°C	0 ¸ 20.0	2.0	**2,0 (5°C)**	
Inverter differential compr. Inver.	R/W	S9	Settings compressor inverter differential	bar /°C	0 ¸ 99.9	0.5	-	-
Fan Inverter	R/W	S9	Settings fan inverter differential	bar /°C	0 ¸ 99.9	2.0	-	-
Enter new password:	R/W	Sa	Enter a new set-point password		0 ¸ 9999	0	-	-

Maintenance screens

Parameter	Type	Pos.	DESCRIPTION	U. ofM.	Range	Default value	System TN	System BT
A0,A1,..,Ai – B0,B1,..,Bs maintenance branch : press maintenance key								
Compressor working hours	R	A0,A1	Displays the operating hours	hours	0¸999999		**maintenance screens/ settings**	
1,2,..6 :			of compressors 1,2,..,6					
Fan working hours	R	A2,A3,.	Displays the operating hours	hours	0¸999999			
1,2,..16 :		A6	of fans 1,2,..,16					
Instant Delta efficiency	R	A7	Displays the instant efficiency value	%	0¸99.9			
Delta efficiency Current daily	R	A8	Displays the current daily,	%	0¸99.9			
Current monthly			monthly and annual efficiency					
Current yearly								
Delta efficiency Daily old Monthly old	R	A9	Displays the daily,	%	0¸99.9			
Yearly old			monthly and annual old efficiency					
Delta efficiency	R	Aa	Indicates the time band in which the current daily efficiency percentage is calculated and displays the current daily efficiency percentage	%	0¸99.9			
00:00 C-gg 00:00 C-gg att. Delta efficiency	R	Ab	Indicates the time band in which the previous daily efficiency percentage is calculated and displays the previous daily efficiency percentage and previous night-time efficiency percentage	%	0¸99.9			

00:00 C-day 00:00 C-day old C-night old						
Power input instant value:	R	Ac	Displays the instant power input value	kw	0¸9999	
Power input	R	Ad	Reads power input	kw,	0¸999999	
Current Day			current daily (kw), current monthly (kw)	Mw		
Current month			and current yearly (Mw)			
Current year						
Power input: Day old	R	Ae	Reads previous daily (kw) monthly(kw) yearly (kw) power input	kw,	0¸999999	
Month old				Mw		
Year old						
Total power input	R	Af	Reads total power input (Mw)	Mw	0¸999999,999	
Power input:	R	Ag	Indicates the time band in which the current daily power input is calculated	kw	0¸9999	
00:00 C-day 00 C-day curr.			displays the current daily power consumption as a percentage			
Power input: 00:00 C-day 00:00	R	Ah	Indicates the time band in which the daily and night-time power consumption is calculated and displays the daily power consumption as a percentage and the night-time power consumption as a percentage	kw	0¸9999	
C-day :						
C-night:						
GSM MODEM	R	Ai	GSM Modem : GSM status and signal reception, expressed as a percentage			
Status:						
Range:						
Enter maintenance password:	R/W	B0	Enter maintenance password		0 ¸ 9999	0
Keyboard On/Off enable:	R/W	B1	Enable ON/OFF from the keypad		Yes/No	Si
Switch-Off unit:	R/W	B1	Enable unit ON/OFF from the screen		Yes/No	Si
Delete Hystorical Alarms:	R/W	B2	Deletes the alarm log		Y/N	N
SMS test sending:	R/W	B2	Used to send a test SMS if the GSM modem is enabled		Y/N	N
Number of attempts :	R/W	B3	Set number of attempts from GSM modem. Visualizzata se abilitato modem GSM		0 ¸ 9	3
Phone number: :	R/W	B3	GSM modem telephone number settings. Displayed if the GSM modem is enabled		20 digits, settable by the user	0
SMS password:	R/W	B3	GSM modem password settings. Displayed if the GSM modem is enabled			0
Description of events:	R/W	B4	This screen is sent as SMS. Visualizzata se abilitato modem GSM		Settable text:	
Alarm compressor hour meter threshold:	R/W	B5	Max compressor operating hour threshold setting. Once the threshold is exceeded, an alarm is activated.	Hours	1 ¸ 999000	1000000
Alarm fan hour meter threshold:	R/W	B6	Max fan operating hour threshold setting. Once the threshold is exceeded, an alarm is activated.	Hours	1 ¸ 999000	1000000
Compressors time counters reset: 1,2,..,6	R/W	B7,	The time counter of compressors can be reset		Y/N	N
Fans time counters reset: 1,2,..,16	R/W	B8,B9	The time counter of fans can be reset		Y/N	N
Power input: Day reset:	R/W	Ba	Reset daily power consumption count, reset monthly power consumption count, reset annual power consumption count		Y/N	N
monthly reset:						
Yearly reset:						
Power input: Total reset:	R/W	Bb	Reset total power consumption count		Y/N	N
C-day reset:	R/W	Bb	Reset day power consumption count		Y/N	N
C-night reset:	R/W	Bb	Reset night power consumption count		Y/N	N
Total Delta efficiency reset:	R/W	Bc	Total Delta efficiency reset		Y/N	N
Date of last maintenance:	R/W	Bd	Set last maintenance date		(1¸31)	
			day month year		(0¸23)	
					(0¸99)	

