

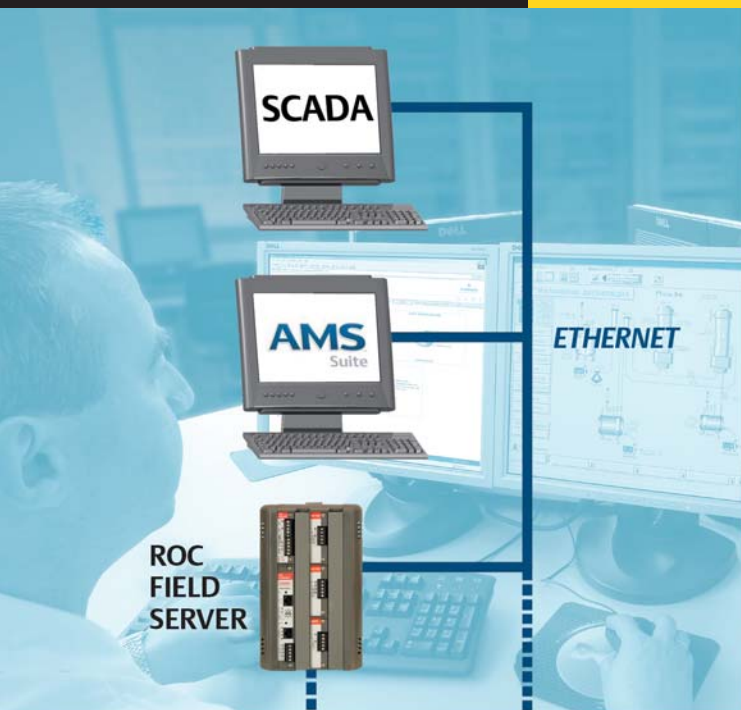
ROC800-Series—The Solution to Field Automation Problems



Flow Computer Division

Building on our reputation for solving problems

The ROC family of Remote Operations Controllers has established an industry benchmark for flexibility, robustness, ease of use, and reliability. The ROC800-Series builds upon this reputation with new features, benefits, and technology that make it the preferred choice for your most demanding remote measurement and control applications.



The ROC800-Series is a core component of **Smart Remote Automation**, an extension of PlantWeb® architecture. The ROC800-Series powers PlantWeb by capturing and delivering smart instrumentation diagnostic data to AMS

Suite from remote locations, providing you with an accurate picture of instrument performance. Typical device diagnostics include:

- Electronics failure
- Sensor failure
- Plugged impulse lines
- RTD life estimation
- Valve travel deviation
- Configuration warning
- Security breach
- And more...





The ROC800-Series has the ruggedness and low power consumption of an RTU; the audit trails and historical data of a flow computer; and the scalability, speed and control capability of a PLC in a single device. It is ideal for field installations where the monitoring, measurement and control of processes and equipment are required.

These features give the ROC800-Series outstanding flexibility in meeting a wide range of field applications:

- Operation over a wide temperature range
- Low power consumption
- Rugged, field-ready construction
- Field-side surge and short-circuit protection
- Local storage of monitored, measured and calculated data
- Local control of field equipment including valves and motors
- Custom configurations
- Broad communications capabilities
- Expandable software and hardware
- High levels of data security

This versatility makes the ROC800-Series ideal for almost any measurement and control application located outside the plant walls, including:

- Gas production
- Fiscal metering
- Compressor stations
- Offshore platforms
- Small gas processing operations
- Water and wastewater facilities
- Tank farms
- Boilers and chillers

The ROC800-Series is comprised of the ROC809, offering nine slots for I/O and communication modules, and the ROC827 offering either 3, 9, 15, 21, or 27, slots using snap-together module racks.



The ROC827 features snap-together module racks that let it accommodate from 3 to 27 I/O and communication modules.



Performance Problems Solved



Traditional RTUs lack the processing speed and capacity to handle control tasks requiring extremely fast response, like those performed by PLCs. The ROC800-Series closes this performance gap by using the Motorola® PowerPC® (MPC862) 32-bit microprocessor as its engine. Not only is the MPC862 fast, but it was designed for telecommunications and networking giving the ROC800-Series a real edge over most PLCs.

The real-time, multitasking operating system is designed specifically for the kind of measurement and control tasks encountered in field applications. This operating system has proven its robustness in industrial control, telecommunications and avionics applications.

