



JULIEN P. FRIEZ & SONS, INC.

(A Subsidiary of The Bendix Aviation Corporation)

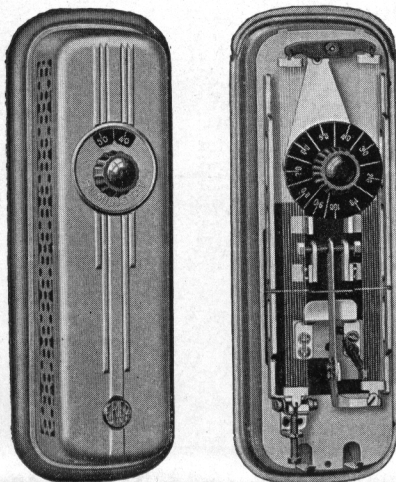
BALTIMORE, MARYLAND, U. S. A.

ESTABLISHED 1876

BULLETIN #K CONDENSED CATALOG—AIR CONDITIONING PRODUCTS MARCH, 1938

FRIEZ HUMIDISTATS

FOR the automatic control of Relative Humidity in all classes of comfort and industrial applications when used to operate electric solenoid valves, motor-operated valves, damper motors, relays, heaters, compressors, pumps, fans, etc., and all classes of humidifying and dehumidifying equipment. Use multiple human hair elements and are considerably more accurate, sensitive and reliable than other types. Available with and without dual magnetic snap action and with many contact arrangements whereby all classes and systems of electrical control are easily achieved. Knob and rotating type dial setting—10% to 100% Relative Humidity range. Differential 1% above and below setting. (Still closer differentials available for special purposes where specified). Fully approved by Underwriters' Laboratories, Inc. **Suitable for low or high voltage.** Maximum volts 120 A. C. or D. C.; Maximum V. A. (or watts), 50. (Use relays for heavier loads—see this Bulletin.) Incorporating all latest improvements and of exceptionally fine appearance. Finished in light satin silver, dark oxidized silver, light bronze or in "old gold" or dark bronze. **Specify finish desired.**



NEW IMPROVED TYPES NOW AVAILABLE

TYPE	LIST PRICE (F.O.B. Baltimore) (A)
H/8 —Snap acting, single pole, single throw (2-wire), <i>to complete circuit at low.</i> Suitable for use with humidifying equipment and for operation of solenoid valves, thermal type valves and damper-motors, or for 2-wire booster relays where heavy loads have to be handled.....	\$18.00
H/9 —Snap acting, single pole, single throw (2-wire), <i>to complete circuit at high.</i> Suitable for use with dehumidifying equipment and for operation of solenoid valves, thermal type valves and damper-motors, or for 2-wire booster relays where heavy loads have to be handled.....	\$18.00
H/10 —Snap acting, single pole, double throw (3-wire). As used for "positive" type motor valves or damper-motors and for "Summer-Winter" applications.....	\$18.00
H/11 —Same as H/10 but without snap action. As used for 3-wire system holding-circuit type relay-transformer sets, "reversing" type motor valves, and dual load relay-transformer set, A/DE	\$17.00
Locking feature on setting adjustment, for public buildings, industrial plants, etc., Extra.....	\$ 1.50

Provision is made for mounting all types onto standard sectional boxes for the leading in of conduit or BX cable where high voltage is employed on control circuit. Where used on low voltage, sectional boxes ordinarily unnecessary

All above instruments are fully approved by Underwriters' Laboratories, Inc., and the Hydro-Electric Power Commission of Ontario. They also carry license for use on Lewis air-conditioning system, U. S. patent #1,785,741. (See Friez diagram #8.)

See this Bulletin for relays where heavy loads have to be handled. A single Friez Humidistat can be used to control both humidifying and dehumidifying equipment—manual cycle reversing switches and diagrams can be furnished. See also Friez fully automatic Special Dual Load Relay-Transformer Set, page 4 this Bulletin. See also this Bulletin, page 2, for Insertion Humidistats for ducts, cabinets, unit air conditioners, incubators, insertion through walls, etc.

Friez Humidistats are the finest that science, sixty years of instrument making experience, and careful attention to detail, testing, etc., can produce—yet strictly competitive in price. Their beauty and finish strike a new note. Standard fitment with most leading builders of air-conditioning equipment, they will serve you well. (See Detailed Bulletin "A".)

FRIEZ WINDOWSTATS



New design, of improved appearance and performance
(Size 5 3/8" wide x 4 1/2" high
x 1 3/4" deep.)

For the automatic prevention of condensation on windows and other chilled surfaces. In either of the two methods mentioned below, the Friez Windowstat **allows the maximum possible humidity to be maintained** as desired without the formation of condensation on windows (or other chilled surfaces on which the Windowstat is mounted). A multiple human hair element senses changes in the relative humidity in the immediate vicinity of the chilled surface and is set to operate the electric switch, just below the point at which condensation would form on the chilled surface. It operates completely automatically day and night with **no outdoor connections required**, yet senses immediately any change in indoor or outdoor conditions affecting condensation. Quickly and simply connected and easily removed during those seasons when not required.

May be employed in two manners:

1. As a supervisory control wired in series with the room Humidistat. In this case the Windowstat breaks the circuit of the Humidistat when condensation condition approaches and before condensation actually forms.
2. As a major control to start and stop such dehumidifying equipment as heaters, fans, etc., blowing across the chilled surface whenever condition of condensation approaches.

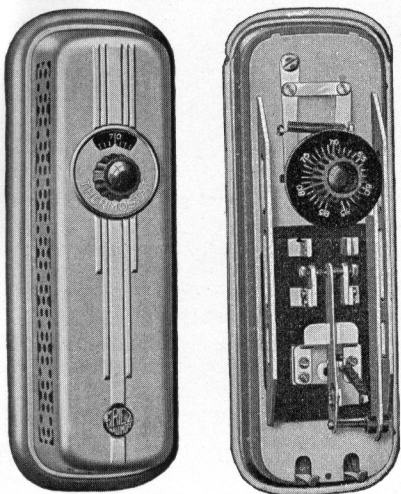
TYPE	LIST PRICE (F.O.B. Baltimore) (A)
W/8 —Friez Windowstat complete with brackets, flexible lead and plug.....	\$18.00

(See Detailed Bulletin "W".)

FRIEZ THERMOSTATS—ROOM TYPES

For the automatic control of Temperature in all classes of comfort, horticultural, refrigeration, and industrial applications; when used in conjunction with electric-solenoid or motor-operated valves for water, steam, gas, oil, refrigerants, etc., or with damper motors, fans, blowers, unit heaters, electric heating elements, or to control electric motors, compressors, pumps, magnetic motor starters and general loads. These new Thermostats are particularly sensitive (1° F. total differential), proof against vibration, incorporate bi-metal elements and dual magnetic snap-action on the pure silver contacts. Without recourse to relays FRIEZ Thermostats will handle electrical loads up to maximum volts, 120 A. C. or D. C.; maximum V. A. (or watts) 100; and are **equally suited for low or line voltage**. Where heavier loads have to be handled see Relays, Page 4. Accurately graduated to single degrees Fahrenheit.

Finished in light satin silver, dark oxidized silver, light bronze or in "old gold" or dark bronze. **Specify finish desired.** Produced by leading instrument makers to fill the better Thermostat requirements.



TYPE

T/8—Single pole, single throw (2-wire), snap acting to complete circuit at low: (for use with heating installations) Standard range 55° to 85° F.....

