**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 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.

**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 design, develop 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 worldwide presence and our high flexibility in production and customer service, we are able to individually offer complete solutions—wherever and whenever you need them. 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.**
Corrosion Costs

It is estimated that industry spends $75 billion annually on corrosion. These costs arise from a variety of areas. Preventive, 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 30 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 necessary wall thickness. This calculation is based on the time it takes for noticeable acoustic waves to travel back and forth.

Corrosion Types

Types of Corrosion

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

Example of General Corrosion

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

Example of 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 polarisation 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 polarisation resistance of the LPR method to calculate a more accurate general corrosion rate. The Stern-Geary, B-value is also determined and used for cycle time to form a reliable result.

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.

Electrochemical Noise (ECN)

The CorrTran™MV is available in two basic mechanical configurations—a direct or remote version. 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 40’ 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 ½ NPT electrical connections for remote wiring. Once inside the housing, the electronics are completely enclosed within a plastic housing for superior protection.

A wide assortment of probes is available for CorrTran™MV. Typically made of stainless steel, these 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 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 for your specification. It comes as a standard, 2-wire, 4-20 mA output with a switchable HART signal. The general or localized corrosion can be set to either the primary or secondary HART variable and the conductivity, 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.
**WHAT IS CORROSION COSTING YOU?**

It is estimated that industry spends $276 billion annually on corrosion. This costs arise from a variety of areas. Preventive, 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. Corrosion can be prevented or minimized by helping to reduce needless expenditures on corrosion.

**WHAT ARE THE TYPES & DETECTION METHODS OF CORROSION?**

**Corrosion Costs**

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

**Example of 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)**

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.

**Types of Corrosion**

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

**Automated Corrosion Monitoring Techniques**

**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 remarkable acoustic waves to travel back and forth.

**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.

**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 a fully rugged aluminum with two 4-20 mA electrical connections for remote wiring. Inside the housing, the electronics are completely enclosed within a plastic housing for superior protection.

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 or fixed 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.

**CorrTran™MV Will Be Configured to Your Specification.**

It comes as a standard transmission, a remote, or a point output with a modulating 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.

**CorrTran™MV**

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.

**Linear Polarization Resistance (LPR)**

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.

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**Automated Corrosion Monitoring Techniques**

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**CorrTran™MV Will Be Configured to Your Specification.**

It comes as a standard transmission, a remote, or a point output with a modulating 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.
WHICH MONITOR IS RIGHT FOR ME?

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 downtime 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. Full can provide the means to monitor corrosion, which gives a 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 expenditures on corrosion.

WHY IS CORROSION COSTING YOU?

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.

WHAT ARE THE TYPES & DETECTION METHODS OF CORROSION?

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

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 super-critical applications. The electronic housing is built of rugged aluminum with two 1/8” NPT electrical connections for corrosion monitoring. Once inside the housing, the electronics are completely enclosed within a plastic housing for superior protection.

Direct Mount

Remote Mount

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 60 days, they are aged, 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 corrosive environment. 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 acoustic 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 new mean wall thickness. This calculation is based on the time it takes for remanent acoustic waves to travel back and forth.

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 resonates two different types of corrosion: general corrosion and localized corrosion (pitting).

Types of Corrosion

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 in contact with 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

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 uses 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 super-critical applications. The electronic housing is built of rugged aluminum with two 1/8” NPT electrical connections for corrosion monitoring. Once inside the housing, the electronics are completely enclosed within a plastic housing for superior protection.

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 and threaded or flange process connections. In addition to the wide probe selections, a complete offering of electrode materials is available for nearly any type of metal tank or pipe.
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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.

New Features & Benefits

For better and faster corrosion trend. 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 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.

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.

CorrTran™ MV MONITORING TRANSMITTER

PROTECTING YOUR PROCESS

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