

Hirange X under

Service Manual

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1 - POSITIONING ON SITE

1.1 - INSPECTION

On receiving the equipment immediately inspect its condition; report any damage to the transport company at once.

1.2 - TRANSPORT

- Always keep the unit vertically upright and do not leave it out in the open.
- If possible transport the unit using a fork lift truck; otherwise use a crane with belts or cables, avoiding the exerting of pressure on the top edges of the packing.
- Unpack the unit as close as possible to its installation position. Once unpacked, avoid stress being transmitted to its internal components.

TAB. 1 - PACKED WEIGHTS AND DIMENSIONS (*)

| Model | Dimensions (mm) | Approx. weight (kg) |
|-------|-------------------|---------------------|
| U24 | 1530 x 850 x 2100 | 530 |
| U34 | 1530 x 850 x 2100 | 510 |
| U35 | 1530 x 850 x 2100 | 540 |
| U45 | 2280 x 850 x 2100 | 720 |
| U55 | 2280 x 850 x 2100 | 760 |
| U65 | 2580 x 850 x 2100 | 890 |
| U75 | 2580 x 850 x 2100 | 900 |

(*) Standard unit with standard packing.

1.3 - SEALING THE ROOM

To create stable atmospheric conditions within the room, proceed as follows:

- "Vapour seal" the walls, floor and ceiling using an impermeable material.
- Ensure that the room is airtight by sealing all gaps, cable entries, etc.

1.4 - POSITIONING OF AIR CONDITIONER

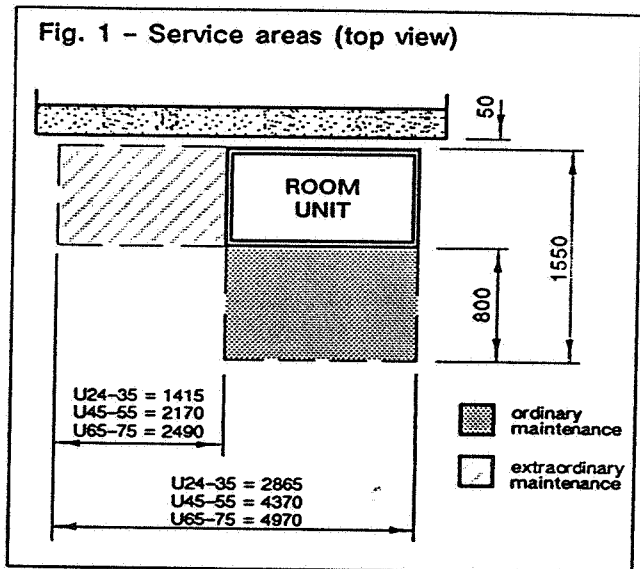
- The air conditioner can be installed in any indoor location where it is not exposed to an aggressive ambient.
- Position the air conditioner so as to ensure optimum air distribution within the area in which it is to operate, preventing the creation of unconditioned zones.

1.5 - FOUNDATIONS

- Position the unit directly on the raised floor, using a rubber sealing strip if necessary.
- For complete elimination of all vibrations place the unit on an adjustable Base frame (optional) which rests directly on the ground beneath the raised floor.

1.6 - SERVICE AREA (Fig. 1)

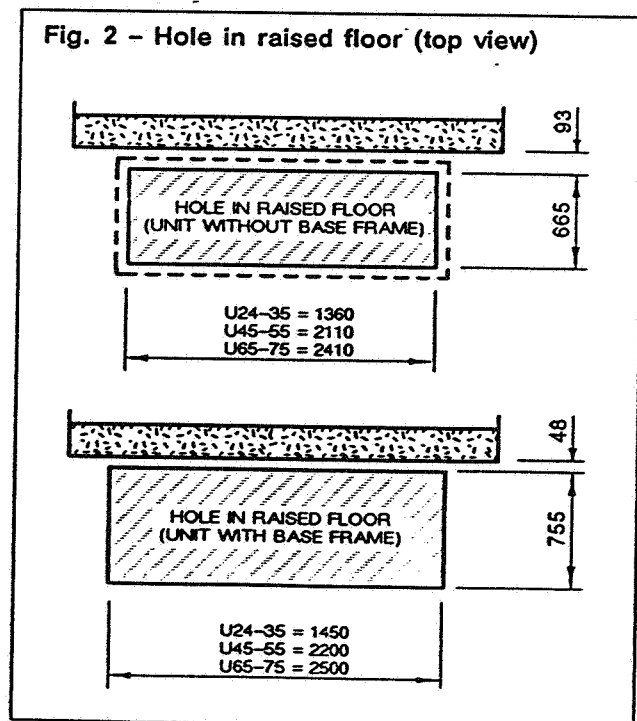
- In order to allow ordinary maintenance, a minimum area must be left free of obstructions.
- In the unlikely event of any extraordinary maintenance it is advised to place only easily removable furniture to the left of the unit.



1.7 - HOLE IN RAISED FLOOR

Make a hole in the raised floor directly below where the air conditioner is to be positioned.

Fig. 2 shows the hole size for use with or without the Base frame.



1.8 - UNDERFLOOR AIR OUTLETS

The unit delivers conditioned air into the distribution plenum created below the raised floor (which must be tall enough to not obstruct the air flow).

- 1) Certain CPUs may require cooling by a specific amount of conditioned air drawn directly from the raised floor by means of holes below the CPU; in this case the CPU manufacturer will specify the air flow rate (q_{calc} , in m^3/s) required for the CPU. Using Fig. 3 the hole size required can be calculated.

N.B. 1: Fig. 3 is formulated according to the assumption that approx. 20% of the hole is occupied by cables.

- 2) The air flow which remains (ie. that not used in 1) above) must be introduced into the room by air outlets distributed around the room.

- Quantity of air outlets:
Fig. 4 allows the number of air outlets required to be calculated.
- Position of air outlets:
 - at least 1m from desks/chairs;
 - along the walls if possible;
 - close to computers, etc. to avoid hot spots;
 - as far as possible from the air conditioner to avoid recirculating conditioned air.

N.B. 2: The air conditioner's total air flow (Q_{cond}) will vary according to the following (see project data):

- type of filters installed;
- type of fans installed.

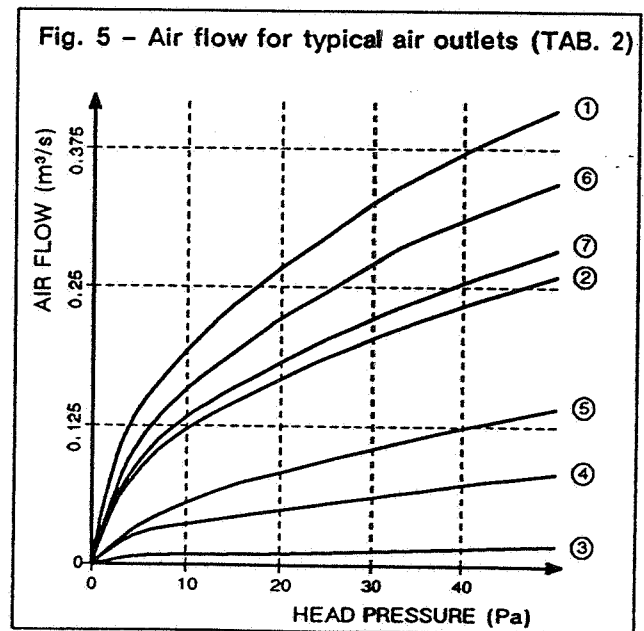
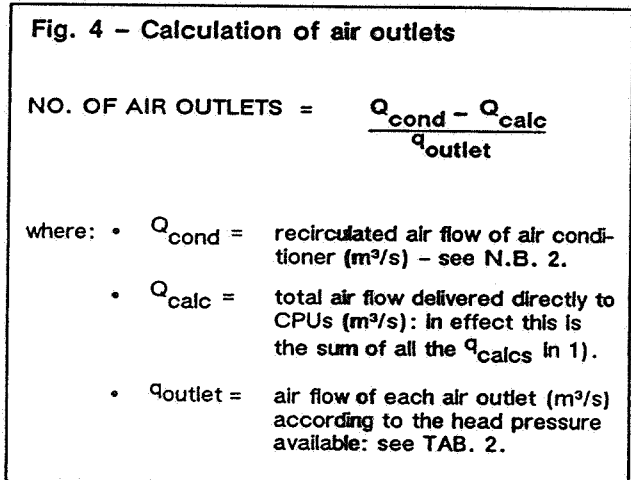
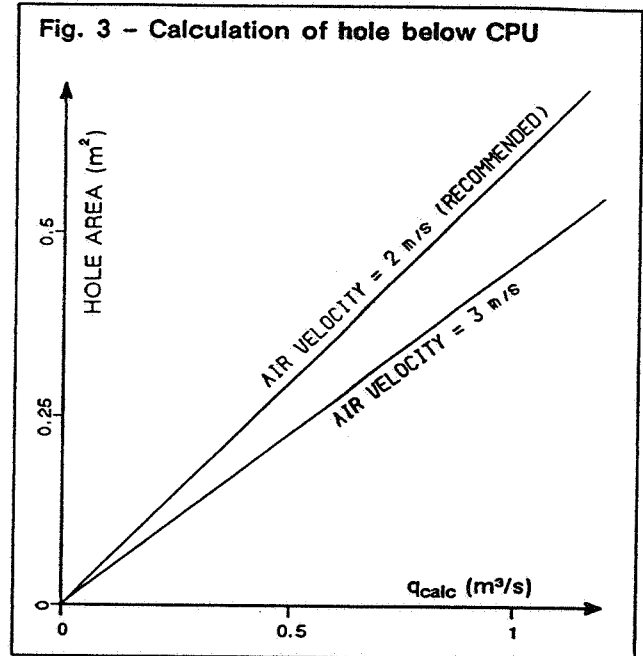
TAB. 2 - TYPICAL AIR OUTLETS AVAILABLE
(to calculate air flow see Fig. 5)

| POS. (Fig. 5) | CODE | DESCRIPTION |
|------------------|--------|---|
| 1 | 910121 | walkable grille |
| 2 | 910101 | walkable grille (with regulation) |
| 3 | - | Krantz unit (KB 150) |
| 4 | - | 96 hole perforated panel |
| 5 | - | 256 hole perforated panel |
| 6 | - | steel 576 hole perforated panel |
| 7 | - | steel 576 hole perforated panel (with regulation) |

WORKED EXAMPLE:

An air conditioner supplies $1.1 m^3/s$ of air (Q_{cond}) with a head pressure of 25 Pa and an air velocity of 2 m/s.

- 1) There is a CPU which requires $0.5 m^3/s$ of air (q_{calc}). It thus requires a $0.3 m^2$ hole (Fig. 3).
- 2) Walkable grilles ('1', TAB. 2) will be used for the remaining air. For 25 Pa these have a $0.3 m^3/s$ air flow (q_{outlet}) (Fig. 5). Thus according to Fig. 4 we require $(1.1 - 0.5) \div 0.3 = 2$ grilles.



2 - INSTALLATION

Fig. 6 - Overall dimensions (drawing AR1200M01)

see
enclosed
drawing

| MODEL | WEIGHT (kg) - std. unit | |
|-------|-------------------------|--------------|
| | air-cooled | water-cooled |
| U24 | 470 | 490 |
| U34 | 460 | 475 |
| U35 | 480 | 500 |
| U45 | 640 | 665 |
| U55 | 680 | 705 |
| U65 | 790 | 820 |
| U75 | 800 | 830 |

2.1 - EXTENSION HOOD (optional)

To install the extension hood, position it on top of the unit and fix it by screwing 4 self-tapping screws into the holes provided (Fig. 7).

