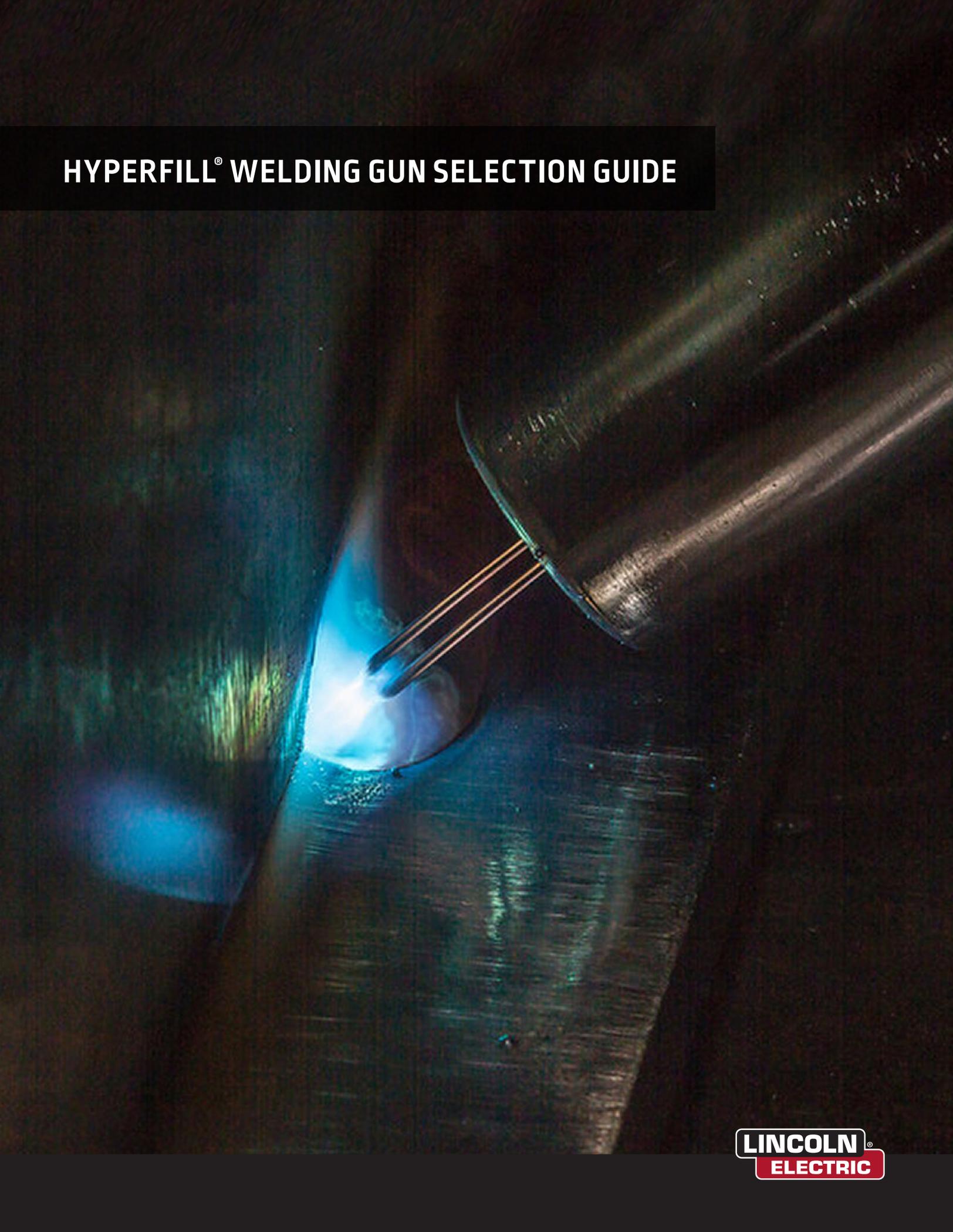


# HYPERFILL<sup>®</sup> WELDING GUN SELECTION GUIDE





# MAGNUM PRO SEMI-AUTOMATIC WELDING GUNS

When running HyperFill in a handheld welding set up, the use of a Magnum PRO Semi-Automatic Welding Gun is required. There are a few things to consider in order to determine the best welding gun for the job.

