

# Cut and Mark with an XPR<sup>®</sup> on an EDGE<sup>®</sup> Connect CNC

Manual Addendum

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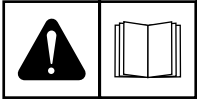
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## ENGLISH

**WARNING!** Before operating any Hypertherm equipment, read the safety instructions in your product's manual, the *Safety and Compliance Manual* (80669C), *Waterjet Safety and Compliance Manual* (80943C), and *Radio Frequency Warning Manual* (80945C). Failure to follow safety instructions can result in personal injury or in damage to equipment.

Copies of the manuals can come with the product in electronic and printed formats. Electronic copies are also on our website. Many manuals are available in multiple languages at [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## BG (БЪЛГАРСКИ/BULGARIAN)

**ПРЕДУПРЕЖДЕНИЕ!** Преди да работите с което и да е оборудване Hypertherm, прочетете инструкциите за безопасност в ръководството на вашия продукт, „Инструкция за безопасност и съответствие“ (80669C), „Инструкция за безопасност и съответствие на Waterjet“ (80943C) и „Инструкция за предупреждение за радиочестота“ (80945C).

Продуктът може да е съпроводен от копия на ръководствата в електронен и в печатен формат. Тези в електронен формат са достъпни също на уебсайта ни. Много ръководства са налице на няколко езика на адрес [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## CS (ČESKY/CZECH)

**VAROVÁNÍ!** Před uvedením jakéhokoli zařízení Hypertherm do provozu si přečtěte bezpečnostní pokyny v příručce k produktu a v *Manuálu pro bezpečnost a dodržování předpisů* (80669C), *Manuálu pro bezpečnost a dodržování předpisů při řezání vodním paprskem* (80943C) a *Manuálu varování ohledně rádiových frekvencí* (80945C).

Kopie příruček mohou být součástí dodávky produktu, a to v elektronické i tištěné formě. Elektronické kopie jsou k dispozici i na našich webových stránkách. Mnoho příruček je k dispozici v různých jazycích na stránce [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## DA (DANSK/DANISH)

**ADVARSEL!** Inden Hypertherm udstyr tages i brug skal sikkerhedsinstruktionerne i produktets manual og i *Manual om sikkerhed og overholdelse af krav* (80669C), *Manual om sikkerhed og overholdelse af krav for vandstråleskæring* (80943C), og *Manual om radiofrekvensadvarsel* (80945C), gennemlæses.

Kopier af manualerne kan leveres med produktet i elektronisk og trykt format. Elektroniske kopier findes også på vores hjemmeside. Mange manualer er tilgængelige på flere sprog på [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## DE (DEUTSCH/GERMAN)

**WARNUNG!** Bevor Sie ein Hypertherm-Gerät in Betrieb nehmen, lesen Sie bitte die Sicherheitsanweisungen in Ihrer Bedienungsanleitung, das *Handbuch für Sicherheit und Übereinstimmung* (80669C), das *Handbuch für Sicherheit und Compliance bei Wasserstrahl-Schneidanlagen* (80943C) und das *Handbuch für Hochfrequenz-Warnung* (80945C).

Bedienungsanleitungen und Handbücher können dem Gerät in elektronischer Form oder als Druckversion beiliegen. In elektronischer Form liegen sie auch auf unserer Website vor. Viele Handbücher stehen in verschiedenen Sprachen auf [www.hypertherm.com/docs](http://www.hypertherm.com/docs) zur Verfügung.

## ES (ESPAÑOL/SPANISH)

**¡ADVERTENCIA!** Antes de operar cualquier equipo Hypertherm, lea las instrucciones de seguridad del manual de su producto, del *Manual de seguridad y cumplimiento* (80669C), del *Manual de seguridad y cumplimiento en corte con chorro de agua* (80943C) y del *Manual de advertencias de radiofrecuencia* (80945C).

El producto puede incluir copias de los manuales en formato digital e impreso. Las copias digitales también están en nuestra página web. Hay diversos manuales disponibles en varios idiomas en [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## ET (EESTI/ESTONIAN)

**HOIATUS!** Enne Hyperthermi mis tahes seadme kasutamist lugege läbi toote kasutusjuhendis olevad ohutusjuhised ning *Ohutus- ja vastavusjuhend* (80669C), *Veejõa ohutuse ja vastavuse juhend* (80943C) ja *Raadiosageduse hoiatusjuhend* (80945C). Ohutusjuhiste eiramine võib põhjustada vigastusi ja kahjustada seadmeid.

Juhiste koopiad võivad tootega kaasas olla elektrooniliselt või trükituna. Elektroonilised koopiad on saadaval ka meie veebilehel. Paljud kasutusjuhendid on erinevates keeltes saadaval veebilehel [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## FI (SUOMI/FINNISH)

**VAROITUS!** Ennen minkään Hypertherm-laitteen käyttöä lue tuotteen käyttöoppaassa olevat turvallisuusohjeet, *turvallisuuden ja vaatimustenmukaisuuden käsikirja* (80669C), *vesileikkauksen turvallisuuden ja vaatimustenmukaisuuden käsikirja* (80943C) ja *radiotaajuusvaroitusten käsikirja* (80945C).

Käyttöoppaiden kopiot voivat olla tuotteen mukana sähköisessä ja tulostetussa muodossa. Sähköiset kopiot ovat myös verkkosivustollamme. Monet käyttöoppaat ovat myös saatavissa useilla kielillä [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## FR (FRANÇAIS/FRENCH)

**AVERTISSEMENT!** Avant d'utiliser tout équipement Hypertherm, lire les consignes de sécurité du manuel de votre produit, du *Manuel de sécurité et de conformité* (80669C), du *Manuel de sécurité et de conformité du jet d'eau* (80943C) et du *Manuel d'avertissement relatif aux radiofréquences* (80945C).

Les exemplaires des manuels qui accompagnent le produit peuvent être sous forme électronique ou papier. Les manuels sous forme électronique se trouvent également sur notre site Internet. Plusieurs manuels sont offerts en plusieurs langues à [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## GR (ΕΛΛΗΝΙΚΑ/GREEK)

**ΠΡΟΕΙΔΟΠΟΙΗΣΗ!** Πριν θέσετε σε λειτουργία οποιονδήποτε εξοπλισμό της Hypertherm, διαβάστε τις οδηγίες ασφαλείας στο εγχειρίδιο του προϊόντος και στο *εγχειρίδιο ασφαλείας και συμμόρφωσης* (80669C), στο *εγχειρίδιο ασφαλείας και συμμόρφωσης του waterjet* (80943C) και στο *εγχειρίδιο προειδοποιήσεων για τις ραδιοσυχνότητες* (80945C).

Το προϊόν μπορεί να συνοδεύεται από αντίγραφα των εγχειριδίων σε ηλεκτρονική και έντυπη μορφή. Τα ηλεκτρονικά αντίγραφα υπάρχουν επίσης στον ιστότοπό μας. Πολλά εγχειρίδια είναι διαθέσιμα σε διάφορες γλώσσες στο [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## HU (MAGYAR/HUNGARIAN)

**VIGYÁZAT!** Mielőtt bármilyen Hypertherm berendezést üzemeltetne, olvassa el a biztonsági információkat a termék kézikönyvében, a *Biztonsági és szabálykövetési kézikönyvben* (80669C), a *Vízugaras biztonsági és szabálykövetési kézikönyvben* (80943C) és a *Rádiófrekvenciás figyelmeztetéseket tartalmazó kézikönyvben* (80945C).

A termékhez a kézikönyv példányai elektronikus és nyomtatott formában is mellékelve lehetnek. Az elektronikus példányok webhelyünkön is megtalálhatók. Számos kézikönyv áll rendelkezésre több nyelven a [www.hypertherm.com/docs](http://www.hypertherm.com/docs) weboldalon.

## ID (BAHASA INDONESIA/INDONESIAN)

**PERINGATAN!** Sebelum mengoperasikan peralatan Hypertherm, bacalah petunjuk keselamatan dalam manual produk Anda, *Manual Keselamatan dan Kepatuhan* (80669C), *Manual Keselamatan dan Kepatuhan Jet Air* (80943C), dan *Manual Peringatan Frekuensi Radio* (80945C). Kegagalan mengikuti petunjuk keselamatan dapat menyebabkan cedera pribadi atau kerusakan pada peralatan.

Produk mungkin disertai salinan manual atau petunjuk dalam format elektronik maupun cetak. Salinan elektronik juga tersedia di situs web kami. Berbagai manual tersedia dalam beberapa bahasa di [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## IT (ITALIANO/ITALIAN)

**AVVERTENZA!** Prima di usare un'attrezzatura Hypertherm, leggere le istruzioni sulla sicurezza nel manuale del prodotto, nel *Manuale sulla sicurezza e la conformità* (80669C), nel *Manuale sulla sicurezza e la conformità Waterjet* (80943C) e nel *Manuale di avvertenze sulla radiofrequenza* (80945C).

Copie del manuale possono accompagnare il prodotto in formato cartaceo o elettronico. Le copie elettroniche sono disponibili anche sul nostro sito web. Molti manuali sono disponibili in diverse lingue all'indirizzo [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## JA (日本語/JAPANESE)

**警告!** Hypertherm 機器を操作する前に、この製品説明書にある安全情報、「安全とコンプライアンスマニュアル」(80669C)、「ウォータージェット的安全とコンプライアンス」(80943C)、「高周波警告」(80945C)をお読みください。

説明書のコピーは、電子フォーマット、または印刷物として製品に同梱されています。電子コピーは当社ウェブサイトにも掲載されています。説明書の多くは [www.hypertherm.com/docs](http://www.hypertherm.com/docs) にて複数の言語でご用意しています。

## KO (한국어/KOREAN)

**경고!** Hypertherm 장비를 사용하기 전에 제품 설명서와 안전 및 규정 준수 설명서(80669C), 워터젯 안전 및 규정 준수 설명서(80943C) 그리고 무선 주파수 경고 설명서(80945C)에 나와 있는 안전 지침을 읽으십시오.

전자 형식과 인쇄된 형식으로 설명서 사본이 제품과 함께 제공될 수 있습니다. 전자 사본도 Hypertherm 웹사이트에서 보실 수 있으며 설명서 사본은 [www.hypertherm.com/docs](http://www.hypertherm.com/docs) 에서 여러 언어로 제공됩니다.

## NE (NEDERLANDS/DUTCH)

**WAARSCHUWING!** Lees voordat u Hypertherm-apparaat gebruikt de veiligheidsinstructies in de producthandleiding, in de *Veiligheids- en nalevingshandleiding* (80669C) in de *Veiligheids- en nalevingshandleiding voor waterstralen* (80943C) en in de *Waarschuwingshandleiding radiofrequentie* (80945C).

De handleidingen kunnen in elektronische en gedrukte vorm met het product worden meegeleverd. Elektronische versies zijn ook beschikbaar op onze website. Veel handleidingen zijn in meerdere talen beschikbaar via [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## NO (NORSK/NORWEGIAN)

ADVARSEL! Før du bruker noe Hypertherm-utstyr, må du lese sikkerhetsinstruksjonene i produktets håndbok, *håndboken om sikkerhet og samsvar* (80669C), *håndboken om vannjet sikkerhet og samsvar* (80943C), og *håndboken om radiofrekvensadvarslar* (80945C).

Eksemplarer av håndbøkene kan følge med produktet i elektronisk og trykt form. Elektroniske eksemplarer finnes også på nettstedet vårt. Mange håndbøker er tilgjengelig i flere språk på [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## PL (POLSKI/POLISH)

OSTRZEŻENIE! Przed rozpoczęciem obsługi jakiegokolwiek systemu firmy Hypertherm należy się zapoznać z instrukcjami bezpieczeństwa zamieszczonymi w podręczniku produktu, w *podręczniku bezpieczeństwa i zgodności* (80669C), *podręczniku bezpieczeństwa i zgodności systemów strumienia wody* (80943C) oraz *podręczniku z ostrzeżeniem o częstotliwości radiowej* (80945C).

