



Filtec 3-G Operation Guide

Bottles

Document 48433-0516

Industrial Dynamics Company, Ltd.

Document 48433-0516 Copyright 2016. All rights reserved.

No part of this publication may be reproduced or used in any form or by any means (graphic, electronic, or mechanical including photocopying, recording, taping, or information storage and retrieval system) without written permission of Industrial Dynamics Company, Ltd.

FILTEC® and Industrial Dynamics® are registered trademarks of Industrial Dynamics Company, Ltd. All other trademarks are the property of their respective owners.

Contact Information

Corporate Headquarters	3100 Fujita Street, Torrance, California 90505-4007 U.S.A. Telephone: 310.325.5633 FAX: 310.530.1000 Internet: www.FILTEC.com
Mailing Address	P.O. Box 2945, Torrance, California 90509-2945 U.S.A.
Shipping Address	3100 Fujita Street, Torrance, California 90505-4007 U.S.A.
Customer Service	800.733.5173

Table of Contents

Preface.	vii
Introduction	vii
Topics That This Guide Covers.	vii
Audience of This Guide	vii
Conventions That Appear in This Guide	viii
 1. Safety Information	 1-1
Section	Page
1.1 Safety Notices and Safety Labels.	1-2
1.2 Radiological Safety	1-3
 2. Overview of the Filtec 3-G Fill Level Inspector	 2-1
Section	Page
2.1 How the Filtec 3-G Fill Level Inspector Works	2-2
2.2 Optional System Features	2-5
 3. Operating Your Filtec 3-G Fill Level Inspector.	 3-1
Section	Page
3.1 Starting Your Filtec 3-G	3-2
3.2 The Safety Shutter	3-3
3.3 Container Changeover	3-4
 4. Using the Filtec 3-G System Software	 4-1
Section	Page
4.1 Operator Control Panel	4-2
4.2 Software Function Groups.	4-3
4.3 Software Functions	4-4

4.4	Software Function Descriptions	4-14
5.	Maintenance Procedures	5-1
	Section	Page
5.1	Maintenance Schedules	5-2
5.2	Maintenance Procedures	5-4
6.	Diagnostic and Repair Procedures	6-1
	Section	Page
6.1	Diagnostic Errors	6-2
6.2	Diagnostic Error Messages	6-6
6.3	Troubleshooting Procedures	6-16
6.4	Troubleshooting the Power Supply System	6-18
6.5	Troubleshooting the Processing System	6-20
6.6	Troubleshooting the Sensor System	6-23
6.7	Troubleshooting Problems With Rejectors	6-25
	Index	Index-1
	Documentation Feedback	Feedback-1
	Help Us Improve	Feedback-1
	Ways to Submit Feedback	Feedback-1
	Documentation Feedback Form	Feedback-2

List of Figures

Preface	vii
1. Safety Information	1-1
Figure 1-1. Safety Labels With Which You Must Comply	1-6
Figure 1-2. Filtec 3-G Radiation Profile Schematic	1-7
2. Overview of the Filtec 3-G Fill Level Inspector	2-1
Figure 2-1. Filtec 3-G Fill Level Inspector	2-2
Figure 2-2. Scanning the Container	2-3
Figure 2-3. Tracking Containers That Fail Inspection	2-4
3. Operating Your Filtec 3-G Fill Level Inspector	3-1
Figure 3-1. Location of Main Power Switch on External Junction Box	3-2
Figure 3-2. Manual Safety Shutter	3-3
Figure 3-3. Filtec 3-G Adjustment Mechanisms	3-5
Figure 3-4. Aligning the Missing Cap Sensor	3-7
Figure 3-5. Aligning the High Cap Sensor	3-9
Figure 3-6. Aligning the Smashed Bottle Sensor	3-10
Figure 3-7. Aligning the Inspection Trigger Beam for a Bottle	3-12
4. Using the Filtec 3-G System Software	4-1
Figure 4-1. Operator Control Panel on the Filtec 3-G	4-2

5. Maintenance Procedures	5-1
6. Diagnostic and Repair Procedures.	6-1
Figure 6-1. Power Supply Circuit Board Test Points	6-18
Figure 6-2. Main Processor Card	6-20
Documentation Feedback	Feedback-1



Preface

Introduction

The Filtec 3-G documentation provides operators, technicians, and service personnel with complete information about the Filtec 3-G. Other documents that describe the Filtec 3-G that you can consult include:

- [Filtec 3-G and Filtec 3-XR Parts Catalog](#) contains a pictorial parts catalog of spare and service parts that you might need to maintain and service the Filtec 3-G.
- [Filtec 3-G and Filtec 3-XR Drawing Pack](#) contains system drawings and schematics that you might need to install Filtec 3-G and complete procedures that are related to the Filtec 3-G.
- [Filtec 3-G Service and Installation Guide](#) describes how to install, set up, use, and maintain the Filtec 3-G.

Topics That This Guide Covers

Filtec 3-G Operation Guide tells you how to use and maintain your Filtec 3-G system.

Audience of This Guide

This guide is intended for use by operators who use the Filtec 3-G on a daily basis.

Conventions That Appear in This Guide

Use the following chart to learn about the typographic conventions that appear in this guide.

This typeface or symbol...	Indicates...	Example...
abcd1234	A link to another document or page in the current document, which, when you click on it, displays the other document or the other page.	Filtec 3-G Operation Guide
 Important:	Important information that you might find helpful or useful and best practice suggestions.	 Important: Send oddly shaped (non-round) and plastic containers to FILTEC for testing and evaluation before you use them with the Filtec 3-G.
 Caution:	That there is a potential for damage to the equipment. Depending on the particular damage that can result, harm to a person can also occur.	 Caution: To ensure your complete safety, run all power cables through liquid tight conduit.
 Warning:	That there is a potential for harm to an individual. As harm can be mild or severe, strictly observe the information that is provided.	 Warning: Before you attempt to install the Filtec 3-G, turn off power and disconnect <i>all</i> electrical power cables from the Filtec 3-G.
<i>abcd1234</i>	Emphasis, a definition of a new concept, or a variable for which you provide actual text.	Before you attempt to install the Filtec 3-G, turn off power and disconnect <i>all</i> electrical power cables from the Filtec 3-G. <i>A text field</i> is a set of alphanumeric characters in a product code that do not change. +X OR -X
abcd1234	Text, including titles, menus, commands, and other information that you see or type on a screen.	Press key 4 until the Filtec 3-G product displays REJECTOR PULSE WIDTH on the screen.
<code>abcd1234</code>	A best practice to follow, a note, an example, a range of values that you can type in a field on a screen, and a document to which to refer.	Best Practice: Note: Example: Range: See Also:
abcd1234	A file name or directory path.	The system encrypts and internally stores the encrypted password that you provide in the configuration file <code>file.cfg</code> .



1. Safety Information

This chapter includes the safety mechanisms that are supplied with your equipment and the safe operating procedures when you use your FILTEC equipment.

This chapter also contains safety disclosure information and certifications that are required by the government, or other governing organizations, and voluntarily provided by FILTEC.

1.1 Safety Notices and Safety Labels

To ensure your safety, FILTEC has included many safety notices and labels within the product documentation and also within the equipment. Always observe these safety instructions.

1.1.1 Safety Notices

This documentation contains two types of safety notices: cautions and warnings. Always observe the safety notices. Cautions and warnings indicate safety issues as follows:



Warning: A warning indicates that there is a potential for harm to an individual. As harm can be mild or severe, strictly observe the information that is provided.



Caution: A caution indicates that there is a potential for damage to the equipment. Depending on the particular damage that can result, harm to a person can also occur.

1.1.2 Safety Labels

FILTEC equipment contains various safety labels. These labels are placed at strategic locations to help ensure your safety. Never remove safety labels from the equipment.

1.2 Radiological Safety

1.2.1 Introduction

This section provides information about radiation, radiation safety procedures, radiation certifications, and the radiation characteristics of your Filtec 3-G.

