Co-innovating tomorrow™

YOKOGAWA

Nuclear Solutions

Data Acquisition, Control, and Monitoring Solutions for Nuclear Power

Bulletin 04L70B01-02E-A

Yokogawa provides proven and highly reliable data acquisition and control solutions for the commercial nuclear power industry. Partnered with National Technical Systems (NTS), we offer qualified equipment and complete, integrated systems for challenging monitoring, control, recording and test applications.

YOKOGAWA

Data Acquisition

Nuclear customers world-wide count on the renowned reliability of the DAQSTATION. Industry-accepted and used for control room and other plant applications, there are models and options to fit every need, including the narrow case DX364 and removable-chassis DX1000N. Standard features on all models include universal inputs , high capacity data storage, and Ethernet communications. A full catalog of information is available describing all DAQSTATION models and capabilities.

Controllers

Offering extreme reliability and sophisticated control functions, the Yokogawa YS1700 and UT35A controllers are the ideal choice for many control room and main plant control applications.

Both models have bright, easy-to-read displays, multiple analog inputs, and powerful control functions. For qualified control room applications, choose the YS1700 with its dual CPUs for maximum reliability and hard-manual control for added protection. The YS1700's powerful function block programming method and setting tools allow it to control water chemistry, temperature, pressure and many other demanding plant processes.

The UT35A can be specified for many commercial applications where reliable, economical control is required in a compact ¼ DIN package. Applications include HVAC, temperature, level, sequence control and more. The included PID control and ladder logic functions use proprietary Yokogawa fuzzy logic technology to achieve highly accurate control.

An optional Ethernet interface with Modbus TCP protocol allows both controller models to readily interface with plant information systems and other control and data acquisition equipment. Controller programming can also be achieved using the Yokogawa Parameter Setting software.

Integrated Solutions

Yokogawa can design and build custom monitoring and control systems for many plant applications. Our capabilities include custom software development, custom adapter plates, equipment panels and enclosures, engineering and assembly drawings and qualification and acceptance testing. Recent projects include complete, turn-key diesel generator monitoring systems that retro-fit antiquated systems, providing a level of performance and insight into diesel generator operation previously unattainable.

Our manufacturing and engineering department in Newnan, GA operates in a ISO9001 quality facility, and utilizes the latest CAD design tools. In-house capabilities include a machine shop, surface mount printed circuit board fabrication and assembly team to handle any size project.

DAQSTATION

The Standard for paper recorder replacement

DAQSTATION DXAdvanced data acquisition stations replace most popular paper chart recorders- with no panel modification requirements. Advanced display, archiving, and connectivity functions support a wide range of plant monitoring and recording applications.

DX2000 Series
- 4 to 48 inputs
- External input option; up to 348 channels max
- 10.4″ color TFT display

DX1000N Series
- 2 to 12 inputs
- 5.5″ color TFT display

DX364 Series
- 3x6 paper replacement
- 4 inputs
- 3.5″ color TFT display

DX3000 Series
- Replaces Yokogawa DX200 /S83, Westronics 3200, D11E and M11E series
- 4-30 input channels
- External input option; up to 330 channels max
- 10.4″ color TFT display

DX2000

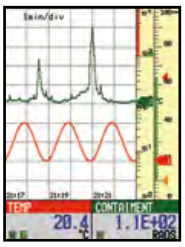
DX1000N

DX364

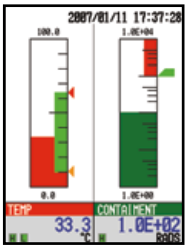
DX3000

Advanced Display and User Interface

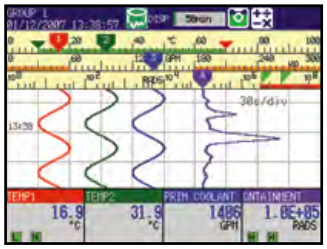
Vibrant color displays give operators critical plant information at-a-glance in familiar display formats, and custom graphics support allows the user to build the exact screen they need.



