

Network-based Control System STARDOM



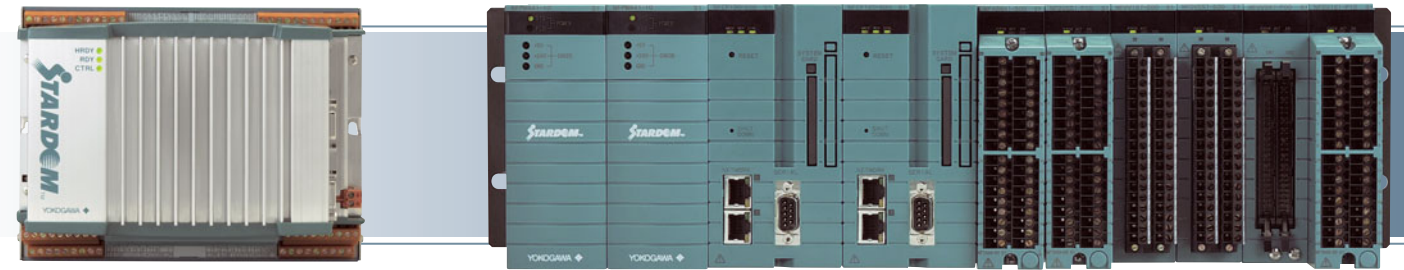
Network-based Control System
STARDOM™
FCN/FCJ
Field Control Node Field Control Junction

Bulletin 34P02A00-51E

<http://stardom.biz>



Open and powerful communications without limits...
 ...through the simple implementation of the latest information technology on reliable hardware.
 Whatever your challenge, the answer is STARDOM, the Network-based Control System (NCS).



**SEE
CLEARLY**

Open architecture...

...Enabling you to operate and monitor your process anywhere, anytime using commercial off-the-shelf (COTS) components. STARDOM autonomous controllers are FOUNDATION fieldbus™ certified and can be adapted to your infrastructure to integrate all process information.

**KNOW
IN ADVANCE**

Predictive maintenance...

...Bringing you maximum return on your assets. Besides reliable control function, STARDOM autonomous controllers offer full maintenance functionality with all the benefits of FOUNDATION fieldbus collaborating with PRM, and become compact asset management systems with minimum investment.

**ACT
WITH AGILITY**

Remote operation...

...Allowing you to operate facilities distributed over a wide area, in real time. STARDOM autonomous controllers have great remote management and stand-alone capability, and reduce running costs by making flexible use of e-mail, the Web, and SCADA technology.

Open System

- Easily fitted into your existing network infrastructures and systems
- Offers total solution for your process, collaborating with all Yokogawa products

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Reliable Hardware

- Industry specific installation, environment resistance
- Dual redundant configuration for all key components including CPU, FOUNDATION fieldbus module, and power supply
- Rich self diagnostic features and rugged design

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Network Ability

- TCP/IP based flexible network configuration
- Compliant with FOUNDATION fieldbus, HART, Modbus, DNP3, DeviceNet
- Dual redundant control, FOUNDATION fieldbus and OPC networks

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Engineering Efficiency

- Supports all five IEC61131-3 programming languages
- Application encapsulation for the secure reuse of your know-how
- Extensive libraries reduce engineering workload

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Autonomous Functions

- Monitoring and operation via the Web and alarm notification via e-mail
- Data storage and transmission using FTP
- Easy GUI-based configuration of information transmission settings

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vigilantplant.®

The clear path to operational excellence

STARDOM™ is a core building block of Yokogawa's VigilantPlant® solutions that promise to bring operational excellence to visionary plants, creating an environment where plant personnel can See Clearly, Know in Advance, and Act with Agility. The VigilantPlant solutions eliminate unplanned downtime, improve asset utilization, and allow businesses to adapt to shifting market conditions and customer demands quickly and efficiently.

Open System

How comprehensive is a STARDOM solution?

STARDOM autonomous controllers integrate production data with MES, MIS, and other types of management systems, guaranteeing continuous control while maximizing your return on assets.

STARDOM autonomous controllers can be easily adapted to your network infrastructure and your existing systems. Combined with other Yokogawa products, STARDOM autonomous controllers offer a high-performance total solution.

One network...

The use of TCP/IP enables a seamless connection between control and information networks using COTS network components. Also, STARDOM autonomous controllers can be easily adapted to existing high- and low-bandwidth network infrastructures employing a PSTN, leased line, ISDN, GSM/GPRS, satellite, RF, xDSL or optical fiber connection.

...but dual redundant...

A dual redundant network configuration is a fundamental prerequisite for reliability in control systems. STARDOM autonomous controllers enable complete redundancy in control, field and OPC networks.

HMI (Human Machine Interface) and SCADA (Supervisory Control And Data Acquisition) Solutions

Yokogawa VDS (Versatile Data Server) SCADA system

VDS software running on COTS PCs uses leading-edge Web technology that is well suited for the requirements of small- to medium-scale processes. Monitoring and operation can be done without dedicated software and require only a web browser and access to the Internet or an intranet. OPC server and client functions are embedded for connection with upper level systems and other SCADA systems.

Yokogawa FAST/TOOLS (Flexible Advanced System Techniques / TOOLS) SCADA system

The FAST/TOOLS is a SCADA system suitable for medium- to large-scale applications and highly distributed processes. Simple object import wizards dramatically reduce engineering workload.

Other vendors' HMIs and SCADAs

Other vendors' HMIs/SCADAs can easily acquire or send data from/to STARDOM autonomous controllers using an OPC connection package (OPC Server for Windows).

