

# ANNUNCIATOR

September 1991



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## President's Letter

August 22nd 1991

Dear Members,

Welcome to the new season! I sincerely hope you will find your association with the Samia Section of I.S.A. in 1991 / 1992, a rewarding and pleasant experience

What do you think of the new look newsletter? As you can see "The Annunciator" has been revamped. If you have any comments on the new format, or suggestions for improvement, let us know. We are committed to meeting your needs in the area of communication.

"Nothing comes for free" or so they say; the revamp is no exception. In this case the price has been a great deal of dedicated effort on the part of the "Newsletter Team" of Dick Bouterse and Bob Devine. Personally I think they have done a super job and deserve to be recognized and congratulated for their work in putting the publication together. . . . . Well done guys!

Talking of change reminds me of another activity that we have undertaken. When I took over from Ken Blair last June, I promised to "give the section back to it's members!". By that, I meant that I wanted to increase the awareness and involvement of our members in the running of the local I.S.A. section.

To do this, I have asked the Membership Team of Bill Arundell and Larry Corbett, to assign every member of the Samia Section to one of the six activity areas that have "chairs" on the Executive. These areas are: Membership, Newsletter, Education, Honors and Awards, Program and Student Liason

Initially the list of members has been arbitrarily divided into six groups and assigned, one group to each area. The intent is to rotate the groups each year. Over time this will afford you the opportunity to get involved in all areas. Let me emphasize, while your involvement is, and always will be, voluntary if you want to learn more about your society and what makes it "tick" this is an ideal opportunity. You can expect to hear from the Chairman of your assigned area in the very near future

I'm sure that those of you who attended the last dinner meeting will note a couple of changes in the Executive line up. These have been brought about by a number of events, some happy and unfortunately, a very sad one.

It's with a lot of sadness that I have to report that we lost a long time member of the local section when Ron Tory died. On behalf of the Section we offer our heartfelt sympathy to his wife Carol and their children

On a more cheerful note, Past President Ken Blair has reported in. He advises that all is well in Saskatchewan. We have also heard via the grapevine, that Jamie Kells is settling down in Thunder Bay.

The vacancies created on the Executive by these transfers and Ron's death have been filled as follows:

- Rich Paterson has accepted the "Delegate and Kates Report" chair in place of Ken Blair
- Mike Murray has accepted the role of "Assistant Program Chairman" in place of Jamie Kells.
- Larry Corbett has accepted the role of "Assistant Membership Chairman" in Ron's place.

Please join with me in wishing them well in their term of office.

Yours sincerely

Jim Lomax  
President Samia Section  
1991 / 1992

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# Student Annual Section Report

## July 1990 to June 1991

The ISA Sarnia Student Section at Lambton College had another successful year. Our membership averaged fifty-five for the two included terms. Members in the student club are mainly enrolled in the two year "Instrumentation and Control Technician" or the three year "Instrumentation and Control Engineering Technology" programs offered at Lambton.

This past year saw many modes of support for the student section put into affect by the ISA Sarnia Section. A new executive position entitled "Student Section Liaison Officer" was initiated with Mike Tyminski of ICI Nitrogen Products the current officer. Mike is a former graduate of the college technology program, and acts as a local ISA and industry contact for our group. This has helped the two sections to develop a closer working relationship.

The ISA Sarnia Section has provided a further incentive to our students to become involved in ISA activities by purchasing their student memberships, and invited them to dinner meetings. This has brought more students into contact with ISA and instrument people from industry.

### Executive Elected January 1991

President	Dan Rooth	- third year technology
Secretary/Treasurer	Aldo Desantis	- second year technology
Program Chairman	Justin Martin	- second year technology
First year Rep.	Roger Hazzard	
Second year Rep.	Kurt Allen	
Third year Rep.	Trevor Whitlock	

### ISA Scholarship Winners - 1990

Third year Best Grade Point Average	David Carling
Second year Best Grade Point Average	Al Churchman
Most Improved Student	Jason Plaine

### Activities Occuring During the Last Two Terms

A major bus trip to the Douglas Point Nuclear Power facility was held in December 1990. The technology and control of the CANDU reactor systems was presented, and a tour of the instrument shops and training center included. Trip was funded through the ISA Sarnia Section, Technology Division at the College, and the Students Council at the College.

A third year group toured a modern control installation at the Esso Chemical facility in Sarnia, in the fall term.

A volleyball tournament with teams participating from first, second, and third year was held in February 1991. This was a great success, and the executive is planning more of this type of inter-year activity.

Approximately twenty students volunteered to help staff the ISA display during Engineering Week at Lambton Mall, in March 1991.

Two students volunteered to help judge a secondary school science fair, also in March.

A major bus trip to either a modern water treatment facility, or a salt mining and processing operation, is in the planning stages for September 1991.

### Donations to the College

The ISA student section accepted a donation of instrumentation software on behalf of the college for use in the instrument programs. This donation was made by the ISA Sarnia Section.

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1956/57	Harold Kohlmeier	1979/80	Dave Braedley
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# Educational Opportunities

Education of members has become an aim for the Sarnia Section.

Different formats are being offered. Please read through and check off those courses which are of interest to you and the organizer for that course will contact you with date, time, and cost.

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*This discussion of buoyancy, capacitance, and ultrasonic level sensing techniques includes a quick reference guide in chart form that cross-references methods, media, and media characteristics.*

# A Look at Level Sensing

*Ted Williams and Boyce Carsella, Jr., Magnetrol*

Understanding level sensing techniques is only part of the answer to level control problems. Understanding which technique to use in a particular application is the rest of the solution. Here is a brief review of three level measurement methods, their advantages, and their limitations. Included too is guidance that should help in selecting the right method for the job. In the "Quick Reference Guide to Level Sensing Systems," each cell lists the level sensing methods of choice as a function of system requirements and type of medium (two left column) and characteristics of the medium (top row).

## BUOYANCY

Archimedes defined the principles of buoyancy some 2200 years ago. Level sensors based on the phenomenon he described might seem somewhat dated, but they remain the device of choice for many applications where more sophisticated instruments would constitute overkill.

Simply put, as the fluid level rises, so does the buoyant float. What varies from manufacturer to manufacturer is how the motion of the float is translated into a control action. In some applications, mechanical linkages convert the float's up and down motion into a contact closure opening. In approaches that require isolation of the stored fluid, magnetic coupling permits the liquid to be completely sealed, as in applications where the fluid is stored at high pressure (see Figure 1).

The displacer method, a variant of the float approach, uses heavier than liquid displacers whose up and down motion actuates a switch. Here, however, the dis-

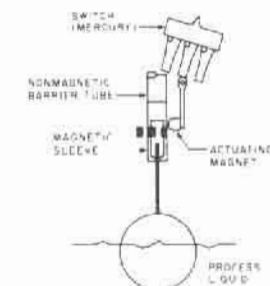


Figure 1. Float and displacer level sensors are isolated from the liquid by a nonmagnetic barrier tube.

placers are connected in line to a spring by means of a suspension cable and are positioned to rise at a force proportional to the displaced volume of the liquid. Magnetic coupling to the switch is also possible, allowing the controlled liquid to be isolated from the controls.

**Buoyancy Advantages.** Floats and displacers are easy to understand and use. Calibration is not required for floats, and displacers can be calibrated without level

movement. Floats provide an accurate, repeatable setpoint. Displacers can have a number of off-on ranges within a single vessel if control of multiple levels is required by the application. Because displacers are heavier than the liquid they control, they do not bob with wave or surge action and with short-term cycling is not a problem. Surface turbulence and foam do not significantly impede displacers or floats. Displacer units permit continuous level transmission. Buoyancy methods are usable in applications up to 5000 psi and  $\pm 100^\circ\text{F}$ .

**Buoyancy Limitations.** Buildup and deposits may impair performance. Accuracy is typically limited to  $\pm 0.5$  in., so the application requires close process control. Floats and displacers work only with low viscous liquids; viscous and dry media require other methods. Liquids with the potential for buildup or those with suspended solids can cause hang-up in the sensors' moving parts.

