Genuine

KIMRAY INC.®

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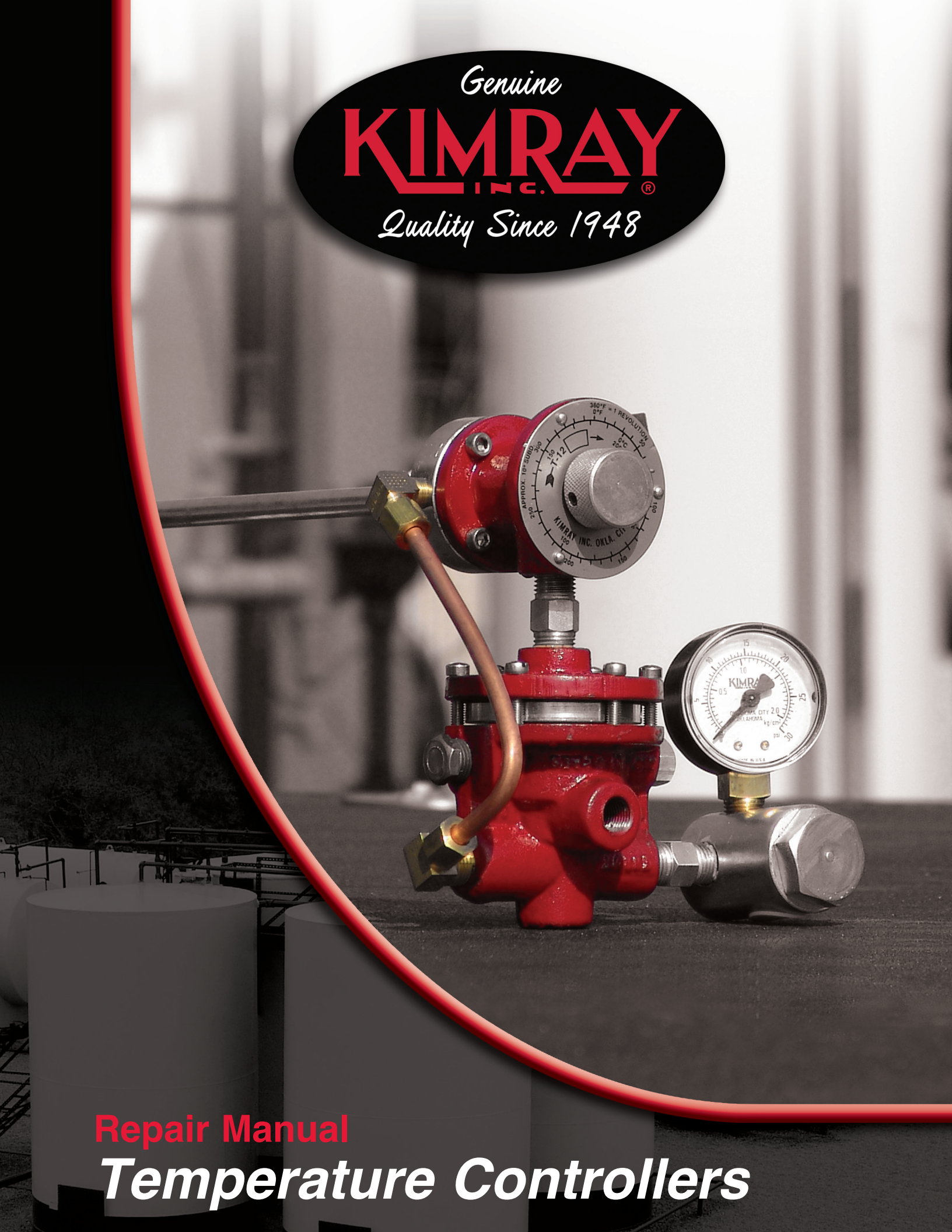


Repair Manual

Temperature Controllers

INDEX

NOTE: We reserve the right to modify or change, without prior notice, any statement or information contained herein. If exact dimensions or specifications are required by the customer certified prints will be furnished for a minimum charge upon request to KIMRAY, Inc.

INTRODUCTION

SCOPE
This instruction manual contains repair information for the Kimray T 12 and T 18 Thermostats with additional information regarding calibration.

