

GE  
Power Conversion

# SCR Drive Services

Engineered Drilling Systems



# Outstanding Services...

GE's Power Conversion business offers a fully integrated DC Drive retrofit package that lets you extend the life cycle of your existing DC Drive systems and defer moving to AC drive technology until scheduling and budget constraints can be addressed. At the same time it lets you improve drive system reliability and performance while reducing total installed cost and disruption to production. We take a complete system approach, combining field engineering expertise with our exceptional drives and control products. Our fully engineered drive solutions for coordinated drive and complex control applications can substantially improve the quality and efficiency of your processes. GE offers a range of DC drive products for the drilling industry including complete DC drives, DC drive electronics upgrades and control upgrades/retrofits.

We support you from start to finish with project management, application engineering, hardware and software engineering, system testing, technical direction of installation, commissioning and spare parts. The breadth of our experience spans oil and gas (upstream and downstream), marine, and industrial applications, with 50+ years of drilling applications experience. We know your application, understand your challenges and can help get the highest performance possible from your drive systems.

## Benefits and Features

- **Experts that fully understand your industry** match our drive features to meet your specific requirements
- **Consistent and cost-effective** project execution from start to finish
- **Phased upgrades and updates** that fit your operating budget
- **Improved process control** resulting in lower operating expenses
- **Extend the life cycle of your existing DC Drive systems** and defer moving to AC drive technology until the time is right

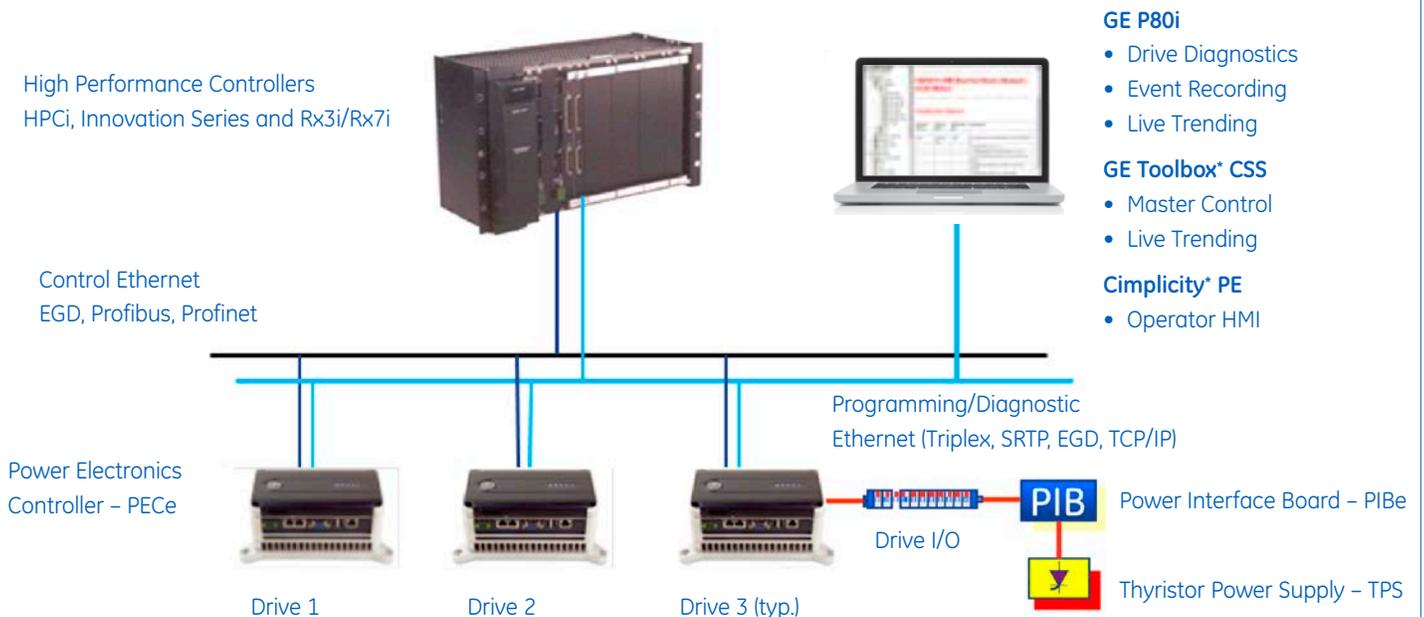
## Proven Designs Support Customer Objectives

Our GE drives employ proven hardware used by GE's Power Conversion organization in demanding industrial applications. The structured design improves engineering efficiency, reduces downtime, increases system reliability, improves process control, and reduces total installed project costs.

