

# Split Air-Air Heat Pumps SOH-076 to 240H (C) / SICH-070 to 180B & 240C



Ref: TSOHBBE1

## Technical Information



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## General information

### General description

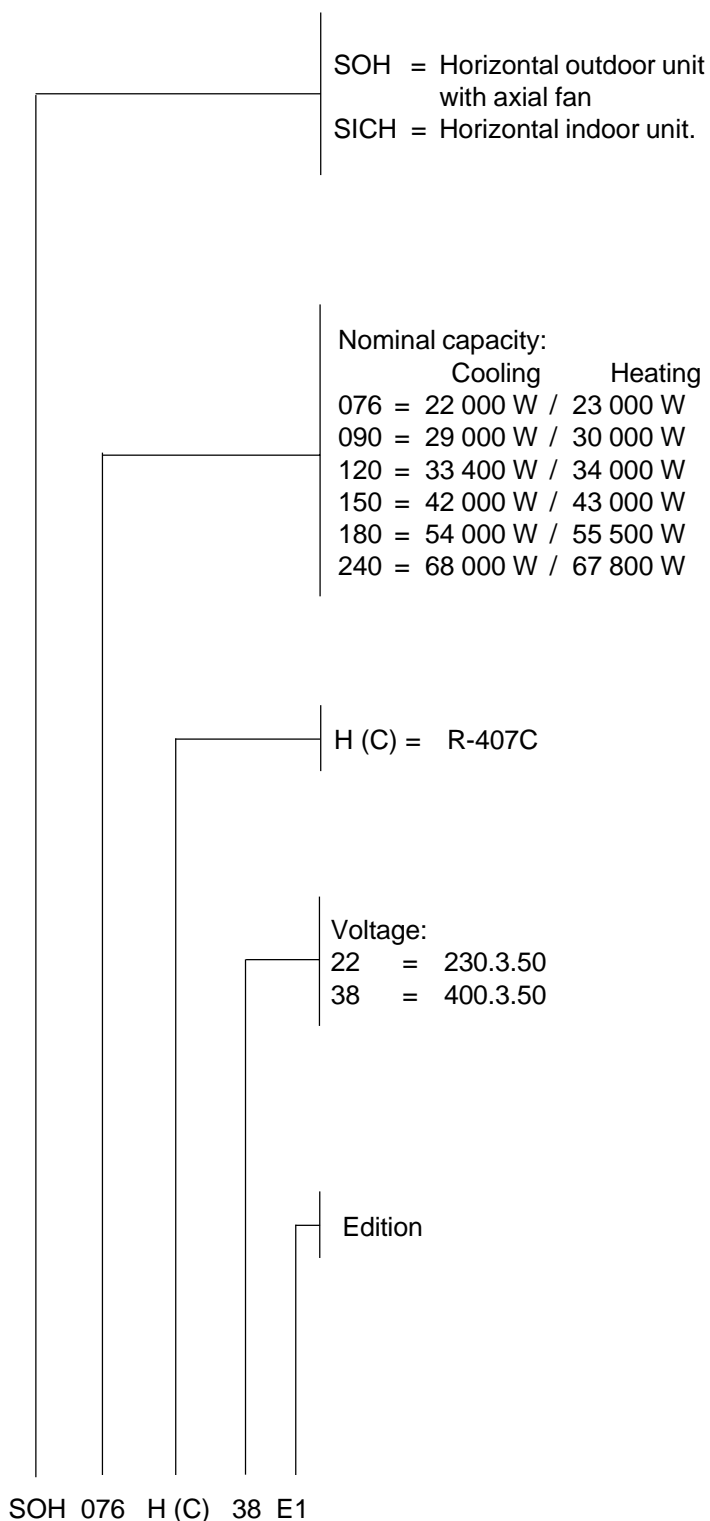
The SOH-H (C) series units are the outdoor units of a split type heat pump, equipped with a vertical discharge axial fan and ready to be installed directly outdoors.

The SOH-076 to 180H (C) units are compatible with indoor units SICH-070 to 180B, 240C.

For adequate operation, both the electrical as well as the cooling sections of these units need to be connected to the corresponding indoor unit.

The SICH indoor units can be equipped, as an optional accessory, with an electric heater or a hot water coil for auxiliary heat in the case of an emergency.

### Nomenclature



## Technical specifications

### Mechanical specifications

#### Compressor

Vertical hermetic type. Mounted on antivibratory supports and has internal motor protection. Includes an electric heater for heating the oil in the sump to make start-up easier and avoid loss of oil in compressor.

#### Coils

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

#### Fans (outdoor units)

Axial with free air discharge, without ducts. The unit is equipped with a speed selector in summer cycle that is regulated by the high pressure of the cooling circuit.

#### Fan (indoor units)

Centrifugal, with dual helix and a shaft in common, except in models SICH- 070 and 076B, that have a single helix. Belt and pulley drive with a removable core. The motors are mounted on tensor bases.

#### Casing (outdoor units)

Made of galvanised steel sheeting, finished with oven-polymerised powdered paint, which allows installing outdoors.

#### Casing (indoor units)

Made of galvanised steel sheeting and finished with oven-polymerised powdered paint. Insulated internally so as to avoid condensation and reduce noise level. Equipped with a tray and corresponding drain for collecting condensation from the coil. The structure of the SICH-070 to 150B indoor units allows either vertical or horizontal orientation of the fans.

#### Cooling circuit

Made of welded copper tubing. The units are supplied dehydrated and factory tested with regard to maximum pressure and airtightness. In the indoor units, refrigerant expansion is carried out by means of calibrated and distributor holes. In the outdoor units, thermostatic expansion and distributor valves are used. The outdoor units also include a suction accumulator, discharge muffler, high and low pressure switches and suction and discharge pressure intakes.

#### Refrigerant

These units are supplied with connections ready for welding. The refrigerant load should be carried out completely at the job site. See Refrigerant Load section of the Installation Instructions.

The refrigerant used is R-407C (R-22 can also be used).

#### Electrical panel

Accessible directly from the exterior. Includes connecting strip, control board and electronic probes, power supply connectors, operating relays, transformer, heat relays and automatic switches. In compliance with European standards in force.

#### Thermostat

The SOH-076, 090 and 120H (C) units include, as standard equipment, a ARTTH001S electronic thermostat. Nevertheless, upon request and as an accessory, the ARTTH003S electronic thermostat can also be used, programmed for one stage and with communication possibilities.

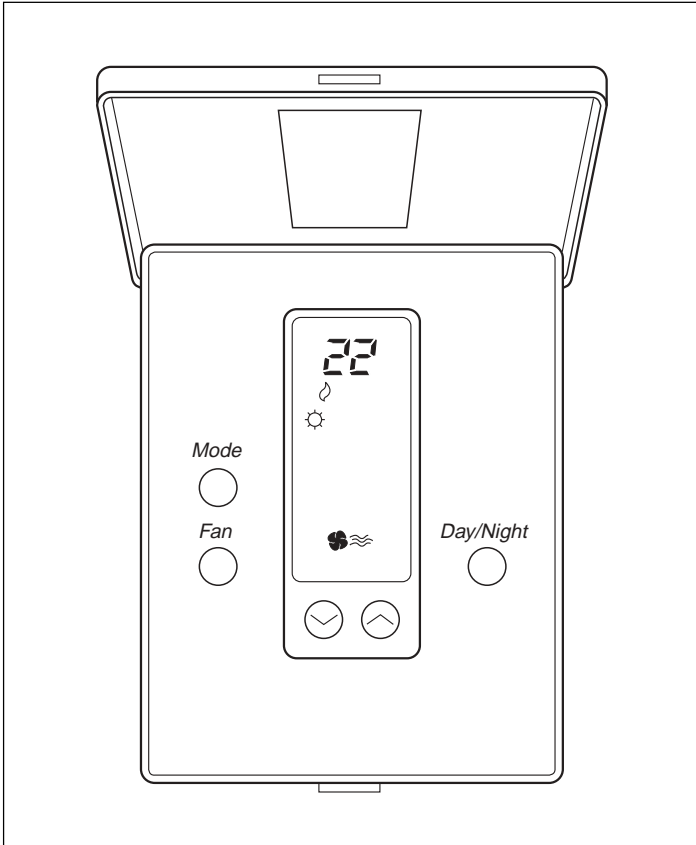
The SOH-150 to 180H (C) units include a ARTTH003S ther-

mostat.

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

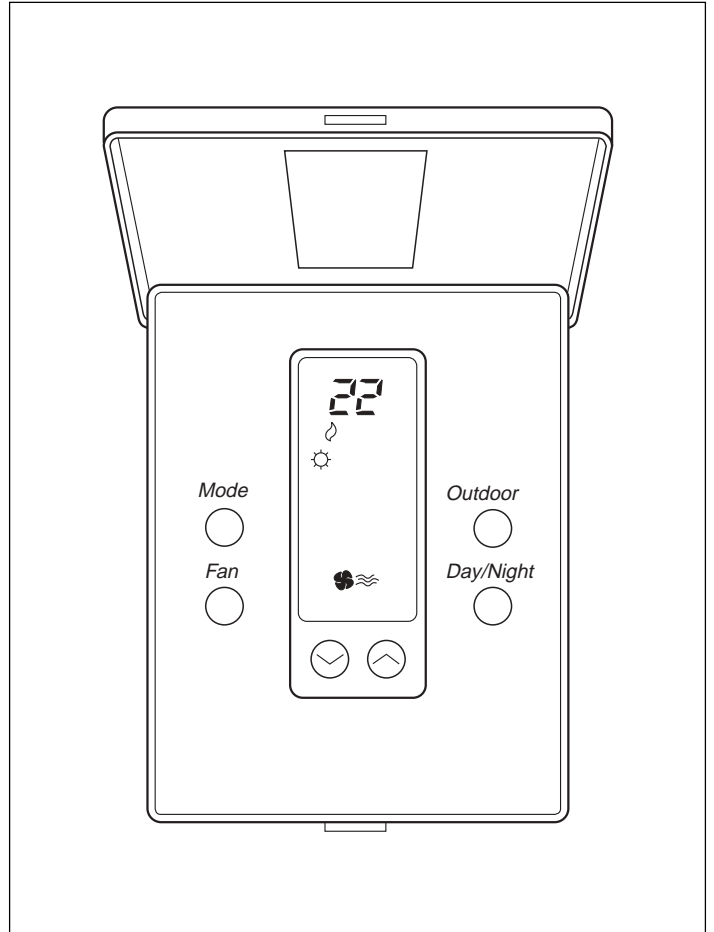
### **Thermostat ARTTH001S**

24 Vac digital electronic type. To control one cool stage and one heat stage. Designed to give a precise control of the ambient temperature and graphic information of the mode in which the air conditioner is operating. This is a Proportional-Differential-Integral response control and, in accordance with the difference between the programmed temperature and the ambient temperature, it varies the on-off cycles to between 3 and 7.5 cycles per hour. Allows AUTO/ON operation of the indoor fan. See the Operating and Maintenance Instructions.



### **Thermostat ARTTH003S**

Digital electronic type. To control two cool stages and two heat stages. Programmable for one cool stage and one heat stage only. Designed to give a precise control of the ambient temperature and graphic information of the mode in which the air conditioner is operating. This is a Proportional-Differential-Integral response control in accordance with the difference between the programmed temperature and the ambient temperature. Allows communication with a PC and AUTO/ON operation of the indoor fan. See the Operating and Maintenance Instructions.



## Physical data

### Outdoor units

Model		SOH-076H(C)	SOH-090H(C)	SOH-120H(C)	SOH-150H(C)	SOH-180H(C)	SOH-240H(C)
Compressor	Amount	1	1	1	2	2	2
	Type	Scroll					
	Power rating kW	6.7	9.6	11.9	2 x 6.7	2 x 9.6	2 x 11.9
	Power supply V.ph.Hz	230.3.50 or 400.3.50					
Fan	Power rating W	370					
	Number of fans	1	1	2	2	2	4
	Power supply V.ph.Hz.	230.1.50					
	Diameter propellers	610					
Coil	Amount	1	1	2	2	2	2
	Tubing depth x height	3 x 36	3 x 42	2 x 42	3 x 42	3 x 44	3 x 42
	Diameter tubing	3/8"					
	Surface m <sup>2</sup>	1.86	2.17	1.57 x 2	1.57 x 2	1.82 x 2	2.17 x 2
Dimensions with standard packing	Height mm	1 005	1 155	1 155	1 155	1 210	1 155
	Width mm	1 240	1 240	1 240	1 240	1 240	1 975
	Depth mm	880	880	1 630	1 630	1 630	1 630
Weight	Nett kg	240	254	332	452	480	612
	Gross kg	244	260	336	458	486	618

### Indoor units

Model		SICH-070-076B	SICH-090-120B	SICH-150B	SICH-180B	SICH-240C
Fan	Motor power rating kW	0.75	1.5	1.5	3	3
	Power supply V.ph.Hz	230.3.50 or 400.3.50				400.3.50
	Motor rpm	1 400	1 400	1 400	1 400	1 400
	Number of turbines	1	2	2	2	2
	Turbine Ø mm	320	320	320	320	380
	Turbine width mm	320	240	320	320	380
Coil	Amount	1				
	Tubing depth x height	4 x 21	4 x 25	4 x 25	4 x 29	5 x 32
	Diameter tubing	3/8"	3/8"	3/8"	3/8"	3/8"
	Surface m <sup>2</sup>	0.57	0.83	1.11	1.4	1.76
Dimensions with standard packing	Height mm	760	833	883	935	950
	Width mm	1 444	1 825	2 125	2 390	2 800
	Depth mm	930	930	930	955	1 030
Weight	Nett kg	120	165	195	240	310
	Gross kg	142	195	230	290	350

### Limits of use

Voltage limits				Air intake temperature to the outdoor coil DB				Air intake temperature to the indoor coil			
Nom. 230 V		Nom. 230 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	2	-20 <sup>(1)</sup>	46	24	14	10 <sup>(2)</sup>	22	25

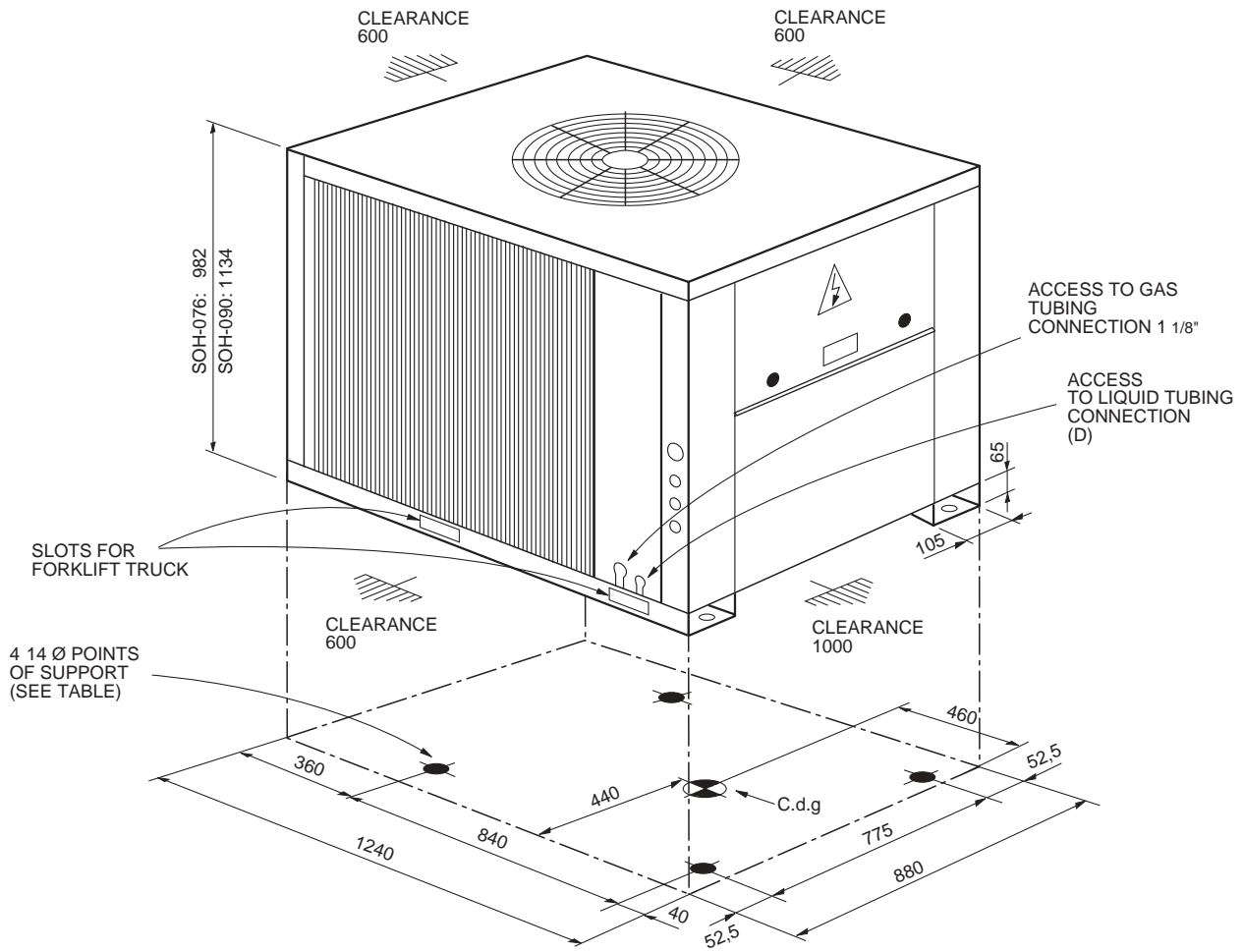
**Notes:** WB = wet bulb. DB = dry bulb.

(1) At below -20°C, only the emergency heater remains operative.

(2) This equipment can operate, for short intervals, at temperatures below 10°C so as to raise the conditioned air temperature to 10°C.

# General dimensions mm

## SOH-076 and 090H (C)

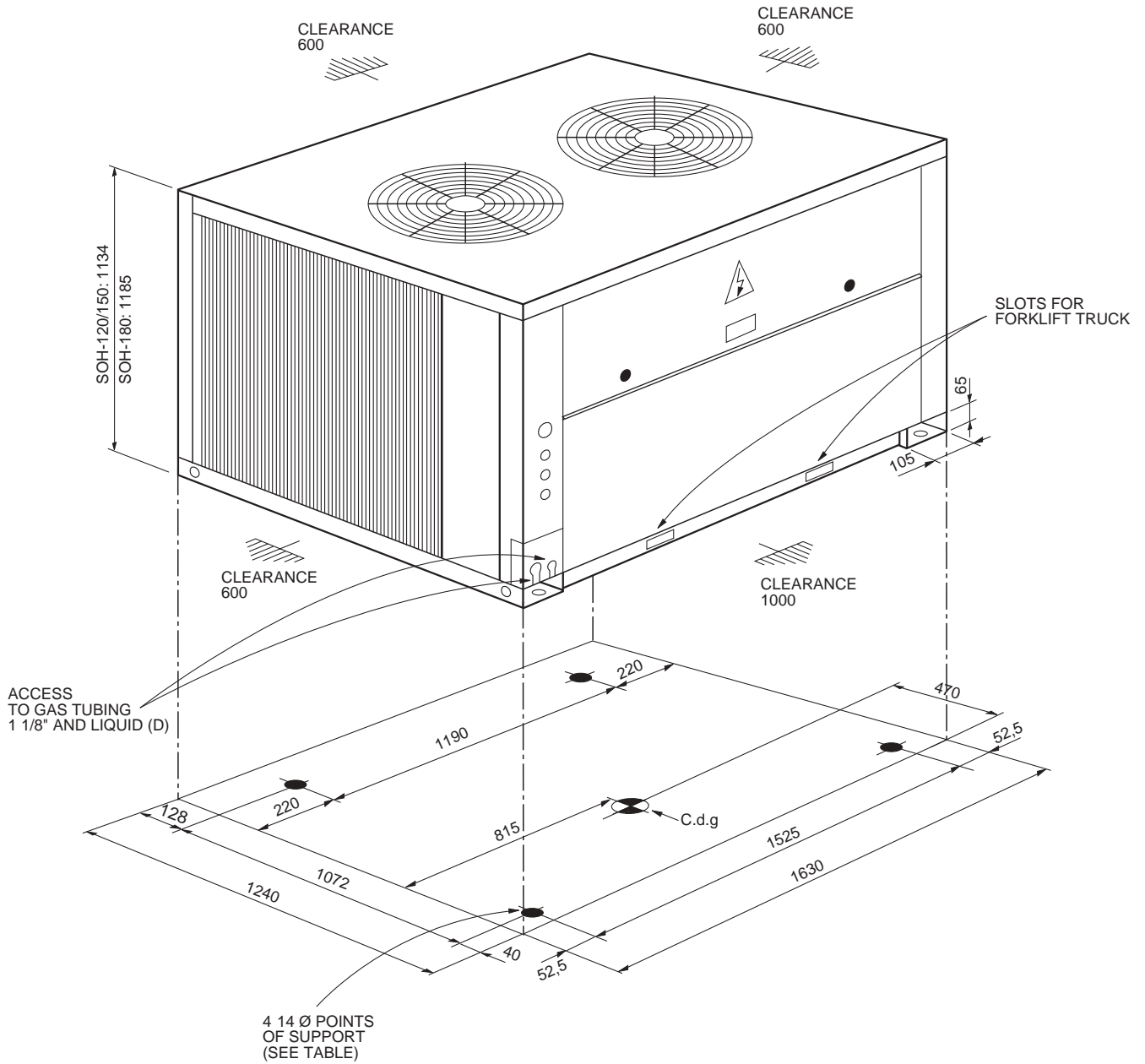


Unit	(D) Liquid tubing diameter	Weight kgs. per point of support
<b>076H (C)</b>	1/2"	60
<b>090H (C)</b>	5/8"	64



