

## Tools

System Studies sells a number of tools used in the installation and maintenance of an air pressure system. Many of them are portable flow measurement tools that are critical in the leak locating process. Others are special application meters and test instruments. This catalog section describes these important tools as well as the products supplied by System Studies for installing half inch (CA3131) and one inch (Power Pipe™) air pipe.

### 9800-3100 Tool, Flow Gauge



The Flow Gauge™ is a measurement device that converts the pressure differential created by the Flow Finder™ into an accurate flow reading. Using a “quick connect” sampler assembly, the Flow Gauge

attaches directly to the two sampler valves located on the Flow Finder. It displays output in four color-coded flow ranges, corresponding to the output of each of the four Flow Finder ranges. A “times two” button on top of the gauge makes it possible to read flow rates up to twice the maximum rated flow range of the Flow Finder being read.

### 9800-3266 Quick-Connect Flow Finder Attachment



This simple product, when used with a Flow Gauge (Part No. 9800-3100), eliminates the need for an expensive, block-style portable flow rater. The Quick-Connect Flow Finder Attachment is supplied with a 0-19 SCFH Flow Finder and

two 22.5" lengths of 1/4" I.D. flexible pneumatic tubing, each with standard air chuck attached. Brass swivel fittings, installed at the tube ends and at the Flow Finder connections, make it easy to properly align the Flow Finder prior to attaching the Flow Gauge Sampler.

The Quick-Connect Flow Finder Attachment makes it possible to read air flow rates up to 38 SCFH (using the Flow Gauge's times-two button) at any location where two tank valves are available, such as legacy distribution panels, old-style air pipe manifolds and bypass valves at plugged cable locations.

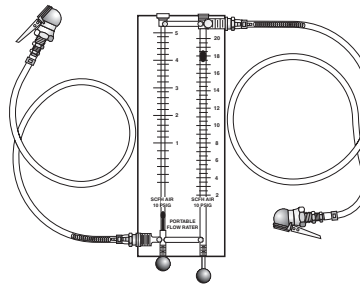
### 9800-3105 Tool, Flow Direction Gauge



The Flow Direction Gauge™ is a manual air flow measurement device that provides both an accurate air flow reading and an indication of the direction of air flow. This critical information is used for leak locating in

the Flow Bank System™. The gauge is supplied with two quick connect samplers (that greatly simplify the reading process), a carrying strap, and a case. Two different gauge faces are available for the Flow Direction: one with output displayed in Standard Cubic Feet per Hour (SCFH) and the other in kilopascals (kPa). (Please note that unless specified during ordering, the gauge will be supplied with the SCFH face.)

### 9800-3115 Tool, Portable Flow Rater



The Portable Flow Rater is available here as an alternative to the Flow Gauge when it is necessary to take cable flow measurements on old-style air pipe manifolds or on individual, pegged B Meter Panel flow raters. The portable flow rater has two

scales: 0-5 SCFH and 0-20 SCFH, and two clear plastic tubes with an air chuck on each end. The Portable Flow Rater provides an approximate indication of the actual flow rate at the measurement point.

### 9800-3123 Tool, Digital Pressure Gauge, 0-30 psi



The Digital Pressure Gauge is a rugged, light weight measurement device that reduces the potential for errors in readings by eliminating the parallax problems common with old-style C pressure gauges. The gauge face contains a four digit reading display

that outputs in a variety of units including psi, mbars, kPa, in. Hg, etc. Each digit is displayed vividly in the output screen with the selected unit of measurement shown above the readout. The Part No. 9800-3123 gauge reads from 0-30 psi with over range protection to 60 psi. Reading accuracy is +/- 0.50% of full scale.

The gauge is powered by two AAA batteries, which provide an average operating life of 2000 hours. To provide greater visibility in low light situations, the gauge includes a display backlight, which can be manually turned on and off. Other reading conveniences include peak and valley readings, auto-zeroing and measurement unit selection.

**9800-3140 Tool, Humidity/Temperature Meter**



In applications where the measurement and monitoring of relative humidity and ambient temperature are desired, System Studies supplies a small, light-weight humidity/temperature meter. The meter measures temperature in the range of 14° to 122° F (-10° to 50° C) and relative humidity in the range of 5% to 95%. Readings are displayed as dual LCDs. The meter is provided with a plastic tube and air chuck for direct connection to pressure testing valve.

**9800-3210 Tool, Direction of Flow Indicator**



The Direction of Flow Indicator detects the most subtle pressure differential between two interlaced cables and identifies the cable with the lower pressure—the one that receives air from the other cable. The gauge face has a prominent

black vertical line that is used to center the tool's reference needle. On opposite sides of this reference point are two color-coded bands (blue and yellow). Two 5 foot lengths of 1/4-inch plastic tubing, each with a threaded tank valve connector on the end, attach to tank valves on the cables being tested. One of the air connectors has an identifying blue plastic collar; the other has a yellow collar.