## CAPACITANCE

Using capacitance to measure level turns the entire storage vessel into a giant capacitor (see Figure 2). As is the case with a circuit-size capacitor, the important parameters are the area of the conductive plates ( $A$ ), the distance between them ( $d$ ), and the dielectric constant of the stored material ( $\epsilon$ ). The capacitance ( $C$ ) of a parallel plate capacitor is thus

$$C = \frac{\epsilon A}{d}$$

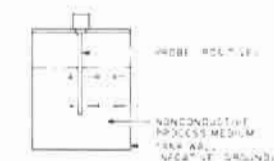


Figure 2. In capacitance level sensing, the capacitance probe and liquid surface respectively, are the positive and negative plates.

In industrial applications, the entire



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tank wall serves as the negative, or ground, plate of the capacitor. The probe serves as the positive plate. The material between the tank wall and the probe, i.e., the material stored in the tank, becomes the dielectric material. When the tank is empty, the dielectric material is air, with its dielectric value of 1. Because all other substances have dielectric constants greater than 1, capacitance increases as the tank fills with material.

This change in capacitance, which corresponds to a rise or fall in the level of the stored material, can be measured with an invasive probe connected to capacitance based electronics. Level change may be indicated by a switch for on/off point level control or a level transmitter with a continuous output, such as 4-20 mA.

The capacitive method of level detection requires one approach when the stored material is nonconductive and another when the material is conductive. In the nonconductive, or insulating, case, a metal rod may be used as the positive plate. As previously noted, the stored material between the rod and the tank wall serves as the dielectric material. If the material is conductive, the effect is one of moving the tank wall into contact with the probe, and an insulated rod is required (see Figure 3). The insulation becomes the dielectric material, while the fluid and tank wall together function as the ground plate. Thus, the "capacitor" is re-established. If there is doubt as to whether or not to use an insulated rod, current practice suggests using one.

**Capacitance Advantages.** RF capacitance level measuring techniques have been in use for a long time, and they represent a well-known, time-tested approach. This method may be used with a wide range of liquids, powders, granular solids, and slurries, and on either conductive or nonconductive materials. Setpoints are adjustable and multilevel measurements can be made. Outputs may be on/off or continuous. Because capacitance measuring devices have no moving parts, maintenance is minimized. Corrosive materials may be measured using probes made of corrosion resistant materials. The interfaces of conductive and nonconductive liquids may also be monitored. Measurements are made at low energy levels that are harmless to operator, process, and environment. Various models of capacitance

probes (rods) can fit contoured and tall tanks. Pressure and temperature capabilities reach 5000 psi and 1000°F.

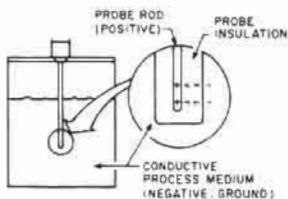


Figure 3: When conductive liquids are measured by capacitance methods, an insulated probe re-establishes the capacitor.

**Capacitance Limitations.** Changes in the dielectric constant of the stored material will result in erroneous measurements; because the dielectric constants of some materials change with temperature, a dielectric compensated detector must be used. Capacitive systems usually require field calibration. Vessel level must typically be varied in order to calibrate the system. If extremely conductive materials are being measured, any build-up of material on the probe can affect accuracy or repeatability.

Because of the possibility of improper probe capacitance, the need for correct probe selection in complex applications, and the possibilities that help will be needed in determining grounding configurations, the user should contact the level control system supplier early in the design process to ensure that the system is correct from the start and thus avoid the delays and added expense of an improper configuration.

## ULTRASONIC

Although some references state that ultrasonic methods should be used only in point level measurement, this method works for continuous level measurement as well. There are two approaches: sending a sound wave through air, and sending a sound wave through liquid.

The level of the medium can be calculated by measuring the transit time for a pulsed sound wave to travel from a transducer downward through air and echo off the surface of the process medium (see Figure 4). This is called non-contact measurement because the transducer is mounted above the highest level

of the medium. The technology is a good choice for media with shifting density, specific gravity, and conductivity, as well as for slurries, bulk media, and corrosive liquids. Transducer limitations, however, restrict applications to low pressure/low temperature.

In a variation of this method, a transducer is submerged in liquid and a pulsed

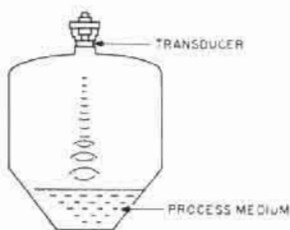


Figure 4: Frequency waves are reflected from the surface of liquids or solids, and the travel time is converted to a level output.

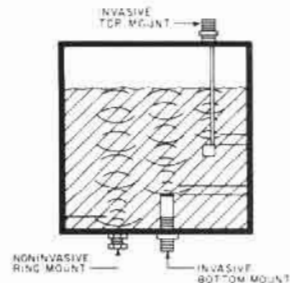


Figure 5: Ultrasonic transducers may be submerged in the fluid. The liquid-air or liquid-liquid interface between liquids of differing densities reflects the waves.

sound wave is transmitted up through the liquid to echo off the liquid/air or liquid/liquid interface. The wave travel time is measured and converted to a liquid depth output (see Figure 5). Transducers may be top or bottom mounted. Higher pressures and temperatures may be monitored than is the case with the noncontact method, but applications are limited to clean liquids. In each approach, the transmitter output can track the level continuously or select predetermined setpoints for alarms and/or pump control.



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When only level alarm and/or pump control is required, a less expensive technique using different ultrasonic transducers can be substituted. As shown in Figure 6, a high-frequency sound wave is generated by a transmitting crystal positioned and focused at a receiving crystal mounted across a gap. When the gap is filled with liquid, the receiving crystal will generate an output at a level 200-400 x

higher than it will with air in the gap. The presence or absence of liquid in the gap can thus be detected.

Time delay circuits can be used to eliminate switch chatter caused by turbulence. Effervescent liquids can be monitored by means of transducers with built-in signal averaging circuitry. Sensing units are available for single and multiple set points.

**Ultrasonic Advantages:** Noncontact ultrasonic measurement is especially suitable for corrosive and dirty applications, as well as for liquids, slurries, and bulk solids. Continuous and multipoint measurement and control are possible. Accuracy is 0.25% of F.S. on transmitters and repeatable setpoints are obtainable with point sensors. Chemically compatible sensors are available. Ultrasonic operation is harmless to the process, operators, and environment, and Sema " housing can permit operation in hazardous atmospheres. Applications with a high degree of aeration or with suspended solids can be

monitored with either noncontact sensors or devices incorporating signal averaging circuitry.

**Ultrasonic Limitations:** Ultrasonic noncontact units are not reliable in the presence of surface foam. Interference from falling liquids, steam, dense vapors, and dust can interrupt the output from noncontact transmitters. Bulk solids prone to bridging, ratholing, or shifting will impede the accuracy of noncontact transmitters. Crystallized build up in the sensor gap will prevent point sensors from functioning reliably. Fluids must also be drained from the gap to reset the alarm relay.

#### SUMMARY

Textbook information must be teamed with experience and direct observation to select the right equipment and make the best use of it.

*Special thanks to Magnetrol for this article. For more information contact local representative Provincial Controls.*

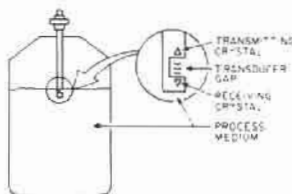


Figure 6. A transmitting crystal generates a high frequency sound wave to a receiving crystal mounted in the other side of a gap. Changes in the receiving crystal's output indicate the presence or absence of liquid in the gap.



