ELECTRONICS AND INSTRUMENTATION ENGINEERS ASSOCIATION
MUTHAYAMMAL ENGINEERING COLLEGE,
RASIPURAM - 637 408

INSTRONICS

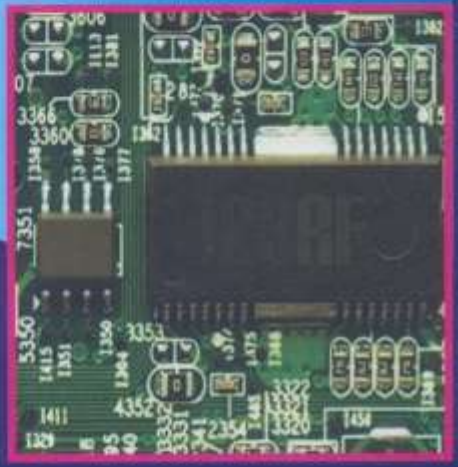
India's best INSTRUMENTATION magazine 19th, SEPT, 2009 VOL. 1

"Techno Fresh"

Carrier Consultants

LEDs
THE FUTURE OF LIGHTING

India's Core Industries



Circuit Shore

Grazping Trendz

YEAR: 2009 Vol: 1 SEPT

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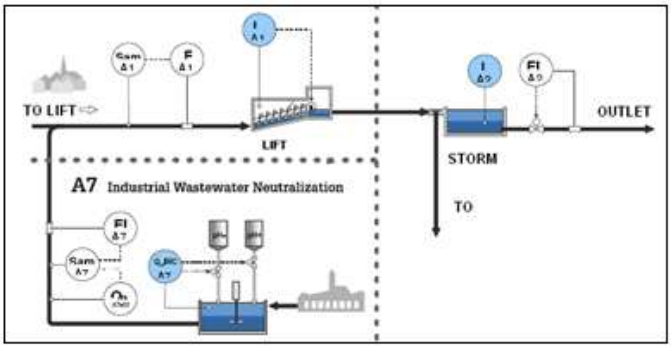


RESISTOR

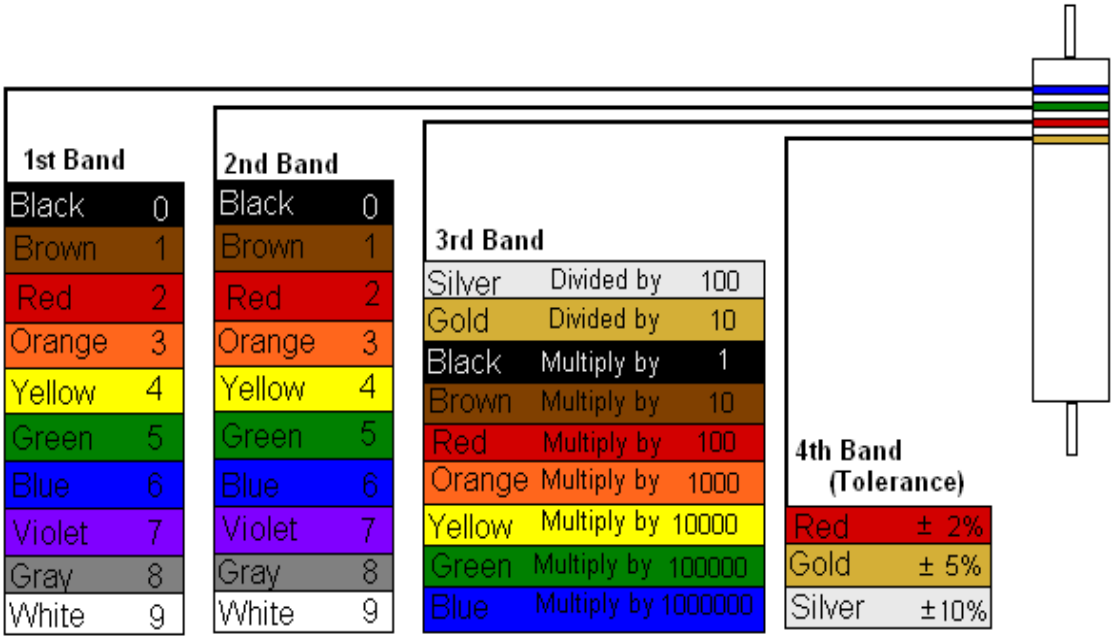
A resistor is a two-terminal electronic component that produces a voltage across its terminals that is proportional to the electric current through it in accordance with Ohm's law:

$$V = IR$$

Resistors are elements of electrical networks and electronic circuits and are ubiquitous in most electronic equipment. Practical resistors can be made of various compounds and films, as well as resistance wire (wire made of a high-resistivity alloy, such as nickel/chrome

The primary characteristics of a resistor are the resistance, the tolerance, maximum working voltage and the power rating. Other characteristics include temperature coefficient, noise, and inductance. Less well-known is critical resistance, the value below which power dissipation limits the maximum permitted current flow, and above which the limit is applied voltage. Critical resistance depends upon the materials constituting the resistor as well as its physical dimensions; it's determined by design

