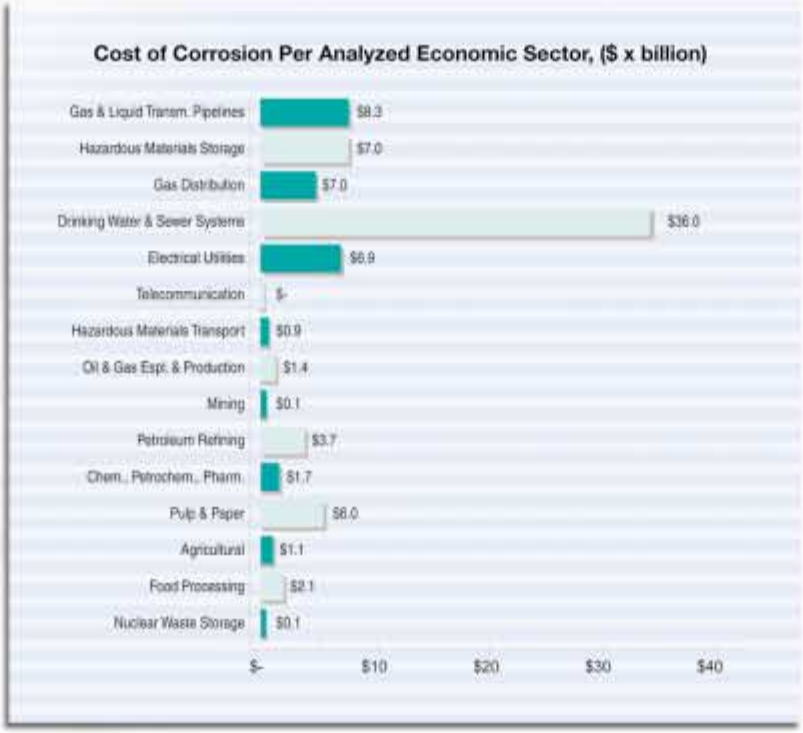
CorrTran™ MV
CORROSION MONITORING TRANSMITTER

PEPPERL+FUCHS
PROTECTING YOUR PROCESS

WHAT IS CORROSION COSTING YOU?

Corrosion Costs

It is estimated that industry spends $276 billion annually on corrosion. These costs arise from a variety of areas. Prevention, monitoring, and repair are the main contributors to this high amount and these values do not even include down time as a result of corrosion. These costs are better controlled when corrosion is viewed as a process variable, rather than as a purely historical value or in a complex, scientific method. P+F can provide an easy-to-use instrument that gives greater insight to the process engineer. CorrTran™MV is a device that pays for itself in a short period of time by helping to reduce needless expenditures on corrosion.



Traditional Corrosion Monitoring Techniques

Mass Loss
Commonly referred to as coupons, these sacrificial pieces of metal are inserted directly into the process. Coupons are weighed before insertion and after extraction. Typically after 90 days, they are again weighed and studied to determine corrosion rate, as well as corrosion type.

Resistance Measurements
Similar to coupon measurement, resistance measurements use wires that are exposed to the process. Resistance is measured, and as the wires corrode, resistance increases, thus providing an indication that corrosion is occurring.

Polarization Resistance
This technique measures the inhibition of the corrosion process. This measurement is inversely proportional to the corrosion current.

Acoustic Emission
Different types of corrosion emit different sounds. These sounds are recorded and provide information about the process relative to corrosion.

Ultrasonic Examinations
As corrosion occurs, the wall thickness of pipe deteriorates. Ultrasonic examinations of the pipe can determine the remaining wall thickness. This calculation is based on the time it takes for nonaudible acoustic waves to travel back and forth.

WHAT ARE THE TYPES & DETECTION METHODS OF CORROSION?

Types of Corrosion

CorrTran™MV monitors two different types of corrosion: general corrosion and localized corrosion (pitting).

Example of General Corrosion

General Corrosion
With this form of corrosion, the process occurs at nearly the same rate across the surface of the material that is exposed to the corrosive environment.

Example of Localized Corrosion (Pitting)

Localized Corrosion (Pitting)
Based on its appearance, corrosion is more localized. These "pits" are found on the surface of the metal and are not uniform across the surface. Seventy to ninety percent of corrosion failures are attributed to pitting.

