

# Compact Horizontal Air-Air Heat Pump Model RTH 07L to 30L

Ref.: N-27661 0608

## Technical information



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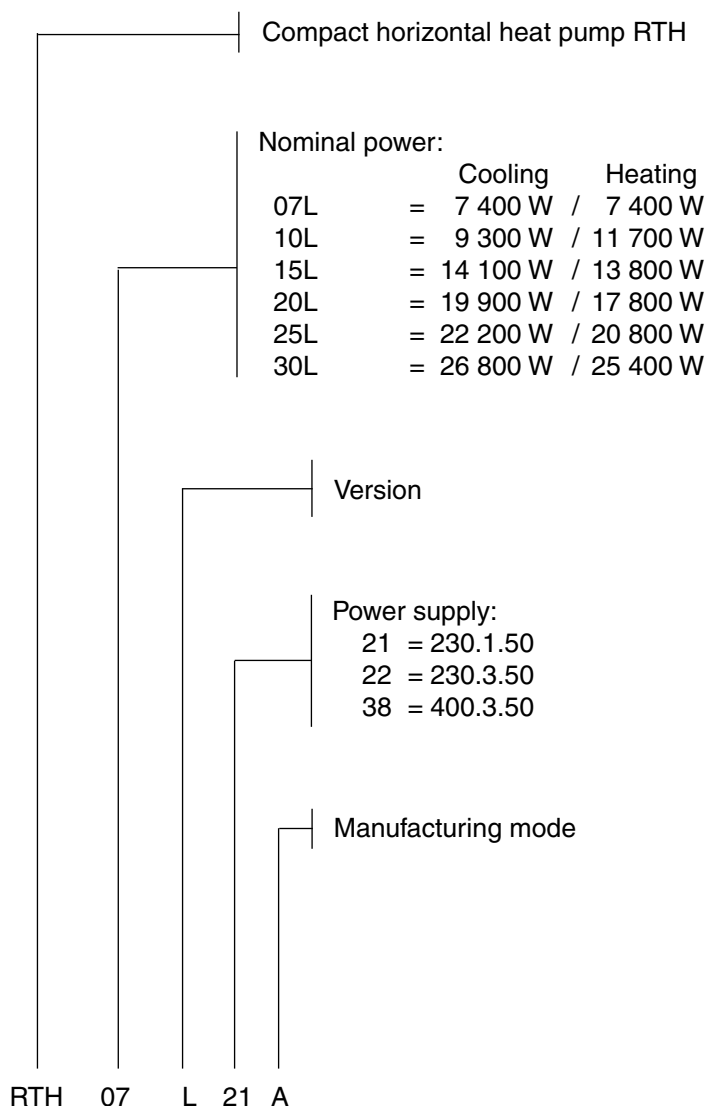
## General information

### General description

The RTH model heat pumps are compact horizontal units, condensed by air, that allow air conditioning, both in winter as well as in summer, by inverting their operating cycle.

They can be installed either indoors or outdoors, and the fans are of the centrifugal type, and thus accept air ducts.

### Nomenclature



## Technical specifications

### Mechanical specifications

#### Compressor

Of the vertical hermetic alternative "Scroll" type, mounted on shock absorbers and with internal motor protection. Includes an electric heater for heating the oil sump, which makes start-ups easier and avoids oil leaking from the compressor.

#### Coils

With a large surface, made of grooved copper tubing and notched aluminium fins.

#### Fans

Centrifugal with directly fitted motor or belt and pulley drive,

depending upon the model. Have sufficient pressure for the installation of optional ducts and accessories.

### Casing

Made of galvanised aluminium steel sheeting and finished with oven-polymerised powdered paint, for outdoor installation. The interior is lined with an insulation coating so as to avoid condensation and reduce noise levels. These units include galvanised sheeting trays with their corresponding drains for collecting condensates from the coils.

### Cooling circuit

Made of welded copper tubing. The units are supplied with their optimum refrigerant loads and having gone through maximum pressure and air tightness tests. Both in the interior as well as exterior sections, the expansion of the refrigerant is carried out by means of a calibrated hole in 07L, 10L and 15L sizes, and with expansion valve and distributor in 20L, 25L and 30L. The circuit includes: four-way valve, suction accumulator, high and low pressure switches and suction and discharge pressure collectors.

### Refrigerant

These units are manufactured with R-410A.

### Electric panel

Accessible directly from the exterior. Includes: connecting strip, protectors, electronic board and probes, power supply contactors, operating relay, phases control relay and transformer. In compliance with European standards in force.

### Phase control relay

The electric panel of models RTH20L, 25L and 30L features a sequence and phase failure detector. In the case of detecting a phase sequence other than R-S-T, or a phase fails once the unit is in operation, this detector, by means of an internal volt-free contact, disconnects power supply to the main board of the unit, leaving it inoperative.

### Electric heater (optional)

Of the uncovered wire type for quick heat dispersion, avoiding temperature inertia that could affect components, equipped with thermal contacts and protectors, automatic switch and manual reset.

### Thermostat

The RTH07L to RTH30L units include, as standard equipment, the electronic DPC-1 thermostat.

To connect the thermostat to the board, 10x0.22mm<sup>2</sup> screened communication cable should be used.

### Ambient thermostat DPC-1

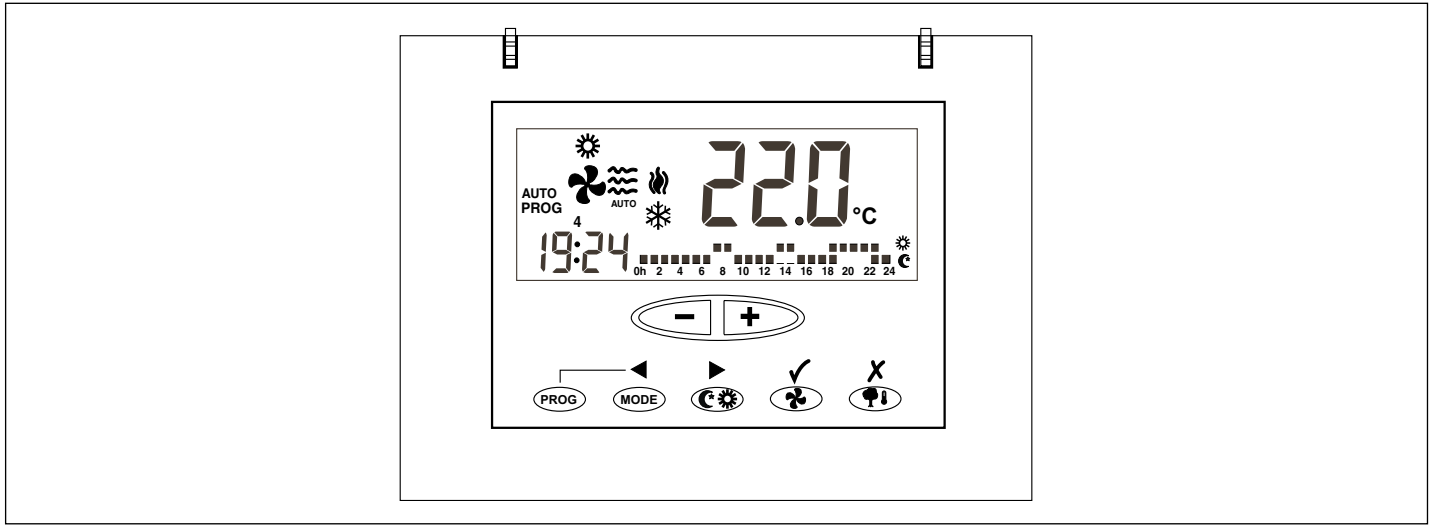
#### Programmable digital thermostat with communication

This thermostat was designed to give close control of the ambient temperature and graphic information regarding the mode it is currently operating in. This control unit, in accordance with the differential between the programmed temperature and the ambient temperature, responds varying the on/off cycles.

The liquid crystal display (LCD) normally indicates the ambient temperature, operating mode and whether the system is in heat or cool.

It allows selecting different set point temperatures for cool and heat, besides choosing between °C and °F on the display.

Fan operation can be in continuous or automatic mode, off or in operation along with the compressor.



## Physical data

Model		RTH07L	RTH10L	RTH15L	RTH20L	RTH25L	RTH30L
Compressor	Amount	1					
	Type	Scroll					
	Nominal power kW	2.7	3.2	4.7	5.2	7.9	9.2
	Power supply V.ph.Hz.	230.1.50	400.3.50	400.3.50	400.3.50	400.3.50	400.3.50
Outdoor coil	Amount	1					
	Tubing depth x height	5 x 18	5 x 21	5 x 21	5 x 21	5 x 24	5 x 24
	Front area m <sup>2</sup>	0.32	0.41	0.51	0.65	0.71	0.87
	Tubing diameter mm (Inches)	9.52 (3/8")					
Indoor coil	Amount	1					
	Tubing depth x height	3 x 18	4 x 21	4 x 21	4 x 21	4 x 24	4 x 24
	Front area m <sup>2</sup>	0.22	0.25	0.37	0.47	0.61	0.73
	Tubing diameter mm (Inches)	9.52 (3/8")					
Outdoor fan motor	Amount	1					(1)
	Turbine diameter mm	270	320	320	320	320	320
	Turbine width mm	270	240	240	320	320	320
	Nominal power kW	0.245	0.55	0.55	1.1	1.1	1.5
	Motor nominal r.p.m.	900	900	900	900	900	1 420
	Power supply V.ph.Hz.	230.1.50	230.1.50	230.1.50	400.3.50	400.3.50	400.3.50
Indoor fan motor	Amount	1				(1)	(1)
	Turbine diameter mm	240	270	320	320	320	320
	Turbine width mm	240	200	240	240	240	320
	Nominal power kW	0.245	0.245	0.55	1.1	1.1	1.1
	motor nominal r.p.m.	900	900	900	900	1 410	1 410
	Power supply V.ph.Hz.	230.1.50	230.1.50	230.1.50	400.3.50	400.3.50	400.3.50
Refrigerant load R-410A kg	2.3	2.9	4.3	5.4	6.7	7	
Dimensions with packing cm	122x124.5x64	127x129.5x71.5	143x145.5x71.5	171.5x169x74.5	180x188.6x81	190.6x220x81	
Weight kg	Nett	178	190	243	317	369	476
	Gross	189	205	262	337	395	504

(1) Pulley drive (adjustable on the motor).

## Limits of Use

Voltage limits				Air intake temperature to outdoor coil DB				Air intake temperature to indoor coil			
Nominal a 230 V		Nominal a 400 V		Operating cycle				Operating cycle			
				Minimum °C		Maximum °C		Minimum °C		Maximum °C	
Minimum	Maximum	Minimum	Maximum	Cool	Heat	Cool	Heat	Cool WB	Heat DB	Cool WB	Heat DB
198	254	342	436	19 <sub>(3)</sub>	-10 <sub>(1)</sub>	46	24	14 (min. 20BS without LAK)	10 <sub>(2)</sub>	22 (max. 32BS)	25

**Notes:** WB = Wet bulb. DB = Dry bulb. (1) At below -10°C, only the emergency electric heater (optional) remains operative. (2) This equipment can operate for a short period of time at a temperature below 10°C so as to increase the air temperature within the conditioned space to 10°C. (3) With the LAK accessory the limit is -10°C.

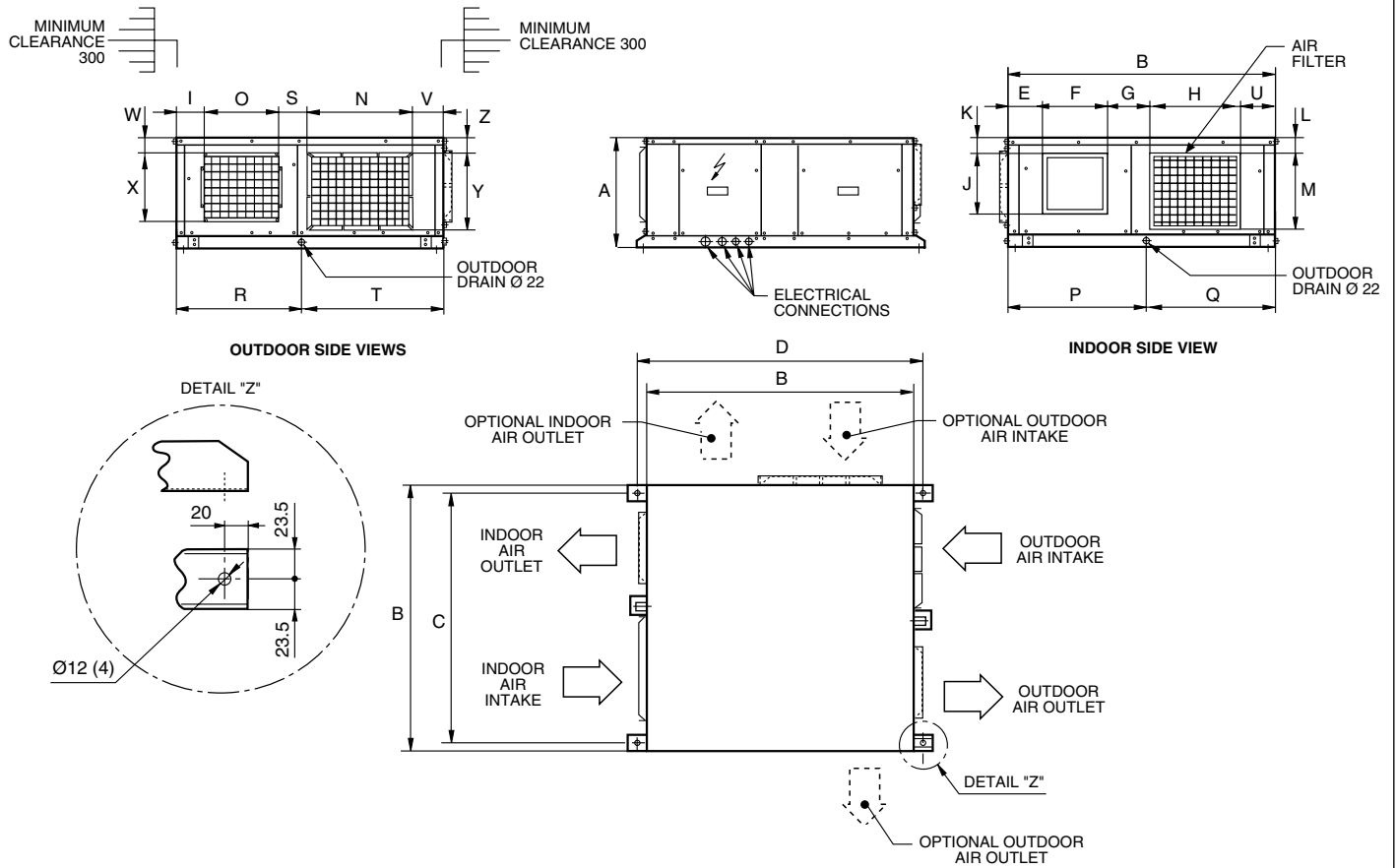
## Sound level

Roomtop	OUTDOOR Spectrum per octave band dB(A)							Global sound power level dB (A)	Sound pressure level dB (A) at 5 m
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		
<b>RTH 07</b>	58	59	64	65	65	60	54	71	49
<b>RTH 10</b>	58	59	64	65	65	60	54	72	49
<b>RTH 15</b>	59	60	65	66	66	63	57	74	50
<b>RTH 20</b>	59	60	66	68	68	66	60	74	52
<b>RTH 25</b>	60	63	70	72	70	67	65	81	55
<b>RTH 30</b>	61	66	76	76	73	68	66	81	59

