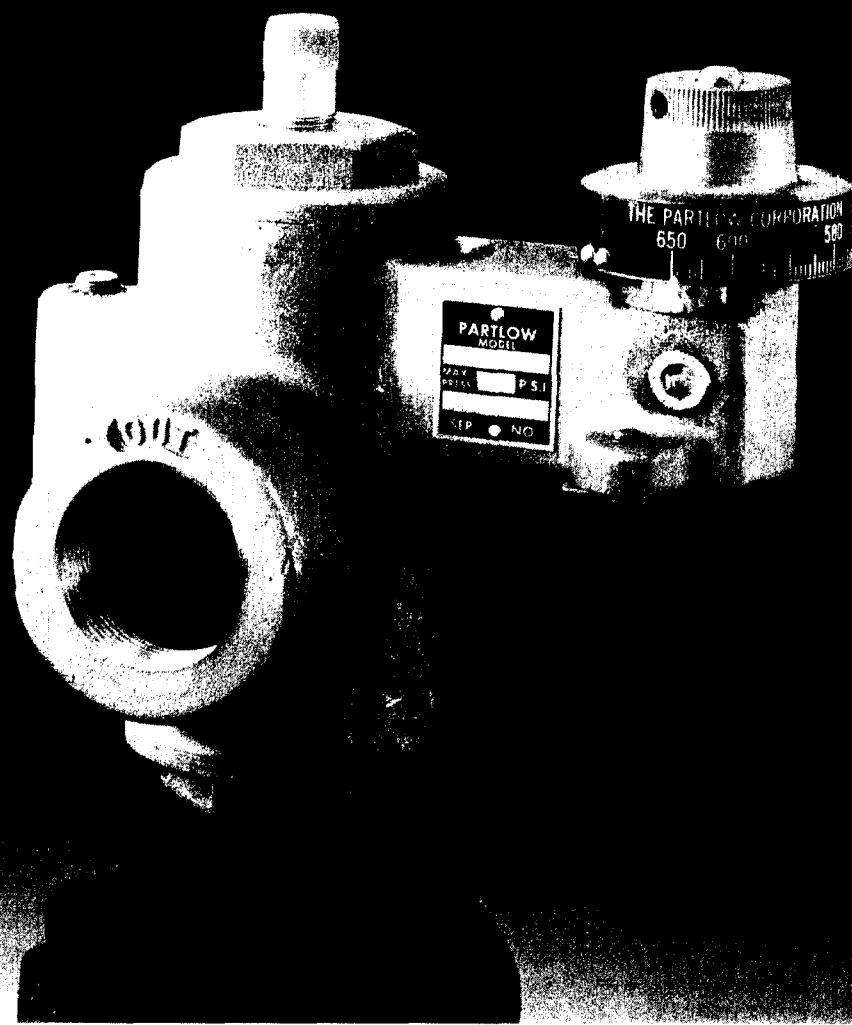


THERMALLY-OPERATED, THROTTLING GAS MECHANICAL CONTROL

The Model 60 is a low pressure thermally-operated, throttling gas control designed for use in horizontal pipelines. It derives its simplicity and efficiency from the Piston-Pak filled system sensing element.



Form Number 3240
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First Edition

**SPECIFICATIONS
INSTALLATION
OPERATION**

MODEL 60

Partlow

The Partlow Corporation • Two Campion Rd. • New Hartford, NY 13413 USA • 315-797-2222 • FAX 315-797-0403
QUALITY INSTRUMENTATION DESIGNED & MANUFACTURED IN THE USA

MODEL 60 PRODUCT SPECIFICATIONS

Dimensions	Length	Height	Width	Center of pipe to top of knob
60 - 1"	6 7/16"	5 7/16"	6"	3 11/16"
60 - 1 1/4"	6 7/16"	5 7/16"	6"	3 11/16"
60 - 1 1/2"	6 1/2"	5 7/16"	6 1/2"	3 3/4"
60 - 2"	6 11/16"	5 7/16"	6 1/2"	3 3/4"

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 process condition in order to preclude possible damage to property or product.

This document should accompany the instruction to its final installation in order to provide operational and service assistance to the end user.