DESCRIPTION
The Thermostat employs a bimetallic probe to monitor changing temperatures. Changes in the length of the stainless steel tube in the probe reposition a small three-way valve (the pilot plug and seats) in the pilot section which controls output pressure. Rising temperature results in decreasing pneumatic output.

OPERATION
The Kimray Thermostat provides a proportional pneumatic output for control of burner valves, mixing valves or air shutters.

MAINTENANCE
Maintenance should be performed on a regular basis. An initial inspection interval of 12 months is recommended. Depending on the service conditions and the condition of the valve, the inspection interval may be decreased or increased.

WARNING
Before performing any service be sure that any operating or instrument gas lines have been disconnected. Never tighten any fitting or the main connections to the regulator while there is pressure on the line.

MATERIALS
Standard materials in the Kimray Thermostat include

Bonnet	Ductile Iron ASTM - A395
Base	C 12L14 Cold Finished Steel
Probe	304 Stainless Steel
Interior Parts	C 12L14 Cold Finished Steel
Pilot Plug	Silver Brazed 303 and 316 Stainless Steel
Elastomers	Nitrile

To get the long service you have come to expect from Kimray products, always use **GENUINE KIMRAY PARTS** when doing repairs. Remember, parts made to less than Kimray specifications don't save you money!!!

ELASTOMER MATERIALS

AFLAS ® is a trade mark of Asahi Glass Co

TEMPERATURE:
-25° to +500° F
-30° to +260° C

APPLICATION:
Crude Oil & Gas Production (High heat), Steam Flood Production Chemicals (corrosion inhibitors) Amine Sweetener Systems, Gasoline, Diesel, Fuel Oil Systems

FLUID / GAS:
Crude Oil & Gas Production, H2S, Steam, Petroleum fluids, Sea Water

HSN (Highly Saturated Nitrile)

TEMPERATURE:
-15° to +300° F
-26° to +149° C

APPLICATION:
Crude Oil & Gas Production w/ H2S C02

FLUID / GAS:
Crude Oil & Gas H2S, C02, Sea Water

NITRILE

TEMPERATURE:
Buna-N:
-40° to +220° F
-40° to +105° C
Low-Temp:
-85° to +120° F
-65° to +49° C

APPLICATION:
Crude Oil & Gas Production Glycol Dehydrators, Gasoline, Jet Fuel & Diesel Fuel Pumping, Water Disposal, Methanol Injection Pumps, Water pump seals, hydraulic pump seals

FLUID / GAS:
Crude Oil & Gas, Good to Poor in Sour Production (See HSN), Water, Glycols, Hydraulic Oils, Resistance to crude oil in the presence of hydrogen sulfide and amines, Diesel fuel, fuel oils

DO NOT USE WITH:
Aromatic hydrocarbons, chlorinated hydrocarbons, phosphate esters (hydraulic fluids)

GYLON

TEMPERATURE:
-350° to +500° F

APPLICATION:
High heat, high chemical resistance, highly resistance to gas permeation

VITON ® is a trade mark of Dupont

TEMPERATURE:
-10° to +350° F
-23° to +177° C

APPLICATION:
Crude Oil & Gas Production, Glycol Dehydrators, Gasoline, Jet Fuel & Diesel Fuel Pumping, Water Disposal, Methanol Injection Pumps. (Also Vacuum Service) (Gas permeability is very low)

FLUID / GAS:
Crude Oil & Gas, Sour Gas (C02), Propane, Gasoline, Diesel, Fuel Oil Systems

DO NOT USE WITH:
Hot Water, Not preferred for wet H2S, Methyl Alcohol, Amines, Sodium hydroxide solutions

ETHYLENE PROPYLENE

TEMPERATURE:
-65° to +300° F
-54° to +148° C

APPLICATION:
Steam Flood

FLUID / GAS:
Steam, Water, Alcohol

DO NOT USE WITH:
Crude Oil & Gas, Diester Lubricants (Lube Oils)

POLYURETHANE

TEMPERATURE:
-40° to +220° F
-40° to +104° C

APPLICATION:
High abrasion resistance Seats, Diaphragms

FLUID / GAS:
Crude Oil gas and Water, Sour Gas (C02), propane, butane, fuel, mineral oil and grease

POLYACRYLATE

TEMPERATURE:
±0° to +300° F
-17° to +149° C

APPLICATION:
Production Heaters, Thermostats

FLUID / GAS:
Crude Oil & Gas at High Temperature

DO NOT USE WITH:
Alcohol, Glycols

REQUIRED TOOLS
Screw Driver:
5/32" Hex Driver (Fig. A)
3/32" Hex Driver (Fig. B)

Figure A Figure B

STEP 1
SEAT ASSEMBLY
Loose the Seat Assembly by turning the Pointer counter clock wise (Fig. 1.1 and 1.2).

