

OPERATION AND MAINTENANCE

12M Wire Flame Spray Gun

Complete operation and maintenance information for the 12M wire flame spray gun.



MANUAL

Product document

VERIFIED

Source retained

LIVE LINKS

Website and support

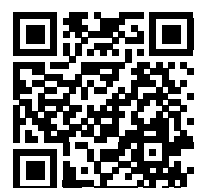
WORLDWIDE

Direct supply

View current information online

Scan for live product details, availability and direct support.

[OPEN PRODUCT ON BUSPRAY.COM](https://www.buspray.com)





12M
FLAME SPRAY GUN

MANUAL
FOR OPERATION & MAINTENANCE
BALAJI UDYOG

**Plot No. 75, Hastinapur Nagar, Sangariya, Jodhpur,
Rajasthan - 342013, India**



TYPE 12M

FLAME SPRAY GUN

INSTRUCTION MANUAL

NOTICE

The operator of this BU Equipment must read and understand this instruction manual. He must be given personal instruction to assure that he understands its operation and



safety requirement before he operates the equipment. All other personnel responsible for its proper and safe use should understand its operation.

Competent instruction is essential.

BU TYPE 12M FLAME SPRAY GUN INSTRUCTIONS CONTENTS

SAFETY MEASURES

Use of Equipment
Reduction of Fire and Explosion Hazards
Gases
Equipment Maintenance
Backfire
Metal Dusts
Gas Cylinder Precautions
Reduction of Respiratory Hazards
Threshold Limits for Air Concentration of Hazardous Materials
Personal Protection
Reduction of Noise Hazard

1. DESCRIPTION

The Gun

Principle of Operation

Features

Size and Weight

AUXILIARY EQUIPMENT

2. Required Facilities Compressed Air Equipment

Air Compressor Air
Compressor After-cooler
Type 3AC Air Cleaner Unit
Type 4A Air Control Unit
Type 2AF Air Flowmeter

Fuel gas and Oxygen Equipment

Type 3G Gas Control Unit
Type 2GF Gas Flowmeter

Gas and Air Hoses

Type 6H Hose Unit
Type 2H-Br Hose Unit
Type 7H Hose Unit
Type HA Air Hose

Metallizing Wire Handling Equipment

Type 2W Wire Control Unit
Type W Wire Control Unit
Type WP Wire Control Unit

Special Fan Spray Equipment

Type 3XTM Extension
Type X Rotary Shaft Preparing Tool
Dust and Fume Collection Equipment

3. INSTALLATION

Hoses
Wire Control Unit
Exhaust System
Check

4. OPERATION

Operating Controls

Gas Head Valve
Speed Control Ring
Wire Grip Handle

Initial Adjustments

- Lighting
- Spraying
- Start-Stop Operation
- Different Wire Size
 - Shutting Down
 - Special Gears
- Different Gases Fan Spray Equipment Tool Post Fixture

5. AVOIDING TROUBLE

- Spraying
- General Gun Care
- Checking Oxygen And Fuel Gas Circuits
- Hoses
- Difficult Lighting
- Backfire
- Siphon Plug
- Nozzles
- Special Instructions For Cleaning Annular Nozzles
- Gas Head Valve
- Sticking Wire
- Drive Rolls
- Threads
- Lighting Flows
- Overheating
- Routine Maintenance Schedule

6. CONSTRUCTION AND ASSEMBLY

- Gas Head
 - Gas Head Valve
 - Valve Core Positioning
 - Siphon Plug
 - Wire Drive Unit
 - Drive Roll Mechanism
 - Push Rod Length Adjustment
 - Lower Drive Roll And Gear
 - Rear Wire Guide And Snubber
 - Strain Relief
 - Turbine and Speed Control
 - Gear Cover and Transmission Gears
 - Drive Shaft Assembly

Countershaft Assembly
Central Housing and Gun Handle
Gear Case Lubrication
Turbine Bearing Lubrication

7. REPLACEMENT PARTS

Replacement Parts
Gas Head Assembly
Drive Roll Carrier and Related Parts
Siphon Plug and Related Parts
Wire Grip Mechanism
Wire Drive Unit
Turbine and Speed Control Assembly
Snubber Assembly
Strain Relief Assembly
Countershaft Assembly
Gear Cover
Central Housing, Handle and Drive shaft
Tool Post Fixture
Tools and Lubricants
Recommended Spare Parts

8. METALLIZING WIRES

BU Metallizing Tables
Descriptions and Recommended Uses

9. SPRAYING TABLES AND GENERAL COST DATE

How to Use the Tables
How to Compute Sprayed Area
Area Formulae
Calculating Costs
 Example (U.S. System)
 Example (Metric System)
Spraying Tables



SECTION 2- BU TYPE 3XTM FLAME SPRAY EXTENSION

Description
Mounting the Extension
Operation
Maintenance
Hardware Selection Chart
Special Non-Loading Nozzles and Air Caps
Replacement Parts
Spraying Tables

FIGURES

Figure No.	Title
6.1	Nozzle Air Cap Cross Section
6.2	Gas Head and Valve
6.3	Removing Siphon Plug
6.4	Turbine Shaft Oil Seal

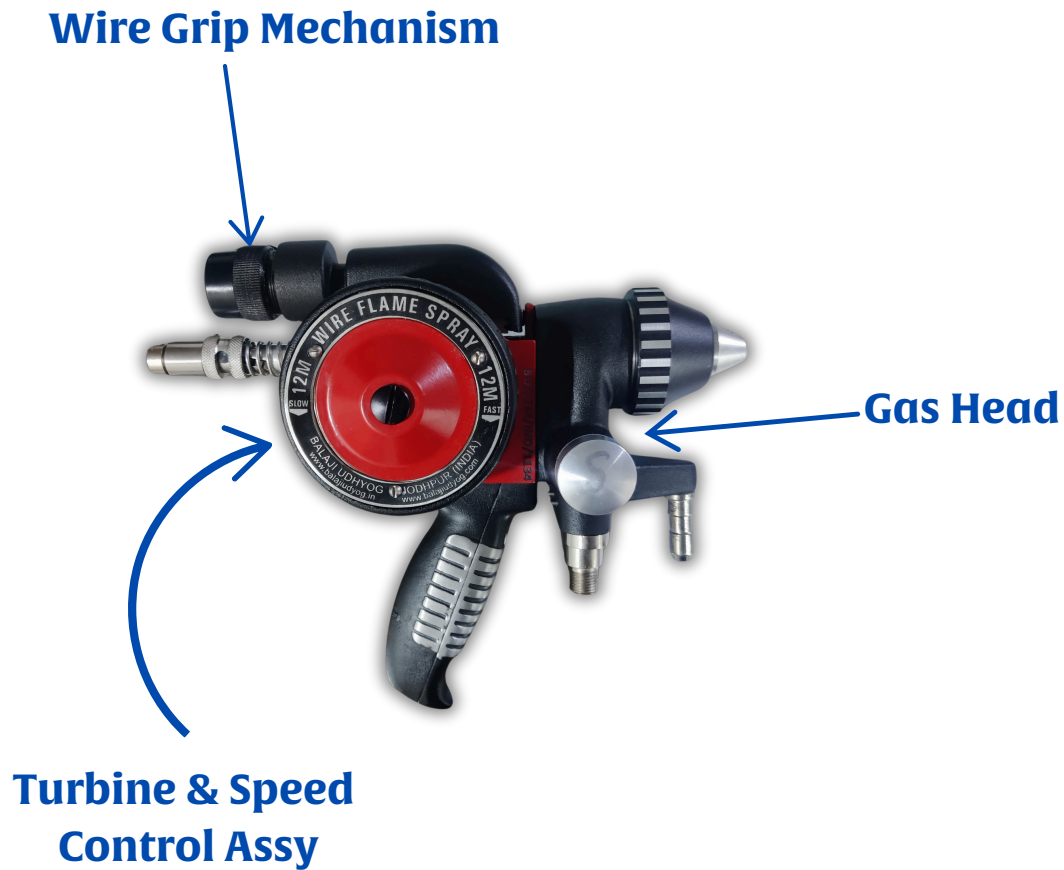
TABLES

Table No.	Description
9.1	Gas Head Hardware Selection Chart
9.2	Wire Guide And Drive Roll Selection Chart
9.3	Standard/ Non-Loading Air Cap Equivalency Chart
9.4	Spraying Table – Acetylene – U.S. System Jetted Hardware
9.5	Spraying Table – Acetylene – Metric System Jetted Hardware
9.6	Spraying Table – Propane - U.S. System Jetted Hardware
9.7	Spraying Table – Propane – Metric System Jetted Hardware
9.8	Spraying Table – MPS – U.S. System Jetted Hardware
9.9	Spraying Table – MPS – Metric System Jetted Hardware
9.10	Spraying Table – Acetylene – U.S. System Annular Hardware
9.11	Spraying Table – Acetylene – Metric System Annular Hardware
9.12	Spraying Table – Propane – U.S. System Annular Hardware
9.13	Spraying Table – Propane – Metric System Annular Hardware

TABLES

DESCRIPTION

3XTM-1	Spraying Table Type 3XTM Extension with Type --- Gun – Acetylene – U.S. System
3XTM-2	Spraying Table Type 3XTM Extension with Type ---- Gun – Acetylene – Metric System
3XTM-3	Spraying Table Type 3XTM Extension with Type --- Gun – Propane – U.S. System
3XTM-4	Spraying Table Type 3XTM Extension with Type --- Gun – Propane – Metric System



1 DESCRIPTION

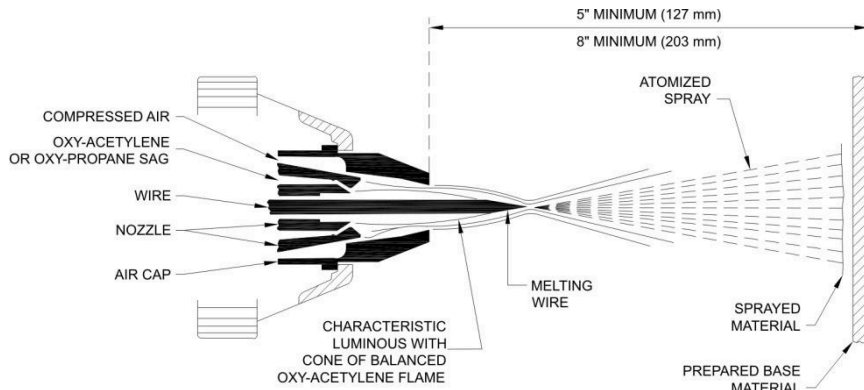
THE GUN:

The BU Type 12M Flame Spray Gun is the world's best hand gun for producing combustion flame sprayed coatings with metallizing wires.

It has a universal, forged-aluminum gas head which can be adapted to use any fuel gas. The standard gun is set up to spray 1/8" wire using

acetylene as the fuel gas suitable hardware is available for handling all standard wire sizes ranging from 3/16" down to 20 gauges.

The controlled speed range of the Type 12M Gun is from about 1-1/2 feet (457mm) of wire per minute with standard gears to approximately 45 feet (13,716 mm) per minute with the special, easily installed, high speed gear set. The high-speed gear set is for continuous high speed spraying of the lower melting point metals such as Babbitt, tin and zinc. Although the Type 12M Gun has been designed primarily for hand-held operation, a simple, rugged tool post fixture is supplied with each unit to permit mounting on BU handling equipment or a machine tool such as a lathe.



**FIG. 1.1 – BU TYPE 12M FLAME SPRAY GUN
NOZZLE AND AIR CAP CROSS SECTION**

PRINCIPLE OF OPERATION :

The wire is pulled into the rear of the gun by an automatic feed mechanism powered by a self-contained compressed air driven turbine. The wire is fed through the gun into a fuel gas/oxygen flame. A stream of compressed air restricts the flame and blasts the molten tip of the wire, producing a fine metal spray.

FEATURES:

Many outstanding design features are included in the Type 12M Flame Spray Gun. Some of them are described below:

- An improvement in the BU siphons jet gas head produces high spray rates, low gas consumption and extreme resistance to backfire and its effects.
- Nozzle-to-siphon plug seals are O-rings, instead of being lapped surfaces, which are troublesome to maintain.
- A new grease seal on the high-speed turbine shaft minimizes leakage of lubricant.
- A sight plug permits checking the level of lubricant in the gear case without need to open it, eliminating a source of contamination.
- The gas head valve provides long service life with limited maintenance. Worn or damaged valve parts can be replaced in the field without lapping or other precise fittings.
- Now-design nozzles and air caps provide excellent coatings at very high spraying speeds and without loading.
- The nozzle, siphon plug and front wire guide assemble as a unit which can be quickly and easily removed and replaced, when changing wire size or servicing.
- The BU controlled power governor provides increased power and stability of wire speed.
- A pump within the gear chamber circulates the gear lubricant. This coupled with large, rugged gears and improved gear chamber sealing, provides longer gear life.
- The drive rolls and wire guides are made of hardened stainless steel for high resistance to wear and corrosion.
- The gun-mounting stud is centrally located, making it very easy to adjust the gun position when it is lathe-mounted.
- For convenience when changing wires, or to stop the wire feed momentarily while spraying, the gun has a quick-action wire grip release level. A simple, effective wire snubber is provided at the back of the gun to keep the wire from slipping out of the gun when operating on a start-stop basis.
- The gun includes a wire grip adjustment for varying the bite of the drive rolls on the wire. This is an independent adjustment which is not affected by any other control.



SIZE AND WEIGHT :

The BU Type 12M Flame Spray Gun is approximately 9" (229 mm) long 9" (229 mm) high and 5 1/4" (133 mm) wide. approximately 5 lb (2.27 kg).

The gun is the heart of the complete flame spray installation. In the BU Type 12M you have the world's best. It is built for continuous hard service and will perform efficiently and economically when operated and maintained according to the instructions in this manual.

2 AUXILIARY EQUIPMENT

REQUIRED FACILITIES:

A complete flame spray installation requires equipment to supply and control compressed air, fuel gas, oxygen and metallizing wire.

COMPRESSED AIR EQUIPMENT

Air Compressor : The Type 12M Flame Spray Gun requires approximately 30 cubic feet (0.85 m³) of free air per minute at 65 psi (4.5 bar). The size of the air compressor will be determined by the number of flame spray guns to be operated, and whether or not the compressor is also to supply air for grit blasting or other uses.

When calculating air requirements, a pressure drop of about 10 psi (0.7 bar) is required by the air regulator in order to get good regulation. In addition, allowance should be made for pressure losses in piping, connections and valves. Therefore, the line pressure at the regulator should be at least 75 psi (5.2 bar) with the gun spraying. The compressor unloader should be set so that the difference between the “cut-out” and “cut in” pressures is not more than 10 to 15 psi (0.7-1.04 bar). An unloading range which is too wide, or line pressure which is too low, will cause fluctuating air pressure at the gun.

Air Compressor After-Cooler: Compressed air usually contains enough oil and moisture to weaken the bonding and strength of the sprayed coatings. To prevent this, an air compressors after-cooler must be used.

The after-cooler available from BU condenses water vapor and incorporates an expeller to remove the water, and an automatic drain trap. This unit will also remove most of the oil and dirt from the air supply under the most adverse conditions.

However, further cleaning of the air may be necessary to obtain top quality flame spray results. For this the BU Type 3AC Air Cleaner Unit is available.

Type 3AC Air Cleaner Unit : The BU Type 3AC Air Cleaner Unit provides clean air for flame spraying in installations where the compressed air cannot be adequately cleaned by the compressor after-cooler. This cleaner is installed in the air line between the after-cooler and the BU Type 4A Air Control Unit.

The Type 3AC is an efficient 4-stage air cleaner which removes all traces of moisture and oil, oil vapor and dirt. The cleaner, consisting of sump, ceramic elements, carbon bed and filter assures the cleanest, driest compressed air commercially practicable. It has sufficient capacity for as many as six flame spray guns.

The Type 3AC conforms to the requirements of the ASME code for unfired pressure vessels which operate in its pressure range.

Type 4A Air Control Unit: The BU Type 4A Air Control Unit filters the compressed air and controls its pressure to the gun. It has been designed especially for flame spraying.



Type 4A Air Control Unit

The Type 4A consists of a rugged, reliable pressure regulator, and two filters. The regulator provides a means for adjusting the pressure and flow of air to the gun. It will hold the required pressure constant, regardless of fluctuations in line pressure. One filter is placed ahead of the regulator to remove water, oil and pipe scale. The second filter is placed downstream to trap additional oil and water which condense out as a result of pressure drop through the regulator. The filters use fine mesh Monel screens which are easy to inspect and clean. A line pressure tap with a valve is provided to which a BU Type **AJ** Siphon Air

Blast Unit or other compressed air equipment may be connected. A large, quarter-turn stopcock at the output of the air control provides for quick and easy cut-off of air to the air flowmeter, hose and gun. No change in adjustment is required when the stopcock is turned on again.

Type Air Flowmeter: The Type Air Flowmeter shows the flow of atomizing air to help maintain exact spraying conditions. The meter also provides immediate indication of any restriction in the airline.

3 INSTALLATION

Mount the Type 12M Metal Spraying Gun in position for use.

HOSES:- The standard hoses are 15'(4.6m) long. The Type 2GFM Gas Flowmeter, the Type 2AFM Air Flowmeter, and the gas and air control units must be mounted within reach of gun hoses. It will be convenient and practical to mount the flowmeters and the air control unit in a group on one wall. Position the fuel gas and oxygen cylinders, with regulators in place, close by, Gas cylinders should always be strapped or chained to the wall to prevent their being knocked over. Always blow out the gas cylinder valves before attaching the regulators. Always back out the pressure regulating screw before opening cylinder valves. Open the cylinder valves slowly. Do not let regulators stand under pressure when not in use. Failure to observe these precautions may result in damage to the regulators.

WIRE CONTROL UNIT:- Place the wire control unit so that the wire will feed as straight as possible into the rear wire guide of the flame spray gun. When the flame spray gun is stationary, place the wire control up close, with its position adjusted to feed the wire in a straight line into the rear wire guide. When the flame spray gun is mounted so that it moves, as on the carriage of a lathe, the wire control should be placed as far away from the gun as is practicable in order to reduce the bend in the wire as it passes into the rear wire guide.

For some permanently-installed production unit the wire may be carried to the flame spray gun, through sleeves or over large diameter pulleys to make a better arrangement of the working space. The plans for every such installation should, however, be checked by a BU Field Engineer before the equipment is installed. Take advantage of his experience and avoid operating troubles later on.

EXHAUST SYSTEM:- Metal dust, flame and the fuel combustion products call for an effective exhaust and dust collection system. In production installations, if the spraying station is enclosed, make sure that there is enough opening for inlet air so that the exhaust system is not starved. Under some conditions, metal dusts can be quite hazardous. For this reason, the exhaust system should be laid out by an experienced engineer. For most installations, a dust collector especially designed for metallizing dust should be installed. Dust collectors designed primarily for other kinds of dust may be found to be very ineffective and in some cases, dangerous, if used for metal dust.

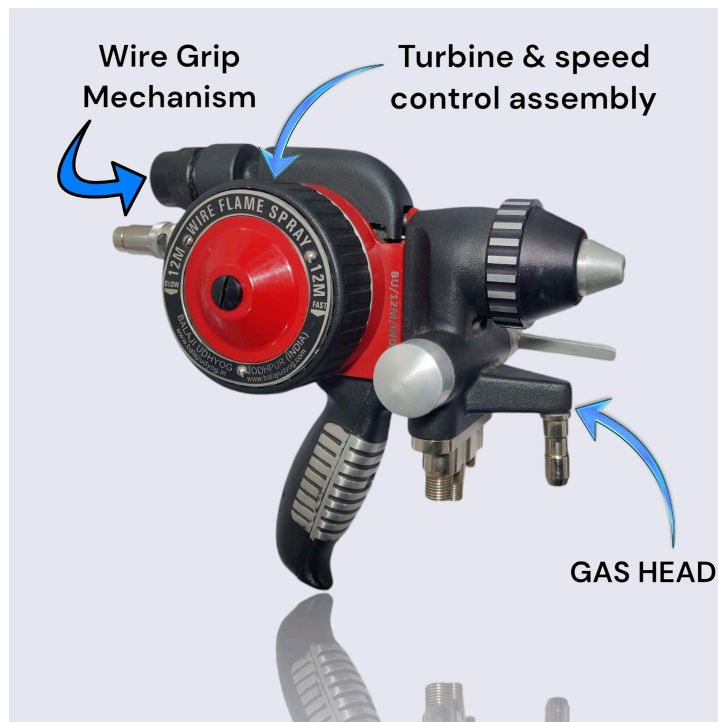
CHECK:- Good shop practice and sound engineering require that the installation be checked before it is put into operation. Check the power line voltage connections, the fuel gas, oxygen and air connections, and the installation of the exhaust system before turning on valve or throwing a switch for the first time.

4 OPERATION

OPERATING CONTROLS

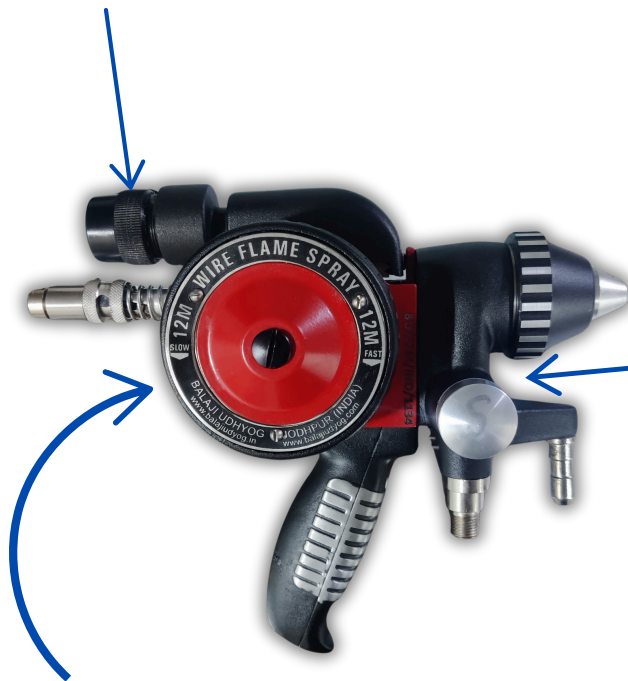
There are three operating control on the gun

1. The **GAS HEAD VALVE** controls the flow of gases and air to both the gas head and turbine.
2. The **SPEED CONTROL RING** adjusts the rate of wire feed.



The **WIRE GRIP HANDLE** causes the drive rolls to grip or release the wire.

Wire Grip Mechanism



Gas Head

**Turbine & Speed
Control Assy**

TYPE 12M FLAME SPRAY GUN

In addition to the above controls, the gun has a WIRE GRIP ADJUSTMENT CAP, which adjusts the bite of the drive rolls on the wire. Turning the cap clockwise increases the bite. Do not adjust for more pressure than is needed to assure smooth, steady wire feed. The wire grip adjustment cap is set at the factory and does not require daily adjustment. When an adjustment is necessary, you will find that it will be easier to turn the cap if the wire grip handle is turned to the horizontal position.

Each gun is given an operating test at the factory and is ready to be hooked up when received. When putting a gun into operation:

1. Use the nozzle and air cap shown in the Spraying Table for the wire to be sprayed.
2. Make sure that the nozzle nut is tight. Tightening by hand is sufficient.
3. The siphon plug flame **must be firmly seated against the gas head**. Make sure the mating surfaces are clean and free of chips.
4. Tighten the air cap body. Tightening by hand is sufficient.
5. Check the gas head valve for smooth, easy action. Relubricate if necessary.
6. Check for proper gear case lubricant level. Add as needed.
7. Read and understand the chapter on **SAFETY MEASURES** before lighting the gun.

INITIAL ADJUSTMENTS

Connect the hoses to the air and gas flowmeters. Turn on the exhaust system. Blow the hoses out and connect them to the gun. The air and oxygen hose nut have right hand threads. The fuel gas hose nut has a left hand thread. These nuts must be tight enough to prevent gas leaks. Do not over tighten, as this may crush the hose stems.

