APPLIED MATERIALS®

Keller Compact Separator

Installation, Operation and Maintenance Manual

Date: April 23, 2010

Standard Part No.: 0230-XXXXX
Revision: 0.1

Applied Materials Confidential

Service Information

The Applied Materials Global Help Center is open 24 hours/day, 7 days/week. Please have your model number, serial number, and phone number ready when you call any of the numbers listed on this page.

Contact the Applied Materials Global Help Center:
Phone: +1 (888) 432-6797 — This USA number is toll-free within the USA; Internationally, a toll may apply.

INFORMATION: For International Dialing (Calling) Codes, including Country Codes and IDD (International Direct Dialing) Prefixes, you may consult the Internet. Recommended: http://kropla.com/dialcode.htm.

Applied Materials Corporate Headquarters

3050 Bowers Avenue
Santa Clara, CA 95054-3299 USA
Phone: +1 (888) 432-6797 or +1 (408) 727-5555

FAX: +1 (408) 748-9943
On the web at: www.AppliedMaterials.com

Applied Materials Authorized Representative in the European Union

Applied Materials France S.A.R.L.
11B, Chemin de la Dhuy
38246 Meylan Cedex (Grenoble)
France

About this Manual

Contact Technical Publications for additions or corrections to this manual. Suggestions and corrections may be submitted by email to: tech_pubs@amat.com. Please include your contact information, manual part number and revision and the correction or addition information.

Disclaimer

Applied Materials, Inc. has prepared this manual for use by Applied Materials personnel. The information contained herein is the property of Applied Materials, Inc.

Applied Materials makes no representations or warranties with respect to the information contained in this manual. The information contained in this manual is for informational purposes only and is subject to change without notice. Applied Materials assumes no responsibility for omissions or errors that may appear in this manual. Further, Applied Materials reserves the right to make changes in the specifications of the product described in the manual at any time, without notice, and without obligation to Applied Materials, Inc.

Trademarks

The following are trademarks of Applied Materials, Inc. and other companies and are not to be reproduced or used in any fashion without written approval from Applied Materials or the company that owns the trademark:

Trademark	Registered Owner
Compact Separator VARIO T 1.0	Keller Lufttechnik GmbH + Co. KG

Table of Contents

List of Figures

Keller Compact Separator Installation, Operation and Maintenance Manual
Standard Part No.: 0230-XXXXX - Revision: 0.1

Applied Materials Confidential

List of Tables

1 Introduction

This chapter introduces the Keller Compact Separator unit. This manual provides instructions on how to install the Separator unit to the Baccini Laser system. The startup, shutdown, normal operation, maintenance and troubleshooting the Separator unit are described in this manual.

Figure 1-1 shows VARIO T 1.0 model Compact Separator unit installed onto the Baccini Laser system.

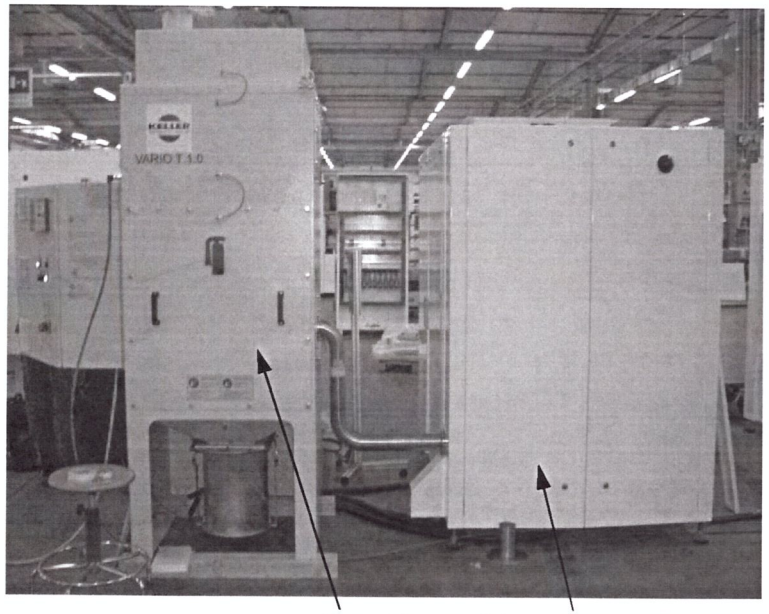

Figure 1-1. Keller Compact Separator Unit Installed On the Baccini Laser System

1.1 Overview

The Separator unit is a filtering separator designed to collect dry substances and separate them from industrial exhaust air. The Separator is not designed to handle combustible or explosive dusts, unless it has special equipment which is appropriate for such requirements.

The properties of the substances that are to be collected determines the selection of the filter element which meet various requirements (i.e., filtration efficiency, temperature resistance, etc.).

