



# cable pressure *AirMAIL*

## System Studies Incorporated

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### **CopperWATCH™ Arrest Record on the Rise**

In our September 2012 bulletin we mentioned that our copper cable theft detection software had successfully led to the capture and arrest of three cable thieves.



Since that time we've verified five additional dispatches on cable thefts in progress. Three of those led to arrests. That's five more people captured, for a grand total of eight.

The current CopperWATCH arrest rate is now at 66%, or 1.3 crooks captured per alarm activation. These are some pretty impressive numbers, especially compared with national burglary and motor vehicle theft arrest rates, for example, which are both around 12%.

If you're having copper cables stolen in your area, call us at **(800) 247-8255**. We've got the software you need to put the bad guys behind bars.

Acquiring and retaining good cable pressurization skills requires more than just initial training and occasional application. At System Studies we believe it's a good idea to brush up on the basics of cable pressurization every so often in order to strengthen your working knowledge of air pressure.

This *AirMAIL* issue includes the first of a 3-part article on "Why Measuring Air Flow Is So Important." Depending upon your level of experience, this information may serve as helpful review material or bring you some important new insight. Either way, we think you'll find it well worth the read.

This bulletin also describes the two most important features that will be included in the upcoming release of PressureWEB™ Version 3.02.02: the Data Export Utility and the Device Comment Tags.

The first feature gives you much greater control over your office data. You can upload device status information from PressureWEB, place it in a spreadsheet, provide supplemental information, if desired, and save it on your hard drive for later reference and/or email delivery. The second new feature includes visual markers on your Device Status View displays, each of which indicates how many comments have been posted for a specific monitoring device. Both features are certain to improve your working experience with PressureWEB, in addition to adding to the application's ever-expanding power and capabilities.

There's also some information below about two of the most important leak locating tools: the Flow Gauge and the Digital Pressure Gauge. For more detailed information about these and the other tools we have to offer, log onto [AirTalk](#) and click on *Hardware* then *Tools* at the top of the home page. You'll see summary information about our various meters and gauges, plus links to the product data sheets.

### In Need of Pneumatic Fittings?

In case you didn't know, System Studies keeps a pretty good inventory of cable pressurization fittings. Whether you need replacement fittings for the discontinued AMP 1/2-inch air pipe connectors, barbed fittings for 1-inch Nylobraid tubing, 45 degree street Ls, or hex nipple fittings — we've got 'em.

Give us a call or log onto our [website](#) for more information.  
**800-247-8255 : 831-475-5777**



### Why Measuring Air Flow Is So Important

We've found that one of the best ways to explain the importance of measuring air flow in a cable pressurization system is by using the analogy of a water department. A municipal water department monitors water usage and locates leaks using the same three basic principles that are at work in a cable pressurization system: pressure, flow, and the resistance of the water pipes (versus air flow resistance in telephone cables). In this first of three articles, we describe these three principles and discuss the relationship among them.

#### **Pressure**

Both water pressure and cable pressure are measured in Pounds per Square Inch (PSI). This measurement is the result of placing a physical force behind the water (such as pumping a large volume of water through a pipe) or physically compressing air molecules (such as the mechanical compression performed by central office air dryers). In either case a source of pressurized water or air is what determines the pressure.

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## Flow Rate

Water flow rates, used for determining customer consumption or the size of a pipe break, are measured in cubic feet per minute. A pipe leak, for example, might use 500 cubic feet of water per minute. Air flow rates in a cable pressure system are measured in Standard Cubic Feet per Hour (SCFH) or Standard Cubic Feet per Day (SCFD). A cable leak, for example, may use 5 Standard Cubic Feet per Hour, or an air pipe may consume 900 Standard Cubic Feet per Day. One Standard Cubic Foot per Hour is the same flow rate as 24 Standard Cubic Feet per Day.

## Pipe/Cable Size

The size of a water main determines the potential of a water pipe to produce certain flow rates. Pipe size (diameter) is measured in inches. The larger the pipe, the less resistance there is to the flow of water. This results in a greater capacity for carrying water. The resistance in a cable, or the tendency to restrict air flow, is not entirely the result of cable size or diameter. This resistance, called pneumatic resistance, is determined by three things: **1)** type of insulation used on the conductors, **2)** number of pairs in the cable, and **3)** conductor gauge.

Pneumatic resistance is measured in units of resistance per 1,000 feet. The higher the pneumatic resistance, the smaller (tighter) the cable will be. This basic relationship between pressure, flow, and resistance can help to explain several basic concepts.