Point the gun into the spray booth. Open the gas valve by turning the valve handle straight up. Adjust the air regulator until the gage shows the pressure specified in the Spraying Tables. When the valve is turned off (horizontal) the regulator gage should not show a pressure increase of more than 10 psi (0.69bar). A greater pressure rise usually indicates

regulator trouble, or a restriction upstream from the air control unit. In either case, the trouble should be corrected before proceeding.

Turn the valve handle up to 45 degrees until it clicks. In this position air is fed to the turbine but not to the air cap. This is the **LIGHTING POSITION**. Turn the valve handle all the way up. A strong blast of air will come out of the air cap. This is the **RUNNING POSITION**.

If the gun has not been used for some time, speed it up and clown it down several times by turning the speed control ring.

The **WIRE-GRIP HANDLE** has two positions: forward (on) and up ward (off).

With the gas head valve in the running position and the wire-grip handle in the OFF position, insert the wire into the rear wire guide and push it through the gun. Turn the wire-grip handle to the ON position. The wire will begin to feed. Adjust the speed control ring to obtain a slow feed foe hard wire, such as steel or bronze or a fast feed for soft wire, such as zinc or aluminum.

With the gas head valve open, quickly set the oxygen and fuel gas pressure to the figures show in the Spraying Table under **LIGHTING PRESSURES**. Adjust the flowmeter gas flow control valve to obtain the flow valve shown in the table. Then close the gas head valve.

LIGHTING

When you are ready to start Spraying:

1. Pick up the lighter.
2. Open the gas head valve all the way (straight up).
3. Pause about three seconds.
4. Close the valve halfway until you feed it click into the lighting stop.
5. Spark the lighter in front of the nozzle.
6. **IMMEDIATELY** open the valve all the way, as soon as the gun lights.

After the gun is lighted:

1. Wait a few seconds for the turbine to come up to speed: then start the wire feed. (If the wire feed is started too soon the cap may load with sprayed metal).
2. Set the speed control to obtain the highest wire speed which permits the wire to melt off to a point without spattering. The wire

should extend about ½" to 1" (12.5 to 25 mm) in front of the air cap. This length, however, will vary, depending upon the metal being sprayed.

3. Readjust the Type 2GFM flow control valves until the readings on the flowmeter correspond to the Spraying Table.

WARNING

**Do not light gun with out wire in the nozzle.
The gun flame can flash back through the rear wire guide,
causing personal injury.**

SPRAYING

Hold the gun 5" (130 mm) to 8" (250 mm) away from the surface deign sprayed. For information on surface preparation and for general information on the flame spray process, refer to th BUTS Flame Spray Handbook.

START-STOP OPERATION

The wire feed ca be stopped temporarily when spraying, by turning the wire grip handle up to release the grip of the drive rolls. The WIRE SNUBBER at the back of the gun will keep the wire from spraying out of the gun. Make sure the outer sleeve of the snubber is in the operating position (rearward).

WARNING

Do not operate the gun with the wire snubber locked out. If during operation, the wire grip is released with the snubber locked out, the wire may pull back out of the gun. If this happens, the gun flame may flash back through the rear wire guide. The hot tip of the wire and the back flash of flame can cause personal injury.

To start the wire feed again, return the wire grip handle to the 'ON' position.

When spraying low-melting point wire in occasional start-stop operation, the standard nozzles and air caps will be satisfactory. However, frequent start and stop may cause these parts to load with sprayed



metal. For this type of operation, special non-load nozzles and air caps are available.

DIFFERENT WIRE SIZES

The Standard BU 12M Gun is equipped to spray 1/8" wire. It may be ordered set-up to spray any size standard metallizing wire from 3/16" down to 20 B & S gauge. It is also sometimes desirable to purchase nozzles and air caps for a number of different sizes in order to be able to handle a wider variety of jobs.

Changing wire size will require a change of nozzle and air cap. Follow the recommendation in the appropriate Spray Table.

Drive rolls, drive roll gears and wire guides may also have to be changed. See the WIRE GUIDE & DRIVE ROLL SELECTION CHART for the proper combination of parts.

NOTE

Plain rear guides (without the snubber mechanism) are available. These are never to be used when operating start- stop since they will allow the wire to slip out of the gun. When this happens, the flame can shoot back through the front wire guide, damaging the nozzle, guides and drive rolls. See preceding warning.

SHUTTING DOWN

To shut the gun down, turn off the gas head valve. To release the wire:

1. Turn the wire-grip handle off.
2. Push the snubber outer sleeve forward. (The sleeve can be locked in this position by twisting it in the direction of the arrow.)

If the gun will not be used again for several hours, shut off the oxygen and fuel gas at the cylinders and shut off the air at the regulator on the air control unit. Back out the pressure regulators and bleed off pressure in the hoses and gun by opening the gas head valve momentarily.

SPECIAL GEARS

For production spraying of high speed wires (such as zinc) which would require the Type 12M to be run at or near top speed, a special high-speed turbine worm and countershaft gear set should be installed. This is easily done. Refer to the chapter on "Construction and Assembly" for instructions on how to replace the turbine shaft and countershaft gear.

Use of this special gear set has the following advantages:

1. It will permit the maximum spray rate for those wires such as lead, tin and Babbitt, which can be sprayed faster than the standard Type 12M can feed them.
2. Wear on the gears, turbine bearings and governor parts will be reduced.
3. Speed adjustment will be easier to make.

DIFFERENT GASES

The Type 12M is equipped with a universal gas head. It may be used with oxygen and any combustible gas such as acetylene, propane, MPS, natural gas, manufactured gas or hydrogen. The proper nozzle and siphon plug must be used.

Oxygen, obtained in standard cylinders, is used with all fuel gases.

Acetylene may be obtained in standard cylinders, or an acetylene generator may be used. Use of acetylene at pressures greater than 15psi (1.04 bar) is NOT APPROVED by the National Board of Fire Underwriters. Do not open the valve on an acetylene cylinder more than 1-1/2 turns.

Manifolding cylinders of acetylene together will provide greater efficiency and economy than using one cylinder at a time. A high withdrawal rate from a single cylinder may result in too much acetone vapor in the acetylene, which lowers flame propagation. In addition, excessive flow rates have a refrigerating effect, which makes it impossible to get all of the acetylene out of the cylinder.

Cylinder pressures should not be run below 20 psi (1.38 bar) to avoid. In very hot weather the minimum pressure should be a few pounds higher.

To sum up briefly, acetone vapor can be a source of trouble. The higher the melting point of the wire being sprayed, the greater the trouble. The

lower the cylinder pressure, or the higher the flow rate, the greater the danger of trouble. If acetylene generator is used, the safety precautions prescribed by its manufacturer should be carefully observed.

Propane is also available in standard cylinders. Odorized propane should always be used. Natural propane is odorless and is very hard to detect if a leak occurs. Propane is heavier than air. In case of a leak it collects along the floor or in low places.

Hydrogen is a good fuel gas, but because of its cost is seldom used except in plants where it is available as a by-product.

MPS Gas (Methylacetylene Propadiene stabilized) is available in standard cylinders.

Natural Gas and Manufactured Gas (Such as coal gas, oil gas and various mixtures) are usually available only at low pressure and require a compressor to raise the pressure for flame spraying. Use only an approved gas compressor, with a check valve between the gun and the gas receiver. The local gas company should be called in to approve the complete gas installation. The gas company will usually require a check valve on the low-pressure side of the compressor, in addition to the check valve mentioned above.

When using gas pumped into a receiver, keep air out of the receiver.

The tank should be pumped to full pressure and drained to about 5 psi (0.345 bar) at least three times before lighting the gun. The pressure should never drop below 5 psi (0.345 bar). If the tank ever becomes completely empty, it should be filled and drained three times. There must be adequate gas available in the gas main to assure that air is not sucked into the compressor through other outlets in the line such as torches, burners, etc.

Nozzle: Each nozzle has its own identification mark for size and fuel gas.

Siphon Plug: Different siphon plugs are required for the full range of fuel gases and styles of nozzles. See the GAS HEAD HARDWARE SELECTION CHART for the proper combination of parts.

Fan Spray Equipment

For spraying large flat surfaces it is often advantageous to use fan spray equipment instead of the standard air cap. This equipment produces a wide, light deposit with each pass of the gun. Uniform coatings are more easily obtained. Air pressure up to 75 psi (5.25 bar) can be used.

The AB Air Cap is spraying 3/16" wires. The CD Air Cap is spraying 1/8" wires. Both of these air caps are used with jetted hardware.

TOOL POST FIXTURE

The Tool Post Fixture is designed for maximum convenience and flexibility in mounting the gun on a machine tool such as a lathe. The fixture bar is usually clamped in the lathe at about 45°.

The stud at the front of the gun fits into the cross hole at the end of the round arm, called the clampshaft housing. Inside the clampshaft housing is the clampshaft which has a similar cross hole. Before inserting the gun stud, line up these two holes by turning the slip handle.

With the gun stud in place, the gun can be locked solidly in position by tightening the handle. To free the gun for repositioning, loosen the handle slightly (about ¼ to ½ turn). If the handle is backed off several turns, the clampshaft will again grip the gun stud, as a safety measure, to keep the gun from dropping out if the clampshaft housing should swivel free.

5 AVOIDING TROUBLE

SPRAYING :- Refer to the chapter on safety measures for a summary of commonsense precautions to be observed when flame spraying.

GENERAL GUN CARE :- The most important point in the care and lubrication of the type 12M Flame Spray Gun is cleanliness. Dirt, grit and metal dust in the mechanism will cause quick wear.

Before lubrication or overhaul, wipe the gun thoroughly to remove all loose dust. Use a clean bench for disassembly and be sure the lubricant tube is free of dirt.

There is a chart showing a suggested maintenance schedule at the end of this chapter. The chart is based on average use and conditions.

Guns receiving hard use should be serviced at shorter intervals. The main factors affecting service frequency are:

1. Speed and load of gun.
2. Frequency of lighting.
3. Temperature in which the gun operates.

The higher each is, the more often the gun should be serviced.

CHECKING OXYGEN AND FUEL GAS CIRCUITS: To check the oxygen and fuel gas circuits for leaks or obstructions, proceed as follows:

1. Make sure that the gun is pointed into the spray booth and its exhaust system is on.
2. Close the valve on the Type **2AF** Air Flowmeter.
3. Turn the cylinder valve on the gun to the RUNNING POSITION.
DO NOT LIGHT the gun.
4. Adjust oxygen and fuel gas pressures to the values shown in the chart -----.
5. Close the fuel gas flow control valve on the Type **2GFM** Flowmeter.
6. Open the oxygen flow control valve on the flowmeter all the way. The oxygen flow should read within 5 points of the value shown in the chart.
7. Close the oxygen flow control valve.
8. Open the fuel gas flow control valve all the way. The fuel gas flow should read within 5 points of the value shown in the chart.
9. If either oxygen or fuel gas flow is not within 5 points of the chart value, check the equipment for leak or obstruction. Some of the items to check are covered in the following paragraphs.

CHECK FLOWS

Wire Size	Fuel System	Pressure	Flow
1/8	Oxygen	30	53
	Acetylene	15	85
3/16	Oxygen	30	54
	Acetylene	15	88
1/8	Oxygen	40	76
	Propane	40	37
3/16	Oxygen	40	77
	Propane	40	37

HOSES: Obstructions in the hoses reduce the flow of oxygen and fuel gas and upset the flame balance.

WARNING:

Do not get oil in the hoses. Oil in the oxygen hose is very dangerous.

In an old, worn hose the lining may come loose and plug up the hose. If hose fittings are over-tightened, the holes in the fittings may collapse. This reduces the flow of gases and causes the same troubles as obstructions in the hoses. The gun-end connections of the two gas hoses are most apt to be damaged. The back of a #43 drill (.089" or 2.2 mm Diameter) should slip easily into the stems at the gun end of the gas hoses, if the hole in the stem is the correct size.

DIFFICULT LIGHTING: If the gun is hard to light make sure that the nozzle and siphon plug are clean and undamaged. If the trouble persists, screw out the regulator handles to shut off the gases and then disconnect the hoses. Inspect hoses and gun fittings for dirt or other obstruction. Blow out the hoses before reconnecting them.

If the gun has been idle for some time, or after the valve has just been lubricated. It is advisable, before lighting to work the valve on and off a few times with gases and air turned on. This will blow out any excess valve lubricant from the small bleeder holes in the valve. Plugged bleeder holes will cause lighting trouble.

BACKFIRE : If the gun backfire, it will appear to go out with a "pop" and will burn back in the siphon plug. Shut the gun "**IMMEDIATELY**" and determine and correct the cause of the backfire.

Backfiring may be caused by the following:

- Leak at the wire nozzle O-rings (See Nozzle).
- Dirt in the nozzle jets.
- Oversized or ragged jets.
- Plugged siphon plug bleeder holes (See Siphon Plug).
- Leak at the siphon plug O-rings.
- Use of wrong air cap.

CAUTION: Excessive backfire, or permitting the gas to burn back in the siphon plug too long, makes it necessary to clean the siphon plug and nozzles. It may also cause the nozzle nut to loosen.

The cause of the backfire should be found and corrected. The gun will not backfire unless something is definitely out of adjustment.

SIPHON PLUG: This part should be cleaned occasionally.

Instructions for removing and replacing it are shown in the section on “Construction and Assembly”. When cleaning the siphon plug wipe out the grooves. Clean the jets with the proper size wires in the cleaning wire kit. Do not use drills. Do not use oversize wires. Do not rotate the wires.

Do not wash the O-rings with strong solvent. Inspect them for damage and replace them if necessary. Do not stretch new O-rings more than necessary when putting them on the siphon plug. Lubricate the O-rings with BU Valvelube before reassembling the siphon plug. Wipe any excess Valvelube off the plug to avoid getting it in the jets.

NOZZLES: Whenever a nozzle is put on the gun, the bore of the siphon plug should be wiped clean and a fresh film of Valvelube put on the nozzle O-rings.

The nozzle nut must be tight on the siphon plug. Firm tightening by hand is sufficient. Over-tightening the nozzle nut can cause damage. The nozzle should be kept clean. To clean it, remove the nozzle, remove the O-rings and wash the nozzle in BU Cleaning Solvent. Push the proper size cleaning wire carefully into each jet hole from the back end. **DO NOT USE A DRILL.** Select a wire that fits the hole. Do not rotate it. Wipe the nozzle dry. Blow out the jet holes with compressed air from the back end.

Do not soak the O-rings in solvent. Inspect them for damage and replace them, if necessary. Do not over-stretch the new O-rings when putting them on the nozzle. Lubricate the O-rings with a thin film of Valvelube before reinstalling the nozzle. Wipe excess Valvelube off the nozzle, to avoid getting it in the jet holes.

SPECIAL INSTRUCTIONS FOR CLEANING ANNULAR

NOZZLES: To clean an annular nozzle, remove the nozzle insert from the nozzle shell. Wash both insert and shell in BU Cleaning Solvent. To clean the jet holes in the insert, push the proper size cleaning wire carefully into each jet hole from the back end. **DO NOT USE A DRILL.** Select a wire that fits the hole. Do not rotate it. Wipe the inset dry. Blow out the jet holes with compressed air from the back end. If it is necessary to scrub the nozzle shell to get it clean, use a small, soft brush or cotton swab and scrub gently. Wipe the shell dry.

Before replacing the insert, put a THIN film of Valvelube on the barrel O.D. Push it all the way into the shell.

Do not soak the O-rings in solvent. Inspect them for damage and replace them, if necessary. Do not over stretch the new O-rings when putting them on the nozzle. Lubricate the O-rings with a THIN film of Valvelube before reinstalling the nozzle. Wipe excess Valvelube off the nozzle, to avoid getting it in the jet holes.

GAS HEAD VALVE: The gas head valve is designed for long service life with minimum maintenance. It has a cylindrical rather than the old-style tapered core and relies upon special electrometric O-rings for proper sealing. Lapping or other precise fitting is not required. Do not disassemble the valve for cleaning and re-lubricating unless it has become excessively stiff and difficult to turn, or a leak has developed. Instructions for taking it apart are given in the chapter on “Construction and Assembly.”

CAUTION: Do not attempt to disassemble the valve without referring to those instructions. Damage to the equipment may result if this “Caution” is ignored.

Any worn or damaged valve part can be replaced in the field.

If the valve develops a leak, examine all O-rings carefully. Replace any which are worn or damaged. The ring materials are specially selected for proper service in this valve. **USE ONLY AUTHORIZED REPLACEMENTS.**

The metal part of the valve can be washed with BU Cleaning Solvent. Make sure the small bleeder holes in the valve sore are clean and free of any hard residue. **DO NOT ENLARGE THEM.**

NEVER soak the O-rings in solvent.

Lubrication all valve O-rings and sliding metal parts with a thin coat of BU Valve lube.

STICKING WIRE

Kinked or badly bent wire will cause trouble. It may jam in the nozzle and stop feeding. If the wire metals into the end of the nozzle, it can

usually by removed by twisting and forcing the wire through from the back with pliers.

The nozzles are bushed with a special alloy, which resists fusing with any common metal.

To reduce sticking due to kinks and bends, especially with hard wire, place the wire control unit so that the wire feeds straight to the gun. Do not overtighten the brake on the wire control unit.

DRIVE ROLLS

If the teeth on drive rolls become packed with chips from the wire, they will not work efficiently. Keep them clean by brushing with a wire brush.

THREADS

BU Valvelube is excellent thread lubrication. Use it on the threads of the air cap body, nozzle, nut, rear countershaft bearing retainer and control ring to keep the threads smooth-running.

CAUTION

**The standard threaded hardware in the Type 12M is metric
Use only replacement parts obtained from BU under their
correct Part Numbers.**

LIGHTING FLOWS

Normal gas flow range with the gas head valve in the lighting position are given below. Flows lower then those shown indicate a possible blockage in a valve core bleeder port. Higher flows may mean a leaky valve seal.

NORMAL LIGHTING FLOWS

FUEL GAS	WIRE SIZE	LIGHTING PRESS. (PSI.)		LIGHTING FLOW	
		OXY.	FUEL	OXY.	FUEL
ACTY.	3/16	38	15	22-30	3-5 ½
	1/8	28	15	22-30	3-5 ½
	11 Ga.	25	15	17-24	3-5 ½
	15 Ga.	25	15	16-23	3-5 ½
PROP.	3/16	42	38	26-33	4-6 ½
	1/8	47	42	26-33	4-6 ½
	11 Ga.	35	30	22-28	4-6 ½
	15 Ga.	30	30	20-26	4-6 ½
MPS	3/16	42	40	26-33	4-6 ½
	1/8	47	42	26-33	4-6 ½
	11 Ga.	40	38	24-30	4-6 ½
	15 Ga.	30	35	20-26	4-6 ½

OVERHEATING

The increased spraying speeds of the Type 12M Gun result from greatly increased heating capacity. Be sure to observe recommended procedures to prevent overheating the work or damaging the coating.

ROUTINE MAINTENANCE SCHEDULE

BASED ON CONTINUOUS SPRAYING-AVERAGE CONDITIONS

Maintenance Operation	Interval (Hours)	Remarks
Clean outside of gun	8	
Clean drive rolls	8	Brush off and blow out dirt and chips.
Clean air cap	8	Wipe out soot.
Clean nozzle	16	Use cleaning wire kit.
Clean siphon plug	40	Use cleaning wire kit.
Oil upper drive roll bushing	40	Machine oil-2 drops.
Oil upper drive roll carrier hinge	40	Machine oil-2 drops.
Lube turbine cover bearing	40	BU gearlube ¼" (6 mm) strip.
Lube gear case	80	BU gearlube-makeup level.

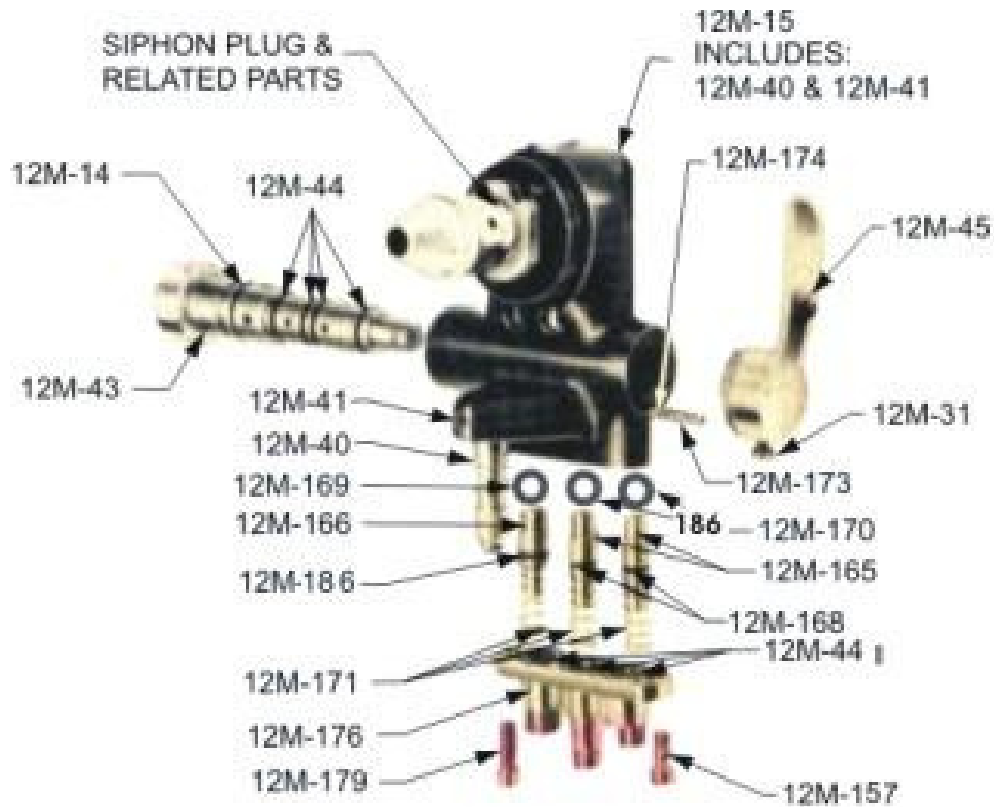


Clean turbine brake disc and shoe	200	Wipe down with BU Cleaning Solvent. Do not lubricate.
relube		
Clean and control ring thread	200	Valve lube
Clean and relube power control spider	200	BU Gear lube.
Lube wire grip cam assy.	200	Two drops of machine oil through set-screw hole in side of bushing. Heavy coat of Valvelube on cam.
Lube cam follower	200	Heavy coat of Valvelube on washer end of cam follower. Thin coat of Valvelube on inner wall of large hole in support block.
Clean and lube gas head valve	1,000	Valvelube-thin film.
Complete overhaul	1,000	Wash out and replace all lubricants.
Check gas pressure against Flowmeter	8	
Check Air Control filters	8	Blow down if needed.
Clean Air Control screens	200	Wash off and blow out.
Lubricate Eire Control Unit	200	See tag on unit.



TYPE 12M FLAME SPRAY GUN

TYPE 12M GUN (RIGHT SIDE)



12M-5 GAS HEAD ASSEMBLY

The BU Type 12M Gun is made up of two main sections:

1. The GAS HEAD which melts and sprays the wire.
2. The DRIVE UNIT which feeds the wire to the gas head.

The drive unit consists of:

- 2.1 The air turbine and speed control assembly.
- 2.2 The transmission (reduction gearing and drive rolls).
- 2.3 The wire grip mechanism

CAUTION

1. The standard threaded hardware in the Type 12M is metric and has a block oxide finish, except
2. Set screws, which have a blue finish
3. Use only replacement parts obtained from under their correct part numbers.

Do not interchange metric and English system threaded parts.

GAS HEAD

The Gas Head 12M-5 is fastened to the gun by three screws, two front screw 12M-97 and one rear screw 12M-96.

GAS HEAD VALVE

A cylindrical Valve Core 12M-43, centrally located in the gas head is held in place by both the Valve Handle 12M-45 and screw 12M-179, Which holes Hose Connection Block 12M-176 to the bottom to the gas head.

To disassemble the valve for cleaning and lubrication:

1. Clean the outside of the gas head thoroughly to remove dirt and grit.
2. Remove the valve handle and hose connection block

CAUTION

These parts must be removed. One of the hose connection block mounting screw (12M-179) is also the valve core will be damaged if attempt is made to remove it without first removing this screw.