Freon type:	R/W	Bd	Set freon		5		
Unit type:	R/W	Bd	Set board type details		MT / LT		**Probe calibration**
Probes calibration: Suction:	R/W	Be	Suction probe calibration	bar	-9.9 ¸ 9.9	0	
Probes calibration: Discharge	R/W	Be	Discharge probes calibration	bar	-9.9 ¸ 9.9	0	
Probe setting: Gas	R/W	Bf	Gas probe calibration	ppM	-9.9 ¸ 9.9	0	
Probe setting: ext	R/W	Bf	Outside probe calibration	°C	-9.9 ¸ 9.9	0	
Manual operation - duration	R	Bg	Display. Manual device operation		Y/N	N	**Device output manual forcing**
max 5 minutes							
Comp.1:N Stat.: (compres.1,2,..,6)	R/W	Bh,Bi, ..,Bm	Manual operation of compressor 1,2,..,6		Y/N	N	
Step1:N Stat.:	R/W	Bh,Bi, ..,Bm	Manual operation by steps compressor 1,2,..,6		Y/N	N	
Parz.2:N Stat.:	R/W	Bh,Bi, ..,Bm	Manual operation by steps compressor 1,2,..,6		Y/N	N	
Parz.3:N Stat.:	R/W	Bh	Manual operation by steps of compressor 1		Y/N	N	
Manual operation: Fans.1,2,..,16: Status	R/W	Bn,Bo ,..,Bq	Manual operation of fans 1,2,..,16		Y/N	N	
COMP. On manual Comp. inverter:	R/W	Br	Inverters can be forced to 100% (MANU.) or to zero (AUTO.)		AUTO /MAX	AUTO	
Inverter fans:	R/W	Br	Inverters can be forced to 100% (MANU.) or to zero (AUTO.)		AUTO /MAX	AUTO	
Enter new password:	R/W	Bs	Enter a new maintenance password		0 ¸ 9999	0	**Maintenance password**

Programming screen

System

Parameter	Type	Pos.	DESCRIPTION	U. of M.	Range	Default value	TN	BT
Enter PROGRAM key – programming branch P0,P1,..,Pj								
Enter user password:	R/W	P0	Enter user password		0 ¸ 9999	0	**0**	
Current language: ITALIAN press ENTER key to change	R/W	P1	Based on the configuration installed, the language used on the screens can be changed (ITALIAN, ENGLISH, FRENCH, GERMAN, SPANISH)		5 Languages		**1 (Italian)**	
bar/°C change set-point	R/W	Pq	Configure the setpoint in degrees centigrade or pressure				**bar**	
Compressor Setpoint limit	R/W	P2	Upper and lower limit of the compressor setpoint	bar / °C	(-95¸95) o (-5¸+70)	2.5	**4,7 (-2)**	**1,5 (-25)**
Max **Min**				bar / °C	(-95¸95) o (-5¸+70)	0.1	**2.4 (-17)**	**0,3 (-40)**
Fan Setpoint limit	R/W	P3	Upper and lower limit of the fan setpoint	bar / °C	(-95¸95) o (0¸+30)	1.0	**10 (+20)**	
Max **Min**				bar / °C	(-95¸95) o	25.0	**17 (+40)**	