T/9—Single pole, single throw (2-wire), snap acting to complete circuit at high: (for use with cooling installations) Standard range 55° to 85° F.....

T/10—Single pole, double throw (3-wire), snap acting; (for "positive" motor valves and "Summer-Winter" applications where separate Summer Winter Switches preferred). Standard range 55° to 85° F.....

T/11—Same as T-10 but without snap-action (for "reversing" motor valves, 3-wire relays, and dual load relays A/DE)

Day-Night or "anticipating" feature may be added to any of the above Thermostats (See Bulletin "N"), extra

Locking feature on Setting Adjustment for public buildings, industrial plants, etc., extra.....

Summer-Winter switches separately furnished and diagrams for wiring.....

Switch mounting plates: Bronze..... \$0.35 Net; Chromium.....

THE ABOVE INSTRUMENTS ARE OF THE VERY HIGHEST QUALITY, APPEARANCE, AND FINISH, AND SUITABLE FOR APPLICATION TO ALL TYPES OF CONTROL CIRCUIT.

Above instruments approved by Underwriters Laboratories, Inc.

NEW REDUCED LIST PRICE (F.O.B. Baltimore)

(A) \$12.00

\$12.00

\$12.00

\$11.00

\$1.50

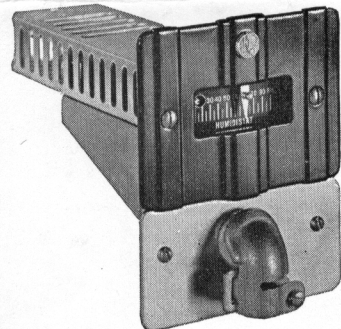
\$1.50

\$1.00 (B)

\$0.50 Net

(See Detailed Bulletins "T" & "N".)

FRIEZ INSERTION CONTROLS AND INDICATORS



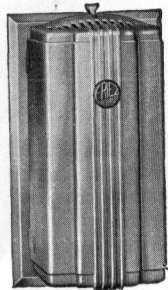
Friez standard Humidistats, Thermostats, and Relative Humidity Indicator mechanisms are available for insertion mounting into ducts, cabinets, unit air conditioners, incubators, and through the walls of special processing rooms such as are employed in fruit ripening and storage, cold storage, tobacco, paper, yarn conditioning, and other industrial and comfort fields. The contacting and general mechanism of these insertion type instruments are identical to those used in these standard wall mounting type instruments. The sensitive element is located inside the enclosure and is thus exposed to air conditions inside while the front mounting flange and the setting pointer and dial remain outside, **presenting a very neat appearance.**

Prices of the insertion types are the same as the prices of the wall mounting types and are given under headings "Humidistats" and "Thermostats," above. (Wall mounting Indicators referred to on page 4, this Bulletin).

(See Detailed Bulletins "A", "T" and "D".)

FRIEZ LOW-PRICED MODEL C THERMOSTATS

To fill the demand for simple Thermostats of the 2-wire snap acting variety at particularly moderate price, a new range of Friez Thermostats is announced. These instruments incorporate many novel features and are suitable for low or line voltage, and have particularly high load carrying capacity, which obviates the use of Relays, except where loads exceed 1/4 H.P., R.I.



TYPE

TC/4—Single pole, single throw (2-wire), snap acting to complete circuit at low (for use with heating installations). With base plate for mounting on to standard sectional box, any voltage up to 250 A. C. (See below for ranges and load carrying capacities.).....

TC/4N—As above (except for low voltage only), fitted with heater element for day-night applications or for "anticipating" applications. (See Bulletin #N for day-night equipment.)...

TC/5—Same details as TC/4, but for completing circuit at high or rising temperature and for cooling applications.....

Standard temperature range 55° to 85° F. Other ranges from minus 25 to plus 225° F. available. (See detailed Bulletin #U.)

LIST PRICE (F.O.B. Baltimore)

(A) \$8.00

\$9.00

\$8.00

SPECIFY LOAD CARRYING CAPACITY WHEN ORDERING—SETTING #A, #B, OR #C

Setting

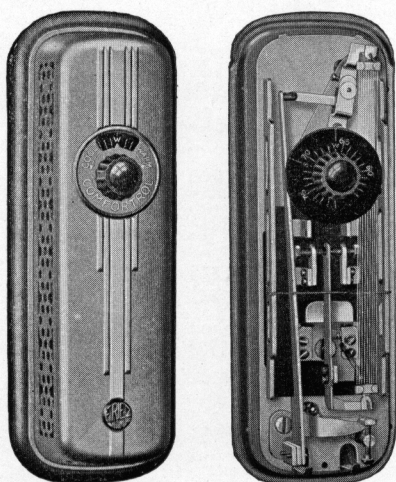
#A—100 V.A. (or Watts), any voltage up to 250 A.C.—plus or minus 1/2° F. differential.*

#B—330 V.A. (or Watts), any voltage up to 250 A.C., 1/8 H.P., R.I., 3 amps. non-inductive at 110 V.—1 1/2 amps. at 220 V.—plus or minus 1° F. differential.*

#C—660 V.A. (or Watts), any voltage up to 250 A.C., 1/4 H.P., R.I., 6 amps. non-inductive at 110 V.—3 amps. at 220 V.—plus or minus 1 1/2° F. differential.* (See Detailed Bulletin "U".)

FRIEZ COMFORTROLS—Effective Temperature

For automatic control in terms of Effective Temperature by means of simple heating or cooling equipment only. As shown on the A. S. H. V. E. "Comfort Chart," Effective Temperature is quite different from ordinary temperatures indicated by thermometers. Since the Friez Comfortrol provides automatic control in terms of Effective Temperatures, it therefore provides automatic control in terms of constant comfort or body sensitive conditions of warmth or cold. A Friez multiple human hair element in



this instrument is coupled with the temperature-sensitive element in such a manner that the point of temperature control is automatically shifted to compensate for the uncontrolled variations in relative humidity. This eliminates those "cold and hot seventies," which are caused by maintaining constant dry bulb temperatures regardless of humidity variations. Since the human body is extremely sensitive to changes in humidity and under certain temperature conditions these variations cause considerable discomfort, the new Friez Comfortrol for simple heating or cooling installations will be welcomed by every one who is interested in uniform comfort conditions. This instrument is applicable where no humidifying or dehumidifying equipment is available (see Hytherstats referred to below.) The instrument of the future, it makes all ordinary thermostats obsolete, and you are recommended to give it careful consideration for your particular application.

Suitable for low or high voltage. Maximum volts 120 A. C. or D. C.; Maximum V. A. (or watts), 50. (Use relays for heavier loads—see this Bulletin.)

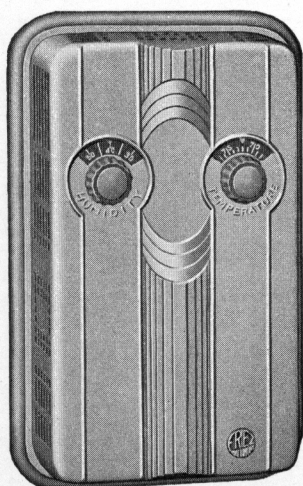
This mechanism may also be incorporated with Humidistat mechanism in Dual Case described below.

