Instructions for INSTALLATION OPERATION • MAINTENANCE

of the SELAS SERIES "F" FLO-SCOPE

This Flo-Scope has been individually calibrated to the capacity, specific gravity, temperature and pressure which you specified and is so indicated on the nameplate. These values have been adjusted to read the flow at the standard conditions of 14.7 P.S.I.A. and 70°F for the English system and 101.3 k Pa and O°C for the metric system. If the actual operating conditions are different than indicated on the nameplate, please apply the flow conversion factors shown on page 4.

Continued accuracy and reproducibility depend upon the care you give this equipment. Careless handling of either the float assembly or the tapered metering body will result in faulty performance. As is true of all flow measuring instruments, satisfactory service requires that instructions be followed.

INSTALLATION (See Fig. 1, 3 and 4)

Remove the corrugated cardboard protecting the sight tube and scale, uncouple the union or float stop flange and carefully remove the scale section with the float assembly from the metering body. Here use extreme caution not to damage the float assembly or the metering body. Unscrew the clean-out plug or outlet flange and remove corrugated cardboard from the body.

Either panel or in-line mounting can be effected with the new Series "F" Flo-Scope, by the use of standard connectors furnished and without the addition of special fittings.

If a control valve is used, this should be connected on the outlet side of instruments. Pipe compound must not be permitted to enter the instruments.

PANEL MOUNTINGS

SIZES F53-1 THROUGH F-98-9 (Fig. 1):

Unscrew lock nut and insert pipe connectors through mounting holes provided in panel. (Refer to Bulletin FS-4 for cut out dimensions.) Align Flo-Scope in a vertical position and reassemble lock nuts to firmly secure the Flo-Scope to the panel. Then the usual procedure is to assemble the proper size unions to these pipe connectors. To remove Flo-Scope, jam lock nut against panel thus securing pipe connector to body. This will allow the union to be removed without loosening the pipe connector from the Flo-Scope body. Back off the lock nuts and the Flo-Scope can be removed from the panel. The pipe connectors should never be disassembled from the body. Never use a wrench on pipe connector threads or tighten pipe connectors excessively.

SIZES F912-10 THROUGH F1424-13 (Fig. 3 and 4):

Assemble Flo-Scope to panel through bolt holes provided in panel. (Refer to Bulletin FS-4 for cut out dimensions.) Align in a vertical position and bolt securely to the panel. Assemble suitable piping and unions if desired (through panel holes) to both inlet and outlet threaded connections. To remove Flo-Scope from panel, disassemble metering body from companion flanges. Flanges can remain bolted to panel.

IN-LINE MOUNTING

SIZES F53-1 THROUGH F98-9 (Fig. 1):

Assemble unions to pipe connectors provided using precautions outlined under **"PANEL MOUNTING."** You are now ready for in-line mounting.

SIZES F912-10 THROUGH F1424-13 (Fig. 3 and 4):

These sizes are furnished with companion flanges. Unions may be used if desired.

GENERAL ASSEMBLY (Fig. 1 thru 4)

Interior gaskets should be cleaned and properly seated—assemble the clean-out plug or outlet flange and gasket—remove float indicator assembly from sight tube and fill tube with Selas Flo-Scope oil. Replace float indicator assembly in such a manner that no air bubbles are trapped below the indicator disc.

NOTE: For Oxygen Application Do Not Use Oil

The Flo-Scope may be used without liquid but if additional damping action is required the sight tube may be filled with distilled water, or preferably, one of the silicone oils. (Union Carbide L-45 or equal.)

Before reassembly, each instrument should be checked, to **MAKE SURE THAT IT HAS ITS ORIGINAL FLOAT ASSEMBLY AND SCALE.** This is important when there is more than one instrument, because each Flo-Scope has been individually calibrated. (Mating parts can be determined by checking serial numbers which appear on nameplates and float guides.) When re-assembling, insert the float disc into the tapered metering tube with care and then make sure the float guide is seated before tightening the union or flange bolts. When the union is tight the indicator disc should be at the zero point punch mark on the scale. Minor adjustments can be made by loosening the screws positioning the scale.