Roomtop	INDOOR Spectrum per octave band in DUCT dB(A)							Global sound power level dB (A)
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
<b>RTH 07</b>	57	58	63	65	64	60	53	70
<b>RTH 10</b>	58	59	64	65	65	60	53	72
<b>RTH 15</b>	59	60	64	65	65	60	53	73
<b>RTH 20</b>	59	61	67	67	66	63	59	73
<b>RTH 25</b>	60	61	70	68	68	66	62	81
<b>RTH 30</b>	60	61	70	68	68	66	62	81

**General dimensions mm**

**RTH07L, 10L, 15L & 20L**



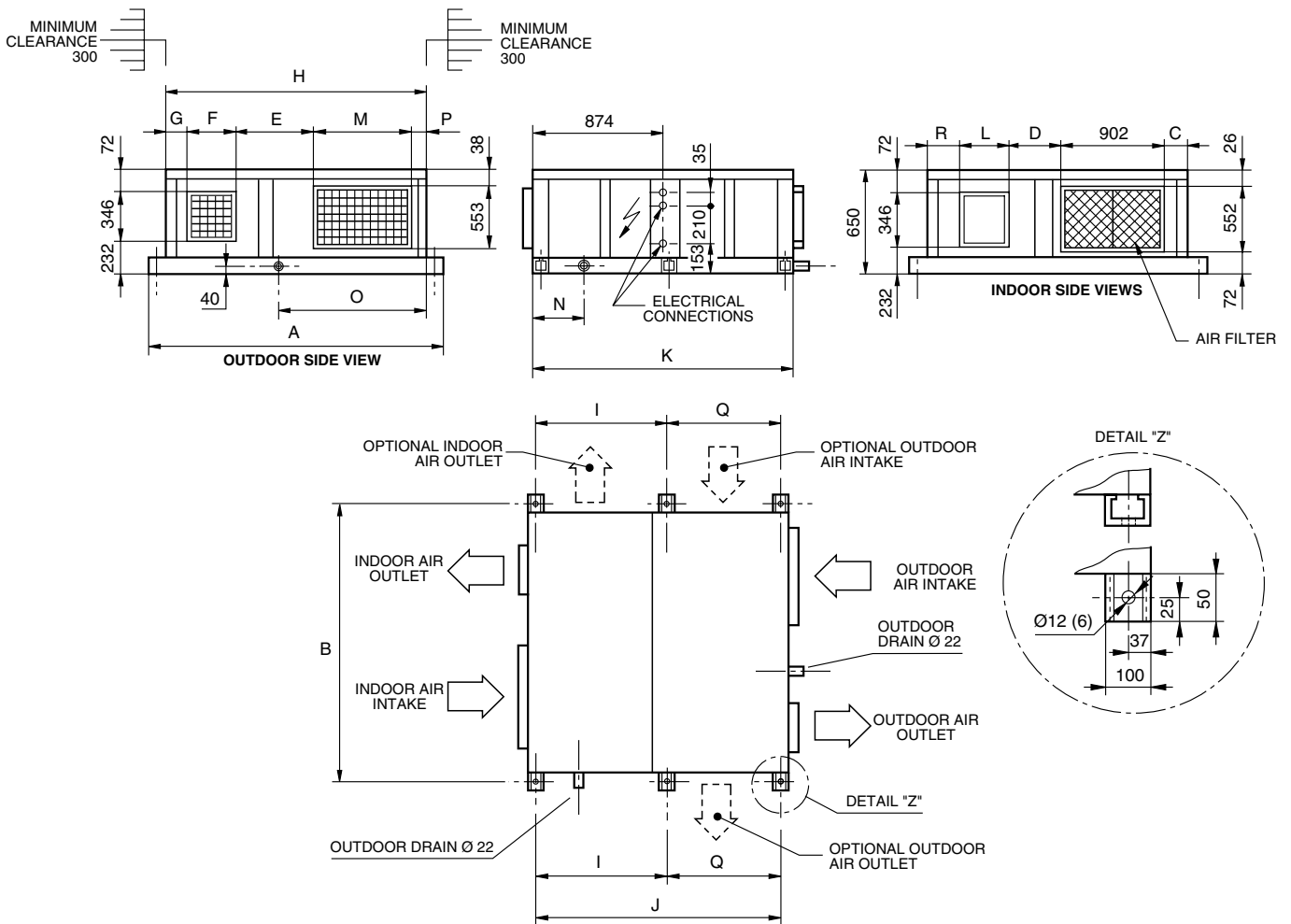
**Note:**

1- The solid arrows indicate the standard air intakes and outlets. The dotted arrows are the intakes and outlets that can be obtained at job site.

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
RTH07L	480	1102	1055	1150	117	302	126	447	82	262	72,5	60	306	425	347	597	505	602	166	500	110	82	18	305	342	40
RTH10L	557	1155	1105	1201	130	270	202	398	75	294	101	50	426	404	323	594	561	617	236	538	155	117	20	353	430	40
RTH15L	557	1312	1265	1361	140	316	136	640	73	346	24	45	425	554	323	616	696	605	241	707	80	121	20	353	430	40
RTH20L	585	1572	1525	1621	140	316	192	788	87	346	54	80	420	770	407	624	948	698	206	877	136	102	50	353	430	70

## General dimensions mm

### RTH25L & 30L



**Note:**

- 1- The solid arrows indicate the standard air intakes and outlets. The dotted arrows are the intakes and outlets that can be obtained at job site.

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
RTH25L	1 750	1 700	87	200	338	405	135	1 651	870	1 675	1 750	315	673	354	1 147	100	806	147
RTH30L	2 150	2 100	115	512	704	405	135	2 056	880	1 696	1 770	400	717	369	1 495	95	816	127

## Nominal capacities

Unit	Summer		Winter	
	Cooling capacity W	Consumption W	Heating capacity W	Consumption W
RTH07L	7 400	3 000	7 400	2 760
RTH10L	9 300	3 880	11 700	3 640
RTH15L	14 100	5 400	13 800	4 840
RTH20L	19 900	8 320	17 800	7 150
RTH25L	22 200	10 040	20 800	7 890
RTH30L	26 800	11 630	25 400	9 670

## Test conditions

Voltage	Summer				Winter			
	Outdoor temp. °C		Indoor temp. °C		Outdoor temp. °C		Indoor temp. °C	
	DB	WB	DB	WB	DB	WB	DB	WB
230 or 400	35	24	27	19	7	6	20	12

## Correcting factors

### Correcting factors for cooling capacities

Correcting factors for cooling capacities in accordance with indoor and outdoor temperatures.

Indoor air intake temperature. °C WB	Outdoor intake air temperature. °C DB					
	19	25	30	35	40	46
23	-	1.20	1.15	1.11	1.06	1
19	1.10	1.08	1.04	1	0.96	0.90
14	0.88	0.86	0.84	0.82	0.79	0.74

**Note:** For indoor unit intake temperatures DB between 21 and 32°C.  
WB - wet bulb. DB - dry bulb.

Cooling capacity correcting factors for flows that differ from the nominal flows of the indoor coil.

Flow %	80	90	100	110	120	130
Total capacity	0.960	0.980	1	1.016	1.032	1.046
Sensible capacity	0.945	0.973	1	1.038	1.075	1.118
Comp. absorbed power	0.980	0.990	1	1.009	1.017	1.025

Correction of the real temperature of air intake of the outdoor coil for flows that differ from the nominal values.

Flow %	70	80	90	100	110	120	130
Correction in °C on real temperature of air intake of outdoor coil	5	3	1.5	0	-1	-2	-2.5

### Correcting factors for the heating capacities

Indoor air intake temperature, °C DB	Outdoor air intake temperature, °C WB				
	14	10	6	0	-8
23	1.20	1.04	0.96	0.77	0.58
20	1.25	1.10	1.00	0.80	0.69
17	1.30	1.13	1.04	0.83	0.63

Correction of the real temperature of intake air to the outdoor unit coil for flows that differ from the nominal values.

Flow %	70	80	90	100	110	120	130
Correction in °C on real temperature of air intake of outdoor coil	-2	-1.5	-0.5	0	0.5	1	1.2

## Nominal flows

The cooling and heating capacities that appear in the corresponding tables are valid for the following nominal flows:

Model	Nominal flow indoor fan m³/h	Nominal pressure available Pa	Nominal flow outdoor fan m³/h	Nominal pressure available Pa
RTH07L	1 490	25	2 420	50
RTH10L	2 015	37	3 520	50
RTH15L	3 580	50	3 890	50
RTH20L	4 100	50	4 810	50
RTH25L	5 060	62	5 640	50
RTH30L	5 300	62	7 450	50

For other flows, apply the correcting factors of the corresponding table.



## Sensible cooling capacities

Model	Dry temperature, outdoor air °C (DB)	Humid temperature, air intake, °C (WB)	Total capacity W	Sensible capacity (W)				Compressor absorbed power kW
				Dry intake air temperature to coil, °C (DB)				
				22	24	27	29	
RTH07L	25	22	8 880	2 765	3 632	4 932	5 800	2.54
		19.5	7 992	4 113	4 980	6 280	7 148	2.66
		17	7 400	4 995	5 862	7 162	7 400	2.78
	35	22	8 214	2 530	3 397	4 697	5 564	2.87
		19.5	7 400	3 881	4 748	6 048	6 915	3.02
		17	6 808	4 291	5 158	6 458	6 808	3.17
	45	22	7 400	2 269	3 136	4 436	5 303	3.32
		19.5	6 660	3 617	4 484	5 784	6 651	3.47
		17	6 068	4 442	5 308	6 068	6 068	3.62
RTH10L	25	22	11 160	3 398	4 683	6 610	7 897	2.44
		19.5	10 044	5 397	6 682	8 609	9 896	2.55
		17	9 300	6 709	7 994	9 300	9 300	2.67
	35	22	10 323	3 113	4 398	6 326	7 611	2.76
		19.5	9 300	5 115	6 400	8 327	9 300	2.90
		17	8 556	6 165	7 450	8 556	8 556	3.05
	45	22	9 300	2 796	4 081	6 009	7 294	3.19
		19.5	8 370	4 793	6 078	8 006	8 370	3.34
		17	7 626	6 033	7 318	7 626	7 626	3.48
RTH15L	25	22	16 920	5 084	7 257	10 518	12 695	3.39
		19.5	15 228	8 463	10 637	13 898	15 228	3.56
		17	14 100	10 686	12 860	14 100	14 100	3.72
	35	22	15 651	4 661	6 835	10 096	12 269	3.84
		19.5	14 100	8 044	10 218	13 478	14 100	4.04
		17	12 972	9 597	11 771	12 972	12 972	4.24
	45	22	14 100	4 190	6 364	9 625	11 798	4.44
		19.5	12 690	7 565	9 738	12 690	12 690	4.65
		17	11 562	9 679	11 562	11 562	11 562	4.85

