

NB/NBR NITROGEN BOOSTER FOR AVIATION SERVICE

INSTALLATION, OPERATION & MAINTENANCE MANUAL



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**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.

NB(R) Serial Number: _____

STATEMENT OF WARRANTY

Interface Devices, Inc. (IDI) warrants its products to be free from defects in material and workmanship under normal use and service for a period of one (1) year from date of shipment. Any defect discovered after the warranty period has expired will be deemed to be outside the above coverage. No goods claimed to be under warranty shall be accepted for return unless authorized by IDI.

Upon discovery of a defect (other than freight damage) or a shortage of an item received in the original shipping container, the purchaser shall, within (10) calendar days, deliver notice of the defect or shortage. Damaged freight claims must be placed with the freight carrier and will not be honored by IDI. If after due investigation of a claim of defect or shortage is found valid, IDI, at its sole discretion, may discharge its entire obligations to the purchaser by either repair or replacement of the defective product or component and for shortages by furnishing a replacement of the missing quantity.

This express warrantee supersedes and is in lieu of all other remedies and warranties, including the implied warranties of merchantability and fitness for a particular purpose, and liability for negligence. IN NO EVENT SHALL IDI BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL LOSSES, EXPENSES OR DAMAGES INCLUDING DAMAGES FOR PERSONAL INJURY OR COMMERCIAL LOSS.

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1 General Description



NB(R) –

The ENB 45 Pneumatic Nitrogen Booster provides the capability of boosting remaining lower pressure Nitrogen from supply bottles to the required pressure, from 400 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.

**** 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 Ratios: 20:1, 30:1 or 45:1.

INTERFACE DEVICES INC
-NITROGEN BOOSTER NB(R)

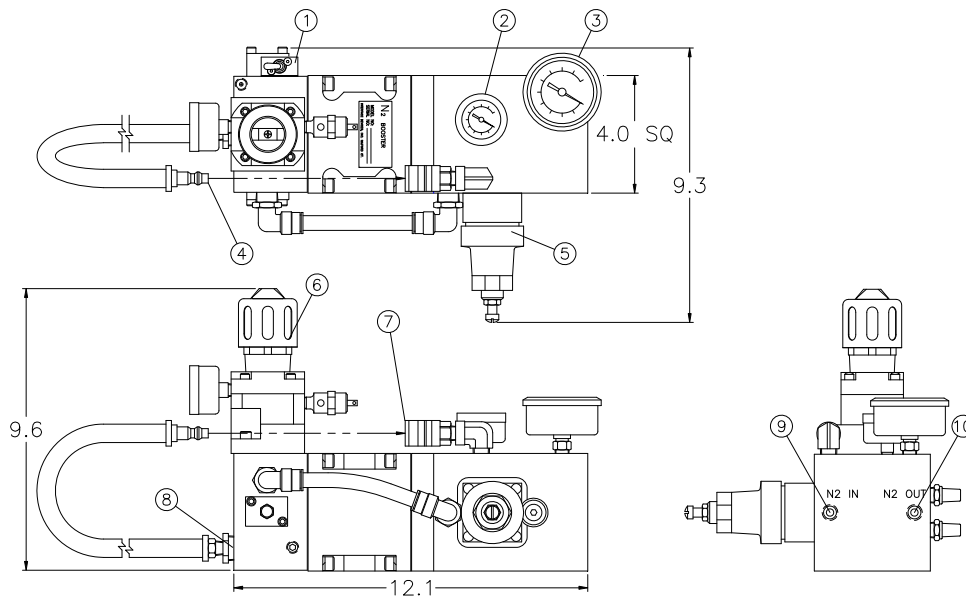


Fig. 1

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, 400 to 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.

**** 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 1/4-20 by 1/2" deep tapped holes for mounting to a bracket or cart.
- 3.3.3 Customer supplied parts:
- Two AN816-6, 3/8" AN to 1/4" 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 1/4" 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 1/4" 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.

- 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 NB(R) Booster.

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.

INTERFACE DEVICES INC
- NITROGEN BOOSTER NB(R)

- 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 the pump ratio to find the initial required regulated air pressure setting). Example for ENB-45: 3,000 psi final pressure 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 are supplied for reference purposes. Calibrated and certified gauges should be used for determining final pressure to the aircraft, which are available from the factory at the time of purchase or upon request during repair.