CLEANING (Fig. 1, 3 and 4)

Periodic cleaning is necessary for efficient and accurate operation. To clean the Flo-Scope, remove the clean-out plug or outlet flange and unscrew the union or unbolt the float guide flange removing the guide and guard assembly from the metering body. A cloth saturated with solvent can be placed on the end of a **WOODEN DOWEL** and this used to swab the metering body. Also, clean the float indicator assembly and sight tube. Replace the Selas Flo-Scope oil in the sight tube. Careful handling of the float indicator assembly is important. Care should be taken not to bend float rod or to damage the float.

CLEANING FV SERIES (Fig. 2)

Disassemble valve by inserting ⅛" dowel pin in hole provided in adjusting knob, Index #28. Rotate knob until pin drops into matching recess in cap, Index #25. When pin engages cap, rotate the adjustment knob and unscrew the internal assembly from the body casting, Index #1. The Flo-Scope is now ready for cleaning, proceed as described in the last paragraph. When through reassemble reversing this described procedure.

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SERIES "F" & "FV" FLO-SCOPE ASSEMBLIES

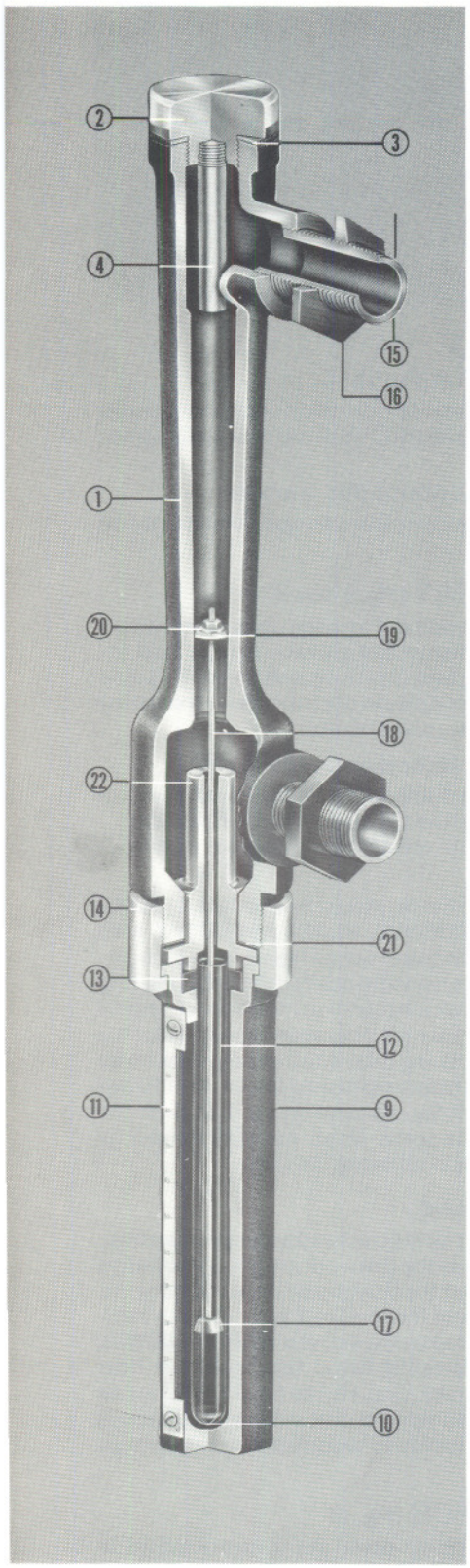

FIGURE 1

CATALOG NO.
F-53 THRU F-98

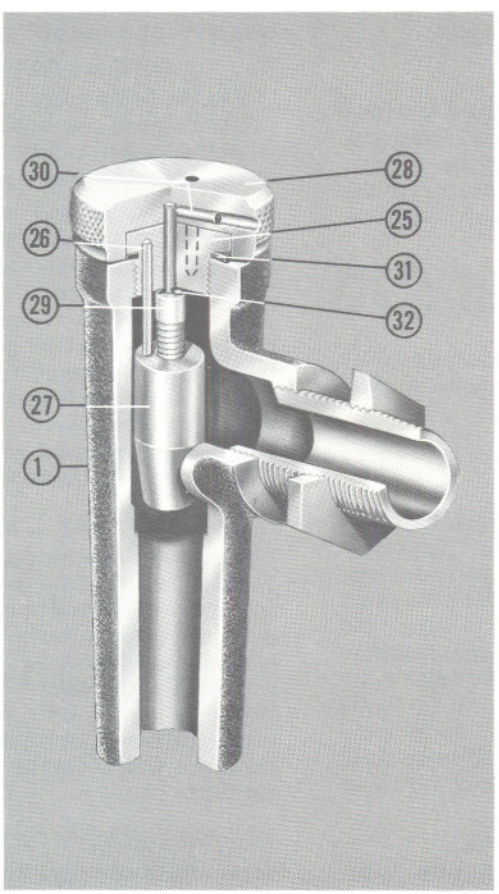

FIGURE 2

CATALOG NO.
FV-53, FV-55, FV-95
FV-96, FV-98

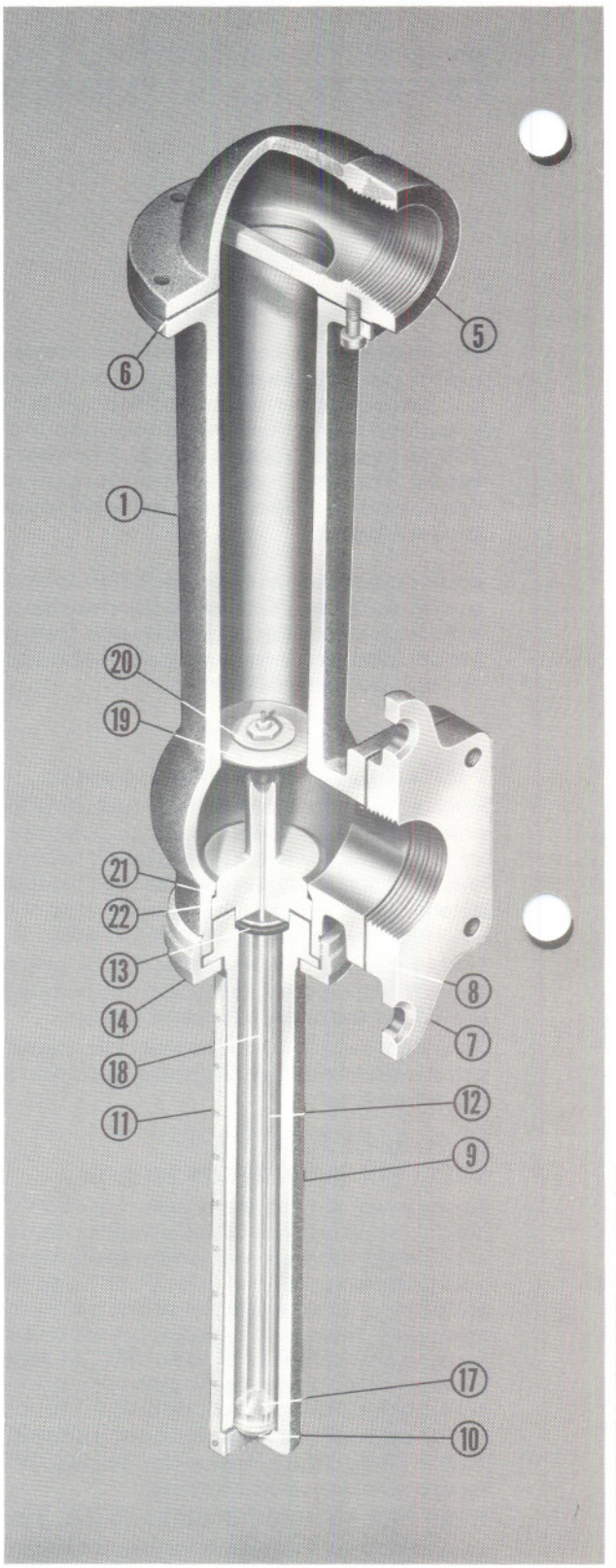

FIGURE 3

CATALOG NO.
F-912, F-1416,

SERIES "F" & "FV" FLO-SCOPE CATALOG NUMBERS AND PARTS LIST

FLO-SCOPE CATALOG NUMBERS

Flo-Scopes not available with built-in valve

PART NUMBER	PART NAME	F-53	F-55	F-95	F-96	F-98	F-912	F-1416	F-1420	F-1424	FV-53	FV-55	FV-95	FV-96	FV-98
1	Metering Body	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2	Clean Out Plug	●	●	●	●	●									
3	Clean Out Plug Gasket	●	●	●	●	●									
4	Float Stop	●	●	●	●										
5	Outlet Flange						●	●	●	●					
6	Gasket Outlet Flange						●	●	●	●					
7	Inlet Flange						●	●	●	●					
8	Gasket Inlet Flange						●	●	●	●					
9	Tube Guard	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10	Felt Pad	●	●	●	●	●	●	●	●	●	●	●	●	●	●
11	Scale	●	●	●	●	●	●	●	●	●	●	●	●	●	●
