



*Power **RICH** System*
Enterprise Edition
Historian

Version 1.5

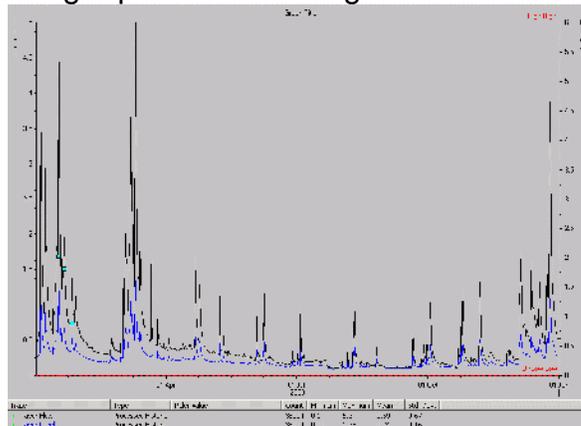
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1 PRS EE Connectivity I Historian Highlights

PRS EE software includes SCADA-to-Enterprise connectivity including an in-built data historian for SCADA events (including alarms) and historical (trend) data. The PRS EE enterprise connectivity and historian facilities include:

- Historical entries at times of interest (e.g. crossing alarm threshold, quality change)
- Historical data storage comprises:
 - Exact time-stamp value stored and displayed at imS resolution (as reported by field RTUs)
 - Engineering Values and Units stored
 - Point alarm state at the time of historic record
 - Point quality at the time of historic record
- Historic compression capability (configurable per point)
 - Can store all point changes
 - Restrict storage to Minimum interval
 - Restrict storage to Significant Change as percentage of span
 - Restrict storage to Significant Change as Absolute value
 - Restrict storage to Significant Change as Percentage of current value
- Full function viewer presents historic data graphically or in tabular views
- Create user defined mimics or trends using full function viewer:
 - Global mimics / trends
 - Restrict access using PRS EE Security
 - Private Trend Stores per user (stored on server, backed-up through redundancy, available wherever a user logs on)
 - Share trends with other users
- Create Ad-hoc multi-pen trends using full function viewer
- View Pre-defined multi-pen trends using Web viewer
- View Ad-hoc single-pen trends using Web viewer



- Event Journal comprises
 - point transaction information (point configurable)
 - alarm information (including operator accepts)
 - auditable events (e.g. operator log-on, modify history, modify alarm limits)
 - insert user comment record
- Selectable on-line retention period of Event Journal data
- Form-based query filters and historic retrieval of Event Journal data from full function viewer and Web viewer
- Select on-line retention period of Historic and Event Journal data
- Archive data to writeable media (e.g. DVD)
- Mount and retrieve data from previous archives
- SCADA level secured access to historic data
- Modify historic data manually (e.g. following instrument calibration, manual readings, etc) - requires privilege
- Modify or Insert historic data programmatically (e.g. via OLE Automation interface) -authentication secured
- Annotate history (operator comments) - requires security privilege

- Historic databases are replicated in real-time between PRS EE Main, Standby and Performance servers.
- Where a Performance server is used as an Historian server, the historic and event journal records can be kept online for longer periods than the Main I Standby servers.

- Open system interfaces provided to all databases:
 - ODBC interface to Event Journal
 - OPC-AE interface to Event Journal

 - ODBC interface to Historic database
 - OPC-HDA interface to Historic database
 - OPC-HDA I DA bridge for providing historic data to OPC-DA clients

 - OLE-DB interface to PRS EE databases via standard Microsoft OLE-DB/ODBC gateway

- Pre-defined and User definable "Historic Views" providing pre-processed virtual database tables simplifying external data access and reducing storage of raw and derived data

2 Reports

- The PRS EE Integrated reporting engine uses Crystal Reports providing:
 - Automated server-side generation of reports based on event triggers, repetitive schedules, ad-hoc user or programmatic triggers, logic (IEC61131-3)
 - Parameter passing to generic reports - e.g. user can run a standard report for data months or years old
 - Export of report data to HTML (web), PDF, CSV, Excel, Word, ODBC, Text, XML, etc.
 - Export generated report format to server, workstation disk, e-mail, etc.

Crystal Reports Run-Time is used as the PRS EE server's report generator and is bundled with each PRS EE server installation.

Users can generate, export and print pre-configured reports, including passing parameters to reports, as a native PRS EE function. Crystal Reports does not have to be installed on the user's workstation.