2.2 - FILTER FRAME (optional)

- To install the filter frame, position it on top of the unit and fix it by screwing 4 self-tapping screws into the holes provided (Fig. 8).
- To install/substitute the filters remove the frame's front panel; the filters can now be simply slid in/out from the front.

2.3 - EXTENSION HOOD + FILTER FRAME (opt.)

- Install the filter frame onto the unit as in para. 2.2.
- To install the extension hood, position it on top of the filter frame and fix it by screwing 4 self-tapping screws into the holes provided (Fig. 9).
- Install/substitute the filters as in para. 2.2.

Fig. 7 - Extension hood (drawing AR 2200M04)

see
enclosed
drawing

N.B.: The standard extension hood can be of any height within the range of 630 - 1230 mm (corresponding to the height specified when ordering the hood plus 30 mm to allow projection into a false ceiling).

Fig. 8 - Filter frame (drawing AR2200M06)

see
enclosed
drawing

Fig. 9 - Extension hood + Filter frame (drawing AR2200M07)

see
enclosed
drawing

N.B.: The standard extension hood can be of any height within the range of 630 - 1230 mm (corresponding to the height specified when ordering the hood plus 30 mm to allow projection into a false ceiling).

2.4 – NEW AIR INTAKE INSTALLATION (Fig. 10)

The optional New Air Intake must be connected as follows: a flexible duct, connected to the nearest possible air inlet, is connected to the Ø100 mm collar at the base of the New Air Intake.
ENSURE THAT THE FLEXIBLE DUCT DOES NOT OBSTRUCT THE UNDERFLOOR AIR FLOW.

2.5 – INSTRUMENT INSTALLATION

Install all optional kits according to the instructions in para. 2.9 and Fig. 10.

Fig. 10 – Instrument installation (drawings AS1000M03/AS2000M03)

see
 enclosed
 drawing

| POS. | STANDARD EQUIPMENT | INSTALLATION |
|------|------------------------------------|--------------|
| 1 | HIROMATIC control | Unit front |
| 2 | Electrical panel | Inside unit |
| 3 | Temp. sensor (RT1) (U34 only) | Inside unit |
| 4 | Flow sensor (PTC) (U34 only) | Inside unit |
| 5 | Temp.+Hum.sensor (opt.on U34) | Inside unit |
| 6 | Interface board (not U34) | Inside unit |
| 7 | Fan press.switch (SP1-2) (not U34) | Inside unit |

| POS. | OPTIONAL EQUIPMENT | INSTALLATION |
|------|-----------------------------------|--------------|
| 8 | Water Leakage Detector (LWD) | Outside unit |
| 9 | EI. Environ. Alarm Package (EEAP) | Outside unit |
| 10 | Antifire Alarm Package (AAP) | Outside unit |
| 11 | Clogged filter sensor (CF) | Inside unit |
| 12 | New Air Intake | Inside unit |
| 13 | Hot water consent therm. (HWT) | Outside unit |

NOTE: On U34, if '5' is fitted '3' will not be fitted.

2.6 - REFRIGERATION CONNECTIONS
(air-cooled only)

- Make all connections as outlined in the 'Refrigeration Pipeline Connections' manual.
- For the position of the attachments see Fig. 11 and the condenser manual.
- The unit is supplied precharged with freon (TAB. 8).
- TAB. 3 specifies the standard pipe diameter required.

NEVER USE THE COMPRESSOR TO CREATE A VACUUM (THIS INVALIDATES ITS GUARANTEE).

TAB. 3 - STANDARD PIPE DIAMETERS (*)

| MODEL | GAS TUBE | LIQUID TUBE |
|----------|----------|-------------|
| U24A/35A | Ø 18 x 1 | Ø 18 x 1 |
| U34A | Ø 22 x 1 | Ø 22 x 1 |
| U45A-65A | Ø 22 x 1 | Ø 22 x 1 |
| U75A | Ø 28 x 1 | Ø 22 x 1 |


(*) Valid for (equivalent) lengths of upto 30 m.

Fig. 11 - Refrigeration connections (air-cooled only) (drawings AS1000M08/AS1000M10)

ALL MODELS EXCEPT U34A

see
enclosed
drawing

U34A

 = Non return valve (optional).
The fitting of these valves is strongly recommended (see also CHAP. 10).

2.7 – COOLING WATER CONNECTIONS (water-cooled only)

The unit must receive cooling water as follows:

- from an external cooling water source, in open circuit (para. 2.7.1).
- using a rad cooler, in closed circuit (para. 2.7.2).

For all units:

- Connect the piping as in Fig. 13.
- Use copper or steel (Mannesmann) piping. It is advisable to place 3-piece union joints, together with short lengths of flexible piping, at the condenser inlet and outlet.
- IMPORTANT:** fit a standard strainer on the inlet water piping.
- Place shut-off ball valves at the conditioner inlet and outlet to allow easy maintenance.
- If desired install a water drain tap at the lowest point in the circuit.
- Fully drain the piping before connecting it to the air conditioner.

2.7.1 – Extra notes for open circuit applications

- Use the unit with mains or well water. **DO NOT USE UNTREATED WATER FROM AN EVAPORATIVE COOLING TOWER.**
- The water pressure must be 2 – 10 bar (if not contact Hiross).
- The required water flow at differing temperatures is given in our catalogues or on request.
- If necessary (very low water temperature) insulate both pipes using Armaflex insulation.
- Calibrate the water pressostatic valve (WV) as described in CHAP. 7.

2.7.2 – Extra notes for closed circuit applications

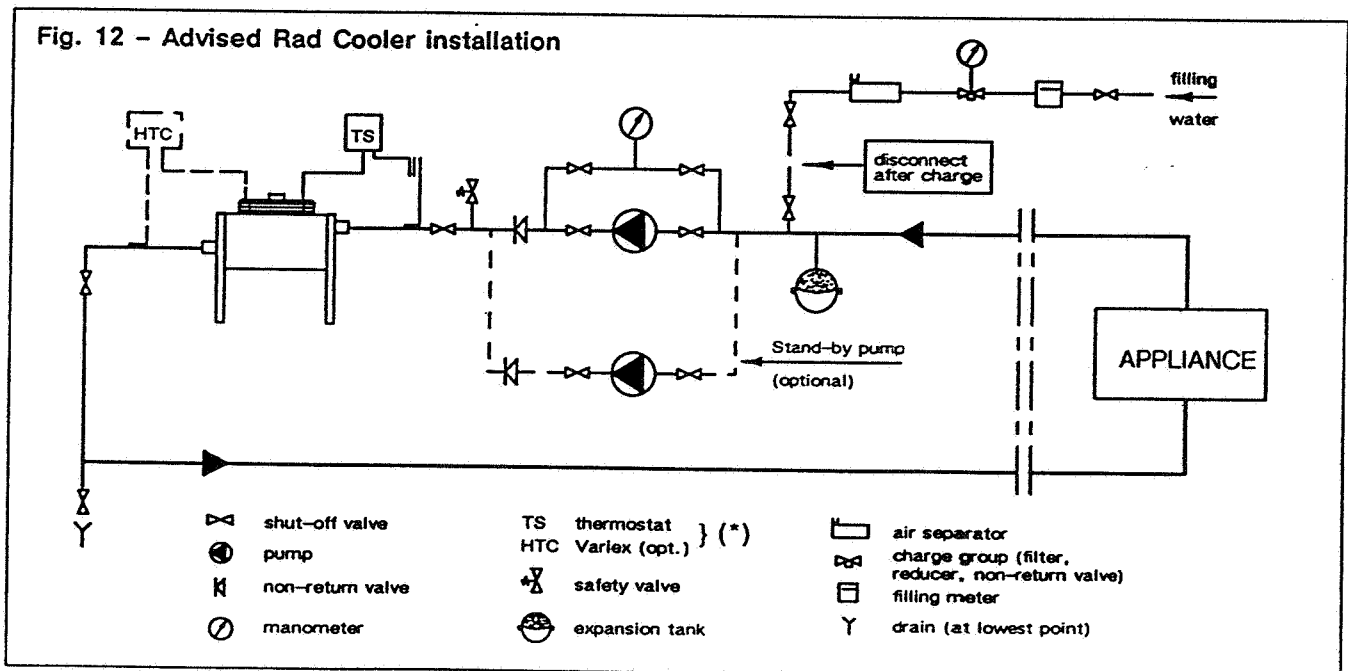
- The installation in Fig. 12 is indicative only; for individual installations follow the project diagram.
- Install a pump system calculated for the flow rate required at a pressure head equal to the sum of all the pressure losses (see project data), and controlled by the compressor(s) running (see label within unit).
- Insulate both pipes using Armaflex insulation.
- VERY IMPORTANT:** Add water and ethylene glycol to the circuit (for quantity of glycol necessary see TAB. 4). Do not exceed the nominal operating pressure of the circuit's components.
- Bleed all air out of the circuit.

TAB. 4 – ETHYLENE GLYCOL TO BE ADDED TO WATER (% IN WEIGHT)

| | | | | | | |
|--|---|----|----|-----|-----|-----|
| minimum water temp. ever obtainable (°C) | 0 | -4 | -9 | -15 | -24 | -37 |
| ethylene glycol to be added to water (% in weight) | 0 | 10 | 20 | 30 | 40 | 50 |

NOTES:

- To avoid stratification run the circulation pump for at least 30 mins. after adding any glycol.
- After adding water to the water circuit always disconnect the supply water coming from the sanitary circuit; this avoids the danger of glycol entering the sanitary water circuit.
- After any topping-up of water check the glycol concentration and add any glycol if necessary.



(*) Rad cooler features one or the other (see ARN/ARL manual).

Fig. 13 – Cooling water connections (water-cooled only) (drawings AS1000M09/AS2000M02)

see
enclosed
drawing

| POS. | CONNECTION | DIMENSION | |
|------|----------------------|---|--------------------------------|
| | | unit without valve (WV) or with valve of 1/2", 3/4", 1" | unit with valve (WV) of 1 1/4" |
| A | COOLING WATER INLET | 1"G FEMALE | 1 1/4"G FEMALE |
| B | COOLING WATER OUTLET | 1"G FEMALE | 1 1/4"G FEMALE |

* This dimension alters according to the type of water pressostatic valve (WV) installed, as follows:

- for 1/2" valve = 260 mm
- for 3/4" valve = 255 mm
- for 1" valve = 295 mm
- for 1 1/4" valve = 250 mm

2.8 – WATER CONNECTIONS (Fig. 15)

ENSURE THAT THE TUBING DOES NOT OBSTRUCT THE UNDERFLOOR AIR FLOW.

1) Condensate drain (Fig. 14):

- Use galvanized steel, PVC or flexible polythene tubing.
- Allow a 2% gradient towards the drain outlet.
- There must be a drain trap (1) placed at least 30mm below the drain tray (2).
- Fill the drain trap with water (3).

2) Humidifier:

- See HUMIDAIR manual.
THERE MUST BE A DRAIN TRAP IN THE HUMIDIFIER DRAIN TUBING.

3) Hot water:

- Use copper or steel (Mannesmann) tubing.
- Insulate both tubes using Armaflex insulation.

