

The MM410 Series consists of a moment-insensitive load cell module prepackaged with flexures. The load cell module is available in any weighing capacity from 200 grams to 50 kilograms delivering weight measurements accurate to 10 ppm. The Mass Monitor is provided with a circuit designed to linearize and temperature compensate the raw digital signal output of the load cell module. The circuit includes a display connector and a three wire RS232C serial data inter-

face. This interface enables bi-directional communications with the controlling or indicating device. Neither hardware nor software handshaking is required.

The ceramic weight sensor is mounted on a rectangular cast aluminum foundation. Combined with flexures, quartz inductor, positive overload safety stop, desiccant and the oscillator circuit board; the entire module is neatly encased under a formed aluminum cover. This self contained

load cell can easily be installed in a scale base or other weight-supporting structure, using only three bolts. A user-built weighing platform can be attached via a threaded shaft that protrudes through the module cover (on high capacity modules, four shafts are provided).

A display board using a six-digit LCD or a five-digit LED is available and may be used as an integral part of the MM410 package or for testing purposes only.

Mass Monitor Principle of Operation

Principle of Operation

Setra's Mass Monitor consists of a ceramic sensor to which two gold plated electrodes are thermally fused. Doubling as a variable capacitor, the sensor is wired into an LC oscillating circuit which typically operates at well over 5 megahertz. This circuit includes a quartz constant value inductor which can withstand moderate fluctuations in environmental conditions such as temperature and humidity. The inductor's stability makes oscillating frequency entirely dependent upon deflection of

the sensor. As weight is applied to the sensor, the gap between the electrodes changes, altering the electrical capacitance of the sensor and changing the oscillating frequency. A microprocessor measures oscillation in the circuit, compensates for temperature-induced variations, linearizes the signal, and provides a digital weight output. The resulting high resolution, coupled with the unique elastic properties of the high grade ceramic sensor provide a weighing accuracy that is ten times better than that of a typical scale using strain gauge load cell technology.

Specifications — MM410

CAPACITY		READABILITY
0.4 lb	(200 g)	0.000002 lb (0.001 g)
2.2 lb	(1,000 g)	0.000004 lb (0.002 g)
5.5 lb	(2,500 g)	0.00001 lb (0.005 g)
11.0 lb	(5,000 g)	0.00002 lb (0.01 g)
22.0 lb	(10,000 g)	0.00004 lb (0.02 g)
55.0 lb	(25,000 g)	0.0001 lb (0.05 g)
110.0 lb	(50,000 g)	0.0002 lb (0.1 g)

Weighing Range:

200 to 50,000 grams

Maximum Readability:

10 ppm

Non-Linearity:

± 10 ppm

Hysteresis:

< ± 10 ppm

Creep:

< ± 10 ppm

Displacement at Full Load:

0.01 in. to 0.05 in.*

(0.25 mm to 1.27 mm)

*Depends on range

Output:

RS232C

Baud Rates:

300	1200	4800
600	2400	9600

Weight Update Rate:

0.2 sec.

Operating Temperature:

32°F to 122°F (0° to 50°C)

Operating Humidity:

0 to 90% R.H.

Display Options:

6 Digit LCD

5 Digit LED

Power Requirement:

12 VDC @ 250 ma

Sensor Weight:

53 oz (1.5 Kg)

Sensor Dimensions:

7.5" l x 5" w x 3.5" h*

19 cm x 12.7 cm x 8.9 cm

*Add 0.5" (1.3 cm) to height for pan supports

Warranty:

15 Months from Shipment

U.S. Patents

The MM410 series is covered by some or

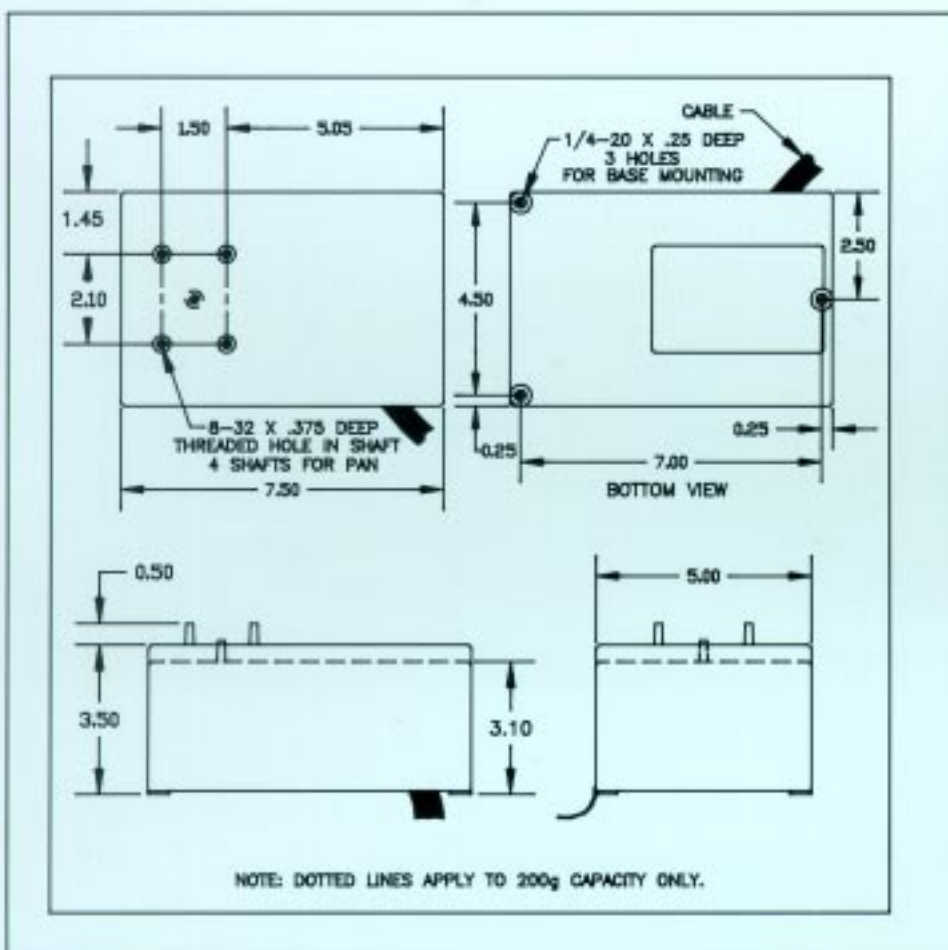
all of the following patents: 4,382,479;

4,383,586; 4,463,614; 4,448,085; 4,513,831;

4,558,600; 4,846,293

Made in the U.S.A.

1/93/Printed in the U.S.A.



Mass Monitor is a trademark of SETRA SYSTEMS, INC.

setra

The technology leader in precision weighing

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