

Calibration

Summer 2013

WORLD

Getting the most from the HART handheld device

**Beamex
Business
Bridge**

**Customer
success story**

Aroona Alliance, Australia



CEO's Letter

The HART Communication Protocol is the leading communication technology for intelligent process measurement and control instrumentation and systems with more than 30 million devices installed worldwide. This year, the Foundation celebrates 20 years of serving the process automation industry. The HART Communications Protocol is an early implementation of Fieldbus, a digital industrial automation protocol. Its most notable advantage is that it can communicate over legacy 4–20 mA analog instrumentation wiring, sharing the pair of wires used by the older system.

We want to bring our contribution to the celebration of the HART Foundation in a form of a detailed article in this magazine highlighting HART instrumentation from the viewpoint of calibration and configuration. The article also clarifies the difference between the calibration and the configuration of a transmitter and why both are needed. After explaining the calibration of modern HART and wireless HART transmitters we go back a bit into the history of purely analogue output transmitters. The article covering this topic focuses especially on how to calibrate a 10–50 mA output instrument.

Social, economic, and environmental effects are the three pillars often used to define and measure sustainability. The Beamex Integrated Calibration Solution (ICS) is a system made of documenting calibrators and calibration software that increase economic sustainability by promoting quality and efficiency through faster, smarter and more accurate management of all calibration assets and procedures. The role of Beamex and calibration in supporting sustainability is covered in more detail in the third main article of this issue.

Dark clouds are hovering over the current economy in the world and especially the economy in Europe. The forecast for sunshine is uncertain. Fortunately, the sun has shone over Beamex for some time and we expect it to get even better. Our sunshine may be due to the fact that, in the northern hemisphere, the summer is coming with more daylight or it may – more probably – be because we have been fortunate to develop, together with our customers, the most efficient calibration solutions for their processes.

Enjoy your reading and remember that we appreciate your feedback very much – not only concerning this magazine!



Raimo Ahola
CEO, Beamex Group



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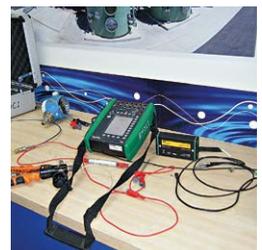
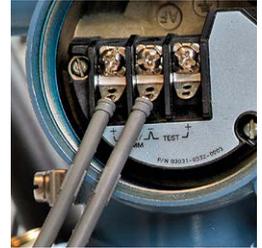
Minimizing system integration risks with the Beamex Business Bridge

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Getting the most from the HART handheld device

Getting the most from the HART handheld device

A device like the Beamex MC6 offers the highest functionality and automation for configuration and calibration of wired or wireless HART transmitters.



CALIBRATION	
MEASURED VALUE	-11.605
SET 4 mA VALUE	0.0000
SET 20 mA VALUE	2.0000
4 mA VALUE AUTOM.	Method
20 mA VALUE AUTOM.	Method
SET BIAS PRESSURE	9.0000

beamex MB6





A HART handheld is an essential tool in plants deploying HART instrumentation. But what is a HART handheld? What are the differences between various handheld brands and what are the practical considerations that should be taken into account when selecting one? Finally, how does one get the most from the HART handheld?

The difference between calibration and configuration

Before beginning a discussion on HART handhelds, it is important to take a short look into a terminology issue that often causes confusion – that is the meaning of and difference between *configuration* and *calibration*.

For a real metrological calibration, a traceable reference standard (calibrator) is always needed.

According to international standards; *calibration* is a comparison of the device under test against a traceable reference instrument (calibrator) and documentation of this comparison. Although, formally, the calibration does not include any adjustments, in practice the possible adjustment is often included in the process of calibration. So, in order to do a calibration of a HART device, a traceable metrological reference device (calibrator) is needed.

Configuration means using the digital communication protocol to change settings inside the field device. Configuration can be done with a configuration software or handheld communicator. It is important to

remember that a communicator alone cannot be used for metrological calibration to check the accuracy of a field device. Configuring parameters of a HART transmitter with a communicator is not metrological calibration and it does not assure accuracy. For a real metrological calibration, a traceable reference standard (calibrator) is always needed. Configuration is not the same as calibration.

HART integration into a plant

There are different ways and levels of integrating the HART protocol into a plant. The simplest integration would be to continue using the standard analog control system and use HART instrumentation that is configurable via HART communication (a handheld device or “communicator”). Another way would be to use an analog control system, but have another digital asset management system that uses the HART protocol to gather diagnostic and other valuable information from field instruments. The highest level of integration would be to use a fully HART enabled ecosystem from the field devices to the control system via all-digital signals with no analog mA signals.

How to calibrate a HART transmitter

It is good to remember that a HART transmitter has different outputs that can be used and calibrated; that is, the analog mA output and the digital HART output(s). In most cases, the analog output is still being used among end users.

In order to calibrate the analog output, the transmitter input signal needs to be generated or measured while simultaneously measuring the transmitter output. For example, generate a pressure input, measure that accurately with a calibrator and at the same time measure the analog mA output with a meter.

If calibrating the digital HART output, the calibration process alters slightly. The generation/measurement of the transmitter input in the same way as for an analog transmitter using a calibrator is still needed.

However, to be able to see what the transmitter digital HART output is, some kind of HART communicator showing the digital HART signal is required.

In the case of analog or digital output, one would go through the range of the transmitter at a few intervals and record the input and output signals to document the calibration. If there are too many errors found during the calibration, the transmitter is trimmed via HART protocol and a new calibration performed.

Practical considerations for the HART handheld

For the configuration of HART transmitters, it is possible to use a PC with a HART modem and related software, but it is often more practical to use a mobile handheld HART communicator. This article will focus on the handhelds.

If one wants to work with a HART transmitter that is not connected to field supply voltage, some kind of power supply to power up the transmitter is needed. Some HART handhelds do not have a built-in loop supply, so there should be an external loop supply with required impedance (nominally 250 ohms) for the HART communication to work. However, some handhelds do have a built-in loop power supply as well as built-in impedance, meaning that no additional equipment to communicate is required. If configuration or calibration of transmitters occurs before installation in the field, power is taken from the DCS (digital control system).

