

***Hypertherm***<sup>®</sup>

**XPR**<sup>®</sup>

OptiMix™ Process Gas Requirements

Guide

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**Hypertherm, Inc.**

Etna Road, P.O. Box 5010  
Hanover, NH 03755 USA  
603-643-3441 Tel (Main Office)  
603-643-5352 Fax (All Departments)  
info@hypertherm.com (Main Office Email)

**800-643-9878 Tel (Technical Service)**

technical.service@hypertherm.com (Technical Service Email)

**800-737-2978 Tel (Customer Service)**

customer.service@hypertherm.com (Customer Service Email)

**866-643-7711 Tel (Return Materials Authorization)****877-371-2876 Fax (Return Materials Authorization)**

return.materials@hypertherm.com (RMA email)

**Hypertherm México, S.A. de C.V.**

Avenida Toluca No. 444, Anexo 1,  
Colonia Olivar de los Padres  
Delegación Álvaro Obregón  
México, D.F. C.P. 01780  
52 55 5681 8109 Tel  
52 55 5683 2127 Fax  
Soporte.Tecnico@hypertherm.com (Technical Service Email)

**Hypertherm Plasmatechnik GmbH**

Sophie-Scholl-Platz 5  
63452 Hanau  
Germany  
00 800 33 24 97 37 Tel  
00 800 49 73 73 29 Fax

**31 (0) 165 596900 Tel (Technical Service)****00 800 4973 7843 Tel (Technical Service)**

technicalservice.emea@hypertherm.com (Technical Service Email)

**Hypertherm (Singapore) Pte Ltd.**

82 Genting Lane  
Media Centre  
Annexe Block #A01-01  
Singapore 349567, Republic of Singapore  
65 6841 2489 Tel  
65 6841 2490 Fax  
Marketing.asia@hypertherm.com (Marketing Email)  
TechSupportAPAC@hypertherm.com (Technical Service Email)

**Hypertherm Japan Ltd.**

Level 9, Edobori Center Building  
2-1-1 Edobori, Nishi-ku  
Osaka 550-0002 Japan  
81 6 6225 1183 Tel  
81 6 6225 1184 Fax  
HTJapan.info@hypertherm.com (Main Office Email)  
TechSupportAPAC@hypertherm.com (Technical Service Email)

**Hypertherm Europe B.V.**

Vaartveld 9, 4704 SE  
Roosendaal, Nederland  
31 165 596907 Tel  
31 165 596901 Fax  
31 165 596908 Tel (Marketing)  
**31 (0) 165 596900 Tel (Technical Service)**  
**00 800 4973 7843 Tel (Technical Service)**  
technicalservice.emea@hypertherm.com  
(Technical Service Email)

**Hypertherm (Shanghai) Trading Co., Ltd.**

B301, 495 ShangZhong Road  
Shanghai, 200231  
PR China  
86-21-80231122 Tel  
86-21-80231120 Fax  
**86-21-80231128 Tel (Technical Service)**  
techsupport.china@hypertherm.com  
(Technical Service Email)

**South America & Central America: Hypertherm Brasil Ltda.**

Rua Bras Cubas, 231 – Jardim Maia  
Guarulhos, SP – Brasil  
CEP 07115-030  
55 11 2409 2636 Tel  
tecnico.sa@hypertherm.com (Technical Service Email)

**Hypertherm Korea Branch**

#3904. APEC-ro 17. Heaundae-gu. Busan.  
Korea 48060  
82 (0)51 747 0358 Tel  
82 (0)51 701 0358 Fax  
Marketing.korea@hypertherm.com (Marketing Email)  
TechSupportAPAC@hypertherm.com  
(Technical Service Email)

**Hypertherm Pty Limited**

GPO Box 4836  
Sydney NSW 2001, Australia  
61 (0) 437 606 995 Tel  
61 7 3219 9010 Fax  
au.sales@Hypertherm.com (Main Office Email)  
TechSupportAPAC@hypertherm.com  
(Technical Service Email)

**Hypertherm (India) Thermal Cutting Pvt. Ltd**

A-18 / B-1 Extension,  
Mohan Co-Operative Industrial Estate,  
Mathura Road, New Delhi 110044, India  
91-11-40521201/ 2/ 3 Tel  
91-11 40521204 Fax  
HTIndia.info@hypertherm.com (Main Office Email)  
TechSupportAPAC@hypertherm.com  
(Technical Service Email)

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## Introduction

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The gas quality, pressure and flow requirements in the *XPR300™ Instruction Manual* and *XPR170™ Instruction Manual* are incorrect for OptiMix™ gas connect consoles. Use the requirements in this guide.



Consult your cutting table manufacturer if you have any questions.

