

# See•All<sup>®</sup>

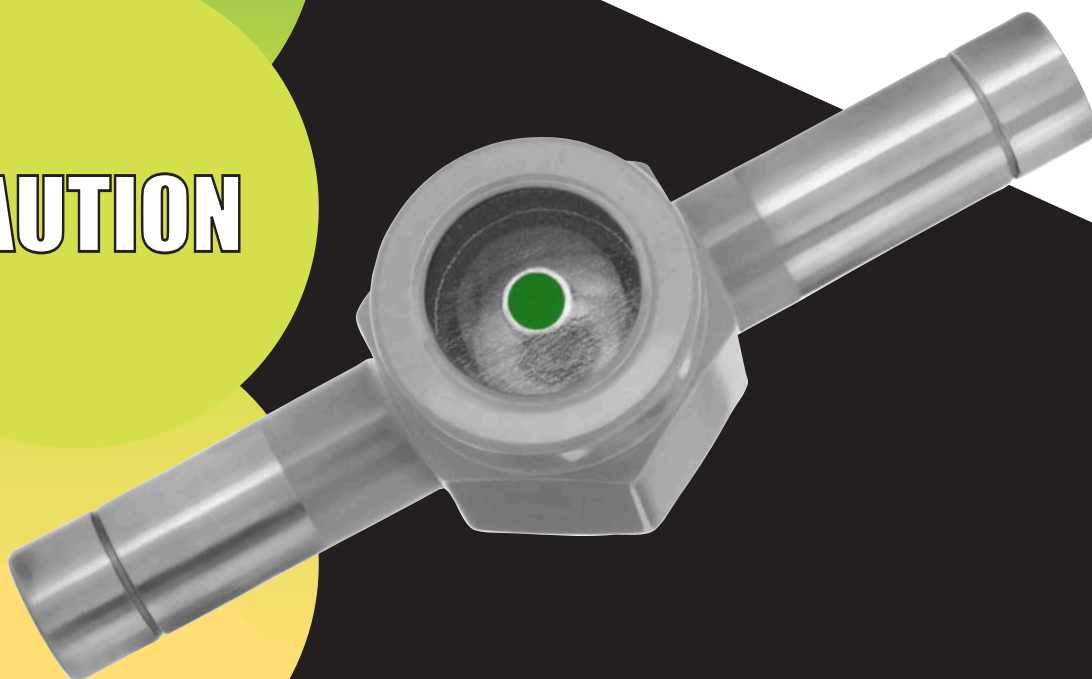
COMBINATION MOISTURE  
& LIQUID INDICATOR



**DRY**

**CAUTION**

**WET**



**THE SEE•ALL<sup>®</sup> IS THE  
SUREST WAY TO KNOW  
YOUR SYSTEM IS DRY...**

For use on Refrigerant 12, 134a, 22, 404A, 407C, 410A, 502, 507 and Other Refrigerants

# See•All®

MOISTURE & LIQUID INDICATOR

The Sporlan See•All Moisture and Liquid Indicator combines the two functions of moisture and liquid indication into a single economical product. It takes the guess work out of servicing refrigeration and air conditioning equipment. The See•All assists the technician in determining the state of the circulating refrigerant at a particular location and if a safe moisture level exists in the system. Excessive moisture in refrigerant systems can cause unwanted chemistries such as hydrolysis of lubricants and other materials, corrosion of metals, copper plating, ice formation at the meeting device and a chemical change in the motor insulation of a hermetic compressor.

## 8 OUTSTANDING BENEFITS

**ONE INDICATOR for all REFRIGERANTS** — provides a true moisture indication for Refrigerant 12, 134a, 22, 404A, 407C, 410A, 502 or 507.

**RELIABLE and ACCURATELY CALIBRATED COLOR CHANGE POINTS** — in parts per million of moisture for each refrigerant.

**REPLACEABLE INDICATOR ELEMENT** — the color indicator paper can be changed on fused glass models manufactured since 1984 without removing the See•All from the line.

**INDICATOR PROTECTED from DISCOLORATION and DIRT** — by a filter pad and screen. This prevents washing of the indicator by the refrigerant and protects it from system contamination and turbulence.

**COLOR CHANGES ARE EASILY DISTINGUISHED and REVERSIBLE** — indicator colors differ so widely between the wet and dry condition, there is no possibility of confusion. Colors reverse as often as moisture concentration in the system changes.

**LARGE FULL VIEW SIGHT GLASS** — extra large crystal clear sight glass for viewing the refrigerant. Bubbles indicate a shortage of refrigerant or a restriction in the liquid line.

