

# CONTROL SIGNAL

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## MSA Portable Gas Detector Selection

Single gas monitors are a low cost way to monitor a specific single gas. MSA single gas instruments come in two families, the ALTAIR and the ALTAIR PRO.

### ALTAIR

The ALTAIR is a “disposable” instrument with a two year life span. This provides maintenance free monitoring of carbon monoxide, oxygen, or hydrogen sulfide. A two year warranted lifespan, coupled with the unit’s high performance, make this the most cost effective monitor on the market. The LED display will indicate the number of

months left in the life of the instrument. The ALTAIR has a triple alarm featuring two bright LED’s, piercing audible alarm, and vibrating alarm. The unit also records the last 25 alarm events.

### ALTAIR PRO

The ALTAIR PRO is similar to the ALTAIR in construction. Both units have a tough rubberized housing, one button operation, and monitor a single gas. The key difference with the ALTAIR PRO is the sensor and battery can be replaced, extending the life of the unit. Also, in



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## What’s New in Vision Sensors from Banner

Moving forward in the Vision Sensor arena, BANNER has introduced the PresencePLUS P4 OMNI COLOR and PresencePLUS PRO COLOR vision sensors for use where color is a discriminator between a good and bad condition.

Banner’s PresencePLUS Pro vision sensor defined low-cost vision sensing with the PresencePLUS P4 GEO, P4 EDGE and P4 AREA all starting at \$995 and the Hi-Res P4 GEO 1.3, P4 EDGE 1.3, AREA 1.3, P4 OMNI (\$1995) and now the P4 OMNI COLOR

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## Hot New Products

### Universal Transmitter/ Signal Conditioner/ Isolator from Moore Industries

Moore Industries introduced the THZ and TDZ series several years back with great success and rave reviews, setting a new standard of accuracy in both a DIN rail mount and an Intrinsically Safe sensor head mount style 2-wire loop powered transmitters configured with HART. The THZ (no display) and the TDZ (with display) offered the flexibility of accepting field selectable inputs including RTDs, thermocouples, millivolt, resistance values, and potentiometers.



Moore Industries is pleased to announce the introduction of THZ2 and the TDZ2. These enhanced units add to the list of acceptable inputs current and voltage as well as allowing configuration via HART or serially via a laptop with configuration software and a serial cable included with each purchase. Now configuration is possible even for those limping along with an older HART handheld, possibly with no more memory to add to the DD library.

The addition of current and voltage inputs, along with the isolated output open the window of application for these units to include the loop isolation function from a single unit on your shelf.



*Banner PresencePlus cameras*

## Inside This Issue

**Monitoring in Remote Locations without Power (p.3)**

**What is Valve Droop? (p.4)**

## Employee Profile

**J**on Boykan is a Sales Engineer for Gilson Engineering Sales. He lives in Perrysburg, OH, with a territory including Northwest Ohio, Northeast Indiana, and the border counties of Michigan.

Jon graduated from Penn Sate in 1984 with a BS in Mechanical Engineering. He started with Gilson Engineering in 1985 as an Applications Engineer and moved to outside sales when he opened the Toledo, OH office for Gilson in 1989. Jon is a licensed PE in Ohio in Control Systems.

“I think the role of a Sales Engineer has changed quite a bit since the mid 80s. Engineers and maintenance personnel have to do much more with less than in years past. Customers rely more on the vendors for assistance in design, installation, and maintenance of products. With over 20 years of experience in instrumentation and controls, I am a resource to customers when they



are trying to add a control or monitoring loop, or trying to improve an existing installation.”

“The best part of this job is getting out to plants to see how processes work, and how things are made. In

the same day I can visit a refinery, wastewater plant, tire factory, and engineering firm. No two days are the same.”

“When I started with Gilson in 1985, we had just purchased our first fax machine. Now, customers require answers immediately. We have spent a lot of time developing resources with the goal of getting customers quotes, drawings, manuals, etc. as fast as possible. I rely on a staff of inside sales and applications specialists when I am out of the office.”