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

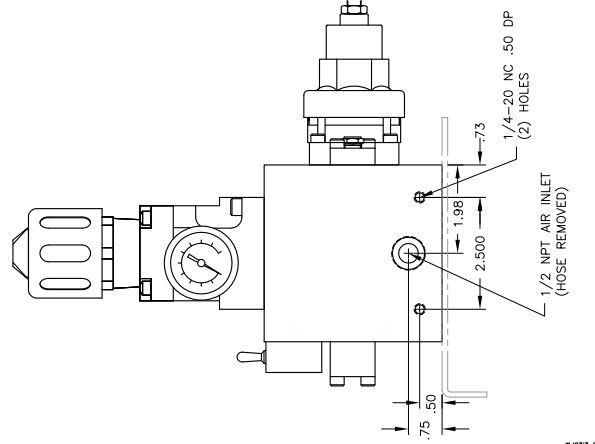
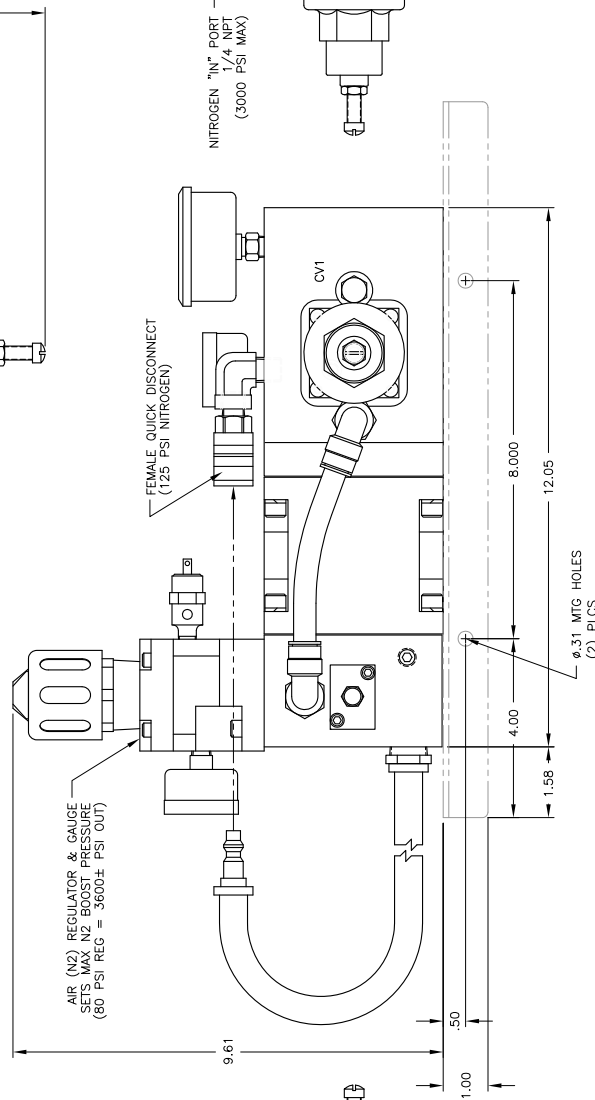
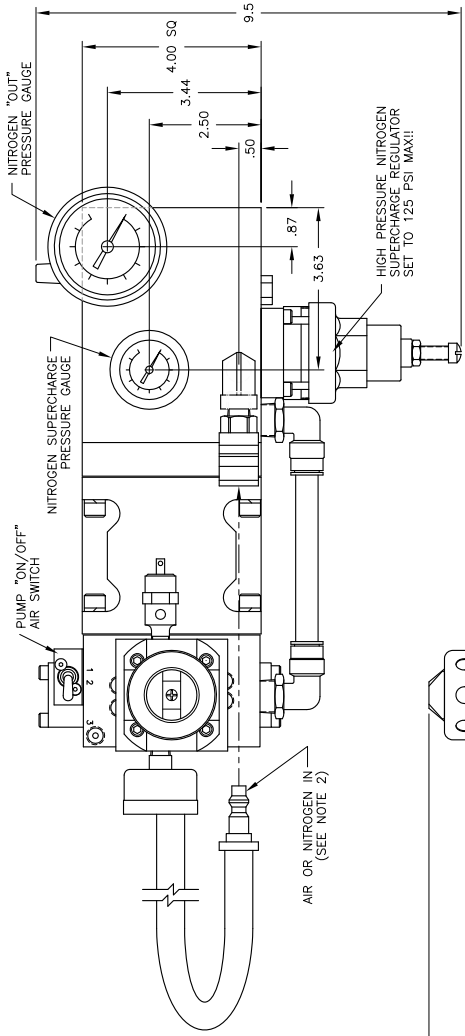
**** Warning ****

Troubleshooting should be undertaken by qualified personnel only.

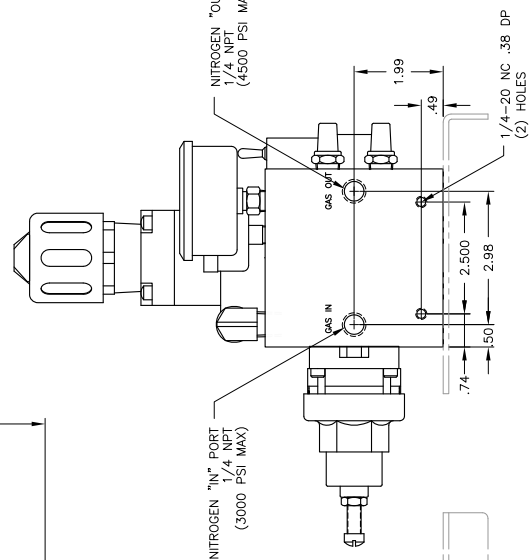
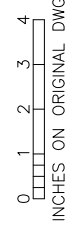
Troubleshooting Chart