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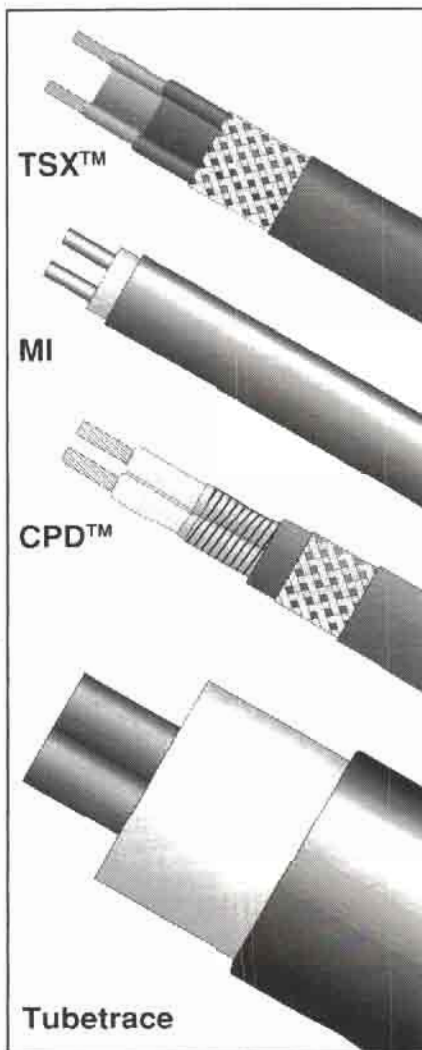


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# Electrical Heat Tracing Cables

With the coming cold season approaching, it is an appropriate time to take a look at what sort of heat tracers are available to the designer. This article will concentrate on the three main forms of electrical heat tracing including self-limiting, zoned constant power density, and mineral insulated heater cables. Each of these heating cables possess unique characteristics that lend each to specific applications. All of the cables that will be discussed are approved for Class 1, Division 1, Groups A, B, C, D. In all cases, it is also recommended that thermostats be used to ensure the design is energy efficient and the performance of the heat tracing system is maximized.

## Self-Limiting Heater Cable

Self-limiting heater cables most notable unique feature is its ability to limit its heat output when the cable senses higher temperature. As the carbon matrix core (a semiconductor) expands, responding to warmer temperatures, microscopic electrical paths are broken causing the heat output to decrease. Similarly, the core contracts as it cools, causing the electrical paths to connect and increase heat is produced. Throughout its operation, this cable will continue to thermally fluctuate along its length in response to local temperature. Therefore, this cable may be much cooler or warmer than in other areas along its length. Since this cable will demand more power at start up when it is cool, the designer must be aware of the increase amperage demand. This "inrush", requires appropriate restriction of cable lengths and correct breaker size must be incorporated into the design. Considering overall cost, there is a point at which it is more economical to select a zero inrush cable that will not require expensive oversized electrical wiring and breakers. Because there is a direct relation between heat output, voltage and amperage, it is difficult to monitor this cable and caution must be exercised.

Being a parallel cut-to-length cable, it is easily field fabricated to exact in-situ piping length. As this cable will reduce its watt thermal output when it senses heat, the tracers subjective advantage is that it can be crossed over itself without affecting its performance. It should be noted that self-regulating cables will never "regulate" itself to the point of turning off. Self-regulating heater cable always consume energy and output heat into a system, whether or not heat input is required, and will do so until power is interrupted (i.e. thermostat).

A common question asked regarding self-regulating cable revolves around the continual expanding and contracting of the cable and its relation to life expectancy. The cable is engineered to contract and expand, and when properly designed with a temperature controller, its service life potential is excellent. It should be stressed, however, that in the case of steamed cleaned heat traced lines, the life expectancy and performance of the cable can be seriously affected, resulting in reduced or zero thermal output capabilities.

There are higher grades of self-limiting heater cables available which are specifically designed for exposure to the high temperatures experienced during pipe steam cleanings. A designer should take precautions to select a higher grade of cable if

...continued on page 29

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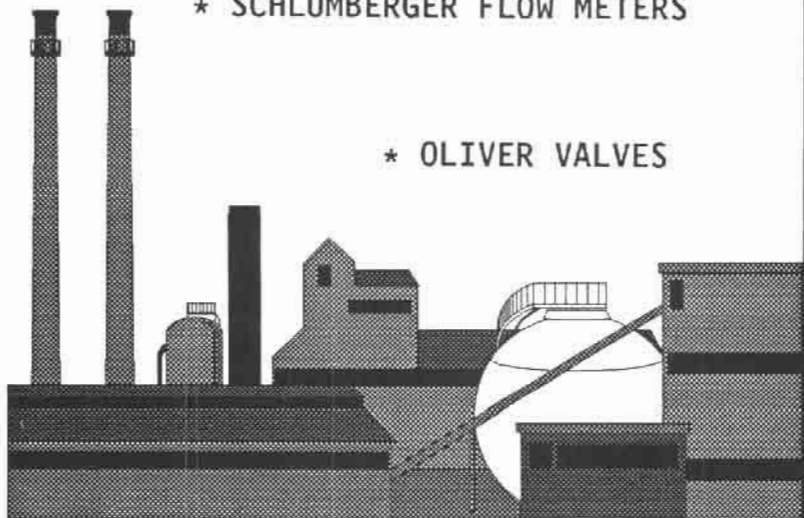
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there is a chance the line will be exposed to such elevated temperature excursions. One should look for CONTINUOUS rating (opposed to vague INTERMITTENT) data regarding what the self-limiting cable can withstand. Bear in mind that the CONTINUOUS rating is confirmed and/or recognized by a certification agency (CSA, FM) whereas an INTERMITTENT rating is assigned by the cable manufacture to a cumulative time/temperature value before the cable ceases to function at its original rated thermal output.

### **Zoned Constant Power Density Heat Trace**

A parallel cut-to-length construction, zoned constant power density cable consists of a series of parallel connected heater zones within the cable construction. A resistance wire (the actual heater) is wound around double bus wire connecting itself at each end of each zone. Each zone can be viewed as an individual circuit. Exposure to steam cleaning may be a concern to the designer and CONTINUOUS empirical data (opposed to undefinable INTERMITTENT ratings) should be review to assure that there are no unpleasant surprises down the road.

Zoned constant power density heater cable is a simple heat trace cable to understand and design. As with all constant power density heat tracers, this cable produces a defined heat output. From this, other definable variables (watts per foot, amps, total watts) can be extrapolated. This allows for a high degree of stability and predictability in your heat trace system. One can establish how the cable will operate on the pipe and, more importantly, how the product will react to the heat tracing. Being a stable non-fluctuating style of cable, a third monitor wire can be very useful in relaying information back to a controller regarding the integrity of the heat tracing. Rated and designed to be powered up to either 120, 240, or 575 VAC, this cut-to-length cable is easily spliced, terminated, etc. in the field. Constant power density cables have zero inrush. Constant power density tracers are ideal for long piping runs (saving money on power points and installation) upwards to 1475 feet, or limited length tracer circuits as short as 12". All may be designed and installed without difficulty. A 200°C rated jacket compliments installations on freeze protection applications, as well as high maintain designs in corrosive or non-corrosive environments.

*Generally, self-limiting and constant power density heater cables are now used in temperature services that had previously been exclusively dedicated to steam tracing and copper sheathed M.I. heat tracing cables.*

### **Mineral Insulated Heat Trace**

The heat tracers that we have discussed so far are most suitable for application temperatures upwards to +150°C. In the process industry, applications exist where temperatures exceed the limitations of fluorocarbon. This may be seen in the form of a high maintain temperature such as sulphur or a water line that, under normal operations, may be exposed to high temperatures. In both of these applications, a mineral insulated (M.I.) stainless steel sheathed heater cable would be the optimum cable construction, whereas other sheath materials would be subject to accelerated oxidization and failure when subjected to high temperatures.

Mineral insulated heater cable is typically a series connected heat tracer cable. For this reason, field modifications are not recommended. Accurate pipe lengths and

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in-line heatsink allowances (valves, filters, pumps, pipe supports, etc.) must be considered during the initial design stages. If the originally factory designed circuit length is increased or decreased, the total watts per foot will also change proportionally. This may upset the engineered balance between applied voltage and resistance, potentially defeating the original purposed of the heat tracing.