1.2.2 Understanding Radiological Safety

Your Filtec 3-G uses a small quantity of the radioisotope Americium-241 to produce low-level gamma radiation. The Americium-241 that your Filtec 3-G uses comes in the form of ceramic enamel. Its melting range is from about 1652 degrees Fahrenheit or 900 degrees Celsius to 1922 degrees Fahrenheit or 1050 degrees Celsius.

The Americium-241 is sealed inside a special type 304 stainless steel capsule that is double-fusion welded. This capsule is mounted in a stainless steel enclosure inside your Filtec 3-G inspection head.

A radiation safety shutter, when in the “on” position (opened), permits a narrow beam of radiation to pass through the plastic radiation window in the enclosure. When the safety shutter is in the “off” position (closed), all radiation is contained within the source enclosure.

There are two possible ways to be exposed to hazardous levels of radioactive material using this equipment: externally, through excessive exposure to a radiation source outside the body, and internally by ingesting radioactive material.

Your Filtec 3-G is unlikely to create hazardous radiation levels for the following reasons:

- The source of radiation in your Filtec 3-G produces a relatively weak source of low energy (low penetrating power) gamma radiation. To receive a hazardous dose of radiation from this low energy source would require extremely long exposure directly to the main radiation beam.
- While FILTEC warns against placing hands or other body parts in front of the gamma beam when it is turned on, it would require several hours of exposure for the hand to receive an excessive radiation dose.

- The gamma beam is tightly confined by shields and collimators and is completely contained within the inspection tunnel. Because the radiation beam does not spread outside the inspection tunnel, it is highly unlikely that under normal circumstances an appreciable radiation dose could be incurred at a location other than directly in front of the main gamma beam when the safety shutter is in the “on” position (opened).
- The radioactive material is sealed by double fusion welds into a stainless steel capsule. At manufacture, and again at installation, this capsule is subjected to rigorous tests capable of detecting the leakage of five millionths of one percent of the contents. Therefore as long as the source capsule’s integrity is not compromised, radioactive material cannot be released.
- As an additional precaution, the regulatory agencies require that a licensed individual inspect the radiation source and the shutter mechanism and conduct a leak test every 36 months.

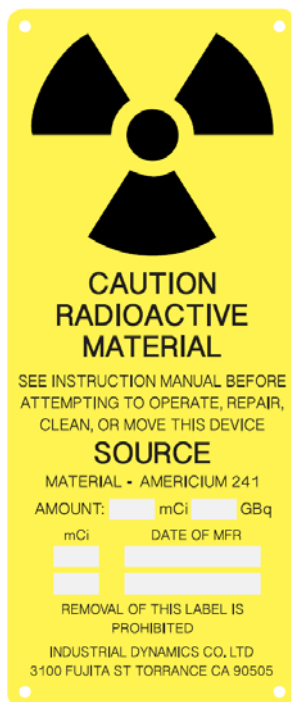
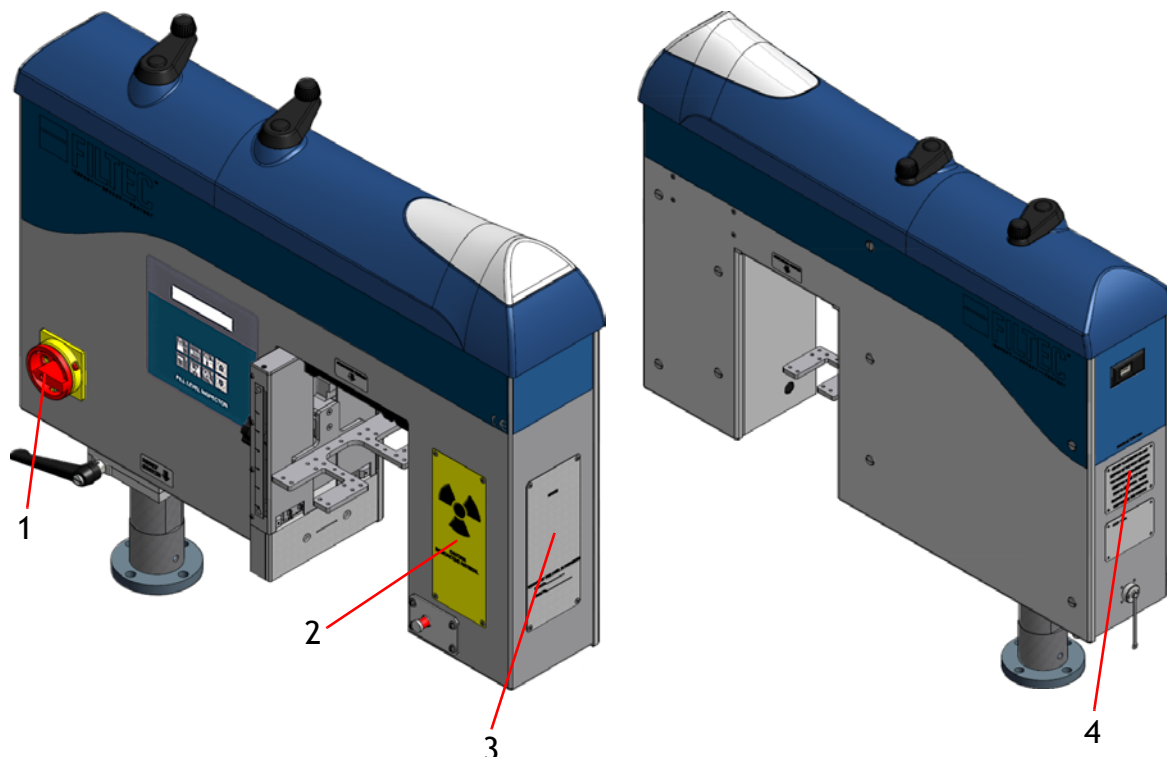
1.2.3 Radiological Safety Guidelines

You have been supplied with a copy of the rules, regulations and registration requirements for your location, however, the following is a brief synopsis of the general requirements.

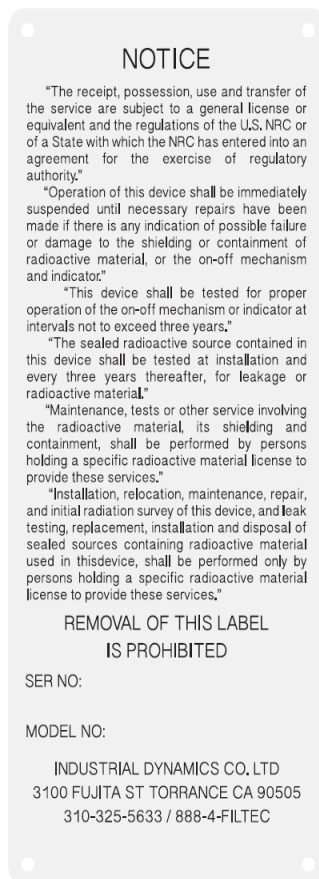
1. Understand the rules, regulations, and registration requirements regarding the use of this equipment at your location. A copy of this is supplied with your Filtec 3-G.
2. Do not open or tamper with the enclosure containing the radio-isotope source.
3. Do not place your hands, or any other body part, between the source and detector when the safety shutter is in the “on” position (opened).
4. Have inspection and wipe tests performed by a licensed technician at the specified 36 month intervals (FILTEC service technicians can perform these inspection and wipe tests). Keep a record of each inspection and test.
5. In the case of an accident which crushes or punctures the source enclosure, seal off the area, cover your Filtec 3-G and surroundings with a plastic sheet or tarpaulin and contact FILTEC Customer Support immediately.
6. Do not relocate or dispose of the Filtec 3-G without proper approval. A licensed technician must perform this task.
7. If you have any questions, contact FILTEC Customer Support.