Read this entire manual before operating or performing maintenance on the Separator. It contains important safety information and familiarizes you with the system and its requirements.

INFORMATION: For specific process application, please contact the Applied Materials Global Help Center at +1 (888) 432-6797, or contact your local Applied Materials representative for help with the Keller Compact Separator unit.

1.2 Manual Use and Layout

1.2.1 Intended Audience

The *Keller Compact Separator Installation, Operation and Maintenance Manual* is intended for all technical staff who might be involved with the Keller Compact Separator, including technicians, equipment engineers and service engineers.

INFORMATION: Users of the maintenance and troubleshooting sections of this manual should be qualified electronics technicians or engineers who are familiar with exhaust systems and who have had training on the Separator.

1.2.2 Organization of this Manual

This manual is organized as a comprehensive reference and is arranged into logical sections, with each section covering a specific function or need. It includes information for users who have limited experience with the Keller Compact Separator as well as for more experienced users. Refer to the Table of Contents for a complete listing of all topics.

The *Keller Compact Separator Installation, Operation and Maintenance Manual* is divided into the following sections:

1 Introduction

This chapter introduces the Keller Compact Separator unit. This manual provides instructions on how to install the Separator unit to the Baccini Laser system. The startup, shutdown, normal operation, maintenance and troubleshooting the Separator unit are described in this manual.

Figure 1-1 shows VARIO T 1.0 model Compact Separator unit installed onto the Baccini Laser system.

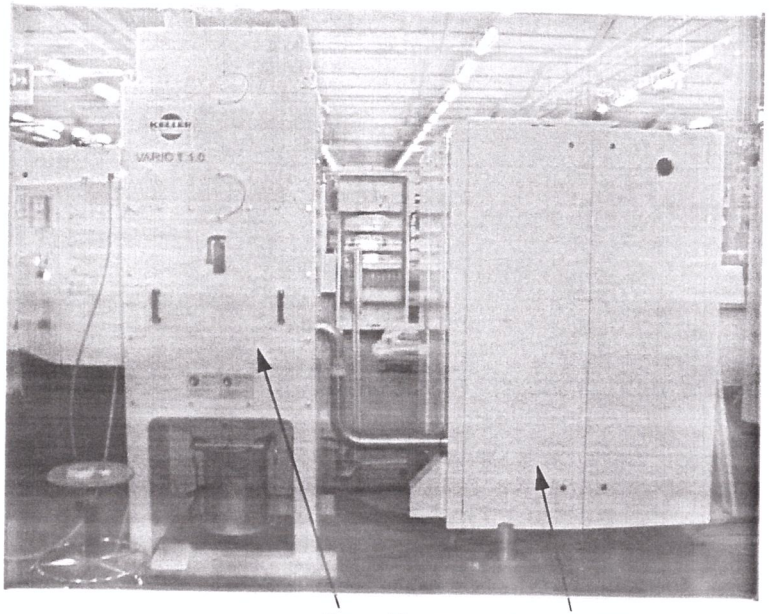

Figure 1-1. Keller Compact Separator Unit Installed On the Baccini Laser System

1.1 Overview

The Separator unit is a filtering separator designed to collect dry substances and separate them from industrial exhaust air. The Separator is not designed to handle combustible or explosive dusts, unless it has special equipment which is appropriate for such requirements.

The properties of the substances that are to be collected determines the selection of the filter element which meet various requirements (i.e., filtration efficiency, temperature resistance, etc.).

Read this entire manual before operating or performing maintenance on the Separator. It contains important safety information and familiarizes you with the system and its requirements.

INFORMATION: For specific process application, please contact the Applied Materials Global Help Center at +1 (888) 432-6797, or contact your local Applied Materials representative for help with the Keller Compact Separator unit.

1.2 Manual Use and Layout

1.2.1 Intended Audience

The *Keller Compact Separator Installation, Operation and Maintenance Manual* is intended for all technical staff who might be involved with the Keller Compact Separator, including technicians, equipment engineers and service engineers.

INFORMATION: Users of the maintenance and troubleshooting sections of this manual should be qualified electronics technicians or engineers who are familiar with exhaust systems and who have had training on the Separator.

1.2.2 Organization of this Manual

This manual is organized as a comprehensive reference and is arranged into logical sections, with each section covering a specific function or need. It includes information for users who have limited experience with the Keller Compact Separator as well as for more experienced users. Refer to the Table of Contents for a complete listing of all topics.

The *Keller Compact Separator Installation, Operation and Maintenance Manual* is divided into the following sections:

Chapter 1, Introduction Provides the Separator unit description as well as a general introduction to the structure and purpose of this manual. It specifies the intended audience, briefly describes the manual's organization, explains special text format conventions, and lists specific acronyms and abbreviations used in this manual.