## Sensible cooling capacities

Model	Dry temperature, outdoor air °C (DB)	Humid temperature, air intake, °C (WB)	Total capacity W	Sensible capacity (W)				Compressor absorbed power kW
				Dry intake air temperature to coil, °C (DB)				
				22	24	27	29	
RTH20L	25	22	23 880	7 359	9 869	13 635	16 150	5.05
		19.5	21 492	10 474	12 985	16 751	19 266	5.29
		17	19 900	13 824	16 334	19 900	19 900	5.53
	35	22	22 089	6 737	9 247	13 013	15 524	5.71
		19.5	19 900	9 872	12 383	16 149	18 660	6.01
		17	18 308	12 327	14 837	18 308	18 308	6.31
	45	22	19 900	6 046	8 557	12 323	14 834	6.61
		19.5	17 910	9 187	11 698	15 463	17 910	6.91
		17	16 318	12 355	14 866	16 318	16 318	7.21
RTH25L	25	22	26 640	8 096	11 210	15 881	18 999	6.72
		19.5	23 976	11 981	15 094	19 765	22 884	7.04
		17	22 200	16 120	19 234	22 200	22 200	7.36
	35	22	24 642	7 418	10 532	15 203	18 317	7.60
		19.5	22 200	11 323	14 437	19 107	22 200	8
		17	20 424	14 509	17 623	20 424	20 424	8.40
	45	22	22 200	6 664	9 778	14 449	17 563	8.80
		19.5	19 980	10 572	13 686	18 357	19 980	9.20
		17	18 204	14 511	17 625	18 204	18 204	9.60
RTH30L	25	22	32 160	9 943	13 243	18 193	21 497	7.58
		19.5	28 944	14 033	17 332	22 282	25 587	7.94
		17	26 800	18 438	21 738	26 688	26 800	8.30
	35	22	29 748	9 101	12 401	17 351	20 650	8.57
		19.5	26 800	13 218	16 518	21 467	24 767	9.02
		17	24 656	16 590	19 890	24 656	24 656	9.47
	45	22	26 800	8 167	11 466	16 416	19 716	9.92
		19.5	24 120	12 290	15 590	20 540	23 839	10.37
		17	21 976	16 452	19 752	21 976	21 976	10.82

## Indoor fan services

Model	Available static pressure		Air flow		Absorbed power W
	mm WG	Pa	m³/h	m³/s	
RTH07L	8	78.4	1 053	0.29	342
	6	58.8	1 204	0.33	346
	4	39.2	1 355	0.37	351
	2.5	24.5	1 490	0.41	368
	2	19.6	1 517	0.42	369
RTH10L	0	0	1 630	0.45	374
	12	117.7	1 491	0.41	375
	10	98	1 657	0.46	390
	8	78.4	1 789	0.49	400
	6	58.8	1 913	0.53	415
	4	39.2	2 006	0.55	428
	3.8	37.3	2 015	0.56	428
RTH15L	2	19.6	2 108	0.58	435
	0	0	2 199	0.61	450
	18	176.5	2 690	0.75	786
	16	156.8	2 842	0.79	808
	14	137.2	2 993	0.83	828
	12	117.6	3 144	0.87	847
	10	98	3 271	0.91	873
	8	78.4	3 399	0.94	898
	6	58.8	3 518	0.97	907
	5.1	50	3 580	0.99	915
	4	39.2	3 637	1.01	950
RTH20L	2	19.6	3 784	1.05	964
	0	0	3 859	1.07	978
	20	196	2 900	0.90	824
	18	176.5	3 045	0.96	872
	16	156.8	3 260	0.99	922
	14	137.2	3 400	1.01	960
	12	117.6	3 580	1.07	1 000
	10	98.0	3 740	1.11	1 036
	8	78.4	3 890	1.14	1 075
	6	58.8	4 030	1.17	1 125
	5.1	50	4 100	1.19	1 150
RTH25L	4	39.2	4 240	1.2	1 162
	2	19.6	4 300	1.24	1 187
	0	0	4 420	1.27	1 212
	16	156.8	4 050	1.12	1 015
	12	117.6	4 535	1.25	1 160
	10	98	4 699	1.3	1 210
	8	78.4	4 916	1.36	1 275
	6.3	61.7	5 060	1.4	1 330
RTH30L	4	39.2	5 243	1.46	1 392
	2	19.6	5 401	1.5	1 446
	0	0	5 560	1.54	1 500
	16	156.8	4 098	1.14	830
	12	117.6	4 602	1.28	973
	10	98	4 854	1.35	1 044
	6.3	61.7	5 300	1.47	1 213
RTH30L	4	39.2	5 541	1.54	1 239
	2	19.6	5 734	1.59	1 297
	0	0	5 928	1.64	1 356

## Outdoor fan services

Model	Available static pressure		Air flow		Absorbed power W
	mm WG	Pa	m³/h	m³/s	
RTH07L	12	117.7	1 891	0.52	402
	10	98	2 055	0.57	414
	8	78.4	2 219	0.62	427
	6	58.8	2 360	0.65	442
	5.1	50	2 420	0.67	450
	4	39.2	2 501	0.69	458
	2	19.6	2 642	0.73	473
	0	0	2 772	0.77	490
RTH10L	16	156.8	2 859	0.79	794
	14	137.2	2 985	0.83	814
	12	117.6	3 112	0.86	844
	10	98	3 241	0.90	866
	8	78.4	3 369	0.93	887
	6	58.8	3 476	0.96	905
	5.1	50	3 520	0.98	919
	4	39.2	3 579	0.99	928
	2	19.6	3 665	1.02	953
	0	0	3 764	1.04	971
RTH15L	16	156.8	3 184	0.88	860
	14	137.2	3 326	0.92	882
	12	117.6	3 468	0.96	905
	10	98	3 599	1.00	935
	8	78.4	3 731	1.03	965
	6	58.8	3 810	1.06	980
	5.1	50	3 890	1.08	995
	4	39.2	3 954	1.09	1 010
	2	19.6	4 050	1.12	1 030
	0	0	4 145	1.15	1 050
	RTH20L	16	156.8	3 705	1.03
14		137.2	3 944	1.09	937
12		117.6	4 183	1.16	941
10		98.0	4 369	1.21	957
8		78.2	4 556	1.26	1 075
6		58.7	4 723	1.31	1 091
5.1		50	4 810	1.33	1 104
4		39.1	4 900	1.36	1 131
2		19.6	5 090	1.41	1 184
0		0.0	5 227	1.45	1 230
14		137.2	4 500	1.25	1 080
10		98	5 030	1.39	1 223
RTH25L		8	78.4	5 295	1.47
	6	58.8	5 532	1.53	1 367
	5.1	50	5 640	1.56	1 400
	4	39.2	5 790	1.61	1 440
	2	19.6	6 005	1.67	1 515
	0	0	6 240	1.73	1 595
	14	137.2	6 449	1.79	1 655
	10	98	6 931	1.92	1 874
RTH30L	8	78.4	7 158	1.99	1 983
	5.1	50	7 450	2.07	2 065
	4	39.2	7 553	2.10	2 145
	2	19.6	7 742	2.15	2 219
	0	0	7 932	2.20	2 293

## Characteristics of the indoor/outdoor fan on pulley models

Model	Speed range (r.p.m)	Motor		Motor pulley (adjustable)		Fan pulley (fixed)		Belt		
		kW	Casing type	Ø pulley (mm)	Ø shaft (mm)	Ø pulley (mm)	Ø shaft (mm)	Length (mm)	Ref.	Amount
25L (indoor)	876 - 1 057	1.1	090S	87 - 105	24	140	25	1 112	XPZ	1
30L (indoor)	876 - 1 057	1.1	090S	87 - 105	24	140	25	1 112	XPZ	1
30L (outdoor)	982 - 1 185	1.5	090L	87 - 105	24	125	25	1 112	XPZ	1

## General characteristics

Model	Compressor			Fan Out. - Ind.	Outdoor fan motor		Indoor fan motor		Nominal total power (unit) kW	Max. total intensity (unit) A	Max. total power (unit) kW	Max. total intensity (unit) A	Automatic switch (K curve) A	Min. cable section mm <sup>2</sup>
	Power supply V.ph.Hz	Nominal intensity A	Start intensity A		Power supply V.ph.Hz	kW	Nominal intensity A	kW						
RTH07L	230.1.50	12	82	230.150	0.4	1.9	0.4	1.6	3.1	16	3.7	22	25	4
RTH10L	400.3.50	5.1	48	230.150	0.8	4.6	0.4	1.9	3.7	9.7	4.2	12.5	16	2.5
RTH15L	400.3.50	7	64	230.150	0.9	4.4	0.8	4.1	4.9	11.5	5.6	15	20	4
RTH20L	400.3.50	13.3	95	400.3.50	1.1	2.8	1	2.7	9	19	10	22	25	4
RTH25L	400.3.50	15	111	400.3.50	1.2	3	1.3	2.4	11	21	12	25	25	4
RTH30L	400.3.50	17	118	400.3.50	2	3.7	1.2	2.4	12	23	14	28	32	6

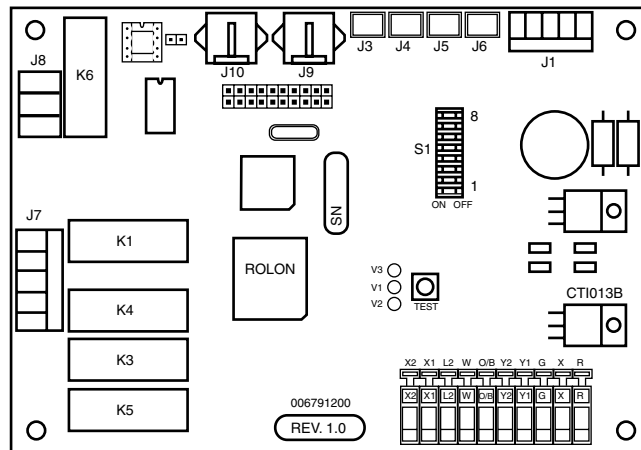
**Important:** Automatic switch dimensioning and power supply and operating line sections are orientative and should be corrected in accordance with conditions at job site. length between units and legislation in force.

**Notes:** 1.- K curve (DIN. VDE 0660-104). 2.- Based on copper conductors.

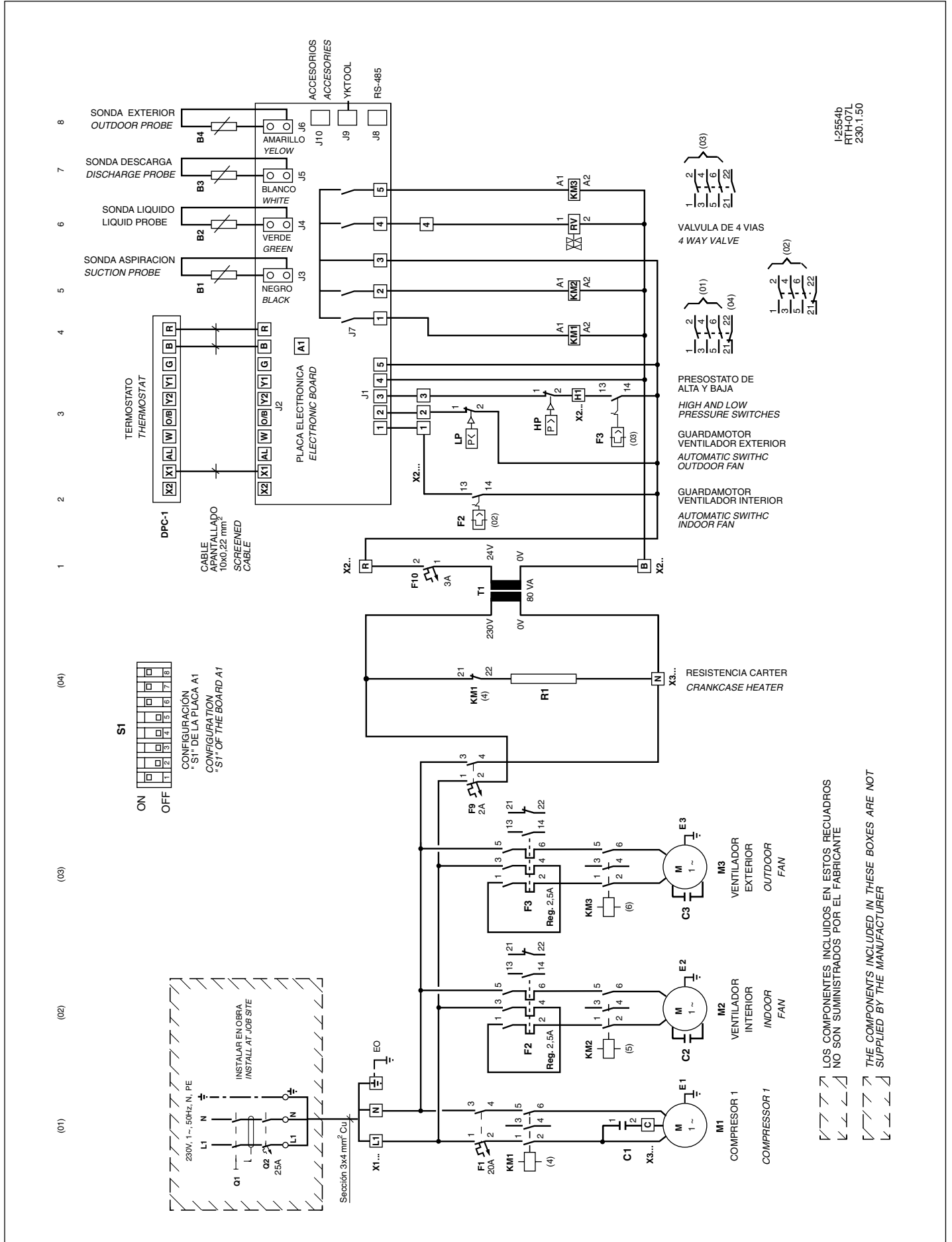
## Control board

The control board of these units is common to both the cool only as well as the heat pump units. Equipment control is carried out by means of software that is resident in the board. The System operates in accordance with the position of the

microswitches in the main board. There are also variations in the control algorithm, depending upon the accessories the board detects installed in the equipment. For further details please see Technical Information of the control board.

