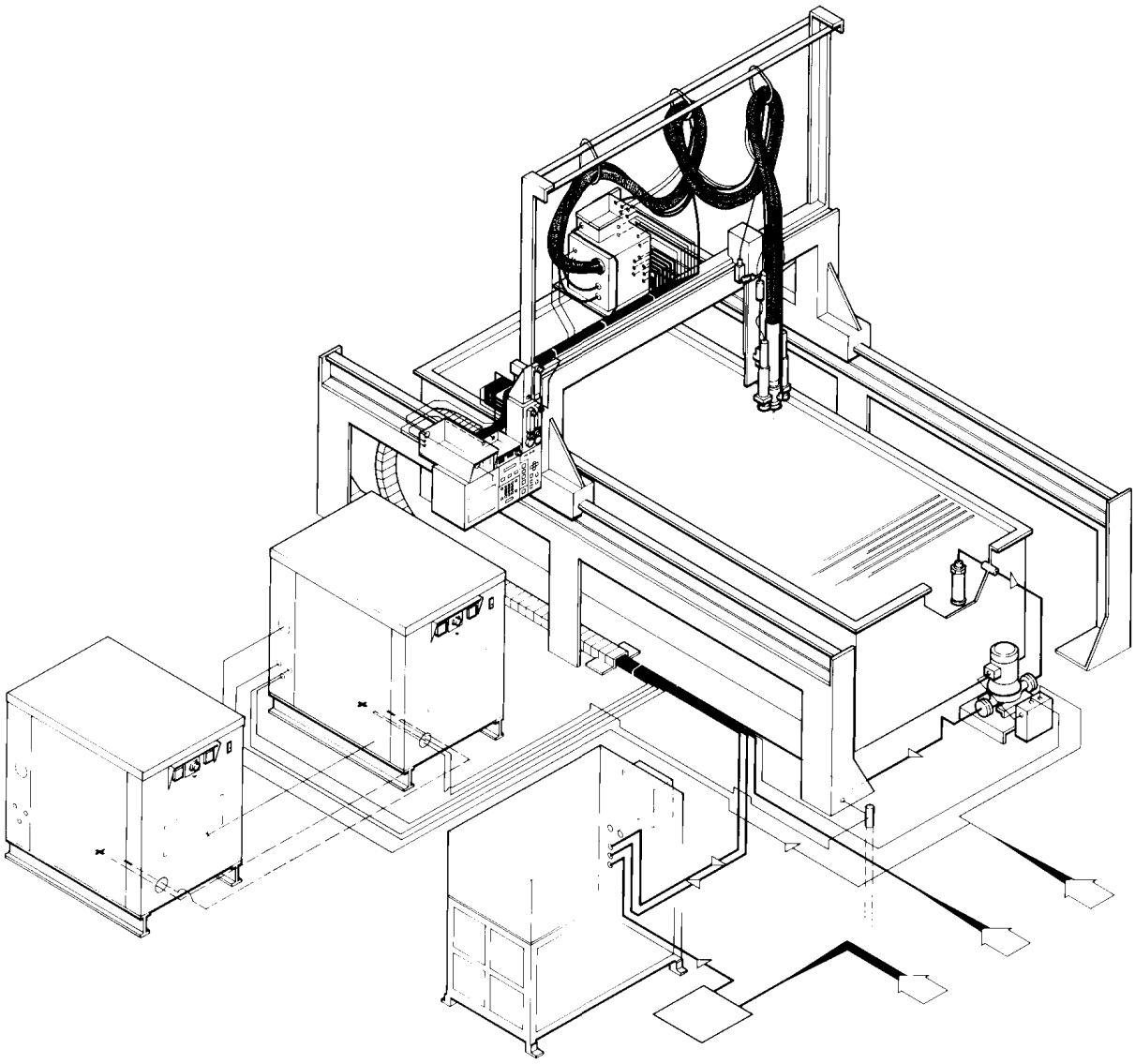
PAC-500

Plasma Arc Cutting System

Product Configuration Manual

801880 - Revision 2



PAC-500

Product Configuration Manual
(P/N 801880)

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TABLE OF CONTENTS

List of Figures

TABLE OF CONTENTS

List of Figures - (Cont.)

1 Ordering Procedure

In this section:

INTRODUCTION

Hypertherm's PAC-500 is designed as a machine-mounted cutting system for production cutting stainless steel to five-inch (127 mm) thick, carbon steel to two-inch (50 mm) thick, and aluminum to six-inch (152 mm) thick.

Four nozzle sizes are available for cutting from gauge to three-inch (75 mm) thick metal when the PAC-500 is used as a water-injection plasma cutting system with nitrogen as the plasma gas. One nozzle size is used for cutting metal thicknesses from three (75 mm) to six inches (152 mm). In this cutting range, the PAC-500 uses argon-hydrogen as the plasma gas (Hypertherm recommends a mixture of 35% hydrogen and 65% argon) and does not use the water-injection process.

The PAC-500 power supplies provide arc current from 200 to 1000 amps to the PAC-500 machine torch. Depending on the cutting application, one or more power supplies are used. See *Specify the Power Supplies* later in this section.

MULTI-TORCH SYSTEMS

If more than one torch is required, increase the quantity of each component by the number of torches to be used. The exceptions to this rule are the Operator's Panel, the Water Supply unit, and the Water Chiller and the water cooling hoses to the chiller.

To specify the correct components for each application, follow the guidelines in this section.

LAYOUT OF CUTTING MACHINE AND PAC-500 SYSTEM

When configuring a PAC-500 system(s), it is important to know where each major component will be placed. This will vary with the cutting machine type (gantry or cantilever) and with the particular installation. After the location of the major components has been determined, the interconnecting leads and cable lengths can be specified.

It is critical to follow the path that the interconnecting leads will follow and allow for some slack when specifying their lengths. **Do not try to get by with the next shorter length!**

Pictured below are two diagrams showing overhead views of typical cantilever and gantry systems. Installations vary, so use these figures as a guide.

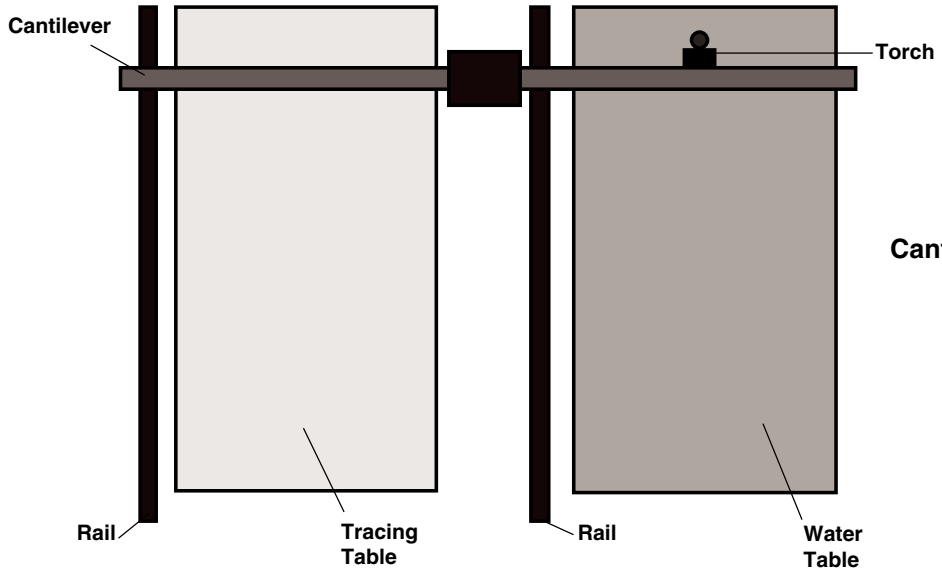


Figure 1.1
Cantilever Layout*

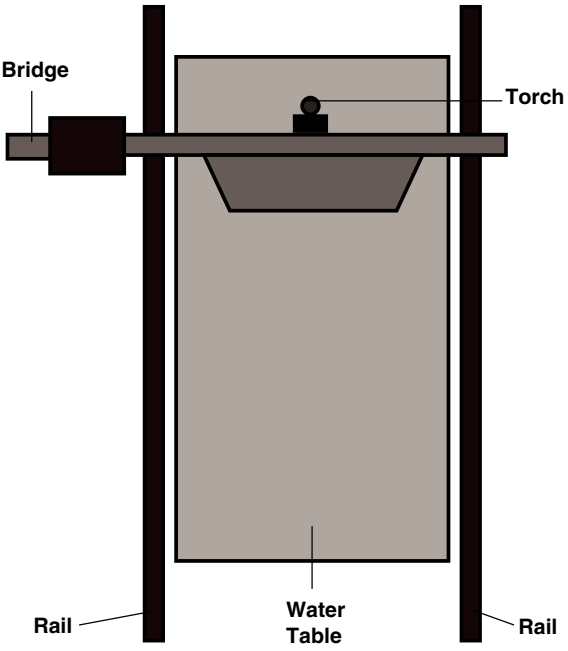


Figure 1.2
Gantry (Bridge) Layout*

*** Cables are usually in a power track or festoon system. Cable, lead and hose lengths must allow for routing through the system.**

ORDERING INFORMATION

Numerous configurations are possible for the PAC-500 system. The figure below represents a 1-Torch 1000-amp system with THC-1/DCC, inductive IHS, argon-hydrogen manifold, and water muffler (Note: The water muffler cannot be operated above 700 amps). Use this figure as a guide when configuring a PAC-500 system. The system below is also represented in block diagram form on page 1-31. Other block diagrams for PAC-500 systems begin on page 1-28.

Each numbered step is cross-referenced in four areas: in the sample gantry system diagram below; in block diagrams to clarify interfacing components; in the accompanying parts list; and in the specifications section to clarify size and weight of major components. (Block diagrams are offered to clarify connection points and do not necessarily reflect relative sizes or distances between components.)

Note: If the cutting system has a power track for cabling and hosing, be certain to see the **Specifications** section to check hose, cable and connector diameters.

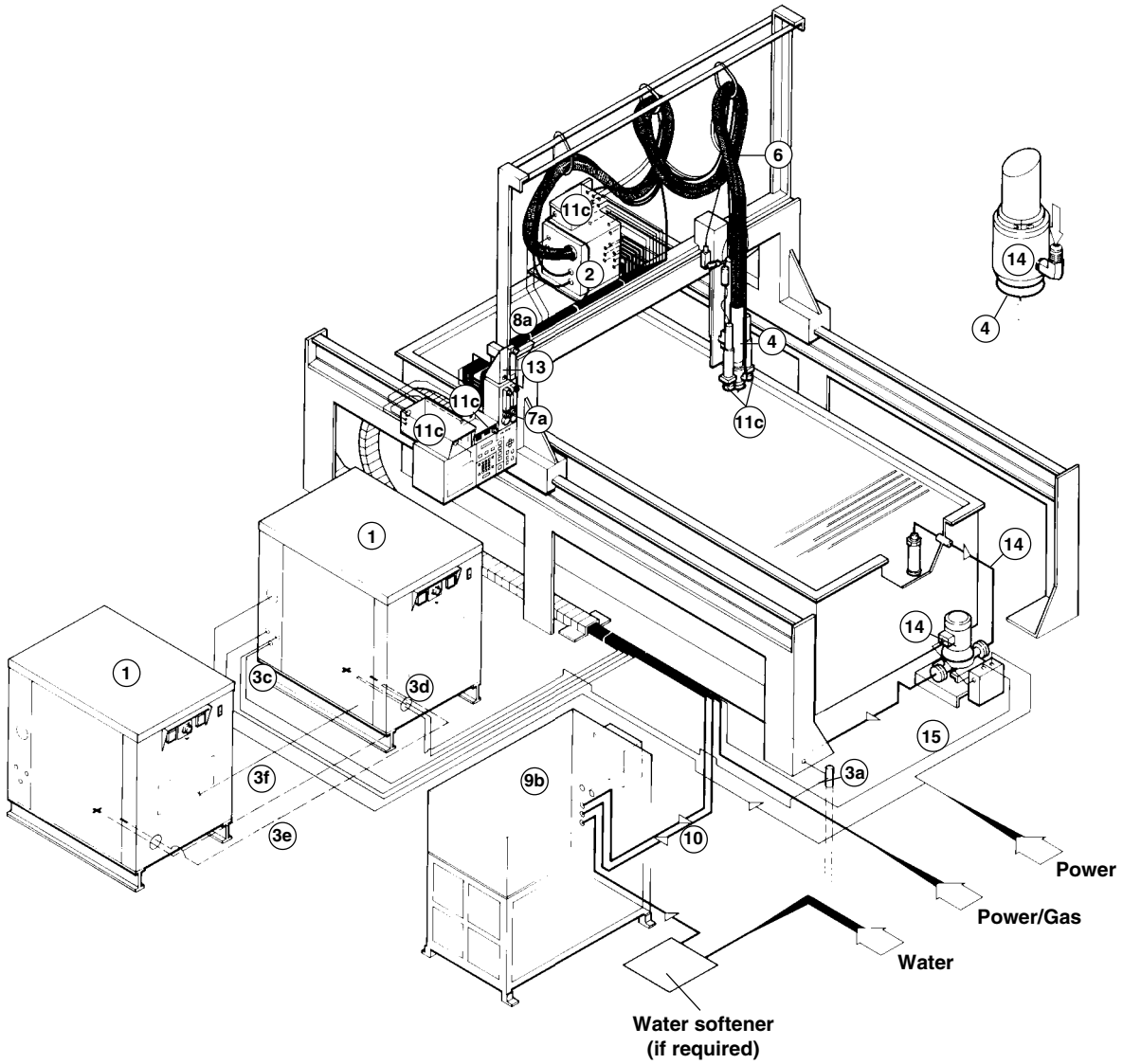


Figure 1.3 1000-Amp PAC-500 System in a Gantry Layout

ORDERING PROCEDURE - Required Equipment

(1) SPECIFY THE POWER SUPPLIES

Two power supplies are available as part of the PAC-500 system: the H-401 and the H-601. See the **Power Supply Selection Guide** below to determine which and how many power supplies to order.

H-401 Power supply

This unit is a three-phase power source using SCRs in a full-wave bridge rectifier circuit for providing up to 400 amps of power at 100% duty cycle. The H-401 can be used independently or paralleled with another H-401 or with an H-601 depending on the plate type and thickness to be cut. See **Power Supply Selection Guide** below. The power supply interfaces with the PAC-500 control console and the workpiece.

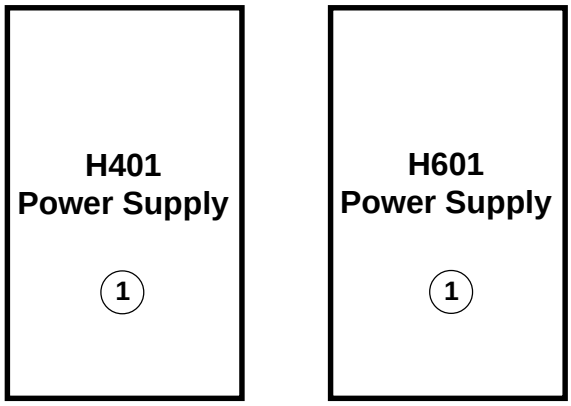
H-601 Power supply

This unit is a three-phase power source using SCRs in a full-wave bridge rectifier circuit for providing up to 600 amps of power at 100% duty cycle. The H-601 can be used independently or paralleled with an H-401 or H-601 depending on the plate type and thickness to be cut. See **Power Supply Selection Guide** below. The power supply interfaces with the PAC-500 control console and the workpiece.

- Using the **Power Supply Selection Guide** below, determine which supply (supplies) are needed for the particular application. Determine the placement of the power supply (supplies) and input line voltage available at the site and order the appropriate power supply or power supply combination.

Power Supply Selection Guide

Material Type	Thickness Range	Power Required	Power Supply Combination
Mild Steel	Up to 3/8" (10 mm)	400 Amps	One H-401
	Up to 1" (25 mm)	600 Amps	One H-601
Stainless & Aluminum	Up to 1" (25 mm)	400 Amps	One H-401
	Up to 2" (50 mm)	600 Amps	One H-601
	Up to 3" (76 mm)	800 Amps	Two H-401s
	Up to 6" (152 mm)	1000 Amps	One H-401 and One H-601 or Two H-601s



(1)	**H401 Power Supply**		
	036038	H401 Power Supply	200V, 50 Hz, 3 Ø
	036036	H401 Power Supply	400V, 50 Hz, 3 Ø
	036035	H401 Power Supply	480V, 60 Hz, 3 Ø
	036037	H401 Power Supply	600V, 60 Hz, 3 Ø

(1)	**H601 Power Supply**		
	036034	H601 Power Supply	200V, 50 Hz, 3 Ø
	036032	H601 Power Supply	400V, 50 Hz, 3 Ø
	036031	H601 Power Supply	480V, 60 Hz, 3 Ø
	036033	H601 Power Supply	600V, 60 Hz, 3 Ø

Figure 1.4 Power Supplies

(2) SPECIFY THE CONTROL CONSOLE

The central component of the PAC-500 system is the control console. This unit houses a high-frequency starting circuit, gas and water solenoid valves, gas pressure switch and water flow switches, as well as control relays for the power supply and IHS. The control console interfaces with the H-401 and/or H-601 power supplies, the water chiller or water supply system, the operator's panel, the gas supplies, the torch, and optional THC, IHS and argon-hydrogen manifold.

There are two control consoles available for the PAC-500: the standard console, and the UL-listed console. The difference between the two models is that the cable from the power supply is hard-wired to the standard console, and is connected with an amphenol connector on the UL console.

- Determine how many consoles are required (one console per torch) and where it (they) will be mounted on the cutting machine. The console is usually mounted on the back of the bridge as close to the torch station as possible. See *System Specifications - Required Equipment* in **Section 2** to check the mounting holes and weight of the console to determine where it can best be attached. Order the control console.

(3) SPECIFY THE POWER SUPPLY LEADS

The basic power supply leads package contains one 50-foot (15 m) 4/0 cable (power supply to control console), one 20-foot (6 m) 4/0 cable (power supply to worktable) and one 50-foot (15 m) 18-4 contactor cable with a 4-pin plug (power supply to control console). See Figure 1.5.

(3a) • If the lead lengths of the cables in the standard leads package are adequate (see above), order the standard leads package.

(3b) • If other lengths of 4/0 and 18-4 cable are necessary, order the additional length power supply leads (specify lengths), in addition to ordering the standard leads package.

If the total arc current of the PAC-500 system will exceed 500 amps, and/or power supplies are to be paralleled, more 4/0 cable is needed:

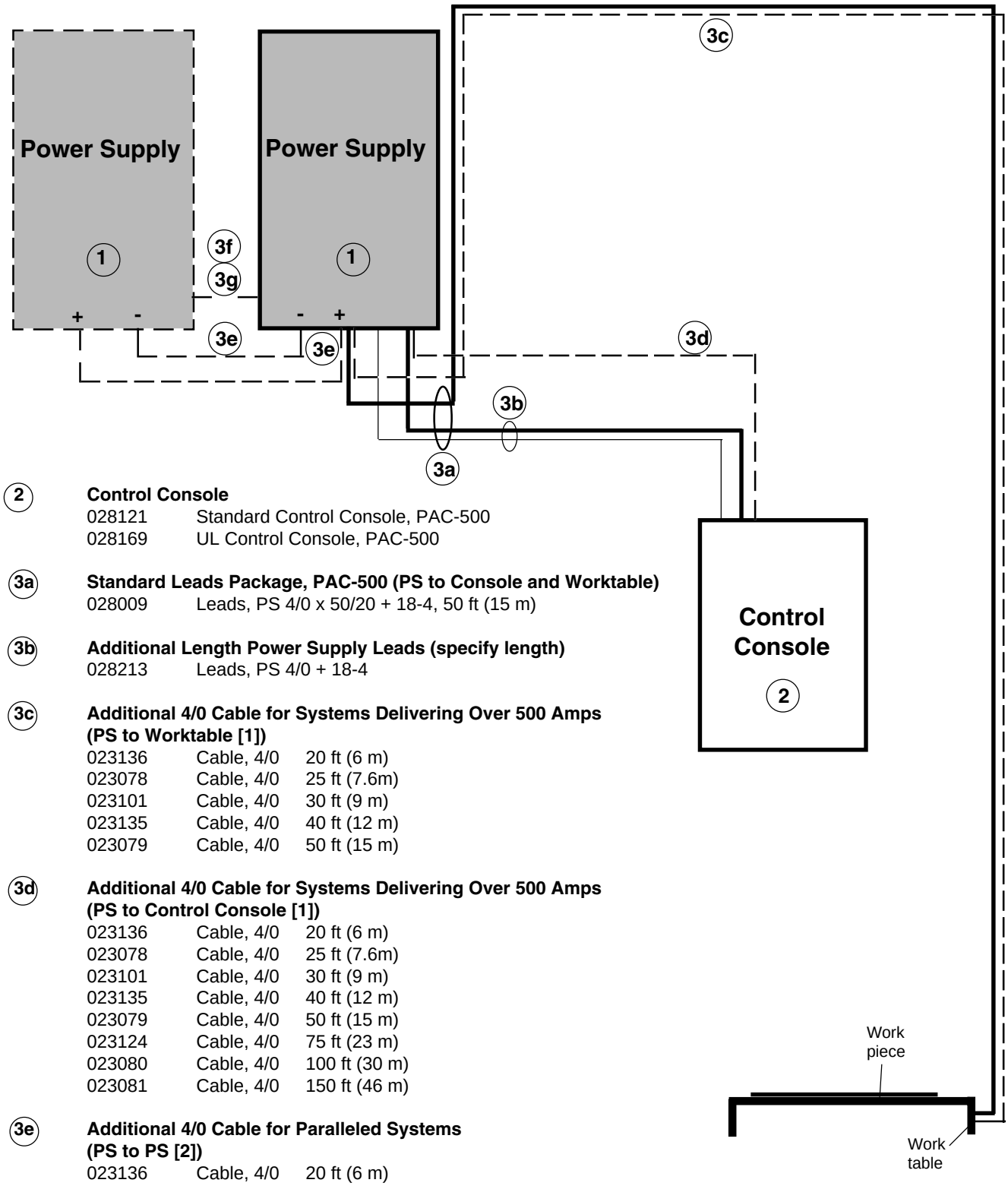
(3c) • Order an additional 4/0 cable to connect the power supply to the worktable.