Chapter 2, Safety Covers the safety considerations and safety precautions that must be addressed when working with the Separator. It describes the types of hazards associated with the Separator and includes procedures to lockout/tagout the abatement module.

Chapter 3, Installation Provides the installation procedure for connecting the Separator unit to the Baccini Laser tool.

Chapter 4, Initial Startup Procedures Provides instructions for setting the vacuum pressure and clock generator. The initial startup procedure is also described.

Chapter 5, Normal Startup and Shutdown Provides the normal startup and shutdown procedures for the Separator unit.

Chapter 6, Inspection and Maintenance Provides routine preventive maintenance procedure to ensure continuous trouble-free performance of the unit.

Chapter 7, Troubleshooting Provides a summary of possible problems and their respective solutions.

1.3 Format Conventions for Text and Graphics

Text Formats

To help locate and identify information easily, the manual uses standard text formatting conventions, as shown in Table 1-1.

Table 1-1. Formatting Conventions

Type Style	Represents
bold	Subject headings, figure titles, and table titles. Bold is also used for special emphasis in the text.
bold narrow	Controls, Switches, Buttons, and Icons: • Control and switch labels (**ON**, **OFF**, **STOP**, etc.) • Button labels on the HMI (**MAINT**, **PREVIOUS**, etc.) • Control icons on the HMI (**Valve NNN**), etc.)
	Tags: Tag numbers are shown as labels on specific components (valves, etc.) on the tool and corresponds to the numbers found on the P&ID drawings (inside hexagon-shaped identifiers). Tag numbers referenced within this manual are shown as **Tag NNN** or **Valve NNN**.
	Software Commands: Commands must be typed exactly as they appear. To carry out a command, type in the command and press the **Enter** key.
	Modes: Various system operating modes such as **Bypass** mode, Abatement mode, etc.
Capital letters	Screen names: Screen names capitalize the first letter in each of the words making up the screen name (Reactor screen, Inlets and Burner screen)

Graphics and Illustrations

Drawings in this manual are not drawn to scale. The tolerance of dimensions is ± 1/16 inch (± 1.6 mm), unless otherwise noted.

Dimensions are provided in both English and International System (SI) units, as shown in Figure 1-2.

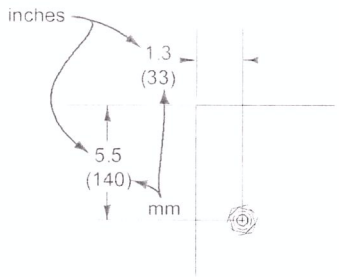

Figure 1-2. Dimensions Shown in English and SI Units

1.4 Technical Support

To obtain technical support or to order parts, contact the Applied Materials Global Help Center at +1 (888) 432-6797, or contact your local representative.

1.5 Reference Information

Additional user documentation to support the Keller Compact Separator is shown in Table 1-2.

Table 1-2. Additional Separator Reference Documentation

Part Number	Title
	Keller Compact Separator VARIO / VARIO T Dust Collector Cell EZV Operating and Maintenance Instruction Manual

Contact your local Applied Materials representative or Applied Materials Technical Support to order additional reference documentation.

1.6 Revision History

The *Keller Compact Separator Installation, Operation and Maintenance Manual* revision history is shown in Table 1-3.

Table 1-3. Revision History (0230-xxxxx

Release Date	Revision	Description
April, 2010	0.1	Initial Release.

2 Safety

2.1 Safety Overview

⚠ WARNING

Warning

Working safely with the Separator unit is possible if all instructions regarding the Separator and its components have been read thoroughly and are carefully followed.

All equipment operators must read and understand the operating and maintenance instructions before operating this equipment.

The *Keller Compact Separator Installation, Operation and Maintenance Manual* is supplied with the Compact Separator unit. Each person performing installation, commissioning, operation, and servicing of the Separator unit must have read the operating and maintenance instructions and understood every detail. This also applies to personnel who operate and work on the system only periodically. The instructions must be within reach and stored in nearby. Before initial start-up of the system, request a demonstration and have the operation of the unit explained to you.

2.2 Keller Compact Separator Unit Energy Isolation Procedures

⚠ WARNING

Warning

Preventive and thorough maintenance is essential for the safety of the personnel working within range of the Separator unit. In addition, it ensures the proper operation of the Separator unit.

Only qualified personnel must perform the inspection, maintenance and service work.

Information and specifications regarding maintenance work and its intervals stated in the operating instructions are only recommendations, because the manufacturer does not have practical data for the long- term under the special operating conditions of each customer. The information stated in the operating instructions is to be supplemented with your own practical experience.