- Mounting: Free standing via piping. Note: piping must be horizontal.
 - Thread Size: Inlet and output 1" NPT, 1 1/4" NPT, 1 1/2" NPT and 2" NPT depending on model selected
 - Maximum Pressure Operation: 1 PSI for all model except 2", 2" unit - 1/2 PSI
 - Maximum Operating Temperature: Limited to sensing element operating temperature, Low Temp. 125°F (52°C), Hi Temp. 150°F (66°C)
 - Flow Capabilities:
 - 60 - 1" model - 574 cfh max, 431 cfh @ 75% load permissible, 345 cfh @ 60% load std.
 - 60 - 1 1/4" model - 1005 cfh max, 755 cfh @ 75% load permissible, 603 cfh @ 60% load std.
 - 60 - 1 1/2" model - 1340 cfh max, 1005 cfh @ 75% load permissible, 804 cfh @ 60% load std.
 - 60 - 2" model - 1580 cfh max, 1185 cfh @ 75% load permissible, 948 cfh @ 60% load std.
- Note: above figures based on 1/2" pressure drop across valve with .60 specific gravity gas.
- Warranty: One year, details on the last page.
 - Approx. Net Weight*: 3 1/2 lbs
 - Approx. Ship. Weight*: 5 1/2 lbs
- * Weight will vary depending on length of element.

MODEL 60 ORDER MATRIX

Model	Order Number
Model 60 - 1"	GC00093
Model 60 - 1 1/4"	GC00094
Model 60 - 1 1/2"	GC00095
Model 60 - 2"	GC00096

*M-type plunger is required.

Specify dial required.

PISTON-PAK THERMAL SENSING ELEMENT

A Piston-Pak Thermal Sensing Element must be specified for each Model 60. Use Partlow Form 3028 " Mechanical Product Instrumentation Cross Reference and Pricing Guide" to configure the matrix number for the sensing element.



INSTALLATION AND WIRING

LOCATION

The element head assembly is subject to ambient temperature limitations of -30°F to 125°F (-35°C to 52°C) for low temperature head assemblies and +32°F to +50°F (0°C to 66°C) for high temperature assemblies. These temperature limitations must be considered when determining the instruments location. It should be located in an area as free from vibration as possible.

MOUNTING

All piping must be clean and free of rust and foreign deposits that may cause valve blockage in operation. If deposits are a problem, a line filter may be required. Install control in horizontal *pipelines only*. Make sure that valve installation does not exceed a 10° tilt from vertical position. Failure to follow this guide line could result in improper valve operation. To facilitate valve installation and ease of removal for possible service, it is recommended that unions be installed in both supply and outlet lines to valve. Be certain to install shut off valve in the supply line for service and 100% shut off.

STUFFING BOX INSTALLATION (IF APPLICABLE)

Overtightening of 21-T-105 steel or stainless steel stuffing boxes can damage the thermal element by restricting the capillary bore. To prevent damage, the stuffing box gland nut should be turned 1/2 to 3/4 of a revolution from a finger-tight position. This is equivalent to a torque of 65 to 100 inch-pounds for steel and 130 to 180 inch-pounds for stainless steel.

PLACING THE THERMAL SENSING ELEMENT

Locate the thermal sensing bulb in the most agitated part of the medium to be measured and completely immerse it. (When U and Y type bulbs are used note separation coupling between bulb and capillary). The element must be immersed up to the coupling for correct temperature indication. Do not bend capillary to less than 1/2 inch radius and never bend it too close to the element bulb or element head. Pencil type bulbs must never be bent as this will affect instrument accuracy. U and Y type bulbs may be bent, but never to less than a two inch radius. Anchor the excess capillary securely to prevent vibration damage. If the bulb is to be subjected to corrosive or scouring conditions, it should be protected by a thermal well, separable socket or other protected material. The bulb may be elevated up to 40 feet above the instrument without affecting calibration. For elevations over 40 feet consult your local Partlow Representative, Distributor or the Factory.

INSTRUMENT OPERATION

The control is shipped with the by-pass and main valve in closed position and the calibrated indicating dial positioned beyond the low end of the element scale range against the dial stop. Variables such as load error, type of application, size of burner, etc., make it impossible for control valves to be pre-set at the factory.

Before being put into service, therefore, the control must be check against a test thermometer, and the by-pass and dial knob reset to your particular requirements and equipment. For checking and adjusting procedure, see MAINTENANCE section of this document.

Temperature setpoint is achieved by turning the control's calibrated setting dial. Movement of the dial positions a fixed lever fulcrum in the control. Suspended from one end of the lever is a hemispheric valve which regulates the amount of gas flow; near the other end, the thermal element plunger contacts the lever adjacent to the fixed fulcrum.