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 AIR IN RELIEF VALVE	1/10/03
B	DWG WAS GA901182 A; PICTURE CHANGE MUFFLER 9.9 WAS 10.9	3/25/03
C	PICTURE CHANGE: NEW SC REGULATOR	3/23/05
D	ADDED MTG BRACKET & DIMS	3/15/12
E	ADDED SHEET 2	9/10/13
F	PICTURE CHANGE: REGULATOR KNOB	9/17/19

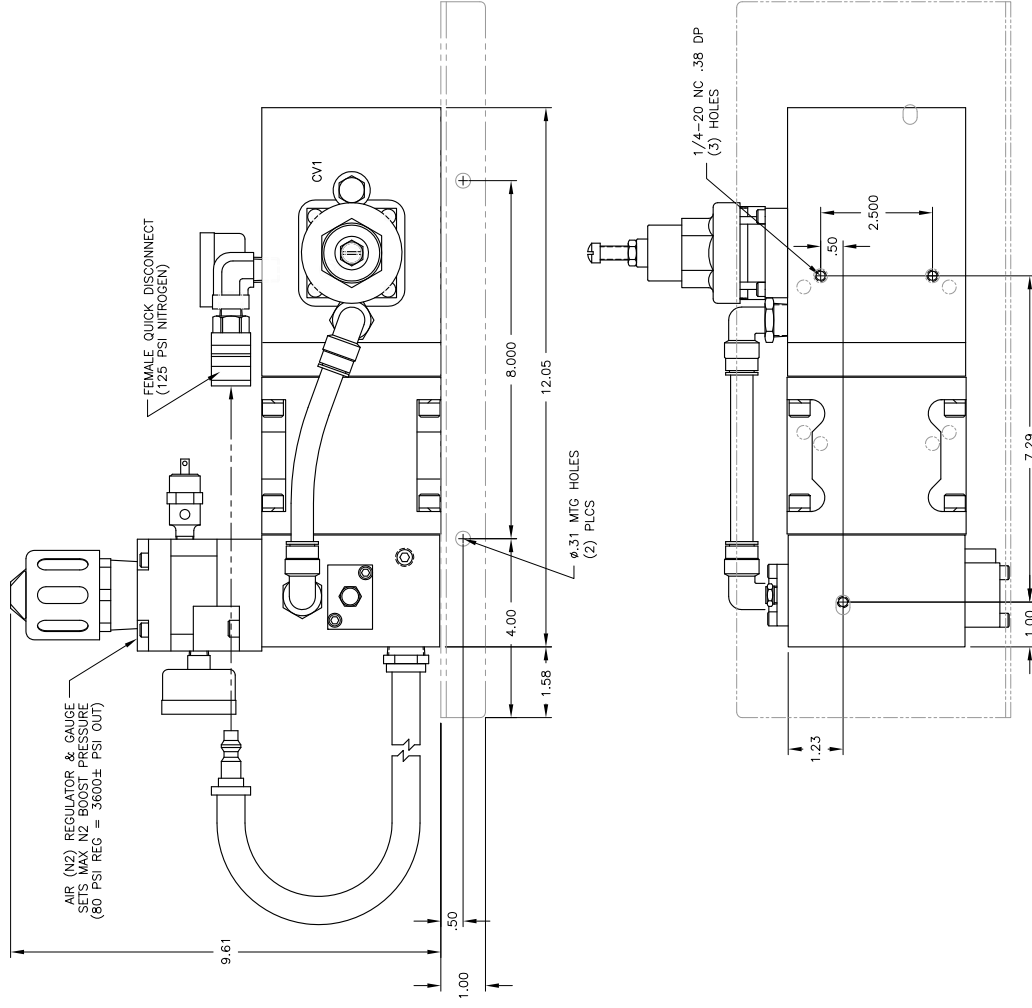


NOTES
 1 SOME COMPONENTS NOT SHOWN IN ALL VIEWS FOR CLARITY
 2 TO RUN PUMP ON SHOP AIR, CONNECT QUICK DISCONNECT TO AIR SUPPLY
 TO RUN PUMP FROM NITROGEN CYLINDER, CONNECT QUICK DISCONNECT TO FEMALE DISCONNECT ON PUMP



		INTERFACE DEVICES, INC. 230 DEPOT ROAD MILFORD, CT 06460
SCALE: NONE	TITLE: GENERAL ARRANGEMENT, NB-45 BOOSTER (AVIATION)	
DWN BY: WNI		
DATE: 1/18/99	REF: (DIRECT CONNECT TO HP CYL)	
SHT: 1 OF 2	DWG NO: P32-0001	
	REV: F	

REV	DESCRIPTION	DATE
A	ADDED AIR IN RELIEF VALVE	1/10/03
B	DWG WAS GA9901182 A; PICTURE CHANGE MUFFLER 9.9 WAS 10.9	3/25/03
C	PICTURE CHANGE: NEW SC REGULATOR	3/23/05
D	ADDED MTG BRACKET & DIMS	3/15/12
E	ADDED SHEET 2	9/10/13
F	PICTURE CHANGE: REGULATOR KNOB	9/17/19