Finished in light satin silver (standard), dark oxidized silver, light bronze or in "old gold" or dark bronze. **Specify finish desired.**

TYPE	LIST PRICE (F.O.B. Baltimore) (A)
E/8—Snap acting, single pole, single throw (2-wire), to complete circuit at low.....	\$20.00
E/9—Snap acting, single pole, single throw (2-wire), to complete circuit at high.....	\$20.00
E/10—Snap acting, single pole, double throw (3-wire). As used for "positive" type motor valves or damper motors and for "Summer-Winter" applications.....	\$20.00
E/11—Same as E/10 but without snap action. As used for 3-wire system holding-circuit type Relay-Transformer sets, "reversing" or "floating" type motor valves and dampers.....	\$19.00

(See Detailed Bulletin "E".)

FRIEZ HYTHERSTATS



When a Humidistat and Thermostat are to be mounted side by side it is clearly advantageous to have the two mechanisms neatly housed in a single case. The Friez Hytherstat is a single instrument case containing a standard Friez Humidistat control mechanism and a standard Friez Thermostat or Comfortrol mechanism. No longer is it necessary to have separate control instruments which do not match in size, shape, or color. The logical place to locate humidity and temperature control instruments is in that place where they sense the average conditions of the room being controlled. The logical way to mount these two control instruments is side by side, both in one single instrument case, which presents a very fine, yet inconspicuous, appearance—the Friez Hytherstat.

This dual control instrument is available in a large number of electric contacting arrangements, thus making it suitable for the control of heating, cooling, humidifying, and dehumidifying, or any two or three of these four functions in comfort or industrial applications.

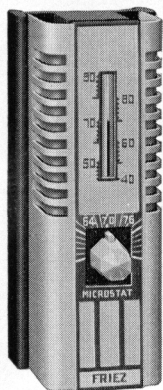
The price of the Hytherstat is obtained by selecting the price of the standard Humidistat required and adding to this the price of the standard Thermostat or Comfortrol mechanism required (see earlier in this Bulletin).

(See Detailed Bulletin "C".)

FRIEZ MICROSTATS

A new compact and moderately priced sensitive Thermostat for the automatic control of temperature. Suitable for the direct operation of Friez magnetic Gas Valves, Relay Transformer Sets, Solenoid Refrigerant Valves, and other low-load, low-voltage equipment, or for the operation of heavier line voltage loads through Relay Transformer Sets. Available in types for heating or cooling applications.

Suitable for any surroundings and only 3½" high, 1½" deep, and 1½" wide. For 2-wire, low-voltage applications only; pure silver snap acting contacts; heat treated and seasoned bimetal element; extremely simple in construction, this Microstat incorporates the new "Alnico" sintered magnets of great strength and permanency, also the Friez concentric contacts. Because of scientific ventilation, great sensitivity and exact control are obtained. Standard differential setting, plus or minus ½° F. (greater if desired).



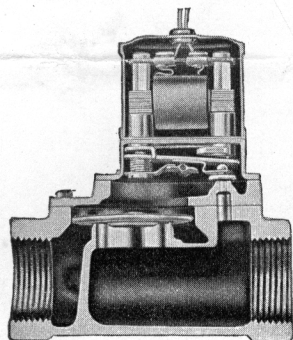
TYPE

	LIST PRICE (F.O.B. Baltimore) (A)
TM/1 —Single pole, single throw (2-wire snap acting, to complete circuit at low (for use with heating installations). Low voltage (25 V. max.; 75 V. A. max.). Standard range 45° to 90° F., ivory or silver finish and including Thermometer.....	\$7.50
TM/1S-R —For heating as above but with anticipator for use with Friez Relay-Transformer Set.....	\$8.50
TM/1S-V —For heating as above but with anticipator for use with Friez Magnetic Gas Valve.....	\$8.50
TM/1N —For heating with day-night feature.....	\$8.50
TM/1N-R —For heating with day-night and with anticipation for Friez Relay-Transformer Set.....	\$9.50
TM/1N-V —For heating with day-night and with anticipation for Friez Magnetic Gas Valve.....	\$9.50
TM/2 —Similar to TM/1 except for cooling installations.....	\$7.50
Mounting Plate TM/M for use where conduit wiring or BX is to be led to standard sectional box and Thermostat to be mounted on box or where hole for earlier Thermostat has to be covered, but otherwise not needed.....	\$1.00

(See detailed Bulletin "TM".)

FRIEZ MAGNETIC GAS VALVES

The new Friez Magnetic Gas Valve incorporates simple and ingenious mechanism, and provides absolute reliability at low cost. Suitable for all types of gas-burning boilers, furnaces or stoves, for domestic automatic heating or for industrial uses. Operating with absolute quiet and reliability with no attention. The valves work on low voltage (6 V.). The entire electrical mechanism can be easily removed for service or replacement, without removal of the valve itself from the pipe line. This operation allows the valve to be cleaned, completely reconditioned, etc., with no special skill required. Complete operation description included in the detailed bulletin. All types are approved by A. G. A.



TYPE

	LIST PRICE (F.O.B. Baltimore) (B)
VG/0 —Friez Magnetic Gas Valve, ¼" pipe size, 50-60 cy., 6 V., with manual emergency operating lever—capacity*: 38 cu. ft. hr.; 19,000 BTU.....	\$ 7.40
VG/1 —As above, but for ⅜" pipe size—capacity*: 38 cu. ft. hr.; 19,000 BTU....	\$ 7.40
VG/2a —As above, for ⅜" pipe size—capacity*: 98 cu. ft. hr.; 49,000 BTU....	\$8.20
VG/2 —As above, but for ½" pipe size—capacity*: 105 cu. ft. hr.; 52,300 BTU....	\$ 8.20
VG/3 —As above, but for ¾" pipe size—capacity*: 234 cu. ft. hr.; 117,000 BTU....	\$10.00
VG/4 —As above, but for 1" pipe size—capacity*: 420 cu. ft. hr.; 210,000 BTU....	\$13.80
VG/5 —As above, but for 1¼" pipe size—capacity*: 600 cu. ft. hr.; 300,000 BTU....	\$17.20

Note: 25-cy. types carry no extra cost—clearly specify, or 60-cy. will be furnished.

*Note: Above approximate capacities based on tests conducted with .6 S.G. gas, at drop of .5" water. The BTU ratings are those designated by the A. G. A.

Under no circumstances must any other transformers be used than those specified below. When ordering valves, specify cycle required, and select transformer accordingly.

TYPE

	LIST PRICE (F.O.B. Baltimore) (B)
630-N-709 —Transformer (plain), 50-60 cy., 110 V. (\$0.40 extra for flange type for junction box mounting)...	\$ 1.20
630-N-976 —Transformer (plain), 50-60 cy., 220 V. (\$0.40 extra for flange type for junction box mounting)...	\$ 1.20
630-N-957 —Transformer (plain), 25 cy., 110 V. (\$0.40 extra for flange type for junction box mounting).....	\$ 1.75

Note: Standard finish on transformers is black.

(See detailed Bulletin "VG".)

FRIEZ SAFETY PILOTS

The Friez Safety Pilot forms an essential portion of automatic gas-burning equipment. This Safety Pilot incorporates features which insure absolute reliability, safety, certain ignition of the main burner, low cost, and adaptability to varying applications. The thermal element is of unique design. Wired in electrical series with the electrical gas valve, full safety in the event of pilot failure is assured.

TYPE

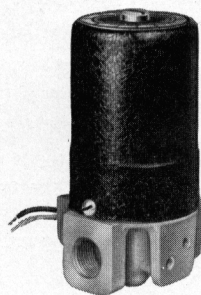
	LIST PRICE (F.O.B. Baltimore) (A)
SP/1 —Friez Automatic Safety Pilot; complete, for vertical mounting.....	\$7.50
SP/2 —Friez Automatic Safety Pilot; complete, for horizontal mounting.....	\$7.50

Note: Specify if for natural, mixed, or manufactured gas.

