Zip Pneumatics, Inc.

Index

Section

V/P 2000

Operation & Maintenance Manual

4” Vacuum Pressure System

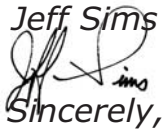
A Message from the President

*At **Zip Pneumatics, Inc.** we strive to provide our customers excellence in the products we manufacture and install. Our reputation is on the line and we know how important that is to the future of our business. Satisfaction for our customers is not an option and we make sure that is achieved.*

We have been in business for nearly 40 years. And with over 70 years combined experience, we can meet your specific needs, no matter how difficult the challenge. Whether you wish to upgrade an existing system or install a new one, we can do the job for you.

***ZIP** offers a wide variety of systems that can be customized for your facility. If you are interested in a demonstration of our products, please call me at (800) 247-7638 and I will make arrangements to meet with you. Let **ZIP** be your transportation solution.*

Jeff Sims



Sincerely,

Zip Pneumatics, Inc.

9815 E. 56th St. Raytown, MO 64133
816.358.3911 • 816.358.1011 (Fax) • www.zip-pneumatics.com

4” Vacuum Pressure System

I. Functional Design **- Minimum Requirements**

V/P 2000 BASE REQUIREMENTS

Blower pac with controls
Main terminal with air diode
Remote terminal with air diode
Bypass tee with air diode
Bend relief valve
Transmission tubing, bends, sleeves
8 conductor low voltage control cable
Main power (120vac 30amp circuit)

OPERATING REQUIREMENTS

Total system power - (1) 120vac 20 amp circuit (controller and blower pac)

Main terminal lighted pushbuttons
(”Press to send” / ”In-use” pushbutton & light combo)
("Arrival” / “Reset" light and pushbutton combo)

Remote terminal lighted pushbuttons
("Press to send” / “In-use" pushbutton & light combo)
("Arrival” / “Reset" light and pushbutton combo)

Carriers with foam inserts

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4” Vacuum Pressure System

I. Functional Design **- Overview**

OVERVIEW

The v/p 2000 system has two stations or terminals, the main terminal and the remote terminal which is somtimes referred to as the substation. The terminals are connected by transit tubing for carrier travel. This tubing is especially designed for pneumatic tube systems.

The v/p 2000 system also has a blower pac which connects to the main terminal. This blower pac is capable of providing vacuum or pressure to the system as required by the controller. This controller is mounted to the blower pac and is powered by the same 110vac circuit as the blower pac.

The v/p 2000 system controller switches the blower between vacuum and pressure thus providing carrier travel in either direction.

DESIGN DETAIL

The v/p 2000 system has two terminals which both receive and send carriers. On each terminal are two lighted pushbuttons; one is red and one is green. The red button is pushed for sending and lights when the system is in use. The green light shows carrier arrival and is pushed to extinguish the light when carrier is removed.

The blower pac is connected to the main terminal and a bypass tee located above the main terminal and tied into the transit tubing. Both the main terminal and the bypass tee contain an air diode which allows air flow in one direction only.

The substation or remote terminal has an air diode and above the substation either on or below the bend is a relief valve. Both of these items allow air flow in one direction only.

BLOWER STATUS	VALVE	VALVE POSITION
PRESSURE	MAIN TERMINAL AIR DIODE	OPEN
PRESSURE	BYPASS TEE AIR DIODE	CLOSED
PRESSURE	BEND RELIEF VALVE	OPEN
PRESSURE	SUBSTATION AIR DIODE	CLOSED
VACUUM	MAIN TERMINAL AIR DIODE	CLOSED
VACUUM	BYPASS TEE AIR DIODE	OPEN
VACUUM	BEND RELIEF VALVE	CLOSED
VACUUM	SUBSTATION AIR DIODE	OPEN

4” Vacuum Pressure System

I. Functional Design **- Features** **Pg. 1**

Items

The item(s) are placed into the carrier and the carrier is inserted into the terminal. After a quick check to see that the system is not busy, the operator presses the red send button. The system will deliver the carrier and the operator may continue with work. This simple procedure applies for operation at either terminal.

Main Terminal

After the "press to send" button is pushed at the main terminal, an input signal is received at the controller. The controller checks and makes sure the system is not in use. If the system is in use, the signal is ignored. If the system is not busy, then an output signal is sent to the in-use lights (red) at both terminals. At the same time, an output signal is sent to the solid state relay which turns the blower on for pressure.

Pressure

As pressure is supplied into the system, the bypass tee air diode closes and the main terminal air diode opens. The pressure catches the upper carrier rubbing band and lifts the carrier up out of the terminal and towards the substation. At the substation, the bend relief valve opens and allows the pressure to exit from the system. The substation air diode closes, which seals the terminal.

Carrier using Pressure

When the carrier passes the relief valve and starts down into the sealed substation, it presses against the trapped air. This causes a cushioned effect with the air released by the carrier as it lands gently into the substation.

4” Vacuum Pressure System

I. Functional Design **- Features** **Pg. 2**

Timer using Pressure

The timer in the controller times out and removes the output signals to the in-use lights and the blower. At the same time, the controller places an output signal to the substation arrival light. The arrival light stays on until the "reset" button is pushed. This gives an input signal to the controller and the output signal to the arrival light is removed.

Timer

After the "press to send" button is pushed at the substation, an input signal is received at the controller. The controller checks and makes sure the system is not in use. If the system is in use, the signal is ignored. If the system is not busy then an output signal is sent to the in-use lights (red) at both terminals. At the same time, an output signal is sent to the solid state relay turns the blower on vacuum.