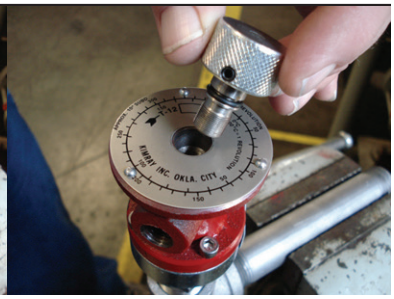


Figure 1.1 Figure 1.2

Remove the Set Screw by using the 3/32" Hex Driver (Fig. 1.3) and remove the seat from the Pointer (Figure 1.4).

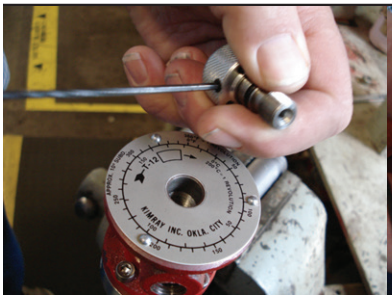


Figure 1.3 Figure 1.4

Remove O-Ring from Seat No. 596 (Fig. 1.5).

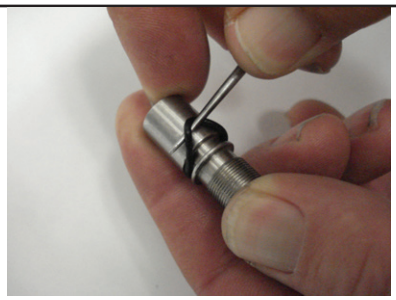


Figure 1.5

STEP 2
BONNET
Remove the Bonnet by loosening the four screws using a 5/32” Hex Driver (Fig. 2.1 and 2.2).

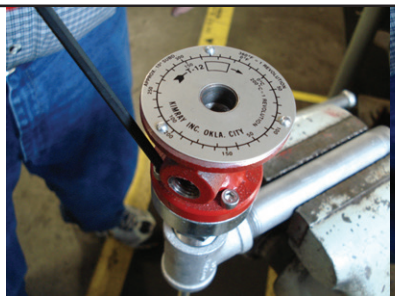


Figure 2.1 Figure 2.2

DISASSEMBLY

STEP 3
HOUSING ASSEMBLY
First Scenario:
Use a wrench to loosen the lower seat (Fig. 3.1).
If the Housing comes apart first (Fig. 3.2), use a pair of pliers and a wrench to loose the Seat from the Housing (Fig. 3.3). Then remove the O-Ring from the Lower Seat (Fig. 3.4).

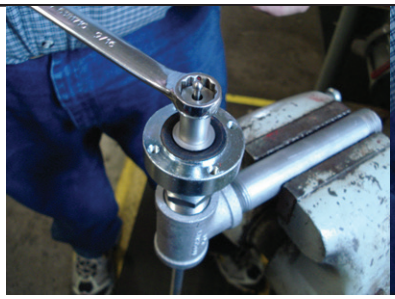


Figure 3.1

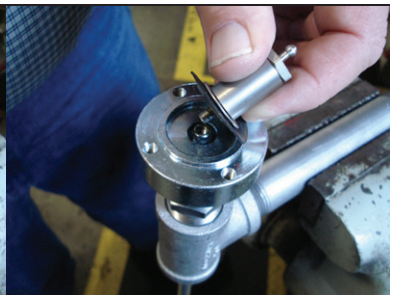


Figure 3.2

Second Scenario:
Use a wrench to loose the lower seat (Fig. 3.1).
If the Seat comes apart by itself, remove the O-Ring form the Lower Seat (Fig. 3.4) and then use a pair of pliers to remove the Housing from the base (Fig. 3.5 and 3.6).