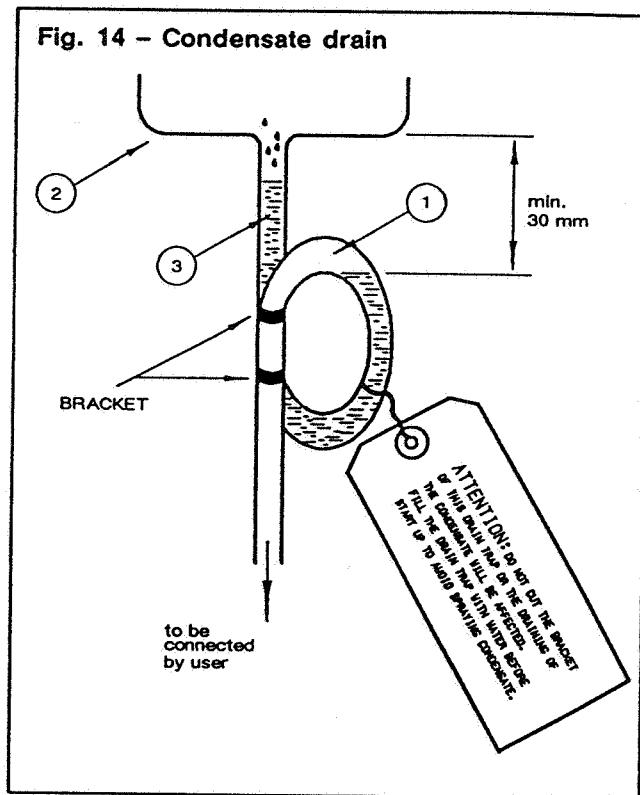


Fig. 15 - Water connections (drawings AS1000M09/AS2000M02)

see
enclosed
drawing

| POS. | CONNECTION | DIMENSION | |
|------|----------------------------------|----------------|----------------|
| | | U24-35 | U45-75 |
| A | HUMIDAIR water supply (optional) | 3/8" G male | 3/8" G male |
| B | HUMIDAIR water drain (optional) | D.22 mm male | D.22 mm male |
| C | condensate drain | D.20 mm female | D.20 mm female |
| D | hot water inlet (optional) | Ø 18 rapid | Ø 22 rapid |
| E | hot water outlet (optional) | Ø 18 rapid | Ø 22 rapid |

2.9 - ELECTRICAL CONNECTIONS

- 1) Before proceeding with the electrical connections, ensure that:
 - all electrical components are undamaged;
 - all terminal screws are tight;
 - the supply voltage and frequency are as indicated on the unit.
- 2) Supply cable connections:
 - Connect the cable to the Line inlet terminal block (Fig. 16).
 - For cable sizes see TAB. 5.
 - Protect the supply using a back-up fuse (see TAB. 5).
- 3) Wiring connections (Fig. 16):
 - Connections for optional kits (para. 2.5) plus those for Remote on-off and Hot water consent, must be done by the installer.
 - The General Alarm terminals allow remote alarm signalling.

TAB. 5 - BACK-UP FUSE AND CABLE SIZES

| UNIT VERSION | BACK-UP FUSE | CABLE SIZE | |
|--|-----------------|--------------------|--------------------|
| cooling (F) | U24, U35-75 | 80A | 35 mm ² |
| | U34 (380V) | 63A | 16 mm ² |
| | U34 (220V) | 80A | 25 mm ² |
| cooling + humidif. (F + H) | U24, U35-75 | 80A | 35 mm ² |
| | U34 (380V) | 63A | 16 mm ² |
| | U34 (220V) | 80A | 25 mm ² |
| cooling + el. heating + humidif. (F + C + H) | U24, U35 (380V) | 80A | 35 mm ² |
| | U24, U35 (220V) | 125A | 70 mm ² |
| | U45 | | |
| | U55-75 (380V) | 63A | 16 mm ² |
| | U34 (380V) | | |
| | U34 (220V) | | |
| U55-75 (220V) | 200A | 95 mm ² | |

NOTE: Above values are valid irrespective of type of fan.

Fig. 16 - Electrical connections (drawing AS1000M05)

see enclosed drawing

TAB. 6 – ELECTRICAL CHARACTERISTICS

| | | STANDARD UNIT | | | | | | | | OPTIONALS | | | |
|--------------|-----|--------------------------|------|------|--------------------|-----------------------|------|-------|--------------------|--------------------------------|--------------------|-----------------------|--------------------|
| | | FANS (6 pole) (3 ph.) | | | | COMPRESSOR (3 ph.) | | | | EL. HEATING (3 ph. connec.) | | HUMIDIFIER (3 ph.) | |
| | | OA | FLA | LRA | nominal power (kW) | OA | FLA | LRA | nominal power (kW) | FLA | nominal power (kW) | FLA | nominal power (kW) |
| unit at 380V | U24 | 5.7 | 7.0 | 19.0 | 2.2 | 5.9 | 7.9 | 38.0 | 4.8 | 17.8 | 11.7 | 15.5 | 6.7 |
| | U34 | 6.3 | 8.5 | 27.0 | 2.2 | 15.5 | 19.8 | 94.0 | 13.6 | 17.8 | 11.7 | 15.5 | 6.7 |
| | U35 | 6.3 | 8.5 | 27.0 | 2.2 | 8.0 | 10.1 | 45.0 | 6.8 | 17.8 | 11.7 | 15.5 | 6.7 |
| | U45 | 5.5 | 7.0 | 19.0 | 2.2 | 10.9 | 13.2 | 69.0 | 8.8 | 17.8 | 11.7 | 15.5 | 6.7 |
| | U55 | 6.0 | 7.0 | 19.0 | 2.2 | 11.9 | 14.9 | 82.0 | 10.2 | 31.5 | 20.7 | 15.5 | 6.7 |
| | U65 | 6.5 | 8.5 | 27.0 | 2.2 | 15.6 | 19.8 | 94.0 | 13.6 | 31.5 | 20.7 | 15.5 | 6.7 |
| | U75 | 6.5 | 8.5 | 27.0 | 2.2 | 19.3 | 24.7 | 122.0 | 16.3 | 31.5 | 20.7 | 15.5 | 6.7 |
| unit at 220V | U24 | 9.9 | 12.1 | 33.0 | 2.2 | 10.2 | 13.7 | 79.0 | 4.8 | 30.8 | 11.7 | 24.3 | 6.1 |
| | U34 | 10.9 | 14.7 | 46.8 | 2.2 | 26.8 | 34.2 | 190.0 | 13.6 | 30.8 | 11.7 | 24.3 | 6.1 |
| | U35 | 10.9 | 14.7 | 46.8 | 2.2 | 13.9 | 17.5 | 105.0 | 6.8 | 30.8 | 11.7 | 24.3 | 6.1 |
| | U45 | 9.5 | 12.1 | 33.0 | 2.2 | 18.9 | 22.9 | 135.0 | 8.8 | 30.8 | 11.7 | 24.3 | 6.1 |
| | U55 | 10.4 | 12.1 | 33.0 | 2.2 | 20.6 | 25.8 | 168.0 | 10.2 | 54.5 | 20.7 | 24.3 | 6.1 |
| | U65 | 11.3 | 14.7 | 46.8 | 2.2 | 27.0 | 34.2 | 190.0 | 13.6 | 54.5 | 20.7 | 24.3 | 6.1 |
| | U75 | 11.3 | 14.7 | 46.8 | 2.2 | 33.4 | 42.7 | 245.0 | 16.3 | 54.5 | 20.7 | 24.3 | 6.1 |

Notes:

- 1) Electrical characteristics are per compressor and per fan motor (for quantity installed see CHAP. 9).
- 2) Fan OA is for standard unit operating at the design pressure drop.
- 3) Compressor OA is referred to - room conditions: 24°C, 50% RH; condensing temperature: 45°C.
- 4) Compressor FLA is for the contemporary conditions of maximum evaporating and condensing pressures.
- 5) Electrical heating values are for maximum heating (3 steps).

TAB. 7 – ELECTRICAL CHARACTERISTICS FOR OPTIONAL FANS

| | | VFAN02 MOTOR (belt drive) | | | | VFAN10 MOTOR (belt drive) | | | | VFAN25 MOTOR (belt drive) | | | |
|--------------|-----|---------------------------|------|------|--------------------|---------------------------|------|------|--------------------|---------------------------|------|-------|--------------------|
| | | OA | FLA | LRA | nominal power (kW) | OA | FLA | LRA | nominal power (kW) | OA | FLA | LRA | nominal power (kW) |
| unit at 380V | U24 | 3.0 | 5.2 | 26.0 | 2.25 | 3.6 | 5.2 | 26.0 | 2.25 | 5.0 | 6.9 | 34.5 | 4.0 |
| | U34 | 6.1 | 9.0 | 49.5 | 4.1 | 6.9 | 9.0 | 49.5 | 4.1 | 8.4 | 12.0 | 84.0 | 5.6 |
| | U35 | 6.1 | 9.0 | 49.5 | 4.1 | 6.9 | 9.0 | 49.5 | 4.1 | 8.4 | 12.0 | 84.0 | 5.6 |
| | U45 | 2.7 | 3.7 | 18.5 | 1.5 | 3.2 | 5.2 | 26.0 | 2.25 | 4.6 | 6.9 | 34.5 | 4.0 |
| | U55 | 4.5 | 6.9 | 34.5 | 4.0 | 5.3 | 6.9 | 34.5 | 4.0 | 6.5 | 9.0 | 49.5 | 4.1 |
| | U65 | 6.6 | 9.0 | 49.5 | 4.1 | 8.3 | 9.0 | 49.5 | 4.1 | 9.1 | 12.0 | 84.0 | 5.6 |
| | U75 | 6.6 | 9.0 | 49.5 | 4.1 | 8.3 | 9.0 | 49.5 | 4.1 | 9.1 | 12.0 | 84.0 | 5.6 |
| unit at 220V | U24 | 5.2 | 9.0 | 45.0 | 2.25 | 6.2 | 9.0 | 45.0 | 2.25 | 8.7 | 12.0 | 59.8 | 4.0 |
| | U34 | 10.6 | 15.6 | 85.7 | 4.1 | 12.0 | 15.6 | 85.7 | 4.1 | 14.5 | 20.8 | 145.5 | 5.6 |
| | U35 | 10.6 | 15.6 | 85.7 | 4.1 | 12.0 | 15.6 | 85.7 | 4.1 | 14.5 | 20.8 | 145.5 | 5.6 |
| | U45 | 4.7 | 6.4 | 32.0 | 1.5 | 5.5 | 9.0 | 45.0 | 2.25 | 8.0 | 12.0 | 59.8 | 4.0 |
| | U55 | 7.8 | 12.0 | 59.8 | 4.0 | 9.2 | 12.0 | 59.8 | 4.0 | 11.3 | 15.6 | 85.7 | 4.1 |
| | U65 | 11.4 | 15.6 | 85.7 | 4.1 | 14.4 | 15.6 | 85.7 | 4.1 | 15.8 | 20.8 | 145.5 | 5.6 |
| | U75 | 11.4 | 15.6 | 85.7 | 4.1 | 14.4 | 15.6 | 85.7 | 4.1 | 15.8 | 20.8 | 145.5 | 5.6 |

Notes:

- 1) Electrical characteristics are per fan motor (for quantity installed see CHAP. 10).
- 2) Fan OA is for standard unit (except for optional fans) operating at the design pressure drop.

3 – START-UP AND OPERATION

3.1 – FIRST START-UP (OR AFTER LONG HALT)

TO PREVENT COMPRESSOR DAMAGE THE CRANKCASE(S) MUST BE PREHEATED FOR AT LEAST 4 HOURS BEFORE CONDITIONER START-UP (FAILURE TO DO SO INVALIDATES THE GUARANTEE).