*(MSA, Continued from page 1)*

addition to monitoring CO, O2, and H2S, units are also available for Ammonia, Chlorine, Hydrogen Cyanide, Nitrogen Dioxide, and Phosphine. Special units are also available for CO for fire service, hydrogen resistant CO monitors for the steel industry, and remote oxygen sensors for remote sampling. The analog gas levels are shown on the LCD display and the alarm points are adjustable. No alarm condition will go unnoticed with the two flashing LED's, flashing LCD display, piercing audible alarm, and internal vibrating alarm.

### Multigas Instruments

Multigas detectors are used primarily to monitor for immediate hazards. MSA offers a full line of multigas instruments and accessories, including batteries, chargers, pumps sample lines, and probes.

### SOLARIS MULTIGAS DETECTOR

The Solaris is one of the smallest, lightest 4 gas monitors on the market. It is designed to withstand use in the harshest environments. The Solaris simultaneously monitors up to four gases including combustibles, O2, CO, H2S, and NO2. The rechargeable lithium ion battery provides 14 hours of continuous use and fully



recharges in less than 4 hours. With high intensity LED alarm and shrill 100dB audible alarm, the Solaris will call immediate attention to a hazardous situation. The unit also logs short term exposure limit (STEL) and time weighted average (TWA).

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### SIRIUS MULTIGAS DETECTOR

The Sirius Multigas detector combines one high performance PID (photoionization detector) into a four gas detector to simultaneously monitor up to five gasses. MSA's patented PID sensor provides users with excellent PID performance including humidity resistance, stable zero readings, fast response, and clear times.

*(Continued on page 6)*



**General News, Schedule of Events**

Pittsburgh  
November 8-9 WESTEC Industrial pretreatment seminar, Holiday Inn Greentree

**(Banner, Continued from page 1)**

(\$3495) continue this trend of making it easy and affordable to adopt vision sensing and inspection to your process.

The P4 OMNI COLOR offers all the gray scale tools from the P4 OMNI: Locate, Geometric Find/Count, Edge, Object, Blob and Average Gray-scale, with a Bar Code option available for \$500.

Other features include:

- New Color Match tool
- P4 OMNI COLOR will perform inspections up to 900 parts per minute (PPM)
- PresencePLUS wizard-like software configures all Banner vision sensors and features Quick Teach for rapid sensor set-up.
- Remote Teach re-configures the P4 OMNI COLOR color match tool without a PC.
- Direct connectivity to Ethernet/IP and Modbus/TCP industrial standard network protocols.
- Communications Tools send data over the Ethernet or RS232 Serial outputs.
- NEW- Compact IP68 rated camera head for the PresencePLUS PRO – Ideal for wash down and harsh environments.

In an ongoing effort to improve upon the PresencePLUS wizard-like software, Banner has recently released the 2006BETA version PresencePLUS PC Software and Firmware. This up grade gives the Banner vision sensor the added capabilities of Math Tool which provides the ability to numerically manipulate the other tool results; Player/Recorder provides the ability to record images in run mode (on-line) and the replay these images off-line; Measure Tool enhancements provide the ability to measure distance and angles between points, a point and line, and between two lines. And as always this latest version of software is available on CD or download from the Banner web site – FREE!

## Monitoring Remote Locations

In many process plants, mining operations, irrigation, municipal water and waste applications there are numerous remote areas that need to be monitored but are not due to lack of available power. Gilson Engineering Sales has the complete solution. We can provide solar panels if the particular area does not have power in conjunction with Elpro wireless I/O to transmit those remote signals back to a central location. By monitoring these



signals, the plants would know immediately when a problem arises, and can eliminate having to send a person out routinely to check on the equipment and record readings. Also, the plant would have continuous data available for flow rates, total flows, levels, etc. that could be recorded into their plant wide distributed control system.

The solar panel system is designed to provide steady, clean power with sufficient storage capacity to continuously operate during extended periods of inclement weather. A typical solar panel system includes four major components: Solar Panels, Charge Controllers, Batteries and Inverters, all mounted in a weatherproof enclosure.



