HARRIS®

THE HARRIS PRODUCTS GROUP

INSTRUCTION MANUAL

For Gas Welding, Cutting, Brazing & Heating Torches.

IMPORTANT:

For your own safety read these instructions. Failure to do so can lead to serious injury.

HARRIS 1905 - 100 YEARS - 2005

www.harrisproductsgroup.com.au

HARRIS

Table of Contents

Harris Products Group *would like to take this opportunity to thank you for choosing this genuine Harris product.*

Our factories in Europe and U. S. A. are managed under strict quality procedures (ISO 14001) and are recognized world wide for their quality, designs, and superior performance.

The Australian Branch is involved with some manufacturing and packaging of product. Harris Australia is staffed with an experienced, motivated team who are trained to respond quickly and efficiently to meet their customers' needs.

We believe that our quality products will last for years and therefore would be valuable assets for any workshop.

Repair

Ensure that only qualified repairmen service, test and clean your equipment.

Register your Warranty

To register your warranty with Harris, email your purchase details to sales@hgea.com.au or fax to (07) 3375 3620.

Extra Copies

Extra copies of these instructions are available. Call your distributor or contact the Harris Office.

Harris Products Group Pty Ltd., Australia.

HARRIS

BACKGROUND

What Regulators do:

- Break down unusable high pressure to a usable lower pressure
- Keeps low pressure constant
- Compensate for supply pressure changes
- Acts as a safety device for the operator & cylinder

How Regulators work:

- Use energy "stored" in the supply cylinder
- Adjusting screw/knob sets delivery pressure
- Right hand gauge displays cylinder pressure
- Left hand gauge displays the deliver/outlet pressure as adjusting knob is screwed in clock-wise
- Adjusting knob deflects diaphragm - opens seat allows pressure into low pressure side

Hoses:

- Carry gas from the supply to the handle for operation. They should be of good quality with good fit up to regulator/flashback arrestor
- Hose/fittings/joints should be checked for leaks on a regular basis

Handles:

- These items allow various attachments to be fitted which allow the operator to complete tasks ie. mixer—brazing tips and cutting attachments

Mixer:

- Mix the two gases prior to the tip tube

Tip Tube:

- Carry the mixed gases to the brazing/heating tip

Brazing/Heating Tip:

- Produces a flame shape to aid the transfer of heat/energy into the job being undertaken
- Quality of the flame shape is governed by quality/condition of the tip and operator adjust-ment

Cutting Attachment:

- Allows the operator to cut/gouge steel, different tip styles and sizes are available
- Quality of cut will depend on operator skill and quality and condition of tip and compli-ance to settings

Flashguards:

- Prevent the reverse flow of gases from the handle to either of the gas hoses, an explosive mixture may result which could cause personal injury or fire

Flashback Arrestor:

- Include a built-in check valve to prevent reverse flow and a sintered metal filter to extin-guish the flame should a flashback occur.

HARRIS

Set Up Instructions

Reference Document AS 4839-2001

1. Check that all equipment connections and especially both cylinder valve outlets and regulator inlets are clean and free from oil and grease.
2. 'Crack' (briefly open and close) cylinder valves (Fig 1).
3. Screw the regulators into cylinder valve outlet using an appropriate spanner (Fig 2).
4. Fit flashback arrestors and hose to regulators (Fig. 3).
5. Adjust the oxygen regulator to allow a small flow through the hose then release the control. Repeat for the fuel gas regulator (this blows off dust and chalk from inside the hoses). (Fig 4.)
6. Connect the handle to the hose end (Fig 5).
7. Connect the required attachments, tips and nozzles to the handle & tighten (Fig 6. next page).

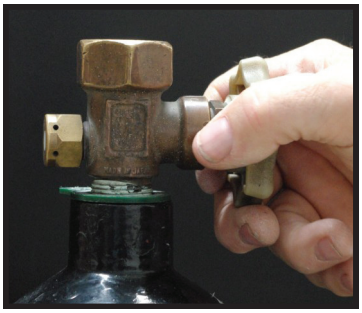


Figure 1. Opening Cylinder Valve

Figure 2.

