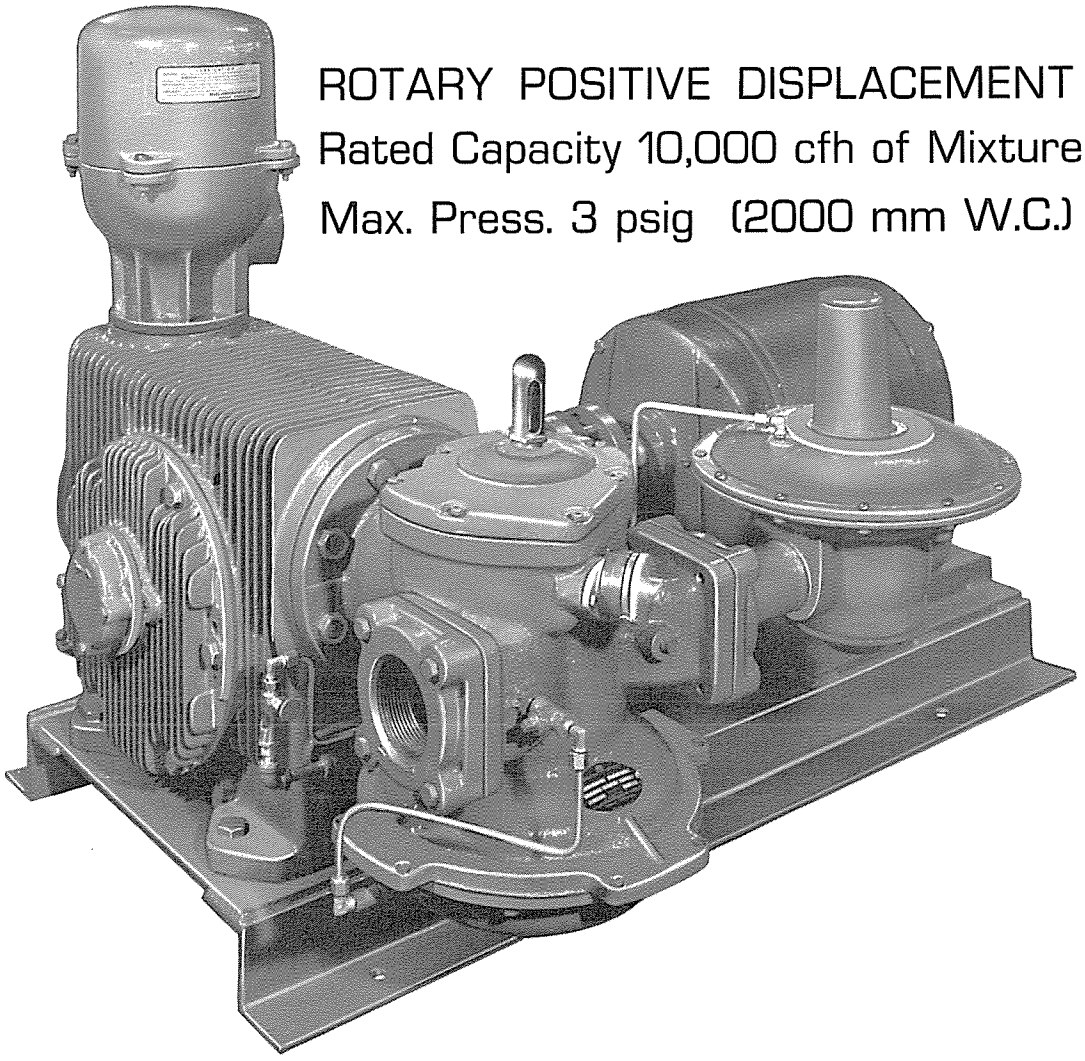
FORM 30020
(Formerly Bulletin CA-100)

Instructions for INSTALLATION • OPERATION • MAINTENANCE

COMBUSTION CONTROLLER

SERIES 100-CA



ROTARY POSITIVE DISPLACEMENT TYPE
Rated Capacity 10,000 cfh of Mixture.
Max. Press. 3 psig (2000 mm W.C.)

FM
FACTORY MUTUAL
APPROVED

selas
SELAS CORPORATION OF AMERICA

SELAS CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA 19025 U.S.A.

BEAVER 7-71

CONTENTS

INSTALLATION

HANDLING

Avoid rough handling while unloading and moving to location. Do not use sling around shafts.

UNPACKING

Remove crating but do not remove skids until machine is placed in final position ready for installation. Remove packing material from inside of pressure governor cap. See Fig. 7 and tag wired to machine. Do not discard instruction tags until installation is completed.

LEVELING

Machine must be installed on level foundation. Grout surface to a finished level where necessary. Do not bolt base plate tightly to foundation.

PIPING

All piping must be thoroughly cleaned. Pipe flanges and threaded connections must be properly aligned to avoid straining or distortion of castings. Support piping independently of the machine. Use gaskets between flanges.

A flexible connector should be installed between the mixture outlet and the mixture piping (see Fig. 4).

GAS CONNECTION

Remove thread protector cap (Fig. 6). Install a flanged or union connection, and a full ported shut-off valve in the raw gas line close to the gas governor on the machine. (Fig. 4)

CAUTION: Pressure in gas line at the inlet of the gas governor should not be lower than 4″ (100 mm) W.C. nor exceed a maximum of 10″ (250 mm) W.C. If pressure in gas supply line is higher, a reducing regulator must be used. This regulator must be located upstream a minimum of ten feet. Consult with Selas if pressure is only slightly higher than 10″ (250 mm) W.C.

MIXTURE CONNECTION

Remove thread protector cap. Install a full ported shut-off valve in the mixture line leading from the machine.

AIR CONNECTION

Air filter may be mounted in any direction. If located outdoors, the inlet openings must be weather-protected. Air supply should be clean and dry. Steam, corrosive, hot and dirty atmospheres are harmful to the Combustion Controller. Where it is necessary to have a long run of piping to reach clean, dry air, use oversized pipe and a minimum of elbows to reduce pressure drops.

ELECTRICAL CONNECTIONS

CAUTION: Motor coupling is shipped disconnected. Do not assemble coupling until electrical connections are made. Serious damage may result if machine is run backwards. See tag wired to machine.

Make proper electrical connections to motor, making sure that motor rotates in direction indicated by arrows on machine (clockwise when looking at shaft end of motor).

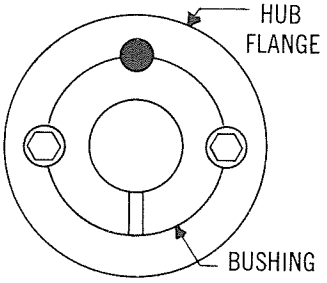
If automatic lubricator is furnished, wire solenoid valve and control timer as instructed.

COUPLING

Do not assemble until electrical connections are made. The coupling used is a taper-lock (disc-type). It requires no lubrication. On machines shipped with bushings attached, install center disc and slide coupling flanges together until flanges are ¾″ apart and flush with shaft ends. Tighten screws on taper-lock bushings. Check alignment using straight-edge across the two flanges (Fig. 6).

Coupling discs can be removed by loosening flanges on shafts (see "Removing Bushing," below) and sliding flanges apart on shafts.

WHEN NECESSARY TO INSTALL BUSHING:



1. Clean shaft, bore and outside of bushing, and bore of hub (taking bushing from hub if already assembled). Remove any oil, lacquer or dirt. Place bushing in hub.

2. Oil thread and point of screws. Place screws loosely in holes shown thus ◎ in diagram.

3. Make sure bushing is free in hub. Slip assembly onto shaft and locate bushing flush with end of shaft.

4. Tighten screws alternately and evenly until they are pulled up very tightly. Use a piece of pipe on wrench to increase leverage. Use a wrench torque of 175 lb.-in.

5. Hammer against large end of bushing using hammer and block or sleeve to avoid damage. Screws can now be turned a little more using the specified wrench torque. Repeat this alternate hammering and screw retightening until the specified wrench torque no longer turns the screws after hammering. Fill other hole with grease to exclude dirt.

REMOVING BUSHING

1. Remove screws. Oil thread and point of screws.

2. Insert one screw in hole shown thus ● in diagram. Note that one screw in each hub is left over and is not used in this loosening operation.

3. Tighten screw until bushing is loosened in hub.

TEST RUN

If unit has been in storage, rotate compressor a few revolutions by hand to free moving parts. Make a test run of machine using air only. Start machine with gas inlet valve and mixture outlet valve closed. (Fig. 4) With motor running, lubricate machine according to instructions in chapter titled "LUBRICATION" under "MAINTENANCE."

Lubrication instructions are for machines supplied with or without automatic lubricator.

Packing gland on shaft of compressor should be taken up gradually during the first 2 or 3 weeks until worn in and then only at long intervals as required. Do not hurry process of tightening since doing so will overheat the bearing housing and shaft.

