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Your Solution to Testing Instrument

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NOMIS
SUPERGRAPH
&
Mini SUPERGRAPH

OPERATING INSTRUCTIONS

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INTRODUCTION

The SUPERGRAPH model for NOMIS introduces a new innovation in seismic instrument design with a focus on simplicity yet powerful in features. The SUPERGRAPH enables ground vibrations and air over-pressure to be monitored with ease and accuracy. All user data, such as customer, seismograph location, operator name, field notes are provided on each printed record for accurate and undisputed results.

The HELP menu key allows for quick and easy access to common features. The ability to save set ups on a daily basis provides for a quick set up with each subsequent use. No wait time between events will prevent the user from missing any seismic data.

The self trigger, bar graph, and combination modes make the SUPERGRAPH & Mini SUPERGRAPH ideal for any type of monitoring situation. The SUPERGRAPH & Mini SUPERGRAPH can be used for most vibration and sound monitoring activities including blasting operations, pile driving operations, construction equipment activity, environmental activity, ambient levels, and any other operation where a permanent record is of importance.

The NOMIS SUPERGRAPH is a full feature unit with an internal printer. This fast, letter quality thermal printer features few moving parts and requires very little maintenance. A large 20 character x 8 line LCD provides adequate display of all vibration data on one screen without the need of going to several screens to collect results. A back light is provided on the LCD with 3 levels of brightness. Storage space is provided within the unit to adequately store all accessories. Ten keys are located around the LCD which will allow the operator to use the unit by accessing these keys only. In addition, a full feature keypad is also provided for easier data input. The unit is powered by a Gel cell rechargeable battery. This battery is easily accessible for easy removal or replacement. While the internal printer is present for instant printing, all events are stored in memory for future use. Windows software is provided to allow printing on standard desk top printers. Ease of use is one of the strong points of the SUPERGRAPH. This instrument is packaged in a plastic, water tight case which is very durable. The use of 2 tri axial geophones and /or microphones is a future option with this unit.

The NOMIS Mini SUPERGRAPH is very similar to the SUPERGRAPH in operation. The same 10 keys around the SUPERGRAPH LCD appear on the Mini unit. Therefore, transition between the two units is not an issue. With the exception of the full feature keypad and printer, the Mini SUPERGRAPH has all the features of the SUPERGRAPH. The Mini unit comes in a hard plastic, water tight carrying case, adequate for storing all accessories.

START UP INSTRUCTIONS

Connecting the transducer and/or microphone prior to turning the instrument on is critical. For this reason, the transducer should be placed in a stable position, which will be the final placement prior to recording an event. Movement of the sensor during the initial sensor check procedure (this is done automatically when the instrument is turned on) may produce inaccurate results. The electronics within the sensor must be allowed to stabilize before monitoring can take place. The arrow on the top of the transducer housing should be pointed toward the vibration source.

Note that the transducer and microphone plugs are color coded to allow for easy recognition at the time of connection. A quick lock ring is provided on each connector to prevent the connection from coming out. The connectors are designed such that the wrong connection cannot be made. If connection is difficult, check for the color coding or rotate the connector until the pins mate properly and then lock the connector in place.

MONITOR MODES

SELF TRIGGER OPERATION

This operation is designed for situations where data collection is desired for a short, precise period of time (normally less than 60 seconds). This operation captures the complete digital waveform for future printing or analysis. Pre determined vibration and/or sound trigger levels are selected that will allow the instrument to turn on automatically and record the activity for a specified period of time. All activity is stored in internal memory in a numbered event format. Once the recording is complete, the SUPERGRAPH & Mini SUPERGRAPH returns to a wait mode for the next event that exceeds the trigger levels.

BAR GRAPH OPERATION

This operation is designed for situations where large data collection is desired for long periods of time (normally over 60 seconds and lasting for hours or days). Seismic and/or air data is collected and recorded in a bar graph (histogram) format and stored in the internal memory for future use. The SUPERGRAPH stores the history in an event format and creates a new event at midnight on each day. The longest time span for any event will be 24 hours. Each 24 hour recording is given a job number on the record stored in memory for easy reference. No digital waveform is stored in this mode.

