ACHIEVER™ Overhead Stirrer Service Manual

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CHAPTER 1 INTRODUCTION

1.1 Introduction

This service manual contains the information needed for diagnosis and repair of Ohaus Achiever Overhead Stirrer series (OHS). The contents of this manual are contained in five chapters:

Chapter 1 Introduction – Contains information regarding Identification label, the safety rule, tools and test equipment, specifications and working principles of OHS.

Chapter 2 Troubleshooting – Provides guidelines for evaluating the condition and performance of a OHS unit, and a standard troubleshooting methodology to follow, as well as a diagnostic guide.

Chapter 3 Maintenance and Repair Procedures – Contains preventive maintenance procedures and disassembly, repair and replacement procedures.

Chapter 4 Service Electronic – Contains guides for checking the locking-ring sensor.

Chapter 5 Parts Identification – Contains pictures of spare parts, identifying all serviceable components with parts lists.

Before servicing the overhead stirrer, you should be familiar with the Instruction Manual.

1.2 Identification label

The identification label is stuck on the back part of the instrument. This label reports the initials of the manufacturer, the identification of the instrument and all information essential for the electrical connection to the mains supply.

Code	Instrument type
S/N	Serial Number
V	Voltage supply
Hz	Frequency supply
W	Max Power absorbed

IMPORTANT:

It is always necessary to communicate the S/N reported on the identification label for any request to the service center.

1.3 General safety rules

The manufacturer, at design and construction, has paid particular attention to issues that may cause risks to the safety and health of people who interact with the instrument, taking into consideration, "rules of engineering practices". However, some safety notes are marked with signal words and warning symbols. These show safety issues and warnings. Ignoring the safety notes may lead to personal injury, damage to the instrument, malfunctions and false results.

CAUTION: Read all safety warnings before servicing this equipment. Failure to comply with these warnings could result in personal injury and/or property damage. Retain all instructions for future reference.

- The purpose of this information is to sensitize professionals to pay particular attention to avoid any risk. Caution is still irreplaceable. Security is also in the hands of all the actors who interact with the instrument.

- Any staff involved in any type of surgery, throughout the lifetime of the instrument, must have specific technical skills and experience in the specific field. Lack of these requirements may result in damage to safety and health of users.

- Do not abuse, do not circumvent, do not delete or bypass the safety devices installed.

- Verify that the local AC power supply is within the input voltage range printed on the equipment’s data label. - Only connect the AC power cord to a compatible grounded electrical outlet.

- Disconnect power from the equipment before cleaning or servicing the equipment.

1.4 Safety during maintenance

The procedures in this manual have been tested and selected by the manufacturer's specialists. Operational methods, therefore, are considered authorized.

- Before performing any technical support make sure that the power supply is disconnected from the network.

- Some procedures should be performed using equipment and tools that simplify and improve the execution time.

- All tools must be in good condition to prevent damage to components of the instrument and to carry out the work properly and safely.

- Wear personal protective equipment provided by law on safety in the workplace and those indicated in the operating manual.

- Do not use liquid detergents to remove grease.

- Replace worn or damaged parts only with original Ohaus parts. This will ensure better performance and longer service life.

1.6 Specifications

Complete specifications for the Ohaus Achiever Overhead Stirrer series are listed in Table 1-1. When a overhead stirrer has been serviced, it must meet the specifications listed in the table. Before servicing the overhead stirrer, determine what specifications are not met.

TABLE 1-1. SPECIFICATIONS FOR ACHIEVER OVERHEAD STIRRER

	Models		e-A51ST020, e-A51ST040, e-A51ST060, e-A51ST100, e-A51ST200	e-A51ST020, e-A51ST040, e-A51ST060, e-A51ST100, e-A51ST200
General features	Power supply		230 V / 50-60 Hz (+/-10%)	115V / 60 Hz (+/-10%)
	Dimensions (WxHxD)	e-A51ST200	90x315x235 mm (3.54x12.40x9.25 in)	90x315x235 mm (3.54x12.40x9.25 in)
		Other Models	90x285x235 mm (3.54x11.22x9.25 in)	90x285x235 mm (3.54x11.22x9.25 in)
	Weight	e-A51ST200	4,6 kg (10,14 lb)	4,6 kg (10,14 lb)
		e-A51ST100	4,1 kg (9,04 lb)	4,1 kg (9,04 lb)
		Other Models	4,1 kg (9,04 lb)	4,1 kg (9,04 lb)
	Power input		190 W	190 W
	Construction material (structure)		Aluminum	Aluminum
	Working in continuous		Admitted	Admitted
	Settable restart modality		Stop or work	Stop or work
	Noisiness		<< 60 dBa	<< 60 dBa
	Environmental temperature admitted		+5…+40 °C	+5…+40 °C
	Storage temperature admitted		-10…+60 °C	-10…+60 °C
	Max humidity		80%	80%
	Level of electrical protection CEI EN60529		IP 54	IP 54
	Overvoltage category		II	II
	Pollution degree CEI EN61010-1		2	2
	Max altitude		2000 m	2000 m
Stir	Stirring capacity	e-A51ST200	100 l H_2O	100 l H_2O
		e-A51ST100	100 l H_2O	100 l H_2O
		e-A51ST060	40 l H_2O	40 l H_2O
		e-A51ST040	25 l H_2O	25 l H_2O
		e-A51ST020	25 l H_2O	25 l H_2O
		e-A51ST200	6-400rpm (1) – 30-2000rpm (2)	6-400rpm (1) – 30-2000rpm (2)