The high power consumption of PLCs often limits their use to factory applications. Low power consumption was a key design goal of the ROC800-Series. In addition to using low power components, extensive use was made of the "sleep" modes provided by the CPU. Sleep modes shut down operations - such as certain software tasks - when they are not needed, and they control power to devices such as LEDs.

Speed, low power consumption and optimized telecommunications are just some of the benefits made possible by the CPU Module.



The ROC800-Series gives you the best features of RTUs, flow computers and PLCs in one device.



RTU, Flow Computer and PLC

You get the ruggedness and low power consumption of an RTU, the audit trails and historical data of a flow computer, and the scalability, speed and control of a PLC in one device.

Fill-In-The-Blanks Configuration

You save time and effort because you don't start from scratch to configure the ROC800-Series. Simply fill in the blanks to configure I/O, PID loops, flow calculations and history.

IEC 61131-3 Compliant Programming

With our DS800 Development Suite, you can create programs in any one of five languages. Create your libraries, functions, function blocks and program templates for single and multiple architecture applications.

Fast, Accurate Flow Calculations

Gas calculations comply with AGA and API standards.

- AGA 3 for orifice metering
- AGA 7/ISO 9951 for turbine metering
- AGA 8/ISO 12213-2 for compressibility
- API Chapter 21

Distributed Architecture

Distributed architecture allows you to strategically place units where you need them to reduce field wiring runs while retaining the ability to create a single control algorithm or multiple control algorithms across units.

Rugged I/O

I/O modules make extensive use of optical (electrical) isolation, transient suppression, and current limiting to dramatically improve reliability. System failures related to power and wiring errors are virtually eliminated without the use of fuses.

Sophisticated PID Loop Control

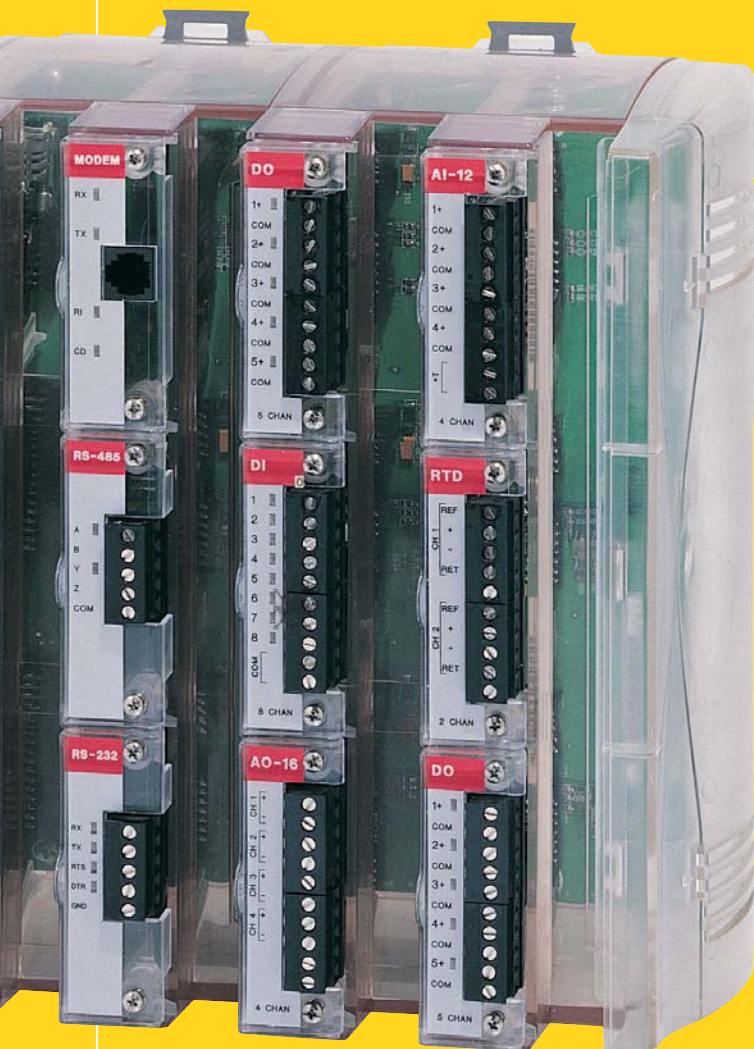
The ROC800-Series provides outstanding PID (proportional, integral, derivative) loop control capability that rivals that found in dedicated process controllers.

Flexible Logic and Sequencing Control

Function Sequence Table, or FST control, lets you construct your own control strategies by choosing from a set of logic, math, comparison, time-related, control-related, database, and general command sets.