As temperature on the thermal element bulb changes, expansion or contraction of the thermal sensing element, positions the plunger either up or down. This movement of the plunger against the lever fulcrum, in turn, produces a counter movement in the heispheric valve at te opposite end of the lever. The valve is thus positioned either away from or toward its valve seat, increasing or decreasing the flow of fuel to the burners.

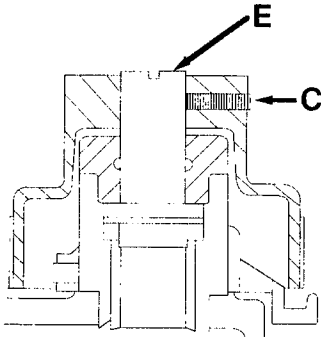
(Continued on next page)

In operation, the control seeks to position its main valve so that a fixed flow of fuel arrives at the burner for that particular load condition and control setting. If the load is constant, a balanced situation with constant temperature will exist for that control setting. If the load changes, the temperature must change to effect a different valve position and fuel flow, which, in turn, will produce a new balanced condition as a new temperature.

An adjustable needle-type by-pass is provided which permits gas flow around the main valve to establish a minimum flame setting. On all Model 60 controls, a secondary by-pass adjustment permits increased gas flow around the valve when the primary by-pass cannot supply an amount sufficient to maintain minimum flame.

A pilot burner supply line may be connected directly to the side of the control by removing the 1/4 NPT assembly plug just above the element flange.

Figure 1 - Control Knob Setting



MAINTAINING YOUR MODEL 60

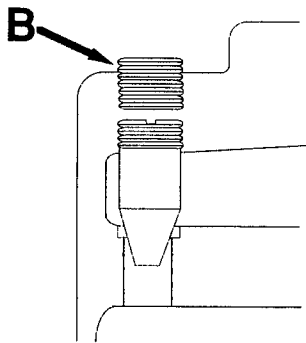
CHECKING TEMPERATURE

When checking and verifying your temperature be sure to use a test thermometer of known accuracy. Locate check test thermometer as close to sensing element as possible. Rotate control dial knob to an approximate temperature that is to be maintained. Allow adequate time for temperature to stabilize. If instrument dial reading does not agree with test thermometer then dial knob must be reset. See below

CONTROL KNOB RESET

See Figure 1. Loosen set screws labeled C. Rotate knob so that pointer is in alignment of test thermometer reading. Tighten set screws C carefully so not to disturb adjusting screw E.

Figure 2 - By-Pass Setting

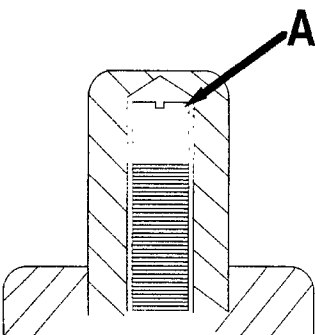


BY-PASS SETTING (minimum flame adjustment)

This gas control has two minimum flame adjustments. The by-pass screw beneath B is a fine adjustment, i.e. multiple turns for small flame changes. Secondary by-pass screw A is a course adjustment, i.e. large flame changes per small adjustments. Adjust either by-pass screw as necessary. For fine by-pass screw adjustments see Figure 2. Adjust control dial knob to a temperature that will insure the application temperature will remain above ambient condition while adjustment is made. Establish a flame and allow system to rise to temperature. Remove by-pass plug labeled B. This will expose a slotted needle valve. Using a screwdriver, slowly back out (CCW) screw until a slight flame increase is observed. Rotate control knob CW to close main control valve. Re-adjust screw in (CW) or out (CCW) as required to establish the lowest most stable flame possible for the application.

Note: Since the by-pass adjustment screw does not seal bubble tight, place thumb over by-pass plug hole when adjusting to be sure that gas leaking around by-pass screw does not affect flame reading.

Figure 3 - Secondary By-Pass Setting



SECONDARY BY-PASS SETTING

See Figure 3. Should the primary fuel minimum flame adjustment be insufficient for the requirement of the system, a greater fuel by-pass is provided for via a valve positioning adjustment located under a sealing cap. Loosen the cap to expose slotted screw A. With valve operating and control knob rotated to a point which is lower than the preset system operation, i.e. control knob below set point, the flame size should decrease. Adjusting screw A CW will cause the valve to be cracked open and fuel to pass causing a larger flame at the burner.