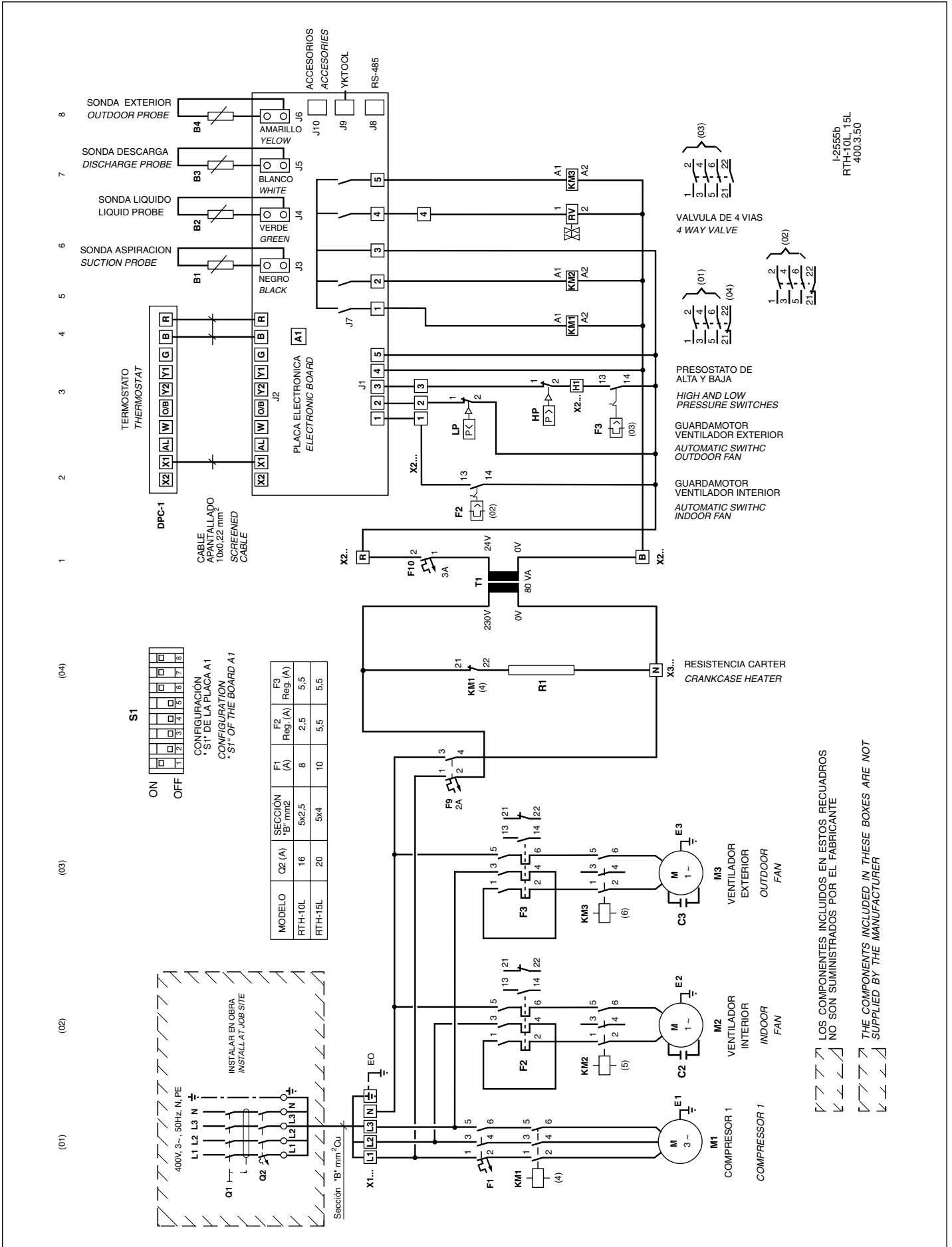


**Wiring diagram, RTH07L, 230.1.50**

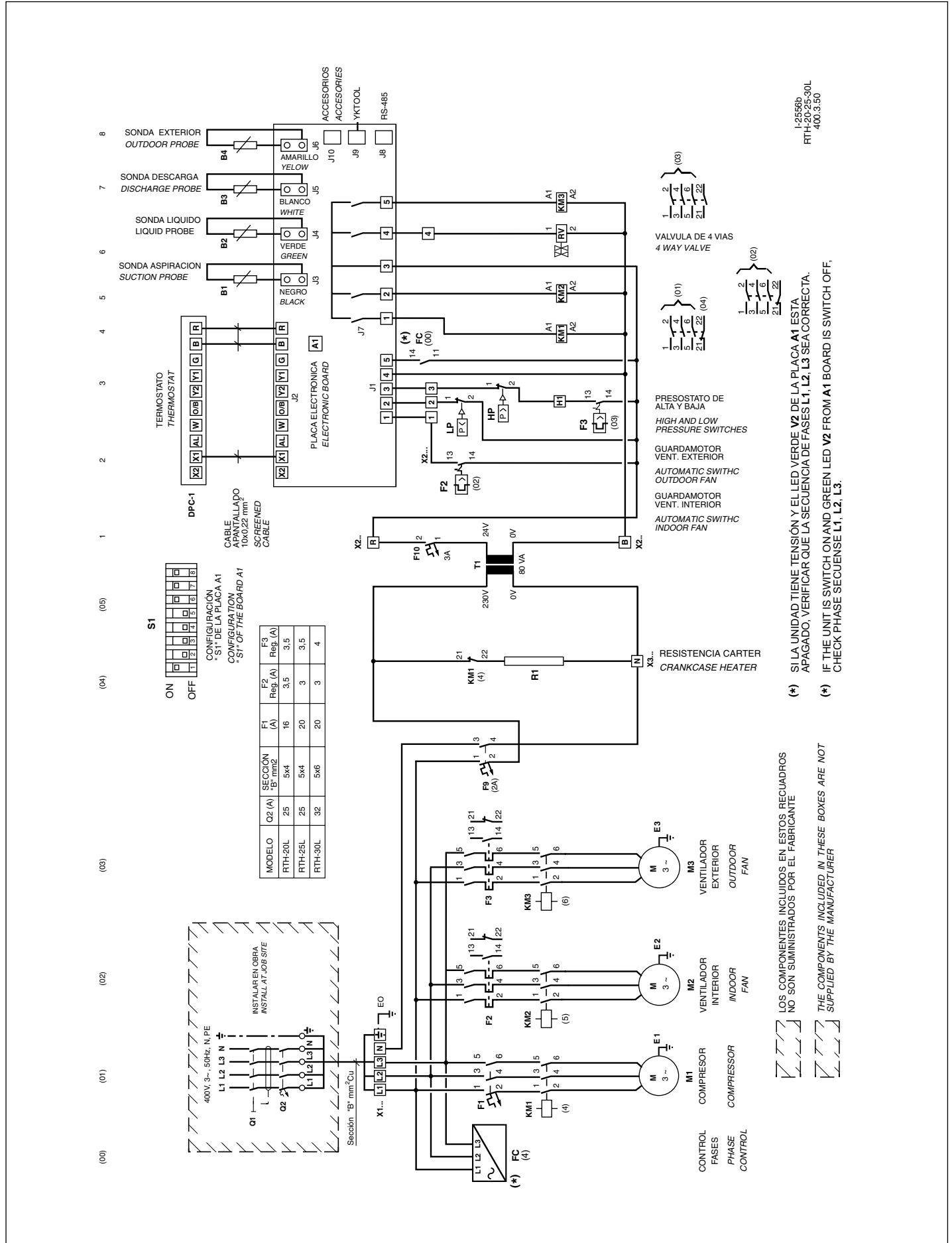


I-2554b  
RTH-07L  
230.1.50

**Wiring diagram, RTH10L, 15L, 400.3.50**



# Wiring diagram, RTH20L, 25L, 30L, 400.3.50



I-2556B  
RTH-20-25-30L  
400.3.50

## Microswitches configuration, failures and incidents

### Configuration of switches

The microswitches establish the following configurations:

Number	Status	Meaning
1 / 2	OFF/OFF	Ignore SW, programmed by communications
	ON/OFF	Time between defrosts 30'
3	OFF/ON	Time between defrosts 60'
	ON/ON	Time between defrosts 90'
4	ON	Crossed coils
	OFF	Independent coils
5	ON	2' compressor delay
	OFF	5' compressor delay
6	ON	Cool mode
	OFF	Heat pump mode
7	ON	4-way valve active in heat
	OFF	4-way valve active in cool
8	ON	Receives signal B from thermostat (active in heat)
	OFF	Receives signal O from thermostat (active in cool)
9	ON	Fan operative during defrost
	OFF	Fan inoperative during defrost

It is necessary to disconnect power supply to the board to read the new configuration.

### Failures (Lockouts)

Lockouts are indicated by the red LED on the YKLON board. If no lockouts exist, the LED remains off. When a lockout is generated, this LED produces two series of flashes with a constant sequence.

The first series indicates the affected circuit: one flash for the first compressor, two for the second, three for the third and four for the accessories. This is followed by a brief pause. The second series indicates the element or situation producing the lockout.

### Lockout table (red LED)

Flashes	Failure
1	Discharge temperature surpassed.
2	High pressure switch, outdoor fan thermal switch or compressor module thermal switch.
3	Low pressure switch.
4	Indoor fan thermal switch.
5	Repeated start-ups in cool or suction temperature <-25° C.
1	Gas 1 control or heater 1 failure
2	Gas 2 control or heater 2 failure
3	Heater 3 stage failure
4	Heater 4 stage failure
5	Failure in economiser or hot water coil (outdoor impulse probe, water return)
6	Smoke detection or high temperature (accessories) or impulse temperature > 80° C

### Incidence

Incidents are indicated by the green LED on the YKLON board. If no lockouts exist, this LED flashes at a constant frequency.

When an incident is generated, this LED produces three series of flashes with a constant sequence.

The first series indicates the affected circuit: one flash for the first compressor, two for the second, three for the third and four for miscellaneous incidences. This is followed by a brief pause. The second and third series indicate the direct cause of the incidence.

### Incidence table

Flashes	Type	Incidence
1	1	Discharge probe open or short circuited
2	2	Liquid probe open or short circuited
3	3	Suction probe open or short circuited
6	1	Repeated defrosts
3	2	Temperature
1	1	Discharge temperature not recovered
	2	Discharge temperature not recovered
2	2	Return probe open or short circuited
3	3	Outdoor probe open or short circuited
4	4	Water probe open or short circuited
5	5	Enthalpy probe error
2	1	Signal Y1 or Y2 without G
2	2	Signal W without B
3	3	Thermostat
4	4	Signal V without G
4	4	Signal Y2 without Y1
4	3	Thermal switch of heater 1
	2	Thermal switch of heater 2
3	Aux. heat	
4	3	Thermal switch of heater 3
	4	Thermal switch of heater 4
4	1	Water coil temp. not recovered
	2	Outdoor temp. too low
3	Temperature	
4	4	Water coil in antifreeze function
5	5	Impulse temp. over 55° C
4	4	Impulse temp. < 25° C with gas
5	5	Transceiver ID unknown
2	2	At least one accessory not found
3	Others	Air quality demand
4	4	Dirty filters
5	5	Occupation sensor in unoccupied
6	6	Suction temperature < 0° C, economiser

### Test button

- If pressed until the green LED goes on, certain timings are shortened and any detected failure is reset.

- If pressed until the red LED goes on, two accessories and optional probes connected to the board are identified.

- If there is communication between units and this button is pressed, the Neuron ID is sent by the LonWorks network.

### DPC-1 thermostat

When a lockout is generated, and there is communication, the thermostat indicates, alternatively, the time and failure produced, in accordance with the lockout table of the unit.

Also indicates other incidences of the thermostat.

Type	Thermostat numbers	Incidence	
Thermostat	9	1	Ambient probe open or short circuited
	9	2	Internal probe not calibrated
	9	3	Communication error
	9	4	External entry of failure
Thermostat	9	5	Digital probe S5 is not detected
	9	6	Digital probe S6 is not detected
Thermostat	9	7	Digital probe S7 is not detected
	9	8	Digital probe S8 is not detected
Thermostat	9	9	Digital probe S9 is not detected