Four Band Resistors



For the above resistor

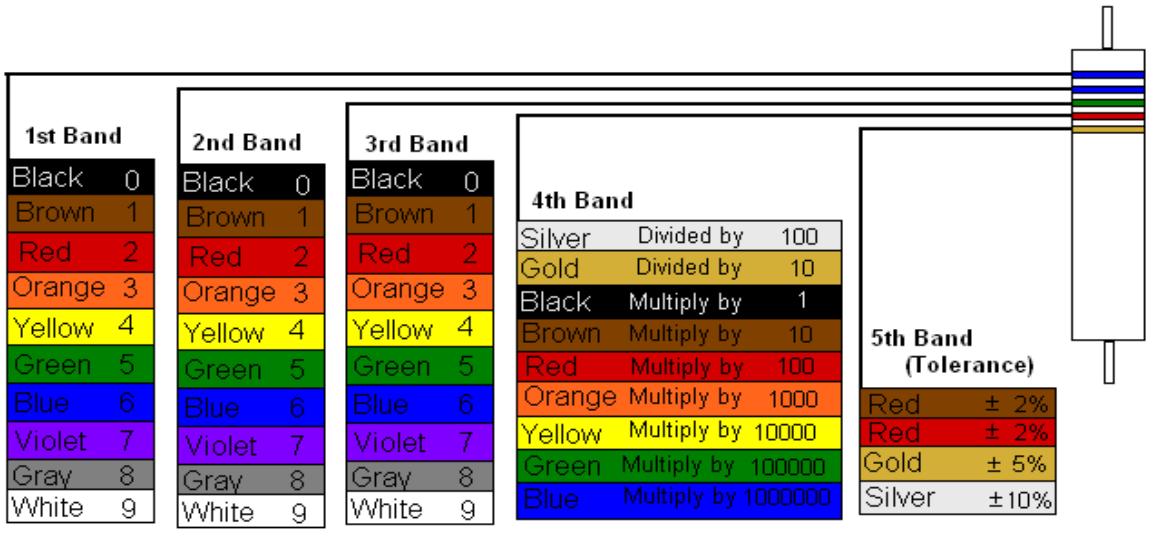
Blue=6
Green=5
Red=10^2
Gold=±5%

Hence,

Value is **6.5kΩ ±5%**

Five band resistors

5-band identification is used for higher precision (lower tolerance) resistors (1%, 0.5%, 0.25%, 0.1%), to specify a third significant digit. The first three bands represent the significant digits, the fourth is the multiplier, and the fifth is the tolerance. Five-band resistors with a gold or silver 4th band are sometimes encountered, generally on older or specialized resistors. The 4th band is the tolerance and the 5th the temperature coefficient.



For the above resistor

Blue=6
Blue=6
Green=5
Red=10^2
Gold=±5%

Hence,

Value is **665.5kΩ ±5%**

Measurement

The value of a resistor can be measured with an ohmmeter, which may be one function of multimeters. Usually, probes on the ends of test leads connect to the resistor. Measuring low-value resistors, such as fractional-ohm resistors, with acceptable accuracy requires four-terminal connections. One pair of terminals applies a known, calibrated current to the resistor, while the other pair senses the voltage drop across the resistor. Some laboratory test instruments have spring-loaded pairs of contacts, with neighboring contacts electrically isolated from each other. Better digital multimeters have four terminals on their panels, generally used with special test leads. These comprise four wires in all, and have special test clips with jaws insulated from each other. One jaw provides the measuring current, while the other senses the voltage drop. The resistance is calculated using Ohm's Law.

By

R.Dileephan (MEIEA)

IIndYear

Ultrasonic Flowmeters in Waste Water Plants

Introduction:

Waste Water Treatment Plants require a large variety of instrumentation in order to monitor and control the processes in the different stages. For the purpose of flow metering; do electromagnetic flow meters and ultrasonic flow meters offer the features and performance which is demanded in these applications?

The small and compact ultrasonic clamp-on flow meters are an attractive alternative to Inline meters, which require a spool-piece. Clamp-on meters are easier to transport and install which not only makes logistics faster and easy but often enables cost savings as well. Especially for big line sizes, the clamp-on meters are a more cost-effective solution than spool-pieces. In the case of retrofitting, clamp-on meters are an unbeatable alternative.

However, a few considerations are required to ensure the successful use of an ultrasonic transit-time flow meter in Waste Water applications. Therefore, it is important to understand the applications, within a typical treatment plant, that are best suited for transit-time ultrasonic flow meters – and those that are best suited to electromagnetic flow meters.

Basic Principles:

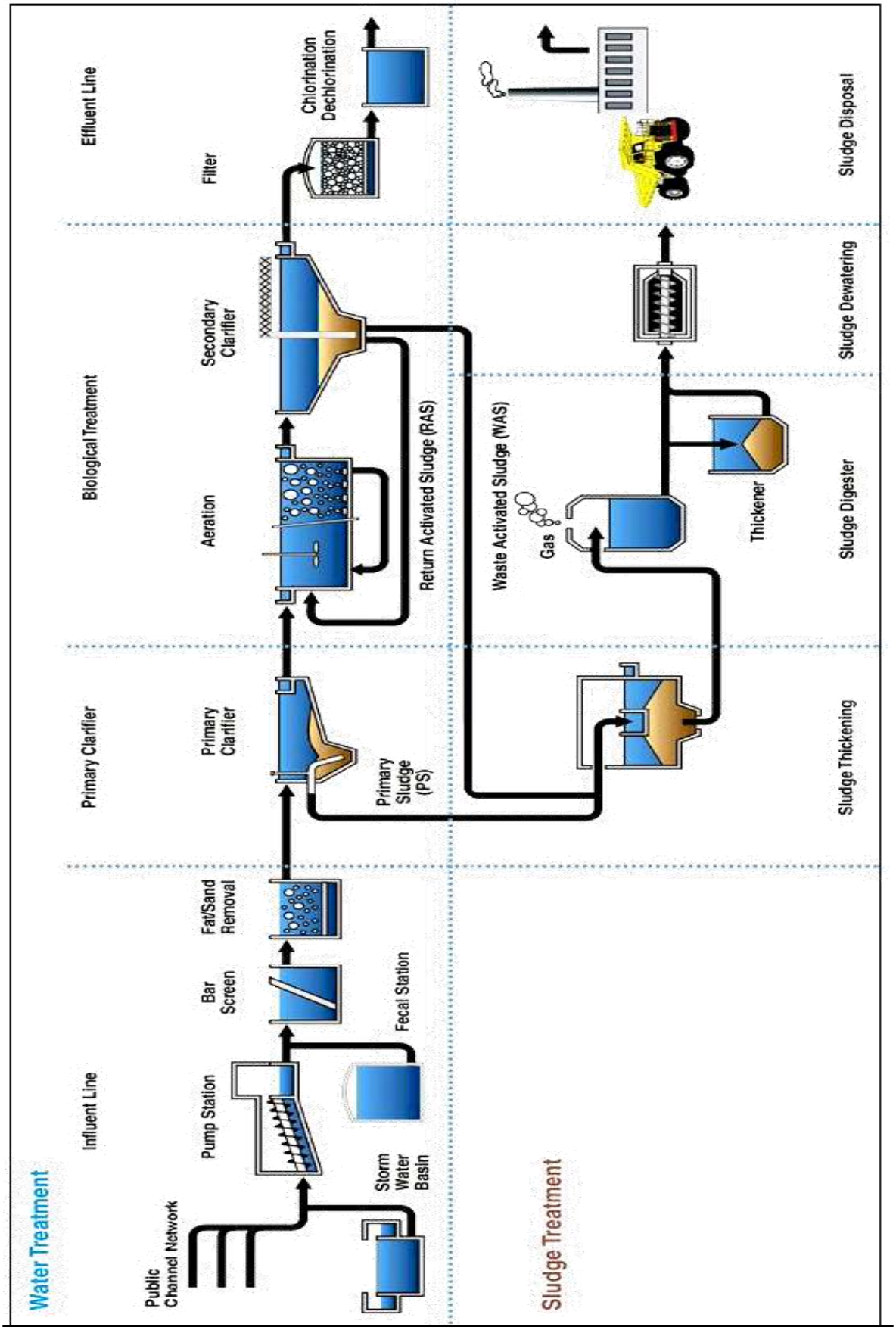
The principles for choosing between a Prosonic Flow ultrasonic transit-time flow meter or a Promag electromagnetic flow meter, at any given location, are as follows:

1.Specify a Prosonic Flow clamp-on flow meter if all of the following conditions Exist:

- ✓ Air or gas is not added to or generated within the waste liquid - in the equipment upstream of the meter.
- ✓ The meter is located as far as possible downstream of any pump to avoid the adverse effects of pump cavitations. A straight run of at least 15 pipe diameters upstream and 3 pipe diameters downstream should be allowed between the flow meter sensors and any elbows, valves, tees or pumps.
- ✓ The application calls for an absolute accuracy in the range of 1% to 2% (of reading) for flow rates greater than 0.3 m/s.

2. Specify a Promag electromagnetic flow meter for following conditions:

- ✓ The solid content of 5% is exceeded and/or the process is generating gas bubbles. These conditions typically apply across the sludge treatment stage, as well as in the biological treatment stage. One important example, for a process, where such a condition applies is Return Activated Sludge (RAS).
- ✓ The application calls for an absolute accuracy in the range of <1%.

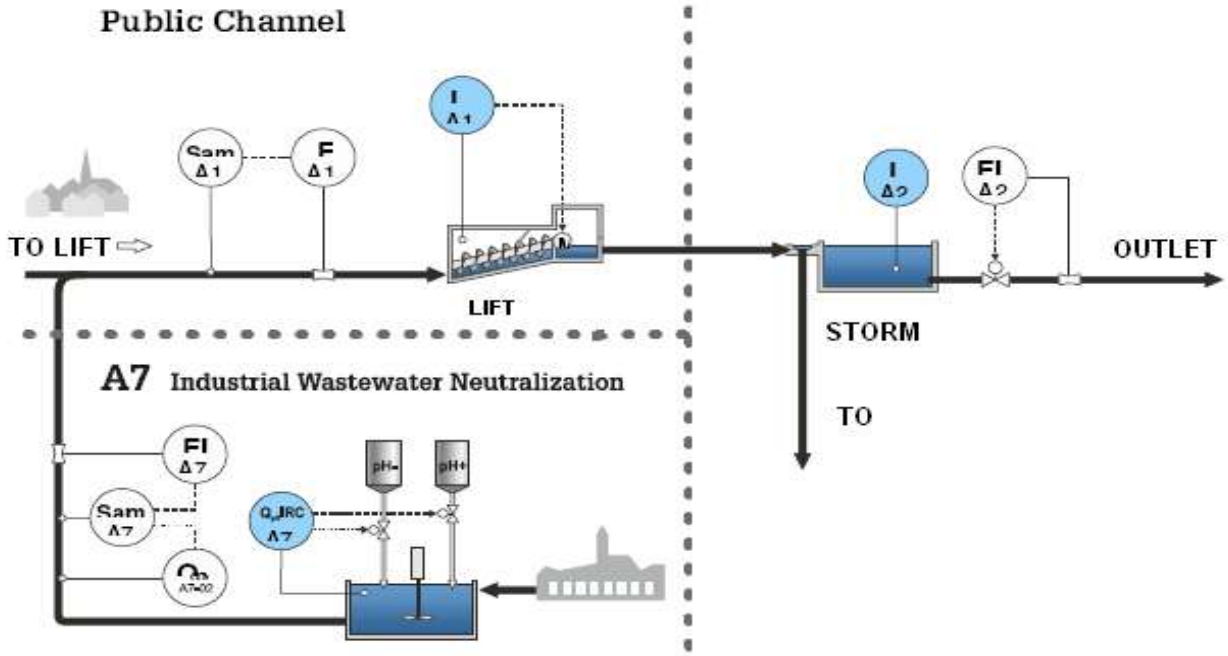

Water Treatment
Sludge Treatment
Public Channel Network
Storm Water Basin
Influent Line
Pump Station
Fecal Station
Bar Screen
Fat/Sand Removal
Primary Clarifier
Primary Clarifier
Primary Sludge (PS)
Biological Treatment
Aeration
Secondary Clarifier
Return Activated Sludge (RAS)
Waste Activated Sludge (WAS)
Filter
Chlorination Dechlorination
Effluent Line
Sludge Thickening
Gas
Sludge Digester
Thickener
Sludge Dewatering
Sludge Disposal

Summary Overview

The processes in a typical waste water treatment plant can be divided into two groups:

- Water Treatment
- Sludge Treatment

The water treatment may be considered the primary process of cleaning the waste water. Ultrasonic transit-time meters are suitable for most of the flow measurement applications in this section. Exceptions are: the location downstream of the aeration in the biological treatment, and also the RAS and WAS lines. In the former, the sludge typically contains a high content of gas, the latter contains a high solid content. The processes within the section sludge treatment are generally the domain of electromagnetic flow meters because of generally high solids and sometimes gas content.