The current summary bar graph results are displayed on the LCD in real time. By pressing the ↓ arrow, the operator can view the current job peak results, which is a summary of peak data since starting the job. Impulse readings are also available by pressing the ↑ arrow at any time.

COMBINATION OPERATION

This mode allows the self trigger and bar graph modes to operate at the same time. Bar graph information is recorded until a pre set trigger is exceeded. At this time, waveform data is recorded. After the waveform data is processed, the unit returns to the bar graph mode. This feature is not currently active.

QUICK OPERATING INSTRUCTIONS

1. Place the transducer and/or microphone in monitor position and point the arrow on the transducer toward the vibration source. THESE CABLES MUST BE CONNECTED BEFORE THE UNIT IS TURNED ON. For proper transducer placement, please see Appendix 2.
2. Press ON (green) and wait (30-60 seconds) for the NOMIS MAIN MENU. At this menu, select the type of monitoring desired by using ↑ and ↓ keys. When the desired selection is highlighted, press ENTER (blue).

For more information on the type of monitoring desired, please see the previous section on MONITOR MODES.

3. The next screen will allow monitoring to start by pressing ENTER or allow the operator to edit the set up data stored from the last event by using the ↑ and ↓ keys.
4. If EDIT is selected, a different screen will appear each time ENTER is pressed. Press ENTER to keep displayed data or key in new data. (Use the + and - keys to move the cursor from right to left.) Standard selections are highlighted at each of these selections. Continue pressing ENTER to proceed through all of the questions. For all numeric entries, use the ↑ and ↓ keys to change the numbers.
5. One of the final screens allows the user to SAVE SETUP data. If YES is selected the user can key in 8 characters for this name. At least one character must be entered for this name. All information previously input will be saved in memory for future use. These saved settings will appear on the NOMIS MAIN MENU at option number **4. Saved Set ups**. A maximum of 14 settings can be saved here.
6. After SAVE SETUP, the next screen allows the user to MONITOR or EDIT. With MONITOR as the default setting, pressing ENTER will allow the SUPERGRAPH to start collecting data according to the monitor mode selected at the NOMIS MAIN MENU. Please note that another sensor check will be performed (which take about 15 seconds) to insure that nothing has changed with the sensors.
7. Once monitoring is complete, pressing the **ESC** key and then the **ENTER** key will allow the instrument to stop monitoring. The instrument can then be turned off by pressing the OFF (red) key. **THIS INSTRUMENT CAN ONLY EXIT THE MONITOR MODE BY PRESSING THE ESC KEY.**

ESC ALWAYS TAKES THE USER OUT OF THE CURRENT OPERATION OR REVERSES TO THE PREVIOUS OPERATION. TO STOP MONITORING, ALWAYS PRESS ESC FIRST AND THEN ENTER. Because there is 0 wait time between events, this unit will continue to trigger while printing. If events continue to print, one after the other, this can be stopped by pressing ESC. All triggered events will be stored in memory and can be printed from the memory.

A HELP menu (see Appendix 1) is provided to change date and time, erase memory, frequency plot on & off, languages, sensor gain, check event summaries, & many other options.

Saved setups are accessed at the NOMIS MAIN MENU (the first menu when the instrument is turned on) by selecting option 4. With this option, data input from previous jobs can be automatically loaded with one selection. This feature is extremely useful on the Mini SUPERGRAPH.

The LCD automatically turns off after 2 minutes to conserve power. Pressing any key will turn the LCD on.

While in the monitor mode, the results of the last vibration event will be displayed on the LCD. Any previous events can be viewed by using the HELP menu and selecting SUMMARIES EVENTS.



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APPENDIX 1

HELP FUNCTIONS

A HELP key is available to assist the operator with normal features of the SUPERGRAPH & Mini SUPERGRAPH. This HELP menu can be entered at any time before monitoring starts. The HELP function has 2 features.

1. Configurations & Options
2. Data Input Information

The features of HELP 1 are listed below. To select any of the options on this menu, use the ↑ or ↓ keys to move the cursor to the desired selection and press ENTER. ESC will allow the operator to exit this selection. Remember that the + and – keys are used to move the cursor right or left. In the English version, these options are in alphabetical order.

The features of HELP 2 consist of technical data for the particular screen at which the HELP key was pressed.