# General dimensions mm

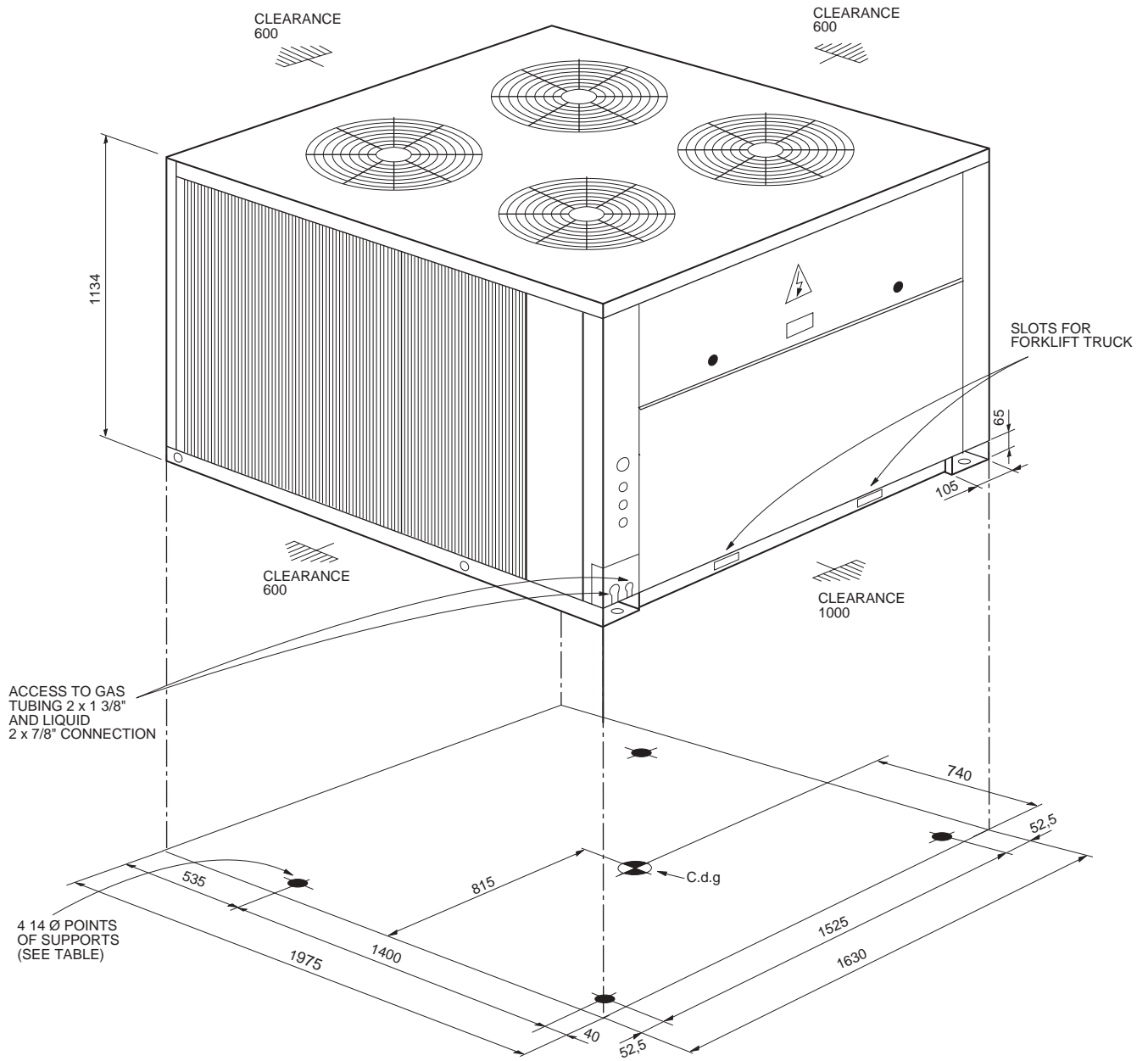
## SOH-120, 150 and 180H (C)



Unit	(D) Liquid tubing diameter	Weight kgs. per point of support
<b>120H (C)</b>	1 x 5/8"	83
<b>150H (C)</b>	2 x 1/2"	113
<b>180H (C)</b>	2 x 5/8"	120

# General dimensions mm

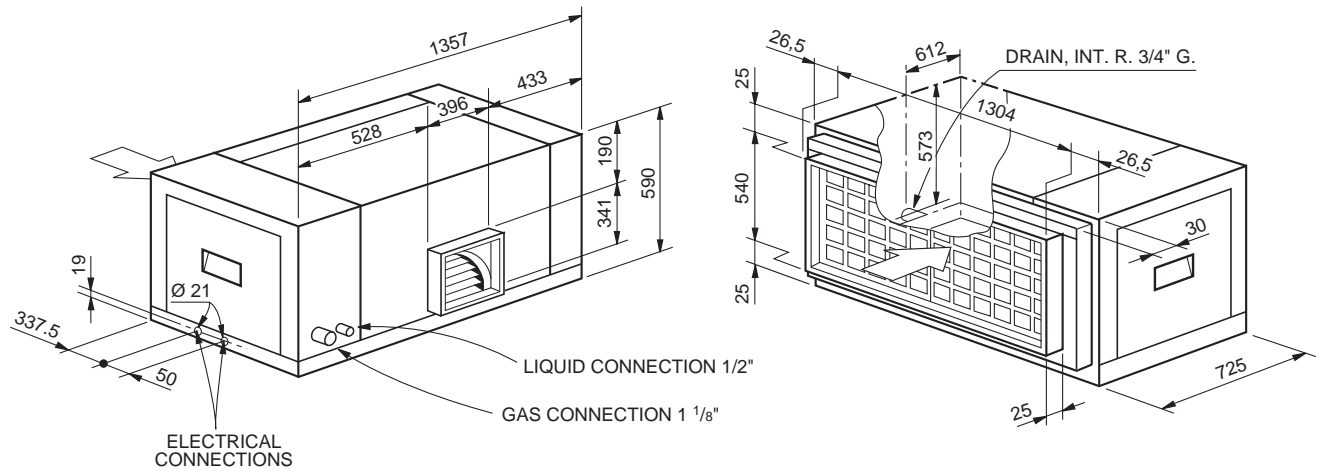
## SOH-240H (C)



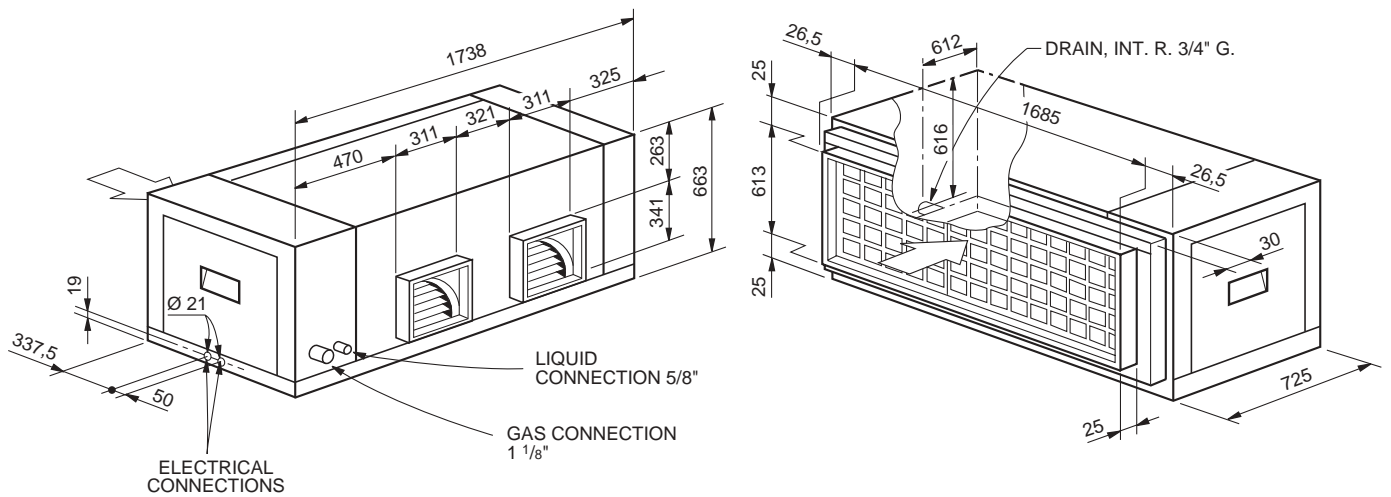
Unit	Weight kgs. per point of support
<b>240H (C)</b>	153

## General dimensions mm

### SICH-070 and 076B

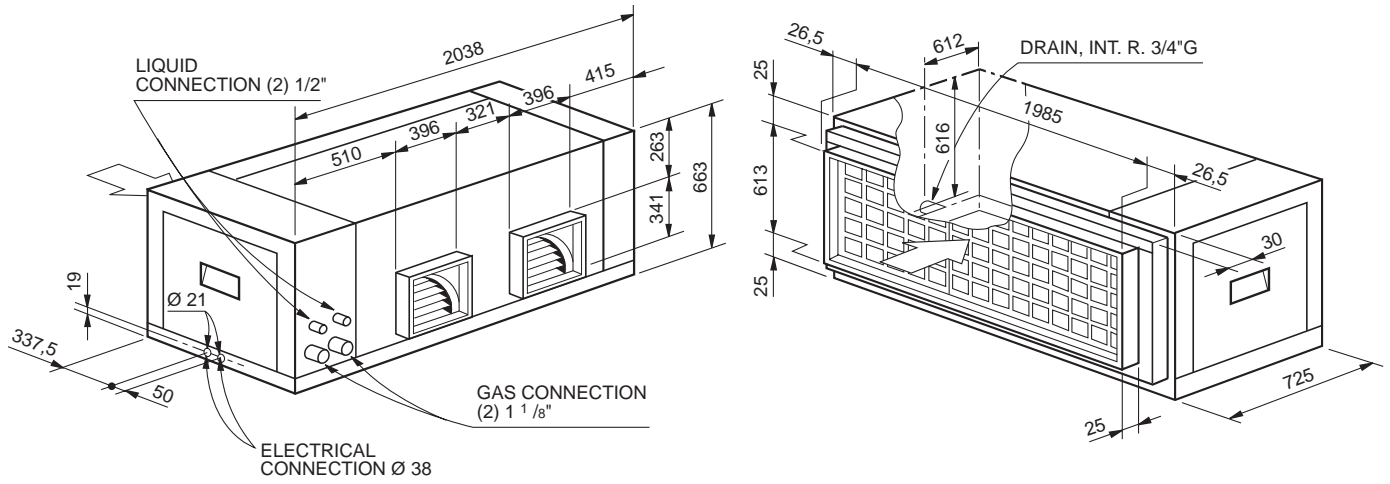


### SICH-090 and 120B

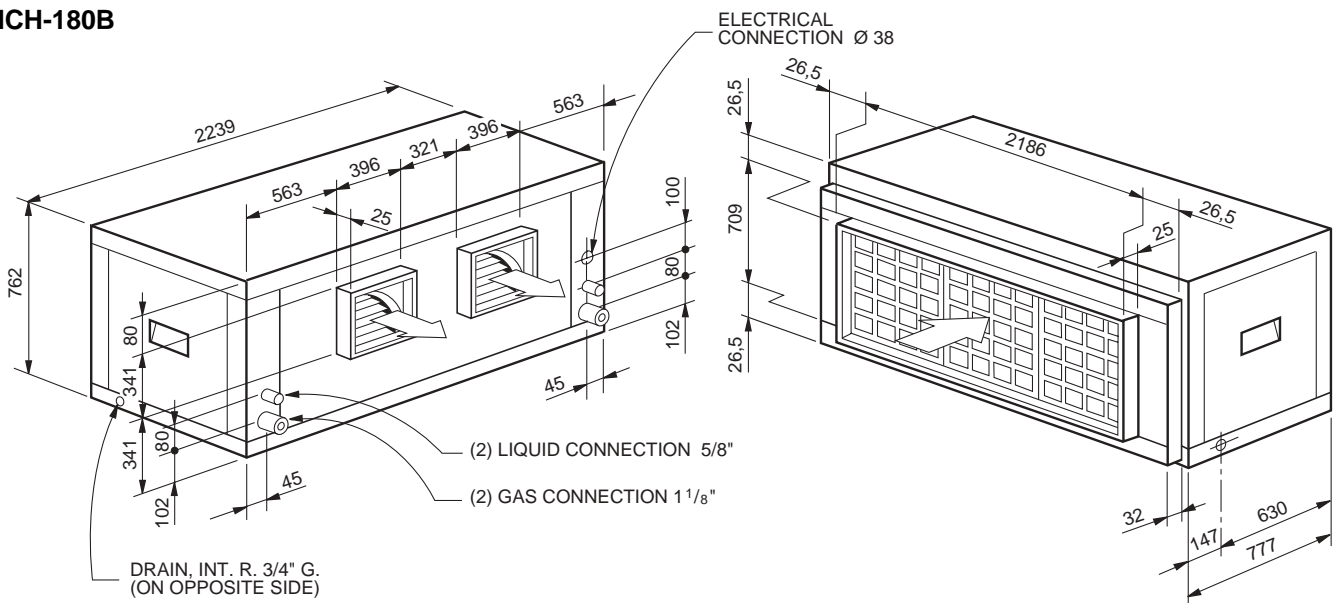


# General dimensions mm

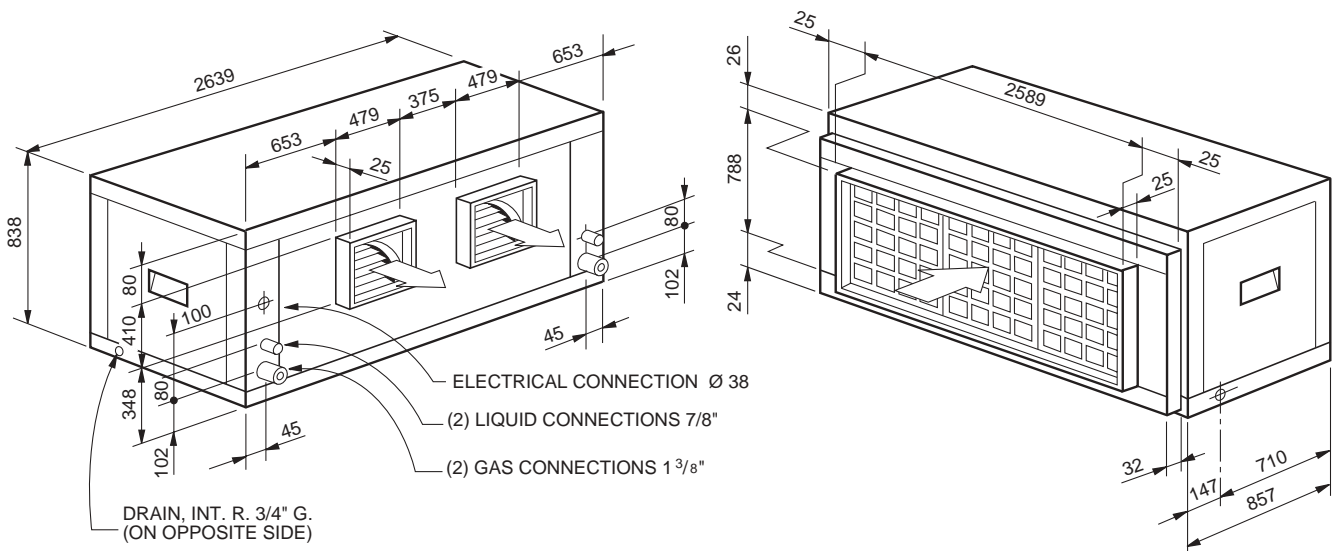
## SICH-150B



## SICH-180B



## SICH-240C



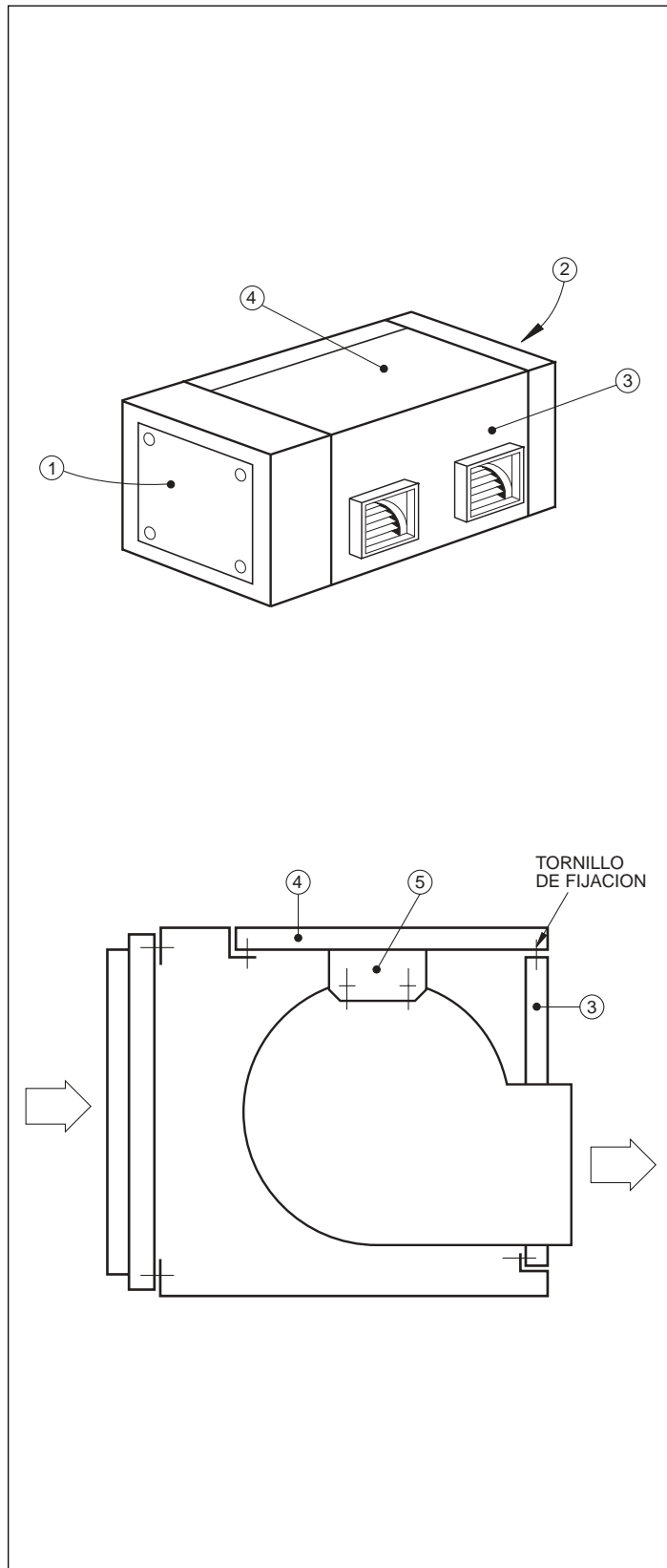
**Process for transforming a horizontal discharge into a vertical discharge (SICH-070, 076, 090, 120, 150B units)**

- 1- Remove the fastening screws from the side covers ref. 1 and 2 of the upper unit.
- 2- Remove the side covers ref. 1 and 2.
- 3- Loosen the screws that fasten the fan motor to its base, and remove the transmission belt.
- 4- Through the side accesses, unscrew panels ref. 3 and 4,

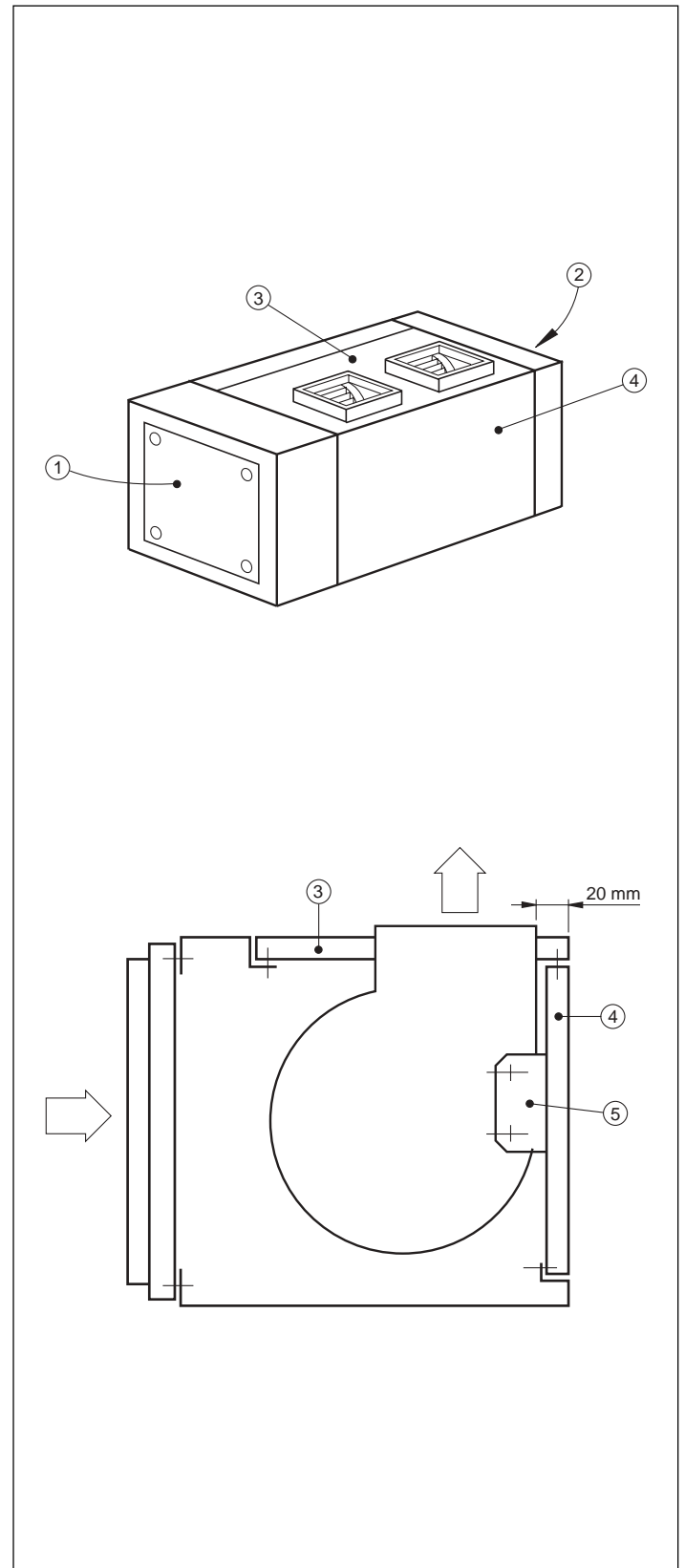
as indicated in the standard orientation figure.