In a case where a transmitter is connected in the field to the power supply coming from DCS, no additional power supply device is needed. However,



Getting the most from the HART handheld device



With the Beamex MC6, you can generate/measure the HART transmitter's input at the same time as the analog or digital output is read.

It is important to remember that the loop supply coming from the DCS does not always include the required impedance for the HART communication to work, especially if the control system is made for analog signals. If the handheld operates according to the HART standard specification, its communication signal level must not be too low (due to excessively low impedance), as that could be noise instead of a real, reliable signal. In that case, additional impedance to the loop may need to be added. While connected to the transmitter in the field, physical connection at the transmitter is not needed. The connection can be anywhere in the loop of the transmitter.

Functionality of a HART handheld

There are two important aspects of a Device Description (DD) published by HART Communication Foundation (HCF) and the available commands of a HART handheld. Some handhelds only support a limited amount of HART devices and commands, while others support all of the HART devices and full command structure of the DD file, including Methods. The support for all of the device-specific advanced features requires support for the entire DD structure. Therefore, it is important to ensure that the chosen handheld supports the installed and future HART device base.



The availability and pricing for the future updates of the DDs for new transmitters vary. If restricted only to the Universal Commands, limited support is offered. Differences also exist between handhelds in the support for the HART methods. These methods are like small “wizards” built in the DD file making it easier to do several configuration steps.

Measuring mA signal

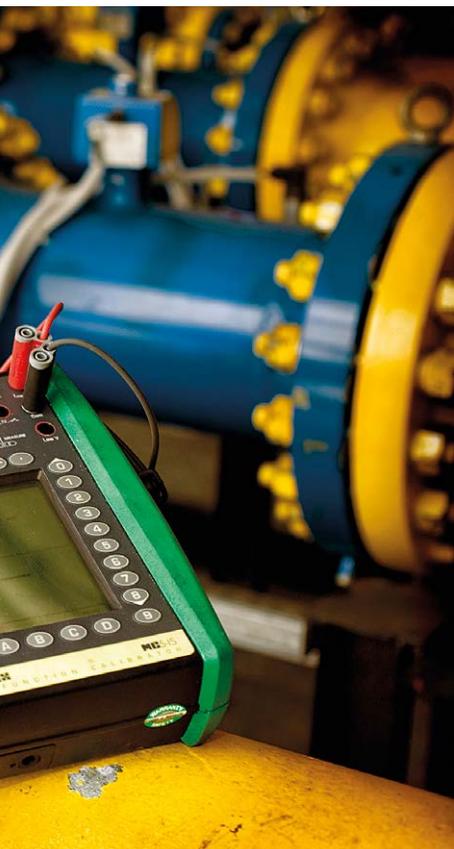
As the HART transmitter is most often used with the analog mA signal, a device for measuring the mA signal is required. If the handheld does not have mA measurement functionality, another device for the mA measurement needs to be used. Some handhelds offer accurate mA measurements, but many of them do not. The mA measurement is also something that

needs to be measured if a calibration of the transmitter's mA output is desired.

When HART transmitters are calibrated, it is good to remember that output should be measured, whether it is an analog mA signal or digital variable. It is also important to remember that in order to calibrate, a traceable reference standard (calibrator) is required to measure or source the transmitter's input. If the handheld does not offer this functionality, an additional calibrator device for the calibration will be needed.

Advanced HART handhelds

A few advanced handhelds even offer a fully multifunctional process calibrator in the same device as the HART handheld. These devices can be used not only for configuring but also for calibrating and trimming of



HART devices, such as temperature and pressure transmitters. The typical procedure with these devices is that if there is a need for trimming after the first “As Found” calibration is done, the HART trim methods are run. After trimming the transmitter, a second calibration, “As Left”, is performed.

Some handheld devices are documenting devices, so they can save the calibration results into memory and later upload results to PC software. Furthermore, some handhelds can also read and document the configurations from the HART device and upload this into a PC for archiving or printing.

Usability and the user interface are important features to consider when choosing a handheld, as there are differences in the ease of use. Some devices are larger and some are smaller; some have a small display and some

have a bigger. A touch screen user interface with color display is available in the most modern handhelds, such as in the Beamex MC6.

WirelessHART

The *WirelessHART* standard is the latest offer from HART. Although a *WirelessHART* instrument transmits wirelessly, it does have screw terminals and configuration and calibration is done via the screw terminals. Therefore, a handheld for *WirelessHART* transmitters does not need to be wireless. The handheld must, however, be able to support the HART 7 standard that the *WirelessHART* uses, and obviously the handheld must have the DD files to support the *WirelessHART* transmitter models that are used.

Durability and support

As the handheld is often used in field environments, the robustness and water/dust protection should be taken into account. While some handhelds seem to be simply based on standard Pocket PC's (made for office use), others are made for use in industrial applications and have good ratings for water and dust protection (IP or NEMA classification). Some handhelds are suitable for use in hazardous (Ex) areas – the Beamex MC5-IS is one of them.

Pocket PC-based handhelds are not necessarily suitable for industrial/factory field environments and they often do not have built-in HART modem; an external modem solution needs to be used. Typically they will not offer built-in loop supply/impedance either, so one may end up carrying several devices.

A handful of the most modern handhelds, the Beamex MC6 among others, have a multifunctional process calibrator and HART communicator in the same device, and offer field communication for FOUNDATION Fieldbus and/or Profibus devices as well.

After-sales support is a final element to take into account when comparing handhelds. All in all, there are many types of HART handhelds available on the market. Be sure to review the features and suitability for current and future needs.

Beamex MC6 advanced calibrator and field communicator

The new Beamex MC6 is a device combining a field communicator and a very accurate multifunctional process calibrator with documentation.

With the Beamex MC6, you can generate/measure the HART transmitter's input at the same time as the analog or digital output is read. Both can be done simultaneously and the results can be automatically stored into the MC6 memory for later reference or uploaded to calibration software.