Vacuum

As vacuum is supplied into the system, the bypass tee air diode opens and the main terminal air diode closes which seals the terminal. At the substation, the bend relief valve closes and seals the system at that point. The substation air diode opens and allows the vacuum to enter the system.

Carrier using Vacuum

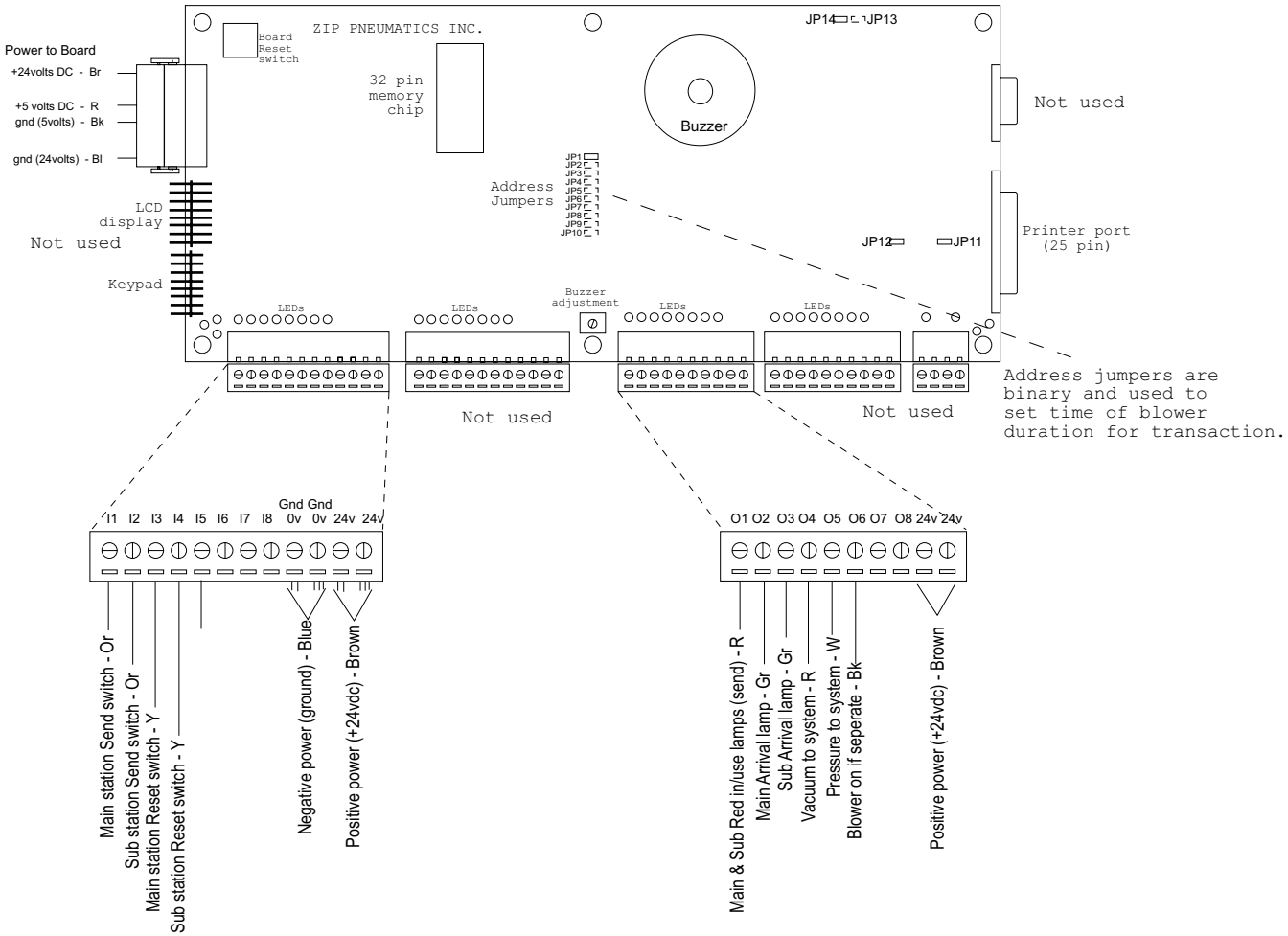
The vacuum catches the upper carrier rubbing band and lifts the carrier up out of the substation and the carrier travels towards the main terminal. When the carrier passes the bypass tee air diode and starts down into the sealed main terminal, it presses against the trapped air. This causes a cushioned effect with the air releasing by the carrier as it lands gently into the main terminal

Timer using Vacuum

The timer in the controller times out and removes the output signals to the in-use lights and the blower. At the same time, the controller places an output signal to the main terminal arrival light. The arrival light stays on until the "reset" button is pushed. This gives an input signal to the controller and the output signal to the arrival light is removed.