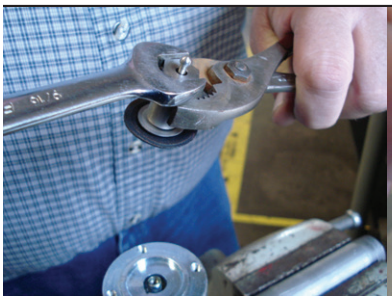


Figure 3.3

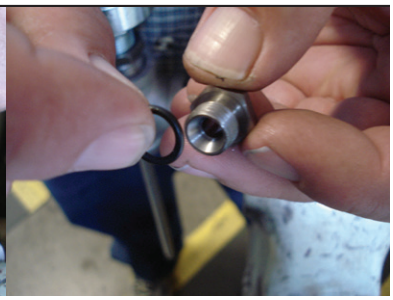


Figure 3.4

Figure 3.5

Figure 3.6

Use a pair of needle nose pliers to remove the spring from the Housing (Fig. 3.7)

Remove the Diaphragm Assembly from the Housing (Fig. 3.8).

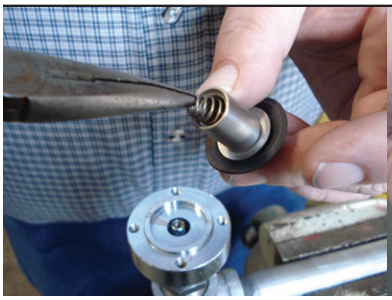


Figure 3.7

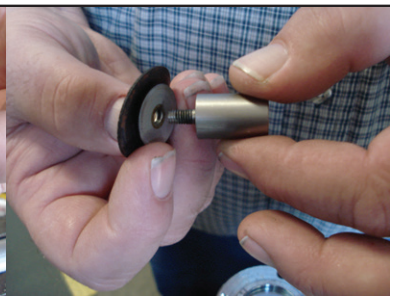


Figure 3.8

BASE
Check for straightness by a sight inspection. (Fig 4.1).

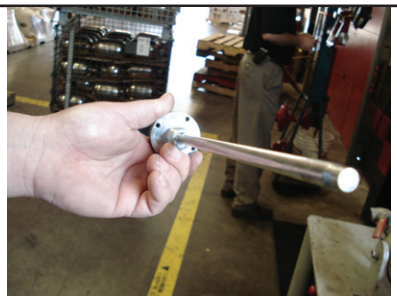


Figure 4.1

REQUIRED TOOLS
Screw Driver:
5/32" Hex Driver (Fig. A)
3/32" Hex Driver (Fig. B)

Figure A

Figure B

STEP 1
BASE
Tighten Jig in vice (Fig. 1.1).

Screw the base on Jig (Fig. 1.2).

Figure 1.1

Figure 1.2

Check the concentricity between the Low Expansion Rod hole and the Base.
If the Low Expansion Rod hole is not in centered (Fig. 1.3), tap the Base bottom with your hand (Fig. 1.4) until you find concentricity (Fig. 1.5).

Note: Do not bend the base by tapping too hard.

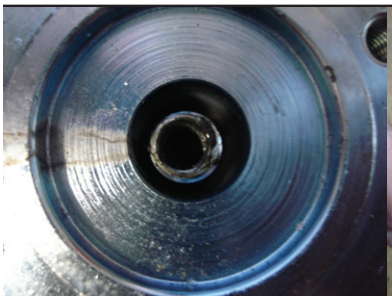


Figure 1.3

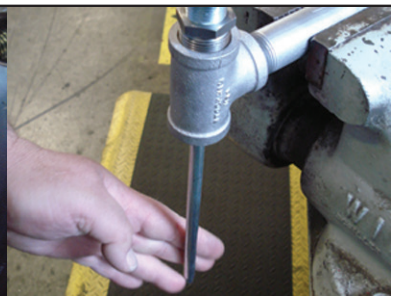


Figure 1.4

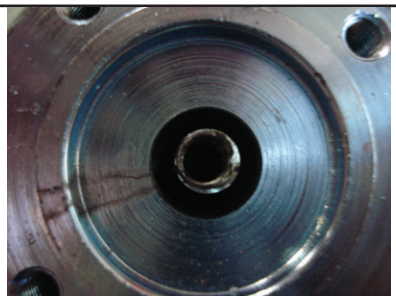


Figure 1.5

ASSEMBLY

STEP 2
HOUSING ASSEMBLY
Insert the Upper plate in the Housing (Fig. 2.1).
Insert the Diaphragm (Fig. 2.2)

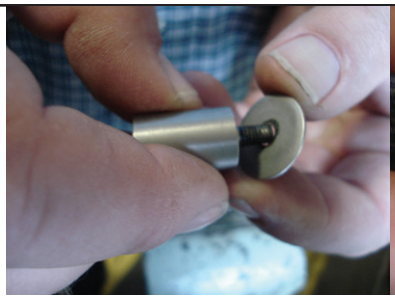


Figure 2.1

Figure 2.2

Insert the Lower Plate (Fig. 2.3).

