



Operating Manual

**Coldstream Air Gun,
Adjustable Coldstream Air Gun and
Small Coldstream Air Gun**

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1. Introduction



The Meech Air Technology Stainless Steel ColdStream Air Gun provides a cold airflow commonly used for spot cooling.

At the heart of the ColdStream Gun is the Vortex Tube which is encased in a hot and cold end silencer. Cold air produced by the Vortex is directed to specific area through knuckle trucking. Hot air is then vented through two holes located in the silencer.

The cold air temperature can be as low as 50°C below the inlet air temperature and be maintained to +/- 0.6°C.

Coldstream Guns have no moving parts and so are intrinsically safe. They require virtually no maintenance which makes them ideal for harsh environments.

They are available in either adjustable or non-adjustable versions.

This operating manual covers products:

- A60015A – Adjustable Large Coldstream Gun, one outlet hose
- A60015AY – Adjustable Large Coldstream Gun, two outlet hose
- A60015 – Large Coldstream Gun, one outlet hose
- A60015Y – Large ColdStream Gun, two outlet hose
- A60008 – Small Coldstream Air Gun, one outlet hose

2. Safety and Inspection

All Meech products are packed carefully at our factory. Nevertheless, we recommend careful examination of the carton and contents for any damage.

To protect yourself and others when using compressed air, you should be aware of the following general safety guidelines:

- Warning – When compressed air is misused, it can cause serious injury or even death.
- Never point an air hose at anyone in fun or to remove dirt from clothing or the body.
- Never use compressed air without adequate eye and ear protection. Use safety glasses with side shields or goggles and ear protectors.
- Before attempting to disconnect a hose from an airline, the air should be cut off, and the remaining air bled from the line.
- Keep air hoses off the floor where they become tripping hazards and are subject to damage by vehicles, doors, and dropped tools. If possible, suspend air hoses from overhead. Please be aware of the following safety guidelines:

Please be aware of the following Safety guidelines specific to the Coldstream Gun:

- Do not operate the Coldstream Gun at compressed air pressures above 11 Bar (160 psi)
 - All Coldstream Guns create both hot and cold air so parts of the unit will become hot.
 - Compressed Air Temperature must not exceed 55°C.
 - Ambient operating temperature can not drop lower than -10°C.
 - Ambient operating temperatures must not exceed 66°C.
- 6 ■ Compressed air temperature must not exceed 55°C.

3. Maintenance

The Meech Coldstream Gun has no moving parts, making them virtually maintenance free. Clean and dry compressed air moving through the Coldstream Gun will not cause wear on any of the components.

Occasionally dirt, water or oil may enter the Coldstream Gun from the compressed air supply, which could hinder performance. If this happens simply take the unit apart, clean the parts with soapy water, allow drying time and then reassemble.

When reassembling ensure you tighten all the components. If the parts are not tightened performance may be affected.

4. Compressed Air Supply

It is recommended to use a 5-micron (or smaller) filter to remove water and dirt from the compressed air supply.

A 5 micron filter will remove 99% of foreign material from the air supply; the use of an oil filter with an effective filtration of 0.01 ppm will remove the oil droplets for an even cleaner compressed air supply.

Failure to use a filter may cause clogging and/or freezing of the compressed air line and the components within the Coldstream Air Gun.

When the temperature of the compressed air within the Coldstream Gun reaches 0°C the water vapour in the air will start to freeze. This could potentially cause a problem with ice clogging the orifices of the Coldstream gun.

In this instance an air dryer must be used to lower the dew point and keep water vapour out of the air line. A dryer rated at 19°C will produce a dew point low enough to eliminate the water vapour freezing.

5. Compressed Air Lines Sizes

Figuring the correct pipe size for your compressed air system is an important task. Pipe that is sized too small can create big pressure losses and reduce operating efficiency.

Many people who plan the piping never consider the fittings or the future.

FITTINGS: Every pipe fitting creates a certain amount of increased frictional air loss that is equal to a specified length of pipe. Any turns in the pipe at fittings, ells, tees, and valves increase pressure drops even more.

FUTURE: Are you planning to add more equipment in the next year or two? Then plan for larger piping now. Since the material costs in piping are low compared to installation or replacement cost, it's wise to select pipe of an adequate size. If there is any doubt that a pipe size may create a pressure drop, use the next largest size. Remember that an oversize pipe compensates for possible scale build-up and provides for future expansion of the overall air system.