(3d) • Order an additional 4/0 cable to connect the power supply to the control console.

(3e) • If power supplies are paralleled, order two additional 4/0 cables to connect between the two supplies.

(3f) • If power supplies are paralleled, order 18-4 cable to connect the contactors together. This is cable is 8 feet (2.4 m) long.

(3g) • Order additional lengths of 18-4 contactor cable, if necessary. Specify length.



2 **Control Console**
028121 Standard Control Console, PAC-500
028169 UL Control Console, PAC-500

3a **Standard Leads Package, PAC-500 (PS to Console and Worktable)**
028009 Leads, PS 4/0 x 50/20 + 18-4, 50 ft (15 m)

3b **Additional Length Power Supply Leads (specify length)**
028213 Leads, PS 4/0 + 18-4

3c **Additional 4/0 Cable for Systems Delivering Over 500 Amps (PS to Worktable [1])**

023136	Cable, 4/0	20 ft (6 m)
023078	Cable, 4/0	25 ft (7.6m)
023101	Cable, 4/0	30 ft (9 m)
023135	Cable, 4/0	40 ft (12 m)
023079	Cable, 4/0	50 ft (15 m)

3d **Additional 4/0 Cable for Systems Delivering Over 500 Amps (PS to Control Console [1])**

023136	Cable, 4/0	20 ft (6 m)
023078	Cable, 4/0	25 ft (7.6m)
023101	Cable, 4/0	30 ft (9 m)
023135	Cable, 4/0	40 ft (12 m)
023079	Cable, 4/0	50 ft (15 m)
023124	Cable, 4/0	75 ft (23 m)
023080	Cable, 4/0	100 ft (30 m)
023081	Cable, 4/0	150 ft (46 m)

3e **Additional 4/0 Cable for Paralleled Systems (PS to PS [2])**

023136	Cable, 4/0	20 ft (6 m)
023078	Cable, 4/0	25 ft (7.6m)
023101	Cable, 4/0	30 ft (9 m)

3f **18-4 Contactor Cable for Paralleled Systems (PS to PS)**
023011 Cable, 18-4 8 ft (m)

3g **Additional Length 18-4 Contactor Cable (specify length)**
023449 Cable, 18-4

Figure 1.5 Control Console, Power Supply Leads

(4) SPECIFY THE PAC-500 TORCH (TORCHES)

There are two PAC-500 torches to choose from:

A torch with a flared retaining cap (recommended for arc currents up to 600 amps);
A torch with a tapered retaining cap (recommended for arc currents in excess of 600 amps).

- Order the appropriate torch and number of torches for your application.

(4a) SPECIFY THE SPARE PARTS KIT

Order a spare parts kit when ordering the PAC-500 torch. The spare parts kit is intended as a starter kit and provides additional nozzles, swirl rings, electrodes, an electrode wrench, O ring kit and O-ring lubricant. Order enough consumables to meet the production requirements before the system is put into operation. There are four spare parts kits available for PAC-500 torches: a kit containing a flared cap (for cutting under 600 amps); a kit with a tapered cap (for cutting over 600 amps); a kit with a .120 nozzle (for cutting gauge thickness); and a kit with only the .220 nozzle size with tapered cap.

- Order the appropriate spare parts kit.

(5) SPECIFY THE TORCH MOUNTING BRACKET

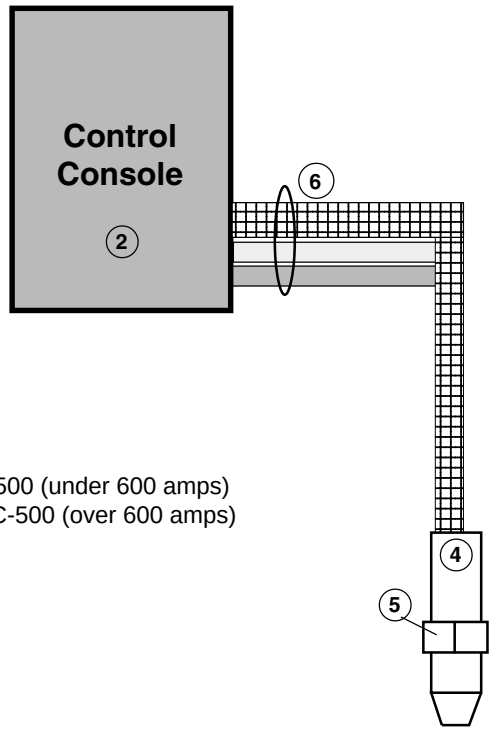
- Order a torch mounting bracket to attach the torch to the torch lifter on the cutting machine.

Note: Do not order a torch mounting bracket when choosing the inductive (underwater) IHS option. A torch mounting bracket is included in the inductive IHS system.

(6) SPECIFY THE TORCH LEADS

The torch leads consist of two water-cooled cables and a high-frequency lead encased in a protective metal sheathing, and a gas and water hose bound to the sheathed section. All leads interface the torch to the control console. Before ordering, check if the leads are being placed in a power track. If they are, then measure the length from the torch through the power track to the console and allow an extra 3 to 5 feet (1 to 1.5 m) of length. If a festoon system is used, measure the width of the bridge and double it for lead length.

- Based on the distance between the torch and the control console and the above considerations, specify the appropriate torch leads. (Order one torch lead set per torch)



4 **PAC-500 Torch**

028031	Torch Assembly w/flared cap, PAC-500 (under 600 amps)
028160	Torch Assembly w/tapered cap, PAC-500 (over 600 amps)

4a **Spare Parts Kit**

028041	Spare Parts Kit, Flared Cap
028210	Spare Parts Kit, Tapered Cap
028161	Spare Parts Kit, .120 Nozzle
028185	Spare Parts Kit, .220 Nozzle

5 **Torch Mounting Bracket**

020046	Torch Mounting Bracket

6 **Torch Leads**

028137	Shielded Torch Leads	10 ft (3 m)
028138	Shielded Torch Leads	15 ft (4.5 m)
028139	Shielded Torch Leads	20 ft (6 m)
028140	Shielded Torch Leads	25 ft (7.6 m)
028141	Shielded Torch Leads	30 ft (9 m)
028142	Shielded Torch Leads	35 ft (10.5 m)
028143	Shielded Torch Leads	40 ft (12 m)

Figure 1.5 Torch, Spare Parts Kit, Torch Mounting Bracket, Torch Leads

(7) SELECT THE FLOWMETER PANEL OR OPERATOR'S PANEL

The flowmeter panel consists of gas and water flowmeters and is connected to the control console.
The operator's panel consists of gas and water flowmeters as well as system status indicator lights, and ON/OFF and TEST/RUN switches.

Both the flowmeter and the operator's panel are available for 1- or multi-torch PAC-500 systems. The panel should be mounted for easy operator access. See the *Specifications* section of this manual for mounting dimensions and weight.

Select the flowmeter panel if the cutting machine provides all plasma operating switches and indicator lights on its own control panel.

(7a) • Determine where the flowmeter panel will be mounted, how many torches will be in the system, and order the appropriate panel. Note: Only <u>one</u> panel needs to be ordered for single or multi-torch systems.

Select the operator's panel if the cutting machine does not provide plasma operating switches and indicator lights on its control panel.

(7b) • Determine where the operator's panel will be mounted, how many torches will be in the system, and order the appropriate panel. Note: Only <u>one</u> panel needs to be ordered for single or multi-torch systems.

(8) SELECT THE FLOWMETER PANEL HOSES OR OPERATOR'S PANEL LEADS

The flowmeter panel hoses and the operator's panel leads both connect their respective panels to the control console. The flowmeter hose set contains no control cable. The operator's panel lead set contains the same hoses as the flowmeter set as well as a control cable that connects to the control console. **Each control console ordered (one per torch) requires one set of flowmeter panel hoses or operator's panel leads.** Ex: A two-torch application using an operator's panel requires <u>one</u> operator's panel, <u>two</u> control consoles and <u>two</u> operator's panel lead sets. A three-torch application using an operator's panel requires <u>one</u> operator's panel, <u>three</u> control consoles and <u>three</u> operator's panel lead sets, etc.

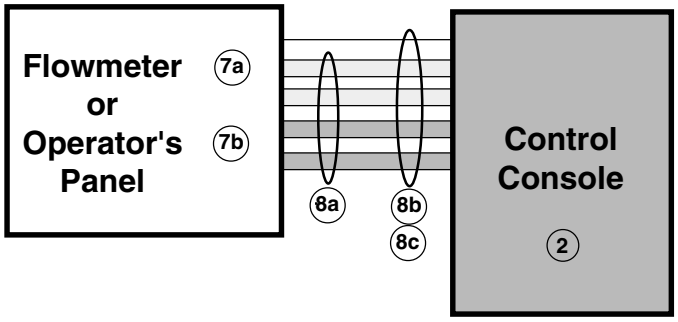
The flowmeter panel hoses can be connected to either the standard control console or the UL control console.

There are two styles of operator's panel leads: one to connect to the standard control console, and one to connect to the UL control console. Be sure to order the correct style lead set.

(8a) • Determine the appropriate length of hose set by measuring the total routing distance from the flowmeter panel to <u>each</u> console.

(8b) • Determine the appropriate length of lead set by measuring the total routing distance from the operator's panel to <u>each</u> standard control console.

(8c) • Determine the appropriate length of lead set by measuring the total routing distance from the operator's panel to <u>each</u> UL control console.



7a **Flowmeter Panel**

028053	Flowmeter Panel Assy, 1 Torch	
028054	Flowmeter Panel Assy, 2 Torch	
028055	Flowmeter Panel Assy, 3 Torch	
028056	Flowmeter Panel Assy, 4 Torch	

7b **Operator's Panel**

028122	Operator's Panel Assy, 1 Torch	
028134	Operator's Panel Assy, 2 Torch	
028135	Operator's Panel Assy, 3 Torch	
028136	Operator's Panel Assy, 4 Torch	

8a **Flowmeter Panel Leads**

028153	Leads, Flowmeter Panel/Console	5 ft (1.5 m)
028154	Leads, Flowmeter Panel/Console	10 ft (3 m)
028155	Leads, Flowmeter Panel/Console	15 ft (4.5 m)
028156	Leads, Flowmeter Panel/Console	20 ft (6 m)
028157	Leads, Flowmeter Panel/Console	25 ft (7.6 m)
028158	Leads, Flowmeter Panel/Console	30 ft (9 m)

8b **Operator's Panel Leads (for standard control console)**

028144	Leads, Operator's Panel/Std Console	5 ft (1.5 m)
028145	Leads, Operator's Panel/Std Console	10 ft (3 m)
028146	Leads, Operator's Panel/Std Console	15 ft (4.5 m)
028147	Leads, Operator's Panel/Std Console	20 ft (6 m)
028148	Leads, Operator's Panel/Std Console	25 ft (7.6 m)
028149	Leads, Operator's Panel/Std Console	30 ft (9 m)

8c **Operator's Panel Leads (for UL control console)**

028186	Leads, Operator's Panel/UL Console	5 ft (1.5 m)
028187	Leads, Operator's Panel/UL Console	10 ft (3 m)
028188	Leads, Operator's Panel/UL Console	15 ft (4.5 m)
028189	Leads, Operator's Panel/UL Console	20 ft (6 m)
028190	Leads, Operator's Panel/UL Console	25 ft (7.6 m)
028191	Leads, Operator's Panel/UL Console	30 ft (9 m)

Figure 1.7 Flowmeter Panel, Operator's Panel, Flowmeter Leads, Op Panel Leads

9 SELECT THE WATER SUPPLY SYSTEM OR WATER CHILLER

All PAC-500 systems require cooling water supplied at the rate of approximately 2.5 gpm (9.5 lpm) for each torch. The water pressure must be 185 psi (12.7 bar). Two choices of water cooling systems are available: a water supply system, or a water chiller.

Water Supply

The water supply system connects to the domestic water supply or a reservoir and pumps the water to the PAC-500 system at the required pressure and flow rates. The cooling water exits the return hose into the building drain system. The domestic water temperature must be below 70° F (21° C) to insure proper cooing of the torch.

The water supply systems are available in one-torch and two-torch configurations. Be certain to order the correct supply or combination of supplies when ordering a multi-torch system. For example; a 3-torch system would require one 2-torch water supply system plus one 1-torch water supply system, while a 2-torch system would require only one 2-torch water supply system. Water is not re-circulated or cooled as it is with the water chiller. A water-softener system may also be required.

- **9a** • Determine the available voltage and where the **1-torch** water supply will be placed. Order the system.
- **9b** • Determine the available voltage and where the **2-torch** water supply will be placed. Order the system.

Water Chiller

The water chiller for the PAC-500 system is a closed-loop refrigeration unit that is capable of reducing the water coolant temperature to the electrode well below ambient air and water supply temperature. Having this capability greatly increases the life of the nozzle and electrode. A source of supply water must be available. A water softener may also be required.

There are three types of water chillers for use with the PAC-500 system: a 1-torch 600 Amp system, a 1-torch 1000 Amp system and a 2-torch 600 Amp system. When ordering a multi-torch system, specify the proper number of water chillers for the number of torches being used.

The water chiller should be located near the power track or festoon entrance and must be level to ensure the water level control switches function properly. The unit should be bolted to the floor, and, if possible, near a floor drain. The water chiller must have at least 10 inches (254 mm) of free air space at the condenser inlet and outlet. If mounted above the cutting table, a check valve will have to be installed to keep the water chiller from draining when the electrode is changed.

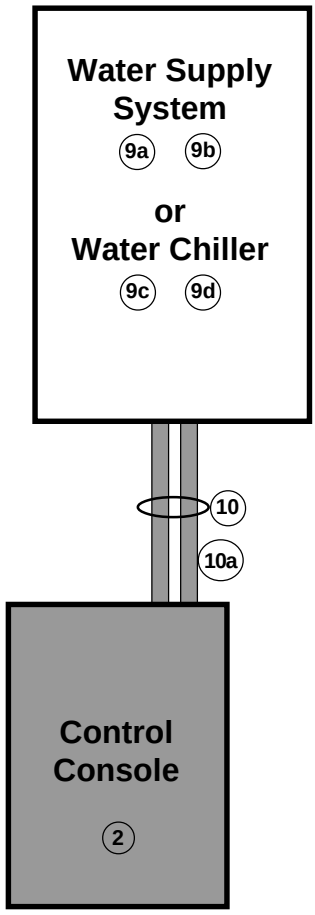
- **9c** • Determine the available voltage and where the **1-torch** water chiller will be placed.
- **9d** • Determine the available voltage and where the **2-torch** water chiller will be placed.

  Order the appropriate system.

10 SPECIFY THE COOLING HOSE SET BETWEEN THE WATER SUPPLY OR WATER CHILLER AND THE CONTROL CONSOLE

Cooling water leads are available for 1-torch and 2-torch systems at a length of 50 feet (15 m). Additional length hosing can also be ordered.

- **10** • Order the correct cooling hose set (1- or 2-torch) for the application. Be sure to consider the path that the hoses will run to attach to the control console.
- **10a** • If the standard hose sets of 50 feet (15 m) are not adequate, order additional length hosing by specifying extra length needed. (Standard hose set must also be ordered when ordering additional length hosing).



9a **Water Supply System (1-Torch)**

028291	Water Supply, 1 T, 380/415/460V, 50-60Hz
028294	Water Supply, 1 T, 575V, 60Hz

9b **Water Supply System (2-Torch)**

028320	Water Supply, 2 T, 380/415/460V, 50-60Hz
028321	Water Supply, 2 T, 575V, 60Hz

9c **Water Chiller (1-Torch)**

039099	Water Chiller, 200V, 600A, 1T
039116	Water Chiller, 240V, 600A, 1T
039102	Water Chiller, 380V, 600A, 1T
039101	Water Chiller, 415V, 600A, 1T
039103	Water Chiller, 440V, 600A, 1T
039098	Water Chiller, 480V, 600A, 1T
039100	Water Chiller, 575V, 600A, 1T
039111	Water Chiller, 200V, 1000A, 1T
039118	Water Chiller, 240V, 1000A, 1T
039114	Water Chiller, 380V, 1000A, 1T
039113	Water Chiller, 415V, 1000A, 1T
039115	Water Chiller, 440V, 1000A, 1T
039110	Water Chiller, 480V, 1000A, 1T
039112	Water Chiller, 575V, 1000A, 1T

9d **Water Chiller (2-Torch)**

039105	Water Chiller, 200V, 600A, 2T
039117	Water Chiller, 240V, 600A, 2T
039108	Water Chiller, 380V, 600A, 2T
039107	Water Chiller, 415V, 600A, 2T
039109	Water Chiller, 440V, 600A, 2T
039104	Water Chiller, 480V, 600A, 2T
039106	Water Chiller, 575V, 600A, 2T

10 **Cooling Water Hose Set**

028010	Hoses, Cooling Water	1T, 50 ft (15m)
028013	Hoses, Cooling Water	2T, 50 ft (15m)

10a **Additional Length Cooling Water Hoses (specify length)**

028214	Additional Length Cooling Water Hoses	1T
028215	Additional Length Cooling Water Hoses	2T

Figure 1.7 Flowmeter Panel, Operator's Panel, Flowmeter Leads, Op Panel Leads

(11) SELECT THE TORCH HEIGHT CONTROL SYSTEM

There are five basic choices to provide torch height control for the PAC-500 system:

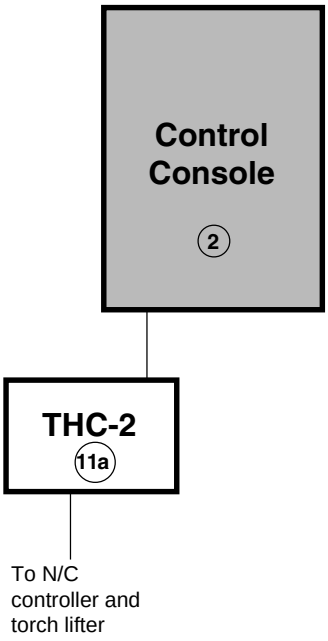
- (11a) THC-2
- (11b) THC-1 with Fluidic Initial Height Sensing
- (11c) THC-1 with Digital Current Control and Inductive Initial Height Sensing
- (11d) THC-1/Remote Voltage-Current Control with Fluidic Initial Height Sensing
- (11e) THC-1/Remote Voltage-Current Control with Inductive Initial Height Sensing

(11a) THC-2

The THC-2 is the simplest of the systems. This unit provides only the torch height control function. (Corner Height Inhibit is not provided and Initial Height Sensing is not available.) This option is best suited to optical trace machines where machine operations are manually controlled by the operator. The THC-2 controls the torch height by arc voltage control. A reference voltage is set on the THC-2 and when there is a variation in that voltage during cutting, the torch suspension motor is activated to adjust the torch height.

Note that with the THC-2 system, cables to the control console and the cutting machine controller are not supplied by Hypertherm. Use five-conductor 18-gauge cable to connect the THC-2 to the cutting machine control. Use three-pair 22-gauge shielded cable to connect the THC-2 to the control console.