Workstations that create ad-hoc reports using Crystal Reports, or modify PRS EE server reports require a licensed installation of Crystal Report Professional Developer.

3 Performance

PRS EE historian performance is optimized for time-series data. It presents a standard relational ODBC/SQL open interface, with excellent performance compared with generic databases such as Oracle, SQLserver, etc.

A PRS EE configuration database, on 32-bit Windows® desktop platforms with 2GB memory, will support in excess of 100,000 configuration database objects. History can be enabled on any number of points within the database. PRS EE historic databases have been sized in the order of billions of records for projects utilizing large server-class installations with Storage Area Networks (SANs).

Enhance system performance through the use of "Performance Server" architecture. A performance server has mirror-image copies of the operational PRS EE server databases including the configuration, real-time, historic and event journal databases. Performance server databases are kept up to date, in real-time, from the Main server. Historic, or other access to the

Performance Server does not impact the operational (e.g. Main I Standby) servers.

4 Data via SMS and E-mail

Delivery of data (including alarm information) via SMS is a standard part of PRS EE paging functionality. E-mail for alarm data is closely related to paging, being another "Alarm Redirection" option. PRS EE natively supports connection to an e-mail server for delivery of alarm data. E-mail content is user configurable including information from within the PRS EE database. E-mail may simply contain text. It may also include a Web hyperlink to take the user directly to a Web Browser alarm view mimic. Using Microsoft embedded HTML technology, the e-mail can also contain a live (updating) mimic picture without requiring the user to start a web browser to display the mimic.

Report data can also be sent via SMS and e-mail. Using the ad-hoc free format text paging, described above, PRS EE logic can form up messages and send to nominated pagers. E-mail of report data is tightly integrated with the PRS EE reporting mechanism via Seagate Crystal Reports. This allows a report, including graphical information, to be generated and exported to a user via e-mail.

5 Redundancy

As a standard feature PRS EE support Symmetric Main I Standby redundancy, as well as Triple Standby redundancy where any server can take over full system operation. True server redundancy is provided, synchronized at database level. All aspects of the SCADA design provide for redundant operation. This encompasses all communication drivers including paging, and extends to facilities such as Reports and Logic.

All data that is written to the PRS EE Historian is replicated from the Main server to Standby, Triple Standby where installed, and optional Performance servers. Installation of Performance server(s) caters for future increases in system load, particularly due to increased numbers of users getting information from the system.

6 Open Interfaces

All PRS EE database interfaces support OPC, ODBC/SQL and OLE Automation. This includes:

- Configuration / Real-time database: OPC-DA, ODBC/SQL
- Historic database: OPC-HDA, ODBC/SQL, OLE Automation and OPC-DA (with PRS EE OPC-DA/HDA bridge)
- Event Journal database: OPC-AE, ODBC/SQL

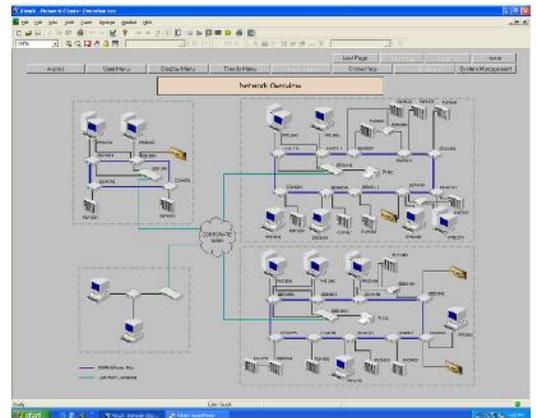
External access to real time and historic data can be provided using standard desktop technologies. For example:

- Copy data result set data displayed on a trend or from a list query from the PRS EE display client directly into the desktop Clipboard, then paste it in to your favorite application: e.g. Excel, Access, Word, etc.
- Connect directly to the PRS EE server databases using ODBC/SQL from your desktop or other server applications: e.g. MS Query from within Excel, directly from MS Access, Crystal Reports, external SQL applications
- Use OPC tools to connect, browse and retrieve data from the PRS EE server databases: e.g. standalone OPC Browser and Trend display applications, Add-ons (plug-ins) for Excel can provide a database browser for finding and retrieving both real-time and historic data.