Do produktu mogą być dołączone podręczniki użytkownika w formie elektronicznej i drukowanej. Kopie elektroniczne znajdują się również w naszej witrynie internetowej. Wiele podręczników jest dostępnych w różnych językach pod adresem [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## PT (PORTUGUÊS/PORTUGUESE)

ADVERTÊNCIA! Antes de operar qualquer equipamento Hypertherm, leia as instruções de segurança no manual do seu produto, no *Manual de Segurança e de Conformidade* (80669C), no *Manual de Segurança e de Conformidade do Waterjet* (80943C) e no *Manual de Advertência de radiofrequência* (80945C).

Cópias dos manuais podem vir com o produto nos formatos eletrônico e impresso. Cópias eletrônicas também são encontradas em nosso website. Muitos manuais estão disponíveis em vários idiomas em [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## RO (ROMÂNĂ/ROMANIAN)

AVERTIZARE! Înainte de utilizarea oricărei echipament Hypertherm, citiți instrucțiunile de siguranță din manualul produsului, *manualul de siguranță și conformitate* (80669C), *manualul de siguranță și conformitate Waterjet* (80943C) și din *manualul de avertizare privind radiofrecvența* (80945C).

Produsul poate fi însoțit de copii ale manualelor în format tipărit și electronic. Exemplarele electronice sunt disponibile și pe site-ul nostru web. Numeroase manuale sunt disponibile în mai mult limbi la adresa: [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## RU (РУССКИЙ/RUSSIAN)

БЕРЕГИТЬСЯ! Перед работой с любым оборудованием Hypertherm ознакомьтесь с инструкциями по безопасности, представленными в руководстве, которое поставляется вместе с продуктом, в *Руководстве по безопасности и соответствию* (80669C), в *Руководстве по безопасности и соответствию для водоструйной резки* (80943C) и *Руководстве по предупреждению о радиочастотном излучении* (80945C).

Копии руководств, которые поставляются вместе с продуктом, могут быть представлены в электронном и бумажном виде. Электронные копии также доступны на нашем веб-сайте. Целый ряд руководств доступны на нескольких языках по ссылке [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## SK (SLOVENČINA/SLOVAK)

VÝSTRAHA! Pred použitím akéhokoľvek zariadenia od spoločnosti Hypertherm si prečítajte bezpečnostné pokyny v návode na obsluhu vášho zariadenia a v *Manuáli o bezpečnosti a súlade s normami* (80669C), *Manuáli o bezpečnosti a súlade s normami pre systém rezania vodou* (80943C) a v *Manuáli s informáciami o rádiových frekvenciách* (80945C).

Návod na obsluhu sa dodáva spolu s produktom v elektronickej a tlačenej podobe. Jeho elektronickej formát je dostupný aj na našej webovej stránke. Mnohé z návodov na obsluhu sú dostupné vo viacjazyčnej mutácii na stránke [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## SL (SLOVENŠČINA/SLOVENIAN)

OPOZORILO! Pred uporabo katerekoli Hyperthermove opreme preberite varnostna navodila v priročniku vašega izdelka, v *Priročniku za varnost in skladnost* (80669C), v *Priročniku za varnost in skladnost sistemov rezanja z vodnim curkom* (80943C) in v *Priročniku Opozorilo o radijskih frekvencah* (80945C).

Izvodi priročnikov so lahko izdelku priloženi v elektronski in tiskani obliki. Elektronski izvodi so na voljo tudi na našem spletnem mestu. Številni priročniki so na voljo v različnih jezikih na naslovu [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## SR (SRPSKI/SERBIAN)

UPOZORENJE! Pre rukovanja bilo kojom Hyperthermovom opremom pročitajte uputstva o bezbednosti u svom priručniku za proizvod, *Priručniku o bezbednosti i usaglašenosti* (80669C), *Priručniku o bezbednosti i usaglašenosti Waterjet tehnologije* (80943C) i *Priručniku sa upozorenjem o radio-frekvenciji* (80945C).

Уз производ се испоручују копије приручника у електронском или штампаном формату. Електронске копије су такође доступне на нашем веб-сајту. Многи приручници су доступни на више језика на адреси [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## SV (SVENSKA/SWEDISH)

VARNING! Läs häftet säkerhetsinformationen i din produkts *säkerhets- och efterlevnadsmanual* (80669C), *säkerhets- och efterlevnadsmanualen för Waterjet* (80943C) och *varningsmanualen för radiofrekvenser* (80945C) för viktig säkerhetsinformation innan du använder eller underhåller Hypertherm-utrustning.

Kopior av manualerna kan medfölja produkten i elektroniskt och tryckt format. Elektroniska kopior finns också på vår webbplats. Många manualer finns på flera språk på [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## TH (ภาษาไทย/THAI)

คำเตือน! ก่อนการใช้งานอุปกรณ์ของ Hypertherm ทั้งหมด โปรดอ่านคำแนะนำด้านความปลอดภัยในคู่มือการใช้สินค้า คู่มือด้านความปลอดภัยและการปฏิบัติตาม (80669C), คู่มือด้านความปลอดภัยและการปฏิบัติตามสำหรับการใช้หัวตัดระบบวอเตอร์เจ็ต (80943C) และ คู่มือคำเตือนเกี่ยวกับความถี่วิทยุ (80945C) การไม่ปฏิบัติตามคำแนะนำด้านความปลอดภัยอาจส่งผลให้เกิดการบาดเจ็บหรือเกิดความเสียหายต่ออุปกรณ์

สำเนาคู่มือทั้งในรูปแบบอิเล็กทรอนิกส์และแบบสิ่งพิมพ์จะถูกแนบมาพร้อมกับผลิตภัณฑ์ สำหรับสำเนาคู่มือในรูปแบบอิเล็กทรอนิกส์ของผลิตภัณฑ์และสำเนาคู่มือต่างๆ ในหลากหลายภาษายังมีให้บริการบนเว็บไซต์ [www.hypertherm.com/docs](http://www.hypertherm.com/docs) ของเรอีกด้วย

## TR (TÜRKÇE/TURKISH)

UYARI! Bir Hypertherm ekipmanını çalıştırmadan önce, ürününüzün kullanım kılavuzunda, *Güvenlik ve Uyumluluk Kılavuzu'nda* (80669C), *Su Jeti Güvenlik ve Uyumluluk Kılavuzu'nda* (80943C) ve *Radyo Frekansı Uyarısı Kılavuzu'nda* (80945C) yer alan güvenlik talimatlarını okuyun.

Kılavuzların kopyaları, elektronik ve basılı formatta ürünle birlikte verilebilir. Elektronik kopyalar web sitemizde de yer alır. Kılavuzların birçokğu [www.hypertherm.com/docs](http://www.hypertherm.com/docs) adresinde birçok dilde mevcuttur.

## VI (TIẾNG VIỆT/VIETNAMESE)

CẢNH BÁO! Trước khi vận hành bất kỳ thiết bị Hypertherm nào, hãy đọc các hướng dẫn an toàn trong hướng dẫn sử dụng sản phẩm của bạn, *Sổ tay An toàn và Tuân thủ* (80669C), *Sổ tay An toàn và Tuân thủ Tia nước* (80943C), và *Hướng dẫn Cảnh báo Tần số Vô tuyến* (80945C). Không tuân thủ các hướng dẫn an toàn có thể dẫn đến thương tích cá nhân hoặc hư hỏng thiết bị.

Bản sao của sổ tay có thể đi kèm với sản phẩm ở định dạng điện tử và in. Bản điện tử cũng có trên trang web của chúng tôi. Nhiều sổ tay có sẵn bằng nhiều ngôn ngữ tại [www.hypertherm.com/docs](http://www.hypertherm.com/docs).

## ZH-CN (简体中文/CHINESE SIMPLIFIED)

警告! 在操作任何海宝设备之前, 请阅读产品手册、《安全和法规遵守手册》(80669C)、《水射流安全和法规遵守手册》(80943C) 以及《射频警告手册》(80945C) 中的安全操作说明。

随产品提供的手册可提供电子版和印刷版两种格式。电子版本同时也在我们的网站上提供。很多手册有多种语言版本, 详见 [www.hypertherm.com/docs](http://www.hypertherm.com/docs)。

## ZH-TW (繁體中文/CHINESE TRADITIONAL)

警告! 在操作任何 Hypertherm 設備前, 請先閱讀您產品手冊內的安全指示, 包括《安全和法規遵從手冊》(80669C)、《水刀安全和法規遵從手冊》(80943C), 以及《無線電頻率警示訊號手冊》(80945C)。

電子版和印刷版手冊複本可能隨產品附上。您也可以前往我們的網站下載電子版手冊。我們的網站上還以多種語言形式提供多種手冊, 請造訪 [www.hypertherm.com/docs](http://www.hypertherm.com/docs)。

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## Before you begin

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This addendum to the *EDGE® Connect Installation and Setup Manual (809340)* explains how to set up an EDGE Connect CNC with an XPR® plasma power supply, and how to cut and mark parts with an XPR. It also includes information about XPR troubleshooting and diagnostics.

This addendum is for a cutting system with the following equipment:

- EDGE Connect CNC with Phoenix® 10.24.0 or later
- ProNest® CNC Nesting Software 15.1.1.8530 or later
- ProNest CNC Archives 1.15.0.1 or later
- Sensor™ THC torch height control
- Four or fewer XPR plasma power supplies



To find out which firmware versions are currently installed on an XPR, see *Firmware versions* on page 29.



Phoenix currently does not support the combination of an HPRXD® EtherCAT® plasma power supply and an XPR EtherCAT plasma power supply installed on the same cutting system.

For additional XPR technical support, see the manual supplied with your XPR plasma power supply:

- *XPR170™ Plasma Instruction Manual (810060)*
- *XPR300™ Plasma Instruction Manual (809480)*
- *XPR460™ Plasma Instruction Manual (811530)*

## Connect an XPR to an EDGE Connect CNC

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The components of an EtherCAT network (or *field bus*), such as drive amplifiers, I/O modules, and plasma power supplies, are connected to the EDGE Connect CNC via a chain of EtherCAT cables. The first cable starts at the CNC and connects to the first component. Another cable connects the first component to the second component, and so on from one component to the next. Typically the first components are the drives, then any I/O modules. **The XPR plasma power supply must be the last component in the network.**



The XPR must be installed before any Powermax EtherCAT Interfaces on the network. Refer to *Cut with a Powermax on an EDGE Connect CNC* (810290).

For more information on connecting an XPR to an EDGE Connect CNC, see the instruction manual supplied with your XPR plasma power supply.

For a system diagram showing all the components connected, see the *EDGE Connect TC system diagram* in *Section 1* of the *EDGE® Connect Installation and Setup Manual* (809340).



Remote on/off must be wired discretely by the cutting system manufacturer. For more information, see the instruction manual supplied with your XPR plasma power supply.

Before continuing to the next step, make sure that the cutting system is ready for motion:

- All of the components are installed, configured, connected to the CNC with an EtherCAT cable, and energized.
- The motors are connected to the drives.

