Pressure Transmitters: EDDL Equals Easy

EDDL technology makes sophisticated pressure transmitters easier to use. By (L) **Dale Perry**, pressure product manager and (R) **Jonas Berge**, senior PlantWeb consultant, Emerson Process Management

Within the last few years many specialised pressure transmitters have been introduced. These transmitters specialise in areas such as DP Flow, Mass Flow, Safety Certified, and Diagnostics.

The value of specialised transmitters has been demonstrated to increase quality, throughput, or uptime. Any added complexity of maintaining these transmitters through their life cycle, installation, start-up, routine maintenance or emergency maintenance could be a challenge to plants.

Evolution Of The Transmitter

Many advances have been made on the hardware to make pressure transmitters easier to install and maintain. The standard hardware offering of just a bolt-on manifold is a thing of the past. Vendors now offer integral manifolds and a variety of primary elements for flow applications. The transmitters arrive on-site calibrated, pressure tested, ready for installation.

The next frontier of making pressure transmitters easy to use was the display used to start-up, maintain, calibrate, and troubleshoot. Historically there was no display standardisation. The dilemma was that the pressure transmitter manufacturer could not dictate the system display or accessible transmitter functionality on a system.

It was primarily left up to the system vendor to create specialised screens that may or may not have included all the specialised functionality of pressure transmitter. It was not uncommon that devices that dud not come from the system vendor itself was at a disadvantage.

Things have changed. The HART Foundation, Foundation fieldbus, and Profibus collaborated on an enhancement of the EDDL (Electronic device description language) standard IEC 61804. The enhancements take the complexity out of a sophisticated transmitter through an easy to use display.

Enhanced EDDL has all the screens embedded in the standard device integration file so now the transmitter manufacturer dictates the display the user sees. No more partial functionality, limited data, and limited wizards to perform multi step task.

Manufacturers compete to create the easiest to use display. The other big change is that since enhanced EDDL is a standard, any manufacturer can implement it in their systems.

Before enhanced EDDL there was no graphics for quick visualisation of the pressure transmitter diagnostic status nor could you look at the current PV and tell what the pressure was two minutes ago. And if the device had multiple variables there would be multiple numbers to look at and do math and correlation in your head.

Maintaining & Troubleshooting

Figure 1 is a current enhanced EDDL screen in use today. It is easy to see how it makes working with a pressure transmitter much easier. On this one screen, you can determine the transmitter status, current PV, and perform basic configuration, task.

The most obvious graphic is trending chart. This is a standard graphic in enhanced EDDL. In this case, the chart is displaying the last 10 minutes of pressure data. The chart has multiple colour lines representing the sensor limits and calibrated range visible at a glance.

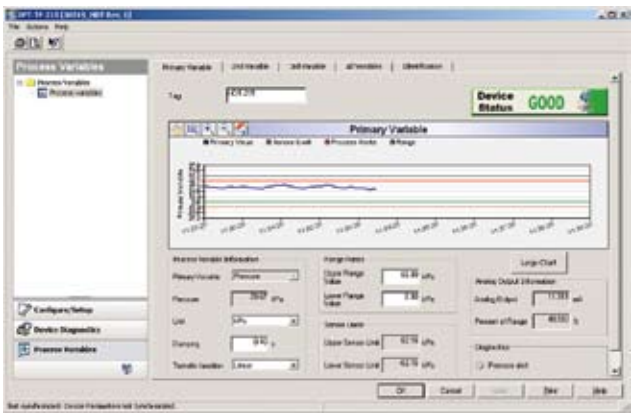

Figure 1: A typical enhanced EDDL process variable screen.

Figure 2 demonstrates a very powerful tool that allows manufacturers to implement graphics that change to help guide technicians through a process, troubleshoot, or in this case, transmitter diagnostic status.

Figure 3 demonstrates how easy it is to see all variables within a device at a glance. As technology has advanced to allow a pressure transmitter to have more than one variable, it is important how to display those variables.

In this case each variable has its own tab for detailed information but many times you are interested in all the variables. In this case the needles turn red if the variable status is something other than Good.

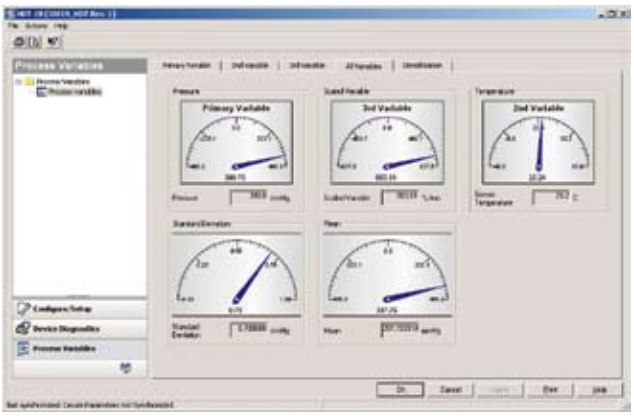

Figure 3: Each variable has its own tab for detailed information.