Communications

In addition to an Ethernet port, the ROC800-Series has two fully functional built-in EIA -232 (RS-232) ports, one typically used for communications to a PC-based local operator interface, and one for communication to other devices. Three additional ports can be added using plug-in communication modules.



ROC809

RTUs

- Low Power
- Broad Communications
- Environmentally Hardened

Flow Computers

- Audit Trails
- Historical Records
- Flow Calculations

PLCs

- Scalable
- Powerful Control
- Fast

I/O Problems Solved



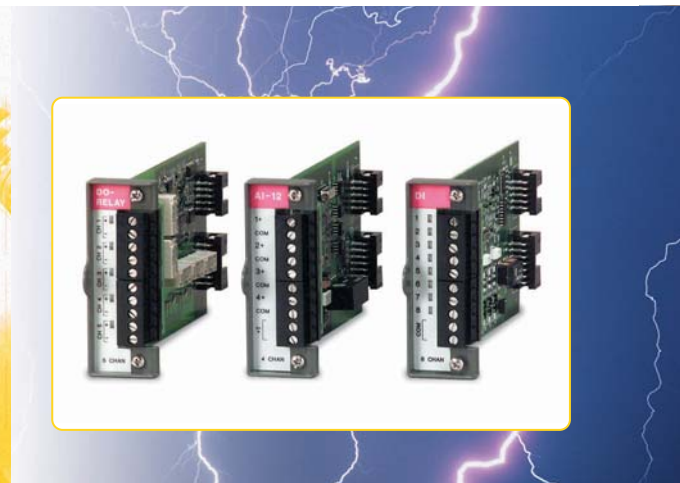
➤ A wide range of plug-in I/O modules lets the ROC800-Series interface to almost any field device.

It's no secret that interfacing to end devices can be the weakest link in a measurement and control system. Problems related to grounding, wiring errors, electrical noise and transients are commonplace. The ROC800-Series solves many of these problems because we've designed its I/O and communications modules with accuracy, ruggedness and survivability in mind.

The I/O modules, which plug into the unit's module slots, make extensive use of optical (electrical) isolation, transient suppression, and current limiting to dramatically improve reliability and virtually eliminate failures related to power, grounding and wiring errors. All I/O modules are isolated from the backplane to minimize cross-card failures. The benefits of this extensive protection are less downtime, fewer trips to the field for repairs, and reduced spares inventory to name a few.

To facilitate expansion or repair, I/O modules can be removed and replaced under power. To simplify configuration, they are self-identifying to the firmware.

Scalability is no problem for the ROC827. Its base unit houses up to three I/O modules and increasing I/O is as easy as snapping additional I/O expansion racks onto the base unit. Up to four six-slot expansion racks can be added to accommodate a total of 27 I/O modules.



➤ I/O modules are exceptionally rugged and designed to survive shorts and transients. Their fuseless design means less downtime.

Modules can be plugged into the module slots in any order and combination of module types. The low point count density of these modules lets you better match I/O to your application requirements. You buy more of what you need, and less of what you don't need. And should a module fail, the impact on your application is minimized.

The HART interface module supports HART-compatible smart instrumentation, increasing the number of instruments that can be connected to the ROC800-Series. It also lets the ROC800-Series transfer device diagnostics to AMS Suite, which is a key component of Smart Remote Automation.



➤ Module racks use pluggable backplanes and snap-together housings to make I/O expansion quick and easy.

Communication Problems Solved



The sophisticated ROC firmware makes it easy to implement almost any communication strategy. ➤

Modern automation systems place increasingly greater demands on the communications capabilities of field equipment. We designed the ROC800-Series to blend into almost any system environment by virtue of its wide range of communications and networking options.

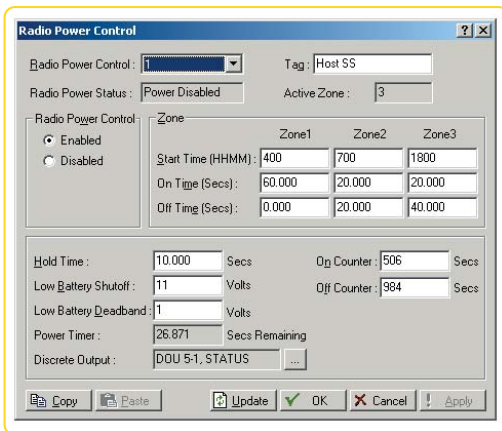
Its Ethernet capability can effectively extend your company's local area network (LAN) to the field. An Ethernet connection gives you more data at a lower cost than with conventional communications methods. When coupled with our DS800 Development Suite (page 10), Ethernet also makes it possible to network ROC800-Series units, giving you tremendous I/O and control capabilities for large applications.