For configuration of smart transmitters, the MC6 includes a field communicator for HART, *WirelessHART*, FOUNDATION Fieldbus H1 and Profibus PA protocols. All required electronics are built-in, including modems, power supply and required impedances for the protocols.

The Beamex MC6 can be used both as a communicator for configuration and as a calibrator for calibration of smart instruments with the supported protocols.

While a normal HART communicator can be used to configure and read the HART digital output, it alone cannot be used for calibration or trimming of the transmitter; an additional calibrator would be needed. This means that one ends up with two separate devices without any automatic calibration procedure or documentation. Therefore, a device like the Beamex MC6 offers the highest functionality and automation for configuration and calibration of wired or wireless HART transmitters.

To watch video demonstrations of a HART handheld, visit: <http://www.youtube.com/beamexcalibration>.

How to calibrate a 10–50 mA instrument

How to calibrate 10–50 mA ins

Today, the market consists mostly of 4–20 mA output instruments, but several 10–50 mA instruments still exist. Finding a calibrator that will measure and source the 10–50 mA instruments is a challenge. Beamex has recently introduced a new tool, the Beamex MC6 calibrator and communicator, to help overcome these challenges.

te a trument



How to calibrate a 10–50 mA instrument



Current loops: 4–20 mA, 10–50 mA, why not 5–25 mA? That is the question that many engineers asked when standardizing on a milliamp output for instrumentation. Believe it or not, several factors were considered when choosing 4–20 mA, but not before 10–50 mA made its presence in the market. Nowadays, most industries have adopted 4–20 mA as standard; therefore, several meters and calibrators are available to measure or generate a 4–20 mA signal, but what about those 10–50 mA instruments that are still functioning in many plants across the world?

Beamex has recently introduced a new tool, the Beamex MC6 calibrator and communicator, to help overcome these challenges.

What existed before the current loop?

Electronic controls have not always been around, so how did instrumentation function before the current loop? Prior to the 1950's, instrumentation was controlled by pneumatics: Typically 3–15 psi represented 0–100% of the range. Not only did technology not support electronic control at the time, but pneumatic control was safe; however, expensive.

The plant had to invest in tubing, compressors, filters, and other accessories to provide the pneumatic control to the instrumentation. Not to mention redundant systems in case the primary system failed.

In the mid 1950's electronic control was accepted into industries. The milliamp output was making its presence because of its robust nature: The milliamp signal is not affected by voltage drops. At the time, a milliamp standard did not exist, so instrument manufacturers engineered their own.

Standardizing on a current loop

Many engineers and manufacturers derived their own “standard” milliamp

But why 4–20 mA? Believe it or not, there is good reasoning behind these numbers. First of all, the lower amperage signals were accepted over the higher amperage signals because lower amps and volts reduce the chance to generate a shock.

output from logical reasoning, but this presented a problem across all industries. Since the instrumentation had to be measured and calibrated, meter and calibrator manufacturers had to develop circuit boards capable of measuring and generating a variety of milliamp signals.

In 1972 the International Society of Automation (ISA), released a standard called, ISA50, *Signal Compatibility of Electrical Instruments*. The purpose of this standard was to, “define a common interface between components of electronic measurements and/or control systems” (ISA50). At the time this ISA standard was issued, it specified 4–20 mA as the standard current loop, but mentioned 10–50 mA as an alternative. Why? A big player in instrumentation required 10–50 mA to power magnetic amplifiers that were already prevalent in many plants across the world.

Before the 4–20 mA signal became the standard across industries, the 10–50 mA signal established its presence in the market.





The reasoning behind 4-20 mA

But why 4–20 mA? Believe it or not, there is good reasoning behind these numbers. First of all, the lower amperage signals were accepted over the higher amperage signals because lower amps and volts reduce the chance to generate a shock. In the beginning, 0–20 mA was likely considered, but engineers quickly realized the potential danger a 0 mA signal could infer. First, it could mean that the instrument is at the low side, 0%, of its range, but it could also mean that a line to the instrument got cut or removed. It was quickly determined that the low side of the milliamp signal needed to be above 0 mA to recognize a true low side of the instrument range. This is referred to as the “live zero” phenomenon. Four was decided upon because it provides the minimum amperage to power loop-powered instruments on the line.

There is an accepted practice and tradition in instrumentation, when possible, to apply a 5:1 ratio, which is where 20 mA came about. Other signals that follow the 5:1 ratio tradition are 3-15 psi and 1-5 volts.

In order for indicating instruments to sense, they often need a 1–5 V signal. According to Ohm’s Law, when a 250 ohm resistor is included in the circuit, the 4–20 mA signal is converted to a 1–5 V signal. This is another reason for using the 4–20 mA signal, as 250 ohm resistors are inexpensive and readily available.

The reasoning behind 10-50 mA

Before the 4–20 mA signal became the standard across industries, the 10–50 mA signal established its presence in the market. One of the more popular instrument manufacturers had chosen 10–50 mA as their instrument output. The low side, 10, was decided upon because it provided the minimum amperage to power the magnetic



How to calibrate a 10–50 mA instrument



amplifiers in the loop, also used by the popular instrument manufacturer. The 5:1 tradition was used to determine the high side of 50 mA.

Plants across the world purchased these 10-50 mA instruments and installed them into their processes. At the time, calibrating these instruments was not difficult since many calibrators were designed to generate 50 mA. When ISA issued standard ISA50 in 1972, plants started replacing their 10-50 mA instruments with the newly standardized 4-20 mA instruments; however, some industries could not adapt to these changes.

Forty-one years later, some of these 10-50 mA instruments are still being used, especially in industries such as nuclear power where licensing complicates the ability to change procedures. The instrumentation is not a problem; the means of calibrating the instrumentation is the problem. As the 4-20 mA signal was accepted as standard, calibrator manufacturers naturally moved away from the 10-50 mA compatibility.

The solution

Today, the market consists mostly of 4–20 mA output instruments, but several 10–50 mA instruments still exist. Finding a calibrator that will measure and source the 10–50 mA instruments is a challenge.

