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1870 STARKEY ROAD, SUITE 1  
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Precision Built Recorders Since 1914

**OPERATING INSTRUCTIONS  
FOR  
G ENVIRONMENTAL MINI-MONITOR  
"GEMM"**

SERIAL NO. GEMM 410G

	Lateral (X)	Vertical (Z)	Longitudinal (Y)
G-Range	10	10	10
Stylus Travel:			
a. Inches/G	.050	.050	.050
b. G/Space of chart	1.0	1.0	1.0

CHART TYPE: GEMM 34 1" - 1/2"

CHART SPEED: 1/2" PER HOUR

CHART DRIVE: ELECTRIC

The GEMM will operate for approximately 33 days without replacing the chart.

**SHIPMENT OF THE GEMM FROM THE FACTORY**

The GEMM's are shipped from the factory with a chart properly installed and operating. Notice in detail just how the chart is threaded through the instrument. Although new chart installation is described below, it will be helpful to observe the chart path while it is still in the instrument.

**READ** the operating instructions **BEFORE REMOVING THE CHART**. The records on the used portion of the chart should be examined. The unused portion of the chart can be used for testing.

**ELECTRIC CHART DRIVE ASSEMBLY**

The GEMM chart is driven by a (Quartz) Electric DC Stepping Motor. The On/Off switch is located on the lower right corner, facing the recorder. The chart will not move until the power switch is in the ON position. The power switch was installed on the inside to prevent any UNAUTHORIZED PERSON from turning the unit off. When the GEMM is not in use, turn the power switch OFF to conserve the battery. Power is supplied to the GEMM by one C-cell, heavy duty battery. (Part No. 1235, 1 1/2 volt, size C Eveready) located on the right back of the unit, after removing the top cover.

**PLEASE NOTE: DATE AND TIME SHOULD BE WRITTEN ON THE CHART AT START AND END OF THE SHIPMENT.**

## TO REMOVE AND REPLACE BATTERY

After removing the top cover, you will notice that the battery is inside a battery tube. Remove either screw from the bar which holds the battery in place. Loosen the other screw, turn the bar 180 degrees and the battery will raise 1/4" so that it can be removed easily. When installing a new battery, PUT PLUS END OF BATTERY DOWN INTO THE BATTERY TUBE. We recommend the battery be replaced every six months, although the estimated life is one year.

## INSTALLATION OF NEW CHART

1. The knurled knob located at the top center of the GEMM is the ON/OFF knob. This knob activates the actuating roll.
2. The GEMM should always be in the "OFF" position when there is no chart in the recorder and during the process of installing or removing the chart.
3. Place the recorder on its base with the styli's points facing the operator.
4. Turn the GEMM to the "OFF" position. (NOTE THE DECAL ON THE LEFT END FRAME.)
5. Tilt the sensing head back. The sensing head, the unit to which the styli and weights are attached, tilts back approximately 35 degrees to allow for easy chart installation.
  - (a) To tilt the head back, remove the knurled knob located on the left end frame (top rear) by turning it towards the back of the recorder.
  - (b) After the knob is removed, tilt the head backwards as far as it will go.
6. The chart supply roll retainer discs are located at the top front of the recorder. Install the new chart in the retainer by placing the chart against the left end retainer and pushing it towards the left end frame.

NOTE: The chart must be placed in the supply retainer in such a way as to make sure that it will roll underneath itself. Have the **end** of the chart pull towards the operator from the top of the chart roll.

7. Thread the chart over the actuating roller with the **sensitive side up**.
8. Thread the end of the chart (cut at a 45 degree angle) in the slot in the receiving roll.
  - (a) Pull the chart underneath the receiving roll.
  - (b) Thread the end of the chart in the receiving roll slot.
  - (c) Wind the chart on the receiving roll at least four full turns. Wind the chart so the sensitive side is out - roll the top of the receiving roll towards the back of the GEMM.

## REMOVAL OF THE CHART

1. Cut or tear the chart after last desired acceleration record.
2. The receiving roller cannot be moved from the recorder. Remove all of the used chart from receiving roller by pulling the chart and rerolling it by hand, or by chart viewer and roller, Model CV-GEMM, manufactured and available from Impact Register, Inc.
3. As an alternative, when the actuating roll clutch is turned to the OFF position, it is possible to rewind the used portion of the chart back onto the supply roll. By doing this, the records may be examined as the chart is rewound. Tilt the sensing head back before the chart is rewound

## CHART INTERPRETATION

This piece of chart is a sample of the chart used in the Model GEMM.