OPERATION

STARTING THE MACHINE

Many installations, often adapted to the system or process to be served, require special instructions which frequently involve a purge interval and/or the use of safety cocks. In addition to following the specific instructions developed for the installation, several general rules should be observed prior to start-up to avoid delivering mixture to areas not prepared for ignition:

Insure that:

1. Gas supply to machine is shut off.
2. Mixture outlet valve is fully closed.
3. All mixture valves at burner positions are closed.

NOTE: At initial start-up make certain to adjust the mixer to deliver the gas-air ratio required. (Refer to Machine Adjustment.)

Follow established starting procedure; or if none is indicated, proceed as follows:

4. Prepare the lighting torch, standing pilot and all ignition devices for the burners.
5. Start motor.
6. Open gas valve.
7. Open mixture outlet.
8. Light burners as required.
9. Where necessary, readjust air/gas ratio setting to produce desired burning characteristic. (Refer to Machine Adjustment.)

STOPPING THE MACHINE

There are two general procedures to follow in shutting down, depending on the type of mixtures used:

A. When operating with mixture within explosive range, and it is desirable to purge all lines of mixture before shut-down, proceed as follows (Fig. 4):

1. Close gas inlet valve on main gas supply to machine inlet.
2. Allow machine to run long enough to clear all pipes of air-gas mixture and then stop motor.
3. Close all valves at burners connected to machine.
4. Close mixture outlet valve at machine outlet.

B. When operating with a mixture within non-explosive range and where it is desirable to maintain mixture in the lines, proceed as follows:

1. Close all valves at burners connected to machine.
2. Close mixture outlet valve at machine outlet.
3. Stop motor.
4. Close gas inlet valve on main gas supply to machine inlet.

NOTE: Where operating conditions appear to warrant a starting and stopping procedure other than listed, consult **Selas Corporation of America** for special instructions.

CAUTION: If unit is used for stand-by purposes, it is essential that machine be run at regular intervals to keep parts in good operating condition. (Refer to maintenance instruction.)

IMPORTANT: To prevent damage to the machine, do not allow temperature of bearing housing or discharge side of compressor housing to rise above the recommended temperature of 212°F. This temperature is generally reached when machine is operating at approximately 20% of the rated capacity for extended periods. If temperature exceeds recommended figure, discharge volume must be increased. If low flow must be continued, water-cooled bearing brackets should be installed.

ADJUSTING MACHINE

MIXING VALVE **(Fig. 8)**

Mixer adjustment for convenience should be made at approximately 50% capacity. However, you may make this adjustment anywhere between 5% and 100% of the Combustion Controller range.

Setting of the air-gas ratio scale No. 48 is done at our factory and position "0" Gas indicates the gas port closed and the air port positioned at its maximum opening.

Any desired air-gas ratio mixture may be obtained by turning the adjustment knob index-50 (Fig. 8).

CHECK VALVE **(Fig. 8)**

The check valve is an integral part of the mixing valve. It is not intended as a positive shut-off, but is installed to protect the mixing valve and its diaphragm from sudden back pressure.

GAS GOVERNOR **(Fig. 9)**

The gas governor was given an initial adjustment at the factory. However, the final adjustment must be made after all the piping is installed. To make final adjustment proceed as follows:

1. Remove the two ¼" pipe plugs No. 37 (Fig. 8); one located on the mixer body air inlet and the other on the mixer body gas inlet. Install a water manometer to these connections.

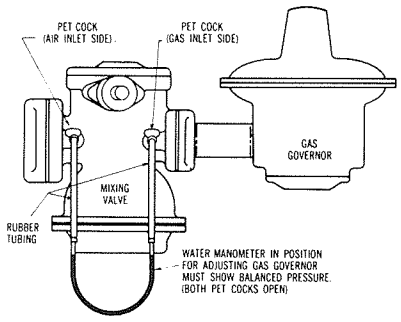


FIG. 1

2. Open gas inlet valve on gas supply and open mixture outlet valve until machine is delivering at least 5% of its capacity. (The mixture should be burned off at some burner position.)

3. The water manometer should show a balance in pressure of ±⅛" W.C. maximum. If it does not, remove the seal plug from the top of the gas governor and turn the adjustment screw up or down. **(The seal plug must be replaced after each adjustment to seal the chamber.)**

4. After adjustment is complete, make sure the seal plug is screwed tight, the water manometer disconnected and ⅛" pipe openings are closed with plugs or cocks.

PRESSURE GOVERNOR **(Fig. 7)**

The pressure governor can be adjusted for 1, 2 or 3 pounds per square inch outlet pressure by adding or removing weights No. 45, 46 and 47 from top of diaphragm No. 66. Replace pressure governor cap No. 56 after adjusting pressure. Maximum recommended outlet pressure is 3 PSI.

MAINTENANCE

Refer to maintenance check list on back cover for general guide and schedule.

LUBRICATION

COMPRESSOR

The compressor oil chamber was filled at the factory with 100% Pennsylvania Motor Oil SAE #20. Oil level should be visible in glass at all times.

To properly lubricate the compressor, the following steps must be taken:

1. With motor running, open oil chamber valve No. 14 (Fig. 7) fully.

2. Open sight feed oil valves (Fig. 2) at side of compressor, allowing 20 drops of oil to drop into the compressor through each valve every 8 hours.

The sight feed oil valves (Fig. 2) must be closed tight after each oiling (too much oil will clog up the burners).

3. If automatic lubricator is used, set sight feed oil valves (Fig. 2) to drop the equivalent of 20 drops of oil in 5 seconds time, by pressing push button on control for 5 seconds. After proper setting is established, tighten gland on valve to prevent tampering.

4. Oil valve No. 14 (Fig. 7) should remain open for normal operation.

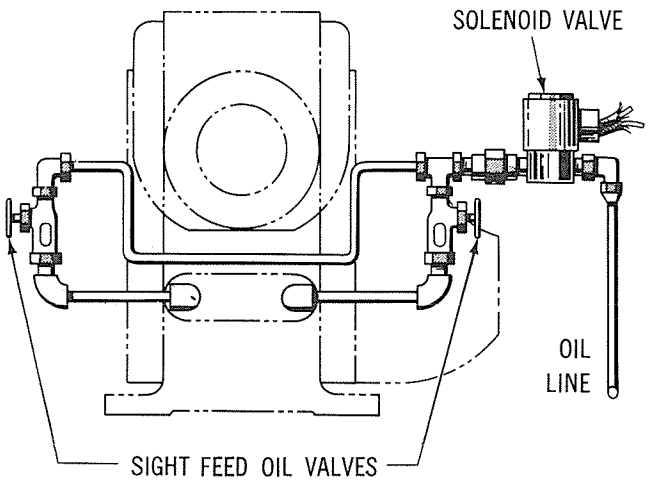


FIG. 2

On continuous 24 hour operation and normal oiling (20 drops through valves every 8 hours), the oil chamber should be refilled every 2 months or when required as follows:

5. Close oil chamber valve No. 14.

6. Remove oil fill plug No. 24 slowly to relieve trapped pressure.

7. Fill chamber with oil and replace fill plug.

8. Open oil chamber valve No. 14.

The oil chamber valve No. 14 need not be closed when compressor is stopped.

AUTOMATIC LUBRICATOR

The automatic lubricator provides and controls proper lubrication to the compressor of the combustion controller. This electrically operated lubricator consists of a timer assembly and a solenoid valve (Fig. 12). For wiring instructions, see applicable wiring diagram Fig. 13.

INDIVIDUAL CONTROL—NORMAL OPERATION

When an automatic lubricator controls the oiling of one compressor, wire to load side of motor starter. Compressor will be oiled on each start and at 8 hour intervals during continuous operation. Timer cam is adjustable for more frequent oiling if necessary.

INDIVIDUAL CONTROL—FREQUENT STARTS

On short-cycle operations or on laboratory installations, because of frequent off-on conditions, it is undesirable to oil the compressor at each start. On such installations, change the micro switch connection (in timer assembly) to the N.C. (normally closed) circuit and connect the timer to the load side of the motor starter. On initial daily start-up, lubricate compressor manually by push-button on cover of control.

COMPRESSOR BEARINGS

The compressor bearings were factory packed with grease type ANDOK-B. They should be inspected and repacked once or twice a year. See instruction (Fig. 14). Spare grease is supplied with machine for this purpose.

WARNING: Do not put grease fittings on bearing covers!

MOTOR

Lubricate motor as directed by motor manufacturer.

CLEANING OF MACHINE

AIR FILTER **(Fig. 10)**

The air filter should be cleaned each month. During cleaning, the machine can be operated without the filter. Do not oil the filter screen.

PRESSURE GOVERNOR **(Fig. 7)**

The pressure governor piston No. 1 (Fig. 7) should be carefully checked each month for free movement. Remove cap No. 35 and weights No. 36, 37 and 38, lift spindle No. 39 and piston No. 1. If piston No. 1 does not settle evenly to solid stop, unbolt body No. 31 and remove entire assembly. Wipe piston No. 1 and bore using a solvent if necessary. Do not oil.

Pressure Governor orifices No. 13, 45 and 46 should be checked periodically. These should be cleaned using wire or correct size drill. Do not increase orifice opening beyond diameter supplied.