(See Detailed Bulletin "SP".)



FRIEZ WATER VALVES, STRAINERS, AND TRANSFORMERS



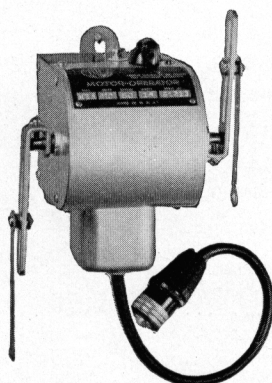
The Friez Solenoid Water Valves are especially designed for use in humidification and air-conditioning applications, particularly where used with Friez Humidistats. They are very compact, and thoroughly reliable in operation. Failure of current closes the valve. Suitable for operation on water pressures up to 150 pounds. Current consumption only approximately 8 Watts. Will not overheat on long continuous operation. Standard incorporates $\frac{3}{32}$ " orifice with straight through flow, and $\frac{3}{8}$ " I. P. T. inlet and outlet connections. Transformers especially designed for use with these valves, and strainers strongly recommended for use with them, are listed below:

TYPE		LIST PRICE (F.O.B. Baltimore) (A)
683-W	Solenoid Water Valve for 110 V. or 20 V., 60 cy. operation (\$1.00 list extra for 25 cy. or for 220 V., or D. C.)	\$9.50
# 839	Transformer: 110 V. primary	\$3.50 (A) ; 220 V. primary \$6.00
# 390	Strainer: 1 sq. in. monel screen	\$2.20 (A) ; 6 1/2 sq. in. monel screen \$3.00

Note: Specify voltage and cycles.

(See Detailed Bulletin "VW")

FRIEZ MOTOR OPERATORS



The Friez Motor Operator (or Damper Motor) is employed to give effect to the automatic control provided by Thermostats, Aquastats, Pressurestats, Furnacestats, Humidistats, Comfortrols (Effective Temperature Controllers), and similar sensitive control instruments. Control is directly from automatic switching provided by the control instrument without recourse to Electrical Relays. The actual Motor Operator is on low voltage furnished to the control circuit and motor by the secondary of a simple transformer (furnished with each Motor Operator) from 110 V. or 220 V., A. C. supply lines.

Fitted with auxiliary hand switch giving manual "On-Off" or "Automatic" positions, and arms which are adjustable in position and which are in turn connected to the draft damper of coal-fired furnaces or boilers, to the duct dampers of air conditioners or warm air systems of heating, to zone dampers, by-pass dampers of conditioners, heating or cooling equipment, humidifiers, and for the operation of valves for steam, water, gas, etc. Many special applications also require such a Motor Operator to give effect to the control provided by Thermostats or other control instruments. Additional types provide heavy auxiliary side switches to operate fans, burners, etc., for zone control systems.

TYPE	Control Circuit (Low Voltage)	Transformer (Furnished)	Supply Voltages* (For Transf.)	Accessories Included	LIST PRICE (F.O.B. Baltimore) (B)
					Including Transformer
M/1A	3-Wire	Separate Mounting	110 V., 60-50 Cy.	Double extension shafts, 2 Standard crank arms and links	\$17.00
M/1B	2-Wire	"	"	"	\$19.20
M/2A	3-Wire	Built-in	"	"	\$17.00
M/3A	3-Wire	Separate Mounting	"	One extension shaft only and with built-in motor side switch (110 V. or 220 V., 1/2 H.P. load capacity) . . .	\$22.50
M/3B	2-Wire	"	"	"	\$24.70
M/4A	3-Wire	Built-in	"	"	\$22.50
M/5A	3-Wire	Separate Mounting	"	Double extension shafts and with built-in motor side switch (110 V. or 220 V., 1/2 H.P. load capacity) . . .	\$23.00
M/5B	2-Wire	"	"	"	\$25.20
M/6A	3-Wire	Built-in	"	"	\$23.00
*For 220 V. 60-50 cy., add to list					\$.50
For 25 to 40 cy. (not available on type M/2A, M/4A, M/6A), add to list					\$ 2.00

All types provide 30 pound inches torque (equivalent to lifting 12-pound weight at end of standard arm).

All types have time cycle of 50 seconds (at no load) for 1/2 cycle.

Standard crank arms are adaptable to vertical or horizontal mounting. Return action is obtained by completion of other half of complete circular motion by arms. Two positions (open or shut action) are given.

Built-in transformer types are furnished with 1 ft. of heavy flexible cord and plug in accordance with Underwriters' requirements.

All transformers are approved by Underwriters' Laboratories, Inc.

SUNDRY FITTINGS

For Hand-Fired Coal Installations:

1 Package containing chain, 4 pulleys, 4 hooks, and staples (no wire) **\$1.00** (B)

For Duct Damper and Zone Control:

1 Duct damper crank arm and adjustable sector assembly (no extra charge if ordered in place of 2 standard crank arms) **\$.30** (B)

1 Package containing 2 special angle brackets, 2 shouldered screws, and 4 lock nuts for duct damper hook-up **\$.25** (B)

Separate or replacement transformers, 110 V., 60 cy. primary **\$2.50** (B)

220 V., 60 cy. primary **\$3.00** (B)

For 25 to 40 cy., add to list **\$2.00** (B)

See elsewhere in this condensed catalog for Friez 2-wire or 3-wire Thermostats for control of above Motor Operators. Type available for room wall, duct insertion mounting. See below for limit controls. (See Detailed Bulletin "VM")

FRIEZ LIMIT CONTROLS AND FAN SWITCHES

Line or low voltage adjustable limit controls for shut down on high air temperature (Furnacestats), or high water temperature (Aqua-stats) or adjustable fan switches to start fan on reaching given temperature are available. Simple, rugged and reliable devices at low prices and with full Friez guarantee.

CAPACITY— $\frac{1}{2}$ H.P.—R.I., $\frac{1}{4}$ H.P.—S.Ph. motor; at 110 V. or 220 V., A. C.

TYPE

L/A1 —Friez High or Low limit air switch (Furnacestat or Fan Switch).....	\$8.00
L/W1 —Friez High or Low limit water switch (Aqua-stat).....	\$9.50

Note: One control serves either requirement as single pole double throw switching is provided.

(See Detailed Bulletin "LS".)

FRIEZ ELECTRICAL RELAYS

Where the electrical loads to be handled exceed the current carrying capacity of sensitive control instruments, such as Thermostats, Humidistats, Effective Temperature Controls, etc., Relays are needed. Complete details of the various types are given in separate Bulletin #AT/R. The types most commonly required are briefed below. **State type, voltage, cycle, load, etc., when ordering.**



Type RT/1 with Housing.

	LIST PRICE (F.O.B. Baltimore) (B)
RT/1 —Friez Standard Relay Set, provides own low voltage supply for control circuit (20 V.), S. P.; S. T.; D. B.; $\frac{1}{4}$ H. P., 1 ϕ , 10 amps., 110 V. Less housing....	\$ 6.50
With housing ..	\$ 8.50
RT/2 —S. P.; D. T.; D. B.; $\frac{1}{2}$ H. P., 1 ϕ , 5 amps., 110 V. Less housing ..	\$ 8.00
With housing ..	\$10.00
RT/3 —D. P.; S. T.; S. B.; $\frac{1}{4}$ H.P., 1 ϕ , 10 amps., 110 V., Less housing...	\$ 7.00
With housing ..	\$ 9.00
RT/4 —D. P.; D. T.; S. B.; $\frac{1}{2}$ H. P., 1 ϕ , 5 amps., 110 V., Less housing ..	\$ 8.00
With housing ..	\$10.00

Note: All Relay Sets are for 50 to 60 cycle, unless otherwise stated.