Once power is available, using the Elpro wireless I/O is the key to sending that data back to the plant. Elpro radios can take a mixture of both

analog, digital or pulse signals as inputs. Back at the plant these signals can be recreated as output signals, or Elpro has numerous gateway devices which communicate Modbus, Profibus, Ethernet, DeviceNet or DF1. Internal to each radio is a battery charging circuit and a solar regulator. The Elpro radios are unlicensed 902-928 MHz frequency hopping spread spectrum technology and are ideally suited for a wide variety of appli-

## Project Cost Savings with PULS Power Supplies

PULS power supplies may look strikingly familiar, although the name may be new to many. PULS private labeled their products for one of the most highly recognized companies in the power supply arena. Now breaking that marketing tie, and selling their product direct with their own reps, PULS has utilized the same innovation that has produced the most dependable DIN rail mounted loop power supplies in the industry to bring cost savings with supplies that accept 3 phase voltage direct, up to 500VAC, and provide DC voltage without the need for an AC step-down transformer.

In many lift station applications, or any instrumented/controlled remote location with a host of wireless options becoming available, 240VAC or

*(Continued on page 6)*



*Puls Dimension series power supply*

## What is 'Droop' in Pressure Regulators

When choosing a regulator over the control valve option, the plant must consider the droop effect. Droop is an inherent characteristic of all self-operated and pilot-operated regulators. It is expressed as the deviation of pressure from the set value that occurs when a regulator travels from the minimum-flow position to the full-flow position.

Fig. 1 shows the effect of droop in a regulator set at 40 pounds per square inch (psi) as the valve travels from the minimum-flow position to the full-flow position. The droop is expressed by the difference between the dotted line and solid line. The dotted line represents the actual controlled pressure attained, and the solid line represents the line of perfect regulation.

Consider the application shown in Fig. 2, which indicates a 100-psi water pressure available in a building. To best operate the equipment and taps, it is necessary to reduce the pressure to 40 psi. A pressure-reducing valve can be installed on the service line to handle this reduc-



tion.

When there is no demand for water, no flow is required; therefore, the regulator is in the closed position. As demand for water increases to the full capacity of the valve, the regulator moves to the fully open position. However, because the regulator will droop with increasing flows, the set pressure of 40 psi to the building will not be maintained. Why not?

An increase or decrease in the

amount of force applied to the spring establishes the set point for a self-contained regulator. In most cases, this is done with an adjusting screw. A clockwise turn of the adjusting screw threads the screw further into the spring housing, compressing the spring and increasing the set point. A counter-clockwise turn of the adjusting screw allows the spring to relax and decreases the set point.

Downstream pressure is transmitted to the diaphragm, either directly or via a downstream tap. When downstream pressure beneath the diaphragm exceeds 40 psi, the spring compresses and the valve closes.

When the pressure beneath the diaphragm decreases, the valve opens once again. In other words, the spring will not expand or contract unless a decrease or an increase in the pressure (force) opposing it occurs. When downstream demand increases, the valve travels toward the fully open position. This allows the spring to expand, "adjusting" the set point," but this time from the diaphragm instead of the adjusting screw.

### Reducing droop

As stated earlier, droop is an inherent characteristic in any self-operated or pilot-operated regulator. However, it can be minimized. The extent of droop is deter-