Therefore, proceed as follows:

- 1) Open all valves in the refrigeration circuit and (water-cooled only) cooling water circuit according to the instruction label attached to the valve.
- 2) Ensure that the refrigerant charge is correct (CHAP. 4). For water-cooled units with the hot gas reheat option add extra freon (as specified in TAB. 9).
- 3) Using a leak detector, verify that there are no refrigerant leaks. If there are then repair the leak and recharge as in CHAP. 4.
- 4) At least 4 hours before start-up, close QS and QF8 on the electrical panel.
- 5) Verify the operation of the crankcase heater(s).
- 6) Check that there are no water leakages.
- 7) If an external condenser or rad cooler is installed, start it by supplying power to it.
- 8) Only for units with optional belt-driven fans: check that the fan belts are under the correct tension (they should give by about 2 cm if pulled by a finger at mid-span).
- 9) Close all MCBs on the electrical panel.
- 10) Check the supply voltage on all phases. Also perform this operation for the external condenser or rad cooler, if fitted.
- 11) ENSURE THAT EACH CRANKCASE HAS BEEN PREHEATED FOR AT LEAST 4 HOURS; only then start the unit by pressing on off (on the HIROMATIC).
- 12) Check the electrical absorption of all components, including the external condenser/rad cooler, if fitted.
- 13) Only for units with optional belt-driven fans: Ensure that the fans rotate in the correct direction (see arrow on fan).

- 14) Ensure that all HIROMATIC settings are correct and that there are no alarms (see HIROMATIC manual).
- 15) Water-cooled only: Verify the water flow. For units in closed circuit ensure that the water pump starts when the compressor starts.
- 16) Verify the New Air Intake operation (if fitted).
- 17) Once the system is operating under load, verify that the various components are functioning, as follows:
 - Verify that the fans are operating.
 - Ensure that the temperature and rel. humidity are being controlled, and that the compressor(s), humidifier (optional) and heating steps (optional) operate when required.
 - Ensure that the Fan operation controller on the external condenser/rad cooler (if fitted) is calibrated correctly, and that it controls the fan operation.

3.2 – STARTING AND STOPPING

ALWAYS ENSURE THAT EACH CRANKCASE HAS BEEN PREHEATED. FOR BRIEF STOPPAGES MAINTAIN THE SUPPLY TO THE CRANKCASE HEATER(S).

- Start the unit by pressing on off on the HIROMATIC (confirmed by SYS. ON on the display).
- Stop the unit by pressing on off on the HIROMATIC (confirmed by SYS. OFF on the display).

3.3 – AUTOMATIC RESTART

If desired, the unit will automatically restart on the return of power after a supply interruption (see HIROMATIC manual).

NOTE: If the power interruption is one of at least 2 hours then switch the HIROMATIC off and, on the return of power, allow the compressor(s) to preheat before restarting the unit.

3.4 - OPERATION (Fig. 17)

Unit operation is completely automatic. The below sequence explains how the unit operates (see also Fig. 18, Fig. 19, Fig. 20 and Fig. 21):

- The air, sucked in by the fan(s), enters the unit through the inlet grille (1).
- The air is immediately filtered (2).
- The temperature + rel. humidity sensor (4) (or, on standard U34 only, temperature sensor (3)), verifies the state of the inlet air, and relays this information to the HIROMATIC.
- The HIROMATIC compares the relayed information to the set point and proportional band values programmed into its memory: it then commands the air conditioner to treat the air as follows (see chapter on OPERATION in HIROMATIC manual):

• COOLING

One or both compressors (12) are started and the cold refrigerant flows through the evaporators (5), thus cooling the air passing over them. For compressor operation see HIROMATIC manual.

• HEATING

This can take one of three forms:

- electrical heating (optional): the heating elements (7) heat the air passing over them. There are 3 heating steps.
- hot water heating (optional): if hot water is available this flows through the hot water coil (6), thus heating the air passing over it. The hot water flow is controlled by an on-off (3-way) valve.
- hot gas reheat (optional and only used during dehumidification): the hot refrigerant which exits the compressor flows through the hot gas coil (6), thus heating the air passing over it.

• DEHUMIDIFICATION - optional

One of the compressors starts and the evaporator surface area is altered, thereby causing dehumidification (refer also to HIROMATIC manual).

If necessary heating is used to reheat the air.
NOTE: If, during dehumidification, the ambient temperature drops below a specified level, dehumidification will be reduced or stopped (see LOW LIMIT intervention in HIROMATIC manual).

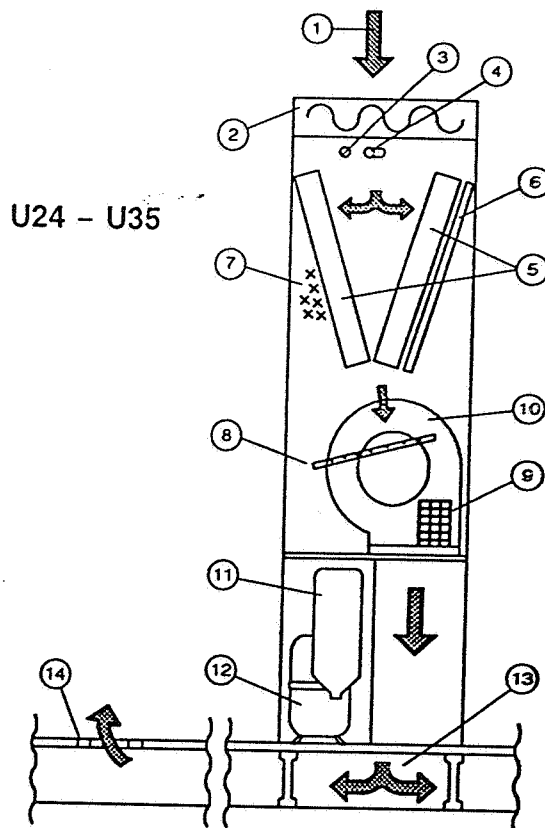
• HUMIDIFICATION - optional

The humidifier (11) creates steam, which is distributed into the air stream via the steam distribution pipe (8) (see also HUMIDAIR manual).

- Filtered new air is injected into the air stream via the New Air Intake (9) (optional).
- The treated air passes through the fans (10), which operate continuously, and is then dispersed into the underfloor void (13), from where it passes into the room via air distribution outlets (14).

NOTE: Manual control can be performed using the HIROMATIC (see HIROMATIC manual).

Fig. 17 - Operation



U45 - U75

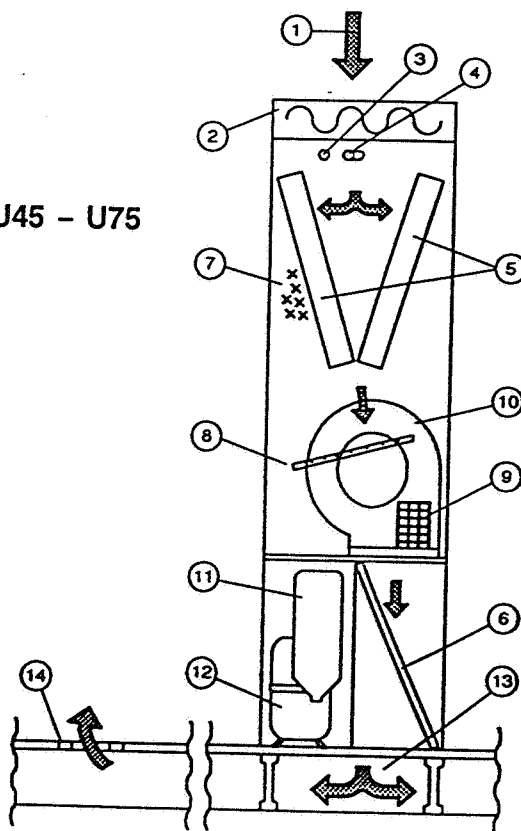


Fig. 18 - Refrigeration circuit - all air-cooled models except U34A (drawing AS1010F01)

see
enclosed
drawing

| POS. | DESCRIPTION |
|------|-----------------------------|
| 1 | compressor |
| 2 | high pressure switch (HP) |
| 3 | low pressure switch (LP) |
| 4 | suction valve |
| 5 | discharge valve |
| 6 | charge connection |
| 7 | hot gas reheat valve (opt.) |
| 8 | hot gas reheat coil (opt.) |
| 9 | non return valve (opt.) |
| 10 | liquid receiver |
| 11 | filter dryer |

| POS. | DESCRIPTION |
|------|------------------------------|
| 12 | sight glass |
| 13 | thermostatic expansion valve |
| 14 | evaporator |
| 15 | crankcase heater |
| 16 | safety valve |
| 17 | shut-off solenoid valve |
| 18 | shut-off valve |
| 19 | air-cooled condenser |
| 20 | fan pressure switch |

* Connect to external refrigerant exhaust (if desired).

Fig. 19 – Refrigeration circuit – all water-cooled models except U34W (drawing AS1010F02)

see
enclosed
drawing

| POS. | DESCRIPTION |
|------|-----------------------------|
| 1 | compressor |
| 2 | high pressure switch (HP) |
| 3 | low pressure switch (LP) |
| 4 | suction valve |
| 5 | discharge valve |
| 6 | charge connection |
| 7 | hot gas reheat valve (opt.) |
| 8 | hot gas reheat coil (opt.) |
| 9 | non return valve (opt.) |
| 10 | liquid receiver |
| 11 | filter dryer |

| POS. | DESCRIPTION |
|------|---------------------------------|
| 12 | sight glass |
| 13 | thermostatic expansion valve |
| 14 | evaporator |
| 15 | crankcase heater |
| 16 | safety valve |
| 17 | shut-off solenoid valve |
| 18 | shut-off valve |
| 19 | water-cooled condenser |
| 20 | water pressostatic valve (opt.) |

* Connect to external refrigerant exhaust (if desired).

Fig. 20 - Refrigeration circuit - U34A (drawing AS1010F03)

see
enclosed
drawing

| POS. | DESCRIPTION |
|------|-----------------------------|
| 1 | compressor |
| 2 | high pressure switch (HP) |
| 3 | low pressure switch (LP) |
| 4 | suction valve |
| 5 | discharge valve |
| 6 | charge connection |
| 7 | hot gas reheat valve (opt.) |
| 8 | hot gas reheat coil (opt.) |
| 9 | non return valve (opt.) |
| 10 | liquid receiver |

| POS. | DESCRIPTION |
|------|------------------------------|
| 11 | filter dryer |
| 12 | sight glass |
| 13 | thermostatic expansion valve |
| 14 | evaporator |
| 15 | crankcase heater |
| 16 | safety valve |
| 17 | shut-off solenoid valve |
| 18 | shut-off valve |
| 19 | air-cooled condenser |
| 20 | fan pressure switch |

Fig. 21 - Refrigeration circuit - U34W (drawing AS1010F04)

see
enclosed
drawing

| POS. | DESCRIPTION |
|------|-----------------------------|
| 1 | compressor |
| 2 | high pressure switch (HP) |
| 3 | low pressure switch (LP) |
| 4 | suction valve |
| 5 | discharge valve |
| 6 | charge connection |
| 7 | hot gas reheat valve (opt.) |
| 8 | hot gas reheat coil (opt.) |
| 9 | non return valve (opt.) |
| 10 | liquid receiver |

| POS. | DESCRIPTION |
|------|---------------------------------|
| 11 | filter dryer |
| 12 | sight glass |
| 13 | thermostatic expansion valve |
| 14 | evaporator |
| 15 | crankcase heater |
| 16 | safety valve |
| 17 | shut-off solenoid valve |
| 18 | shut-off valve |
| 19 | water-cooled condenser |
| 20 | water pressostatic valve (opt.) |

4 – REFRIGERANT CHARGING

THIS OPERATION MUST BE CARRIED OUT BY AN EXPERIENCED REFRIGERATION TECHNICIAN.