4” Vacuum Pressure System

I. Functional Design **- Control Board Wiring** **Pg. 1**



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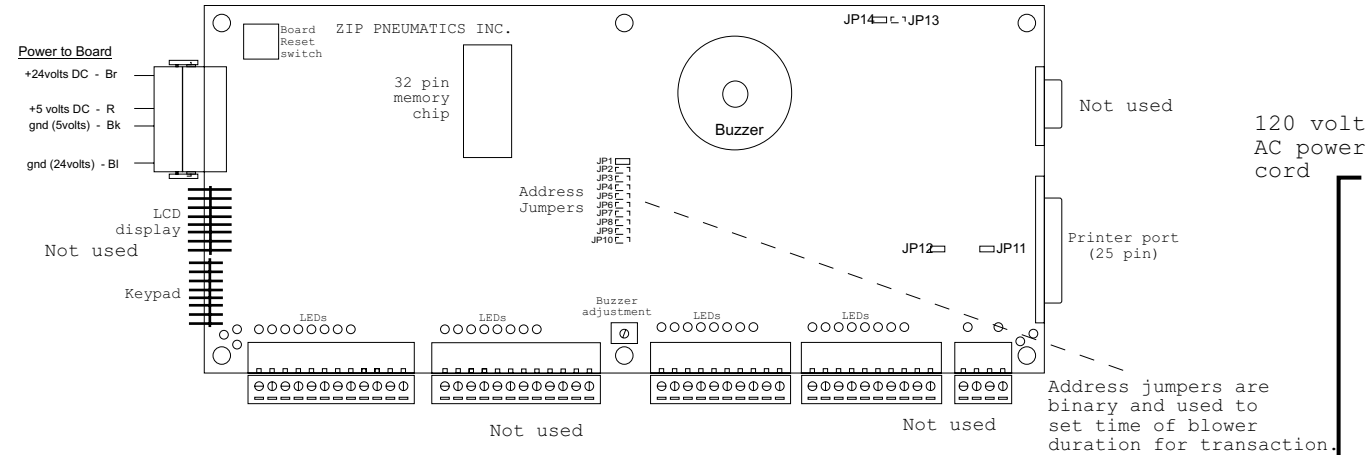
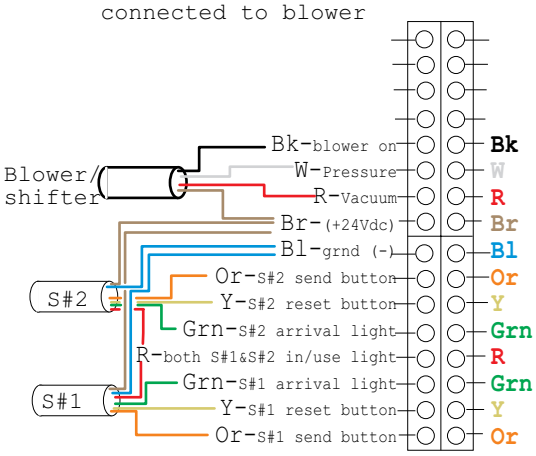
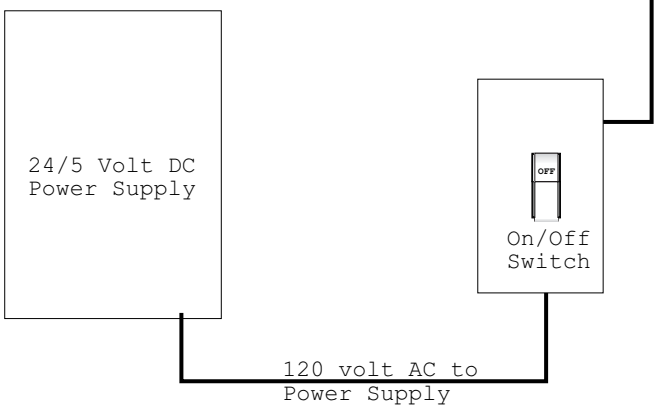
4” Vacuum Pressure System

I. Functional Design - **Control Board Wiring** **Pg. 2**



*S#1=main station connected to blower





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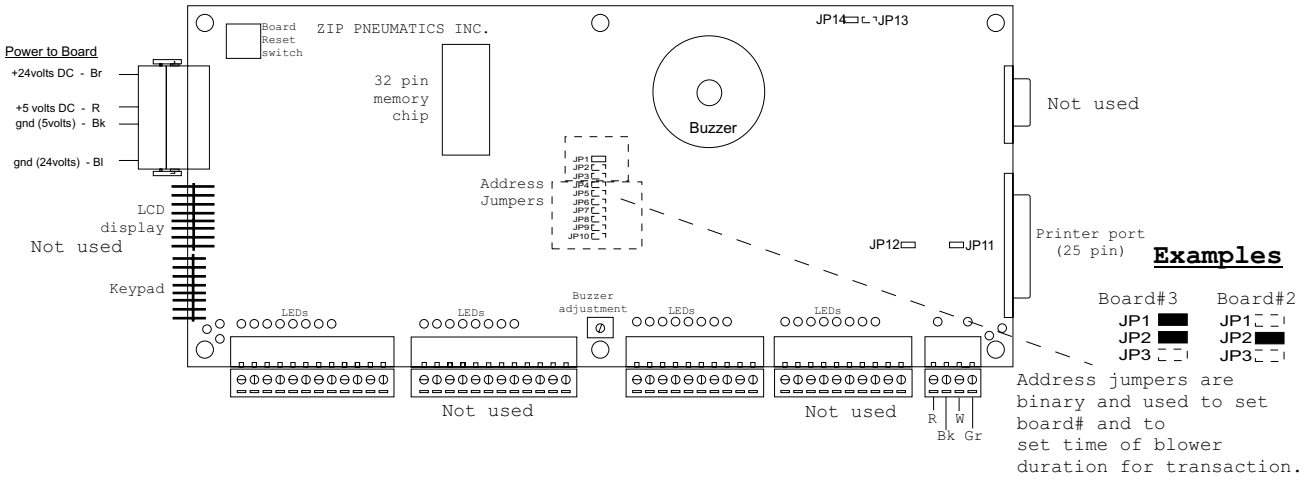
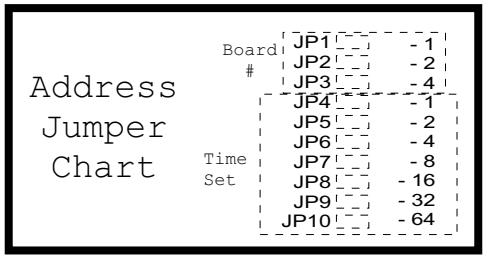
4” Vacuum Pressure System