The Beamex MC6 is a device combining a full field communicator and an extremely accurate multifunctional process calibrator. The Beamex MC6 can measure up to 100 mA and generate up to 55 mA. As shown in the picture on the right, the Beamex MC6 displays a split screen for calibration. The upper window displays the generated or simulated value, while the lower screen displays the measured value. In this example, the calibrator is measuring what it is generating.

The Beamex MC6 also has a built in communicator for configuration and

The Beamex MC6 displays a split screen for calibration.

The upper window displays the generated or simulated value, while the lower screen displays the measured value.

trimming of smart instrumentation. The MC6 supports all of the protocol commands according to the transmitter's Device Description file. Any additional communicator is therefore not needed.

Pressure calibration is also supported by the Beamex MC6 calibrator and communicator. A unique distinction of the MC6 is that the pressure modules are internal to the calibrator, reducing the amount of equipment required to take into the field. Instead of a communicator, a calibrator, and 3 pressure modules, you only need the Beamex MC6.

Many industries are adopting the documenting calibration phenomenon. With the MC6 in conjunction with the Beamex CMX calibration software, you can have an automated, streamlined solution to support paperless and regulatory environments.

REFERENCES: ISA. "ISA50, Signal Compatibility of Electrical Instruments." ISA. 1995-2013. Web. 01 March 2013. <<http://www.isa.org/MSTemplate.cfm?MicrositeID=201&CommitteeID=4663>>.





How calibration improves sustainability



How calibration imp

CALIBRATION CERTIFICATE
Certificate Number: 2010-5214-CHEM
POSITION ID: 221-PIC-003-PT

POSITION
Product Name: Reactor 3 pressure
Work Order Number: 1234
Location: Chemical Plant/CO 2 (Subarea plant/201) (Subarea
reference 2010/0202)

FUNCTION
Function: Pressure Transmitter (G)
Transfer Function: Linear
Range (mV): 0 to 1.00 (V)
4 to 20 mA

PROCEDURE
Use: 2011/0011
Interval: 12 months
Adjust To: 0.25 % of span

DEVICE
Device ID: 00042007-01
Serial Number: 1234
Manufacturer: ABB
Part Number: 3041
Range/Supply: 0 to 20 mA
Operating Temp: 0 to 50 °C
Enclosure: IP65

CALIBRATION EVENT
Calibrated On: 2011/05/10 10:31:24
Next Cal. Due: 2011/05/11
Calibrated By: [Signature]

LIBRARIAN
Plant Librarian: MJS on 2011/05/10
Input Module: 63170, rev. 24 112
Output Module: M3-2, rev. 2011/05/10
Output Module: 0, rev. 30017

Output Error (% of span)

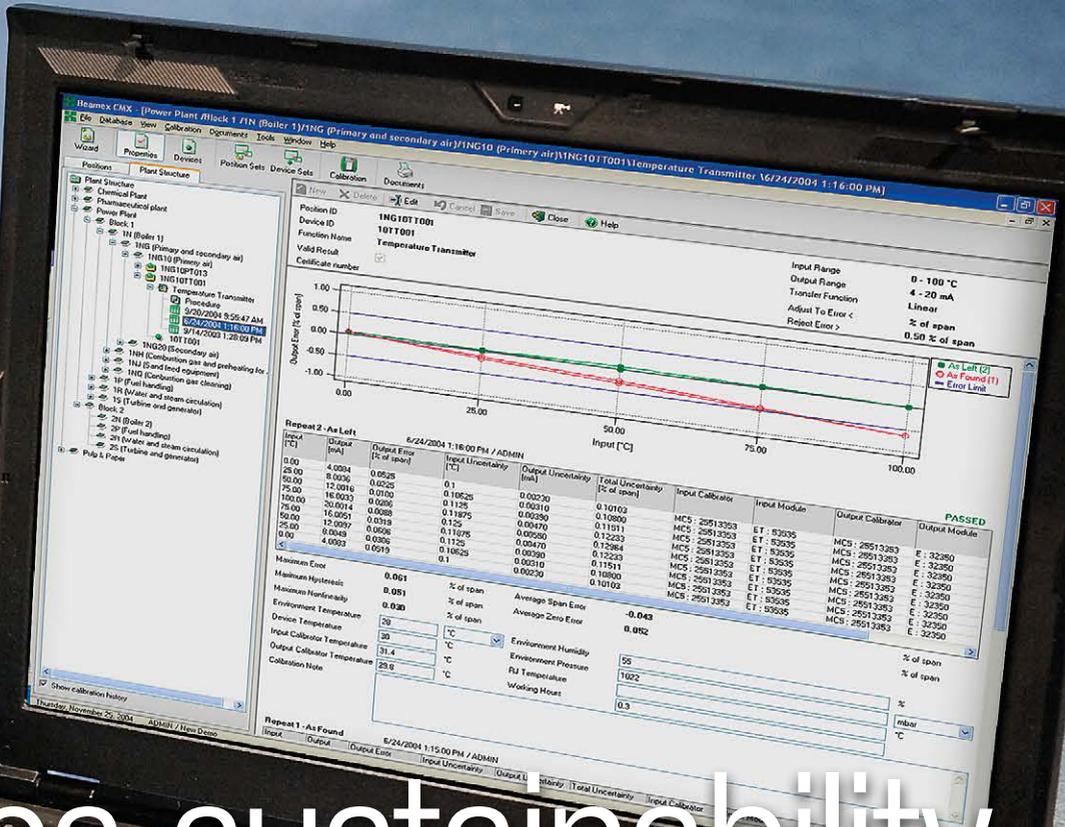
Input (kPa)	Output Error (% of span)
0.00	0.00
0.25	0.00
0.50	0.00
0.75	0.00
1.00	0.00

1. As Found
Max Error: 1.00 % of span

Point	Input (kPa)	Output (mA)	Actual (mA)	Error (mA)	Error (%)
1	0.00	4.000	4.000	0.000	0.00
2	0.25	4.125	4.125	0.000	0.00
3	0.50	4.250	4.250	0.000	0.00
4	0.75	4.375	4.375	0.000	0.00
5	1.00	4.500	4.500	0.000	0.00

2. As Left
Max Error: 0.161 % of span

Point	Input (kPa)	Output (mA)	Actual (mA)	Error (mA)	Error (%)
1	0.00	4.000	4.000	0.000	0.00
2	0.25	4.125	4.125	0.000	0.00
3	0.50	4.250	4.250	0.000	0.00
4	0.75	4.375	4.375	0.000	0.00
5	1.00	4.500	4.500	0.000	0.00



Improves sustainability

The Beamex Integrated Calibration Solution (ICS) is a system made of documenting calibrators and calibration software that increase economic sustainability by promoting quality and efficiency through faster, smarter and more accurate management of all calibration assets and procedures.