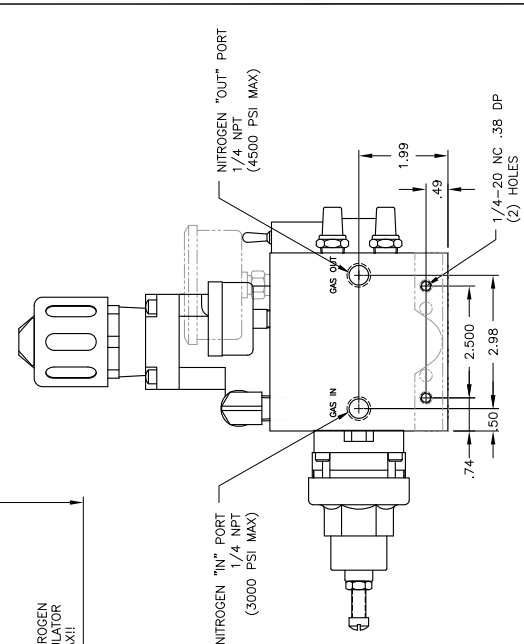
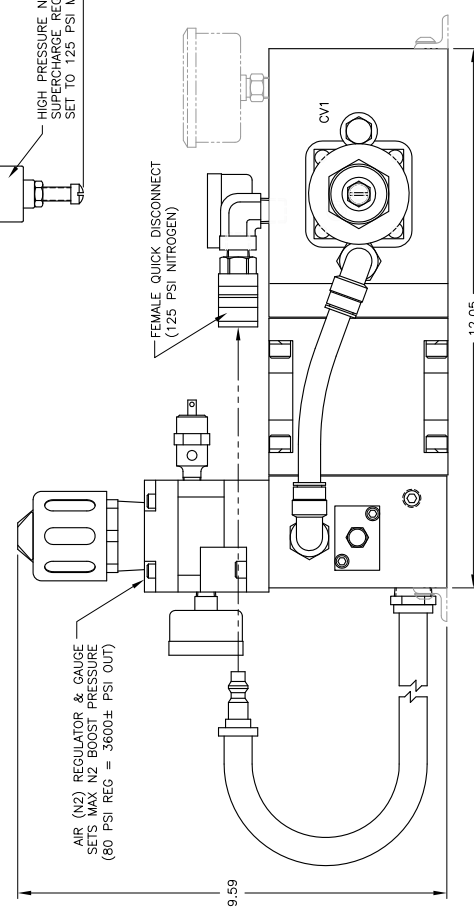
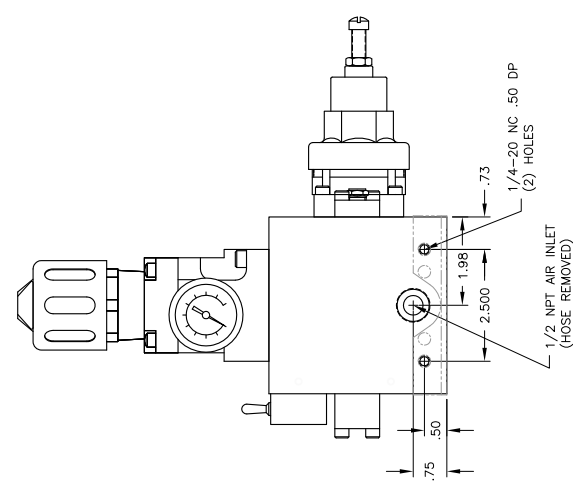
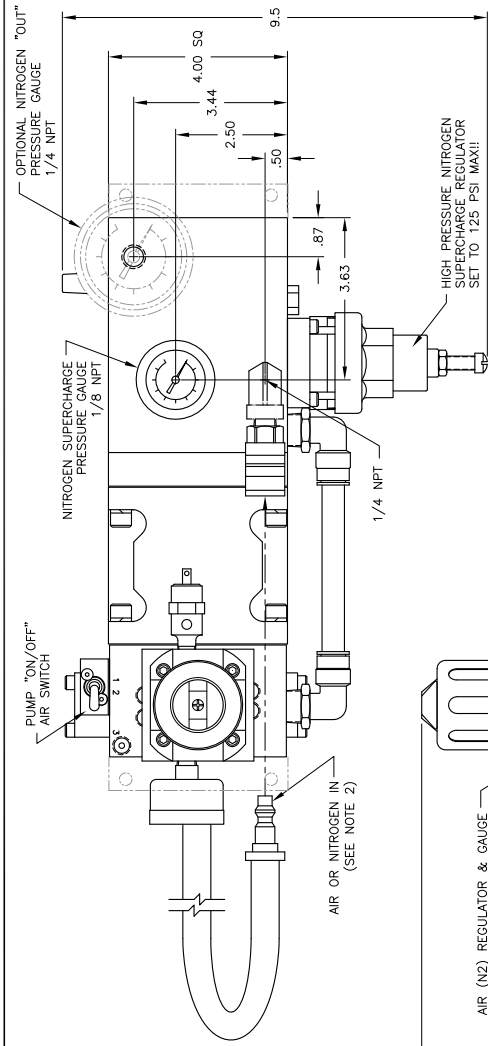