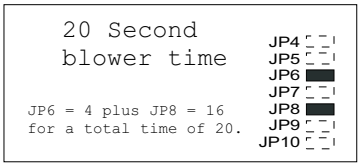
I. Functional Design **- Jumper Time Settings**

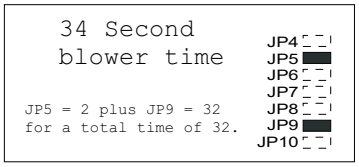


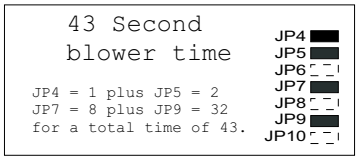


Address jumpers are binary and used to set both the board # and the time of blower duration for transaction.

Examples







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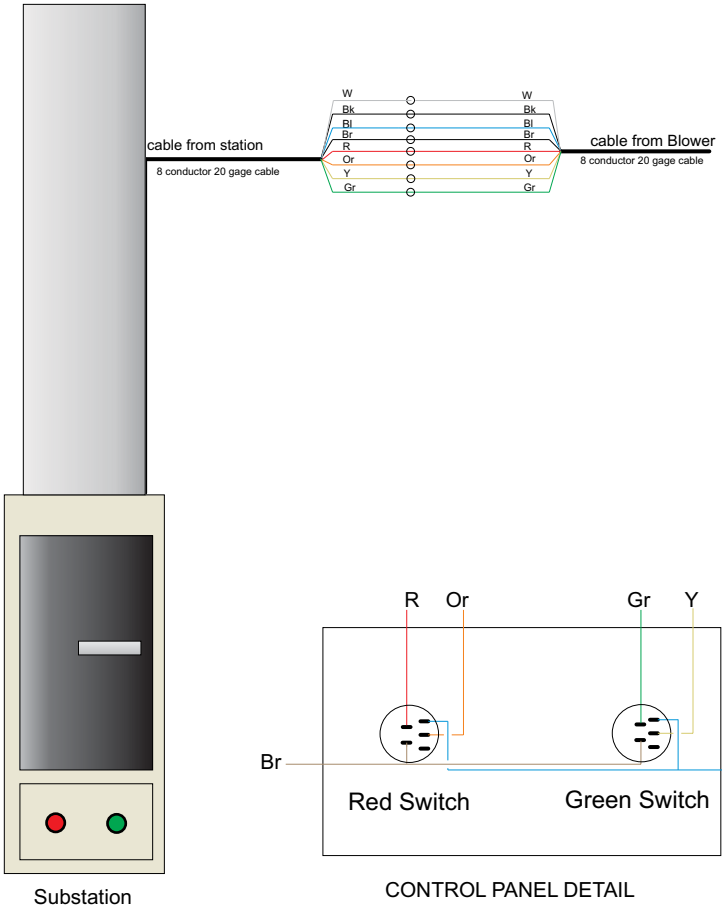
4” Vacuum Pressure System

I. Functional Design **- Station Wiring Detail**



Br = (+) 24 VOLTS D.C.
Bl = (-) 24 VOLTS D.C.
W = NOT USED
Bk = NOT USED
R = IN/USE LIGHT
Or = SEND SWITCH
Y = RESET SWITCH
Gr = ARRIVAL LIGHT

CONTROL PANEL DETAIL

COLOR CODE:

Bk = BLACK
Bl = BLUE
Br = BROWN
Gr = GREEN
Or = ORANGE
R = RED
W = WHITE
Y = YELLOW

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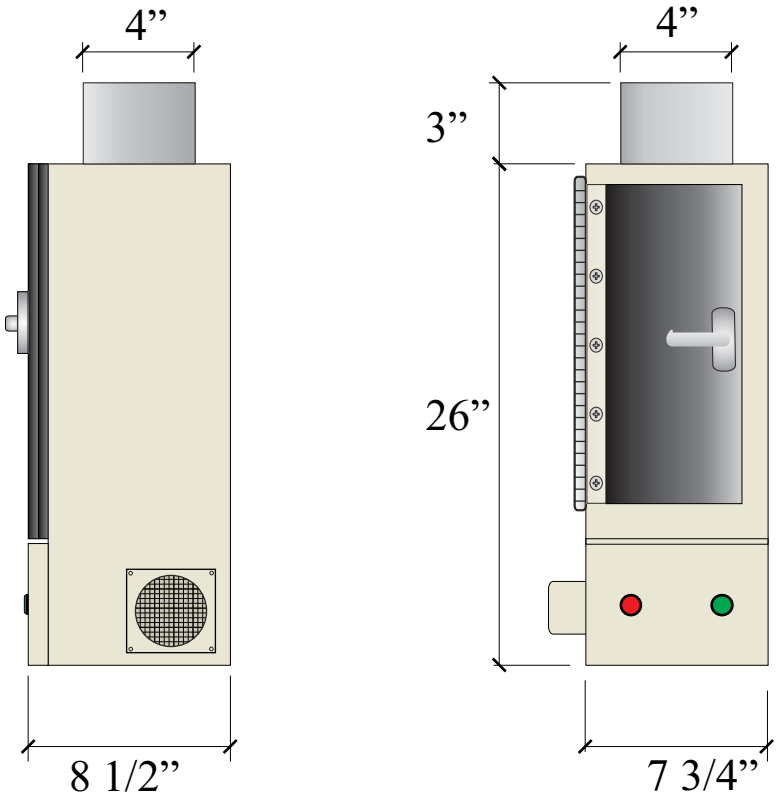
4” Vacuum Pressure System