Trend display with logarithmic scale

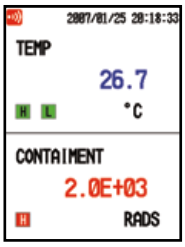


Bar graph display

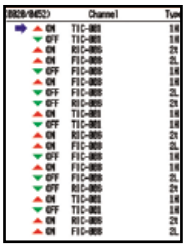


Trend display

Overview display



Digital display



Alarm summary display

Trend history display with calendar search

Split screen display

LOGARITHMIC SCALE AND EXPONENTIAL DISPLAY
- Required for radiation level monitoring

COLOR SCALE BAND
- Color scale banding defined by zone low and zone high, or within zone

SIMULATOR FUNCTION
- Via Ethernet or contact input, host PC can freeze all display functions including clock; pauses DX for exercise review. Clock resumes correct time on release.

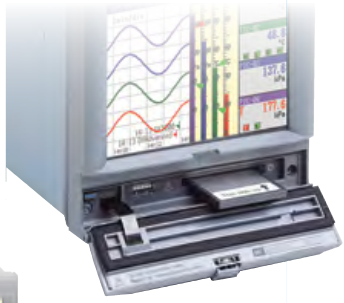
USB PORT
- USB port for connection of USB keyboard or USB memory

Removable Chassis Convenience

DX1000N and DX364 models utilize an inner chassis that can be removed from the front of the instrument. Technicians can access all internal components for routine calibration checks from the front of the control panel. They no longer have to access the rear of the control panel or disturb any field and power supply wiring for this task.

Advanced Data Storage

High capacity, non-volatile flash memory provides secure, non-stop recording over long time periods. This memory technology requires no battery back up, and there is no risk of data loss during power failure of any duration. Reliable Compact Flash removable media permanently archives data and is used to transport it to the PC environment.



REMOVABLE MEDIA

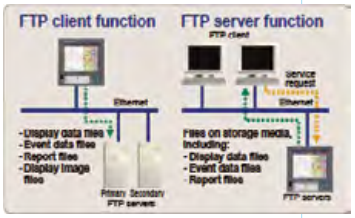
DX364, DX1000N, DX2000, DX3000
- Compact Flash card
- USB flash drive (optional)

Advanced Ethernet Connectivity

The Ethernet interface standard on all DAQSTATION models includes powerful connectivity and convenience functions that make access to important information easier than ever

SUPPORTED PROTOCOLS AND FUNCTIONS:

- FTP data file transfer
- Web server functions
- E-mail messaging functions
- SNTP client/server functions for time synchronization
- Modbus TCP & RTU
- EtherNet/IP™ and PROFIBUS-DP (DX1000N/DX2000/DX3000)
- OPC Server software option
- Accepts simulator channel data from host PC, also pause and memory clear functions



Controllers

Yokogawa offers two highly capable controller models that are qualified for nuclear power applications.

The YS1700 programmable controller provides single-loop, cascade, and output selector control modes. There is also a user-programming mode that supports custom control strategies. This unit features dual CPU redundancy and hard manual control with hot-swap capability. Peer-to-peer communication between controllers allows the user to build a small-scale control system.

The UT35A Digital Indicating Controller (1/4 DIN size) is a compact, general-purpose instrument with an intuitive and highly visible Active Color PV display that changes color from white to red on a PV deviation or an alarm event. Control functions include auto-tuning, PID control with overshoot suppression and new hunting suppression functions. Re-transmission output and 15 VDC transmitter power supply are also included.

On both models, optional communication interface choices include RS-485 serial with Modbus and Ethernet with Modbus TCP protocol. The UT35A can also be equipped with optional PROFIBUS-DP and DeviceNet protocol support.