4.1 – AIR-COOLED UNITS

- 1) Start the unit as described in para. 3.1.
- 2) Manually start each compressor one at a time (ensure the unit is not in dehumidification).
- 3) Guarantee a constant condensation temperature (preferably 42–45 °C); if necessary partially obstruct the condenser coil's surface or limit its ventilating power to obtain these conditions.
- 4) Charge the unit until the bubbles in the sight glass have disappeared and the working conditions of the entire refrigeration circuit have returned to normal (see also TAB. 8).
- 5) Verify that the superheat is 7–8 °C (to do this refer to para. 6.1).

TAB. 8 – FREON R22 REFRIGERANT CHARGE – STANDARD AIR-COOLED UNITS

| MODEL | Charge per circuit (kg) for conditioner + condenser (*) | | Charge per circuit (kg) to add for each metre between conditioner and condenser (**) | |
|-------|---|--------------|--|--------------|
| | without hot gas | with hot gas | without hot gas | with hot gas |
| U24 | 4.6 | 5.6 | 0.25 | 0.25 |
| U34 | 8.8 | 9.8 | 0.40 | 0.40 |
| U35 | 5.1 | 6.1 | 0.25 | 0.25 |
| U45 | 6.4 | 7.9 | 0.40 | 0.40 |
| U55 | 7.3 | 8.8 | 0.40 | 0.40 |
| U65 | 8.5 | 10.0 | 0.40 | 0.40 |
| U75 | 9.9 | 11.4 | 0.45 | 0.45 |

(*) Unit is supplied with a 3 kg precharge.

(**) Valid for tube diameters in TAB. 3.

NOTES:

- 1) Above charges are valid for standard condensers (operation at external temperature of upto 40°C).
- 2) It is normal for bubbles to be visible in the sight glass when hot gas reheat is in operation.

4.2 – WATER-COOLED UNITS

- 1) Start the unit as described in para. 3.1.
- 2) Manually start each compressor one at a time (ensure the unit is not in dehumidification).
- 3) Wait a few minutes to allow conditions to stabilize.
- 4) Check whether there are any bubbles visible in the sight glass. If there are this means there is a leak, which must be traced (using a leak detector) and repaired; then recharge the unit until no further bubbles are visible (see also TAB. 9).
- 5) Using a manometer, check that the evaporating temperature is above 0 °C; if not see CHAP. 8 (evaporator partially frozen).
- 6) Verify the water pressostatic valve (WV) setting (CHAP. 6).
- 7) Verify that the superheat is 7–8 °C (to do this refer to para. 6.1).

TAB. 9 – FREON R22 REFRIGERANT CHARGE – WATER-COOLED UNITS

| MODEL | Charge per circuit (kg) | |
|-------|-------------------------|--------------|
| | without hot gas | with hot gas |
| U24 | 4.0 | 5.0 |
| U34 | 7.5 | 8.5 |
| U35 | 4.5 | 5.5 |
| U45 | 6.0 | 7.5 |
| U55 | 6.0 | 7.5 |
| U65 | 7.5 | 9.0 |
| U75 | 7.5 | 9.0 |

NOTE:

It is normal for bubbles to be visible in the sight glass when hot gas reheat is in operation.

5 - TOPPING UP WITH OIL

THIS OPERATION MUST BE CARRIED OUT BY AN EXPERIENCED REFRIGERATION TECHNICIAN.

The oil to be used when topping up is SUNISO 4G, the characteristics of which are as in TAB. 10.

TAB. 10 - SUNISO 4G OIL

| | | |
|------------------------------|---|--------------|
| approx. specific weight | : | 0.9 kg/l |
| flash point | : | 180 - 200 °C |
| freezing point | : | ≤ - 30 °C |
| ENGLER viscosity at 50 °C | : | 4.5 - 5.5 E |
| viscosity index | : | min. 25 |
| copper corrosion 100 °C | : | none |
| approx. neutralization value | : | 0.02 |
| Ash current | : | 0 |
| insulation strength | : | 25 kv |

If SUNISO 4G is unavailable use one of the oils listed in TAB. 11.

NEVER MIX DIFFERENT OILS TOGETHER. CLEAN THE PIPING COMPLETELY BEFORE CHANGING THE TYPE OF OIL USED.

TAB. 11 - RECOMMENDED ALTERNATIVE OILS

| |
|--|
| <ul style="list-style-type: none"> • AGIP F1 Ter 68 • BP Energol LPT 68 • CASTROL Icematic 99 • ESSO Zerice 68 • FIAT ESP 346 • GULF Eskimo 68 • MOBIL Gargoyle Arctic oil no. 300 • SHELL Clavus oil 68 • TEXACO (CALTEX) Capella WF68 • VALVOLINE Refrigeration oil 3231 |
|--|

5.1 - TOPPING UP FOR AIR-COOLED UNITS WITH OVER 30M OF PIPELINE

Add 6-7% (see also TAB. 12) of the total EXTRA freon volume over that contained in the first 30m. Add the oil by simply pouring it into the pipeline during installation.

5.2 - TOPPING UP A FULLY OPERATIONAL CIRCUIT

If there has been any loss of oil then this must be topped up as follows:

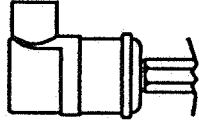
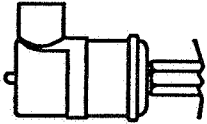
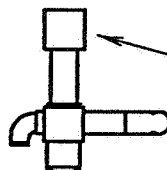
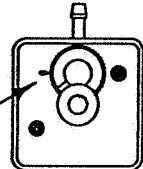
- 1) Take a clean, dry, transparent container (with volume calibrations) and fill it with at least twice the amount of oil required.
- 2) Bridge the contacts of the LP pressure switch.
- 3) Take a charging tube complete with pressure gauge and (closed) shut-off valve; connect one end to the compressor's inlet valve and immerse the other end in the oil.
- 4) Start the compressor with the inlet valve closed (open it only for an instant to purge air from the charging tube) and stop the compressor when the suction pressure has dropped below atmospheric.
- 5) Open the compressor's inlet valve and the tube's shut-off valve.
- 6) Charge the required quantity of oil (ensure that the tube always remains below the surface of the oil).
Only restart the compressor if the suction pressure increases to near atmospheric.
- 7) Remove the bridge from the pressure switch and restart the unit.

TAB. 12 - CHARGE OF SUNISO 4G OIL (AND TOPPING UP FOR AIR-COOLED UNITS)

| MODEL | OIL WITHIN EACH CRANKCASE | OIL TO BE ADDED FOR EVERY 10M OVER 30M LINE (air-cooled only and per compressor) |
|-------|---------------------------|--|
| | (litres) | (litres) |
| U24 | 1.7 | 0.2 |
| U34 | 3.4 | 0.3 |
| U35 | 2.2 | 0.2 |
| U45 | 1.9 | 0.3 |
| U55 | 3.4 | 0.3 |
| U65 | 3.4 | 0.3 |
| U75 | 3.4 | 0.35 |

6 – CALIBRATIONS

- The air conditioner has already been factory tested and calibrated as below (except for the water pressostatic valve (WV) which must be set during installation).
- For calibrations of instruments installed on the external condensers/rad coolers refer to the relevant manual.
- For HIROMATIC calibrations refer to the HIROMATIC manual (to prevent erratic operations do not use temperature and rel. humidity set points/proportional bands which differ excessively from the Standard Settings).

| COMPONENT | SETTING | NOTES |
|--|--|---|
| Low pressure switch (LP) | STOP : 2 bar START: 2.8 bar (fixed settings) | delayed automatic reset (see HIROMATIC manual)  |
| High pressure switch (HP) | STOP : 24 bar START: 17.5 bar (fixed settings) |  reset |
| Water pressostatic valve (WV) (water-cooled only) | ADVISED: 45°C (MIN.: 40°C) |  calibrate |
| Fan pressure switch (not U34) | 0.8 mbar |  calibrate |

6.1 – SETTING THERMOSTATIC EXPANSION VALVE THIS OPERATION MUST BE CARRIED OUT BY AN EXPERIENCED REFRIGERATION TECHNICIAN.

The valve has already been factory-set and should be reset (only if necessary) as follows:

- 1) **IMPORTANT:** Ensure that the instructions in CHAP. 5 have been carried out.
- 2) Allow the compressor to operate for 15 mins.
- 3) Measure the superheat as follows:
 - a) Place a contact thermometer on the tube exiting the evaporator;
 - b) Connect a manometer (via a tube of max. 30 cm) to the rapid connector on the evaporator.
 - c) The superheat is the difference between the two readings.

- 4) The superheat must be 7–8 °C; if not, set the expansion valve as follows:

- a) Remove the protective cover;
- b) Turn the adjustment screw by 2–4 turns only;
- c) Wait 10 minutes.
- d) Measure the superheat and repeat the operation if necessary.

NOTE:

If the superheat is too low (compressor cool to the touch) the screw must be turned in a clockwise direction.

If the superheat is too high (compressor hot to the touch) the screw must be turned in an anti-clockwise direction.

7 - MAINTENANCE

AS THE HIROMATIC FEATURES AUTOMATIC RE-START (AFTER A SUPPLY INTERRUPTION) IT IS ADVISED TO EITHER DISABILTATE AUTORESTART OR OPEN SWITCH QS WHEN PERFORMING ANY MAINTENANCE.

- On a daily basis check the HIROMATIC readings for temperature and, if shown, rel. humidity.

- The Maintenance Programme below should be carried out by a qualified technician, preferably working under a maintenance contract.

NOTE: CHAPS. 9 and 10 list all major spare parts for the unit.