II. Hardware **- Station**



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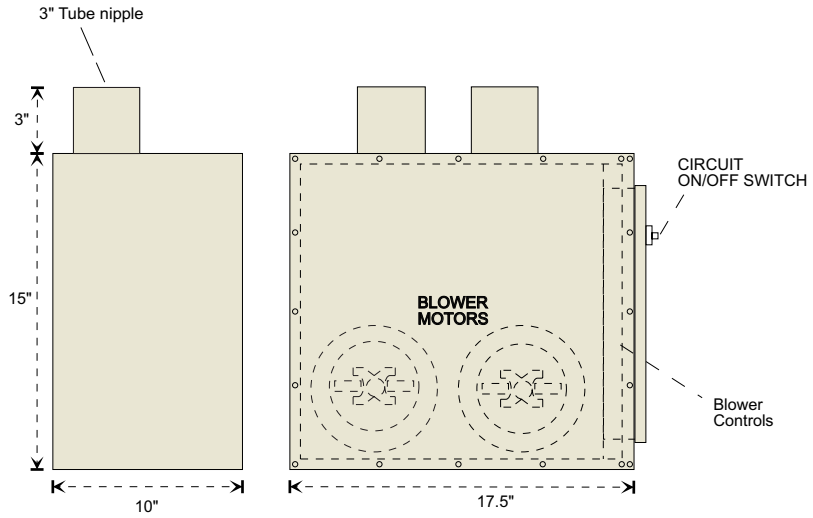
4” Vacuum Pressure System

II. Hardware **- Blower**

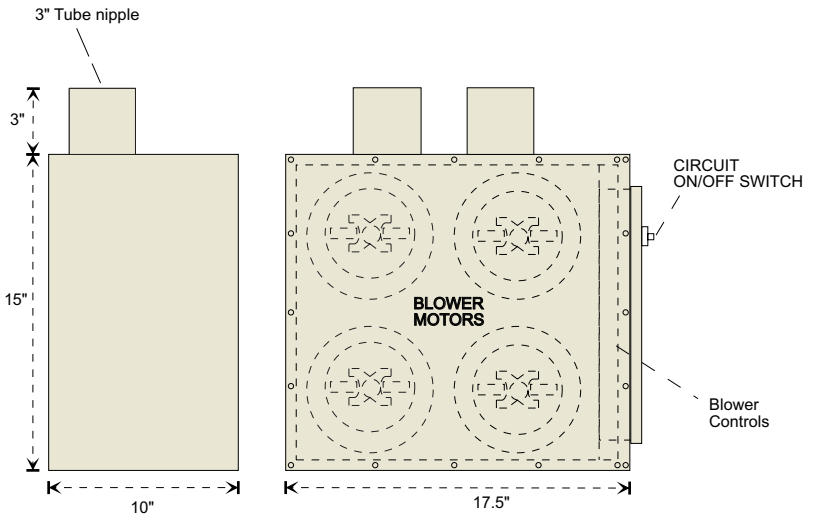
Blower - Systems shorter than 300’



TOTAL POWER EQUIREMENTS
1 - 120 VOLT A.C. 20 AMP CIRCUIT BLOWER MOTOR - 7.5 AMPS MAX.

CONFIGURATION
1 Blower motor on at a time

Blower - Systems longer than 300’



TOTAL POWER EQUIREMENTS
1 - 120 VOLT A.C. 20 AMP CIRCUIT BLOWER MOTOR - 7.5 AMPS MAX.

CONFIGURATION
2 Blower motors on at same time

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4” Vacuum Pressure System

II. Hardware - **GLC40 40 Watt Power** **Pg. 1**

FEATURES:

Cost-effective power source
Universal input 90-264 Vac
2-year warranty
Single and multiple outputs
Overload and overvoltage protection
Built-in EMI filter
UL1950, CSA-C22.2 No. 234 Level 3, IEC950 and EN60950
Operation at no-load
CE marked to LVD

SPECIFICATIONS:

Ac Input
90-264 Vac, 47-63 Hz single phase.

Input Current
Maximum input current at 120 Vac, 60 Hz with full rated output load not to exceed 1.3 A.

Output Power
Normal continuous output power is 40 W for unrestricted natural convection cooling, 45 W peak for 60 seconds. During peak load conditions output regulation may exceed total regulation and noise limits.

Output Regulation
Regulation for multiple-output models measured by ±40% load change from 60% rated load with all other outputs at 60% full rated load and a line voltage change from low line to high line. Initial set tolerance is measured with all outputs at 60% of full rated load. Output voltage V1 requires 20% load for proper regulation of multiple-output models. Regulation for single-output models measured by changing from 5% to 50% load or 50% load to full load in either direction.

Power Limit
Factory set to begin power limiting at approximately 55 W. Fully protected against short circuit and output overload. Short circuit protection is cycling type power limit.