Leak Testing Procedure: - Initial System Pressurization.

a) Both cylinder supply valves should be fully closed. (Fig. 1).

b) Both regulator pressure adjusting knobs shall be turned anti-clockwise until fully disengaged with spring/diaphragm. Knob will feel loose.

c) The valves on the handle shall be fully closed (Fig. 9 over page).

d) Each cylinder gas supply valve shall be slowly opened one end at a time. The low pressure gauge on each regulator shall be observed. If pressure is registered on either or both low pressure gauge, this indicates a faulty regulator—internal seat not closing. Replace faulty regulator and re-start the pressurization procedure.

Figure 3. Attaching Fuel Gas Regulator.

Note: If the system indicates a leak free seat state screw in the fuel gas regulator pressure adjusting knob until a pressure of 100KPA is achieved. Do the same for the oxygen regulator.

e) Turn both gas cylinder supply valves off fully (Fig 1).

f) Observe the pressure gauges on each regulator of a nominal 1 min. If a drop in pressure is indicated, then there is a leak in the system. Comply with specific test locations procedure to find the leak.

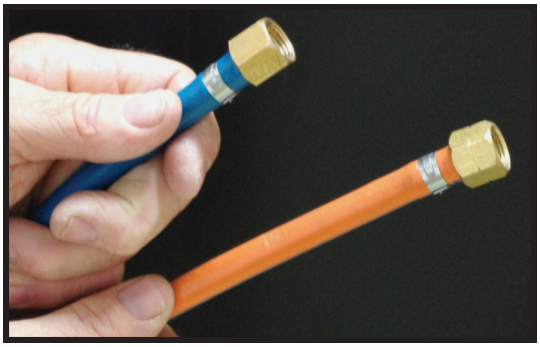


Figure 4.

Specific test locations: Test for leaks at the following points (using a suitable leak detecting solution)

a) Between both the gas cylinder supply valves and the regulator connections.

b) Between the regulator outlet connections and the welding hose connection.

c) Between the welding hoses and the hose connections on both ends.

d) Between the blowpipe inlet connections and the welding hose connections.

e) Around the spindles of all blowpipe and cutting attachment valves.

f) At the connection joint between the blowpipe and the welding cutting or heating attachment.

g) At the tip.

Note: *If leaks are detected at any of these points then necessary adjustments, repairs or replacements shall be made before proceeding.*

8. Turn on each cylinder valve. Slowly pressure will be displayed in the right hand gauge for oxygen and acetylene. LPG/ Propane is filled by weight therefore there is no cylinder pressure.

9. Adjust regulator to required pressure for the task at hand (Fig. 8), refer to Table 2 to obtain recommended pressures.

Fig. 8 **Adjusting Regulator**

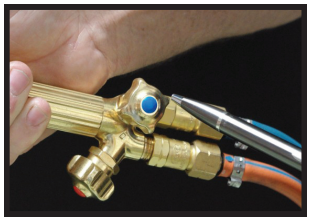


Figure 9. Handle Valve Example

10. Purge oxygen and fuel gas individually to ensure there is no mix gases in handle before fitting attachments and lighting torch. (Fig. 9)

11. Install correct size tip (Fig. 6 above) for metal thickness to be welded or cut. Make sure the tip seat is free of nicks or burrs. Welding tips should be hand-tightened only. Cutting tips should be wrench tightened.

11a) Open handle fuel gas valve approximately one quarter turn and ignite fuel gas. Close valve slightly if flame blows off tip.

11b) Crack oxygen valve and open until feathery, secondary cone disappears (Fig 11). Inner cone will be carbonizing at first stage. As more oxygen is added a neutral flame is achieved (Fig. 12).