## What's the Cause of Low Pressure?

If a water department is required to ration water during a drought, it has to determine a fair system of distribution. For

example, if there are two apartment buildings, how much water should be allocated for each? Obviously, the fairest thing to do would be to base the amount of water given to each building on the number of people who live there. If one of the apartments has four times as many residents as the other, it should be allowed four times as much water. It would be unfair and impractical to allocate a fixed amount to each apartment.

Determining an amount of air usage in a cable pressure system is very similar to this water rationing analogy. Instead of counting the number of people served, we would count air usage per pressurized sheath mile of cable. An accepted usage for a cable pressure system is 30 SCFD or 1.25 SCFH per sheath mile of cable. Ten sheath miles of cable should use no more than 300 SCFD; 20 sheath miles should use no more than 600 SCFD. The standard or acceptable air consumption for a cable pressurization system is called Optimum Air Usage, or OAU. Using this optimum air flow concept, it's easy to see how the highest flowing route in a wire center could, theoretically, be in the best shape.

This analogy is useful when explaining the sizing of air dryers/compressors for a central office. Obviously, the size of dryer required depends upon the number of pressurized sheath miles of cable being fed. System Studies Incorporated recommends that when sizing a dryer, you take the total number of pressurized sheath miles in the office and multiply that figure by 100 SCFD (3 times standard plus some). Based on this calculation, you can select a dryer that will maintain the estimated output.

*Before we get too far along, let's stop our explanation here. Next time we'll continue with [The Reasons for Good and Bad Flow](#) and [Using Flow Rates in Leak Locating](#).*

## The Dynamic Duo

We've been selling our trusty **Flow Gauge** (Part No. 9800-3100) for over 25 years. This indispensable item is one of the two most commonly used cable pressurization leak locating tools—the other being the C pressure gauge. Every once in a while, however, someone will return a Flow Gauge to us for repair. Cause of the problem? A broken or leaking Flow Sampler head (see illustration). That's the component that attaches to the Flow Finder or Flow Finder Manifold's tank valves when taking a reading.



During the ongoing process of making our products better and, hopefully, more trouble-free, we've made a few improvements to the Flow Sampler since the first ones were built. If your Flow Gauge is getting up there in years or the sampler head is beginning to give you problems, give us a call. For a modest fee we'll replace the Flow Sampler and get that tool back to good working order.

Now about that other important leak locating tool . . . did you know that there's an easier and more accurate way of taking air pressure measurements than using the old, mechanical C pressure gauge? Our **Digital Pressure Gauge** (Part No. 9800-3123) greatly simplifies the process. It provides a nearly instantaneous digital readout of the sampled pressure (down to one one-hundredth of a psi), and it has a very high reading capability. While it is nominally rated to read up to 30 psi, it can actually read much higher (up to 70 or 80 psi).

Even more importantly, there are no reading problems associated with the digital gauge. When you take pressure readings with the C pressure gauge, the angle at which it is viewed can affect reading accuracy by as much as 0.25 psi. That just doesn't cut it when taking readings for leak locating calculations.



# Latest PressureWEB Improvements

As PressureWEB continues to evolve and more and more features are added, one might think that all the important capabilities have already been implemented. Not so. PressureWEB 3.02.02 includes two features that make the application more powerful than ever before.

## Data Export Utility

Located in the Tools section on any of the Device Status View listings for an office is a new Data Export link. Clicking this link produces a popup window which includes all of the data for the office in a scrollable spreadsheet type of format (see below). You can export selected rows of data by holding down the <Ctrl> button on your keyboard and using the mouse to click on the desired rows, or highlight them all by pressing the Select All button in the lower left corner of the window. The Create Export File button copies your selected data and exports it into an Excel spreadsheet, where you can reformat or rearrange it for your particular needs.