**DISASSEMBLY FOR INSTALLATION IS UNNECESSARY** — with extended fittings on small size solder models. See•Alls are easy to braze.

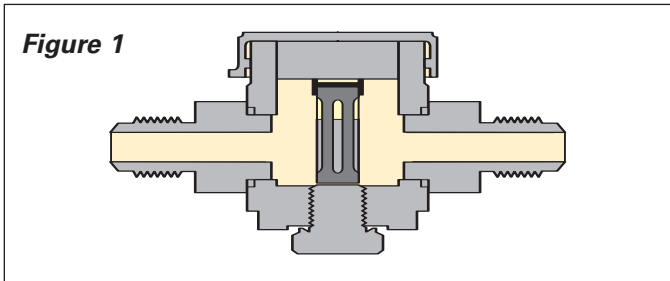
**PLASTIC CAP** — is supplied with See•All to keep the glass free from dust, dirt and grease.

## HOW IT'S MADE

The plated steel and copper fittings are copper brazed to the heavily copper plated steel body. A glass disc is inserted in the body and heated just to the melting point under carefully controlled conditions. This **fuses the glass to the body** in a permanent leak-free joint. The indicator paper (retained in a small brass ferrule) is inserted from the back and held in place with a slotted cylinder. The slotted cylinder and indicator assembly is mounted on a post that screws into the bottom of the body, and seals with a knife-edge joint. This overall construction is highly effective in preventing refrigerant leakage. The unit is painted to protect it from corrosion.

Paper indicator elements are made in the Sporlan laboratory under the strictest quality control procedures. The

indicator is tested for proper color change ability in the laboratory and twice more during assembly.



## HOW IT WORKS

The indicator is a porous filter paper impregnated with a chemical salt that is sensitive to moisture. The salt changes color according to the moisture content (relative saturation) in the refrigerant. A dark green color indicates the refrigerant is DRY and yellow indicates a WET condition. The indicator is formulated so that it changes color at the moisture levels generally accepted as the safe operating range.

The See•All calibration information in Table 1 is based on detailed experimental data for Refrigerants 12, 22, 134a, 404A, 407C, 410A, 502 and 507. The calibration information on other refrigerants was obtained from a comparison of their properties with these refrigerants. For Refrigerants 123, 401A and 402A; Refrigerant 22 moisture calibration is suggested. For Refrigerant 11 use Refrigerant 12 data and for Refrigerants 113 and 114 use Refrigerant 502 values. For other refrigerants, contact Sporlan Valve.

**FOR AIR** — Tests on air show that the See•All changes color in the range of **0.5% to 2.0% R.H.** In ordinary air lines this means that the See•All will change color at dew points in the range of minus 40°F to minus 60°F.

## BRAZING

See•Alls with 1/4" through 1-1/8" ODF Solder connections are constructed with long fittings made from either heavily copper plated steel or copper. Both fitting types are suitable for soldering or brazing using any of the common alloys, such as silver solder, soft solder, Sta-Brite, or Sil-Fos or PhosCopper. These See•Alls do not require disassembly in the field for brazing because the extended fittings reduce the possibility of damaging the moisture indicator element when the See•All is brazed into the system. To prevent damaging the See•All ensure ample heat is supplied to the fittings and point the torch tip away from the See•All body. Proper brazing technique ensures proper capillary action of the alloy.

The ODF Solder connections on the See•All are clean when shipped. Polishing the inside of the fittings before brazing is unnecessary, and could be harmful on the copper plated steel fittings if an excessive amount of copper plating is removed. See•Alls with 1/4" through 1-1/8" ODF Solder fittings stated in this publication are with copper plated steel fittings. Contact Sporlan Valve if copper fittings are desired on these models.

The larger See•Alls with 1-3/8", 1-5/8", and 2-1/8" ODF Solder connections utilize copper connections and require

Table 1

MOISTURE CONTENT - PPM												
SEE•ALL SHOWS	REFRIGERANT 12		REFRIGERANT 22		REFRIGERANT 134a		REFRIGERANT 502		REFRIGERANT 404A & 507		REFRIGERANT 407C	REFRIGERANT 410A
	LIQUID LINE TEMPERATURE											
	75° F	100° F	75° F	100° F	75° F	100° F	75° F	100° F	75° F	100° F	75° F	75° F
<b>Green - DRY</b>	Below 5	Below 10	Below 30	Below 45	Below 50	Below 80	Below 10	Below 20	Below 15	Below 30	Below 120	Below 75
<b>Chartreuse - CAUTION</b>	5-15	10-30	30-90	45-130	50-200	80-225	10-45	20-65	15-90	30-140	120-280	75-150
<b>Yellow - WET</b>	Above 15	Above 30	Above 90	Above 130	Above 200	Above 225	Above 45	Above 65	Above 90	Above 140	Above 280	Above 150

NOTE: Change or add Catch-All Filter-Drier when paper turns from green to chartreuse.

removal of the cartridge from the brass saddle adaptor before brazing. The cartridge is shipped hand tight for easy removal.

