- ACCURATE TRUE RMS READING
- GALVANIC ISOLATION TO 3.5 kv
- IP65 FRONT PANEL
- UNIQUE OPTION POD DESIGN
- RELAY OR 4-20mA OUTPUT OPTIONS
- RS485 SERIAL MODBUS

INDICATORS

TRUE RMS CURRENT AND VOLTMETER FOR AC AND DC DM3430

INTRODUCTION

The DM3430 is a true RMS current and voltage panel meter suitable for measuring AC or DC signals. It has a four high intensity LED display that can be set to show a fixed number of decimal places with 'auto-rounding' to always show the maximum resolution.

It is highly accurate and designed to measure AC or DC voltages up to 550 Volts or currents up to 6 amps. Readings can be displayed as current or voltage or, alternatively, the reading can be easily scaled from the front panel to take into account a multiplier from a transformed input or to display directly in engineering values. The 3.5KV isolation gives added protection when the instrument is used to measure high voltages. This is particularly important when measuring current, in that the instrument can be mounted anywhere in the measuring circuit and remains unaffected by any standing voltage.

The DM3430 has a number of special software features including Peak and Valley memory (Storing Maximum and Minimum readings) and an Alarm Inhibit that disables the alarm function for a programmable period after start up. It is available with a choice of power supplies, S1 for 90-253V AC, and S2 for 20-35 V DC.

Output functions including Relay, 4-20 mA re-transmission or Modbus RS485 serial communications. Options are all available and easily installed without dismantling the case thanks to the unique 'plug and play' option pod design.

All programming is done via a simple to use menu accessible from the instrument front panel or via the RS485 Modbus RTU serial communications option.

BENEFITS OF TRUE RMS MEASUREMENT

The DM3430 uses true Root Mean Square measurement. This RMS value is related to the 'heating effect' of a waveform i.e. the amount of heat that a signal would generate in a resistor (1V AC RMS would generate the same amount of heat as 1V DC). This is quite different to the average or mean value of an AC signal, which is sometimes measured and then scaled as an RMS value. This can be acceptable if the waveform is a pure undistorted sine wave. Unfortunately this rarely occurs in practice and waveforms can vary considerably and therefore very significant errors of up to 30% for different waveform types can result as shown in the table on page 2.

TRUE RMS EXAMPLE

The waveform shown is typical of that encountered in mains voltage measurement with a fundamental plus 30% of 3rd harmonic. The 3430 will accurately measure this waveform but a scaled average meter could be up to 12% in error

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Waveform Type	Crest Factor (V Peak/ V RMS)	True RMS	Mean Value Calibrated to read RMS	%Error in Mean Circuit *1
Pure Sine Wave	1.41	0.707	0.707	0%
Symmetrical Square wave	1	1	1.11	+11%
Pure Triangle Wave	1. 73	0.577	0.555	-3.8%
SCR Waveforms 50% Duty Cycle 25% Duty Cycle	 2 4.7	 0.495 0.212	 0.354 0.15	 -28% -30%

*1 Error =((Mean Value - True RMS Value) / (True RMS Value))*100%

THE IMPORTANCE OF ISOLATION

The input is galvanically isolated to 3.5KV from the rest of the electronics circuitry. What this means in practice is that any standing voltages can be ignored and currents or voltage differentials can be measured with high levels of common mode potentials. The Common Mode Rejection Ratio is a measure of the amount of error introduced when common mode voltages exist. The DM3430 has an exceptional rejection ratio of 102dB which means that even high levels of standing voltage have little or no effect on the overall measurement accuracy.

SPECIFICATIONS @20°C

INPUTS

			AC[1]	DC	
Ranges[2]	Voltage		550	±550	Volts
			60	±60	Volts
	Current		6	±6	Amps
Accuracy[3]			0.1%rdg±0.1FSD	0.1%	FSD
Stability[4]			0.02	0.02	%/ °C
Input Inpedance	550V Range		10	10	M ohm
	60V Range		1	1	M ohm
	6A Range		0.02	0.02	ohm
Frequency Range			0-20	N/A	K Hz
Frequency Effect	20Hz to 1K Hz		Negligible	N/A	%/ K Hz
	1K Hz to 20 K Hz		0.04	N/A	%/ K Hz

