

## **AIR TOOLS MANUAL**

### **Safety Rules**

1. Wear proper personal protection equipment (safety glasses, hearing protection)
2. Do not bypass any safety devices
3. Keep hands clear of nail exit points and paths
4. Do not bump-trigger ANY nailer
5. Drain the compressor after after each use
6. If something is broken or breaks, notify one of the wood shop leads at ([woodshop@sparkmakerspace.org](mailto:woodshop@sparkmakerspace.org)).

### **Air Tool Summary**

1. Tool Location in Shop
2. Uses for Tools
3. Safety
4. Compressor Parts
5. Compressor Setup
6. Nailer/Stapler Parts
7. Nailer/Stapler Setup
8. Operation
9. Shutdown & Cleanup

## **Instructions for Use**

### **Uses for Tool:**

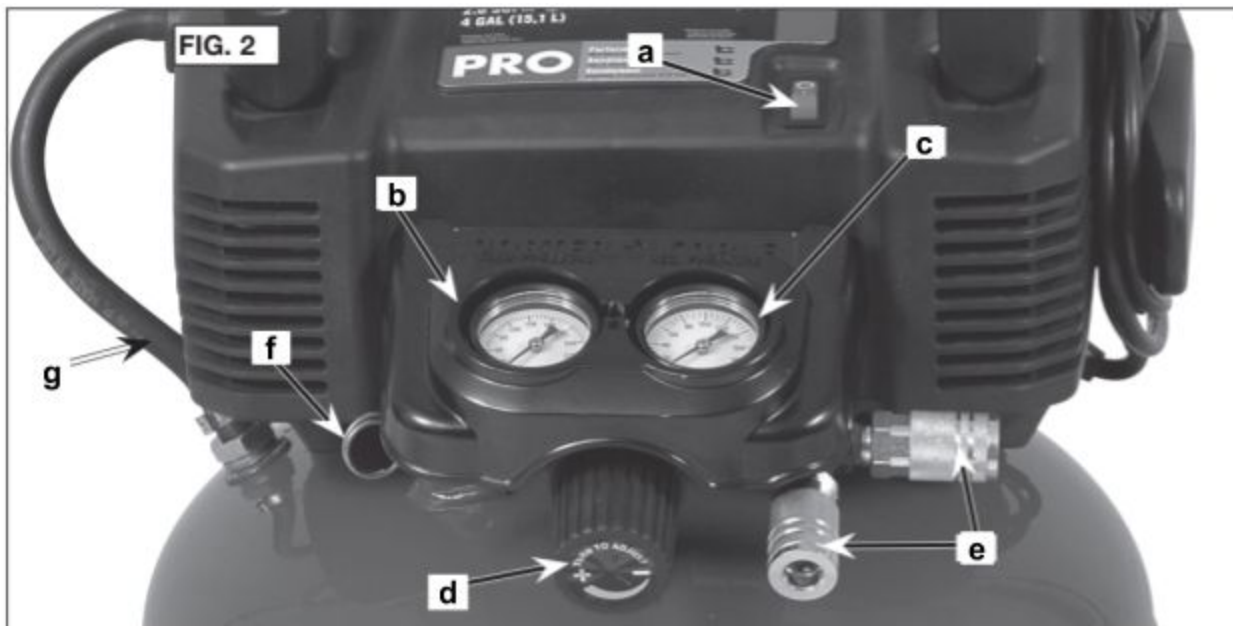
1. Compressor:
  - a. Feeds compressed air to air nailers, blowgun, tire chuck, etc
  - b. Should not be used for breathing air
2. Nailer:
  - a. Good for:
    - i. Wood and engineered lumber (plywood, particle board, MDF, etc)
    - ii. Attaching small or light parts to other larger parts
    - iii. Finish work; small heads easily covered
    - iv. Holding pieces together while glue dries
  - b. Bad for:
    - i. Large pieces
    - ii. Strength
    - iii. Metal, ceramics, plastics, composites, glass, or anything else but wood
3. Stapler:
  - a. Good for:
    - i. Wood and engineered lumber (plywood, particle board, MDF, etc)
    - ii. Small parts assembly - stronger than nailer
  - b. Bad for:
    - i. Surface finish - leaves larger hole in surface
    - ii. Metal, ceramics, plastics, composites, glass, or anything else but wood