PAM (Plant Asset Management)

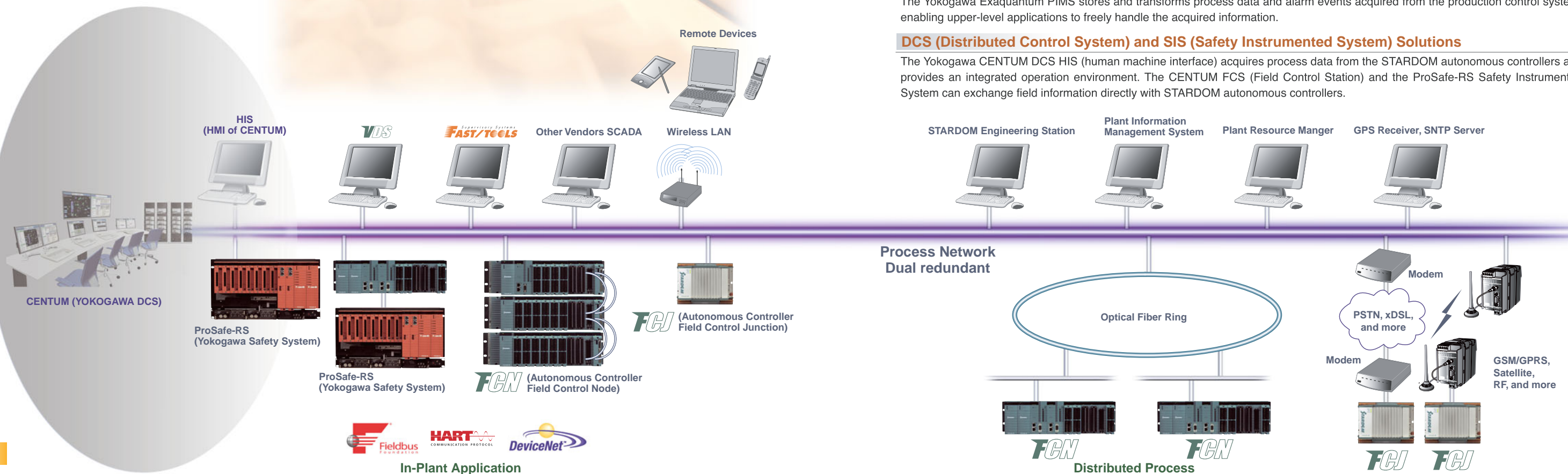
The Yokogawa PRM (Plant Resource Manager) PAM system comprehensively manages and maintains intelligent field devices through FOUNDATION fieldbus or HART, thereby improving maintenance efficiency.

PIMS (Plant Information Management System)

The Yokogawa Exaquantum PIMS stores and transforms process data and alarm events acquired from the production control system, enabling upper-level applications to freely handle the acquired information.

DCS (Distributed Control System) and SIS (Safety Instrumented System) Solutions

The Yokogawa CENTUM DCS HIS (human machine interface) acquires process data from the STARDOM autonomous controllers and provides an integrated operation environment. The CENTUM FCS (Field Control Station) and the ProSafe-RS Safety Instrumented System can exchange field information directly with STARDOM autonomous controllers.



Reliable Hardware

Why is it so important to have reliable hardware?

Avoiding downtime is a key issue for any continuous production line. Our DCS experience went into the development of STARDOM autonomous controllers and produced hardware that is reliable in every respect.

Risk diversification

Each STARDOM autonomous controller has independent control functions including sequence and loop control, alarm monitoring, and data storage. By distributing independent controllers at remote sites or mounting them on individual pieces of equipment, you no longer need to worry what will happen if your network goes down. Thanks to the data storage functions of STARDOM's autonomous controllers, data is never lost. When STARDOM autonomous controllers are used in combination with FAST/TOOLS, time stamped data stored on the controllers are merged into FAST/TOOLS historical data base and become available as soon as the network recovers. Also these data on the controllers can be monitored on demand via a dial-up, RF, or other network connection, further reducing operational expenditure (OPEX) for your process.

Wide Ranging Product Line

Suitable size for your application

There are two types of STARDOM autonomous controllers

Field Control Node (FCN)

A modular controller with a wide range of I/O modules and two expansion units
Suitable for small- to mid-size applications

Field Control Junction (FCJ)

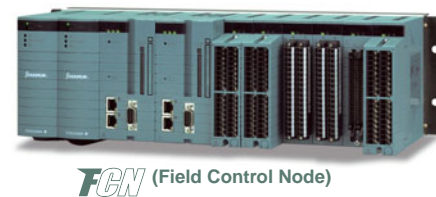
An all-in-one compact controller with built-in I/O (213.8mm W x 156mm H x 95mm D)
Suitable for direct installation on equipment or utilities

Analog modules

In addition to digital input and output modules, the FCN supports a wide range of analog modules:

- 4-20mA, 1-5V, -10-10V, HART, RTD, TC, mV
- Isolated channel, Isolated, Non-isolated
- Input, Output, Input and output combined

The 4-20mA analog module includes a HART module and can supply power to two-wired transmitters, eliminating the need for a dedicated power supply. A terminal block with surge protection is also available.



FCN (Field Control Node)



FCJ (Field Control Junction)

High Speed Regulatory Control

High-speed CPU scan time

STARDOM autonomous controllers are high-speed and accurate control systems featuring 50msec analog control and a 10msec CPU scan time.

Time stamp

Time synchronization between controllers is done without PC software, using a simple network time protocol (SNTP) server and client function embedded in the STARDOM autonomous controller. Using the system's GPS receiver, the system time is synchronized with GPS time to give the precise local time in each time zone.

With this high level of accuracy, alarm and events have 1msec time resolution.

Dual Redundant Configuration

System availability is significantly improved with the dual redundant configuration.