- Locate an area to mount the THC-2 (this should be in easy reach of the operator), and order the system.



11a **THC-2 Torch Height Control**
052001 THC-2 Torch Height Control, PAC-500

Figure 1.9 THC-2

(11b) THC-1 with Fluidic IHS

As in the THC-2, The THC-1 controls the torch height by arc voltage control. A reference voltage is set on the THC-1 and when there is a variation in that voltage during cutting, the torch suspension motor is activated to adjust the torch height. A voltage divider is part of this system, and is mounted within the power supply. (The voltage divider reduces the arc voltage from the power supply by a ratio of 25:1. This voltage is then used by the THC-1 electronic circuitry to adjust the torch height.) Additional features with the THC-1 are:

1. Corner Height Inhibit - This prevents the torch from diving into the workpiece during corner cutting when travel speed is automatically reduced on CNC machines.

2. Fluidic Initial Height Sensing - This establishes proper piercing height for the start of each cut. The torch acts as the detection device in this system by generating a high flow of nitrogen from the torch nozzle. The work piece must be above water for this system to function properly. (If IHS is desired, but cutting will be under water, see THC-1 options **11c** or **11e**).

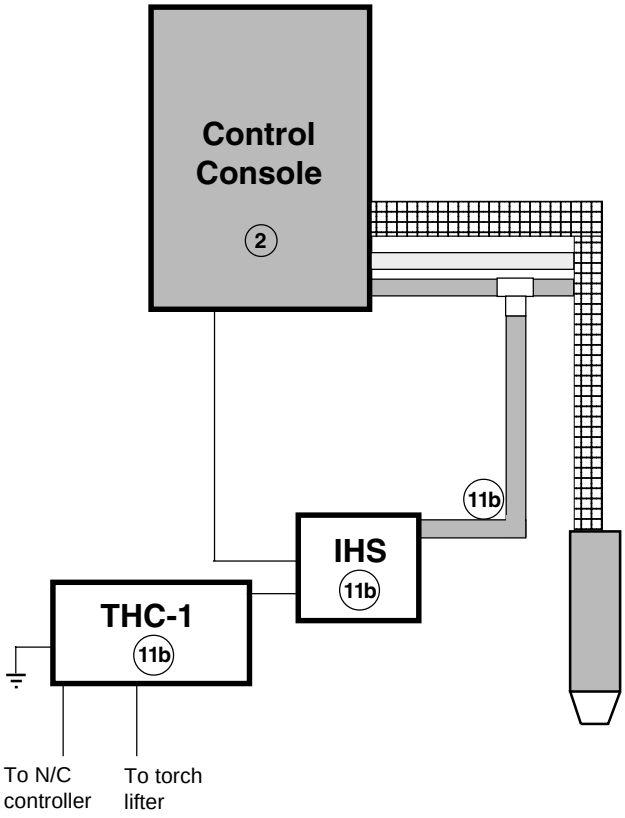
3. Digital Inputs - The THC-1 accepts digital signals from the machine computer control. A "Torch On" or "Torch Off" pulse is all that is required from the computer. The THC-1 provides the control for proper sequencing of the IHS function and synchronization of torch ignition.

A 30-inch hose and tee are supplied to connect the IHS to the torch side of the control module.

Note that with this system, cables from the THC-1 module to the IHS, cutting machine controller, torch lifter and star ground are not supplied by Hypertherm. Use six-pair 22 gauge cable to connect the THC-1 module to the IHS, and the cutting machine. Use five-conductor 18 gauge cable to connect the THC-1 module to the torch lifter motor. Use 18 gauge stranded copper wire to connect the THC-1 module to star ground (water table), and voltage divider to star ground.

The cable from the IHS module to the control console is also not supplied. Use six-pair 22 gauge cable to connect the IHS module to the control console.

- Locate an area to mount the THC-1 (this should be in easy reach of the operator). The IHS module should be located as near to the control console as possible. The hose from the IHS module to the control console is 2-1/2 feet (.76 m) long . Order the system.



11b **THC-1 Torch Height Control w/Fluidic IHS**
050001 THC-1 Standard, Fluidic IHS

Figure 1.10 THC-1 w/Fluidic IHS

(11c) THC-1 with Digital Current Control and Inductive IHS

The THC-1 in this system has the same benefits as the standard THC-1 (see **11b**) with the additional feature of arc current control from a small current control receiver that should be located near the operator. A manual transmitter interfacing between the current control receiver and power supply completes the digital current control portion of this system.

Unlike the fluidic IHS, the inductive IHS can be used for both above and underwater cutting applications. The inductive IHS system requires a regulated air supply of 20 psi (1.4 bar) to operate the probe assembly air cylinder. Two probes, two probe cables, an air cylinder and air cylinder hosing are included in this package. The IHS module must be located within 40 feet (12 m) of the torch. **A torch mounting bracket is also included with the inductive IHS system. Do not order a separate torch mounting bracket when ordering the inductive IHS option.**

Note that with this system, cables from the THC-1 module to the IHS, cutting machine controller, torch lifter, and star ground are not supplied by Hypertherm. Use six-pair 22-gauge cable to connect the THC-1 module to the IHS, and cutting machine controller. Use five-conductor 18-gauge cable to connect the THC-1 to the torch lifter, and 18-gauge stranded copper to connect the THC-1 to star ground.

The cable from the IHS module to the control console is also not supplied. Use six-pair 22-gauge cable for this connection.

Cabling is also not supplied connecting the transmitter to the current control receiver and power supply. Use six-pair 22-gauge cable to connect the transmitter to the current control receiver, and three-pair 22-gauge cable to connect the transmitter to the power supply. If power supplies are connected in parallel, use two cables between the transmitter and the power supplies.

- Locate an area to mount the THC-1 module (this should be in eye sight of the operator), the current control receiver (this should be in easy reach of the operator), the transmitter, and the IHS module (within 40 feet (12 m) of the torch). Order the system.

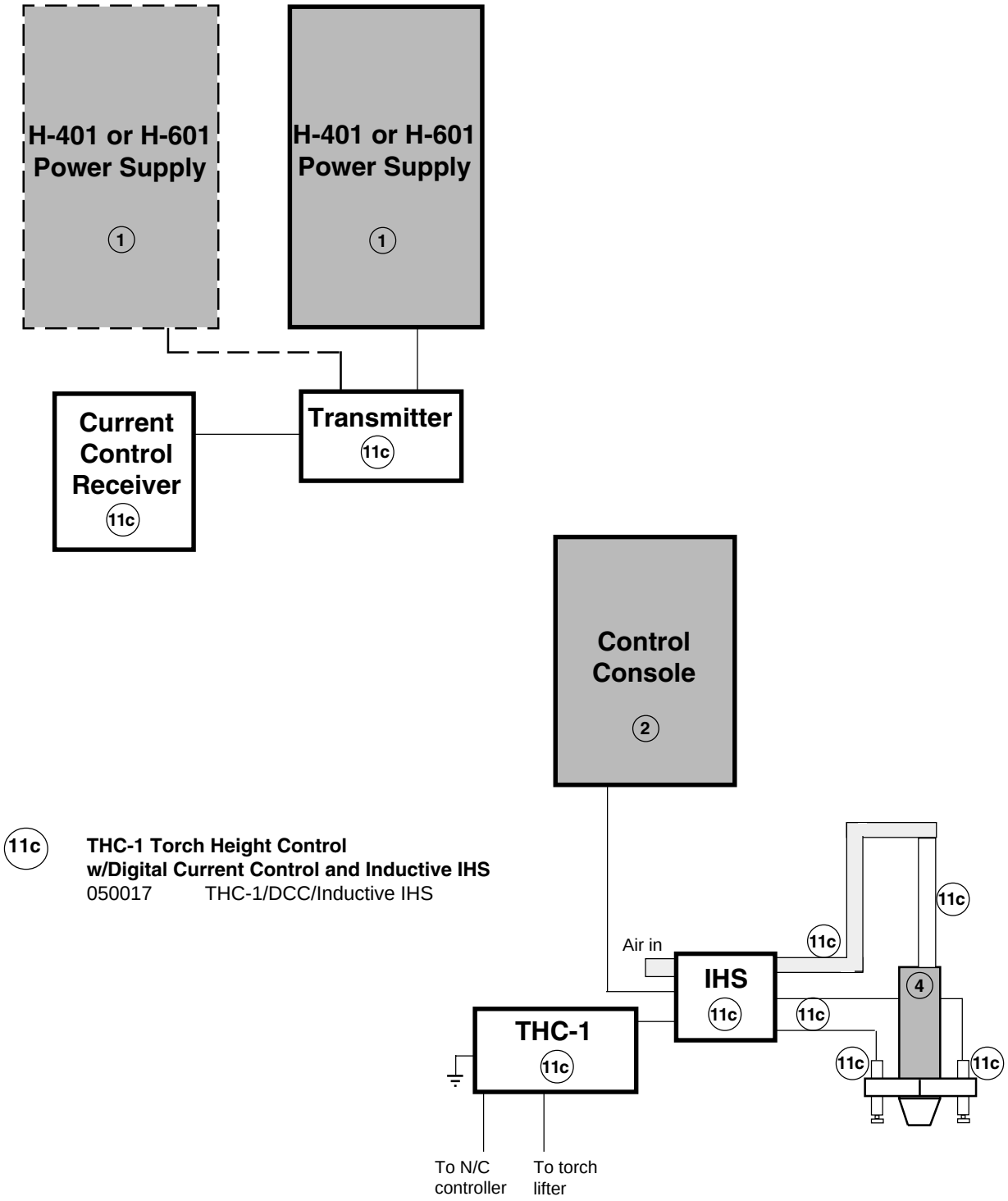


Figure 1.11 THC-1 w/DCC and inductive IHS

(11d) THC-1/Remote Voltage-Current Control (RVC) with Fluidic IHS

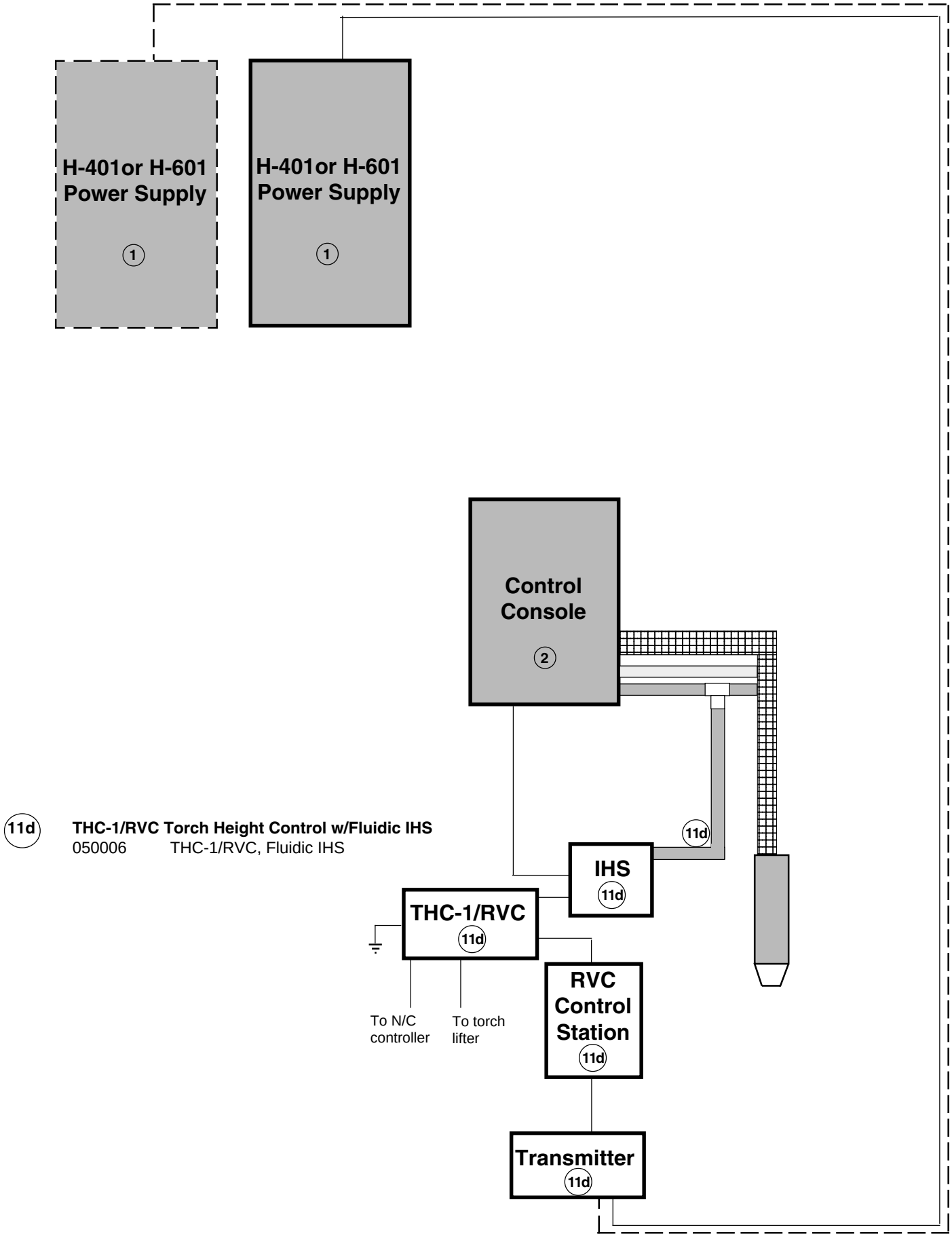
The THC-1/RVC system has the same benefits and components as the standard THC-1 (see **11b**) with the additional feature of arc voltage and arc current control from a small control station that can be located remotely from the THC-1 control module. A manual transmitter interfacing the RVC control station and power supply completes this system.

Note that with this system, cables from the THC-1/RVC module to the IHS, cutting machine controller, RVC control station, torch lifter, and star ground are not supplied by Hypertherm. Use six-pair 22-gauge cable to connect the THC-1/RVC module to the IHS, cutting machine controller, and RVC control station. Use five-conductor 18-gauge cable to connect the THC-1/RVC to the torch lifter, and 18-gauge stranded copper to connect the THC-1/RVC to star ground.

The cable from the IHS module to the control console is also not supplied. Use six-pair 22-gauge cable for this connection.

Cabling is also not supplied connecting the transmitter to the RVC control station and power supply. Use six-pair 22-gauge cable to connect the transmitter to the RVC control station, and five-conductor 18-gauge cable to connect the transmitter to the power supply. If power supplies are connected in parallel, use two cables between the transmitter and the power supplies.

- Locate an area to mount the THC-1/RVC module (this should be in eye sight of the operator), the RVC control station (this should be in easy reach of the operator), and the transmitter. The IHS module should be located as near to the control console as possible. The hose from the IHS module to the control console is 2-1/2 feet (.76 m) long Order the system.



11d **THC-1/RVC Torch Height Control w/Fluidic IHS**
050006 THC-1/RVC, Fluidic IHS

Figure 1.12 THC-1/RVC w/Fluidic IHS

(11e) THC-1/Remote Voltage-Current Control (RVC) with Inductive IHS

This variation of the THC-1/RVC is identical to the THC-1/RVC unit described on page 1-22 (**11d**) with the exception of the IHS system. Unlike the fluidic IHS, the inductive IHS can be used for both above and underwater cutting applications. The inductive IHS system requires a regulated air supply of 20 psi (1.4 bar) to operate the probe assembly air cylinder. Two probes, two probe cables, an air cylinder and air cylinder hosing are included in this package. The IHS module must be located within 40 feet (12 m) of the torch. **A torch mounting bracket is also included with the inductive IHS system. Do not order a separate torch mounting bracket when ordering the inductive IHS option.**

Note that with this system, cables from the THC-1/RVC module to the IHS, cutting machine controller, RVC control station, torch lifter, and star ground are not supplied by Hypertherm. Use six-pair 22-gauge cable to connect the THC-1/RVC module to the IHS, cutting machine controller, and RVC control station. Use five-conductor 18-gauge cable to connect the THC-1/RVC to the torch lifter, and 18-gauge stranded copper to connect the THC-1/RVC to star ground.

The cable from the IHS module to the control console is also not supplied. Use six-pair 22-gauge cable for this connection.

Cabling is also not supplied connecting the transmitter to the RVC control station and power supply. Use six-pair 22-gauge cable to connect the transmitter to the RVC control station, and five-conductor 18-gauge cable to connect the transmitter to the power supply. If power supplies are connected in parallel, use two cables between the transmitter and the power supplies.

- Locate an area to mount the THC-1/RVC module (this should be in eye sight of the operator), the RVC control station (this should be in easy reach of the operator), and the transmitter. The IHS console must be located within 40 feet (12 m) of the torch. See *Specifications* in Section 2 for weight and mounting requirements. Order the system.

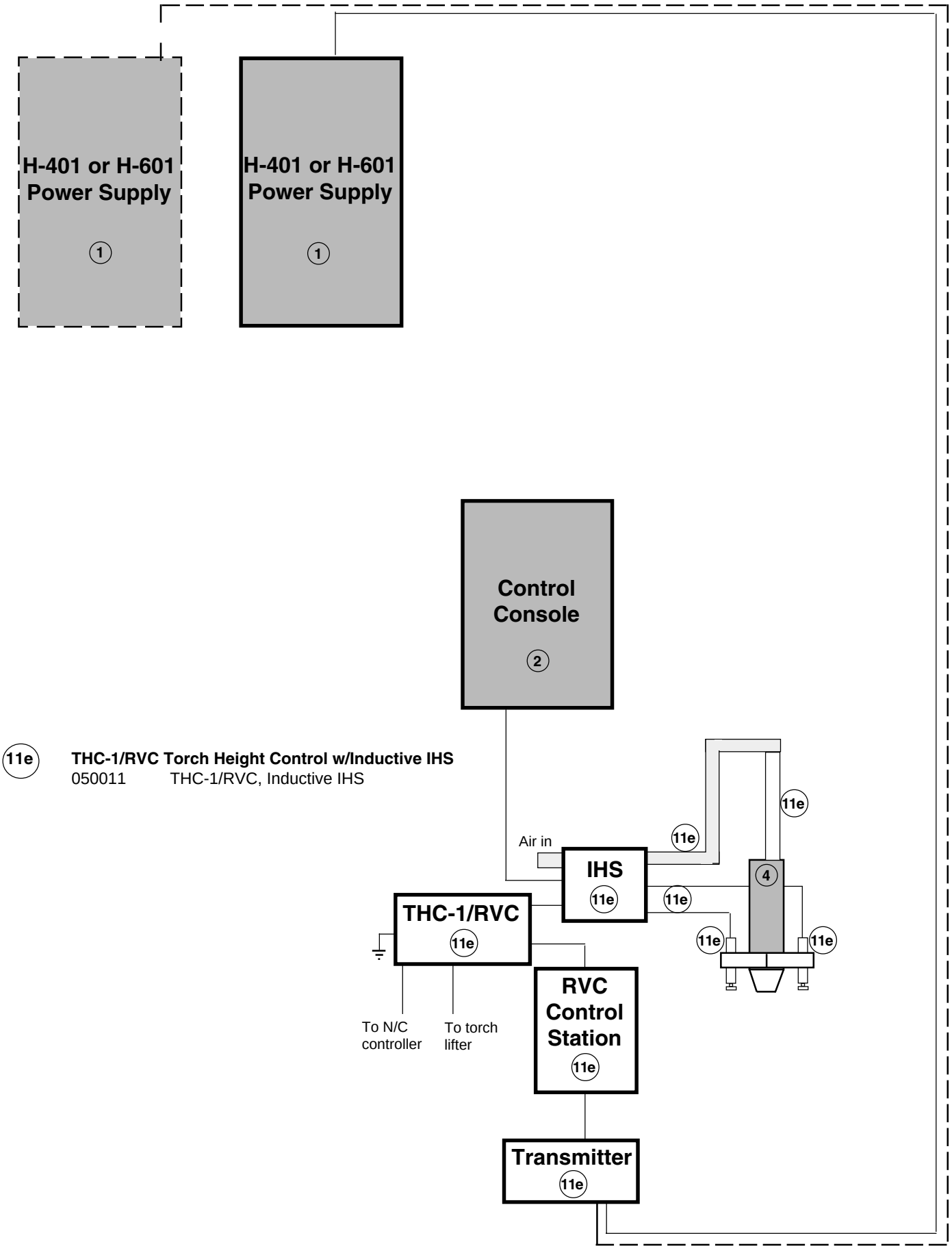


Figure 1.13 THC-1/RVC w/Inductive IHS

(12) SPECIFY THE DIGITAL CURRENT CONTROL (DCC)

Since the DCC can be used with or without a THC system, the digital current control can be ordered independently under its own part number. This allows the operator to set the current at the control station.