How calibration improves sustainability



You only live once: A common phrase used around the world to indicate how one should live their life to the fullest. This is a great concept for individuals to take advantage of the life they have been given, but to assure a life for the future, resources need not be compromised in the process. In 1969, sustainability was introduced with the passage of the National Environmental Policy Act (NEPA), and has been an important topic ever since. *Sustainable Plant Magazine* defines sustainability as, “Operating our business in ways that meet the needs of the present without compromising the world we leave to the future.”

Social, economic, and environmental effects are the three pillars often used to define and measure sustainability. Calibration plays a critical role in impacting these pillars to help maintain sustainability throughout all process industries. Calibrating process instruments on a regular basis aids in optimizing processes to minimize production downtime and energy losses. Regular calibration also ensures high and consistent product quality. Calibration is a critical activity in controlling emissions, as emission-related instruments are often associated with the plant’s license to operate.

The pillars of sustainability

Although social effects are hard to quantify and measure, they still play an important role in maintaining sustainability. Safety is one social factor that tends to be more quantifiable than others: Evident across many industries, companies often display the number of days without injury. Employee safety is a social factor made responsible by the company.

A plant’s overall health and performance is important in protecting not only employees, but the community too. The community will not be impacted by on-the-job injury; however, poor maintenance and operations

A plant’s overall health and performance is important in protecting not only employees, but the community too.

can lead to harmful impacts on the community, such as toxic gas emissions, out-of-spec products, or worst case scenario, an explosion.

Another social factor is the working and living conditions of the employees and community. Working conditions could include, working hours, industrial noise, plant temperature, and harmful toxin release. In some cases, employees are required to live where they work. An oil platform is a good example where social sustainability becomes even more important. Social sustainability is important in maintaining industrial performance for the future.



Economic sustainability in plant operations includes using available resources to increase performance with positive returns on investment and overall plant profit. Economic impacts are typically measured monetarily. If the return on investment is desirable, the plant can consider the resources justifiable. For example, if a software solution helps monitor the overall health of the plant to prevent unplanned shutdowns that could cost hundreds of thousands of dollars, that software package is considered an economic solution to help maintain sustainability.

If available resources are not being used, the plant may not be sustainable in the future. In many of those situations, plant personnel do not understand what types of sustainable solutions are available and if they are right for a particular situation. Fortunately, many solution providers make available different sustainability and return on investment reports to help distinguish sustainable solutions.

Although economic sustainability involves increasing plant profit by using available resources, the environment cannot be compromised in the process. For example, if cheaper raw materials exist which improve overall profit but create harmful and toxic waste that compromise the environment, that solution is not considered sustainable. Environmental conditions must be considered in sustainable solutions.

Sustainability initiatives, regardless of the positive impacts on the social and economic pillars, all depend on the impact made on the environment, because ultimately, the future depends on today’s efforts to maintain a livable environment. Environmental initiatives could include many different projects to decrease negative effects on natural resources available today. One such project includes promoting paperless environments to not only maintain trees and reduce waste, but also to create a more economical solution that decreases time spent using paper

and pen. Other projects include the design and construction of green buildings that use less energy and water, manufacturing process modification that reduce greenhouse gas emissions that destroy the atmosphere, and restoration of different aspects of the environment that have been destroyed in the past, such as greenery and natural streams and rivers.

Different governmental agencies and acts, such as the EPA, OSHA and NEPA, have set regulations to help advance sustainability initiatives that promote positive influence on the social, economic, and environmental aspects indicating the importance of sustainability to ensure a future for this planet.

How calibration helps improve sustainability

Calibrating process instrumentation adheres to the social, economical, and environmental pillars of sustainability. Social sustainability includes the safety of the employees and community. Toxic gas emissions are monitored by instrumentation which must be calibrated and documented to ensure accurate readings and representation required by the EPA and OSHA regulations. The Beamex CMX calibration software reminds plant personnel when these instruments are due for calibration, reducing the chance for these instruments to be overlooked which could result in drifting or failure leading to more emissions. Out-of-spec, end products could harmfully affect the end user. Process instrumentation exists to monitor how much, how high, how little, how often, contents are being used to create a product. Again, these instruments can drift or fail resulting in out-of-spec products that could be harmful or deadly to the community. Calibration helps to ensure proper function, reliability and accuracy of instrumentation.

The Beamex Integrated Calibration

Solution (ICS) is a system made of documenting calibrators and calibration software that increase economic sustainability by promoting quality and efficiency through faster, smarter and more accurate management of all calibration assets and procedures. An automated, integrated calibration program, such as the Beamex ICS solution, can connect to other computerized maintenance management systems (CMMS), which increases quality and decreases the time and money spent on calibration, especially when compared to manual systems, such as pen and paper. Many plants receive work orders from the CMMS requiring them to open the calibration system to locate required calibration work. Results are often written down using paper and pen and inserted into some database twice, once in the calibration system and once in the CMMS. This manual process can take hours of work while the Beamex ICS can save a considerable number of man-hours per year. Streamlined calibration processes have fast returns on investment and improve plant profit by catching potential failures before they cause unplanned shutdowns.

Calibration plays an important role in monitoring the impacts on environmental sustainability. Instrumentation directly reflects the measurements of greenhouse gas emissions, but how certain are these measurements? Proper calibration of these instruments is required by the EPA and OSHA to ensure accurate readings. Often times, audits require calibration certificates to prove proper maintenance and calibration. The Beamex CMX calibration software helps maintenance groups to schedule and store calibration records for proper upkeep.