YS1700 Programmable Indicating Controller

Controller modes
- Single-loop
- Cascade
- Selector with pre-set control modes
- Programmable for user-defined control modes

Programming functions
- Versatile computation
- Function Block programming; 400 blocks
- Sequence Logic programming; 1000 steps

Programming method
- The YS1700 controller is programmed using a PC. You can combine computational instructions to program a wide range of control functions

Control methods
- Basic PID control (built-in nonlinear control function)
- Proportional control
- Feed-forward control
- Variable set-point filtering
- Self-tuning
- Control computation period: 0.05, 0.1 or 0.2 sec

I/O signals
- Input: 1 to 5 V (5 points, Expandable to 8 points)
- Output: 4 to 20 mA (1 point) and 1-5 VDC (2 points, Expandable to 4 points)
- Status I/O signals: 6 points for input/output and 1 fail contact, Expandable to 148 DIO

Approvals
- FM approval for non-incendive electrical equipment for use in hazardous locations, Class I, Div 2, Gr. A, B, C&D; T4 (with/FM options)

Communication functions
- YS-net for peer-to-peer communication.
- Serial RS-485 with Modbus RTU protocol
- Ethernet with Modbus TCP protocol
- DCS-LCS

UT35A Digital Indicating Controller

Controller modes
- Single loop PID with ladder sequence functions
- Optional position/proportional and heat/cool

Display
- Large, 5 digit Active Color PV display:
  - Alarm Status: Active color display changes from white (normal) to red (alarm) automatically.
  - Deviation Status: Color changes based on a PV deviation from SP

Programming method
- PC software configuration using LL50A Parameter Setting Tool
  - Parameter settings are transferred via the front panel using an optical communication adapter

Optional Communication functions
- Serial RS-485 with Modbus RTU and ASCII protocols
- Serial RS-485 with PROFIBUS-DP and DeviceNet protocols
- Ethernet with Modbus TCP protocol

Diesel Generator Monitoring System

Yokogawa builds custom new turn-key diesel generator monitoring systems using our high performance data acquisition systems that capture and report on the critical information required to perform a successful and reliable engine/generator test.

This customized system allows you to monitor:

- Starting speed
- Temperature
- Cool down
- Voltage, current, frequency
- Oil pressure
- Fuel levels
- And much more…

Yokogawa diesel generator systems provide:

- Extreme reliability
- Data accuracy
- Preventive maintenance and diagnostic information
- Interface to plant information systems

Yokogawa services:

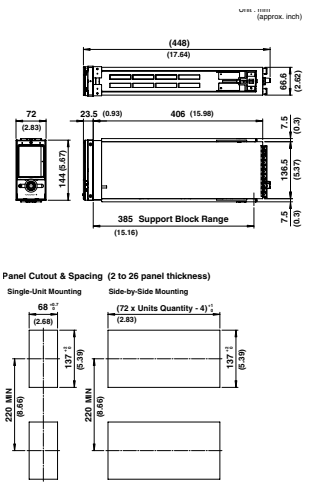
- Design engineering
- Assembly
- Acceptance testing
- Documentation & training

Yokogawa will design, build, test and provide documentation for your system at our Newnan, GA headquarters. We can fully qualify systems to 1E standards and supply both Safety and Non-Safety Seismic supporting documentation.

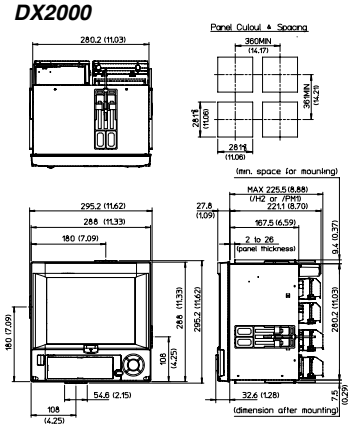
To launch your custom diesel generator monitoring project, contact your local Yokogawa representative or email us at networksolutionspmk@us.yokogawa.com.