ALARM OUTPUT MODE

This selection allows the operator to turn on or off the external alarm feature. With this feature the operator can connect external alarms to the unit to indicate when limits for vibration and/or air have been exceeded. The operator has the option to select 2 limits (of their choice) as a caution and not to exceed limit. Once either of these limits is exceeded, the external alarm will indicate such.

AUTO CALIBRATION

This selection allows the instrument to generate a calibration record (stored as an event in memory noted by a “P”) every 24, 48, or 72 hours or no calibration record. Each self trigger event recorded ALWAYS has a calibration signal recorded with that record. The bar graph mode does not print a calibration graph. If this calibration graph is required, this option should be enabled.

This feature is intended for use on instruments that are left in place for a number of days at one time. By selecting this feature the operator can prove that the instrument was operating each day but may not have been triggered during the selected monitoring time period. The auto calibration record will occur at midnight at the time period selected. In most cases, this selection should remain at the default setting of NO AUTO CAL.

AUTO MONITOR

This selection allows the instrument to automatically go into monitoring state after 2, 3, or 4 minutes or no auto monitor. If you select the 2, 3, or 4 minutes option, the SUPERGRAPH will automatically go into monitor mode after the selected period of time. This time begins after the last key is pressed. If you have not selected a set up preference, the set up used for the last operation will be used. This option is used if there

is the chance that the operator will forget to put the SUPERGRAPH into the monitor mode. If the operator selects the “no auto monitor”, it will be necessary for the operator to press all keys necessary for the unit to begin monitoring. Of course, if the SUPERGRAPH is not placed in the monitor mode, the event will not be recorded.

BATTERY

This selection will allow the operator to check the status of the battery voltage. The real voltage is printed on the screen. A bar indicator is present to show the battery status. The bottom line of this screen has 2 values in parenthesis. The first value is the charging voltage and the second value is the signal voltage (which should be approximately 1.8V). Please note that when the unit is not connected to a charging system, the charging voltage will appear as 0 V. **The unit will stop monitoring at 5.0 volts** and return to the NOMIS MAIN MENU.

BAUD RATE

This selection is used to set the baud rate of the instrument when some type of modem is in use. The default value for this setting is 38,400, with 19,200 and 9600 as options.

CALIBRATION DATE

This selection will allow the operator to check for the last factory calibration of the unit done by an authorized NOMIS facility.

COPIES

This selection will allow the operator to choose the number of copies (1-9) of a record to be printed by the SUPERGRAPH model. Use the ↑ or ↓ keys to select the desired number of copies. Because the Mini unit does not have a printer, this does not apply to the Mini SUPERGRAPH.

DATE/TIME

This selection will allow the operator to change the date and time. When this option is selected, the cursor will start on the hour. All time is entered in a military manner. Hours are entered in numbers ranging from 1 to 23. After 23:59 (midnight) the numbers will change to 00 (midnight). The + and – keys are used to move horizontally through the edit process. Use the ↑ or ↓ keys to change the settings at the cursor. The time does not begin to count until the ENTER key is pressed.

ERASE MEMORY

This selection allows the operator to clear all stored events from the memory. Because this unit has 8 megabytes of memory, it will take approximately 1 minute to perform this operation, no matter how many events are stored. There are several questions to be answered for this operation. **All previously stored data will be lost if this operation is executed.** It is important to make sure all useable data is downloaded prior to executing the option. For this reason, the question will be asked 2 times to make sure the operator intends to erase all data.

When all data events have been erased from memory, the next question will be to ZERO EVENT NUMBERS? By selecting YES, the event numbering will start at 1. Some operators may have a preference to start the events numbers from 1 on a regular time period while some prefer to let the numbers continue to increase. Make the choice of YES or NO and press ENTER.

The next question will be to erase saved settings (These are the save settings at option 4 of the NOMIS MAIN MENU.). If the YES option is selected all saved settings will be erased except for the default settings, which cannot be erased. The saved settings can be erased without erasing the memory.

FREQUENCY PLOT

This selection allows the operator to choose a preference for printing a damage criteria chart on the seismic record. If this option is selected as NO, this damage criteria chart can always be printed on the computer down loaded record at a later time.