MAINTENANCE PROGRAMME - MONTHLY CHECK

| | |
|---|---|
| FANS | <p>Check that the fan motor rotates freely without any abnormal noise, and ensure that the bearings are not running hot. Also check the current absorption.</p> <p>For units with belt-driven fans, check that the fan belts give by about 2 cm if pulled by a finger at mid-span.</p> |
| AIR FILTERS | <p>Verify the state of the filters; if necessary clean or substitute them.</p> <p>NOTE: In very dusty ambients perform this check more frequently.</p> |
| NEW AIR FILTER (if fitted) | <p>Verify the state of the filter; if necessary clean or substitute it.</p> |
| HIROMATIC | <p>Verify the operation of the HIROMATIC's LEDs, display and alarms.</p> |
| HUMIDIFIER (if fitted) | <p>See HUMIDAIR manual.</p> |
| ELECTRICAL CIRCUIT | <ul style="list-style-type: none"> • Check the electrical supply on all phases. • Ensure that all electrical connections are tight. |
| COOLING WATER (water-cooled only) | <ul style="list-style-type: none"> • Verify the cooling water circulation. • Ensure that there are no water leaks. • Closed circuit only: Verify that the water pump is operating correctly and bleed any air out of the circuit. |
| REFRIGERATION CIRCUIT | <ul style="list-style-type: none"> • Check the operating pressures (to be done by a refrigeration technician). • Check the compressor's current absorption, its head temperature and the presence of any unusual noise. • Ensure that there is no ice formation on the evaporator. |
| EXTERNAL CONDENSER/ RAD COOLER (if fitted) | <p>See relevant manual.</p> |

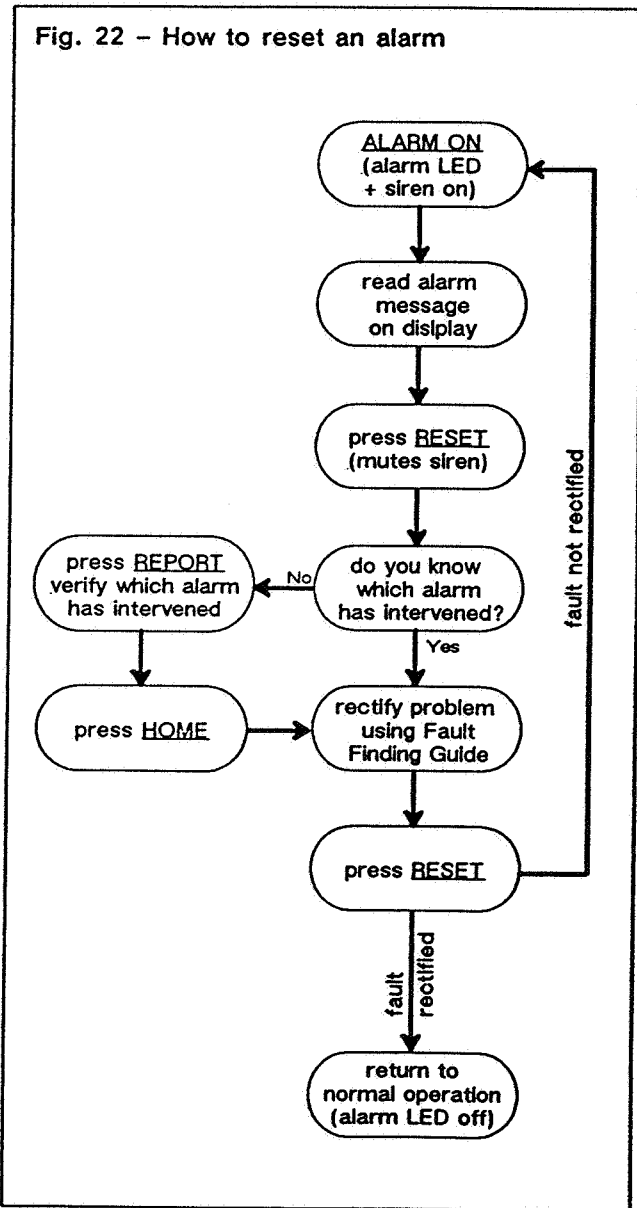
8 - FAULT FINDING / ALARMS

Use the Fault Finding Guide on the right as follows: Commence at "START" and follow the arrows marked either 'YES' or 'NO' according to the type of fault.

The guide uses the following abbreviations:

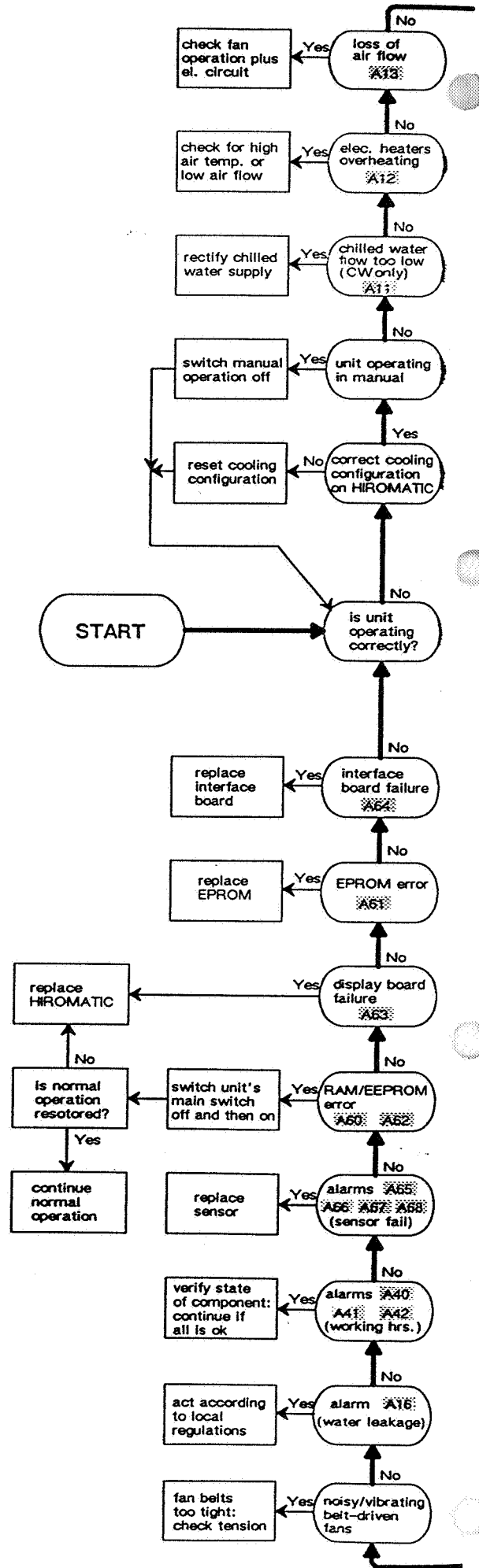
- CW: chilled water unit
- DX: direct expansion unit
- A: DX unit: air-cooled
- WO: DX unit: water-cooled in open circuit
- WC: DX unit: water-cooled in closed circuit
- DXC: DX unit using capillary (instead of expansion valve)

Alarms, shown shaded in the Guide (eg. A12), are reset as in Fig. 22.



NOTES:

- For multiple alarms, all are reset together; only the last to Intervene is displayed.
- STATUS REPORT lists all recent alarms (see Hiromatic manual).
- For more detailed information see Hiromatic manual.



9 - SPARE PARTS - STANDARD UNIT

Hiross recommends the use of original spare parts.
When placing an order quote the part's code, as well
as the unit's model no. and serial no.

FOR HIROMATIC CONTROL, EXTERNAL CONDENSER
AND RAD COOLER CONSULT RELEVANT MANUAL.

| CODE | DESCRIPTION | INSTALLED QUANTITY | | | | | | | Notes |
|--------|---|--------------------|-----|-----|-----|-----|-----|-----|----------|
| | | U24 | U34 | U35 | U45 | U55 | U65 | U75 | |
| 147014 | Compressor (380V) } (#) | 2 | | | | | | | |
| 147015 | Compressor (220V) } | | | | | | | | |
| 147029 | Compressor (380V) } | | 1 | | | | 2 | | |
| 147030 | Compressor (220V) } | | | | | | | | |
| 147020 | Compressor (380V) } | | | 2 | | | | | |
| 147021 | Compressor (220V) } | | | | | | | | |
| 147040 | Compressor (380V) } | | | | 2 | | | | |
| 147041 | Compressor (220V) } | | | | | | | | |
| 147023 | Compressor (380V) } | | | | | | | | |
| 147024 | Compressor (220V) } | | | | | 2 | | | |
| 147031 | Compressor (380V) } | | | | | | | | |
| 147032 | Compressor (220V) } | | | | | | | 2 | |
| 328231 | Crankcase heater (380V) } | | | | | | | | |
| 328230 | Crankcase heater (220V) } | 2 | | 2 | | | | | (+) |
| 328298 | Crankcase heater (380V) } | | | | | | | | (+) |
| 328297 | Crankcase heater (220V) } | | 1 | | | 2 | 2 | 2 | (+) |
| 328200 | Crankcase heater (220/380V) | | | | 1 | | | | (+) |
| 114451 | Evaporator coil (front) | 1 | | | | | | | |
| 114452 | Evaporator coil (rear) | 1 | | | | | | | |
| 114463 | Evaporator coil (front) | | 1 | 1 | | | | | |
| 114464 | Evaporator coil (rear) | | 1 | 1 | | | | | |
| 114455 | Evaporator coil (front) | | | | 1 | 1 | | | |
| 114456 | Evaporator coil (rear) | | | | 1 | 1 | | | |
| 114457 | Evaporator coil (front) | | | | | | 1 | 1 | |
| 114458 | Evaporator coil (rear) | | | | | | 1 | 1 | |
| 186100 | Plate water condenser | 2 | | 2 | | | | | (++) |
| 186112 | Plate water condenser | | 1 | | | | 2 | | (++) |
| 186105 | Plate water condenser | | | | 2 | | | | (++) |
| 186110 | Plate water condenser | | | | | 2 | | | (++) |
| 186114 | Plate water condenser | | | | | | | 2 | (++) |
| 183039 | Solenoid valve | 2 | | 2 | | | | | (+)(+++) |
| 183063 | Solenoid valve | | 1 | | 2 | 2 | 2 | 2 | (+)(+++) |
| 183070 | Solenoid valve (evaporator) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | (+) |
| 206243 | Filter dryer | 2 | | 2 | | | | | (+) |
| 206255 | Filter dryer | | 1 | | 2 | 2 | 2 | 2 | (+) |
| 330100 | Liquid receiver | 2 | 1 | 2 | 2 | 2 | 2 | 2 | (+) |
| 348002 | Sight glass | 2 | | 2 | | | | | |
| 348003 | Sight glass | | 1 | | 2 | 2 | 2 | 2 | |
| 378344 | Safety valve (26 bar) | 2 | 1 | 2 | 2 | 2 | 2 | 2 | |
| 378354 | Safety valve (26 bar) | 2 | 1 | 2 | 2 | 2 | 2 | 2 | |
| 378405 | Thermostatic expansion valve | 2 | | | | | | | (+) |
| 378415 | Thermostatic expansion valve | | 1 | | | | 2 | | (+) |
| 378411 | Thermostatic expansion valve | | | 2 | | | | | (+) |
| 378413 | Thermostatic expansion valve | | | | 2 | 2 | | | (+) |
| 378417 | Thermostatic expansion valve | | | | | | | 2 | (+) |
| 354164 | HP switch | 2 | 1 | 2 | 2 | 2 | 2 | 2 | (+) |
| 354168 | LP switch | 2 | 1 | 2 | 2 | 2 | 2 | 2 | (+) |
| 210076 | Air relative filter (650 x 700 x 100) - EU3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | (*) |
| 210077 | Air relative filter (650 x 370 x 100) - EU3 | | | | | | 1 | 1 | (*) |
| 381011 | Fan | 1 | | | 2 | 2 | | | |
| 381010 | Fan (380V) } | | | | | | | | |
| 381009 | Fan (220V) } | | 1 | 1 | | | 2 | 2 | |
| 132086 | Outer panel | 3 | 3 | 3 | 4 | 4 | 4 | 4 | |
| 132087 | Hinged outer panel | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| 132100 | Front panel (small) | | | | | | 1 | 1 | |
| 271028 | Key for panels | 2 | 2 | 2 | 2 | 2 | 2 | 2 | (+) |

- (+) Stockage of spare part recommended
- (++) Water-cooled only
- (+++) Air-cooled only
- (*) Consumable material
- (#) Check type installed

10 - SPARE PARTS - OPTIONALS

Hiross recommends the use of original spare parts. When placing an order quote the part's code, as well as the unit's model no. and serial no.