1.2.4 Radiation Measurement Testing Data

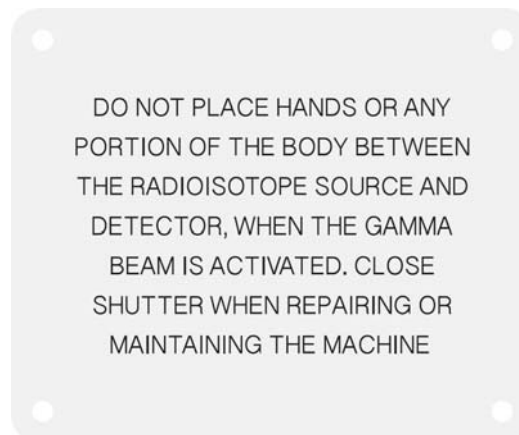
1. All measurements were taken with a Technical Associates Model Pug-1 survey meter. The meter was cross calibrated against an air ionization chamber survey meter whose response was corrected against an Americium-241 test source.
2. Source shutter in the “off” position (closed) - The radiation levels are less than 0.05 mR per hour (mR/hr) at distances greater than 2 inches, or 5 centimeters, from any surface of the gauge (including inside the tunnel).
3. Source shutter in the “on” position (opened) - The extent of the main gamma beam is completely contained within the tunnel formed by the inspection head and shielding bar. All radiation levels outside the main beam are less than 0.05 mR/hr.
4. The exposure rate in the main beam is measured to be approximately 60 mR/hr at 2 inches, or 5 centimeters, from source enclosure containing 300 millicuries (mCi).



2



3

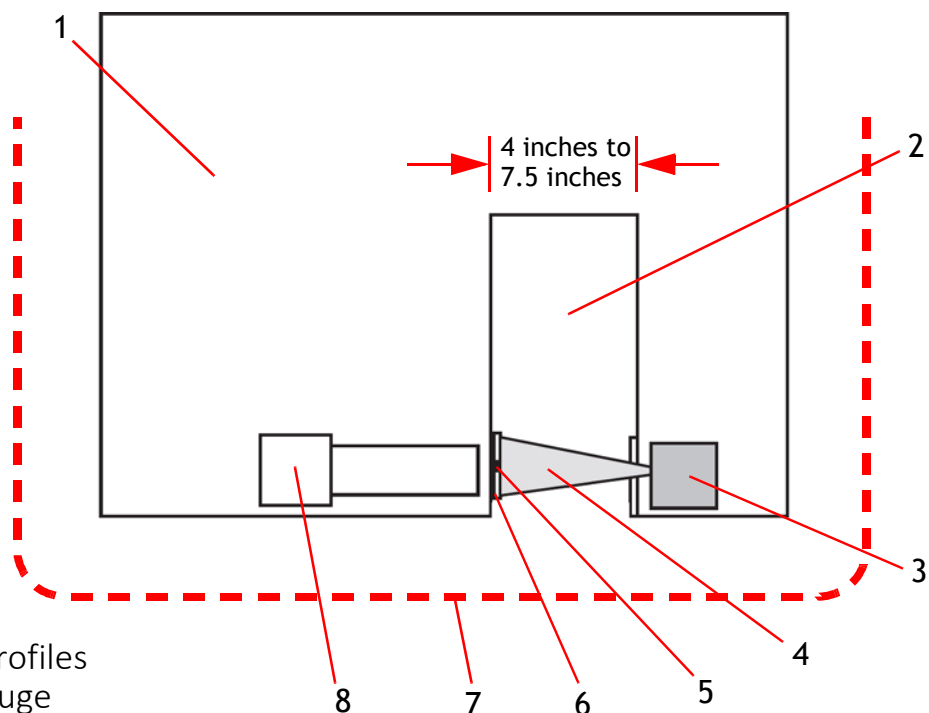


4

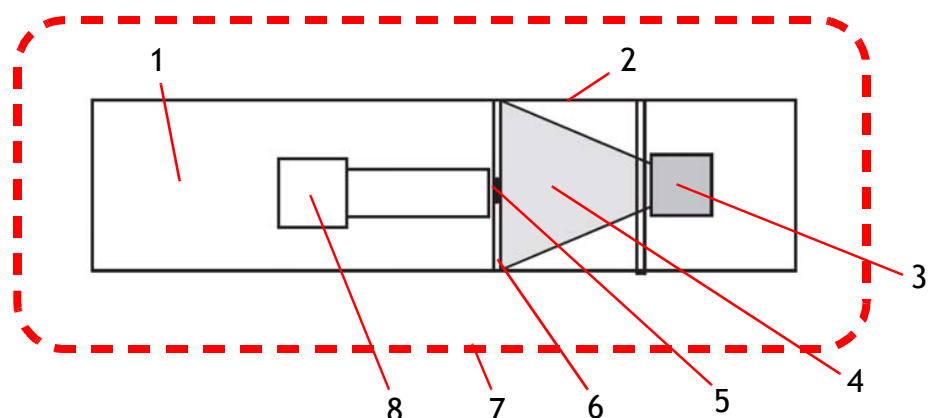
No.	Description
1	Main power lock out, tag out switch
2	Radioactive material warning
3	Notice of United States Nuclear Regulatory Commission (U.S. NRC) regulation
4	Warning to keep hands and all body parts away from the radioisotope source in the Filtec 3-G

Figure 1-1. Safety Labels With Which You Must Comply

- | No. | Description |
|-----|--------------------------------------|
| 1 | Inspection head |
| 2 | Inspection tunnel |
| 3 | Sealed Americium-241 |
| 4 | Limits of the main beam |
| 5 | Detector window |
| 6 | Shielding bar (1/4 inch thick sheet) |
| 7 | Isodistance contour (5 centimeters) |
| 8 | Radiation detector |
- Note:** Gamma gauge equals 100 or 300 mCi source.



Radiation Exposure Profiles Filtec 3-G Gamma Gauge



Radiation Data

- 1 All measurements were taken with a technical associates model PUG-1 survey meter that was cross calibrated against an air ionization chamber survey meter whose response was corrected against an Americium-241 test source
- 2 Source shutter in the "off" position (closed) - the radiation levels are less than 0.05 MR/HR at distances greater than 5 cm from any surface of the gauge (including inside the tunnel)
- 3 Source shutter in the "on" position (opened) - the extent of the main gamma beam is completely contained within the tunnel formed by the inspection head and shielding bar. All radiation levels outside the main beam are less than 0.05 MR/HR.
- 4 Exposure rate in main beam is measured to be approximately 60 MR/HR at 5 cm from source enclosure containing 300 millicuries.

Figure 1-2. Filtec 3-G Radiation Profile Schematic



2. Overview of the Filtec 3-G Fill Level Inspector

This chapter provides a brief overview of the Filtec 3-G Fill Level Inspector.

2.1 How the Filtec 3-G Fill Level Inspector Works

2.1.1 Description

The Filtec 3-G inspects the liquid contents of a container and determines whether the container is either overfilled or underfilled. The Filtec 3-G cannot perform overfill and underfill inspections at the same time.

You can add inspection options such as high or cocked cap detection, down bottle detection, missing cap detection, missing label detection, smashed bottle detection, low foam detection, foil seal detection, dud detection, and reject sorting (if you have a Servotec II rejector) to the Filtec 3-G to enhance its functionality.