12	Sight Tube	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13	Gasket, Sight Glass	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14	Union	●	●	●	●	●	●	●	●	●	●	●	●	●	●
15	(2) Pipe Connectors Ea.	●	●	●	●	●					●	●	●	●	●
16	2 Lock Nuts (Panel Mtg.) Ea.	●	●	●	●	●					●	●	●	●	●
17	Indicator Disc	●	●	●	●	●	●	●	●	●	●	●	●	●	●
18	Float Rod	●	●	●	●	●	●	●	●	●	●	●	●	●	●
19	Float Disc	●	●	●	●	●	●	●	●	●	●	●	●	●	●
20	Weight	●	●	●	●	●	●	●	●	●	●	●	●	●	●
21	Float Guide Gasket	●	●	●	●	●	●	●	●	●	●	●	●	●	●
22	Float Guide	●	●	●	●	●	●	●	●	●	●	●	●	●	●
22a	Float Guide Extension								●	●					
23	Inlet Housing (not shown)									●					
24	Inlet Housing Gskt. (not shown)									●					
25	Cap										●	●	●	●	●
26	Guide Pin										●	●	●	●	●
27	Valve Plug										●	●	●	●	●
28	Adj. Knob										●	●	●	●	●
29	Adj. Stem										●	●	●	●	●
30	Spring Pin										●	●	●	●	●
31	Gasket										●	●	●	●	●
32	Stat-O-Seal Washer										●	●	●	●	●

For ordering replacement parts always furnish meter serial number, catalog number, part name and quantity