MIXING VALVE **(Fig. 8)**

Mixer piston No. 3 and internal surface of mixer bushing No. 2 should be cleaned each month. To expose the

internal parts, unscrew socket hd. machine screws No. 27 and remove mixer cover No. 6 by lifting straight up. Unscrew piston locknut No. 13 which includes upper spindle extension No. 66, from mixer spindle No. 14. Remove piston No. 3.

Thoroughly clean all parts, including mixer body No. 1 and the guide sleeve No. 4 using a cloth saturated with solvent. Do not overlook orifice opening located in mixer body and remove any obstruction.

Remove loose grit and dirt from the mixer piston No. 3 and mixer bushing No. 2 and carefully inspect surfaces for corrosion and abrasions. Remove with crocus cloth dipped in a solvent.

It is important during this cleaning operation not to mar or deform in any way the sharp metering edges of both piston and bushing ports. This cleaning must be a preventative maintenance function and the frequency is dictated by the severity of your particular application.

Apply a light film of dry slide to outer surface of piston and carefully line up with guide sleeve No. 4, being careful not to cock or force while sliding into bushing.

Under no conditions should either the mixer piston No. 3 or the internal surfaces of mixer bushing No. 2 be oiled or greased, as this will tend to attract abrasive impurities from the gas or air supply. This will eventually cause sticking or excessive wear.

Remove balancing line tubing No. 7 and clean by blowing high pressure air through the tube. (Make sure that both ends of balancing lines are disconnected.)

A drain plug No. 44 is located in the diaphragm cap No. 16 and should be removed to drain excessive condensation from the mixing valve.

Ordinarily it is not necessary to remove the mixer bushing No. 2 for cleaning. However, if it does not rotate easily in mixer body No. 1, disassemble as follows:

Remove two machine screws No. 28, unscrew ratio adjustment assembly No. 9 from adjustment pivot No. 15. Lift out mixer bushing No. 2 from mixer body No. 1, carefully using a steady vertical lift in order to prevent binding. Clean thoroughly as indicated above.

Before reassembling mixer bushing No. 2 in mixer body No. 1, coat mating surfaces of each with Andok "B" grease. (Remove all grease from port area.) Replace all parts with care. Do not use force to reassemble parts.

Reinstall piston as instructed above.

After replacing upper spindle extension No. 66 and piston lock-nut No. 13 pull up on upper spindle extension until upward travel is complete. Then release, allowing the mixer piston No. 3 to return to the "down" position.

RESETTING RANGE-OF-PORT-OPENING SCALE

It is now necessary to reset the range-of-port-opening scale No. 48, since the ratio adjustment assembly No. 9 was disengaged from the mixing valve during disassembly.

Rotate knurled adjustment knob No. 50 until gas port scribe marks on the piston No. 3 and bushing No. 2 are matched. This position must indicate 100% air 0% gas on the range-of-port-opening scale No. 48. Any deviation must be corrected with the following steps:

Remove roll pin No. 60 and retract adjustment knob No. 50 and internal gear mount and gear assembly No. 47, thereby disengaging them from the idler gear No. 65.

Rotate internal gear mount and gear assembly No. 47 so the "0" gas position on the range-of-port-opening scale No. 48 is aligned with the air-gas pointer No. 63.

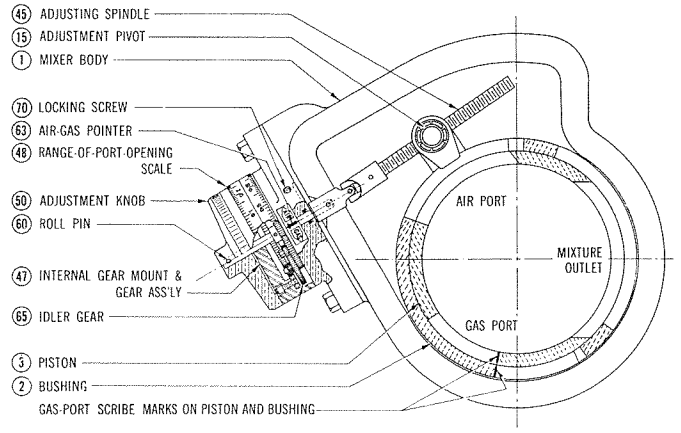
Re-engage internal gear mount and gear assembly No. 47 with idler gear No. 65.

Reassemble adjustment knob No. 50 in proper position. Replace roll pin No. 60 and select air-gas ratio for proper combustion.

NOTE: A locking device has been provided on the ratio adjustment assembly No. 9. After setting ratio, tighten locking screw No. 70 with Allen wrench. Locking screw to be hand tight only (see attached tag).

Complete reassembly of mixing valve.

FIG. 3



CHECK VALVE **(Fig. 8)**

The spring loaded check valve is located in the mixture outlet of the mixing valve. To remove it, disconnect mixing valve. Disassemble check valve by removing round head machine screws No. 26. Clean the valve parts with a cloth saturated in a solvent and reassemble.

COMPRESSOR **(Fig. 7)**

The compressor should be cleaned internally every 6 months under normal operating conditions by flushing with a solvent.

Shut off the gas inlet valve and mixture outlet valve. (Fig. 4.) Stop compressor, remove drain plug No. 25 and drain oil from chamber. Remove fill Plug No. 24, fill the chamber with a solvent and replace fill plug No. 24. Open the oil chamber valve No. 4 and both sight feed oil valves No. 19 fully and run compressor for several minutes.

NOTE: If automatic lubricator is installed, open both sight feed oil valves No. 19 and use manual button repeatedly.

Stop compressor, drain the oil chamber thru drain plug opening and refill with fresh oil. Start compressor and lubricate in normal manner.

(Reset sight feed oil valves No. 19 for automatic lubrication.)

At least once a year, the compressor should be opened and the rotor blades No. 15 examined for wear. To remove bearing bracket No. 5 first remove bearing cap No. 4 and bearing locknut No. 9. Remove bolts No. 27 holding bearing bracket No. 5 to compressor body No. 1. The bracket No. 5 including bearing No. 17 and oil seal unit No. 16 can be jacked off the shaft, using a bearing puller or the jack screw holes provided.

All internal parts should be thoroughly cleaned. If rotor blades No. 15 are badly worn, have rough edges or will not slide in slots freely, a new set should be installed. Apply a thin coat of SAE #30 oil to surfaces of blades before installing.

To remove drum and shaft, No. 8 remove coupling, fan guard No. 59 and 60, fan No. 58 and stuffing box No. 2 from drum and shaft No. 8. Remove bearing locknut No. 10 and jack out the drum and shaft No. 8.

Inspect stuffing box No. 2 and packing No. 18. When repacking use Garlock Braided Packing Style 117, 3/16" diameter. Do not hurry process of tightening since doing so will overheat the bearing housing and shaft.

CAUTION: Be sure to align coupling on reassembly.

GAS GOVERNOR **(Fig. 9)**

The gas governor can be cleaned by removing body coupling No. 17 and lifting off top section. Wipe valve seat disc No. 21, lower and upper seat disc retainers No. 26 and 27 and valve cage No. 19 carefully with a soft cloth and solvent.

Reassemble all parts.

REPLACING DIAPHRAGMS

When installing a new diaphragm, be sure to allow sufficient slack for full movement of parts. Too little or too much will affect the proper control. Coat outer surface or hole area of diaphragm with Andok "B" grease before reassembling. When installing a new diaphragm, carefully center the spindle and evenly space the folds before clamping. Do not allow more than one fold at any one point under the clamping surface.

PRESSURE GOVERNOR **(Fig. 7)**

The pressure governor diaphragm No. 47 (Fig. 7) can be replaced by removing cap No. 35, weights No. 36, 37 and 38, union nut No. 42, upper diaphragm plate No. 40 and diaphragm ring No. 32.

When replacing diaphragm No. 47 be sure to assemble with one vellumoid gasket No. 57, and one vellumoid washer No. 43 on top of diaphragm and one of each on the bottom of diaphragm.

MIXING VALVE **(Fig. 8)**

Disconnect tubing fitting No. 38. Detach mixing valve from compressor and governor. Unscrew hex head machine screws No. 31 and remove diaphragm cap No. 16. Unscrew hex nut No. 33, removing diaphragm assembly No. 19, diaphragm plates No. 17 and diaphragm washers No. 18. Replace diaphragm. Reassemble plates, washers and gaskets. Lift diaphragm cap No. 16 into position and fasten to mixer body No. 1 with machine screws No. 31.

GAS GOVERNOR **(Fig. 9)**

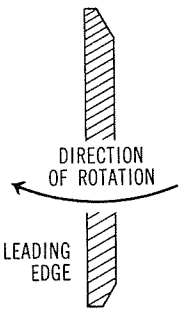
The gas governor has a main diaphragm No. 7 and an auxiliary or secondary diaphragm No. 15. Replace both diaphragms if either needs replacing. The entire gas governor must be disassembled to properly install new diaphragms.

BLADE REPLACEMENT

WORN BLADES FIG. 7

Blades should be replaced when dimension across width measures 2⅞" (73 mm) or less.