If "anticipation" is going to be used in conjunction with the above Relay Sets, separate low voltage producing coil can be furnished, built integrally into Relay. **Add to list price**.....

\$ 1.00

If both "day-night" and "anticipation" features are desired, this can be arranged. Consult Manufacturers.

TYPE

THREE-WIRE HOLDING-CIRCUIT RELAY-TRANSFORMER SETS

A/CA —Load rating: 110 V., 60 cy., 8 amps. non-inductive; $\frac{1}{2}$ H. P. inductive, S. P.; S. T. Complete in housing ..	\$13.90
A/CB —Load rating: 220 V., 60 cy., 8 amps. non-inductive; $\frac{1}{2}$ H. P. inductive, S. P.; S. T. Complete in housing ..	\$13.90
RS/73 (SP) —Load rating: 110 V., 60 cy., 30 amps. non-inductive; 1 H. P. inductive, S. P.; S. T. Available with electrically separate or common load and supply circuits—specify which required. Complete in housing.....	\$22.85
RS/73 (DP) —Same as RS/73 (SP) except with D. P., S. T. load contacts, as used for 3-phase loads.....	\$23.60

FRIEZ SPECIAL DUAL LOAD RELAY SETS

For the control of heating and cooling from a single Thermostat or Comfortrol—Effective Temperature Controller, and without recourse to manual summer-winter switch and providing any desired differential or dead zone between the two functions. Control circuit remains on line voltage.

A/DE —For two independent loads (see above), each being S. P.; S. T. Load ratings: 110 V., 60 cy.; 5 amps. non-inductive. Complete in housing.....	Prices on Application
A/DE —As above, but for load ratings: 220 V., 60 cy.; 3 amps. non-inductive. Complete in housing.....	Prices on Application

THERMAL TIME DELAY SWITCHES See Bulletin #AT/R for details.

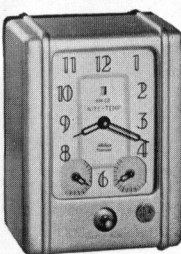
TD/216A —For use on 20 V. control circuit and with electrically separate S. P.; S. T. (or S. P.; D. T.) load contacting, 2 amps. at 110 V.; 1 amp. at 220 V., fitted with magnetic snap action on load contacts, less housing	\$13.30
TD/216 —As above, but suitable for 110 V. control circuit, Less housing....	\$15.25

DIRECT CURRENT RELAYS

CSC/1140 —Operates on 3-wire control system. Proof against vibration at instrument contacts. Load ratings: 110 V., D. C., 4 amps.; 220 V., D. C., 2 amps. Complete in housing. (State volts when ordering).....	\$18.20
CSB/1140 —Similar to the above but furnished with blow-out coils across load contacts for handling heavier loads up to 30 amps. at 110 V., 15 amps. at 220 V., D. C. (State load in amperes and volts when ordering.).....	\$23.55

(See Detailed Bulletin #AT/R and Wiring Diagrams on Data Sheet #217.)

DAY-NIGHT TEMPERATURE CONTROLS



Synchronous Self-starting Electric Clock Switches of extremely handsome design are offered for use with Friez Thermostats and Effective Temperature Controllers to provide automatic night-time temperature setback. These Friez Nite-Temp Clock Switches can be located either with the Thermostat concerned or at some remote location—wherever a handsome electric clock would be of use as a timekeeper. The clock motors themselves operate at 20 V. from small transformers furnished with the Clocks, which are in turn supplied from the 110 V. (or 220 V. where specified) electric lines. (See details of Thermostats above for day-night types for use with the Friez Nite-Temp. Electric Switch.)

TYPE

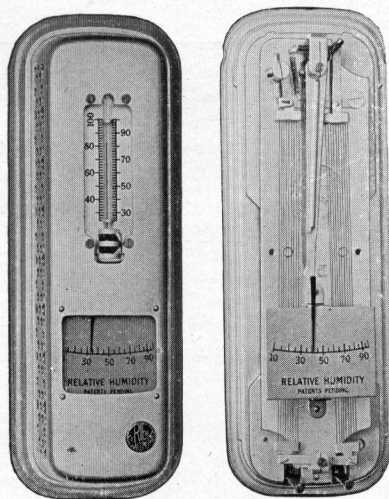
DN/11 —Friez Nite-Temp Self-starting Electric Clock Switch, 110 V. 60 cycle primary.....	\$21.00
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For 110 V. or 220 V. 25 cycle, or for 220 V., add 50 cents net.

Standard finishes—satin silver or ivory. Specify voltage and finish.

(See Detailed Bulletin "N".)

FRIEZ HUMIDITY AND TEMPERATURE INDICATORS



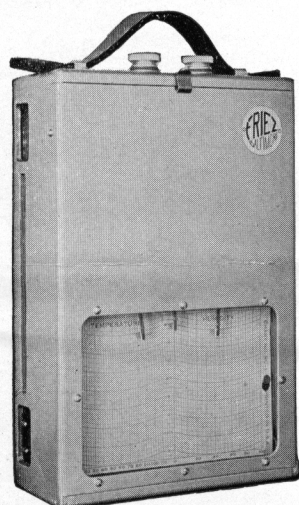
Those who require an accurate, extremely sensitive and reliable Indicator for Relative Humidity and Temperature will find this Friez product a true scientific instrument and not a toy. It should not be confused with cheaper instruments. Suitable for all classes of comfort and industrial applications, this instrument indicates over the ranges 10%-100% Relative Humidity and 20°-110° F. temperature. (Humidity portion can be used satisfactorily down to minus 70° F.) **Uses multiple human hair element**, same as used on Friez Humidistats, and on our expensive U. S. Weather Bureau type Recording Instruments. For use in homes, hospitals, schools, hotels, stores, offices, industrial plants, bakeries, printing shops; fruit, flower and tobacco storage; greenhouses, warehouses; in refrigeration work and as valuable sales and service aid in air-conditioning fields. **The best instrument of its type on the market.**

I/3—Friez Relative Humidity & Temperature Indicator (as left-hand illustration). Latest improved type. Finished in light satin silver, dark oxidized silver, light bronze or in "old gold" or dark bronze. **Specify finish desired.** **LIST PRICE (F.O.B. Baltimore) \$12.00 (A)**

NOTE: Can be furnished in special form and finish and less thermometers for use in higher temperatures. (Up to 200° F.) Prices same as above. (See Detailed Bulletin "D",)

FRIEZ PORTABLE RECORDERS (For Humidity, Temperature, and Operation)

Designed for hard service by all engaged in heating, ventilating, refrigerating—Air-Conditioning Fields, and for many industrial uses. Easily portable and compact—Weight, 52 oz.; Size, 8½"x5½"x2¼". Charts of index file card type (3"x5") with space on back for simultaneous filing of general data, giving clear, progressive, and easily-read records for 30 or 10 hour periods. Gives complete data on all functions of heating, cooling, humidifying, dehumidifying, number and duration of cycles of operation of the equipment, etc. Week's supply of charts, ink, and spare pen carried in case. 100 charts, ink, and spare pen included in price of each instrument. Die cast aluminum case. Hand-wound, clock-driven chart—electrical connections required only when operation records being made (on R/4 and R/4-A types).