Simple duplexed CPU architecture

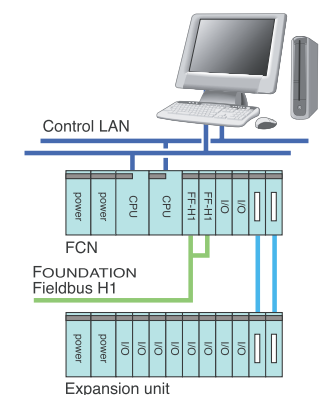
The duplexed CPU configuration dramatically reduces the chance of process downtime. When the CPU in service fails, the stand-by CPU takes over immediately and resumes control without any impact on the process. When the failed CPU is replaced, the database/applications on the new CPU are automatically equalized without stopping the process.

Dual redundant configuration

Not just the CPU, all key components such as the power supply, control network, I/O expansion bus, and FOUNDATION fieldbus H1 fieldbus network can be dual redundant. Even the bus between the CPU and I/O modules is redundant.

Compact design

The duplexed CPUs are located on the same base module and the power is supplied from the base module. Duplexed CPU systems have a compact design and eliminate single points of failure.



Robust Hardware

Explosion proof

STARDOM autonomous controllers with Class 1 Division 2 FM approval and ATEX Type n are designed for surviving in a harsh industrial environment (corrosion proof coating is available). Fan-less architectures and analog current input modules with surge protection circuits also reduce the downtime risk.

Minimize Downtime Losses

Hot swappable I/O module

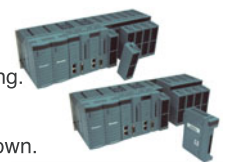
I/O modules are hot swappable. Neither other I/O modules nor CPUs are affected by changing an I/O module.

To facilitate hot swapping, MIL terminals and pressure clamp terminals can be easily disconnected without rewiring.

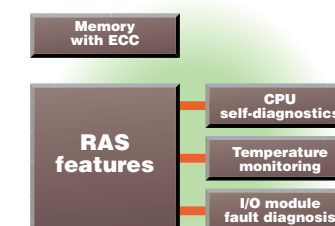
Downtime action

Even if you have a single CPU configuration, output modules will not take unexpected actions if the CPU goes down.

"Hold last value" or "User preset value" can be selected for the output modules to keep your process safe.



Advanced Self Diagnosis



In addition to the CPU and power supply current status indicated on the front panel LEDs, the CPU temperature, SRAM memory, and I/O module status can be viewed using rich self diagnostic functions. Besides the CPU, analog input modules have embedded self diagnostic functions which detect disconnected wires or short circuits by continuously monitoring the loop status. The checked status can also be viewed on the front panel LEDs. All data processed by Error Check and Correct (ECC) memory is accurate and has the data status attached.

Network Ability

Does system expansion take a lot of time and effort?

TCP/IP based STARDOM autonomous controllers can easily fit into your existing systems and network infrastructure without adding gateways or laying dedicated networks.

Plant Resource Manager

How can I manage thousands of field devices?

With the diagnostic features of FOUNDATION fieldbus and HART Communications, STARDOM autonomous controllers are a valuable asset management system.

Wide Support of Field Networks

Variety of field network

STARDOM autonomous controllers support a wide variety of field networks

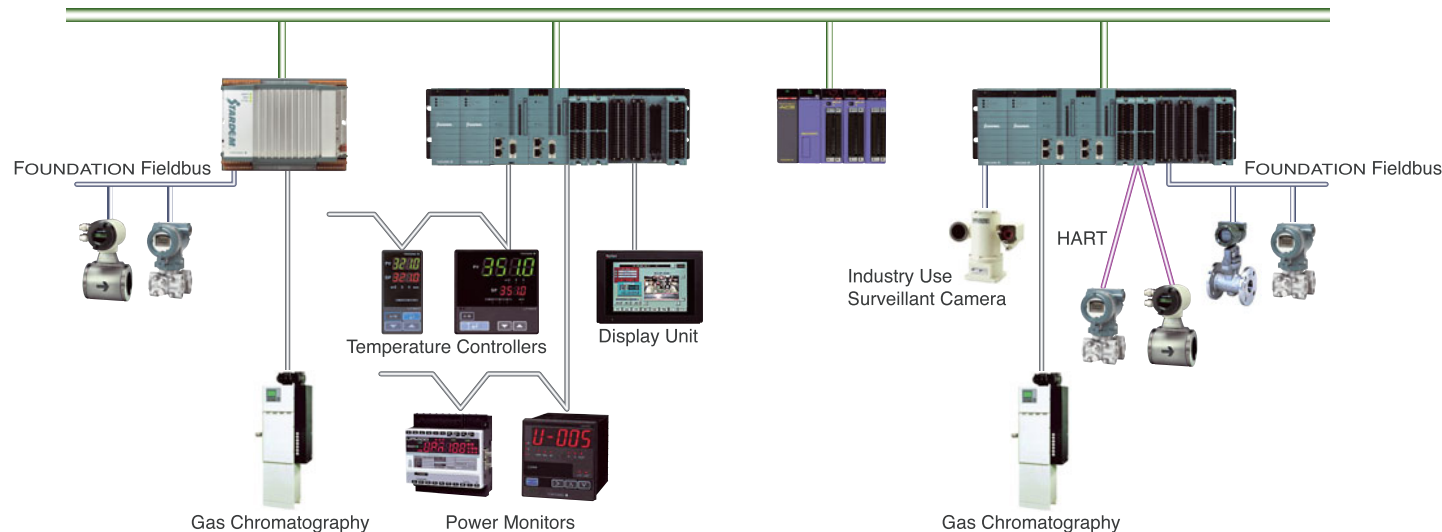
- FOUNDATION Fieldbus
- HART
- Modbus RTU/ASCII (Master/Slave)
- Modbus TCP (Server/Client)
- DeviceNet
- Profibus-DP*
- DNP3