- 5- Unscrew the fastener of the fan to its support ref. 5.
- 6- Place panel ref. 3 in the previous position of panel ref. 4, and place panel ref. 4 in the previous position of panel ref. 3.
- 7- Tighten the screws of these panels and the fan on support ref. 5.
- 8- Replace the transmission belt and fasten the motor to its base.
- 9- Screw on side covers ref. 1 and 2.

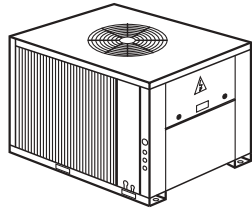
**Standard orientation**



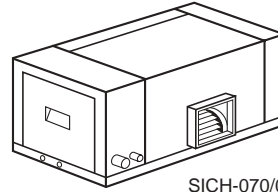
**Orientatin variable at job site**



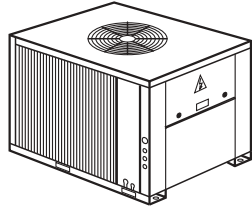
# Variant chart



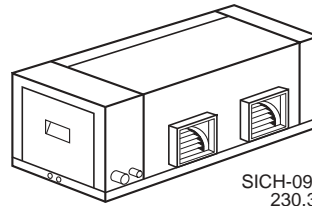
SOH-076H (C)  
230.3.50  
400.3.50



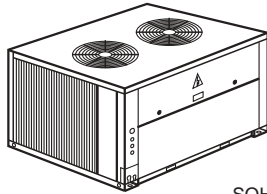
SICH-070/076B  
230.3.50  
400.3.50



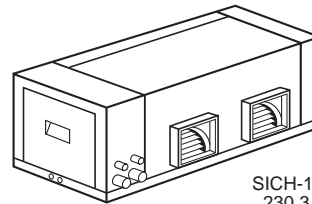
SOH-090H (C)  
230.3.50  
400.3.50



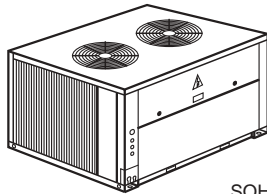
SICH-090/120B  
230.3.50  
400.3.50



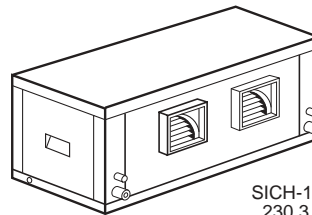
SOH-120H (C)  
230.3.50  
400.3.50



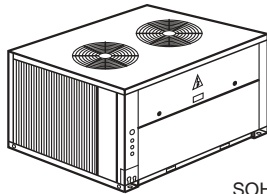
SICH-150B  
230.3.50  
400.3.50



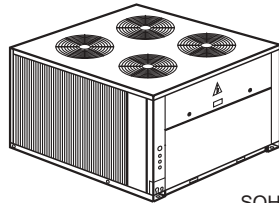
SOH-150H (C)  
230.3.50  
400.3.50



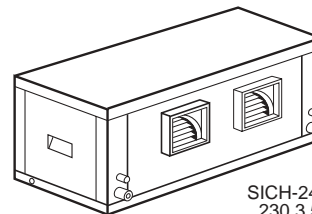
SICH-180B  
230.3.50  
400.3.50



SOH-180H (C)  
230.3.50  
400.3.50



SOH-240H (C)  
230.3.50  
400.3.50



SICH-240C  
230.3.50  
400.3.50

## Nominal characteristics

Outdoor unit	Indoor unit	Summer		Winter	
		Cooling capacity W	Consumption W	Heating capacity W	Consumption W
SOH-076H (C)	SICH-070/076B	22 000	8 300	23 000	6 300
SOH-090H (C)	SICH-090/120B	29 000	11 000	30 000	8 640
SOH-120H (C)	SICH-090/120B	33 400	13 800	34 000	12 100
SOH-150H (C)	SICH-150B	42 000	17 500	43 000	14 600
SOH-180H (C)	SICH-180B	54 000	20 800	55 500	19 400
SOH-240H (C)	SICH-240C	68 000	28 000	67 800	22 300

## Correcting factors

### Correcting factors of the cooling capacities

Cooling capacity correcting factors for flows that vary from the nominal flows in 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 to the outdoor coil for flows that vary from the nominal flows.

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

### Correcting factors for heating capacities

DB air intake temperature indoor unit °C	WB air temperature outdoor unit °C				
	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 the air intake to the outdoor unit for flows that vary from the nominal flows.

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

## Sensible cooling capacities

Model	Dry outdoor air temperature °C (DB)	Humid air intake temperature °C (WB)	Total capacity	Sensible capacity (W/h)				Compressor absorbed power
				Dry air intake temperature to the coil °C (DB)				
				22	24	27	29	
			W/h	W/h	W/h	W/h	W/h	kW
SOH-076H (C) SICH-076B	25	22	26 400	8 108	10 954	15 223	18 073	6.43
		19.5	23 760	11 644	14 491	18 760	21 611	6.74
		17	22 000	15 438	18 284	22 000	22 000	7.04
	35	22	24 420	7 424	10 270	14 539	17 385	7.27
		19.5	22 000	10 982	13 828	18 097	20 994	7.66
		17	20 240	13 848	16 694	20 240	20 240	8.04
	45	22	22 000	6 665	9 511	13 780	16 626	8.42
		19.5	19 800	10 228	13 074	17 343	19 800	8.8
		17	18 040	13 822	16 668	18 040	18 040	9.19

## Sensible cooling capacities

Model	Dry outdoor air temperature °C (DB)	Humid air intake temperature °C (WB)	Total capacity	Sensible capacity (W/h)				Compressor absorbed power
				Dry air intake temperature to the coil °C (DB)				
				22	24	27	29	
			W/h	W/h	W/h	W/h	W/h	kW
<b>SOH-090H (C) SICH-090B</b>	25	22	34 800	10 350	15 243	22 581	27 480	8.26
		19.5	31 320	16 492	21 385	28 723	31 320	8.66
		17	29 000	22 957	27 850	29 000	29 000	9.05
	35	22	32 190	9 495	14 387	21 726	26 619	9.35
		19.5	29 000	15 659	20 552	27 890	29 000	9.84
		17	26 680	20 723	25 616	26 680	26 680	10.33
	45	22	29 000	8 541	13 433	20 772	25 564	10.82
		19.5	26 100	14 706	19 599	26 100	26 100	11.31
		17	23 780	20 911	23 780	23 780	23 780	11.81
<b>SOH-120H (C) SICH-120B</b>	25	22	40 080	12 151	16 927	24 090	28 874	9.99
		19.5	36 072	18 114	22 890	30 054	34 838	10.46
		17	33 400	24 460	29 235	33 400	33 400	10.94
	35	22	37 074	11 136	15 910	23 075	27 850	11.30
		19.5	33 400	17 128	21 904	29 068	33 400	11.89
		17	30 728	21 892	26 668	30 728	30 728	12.49
	45	22	33 400	10 005	14 780	21 944	26 720	13.08
		19.5	30 060	16 002	20 778	27 942	30 060	13.68
		17	27 388	22 045	26 820	27 388	27 388	14.27
<b>SOH-150H (C) SICH-150B</b>	25	22	50 400	15 136	21 635	31 384	37 892	6.33
		19.5	45 360	23 274	29 773	39 522	45 360	6.63
		17	42 000	31 886	38 385	42 000	42 000	6.93
	35	22	46 620	13 878	20 378	30 126	36 625	7.16
		19.5	42 000	22 051	28 550	38 299	42 000	7.53
		17	38 640	28 648	35 147	38 640	38 640	7.91
	45	22	42 000	12 477	18 976	28 725	35 224	8.29
		19.5	37 800	20 653	27 152	36 901	37 800	8.66
		17	34 440	28 887	34 440	34 440	34 440	9.04



## Sensible cooling capacities

Model	Dry outdoor air temperature °C (DB)	Humid air intake temperature °C (WB)	Total capacity	Sensible capacity (W/h)				Compressor absorbed power
				Dry air intake temperature to the coil °C (DB)				
				22	24	27	29	
			W/h	W/h	W/h	W/h	W/h	kW
<b>SOH-180H (C) SICH-180B</b>	25	22	64 800	19 662	27 333	38 841	46 524	12.60
		19.5	58 320	29 237	36 909	48 417	56 102	13.20
		17	54 000	39 432	47 104	54 000	54 000	13.80
	35	22	59 940	18 017	25 689	37 197	44 869	14.25
		19.5	54 000	27 641	35 313	46 820	54 000	15.00
		17	49 680	35 362	43 034	49 680	49 680	15.75
	45	22	54 000	16 187	23 859	35 367	43 039	16.50
		19.5	48 600	25 819	33 491	45 000	48 600	17.25
		17	44 280	35 525	43 197	44 280	44 280	18.00
<b>SOH-240H (C) SICH-240C</b>	25	22	81 600	24 507	35 027	50 807	61 340	19.65
		19.5	73 440	37 680	48 200	63 980	73 440	20.58
		17	68 000	51 620	62 140	68 000	68 000	21.52
	35	22	75 480	22 470	32 990	48 770	59 290	22.22
		19.5	68 000	35 700	46 218	62 000	68 000	23.39
		17	62 560	47 676	58 196	62 560	62 560	24.56
	45	22	68 000	20 200	30 720	46 500	57 020	25.73
		19.5	61 200	33 436	43 956	59 735	61 200	26.90
		17	55 760	46 763	55 760	55 760	55 760	28.07

## Test conditions

Voltage	Length of interconnecting tubing	Summer				Winter			
		Outdoor temp. °C		Indoor temp. °C		Outdoor temp °C		Indoor temp. °C	
		DB	WB	DB	WB	DB	WB	DB	WB
400	7.5 meters	35	24	27	19	7	6	20	12

## Nominal flows

The cooling and heating capacities of the corresponding tables are valid for the following nominal flows.

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

Model	Nominal flow		Indoor fan available pressure
	m <sup>3</sup> /h	m <sup>3</sup> /s	
<b>SICH-070 and 076B</b>	4 615	1.28	62
<b>SICH-090 and 120B</b>	8 060 / 7 850	2.24 / 2.18	62 / 75
<b>SICH-150B</b>	10 700	2.97	75
<b>SICH-180B</b>	13 600	3.77	80
<b>SICH-240C</b>	16 500	4.58	80

## Indoor fan features

Model	Static pressure available		Air flow		Absorbed power W
	mm WG <sup>(1)</sup>	Pa	m <sup>3</sup> /h	m <sup>3</sup> /s	
<b>SICH-070-076B</b>	14	137.2	3 577	0.99	680
	12	117.6	3 885	1.07	740
	10	98	4 130	1.14	785
	8	78.4	4 399	1.22	840
	6	58.8	4 653	1.29	900
	5	49	4 723	1.31	920
	4	39.2	4 860	1.35	955
	2	19.6	5 058	1.40	1 005
	0	0	5 281	1.46	1 070
<b>SICH-090-120B</b>	17.1	167.6	5 250	1.46	650
	16.5	161.7	5 500	1.53	690
	15.2	149.0	6 000	1.66	770
	13.6	133.3	6 500	1.80	850
	11.5	112.7	7 000	1.94	950
	10.0	98.0	7 500	2.08	1 050
	6.7	65.7	8 000	2.22	1 100
	3.6	35.3	8 500	2.36	1 210
	1.0	9.8	9 000	2.50	1 320
	0.0	0.0	9 200	2.55	1 375
<b>SICH-150B</b>	17.9	175.4	7 000	1.94	896
	17.1	167.6	7 500	2.08	970
	16.0	156.8	8 000	2.22	1 045
	14.8	137.2	8 500	2.36	1 100
	13.3	130.3	9 000	2.50	1 175
	12.1	118.6	9 500	2.64	1 275
	10.0	98.0	10 000	2.78	1 375
	8.5	83.3	10 500	2.92	1 450
	6.5	63.7	11 000	3.05	1 600
	4.3	42.1	11 500	3.19	1 700
	2.0	19.6	12 000	3.33	1 802
0.0	0.0	12 500	3.47	1 970	
<b>SICH-180B</b>	15.9	155.8	11 500	3.19	2 004
	14.2	139.1	12 000	3.33	2 139
	12.6	123.4	12 500	3.47	2 240
	11.0	107.8	13 000	3.61	2 408
	8.6	84.2	13 500	3.75	2 535
	6.5	63.7	14 000	3.89	2 732
	3.9	38.2	14 500	4.02	2 843
	1.3	12.7	15 000	4.16	3 000
	0.0	0.0	15 200	4.22	3 150
<b>SICH-240C</b>	20	196	12 900	3.58	2 200
	16	157	14 000	3.89	2 800
	12	118	15 300	4.25	3 120
	8	78	16 500	4.58	3 520
	6	59	17 100	4.75	3 650
	4	39	17 700	4.92	3 800
	0	0	19 000	5.28	4 100

(1) Flow services with wet coil, including filters.

## Electrical characteristics

### Outdoor units

Model	Power supply V.ph.Hz.		Consumption A				Power supply cable section (2) mm <sup>2</sup>	Automatic switch (K curve)(1) A
	Compressor	Fan	Compressor		Fan			
			Start	Nominal	Start	Nominal		
<b>SOH-076H (C)</b>	230.3.50	230.1.50	166	22.4	6	2.2	10	40
	400.3.50	230.1.50	94	11.7	6	2.2	4	25
<b>SOH-090H (C)</b>	230.3.50	230.1.50	224	29.7	6	2.2	10	50
	400.3.50	230.1.50	134	17.1	6	2.2	6	32
<b>SOH-120H (C)</b>	230.3.50	230.1.50	279	36.8	2 x 6	2 x 2.2	16	63
	400.3.50	230.1.50	167	21.1	2 x 6	2 x 2.2	10	40
<b>SOH-150H (C)</b>	230.3.50	230.1.50	2 x 166	2 x 22.4	2 x 6	2 x 2.2	25	80
	400.3.50	230.1.50	2 x 94	2 x 11.7	2 x 6	2 x 2.2	10	50
<b>SOH-180H (C)</b>	230.3.50	230.1.50	2 x 224	2 x 29.7	2 x 6	2 x 2.2	35	100
	400.3.50	230.1.50	2 x 134	2 x 17.1	2 x 6	2 x 2.2	16	63
<b>SOH-240H (C)</b>	230.3.50	230.1.50	2 x 279	2 x 36.8	4 x 6	4 x 2.2	50	125
	400.3.50	230.1.50	2 x 167	2 x 21.1	4 x 6	4 x 2.2	25	80

**Important:** The dimensioning of the automatic switch and power supply line sections are orientative and should be corrected in accordance with job site conditions, length between units and legislation in force.

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

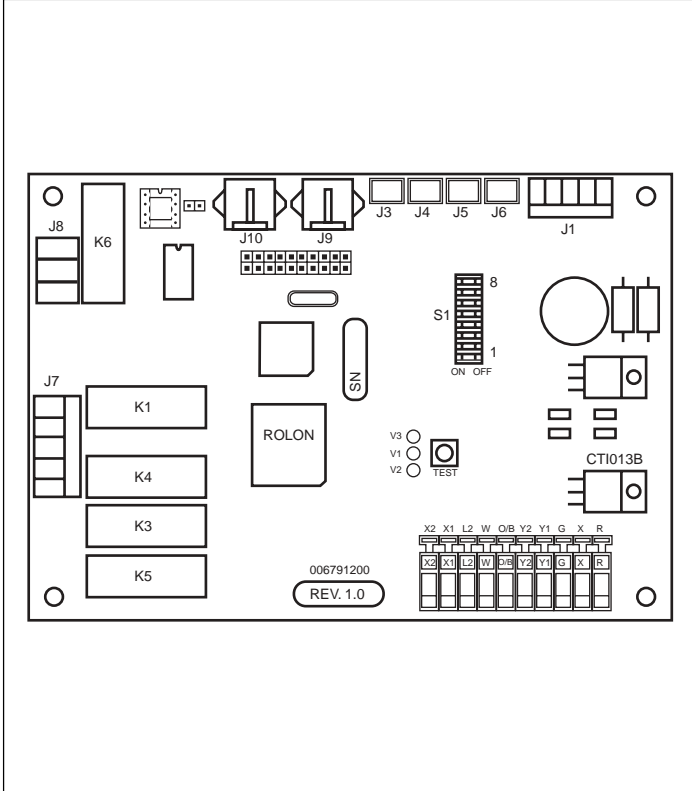
### Indoor units

Model	Power supply V.ph.Hz.	Consumption A		Power supply cable section mm <sup>2</sup>
	Fan	Fan		
		Start	Nominal	
<b>SICH-070/076B</b>	230.3.50	14	3.4	4 x 1.5
	400.3.50	8	2.2	4 x 1.5
<b>SICH-090B</b>	230.3.50	30	6.1	4 x 1.5
	400.3.50	17	3.5	4 x 1.5
<b>SICH-120B</b>	230.3.50	30	5.8	4 x 1.5
	400.3.50	17	3.3	4 x 1.5
<b>SICH-150B</b>	230.3.50	32	6.4	4 x 1.5
	400.3.50	20	3.7	4 x 1.5
<b>SICH-180B</b>	230.3.50	59	10.8	4 x 2.5
	400.3.50	34	6.1	4 x 1.5
<b>SICH-240C</b>	230.3.50	59	10.8	4 x 2.5
	400.3.50	36	6.8	4 x 1.5

**Important:** The dimensioning of the automatic switch and power supply line sections are orientative and should be corrected in accordance with job site conditions, length between units and legislation in force.

## Operation

The control board of these units is common to both the cool only as well as the heat pump units. By connecting an additional module, two-compressor equipment can be controlled. Equipment control is carried out by means of software that is resident in the board. System operation is carried out 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.



## Indoor fan

Operation can be continuous or automatic. For continuous operation, select said operation on the thermostat.

If the internal probe (optional accessory) is installed, and the operating mode is heat, the fan will not start until the indoor coil has reached 35°C, and will stop when this temperature drops to below 30°C. Whenever the electric heating starts, the indoor fan will also start.

## Outdoor fan

The outdoor fan starts 5 seconds before the compressor. And stops after the compressor stops.

## Four-way valve

When SW6 of the control board is set to ON, the four-way valve activates when the thermostat requests heat. When a defrost cycle is carried out, this valve operates inversely; that is to say, in cool.

## Compressor

When signal Y1 is present, the board commands the outdoor fan to become operative, and then the compressor. The compressor, along with the outdoor fan, does not start until after a minimum off time, so as to avoid consecutive start-ups. This period of time can be set by means of microswitches SW4; ON = 2' and OFF = 5'.

In two-stage equipment, the first compressor to start up will

be the one that has been less hours in operation.

The second compressor will start if a Y2 signal is received from the thermostat.

Whenever one of the compressors is to turn off, it will be the one that has been most hours in operation.

## Defrost

The defrost cycle is possible only in heat pump operation.

In two-stage units, simultaneous defrost of both stages is not allowed, one remaining in standby until the other one has finished.

## Start-up

The following conditions should apply:

- 1) The compressor is on.
- 2) The liquid probe temperature is below -3°C for 3'.
- 3) If outdoor temperature is below 0°C, after compressor start-up 5' are timed before activating the defrost cycle.

When the defrost cycle is started, the board carries out the following operations:

- 1) Sets the 4-way valve to cool mode.
- 2) Turns the outdoor fan off.
- 3) Activates the following heat-generating phase, if the thermostat requires heat.
- 4) Turns the indoor fan off if there is no next heat stage.
- 5) Does not turn off the compressor that is defrosting, even if indicated by the thermostat.

## End

This operation will last until one of the following conditions is completed:

- a) Liquid temperature above 13°C during 2".
- b) Liquid temperature above 5°C during 30".
- c) Timing period after defrost start-up over 10'.
- d) Failure signal from high pressure switch.

Once defrost is over:

- 1) Sets four-way valve to heat.
- 2) Turns outdoor fan on.
- 3) Starts indoor fan if no next heat stage exists.
- 4) Turns off heat generating phase that started due to the defrost cycle.

## Test button and LEDs

The Test button shortens certain timings, resets any failure detected and also acts as a LonWorks service pin.

There are three signalling led diodes:

- a) The green led indicates correct operation of the equipment and incidents. If the equipment is operating correctly, this led flashes at a frequency of 1.6 Hz.
- b) The red led indicates failures. If no failure is present, this led remains off.
- c) The yellow led is the LonWorks service led, and also indicates, by flashing, that the operating compressor is timed.