I-2367c



## Accessories

### Duct electric heaters for RTC & RTH07L 30L

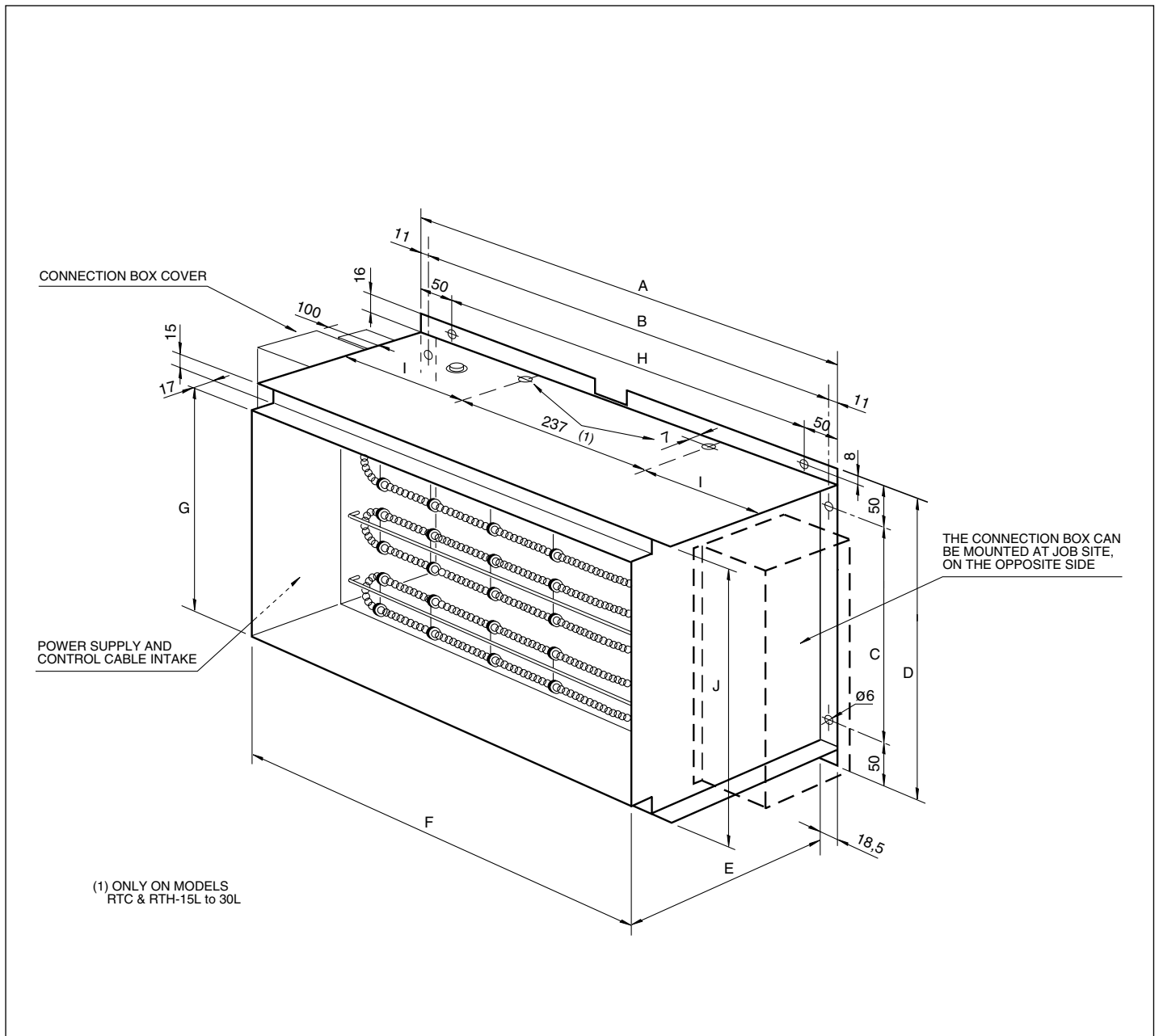
These duct electric heaters are designed to provide backup heat in the RTH units, and complementary heat in the RTC units. On and off cycles are governed by the air conditioning equipment control system. They should be fitted directly in the impulse outlet of the indoor section of the unit.

### Technical specifications

These duct electric heaters include the following components:

- Galvanised sheet casing, covers and supports.
- Exposed nickel-chrome wire electric resistance mounted on seatite supports.
- Power supply contactor with a 24 VAC.
- Two thermal switches located at the top of the heater. The first, with automatic reset, disconnects the heater when a temperature of 77°C is reached. The second, accessible externally and with manual reset, disconnects the heater when a temperature of 138°C is reached.
- Interlock with the indoor fan thermal relay. The control system of the unit does not allow operation of the heater when the indoor fan thermal relay fails.
- Plug-in connector for interconnection between the control panel of the air conditioning unit and the heater.
- PVC gasket for heater-air conditioner joint and self-threading screws for fastening the accessory.

### General dimensions mm



Model	A	B	C	D	E	F	G	H	I	J
RTC and RTH07L to 10L	400	378	285	385	275	362	320	300	-	353
RTC and RTH15L to 30L	527	505	325	425	350	490	380	427	145	412

## General characteristics

Model	Power supply	Power	Consumption	Stages	Automatic switch (1) Q1	Power supply cable section (2)	Front surface	Pressure drop (3)
	V.ph.Hz	kW	A		A	mm <sup>2</sup>	m <sup>2</sup>	Pa
<b>RTC and RTH07L</b>	230.1.50	5	22	1	25	4	0.12	6
<b>RTC and RTH07L to 10L</b>	400.3.50	5	8	1	10	2.5	0.12	6
<b>RTC and RTH07L to 10L</b>	400.3.50	10	15	1	20	2.5	0.12	6
<b>RTC and RTH15L to 30L</b>	400.3.50	5	8	1	10	2.5	0.12	6
<b>RTC and RTH15L to 30L</b>	400.3.50	10	15	1	20	2.5	0.19	15
<b>RTC and RTH15L to 30L</b>	400.3.50	15	22	1	25	4	0.19	15

**Notes:** 1.- K curve (DIN. VDE 0660-104). 2.- Based on copper conductors. 3.- Considered the nominal air flow of the indoor section.

## Dimensions with packing and weights

Heater model	Dimensions with packing mm			Weight kg
	Height	Width	Depth	
<b>RTC and RTH07L &amp; 10L</b>	360	513	293	15
<b>RTC and RTH15L to 30L</b>	440	640	370	20

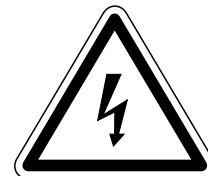
## Installation

Install the electric heater in the RTC & RTH unit as follows:

- 1) In all cases, the **established national regulations** should be followed.
- 2) Disconnect the power supply to the air conditioning unit.
- 3) Install the magnetothermal and differential switches for the heater in accordance with the table of General Characteristics and the Wiring Diagrams.
- 4) Remove the access panels of the RTC & RTH unit control box.
- 5) Unpack the accessory, opening the top of the box. Make sure the heater assembly has not been damaged during transportation. Check the ceramic insulation and that the heater wires are not in contact with any metal parts.
- 6) Fit the electric heater in the mouth of the indoor fan panel housing and drill eight 3 diameter holes for fastening. Check to make sure that the reset push button of the F9 thermal switch is accessible and at the top. See Heater Location diagram.
- 7) Fasten the PVC gasket, supplied with the accessory, to the frame surface of the heater adjacent to the indoor fan panel.
- 8) Fasten the heater to the panel with the screws supplied.
- 9) Remove the electrical connections cover of the heater and connect the power supply cables to connecting strip X1. Connect the control cable supplied, between connector J1 of the A3 Auxiliary Resistance board, and connector J10 of the A1 control board of the air conditioning unit.
- 10) The installer should complete the electric circuit of the heater by fitting an air flow control F14 at the most convenient point of the ducts so as to make sure the heater operates only when there is sufficient air flow.

- 11) Connect power supply to the RTC & RTH unit and the heater.
- 12) To configure the accessory, press the test button of control board A1 for over 2 seconds, until the red led on the board goes on. Configuration will be complete when said led goes off.
- 13) Check operation of the heater by selecting the Emergency Heat mode at the ambient thermostat of the air conditioning unit.
- 14) Assemble the electrical box covers of the heater and the RTC & RTH unit.

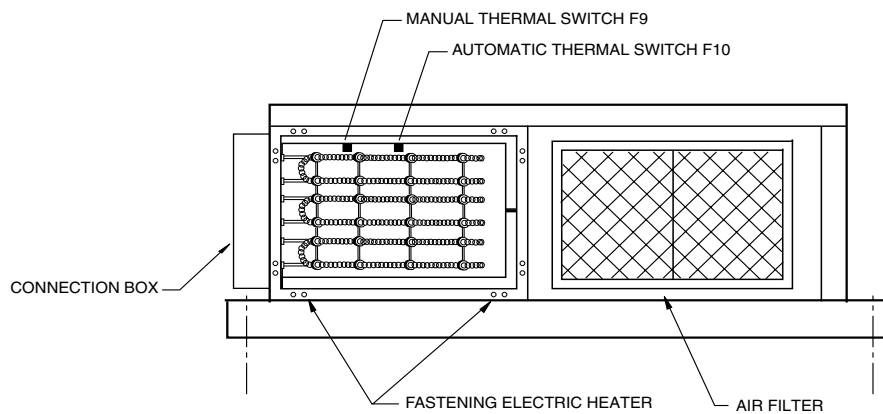
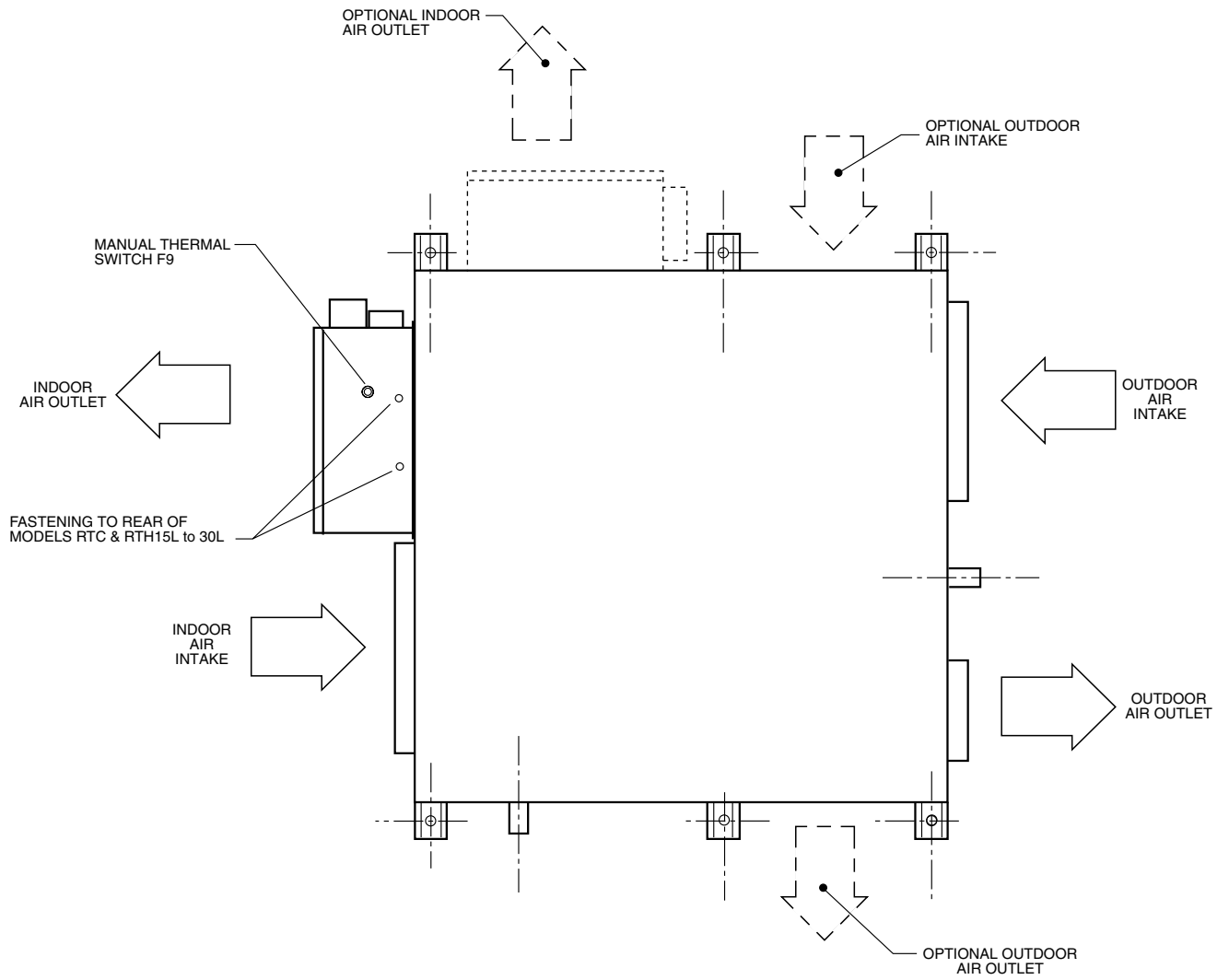
**Note:** Should an incorrect response of the system take place, see the Operation section of the RTC & RTH Installation Instructions. There you will find the control functions of the A1 electronic board on the heater, as well as its configuration, incidents identification, etc.



Loose cables can cause overheating of the terminals or incorrect operation of the unit. Fire hazards may also arise. Therefore, make sure all cables are connected tightly.