Note: This adjustment is more course than the primary fuel adjustment. Care should be exercised to avoid either total fuel shut-off or a much larger than needed flame size using this adjustment.

An adjustment between primary and secondary adjustments may be necessary to accurately achieve fuel flame size. Re-cap the protective cap over the secondary adjustment screw once the correct adjustment has been achieved.

PISTON-PAK THERMAL SENSING ELEMENT IDENTIFICATION

An element designation number is stamped on the bottom of the element head. This is a coded description of the element specifications and should be used whenever a replacement element is ordered. The number appearing on the side of the element head (Figure 4) is the element age code, which may be required in establishing warranty.

ORDERING/SPECIFYING THE PISTON-PAK SENSING ELEMENT

The sensing element is ordered separately from the Model 60 and requires its own matrix number. To determine the correct sensing element configuration for your instrument(s) and application see, Partlow Form 3028 "Mechanical Product Instrumentation Cross Reference and Pricing Guide."

ELEMENT REPLACEMENT

See Figure 5 for details. Be certain to shut off fuel to the system being serviced. Remove screws D and remove element from control body. Be certain that O-ring G is retained as element is removed. Lubricate with Plastilube or No. 1 Petroleum base grease or equivalent. Install replacement element using care to make certain that O-ring G is properly positioned on element head assembly. Install two screws D. Re-supply gas, check connections for leaks around surface of gas control to element connection. Do this using a soap solution.

Note: *Element replacement will cause control knob to need adjustment, see CONTROL KNOB RESETTING for adjustment procedure.*

Caution: *The inside valve mechanism(s), particularly the inside of the element housing, should never be oiled.*

Figure 4 - Sensing Element ID

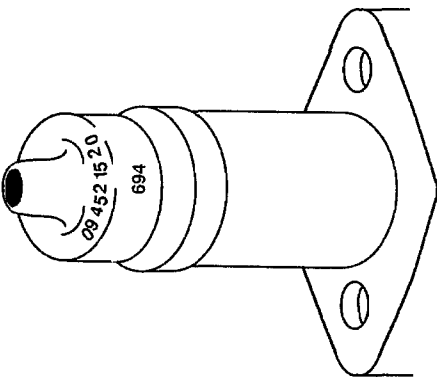
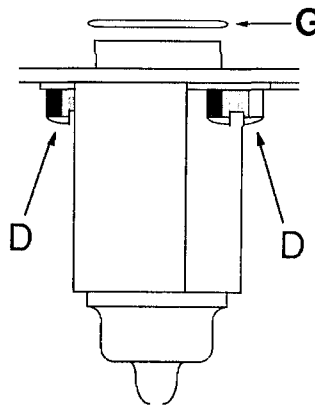


Figure 5 - Replacing Element



CONTROL CAPACITY

Normal Control lead

Instrument	Desireable (60%)	Permissible (75%)	†Maximum Control Capability
60 - 1/2	100 cfh	125 cfh	168 cfh
60 - 3/4	201	252	335
60 - 1	345	431	574
60 - 1 1/4	603	755	1005
60 - 1 1/2	804	1005	1340
60 - 2	948	1185	1580

† Maximum control capacity based on 1/2 inch pressure drop in control with .60 specific gravity gas.

Capacity Correction Factors:

For pressure drops other than 1/2" water column, multiply by:

$$\text{FACTOR} = \sqrt{\frac{2}{\frac{\text{REQUIRED PRESSURE DROP IN INCHES H}_2\text{O}}{0.5}}}$$

For specific gravities other than 0.60, multiply by:

$$\text{FACTOR} = \sqrt{\frac{2}{\frac{0.60 \text{ SPECIFIC GRAVITY}}{\text{REQUIRED SPECIFIC GRAVITY}}}}$$