## Process gas requirements for OptiMix gas connect consoles

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As an installer or user, you must supply the process gases and supply gas plumbing for your cutting system. See *Table 1* on page 4 for supply gas quality, pressure, and flow requirements.

### NOTICE

Gas leaks or pressure and flow rates that are outside of recommended ranges can:

- Cause problems with system performance
- Result in bad cut quality
- Shorten the life of consumables

If the quality of the gas is bad or if the pressure setting is incorrect, it can decrease:

- Cut quality
- Cut speed
- Cut thickness capabilities

**Table 1** – Gas quality, pressure, and flow requirements

Gas*	Quality	Minimum inlet pressure (during gas flow)	Flow rate
O <sub>2</sub> (oxygen)	99.5% pure, clean, dry, oil-free**	Core, VWI: 7.5 bar ± 0.4 (110 psi ± 5) OptiMix: 7.9 bar ± 0.4 (115 psi ± 5)	71 slpm (150 scfh)
N <sub>2</sub> (nitrogen)**	99.99% pure, clean, dry, oil-free	Core, VWI: 7.5 bar ± 0.4 (110 psi ± 5) OptiMix: 8.3 bar ± 0.4 (120 psi ± 5)	181 slpm (380 scfh)
Air***†	Clean, dry, oil free consistent with 8573-1:2010 Class 1.4.2	Core, VWI: 7.5 bar ± 0.4 (110 psi ± 5) OptiMix: 7.9 bar ± 0.4 (115 psi ± 5)	118 slpm (250 scfh)
H <sub>2</sub> (hydrogen)	99.995% pure	OptiMix: 8.3 bar ± 0.4 (120 psi ± 5)	50 slpm (105 scfh)
Ar (argon)	99.99% pure; clean, dry, oil-free	VWI: 7.5 bar ± 0.4 (110 psi ± 5) OptiMix: 8.3 bar ± 0.4 (120 psi ± 5)	118 slpm (250 scfh)
F5 (95% nitrogen, 5% hydrogen)	99.98% pure	VWI: 7.5 bar ± 0.4 (110 psi ± 5) OptiMix: 7.9 bar ± 0.4 (115 psi ± 5)	40 slpm (85 scfh)

\* Water can be used as a shield fluid for XPR plasma power supplies that have a VWI or OptiMix gas connect console. See *Shield water requirements (VWI and OptiMix)* in the *Qualifications and Requirements* section of your instruction manual for the specifications and requirements for water that is used for shield purposes.

\*\* Nitrogen is required for all processes.

\*\*\* Air is required for H<sub>2</sub> mix and F5 processes.

† Any air compressors that supply air to the cutting system must remove oil prior to air delivery.

**Hypertherm recommends that air compressors supply air that obey the following requirements of ISO Standard 8573-1:2010 Class 1.4.2:**

Maximum particle count in 1.0m<sup>3</sup>:

- 20,000 at 0.1 microns – 0.5 microns
- 400 at 0.5 microns – 1.0 microns
- 10 at 1.0 microns – 5.0 microns

Maximum water vapor pressure dew point: 3°C (37°F)

Maximum oil concentration: 0.1 mg/m<sup>3</sup> (for aerosol, liquid, and vapor)



Speak to your air compressor manufacturer if you operate the cutting system in temperatures colder than 3°C (37°F) or if you are unsure that the air compressor can obey the ISO standard for air quality.

## Important Information

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Make sure that you meet the following requirements to get the best performance from your OptiMix gas connect console:

- Pressure / flow gas requirements per *Table 1* on page 4 – the values in the table are pressures while the gases are flowing
- XPR firmware revision J or later
- XPR cut charts revision M or later
- Phoenix® version 10.9 or later
- ProNest® 2019 version 13.03 or later

Note:

- Make sure that the gas supply is leak free.
- The type and quality of the inlet regulator can affect the pressure response in the line.
- Under sized inlet gas plumbing (pipes) can affect the pressure response in the line.
- XPR mixed gas processes (Mix of H<sub>2</sub>, Ar and N<sub>2</sub>) are flow rate controlled. These processes rely on sufficient inlet pressure to achieve proper flow rates. If the pressure in one of the supply gas lines of H<sub>2</sub>, Ar, or N<sub>2</sub> goes below the outlet pressure, the mixer generates an alert (720). However, the system continues to cut. Please supply sufficient inlet pressures for optimum cut performance.

## How to set the N<sub>2</sub> and Ar regulators

This procedure is for when the regulators need to be adjusted in the field.