If the operator chooses YES, several international standards are available to choose.

LANGUAGE

This selection allows the operator to change languages within the unit. All questions and display data will be in that language after this selection. The languages available at the present are English, French, Italian, Spanish, and German.

LCD CONTRAST

This selection allows the operator to change the contrast on the LCD. This can be done by selecting options 1, 2, or 3. Also, the + and – keys can be used and the bar at the bottom will indicate the change. This setting can be saved when complete.

Please note that the LCD contrast can be changed at anytime (without going to the HELP menu) by pressing the – or + keys.

LCD TIMEOUT

This option will allow the LCD to stay on for a longer period of time. Normally, the LCD will turn off after 2 minutes to conserve power. The operator has the option to select a time up to 60 minutes for the LCD to stay on. If longer periods of time are selected, the battery life will be reduced.

MODEM SET UP

This selection is used to configure the instrument for remote communication with a modem. There are 4 questions to answer for this set up. There is a modem unlock code which by default is 0000. This unlock code prevents unauthorized entry by vandals.

Please note that if this code is changed from 0000, you must make a note of this code for use in a computer connection using SuperGraphics.

PRINTER

This selection allows the operator to turn the printer on or off. If the printer is turned off, all events will be stored in memory. These events can be viewed in the HELP menu at SUMMARIES EVENTS and printed (if the printer is turned on) or down loaded to a computer and printed.

SENSOR GAIN/TYPE

This selection allows the operator to view the type sensor provided with the unit and the maximum vibration level for that sensor. The sensors available are X1 (20 IPS/508 mm max), X2 (10 IPS/254 mm max), X4 (5 IPS/127 mm max), and X8 (2.5 IPS/63 mm max).

SERIAL NUMBER

This selection allows the operator to view the serial number of the instrument. This serial number can only be set at the NOMIS facility.

SUMMARIES EVENTS

This selection allows the operator to view all events stored in memory. At this location the information on the LCD includes event number, date, and time of the event. At the far right side of the LCD will be a W, B, C, or P. These letters indicate the mode of operation when that event was recorded. The W represents waveform, the B represents bar graph, the C represents combo, and P represents cal pulse.

Moving the cursor to the desired event and pressing ENTER will display the results summary for that event. The operator can press ESC to exit the results summary or press ENTER to print the record on a SUPERGRAPH.

TIMER MODE

This selection allows the operator to choose times the unit will be operating and monitoring for vibrations. When the timer has the instrument turned off, the unit will operate on very little power and will not trigger.

It is imperative that current date and time is correct before timer mode is selected. If the date and time are changed after timer mode is set, the timer mode will automatically be cancelled.

To use timer mode, the operator must enable this option. Once enabled the operator will have 5 options for this mode.

#1 option is a one time on and off of the unit. After this one time, it will not occur again.

#2 option is for the same time every day, seven days per week, 365 days per year.

#3 option is for the same time, Monday – Friday, of each week, 52 weeks per year. The instrument will not be operational on Saturday and Sunday of each week.

#4 option is for a weekly operation, only once a week. This operation will be active for the same day each week that is entered for the start date.

#5 option is for a monthly operation, only once a month. This operation will be active for the same date (not day) of the month that is entered for the start date.

It is important to note that for options 2-5 above, the stop date year must be greater than the current year. If the stop date year is the same as the current year, the unit will operate as indicated in option #1 and only turn ON and OFF one time.

When timer mode settings are complete, the LCD will show this message, “Timer mode now active. Please power off unit”. Press ENTER to accept this option. At this time the operator can go back to the NOMIS MAIN MENU and select the desired recording mode. Once the desired recording mode (self trigger, bar graph, combo, saved settings) is selected, it is suggested that the EDIT option is selected to view the operating parameters. Once the operator has reviewed all of these, the LCD will display MONITOR or EDIT. The unit should be turned OFF at this time. Timer mode will be active and turn ON and OFF at the selected times.

If the unit is turned ON, the operator will see a message on the LCD indicating the unit is in timer mode. By pressing ENTER another message will ask the operator if timer mode should be cancelled. If YES is selected, the unit will operate as normal and timer mode will be cancelled. If NO is selected, the unit will automatically turn OFF and wait for the programmed start time.