FOR HIROMATIC CONTROL (PLUS EEAP AND WATER LEAKAGE DETECTOR) AND HUMIDAIR HUMIDIFIER CONSULT RELEVANT MANUAL.

| CODE | DESCRIPTION | INSTALLED QUANTITY | | | | | | | Notes | |
|---|---|--------------------|-----|-----|-----|-----|-----|-----|-------|-----|
| | | U24 | U34 | U35 | U45 | U55 | U65 | U75 | | |
| ELECTRICAL HEATING | | | | | | | | | | |
| 328012 | Heating element ((1.3 + 0.65 kW) | 6 | 6 | 6 | 6 | | | | | (+) |
| 328015 | Heating element (2.3 + 1.15 kW) | | | | | 6 | 6 | 6 | | (+) |
| 354202 | Safety thermostat (TSR) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | (+) |
| HOT GAS REHEAT | | | | | | | | | | |
| 378762 | Hot gas valve | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| 114562 | Hot gas/hot water reheat coll | 1 | 1 | 1 | | | | | | |
| 114563 | Hot gas/hot water reheat coll | | | | 1 | 1 | 1 | 1 | | |
| HOT WATER HEATING | | | | | | | | | | |
| 378022 | 3-way valve | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | (+) |
| 114562 | Hot gas/hot water reheat coll | 1 | 1 | 1 | | | | | | |
| 114563 | Hot gas/hot water reheat coll | | | | 1 | 1 | 1 | 1 | | |
| NEW AIR INTAKE | | | | | | | | | | |
| 210204 | New air relative filter (120 x 240) - EU3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | (*) |
| AIR RELATIVE FILTERS - EU4 GRADING | | | | | | | | | | |
| 210126 | Air relative filter (650 x 700 x 100) - EU4 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | | (*) |
| 210127 | Air relative filter (650 x 370 x 100) - EU4 | | | | | | 1 | 1 | | (*) |
| AIR RELATIVE FILTERS - EU5 GRADING | | | | | | | | | | |
| 210015 | Air relative filter (650 x 700 x 100) - EU5 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | | (*) |
| 210017 | Air relative filter (650 x 370 x 100) - EU5 | | | | | | 1 | 1 | | (*) |
| AIR RELATIVE FILTERS FOR USE WITH FILTER FRAME - EU5 GRADING | | | | | | | | | | |
| 210016 | Air relative filter (700 x 700 x 300) - EU5 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | | (*) |
| 210018 | Air relative filter (700 x 370 x 300) - EU5 | | | | | | 1 | 1 | | (*) |
| CLOGGED FILTER KIT | | | | | | | | | | |
| 354102 | Diff. pressure switch (CF) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | (+) |
| VFAN02 BELT-DRIVEN FAN | | | | | | | | | | |
| 281080 | Fan motor (220/380V) | 1 | | | | | | | | |
| 281085 | Fan motor (220/380V) | | 1 | 1 | | | 2 | 2 | | |
| 281079 | Fan motor (220/380V) | | | | 2 | | | | | |
| 281084 | Fan motor (220/380V) | | | | | 2 | | | | |
| 144002 | Fan belt | 2 | | | 4 | | | | | (+) |
| 144003 | Fan belt | | 2 | 2 | | | 4 | 4 | | (+) |
| 144008 | Fan belt | | | | | 4 | | | | (+) |
| 381214 | Fan | 1 | 1 | 1 | 2 | 2 | 2 | 2 | | (+) |
| VFAN10 BELT-DRIVEN FAN | | | | | | | | | | |
| 281080 | Fan motor (220/380V) | 1 | | | 2 | | | | | |
| 281085 | Fan motor (220/380V) | | 1 | 1 | | | 2 | 2 | | |
| 281084 | Fan motor (220/380V) | | | | | | | | | |
| 144002 | Fan belt | 2 | | | 4 | | | | | (+) |
| 144008 | Fan belt | | 2 | 2 | | | 4 | 4 | | (+) |
| 144003 | Fan belt | | | | | 4 | | | | (+) |
| 381214 | Fan | 1 | 1 | 1 | 2 | 2 | 2 | 2 | | (+) |

| CODE | DESCRIPTION | INSTALLED QUANTITY | | | | | | | Notes |
|--------|---|--------------------|-----|-----|-----|-----|-----|-----|---------|
| | | U24 | U34 | U35 | U45 | U55 | U65 | U75 | |
| | VFAN25 BELT-DRIVEN FAN | | | | | | | | |
| 281084 | Fan motor (220/380V) | 1 | | | 2 | | | | |
| 281086 | Fan motor (220/380V) | | 1 | 1 | | | 2 | 2 | |
| 281085 | Fan motor (220/380V) | | | | | 2 | | | |
| 144001 | Fan belt | 1 | 2 | 2 | | | 4 | 4 | (+) |
| 144003 | Fan belt | | | | 4 | 4 | | | (+) |
| 381214 | Fan | 1 | 1 | 1 | 2 | 2 | 2 | 2 | |
| | WATER PRESSOSTATIC VALVE (FOR WELL WATER) | | | | | | | | |
| 378201 | Water pressostatic valve (WV) - 1/2" | 2 | | | | | | | (+)(++) |
| 378202 | Water pressostatic valve (WV) - 3/4" | | | 2 | 2 | 2 | | | (+)(++) |
| 378203 | Water pressostatic valve (WV) - 1" | | 1 | | | | 2 | 2 | (+)(++) |
| 271360 | Bellows for WV | 1 | 1 | 1 | 1 | 1 | 1 | 1 | (+)(++) |
| | WATER PRESSOSTATIC VALVE (FOR TOWER WATER) | | | | | | | | |
| 378202 | Water pressostatic valve (WV) - 3/4" | 2 | | | | | | | (+)(++) |
| 378203 | Water pressostatic valve (WV) - 1" | | | 2 | 2 | 2 | | | (+)(++) |
| 378204 | Water pressostatic valve (WV) - 1 1/4" | | 1 | | | | 2 | 2 | (+)(++) |
| 271360 | Bellows for WV | 1 | 1 | 1 | 1 | 1 | 1 | 1 | (+)(++) |
| | FREON NON RETURN VALVES KIT | | | | | | | | |
| 482952 | Set of non return valves | 1 | | 1 | | | | | (+++) |
| 482991 | Set of non return valves | | 1 | | | | | | (+++) |
| 482953 | Set of non return valves | | | | 1 | 1 | 1 | 1 | (+++) |
| - | BASE FRAME (specify height) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |

(+) Stockage of spare part recommended

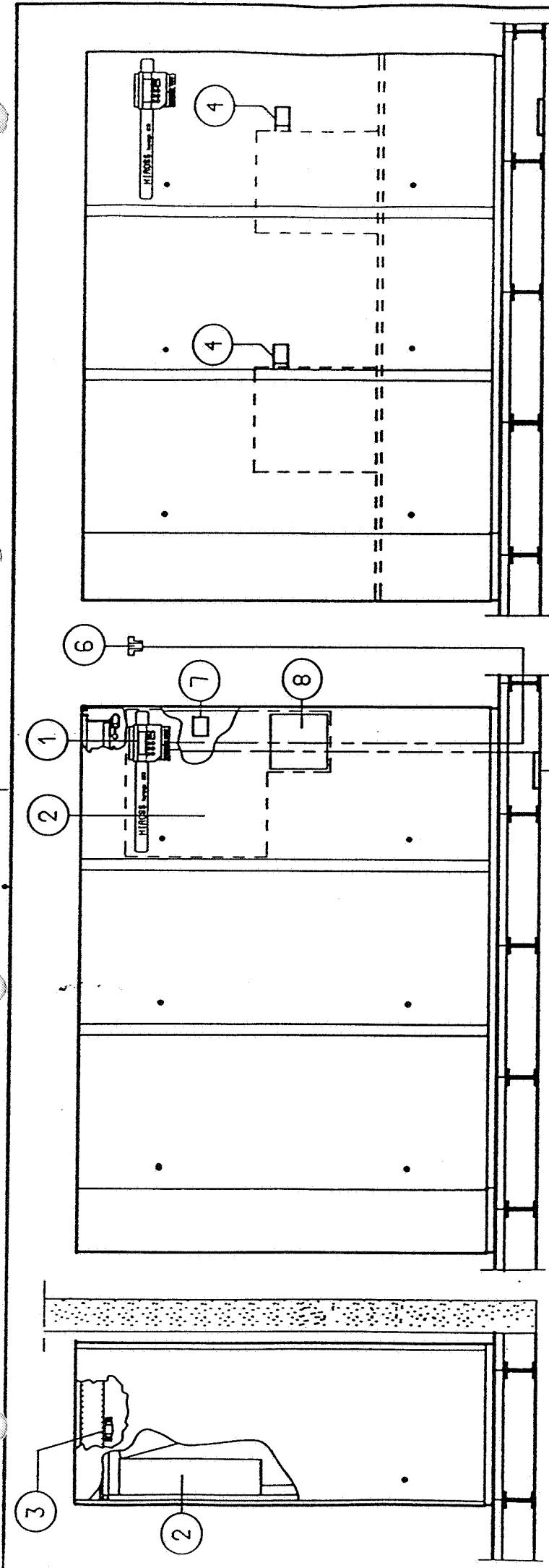
(++) Water-cooled only

(+++) Air-cooled only

(*) Consumable material

(#) Check type installed

NOTE: Certain optionals (eg. thermostat HWT - see Fig. 10) must be installed by the client.



| POS. | DESCRIPTION DESCRIZIONE | INSTALLATION INSTALLAZIONE | NOTES NOTE |
|------|---|------------------------------------|---------------|
| 1 | HIROMATIC CONTROL CONTROLLO HIROMATIC | UNIT FRONT FRONTE UNITA' | STANDARD |
| 2 | ELECTRICAL PANEL QUADRO ELETTRICO | INSIDE THE UNIT INTERNO UNITA' | STANDARD |
| 3 | TEMPERATURE + HUMIDITY SENSOR SONDA TEMPERATURA + UMIDITA' | INSIDE THE UNIT INTERNO UNITA' | OPTIONAL |
| 4 | DIFFERENTIAL PRESSURE SWITCH PRESSOSTATO DIFFERENZIALE | INSIDE THE UNIT INTERNO UNITA' | STANDARD |
| 5 | SENSOR FOR LIQUIDSTAT SENSORE DI ALLAGAMENTO | OUTSIDE THE UNIT ESTERNO UNITA' | OPTIONAL |
| 6 | ELECTRONIC ENVIRONMENTAL ALARM PACKAGE PANNELLO ALLARMI PER AMBIENTI | OUTSIDE THE UNIT ESTERNO UNITA' | OPTIONAL |
| 7 | CLOGGED FILTER INDICATORE FILTRI SPORCHI | INSIDE THE UNIT INTERNO UNITA' | OPTIONAL |
| 8 | INTERFACE BOARD SCHEDA INTERFACCIA | INSIDE THE UNIT INTERNO UNITA' | STANDARD |

| | | |
|--|------------------------------|--------------|
| REV. 8 | Firma Sup. | Data Date |
| HIROSS P. P. A. Pavia di Secco (Padova) Italia | | |
| INSTRUMENTS INSTALLATION INSTALLAZIONE STRUMENTI | | |
| Destinazione - Destination Bestimmung | | REV |
| HIRANGE A-W | | A |
| U 65-75 | | |
| Disegno - Drawing - Zeichnung - Design N. | | |
| Disegnato il disegno Appointed drawing Erreist durch Remplacé le dessin | | |
| Scala - Scale Maßstab - Echelle | Data - Datum Date - Datum | REV |
| 1/25 | 12.09.91 | |
| Dis. - Entwurf Zeichner - Datum | | |
| BALDON S. S. | | |
| AS3000M03 | | |



| | |
|----|-----------------------------|
| 25 | |
| 24 | |
| 23 | |
| 22 | |
| 21 | MOTOVENTILATORE |
| 20 | PRESSOSTATO VENTILATORE |
| 19 | CONDENSATORE AD ARIA |
| 18 | RUBINETTO INTERCETT. |
| 17 | ELETTROVALVOLA INTER. |
| 16 | VALVOLA DI SICUREZZA |
| 15 | RESISTENZA CARTER |
| 14 | EVAPORATORE |
| 13 | THERMOSTATIC VALVE |
| 12 | SIGHT GLASS |
| 11 | FILTER DRIER |
| 10 | LIQUID RECEIVER |
| 9 | NON RETURN VALVE (OPTIONAL) |
| 8 | REHEATING COIL |
| 7 | HOT GAS VALVE |
| 6 | CHARGE CONNECTION |
| 5 | DISCHARGE VALVE |
| 4 | SUCTION VALVE |
| 3 | LOW PRESSURE SWITCH |
| 2 | HIGH PRESSURE SWITCH |
| 1 | COMPRESSOR |

| | | |
|--------|-------------|---------------|
| N. | DESCRIPTION | DENOMINAZIONE |
| REV. B | | |

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 P. via S. Sesto (Foscolo) Italo

