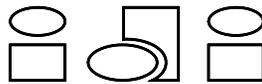


ENB-45 NITROGEN BOOSTER

INSTALLATION, OPERATION & MAINTENANCE MANUAL



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www.interfacedevices.com

**IMPORTANT! FILE THIS MANUAL IN A SAFE PLACE FOR FUTURE SERVICE & PARTS NEEDS
ALWAYS REFERENCE THE SERIAL NUMBER FOR SERVICE & PARTS REQUESTS**

Safety instructions specifically pertaining to this unit appear throughout this manual highlighted by these signal words ** Warning**** and ****Caution**** to denote different levels of hazard.**

Warning: denotes practices, which if not carefully followed, could result in property damage, **SERIOUS** personal injury and /or **DEATH**

Caution: denotes practices which if not carefully followed, could result in minor personal injury or damage to equipment.

ENB-45 Serial Number: _____

Parts & Repairs: (Use the space below to document service history)

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**INTERFACE DEVICES INC
- NITROGEN BOOSTER ENB-45 -**

1 General Description



ENB 45

The ENB 45 Pneumatic Nitrogen Booster provides the capability of boosting remaining lower pressure Nitrogen from supply bottles to the required pressure, up to 4,500 psi.

The Nitrogen Booster is driven by compressed air or nitrogen. It cycles automatically to boost low-pressure nitrogen to high pressure.

1.1 Optional equipment available to enhance unit

- Three bottle Oxygen or Nitrogen service cart.
Low center of gravity for safe maneuvering.
Booster Mount and fire extinguisher are optional.
- Cart mount and protection guard for Nitrogen Booster.
Mounts to the front of virtually any cart.

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-NITROGEN BOOSTER ENB-45-

**** Warning ****

To Avoid Serious Injury, Loss of Limb or Death

1. Use of a supply Bottle pressure regulator is required with this unit.
2. **Do not** try to boost any gas other than nitrogen
3. **Do not** exceed 3000 PSIG inlet Pressure.
4. All Components used in the nitrogen system or shop air system shall be clean, dry and free of all contamination.
5. Servicing and/or maintenance of nitrogen systems shall be done by trained and qualified personnel using approved procedures per SAE specifications.

2 Specifications / Features

Dimensions: 12.1" long, 9.4" high and 10.8" wide.

Weight: 24lbs. complete.

Output Rating: Adjustable from 500 to 4500 psi.

Nitrogen Booster Ratio: 45:1.

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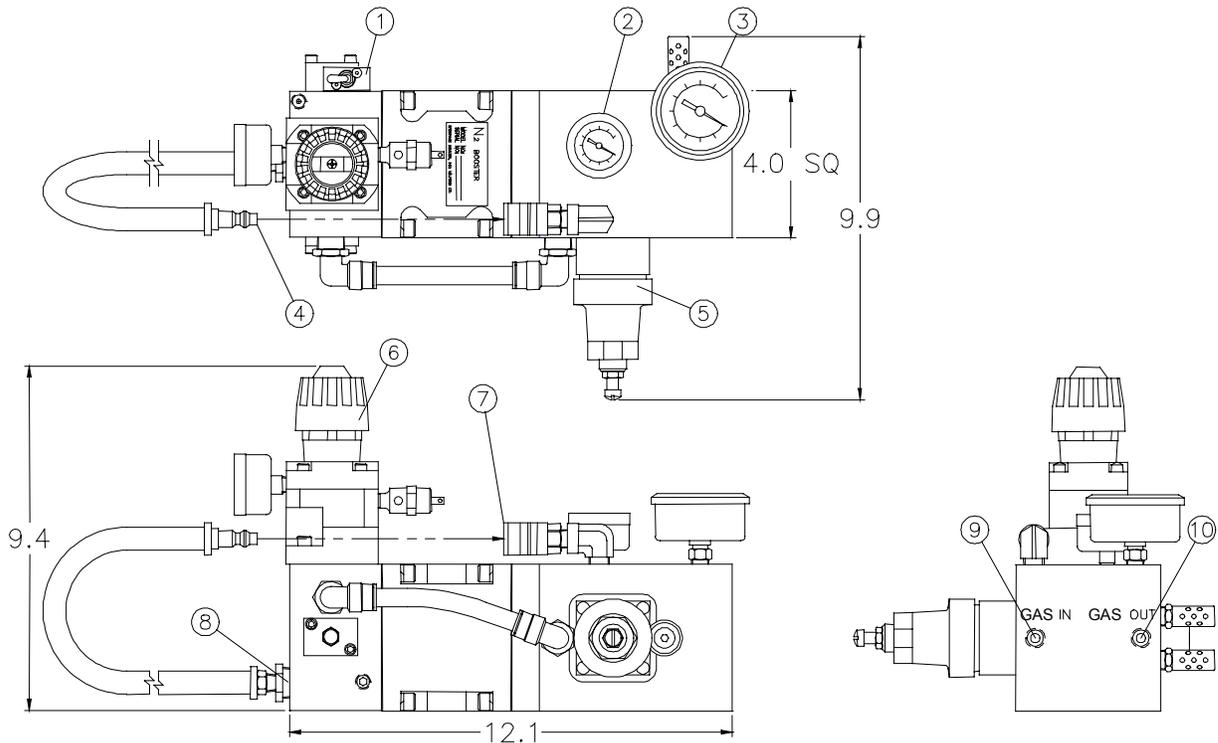