## Amperage Requirements:

HyperFill is a high amperage process which requires the use of welding guns which can withstand the duty cycle while keeping the system cool. The solution matrix below will help select the right welding gun for your application based on wire type and size.

Wire Type Wire Diameter	GMAW (Solid and Metal Core Wire)			FCAW	
	0.035 in.	0.040 in.	0.045 in.	1.2 mm	1.4 mm
Magnum PRO 500 Water-Cooled Welding Gun	•	•	•	•	•
Magnum PRO HDE 350 Welding Gun				•	
Magnum PRO HDE 450 Welding Gun				•	

**IMPORTANT:** Air-Cooled welding guns are not recommended for HyperFill GMAW (solid or metal core wire) applications.

Note: The 1.2 mm FCAW HyperFill process can exceed the duty cycle of the 350 HDE welding guns when used at the upper end of the procedure. When pushing past the 350A 100% mixed gas duty cycle of these guns, it is recommended to size up to the 450 HDE welding guns.

## Curve vs. Barrel Handle:

After determining the proper welding gun based on the process requirements, the selection of the handle style can be chosen for operator comfort. Both Magnum PRO Water Cooled and Air Cooled Welding Guns offer the choice between a curved and straight, barrel style handle.

**Solution Requirements:**  
HyperFill® is a patented and licensed twin-wire solution that is designed to perform specifically with select Lincoln Electric welding wire. To access this licensed solution, activation is required through the Lincoln Electric REVEAL™ Activation Platform. [For more details, reference document MC20-106](#)



Magnum PRO 500 Curve Water Cooled Welding Gun



Magnum PRO 500 Barrel Water Cooled Welding Gun



Magnum PRO Barrel HDE Welding Gun



Magnum PRO Curve HDE Welding Gun



## PRODUCT SPECIFICATIONS

Product Name	Product Number	Amperage Rating (Mixed Gas)	Back End Connector	Handle Style	Cable Length ft (m)	Cable Liner	Gun Tube
<b>Magnum PRO Water-Cooled Guns</b>							
Magnum PRO 500 Curve Water-Cooled Gun	K4522-1-10-45	500A @ 100%	K466-10	Curve	10 (3.0)	KP44-3545-15	KP4526-45
	K4522-1-FM-45		Fast-Mate		15 (4.5)		
	K4522-2-10-45		K466-10			20 (6.1)	
	K4522-2-FM-45		Fast-Mate		25 (7.6)		
	K4522-3-10-45		K466-10			15 (4.5)	
	K4522-3-FM-45		Fast-Mate		KP44-564-15		
	K4522-4-10-45		K466-10			15 (4.5)	
	K4522-4-FM-45		Fast-Mate		KP44-332-15		
	<b>K4522-2-10-564<sup>(1)</sup></b>		K466-10			15 (4.5)	
	<b>K4885-2-10-332<sup>(2)</sup></b>		K466-10		25 (7.6)		
	<b>K4885-2-FM-332<sup>(2)</sup></b>		Fast-Mate			25 (7.6)	
Magnum PRO 500 Barrel Water-Cooled Gun	<b>K4879-2-10-564<sup>(1)</sup></b>	K466-10	Barrel	15 (4.5)	KP44-564-15		KP4526-60L3
	<b>K4879-3-10-564<sup>(1)</sup></b>			20 (6.1)			
	<b>K4879-4-10-564<sup>(1)</sup></b>			25 (7.6)			
Magnum PRO 500 Barrel Water-Cooled Gun - Dual Procedure	<b>K4880-2-10-564<sup>(1)</sup></b>	K466-10	Barrel	15 (4.5)	KP44-564-15	KP4526-60L3	
	<b>K4880-3-10-564<sup>(1)</sup></b>			20 (6.1)			
	<b>K4880-4-10-564<sup>(1)</sup></b>			25 (7.6)			
<b>Magnum PRO Air-Cooled Guns</b>							
Magnum PRO Curve HDE 350 HyperFill Ready-Pak®	K5383-2-10-047H	350A @ 100%	K466-10	Curve	15 (4.5)	KP44-332-15	KP4694-60
	K5383-2-FM-047H		Fast-Mate				
Magnum PRO Curve HDE 450 HyperFill Ready-Pak®	K5384-2-10-047H	450A @ 100%	K466-10	Curve	15 (4.5)	KP44-332-15	KP4696-60SN
	K5384-2-FM-047H		Fast-Mate				
Magnum PRO Curve HDE 350 Gun	K4532-1	350A @ 100%	Order Separately	Curve	10 (3.0)	Order Separately	KP4694-60
	K4532-2				15 (4.5)		
	K4532-3				20 (6.1)		
Magnum PRO Curve HDE 450 Gun	K4533-1	450A @ 100%	Order Separately	Curve	10 (3.0)	Order Separately	KP4695-60
	K4533-2				15 (4.5)		
	K4533-3				20 (6.1)		
Magnum PRO Barrel HDE 350 Gun	K4857-1	350A @ 100%	Order Separately	Barrel	10 (3.0)	Order Separately	KP4694-60
	K4857-2				15 (4.5)		
	K4857-3				20 (6.1)		
Magnum PRO Barrel HDE 450 Gun	K4858-1	450A @ 100%	Order Separately	Barrel	10 (3.0)	Order Separately	KP4695-60
	K4858-2				15 (4.5)		
	K4858-3				20 (6.1)		