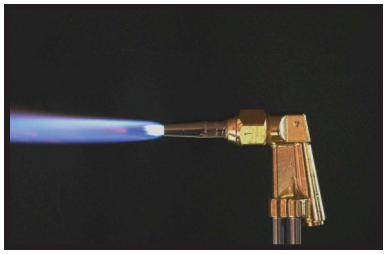


Fig. 11) Carbonizing

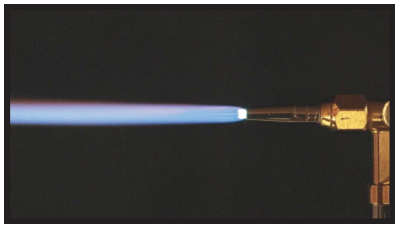


Fig. 12 Neutral

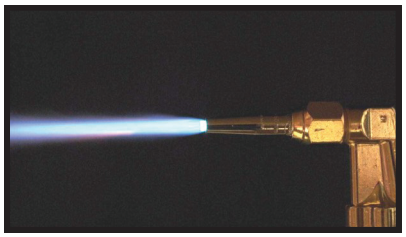


Fig. 13 Oxidizing

11c) Alternately open each valve to bring flame intensity up to the desired point. Maintain the neutral position for the best results.

11d) If you add too much oxygen you will shorten the inner flame and create the 'oxidizing' position. (Fig. 13) This will damage the tip and interfere with the task i.e. bad cut face/burn out tip.

Shut Down Procedure

1. Close torch oxygen valve. The close the fuel gas valve (Fig 9), which will extinguish the flame.
2. Turn off cylinder valve (Fig 1).
3. Open valves on handle / cutting attachment to vent hoses separately. Re-close valves. (Fig. 14)
4. Return the regulator adjusting screw to zero delivery position.
5. Check equipment for damage. Any damage should be reported and equipment tagged as defective. Equipment MUST be repaired prior to re-use.
6. Return equipment and cylinders to a place of storage.
7. Check to ensure that the cylinder valves are properly closed and there is no leakage of gas.

Figure 1. Opening Cylinder

Figure 14. Open valves & Purge gas

Spare Parts

A range of small parts are available for all equipment, the attached **drawing is a typical example**. Please contact your local Harris Distributor or our friendly Customer Service Team at Harris Products Group on (07) 3375 3670 or email sales@hgea.com.au.

WARNING

DO NOT—attempt to repair or substitute parts on equipment, particularly the regulators. Special techniques and tools are needed to safely repair oxy-fuel gas welding and cutting apparatus.

DO NOT—handle oxygen regulators, oxygen cylinders, valves or any other equipment with oily or greasy hands or gloves. Oxygen will react with oil and grease in such a manner that will easily result in fire or explosion.

DO NOT—lay or store oxygen regulators or other oxygen equipment on oily or greasy surfaces. The equipment can become contaminated with oil or grease which might result in a fire or explosion.

DO NOT—use acetylene pressure above 150kpa. Acetylene pressures above 150kpa can result in a fire or explosion.

DO NOT—empty the oxygen cylinder below 250kpa. If the oxygen cylinder is allowed to become completely empty, it will lose its positive pressure and contamination may enter the cylinder and create an unsafe condition.

DO NOT—change regulators from one gas service to another or replace a pressure gauge with one taken from any other service. Contamination resulting in a fire or explosion can take place by changing pressure gauges or regulators from one service to the other.

DO NOT– leave pressure on a regulator when not in use.

IN CONCLUSION

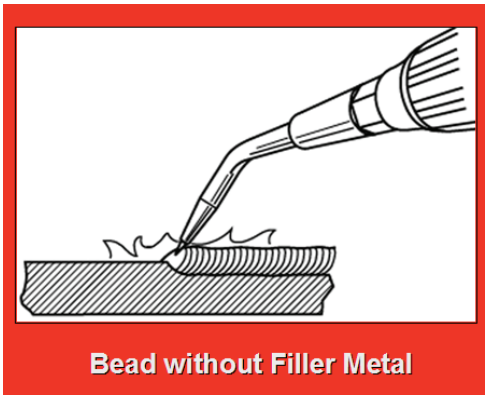
Treat your gas apparatus with respect. All manufacturers try to produce the safest equipment possible; but when it is not properly used, serious accidents do occur. Also, make sure check valves are on every torch. They'll help you during those times when your hands are working, but your head is not.