In addition to an Ethernet port, the ROC800-Series has two built-in EIA-232 (RS-232) ports, one typically used for communications to a PC-based local operator interface, and one for communication to other devices.

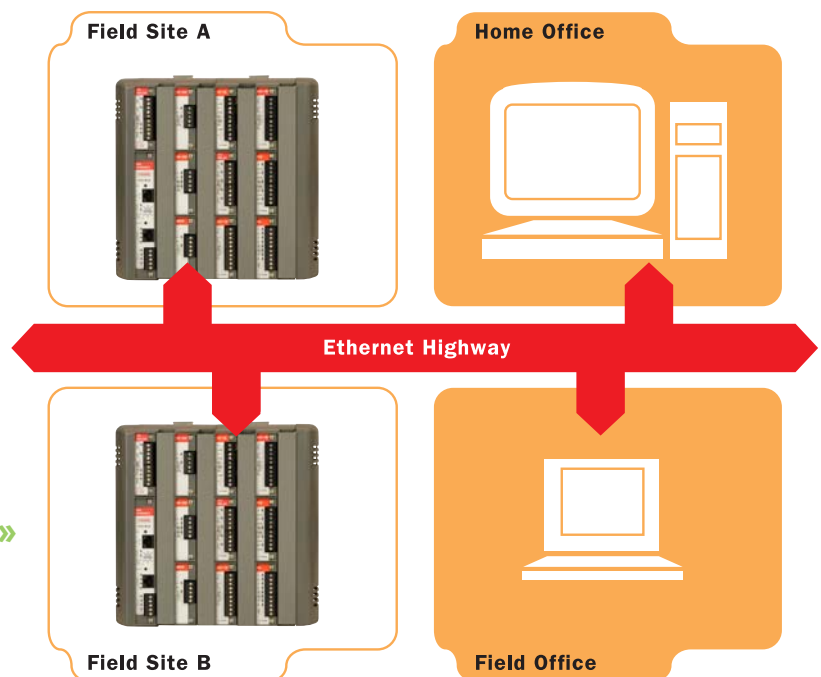
Three additional ports can be added using plug-in Communication Modules. Any combination of the following modules can be used:

- EIA-232 (RS-232) for point-to-point asynchronous serial communications
- EIA-422/EIA-485 (RS-422/RS-485) for multiple-point asynchronous serial communications
- Dial-up modem for communications over a telephone network at up to 56K bps
- Multi-Variable Sensor (MVS) interface for up to 6 Remote Sensors (two MVS Modules maximum)

An outstanding communication feature is Spontaneous Report-by-Exception (SRBX) Data Transmission capability. A host computer can poll the ROC800-Series unit at a user-specified time interval, or the unit can initiate a transmission when certain alarm conditions occur. SRBX can greatly reduce communication system loading and related costs. Modbus protocol is supported so you can easily integrate it into new or existing systems.



The available Ethernet port gives you access to field data across your organization. ➤



Application Problems Solved

The problem with many RTUs, PLCs and flow computers is their inability to meet a wide range of typical field applications. Most are optimized for one type of application and therefore weak in others, leaving you little choice but to purchase as many types of devices as you have applications.

The ROC800-Series addresses this problem with a comprehensive applications package that supports a wide range of metering and control needs. The package builds upon the outstanding features proven in tens of thousands of ROC300-Series installations worldwide. The ROC800-Series carries on that tradition as an established leader in gas flow measurement and PID loop control.

Fast, Accurate Flow Calculations

The ROC800-Series flow calculations are compliant with:

- API Chapter 21 Section 1
- AGA 3 for orifice metering
- AGA 7 (ISO 9951) for turbine metering
- AGA 8 (ISO 12213-2,3) for compressibility
- ISO 5167 for orifice metering (liquids)
- API 12 for turbine metering (liquids)

Setting up meter runs is fast and easy, even for novices, with our fill-in-the-blanks configuration method. We've done the hard work so you don't have to. There's no learning curve, and minimal knowledge of AGA calculations is needed.

The ROC800-Series incorporates the Meter Station concept to make it easy to configure and operate multiple meter runs with similar properties. It reduces communications overhead and the amount of data entry required when configuring multiple meter runs. Up to 12 meter runs can be grouped in up to 12 stations.