- 2.1 **Lighting Detent Pin 12M-173 and Spring 12E-174 trapped by the valve handle, can now be removed.**
- 2.2 **O-rings 12M-44, in grooves on the hose connection block can be lifted out. These seal against leakage at the mounting face.**
3. Remove Plunger Spring 12M-171.
4. Remove two Plungers 12M-165 and one Plunger 12M-166 by pulling on the plunger stem. **Do not twist.** Each plunger is keyed against rotation.
5. Slide Valve Core 12M-43 out of the gas head. **NEVER TRY TO TAKE OUT THE VALVE CORE BEFORE REMOVING THE HOSE CONNECTION BLOCK.** Four O-rings 12M-44 and one O-ring 12M-14 on the valve core seal off the oxygen, fuel gas and air from each other and from leakage to the outside.

6. Tow Plunger Seal O-rings 12M-170 and one Plunger seal O-ring 12M-169, normally squeezed against the valve core by the front ends of the spring loaded plungers, may stick to the plungers when the plunger are removed. If not, these rings will be found in the gas head holes which house the plungers. Push these rings into the valve bore and take them out for servicing.

BEFORE REASSEMBLING THE VALVE PARTS

1. Examine all O-rings and replace any which are worn or damaged. Use only authorized replacements. If cleaning is needed, use a clean cloth lightly dampened with Cleaning Solvent.

NEVER soak the O-rings in solvent or any other liquid.

2. Wash the metal parts with Cleaning Solvent as required. Full-flow and bleeder ports are machined into the valve core for proper control of the gears. These ports should be clean and free of any hard residue.
3. Lubricate valve O-rings and sliding metal parts with a thin coat of BU Valvelube.

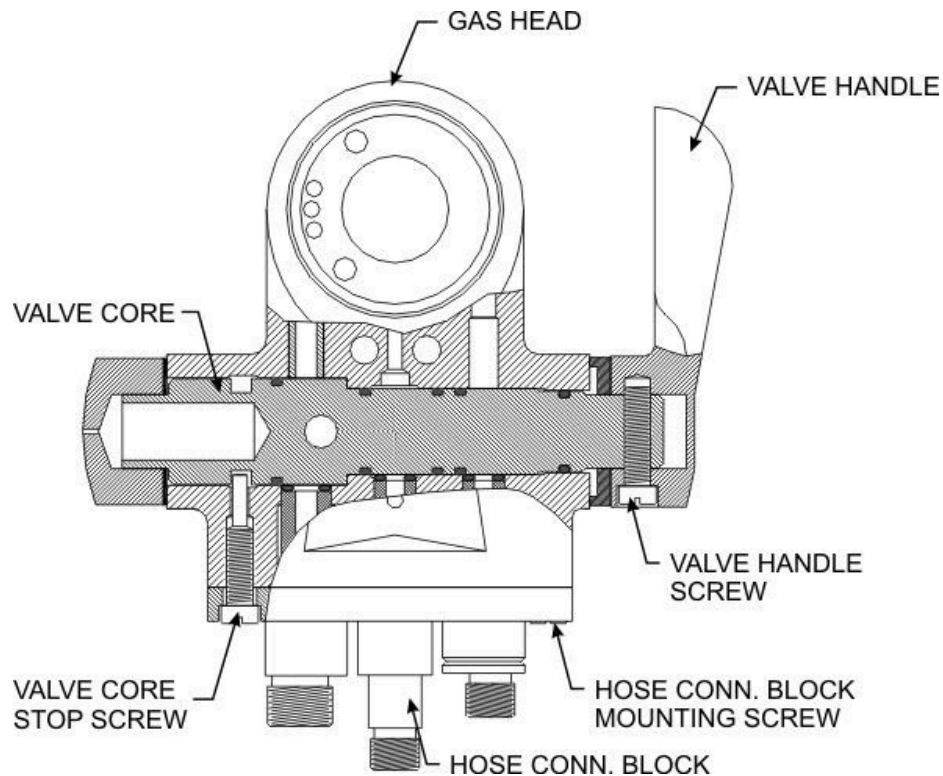
When putting back the plungers, align the plunger keyway with the mating key pin in the gas head. Slide each plunger into its hole and press firmly all the way home to seat each seal ring against the valve core. When properly installed, the large diameter of each plunger will be completely inside its hole. If it is not, it means the key pin is not engaging the plunger keyway and the valve will not seal properly.

A dowel pin at the bottom of the gas head fits into a mating hole in the hose connection block to preserve proper orientation. The long nose on the Valve Core Stop Screw 12M-179 (next to the air hose fitting) engages a groove in the valve core. Make sure to put this screw back in its proper place. Check that the connection block O-rings are in their retaining grooves before tightening the connection block screws.

VALVE CORE POSITIONING

One end of the valve core has a black dot on it. With the valve core in place in the gas head, before mounting the valve handle, turn the core so the black dot points towards the back of the gas head. Point the valve handle forward and screw it onto the stem of the valve core. When properly mounted, the head of the valve, handle screw will be in

line with the dot. If they are opposite instead of in line, the valve will not feed air to the turbine when you try to spray.



**Fig. 6.1 TYPE 12M FLAME SPRAY GUN
GAS HEAD AND VALVE**

SIPHON PLUG

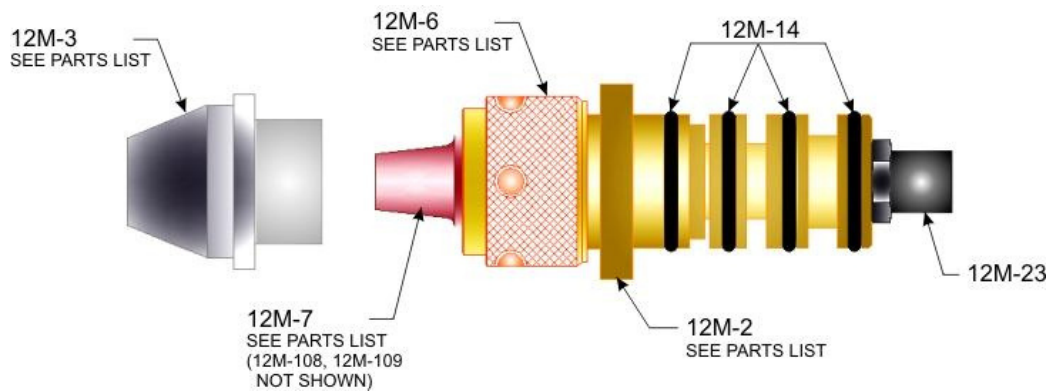
The siphon plug 12M-2 fits into the large hole through the upper part of the gas head. The flange of the siphon plug has two store which mate with pins in the head. Four O-rings 12M-14 seal against gas leakage.

The Front Wire Guide 12M-23 threads into the back of the siphon plug. The Nozzle 12M-7 is held onto the front of the siphon plug by Nozzle nut 12M-6. Air Cap Body 12M-1 holds this entire assembly a place on the gas head.

With the air cap body off the entire assembly of front wire guide, siphon plug, nozzle, nozzle nut and air cap can be quickly removed.

If the assembly cannot be pilled out easily by hand, place a screw driver blade between the drive roll and the front wire guide as shown in Fig.2 and pry forward. Once the O-ring seals break loose the assembly can be pulled forward out of the gas head.

Whenever the siphon plug is removed, examine the O-rings for nicks and cuts. If they are damaged, replace them.



SIPHON PLUG AND RELATED PARTS

When reinstalling the siphon plug, lubricate the O-rings with Vlavelube. Make sure the slots in the siphon plug flange engage the gas head pins. The front wire guide must be threaded into the siphon plug as far as it will go.

Push the siphon plug assembly in until the flange of the siphon plug is firmly seated against the gas head. The Air Cap Body 12M-1 must be on tight before spraying.

See the **Gas Head Hardware Selection Chart** for the proper combination of parts to be used with the various wire sizes and fuel gases.

WIRE DRIVE UNIT

DRIVE ROLL CARRIER

The Drive Roll Carrier 12M-136 is fastened to the gun at the front end of the wire grip mechanism.

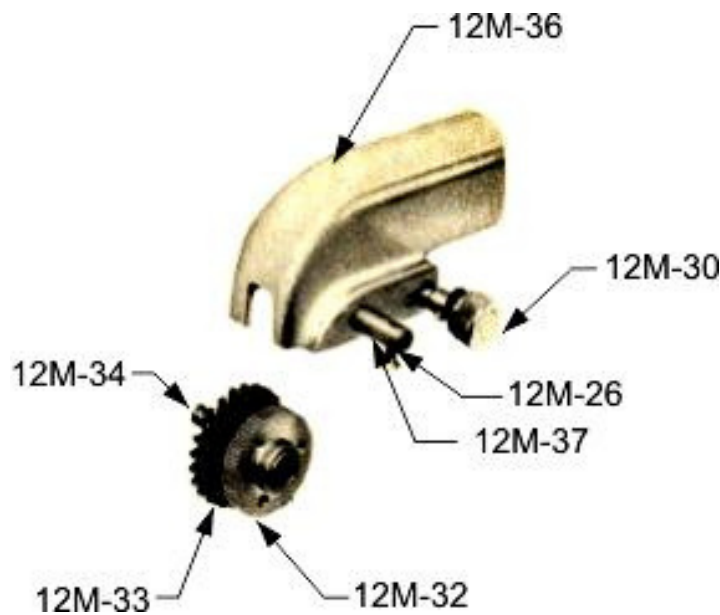
To remove it, twist Pivot Pin 12M-30 one-quarter turn clockwise and pull it out. The carrier can then be lifted up and off the wire grip mechanism.

The Upper Drive Gear 12M-33 is fastened to the Upper Drive Roll 12M-32 by three Screw 12M-34. This gear and Drive Roll ride freely on Axle 12M-37 which is held in the carrier by Screw 12M-26. A sintered bronze bushing is permanently pressed into the drive roll. Do not try to remove.

Inside the carrier is a slotted wall.

When re-installing

1. Slide the carrier wall slot over the neck of the push rod which sticks out at the front end of the wire grip mechanism.
2. Line up the carrier mounting hole with the mating hole in the wire grip mechanism.
3. Slide the pivot pin into place so that its projecting key pin enters the keyway in the carrier. Push it in turn it one-quarter turn counter-clockwise to lock it in place.

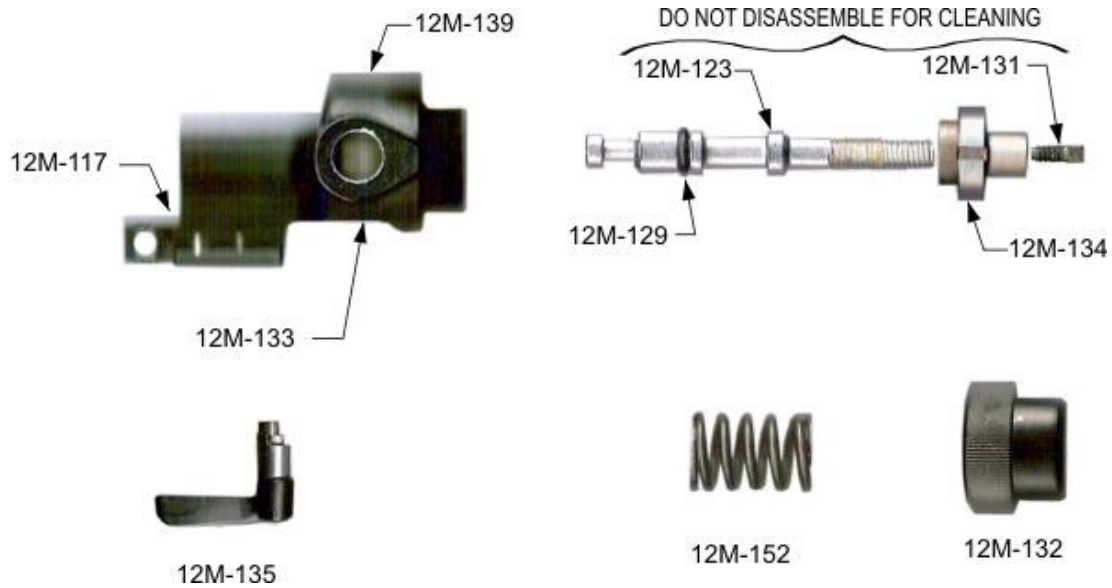


DRIVE ROLL CARRIER AND RELATED PARTS

WIRE GRIP MECHANISM

The Wire Grip Mechanism is held on the gun by three Screws 12M-117. Complete disassembly of this mechanism will be needed only for major cleaning and overhaul. To disassembly

1. Remove the drive roll carrier.
2. Turn the wire grip handle to the horizontal position. Ease it down.
Do not let it snap.
3. Unscrew the Wire Grip Adjustment Cap 12M-132.
4. Lift out Spring 12M-152
5. Push back on the front end of Push Rod 12M-123 and slip it out of Support Block 12M-139. **Do not disassemble the parts on the Push Rod.** (See Push Rod length adjustment below.)
6. Loosen Set Screw 12M-133 and pull the Cam Assembly 12M-135 out of the Support Block. **Do not disassemble the Cam Assembly for cleaning.**



WHEN REASSEMBLING

1. The nose on Set Screw 12M-133 must drop into the hole provided for it in the side of the bushing on the Cam Assembly. Before reinstalling, add two drops of machine oil through this hole.
2. Lubricate the following heavily with Valvelube:
 - 2.1 The working end of the Cam Assembly.
 - 2.2 The Cam chamber in the Support Block. Also smear a thin coat of Valve lube on the inner wall of the large hole in the Support Block.
 - 2.3 The rotating washer-end of Cam Follower 12M-134 which is mounted on the push rod.
3. When re-installing the push rod, line up the slot in the Cam Follower with the key pin which strikes up in the Support Block hole. **Make sure these engage.**
4. The normal setting for the wire grip adjustment cap is about 1/8 inch or 3 mm (3 to 4 turns) off the shoulder of the support block.

PUSH ROD LENGTH ADJUSTMENT

Push Rod 12M-123 threads into Cam Follower 12M-134 and is locked in position by Set Screw 12M-131. The assembled length is important. With the push rod length properly set and the wire grip handle up in the release position, the drive rolls will release 1/8 inch wire while the Drive Gear 12M-33 and 12M-36 stay in engagement. The Push rod assembly is adjusted for proper length at the factory and **should not be taken apart** except to replace worn or damaged parts. To adjust for proper push rod length, the wire grip mechanism and drive roll carrier must be mounted on the gun. Hang the gun level in the tool post mounting fixture and proceed as follows:

1. Take off the wire grip adjustment cap, lift out the spring and remove the locking set screw at the back end of the push rod assembly.
2. Turn the wire grip handle up.
3. Using a narrow-blade, thin –shank screw driver to reach the slotted back end of the push rod, screw the push rod forward (turn clockwise). You will see the drive roll carrier move down as this is done. (Be sure the drive gear teeth engage as you do this. If they happen to be positioned so that their tops hit, they will keep the carrier from moving down.)
4. Stop when the drive roll carrier has closed too far to allow 1/8 inch wire to pass freely between the drive rolls. Check this by pressing forward on the back of Push Rod while trying to slide a short length of 1/8 inch wire through the Rear Wire Guide and between the Drive Rolls.
5. Back out the Push Rod gradually. The carrier will move up. Stop when you can just slip the test wire freely between the rolls while pressing forward on the back of the Push Rod. Then back out the Push Rod an additional ½ turn and lock it in position with the set screw. If you back out the push rod too far, the drive gears will disengage when releasing the wire grip. This may interfere with proper closing of the drive rolls when you try to reapply the grip.

For guns specially set up to spray 3/16 inch and 1/8 inch wire, use 3/16 inch wire for this adjustment.

LOWER DRIVE ROLL AND GEAR

Lower Drive Roll 12M-35 and Lower Drive Gear 12M-36 are threaded onto Drive Shaft 12M-65. Both have **Left hand Threads**. Use Spanner Wrench 12M-104 to unscrew these parts. To replace the roll and gear:

1. Use Drive Roll Tool 12M-103. The projecting Dutton on the tool fits the center hole of each part.
2. Slip the part on the tool, line it up with the end of the drive shaft, and spin it counterclockwise (left hand thread) onto the shaft.
3. Use the spanner wrench for tightening.

REAR WIRE GUIDE & SNUBBER

Snubber 12M-118 consisting of a rear guide and wire snubbing mechanism, is held in place at the back of the gun by Set Screw 12M-25. With the gun completely assembled, this set screw can be reached through an access hole in the mounting flange of the wire grip mechanism.

STRAIN RELIEF

When spraying with wire Strain Relief 12M-143 should be used to protect the wire against damage. To assemble, remove Guide Insert 12M-187 from the back of the snubber by loosening the set screw which holds it. Push in the plain end of the strain relief and lock it in place with the set screw.

If desired, the strain relief can be left in place when spraying any other kind and size of wire.

TURBINE AND SPEED CONTROL

The speed adjustment parts are mounted on Turbine Cover 12M-77. The ensure assembly is removed from the right side of the gun by taking out three Screw 12M-53 and pulling the unit away from the mounting flange. Don't try the turbine cover of easy removal, loosen the cover screws and tap lightly on the screw heads.

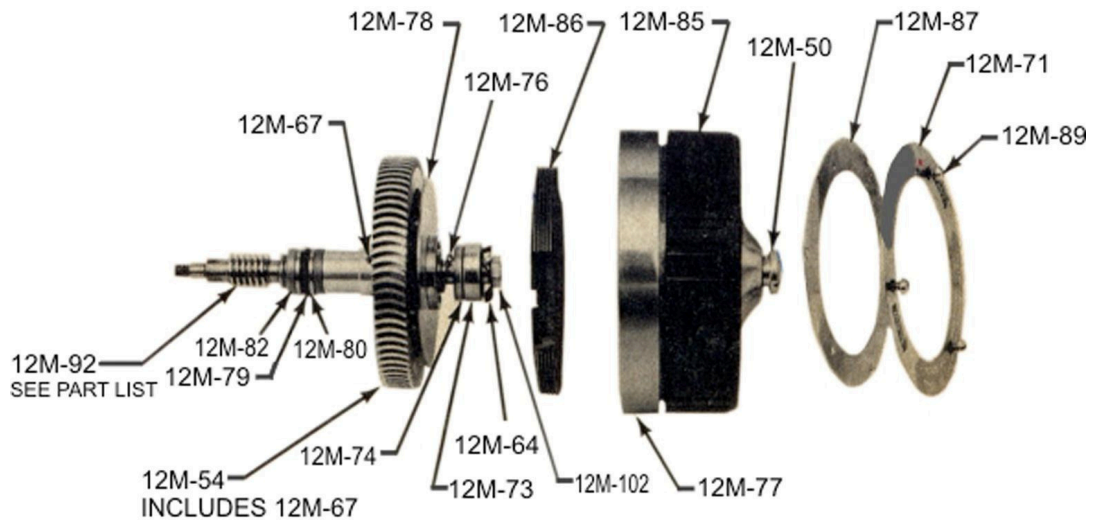
The speed adjustment parts consist of:

Ring Name Plate	12M-71
Speed Control Ring	12M-85
Detent Spring (Washer-Type flat Spring)	12M-87
Spider	12M-86

The spider assembly can be removed by turning the control ring counterclockwise until the spider drops out. The rest of the parts can be

separated by removing the three Ring Name Plate Screws 12M-89. When reassembling, clean the parts thoroughly. Lubricate the thread and Detent surface of the control ring with Valvelube.

The spider assembly has a ring brake shoe mounted to it with four screws. **Do not take off the shoe. Do not lubricate the shoe nor the BRAKE DISC which runs against it.** These parts are designed to run dry. Any grease or oil on them should be removed by wiping down with cleaning Solvent.



TURBINE AND SPEED CONTROL ASSEMBLY

After the Turbine Cover is removed, the turbine assembly and speed governor parts can be taken from the gun by first removing Bearing Cover 12M-47, which is held in place with two Screws 12M-31.

When lifting off the bearing cover be careful not drop bearing follower assembly 12M-39. This is a small assembly located just under and held in place by the bearing cover. It consists of a thin, precision disc-spring permanently joined to a supporting steel plug.

It is an important part of the precise governing system. Do not take this assembly a part. Always re-install it with the disc towards the bearing cover.

Bearing Cover Gasket 12M-48 seals the surface under the bearing cover. Lift it off carefully. When re-installing, coat both sides of the gasket with a thin layer of valvelube.

Turbine Shaft Nut 12M-84 is located behind the bearing follower assembly and mounts on the left end of Turbine Shaft 12M-92. Hold the Turbine Rotor by hand (never hold it with a wrench or screw driver) when taking off this nut. After the nut has been removed, the turbine assembly can be pulled out of the housing. The turbine shaft left bearing 12M-83 will stay in the housing. This bearing has a deep cup on one side and a flush face on its other side. If it is removed from the housing, always put it back with the **deep cup to wards the bearing cover**.

Take off Nut 12M-102 at the right end of the turbine shaft. The following parts will slide off the shaft:

Finger Spring	12M-64
Right Bearing	12M-73
Spring Washer	12M-74
Spring	12M-76
Brake Disc Assembly	12M-78

Turbine Rotor Assembly 12M-54 is fastened to the Turbine Shaft by Set Screw 12M-67 and holds Oil Seal Assembly 12M-160 in place.

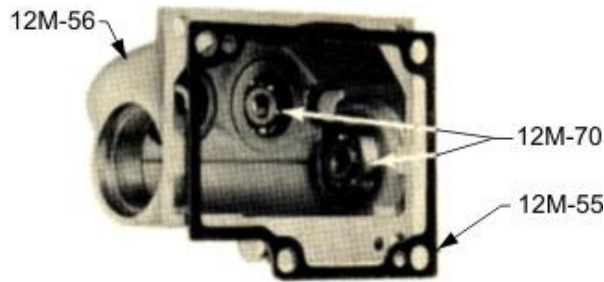
Never take apart the brake disc assembly or the turbine rotor assembly.

Each of these assemblies, pay particular attention to the following instructions:

1. The parts and bearings must be clean. Dirt or grit will cause rapid wear.
2. The end of the turbine rotor set screw must seat in the spot provided for it on the turbine shaft.
3. If it is necessary to take the oil seal assembly apart, reassemble it exactly each other, spring ends in the bobbin cups.
4. Be sure to place the bent ears of the brake disc assembly over the bottom weights, which are on the governor spring attached to the turbine rotor.
5. The turbine shaft right bearing has a shield on one side. Put the bearing on the shaft with the **Shield to wards the turbine rotor**. Assemble the left turbine bearing with the **Deep Cut Towards the bearing cover**. When worn turbine bearing are replaced, the new bearing must slide freely in the housing sockets for proper speed governing.
6. Finger Spring 12M-64 must be assembled with the bend-up fingers towards the bearing. Make sure the center hole rides freely on the shank of Nut 12M-102 and the spring fingers rest on the outer race of the bearing.

GEAR COVER & TRANSMISSION GEARS

The gears for the wire drive unit are enclosed by a gasketed Gear Cover 12M-56, which is held in place with four Screws 12M-53.



GEAR COVER

Continuing from the point of disassembly described so far, the gear can be removed as follows:

1. Take off Drive Shaft Nut 12M-84 (under the bearing cover) on the left end of Drive Shaft 12M-65.
2. Remove the countershaft assembly by unscrewing Bearing Retainer 12M-51 located at the back of the gear cover. The retainer has milled wrench flats for this purpose.
3. Remove the four gear cover mounting screws and ease the cover off the gun. The Drive Shaft Left Bearing 12M-70, the Turbine Shaft Left Bearing 12M-83 and the Countershaft Front Bearing 12M-70 will come off with the gear cover.