While the unit is turned ON, the operator can check the timer mode settings by going to the HELP menu and selecting TIMER MODE. The settings will be displayed and the operator has the choice to cancel or keep these settings.

SPECIAL NOTE: 1)The start time must always be earlier than the stop time.
2)The timer mode cannot be selected when the current time is between the start and stop time. In this event, the user must select the next day for the beginning of the timer mode

UNITS OF MEASURE

This selection allows the operator to choose between imperial and metric units. All data stored in the unit will be changed to the selection of choice.

VECTOR SUM

This selection allows the operator to choose the option of printing the vector sum on the seismic record. For the SUPERGRAPH the vector sum will be printed at the end of the main prompts after SENSITIVITY: on the printed record.

The vector sum can always be viewed on the LCD (when the results are visible) by pressing the + key. The vector sum will appear where the air results are viewed. Pressing the – key will eliminate the vector sum and replace it with the air results.



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APPENDIX 2

TRANSDUCER PLACEMENT PROCEDURE

Placement of the transducer block is very important when taking vibration readings. It is important to realize that this block must always make firm contact with the surface if the vibration reading is to be accurate. There are very few incidents where the transducer block can be simply placed on the surface for a vibration measurement. While movement cannot be seen with the eye, the possibility does exist that the transducer can actually vibrate or "walk" on the surface during vibration activity. This creates an inaccurate reading due to the fact that the measurement is that of the block vibrating against the surface and not the actual vibration source. The simple procedure of leveling the transducer on a surface is a minor part of setting up the instrument correctly. It is very important to make sure that the transducer is secured to the surface.

The leveling of the seismic transducer is important. As long as this sensor is within 20° (20 degrees) of the horizon, the readings will not be affected.

There are 4 generally accepted procedures for mounting the transducer in preparation for recording vibration activity. These 3 procedures are listed below.

1. Bury transducer in soil.
2. Secure transducer block with bolt
3. Spike transducer to soil.
4. Place sand bag on top of transducer block.

These are the 4 most generally accepted procedures for assuring there is no transducer slippage. These procedures are arranged in the order of the most desirable on down to the least desirable.

Burial of Transducer Block

Burying of the transducer block is the most accepted procedure and will produce the most dependable results. This procedure can be further evaluated using the U.S. Bureau of Mines Bulletin RI 8506 - Measurement of Blast Induced Ground Vibrations and Seismograph Calibration. For most blasting operations (vibration readings less than 1.0 ips, 25.4 mm/s) the transducer block can be buried in the soil

with the top of the block level with the surface of the ground. It is advisable for the spike to be placed on the transducer block and spiked in the bottom of the hole in which the transducer is placed. This will add additional coupling. The soil should be packed tightly around the transducer block when the hole is filled with soil. If the transducer block moves any at all when a slight force is applied to it, the soil is not packed tightly enough around the transducer block. For larger blasting vibration recordings (in excess of 1.0 ips, 25.4 mm/s) one should consider burying the transducer block deeper in the soil. It may be advisable to place the transducer block in a hole, which is at least 6 inches deep and pack the soil on top of this transducer block. This will provide a very good coupling with the soil such that no slippage can occur.

Bolting of Transducer Block

When soil is not available it may be desirable to bolt the transducer block to a rock or concrete surface. A hole may be provided through the center of this transducer block for such a procedure. If not, a bracket may be fabricated for this use. Depending on the anchors available in your area, an anchor can be placed in the concrete or rock and a threaded bolt placed through the hole to bolt the transducer block into place. This procedure will assure no slippage and result in accurate readings of the vibration levels.

Spiking of Transducer Block

For most vibration levels less than .5 ips (12.7 mm/s) spiking the transducer block is often adequate. One must be sure that the spike is pushed into soil which is adequate for providing a good coupling for the spike. As in any of the other cases, the transducer block should not be able to move with a slight force applied to it. In areas where the vibration recording is desired on a beautiful, landscaped lawn, spiking may be the only alternative. It is not always feasible or acceptable to dig a hole to bury the transducer block. Once vibration levels exceed .50 ips (12.7 mm/s) the operator should consider burying the transducer block.