The industrial standard metal sheath for M.I. cable is a high nickel content Alloy 825. This sheath is best suited for the industrial applications for its ability to withstand a wide variety of hostile plant environments to exposure to simple road salt. Rated to 600 VAC, M.I. cable can be designed to produce a thermal output well above that possible by any cut-to-length cable. At high watts densities, the designer should be aware of the cable sets T-Ratings to ensure the heat tracers sheath does not surpass the areas restrictions. In some cases, a heat transfer cement may be required to conduct the heat produced by the heater cable directly into the system and away from the cables surface.

Mineral insulated series type cables may be designed in a variety of cable set forms, all of which consist of a cold lead and the hot section. The cold lead is constructed of identical materials as the heater section. The only difference lies in the very low resistance characteristics of the cold leads internal wires. The hot lead consist of a specifically rated resistance wires that is engineer to produce a specific watt desity for a given cable length and applied voltage. It is very important to note that both the cold lead and hot lead sheaths must be constructed of the same material. If this design practice is not aheared to, any perceived benefits will be immediately revoked when the system fails due to dissimilar metals performing independently during normal expansion and contractions, not to mention the accelerated effects of temperature and environmental chemical exposure as previously noted.

In conclusion, it is understood that there is no single "right" heating cable for all heat tracing applications. Some electrical heat tracers are more suitable for shorter lengths or very high temperatures, while others are designed for more diverse heating applications that exist throughout a process plant. This report is offered only to give a quick reference to the reader. Since every application is somewhat unique, a factory representative would be a good place to start to help you with your cable selection and design. Theoretical, and more importantly, practical realities can be reviewed so that the most appropriate complete heat tracing system can be applied to your specific requirements.

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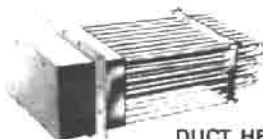
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## **SUMMARY**

### **A. Accomplishments**

The focus this year has been on increased programming support of conferences with high quality sessions, including fully reviewed paper sessions, as well as panel discussions and tutorials. The regularly issued CHEMPID *Feedforward* Newsletter now welcomes each new member by name, as membership continues to increase. Noteworthy accomplishments have been achieved in the following areas:

#### **Programming and Review**

Developed 4 paper sessions, 1 panel and 3 tutorials at ISA/90 in New Orleans

Developed 6 paper sessions, 1 panel and 1 tutorial at ISA/90 in Edmonton

Developing 7 paper sessions, 2 panels and 1 tutorial for ISA/91 in Anaheim

#### **Publications**

Published 3 issues of the CHEMPID *Feedforward* Newsletter

Published 2 technical papers in our Newsletter (CHEMPID Best Papers)

Publishing Instrumentation in the Chemical & Petroleum Industries, Vol. 22

#### **Membership Services**

Published and offered the 1990 CHEMPID Membership Roster free to members

Developed and published an updated Division Membership Brochure

Presented Section/Division Slide show at St. Louis Section meeting

Offering trial memberships to CHEMPID conference session attendees

#### **Education**

Awarded five \$1000 undergraduate scholarships

Developing CHEMPID Tutorial Series for tutorials presented at 3 or more sites

#### **Honors and Awards**

Judged and presented \$400 best paper awards for each conference

Presented R. N. Pond Award for best paper of the year

Presented Past Director & Program Coordinators with plaques for their service

#### **Liaisons**

Donated a complete set of ISA Standards to the Romanian National Library

Representing ISA on AGA's International Task Force on Technology Assessment

#### **Executive Board**

Expanded to 10 Standing Committees for support of programming and reviews

Held 4 meetings with pre-meeting agenda and post-meeting action items

Held CHEMPID Luncheons at conference meetings

Presented an Outstanding Service Award

### **B. Areas for Improvement**

The main challenge ahead is to continue to bring onto the Executive Board high quality volunteers with long term company support to allow them to proceed to higher positions. New volunteers on the Board also ensure an influx of fresh ideas. The CHEMPID Manual of Procedures needs to be updated to document and to provide continuity for the many innovative, new programs that have recently been initiated.

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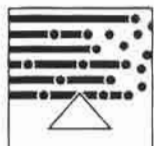
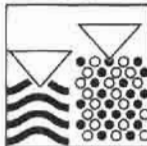
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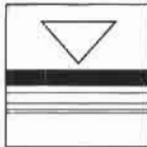


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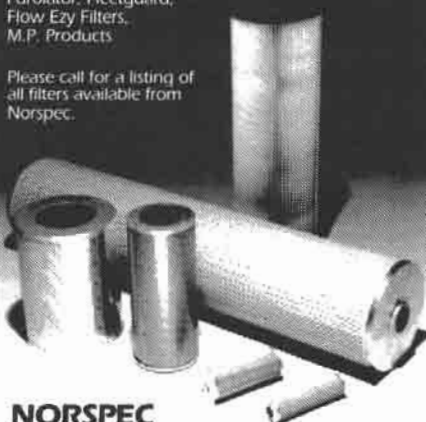
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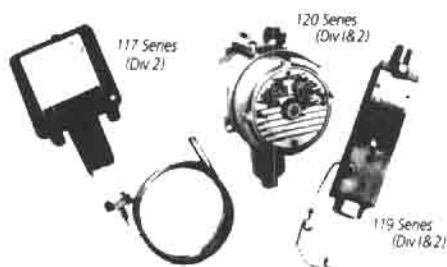
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# Meeting Dates

## MEMBERSHIP DINNER MEETINGS

Date	Place
September 30/91	Sarnia Golf & Curling Club
November 25/91	Sarnia Golf & Curling Club
January 27/92	Sarnia Golf & Curling Club
March 30/91	Sarnia Golf & Curling Club
May 25/92 ( <i>Awards Night</i> )	Sarnia Golf & Curling Club

Time: Cocktails @ 6:00 p.m.

Dinner @ 7:00 p.m.

## Executive Meetings

Date	Place
September 24/91	Drawbridge Inn

OTHERS TO BE ANNOUNCED

Time: 7:00 p.m.



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*SARNIA SECTION*

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## Dinner Meeting Notice

The first ISA dinner meeting will be held on Monday, September 30, 1991, at the Sarnia Golf and Curling Club, 500 Errol Road West, Point Edward. The cocktail hour will start at 6:00 p.m. followed by dinner at 7:00 p.m.

The guest speakers for the evening will be Mr Fred Lawrence and Mr. Ron Gough, Electrical Inspectors, Western Region for Ontario Hydro. The topic for the evening will be the Ontario Hydro Electrical Code. Fred and Ron's topic is relevant to all people who supply and install electronic/electrical equipment in classified areas.

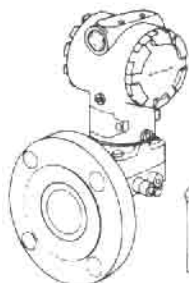
Please contact one of the following no later than Friday, September 27, 1991, to make your reservations.

Gayle at Provincial Controls -	336-7301
Maureen at Willer Engineering -	336-3006

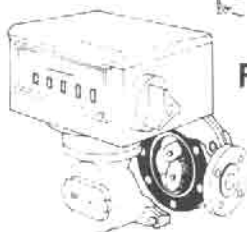
Members:	\$ 8.00
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Program Committee: Ron Thurier, Mike Murray

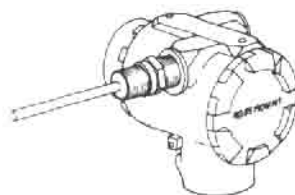
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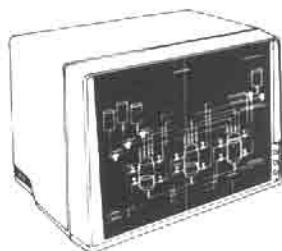
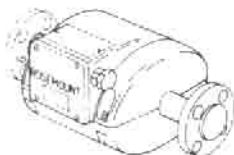
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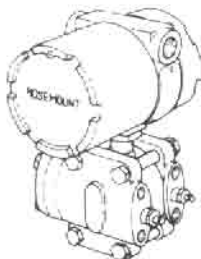
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# ISA Perspectives

> Well what do you expect on Awards Night? A host of awards including Harry Dawson...

and Doug Carter who also collects one for Foxboro Canada.