Gas Welding , Brazing & Cutting

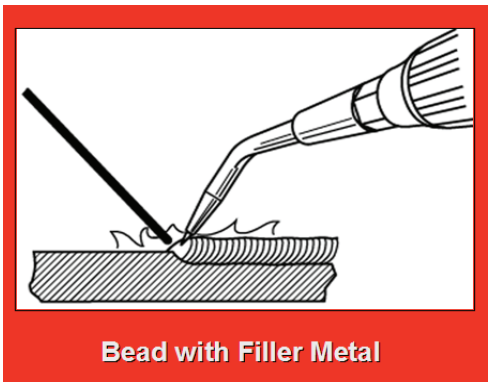
Basic Gas Welding Procedures

Gas Welding.

Gas welding is a method of joining similar metals by heating the adjacent surfaces to the melting point with an oxy-acetylene flame, and allowing the two parts to fuse together, with a filler metal being required on materials 5mm thick or more. The resulting weld is as strong as the parent metal.



Bead without Filler Metal



Bead with Filler Metal

Clean all metal.

All metal should be cleaned before welding. Oil, grease, rust, scale, or other

Impurities affect the weld quality, or tensile strength. Metal 5mm or more thick should be beveled before welding, and when beveled sides are joined, a filler rod of the same material is necessary.

Welding Tip Chart.

The welding tip chart shows the proper tip sizes and oxygen and acetylene pressures related to the thickness of material to be welded.

The chart should serve as a handy guide to be referred to often. If too large a tip is used and the flame softened, the tip heats up unnecessarily and is often accompanied by a popping noise which splatters the weld puddle.

Too hot a flame burns the steel, and too small a flame will not heat the metal to the proper temperature.

(Refer Table 2 appendix)

Welding Rod.

Welding rods are available for all types of welding, including mild steel, cast iron and aluminium. The size needed will be determined by the type of weld, the thickness of the metal, and the amount of filler metal required.

Steel Flame Cutting

Steel flame cutting is a simple process that can be quickly mastered.

Only carbon steel can be cut with the oxy-fuel gas method, since cast iron, stainless steel, aluminium, brass and other ferrous metals do not burn the way steel does.

The way to cut steel is to heat it to its kindling temperature (a red colour) and then burn it rapidly with pure oxygen. A cutting torch provides both the preheat flames and pure oxygen cutting stream.

Fuel gas and oxygen are combined in the torch head and burn at the torch tip with a flame temperature of 3000 c. These are the preheat flames.

The center hole in the cutting tip is for the pure oxygen, which flows through to cut the steel after the metal is sufficiently preheated.

Note: *Cutting Tips are available in a wide range of sizes, the proper size being determined by the steel thickness. Refer to the chart in appendix a guide for tip sizes, style and operating pressures.*

Figure 19. Steel Flame Cutting

Cutting

1. Make certain the correct tip is tightly secured in the torch head.
2. Set proper pressure on regulators.

   Lighting Procedures:

   Cutting Attachment. Always open oxygen valve wide on torch handle. Follow lighting procedure in welding torch instructions, using fuel gas valve on torch handle and preheat oxygen valve on cutting attachment to adjust preheat flames.

   Cutting Torch. Use same procedure as in welding torch instructions. After setting flame, depress cutting oxygen lever and open preheat oxygen valve slightly to re-set flame.
4. Move flame to edge of steel and position preheat cones just above the metal.
5. When steel becomes red, slowly depress cutting lever to release oxygen stream to cut through steel.
6. Slowly move torch in direction of the cut.

Note: 1. The correct cutting speed is accompanied by a sputtering sound, and a steady stream of sparks. This results in a clean, slagfree cut with square to and bottom edges.

2. Too fast a movement does not allow enough time for the oxygen stream to cut all the way through the metal. Slag fills the kerf and the two pieces are not severed.

3. Too slow a movement leaves a rounded top edge with slag sticking to the bottom of the metal.

4. The size of the preheat flame determines how quickly the cut can be started. Often, a small preheat flame is desirable to conserve gases, and prevent the melting of the top edges.

Demonstrations & Technical Help

Harris Distributors and/or personnel can help with on-site training and demonstrations should you have problems or need this service.

Please contact us on the below listed numbers.

HARRIS
THE HARRIS PRODUCTS GROUP

Contact Us

Ph: (07) 3375 3670

F: (07) 3375 3620

E: sales@hgea.com.au

W: www.harrisproductsgroup.com

The Harris team is committed to providing you with the very best service and support. We believe in putting “you” first in everything we do.