Once the threaded connectors are attached to each cable being tested, the gauge needle will move either to the left or to the right. If the needle moves into the blue area on the gauge face, this indicates that air is flowing from the cable where the yellow connector is attached to the cable with the blue connector. If the needle moves to the yellow area on the gauge face, the opposite is true.

**9800-3600 Tool, Transducer Test Meter**



The Transducer Test Meter (Part No. 9800-3600), provided by System Studies Incorporated, is a reliable and easy-to-use instrument which reads monitoring devices that output in the range of 4–20 milliamperes (mA). It is the ideal tool for performing field diagnostics on System Studies' High Resolution Pressure and Flow Transducers™, and for

assisting in the installation of Cable Section Locator (CSL) devices used in the CopperWATCH cable theft monitoring application.

While 4–20 mA sensors monitored by 289H LSS™ or uM260™ equipment can be read remotely via Pressure-MAP™, the Transducer Test Meter makes it possible to obtain the same information quickly, on-site without having to log into the software. Now you can install transducers and perform routine maintenance on your monitoring equipment with the knowledge that your test meter will closely match what the monitoring system sees.

**9800-3750 Tool, Ultrasonic Leak Detector**



System Studies' Ultrasonic Leak Detector (Part No. 9800-3750) is a specialized tool to assist in your leak locating efforts. This tool makes it possible to detect small leaks that emit an ultrasonic signal—the type of sound that cannot be heard by the unaided human ear. These leaks are created when air or gas under pressure is forced through a small opening, such as a cable sheath or splice case. When the ultrasonic leak detector is directed toward a potential leak, it converts the ultrasonic sound emission to a frequency range that can be heard through standard headphones.

**9800-3755 Tool, Hydrogen Leak Detector**



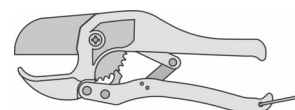
Another of the more recent additions to the growing list of leak locating tools offered by System Studies is our Part No. 9800-3755 Hydrogen Leak Detector. This relatively small, light-weight instrument provides you with additional flexibility when looking for those "impossible to find" pressurized cable leaks. The tool is used in conjunction with a commercial-grade nitrogen/hydrogen tracer gas mix to "sniff out" leaks in localized sections of pressurized cable.

**9800-3508 Tool, Air Pipe Cutter, 1/2" Pipe**



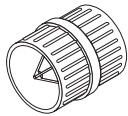
This air pipe cutter is the ideal tool to use when installing Flow Finders™ and other pressurization system components in CA3131 air pipe. Using this tool will ensure a clean, 90 degree crosscut and will prevent the pipe from going out of round. It is also ideal for making clean cuts on 3/8" plastic tubing.

**9800-3505 Tool, Air Pipe Cutter, Power Pipe**



This hand-held plastic pipe cutter simplifies the task of making precision crosscuts of Power Pipe (1" O.D.). The tool uses a ratchet mechanism and razor sharp blade to grip and cut the plastic tubing. It is used with the Power Pipe Reamer (9800-3504) when installing Power Pipe connector fittings.

**9800-3504 Tool, Power Pipe Reamer**



This tool is designed to remove burrs from the end of a section of Power Pipe before inserting either a Power Pipe

straight splice fitting (9800-0140) or a Power Pipe end connector fitting (9800-0141). One end of the reamer is used to bevel the outside circumference of the pipe; the other end bevels the inside.

**9800-3510 Tool, Standard Jaw Pinchers**



These Jaw Pinchers can be used during the installation of High Valve Assemblies, High Resolution Flow

Transducers™, and High Resolution Dual Transducers™. The Jaw Pinchers are used to cleanly cut and separate twin tube hose. The tool also doubles as a crimper to conveniently crimp hose clamps onto barbed valve fittings.

**9800-3275 Tool, Half Inch Air Pipe Reamer**



System Studies' Half Inch Air Pipe Reamer (Part No. 9800-3275) is designed to simplify the process of rounding out the end

of a half inch air pipe (CA 3131) prior to inserting coupler components. Its solid steel construction, slight end taper, and cushioned non-slip grip make it easy to insert the end of the tool into the pipe. A marker ring, located one inch from the tapered end, serves as a guide for determining how far the tool needs to be placed into the pipe end to create the optimal circular shape needed. The reamer includes a standard tank valve for taking pipe pressure measurements or rerouting air feed when cutting in new equipment.