- Locate an area to mount the current control receiver (this should be in easy reach of the operator) and the transmitter and order the system.

(12a) SPECIFY THE DIGITAL CURRENT CONTROL INTERCONNECTING CABLE

The cabling for the DCC system must be ordered to connect the transmitter to the current control receiver. The standard length is 50 feet (15 m). Additional length DCC cable is also available (specify required additional length).

Cabling from the transmitter to the power supply (supplies) is not provided. Use three-pair 22-gauge cable for this connection.

(13) SPECIFY THE ARGON-HYDROGEN MANIFOLD

The argon-hydrogen manifold must be used when argon-hydrogen mixtures will be used. The open panel design is ideal to vent possible combustible gas leaks. A six-foot cable to connect the manifold to the control console is included in the system. The hosing that connects the torch to the control console is removed at the control console and attached to the argon-hydrogen manifold when cutting with an argon-hydrogen mixture.

- The argon-hydrogen manifold should be mounted on or very near the control console. Order the system.

(14) SPECIFY THE WATER MUFFLER SYSTEM

The water muffler noise control attachment reduces the extremely high noise levels produced in plasma cutting. For this reason, the water muffler system is required for above-water cutting. The water muffler system can not be used when cutting above 700 amps. The system includes a torch nozzle, a re-circulating pump and two interconnecting hoses. The two hoses are four feet (1.2 m) - water pump to water table and 50 feet (15 m) - water pump to torch in length. Systems can be ordered with or without the hosing.

(14a) • Determine the voltage available at the site, where the pump is to be placed (it should be very near the water table), and order the WM system <u>with</u> hoses.

(14b) • Determine the voltage available at the site, where the pump is to be placed (it should be very near the water table), and order the WM system <u>without</u> hoses.

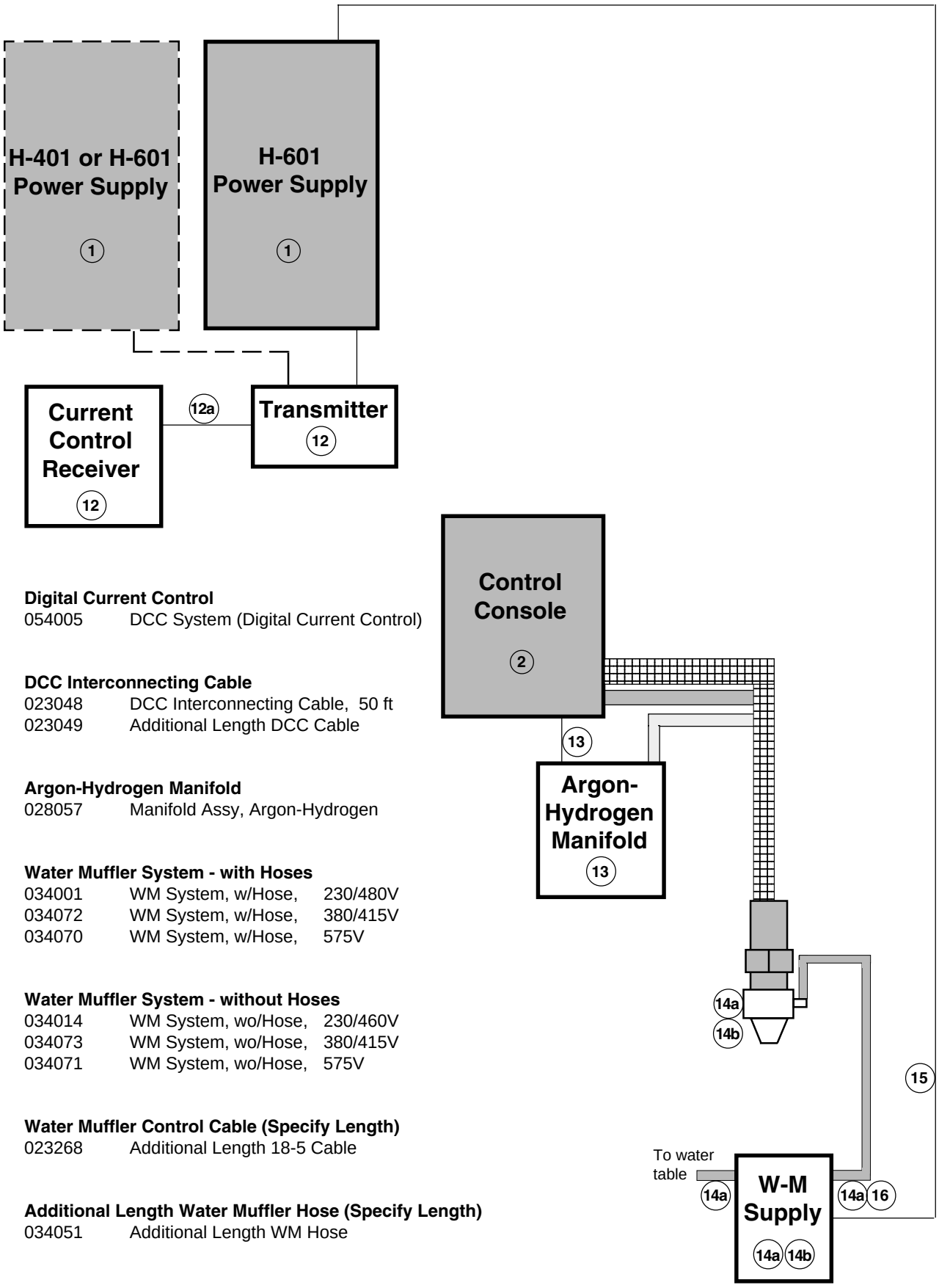
(15) ORDER THE WATER MUFFLER CONTROL CABLE

The water muffler system does not come with a control cable. The control cable interconnects the water muffler pump with the power supply. Specify length when ordering this cable.

- Order the water muffler control cable.

(16) ORDER ADDITIONAL LENGTH WATER MUFFLER HOSE

- If additional length water muffler hosing is needed, specify length when ordering.



12 **Digital Current Control**
054005 DCC System (Digital Current Control)

12a **DCC Interconnecting Cable**
023048 DCC Interconnecting Cable, 50 ft
023049 Additional Length DCC Cable

13 **Argon-Hydrogen Manifold**
028057 Manifold Assy, Argon-Hydrogen

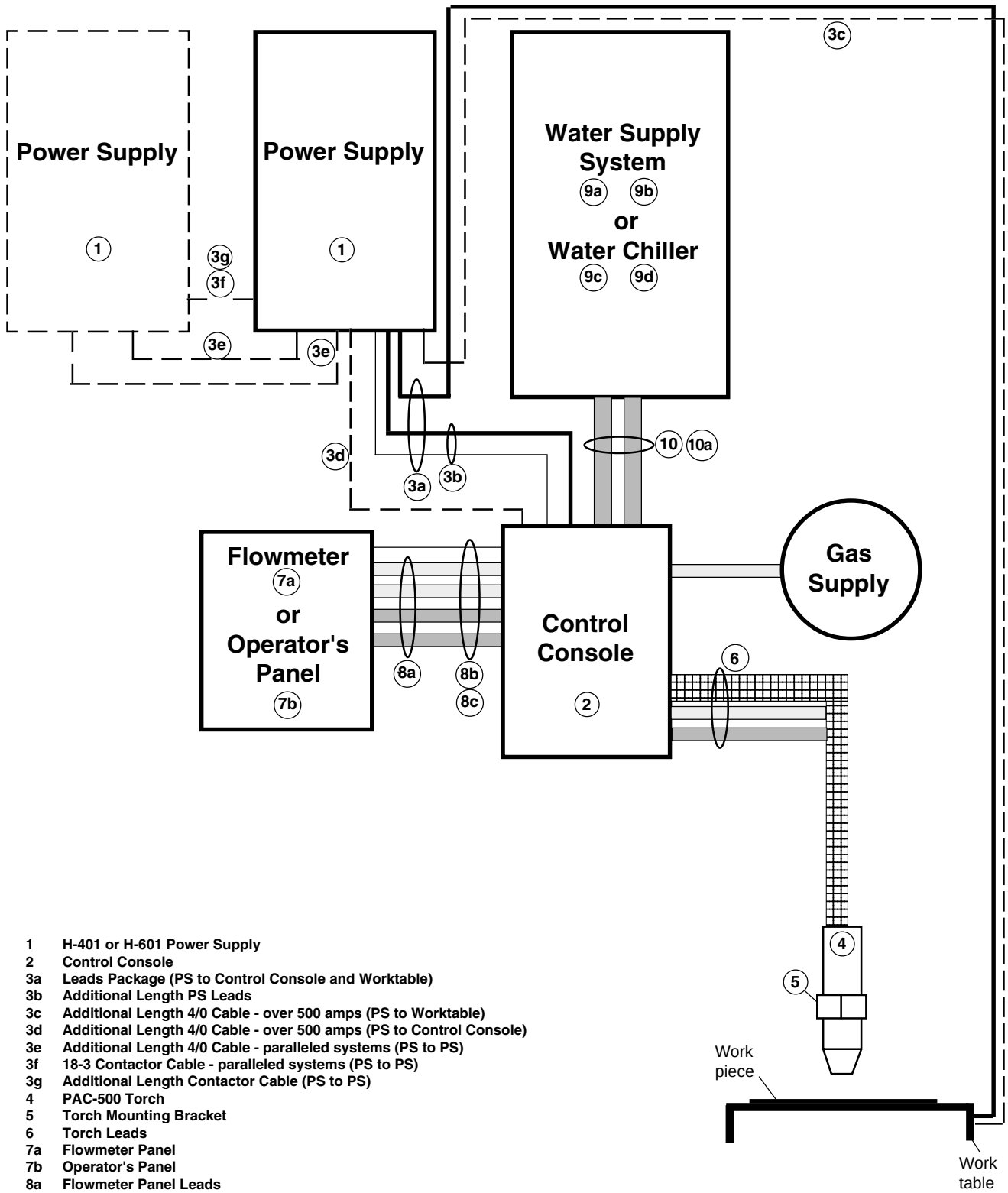
14a **Water Muffler System - with Hoses**
034001 WM System, w/Hose, 230/480V
034072 WM System, w/Hose, 380/415V
034070 WM System, w/Hose, 575V

14b **Water Muffler System - without Hoses**
034014 WM System, wo/Hose, 230/460V
034073 WM System, wo/Hose, 380/415V
034071 WM System, wo/Hose, 575V

15 **Water Muffler Control Cable (Specify Length)**
023268 Additional Length 18-5 Cable

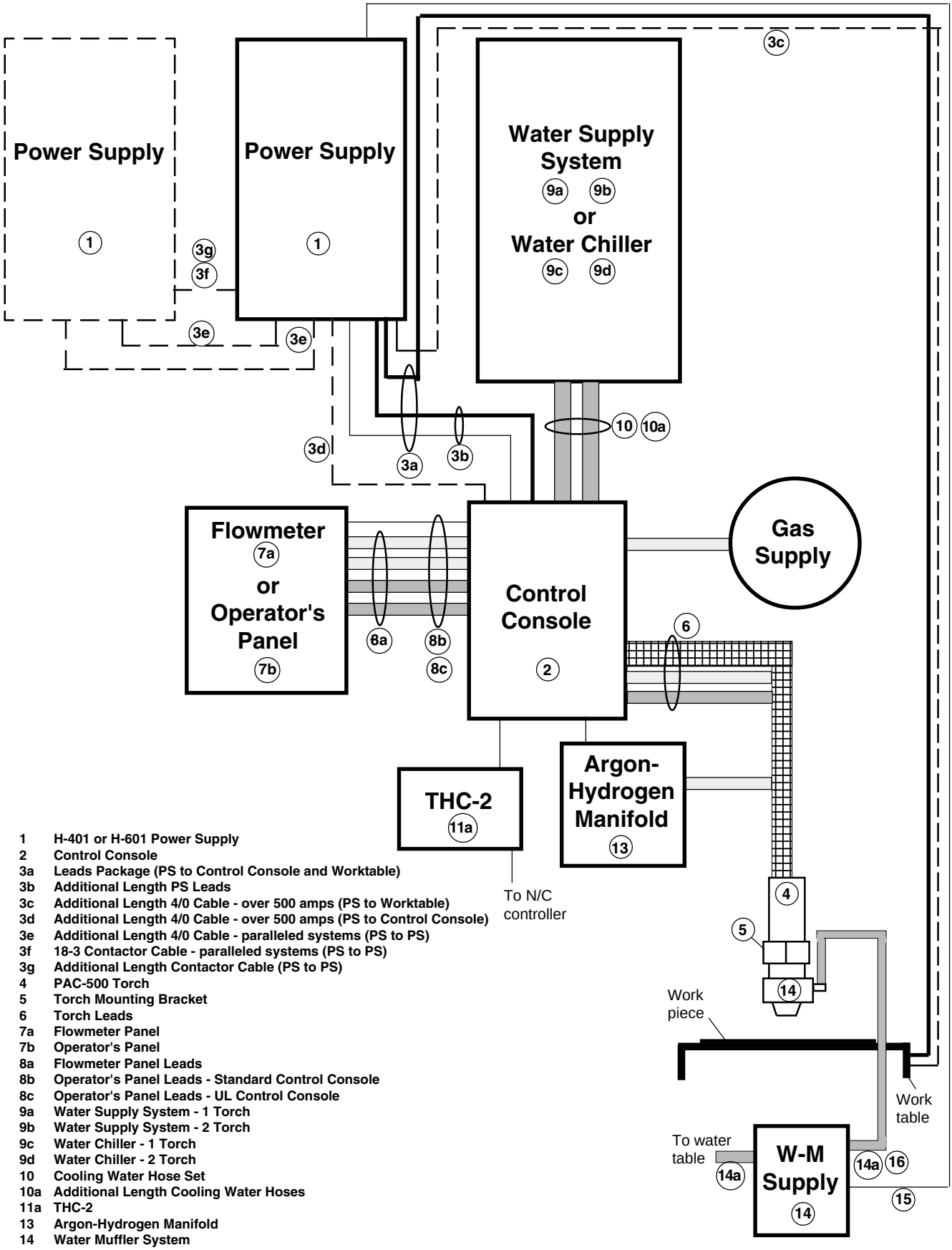
16 **Additional Length Water Muffler Hose (Specify Length)**
034051 Additional Length WM Hose

Figure 1.14 DCC, Argon-Hydrogen Manifold, Water Muffler System,



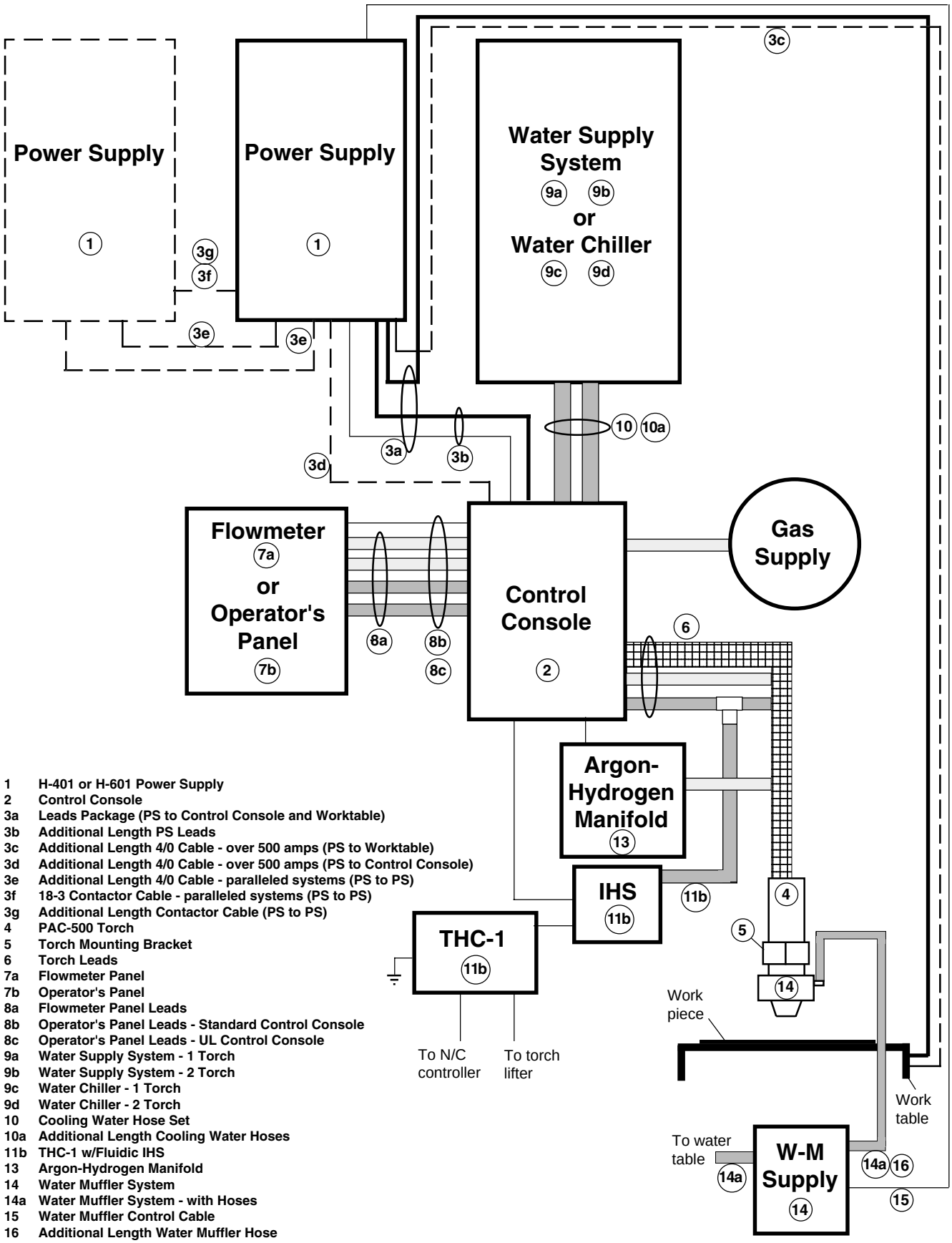
1 H-401 or H-601 Power Supply
2 Control Console
3a Leads Package (PS to Control Console and Worktable)
3b Additional Length PS Leads
3c Additional Length 4/0 Cable - over 500 amps (PS to Worktable)
3d Additional Length 4/0 Cable - over 500 amps (PS to Control Console)
3e Additional Length 4/0 Cable - paralleled systems (PS to PS)
3f 18-3 Contactor Cable - paralleled systems (PS to PS)
3g Additional Length Contactor Cable (PS to PS)
4 PAC-500 Torch
5 Torch Mounting Bracket
6 Torch Leads
7a Flowmeter Panel
7b Operator's Panel
8a Flowmeter Panel Leads
8b Operator's Panel Leads - Standard Control Console
8c Operator's Panel Leads - UL Control Console
9a Water Supply System - 1 Torch
9b Water Supply System - 2 Torch
9c Water Chiller - 1 Torch
9d Water Chiller - 2 Torch
10 Cooling Water Hose Set
10a Additional Length Cooling Water Hoses