Our plans are to support the Harris quality with ethical, professional management that “listens” to its customers. WE can only learn and improve with your input, please feel free to contribute.

THE HARRIS PRODUCTS GROUP

Appendix

Harris Products Group Pty Ltd., Australia.

Troubleshooting Guide

TROUBLE	PROBABLE CAUSE	REMEDY
Welding Tip Popping	Tip is operational at too low heat valve Tip too large Too close to work	Increase pressures and consult appropriate tip chart. Use next smaller size tip Raise tip further from work
Flames not clearly defined, smooth or even.	Dirty tip	Clean with tip cleaner or replace tip
Regulator not holding constant pressure	Defective seat	Return unit for replace-ment.
Cutting Tip Popping	Too loose Nicked seat	Tighten tip nut Replace tip
Leak around needle valve	Packing nut loose	Tighten packing nut
Difficult to light	Too much pressure	Consult appropriate tip chart
Flame Change when cutting	Oxygen needle valve on torch handle partly closed Oxygen cylinder almost empty	Open Oxygen valve wide Replace cylinder with full one.

HARRIS

GUIDANCE ON MAINTENANCE - Refer Document AS4839-2001

Equipment	Maintenance		
	Weekly (if in constant use) or before every use (to be performed by the operator)	**As nominated (to be carried out by a technically competent person)**	**Refurbishment or replacement intervals (Equipment condition determines whether refurbishment or replacement is required.)**
1. Regulators (including their integral protective devices)	According to the manufacturer's instructions including – visual examination to determine suitability for service (e.g. gas, pressure rating, damage); condition of threads and sealing surfaces; and oil or grease contamination. Leak test all joints at working pressure.	Six monthly: Functional tests to ensure the correct operation of internal components	Manufacturer or supplier recommendation, but not exceeding 5 years.*
2. Flashback arrestors and other external devices (including non-return valves)	Visual examination to determine suitability for service (e.g. gas, pressure rating, damage); condition of threads and sealing surfaces; and oil or grease contamination. Leak test all joints at working pressure.	Yearly as detailed in AS 4603 or following a flashback. Proper functioning of the non-return valves and flashback arrestors. For pressure-activated valves, check there is no flow in the normal direction with	Manufacturer or supplier recommendation, but not exceeding 5 years.*
3. Hose assemblies	Visual examination to determine the suitability for service (e.g. gas, pressure rating, damage); condition of cover; and threads and sealing surfaces of the end fittings. Leak test all joints at working pressure.	Six monthly: Check for absence of cuts and excessive wear by bending the hose in a tight radius, to ensure reinforcement is not visible.	Determined by the hose assembly condition.
4. Blowpipes, mixers and attachments	Visual examination for damage of the threads and sealing surfaces of the hose connections and the attachment conditions. Leak test all joints at working pressure.	Six monthly: Test control valve function. Blank the attachment connection and leak test for internal malfunction.	Manufacturer or supplier recommendation, but not exceeding 5 years.*

* *Regulator elastomers and seals will wear and deteriorate in service and deteriorate out of service. Items stored for one year or over without use should receive inspection as per the annual maintenance inspection.*

HARRIS

TABLE 2

Tip Chart Pressure Guide

Oxy Acetylene Professional Equipment			
Part No. (6290)	**Cutting Thickness (mm)**	**Oxy Pressure (KPA)**	**Fuel Pressure (KPA)**
000	0-5	100-200	40
00AC	5-10	100-200	40
0AC	10-15	150-250	40
1AC	15-25	200-350	40
2AC	25-30	300-450	40
3AC	50-100	300-450	40
4AC	100-175	300-550	40
5AC	175-200	300-550	40
6AC	250-300	300-550	40

Oxy Acetylene Heating Tip				
Part No.	**Size**	**Oxy Press (KPA)**	**Fuel Press (KPA)**	**Mixer**
J63	1	40	40	E43, E43HC
J63	2	50	50	E43, E43HC
J63	3	100	80	E243
J63	4	160	120	E243
J143	5	180	120	E343