GENERAL

Isolation[5]			3.5	3.5	K Volts
Display (With Auto-rounding)[6]			0-9999	-999 to 9999	Counts
Resolution[7]	A/D		0.002	0.002	%FSD
	Display		0.017	+ve 0.017	%FSD
				-ve 0.17	%FSD
Reading Rate			3	3	Hz
CMRR[8]			102	102	DB
Power Supply	Switch Mode	S1	90-252	90-252	V AC
		S2	20-35	20-35	V DC

NOTES

1 Based on 50/60 Hz AC signal

2 All ranges have a 10% over-range capability

3 Crest factor is the ratio between the Peak voltage and the RMS voltage and can have an effect on accuracy as shown in the following table:

Crest Factor	Degradation of Accuracy %
1	0
2	0.5%
5	2.5%

4 Over ambient Range 0-60°C

5 3 way isolation between Input, PSU and any outputs: IEC pollution class 2

6 The A/D resolution frequently exceeds the display resolution. Auto-rounding makes maximum use of the 4 digit display by reducing the displayed resolution if the measured parameter exceeds the available digits thus providing a level of performance in excess of the four digit capability. i.e. if the reading is showing 999.9 and the input increases by 0.1 the new reading will show 1000.

7 Perceived resolution increases with the level of filtering

8 Common mode Rejection Ratio

ENVIRONMENTAL

Sealing to PANEL	IP65
Ambient operating range	-30 to +60 °C
Ambient storage temperature	-50 to +85 °C
Ambient humidity range	10 to 90% RH non-condensing

APPROVALS

EMC	Emissions	BS EN50081-1
	Susceptibility	BS EN50082-2
ELECTRICAL SAFETY		BS EN61010-1
		UL pending

OUTPUT OPTIONS

Plug and **Play Option Pods**

Simple plug in pre-calibrated units, no dismantling or recalibration

Pod-3000/02 Dual relay Alarm

Two independent mains rated relay outputs (common connection)

Contacts	2 x Changeover relays common wiper	
Ratings	AC	DC
Maximum Load	5A@250V	5A@30V
Maximum Power	1250VA	150W
Maximum Switching	253 Volts	125 Volts
Electrical Life	10^5 operations at rated load	
Mechanical Life	50 million operations	
Termination Standard	5 way tension clamp connector	
Optional	Screw terminals	

Pod-3000/03 Isolated re-transmission

Ranges	0-10mA (Active or Passive) 0-20 mA (Active or Passive) 4-20 mA (Active or Passive)
Minimum current output	0 mA
Maximum current output	23 mA
Accuracy	0.07% F.S.
Max. Output load Active	1 K ohm
Passive	[(Vsupply-2)/20] K ohms
Max. External Supply Voltage	30V (Passive mode)
Voltage effect	0.2 µA/V
Ripple current	<3µA
Isolation	500V AC
Stability	1µA/°C
Termination Standard connector	5 way tension clamp Optional Screw terminals

COMMUNICATIONS

Pod-3000/05 RS 485 Modbus Comms.

PC communication for configuration and monitoring.

Physical Layer	4 wire or 2 wire half duplex RS485
Baud Rate software selectable	19,200 or 9,600
Protocol	Modbus RTU format
Isolation	500V AC
Maximum Fan out	32 units
Termination Standard	5 way tension clamp connector
Optional	screw terminals
Optional	ribbon cable - RC

ORDER CODE

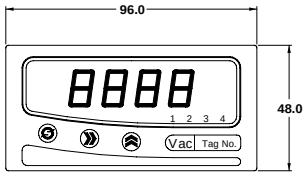
Series DM34 [ ] [ ] / [ ]

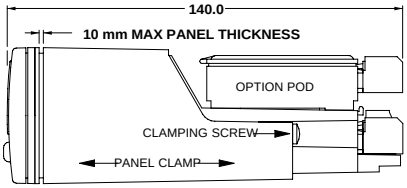
True RMS Current & Voltage	3
RED LED version	0
GREEN LED version	1
Power supply 90-253V AC 50/60Hz	S1*
Power supply 20-35V DC	S2