2.2.1 General Information for All Energy Isolation Procedures

Applied Materials requires lockout/tagout to be performed before working on a specific piece of equipment unless otherwise specified in the maintenance procedure. All energy sources to the equipment must be locked and tagged out before beginning work unless otherwise indicated in the specific procedures. Customer facilities may have additional policies and procedures. Follow specific customer facility policies and procedures when performing lockout/tagout of the Separator unit and the electrical isolation of the Baccini Laser tool.

INFORMATION: Because the Keller Compact Separator unit is connected downstream from the Baccini Laser, it is necessary to shut down the Laser tool when performing maintenance on the Keller Compact Separator unit.

Table 2-1. Separator Unit Lockout/Tagout Matrix

Energy Source(s)	Energy Type Being Controlled	LOTO Location	LOTO Device Used	How to Test
CDA	Pneumatic	Manual stop valve	Padlock	Attempt to turn on valve
Electrical Sources	Electrical	Circuit breakers on ???	Circuit breaker locks and padlocks	Attempt to turn on circuit breakers. They should not turn on. Verify nothing is visible on touchscreen monitor. Measure AC power in affected modules.
House Exhaust				

2.2.2 Measures To Be Taken Before Performing Maintenance

Before undertaking any work, such as inspection and maintenance, please reduce the amount of waste in the dirty air chamber of the Separator to a minimum:

- Run the system for approximately one minute without feeding the substances that are to be separated. In addition, turn **OFF** the processing machine that is being exhausted.
- Run the automatic off-line cleaning cycle for a few minutes.
- Following the off-line cleaning cycle, please wait for approximately five minutes before opening the inspection door. This ensures that the substances to be separated have settled.
- Shut the unit down safely (see Section 2.2.3)

2.2.3 Shutting the System Down Safely

To shutdown the system:

1. Turn **OFF** the main switch.
2. Secure the main switch against re-activation (lock it by means of a padlock). See Figure 2-1.

Figure 2-1. Main Switch LOTO

3. Wait until all of the rotating parts have stopped and secure them.
4. Perform lockout/tagout of the CDA supply before performing any work at the compressed air cleaning systems. See Figure 2-2.

Figure 2-2. Compressed Air Supply LOTO

3 Installation

This chapter provides the installation procedure for connecting the Separator unit to the Baccini Laser system. This includes the Separator placement, ductwork connections, exhaust connections, CDA connection and electrical connections.

⚠ WARNING

Warning

Working safely with this unit is possible if all instructions regarding the Separator and its components have been read thoroughly and are carefully followed.

All equipment operators must read and understand the operating and maintenance instructions before operating this equipment.

To install the Separator unit:

1. Place the Separator to the installation location.
2. Assemble the components, like ductwork, capture elements, etc and fasten them according to the structural requirements.
3. Install the compressed air connection.
4. Connect the Separator by a skilled electrician.

3.1 Separator Placement

1. Move the Keller Compact Separator unit into the approximate final position next to the exhaust port on the Baccini Laser.
2. The Separator unit should be between 70 and 100 cm from the Laser tool and 70 cm from the conveyer track.

3.2 Ductwork Connections

The Inlet ductwork consists of three separate parts:

- Straight piece connecting to Laser tool
- Two 90° Pipes - one of which has a flange and is connected to the Separator.

INFORMATION: This is a typical installation example and the installation of any particular unit may vary depending upon space requirements and restrictions near the Baccini Laser tool.

To connect the inlet ductwork:

1. Connect the straight pipe to the exhaust flange on Baccini Laser tool. See Figure 3-1.

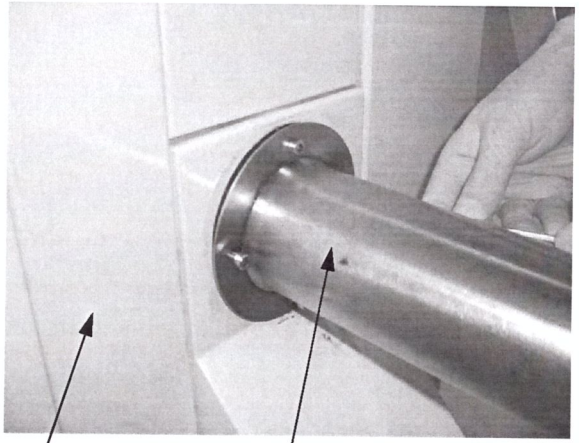

Figure 3-1. Connecting Straight Pipe to Exhaust Flange on Baccini Laser Tool

2. Connect the 90° pipe to the Separator with the supplied bracket. See Figure 3-2.

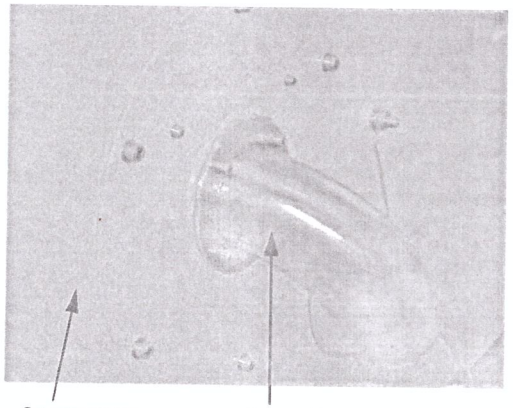

Figure 3-2. Connecting 90° Pipe to the Separator Unit

3. Install the 90° Elbow connection. See Figure 3-3.
4. Tape the ductwork to ensure no dust leakage. See Figure 3-3.

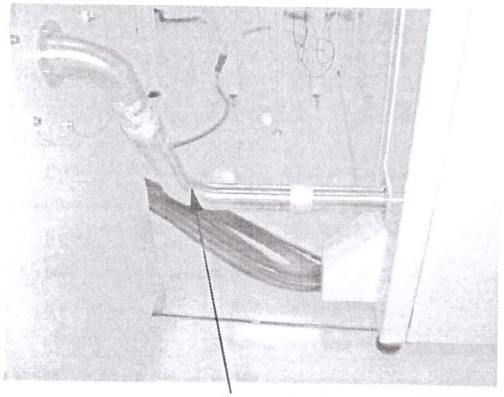

Figure 3-3. Installing 90° Elbow Connection

This completes the inlet ductwork connections.

3.3 Exhaust Connection

The flexible hose from the top of the Keller Compact Separator unit is connected to the house exhaust. See Figure 3-4.

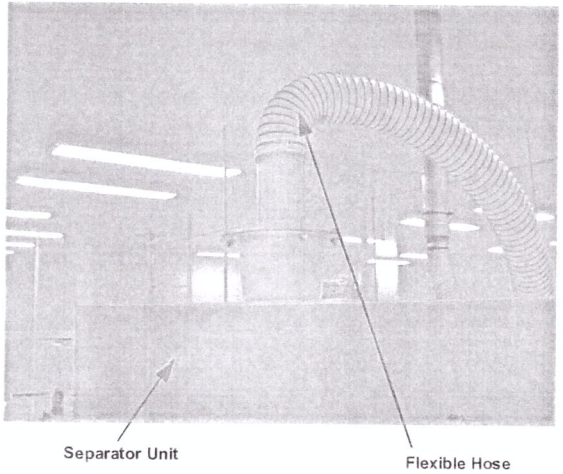

Figure 3-4. Connecting Flexible Hose to House Exhaust

3.4 CDA Connection

The customer provides compressed air from the supply to the Separator.

The compressed air should be equipped with a maintenance unit consisting of a pressure reducer (control valve), water separator and a drain with manual stop valve.

Outside supply ducts must be protected from frost (by insulated or heated duct). At very low temperatures the drying of the compressed air alone prevents condensation.

The compressed air has to be clean and the quality should adhere to the following parameters.

- Working pressure 6 barr
- Quality 3 according to Pneeurop 6611
- Residual dust < 5µm, <1mg/m³
- Pressure dew point +2°C
- Residual Oil <0.03mg/m³

To connect the compressed air supply connection:

1. Connect Air line to the Customer supply. See Figure 3-5.

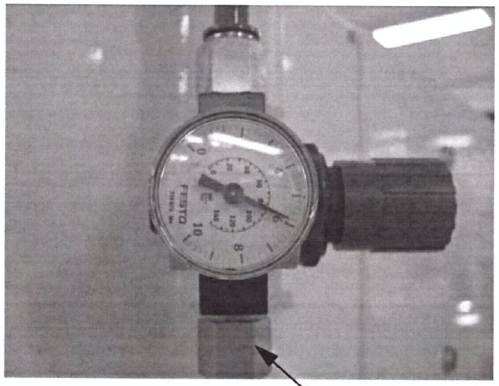

Figure 3-5. Compressed Air Supply Line

2. Compressed air connection to Separator. See Figure 3-6.

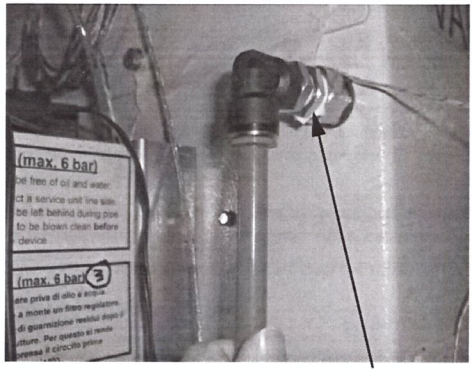

Figure 3-6. Connecting Compressed Air Supply Line to Separator

3.5 Electrical Connection

The electrical requirements for the Separator unit are listed as follows:

1. Electrical equipment requires a three phase current.
   - 3 PEN 400/230 Volt 50 Hz
   - Voltage swing must only be ± 5 % max
   - Frequency swings must only be ± 2 % max.
2. For proper functioning of the electrical equipment, the following feed must not be exceeded.
   - Voltage cut-off up to 10 ms
   - Voltage drop up to 0.5 s duration at most 15 % of the nominal voltage
   - Voltage peaks up to 1.5 ms with peak values up to 200 % of the nominal voltage (virtual value of the voltage) between the phases.
3. On initial start up, test between pins 1-2, 1-3 and 2-3. The voltage should be between 230 volts ±12volts.