Figure 1.15 PAC-500 System w/No Options



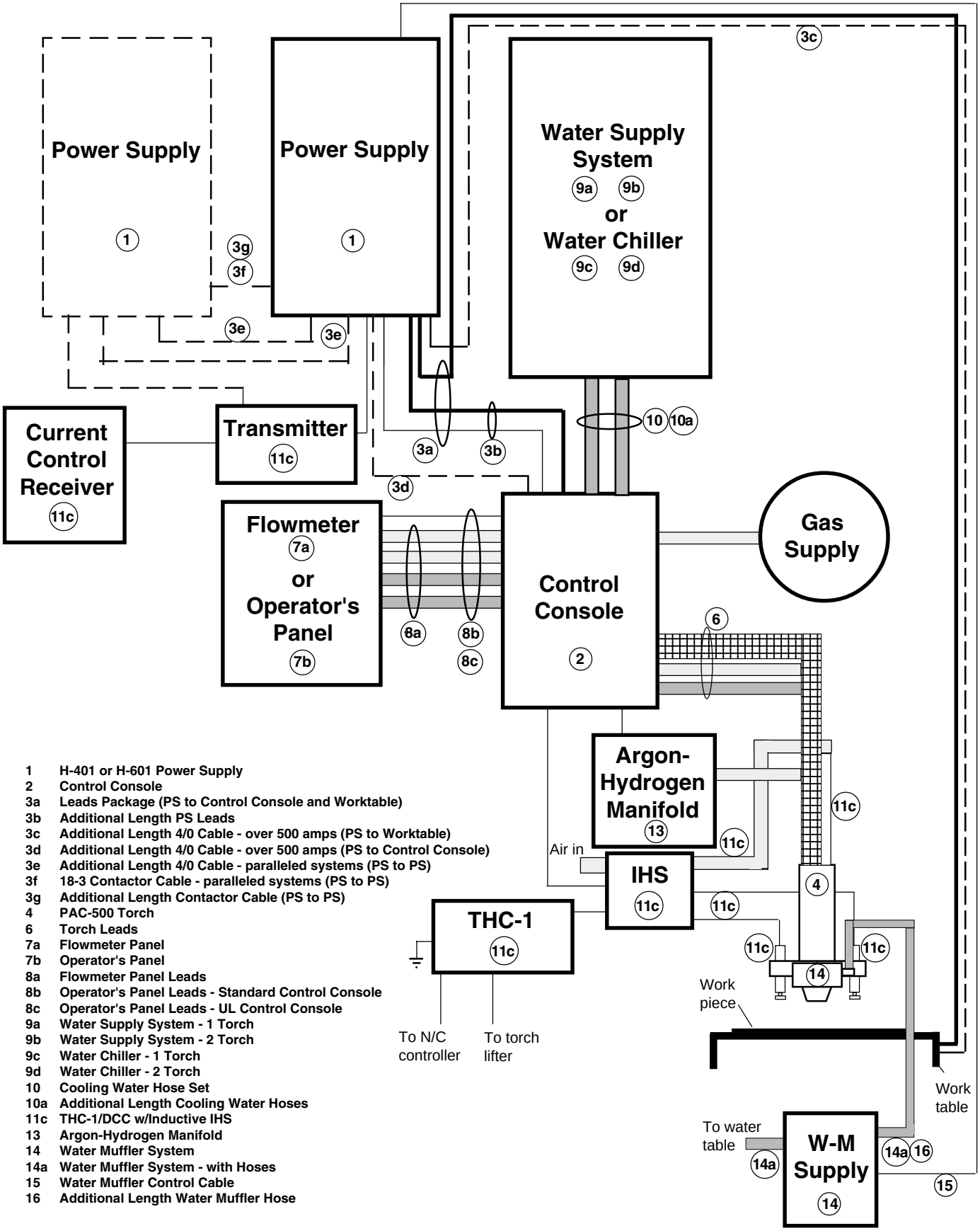
1 H-401 or H-601 Power Supply
2 Control Console
3a Leads Package (PS to Control Console and Worktable)
3b Additional Length PS Leads
3c Additional Length 4/0 Cable - over 500 amps (PS to Worktable)
3d Additional Length 4/0 Cable - over 500 amps (PS to Control Console)
3e Additional Length 4/0 Cable - paralleled systems (PS to PS)
3f 18-3 Contactor Cable - paralleled systems (PS to PS)
3g Additional Length Contactor Cable (PS to PS)
4 PAC-500 Torch
5 Torch Mounting Bracket
6 Torch Leads
7a Flowmeter Panel
7b Operator's Panel
8a Flowmeter Panel Leads
8b Operator's Panel Leads - Standard Control Console
8c Operator's Panel Leads - UL Control Console
9a Water Supply System - 1 Torch
9b Water Supply System - 2 Torch
9c Water Chiller - 1 Torch
9d Water Chiller - 2 Torch
10 Cooling Water Hose Set
10a Additional Length Cooling Water Hoses
11a THC-2
13 Argon-Hydrogen Manifold
14 Water Muffler System
14a Water Muffler System - with Hoses
15 Water Muffler Control Cable
16 Additional Length Water Muffler Hose

Figure 1.16 PAC-500 System w/THC-2 and Options



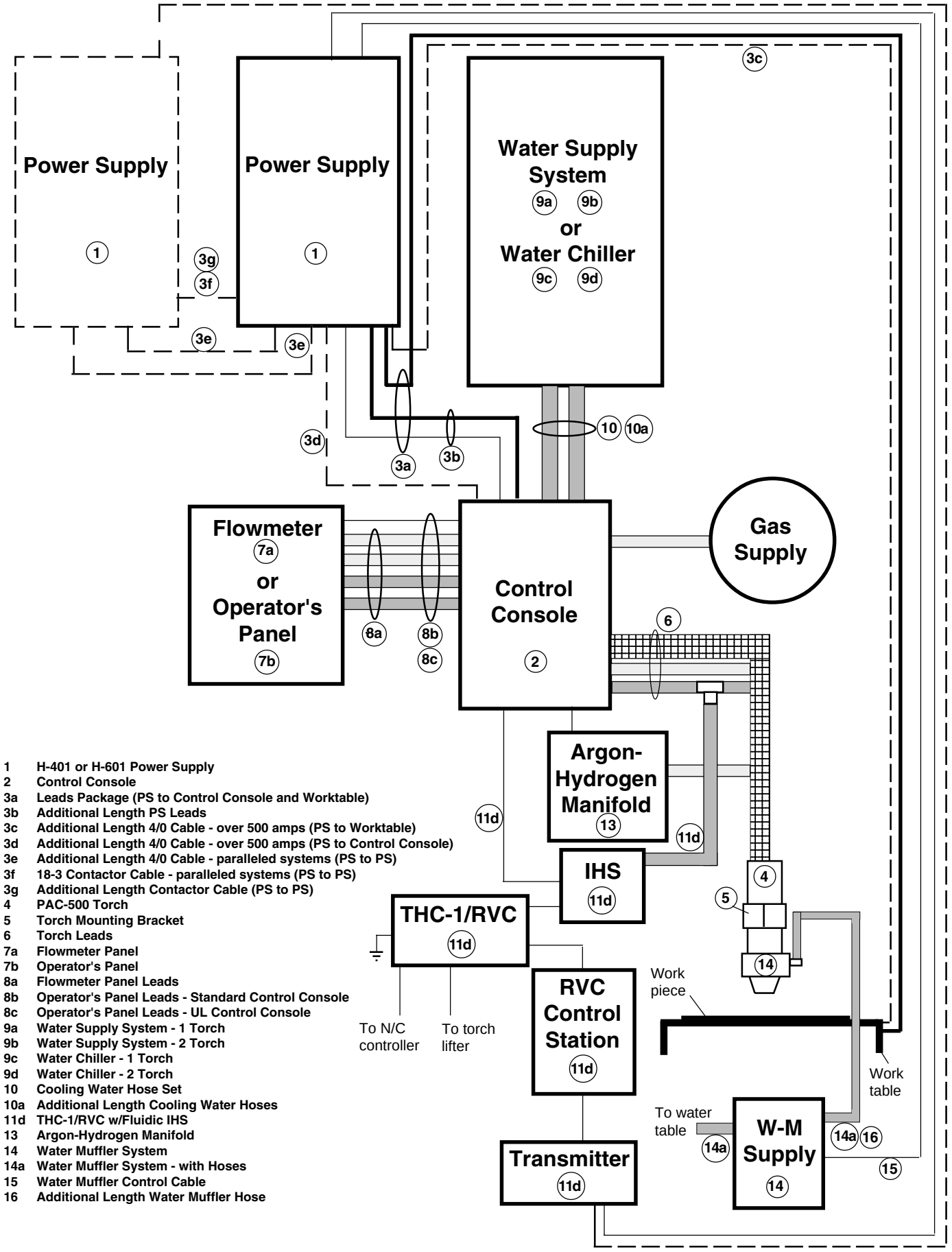
1 H-401 or H-601 Power Supply
2 Control Console
3a Leads Package (PS to Control Console and Worktable)
3b Additional Length PS Leads
3c Additional Length 4/0 Cable - over 500 amps (PS to Worktable)
3d Additional Length 4/0 Cable - over 500 amps (PS to Control Console)
3e Additional Length 4/0 Cable - paralleled systems (PS to PS)
3f 18-3 Contactor Cable - paralleled systems (PS to PS)
3g Additional Length Contactor Cable (PS to PS)
4 PAC-500 Torch
5 Torch Mounting Bracket
6 Torch Leads
7a Flowmeter Panel
7b Operator's Panel
8a Flowmeter Panel Leads
8b Operator's Panel Leads - Standard Control Console
8c Operator's Panel Leads - UL Control Console
9a Water Supply System - 1 Torch
9b Water Supply System - 2 Torch
9c Water Chiller - 1 Torch
9d Water Chiller - 2 Torch
10 Cooling Water Hose Set
10a Additional Length Cooling Water Hoses
11b THC-1 w/Fluidic IHS
13 Argon-Hydrogen Manifold
14 Water Muffler System
14a Water Muffler System - with Hoses
15 Water Muffler Control Cable
16 Additional Length Water Muffler Hose

Figure 1.17 PAC-500 System w/THC-1, Fluidic IHS and Options



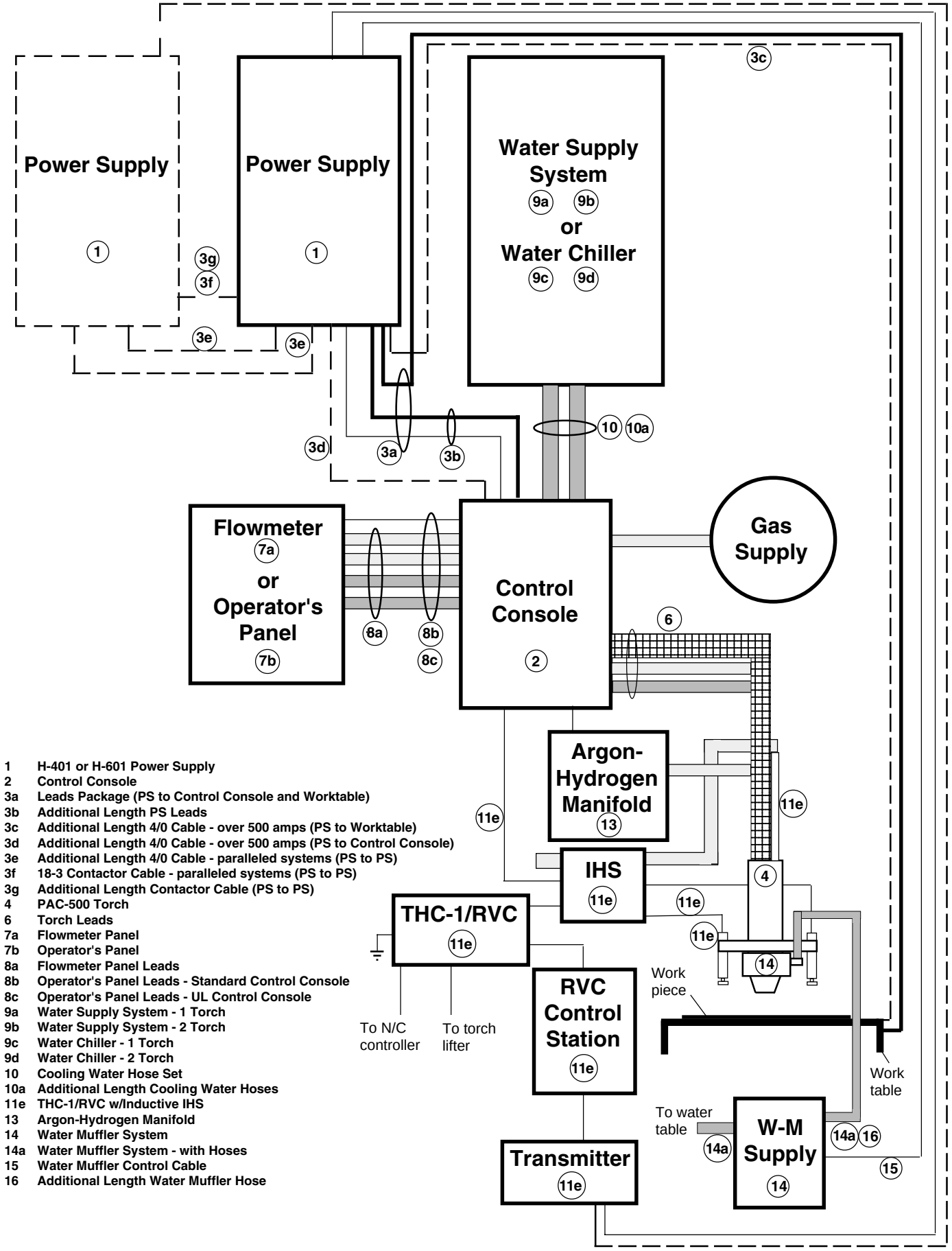
1 H-401 or H-601 Power Supply
2 Control Console
3a Leads Package (PS to Control Console and Worktable)
3b Additional Length PS Leads
3c Additional Length 4/0 Cable - over 500 amps (PS to Worktable)
3d Additional Length 4/0 Cable - over 500 amps (PS to Control Console)
3e Additional Length 4/0 Cable - paralleled systems (PS to PS)
3f 18-3 Contactor Cable - paralleled systems (PS to PS)
3g Additional Length Contactor Cable (PS to PS)
4 PAC-500 Torch
6 Torch Leads
7a Flowmeter Panel
7b Operator's Panel
8a Flowmeter Panel Leads
8b Operator's Panel Leads - Standard Control Console
8c Operator's Panel Leads - UL Control Console
9a Water Supply System - 1 Torch
9b Water Supply System - 2 Torch
9c Water Chiller - 1 Torch
9d Water Chiller - 2 Torch
10 Cooling Water Hose Set
10a Additional Length Cooling Water Hoses
11c THC-1/DCC w/Inductive IHS
13 Argon-Hydrogen Manifold
14 Water Muffler System
14a Water Muffler System - with Hoses
15 Water Muffler Control Cable
16 Additional Length Water Muffler Hose

Figure 1.18 PAC-500 System w/THC-1/DCC and Inductive IHS and Options



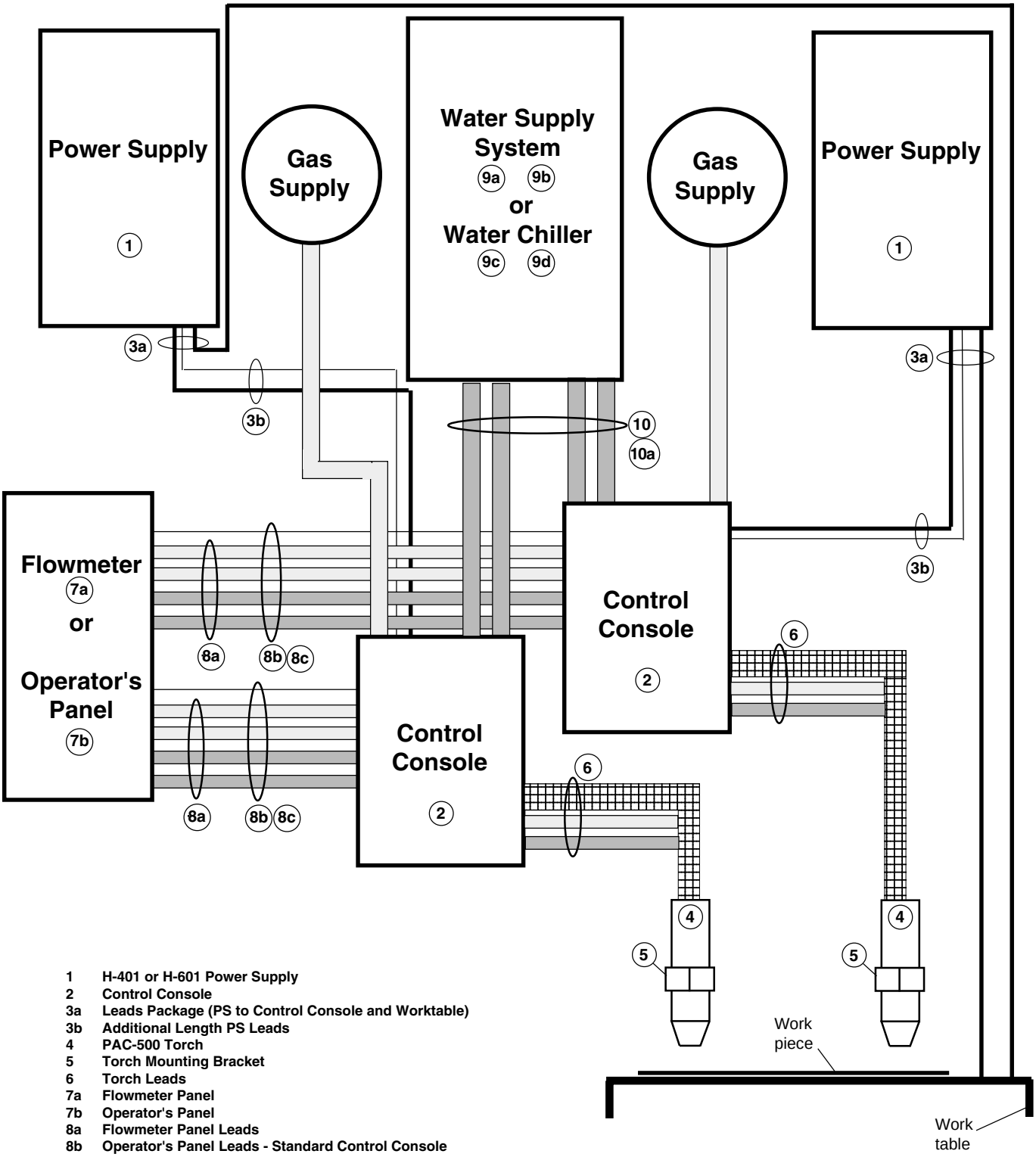
1 H-401 or H-601 Power Supply
2 Control Console
3a Leads Package (PS to Control Console and Worktable)
3b Additional Length PS Leads
3c Additional Length 4/0 Cable - over 500 amps (PS to Worktable)
3d Additional Length 4/0 Cable - over 500 amps (PS to Control Console)
3e Additional Length 4/0 Cable - paralleled systems (PS to PS)
3f 18-3 Contactor Cable - paralleled systems (PS to PS)
3g Additional Length Contactor Cable (PS to PS)
4 PAC-500 Torch
5 Torch Mounting Bracket
6 Torch Leads
7a Flowmeter Panel
7b Operator's Panel
8a Flowmeter Panel Leads
8b Operator's Panel Leads - Standard Control Console
8c Operator's Panel Leads - UL Control Console
9a Water Supply System - 1 Torch
9b Water Supply System - 2 Torch
9c Water Chiller - 1 Torch
9d Water Chiller - 2 Torch
10 Cooling Water Hose Set
10a Additional Length Cooling Water Hoses
11d THC-1/RVC w/Fluidic IHS
13 Argon-Hydrogen Manifold
14 Water Muffler System
14a Water Muffler System - with Hoses
15 Water Muffler Control Cable
16 Additional Length Water Muffler Hose

Figure 1.19 PAC-500 System w/THC-1/RVC, Fluidic IHS and Options



1 H-401 or H-601 Power Supply
2 Control Console
3a Leads Package (PS to Control Console and Worktable)
3b Additional Length PS Leads
3c Additional Length 4/0 Cable - over 500 amps (PS to Worktable)
3d Additional Length 4/0 Cable - over 500 amps (PS to Control Console)
3e Additional Length 4/0 Cable - paralleled systems (PS to PS)
3f 18-3 Contactor Cable - paralleled systems (PS to PS)
3g Additional Length Contactor Cable (PS to PS)
4 PAC-500 Torch
6 Torch Leads
7a Flowmeter Panel
7b Operator's Panel
8a Flowmeter Panel Leads
8b Operator's Panel Leads - Standard Control Console
8c Operator's Panel Leads - UL Control Console
9a Water Supply System - 1 Torch
9b Water Supply System - 2 Torch
9c Water Chiller - 1 Torch
9d Water Chiller - 2 Torch
10 Cooling Water Hose Set
10a Additional Length Cooling Water Hoses
11e THC-1/RVC w/Inductive IHS
13 Argon-Hydrogen Manifold
14 Water Muffler System
14a Water Muffler System - with Hoses
15 Water Muffler Control Cable
16 Additional Length Water Muffler Hose

Figure 1.20 PAC-500 System w/THC-1/RVC, Inductive IHS and Options



1 H-401 or H-601 Power Supply
2 Control Console
3a Leads Package (PS to Control Console and Worktable)
3b Additional Length PS Leads
4 PAC-500 Torch
5 Torch Mounting Bracket
6 Torch Leads
7a Flowmeter Panel
7b Operator's Panel
8a Flowmeter Panel Leads
8b Operator's Panel Leads - Standard Control Console
8c Operator's Panel Leads - UL Control Console
9a Water Supply System - 1 Torch
9b Water Supply System - 2 Torch
9c Water Chiller - 1 Torch
9d Water Chiller - 2 Torch
10 Cooling Water Hose Set
10a Additional Length Cooling Water Hoses