(1) Welding guns come with 5/64" cable liner for welding with 0.035"-0.040" HyperFill applications.

(2) Welding guns come with 3/32" cable liner for welding with 0.045" HyperFill applications.

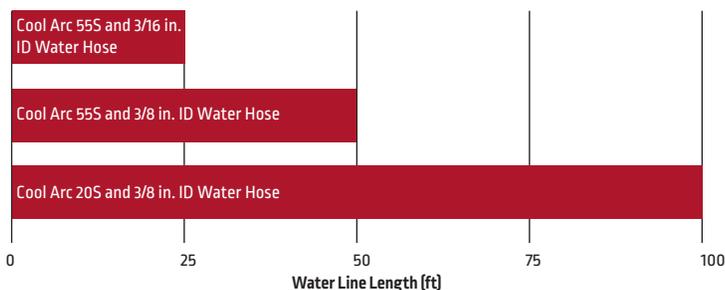
Note: When welding with any 0.045 in (1.2 mm) diameter or larger HyperFill application, air-cooled or water-cooled, we recommend keeping the cable length to 20ft (6.1 m) or shorter.

## Cooling Solution Selection:

The cooling equipment suggestions in the chart to the right are minimum requirements for proper cooling performance. All systems can be sized up but should not be sized down.

For HyperFill applications using 0.045 in. /1.2 mm solid wire or exceeding 425A @ 70% duty cycle, the Cool Wave™ 20S should be used.

For all applications with hose lengths longer than 25 ft., 3/8 in. water hoses should be used.



Note: Water line length is defined as the one-way distance between the water cooler and gun/torch water line connections



# MAGNUM PRO WATER-COOLED ROBOTIC TORCHES

HyperFill can also be used in automated robotic set-ups. Magnum PRO Water Cooled Robotic Torches are rated to withstand up to 650A at a 100% duty cycle making them the perfect solution for this high heat application.