> Mike Whitton (Honors & Awards) didn't know he was getting one. Surprise!



*continued on page 51....*



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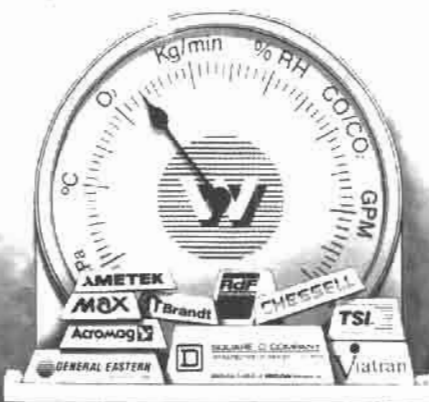
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# ISA Perspectives



\* You see we do get ladies out to Awards Night. And they seem to have fun!

< Honest Guv, I won't smuggle ever again!!! Featured speaker requests anonymity.

*continued on page 53...*

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# ISA Perspectives



^ Irvin Hawks leaving.

< Ken Blair (Past President) gone.

Anyone who knows Ken is expecting a Moose Jaw section any time now.

> Hands up if you're staying.

Bob Kelly goes to Vice-president.

Subash Khimdas moves on.



*continued on page 57....*

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# *ISA Perspectives*



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# News Release

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**ROSEMOUNT:** Rosemount Instruments Ltd has introduced the Smart, microprocessor based Models 2054 pH, Conductivity and Toroidal Conductivity Analyzers from Rosemount Analytical Inc - Irvine, California. These analyzers are the latest members of the Rosemount SMART FAMILY® of instruments; of which all are designed to communicate with the Model 268 SMART FAMILY® (hand-held) Interface or the Rosemount System3™ Distributed Control System.

**HONEYWELL:** Brian Controls, Sarnia is pleased to announce the introduction of the Honeywell DPR 1000 Strip Chart Recorder. This Truly Digital 100mm recorder provides continuous line reporting plus digital printing, alphanumeric display, software alarms, 6-colour recording and up to 6 analog inputs.

*Demonstration units available.*

**NOTE:** To have your News Release published  
in the Annunciator, please forward  
the information to:

## **ISA Sarnia Section**

Box 206

Sarnia, Ontario / N7T 7H9

Att: Newsletter

*This index lists manufacturers and trade names alphabetically and enables users to determine the local representative for a particular manufacturer or product.*

## Manufacturer/Tradename

3D Instruments Inc.  
 A+ Corp.  
 ABB Kent-Taylor  
 Accutech  
 ACR Systems Inc.  
 Acromag  
 ACS  
 Action Instruments Inc.  
 Action Instruments Inc.  
 AERCO  
 Agar Corporation  
 Air Dimensions  
 Allenair  
 Alltemp Sensors Inc.  
 Alnor Instrument Company  
 Altek Calibrators  
 American Sigma  
 Ametek (Canada) Inc. - Panalarm Division  
 Ametek Controls  
 Ametek Hunter Spring  
 Ametek Mansfield & Green  
 Ametek U.S. Gauge  
 Amri Valves  
 Anarad Inc.  
 Anderson Greenwood  
 Annin  
 Anritsu  
 Appollo  
 Applied Automation  
 ARI Industries  
 Arjay  
 Arjay Engineering  
 Armstrong Monitoring Corp.  
 Armtec Industries  
 ASCO  
 ASCO  
 ASCO  
 Ashcroft - Dresser  
 Atwood & Morrill  
 Aurora Technical  
 Autotech  
 Auxitrol  
 Azonix  
 B S & B  
 B/W Controls  
 Bacharach  
 Badger Meter  
 Balluf  
 Balston  
 Balston Inc.  
 Barksdale  
 Barrington  
 Bauman  
 BEI Electronics Inc.  
 Bellofram  
 Bellofram  
 Berthold

## Local Sales Representative

Alpha Controls and Instrumentation  
 R.A. Kirby Sales Inc.  
 Globaltech Process Controls Ltd.  
 Brian Controls  
 Alpha Controls and Instrumentation  
 Willer Engineering Ltd.  
 Cancoppas Ltd.  
 Norspec Controls Ltd.  
 Cambridge Controls  
 Valley Process Specialties Ltd.  
 R.A. Kirby Sales Inc.  
 Cancoppas Ltd.  
 Davis Controls Ltd.  
 ATS-Altemp  
 Baker Instruments Ltd.  
 Alpha Controls and Instrumentation  
 Can-Am Instruments Ltd.  
 Cambridge Controls  
 Brian Controls  
 Brian Controls  
 Brian Controls  
 Brian Controls  
 Sharp Valve and Instrumentation Inc.  
 Willer Engineering Ltd.  
 Cantech Controls  
 Controls Equipment Ltd.  
 R.H. Nichols Co. Ltd.  
 Romatec  
 Westech Industrial Ltd.  
 Alpha Controls and Instrumentation  
 TubeTech Ltd.  
 Can-Am Instruments Ltd.  
 R.A. Kirby Sales Inc.  
 Bestobell Canada  
 Conval Equipment  
 Westburne Lytle  
 TubeTech Ltd.  
 Conval Equipment  
 Controls Equipment Ltd.  
 Can-Am Instruments Ltd.  
 Davis Controls Ltd.  
 Bestobell Canada  
 R.H. Nichols Co. Ltd.  
 Romatec  
 Controls Equipment Ltd.  
 SSCAN-Grodyne Controls  
 Lakeside Controls Ltd.  
 Davis Controls Ltd.  
 T.J. McCarthy Ltd.  
 Can-Am Instruments Ltd.  
 Sharp Valve and Instrumentation Inc.  
 Davis Controls Ltd.  
 Conval Equipment  
 Willer Engineering Ltd.  
 Romatec  
 Conval Equipment  
 SSCAN-Grodyne Controls

**Manufacturer/Tradename**

Bestobell  
Bestobell  
Bestobell Valves  
Beta Products  
Biddle Instruments  
Bilok Fittings  
Blue White  
Bourdon  
Brandt Industries Inc.  
Brian Controls RTD's  
Brian Controls Thermocouples  
Brookfield Engineering Lab. Inc.  
Brooks Instrument  
Burns Engineering  
C.C.U.  
C.D.C. Valve Co.  
C.R.L.  
Cajon  
Canadian Meter Company  
Canadian Worcester  
Canadian Worcester  
Canty  
Carle Chromatography  
Cash-Acme  
Cashco Canada Inc.  
Centrac Metering Pumps  
CEWE  
Chart Pens Inc.  
ChemTec Equipment  
Chessell Corporation  
CJEN Couplers  
Clif Mock  
Codel  
Colder  
Collins Instrument Co.  
Compressor Controls Corporation  
Computer Technology Ltd.  
Conant Controls Inc.  
Conax Buffalo  
Conoflow ITT  
Control Microsystems  
Control One  
Control Valves  
Contromatics  
Custom Control Sensors Inc.  
d/p Cell  
Danfoss  
DanFoss Manufacturing Co. Ltd. - Denmark  
Daniel Industries  
Darmatt Fire Protection  
Data Industrial  
Data Lynx  
Davis Controls Ltd.  
Delphian  
Delta  
Delta-Trace  
Descote  
Det-Tronics  
Devar  
DGH Corporation