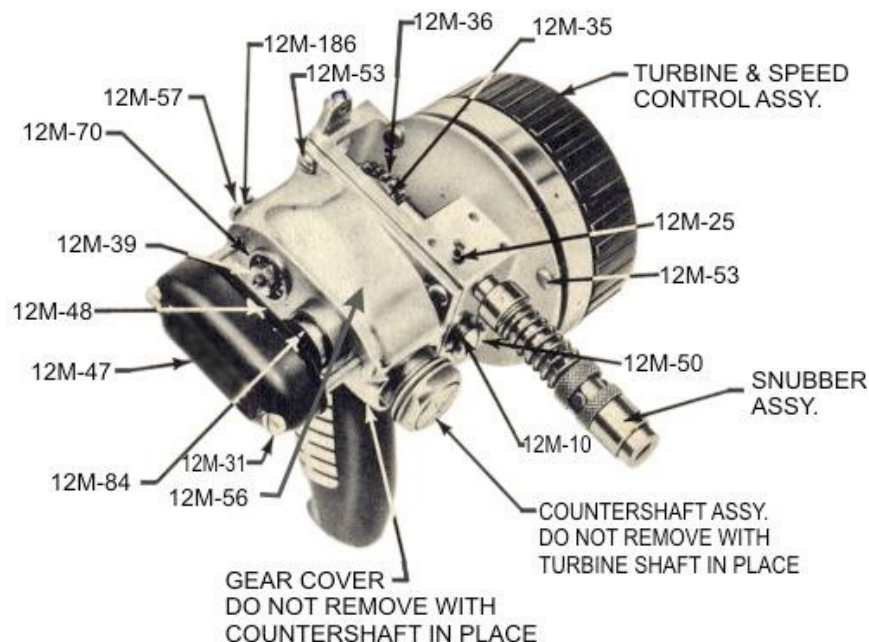
Note that the gear cover mounts on two dowel pins and is sealed against leakage by Gasket 12M-55. When re-installing the gasket, coat both sides with a thin layer of Valvelube.

DRIVE SHAFT ASSEMBLY

When the gear cover is removed, the drive shaft assembly will stay in the housing. With the lower drive roll and drive gear removed as previously described, the entire assembly can be pulled out of the housing as a unit. The parts consist of:

Drive Shaft	12M-65
Drive Shaft Gear	12M-66
Right Drive Shaft Bearing	12M-69
Drive Shaft Seal	12M-68

The gear is fastened to the shaft by Set Screw 12M-67. Right Bearing 12M-69 is pressed onto the drive shaft and should not be removed. If it becomes necessary to replace this bearing, make certain to push on the inner race when pressing the new bearing onto the shaft.



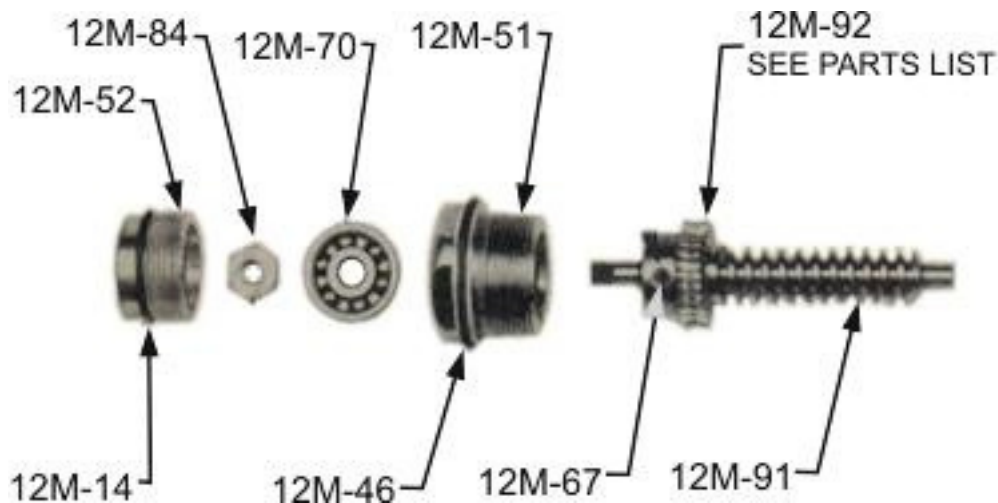
DRIVE UNIT WITH WIRE GRIP MECHANISM REMOVED COUNTERSHAFT ASSEMBLY

When the countershaft assembly is removed as discussed above. Four Bearings 12M-70 will stay in the gear cover. (If may slip out of the socket and drop into the gear chamber). The rest of this assembly can be taken apart as follows:

1. Unscrew Plug 12M-52 from the Bearing Retainer 12M-51. O-rings 12M-14 and 12M-46 on these parts help seal the gear case against grease leakage.
2. Remove Countershaft Nut 12M-84 locked on the end of the shaft under the plug. When doing this, hold the gear by hand with a cloth. Never hold it with a wrench.

Bearing 12M-70 can be pushed out of the retainer and countershaft 12M-91 with Countershaft Gear 12M-93 fastened to it can be pulled

free. Taken the gear off the shaft by loosening Set Screw 12M-67. When putting the gear back on, be sure the setscrew goes into the hole provided for it on the shaft.

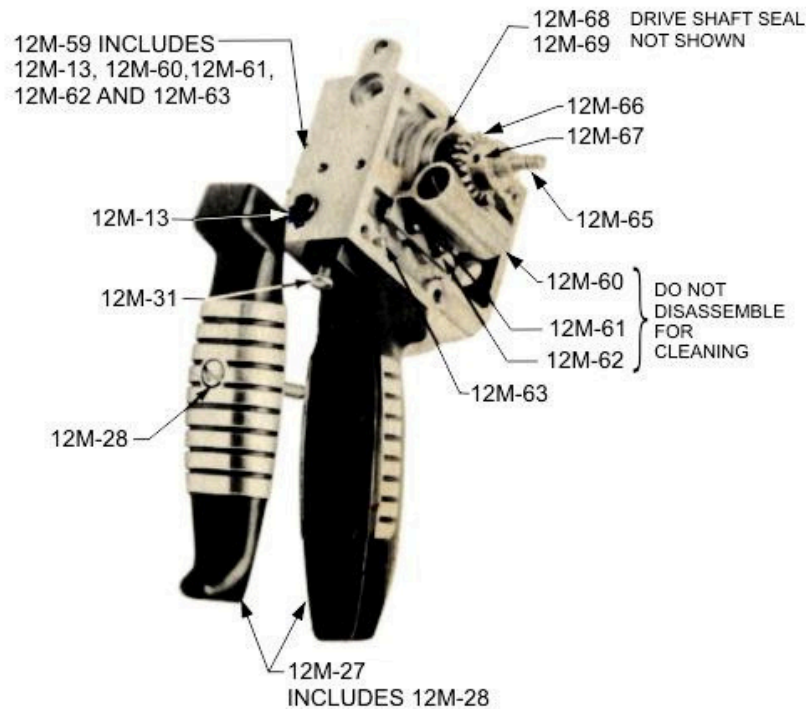


COUNTERSHAFT ASSEMBLY

CENTRAL HOUSING AND GUN HANDLE

The centrally located casting on which all the assemblies are mounted is Central Housing 12M-59. Two Dowel Pins 12M-63 are pressed in place. Do not remove them. O-ring 12M-13 seals the turbine air passage at the gas head-to-central housing with two Screw 12M-61 and two Lock washer 12M-62. **Do not remove these parts.** With the gun completely assembled, the countershaft passes through the pump housing and pumps gear lubricate to the back of the gun to lubricate the high-speed bearings and gear. The pump housing has been specially aligned for proper clearance over the countershaft to insure efficient pumping action.

The Gun Handle 12M-27 is constructed in tow holes, held together with Screw 12M-28. To remove it from the gun, take off the front half and then remove the two Screw 12M-31, with hold the back half to the central housing.



CENTRAL HOUSING, HANDLE AND DRIVE SHAFT PARTS

GEAR CASE LUBRICATION

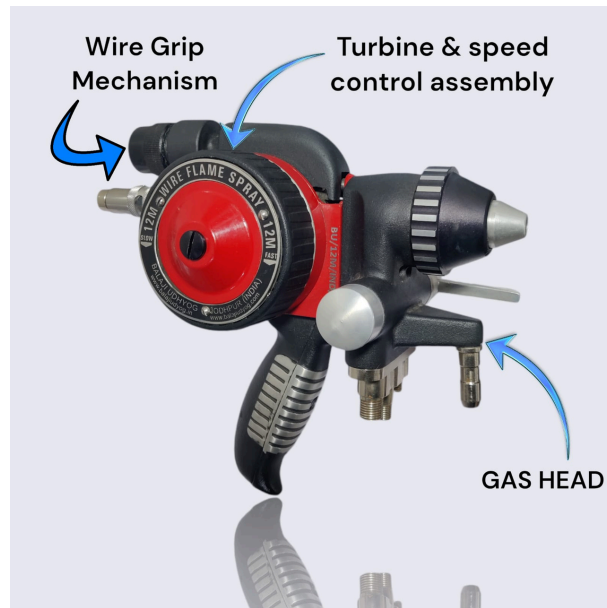
The most important point in lubricating the gun is cleanliness. Dirt, grit and metal dust in the mechanism will cause quick wear of gears and bearings.

The lubricant for the gears and bearings is BU Gearlube. To lubricate a dry gun, one full lube of Gearlube should be squeezed into the gear case. To do this, wipe the back of the central housing clean and remove Oil Sight Plug 12M-10. After cleaning the screw end of the Gearlube lube, put it into the hole and squeeze the lube until empty. Reinstall the sight plug.

With the gun upright and level, the lubricant should be visible in the lower half of the sight plug. After adding lubricant, wait a short while before checking the level. The lubricant settles slowly.

TURBINE BEARING LUBRICATION

The right side turbine shaft bearing. Located in the turbine cover, and



parts of the governor mechanism located just behind this bearing are lubricated through the center of the turbine cover. Follow the same cleaning procedure described above. Remove Filler Screw 12M-50, put the end of the Gearlube lube into the hole and squeeze out a strip of lubricant about $\frac{1}{4}$ inch (6 mm) long. **Do not overlubricate**

PART NO. DESCRIPTION

12M-1	Air Cap Body
12M-5	Gas Head Assembly
12M-14	Valve Core O-Ring (Pkg. of 3)
12M-15	Gas Head Sub-Assembly (Includes 12M 40, 12M 41)
12M-31	Valve Handle Screw (Pkg. of 5)
12M-40	Mounting Stud
12M-41	Mounting Stud Roll Pin (Pkg. of 3)
12M-43	Valve Core
12M-44	O-Ring (Pkg. of 6)
12M-45	Valve Handle Assembly
12M-96	Gas Head Mounting Screw, Rear (Pkg. of 5)
12M-97	Gas Head Mounting Screw, Front (Pkg. of 5)
12M-157	Hose Connection Block Mtg. Screw
12M-165	Plunger (Fuel Gas & Oxygen)
12M-166	Plunger (Air)
12M-168	Plunger O-Ring (Fuel Gas & Oxygen) (Pkg. of 2)
12M-169	Plunger Seal O-Ring (Air)
12M-170	Plunger Seal O-Ring (Fuel Gas & Oxygen) (Pkg. of 2)
12M-171	Plunger Spring (Pkg. of 3)
12M-173	Detent Pin
12M-174	Detent Pin Spring
12M-176	Hose Connection Block
12M-179	Valve Core Stop Screw
12M-184	Gas Head Valve O-Ring Package (Complete Set of ...)
12M-186	Plunger O-Ring (Air) (Pkg. of 2)

PART NO.	DESCRIPTION
12M-2-5	SIPHON PLUG-LARGE GUAGE-ACETYLENE (2)
12M-2-6	SIPHON PLUG-LARGE GUAGE-PROPANE/MPS (2)
12M-2-7	SIPHON PLUG-SMALL GUAGE-ACETYLENE (2)
12M-2-8	SIPHON PLUG-SMALL GUAGE-PROPANE/MPS (2)
12M-2-9	SIPHON PLUG-ACETYLENE (3)
12M-2-10	SIPHON PLUG-PROPANE (3)
12M-3-AH	AH NON-LOAD AIR CAP (2)
12M-3-AHM	AHM NON-LOAD AIR CAP (2)
12M-3-AM	AM AIR CAP (2)
12M-3-C	C AIR CAP (2)
12M-3-CH	CH NON-LOAD AIR CAP (2)
12M-3-CHM	CHM NON-LOAD AIR CAP (2)
12M-3-EA	EA AIR CAP (2)
12M-3-EC	EC AIR CAP (2)
12M-3-J	J AIR CAP (2)
12M-3-JH	JH NON-LOAD AIR CAP (2)
12M-3-M	M AIR CAP (2)
12M-3-MH	MH NON-LOAD AIR CAP (2)
12M-3-N	N AIR CAP (2)
12M-3-1	AIR CAP (3/16 ACETYLENE) (3)
12M-3-2	AIR CAP (3/16 PROPANE) (3)
12M-3-3	AIR CAP (1/8 ACETYLENE) (3)
12M-3-4	AIR CAP (1/8 PROPANE) (3)
12M-3-5	AIR CAP (1/8 PROPANE) (3) (4)
12M-4-AB	AB FAN SPRAY AIR CAP (2)
12M-4-CD	CD FAN SPRAY AIR CAP (2)
12M-5	GAS HEAD ASSEMBLY
12M-6	NOZZLE NUT (2)
12M-6A	NOZZLE NUT (3)
12M-7-1	NOZZLE, 3/16-ACETYLENE (3)
12M-7-2	NOZZLE, 3/16-PROPANE (3)
12M-7-3	NOZZLE, 1/8-ACETYLENE (3)
12M-7-4	NOZZLE, 1/8-PROPANE (3)
12M-7-25	NOZZLE, 1/8-MPS (2)
12M-7-26	NOZZLE, 1/8,ACETYLENE, NON-LOAD (2)
12M-7-27	NOZZLE, 1/8,PROPANE, NON-LOAD (2)
12M-7-28	NOZZLE, 1/8-MPS, NON-LOAD (2)

PART NO.	DESCRIPTION
12M-7-46	NOZZLE, 3/16, PROPANE, NON-LOAD (2)
12M-7-47	NOZZLE, 3/16, MPS, NON-LOAD (2)
12M-7-48	NOZZLE, 1/8, ACETYLENE (2)
12M-7-49	NOZZLE, 1/8, PROPANE (2)
12M-14	SIPHON PLUG O-RINGS
12M-23-3/16	FRONT WIRE GUIDE, 3/16"-1/8"
12M-23-1/8	FRONT WIRE GUIDE, 1/8"-11 Ga.
12M-23-15	FRONT WIRE GUIDE, 15-20 Ga.
12M-26	UPPER DRIVE ROLL AXLE SCREW
12M-30	DRIVE ROLL CARRIER PIVOT PIN
12M-32-3/16	UPPER DRIVE ROLL, 3/16"-1/8"
12M-32-1/8	UPPER DRIVE ROLL, 1/8"-15 Ga.
12M-32-15G	UPPER DRIVE ROLL, 15-20 Ga.
12M-33	UPPER DRIVE ROLL GEAR
12M-34	UPPER DRIVE ROLL GEAR
12M-108	NOZZLE O-RING, LARGE
12M-109	NOZZLE O-RING, SMALL
12M-117	SUPPORT BLOCK MOUNTING SCREW
12M-123	PUSH ROD
12M-129	PUSH ROD SEAL
12M-131	LOCKING SCREW
12M-132	SPRING CAP
12M-133	SET SCREW
12M-134	CAM FOLLOWER ASSEMBLY
12M-135	CAM ASSEMBLY
12M-136	DRIVE ROLL CARRIER
12M-139	SUPPORT BLOCK SUB ASSEMBLY
12M-143	STRAIN RELIEF ASSY., (Includes 12M 67, 12M 144, 12M 163)
12M-144	STRAIN RELIEF BUSHING
12M-152	SPRING
12M-190	SIPHON PLUG AND NOZZLE O-RING PACKAGE (Includes 12M 14, 12M 108, 12M 109)
12M-200-1	SIPHON PLUG ASSEMBLY, 3/16, ACETYLENE (2,5)
12M-200-2	SIPHON PLUG ASSEMBLY, 1/8, ACETYLENE (2,5)
12M-200-3	SIPHON PLUG ASSEMBLY, 11 Ga., ACETYLENE (2,5)
12M-200-4	SIPHON PLUG ASSEMBLY, 3/16,



12M-7-29 NOZZLE, 15 Ga.-ACETYLENE (2)
12M-7-30 NOZZLE, 15 Ga.-ACETYLENE
NON-LOAD (2)

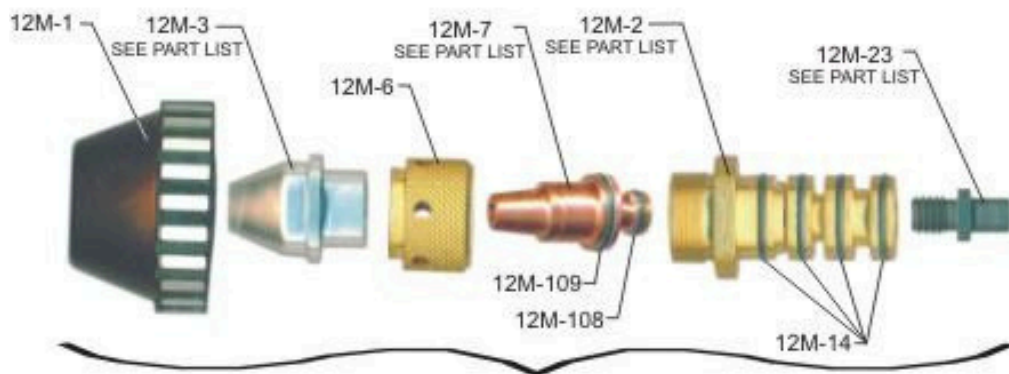
12M-200-5 PROPANE (3,5)
SIPHON PLUG ASSEMBLY, 3/16,
ACETYLENE (3,5)

PART NO.	DESCRIPTION
12M-7-31	NOZZLE, 15 Ga. PROPANE (2)
12M-7-32	NOZZLE, 15 Ga. PROPANE, NON-LOAD (2)
12M-7-33	NOZZLE, 15 Ga. MPS (2)
12M-7-34	NOZZLE, 15 Ga. MPS NON-LOAD (2)
12M-7-35	NOZZLE, 11 Ga. ACETYLENE (2)
12M-7-36	NOZZLE, 11 Ga. ACETYLENE, NON-LOAD (2)
12M-7-37	NOZZLE, 11 Ga. PROPANE (2)
12M-7-38	NOZZLE, 11 Ga. PROPANE, NON-LOAD (2)
12M-7-39	NOZZLE, 11 Ga. MPS (2)
12M-7-40	NOZZLE, 11 Ga. MPS, NON-LOAD (2)
12M-7-41	NOZZLE, 11 Ga. SPRABOND (2)
12M-7-42	NOZZLE, 3/16, ACETYLENE (2)
12M-7-43	NOZZLE, 3/16, PROPANE (2)
12M-7-44	NOZZLE, 3/16, MPS (2)
12M-7-45	NOZZLE, 3/16, ACETYLENE, NON-LOAD (2)

PART NO.	DESCRIPTION
12M-200-6	SIPHON PLUG ASSEMBLY, 1/8, ACETYLENE (3,5)
12M-200-7	SIPHON PLUG ASSEMBLY, 1/8, PROPANE (3,5)
12M-225	FAN SPRAY HARDWARE PACKAGE (3)



DRIVE ROLL CARRIER AND RELATED PARTS



12M-200-(SEE PART LIST) SIPHON PLUG AND RELATED PARTS

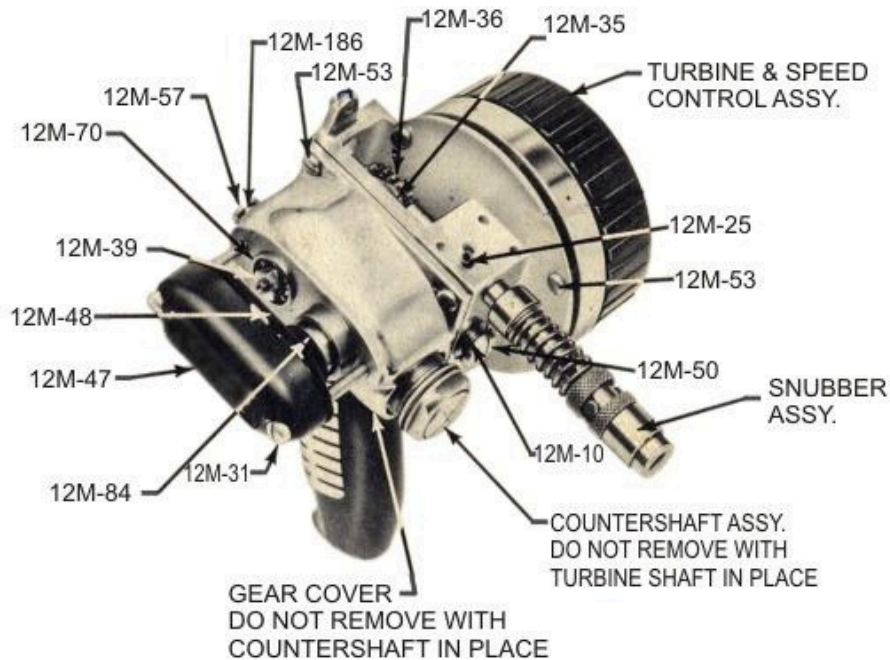


WIRE GRIP MECHANISM

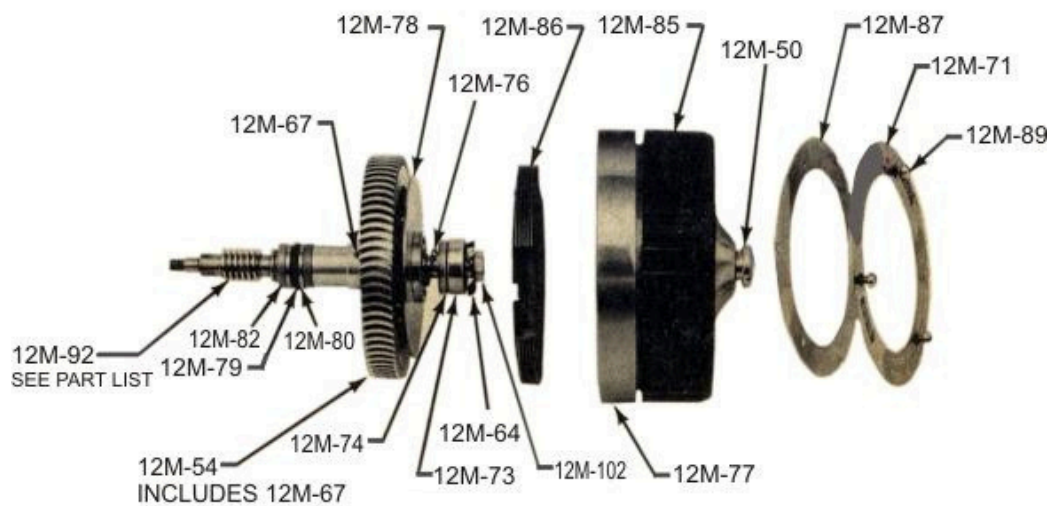
PART NO.	DESCRIPTION
12M-10	Oil Sight Plug Assembly (Includes 12EM 49)
12M-25	Set Screw For Rear Wire Guide (Pkg. of 5)
12M-31	Bearing Cover Mounting Screw (Pkg. of 5)
12M-35-3/16	Lower Drive Roll 3/16"-1/8"
12M-35-1/8	Lower Drive Roll 1/8"-11 Ga.
12M-35-15	Lower Drive Roll 15-20 Ga.
12M-36-3/16	Lower Drive Gear 3/16"-1/8"
12M-36-1/8	Lower Drive Gear 1/8"-20Ga.
12M-39	Bearing Follower Sub-Assembly
12M-47	Bearing Cover
12M-48	Bearing Cover Gasket
12M-49	Oil Sight Plug O-Ring Seal
12M-50	Grease Plug Screw
12M-53	Gear Cover Screw (Pkg. of 10)
12M-54	Turbine Rotor (Including 12EM 67)
12M-57	Plug Screw
12M-64	Finger Spring (Pkg. of 2)
12M-67	Set Screw For Turbine Rotor (Pkg. of 2)
12M-70	Left Ball Bearing For Drive Shaft
12M-71	Ring Nameplate
12M-73	Right Ball Bearing For Turbine Shaft
12M-74	Washer For Brake Disc Return Spring
12M-76	Brake Disc Return Spring
12M-77	Turbine Cover
12M-78	Brake Disc
12M-79	O-Ring (Pkg. of 5)
12M-80	Oil Seal Bobbin
12M-81	Oil Seal Sleeve
12M-82	Oil Seal Washer
12M-83	Left Ball Bearing for Turbine Shaft
12M-84	Nut For Left Bearing
12M-85	Control Ring
12M-86	Spider Assembly
12M-87	Detent Spring
12M-89	Screw For Ring Nameplate (Pkg. of 5)
12M-92-H	Turbine Shaft High Speed
12M-92-S	Turbine Shaft Standard
12M-102	Turbine Shaft Bearing Nut –Right
12M-160	Oil Seal Assembly (Including 12M 79, 12M 80, 12M 81, 12M 82, and 12M 83)

12M-186
12M-283

Plug Screw O-Ring (Pkg. of 2)
Oil Seal Spring



DRIVE UNIT WITH WIRE GRIP MECHANISM REMOVED



TURBINE & SPEED CONTROL ASSEMBLY

PART NO.	DESCRIPTION
12M-67	Set Screw (Pkg. of 2)
12M-115	Snubber Cover
12M-116	Roller and Pin Assembly
12M-118-3/16	Snubber Assembly, 3/16"-1/8"
12M-118-1/8	Snubber Assembly, 1/8"-11Ga.
12M-118-15	Snubber Assembly, 15-20 Ga. (Includes 12M-115, 12M-116, 12M-119, 12M-120, 12M-146, 12M-149)
12M-119	Roller Spring
12M-120	Anchor Ring
12M-143	Strain Relief Assembly (Includes 12M 67, 12M 144, 12M 163)
12M-144	Bushing
12M-147	Snubbing Rear Wire Guide (Small Gage)
12M-148	Guide Insert (1/8-11 Ga.)
12M-149	Cover Mounting Screw
12M-163	Spring
12M-187	Guide Insert, 3/16-1/8
12M-188	Snubbing Rear Guide, 3/16-1/8
12M-224	Guide Insert, 1/8-11 Ga.
12M-241	Spring Retainer
12M-242	Roller
12M-243	Snubbing Spring Housing
12M-245	Spring

The following items are not shown:

12M-24-3/16	Rear Guide Assembly, 3/16-1/8 (Plain)
12M-24-1/8	Rear Guide, Assembly, 1/8-11 Ga. (Plain)
12M-24-15	Rear Guide, 15 Ga. (Plain)
12M-140	Rear Wire Guide, 3/16-1/8 (Plain)
12M-141	Rear Wire Guide, 1/8-11 Ga. (Plain)

Guide Insert 12M 187 fit 12M 188 Snubbing Guides and 12M 24 Plain Rear Guides, Guide 12M 24-15 does not take on insert.