- NOTES
- SOME COMPONENTS NOT SHOWN IN ALL VIEWS FOR CLARITY
 - TO RUN PUMP ON SHOP AIR, CONNECT QUICK DISCONNECT TO AIR SUPPLY
 - TO RUN PUMP FROM NITROGEN CYLINDER, CONNECT QUICK DISCONNECT TO FEMALE DISCONNECT ON PUMP

0 1 2 3 4
INCHES ON ORIGINAL DWG

		INTERFACE DEVICES, INC. 230 DEPOT ROAD MILFORD, CT 06460
SCALE:	NONE	TITLE: GENERAL ARRANGEMENT, NB-45 BOOSTER (AVIATION)
DWG BY:	WNI	
DATE:	1/18/99	REF: (DIRECT CONNECT TO HP CYL)
SHT: 2 OF: 2	DWG NO: P32-0001	REV: F

REV	DESCRIPTION	BY	DATE
A	ADDED GAUGE & N2 INLET DIMENSIONS; ADDED PUMP, HOSE, MOUNTING BRACKETS	WNI	3/19/12
B	PICTURE CHANGE: AIR REGULATOR KNOB	WNI	9/17/12



NOTES
 1 SOME COMPONENTS NOT SHOWN IN ALL VIEWS FOR CLARITY
 2 TO RUN PUMP ON SHOP AIR, CONNECT QUICK DISCONNECT TO AIR SUPPLY
 TO RUN PUMP FROM NITROGEN CYLINDER, CONNECT QUICK DISCONNECT TO FEMALE DISCONNECT ON PUMP