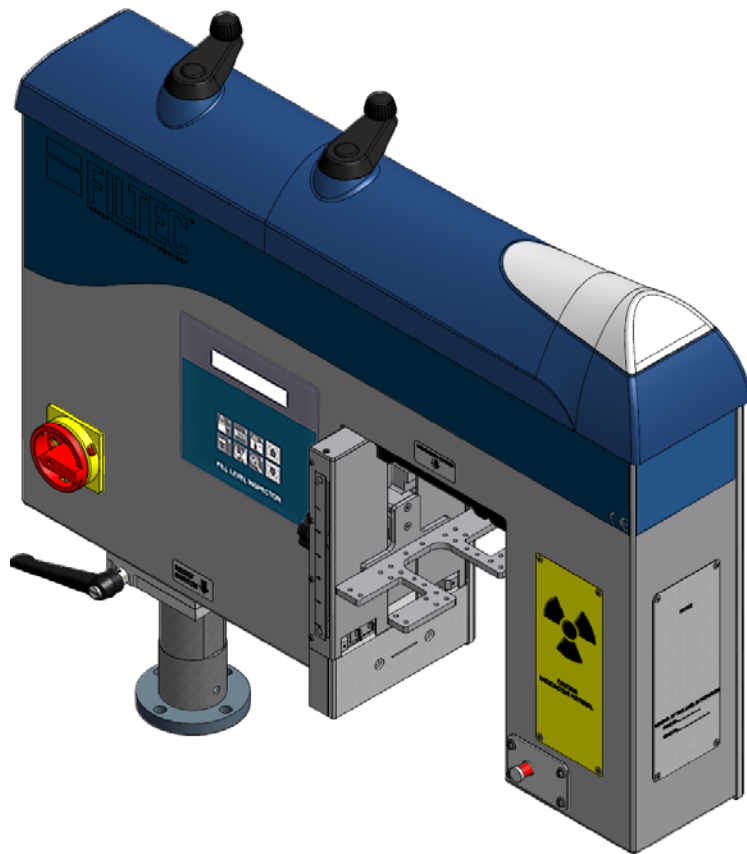


Figure 2-1. Filtec 3-G Fill Level Inspector

2.1.2 Fill Level Inspection Basics

The Filtec 3-G Fill Level Inspection systems uses a container radiation profile comparison principle to create a radiation fingerprint of the container.

To create a radiation profile a gamma beam is directed through the container. Some of the radiation is blocked by the container material and container's contents while the remaining gammas emerge from the opposite side of the container where they are measured by a gamma detector.

The amount of radiation measured is the container's radiation profile, or fingerprint, which is then compared against a master container profile.



Figure 2-2. Scanning the Container

To allow for slight variances in the fill level an underfill threshold or overfill threshold is determined. These thresholds form the tolerance range for deviation from the master profile.

Any container with a gamma count above the underfill threshold (higher gamma counts indicate there is less product to absorb the gamma beam) is rejected as an underfill. Any container with a gamma count below the overfill threshold (lower gamma counts indicate there is more product to absorb the gamma beam) is rejected as an overfill.

2.1.3 Rejection Control Basics

The Filtec 3-G identifies and then tracks any container that fails inspection. Tracking begins the moment that the container crosses the inspection trigger beam in the Filtec 3-G and ends when the container reaches the rejector center line.

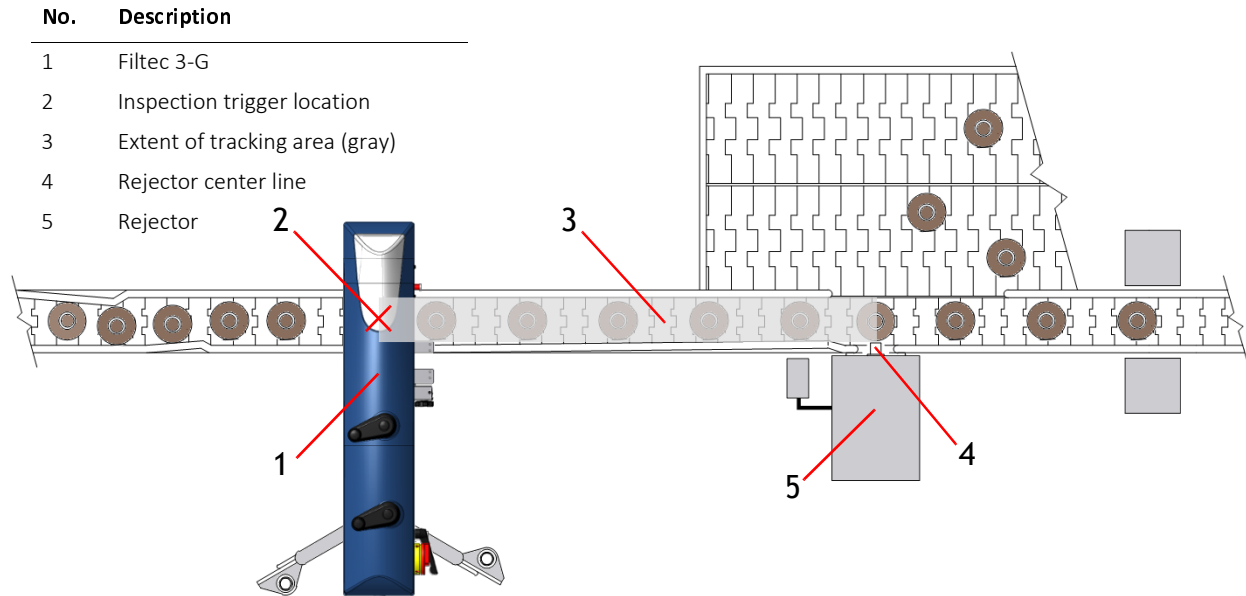


Figure 2-3. Tracking Containers That Fail Inspection

To maintain container tracking and to synchronize the rejector to the conveyor, the Filtec 3-G uses a high-resolution encoder coupled directly to the conveyor drive sprocket.

The encoder sends timing pulses to the Filtec 3-G, which uses the pulses to determine the container's position as it moves along the conveyor between the Filtec 3-G and the rejector. When the container reaches the rejector center line, the Filtec 3-G emits a reject signal, which activates the rejector and removes the container from the production line.

2.2 Optional System Features

The expandability of the Filtec 3-G enables you to add additional inspection capabilities to match your production requirements. Depending on the Filtec 3-G configuration that you order, your Filtec 3-G might contain some of the following features:

- High or cocked cap detection
- Missing cap detection
- Dud detection (high and low container pressure)
- Smashed bottle detection
- Down bottle detection
- Low foam detection
- Foil seal detection
- Label inspection
- Reject sorting (if you use a Servotec II rejector or two Proline rejectors)
- External reject control
- Serial controller interface (Modbus or IDC protocols)
- Programmable logic controller (PLC) interface



Important: If you are unsure which options that your unit contains, contact your service department for information.

High or Cocked Cap Detection

This feature uses an optical sensor to detect seated caps on bottles.

Missing Cap Detection

This feature detects the presence or absence of the cap on a bottle. It is compatible with either aluminum or metal caps.

Dud Detection

This feature detects incorrect pressurization of vacuum sealed or pressure sealed containers.

Low Foam Detection

This feature uses an optical sensor to detect a low foam condition within a container. This option is only available for use on clear containers.

Foil Seal Detection

This feature uses a proximity sensor to detect a foil seal under the container cap. This option is available only for containers with plastic caps.

Smashed Bottle Detection

This feature uses an optical sensor to detect a smashed plastic or broken glass bottle. This feature requires a FILTEC slat rejector.

Down Bottle Detection

This feature uses an optical sensor to detect a bottle that has been knocked over onto its side.

Label Inspection

Depending on the complexity of the container label configuration, optical sensor arrays are used to detect the presence of a label or labels, including barcode verification.

Reject Sorting

This option enables the Filtec 3-G to classify the various types of rejects and then reject them into different reject bins or reject conveyor lanes, based on the classifications. This option requires that you use a FILTEC Servotec II rejector or two Proline rejectors.

Serial Interface

Provides serial network communications over RS-232, RS-422, RS-423, and RS-485 networks. It enables you to directly control your Filtec 3-G system from a host computer or programmable logic controller (PLC) and collect counter data.

Programmable Logic Controller Interface (PLC)

Provides for data collection, so that you can receive signals from the Filtec 3-G. This option requires an I/O junction box.



3. Operating Your Filtec 3-G Fill Level Inspector

This chapter describes how to start and operate your Filtec 3-G Fill Level Inspector system.