	Programmable speed range	e-A51ST100	30-1300rpm	30-1300rpm
		e-A51ST060	30-2000rpm	30-2000rpm
		e-A51ST040	30-2000rpm	30-2000rpm
		e-A51ST020	30-2000rpm	30-2000rpm
	Motor type		BLDC	BLDC
	Speed selection		1 rpm step	1 rpm step
	Stirring alarm		Motor fault	Motor fault
	Motor rating output		150 W	150 W
Torque	Max torque admitted	e-A51ST200	200 Ncm (1) – 40 Ncm (2)	200 Ncm (1) – 40 Ncm (2)
		e-A51ST100	100 Ncm	100 Ncm
		e-A51ST060	60 Ncm	60 Ncm
		e-A51ST040	40 Ncm	40 Ncm
		e-A51ST020	20 Ncm	20 Ncm
Counters	Motor counter		Working hours	Working hours

1.7 Working principles

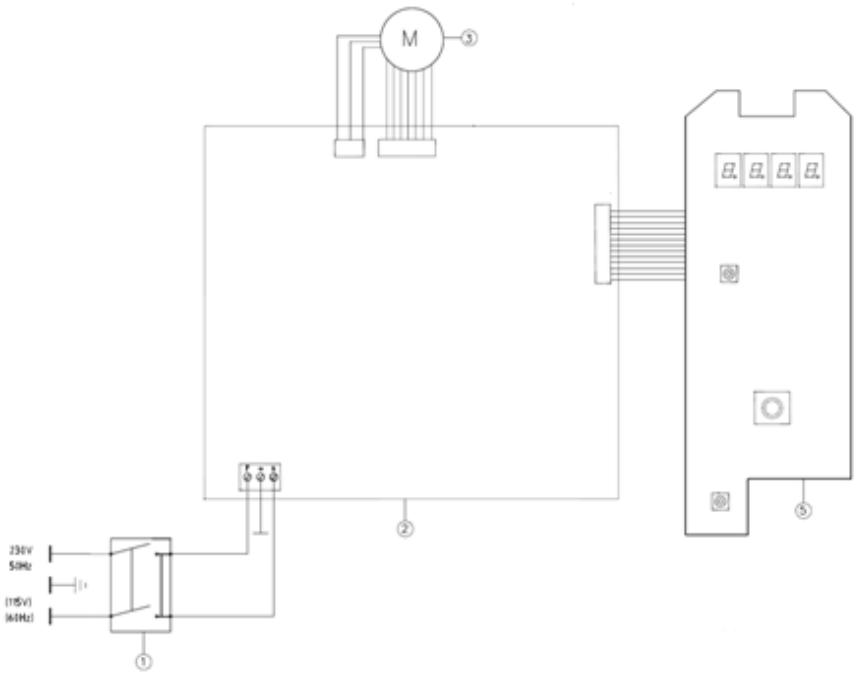


Figure: Electrical Scheme OHS Digital

Description	Position in the scheme
Main switch	1
Main board	2
Electric motor	3
Display board	5

CHAPTER 2 TROUBLESHOOTING

2.1 Alarm messages and Troubleshooting

This section of the manual provides guidelines for evaluating the condition and performance of a overhead stirr, and a standard troubleshooting methodology to follow.

2.1.1 Alarm/warning messages

Alarm description	Possible cause	Remedial action
AL1 - Motor doesn't start stirring	Motor is broken or disconnected; Main does not supply power at the motor;	Check the continuity of the motor electric circuit and, if necessary, replace the motor Check the voltage supplied at the motor and, if necessary, replace the main board;
AL2 - High internal motor temperature	Temperature of the motor is too high (>120°C) Motor thermostat is broken;	Check the application of the customer in order to identify the viscosity of the sample; Check the ohmic value of the motor thermostat and, if necessary, replace the motor;
AL3 - Motor overload	The torque is too high; Motor doesn't work correctly	Check application of the customer (volume, viscosity…); Check if the motor shaft turn freely (without stirring shaft), and if necessary, replace the motor;
AL4 - High driver temperature	Temperature of the driver (on the main board) is too high (>100°C);	Check the application of the customer in order to identify the viscosity of the sample; Check the position of the insulating layer on the driver;
AL5 - Safety relay fault	Safety relay damaged;	If after the turn OFF/ON the alarm appears again, replace the main board;

2.1.2 Trouble shooting

The following table contains the possible causes of some failures that may occur during operation. Always perform these simple checks before removing or replacing any part.