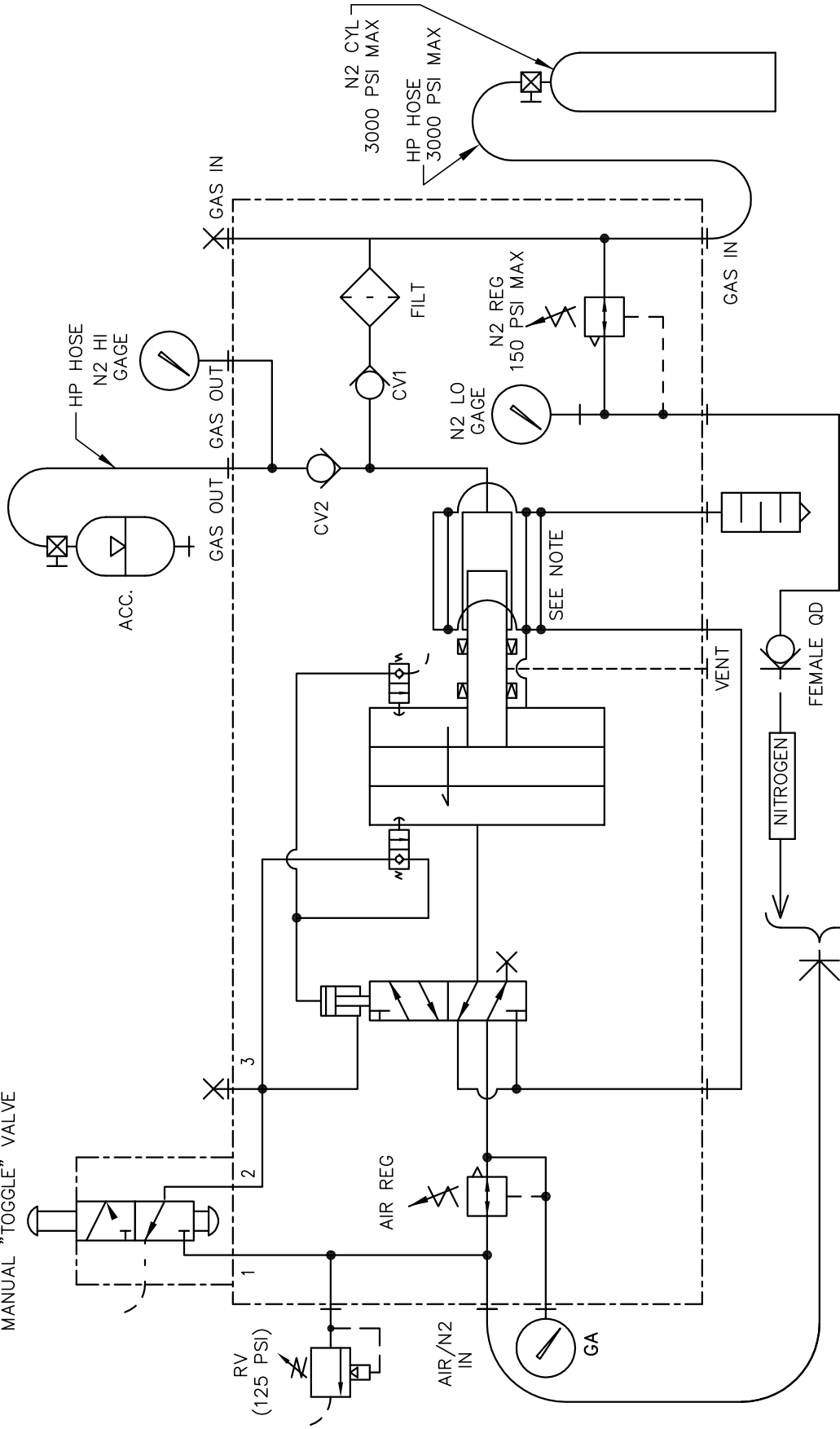


		INTERFACE DEVICES, INC. 230 DEPOT ROAD MILFORD, CT 06460
SCALE:	NONE	
DWG BY:	WNI	
DATE:	3/15/12	
SHEET:	1 OF 1	
TITLE:	GENERAL ARRANGEMENT, NBR-45 BOOSTER	
REF:	(DIRECT CONNECT TO HP CYL)	
DWG NO:	P32-0003	
REV:	B	