Fig. 1

2.1 Component Description

(Refer to Fig. 1 for component locations)

1. Pump on / off Air Switch.
2. Nitrogen Drive Pressure Gauge.
3. Nitrogen out Pressure Gauge.
4. Air or Nitrogen in Male Quick Connector half.
5. High Pressure Nitrogen Supercharge Regulator.
(Factory set to 125 PSIG)
6. Air/Nitrogen Regulator & gauge .
(Sets N₂ Boost Pressure, (ie: 80 PSIG in yields 3,600 psi N₂ Out).
7. Female Quick Disconnect Half (used when driving with nitrogen).
8. Air Inlet (1/2 npt, reference).
9. Gas In Port: 1/4 npt 3,000 psi max..
10. Gas Out Port: 1/4 npt, 4,500 psi max.

Typical Applications: Emergency gear blow-down bottle, hydraulic accumulator pre-charge, landing gear struts.

3 Preparation for use

**** Caution ****

It is mandatory that this instruction manual be read, understood and followed by all persons operating this high- pressure nitrogen booster.

3.1 Safety Instructions

- 3.1.1 General: Information presented in this manual and on various labels, tags and plates on the unit pertains to equipment design, installation, operation maintenance and trouble shooting which should be read, understood and followed for safe and effective use of this equipment.
- 3.1.2 Safety: The operation, maintenance, and trouble shooting of this high pressure Nitrogen Booster requires practices and procedures which ensure personal operator safety and the safety of others. Therefore, this equipment is to be operated and maintained only by qualified persons in accordance with this manual and all applicable local codes.
- 3.1.3 Safety instructions specifically pertaining to this unit appear throughout this manual highlighted by these signal words ****Warning**** and ****Caution**** to denote different levels of hazard.
****Warning**** denotes practices which if not carefully followed, could result in SERIOUS personal injury and /or DEATH.
****Caution**** denotes practices which if not carefully followed, could result in minor personal injury or damage to this equipment.
- 3.1.4 Training: Read through this entire manual prior to any Nitrogen booster operation. All personnel using this Nitrogen Booster should understand and follow this manual and receive training. We encourage our customers to call Interface Devices to discuss any operating or testing requirements.

3.2 General Safety Precautions

- 3.2.1 Pressures: Gasses under pressure are a potential hazard in the form of stored energy. Accidents can occur when this energy is improperly handled. Be sure that all equipment used is compatible and designed to control the pressures encountered.
- 3.2.2 Nitrogen: Nitrogen is a stable gas and non-flammable.
- 3.2.3 Lubrication: the use of lubrication in a Nitrogen system should be kept to a minimum. The booster requires no lubrication. An air line lubricator must not be used.

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**** Warning ****

Only Lubricants compatible with high-pressure nitrogen shall be used

No lubricant shall be applied in any area that will come into direct contact with Nitrogen during normal use.