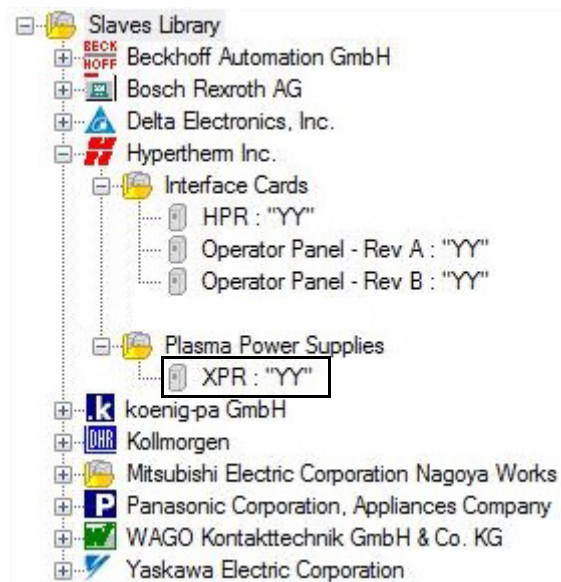


## Configure an EtherCAT network with an XPR

In an EtherCAT network, each component is considered a connected device (called a “subordinate device” by the EtherCAT Technology Group), and must be included in the EtherCAT network configuration (Phoenix.xml) file on the CNC (master). Once all of the components of the cutting system are connected to an EDGE Connect CNC via EtherCAT cables, the EtherCAT network can be scanned and configured using Hypertherm EtherCAT Studio.

In Hypertherm EtherCAT Studio, when you scan the connected devices on the network, an XPR appears in the list of connected devices as **XPR**. See *Figure 1*.

**Figure 1** – List of connected devices



For instructions on configuring the EtherCAT network, see the *Configure the EtherCAT Network* topic in *Section 4* of the *EDGE® Connect Installation and Setup Manual* (809340).



Before you begin to configure the EtherCAT network, connect a keyboard and mouse to the CNC.

# Set up a CNC with an XPR

## Make sure that the Sensor THC is set up

These instructions assume that you have set up the Sensor THC on the Machine Setups screen (**Setups > Password > Machine Setups**). For instructions, refer to *Section 8, Torch Height Control (THC)*, in the *EDGE® Connect Installation and Setup Manual (809340)*.



During plate sensing for underwater processes, Phoenix automatically uses only stall force (torque-controlled height sensing) instead of ohmic contact (nozzle-contact height sensing) with stall force backup. Make sure to set Stall Force Tolerance correctly, and to use drive amplifiers that support torque-controlled height sensing. The torch could collide with the plate if the drive amplifier does not support torque-controlled height sensing.

## Define the tools installed and the process used (Special Setups screen)

1. Choose **Setups > Password > Special Setups**.
2. Make the appropriate plasma selections. Refer to *Table 1* for more information.



Do **not** make selections for **Marker 1** and **Marker 2**. It is not necessary with an XPR. The XPR cutting processes automatically include marking process information, and no separate marking processes (or screens) are needed.

**Table 1**– Plasma process selections on the Special Setups screen

When you have...	and...	Select...
A single torch/XPR	One cutting/marketing process	<b>Plasma 1</b>
Two torches/XPRs	One cutting/marketing process	<b>Plasma 1</b>
Two torches/XPRs	Two cutting/marketing processes	<b>Plasma 1 and Plasma 2</b>

1. Choose **Setups > Password > Station Configuration**.
2. Make the appropriate selections. Refer to *Table 2* for more information.



**Marker 1** and **Marker 2** are automatically set to None and are read-only. The XPR cutting processes automatically include marking process information, and no separate marking processes (or screens) are needed.



As a reminder, when you select an XPR plasma power supply on the Station Configuration screen, Phoenix automatically enables the XPR cut charts.

**Table 2** – Example of selections on the Station Configuration screen

When you have...	and...	Select...			
A single torch/XPR	One cutting/marking process	Station 1: ▪ <b>Lifter:</b> Sensor THC ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	Station 2: ▪ <b>Lifter:</b> None ▪ <b>Plasma 1:</b> None ▪ <b>Plasma 2:</b> None		
Two torches/XPRs	One cutting/marking process	Station 1: ▪ <b>Lifter:</b> Sensor THC 1 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	Station 2: ▪ <b>Lifter:</b> Sensor THC 2 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None		
Two torches/XPRs	Two cutting/marking processes	Station 1: ▪ <b>Lifter:</b> Sensor THC 1 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	Station 2: ▪ <b>Lifter:</b> Sensor THC 2 ▪ <b>Plasma 1:</b> None ▪ <b>Plasma 2:</b> XPR		
Three torches/XPRs	One cutting/marking process	Station 1: ▪ <b>Lifter:</b> Sensor THC 1 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	Station 2: ▪ <b>Lifter:</b> Sensor THC 2 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	Station 3: ▪ <b>Lifter:</b> Sensor THC 3 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	
Three torches/XPRs	Two cutting/marking processes	Station 1: ▪ <b>Lifter:</b> Sensor THC 1 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	Station 2: ▪ <b>Lifter:</b> Sensor THC 2 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	Station 3: ▪ <b>Lifter:</b> Sensor THC 3 ▪ <b>Plasma 1:</b> None ▪ <b>Plasma 2:</b> XPR	
Four torches/XPRs	Two cutting/marking processes	Station 1: ▪ <b>Lifter:</b> Sensor THC 1 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	Station 2: ▪ <b>Lifter:</b> Sensor THC 2 ▪ <b>Plasma 1:</b> XPR ▪ <b>Plasma 2:</b> None	Station 3: ▪ <b>Lifter:</b> Sensor THC 3 ▪ <b>Plasma 1:</b> None ▪ <b>Plasma 2:</b> XPR	Station 4: ▪ <b>Lifter:</b> Sensor THC 4 ▪ <b>Plasma 1:</b> None ▪ <b>Plasma 2:</b> XPR

## Automatically assigned XPR fixed function digital I/O

When you select an XPR plasma power supply on the Station Configuration screen, Phoenix automatically assigns the following fixed function digital I/O for that plasma power supply. If you have two XPRs, then the fixed function digital I/O is numbered accordingly (for example, XPR Cut Sense 1, XPR Cut Sense 2, and so on).



There is also a fixed function **analog** input: XPR Arc Voltage. This input is automatically assigned when you set up a Sensor THC on the Machine Setups screen (**Setups > Password > Machine Setups**).

### Inputs:

- XPR Cut Sense
- XPR Nozzle Contact Sense
- XPR Process Ready
- XPR Ready to Start
- XPR Remote Status

### Outputs:

- XPR Cut Control
- XPR Hold Ignition
- XPR Nozzle Contact Enable
- XPR Pierce Control

Fixed function I/O is continually updated over the EtherCAT network.

See *Table 3* and *Table 4* for descriptions of each I/O point.

**Table 3** – Fixed function digital inputs

Inputs	
XPR Cut Sense	This input tells the CNC that the torch has transferred the arc to the workpiece.
XPR Nozzle Contact Sense	This input is used during initial height sense (IHS) to detect the surface of the workpiece. <b>Note:</b> During plate sensing for underwater and water injection cutting, Phoenix automatically uses only stall force (torque-controlled height sensing) instead of ohmic contact (nozzle-contact height sensing) with stall force backup. See <i>Make sure that the Sensor THC is set up</i> on page 10 for more information.
XPR Process Ready	This input tells the CNC that the XPR has completed switching to the cutting/marking process sent by the CNC.
XPR Ready to Start	This input tells the CNC that the XPR is ready to receive the Plasma Start input of the XPR.
XPR Remote Status	The XPR's Remote On-Off input activates the XPR's Remote Status output. The CNC receives this output as the XPR Remote Status input over the EtherCAT network. <b>Note:</b> The XPR's Remote On-Off input is wired discretely by the cutting system manufacturer. For more information, see the instruction manual supplied with your XPR plasma power supply.

**Table 4** – Fixed function digital outputs

Outputs	
XPR Cut Control	This output activates the Plasma Start input of the XPR. Cut Control turns on and remains on until the M08 (Cut Off) command is executed in the part program.
XPR Hold Ignition	This output activates the Hold Ignition input of the XPR. In a single-XPR cutting system, the Hold Ignition output turns on if the Preflow During IHS option is on (in Setups > Process > Plasma 1). In a multiple-XPR cutting system, if the Preflow During IHS option is on (in Setups > Process > Plasma 1/2), the Hold Ignition output turns on when the torch begins to lower to the workpiece. If the Preflow During IHS option is off, the Hold Ignition output turns on when the THC reaches the Start IHS Height.
XPR Nozzle Contact Enable	This output activates when the Sensor THC reaches the Start IHS Height. It remains active during Sensor THC IHS.
XPR Pierce Control	This output activates with the Cut Control output or after the Hold Ignition output turns off. It turns on prior to torch ignition and remains on until the pierce is complete.

## Set up Watch Windows and the Oscilloscope for XPR information

In Phoenix, XPR information is supported with the I/O, Process Data, and System Errors Watch Windows, the Oscilloscope, and the Plasma Process screen.



Phoenix currently does not support an XPR information Watch Window (similar to the HPR Supply Num 1 Watch Window). Refer to *Monitor the XPR from the CNC* on page 28.

## Fixed function digital I/O for an XPR

Fixed function digital I/O is available on the Input/Output Watch Windows and in the Oscilloscope.

To view/record the fixed function digital I/O for an XPR, do the following:

- Set up an Input/Output Watch Window (**Setups > Watch**)
- Create an Oscilloscope log that includes the I/O (**Setups > Diagnostics > Oscilloscope**)



For a list of the fixed function digital I/O available, see page 12.



There is also a fixed function **analog** input: XPR Arc Voltage. This input is automatically assigned when you set up a Sensor THC on the Machine Setups screen (**Setups > Password > Machine Setups**).



The fixed function digital I/O start at 513. The XPR Arc Voltage analog input is at 33.

## Process data for an XPR

To get access to process data for an XPR, do the following:

- Go to the Plasma Process screen (**Setups > Process > Plasma 1 or Plasma 2**)
- Set up a Process Data Watch Window (**Setups > Watch**)

In addition to the process data previously available in Phoenix for plasma power supplies, new information is available for the XPR:

- **Record ID:** This is the unique identification number for the record in the XPR cut chart database that contains all of the parameters needed by Phoenix and the XPR to execute a part program. The record includes the corresponding process IDs for cutting, marking, and True Hole® (when applicable), which Phoenix sends to the XPR when executing the part program.
- **Process ID:** This is the identification number for the XPR process for which cut chart parameters are currently in use. This can be a cutting, marking, or True Hole process ID.



Record and process IDs are also shown on the Cut Chart screen (**Setups > Process > Plasma 1/2 > Cut Chart**). See *Figure 2* on page 18.

## XPR system errors and failures

To view system errors and failures for an XPR, set up a System Errors Watch Window (**Setups > Watch**).



The System Errors Watch Window shows XPR errors and failures. To see full diagnostic information, including warnings and status, use the XPR Web Interface.

For more information, see *Troubleshooting and diagnostics* on page 24.

## Cut and mark a part with an XPR

---

There are two primary ways to cut and mark with an XPR:

- With a ProNest part program
- Without a ProNest part program (basic cutting and marking)

Each is explained in this section.

## With a ProNest part program

When you have a part program that was created with ProNest for an XPR, the part program automatically uses the embedded process expertise provided by the Hypertherm cut charts. The cut charts contain all of the process parameters needed by the XPR and by Phoenix on the CNC to get the best results when cutting and marking, including True Hole quality for any True Hole-compatible circles within a part.



Make sure that the following Program Code settings are enabled on the Cutting screen in Phoenix (**Setups > Cutting**): EIA G59 Code Override, Process Select Override, EIA Kerf Override, and EIA F-Code Override.

To cut or mark with a ProNest part program, use the CutPro® Wizard or perform the following steps.

1. Load the part program (**Files > Load from Disk**).
2. Align the part to the plate (**Current Part Options > Align**).
3. On the Soft Op Con, choose **Program (Automatic) mode** for the station you want to use.
4. Press **Start**.

When the CNC reads the M07 (Cut On) command in the part program, the following parameters for the specified process are loaded from the cut chart.

- |               |                          |                   |
|---------------|--------------------------|-------------------|
| ■ Arc Voltage | ■ Cut Speed              | ■ Pierce Height   |
| ■ Cut Current | ■ Gas type and flow rate | ■ Pierce Time     |
| ■ Cut Height  | ■ Kerf                   | ■ Transfer Height |

These process parameters are loaded *every* time the CNC reads an M07 (Cut On) command in the part program. The Cut Chart screen shows the currently loaded process parameters.