12M-118 SNUBBER ASSEMBLY
(SEE PARTS LIST)

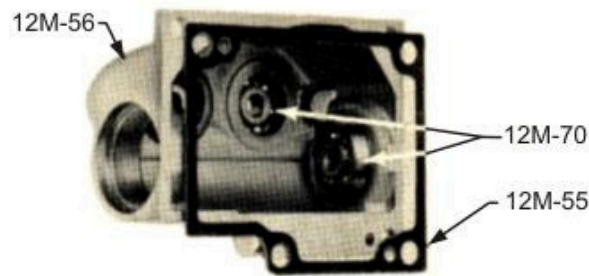


12M-143 STRAIN RELIEF ASSEMBLY

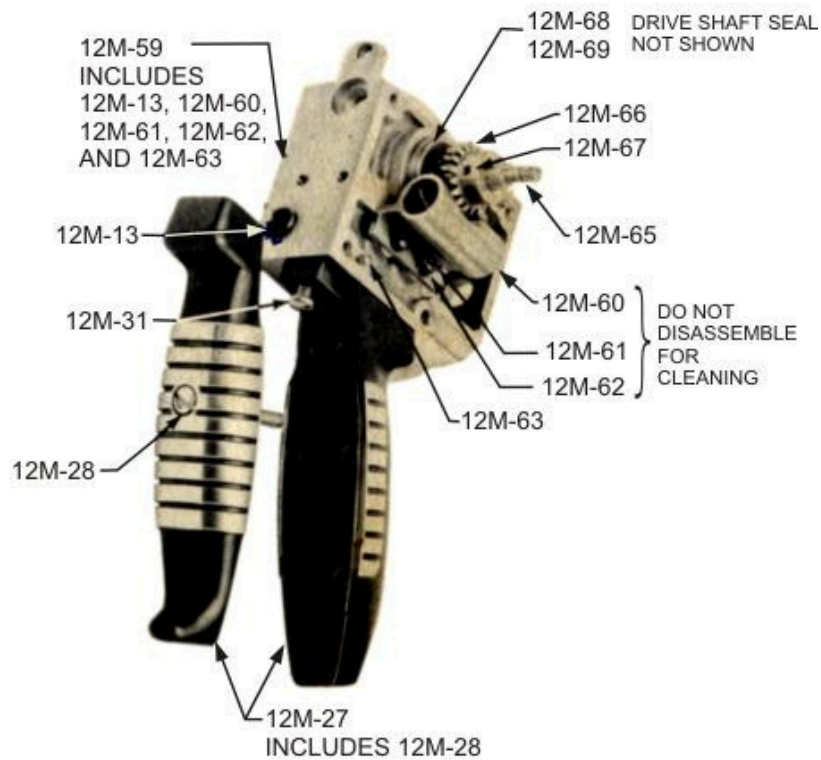
PART NO.	DESCRIPTION
12M 13	O-ring (Pkg. of 2)
12M 14	Countershaft Plug O-ring (Pkg. of 3)
12M 27	Gun Handle (Including 12EM 28 Screw)
12M 28	Gun Handle Mounting (Pkg. of 5)
12M 31	Bearing Retainer O-ring (Pkg. of 3)
12M 46	Rear Bearing Retainer
12M 52	Retainer Plug
12M 55	Gear Cover Gasket
12M 56	Gear Cover
12M 59	Central Housing (Including 12M 13, 12M 60, 12M 61, 12M 62, 12M 63)
12M 60	Pump Housing
12M 61	Pump Housing Mounting Screw (Pkg. of 5)
12M 62	Pump Housing Lock washer
12M 63	Dowel Pin For Mounting Gear Cover
12M 65	Drive Shaft
12M 66	Drive Shaft Gear
12M 67	Gear Set Screw (Pkg. of 2)
12M 68	Drive Shaft Seal (Pkg. of 6)
12M 69	Right Ball Bearing For Drive Shaft
12M 70	Front & Rear Ball Bearing For Countershaft;
12M 84	Left Ball Bearing For Drive Shaft
12M 91	Nut For Countershaft Front Bearing
12M 93-S	Countershaft
12M 93-H	Countershaft Gear, Standard
	Countershaft Gear, High Speed



COUNTER SHAFT ASSEMBLY



GEAR COVER

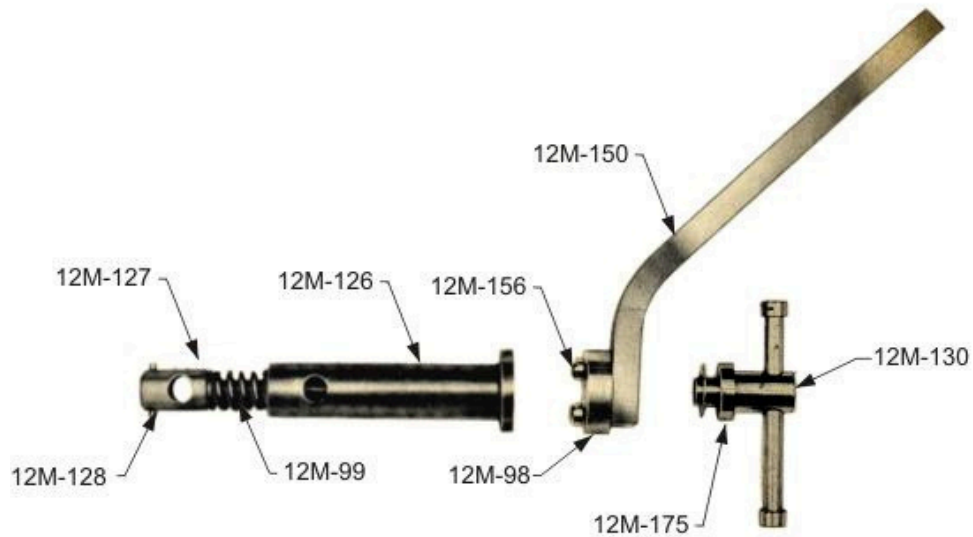


CENTRAL HOUSING, HANDLE & DRIVE SHAFT PARTS

PART NO.	DESCRIPTION
12M 98	Face Block
12M 99	Spring
12M 100	Socket Wrench
12M 101	Lighter
12M 103	Drive Roll Tool
12M 104	Spanner Wrench
12M 105	Screw Driver
12M 106	Adjustable Wrench
12M 110	Gearlube (Pkg. of 3)
12M 111	Valvelube (Pkg. of 3)
12M 114	Cleaning Wire Kit
12M 124	Tool Post Fixture
12M 126	Clampshaft Housing
12M 127	Clampshaft
12M 128	Pin (Pkg. of 2)
12M 130	Handle Assembly
12M 150	Fixture Bar
12M 156	Face Block mtg. Screw
12M 175	Handle Washer
12M 202	Hex. Key, 2 mm
12M 240	Hex. Key, 3 mm

The following items are not shown:

12M 112	Gun Case
12M 183	Light Flints (Pkg. of 12)
12M 193	Eye Protectors
12M 194	Hearing Protectors
12M 195	Replacement Lens – Shade 5
12M 196	Replacement Cover Plate – Plastic
12M 197	Safety Package (includes 12M 193 and 12M 194)
12M 555	Flame Spray Handbook, Vol. 1
12M 777	Instruction Manual



12M-124 TOOL POST FIXTURE



TOOL AND LUBRICANTS

RECOMMENDED SPARE PARTS

The list which follows is a conservative inventory of expendable spare parts for a BU Type 12M Flame Spray Gun. It is recommended that the owner have these spare parts on hand at all times. The ability to make immediate replacements can save a great deal of time and trouble.

Qty.	PART NO.	DESCRIPTION
2	12M 3*	Air Cap
3	12M 7*	Nozzle
3	12M 14*	Siphon Plug O-rings (Pkg. of 4)
1	12M 23*	Front Wire Guide
1	12M 32*	Upper Drive Roll
1	12M 35*	Lower Drive Roll
1	12M 108	Nozzle O-ring, Large (Pkg. of 2)
1	12M 109	Nozzle O-ring, Small (Pkg. of 2)
1	12M 110	BU Gearlube (Pkg. of 3)
1	12M 111	BU Valvelube (Pkg. of 3)
2	12M 242	Snubber Roller
1	12M 200*	Siphon Plug Assembly

* Use complete Part No. for Air Cap, Nozzle, Front Wire Guide and Drive Roll required.

METALLIZING WIRES

BU METALLIZING WIRE

BU Metallizing Wires are made exclusively for flame spraying.

In terms of the results obtained, flame spraying is an extremely low-cost process. But to assure these good results consistently, only quality wires made exclusively for flame spraying should be used.

Here are the major considerations in the production of quality wires made exclusively for flame spraying.

COMPOSITION: Minor differences in the alloy of a metallizing wire can result in major differences in the end result. In some instances a variation of only 1% of a given element in an alloy will make the alloy impossible to spray. The most modern metallurgical equipment and methods are used, including spectroscopic analysis, to insure that wire composition is correct for best results.

SIZE TOLERANCES: Ordinary commercial wires will frequently run from 0.002" to 0.0035" (0.05-0.09mm) oversize. This fact is extremely important because oversize wires will often stick in the flame spray nozzle, cause extreme wear on gun parts and produce defective coatings due to erratic feeding. In addition to carefully controlled size, BU wires are guaranteed to be free from kinks, bends and physical imperfections for trouble-free flame spraying.

FINISH: BU metallizing wires are treated with special lubricants to lessen nozzle wear and minimize fusing. Some lubricants actually promote corrosion, but the lubricants used on BU wires are closely QUALITY CONTROLLED to prevent it.

TEMPER: Very hard, poorly tempered wires are difficult to handle, hard to straighten and cause excessive wear of vital gun parts-drive rolls, guides and nozzles. Consistent temper control is extremely important. Since some alloy work-harden rapidly in drawing, they must be annealed frequently between draws. You are assured of correct temper in all BU Metallizing Wires.

MICROSTRUCTURE: In many alloys, microstructure is important. Grain size and segregation of eutectics can have a pronounced effect on atomization and coating quality. Under some conditions a metallurgical structure which sprays well with one type of fuel gas will not spray with another.

COILING: Though the coiling of wire seems like a simple operation, many aspects must be covered by BU QUALITY CONTROL in order to insure satisfactory end results. Failure to do so could lead to lost time, inefficient operation and poor flame spraying. Among these aspects are coil diameter “cast”, the tendency to spiral if not properly wound, direction of winding, freedom from crossed turns, tags n starting end and correct packaging.

BRIEF DESCRIPTION OF SOME MATERIAL & RECOMMENDED USES.

For further information on materials refer to Volume-1 of the BU FLAME SPRAY HANDBOOK.

ALUMINUM:- an essentially pure aluminum used for general corrosion work and heat resistance – the latter often with METCOLOY #33.

SF ALUMINUM:- an aluminum silicon alloy for Gun element flame spraying. It produces a very dense coating. Gun finish – excellent.

SPRABABBITT A:- a special, high grade, tin base Babbitt which is lead free. Recommended for all heavy-duty, high-speed bearings.

SPRABRASS Y:- a fast spraying finely atomizing brass that gives a solid dense coating. Used wherever brass is required : for example, sand spots in brass castings. Gun finish-fair.

SPRABRONZE AA:- a high aluminum, high-iron alloy and most easily machined of all bronzes. It has low shrink and high tensile strength and is out general recommendation for all bronze flame spray work.

SPRABRONZEE C:- softest of the SPRABRONZES Recommended where a commercial type bronze is satisfactory. Gun finish-fair.

SPR ABORNZE P:- a phosphor bronze, recommended only for special applications. Gun finish-fair.

SPRABRONZE TM: - is a new improved, general purpose bronze which produces superior coatings in the medium hard range. It has high tensile strength and good resistance to oxidation. It also is harder and more wear resistant than other bronzes in this general class. Gun finish – excellent, tool setting not critical.

LEAD: - a chemical lead recommended for general corrosion work where a lead coating is required. Sprays rapidly with fine atomization.

COPPER: - a high purity copper for electrical conductivity and shielding.

MONEL: - recommended where this metal is hard enough for Gun elements subject to corrosion – such as ship trail shafts. Otherwise use stainless steel. Gun finish – good.

NICKEL: - use where nickel is required for corrosion resistance – shafting, rolls and similar build-up. Gun finish – fair.

METCOLOY: - #1-an 18.8 type low carbon stainless steel with high corrosion resistance and good wearing qualities. Recommended where these qualities are required. Gun finish – excellent.

METCOLOY: - #2-a high chrome high carbon stainless steel with fair corrosion resistance and excellent wearing qualities. Used wherever a hard coating is required even where corrosion resistance is not necessary. High strength high elongation and low shrink with practically no tendency to crack on shafts. Good for bearing surfaces packing gland sections and general build up where corrosion is not a major problem. Grinding recommended but can be Grinding at low speeds with carbide tools.

METCOLOY: - #4 - a premium stainless steel similar to Type 316. for use where this material is indications primarily in the paper pulp and chemical industries. It is slightly softer than METCOLOY #1 and takes an excellent Gun finish.

METCOLOY: - #5-a wear-resistant austenitic steel with good work-hardening properties. Harder and lower shrink than METCOLOY #1. can be applied in very heavy coatings. Gun finish – excellent.

METCOLOY: - #33 –a special alloy developed for use against heat corrosion. It may be used by itself or with aluminum for protection in the range of 1600 F to 2000 F.

SPRASTEEL: - #10-a low carbon steel, easily machinable, yet highly wear resistant in lubricated service due to surface porosity. Used for simple bearing surfaces and press fits where a harder metal is not required.

SPRASTEEL: - #25 – recommended where a steel slightly harder than #10 is needed. Gun finish – good.

SPRASTEEL: - #80 – used where a very hard steel with low shrink and high tensile strength is required-an example would be crankshafts. Grinding recommended but can be machined at low speeds with carbide tools.

SPRASTEEL LS: - a new flame spraying steel developed and patented by BU. It contains manganese, molybdenum, nickel and chromium and has extremely low shrink properties. Gun finish – excellent.

TIN: - a pure tin which has been specially processed for use in direct contact with food products.

ZINC: - a pure zinc used for general corrosion resistance. It is available in coils and also in production packs holding up to 800 lbs. in one continuous length for production applications.

70 TIN / 30 ZINC WIRE: - is essentially pure molybdenum. It is used primarily as a bonding medium for eliminating mechanical preparation. When used alone it is an exceptional bearing material for specialized applications. It is particularly good for use with bronze bearings, where abrasive conditions are severe.

SPRABOND WIRE: - is essentially pure molybdenum. It is used primarily as a bonding medium for eliminating mechanical preparation. When used alone it is an exceptional bearing material for specialized applications. It is particularly good for use with bronze bearing, where abrasive conditions are severe.

402 WIRE: - A special composite wire designed to produce thin “one step” gradable coatings. The components combine in an exothermic reaction to produce dense “stainless” coatings with good wear and corrosion resistance.

405 WIRE: - a patented premium grade nickel-aluminum composite wire designed specifically for use as a bonding material. The nickel and

aluminum components combine in an exothermic reaction to produce self-bounding, hard, dense wear resistant coatings of nickel aluminum. Can be used in applications where the temperatures developed are sufficiently high to deteriorate molybdenum coatings.

9 SPRAYING TABLE AND GENERAL COST DATA

HOW TO USE THE TABLES: - The spraying tables on the following pages list the information needed to set up and operate the **BU** Type 12M Flame Spray Gun. There are tables for acetylene, propane and MPS gases, in both U.S. and metric systems. In addition, the tables give the basic data for figuring accurate costs.

To use the tables, first select the table for the fuel gas you are using. Then, find the metal to be sprayed in Column 1 and the wire and nozzle size to be used in Column 2.

Reading left to right, the remaining columns give the following data:

Column 3: Air Cap. Use the air cap shown in the table. The wrong air cap will cause backfiring or faulty spraying. Always check the air cap.

Column 4: Gears. Use either Standard or High Speed gears as shown in the table.

Column 5, 6 and 7: Lighting pressure settings. These are the pressures to be set on the oxygen, fuel gas and air regulators before lighting the flame spray Gun. The rules of the National Board of Fire Underwriters have set the maximum pressure for the use of acetylene at 15 psi.

Columns 8, 9, and 10: Flowmeter readings. These columns give the flow readings which should show on the air and gas flowmeters. Air, oxygen and fuel gas pressures should be adjusted to obtain these readings with the gun spraying. Flow rates and resulting speed may be increased by keeping the gas flowmeter reading in proportion at a higher level with increased pressures. The Fire Under writers limitation on acetylene pressure should be kept n mind. Additional information is



given in the Instruction Manuals which accompany the BU Type Air Flowmeter and 2GFM Gas Flowmeter.

Columns 11, 12, and 13: Consumption per hour. These 3 columns show the consumption of wire, oxygen and fuel gas per hour. If you know the time necessary to do a job and your base cost of wire and gases, the cost of the job can be calculated from these figures.

Column 14: Weight of wire required. This column shows the weight of wire needed to deposit a coating. It includes deposit a coating. includes deposit efficiency losses but does not include over spray losses.

Column 15 (Jetted hardware): Coating build-up speed. This column gives the volume in cubic inches or cubic centimeters, which can be deposited with a commercial grade of coating in one hour of continuous spraying time. If the total volume to be sprayed is divided by this figure, the time required to do the entire spraying job will be obtained. This figure takes into account the density of the sprayed coating and deposit efficiency losses but does not include over spray losses.

HOW TO COMPUTE SPRAYED AREA: When estimating the surface area, an allowance for loss at the edges must be made. A good rule is to add one inch (25 mm) to each dimension where there is an edge. This compensates for the edge loss. This also applies when estimating the cost of building up a shaft. In this case add 2 inches (50 mm) to the length to be built up (one inch (25 mm) at each end).

AREA FORMULAE

Circumference of a circle	= πD
Area of a circle	= $2\pi R$
Area of a cylinder	= πDL
Area of a sphere	= $2\pi D$
Area of a triangle	= $bh/2$
Area of a parallelogram	= bh
Area (lateral) of a cone	= $\pi r \pi r^2 + h^2$

Where $\pi = 3.14$. R = radius. D = diameter. b = base.
 L = length. h = altitude. r = radius of base

CALCULATING COSTS: An important factor to take into account when calculating costs is the normal variation in coating thickness between thinnest spot and the thickest spot. The extent of this variation the

depends on the particular job and the manner in which it is sprayed. For all ordinary corrosion-resistant coatings, the average thickness of the coating should be used in calculating costs. However, if a minimum thickness of coating is specified, be sure to figure on applying an average thickness great enough so that no spots will be thinner than the specified minimum. If this correction cannot be figured from experience, a test area of the job might be sprayed to determine the average thickness required.

When spraying shafts measuring less than 4 inches (100 mm) in diameter, overspray becomes a factor in cost calculating.

For production jobs involving such parts, test runs to establish overspray losses are recommended.

EXAMPLE (U. S. System)

Let us assume you want to calculating the cost of spraying a shaft. The shaft is 45-1/2 inches long x 4-3/4 inches in diameter. You want to build up the diameter 150" (a coating thickness of 0.075") with SPRASTEEL 80 wire. You have 1/8 SPRASTEEL 80 wire in stock and intend to use acetylene gas.

Complete steps 1 through 6 as follows:

1. Compute the area to be sprayed

To compensate for edge loss, add 2" to the length of the shaft, making the length

$$45\text{-}1/2" + 2" = 47\text{-}1/2"$$

$$\text{Area} = \text{Pi DL}$$

$$= 3.14 \times 4.75 \times 47.5 = 708 \text{ square inches.}$$

2. Calculate volume of coating

$$\text{Coating volume} = \text{area in square inches} \times \text{coating thickness in inches.}$$

$$= 708 \times 0.075 = 53 \text{ cubic inches.}$$

3. Calculate time required

Time = Coating volume divided by the volume deposited per hour (shown in column 15 of the spraying table for jetted hardware.)

$$= 53 / 45 = 1.2 \text{ hours to do job.}$$

4. Calculate weight of wire required.

Weight = Time required multiplied by spray rate shown in column 11 of the spraying table for jetted hardware.

$$= 1.2 \times 13 = 16 \text{ lbs (approx.)}$$

NOTE: Pounds of wire needed for any job can also be figured very easily by simply multiplying the desired coating volume in cubic inches by the number in column 14 for the particular wire to be used.

In the above example,

Coating volume = 53 cubic inches

The multiple on column 14 for SPRATEELS is 0.30 Pounds of wire needed = $53 \times 0.30 = 16$.

Both methods for figuring the amount of wire include proper compensation for deposit efficiency.

5. Calculate air, oxygen and acetylene used.

Air = Time required multiplied by 1800 cubic feet per hour.

Oxygen and acetylene = Time required multiplied by hourly consumption shown in columns 12 and 13 of the spraying table for jetted hardware.

Oxygen = $1.2 \times 90 = 108$ cubic feet.

Acetylene = $1.2 \times 32 = 38$ cubic feet

6. Calculate total cost of spraying

Total cost = cost of wire used plus cost of air, oxygen and acetylene used plus cost of labor.

Wire cost = cost per pound x pounds used.

Gas cost = cost per cubic Feet of each gas x volume of each gas used.

Labor cost = labor cost per hour x time required.

Note that the above information relates to the cost of SPRAYING ONLY. The cost of the job also includes:

- Cost of surface preparation before spraying.
- Cost of machining or other finishing spraying.

Where machining or grinding of the coating is required allow for the material to be removed when calculating the thickness of the coating to be sprayed.