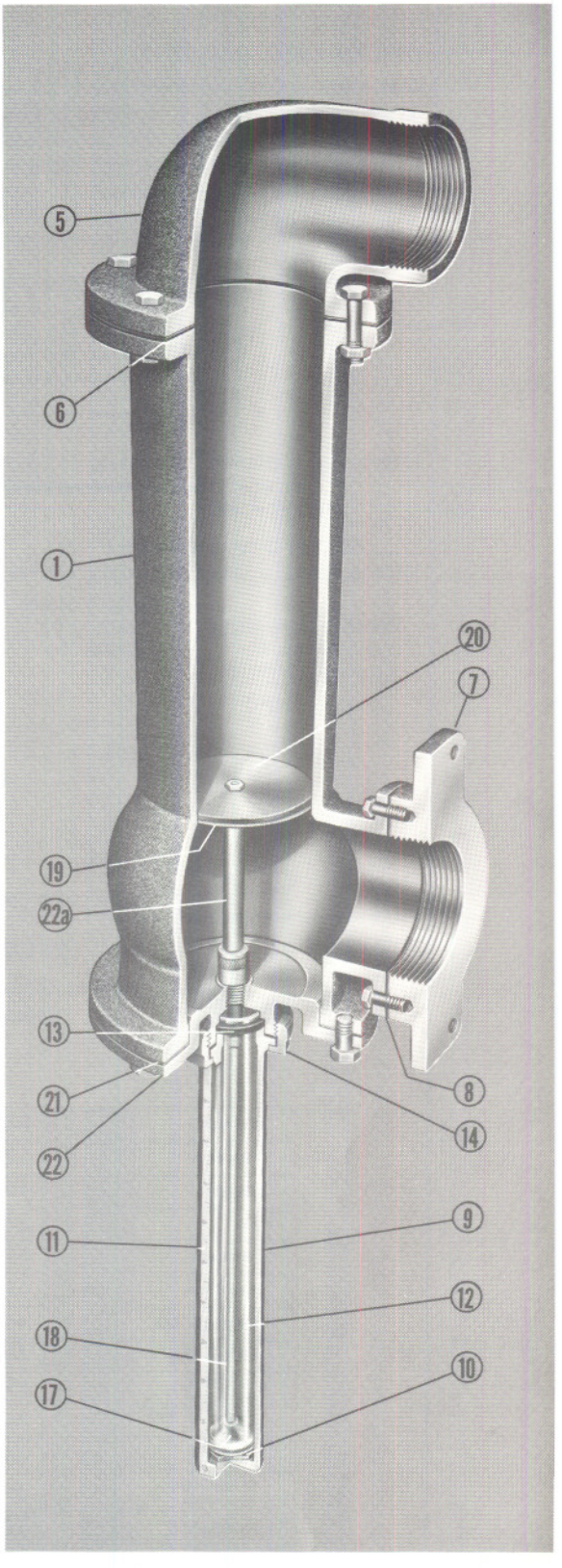

FIGURE 4

CATALOG NO.
F-1420, F-1424

Installation Note

Flo-Scope bodies and some connecting fittings are made of aluminum. Use care in handling and joining to avoid distortion, particularly at threaded sections. Aluminum threads are easily galled, therefore it is important to lubricate the external threads. (Do not apply sealant in first turn of external thread nor on any internal threads.) WRENCH fittings SLOWLY to avoid heating parts by friction. Fast turning can produce galling which tightens joint without sealing.

The equipment described in this Bulletin must be installed in compliance with all appiicable laws and regulations. Details covering safety precautions applicable to particular installations will be provided by Selas at the time of purchase upon your request.

OPERATING LIMITS

There are occasions where it may be necessary to operate at an inlet temperature, specific gravity or pressure other than that for which your Flo-Scope was calibrated. If this is a permanent change and recalibration of the Flo-Scope is desired, the complete instrument must be returned to the Selas Corporation.

If this procedure is not feasible, correction factors in the following tables (Fig. 5, 6 & 7) may be applied to your existing scale reading.

All Flo-Scopes have been designed for a maximum temperature of 150°F (66°C). The pressure limits are 50 psig (345 kPa) for smaller sizes up to F-98 series but only 10 psig (69 kPa) for Models F-912-10 through F-1424-13.

