Initial step by step testing of the MMM system for first-time users

In order to get familiar with the system operation and different settings, please follow the procedure described below.

1. If the system just arrived to your place, please first open the bottom cover of the generator box and remove protecting plates. Heavy components of the generator are blocked with packaging material in order to avoid generator damages during transport. See the pictures below. Then close the generator box and fix the screws.

MSG 1200.IX UNPACKING INSTRUCTIONS

Take the generator out of the package and put it on a table.





Unscrew the ten side screws, holding the lower cover of the generator.



Put the generator up side down and unscrew the other four screws on the bottom;



Remove the unscrewed cover.



Remove protection elements.



Put the cover and screw it back to the generator. Your generator is ready for operation. Now follow the instructions from User Manual.



2. Connect ultrasonic converter to the generator. Connect the PC interface MSA 2339 between the front panel of the generator and a serial (RS232) port of your PC. Connect the main power supply cable to the rear panel of the generator (applicable supply voltage range is between 208 VAC and 240 VAC). Users in USA can apply 2-phase main-supply voltage, which is equal to 208 VAC. Ask authorized electrician in your company to open one 3-phase plug, select only 2 phases (leaving third phase hanging free, and create new power plug). Do not use regulating or autotransformers

(step-up or step-down) to create proper main supply voltage. Users in Europe can directly apply standardized 230 VAC input.

3. Place the converter perpendicularly, on the flat, clean and dry surface of a table where you will perform initial testing. Be careful not to enter water or any other liquid inside of the threaded hole of the converter front mass (ultrasonic capillary effect could cause water penetration to the sensitive core of the converter). See the pictures below.



4. Activate the generator (main power switched ON). Activate the software interface on your PC. Read first the generator manual in order to learn important steps. Do not activate the start button (neither on the generator front panel nor on the software interface). Generator has the main power supply input, but it is still ultrasonically inactive. Ultrasonic converter is still in no-load conditions (free, nothing mechanically connected to it).

5. Now, open the software tab "Power" (see the screen below) and set the input power to 15%. Set maximal current limit to 2.5 Amp., PWM period to 0.1 s, and PWM ratio to 100%.

See the picture below.

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6. Now, open the software "US power" tab and set the output ultrasonic power level to some low value; -for instance to 50. Generator is still ultrasonically inactive, but software settings are active, and main power supply is ON. See the picture below.

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7. Now, open the software "DDS" tab and set the initial operating frequency of the generator to 17.5 kHz (or, for instance, between 17.5 kHz and 22 kHz in cases when you will connect some metal object to the converter, later). Set the "Sweeping" to zero (meaning that the converter should operate in a fixed-frequency regime, without frequency modulation). See the picture below. Do not activate the start button.

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8. Now, open the software "FSWM" tab and set the "FSWM range" to zero. "FSWM ratio" and "FSWM period" are inactive when "FSWM range" is set to zero. Just to have some initial settings here, set "FSWM ratio" to 50% (since this is the most useful case for later testing) and set "FSWM period" between 0.02 s and 0.1 s.

See the picture below. Do not activate the start button.

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9. Now, open the software "DMMM" tab and set the "Q factor" to 150. In cases when ultrasonic converter is not-loaded, good "Q factor" settings are higher values (between 100 and 255). When ultrasonic converter is loaded, good "Q factor settings are bellow 150. Set frequency correction between 20 and 150 (for instance start with 150). Set "Amplification factor" to 150. Later you will have a chance to vary such parameters and to see how they are influencing converter operating-regime.

See the picture below. Do not activate the start button.

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10. Now open the software "DDS" tab again and <u>activate the start</u> <u>button</u> (this is the first ultrasonic power activation). Ultrasonic converter will start oscillating and floating over the testing surface. Experiment with changing the "Sweeping" range between 0 and 100 Hz (or from o to 0.100 kHz). You will notice that certain kind of random frequency modulation is mixed with main frequency carrier. Do not operate too long in such regimes, since converter will start dissipating heat. See the picture below.

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11. Set again "Sweeping" to zero and open the next software tab, "Power". Experiment with changing "PWM period" from 0.02 until 0.1 s, and "PWM ratio" from 100% to 50%. See the picture below.

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12. Open again the next software tab, "FSWM", and experiment with changing "FSWM range" from 0.0 s until 0.10 s, and "FSWM ratio" from 10% to 90%. Vary also "FSWM period" from 0.02 s until 0.60 s. Select your preferable oscillating regime. Do not overheat the converter, since in all cases if you select wrong operating regime, converter would significantly increase its temperature. In smooth and quiet operating regimes converter would have room temperature (below 40 centigrade).

See the pictures below.

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13. Open again the next software tab, "DMMM", and experiment with changing "Q factor" from 10 to 255, "Frequency correction" from 0 to 255, and "Amplification factor" from 0 to 200.

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See the picture below.

14. Open again the next software tab, "US power", and experiment with changing "US power" from 0 to 200. Do not keep the converter operating too long under high input and output power settings, since it will start increasing temperature.

See the picture below.

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15. When you decide that selected operating parameters are good for your application, memorize then by activating the "Write" button. Last memorized data will stay in the internal memory of the generator, and will not be lost in case you switch the generator OFF. Next time, after switching the generator ON, you can first press the "Read" button and activate the last time memorized operating parameters.

16. Now, switch the generator OFF and prepare the converter for real testing. First, you need to fix (by screwing) a cylindrical wave-guide aluminum rod to the converter. It is always better to separate the converter from your mechanical load (from the part that would be vibrated), using an aluminum wave-guide rod. For making wave-guides use only AL 7075 (see the drawing below).



For fixing aluminum wave-guide to the converter use couple of proper spanner wrenches (see the pictures below).



Spanner

Tighten

Loosen



In cases of prolonged testing under heavy loading conditions, you could apply water jacket (with 2 O-rings) for cooling the wave guide rod.