**Local Sales Representative**

PMP Instrumentation Ltd.  
Sarnia Piping Specialties Ltd.  
Bestobell Canada  
Armatek Controls Ltd.  
R.H. Nichols Co. Ltd.  
Provincial Controls  
Brian Controls  
Sarnia Piping Specialties Ltd.  
Willer Engineering Ltd.  
Brian Controls  
Brian Controls  
Can-Am Instruments Ltd.  
Rosemount Instruments Ltd.  
Armatek Controls Ltd.  
R.A. Kirby Sales Inc.  
R.A. Kirby Sales Inc.  
Cancoppas Ltd.  
Huron Valve & Fittings Ltd.  
G.L. Stebbins Co. (1982) Ltd.  
U & I Supply  
Conval Equipment  
Brian Controls  
R.A. Kirby Sales Inc.  
Westburne Lytle  
Cambridge Controls  
Milton Roy Industries Ltd.  
Cancoppas Ltd.  
ATS-Ailtemp  
Brian Controls  
Willer Engineering Ltd.  
Provincial Controls  
Westburne Lytle  
Westech Industrial Ltd.  
Davis Controls Ltd.  
Sharp Valve and Instrumentation Inc.  
SSCAN-Grodyne Controls  
PMP Instrumentation Ltd.  
Industrial Projects Ltd.  
R.H. Nichols Co. Ltd.  
Sarnia Piping Specialties Ltd.  
Brian Controls  
Cancoppas Ltd.  
Sharp Valve and Instrumentation Inc.  
Brian Controls  
Willer Engineering Ltd.  
Foxboro Canada Inc.  
Cancoppas Ltd.  
Lisle-Matrix Ltd.  
Controls Equipment Ltd.  
Bestobell Canada  
Cambridge Controls  
SSCAN-Grodyne Controls  
PMP Instrumentation Ltd.  
Romatec  
Cancoppas Ltd.  
Cantech Controls  
Sharp Valve and Instrumentation Inc.  
CB ENGINEERING (Eastern) Ltd.  
Cantech Controls  
Alpha Controls and Instrumentation

**Manufacturer/Tradename**

DH Instruments Inc.  
Dianachart Inc.  
Digitron Instrumentation Ltd.  
Dillon  
Dopak  
Dresser Valve & Control (Consolidated)  
Druck Inc.  
DSP Technology Inc.  
Dupont Process Instruments  
Durabla  
Durakool  
Duro Instruments  
Dwyer  
Dynapar  
Dynasonics  
Dynatherm  
E.G.&G. Chandler Engineering  
E.G.&G. Humidity & Moisture Systems  
Eagle Signal  
Eastech Inc.  
ECS Electronic Control Systems  
E.G.&G./Flow Technology Inc. - USA  
El-O-Matic  
Elcon Instruments Inc.  
Electromatic  
Endress + Hauser  
Enercorp  
Engineering Measurements Co.  
Enmet Canada  
Enraf  
Enviro-nics  
Environment S.A.  
Epic  
Erdco  
Ero Electronic Co.  
Esko Industries Ltd.  
Essex Brass  
Exac  
Exact  
F.W. Murphy  
Fabco-Air  
Fastest  
Fedab  
Fiberglass Instrument Housings  
Fike Canada  
Fischer & Porter Rotameters  
Fisher Controls  
Flotect  
Flow Measurement Systems Inc.  
Flow Measurement Systems Inc. - USA  
Flow Research  
Flow Technology Inc. - USA  
Flow-Lin Corp.  
Flowtek Valves  
Fluid Data/Amscor  
Fluidic Techniques  
Fluke Electronics  
Fluke Temperature  
Foster  
G.W. Dahl Company

**Local Sales Representative**

SRP control systems ltd.  
Alpha Controls and Instrumentation  
SRP control systems ltd.  
Brian Controls  
Westburne Lytle  
Sharp Valve and Instrumentation Inc.  
SRP control systems ltd.  
SRP control systems ltd.  
Westech Industrial Ltd.  
Brian Controls  
Davis Controls Ltd.  
Brian Controls  
Baker Instruments Ltd.  
Davis Controls Ltd.  
Brian Controls  
Foxboro Canada Inc.  
R.A. Kirby Sales Inc.  
R.A. Kirby Sales Inc.  
Davis Controls Ltd.  
Can-Am Instruments Ltd.  
Brian Controls  
Lisle-Matrix Ltd.  
Westburne Lytle  
SRP control systems ltd.  
R.H. Nichols Co. Ltd.  
Davis Controls Ltd.  
Provincial Controls  
Brian Controls  
Can-Am Instruments Ltd.  
Troy Control Systems Inc.  
Brian Controls  
SSCAN-Grodyne Controls  
Cancoppas Ltd.  
Bestobell Canada  
ATS-Alltemp  
ATS-Alltemp  
Brian Controls  
Lakeside Controls Ltd.  
Foxboro Canada Inc.  
Cantech Controls  
Davis Controls Ltd.  
Davis Controls Ltd.  
Cancoppas Ltd.  
Provincial Controls  
Brian Controls  
TubeTech Ltd.  
Lakeside Controls Ltd.  
Cantech Controls  
SRP control systems ltd.  
Lisle Matrix Ltd.  
Davis Controls Ltd.  
Lisle-Matrix Ltd.  
G.L. Stebbins Co. (1982) Ltd.  
Provincial Controls  
Armatek Controls Ltd.  
Brian Controls  
Armatek Controls Ltd.  
Brian Controls  
R.H. Nichols Co. Ltd.  
Armatek Controls Ltd.



**Manufacturer/Tradename**

Galtek  
Gauging Systems Inc.  
General Eastern Inst. Corp.  
General Monitors  
Gerfran Inc.  
GF  
GGOSCO  
GGOSCO Eng.  
GGOSCO Engineering  
GLA Elettronica  
Go. Inc.  
Gordon Temperature Sensors  
Gossen  
Great Lakes Instruments - USA  
Grundfos  
Haenni  
Halliburton Services  
Hammel Dahl  
Hansen Quik Connects  
Hartmann & Braun  
Haven  
Heatrace  
Hedland  
Hedland  
Hedland Flowmeters  
Hengstler  
Hex Valve  
Hills McCanna  
Hoffer Flow Controls Inc.  
Hoke Controls Ltd.  
Hone  
Honeywell - Controllers & Recorders  
Honeywell Recorders  
Honeywell Skinner  
Honeywell Smartline Instruments  
Horiba  
Hoskins  
Houston Atlas Inc., Div. of Baker-Hughes  
Humitex Charts  
Hy-Cal  
Hydr-o-Matic  
Hydri  
Hyper-Reset  
I/A  
IBM  
IC Sensors  
Illinois Instruments  
Imperial Eastman  
Imperial Eastman  
Inbal  
Industrial Control Services  
Industrial Scientific Corporation  
Infrared Engineering  
Ingold  
Inicon  
Inor Instruments  
Intecolor  
Intek  
Intelligent Controls Inc.  
Intellitron

**Local Sales Representative**

Romatec  
Sarnia Piping Specialties Ltd.  
Willer Engineering Ltd.  
Simark Controls Ltd.  
SRP control systems Ltd.  
Davis Controls Ltd.  
Westburne Lytle  
Westburne Lytle  
Provincial Controls  
SRP control systems Ltd.  
Sarnia Piping Specialties Ltd.  
Zesta Engineering  
R.H. Nichols Co. Ltd.  
Lisle-Metrix Ltd.  
Valley Process Specialties Ltd.  
U & I Supply  
Simark Controls Ltd.  
Neles-Jamesbury Ltd.  
Provincial Controls  
Westech Industrial Ltd.  
Cancoppas Ltd.  
Thermon Canada Ltd.  
Brian Controls  
Davis Controls Ltd.  
R.A. Kirby Sales Inc.  
Globaltech Process Controls Ltd.  
Sharp Valve and Instrumentation Inc.  
Sharp Valve and Instrumentation Inc.  
R.A. Kirby Sales Inc.  
Sarnia Piping Specialties Ltd.  
Troy Control Systems Inc.  
Brian Controls  
Provincial Controls  
Davis Controls Ltd.  
Sharp Valve and Instrumentation Inc.  
SSCAN-Grodyne Controls  
Cantech Controls  
R.A. Kirby Sales Inc.  
Foxboro Canada Inc.  
Davis Controls Ltd.  
Valley Process Specialties Ltd.  
Cantech Controls  
Foxboro Canada Inc.  
Foxboro Canada Inc.  
CB ENGINEERING (Eastern) Ltd.  
SRP control systems Ltd.  
Veronics Inc.  
U & I Supply  
Provincial Controls  
Davis Controls Ltd.  
Armatek Controls Ltd.  
SSCAN-Grodyne Controls  
Norspec Controls Ltd.  
Westech Industrial Ltd.  
Cantech Controls  
Alpha Controls and Instrumentation  
CB ENGINEERING (Eastern) Ltd.  
Davis Controls Ltd.  
SRP control systems Ltd.  
Cantech Controls