### **Safety**

1. Wear personal protective equipment.
  - a. Safety glasses
  - b. Hearing protection is recommended.
  - c. Tie long hair back.
2. Compressed air can propel particles and debris. Care should be taken when connecting and disconnecting fittings.
3. Compressed air, if pressed directly against the skin, can force air bubbles into the bloodstream. The resulting air embolism can have significant adverse health effects.
  - a. Point outlets, nozzles, sprayers, and vents in a safe direction. Do not use compressed air to clean off clothes while being worn.
4. Nailer should be connected to air pressure before loading fasteners and disconnected when making adjustments.
5. Nailer should not be triggered except when in contact with workpiece.
  - a. "Bumping" the nailer by holding down the trigger and using the contact safety to actuate the nailer is unsafe.
  - b. Users found bump-triggering air nailers will have their tool use approval revoked.
6. Keep hands clear of fastener exit direction; fasteners may be overdriven, may not drive straight, and may exit the back side of the workpiece at unexpected angles.

## Compressor Parts

1. Compressor consists of low volume, high-pressure air pump on top of compressed air tank.
2. Air tank is rated to 150 PSIG.
3. Fig 2, taken from manual, shows the following parts:
  - a. Power switch - turns the compressor on or off. Even when powered off, the compressor may have air left in the tank, which must be bled at the end of use.
  - b. Tank pressure gauge - indicates pressure currently in the air tank. The compressor attempts to keep this pressure between 120 PSIG and 150 PSIG automatically. If this pressure is constantly falling while not using the tool, the drain is open, or there is a leak in the system.
  - c. Regulator outlet pressure gauge - indicates the outlet pressure being fed to the tool. This is adjusted by part (d), the regulator knob.
  - d. Regulator control knob - used to set the outlet pressure of the regulator, which is hidden under the plastic shroud. The regulator is turned clockwise to raise the outlet pressure, and counterclockwise to reduce the pressure. The regulator will maintain the outlet pressure feeding the tool.
  - e. Outlet connections - quick-connect fittings used to connect the air hose.
  - f. Safety relief valve - prevents overpressure of the tank in case of failure of the automatic control pressure switch. It may also be used to vent the compressor tank by pulling on the ring.
  - g. Compressor to tank connection tube - may get hot under heavy cycling of the compressor



4. Other important parts include:

- a. Power cord - found on the side of the compressor head.
- b. Tank drain - used to drain water from the tank. Found underneath the tank. It should be closed during operation and opened to drain as part of the shutdown procedure.
- c. Pressure switch - internal to the compressor head, this switch turns the air pump on and off depending on the tank pressure.
- d. Cooling fan - internal to the compressor head, this fan moves a significant amount of air through the head to cool the compressor. Vents on the head should be left clear at all times to allow sufficient airflow.

**Compressor Setup**

- 1. Check compressor switch is off.
- 2. Check regulator knob is unloaded and spinning easily.
- 3. Plug in compressor.
- 4. Turn on compressor.
  - a. Compressor will loudly start to fill the air tank.
  - b. The tank pressure gauge will start to move to indicate pressure in the tank.
- 5. Determine required outlet pressure.
  - a. A table of the most common applications is shown below.

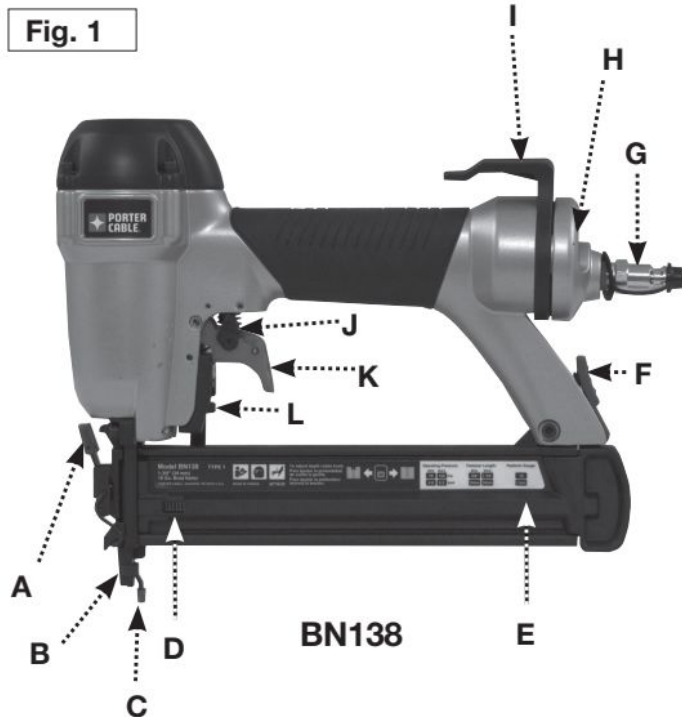
<i><b>Tool</b></i>	<i><b>Suggested Set (PSIG)</b></i>	<i><b>Pressure Range (PSIG)</b></i>
Finish/Brad Nailer (BN200SB, BN138)	80	70-100
Narrow Crown Stapler (IFN328K0AV)	65	60-100
Blowgun	25	0-30
Air Chuck	Desired tire pressure	-