* Check for availability



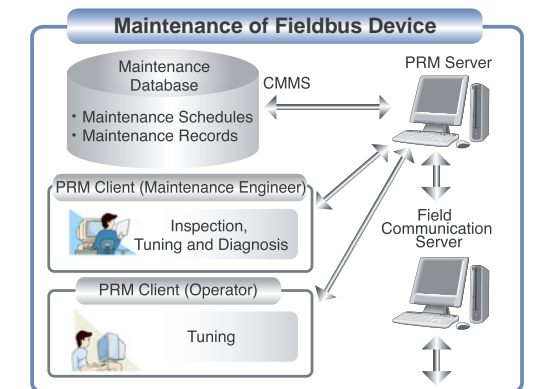
Controller Communication

STARDOM autonomous controllers have embedded peer-to-peer communication functionality. They also have embedded drivers for communications with Yokogawa's FA-M3 PLC, PLCs from other vendors, temperature controllers, and power monitors. Via RS-232-C and RS-422/RS-485 interfaces, STARDOM autonomous controllers can read raw data even from devices such as bar-code readers which do not support Modbus or other protocols. STARDOM autonomous controllers can acquire data from a wide variety of field equipment.



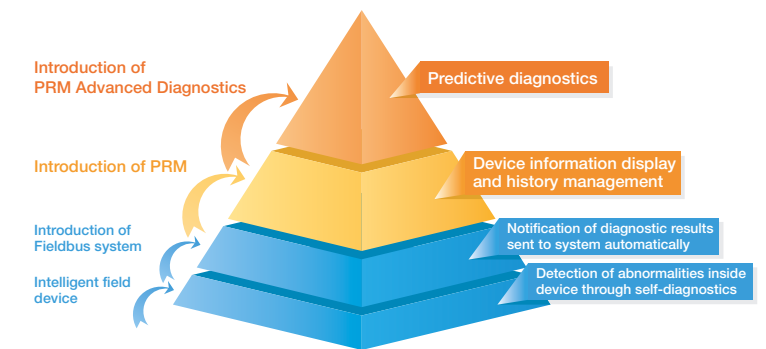
Maintenance efficiency

When a STARDOM autonomous controller is used in combination with PRM, which has such advanced features as plug-and-play device registration and automatic collection and storage of detected device events, the time and effort required to build and maintain an asset database is dramatically reduced. An audit trail of maintenance activities such as parameter modification and inspection that are executed by PRM is also integrated into the same database, making your maintenance activities much more efficient. PRM supports FOUNDATION fieldbus H1 and HART communications.



Device diagnosis

For greater maintenance efficiency, PRM also provides advanced diagnostic functions for predictive maintenance. With these functions, it is possible even when a plant is operating to define and perform a diagnosis that uses information from multiple devices; it is also possible under these circumstances to receive a highly process-dependent diagnosis.



Yokogawa FOUNDATION Fieldbus devices

- Our completely integrated FOUNDATION fieldbus solutions include:
- Differential pressure/pressure transmitters (DPharp EJA/EJX series)
 - Vortex flowmeters (Digital YEWFLOW series)
 - Magnetic flowmeters (ADMAG AE series)
 - Temperature transmitters (YTA320)
 - Valve positioners (YVP110)
 - Ph and conductivity meters (SC202, ISC202, and PH202 series)
 - Paperless recorders (DAQSTATION DX series)



Engineering Efficiency

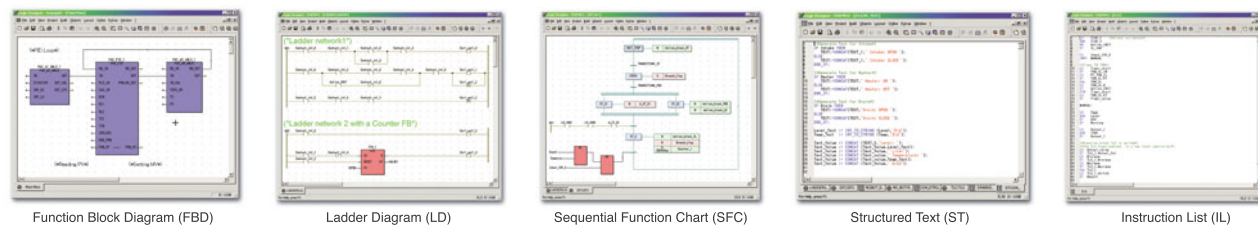
How can I reduce our engineering workload?

Our support of the international standard programming languages and provision of efficient simulators dramatically improves engineering efficiency and maintainability.

IEC 61131-3 Language Support

IEC 61131-3 International Standard Language

The Logic Designer engineering tool for the STARDOM autonomous controllers supports the five programming languages of the International Electrical Commission's IEC61131-3 standard: Function Block Diagram (FBD), Ladder Diagram (LD), Sequential Function Chart (SFC), Structured Text (ST), and IL (Instruction List). IEC61131-3 the de facto programming standard for control logic, is platform independent, and has great reusability. Both loop and sequence control can be developed in this environment. By conforming to this international standard, control applications can run on any platform and can be easily ported to other systems without the loss of application know-how.

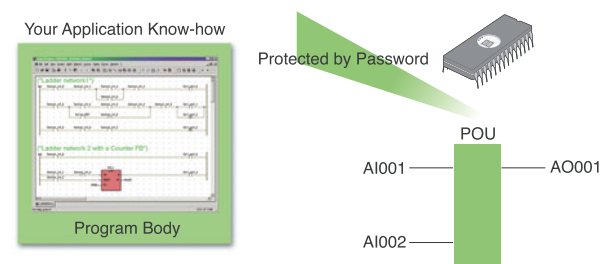


Reuse of programs

Applications are the product of considerable engineering know-how. Therefore, the ability in reuse of such applications is a key to enhance engineering efficiency.