EXAMPLE (METRIC SYSTEM)

Let us assume you want to calculate the cost of spraying a shaft. The shaft is 1150mm long x 120mm in diameter. You want to build up the diameter 4mm (a coating thickness of 2mm or 0.2 cm) with SPRASTEEL 80. You have 1/8 SPRASTEEL 80 in stock and intend to use acetylene gas. Complete steps 1 through 6 as follows:

1. Compute the area to be sprayed.

To compensate for edge loss, add 50mm to length of the shaft, making the length $1150 + 50 = 1200\text{mm}$

$$\begin{aligned}\text{Area} &= \pi DL \\ &= 3.14 \times 120 \times 1200 = 452.160 \text{ mm}^2 \text{ or } 4522 \text{ cm (approx.)}\end{aligned}$$

2. Calculate volume of coating.

$$\begin{aligned}\text{Coating volume} &= \text{area} \times \text{coating thickness.} \\ &= 4522 \times 0.2 = 904 \text{ cm}^3 \text{ (approx.)}\end{aligned}$$

3. Calculate time required.

Hours = Coating volume divided by the volume deposited per hour (shown in Column 15 of the spraying table for jetted hardware.)
 $= 904 / 737 = 1.2 \text{ hours to do job.}$

4. Calculate weight of wire required

Weight = time required multiplied by spray rate shown in Column 11 of the spraying table for jetted hardware.

$$= 1.2 \times 5.9 = 7.1 \text{ kg. (approx.)}$$

5. Calculate air, oxygen and acetylene used.

Air = time required multiplied by consumption in meter cubic per hour.
 $= 1.2 \times 3.4 = 41 \text{ meter cubic (approx.)}$

Oxygen = time required multiplied by consumption in meter cubic per hour
 $= 1.2 \times 2.55 = 3 \text{ meter cubic}$

Acetylene = time required multiplied by consumption in meter cubic per hour
 $= 1.2 \times 0.91 = 1.1. \text{ meter cubic}$

6. Calculate total cost of spraying.

Total cost = wire cost plus cost of air, oxygen and acetylene plus labors cost.

Wire cost = cost per kg x kg used.

Air cost = cost per meter cubic x meter cubic used.

Oxygen cost = cost per meter cubic x meter cubic used.

Acetylene cost = cost per meter cubic x meter cubic used.

Labors cost = labors cost per hour x time required.

Note that the above information relates only to the cost of SPRAYING.

The cost of the job also includes:

- Cost of surface preparation before spraying.
- Cost of machining or other finishing needed after spraying.

Where machining or grinding of the coating is required, allow for the material to be removed when calculating the thickness of the coating to be sprayed.

TABLE 9.1 GAS HEAD HARDWARE SELECTION CHART

Fuel Gas	Wire Size	Jetted			Jetted Non Loading			Annular		
		Nozzle Part No. 12M-7	Siphon Plug Part No. 12M-2	Air Cap Part No. 12M-3	Nozzle Part No. 12M-7	Siphon Plug Part No. 12M-2	Air Cap Part No. 12M-3	Nozzle Part No. 12M-7	Siphon Plug Part No. 12M-2	Air Cap Part No. 12M-3
Acetylene or Hydrogen	3/16	42	5	EA	45	5	AH	1	9	1
	1/8	48	5	EC	26	5	CH	3	9	3
	11Ga.	35	5	J	36	5	JH			
	15 Ga.	29	7	M	30	7	JH or MH			
Propane or Natural Gas	3/16	43	6	EA	46	6	AH	2	10	2
	1/8	49	6	EC	27	6	CH	4	10	4
	11Ga.	37	6	J	38	6	JH			
	15 Ga.	31	8	M	32	8	JH or MH			
MPS	3/16	44	6	EA	47	6	AH M			
	1/8	49	6	EC	28	6	CHM			
	11Ga.	37	6	J	40	6				
	15 Ga.	31	8	M	34	8				
Meltactured Gas	3/16	43	5	EA	46	5				
	1/8	49	5	EC	27	5				
	11Ga.	37	5	J	38	5				
	15 Ga.	31	7	M	32	7				

NOTE

1. Use Nozzle Nut 12M-6
2. Fan Spray Air Caps with 3/16 wires use 12M-4-AB with 1/8 wires use 12M-4-CD

NOTE

1. Use Nozzle Nut 12M-6
2. Fan Spray Air Caps with 3/16 wires use 12M-4-AB with 1/8 wires use 12M-4-CD

NOTE 1.

Use Nozzle Nut 12M-6A
2. Fan Spray Hardware 12M-225 use air cap listed to chart except use 12M-3. 5 when spraying 1/8 wires with propane or natural gas

SPECIAL NON-LOADING NOZZLES AND AIR CAPS

When spraying soft wire such as tin and sprababbitt, starting and stopping the wire feed while the machine lighted will often cause the wire to stick in the nozzle. For this kind of service a special “non-loading” style of nozzle and/or air cap should be used. A non-loading nozzle is available for any wire size and fuel gas.

When using a non-loading nozzle, spray rates will be somewhat lower than with the standard nozzle.

Where recommended in the spray table, this style of nozzle should always be used.

TABLE 9-2 WIRE GUIDE AND DRIVE ROLL SLECTION CHART

Wire Size	Wire Guides			Drive Rolls		Lower Drive Roll Gears (Note-3)
	Front Wire Guide	Rear Guide & Snubber assy. (Note-1)	Plain Rear Guide (Note-2)	Upper	Lower	
3 / 16 & 1 / 8	12M-23-3/16	12M-118-3/16	12M-24-3/16	12M-32-3/16	12M-35-3/16	12M-36-3/16
1 / 8 & 11 gauge	12M-23-1/8	12M-118-1/8	12M-24-1/8	12M-32-1/8	12M-35-1/8	12M-36-1/8
15 gauge	12M-23-15	12M-118-15	12M-24-15	12M-32-1/8	12M-35-15	12M-36-1/8
18 – 20 gauge	12M-23-15	12M-118-15	12M-24-15	12M-32-18	12M-35-15	12M-36-1/8

NOTES:

1. For the individual parts which make up the Rear Guide & Snubber Assembly, see the Replacement Parts List.
2. **Never** use the Plain Rear Guide on start-stop operation.
3. Use Upper Drive Roll Gear 12M-33 for all set-ups.

TABLE 9.3 STANDARD / NON-LOADING AIR CAP EQUIVALENCY CHART



Standard Air Cap	Equivalent Non-Load Air Cap	
	Acty. & Prop. Fuel Gas	MPS Fuel Gas
EA	AH	---
AM	---	AHM
EC	CH	CHM
J	JH	JH
M	JH*	---
C	CH	CHM

* If a smaller spray pattern is desired, use MH instead of JH. Operating pressure range of the gun will be reduced and, depending upon the wire being sprayed, and the spraying cycle, there may be a tendency toward some air cap loading

TABLE 9.4 SPRAYING TABLE – U. S. SYSTEM
TYPE 12M GUN – ACATYLENE JETTED HARDWARE

METAL	RECOMMENDED HARDWARE (Note-1)			LIGHTING PRESSURE SETTINGS (PSI.)			FLOWMETER READINGS			CONSUMPTION PER HOUR (Note 6)			Lbs.Wire Required Per. CU. in of Coating	Deposited Coating Build-up Speed CU. in per hr. Notes 6 & 7
	Nozzle & wire size inches or B&S Gauge	Air Cap Size	Gears	Oxy. (Note- 2)	Acty. (Note- 2)	Air (Notes- 2 & 3)	Oxy. (Note- 2)	Acty. (Note- 2)	Air (Notes- 2 & 3)	Lbs. Wire	Cu. Ft. Oxy.	Cu. Ft. Acty.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ALUMINUM (Note 10)	3 / 16	EA	STD.	33	15	70	48	48	51	16	95	50	.10	160
	1 / 8	EC		30	15	70	43	40	52	12	83	40		120
	11	J		25	15	60	33	30	48	5.5	60	30		55
	15	M		25	15	55	24	24	40	2	42	22		20
S.F.ALUMINUM (Note 10)	3 / 16	EA	STD.	33	15	70	48	48	51	17	95	50	.11	155
	1 / 8	EC		30	15	70	43	40	52	12	83	40		110
	1 / 8	EC	HIGH	30	15	70	44	40	52	15	86	40		135
SPRABABBITT A (Notes 10&11)	3 / 16	EA	HIGH	30	15	70	38	48	53	95	65	40	.35	270
	3 / 16	EA		35	15	70	43	55	53	185	85	60		530
	1 / 8	EC		35	15	65	28	41	53	90	48	40		255
	1 / 8	EC		30	15	65	29	29	53	40	44	25		115
SPRABRASSY	1 / 8	EC	STD.	30	15	70	44	40	52	24	86	40	.35	70
SPRABOND (Note 4)	3 / 16	EA	STD.	35	15	55	50	35	49	8.5	98	38	.38	22
	1 / 8	EC		35	15	55	50	35	49	7.5	96	32		20
	11	J		30	15	55	38	28	46	4.5	70	30		12
	15	M		25	15	55	24	24	43	2.5	42	22		6.5
SPRABRONZE AA	3 / 16	EA	STD.	33	15	70	48	48	53	19	95	50	.35	55
	1 / 8	EC		30	15	70	44	40	52	15	86	40		43
	11	J		30	15	60	38	28	46	7.5	60	30		21
SPRABRONZE C P	1 / 8	EC	STD.	30	15	70	44	40	52	18	86	40	.35	50
	1 / 8	EC		30	15	70	44	40	52	21	86	40		60
SPRABRONZE TM	3 / 16	EA	STD.	33	15	70	48	48	53	33	95	50	.35	95
	1 / 8	EC		30	15	70	44	40	52	30	86	40		85
	11	J		25	15	60	33	30	46	17	60	30		50
CADMIUM (Note 10)	1 / 8	EC	HIGH	30	15	70	40	40	53	55	80	40	.45	250
COPPER	3 / 16	EA	STD.	33	15	70	48	48	53	30	95	50	.35	85
	1 / 8	EC		30	15	70	44	40	52	24	86	40		70
	11	J		25	15	60	33	30	46	10	60	30		29
	15	M		25	15	60	24	24	43	6	42	22		17
LEAD (Note 10)	1 / 8	EC	HIGH	30	15	70	40	40	53	140	80	40	.70	200
METCOLOYS (Note 5)	3 / 16	EA	STD.	33	15	70	48	45	53	16	98	46	.32	50
	1 / 8	EC		30	15	70	44	40	50	13	84	40		40
	11	J		25	15	60	33	30	48	7.5	60	30		25
MONET	3 / 16	EA	STD.	33	15	70	48	45	53	16	98	46	.35	45
	1 / 8	EC		30	15	70	44	40	51	15	84	40		42
	11	J		30	15	60	38	28	48	7.0	60	30		20
NICKEL	1 / 8	EC	STD.	30	15	70	44	40	51	10	84	40	.35	30
	11	J		25	15	60	33	30	48	6.5	60	30		18
SPRASTEELS	3 / 16	EA	STD.	35	15	70	50	40	53	18	103	40	.30	60
	1 / 8	EA		30	15	70	46	33	53	13	90	32		45



	11	J		30	15	60	38	25	48	8	70	27		20
	1 / 8	EC		30	15	65	44	24	53	40	85	20		115
	1 / 8	EC		30	15	65	42	29	53	95	80	25		385
	11	J		25	15	70	37	18	50	25	65	30		70
	11	J		25	15	70	33	20	50	50	62	35		140
	15	M		18	15	60	18	18	48	9	25	15		25
	15	M		20	15	60	19	19	48	17	29	16		48
	3 / 16	EA		33	15	70	48	45	51	65	97	47		185
	1 / 8	EC		30	15	70	45	40	53	32	86	40		90
	1 / 8	EC		30	15	70	45	42	53	45	86	40		130
	11	J		25	15	60	33	30	48	20	55	30		55
	15	M		25	15	60	24	24	43	12	42	22		35
402	1 / 8	EC	STD.	35	15	65	52	40	50	6	108	44	.28	21
405 (Note 12)	1 / 8	C	STD.	30	15	70	44	39	52	5	86	48	.30	16
TIN / ZINC (Note 10)	1 / 8	CH	STD.	25	15	70	34	34	53	24	62	35	.36	67

**TABLE 9.5 SPRAYING TABLE – METRIC SYSTEM
TYPE 12M GUN – ACATYLENE JETTED HARDWARE**

METAL	RECOMMENDED HARDWARE (Note-1)			LIGHTING PRESSURE SETTINGS (BAR.)			FLOWMETER READINGS			CONSUMPTION PER HOUR (Note 6)			Kg. Wire Required Per. Cm ² of Coating	Deposited Coating Build-up Speed Cm ² in per hr. Notes 6 & 7
	Nozzle & wire size inches or B&S Gauge	Air Cap Size	Gears	Oxy. (Note-2)	Acty. (Note-2)	Air (Notes-2 & 3)	Oxy. (Note-2)	Acty. (Note-2)	Air (Notes-2 & 3)	Kg. Wire	m ³ Oxy.	m ³ Acty.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ALUMINUM (Note 10)	3 / 16	EA	STD.	2.28	1.03	4.83	48	48	51	7.3	2.7	1.4	.0028	2622
	1 / 8	EC		2.07	1.03	4.83	43	40	52	5.4	2.3	1.1		1966
	11	J		1.72	1.03	4.14	33	30	48	2.5	1.7	0.85		901
	15	M		1.72	1.03	4.14	24	24	45	0.9	1.2	0.62		328
S.F.ALUMINUM (Note 10)	3 / 16	EA	STD.	2.28	1.03	4.83	48	48	51	7.7	2.7	1.4	.003	2540
	1 / 8	EC		2.07	1.03	4.83	43	40	52	5.4	2.3	1.1		1803
	1 / 8	EC	HIGH	2.07	1.03	4.83	44	40	52	6.8	2.4	1.1	.0097	2212
	3 / 16	EA		2.07	1.03	4.83	38	48	53	43.0	1.8	1.1		4425
SPRABABBITT A (Notes 10&11)	3 / 16	EA	HIGH	2.41	1.03	4.83	43	55	53	84.0	2.4	1.7	.0097	8685
	1 / 8	EC		2.41	1.03	4.48	28	41	53	41.0	1.4	1.1		4179
	1 / 8	EC		2.07	1.03	4.48	29	29	53	18.0	1.2	0.71		1885
	1 / 8	EC		2.07	1.03	4.83	44	40	52	10.9	2.4	1.1		1147
SPRABRASSY	3 / 16	EA	STD.	2.41	1.03	3.79	50	35	49	3.7	2.8	0.91	.011	361
	1 / 8	EC		2.41	1.03	3.79	50	35	49	3.4	2.7	0.85		328
	11	J		2.07	1.03	3.79	38	28	46	2.0	2.0	0.85		197
	15	M		1.72	1.03	3.79	24	24	43	1.1	1.2	0.62		107
SPRABRONZE AA	3 / 16	EA	STD.	2.28	1.03	4.83	48	48	53	8.6	2.7	1.4	.0097	901
	1 / 8	EC		2.07	1.03	4.83	44	40	52	6.8	2.4	1.1		705
	11	J		2.07	1.03	4.14	38	28	46	3.4	1.7	0.85		344
	1 / 8	EC	STD.	2.07	1.03	4.83	44	40	52	8.2	2.4	1.1	.0097	819
SPRABRONZE C P	1 / 8	EC		2.07	1.03	4.83	44	40	52	9.5	2.4	1.1		983
	3 / 16	EA		2.28	1.03	4.83	48	48	53	15.0	2.7	1.4		1557
	1 / 8	EC		2.07	1.03	4.83	44	40	52	13.6	2.4	1.1		1395
SPRABRONZE TM	11	J	STD.	1.72	1.03	4.14	33	30	46	7.7	1.7	0.85	.0097	819
	1 / 8	EC		2.07	1.03	4.83	40	40	53	24.9	2.3	1.1		.0125
	1 / 8	EC		2.07	1.03	4.83	40	40	53	24.9	2.3	1.1		4097
	15	M		1.72	1.03	4.14	24	24	43	2.7	1.2	0.62		279
COPPER	3 / 16	EA	STD.	2.28	1.03	4.83	48	48	53	13.6	2.7	1.4	.0097	1393
	1 / 8	EC		2.07	1.03	4.83	44	40	52	10.9	2.4	1.1		1147
	11	J		1.72	1.03	4.14	33	30	46	4.5	1.7	0.85		475
	15	M		1.72	1.03	4.14	24	24	43	2.7	1.2	0.62		279
LEAD (Note 10)	1 / 8	EC	HIGH	2.07	1.03	5.17	40	40	53	63.5	2.3	1.1	.0194	3278
	3 / 16	EA		2.28	1.03	4.83	48	45	53	7.3	2.8	1.3		819
	1 / 8	EC		2.07	1.03	4.83	44	40	50	5.9	2.4	1.1		656
	11	J		1.72	1.03	4.14	33	30	48	3.4	1.7	0.85		410
METCOLOYS (Note 5)	3 / 16	EA	STD.	2.28	1.03	4.83	48	45	53	7.3	2.8	1.3	.0097	737
	1 / 8	EC		2.07	1.03	4.83	44	40	51	6.8	2.4	1.1		688
	11	J		2.07	1.03	4.14	38	28	48	3.2	1.7	0.85		328
	1 / 8	EC		2.07	1.03	4.83	44	40	51	4.5	2.4	1.1		
MONET	1 / 8	EC	STD.	1.72	1.03	4.14	33	30	48	3.0	1.7	0.85	.0097	
	11	J		2.07	1.03	4.83	44	40	51	4.5	2.4	1.1		
	1 / 8	EC		2.07	1.03	4.83	44	40	51	4.5	2.4	1.1		
	11	J		1.72	1.03	4.14	33	30	48	3.0	1.7	0.85		
NICKEL	3 / 16	EA	STD.	2.41	1.03	4.83	50	40	53	8.2	2.9	1.1	.0083	983
	1 / 8	EC		2.07	1.03	4.83	44	40	53	8.2	2.9	1.1		
	11	J		2.07	1.03	4.83	44	40	53	8.2	2.9	1.1		
	15	M		1.72	1.03	4.14	33	30	48	3.0	1.7	0.85		
SPRASTEELS	3 / 16	EA	STD.	2.41	1.03	4.83	50	40	53	8.2	2.9	1.1	.0083	983
	1 / 8	EC		2.07	1.03	4.83	44	40	53	8.2	2.9	1.1		
	11	J		2.07	1.03	4.83	44	40	53	8.2	2.9	1.1		
	15	M		1.72	1.03	4.14	33	30	48	3.0	1.7	0.85		



TIN (Notes 10 & 11)	1 / 8	EC	HIGH	2.07	1.03	4.83	46	33	53	5.9	2.5	0.91	.0097	737
	11	J		2.07	1.03	4.14	38	25	48	3.6	2.0	0.76		328
	1 / 8	EC		2.07	1.03	4.48	44	24	53	18.1	2.4	0.57		1885
	1 / 8	EC		2.07	1.03	4.48	42	29	53	43.1	2.3	0.71		6309
	11	J		1.72	1.03	4.83	37	18	50	11.3	1.8	0.85		1147
	11	J		1.72	1.03	4.83	33	20	50	22.7	1.8	0.99		2294
	15	M		1.27	1.03	4.14	18	18	48	4.1	0.71	0.42		410
	15	M		1.39	1.03	4.14	19	19	48	7.7	0.82	0.45		787
ZINC (Notes 10 & 11)	3 / 16	EA	STD.	2.28	1.03	4.83	48	45	51	29.5	2.7	1.3	.0097	3032
	1 / 8	EC		2.07	1.03	4.83	45	40	53	14.5	2.4	1.1		1475
	1 / 8	EC	HIGH	2.07	1.03	4.83	45	42	53	20.4	2.4	1.1		2130
	11	J		1.72	1.03	4.14	33	30	48	9.1	1.6	0.85		902
	15	M		1.72	1.03	4.14	24	24	43	5.4	1.2	0.62		574
402	1 / 8	EC	STD.	2.41	1.03	4.48	52	40	50	2.7	3.1	1.2	.0077	344
405 (Note 12)	1 / 8	C	STD.	2.07	1.03	4.83	44	39	52	2.3	2.4	1.4	.0083	262
TIN / ZINC (Note 10)	1 / 8	CH	STD.	1.72	1.03	4.83	34	34	53	10.9	1.8	1.0	.010	1098

**TABLE 9.6 SPRAYING TABLE – U. S. SYSTEM
TYPE 12M GUN – PROPANE JETTED HARDWARE**

METAL	RECOMMENDED HARDWARE (Note-1)			LIGHTING PRESSURE SETTINGS (PSI.)			FLOWMETER READINGS			CONSUMPTION PER HOUR (Note 6)			Lbs.Wire Required Per. CU. in of Coating	Deposited Coating Build-up Speed CU. in per hr. Notes 6 & 7
	Nozzle & wire size inches or B&S Gauge	Air Cap Size	Gears	Oxy. (Note- 2)	Prop. (Note- 2)	Air (Notes- 2 & 3)	Oxy. (Note- 2)	Prop. (Note- 2)	Air (Notes- 2 & 3)	Lbs. Wire	Cu. Ft. Oxy.	Cu. Ft. Prop.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ALUMINUM (Note 10)	3 / 16	EA	STD.	45	40	70	69	35	53	16	172	34	.10	160
	1 / 8	EC		50	40	70	72	33	52	12	194	33		120
	11	J		40	35	60	54	24	48	5.5	120	23		55
	15	M		35	35	60	46	18	45	2	95	15		20
S.F.ALUMINUM (Note 10)	3 / 16	EA	STD.	45	40	70	69	35	53	17	172	34	.11	155
	1 / 8	EC	HIGH	50	40	70	72	33	52	15	194	33		110
	1 / 8	EC		50	40	70	72	33	52	17	194	33		135
SPRABABBITT A (Notes 10&11)	3 / 16	EA	HIGH	30	30	70	60	26	53	95	130	20	.35	270
	3 / 16	EA		45	35	70	72	35	53	185	185	35		530
	1 / 8	EC		25	25	70	45	17	53	40	80	12		115
	1 / 8	EC		25	20	70	50	22	53	90	90	17		255
SPRABRASSY	1 / 8	EC	STD.	50	40	70	68	33	53	26	175	35	.35	76
SPRABRONZE AA	3 / 16	EA	STD.	50	40	70	70	35	53	21	180	35	.35	58
	1 / 8	EC		50	40	70	68	33	53	18	175	35		51
	11	J		40	35	60	54	24	48	8	120	23		23
SPRABRONZE C P	1 / 8	EC	STD.	50	40	70	68	33	53	20	175	35	.35	55
	1 / 8	EC		50	40	70	68	33	53	23	175	35		65
SPRABRONZE TM	3 / 16	EA	STD.	50	40	70	70	35	53	36	180	35	.35	98
	1 / 8	EC		50	40	70	68	33	53	33	175	35		90
	11	J		40	35	60	54	24	48	19	120	23		52
CADMIUM (Note 10)	1 / 8	EC	HIGH	35	30	70	60	26	53	55	130	20	.45	250
COPPER	3 / 16	EA	STD.	50	40	70	70	35	53	33	180	35	.35	95
	1 / 8	EC		50	40	70	68	33	53	25	175	35		75
	11	J		40	35	60	54	24	48	14	120	23		40
	15	M		35	35	60	46	18	48	8	95	15		23
LEAD (Note 10)	1 / 8	EC	HIGH	35	30	70	60	26	53	145	130	20	.32	205
METCOLOYS (Note 5)	3 / 16	EA	STD.	55	50	70	68	38	53	20	180	42	.32	60
	1 / 8	EC		55	50	70	68	36	53	15	181	40		48
	11	J		45	35	70	50	25	48	8	97	22		26
MONET	3 / 16	EA	STD.	55	50	70	68	30	53	16	180	42	.35	45
	1 / 8	EC		55	50	70	68	36	53	15	181	40		42
	11	J		40	35	60	54	24	48	7	120	23		20
NICKEL	1 / 8	EC	STD.	55	50	70	68	36	53	10	181	40	.35	30
	11	J		40	35	60	54	21	48	6.5	120	23		18
SPRASTEELS	3 / 16	EA	STD.	50	40	70	70	32	53	18	188	33	.30	60
	1 / 8	EC		55	40	70	68	32	53	13	176	30		45
	11	J		40	35	60	54	24	48	8	120	23		25