- b. For fastening applications, start at the low end of the range and gradually increase pressure if the fastener is not being completely driven.
  - c. Do not exceed 30 PSIG with the blowgun, for safety.
- 6. Set outlet pressure.
  - a. Wait until the tank pressure has increased above the desired outlet pressure.
  - b. Gradually turn the regulator knob clockwise until the regulator outlet pressure gauge reads the desired outlet pressure.
    - i. The outlet pressure gauge reading will lag behind the regulator knob setting, particularly if the hose is attached. This lag can be minimized by turning the regulator knob very slowly as the gauge needle approaches the desired pressure.

- c. Leave regulator knob in position.
- d. If the desired outlet pressure is exceeded, turn regulator knob counterclockwise.
  - i. The outlet pressure will not reduce, as the current regulator is not self-venting. It will be necessary to vent the downstream pressure. This may be done by partially inserting a tool into one of the outlets quick connect (or hose, if attached) and briefly venting the trapped air. Care should be taken to prevent the escaping air from driving dust or particles towards the operator.
- 7. The air compressor is now ready for use. No further operator interaction is required during use unless parameters need to be changed.

**Air Nailer Parts**

- 1. Nailers and staplers will differ in details but generally, have similar layouts and parts. For simplicity, the term “nailer” will be used throughout these directions. Staplers operate in near identical fashion, other than loading the magazine.
- 2. Major parts are labeled below:
  - A. Jam clearing latch - allows partial disassembly of the nose of the nailer, to allow jammed fasteners to be removed. Air should be disconnected from the nailer before using this latch. May not be present on all nailers.
  - B. Contact safety - prevents the nailer from actuating unless the contact safety is depressed. This should be done by placing it firmly against the workpiece.
  - C. Rubber pad - prevents contact safety from damaging the workpiece. May not be present on all nailers.
  - D. Nail window - allows the user to check magazine status. If fasteners are not visible through this window, the magazine is empty or nearly empty. May not be present on all nailers.
  - E. Magazine - holds fasteners. Ensure the fasteners are appropriate for the tool before inserting them in the magazine, or the tool may be jammed or damaged.



- F. Magazine release - allows opening of the magazine to load fasteners. Position will vary between brands and models but is usually somewhere on the rear of the magazine.
- G. Air inlet - connects the nailer to the compressor air hose. Incoming air should be within the limits of the tool, generally found somewhere on each nailer.
- H. Air exhaust - air outlet of tool. Puffs of compressed air will exit this location during tool use. On larger nailers, the exhaust is often atop the nailer's head and will have an adjustable, directional vent guide. Vent should be turned away from the user for safety.
- I. Belt hook - may not be found on all nailers. Intended for job-site applications; not required for most uses at Spark.
- J. Trigger lock - prevents accidental actuation of the nailer. May not be found on all nailers.
- K. Trigger - triggers actuation of nailer. Fingers should be kept clear of trigger until nailer is positioned and ready for fastening.
- L. Depth adjustment wheel - acts as stop for fastener depth. Allows for fine tuning of the depth to which the fastener is driven. Location may vary with model and brand of tool; often found on front of nailer.

