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MECHANICAL AND MOBILE REFRIGERATION PRODUCT CATALOG

Partlow

ISO 9002
CERTIFIED
UL FILE #1130 PARTLOW CORPORATION

NOTE:
It is strongly recommended that Partlow equipped applications incorporate a high or low limit protective device which will shut down the equipment at a preset temperature condition in order to preclude possible damage to property or product.

INDEX

MF79
INDICATING CONTROLLER

BASIC MF79 MODEL

#73 switch is available in place of #79.
It must be ordered separately and installed in the field.
#73 Close (1/2%) Sensitivity 64403018

ACCESSORIES

Description	Code
None	1
237A Weather Resistant*	2
266 Fungus Proofing	3

* Requires inverted scale, check availability.

HOW TO ORDER

First select the proper ordering number for the MF79 unit. Next consult element selection matrix, see Page 62. Select dial part number, see page 64, and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. The MF79 instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052 "Guide for use in Corrosive Applications".

Sample Order:

Description	Required Number
MF79 Unit	MF791
with Dial	00602234 (from page 64)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 10.

ABOUT THIS INSTRUMENT

Description

A compact electrical, single switch indicating temperature controller designed to operate fuel valves or relays which start and stop heating or cooling systems. This unit is UL and CSA listed. Flush or wall mount, three-wire control circuit and twelve operating ranges within -30°F to 1100°F.

Operation

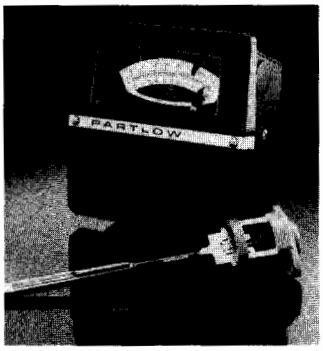
A single snap-acting switch is positioned at the control point by turning the setting knob on the front of the instrument. Set point is shown by the red pointer on the dial.

The switch is operated by a black indicating pointer which moves up or down scale in response to the expansion or contraction of the thermal element. When the indicating pointer moves in line with the red set pointer, the snap-acting switch opens or closes the circuit controlling the heating or cooling input to the appliance.

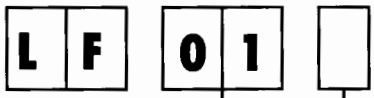
Specifications

Dimensions	6 3/4" W x 6 5/16" H x 4" D
Wall Mounting	Brackets supplied with instrument.
Panel Mount Cutout	5 1/4" W x 5 15/16" H
Switch Type	Three wire SPDT.
Switch Sensitivities	Normal 1% of range (factory standard #79 switch). Super Sensitive 1/2% of element range (optional #73 switch, field installable only).
Electrical Hookup	Terminal block accessible through top cover hatch.
Conduit Openings	One 7/8" diameter hole on each side of the case for 1/2" conduit fitting; drill guide hole spotted in the rear of the case showing optional rear conduit locations.
Electrical Rating	50VA, inductive; 500VA, non inductive; 250V maximum AC only.
Agency Listings	UL and CSA.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	5 lbs.
Approx. Ship. Weight*	8 lbs.

*Weight may vary depending on element length.



LF15-79
INDICATING CONTROLLER



BASIC LF15-79 MODEL

#73 switch is available in place of #79.
It must be ordered separately and installed in the field.
#73 Close (1/2%) Sensitivity 64403018

ACCESSORIES

Description	Code
None	0
201 Weather Resistant (requires inverted scale)	1

HOW TO ORDER

First select the proper ordering number for the LF15-79 unit. Next consult element selection matrix, see Page 62. Select dial part number, see page 65, and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. The LF15-79 instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Sample Order:

Description	Required Number
LF15-79 Unit	LF010
with Dial	00601739 (from page 65)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 11.

ABOUT THIS INSTRUMENT

Description

This controller incorporates two switches which operate in fixed relationship to the temperature setting. Differential between switch settings is adjustable up to 5% of scale range. Unit is UL and CSA listed. Flush or wall mount, two three-wire circuits and seventeen optional ranges within -30°F to 1100°F.

Operation

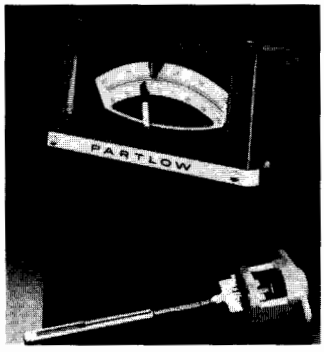
The two single snap-acting switches are mounted on a common setting arm (red pointer) and activated by the same temperature-responsive mechanism which moves the indicating pointer.

First to be actuated on a temperature rise is the leaf-type #15 switch. The second, a pin type switch #79, is actuated only when the indicated temperature exceeds the operation of the first switch.

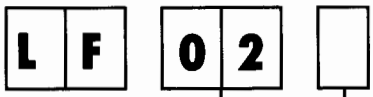
Switches are mounted one behind the other, each having its own circuit. Temperature actuation points between the two switches (differential) is adjustable from 0 to 5 percent of scale range with tolerance on switch settings ± 1/2%. Unless otherwise requested, differential is approximately 1% of scale.

Specifications

Dimensions	8 5/8" W x 8"H x 4 9/32" D
Panel Mount Cutout	7" W x 7 3/4" H
Surface Mounting	Mounting brackets included.
Switch Type	Two 3-wire SPDT.
Switch Sensitivities	Normal 1% of range (factory standard #79 switch). Super Sensitive 1/2% of element range (optional #73 switch).
Switch Differential (between each switch)	0 to 5% of element range.
Electrical Connection	Terminal block accessible through top cover hatch.
Conduit Openings	1/2 inch NPS holes on each side of the case for 1/2" conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening locations.
Electrical Rating	50VA, inductive; 500VA, non inductive; 250V maximum AC only. (each switch individually)
Agency Listings	UL and CSA.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	5 lbs.
Approx Ship. Weight*	7 lbs.



LFB73-73
INDICATING CONTROLLER



BASIC LFB73-73 MODEL

ACCESSORIES

Description	Code
None	0
201 Weather Resistant (requires inverted scale)	1

HOW TO ORDER

First select the proper ordering number for the LFB73-73 unit. Next consult element selection matrix, see Page 62. Select dial part number, see page 65, and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. The LFB73-73 instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Sample Order:

Description	Required Number
LFB73-73 Unit	LF020
with Dial	00601739 (from page 65)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 11.

ABOUT THIS INSTRUMENT

Description

Dual setpoint controller. This is a fully adjustable, wide-differential temperature controller designed for two-stage heating or cooling, or one switch control plus alarm actuation. Equipped with two individually adjustable set pointers. Unit is UL and CSA listed. Flush or wall mount, two three-wire circuits and available in twelve optional ranges within -30 to 1100°F.

Operation

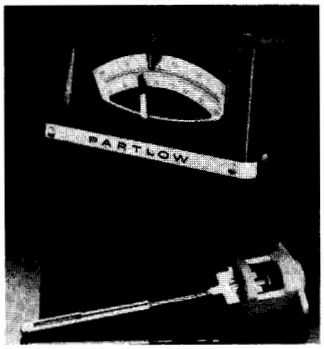
Temperature setting of either switch is made by a two-position in-out knob located on the instrument cover. Two red setting pointers permit each switch to be positioned independently at any two points on the temperature scale. Note: setpoints may not cross each other.

Each switch is operated independently by the single black indicating pointer, which moves up and down scale in response to the expansion and contraction in the thermal element.

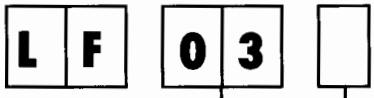
Specifications

Dimensions	8 5/8" W x 8"H x 4 9/32" D
Panel Mount Cutout	7" W x 7 3/4" H
Surface Mounting	Mounting brackets included.
Switch Type	Two 3-wire SPDT.
Switch Sensitivities	Super Sensitive 1/2% of element range.
Switch Differential (between each switch)	Maximum, full scale; minimum, 1.5% of element range.
Electrical Connection	Terminal block accessible through top cover hatch.
Conduit Openings	1/2 inch NPS holes on each side of the case for 1/2" conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening locations.
Electrical Rating	50VA, inductive; 500VA, non inductive; 250V maximum AC only.
Agency Listings	UL and CSA.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	6 lbs.
Approx Ship. Weight*	8 lbs.

*Weight may vary depending on element length.



LFP
INDICATING CONTROLLER



BASIC LFP 135 5/16" MODEL

The potentiometer coil kits listed below are available. They are ordered separately and installed in the field.

Description	Part #
100 Ohm 1/8"	64403504
100 Ohm 5/16"	64403505
135 Ohm 1/8"	64403501

ACCESSORIES

Description	Code
None	0
201 Weather Resistant*	1
392 High Limit Setpoint	2
Combination of 201 and 392	3

*Requires inverted scale

HOW TO ORDER

First select the proper ordering number for the LFP unit. Next consult element selection matrix, see Page 62. Select dial part number, see page 65, and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. The LFP instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Sample Order:

Description	Required Number
LFP Unit	LF030
with Dial	00601719 (from page 65)
with element	101511024 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 11.

ABOUT THIS INSTRUMENT

Description
Electric modulating potentiometer-type controller. Used with proportional positioning motors to operate modulating valves, damper systems, etc. where straight line control is required. The instrument automatically positions any of a variety of standard motor operators to provide precise temperature control without the sawtooth line characteristic of conventional on-off control. CSA listed. Flush or wall mount, available in twelve optional ranges within -30 to 1100°F.

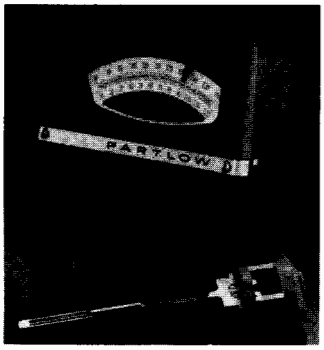
Operation
The potentiometer coil, which moves with the red set pointer, is positioned at the control point by turning the setting knob located on the instrument cover.

The indicating pointer, moving up or down scale in response to the expansion or contraction in the thermal element, also slides the contact finger along the potentiometer coil within the modulating range.

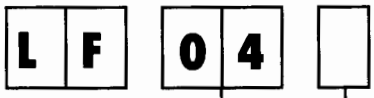
Specifications

Dimensions	8 5/8" W x 8"H x 4 9/32" D		
Flush Mount Cutout	7" W x 7 3/4" H		
Surface Mounting	Mounting brackets included.		
Coil Resistant	135 ohms 5/16" width standard, other widths and resistances are optional (must be field installed)		
Coil Length, Throttling Range Available	1/8" 3.5%	5/16" 8%	5/8" 16%
Load Error Adjustment	Manual reset for load error compensation.		
Electrical Rating	Max. volts - 30; Max. watts - 3.		
Electrical Hookup	Terminal block accessible through top hatch.		
Conduit Openings	1/2 inch NPS holes on each side of the case for 1/2" conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening locations.		
Agency Listing	CSA		
Warranty	One year, see page 80 for details.		
Approx. Net Weight*	6 lbs.		
Approx Ship. Weight*	8 lbs.		

*Weight may vary depending on element length.



LFA
PNEUMATIC CONTROL



BASIC LFA MODEL

ACCESSORIES

Description	Code
None	0
201 Weather Resistant (requires inverted scale)	1

HOW TO ORDER

First select the proper ordering number for the LFA unit. Next consult element selection matrix, see Page 62. Select dial part number, see page 65, and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. The LFA instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Sample Order:

Description	Required Number
LFA Unit	LF040
with Dial	00601739 (from page 65)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 11.

ABOUT THIS INSTRUMENT

Description
Pneumatic controller used in conjunction with an air-operated valve for control of steam, gas or fuel for combustion equipment or to operate other pneumatic devices. Requires approximately 16 psi input; air output is 3 to 15 psi. Throttling span is 5% to 25% of scale range. Flush or wall mount, available in twelve optional ranges within -30 to 1100°F.

Operation
As the indicating pointer, moving up or down scale in response to the expansion or contraction in the thermal element, enters the throttling range and approaches set point, it changes the effective orifice in the instrument's bleed valve.

Depending upon its control action (reverse or direct acting), this increases or decreases the pressure delivered to the remotely placed air-operated control device.

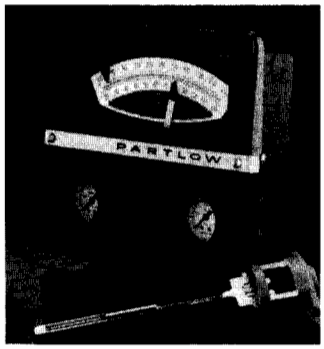
Pressure transmitted by the control instrument is reflected by the valve position of the air-operated device which modulates the flow of heating or cooling medium.

Load error, inherent in throttling controls, is compensated by manual reset adjustment.
Note: For long air line feeds, ie. 10 feet or greater, or large volume valves or control devices, an air pressure booster is strongly recommended.

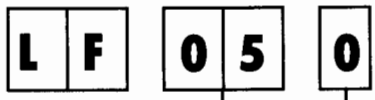
Specifications

Dimensions	8 5/8" W x 8"H x 4 9/32" D
Flush Mount Cutout	7" W x 7 3/4" H
Surface Mounting	Mounting brackets included.
Air Hookup	1/4-NPT inlet and outlet openings at top and back of case.
Air Input Requirements	Approximately 16 psi.
Air Output Pressure	3 to 15 psi.
Air Consumption	12 cfh maximum.
Throttling Span	Adjustable from 5 to 20% of element range.
Load Error Adjustment	Manual reset for load error compensation.
Control Action	Reverse Acting, std; Direct Acting, field adjustable.
Air Gauges	Inlet and outlet - both gauges provide for English and Metric scales.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	6 lbs.
Approx Ship. Weight*	8 lbs.

*Weight may vary depending on element length.



LFV4
EXPLOSION-PROOF CONTROL



BASIC LFV4 MODEL

ACCESSORIES

Description	Code
None	0

Note: This unit is UL listed but agency recognition is void if instrument is modified from factory standard.

HOW TO ORDER

First select the proper ordering number for the LFV4 unit. Next consult element selection matrix, see Page 62. Select dial part number, see page 65, and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. The LFV4 instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Sample Order:

Description	Required Number
LFV4 Unit	LF050
with Dial	00601739 (from page 65)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 11.

ABOUT THIS INSTRUMENT

Description
Explosion proof controller. All electric wiring and switching in this unit is isolated atop the control body in approved enclosures. It is UL listed for use in Class 1, groups B, C, and D; and Class 2, Groups E, F, and G locations.

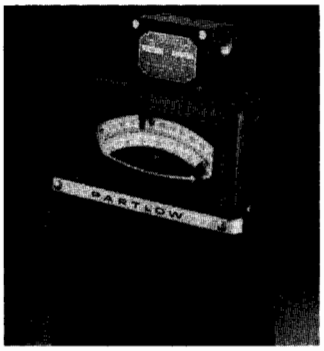
Operation
Control point is positioned by the cover knob located on the instrument cover.

The snap-acting switch, located atop the instrument in a separate UL listed explosion-proof enclosure, is operated by the indicating pointer which moves in response to the expansion and contraction of the sensing element. When they align with the set pointer, the switch opens or closes the circuit.

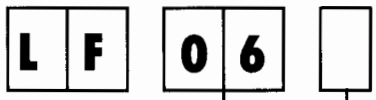
Specifications

Dimensions	8 5/8" W x 10 3/16"H x 4 9/32" D
Flush Mount Cutout	7" W x 7 3/4" H
Surface Mounting	Mounting brackets included.
Switch Type	SPDT #4 explosion proof switch.
Electrical Rating	50VA inductive, 500 VA non-inductive.
Electrical Hookup	Front of switch enclosure, removable for terminal access.
Conduit Openings	Threaded 1/2" NPS hole in right side of switch enclosure.
Agency Listing	UL
Warranty	One year, see page 80 for details.
Approx. Net Weight*	8 lbs.
Approx Ship. Weight*	11 lbs.

*Weight may vary depending on element length.



LFHL
HIGH TEMPERATURE LIMIT CONTROL



BASIC LFHL MODEL

ACCESSORIES

Description	Code
None	0

HOW TO ORDER

First select the proper ordering number for the LFHL unit. Next consult element selection matrix, see Page 62. Select dial part number, see page 65, and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. The LFHL instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Only a certain select few ranges are applicable to the correct operation of the instrument.

Sample Order:

Description	Required Number
LFHL Unit	LF060
with Dial	00602022 (from page 65)
with element	110510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 11.

ABOUT THIS INSTRUMENT

Description

Indicating high-temperature limit device which also contains a fail-safe feature in the event temperature drops below normal ambient due to damage to the thermal sensing element. A red signal light remains on as long as temperature is below the limit setting. FM and CSA listed. Flush or wall mount, only approved for the following range codes 107, 110, 113, 114, and 115.

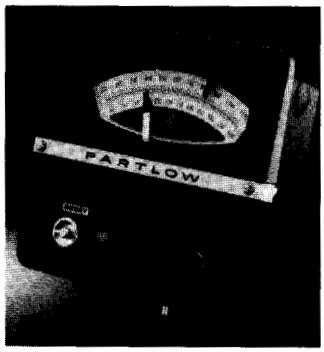
Operation

The unit is equipped with both manual reset and element failure switches. The limit switch is set internally to prevent tampering with set point, capstan-type cover screws provide wire-sealing of the instrument. The high limit switch cannot be reactivated until temperature has dropped below limit set point. The element failure switch actuates to shut down the heating system in the event temperature drops below normal ambient due to accidental loss of operation of the sensing element. A cover mounted red signal light remains on during normal operation. The light is de-energized the instant either switch is actuated, alerting personnel to a malfunction of heating system or thermal element.

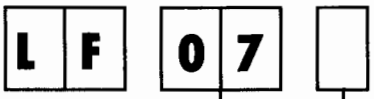
Specifications

Dimensions	8 5/8" W x 8"H x 4 9/32" D
Flush Mount Cutout	7" W x 7 3/4" H
Surface Mounting	Mounting brackets included.
Switch Type	Three-wire: SPDT High Limit: #10, manual reset Element Failure: #15, spring leaf
Switch Sensitivities	Normal 1% of range.
Electrical Connection	Terminal block accessible through top cover hatch.
Conduit Openings	1/2 inch NPS holes on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Electrical Rating	15 amps, 250 volts, AC.
Agency Listings	FM and CSA.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	5 lbs.
Approx Ship. Weight*	8 lbs.

*Weight may vary depending on element length.



LFE18
IMPULSE-TYPE MODULATING CONTROL



BASIC LFE18
2 RPM 8% 220/60 MODEL

ACCESSORIES

Description	Code
None	0
201 Weather Resistant (requires inverted scale)	1

HOW TO ORDER

First select the proper ordering number for the LFE18 unit. Next consult element selection matrix, see Page 62. Select dial part number, see page 65, and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. The LFE18 instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Sample Order:

Description	Required Number
LFE18 Unit	LF070
with Dial	00601739 (from page 65)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 11.

ABOUT THIS INSTRUMENT

Description

Electric modulating impulse-type controller designed to provide straight line control of electric heaters. Change in electrical input is automatically proportioned by a change in temperature within the modulating range. This anticipatory characteristic of the instrument reduces heat input as process temperature approaches set point, eliminating the over and under shoot of conventional on-off control of electric heaters. UL and CSA listed. Flush or wall mount. Twelve optional ranges within -30°F to 1100°F.

Operation

Control point is set by turning the setting knob until red set pointer, which moves with the knob, is positioned at desired temperature on the scale.

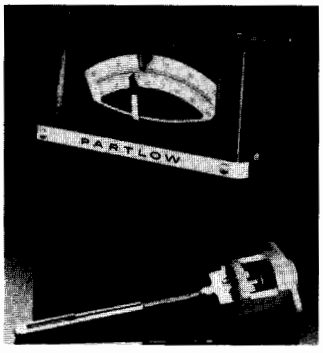
The indicating pointer moves up or down scale in response to the expansion or contraction in the thermal sensing element. A stiff leaf snap-acting switch, mounted on the pointer assembly, is actuated by a constantly-turning cam mounted on the set pointer assembly.