TYPE

NEW IMPROVED TYPES NOW AVAILABLE

LIST PRICE (F.O.B. Baltimore) (C)

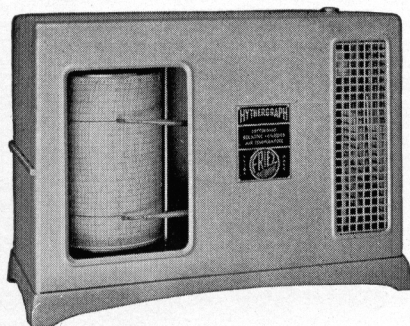
R/3—For Humidity and Temperature Records	\$55.00
R/4—For Humidity, Temperature, and Operation Records. Furnished with 12 ft. cord and special plug to facilitate connection of operation feature with electrical equipment being tested without disturbing wiring. For use in series with loads of 2 to 8 amps. A. C. or D. C. up to 250 v.	\$65.00
R/4-A—For Humidity, Temperature, and Operation Records. For use in parallel with load and furnished with Friez Special Transformer Set for use on 110 or 220 v., 50 or 60 cy. A. C. Suitable for all applications not ideally covered by R/4 type above. Extra Charts , per 100 (Discounts off larger quantities. Centigrade Charts 50c extra per 100. See below).....	\$72.50
Special Ink , per bottle.....	\$1.00 Net;
Spare Pens , each.....	\$1.65 Net
Carrying Cases: Tan Leather ..	\$5.00 Net;
Black Imitation Leather ..	\$3.00 Net

Any of above Recorders available for 30 or 10 hour records, using same size charts with different graduations. Humidity range from 0% to 100% R. H. on all types. Two temperature ranges available on all types; easily adjustable from one range to another by operator with good thermometer. Temperature

Ranges: Standard, 0° to 110° F.; Low, -30° to +80° F.; High, 100° to 210° F.

State clearly type, hours, temperature range, and if extra charts desired when ordering. (See Detailed Bulletin "G".)

FRIEZ HYTHERGRAPHS



The new Friez "Hythergraph" follows the same general lines of the famous Friez Weather Bureau type Hygro-Thermograph, but details have been modified, and a commercial finish given, thus enabling the instrument to be offered at more moderate price. ("Satin Silver" case and cadmium-plated metal parts—special finishes to order.) **Simultaneous records of relative humidity** by means of multiple human hair element, **and of dry-bulb temperature** by means of a special bimetallic element, **are given on common time lines.** A progressive 8-day record is made on a rectangular chart which is extremely easy to read. An unusual degree of accuracy is obtained by this Recorder designed primarily for permanent installation in large comfort and industrial Air-Conditioning applications. Carrying handle available at no extra cost (if specified) making instrument semi-portable. Case furnished with lock and means for securing in position. One year's supply of charts included with each instrument.

Overall dimensions: 12"x5½"x8½" high; Weight: Net, 8 lbs.; Gross, 25 lbs.

TYPE

LIST PRICE (F.O.B. Baltimore)

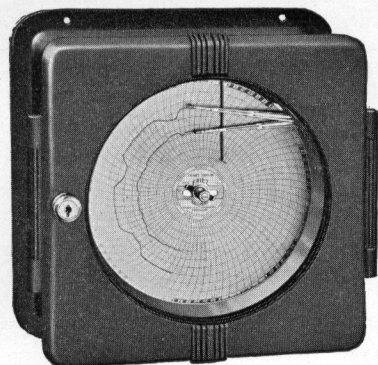
600—Friez Hythergraph— for Relative Humidity and Temperature Records on weekly charts and complete with one year's supply (55) of charts. Relative Humidity range 0% to 100%. Temperature range 10° to 105° F.....	\$142.00 (D)
601—Friez Hythergraph— for Relative Humidity and Temperature Records on daily charts and complete with one year's supply (375) of charts. Relative Humidity range 0% to 100%. Temperature range 10° to 105° F.....	\$147.00 (D)
Wooden carrying case.....	\$7.00 Net

(See Detailed Bulletin "H".)

FRIEZ PERMANENTLY INSTALLED RECORDERS

Especially designed for permanent installation into buildings, and factories for comfort and industrial application, the complete range of Friez Round Chart Recorders for relative humidity and temperature are briefly listed below:

These instruments are not merely re-designs of earlier industrial types, but are an entirely new range, designed for the present advanced state of the air conditioning comfort and industrial art.



These Recorders are available in various forms as listed below. Particular attention is invited to the all-electric type which for the first time makes possible the recording of not only dry-bulb temperature, but **relative humidity direct from remote distances**, and the distance between the humidity and temperature sensitive transmitting elements and the Recorder itself, does not affect the accuracy of records obtained. With this type, the Recorder itself may be placed at the most convenient location (in Engineer's office, on display in lobby, etc.) and the transmitting element may be located in ducts, separate rooms, outside of building (in weather-proof shelter) in ovens or refrigerator, etc. The only connection required between the Recorder and the elements is low-voltage wire.

It will also be noted from the listing below that these Recorders may be obtained for capillary temperature applications for both wet and dry bulb where required for comparatively short distances. Similarly, in the self-contained form, the instrument responds to the conditions immediately surrounding the Recorder itself.

Charts are normally driven by synchronous electric self-starting clocks, but hand-wound clocks may be specified at no extra cost.

LIST PRICE
(F.O.B. Baltimore)
(D)

TYPE

SELF-CONTAINED RECORDERS (For Air conditions surrounding actual Recorder) for mounting on surface of walls or panels.

RD/S1 —Single-pen Relative Humidity Recorder; range 0 to 100% R. H.....	\$ 90.00
RD/S2 —Single-pen Temperature Recorder; range 0 to 100° F. (Other ranges also available.).....	\$ 90.00
RD/S3 —Two-pen Relative Humidity and Temperature Recorder; ranges as above.....	\$112.00

ALL ELECTRIC DISTANCE TRANSMISSION TYPES (Suitable for distances up to approximately 5,000 feet) for surface or flush, wall or panel mounting.

RD/E1 —Single-pen Relative Humidity Recorder, complete with remote Friez patented human-hair element humidity sensitive transmitter, and other accessories; range from 0 to 100% R. H.....	\$175.00
RD/E2 —Single-pen Temperature Recorder; complete with Friez special bi-metallic temperature transmitter and other accessories; range from 0 to 100° F. (Special ranges also available.).....	\$175.00
RD/E3 —Two-pen Relative Humidity and Temperature Recorder; complete with humidity and temperature transmitters as above, and other accessories, ranges as above. (Special ranges also available.).....	\$260.00

Note: Type **RD/E3** may also be obtained with two temperature pens or two humidity pens at no extra cost.

CAPILLARY-ELECTRIC DISTANCE TRANSMISSION TYPE (Employing capillary tube system for temperature, and electric system for relative humidity) for surface or flush, wall or panel mounting.

RD/CE3 —Two-pen Relative Humidity and Temperature Recorder. Standard capillary length for temperature 6' or 12' (see below). Distance of humidity transmission (electrical), unlimited. Standard temperature and humidity ranges as above. Complete with accessories as above.....	\$186.00
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CAPILLARY DISTANCE TRANSMISSION TYPE (Employing capillary tube system) for surface or flush, wall or panel mounting.