Steps to calculating overall piping size for your compressed air system:

1. Determine your air compressor's maximum CFM.
2. Draw a piping schematic and show all pipe fittings, valves, etc.
3. Measure and write the corresponding lengths of pipe on your schematic, then total the length of all straight pipes needed and note that on your schematic.
4. Using TABLE 1 (over page), find your compressor's CFM number on the far left column, and then go to the right until you see the column header with nearest length in feet to your total pipe length. Find where the CFM & PIPE LENGTH intersect on the chart and it will show the recommended pipe size for that length.

5. Take that pipe size to TABLE 2 and use the table to find all the EQUIVELENT LENGTHS OF PIPE needed for each PIPE FITTING. Write these lengths on your piping schematic at each fitting.
6. TOTAL all the EQUIVELENT LENGTHS OF PIPE needed for each PIPE FITTING and add to your total of straight length of pipe. This will give you a new and more accurate total pipe length needed.
7. Take your new total of EQUIVELENT LENGTH OF PIPE IN FEET back to TABLE 1 and use this number to determine the PIPE SIZE you need.

Specific Coldstream Gun Pipe Size

To obtain maximum performance from the Coldstream Gun, accurate measures of air pressure and air volume must be obtained. Line pressure of 70-90 psi (5-6 Bar) can be present without a sufficient volume (cfm) of air.

To ensure that both pressure and volume are present to efficiently operate the Coldstream Gun a line size of 3/8" pipe or 1/2" hose should be used for applications 10ft from the main header. Use 1/2" pipe or 3/4" hose up to 20ft. For pipe size over 20ft from the header please refer to the table over the page.

How to determine what size of PIPE you need for compressed air lines:

Your Air Compressor's CFM	TABLE 1: EQUIVALENT LENGTH OF PIPE LINES IN FEET <i>Don't forget to include *PIPE FITTINGS in your final calculations</i>								
	25 feet	50 feet	75 feet	100 feet	150 feet	200 feet	250 feet	300 feet	
1	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
3	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
5	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
10	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4	3/4
15	1/2	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
20	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
25	3/4	3/4	3/4	3/4	3/4	1	1	1	1
30	3/4	3/4	3/4	3/4	1	1	1	1	1
35	3/4	3/4	1	1	1	1	1	1	1
40	3/4	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/4
70	1	1	1	1	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/4
80	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2
100	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2
125	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2
150	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/4	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2
175	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2	2	2	2	2	2
200	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2	2	2	2	2	2
225	1 - 1/2	1 - 1/2	1 - 1/2	1 - 1/2	2	2	2	2	2
250	2	2	2	2	2	2	2	2	2
275	2	2	2	2	2	2	2 - 1/2	2 - 1/2	2 - 1/2
300	2	2	2	2	2	2	2 - 1/2	2 - 1/2	2 - 1/2
350	2	2	2	2	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2
400	2	2	2	2	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2
450	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	3	3	3
500	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	3	3	3
550	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	3	3	3	3	3
600	2 - 1/2	2 - 1/2	2 - 1/2	2 - 1/2	3	3	3	3	3
750	2 - 1/2	2 - 1/2	2 - 1/2	3	3	3	3	4	4
1000	3	3	3	3	3	3	4	4	4

TABLE 2: * EQUIVALENT LENGTH OF PIPE (FT.) for PIPE FITTINGS <i>Add these numbers for each pipe fitting to total length of straight pipe</i>						
Pipe Size	Long Rad, Ell or run of tee	STD. Ell or Run of reduced tee	Tee Thru side outlet	Globe Valve	Gate Valve	
1/2	0.62	1.55	3.1	17.3	0.36	
3/4	0.82	2.06	4.12	22.9	0.48	
1	1.05	2.62	5.24	29.1	0.61	
1 - 1/4	1.38	3.45	6.9	38.3	0.81	
1 - 1/2	1.61	4.02	8.04	44.7	0.94	
2	2.07	5.17	10.3	57.4	1.21	
2 - 1/2	2.47	6.16	12.3	68.5	1.44	
3	3.07	6.16	15.3	85.2	1.79	
4	4.03	7.67	20.2	112	2.35	

6. Installation

All Meech Coldstream Guns are fitted with a strong magnet allowing it to be fitted to any surface that will hold the magnet.

The magnet can be removed by unscrewing the hot end silencer and removing the nut holding the magnet in place.

Air Fitting

The large Coldstream Gun has a 1/4" BSP female air fitting.

The small Coldstream Gun has a 1/8" BSP female air fitting.

Standard Pneumatic push-fit compressed air fittings can be used on the Coldstream Gun.

7. Operation

Coldstream Gun

All Coldstream Guns are set to deliver the most efficient cooling possible. Coldstream Guns are factory set to 70% cold fraction at 80psi (5.4 Bar). As standard they are fitted with a Red 15 cfm Generator, so approximately 10cfm of cold air will exit through the cold end of the Coldstream Gun.