**9800-3516 Tool, Torque Wrench, 3/8 Inch Square Drive**

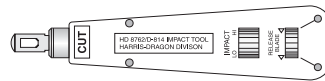


This 3/8" Craftsman® square drive torque wrench measures 25 to 250 inch pounds in 1 inch pound increments. Constructed of hardened and plated carbon steel, it boasts precision internal components and dual scales

(inch-pounds and Newton-meters). The tool is accurate to 4 percent on clockwise or right-handed reading greater than or equal to 20 percent of capacity. The large ergonomic handle easily turns to set torque.

The torque wrench is ideal for use in One Inch Air Pipe (Power Pipe) Installations where the maximum torque setting recommended for the stainless steel 3/8" hex head hose clamp (Part No. 6200-0022) is 150 inch pounds.

**9800-6064 Tool, Impact, for Type 66 Blocks**



This hand-held impact tool is used to terminate wires on the Type 66 blocks (Part Nos. 9800-6063,

6076, 6077 and 6078). The tool is spring loaded and fully adjustable—features that are helpful when working with wires of varying thickness. It also has a bayonet style mount which allows the blades to be changed easily and quickly. A compartment in the handle contains is used to store an extra blade.

**9800-6079 Tool, Insertion, for Krone Block**



The 50 pair, Krone Disconnect Block (Part No. 9800-6060), which is equipped with standard

punch-down clips, requires this tool to complete the wiring process. The tool has been optimally designed to simplify wiring and ensure lasting wire connections.

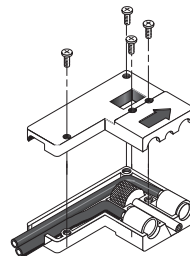
**MISCELLANEOUS ITEMS**

**9800-3509 Tool, Replacement Blades, Pipe and Tubing Cutter**



Replacement blades are available for the Air Pipe & Tubing Cutter (Part No. 9800-3508). These blades, which are supplied in a package of two, help ensure that the cutting tool will continue to achieve a clean, precision cut of air pipe or pneumatic tubing.

**9900-0008 Tool, Flow Gauge Sampler, Replacement Kit**



If, through extended rough use or abuse, an Instrument Panel or Flow Gauge Sampler head requires replacement, this kit contains all of the components needed to install a new sampler head.

The words Flow Finder™, Flow Gauge™, Flow Finder System of Measurement™, Flow Bank™, Flow Direction Gauge™, Flow Bank System™, Power Pipe™, High Resolution Flow Transducer™, High Resolution Dual Transducer™, and Selector Pair Saver™ are trademarks of System Studies Incorporated. Craftsman® is a registered trademark of Sears, Roebuck and Co.