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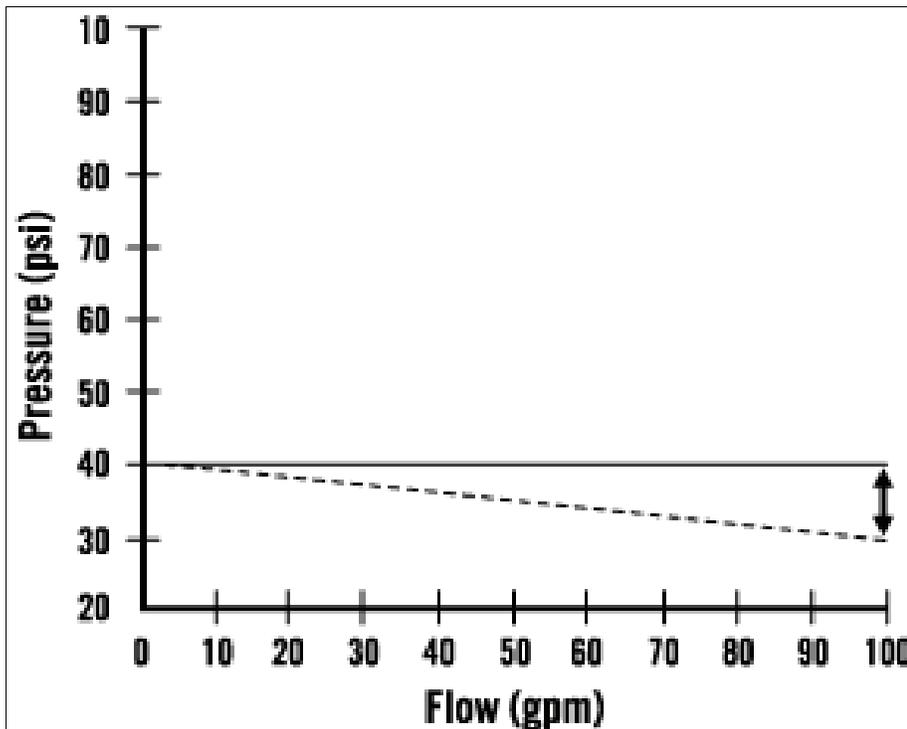
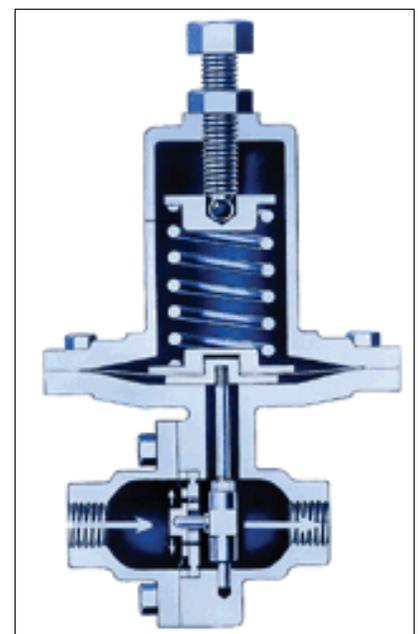


Fig 1. The dotted line shows the droop effect as a valve travels from the minimum-flow to the maximum-flow position.



Self operated pressure regulator

*(Valve droop, continued from page 4)*

mined by three factors: diaphragm area, spring rate and stroke length.

An increase in the diaphragm area, a decrease in the spring rate and/or a decrease in the length of the valve stroke can reduce the droop. It is important to remember that these factors are interrelated.

**Diaphragm area.** The diaphragm area is restricted by economic and practical reasons. Larger diaphragms tend to increase the overall cost of the regulator because they require larger spring housings, heavier bolting, etc.

**Spring rate.** Design engineers typically will use the lowest-rate spring that will allow an adequate range of pressure adjustments (set points) and still retain sensitivity to small changes in pressure. It is possible to reduce the droop with low-rate springs, but plants run the risk of making the regulator too sensitive, which will create instability. Plus, the range of set points with a very light spring might prove too narrow for general industrial use. By lengthening a heavier spring, plants can increase the sensitivity, but this practice often is restricted by economics and valve size.

**Stroke length.** The distance a spring is allowed to relax in proceeding

from minimum to maximum flow can be reduced to decrease the droop. Plant personnel establish the set point for any self-contained regulator by increasing or decreasing the amount of force applied to the spring (spring compression). In most cases, this is accomplished with the adjusting screw. When flow conditions downstream cause the valve to move toward fully open, this also "adjusts" the spring from the bottom. Thus, when the valve opens to compensate for additional flow demand, the spring is allowed to relax and the set point decreases. To minimize the droop, design engineers can use regulators offering a shorter-than-normal overall stroke length.

**Pilot-operated valves**

Pilot-operated valves experience less droop than self-contained valves. The additional sensitivity is obtained by a combination of the pilot diaphragm, pilot spring and pilot valve stroke. The required stroke in most piloted valves is minimal because little flow is required to load the diaphragm of the main valve. Only minute pressure changes are necessary to fully move the pilot spring. Droop will occur, but it will not be dramatic.

**Choosing the best valve**

Most self-contained regulators will demonstrate a droop effect of approximately 10 percent to 20 percent of rated capacity. For higher set points, heavier springs are used, and droop could be considerably higher. Most piloted-operated regulators will demonstrate a droop between 2 percent and 5 percent.

Most applications do not require a valve to throttle from 5 percent open to 100 percent open, so the droop will be minimized. In fact, if the minimum flow required is 20 percent to 30 percent of the maximum flow, the droop might be negligible.