Output Noise
0.5% rms, 1% pk-pk, 20 MHz bandwidth, differential mode. Measured with noise probe directly across output terminals of the power supply.

Transient Response
Main Output: 500 µs typical response time for return to within 0.5% of final value for a 50% load step change, Δi/Δt<0.2 A/µs. Maximum voltage deviation is 3.5%. Startup/shutdown overshoot less than 3%.

Overvoltage Protection
Built in on V1 with firing point set per table. OVP firing reduces output #1 and #2 to less than 50% of nominal voltage in 50 ms.

Voltage Adjust
Factory set on standard unit; however, optional potentiometer adjusts voltage from 4.7 V to OVP point (6.2 V nominal) on the +5 V output.

Efficiency
70% typical depending on model.

Turn-on Time
Less than 1 second at 120 Vac, 25°C (inversely proportional to input voltage and thermistor temperature).

Input Protection
Internal ac fuse provided on all units. Designed to blow only if a catastrophic failure occurs in the unit. Fuse does not blow on overload or short circuit.

Inrush Current
Inrush limited by internal thermistors. Inrush at 240 Vac, averaged over the first ac half-cycle under cold start conditions will not exceed 37 A.

Temperature Coefficient
0.03%/°C typical on all outputs.

EMI/EMC Compliance
All models include built-in EMI filtering to meet the following emissions requirements:

EMI SPECIFICATIONS	COMPLIANCE LEVEL
Conducted Emissions	EN55022 Class A; FCC Class A
Static Discharge	EN61000-4-2, 6 kV contact, 8 kV air
RF Field Susceptibility	EN61000-4-3, 3 V/meter
Fast Transients/Bursts	EN61000-4-4, 2 kV, 5 kHz
Surge Susceptibility	EN61000-4-5, 1 kV diff., 2 kV com.

Safety
All GLC models are approved to UL1950, CSA-C22.2 No. 234 Level 3, IEC950 and EN60950.

4” Vacuum Pressure System

II. Hardware - **GLC40 40 Watt Power** **Pg. 2**

Commercial Model	Output No.	Output	Output Minimum	Output Maximum	V1 OVP Set	Noise P-P	Total Regulation
GLC40A	1	+5.1 V	1 A	3 A	+6.2 ± 0.6 V	50 mV	2%
	2	+12 V	0 A	2 A		120 mV	6%
	3	-12 V	0 A	0.4 A		120 mV	5%
GLC40B	1	+5.1 V	1 A	3 A	+6.2 ± 0.6 V	50 mV	2%
	2	+15 V	0 A	1.5 A		150 mV	6%
	3	-15 V	0 A	0.4 A		150 mV	5%
GLC40D	1	+5 V	1 A	3 A	+6.2 ± 0.6 V	50 mV	2%
	2	+24 V	0 A	1 A		240 mV	6%
	3	-12 V	0 A	0.4 A		120 mV	5%
GLC40-3.3	1	3.3 V	0 A	8 A	+4.2 ± 0.6 V	33 mV	2%
GLC40-5	1	5 V	0 A	8 A	+6.2 ± 0.6 V	50 mV	2%
GLC40-12	1	12 V	0 A	3.3 A	+14 ± 1.1 V	120 mV	2%
GLC40-15	1	15 V	0 A	2.7 A	+18.5 ± 1.5 V	150 mV	2%
GLC40-24	1	24 V	0 A	1.7 A	+28.5 ± 2.5 V	240 mV	2%
GLC40-28	1	28 V	0 A	1.4 A	+34 ± 2.8 V	280 mV	2%
GLC40-48	1	48 V	0 A	0.83 A	+55 ± 4.0 V	480 mV	2%

GLC40 MECHANICAL SPECIFICATIONS

J1 CONNECTOR: AMP P/N 640445-3
W/CENTER PIN REMOVED,
0.156 [3.96mm] CTR HEADER

J2 CONNECTOR: AMP P/N 640445-6,
0.156 [3.96mm] CTR HEADER

INPUT: J1 PIN 1) AC LINE
PIN 2) AC NEUTRAL
⏚ GND

OUTPUT:

J2	MULTI OUTPUT MODELS	SINGLE OUTPUT MODELS
PIN 1	OUTPUT #2	OUTPUT #1
PIN 2	OUTPUT #1	OUTPUT #1
PIN 3	OUTPUT #1	OUTPUT #1
PIN 4	COMMON	COMMON
PIN 5	COMMON	COMMON
PIN 6	OUTPUT #3	COMMON

MATING CONNECTORS AMP P/N

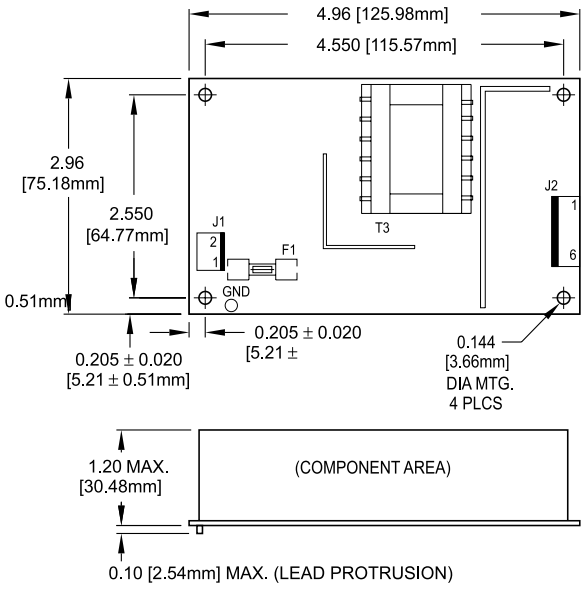
	HOUSING	CONTACT
INPUT	640250-3	770476-1
OUTPUT	640250-6	770476-1

NOTE: 5A MAXIMUM RECOMMENDED CURRENT PER CONNECTOR PIN

OPTIONAL ENCLOSURE (P/N 08-30466-1040)

WEIGHT: 1.0 LBS MAX. [0.45 kg MAX.]