φ.28 MTG HOLES
 (4) PLCS
 IN OPTIONAL MOUNTING BRACKETS

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

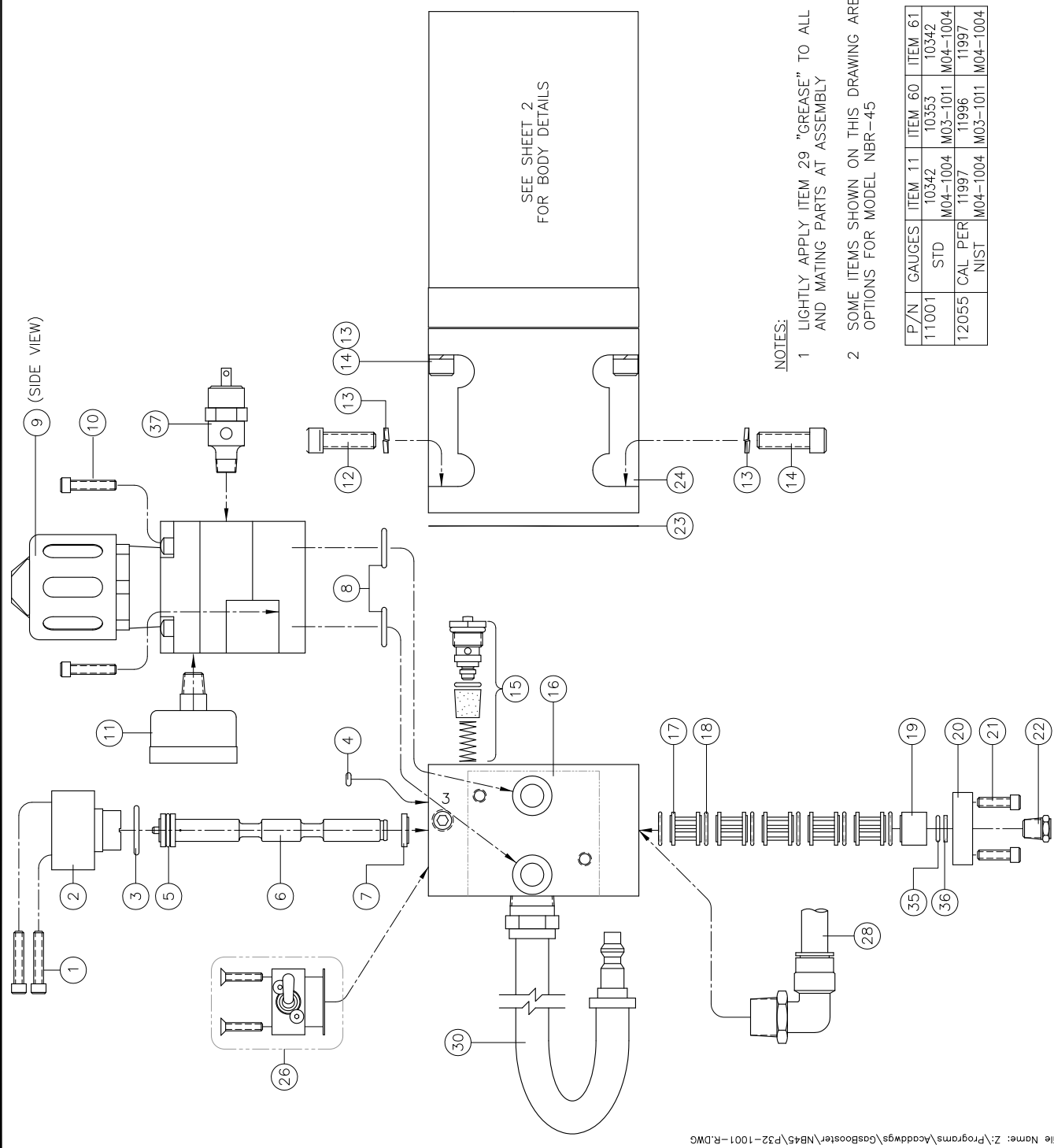
PUMP ON/OFF
MANUAL "TOGGLE" VALVE



		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	DATE
K	DEL 42; 45 WAS 10477 P00-5203; 46 WAS SO-903B7; 47 WAS 10484 P32-5501	WNI	4/30/08
L	ADDED CHART, ADDED IDI P/NS	WNI	7/29/10
M	DEL 25 & 34 (INCLUDED W/26)	WNI	4/13/11
N	ADD IDI P/NS, REV O-RING MAT'L	WNI	1/12/12
P	ITM 57 WAS 10694 NOW 11632	WNI	7/1/13
R	ITM 9 WAS 10015 P12-1202	WNI	9/17/18



- NOTES:**
- 1 LIGHTLY APPLY ITEM 29 "GREASE" TO ALL SEALS AND MATING PARTS AT ASSEMBLY
 - 2 SOME ITEMS SHOWN ON THIS DRAWING ARE OPTIONS FOR MODEL NBR-45

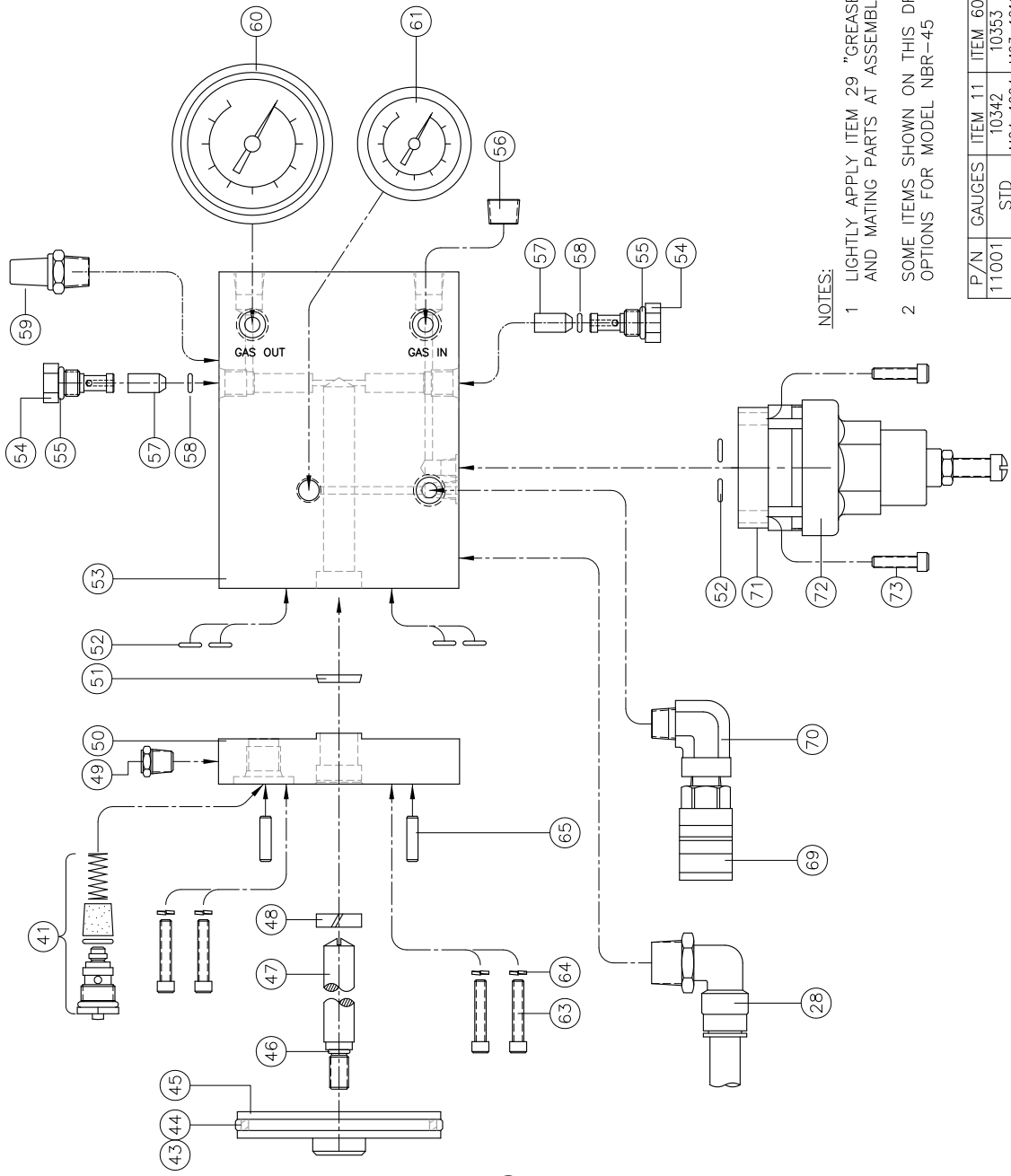
P/N	GAUGES	ITEM 11	ITEM 60	ITEM 61
11001	STD	10342	10353	10342
12055	CAL PER	11997	11996	11997
	NIST	M04-1004	M03-1011	M04-1004