The rotating cam contacts the switch at the start of the modulating range. Contacts are actuated for longer and longer periods as temperature continues to rise, each contact breaking the control circuit and interrupting the heating as set point is approached. When the precise proportion of circuit cycle is attained, the balance of heat input and process requirements is maintained.

Specifications

Dimensions	8 5/8" W x 8"H x 4 9/32" D
Flush Mount Cutout	7" W x 7 3/4" H
Surface Mounting	Mounting brackets included.
Switch Type	#18A, SPDT, stiff leaf. Only the normally closed and common terminals are used for control circuit.
Cam Motor	2 rpm (for other speeds, consult factory)
Electrical Hookup	Terminal block accessible through top cover hatch.
Conduit Openings	1/2 inch NPS holes on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Electrical Rating	50VA inductive, 500VA non-inductive; AC only.
Rated Accuracy	± 1% of element range.
Agency Listings	UL and CSA.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	7 lbs.
Approx Ship. Weight*	10 lbs.

*Weight may vary depending on element length.



RFT
RECORDING THERMOMETER

R	F	0	1			0

BASIC RFT MODEL

CHART DRIVES (Counter Clockwise Rotation)

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02
125V/60Hz	12 H	03
125V/60Hz	48 H	04
125V/50Hz	24 H	05
125V/50Hz	7 D	06
Spring	24 H	07
Spring	7 D	08
250V/50Hz	24 H	09
250V/50Hz	7 D	10
250V/60Hz	24 H	11

ACCESSORIES

Description	Code
None	0
Pressure Sensitive Marking Sys.	3

HOW TO ORDER

First select the proper ordering number for the RFT unit. Next consult element selection matrix, see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RFT instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Availability of charts will limit element selection.

Sample Order:

Description	Required Number
RFT Unit	RF01010
with charts	00208004 (from page 71)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 12.

ABOUT THIS INSTRUMENT

Description

Records temperature on a 10" chart. Twelve ambient compensated ranges within -30° to 1100°F, permit application diversity from refrigeration to high temperature ovens. Standard clock rotations 12, 24, and 48 hour, 7 day, others available. Choice of electric or spring wound chart drives available. Wall mounted (brackets furnished) or flush mounted. UL listed.

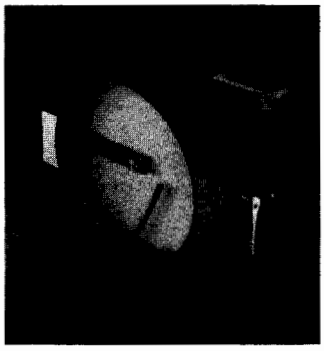
Operation

Pen recording is powered by the Piston Pak thermal sensing element, which is field replaceable. Temperature ranges may be substituted at any time by obtaining the correct Piston Pak assembly and proper chart graph, and exchange these with those already on the recorder, providing field range changeability.

Specifications

Dimensions	15 1/8" W x 13 13/16"H x 4 7/8" D
Chart Diameter	10 inch.
Chart Marking	Felt Tip Cartridge/optional pressure sensitive charts
Chart Drive	Electric with toggle switch, or spring wound.
Chart Rotation Periods	24 and 48 hour, 7 day, other options.
Flush Mount Cutout	13 1/2" W x 12 11/16" H
Surface Mounting	Mounting brackets included.
Electrical Hookup	Terminal block accessible with cover open.
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Rated Accuracy	1% of element range.
Agency Listing	UL
Warranty	One year, see page 80 for details.
Approx. Net Weight*	9 lbs.
Approx Ship. Weight*	14 lbs.

*Weight may vary depending on element length.



RF15-79
RECORDING TEMPERATURE CONTROL

BASIC RF15-79 MODEL

#73 switch is available in place of #79. It must be ordered separately and installed in the field.
#73 Close (1/2%) Sensitivity 64403018

CHART DRIVES (Counter Clockwise Rotation)

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02
125V/60Hz	12 H	03
125V/60Hz	48 H	04
125V/50Hz	24 H	05
125V/50Hz	7 D	06
Spring wound	24 H	07
Spring wound	7 D	08
250V/50Hz	24 H	09
250V/50Hz	7 D	10
250V/60Hz	24 H	11

ACCESSORIES

Description	Code
None	0
257AP Low Limit Switch	1
Pressure Sensitive Marking Sys.	3

HOW TO ORDER

First select the proper ordering number for the RF15-79 unit. Next consult element selection matrix, see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RF15-79 instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Availability of charts will limit element selection.

Sample Order:

Description	Required Number
RF15-79 Unit	RF02010
with charts	00208004 (from page 71)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 12.

ABOUT THIS INSTRUMENT

Description
This recording temperature controller incorporates two switches which operate in fixed relationship to the temperature setting. Differential between switches can be adjusted up to 5% of scale range. Like other RF series recorders, this unit has a 10" chart, may be flush or surface mounted. Unit is shipped with brackets for surface mounting operation. UL and CSA listed.

Operation
This unit incorporates two snap-setting switches mounted on a common setting arm (red pointer) and actuated by the same temperature response mechanism which moves the recording pen.

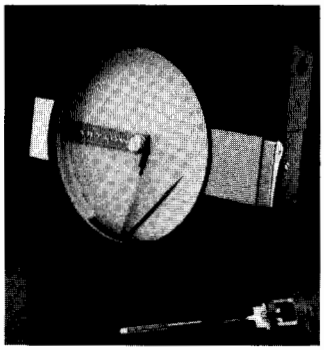
First to be actuated on a temperature rise is a leaf-type switch. The second, a pin-type switch, is actuated only when the recorded temperature exceeds the operation of the first switch.

Switches are mounted one behind the other, each having its own circuit. Temperature actuation points between the two switches (differential) is adjustable from 0 to 5 percent of scale range, with tolerance on switch settings ± 1/2%. Adjustment is made by set screws inside the instrument case.

Specifications

Dimensions	15 1/8" W x 13 3/16"H x 4 7/8" D
Chart Diameter	10 inch.
Chart Marking	Felt Tip Cartridge/optional pressure sensitive charts
Chart Drive	Electric with toggle switch, or spring wound.
Chart Rotation Periods	24 and 48 hour, 7 day, other options.
Panel Mount Cutout	13 1/2" W x 12 5/8" H
Surface Mounting	Mounting brackets included.
Switch Type	Three wire SPDT, 2 per mechanism.
Switch Sensitivities	Normal 1% of range (#79) standard. Super Sensitive (#73) 0.5% of range optional.
Electrical Hookup	Terminal block accessible with cover open.
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Electrical Rating	50VA, inductive; 500VA, non inductive; 250V maximum AC only.
Agency Listings	UL and CSA.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	9 lbs.
Approx Ship. Weight*	14 lbs.

*Weight may vary depending on element length.



RFA - PNEUMATIC RECORDING TEMPERATURE CONTROLLER

R	F	0	3			0

BASIC RFA MODEL

CHART DRIVES (Counter Clockwise Rotation)

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02
125V/60Hz	12 H	03
125V/60Hz	48 H	04
125V/50Hz	24 H	05
125V/50Hz	7 D	06
Spring	24 H	07
Spring	7 D	08
250V/50Hz	24 H	09
250V/50Hz	7 D	10
250V/60Hz	24 H	11

ACCESSORIES

Description	Code
None	0
Pressure Sensitive Marking Sys.	3

HOW TO ORDER

First select the proper ordering number for the RFT unit. Next consult element selection matrix, see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RFT instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Availability of charts will limit element selection.

Sample Order:

Description	Required Number
RFA Unit	RF03010
with charts	00208004 (from page 71)
with element	109510520 (from apge 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 12.

ABOUT THIS INSTRUMENT

Description

This recorder is an accurate, sensitive pneumatic controller used in conjunction with an air-operated valve for control of steam, gas or fuel for combustion equipment or to operate other pneumatic devices. Requires approximately 16 psi input, air output is 3 to 15 psi, throttling span is 5% to 25% of scale range. Flush or wall mounted (brackets supplied) with 12 optional ranges from -30°F to 1100°F.

Operation

Operates in an adjustable throttling range of 5-25% of scale range. As the indicating pointer, moving up or down scale in response to the expansion or contraction in the thermal sensing element, enters the throttling range and approaches set point, it changes the effective orifice in the instrument's bleed valve.

Depending upon its control action (reverse or direct acting) this increases or decreases the pressure delivered to the remotely-placed air operated control device.

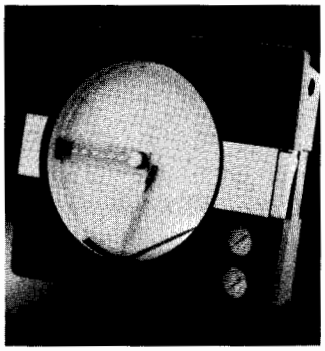
Pressure transmitted by the control instrument is reflected by the valve position of the air-operated device which modulates the flow of heating or cooling medium.

Load error, inherent in throttling controls, is compensated by manual reset adjustment. Note: For long air line feeds, ie. 10 feet or greater, or large volume air valves or control devices, an air pressure booster relay is strongly recommended.

Specifications

Dimensions	15 1/8" W x 13 3/16"H x 4 7/8" D
Chart Diameter	10 inch.
Chart Marking	Felt Tip Cartridge/optional pressure sensitive charts
Chart Drive	Electric with toggle switch, or spring wound.
Chart Rotation Periods	24 and 48 hour, 7 day, other options.
Flush Mount Cutout	13 1/2" W x 12 11/16" H
Surface Mounting	Mounting brackets included.
Electrical Hookup	Terminal block accessible with cover open.
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Air Hookup	1/4-NPT inlet and outlet openings at top and back of case.
Air Input Requirements	Approximately 16 psi to 20 psi.
Air Output Pressure	3 to 15 psi.
Air Consumption	12 cfh maximum.
Throttling Span	Adjustable from 7 to 35% of element range.
Load Error Adjustment	Manual reset for load error compensation.
Control Action	Reverse or Direct Acting (factory set-reverse, field changeable to direct acting).
Air Gauges	Inlet and outlet - both gauges provide for English and Metric scales.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	9 1/2 lbs.
Approx Ship. Weight*	10 3/4 lbs.

*Weight may vary depending on element length.



RFP
MODULATING TEMPERATURE RECORDER

BASIC RFP MODEL

The potentiometer coil kits listed below are available.
They must be ordered separately and installed in the field.

Description	Part #
100 Ohm 1/8"	64403504
100 Ohm 5/16"	64403505
135 Ohm 1/8"	64403501

CHART DRIVES (Counter Clockwise Rotation)

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02
125V/60Hz	12 H	03
125V/60Hz	48 H	04
125V/50Hz	24 H	05
125V/50Hz	7 D	06
Spring wound	24 H	07
Spring wound	7 D	08
250V/50Hz	24 H	09
250V/50Hz	7 D	10
250V/60Hz	24 H	11

ACCESSORIES

Description	Code
None	0
Pressure Sensitive Marking Sys.	3

HOW TO ORDER

First select the proper ordering number for the RFP unit. Next consult element selection matrix, see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RFP instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Availability of charts will limit element selection.

Sample Order:

Description	Required Number
RFP Unit	RF04010
with charts	00208004 (from page 71)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 12.

ABOUT THIS INSTRUMENT

Description

This recorder is a potentiometer-type controller designed for use with proportional positioning motors to operate modulating valves or damper systems where extremely close sensitivity or straight-line control is required.

The instrument automatically positions any of a variety of standard motor operators to provide precise temperature control without sawtooth line characteristics of conventional on-off control. Flush or wall mounted, brackets supplied. Available in 12 optional ranges from -30°F to 1100°F. CSA listed.

Operation

The potentiometer coil, which moves up or down scale in response to the expansion or contraction in the thermal element, also slides the contact finger along the potentiometer coil within the modulating range.

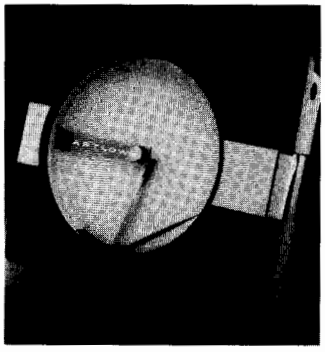
In essence, the coil forms half of a Wheatstone Bridge circuit, while the other half of the bridge is formed by a potentiometer of similar electrical characteristics built into the proportioning motor and driven by the motor shaft.

When the contact finger is located at the low end of the potentiometer coil as in process start-up, the motor drives the device to the fully open position.

With the contact finger at the high end of the coil, the motor moves the drive to the fully closed position.

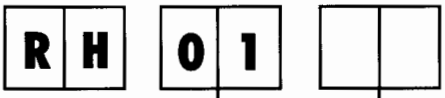
Specifications

Dimensions	15 1/8" W x 13 3/16"H x 4 7/8" D			
Chart Diameter	10 inch.			
Chart Marking	Felt Tip Cartridge/optional pressure sensitive charts			
Chart Drive	Electric with toggle switch, or spring wound.			
Chart Rotation Periods	24 and 48 hour, 7 day, other options.			
Flush Mount Cutout	13 1/2" W x 12 11/16" H			
Surface Mounting	Mounting brackets included.			
Electrical Hookup	Terminal block accessible with hinged cover open.			
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.			
Coil Resistance	135 ohms 5/16" width std; others available as field installable kits.			
Electrical Rating	Max. volts - 30; max. watts - 3.			
Coil Length,	5/16"	1/8"	5/8"	
Throttling Range Available	12%	5%	24%	
Rated Accuracy	1% of element range.			
Agency Listing	CSA			
Warranty	One year, see page 80 for details.			
Approx. Net Weight*	12 lbs.			
Approx Ship. Weight*	17 lbs.			



*Weight may vary depending on element length.

RFHTT
DUAL RECORDING THERMOMETER



BASIC RFHTT MODEL

CHART DRIVES

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02
125V/60Hz	12 H	03
125V/60Hz	48 H	04
125V/50Hz	24 H	05
125V/50Hz	7 D	06
Spring	24 H	07
Spring	7 D	08
250V/50Hz	24 H	09
250V/50Hz	7 D	10
250V/60Hz	24 H	11
250V/60Hz	7 D	12

HOW TO ORDER

First select the proper ordering number for the RFHTT unit. Next consult element selection matrix (this unit requires 2 thermal sensing element), see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RFHTT instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Availability of charts will limit element selection.

Sample Order:

Description	Required Number
RFHTT Unit	RH01010
with charts	00208004 (from page 71)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 13.

ABOUT THIS INSTRUMENT

Description

This unit is a dual recording thermometer designed to sense and record temperature from two separate locations simultaneously on a single chart. The case contains two pen mechanisms with individual thermal sensing elements. The pens operate on 1/12 revolution of the chart, for example 2 hours per 24 hour rotation to prevent possible interference when both sensed temperatures happen to coincide. Flush or wall mount available (brackets supplied). Available in 12 ranges from -30°F to 1100°F.

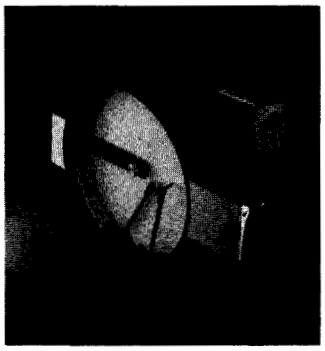
Operation

The unit consists of a chart drive either electrically driven or spring wound. This chart drive rotates a 10" chart on which two independent pens mark temperature. The mechanism pens function as a result of the Piston Pak expanding or contracting due to temperature change.

Specifications

Dimensions	15 1/8" W x 13 3/16"H x 4 7/8" D
Chart Diameter	10 inch.
Chart Marking	Felt Tip Cartridge.
Chart Drive	Electric with toggle switch, or spring wound.
Chart Rotation Periods	24 and 48 hour, 7 day, other options.
Flush Mount Cutout	13 1/2" W x 12 11/16" H
Surface Mounting	Mounting brackets included.
Electrical Hookup	Terminal block accessible with cover open.
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Rated Accuracy	1% of element range.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	9 lbs.
Approx Ship. Weight*	14 lbs.

*Weight may vary depending on element length.



RFH15-79/15-15
DUAL RECORDING TEMPERATURE CONTROL

R	H	0	2		

BASIC RFH15-79/15-15 MODEL

#73 switch is available in place of #79.
It must be ordered separately and installed in the field.
#73 Close (1/2%) Sensitivity p/n 64403018

CHART DRIVES

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02
125V/60Hz	12 H	03
125V/60Hz	48 H	04
125V/50Hz	24 H	05
125V/50Hz	7 D	06
Spring	24 H	07
Spring	7 D	08
250V/50Hz	24 H	09
250V/50Hz	7 D	10
250V/60Hz	24 H	11
250V/60Hz	7 D	12

Note: Set pointers cannot be crossed more than 50% of chart span.

HOW TO ORDER

First select the proper ordering number for the RFH15-79/15-15 unit. Next consult element selection matrix (this unit requires 2 thermal sensing elements), see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RFH15-79/15-15 instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Availability of charts will limit element selection.

Sample Order:

Description	Required Number
RFH15-79/15-15 Unit	RH0201
with charts	00208004 (from page 71)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 13.

ABOUT THIS INSTRUMENT

Description
This dual instrument controls and records two temperature variables on a single chart. It is ideal for temperature and humidity controlled applications such as growth chambers, smokehouses, and kilns. The unit is made up of two switch mechanisms. UL and CSA listed. Flush or wall mount (brackets available).

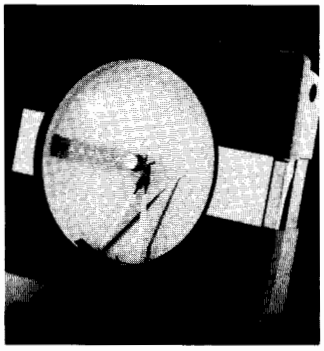
Operation
The unit is a mechanical, recording controller that incorporates two independent control switching systems in a single case. To avoid interference, the two pens register a difference on one-twelfth revolution of the chart, or a two hour differential on a 24 hour chart. Control points are indicated by a red setting pointer on the right hand mechanism, a green pointer on the left.

There are two control switches mounted on each mechanism, they are mounted one behind the other. First switch to be actuated on a temperature rise is the leaf-type switch. The second switch (a pin type for left mechanism and a leaf type for the right mechanism) is actuated when the recorded temperature exceeds the operation of the first switch. Temperature actuation points between the two switches (differential) is adjustable from 0 to 5% of scale range, with tolerance on switch setting ± 1/2%, adjustment is made by set screws inside the instrument case.

Specifications

Dimensions	15 1/8" W x 13 13/16"H x 4 7/8" D
Chart Diameter	10 inch.
Chart Marking	Felt Tip Cartridge.
Chart Drive	Electric with toggle switch, or spring wound.
Chart Rotation Periods	24 and 48 hour, 7 day, other options.
Flush Mount Cutout	13 1/2" W x 12 5/8" H
Surface Mounting	Mounting brackets included.
Electrical Hookup	Terminal block accessible with cover open.
Switch Type	Three wire SPDT, 2 per each mechanism.
Switch Sensitivities	Normal 1% of range (#79) standard. Super Sensitive (#73)) 0.5% of range-field installable.
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Electrical Rating	50VA, inductive; 500VA, non inductive; 250V maximum AC only.
Agency Listings	UL and CSA.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	9 lbs.
Approx Ship. Weight*	14 lbs.

*Weight may vary depending on element length.



RFHAA - DUAL RECORDING PNEUMATIC TEMPERATURE CONTROL

R	H	0	3		

BASIC RFHAA MODEL

CHART DRIVES

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02
125V/60Hz	12 H	03
125V/60Hz	48 H	04
125V/50Hz	24 H	05
125V/50Hz	7 D	06
Spring	24 H	07
Spring	7 D	08
250V/50Hz	24 H	09
250V/50Hz	7 D	10
250V/60Hz	24 H	11
250V/60Hz	7 D	12

Note: Set pointers cannot be crossed more than 50% of chart span.

HOW TO ORDER

First select the proper ordering number for the RFHAA unit. Next consult element selection matrix (this unit requires 2 thermal sensing element), see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RFHAA instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Availability of charts will limit element selection.

Sample Order:

Description	Required Number
RFHAA Unit	RH0301
with charts	00208004 (from page 71)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 13.