To replace worn blades No. 15, remove compressor outboard bearing cap No. 4, locknut No. 9 and bracket No. 5. After removing worn blades, thoroughly cover new blades with a thin coat of 100% Pennsylvania SAE#30 motor oil and install them with square cornered leading edges facing in the direction of rotation.



ROTOR BLADE

After new blades are installed and reassembly of compressor is completed, operate the Combustion Controller for 20 to 30 minutes with all valves closed. This will cause compressor and blades to heat up and expand. If pounding occurs, stop the compressor and file 0.003" to 0.005" (0.1 mm) off the length of each blade. Repeat the performance until the compressor runs quietly when heated. [Maximum allowable temperature is 212°F (100°C).]

BROKEN BLADES

When blades break, small pieces may lodge in corners and sometimes travel back into the check valve in mixing valve (Fig. 8). (Likely "hiding" places are shown by small arrows in Fig. 7). Because these small pieces sometimes work back into the revolving rotor to break the next set of blades, it is absolutely necessary that all pieces, large and small, be removed from corners and recesses before new blades are installed.

In addition to fully exposing the compressor bore, it is advisable to remove the check valve in mixing valve (Fig. 8) and a short section of the compressor discharge piping for inspection. After removing all pieces of broken blades, install new blades as described above.

PIPING DIAGRAM

CAUTION:
Complete premix gas-air is explosive. A flashback or leak can be dangerous. It is important that the system include the safety devices described and that their specific instruction Bulletins be understood and followed by responsible operating personnel.

These diagrams are intended to show the relative positions of Combustion Controller and auxiliary equipment. The following notes can be used as general installation guides. Refer to installation bulletin for each piece of equipment for complete instructions.

NOTES

1. COMBUSTION CONTROLLER PROTECTION

Install a Safety Blowout type SBC for protection of Combustion Controller. It should be located close to the Controller and its micro switch should be wired to close manual rest shut-off valve and to stop Controller motor in case of backfire.

2. AUTOMATIC FIRECHECKS

A. Type AF-A (without micro switch)
Install type AF-A when backfire at one Firecheck must not interrupt operation of remaining burners and no signal or alarm is necessary.

B. Type AFS-A (With micro switch)
1. Install type AFS-A if alarm or signal is necessary.
2. Install type AFS-A if all burners of entire system must shut down in event of backfire at any section. Micro switch should be wired to close manual reset shut-off valve and allow air to purge line before stopping Controller motor.

3. MANUAL RESET SHUT-OFF VALVE

Install a manual reset shut-off valve to shut off gas supply in case of backfire, high pressure or low pressure.

4. PRESSURE SWITCH

A. The low pressure switch is wired to safety shut-off valve. In case of low gas line pressure, the valve is actuated by the switch, thereby closing off gas supply.

B. The high pressure switch is wired to the safety shut-off valve. In case of excessive gas line pressure, the valve is actuated by the switch, thereby closing off gas supply.

5. Piping

A. Piping from the Combustion Controller to the Safety Blowout is generally the same size as the Combustion Controller discharge connection.

B. Piping from the Safety Blowout to the take-off points is usually as large as the blowout discharge connection, depending on allowable pipe line losses.

C. Piping from the main header to the automatic firechecks should be sized with reference to allowable pipe line losses and size of Firecheck or firechecks being supplied.

D. Insurance company regulations specify that the size of the piping from automatic firechecks to burners must not exceed the Firecheck size. Maintain or reduce this size according to allowable pressure losses.

E. Always install a manual shut-off valve ahead of each Firecheck.

Fig. 4

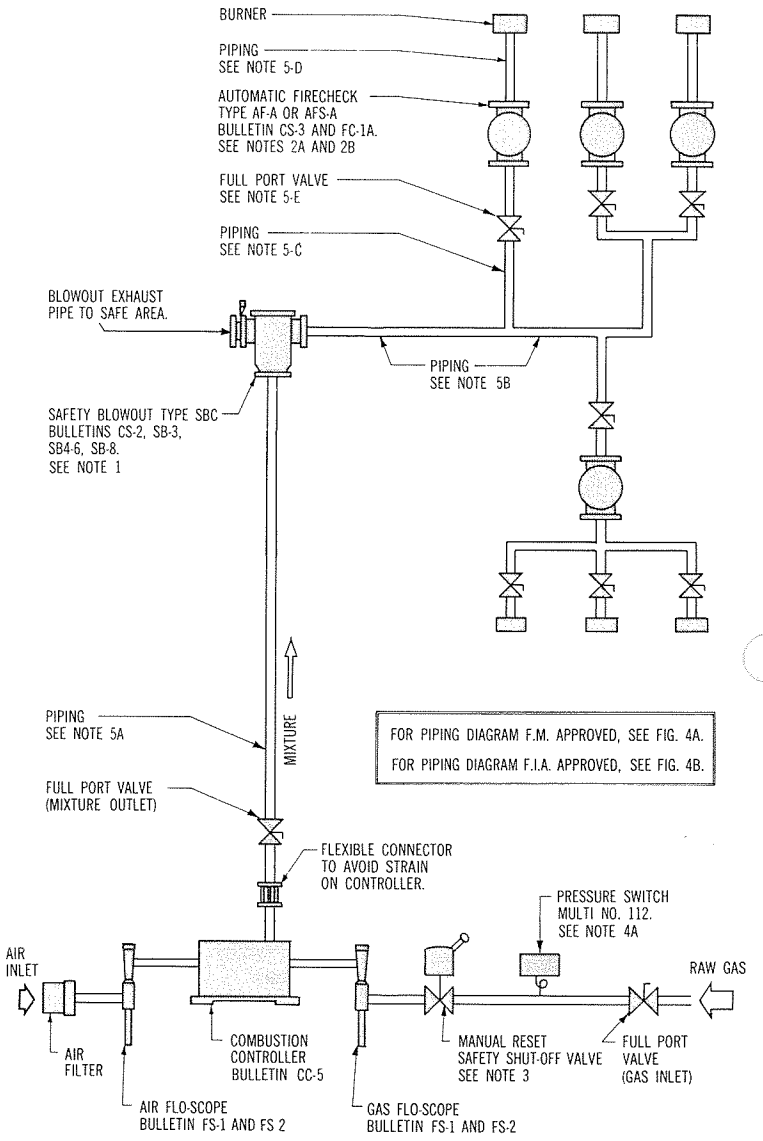


Fig. 4A

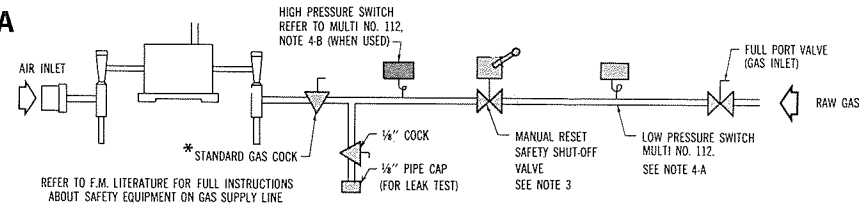
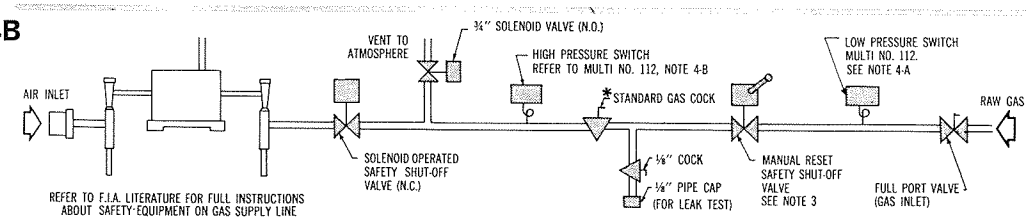
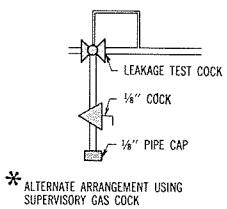