## Configuration

Each time the electronic board is powered, system configuration will be checked, with the exception of the accessories. Below we can see how the different options are configured.

## Microswitches

They are read after power supply connection, and the board will act in accordance with their position. SW1 and SW2 set to OFF indicates that the configuration is carried out by remote control, and the parameters stored in the EEPROM memory are use.

## Configuration of switches

The microswitches establish the following configurations:

Number	State	Meaning
1 / 2	OFF/OFF	Ignore SW, programs communications routes
	ON/OFF	Defrost period 30'
	OFF/ON	Defrost period 60'
	ON/ON	Defrost period 90'
3	ON	Indoor fan ON during defrost
	OFF	Indoor fan OFF during defrost
4	ON	Compressor delay 2'
	OFF	Compressor delay 5'
5	ON	Cool mode
	OFF	Heat pump mode
6	ON	4-way valve active in heat
	OFF	4-way valve active in cool
7	ON	Receives signal B from thermostat (active in heat)
	OFF	Receives signal O from thermostat (active in cool)
8	ON	NA
	OFF	NA

## Configuration of accessories

To carry out an accessory search and configuration, the test button should be pressed for over two seconds, until the red led goes on. Once the search and configuration process begins, the red led on the board goes on, and stays on until the operation is concluded. Once off, the board uses the accessories found.

In said search the board will also detect which optional probes are connected to the board. A incident will be give if one of the optional probes detected in the configuration process does not give valid values.

The following table shows the probe configuration.

Probe	Pump	
	Obligatory	Optional
Discharge	X	
Liquid	X	
Outdoor	X	
Suction	X	
Indoor coil		X

## Installation of accessories

The accessories are used to support extended functions of the unit.

Said accessories can be either factory mounted or installed at the client's facilities. Power supply to the unit should always be disconnected. The accessory, along with the necessary elements, will then be assembled, and the power supply connected once again.

Once the search and configuration sequence is carried out, the new elements will be recognised and they will begin to operate.

The function of the different accessories is defined below.

### Tray heater

A cable heater is used, mounted between the lower area of the outdoor coil and the tray, where the defrost water is collected. Its function is to avoid freezing of the water in the tray and ice in the lower area of the coil.

This heater should be activated in the winter cycle, while the compressor is operative, and when the liquid temperature is below -2°C; and disactivated when the temperature is above 2°C.

### Electric heating

In the case of the heaters, the relay is used to switch the power contactor on and off, as well as the thermal switch with safety automatic reset.

In one-stage equipment, the response to a demand for first stage from the thermostat starts the compressor stage, and the second starts the electric heating.

In the case of a failure in the compressor stage, the electric heating would be activated as the first stage.

Whenever the electric heating is on, the indoor fan will also be operative.

### Indoor coil probe (SOH-076 to 120 and H(C))

The probe in the indoor coil, depending upon the temperature, carries out the following operations:

- 1) If in heat operating mode, and the electric heater is not activated, the fan will not start until the indoor coil reaches 35°C. If the electric heating is not activated, the indoor fan will turn off if the temperature drops below 30°C. If once the compressor is operating in heat mode for 2' the indoor temperature does not reach over 35°C, an unrecoverable heat temperature incidence is indicated.
- 2) If in cool operating mode, and the probe temperature is below -25°C, or the compressor is in operation for over 5' and the temperature is below -4°C, the compressor and outdoor fan go off. After the timed period, the compressor starts again. If this is repeated 3 times in 35 minutes, a failure of repeated start-up in cool is indicated, and the compressor will not restart.

## Malfunctions

There are two different types of malfunctions: incidents that do not turn the unit off, and failures or lockouts, that inactivate the unit.

### Indoor fan thermal switch

Its activation turns the entire unit off, and an indoor fan thermal switch failure is indicated.

### High and low pressure switch

Its activation turns the compressor and outdoor fan off. A high or low pressure failure of the switch is indicated.

## Electric heating thermal switch (accessory)

Activation turns the electric heating off and indicates an incident. If this error occurs more than 3 times in an hour, an electric heater thermal switch incident is indicated, it is inhibited, and the electric heater is turned off.

## Thermostat errors

If signal Y is given without signal G, it acts as if signal G were active. An incident of signal Y1 without signal G is indicated. If signal W is given without signal G, it acts as if signal G were active. An incident of signal W without signal G is given. If signal W is given without signal B/O, it acts as if signal B/O were indicating heat mode. An incident of signal W without signal B/O is given.

## Protection for defrost cycles

If 3 consecutive defrost cycles are carried out and ended in compliance with the 10' timer, an incident of repeated defrosts is indicated. This incident is deleted when a defrost cycle is ended in compliance with another condition that is not the maximum timer period.

## Protection for temperature

- If the outdoor temperature is below  $-20^{\circ}\text{C}$ , the compressor turns off. An incident of low outdoor temperature (only in heat mode) is indicated.
- If discharge temperature is over  $130^{\circ}\text{C}$ , the compressor and outdoor fan go off. An exceeded discharge temperature failure is shown.
- If while the compressor is on for 5', the discharge temperature does not rise above  $50^{\circ}\text{C}$ , in cool mode, or  $35^{\circ}\text{C}$  in heat mode, a low discharge temperature incident is indicated.
- If the suction temperature is very low, the compressor and outdoor fan turn off. If this is repeated 3 times in 35 minutes, a failure is indicated.
- If, in heat mode, the liquid temperature is below  $-30^{\circ}\text{C}$ , the compressor and outdoor fan turn off, and a failure is indicated.

## Open or short circuit of the outdoor or indoor liquid probe

An incident of the corresponding probe is indicated if the value read is below  $-40^{\circ}\text{C}$ , or above  $100^{\circ}\text{C}$ . If this incident takes place in heat mode in the liquid probe, repeated defrost cycles are carried out with a maximum duration of 30".

## Open or short circuit of discharge probe

An incident of the discharge probe is indicated if its value is below  $-20^{\circ}\text{C}$ , or above  $150^{\circ}\text{C}$ . If the probe is short circuited, a failure is indicated.

## Signalling

Malfunction signalling is carried out at two levels. One for incidents and another for failures.

## Incidents

Incidents do not turn the unit off, and are indicated by the green led on the electronic board. If there is no failure present, this led flashes at a frequency of 1 Hz.

When an incident occurs, the led flashes in three sequences. The first indicates the compressor involved: one flash for stage 1, and two for stage 2, followed by a short pause. The second indicates the type of incident. Another short pause. The third indicates the incident detected, followed by a long pause,

and the sequence is repeated again as long as the incident lasts.

The incidents reset when the cause disappears. In the case of more than once incident at the same time, only the first one detected and not reset is indicated. As they reset, the other existing incidents not reset will be indicated.

Type	Flashes 2 <sup>a</sup>	3 <sup>a</sup>	Incident
Probes	1	1	Discharge probe open or $>150^{\circ}\text{C}$
	1	2	Liquid probe open or short circuited
	1	3	Outdoor probe open or short circuited
	1	4	Indoor probe open or short circuited
	1	5	Outdoor temperature too low
Thermostat	2	1	Signal Y1 or Y2 without signal G
	2	2	Signal W without signal B
	2	3	Signal W without signal G
	2	4	Signal Y2 without signal Y1
Electric heater	3	1	Electric heater thermal switch AUX1
	3	2	Electric heater thermal switch AUX2
	3	3	Electric heater thermal switch EM1
	3	4	Electric heater thermal switch EM2
Temperature	4	1	Repeated defrost cycles
	4	2	Discharge temperature does not recover
	4	4	Temperature in heat does not recover
Others	5	1	ID of transceiver unknown
	5	2	Accessory disappeared

## Failures (lockouts)

Failures or lockouts turn the unit off.

They are indicated by the red led on the board, and by means of the thermostat (depending upon the model). Relay K6 of the board is also activated with a 24 VAC signal between terminals LED2 and B of J2. If no failure is present, this led remains off. When a failure takes place, this led flashes in two sequences. The first indicates the compressor involved: one flash for stage 1 and two for stage 2, followed by a short pause. Then the detected failure is indicated, followed by a long pause and the sequence is repeated.

Should more than one alarm take place, only the first one

detected and not reset is indicated.

The following table shows the possible failures:

Flashes	Meaning
1	Discharge temperature exceeded, or probe short circuited
2	High pressure switch, outdoor fan thermal switch or compressor module thermal switch
3	Low pressure switch
4	Indoor fan thermal swicht
5	Repeated start ups in cool, or suction temperature <-25°C
6	Low liquid temperature <-30°C

## Reset

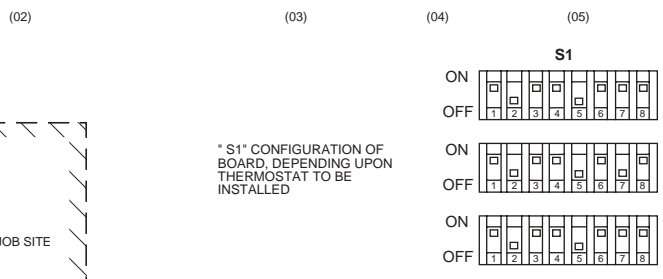
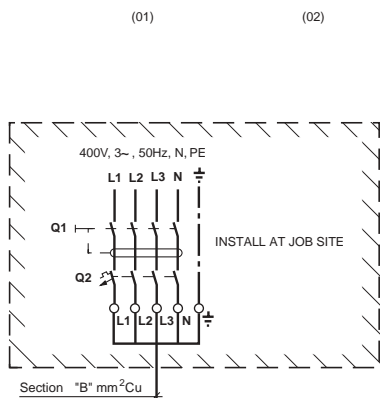
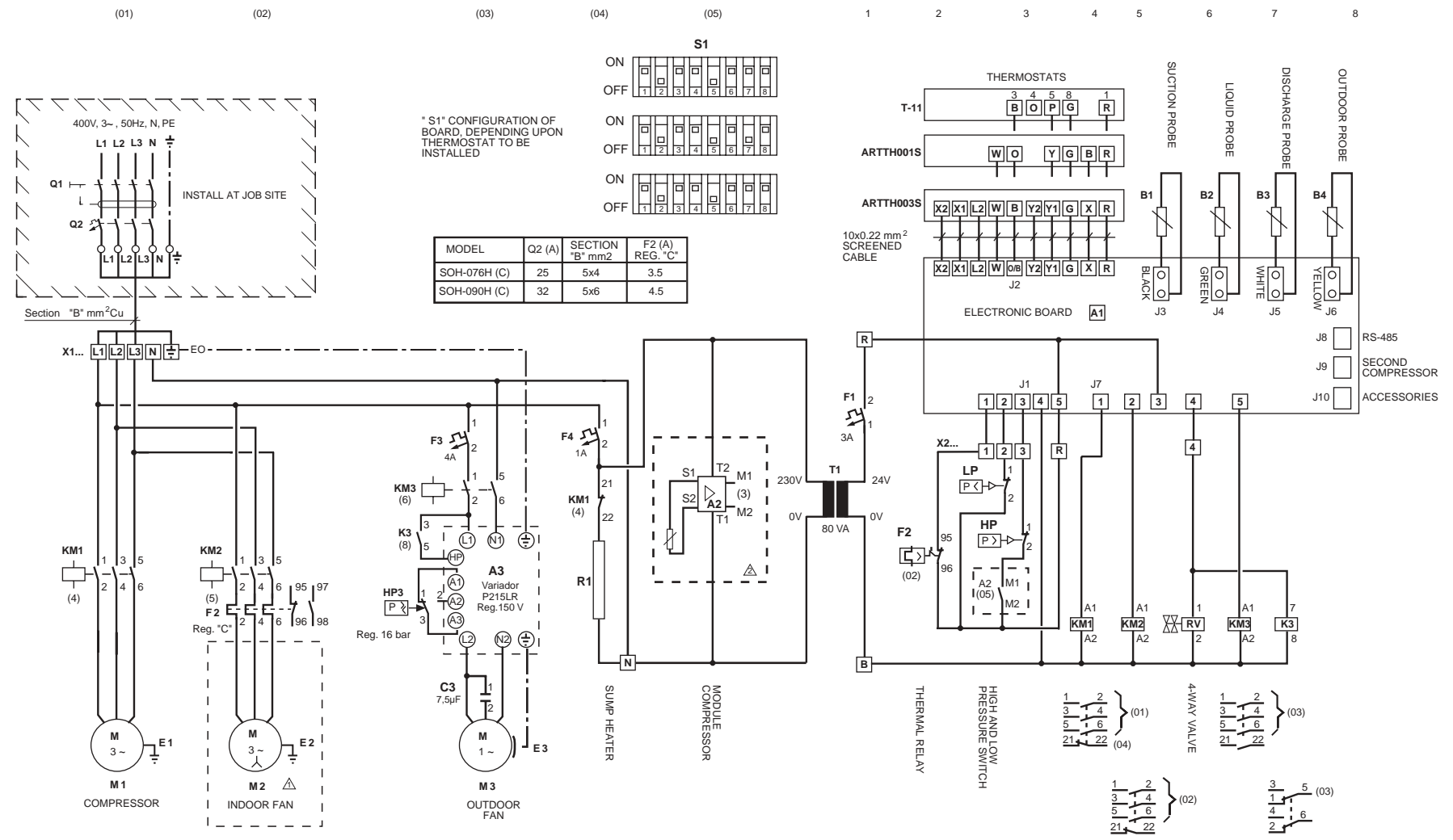
The incidents, with a few exceptions, do not need to be reset. They reset automatically once the cause has disappeared. The following incidents require resetting, and are reset in the same way as the alarms:

- a) Accessory disappeared.
- b) Repeated defrost cycles (also reset if a defrost cycle ends under normal conditions).
- c) Electric heating thermal switch.

These alarms can be reset as follows:

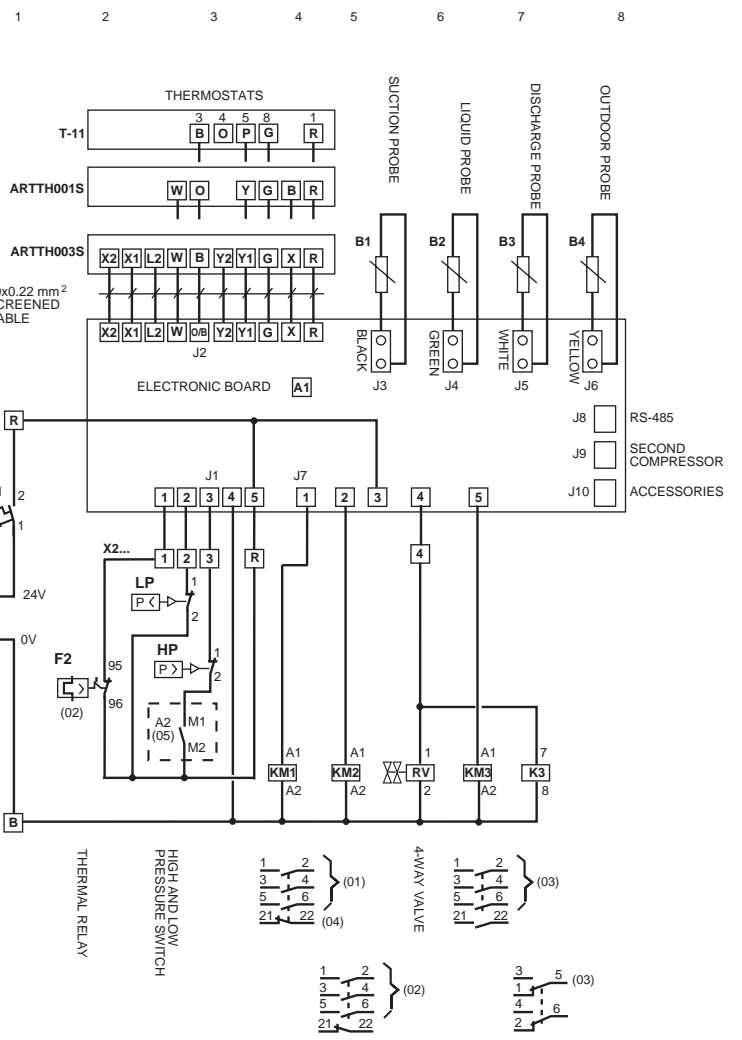
- 1) Setting the thermostat to OFF, if communication with the thermostat has been implemented.
- 2) Pressing the reset button on the electronic board.
- 3) Disconnecting and reconnecting power supply to the electronic board.
- 4) By means of the communications trunk.

It should be pointed out that by means of setting the thermostat to OFF, the board cannot be reset more than 3 times a day.



"S1" CONFIGURATION OF BOARD, DEPENDING UPON THERMOSTAT TO BE INSTALLED

MODEL	Q2 (A)	SECTION "B" mm <sup>2</sup>	F2 (A) REG. °C*
SOH-076H (C)	25	5x4	3.5
SOH-090H (C)	32	5x6	4.5

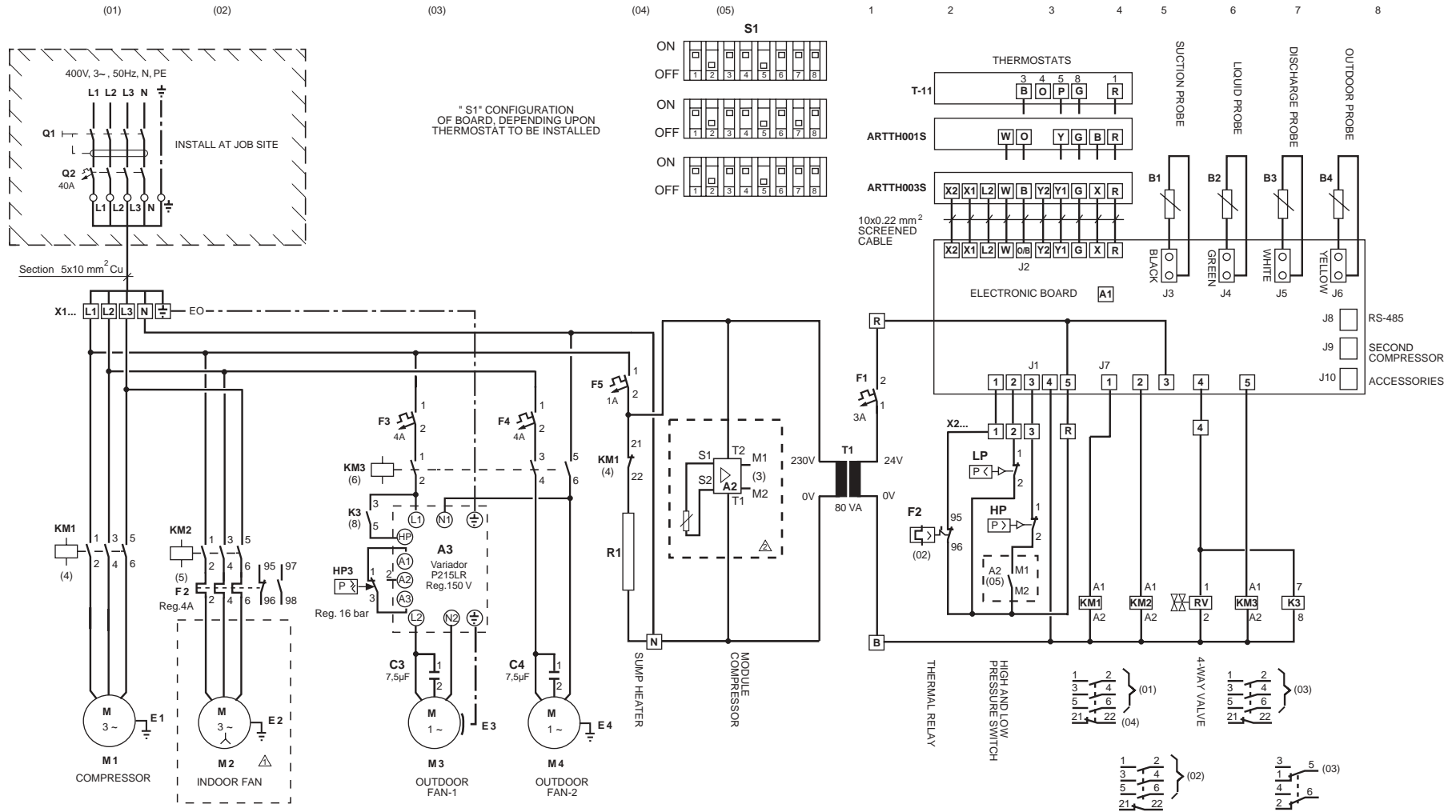


NOTE: -INDOOR FAN M2 WILL BE CONNECTED AT JOB SITE. SEE "ELECTRICAL CHARACTERISTICS" TABLE.  
 -MODULE A2 IS MOUNTED ON SCROLL COMPRESSORS ONLY.