RD/C1 & 2 —Single-pen temperature Recorder, suitable for dry or wet bulb temperatures (wet bulb accessories extra); range 0 to 100° F. Standard capillary length, 6' or 12' (see below), complete with accessories.....	\$ 90.00
RD/C3 —Two-pen Temperature Recorder (two wet bulb, 2 dry bulb, or 1 of each), as above.....	\$112.00

Note: If 12' capillary length is insufficient, further capillary (up to 75') is available at **\$0.50** per foot list.

Separable Socket for any standard sensitive bulb, each.....	\$ 5.00 Net
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Standard range for any above Recorders, 0 to 100° F., 0 to 100% R. H. Other special ranges available at **\$10.00** list extra for complete instrument. Apply for details.

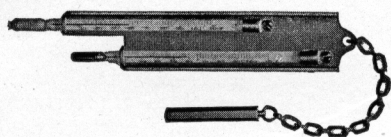
Humidity sensitive portion of all above Recorders is the famous Friez multiple human hair element. Temperature sensitive portion is Friez special seasoned bi-metallic element (except on capillary types).

All Recorders supplied with 100 charts, ink, and pen cleaner, available in weekly or daily form. **Specify electric current available in terms of voltage and cycle; daily or weekly records; surface or flush mounting; temperature range.**

Apply for complete information.

(See Detailed Bulletin "R".)

FRIEZ PSYCHROMETERS



POCKET SLING PSYCHROMETERS

Pocket Sling Psychrometers of high quality, with instantly replaceable 5" thermometers. 30° F. to 110° F. in 1° divisions. Aluminum back. In strong leather metal-lined pocket case. 7" over-all, 1½" wide.

LIST PRICE
(F.O.B. Baltimore)
(C)

TYPE

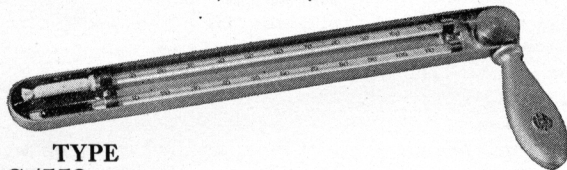
S/1—Friez Pocket Sling Psychrometer*	\$7.00
S/1A—Replacement Thermometereach	\$1.90

Centigrade and other special thermometers available.

* Above price includes Pocket Psychrometric Slide Rule and carrying case.

STANDARD SLING PSYCHROMETERS

First class Sling Psychrometer of comparable accuracy with famous Friez Weather Bureau types and incorporating new features. Fitted with accurate, carefully matched and seasoned thermometers (8⅞" long) of the new oval bore capillary, mercury-filled type, mounted on rigid aluminum frame with thermometers protected in thermo-shield. Standard thermometer range 10° to 110° F., with ½° graduations. Hinged handle with adequate bearings.



LIST PRICE
(F.O.B. Baltimore)
(C)

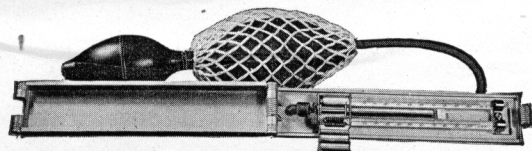
TYPE

S/552—Friez Standard Sling Psychrometer*	\$10.00
S/552-a—Replacement Thermometereach	\$3.00
Leather Carrying Case	\$2.00

* Above price includes Pocket Psychrometric Slide Rule, Distilled Water Container, Applicator, etc.

FRIEZ HAND-ASPIRATED PSYCHROMETERS

These radically new instruments have a number of very decided advantages over all Sling-type Psychrometers. The results obtained with these instruments are far superior in consistency, accuracy, and general reliability. Comparatively inexperienced persons can obtain very accurate results with this Hand-Aspirated Psychrometer, in fact even more accurate results than can be obtained by an expert with the best available type of Sling Psychrometer.



By means of the hand pump assembly, air is forced through the venturi throat lying in between the thermometers, the action of this venturi causes air to be induced from the sides across the wet and dry bulbs. The instrument is ideally suited for locations where it is undesirable or impossible to use Sling Psychrometers because of cramped quarters or because they would be too conspicuous in use. The question ever present in the use of a Sling Psychrometer as to whether or not the instrument has been whirled long enough or too long is completely eliminated in this Hand-Aspirated Psychrometer, because the thermometers are observed during the entire operation. Also it should be noted that the thermometers are guarded against radiation error by an effective

thermo-shield. It is ideally suited for the checking of controlling or recording equipment or for checking conditions in small enclosures, etc., because it may be placed in very close proximity to the actual point at which it is desired to check conditions. The necessity for taking a series of readings, then averaging these is completely eliminated in the Hand-Aspirated Psychrometer, as the first reading from its always stationary thermometers is the correct reading.

LIST PRICE
(F.O.B. Baltimore)
(C)

TYPE

HA/2—Friez Hand-Aspirated Psychrometer with standard range thermometers (10°-110° F., with 1° divisions), complete with water bottle and applicator, spare wicks, pocket psychrometric slide rule and integrally constructed case. Certain special range thermometers available at extra cost.	\$15.00
Leather carrying case	\$4.00 Net

THERMO-SHIELDED ELECTRICALLY-ASPIRATED PSYCHROMETERS

The most precise instrument known for accurate measurements of moisture content of the air. Incorporates all latest features, eliminating errors. Air is drawn across wet and dry bulbs at uniform speed by electric motor located outside of case. Thermometers 10" long. Standard range 0° to 130° F. in ½° graduations. (Special thermometers available on application.) Standard fan motors for 110 v. A. C. or D. C.; special motors on application. Instrument is 13" high and 7" square.

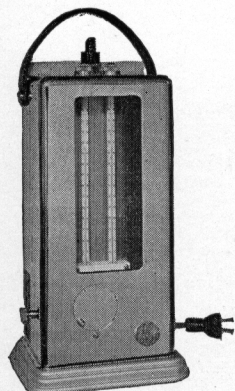
TYPE

LIST PRICE
(F.O.B. Baltimore)
(C)

573—Friez Thermo-Shielded Electrically-Aspirated Psychrometer*	\$75.00
573-a—Replacement Thermometerseach	\$6.50
Wooden Carrying Case	\$7.00 Net

* Above price includes full book of Psychrometric Tables, Distilled Water Container, Applicator, etc.

(See Detailed Bulletins "S" and "P".)

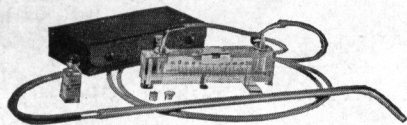


FRIEZ AIR METERS, DRAFT AND AIR FILTER GAUGES

AIR METERS AND PITOT STATIC HEADS

The Friez Air Meters and Pitot Static Heads are scientifically designed, ruggedly constructed, moderately priced instruments for accurate measurements of static pressures, velocities, cubic feet per minute, draft, etc. A unique feature of these Friez Meters and Gauges is the chromium plated and highly polished graduated scale which reflects an image of the liquid column through the transparent Bakelite and thus completely eliminates error from parallax. These instruments are especially designed for the measurement of air velocities from approximately 400 feet per minute and higher, or pressures or vacuums of from .005" water and higher. The Friez Pitot Static Head is accurately designed by engineers familiar with aircraft velocity instruments and is accurately machined. Even when held 15 angular degrees from directly facing the air movement, correct results are insured. These Air Meters and Draft Gauges are available in portable form (as illustrated) or in stationary form mounted on metal mounting plate.

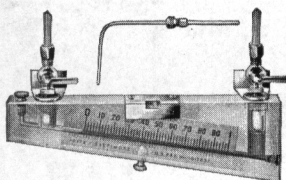
The Air Meters and Draft Gauges are available in various ranges. The list prices of these without Pitot Static Head range from \$21.00. The list price of the Pitot Static Head is \$7.00.