3.1 Starting Your Filtec 3-G

3.1.1 Steps

The start-up procedure for the Filtec 3-G is simple and quick. Your Filtec 3-G can be ready for operation in as little as 5-seconds from the moment you turn on the main power to the unit.

1. If your Filtec 3-G is not equipped with an automatic safety shutter, verify the manual safety shutter is in the “on” position (opened). For more information see “The Safety Shutter” on page 2-3.
2. Locate the main power switch for the unit. If your Filtec 3-G has the external junction box option installed, the switch is located on this box. If the external junction box is not installed, and the main power switch is not readily discernible, contact your plant service personnel for assistance.

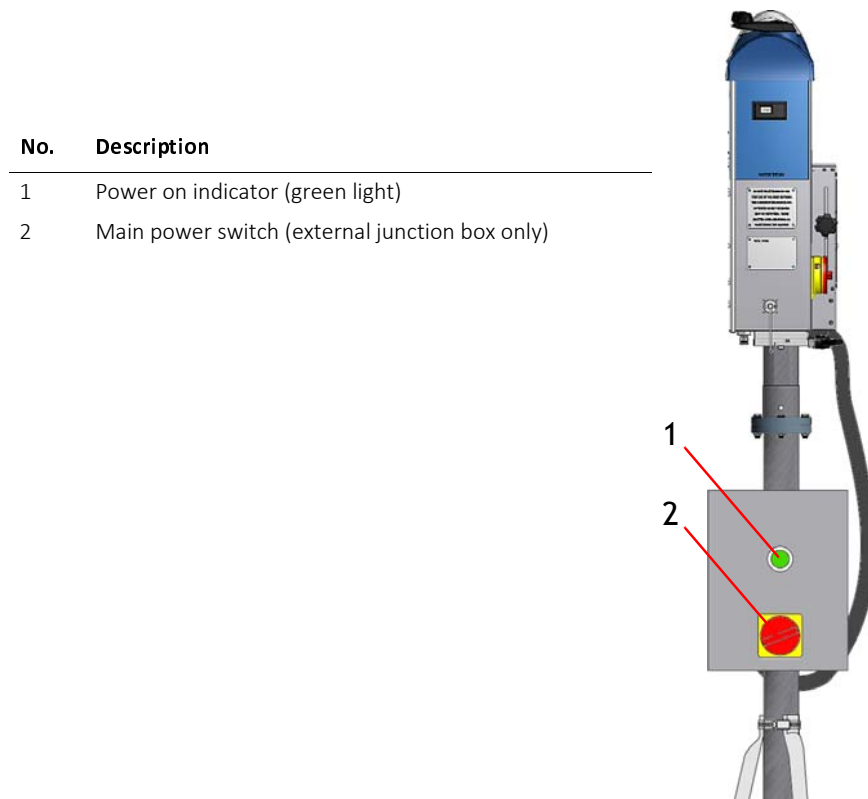


Figure 3-1. Location of Main Power Switch on External Junction Box

3. When the power is turned on, the amber beacon on top of the unit will light briefly and then extinguish. If the external junction box is installed, the green power indicator light on the junction box will light while the power remains on.

3.2 The Safety Shutter

3.2.1 Description

The safety shutter is a small metal door that, when closed, stops the emission of gamma waves that are required for fill level inspection.

Your Filtec 3-G can be equipped with either a manual safety shutter or an automatic safety shutter called the autoshutter. The autoshutter operates automatically by closing when the production line stops and opening when the production line is running. You must manually open and close the manual safety shutter.

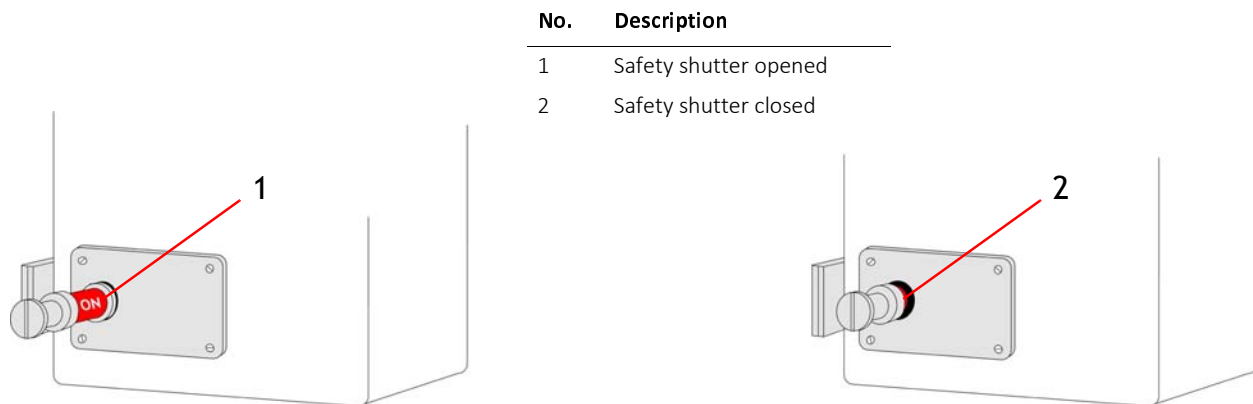


Figure 3-2. Manual Safety Shutter

3.2.2 Operating the Manual Safety Shutter

You need only close the safety shutter if you are performing an operation that requires you to place a body part (such as your hand) in the inspection tunnel.

1. Open the safety shutter by pulling the activation rod out until it stops. When the shutter is opened completely, the red band on the rod showing the word “on” appears.
2. Close the safety shutter by pushing the rod in until it stops. When the shutter is completely closed, the red band on the rod showing the word “on” will no longer appear.



Note: The safety shutter must be opened to perform fill level inspection. If the shutter is closed and you attempt to perform fill level inspection, you will receive an error number 13.

3.3 Container Changeover

3.3.1 Overview

The Filtec 3-G is equipped with certain features that allow you to change between different container types easily. If the production line the Filtec 3-G is installed on is designed to produce more than one size or type of container, this procedure will explain how to reconfigure the unit for a different container type.

To accomplish a container changeover you must do the following:

- Select the container type to be inspected.
- Adjust the inspection head height.
- Adjust the conveyor guide rails.
- Adjust the center line trigger bracket height
- Adjust as needed any option sensors and sensor brackets installed.

3.3.2 Selecting the Container Type to Be Inspected

Before you can select a particular container type, the parameters for that container type must be programmed into the Filtec 3-G. This should have been done by your service department.