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

I-1998f  
 SOH-076, 090H (C)  
 400.3.50

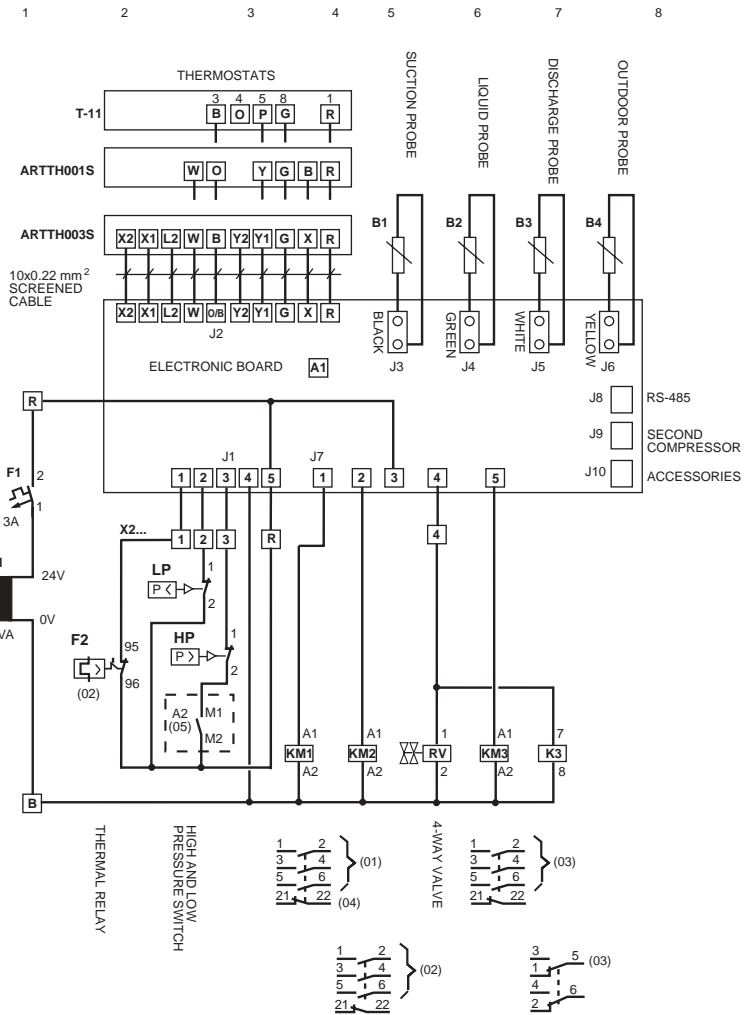
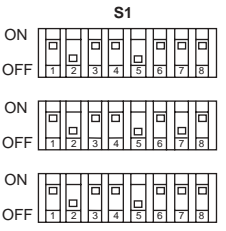


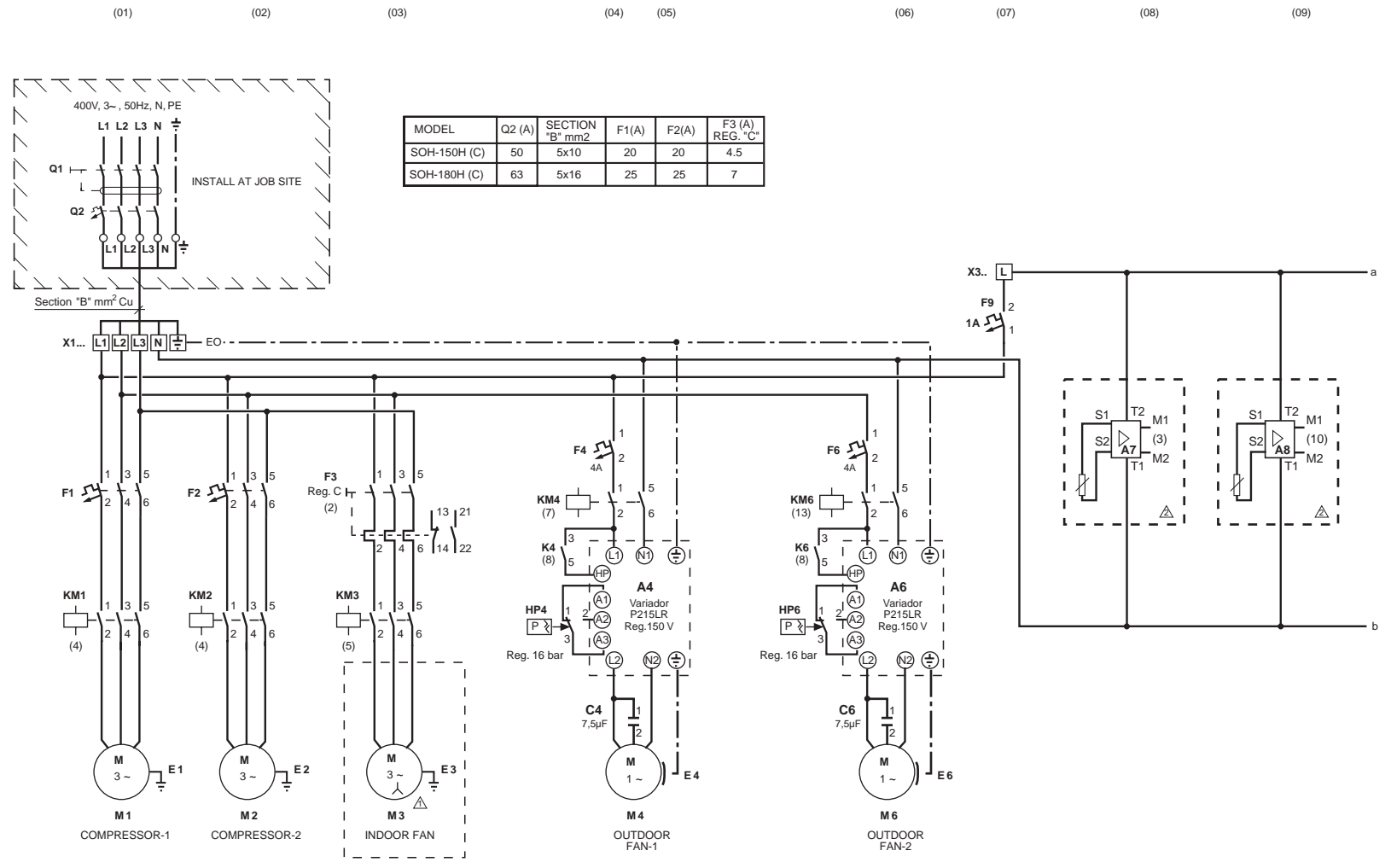


NOTE: -INDOOR FAN M2 WILL BE CONNECTED AT JOB SITE. SEE "ELECTRICAL CHARACTERISTICS" TABLE.  
 -MODULE A2 IS MOUNTED ON SCROLL COMPRESSORS ONLY.

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

I-1959f  
 SOH-120H (C)  
 400.3.50

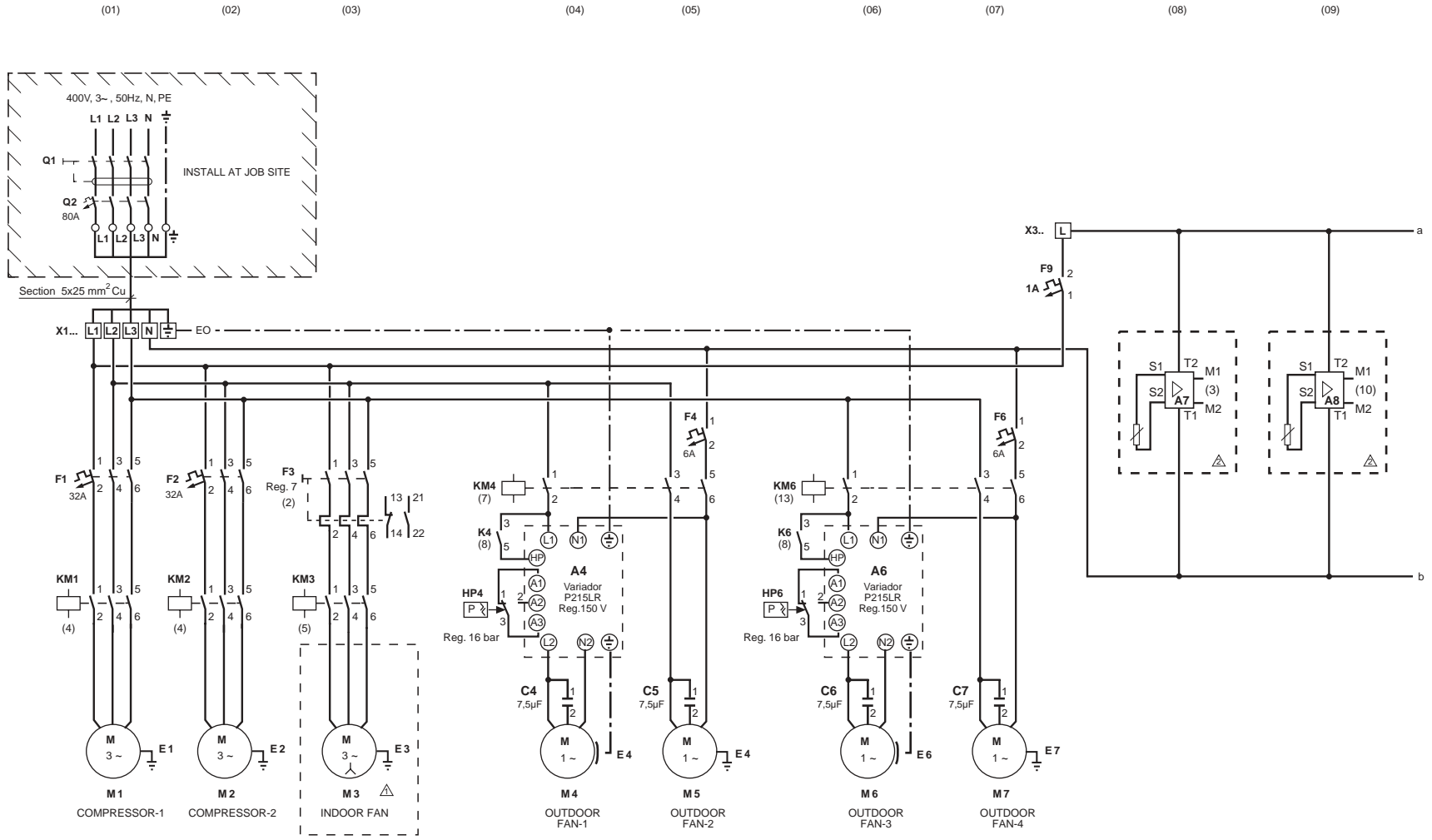




NOTA: -INDOOR FAN M3 WILL BE CONNECTED AT JOB SITE. SEE "ELECTRICAL CHARACTERISTICS" TABLE.  
 -PROTECTION MODULES A7 AND A8 ARE MOUNTED ON SCROLL COMPRESSORS ONLY

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

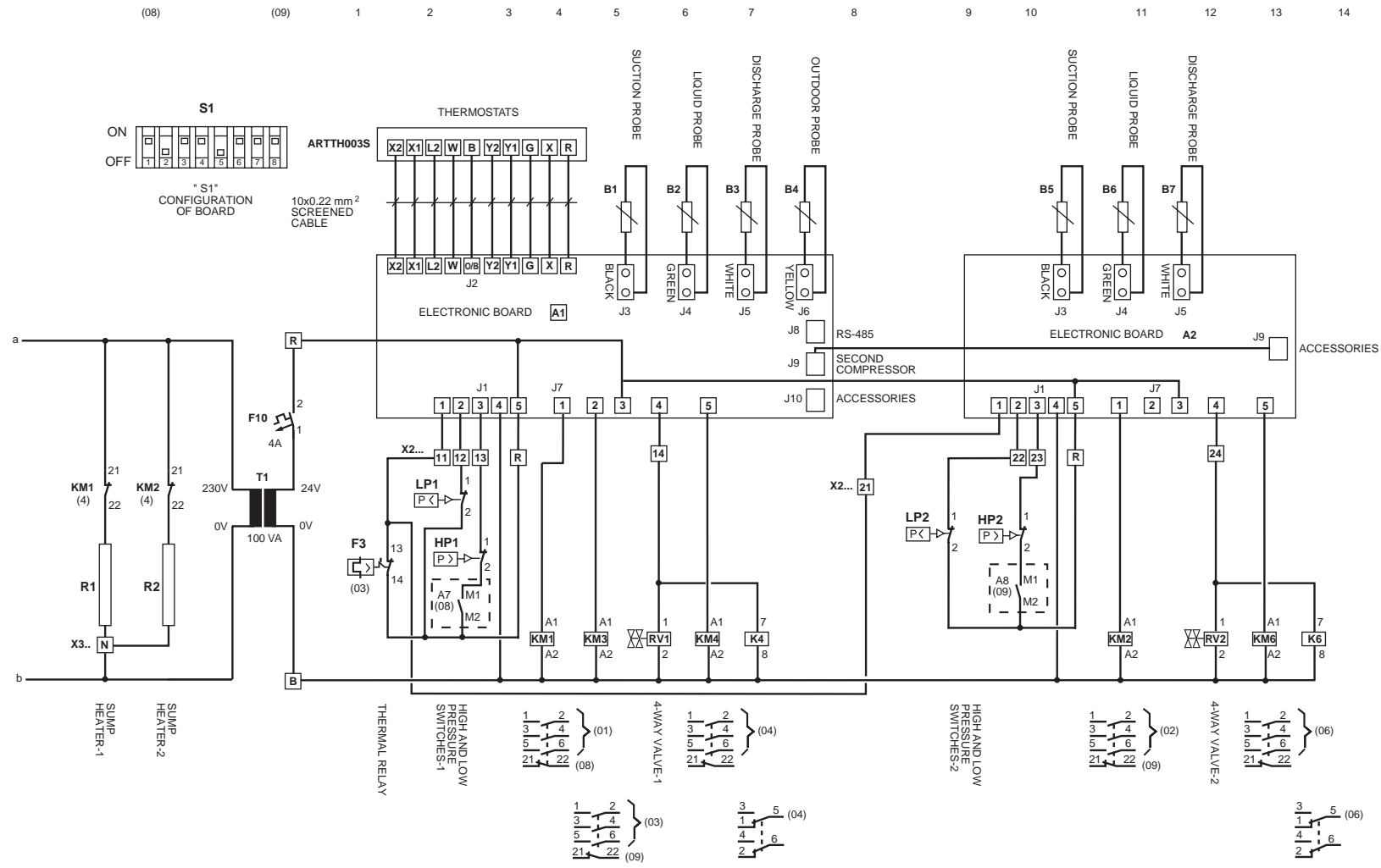
I-1986-1f  
 SOH-150, 180H (C)  
 400.3.50



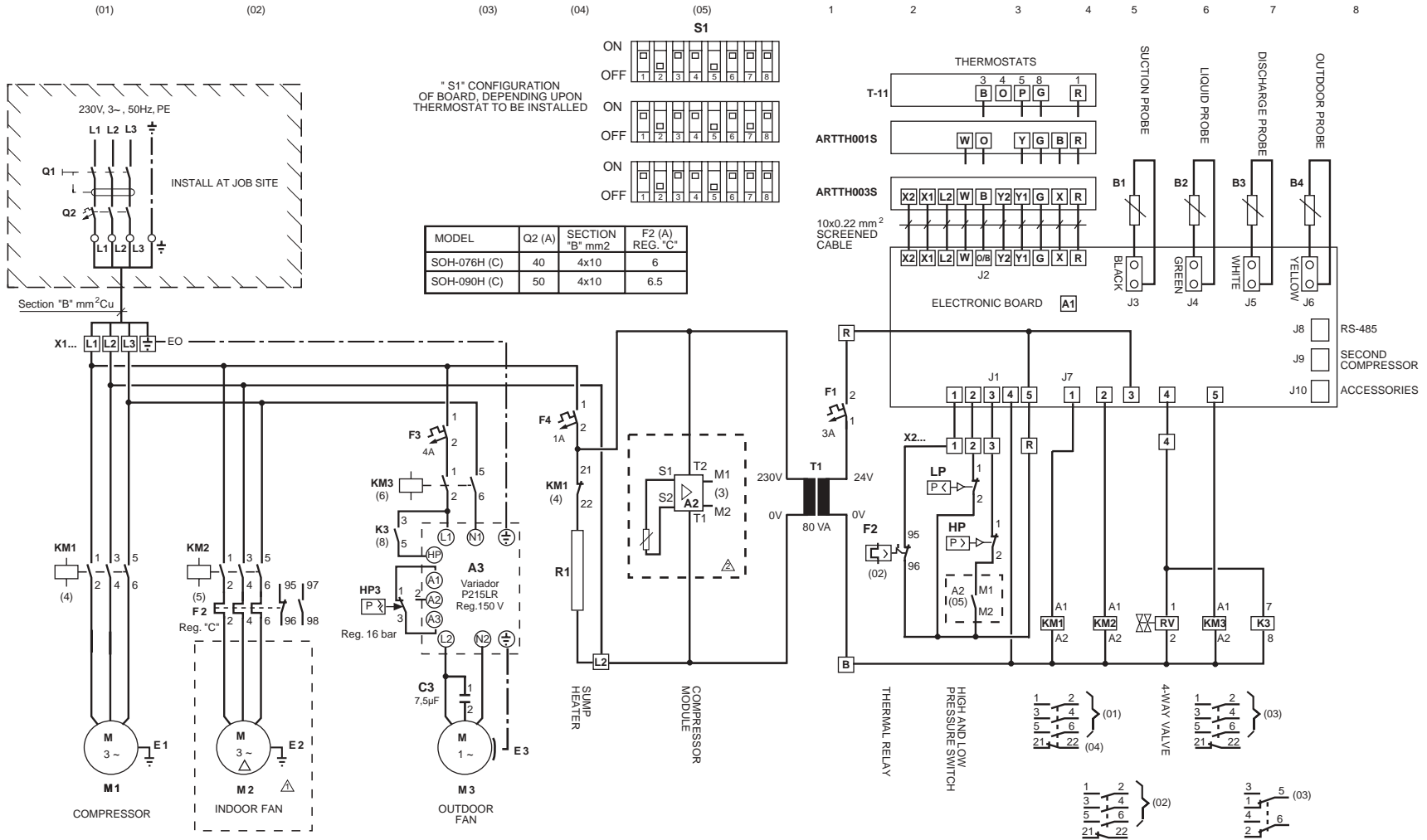
NOTE: ⚠ -INDOOR FAN M3 WILL BE CONNECTED AT JOB SITE. SEE "ELECTRICAL CHARACTERISTICS" TABLE.  
 ⚠ -PROTECTION MODULES A7 AND A8 ARE MOUNTED ON SCROLL COMPRESSORS ONLY

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

I-1986-2f  
 SOH-240H (C)  
 400.3.50



I-1986-3f  
SOH-150, 160, 240H (C)  
400.3.50

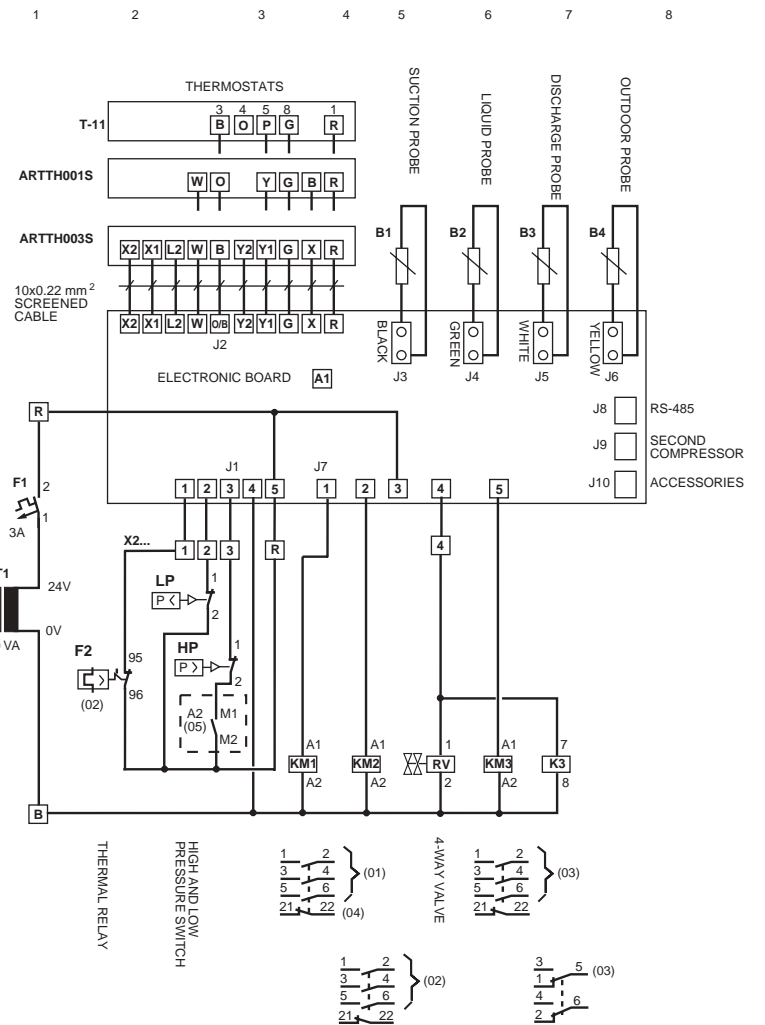
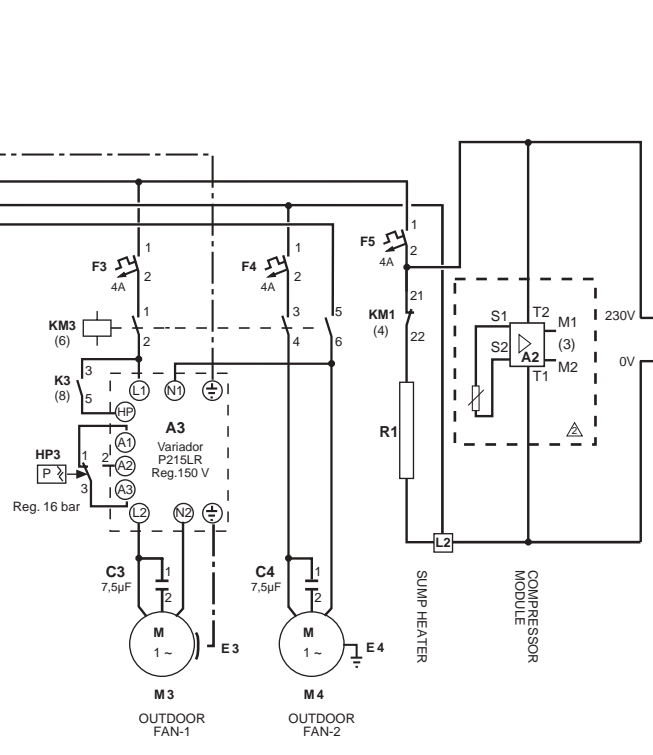
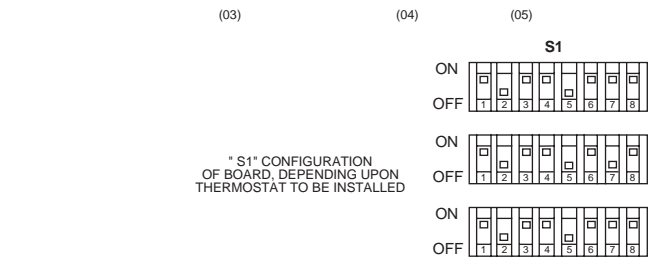
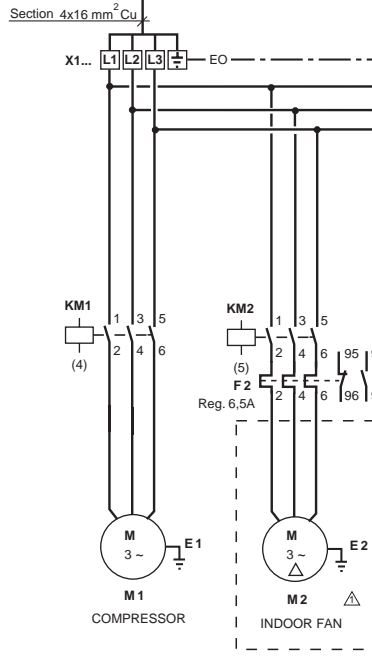
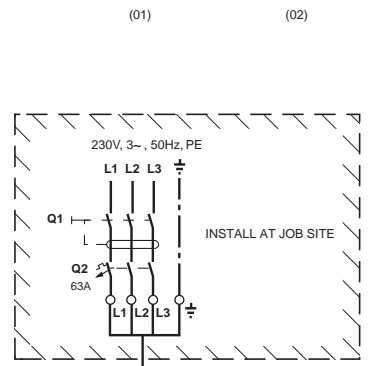


NOTE: -INDOOR FAN M2 WILL BE CONNECTED AT JOB SITE. SEE "ELECTRICAL CHARACTERISTICS" TABLE.