Screw the Housing in to the Low Expansion Rod hole (Fig. 2.4).

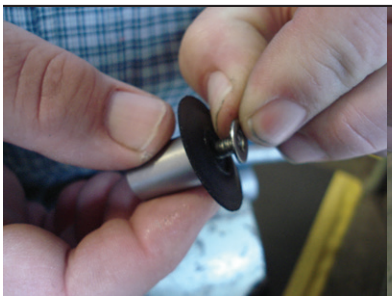


Figure 2.3

Figure 2.4

Finger tighten the Housing (Fig. 2.5).

Use a pair of needle nose pliers to insert the spring in the Housing placing the wider side on bottom (Fig. 2.6).

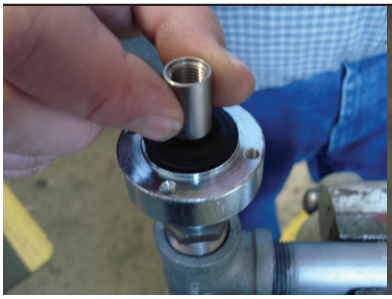


Figure 2.5

Figure 2.6

STEP 3
SEAT
Insert O-Ring on Seat (Fig. 3.1).

Introduce Peanut in Seat (Fig. 3.2).

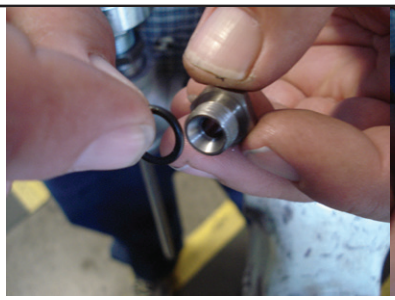


Figure 3.1

Figure 3.2

Insert Seat on Housing (Fig. 3.3) and tighten with a wrench (Fig. 3.4).

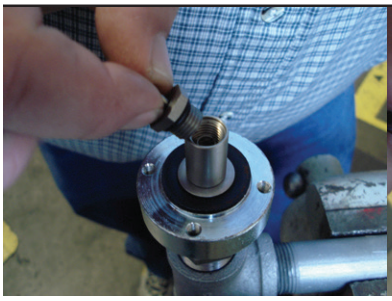


Figure 3.3

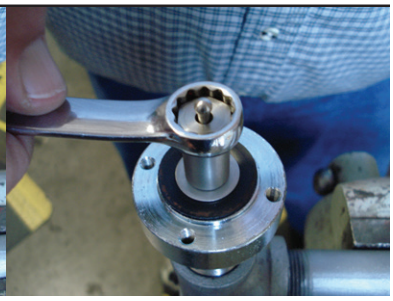


Figure 3.4

STEP 4
BONNET
Place the Bonnet on top of the Base and tighten (Fig. 4.1)

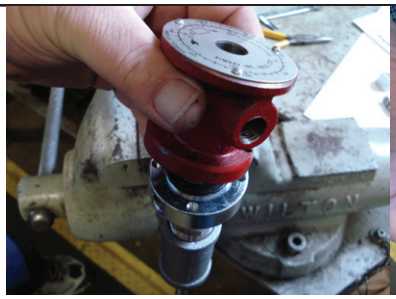


Figure 4.1

Figure 4.2

Insert bolts on Bonnet and tighten with a 5/32" Hex Driver (Fig. 4.2 and 4.3).

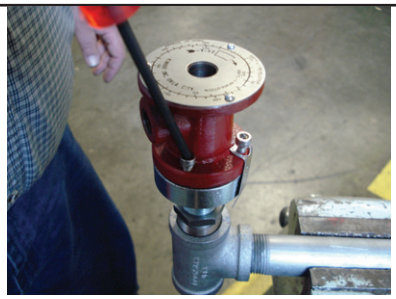


Figure 4.3

STEP 5
HOUSING
Insert O-Ring in Housing (Fig. 5.1).

