SERVICE MANUAL

Vortex Mixer

MX-S Adjustable speed model
MX-F Fixed speed model

VERSION20170204

CONTENTS

Chapter 1: Working Principle

1.1 Introduction

FIG.1

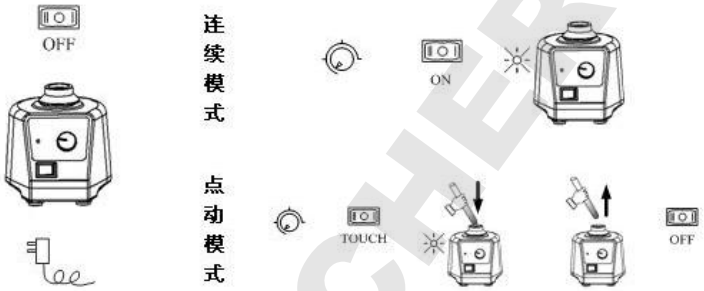


FIG.2

Through a standard fixture, Single Head Oscillator makes an oscillating movement with different intensity action on test tube and other carriers, and then to mix evenly the liquid in carrier. Fig. 1 is the schematic diagram of adjustable Single Head Oscillator MX-S. There are two-way switch, indicator, and speed control knob on the control panel. Fig. 2 is the schematic diagram of MX-S working. When turn the two-way switch to the left "ON", the current mode is continuous mode, you can set speed by turning the speed control knob to start oscillation movement; when turn the two-way switch to the right "TOUCH", the current mode is JOG Mode, and after set the speed by turning the speed control knob as well as when only apply certain force upon the mixed carrier on the standard fixture, you can start oscillation movement. And when the force is withdrawn, the oscillating movement will stop. Non-adjustable Single Head Oscillator MX-F and MX-S provide the same mode, namely continuous and jog modes. The difference of them is that MX-F has no speed adjustment knob, and the speed of the oscillation movement is not adjustable.

1.2 Structure

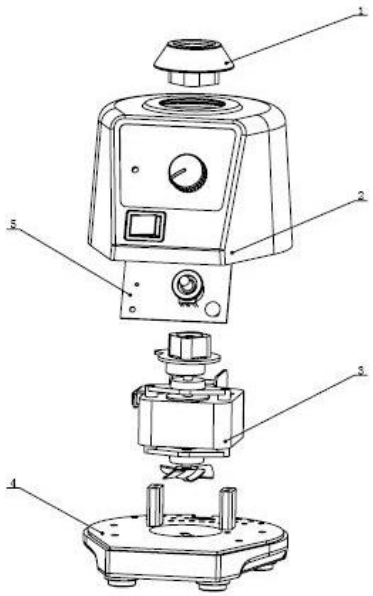


FIG.4

1	Vibration-head
2	Guard module
3	Motor module
4	Base module
5	Main board

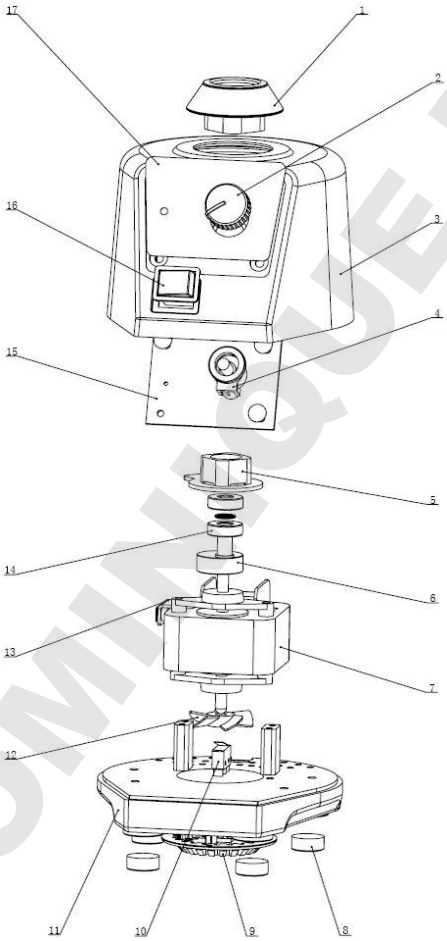


FIG.5

1	Vibration-head
2	Knob
3	Guard
4	Potentiometer
5	Axile Bush
6	Eccentric bushing
7	Motor
8	Silicon foot
9	Ventilation hood
10	Action switch
11	Base
12	Fan
13	Setting plate
14	Bearing
15	Main board
16	Switch
17	membrace