-MODULE A2 IS MOUNTED ON SCROLL COMPRESSORS ONLY.

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

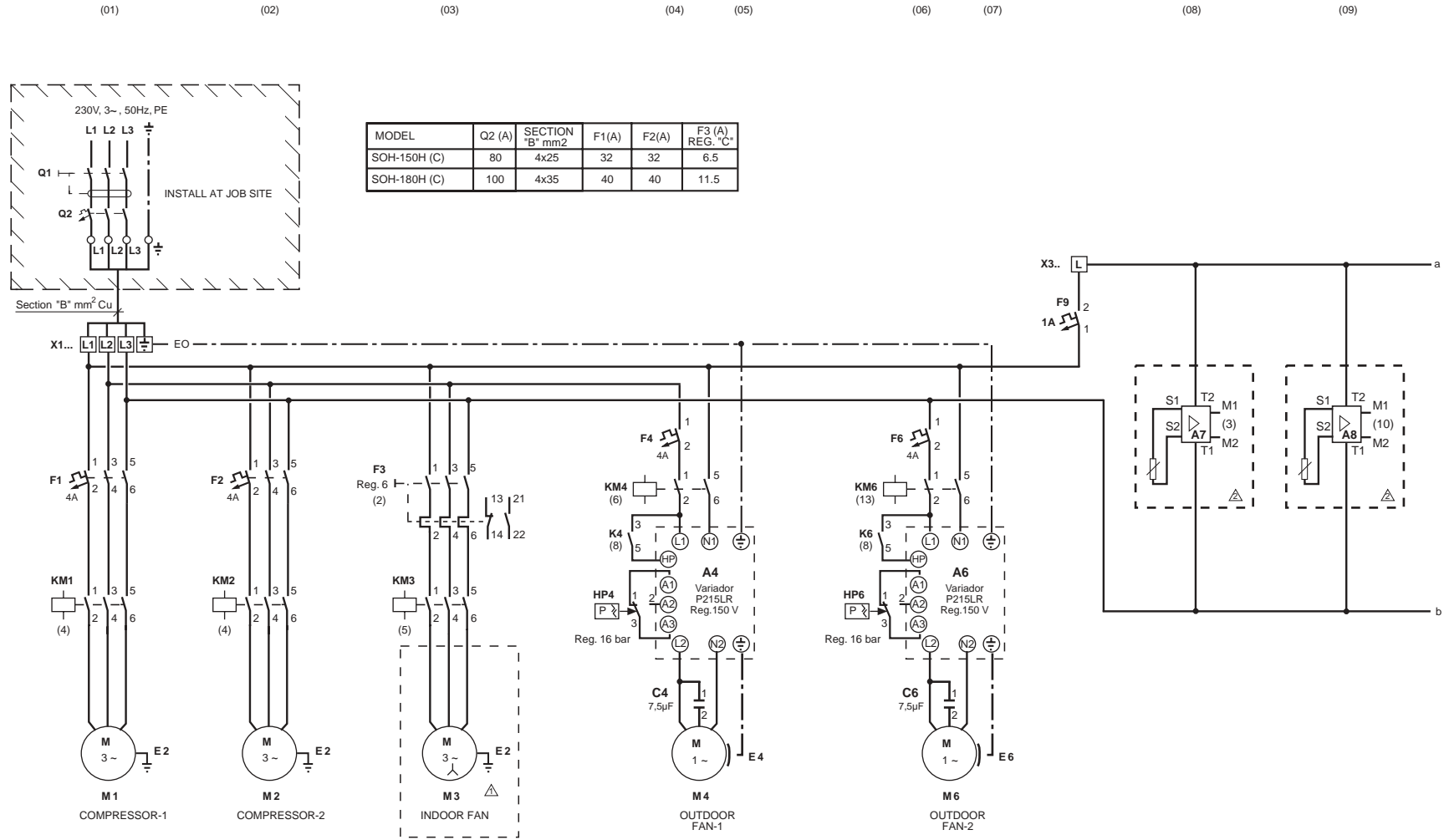
I-1997f  
SOH-076 & 090H (C)  
230.3.50



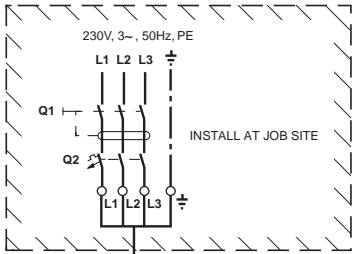
NOTE: ⚠ -INDOOR FAN M2 WILL BE CONNECTED AT JOB SITE. SEE "ELECTRICAL CHARACTERISTICS" TABLE.  
 ⚠ -MODULE A2 IS MOUNTED ON SCROLL COMPRESSORS ONLY.

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

I-1976f  
 SOH-120H (C)  
 230.3.50



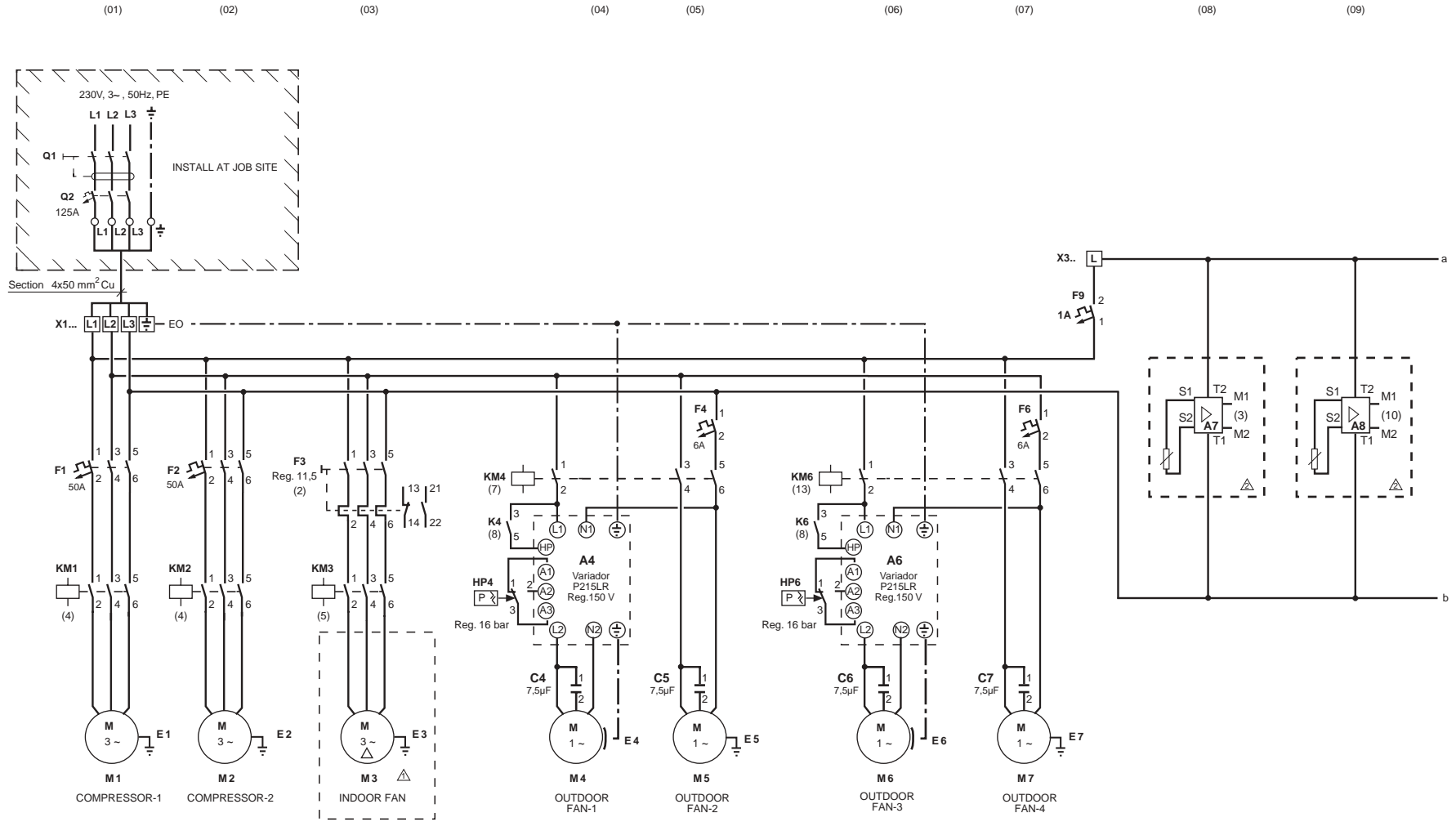
MODEL	Q2 (A)	SECTION "B" mm <sup>2</sup>	F1(A)	F2(A)	F3 (A), REG. °C <sup>+</sup>
SOH-150H (C)	80	4x25	32	32	6.5
SOH-180H (C)	100	4x35	40	40	11.5



NOTE: ⚠ -INDOOR FAN M3 WILL BE CONNECTED AT JOB SITE. SEE "ELECTRICAL CHARACTERISTICS" TABLE.  
⚠ -PROTECTION MODULES A7 AND A8 ARE MOUNTED ON SCROLL COMPRESSORS ONLY

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

I-1988-1f  
SOH-150 & 180H (C)  
230.3.50

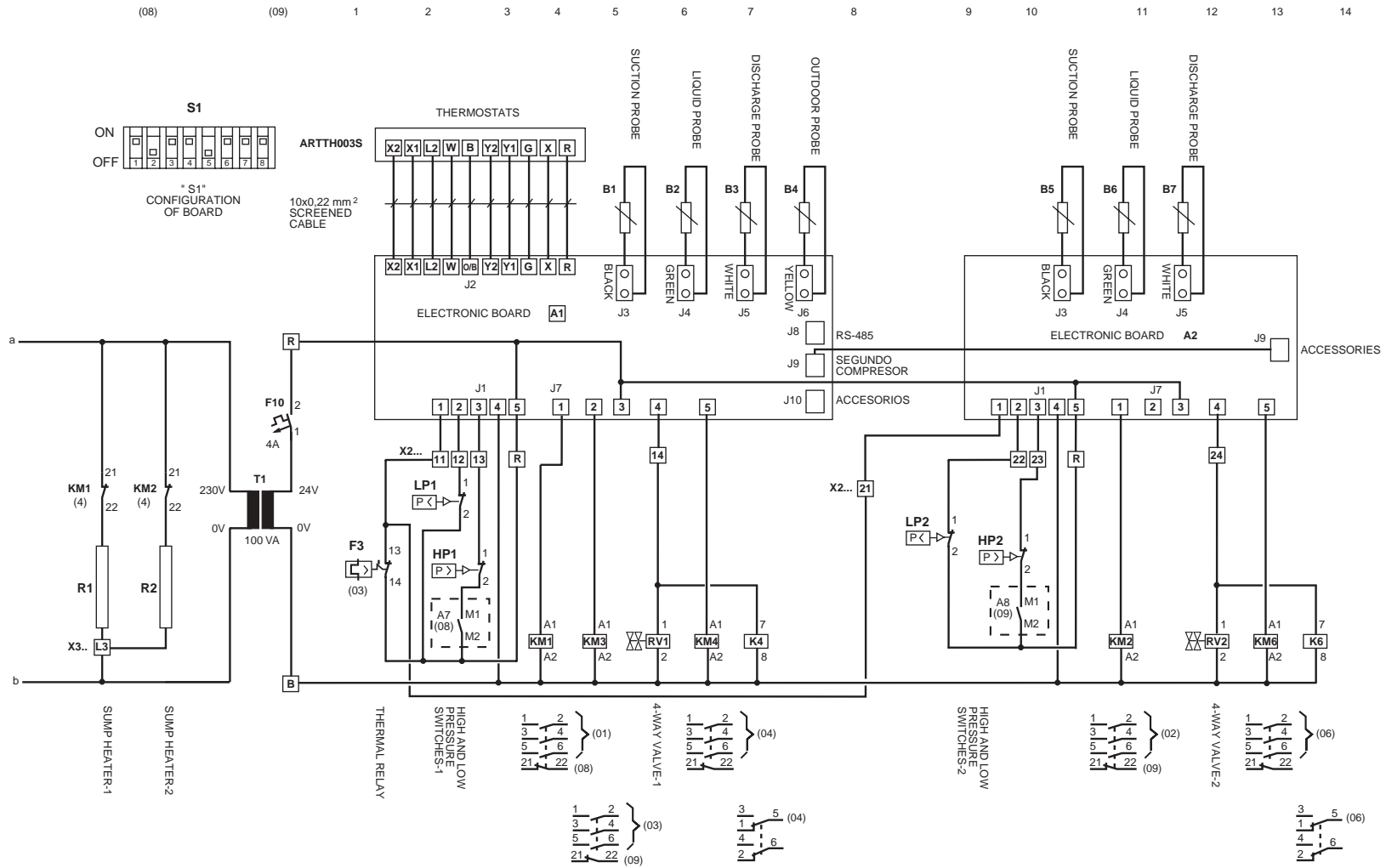


NOTE: -INDOOR FAN M3 WILL BE CONNECTED AT JOB SITE. SEE "ELECTRICAL CHARACTERISTICS" TABLE.  
 -PROTECTION MODULES A7 AND A8 ARE MOUNTED ON SCROLL COMPRESSORS ONLY

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

I-1988-2f  
 SOH-240H (C)  
 230.3.50





I-1988-3f  
SOH-150, 180, 240H (C)  
230.3.50

## Accessories

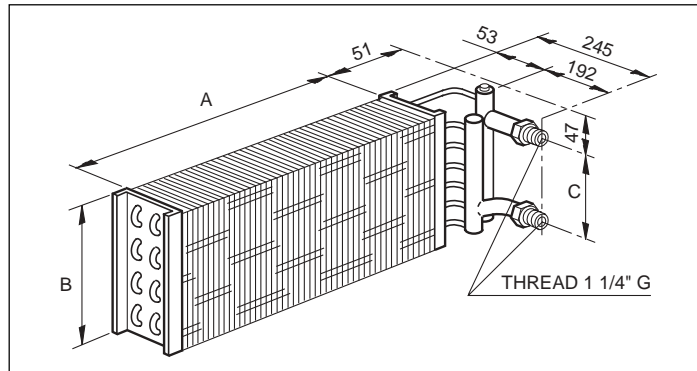
### Standard accessories

Accessory	Model SICH						Model SIH
	070-076	090-120	150	180	240	300	
Internal electric heater for	<b>SICH-070-076B</b>	10 kW	X				
Internal electric heater for	<b>SICH-070-076B</b>	15 kW	X				
Internal electric heater for	<b>SICH-090-120B</b>	10 kW		X			
Internal electric heater for	<b>SICH-090-120B</b>	20 kW		X			
Internal electric heater for	<b>SICH-150B</b>	15 kW		X			
Internal electric heater for	<b>SICH-150B</b>	30 kW		X			
Internal electric heater for	<b>SICH-180B</b>	15 kW			X		
Internal electric heater for	<b>SICH-180B</b>	30 kW			X		
Duct electric heater for	<b>SICH-070-076B</b>	10 kW	X				
Duct electric heater for	<b>SICH-070-076B</b>	15 kW	X				
Duct electric heater for	<b>SICH-090 to 180B, 240C and SIH-300</b>	20kW		X	X	X	X
Duct electric heater for	<b>SICH-090 to 180B, 240C and SIH-300</b>	30kW		X	X	X	X
Water coil for	<b>SICH-070-076B</b>		X				
Water coil for	<b>SICH-090-120B</b>			X			
Water coil for	<b>SICH-150B</b>			X			
Vertical conversion kit for	<b>SICH-180B</b>				X		
Vertical conversion kit for	<b>SICH-240C</b>					X	
Vertical conversion kit for	<b>SIH-300</b>						X

## Hot water coil for SICH-070-076, 090-120 and 150B

Made of copper tubes and aluminium fins.  
Designed to be fitted inside the conditioner, on galvanised steel supports.  
Equipped with an 1/8" air purger.

### General dimensions mm



For model	A	B	C
<b>SICH-070-076B</b>	1 069	458	340
<b>SICH-090-120B</b>	1 312	534	416
<b>SICH-150B</b>	1 750	534	416

### Physical data

For model	SICH-070-076B	SICH-090-120B	SICH-150B
Tube depth	2	2	2
Tube height	16	19	19
Fins/inch	12	12	12
Front area	m <sup>2</sup> 0.49	0.70	0.93
Tubing diameter	3/8"	3/8"	3/8"
Inlet/outlet GAS male threaded connections	1 1/4"	1 1/4"	1 1/4"

## Heating capacity

For model	Nominal flow-rate		Heating capacity (*)	Air circuit pressure drop	
	m <sup>3</sup> /h	m <sup>3</sup> /s	kW	mm WG	Pa
<b>SICH-070-076B</b>	4 615	1.28	40.7	3.9	38.2
<b>SICH-090B</b>	7 940	2.20	59.3	4.4	43.0
<b>SICH-150B</b>	10 000	2.97	79.1	4.4	43.0

\* The heating capacities given in this table are valid for water intake temperatures of 90°C, outlet 80°C, and air intake at 13°C. For different conditions, apply the correction factor appearing in the corresponding table.

### Correction factors for the heating capacities of the hot water coil

These correction factors are for water intake and outlet and air intake temperatures other than nominal.

Air temperature	Water intake/outlet temperature °C					
	75/65	85/75	90/80	85/70	90/75	90/70
-10	1.03	1.23	1.33	1.13	1.24	1.14
-5	0.97	1.16	1.28	1.07	1.17	1.08
0	0.91	1.09	1.19	1.00	1.10	1.01
5	0.85	1.02	1.12	0.94	1.03	0.95
10	0.79	0.95	1.04	0.88	0.96	0.89
13	0.75	0.91	1.00	0.84	0.92	0.85
15	0.73	0.88	0.97	0.82	0.90	0.83
20	0.68	0.82	0.90	0.76	0.83	0.77
25	0.60	0.74	0.83	0.68	0.75	0.69

### Pressure drop in the water circuit of the hot water coil

		Hot water flow-rate												
		m <sup>3</sup> /h	1.00	1.30	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	6.00	7.00
For model <b>SICH-070-076B</b>	mm WG		0.08	0.10	0.17	0.24	0.33	0.42	0.48					
	kPa		0.78	0.98	1.66	2.35	3.23	4.11	4.70					
For model <b>SICH-090-120B</b>	mm WG				0.13	0.20	0.27	0.36	0.46	0.54	0.66			
	kPa				1.27	1.96	2.64	3.52	4.50	5.28	6.46			
For model <b>SICH-150B</b>	mm WG					0.25	0.34	0.45	0.57	0.68	0.82	1.17	1.50	
	kPa					2.44	3.33	4.40	5.58	6.66	8.03	11.45	14.68	

## Interior electric heaters for SICH-070 to 180B

These internal electric heaters are designed to provide backup or complementary heat for the SICH units. On and off cycles are governed by the air conditioning equipment control system. They should be fitted to the internal supports of the indoor unit.