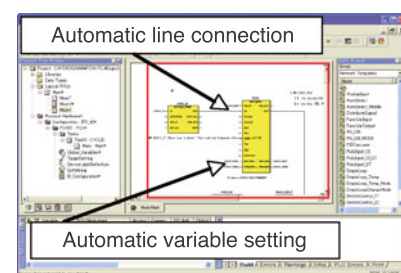
POU

Program Organisation Units (POUs) are the smallest software units of a user program. Reused logics can be encapsulated into a POU. The source code for the POUs, which are the intellectual property, can be protected by password. Encapsulated logics can be used to the other vendors PLCs since IN and OUT variables of POUs are independent from the hardware.



Network Template

Network template allows a group of POUs with connecting lines, called Network, to be inserted into a worksheet as they are. Unlike the ordinary copy functions, variables, instance names and comments of network templates are replaced as the specified names when they are inserted.



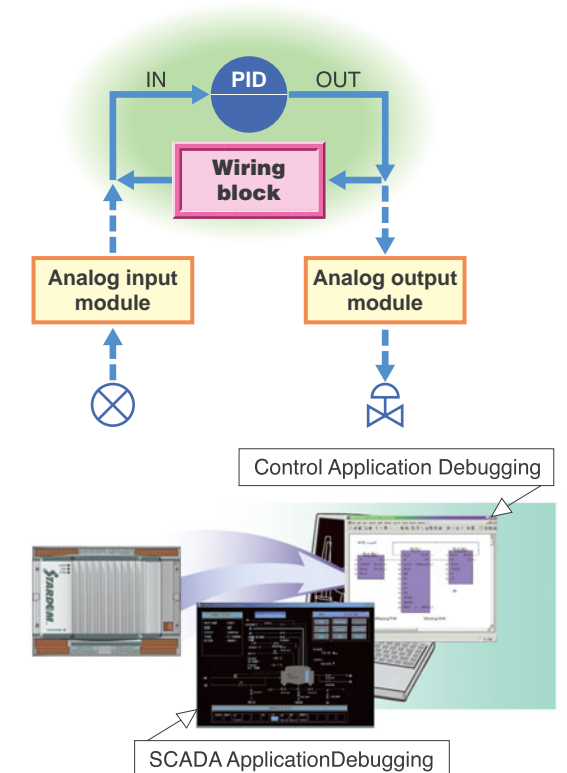
Online download

You can modify your applications online without interrupting your control functions, giving you the flexibility you need to quickly adapt your product in response to a customer's changing needs. And whenever an application is changed, notification is made to the Yokogawa SCADA in real time

Efficient Simulation Tool

Software wiring

Software debugging can be performed virtually by defining the wiring in the software. This software wiring enables loop checks and ladder sequence tests without having to actually wire the input and output modules. With this function, a calibrator and test switch are no longer necessary.



Simulator

Simulation software for the controllers can run on PCs. In the test phase, an engineer can debug the modules using Logic Designer without actual controllers. Also, as the Yokogawa SCADA can be installed on the same PC, its functionality can be checked at the same time.

Engineering Support

Specialized Libraries

Various software libraries, called Application Portfolios (APPF), are prepared to improve engineering efficiency.

Regulatory Control Blocks:

Equivalent to DCS regulatory control functions cultivated in Yokogawa long DCS history

Communication Blocks:

Various in communication suitable for SCADA applications, such as DNP3 and Modbus

Application Oriented Blocks:

Effective in the specified application, such as gas flow calculation

Network Template Sample

Typical applications for control, such as cascade control, are provided as network templates on STARDOM membership site. Use of the provided network template improves the application quality and reduces the debugging time since they are all tested in Yokogawa laboratory.

Autonomous Function

How can the latest information technology benefit our process?

Readily available leading edge technologies can produce dramatic improvements in the efficiency of your remote operations with such functions as alarm notification via e-mail and process monitoring and operation through a web browser.



Features and Benefits

STARDOM autonomous controllers FCN/FCJ realize an all in one solution by including control functions, PC-based information technology and logging functions embedded on rugged hardware. They are the best substitute for PC-based remote monitoring system to reduce TCO (Total Cost of Ownership) and improve TVO (Total Value of Ownership).

Secure data on rugged hardware

STARDOM autonomous controllers log process data and create reports. In addition to the real-time data, logging data can be displayed using a Web browser from remote locations. This capability enables remote monitoring, without requiring personnel to visit hazardous and remote areas, and helps reduce patrolling costs.

Alarm and message notification

STARDOM autonomous controllers generate alarm and message E-mails according to user defined rules and send them to COTS PCs or mobile phones. This function enables the detection of unexpected situations at an early stage.

Stable environment

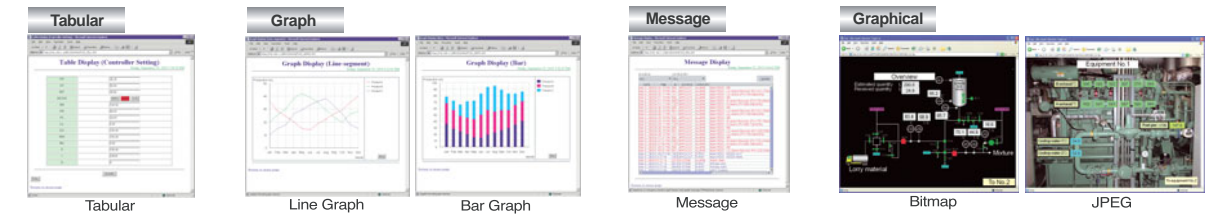
PC-based systems are often used for remote monitoring because they suit information transmission via Web or FTP. However, maintaining PCs by patching and updating the OS is a challenge. Installation of patch update systems in each location and the purchase of new OS every few years increases TCO. The total system configuration becomes more complex and difficult to maintain. Replacing them with STARDOM autonomous controllers eliminates the time and expense of COTS PC OS updates



Embedded Web HMI

STARDOM autonomous controllers are embedded with Web server functions. Web-based HMI (Human Machine Interface), integrated into controllers, enables remote site operation and monitoring without requiring any dedicated software on COTS PCs or any programming.