ABOUT THIS INSTRUMENT

Description

This unit is designed to control pneumatically and record two separate temperature variables on a common chart. Relative humidity can be governed through the control of wet and dry bulb temperatures. Two independent control systems in a single case. Humidity and temperature control, output 3-15psi. Manual reset adjustment with adjustable throttling range 5-25%.

Operation

The dual RFHAA operates air powered throttling valves regulating the flow of steam, water or gas or actuates other pneumatic devices such as pressure switches or relays. Wet and dry bulbs are recorded when it is used to control temperature and relative humidity.

Two instruments with independent pen arms comprise the control. Pen arms are set at two-hour time differential on a 24 hour chart to prevent interference when recording at or near the same control temperature.

Pen arms move up or down scale in response to the expansion or contraction in the thermal sensing element. As a pen arm enters the throttling range and approaches set point, it changes the effective orifice size in its control mechanism's bleed valve.

Pressure transmitted by the instrument is reflected by the valve position of the air-operated device which modulates the flow of heating or cooling medium.

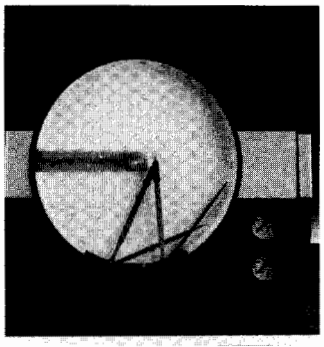
The control produces an output pressure of 3 to 15 psi, approximately 16 psi input pressure is required to obtain this range. Throttling span is adjustable within the extremes of 5 to 15% of the scale range.

Load arm, inherent in throttling controls, is compensated by a manual reset adjustment.

Specifications

Dimensions	15 1/8" W x 13 13/16"H x 4 7/8" D
Chart Diameter	10 inch.
Chart Marking	Felt Tip Cartridge.
Chart Drive	Electric with toggle switch, or spring wound.
Chart Rotation Periods	24 and 48 hour, 7 day, other options.
Flush Mount Cutout	13 1/2" W x 12 11/16" H
Surface Mounting	Mounting brackets included.
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Air Hookup	1/4-NPT inlet and outlet openings at top and back of case.
Air Input Requirements	Approximately 16 psi to 20 psi.
Air Output Pressure	3 to 15 psi.
Air Consumption	12 cfh maximum per mechanism.
Throttling Span	Adjustable from 7 to 35% of element range.
Load Error Adjustment	Manual reset for load error compensation.
Control Action	Reverse or Direct Acting (Factory set - reverse, field changeable to direct acting).
Warranty	One year, see page 80 for details.
Approx. Net Weight*	10 lbs.
Approx Ship. Weight*	11 lbs.

*Weight may vary depending on element length.



RFC15-52
RECORDING TEMPERATURE PROGRAMMER

BASIC RFC15-52 MODEL

CHART DRIVES

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02

ACCESSORIES

Description	Code
None	0
250P Cam Follower Attachment	2

HOW TO ORDER

First select the proper ordering number for the RFC15-52 unit. Next consult element selection matrix, see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RFC15-52 instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Availability of charts will limit element selection.

Sample Order:

Description	Required Number
RFC15-52 Unit	RF07010
with charts	00208004 (from page 71)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 14.

ABOUT THIS INSTRUMENT

Description

This instrument is a recorder with a two switch control mechanism which provides automatic temperature programming by use of a pre-cut plastic cam. It is used when two temperatures separated by not more than 5 percent of scale range are specified as control points. The instrument contains two internally-mounted three-wire thermostatic relays. Wall mounted (brackets furnished) or flush mounted. CSA listed.

Operation

Control point of the RFC15-52 is determined by a cam-follower which rides the edge of a revolving pre-cut cam and positions the snap-acting switches in accordance with the program for which the cam is shaped. Cam is configured and fabricated by end user.

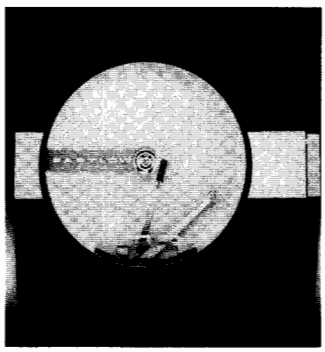
Switches are actuated by the same temperature-responsive mechanism which moves the recording pen, operating at preselected points in relation to the center line of the cam follower roller.

First switch to be actuated on a temperature rise is the leaf-type #15 if normal sensitivity. Second is a super-sensitive #52 pin type, actuated only when the recorded temperature exceeds the operating point of the first switch.

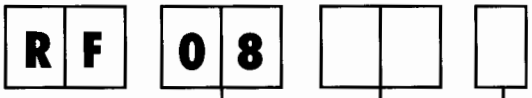
Specifications

Dimensions	15 1/8" W x 13 3/16"H x 4 7/8" D
Chart Diameter	10 inch.
Chart Marking	Felt Tip Cartridge.
Chart Drive	Electric with toggle switch.
Chart Rotation Periods	24 hour and 7 day.
Flush Mount Cutout	13 1/2" W x 12 11/16" H
Surface Mounting	Mounting brackets included.
Electrical Hookup	Terminal block accessible with cover open.
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Switch Specifications	#15 and #52 combination only. #15 SPDT, normal sensitivity (1% of element range). #52 SPDT, super sensitive (1/2% of element range).
Electrical Rating	6 amps at 125VAC, inductive or non-inductive load (through 2 pole thermostatic relay contacts).
Rated Accuracy	1% of element range.
Agency Listing	CSA
Warranty	One year, see page 80 for details.
Approx. Net Weight*	9 lbs.
Approx Ship. Weight*	14 lbs.

*Weight may vary depending on element length.



RFCP
RECORDING TEMPERATURE PROGRAMMER



BASIC RFCP 135 5/16"MODEL

The potentiometer coil kits listed below are available. They must be ordered separately and installed in the field.

Description	Part #
100 Ohm 1/8"	64403504
100 Ohm 5/16"	64403505
135 Ohm 1/8"	64403501

CHART DRIVES

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02
250V/50Hz	24 H	03
250V/50Hz	7 D	04
250V/60Hz	24 H	05

ACCESSORIES

Description	Code
None	0
250P Cam Follower Attachment	2

HOW TO ORDER

First select the proper ordering number for the RFCP unit. Next consult element selection matrix, see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RFCP instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Note: Availability of charts will limit element selection.

Sample Order:

Description	Required Number
RFCP Unit	RF08010
with charts	00208004 (from page 71)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 14.

ABOUT THIS INSTRUMENT

Description

This instrument is a recorder which utilizes a potentiometer-type controlling mechanism which provides automatic temperature programming by use of a pre-cut plastic cam. It governs proportional positioning motors which operate modulating valves, damper systems, or electric multi-state systems where extremely close sensitive or straight-line control is required. The instrument automatically positions any of a wide variety of standard motor operators to provide precise temperature control without the sawtooth line characteristics of conventional on-off control. CSA listed.

Operation

Control point of the RFCP is determined by a cam-follower which rides the edge of a revolving pre-cut cam and positions the potentiometer in accordance with the program for which the cam is shaped. Cam is configured and fabricated by end user.

The pen arm, which moves up or down scale in response to the expansion and contraction in the thermal sensing element, also slides the contact finger along the potentiometer coil within the modulating range. In essence, the coil forms half of a Wheatstone bridge circuit, while the other half of the bridge is formed by a potentiometer of similarly electric characteristics built into the proportioning motor and driven by the motor shaft. A detector relay, either incorporated into the proportioning motor or operating as a separate unit, detects any imbalance in the Wheatstone bridge caused by a change in control temperature and drives the proportioning motor in the direction necessary to regain a balanced bridged circuit.

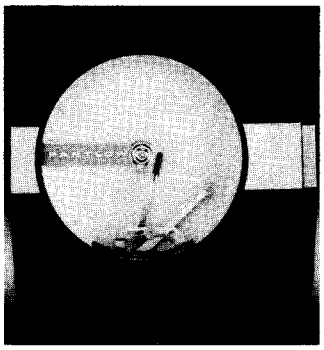
The shaft of the proportioning motor is connected through linkage to the device which controls the process fuel flow or temperature variable. When the contact finger is located at the low end of the potentiometer coil, the motor drives the device to the fully open position. When the contact finger at the high end of the coil, the motor moves the divide to the fully-closed position.

Resistance of the potentiometer coil to the Model RFCP should match that of the coil in the positioning motor. Optional resistance coils are listed on page 36. These may be selected if the motor to be controlled utilizes this resistance requirement.

Specifications

Dimensions	15 1/8" W x 13 3/16"H x 4 7/8" D
Chart Diameter	10 inch.
Chart Marking	Felt Tip Cartridge.
Chart Drive	Electric with toggle switch.
Chart Rotation Periods	24 hour and 7 day.
Flush Mount Cutout	13 1/2" W x 12 11/16" H
Surface Mounting	Mounting brackets included.
Electrical Hookup	Terminal block accessible with cover open.
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Coil Resistance	135 ohms 5/16" width std., others available as field installed kits.
Coil Length,	1/8" 5/16" 5/8" .
Throttling Range Available	5% 12% 24%
	Optional throttling ranges must be user installed and obtained separately.
Rated Accuracy	1% of element range.
Agency Listing	CSA
Warranty	One year, see page 80 for details.
Approx. Net Weight*	9 lbs.
Approx Ship. Weight*	14 lbs.

*Weight may vary depending on element length.



RFC52
RECORDING TEMPERATURE PROGRAMMER

BASIC RFC52 MODEL

CHART DRIVES

Description		Code
125V/60Hz	24 H	01
125V/60Hz	7 D	02

ACCESSORIES

Description	Code
None	0
250P Cam Follower Attachment	2

HOW TO ORDER

First select the proper ordering number for the RFC52 unit. Next consult element selection matrix, see Page 62. Select chart number, see page 70 and 71, and specify as a separate line item. The chart selected must correspond to specific range of sensing element selected. The RFC52 instrument requires a hollow (L-Type) element plunger (code 51 or 52). High ambient temperature head assembly (code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 52) when the instrument will be located in ambient temperatures between -30°F and 125°F. If the solution the sensing bulb is being immersed in is of a corrosive nature, see Form 3052, "Guide for use in Corrosive Applications".

Sample Order:

Description	Required Number
RFC52 Unit	RF09010
with charts	00208004 (from page 71)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 14.

ABOUT THIS INSTRUMENT

Description

This instrument is a recorder with a mechanism that has single switch control capability which provides automatic temperature programming by use of a pre-cut plastic cam. An internally-mounted three-wire thermostatic relay insures extremely long switch life and often eliminates the need for an external conductor. Wall mounted (brackets furnished) or flush mounted. CSA listed.

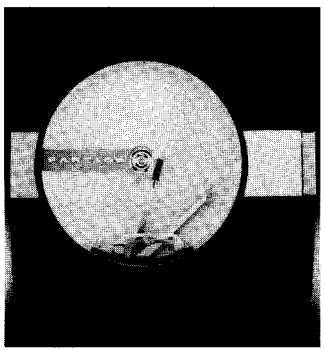
Operation

Control point of the RFC52 is determined by a cam-follower which rides the edge of a revolving pre-cut cam and positions the snap-acting switch in accordance with the program for which the cam is shaped. Cam is configured and fabricated by the end user.

The switch is actuated by the same temperature responsive mechanism which moves the recording pen, actuated when the pen point is at the center line of the cam follower, the switch operates the three-wire thermostatic relay which handles the load.

Specifications

Dimensions	15 1/8" W x 13 3/16"H x 4 7/8" D
Chart Diameter	10 inch.
Chart Marking	Felt Tip Cartridge.
Chart Drive	Electric with toggle switch.
Chart Rotation Periods	24 hour and 7 day.
Flush Mount Cutout	13 1/2" W x 12 11/16" H
Surface Mounting	Mounting brackets included.
Electrical Hookup	Terminal block accessible with cover open.
Conduit Openings	One 7/8 inch diameter hole on each side of the case for 1/2 inch conduit fitting; drill guide hole spotted in the rear of the case showing optional rear opening location.
Switch Specifications	#52 SPDT, super sensitive (1/2% of element range). Switch controls a 3-wire thermostatic relay for actual handling of electric load.
Electrical Rating	6 amps at 125VAC, inductive or non-inductive load (through 2 pole thermostatic relay contacts).
Rated Accuracy	1% of element range.
Agency Listing	CSA
Warranty	One year, see page 80 for details.
Approx. Net Weight*	9 lbs.
Approx Ship. Weight*	14 lbs.



*Weight may vary depending on element length.

OL63X - NON-INDICATING HIGH TEMP. LIMIT DEVICE

Description

This unit is used to cut off a heat supply at any pre-determined temperature within the overall range of -30 to 1100°F. It operates in conjunction with a separate temperature control to provide positive safety shutdown of industrial heating appliances. Reset button and safety light on front cover, trip free switch, fully tamperproof. UL and FM listed. Agency recognition is void if instrument is modified from factory standard.

Operation

The high limit switch is manually reset to reactuate the equipment after shutdown. It can be reset only after temperature has returned below the high-limit setting. The switch is of a trip-free design, i.e. it will not function in the event the reset button is tied or welded down, providing protection from tampering.

It is designed primarily for user applications where high temperature limitations can be specified in advance of ordering, the OL63X is always factory preset to customer requirements and the setting adjustment is factory sealed to prevent unauthorized changing. *Note: the element must be purchased with instrument to have switch set correctly.* Preset limit temperature is stamped on the rating plate affixed to the side of the control case.

A cover-mounted red signal light remains "on" during normal operation. Light is de-energized the instant the high limit switch is activated. The instrument also is equipped with capstan cover screws through which a wire may be threaded and secured with a lead seal.

Specifications

Dimensions	5 7/16" W x 5"H x 2 1/4" D
Switch Type	#63 SPST, normally closed, trip-free manual reset
Switch Sensitivity	1% of element range.
Electrical Hookup	Terminal block in conduit outlet box.
Conduit Openings	Threaded 1/2-NPT inlet and outlet.
Switch Rating	250VA pilot duty, 125 or 250V, AC only.
Agency Listings	UL and FM.
Warranty	One year, see page 80 for details.

How to Order

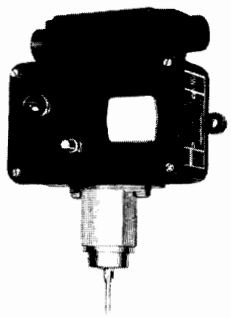
The proper ordering number for the OL63X is OH00074.

Next consult element selection matrix, page 62. The OL63X requires a solid (B-Type) element plunger (Code 53 or 54). High ambient temperature head assembly (Code 53) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (Code 54) when instruments will be located in ambient temperatures between -30°F and 125°F.

Sample Order:

Description	Required Number
OL63X	OH00074
with element	113530520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 15.



O63X - NON-INDICATING HIGH TEMP. LIMIT DEVICE

Description

This unit is for OEM's. Identical to the OL63X in all respects except for the preset high temperature limit and sealing of the setting adjustment, the O63X is listed under UL component recognition program. However, it does not carry the UL label when it leaves the factory.

This modification of the OL63X is made to accommodate the original equipment manufacturer who, at the time of ordering, has not determined the high temperature limit to be imposed on a given application.

The OEM is required to made his own temperature setting and to seal the setting adjustment screw to qualify the limit device for incorporation in UL listed appliance.

Specifications

Dimensions	5 7/16" W x 5"H x 2 1/4" D
Switch Type	#63 SPST, normally closed, trip-free manual reset
Switch Sensitivity	1% of element range.
Electrical Hookup	Terminal block in conduit outlet box.
Conduit Openings	Threaded 1/2-NPT inlet and outlet.
Switch Rating	250VA pilot duty, 125 or 250V, AC only.
Warranty	One year, see page 80 for details.

How to Order

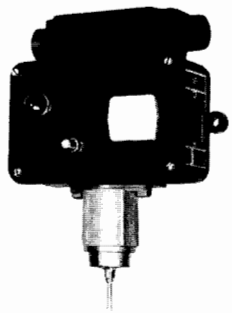
The proper ordering number for the O63X is OH00073.

Next consult element selection matrix, page 62. The O63X requires a solid (B-Type) element plunger (Code 53 or 54). High ambient temperature head assembly (Code 53) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (Code 54) when instruments will be located in ambient temperatures between -30°F and 125°F.

Sample Order:

Description	Required Number
OL63X	OH00073
with element	113530520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 15.



OHL63X - NON-INDICATING HIGH TEMP. LIMIT DEVICE

Description

This unit incorporates element failure protection. It operates in conjunction with a primary temperature controller to provide preset positive safety shutdown of industrial heating appliances. It features fully tamperproof trip-free switch, reset button and signal light on front cover. It has both UL and FM listing. *Agency recognition is void if modified from factory standard.*

Operation

The high limit switch is manually reset to reactuate the equipment after shutdown. It can be reset only after the temperature drops below the high-limit setting. The switch is of a trip-free design, i.e. it will not function in the event the reset button is tied or welded down, providing protection from tampering.

Designed primarily for user applications where high temperature limitations can be specified in advance of ordering, the OHL63X is always factory preset to customer requirements and the setting adjustment factory sealed to prevent unauthorized changes. *Note: the element must be purchased with instrument to have switch set correctly.* Preset limit temperature is stamped on the rating plate affixed to the side of the control case.

The element failure switch, connected in series with the high limit switch, is factory set at a point below normal ambient, at 50°F, unless otherwise specified. This switch will prevent appliance start-up if ambient temperature is lower than switch setting or if the instrument's thermal element has lost some of its fill.

A cover-mounted amber signal light remains energized during normal operation, while the light is de-energized the instant the high limit switch is activated. The instrument also is equipped with capstan cover screws through which a wire may be threaded and secured with a lead seal.

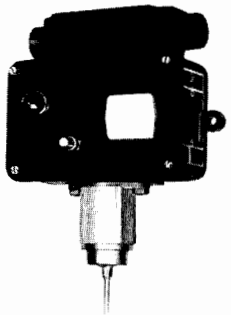
Specifications

Dimensions	5 7/16" W x 5"H x 2 1/4" D
Mounting	Wall mounting ears on body for 1/4" screws.
Switch Type	Manual reset: #63 2-wire, N.C., trip free. Element Failure: #57, 3-wire, SPDT.
Electrical Hookup	Pigtails brought out through outlet conduit box.
Conduit Openings	Threaded 1/2-NPT inlet and outlet.
Electrical Rating	125 or 250V, AC only. 250VAC pilot duty.
Instrument Accuracy	1% of element range.
Agency Listings	UL and FM.
Warranty	One year, see page 80 for details.

How to Order

The proper ordering number for the OHL63X is OH00080.

Next consult element selection matrix, page 62. The OHL63X requires a solid (B-Type) element plunger (Code 53 or 54). High ambient temperature head assembly (Code 53) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (Code 54) when instruments will be located in ambient temperatures between -30°F and 125°F.



Sample Order:

Description	Required Number
OHL63X	OH00080
with element	113530520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 15.

OH63X - NON-INDICATING HIGH TEMP. LIMIT DEVICE

Description

This unit is for OEM's. Identical to Model OHL63X in all respects except for the preset high temperature limit and sealing of the setting adjustment, the OH63X is listed under the UL component recognition program.

This modification of the OHL63X is available to accommodate the original equipment manufacturer who, at the time of ordering, has not determined the high limit to be imposed on a given application. The OEM is required to make his own temperature setting and to see the setting adjustment screw to qualify the limit device for incorporation in a UL listed appliance. However, this model does carry the FM emblem when it leaves the factory.

Specifications

Dimensions	5 7/16" W x 5"H x 2 1/4" D
Mounting	Wall mounting ears on body for 1/4" screws.
Switch Type	Manual reset: #63 2-wire, N.C., trip free. Element Failure: #57, 3-wire, SPDT.
Electrical Hookup	Pigtails brought out through outlet conduit box.
Conduit Openings	Threaded 1/2-NPT inlet and outlet.
Electrical Rating	125 or 250V, AC only. 250VAC pilot duty.
Instrument Accuracy	1% of element range.
Warranty	One year, see page 80 for details.