Fig. 4B



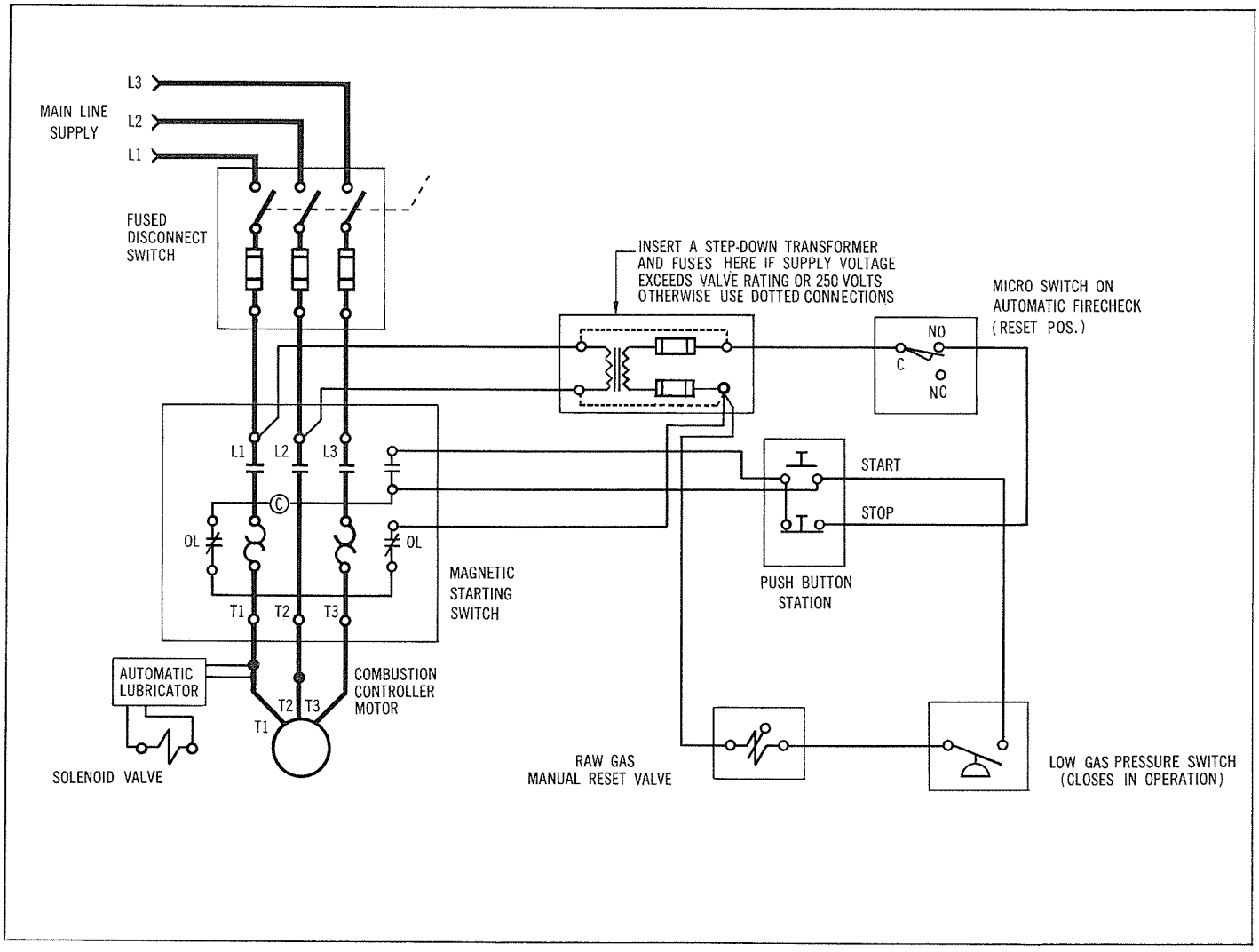


WIRING DIAGRAM

Fig. 5

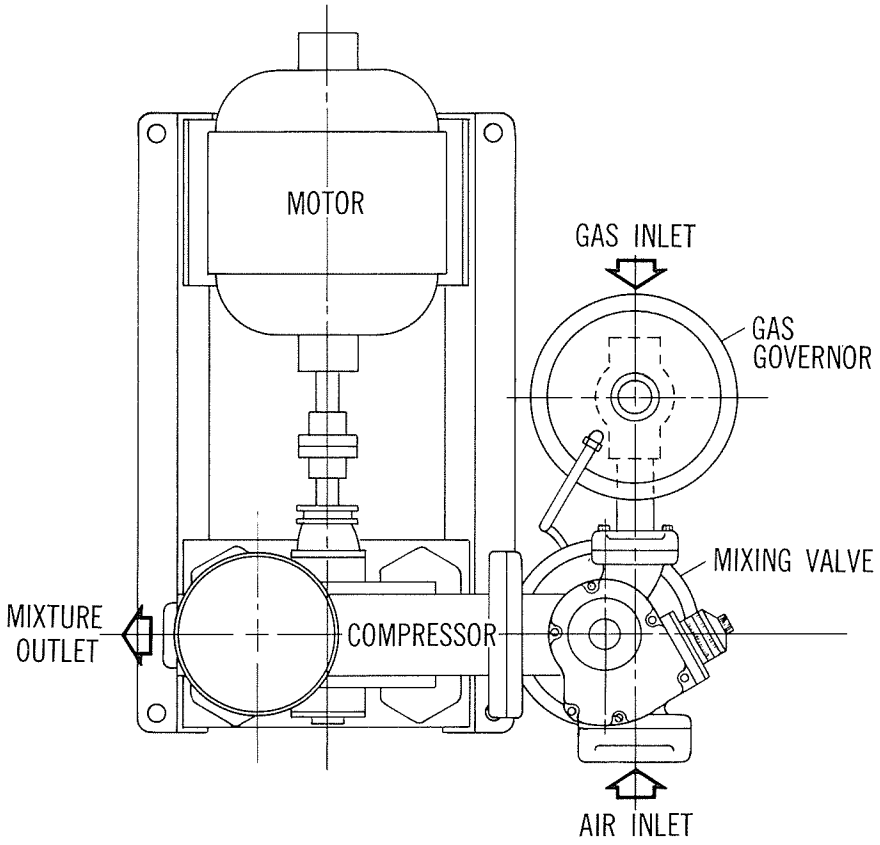
Operation Features of Combustion System Using Blowout or Firecheck with micro switch, pressure switch and solenoid valve

CONDITION	MOTOR	GAS SAFETY VALVE
FLASH BACK	STOPS	CLOSES
LOW VOLTAGE OR CURRENT FAILURE	STOPS	CLOSES
PRESSURE FAILURE IN RAW GAS LINE	RUNS	CLOSES

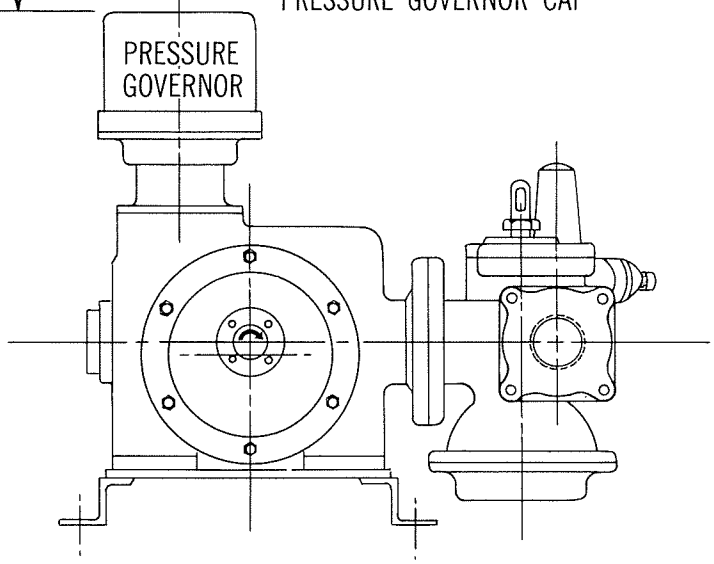


OUTLINE VIEW

Fig. 6



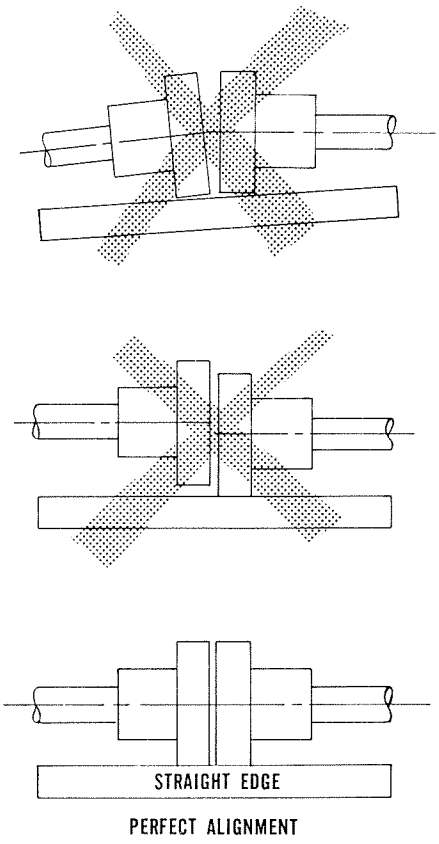
NOTE: 5″ MINIMUM CLEARANCE REQUIRED TO LIFT OFF PRESSURE GOVERNOR CAP



CAUTION

Pressure in gas line at inlet of Gas Governor should not be lower than 4″ (100 mm) W.C. nor higher than 10″ (250 mm) W.C. If pressure is higher than 10″ (250 mm) W.C., a Reducing Governor must be used

