



Configuring and Maintaining Fieldbus Instruments in Hazardous Areas

The 375 Field Communicator is the world's first and only handheld tool for use with HART® and FOUNDATION™ fieldbus instruments in intrinsically safe circuits

by Alan R. Dewey



While diagnostic information obtained remotely from the smart field instrumentation found in most process industry plants today enables technicians to do most configuration and diagnose work from the comfort of their shop, certain tasks are best performed at the device in the field using a handheld communicator. When the work site is designated a Class 1 Division 1 or Zone 1 hazardous area, the communicator must be functional and rugged without breaching standard safety precautions.

For a number of years, the intrinsically safe 275 HART Communicator has been used with devices configured for the HART® communications protocol. However, with the introduction of the FOUNDATION™ field-

bus protocol, the requirements for a field maintenance tool became considerably more complex and beyond the capability of the 275 Communicator. One solution for configuring fieldbus transmitters in the field is to use laptop and notebook computers. However, the only true portable maintenance tool for configuring and maintaining fieldbus devices in hazardous areas is Emerson's 375 Field Communicator.

Explosion protection of the 375 Communicator

Due to the focus on global use the explosion protection measure type of protection Intrinsic Safety (i) was selected. Only this solution assures the realisation of the different certifications world wide with only one variant.

The 375 Field Communicator (KL option) is certified by FM (USA), CSA (Canada) and EXAM (Europe). Additionally the FISCO requirements are fulfilled. The specific approvals are:

- Factory Mutual (FM)
 - according to NEC 500: Class I, Division 1, Groups A, B, C, and D
 - according to NEC 505: Class I, Zone 0, AEx ia IIC T4 (Ta = 50 °C)
- Canadian Standards Association (CSA)
 - Ex ia IIC T4
- Exam (according to ATEX 94/9/EG)
 - II 2 G (1 GD) EEx ib [ia] IIC T4

The approvals and the test reports are documented according to IEC Ex scheme and other global certifications can be easily realized. Unique is the possibility to change the battery pack in hazardous locations. This could be reached by designing the connection to the handheld in intrinsically safe manner.

Smart Instrumentation

Essentially all process industry plants now employ some types of smart instrumentation. Besides reading or controlling the process value of interest, these instruments generate a myriad of additional data having to do with the characteristics and health of the device itself. This information is typically transmitted over a multi-drop digital bus back to the control system host.

Modern asset management software, such as the AMS™ Suite: Intelligent Device Manager, gives engineers and technicians the ability to communicate with smart field devices connected to the digital bus. By tapping onto this network, they are able to remotely configure those devices and even to diagnose device problems without having to go out into the plant – for a tremendous saving of time. This software also monitors the condition of the instruments on a regular basis and automatically keeps a maintenance history of every device in a master database. This is a major benefit where accurate records must be available for regulatory purposes.

Local configuration and maintenance

Despite the obvious benefits of remote access using asset management software, it is often necessary to configure and diagnose instruments in the field. For one thing, this technology, while growing rapidly, is still not widely utilized, so portable tools are needed to

supplement advanced online diagnostics. In addition, certain tasks simply must be done at the instrument. These include zero trimming of pressure transmitters after final mounting, compensating a level transmitter for the wet leg included in the process piping, stroking a control valve and physically watching its response, and entering nameplate and device tag data into a field device after final mounting.

With the many restrictions placed on equipment taken into a Class 1 Div 1 and Zone 1 (0) area, the 375 Field Communicator emerges as the ideal tool for all these tasks, especially with instruments that comply with the requirements of the Fieldbus Foundation. This is the fastest growing class of smart instrumentation with about 500,000 devices currently in use around the world. For a great many of these devices, a handheld communicator is the only means of configuration and maintenance after they are installed. Again, the 375 Field Communicator is the ideal solution.

Introduced in July 2003, this unit has quickly become the standard field communicator used by instrument technicians. It is compatible with more than 800 HART and fieldbus instruments from a variety of manufacturers.

This portable communicator is rugged and reliable, meeting the demands of production environments. Navigation through test procedures using the large touch-screen is even easier with the 375 Communicator than with the older type 275. The brighter screen is easier to see even in dark areas of a plant or mill.

The processor of the 375 Communicator is 20 times faster than the 275 HART communicator, giving it blazing speed by comparison. It features 32 MB of flash memory, 32 MB of RAM memory, and a 128 MB System Card. The readily accessible Configuration Expansion Module contains another 32 MB of memory and easily holds hundreds of device configurations. The rechargeable battery pack is specially designed for hazardous areas. It can be fully recharged (in a safe area) in two hours. These are all good reasons to replace the older models with the 375 Field Communicator now to speed up normal everyday maintenance in non-hazardous areas.

Using the 375 Communicator in hazardous areas

The following common functions can be performed using the 375 Field Communicator in Class 1 Division 1 areas:

- Pressure Transmitters often have to be adjusted after mounting in the field. While these devices can be calibrated in the shop, it is necessary to perform a trim once their exact mounting position has been realized. One person can perform this operation in the field using the 375 Communicator to execute a preprogrammed method that is embedded in the transmitter's standard device description.
- Control Valves often require very intensive maintenance because of the demands placed on them in many process plants. If a critical valve seems to be operating erratically, maintenance personnel often want to observe the valve's operation while attempting to stroke it. If the valve is located in a hazardous area, as many are, one person using the 375 Field Communicator can stroke the valve by executing standard methods developed by the manufacturer and included in the device description of the valve controller. Certain calibration operations on valves require visually noting a valve or armature position when the valve is being

calibrated. Without an intrinsically safe maintenance tool like the 375 Communicator, two people are required for this operation (e.g. one at the control system and one in the field to observe the valve).

- › When a new device is installed in the field, there is often nameplate-date that needs to be entered into the memory of the device. It's possible to write this information down and then enter it into the device when you return to the control system. However, it is often much more convenient (and less error prone) to connect to the device and enter it directly into the device while reading the rating plate data off the device. The 375 Field Communicator allows you to do this even if you are in a hazardous area.

Updating the 375 Communicator

As new field devices become available, their device descriptions can be downloaded from the Internet to the 375Communicator. With its Easy Upgrade feature it can be immediately ready for use with any new fieldbus or HART device. Any time a new instrument is installed in a plant, its device description is easily obtained via the Internet, so there's no need to send the communicator to a service center to be upgraded. IRDA provides a wireless IS friendly interface for performing this download, an interface which is conform with the physical condition of type of protection Intrinsic Safety.

Conclusion

The rapid acceptance of the 375 Communicator is largely due to its capacity to support both HART and fieldbus devices, regardless of manufacturer. Craig Llewellyn, President of Emerson's Asset Optimization Division, has said, Emerson has championed open communication of process control elements for years, giving end-users the freedom to choose the best components to match their unique production systems. The 375 Field Communicator extends that openness to instrument maintenance.

The 375 Field Communicator is also totally integrated with Emerson's AMS Device Manager. Instrument data collected in the field using the 375 Communicator can be uploaded to the permanent database of the AMS Device Manager. Together, they enable maintenance personnel to more effectively manage all field devices – the assets that are the very foundation of the process.

For more information on the 375 Field Communicator, including lists of FOUNDATION fieldbus and HART devices supported by the 375 Communicator, log onto www.fieldcommunicator.com.