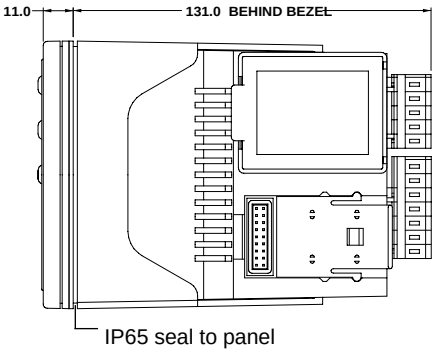
(*Note - Supplied as standard unless otherwise specified)

Mechanical Details

Main Unit

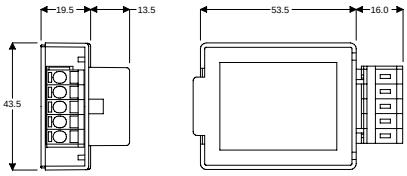






IP65 seal to panel

Weight 230gms. Panel cut out 92 x 45mm



Option Pod

	Material	ABS/PC
	Flammability	IEC707 FV0
Dimensions in mm		UL 94VO

OPTIONS

Pod-3000/02	Dual Relay Output (2 per unit maximum)
Pod-3000/03	Isolated 4-20mA re-transmission (1per unit maximum)
Pod-3000/05	Isolated Modbus RS485(1per unit maximum)
Pod 3000/05-RC	Ribbon cable option
ACC001	Pack of 10 5 way optional screw terminals

SOFTWARE FEATURES

INPUT MENU

Type	550V, 60V, 6A
Display resolution	0,1,2 and 3 dps. (with Auto rounding)
Scale	Scale factor (Default 1)
ACDC	AC or DC Input
Filter	*Off, 2Sec, 10Sec, Adaptive*

Output menu (relay if fitted)

The following parameters may be set for each individual relay.

Alarm type	Off, High, Low, Test
Setpoint	Setpoint in engineering units
Hysterisis	*Alarm Hysterisis in engineering units*
Alarm delay	*Off, 2Sec, 5Sec,10Sec, 20Sec,1min, 2min, 4min*
Latch	*Off, On (latch reset from front panel)*
Invert operation	*Off, On*

Output menu (Analogue Re-transmission if fitted)

Span	*4-20, 0-20, 0-10 (Set output range to 4-20, 0-20 0r 0-10 mA)*
Rt Lo	User Defined (Set low end of scale)
Rt Hi	User Defined (Set high end of scale)

Output menu (Modbus Comms if fitted)

Device No	1-99
Baud Rate	19.2Kb/ 1.2Kb
Connections	2wire/ 4wire

System menu

List	Short menu, Full menu
Clear enable	*Off, On*
Setpoint enable	*Off, On*
Alarm inhibit	*Off, 2Sec, 5Sec,10Sec, 20Sec, 1min, 2min, 4min*
Passcode	*4 digit passcode. (0000=Passcode disabled)*
Offset	*User calibration offset in engineering units.*

Items *in italics* are only available in the 'full menu' option has been selected

ASSOCIATED STATUS PRODUCTS

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PANEL PRODUCTS

A full range of digital panel meters and signal conditioning devices including:

SEM1000 Series
Signal Conditioning

- °RTD and TC conditioners
- °Loop Boosters
- °Loop Splitters
- °Trip Amplifiers
- °Power Supplies
- °Loop Isolators

DIN rail mount, high accuracy (0.05%) and stability is offered with a high packing density.

DM3410/ DM3420
Digital Panel Meters

- ° DM3410 Universal Temperature Inputs
- ° DM3420 Process Inputs
- ° Transmitter Excitation
- ° IP65 Front Panel Sealing
- ° Plug & Play Option Pods
- ° Modbus RS485 Serial Comms
- ° Auto Rounding

FIELD PRODUCTS

A full range of analogue, push-button digital and smart programmable temperature transmitters including:

SEM203P/ TC
Push Button Temperature Transmitter

- ° Push Button Programmable
- ° Temperature Linear
- ° Galvanically Isolated (203tc)
- ° 8 Standard Thermocouple Types (203tc)
- ° Pt-100, Pt-500, & Pt-1000 (203P)

SEM310 HART
HART Temperature Transmitter

- ° HART Protocol
- ° Universal Input
- ° Ex Option
- ° Sensor Burnout Detect
- ° Galvanically Isolated
- ° Spring Mounting

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