Selectable data display corresponding to the monitoring and operation style



Logging & Report

STARDOM autonomous controllers log the data and create the report files. COTS PC can upload all files using FTP server functions embedded on the controllers, and report files can be also sent to COTS PC as e-mail attachments.

Logging type

Various logging files can be created:

- Data Logging
- Continuous logging
- Batch logging
- Snapshot logging
- Message logging

Reporting

Report files are automatically created:

- Daily / Monthly / Annual report

Embedded viewer and Setting tool

Logging data viewer and setting tools are all embedded in the controller. No dedicated software is required on COTS PC .



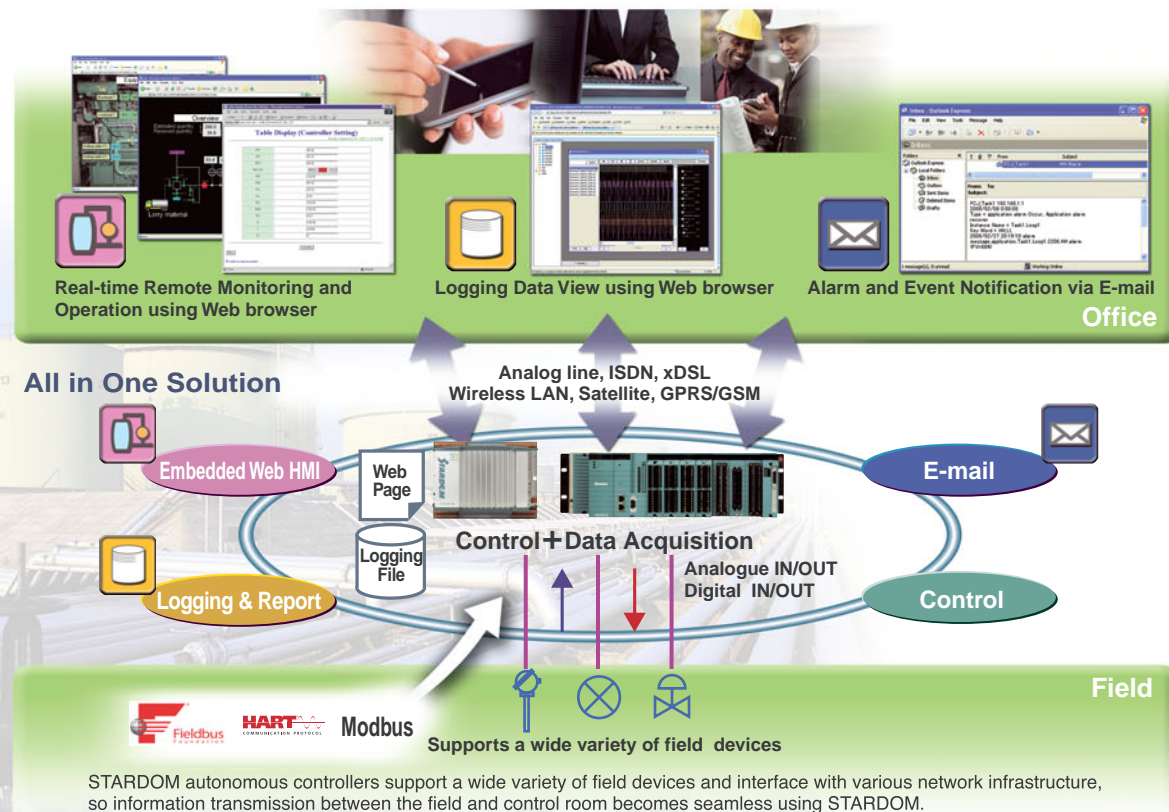
E-mail

Message E-mail

STARDOM autonomous controllers send FCN/FCJ system or application messages via e-mail.

Alarm E-mail

STARDOM autonomous controllers send alarm e-mail when data exceeds high or low limits or discrete data status changes.



Application Examples

Remote monitoring under harsh conditions, such as a corrosive gas environment, dust, high temperature and vibration, is a best fit for STARDOM autonomous controllers.

- Controllers on vehicles enable movable patrol systems.
- Real-time data monitoring on handy terminals with browser allows site device calibration.
- Notebook PC connected to controllers is used as a graphic panel.