Sandbagging of Transducer Block

As a last resort it may be necessary to sandbag the transducer block to eliminate slippage. This should be considered when burying, bolting, or spiking of the transducer block is not permissible or acceptable. The effectiveness of sandbagging will depend on the vibration level experienced and the weight of the

sand placed on the transducer block. One should realize that the higher the vibration level being recorded, the heavier the sand bag should be. For vibration levels less than 1.0 ips (25.4 mm/s) a 15 pound (7 kg) bag of sand should be adequate. This sand bag should be placed on top of the transducer block such that the sand can form around the block to provide good coupling with the transducer block and prevent horizontal slippage. In an emergency situation, a plastic trash can bag filled with sand can provide an adequate anchor for the transducer block.

This has been a brief explanation of proper transducer placement procedures. As previously stated the practice of simply placing the transducer on a surface and using the leveling feet to level this transducer block is not acceptable. For this reason NOMIS is very hesitant to provide leveling feet with the transducer block. If the leveling feet are provided, the operator may falsely assume that this is the most important procedure for proper transducer installation. With the type of geophone elements being used in the NOMIS Seismograph, the leveling of the transducer block is not extremely critical. It should be noted that the manufacturer of the geophones only requires that the geophone elements be within a 20 degree angle with the horizon. This can often be detected by the eye.

The most common result of a transducer not being installed properly is an abnormally high reading. For this reason it is to the operators advantage to make sure that this transducer block is set up properly. If there are any questions on this issue please do not hesitate to contact the technicians at NOMIS Seismographs.



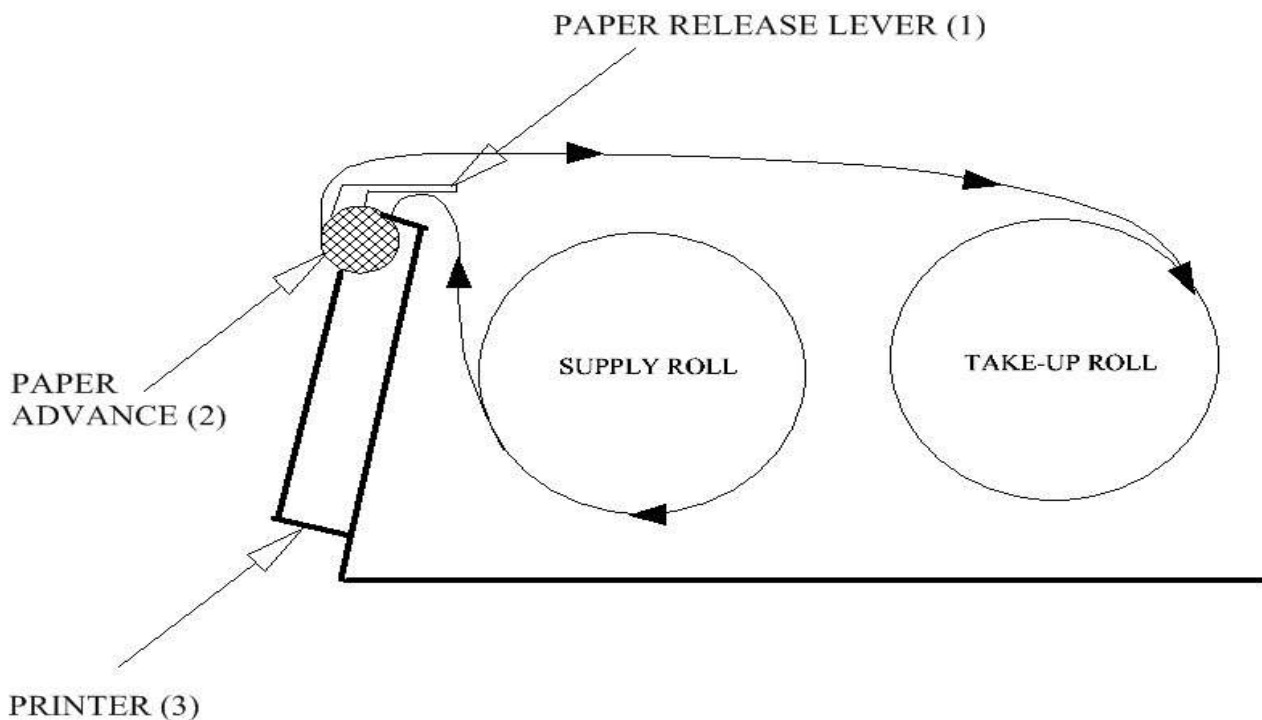
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APPENDIX 3 – PRINTER OPERATION

The steps for loading paper into the Seiko printer are listed below. Please refer to the diagram of the printer and body.