TOLERANCES: X.XX=0.030 [0.76mm]
X.XXX=0.010 [0.25mm]



Environmental Specification	Operating	Non-operating
Temperature (A)	0 to 50°C	-40 to +85°C
Humidity (A)	0 to 95% RH	0 to 95% RH
Shock (B)	20 g_{pk}	40 g_{pk}
Altitude	-500 to 10,000 ft	-500 to 40,000 ft
Vibration (C)	1.5 g_{rms}, 0.003 g^2/Hz	5 g_{rms}, 0.026 g^2/Hz

A. Units should be allowed to warm up/operate under non-condensing conditions before application of power. Derate output current and total output power by 2.5% per °C above 50°C.
B. Random vibration—10 to 2000Hz, 6dB/octave roll-off from 350 to 2000Hz, 3 orthogonal axes. Tested for 10 min./axis operating and 1 hr./axis non-operating.
C. Shock testing—half-sinusoidal, 10 ± 3 ms duration, ± direction, 3 orthogonal axes, total 6 shocks.

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4” Vacuum Pressure System

III. Operator **- Procedure**

The key to an efficient maintenance free system is familiarizing all personnel with the basic procedure in using the system.

STEP 1. Open a carrier and place the item(s) you want to send in the carrier.

STEP 2. Close the carrier securely! Make sure each latch or cap is fastened properly. (side opening carrier hints: if sending items which will not fit with both foam inserts in the carrier, try taking just one side of the foam out first before pulling both halves out. This will keep items from excessive movement during transit.)

STEP 3. Check and see if the system is currently busy (red in/use). If so, wait till the system has cleared.

STEP 4. If system is clear, open door of station and insert carrier. [**important:** only one carrier at a time!]

STEP 5. Close the door and latch the handle properly.

STEP 6. Press the send button.

The system will do the rest.

From the above steps for the basic system procedure, the most important ones are step #2 and step #4 [close the carrier securely and only send 1 carrier]. This alone causes 95% of all service work needed on a pneumatic tube system

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4” Vacuum Pressure System

III. Operator **- Parts List** **Pg. 1**

System

Product Part Number	Part Description
ESS2453	ZPI Universal landing pad
ESS2459	ZPI Universal Door Handle (assm)
ESS2462	ZPI Universal Door Latch Ramp
ESS2461	ZPI Universal Door Handle Cam
ESS2457	ZPI Universal Door w/hinge
ESS2455	ZPI Universal Door Gasket
ESS2149	ZPI Universal Launcher (assm)
ESS2148	ZPI Universal Launcher spring
ESS2147	ZPI Universal Launcher arm
ESS2146	ZPI Universal Launcher shaft
ESS2452	ZPI Universal Internal Flap Valve
ESS2080	ZPI Send lighted pushbutton (round red)
ESS2086	ZPI Reset lighted pushbutton (round yellow)
ESS2087	ZPI Reset lighted pushbutton (round green)
ESS2082	ZPI Lamp (for lighted pushbutton - 24volt)
ESS0850	VP controller board
ESS0226	24/5 volt power supply
ESS0231	Solid State relay (10 amp for blower motor)
ESS9310	Blower motor
ESS2470	6" Up Receive Iris

4” Vacuum Pressure System

III. Operator - **Parts List** **Pg. 2**

Shifter

Product Part Number	Part Description
WF-UDR-17-6-B	Shifter Cylinder
HR-ESS0704	4” Fabrica Air Disc for Shifter
RP-ESS9071	Plastic Shifter Washer

Controls and Carriers

Product Part Number	Part Description
AE-744-9110	24/5 volt Power Supply
HR-04-WG-60	WormGear Hose Clamp - Size 60
GP-4015-NR	4" Redlatch side opening - Red

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4” Vacuum Pressure System

IV. Maintenance **- Instructions**

The Enterprise Vacuum Pressure pneumatic tube system consists of these components:

1. 2 - Enterprise VP universal terminals
2. 1 - Enterprise VP controller
3. 1 - Enterprise VP blower & screenbox
4. Carriers

Under normal operating conditions, a preventive maintenance check should be preformed once every four (4) months. This would include a quick physical check and a brief operational check for all the above components.

For component #1, Enterprise VP Universal Stations, physically check, repair or replace the following items; landing pad, door gasket, door handle and latch, screws on lighted pushbutton panel, pushbutton lights or lamps, internal flap valve and the bend relief valve above the station.

For component #2, Enterprise controller, check connections and lights on circuit board for proper operation.

For component #3, blower w/shifter, if the system is working properly just check the seals on the shifter cylinders for leakage. In all systems, in the line between the main diverter and the blower, there is a screenbox or cleanout which will accumulate dust, etc. Find the cleanout box and after taking the clear front off, remove the screen for cleaning and then reinstall.

For component #4 carriers, check for cracks, breakage, improper closing and loose or worn rubbing bands. Remove from service and replace or repair carriers in poor condition.