7 Distributing data across Wide Area Networks

PRS EE distributed architecture is optimized for data access across wide area networks. PRS EE combines a number of advanced techniques including data compression; caching and exception reported data, to provide high performance across medium to slow links. This permits display clients to each connect to multiple remote systems. Data is presented to the display client as a single system, combining alarms, permitting trends with curves from multiple systems, combined system data on the same mimic, etc.

Configuration and maintenance of distributed systems can be centralized through common client interfaces, in the same way.



8 Online Configuration

PRS EE database configurations can be modified on line. This includes activating the configurations when modified, as well as propagating the changes to standby and performance PRS EE nodes. PRS EE display client caches are updated when next accessed. Features that can be modified online without disrupting system operation include:

- add communication channels
- add devices to an existing channel
- add points to an existing device
- modify channel, device & point attributes
- enable / disable or modify event and historic recording attributes
- add or modify mimics
- add or modify pre-defined trends
- alarm redirection strategies including paging, SMS, e-mail
- system administration
- security

Most PRS EE server characteristics can also be modified on line including:

- Historian characteristics for large databases. Hence the overall system disruption is minimized, and only for the following configuration changes:
 - User defined Historic Views (database query pre-processing)
 - Event Journal characteristics
 - Historical event "regions" (e.g. Storm events, Flood events, etc)
 - Alarm Severities (priorities)
 - Alarm Acceptance characteristics
 - Driver characteristics
 - E-mail connection
 - Printer connection
 - Exclusive control characteristics
 - Database location
 - System logging
 - Web server characteristics

9 Historian Data from within SCADA

As detailed above, the SCADA software natively provides the user interface for Historian data access. Historian data can be accessed through full function SCADA viewer (display client) or Web display client. Configuration of the historian is part of the standard PRS EE SCADA configuration. Queries can be made with SQL.

10 Disaster Recovery

PRS EE natively supports Main / Standby configurations as described above. Triple standby is also available for PRS EE. Each PRS EE server node database is a mirror image of the PRS EE Main server with respect of Configuration Data, real-time SCADA data and historic data. It is typical to locate Main and Standby PRS EE server nodes at physically separated locations, e.g. Main Control Center + Disaster Recovery Center. PRS EE designs are based around this architecture.

As described above, PRS EE historian supports the capability to archive data from the PRS EE event journal and historic database on to external media.

Typical PRS EE installations include removable disk media (e.g. DVD) and backup media (e.g. Tape Backup). The removable disk media is typically used for historic and event journal archive. The backup media is typically used for disaster recovery storage. The PRS EE configuration, real time, historic and event journal databases can be copied to backup media, online, simplifying disaster recovery procedures.

PRS EE provides disaster recovery procedures as part of system installation. PRS EE software contains all product features. For disaster recovery scenarios requiring complete system rebuild, PRS EE is readily installed from CD-ROM, utilizes standard Windows® operating system facilities. The PRS EE databases are readily restored from backup media. No other special installation procedures are required.

11 Licensing

The enterprise connectivity and historian components of PRS EE are bundled with the PRS EE SCADA product. Client connection licensing applies to the database from full function clients, and data access clients (ODBC, OPC, OLE Automation). This is the most effective and convenient way to license clients that may connect to separate PRS EE server systems. Pooled licensing is also available for Web clients, full function clients and data access connections.

Each concurrent connection uses a license from the PRS EE server's license pools. NOTE: Web Clients are also called, a Floating Client.

PRS EE is licensed in a number of ways. Classic licensing is through soft-key or dongle based licenses. Servers are licensed based on number of database points and proprietary protocol drivers. Command and Open Standard protocols are bundled with PRS EE. These include OPC to connect to third party drivers, MODBUS (including Open MODBUS/TCP), DNP 3, ODBC to extract data from other databases, Rockwell DF/1, etc. Client licensing is also available, similarly using soft-key or dongle based licenses to authorize a client to connect to a number of clustered server systems.

In comparison with other products, PRS EE client licensing is a cost effective way to distribute SCADA information to the enterprise.

12 Contacts

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References are available on the Web Site or by contacting Dr Jay park, above.