Graph: Influent Line

Raw Sewage — The rate of flow of raw sewage into the waste treatment plant is often used as a basis for billing the source of the sewage - perhaps another municipality or a large industrial facility. Since that the solids concentration is usually relatively low, transit time meters are usually specified. However, electromagnetic flow meters might be used because of the improved accuracy and traceability.

Interceptor Storage or Flow Equalization — the interceptor storage tanks are typically located on the raw sewage lines (into the plant and upstream of the bar screens). They are utilized to minimize flow variations within the plant and thus help to achieve consistent performance of the treatment processes. Since that the solids concentration is usually relatively low, transit-time meters can be used.

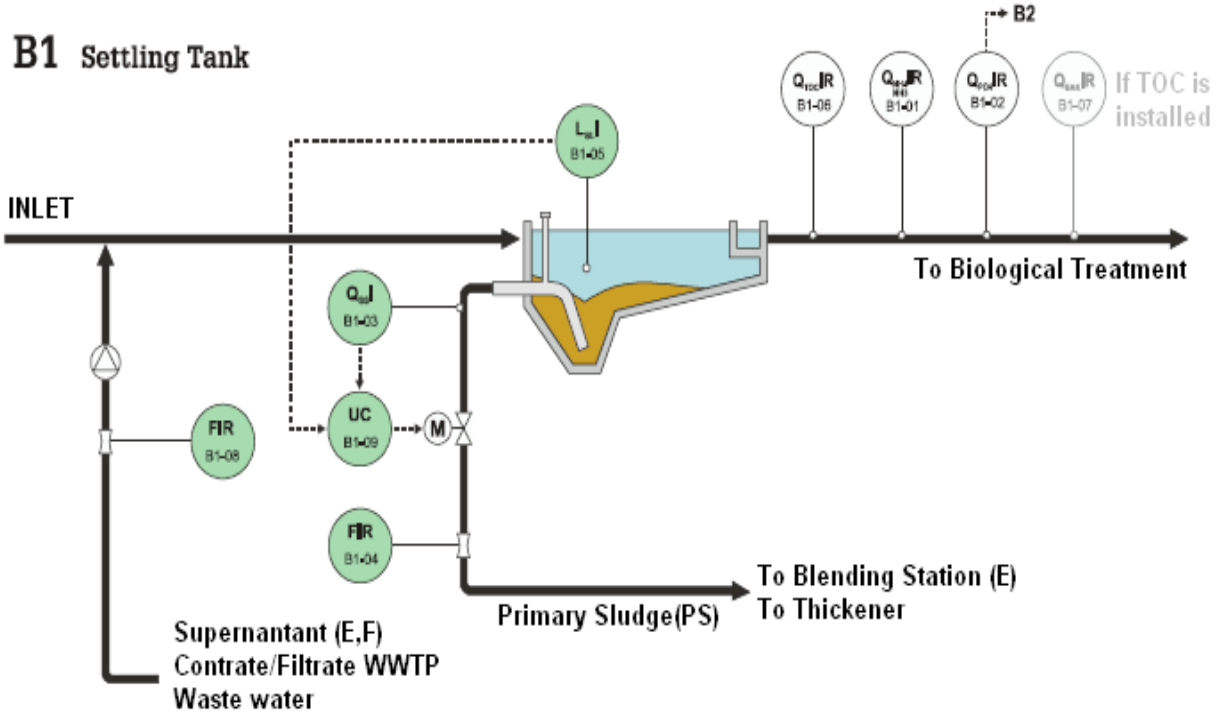
Features to be Considerations:

Measuring in the overflow line (see graphic: to River) is normally a challenge for all flow meters because this line is often not filled completely.

Primary Clarification and Sludge Pumping — Primary clarifiers are tanks used to remove or reduce suspended solids, and organic loading, from the wastewater, before it goes to secondary treatment units.

Electromagnetic flow meters are suggested for the high solids content of sludge flow to the thickeners (Primary Sludge, PS). Transit-time flow meters are usually recommended for the primary effluent (water treatment).

Primary Clarifier



Return Activated Sludge (RAS) — A primary objective is to maintain the stability of the activated sludge process. This is accomplished by recycling an active mass of microorganisms, in sufficient quantity, to break down most of the biodegradable organics flowing as effluent from the primary clarifiers. The RAS is usually returned to a point just upstream of the aeration tanks. Because of the high gas content, a domain of electromagnetic flow meters.

Effluent Line

The rate of flow of effluent from the waste treatment plant, into a nearby lake or river, is usually monitored carefully; due to requirements for reporting to governmental authorities. Since the effluent is virtually solids-free, transit-time flow meters are usually recommended.

Important Considerations:

- ✓ Note that effluent, cascading from the secondary clarifier or subjected to a final aeration (in an open channel leading to the final closed effluent piping), may be full of bubbles. In such cases, electromagnetic flow meters are used.
- ✓ In some cases the section of the pipe (which is located close to the upstream open channel inlet) will not be filled completely with water. The only possible solution is to move the instrument further downstream - to a section where the pipe will be completely filled with water.

Sludge Treatment

The sludge treatment is generally a domain of electromagnetic flow meters, because of the generally high solid and sometimes gas contents.

Waste Activated Sludge (WAS) — The purpose of the secondary clarifiers is to concentrate solids, a portion of which is recycled (RAS), and a portion of which is waste (WAS). Due to the high solid content, electromagnetic flow meters are recommended.