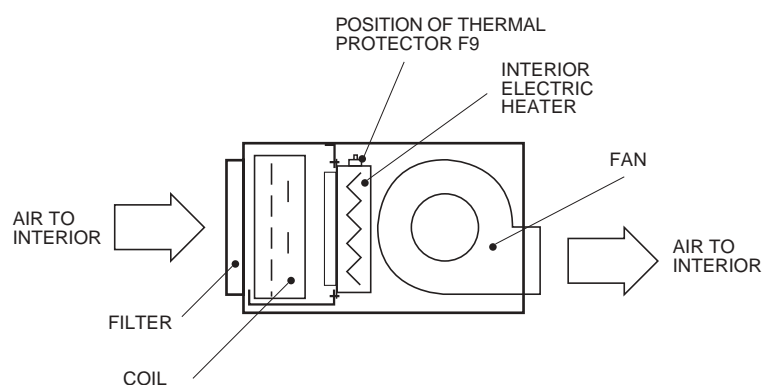
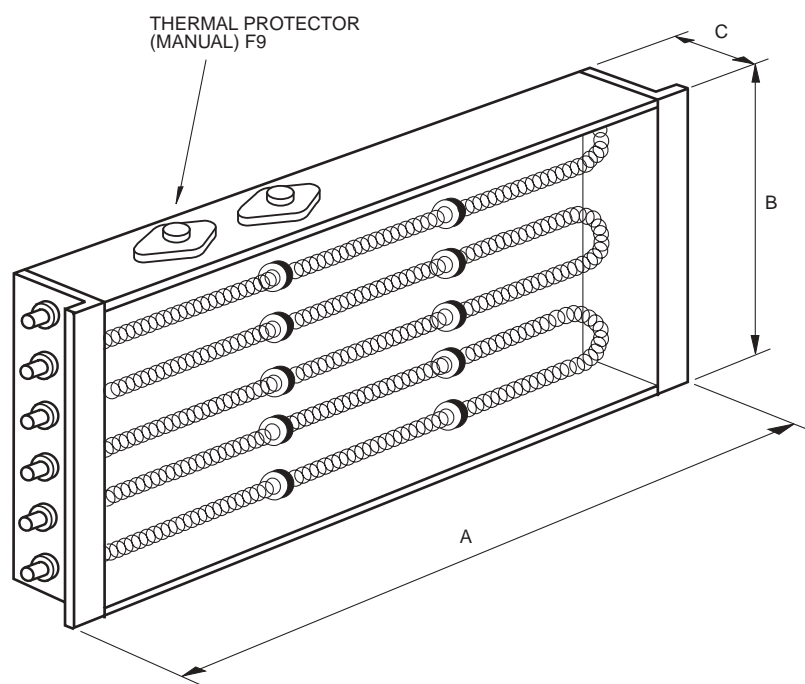
### Technical specifications

These internal electric heaters include the following components:

- Galvanised sheet casing and supports.
- Exposed Nickel-chrome wire electric resistances mounted

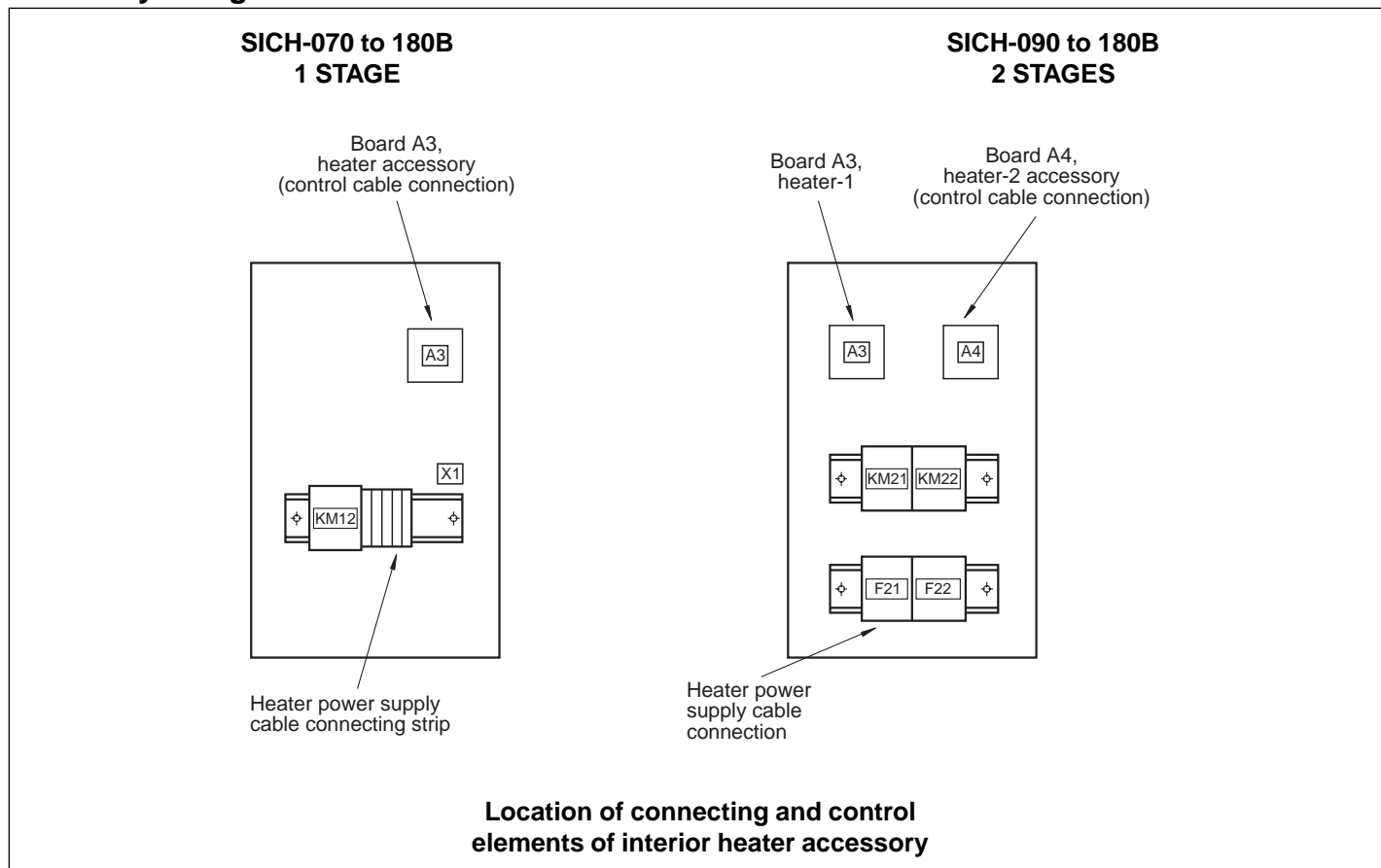
- on steatite supports.
- Power supply contactor with a 400 V coil.
- Two thermal protectors located at the top of the heater. The first, with automatic reset, disconnects the heater when a temperature of 77°C is reached. The second, accessible internally and with manual reset, disconnects the heater when reaching a temperature of 138°C. Two-stage heaters contain four thermal protectors; two for each stage.
- Interlock with the heat relay of the indoor fan. The control system of the unit does not let the heater operate if the indoor fan heat relay has failed.
- Plug-in connector for interconnecting the control panel of the air conditioning unit and the heater.
- Self-threading screws for fastening this accessory.

### Assembly and general dimensions mm



For mounting on	A	B	C
<b>SICH-070 &amp; 076B</b>	1 103	480	48
<b>SICH-090 &amp; 120B</b>	1 339	550	48
<b>SICH-150B</b>	1 740	550	48
<b>SICH-180B</b>	1 930	470	80

## Assembly and general dimensions mm



## General characteristics

Heater 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>SICH-070 &amp; 076B</b>	400.3.50	10	15	1	20	2.5	0.53	2.9
<b>SICH-070 &amp; 076B</b>	400.3.50	15	22	1	25	4	0.53	2.9
<b>SICH-090 &amp; 120B</b>	400.3.50	10	15	1	20	2.5	0.74	4.9
<b>SICH-090 &amp; 120B</b>	400.3.50	20	30	2	40	6	0.74	4.9
<b>SICH-150B</b>	400.3.50	15	22	1	25	4	0.98	7.1
<b>SICH-150B</b>	400.3.50	30	46	2	50	10	0.98	7.1
<b>SICH-180B</b>	400.3.50	15	22	1	25	4	0.98	7.1
<b>SICH-180B</b>	400.3.50	30	46	2	50	10	0.98	7.1

**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 kgs
	Height	Width	Depth	
<b>SICH-070 &amp; 076B</b>	620	1 300	110	7
<b>SICH-090 &amp; 120B</b>	620	1 520	110	8
<b>SICH-150B</b>	620	1 920	110	9
<b>SICH-180B</b>	510	2 405	165	10

## Installation

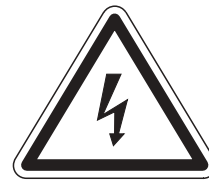
Install the electric heater in the SICH unit as follows:

- 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 switches and differentials for the heater in accordance with the indications appearing in the table of General Characteristics and Wiring Diagrams.
- 4) Remove the access covers to the controls of the SCOC, SCOH, SOC or SOH/SICH units.
- 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) Remove the side covers of the SICH unit and place the electric heater on the two vertical supports of the coil, making the tab coincide with the drilled hole. Check to make sure that the reset push button of the F9 thermal switch (F9 and F11 in 2-stage units) is accessible and at the top. See *Assembly and general dimensions*.
- 7) Mount the control support on the side of the machine, or inside the electrical box, depending upon the SICH unit, and fasten with the screws supplied.
- 8) Connect the power supply cables to connecting strip X1 (or automatic switch F21 in 2-stage). Connect the control cable included between connector J1 of the A3 auxiliary heater board (A4 in 2-stage units) and connector J10 of the A1 control board of the air conditioning unit.
- 9) The installer should complete the electric circuit of the heater by fitting an air flow control F14 (F14 and F15 in 2-

stage) at the most convenient point of the ducts so as to make sure the heater operates only when there is sufficient air flow.

- 10) Connect power supply to the SCOC or SCOH/SICH unit and to the heater.
- 11) 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 once said led goes off.
- 12) Check operation of the heater by selecting the Emergency Heat mode at the ambient thermostat of the air conditioning unit.
- 13) Replace the covers of the SCOC or SCOH/SICH units.

**Note:** Should an incorrect response of the system take place, see the Operation section of the SCOC or SCOH/SICH 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.

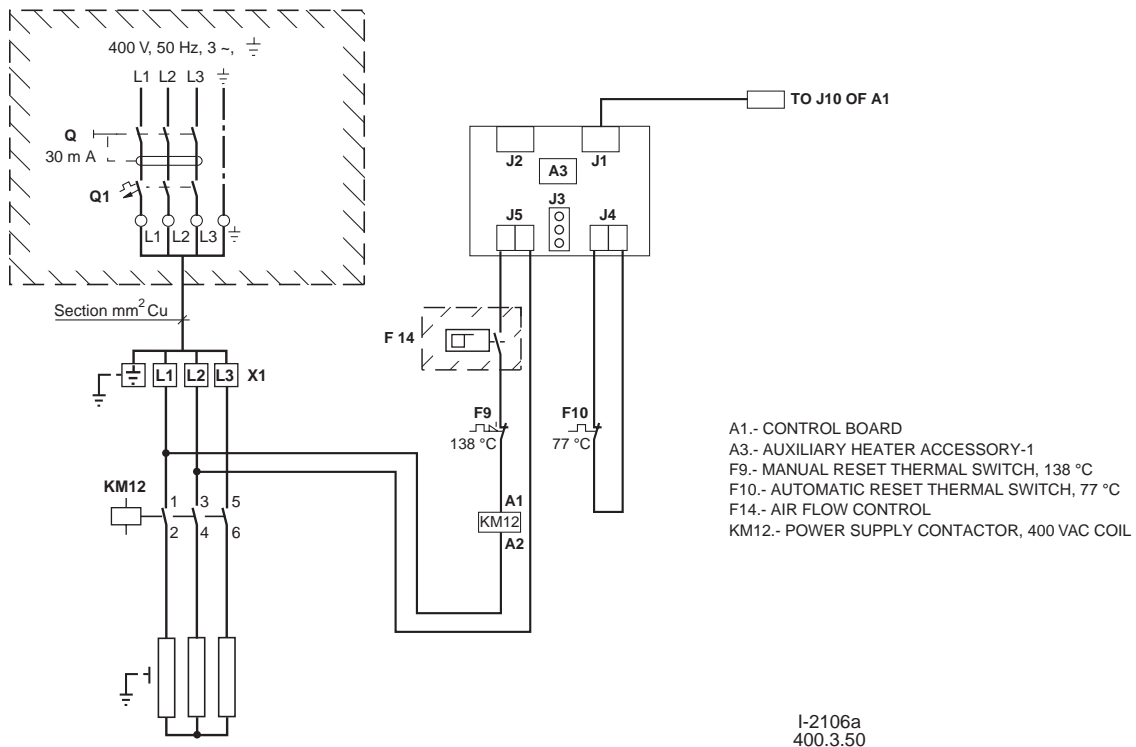


Loose cables can cause overheating of the terminals or incorrect operation of the unit. Fire hazards may also arise. Therefore, make sure all cables are connected tightly.

# Wiring diagram

**Heater 10, 15kW, 400.3.50**  
**SICH-070 to 076B**

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



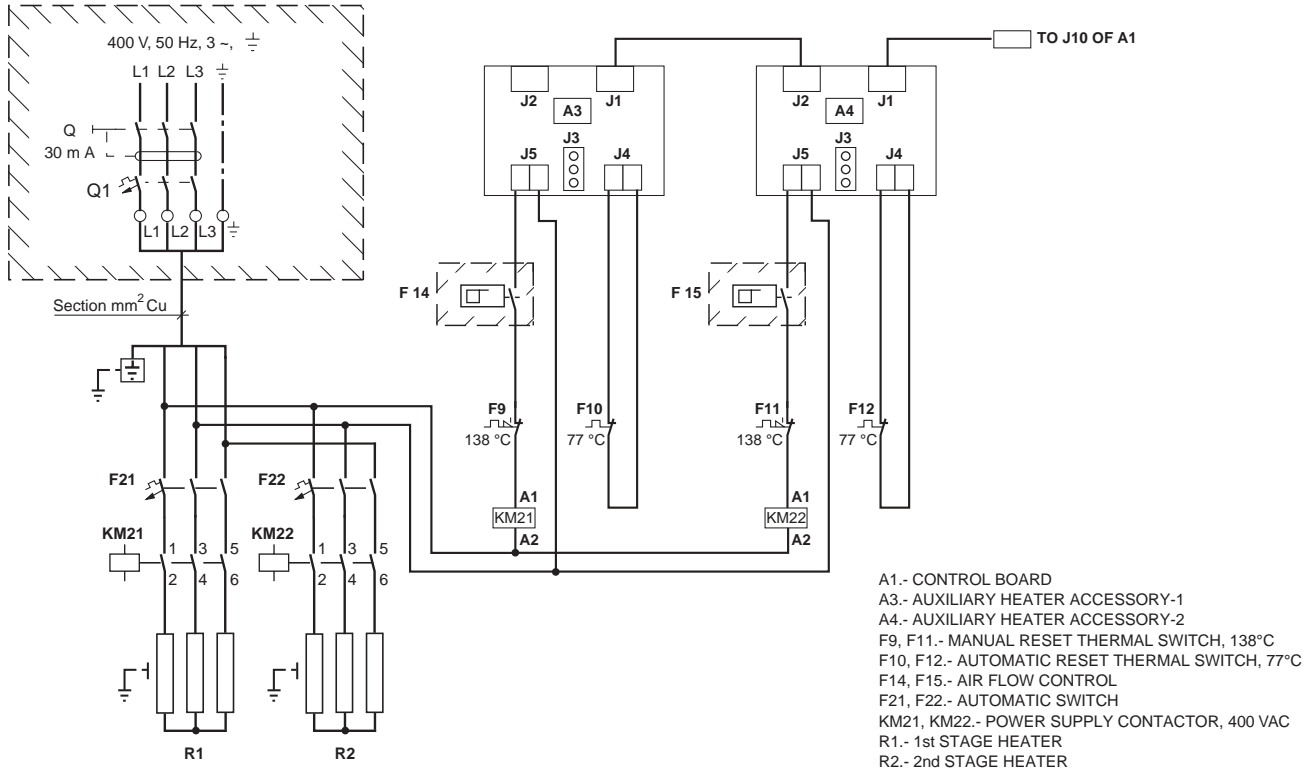
 THE COMPONENTS INCLUDED IN THESE BOXES ARE NOT SUPPLIED BY THE MANUFACTURER.

IMPORTANT: THE SIZE OF THE CIRCUIT BREAKER AND THE CROSS-SECTION OF THE SUPPLY AND CONTROL LINES ARE ONLY AS A GUIDE AND SHOULD BE CORRECTED IN ACCORDANCE WITH THE CONDITIONS AT THE JOBSITE, DISTANCE BETWEEN UNITS, AND CURRENT LEGISLATION.

# Wiring diagram

**Heater 20, 30kW, 400.3.50**  
**SICH-090 to 180B**

POWER SUPPLY kW	AUTOMATIC SWITCH Q1	AUTOMATIC SWITCH		MINIMUM SECTION CABLES mm <sup>2</sup>
		F21	F22	
20	40	20	20	6
30	50	25	25	10



- A1.- CONTROL BOARD
- A3.- AUXILIARY HEATER ACCESSORY-1
- A4.- AUXILIARY HEATER ACCESSORY-2
- F9, F11.- MANUAL RESET THERMAL SWITCH, 138°C
- F10, F12.- AUTOMATIC RESET THERMAL SWITCH, 77°C
- F14, F15.- AIR FLOW CONTROL
- F21, F22.- AUTOMATIC SWITCH
- KM21, KM22.- POWER SUPPLY CONTACTOR, 400 VAC
- R1.- 1st STAGE HEATER
- R2.- 2nd STAGE HEATER

I-2107a  
 400.3.50

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# Duct electric heaters for SICH-070 to 180B, 240C and SIH-300

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

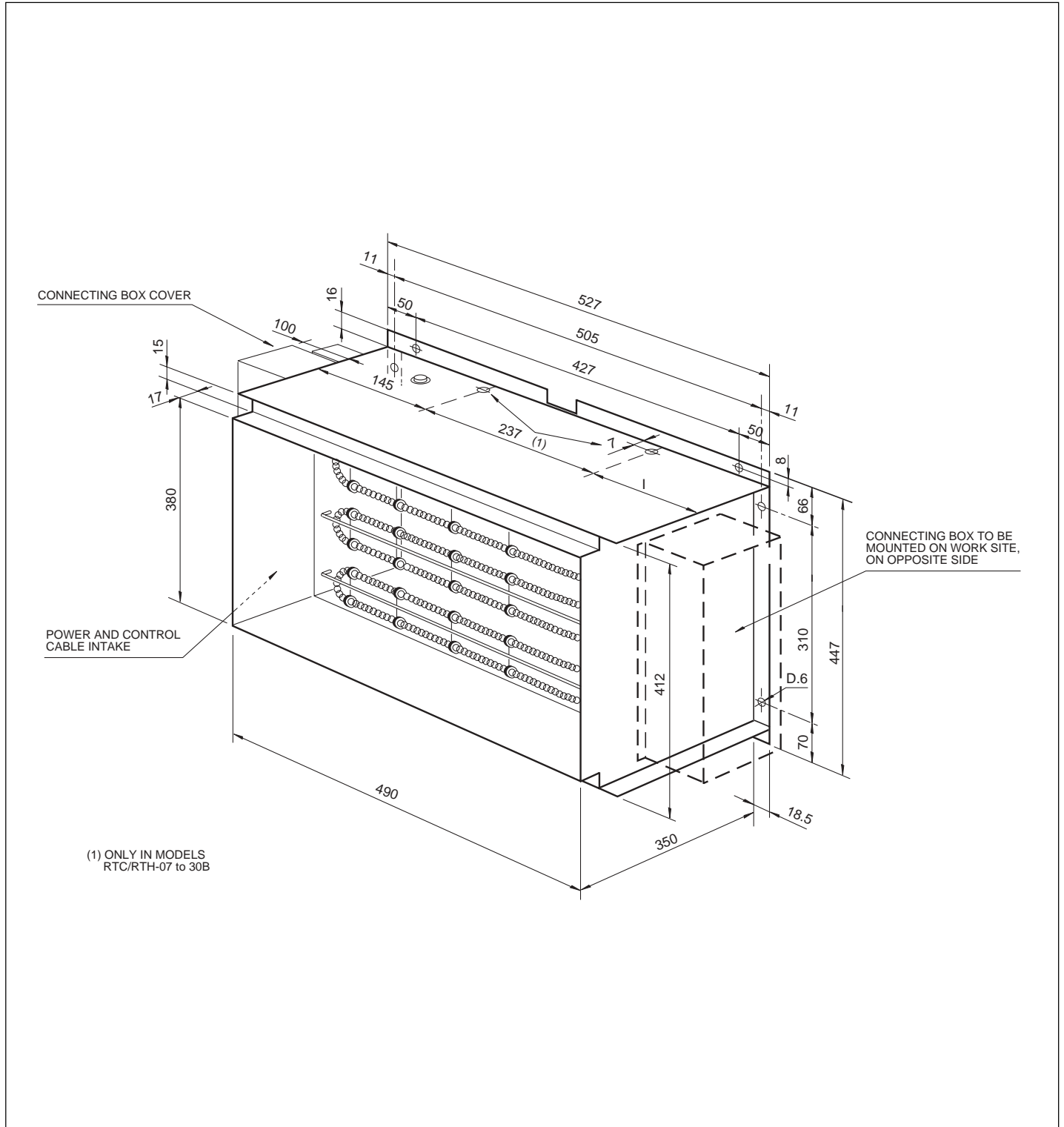
## Technical specifications

These duct electric heaters include the following components:

- Galvanised sheet casing, covers and supports.
- Exposed nickel-chrome wire electric resistance mounted on steatite supports.