The Beamex Integrated Calibration Solution promotes paperless environments which saves trees and reduces waste. With advanced technology that supports download and upload of instruments requiring

calibration from the Beamex CMX database to Beamex MC-series portable calibrators, the paper and pen phenomenon is erased, which saves time and money. For example, after implementing the Beamex CMX calibration management system, a GSK plant in Cork, Ireland eliminated 21,000 sheets of printed paper on a yearly basis, as the entire flow of data occurs electronically, from measurement to signing and archiving. In line with the interval extensions defined by the calibration blueprint, CMX also identified over 100 hours of savings in the first three months of operation.

Beamex products are sustainable

Not only does calibration promote sustainability, but Beamex calibration solutions are manufactured with sustainability in mind as well. Beamex's product development and production teams have received training on the environmental impact of product design. Beamex products are also designed to have a long operating life – typically a customer uses a Beamex calibrator for over ten years. This minimizes the waste generated from the products.

The Beamex production process follows the Waste Electrical and Electronic Equipment (WEEE) directive 2002/96/EC that sets collection, recycling and recovery targets for electrical goods and is part of a European Union legislative initiative to solve the problem of huge amounts of toxic electronic waste. Beamex also takes into consideration the ISO 14001 environmental standards in their ISO 9001 quality system.

REFERENCES: Larson, Keith. "Why Sustainability Now?" Sustainable Plant. Putnam Media. 2013. Web. 26 March 2013. <<http://www.sustainableplant.com/about-us/>

Aroona Alliance, Australia

Aroona Alliance strives for high performance in a zero harm environment

The Water Corporation is the principal supplier of water, wastewater and drainage services in Western Australia to hundreds of thousands of homes, businesses and farms, as well as providing bulk water to farms for irrigation. The corporation supplies over 350 billion litres of high quality drinking water from 103 dams and weirs and 94 borefields to over 1 million properties through 33,600 km of water mains.

“Calibrators must be accurate, robust, easy to use and allow the calibration of multiple different types of instruments. Calibration software must be safe and configurable, allowing the company to design its own calibration database that suits both the field technicians and the company itself”, Colin emphasizes.

The Water Corporation has regional offices in Perth, Bunbury, Albany, Karratha, Geraldton, Northam and Kalgoorlie. Since June 2012 Aroona Alliance, with over 400 employees, has been selected to partner with the group and is responsible for the operational, maintenance and asset management for ground and waste water sites across the Perth metropolitan area. Reduced rainfall, and changes in rainfall timing, have greatly reduced run-off into the dams around Perth and dramatically reduced their role in the drinking water supplies. The fact that dams simply can



Colin Curtin and Frank Luchesse, calibrating thermocouples during Aeration Blower maintenance.

no longer be relied upon presents new challenges for the water and wastewater industry.

Calibration makes part of the overall asset and maintenance management

The drinking water supplied by Aroona Alliance is of excellent quality and is regularly tested to make sure it remains this way. The water quality performance is based on water samples from water sources, treatment plants and pipe networks which supply the customers,

and individual analyses performed in independent laboratories. Hundred percent of the water quality health standards set by the Department of Health (DoH) is met.

Colin Curtin works as part of the technical services group within the asset management branch as an Instrumentation Consultant. The technical services group, consisting of 9 engineers / consultants, provides technical support in the instrument, control, electrical, mechanical and civil areas to key stakeholders across the

The main benefit with the Beamex equipment is the automated calibrations for many different instruments and protocols, with a documenting capability.

Alliance.

Calibration has its place, as part of the overall asset and maintenance management structure. Calibration avoids unplanned shutdowns, which are harder to manage in the ever increasing demanding production environment. According to Colin Curtin calibration is crucial as they need to prove their assets are working within their functional specifications and allowable tolerances, and ensure the Aroona Alliance adhere to the requirements of national and international standards. They also need to ensure the Water Corporation environmental responsibilities and the safety of all the employees. The technical services group strives for high performance in a zero harm environment.

The technical service group supports the calibration of a huge amount of

pressure, temperature, flow, level and analytical instrumentation, both analogue and digital. The stores department handles the calibration of the test equipment to ensure compliance to ISO9001:2008 using their own internal system, and to update the system once the calibrated equipment returns from the vendor. In terms of field instrumentation, the maintenance coordinator team generates work orders for the field instrument electricians who then calibrate the relevant assets.

One single unit with direct download to a paperless database

“Calibrators must be accurate, robust, easy to use and allow the calibration of multiple different types of instruments. Calibration software must be safe and configurable, allowing the company to design its own calibration database that suits both the field technicians and the company itself”, Colin emphasizes.

When buying calibration equipment a few different vendors of calibration test equipment and systems were measured up, but none had the capability or functionality of the Beamex MC5. Their compatibility with the CMX software was an added bonus in terms of where Aroona Alliance wanted their documentation system to be.

“It was very clear and simple - Beamex calibrators and calibration software was

“In terms of calibration, these are excellent pieces of equipment and the support from AMS Instrumentation on behalf of Beamex has been second to none”, Colin Curtin states.

→ SOLUTION

Description

- Beamex MC5 multifunction calibrator
- Beamex POC6 automatic pressure controller
- Beamex CMX calibration management software

Main benefits

- Improved regulatory compliance
- Automated and paperless calibration
- Increased accuracy
- History Trend analyses

a good choice, because they allow for the calibration of 4-20mA, HART and Profibus instrumentation in one single unit with direct download to a paperless database. We have four MC5 calibrators, four POC6 automatic pressure controllers and CMX professional”, he explains.

The main benefit with the Beamex equipment is the automated calibrations for many different instruments and protocols, with a documenting capability. Being able to analyze accurate calibration data will allow for the increase of calibration frequency. Performing much more in-house calibration saves on vendor calibration costs also. The calibrators are fast, accurate and easy to use, plus the fact that the ability to analyze the calibration data on the CMX software will always lead to improved efficiency. “We have improved regulatory compliance in relation to ISO 9001, calibration documentation stored safely, with less possibility of human error. In terms of calibration, these are excellent pieces of equipment and the support from AMS Instrumentation on behalf of Beamex has been second to none”, Colin Curtin states.