The N<sub>2</sub> and Ar OptiMix gas connect console (078633) regulators are set at Hypertherm before the regulators are installed into the gas connect console. The regulators are set in a dynamic condition, when gas is flowing, with 7.9 bar – 8.6 bar (115 psi – 125 psi) on the inlet and 6.9 bar (100 psi) on the outlet. There is a 1.6 mm (0.063 inch) orifice downstream.

When to adjust regulators:

- If your N<sub>2</sub> Shield inlet (P4) pressure is above 7.5 bar (110 psi) or below 6.2 bar (90 psi).
- If your Ar Shield Inlet (P4) pressure is above 7.5 bar (110 psi) or below 6.2 bar (90 psi).

This procedure has the technician open the cover of the system while the system is powered to set regulators located in the OptiMix gas connect console.

### **WARNING**



#### **ELECTRIC SHOCK CAN KILL**

The gas connect console contains dangerous electric voltages that can cause injury or death.

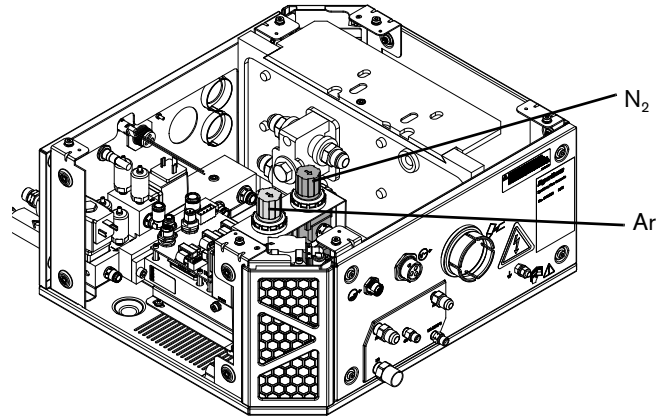


Use extreme caution if you service a gas connect console when connected to an electric power source and the outer cover or panels are removed.

## Set the N<sub>2</sub> regulator

1. Install one of the following sets of consumables:
  - 300 A O<sub>2</sub>/Air
  - 300 A N<sub>2</sub>/N<sub>2</sub>
  - 300 A Mix/N<sub>2</sub>
  - 170 A O<sub>2</sub>/Air
  - 170 A N<sub>2</sub>/N<sub>2</sub>
  - 170 A Mix/N<sub>2</sub>
2. Use the XPR web interface to load one of the following processes:
  - 2100 for the 300 A consumables
  - 2057 for the 170 A consumables
3. Remove the cover from OptiMix gas connect console.

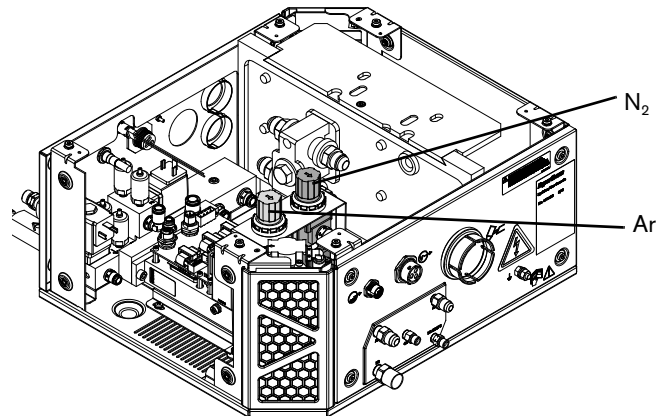
4. Pop the N<sub>2</sub> regulator knob up so the orange indicator is visible.



5. Go to **Gas System** in the XPR web interface.
6. Choose **TEST PREFLOW**.
7. Adjust the regulator until the shield inlet sensor (P4) reads 6.9 bar (100 psi) on the XPR web interface while N<sub>2</sub> is flowing.

## Set the Ar regulator

1. Load one of the following sets of consumables:
  - 300 A O<sub>2</sub>/Air
  - 170 A O<sub>2</sub>/Air
2. Use the XPR web interface to load one of the following processes:
  - 1205 for the 300 A consumables
  - 1157 for the 170 A consumables
3. Remove the cover for OptiMix gas connect console.
4. Pop the Ar regulator knob up so the orange indicator is visible.



5. Go to **Gas System** in the XPR web interface.

**6. Choose TEST PIERCEFLOW.**

**7. Adjust the regulator until the shield inlet sensor (P4) reads 6.9 bar (100 psi) on the web interface while Ar gas is flowing.**

## **Troubleshooting**

- Oscillations or bouncing flow rates in the mixer N<sub>2</sub> line can occur when the N<sub>2</sub> regulator in the gas connect console is set to too high of a pressure to the N<sub>2</sub> shield line. Reducing the pressure output of this regulator reduces the pressure oscillations.