Insert Housing in Bonnet (Fig. 5.2).

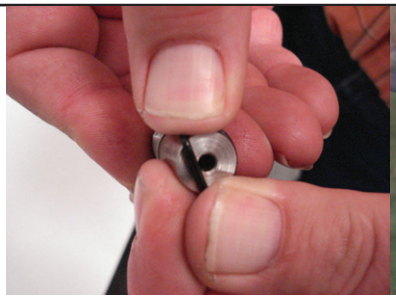


Figure 5.1

Figure 5.2

STEP 6
POINTER
Use the 3/32" Hex Driver to thread the Set Screw (Fig. 6.1).

Figure 6.1

NOTES

EQUIPMENT & REQUIREMENTS

Screw Driver:
5/32" Hex Driver (Fig. A)
3/32" Hex Driver (Fig. B)

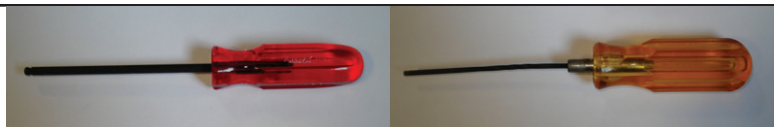


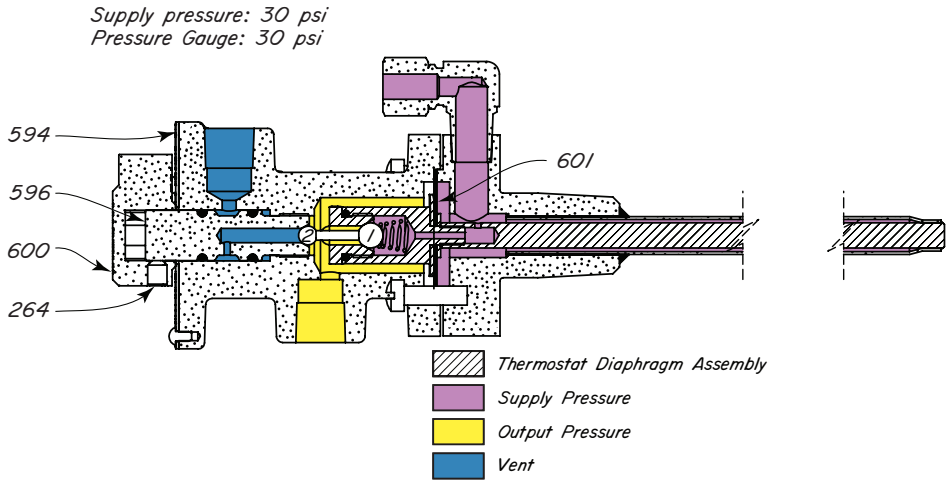
Figure A Figure B

Jig:
Made with a 3/4" Tee, 3/4" pipe 8" long and a 3/4" to 1/2" reducer nipple. (Fig. C).

Figure C

Thermometer:
Required to measure atmospheric temperature. (Fig. D).

Figure D



STEP 1
Tighten the jig in vice (Fig. 1.1).

Figure 1.1

STEP 2
Install a readable Pressure Gauge for 30 psi, as shown in the yellow outlet connection of the Base Assembly. (Fig. 2.1).

Figure 2.1

STEP 3
Supply the Temperature Controller with 30 psi of air pressure. (Fig. 3.1).

Figure 3.1

STEP 4
Loosen screw No. 264 (Fig. 4.1) and remove Pointer No. 600 (Fig. 4.2).

Figure 4.1

Figure 4.2

STEP 5
If pressure is indicated on the yellow outlet gauge, turn the 596 Seat counter clockwise slowly until the pressure vents from the gauge (Fig. 5.1). Check for air leakage from the hole in No. 596. There should only be a slow bubble blow from a soap solution (Fig. 5.2). This test Ball and Seat No.1.

Now turn No. 596 Seat clockwise until the output pressure equals the supply then continue for approximately ? turn clockwise. (Fig. 5.3). Check for air leakage from the hole in No. 596 Seat. There should only be a slow bubble blown from a soap solution (Fig. 5.4).This checks Ball and Seat No.2


Figure 5.1


Figure 5.2


Figure 5.3


Figure 5.4

STEP 6
If Ball and Seat No.1 are leaking excessively, it may be due to a small foreign object. You may wish to remove No. 596 (Fig. 6.1) and then with a small rod (about 1/4" diameter) push against Ball No.2 to push Ball No. 1 off its Seat several times to purge the Seat clean (Fig. 6.2)


Figure 6.1


Figure 6.2

STEP 7
If Ball and Seat No.1 or No.2 continues to leak excessively, they should be removed clean and lapped.