The See•All may be installed anywhere in the the liquid line, but preferably after the Catch-All Filter-Drier and ahead of the metering device.

### APPLICATION

The indicator element of the See•All prior to installation will be yellow, indicating a wet condition. This is a normal situation since the air in contact with the element is above 0.5% Relative Humidity. This does not affect the operation or calibration of the See•All. As soon as it is installed in a system, the indicator element will begin to change according to the moisture content of the refrigerant. Some change may take place rapidly at the start-up of a new system or after replacement of a drier on existing installations. In some cases the See•All will change in as short a time as 15 minutes. However, it is **recommended that the equipment operate for about 12 hours** to allow the moisture in the system and the See•All color to come to complete equilibrium. The action of the indicator element is completely **reversible** and will change color as often as the moisture content of the system varies.

The drying of the system should be continued until the indicating element changes from chartreuse to green. The actual moisture content of the refrigerant will be in accordance with the above table.

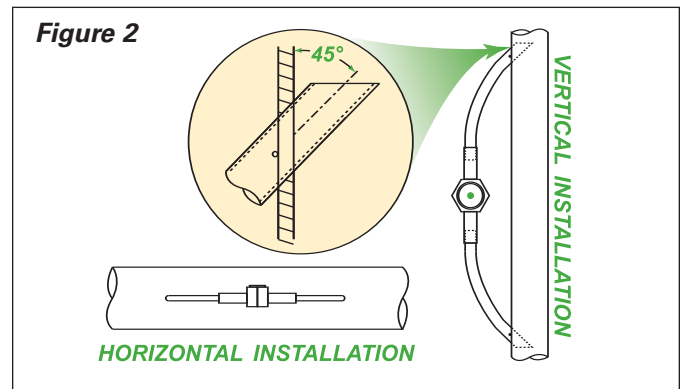
For best results with the nickel plated SAE flare fittings that are used on See•Alls, **lubricate the flare surface** and the back of the flare nut with refrigerant grade oil during assembly. This is particularly necessary to avoid leaks if the See•All is being assembled to another plated steel flare fitting, such as the Catch-All Filter-Drier.

### BYPASS INSTALLATION

On systems having liquid lines larger than 2-1/8" O.D., the See•All should be installed in a bypass line. During the operating cycle this will provide sufficient flow to obtain a **satisfactory reading for both moisture and liquid indication.**

Best results will be obtained if the bypass line is parallel to the main liquid line and the take off and return tubes **project into the main liquid** line at a 45° angle.

While satisfactory liquid and moisture indication will generally be obtained in any position, the preferred methods of installation are shown in Figure 2.



Kits of preformed 1/4" or 3/8" tubing are available as a separate item at a nominal cost; application instructions and a detailed template are included. The kits can be used with either SAE Flare or ODF Solder type See•Alls.

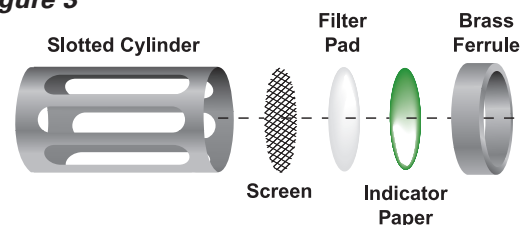
Table 2

Tube Size ODF	Kit No.	SAE Flare	ODF SOLDER
1/4"	AC-2	SA-12	SA-12S
3/8"	AC-3	SA-13	SA-13S

### SERVICE POINTERS

**REPLACEMENT INDICATOR PAPER** — Sporlan kit K-SA-4 consisting of a slotted cylinder and indicator paper assembly is available for replacing the indicator in the fused glass style Sporlan See•Alls (1/4" thru 1-1/8" sizes). Replacement is through the bottom (see Figure 1). If the indicator becomes damaged, it is generally recommended that the entire See•All be replaced. However, the parts kit can be used in situations where it is difficult to remove the See•All.