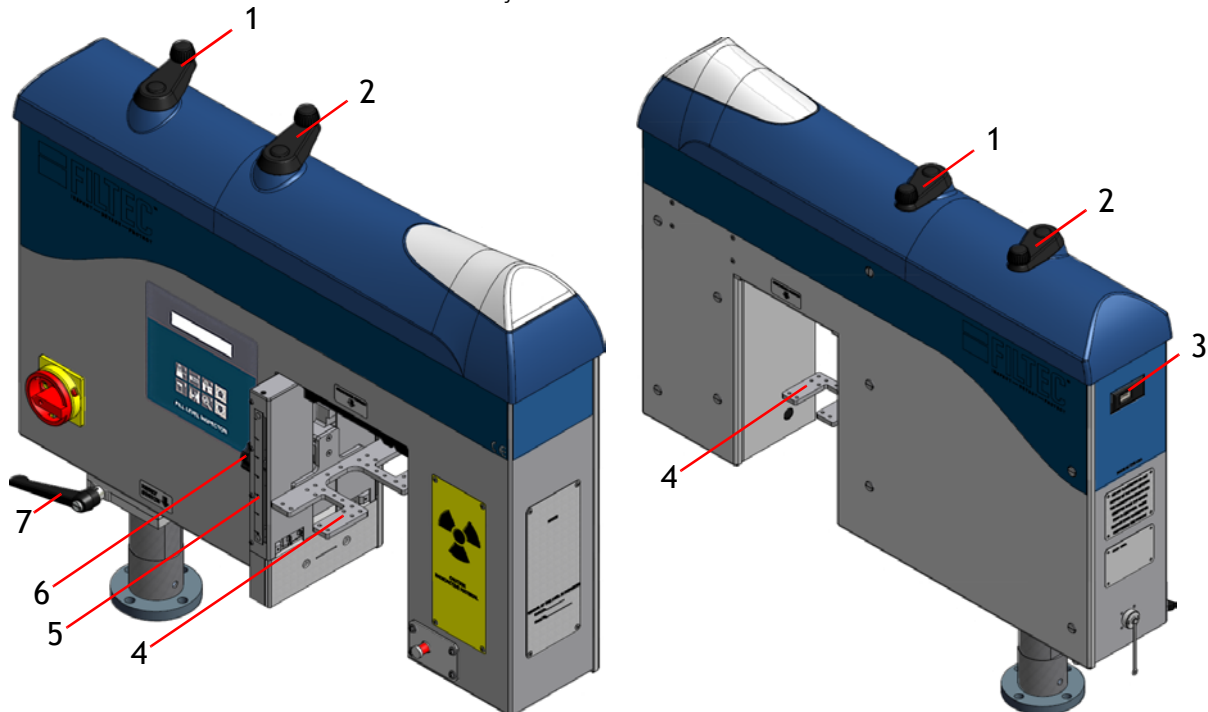
1. On the two-line display, press key 5 until your Filtec 3-G displays **Current Container Type**.
2. Use the arrow key to select the desired container type.

After you select the container type, your Filtec 3-G displays a message that prompts you to wait while the Filtec 3-G reconfigures itself for the new container type.

3.3.3 Adjusting the Inspection Head Height

You must adjust the inspection head height to align the inspection beam to the container's target fill level. This will require you to make several mechanical adjustments.

1. Approximately 5 seconds after you select the container type, a message will appear indicating the head height setting to which you must adjust the Filtec 3-G.



No.	Description
1	Head Height adjustment crank
2	Center line trigger bracket height adjustment crank
3	Head height counter
4	Center line trigger bracket
5	Center line trigger height adjustment scale
6	Center line trigger bracket height lock
7	Head height lock

Figure 3-3. Filtec 3-G Adjustment Mechanisms

2. Loosen the head height lock and, using the head height adjustment crank, adjust the head height as follows:
 - If the new setting is above the previous setting, crank the head up until the head height counter indicates you have reached the correct height.
 - If the new setting is below the previous setting, crank the head below the new setting about 20 ticks and then back up until the head height counter indicates you have reached the correct height. This will eliminated any backlash in the raising mechanism.

3. Tighten the head height lock to secure the position.

3.3.4 Adjusting the Conveyor Guide Rails

To accommodate the new container you may need to adjust the conveyor guide rails. If this is required, your service department should instruct you in the correct method.

3.3.5 Adjusting the Center Line Trigger Bracket Height

When you adjusted the head height for the new container, the center line trigger bracket also moved because it is attached directly to the inspection head. Therefore, you may need to adjust the trigger bracket to accommodate the new container type.



Note: Your service department should indicate whether or not you will need to make this adjustment and what the adjustment should be.

1. Loosen the center line trigger bracket height lock. Refer to Figure 3-3 on page 3-5 for more information.
2. There is a height adjustment scale located on the side of the inspection tunnel that you will use to measure the height (see Figure 3-3). Your service department may have marked the correct height for each container type on the scale.

If the correct height is not indicated, or you do not know the correct height you will need to determine the correct setting:

For more information see “Aligning the Inspection Trigger (Bottles)” on page 2-12.

3. Use the center line trigger bracket height adjustment crank to adjust the bracket height to the correct height.
4. Tighten the center line trigger bracket height lock to secure the position.

3.3.6 Adjusting Optional Sensors and Sensor Brackets

After you have adjusted the head height and center line trigger bracket height you may need to adjust any optional sensors or sensor brackets that are installed on the Filtec 3-G. Your service department should indicate whether or not you will need to make these adjustment and what the adjustment should be.

If your service department has not indicated the correct settings for the sensors, use the procedures in this section to help you adjust the following sensors:

Bottles

- Missing Cap, page 7
- High Cap, page 9
- Smashed Bottle, page 10

3.3.7 Aligning the Missing Cap Sensor

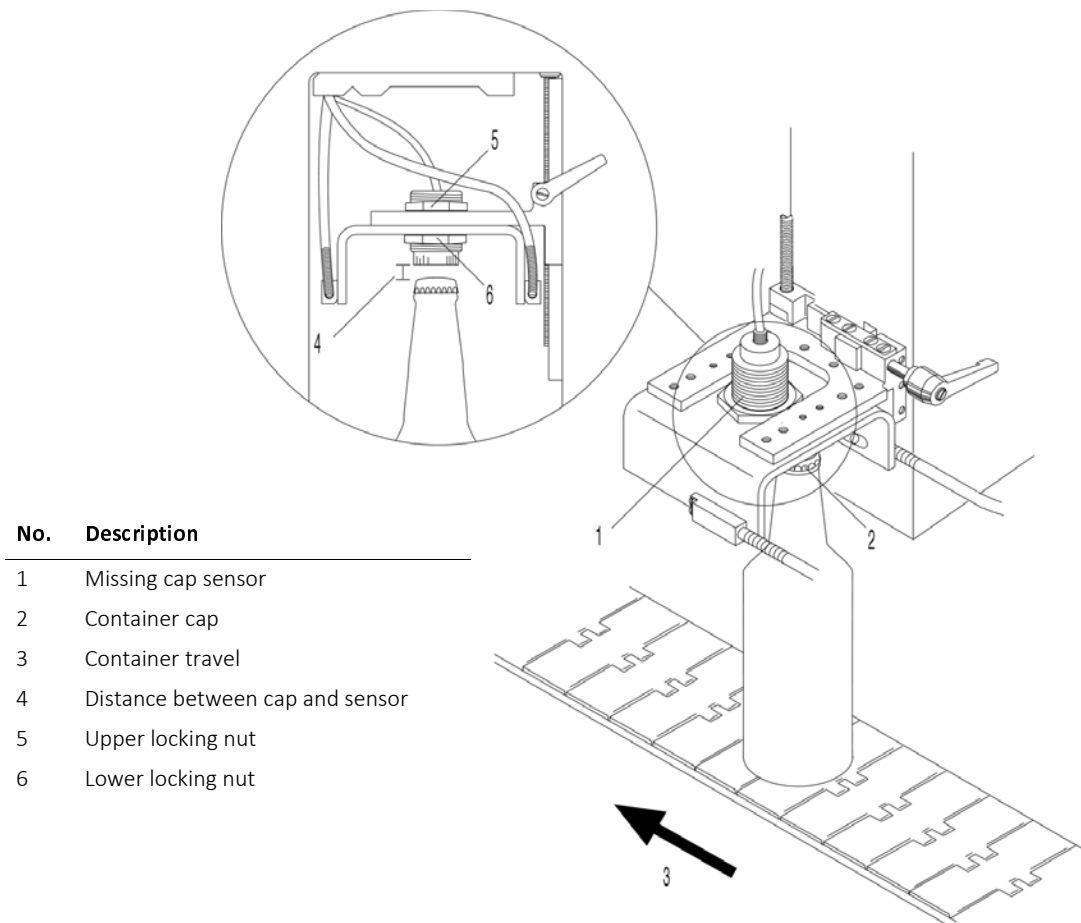


Figure 3-4. Aligning the Missing Cap Sensor

The missing cap sensor is mounted on the center line trigger bracket, therefore before you align missing cap sensor be certain the center line trigger bracket is aligned correctly. For more information see “Adjusting the Center Line Trigger Bracket Height” on page 2-6.