Fig. 4 illustrates the spitted structural components of MX-S, and Fig. 5 is the Exploded View of MX-S. Guard Module is consisted of Guard, key film, knob, and switch etc.; Motor Modules include: motor, Bearing, Bearing sleeve, Eccentric Bushing, cable, fan etc.; Base Module: Base, Action Switch, Fan Ventilation hood, foot and so on

Power supply: 220V (or 110V) → Driver MAIN BOARD → system control power supply

Linkage mode: turn power switch to “ON”, the motor is powered on to drive Eccentric Bushing, Bearing on it to rotate. Bearing sleeve is fixed on the bearing outer ring. Under the action of the cable, Bearing sleeve does not rotate with the bearing, but swing at the gyration radius of Eccentric Bushing. Standard fixture is set on the Eccentric Bushing, and moves synchronously with the Eccentric Bushing.

Jog modes: turn power switch to “TOUCH”. At this time, motor circuit is in series with Action Switch. Only after the Action Switch is touched, the motor is powered on. Apply a force on the standard fixture, Dual Shaft Motor moves downwardly, to touch Action Switch and power on motor. The motor drives Eccentric Bushing, Bearing on it to rotate. Bearing sleeve is fixed on the bearing outer ring. Under the action of the cable, Bearing sleeve does not rotate with the bearing, but swing at the gyration radius of Eccentric Bushing. Standard fixture is set on the Eccentric Bushing, and moves synchronously with the Eccentric Bushing.

Speed adjustment: Turn the speed control knob to set the oscillation speed.(MX-S)

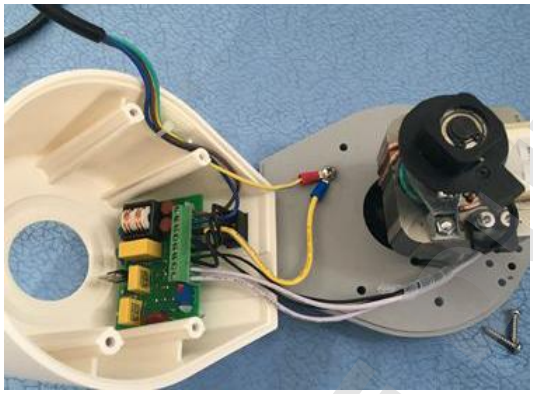
Chapter 2: Removal and Installation of Instrument

When instrument failure occurs, first, you should conduct a failure analysis; if the failure is caused by the damage of instrument hardware, the related component must be repaired or replaced. Here are the relevant contents of the replacement and disassembly of instrument.

2.1 Removal

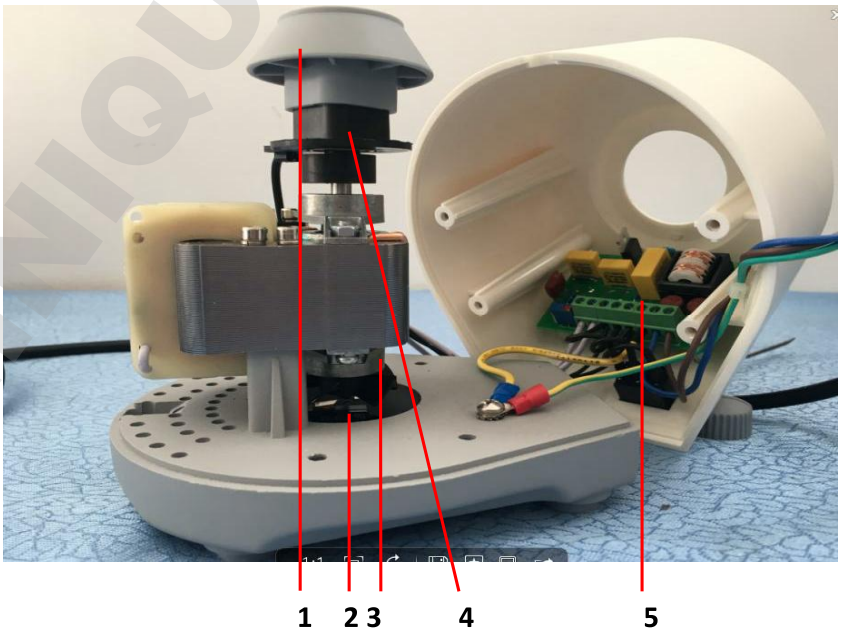
Tool：Cross screwdriver

Step 1: Unplug standard fixture Vibration-head for retention;