TIN (Notes 10 & 11)	1 / 8	EC	HIGH	25	20	70	45	17	53	40	80	12	.35	115
	1 / 8	EC		25	25	70	50	22	53	95	90	17		385
	11	J		30	20	70	48	14	50	25	90	10		70
	11	J		35	25	70	50	19	50	50	100	13		140
	15	M		25	25	70	38	11	48	9	72	10		25
ZINC (Notes 10 & 11)	15	M	STD.	25	25	70	41	10	48	17	78	7	.35	48
	3 / 16	AH		45	35	70	68	32	53	60	161	30		162
	1 / 8	CH		50	40	70	68	34	53	32	175	35		90
	1 / 8	CH	HIGH	50	40	70	68	34	53	45	175	35		130
	11	J		40	35	60	54	24	48	20	120	23		55
402	1 / 8	EC	STD.	35	35	60	45	18	43	12	95	15		35
405 (Note 12)	1 / 8	C	STD.	50	40	70	70	32	53	6	182	32	.28	21
TIN / ZINC (Note 10)	1 / 8	CH	STD.	50	45	70	68	35	53	5	176	38	.30	16
	1 / 8	CH	STD.	30	30	70	53	30	52	24	108	27	.38	63

**TABLE 9.7 SPRAYING TABLE – METRIC SYSTEM
TYPE 12M GUN – PROPANE JETTED HARDWARE**

METAL	RECOMMENDED HARDWARE (Note-1)			LIGHTING PRESSURE SETTINGS (BAR)			FLOWMETER READINGS			CONSUMPTION PER HOUR (Note 6)			Kg. Wire Required Per. Cm ³ of Coating	Deposited Coating Build-up Speed Cm ³ per hr. Notes 6 & 7
	Nozzle & wire size inches or B&S Gauge	Air Cap Size	Gears	Oxy. (Note- 2)	Prop. (Note- 2)	Air (Notes- 2 & 3)	Oxy. (Note- 2)	Prop. (Note- 2)	Air (Notes- 2 & 3)	Kg. Wire	m ³ Oxy.	m ³ Prop.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ALUMINUM (Note 10)	3 / 16	EA	STD.	3.10	2.76	4.83	69	35	53	7.3	4.9	0.96	.0028	2622
	1 / 8	EC		3.45	2.76	4.83	72	33	52	5.4	5.5	0.93		1966
	11	J		2.76	2.41	4.14	54	24	48	2.5	3.4	0.65		901
	15	M		2.41	2.4	4.14	46	18	45	0.91	2.7	0.42		328
S.F. ALUMINUM (Note 10)	3 / 16	EA	STD.	3.10	2.76	4.83	69	35	53	7.7	4.9	0.96	.0030	2540
	1 / 8	EC	HIGH	3.45	2.76	4.83	72	33	52	6.8	5.5	0.93		1803
	1 / 8	EC		3.45	2.76	4.83	72	33	52	7.7	5.5	0.93		2212
SPRABABBITT A (Notes 10&11)	3 / 16	EA	HIGH	2.07	2.07	4.83	60	26	53	43.1	3.7	0.57	.0097	4425
	3 / 16	EA		3.10	2.41	4.83	72	35	53	84.9	5.2	0.99		
	1 / 8	EC		1.72	1.72	4.83	45	17	53	18.1	2.3	0.34		
	1 / 8	EC		1.72	1.38	4.83	50	22	53	49.8	2.3	0.48		
SPRABRASSY	1 / 8	EC	STD.	3.45	2.76	4.83	68	33	53	11.8	5.0	0.99	.0097	
SPRABRONZE AA	3 / 16	EA	STD.	3.45	2.76	4.83	70	35	53	9.5	5.1	0.99	.0097	
	1 / 8	EC		3.45	2.76	4.83	68	33	53	8.2	5.0	0.99		
	11	J		2.76	2.41	4.14	54	24	48	3.6	3.4	0.65		
SPRABRONZE C P	1 / 8	EC	STD.	3.45	2.76	4.83	68	33	53	9.1	5.0	0.99	.0097	1065
	1 / 8	EC		3.45	2.76	4.83	68	33	53	10.4	5.0	0.99		
SPRABRONZE TM	3 / 16	EA	STD.	3.45	2.76	4.83	70	35	53	16.3	5.1	0.99	.0097	1608
	1 / 8	EC		3.45	2.76	4.83	68	33	53	15.0	5.0	0.99		1475
	11	J		2.76	2.41	4.14	54	24	48	8.6	3.4	0.65		832
CADMIUM (Note 10)	1 / 8	EC	HIGH	2.41	2.07	4.83	60	26	53	24.9	3.7	0.57	.0125	4097
COPPER	3 / 16	EA	STD.	3.45	2.76	4.83	70	35	53	15.0	5.1	0.99	.0097	1557
	1 / 8	EC		3.45	2.76	4.83	68	33	53	11.3	5.0	0.99		1229
	11	J		2.76	2.07	4.14	54	24	48	6.4	3.4	0.65		636
	15	M		2.41	2.07	4.14	46	18	48	3.6	2.7	0.42		877
LEAD (Note 10)	1 / 8	EC	HIGH	2.41	2.07	4.83	60	26	53	65.8	3.7	0.57	.0194	3360
METCOLOYS (Note 5)	3 / 16	EA	STD.	3.79	3.45	4.83	68	38	53	9.1	5.1	1.2	.0089	983
	1 / 8	EC		3.79	3.45	4.83	68	36	53	6.8	5.1	1.1		787
	11	J		3.10	2.41	4.83	50	25	48	3.6	2.8	0.68		426
MONET	3 / 16	EA	STD.	3.79	3.45	4.83	68	30	53	7.3	5.1	1.2	.0097	738
	1 / 8	EC		3.79	3.45	4.83	68	36	53	6.8	5.1	1.1		688
	11	J		2.76	2.41	4.14	54	24	48	3.2	3.4	0.65		328
	1 / 8	EC		3.79	3.45	4.83	68	36	53	4.5	5.1	1.1		
NICKEL	11	J	STD.	2.76	2.41	4.14	54	24	48	2.9	3.4	0.65	.0097	
SPRASTEELS	3 / 16	EA	STD.	3.45	2.76	4.83	70	32	53	8.2	5.3	0.93	.0083	983
	1 / 8	EC		3.79	2.76	4.83	68	32	53	3.9	5.0	0.85		737



	11	J		2.76	2.41	4.14	54	24	48	3.6	3.4	0.65		328
	1 / 8	EC		1.72	1.38	4.83	45	17	53	18.1	2.3	0.44		1885
	1 / 8	EC		1.72	1.72	4.83	50	22	53	48.1	2.5	0.48		6309
	11	J		2.07	1.38	4.83	48	14	50	11.3	2.5	0.28		1147
	11	J		2.41	1.72	4.83	50	19	50	22.7	2.8	0.37		2294
	15	M		1.72	1.72	4.83	38	11	48	4.1	2.0	0.28		410
	15	M		1.72	1.72	4.83	41	10	48	7.7	2.2	0.20		787
	3 / 16	AH		3.10	2.41	4.83	68	32	53	27.2	4.6	0.85		3032
	1 / 8	CH		3.45	2.76	4.83	68	34	53	14.5	5.0	0.99		1475
	1 / 8	CH		3.45	2.76	4.83	68	34	53	20.4	5.0	0.99		2130
	11	J		2.76	2.41	4.14	54	24	48	9.1	3.4	0.65		902
	15	M		2.41	2.41	4.14	46	18	43	5.4	2.7	0.42		594
402	1 / 8	EC	STD.	3.45	2.76	4.83	70	32	53	2.7	5.2	0.91	.0077	344
405 (Note 12)	1 / 8	C	STD.	3.45	3.10	4.83	68	33	53	2.3	5.0	1.1	.0083	262
TIN / ZINC (Note 10)	1 / 8	CH	STD.	2.07	2.07	4.83	53	30	52	10.9	3.4	0.76	.010	1098

**TABLE 9.8 SPRAYING TABLE – U. S. SYSTEM
TYPE 12M GUN – MPS JETTED HARDWARE**

METAL	RECOMMENDED HARDWARE (Note-1)			LIGHTING PRESSURE SETTINGS (PSI.)			FLOWMETER READINGS			CONSUMPTION PER HOUR (Note 6)			Lbs.Wire Required Per. CU. in of Coating	Deposited Coating Build-up Speed CU. in per hr. Notes 6 & 7
	Nozzle & wire size inches or B&S Gauge	Air Cap Size	Gears	Oxy. (Note-2)	MPS (Note-2)	Air (Notes-2 & 3)	Oxy. (Note-2)	MPS (Note-2)	Air (Notes-2 & 3)	Lbs. Wire	Cu. Ft. Oxy.	Cu. Ft. MPS		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ALUMINUM (Note 10)	3 / 16	AM		45	45	70	72	34	51	20.5	185	40		200
	1 / 8	EC	STD.	45	40	70	67	30	53	12.5	170	30	.10	120
	15	J		35	40	60	47	22	48	3	165	20		30
S.F.ALUMINUM (Note 10)	1 / 8	EC	HIGH	50	50	60	69	33	51	16	175	37	.11	145
	1 / 8	EC	STD.	50	50	60	69	33	45	12	175	37		110
SPRABABBITT A (Notes 10&11)	3 / 16	AM		30	25	70	57	25	53	95	110	20	.35	270
	3 / 16	AM	HIGH	35	35	70	60	30	53	185	130	30		530
	1 / 8	EC		35	25	70	57	20	53	40	120	15		115
	1 / 8	EC		40	30	70	60	25	53	90	130	22		255
SPRABOND (Note 4)	3 / 16	AM		45	40	55	70	32	50	9	180	35	.38	23
	1 / 8	EC	STD.	45	40	55	67	30	48	7	170	30		18
	11	J		50	45	55	60	27	48	6	145	28		13
SPRABRONZE AA	3 / 16	AM		45	45	70	72	34	51	25	185	40	.35	70
	1 / 8	EC	STD.	50	50	60	69	33	51	16	175	37		45
SPRABRONZE TM	1 / 8	EC	STD.	50	50	60	69	33	51	28	175	37	.35	80
	1 / 8	EC		50	50	60	69	33	51	22	175	37		63
COPPER	11	J	STD.	50	45	60	60	27	48	15	145	28	.35	43
	3 / 16	AM		45	45	70	72	34	51	20	185	40		62
METCOLOYS (Note 5)	1 / 8	EC	STD.	50	50	60	69	33	51	14	175	37	.32	44
	11	J		50	45	60	60	30	48	11	150	32		35
MONET	3 / 16	AM	STD.	45	45	70	69	33	51	15	175	37	.35	43
	3 / 16	AM		45	45	70	72	34	51	20	195	37		66
SPRASTEELS	1 / 8	EC	STD.	50	50	60	70	32	51	14.5	180	36	.30	48
	11	J		45	40	60	58	28	48	8	110	30		30
	3 / 16	AM	STD.	45	45	70	72	34	51	68	185	40	.35	195
ZINC (Notes 10 & 11)	1 / 8	EC		50	50	70	69	33	53	32	175	37		90
	1 / 8	EC	HIGH	50	50	70	69	33	53	45	175	37		130
	15	J		40	45	60	51	22	48	14	105	20		40
402	1 / 8	EC	STD.	55	45	70	70	32	51	5	177	35	.28	18
405 (Note 12)	1 / 8	C	STD.	40	40	70	65	30	52	5	145	30	.30	16
TIN / ZINC (Note 10)	1 / 8	CHM	STD.	35	30	65	57	20	53	33	119	16	.37	89

Notes:

HARDWARE

1. Refer to the Gas Head Hardware selection chart for additional hardware recommendations before spraying.



OPERATING PARAMETERS

- Columns 5,6 and 7 show lighting PRESSURES ONLY. After the gun is lighted and spraying, adjust the flow meter needle valve to obtain the flows listed in columns 8, 9 and 10.
- Adjust the air for running as well as for lighting to the Pressure in column 7. At this air pressure the flow reading on the Type 2AFM Air Flowmeter should be adjusted to this figure in column 10.

SPRAYING

- Only acetylene and MPS can be used as fuel gases to spray SPRABOND Wire. Read the Flame Spray Handbook, before spraying this material.
- When spraying METCOLOY Wires, the molten wire tip may appear ragged and uneven. If this should occur, correct by reducing Oxygen flow by 2 or 3 points.

**TABLE 9.9 SPRAYING TABLE – METRIC SYSTEM
TYPE 12M GUN – MPS JETTED HARDWARE**

METAL	RECOMMENDED HARDWARE (Note-1)			LIGHTING PRESSURE SETTINGS (PSI.)			FLOWMETER READINGS			CONSUMPTION PER HOUR (Note 6)			Lbs.Wire Required Per. Cm ³ of Coating	Deposited Coating Build-up Speed Cm ³ per hr. Notes 6 & 7
	Nozzle & wire size inches or B&S Gauge	Air Cap Size	Gears	Oxy. (Note-2)	MPS (Note-2)	Air (Notes-2 & 3)	Oxy. (Note-2)	MPS (Note-2)	Air (Notes-2 & 3)	Kg. Wire	m ³ Oxy.	m ³ MPS		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ALUMINUM (Note 10)	3 / 16	AM	STD.	3.10	3.10	4.83	72	34	51	9.3	5.2	1.1	.0028	3277
	1 / 8	J		3.10	2.76	4.83	67	30	53	5.7	4.8	0.85		1966
	15	J		2.41	2.76	4.14	47	22	48	1.4	3.0	0.57		492
S.F.ALUMINUM (Note 10)	1 / 8	EC	HIGH	3.45	3.45	4.14	69	33	51	7.3	5.0	1.1	.0030	2176
	1 / 8	EC		3.45	3.45	4.14	69	33	45	5.4	5.0	1.1		1803
	3 / 16	AM		2.07	1.72	4.83	57	25	53	4.3	3.1	0.57		4425
SPRABABBITT A (Notes 10&11)	3 / 16	AM	HIGH	2.41	2.41	4.83	60	30	53	8.4	3.7	0.85	.0097	8685
	1 / 8	EC		2.41	1.72	4.83	57	20	53	18	3.4	0.42		1885
	1 / 8	EC		2.76	2.07	4.83	60	25	53	4.1	3.7	0.62		4179
SPRABOND (Note 4)	3 / 16	AM	STD.	3.10	2.76	3.79	70	32	50	4.1	5.1	0.99	.0105	377
	1 / 8	EC		3.10	2.76	3.79	67	30	46	3.2	4.8	0.85		295
	11	J		3.45	3.10	3.79	60	27	48	2.3	4.1	0.79		213
SPRABRONZE AA	3 / 16	AM	STD.	3.10	3.10	4.83	72	34	51	11.3	5.2	1.1	.0097	1147
	1 / 8	EC		3.45	3.45	4.14	69	33	51	7.3	5.0	1.1		737
SPRABRONZE TM	1 / 8	EC	STD.	3.45	3.45	4.14	69	33	51	12.7	5.0	1.1	.0097	1311
COPPER	1 / 8	EC	STD.	3.45	3.45	4.14	69	33	51	10	5.0	1.1	.0097	1038
	11	J		3.45	3.10	4.14	60	27	48	6.8	4.1	0.79		
METCOLOYS (Note 5)	3 / 16	AM	STD.	3.10	3.10	4.83	72	34	51	9.1	5.2	1.1	.0089	1010
	1 / 8	EC		3.45	3.45	4.14	69	33	51	6.4	5.0	1.1		721
	11	J		3.45	3.10	4.14	60	30	48	5	4.3	0.91		574
MONET	3 / 16	AM	STD.	3.10	3.10	4.83	69	33	51	6.8	5.0	1.1	.0097	705
SPRASTEELS	3 / 16	AM	STD.	3.10	3.10	4.83	72	34	51	9.1	5.5	1.1	.0083	1082
	1 / 8	EC		3.45	3.45	4.14	70	32	51	6.6	5.1	1.0		782
	11	J		3.10	2.76	4.14	58	28	48	4.1	4.0	0.85		492
ZINC (Notes 10 & 11)	3 / 16	AM	STD.	3.10	3.10	4.83	72	34	51	31	5.2	1.1	.0097	3196
	1 / 8	EC		3.45	3.45	4.83	69	33	53	14.5	5.0	1.1		1475
	1 / 8	EC		3.45	3.45	4.83	69	33	53	20.4	5.0	1.1		2130
	15	J	HIGH	2.76	3.10	4.14	51	22	48	6.4	3.0	0.57		656
402	1 / 8	EC	STD.	3.79	3.10	4.83	70	32	51	2.3	5.1	1.0	.0076	302
405 (Note 12)	1 / 8	C	STD.	2.76	2.76	4.83	65	30	52	2.3	4.1	0.85	.0083	262
TIN / ZINC (Note 10)	1 / 8	CHM	STD.	2.41	2.0	4.48	57	20	53	15	3.4	0.57	.010	1457

Notes:

HARDWARE

- Refer to the Gas Head Hardware selection chart for additional hardware recommendations before spraying.

OPERATING PARAMETERS



2. Columns 5,6 and 7 show lighting PRESSURES ONLY. After the gun is lighted and spraying, adjust the flow meter needle valve to obtain the flows listed in columns 8, 9 and 10.
3. Adjust the air for running as well as for lighting to the Pressure in column 7. At this air pressure the flow reading on the Type 2AFM Air Flowmeter should be adjusted to this figure in column 10.

SPRAYING

4. Only acetylene and MPS can be used as fuel gases to spray SPRABOND Wire. Read the Flame Spray Handbook, before spraying this material.
5. When spraying METCOLOY Wires, the molten wire tip may appear ragged and uneven. If this should occur, correct by reducing Oxygen flow by 2 or 3 points.

PERFORMANCE

6. The figures in columns 12, 13 & 15 are optimum. They can be obtained by skilled operators with all equipment in first-class condition.
7. One cubic centimeter of coating covers: 100 square centimeters of surface area 0.1mm thick. (To find coating build-up 1000 square centimeters 0.10mm thick.
1 square meter 0.001mm thick
8. The 12M Gun has greatly increased heating capacity. Be sure to observe recommended procedures to prevent overheating the work or damaging the coating
9. When using the fan spray air cap, spray rates will be some what lower then the chart figures.
10. Use non-loading nozzles and air caps when spraying SPRABABBITTA, CADMIUM, LEAD, TIN, ZINC, TIN/ZINC AND ALUMINUM in start-stop operation.
11. For convenience, parameters for both high and reduced spray rates for SPRABABBITTA and TIN in each wire size are shown.

**TABLE 9.11 SPRAYING TABLE – METRIC SYSTEM
TYPE 12M GUN – ACETYLENE ANNULAR HARDWARE**

WIRE	wire size inches	Air Cap Size	LIGHTING PRESSURE SETTINGS (Bar)			FLOWMETER READINGS			CONSUMPTION PER HOUR			Speed m ³ Per Hr. 0.1mm Thick	Wire Weight Kg. m ³ 0.1mm Thick
			Oxy.	Acty.	Air	Oxy.	Acty.	Air	Oxy. m ³	Acty. m ³	Wire Kg.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ALUMINUM	3/16	1	2.11	1.03	4.83	48	48	54	2.1	1.1	6.1	23.8	0.27
	1/8	3	1.72	1.03	4.83	42	42	54	2.1	1.1	5.1		0.27
SPRABABBITTA	3/16	1	1.72	1.03	4.83	40	30	54	2.0	1.1	38.1		1.06
	1/8	3	1.03	0.69	4.83	35	24	54	1.6	0.57	25.0	24.7	1.0
LEAD	1/8	3	1.03	0.69	4.83	35	24	54	1.6	0.57	36.3	14.7	2.06
TIN	1/8	3	1.03	0.69	4.83	35	24	54	1.6	0.57	31.8	33.0	0.96
ZINC	3/16	1	2.41	1.03	4.83	48	48	54	2.8	1.1	27.7	27.3	1.0
	1/8	3	2.41	1.03	4.83	46	46	54	2.7	1.4	20.4	21.5	0.94

Notes:

1. See Table 9.1 for Nozzle and Siphon Plug recommendations. If excessive loading or air cap and nozzle occurs when spraying zinc and aluminum, in applications requiring frequent starts and stops, replace the annular hardware with jetted non-loading hardware. There will then be a reduction of 10% to 20% in spraying speed.
2. Recommended spray distance for SPRABABBITT A is 130mm for other wires, unless other wise noted. It is 130 to 205mm.
3. Consumption figures shown in Columns 10, 11 & 12 are optimum. They can be obtained by skilled operators with all equipment in first-class condition.
4. When using Types AFM & GFM Flowmeters, reduce pressures shown, as necessary to obtain flowmeter readings shown.



**TABLE 9.12 SPRAYING TABLE – U.S. SYSTEM
TYPE 12M GUN – PROPANE ANNULAR HARDWARE**

WIRE	wire size inches	Air Cap Size	LIGHTING PRESSURE SETTINGS (PSI)			FLOWMETER READINGS			CONSUMPTION PER HOUR			Speed Sq. Ft. Per Hr. 0.001 Thick	Wire Weight 1 Sq. Ft. 0.001 Thick
			Oxy.	Prop.	Air	Oxy.	Prop.	Air	Oxy. Ft ³	Prop. Ft ³	Wire Lb.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ALUMINUM	3/16	2	45	40	70	66	34	57	2.1	33	14	1010	.014
	1/8	4	40	35	70	66	33	57	2.1	32	10	720	.014
SPRABABBITTA	3/16	2	35	30	70	57	30	57	2.0	27	107	1970	.055
	1/8	4	25	25	70	55	28	52	1.6	22	50	960	.052
LEAD	1/8	4	25	25	70	55	28	52	1.6	22	80	750	.107
TIN	1/8	4	25	25	70	55	28	52	1.6	22	50	1000	.050
ZINC	3/16	2	50	50	70	70	36	53	2.8	40	61	1150	.052
	1/8	4	40	35	70	66	33	57	2.7	42	45	910	.049

**TABLE 9.13 SPRAYING TABLE – METRIC SYSTEM
TYPE 12M GUN – PROPANE ANNULAR HARDWARE**

0.1mm WIRE	wire size inches	Air Cap Size	LIGHTING PRESSURE SETTINGS (Bar)			FLOWMETER READINGS			CONSUMPTION PER HOUR			Speed m ³ Per Hr. 0.1mm Thick	Wire Weight Kg. m ³ 0.1mm Thick
			Oxy.	Prop.	Air	Oxy.	Prop.	Air	Oxy. m ³	Prop. m ³	Wire Kg.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ALUMINUM	3/16	2	3.10	2.76	4.83	66	34	57	4.4	0.94	6.4	23.8	0.27
	1/8	4	2.76	2.41	4.83	66	33	57	4.3	0.91	4.5	17.0	0.27
SPRABABBITTA	3/16	2	2.41	2.07	4.83	57	30	57	3.4	0.77	48.5	46.5	1.06
	1/8	4	1.72	1.72	4.83	55	28	52	3.0	0.63	22.7	22.7	1.0
LEAD	1/8	4	1.72	1.72	4.83	55	28	52	3.0	0.63	36.3	17.7	2.06
TIN	1/8	4	1.72	1.72	4.83	55	28	52	3.0	0.63	22.7	23.6	0.96
ZINC	3/16	2	3.45	3.45	4.83	70	36	53	5.3	1.14	27.7	27.1	1.0
	1/8	4	2.76	2.41	4.83	66	33	57	4.3	0.91	20.4	21.5	0.94



Notes:

1. See Table 9.1 for Nozzle and Siphon Plug recommendations. If excessive loading or air cap and nozzle occurs when spraying zinc and aluminum, in applications requiring frequent starts and stops, replace the annular hardware with jetted non-loading hardware. There will then be a reduction of 10% to 20% in spraying speed.
2. Recommended spray distance for SPRABABBITT A is 130mm for other wires, unless other wise noted. It is 130 to 205mm.
3. Consumption figures shown in Columns 10, 11 & 12 are optimum. They can be obtained by skilled operators with all equipment in first-class condition.
4. When using Types AFM & GFM Flowmeters, reduce pressures shown, as necessary to obtain flowmeter readings shown.