Figure 1.21 Two-Torch PAC-500 System w/No Options

2 Specifications

In this section

SYSTEM SPECIFICATIONS - Required Equipment

System Requirements

Power Requirements:
Refer to H-401 and H-601 power supply specifications below:

Gas Requirements:

Plasma Gas Types	Nitrogen (N_2)
Gas Quality	99.995 pure (liquid gas recommended)
Nitrogen Gas Inlet Pressure	120 psi (8.3 bar)
Air Gas Inlet Pressure	120 psi (8.3 bar)

Water Requirements:

Water Flow	2.5 gpm (9.5 l/m)
Water Inlet Pressure	35 psi (2.4 bar)

(1) H-401 Power Supply

Dimensions and Weight

Width	27-1/4" (690 mm)
Height	43" (1090 mm)
Depth	46" (1170 mm)
Weight	1905 pounds (866 kg)

(1) H-601 Power Supply

Dimensions and Weight:

Width	34" (860 mm)
Height	43" (1090 mm)
Depth	46" (1170 mm)
Weight	2260 pounds (1027 kg)

(2) Control Console

Dimensions and Weight:

Width	13" (330 mm)
Height	16" (410 mm)
Depth	15" (380 mm)
Weight	75 pounds (34 kg)

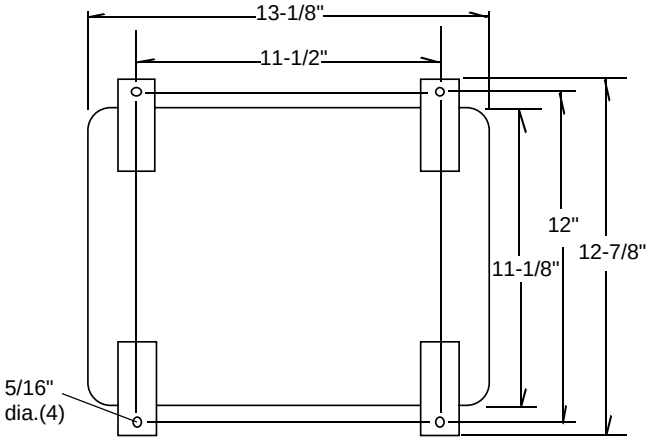


Figure 2.1 Control Console Mounting Dimensions

(3a) Power Supply Leads

Lead	Lead Diameter (O.D.)	Connector/Lug Diameter
Negative Cable to Cntrl Cnsl	7/8" (22 mm)	1-1/4" (32 mm)
Positive Cable to Work Table	7/8" (22 mm)	1-1/4" (32 mm)
Control Cable to Cntrl Cnsl	7/16" (11 mm)	7/16" (11 mm)

(3f) 18-4 Contactor Cable for Paralleled Systems

Lead	Lead Diameter (O.D.)	Connector/Lug Diameter
Cable, 18-4, PS to PS	3/8" (9.5 mm)	3/8" (9.5 mm)

(4) PAC-500 Torch

Dimensions and Weight

Diameter .....2" (51 mm)
Length .....17-1/2" (444 mm)
Weight .....2-1/2 pounds (1.1 kg)

(6) Torch Leads

Lead	Lead Diameter (O.D.)	Connector/Lug Diameter
Water Cooled Cable (2)	7/8" (22 mm)	7/8" (22 mm)
HF Lead	1/4" (6 mm)	1/4" (6 mm)
Gas Hose	3/8" (9.5 mm)	3/8" (9.5 mm)
Water Hose	3/8" (9.5 mm)	3/8" (9.5 mm)

7a 7b Flowmeter Panel/Operator's Panel

Dimensions and Weight (1-torch):

Width ..... 6-1/2 " (165 mm)
Height ..... 14" (355 mm)
Depth ..... 6 " (152 mm)
Weight ..... 12 pounds (5.5 kg)

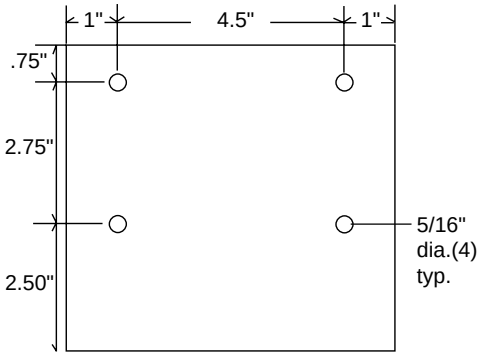


Figure 2.2 Mounting Dimensions - Flowmeter/Operator's Panel - 1 Torch

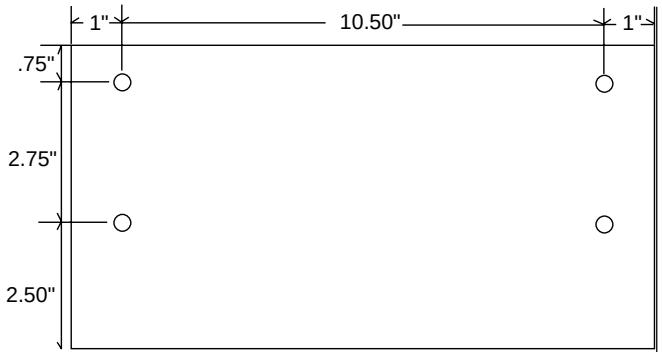


Figure 2.3 Mounting Dimensions - Flowmeter/Operator's Panel - 2 Torch

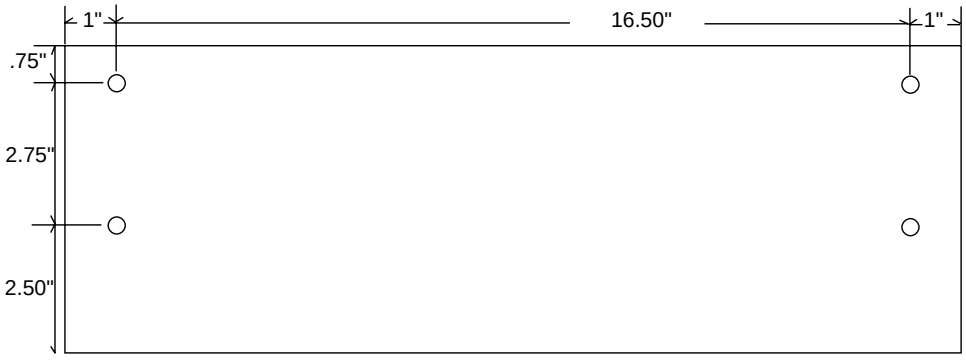


Figure 2.4 Mounting Dimensions - Flowmeter/Operator's Panel - 3 Torch

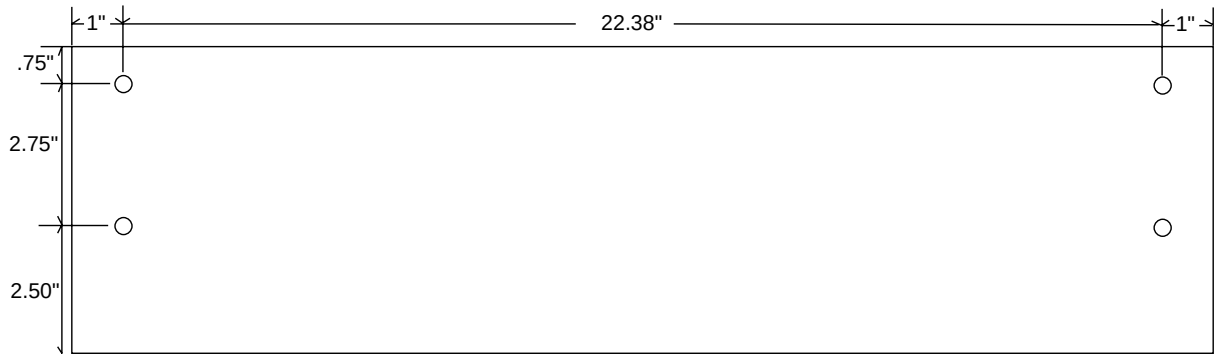


Figure 2.5 Mounting Dimensions - Flowmeter/Operator's Panel - 4 Torch

8a Flowmeter Panel Leads

Lead	Lead Diameter (O.D.)	Connector/Lug Diameter
Water Hose (2)	1/2" (13 mm)	1/2" (13 mm)
Gas Hose (2)	1/2" (13 mm)	1/2" (13 mm)

8b Operator's Panel Leads

Lead	Lead Diameter (O.D.)	Connector/Lug Diameter
Water Hose (2)	1/2" (13 mm)	1/2" (13 mm)
Gas Hose (2)	1/2" (13 mm)	1/2" (13 mm)
Control Cable (1)	1/2" (13 mm)	1/2" (13 mm)

(9a) Water Supply System (1-Torch)

Dimensions and Weight:

Width ..... 10" (254 mm)
Height ..... 26" (660 mm)
Depth ..... 24" (610 mm)
Weight ..... 90 pounds (41 kg)

(9a) Water Supply System (2-Torch)

Dimensions and Weight:

Width ..... 10" (254 mm)
Height ..... 26" (660 mm)
Depth ..... 24" (610 mm)
Weight ..... 115 pounds (52 kg)

(9b) Water Chiller (1-Torch, 600 Amp)

Dimensions and Weight:

Width ..... 30.25" (770 mm)
Height ..... 42.25" (1075 mm)
Depth ..... 46" (1170 mm)
Weight ..... 700 pounds (320 kg), 600A - 1-Torch

(9b) Water Chiller (1-Torch, 1000 Amp)

Dimensions and Weight:

Width ..... 30.25" (770 mm)
Height ..... 42.25" (1075 mm)
Depth ..... 46" (1170 mm)
Weight ..... 745 pounds (340 kg), 1000A - 1-Torch

(9b) Water Chiller (2-Torch, 600 Amp)

Dimensions and Weight:

Width ..... 30.25" (770 mm)
Height ..... 42.25" (1075 mm)
Depth ..... 46" (1170 mm)
Weight ..... 745 pounds (340 kg), 600A - 2-Torch

(10) Cooling Water Hose Set

Hose	Hose Diameter (O.D.)	Connector/Lug Diameter
Cooling Hose 1	5/8" (16 mm)	5/8" (16 mm)
Cooling Hose 2	5/8" (16 mm)	5/8" (16 mm)

(11) THC Control Modules (All)

Dimensions and Weight:

Width ..... 8" (203 mm)
Height ..... 6" (152 mm)
Depth ..... 18" (457 mm)
Weight ..... 15 pounds (6.8 kg)

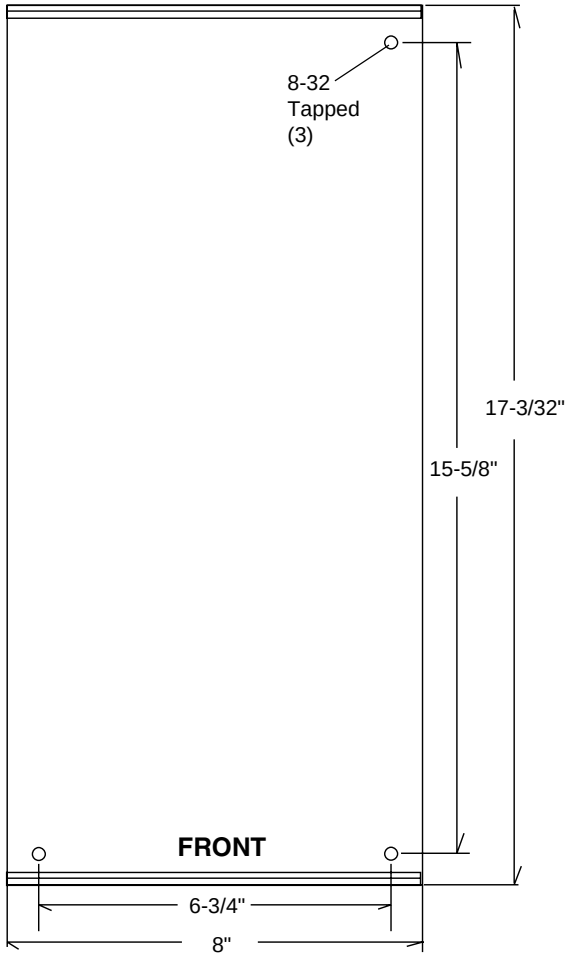


Figure 2.6 Mounting Dimensions - THC Modules

11b Fluidic Initial Height Sensing Module

11d

Dimensions and Weight:

Width ..... 8-7/8" (225 mm)
Height ..... 4-1/2" (114 mm)
Depth ..... 12-1/2" (317 mm)
Weight ..... 10 pounds (4.5 kg)

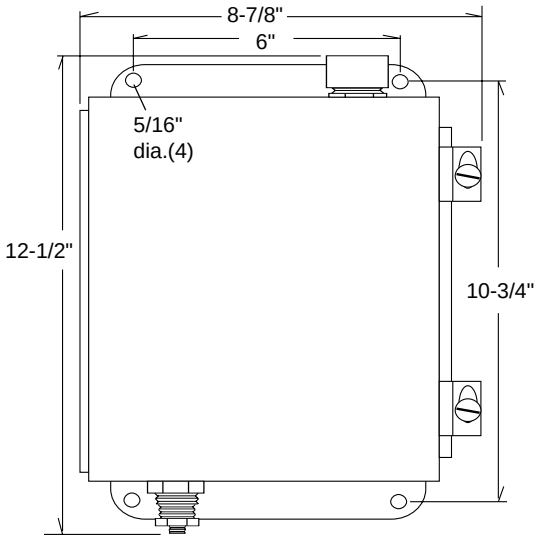


Figure 2.7 Mounting Dimensions - Fluidic IHS Module

11c Inductive Initial Height Sensing Module

11e

Dimensions and Weight:

Width ..... 8-7/8" (225 mm)
Height ..... 4-1/2" (114 mm)
Depth ..... 13" (330 mm)
Weight ..... 13 pounds (6 kg)

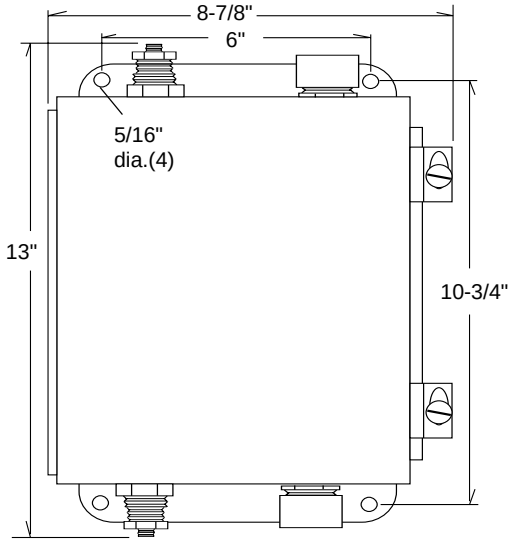


Figure 2.8 Mounting Dimensions - Inductive IHS Module

11c Current Control Receiver

12

Dimensions and Weight (w/o suggested mounting brackets):

Width .....6-1/2" (165 mm)
Height .....2-1/2" (64 mm)
Depth .....8-1/2" (216 mm)
Weight .....3 pounds (1.4 kg)

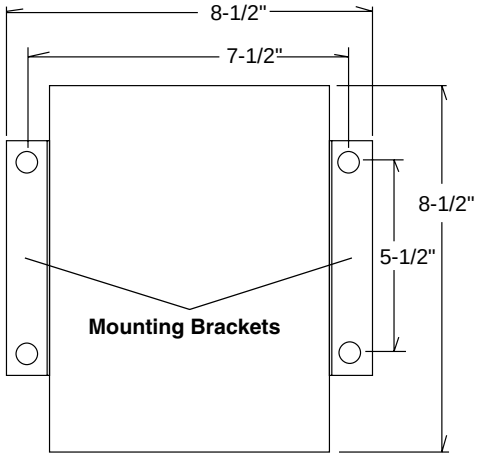


Figure 2.9 Mounting Dimensions - Current Control Receiver w/Suggested Mounting Brackets

11d RVC Control Station

11e

Dimensions and Weight (w/o suggested mounting brackets):

Width .....8-7/8" (225 mm)
Height .....2-1/2" (64 mm)
Depth .....8-1/2" (216 mm)
Weight .....3 pounds (1.4 kg)

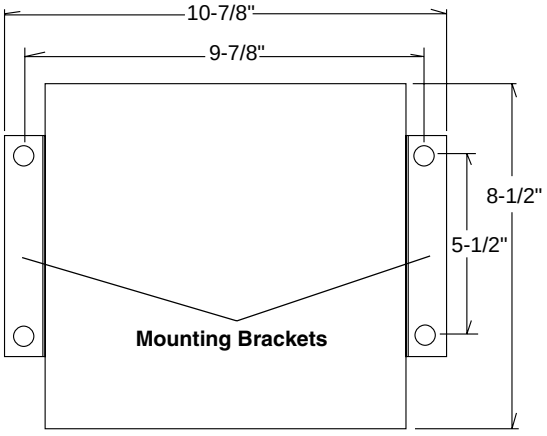


Figure 2.10 Mounting Dimensions - RVC Control Station w/Suggested Mounting Brackets

11c 11d Transmitter (Manual)

11e 12

Dimensions and Weight

Width ..... 8-7/8" (225 mm)
Height ..... 4-1/2" (108 mm)
Depth ..... 11-7/8" (302 mm)
Weight ..... 11-1/2 pounds (5.11 kg)

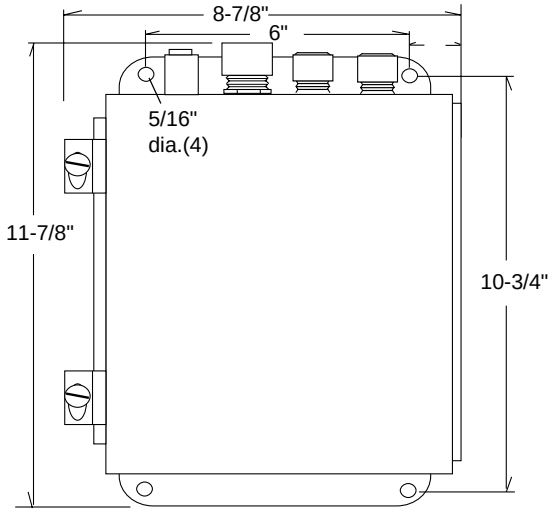


Figure 2.11 Mounting Dimensions - Manual Transmitter

13 Argon-Hydrogen Manifold

Dimensions:

Width ..... 5" (12.7 cm)
Height ..... 10" (25.4 cm)
Depth ..... 5" (12.7 cm)
Weight ..... 5-3/4 pounds (2.6 kg)

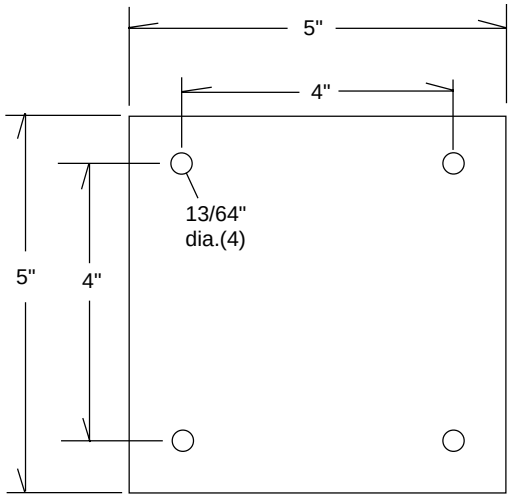


Figure 2.12 Mounting Dimensions - Argon-Hydrogen Manifold

(14) Water Muffler - Pump

Dimensions and Weight:

Width ..... 11" (28 cm)
Height ..... 19" (48 cm)
Depth ..... 17" (43 cm)
Weight ..... 85 pounds (38.6 kg)

Hose	Hose Diameter (O.D.)	Connector/Lug Diameter
WM Pump/WM Nozzle	1" (24 mm)	1" (24 mm)

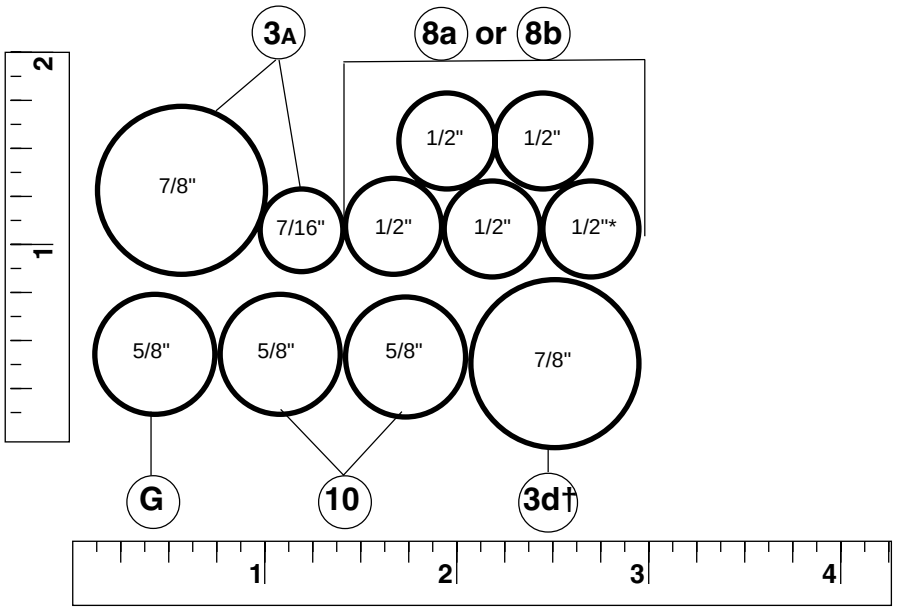
(15) Water Muffler Control Cable

Cable	Cable Diameter (O.D.)	Connector/Lug Diameter
WM Pump/PS	3/8" (9.5 mm)	3/8" (9.5 mm)

QUICK REFERENCE TO CABLE / HOSE DIMENSIONS

PAC-500 System - No Options (Ref. Fig. 1.15)

The following figures are one-to-one representations of the PAC-500 interconnecting cables and hoses for single-torch systms. Cables and hoses that would lay in the rail or in the cutting machine's cable/hose carrier are represented on the following pages. (Use these figures as a guide for multi-torch systems if cables and hoses will be sharing the same rail or cable/hose carrier. Double the number of hoses/cables for 2-torch systems, triple the number for 3-torch systems, etc.) System block diagrams are referenced for each figure pair. Arrangement of cables and hoses laying in rails or carriers are roughly suggested here.



