

AMONG the wheat fields in the Northern part of Florence, Italy, some 20 minutes drive from the city centre, is a highly organised company specialising in the production of sophisticated equipment. One of its special divisions is that of vacuum technology. Here, fully computerised evacuation and charging units for refrigeration are designed and produced. This year, Officine Galileo and Kent-Moore UK Ltd came to an agreement whereby the latter was appointed exclusive UK agent for the Italian company's automatic charging stations and vacuum equipment.

Officine Galileo is divided into three main fields of production. Sixty-five per cent of the total output is devoted to military equipment, while the second largest part of its operation is the optics and space division. Third in line but of no less importance is the high vacuum technology division, where 20 per cent of the operation produces refrigeration equipment.

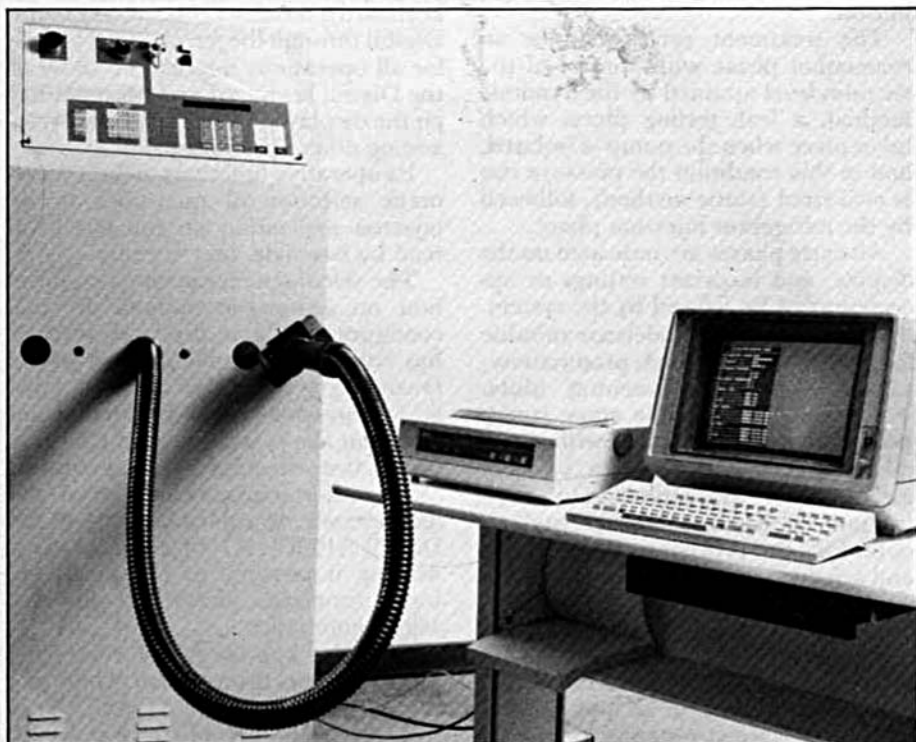
Off the Galileo production line in the vacuum technology department come a variety of products including rotary and diffusion pumps, valves, fittings and high vacuum measuring instruments; cryogenic pumps, cryogenerators, split mini coolers; automatic units for evacuating and charging refrigeration systems; TV tubes aluminising and degassing automatic plants; and high vacuum furnaces for the thermal treatment of steel.

Officine Galileo has been involved in the field of automatic drying and charging units for refrigeration and air conditioning systems for 30 years. The units have evolved considerably since the first launch on the market, with the more recent units having the same basic outline but being updated.

The latest celebrity to emerge from the vacuum technology division is the Digifill range of automatic microprocessor units, which has actually been on the market for about two years. The range has been sold extensively to refrigeration manufacturing companies and elsewhere through distributors in Italy, as well as to companies in Yugoslavia, Argentina and France. Among the many users are IBERNA, Ignus, Zanussi, Lancia, Fiat and Citroen.

'When our technology department started designing the Digifill line we wanted two things: one, to make sure the units would not become too expensive despite the relatively low production numbers, and two, we needed to reduce the time between the production of a unit from the raw material and the finished goods in store,' said engineer Roberto Taddei of the vacuum technology division's promotion and advertising department.

