MICRO CONTROL SYSTEMS

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The MCS-CONDUCTIVITY Specifications & Description

Physical Characteristics

Conductivity Range	0 to 5000µS/cm
Supply Voltage	5.00vdc ±0.25v
Output Voltage	0 to 4.50vdc
Conductivity Accuracy	0 to 100µS/cm ±10µS/cm
	100 to 500µS/cm ±15µS/cm
	500 to 1000µS/cm ±25µS/cm
	1000 to 2000µS/cm ±50µS/cm
	2000 to 3000µS/cm ±75µS/cm
	3000 to 4000µS/cm ±150µS/cm
	4000 to 5000µS/cm ±250µS/cm
Resolution	1% over range 100 to 5000µS/cm
Calibration	None required
Probe	Cell constant = 1.5 cm^{-1}
Temperature Compensation	Thermistor integral with probe
Fluid Temperature Range	+32°F to +140°F (0°C to +60°C)
Operating Range	-4°F to +158°F (-20°C to +70°C)

Product Description

The MCS-CONDUCTIVITY is a conductivity-to-voltage transducer which takes its input from a carbon electrode probe in a fluid stream and outputs a corresponding voltage to a MCS-8 micro controller. The MCS-8 software accurately translates this voltage to read out the fluid conductivity in standard units of µS/cm . This value is compared with setpoint information to control bleed and feed functions.

The probe is mounted in a custom PVC pipe tee whose geometry is designed to produce a cell constant of 1.5 cm^{-1}. It is important to ensure that the electrode excitation is pure AC in order to prevent electrolytic formation of gas bubbles which reduce the effective area of the electrodes. The MCS-CONDUCTIVITY uses a proprietary "D-Loop" circuit which effectively eliminates the DC component of the excitation. The excitation AC voltage is derived from the +5 volts supplied by the MCS-8. The output of the MCS-CONDUCTIVITY is directly proportional to this voltage, making the output ratiometric.

Since the conductivity is a strong function of the fluid temperature, a thermistor integrated with the conductivity probe provides the MCS-8 with correcting temperature information.

Product Specifications

$Vo = Vr*[\gamma_t / (547.45 + \gamma_t)]$; $TF = [1 + 0.0111*(T-77)]$; $\gamma_{77} = \gamma_t / TF$; VR = 5.0 v ; T = 99ºF ; TF = 1.244

γ_t is conductivity at a fluid temp of 99ºF ; γ_{77} is conductivity at a the reference temp of 77ºF ; Vo is output voltage

Vo volts	γ_t µS/cm	γ_{77} µS/cm
0.772	100	80.4
1.338	200	160.7
1.770	300	241.1
2.111	400	321.5
2.387	500	401.9
2.614	600	482.2
2.806	700	562.6
2.969	800	643.0
3.109	900	723.4
3.231	1000	803.7

Vo volts	γ_t µS/cm	γ_{77} µS/cm
3.338	1100	884.1
3.434	1200	964.5
3.518	1300	1044.8
3.594	1400	1125.2
3.663	1500	1205.6
3.725	1600	1286.0
3.782	1700	1366.3
3.834	1800	1446.7
3.882	1900	1527.1
3.925	2000	1607.5

Vo volts	γ_t µS/cm	γ_{77} µS/cm
3.966	2100	1687.8
4.004	2200	1768.2
4.039	2300	1848.6
4.071	2400	1929.0
4.102	2500	2009.3
4.130	2600	2089.7
4.157	2700	2170.1
4.182	2800	2250.4
4.206	2900	2330.8
4.228	3000	2411.2

Vo volts	γ_t µS/cm	γ_{77} µS/cm
4.250	3100	2491.6
4.270	3200	2571.9
4.289	3300	2652.3
4.307	3400	2732.7
4.324	3500	2813.1
4.340	3600	2893.4
4.356	3700	2973.8
4.370	3800	3054.2
4.385	3900	3134.5
4.398	4000	3214.9

Vo volts	γ_t µS/cm	γ_{77} µS/cm
4.411	4100	3295.3
4.423	4200	3375.7
4.435	4300	3456.0
4.447	4400	3536.4
4.458	4500	3616.8
4.468	4600	3697.2
4.478	4700	3777.5
4.488	4800	3857.9
4.498	4900	3938.3
4.507	5000	4018.6