

### Programming Sure-Aire™

Greenheck's Sure-Aire™ Differential Pressure Controller provides either a 2-10 Vdc or 4-20 mA electrical output signal. The output signal is linearly proportional to the pressure range of differential pressure controller. The ranges for Greenheck's Sure-Aire controllers are listed in the table.

Greenheck Part Number		Controller ΔP Range (inches W.C.)	P <sub>max</sub> (inches W.C.)
100-240 VAC	24 VAC / VDC		
384799	384986	0-8.30	8.30
384800	384987	0-22.14	22.14
384801	384988	0-41.52	41.52
384802	384989	0-83.04	83.04
384803	384990	0-138.40	138.40

### Calculating Flow from Differential Pressure

The volumetric flow through the fan (cfm) can be calculated from the equation:

$$CFM = K \sqrt{\frac{\Delta P}{\rho}}$$

where K is the K-factor for the specific fan model and size, ΔP is the measured differential pressure across the inlet cone (inches W.C.), and ρ is the air density (lb/ft<sup>3</sup>). K-factors for Greenheck models are found on the back of this document.

### Calculating Flow from Voltage Signal

If using a 2-10 Vdc output signal from a differential pressure controller, this equation can be used to calculate the flow:

$$CFM = K \sqrt{\frac{(V - 2) P_{max}}{8\rho}}$$

where V is the output voltage of a 2-10 Vdc transmitter and P<sub>max</sub> is the maximum pressure range of the controller being used (inches W.C.).

### Calculating Flow from Current Signal

If using a 4-20 mA output signal from a differential pressure controller, this equation can be used to calculate the flow:

$$CFM = K \sqrt{\frac{(mA - 4) P_{max}}{16\rho}}$$

where mA is the output current of a 4-20 mA transmitter and P<sub>max</sub> is the maximum pressure range of the controller being used (inches W.C.).

### Density Corrections

Air density, ρ, is affected by elevation and temperature. The Greenheck Sure-Aire Differential Pressure Controllers allow the user to input the elevation for the application. This elevation input automatically updates the density used for the flow calculation.

The Remote Temperature Sensor will adjust the air density value in the controller based on the sensor measurement when Temperature Compensation is set to 'Yes'. This density compensation will affect the flow rate displayed on the controller. If Temperature Compensation is set to 'No', the air density value will be a function of standard air (70°F/21°C).

The density being used by the Sure-Aire controller can be viewed on the main menu by scrolling up or down through the settings.

## K-Factors

Size	CSW USF-400 Vektor-CD Vektor-CH Vektor-CS	AFSW / BISW Vektor-H Vektor-HS	AFDW / BIDW	QEI / QEID	HPA APH / APM	Vektor-MD Vektor-MH Vektor-MS
7	179	259	not applicable	not applicable	not applicable	not applicable
8	179	252	not applicable	not applicable	not applicable	not applicable
9	179	248	not applicable	408	not applicable	not applicable
10	179	202	not applicable	not applicable	not applicable	not applicable
12	244	296	592	408	355	not applicable
13	296	351	701	not applicable	not applicable	not applicable
15	366	431	861	603	355	526
16	443	531	1062	724	421	634
18	542		1083	897	517	787
20	651		1301	1088	617	955
22	805		1610	1321	759	1161
24	976		1964	1631	913	1436
27	1186		2369	1962	1105	1729
30	1464		2928	2400	1355	2116
33	1771		3540	2923	1625	2581
36	2167		4336	3576	1967	3154
40	2635		5259	4331	2361	3825
44	3220		6440	5318	2854	4698
49	3905		7808	6525	3411	5766
54	4786		9571	7891	4121	6975
60	5855		11707	9648	4972	not applicable
66	7084		14166	not applicable	5960	not applicable
73	8667		17330	not applicable	7276	not applicable

Size	APD
315	936
355	1198
400	1479
450	1956
500	2377
560	3089
630	3838

## Our Commitment

*As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.*

Specific Greenheck product warranties are located on [greenheck.com](http://greenheck.com) within the product area tabs and in the Library under Warranties.

Greenheck's Sure-Aire™ Flow Monitoring Systems catalogs provides additional information describing the equipment, fan performance, available accessories, and specification data.

AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at [www.amca.org](http://www.amca.org).