Sludge Thickening — The main objective is to concentrate the sludge as much as possible, within the constraints of the process, to maintain as consistent an underflow quantity, and composition, as can be achieved. Because solids and/or bubble contents may be rather high, electromagnetic flow meters should be specified. Transit-time meters are usually unsuitable.

Digestion — This is the process of breaking down and partially liquefying waste solids by the action of bacteria, so that the solids which remain are stable and can be disposed of without posing a health hazard. In primary treatment, the process is anaerobic (i.e., in the absence of air) and methane gas is generated. In secondary treatment, the process is aerobic (i.e. in the presence of air) and air or oxygen is bubbled through the waste system. In either case, the presence of gas bubbles point to the use of electromagnetic flow meters.

Ultrasonic transit-time flow meter
Prosonic Flow

- Perfectly suited to bidirectional measurement of pure or slightly
- Contaminated liquids with a gas content < 1 % or a solids content < 5 %.
- Accuracy typically < 1...2%
- Cost-effective alternative to magmeters for large line sizes (>DN600)

Electromagnetic Flow meter
Promag Flow

- Fluids with a minimum conductivity of 5 µS/cm can be measured: water, waste
- Water, sludge, etc.
- Guaranteed accuracy of 0.5 %
- Traceable (calibration)
- Cost effective for small line sizes (<DN600)
- Can afford a high solid and gas content

By
T.S.Srinivasan (MEIEA)
Lecturer

EXPERT VIEW

Dr.V.Nandagopal Ph.D
Dean (EIE Dept.)
Development officer of Vel Tech. group of Institution

"With science and technology becoming the power in today's arena, I am glad that the young Engineers of EIE Muthayammal engineering college has brought out this manicured magazine"

He has completed his bachelor's degree in EEE, then he joined TNEB and served for about 34years in Electric utility for about five years he had opportunity to serve Indian Government authority, New Delhi as deputy director in northern region. In between these years he joined M.Tech (energy system) inIIT, New Delhi

He studied Master degree in solar and served for popularizing solar gadgets. He is an expert in SCADA control of its power systems.

He has prepared a support material for final students of Anna University in the following subjects, Professional ethics, Total quality management, Analytical instruments, and also to produce 100% result in examination

He who actively involved as dean and Professor to get the accreditation notes from National Board of Accreditation for the EIE department of Vel Tech. engineering college.

He had a training record in power system protection and instrumentation on line load flow analysis in India and U.S.A

He has also visited several countries like Japan, France, U.K Singapore etc. and also gave guest lecture on solar voltaic in Eco-solar training, Maintenance of equipment, spares for SCADA operation systems.

Now he is currently in the position of Development officer of Vel Tech. group of Institution

1) "Current atmosphere prevailing in industries".

As I joined in TNEB as J.E (Junior Engineer) in 1970 that's the time of replacement in relay logics or general hardware to Automation by logics stating the PLC's. My 25 years Industrial exposure all ways showed me that one who learns from the work he does will surely come up with flying colors all the manual operations done by PLC's now days the latest PLC is Siemens. A product of siemens.

2) What is the "IIPDATE ASPECT FOR TODAYS ENGINEERS?"

Updated is a finite habitual practice to exposure the infinite development in scientist & technology. In 1970's when I attended the seminars and conference in U.S.A, Australia I witnessed the presence of Robotics performs various Operation in Automobile & Manufacturing Industries& in those days itself Automation were present. So talking that the next trends are Automation is an example of sting the stupidity. I suggest & my lovable order that student should browse, learn, visit & compare last 3

decades with its development & should understand the need of next 2 decades.

3) What is the Basic Need to be holded by an Engineer before holding the degree certificate?

"The development is rapid in all the industries and the books & Syllabus where all are for the technologies before 15 year. So the young or fresher has to update themselves through Net and should have an exposure in term of IV." Says the chief and also adds that "communication is must with the positive attitude".

4) What about the term "Scoring-PERCENTAGE"?

Pupils of Various Engineering disciplines want to crab more & more ideas , techniques, methods and solving technique in Various aspects "co-curriculum & extra-curriculum" but when they failed in terms of scoring or maintaining a high percentage (curriculum) their loosing their own entry ticket of "the journey of PROFESSIONAL". Students should learn & learn to score and should have good score that shows his eligibility and his records that's the first impression. Where ever he gets steps into.

5) What is the next R&D Requirement and what does it wants from Engineers.

The limited sources, lagging Infra-structure and high requirement Amount always need s the Engineers to give there creativity, or Innovative to overcome the failure of Bio-Gas plants & others. If one with a paper in this area will be surely appreciated and awarded. Students in different communities of ECE, EEE, EIE, Mechatronic, BME, mechanical, civil all should at least submit a paper on these area that will help in way to get govt., scholarship, recognitions or even a job and higher posting too.

6)"Guide lines to freshers"

I stay tunned only by my job and by the industrial exposure I have got. So after B.E all the students should march forward to core of various Engineering sectors and companies for the self development in both in terms of experience and financial to satisfy the need as major category of the students where from middle class. When you satisfied your needs and your parents need one, one itself thinks the next development of his/her carrier options with the industrial more and works whether to do M.E., M.Tech or M.sc or other job and so on

Your Feedbacks and Quires are most Welcomed

By post:

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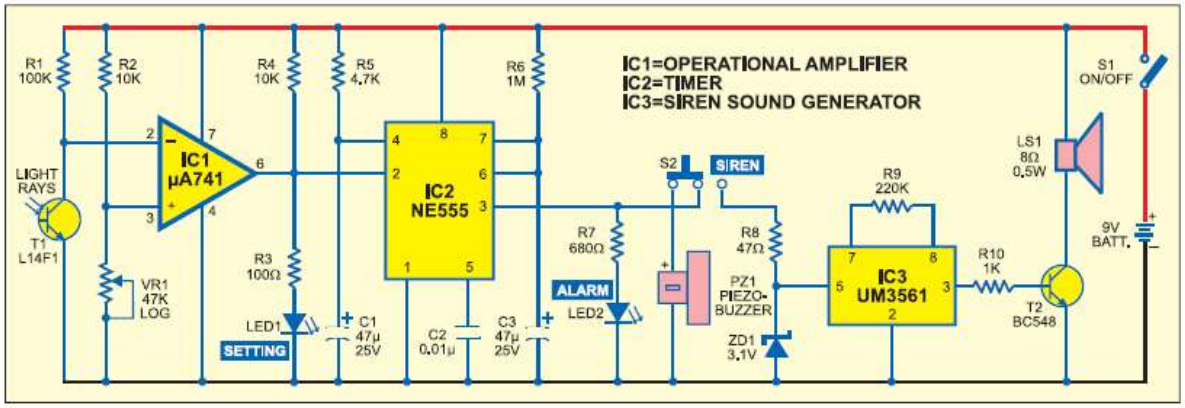
By
Karthick Raja (MEIEA)
(Pre-Final Year)

Shadow Alarm

This opto-sensitive circuit sou 9 an alarm whenever a shadow falls on it. So it can be used at night by shopkeepers to protect the valuables in their showrooms. A dim lighting in the room is necessary to detect the moving shadow. Unlike opto-interruption alarms based on light-dependent resistors (LDRs), it does not require an aligned light beam to illuminate the photo-sensor. The circuit is powered by a 9V PP3 battery and uses the most sensitive photo-sensor L14F1 to detect shadows. It is portable and can be used at any place that is to be monitored. Op-amp µA741 (IC1) is used as a voltage comparator. Its inverting input is biased by the voltage obtained from the junction of 100k resistor R1 and the collector of phototransistor T1. The non-inverting input of IC1 gets a controlled voltage from potential divider R2 and VR1. In the presence of ambient light, the phototransistor conducts and the inverting input (pin 2) of IC1 gets a lower voltage than its non-inverting input (pin 3). This makes the output of IC1 high, which is indicated by the glowing of LED1. When a shadow falls on the photo sensor, the output of IC1 goes low.



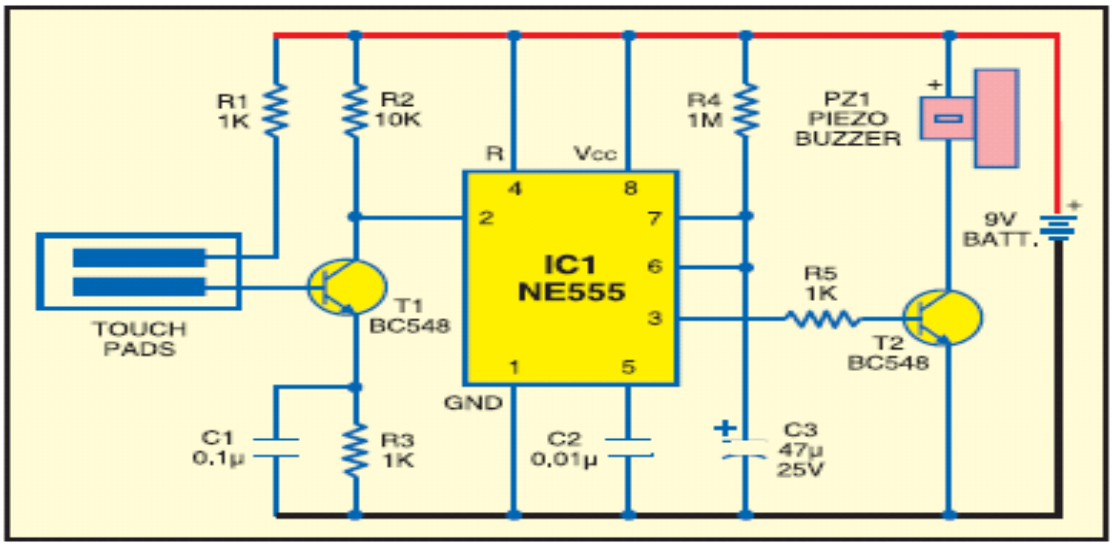
Circuit of Shadow Alarm

This low pulse triggers the monostable (IC2) designed for a delay of 51 seconds using R6 and C3. The output of IC2 is used to light up LED2 and activate the alarm. Slide switch S2 is used to select either the buzzer or siren. When it is towards left the buzzer beeps, and when it is towards right IC UM3561 (IC3) activates to give a loud alarm simulating a police siren. Resistor R8 and zener diode ZD1 provide 3.1V DC to IC UM3561. The circuit is easy to assemble as it requires only a few low-cost components. Enclose it in a cabinet with the photo-sensor inside. Drill a 5mm hole on the front panel of the cabinet to let ambient light fall on the photo sensor. Adjust photometer VR1 (47k) until LED2 stops glowing and the buzzer stops beeping while LED1 glows. This is the position of VR1 to be maintained for that particular intensity of light. LED1 will continue to glow even when a shadow is detected. The circuit is now ready to use. To test it, move a paper in front of the unit. If LED2 glows along with the beep of the buzzer, it means that the photo-sensor has detected a shadow.

Mat Switch

This simple circuit produces a warning beep when somebody crosses a protected area in your home or office. The switch, hidden below the floor mat, triggers the alarm when the person walks over it. The circuit uses conductive foam as the switch. It can be two small pieces of conductive pads usually used to pack sensitive ICs as antistatic cover.

Alternatively, you can make the switch by coating conducting carbon ink on two small pieces of a copper-clad board. When the circuit is in standby mode, transistor T1 does not conduct, since its base is floating. When the person walks, the switch is pressed and current flows through R1 and the switch to provide positive bias to transistor T1.