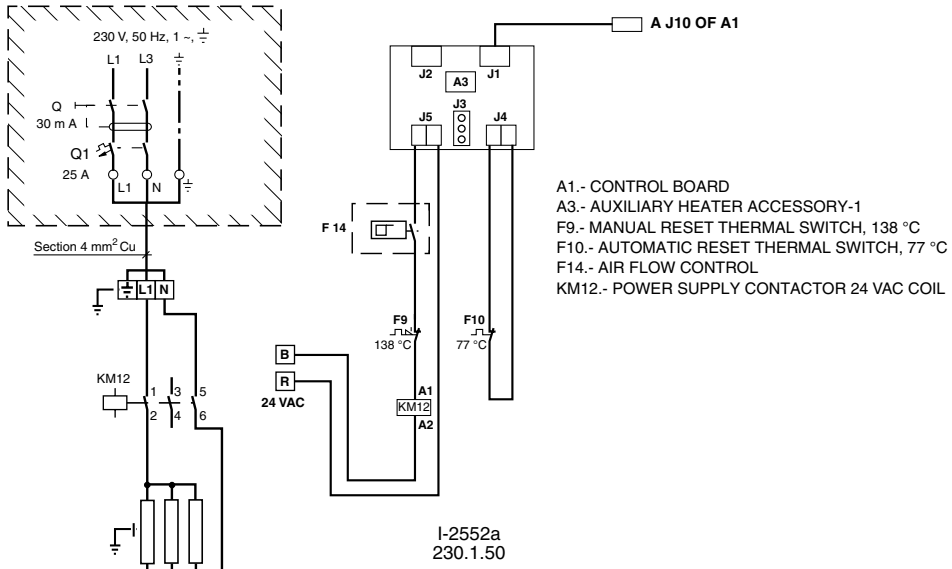
## Heater location

### RTC & RTH07L to 30L



## Wiring diagram

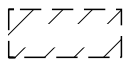
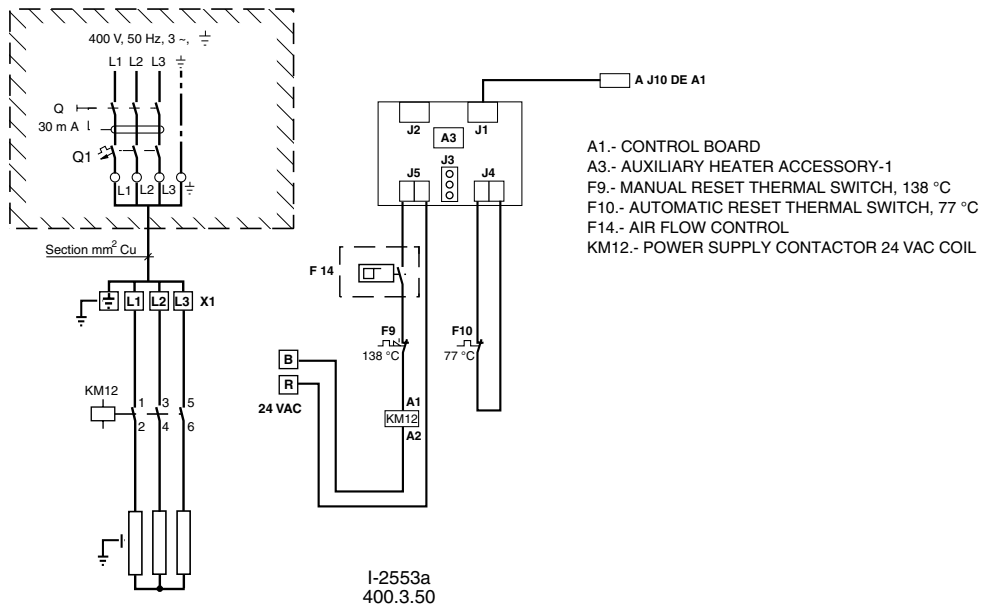
**Heater 5kW, 230.1.50**  
**RTC & RTH07L**



## Wiring diagram

**Heater 5, 10, 15kW, 400.3.50**  
**RTC & RTH07L to 30L**

POWER kW	AUTOMATIC SWITCH Q1	MINIMUM CABLE SECTION mm <sup>2</sup>
5	10	2.5
10	20	2.5
15	25	4



THE COMPONENTS INCLUDED IN THESE BOXES ARE NOT SUPPLIED BY THE MANUFACTURER

IMPORTANT: THE AUTOMATIC SWITCH SIZING AND POWER SUPPLY LINE SECTION ARE ORIENTATIVE AND SHOULD BE CORRECTED IN ACCORDANCE WITH JOB SITE CONDITIONS AND LEGISLATION IN FORCE

## Low Ambient Kit for RTH-7L, 10L and 15L General information

The condensation control accessory (Low Ambient Kit) is factory-fitted as an option.

The electronic module controls the outdoor fan speed in cool cycle to keep the condensing pressure constant at low outdoor temperatures. This control is not carried out in the winter cycle, and fans operate at 100% capacity.

The regulator is located on the separator panel, on the outdoor fan side (M3).

With this accessory the operating limit of the outdoor air is -10°C.

### Technical specifications

This accessory includes the following components:

- Single-phase speed regulator, ref. P215DP (LAK).  
Cut-off regulation.
- Pressure switch set to 30 bar.
- 24 VAC terminal relay (RRV1) for RTH.
- Connecting hose and cables.
- Screws, wall hole guide and plastic flanges.

### Installation

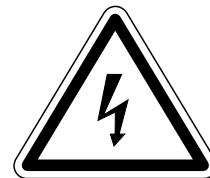
Disconnect main power supply to the unit with switch Q1. See Figs. 1, 2, 3, 4, 5 and wiring diagram for details on assembly and wiring connections.

Install the condensation control unit as follows:

1. Remove the top cover and access panels to the outdoor fan.
2. Install the speed regulators (LAK) on the separator panel, using the screws supplied. On heat pump models (RTH), connect the 24 VAC relay (RRV1) to terminal X3.
3. Connect cables inside the electric box in accordance with the wiring diagram.
4. Disconnect the outdoor fan (M3) hose from the KM3 contactor side, and connect same to the LAK side at terminals L2, N2 and ground. Connect the supplied outdoor fan hose to contactor KM3 on the electric box and connect terminals L1, N1 and ground to the LAK side.
5. Connect the control hoses of heat pump models (RTH) to terminals 11 and 14 of the RRV1 relay and on the LAK side of terminals 1 and 3.
6. Install the wall hole guide on the separator panel and insert the pressure switch pressure intake.
7. Connect the pressure intake of the pressure switch to

the high pressure intake at the condenser outlet and make sure there are no leaks.

8. Check correct operation. Set maximum fan output regulation (LAK) and disconnect the magneto thermal switch of the compressor (F1). Connect power supply to the unit with switch Q1. Activate stage 1 of cool and make sure contactors KM1, KM2 and KM3 are enabled. The outdoor fan, M3, should rotate 100%. With a voltmeter, check the output voltage (230 VAC) at terminals L2 and N2 of the LAK1 regulator. Set output to a minimum (cut-off). Make sure the outdoor fan turns off.
9. If the unit is heat pump (RTH), activate stage 1 of heating and make sure the outdoor fan M3 rotates 100%. Deactivate this stage.
10. Connect the magneto thermal switch to the compressor (F1).
11. Replace the top cover and the access panel to the outdoor fan.



Loose cables can cause overheating of terminals or incorrect operation of the unit. Fire hazards may also exist. Therefore, make sure all cables are connected tightly.

### Operation

In summer cycle, allows adjusting outdoor fan speed to keep a constant condensing pressure at low outdoor temperatures. The pressure switch is factory-set to 30 bar. This setting can be modified with the adjusting screw on the pressure switch. Clockwise increases pressure and counter clockwise decreases pressure.

On heat pump models, the control has an intake that, in heat cycle, remains closed through the contact on the cycle changeover relay (RRV1). Fan speed at maximum (output voltage 230 VAC).