The Digifill line consists of models A150F1, A150F2, A150F3, A100, Combi 2 and Combi 3, which all meet



Digifill automatic dehydrating and charging machines equipped with bar code reader, printer and remote computer control

Galileo—a specialist in vacuum technology

Cheryl Robertson recently visited the Officine Galileo factory in Florence, Italy, to look at the evacuation and charging equipment now handled in the UK by Kent-Moore

different requirements. The line features an automatic microprocessor control system which, before the production processes start, can program up to 100 different doses together with relevant working parameters.

These parameters include evacuation time, leak test time, cycle time and pressure set point. Automatic compensation of the charge in relation to the temperature is provided, granting a metering accuracy of 0.5 per cent. Programming is exercised on a touch type control panel, situated on the front of the unit. Once a program has been selected access can be protected and stored data can be retained in the memory facility even when the unit is off.

'We all know how essential it is for the refrigeration and air conditioning industry to achieve correct drying and charging procedures. By combining

electronics and computerisation we have managed to produce a reliable, rapid, accurate and automatic product in the form of Digifill,' said Mr Taddei.

Other features of the Digifill line are that it can be used easily by unskilled personnel, it has built in diagnostic functions, a simple maintenance facility can be programmed (the display panel will command the user what needs to be done at a particular time) and units can, on request, have French, Italian, Spanish or German inserted instead of the standard English. Several accessories are also made at the Officine Galileo factory which ease the operation still further.

The complete treatment cycle is automatic once the machine has been programmed. The operator has to connect the refrigeration system to the Digifill via the connect coupler on the injector device, check the setting for

77 ◀ the dose, and simply press the start button.

The treatment cycle includes an evacuation phase with control of the vacuum level attained by the dynamic method, a leak testing phase which takes place when the pump is isolated, and in this condition the pressure rise is evaluated (static method), followed by the refrigerant injection phase.

All cycle phases are indicated on the display, and incorrect settings or operations can be refused by the system.

The A150F1/2/3 models are suitable for lines of medium-high productivity, associated with forevacuum units. These feature a double stage rotary pump, 20 m/hr, equipped with an oil mist filter on the outlet, a vacuum gauge with atmosphere to high vacuum measurement range and an option for the provision of diagnomat and selediagnomat accessories.

The selediagnomat can perform logic and operative functions with the support of a laser scanner. Logic functions include diagnostics on the work cycle of the unit, and quality control of charged systems, writing on a printer connected to the Digifill all data relevant to the cycle, the diagnostics and the quality control, which is presented in tables.

The tables present programmed doses, alarms with relevant causes, diagnostics for each charged unit, complete with all data relevant to the cycle as well as the adopted refrigerant.

The selediagnomat can also print out a table presenting the average value of the previously mentioned data, for each group of charged units of the same type. Printing of the tables can be done automatically or on request.

The device also holds a remote control facility, by means of a terminal

(a simple monitor with an input data keyboard), which enables access to the Digifill through the terminal keyboard, for all operations duplicating those of the Digifill keyboard and presentation on the display of the data for the cycle, among other applications.

Its operative functions include automatic selection of quantities to be injected depending on the bar code read by bar code laser scanner.

The selediagnomat can also function on automatic/manual. In this configuration, after the laser scanner has read the bar code applied to the oncoming system, the operator must give permission so that the Digifill can carry out the evacuation and charging cycles, thus effecting a second control.

The other accessory mentioned, the diagnomat, is applicable only to the Digifill A150F1, A150F2 and A150F3, making it possible to obtain all the logic functions described for the selediagnomat.

Going back to the A150F range, the A150F1 allows the injection of only one type of refrigerant, the A150F2 allows two combinations of refrigerant or having a spare charging line when using single type of refrigerant, and the Digifill A150F3 allows injection of three different combinations of refrigerant, or two different types with a reserve line. When a dose is selected in the A150F2 and A150F3 versions, the unit automatically activates the circuit relative to the refrigerant associated with the dose.

When the latter two models are used with a reserve line, when the charging device must be changed by means of a simple keyboard operation, all the data relative to the doses associated with the line to be replaced are transferred to the reserve line.

According to the technical data from

the manufacturer, all three models accept refrigerants 12, 22 and 502.