**Manufacturer/Tradename**

Intellution  
 Interface Inc.  
 International Sensor Technology  
 Interscan  
 Intertec  
 Invalco  
 Inventron  
 Ion Track Instruments  
 Ionics Inc.  
 Itron Inc.  
 ISO  
 ITT Barton Instruments  
 ITT Neodyne  
 J-Tec  
 Jacoby Tarbox  
 Jamesbury  
 Jofra  
 John C. Ernst  
 Jordan Controls Inc.  
 Joucomatic International  
 Jucker  
 K & K  
 K-Flow  
 Kammer  
 Kay-Ray/Sensall Inc.  
 Kaye Instruments  
 KDG Mobrey Level  
 Keddco Manufacturing  
 Kenco Plastics  
 Kenco-Magnetic Level Gauge  
 Kenmac Controls  
 Kerotest  
 Kessler Ellis  
 Ketema - Cox  
 Ketema - McCrometer  
 Ketema - Schutte & Keorting  
 Kinetrol  
 King Instrument Co.  
 KIP  
 Klinger  
 KTM  
 Kurz  
 L & J Technologies  
 Land Combustion Inc.  
 Land Instruments  
 Larson Instrument  
 Lear Siegler  
 Lee-Dickens Ltd. - England  
 Leeds & Northrup  
 Legris  
 LFE Instruments Inc. - USA  
 Linc Mfg.  
 LMI  
 Lucas Industrial Measurement Ltd.  
 Lumenite  
 M & C Products  
 M-Systems Inc.  
 M.S.R.  
 Mac Weld  
 Madison Controls

**Local Sales Representative**

CB ENGINEERING (Eastern) Ltd.  
 Willer Engineering Ltd.  
 Industrial Projects Ltd.  
 SSCAN-Grodyne Controls  
 Sarnia Piping Specialties Ltd.  
 Brian Controls  
 Can-Am Instruments Ltd.  
 Bestobell Canada  
 Veronics Inc.  
 Willer Engineering Ltd.  
 Davis Controls Ltd.  
 Armatek Controls Ltd.  
 CB ENGINEERING (Eastern) Ltd.  
 Romatec  
 Romatec  
 Neles-Jamesbury Ltd.  
 Brian Controls  
 T.J. McCarthy Ltd.  
 Cambridge Controls  
 Conval Equipment  
 Bestobell Canada  
 Davis Controls Ltd.  
 Willer Engineering Ltd.  
 Bestobell Canada  
 Rosemount Instruments Ltd.  
 CB ENGINEERING (Eastern) Ltd.  
 Bestobell Canada  
 U & I Supply  
 Armatek Controls Ltd.  
 Bestobell Canada  
 Brian Controls  
 Brian Controls  
 Brian Controls  
 Brian Controls  
 Brian Controls  
 Brian Controls  
 Brian Controls  
 Provincial Controls  
 Industrial Projects Ltd.  
 Brian Controls  
 Davis Controls Ltd.  
 Brian Controls  
 SSCAN-Grodyne Controls  
 Westburne Lytle  
 R.A. Kirby Sales Inc.  
 Norspec Controls Ltd.  
 Brian Controls  
 Romatec  
 Lisle-Metrix Ltd.  
 Norspec Controls Ltd.  
 Davis Controls Ltd.  
 Lisle-Metrix Ltd.  
 ATS-Alltemp  
 U & I Supply  
 SRP control systems ltd.  
 Bestobell Canada  
 Willer Engineering Ltd.  
 SRP control systems ltd.  
 Cancoppas Ltd.  
 Brian Controls  
 Bestobell Canada

**Manufacturer/Tradename**

MagneTek Controls  
Magnetrol  
Major Controls Inc.  
Marine Moisture Co. International  
Marlin Manufacturing  
Marpac  
Marsh  
Marshalltown  
Masoneilan Dresser  
Max Machinery  
McDaniel  
McDaniel Gauges  
McTighe Industries Inc.  
MDA Scientific  
MECI  
Megger Instruments Ltd.  
Mercoind  
Meterflow  
Micon  
Micro Motion Inc.  
Micronics Ltd.  
Microspec  
Microtel Inc.  
Mid West  
Milroyal Metering Pumps  
Milton Roy Analyzers  
Minox  
Minitek Inc.  
Monitor  
Monitor Labs  
Moore Industries  
mRoy Metering Pumps  
MTL Barriers  
Multitrode  
N.B. Instruments Inc.  
Negretti  
Neles  
Newman Hattersly  
Newport  
Nissin  
Nohken  
Nohken  
Noral  
Nova Analytical  
Numatics  
Nupro  
Nusonics  
O'Brien Enclosures  
Ogontz  
Ohio Semitronics  
Ohmart Corp.  
Oilgear  
Omniguard  
Oval  
Pacific Instruments Inc.  
Pacific Transducer  
Panamart - Division of Panalarm  
Panametrics Inc.  
Parker  
Peineman  
Penberthy

**Local Sales Representative**

Controls Equipment Ltd.  
Provincial Controls  
Alpha Controls and Instrumentation  
R.A. Kirby Sales Inc.  
Brian Controls  
Sharp Valve and Instrumentation Inc.  
TubeTech Ltd.  
T.J. McCarthy Ltd.  
Controls Equipment Ltd.  
Willer Engineering Ltd.  
Davis Controls Ltd.  
Provincial Controls  
Can-Am Instruments Ltd.  
Brian Controls  
Globaltech Process Controls Ltd.  
R.H. Nichols Co. Ltd.  
Davis Controls Ltd.  
Bestobell Canada  
Cantech Controls  
Rosemount Instruments Ltd.  
Can-Am Instruments Ltd.  
Foxboro Canada Inc.  
Can-Am Instruments Ltd.  
Brian Controls  
Milton Roy Industries Ltd.  
Westech Industrial Ltd.  
Foxboro Canada Inc.  
Willer Engineering Ltd.  
Romatec  
Brian Controls  
Armatek Controls Ltd.  
Milton Roy Industries Ltd.  
Provincial Controls  
Bestobell Canada  
Can-Am Instruments Ltd.  
Bestobell Canada  
Neles-Jamesbury Ltd.  
Bestobell Canada  
R.H. Nichols Co. Ltd.  
Davis Controls Ltd.  
Bestobell Canada  
Troy Control Systems Inc.  
Baker Instruments Ltd.  
Veronics Inc.  
Provincial Controls  
Huron Valve & Fittings Ltd.  
Armatek Controls Ltd.  
Armatek Controls Ltd.  
Cantech Controls  
Armatek Controls Ltd.  
G.L. Stebbins Co. (1982) Ltd.  
Bestobell Canada  
Bestobell Canada  
Davis Controls Ltd.  
SRP control systems ltd.  
Brian Controls  
Provincial Controls  
Veronics Inc.  
TubeTech Ltd.  
Cancoppas Ltd.  
Westburne Lytle