Training session on calibrating a Profibus PA E+H Cerabar S transmitter.

The 2nd generation of the MC2-IS launched

■ Beamex has recently launched the 2nd generation of the intrinsically safe calibrator MC2-IS. Intrinsic safety (IS) is a protection technique for safely operating electronic equipment in explosive environments. An intrinsically safe calibrator is therefore designed to be incapable of causing ignition in the surrounding environment, which may have flammable materials, such as gases, vapors or combustible dust in it. Intrinsically safe calibrators are designed for use in potentially explosive environments, such as oil refineries, rigs and processing plants, gas pipelines and distribution centers, petrochemical and chemical plants, as well as in pharmaceutical plants.

The ATEX and IECEx certified 2nd generation of the Beamex MC2-IS intrinsically safe multifunction calibrator is a practical tool designed for field calibration and testing in explosive environments. Compared to the 1st generation, there is a new display with an LED backlight for improved display visibility in various environments. It also has a more powerful processor and an improved battery shelf life. The appearance of the 2nd generation MC2-IS has a stronger IS unit identification. As with the previous generation, the MC2-IS has calibration capabilities for pressure, temperature and electrical signals, and it connects to almost 20 available Beamex intrinsically safe external pressure modules. It is a compact-sized, lightweight portable calibrator with a multilingual interface and a complete numerical keyboard. Calibration with the MC2-IS is fast and simple.

Summarizing the benefits of the 2nd generation MC2-IS, Heikki Laurila, product manager at Beamex, comments, "When developing the 2nd generation MC2-IS we heavily considered customer feedback. The new generation is very user friendly and robust. It provides safety for the person using it, as it is incapable of causing ignition in an explosive environment. Not only is it safe, but it also offers the functionality and performance of an industrial calibrator, as it has a wide range of calibration and configuration possibilities."



The launch of the 2nd generation MC2-IS improves Beamex's already excellent ability to serve customers operating in potentially explosive environments, as Beamex currently has yet another intrinsically safe calibrator in its range, the MC5-IS intrinsically safe multifunction calibrator.

Minimizing system integration risks with the Beamex Business Bridge

■ *Beamex minimizes system integration risks by introducing the Business Bridge – a standardized, but configurable software solution for connecting Beamex CMX calibration management system to an ERP/CMMS system.*

These days, integration of various independent IT systems is a requirement in almost any business. Unfortunately, system integration projects are many times considered costly and risky. Staying within the original project budget and timetable can be a challenge, specifications and scope of work keep changing constantly during the project and system maintenance of a finished, highly customized integration solution turns out to be difficult and expensive. Beamex minimizes these system integration risks by introducing the Business Bridge - a standardized, but configurable software solution for connecting Beamex CMX calibration management system to an ERP/CMMS system.

Mr. Pekka Videnoja, Product Owner of the Beamex Business Bridge solution explains, "Many of the common system integration risks relate to the fact that system integration typically requires software development, customization or configuration on both ends of the integrated system, the calibration software and the ERP/CMMS system. We are aiming to minimize these system integration risks by offering a solution where the integration part related to the calibration software is based on a standardized, but still configurable solution". Having a standardized integration solution brings many benefits. Due to a standardized solution, a system integration project requires less customer-specific

software development work. This means quicker and more reliable delivery. A standardized solution also means availability of long-term software maintenance contracts with regular software updates for software evolution and helpdesk services. Availability of long-term support contracts also decreases IT system lifecycle risks. The Business Bridge is therefore a safe, less risky and future-proof solution for integrating calibration system with an ERP/CMMS system and the integration project can be implemented more quickly and accurately. Jan-Henrik Svensson, VP Sales & Marketing of Beamex explains, "Having a safe and less risky system integration solution with long-term maintenance capability is appreciated in many of our regulated customer industries, such as the pharmaceutical, energy as well as food and beverage industries".

The main purpose of the Business Bridge software solution is to provide a transfer channel for sharing instrument, work order and basic calibration data between the calibration management and ERP/CMMS systems. System integration itself is beneficial in several ways. Firstly, productivity may increase significantly due to system integration, as data needs to be entered and kept up to date in one place only, instead of manually re-keying the data into two or more separate systems. Secondly, because data needs to be entered only once, human typing errors and delays related to manual re-keying of data are minimized. The Business Bridge solution is available for integrating Beamex CMX calibration software with several of the leading ERP/CMMS systems used in the processing industry.

As a software vendor, Beamex is able to offer all key elements of a system supply project, including calibration software licenses, services required for supplying an integrated system (such as consulting, project planning and management, software configuration, installation and training) as well as system support and maintenance programs.



New and added features for the Beamex MC6

■ Beamex has recently added new features to the Beamex MC6 advanced calibrator and communicator.

The new features can be downloaded free of charge from the Beamex website.

The features are;

1. Added possibility to read all configurations from a smart (HART, FOUNDATION Fieldbus H1 or Profibus PA) instrument, save them in an MC6 and upload them to a PC.
2. Added possibility to automatically populate certain fields in the MC6 instrument data by reading the data from a connected smart transmitter.

Other new features include easier switch testing in the Calibrator mode.

The new features are something that has been frequently requested and will make the MC6 an even more competitive product.



Beamex website in several languages

■ The Beamex website www.beamex.com has been translated into several languages and can now be found in English, Spanish, French, German, Finnish and Swedish.

The website is easy to navigate and product search can be done by application, type or name. Different calibration solutions are presented as well as industry-specific pages. The webpages include detailed information about Beamex products and services with video demonstrations. Create your personal login name for downloading documents quickly and easily at MyBeamex. Visit the Beamex webpage and get up to date on Beamex's latest news!



When safety becomes a top priority issue in calibration

Beamex intrinsically safe multifunction calibrators



Beamex MC5-IS



Beamex MC2-IS

Beamex MC2-IS & MC5-IS

The ATEX and IECEx certified MC5-IS and MC2-IS are designed for use in potentially explosive environments, such as offshore platforms, oil refineries, chemical and petrochemical plants where inflammable gases may be present. The high accuracy all-in-one calibrators have calibration capabilities for pressure, temperature, electrical and frequency signals. The MC5-IS is a documenting calibrator communicating with HART, Foundation Fieldbus H1 and Profibus PA transmitters.