## Location of components

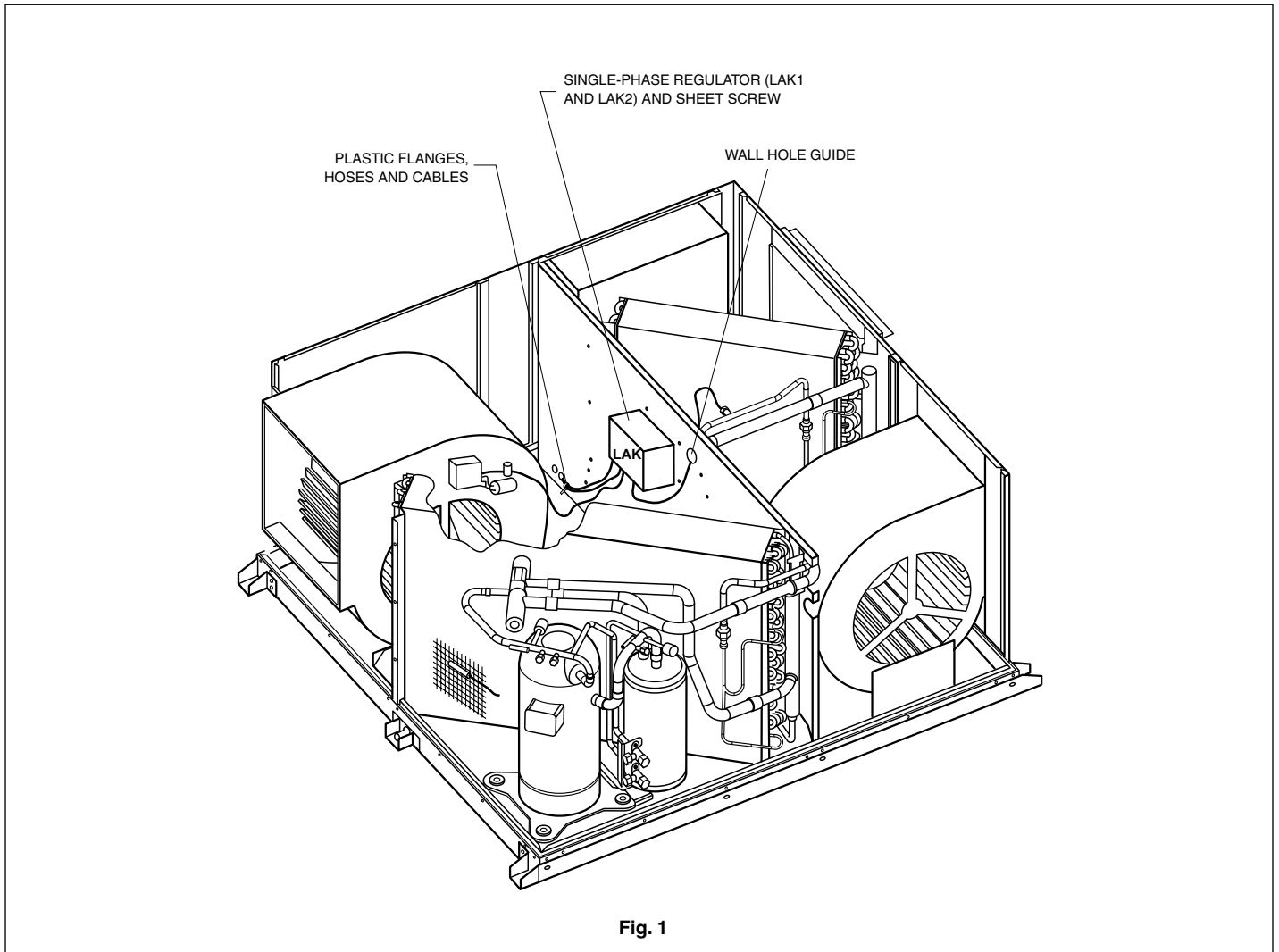


Fig. 1

## Connection of hoses at electric box

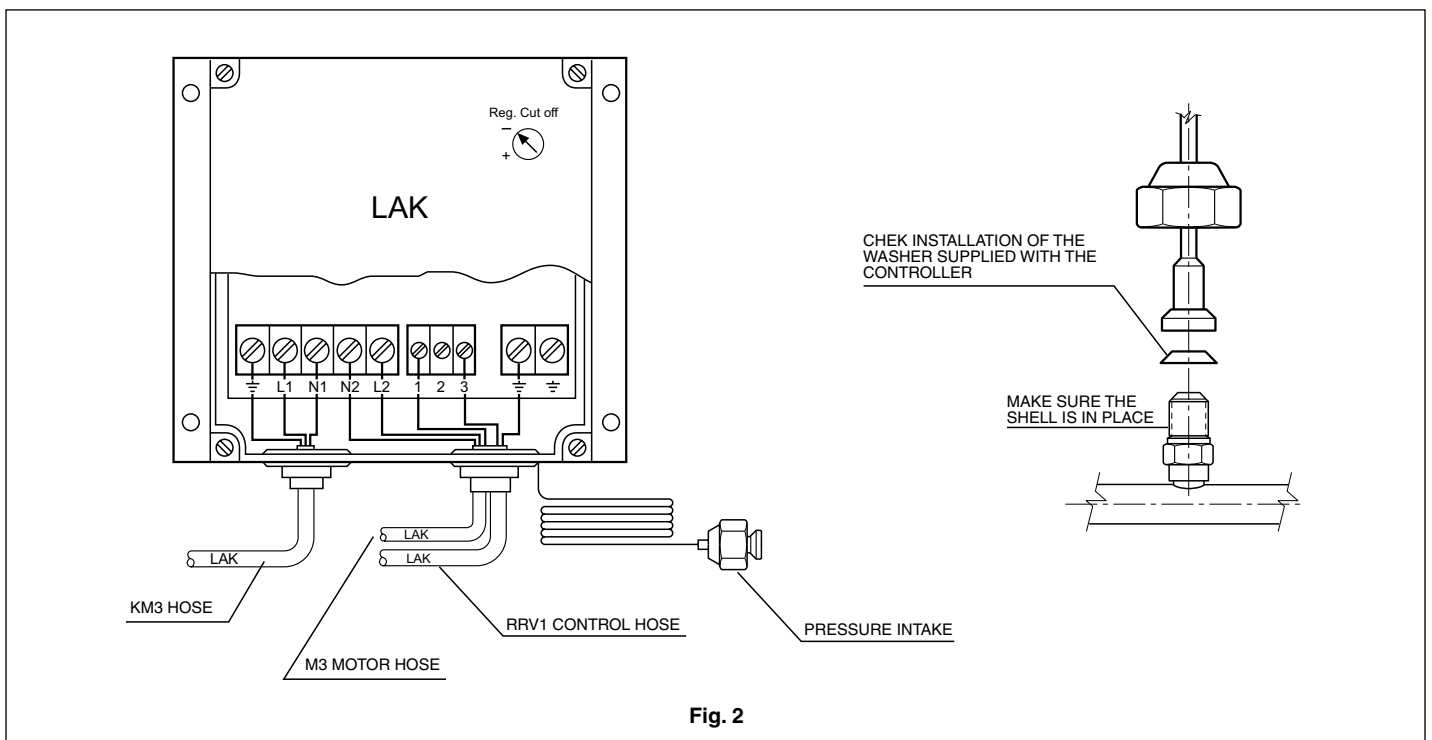


Fig. 2

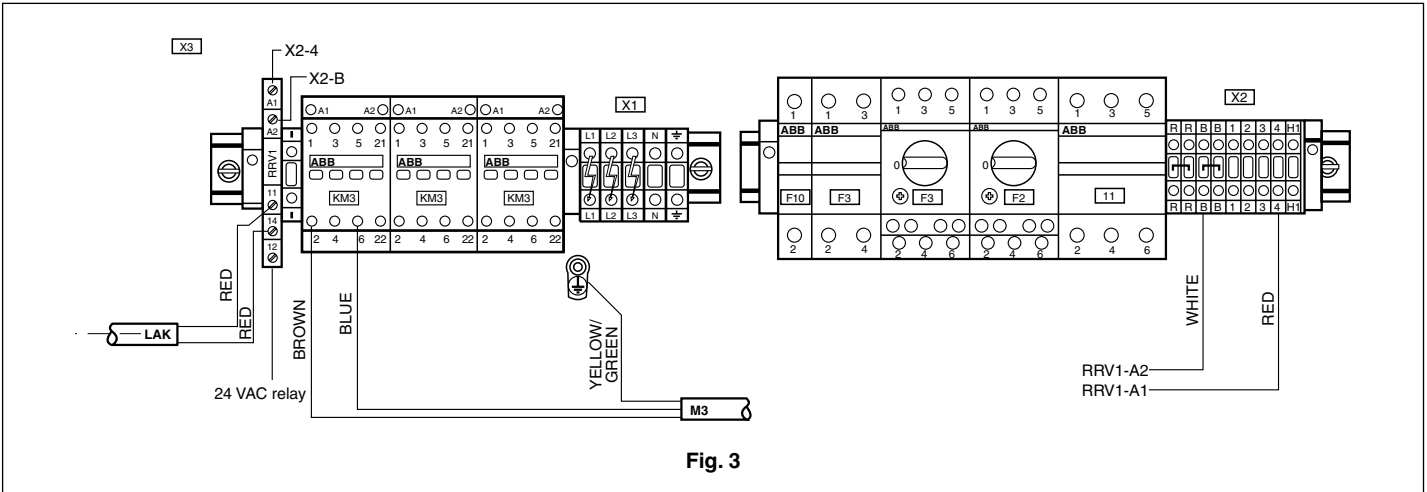


Fig. 3

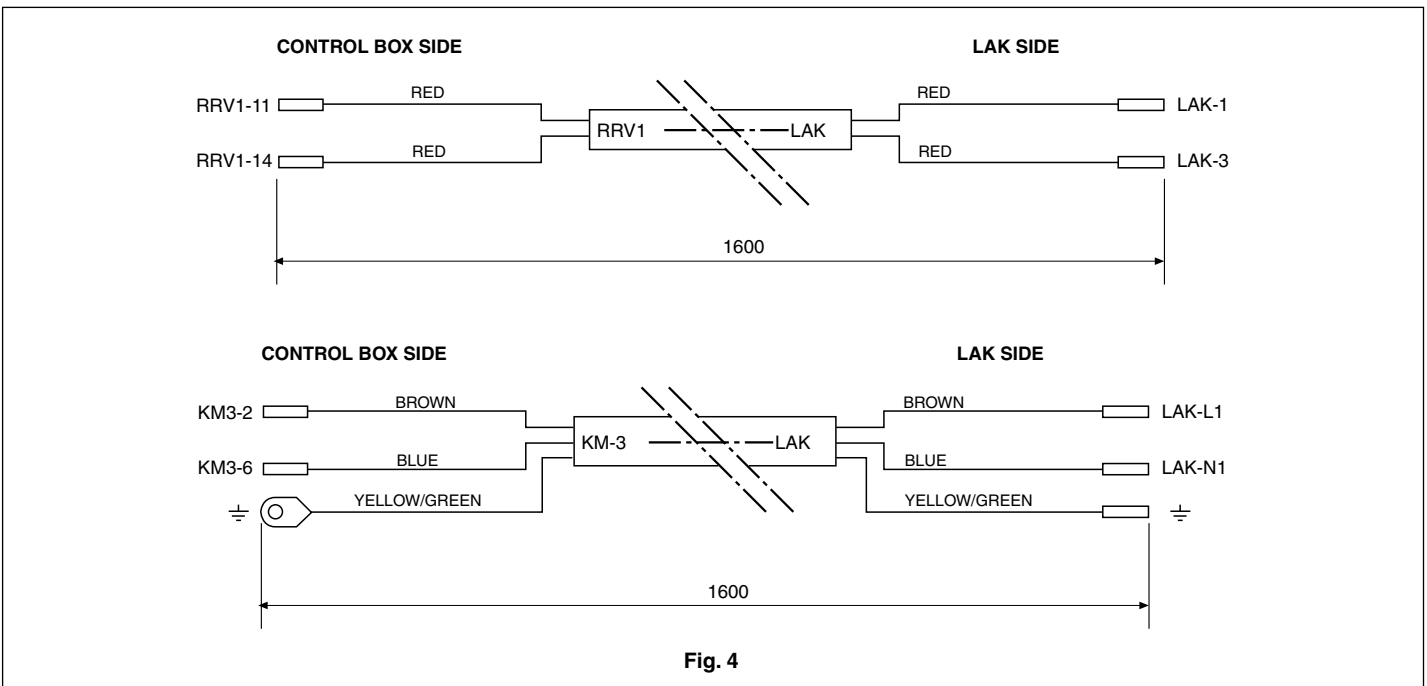


Fig. 4

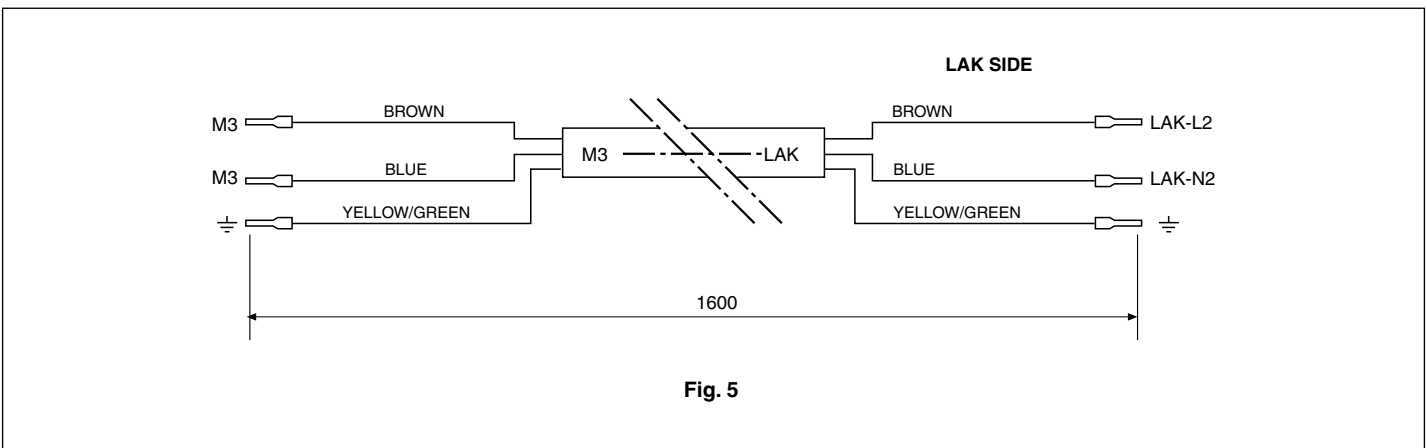
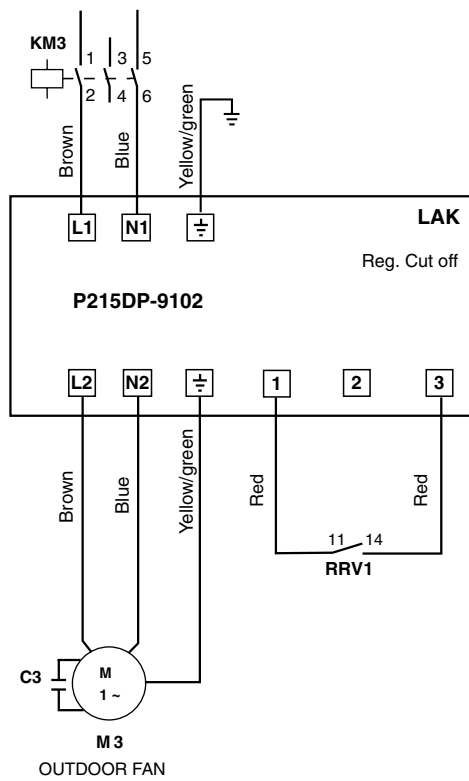


Fig. 5

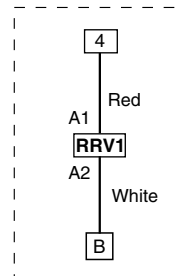
Cable No.	Cable		Diagram			Cable length
	Color	Section	From	To		
1	White	1	X2-B		RRV1-A2	360
2	Red	1	X2-4		RRV1-A1	400



## Wiring diagram for RTH 07L, 10L and 15L



Install on models  
**RTH07L, 10L, 15L**



**RRV1** - 4-way valve relay  
**LAK** - Low ambient kit  
**M3** - Outdoor fan motor  
**KM3** - Outdoor fan contactor

I-2563a  
LAK ACCESSORIES  
RTC07L, 10L, 15L  
RTH07L, 10L, 15L

## LAK condensing pressure control for RTH-20L, 25L and 30L units

### General information

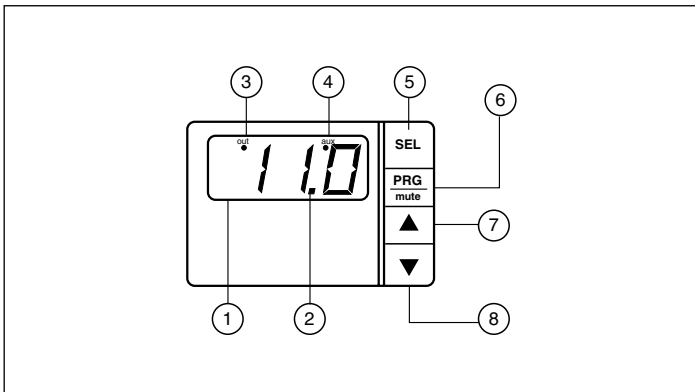
In the summer cycle, this accessory controls the condensing pressure by varying air flow in the outdoor coils. This air flow variation keeps the condensing pressure constant when outdoor temperatures are low. With this accessory the operating limit of the outdoor air is -10°C.

### Operation

By means of the pressure detected by the control unit through the analogical pressure switches installed in the cooling circuit, and carrying out the appropriate calculations in accordance with the settings, this control unit gives off an analogical signal that positions the opening of the dampers in such a way that the previously programmed set point condensing pressure is maintained.

### Programming and adjustment

Keys and display (description of the control unit)



- 1) Display:
  - Displays the value of the pressure switches.
  - Displays the code of the alarms produced.
- 2) Decimal LED:
  - Is lit when the value has a decimal part.
- 3) OUT LED:
  - Is lit constantly when the 0V output is different.
  - Flashes when the output is at the maximum programmed value.
- 4) AUX LED:
  - Is lit or flashes, depending upon the operating mode selected.
- 5) **SEL** key:
  - Displays and/or selects the set point value.
  - If pressed along with the **Prg/Mute** key for 5 seconds, 00 appears on the display. Using the **▲ ▼** keys, select the access code to enter the main programming mode, parameters "Cxx".
- 6) **Prg/Mute** key:
  - If pressed for 5 seconds, the basic programming mode is accessed, parameters "Pxx".
  - If an alarm is produced, pressing once deactivates the acoustic signal. If pressed a second time, the alarm is reset.
- 7) **▲** key:
  - In standby mode, displays pressure switch 1 value.

- In programming mode, it is used to move on to the next parameter and to increase the values of same.

8) **▼** key:

- In standby mode, displays pressure switch 2 value.
- In programming mode, it is used to move on to the previous parameter and to decrease the values of same.



### Necessary settings

- Single compressor unit:

Parameter	Value
St1	26
C00	3
P01	2
C03	∅
C04	∅%
C05	1∅∅%
C10	∅
C13	6
C14	∅
C15	∅.∅
C16	44.8
C19	∅
C30	4

### Programming sequence

- 1.- Press **SEL** for 2 or more seconds, until "St1" appears on the display. After displaying "St1" for one second, the present "St1" value will appear.
- 2.- By means of the **▲ ▼** keys, change this value to the value indicated in the above tables.
- 3.- Press **SEL** to confirm the new value. "St2" will appear on the display, but it should not be programmed. Press **SEL** once again to exit the programming mode.
- 4.- To program C00, press **SEL** and **Prg/Mute** simultaneously for 5 seconds, until "00" appears on the display.
- 5.- By means of the **▲ ▼** keys, enter the password "77" to access the "Cxx" parameters. Press **SEL** to confirm.
- 6.- Use the **▲ ▼** keys to move through the different "Cxx" parameters, until reaching "C00".
- 7.- Press **SEL** to view current value.
- 8.- By means of the **▲ ▼** keys, set the values indicated in the above tables, as required.
- 9.- Press **SEL** to confirm the change.
- 10.- Press **Prg/Mute** to save the changes and exit the programming mode.
- 11.- To program "P01", press **Prg/Mute** for 5 seconds, until "P01" appears on the display.
- 12.- Press **SEL** to access the current value.
- 13.- Use the **▲ ▼** keys to modify the value in accordance with the above tables.
- 14.- Press **SEL** to confirm the change.
- 15.- Press **Prg/Mute** to save these values and exit the programming mode.
- 16.- To program the remaining "Cxx" parameters, press **SEL** and **Prg/Mute** simultaneously for 5 seconds, until "00" appears on the display. Enter the password "77" and press **SEL** to confirm.
- 17.- By means of the **▲ ▼** keys, move through the different "Cxx" parameters, and then use **SEL** to access and

validate the values and the   keys to modify these parameters in accordance with the above tables.