Circuit of Mat Switch

Transistor T1 conducts and its collector voltage drops, which acts as a negative trigger input for the monostable wired around IC NE555 (IC1). IC1 outputs a pulse of fifty-second duration with preset values of R4 and C3. This pulse is applied to the buzzer through transistor T2. The buzzer sounds a warning beep on unauthorized entry. The pulse duration can be changed to the desired value by changing the values of R4 and C 3. Resistor R2 in the circuit makes the trigger pin of IC1 high to prevent false triggering. Assemble the circuit on a general purpose PCB and enclose in a plastic case. Use a 9V battery to power the circuit. Connect the touchpad switch with the PCB and hide under the mat at the entrance. The PCB can be mounted on the nearby wall. Make the switch carefully using conducting foam or copper clad coated with conducting ink. Place the two pieces with their conducting surface facing each other. Solder carefully a thin copper electric wire and ensure that it makes contact when the two plates touch together on pressing. Provide two 1cm rubber tabs between the plates to avoid touch in the standby mode.

By

K.Ravisankar (MEIEA)

Final year

Software-Defined Instrumentation Meeting Today's Design & Test Challenges

One of the most visible challenges test engineers face today is the increased complexity of the devices they need to test. The fluid functionality of these complex devices is defined by the software embedded in them, which gives design engineers the ability to add features faster than ever before. It would be worth saying that software – defined instrumentation plays a pivotal role in meeting the challenges faced by test engineers in the day and age of automation.

More than the making of a device, its testing has become a Herculean task. It is because test engineers face many challenges on account of complexities in today's devices. For example, the consumer electronics, communications and semiconductor industries continue to drive the convergence of digital imaging/video, high-fidelity audio, wireless communications and Internet connectivity into a single product. Even the automobile has become a convergent electronics device with integrated entertainment and information system, safety & early warning systems and body & engine control electronics.

Software-Defined Instrumentation

Next-generation test system must be flexible enough to support the wide variety of tests that differ among convergent products. They must be scalable enough to accommodate a larger number of tests, as new measurement functionality is required. Software-defined instrumentation is the essential differentiator for meeting this test challenge. The mainstream adoption of software-defined modular instruments in automated validation and production test applications is confirmation of this trend.

The functionality of a modular instrument is characterized through user-defined software residing on the host PC instead of on the instrument. The role of software in modular instrumentation cannot be overstated. With a software-defined modular instrumentation system, engineers can quickly adapt to changing test needs. Through software, they can program a high-performance modular instrumentation system to function as one user-defined instrument employing built-in shared clocks and triggers. PXI, governed by the PXI Systems Alliance (PXISA) since its inspection in 1997, is an example of a widely used software-defined instrumentation platform for building modular, automated test systems. The PXISA comprises more than 70 vendors, including Agilent Technologies, National Instruments and Rhode & Schwarz, as well as more than 1500 software-defined PXI instruments.

Frost & sulliven Measurement & Instrumentation Research Manager Kiran Unni recently stated, "The adoption of tools such as PXI is an indicator that companies recognize the benefits of moving toward software-defined instruments .The savings being realized in capital equipment, system development and improvements in system development and improvement in system efficiency all contribute to the per-unit cost of test, directly influencing the bottom line

Pc-Based Application Software

With increasing pressures on delivering higher-functionality Products to market faster, modern Engineers must move quickly through the development cycles expressed simply as three primary stages; design, prototype and development. Hence, venders are delivering PC-based application software to reduce time to market and increase measurement flexibility, NI LabVIEW SignalExpress software for example, is shipped with numerous Tektronix MS4000, DPO400, TDS2000B and TDSI000b series oscilloscopes to give engineers a tool for quickly adapting their measurement algorithms and user interfaces to meet specific application requirements on a PC connected to oscilloscope.
Such a productive software approach using graphical programming powerfully expands to unify most of the disparate software tools of the different development phases. Modular I/O integrated into each space ensures better code reuse and certainty of functionality at each step. Finally, the power to leverage the latest commercial-off-the-self (COTS) technologies – such as FPGAs PCI Express and powerful yet inexpensive DSPs – with the exact same code is used in the design and prototype phases speeds up deployment of validated designs.

Benefits

Engineers implementing test systems based on modular, software-defined instrumentation attain the following benefits compared to hardware-defined instrument systems for previous generations:

- Increased flexibility for deploying to a variety of applications business segments and product generations
- Higher-performance architectures that significantly increase the test system throughput by the incorporating the latest PPC technology such as multicore processors, PGAs and PCI Express.
- Lower test system investment and maintenance cost through reuse across multiple test requirements.
- Increased longetivity based on widely adopted industry standard that enable technology upgradation to improve performance and meet future test requipments.

Countless companies around the globe already deploy modular, software-defined test system and realize significant returns on their investments. For example, Microsoft neede a functional test system for its Xbox 360 controllers that could perform tests similar to the original Xbox360 controller test system but with high performance signal capture to qualify the signal integrity of the new controller and ensure a high quality user experience. Because the original system was based on Lab VIEW and PXI,Microsoft engineers could rapidly adapt the existing test system capabilities to meet the new the requirements for both the validation lab and production by adding PXI modules with additional measurement capabilities .

With updated fuctional test system for the Xbox 360 controller, Microsoft implemented a test statergy that resulted in a 100 per cent increase in its tests throught per test station

Flexible Test Systems

As device continues to become more complex and include more disparate technologies, test system must become more flexible. The only way to accomplish this is through graphical software-design instrumentation in both stand alone and modular formats ,which helps engineers quickly design ,test and control scalable, high-performance systems.

By
K.Shakil (MEIEA)
Final Year

Chandrasekhar Venkata Raman

When light is scattered from an atom or molecule, most photons are elastically scattered. The scattered photons have the same energy and, therefore, wavelength, as the happening photons. However, a small fraction of scattered light approximately 1 in 10 million photons is scattered from excitations with optical frequencies different from and usually lower than, the frequency of the incident photons. In a gas inelastic scattering of a photon can occur with a change in vibrational, rotational or electronic energy of a molecule. This effect was first reported by C.V.Raman and K.S.Krishnan and independently by Grigory Lansberg and Leonid Mandelstam in 1928. Chandrasekhara Venkata was born on Nov7, 1888. Raman received the Nobel Prize in 1930 for this work. His work have been named after his name `Raman effect`. In 1998 the Raman Effect was designated an ACS National Historical Chemical Landmark in recognition of its significance as a tool for analyzing the composition of liquids, gases and solids.