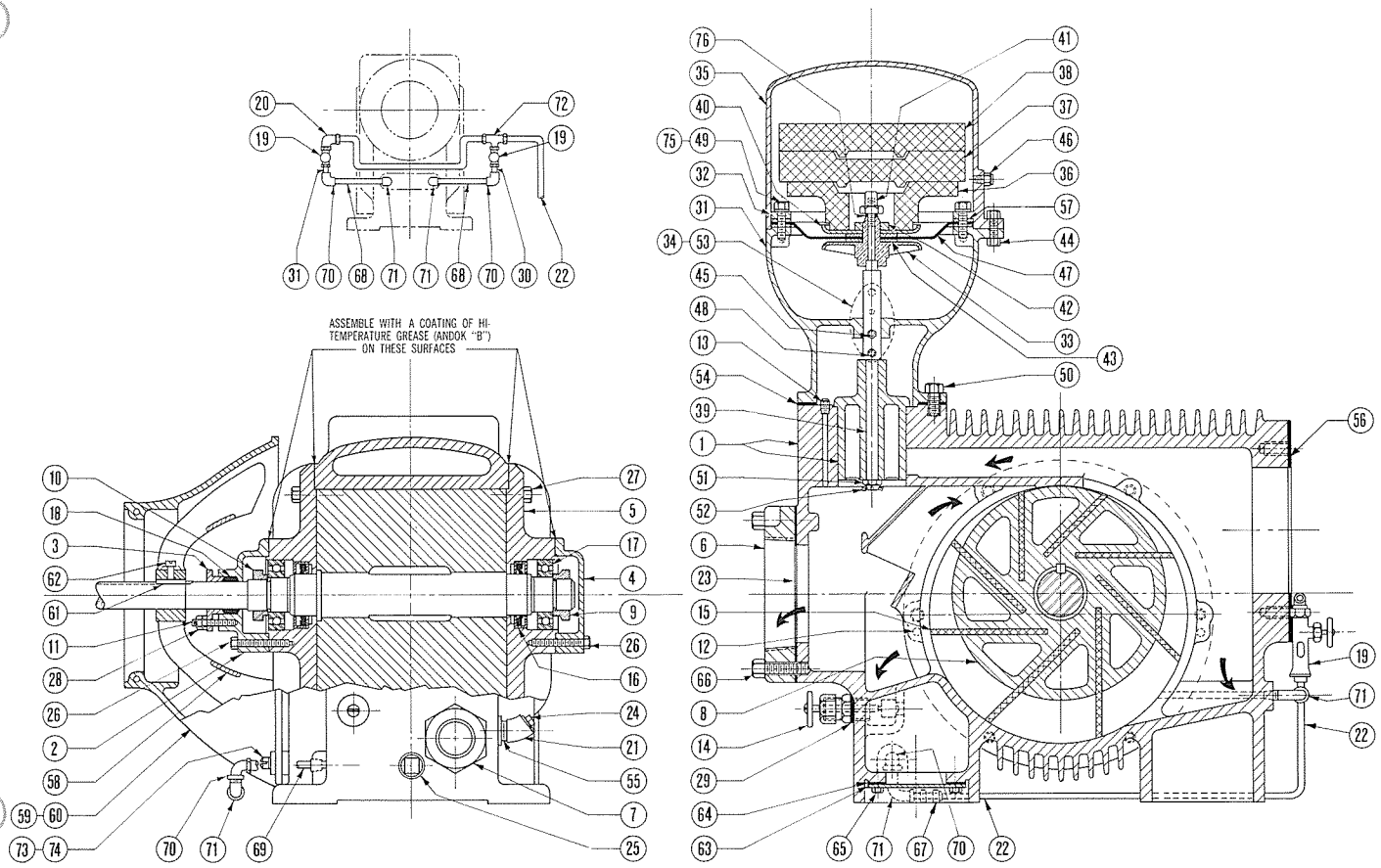
CORRECT
COUPLING ALIGNMENT



PERFECT ALIGNMENT

COMPRESSOR and PRESSURE GOVERNOR

FIG. 7



PARTS LIST FOR

COMPRESSOR AND PRESSURE GOVERNOR

INDEX NO.	QTY.	PART
1	1	COMPRESSOR BODY & PISTON
2	1	STUFFING BOX & BEARING CAP
3	1	GLAND
4	1	BEARING CAP
5	2	BEARING BRACKET
6	1	OUTLET FLANGE
7	1	OIL GAGE
8	1	DRUM & SHAFT ASSEMBLY
9	1	CLAMP NUT R.H.
10	1	CLAMP NUT L.H.
11	2	PACKING GLAND STUD
12	4	DOWEL PIN
13	1	ORIFICE (COMPRESSOR BODY)
14	1	OIL VALVE ASSEMBLY
*15	8	BLADES
*16	2	OIL SEAL
*17	2	BEARING
*18	1	PACKING
19	2	SIGHT FEED OIL VALVE
20	1	COMPRESSION ELBOW
21	1	ELBOW 1/4" x 45°
22	1	1/4" O.D. TUBING
23	1	OUTLET FLANGE GASKET
24	1	OIL FILL PLUG (1/4")
25	1	OIL DRAIN PLUG
26	8	BEARING CAP SCREW

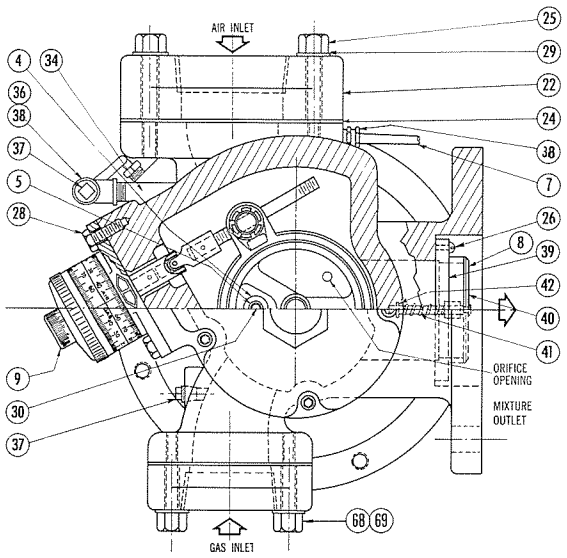
INDEX NO.	QTY.	PART
27	12	BEARING BRACKET SCREW
28	4	1/4"—20 JAM NUT
29	1	OIL VALVE GASKET
30	2	CLOSE NIPPLE (1/8")
31	1	PRESSURE GOVERNOR BODY
32	1	DIAPHRAGM RING
33	1	LOWER DIAPHRAGM PLATE
34	1	ORIFICE COVER
35	1	PRESSURE GOVERNOR CAP
36	1	WEIGHT #1
37	1	WEIGHT #2
38	1	WEIGHT #3
39	1	SPINDLE
40	1	UPPER DIAPHRAGM PLATE
41	1	PRESSURE GOVERNOR SPINDLE NUT
42	1	UNION NUT
*43	2	DIAPHRAGM WASHER
44	4	HEX. HD. CAP SCREW WITH NUT
45	1	ORIFICE (BODY)
46	1	ORIFICE (CAP)
*47	1	DIAPHRAGM
48	2	ORIFICE COVER SCREW
49	8	DIAPHRAGM RING SCREW
50	4	PRESS. GOV. BODY SCREW
51	1	CASTELLATED LOCK NUT
52	1	1/16" DIA. COTTER PIN 1" LONG

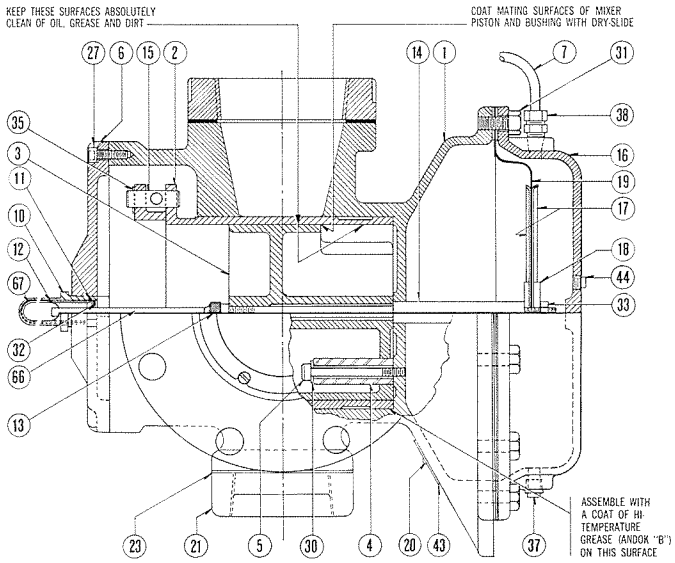
INDEX NO.	QTY.	PART
53	1	ORIFICE COVER GASKET
54	1	PRESSURE GOVERNOR BODY GASKET
55	1	CLOSE NIPPLE (1/4")
56	1	GASKET
*57	1	DIAPHRAGM GASKET
58	1	FAN
59	1	FAN GUARD L.H.
60	1	FAN GUARD R.H.
61	1	FAN KEY
62	1	SQ. HD. SET SCREW (FAN)
63	1	OIL CHAMBER COVER
64	1	OIL CHAMBER COVER GASKET
65	6	OIL CHAMBER COVER SCREW
66	6	HEX. HD. CAP SCREW
67	1	STRAIGHT CONNECTOR 1/8" NPT x 1/4" TUBING
68	2	NIPPLE 1/8" NPT x 1 3/4" LONG
69	1	NIPPLE 1/8" NPT x 3" LONG
70	3	ELBOW 1/8" x 90°
71	3	STREET ELBOW 1/8" x 90°
72	1	COMPRESSION TEE 1/4" x 1/4" TUBE x 1/8" N.P.T.
73	6	FILL. HD. MACH. SCR. 1/4"-20 x 2 3/4" LG.
74	6	LOCKWASHER (1/4")
75	8	LOCKWASHER (5/16")
76	1	SPINDLE NUT GASKET