- Power supply contactor with a 400 V coil.
- 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. With 2-stage heaters, there are four thermal protectors, 2 for each stage.
- 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



## General characteristics

Heater 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>SICH-070 &amp; 076B</b>	400.3.50	10	15	1	20	2.5	0.19	6
<b>SICH-070 &amp; 076B</b>	400.3.50	15	22	1	25	4	0.19	6
<b>SICH-090 to 180B, 240C, SIH-300</b>	400.3.50	20	30	2	40	6	0.19	15
<b>SICH-090 to 180B, 240C, SIH-300</b>	400.3.50	30	46	2	50	10	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

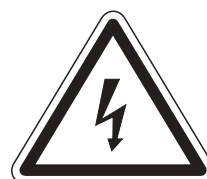
Heater model	Dimensions with packing mm			Weight kg
	Height	Width	Depth	
<b>SICH-070 &amp; 076B</b>	440	640	370	20
<b>SICH-090 to 180B, 240C and SIH-300</b>	880	640	370	40

## Installation

Install the electric heater in the SICH 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 switches and differentials for the heater in accordance with the indications appearing in the table of General Characteristics and Wiring Diagrams.
- 4) Remove the access covers to the controls of the SCOC, SCOH, SOC or SOH/SICH units.
- 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 (F9 and F11 in 2 stages) 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 (or automatic switch F21 in 2 stages). Connect the control cable supplied, between connector J1 of the A3 Auxiliary Resistance board (A4 in 2 stages) 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 (F14 and F15 in 2 stages) 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 SCOC, SCOH, SOC or SOH/SICH 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 SCOC, SCOH, SOC or SOH/SICH unit.

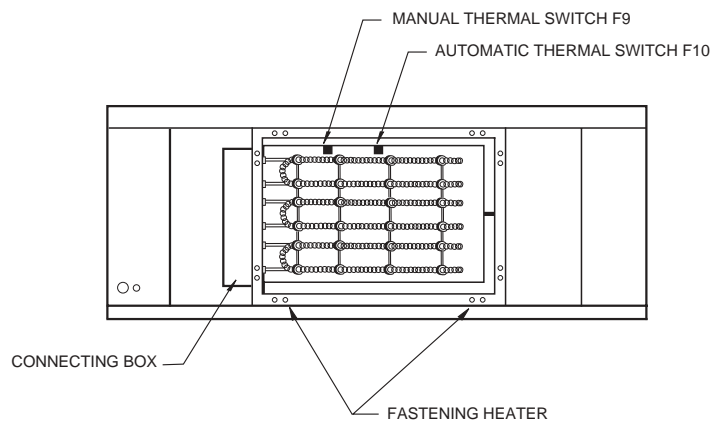
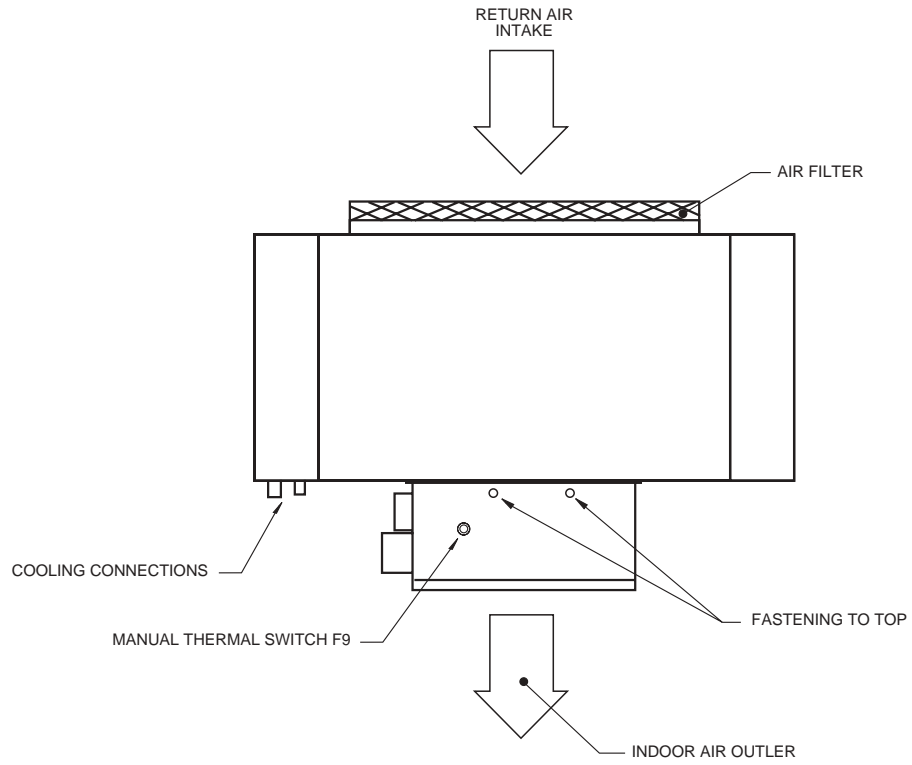
**Note:** Should an incorrect response of the system take place, see the Operation section of the SCOC or SCOH, SOC or SOH/SICH Installation Instructions. There you will find the control functions of the A1 electronic board on the heater, as well as its configuration, incidents identification, etc.



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.

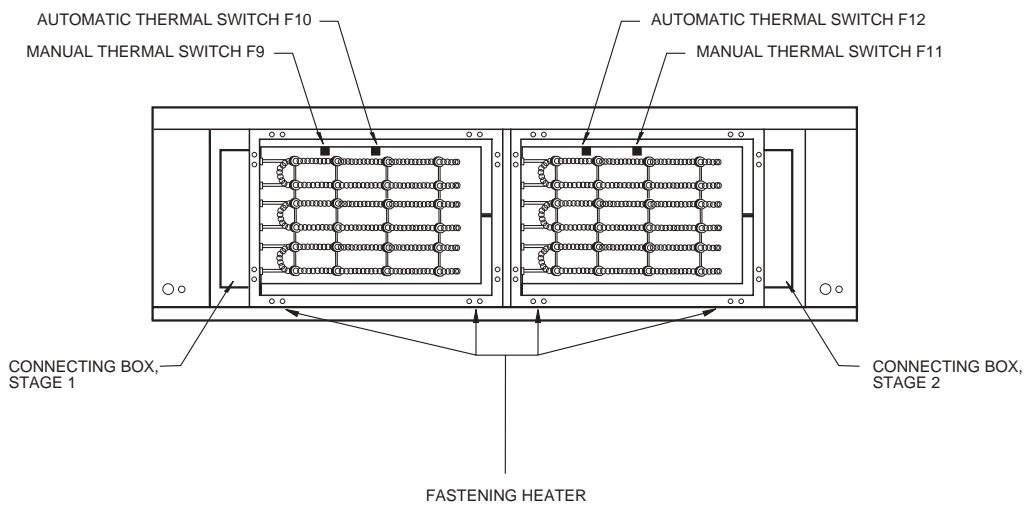
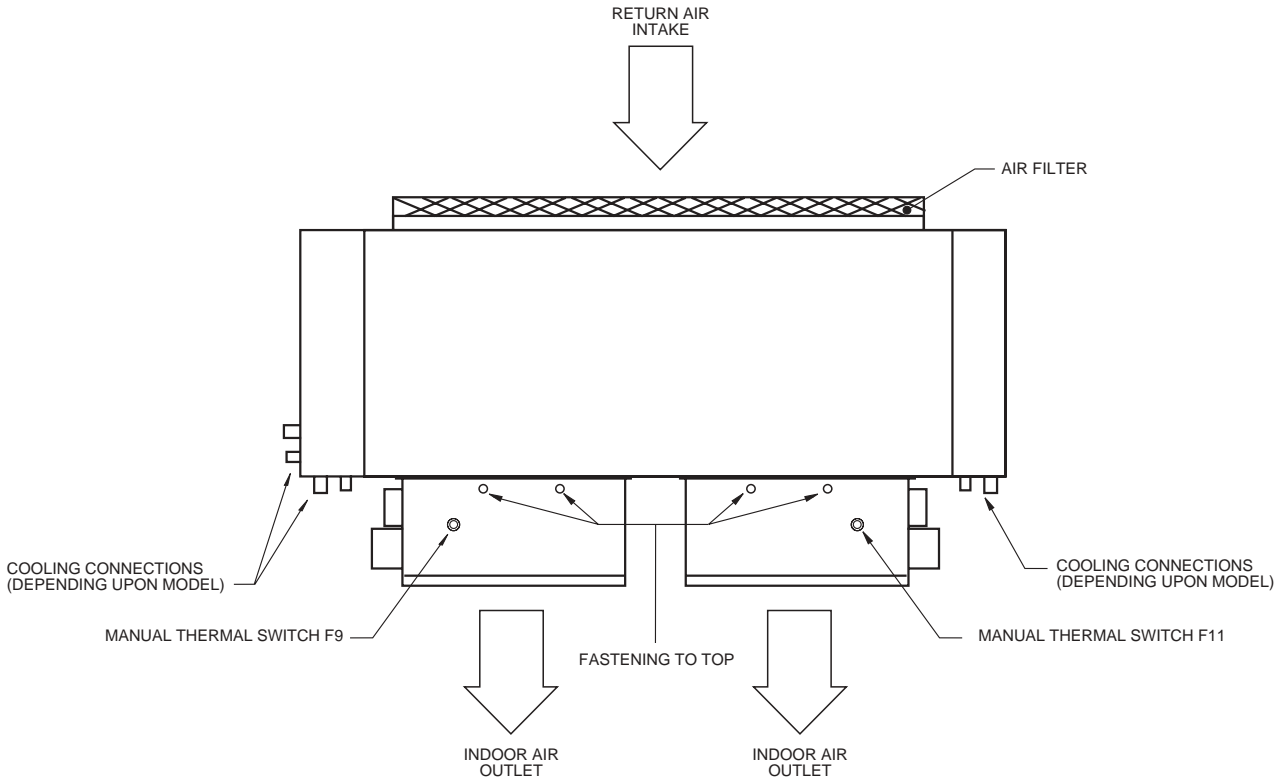
# Location of the heater

SICH-070 and 076B



# Location of the heater

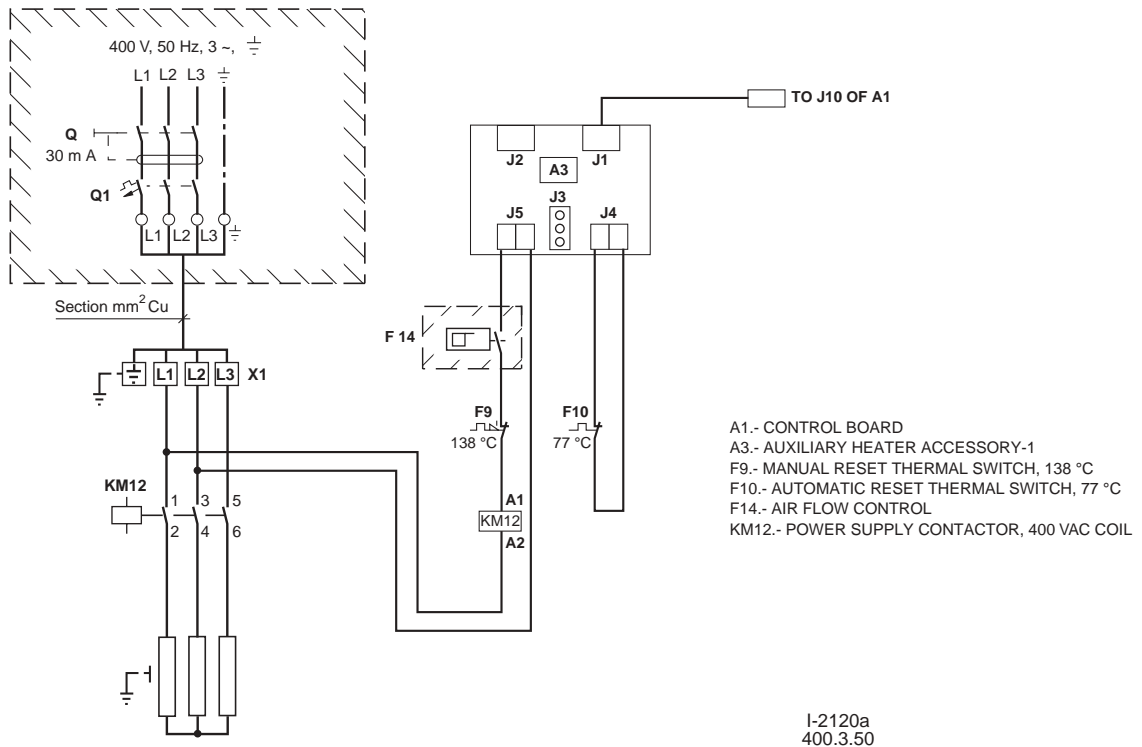
SICH-090 to 180B, 240C and SIH-300



# Wiring diagram

**Heater 10, 15kW, 400.3.50**  
**SICH-070 and 076B**

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



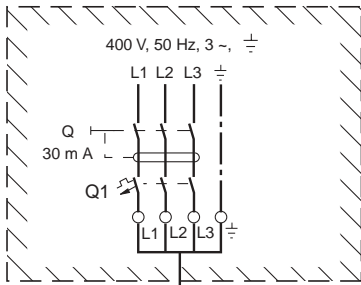
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IMPORTANT: THE SIZE OF THE CIRCUIT BREAKER AND THE CROSS-SECTION OF THE SUPPLY AND CONTROL LINES ARE ONLY AS A GUIDE AND SHOULD BE CORRECTED IN ACCORDANCE WITH THE CONDITIONS AT THE JOBSITE, DISTANCE BETWEEN UNITS, AND CURRENT LEGISLATION.

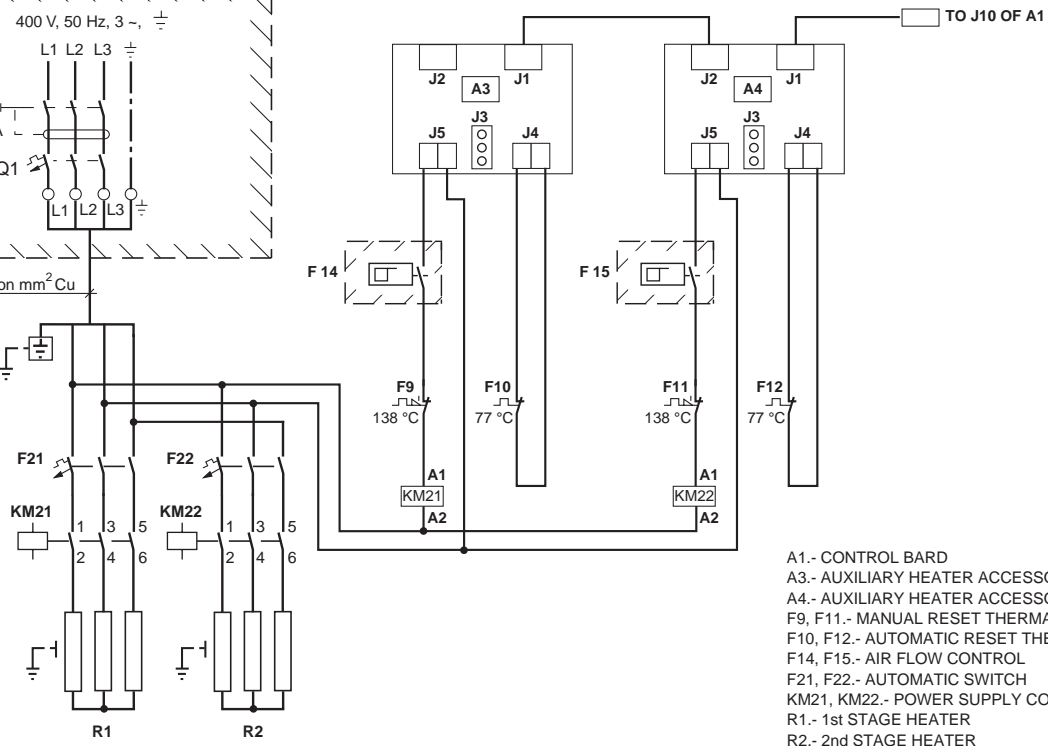
# Wiring diagram

**Heater 20, 30kW, 400.3.50**  
**for SICH-090 to 180B, 240C and SIH-300**

POWER kW	AUTOMATIC SWITCH Q1	AUTOMATIC SWITCH F21	AUTOMATIC SWITCH F22	MINIMUM CABLE SECTION mm <sup>2</sup>
20	40	20	20	6
30	50	25	25	10



Section mm<sup>2</sup> Cu



- A1.- CONTROL BARD
- A3.- AUXILIARY HEATER ACCESSORY-1
- A4.- AUXILIARY HEATER ACCESSORY-2
- F9, F11.- MANUAL RESET THERMAL SWITCH, 138°C
- F10, F12.- AUTOMATIC RESET THERMAL SWITCH, 77°C
- F14, F15.- AIR FLOW CONTROL
- F21, F22.- AUTOMATIC SWITCH
- KM21, KM22.- POWER SUPPLY CONTACTOR, 400 VAC COIL
- R1.- 1st STAGE HEATER
- R2.- 2nd STAGE HEATER

I-2121a  
 400.3.50

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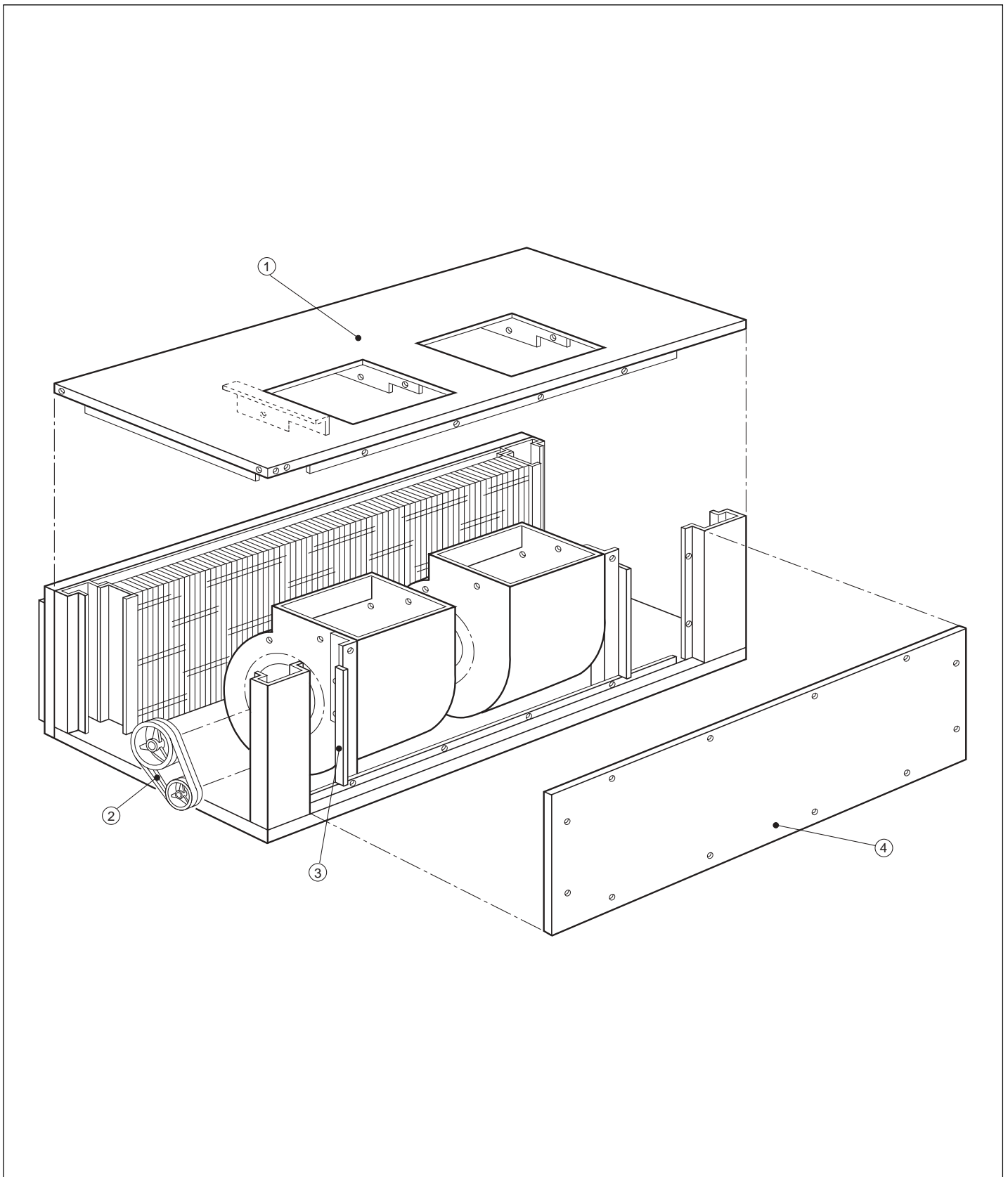
## Vertical conversion kit for: SICH-180B a 240C and SIH-300

The SICH-180B a 240C and SIH-300 units require a transformation kit that includes: rear and upper panel, belts, motor and fan pulleys.

1- Remove the standard upper, rear and side panels, as well as the fans and orient them as shown in the following drawing, fastening them to the upper panel supplied with the

transformation kit.

- 2- Once the fans are mounted, fasten upper panel ref. 1 to the unit.
- 3- Fasten the fan left and right side angles ref. 3 to the unit.
- 4- Substitute motor and fan belts, as well as belts ref. 2 with those included in the kit.
- 5- Mount rear panel ref. 4.
- 6- Finally, mount the standard side panels.



All data subject to change without notice.



Ref: Y-R70034 0402