**Manufacturer/Tradename**

Penberthy Canada  
 Penberthy Level Mark  
 Penberthy MEM  
 Penberthy Standwich  
 Penny & Giles  
 Pepperl & Fuchs Inc. - USA  
 Pfortner Thermometers  
 Philips (Temperature Controls)  
 Phoenix Data Inc  
 PMC Inc.  
 PMV  
 PMV  
 Pneuroyal Metering Pumps  
 Polysonics  
 Porter Instrument Co. - USA  
 Power Instruments  
 Powers Process Control  
 Precision General  
 Preso  
 Pribusin  
 Princo Instruments  
 Promac  
 Prominent Fluid Controls  
 ProQuip  
 Proximity Controls  
 Pulsafeeder  
 Pyramid  
 Q Trims  
 QEL  
 QSDM  
 Quantum Logic Corp.  
 R. Stahl Inc.  
 R. M. Engineered Products  
 Ramapo  
 Ramsay Canada  
 Ranarex  
 Ray Snubbers  
 RCS  
 RdF  
 Redington  
 Remote Control  
 Reotemp  
 Reotemp Instrument Corp  
 Rex  
 Riley  
 Rite Pro  
 Robbins & Myers  
 Robertshaw  
 Rochester Gauge  
 Rochester Instrument Systems  
 Rohrback Conasco Systems  
 Ronan  
 Rosemount Analytical Inc.  
 Rosemount Inc.  
 Rotork  
 Rotronics Instruments Corp.  
 Royce  
 S.F.J. - Flow Measuring Systems  
 Saab Tank Control  
 Safety-Relief Valves  
 Sampling Technology Inc.

**Local Sales Representative**

Brian Controls  
 Brian Controls  
 Brian Controls  
 Brian Controls  
 Cantech Controls  
 Lisle Metrix Ltd.  
 Norspec Controls Ltd.  
 Baker Instruments Ltd.  
 R.H. Nichols Co. Ltd.  
 ATS-Alltemp  
 Romatec  
 Cancoppas Ltd.  
 Milton Roy Industries Ltd.  
 Davis Controls Ltd.  
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 Troy Control Systems Inc.  
 Norspec Controls Ltd.  
 PMP Instrumentation Ltd.  
 Bestobell Canada  
 Romatec  
 Romatec  
 Neles-Jamesbury  
 TubeTech Ltd.  
 Alpha Controls and Instrumentation  
 ATS-Alltemp  
 Alpha Controls and Instrumentation  
 Bestobell Canada  
 Cancoppas Ltd.  
 Controls Equipment Ltd.  
 R.A. Kirby Sales Inc.  
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 Cancoppas Ltd.  
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 Davis Controls Ltd.  
 Troy Control Systems Inc.  
 Valley Process Specialties Ltd.  
 U & I Supply  
 Sharp Valve and Instrumentation Inc.  
 Davis Controls Ltd.  
 Controls Equipment Ltd.  
 Armatek Controls Ltd.  
 Industrial Projects Ltd.  
 Rosemount Instruments Ltd.  
 Rosemount Instruments Ltd.  
 Troy Control Systems Inc.  
 Alpha Controls and Instrumentation  
 Cancoppas Ltd.  
 Valley Process Specialties Ltd.  
 R.A. Kirby Sales Inc.  
 Farris Industries Canada  
 CB ENGINEERING (Eastern) Ltd.

**Manufacturer/Tradename**

Sandtron  
Sartek  
Sattcontrol Windeler  
Sauter  
Schlumberger  
Schrader Bellows  
Schrader Bellows  
Schramm  
Scully Electronic Systems Inc.  
Sensall  
Sensor Technology Inc.  
Sensorex  
Sensotron Pressure Transducers  
Serfilco  
Servomex  
Setra Systems Inc.  
Shand & Jurs  
Sieger  
Siemens Electric Ltd.  
Sierra  
Signet Scientific  
Sigrist Photometer Ltd. - Switzerland  
SIOC  
Skinner  
Smar International  
Sno-Trik  
Solomat Corp.  
Somat Corp.  
SOR Inc.  
Sparling Instruments  
Spec 200  
Spectrum  
Spirax Sarco Canada Ltd.  
Stabilflo  
Statham  
Statiflow  
Sterling  
Stewart Electronics Inc.  
Strahman  
Streaming Current Detector  
Swagelok  
Swoffer Instruments  
Syracuse  
Syscon  
TCS  
Teac  
Techmation  
Technology for Energy  
Techscience International  
Tedeo Inc.  
Tegam  
Tel Tru  
Teledyne Hastings  
Telematic Controls  
Teltronics Inc.  
Temperature Electronics Ltd.  
Terwin Instruments  
Testoterm  
Texas Nuclear  
Texmate  
The Electron Machine Corporation

**Local Sales Representative**

Davis Controls Ltd  
Bestobell Canada  
Brian Controls  
Bestobell Canada  
Westech Industrial Ltd.  
Davis Controls Ltd.  
TubeTech Ltd.  
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SRP control systems ltd.  
Alpha Controls and Instrumentation  
Alpha Controls and Instrumentation  
Romatec  
Zesta Engineering  
Cancoppas Ltd.  
Westech Industrial Ltd.  
Alpha Controls and Instrumentation  
Westburne Lytle  
SSCAN-Grodyne Controls  
Alpha Controls and Instrumentation  
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Lisle-Matrix Ltd.  
Davis Controls Ltd.  
Cantech Controls  
G.L. Stebbins Co. (1982) Ltd.  
Huron Valve & Fittings Ltd.  
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Foxboro Canada Inc.  
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Neles-Jamesbury Ltd.  
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Milton Roy Industries Ltd.  
Huron Valve & Fittings Ltd.  
Can-Am Instruments Ltd.  
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R.H. Nichols Co. Ltd.  
Lakeside Controls Ltd.  
SRP control systems ltd.  
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Willer Engineering Ltd.  
Cantech Controls  
Baker Instruments Ltd.  
Norspec Controls Ltd.  
Baker Instruments Ltd.  
Controls Equipment Ltd.  
R.H. Nichols Co. Ltd.  
Industrial Projects Ltd.

**Manufacturer/Tradename**

Thermal Instrument Co.  
 Thermo Electric  
 Thermo-Kinetics  
 Thermocase  
 Thermographic Measurements  
 Thermon  
 Thermox Instruments  
 TLV  
 Tobar  
 Tomoe  
 Toshiba Recorders  
 Trademark Mfg. Inc.  
 Transtector Systems  
 Tricentric Butterfly Valve  
 TSI Inc.  
 Tubetrace  
 U.G.C. & Carle Chromatography  
 Uehling  
 United Controls (Canada) Ltd.  
 United Electric Controls  
 Universal Vortex Inc.  
 UOP-Monirex  
 V.P.S.  
 Valtek  
 Valvecon  
 Valve Repair  
 Vanessa Valve  
 Vanzetti Systems  
 Varec  
 Velan  
 Versatile Measuring Instruments Inc.  
 Viatran Corp.  
 Vibra-Metrics Inc.  
 Vraco  
 W.E. Anderson  
 W.E. Anderson  
 Warren Jones Engineering - England  
 Warrick  
 Watlow Electric Heaters  
 Watlow Temperature Controls  
 Watts  
 Waugh Controls Corp.  
 Weigh Tronix  
 Weksler  
 Welker Engineering  
 Weschler/Bowmar  
 West Instruments  
 Westech Manufacturing  
 Westinghouse Combustion Controls  
 Westlock  
 Whitey  
 Whitman Controls  
 Wika  
 Winters Gauges  
 Wodex Technology Inc.  
 Worcester Controls  
 Y-Z Industries  
 Yokogawa  
 Zook  
 Zullig

**Local Sales Representative**

R.A. Kirby Sales Inc.  
 TubeTech Ltd.  
 Provincial Controls  
 Thermon Canada Ltd.  
 Brian Controls  
 PMP Instrumentation Ltd.  
 Willer Engineering Ltd.  
 TubeTech Ltd.  
 Cantech Controls  
 Davis Controls Ltd.  
 Westech Industrial Ltd.  
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