3.3 Assembly

- 3.3.1 Although the Nitrogen Booster is inspected prior to shipping, it could be damaged during shipping. Therefore, it should be carefully unpacked and placed on a clean level surface for inspection.
- 3.3.2 The Nitrogen booster is furnished with three ¼-20 by ½” deep tapped holes for mounting to a bracket or cart.
- 3.3.3 Customer supplied parts:
- Two AN816-6, 3/8” AN to ¼” male pipe adapters.
 - Two stainless steel/Teflon® -6 hose assemblies, rated to 5,000 psi working pressure.
 - Teflon® pipe tape.
 - Pressurization attachment fitting.
- 3.3.4 Wrap 2-3 turns of Teflon® tape clockwise around the ¼” pipe thread ends of each adapter fitting.

**** Caution ****

The customer supplied nitrogen supply must be complete with shutoff valves, pressure gauges, pressure regulators and -6 hose assemblies. These components must be rated for 5,000 psi operation.

- 3.3.5 Remove the protective plastic plugs from “GAS IN” and “GAS OUT” ports.
- 3.3.6 Insert ¼” nipple ends into their respective ports, and firmly tighten down, being careful not to over-tighten. With supply regulator closed, connect one -6 swivel hose end to the “GAS IN” fitting. Connect the other hose to the “GAS OUT” port.

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- 3.3.7 Attach the pressurization fitting to the other end of the nitrogen out hose.
- 3.3.8 Check all components for integrity. If all is well, you are ready to use ENB 45.

4 Operation

4.1 Preparation for Operation

- 4.1.1 Be sure all valves and controls are in the closed position.
- 4.1.2 Decrease the item 6 (fig 1) inlet pressure regulator to its minimum pressure setting.
- 4.1.3 Inspect all connections for contaminants before installation and tightening. Remove any foreign Materials. Be sure all Nitrogen components are clean as per SAE specifications.
- 4.1.4 Connect the output of the gas supply bottle to the “GAS IN” connection of the booster (see figure 1a).
- 4.1.5 Decrease the nitrogen bottle regulator to its minimum pressure setting.
- 4.1.6 Connect the Nitrogen fill line and purge line by SLOWLY cracking open gas supply bottle shutoff valve and adjusting the supply bottle pressure to a low-pressure setting.

**** Warning ****

Be sure fill line is secured prior to purging the unit. This will prevent the hose from whipping about if too much N₂ is allowed to flow through the unit

- 4.1.7 Tighten the N₂ fill line connection.
- 4.1.8 The high pressure N₂ Booster is ready to charge the system.

4.2 Charging the Nitrogen System

**** Warning ****

When nitrogen line is pressurized or when nitrogen is flowing through the system, the fill line hose may “whip” about if not secured.

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- 4.2.1 After the nitrogen booster has been properly connected, fully open the N₂ supply bottle shut off valve. Adjust the gas supply bottle pressure regulator to the required N₂ system Pressure. Wait until the bottle pressure and the system pressure are equal. If the supply bottle pressure is lower than the required system pressure, run the booster as follows:
- 4.2.2 Adjust the booster's air pressure to attain a pressure slightly lower than the final required N₂ pressure (divide this nitrogen pressure by 45 to find the initial required regulated air pressure setting). Example: 3,000 psi final minus 75 equals 2,925 psi divided by 45 equals 65 psi regulated air pressure.
- 4.2.3 Turn on the booster's "PUMP RUN" toggle switch to the "ON" position to further pressurize the nitrogen system. The nitrogen outlet pressure gauge will show the system pressure developed by the booster. When the set pressure has been reached (i.e.: pump stops pumping), increase the pressure of the air regulator to obtain the required final system pressure. When the booster stops running, turn off the booster by switching the toggle switch to the "OFF" position.

4.3 Disconnecting Nitrogen Booster

- 4.3.1 Close the nitrogen bottle shut off valve. This will stop inlet nitrogen flow.
- 4.3.2 Decrease both the air inlet pressure regulator and the nitrogen supply bottle pressure regulators to their respective minimum settings.
- 4.3.3 Disconnect air (or nitrogen) supply line.
- 4.3.4 Slowly loosen, bleed down, and disconnect nitrogen fill line. Disconnect the supply hose.
- 4.3.5 Cap both hose connections to prevent nitrogen hoses and booster contamination.