How to Order

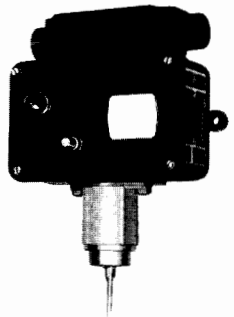
The proper ordering number for the OH63X is OH00079.

Next consult element selection matrix, page 62. The OH63X requires a solid (B-Type) element plunger (Code 53 or 54). High ambient temperature head assembly (Code 53) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (Code 54) when instrument will be located in ambient temperatures between -30°F and 125°F.

Sample Order:

Description	Required Number
OH63X	OH00079
with element	113530520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 15.



N5-10X - NON-INDICATING HIGH TEMP. LIMIT DEVICE

Description
This unit is designed to operate in conjunction with a primary temperature controller to provide positive safety shutdown of industrial heating systems.

The instrument also contains a fail-safe feature in the event temperature drops below normal ambient because of accidental severance of sensing bulb or capillary. This instrument has manual reset, internal-switch actuation adjustment and is available with any temperature ranged element from -30°F to 1100°F. CSA and FM listed. *Agency recognition is void if instrument is modified from factory standard.*

Operation
Switches are set at designated temperatures by removing the front cover and adjusting setting of switch actuating screws on the lever arms. The element failure switch is usually set at ambient temperature.

Adjustment is made by reference to a test thermometer of known accuracy, its probe placed adjacent to the thermal sensing bulb in the controlled medium.

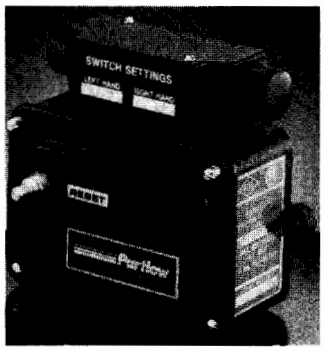
Specifications

Dimensions	5 7/16" W x 5 1/8"H x 2 3/16" D
Mounting	Surface only. Brackets integral part of instrument.
Electrical Rating	15 amps, 125 or 250 AC only.
Number of Switches	One element failure (low temp. limit), one high limit safety switch, manually resettable.
Electrical Hookup	Terminal block in conduit outlet box.
Conduit Openings	1/2" NPT fittings on each side of conduit box.
Agency Listings	CSA and FM.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	3 lbs.
Approx. Ship. Weight*	6 lbs.

*Weight may vary depending on element length.

How to Order
The proper ordering number for the N5-10X is NS00056.

Next consult element selection matrix, page 62. The N5-10X requires a solid (B-Type) element plunger (Code 53 or 54). High ambient temperature head assembly (Code 53) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (Code 54) when instrument will be located in ambient temperatures between -30°F and 125°F.



Sample Order:

Description	Required Number
N5-10X	NS00056
with element	113530520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 15.

ZFHL - NON-INDICATING HIGH TEMP. LIMIT DEVICE

Description
This unit is used in conjunction with a primary temperature controller to cut off heat supply if preset temperature is exceeded.

The externally-set Model ZFHL is tamperproof by application of a clear acrylic dial and knob shield which is held in place by capstan cover screws. This feature permits tie-wiring for positive sealing of the protective shield. Reset button on front of cover, FM listed. *Agency recognition is void if instrument is modified from factory standard.*

Operation
The high-limit switch is positioned to desired setting by turning dial knob on the instrument cover, this is accomplished only after the acrylic dial shield is removed by withdrawing the capstan cover screws.

In response to minuet temperature changes, expansion and contraction in the thermal element moves a switch actuating lever through a simple mechanical linkage. When the bulb reflects the temperature set on the dial, the limit switch is actuated, shutting down equipment, energizing the lights or sounding alarms.

Only when the process temperature drops below the dial setting can the switch be reset by pushing the reset button on the cover of the instrument.

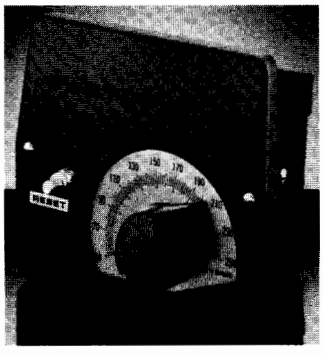
Specifications

Dimensions	5 7/8" W x 5 7/16"H x 4 1/8" D
Mounting	Surface or panel (brackets included).
Panel Mount Cutout	4 3/4" W x 5" H
Electrical Rating	15 amps, 125 or 250 AC only.
Number of Switches	One, high limit safety switch manually resettable.
Electrical Connections	Thru terminal block located inside of instrument.
Conduit Openings	7/8" diameter opening in top of case for electrical fitting; drill-guide hole spotted in rear of case for optional rear entrance.
Agency Listing	FM
Warranty	One year, see page 80 for details.
Approx. Net Weight*	5 lbs.
Approx. Ship. Weight*	8 lbs.

*Weight may vary depending on element length.

How to Order
The proper ordering number for the ZFHL is ZF00061.

Next consult element selection matrix, page 62 . Also select dial part number, see page 62. and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. The ZFHL requires a hollow (L-Type) element plunger (Code 51 or 52). High ambient temperature head assembly (Code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (Code 52) when instrument will be located in ambient temperatures between -30°F and 125°F.



Sample Order:

Description	Required Number
ZFHL	ZF00061
with dial	00603031 (from page 64)
with element	113510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 15.

SB79
SAFETY SWITCH

Description
This unit is a protective device which operates an electrical switch in the event of pilot flame failure. It's purpose is to shut down both pilot and main fuel flow in the event a pilot flame is extinguished.

On applications where the main fuel line is 3/4" or less, the SB79 is connected to two solenoid valves, one in the main fuel line and one in the pilot fuel line. Loss of pilot flame will cause the switch to shutdown both solenoids. On applications where the main fuel line is over 3/4" in size, the SB79 is usually connected to an approved latch valve in the main fuel line along with the solenoid valve in the pilot line. Positive safety shutdown, small and compact.

Operation
The device operates simply and positively. Under normal operating conditions, the bulb is installed in close proximity to the pilot flame and is heated to a bright red color. This keeps the switch inside the case depressed. The circuit is thus completed to the fuel valves. At the same time, the indicating dial on the face of the case shows the device to be operating in its normal operating range.

If for any reason, the pilot flame is extinguished, the vapor in the bulb condenses, permitting the switch to open, thus interrupting the circuit to the solenoid valves or other devices. At the same time, the indicator needle will drop, indicating the pilot is out.

The Partlow safety switch will shut off all gas flow in 30 to 45 seconds after pilot gas failure.

Pilot burners are of major importance and must be installed so that they will maintain a high level of heat on the safety switch bulb at all times. It should not be influenced by outside sources such as drafts, suctions, smothering, etc.

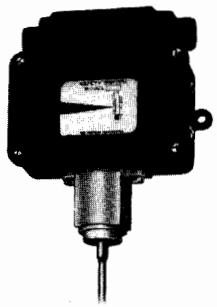
The temperature of the bulb should be between 1200° and 1400°F. It should not exceed 1400°F and direct flame should not come into contact with the welded portion of the bulb.

Partlow cannot assume responsibility for improper application or conditions beyond our control. It is strongly recommended that the application be properly checked before installing safety gas valves.

SB79 safety switch is furnished with CN type element which can be readily replaced in the field.

Specifications

Dimensions	5 1/4" W x 5 1/8"H x 2 1/4" D
Mounting	Wall-mounting ears on body for 1/4" screws.
Switch Type	Three-wire, SPDT, #79.
Electrical Hookup	Terminal block in conduit outlet box.
Conduit Openings	Threaded 1/2 NPT inlet and outlet.
Switch Rating	15 amps, 125 or 250 volt, AC only.
Warranty	One year, see page 80 for details.



How to Order
The proper ordering number for the SB79 is SB00205.

The SB79 uses only the CN220 element P/N 1320105 (5 ft. length). Consult factory for longer element length.

For pricing see Form 3028, Mechanical Price Book, page 15.

INDICATOR 194 - DIAL THERMOMETER ATTACHMENT

Description

The 194 indicating thermometer is available for positive indicating of temperatures in applications using any of Partlow's line of throttling control valves with high or low pressure gas, air, or air-gas mixtures.

Installed between the thermal sensing element and the Partlow gas control valve body, the Indicator 194 does away with the need for auxiliary thermometers.

It is calibrated with the gas control and powered directly by the same Piston-Pak thermal sensing element that actuates the valve. The Indicator 194 is retrofittable to all gas controls.

Compact and clean in design, the slim Indicator 194 has a wide-scale vertical dial with sharp, bright orange pointer for long-range visibility. Thermal elements are interchangeable in the same scale span and easily replaceable. The 194 Indicator is applicable to all scale ranges.

Operation

The 194 Indicator is installed between the thermal sensing element and the gas control body. The bulb expands and contracts with any minuet change in temperature and this movement is transmitted through the capillary tubing to the element head. A piston inside the head respond to this calibrated expansion or contraction, providing the precise force to move simultaneously the thermometer linkage and the valve actuator.

The control valve is set by turning the control setting dial knob. To avoid confusion, the setting dial of the control valve has an uncalibrated scale not related to temperature. To provide the desired temperature setting the setting knob is rotated to the proper point by observing actual temperature reading on the indicator.

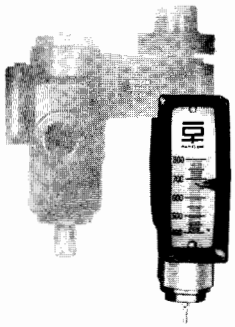
The thermometer is extremely simple, it has only one adjustment which is an easily accessible rezeroing screw.

Specifications

Dimensions	1 7/8" W x 4 1/2" H x 6 3/8" D
Mounting	Installed between gas control and thermal element.
Internal Adjustment	Removable sideplate.

How to Order

The proper code number for the Indicator 194 is IT00057. Next consult element selection matrix, page 62. Select dial part number, page 69, and specify as separate line item. The dial must correspond to specific range of sensing element selected. The 194 thermometer requires a solid Type B element plunger (code 53 or 54). High ambient temperature head assembly (code 53) is used when instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (code 54) when instrument will be located in ambient temperatures between -30°F and 125°F.



Sample Order:

Description	Required Number
194	IT00057
with dial	00603614 (from page 69)
with element	109530520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 16.

OBSOLETE

Gas Controls

SELF OPERATING GAS CONTROLS

Description

Partlow's series of self-operating, throttling gas valves have been specified for a wide variety of applications for more than 60 years. They maintain critical temperatures in gas-fired appliances without the characteristic sawtooth curves of two-position controls.

Model 10

Tapped for 1/2" pipe size only, these valves control kerosene, fuel oil and liquid phase of LP gas without freeze up. Heavy-walled bronze body, with delrin valve seat and stainless valve. Maximum pressure: 65 psi.

Model 20

Pocket-sized valve designed for temperature control of small appliances. May be mounted in any position. Pipe size 3/8" for 1 psi. Model 28 - 3/8 is constructed to handle up to 40 psi.

Model 40

Self-operating Model 40 was designed for use in vertical pipelines to maintain throttling temperature control of small or medium capacity gas-fired appliances. Pipe size of 1" take 1 psi. Model 48 - 1/2" has a 5 psi rating.

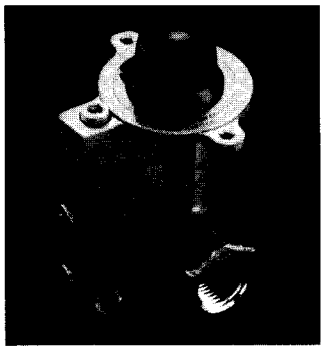
Model 60

The horizontally-mounted Model 60 is used to provide throttling control in gas-fired appliances of moderate capacity. Pipe sizes of 1 1/4", 1 1/2" and 2" handle 1 psi. UL listed.

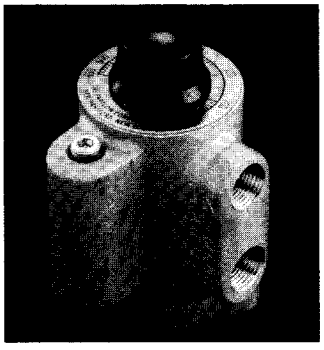
Model 70

Features a balanced double-ball valving mechanism. Pipe sizes 3/4", 1 1/4" and 2" for pressures up to 20 psi. Model 70 - 3", a special large capacity valve up to 5000 cfh operates at 1 psi instead of 20 psi. For very sensitive applications, the Model 713 was developed, with larger seat and ball dimensions. Model 70 series may be installed horizontally only.

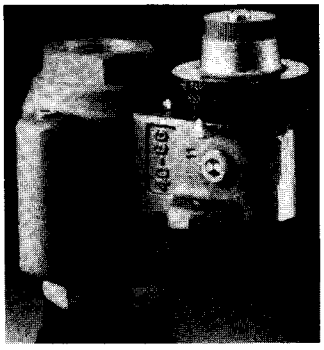
MODEL 10



MODEL 20



MODEL 40



Operation

Adjustment is made by turning the setting knob, which advances or retracts a fixed level fulcrum in larger modes, or raises or lowers the valve seat of smaller instruments. The plunger of the thermal element bears directly on the short leg of the lever or control valve.

There is no power requirement.

In the thermal element, expanding and contracting with deviations from appliance set point, advances and retracts the element plunger. The valve is thus throttled to decrease or increase the fuel supply to the burners, restoring control temperature at the bulb.

The throttling action leads to a state of balance in which the valve is held at just that position which permits a gas flow sufficient to maintain control temperature under existing appliance load conditions. As load conditions change, a new valve position is sought and maintained as soon as equilibrium is established under the new condition.

An adjustable needle-type by-pass regulates the gas flow around the valve to supply minimum flame, if required.

All models (except Model 10) are made of heavy-wall die-cast aluminum; internal mechanisms are machined brass, aluminum and zinc die cast parts.

MODELS
10, 20, 28, 40, 48, 60, 70, 713

Applications range from industrial ovens to bakery and permanent press ovens, grain dryers, maintenance of molten solder temperature in side-seaming of cans, asphalt and tar kettles, air makeup heaters, bismuth to wax melt tanks, even cotton gins and propane heaters to power desert-based radar units.

Models 70, 60 and 40 are designed for stationary applications only. For mobile applications, like tar kettles, Models 20 and 10 are recommended.

Those sizes of gas control valves which have shared common internal parts have been consolidated into the largest pipe size in each group. Since the only difference between them was the pipe thread machining, it is proper to reduce the large sizes by common, locally available pipe bushings, to the needed smaller size. Previous published flow characteristics for the smaller sizes after being bushed-down are still appropriate. Some codes may not allow the use of standard reduced bushings. If this is the case, a standard pipe concentric reducing coupling and pipe nipple may be allowed. We recommend that local codes be checked to be sure acceptable fittings are used.

How To Order
The various ordering numbers are:

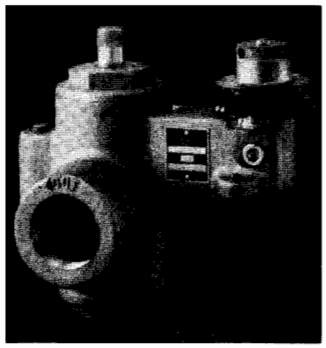
Model 10	GC00107
Model 20 - 3/8"	GC00098
Model 28 - 3/8"	GC00100
Model 40 - 1"	GC00088
Model 48 - 1/2"	GC00090
Model 60 - 1"	GC00093
Model 60 - 1 1/4"	GC00094
Model 60 - 1 1/2"	GC00095
Model 60 - 2"	GC00096
Model 70 - 3/4"	GC00101
Model 70 - 1 1/4"	GC00103
Model 70 - 2"	GC00105
Model 70 - 3"	GC00106
Model 713A - 1 1/4"	GC00104

Select the proper ordering number. Next consult element selection matrix, page 62, and after selecting part number, specify as a separate line item. Dials available for gas controls are on pages 66- 68. Dial selected must correspond to specific range of element selected.

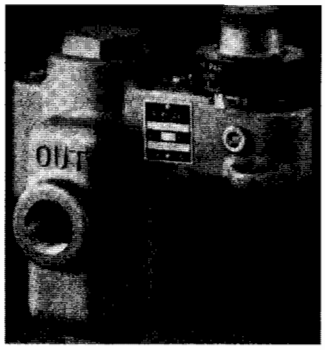
All gas controls require a Type M element plunger which is spring loaded to compensate for overtravel (Code 55 or 56). High ambient temperature head assembly (Code 55) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient assembly should be called out (Code 56) when instrument will be located in ambient temperatures between -30°F and 125°F.

For pricing see Form 3028, Mechanical Price Book, page 16.

MODEL 60



MODEL 70



N79-79 - NON-INDICATING TEMPERATURE CONTROL

Description
This unit is a two-switch, non-indicating temperature control with unlimited differential setting capabilities between switches. It is used where two fixed temperatures are specified as control points and where a change or adjustment of those points is seldom required. UL and CSA listed.

Operation
Temperature setting on the N79-79 may be set by the factory or the end user by adjusting screws inside the control case in conjunction with an accurate temperature-sensing device placed adjacent to the thermal sensing element.

Due to the construction of the instruments, the switches are held in a depressed position and revert to their normal, or free state, in response to a temperature increase.

Therefore, as a mechanism function in this control, a normally open two-wire switch, or the normally open side of a three-wire switch, operates as a normally closed circuit when the bulb temperature is below set point.

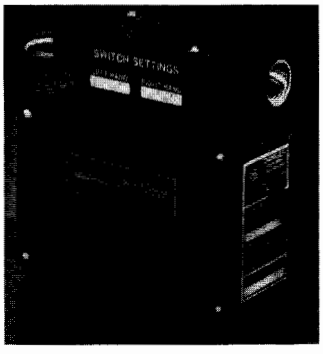
Specifications

Dimensions	5 7/16" W x 5 1/8"H x 2 3/16" D
Mounting	Surface only. Brackets integral part of instrument.
Switch Differential (between switches)	0 to 100% of element range.
Electrical Rating	50VA inductive, 500VA non-inductive, 250 VAC maximum.
Electrical Connections	24" pigtail connection located in top conduit box. Connections made using wire nut connection. Switches are labeled 1 & 2 , the wiring from the switches are color coded. Red - common, Blue, normally closed, White - normally open.
Conduit Openings	1/2" NPT fittings on each side of conduit box.
Agency Listings	UL and CSA.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	2 1/4 lbs.
Approx. Ship. Weight*	5 1/2 lbs.

*Weight may vary depending on element length.

How to Order
The proper ordering number for the N79-79 is NS00207.

Next consult element selection matrix, page 62. The N79-79 requires a solid (B-Type) element plunger (Code 53 or 54). High ambient temperature head assembly (Code 53) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (Code 54) when instrument will be located in ambient temperatures between -30°F and 125°F.



Sample Order:

Description	Required Number
N79-79	NS00207
with element	109530520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Pricing Book, page 17.

ZF79 - NON-INDICATING TEMPERATURE CONTROL

Description

This unit is a compact single-switch industrial temperature controller designed to operate fuel valves or relays which start and stop heating or cooling systems. It can also be used as a limit device for sounding an alarm, actuating lights or to shut down equipment at a pre-determined temperature. Compact, flush or wall mounted (brackets included), externally adjustable set point, available in twelve optional ranges within -30°F to 1100°F. UL and CSA listed.

Operation

Temperature is set by turning the large, easy to handle setting knob on the front of the instrument to the desired point on a 200 angular degree semi-circular scale.

Expansion and contraction in the sensing element moves the switch-actuating lever through a simple mechanical linkage. Optional weather resistance accessory (Acc 243) is available. Adaption of Acc 243 provides for inverted mounting and special gasketing for resistance to normal outdoor climate conditions.

Specifications

Dimensions	6 1/8" W x 5 1/2"H x 3 1/2" D
Surface Mounting	Brackets included.
Flush Mount Cutout	4 3/4" W x 5" H
Electrical Rating	50VA, inductive; 500VA, non-inductive; 250V maximum.
Switch Type	Three wire SPDT.
Switch Sensitivities	Normal 1% of range (factory std #79) Super Sensitive 1/2% of element range (optional #73)
Electrical Hookup	Internal terminal block.
Conduit Openings	7/8" diameter opening in top of case for 1/2" electrical fitting; drill-guide hole spotted in rear of case for optional rear entrance.
Agency Listings	UL and CSA.
Warranty	One year, see page 80 for details.
Approx. Net Weight*	5 lbs.
Approx. Ship. Weight*	8 lbs.