Automated Corrosion Monitoring Techniques

Linear Polarization Resistance (LPR)
Involves the measurement of the polarization resistance of a corroding electrode to determine the corrosion current. Since the voltage-current response of a corroding element tends to be linear over a small range, determination of the polarization resistance allows the corrosion current to be determined. The slope of the response, the polarization resistance, is inversely proportional to the corrosion current, thus a corrosion rate can be calculated.

Harmonic Distortion Analysis (HDA)
Measures the resistance of the corrosive solution by applying a low frequency sine wave to the measurement current. Using harmonic analysis, the solution resistance is determined and combined with the polarization resistance of the LPR method to calculate a more accurate general corrosion rate. The Stern-Geary, B-value is also determined and updated each cycle for accurate results.

Electrochemical Noise (ECN)
Evaluates the fluctuation in current and voltage noise generated at the corroding metal-solution interface. This technique is generally used to detect nonuniform or localized corrosion.

CorrTran™ MV

Uses all three automated corrosion monitoring techniques, LPR, HDA and ECN, to provide a corrosion rate that is most comparable to the traditional coupon method. CorrTran™MV is the first field device to use the strengths of each of these techniques to provide a corrosion rate in the form of a 4-20 mA process signal.

Model Selection

CorrTran™MV is available in two basic mechanical configurations – direct or remote mount. A direct mount version is configured with the transmitter's electronic housing secured directly to the probe while the remote version allows the housing to be mounted up to 12' from the probe. The direct mount version is considered the standard unit for most applications due to its rugged construction, while the remote mounted CorrTran™MV is most suited for space-critical applications. The electronic housing is built of rugged aluminum with two ¾" NPT electrical connections for easy wiring. Once inside the housing, the electronics are completely enclosed within a plastic housing for superior protection.

Remote Mount

Direct Mount

Fixed probe type: fitting is welded to the probe

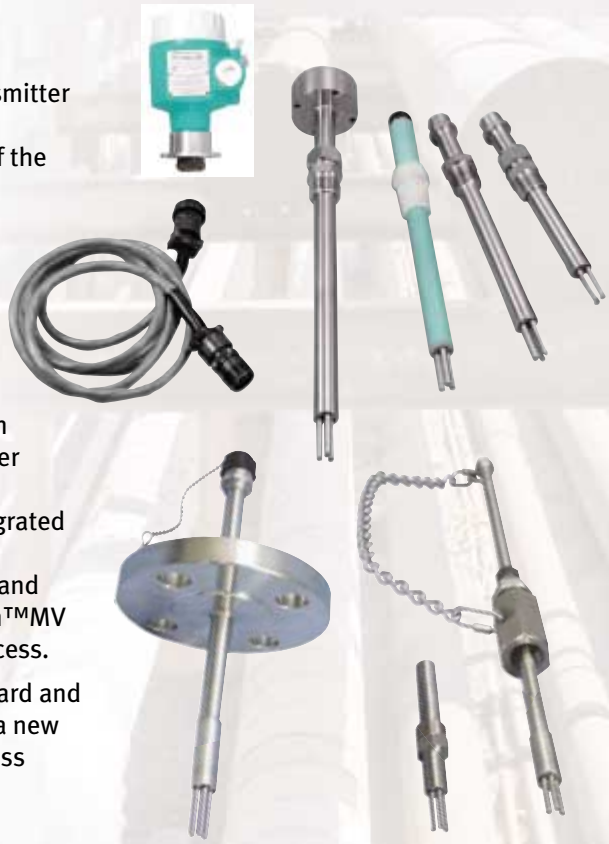
Adjustable probe type: able to slide fitting along probe

A wide assortment of probes is available for CorrTran™MV. Typically made of stainless steel, the probes can be built for various applications and mounting requirements relating to pressure, temperature and size. CorrTran™MV probes are available in adjustable and fixed length; retrievable, retractable and threaded or flange process connections. In addition to the wide probe selection, a complete offering of electrode materials is available for nearly any type of metal tank or pipe.

Once the proper mechanical connections have been specified, CorrTran™MV will be configured to your specification. It comes as a standard, loop-powered, 2-wire, 4-20 mA output with a multivariable HART signal. The general or localized corrosion can be set to either the primary or secondary HART variable and the conductivity value, measured in siemens/cm, is set as the third variable. One of the most powerful features of the new CorrTran™MV is an automatic Stern-Geary, B-value update that eliminates any need to reconfigure because of process variables.