Sophisticated PID Loop Control

The ROC800-Series provides outstanding PID (proportional, integral, derivative) loop control capability rivaling that found in dedicated process controllers. A wide range of control problems can be solved easily and quickly with outstanding results. The control firmware incorporates:

- Pre-configured templates for basic PID loop control
- Up to 16 PID control loops each with override support
- Support for both analog and discrete control devices

In addition to the standard PID algorithms provided, special loop control strategies can be implemented using the extensive programming capabilities of the ROC800-Series.

Flexible Logic and Sequencing Control

The same logic and sequencing control capability we pioneered in the ROC300-Series is a standard feature of the ROC800-Series. Function Sequence Table (FST) control lets you construct your own control strategies by choosing from a set of logic, math, comparison, time-related, control-related, database and general command sets. An easy-to-use editor is provided in ROCLINK for building FSTs. The ROC800-Series provides:

- Up to six FSTs
- 500 lines for each FST, providing 3,000 total lines of code
- Event and alarm logging for FSTs
- Write data to, and retrieve data from, the historical database

ROC300 users will appreciate knowing that they can run their current FSTs on the ROC800-Series with only minor modifications.





Station Setup

General | Gas Quality | Advanced | Alarms

Station: [1] Tag: Station 1 History Segment: Station 1

Calculation Standard: ☒ AGA ☐ ISO Calculation Edition: 1992 Contract Hour: 6

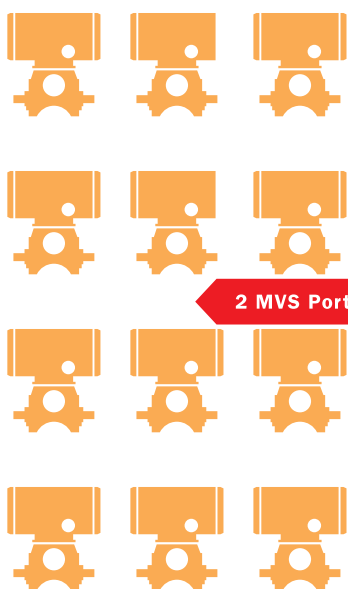
Station Values:

Flow Rate:	3436.769	MCF/day	Zs:	0.9979234
Energy Rate:	3436.769	MMBTU/day	Zb:	0.9979234
			Base Density:	0.0466 Lb/Cf
Flow Today:	86.10591	MMCF	Flow Yesterday:	6.639583 MMCF
Energy Today:	86.10591	MMBTU	Energy Yesterday:	6.639582 MMBTU

Active Alarms: [0]

[Copy] [Paste] [Update] [OK] [Cancel] [Apply]

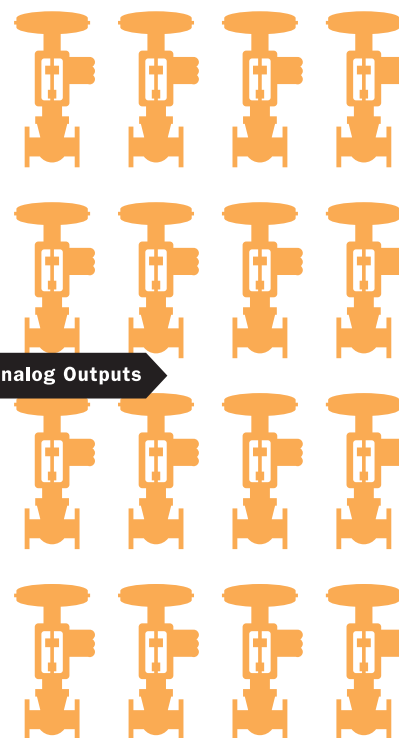
12 Meter Runs and
16 Control Loops
can be managed by
the ROC800-Series,
while leaving plenty
of I/O capacity for
other tasks.



2 MVS Ports



Analog Outputs



Programming Problems Solved



To fully exploit the capabilities of the ROC800-Series, you don't need to be a programming expert. We've assembled programming tools that make almost anyone look like an expert. And all tools are Microsoft® Windows®-based for ease of use.

DS800 Development Suite

The optional DS800 Development Suite is a powerful programming tool that lets you create custom continuous and discrete control strategies using any of six programming languages. Five are IEC 61131-3 graphical programming languages: sequential function chart, function block diagram, ladder diagram, structured text and instruction list. A graphical flow chart programming language is also provided.