1. It is most important to load the paper into the printer as shown below. The paper from the supply roll must always feed from the bottom of this roll. Because thermal paper only prints on one side, paper feeding from the top will not print. Place a new roll of paper on the supply spool as shown below.
2. In order to feed paper into the printer, the red lever (paper release lever 1) on the right side of the printer must be lifted to the vertical position.
3. The paper should be pushed into the printer as shown in the printer diagram. The paper advance (2) wheel can be used to assist in this.



4. Enough paper should be advanced through the printer to allow the operator to use 2 fingers and pull 8 inches (200 mm) of paper through the printer. Take note to pull this paper straight from the printer as opposed to pulling to one side.
5. The red lever (paper release lever 1) can now be returned to the horizontal position.
6. In most cases the paper should be attached to the take up spool. This is easily done by folding the end of the paper into a point. The point can be pushed into the slot in the take up spool. This will allow the paper to wind around this take up spool. The paper feed key (at the bottom left of the SUPERGRAPH keypad) can be used to wind loose paper onto the take up spool.

Please note that this take up spool has a slot that is open on one end. This open end on the slot will allow the operator to push the take up spool from a large roll of paper without having to unwind the entire length of paper. If the paper is taped onto the take up spool, this will eliminate the option to push the spool out.

If printing does not work, please check the paper for installation according to the printer diagram.



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SUPERGRAPH

TECHNICAL SPECIFICATIONS

SEISMIC

Seismic Monitoring (with Standard Triaxial Geophone)

Range	0 – 10 in/s (0-254 mm/s) - Standard
Resolution	.005 in/s
Accuracy	+/- 3%
Transducer Density	< 150 lbs/ft ³
Frequency Response	2 – 400 Hz (1 Hz optional)

Two Triaxial Geophones Optional

SOUND

Weighting Scales	Linear (flat) or A - weighted
Linear Range	92-148 dB
Linear Resolution	.0025 milli bars
Linear Accuracy	+/- .1 dB at 30 Hz & 127 dB
Linear Frequency Response	2 –400 Hz

WAVEFORM RECORDED DATA

Record Modes	Waveform, Manual, Combination
Seismic Trigger Range	.01-10 in/s (.25-254 mm/s) , no trigger, manual [.0025 – 2.5 in/s (.06-63 mm/s) Optional]
Sound Trigger Range	
Linear	92 - 148 dBL, no trigger
A-weight	50 – 110 dBA
Sample Rate	1024 – 4096 Standard, Higher rates optional
Record Time	1-80 seconds
Cycle Time	No wait time between events
Storage Capacity	300 two second events standard @ 1024 samples/s

BAR GRAPH DATA

Record Modes	Bar Graph and Combination (Records waveform & bar graph at the same time)
LCD Readings	Real Time update every 2 seconds
Bar Recording Interval	1, 10, 20, 30, 40, 50, 60 seconds
Summary Interval	5, 15, 30 minutes, 1, 2, 4, 8, 12, 24 hours
Summary Data	Peak R,T,V + Sound& Frequencies for each Choice of vector sum and displacement

PHYSICAL SPECIFICATIONS

Dimensions	10.5 x 14 x 6.6 in. (267 x 356 x 168 mm)
Weight	15.6 lbs. (7 kgs)
Battery	6 Volt, gel type rechargeable, 30 days duration
Display – LCD	8 lines x 21 characters with backlight
Printer	High resolution thermal printer
PC Interface	RS-232 & additional 15 pin auxiliary connector
Auxiliary Inputs and Outputs	External trigger & remote alarm
Operating Temperature	0 to 120 ⁰ F (-8 to 50 ⁰ C)
Remote Communications	Full function RS-232 Port, compatible with telephone, GSM, Satellite, RF