Malfunction	Possible cause	Remedial action
Instrument does not switch on.	Power socket or main switch are broken; Main board is broken;	Check the inlet and the outlet power of the main switch; Check the inlet power at the main board and, if necessary, replace the main board;
The encoder does not respond	The encoder (display board) is broken	Switch OFF/ON the unit and, if necessary, replace the display board
Instrument shows “0000”		Contact Ohaus Service Support

CHAPTER 3 MAINTENANCE AND REPAIR PROCEDURES

WARNING:
Electrical shock hazards exist within the housing. The housing should only be opened by authorized and qualified personnel. Remove all power connections to the unit before opening.

3.1 Remove the External Cover

In order to open the OHS system, remove the two screws on the bottom and the one on the top (below plastic cup):


This allows removal of the frontal part from the case.

NOTE: When the frontal cover is removed, pay attention to the gaskets between the two metal parts.

To separate the upper case from the lower case, remove the screw on the back of the system (near the Pt100 port).

NOTE: When the upper case is removed, pay attention to the gaskets between the two metal cases;

3.2 Replacing the Smart-Chuck

To remove the smart chuck, turn it until the hole on the lock-ring is aligned with the hole of the motor shaft:

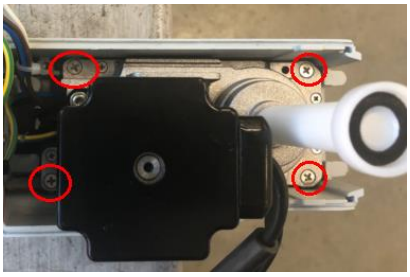

Using a screw-driver, block the motor shaft and unscrew the smart-chuck:

NOTE: in order to lock the smart-chuck in the correct position, block the shaft of the motor with the screwdriver even during the screw of the new chuck;

3.3 Replace the Motor

Follow the instruction in chapter 3.1 and 3.2 to open the OHS system and remove the chuck.

The motor is on the lower case. To replace it, remove the screws that hold the motor support at the lower case and the ground-connection cable and disconnect the motor at the main board:



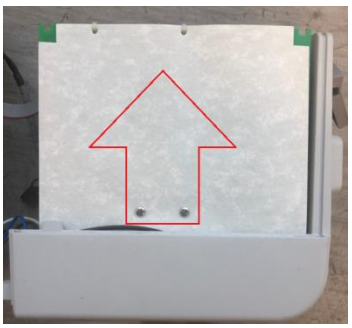
3.4 Replace the Display or the Main PCB

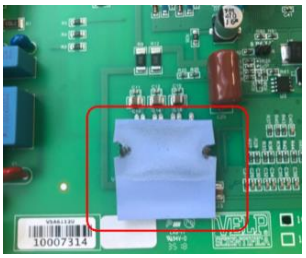
Follow the instruction in chapter 3.1 to open the OHS system.

The display board is on the frontal case. To replace it, remove the screws that hold the board at the case:

NOTE: The battery of the display board is insulated with plastic layer (The plastic layer MUST be removed)

The main board is screwed on the internal motor support. To replace it unscrew the two screws on the lower end and slide out the board from its housing:





NOTE: When the main board is removed, pay attention to the insulating layer above the driver.

3.5 Replace the Locking-Ring Sensor

Follow the instruction in chapter 3.1 to open the OHS system.

Follow the instruction in chapter 3.3 to remove the motor.

The locking-ring sensor is below the motor, to remove it, unscrew the screw that hold it on the lower case and disconnect it from the main board:

3.6 Replace the Locking-ring

Follow the instruction in chapter 3.2 to remove the chuck.

To remove the Locking-ring, is necessary to unscrew-it from the locking ring holder:

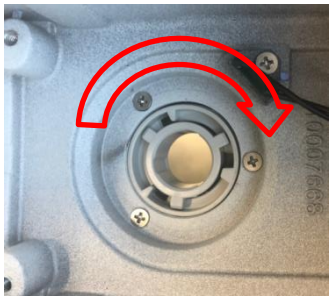
CHAPTER 4 SERVICE ELECTRONIC

WARNING:
Electrical shock hazards exist within the housing. The housing should only be opened by authorized and qualified personnel. Remove all power connections to the unit before opening.

4.1 How to check the Locking-Ring Sensor

Follow chapter 3.1 instructions, to open the OHS system. Then disconnect the sensor from the main board and measure the electrical continuity. When the locking-ring is turned, the continuity must be changed (open/close):

The sensors are magnetic, so it is necessary to check that even the magnet on the locking-ring is in position. To access this magnet, follow step 3.2, to remove the chuck and disconnect the locking ring by rotation and pulling down.



CHAPTER 5 PARTS IDENTIFICATION

5.1 Part list and Images

See "Service Parts List" document for Overhead Stirrer e-A51 Series.

NOTE:

When replacement parts are needed, refer to the spare part list for the model you are servicing. Parts lists are available from your local Ohaus office.