## SPECIFICATIONS

Product Name	Product Number	Robot Arm	Torch Type	Cable	Breakaway Disk	Torch Housing	Amperage Rating (with 90/10 Ar/CO <sub>2</sub> )	Wire Diameter Range, in. (mm)
Magnum <sup>®</sup> PRO Water-Cooled Robotic Torch One-Pak <sup>®</sup>	K3593-1	Fanuc 100iC/6L	Standard	KP4399-1	KP2920-4	K4398-1	100% @ 650A <sup>(1)</sup>	0.035-5/64 in. (0.9-2.0 mm)
	K35393-1A		Air Blast					
	K3593-2	Fanuc 120iC/10L	Standard	KP4399-2				
	K3593-2A		Air Blast					
	K3593-3	Fanuc 100iC	Standard	KP4399-3				
	K53593-3A		Air Blast					
	K3593-4	Fanuc 100iC/8L	Standard	KP4399-4				
	K35393-4A		Air Blast					
	K3593-5	Fanuc 120iC	Standard	KP4399-5				
	K35393-5A		Air Blast					
	K3593-6	Fanuc M710iC/12L	Standard	KP4399-6				
	K3593-6A		Air Blast					
	K3593-7	Fanuc 100iD	Standard	KP4399-7	KP2920-9			
	K35393-7A		Air Blast					
	K3593-8	Fanuc 100iD/10L and Fanuc 120iD	Standard	KP4399-8				
	K35393-8A		Air Blast					
	K3593-9	Fanuc 100iD/8L	Standard	KP4399-22				
	K35393-9A		Air Blast					
	K3593-10	Fanuc M710iC/12L with Top Mount Feeder	Standard	KP4399-10	KP2920-4			
	K3593-10A		Air Blast					
	K3593-12	ABB IRB 1520iD	Standard	KP4399-12	KP2920-11	K4398-3		
	K35393-12A		Air Blast					
	K3593-14	ABB IRB 1660iD	Standard	KP4399-14	KP2920-8	K4398-1		
	K35393-14A		Air Blast					
	K3593-15	ABB IRB 2600iD-15/1.85	Standard	KP4399-17				
	K35393-15A		Air Blast					
	K3593-16	ABB IRB 2600iD-8/2.0	Standard	KP4399-16				
	K3593-16A		Air Blast					
	K3593-20	KUKA KR6R1820HW	Standard	KP4399-20	KP2920-5	K4398-2		
K3593-20A	Air Blast							
K3593-21	KUKA KR8R1420HW	Standard	KP4399-21					
K3593-21A		Air Blast						
K3593-22	KUKA KR8R2100HW	Standard	KP4399-22					
K3593-22A		Air Blast						
K3593-23	Motoman MA1440 (with K2685-1 Feeder)	Standard	KP4399-23	KP2920-4	K4398-1			
K3593-23A		Air Blast						
K3593-24	Motoman MA2010	Standard	KP4399-24					
K3593-24A		Air Blast						
K3593-28	Motoman MA1440 (with K3561-1 Feeder)	Standard	KP4399-24					
K3593-28A		Air Blast						
K3593-29	Fanuc 120iD/12L	Standard	KP4399-29	KP2920-9				
K35393-29A		Air Blast						

(1) The use of the Cooled Wave 20S water cooler is required for a 100% Duty Cycle at 650A. Extreme ambient temperatures may diminish the duty cycle. Testing is recommended for applications utilizing the full duty cycle in high heat ambient environments. For more information, reference the Magnum PRO Water-Cooled Robotic Torch specification sheet, E12.07.



# MAGNUM PRO WATER-COOLED EXTERNAL DRESS ROBOTIC TORCH PARTS

## SPECIFICATIONS

Product Name	Product Number	Cable Length ft (m)	Torch Type	Nose Cone	Cable	Wire Guide	Jump Liner	Amperage Rating (with 90/10 Ar CO <sub>2</sub> )	Wire Diameter Range in. (mm)
Magnum <sup>®</sup> PRO Water-Cooled External Dress Robotic Torch One-Pak <sup>®</sup>	K5415-4	4 (1.2)	Standard	K5386-1	KP5385-4	-	-	100% @ 650A <sup>1</sup>	0.035 - 3/32 (0.9-2.0)
	K5415-4W		Wire Brake	K5386-2		KP5390-3	KP3364-3		
	K5415-4L	4.5 (1.4)	Standard	K5386-1	KP5385-4L	-	-		
	K5415-4LW		Wire Brake	K5386-2		KP5390-3	KP3364-3		
	K5415-5L	5.5 (1.7)	Standard	K5386-1	KP5385-5L	-	-		
	K5415-5LW		Wire Brake	K5386-2		KP5390-3	KP3364-3		
	K5415-6L	6.5 (2.0)	Standard	K5386-1	KP5385-6L	-	-		
	K5415-6LW		Wire Brake	K5386-2		KP5390-3	KP3364-3		
	K5415-8	8 (2.4)	Standard	K5386-1	KP5385-8	-	-		
	K5415-8W		Wire Brake	K5386-2		KP5390-3	KP3364-3		
	K5415-9L	9.5 (2.9)	Standard	K5386-1	KP5385-9L	-	-		
	K5415-9LW		Wire Brake	K5386-2		KP5390-3	KP3364-3		
	K5415-11	11 (3.4)	Standard	K5386-1	KP5385-11	-	-		
	K5415-11W		Wire Brake	K5386-2		KP5390-3	KP3364-3		