Gas distribution

- Truck refueling (LNG)
- Cryogenic gas tanker loading/delivery

Environment monitoring

- Water/air pollution monitoring

Wind power generation

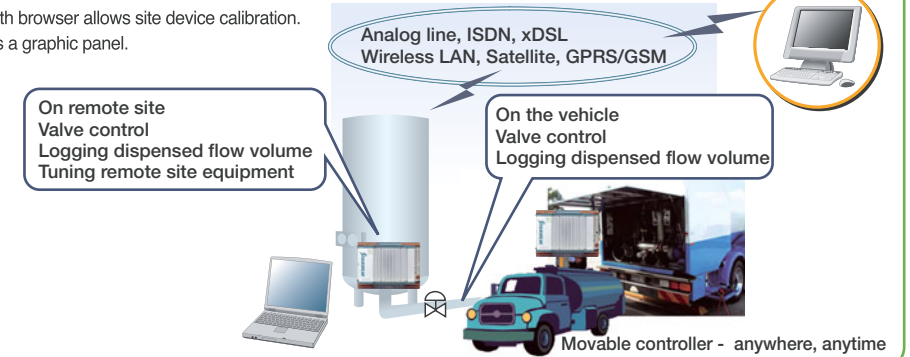
- Wind turbine monitoring and control

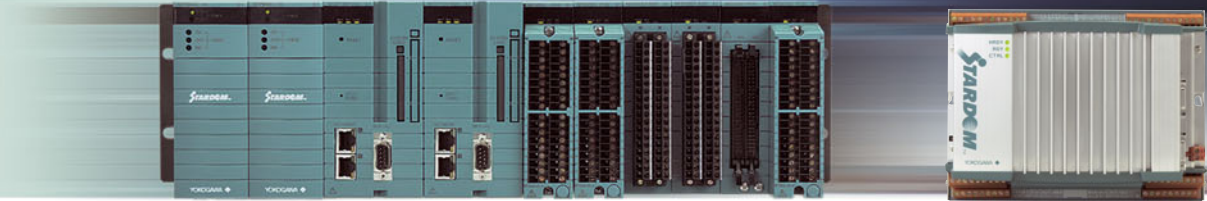
Tank monitoring

- Tank level monitoring

Water

- Water intake valve control and monitoring





FCN/FCJ Software

Media for FCN/FCJ Software

Name	Model	Description
FCN/FCJ Software Medium	NT203AJ	CD-ROM* containing Logic Designer, PAS Portfolio, and electronic documents
APPF for FCN/FCJ Software Medium	NT205AJ	CD-ROM* containing Application Portfolios except for PAS Portfolio, and electronic documents

* To run individual software, you need to purchase the licenses of the respective software packages.

FCN/FCJ Basic Software Licenses

Name	Model	Description
FCN/FCJ Basic Software License for Single CPU for Duplexed CPU **NT712AJ	NT711AJ	License to run basic software for implementing control logic on an FCN or FCJ (Single CPU with or without Java function needs to be selected. Duplexed CPU only comes without Java function.)
Additional FCN/FCJ Java Function License	NT719AJ	License for adding Java function to NT711AJ without Java function
Software License for Duplexed Field Network Module	NT730AJ	License to duplex field network modules
Logic Designer License	NT751FJ	License to run Logic Designer, a bundle of tools for developing control logic and featuring the software wiring function as standard
FCN/FCJ Simulator License	NT752AJ	License to run on a PC and simulates control applications
FCN/FCJ OPC Server for Windows	NT781AJ	Implements OPC interfaces for clients compliant with the OPC (OLE for Process Control) Data Access standard ver. 2.0 (DA 2.0) and Alarms and Events standard ver. 1.10 (A & E 1.10)
Duplexed Network Program for FCN/FCJ OPC Server	NT783AJ	Program for duplexing network communication between FCN/FCJ and PC with OPC server (NT781AJ)
FCN/FCJ Java Application Development Kit License	NT755FJ	License to use functions necessary for Java application development and debug

** Always order NT712AE for an FCN with Duplexed CPU.

Application Portfolio Licenses

Name	Model	Description
PAS Portfolio License	NT8001J	License to use a library of functions for process control, such as PID controller and switch instrument blocks
SAMA Portfolio License	NT8002J	License to use a library of functions compliant with Scientific Apparatus Makers Association (SAMA) and often used in power processes
General-purpose Portfolio License	NT8005J	License to use a library of often used functions such as cross-limiting, high-low range switching, and feed sequence
Webmetry Basic Library Portfolio License	NT8010J	Web monitoring parts running on FCN/FCJ Java function
Web Application Portfolio (InfoWell) License*	NT8012J	Information transmission function (InfoWell) for transmitting data to the web browser on a general-purpose PC using the FCN/FCJ as web servers
E-mail Application Portfolio (InfoWell) License*	NT8013J	Information transmission function (InfoWell) for transmitting messages and alarms from the FCN/FCJ via e-mail
Graphic Portfolio (InfoWell) License*	NT8014J	Information transmission function (InfoWell) for displaying data on image files using the FCN/FCJ web server function
Logging Portfolio (InfoWell) License*	NT8016J	Information transmission function (InfoWell) for logging data and report creation on FCN/FCJ
InfoWell License Pack*	NT8017J	InfoWell license pack including NT8012J, NT8013J, NT8014J and NT8016J
FA-M3 Communication Portfolio License	NT8020J	License to use a library of functions to directly communicate with Yokogawa FA-M3 controllers via the control LAN
MELSEC Communication Portfolio License	NT8021J	License to use a library of functions to directly communicate with Mitsubishi Electric MELSEC controllers via the control LAN
SYSMAC Communication Portfolio License	NT8022J	License to use a library of functions to directly communicate with OMRON SYSMAC controllers via the control LAN
Power Monitor Communication Portfolio License	NT8030J	License to use a library of functions to communicate with Yokogawa M&C power monitors
Temperature Controller Communication Portfolio License	NT8031J	License to use a library of functions to communicate with Yokogawa M&C Green Series temperature controllers
Modbus Communication Portfolio License	NT8035J	License to use a library of functions to communicate with Modbus equipments
DNP3 Communication Portfolio License	NT8036J	License to use a library of functions to communicate with DNP3 equipments
Time Synchronization Server Portfolio License	NT8040J	License to use a library of functions to time synchronization among equipment supporting SNTP
Boiler Control Portfolio License	NT8101J	Library for boiler control applications
Boiler Auxiliary Control Portfolio License	NT8102J	Library for boiler's auxiliary equipment control applications
Gas Flow Calculation Portfolio License	NT8105J	Library for gas flow calculation