### DC Drive Family:

- Complete DC drives 30 HP to 6000 HP
- Digital front end kits to upgrade existing DC power converters

## Integrated System - Example



# ...Complementing Proven DC Drive Technology

## Power Electronics Controller (PECe)

The PECe is an Industrial PC running standard P80i IEC1131 compliant function block programming language with ladder capability to a deterministic Ethernet (EtherCAT) connection to drive I/O. The system consists of a Power Electronics Controller (PECe), Power Interface Board (PIBe), and depending on system requirement, EtherCAT I/O or Ethernet I/O (GE RSTi).

Features	Advantages	
Scalable performance – three dual-core CPU Variants: VIA Nano, Intel Celeron and Intel i7	<ul style="list-style-type: none"> <li>• Low cost</li> <li>• Small footprint</li> <li>• Less cubicle wiring</li> <li>• Scalable</li> <li>• Easy to upgrade</li> <li>• Rugged/reliable</li> </ul>	
<ul style="list-style-type: none"> <li>• Temperature range 0° to 60°C, -20° to 60°C</li> <li>• Fan-less, battery-less</li> <li>• Flexible mounting</li> <li>• Two/four PCI slots</li> <li>• Five Ethernet ports</li> <li>• Four USB</li> <li>• Two serial ports (RS232 and RS422/485), option of four serials</li> </ul>		
		

The Power Electronics Controller will run on the Vx Works operating system. It is enclosed in a rugged aluminum housing for optimal thermal management and protection against particles based on IP 20. And it is designed to meet standard UL1950, CE class A, FCC A.

## Fast EtherCAT Technology

A single Ethernet cable runs from the controller to the Power Interface Board (PIB). Multiple PIBs are used for multi-bridge power converters. Pulses are synchronized across PIBs to within 70 ns—supporting both IGBTs and thyristors.

- Real time transmission
- High synchronization
- High speed binary and analog I/O for customer application
- Low cycle-time
- High concurrence

## Power Interface Board (PIBe)

- 2x EtherCAT selectable copper or fiber
- 8x analog input
- 4x analog output
- 1x encoder Interface
- 8x digital input
- 4x digital output



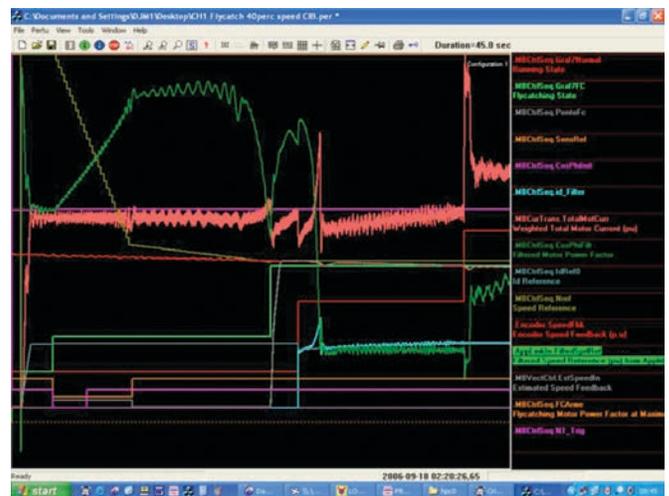
There are two places for an impulse amplifier. The following modules are available:

- Impulse amplifier – 12x outputs (max. 60 V, 10 amps)
- HCS Fiber – 16x outputs, 16x input
- ST Fiber – 16x outputs, 16x input

## Toolbox Computer

This is a Windows® PC-based Programming Unit that integrates all functions in the P80i Tool case.