[1] The use of the Cooled Wave 20S water cooler is required for a 100% Duty Cycle. Extreme ambient temperatures may diminish the duty cycle. Testing is recommended for applications utilizing the full duty cycle in high heat ambient environments.



# MAGNUM PRO EXPENDABLES

HyperFill requires the use of special MIG expendables to deliver two wires through a single gun. The patented twin wire contact tip provides the proper wire orientation for arc stability at elevated deposition rates.

## HyperFill Contact Tips:

The innovative twin wire contact tips are offered in a wide range of wire diameters and styles which have each been designed to provide the wide, smooth arc cone specific to the HyperFill process. In addition to the second hole which is different from a standard Magnum PRO contact tip, the HyperFill tips also use a Dual Camlock Connection for easy, efficient installation.



Camlock Connection

The selection matrix below provides a quick guide to the contact tip you should use based on your HyperFill application.

Description	Part Number	Solid Wire				Metal-Cored Wire	Flux-Cored Wire	
		0.035 in (0.9 mm)	0.040 in (1.0 mm)	0.045 in (1.2 mm)	0.047 in (1.2 mm)	0.045 in (1.2 mm)	0.045 in (1.2 mm)	0.052 in (1.4 mm)
Hyperfill GMAW Contact Tip	KP4482-035-HD	•						
	KP4482-040-HD		•					
	KP4482-045-HD			•		•		
	KP4482-047-HD				•			
Hyperfill FCAW Contact Tip	KP5344-047-HD						•	
	KP5344-052-HD							•
Hyperfill RA Contact Tip	KP5368-035	•						•
	KP5368-040		•					
Hyperfill STT Contact Tip	KP5368-035T	•						
	KP5368-040T		•					



KP4482 Series  
Standard  
HyperFill  
Contact Tip



KP5344 Series  
Figure-Eight  
HyperFill  
Contact Tip



KP5368 Series  
Slotted HyperFill  
Contact Tip



## HyperFill Gas Diffusers:

The special Camlock Connection specific to the HyperFill Contact Tips requires the use of a HyperFill Gas Diffuser. Offered in both Water-Cooled and Air-Cooled styles, the selection matrix below will help you understand which diffuser will best fit your application.

Water-Cooled		Air-Cooled
Single Package	Bulk Package	Single Package
KP4481-2-HD	KP4481-2-HD-B25	KP5367-1-HD



Image of Water-Cooled Diffuser



Image of Air-Cooled Diffuser

## Cable Liners:

Choosing the proper cable liner is important when running HyperFill. Unlike selecting the cable liner size for the wire diameter you are running (0.035" liner for 0.035" wire), it is necessary to select a liner that can accommodate the diameters of two wires running simultaneously through the gun. The table below helps determine the proper liner size for each HyperFill process.

Part Number	Solid Wire				Metal-Cored Wire	Flux-Cored Wire	
	0.035 in (0.9 mm)	0.040 in (1.0 mm)	0.045 in (1.2 mm)	0.047 in (1.2 mm)	0.045 in (1.2 mm)	0.045 in (1.2 mm)	0.052 in (1.4 mm)
KP44-564-15	•	•					
KP44-564-25							
KP44-332-15 <sup>[1]</sup>			•	•	•	•	•
KP44-332-25							
KP45H-332-15 <sup>[2]</sup>						•	•
KP45H-332-25							

[1] comes standard with Magnum PRO Air-Cooled Hyperfill Ready-Paks

Note: KP44 series liners are recommended for use with water-cooled HyperFill guns

[2] Can be used with Air-Cooled Hyperfill guns, but require a K613 back-end gun bushing and a larger machine bushing





## Gas Nozzles:

Selecting the proper gas nozzle will ensure the welding gun is providing sufficient gas to the weld joint. The surface area of the HyperFill Contact Tips are larger than a standard contact tip and limits the minimum nozzle size which can be used in the application.