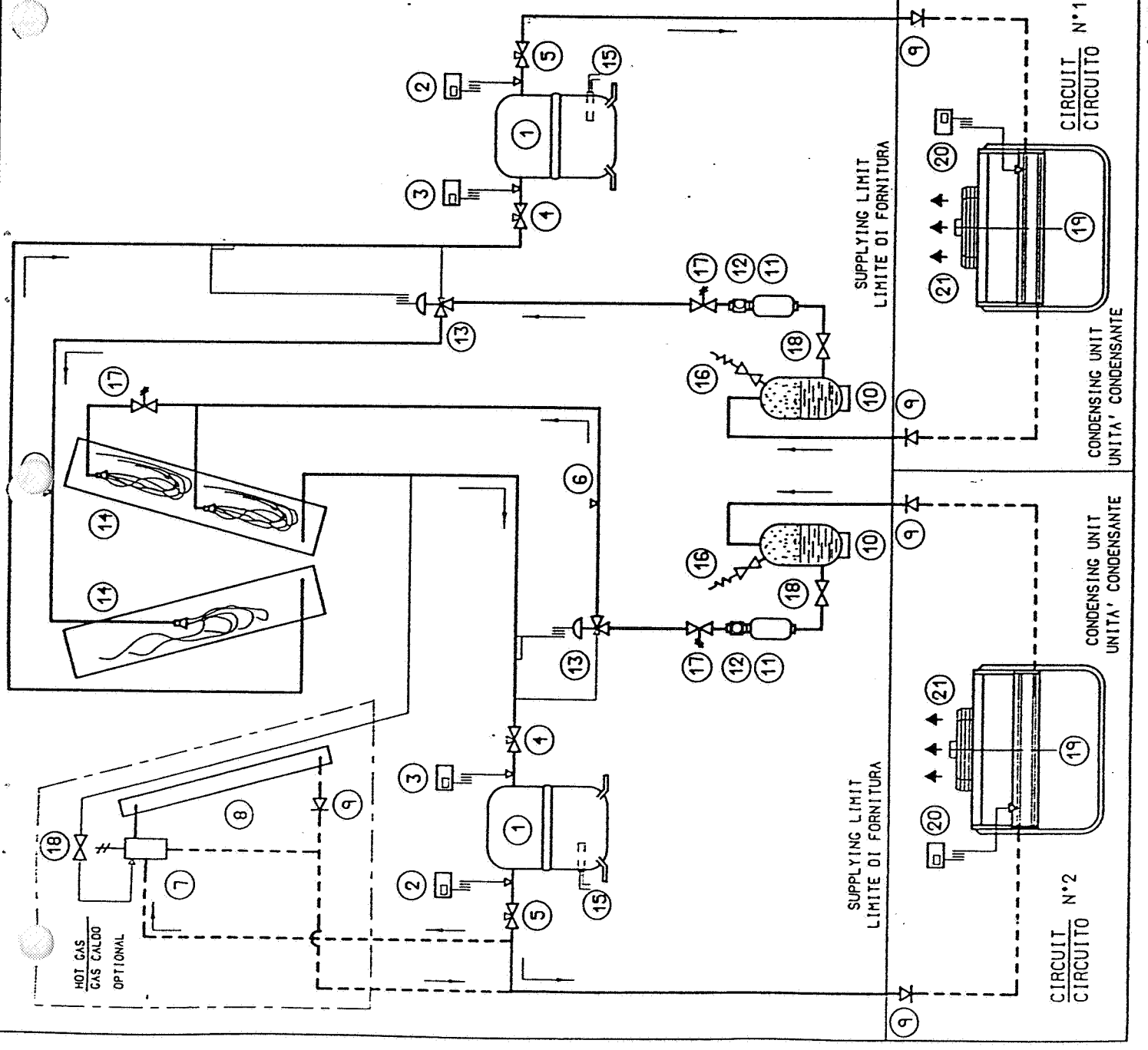
REFRIGERATION CIRCUIT
 SCHEMA FRIGORIFERO

Destination - Destinazione - Air-charging - Demarcation
 AIRRANGE A
 U24-35+75

U. Design - Disegno - Air-charging - Demarcation
 AS1010 F01

REV. A

DATE - Data - 30.01.91
 A. B.

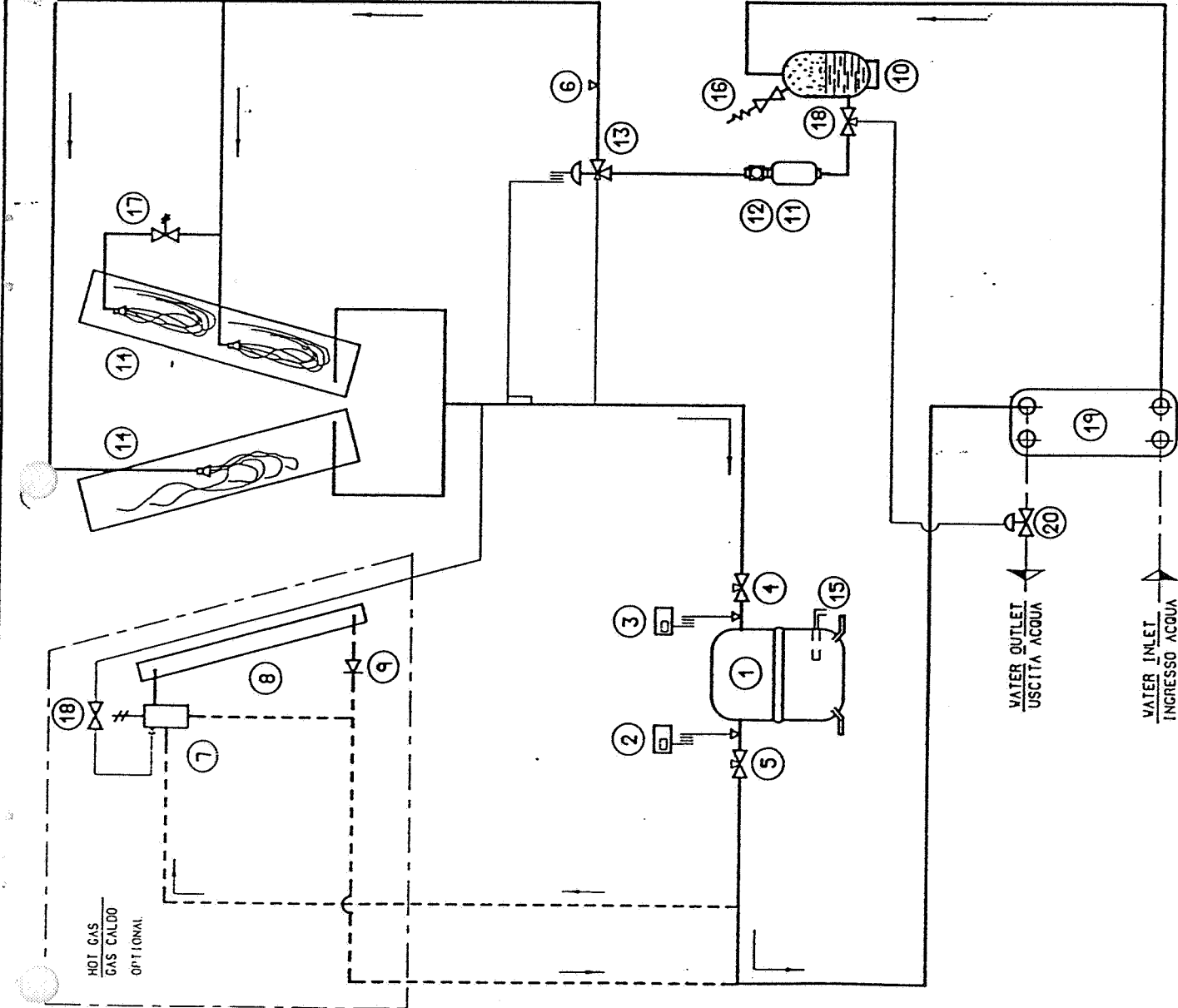


HIROSS S.p.A. - Via S. Sesto (Foscolo) Italo - 20139 Milano - Tel. 02/57501 - Telex 320321 - Fax 02/575011









| N. | DESCRIPTION | DENOMINAZIONE |
|----|-----------------------------|----------------------------|
| 25 | | |
| 24 | | |
| 23 | | |
| 22 | | |
| 21 | PRESSOSTATIC VALVE OPT. | VALVOLA PRESSOSTATICA OPZ. |
| 20 | WATER CONDENSER | CONDENSATORE AD ACQUA |
| 19 | SHUT-OFF VALVE | RUBINETTO INTERCETT. |
| 18 | SHUT-OFF SOLENOID VALVE | ELETTROVALVOLA INTER. |
| 17 | SAFETY VALVE | VALVOLA DI SICUREZZA |
| 16 | CRANKCASE HEATER | RESISTENZA CARTER |
| 15 | EVAPORATOR | EVAPORATORE |
| 14 | THERMOSTATIC VALVE | VALVOLA TERMOSTATICA |
| 13 | SIGHT GLASS | SPIA DI FLUSSO |
| 12 | FILTER DRIER | FILTRO DEIDRATORE |
| 11 | LIQUID RECEIVER | RICEVITORE DI LIQUIDO |
| 10 | NON RETURN VALVE (OPTIONAL) | VALVOLA NON RITORNO (OPZ.) |
| 9 | REHEATING COIL | BATTERIA POSTRISC. |
| 8 | HOT GAS VALVE | VALVOLA GAS CALDO |
| 7 | CHARGE CONNECTION | ATTACCO DI CARICA |
| 6 | DISCHARGE VALVE | RUBINETTO MANDATA |
| 5 | SUCTION VALVE | RUBINETTO ASPIRAZIONE |
| 4 | LOW PRESSURE SWITCH | PRESSOSTATO BASSA PRESS. |
| 3 | HIGH PRESSURE SWITCH | PRESSOSTATO ALTA PRESS. |
| 2 | COMPRESSOR | COMPRESSORE |
| 1 | | |

HIROSS

17 FEB. 1992

PIRELLA GÖTTSCHE LOWE

REFRIGERATION CIRCUIT

SCHEMA FRIGORIFERO

REV. B

AS1010 F04

A

REV. A

REV. B

REV. C

REV. D

REV. E

REV. F

REV. G

REV. H

REV. I

REV. J

REV. K

REV. L

REV. M

REV. N

REV. O

REV. P

REV. Q

REV. R

REV. S

REV. T



2
-4



3
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5
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2



1
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3



4
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2



HIROSS