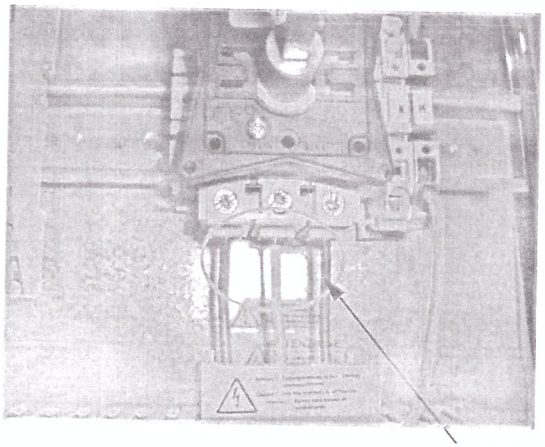

Figure 3-7. Electrical Connections

4 Initial Startup Procedures

This chapter provides instructions for setting the vacuum pressure and clock generator. The initial startup and normal operation procedures are also described in this chapter.

Need additional power on instructions...(Main power, CDA)

4.1 Variable Vacuum Setpoint

To set up the variable vacuum setpoint:

1. Open control panel door and locate the variable set point. See Figure 4-1.
2. Adjust the knob to set point 2. This will give a vacuum of approximately 300 cm^3 at the input to the Separator.
3. If the set point is higher, there will be problems with high pressure and the Separator will become noisy.

Figure 4-1. Variable Vacuum Setpoint Knob

4.2 Clock Generator Setup and Operation

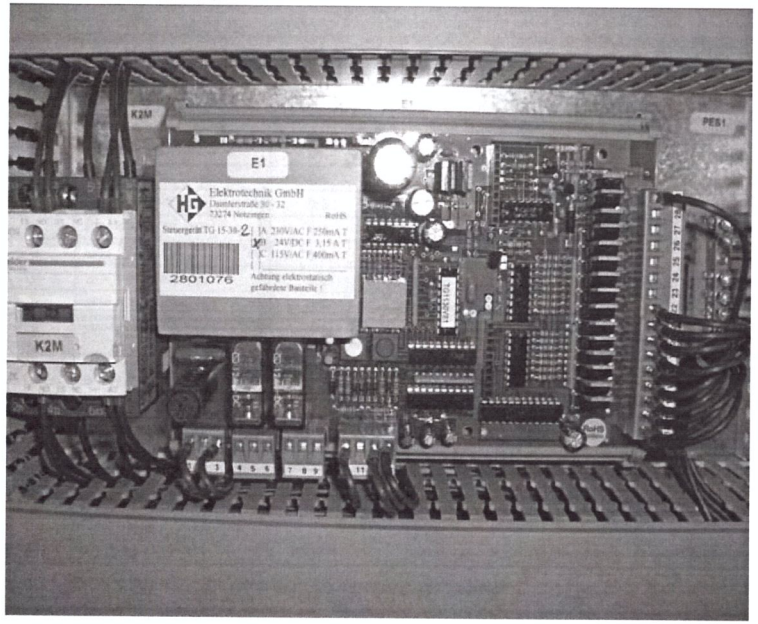

Figure 4-2. Clock Generator Components

1. White push button (left)
2. Black push button (Right)
3. Two alpha numeric displays.

4.2.1 Startup

When the supply voltage is applied, the clock generator goes though an initialization sequence. During this phase, the software version is displayed.

4.2.2 Normal Operation

The description of the values and pushbutton functions assumes that no error is present. In the case of an error message, read the information in the Section 4.2.9, Malfunctions. The cycle and run-on functions are not affected by an error condition.

During normal operation, the functions of the push buttons are as follows.

The **Black** pushbutton (R) triggers the next pulse (Manual cycling through the outputs).

INFORMATION: Pressing the buttons shows an immediate response.

The **White** pushbutton (L) invokes the Programming mode.

INFORMATION: A running cycle is aborted at the current position. On restart, the cleaning will resume from filter 1.

4.2.3 Invoke Programming mode

Depress the **White** pushbutton (L) for approximately 2.5 sec until PG appears. After releasing the pushbutton, IG will be displayed. Need screenshot

4.2.4 Select Parameter

Use the (L) pushbutton to cycle through the parameters until the correct parameter is displayed. Left display. Need screenshot

4.2.5 Set Parameter

Use the (R) pushbutton to set the required parameter value. Right display.