					(0,+30)			
Dead zone cut-in time **max time** **min time**	R/W	PL	Set the maximum and minimum time for the cut-in calls for compressors in dead zone	s	0…..9999	60 20	**240** **120**	**180** **90**
Dead zone cut-in time **max time** **min time**	R/W	PM	Set the maximum and minimum time for the cut-out calls for compressors in dead zone	s	0…..9999	60 10	**60 15**	**40** **5**
Diff. Dead zone **Pressure range in which time varies**	R/W	PN	Pressure differential in which compressor on/off time is proportional to suction pressure position	bar	0…..99,9	0,5	**0,5**	**0,3**
Alarm delay generic input	R/W	Po	Generic/compressor thermal overload alarm delay	s	0…..99	0	**90**	**90**
Oil differential delay alarm Start:	R/W	P4	Delay of oil differential alarm (if configured) Alarm timing on compressor start	s	0 ... 360	120	**/**	
Oil differential delay alarm Running:	R/W	P4	Oil differential alarm delay (if configured) alarm times with compressor in stable operation	s	0 ... 99	10	**/**	
Alarms relay delay:	R/W	P5	Change in alarm relay status delay	s	0….999	1	**900**	
LP auto->man change 5 alarms within:	R/W	P5	On the fifth activation, within the set time, the low pressure alarm from pressure switch changes from automatic to manual reset	min	0….999	10	**10**	
Suction press. alarm Thresh. A.:	R/W	P6	Suction probe alarm: high threshold setting	bar /°C	(-95..95) o (-5..+70)	4.0	**5,0 (0)**	**2,0 (-20)**
Differ. :	R/W	P6	Suction probe alarm: differential setting	bar /°C	0….99,9	0.5	**0,5 (3K)**	**0,3 (2K)**
Delay:	R/W	P6	Suction probe alarm: delay setting	s	0….9999	1	**1800**	
Suction press. alarm Thresh. B.:	R/W	P7	Suction probe alarm: low threshold setting	bar /°C	(-95..95) o (-5..+70)	0.5	**1,5 (-25)**	**0,2 (-42)**
Differ. :	R/W	P7	Suction probe alarm: differential setting	bar /°C	0….99,9	0.5	**0,5 (3K)**	**0,3 (2K)**
Delay:	R/W	P7	Suction probe alarm: delay setting	s	0….9999	1	**300**	
Disch. press. alarm Thresh. A.:	R/W	P8	Discharge probe alarm: high threshold setting	bar /°C	(-95¸95) o (0¸+30)	20.00	**22,0 (+50)**	
Differ. :	R/W	P8	Discharge probe alarm: differential setting	bar / °C	0...99.9	1.0	**1,0 (2K)**	
HP Prev Time prevent 1:	R/W	P9	The time in which cut-in calls after a prevent cycle has occurred	min	0…99	6	**5**	
HP Prev Time prevent 2:	R/W	P9	If two prevent cycles occur within this time, an excessive prevent frequency alarm is generated	min	0…9999	6	**10**	
HP Prev Time prevent 3:	R/W	P9	If no prevent alarms are activated in this period, the excessive prevent frequency alarm is reset automatically	min	0…99	30	**30**	
Disch. press. alarm Thresh. B.:	R/W	Pa	Discharge probe alarm: low threshold setting	bar / °C	(-95¸95) o (0¸+30)	2.0	**5,0 (0)**	
Differ. :	R/W	Pa	Discharge probe alarm: differential setting	bar / °C	0...99.9	1.0	**0,5 (2,5K)**	
Delay:	R/W	Pa	Discharge probe alarm: delay setting	s	0….999	1	**60**	
Liquid level al. Delay:	R/W	Pb	Liquid level alarm delay	s	0….9999	90	**1800**	
Alarm gas detec. Threshold:	R/W	Pc	Refrigerant leak detector alarm threshold	ppM	99.9..99.9	50.0	50	
Alarm gas detec. Different.:	R/W	Pc	Refrigerant leak detector alarm differential	ppM	9.9...9.9	2.0	2.0	
Delay:	R/W	Pc	Refrigerant leak detector alarm delay	min	0...99	3	3	
Blackout startup delay enabled:	R/W	Pd	Enable delay at start-up after blackout.		Y/N	N	**N**	
Delay time:	R/W	Pd	Used to diversify the start times with multiple units, when power returns after a blackout	S	0...9999		**-**	
Switch OFF unit OFF by supervisor:	R/W	Pe	Enable ON/OFF from supervisor		Y/N	N	N	
Disconnected probe:	R/W	Pe	Enable Off from disconnected probe		Y/N	N	N	
Elect. input start sampling **Daily, minutes**	R/W	Pf	Set daily power consumption sampling, hours, minutes, monthly		(0..23)	23	**-**	
Monthly **Power input**	R/W	Pg	Set yearly power consumption sampling		(0..59) (0..31) 1¸12	12	**-** **-** **-**	
Start sampling yearly:							**-**	

Power input	R/W	Ph	Set power consumption sampling, start time		0¸23	8	-	
Start daily zone							-	
Minutes	R/W		minutes to end		0¸59	0	-	
End daily zone:	R/W	Ph	Set power consumption sampling, end time		0¸23	20	-	
Minutes	R/W		minutes to end		0¸59	30	-	
Evaporator Evap. Temp.	R/W	Pi	Evaporator evaporating temperature		-99.9¸ Set. comp °C	-265	-	
Evap.Delta efficiency	R/W	Pi	Evaporator efficiency	%	0¸99	3	-	
Condenser cond Temp.	R/W	Pj	Condenser condensing temperature		Set fans °C¸999	430	-	
CondDelta efficiency	R/W	Pk	Efficienza condensatore	%	0¸99	2	-	
Enter new password:	R/W	Pk	Enter a new user password		0¸9999	0	-	
Configuration screen							**System**	
Parameter	**Type**	**Pos.**	**DESCRIPTION**	**U. of M.**	**Range**	**Default value**	**TN**	**BT**
Press MENU+PROGRAM key, the cursor will already be in the CONFIGURATION chain; press ENTER, the cursor will already be on DEVICES, press ENTER: you can now view the branch C1,2,..,Ch								
Enter manufacturer password:	R/W	C0	Enter manufacturer password		0¸9999	0	**0**	
Type of safety devices per compressor	R/W	C3	Set the type of safety devices per compressor:		4	1	**1 (generic)**	
			1-Generic, 2-Thermal overload + Oil differential, 3- Thermal overload + High/low pressure switch 4: Thermal overload + High/low pressure switch + Diff. Oil					
Config. number of fans:	R/W	C4	Set number of fans		0-16	4	**2=2 fans 3=3 fans 4=4 fans**	
Config. number of compressors:	R/W	C4	Set number of compressors		0¸6	3	**3=3 compr. 4=4 compr. 5=5 compr.**	
Config. number of Load steps:	R/W	C4	Set load steps		0¸3	0	**0**	
Non configurable compressor inverters	R/W	C5	Enable compressor inverters if configured without load steps		Y/N	N	**N**	
Enable fan Inverter:N Y1=t	R/W	C5	Enable control of fans with inverters		Y/N	S	**N**	
Enable alarm relay:	R/W	C6	Enable alarm relay		Y/N	S	**Y**	
Enable clock card:	R/W	C6	Enable clock card if pCO1		Y/N	S	**Y**	
Enable inputs Gen. pressure switch HP : gen.HP:	R/W	C7	Enable inputs: System-protection low-pressure switch (automatic –reset) and high-pressure switch (manual reset)		Y/N	S	**Y**	
Enable ON/OFF inputs from Dig. Input :	R/W	C3	Enable ON/OFF of units from digital input, has priority over that of keypad		Y/N	N	**N**	
Liquid level alarm:	R/W	C8	Enable liquid level alarm from digital input (display only).		Y/N	S	**Y**	
Enable inputs Common oil diff.	R/W	CK	Enable common oil differential alarm		Y/N	N	**N**	
Enable inputs Com. fan thermal overload	R/W	CK	Enable common fan thermal overload alarm (display only).		Y/N	N	**N**	
Enable inputs Setpoint change from DIN	R/W	CK	Enable change of setpoint from digital input. The setpoint changes depending on the offsets entered on the		Y/N	N	**N**	