13 Product Highlights

PRS EE Historian	
Sales Brochure Summary:	An open and resilient architecture for gathering, analyzing and reporting on operational and commercial data, with powerful configuration tools, high performance and cost-effective licensing
HISTORIAN PLATFORM	
Data Sources	Data can be acquired and stored simultaneously from: <ul style="list-style-type: none"> - Any OPC data source (e.g. Intellution / Wonderware / Icon ics / CitectSCADA / OPC drivers to PLCs) - Directly from PLCs and RTUs via built-in drivers (e.g. DNP3, Modbus, Fieldbuses) - Enterprise databases via ODBC (e.g. Oracle, SQLserver)
Point Name Sizes	Up to 255 characters in OPC tag format
Database size	License control led
Failover	Failover for data sources and for the database server
Multiprocessor support	Yes
Backfill to eliminate data loss	Automatic, if supported by data source
Redundancy	Built-in dual network support, built-in main/standby and triple-redundant server support, performance server support
CONFIGURATION	
Drag-and-drop configuration	Yes
"Fill in the form" configuration of specific properties	Yes - with interactive hover-help and advice on configuration consistency
Express Wizards for communications	Yes - Templates provide a powerful way to structure and manage duplicate configuration using object oriented techniques
Long name support for attributes and folders	Yes
User definable folder structures and tree hierarchy	Yes
Alias support for plain text names of plant floor data tags	Yes

PRS EE Historian

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User definable field definitions	Yes
Automation Interface for uploading configuration quickly	Yes
VISUALIZATION TOOLS	
Live plant mimic displays	Yes
Historic Trend displays	Yes
Trend displays with on-line pan/zoom navigation	Yes
Trend displays with derived traces	Yes
Trend displays with time-offsets (e.g. for forecasting and comparison)	Yes
Trend displays with X-Y Plots	Yes
Trend displays with Customized Aggregates	Yes - Full aggregate support including quality (% good etc.) and statistical measures
Data Lists	Yes - both pre-built and customized lists on full display client and web clients
Gantt charts	Yes - via Crystal Reports
Pareto charts	Yes - via Crystal Reports
Copy-and-paste exporting	Yes
Crystal reports interface	Yes - layout and generated report files are fully managed by the server
Excel spreadsheet interface	Yes - via ODBC or third party OPC Add-ons
Web browser interface	Yes - automatically generated with integrated live mimic displays
Configurable alarm parameters	Yes
Live alarm list	Yes
Redirection of alarms via email and SMS	Yes
DATA STORAGE	
Event log	Yes
Historic point data	Yes
Integer	Yes
Long	Yes
Float/real	Yes
Double	Yes
String	Yes
All real-time and historic SCADA data stored in engineering units	Yes

PRS EE Historian

PRS EE Historian	
OPC quality status and sub-status	Yes
Entry, logging and identification of new or modified data	Yes
Automatic managed archive to offline media	Yes
Aggregates available via ODBC Interface (enables point and click reports of historic data, and all data is stored in raw form for full data analysis)	Yes
HISTORIAN PARAMETERS	
Store @ SCADA poll rate	Yes
Historic compression	Yes - by significant value change, %, range and with minimum interval
Historic enable/disable	Yes
Individual trend default time bases	Yes, per point
Historic storage on exception	Yes, important changes stored (e.g. crossing an alarm threshold)
Time series database	Yes - stores exact timestamp, scaled value with engineering units, alarm status, point quality and reason for storage with every piece of historic data
Adjustable retention rates	Yes, different thresholds can apply to different servers
Adjustable archive rates	Yes, can be controlled through database (e.g. scheduled or ad-hoc archives)
SECURITY	
Security model	Security model with additional attributes such as hand-entry/modification, alarm management and view permissions etc
Import/Export of configuration with security permissions	Yes - point and click
Password encryption for internet security	Yes
Multiple areas and levels for each user	Yes
Permissions can be defined to the point level	Yes
Permissions differentiate: - Folder and attribute visibility - Attribute display	Yes

PRS EE Historian

PRS EE Historian	
- Attribute write-back - Attribute parameter changes - Security administration	
Permissions apply to configuration environment as well as client environment	Yes
DATA MIGRATION	
Upload to relational databases	Yes
Client export facilities	Yes
Copy to clipboard facilities	Yes
API interface	Yes - OLE Automation (COM), access via Visual Basic etc.
OPC Client interfaces	Yes - Data access, Historic Data and Alarm/Event
Built-in XML/SOAP queries	Yes
CUSTOMIZATION	
Crystal Reports full customizable and user definable reporting facilities (report development requires Crystal Reports software)	Yes
Customization of web displays	Yes
Logical operation features	Yes - IEC 61131-3 compliant
SUPPORT	
Phone/email support teams	Yes
Training packages	Yes
Knowledgebase articles	Yes
Product Website	Yes
Application support (optional)	Yes
Engineering support (optional)	Yes