The Combi units were specifically designed for treatment of two compressor refrigeration cabinets, for example freezer compartment and refrigerator compartment (when required, they may be used for treatment of single compressor systems).

The programme guarantees the correct filling of the two units with a single sequential operation. There are 50 pairs of programmable doses.

Different refrigerants can be used in one cycle. Incorrect charges are prevented by the unit electronics, and, in the event of problems, identifies on which system the error was made.

The Combi 2 unit is provided with two charging circuits, while the Combi 3 unit has a third charging circuit as a reserve for the other two, or for charging another refrigerant. The pair of charge lines to be used is selected by means of a keyboard.

Both Combi units can be supplied in the 'SEL' version, integrated with the selediagnomat.

The agreement between Kent-Moore and Galileo resulted from a requirement to have a local back-up service essential for production equipment. Kent-Moore, an established manufacturer of manually controlled charging stations, has experienced fitters and workshop facilities, with Galileo providing further training on its machines.

Officine Galileo has come a long way since its humble beginnings in a small Florentine workshop in 1864. It would be hard for the then master craftsman G. Poggiali, and director of operations Professor G. B. Donati, to fathom the size of the operation as it stands today.

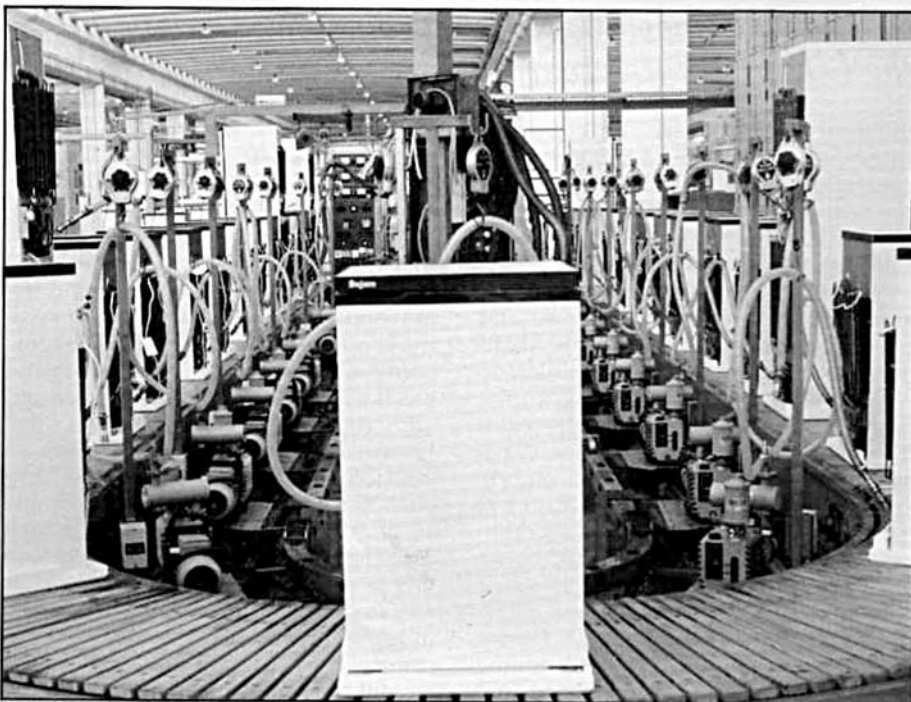
In 1881 work started in optics, which later led to the purchase of rangefinders by the Italian and Japanese navies. Seventeen years later Officine Galileo was involved in photogrammetry for surveying for the Italian Military Geographic Institute.

In 1907 it became a public limited company.

With the First World War came the rapid development of a military technology division, which produced fixed eyepiece periscopes, firing angle calculators and searchlights, among many other products. It was towards the end of the 1930s that production of high vacuum rotary pumps began.

Between 1951 and 1980 certain product lines such as ophthalmic lenses, electrical equipment, electromedical equipment and textile machinery branched off from Officine Galileo, leaving it to concentrate on high precision work.

This precision theme runs through the entire 1,300 employee factory — attention is given to every small detail, as was revealed in a tour of the extensive, spotlessly clean and well organised Florence complex.



Two and single compressor cabinets on a forevacuum carousel