* INDICATES RECOMMENDED SPARE PARTS

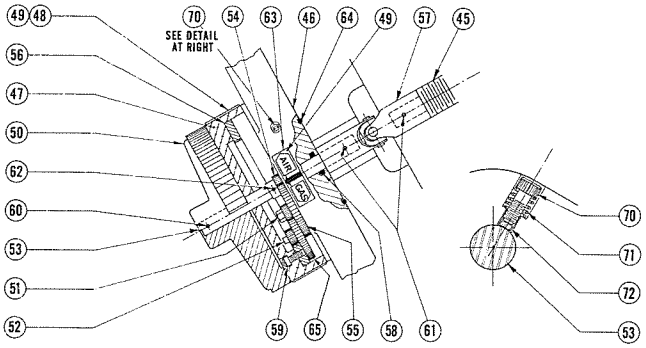
MIXING VALVE

Fig. 8

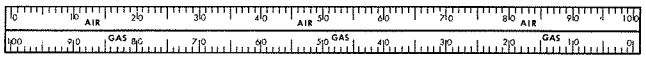




RATIO ADJUSTMENT SUB ASSEMBLY



RANGE-OF-PORT-OPENING SCALE



INDEX NO.	QTY.	PART
1	1	MIXER BODY
‡ 2	1	MIXER BUSHING
‡ 3	1	MIXER PISTON
4	1	GUIDE SLEEVE
5	1	GUIDE SLEEVE SCREW
6	1	MIXER COVER
7	1	BALANCING LINE TUBING
8	1	CHECK VALVE ASSEMBLY
9	1	RATIO ADJUSTMENT ASSEMBLY
10	1	SIGHT GLASS HOUSING
* 11	1	SIGHT GLASS "O" RING
* 12	1	SIGHT GLASS TUBE
13	1	PISTON LOCK NUT
14	1	MIXER SPINDLE
15	1	ADJUSTMENT PIVOT
16	1	DIAPHRAGM CAP
17	2	DIAPHRAGM PLATES
18	2	DIAPHRAGM WASHER
* 19	1	DIAPHRAGM ASSEMBLY
20	1	DRIVE SCREW
21	1	GAS INLET FLANGE
22	1	AIR INLET FLANGE
23	1	GAS INLET GASKET
24	1	AIR INLET GASKET

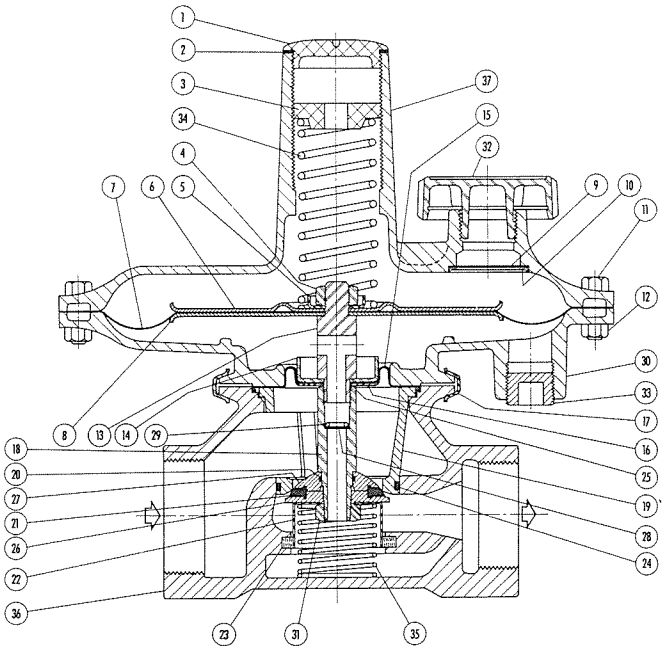
INDEX NO.	QTY.	PART
25	4	HEX. HD. CAP SCREW
26	3	SLOTTED RD. HD. MACH. SCR.
27	6	SOCKET HD. MACH. SCR.
28	2	HEX. HD. MACH. SCR.
29	4	PLAIN WASHER—MEDIUM
30	1	5/16" BURR WASHER
31	12	HEX. HD. MACH. SCR.
32	1	RETAINING RING
33	1	3/8"-16 HEX. NUT
34	1	1/4" x 1 1/2" LG. NIPPLE
35	1	RETAINING RING
36	1	1/4" N.P.T. STRAIGHT TEE
37	2	1/4" N.P.T. PIPE PLUG
38	3	TUBING CONNECTION
39	1	CHECK VALVE BODY
40	1	CHECK VALVE DISC & STEM ASSEMBLY
41	1	CHECK VALVE SPRING
42	1	CHECK VALVE LOCK RING
43	1	NAMEPLATE
44	1	DRAIN PLUG
45	1	ADJUSTING SPINDLE
46	1	MOUNTING FLANGE
47	1	INTERNAL GEAR MOUNT
48	1	RANGE OF PORT OPENING SCALE
49	1	DRIVE SCREW
50	1	ADJUSTMENT KNOB
51	1	GEAR MOUNTING SHAFT
52	1	GEAR MOUNTING SHAFT
53	1	ADJUSTMENT SHAFT
54	1	DRIVER GEAR
55	1	IDLER GEAR
56	1	INTERNAL GEAR
57	1	UNIVERSAL JOINT
58	2	"O" RING
59	3	FILLISTER HD. MACH. SCREW
60	1	ROLL PIN
61	2	ROLL PIN
62	1	ROLL PIN
63	1	"AIR-GAS" POINTER
64	1	"O" RING
65	1	IDLER GEAR
66	1	UPPER SPINDLE EXTENSION
67	1	FELT PAD
68	4	HEX. HEAD CAP SCREW
69	4	WASHER
70	1	LOCKING SCREW
71	1	LOCKING SPRING
72	1	LOCKING PLUG

‡ NOTE: IT IS POSSIBLE TO REPLACE EITHER OR BOTH THE MIXER PISTON NO. 3 OR THE MIXER BUSHING NO. 2 IN THE FIELD. THESE PARTS ARE INTER-CHANGEABLE.

* **INDICATES RECOMMENDED SPARE PARTS**

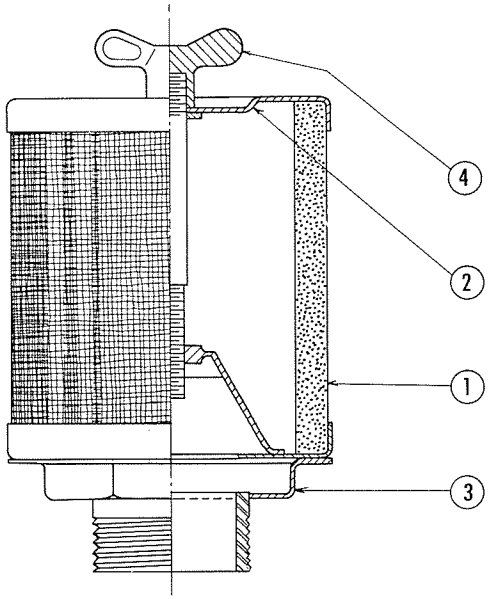
GAS GOVERNOR TYPE 3200

Fig. 9



INDEX NO.	QTY.	PART
1	1	PLUG, SEAL
2	1	GASKET, SEAL PLUG
3	1	SCREW, PRESSURE ADJUSTING
4	1	NUT, DIAPHRAGM STEM
5	1	GUIDE, SPRING
6	1	PLATE, UPPER DIAPHRAGM
* 7	1	DIAPHRAGM
8	1	PLATE, LOWER DIAPHRAGM
9	1	FLAPPER, VENT
10	1	RING, FLAPPER RETAINING
11	12	BOLT, BODY—5/16"-24 x 1 1/8" LG. HEX. HD.
12	12	NUT, BODY BOLT—5/16"-24 HEX. HD.
13	1	STEM, DIAPHRAGM
14	1	PLATE, SECONDARY DIAPHRAGM—UPPER
* 15	1	DIAPHRAGM, SECONDARY
16	1	PLATE, SECONDARY DIAPHRAGM—LOWER
17	1	COUPLING, BODY
18	1	STEM, VALVE
19	1	CAGE, VALVE
20	1	"O" RING, VALVE STEM
* 21	1	DISC, VALVE SEAT
22	1	PISTON, BALANCING
23	1	RING, FELT
24	1	"O" RING, VALVE CAGE
25	1	WASHER, VALVE STEM
26	1	RETAINER, SEAT DISC—LOWER
27	1	RETAINER, SET DISC—UPPER
28	1	FLAPPER, VALVE STEM
29	1	RETAINER, VALVE STEM FLAPPER
30	1	CHAMBER, LOWER DIAPHRAGM
31	1	NUT, BALANCING PISTON RETAINER
32	1	ASSEMBLY, VENT CAP
33	1	PLUG, PIPE—LOWER CHAMBER
34	1	SPRING, DIAPHRAGM
35	1	SPRING, BALANCING
36	1	BODY
37	1	TOP