			screens Sb, Sc					
Enable electronic expansion valve:	R/W	C9	Enable expansion with the help of the electronic valve		Y/N	N	**N**	
Type of NTC suction probe:	R/W	Ca	Defines type of suction probe Carel NTC temperature probes, (50÷100 °C; R/T 10KW a 25°C), voltage (0-1)V, (0-10)V current (0-20)mA, (4-20)mA			(4-20)mA	**4-20mA**	
input no. B1	R/W	Ca	Sets position of the suction probe: B1 o B7 solo per schede Medium o Large	Y/N	N		**N**	
Type of NTC discharge probe:	R/W	Cb	Defines type of discharge probe Carel NTC temperature probes, (50÷100 °C; R/T 10KW a 25°C), voltage (0-1)V, (0-10)V current (0-20)mA, (4-20)mA		(4-20)mA		**4-20mA**	
input no. B2	R/W	Cb	Sets position of the discharge probe: B2 or Bx only for Medium or Large boards		Y/N	N	**N**	
Suction pressure probe min.value:	R/W	Cc	Suction probe full scale setting	bar	-10.0¸40.0	-5	**-1**	
Max :	R/W	Cc	Suction probe full scale setting	bar	-10.0¸40.0	70	**9**	
Discharge pressure probe min. value:	R/W	Cd	Discharge probe full scale setting	bar	-10.0¸40.0	0	**-1**	
Max :	R/W	Cd	Discharge probe full scale setting	bar	-10.0¸40.0	300	**19 (30)**	
Enable probes: B3 Room. temp. :	R/W	Ce	For enabling external temperature probes		Y/N	N	**N**	
B6 Outside Temper.:	R/W	Ce	For enabling external temperature probes		Y/N	N	**N**	
B7 settable:	R/W	Ce	For enabling external temperature probes		Y/N	N	**N**	
B3 Power input:	R/W	Cf	For enabling probe B3 for power consumption		Y/N	N	**N**	
Min :	R/W	Cf	Probe full scale setting		0¸999	0	**-**	
Max :	R/W	Cf	Probe full scale setting		0¸200.0	200	**-**	
B7 Gas detector	R/W	Cg	For enabling probe B7 for refrigerant gas detection		Y/N	S	**N**	
Min :	R/W	Cg	Setting scale max. and min. limits		-99.9¸ 99.9	0	**-**	
Max :	R/W	Cg	Setting scale max. and min. limits		-999.9¸ 999.9	90	**-**	
Freon type:	R/W	Ch	Type of refrigerant used: R22, R134a, NH3, R404a, R407C, R410A o nessuno di questi tipi		7	r134a	**r404a**	

Input configuration screens

Parameter	Type	Pos.	DESCRIPTION	U. of M.	Range	Default value	System TN	System BT
Press keys MENU+PROGRAM, the cursor will already be in the CONFIGURATION chain; press ENTER, place the cursor on the INPUT POSITION CHAIN, press ENTER; using UP/DOWN it is possible to scroll the screens in branch D1,D2,..,Dd								
Card Pos. Thermal overload comp 1,2,..,6	R/W	D0,D1,..,D5	Position of digital inputs used as safety devices		0¸23			
Oil Diff. comp. 1,2,..,6	R/W	D0,D1,..,D5	compressor 1,2,..,6 Position of digital inputs used as safety devices		0¸23			
Pres.HL. Comp. 1,2,..,6	R/W	D0,D1,..,D5	compressor 1,2,..,6 Position of digital inputs used as safety devices		0¸23			
Card Pos. Thermal overload fans 1,2,..,16	R/W	D6,D7,..,Da	compressor 1,2,..,6 Position of digital inputs used as safety devices fans 1,2,..,16		0¸23			
Card Pos. ON / OFF %	R/W	Db	Position of the ON/OFF digital input on the card Parametri visibili solo se abilitati.		0¸23			
Card Pos.: Liquid level	R/W	Dc	Position of the liquid level alarm on the card. Parameter		0¸23			