Cold Fraction

The Cold fraction is the percentage of input compressed air that is released through the cold end of the Coldstream Gun. The Cold Fraction is adjusted in two ways, by adjusting the control relief valve to exhaust more or less air (Adjustable version only) or by changing the generator inside the Coldstream Gun.

There are two levels of Generator, either a “high” or “low” cold fraction model. A “high” cold fraction Generator is where more than 50% of the air flow exits through the cold end of the Coldstream Gun. This setting will suit most industrial applications as it provides the most efficient cooling, although not the coldest possible temperature.

A “low” cold fraction Generator is where less than 50% of the air flow exits through the cold end of the Coldstream Gun. This setting will provide the lowest air temperatures but will not be as efficient.

Generators

The Coldstream Gun is supplied with a set of 4 high fraction Generators as standard.

- Yellow 10cfm (283 l/min)
- Red 15cfm (425 l/min)
- Blue 25cfm (708 l/min)
- Brown 35cfm (991 l/min)

There are also 4 Cold Fraction generators available,

The Generators within the Coldstream Gun control the air consumption and air flow, they also influence the achievable temperatures.

To change the Generator, simply unscrew the cold end silencer (the end the knuckle trunking is fitted to).



You will then need to remove the cold cap from the Vortex Tube. You can simply unscrew this from the ColdStream Gun. Inside you will find an O-ring and Generator.



Finally remove the generator and replace with new generator, please also remember to fit the original O-ring.

Reassemble the parts remembering to tighten everything well, failure to tighten could lead to a drop in performance.

Adjustable and Non Adjustable ColdStream Guns

The Coldstream Gun is available in either an adjustable or non-adjustable version.

The non-adjustable version is factory set at 80psi (5.4 Bar) to 70% cold fraction. The only way to adjust this is by changing generators.



The Adjustable version of the Coldstream features a control knob that allows fine-tuning of the volume of hot air exiting the Coldstream Gun. This in turn affects the volume of cold air and the temperature of that air.

Like the non-adjustable version the adjustable Coldstream Gun is factory set at 80psi (5.4 Bar) to 70% cold fraction. To reset to the factory setting turn the control knob clockwise until closed. Once it is completely closed you can set to 70 Cold Fraction by turning the knob 2.5 turns anti-clockwise



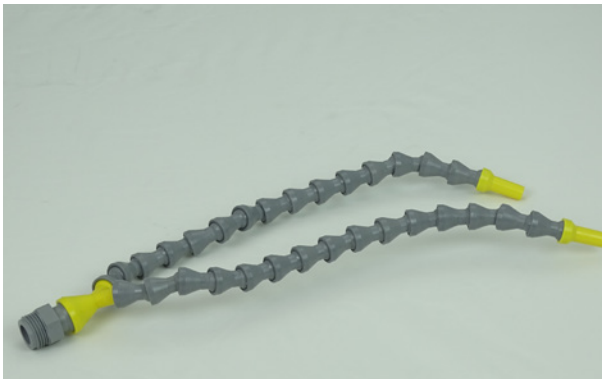
Flexible Knuckle Trunking

All Coldstream Guns feature either single or double outlet hoses.

The single outlet hose is made of 12 x ½” flexible knuckles. The overall length of the hose is approximately 310mm.



The double outlet hose is comprised of 2 hoses connected by a Y junction. Each hose is made up of 15 x ¼” flexible knuckles. The overall length of the hose is approximately 320mm.



Both the single and double hoses come with a standard round ¼” or 1/2” nozzle.

There is also a range of spare parts these include a range of flat nozzle in various sizes and additional knuckle trunking to increase the length of the flexible trunking. For more information please contact the Meech office.

8. Troubleshooting

Air Flow

Problems with compressed air flow can be caused by:

1. Air pressure too low – increase air pressure at the relevant regulator.
2. Undersized compressed air lines – replace pipes with correct sizes, see section 5.
3. Blocked compressed air line – remove blockage.
4. Insufficient compressor size – Check compressor size for fitting.

Coldstream Air Gun

Problems with the air temperature can be caused by:

1. Incorrect generator fitted – Check and replace generator (see section 7)
2. Ambient Compressed air temperature too high – Check compressed air temperature and use cooler if necessary.
3. Loose/missing parts – Check all Cabinet Cooler parts are screwed in tightly and there are no missing parts.
4. Water vapour in the compressed air supply – Check compressed air supply.
5. Air pressure too low – increase air pressure at the relevant regulator



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