Engineering and Commissioning	Maintenance and Diagnosis
<ul style="list-style-type: none"> <li>• Communication</li> <li>• Input/output (local and remote)</li> <li>• Open and closed-loop control and sequence control with function blocks</li> </ul>	<ul style="list-style-type: none"> <li>• History data</li> <li>• Hardware performance</li> <li>• Application monitoring</li> <li>• Plant-wide signal references</li> </ul>



## Product and Services for Low-Risk Upgrades

GE drives are compatible with GE Innovation Series and HPCi Controllers. For customers with legacy drives, our engineering drive solution enables a phased upgrade to next generation technology, without having to replace complete systems and large subsystems. You can benefit by:

- **Mitigating control obsolescence** through phased installation and spare parts availability.
- **Reducing total installed cost** by saving the expense of purchasing, installing and commissioning an entirely new drive system.
- **Reducing operating expense** and increasing process equipment reliability with improved process control products.
- **Updating control and gating system** while having the option of retaining the existing GE or third-party power stacks.

# Why GE Services?

Your production processes must run continuously without interruptions 24 hours a day, 7 days a week. We're there when and where you need us with:

- OEM expertise
- Global technical support
- 24/7 Availability
- Installation and commissioning services
- Field engineering services
- Performance auditing
- Spare parts/exchange units/life-cycle services

## OEM Advantages

Your GE drive application can run smoothly when you rely on GE as the original equipment manufacturer. As a drive OEM, we are able to provide:

- **In-depth product knowledge** – We've been there at every step of the process from design to manufacturing to installation, commissioning and continued maintenance. No one has a better understanding of our drive products, not only as an individual component, but as part of a coordinated system.
- **OEM data** – We have access to invaluable information including engineering drawings, operational performance data and a vast repairs database.
- **Field and factor engineering resources working together** – We create proactive solutions to maintain, improve, and extend key infrastructure assets.
- **Genuine GE parts and repair services** – We can provide factory-approved testing, unlike non-GE providers.

## Local Presence Backed by a Global GE Organization

Our world class Global Customer Service and Support Center is available 24/7 for 365 days a year. We have strategic distribution centers that carry extensive inventory for GE drives. We can support your genuine replacement part needs any time or any place.

With a comprehensive global network of service engineers and technicians, GE is uniquely positioned to provide you with the knowledge, experience, and skills for the full range of your electrical equipment needs. From system design to maintenance and outage support, GE has the resources and capabilities to help you improve your equipment's performance and reliability.



## Single-Source Provider for Startup and Commissioning of Your GE Equipment

Proper startup and commissioning of drives and control equipment is vital to the long-term health of an electrical system. Our Startup and Commissioning Services provide the people and knowledge to complete the job right and on schedule. With our Startup and Commissioning Services, your equipment will be installed properly and meet factory standards for operation.

## Field Engineering Services

We offer a complete line of engineering services for:

- Planned and on-demand engineering
- Modifications and upgrades
- Appraisals and studies (see Performance Auditing below)
- Project engineering

## Performance Auditing

Understanding the health of your drive system lets you plan maintenance, and equipment upgrades to meet productivity objectives. A GE Drives Performance Audit is a comprehensive review of the system and its ability to maintain performance levels. Benefits include:

- Improving system operation and reliability
- Enhancing equipment capacity
- Prolonging equipment life
- Identifying opportunities to optimize equipment performance and spare parts inventory

## Parts Repair/Replacement

Our flexible program lets you choose the solution that best fits your schedule and budget:

- Test and certification – Affordable option to verify inventory
- Repair/return – Most cost effective
- Exchange – Fastest method to receive reconditioned parts
- Remanufactured – Lower cost alternative to new parts
- New – Genuine OEM parts
- Life-cycle solutions – Ability to extend the life of your GE drives with:
  - Scheduled GE Drive Part/Service Reviews
  - Proactive refurbishment programs
  - Whole drive services

## Why trust your equipment to anyone other than GE?

For more information, contact your local GE office, call 1-888-GE4-SERV, 540-378-3280 or 800-533-5885 or visit [www.gepowerconversion.com](http://www.gepowerconversion.com)

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GEA31234 (06/2014)