Figure 3



**LIQUID WATER** — On occasion it is possible for large quantities of water to enter a refrigeration system. An example would be a broken tube in a water cooled condenser. If this happens and **free water** comes in contact with the indicator element, the element will be damaged.

All moisture indicating elements use a chemical salt (see "How it Works"). These salts must be soluble in water in order to change color, **if excessive water is present then the salts will dissolve causing permanent damage to the indicator. The indicator paper may remain yellow or turn white.**

**HERMETIC MOTOR BURNOUTS** — After a hermetic motor burnout, install a **Catch-All Filter-Drier** to remove the acid and sludge contamination. When the system has operated for 48 hours, replace the Catch-All Filter-Drier and install a See•All.

Since the **acid formed by the burnout** may damage the indicator element of the See•All, it is preferable to install it after most of the contaminants have been removed.

**EXCESS OIL** — When a system is circulating an excessive amount of oil, the See•All indicator paper may become saturated. This causes the **indicator to appear brown** or translucent and lose its ability to change color, but does not permanently damage the See•All. **Let the See•All remain in the system.** The circulating refrigerant will remove the excess oil, and the indicator element will return to its proper color.

**LEAK DETECTORS** — Certain dye type liquid leak detectors may interfere with the color change of the indicator paper. If desired, many of these leak detectors can be removed by installing a Sporlan HH style **Catch-All** in the liquid line. The See•All can then be installed on the system without risk of damaging the indicator paper.

**ALCOHOL** — Do **NOT** install a See•All in a system that contains methyl alcohol or similar liquid dehydrating agents. Remove the alcohol by using a Catch-All Filter-Drier, and then install the See•All. Otherwise the alcohol will damage the See•All color indicator.

**REMOVABLE CARTRIDGE**

Types SA-211, 213 and 217 have copper connections and feature a removable cartridge containing the moisture indicating element. The cartridge has a **knife edge joint** and is available as a separate unit for field replacement purposes if necessary. It is designated as AC-20 and fits all three sizes.



Table 3

SPECIFICATIONS			
Connection Sizes (Inches)	Type No.	Overall Length (Inches)	See•All
<b>Male Flare</b>			
1/4	SA-12	2.87	
3/8	SA-13	3.37	
1/2	SA-14	3.82	
5/8	SA-15	4.12	
<b>Female X Male Flare</b>			
1/4	SA-12FM	2.56	
3/8	SA-13FM	2.97	
1/2	SA-14FM	3.44	
<b>Male Flare X Swivel Nut</b>			
3/8	SA-13U	3.15	
1/2	SA-14U	3.68	
5/8	SA-15U	3.90	
<b>Swivel Nut X Swivel Nut</b>			
3/8	SA-13UU	3.00	
1/2	SA-14UU	3.55	
5/8	SA-15UU	3.68	
<b>Female Flare X Swivel Nut</b>			
3/8	SA-13FU	2.81	
1/2	SA-14FU	3.31	
<b>Swivel Nut X ODF Solder</b>			
3/8	SA-13SU	3.81	
1/2	SA-14SU	4.22	
5/8	SA-15SU	4.28	
<b>ODF Solder</b>			
1/4	SA-12S	4.63	
3/8	SA-13S		
1/2	SA-14S	4.88	
5/8	SA-15S		
7/8	SA-17S	6.32	
1-1/8	SA19S		
1-3/8	SA-211	8.00	
1-5/8	SA-213		
2-1/8	SA-217		

Most solder connections can be used as male fittings as well as female fittings. The 1/4" ODF is 3/8" ODM, the 3/8" ODF is 1/2" ODM, the 1/2" ODF is 5/8" ODM and the 5/8" ODF is 3/4" ODM. Models with female flare and/or swivel nut connections are supplied with a copper gasket in the fitting.

Overall width is: 1.31" for 1/4" and 3/8" sizes, 1.58" for 1/2" and 5/8" sizes, and 1.38" for 7/8" and 1-1/8" sizes. Shipping weight is: 7 oz. for 1/4" and 3/8" sizes, 10 oz for 1/2" and 5/8" sizes, 15 oz for 7/8" and 1-1/8" sizes and 1.5 lbs. for the SA-200 series.

UL and UL<sub>c</sub> Listed - Guide - SEYW - File No. SA-3182. Maximum Rated Pressure is 650 psig.

**FOR USE WITH AIR CONDITIONING and/or REFRIGERATION SYSTEMS ONLY**



Sporlan Division  
Parker Hannifin Corporation  
206 Lange Drive  
Washington, MO 63090  
636-239-1111 • FAX 636-239-9130  
www.sporlan.com