40			
39			
38			
37	1	11236 M04-1006	RELIEF VALVE, 1/8 NPT
36	1	11753	TEFLON BU RING, -012
35	1	SO-012P7	O-RING
34			
33			
32			
31			
30	1	12060 M03-1046	HOSE ASSY
29	A/R		GREASE, WHITE LITHIUM
28	1	12061 M04-1025	HOSE ASSY
27			
26	1	10743 V04-1001	VALVE ASSY, 3-W, TOGGLE
25			
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	10393	WASHER, 5/16 HI COLLAR
12	4	5/16-18 x 1.00	SCREW, SOC HD CAP
11	1	SEE CHART	AIR GAUGE (0-160 PS)
10	2	1/4-20 x .88	SCREW, SOC HD CAP
9	1	12286 P12-1206	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-111B7	O-RING
4	1	SO-006B7	O-RING
3	1	SO-019B7	O-RING
2	1	11768 P00-1202	PILOT CAP ASSY
1	2	10-24 x 1.00	SCREW, SOC HD CAP

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

SCALE: 1/2
DWG BK: WNI
TITLE: ASSEMBLY,
NB-45 BOOSTER (AVIATION)

DATE: 9/27/99 REF: W/N2 SUPERCHARGE REG.
SHEET: 1 OF: 2 DWG NO: P32-1001 REV: R



NOT SHOWN

- NOTES:
- 1 LIGHTLY APPLY ITEM 29 "GREASE" TO ALL SEALS AND MATING PARTS AT ASSEMBLY
 - 2 SOME ITEMS SHOWN ON THIS DRAWING ARE OPTIONS FOR MODEL NBR-45

P/N	GAUGES	ITEM 11	ITEM 60	ITEM 61
11001	STD	10342	10353	10342
12055	CAL PER	M04-1004	M03-1011	M04-1004
	NIST	11997	11996	11997
		M04-1004	M03-1011	M04-1004

REV	DESCRIPTION	BY	DATE
K	DEL 45 WAS 10477 P00-5203, 46 WAS SO-902B7, 47 WAS 10484 P32-5501	WNI	4/30/08
L	ADDED CHART, ADDED IDI P/NS	WNI	7/20/10
M	DEL 25 & 34 (INCLUDED W/26)	WNI	4/13/11
N	ADD IDI P/NS, REV O-RING MAT'L	WNI	1/12/12
P	ITEM 57 WAS 10694 NOW 11632	WNI	7/1/13
R	ITEM 9 WAS 10015 P12-1202	WNI	9/17/18

ITEM	QTY	PART NUMBER	DESCRIPTION
80	3	1/4-20 x .38 BUT HD CAP SCR, SS	
79	1	11175 P00-5803 MOUNTING PLATE	
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	12011 STREET ELBOW, 1/4 NPT	
69	1	12058 QUICK DISCONNECT	
68			
67			
66			
65	2	11772 DOWEL PIN, .618 x .62	
64	4	10392 L'WASHER, 1/4 HI COLLAR	
63	4	1/4-20 x 1.00 SOC HD CAP SCR	
62	1	10394 P00-5205 GASKET, AIR BODY	
61	1	SEE CHART GAUGE, 1/8 NPT, CBM, 160	
60	1	SEE CHART GAUGE, 1/4 NPT, CBM, 5K	
59	2	10429 MUFFLER, 1/4 NPT	
58	2	SO-008P7 O-RING, POLY	
57	2	11632 M04-1002 CHECK VALVE (2201)	
56	1	12095 PIPE PLUG, 1/4 NPT, BRSS	
55	2	SO-012P9 O-RING, POLY	
54	2	11288 P32-5602 PLUG, CV RETAINER	
53	1	10116 P32-5601 BODY, N2 BOOSTER	
52	7	SO-011B7 O-RING, BUNA	
51	1	11597 M03-1008 VARISEAL	
50	1	10553 P32-5401 RATIO PLATE	
49	1	10264 BREATHER, 1/8 NPT	
48	1	10369 M03-1031 ROD BEARING, TEFLON	
47	1	11906 P32-5502 PISTON ROD	
46	1	SO-902B7 O-RING, BUNA	
45	1	11167 P09-5201 AIR PISTON	
44	1	10377 GLYDE RING	
43	1	SO-233B7 O-RING	
42			
41	1	10017 V04-1005 2-WAY AIR VLV ASSY	

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

SCALE: 1/2
TITLE: ASSEMBLY, NB-45 BOOSTER (AVIATION)
DWG BY: WNI
DATE: 9/27/99 REF: W/N2 SUPERCHARGE REG.
SHEET OF: 2 DWG NO: P32-1001 REV: R