

GateCycle* Version 6.x

Optimization and Diagnostics Software

Description

GateCycle software is a powerful, flexible, and fully featured heat balance modeling software. A GateCycle model is used to predict design and off-design performance of combined-cycle power plants, conventional steam plants, cogeneration systems, combined heat-and-power plants, advanced gas turbine cycles, and many other energy systems. A model is built much the same way as you might build a diagram in your favorite slide presentation or graphics software. Simply select a component from the equipment tool box, drag it onto the model diagram, and connect components together by dragging and dropping graphical stream symbols onto your diagram. In addition to providing a Gas Turbine library consisting of ISO ratings and performance curves, GateCycle provides an extensive library of equipment icons and modeling methods enabling users to model virtually any type of energy system using a single software package. With the flexibility to incorporate user defined equations and tables, to simulate control loops, and to vary an unrestricted number of model parameters in a regression routine, GateCycle is used to optimize a plant's design or to simulate the operation of an existing plant under specific conditions.

GateCycle models are extremely flexible, allowing an indefinite number of calculation cases to cover variations in design parameters as well as plant performance under "off-design" conditions. When models are executed, a sequential modular algorithm solves the mass and energy balances for both the overall system as well as all individual components, and generates detailed reports for each. If equipment constraints cannot be met or the heat balance cannot be solved, an error file is generated, allowing the user to identify the source of the problem and correct the model accordingly.

GateCycle has a wide range of applications. Examples include conceptual plant design, equipment and plant performance evaluation, detailed design work, parametric or feasibility studies, pro-formas, "What-if" analysis, plant retrofits/re-powering and many others. It is used within GE and by the world's leading OEMs, engineering companies, utilities, and research institutions, over 250 companies.

GateCycle provides an interface with Microsoft® Excel® (CycleLink) allowing users to execute and control GateCycle calculations from within an Excel spreadsheet. This allows the users to perform automated parametric studies using the interface's built-in tools, and to link GateCycle inputs and outputs with other Excel spreadsheets. Another Excel add-in enables the users to find optimal settings of design parameters, reconcile plant measurements, predict and optimize plant operation via a Regression Tool.

GateCycle can interface with GE Energy's proprietary Application for Packaged Power Solutions (APPS)** software resulting in extremely accurate GateCycle models for GE aeroderivative gas turbines. This enables GE Energy's EfficiencyMap* online performance monitoring and optimization software and Closed Loop Optimal Control (CLOC*) software to further improve their modeling capabilities.

Specifications

Minimum Computer Requirements

1.0+ GHz processor
1 GB RAM
300MB hard disk space
Available USB port
24X CD-ROM drive
8 MB video card
Microsoft Internet Explorer 6.0

Recommended Computer Requirements

2.0+ GHz processor
2 GB RAM
1 GB hard disk space
Available USB port
24X CD-ROM drive
16 MB video card
Microsoft Internet Explorer 6.0

Supported Operating System

Windows® 2000 Server Service Pack 4
Windows 2000 Workstation Service Pack 4
Windows Server® 2003 SP1
Windows XP Service Pack 2

Supported Microsoft® Office Software:

Microsoft Office 2000
Microsoft Office XP
Microsoft Office 2003
Microsoft Office 2007

Ordering Information

Step 1 – Choose Software (3160/00), Rental (3160/10) or License Method Upgrade (3160/21). For Maintenance Agreement renewals, go directly to step 3.

3160/00 GateCycle Software

Standard item used for ordering software and licenses.

3160/00-AXX -BXX

A: Package Type (See Table 1)

- 01 Standard
- 02 Gas Turbine Plant Only
- 03 Steam Turbine Plant Only
- 04 High Moisture Steam Turbines
- 05 Monitoring
- 06 Educational Package
- 08 CycleLink Only
- 21 GE Standard (internal GE use only)
- 22 GE Proprietary (internal GE use only)
- 23 GE Nuclear (internal GE use only)
- 24 GE PowerSmarts (internal GE use only)
- 25 GE EfficiencyMap (internal GE use only)
- 26 GE EfficiencyMap with APPS (internal GE use only)
- 27 GE APPS with GTP (internal GE use only)
- 30 30 Day Demo
- 99 Update (CD only)