Calibration

Technology has enabled high-performance pressure transmitters that are very stable and in most applications the sensor rarely needs calibration, although in applications requiring high accuracy, or where ambient condition adversely affects the transmitter, licensing requirements, or in some cases the law requires calibration must be done more often.

A plant may have several hundreds of pressure transmitters, and they may be a mix of different brands, different models, and even using different protocols. Over the years, as part of natural replacement, many new versions of these transmitters make it onto the site.

Transmitter diagnostics can be categorised by severity so the technician can immediately determine the status.	
	Indicates normal operation.
	Informative. No action required.
	Indicates maintenance needed soon.
	Indicates the pressure transmitter is not operational

Figure 2: Transmitter status graphics.

Mastering this mix of pressure transmitters presents a challenge to technicians tasked with calibration. Enhanced EDDL has made this task easier also by embedding wizards to take a technician through all the required steps in the required sequence.

Diagnostics

Enhanced EDDL graphics makes troubleshooting a pressure transmitter easier. For example, the Transmitter Status icon changes according to the health of the transmitter. Images are also be used to lead the technician to the root cause of the problem taking the guesswork out of troubleshooting.

Figure 4 shows an example of a pressure module failure. Prior to EDDL the technician would have received a message such as 'Pressure Sensor Update Failure' or an even more cryptic message about an 'Unknown Software Error' or worse yet 'Error 37', without any clue as what action to take.

Figure 4: Images for easy troubleshooting.

Specialised Pressure Transmitters

Today, not only do many transmitters have better internal diagnostics, they have advanced diagnostics that can detect abnormal process situations.

These transmitters utilise high resolution, fast sampling pressure sensors (20 times per sec) to measure the pressure. Small changes in pressure (process noise) are turned in to statistical data such as mean, standard deviation, standard deviation rate of change, and ratios between the two.

The diagnostic baselines the statistical data (process noise signature) and then continuously compares the current statistical data. The user selects the action to be taken if the current data exceeds the user defined limit.

Advanced diagnostics have been available in Foundation fieldbus transmitters for years as they do not have power limitations like HART transmitters. Now some manufacturers have taken advantage of new low power technology to embed advanced diagnostics in 4-20mA HART transmitters.

In either case, Foundation Fieldbus and HART transmitters now have enhanced EDDL to display the diagnostic rich process data information. Figure 5 illustrates the effective use of enhanced EDDL charts where the user can visually see the standard deviation (process noise) has changed and the mean hasn't, a typical indication a impulse line has plugged.

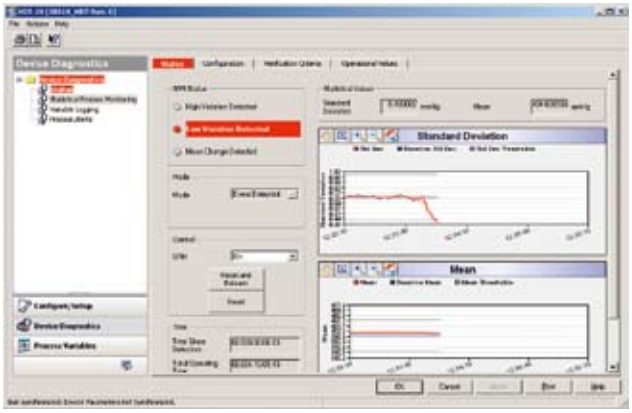

Figure 5: Advanced diagnostics statistical process monitoring.

Advanced Diagnostic transmitters may also include other data logging capabilities to help indicate extreme conditions that could shorten the life of a pressure transmitter. Figure 6 shows an example of diagnostic display utilising gauges to give the user a quick look at operating conditions or over-pressurising that has occurred.

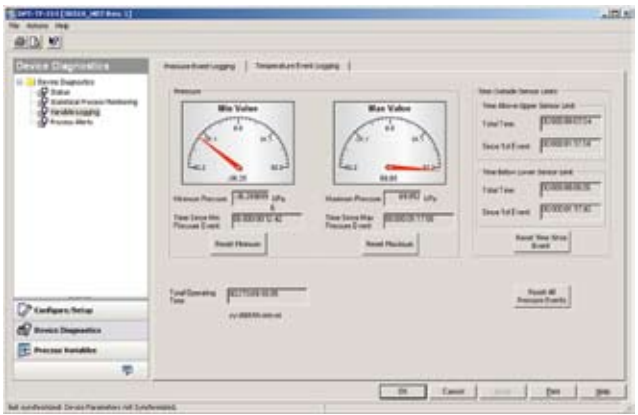

Figure 6: Use of gauges in variable logging.

Given the breadth of transmitters and other field devices throughout process facilities, interoperability is essential for integration and ease of use. EDDL is the key to interoperability in a digital plant architecture as it merges functionality of devices using HART, Foundation fieldbus, or Wireless HART into the same single software structure so they can be managed together from a single dashboard.

Although the transmitter manufacturer controls what information is made available from the transmitter and how it is laid out on the screen, the look & feel details such as the appearance of buttons as well as activation of the help, printing, acceptances of changes, and comparison is handled by the device management software ensuring all devices work consistently regardless of manufacturer, type, or protocol.