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www.beamex.com
info@beamex.com

Minimize system integration risks with the Beamex Business Bridge

Business Bridge is a standardized, but configurable software solution for connecting Beamex CMX calibration management system to an ERP/CMMS system.



Staying within the original project budget and timetable can be a challenge, specifications and scope of work keep changing constantly during the project and system maintenance of a finished, highly customized integration solution turns out to be difficult and expensive. Beamex minimizes these system integration risks by introducing the Business Bridge.

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Beamex in brief

Beamex is a leading worldwide provider of calibration solutions that meet even the most demanding requirements of process instrumentation. Beamex offers a comprehensive range of products and services — from portable calibrators to workstations, calibration accessories, calibration software, industry-specific solutions and professional services. Through Beamex's partner network, our products and services are available in more than 60 countries.

Learn more about Beamex products and services

www.beamex.com

Brochures, product demonstrations and quotations

info@beamex.com

www.beamex.com/request (online request form)

Software support

support@beamex.com

Re-calibration and service

service@beamex.com

Find your local Beamex sales office

www.beamex.com/contacts

Interested in submitting an article to Calibration World?

Contact: pamela.skytte@beamex.com

If you would like to remove your name from our mailing list

Please visit www.beamex.com

or send an e-mail to info@beamex.com

Beamex products and services

Portable calibrators

Beamex's range of portable MC calibrators for field calibration is known for accuracy, versatility and meeting both high and uncompromised quality standards.

- MC6 advanced field calibrator and communicator
- MC5 multifunction calibrator
- MC5-IS intrinsically safe multifunction calibrator
- MC2 series
- MC4 documenting process calibrator
- MC2-IS intrinsically safe multifunction calibrator
- FB/MB temperature dry blocks
- POC6 automatic pressure controller

Workstations

A workstation can be considered ideal when most of the maintenance and calibration tasks are performed in the workshop.

- MCS200 workstation
- MCS100 workstation
- MC5P calibration host module

Accessories

Beamex's calibration accessories complete your investment in calibration equipment.

- External pressure modules
- Calibration hand-pumps
- Spare parts

Calibration software

Plan, manage and document all your calibrations efficiently and safely using Beamex's calibration software.

- CMX light
- CMX professional
- CMX enterprise

Professional services

An essential part of a complete calibration solution is professional services — service and re-calibration, installation and training, software support, validation services and integration services.

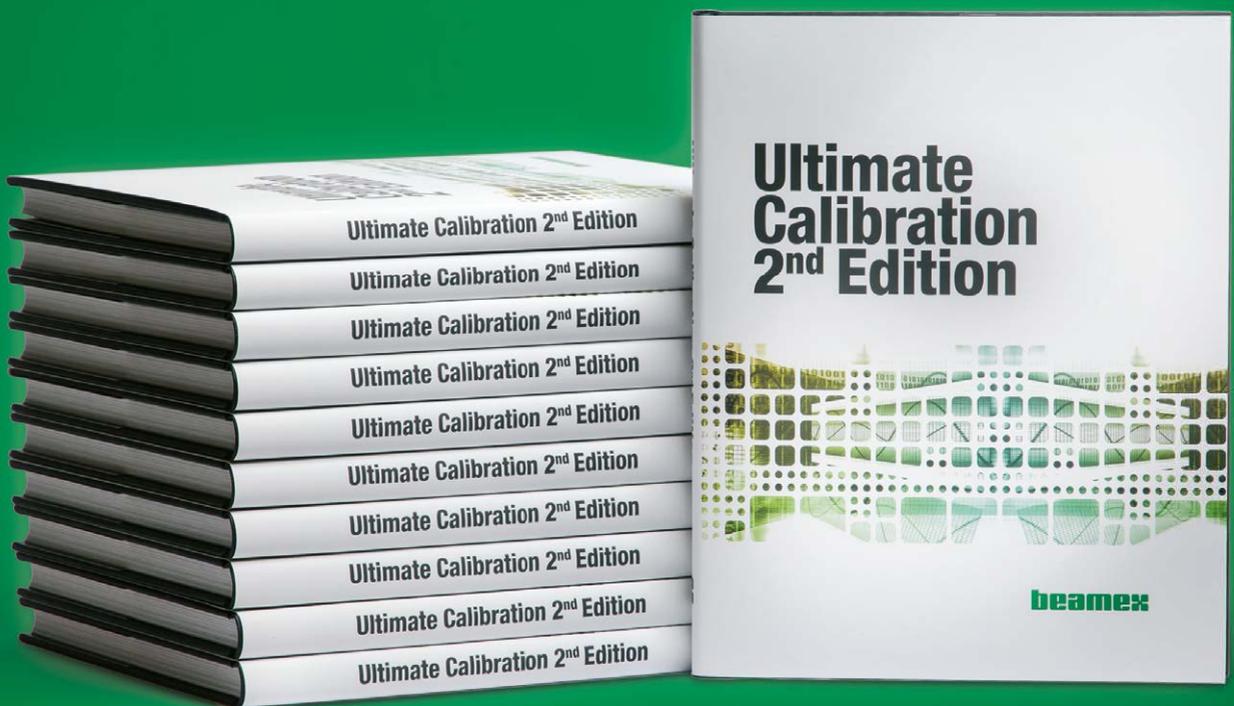
- Re-calibration and service
- Installation and training
- Software service agreement (SSA)
- Validation services (pharmaceutical industry)
- Integration services



Learn more about advanced calibration - Ultimate Calibration, 2nd edition

- What is paperless calibration and how can it be managed?
- Why must smart instruments be calibrated and how can this be done?
- How calibrate safely in hazardous environments?

The second edition of the Ultimate Calibration book, a calibration handbook made by Beamex, provides answers to these and many other questions.



*Register for an electronic copy of
the new calibration handbook at
www.beamex.com*

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