4.2.6 Store Parameter

When changing the parameter number or terminating the Programming mode, the parameter value is automatically stored.

4.2.7 Terminating Programming Mode

Press the (L) pushbutton for approximately 2.5 sec until the version number is displayed. Need screenshot The clock generator performs a remilitarization procedure.

NOTICE

General Notice: After terminating the Programming mode or loading the default settings, wait until the initialization procedure is complete. Never terminate the programming mode by removing the supply voltage, as the case parameter values might get lost.

4.2.8 Parameter Values

Table 4-1 lists the various parameters and their default and setup range values.

Table 4-1. Parameter Value Settings

Number	Parameter (Left Display)	Range	Minimum/ Maximum	Default Value	New Value
1	Dosage pulse * 100	0-9	0-999min F4=4	0	0
2	Dosage pulse *10	0-9	0-999sec F4=00	0	0
3	Dosage pulse *	0-9		0	0
4	Pulse period *100	0-9	0-999min F4=4	0	0
5	Pulse period *10	0-9	0-999 sec F4=0	2	0
6	Pulse period *1	0-9		0	3
7	No of run on cycles *10	0-9	0-99	0	0
8	No of run on cycles *1	0-9		0	0
9	Run on period *100	0-9	0-999Min F4=2	0	0
A	Run on period *10	0-9	0-999sec F4=0	0	0
B	Run on period *1	0-9		0	0
C	No of outputs *10	0-3	1-30	1	0
D	No of outputs *1	0-9		5	8
E	Reserved	0-f	0-f	0	0
F	Optional Parameter	0-f	0-f	b	f

As described in Table 4-1, we need to change parameters 5, 6, C, D and F.

The parameter settings for 4, 5 and 6 relate to the cleaning cycle and the default setting is 20 mins. By changing the above parameters, we will change this to 3 mins.

The parameter setting for C and D relate to the amount of filters in the Separator. The default setting is for 15 filters. We will change the setting to 8.

4.2.9 Malfunctions

The clock generator is capable of detecting the following malfunctions:

Fo Overload or short circuit

Fu Underload or open circuit

FE Internal error

5 Normal Startup and Shutdown

This chapter describes the normal startup and shutdown procedures for the Separator unit.

Need additional power on instructions...(Main power, CDA)

5.1 System Startup

To startup the system:

1. Ensure that the exhaust connections, CDA connections and all electrical connections are secure.
2. Check if all the rotating parts are secure.
3. Remove the padlock from the Main switch.
4. Turn **ON** the Main switch.
5. Perform necessary test to check if the system is operating properly.

5.2 System Shutdown

Turn off the system by pushing the **OFF** button at the switch cabinet.

When special circumstances require a rapid shutdown (in a dangerous situation), the unit can be switched **OFF** with an emergency switch located at the electrical switch box. Need picture of Emergency switch

All maintenance inspections and repairs must be performed only when the overall system is safely turned off. The procedure is as follows.

1. Turn **OFF** the Main switch
2. Secure the Main switch from turning **ON** (with padlock)
3. Wait until all rotating parts have stopped and secure them.

Allow the fan impeller and motor to wind down for approximately 3 to 5 minutes, because of residual torque.

Caution: Do not attempt to slow down rotating parts. Let them come to a complete stop before working on the fan, otherwise there is a risk of injury. A total stop can be checked visually at the motor fanwheel.

WARNING

Hazardous Voltage

Even when the main switch is turned off, parts of the electrical switch and control unit are still energized. Work in the electrical switch and control unit must only be done by a skilled electrician.

Keller Compact Separator Installation, Operation and Maintenance Manual
Standard Part No.: 0230-XXXXX - Revision: 0.1

Applied Materials Confidential

6 Inspection and Maintenance

Trouble free operation of the system depends upon regular and consistent maintenance. A regular preventive maintenance (PM) program reduces system downtime by requiring the customer to inspect, remove, clean and replace system components before they become a problem.

6.1 Maintenance

This chapter provides the schedules for performing maintenance tasks. The frequency and the maintenance operation for various components are listed in Table 6-1.