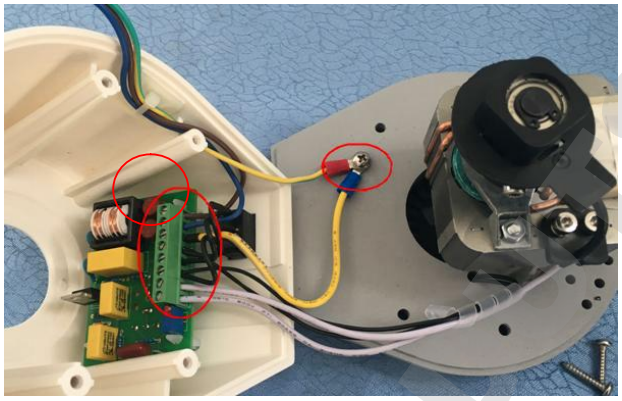
Step 2: Turn the instrument upside down, by the use of tools, remove the screws marked by the red circles for retention, as shown in figure;

2.2 Main parts illustration



Item	Spare part	MX-S	MX-F
1	Vibration-head	18200158	18200158
2	Microswitch	18100109	18100109
3	Motor	18100188	18100188
4	Axile Bush	18200172	18200172
5	Main Board	18100040	18100041

2.3 Circuit Connections



Step 1: According to the red circles in figure inspect whether circuit connections is reliable. When install instruments after have replaced a component, please to carry on circuit connections, as shown in the figure;

Step 2: during connection, you must note the connecting sequence of three black cables of power switch and that of power cable;

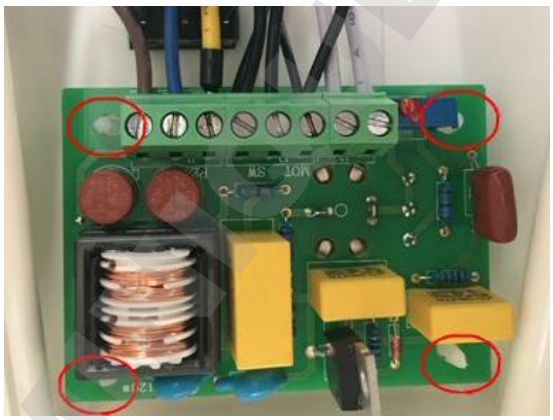
2.4 Replacement of drive board

Step 1:

Disassemble the cable that connect the terminals of the MAIN BOARD to other components;

Step 2:

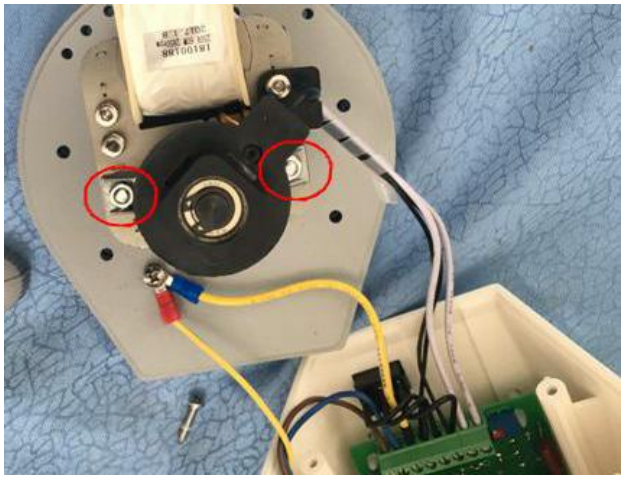
Unplug knob, peel off membrane;



Step 3:

By the use of pinch-off pliers to remove the clamp of MAIN BOARD marked red circle, and then remove the MAIN BOARD;

2.5 Replacement of Motor module



Step 1: Disassemble the cable that connects motor to MAIN BOARD, and remove the socket hexagon screws (marked by the red circles) by the use of tools for retention. Replace new Motor Module;

Step 2: After the motor is installed, repeatedly apply a force on the Bearing sleeve, to check Action Switch (marked by the red circles) is on appropriate position. Before no external force is applied, the Action Switch is free release; after the external force is applied, the Action Switch shrapnel presses and moves yellow touch button, to start Action Switch;