During his tenure in Calcutta, he received worldwide recognition for his work in optics and scattering of light. He was elected to the Royal Society of London in 1924 and the British made him a knight of the British Empire in 1929. In the same year C.V.Raman was honored with the president's chair of the 16th Session of the Indian Science Congress.

Born	7 November 1888 Tiruchirapalli, Tamil Nadu
Died	21 November 1970 (aged 82) Bangalore, Karnataka, India
Nationality	India
Fields	Physics
Institutions	Indian Finance Department Indian Association for the Cultivation of Science Indian Institute of Science
Alma mater	Presidency College
Doctoral students	G. N. Ramachandran
Known for	Raman effect
Notable awards	Knight Bachelor (1929) Nobel Prize in Physics (1930) BharatRatna Lenin Peace Prize
Religious stance	Hindu

The following year he was honored with the prestigious Hughes medal from the Royal Society. His research work in the Indian Association for the Cultivation of Science culminated with his Nobel Prize winning work. In the year 1930 C.V.Raman won the Nobel Prize for his work on the scattering of light and for the discovery of the `Raman effect`. For the first time in its history, an Indian scholar has received the highest honor in science. When he was offered a toast during the Nobel function being a strict abstains completely from alcoholic beverages he responded "Sir, you have seen the Raman effect on alcohol; please do not try to see the alcohol effect on Raman".

Raman Spectroscopy` is based on this phenomenon. `Raman spectroscopy` is a spectroscopic technique used in condensed matter physics and chemistry to study vibrational, rotational, and other low-frequency modes in a system. Raman also worked on the acoustics of musical instruments. He worked out the theory of `transverse vibration` of bowed strings, on the basis of `superposition velocities`. Hermann Ludwig Ferdinand von Helmholtz, German physician and physicist have also worked on it but Raman's work does a better job in explaining bowed string vibration over Helmholtz approach. He was also the first to investigate the harmonic nature of the sound of the Indian drums such as the table and mridangam.

After 15 years at Calcutta in 1934 he became the director of the newly established `Indian Institute of Science` at Bangalore. Two years later he continued as a professor of Physics there. Raman along with Dr. Krishnamurthy in 1943 started a company called Travancore Chemical and Manufacturing Co. Ltd .which during its 60 year history, established 4 factories in Southern India.C.V.Raman was appointed as the first National professor in the year 1947 by the new government of Independent India. He retired from the Indian Institute in 1948 and a year later he established the Raman Research Institute in Bangalore. Raman remained active with his institute until his death

He also founded the Indian Journal of Physics in 1926, of which he is the Editor. Raman sponsored the establishment of the Indian Academy of Sciences and endowed as the President since its origin. He also initiated the Proceedings of that academy, in which much of his work has been published, and is President of the Current Science Association, Bangalore, which publishes Current Science (India).

Publications

- "The Small Motion at the Nodes of a Vibrating String", *Nature*, 1909
- "The Maintenance of Forced Oscillations of a New Type", *Nature*, 1909
- "The Ectara", *J. Indian Math. Club*, 1909
- "A new type of Secondary Radiation", *Nature*, 1928
- "A new radiation", *Indian Journal of Physics*, 1928
- "Acoustic Spectrum of Liquids", *Nature* (London), 1937 (with B.V. Raghavendra Rao)

By

N.Balasubramnium (MEIEA)
Pre-Final Year

R.Dileepan (MEIEA)
IInd Year

MULTI-UTILITY COURSE

Instrumentation and control engineers design build and manage systems that are used in a range of modern industrial settings such as manufacturing environmental, health, food production mining and energy production.

They are typically used to monitor ,measure, regulate and control physical quantities such as temperature ,pressure ,flow and to control product movement, actuators, positioning devices and the like .instrumentation and control engineering is also the basis of mechatronic and robotic engineering and robotic engineering .

The main objective of control and instrumentation engineers is to ensure that these systems and processor operate effectively, efficiently, safely. They usually companies who manufacture and supply the equipment, or for the company who use it.

Instrumentation and control is a field that requires a combined knowledge of math's physics chemistry electronics and process control in order to measure and control industrial process

A broad range of career opportunities exists for engineers from sales, management, technical projects and research and development. They can be employed in power plants refineries steel plants fertilizer plants cement manufacture plants , research and development laboratories and also in establishments.

Source: THE HINDU News paper

COMPANIES

Datasensor Pvt Ltd

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India.
Email:
datalogic@vsnl.com,
datasensor@airtelbroadband.in

Dynalog India Ltd

Kailash Vaibhav,'g' Wing
Vikhroli Parksite
B/h.Godrej Colony
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sales@dynalogindia.com
Web:
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Benz Instruments:

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Baber Road
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Bharat Pumps & Compressors Ltd

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www.bpclindia.com

By
M.Surendar (MEIEA)
Final Year

New products

AII-2000 A Oxygen Analyzer

Description:

Auto diagnostics, menu driven state-of-the-art electronics, large backlit LCD for easy viewing, integral tripod stand and dove tail bracket. Proprietary advanced galvanic sensor capable of oxygen analysis from 0-100% and 60 months expected life in air. General purpose analyzer operates 1,500 hours on 2 AA Alkaline batteries. Optional carrying case.

Ranges - Standard: 0-100%

GPR-25 AXP ppm Oxygen Transmitter

Description:

Two wire loop powered 4-20mA signal output operates on 12-28VDC. Enclosure and flame arrestors certified for use in Class 1, Division 1, Groups C, D. Proprietary advanced galvanic sensor designed for ppm oxygen analysis above 2 ppm. Manual range and calibration functions. Wall mount NEMA 4 configuration.

Ranges - Standard: 0-100 ppm, 0-25%