You cannot override these process parameters at the CNC. To override process parameters, the modifications must be made in ProNest. For more information, see *Appendix A: About ProNest part programs for XPR* on page 36.

There are *other* parameters that an operator *can* override at the CNC. Parameters that an operator can and cannot override at the CNC are listed in *Table 5* on page 16.



An operator can always use the speed pots to modify program speed.

**Table 5** – Cutting parameters an operator *can* and *cannot* override at the CNC

Screen	<i>Can</i> override	<i>Cannot</i> override
<p><b>Process</b> (Setups &gt; Process &gt; Plasma 1 or Plasma 2)</p>	<ul style="list-style-type: none"> <li>▪ Arc Off Time</li> <li>▪ AVC Delay</li> <li>▪ IHS Start Height</li> <li>▪ Kerf Reacquire Time</li> <li>▪ Puddle Jump Height</li> <li>▪ Retract Height</li> <li>▪ Skip IHS Within</li> <li>▪ Stop Time</li> </ul>	<ul style="list-style-type: none"> <li>▪ Creep Time</li> <li>▪ Cut Height</li> <li>▪ Cut Height Delay</li> <li>▪ Cut Off Time</li> <li>▪ Cut Speed</li> <li>▪ Pierce Height</li> <li>▪ Pierce Time</li> <li>▪ Set Arc Current</li> <li>▪ Set Arc Voltage</li> <li>▪ Transfer Height</li> </ul>
<p><b>Process Data Watch Window</b> (Setups &gt; Watch)</p>	<ul style="list-style-type: none"> <li>▪ Arc Off Time</li> <li>▪ AVC Delay</li> <li>▪ IHS Start Height</li> <li>▪ Puddle Jump Height</li> <li>▪ Retract Delay</li> <li>▪ Skip IHS Within</li> <li>▪ Stop Time</li> </ul> <p><b>Note:</b> If the <b>Check to Automatically Set Parameter</b> option is selected for a parameter on the Process screen, then you cannot override that parameter in a Watch Window.</p>	<ul style="list-style-type: none"> <li>▪ Creep Time</li> <li>▪ Cut Height</li> <li>▪ Cut Height Delay</li> <li>▪ Cut Off Time</li> <li>▪ Kerf</li> <li>▪ Pierce Height</li> <li>▪ Pierce Time</li> <li>▪ Plasma Speed</li> <li>▪ Set Arc Voltage</li> <li>▪ Transfer Height</li> </ul>
<p><b>Cutting</b> (Setups &gt; Cutting)</p>	<p>N/A</p>	<ul style="list-style-type: none"> <li>▪ Cut Speed</li> <li>▪ Kerf</li> </ul>



## Without a ProNest part program (basic cutting and marking)

Cutting and marking without using a ProNest or other CAM posted part program is known as *basic cutting and marking*. Examples of basic cutting and marking include the following:

- The part program does **not** have any advanced codes. Advanced codes include but are not limited to G59 process variables, M37 station selects, M36 process selects, G43 kerf codes, marker offsets, and others.
- You select a simple shape from the Shape Library but then you cancel processing it through ProNest CNC.



For parts with True Hole-compatible circles, True Hole is only applied if you process the part through ProNest CNC. Otherwise, True Hole processes are **not** applied to basic cutting.

- You use a part program that was created with ProNest or other CAM software but you disable the EIA G59 Code Override, Process Select Override, EIA Kerf Override, and EIA F-Code Override Program Code settings on the Cutting screen in Phoenix (**Setups > Cutting**).

With basic cutting and marking, after you load the part, you select the process on the Cut Chart screen (**Main > Cut Chart**). See *Figure 2* on page 18.

Process selection with an XPR involves specifying the following:

1. Material type
2. Material thickness
3. Cutting surface
4. Process name
5. Marking gas, if applicable

As you make your process selection, the Cut Chart screen shows the identification number for the record in the XPR cut chart database that matches those selections. The Cut Chart screen also shows the identification numbers for the cutting and marking processes included in that record. In addition, the Cut Chart screen shows the cut chart parameters for the selected process. To override cut chart parameters, see page 18.

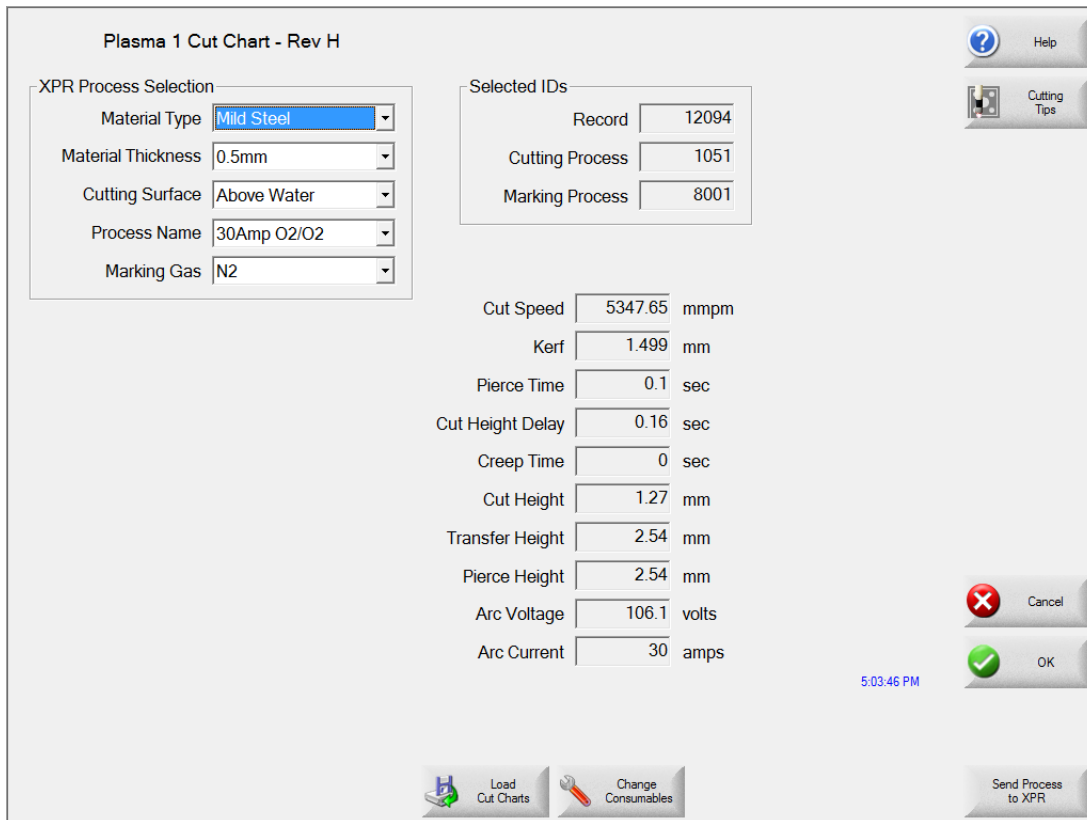


If you are using a ProNest part program that includes marking, but you disabled the use of G59 codes, Phoenix automatically interprets the M07 Ar or M07 N2 in the ProNest part program as an M09 (Marker 1 On), and uses the marking gas you selected on the Cut Chart screen. For more information about codes used in ProNest part programs, see *Appendix A: About ProNest part programs for XPR* on page 36.



If an XPR Not Ready dialog message displays, see *XPR readiness* on page 24.

**Figure 2 – Cut Chart screen**



## Operator overrides of cut chart parameters

If necessary, an operator can override the standard cut chart parameters. Override values can be entered on the following screens, and will be used during the cut.



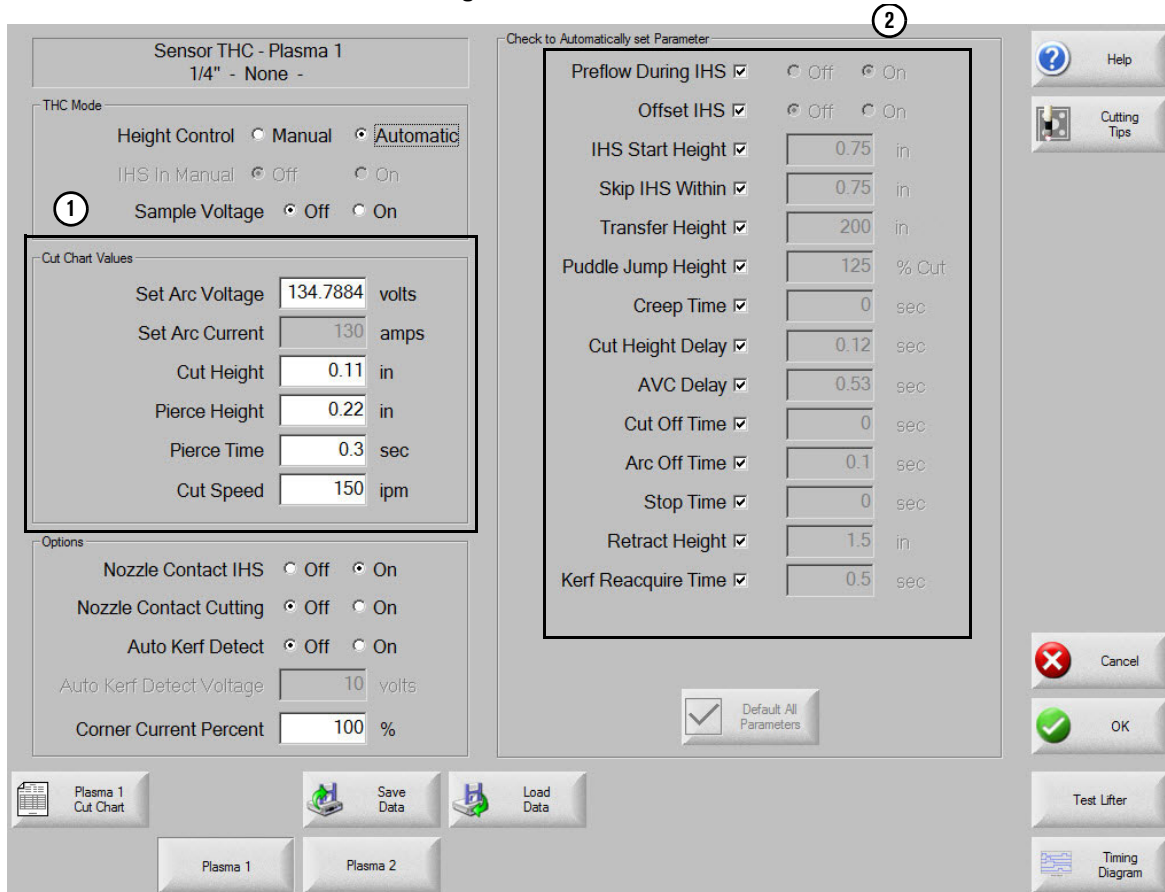
You cannot override the Set Arc Current value from the cut chart.

- Process screen (**Setups > Process > Plasma 1 or Plasma 2**)
- Cutting screen (**Setups > Cutting**)
- Process Data Watch Window

## Operator overrides on the Process screen

The cut chart determines most of the default values on the Process screen (see *Figure 3* on page 19). Some values come directly from the cut chart ①, and others are calculated from a combination of cut chart values and other Phoenix settings ②.

**Figure 3** – Process screen



- **To override a value that comes directly from the cut chart ①, the operator deletes the default value and enters a new value.**

When an operator overrides a value that comes directly from the cut chart ①, the value is kept until the cut charts are reloaded. Cut charts are reloaded when an operator goes to the Cut Chart screen and chooses to save when exiting the screen (if prompted; if not prompted, Phoenix automatically saves). Cut charts are also reloaded when the CNC is restarted.

