

FOREWORD

The information contained in:

- the "Refrigeration Family products": **REFRIBASE**, **REFREPAIR**, **REFRIDIAG**, **REFRILEC** and the **MANAGER Software**
- the "**REFRIBASE Manual**"
- the "**REFREPAIR Manual**"
- and this "**User's Manual**"

are liable to be amended without warning.

The organisation KOTZA INTERNATIONAL cannot be held responsible for any omissions, nor for any damage, accidental or otherwise, that results from the supply or use of its Software or any of its Manuals.



In this Manual, **the individual in possession of the password** (the supervisor, trainer etc.) will be referred to as: **THE SUPERVISOR**. Those individuals not in possession of the password (students, trainees, technicians, engineers etc.) will be referred to as: **THE USER**.

All rights reserved. All reproduction of all or any parts of these products in any way or by any method whatsoever is explicitly forbidden. Any unauthorised reproduction or distribution is punishable under the legislation safeguarding the rights of authors.

All versions of the software have been registered with the Software Protection Agency since 1990.

The Software will only operate on a multimedia PC using Windows 2000, XP, Vista or Seven. The PC should be configured to a *minimum* of 800 x 600 point mode with 65536 colours in small fonts.

In effect, the Software referred to in this Manual will not function on a PC if the corresponding demonstration version of the Software does not function on that PC.

If you require any further information, please contact:

KOTZA INTERNATIONAL – Le Chêne – 05130 TALLARD (France)
Tel.: **+33 (0) 492 540 733** - Fax: **+33 (0) 492 540 730**
E-mail: **kotza@kotza.com** Internet: **www.kotza.com**

Revision March 2010

Translation from french by Gareth J. Rees & Ann Auzet

Windows 2000 / XP / Vista & Seven are all trademarks of the MICROSOFT CORPORATION

USER'S MANUAL FOR REFREPAIR4

REFREPAIR: DETAILED DESCRIPTION

REFREPAIR (which carries on where REFRIBASE ends) is at an "intermediate" level.

REFREPAIR is a training Software for refrigeration repairs that uses examples of several direct expansion systems with air-cooled condensers, and which are running on several different refrigerants.



If a User has little or no knowledge of refrigeration systems, it is recommended that they start by using REFRIBASE before trying to get to grips with REFREPAIR.

REFREPAIR: USING AND DURATION OF TRAINING

Refrigeration and A/C skills are not easily acquired. In the same way, the refrigeration topics dealt with in the REFREPAIR Software might seem difficult.

This is why **we would recommend that you proceed as follows:**

- 1) **Study the REFREPAIR Manual** (average time required: from 10 to 20 hours, in several sessions).
- 2) **Make a first attempt using the PC**, making corrections with the help of the REFREPAIR Manual (average time required: from 4 to 16 hours, in several sessions).
- 3) **Make a second study of the Manual** (average time required: from 5 to 10 hours, in several sessions).
- 4) **Make a second attempt using the PC**, alone, without using the REFREPAIR Manual, making final corrections by using the on-line help (average time required: from 4 to 12 hours, in several sessions).

A User who wishes to do so could run the REFREPAIR Software as often as is needed until he achieves an 'excellent' score.

Note: These times are, of course, simply indications of what might be expected. The time taken varies enormously according to the User's initial knowledge.



When a User obtains a good score using REFREPAIR, *and completes every step entirely on his own*, he should be able to diagnose most of the usual refrigeration problems that he is likely to come across in the plant room.

He could then continue to improve his skills and knowledge using the REFRI DIAG Software, which is a refrigeration fault simulator.

REFREPAIR: THE SEQUENCE OF STEPS

Every time REFREPAIR is run, the User is taken automatically to the appropriate step and his last score (as points and percentage) is displayed.

REFREPAIR RECORDS THE RESULT OF *EVERY QUESTION IN EVERY STEP FOR EVERY USER. IT IS THEREFORE PERFECTLY OK TO QUIT A STEP WHENEVER YOU LIKE.*

After every answer, REFREPAIR updates the score, archives it on the hard disk and provides the User with the choice of continuing or of ending the session.

Each Step considers a principal refrigeration theme or a particular equipment configuration. The progressive nature of the problems posed and the different methods used to formulate questions encourage the acquisition of knowledge, which can quickly be put to use in the plant room.

The value of the program has been proven repeatedly since the first version appeared in 1990.

REFREPAIR: THE THEME OF EACH STEP

- **Step 1:** Installing an hermetic compressor.
- **Step 2:** Installing an hermetic compressor (further features).
- **Step 3:** Installing an air-cooled condenser (with level differences).
- **Step 4:** Installation of a complete condensing set.
- **Step 5:** $\Delta\theta$ for air-cooled condensers.
- **Step 6:** Malfunctions in condensing sets.
- **Step 7:** Installation of the liquid line and a capillary expansion device.
- **Step 8:** Selection of (and faults associated with) capillaries.
- **Step 9:** Installing the evaporator.
- **Step 10:** Problems associated with fans.
- **Step 11:** Replacing a hermetic compressor with a semi-hermetic.
- **Step 12:** Problems with semi-hermetic compressors.
- **Step 13:** Installing a condensing set. Problems with lubricants.
- **Step 14:** Installing the liquid line and a thermostatic expansion valve.
- **Step 15:** Installation and adjustment of thermostatic expansion valves.
- **Step 16:** MOP expansion devices, $\Delta\theta$, and thermostats.
- **Step 17:** Solenoid valves. Control by pump-down.
- **Step 18:** Installation of a capacity regulator.
- **Step 19:** Installation of a HP regulator valve.
- **Step 20:** Testing for leaks, evacuation and charging a system.

- **Step 21:** Fitting a set of gauges. Using a contact thermometer. Sub-cooling and superheat with single component refrigerants and refrigerants with large temperature glides.
- **Step 22:** Using a trend table: Diagnosis of a fault from its symptoms. Some LP faults.
- **Step 23:** Finding a number of errors in a trend table. Some HP faults.
- **Step 24:** Measuring air temperatures. Diagnosis of a fault from measurements made.
- **Step 25:** The test for non-condensables.
- **Step 26:** Measurement of air-flows. Air-flow problems.
- **Step 27:** Finding the only impossible fault from measurements displayed, with single component refrigerants and refrigerants with a large temperature glide.
- **Step 28:** Measuring current. Installation of a 4-way cycle inversion valve.

After every answer, the cumulative score (in points and as a percentage score) is updated. REFREPAIR comments briefly on the answer given by the User and indicates the page of the Manual where additional information can be found.

Unfortunately you've fallen into the trap! If you want an explanation [click here](#)

Explanations: manual page 316

This ensures that effective auto-correction takes place.

Clicking on the commentary accesses on-line help, which allows the User to consult (on screen) the appropriate pages of the REFREPAIR Manual.

In total, REFREPAIR 4 poses 435 different questions throughout its 28 steps). At the end of every question, REFREPAIR archives the results on the hard disk and gives the User the choice of continuing or ending the session.

When a User chooses to end the session, then at the start of the next session, REFREPAIR will bring him back to exactly the same point at which he left the program.



KOTZA International - Distribution Centre
Le Chêne F- 05130 Tallard (France)

Tel: +33 492 540 733 Fax: +33 492 540 730
E-mail: kotza@kotza.com