5 Maintenance

**** Warning ****

Maintenance should be undertaken by qualified personnel only.

The operation, maintenance and troubleshooting of this high pressure Nitrogen Booster system requires practices and procedures which ensure personal operator safety and the safety of others. Therefore, this equipment is to be operated and maintained only by qualified persons in accordance with this manual and all applicable codes.

5.1 General

- 5.1.1 All maintenance performed on this high pressure Nitrogen Booster shall be conducted in accordance with all applicable codes governing the handling, operation, installation and trouble shooting for high-pressure gas operation. Maintenance is to only be done by qualified persons.
- 5.1.2 All maintenance personnel must be familiar with the cautions and warnings associated with high pressure gas systems as outlined in sections 3.1 and 3.2 of this manual prior to performing any maintenance on this unit.
- 5.1.3 The gauges on this unit should be inspected and calibrated annually to $\pm 1/2$ % of full scale, to maintain and ensure accuracy.

5.2 Storage

- 5.2.1 Store the unit in a clean, dry and secure area when not in use.
- 5.2.2 Be sure all hoses are capped and the unit is covered with a lint free covering for the duration of unit storage to ensure complete N₂ system cleanliness for future system recharging.

6 Troubleshooting

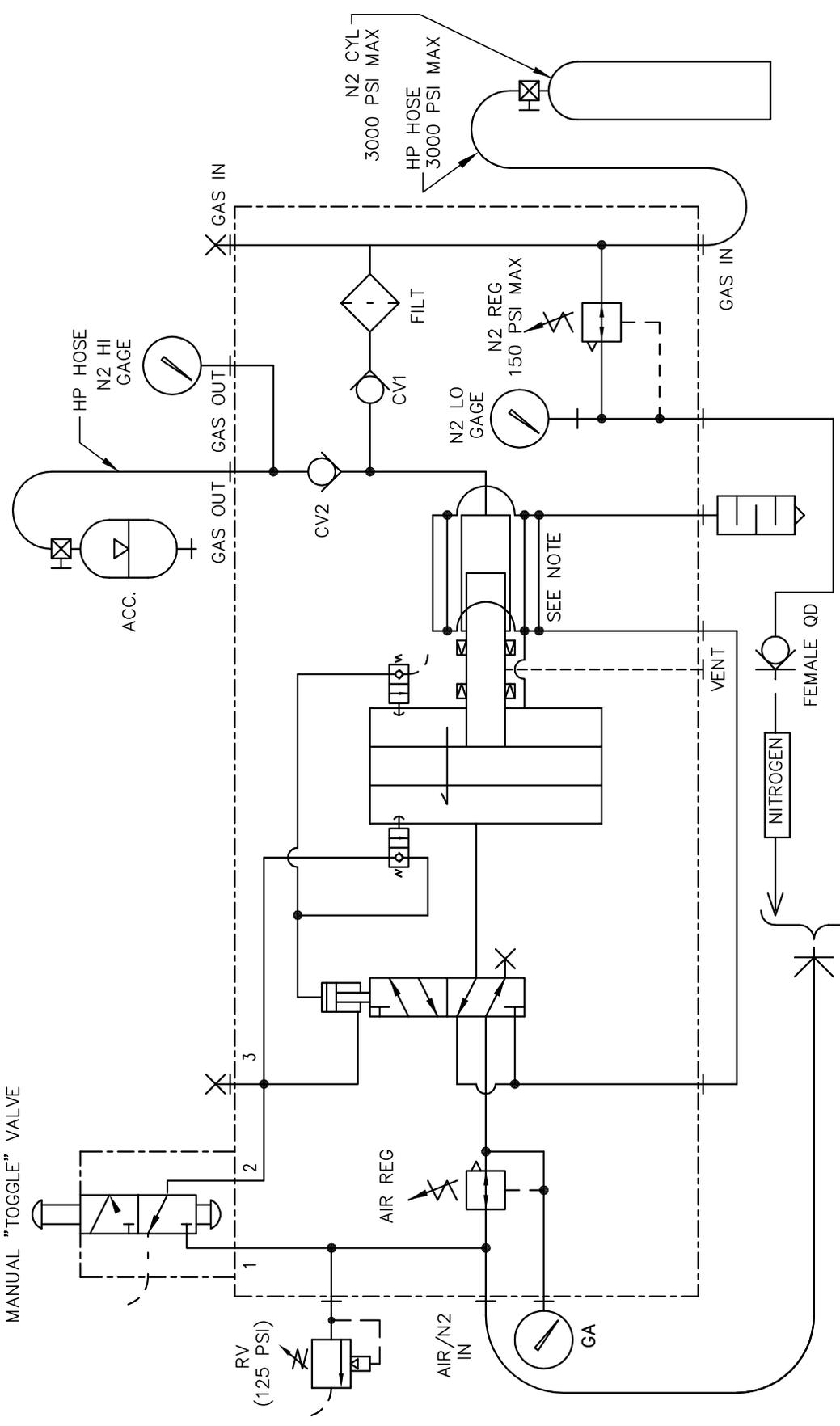
**** Warning ****

Troubleshooting should be undertaken by qualified personnel only.

Troubleshooting Chart

Symptom	Probable Cause	Remedy
Pump will not cycle (Only regulated nitrogen pressure at out put.)	No air supply to pump Pump regulator set too low Four way air reciprocating valve spool stuck at mid position	Look for and fix Increase setting Disconnect/ reconnect air supply (resets air spool to end position) If spool still sticks, manually push spool to far end with probe through hole in “spool stop cap”. If stuck or requires excessive force, disassemble air valve assembly. Inspect for contamination or mechanical bind. Repair or replace, lubricate seals with water-proof grease
Pump makes one cycle then stops	Faulty “2 way air Valve” (Broken, leaks or contaminated)	Repair or replace
Pump cycles constantly when Dead Headed	External leak at pump or down stream high pressure circuit Contaminated or stuck open check valve cartridge Internal leak in pump	Look for and correct Clean or replace Check all dynamic and static seals and gaskets

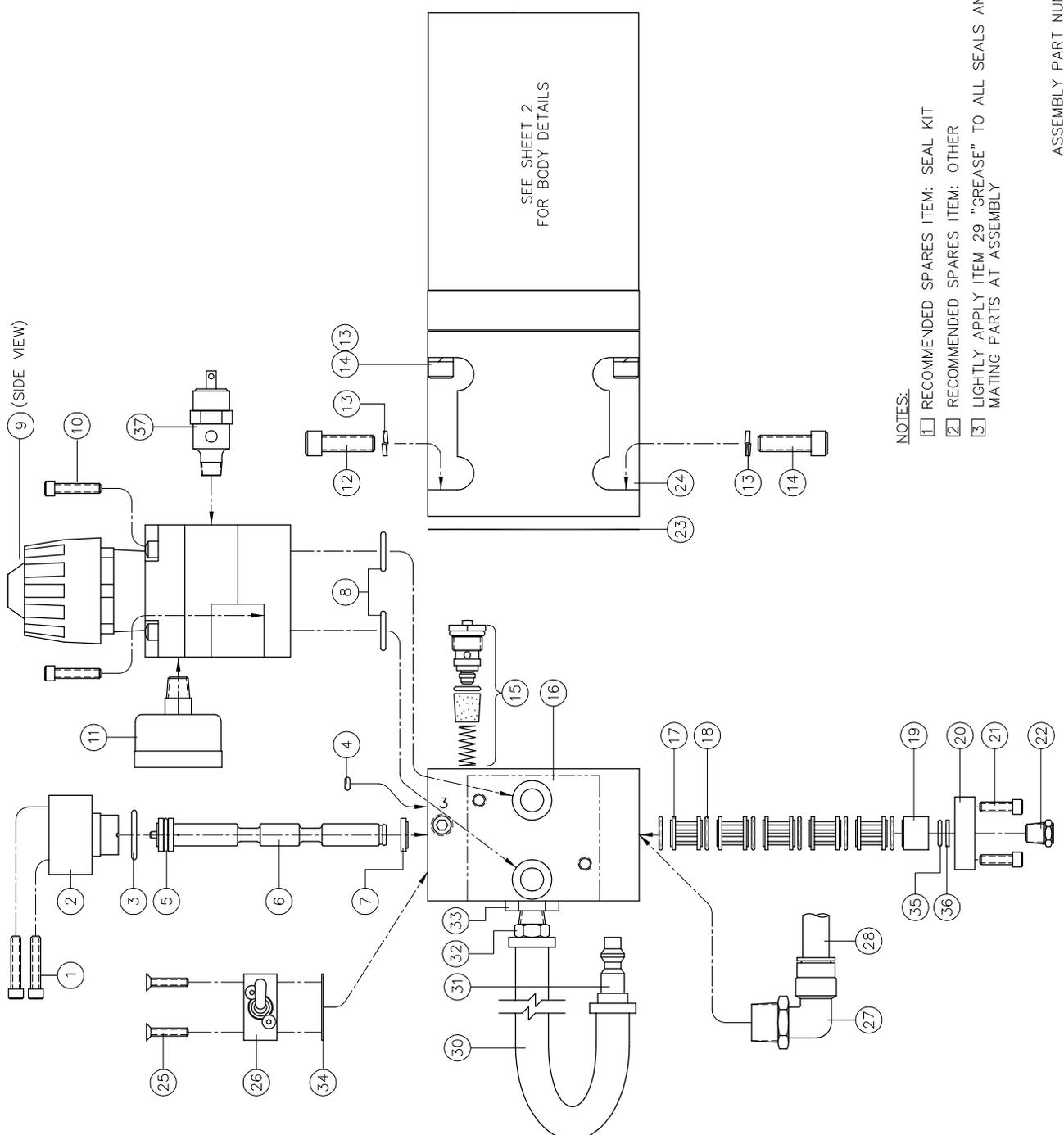
REV	DESCRIPTION	DATE
A	ADDED 125 PSI "RV". AIR CIRCUIT TO S.A.	1/9/03
B	CYL R.E. EXHAUST COMMON TO H.E. EXHAUST	4/11/03
C	RELABELED PORTS	1/26/07