We recommend using 3/4" ID nozzles for all HyperFill application to deliver enough gas to the weld puddle. In some tighter joint fit ups a 5/8" ID nozzle can be used, but it is important to thoroughly test to insure proper gas shielding is being provided.



Nozzle Type	Magnum PRO 500 Water-Cooled Guns		Magnum PRO HDE Air-Cooled Guns		Magnum PRO Robotic Torches	
	5/8 in. ID	3/4 in. ID	5/8 in. ID	3/4 in. ID	5/8 in. ID	3/4 in. ID
1/4 in. Recess		KP4523-3-75R				
		KP4523-3-75R-B25				
1/8 in. Recess	KP4523-1-62R	KP4523-1-75R	KP2743-1-62R	KP2743-1-75R	KP4120-1-62R	KP4120-1-75R
	KP4523-1-62R-B25	KP4523-1-75R-B25	KP2743-1-62R-B25	KP2743-1-75R-B25	KP4120-1-62R-B25	KP4120-1-75R-B25
Flush	KP4523-1-62F	KP4523-1-75F	KP2743-1-62F	KP2743-1-75F	KP4120-1-62F	KP4120-1-75F
	KP4523-1-62F-B25	KP4523-1-75F-B25	KP2743-1-62F-B25	KP2743-1-75F-B25	KP4120-1-62F-B25	KP4120-1-75F-B25
1/8 in. Stickout	KP4523-1-62S	KP4523-1-75S	KP2743-1-62S	KP2743-1-75S	KP4120-1-62S	KP4120-1-75S
	KP4523-1-62S-B25	KP4523-1-75S-B25	KP2743-1-62S-B25	KP2743-1-75S-B25	KP4120-1-62S-B25	KP4120-1-75S-B25

## Gun Tubes:

Selecting a gun tube is mostly based on operator preference. Due to the higher amperages needed to run the HyperFill procedure, we typically see the use of an extended length gun tube which positions the hand further away from the arc. This also provides better visibility which improves the overall operator comfort.

The extended length water cooled gun tubes provide an additional 3 inches of length over the standard configuration. All air-cooled gun tubes are interchangeable between the different welding gun amperage ratings. The length of the gun tube increases as the amperage rating goes up. For example, by placing a 450A gun tube and a 350A welding gun, you can position the operators hand further away from the arc in Air-Cooled HyperFill applications



Gun Tube Style	Magnum PRO 500 Water-Cooled Guns		Magnum PRO HDE Air-Cooled Guns		Magnum PRO Robotic Torches			
	45	60	45	60	22	45	60	180
Standard	KP4526-45	KP4526-60	-	-	KP4403-22	KP4403-45	-	KP4403-180
Extended Length	KP4526-45L3	KP4526-60L3	-	-	KP4403-22-6L	KP4403-45-6L	KP4403-60-6L	KP4403-180-6L
Standard - 350A	-	-	KP4694-45	KP4694-60	-	-	-	-
Standard - 450A	-	-	KP4695-45	KP4695-60	-	-	-	-
Standard - 550A	-	-	KP4696-45	KP4696-60	-	-	-	-



#### Test Results Disclaimer

Test results for deposition rates, arc time, and mechanical properties were obtained from a weld produced and tested according to prescribed standards. Actual results will vary depending on many factors, including, but not limited to: the base material or substrate being welded, the welding procedure and welding process, and the unique conditions present in the workplace or welding environment. Users and employers have the sole responsibility for and control over workplace conditions, including the manner in which work is performed and the safety measures taken. Always read and follow applicable OSHA regulations as well as all information on product labeling and safety data sheets when using Lincoln Electric products. Safety data sheets for Lincoln Electric products can be found at <http://www.lincolnelectric.com/en-us/support/msds/Pages/sds-search.aspx>. Users and employers should have an industrial hygienist check worker exposure levels to be certain that they are within applicable OSHA PEL and ACGIH TLV limits for the particular application or weldment.

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