B: License Type (See Table 2)

- 00 None
- 01 Single User License(s)
- 02 Network User License(s)
- 03 Mixed Single and Network User License(s)

3160/10 GateCycle Rental

Used to purchase rental (Time Limited) Licenses

3160/10-AXX -BXX-CXX

A: Package Type (See Table 1)

- 01 Standard
- 02 Gas Turbine Plant Only
- 03 Steam Turbine Plant Only
- 04 High Moisture Steam Turbines
- 05 Monitoring
- 08 CycleLink Only
- 21 GE Standard (internal GE use only)

B: Number of Users

- 00 None
- 01 to 20 Number of Users (1 to 20)

C: Number of Months

- 00 None
- 01 to 12 Number of Months (1 to 12)

Note: Rental license time starts from the time the license is manufactured. An adequate addition to the time window has been added to cover normal shipping and transportation time

Note: For rental licenses, stop here. Your order is complete.

3160/21 License Method Upgrade

Used for upgrading from older CrypKey® license method to Hardlock® or from single user to network user licenses

3160/21-AXX -BXX-CXX

A: Package Type (See Table 1)

- 01 Standard
- 02 Gas Turbine Plant Only
- 03 Steam Turbine Plant Only
- 04 High Moisture Steam Turbines
- 05 Monitoring
- 06 Educational Package
- 08 CycleLink Only
- 21 GE Standard (internal GE use only)
- 22 GE Proprietary (internal GE use only)
- 23 GE Nuclear (internal GE use only)
- 25 GE EfficiencyMap (internal GE use only)

B: Number of Single User CrypKey to Hardlock Upgrades

- 00 None
- 01 to 20 Number of Users (1 to 20)

C: Number of Single User (CrypKey or Hardlock) to Network User Hardlock Upgrades

- 00 None
- 01 to 20 Number of Users (1 to 20)

Note: For license method upgrades, stop here. Your order is complete.

Note: You cannot order both B and C items in the same line item. Use separate line items if you require both.

Note: For CrypKey to Hardlock upgrade, the end user must terminate CrypKey license via the GateCycle license manager and notify technical support with the termination code. Otherwise the end user will be billed for the additional licenses.

Step 2 – For Software select number of user licenses with 3160/01 or 3160/02 or both.

Note: If ordering mixed licenses (3160/00-XX-03) you must use both 3160/01 and 3160/02.

3160/01 GateCycle Single User License₁

Sub-item for license orders. 3160/00 line item is required first. Used for single user licensing only.

3160/01-AXX-BXX

A: Package Type (See Table 1)

- 01 Standard
- 02 Gas Turbine Plant Only
- 03 Steam Turbine Plant Only
- 04 High Moisture Steam Turbines
- 05 Monitoring

06 Educational Package

08 CycleLink Only

21 GE Standard (internal GE use only)

22 GE Proprietary (internal GE use only)

23 GE Nuclear (internal GE use only)

24 GE PowerSmarts (internal GE use only)

25 GE EfficiencyMap (internal GE use only)

26 GE EfficiencyMap with APPS (internal GE use only)

27 GE APPS with GTP (internal GE use only)

30 30 Day Demo

99 Update (CD only)

B: Number of Users

00 None

01 to 20 Number of Users (1 to 20)

Note: For package types: 05, 06, 08, 24, 25, 26, 30, and 99, stop here. Your order is complete.

3160/02 GateCycle Network User License₁

Sub-item for license orders. 3160/00 line item is required first. Used for network based floating licensing only.

3160/02-AXX-BXX

A: Package Type (See Table 1)

- 01 Standard
- 02 Gas Turbine Plant Only
- 03 Steam Turbine Plant Only
- 04 High Moisture Steam Turbines
- 05 Monitoring
- 06 Educational Package
- 08 CycleLink Only
- 21 GE Standard (internal GE use only)

B: Number of Users

00 None

01 to 20 Number of Users (1 to 20)

Note: For package types: 05, 06, and 08, stop here. Your order is complete.

Step 3 – For new licenses or maintenance agreement renewals choose Maintenance Agreement (3160/19 or 3160/20)

3160/20 GateCycle Maintenance Agreement - External

Used for maintenance agreements for External sales only.