## Tool Specifications

Part #	Name	Features	Dimensions	Material	Ship Weight	
9800-3100	Flow Gauge	<ul style="list-style-type: none"> <li>Converts Flow Finder pressure differential to flow reading</li> <li>Color coded reading scales for each Flow Finder range</li> <li>Times two reading capability</li> <li>Calibrated for maximum accuracy at 9.0 PSI</li> <li>Zero adjustment screw</li> <li>Protective rubber case and carrying strap</li> <li>"Quick Connect" flow sampler with six feet of twin tubing</li> <li>No batteries required</li> </ul>	4 in (9.6 cm) diameter x 4.25 in (10.2 cm) width		3.75 lbs (1.7 kg)	
9800-3120	Digital Pressure Gauge, 0-30 psi	<ul style="list-style-type: none"> <li>Pressure range: 0-30 psi, w/over range protection to 60 psi</li> <li>Accuracy: 0.50% F.S., +/- 1 least significant digit</li> <li>Large 4-digit display: .425 in (1.08 cm) H x .234 (.59 cm) W</li> <li>Includes 4-button keypad for easy access to features</li> <li>Supplied with tubing, tank valve and air chuck (chuck attaches to tank valve for transport/storage)</li> <li>Temperature Limits: 0° to 130° F (-18° to 55° C)</li> <li>Powered by two AAA alkaline batteries</li> <li>Battery life: approximately 2000 hours, has low battery indicator</li> <li>60 minute auto shutoff, 2 minute auto shutoff for backlight</li> <li>Includes thick rubber protective boot</li> </ul>	With boot: 3.375 in (8.57 cm) diameter  Tubing: 20 in (50.8 cm)	Polycarbonate front & back cover; Anodized Aluminum housing; 4 mm rubber boot; Buna-N O-Rings; nickel-plated brass tank valve	1.65 lbs (.748 kg)	
9800-3210	Direction of Flow Indicator	<ul style="list-style-type: none"> <li>Reads subtle pressure differences: maximum deflection is 0-2 in (5.08 cm) water, .072 psi</li> <li>Includes colored gauge face with center reference indicator</li> <li>Gauge face colors correspond to colored tank valve connectors for easy flow direction recognition</li> <li>No batteries required for operation</li> <li>Includes hard rubber case with horizontal base</li> </ul>	Diameter: 5 in (12.7 cm) by 4 in (10.16 cm) deep;  Tubing: 5 ft (152.4 cm)	Metal housing, plastic cover; Hard rubber case	3.5 lbs (1.58 kg)	
9800-3140	Humidity/Temp Meter	<ul style="list-style-type: none"> <li>Measures temperature in the range of 14° to 122° F (-10° to 50° C) with resolution to 0.1° F (0.1° C)</li> <li>Measures relative humidity in the range of 5 to 95% with resolution down to 0.1% RH</li> <li>Has a response time of 80 seconds</li> <li>Powered by two AAA batteries</li> <li>Includes carrying case and operation instructions</li> </ul>	6.75 in (17.1 cm) x 1.94 in (4.9 cm) x 0.75 in (1.9 cm)	ABS Plastic housing; vinyl carrying case	.75 lb (.34 kg)	
9800-3105	Flow Direction Gauge	<ul style="list-style-type: none"> <li>Used in Flow Bank Systems</li> <li>Provides both air flow reading and indication of direction of air flow</li> <li>Calibrated for maximum accuracy at 9.0 PSI</li> <li>Zero adjustment screw</li> <li>Protective rubber case and carrying strap</li> <li>No batteries required</li> <li>Gauge face in either SCFH or LPH</li> </ul>	4 in (9.6 cm) diameter x 4.25 in (10.2 cm) width		3.75 lbs (1.7 kg)	
9800-3600	Transducer Test Meter	<ul style="list-style-type: none"> <li>Reads monitoring devices that output in the range of 4–20 mA</li> <li>Provides 4 digit milliampere output in display window</li> <li>22 mm font height</li> <li>Requires three (3) AAA batteries for digital display, and one (1) 9V alkaline battery for mA power source</li> </ul>	Length: 7.0 in (17.78 cm) long Width: 3.25 in (8.26 cm) wide Thickness: 2.75 in (6.99 cm)	Non-slip, protective hard plastic enclosure	2.6 lbs. (1.18 kg)	
9800-3266	Quick-Connect Flow Finder Attachment	<ul style="list-style-type: none"> <li>Used with Flow Gauge to read non-Flow Finder-equipped pressurization system components (e.g. Legacy Distribution panels, manifold, etc.)</li> <li>Eliminates the need for a portable flow rater</li> <li>Includes 0–19 SCFH Flow Finder</li> <li>Reads up to 38 SCFH</li> </ul>		Supplied w/brass swivel fittings, standard air chucks and 25.5" flexible reinforced plastic tubing	2.75 lbs (1.13 kg)	
9800-3508	Air Pipe Cutter 1/2" Pipe	<ul style="list-style-type: none"> <li>Used when installing Flow Finders in CA3131</li> <li>Will also cut 3/8" plastic tubing</li> </ul>	7.5 in (18 cm) long		2.5 lbs (1.13 kg)	
9800-3275	Half Inch Air Pipe Reamer	<ul style="list-style-type: none"> <li>Includes tapered end</li> <li>Marker ring on tapered end provides guide for determining how far to insert tool to obtain desired pipe roundness</li> <li>Includes tank valve for taking pressure readings and or re-routing air feed during equipment installation</li> </ul>	Length: 6.625 in (16.83 cm) Handle length: 4.625 in (11.75 cm) Probe diameter: .56 in (11.43 cm)	Reamer: steel Valve: nickel-plated brass Handle: synthetic Chord: braided nylon	1.65 lbs (.75 kg)	
9800-3505	Air Pipe Cutter Power Pipe	<ul style="list-style-type: none"> <li>Ratchet mechanism and razor sharp blade enables precision crosscut of Power Pipe</li> </ul>			1 lb (.45 kg)	
9800-3504	Power Pipe Reamer	<ul style="list-style-type: none"> <li>Removes burrs from cut end of Power Pipe</li> <li>Bevels outside and inside of Power Pipe</li> </ul>			1 lb (.45 kg)	
9800-3510	Standard Jaw Pinchers	<ul style="list-style-type: none"> <li>Cuts and separates twin tube hose</li> </ul>			2 lbs (.91 kg)	
9800-3516	Torque Wrench	<ul style="list-style-type: none"> <li>High strength ratchet</li> <li>Precision internal components</li> <li>Dual scales</li> <li>Large plastic handle</li> </ul>	<ul style="list-style-type: none"> <li>3/8 in ratchet drive</li> <li>25-250 in - lbs</li> <li>1 in - lbs increments</li> </ul>	13 in (330.2 mm) x 1.25 in (31.75 mm) x 1.5 in (38.1 mm)	Hardened and plated carbon steal body	1.7 lbs (0.77 kg)