SPECIFIC GRAVITY OF TYPICAL GASES

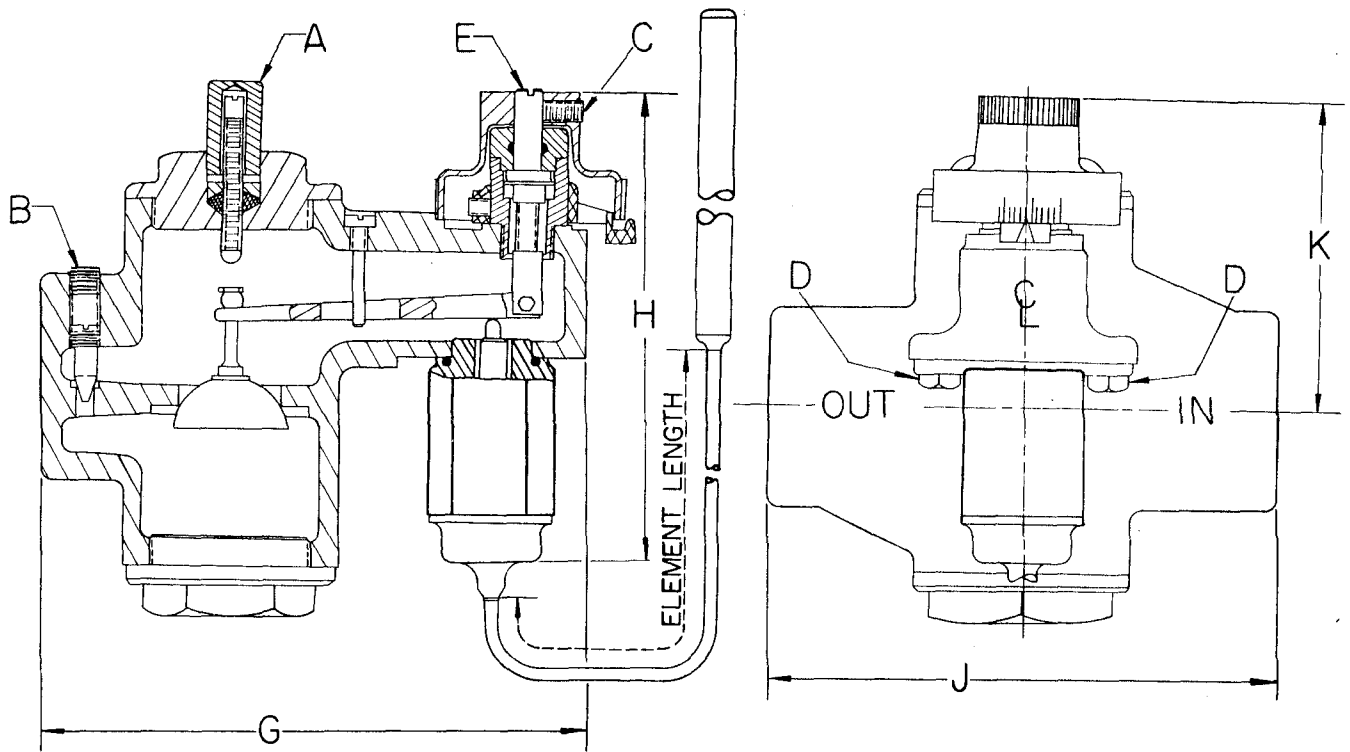
Gas	Straight	100% Premix
Manufactured	.55 to .65	.93
Natural	.60	.97
Propane	1.50	1.03
Butane	2.00	1.03

TROUBLESHOOTING

Symptom	Probable Causes	Remedies
After resetting dial knob, control temperature gradually creeps higher	1. Sensor failure	1. Replace Piston-Pak element
At low knob setting, measured control temperature is consistantly higher than knob reading	1. Minimum flame is set too high	1. Adjust by-pass; reset minimum flame
Burner has tendency to go out	1. Minimum flame has not been set or is set too low	1. Adjust by-pass; reset minimum flame
Measured control temperature is lower than knob settting (conveyor-type oven)	1. Load has increased 2. Dial knob not set properly	1. Set dial to higher temperature to offset increased load 2. Reset control dial

DIMENSIONAL DRAWING

Figure 6 - Dimensional Drawing



EXPLODED VIEW AND PARTS LIST

1. By-Pass Cap Kit 64403601
Includes: By Pass Screw, Pipe Plug, By-Pass Spring

2. Secondary By-Pass Cap Kit
Includes: Cap, Adjustment Screw, Gland, Packing, Cap Top
60 - 1 1/2", 2" 64405502
60 - 1", 1 1/4" 64405501

3. Valve Assembly Kit
Includes: Valve Stem Nut, Valve Arm, Valve Stem, Valve, Pivot Screw, Pipe Plug, Guide Screw
60 - 1", 1 1/4" 64404209
60 - 1 1/2" 64404210
60 - 2" 64404211