Table 6-1. Preventive Maintenance Guidelines

Frequency	Components	Operation to be Performed
Daily	Differential pressure measuring gauge	Check filter resistance
	Compressed air	Check whether compressed air is available
	Placement area	To be cleaned (for danger of fire and explosion)
Weekly	Waste Bin	Check fill level: • At 2/3 level remove the bin, cover with lid and completely dispose of in accordance with local regulations • Securely connect a new bin
Monthly	Diaphragm valves	Perform acoustic check to determine if the cleaning of the filter elements are occurring.
	Fan impeller	Oscillations imbalance can be felt by touching the outside. For removal of the impeller, contact Keller Luftttechnik. Applied Materials Global Help Center or local Applied Materials representative.
	Fan motor	Check for a trouble free run and correct rotating direction
	Ductwork and flaps	Check for deposits, clean, as necessary, especially elbows • Check fixings • Check for leaks • Check and adjust valves and flaps
	Switch cabinet	Check for damage, door seals, locks and lights

Table 6-1. Preventive Maintenance Guidelines (Continued)

Frequency	Components	Operation to be Performed
Annually	Filters Elements	Open the inspection door of the filter chamber. Check if cleaning of the elements is necessary: • Has exhaust efficiency reduced • Is there increased filter resistance • Are there deposits on the filter elements • If yes, carefully remove all filter elements. Check filter elements for damage and change, if necessary.
	Complete system	Clean inside and outside, check for corrosion damage and loose parts, repair paint damage
	Complete system	Take measurements and compare to nominal values • Air velocity • Filter resistance • Temperature • Check the adjusted values of the compressed air cleaning cycle

6.2 Removal of Waste Bin

To remove the Separator unit waste bin:

1. Switch OFF the Separator unit according to the switch off procedure. See Section 5.2, System Shutdown.
2. Disconnect the ground clip form the waste bin. See Figure 6-1.
3. Locate and pull down both the retaining clips on either side of the waste bin.
4. The bin will lower on the lifting device. Pull out the bin cover and dispose off according to local regulations.

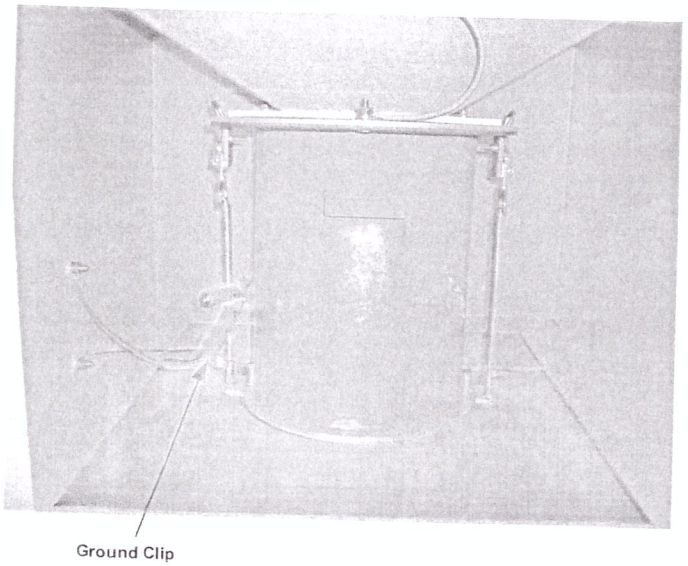

Figure 6-1. Waste Bin Location

I think we should specify the type of replacement filters and any other specific parts required for PM. Do we want to include filter replacement procedures?

7 Troubleshooting

This chapter provides a summary of possible problems and their respective solutions. See Table 7-1.

Table 7-1. Separator Unit Problems

Problem	Possible Cause	Solution
	Compressed air	Check compressed air supply and pressure.
	Wrong rotation direction of the fan	Correct the direction of rotation to clockwise direction (recognizable by a look at the motor, rotation of the motor wheel) Reversal of polarity should be performed by an electrician only.
Insufficient suction	Filter elements clogged	Replace, as necessary.
	Diaphragm valve defective	Check the cleaning function of each valve. If defective (recognizable by a missing bang or by a steady hissing noise), check the electrical connection.
	The same valve is always activated	Check the electrical switch and control unit.
	Leaky connection of the disposal bin	Connect tightly.
	Defective seal on the inspection door	Replace seal.
Dust in clean air	Filter elements or sealing gaskets	Turn off the unit. Remove the filter elements, check for damage, replace, if necessary. Replace gaskets.
	Fan pulls too much air	Search for air leaks.
Motor protection is activated	Two-phase run	Check electrical systems and make corrections.
	Wrong direction of rotation	Correct the direction of rotation to clockwise direction (recognizable by a look at the motor, rotation of the motor wheel) Reversal of polarity should be performed by an electrician only.
	Ambient temperature too high	The ambient air temperature of the motor should be 40°C maximum.

Keller Compact Separator Installation, Operation and Maintenance Manual
Standard Part No.: 0230-XXXXX - Revision: 0.1
Applied Materials Confidential

Address correspondence to:

Applied Materials, Inc.

3050 Bowers Avenue

Santa Clara, CA 95054-3299 USA

Telephone: +1 (408) 727-5555

FAX: +1 (408) 748-9943

Toll-free: +1 (888) 432-6797

Website: http://www.AppliedMaterials.com

Applied Materials Confidential