When overriding Cut Height on the Process screen, Pierce Height and Transfer Height automatically adjust in proportion. If you want specific values for Pierce Height and Transfer Height, enter them as absolute values in inches or millimeters after adjusting the Cut Height.

- **To override a value that is calculated from a combination of cut chart values and other Phoenix settings** ②, an operator clears the check box, deletes the default value, and enters a new value.



Clearing the check box breaks the link to the cut chart and other Phoenix settings. Thus the override value is kept as is until an operator changes it again on the Process screen **or** re-selects the check box to put back the default value.

## Plasma cut sequence

---

The CNC identifies each state of the cut sequence with a status message in blue font below the part preview area on the Phoenix Main screen.



If a status message does not describe the current state in the plasma cut sequence, then the message indicates a condition at the XPR. See *Status message* on page 25.

The current state in the plasma cut sequence is reported by the CNC. The CNC begins to read and execute the part program at Cycle Start. See plasma cut sequence states in *Table 6*.

**Table 6** – Plasma cut sequence

<b>When...</b>	<b>The status message is:</b>	<b>And...</b>
The CNC reads the M07 code (Cut On) in the part program	<i>Updating Process</i>	<ul style="list-style-type: none"> <li>▪ The XPR Ready to Start and XPR Process Ready inputs turn off.</li> <li>▪ The CNC sends the process to the XPR.</li> </ul>
The THC begins to perform its initial height sense (IHS)	<i>Lowering Torch</i>	<ul style="list-style-type: none"> <li>▪ The Torch Height Disable output turns on and remains on until the cutting system reaches cutting speed.</li> <li>▪ If Preflow During IHS is on (in Setups &gt; Process &gt; Plasma 1/2): the XPR Cut Control, XPR Pierce Control, and XPR Hold Ignition outputs turn on after the torch begins to lower to the workpiece.</li> <li>▪ In a multiple-torch cutting system when Preflow During IHS is off (in Setups &gt; Process &gt; Plasma 1/2): the XPR Cut Control, XPR Pierce Control, and XPR Hold Ignition outputs turn on when the THC reaches the Start IHS Height.</li> <li>▪ The XPR Nozzle Contact Enable and THC Torque Limit outputs turn on when the THC reaches the Start IHS Height.</li> </ul>
IHS completes and the torch is at the Transfer Height	<i>Waiting for Arc On</i>	<ul style="list-style-type: none"> <li>▪ If Preflow During IHS is off (in Setups &gt; Process &gt; Plasma 1/2): the XPR Cut Control and XPR Pierce Control outputs turn on.</li> <li>▪ The XPR Process Ready and XPR Ready to Start inputs turn on (after XPR purge is complete).</li> <li>▪ The XPR Hold Ignition, XPR Nozzle Contact Enable, and THC Torque Limit outputs turn off.</li> </ul>
The XPR ignites an arc	<i>Piercing</i>	<ul style="list-style-type: none"> <li>▪ The XPR Cut Sense input turns on.</li> <li>▪ After the Pierce Time elapses, the XPR Pierce Control output turns off.</li> <li>▪ The Cut Height Delay and AVC Delay timers begin.</li> <li>▪ After the Cut Height Delay time elapses, the THC lowers to the Cut Height.</li> </ul>
Creep motion begins (if Creep Time is set)	<i>Creeping</i>	<ul style="list-style-type: none"> <li>▪ The Motion output turns on.</li> <li>▪ Creep motion continues until the Creep Time elapses.</li> </ul>

<b>When...</b>	<b>The status message is:</b>	<b>And...</b>
The cutting system accelerates to Cut Speed	<i>Cutting</i>	<ul style="list-style-type: none"> <li>▪ The Torch Height Disable output turns off after the cutting system accelerates to the Torch Height Disable Speed Percentage plus Plasma Distance From Corner <b>or</b> after the AVC delay time expires, whichever occurs last.</li> <li>▪ The Torch Height Disable output turns on and off while cutting whenever the actual cut speed drops to a percentage below the set Torch Height Disable Speed.</li> </ul>
The CNC reads the M08 code (Cut Off) in the part program	<i>Raising Torch</i>	<ul style="list-style-type: none"> <li>▪ The XPR Cut Control output turns off.</li> <li>▪ The Plasma Start input turns off.</li> <li>▪ The Motion output turns off.</li> <li>▪ The XPR Cut Sense input turns off.</li> <li>▪ The torch retracts to the Retract Height.</li> </ul>
Stop Time begins (if Stop Time is set)	<i>Stop Delay</i>	<ul style="list-style-type: none"> <li>▪ The CNC prevents the gantry from moving to the next pierce point until the Stop Time elapses.</li> </ul>
Stop Time elapses	<i>Traversing</i>	<ul style="list-style-type: none"> <li>▪ The gantry moves to the next pierce point and the sequence repeats.</li> </ul>

## Troubleshooting and diagnostics

Phoenix displays diagnostic codes from the XPR as status messages, error dialogs, System Error Watch Window information, and Diagnostics Log data. The XPR has four types of diagnostic codes and Phoenix will display the codes as defined in the table below.

**Table 7** – Types of XPR diagnostic codes

Type of code	Effect while cutting	What to do
Information	No immediate effect. In most cases, operator action is not necessary.	<p><b>To find the numeric code</b> for an Information or Alert status message, go to the Log screen in the XPR Web Interface.</p> <ul style="list-style-type: none"> <li>▪ <b>For troubleshooting steps</b>, see the instruction manual supplied with your XPR plasma power supply.</li> </ul>
Alert	Alerts do not pause the part program, but they can negatively affect productivity and cut quality. Operator action is necessary to resolve an alert code.	
Errors	<p>Errors can have an adverse effect on productivity or quality, or cause damage to cutting system components.</p> <p><b>Errors pause the part program and display a CNC error dialog.</b></p>	<p>To resolve an XPR error or failure:</p> <ul style="list-style-type: none"> <li>▪ Locate the error number on the error dialog that pops up. See <i>Error dialog box</i> on page 26.</li> <li>▪ Follow the corrective action steps in the instruction manual supplied with your XPR plasma power supply.</li> </ul>
Failures	<p>Failures protect the cutting system and system components from permanent damage.</p> <p><b>Failures pause the part program and display a CNC error dialog.</b> The arc will not start until the failure is resolved.</p>	

### XPR readiness

Before sending a process to the XPR, make sure that the following conditions are satisfied:

- Make sure the field bus is running.
- The tool's station is enabled and the cutting tool is ready to cut (in the Initial Checks or Wait for Start state).
- The XPR system is powered ON.
- Gas purges are complete.
- There are no major XPR errors present.



## View information about XPR errors at the CNC

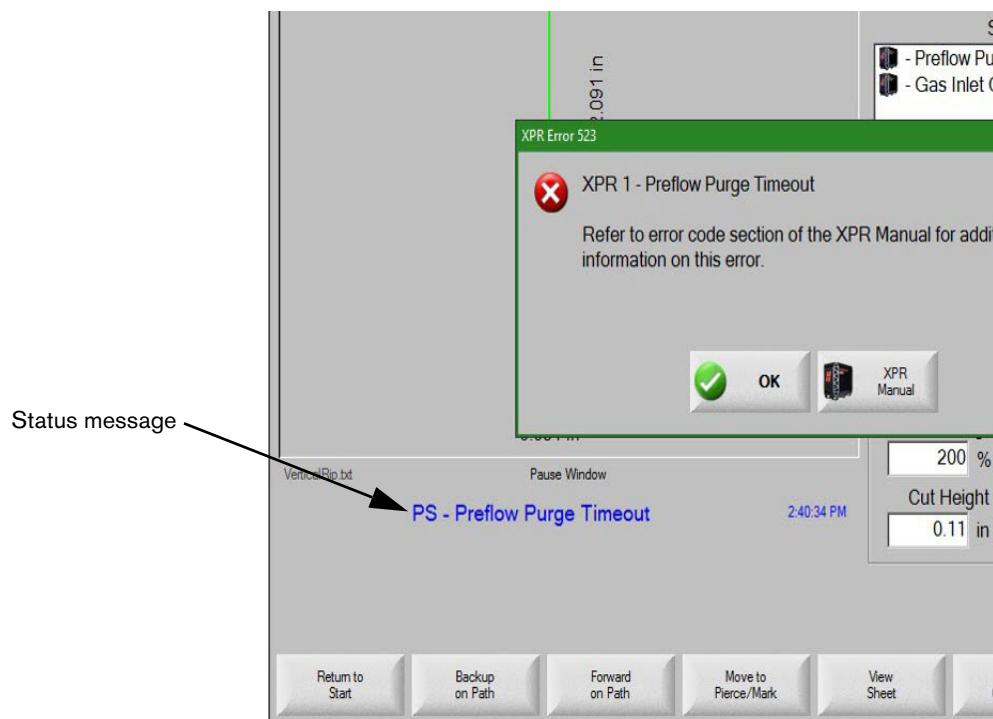
XPR error information displays in Phoenix in the following places:

- Status message
- Error dialog box
- System errors watch window (if set up)
- Log in the XPR Diagnostics View at the CNC

### Status message

The highest priority XPR error, if one exists, displays in blue font below the part preview on the Main screen in Phoenix.

**Figure 4** – Example of a status message displaying an XPR error



When an XPR error or fault occurs, **the part program pauses and a dialog box appears**. To resolve an error, see *Error dialog box* on page 26.

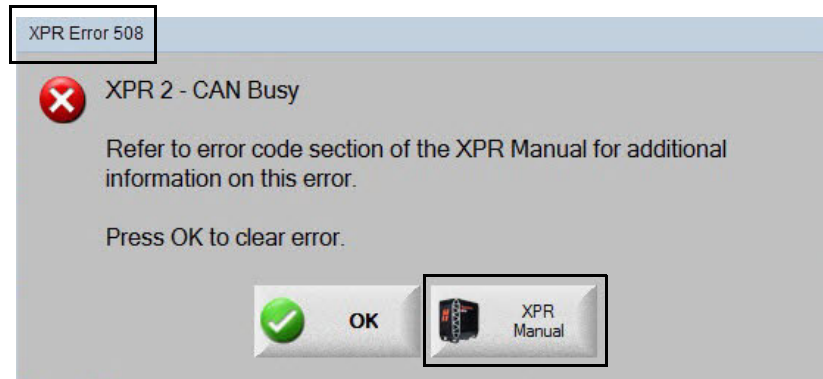
**If an error dialog box does not pop up and the part program does not pause**, then the status message indicates **one** of the following:

- XPR information or alert – See *Table 7* on page 24.
- Current state in the plasma cut sequence – See page 21.

## Error dialog box

XPR errors and failures display in a dialog box at the CNC. On the dialog box, select the **XPR Manual** soft key to view the troubleshooting information for the error. The error message includes the error code number (for example, **XPR Error 508**). See *Figure 5*.

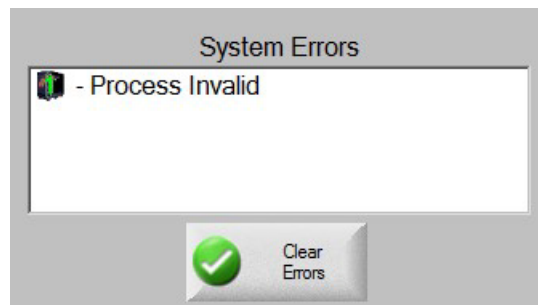
**Figure 5** – Dialog box with an XPR error message



## System errors watch window

You can also monitor alerts, failures, or error messages at the CNC through the System Errors Watch Window, as shown in *Figure 6*.

**Figure 6** – System Errors Watch Window



To set up a System Errors Watch Window, see page 13.

To see detailed XPR diagnostic information, refer to *XPR Diagnostics Log* on page 27.