BU

TYPE 3XTM

FLAME SPRAY EXTENSION



Balaji udyog

J1-114 Mini Growth Center, IST Phase, Sangaria,
Jodhpur-342 013 (India)
Office :- P,167 amar nagar math aka than Jodhpur-342304
(India)

BUTES TYPE 3XTM FLAME SPRAY EXTENSION

The BU Type 3XTM Extension is a new and greatly improved equipment for heavy-duty spraying of wire in holes-to reach surfaces. It is used with the BU Type 12M Flame Spray Gun & BU 5KM Flame Spray Machine.

The Type 3XTM incorporates the BU multi-jet siphon head principle and uses no-lap nozzles for high spraying speeds and freedom from backfire. Fuel gas and Oxygen are carried in separate tubes, remaining unmixed until fed to the siphon head. This minimizes flashback into the gas tubes.

This section of the manual describes the BU Type 3XTM Extension. It explains how to use it and maintain it.

For information on connecting operating and maintaining the flame spray gun on which this extension is used, see the gun instruction manual.

TYPES OF 3XTM EXTENSION

- | | |
|-------------------|-------------------------|
| 1. 3XTM-6" | 6 inch Extension |
| 2. 3XTM-1' | 1 Feet Extension |
| 3. 3XTM-2' | 2 Feet Extension |
| 4. 3XTM-3' | 3 Feet Extension |



DESCRIPTION

The Type 3XTM Flame Spray Extension is a device to extend the nozzle and air cap away from the gas head, in order to spray into restricted spaces such as cylinders and holes which cannot be reached with the stand and flame spray gun. See the flame spray handbook for detailed discussion of methods used in spraying inside diameters.

The Extension is basically an assembly of four tubes. At the gun end these tubes terminate at a grooved seat plug which seals into the gas head of the gun. At the other end is a gas siphon head in which the gases are mixed and fed into the nozzle. The stainless steel central tube carries the wire to be sprayed. The two brass tubes, silver brazed at both ends, carry oxygen and fuel gas separately to the siphon head. The aluminum outer tube carries atomizing air to the front of the extension. The extension is available in 6 inch (152mm), 1 foot (305mm), 2 feet (610mm) and 3 feet (915mm) lengths.

MOUNTING THE EXTENSION

To mount the extension:

1. Remove the Air Cap Body, Air Cap, Nozzle Nut, Nozzle and Siphon Plug from the gas head of the gun.
2. Clean the bore in the gas head with a soft, clean cloth and relubricate with a thin film of BU valvelube.
3. Lubricate the O-rings on the extension seat plug with a thin film of BU valvelube.
4. Gently push the extension seat plug into place in the gas head.
5. Clamp the entire assembly to the gas head with the rear air cap body supplied as part of the extension.
6. Mount the proper nozzle and air cap on the outboard end. (See the extension spray Tables.)

OPERATION

1. Open the gas head valve all the way.



2. Wait at least three full seconds. This purges the long air tube of any gas, which may have collected and also purges the gas tubes of unwanted air.
3. Turn the valve back to the lighting stop and spark the gases.
4. When the gases ignite, immediately turn the valve to the full-on position.

CAUTION

Do not light the extension unless there is wire in the nozzle.

Otherwise the flame may blow back and char the siphon head O-rings.

MAINTENANCE

Persistent backfiring during lighting or operation of the extension usually indicates a leak across the nozzle O-rings or across the O-rings located under the siphon head sleeve. All O-rings must be in good condition to prevent leaks. To examine the siphon head set screw and slide the sleeve off. If O-rings are charred, flattened or nicked, replace them. When replacing the O-rings lubricate them with a thin film of BU Valvelube and do not stretch them more than absolutely necessary. Accumulated carbon should be removed from the siphon head jets with the cleaning wire kit and cleaning Solvent. The parts should be blown dry with clean air. Make sure that the air bleeder hole, located in the siphon head in front of the sleeve, is not plugged.

A slow decrease in the gas flowmeter reading which the equipment is in operation indicates that carbon is forming in the nozzle and siphon head jets. Remove the nozzle and clean the jets with the proper wire in the cleaning wire kit supplied with the flame spray gun. (See the Flame Spray Gun Instruction Manual.)

CAUTION

The Set Screws used in the Type 3XTM Extension are metric. Use only replacement parts obtained from BU under correct Part numbers. Do not interchange metric and English system threaded parts.



HARDWARE SELECTION CHART

When setting up to spray, refer to the following Hardware Selection Chart for the proper combination of parts.

EXTENSION HARDWARE SELECTION CHART

Fuel Gas	Tube Assembly	Nozzle
Acetylene or Hydrogen	3xtm-10 (**)	See Note (*)
Manufactured Gas	3xtm-10 (**)	See Note (*)
Propane or Natural Gas	3xtm-10 (**)	See Note (*)

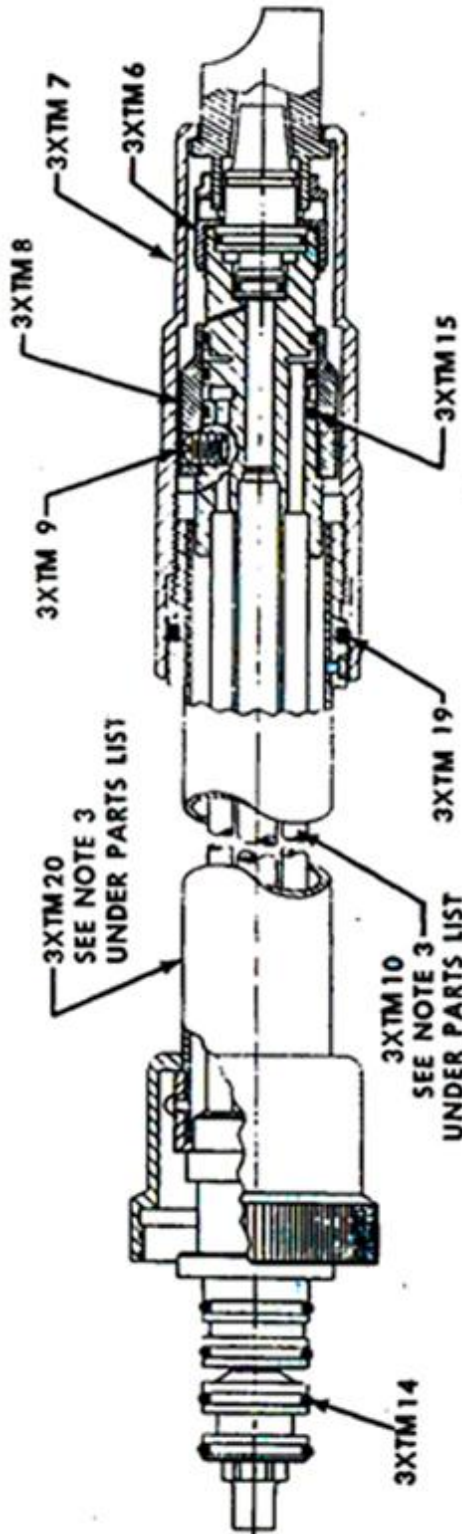
The size of nozzle required is determined by the size of the wire being sprayed. Order required nozzle by complete Part no. as shown in the gun instruction manual list of replacement parts.

Denotes tube assembly length 6 inch (152 mm), 1 feet (305 mm), 2 feet (610 mm) and 3 feet (915 mm)

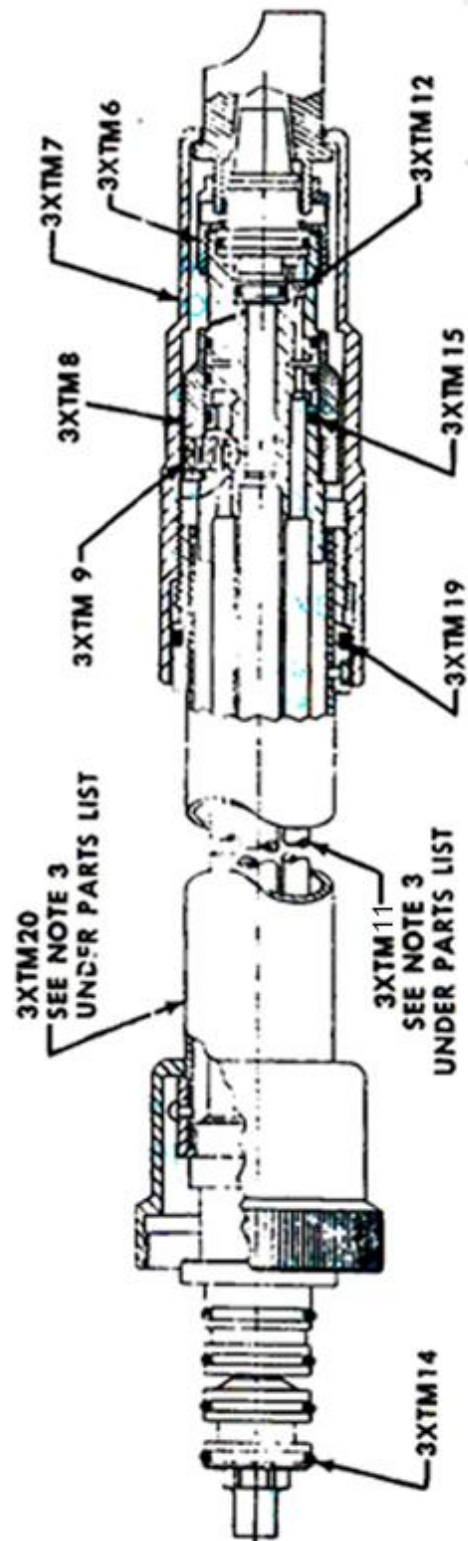
SPECIAL NON-LOADING NOZZLES AND AIR CAPS

When spraying low-melting point wires such as Tin and SPRABABBITT, starting and stopping the wire feed with the extension lighted will often cause the wire to stick in the nozzle. For this kind of service special Non Loading Nozzle and air cap should be used. A Non Loading Nozzle is available for any wire size and fuel gas. When using a Non-Loading nozzle, spray rates will be somewhat lower then with the standard nozzle. When recommended in the Spray Table, this style of nozzle should always be used.

For straight spraying, order the appropriate Non-Loading Air Cap by the complete Part No. Shown in the Gun Manual List Replacement Parts and use it with the proper Non-Loading nozzle. For angle spraying, use the proper Non-Loading nozzle with the appropriate standard Angular Air Cap listed with the replacement parts for the Type 3XTM Extension.



TYPE 3XTM ACETYLENE EXTENSION



TYPE 3XTM PROPANE EXTENSION



REPLACEMENT PARTS

PART NO.	DESCRIPTION
3XTM-6"	COMPLETE UNIT-6"
3XTM-1'	COMPLETE UNIT-1 FEET
3XTM-2'	COMPLETE UNIT-2 FEET
3XTM-3'	COMPLETE UNIT-3 FEET
3XTM-6	NOZZLE NUT
3XTM-7	AIR CAP BODY
3XTM-8	SLEEVE
3XTM-9	SLEEVE SET SCREW.
3XTM-10-6"	GAS TUBE ASSEMBLY- 6"
3XTM-10-1'	GAS TUBE ASSEMBLY-1 FEET
3XTM-10-2'	GAS TUBE ASSEMBLY-2 FEET
3XTM-10-3'	GAS TUBE ASSEMBLY-3 FEET
3XTM-11-6"	GAS TUBE ASSEMBLY-6" (PROPANE)
3XTM-11-1'	GAS TUBE ASSEMBLY-1FEET (PROPANE)
3XTM-11-2'	GAS TUBE ASSEMBLY-2FEET (PROPANE)
3XTM-11-3'	GAS TUBE ASSEMBLY-3FEET (PROPANE)
3XTM-12	SET SCREW
3XTM-14	SEAT PLUG O-RING.
3XTM-15	DISTRIBUTION HEAD O-RING.
3XTM-16-1/8	ANGULAR AIR CAP ASSEMBLY (1/8-11Ga.)
3XTM-16-1/8T	ANGULAR AIR CAP ASSEMBLY-FOR METCO 405 WIRE
3XTM-16-6	ANGULAR AIR CAP ASSEMBLY
3XTM-19	AIR TUBE O-RING.
3XTM-20-6"	AIR TUBE ASSEMBLY- 6"
3XTM-20-1'	AIR TUBE ASSEMBLY- 1 FEET
3XTM-20-2'	AIR TUBE ASSEMBLY- 2 FEET
3XTM-20-3'	AIR TUBE ASSEMBLY- 3 FEET
3XTM-25	SPARE O-RING PACKAGE (Includes 3XMT-14, 3XMT-15 & 3XMT-19)

Notes:

1. Nozzles and air caps are not furnished with Extension. They must be ordered separately. Use Part. Nos. shown above and in the Gun Instruction Manual.
2. Interchangeable with gun siphon plug O-rings.
3. Part No. of tubular parts includes length. When ordering specify entire part no. as shown above.



**TABLE 3XTM -1 SPRAYING TABLE – U. S. SYSTEM
TYPE 3XTM EXTENSION – ACATYLENE
ANGULAR AIR CAPS**

METAL	RECOMMENDED HARDWARE (Note-2)			LIGHTING PRESSURE SETTINGS (PSI.)			FLOWMETER READINGS		
	Nozzle & wire size inches or B&S Gauge	Air Cap Size	Gears	Oxy. (Note-3)	Acty. (Note-3)	Air (Notes-3 & 4)	Oxy. (Note-3)	Acty. (Note-3)	Air (Notes-3 & 4)
1	2	3	4	5	6	7	8	9	10
ALUMINUM (Note 10)	3 / 16	6	STD.	40	15	70	45	45	51
	1 / 8	1 / 8		35	15	70	40	36	51
	11	1 / 8		30	15	60	31	28	48
	15	1 / 8		25	15	60	22	20	50
SPRABABBITT A (Notes 10&11)	3 / 16	6	HIGH	30	15	70	38	38	53
	3 / 16	6		35	15	70	44	44	53
	1 / 8	1 / 8		20	15	70	36	22	54
	1 / 8	1 / 8		25	15	70	35	33	54
SPRABOND (Note 5)	3 / 16	6	STD.	40	15	55	46	44	49
	1 / 8	1 / 8		35	15	55	42	39	49
	11	1 / 8		35	15	55	35	35	47
	15	1 / 8		30	15	55	25	25	47
SPRABRASS & SPRABRONZE AA	3 / 16	6	STD.	40	15	70	45	45	53
	1 / 8	1 / 8 T		35	15	70	42	42	53
	11	1 / 8		30	15	60	31	28	48
	1 / 8	1 / 8		25	15	70	35	33	54
CADMIUM & LEAD (Note 10)	3 / 16	6	STD.	35	15	70	42	42	53
COPPER	1 / 8	1 / 8		35	15	70	40	36	53
	11	1 / 8		30	15	60	31	28	48
	15	1 / 8		25	15	60	22	20	48
METCOLOYS & NICKEL (Note 5)	3 / 16	6	STD.	40	15	70	45	43	53
	1 / 8	1 / 8		40	15	70	43	34	53
	11	1 / 8		30	15	60	31	28	48
	3 / 16	6	STD.	40	15	70	45	45	53
SPRASTEELS	1 / 8	1 / 8		35	15	70	42	34	53
	11	1 / 8		35	15	60	36	26	48
	1 / 8	1 / 8	HIGH	20	15	70	36	22	54
TIN (Notes 10 & 11)	1 / 8	1 / 8		35	15	70	41	29	54
	11	1 / 8		30	15	70	37	20	52
	11	1 / 8		25	15	70	33	21	52
	15	1 / 8		20	15	70	17	17	51
ZINC (Notes 10 & 11)	15	1 / 8	STD.	20	15	70	18	18	51
	3 / 16	6		40	15	70	45	42	53
	1 / 8	1 / 8 T		35	15	70	43	40	53
	11	1 / 8 T		30	15	70	31	28	48
402	15	1 / 8	HIGH	25	15	70	22	20	50
405 (Note 12)	1 / 8	1 / 8		25	15	70	40	32	50
405 (Note 12)	1 / 8	1 / 8 T	STD.	35	15	70	43	40	53

NOTES:

GENERAL

- The pressure and flows listed in table are based on 3 Feet extension. When using the 'G' nozzle, 1 and 2 Feet extensions, the fuel and oxygen flows can be obtained at slightly lower pressures.

HARDWARE

- Refer to the Hardware selection chart for additional hardware recommendations before spraying. Table parameters and all qualifying Footnotes shown here apply without change when using standard Type 12M Gun Air Cap.

OPERATING PARAMETERS

- Columns 5,6 and 7 show lighting PRESSURES ONLY. After the Extension is lighted and spraying, adjust the flowmeter needle valves to obtain the flows listed in columns 8, 9 and 10.
- Adjust the air for running as well as for lighting to the Pressure in column 7. At this air pressure the flow reading on the Type 2AFM Air Flowmeter should be adjusted to this figure in column 10.

SPRAYING

- Only acetylene and MPS can be used as fuel gases to spray SPRABOND Wire. Read the Flame Spray Handbook, before spraying this material.
- When spraying METCOLOY Wires, the molten wire tip may appear ragged and uneven. If this should occur, correct by reducing Oxygen flow by 2 or 3 points.
- With Extension or with Gun alone, always set the wire tip position for good coating. For equal quality coating, Extension spray rates may be lower than Gun spray rates by 10% (for high-melting point wires) to 50% (for low-melting point wires).

PERFORMANCE

- The 12M Gun has greatly increased heating capacity. Be sure to observe recommended procedures to prevent overheating the work or damaging the coating.
- When using the fan spray air cap, spray rates will be some what lower than the chart figures.
- Use non-loading nozzles and air caps when spraying SPRABABBITA, CADMIUM, LEAD, TIN, ZINC, TIN/ZINC AND ALUMINUM in start-stop operation.
- For convenience, parameters for both high and reduced spray rates for SPRABABBITA and TIN in each wire size are shown.



12. For convenience, after spraying 405 Wire, you can continue to use the 1/8" T Air Cap with any 1/8" overcoat wire at a slight reduction in spray rate. Use gas flows shown above.
13. When using Type AFM and GFM Flowmeters, reduce pressure shown, as necessary, to obtain flowmeter readings shown.

TABLE 3XTM -1 SPRAYING TABLE – METRIC SYSTEM
TYPE 3XTM EXTENSION – ACATYLENE
ANGULAR AIR CAPS

METAL	RECOMMENDED HARDWARE (Note-2)			LIGHTING PRESSURE SETTINGS (PSI.)			FLOWMETER READINGS		
	Nozzle & wire size inches or B&S Gauge	Air Cap Size	Gears	Oxy. (Note-3)	Acty. (Note-3)	Air (Notes-3 & 4)	Oxy. (Note-3)	Acty. (Note-3)	Air (Notes-3 & 4)
1	2	3	4	5	6	7	8	9	10
ALUMINUM (Note 10)	3 / 16	6	STD.	2.76	1.03	4.83	45	45	53
	1 / 8	1 / 8		2.41	1.03	4.83	40	36	54
	11	1 / 8		2.07	1.03	4.14	31	28	48
	15	1 / 8		1.72	1.03	4.14	22	20	50
SPRABABBITT A (Notes 10&11)	3 / 16	6	HIGH	2.07	1.03	4.83	38	38	54
	3 / 16	6		2.41	1.03	4.83	44	44	54
	1 / 8	1 / 8		1.38	1.03	4.83	36	22	54
	1 / 8	1 / 8		1.72	1.03	4.83	35	33	54
SPRABOND (Note 5)	3 / 16	6	STD.	2.26	1.03	3.29	46	44	49
	1 / 8	1 / 8		2.41	1.03	3.29	42	39	49
	11	1 / 8		2.41	1.03	3.29	36	26	47
	15	1 / 8		2.07	1.03	3.29	25	25	47
SPRABRASS & SPRABRONZE AA	3 / 16	6	STD.	2.76	1.03	4.83	45	45	53
	1 / 8	1 / 8 T		2.41	1.03	4.83	42	42	53
	11	1 / 8		2.07	1.03	4.14	31	28	48
CADMIUM & LEAD (Note 10)	1 / 8	1 / 8	HIGH	1.72	1.03	4.83	35	33	54
COPPER	3 / 16	6	STD.	2.41	1.03	4.83	42	42	53
	1 / 8	1 / 8		2.41	1.03	4.83	40	36	53
	11	1 / 8		2.07	1.03	4.14	31	28	48
	15	1 / 8		1.72	1.03	4.14	22	20	48
METCOLOYS & NICKEL (Note 5)	3 / 16	6	STD.	2.76	1.03	4.83	45	43	53
	1 / 8	1 / 8		2.76	1.03	4.83	43	34	53
	11	1 / 8		2.07	1.03	4.14	31	28	48
SPRASTEELS	3 / 16	6	STD.	2.76	1.03	4.83	45	45	53
	1 / 8	1 / 8		2.41	1.03	4.83	42	34	53
	11	1 / 8		2.41	1.03	4.14	36	26	48
TIN (Notes 10 & 11)	1 / 8	1 / 8	HIGH	1.38	1.03	4.83	36	22	54
	1 / 8	1 / 8		2.41	1.03	4.83	41	29	54
	11	1 / 8		2.07	1.03	4.83	42	20	52
	11	1 / 8		1.72	1.03	4.83	44	23	52
	15	1 / 8		1.38	1.03	4.83	17	17	53
	15	1 / 8		1.38	1.03	4.83	18	18	53
ZINC (Notes 10 & 11)	3 / 16	6	STD.	2.76	1.03	4.83	45	42	53
	1 / 8	1 / 8 T		2.41	1.03	4.83	43	40	53
	11	1 / 8 T	HIGH	2.07	1.03	4.83	31	28	48
	15	1 / 8		1.72	1.03	4.83	22	20	50
402	1 / 8	1 / 8	STD.	2.41	1.03	4.83	40	42	50
405 (Note 12)	1 / 8	1 / 8 T	STD.	2.41	1.03	4.83	43	40	53

NOTES:

GENERAL

1. The pressure and flows listed in table are based on 3 Feet extension. When using the 'G' nozzle, 1 and 2 Feet extensions, the fuel and oxygen flows can be obtained at slightly lower pressures.

HARDWARE

2. Refer to the Hardware selection chart for additional hardware recommendations before spraying. Table parameters and all qualifying Footnotes shown here apply without change when using standard Type 12M Gun Air Cap.

OPERATING PARAMETERS

3. Columns 5,6 and 7 show lighting PRESSURES ONLY. After the Extension is lighted and spraying, adjust the flowmeter needle valves to obtain the flows listed in columns 8, 9 and 10.
4. Adjust the air for running as well as for lighting to the Pressure in column 7. At this air pressure the flow reading on the Type 2AFM Air Flowmeter should be adjusted to this figure in column 10.

SPRAYING

5. Only acetylene and MPS can be used as fuel gases to spray SPRABOND Wire. Read the Flame Spray Handbook, before spraying this material.
6. When spraying METCOLOY Wires, the molten wire tip may appear ragged and uneven. If this should occur, correct by reducing Oxygen flow by 2 or 3 points.
7. With Extension or with Gun alone, always set the wire tip position for good coating. For equal quality coating, Extension spray rates may be lower than Gun spray rates by 10% (for high-melting point wires) to 50% (for low-melting point wires).

PERFORMANCE

8. The 12M Gun has greatly increased heating capacity. Be sure to observe recommended procedures to prevent overheating the work or damaging the coating
9. When using the fan spray air cap, spray rates will be some what lower than the chart figures.
10. Use non-loading nozzles and air caps when spraying SPRABABBITTA, CADMIUM, LEAD, TIN, ZINC, TIN/ZINC AND ALUMINUM in start-stop operation.



11. For convenience, parameters for both high and reduced spray rates for SPRABABBITTA and TIN in each wire size are shown.
12. For convenience, after spraying 405 Wire, you can continue to use the 1/8" T Air Cap with any 1/8" overcoat wire at a slight reduction in spray rate. Use gas flows shown above.
13. When using Type AFM and GFM Flowmeters, reduce pressure shown, as necessary, to obtain flowmeter readings shown.

BALAJI UDYOG
Metal Spray Equipment