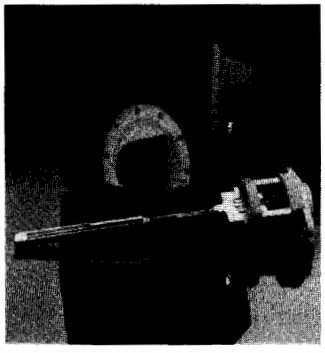
*Weight may vary depending on element length.

Non-Indicating Controls

How to Order

The proper ordering number for the ZF79 without Acc. 243 is ZF00127, for the ZF79 with Acc. 243 is ZF00235.

Next consult element selection matrix, page 62 . Select dial part number, see page 64, and specify as a separate line item. The dial selected must correspond to specific range of sensing element selected. Note that when using Acc. 243, the unit uses inverted dial. The ZF79 requires a hollow (L-Type) element plunger (Code 51 or 52). High ambient temperature head assembly (Code 51) is used when the instrument will be located in ambient temperatures between 32°F but not greater than 150°F. Low ambient head assembly should be called out (Code 52) when instrument will be located in ambient temperatures between -30°F and 125°F.



Sample Order:

Description	Required Number
ZF79	ZF00127
with dial	00603023 (from page 64)
with element	109510520 (from page 62 and 63)

For pricing see Form 3028, Mechanical Price Book, page 17.

SR SERIES - SINGLE PEN TEMP. RECORDER FOR REFRIGERATED TRANSPORT

S	R					0	0

CONFIGURATION

1 Enclosed Version
2 Skeleton Version

CHART DRIVES

01 7 Day Spring Wound
02 31 Day Spring Wound
03 7 Day Electric
04 31 Day Electric
05 7 Day Battery
06 31 Day Battery
07 24 Hour Battery

OPTIONS

1 None

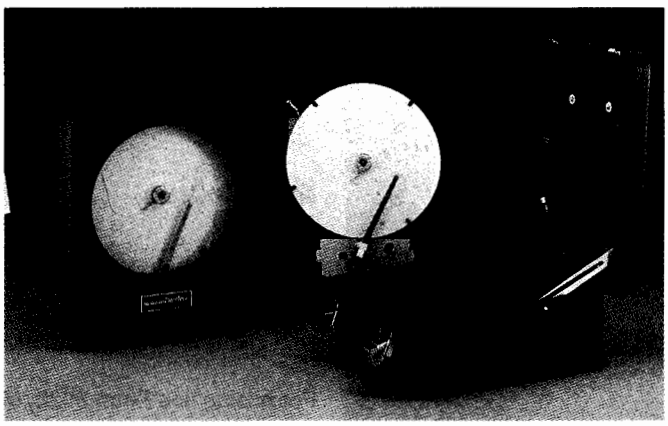
HOW TO ORDER

First select the proper ordering number for the SR unit. Next select chart part number, see page 71, and specify as a separate line item. The chart selected must be from the 8 inch pressure senstive listing. Finally, consult element selection matrix, see Page 62 (range code limited to chart availability).

Sample Order:

Description	Required Number
SR Unit	SR102100
with chart	00150203 (from page 71)
with element	094521020 (from page 62 and 63)

For pricing see Form 3264, Mobile Refrigeration Price List.



ABOUT THIS INSTRUMENT

Description

The SR Series are compact, weather resistant recording thermometers designed especially for the mobile refrigeration industry. These recorders can operate completely independent of the refrigeration system power supply. Two configurations are available, an enclosed stand alone unit for exterior mounting on a vehicle or container, and a skeleton version requiring a suitable protective enclosure as provided in certain reefer unit designs.

The enclosed version of the SR recorder features a rugged cast aluminum enclousre. It's mounting dimensions are similar to the TRDW. This allows for easy interchange and retrofitting by original equipment manufacturers and end users without design changes in the reefer refrigeration unit. In most cases the SR will also easily retrofit the Partlow TRDW as the SR enclosure is thinner. The skeleton version of the SR is designed for mounting inside weather-tight enclosures provided by the reefer equipment manufacturer. It utilizes integral 3-point mounting to compensate for uneven surfaces. The skeleton version of the SR provides for cost savings opportunities for original equipment manufacturers and after market applications.

The lower cost of the SR recorder makes it an ideal choice for price sensitive original equipment manufactuers. End users will also find it to be an excellent recorder for retrofitting exisitng recorders. Its technology driven design and ease of manufacturing has positioned the SR recorder as the leading global choice among competitive circle chart recorders.

Operation

The recorder span is limited to 50% of the thermal range to provide large degree division spacing for easy readout. For refrigerated transport range of -35°C to 77°C (-30°F to 170°F), the chart span is -25°C to 25°C (-20°F to 80°F). Over-travel protection prevents instrument damage to 77°C (170°F) bulb temperature.

Specifications

Dimensions	241 mm wide x 292 mm high x 127 mm deep (9.5 inch wide x 11.5 inch high x 5 inch deep) Skeleton version is slightly smaller.
Chart	203 mm (8 inch) diameter, pressure sensitive marking, standard Partlow
Mounting	Enclosed Version: Surface mount via 4 mounting brackets (ordered separately). Skeleton Version: Surface mount via 3 fasteners
Temperature Accuracy	1% of sensing element range within ambient temperatures of -35 °C to 52°C (-30°F to 125°F)
Vibration	2G, 5 to 80 Hz in any of the 3 principle axes
Shock	15G, 11 ms half sine wave
Weight	5.9 kg (13 lbs), without sensing element (enclosed version)

TR10 - SKELETON TEMP. RECORDER FOR REFRIGERATED TRANSPORT

Description
This unit is a compact, recording thermometer designed especially for the mobile refrigeration industry. Requires mounting within customer's enclosure for protection from weather and climate conditions.

Operation
The recorder span is limited to 50% of the thermal element range to provide large degree division spacing for easy readout. For refrigerated transport range of -35°C to 77°C (-30°F to 170°F), the chart span is -25°C to 25°C (-20°F to 80°F). Over-travel protection prevents instrument damage to 77°C (170°F) bulb temperature. The recorder can operate completely independent of the refrigeration system power supply.

Specifications

Dimensions	166mm W x 263mm H x 111mm D (6.53in. W x 10.35 in. H x 4.37 in. D)
Chart Diameter	203mm (8 inch) pressure sensitive marking.
Chart Drive	Spring wound, 24VAC or 1.5V Battery
Chart Rotation	7 and 31 Day.
Mounting	To customer enclosure.
Temperature Accuracy	1% of element range within ambient temperature of -35°C to 52°C (-30°F to 125°F).
Time Accuracy	Approximately ± 5 minutes per month
Vibration	2G, 5 to 80 Hz in any of the 3 principle axes.
Shock	15G, 11 MS Half Sine Wave.
Weight	1.5 kg (3.2 lb) without thermal sensing element.

How to Order
The various ordering numbers for the TR10 are:

7 Day Spring Drive	TR00413
31 Day Spring Drive	TR00355
31 Day Electric, 12 or 24V, AC or DC	TR00367
7 Day Electric, 12 or 24 V, AC or DC	TR00428
7 Day Battery, 1 1/2V "D" Cell	TR00415
31 Day Battery, 1 1/2V "D" Cell	TR00369

Select the proper ordering number. Next consult element selection matrix, page 62. The TR10 requires the element number to be 09452XXXX(XXXX). Also select chart number, see page 71 and specify as separate line item*.

For pricing see Form 3264, Mobile Refrigeration Price List.

*A few charts are available that use range other than 094 as listed on page 71.

TR20 - TEMP. RECORDER FOR REFRIGERATED TRANSPORT

Description
This unit is a compact, weather resistant recording thermometer designed especially for mobile refrigeration applications.

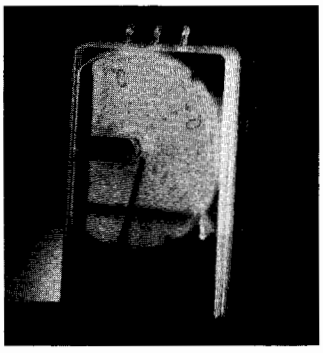
Operation
The recorder span is limited to 50% of the thermal element range to provide large degree division spacing for easy readout. For refrigerated transport range of -35°C to 77°C (-30°F to 170°F), the chart span is -25°C to 25°C (-20°F to 80°F). Over-travel protection prevents instrument damage to 77°C (170°F) bulb temperature. The recorder can operate completely independent of the refrigeration system power supply. The cover is designed so that it may be sealed for chart protection.

Specifications

Dimensions	179mm W x 334mm H x 128mm D (7.03in. W x 13.3 in. H x 5.04 in. D)
Chart Diameter	203mm (8 inch) pressure sensitive marking.
Chart Drive	Spring wound, Electric or 1.5V Battery. (Electric drives suitable for 12 to 24VAC or DC)
Chart Rotation	7 and 31 Day, 24 Hour in 1.5V battery only.
Mounting	Surface via 4 integral mounting brackets.
Temperature Accuracy	1% of element range within ambient temperature of -35°C to 52°C (-30°F to 125°F).
Time Accuracy	Approximately ± 5 minutes per month
Vibration	2G, 5 to 80 Hz in any of the 3 principle axes.
Shock	15G, 11 MS Half Sine Wave.
Weight	2.4 kg (5.3 lb) without thermal sensing element.

How to Order
The various ordering numbers for the TR10 are:

7 Day Spring Drive	TR00414
31 Day Spring Drive	TR00356
31 Day Electric, 12 or 24V, AC or DC	TR00368
7 Day Electric, 12 or 24 V, AC or DC	TR00429
7 Day Battery, 1 1/2V "D" Cell	TR00416
31 Day Battery, 1 1/2V "D" Cell	TR00370
24 Hour Battery, 1 1/2V "D" Cell	TR00432



Select the proper ordering number. Next consult element selection matrix, page 62. The TR20 requires the element number to be 09452XXXX(XXXX). Also select chart number, see page 71 and specify as separate line item*.

For pricing see Form 3264, Mobile Refrigeration Price List.

*A few charts are available that use range other than 094 as listed on Page 71.

TRDW - TEMP. RECORDER FOR REFRIGERATED TRANSPORT

Description
This unit is a standard, weather resistant recording thermometer designed especially for the mobile refrigeration industry. It is specified for the accurate reading of temperature in a variety of perishable product transportation applications from over-the-road trucks to ocean-going container vessels.

Operation
The recorder span is limited to 50% of the thermal element range to provide large degree division spacing for easy readout. For refrigerated transport range of -35°C to 77°C (-30°F to 170°F), the chart span is -25°C to 25°C (-20°F to 80°F). Over-travel protection prevents instrument damage to 77°C (170°F) bulb temperature. The recorder can operate completely independent of the refrigeration system power supply.

Specifications

Dimensions	241mm W x 292mm H x 159mm D 9.5in. W x 11.5 in. H x 6.25 in. D
Chart Diameter	203mm (8 inch) pressure sensitive marking.
Chart Drive	Spring wound.
Chart Rotation	31 Day, 7 Day, 24 Hour.
Mounting	Surface mount via 4 mounting brackets (ordered separately)
Temperature Accuracy	1% of element range within ambient temperature of -35°C to 52°C (-30°F to 125°F).
Time Accuracy	Approximately ± 5 minutes per month
Vibration	2G, 5 to 80 Hz in any of the 3 principle axes.
Shock	15G, 11 MS Half Sine Wave.
Weight	6.5 kg (14 lb) without thermal sensing element.

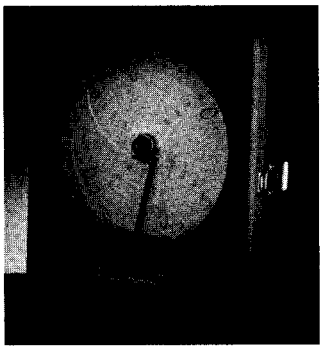
How to Order
The various ordering numbers for the TRDW are:

24 Hour Spring Wound	RD00154
7 Day Spring Wound	RD00077
31 Day Spring Wound	RD00021

Select the proper ordering number. Next consult element selection matrix, page 62. The TRDW requires the element number to be 09452XXXX(XXXX). Also select chart number, see page 71 and specify as separate line item*.

For pricing see Form 3264, Mobile Refrigeration Price List.

*A few charts are available that use range other than 094 as listed on page 71.



TRLW - TEMP. RECORDER FOR REFRIGERATED TRANSPORT

Description
This unit is a more compact version of weather resistant recording thermometer designed especially for the mobile refrigeration industry. It is specified for the accurate recording of temperature in a variety of perishable product transportation applications from over-the-road trucks to ocean-going container vessels.

Operation
The recorder span is limited to 50% of the thermal element range to provide large degree division spacing for easy readout. For refrigerated transport range of -35°C to 77°C (-30°F to 170°F), the chart span is -25°C to 25°C (-20°F to 80°F). Overtravel protection prevents instrument damage to 77°C (170°F) bulb temperature. The recorder can operate completely independent of the refrigeration system power supply.

Specifications

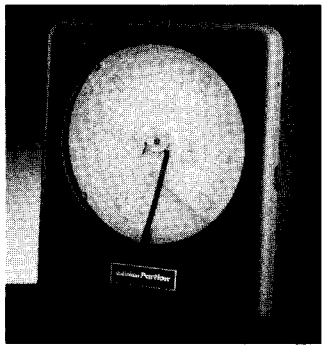
Dimensions	241mm W x 292mm H x 127mm D 9.5in. W x 11.5 in. H x 5 in. D
Chart Diameter	203mm (8 inch) pressure sensitive marking.
Chart Drive	Spring wound.
Chart Rotation	24 Hour, 7 Day, 31 Day
Mounting	Surface via integral mounting brackets.
Temperature Accuracy	1% of element range within ambient temperature of -35°C to 52°C (-30°F to 125°F).
Time Accuracy	Approximately ± 5 minutes per month
Vibration	2G, 5 to 60 Hz in any of the 3 principle axes.
Shock	6G, 11 MS Half Sine Wave.
Weight	5.9 kg (13 lb) without thermal sensing element.

OBSOLETE

Mobile Refrig. Products

How to Order
The various ordering part numbers for the TRLW are:

7 Day Spring Wound	RT00164
31 Day Spring Wound	RT00022



Select proper ordering number. Next consult element selection matrix, page 62. The TRLW requires the element number to be 09452XXXX(XXXX). Also select chart number, see page 71 and specify as separate line item*.

For pricing see Form 3264, Mobile Refrigeration Price List.

*A few charts are available that use range other than 094 as listed on page 71.

DR - DUAL PEN TEMP. RECORDER FOR REFRIGERATED TRANSPORT

D	R			0	0

CHART DRIVE OPTIONS

1 7 Day Spring Wound
2 31 Day Spring Wound
3 7 Day Electric
4 31 Day Electric

OTHER OPTIONS

1 None
2 Alarm Switch & Event Stylus 24 VDC
3 Alarm Switch & Event Stylus 12 VDC
4 Alarm Switch Only, 12 or 24 VAC/DC
5 Event Stylus Only, 24 VDC
6 Event Stylus Only, 12 VDC

HOW TO ORDER

First select the proper ordering number for the DR unit. Next consult element selection matrix, see Page 62 (must be 094 range). Also select chart part number, see page 71, and specify as a separate line item. The chart selected must be selected from DR listing only.

Sample Order:

Description	Required Number
DR Unit	DR1100
with chart	00152601 (from page 71)
with element	094XXXXXXX (from page 62 and 63)

For pricing see Form 3264, Mobile Refrigeration Price List.

ABOUT THIS INSTRUMENT

Description

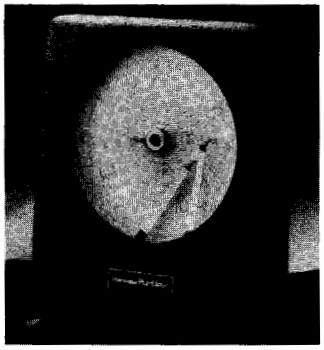
This dual pen unit is a weather resistant recording thermometer designed especially for the mobile refrigeration industry. It is specified for the accurate reading of temperature in a variety of perishable transport applications from over-the-road trucks to ocean-going container vessels.

Operation

The eight inch recorder chart is limited to a portion of the full sensor temperature range in order to depict each input on a separate segment thus avoiding any confusion from intermingling of recorded traces on the standard pressure senstive marking system. The extended temperature range of -35°C to 77°C (-30°F to 170°F) provides over temperature protection even for normal steam cleaning procedures, while its recorder display is standard at -20°C to 20°C. The left hand sensor records on the inner area of the circular chart and the right hand sensor on the outer area. Each area has separate time scales so that each stylus records in real time. Chart drive options provide for fully independent instrument operation without power from the refrigeration unit. The options include spring wound and electronic stepper motor drives.

Specifications

Dimensions	241mm W x 292mm H x 159mm D 9.5in. W x 11.5 in. H x 6.25 in. D
Chart Diameter	203mm (8 inch) pressure sensitive marking calibrated span -20°C to 20°C, 1 degree C division value. Separate chart areas for each stylus recording.
Chart Drive	Spring wound or 12 to 24V AC or DC electric with integral battery back-up.
Chart Rotation	31 Day or 7 Day.
Mounting	Surface mount via 4 mounting brackets (P/N 64400101 included)
Temperature Accuracy	1% of element range within ambient temperature of -35°C to 52°C (-30°F to 125°F).
Time Accuracy	Approximately ± 5 minutes per month.
Vibration	2G, 5 to 80 Hz in any of the 3 principle axes.
Shock	15G, 11 MS Half Sine Wave.
Weight	6.0 kg (13.2 lb) without thermal sensing elements.



RTM-245
ELECTRONIC DATA LOGGER

R	T	M	2	4	5		

DATA LOGGER

01 1 or 2 Probe Unit
02 3 to 6 Probe Unit

7	4	1	0	0	4		

818 OHM RTD PROBES

03 3 Meter (9.8 feet)
05 5 Meter (16.4 feet)
10 10 Meter (32.8 feet)
15 15 Meter (49.2 feet)

HAND HELD PRINTER

RTP-24500

OBSOLETE

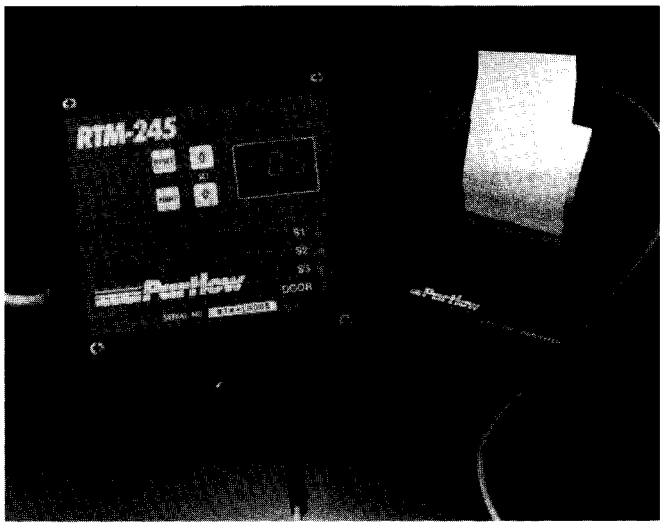
HOW TO ORDER

First select the proper ordering number for the RTM-245 unit. Then select the proper ordering part number for the RTD probe(s). And finally, order the printer.

Sample Order:

Description	Required Number
RTM-245 Unit	RTM24501
with probe	74100403
with printer	RTP24500

For pricing see Form 3285, RTM-245 Price List.



ABOUT THIS INSTRUMENT

Description

The RTM-245 Electronic Data Logger is a basic temperature/time monitoring and recording device designed especially for the severe environment of mobile transportation applications. Incorporated with the time/temperature basic function are 3 programmable alarms, 1 event input circuit, and a defrost input circuit as standard. It is capable of monitoring, displaying and recording from up to six different locations within a truck trailer.