If flow demands are relatively constant, or if a 10 percent to 20 percent deviation from the set point is tolerable, a self-contained regulator should be used. If the fluctuations are great or accuracy is essential, pilot-operated valves or instruments might be necessary.

When selecting a valve for a pressure-reducing application, plants should keep in mind that:

A piloted regulator will exhibit less droop than a non-piloted regulator.

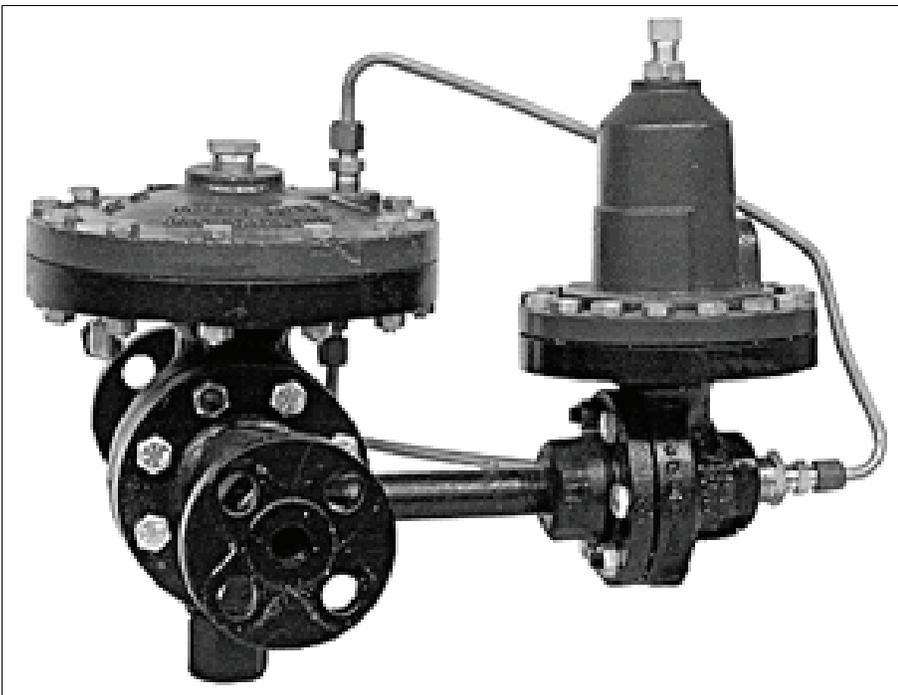
Air-loaded regulators are much more accurate because the spring is eliminated. High-flow regulators are less accurate than standard regulators.

Typically, the shorter the overall stroke, the less the droop.

Larger diaphragms will increase overall accuracy.

Regulators supplying a medium to multiple users/vessels will be less accurate than regulators supplying a medium to a single unit/vessel.

The set point should be toward the high end of the selected spring range to give increased regulation accuracy.



*Pilot operated regulator*

*(Puls, Continued from page 3)*

480VAC may be utilized to run pumps or motors. The cost of purchasing and installing a 480/120 VAC transformer before feeding a traditional 120VAC/24VDC power supply goes right into your pocket.

PULS has also introduced the DIMENSION SERIES DIN rail mounted units with up to 480W output, while providing up to 55% savings in panel space, and unmatched efficiencies of up to 95%, and a rating of 150% peak load capability to handle inrush situations.

Some of the most recognized names in the control field are already private labeling PULS power supplies.

*(MSA, Continued from page 2)*

**AUTOMATED TEST STATION**

MSA's Galaxy Automated Test System is a docking station to charge and calibrate your portable gas monitors. Simply place your MSA portable gas detector in the Galaxy, close the lid, touch one button, and a full, automatic calibration will be performed on your gas monitor. An LED will indicate whether the calibration passed or failed. No computer or network connection is required, the system is completely standalone.

All gas tubing is pre-

connected within each Galaxy test stand and optional cal gas cylinder holder. In addition, up to ten Galaxy units can be interconnected. All tubing and electrical connections are pre-linked inside each Galaxy test stand, meaning no wiring or tubing will be exposed.

Another great option to the Galaxy system is the instrument charge function. Place your portable gas monitor in the Galaxy Test Stand and the next day your instrument will be fully charged and calibrated, ready for use.

The Galaxy can be used with the Solaris, Sirius, ALTAIR and the ALTAIR PRO.



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