4” Vacuum Pressure System

IV. Maintenance **- Troubleshooting** **Pg. 1**

No power to system

1. Check power supply and circuit breaker to blower and controller.

Carrier blockage or didn't arrive

1. Count carriers and make sure there is a carrier stopped in the system.
2. Press the send button at both ends of system, alternating to see if blockage will clear.
3. Possibly use a empty carrier to try and dislodge the blockage.

Note: if carrier is freed, please check carrier for possible causes. Resend carrier if none were found to see if system is operational. If so, place in operation. If not, note the direction of carrier being sent and call zip pneumatics at (816) 358-3911 for assistance.

No Pressure or Vacuum

1. Check screenbox near VP blower for paperwork, etc. Remove cover and clean screen then replace.
2. Check power to blower.

4” Vacuum Pressure System

IV. Maintenance **- Troubleshooting** **Pg. 2**

If System has Shifter and Blower Seems Fine

1. Check the pneumatic shifter for normal operation using the override on the mac valves (p-e valve). Note: override is small round indentation on black body.

Pressure but no Vacuum

1. Check solid state relays to pressure motor(s).
2. If shifter; check valve and cylinder to vacuum.

Vacuum but no Pressure

1. Check solid state relays to vacuum motor(s).
2. If shifter; check valve and cylinder to pressure.

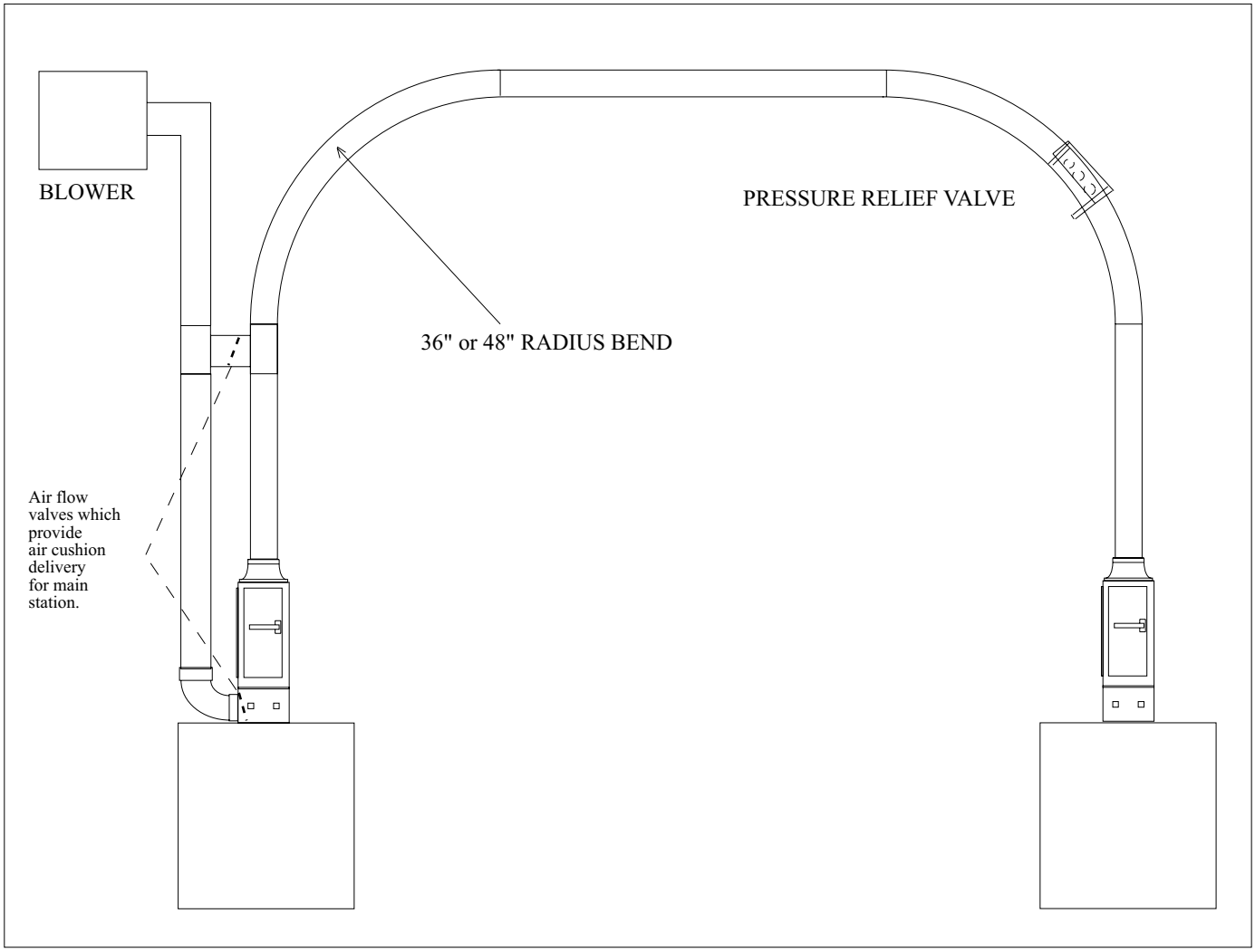
Low Suction or Pressure

There are several possible causes to condition.

1. Check screenbox or cleanout for paper or dust.
2. If multiple motor VP blower check each motor for proper operation.
3. Check voltage on regenerative style blower.
4. Check seals on pneumatic shifter.
5. Tube line may be blocked; contact factory for suggestions.

4” Vacuum Pressure System

IV. Maintenance **- Riser Diagram**



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