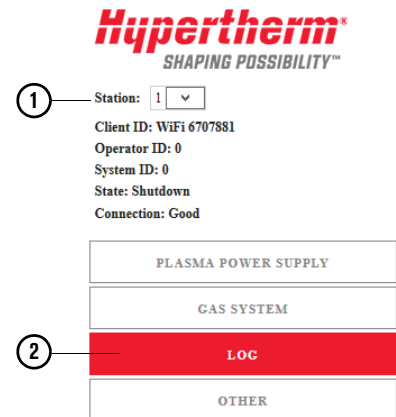
## XPR Diagnostics Log

You can view active and recent XPR diagnostic codes, error details, and On Time data from the Log in the XPR Diagnostics View at the CNC.

To go to the XPR Diagnostics Log:

1. From the Main screen in Phoenix, select **Setups > Diagnostics > XPR System**.
2. Select the **Station** number ① of the XPR that you want to monitor.
3. Select **Log** ②.


The Log (*Figure 7*) displays 4 classes of XPR diagnostics codes: failures, errors, alerts, and info messages. To learn the differences between each class, refer to *Table 7* on page 24.








**Figure 7** – Log screen in the XPR Diagnostics View

Log English ▼

Active

Class	ID	Description
Info	574	Start Removed preflow
 Alert	770	Gas Inlet - N <sub>2</sub> Line B

History

Class	ID	On Time	Description	Details
 Alert	770	0d 11h 29min 1s	Gas Inlet - N <sub>2</sub> Line B	p2:671psi ref:92
Info	574	0d 11h 25min 41s	Start Removed preflow	time:1234ms
 Alert	770	0d 11h 12min 21s	Gas Inlet - N <sub>2</sub> Line B	p2:65psi ref:92
Info	647	0d 8h 16min 24s	Process selected	id:11189
 Alert	770	0d 8h 13min 4s	Gas Inlet - N <sub>2</sub> Line B	p2:42psi ref:92
 Alert	620	0d 7h 59min 44s	Arc stretch detected	duty:67% lim:65%
 Alert	770	0d 5h 29min 44s	Gas Inlet - N <sub>2</sub> Line B	p2:68psi ref:92



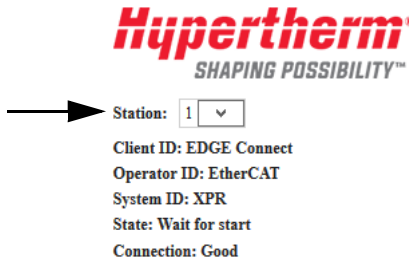
**For troubleshooting steps**, refer to the instruction manual supplied with your XPR plasma power supply.

## Monitor the XPR from the CNC

You can monitor up to four XPR plasma power supplies at the CNC by opening the XPR Diagnostics View in Phoenix. The information in the Diagnostics View is populated from the XPR over EtherCAT.

To go to the XPR Diagnostics View in Phoenix:

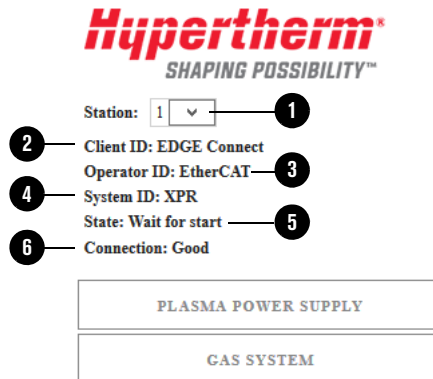
1. Select **Setups > Diagnostics > XPR System**.
2. Select the **Station** of the XPR that you want to monitor.



### State and connection

The main screen of the XPR Diagnostics view in Phoenix shows you the state and connection of the XPR station that you have selected to monitor. See *Figure 8*.

**Figure 8** – View the XPR plasma power supply's state and connection status

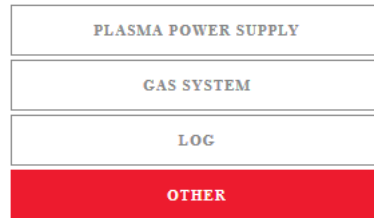


- 1 **Station ID** is the station number of the XPR to monitor.
- 2 **Client ID** is the device that is communicating with the XPR. Client ID displays as "EDGE Connect" for all CNCs.
- 3 **Operator ID** is the type of connection that sent a process. The Operator ID displays as "No User" if the network is disconnected.
- 4 **System ID** is the type of plasma power supply on the selected station. System ID displays as "None" if the selected station is not an XPR.
- 5 **State** is the current status of the XPR on the selected station. For more information, see the instruction manual supplied with your XPR plasma power supply.
- 6 **Connection** is the status of the communication between Phoenix and the web browser displaying the diagnostics data.

## Firmware versions

To find out which firmware versions are installed on an XPR station:

1. From the XPR Diagnostics view in Phoenix, select the **Station** number for the XPR.
2. Select the **Other** tab.



The following firmware update procedures are available at [www.hypertherm.com/docs](http://www.hypertherm.com/docs):

- To update XPR firmware automatically over EtherCAT (recommended), refer to Application Note 810720.



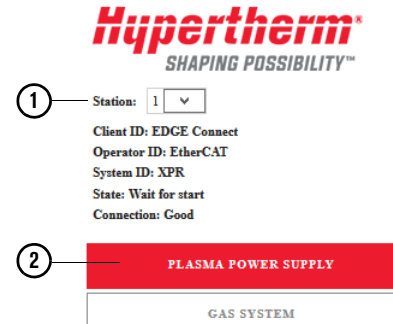
The XPR Web Interface firmware cannot be updated over EtherCAT.

- To update XPR firmware with a wireless or USB connection, refer to Hypertherm Field Service Bulletin 809820 (for XPR170/300) or 10084813 (for XPR460).

## Plasma power supply I/O, temperatures, and chopper status

The Plasma Power Supply screen shows you details about active I/O, temperature, and chopper status. To view the XPR plasma power supply I/O, temperatures, and chopper status:

1. From the Main screen in Phoenix, select **Setups > Diagnostics > XPR System**.
2. Select the **Station** number ① of the XPR that you want to monitor.
3. Select **Plasma Power Supply** ②.



The Plasma Power Supply screen appears (see *Figure 9* on page 30). This screen also shows inputs and outputs. When highlighted red or gray, that input or output is active.

**Figure 9** – Plasma power supply screen in the XPR Diagnostics View

Type	XPR300 OptiMix		
State	Steady state		
Log	No Error		
Process	1002		
Arc Time	0d 0h 12min 18s		
On Time	16d 6h 23min 11s		
(+) DC	0 A		
Coolant Flow	8.11 lpm (2.14 gpm)		
Coolant Level	Good		

Inputs		Outputs	
On Switch		Main Contactor	
Start		Coolant Pump	
Hold		Coolant Solenoid	
Pierce		Magnetics Fans	
		Heat Exchanger Fans	
		Ready for Start	
		Ohmic Contact	
		Motion	
		Hold	
		Error	

Fan Speed		Temperature	
Heat Exchanger 1	2917 rpm	Coolant	24.6 °C (76 °F)
Heat Exchanger 2	2880 rpm	Transformer	21.9 °C (71 °F)
Magnetics 1	2895 rpm	Inductor 1	22.6 °C (73 °F)
Magnetics 2	2925 rpm	Inductor 2	22.5 °C (73 °F)
Control Side 1	6255 rpm	Inductor 3	22.4 °C (72 °F)
Control Side 2	6412 rpm	Inductor 4	22.5 °C (73 °F)

Chopper					
	Setpoint	DC	Temperature	Arc Voltage	0 V
Chopper 1	0 A	0 A	25.3 °C (78 °F)	Bus Voltage	347.3 V
Chopper 2	0 A	0 A	25.4 °C (78 °F)		

(Not applicable for XPR170)



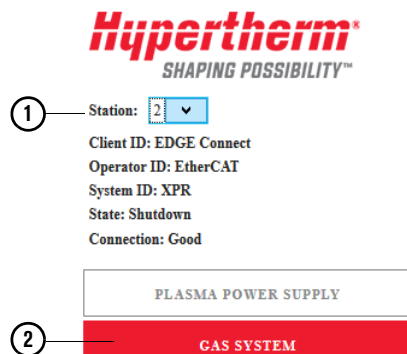
To view active or recent alerts and errors, go to the **Log** screen. See page 27.

## Monitor and test gas flows

You can monitor and test gas flows from the Gas System screen in the XPR Diagnostics View at the CNC over EtherCAT.

To view the Gas System screen:

1. From the Main screen in Phoenix, select **Setups > Diagnostics > XPR System**.
2. Select the **Station** number ① of the XPR that you want to monitor.
3. Select **Gas System** ②.



## Monitor gas flows

You can monitor gas flows in Text View (refer to *Figure 10*) or Diagram View (refer to *Figure 11* on page 32).