NOTE: For safety use large Bore 8mm or above with sizes 3, 4 and 5 tip. Size 3, 4 and 5 tips exceeds the capacity of one standard

Oxy Propane Gouging			
Part No. (6290)	**Cutting Thickness (mm)**	**Oxy Press. (KPA)**	**Fuel Press. (KPA)**
1GG	3-6	250	1.5
2GG	5-10	350	1.5
3GG	6-13	350	1.5

Note: The low fuel gas pressure is applicable when using Harris universal pressure mixing systems

Oxy Acetylene Welding & Brazing				
Part No.	**Size**	**Oxy Press. (KPA)**	**Fuel Press. (KPA)**	**Mixer**
0090	1,3,5,6,8	50	50	E43, E43HC
23A90	1,3,5,6,8	50	50	E43, E43HC

Oxy Acetylene Gouging			
Part No. (6290)	**Cutting Thickness (mm)**	**Oxy Press. (KPA)**	**Fuel Press. (KPA)**
1G	3-6	250	40
2G	5-10	350	40
3G	6-13	350	40

Oxy Propane Torch			
Part No. (6290)	**Cutting Thickness (mm)**	**Oxy Press. (KPA)**	**Fuel Press. (KPA)**
000NX	0-5	100-200	1.5
00NX	5-10	150-200	1.5
0NX	10-15	200-300	1.5
1NX	15-25	250-350	1.5
2NX	25-30	300-400	1.5
3NX	50-75	300-450	1.5
4NX	75-150	350-550	1.5
5NX	150-200	350-550	1.5
6NX	200-300	350-550	1.5

Oxy Propane Specialty Tip			
Part No. (6290)	**Cutting Thickness (mm)**	**Oxy Press. (KPA)**	**Fuel Press. (KPA)**
NFW	Rivet Washing	300	1.5
2NFFR	Rivet Cutting	350	1.5

HARRIS

TIP CHART PRESSURE GUIDE—CONTINUED

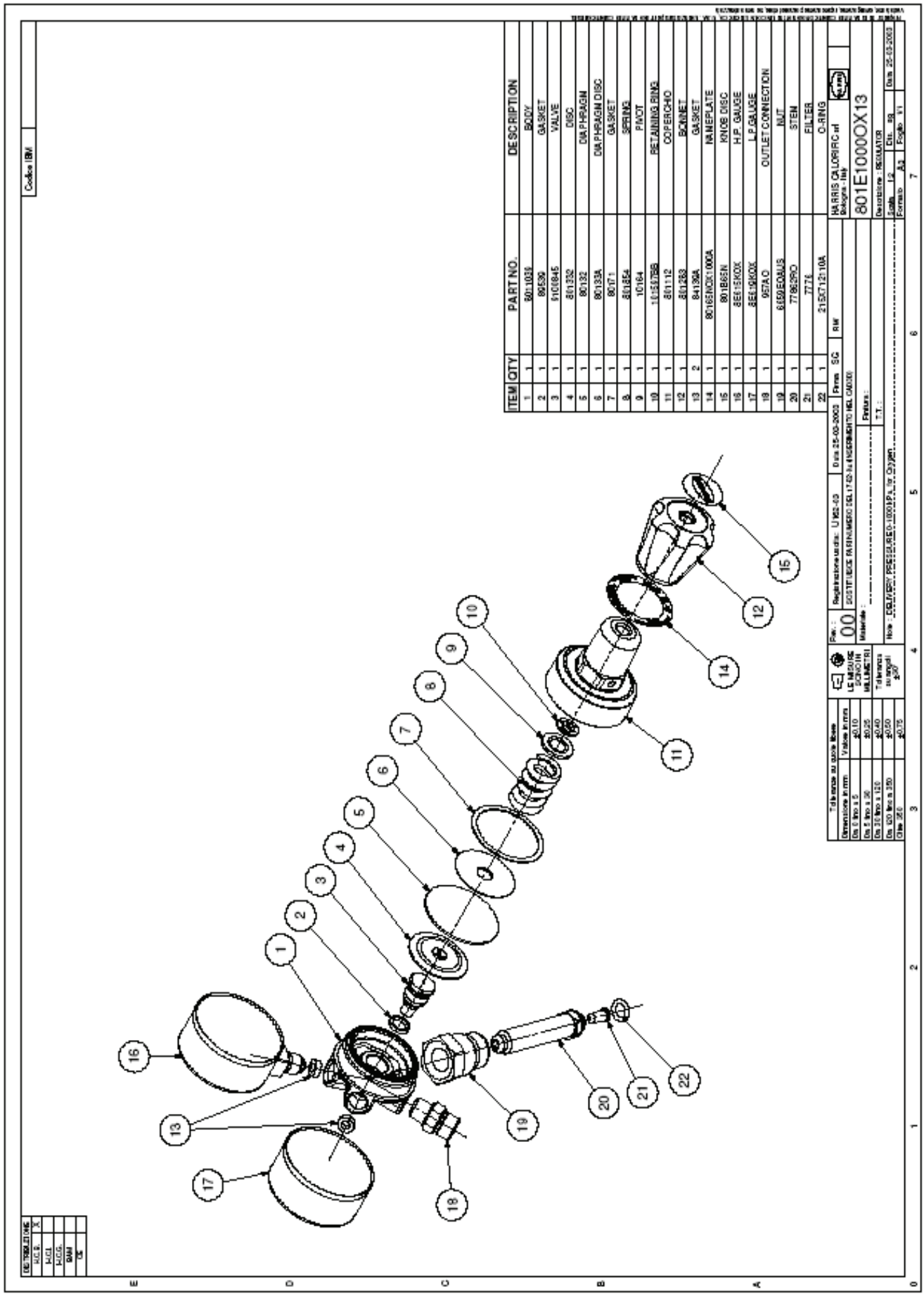
Oxy Propane Brazing Tip				
Part No.	**Size**	**Oxy Press. (KPA)**	**Fuel Press. (KPA)**	**Mixer**
0090	2N,4N,6N,8N	100-210	1.5	Universal Pressure Mixing
1390	3N,5N,6N,8N	100-210	1.5	