FIGURE 5

PRESSURE CONVERSION FACTOR, F_P

$$F_P = \sqrt{\frac{14.7 + Pp\ (psig)}{14.7 + Po\ (psig)}} = \sqrt{\frac{101.4 + Pp\ (kPa)}{101.4 + Po\ (kPa)}}$$

where Pp is present operating pressure.
Po is original specified operating pressure stamped on nameplate*

FIGURE 6

TEMPERATURE CONVERSION FACTOR, F_T

$$F_T = \sqrt{\frac{460°F + To\ (°F)}{460°F + Tp\ (°F)}} = \sqrt{\frac{273°C + To\ (°C)}{273°C + Tp\ (°C)}}$$

where Tp is present operating temperature.
To is original specified operating temperature stamped on nameplate.

For Flo-Scope stamped* for atmospheric pressure (O psig/OkPa)			For Flo-Scope stamped for 70°F		For Flo-Scope stamped for 20°C	
Present Operating Pressure, P_P English	Metric	Multiply scale reading by factor, F_P	Present Operating Temperature, T_P °F.	Multiply scale reading by factor, F_T	Present Operating Temperature, T_P °C	Multiply scale reading by factor, F_T
psig	kPa					
1	7	1.03	50	1.02	10	1.02
5	34	1.16	70	1.00	20	1.00
10	69	1.30	90	0.98	30	0.98
20	138	1.53	110	0.96	40	0.97
30	207	1.75	130	0.95	50	0.95
40	276	1.93	150	0.93	60	0.94
50	345	2.10			66	0.93

*If nameplate data is blank, Po equals atmospheric pressure (0psig/0kPa).

FIGURE 7

SPECIFIC GRAVITY CONVERSION FACTOR, F_{SG}

$$F_{SG} = \sqrt{\frac{SGo}{SGp}}$$

where SGp is specific gravity of gas being measured
SGo is specific gravity of original specified gas which is stamped on Flo-Scope.

SCALE MULTIPLIER

PRESENT FLO-SCOPE CALIBRATION	Specific Gravity	.07	.29	.40	.56	.59	.65	.85	.92	.97	1.0	1.11	1.52	2.02
Butane	2.02	5.38	2.64	2.25	1.91	1.85	1.76	1.54	1.48	1.45	1.42	1.35	1.15	1.00
Propane	1.52	4.65	2.29	1.95	1.65	1.61	1.53	1.34	1.28	1.25	1.23	1.17	1.00	.87
Oxygen	1.11	4.00	1.95	1.66	1.40	1.37	1.30	1.14	1.09	1.07	1.05	1.00	.85	.74
Air	1.0	3.78	1.86	1.58	1.34	1.30	1.24	1.09	1.04	1.02	1.00	.95	.81	.70
Nitrogen	.97	3.72	1.83	1.56	1.32	1.28	1.22	1.07	1.03	1.00	.98	.94	.80	.69
Acetylene	.92	3.62	1.78	1.52	1.28	1.25	1.19	1.04	1.00	.97	.96	.92	.78	.67
Producer Gas	.85	3.48	1.71	1.46	1.23	1.20	1.14	1.00	.96	.93	.92	.88	.75	.65
Natural Gas	.65	3.05	1.49	1.27	1.08	1.05	1.00	.88	.84	.82	.81	.77	.65	.57
Anhydrous Ammonia	.59	2.91	1.42	1.21	1.03	1.00	.95	.83	.80	.78	.77	.73	.62	.54
Manufactured Gas	.56	2.83	1.39	1.18	1.00	.97	.93	.81	.78	.76	.75	.71	.61	.53
Coke Oven Gas	.40	2.40	1.18	1.00	.85	.83	.79	.69	.66	.64	.63	.60	.51	.44
Dissociated Ammonia	.29	2.04	1.00	.85	.72	.71	.67	.59	.56	.55	.54	.51	.44	.38
Hydrogen	.07	1.00	.49	.42	.35	.34	.33	.29	.28	.27	.26	.25	.22	.19
OTHER GAS TO BE METERED		Hydrogen	Dissociated Ammonia	Coke Oven Gas	Manufactured Gas	Anhydrous Ammonia	Natural Gas	Producer Gas	Acetylene	Nitrogen	Air	Oxygen	Propane	Butane

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