		INTERFACE DEVICES, INC. 230 DEPOT ROAD MILFORD, CT 06460
SCALE: N/A	TITLE: PNEUMATIC SCHEMATIC, SA NITROGEN BOOSTER DIRECT CONNECT TO HP CYL.	
DWN BY: TWH	REF:	
DATE: 10/27/98	DWG NO: P32-4001	
SHT: 1 OF: 1	REV: C	

NOTE: COLD EXHAUST AIR IS ROUTED AROUND THE NITROGEN BORE FOR COOLING

REV	DESCRIPTION	BY	DWG
J	ITEM 20 WAS 10305; SEE SHT 2	WNI	3/23/05



ITEM	QTY	PART NUMBER	DESCRIPTION
40			
39			
38			
37	1	11236 M04-1006	RELIEF VALVE, 1/8 NPT
36	1	-012	TEFLON BACKUP RING
35	1	SO-012 6865	O-RING
34	1	10333 V04-5001	GASKET
33	1	1/2 x 3/8 PIR-S	PIPE THD REDUCER
32	1	30182-6-6	HOSE FITTING, 3/8 NPT
31	1	H9CP	QD HOSE FITTING
30	20	3/8 ID	HOSE, PUSHLOC
29	A/R	WATERPROOF GREASE	
28	5	NYLON N2	TUBING
27	2	6520-08-08	FITTING
26	1	10743 V04-1001	VALVE, 3-W, TOGGLE
25	2	M4 x 20	SCREW, FLAT HD
24	1	10111 P12-5202	BODY, AIR CYLINDER
23	1	10334 P00-5205	GASKET, AIR BODY
22	1	10264	BREATHER, 1/8 NPT
21	2	10-24 x .62	SCREW, SOC HD CAP
20	1	10299 P00-5208	SPOOL CAP
19	1	10269 P00-5210	BUSHING, LONG
18	6	10629	TEE SEAL
17	5	10273 P00-5209	CAGE
16	1	10004 P12-5201	AIR CAP HOUSING
15	1	10017 V04-1005	2-WAY AIR VLV ASSY
14	4	5/16-18 x 1.75	SCREW, SOC HD CAP
13	8	5/16 HI COLLAR	LOCK WASHER
12	4	5/16-18 x 1.00	SCREW, SOC HD CAP
11	1	10342 M04-1004	AIR GAUGE (0-160 PSI)
10	2	1/4-20 x .88	SCREW, SOC HD CAP
9	1	10015 P12-1202	AIR REG ASSY
8	2	SO-016B7	O-RING
7	1	10271 P00-5212	BUSHING, SHORT
6	1	10659 P00-5211	AIR SPOOL
5	1	SO-111CN7	O-RING
4	1	SO-006CN7	O-RING
3	1	SO-019B7	O-RING
2	1	10298 P00-5207	PILOT CAP
1	2	10-24 x 1.00	SCREW, SOC HD CAP

