

Attachment 4

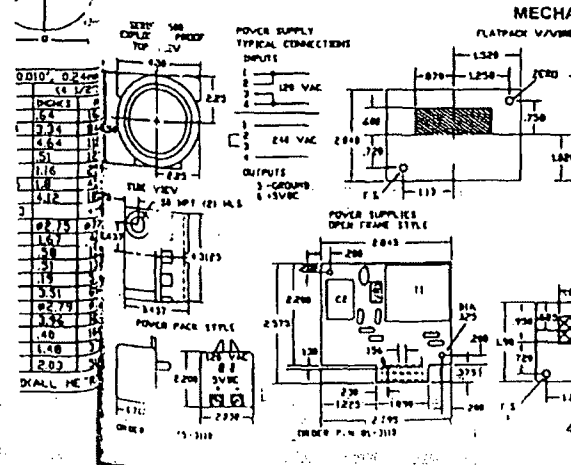
Calculation No. 98-ENG-02045D2 Rev. 00, Attachment A, Pages A2 and A3

**DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 2**

COMMON PERFORMANCE SPECIFICATIONS BY FUNCTION AT 25°C

Flat Panel	A.C. POWERLESS (All models except as noted)
Naked (Digital)	Accuracy and linearity $\pm 1\%$ of full scale, ± 1 count
	Maximum input signal (volts) $\pm 150\%$ of range, except 500V range limited to 550V
	Maximum input signal (current) 5V RMS (across R_{shunt})
	Maximum power consumption 1 watt
	Maximal power consumption 0.2 watts
	Measuring method (V, W, I) A.C. average RMS calibrated
	Measuring method (freq) Freq. to voltage
	Span adjustment range $\pm 30\%$ of full scale
	Zero Automatic
	Backlight operating range 60-200V and 200-500V; 50-400Hz
	Operating frequency range 40-70Hz (others on request)
Program	
No	POWERED VDC AND mA DC
Bipolar	Models 518, 560, 570, 580, and 590
No	Accuracy and linearity $\pm 0.05\%$ of full scale ± 1 count/bar
1	Resolution 1% of F.S. for bargraph; 0.05% for digital
	Power operating range 5VDC $\pm 10\%$ (see power input option)
0-50°C	Current requirements 5mA for 518; 3mA for 560, 570, and 580; 0.30mA for 590
-10 to +60	Input signal protection 300% of specified range except 500V limited to 600VDC
$\pm 0.05\%$	Resolution 1% of F.S. for bargraph; 0.05% for digital
2561	Polarity Bipolar for digital, unipolar for bargraph
538	Measuring method Dual slope integration
528	Input type Single ended and differential
548	Span adjustment range $\pm 40\%$ of full scale
568	Backlight operating range 4-6VDC/AC, 120mA
	D.C. POWERLESS (Models 561, 571, 581, and 591)
521	Accuracy and linearity $\pm 0.05\%$ of F.S. ± 1 count/bar
518	Resolution 1% of F.S. for bargraph, 0.05% for digital
	Minimum input signal 4VDC/200 μ A for 591; 4VDC/2mA for 571, 561, and 581
	Maximum input signal 150% of specified range except 140VDC range limited to 160VDC

ANAL. OUT-OUT	Polarity Unipolar
	Measuring method Dual slope integration
	Span adjustment $\pm 40\%$ of full scale
	Zero Automatic
	Backlight operating range 4-6VDC/AC, 120mA



SLAVE DISPLAY (Model 547) for use with 570 series

NOTE: It connects directly to any of the 570 series and it is powered and signal driven from the same.

Power requirement 5VDC $\pm 20\%$ at 5mA (from 570)
 Limit's logic output 1 TTL load (see NOTE)
 Optoisolated limit's logic output 10 TTL loads
 Accuracy and linearity $\pm 0.1\%$ of F.S. ± 1 Digit

NOTE: When the 547 is ordered as slave display for the A.C. POWERLESS (models 572, 577, 578, and 579) no isolation from the A.C. mains exists and the backlight (if ordered) is driven from the same signal (powerline) as the master.

When it's ordered for the D.C. (models 570, 571, and 573) the backlight (if ordered) must be externally powered from a 5VDC $\pm 20\%$ at 120mA supply.

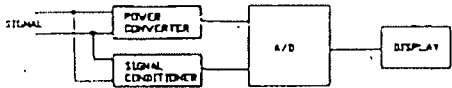
CURRENT LOOP POWERLESS

(Models 500, 521, 563, 573, 583, and 593)
 Accuracy and linearity $\pm 0.05\%$ ± 1 count/bar
 Resolution 1% of F.S. for bargraph, 0.05% for digital
 Minimum input signal 3VDC/5mA DC for 521 and 593; 4V/2mA for 500, 563, 573, and 583
 Maximum input voltage 30VDC (clamped to 4VDC)
 Maximum input current 50mA DC (fuse protected to 100mA)
 Polarity Unipolar (digital will show "zero" sett "zero" sett)
 Span adjustment range $\pm 50\%$ of specified range
 Zero adjustment range $\pm 50\%$ of "zero" (see NOTE 1)
 Backlight operating range 4-6VDC/AC, 120mA

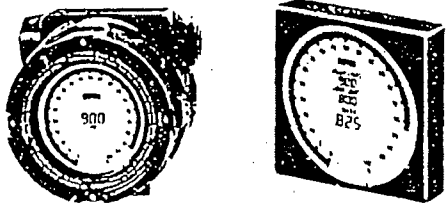
NOTE 1: Models 593 are factory set to specified "floating zero."