Key - Figure 2.13

3A PS Leads - PS to Cntrl Csl
- 7/8" Negative Lead - PS/Cntrl Csl
- 7/16" Control Cable - PS/Cntrl Csl

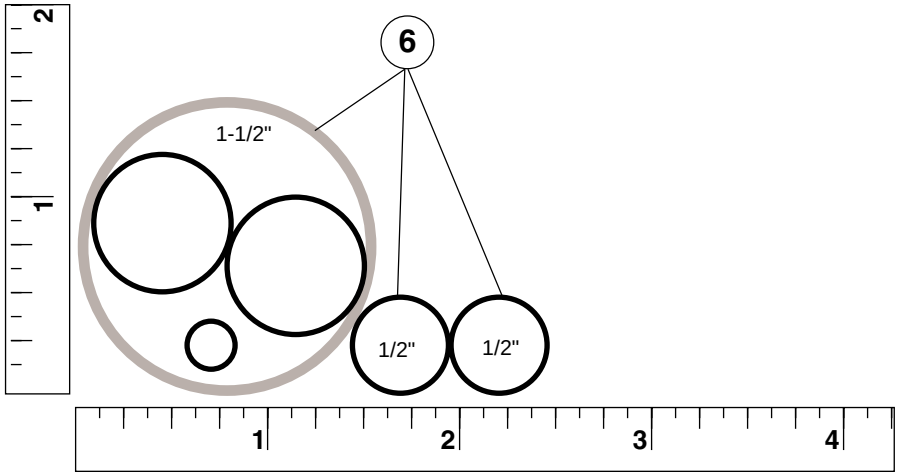
8a or 8b Flowmeter or Op Panel Leads - Flowmeter or Op Panel to Cntrl Csl
- 1/2" Gas In
- 1/2" Gas Out
- 1/2" Inj. Water In
- 1/2" Inj. Water Out
- 1/2"* Control Cable (Included with Op Panel Leads only)

G Gas Supply Hose - Gas Supply to Cntrl Csl

10 Cooling Water Hose Set - Water Supply or Water Chiller to Cntrl Csl

3d† Negative Lead - PS to Cntrl Csl (Used in systems delivering more than 500 Amps)

Figure 2.13 Cables / Hoses in Rail - No Options



Key - Figure 2.14

6 Torch Leads -
- Control Console to Torch
- 1-1/2" Shielded Torch Leads
- 1/2" Gas Lead
- 1/2" Inj. Water Lead

Figure 2.14 Cables / Hoses in Machine Cable/Hose Carrier - No Options

PAC-500 System - w/THC-2 and All Options (Ref. Fig. 1.16)

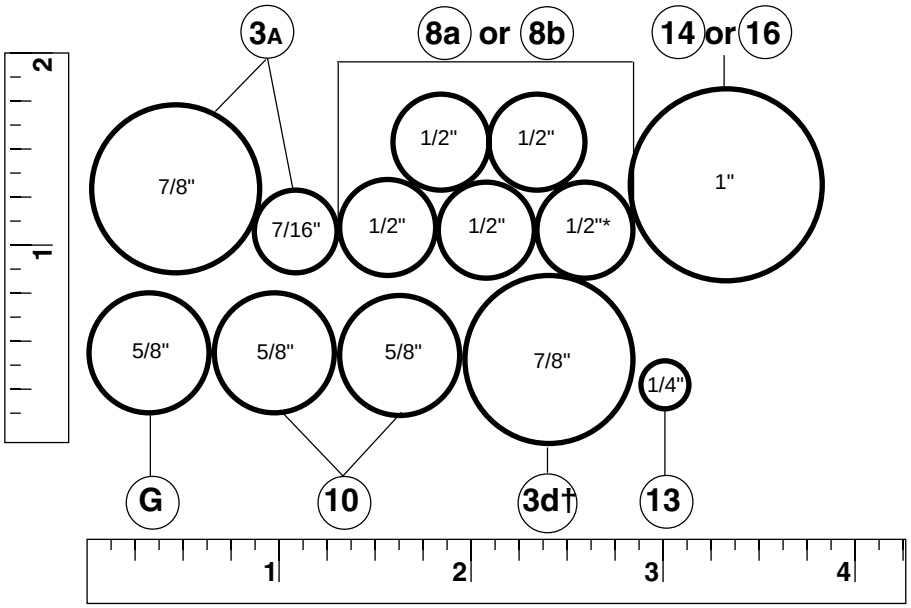


Figure 2.15 Cables / Hoses in Rail - THC-2 w/Options

Key - Figure 2.15

3A PS Leads - PS to Cntrl Csl
- 7/8" Negative Lead - PS/Cntrl Csl
- 7/16" Control Cable - PS/Cntrl Csl

8a or 8b Flowmeter or Op Panel Leads - Flowmeter or Op Panel to Cntrl Csl
- 1/2" Gas In
- 1/2" Gas Out
- 1/2" Inj. Water In
- 1/2" Inj. Water Out
- 1/2"* Control Cable (Included with Op Panel Leads only)

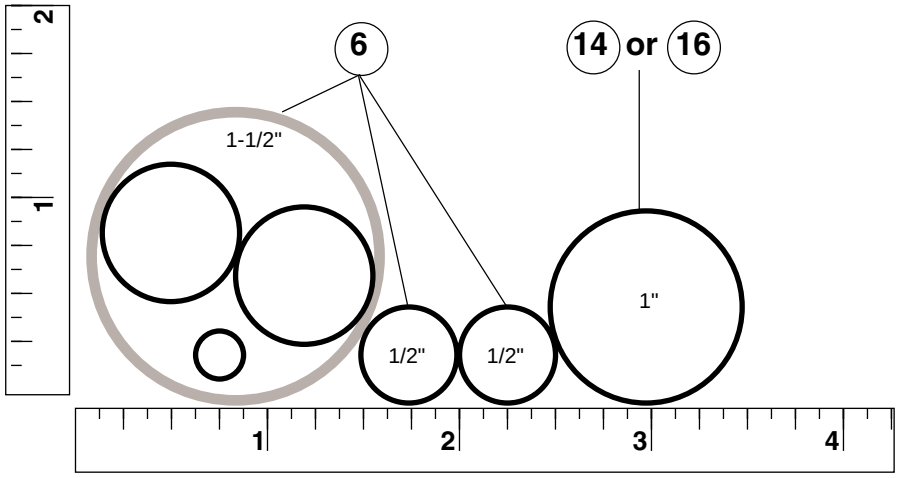
14 or 16 Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle

G Gas Supply Hose - Gas Supply to Cntrl Csl

10 Cooling Water Hose Set - Water Supply or Water Chiller to Cntrl Csl

3d† Negative Lead - PS to Cntrl Csl (Used in systems delivering more than 500 Amps)

13 Cable - Argon-Hydrogen Csl to Cntrl Csl



Key - Figure 2.16

6 Torch Leads - Control Console to Torch
- 1-1/2" Shielded Torch Leads
- 1/2" Gas Lead
- 1/2" Inj. Water Lead

14 or 16 Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle

Figure 2.16 Cables / Hoses in Machine Cable/Hose Carrier - THC-2 w/Options

PAC-500 System - w/THC-1, Fluidic IHS and All Options (Ref. Fig. 1.17)

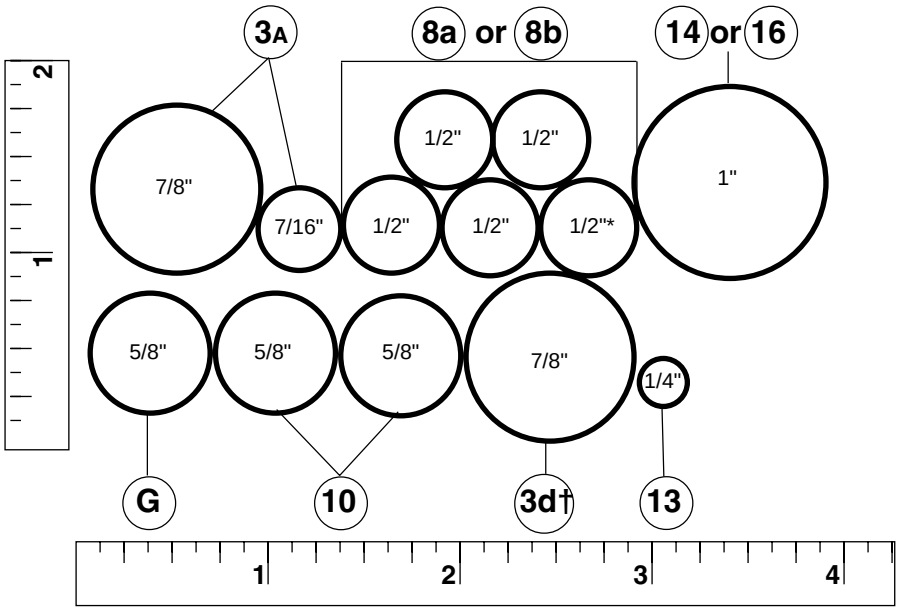
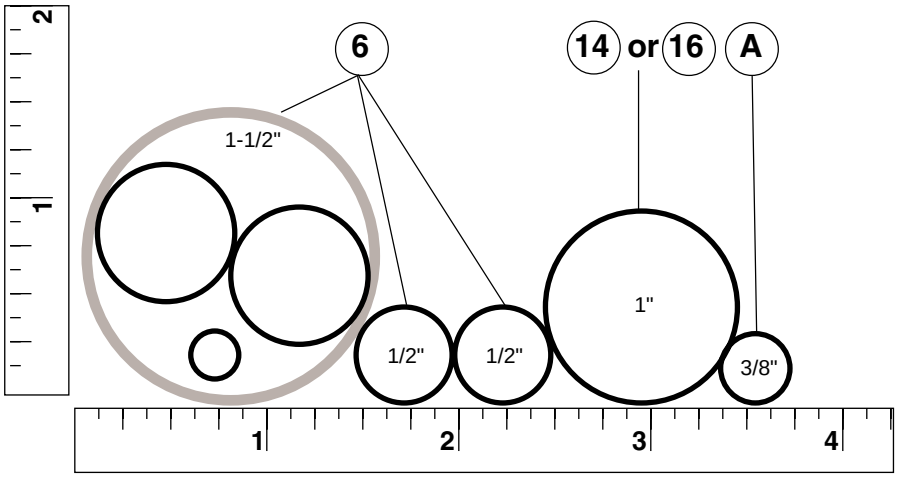


Figure 2.17 Cables / Hoses in Rail - THC-1, Fluidic IHS w/Options

Key - Figure 2.17	
3A PS Leads - PS to Cntrl Csl 7/8" Negative Lead - PS/Cntrl Csl 7/16" Control Cable - PS/Cntrl Csl **8a or 8b** Flowmeter or Op Panel Leads - Flowmeter or Op Panel to Cntrl Csl 1/2" Gas In 1/2" Gas Out 1/2" Inj. Water In 1/2" Inj. Water Out 1/2"* Control Cable (Included with Op Panel Leads only)	**14 or 16** Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle **G** Gas Supply Hose - Gas Supply to Cntrl Csl **10** Cooling Water Hose Set - Water Supply or Water Chiller to Cntrl Csl **3d†** Negative Lead - PS to Cntrl Csl (Used in systems delivering more than 500 Amps) **13** Cable - Argon-Hydrogen Csl to Cntrl Csl



Key - Figure 2.18
6 Torch Leads - Control Console to Torch 1-1/2" Shielded Torch Leads 1/2" Gas Lead 1/2" Inj. Water Lead **14 or 16** Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle **A** Cable - THC-1 to Torch Lifter

Figure 2.18 Cables / Hoses in Machine Cable/Hose Carrier - THC-1, Fluidic IHS w/Options

PAC-500 System - w/THC-1/DCC, Inductive IHS and All Options (Ref. Fig. 1.18)

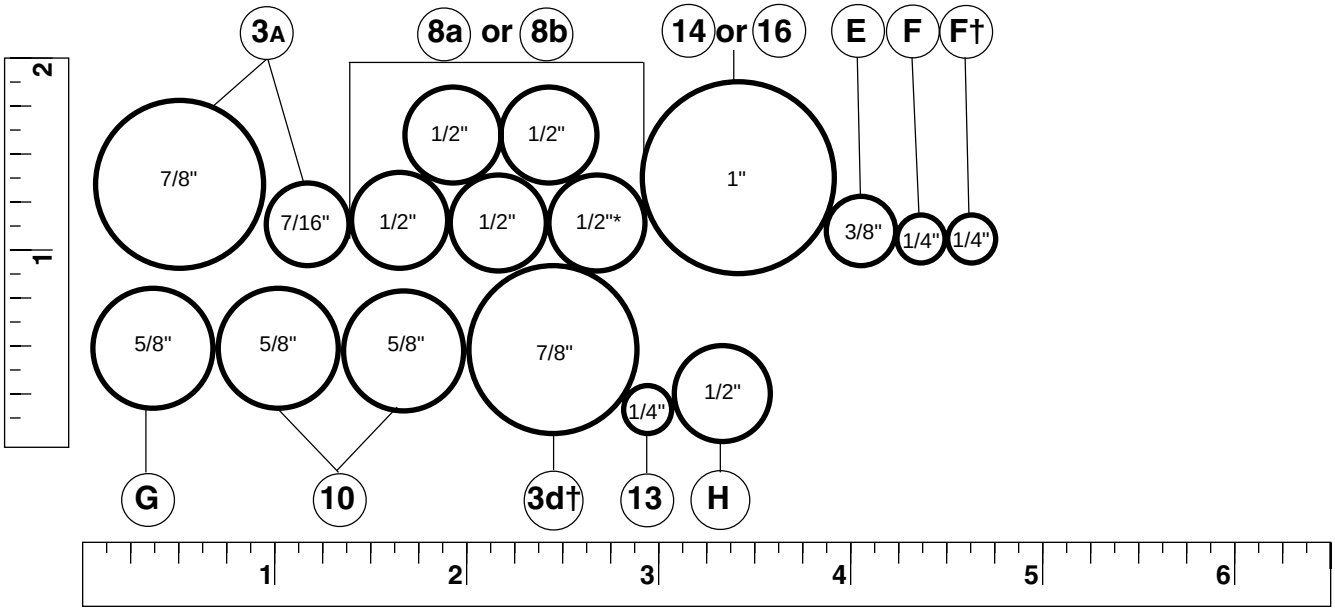


Figure 2.19 Cables / Hoses in Rail - THC-1/DCC, Inductive IHS w/Options

Key - Figure 2.19

3A PS Leads - PS to Cntrl Csl
- 7/8" Negative Lead - PS/Cntrl Csl
- 7/16" Control Cable - PS/Cntrl Csl

8a or 8b Flowmeter or Op Panel Leads - Flowmeter or Op Panel to Cntrl Csl
- 1/2" Gas In
- 1/2" Gas Out
- 1/2" Inj. Water In
- 1/2" Inj. Water Out
- 1/2"* Control Cable (Included with Op Panel Leads only)

14 or 16 Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle

E Cable - DCC Receiver to DCC Trnsmtr

F Cable - DCC Transmitter to Power Supply

F† Cable - DCC Transmitter to Power Supply (Used in paralleled systems)

G Gas Supply Hose - Gas Supply to Cntrl Csl

10 Cooling Water Hose Set - Water Supply or Water Chiller to Cntrl Csl

3d† Negative Lead - PS to Cntrl Csl (Used in systems delivering more than 500 Amps)

13 Cable - Argon-Hydrogen Csl to Cntrl Csl

H Hose - Air Supply to Inductive IHS

Key - Figure 2.20

6 Torch Leads - Control Console to Torch
- 1-1/2" Shielded Torch Leads
- 1/2" Gas Lead
- 1/2" Inj. Water Lead

14 or 16 Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle

11c Inductive IHS Leads - IHS Module to Torch Location
- 1/2" Hose - IHS to Air Cylinder
- 1/4" Cable - IHS to IHS Probe
- 1/4" Cable - IHS to IHS Probe

A Cable - THC-1 to Torch Lifter

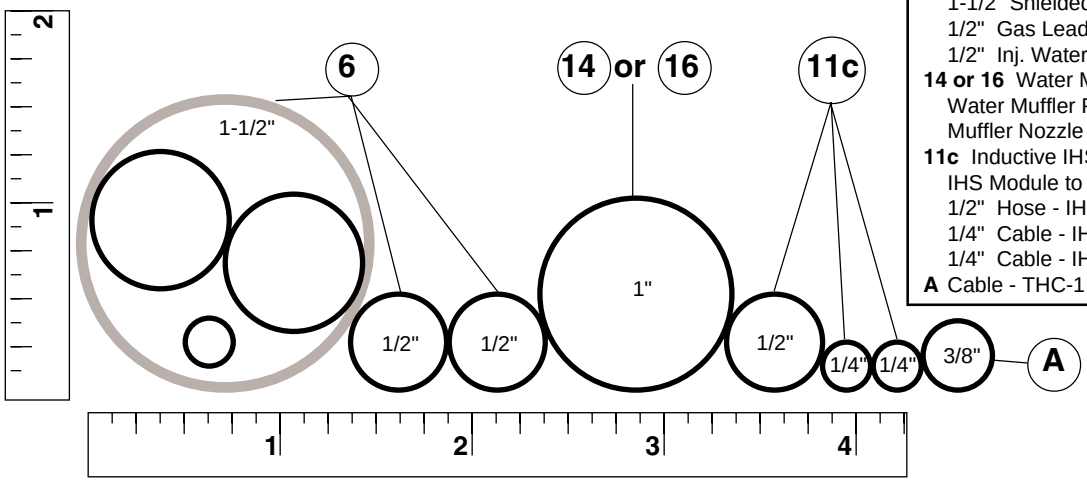


Figure 2.20 Cables / Hoses in Machine Cable/Hose Carrier - THC-1/DCC Inductive IHS w/Options

PAC-500 System - w/THC-1/RVC, Fluidic IHS and All Options (Ref. Fig. 1.19)