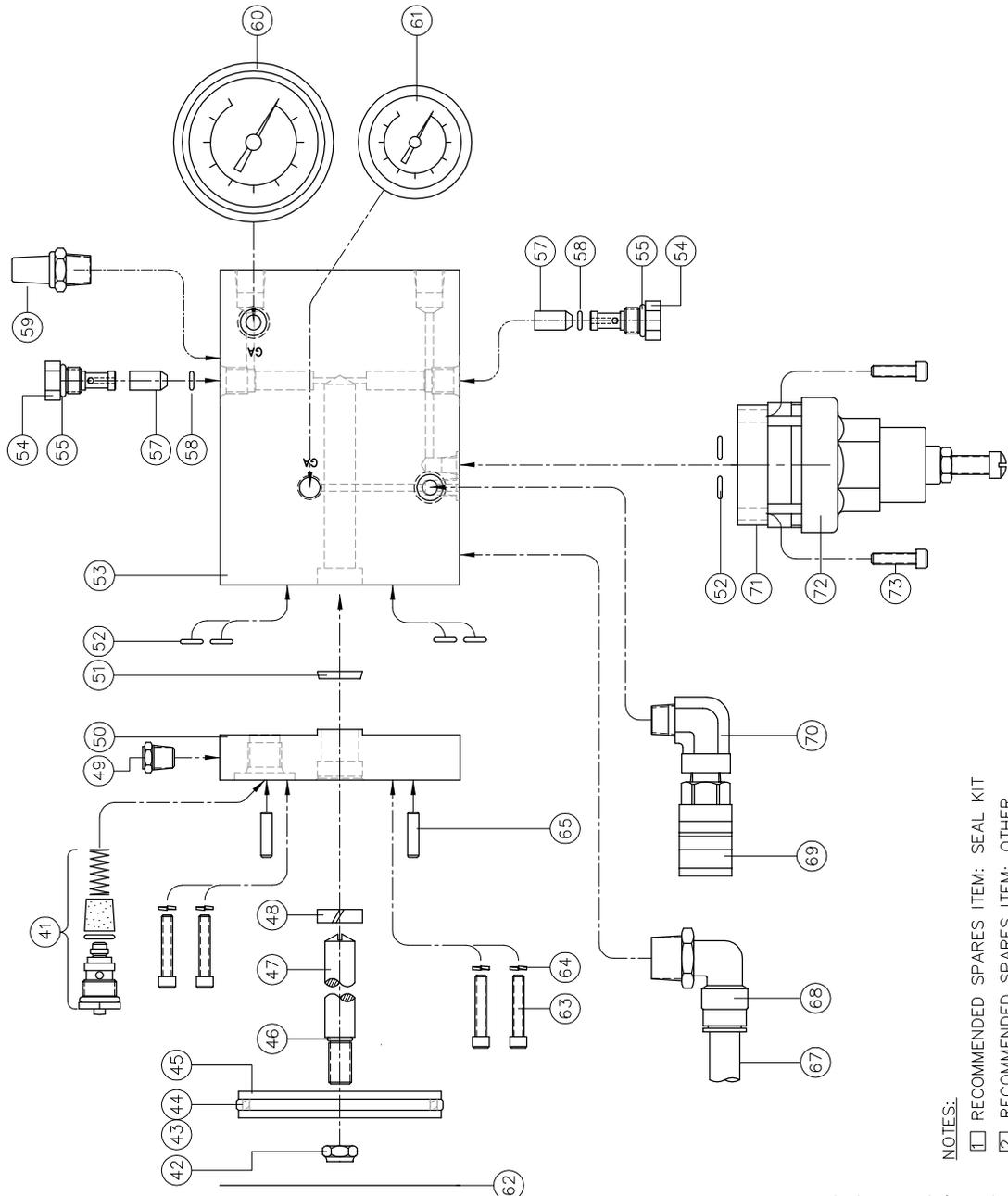
NOTES:

- 1 RECOMMENDED SPARES ITEM: SEAL KIT
- 2 RECOMMENDED SPARES ITEM: OTHER
- 3 LIGHTLY APPLY ITEM 29 "GREASE" TO ALL SEALS AND MATING PARTS AT ASSEMBLY

SCALE: 1/2	TITLE: ASSEMBLY, N2 45:1 BOOSTER
DWG BK: WNI	
DWG: 9/27/99	REF: W/N2 SUPERCHARGE REG.
SHT: 1 OF: 2	DWG NO: P32-1001
	REV: J

ASSEMBLY PART NUMBER 11001

REV	DESCRIPTION	BY	DATE
J	ITEM 44 WAS 36603375-29; 48 WAS GROA-0500-147; 51 WAS M10-MS-R-206-Z1103; 60 WAS 754 PSI, LIQ FILL; 61 WAS 160 PSI; 71 WAS 10383; 72 WAS R83-200-RNLA; 73 WAS 1.00 GAL	WNI	3/23/05



ITEM	QTY	PART NUMBER	DESCRIPTION
80			
79			
78			
77			
76			
75			
74			
73	4	10-24 x .75	SOC HD CAP SCR, SS
72	1	11580 M04-1017	REGULATOR
71	1	11562 P32-5604	REG MTG BLOCK
70	1	1/4 CD-S	STREET ELBOW
69	1	BT3	QUICK DISCONNECT
68	REF	6520-08-08	FITTING
67	REF	NYLON N2	TUBING
66	2	ø3/16 x .75	DOWEL PIN
64	4	1/4 HI COLLAR	LOCK WASHER
63	4	1/4-20 x 1.00	SOC HD CAP SCR
62	1	10334 P00-5205	GASKET, AIR BODY
61	1	10342 M04-1004	GAUGE, 1/8 NPT, CBM, 160
60	1	10353 M03-1011	GAUGE, 1/4 NPT, CBM, 5K
59	2	10429	MUFFLER, 1/4 NPT
58	2	SO-008-9250	O-RING, POLY
57	2	10694 M04-1002	CHECK VALVE (2201)
56			
55	2	SO-904B7	O-RING, BUNA
54	2	11288 P32-5602	PLUG, CV RETAINER
53	1	10116 P32-5601	BODY, N2 BOOSTER
52	9	SO-011B7	O-RING, BUNA
51	1	11597 M03-1008	VARISEAL
50	1	10553 P32-5401	RATIO PLATE
49	2	10264	BREAHER, 1/8 NPT
48	1	10369 M03-1031	ROD BEARING, TEFLON
47	1	10484 P32-5501	PISTON ROD
46	1	SO-903B7	O-RING, BUNA
45	1	10477 P00-5203	AIR PISTON
44	1	10377	GLYDE RING
43	1	SO-233B7	O-RING
42	1	3/8-24	FLEXLOC JAM NUT
41	1	10017 V04-1005	2-WAY AIR VLV ASSY

INTERFACE DEVICES, INC.
230 DEPOT ROAD
MILFORD, CT 06460

SCALE: 1/2	TITLE: ASSEMBLY,
DWG BY: WNI	N2 45:1 BOOSTER
DATE: 9/27/99	REF: W/N2 SUPERCHARGE REC.
SHEET OF: 2	DWG NO: P32-1001
	REF: J

ASSEMBLY PART NUMBER 11001

- NOTES:
- 1 RECOMMENDED SPARES ITEM: SEAL KIT
 - 2 RECOMMENDED SPARES ITEM: OTHER
 - 3 LIGHTLY APPLY ITEM 29 "GREASE" TO ALL SEALS AND MATING PARTS AT ASSEMBLY