*InfoWell runs only on Single CPU configuration FCN with Java function

FCN/FCJ Hardware

Hardware for FCN

Name	Model	Description
Base Module	NFBU050	With 5 module slots
	NFBU200	With 10 module slots
Power Supply Modules	NFPW441	100 to 120 V AC input
	NFPW442	220 to 240 V AC input
	NFPW444	24 V DC input
CPU Module	NFCP100	With two Ethernet ports and one RS-232-C port
SB Bus Repeater Module	NFSB100	Module used to connect an I/O expansion unit
SB Bus Cable	NFCB301	Cable connecting SB bus repeater modules to each other
Analog Input Modules	*NFAI135	Eight 4 to 20 mA DC inputs, point-to-point isolated, field-to-circuit isolated
	*NFAI141	Sixteen 4 to 20 mA DC inputs, non-isolated
	*NFAI143	Sixteen 4 to 20 mA DC inputs, point-to-point non-isolated, field-to-circuit isolated
	NFAV141	Sixteen 1 to 5 V DC inputs, non-isolated (differential input)
	NFAV142	Sixteen -10 to +10 V DC inputs, non-isolated
	NFAV144	Sixteen -10 to +10 V DC inputs, point-to-point non-isolated, field-to-circuit isolated
Thermocouple/mV Input Module	NFAT141	Sixteen TC/mV inputs, point-to-point non-isolated, field-to-circuit isolated
Frequency Input Module	NFAF135	Eight 0.1Hz to 10kHz inputs, point-to-point isolated, field-to-circuit isolated
Resistance Temperature Detector Input Module	NFAR181	Twelve RTD inputs, point-to-point non-isolated, field-to-circuit isolated
Pulse Input Module	NFAP135	Eight 0 to 10 kHz pulse inputs, point-to-point isolated, field-to-circuit isolated
Analog Input/Output Modules	*NFAI835	Four 4 to 20 mA DC inputs, four 4 to 20 mA DC outputs, point-to-point isolated, field-to-circuit isolated
	*NFAI841	Eight 4 to 20 mA DC inputs, eight 4 to 20 mA DC outputs, non-isolated
	NFAB841	Eight 1 to 5 V DC inputs, eight 4 to 20 mA DC outputs, non-isolated (differential input)
Analog Output Module	NFAV542	Sixteen -10 to +10 V DC outputs, non-isolated
	NFAV544	Sixteen -10 to +10 V DC outputs, point-to-point non-isolated, field-to-circuit isolated
	*NFAI543	Sixteen 4 to 20 mA DC outputs, point-to-point non-isolated
Digital Input Modules	NFDV151	Thirty-two digital inputs, 24 V DC, point-to-point non-isolated, field-to-circuit isolated
	NFDV141	Sixteen digital inputs, 100 to 120 V AC, point-to-point non-isolated, field-to-circuit isolated
	NFDV142	Sixteen digital inputs, 200 to 240 V AC, point-to-point non-isolated, field-to-circuit isolated
	NFDV157	Thirty-two digital inputs, 24 V DC, point-to-point non-isolated, field-to-circuit isolated, dedicated for use with pressure-clamp terminal block
	NFDV161	Sixty-four digital inputs, 24 V DC, point-to-point non-isolated, field-to-circuit isolated
Digital Output Modules	NFDV551	Thirty-two digital outputs, 24 V DC, point-to-point non-isolated, field-to-circuit isolated
	NFDV557	Thirty-two digital outputs, 24 V DC, point-to-point non-isolated, field-to-circuit isolated, dedicated for use with pressure-clamp terminal block
	NFDV561	Sixty-four digital outputs, 24 V DC, point-to-point non-isolated, field-to-circuit isolated
	NFDV532	Four-channels UP/DOWN pulse width outputs, 24 V DC, point-to-point non-isolated, field-to-circuit isolated
Relay Output Module	NFDR541	Sixteen relay outputs, 24 to 100 V DC or 100 to 240 V AC, point-to-point non-isolated, field-to-circuit isolated
Foundation Fieldbus Communication Module	NFLF111	Foundation Fieldbus ports: 4
Communication Modules	NFLR111	Two RS-232-C communication, 300bps to 115.2kbps
	NFLR121	Two RS-422/RS-485 communication, 300bps to 115.2kbps
Dummy Covers	NFDCV01	Dummy cover for I/O module slot
	NFDCV02	Dummy cover for power supply module slot
Dummy Covers	NFCCC01	MIL Cable Connector Cover
SB Bus T-joint	NFSBT01	SB Bus T-joint
	NFSBT02	SB Bus T-joint with Built-in Terminator
FCN/FCJ Software License Support Contract	SVMEC05	Contract of reissuing licenses for spare parts
System Card for FCN/FCJ Spare parts	NT225AA	System card spare part

*HART Communication is also available as an option

Hardware for FCJ

Name	Model	Description
FCJ Controller	NFJT100	With 6 analog inputs, 2 analog outputs, 16 digital inputs, 16 digital outputs, 2 Ethernet ports, 2 RS-232-C ports, and optionally 2 Foundation Fieldbus ports

Corrosion protection coatings (G3 coatings) are available for all components.

Trademarks

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The clear path to operational excellence

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WITH AGILITY

VigilantPlant is Yokogawa's automation concept for safe, reliable, and profitable plant operations. VigilantPlant aims to enable an ongoing state of Operational Excellence where plant personnel are watchful and attentive, well-informed, and ready to take actions that optimize plant and business performance.

YOKOGAWA ELECTRIC CORPORATION

World Headquarters

9-32, Nakacho 2-chome, Musashino-shi, Tokyo 180-8750, Japan
<http://www.yokogawa.com/>

YOKOGAWA CORPORATION OF AMERICA

12530 West Airport Blvd, Sugar Land, Texas 77478, USA
<http://www.yokogawa.com/us/>

YOKOGAWA EUROPE B.V.

Euroweg 2, 3825 HD Amersfoort, The Netherlands
<http://www.yokogawa.com/eu/>

YOKOGAWA ENGINEERING ASIA PTE. LTD.

5 Bedok South Road, Singapore 469270, Singapore
<http://www.yokogawa.com/sg/>

YOKOGAWA CHINA CO., LTD.

3F TowerD Cartelo Crocodile Building
No.568 West Tianshan Road, Shanghai 200335, China
<http://www.yokogawa.com/cn/>

YOKOGAWA MIDDLE EAST B.S.C. (c)

P.O. Box 10070, Manama
Building 577, Road 2516, Busaiteen 225, Muharraq, Bahrain
<http://www.yokogawa.com/bh/>