Operation

The package consists of the Data Logger, to be surface mounted in the vehicle and a hand-held printer. Mounting of the Data Logger can be on external surface of the vehicle with no secondary enclosure required. The logger has on the front panel, four tactile feedback keys for programming. There is an LED display for use during programming and for sequential indication of each of up to three RTD sensor probes. When the temperatures are being displayed, the first three of their indicating lights S1, S2 and S3 illuminate in sequence to show which sensor's temperature is displayed. If present, the last three probe temperatures are not displayed, only printed along with the first three. A door open event indicator light completes the active features on the front panel.

The data are printed out on a hand-held printer. The printer cable is connected to the logger whenever data are to be extracted. The data are retained in memory even after printing. When the refrigeration system power supply is off, an internal rechargeable battery retains the data. Data stored in memory may only be cleared after is has been printed. This prevents accidental clearing without the need of special security codes. Also, this method allows multiple delivery drops to print out a new record throughout the trip, all from original start time. Each customer thereby can be provided with a complete history of their portion of the load.

Specifications

Display	LED with 1 degree (F or C) resolution, 3 digits plus negative sign, open sensor will display "OP", shorted sensor will display "SH".
Range	-40°C to 32°C (-40°F to 90°F) approximately. Over range will cause display to read "HI", continued over range will eventually display "OP". Under range display is "LO".
Temperature Accuracy	± 1°C within ambient range of -32 to 32°C ± 2°C or better within ambient of -40 to -32°C and 32 to 49°C
Calibration	Factory calibration only, except for limited capability in the field by keypad programming within limits of ± 5° F or C.
Environmental	Input power circuit protected against reverse polarity. Shock to 15 g, 11 millisecond, in any principle axis. Vibration to 2 g, 20 to 80 Hz in any princliple axis. Humidity 20 to 100% condensing Radio freqency inteference (RFI) protected. Ambient temperature, continuous: -20°C to 32°C, intermittent: -40°C to 52°C, storage : - 40°C to 75°C
Power Supply	13.8vdc nominal. 10 to 16 vdc operating range. Reverse polarity protected to 36v. Jump start over voltage protected to 36vdc for 1 minute. Maximum current requirement, Data Logger only 0.25 amp at 13.8 vdc. Maximum current requirements, Data Logger and printer 1.5 amps at 13.8v.
Weight	RTM-245 - .8Kg (1.7 lbs) Printer - .5Kg (1.01 lbs).

OBSOLETE

ELEMENT SELECTION MATRIX

How to Order
Elements are specified by a single matrix number which can be 9 to 15 digits long. The basic unit requires the first nine digits; the adders such as of sleeves, stuffing boxes and coatings are called out in the remaining six boxes. If none of the adders are required, leave the boxes blank. *However, if only one or two of these items is required, fill in the unused boxes with zeros.*

For pricing see Form 3028, Mechanical Price Book, page 2 and 3.

A - Operating Range
Select the three digit code number representing the temperature range and insert the number in the first three boxes of the ordering matrix.

B - Head Assembly
In selecting the two digit number for head assembly operating temperature, be sure to note the high and low ambient choices. The hollow L-Type plunger is for all non indicating, indicating and recording instruments, except O and N model instruments, which take the solid B Type plunger. Mechanical gas valves require the spring loaded M Type plunger.

C - Capillary Length
Next select capillary length

D - Optional Bulb Sizes
Note the order code used when Teflon® or Geon® coating is specified.

E, F, G
When Sleeves, Stuffing Boxes and/or Coatings are required, continue with E, F, and G.

(A) OPERATING RANGE AND MATERIAL

List price includes 5' capillary

Temperature Range F	Temperature Range C	Element Material	Order Code
120 to 220	50 to 105	Stainless	**099**
60 to 180	15 to 80	Stainless	**096**
30 to 160	0 to 70	Stainless	**093**
30 to 180	0 to 80	Stainless	**095**
30 to 230	0 to 110	Stainless	**100**
0 to 700	-25 to 375	Stainless	**110**
0 to 900	-25 to 475	Stainless	**112**
0 to 1100	-25 to 600	Stainless	**114**
0 to 350	20 to 180	Stainless	**103**
0 to 450	-20 to 230	Stainless	**105**
0 to 550	-20 to 290	Stainless	**107**
20 to 120	-5 to 50	Stainless	**091**
-30 to 170	-35 to 75	Stainless	**094**
50 to 250	10 to 120	Stainless	**101**
100 to 350	40 to 175	Stainless	**104**
100 to 450	40 to 230	Stainless	**106**
100 to 550	40 to 290	Stainless	**108**
100 to 650	40 to 340	Stainless	**109**
100 to 800	40 to 425	Stainless	**111**
100 to 1000	40 to 540	Stainless	**113**
100 to 1100	40 to 600	Stainless	**115**

(B) HEAD ASSEMBLY

High Ambient Temperature 32° to 150°F	
Plunger Type	Order Code
L	**51**
B	**53**
M	**55**
Low Ambient Temperature -30° to 125°F	
Plunger Type	Order Code
L	**52**
B	**54**
M	**56**

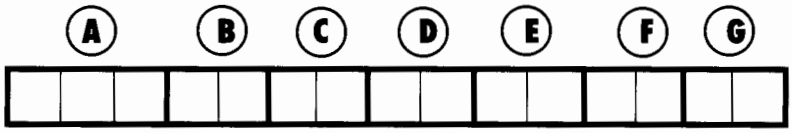
(C) CAPILLARY LENGTH

Length (feet)	Order Code
1	**01**
2	**02**
3	**03**
4	**04**
5	**05**
7	**07**
10	**10**
12	**12**
15	**15**
20	**20**
25	**25**
30	**30**
35	**35**
40	**40**
50	**50**
60	**52**
70	**54**
80	**56**
90	**58**
100	**60**
110	**62**
120	**64**

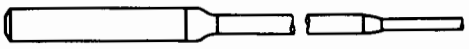
(D) OPTIONAL BULB SIZES

Bulb Type	O.D. (")	Gauge	Range Code **093**	Range Code **095**	Range Code **096**	Range Code **099**	Range Code **100**	Range Code **103**	Range Code **105**	Range Code **107**	Range Code **110**	Range Code **112**	Range Code **114**	Order Code For Sleeve	Order Code No Sleeve
U	.137	.095"	192.27	N/A	N/A	N/A	124.76	72.18	57.42	47.40	37.05	29.34	24.21	**N/A**	**15**
Y*	3/16	21	114.41	N/A	124.54	146.80	74.00	42.78	33.87	27.97	21.87	17.29	14.23	**N/A**	**16**
P	1/4	20	N/A	N/A	N/A	N/A	N/A	20.58	16.37	3.57	10.77	8.59	7.19	**40**	**17**
	5/16	18	N/A	N/A	N/A	N/A	24.94	14.63	11.69	9.70	7.67	6.16	5.15	**41**	**18**
	3/8	9/32"	22.55	N/A	N/A	28.72	14.77	8.84	7.13	5.99	4.83	3.69	3.36	**43**	**20**
	7/16	18	N/A	N/A	N/A	20.11	10.53	6.45	5.26	4.48	3.68	N/A	N/A	**45**	**22**
	1/2	18	11.54	N/A	12.49	14.55	7.74	4.83	4.00	3.44	N/A	2.44	2.16	**46**	**23**
	9/16	17	N/A	N/A	N/A	12.03	6.55	4.20	3.51	3.06	N/A	2.25	2.02	**47**	**24**
	5/8	17	7.68	6.79	8.26	9.57	5.36	3.55	3.03	2.68	2.33	2.06	N/A	**48**	**25**
	3/4	16	N/A	5.64	6.02	6.90	4.05	2.84	2.49	2.26	N/A	N/A	N/A	**50**	**27**

* If Teflon or Geon coating is specified for Y-Bulb, use **Order Code 51**.



Element Component (Head Assembly below)

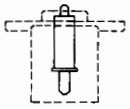
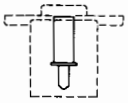
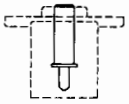


(G) COATINGS

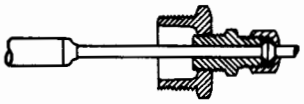
If Teflon or Geon coating is specified, use order code 51 for bulb codes

TEFLON Y-Bulbs Only — Maximum operating temperature 400°F								
Length in Feet	5	10	15	20	25	30	35	40
	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code
	02	**03**	**04**	**05**	**06**	**07**	**08**	**09**
GEON Applies to Range Codes 091, 094, and 101								
Length in Feet	5	10	15	20	25	30	35	40
	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code
P-Bulb	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
P-Bulb & Sleeve	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Y-Bulb	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
LEAD 3/8" O.D. x 9/32" I.D. Bulbs only; sleeves 15". Applies to Range Codes 091, 094, 101, 104								
Length in Feet	5	10	15	20	25	30	35	40
	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code
Stainless	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**
SST & Sleeve	**73**	**75**	**77**	**79**	**81**	**83**	**85**	**87**

Element Heads

Type M (Pin)	Type L (Hollow)	Type B (Flat Solid)
		

21-T-105-SST



(F) STUFFING BOXES

Not available if coating is selected

Type	Size (")	Order Code	Remarks
21-T-105 Capillary Only	1/4	**02**	Compression type fitting 300 psi pressure rating. Can only be installed at time of element fabrication
	3/8	**03**	
	1/2	**04**	
	3/4	**05**	
21-T-105 with 5/16" Sleeve	1/4	**20**	Compression type fitting 300 psi pressure rating. Can only be installed at time of element fabrication for 5/16" sleeve
	3/8	**21**	
	1/2	**22**	
	3/4	**23**	
T112 Capillary Only	3/8	**54**	Has slotted bushing to provide connection between capillary and bushing. Use on capillaries only. Non-pressure sealing.
	1/2	**55**	
	3/4	**56**	
131 with 5/16" Sleeve	3/8	**78**	For mech. holding of sleeve. Same construction as T-112. For use on all 5/16" sleeves. Non-pressure sealing.
	1/2	**79**	
	3/4	**80**	

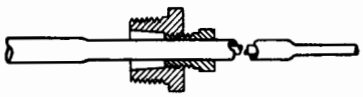
T-112C

(E) SLEEVES 5/16" O.D.

For P-Bulbs Only

Length (")	SST Order Code
5	**05**
6	**06**
7	**07**
8	**08**
9	**09**
10	**10**
15	**15**

Acc. 131C



(D) OPTIONAL BULB SIZES (CONT.)

Bulb Type	O.D. (")	Gauge	Range Code **091**	Range Code **094**	Range Code **101**	Range Code **104**	Range Code **106**	Range Code **108**	Range Code **109**	Range Code **111**	Range Code **113**	Range Code **115**	Order Code For Sleeve	Order Code No Sleeve
U	.137	.095"	N/A	122.05	124.76	102.10	73.60	57.42	47.10	37.36	29.40	26.66	**N/A**	**15**
Y*	3/16	21	146.80	72.39	74.00	60.74	43.61	33.87	27.78	21.99	17.34	15.63	**N/A**	**16**
P	1/4	20	N/A	N/A	N/A	28.76	20.86	16.37	13.52	10.82	8.61	7.85	**40**	**17**
	5/16	18	N/A	24.41	24.94	20.48	14.87	11.69	9.67	7.75	6.17	5.63	**41**	**18**
	3/8	9/32"	28.72	14.47	14.77	12.21	8.97	7.13	5.97	4.86	3.97	3.65	**43**	**20**
	7/16	18	20.11	10.32	10.53	8.75	6.53	5.26	4.46	3.70	3.08	2.86	**45**	**22**
	1/2	18	14.55	7.59	7.74	6.48	4.90	4.00	3.43	2.89	2.45	2.29	**46**	**23**
	9/16	17	12.03	6.43	6.55	5.53	4.24	3.51	3.05	2.61	2.25	2.13	**47**	**24**
	5/8	17	9.57	5.27	5.36	4.58	3.59	3.03	2.67	2.34	2.06	1.97	**48**	**25**
	3/4	16	6.90	4.00	4.05	3.53	2.87	2.49	2.25	2.02	1.84	1.77	**50**	**27**

* If Teflon or Geon coating is specified for Y-Bulb, use **Order Code 51**.

DIALS

MF DIALS

	Dial P/N	Description (Old Range Code)	Current Range Code	Temperature Ranges	
Standard	006 022 07	QMF 217 F & C	094	-30 to 170°F	-35 to 75°C
	006 022 13	QMF 225 F & C	101	50 to 250°F	10 to 120°C
	006 022 17	QMF 335 F & C	104	100 to 350°F	40 to 175°C
	006 022 19	QMF 435 F & C	103	0 to 350°F	20 to 180°C
	006 022 24	QMF 445 F & C	106	100 to 450°F	40 to 230°C
	006 022 28	QMF 555 F & C	108	100 to 550°F	40 to 290°C
	006 022 34	QMF 665 F & C	109	100 to 650°F	40 to 340°C
	006 022 36	QMF 770 F	110	0 to 700°F	-25 to 375°C
	006 022 40	QMF 780 F & C	111	100 to 800°F	40 to 425°C
	006 022 44	QMF 910 F & C	113	100 to 1000°F	40 to 540°C
	006 022 48	QMF 1011 F & C	115	100 to 1100°F	40 to 600°C
	006 022 49	QMF 112 F & C	091	20 to 120°F	-5 to 50°C
Inverted	006 022 08	QMF 217 F & CA	094*	-30 to 170°F	-35 to 75°C
	006 022 35	QMF 665 F & CA	109*	100 to 650°F	40 to 340°C
	006 022 50	QMF 112 F & CA	091*	20 to 120°F	-5 to 50°C
	006 022 52	QMF 225 F & CA	101*	50 to 250°F	10 to 120°C
	006 022 53	QMF 335 F & CA	104*	100 to 350°F	40 to 175°C
	006 022 55	QMF 435 F & CA	103*	0 to 350°F	20 to 180°C
	006 022 56	QMF 445 F & CA	106*	100 to 450°F	40 to 230°C
	006 022 57	QMF 555 F & CA	108*	100 to 550°F	40 to 290°C
	006 022 59	QMF 780 F & CA	111*	100 to 800°F	40 to 425°C
	006 022 60	QMF 910 F & CA	113*	100 to 1000°F	40 to 540°C
	006 022 61	QMF 1011 F & CA	115*	100 to 1100°F	40 to 600°C

* Inverted Dial/Acc. 237A

Note: Dials are combination fahrenheit and centigrade unless noted.

ZF DIALS

Standard	006 030 02	ZF 112 F	091	20 to 120°F	-5 to 50°C
	006 030 04	ZF 217 F	094	-30 to 170°F	-35 to 75°C
	006 030 08	ZF 225 F	101	50 to 250°F	10 to 120°C
	006 030 10	ZF 225 C	101	50 to 250°F	10 to 120°C
	006 030 11	ZF 335 F	104	100 to 350°F	40 to 175°C
	006 030 13	ZF 335 C	104	100 to 350°F	40 to 175°C
	006 030 15	ZF 435 F	103	0 to 350°F	20 to 180°C
	006 030 16	ZF 445 F	106	100 to 450°F	40 to 230°C
	006 030 18	ZF 445 C	106	100 to 450°F	40 to 230°C
	006 030 19	ZF 555 F	108	100 to 550°F	40 to 290°C
	006 030 21	ZF 555 C	108	100 to 550°F	40 to 290°C
	006 030 23	ZF 665 F	109	100 to 650°F	40 to 340°C
	006 030 25	ZF 665 C	109	100 to 650°F	40 to 340°C
	006 030 26	ZF 770 F	110	0 to 700°F	-25 to 375°C
	006 030 27	ZF 780 F	111	100 to 800°F	40 to 425°C
	006 030 29	ZF 780 C	111	100 to 800°F	40 to 425°C
	006 030 31	ZF 910 F	113	100 to 1000°F	40 to 540°C
	006 030 35	ZF 1011 F	115	100 to 1100°F	40 to 600°C
Inverted	006 030 09	ZF 225 FA	101**	50 to 250°F	10 to 120°C
	006 030 12	ZF 335 FA	104**	100 to 350°F	40 to 175°C
	006 030 17	ZF 445 FA	106**	100 to 450°F	40 to 230°C
	006 030 28	ZF 780 FA	111**	100 to 800°F	40 to 425°C
	006 030 32	ZF 910 FA	113**	100 to 1000°F	40 to 540°C
	006 030 36	ZF 1011 FA	115**	100 to 1100°F	40 to 600°C

**Inverted Dial/Acc. 243

DIALS

LF DIALS

	Dial P/N	Description (Old Range Code)	Current Range Code	Temperature Ranges	
Standard	006 017 04	LF 112 F & C	091	20 to 120°F	-5 to 50°C
	006 017 12	LF 217 F & C	094	-30 to 170°F	-35 to 75°C
	006 017 19	LF 225 F & C	101	50 to 250°F	10 to 120°C
	006 017 24	LF 335 F & C	104	100 to 350°F	40 to 175°C
	006 017 30	LF 445 F & C	106	100 to 450°F	40 to 230°C
	006 017 39	LF 665 F & C	109	100 to 650°F	40 to 340°C
	006 017 48	LF 910 F & C	113	100 to 1000°F	40 to 540°C
	006 017 52	LF 1011 F & C	115	100 to 1100°F	40 to 600°C
	006 017 58	LF 1:518 F & C	095	30 to 180°F	0 to 80°C
	006 017 59	LF 122 F & C	099	120 to 220°F	50 to 105°C
	006 017 61	LF 223 F & C	100	30 to 230°F	0 to 110°C
	006 017 63	LF 545 F & C	105	0 to 450°F	-20 to 230°C
	006 017 64	LF 555 F & C	108	100 to 550°F	40 to 290°C
	006 017 74	LF 435 F & C	103	0 to 350°F	20 to 180°C
	006 017 80	LF 780 F & C	111	100 to 800°F	40 to 425°C
Inverted	006 017 60	LF 217 F & CA	094*	-30 to 170°F	-35 to 75°C
	006 017 62	LF 223 F & CA	100*	30 to 230°F	0 to 110°C
	006 017 65	LF 112 F & CA	091*	20 to 120°F	-5 to 50°C
	006 017 70	LF 225 F & CA	101*	50 to 250°F	10 to 120°C
	006 017 72	LF 335 F & CA	104*	100 to 350°F	40 to 175°C
	006 017 75	LF 435 F & CA	103*	0 to 350°F	20 to 180°C
	006 017 77	LF 445 F & CA	106*	100 to 450°F	40 to 230°C
	006 017 78	LF 555 F & CA	108*	100 to 550°F	40 to 290°C
	006 017 81	LF 780 F & CA	111*	100 to 800°F	40 to 425°C
	006 017 82	LF 910 F & CA	113*	100 to 1000°F	40 to 540°C
	006 017 83	LF 1011 F & CA	115*	100 to 1100°F	40 to 600°C
	006 017 84	LF 665 F & CA	109*	100 to 650°F	40 to 340°C

Note: All dials are combination fahrenheit and centigrade.
* Inverted Dial/Acc. 201

LFHL DIALS

006 020 04	LFHL 655 F & C	107	0 to 550°F	-20 to 290°C
006 020 09	LFHL 770 F & C	110	0 to 700°F	-25 to 375°C
006 020 12	LFHL 910 F & C	113	100 to 1000°F	40 to 540°C
006 020 25	LFHL 990 F & C	112	0 to 900°F	-25 to 475°C
006 020 27	LFHL 1011 F& C	115	100 to 1100°F	40 to 600°C
006 020 29	LFHL 1111 F & C	114	0 to 1100°F	-25 to 600°C

Note: All dials are combination fahrenheit and centrigrade.