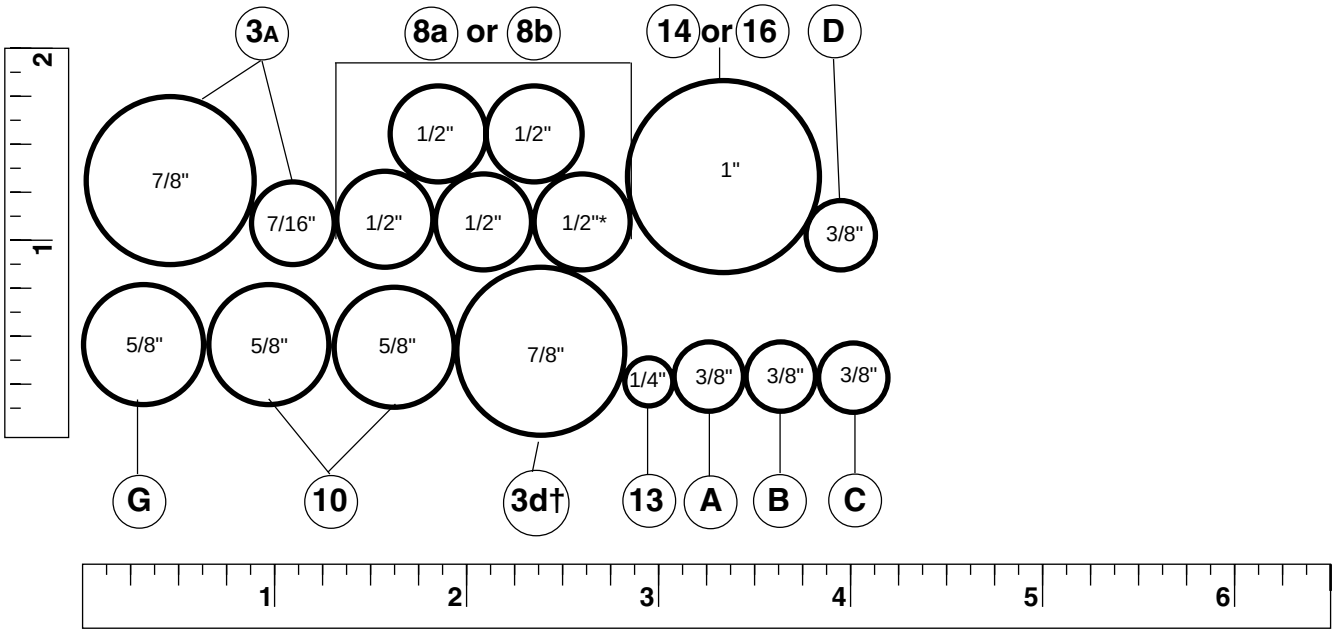


Figure 2.21 Cables / Hoses in Rail - THC-1/RVC, Fluidic IHS w/Options

Key - Figure 2.21

3A PS Leads - PS to Cntrl Csl
- 7/8" Negative Lead - PS/Cntrl Csl
- 7/16" Control Cable - PS/Cntrl Csl

8a or 8b Flowmeter or Op Panel Leads - Flowmeter or Op Panel to Cntrl Csl
- 1/2" Gas In
- 1/2" Gas Out
- 1/2" Inj. Water In
- 1/2" Inj. Water Out
- 1/2"* Control Cable (Included with Op Panel Leads only)

14 or 16 Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle

D Cable - RVC Cntrl Stn to RVC Trnsmtr

G Gas Supply Hose - Gas Supply to Cntrl Csl

10 Cooling Water Hose Set - Water Supply or Water Chiller to Cntrl Csl

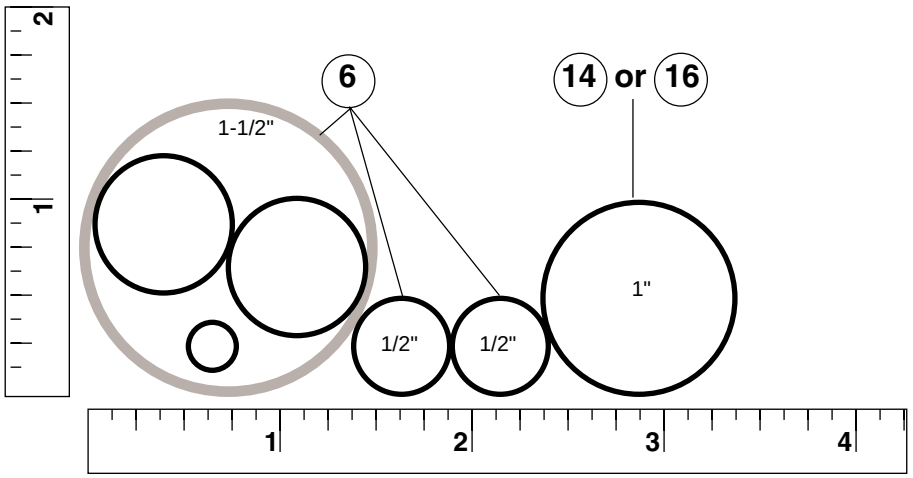
3d† Negative Lead - PS to Cntrl Csl (Used in systems delivering more than 500 Amps)

13 Cable - Argon-Hydrogen Csl to Cntrl Csl

A Cable - THC-1/RVC Module to Torch Lifter

B Cable - THC-1/RVC Module to N/C Controller

C Cable - THC-1/RVC Module to IHS



Key - Figure 2.22

6 Torch Leads -
- Control Console to Torch
- 1-1/2" Shielded Torch Leads
- 1/2" Gas Lead
- 1/2" Inj. Water Lead

14 or 16 Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle

Figure 2.22 Cables / Hoses in Machine Cable/Hose Carrier - THC-1/RVC Fluidic IHS w/Options

PAC-500 System - w/THC-1/RVC, Inductive IHS and All Options (Ref. Fig. 1.20)

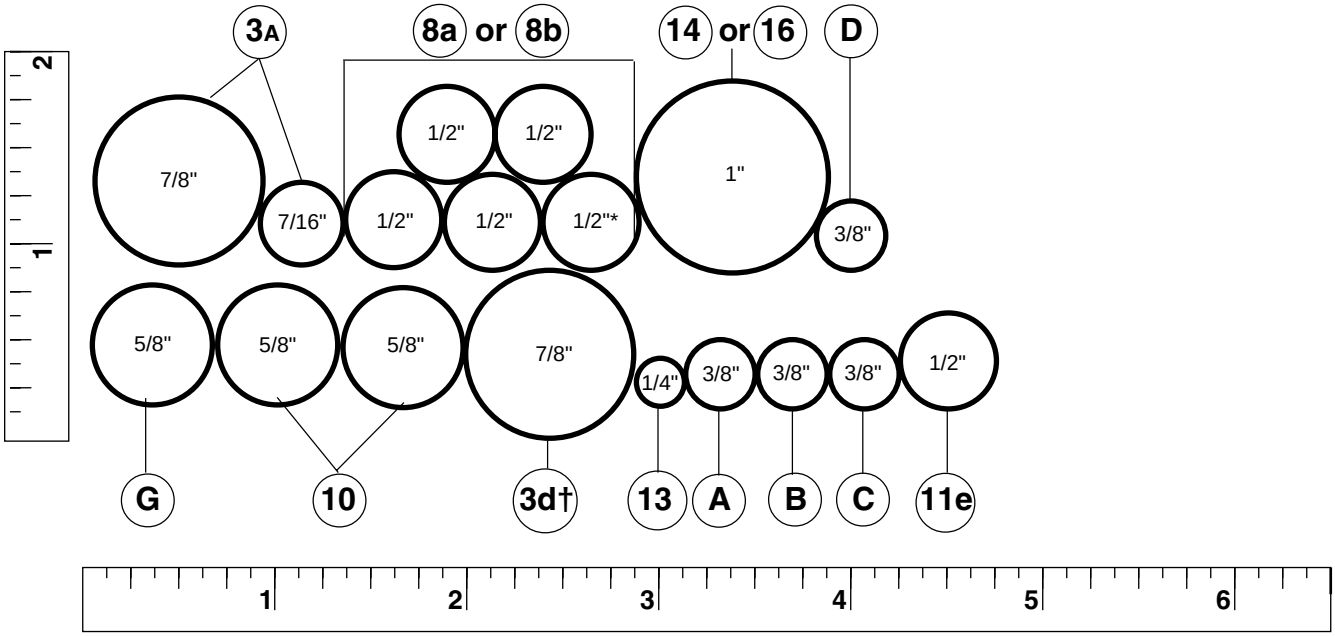


Figure 2.23 Cables / Hoses in Rail - THC-1/RVC, Inductive IHS w/Options

Key - Figure 2.23

3A PS Leads - PS to Cntrl Csl
- 7/8" Negative Lead - PS/Cntrl Csl
- 7/16" Control Cable - PS/Cntrl Csl

8a or 8b Flowmeter or Op Panel Leads - Flowmeter or Op Panel to Cntrl Csl
- 1/2" Gas In
- 1/2" Gas Out
- 1/2" Inj. Water In
- 1/2" Inj. Water Out
- 1/2"* Control Cable (Included with Op Panel Leads only)

14 or 16 Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle

D Cable - RVC Cntrl Stn to RVC Trnsmtr

G Gas Supply Hose - Gas Supply to Cntrl Csl

10 Cooling Water Hose Set - Water Supply or Water Chiller to Cntrl Csl

3d† Negative Lead - PS to Cntrl Csl (Used in systems delivering more than 500 Amps)

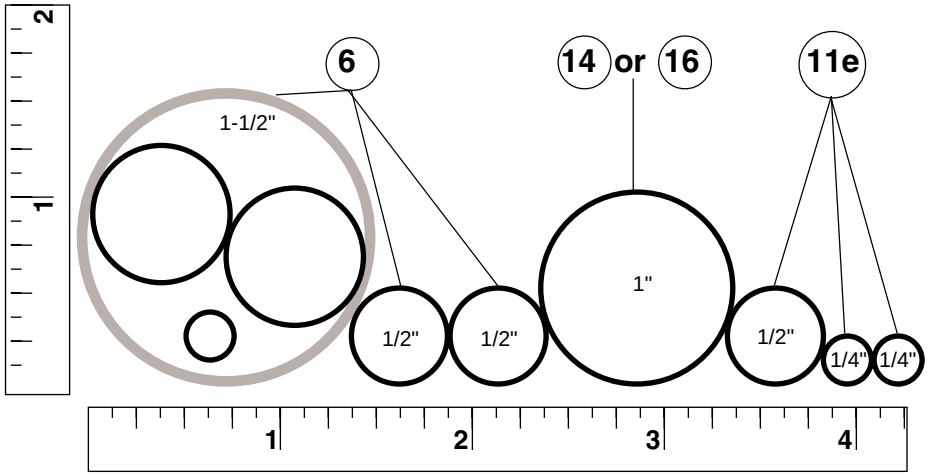
13 Cable - Argon-Hydrogen Csl to Cntrl Csl

A Cable - THC-1/RVC Module to Torch Lifter

B Cable - THC-1/RVC Module to N/C Controller

C Cable - THC-1/RVC Module to IHS

11e Hose - Air Supply to IHS Module



Key - Figure 2.24

6 Torch Leads - Control Console to Torch
- 1-1/2" Shielded Torch Leads
- 1/2" Gas Lead
- 1/2" Inj. Water Lead

14 or 16 Water Muffler Hose - Water Muffler Pump to Water Muffler Nozzle

11e Inductive IHS Leads - IHS Module to Torch Location
- 1/2" Hose - IHS to Air Cylinder
- 1/4" Cable - IHS to IHS Probe
- 1/4" Cable - IHS to IHS Probe

Figure 2.24 Cables / Hoses in Machine Cable/Hose Carrier - THC-1/RVC, Inductive IHS w/Options

Distributor Information:

_____

_____

_____

HYPERTHERM
PAC500 Order Form

Customer Information:

_____

_____

_____

(1) H401 Power Supply

- ☐ 036038 H401 PS, 200V, 50 Hz, 3Ø
- ☐ 036036 H401 PS, 400V, 50 Hz, 3Ø
- ☐ 036035 H401 PS, 480V, 60 Hz, 3Ø
- ☐ 036037 H401 PS, 600V, 60 Hz, 3Ø

(1) H601 Power Supply

- ☐ 036034 H601 PS, 200V, 50 Hz, 3Ø
- ☐ 036032 H601 PS, 400V, 50 Hz, 3Ø
- ☐ 036031 H601 PS, 480V, 60 Hz, 3Ø
- ☐ 036033 H601 PS, 600V, 60 Hz, 3Ø

(2) Control Console

- ☐ 028121 Standard Control Console, PAC500
- ☐ 028169 UL Control Console, PAC500

(3a) Standard Leads Package, PAC500 (PS to Console and Worktable)

- ☐ 028009 Leads, PS 4/0 x 50/20 + 18-4, 50 Ft

(3b) Additional Length Power Supply Leads (specify length)

- ☐ 028213 Leads, PS 4/0 + 18-4

(3c) Additional 4/0 Cable for Systems Delivering Over 500 Amps (PS to Worktable [1])

- ☐ 023136 Cable, 4/0 20 Ft
- ☐ 023078 Cable, 4/0 25 Ft
- ☐ 023101 Cable, 4/0 30 Ft
- ☐ 023135 Cable, 4/0 40 Ft
- ☐ 023079 Cable, 4/0 50 Ft

(3d) Additional 4/0 Cable for Systems Delivering Over 500 Amps (PS to Control Console [1])

- ☐ 023136 Cable, 4/0 20 Ft
- ☐ 023078 Cable, 4/0 25 Ft
- ☐ 023101 Cable, 4/0 30 Ft
- ☐ 023135 Cable, 4/0 40 Ft
- ☐ 023079 Cable, 4/0 50 Ft
- ☐ 023124 Cable, 4/0 75 Ft
- ☐ 023080 Cable, 4/0 100 Ft
- ☐ 023081 Cable, 4/0 150 Ft

(3e) Additional 4/0 Cable for Paralleled Systems (PS to PS [2])

- ☐ 023136 Cable, 4/0 20 Ft
- ☐ 023078 Cable, 4/0 25 Ft
- ☐ 023101 Cable, 4/0 30 Ft

(3f) 18-4 Contactor Cable for Paralleled Systems (PS to PS)

- ☐ 023011 Cable, 18-4

(3g) Additional Length 18-4 Contactor Cable (specify length)

- ☐ 023449 Cable, 18-4

(4) PAC500 Torch

- ☐ 028031 Torch Assy w/flared cap, PAC500 (under 600 amps)
- ☐ 028160 Torch Assy w/flared cap, PAC500 (over 600 amps)

(4a) Spare Parts Kit

- ☐ 028041 Spare Parts Kit, Flared Cap
- ☐ 028210 Spare Parts Kit, Tapered Cap
- ☐ 028161 Spare Parts Kit, .120 Nozzle
- ☐ 028185 Spare Parts Kit, .220 Nozzle

(5) Torch Mounting Bracket

- ☐ 020046 Torch Mounting Bracket

(6) Torch Leads

- ☐ 028137 Shielded Torch Leads, 10 Ft
- ☐ 028138 Shielded Torch Leads, 15 Ft
- ☐ 028139 Shielded Torch Leads, 20 Ft
- ☐ 028140 Shielded Torch Leads, 25 Ft
- ☐ 028141 Shielded Torch Leads, 30 Ft
- ☐ 028142 Shielded Torch Leads, 35 Ft
- ☐ 028143 Shielded Torch Leads, 40 Ft

(7a) Flowmeter Panel

- ☐ 028053 Flowmeter Panel Assy, 1 Torch
- ☐ 028054 Flowmeter Panel Assy, 2 Torch
- ☐ 028055 Flowmeter Panel Assy, 3 Torch
- ☐ 028056 Flowmeter Panel Assy, 4 Torch

(7b) Operator's Panel

- ☐ 028122 Operator's Panel Assy, 1 Torch
- ☐ 028134 Operator's Panel Assy, 2 Torch
- ☐ 028135 Operator's Panel Assy, 3 Torch
- ☐ 028136 Operator's Panel Assy, 4 Torch

8a Flowmeter Panel Leads

- ☐ 028153 Leads, Flowmeter Panel/Console 5 Ft
- ☐ 028154 Leads, Flowmeter Panel/Console 10 Ft
- ☐ 028155 Leads, Flowmeter Panel/Console 15 Ft
- ☐ 028156 Leads, Flowmeter Panel/Console 20 Ft
- ☐ 028157 Leads, Flowmeter Panel/Console 25 Ft
- ☐ 028158 Leads, Flowmeter Panel/Console 30 Ft

8b Operator's Panel Leads (standard control csl)

- ☐ 028144 Leads, Operator's Panel/Std Csl 5 Ft
- ☐ 028145 Leads, Operator's Panel/Std Csl 10 Ft
- ☐ 028146 Leads, Operator's Panel/Std Csl 15 Ft
- ☐ 028147 Leads, Operator's Panel/Std Csl 20 Ft
- ☐ 028148 Leads, Operator's Panel/Std Csl 25 Ft
- ☐ 028149 Leads, Operator's Panel/Std Csl 30 Ft

8c Operator's Panel Leads (UL control csl)

- ☐ 028186 Leads, Operator's Panel/UL Csl 5 Ft
- ☐ 028187 Leads, Operator's Panel/UL Csl 10 Ft
- ☐ 028188 Leads, Operator's Panel/UL Csl 15 Ft
- ☐ 028189 Leads, Operator's Panel/UL Csl 20 Ft
- ☐ 028190 Leads, Operator's Panel/UL Csl 25 Ft
- ☐ 028191 Leads, Operator's Panel/UL Csl 30 Ft

9a Water Supply System (1 Torch)

- ☐ 028291 Water Supply, 1T 380/415/460V, 50-60 Hz
- ☐ 028294 Water Supply, 1T 575V, 60 Hz

9b Water Supply System (2 Torch)

- ☐ 028320 Water Supply, 2T 380/415/460V, 50-60 Hz
- ☐ 028321 Water Supply, 2T 575V, 60 Hz

9c Water Chiller (1-Torch)

- ☐ 039099 Water Chiller, 200V, 600A, 1T
- ☐ 039116 Water Chiller, 240V, 600A, 1T
- ☐ 039102 Water Chiller, 380V, 600A, 1T
- ☐ 039101 Water Chiller, 415V, 600A, 1T
- ☐ 039103 Water Chiller, 440V, 600A, 1T
- ☐ 039098 Water Chiller, 480V, 600A, 1T
- ☐ 039100 Water Chiller, 575V, 600A, 1T
- ☐ 039111 Water Chiller, 200V. 1000A, 1T
- ☐ 039118 Water Chiller, 240V. 1000A, 1T
- ☐ 039114 Water Chiller, 380V, 1000A, 1T
- ☐ 039113 Water Chiller, 415V, 1000A, 1T
- ☐ 039115 Water Chiller, 440V, 1000A, 1T
- ☐ 039110 Water Chiller, 480V, 1000A, 1T
- ☐ 039112 Water Chiller, 575V, 1000A, 1T

9d Water Chiller (2-Torch)

- ☐ 039105 Water Chiller, 200V, 600A, 2T
- ☐ 039117 Water Chiller, 240V, 600A, 2T
- ☐ 039108 Water Chiller, 380V, 600A, 2T
- ☐ 039107 Water Chiller, 415V, 600A, 2T
- ☐ 039109 Water Chiller, 440V, 600A, 2T
- ☐ 039104 Water Chiller, 480V, 600A, 2T
- ☐ 039106 Water Chiller, 575V, 600A, 2T

10 Cooling Water Hose Set

- ☐ 028010 Hoses, Cooling Water, 1T 50 Ft
- ☐ 028013 Hoses, Cooling Water, 2T 50 Ft

10a Additional Length Cooling Water Hoses (specify length)

- ☐ 028214 Additional Lngth Cooling Water Hoses 1T
- ☐ 028215 Additional Lngth Cooling Water Hoses 2T

11a THC-2 Torch Height Cotrol

- ☐ 052001 THC-2 Torch Height Control, PAC500

11b THC-1 Torch Height Control w/Fluidic IHS

- ☐ 050001 THC-1 Standard, Fluidic IHS

11c THC-1 Torch Height Control w/Digital Current Control and Inductive IHS

- ☐ 050017 THC-1/DCC/Inductive IHS

11d THC-1/RVC Torch Height Control w/Fluidic IHS

- ☐ 050006 THC-1/RVC, Fluidic IHS

11e THC-1/RVC Torch Height Control w/Inductive IHS

- ☐ 050011 THC-1/RVC, Inductive IHS

12 Digital Current Control

- ☐ 054005 DCC System (Digital Current Control)

12a DCC Interconnecting Cable

- ☐ 023048 DCC Interconnecting Cable, 50 Ft
- ☐ 023049 Additional Length DCC Cable

13 Argon-Hydrogen Manifold

- ☐ 028057 Manifold Assy, Argon-Hydrogen

14a Water Muffler System - with hoses

- ☐ 034001 WM System, w/Hose, 230/480V
- ☐ 034072 WM System, w/Hose, 380/415V
- ☐ 034070 WM System, w/Hose, 575V

14b Water Muffler System - without hoses

- ☐ 034014 WM System, wo/Hose, 230/480V
- ☐ 034073 WM System, wo/Hose, 380/415V
- ☐ 034071 WM System, wo/Hose, 575V

15 Water Muffler Control Cable (specify length)

- ☐ 023268 Additional Length WM Cable

16 Additional Length water Muffler Hose (specify length)

- ☐ 034051 Additional Length WM Hose