Dimensions

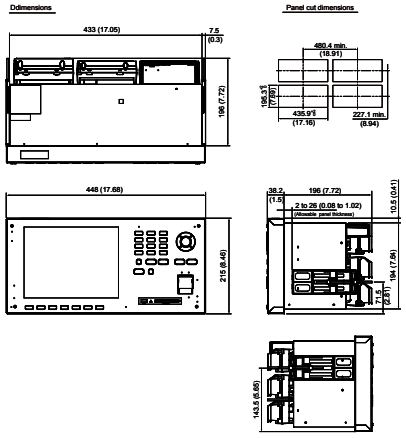
DX364



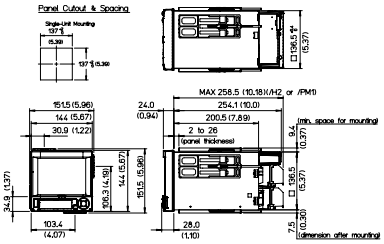
DX2000



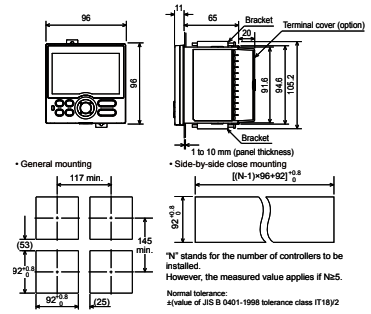
DX3000



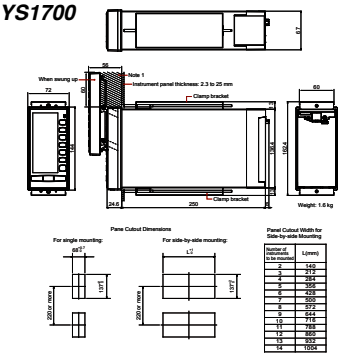
DX1000N



UT35A



YS1700



DAQSTATION ordering notes:

DX1000N/DX2000
- Specify option /S2 for Log & Exponential display and Simulator functions
- Specify option /R1 remote control inputs for contact input activation of simulator functions
- Specify option /USB1 for USB interface

DX364
- Includes Log & Exponential display and Simulator functions.
- Specify option /R1 remote control inputs for contact input activation of simulator functions
- USB interface is included as standard

DX3000
- Includes Log & Exponential display and Simulator functions. Specify option /R1 remote control inputs for contact input activation of simulator functions
- Specify option /USB1 for USB interface

Qualifications	Standards
Seismic qualification	IEEE 344-1975/1987
Environmental qualification	IEEE 323-1974 (DX1000N) IEEE 323-1983 (DX364, DX1000N, DX2000, DX3000)
EMI/RFI	EPRI TR 102323 REV 1&2 (DX200/S83) USNRC Reg Guide 1.180 Rev 1 (DX1000N/DX2000) USNRC Reg Guide 1.180 Rev 1 & EPRI TR 102323 Rev 1 to 3 (DX364)
Firmware validation and verification	IEEE 7.4.3.2 Annex D

Description	Document No.
DX364 General Specifications	GS04L70B01-01E
DX1000N General Specifications	GS04L43B01-01E
DX2000 General Specifications	GS04L42B01-01E
DX3000 General Specifications	GS04L75B01-01EN
UT35A/UT32A General Specifications	GS05P01D31-01EN
YS1700 General Specifications	GS01B08B01-01E

YOKOGAWA

Yokogawa Electric Corporation
World Headquarters
9-32, Nakacho 2-chome,
Musashino-shi, Tokyo 180-8750
Japan
yokogawa.com/jp

Yokogawa Corporation of America
12530 W. Airport Blvd.,
Sugar Land, TX 77478
USA
yokogawa.com/us

Yokogawa Europe B.V.
Euroweg 2, 3825 HD
Amersfoort, The Netherlands
yokogawa.com/eu

Yokogawa Engineering Asia PTE. LTD
5 Bedok South Road, Singapore 469270,
Singapore
yokogawa.com/sg

Yokogawa China Co., Ltd.
3F Tower D, Cartelo Crocodile Building,
No.568 West Tianshan Road, Shanghai
200335, China
yokogawa.com/cn

Yokogawa Middle East & Africa B.S.C.(c)
P.O. Box 10070,
Manama Building 577,
Road 2516, Busaiteen 225,
Muharraq, Bahrain
yokogawa.com/bh

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