* INDICATES RECOMMENDED SPARE PARTS



AIR FILTER

Fig. 10

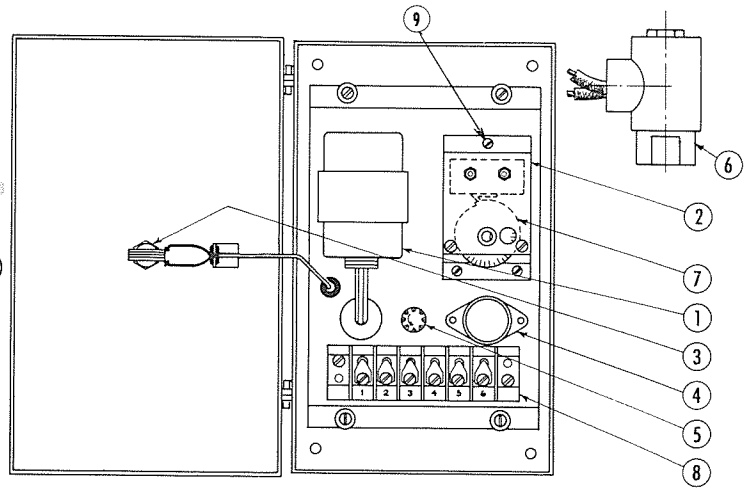
INDEX NO.	PART
* 1	ELEMENT
2	COVER
3	ADAPTER
4	WING NUT

* INDICATES RECOMMENDED SPARE PARTS

AUTOMATIC LUBRICATOR and SOLENOID VALVE

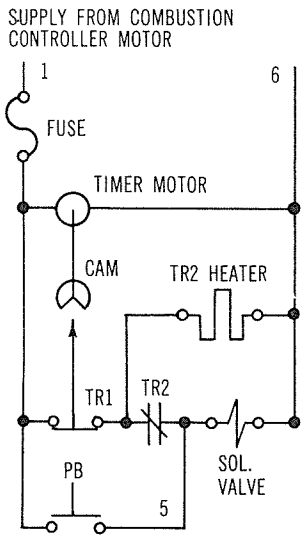
FIG. 11

INDEX NO.	PART	INDEX NO.	PART
1	TRANSFORMER	6	SOLENOID VALVE
2	CYCLE TIMER	7	ADJUSTABLE CAM ASSEMBLY (8 HR., 4 HR. & 2 HR. OILING CYCLE)
3	PUSHBUTTON	8	TERMINAL STRIP
4	TIME DELAY RELAY	9	CYCLE TIMER MOUNTING SCREWS
5	LITTLE FUSE		

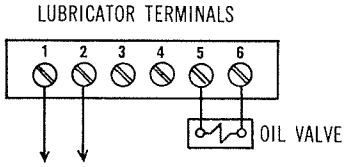


WIRING DIAGRAM

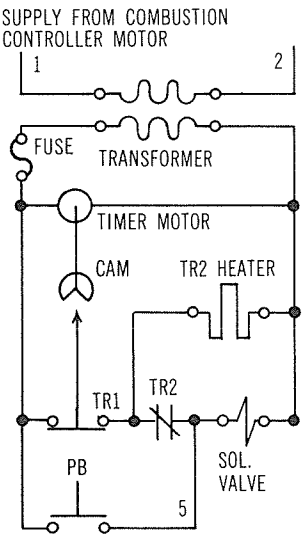
FIG. 12



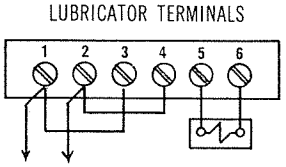
110 VOLT OPERATION



CONNECT TO LOAD SIDE OF COMBUSTION CONTROLLER MOTOR STARTER—110 VOLTS

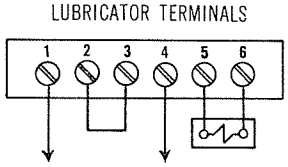


220 VOLT OPERATION



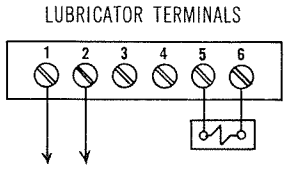
CONNECT TO LOAD SIDE OF COMBUSTION CONTROLLER MOTOR STARTER—220 VOLTS

440 VOLT OPERATION



CONNECT TO LOAD SIDE OF COMBUSTION CONTROLLER MOTOR STARTER—440 VOLTS

550 VOLT OPERATION



CONNECT TO LOAD SIDE OF COMBUSTION CONTROLLER MOTOR STARTER—550 VOLTS

NOTE: If two oil valves are used in parallel, connect to line side of starter or to separate supply

OPERATIONAL DIFFICULTIES

(Usual Causes)

In Case Of CHANGE IN MIXTURE RATIO Check For

1. Dirty mixer piston, gas governor valve or air filter element.
2. Leaky diaphragms in mixing valve or gas governor.
3. Dirty or clogged orifice in mixing valve.
4. Dirty or clogged balancing line or equalizing tube in gas governor.
5. Broken or leaking mixing valve sight glass tube.

In Case Of ABNORMAL DISCHARGE PRESSURE Check For

1. Dirty pressure governor piston.
2. Dirty or clogged orifices in pressure governor.
3. Leaky diaphragm in pressure governor.
4. Exceeding rated machine capacity.

In Case Of LOSS OF MACHINE CAPACITY Check For

1. Leaks in piping or connections.
2. Reduced motor RPM. (Should be 900 R.P.M.)
3. Worn or sticky pressure governor piston.
4. Worn blades.

BEARING INSTRUCTIONS

INSTALLATION

WARNING: Do not put grease fittings on bearing covers!

The bearings in the Selas Compressor are hand-press fitted. The inner race must be tightly locked by bearing nut. The outer race is not locked which permits it to "float" in its housing. The outer race may also creep around during operation.

GREASING

Do not overgrease. Overgreasing causes overheating and damage to unit.

The bearing is packed with grease by the manufacturer. After it is installed, put additional grease in bearing housing, filling cavity flush with face of bearing bracket. (Fig. 13.) Use ANDOK-B grease.

INSPECTION

Inspect and regrease bearings every 6 months under normal 8 hours-a-day operation.

Under abnormal conditions, bearings should be inspected more frequently. Some abnormal conditions are:

1. Continuous operation.
2. Reduced output for extended periods, causing excessive temperature at bearing.
3. High surrounding temperatures.

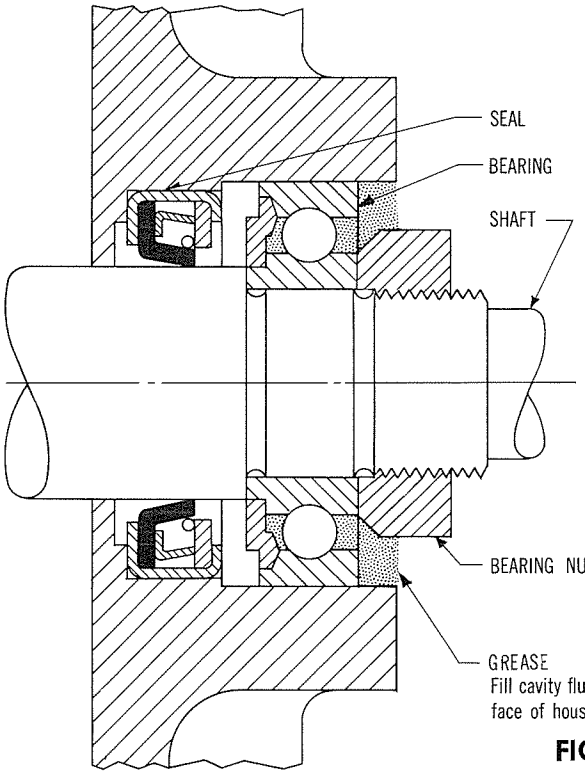


FIG. 13

ORDERING INSTRUCTIONS

When ordering parts, always specify:

1. **Quantity**
2. **Part Name or Index Number**
3. **Figure Number and Title**
4. **Serial Number**
5. **Catalog Number and Reference Number**

MAINTENANCE CHECK LIST

	MAXIMUM OPERATING PERIODS				
	8 Hrs.	1 Mo.	3 Mos.	6 Mos.	1 Yr.
Lubricate Compressor					
Check Oil Level					
Clean Air Filter					
Clean Mixer Piston and Bushing					
Check Stuffing Gland for Leaks					
Check Coupling Alignment					
Flush Compressor					
Change Bearing Grease					
Clean Entire Machine (Internally)					
Check Oil Seals					
Check Blades for Wear etc.					

The above schedule is prepared as guide only. Definite maintenance schedule will depend on installation, surrounding conditions and operation.

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