**Figure 10** – Gas System screen (Example of Text View)

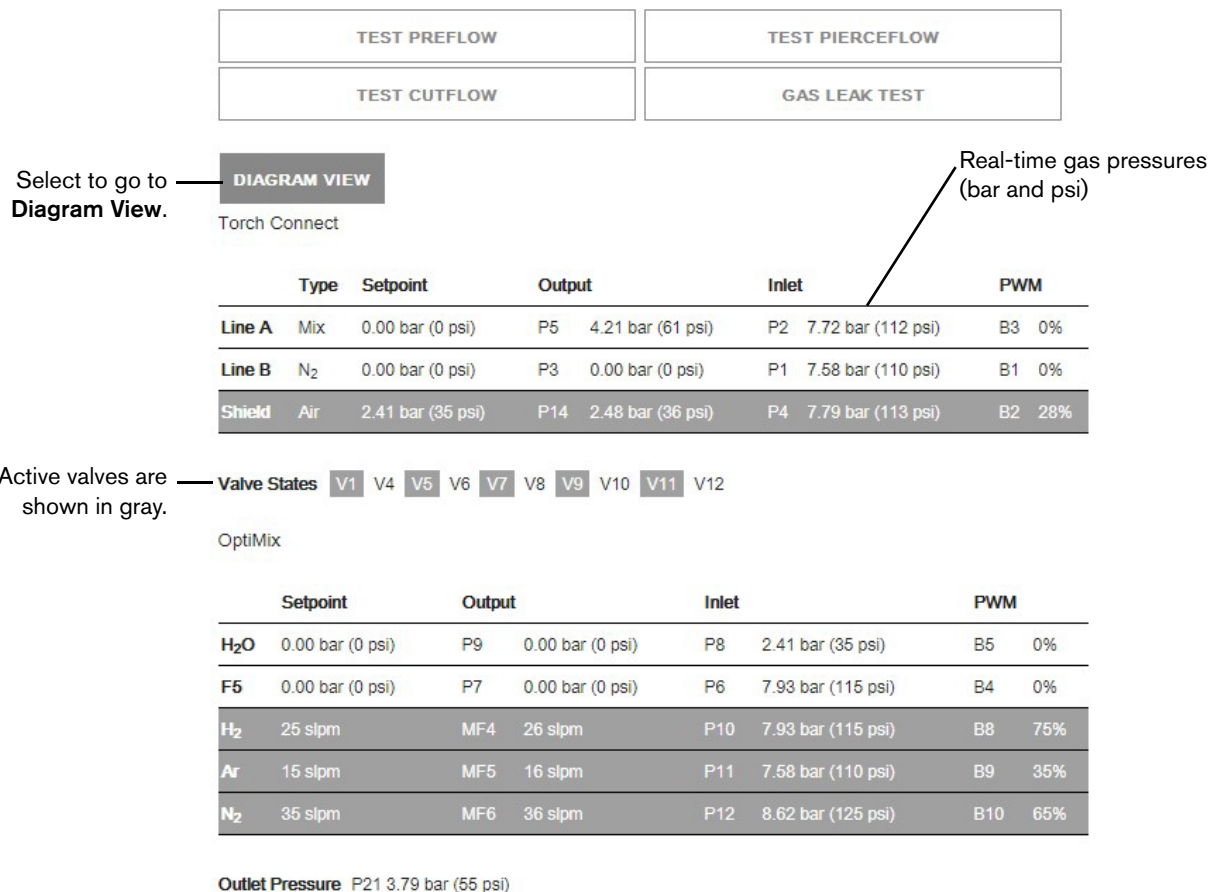
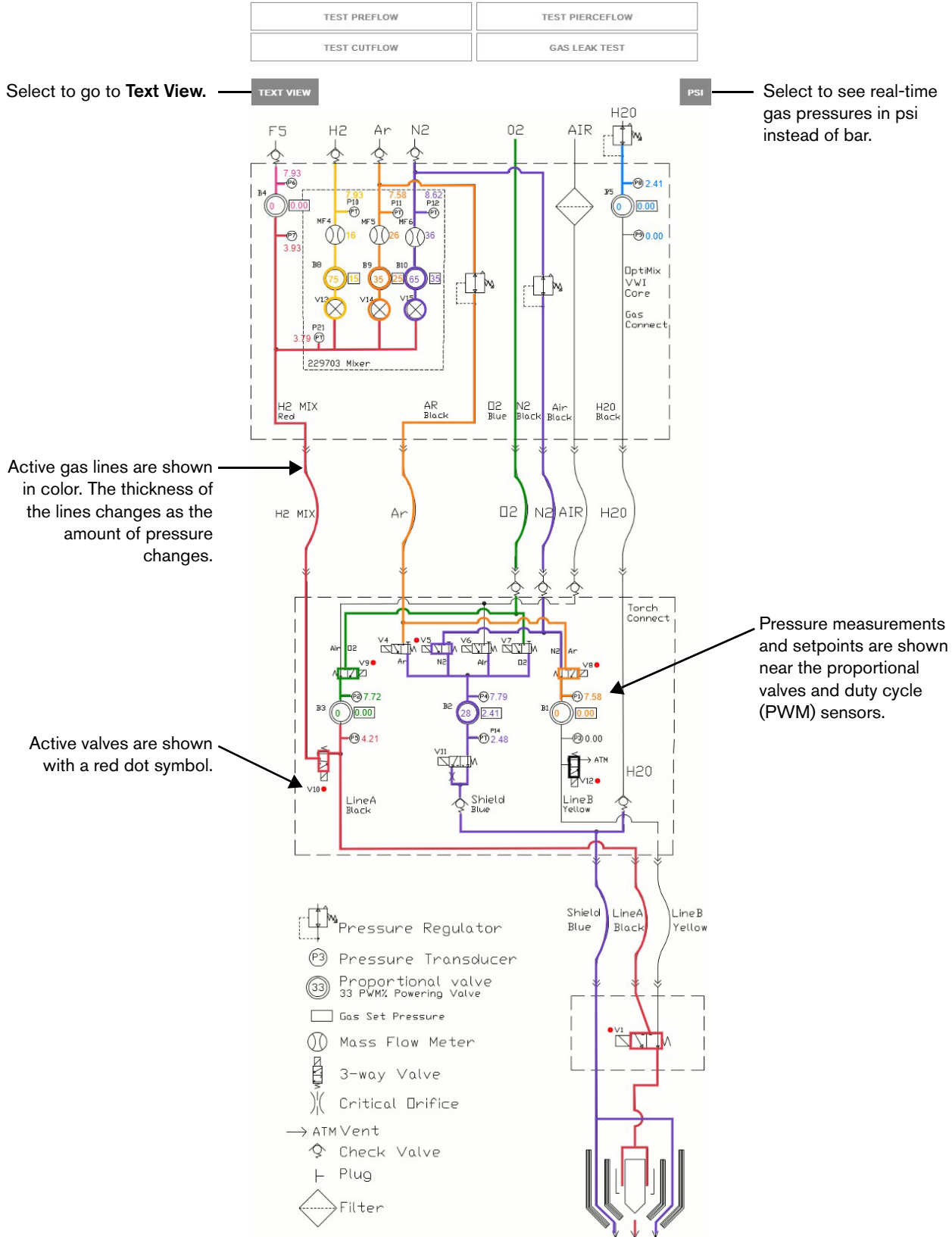


Figure 11 – Gas System screen (Example of Diagram View)





## Test gas flows and leaks

Do a gas test to make sure that you are ready to cut or to help diagnose problems with cut quality, system performance, and consumable life.



To do a gas flow or gas leak test from the CNC, the CNC must have control of the XPR. The device that sets a process **first** has control of the XPR.

To do a gas flow test at the CNC:

1. Go to the **Gas System** screen in the XPR Diagnostics View. For details, see page 31.
2. Choose the test that you want to do (Preflow, Pierceflow, Outflow, or Gas Leak).
3. On the “Are you sure?” dialog box, select **YES**. The test begins immediately and continues for 45 seconds.



To cancel a gas flow test, select the same gas flow test button again or choose a different gas test. Gas leak tests cannot be canceled.

To view gas information, alerts, and errors during or after the test, choose **Log**. See *XPR Diagnostics Log* on page 27.

## View XPR information with the XPR Web Interface

The XPR Web Interface, which is only available on wireless-enabled devices, provides most of the same data as you can find in the XPR Diagnostics View at the CNC. **Before using a wireless-enabled device to monitor XPR diagnostics, review the XPR Diagnostics View in Phoenix to see if the data you need is already available at the CNC.** See *Monitor the XPR from the CNC* on page 28.

- If the XPR diagnostic data that you need is only available in the XPR Web Interface on a wireless-enabled device, see the instruction manual supplied with your XPR plasma power supply for documentation.
- If you connect the CNC to an XPR's wireless network (Access Point mode), the CNC can only communicate with the XPR's network and not with your site's network. To resolve this issue, use Network mode instead or connect an Ethernet cable from the CNC's LAN connection to a port that has access to your site's network. For more details about AP versus Network mode, see the instruction manual supplied with your XPR plasma power supply.



For Ethernet cable specifications, see *Specifications and Installation in Section 1 of the EDGE® Connect Installation and Setup Manual (809340)*.

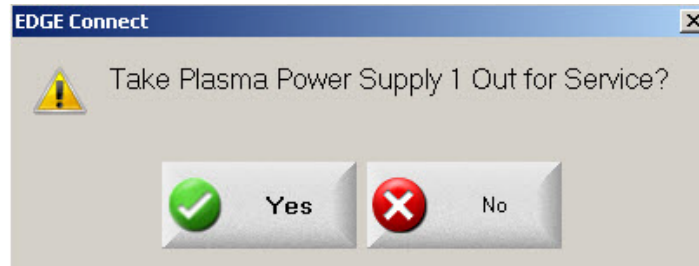
## Take an XPR on the EtherCAT network out for service

If you need to turn off one XPR temporarily (for example, for maintenance) but continue to use the cutting system, you must temporarily remove the XPR from the EtherCAT network configuration. Removing an XPR from the network configuration, known as taking an XPR out for service, lets you continue to use the cutting system without field bus faults.

**To take an XPR out for service:**

1. Turn OFF the CNC.
2. Turn OFF main power to the XPR that you want to take out for service.
3. Turn ON the CNC. After Phoenix opens, it begins to start the EtherCAT network. Then the message shown in *Figure 12* appears.

**Figure 12**



The message shows the XPR that you want to take out for service. In this example, it is the XPR on Station 1.

**4. Choose Yes.**

Phoenix removes the XPR from the network configuration and starts the EtherCAT network.

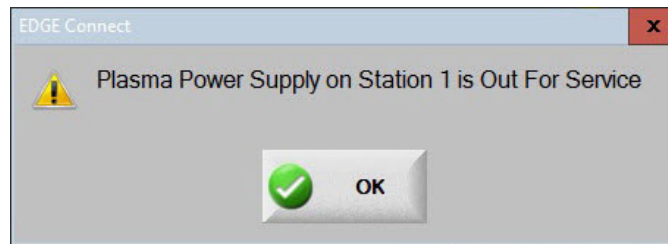


If you restart the CNC while the XPR is out for service, you will need to respond to the **Take Plasma Power Supply 1 Out for Service?** message again. Choose **Yes**.



If you try to cut with an XPR that is out for service, the following message shows.

**Figure 13**



**To put the XPR back in service:**

- 1.** Turn OFF the CNC.
- 2.** Turn ON main power to the XPR that you want to put back in service.
- 3.** Turn ON the CNC.

Phoenix adds the XPR to the network configuration and starts the EtherCAT network.

## Appendix A: About ProNest part programs for XPR

---



See the *EDGE Connect Programmer Reference* (809550) for more information about the codes used for part programming.

### ProNest part program format for an XPR

When you use ProNest to create a part program for an XPR, ProNest includes a `G59 V509 Fxxxxx` command at the beginning of the part program. This command tells the CNC and the XPR which record in the cut chart database to use for this part program. The record contains all of the process parameters needed by the CNC and the XPR to execute the part program, including all of the process parameters for cutting, marking, and/or True Hole (when applicable).



Make sure that the following Program Code settings are enabled on the Cutting screen in Phoenix (**Setups > Cutting**): EIA G59 Code Override, Process Select Override, EIA Kerf Override, and EIA F-Code Override.

For example: **G59 V509 F11189**

In this example, the V509 command tells the CNC and the XPR to use record 11189 (80 A O2/Air) in the cut chart database for this part program.

When the CNC reads the M07 (Cut On) command in the part program, the CNC sends record number 11189 to the XPR. The XPR then loads the associated cutting process parameters from record number 11189. At the same time, the CNC loads the cutting process parameters from record number 11189. The process parameters are as follows:

- |               |                          |                   |
|---------------|--------------------------|-------------------|
| ■ Arc Voltage | ■ Cut Speed              | ■ Pierce Height   |
| ■ Cut Current | ■ Gas type and flow rate | ■ Pierce Time     |
| ■ Cut Height  | ■ Kerf                   | ■ Transfer Height |



An operator **cannot** override these parameters at the CNC. To override process parameters, the modifications must be made in the cut chart in ProNest. See *Table 8* on page 38 for more information.

## Process overrides

To modify an XPR part program, modify the cut chart in ProNest (or other CAM software) and output the modified part program to use in Phoenix.

A single G59 V509 Fxxxx command in the part program automatically populates the XPR Process Selection fields.

An override code on the M07 line in the part program modifies these values.

## Override codes

If it is necessary to modify the cutting, marking, or True Hole process parameters in a record in the cut chart database, you make the modifications in ProNest. These modifications are known as *process overrides*. When you output the new part program from ProNest, ProNest indicates the process overrides with the codes in *Table 8* on page 38.

**Table 8** – Process parameter override codes

<b>Override code</b>	<b>Description</b>
AVO	Arc Voltage Override
AVD	Arc Voltage Delay Override*
CCO	Cut Current Override
CHT	Cut Height Override
MAF	Mix AR Flow Override
MHF	Mix H2 Flow Override
MNF	Mix N2 Flow Override
PCF	Plasma Cut Flow Override
PHT	Pierce Height Override**
PTO	Pierce Time Override
SCF	Shield Cut Flow Override
SPF	Shield Pierce Flow Override
THT	Transfer Height Override**
* Also called Automatic Voltage Control (AVC) delay.	
** See <i>Pierce height and transfer height overrides</i> .	

ProNest includes these process override codes on the M07 command line. This tells Phoenix and the XPR which standard value from the cut chart record to override with the specified value.

For example: **M07 AVO116**

In this example, assume that the standard arc voltage specified for this process in the cut chart record is 118. The AVO116 process parameter override in the part program tells Phoenix and the XPR to use an arc voltage of 116 instead of 118.

Process overrides applied on the M07 line remain **in effect until the next M07 command** which reloads the standard cut chart values.

### **Pierce height and transfer height overrides**

Pierce height and transfer height are defined in the XPR cut chart as absolute values (in inches or millimeters). For XPR, pierce height and transfer height overrides are independent of cut height.