1. If your Filtec 3-G is not equipped with an automatic safety shutter, you must close the manual shutter before you proceed. For more information see “The Safety Shutter” on page 2-3.
2. Loosen the bottom jam nut on the missing cap sensor.
3. Center a correctly filled and capped production container in the inspection tunnel so that it is directly under the missing cap sensor.
4. Find your type of missing cap sensor in the table below and adjust the upper jam nut to raise or lower the sensor to the correct height.

Description (Cap Type)	Maximum Height Above Cap
Nonferrous (Aluminum)	0.4 inch (10 mm)
Photo-Optic Sensor (All)	0.7 inch (18 mm)
Extended Range (Aluminum)	0.5 inch (13 mm)
Extended Range (Steel)	0.88 inch (22 mm)
Steel Cap Under Aluminum Foil	0.3 inch (8 mm)
Standard	0.25-0.38 inch (6-9 mm)
Bifurcated Fiber-Optic Sensor	0.7 inch (18 mm)

5. When you achieve the correct height, tighten the lower jam nut to secure the sensor positioning.
6. If you closed the manual safety shutter, open it before resuming operation. For more information see “The Safety Shutter” on page 2-3.

3.3.8 Aligning the High Cap Sensor

No.	Description
-----	-------------

- | | |
|---|--|
| 1 | Sensor emitter |
| 2 | Height adjustment lock |
| 3 | Container cap |
| 4 | Sensor beam |
| 5 | Sensor receiver |
| 6 | Container travel |
| 7 | Distance between container cap and sensor beam |
| 8 | Secondary sensor height adjustment |

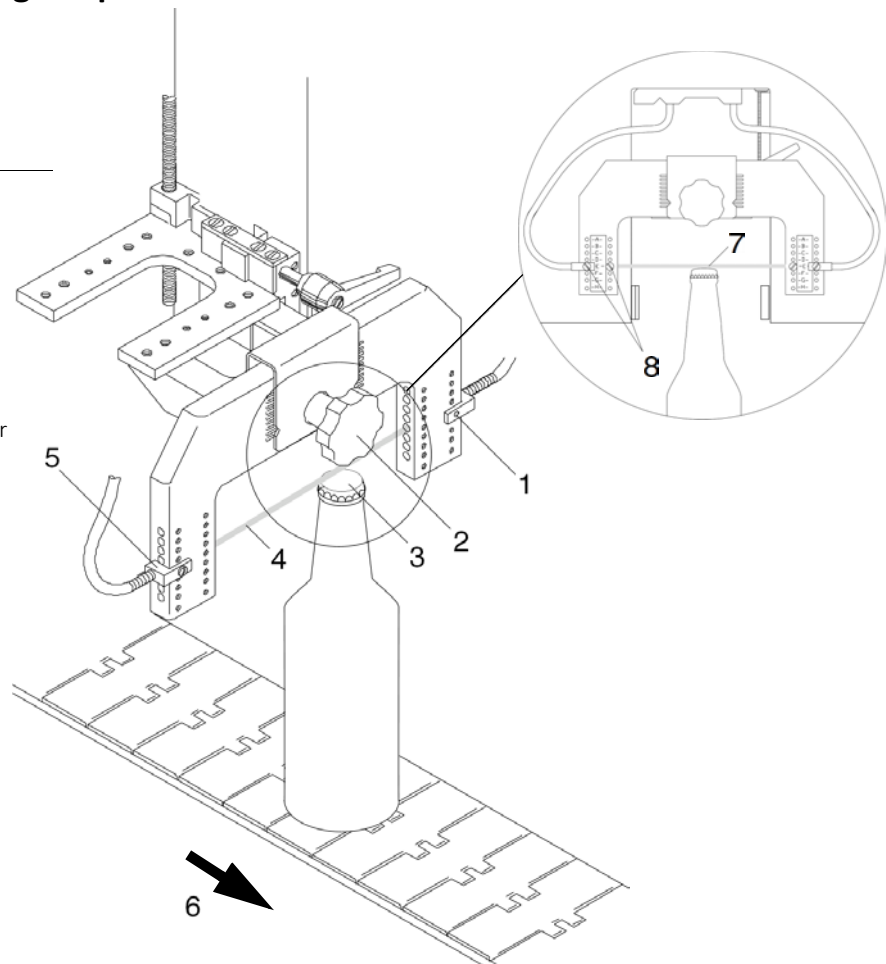


Figure 3-5. Aligning the High Cap Sensor

The high cap sensor is mounted on a downstream offset bracket attached to the center line trigger bracket. Therefore before you align the high cap sensor, be certain the center line trigger bracket is aligned correctly. For more information see “Adjusting the Center Line Trigger Bracket Height” on page 2-6.

1. If your Filtec 3-G is not equipped with an automatic safety shutter, you must close the manual shutter before you proceed. For more information see “The Safety Shutter” on page 2-3.
2. Center a correctly filled and sealed production container under the downstream sensor mounting bracket.

3. Loosen the downstream sensor mounting bracket adjustment knob and adjust the sensor so that it is 1mm above the container cap.



Note: If you do not have enough adjustment range to position the sensor correctly, reposition the sensor receiver and emitter in the bracket by moving it up or down 1 or 2 hole positions to give you the range you need.

4. Tighten the adjustment knob to secure the positioning.
5. If you closed the manual safety shutter, open it before resuming operation. For more information see “The Safety Shutter” on page 2-3.

3.3.9 Aligning the Smashed Bottle Sensor

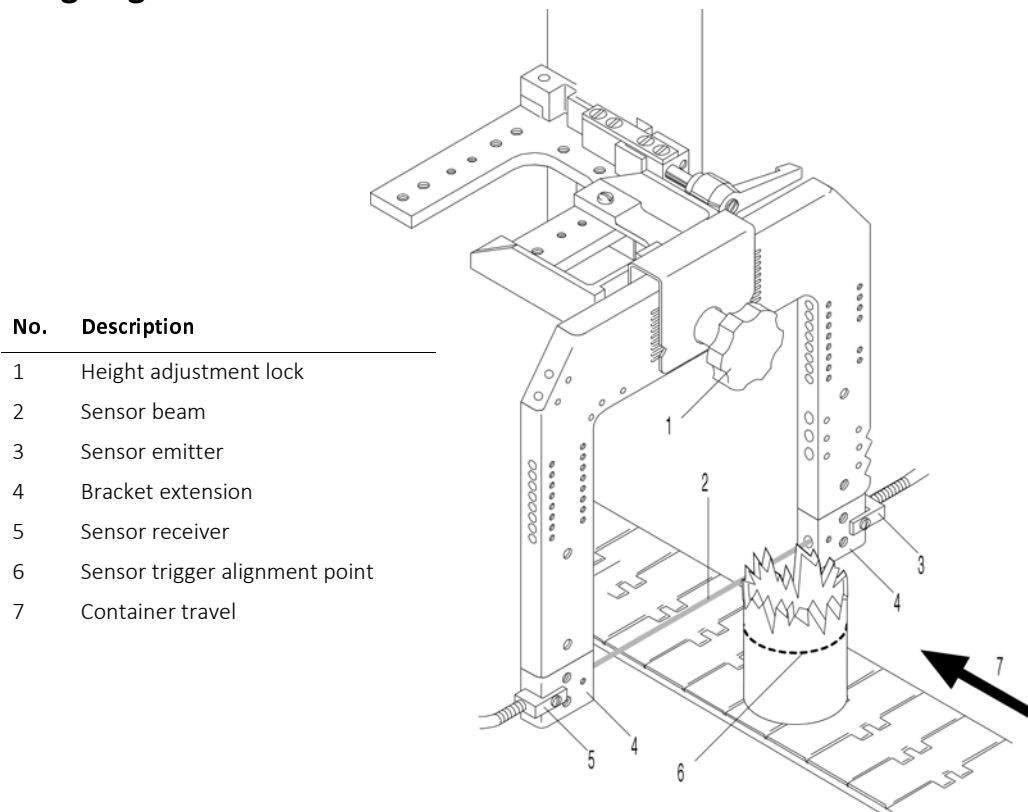


Figure 3-6. Aligning the Smashed Bottle Sensor

The smashed bottle sensor is mounted on an upstream offset bracket attached to the center line trigger bracket. Therefore before you align high cap sensor, be certain the center line trigger bracket is aligned correctly. For more information see “Adjusting the Center Line Trigger Bracket Height” on page 2-6.