- Prepare a lapping compound (Fig. 7.1)
- Spread the lapping compound in Ball No. 1. (Fig. 7.2)
- Hand rub the ball in the seat (Fig. 7.3)
- Use a air nozzle to blow out the particles left (Fig. 7.4)

If either Ball or Seat is pitted, they should be replaced.

Note: If you do not have a lapping compound it can be made by using sandpaper grit and water.

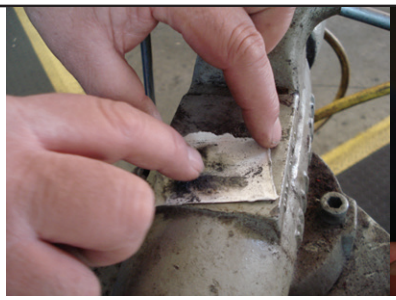


Figure 7.1


Figure 7.2


Figure 7.3

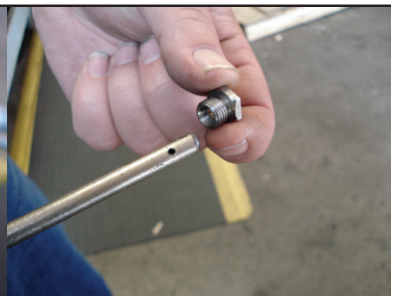


Figure 7.4

STEP 8

With no pressure on the yellow outlet gauge, slowly turn seat No. 596 clockwise until the Gauge reads 10 to 15 lbs (Fig. 8.1).

The sensing tube of the controller should be sensing Atmospheric temperature which you can check with a thermometer (Fig. 8.2).
Locate this atmospheric temperature on the scale of the controller. Install the Pointer on Seat 596 with the Pointer at Atmospheric Temperature (Fig. 8.3).
The Pointer should be pushed on just far enough to be able to tighten the Set Screw. Be careful not to turn No. 569

Now turn Pointer clock wise to maximum temperature setting required by counting the dial subdivisions. Do not exceed the controller rating (Fig. 8.4).

At this maximum temperature loosen set screw 264. Push the Pointer on 596 as low as possible and tighten Set Screw No. 264 (Fig. 8.5)

The Pointer can now be moved to any desired temperature setting below the maximum (Figure 8.6).

Figure 8.1

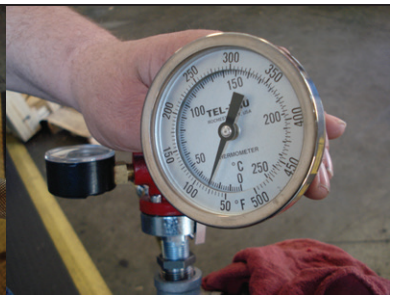


Figure 8.2

Figure 8.3

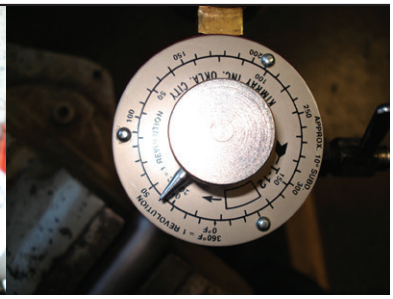


Figure 8.4

Figure 8.5

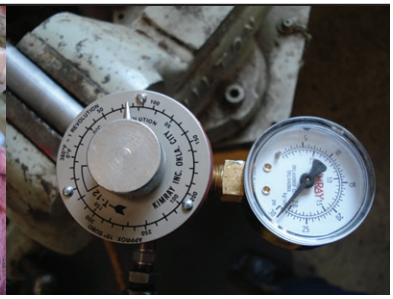


Figure 8.6

FIELD SETTING

For field setting this same procedure may be used except instead of using a pressure gauge, observe the Burner Valve as it opens and closes to position the Pointer at the proper temperature in accordance with a Thermometer on the vessel.

NOTES

KIMRAY
Temperature Controllers

Repair Manual

www.kimray.com

MADE IN THE USA