GAS CONTROL DIALS

Models 10, 20 & 28

Dial P/N to be called out on order when ordering gas body	Description	Range Code	Temperature Ranges	
00603 402	136 - 112F	091	20 to 120°F	-5 to 50°C
00603 403	136 - 217F	094	-30 to 170°F	-35 to 75°C
00603 405	136 - 225F	101	50 to 250°F	10 to 120°C
00603 406	136 - 225C	101	50 to 250°F	10 to 120°C
00603 407	136 - 335F	104	100 to 350°F	40 to 175°C
00603 408	136 - 335C	104	100 to 350°F	40 to 175°C
00603 409	136 - 445F	106	100 to 450°F	40 to 230°C
00603 410	136 - 445C	106	100 to 450°F	40 to 230°C
00603 411	136 - 555F	108	100 to 550°F	40 to 290°C
00603 412	136 - 555C	108	100 to 550°F	40 to 290°C
00603 413	136 - 665F	109	100 to 650°F	40 to 340°C
00603 414	136 - 665C	109	100 to 650°F	40 to 340°C
00603 415	136 - 780F	111	100 to 800°F	40 to 425°C
00603 417	136 - 910F	113	100 to 1000°F	40 to 540°C
00603 418	136 - 910C	113	100 to 1000°F	40 to 540°C
00603 419	136 - 1011F	115	100 to 1100°F	40 to 600°C

GAS CONTROL DIALS

40 & 60 Series including 70 - 3"

Dial P/N	Description	Range Code	Temperature Ranges	
10040 701	40 - 112F	091	20 to 120°F	-5 to 50°C
10040 703	40 - 217F	094	-30 to 170°F	-35 to 75°C
10040 704	40 - 217C	094	-30 to 170°F	-35 to 75°C
10040 705	40 - 225F	101	50 to 250°F	10 to 120°C
10040 706	40 - 225C	101	50 to 250°F	10 to 120°C
10040 707	40 - 335F	104	100 to 350°F	40 to 175°C
10040 708	40 - 335C	104	100 to 350°F	40 to 175°C
10040 709	40 - 445F	106	100 to 450°F	40 to 230°C
10040 710	40 - 445C	106	100 to 450°f	40 to 230°C
10040 711	40 - 555F	108	100 to 550°F	40 to 290°C
10040 712	40 - 555C	108	100 to 550°F	40 to 290°C
10040 713	40 - 655F	107	0 to 550°F	-20 to 290°C
10040 714	40 - 665F	109	100 to 650°F	40 to 340°C
10040 715	40 - 665C	109	100 to 650°F	40 to 340°C
10040 716	40 - 780F	111	100 to 800°F	40 to 425°C
10040 717	40 - 780C	111	100 to 800°F	40 to 425°C
10040 718	40 - 910F	113	100 to 1000°F	40 to 540°C
10040 719	40 - 910C	113	100 to 1000°F	40 to 540°C
10040 720	40 - 1011F	115	100 to 1100°F	40 to 600°C

GAS CONTROL DIALS

70 Series (except 70 - 3") & 713

Dial P/N	Description (Old range P/N)	Range Code	Temperature Ranges	
10041 201	58R 112F	091	20 to 120°F	-5 to 50°C
10041 202	58R 217F	094	-30 to 170°F	-35 to 75°C
10041 203	58R 217C	094	-30 to 170°F	-35 to 75°C
10041 204	58R 225F	101	50 to 250°F	10 to 120°C
10041 205	58R 225C	101	50 to 250°F	10 to 120°C
10041 206	58R 335F	104	100 to 350°F	40 to 175°C
10041 207	58R 335C	104	100 to 350°F	40 to 175°C
10041 208	58R 445F	106	100 to 450°F	40 to 230°C
10041 209	58R 445C	106	100 to 450°F	40 to 230°C
10041 210	58R 555F	108	100 to 550°F	40 to 290°C
10041 212	58R 655F	107	0 to 550°F	-20 to 290°C
10041 213	58R 665F	109	100 to 650°F	40 to 340°C
10041 214	58R 665C	109	100 to 650°F	40 to 340°C
10041 215	58R 780F	111	100 to 800°F	40 to 425°C
10041 216	58R 780C	111	100 to 800°F	40 to 425°C
10041 217	58R 910F	113	100 to 1000°F	40 to 540°C
10041 218	58R 910C	113	100 to 1000°F	40 to 540°C
10041 219	58R 1011F	115	100 to 1100°F	40 to 600°C
10041 220	58R 1011C	115	100 to 1100°F	40 to 600°C

10 INCH INK TYPE CIRCLE CHARTS

Part Number	Description	Range Code	Temperature Range	
00202401	A112C, 24 Hr	091	20 to 120°F	-5 to 50°C
00202403	A112C, 7 Day	091	20 to 120°F	-5 to 50°C
00202501	A112F, 12 Hr	091	20 to 120°F	-5 to 50°C
00202502	A112F, 24 Hr	091	20 to 120°F	-5 to 50°C
00202504	A112F, 7 Day	091	20 to 120°F	-5 to 50°C
00202601	A112F-J615, 7 Day	091	20 to 120°F	-5 to 50°C
00203301	A122C, 12 Hr	099	120 to 220°F	50 to 105°C
00203401	A122F, 12 Hr	099	120 to 220°F	50 to 105°C
00203402	A122F, 24 Hr	099	120 to 220°F	50 to 105°C
00203501	A217C, 24 Hr	094	-30 to 170°F	-35 to 75°C
00203503	A217C, 7 Day	094	-30 to 170°F	-35 to 75°C
00203602	A217F, 24 Hr	094	-30 to 170°F	-35 to 75°C
00203604	A217F, 7 Day	094	-30 to 170°F	-35 to 75°C
00204002	R217C, 7 Day	094	-30 to 170°F	-35 to 75°C
00204101	R217F, 24 Hr	094	-30 to 170°F	-35 to 75°C
00204103	R217F, 7 Day	094	-30 to 170°F	-35 to 75°C
00204401	A1:218F, 12 Hr	096	60 to 180°F	15 to 80°C
00204402	A1:218F, 24 Hr	096	60 to 180°F	15 to 80°C
00204501	A1:218F, 0-120PSI, 12 Hr	096	60 to 180°F	15 to 80°C
00204502	A1:218F, 0-120PSI, 24 Hr	096	60 to 180°F	15 to 80°C
00204601	A1:220F, 0-120PSI, 24 Hr			
00204901	A223C, 24 Hr	100	30 to 230°F	0 to 110°C
00205001	A223F, 12 Hr	100	30 to 230°F	0 to 110°C
00205002	A223F, 24 Hr	100	30 to 230°F	0 to 110°C
00205004	A223F, 7 Day	100	30 to 230°F	0 to 110°C
00205102	R223F, 24 Hr	100	30 to 230°F	0 to 110°C
00205202	A225C, 24 Hr	101	50 to 250°F	10 to 120°C
00205205	A225C, 7 Day	101	50 to 250°F	10 to 120°C
00205301	A225F, 8 Hr	101	50 to 250°F	10 to 120°C
00205302	A225F, 12 Hr	101	50 to 250°F	10 to 120°C
00205303	A225F, 24 Hr	101	50 to 250°F	10 to 120°C
00205304	A225F, 48 Hr	101	50 to 250°F	10 to 120°C
00205305	A225F, 72 Hr	101	50 to 250°F	10 to 120°C
00205306	A225F, 7 Day	101	50 to 250°F	10 to 120°C
00205902	A335C, 8 Hr	104	100 to 350°F	40 to 175°C
00205903	A335C, 24 Hr	104	100 to 350°F	40 to 175°C
00205904	A335C, 48 Hr	104	100 to 350°F	40 to 175°C
00205905	A335C, 7 Day	104	100 to 350°F	40 to 175°C
00206001	A335F, 8 Hr	104	100 to 350°F	40 to 175°C
00206002	A335F, 12 Hr	104	100 to 350°F	40 to 175°C
00206003	A335F, 24 Hr	104	100 to 350°F	40 to 175°C
00206004	A335F, 48 Hr	104	100 to 350°F	40 to 175°C
00206006	A335F, 7 Day	104	100 to 350°F	40 to 175°C
00206301	A435F, 24 Hr	103	0 to 350°F	20 to 180°C
00206401	A445C, 24 Hr	106	100 to 450°F	40 to 230°C
00206403	A445C, 7 Day	106	100 to 450°F	40 to 230°C
00206502	A445F, 8 Hr	106	100 to30°F	40 to 230°C
00206503	A445F, 24 Hr	106	100 to 450°F	40 to 230°C
00206504	A445, 48 Hr	106	100 to 450°F	40 to 230°C
00206506	A445F, 7 Day	106	100 to 450°F	40 to 230°C
00206901	A1:518F, 24 Hr	095	30 to 180°F	0 to 80°C

10 INCH INK TYPE CIRCLE CHARTS (CONT.)

Part Number	Description	Range Code	Temperature Range	
00207002	R1:518F, 24 Hr	095	30 to 180°F	0 to 80°C
00207004	R1:518F, 7 Day	095	30 to 180°F	0 to 80°C
00207202	A1:527F, 24 Hr			
00207401	A555C, 24 Hr	108	100 to 550°F	40 to 290°C
00207501	A555F, 8 Hr	108	100 to 550°F	40 to 290°C
00207502	A555F, 24 Hr	108	100 to 550°F	40 to 290°C
00207505	A555F, 7 Day	108	100 to 550°F	40 to 290°C
00207801	A655F, 24 Hr	107	0 to 550°F	-20 to 290°C
00207901	A665C, 24 Hr	109	100 to 650°F	40 to 340°C
00207903	A665C, 7 Day	109	100 to 650°F	40 to 340°C
00208001	A665F, 3 Hr	109	100 to 650°F	40 to 340°C
00208003	A665F, 12 Hr	109	100 to 650°F	40 to 340°C
00208004	A665F, 24 Hr	109	100 to 650°F	40 to 340°C
00208005	A665F, 48 Hr	109	100 to 650°F	40 to 340°C
00208006	A665F, 72 Hr	109	100 to 650°F	40 to 340°C
00208007	A665F, 7 Day	109	100 to 650°F	40 to 340°C
00208202	A780C, 24 Hr	111	100 to 800°F	40 to 425°C
00208301	A780F, 24 Hr	111	100 to 800°F	40 to 425°C
00208302	A780F, 48 Hr	111	100 to 800°F	40 to 425°C
00208403	A910C, 24 Hr	113	100 to 1000°F	40 to 540°C
00208502	A910F, 8 Hr	113	100 to 1000°F	40 to 540°C
00208503	A910F, 24 Hr	113	100 to 1000°F	40 to 540°C
00208504	A910F, 48 Hr	113	100 to 1000°F	40 to 540°C
00208701	A1011F, 24 Hr	115	100 to 1100°F	40 to 600°C
00208902	AA1314C, 7 Day	115	100 to 1100°F	40 to 600°C
00209301	RA1956F, 12 Hr	131	30 to 180°F	
00209302	RA1956F, 24 Hr	131	30 to 180°F	
00209303	RA1956F, 48 Hr	131	30 to 180°F	
00209305	RA1956F, 7 Day	131	30 to 180°F	

10 Inch Pressure Sensitive Type Circle Charts

00300402	PSA112F, 7 Day	094	-30 to 170°F	-35 to 75°C
00300601	PSA217F, 24 Hr	094	-30 to 170°F	-35 to 75°C
00300602	PSA217F, 7 Day	094	-30 to 170°F	-35 to 75°C
00301001	PSA225F, 24 Hr	101	50 to 250°F	10 to 120°C
00301201	PSA335F, 24 Hr	104	100 to 350°F	40 to 175°C
00301601	PSA445F, 24 Hr	106	100 to 450°F	40 to 230°C
00301702	PSA1:5227F, 24 Hr			
00302001	PSA665F, 24 Hr	109	100 to 650°F	40 to 340°C
00302501	PSR 217F, 24 Hr	094	-30 to 170°F	-35 to 75°C

8 INCH PRESSURE SENSITIVE CIRCLE CHARTS FOR MOBILE REFRIGERATION

Part Number	Description	Range Code
00150101	PSD217C, 24 Hr	094 (Except DR)
00150201	PSD 217C, (Rev A), 7 Day	094 (Except DR)
00150202	PSD217C (Rev A), 14 Day	094 (Except DR)
00150203	PSD217C (Rev A), 31 Day	094 (Except DR)
00150501	PSD217F, 24 Hr	094 (Except DR)
00150502	PSD217F, 48 Hr	094 (Except DR)
00150601	PSD217F (Rev A), 7 Day	094 (Except DR)
00150602	PSD217F (Rev A), 14 Day	094 (Except DR)
00150603	PSD217F (Rev A), 31 Day	094 (Except DR)
00151601	PSD225F, 24 Hr	101 (Except DR)
00151701	PSD225F (76/176), 7 Day	101 (Except DR)
00151801	PSD335F (173/300F), 24 Hr	104 (Except DR)
00151901	PSDA1472C (-30/25C), 7 Day	094 (Except DR)
00151902	PSDA1472C, 31 Day	094 (Except DR)
00152601	DR Recorder, -20 to 20°C, 7 Day	094 (DR only)
00152602	DR Recorder, -20 to 20°C, 31 Day	094 (DR only)

PISTON PAK THERMAL SENSING ELEMENT

General

The fluid filled thermal sensing element is the unique sensing and powering device common to all Partlow temperature control instruments. Hermetically-sealed, it is ruggedly constructed for long-term industrial and commercial applications where reliability, accuracy, sensitivity and trouble-free performance are required.

Use of the piston-cylinder arrangement over a column of fluid, utilizing the extremely high force of expanding liquid for direct operation of levers, switches, valves and other instrument components, is exclusive with Partlow. Vertical mechanical movement is virtually linear. All components of the thermal element, head, capillary, bulb and connecting hardware, are uniformly heliwelded in automatic machines to form a continuous, extremely strong assembly.

Element head-capillary-bulb assemblies are pressure-tested to a minimum of 3000 psi. The capillary is rugged enough to require no armoring and bulb tubing is designed with a safety factor of 5 to 1 at maximum temperature. Capillary is 5/32" O.D.

Ambient temperature changes in all 10 standard ranges within a total span of -30° to 1100°F are compensated by the internal structural design of the capillary.

Accuracy is warranted to be within 1% of sensing element range. Bulb sensitivities from standard to ultra-sensitive enable Partlow controls to handle the widest possible range of applications.

All Piston-Pak elements are easily field-replaceable and interchangeable with all other elements of the same range with a simple rezeroing of the control; with a change to the appropriate range dial or chart, they are interchangeable with any Partlow element. Except the A 1956 Series which are not interchangeable with other listed ranges.

How It Works

Fluid is hermetically-sealed in the bulb-capillary assembly and the lower portion of the element head. This column of fluid is capped by a piston-in-cylinder assembly especially designed to provide the necessary vertical motion without the possibility of fluid leakage.

The seal is maintained by a synthetic rubber O-ring mounted on a stainless steel piston. The O-ring is made in Partlow dies to better than military specification white room conditions; O-ring surfaces are subjected to four individual microscopic inspections by the manufacturer, plus two further Partlow inspections, before being assembled on the piston.

Fluid in the sensing bulb expands with temperature increases, exerting a forceful thrust against the piston and imparting vertical motion directly relative to the degrees of temperature increase.

The piston is spring-loaded with a heavy conical spring which provides a return force to the piston and exerts more than enough back pressure to maintain the fluid in a liquid state at highest Partlow scale temperatures.

The piston operates against the bottom of the element plunger. In non-indicating series O and N controls, the plunger is the solid Type B. The hollow Type L is used in all other non-indicating controls and all indicating and recording instruments. Type M, which is spring-loaded to compensate for overtravel, is used with mechanical gas controls.

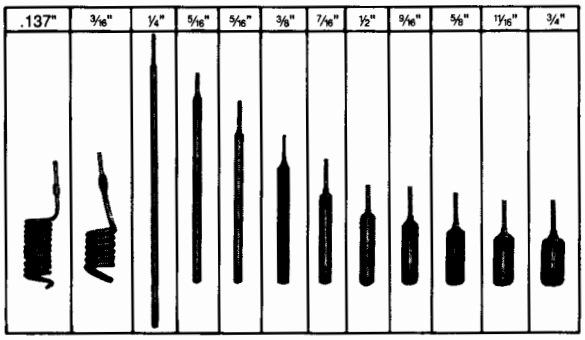
Piston movement is precise and uniform for each element, regardless of range, traveling 0.1635" from top to bottom of any given range. This travel is matched exactly to the travel of each instrument mechanism, providing the uniformity which permits field interchangeability and replacement.

Ambient Compensation
The capillary is compensated against error resulting from the effects of changing ambient temperature through internal structural design rather than the use of double capillaries of fragile auxiliary bellows. Immersion of part of the capillary in heated or cooled media likewise will have no measurable effect on temperature reading.

Temperature Ranges
Over twenty temperature ranges are offered by Partlow within the overall capability of span of -30° to 1100°F. Each range requires a specific volume of fluid in the bulb to provide the standard 0.1635" piston travel. These ranges, chosen to fit best the greatest number of industrial applications are:
099, 096, 093, 095, 100, 110, 112, 114, 103, 105, 107, 091, 094, 101, 104, 106, 108, 109, 111, 113, 115 (for temperature ranges of these, see Page 62).

Sensing Bulbs
There are three basic configurations of sensing bulbs for the Partlow system, to be selected according to the application demands for sensitivity and physical location of the sensor.

The pencil bulb is most commonly used and provides highly satisfactory response when temperature transfer between the bulb and heated or cooled medium is good. Standard pencil bulb diameter is 3/8", but additional bulb diameters ranging from 1/4" to 3/4" are offered, to give the specifying engineer a wide range of length-diameter ratios from which to choose. Optimum bulb selection is usually one which has the smallest cross section applicable to the space available. See optional bulb sizes:



Optional Bulb Configurations for 100°-650° Range

The Y-Type or Supersensitive bulb, which can be field formed, is fabricated from 3/16" tubing to provide a high ratio of tube length to tube diameter, thus more surface for heat transfer, thinner cross-section for faster heat penetration, as well as averaging capability. It can be ordered coiled in a helix or pancake form. Otherwise, it is shipped loosely coiled for straightening or forming as desired.

The U-Type or Ultrasensitive, bulb provides the ultimate in sensitivity, response rate and averaging, due to its minimum cross section and corresponding greater length. Fabricated from .137" tubing, it is ideal for applications requiring extremely close temperature tolerances and will out-perform all filled system competitors and even some sheathed thermocouple instruments and thermistor sensors. It is ordered and shipped the same as Y-bulb above.

PISTON PAK
THERMAL SENSING ELEMENT (CONT.)

Sleeves
Up to 15 inch of protective metal sleeve may be welded over the capillary at the sensing bulb end of the element to provide additional element life. Applicable to Partlow pencil bulb (not Y or U style) elements, they serve to:

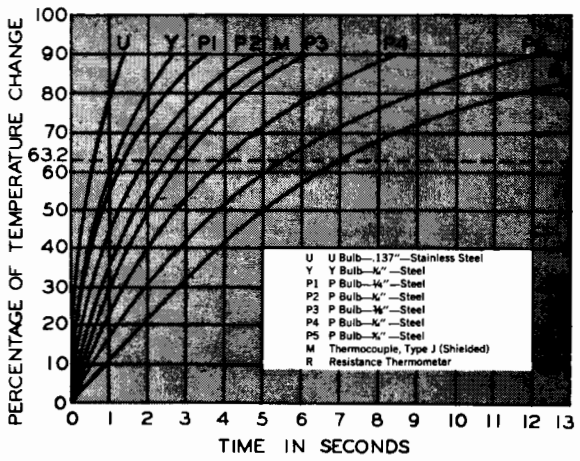
1. Retard or eliminate the effects of corrosion and/or

2. Add rigidity to the capillary to provide a secure mounting point and prevent flexing and fatigue of the metal.

Sleeves are available in stainless steel, 5/16" diameter standard.

Response Rate
Standard Partlow pencil type bulbs provide response to temperature change sufficiently fast for most industrial applications. But when the most sensitive pencil bulb is not applicable, Y or U type bulbs are almost certain to meet response requirements.

The curves shown below plot response rates of seven different Partlow bulb configurations compared under identical laboratory conditions. Each bulb was subjected to the same temperature change and its reaction time noted. M shows response of a sheathed thermocouple in the same test.



Comparison of Response Rates of various Bulb Configurations.

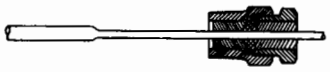
Material
Capillary is Type 304 Stainless Steel; Bulb and Sleeve is Type 316 Stainless Steel.

Stuffing Boxes - Field Installed

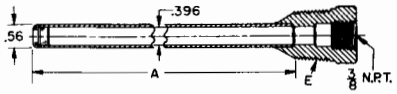
Acc. 143 - Slotted pipe for mechanical holding of capillary only. Material - stainless steel.

P/N	Bushing Thread Size NPT
1431H	3/8"
1431J	1/2"
1431K	3/4"

SST-105 - Pressure Connection, 200 psi for field application of capillary or sleeve. 3/4" pipe size accommodates bulbs up to 1/2" in diameter; the 1" pipe size handles all bulb sizes. When ordering, select pipe size and whether it is to be applied to capillary or sleeve from part numbers listed below.