SHOULD I MONITOR CORROSION THE SAME WAY?

The New CorrTran MV

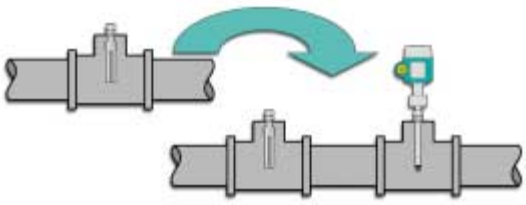


CorrTran™MV is the first 2-wire, multivariable, 4-20 mA HART transmitter that evaluates general and localized (pitting) corrosion as well as conductivity in real-time. Meant to take corrosion monitoring out of the laboratory and into everyday process control, CorrTran™MV is a revolutionary approach to corrosion detection. Unlike the traditional coupon method that establishes a historical average corrosion rate over time, CorrTran™MV can monitor corrosion on-line and in real-time rather than in a historical "after-the-fact" method that misses the possibility of a process-corrosion correlation.

CorrTran™MV gives plant operators the ability to monitor corrosion rates within their existing software and control system like any other process variable (i.e., pressure, flow, level, temperature, pH). Since CorrTran™MV has a standard 4-20 mA output, it can be easily integrated into a new or legacy system architecture. The HART signal allows multivariable monitoring of general corrosion, localized corrosion, and conductivity measurements. As an added feature, the new CorrTran™MV is capable of self-tuning according to changing conditions in the process.

With a wide range of mechanical configurations available for standard and hazardous locations, CorrTran™MV takes corrosion monitoring to a new level – one that makes corrosion data readily available to the process engineer so decisions can be made in real-time and according to current process conditions.

Historical corrosion monitoring with coupons



On-line corrosion monitoring with CorrTran™ MV

A New Way to Monitor Corrosion

Coupons have been used to determine a historical corrosion trend that may extend over a 2 – 6 month period. Once analyzed, this data is used to determine the detrimental effects of corrosion over time; however, it does not allow corrections to be made as corrosion is occurring. On-line, real-time monitoring with CorrTran™MV allows immediate changes to be made to the process as corrosion occurs thus reducing the effects of corrosion and lowering operating costs. By measuring with general and localized corrosion a full picture can be achieved.

New Features & Benefits

Features (NEW)	Benefits
Multivariable on-line/real-time measurement of general corrosion rate, localized corrosion rate (pitting), and conductivity	• Suitable for a wide range of process environments • Monitors general and localized (pitting) corrosion for any metallic material and conductivity of the solution • Reduces guesswork on amounts of inhibitors to use • Corrosion is no longer viewed historically • Multivariable with HART
Uses three identical electrode arrangements	• Accurate corrosion rate using LPR, HDA, and ECN • Wide choice of electrode materials • No requirement for a complicated reference electrode
Data update rate every 20 minutes	• Allows corrosion rate to be another process variable • Trend corrosion rate with other variables • Fast cycle time with integration of 100 data samples
2-wire, 4-20 mA transmitter, HART® interface	• Industry accepted process signal to DCS, PLC or other control systems • Allows corrosion rate to be monitored like other process variables • No special software required
Automatically updated Stern-Geary variable (B-value)	• Automatic update of B-value, no calibration required
Patented LPR, HDA, ECN measurement algorithm	• Applicable to a wide range of corrosion rates • Low frequency measurement aids evaluation
Rugged field instrument housing (Explosion-proof version)	• Type 4X housing for industrial applications • Hazardous location certified units available (IS or Explosion-proof) • Retractable and retrievable probes available

PROCESS AUTOMATION – PROTECTING YOUR PROCESS

For over a half century, Pepperl+Fuchs has been continually providing new concepts for the world of process automation. Our company sets standards in quality and innovative technology. We develop, produce and distribute electronic interface modules, Human-Machine Interfaces and hazardous location protection equipment on a global scale, meeting the most demanding needs of industry. Resulting from our world-wide presence and our high flexibility in production and customer service, we are able to individually offer complete solutions – wherever and whenever you need us. We are the recognized experts in our technologies – Pepperl+Fuchs has earned a strong reputation by supplying the world's largest process industry companies with the broadest line of proven components for a diverse range of applications.

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