alarm:			can be seen only if enabled.					
Card Pos. Gen. LP pressure switch: Gen. HP pressure switch:	R/W	Dd	Position of high and low pressure switches on the card. Parameter can be seen only if enabled.		0..23			
Output configuration screens							**System**	
Parameter	**Type**	**Pos.**	**DESCRIPTION**	**U. of M.**	**Range**	**Default value**	**TN**	**BT**
Press keys MENU+PROGRAM, the cursor will already be in the CONFIGURATION chain; press ENTER, place the cursor on the OUTPUT POSITION CHAIN, press ENTER; using UP/DOWN it is possible to scroll the screens in branch E1,E2,..,Ed								
Comp.1,2,..,6	R/W	E1,E2,	Position of high and low pressure switches on the card.		0¸(8-13-8)			
Relay no.:		,E5	digital output compressor 1,2,..,6					
Load step 1-C1,2,..,6	R/W	E1,E2,	Position of load step 1 of compressor 1,2,…,6 digital outputs on the card		0¸(8-13-8)			
Relay no.:		,E5						
Load step 2-C1,2,..,6	R/W	E1,E2,	Position of load step 2 of compressor 1,2,…,6 digital outputs on the card		0¸(8-13-8)			
Relay no. 0:		,E5						
Load step 3-C1,2,..,6	R/W	E1,E2,	Position of load step 3 of compressor 1,2,…,6 digital outputs on the card		0¸(8-13-8)			
Relay no.:		,E5						
Card Pos. Fans 1,2,..,16	R/W	E6,E7,	Position of digital outputs on the card.		0¸(8-13-8)			
Relay no.:		Ea	fans 1,2,..16					
Card Pos. Alarm relay n°.:	R/W	Eb	Position of the alarm digital output on the card		0¸(8-13-8)			
General settings:							**System**	
Parameter	**Type**	**Pos.**	**DESCRIPTION**	**U. of M.**	**Range**	**Default value**	**TN**	**BT**
Press keys MENU+PROG; using the UP/DOWN keys go to the PARAMETERS chain and press ENTER								
Logic:Digital inputs N/A = no alarm	R/W	G0	Digital input logic setting. Normally open: the contact is open in non-alarm conditions		N.A./N.C	N.C.	**N.C.**	
Logic ON/OFF from digital input	R/W	G1	Remote ON/OFF logic setting. Normally open: unit in OFF position from digital input.		N.O./N.C	N.O.	**N.O.**	
Type of reset for pressure-switch alarm A/B single compresso:	R/W	G2	Type of high/low pressure switch reset for single compressor. Automatico: al cessare dell'allarme il compressore riparte. Visibile se i parametri sono abilitati		AUTOMATIC/ MANUAL	MANUAL	**AUTOMATIC**	
High Prevent	R/W	G3	Enables suction high pressure prevention		DISABLED/ENABLED	ENABLED	**ENABLED**	
Discharge pressure	R/W	G3	Enables high suction pressure prevention	bar	0¸99	18	**18**	
Alarm relay logic:	R/W	G4	Alarm relay logic. Can be seen if the alarm relay is enabled.		NORMALLY CLOSED/OPEN	NORMALMENTE CHIUSO	**NORMALLY CLOSED**	
Comp. rotation	R/W	G5	Enabling FIFO rotation first in first out) for compressors.		LIFO.FIFO, timer controlled	FIFO	**FIFO**	
Set. PROPORTIONAL BAND for comp.	R/W	G5	Type of control to be used with compressor management: Proportional band or Dead Zone		Proportional band/dead band	Dead zone	**DEAD ZONE**	
Type of control Compressors:	R/W	G6	This screen can only be viewed if the compressor setting is Proportional band. Tipo di regolazione da seguire: (P) Proporzionale o (P+I)Proporzionale è integrale.		P / P+I	P	**P**	
Integr. time (only P+I)	R/W	G6	Integral time of P+I control	s	0¸999	600	**-**	
Comp. start mode :CppCppCpp	R/W	G7	Compressors start mode CppCppCpp = fully start one compressor at a time CCCppppppp= start first all		CppCppCpp / CCCppppppp	CppCppCpp	**-**	

			compressors and then all load steps					
Comp. Switch off mode:ppCppCppC	R/W	G7	Compressors switch off mode CppCppCpp = fully start one compressor at a time CCCppppppp= start first all compressors and then all load steps		CppCppCpp / CCCppppppp	CppCppCpp	-	
Load steps logic:	R/W	G8	Sets whether the load step solenoids are: normally energised (closed), de-energised (open).		NORMALLY CLOSED/ OPEN	NORMALLY CLOSED	-	
Minimum compressor inverter opening:	R/W	G9	Minimum inverter opening setting: This screen can only be seen if inverters are enabled	%	0¸99.9	0	-	
Fans:	R/W	G9	Minimum inverter opening setting:	%	0¸99.9	0	-	
PWM speed controller Max. Triac:	R/W	Ga	When controller pCO1 is used and PWM outputs are enabled this Triac Max screen can be seen: triac voltage to fan electric motor is minimum speed. This does not correspond to effective voltage applied but to a a calculation unit from pCO1.	%	0¸100	75	-	
Triac min.:	R/W	Ga	Min Triac setting: triac voltage to fan electric motor is minimum speed. This does not correspond to effective voltage applied but to a a calculation unit from pCO1.	%	0¸100	25	-	
Pulse amplitude:	R/W	Ga	Sets pulse amplitude that stands for triac pulse duration: this represents the triac applied pulse duration in milliseconds	ms	0¸10.0	2.5	-	
Number of compressors forced on with probe fault: 0	R/W	Gb	If there is a faulty or disconnected suction probe alarm, it forces no. compressors that are on. They are in any case controlled by single alarms and by general pressure switches.		0¸6	1	**0**	
Fan rotation DISABLES	R/W	Gc	Enabling FIFO rotation first in first out) for fans.		Disabled /FIFO	Disabled	**FIFO**	
Control type PROPORTIONAL BAND	R/W	Gc	Type of control to be used with fan management: Proportional band or Dead Zone		Proportional band/dead band	Proportional band	**DEAD ZONE**	
Number of fans forced on with probe fault:	R/W	Gd	If there is a faulty or disconnected discharge probe alarm, it forces no. fans that are on. They are in any case controlled by single alarms and by general pressure switches.		0…16	2	**0**	
Type of general discharge pressure switch reset:	R/W	Ge	Type of general high pressure switch reset		AUTOMATIC / MANUAL	2	**AUTOMATIC**	