Oxy Propane Heating Tip				
Part No.	**Size**	**Oxy Pressure (KPA)**	**Fuel Pressure (KPA)**	**Max. MJ based on Flow**
1390	H	350	50	98 MJ/HR
2290	1H	100-200	50	186 MJ/HR
2290	2H	200-300	50	298 MJ/HR
2290	3H	200-500	100	532 MJ/HR
2290	4H	300-600	100	663 MJ/HR
2290	5H	400-800	100-200	934 MJ/HR

Type 41 = Oxy Acetylene		**Type 44 = Oxy/LPG**		
Plate Thickness	Tip Size	Type	Oxy Press.	Acet Press.
1-6	6	41	200	40
6-10	8	41	200	40
12-20	12	41	250	40
25-75	15	41	350	40
100-25	20	41	400	40
3-6	6	44	200	40
6-12	8	44	200	40
12-20	12	44	250	40
25-75	15	44	400	40
100-125	20	44	400	40

Note: All tables are for use as a guide only. Specifications may change without notice. Gas abbreviations are not exact technical terms.

HARRIS


ITEM QTY PART NO. DESCRIPTION
1 1 80.1031 BODY
2 1 86590 GASKET
3 1 9100845 VALVE
4 1 861332 DISC
5 1 80132 DIAPHRAGM
6 1 80133A DIAPHRAGM DISC
7 1 80171 GASKET
8 1 80.854 SPRING
9 1 10164 PIVOT
10 1 10156788 RETAINING RING
11 1 861112 COPERCHIO
12 1 861283 BONNET
13 2 841394 GASKET
14 1 80165NOX1000A NAMEPLATE
15 1 801B6SIN KNOB DISC
16 1 8EE16KOX H.P. GAUGE
17 1 8EE19KOX L.P.GAUGE
18 1 957AO OUTLET CONNECTION
19 1 6150E06NUS NUT
20 1 7786SRO STEM
21 1 7776 FILTER
22 1 215X712110A O-RING
HARRIS CALORIFIC srl
801E1000OX13
Codice IBM
Foglio 1/1
Data 25-03-2003