NOTE 2: Standard calibration is 1-5mA = 0-100%, 4-20mA = 0-100% and 10-50mA = 0-100% and/or 0-1000 counts for the digital section of full scale unless otherwise specified at time of ordering (others on request).

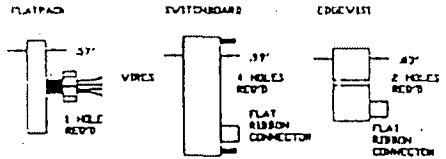
HOW IT WORKS: IMC's Powerless DPM's (not panel) utilize custom and semi-custom IC's for extra low power consumption, and AC/DC conversion or charge pump techniques to minimize standby quiescent power.



THE DISPLAY is the most important element on a panel since it interfaces directly and instantaneously with our fastest sense, IMC's Powerless DPM's are designed to give the maximum display to case ratio and to blend in your panel as an integral part of it. Both ambient light reflective and backlighted models have sharp contrasting characters and annunciators for easy viewing.



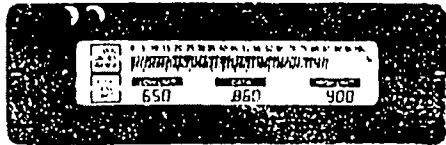
MOUNTING & CONNECTIONS to the Powerless DPM's are kept simple. None of the series require soldering, and except for the analog meter replacements, none require the usual expensive panel cut out. The size of the cases were designed to meet industry's existing standards for easy replacement, mounting and connections with minimum labor.



ANALOG, DIGITAL, OR BOTH?
THE ANALOG BARGRAPH models have 101 bars that illuminate in proportion to the signal's amplitude, this gives you 1% resolution at a glance and with the scale graduation constantly lit, it indicates the trend.

THE DIGITAL (3 1/2 DIGITS) models have 0.05% resolution of full scale for an accurate display of your process.

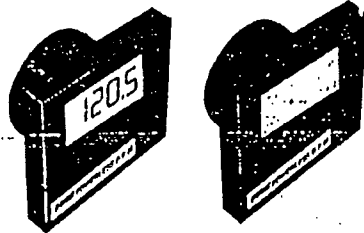
THE HYBRID models combine both the bargraph and digital technologies to give you the best of them in the same compact case, the bargraph section gives you 1% resolution and the digital section 0.1% resolution.



POWERED OR POWERLESS? Not all applications are served efficiently with the POWERLESS DPM's. Generally, your signal can stand the burden of the load (meter) without affecting its accuracy then the powerless is the right choice to go because it means less components to go bad, common not weight, less installation costs, and safety problems. If your signal cannot withstand the burden or it cannot be buffered, then see our powered models.

	POWERLESS DPM*	ANALOG METER	CONVENTIONAL DPMs
Accuracy	0.5%	2.5%	0.5%
Resolution	0.5%	1.5%	0.5%
Parallax	None	Poor	None
Response	Good	Poor	Good
Viewing Range	Good	Poor	Good
Ruggedness	Excellent	Poor	Good
Power Consumption	3mW-1W	0.2-5W	2 Watts +
Freq Response	30-1KHz	Limited	Good
Illumination	Yes	No	Yes
Power Supply	None Req'd	None Req'd	Required
Connections	2 or 3	2 or 3	Many
Price Range	Moderate	Low	High
Weight	Very Low	Low	High
Environmental	Very Good	Poor	Good
Acceleration	Very Good	Poor	Good
Shock	Very Good	Poor	Poor
Vibration	Very Good	Poor	Poor

AMBIENT OR BACKLIGHTING? The decision is not clear cut but the trend is to backlight the display for better viewing under most ambient light conditions. All IMC's Powerless DPM's feature an optional soft aviation green backlight or standard high contrast reflective display. A word of advice: if the operator's viewing angle is very important in either backlit or reflective displays, the location of the DPM should be so it is normally viewed from the 6 o'clock position. IMC's DPM's can be easily viewed from ±40° of center.



SCALING needs not be specified if standard 1:1 signal reading ratio is desired (100mV = 100%, 10V = 1000, 50V = 500). However, if the signal represents other than direct reading its relationship must be noted next to the part number. Examples: 4-20mA = 0 to +1500; 0-50mV = 0 to 600; 1-5V = 0 to 1300, etc.

In hybrid models, the digital display is (are) limited by 0 - 100% full scale of the bargraph section, consequently if the scaling is set for 4-20mA = 0 - 600 the bargraph illuminate up to the 60% bar and the digital "data" will show 600.

NOTE: The digital portion will not read beyond 10(X) count since it's controlled by the bargraph's A/D converter.

POWERLESS DPM's require less power than conventional DPM's. They can be used in open frame applications where power is only available. POWERLESS DPM's require no external power source. They are available in many sizes with the following characteristics: taken not to be taken with these models. VDC ± 20%. POWERLESS DPM's are available in 3, 5, 8, & 9 digit models. Limit the voltage compliance. Must be capable of 100% overvoltage. The display is required by the DPM's (4V typ). The DPM's are not for 22 g. The DPM's are not for 22 g. The DPM's are not for 22 g. **WARNING:** / C. VOL. : and 599 are c go and contr typically less be "loading" ations). The calibrated, bel **HOUSINGS:** series) come: black matte fir **FLAT PAD** A dark red out is rec attach the i **THE "NAKED" SECURE MONI** count from b (see) are av: laboratory for (carbon c: need to see