General settings

Parameter	Type	Pos.	DESCRIPTION	U. of M.	Range	Default value	System TN	System BT
Press keys MENU+PROG; using the UP/DOWN keys go to the TIMES chain and press ENTER								
Time between compr. Switch on requests :	R/W	T0	These parameters are visible when the compressor setting is dead band control. Time between compressor switch-on requests	s	0¸999	20	**60**	**40**
Time between compr. Switch off requests :	R/W	T1	Time between compressor switch-off requests (dead band or proportional band prevent)	s	0¸999	10	**20**	**15**
Min. compressor on time :	R/W	T2	Minimum On time of same compressor	s	0¸9999	10	**90**	
Min. compressor off time :	R/W	T2	Minimum Off time of same compressor	s	0¸9999	120	**120**	
Min. time between switch-ons of different compressors:	R/W	T3	Minimum time between two ON requests of different compressors. They prevent simultaneous starts.	s	0¸9999	20	**20**	
Min. time between switch-ons of same compressor:	R/W	T4	Minimum time between two actual power ups of same compressor	s	0¸999	360	**360**	
Delay of load steps on power up:	R/W	T5	This parameter can only be seen is load steps are configured. Delay between the request and actual switch-on of load steps	s	0¸999	20	-	
Time between fan switch-on requests :	R/W	T6	Minimum time between two switch-ons of same fan	s	0¸999	2	**30**	
Time between fan switch-off requests :	R/W	T6	Minimum time between two switch-offs of same fan	s	0¸999	2	**30**	
Fans minimum time between different switch ons:	R/W	T7	Minimum time between two fan switch-on request. They prevent simultaneous starts.	s	0¸999	5	**5**	

General settings:							System	
Parameter	Type	Pos.	DESCRIPTION	U. of M.	Range	Default value	TN	BT
Press keys MENU+PROG; using the UP/DOWN keys go to the INITIALIZATION chain and press ENTER								
Supervisor Comunication speed	R/W	V0	Supervisor configuration. Speed of communication with the supervision system.	baud	0¸5	19200	-	
Identification:	R/W	V0	Supervisor configuration. Sets the identification number of the pCO² card for the serial supervision network.		1¸200	1	-	
Type of protocol:CAREL SUPERVISOR	R/W	V1	Protocol type setting: CAREL Supervisor, Modbus Supervisor or GSM Modem		1¸3	Carel supervisor	-	
New manufacturer password:	R/W	V2	Allows to change the password for entering the manufacturer branch		0¸9999	1234	-	
Maintenance:	R/W	V2	Allows to change the password for entering the maintenance branch		0¸9999	0	-	
User:	R/W	V2	Allows to change the password for entering the user branch.		0¸9999	0	-	
Display the	R/W	V3	Position Y views the language change screen on startup. Position N does not view the language change screen on startup	On/Off	Y/N	Y	-	
Change message: Language on startup								
Installation of default values:	R/W	V4	Allows to delete all of the permanent memory and reset the default settings N.B. It is advisable to effect this when the machine is off.	On/Off	Y/N	N	-	

080 - OUTSTANDING RISKS AND EMERGENCY SITUATIONS

All jobs carried out around the equipment must be done by authorised and competent personnel.

General risks

Component considered	Outstanding risk	Type	Caution
sheet metal with non-protected edges	Minor injuries	Contact	handle wearing protective gloves to avoid cuts consequent to mishandling
Compressors	Burns	Contact	Avoid accidental contact. Only handle with protective gloves.
Discharge pipes	Burns	Contact	Avoid accidental contact. Only handle with protective gloves.

Area considered	Outstanding risk	Type	Caution
Area around equipment	Injuries Intoxication Serious burns Death	Explosions due to increase in ambient temperature following a fire.	Never leave compressor discharge and suction valves closed. Close only during maintenance and re-open before restarting the equipment
Area around equipment	Injuries Intoxication Serious burns Death	Fire due to short-circuit or overheating of power cable upstream of machine cutoff switches.	Connection cables and protection devices must be correctly sized following the instructions in the technical literature
Danger area	Serious burns Electric shocks Death	Insulation fault of power cables located upstream of machine power cutoff switches.	Open the circuit breaker on the general electrical board in the event of having to perform any jobs on the terminals upstream from the machine cutoff switch.
Danger area	Electric shocks Death	Metal parts energised.	Connect the earth wires of the equipment's electrical board to the earthing system in the building so that all the metal parts of the unit are properly earthed.
Danger area	Serious burns Electric shocks Death	Contact with energised parts that have become accessible due to removal of covers.	Open the machine cutoff switch and lock this with the safety padlock provided before removing the covers and accessing internal equipment parts.
Danger area	Electric shocks Death	Maintenance of energised parts by authorised persons.	Never perform any jobs in the rain or when in contact with water and always work in the presence of another person.
Danger area	Electric shocks- Death	Maintenance of energised parts by authorised persons.	Do not perform any job other than maintenance and setting on the controller-holding module. To this purpose use the appropriate key that only the authorised and qualified personnel is given.