**Example:** M07 CHT0.5 THT0.25 = Cut On, use a 0.5 inch cut height, **and** use a 0.25 inch transfer height

In this example, CHT and THT override values are used instead of the cut height and transfer height values from the cut chart record referenced on the G59 line. Because PHT is not included on the M07 line, the pierce height value from the cut chart record referenced on the G59 line is used.

## Marking codes

To tell Phoenix and the XPR to override the cutting process parameters with the marking process parameters from the cut chart record, ProNest includes the N2 (Nitrogen) or AR (Argon) code on the M07 (Cut On) command line.

For example: **M07 N2** or **M07 AR**

In addition, ProNest indicates the marking speed as an *Fvalue* code after the M07 (Cut On). The marking speed may be the value from the cut chart or an override value, if you specified a marking speed override in the cut chart in ProNest.

For example:

**M07 N2**  
**F250.**



If you are marking text, see also *Choose **Start to resume plasma cutting with XPR.*** on page 44.



If your part requires oxyfuel powder marking with legacy M09 codes, see page 44.

## True Hole codes

To tell Phoenix and the XPR to override the standard cutting process parameters with the True Hole cutting process parameters from the cut chart record, ProNest includes the TH code on the M07 (Cut On) command line.

For example: **M07 TH**

This indicates that the True Hole cutting process parameters from the cut chart record, as well as Phoenix True Hole parameters, will be used for any True Hole-compatible circles instead of the standard cutting process parameters.



In addition to using the True Hole parameters in the cut chart and in Phoenix, a ProNest part program automatically applies varying speeds across multiple hole segments to complete the True Hole technique.

## Interior contour codes

For parts with interior contours such as slots, arcs, or holes that are not True Hole-compatible, ProNest includes the O2S code on the M07 (Cut On) command line. The O2S code tells Phoenix and the XPR to override the standard cutting process parameters with the O2/O2 cutting process parameters from the cut chart record.

For example: **M07 O2S**

## **Sample ProNest part program**

The following is a sample ProNest part program for an XPR.

```
G59 V509 F11420  
(130Amp O2/Air)  
G41  
M07 AVO132 THT0.25  
M51  
F80.  
G03X0. 7071Y0. 7072I0. 3536J0. 3536  
G02I1. 5556J1. 5556  
M50  
M50H-0. 035  
G03X-0. 3536I-0. 1768J-0. 1768  
M08  
G40  
M51  
M19  
M02
```

## **Differences between XPR and HPRXD ProNest part programs**



If you have a ProNest part program that was created for an HPRXD, Hypertherm strongly recommends that you create a new part program specifically for XPR.

There are many differences between the XPR and the HPRXD cut charts. Thus, there are many differences between a ProNest part program created for an XPR and a ProNest part program created for an HPRXD. The key differences involve the following:

- Process selection
- Marking
- True Hole
- Overrides
- Transfer height and pierce height

Each is described briefly below. See the *EDGE Connect Programmer Reference* (809550) for full information about the codes used for part programming.



## Process selection

With XPR cut charts, process selection uses a single line of code in the part program. For example:

```
G59 V509 F11189
```

This command tells the CNC and the XPR which record in the cut chart database to use for this part program. The record includes the parameters for torch type, material type, cut current, gas, and material thickness. Thus, this single command specifies all of those parameters at once.

With HPRXD cut charts, process selection uses several lines of V5xx code in the part program to specify the parameters for torch type, material type, cut current, gas, and material thickness. For example:

```
G59 V502 F34
G59 V503 F1.00
G59 V504 F130
G59 V505 F2
G59 V507 F33
```

## Marking

With XPR cut charts, marking process selection uses the N2 or AR code on the M07 (Cut On) line in the part program. For example:

```
G59 V509 F11189
...
M07 N2
...
M08
```

With HPRXD cut charts, marking uses several lines of code in the part program, including marking-specific codes. For example:

```
G59 V525 F27
...
M36 T3
...
M09
...
M10
```

Note that the marking codes used in HPRXD part programs are not used in XPR part programs. See *Table 9* for more information.

**Table 9** – Marking code differences between an XPR and an HPRXD

Code	With an XPR, used for...	With an HPRXD, used for...
M36 T1 (Select Plasma 1 Process)	Cutting and marking	Cutting
M07 (Cut On)	Cutting and marking	Cutting
M08 (Cut Off)	Cutting and marking	Cutting
M36 T3 (Select Marker 1 process)	Not used	Marking
M09 (Enable Marker 1)	Not used	Marking
M10 (Disable Marker 1)	Not used	Marking



When marking with an XPR using an HPRXD part program, Phoenix automatically interprets the legacy marking codes correctly, without visibly changing the codes in the part program if you disable the following Program Code settings on the Cutting screen in Phoenix (**Setups > Cutting**): EIA G59 Code Override, Process Select Override, EIA Kerf Override, and EIA F-Code Override.

## True Hole

With XPR cut charts, True Hole process selection uses the TH code on the M07 (Cut On) line in the part program. For example:

```
G59 V509 F11189
...
M07 TH
```

With HPRXD cut charts, True Hole process selection uses several lines of V5xx code in the part program. For example:

```
G59 V502 F34
G59 V503 F1.99
G59 V504 F130
G59 V505 F2
G59 V507 F33
```

In addition, in an HPRXD part program with True Hole, one speed is applied to the hole. With an XPR part program with True Hole, varying speeds across multiple segments of the hole are applied.

## Overrides

With XPR cut charts, process parameter overrides use an override code on the M07 (Cut On) line in the part program. For example:

```
G59 V509 F11189
...
M07 AVO116 THT0.25
```

With HPRXD cut charts, overrides use V6xx codes in the part program. For example:

```
G59 V502 F34
G59 V503 F1.00
G59 V504 F130
G59 V505 F2
G59 V507 F33
...
G59 V600 F125
M07
```



ProNest still uses the V600 and V607 height control override codes as needed in XPR part programs created for bevel cutting. But no other V6xx override codes are supported with an XPR.

## Pierce height and transfer height

With XPR, pierce height and transfer height overrides are independent of cut height. Pierce height and transfer height are expressed only as absolute values (in millimeters or inches) in the XPR cut charts and on the Process screen in Phoenix. For part program code examples, see page 38.

With HPRXD, pierce height and transfer height values are expressed as 50% to 400% of cut height. For example:

```
G59 V602 F200 = Set the plasma 1 pierce height factor to 200% of cut height
G59 V604 F75 = Set the plasma 1 transfer height factor to 75% of cut height
```

## Appendix B: Oxyfuel powder marking

---

Although legacy part programs should be reposted with CAM software, there is a manual way to use a legacy part program to mark M09 codes with oxyfuel powder and cut M07 codes with XPR. Follow the guidelines and special sequence of steps below.

### Guidelines

- Control the CNC in Manual mode.
- Use the **Move to Pierce** function to **complete all oxyfuel powder marking first**.



It is not possible to switch from Plasma mode to Oxy Fuel mode.

### Mark with oxyfuel powder and cut with XPR

To use a legacy part program to mark with oxyfuel powder and cut with XPR:

1. With the part program in **Oxy Fuel** mode, press **Start** and then immediately press **Stop** to pause the program.
2. Choose **Move to Pierce** and select the first M09 code pierce point for oxyfuel powder marking.
3. Choose **Start** to begin oxyfuel powder marking.
4. As soon as all M09 marking codes are complete, immediately choose **Stop** to pause the part program.

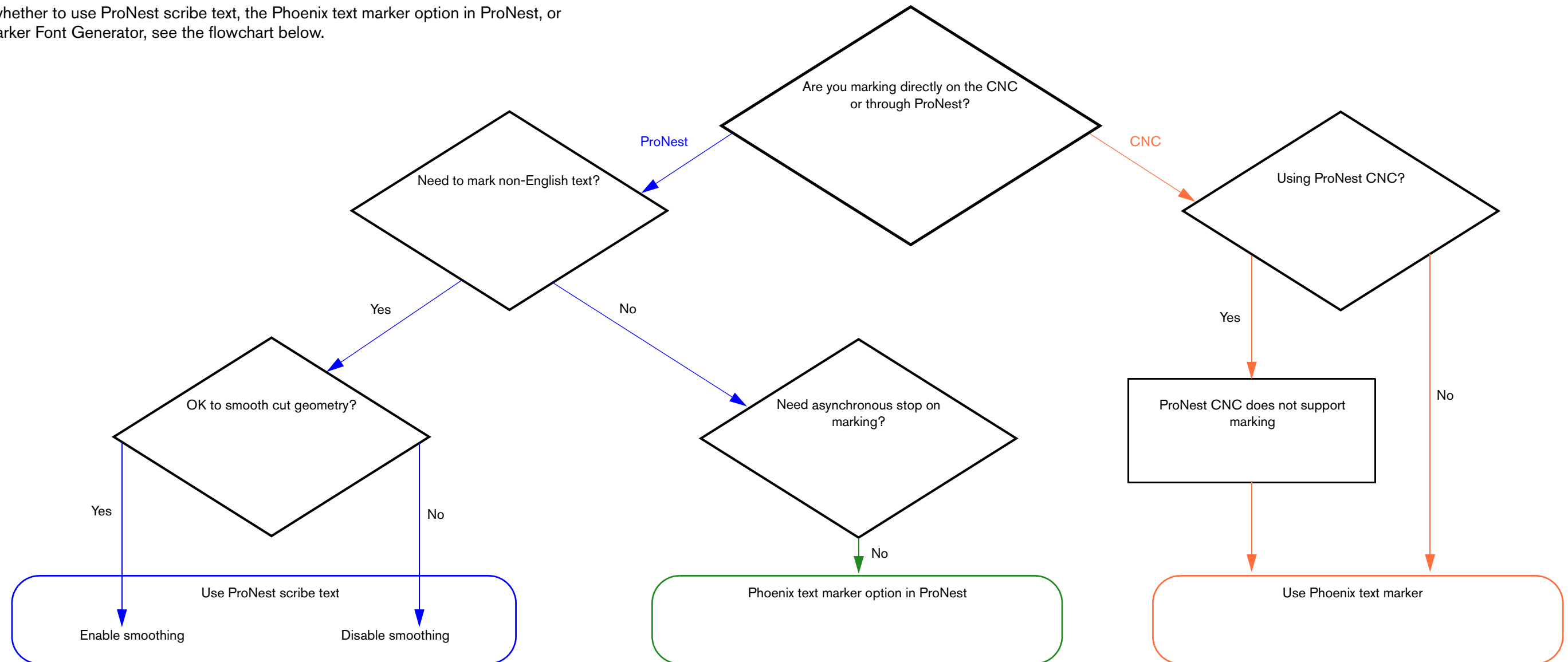


If you wait too long to pause the program, then the plasma cutting M07 codes are cut with in Oxy Fuel mode instead of in Plasma mode.

5. On the **Main** screen, choose **Change Cut Mode** and then choose **Plasma**.
6. Choose the **Move to Pierce** soft key to skip to the first M07 pierce in the part program.
7. Choose **Start** to resume plasma cutting with XPR.

## Appendix C: Options for text marking

To determine whether to use ProNest scribe text, the Phoenix text marker option in ProNest, or the Phoenix Marker Font Generator, see the flowchart below.



### ProNest scribe text

ProNest scribe text included as individual marking motions in output code.

- Import CAD text or apply in Advanced Edit
- Asynchronous stop supported on marking motions
- Unicode support
- Upper or lowercase
- Current overrides available
- All part geometry (cutting and marking) will be smoothed during part import, if “Smooth entities” is enabled.
- Using this option without smoothing can result in cosmetically poor results.

### Phoenix text marker in ProNest

ProNest converts all scribe text to the Phoenix text marker during output.

- No asynchronous stop
- ASCII text only
- ALL CAPS
- No current overrides

### Use Phoenix text marker

Mark text is applied in Phoenix on the CNC.

- No asynchronous stop
- ASCII text only
- ALL CAPS
- No current overrides