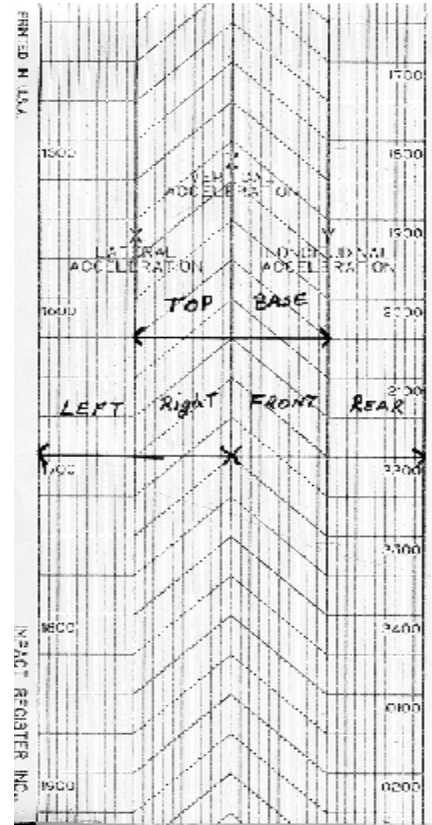
Note that there is a 3" of recording trace on 2" of chart. This is accomplished by placing the vertical record exactly  $\frac{1}{2}$ " in front of the lateral and longitudinal record.

The wording on the chart "Base and Top", "Left and Right", and "Front and Rear" indicates how the GEMM will record when a shock is incurred. It is assumed that the GEMM has been placed in a package, for example, if the package (GEMM) was dropped on its front, the trace would be longer on the left side of the Y axis. If the package (GEMM) was dropped on its base, the trace would be larger on the right side of the Z axis.

If the GEMM has a maximum G sensitivity setting of  $\pm 100G$  on each axis, each  $\frac{1}{2}$ " of chart equals 100G, therefore, 100G of each direction on each axis. For a 100G instrument each space equals 10G.

For a maximum G sensitivity setting of  $\pm 50G$ ,  $\frac{1}{2}$ " of the chart equals 50G and each space on the chart for each axis equals 5G.

To determine what G's are incurred, regardless of the maximum sensitivity setting of a particular GEMM, divide the maximum setting by 10 (the number of spaces for each direction). On a  $\pm 25G$  GEMM, each space on the chart equals 2.5G ( $25 \div 10$ ). The heavy lines across the chart are  $\frac{1}{4}$ " apart. On the right side of the last 5' of the chart there is a red line which serves as warning that you are nearing the end of the chart.



## ANCHORING THE GEMM

1. The base of the GEMM has, either internally or externally, two 3/16" mounting holes for anchoring the instrument to the object on which acceleration measurements are to be made. The following materials may be used to mount the GEMM:

- (a) #10 round head wood screw.
- (b) #10 machine screw with lock washer and nut.
- (c) Penny nail - double headed nails are preferred.

2. Securely fasten the GEMM to the vehicle or object whose accelerations are to be measured. The arrows on the outside of the case indicate the longitudinal direction (fore and aft). Secure both anchoring positions provided. Any movement of the GEMM, in relation to the surface to be tested, will give erroneous results, therefore contact **must** be tight and secure.

### **WARNING: HANDLE THE GEMM WITH CARE - IT IS A VALUABLE INSTRUMENT.**

1. **NEVER** move the stylus arm by hand for more than a short distance, as damage to the stylus and multiplication system may result.
2. Check the stylus pressure before each use. The stylus pressure on the chart was accurately adjusted at the factory. For maximum record accuracy, the trace should be as light as possible, while still giving legible records.
3. **DO NOT** use an air hose to blow out the dust and wax accumulated in the sensing system.
4. **DO NOT** lubricate the sensing mechanism.

### **THE GEMM CHART SPEED IS INDICATED ON THE NAMEPLATE**

**RETURN THE GEMM TO THE FACTORY ANNUALLY FOR CLEANING AND INSPECTION.**

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