Refrigerant safety sheet

Substance identifying elements	
Details of components	1, 1, 1 – trifluorethane (R143a) CAS – No. 420 – 46 – 2 EEC – No. 206 - 996 – 5 pentafluorethane (R125) CAS – No. 354 – 33 – 6 EEC – No. 206 - 557 – 8 1, 1, 1.2 – tetrafluorethane (R134a) CAS – No. 811 – 97 – 2 EEC – No. 213 - 377 – 0
Hazard identification	**Specific hazards:** rapid evaporation of the liquid can cause frost-bite**.** **Greater hazards:** the vapours are heavier than air and can cause suffocation by reducing the oxygen available for breathing.
First-aid measures	**General information:** do not administer anything to persons who have fainted **Inhalation:** take the person involved into the fresh air. Give oxygen or artificial respiration if necessary. Do not administer adrenaline or similar substances. **Contact with eyes:** Carefully rinse with plenty of water for at least 15 minutes and see a doctor. **Contact with skin:** Wash immediately with plenty of water. Immediately take off contaminated clothing.
Fire-prevention measures	**Appropriate fire-fighting equipment:** any **Specific hazards:** pressure increase **Specific fire-fighting methods:** cool containers/tanks with water jets.
Measures to be taken in case of accidental leaks	**Individual precautions:** evacuate personnel to safety areas. **Environmental precautions:** none because the fluid evaporates. **Cleaning methods:** not necessary because fluid evaporates.
Handling and storing	**Handling** **-Technical measures/precautions:** make sure sufficient air is circulating in the work premises and/or that air extraction is adequate **-Hints for safe use:** use only in well-ventilated premises. Do not breathe vapours or aerosols **-Storage** **-Technical measures/storage methods:** carefully close and keep in a cool, dry and well-ventilated environment **-Incompatible products:** explosives, inflammable materials, organic peroxides (**XXX**) **-Packaging materials:** keep in original containers
Exposure control / individual protection	**Control parameters – exposure limit values:** 1, 1, 1 – trifluorethane (R143a) **AEL (8-H E 12-H TWA)=1000** lm/cu.m Dupont (1992) pentafluorethane (R125) **AEL (8-H E 12-H TWA)=1000** lm/cu.m Dupont (1992) 1, 1, 1, 2 – tetrafluorethane (R134a) **AEL (8-H E 12-H TWA)=1000** lm/cu.m Dupont (1992) **Individual protection:** **- breathing protection:** during salvage and cfc tank operations, independent breathing apparatus must be used. The vapours are in fact heavier than air and can cause suffocation by reducing the oxygen available for breathing. **- eye protection:** safety goggles. **- hand protection:** rubber gloves. **Specific hygienic precautions:** do not smoke.
Chemical-physical properties	**Physical state (20°C):** liquefied gas **Colour:** colourless **Smell:** similar to ether **pH:** neutral **Boiling point/interval:** 46.7°C **Flash point:** non inflammable **Explosive properties:** no available details **Vapour pressure:** 1234 kPa (25°C) 2310 kPa (50°C) **Relative density:** 1050 kg / cu.m (at 20°C – liquid) **Solubility in water:** negligible
Stability and reactivity	**Stability:** no decomposition if used according to instructions**.** **Conditions to be avoided:** contact with alkaline metals, earthy alkaline metals, granulated metal salts, Aluminium, Zinc, Beryllium, etc. in powder. **Hazardous decomposition products:** halogen acids, traces of carbonyl halides.

Toxicological details	1,1,1 – tetrafluorethane (R143a) LC50/inhalation/4 hours/on rats => 540 ml / l pentafluorethane (R125) LC50/inhalation/1 hour/on rats => 3480 mg /l 1, 1, 1,2 – tetrafluorethane (R134a) ALC/inhalation/4 hours/on rats => 567 ml/l **Local effects**: concentrations well above the TLV value can cause narcotic effects. Inhalation of high concentrations of products in decomposition can cause breathing difficulty (pulmonary edema). **Long-term toxicity**: during experiments carried out on animals no carcinogenic, teratogenic or mutagenic effects were found. **Specific effects**: rapid evaporation of liquid can cause frost-bite.
Ecological information	**Effects tied to eco-toxicity:** pentafluorethane (R125) halocarbons global warming potential; HGWP; (R-11 = 1) = 0.84; ozone layer depletion potential, ODP, (R-11 = 1) = 0 trifluorethane (R143a) potential global warming effect of halocarbons; HGWP; (R-11 = 1) = 1.1; ozone layer depletion potential ODP, (R-11 = 1) = 0 tetrafluorethane (R134a) potential global warming effect of halocarbons; HGWP; (R-11 = 1) = 0.28; ozone layer depletion potential ODP, (R-11 = 1) = 0
Disposal	**Waste refuse/unused products: usable through reconditioning.** **Contaminated containers: depressurised containers should be returned to the supplier.**
Details of regulations	**EEC Directive** **Safety sheet:** D91/155/EEC amended by D 93/112/EEC "hazardous substances and compounds" **Hazardous compounds:** D 67/548/EEC amended by D 93/21/EEC "labelling guide" **Circulars 46/79 and 61/81 issued by the Ministry of Labour**" Risks relating to the use of products containing aromatic amines" **L.D. 133/92 "Regulations relating to the disposal of hazardous substances in groundwaters"** **L.D. 277/91 "Protection of workers from noise, lead and asbestos"** **M.D. 28/01/92 "Classification and rules governing packaging and labelling of hazardous Compounds"** **P.D. 175/88 "Activities entailing serious accident risks (Seveso Law)"** **P.D. 203/88 "Emissions into the atmosphere" P.D. 303/56 "Work hygiene"** **P.D. 303/56 "Work hygiene"** **P.D. 547/55 "Regulations governing accident prevention"** **Law 319/76 "Protection of waters (also known as Merli law)"**