### **Air Nailer Setup**

1. Inspect tool for loose or damaged parts.
  - a. Report any tool issues to a Woodshop Lead
2. Open magazine, ensure no fasteners are loaded, and reclose magazine.
3. Holding tool with the air intake up, put one or two drops of air tool oil into the air fitting.
4. Set up compressor to desired pressure. Pressure ratings for each tool are found on the tool. The chart in the Compressor Setup section may also be used for guidance.
5. Connect the air hose
  - a. Male quick connect fittings should just need a single firm thrust to lock into the female fittings. However, it is often necessary, particularly on the larger fittings used at Spark, to pull back slightly on the female quick connect collar to ease insertion. As soon as air movement is heard, the collar should be released.
6. Open the magazine and load the appropriate fasteners.
  - a. Fasteners must be matched in style, width, and length to the nailer. For brads or finish nails, the width will be measured in a wire gauge. Higher numbers indicate thinner nails. For staples, the nailer will indicate the width across the top, or "crown," of the staple.
  - b. Fastener length should be determined by the application. The fasteners should not be long enough to exit the far side of the workpiece(s).
7. Close the magazine firmly until latched.
8. The nailer is now ready for operation. Keep fingers away from the trigger until the nailer is in position against the workpiece.
9. During use:

- a. If the depth of the fastener must be adjusted, disconnect the air line from the nailer before adjustment.
- b. All fasteners should be removed from the magazine before reconnecting, as accidental actuation of the nailer is possible upon connecting to the air supply.

## **Operation**

1. Safety:
  - a. Keep fingers clear of the trigger until the nailer is in contact with the workpiece and ready for use.
  - b. Nailer should only be triggered in contact with workpiece, and the trigger fully released after each fastener.
    - i. “Bumping” the nailer by holding down the trigger and using the contact safety to actuate the nailer is unsafe.
    - ii. Users found bump-triggering air nailers will have their tool use approval revoked.
  - c. User body parts should be kept clear of the working area, on both sides of the workpiece. Strong grain patterns or knots may direct the fastener in an unexpected direction.
  - d. Fasteners should not be driven at extreme angles, as the nail or staple may not penetrate the workpiece. This will propel the fastener in an unsafe direction.
2. Place nailer in position required for fastening
3. Pull and release trigger.
  - a. Nailer will actuate, driving nail into work piece.
4. Inspect nail position to confirm correct depth.
  - a. Two adjustments are possible to ensure the nail is being driven to the correct depth.
    - i. There is a depth stop on each tool, adjusted by the depth stop adjustment wheel. If the nail is not being driving to this depth, increase the outlet pressure on the compressor.
    - ii. If depth stop adjustments are needed, disconnect air supply before moving the depth adjustment wheel.
5. Proceed with further fastening, as required.

## **After Use**

1. Air Nailer:
  - a. Disconnect the air hose from the nailer.
  - b. Remove all fasteners from the magazine, and return them the correct box or case.
2. Compressor:
  - a. Turn the compressor off.
  - b. Disconnect the tool from the hose .
  - c. Unplug the compressor.

- i. Compressor cord should be wrapped onto the appropriate location on the side of the compressor head.
  - d. Turn the regulator knob counterclockwise until it is unloaded. At this point, it will spin with very little effort. It is not necessary nor desirable to spin it all the way out.
  - e. Pull the relief valve ring until the tank pressure gauge reads approximately 20 PSIG.
  - f. With the compressor in the upright position, open the tank drain valve on the underside of the tank. Allow the tank to vent water and pressure until the tank gauge reads zero.
    - i. NOTE: extended use of the compressor may result in significant water collection in the tank, particularly in humid weather. This water should be dealt with appropriately; it should not be left as a puddle on the shop floor.
  - g. Close the tank drain valve.
3. Coil air hose neatly
4. Clean surrounding area

#### **Baseline Configuration Identification**

1. Compressor drained and unpressurized
2. Regulator set to zero
3. Compressor power cord unplugged and wrapped
4. Compressor hose wrapped on cart
5. Tool magazine empty
6. Tools disconnected and on cart



## Air Tool Competencies

### **Trained User Competencies**

#### Setup

- Oil Tool
- Set Compressor Outlet Pressure
- Load Air Tool

#### Operation

- Safely
- Clearing Jam

#### Changes and Adjustments

- Depth Stop Adjustment
- Connect/Disconnect Tool

#### Maintenance and Care

- Clean Space
- Coil Hose
- Drain Compressor