AIR FILTER GAUGES

Friez Air Filter Gauges resemble in appearance and general construction the Friez Air Meters and Draft Gauges. They are supplied complete with two 3-way cocks, two 5-ft. lengths of aluminum tubing, two static tips, oil, and necessary instructional data sheets, etc. They are especially designed to give accurate indications of the differential of static pressures on either side of filter elements. The correct readings vary with the type of filter and these readings are furnished by the filter manufacturer. The Air Filter Gauges are available in different ranges. The list prices of these instruments complete as described above range from \$27.00.

(See Detailed Bulletin "F".)

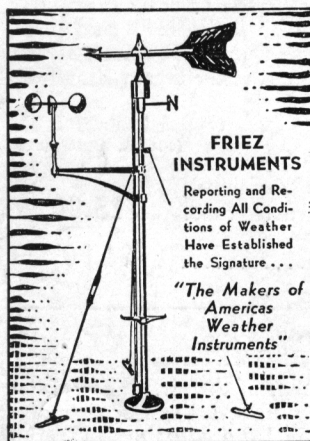
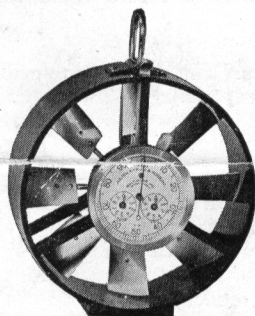


FRIEZ ANEMOMETERS

Friez Anemometers are famous for their accuracy, reliability, sensitivity, and scientific construction, as well as their low price. These instruments are in daily service by various U. S. Government Departments and in all types of air-conditioning applications. Each instrument is individually tested and calibrated. These Anemometers are entirely designed and manufactured in the United States. Various types are available covering different ranges and for different applications. The Biram types give readings directly in linear feet and velocity is obtained by dividing these readings by the elapsed time in minutes. The direct reading types give readings directly in feet per minute. They range from supersensitive types for the measurement of velocities down to 15 feet per minute to special high velocity types suitable for measuring velocities up to 10,000 feet per minute.

The type illustrated is the Biram type A/2 which is the most popular in the air-conditioning industry. The list price of the instrument with plain zero return gear is \$28.00. Provision for instantaneous zero return may be provided for \$5.80 extra. Leather carrying cases (strongly recommended for the protection of the instrument when not in use) have a net price of \$4.00.

(See Detailed Bulletin "J".)



After sixty-one years devoted exclusively to the design and manufacture of Precision Instruments employed so extensively in the serious national tasks of meteorology, aviation, flood control, and soil conservation—the Friez Company very naturally has come to be regarded, chiefly by the inherent value of its products, to be superbly equipped to design likewise and market controls and instruments for Air-Conditioning (indoor weather)—that wear the hall-mark of the very soundest principles of engineering and manufacture. Specify Friez when you specify Air-Conditioning Instruments and Controls.

Designed and Manufactured by
JULIEN P. FRIEZ & SONS, Inc.
(A Subsidiary of The Bendix Aviation Corporation)
BALTIMORE, MARYLAND, U. S. A.

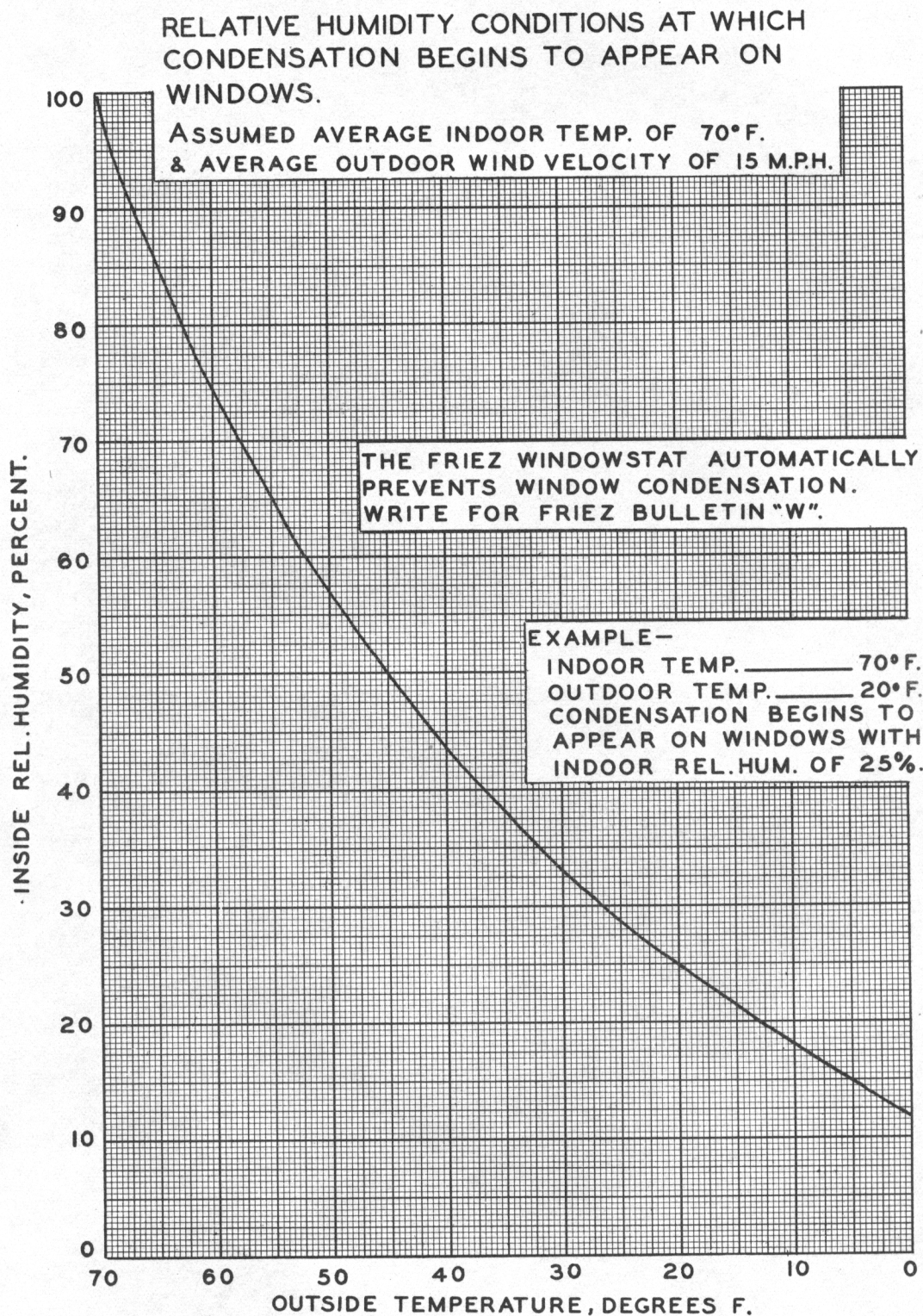


REG. U. S. PAT. OFFICE

EXPORT—Bendix Aviation Export Corp., 30 Rockefeller Plaza, New York. Cables: "BENDEXPORT", New York.

"THE MAKERS OF AMERICA'S WEATHER INSTRUMENTS"

CONDENSATION ON (SINGLE) WINDOWS



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JULIEN P. FRIEZ & SONS, INC. BALTIMORE
MARYLAND

PRINTED IN U.S.A.