3160/20-AXXX-BXXX-CXXX

A: Level

01 Bronze

B: Number of Users

00 None

01 to 20 Number of Users (1 to 20)

C: Number of Years

01 to 05 Number of Years (1 to 5)

Note: For new licenses, first year maintenance agreement is mandatory.

Note: For more than 20 users or more than 5 years, contact Product Line Manager to ensure the proper discount is applied.

3160/19 GateCycle Maintenance Agreement – GE Internal

Used for maintenance agreements for GE Internal sales only.

3160/19-AXXX-BXXX-CXXX

A: Level

01 Bronze

B: Number of Users

00 None

01 to 20 Number of Users (1 to 20)

C: Number of Years

01 to 05 Number of years (1 to 5)

Note: For new licenses, first year maintenance agreement is mandatory.

Note: For more than 20 users or more than 5 years, use multiple line items.

Footnotes:

1 If end user is adding to their existing license pool, contact Product Line Manager to ensure the proper discount is applied for the additional licenses.

Table 1: Package Type Descriptions

Package Type	Description
Standard	Typical package. Includes GateCycle model development application, CycleLink Excel add-in, all Gas Turbine components, Fossil Boiler and Fluidized Bed Boiler, Macros, off-design analysis and Regression tool. Ancillary equipment are included in this package.
Gas Turbine Plant	Standard package but does NOT include Fossil Boiler and Fluidized Bed Boiler.
Steam Turbine Plant	Standard package but does NOT include Gas Turbine components.
High Moisture	Standard License package and also includes moisture separator, reheater, reboiler, mechanical speed converter, adjustable speed drive and enables the BBCM method in the steam turbine

Monitoring	Allows user to only view models and enables POLY() function in macros. No technical service agreement (TSA) is provided.
Educational Package	Same as standard package but for educational use only. No technical service agreement (TSA) is provided.
CycleLink	Only enables CycleLink Excel Add-in. Does not allow viewing or editing of models. No technical service agreement (TSA) is provided.
GE Standard (internal only)	Same as standard package but for GE internal use only. Requires special approval in ordering process.
GE Proprietary (internal only)	GE Standard package plus additional variables and methods in SPHT, EVAP, ECON, GTDATA, ST equipment. Adds FMOIST equipment. Also enables POLY() function in macros and GTP link in GTDATA equipment. Time limited licenses good for only 1 year. Requires special approval in ordering process.
GE Nuclear Steam Cycle (internal only)	GE Proprietary package plus High Moisture package plus enables ST proprietary methods 77 and 81 in the steam turbine that require access to the proprietary controlled GE Nuclear Steam calculation dlls. Time limited licenses good for only 1 year. Requires special approval in ordering process.
GE PowerSmarts (internal only)	Standard package plus GTDATA equipment. Also enables POLY() function in macros and GTP link in GTDATA equipment. Requires special approval in ordering process. No technical service agreement (TSA) is provided.
GE EfficiencyMap* (internal only)	Same as PowerSmarts package. No technical service agreement (TSA) is provided.
GE EfficiencyMap with APPS (internal only)	PowerSmarts package plus APPS equipment icon for connectivity to APPS. No technical service agreement (TSA) is provided.

GE APPS with GTP (internal only)	GE Proprietary package plus APPS equipment. Also enables GTP link in GTDATA equipment. Time limited licenses good for only 1 year.
Demo	Standard Package but time limited license for 30 days. No technical service agreement (TSA) is provided.
Update (CD only)	No licenses, just the software CDs. Used for updating to current version. Requires a valid technical service agreement.

Table 2: License Type Descriptions

Package Type	Description
Single User License	License tied to a single computer. Comes on a USB dongle that must be connected to the computer for GateCycle to run, or is a software license key acquired through Technical Support that is stored on the computer.
Network User License	Network licenses are concurrent floating licenses. A network license server is set up with a special USB dongle attached and users from other computers can access and share licenses from that server. Since the licenses are concurrent, only the purchased number of licenses can be used at the same time. So if a license is available, anyone with access to the network license server can use a license.

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GE Energy gratefully acknowledges the contributions of EPRI to the early development of GateCycle

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