ID	Pipe	SQI	Device #	Access #	Address	TP	Curr	Tdy	Wk-1	Alarm	In
1	1A	86	135	004-27	C.O. PIPE PANEL, OCEAN/HUBBARD	SF	79.2	76.9	78.2		
2	1A	86	178	005-34	P81 EL RANCHO	EP	9.0	9.5	9.3		
3	1A	86	182	006-02	MH50 CENTER @ MISSION	MF	18.3	18.3	18.7	*	1
4	1A	86	186	006-06	MH232 OCEAN @ PLYMOUTH	MF	8.6	7.9	7.8		
5	1A	86	202	006-22	P133 MISSION	MF	7.2	7.2	7.6		
6	1A	86	K004	008-22	P81 EL RANCHO DR	RA	OK	OK	OK		
7	1B	77	036	001-36	MH316 BRANCIFORTE	UP	9.0	9.0	9.2		
8	1B	77	038	002-02	MH316 BRANCIFORTE	UP	3.5	4.0	3.4	*	1
9	1B	77	042	002-06	MH345 BRANCIFORTE DR	PP	SHRT	SHRT	SHRT		
10	1B	77	152	005-08	C.O. PIPE PANEL, OCEAN TO LEE	SF	55.0	54.2	54.4		
11	1B	77	181	006-01	MH342 BRANCIFORTE	MF	SHRT	SHRT	SHRT	*	95
12	1B	77	185	006-05	MH222 OCEAN	MF	18.2	18.2	18.2	*	1
13	1B	77	193	006-13	MH312 MARKET	MF	8.9	8.8	8.6		
14	1B	77	194	006-14	P18.5 N. BRANCIFORTE	MF	6.7	6.2	7.0		
15	2A	87	154	005-10	C.O. PIPE PANEL, SOQUEL/B40	SF	23.0	21.8	21.4		
16	2A	87	171	005-27	M612 S. BRANCIFORTE AV	MF	4.8	4.9	4.9		
17	2A	87	198	006-19	MH578 PINE	UP	6.0	6.0	6.0		
18	2B	85	046	002-10	MH707 SOQUEL AV	UP	2.5	2.5	2.5	*	34
19	2B	85	051	002-15	MH707 SOQUEL AV	UP	7.0	7.0	7.0		
20	2B	85	052	002-16	MH707 SOQUEL AV	UP	4.5	4.5	4.5	*	131
21	2B	85	056	002-20	MH421 FREDERICK AV	UP	5.5	5.5	5.1		
22	2B	85	058	002-22	MH126 SOQUEL AV	MF	19.0	19.0	19.0	*	271
23	2B	85	155	005-11	CO PIPE PNL, SOQUEL/FREDERICK	SF	67.5	65.1	66.5	R	161
24	2C	84	045	002-09	MH182 TREVETHAN	UP	6.5	6.5	6.5		
25	2C	84	047	002-11	MH707 SOQUEL AV	UP	9.5	9.5	9.5		
26	2C	84	053	002-17	MH707 SOQUEL AV	UP	6.0	6.0	6.0		
27	2C	84	054	002-18	MH707 SOQUEL AV	MF	6.3	5.4	6.1	R	1
28	2C	84	056	002-19	MH707 SOQUEL AV	UP	OPEN	OPEN	OPEN	**	1

## Comment Tags

Another noteworthy improvement in PressureWEB 3.02.02 is the addition of circular Comment Tags, which appear in the upper right corner of the Device # column fields if any user comments have been entered for a specific device (see below). Each tag contains a number (up to eight maximum), which identifies how many comments are associated with the device.

**PressureWEB 3.0** from System Studies Incorporated

All Offices My Offices Actions View Options Reports System Errors Setup Tools

**Device Status by Pipe View**

<OFFICE NAME>

Device #	Access #	Address	TP	Curr	Tdy	Wk-1
Pipe Route 1A SQI: 86						
135	004-27	C.O. PIPE PANEL, OCEAN/HUBBARD	SF	79.2	76.9	78.2
178	005-34	P81 EL RANCHO	EP	9.0	9.5	9.3
182	006-02	MH50 CENTER @ MISSION	MF	18.3	18.3	18.7
186	006-06	MH232 OCEAN @ PLYMOUTH	MF	8.6	7.9	7.8
202	006-22	P133 MISSION	MF	7.2	7.2	7.6
K004	008-22	P81 EL RANCHO DR	RA	OK	OK	OK
Pipe Route 1B SQI: 77						
036	001-36	MH316 BRANCIFORTE	UP	9.0	9.0	9.2
038	002-02	MH316 BRANCIFORTE	UP	3.5	4.0	3.4
042	002-06	MH345 BRANCIFORTE DR	PP	SHRT	SHRT	SHRT
152	005-08	C.O. PIPE PANEL, OCEAN TO LEE	SF	55.0	54.2	54.4
181	006-01	MH342 BRANCIFORTE	MF	SHRT	SHRT	SHRT
185	006-05	MH222 OCEAN	MF	18.2	18.2	18.2
193	006-13	MH312 MARKET	MF	8.9	8.8	8.6
194	006-14	P18.5 N. BRANCIFORTE	MF	6.7	6.2	7.0

There are three background colors used for these tags. The colors represent how long ago a comment was posted for a specific device:

- 4 A red-colored background indicates that the comment was entered into PressureMAP or PressureWEB within the last week.
- 5 An orange-colored background color signifies that the most recent comment was entered between one and three weeks ago.
- 1 A gray-colored tag identifies a comment(s) that is over three weeks old.

By the way, if you click on a Comment Tag, PressureWEB produces a Device Comments popup window where you can view the comment(s) and/or add one or more notes of your own. We think these latest interactive PressureWEB features will give you even more control of your monitoring system data.

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