### Horizontal air discharge assembly

- 0.- Check to see the packing is not damaged. Unblock the motor and make sure the slits open and close correctly by applying force.
- 1.- Disconnect power supply to the unit.
- 2.- Install the lower support supplied, as in figure 1. Fasten the support with the self-threading screws of the accessory.  
Cut four 400 mm. long strips of the 24 x 24 mm. gasket. Place on both verticle sides of the damper and the panel to avoid air leaks.
- 3.- Lean the dampers on the previously fitted support, with the motor at the point nearest the control panel (Fig. 7).
- 4.- Install the top support and fasten it to the chassis of the unit by means of the drilled holes and self-threading screws supplied (Fig. 7).
- 5.- Fasten the dampers to the lower and top supports with the self-threading screws supplied (Fig. 7).
- 6.- Open the control panel and remove the roof cover.
- 7.- Fit the CP1 control unit in the DIN guide on the X3 connecting strip side. On models RTH, also install relay RRV1 (Fig. 8).
- 8.- Move contactors KM1 and KM2 to attach the side auxiliary contacts supplied.
- 9.- Screw the high pressure intake switch on to the condensing unit output and check for leaks. But first unscrew and remove the plugs that protect same.
- 10.- Connect the pressure switch hose and fasten it by means

of the clamps supplied along with the existing wiring cables.

- 11.- Insert the pressure switch hose through the hole on the separator panel, and install the 28 Ø wall hole guide supplied.
- 12.- Connect the pressure switch hoses to control unit CP1.
- 13.- Remove the damper motor cover, insert the damper hoses and connect as indicated on the corresponding diagram (Fig. 7).
- 14.- Drill a 22 Ø hole and insert the wall hole guide for the damper motor hose.
- 15.- Connect all cables supplied, in accordance with the corresponding wiring diagram.
- 16.- Turn main power supply on and program the control unit.
- 17.- Close all panels.

### Checking

- 1.- Program the thermostat in the winter cycle (pumps only), start the compressors and make sure the dampers open completely.
- 2.- Turn the unit off and program the thermostat in the summer cycle.
- 3.- Start the compressors and check to be sure that when the pressure begins to rise above the programmed 26 bars, the dampers begin to close.

Once this pressure is reached, the dampers open to a specific position, depending upon the outdoor temperature. With a very low outdoor temperature, the dampers should be closed.

## Location of components

RTC 20L ÷ 30L  
RTH 20L ÷ 30L

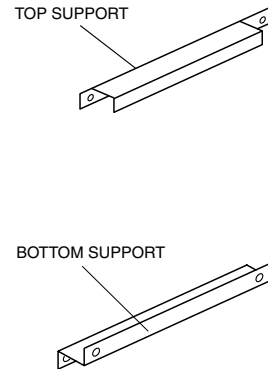
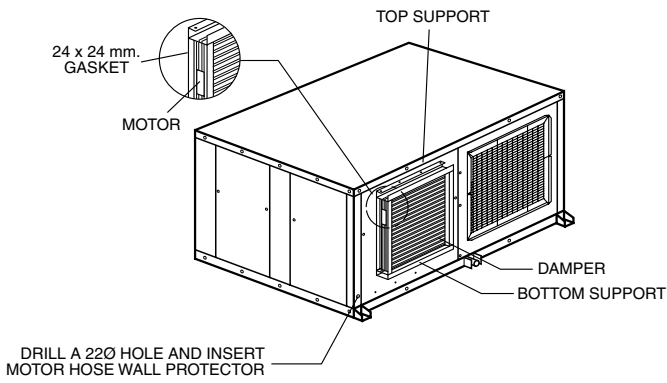


Fig. 6

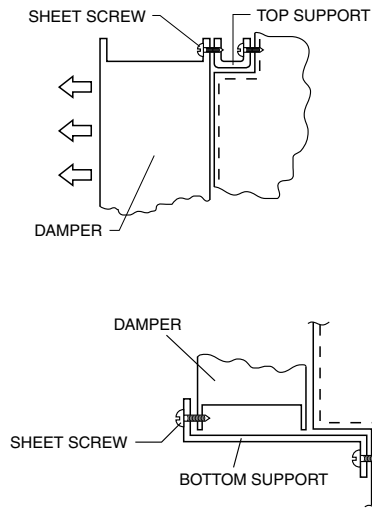
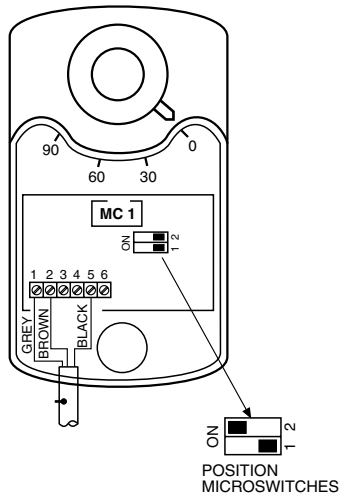


Fig. 7

## Connection of hoses in electric box

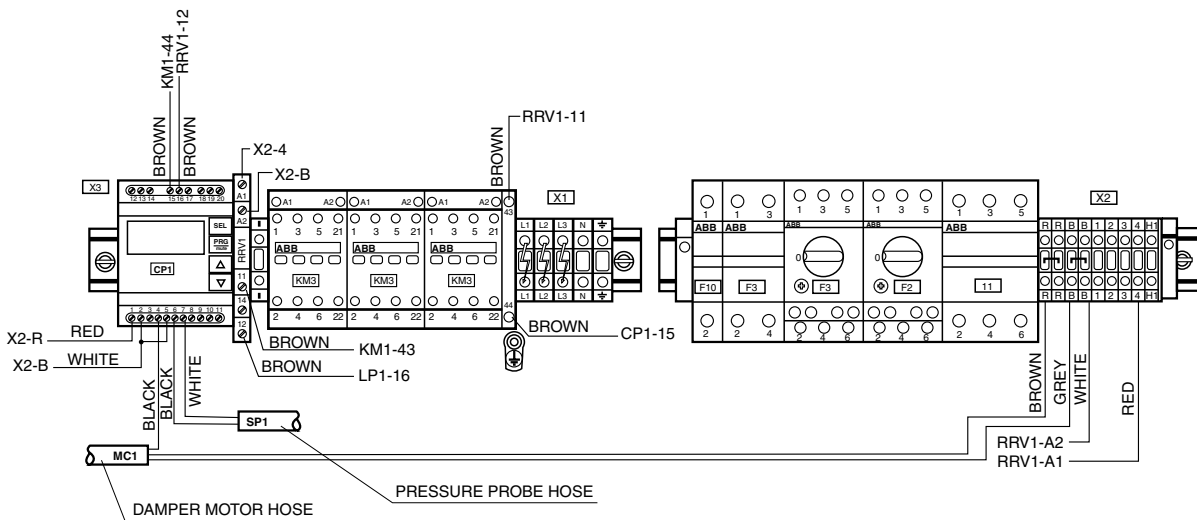


Fig. 8

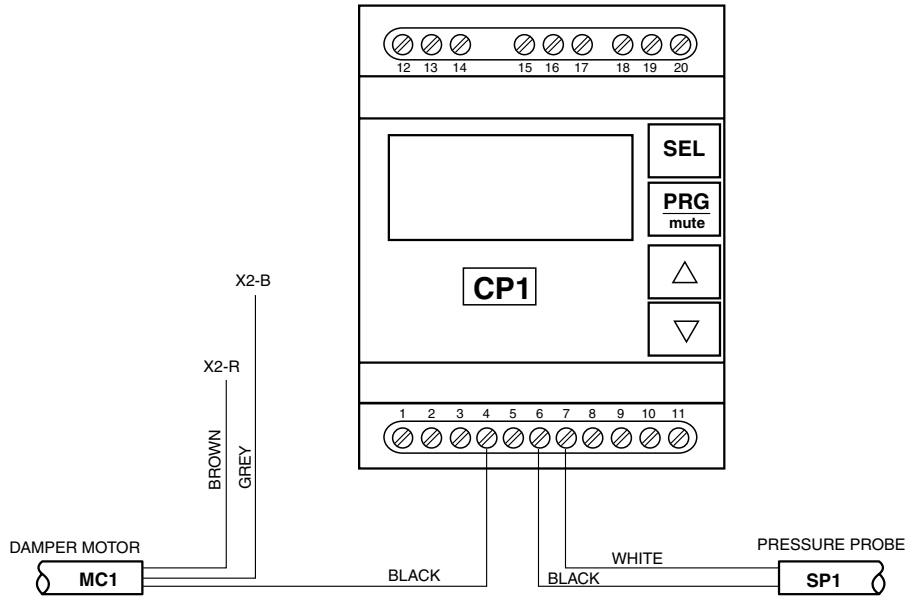


Fig. 9

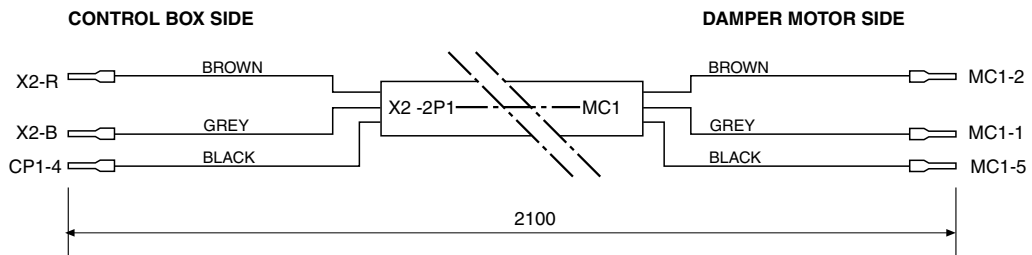
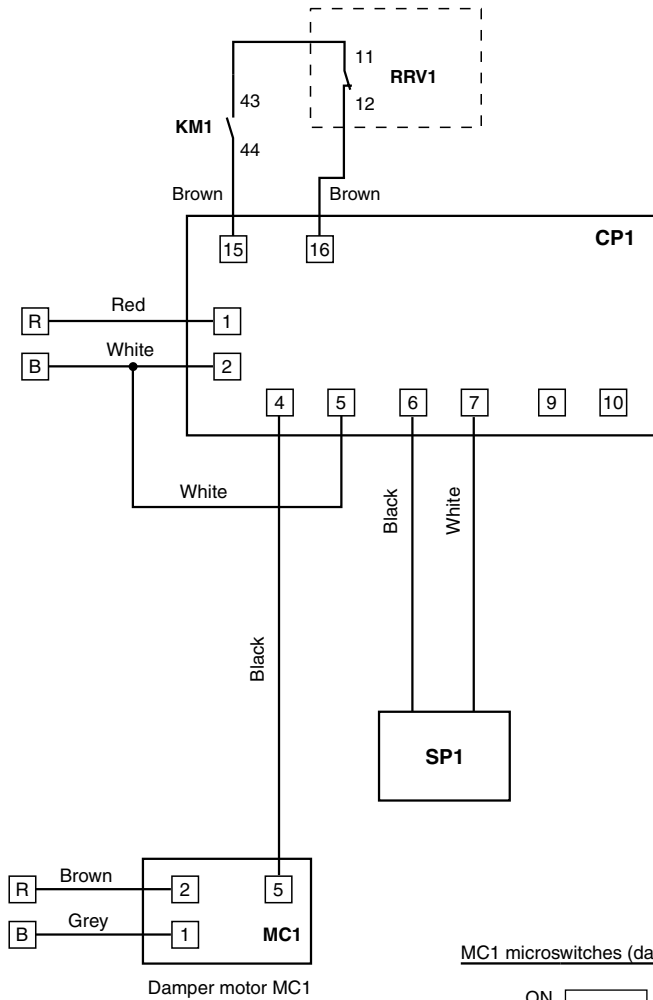


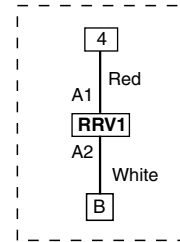
Fig. 10

Cable No.	Cable		Diagram			Cable length
	Colour	Section	From		To	
1	Red	1	X2-R		CP1-1	500
2	White	1	X2-B		CP1-2	490
3	White	1	CP1-5		-	160
4	Brown	1	CP1-15		KM1-44	570
5	Brown	1	KM1-43		RRV1-11	440
6	Brown	1	RRV1-12		CP1-16	590
7	Red	1	X2-4		RRV1-A1	500
8	White	1	RRV1-A2		X2-B	600

**Wiring diagrams for RTH 20L, 25L and 30L**



**ASSEMBLY MODELS  
RTH 20L, 25L, 30L**

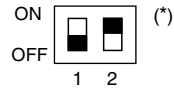


RRV1 - 4-way valve relay  
 CP1 - Proportional control  
 MC1 - Damper motor  
 SP1 - Circuit 1 pressure probe

Parameters CP1

- St1 - 26
- C00 - 3
- P01 - 2
- C03 - 0
- C04 - 0%
- C05 - 100%
- C10 - 0
- C13 - 6
- C14 - 0
- C15 - 0.0
- C16 - 44,8
- C19 - 0
- C30 - 4

MC1 microswitches (damper motor)



I-2564a  
 RTC-20L, 25L and 30L  
 RTH-20L, 25L and 30L

(\*) The position of the damper in standby (0V set point between 1 and 5 of MC1) should be open. With signal (0-10 Vdc), the damper should close. Set switch 2 to ON/OFF position to carry out this logic.





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