Step 3: When the motor inappropriately fits Action Switch, you need to fine-tune the Action Switch, namely bend slightly the Action Switch shrapnel along green arrow, as shown in figure; repeatedly test motor shaft being applied dynamic pressure, to examine whether the motor shaft is applied with dynamic pressure under different states of the Action Switch;

2.6 Replacement of Action Switch Module

Step 1: Remove the cable of Action Switch marked by red circles by the use of tools;

Step 2: Turn the instrument upside down, by the use of tools, remove the screws marked by the red circles for retention, as shown in figure; replace new Action Switch Module;

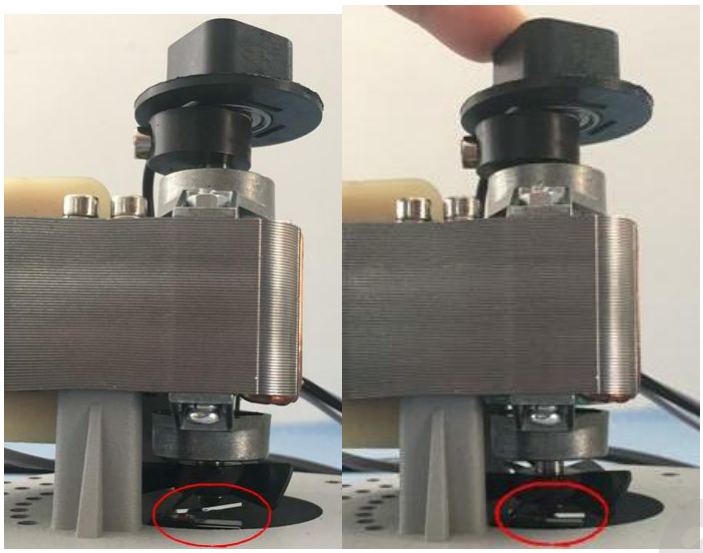
Step 3: Adjust the matching position of the motor and Action Switch; if you need to fine-tune the Action Switch, bend slightly the Action Switch shrapnel along green arrow, as shown in figure; repeatedly test motor shaft being applied dynamic pressure, to examine whether the motor shaft is applied with dynamic pressure under different states of the Action Switch;

Chapter 3: trouble shooting

FAULT CODE	PROBLEM	CAUSE	SOLUTION
E01	No operation response (LED off)	No power supply	Check and connect the power supply, then power on again
		Some cable Connection is failure	As shown in the chapter 2.1 open the instrument and check all the connection, re-connect.
E02	Does not oscillate in Linkage Mode	the power switch doesn't placed in "II" position	Check the power switch is turned on, is should be placed in "II" position (namely "ON" in figure);
		No set a target speed	Turn the knob to set the speed;
		Some cable connection is failure	Check if each cable is loose and re-connect it.
		the position of the motor and Action Switch goes failure	Adjust the distance of motor and action switch(as shown in the chapter 4.1)
E03	Does not oscillate in Jog Mode	the power switch doesn't placed in "I" position	Check the power switch is turned on, is should be placed in "I" position (namely "TOUCH" in figure);
		Some cable connection is failure	Check if each cable is loose and re-connect it.
		the position of the motor and Action Switch goes failure	Adjust the distance of motor and action switch(as shown in the chapter 4.1)
EO4	The motor stops automatically	No power supply	Check and connect the power supply, then power on again
		Overheating protection	Stop working about 20 minutes, boot up again after motor cooling down.
E05	Speed is not controlled	The main board is failure	Replace a new main board
		The photosensor switch is failure	Replace a new photosensor switch.
		Motor is over heated	Stop working about 20 minutes, boot up again after motor cooling down.

Chapter 4: Test method

4.1 Check the position of the motor and action switch



As shown in the figure, repeatedly apply a force on the Bearing sleeve, to check Action Switch (marked by the green circles) is on appropriate position. Before no external force is applied, the Action Switch is free release; after the external force is applied, the Action Switch shrapnel presses and moves yellow touch button, to start Action Switch; If the motor and Action Switch are in appropriate location, the motor and Action Switch fail, and you need in turn to replace the Motor Module or Action Switch Module;

Step 3: Fine tune Action Switch position After test, you find that the motor inappropriately fits Action Switch, you need to fine-tune the Action Switch, namely bend slightly the Action Switch shrapnel along green arrow, as shown in figure; repeatedly test motor shaft being applied dynamic pressure, to examine whether the motor shaft is applied with dynamic pressure under different states of the Action Switch.