These indications conform to those provided by the supplier and are to be considered as based on the latest knowledge relating to the substance in question. Products must be used for the specific purposes for which they were intended in accordance with the indications shown above. All other uses must be carefully assessed in terms of the risks involved. The list of rules and regulations is provided as a mere indication and should not be considered complete as the user shall be responsible for making reference to the official regulations of the country of installation, both in terms of use, storage and handling of products.

090 - MAINTENANCE

Constant supervision of machine condition and correct maintenance guarantee reliability and efficient operation of the entire system over time. This chapter caters for qualified personnel and addresses scheduled controls and maintenance but also deals with a series of checks that the user himself can do at the indicated intervals. For example, some simple visual controls of the system's main components that require no particular technical skills

Periodic machine maintenance

- Control of machine structural integrity: the metal panels composing the casing must be firmly secured to the structure; removable panels and peep panels must not cause irregular vibration or noise during operation.
- Control of oxidised parts: rust must be removed; ascertain rust causes, remedy and if necessary repair.
- Control of leaks: unusual oil spots on the floor, condensation due to damaged insulation and leaking piping demand immediate assistance from Costan's after-sales service.
- Check the integrity of the electric power line: the power cord connecting the machine to the mains must be in perfect condition, with no cracks or damage that may jeopardise insulation. Should repairs be needed, request assistance from the after-sales service.
- Check the tripping capacity of safety pressure-switches as per the laws in force
- Check the tripping capacity of the pressure-switches protecting the compressor[1]

Machine maintenance

The actions indicated here below are restricted to the authorised personnel and must be performed following the recommended frequency after start up.
Disconnect the machine from the mains before attempting any maintenance. Avoid contact with the hot internal parts.

CONTROL/ACTION	WEEKLY	MONTHLY	SEMESTRAL
Measure discharge pressure	X		
Measure suction-line pressure	X		
Measure electrical power voltage	X		
measure current intensity	X		
Check whether electrical contacts and connections are tight		X	
Check compressor oil level		X	
Check liquid sight glass and moisture indicator		X	
Check suction filters			X
Check whether motor-driven fans are securely fastened			X

Control of the liquid sight glass may indicate that the filter dryer cartridge needs replacing. The colour of the sensitive element may vary from green to yellow according to the amount of humidity in the circuit. Deep yellow or yellowish pink indicates that the cartridge is unable to hold any more moisture and must be replaced (Costan code Costan 761300028).
A strong flow resistance along the suction filters denotes that the mechanical filtering cartridge is clogged with residue and dirt. Cartridges must then be replaced (Code). Costan 761300034).

Safety valve

It is advisable to replace the safety valve after it has tripped; valve discharging may cause manufacturing residues that proceed form components and pipes to build up against the valve seal, which may impair valve tightness after opening.

[1] The pressure switches are set when tested as per operational instruction QOP019110A

The service life of safety valves Castel of the series "3030/44" is 5 years from installation. No matter the jobs carried out (or periodic inspection), safety valves must be replaced after their lifespan has expired.

Prior to replacing the valve, make sure that the system area in which the jobs are carried out is free from pressure and high temperature. When installing, strictly follow the instructions on the package.

Compatibility of lubricants for motor-driven Bitzer compressors using R404A

Bitzer compressors appropriate for use with HFC refrigerants and polyester oil charge, are singled out by the letter "Y" in the model acronym (e.g. 4CC-6.2**Y**). The lubricant oil the Bitzer compressors in Eptagloo systems are charged with when delivered is BSE32 and is recommended for a maximum condensing temperature of 55°C.
Before any such jobs, it is advisable to check the original oil type on the compressor rating plate. When in doubt, contact Costan's service center.
Find below a chart listing the Bitzer-approved lube oils by other manufacturers, which have properties similar to the BSE 32 lube oil of initial charge.

Compressore tipo Compressor type	Refrigerante (HFC) (HFC) Refrigerant	Tipo di olio Oil type	Viscosità a 40°c Viscosity at 40°c	Fornitore - tipo di olio Supplier - oil type
Bitzer 2CC-..Y – 4NCS-..Y	R404A R134a R407A R407B R407C R507A	Bitzer BSE 32 (poliestere)	32 cst	Castrol Icematic SW 32 CPI Solest 31-HE Exxon Mobil EAL Arctic 22CC Exxon Mobil EAL Arctic 32 Fuchs SEZ 32 Shell Clavus R32 Uniquema RL 32 H
Data given by Bitzer (technical instruction KT-510-3)				