P/N	Bushing Thread Size NPT
10035105	3/4" for capillary
10035106	3/4" for sleeve
10035205	1" for capillary
10035206	1" for sleeve



Separable Socket

Separable sockets are used where it is desireable to change or replace thermal elements in a vessel wihtout disturbing the contents of the vessel. They also act to protect the bulb from corrosion or mechanical damage.

Sockets to fit standard 3/8" O.D. pencil-type bulbs are carried in stock. Of Type 304 stainless, they are available with 3/4" and 1" NPT external threads. Since the internal thread for sealing the element is 3/8", standard element should be ordered with Acc. 1431H stuffing box, or if desired, pressure-type 21-T-105SS (3/8"). Socket dimensions are listed in the table below.

Stainless Steel, 1" External Thread - "E"

P/N	Immersion Length - "A"
63701018	5.00"
63701016	7.25
63701015	8.44
63701012	16.00

Stainless Steel, 3/4" External Thread "E"

63701008	6.00
63701007	7.00
63701006	8.25
63701005	9.44
63701004	11.25
63701003	14.38
63701002	17.00
63701010	30.75

SNAP ACTING SWITCHES

General

Most Partlow controls requiring switching arrangements using snap-acting switches designed and manufactured to Partlow specifications and tolerances by Micro-Switch Division of Honeywell.

The device is basically a toggle switch, that is, it snaps from one contact to another with no possibility of hanging up between these points. Extensive development to this end is incorporated in its design.

The assembly consists of a snap-acting spring mechanism built into a molded phenolic case. Heart of the mechanism is a beryllium copper leaf stamped in the shape of a three-tined fork. The two outside tines are held bent under tension to provide toggled spring action. The center tine is moved by pressure from the switch plunger. At the end of this moveable part is a two-sided silver contact.

When the plunger is depressed, the center leaf, or tine, snaps away from its normal position, always the normally-closed configuration. When the actuating force is relieved, the leaf snaps back again through the force of its own spring. The mechanism is designed to exceed 4 million mechanical actuations.

Operating Characteristics

There are several different switches used in Partlow temperature controls. In specifying switches, it is important to understand the characteristics which distinguish one type from another. Following are therms and definitions relating to these differences:

Operating Force - the amount of force applied to the switch plunger to cause snap-over of the contacts; this is operating force. Because of differences in Partlow instrument mechanism and linkage design, certain controls require more mechanism-actuating force than others for the same switch. With switches of equal differential or contact spacing, the one with a lighter force provides the closer sensitivity.

Release Force - the amount of force applied to the switch plunger at the instant of snap-back of the contacts to their normal position. This force is considerably less than the operating force and is provided solely by the beryllium copper leaf spring of the switch. Hence, it is never as effective to work a switch backward.

Pre-Travel - the distance the plunger moves before the operating point, or snap-over, is reached. Each switch model has its own inherent amount of pre-travel, expressed in maximum figures.

Contact Pressure - the amount of force holding the movable and stationary contacts together. This contact pressure is reduced in direct proportion to the reduction of pre-travel or overtravel.

Differential or Differential Travel - the actuator movement from the point where the contacts snap over to where the contacts snap back. This differential directly affects sensitivity. The switch with the narrowest switch differential and lightest force requirements is the most sensitive in a Partlow application.

Over Travel - the distance the plunger may safely be moved after operating point has been reached, usually stated in a minimum figure. In addition to the switch overtravel, Partlow control mechanisms incorporate an overtravel feature which permits the switch-holding assembly to move, without damaging the switch or control mechanism, in the event temperature rises appreciably.

Switch Contact Protection

Besides electrical down-rating, other forms of protection are recommended for extremely long switch life or direct current applications.

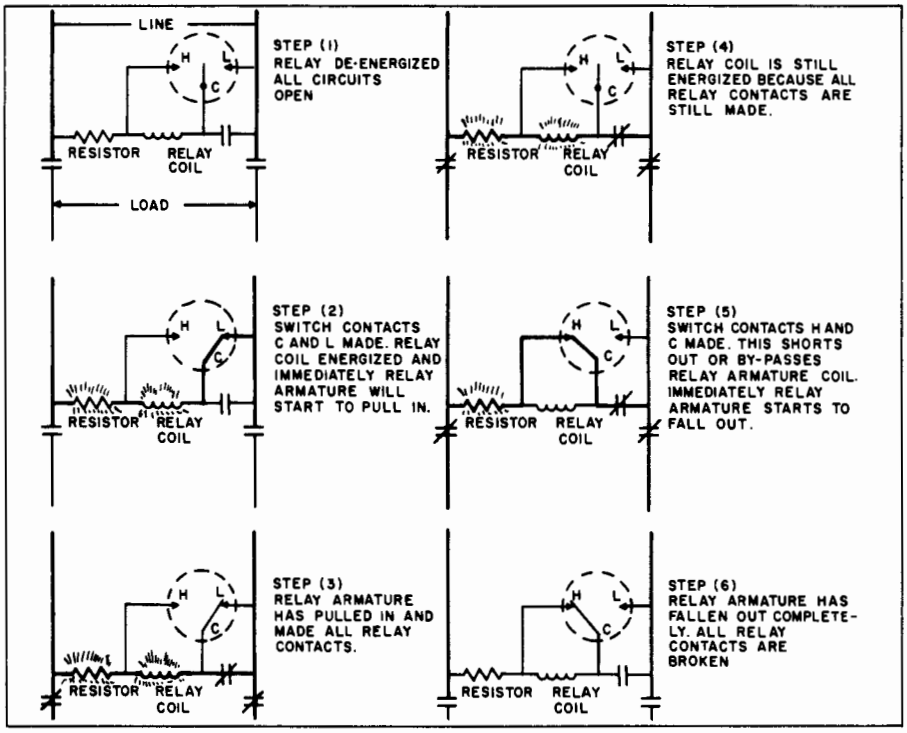
3 Wire Thermostatic Relay Circuit - One of the soundest switch contact protection devices is the 3-wire thermostatic relay circuit illustrated in a series of six diagrammed steps. The circuit may be adapted to either AC or DC circuits. It requires an SPDT or 3-wire switch.

While a microswitch cannot remain hung between contacts, Step 1 shows the relay de-energized, with all circuits open. In Step 2, the Partlow thermal sensing element has signalled a drop in temperature and caused moveable contact C to move into contact with the normally-closed terminal L. This energizes the relay coil and the relay armature pulls in, making the relay contacts.

In Step 3, which occurs nearly simultaneously with Step 2, the holding contacts of the relay are closed and the coil is fed through the holding contacts, rather than through the switch contacts, because of the lower electrical resistance of that branch of the circuit. For all practical purposes, no current now flows through switch contact L and C.

Step 4 shows that a resulting rise in temperature does not affect the established circuit through the holding contact of the relay until the movement is sufficient enough for common arm C to make contact with the fixed, normally-open contact H.

In Step 5, enough rise in temperature has taken place to "make" the H and C contact. When this is made, the relay coil shorted out, or bypassed, again due to the current following the path of least resistance, and the relay armature immediately falls out, breaking all relay contacts. In Step 6, the relay coil is shown completely de-energized and all relay contacts are open.



SNAP ACTING SWITCHES (CONT.)

Note that the switch contacts in the temperature controller are made on both a temperature rise and a temperature fall. Neither C and L, nor C and H, are broken at any time under the electrical load because the load is removed from the contacts after the initial contact.

In make and break switch action, switches are more susceptible to contact damage at the time of break than they are at make. When contacts start to separate to break the circuit, an arc develops in the gap. Air in the gap is ionized, reducing the electrical resistance in the gap and allowing the contacts to separate further before the arc is terminated. The arc generates heat, which melts the metal of the contact. Contact bounce at this time may cause material transfer or sticking.

On make, however, the contacts can move together until they are virtually in contact before an arc develops, due to the absence of ionized (conductible) air between the contact points. Since the 3-wire thermostatic circuit eliminates breaking of the switch contacts under load, it increases switch electrical life to nearly the length of its mechanical life.

Direct current has a tendency to aggravate the welding tendency inherent in the switching of alternating current, as described above. Hence, relieving current from the contacts on contact break has an even greater advantage where direct current is concerned.

Diode Contact Protector - Another form of contact protection for direct current circuits is the use of a semi-conductor diode as an arc suppressor.

A diode may be regarded as an electrical check valve; it allows current to flow in one direction, but not in the other. With a diode in the circuit, a low resistance path for expending the energy of an inductive load is provided. With the reduced load, the severity of arcing is greatly diminished, thus prolonging contact life.

Partlow Switches Down-Rated

Most Micro-Switches used in Partlow instruments carry an Underwriters' Laboratories' electrical rating of 15 amps, 125, 250, and 460 volts AC. However, for temperature control applications, the same switches are downrated to 50 volt-amperes inductive, 500 volt-amphere non-inductive, 125 or 250 volts AC maximum.

This is done to accommodate the peculiar switch actuation conditions in the control of temperature, compared to control of non-temperature functions, and to meet Partlow's requirements for guaranteed long switch life.

In non-temperature control applications, switches are actuated with complete pre-travel and over-travel on each cycle. Furthermore, UL requires that switches cycle only 6000 times at full load under conditions of complete pre-and over-travel. Partlow aims for one million trouble-free electrical cycles. This alone requires electrical down-rating. In addition, temperature control applications, where switch plunger movement is only sufficient enough to actuate the switch differential travel, contact pressure cannot be built up through plunger pre and over-travel. Reduced contact pressure makes switch contacts more vulnerable to "bounce" either through mechanical vibration or electrical load. Bouncing causes arcing, which leads to heat-up of the contact material and eventual welding or material transfer from one contact to the other (cone and crater effect). Each of these conditions can cause switch failure.

Optional Switch Models

Plunger Types - Most common type of actuating device used in Partlow switches in the pin plunger. On certain controls, however, a leaf actuator is used in place of the pin type, primarily to provide greater over-travel.

Sensitivity - Switches can be furnished in four basic sensitivities, all of which are related to the degree of inherent differential travel: normal, super-sensitive, medium side differential and wide differential. For most standard operations, the normally sensitive is adequate. Where closer control is desired, super-sensitive switches, with lighter spring tension and narrower air gaps between contacts, achieve reduced differential (#73).

Stress Corrosion Resistance - To overcome switch failure due to stress corrosion, usually in outdoor applications, switches with special lacquer coating on the spring leaf are recommended. The coating prevents corrosive attack, eliminating one of the two factors, corrosion and material stress, necessary to set up conditions for failure. Coated switch #79 is standard.

Limit Control Applications - In limit control applications, manual reset type switches are used. The design provides for sustained contact after the plunger force has been relieved, but also provision for resetting the switch for succeeding operations.

Snap Acting Switch Specifications

Switch #	Wires	Contact Position	Special Features	Sensitivity
5	2	N.C.	Used only in Model N510X	Super Sensitive
10	3	S.P.D.T.	Manual Reset	Normal
15	3	S.P.D.T.	Spring Leaf	Normal
18	3	S.P.D.T.	Stiff Leaf	Normal
52	3	S.P.D.T.	Extra Light Operating Force	Super Sensitive
63	2	N.C.	Trip-free Manual Reset	Normal
73	3	S.P.D.T.	Coated Internal Spring	Super Sensitive
79	3	S.P.D.T.	Coated Internal Spring	Normal

Note: All switches have pin plunger and solid contacts unless otherwise stated. N.C. - Normally Closed (circuit made); N.O. - Normally Open (circuit broken); and S.P.D.T. - Single Pole, Double Thorw.

WARRANTY

Warranty and Return Statement

These products are sold by The Partlow Corporation (Partlow) under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to a purchase of these products, as new merchandise, directly from Partlow or from a Partlow distributor, representative or reseller, and are extended only to the first buyer thereof who purchases them other than for the purpose of resale.

Warranty

These products are warranted to be free from functional defects in materials and workmanship at the time the products leave the Partlow factory and to conform at that time to the specifications set forth in the relevant Partlow instruction manual or manuals, sheet or sheets, for such products for a period of **one year**.

THERE ARE NO EXPRESSED OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREIN AND ABOVE SET FORTH. PARTLOW MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCTS.

Limitations

Partlow shall not be liable for any incidental damages, consequential damages, special damages, or any other damages, costs or expenses excepting only the cost or expense of repair or replacement as described above.

Products must be installed and maintained in accordance with Partlow instructions. Users are responsible for the suitability of the products to their application. There is no warranty against damage resulting from corrosion, misapplication, improper specifications or other operating condition beyond our control. Claims against carriers for damage in transit must be filed by the buyer.

This warranty is void if the purchaser uses non-factory approved replacement parts and supplies or if the purchaser attempts to repair the product themselves or through a third party without Partlow authorization.

Returns

Partlow's sole and exclusive obligation and buyer's sole and exclusive remedy under the above warranty is limited to repairing or replacing (at Partlow's option), free of charge, the products which are reported in writing to Partlow at its main office indicated below.

Partlow is to be advised of return requests during normal business hours and such returns are to include a statement of the observed deficiency. The buyer shall pre-pay shipping charges for products returned and Partlow or its representative shall pay for the return of the products to the buyer.

Approved returns should be sent to:

PARTLOW CORPORATION
2 CAMPION ROAD
NEW HARTFORD, NY 13413 USA
Att: Repair Dept

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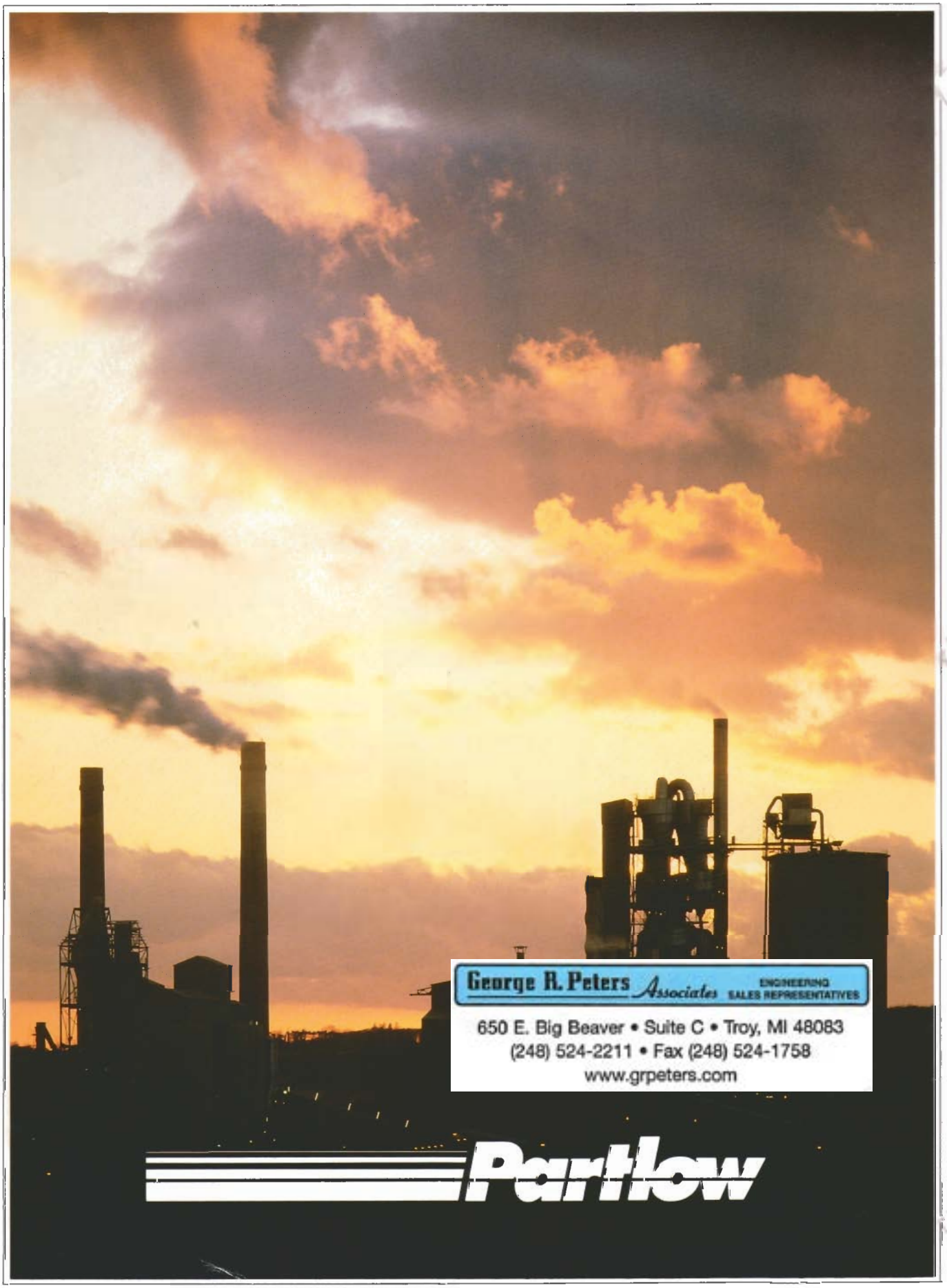

Form No. 3280 August 1996

ORDERING A MECHANICAL INSTRUMENT

Partlow Mechanical Instruments are known for providing long, reliable service. However, over the years many products manufactured were discontinued for a variety of reasons. Because of this we have some suggestions to assist in ordering a new mechanical instrument when replacing an obsolete model.

Indicating
Only two switch controllers remain. If an LFS would have been first choice, the LF15-79 can substitute since one switch can remain inactive.

Reset Switches
Manual reset switches were discontinued except in the recognized high limit safety switches, because a redundant system (controller and separate high limit with element failure protection) is a safer way to go.

Accessories
Toggle switch and signal light accessories can be installed on a panel or in separate electrical boxes using standard electric components, probably at lower cost, by the user or his contractor.

Gas Controls
Those sizes of gas control valves which have shared common internal parts have been consolidated into the largest pipe size in each group. Since the only difference between them was the pipe thread machining, it is proper to reduce the large sizes by common, locally available pipe brushings, to the needed smaller size. Previous published flow characteristics for the smaller sizes after being bushed-down are still appropriate. Some codes may not allow the use of standard reducing bushings. If this is the case, a standard pipe concenctric reducing coupling and pipe nipple may be allowed. We recommend that local codes be check to be sure acceptable fittings are used.

RECAP OF OBSOLETE PARTLOW INSTRUMENTS

RECORDERS

Obsolete Model	Nearest Current Equivalent
RFHSS	RFH15-79/15-15
RF4, RF47	RF15-79
RF15-4, RF15-7	RF15-79
RF10	RF15-79
RF7	RF15-79
RF3, RF37	RF15-79
RF9, RF8	LFHL Indicating/ NSSX Non Indicating
RFH4-4, RFH7-7	RFH15-79/15-15
RFH3-3, RFH7-7	RFH15-79/15-15
RFH2-2, RFH5-5	RFH15-79/15-79
RFP	RFP
RFT	RFT
RF2, RF27	RF15-79
RFCS	RFC52
RF5	RF15-79
RF6	RF15-79
RFC52-15	RFC15-52

INDICATING

Obsolete Model	Nearest Current Equivalent
IA	LFA
LF4, LF7	LF15-79
LF15-4, LF15-7	LF15-79
LF15-8, LF15-10	LFHL
LF-J269A	LFP/w Acc 392
LF2, LF5	LF15-79
LF3, LF6	LF15-79
MF8, MF9, MF10	LFHL Indicating/ NSSX Non-indicating
MF2, MF3, MF4, MF5, MF6, MF7	MF79
MF4-4, MF7-7	LF15-79
LFBSS	LFB73-73
LFES	LFE18

NON-INDICATING

Obsolete Model	Nearest Current Equivalent
NSS	N79-79
N4-10	N5-10X
N2-9	N5-10X
N5-8	N5-10X
RA	RFA
SB3, SB4	SB79
04(R)	N79-79
010(R)	ZFHL
07(R)	N79-79
03(R)	N79-79
09(R)	ZFHL
02(R)	N79-79
08(R)	ZFHL
GVS	LFV4
ZF2, ZF3, ZF4, ZF5, ZF6, ZF7	ZF79