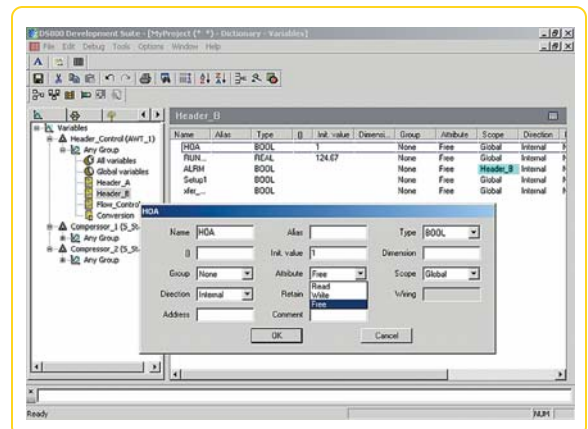
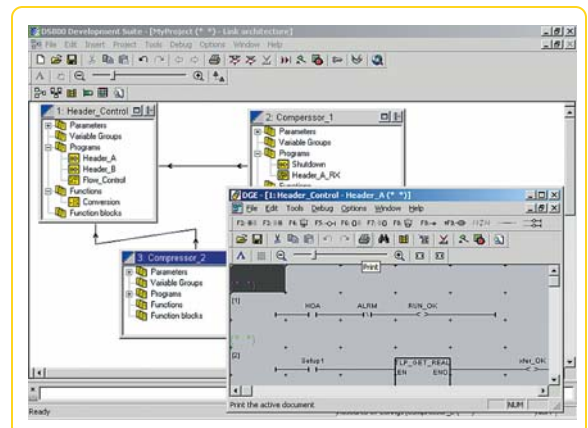
DS800 provides a standard programming interface that allows people with different backgrounds and skills to create different elements of a program using any of the programming languages. When completed, all elements will work together seamlessly.

For example, if your background includes programming PLCs, DS800 lets you continue to create programs in ladder logic and then run

them in the ROC800-Series. And, if your background is process control, you can still create programs using Function Block diagrams.

Pre-Engineered Application Programs

Pre-engineered application programs enable the ROC800-Series to address the needs of many common applications. The programs are written in the C/C++ language and can be adapted to your specific requirements. Contact your Emerson Process Management Representative or sales office for more information.



➤ The DS800 Development Suite provides a standard programming interface that lets you implement your strategies using any of six languages.

Configuration Problems Solved



The ROC800-Series uses our Microsoft® Windows®-based ROCLINK software package to perform all configuration and setup functions. ROCLINK runs on almost any laptop or desktop personal computer and uses a simple fill-in-the-blanks approach to configuration.

You can perform configuration and data retrieval on-site, or remotely through virtually any communications link. The remote capability can be a tremendous cost saver by reducing the need for on-site travel.

Help screens are provided and are accessed either from the Help menu or in a context-sensitive fashion. This makes it easy to obtain information on almost any topic.

With ROCLINK you can:

- Configure and view I/O points, stations, flow calculations, PID control loops, system parameters and power management features
- Retrieve, log and print history data
- Retrieve, log and print events and alarms
- Perform five-point calibration on analog inputs including multivariable sensor inputs
- Implement user security levels
- Create and edit graphical displays
- Create and edit Function Sequence Tables (FSTs)
- Set up communications parameters for direct connection, radio interface, telephone modems and other communications methods



« You can operate the ROC800-Series locally using the 800 Keypad Display.

ROCLINK »
is powerful,
yet easy-to-use
on-site or
from a host.

Support Problems Solved

Doing business with Emerson Process Management gives you the confidence that the products, services and solutions you buy are backed by our unmatched global support. And Emerson's industry expertise will help you achieve the performance and profitability goals you are measured by.

The information and support you need can be as close as your telephone or web browser, or right around the corner. With over 600 locations in more than 85 countries, chances are we have an office near you.

Technical support for your ROC, FloBoss™, and related products is also available directly from the Internet with SupportNet™ Technical Services. Whether you need software or firmware updates, or just have a technical question, SupportNet can make your job easier. And best of all, SupportNet is available to you 24 hours a day, seven days a week.

SupportNet gives you an easy and convenient means to get answers to technical questions or solutions to product problems. You have access to our extensive knowledge base of information, as well as to our factory-trained technical support team. You also have access to e-learning modules that provide audio-visual training on a variety of topics.

You can enjoy even more benefits with SupportNet Plus, a subscription service that lets you download software and firmware updates, among other advantages. SupportNet Plus gives you valuable on-line tools designed to meet your technical support needs.

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