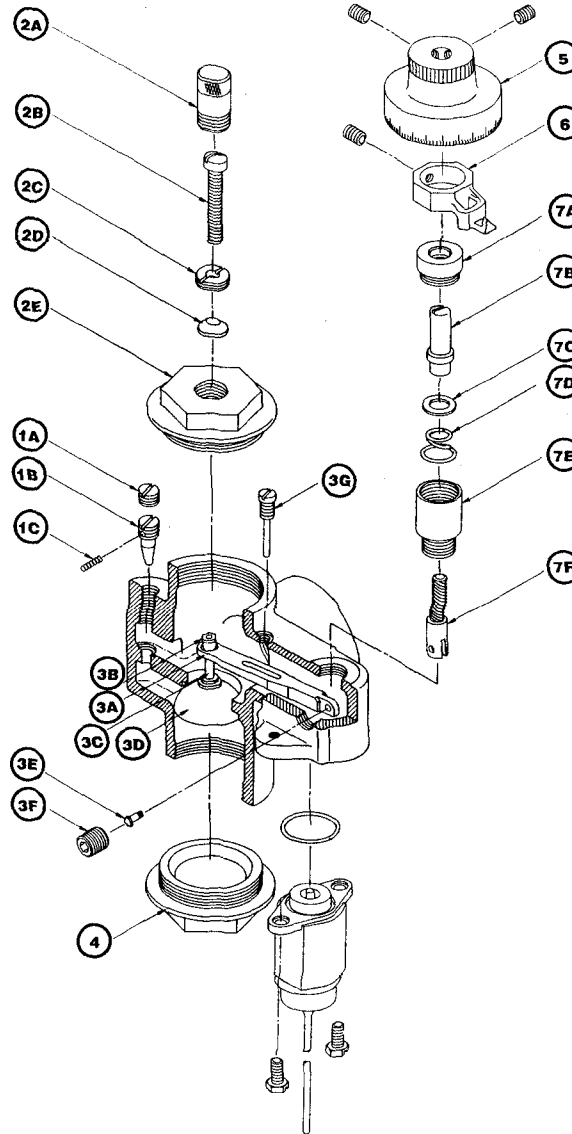
4. Lower Valve Cap
60 - 1", 1 1/4" 64405407
60 - 1 1/2", 2" 64405408

5. Dial Assembly
Includes: Knob, Dial Scale, (2) Set Screws

112F	64403701
112C	64403702
217F	64403703
217C	64403704
225F	64403705
225C	64403706
335F	64403707
335C	64403708
445F	64403709
445C	64403710
555F	64403711
555C	64403712
655F	64403713
665F	64403714
665C	64403715
780F	64403716
780C	64403717
910F	64403718
910C	64403719
1011F	64403720
1011C	64403721
38 0/50 Uncal.	64403722
112F Uncal.	64403723
112C Uncal.	64403724
217F Uncal.	64403725
217C Uncal.	64403726
225F Uncal.	64403727
225C Uncal.	64403728
335F Uncal.	64403729
335C Uncal.	64403730
445F Uncal.	64403731
445C Uncal.	64403732
555F Uncal.	64403733
555C Uncal.	64403734
665F Uncal.	64403735
665C Uncal.	64403736
780F Uncal.	64403737
780C Uncal.	64403738
910F Uncal.	64403739
910C Uncal.	64403740
1011F Uncal.	64403741
1011C Uncal.	64403742

6. Dial Stop Kit 64405301
Includes: Dial Stop and Screws

7. Stuffing Box Kit 64404001
Includes: O-ring Stuffing Box, Adjusting Stem, Adjusting Screw Washer, Stuffing Box Spring, Stuffing Box Body, Adjusting Screw, O-ring



Warranty

These products are sold by The Partlow Corporation ("Partlow") under the warranties set forth in the following paragraph. 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 there of who purchases them other than for the purpose of resale.

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 same time to the specifications set forth in the relevant Partlow instrumentation sheet, sheets, manual or manuals for such products.

Partlow's sole and exclusive obligation and buyer's sole and exclusive remedy under the above warranties 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 - The Partlow Corporation, 2 Campion Road, New Hartford, New York 13413 or FAX MAIL 1-315-797-0403 and which if so advised by Partlow, are returned with a statement of the observed deficiency to the designated facility during normal business hours, transportation charges prepaid and which upon examination by Partlow are found not to comply with the above warranties. PARTLOW SHALL NOT BE LIABLE FOR ANY INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES, OR ANY OTHER DAMAGES, COSTS OR EXPENSES, EXCEPTING ONLY THE COST OR EXPENSE OF REPAIR OR REPLACEMENT AS ABOVE DESCRIBED.

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