1. If your Filtec 3-G is not equipped with an automatic safety shutter, you must close the manual shutter before you proceed. For more information see “The Safety Shutter” on page 2-3.
2. Center a typical smashed production container under the upstream sensor mounting bracket.



Caution: Do not use the smashed bottle function to detect the container base only. If the container is smashed down to the base it cannot be rejected correctly and may damage the rejector.

3. Loosen the upstream sensor mounting bracket adjustment knob and adjust the sensor so that it contacts the bottle 1 millimeter to 2 millimeter below the point where the container is smashed.



Note: If you do not have enough adjustment range to position the sensor correctly, reposition the sensor receiver and emitter in the bracket by moving it up or down enough hole positions to give you the range you need.

4. Tighten the adjustment knob to secure the positioning.
5. If you closed the manual safety shutter, open it before resuming operation. For more information see “The Safety Shutter” on page 2-3.

3.3.10 Aligning the Inspection Trigger (Bottles)

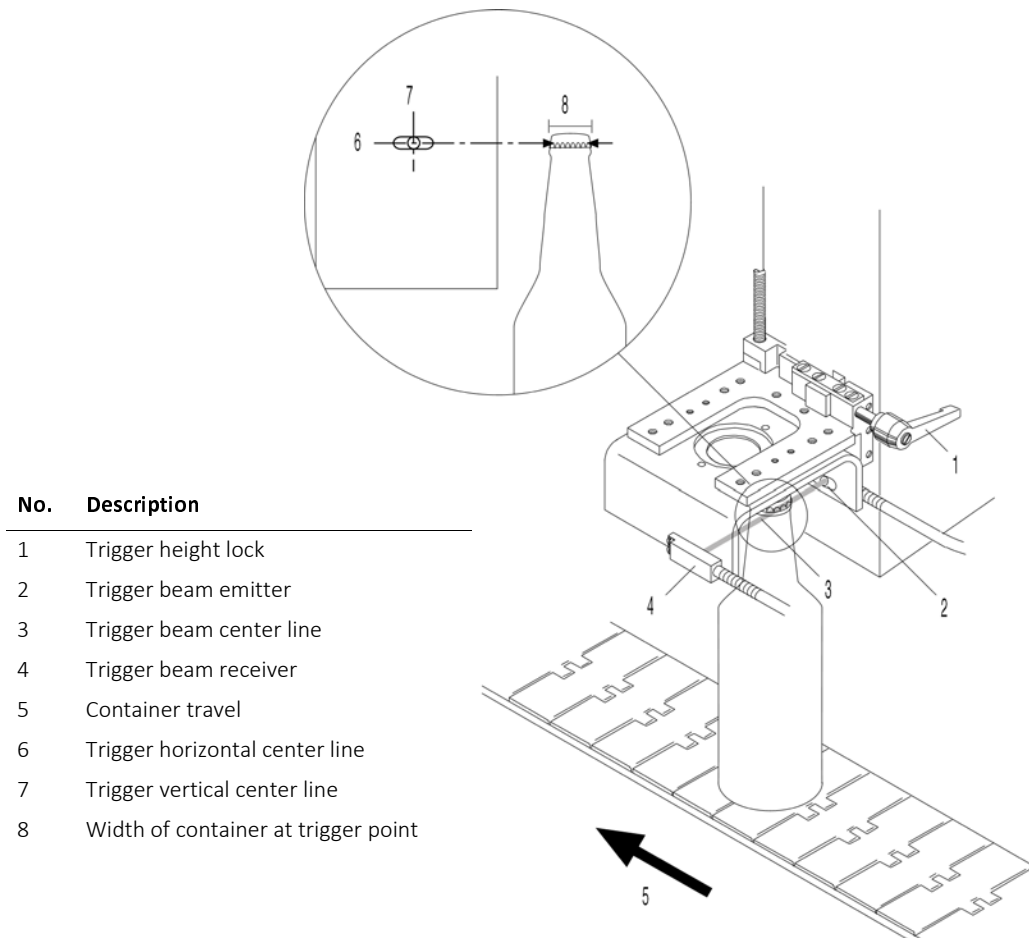


Figure 3-7. Aligning the Inspection Trigger Beam for a Bottle

To correctly align the beam, you must align the inspection trigger height so the trigger beam contacts the container at the widest part of the cap.

1. If your Filtec 3-G is not equipped with an automatic safety shutter, you must close the manual shutter before you proceed. For more information see "The Safety Shutter" on page 2-3.
2. Loosen the center line bracket height lock, and using the center line sensor bracket height crank, raise the bracket all the way.
3. Center a correctly filled and capped production container in the inspection tunnel so that when the sensor mounting bracket is lowered, it is aligned with the trigger beam.
4. Lower the bracket until the trigger beam contacts the container at the widest part of the cap.

5. Tighten the height locking handle to secure the trigger beam positioning.
6. If you closed the manual safety shutter, open it before resuming operation. For more information see “The Safety Shutter” on page 2-3.



4. Using the Filtec 3-G System Software

This chapter describes how to use the Filtec 3-G system software.

4.1 Operator Control Panel

4.1.1 Diagram

You interact with the Filtec 3-G through the operator control panel. The control panel contains eight keys and a two-line LCD (Liquid Crystal Display) capable of displaying 24 characters per line.

A remote, hand-held control is also available. The remote control panel detaches from the Filtec 3-G thereby allowing easier access.



Figure 4-1. Operator Control Panel on the Filtec 3-G

4.2 Software Function Groups

4.2.1 List

The function group keys are numbered one through six, representing each of the following function groups:

- Fill Level Function Group (key 1)
- Finishing Function Group (key 2)
- Counters Function Group (key 3)
- Rejector Function Group (key 4)
- System Function Group (key 5)
- Diagnostic Function Group (key 6)

Operator's access to the Filtec 3-G's system software grants you rights to specific functions required to operate the unit, therefore you will have limited access to each function group.

Function Keys

Pressing a function key displays the first available function in that group. Repeatedly pressing the same function key scrolls through the list of available functions.

Arrow Keys

The arrow keys allow you to change a parameter value, enable/disable a function, reset shift counters, or clear an error.

After you select the correct function with a function key, press the up arrow to increase a value or press the down arrow to decrease a value. Holding the key down will rapidly increase the value. After you make a change, press another function key, or wait 5 seconds, and the value is automatically entered into memory.

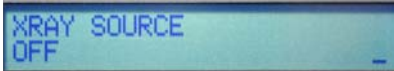
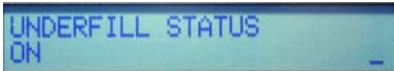
4.3 Software Functions

4.3.1 Table

There are two types of software functions: status and operating. Status functions display information about the status of a software function or system component. Pressing the arrow keys has no effect on a status function because it is not a changeable parameter, it only provides current operating information for a particular software function.

Operating functions allow you to change software function values (parameters). Using the arrow keys allows you to change a value, clear an error, or turn a function on or off.

The following list contains the software functions that are available to the Operator's access level. For more information see "Software Function Descriptions" on page 2-14.

Use this key...	To display the function...	Which you can set to...	Or use default value...
Fill Level Key 1			
	XRAY SOURCE 	ON or OFF	OFF
	UNDERFILL STATUS 	ON or OFF	OFF
	OVERFILL STATUS 	ON or OFF	OFF
	GAMMA COUNTS 	0 through 65535 Counts UPDATING CONSTANTLY UPDATING ON REJECT ONLY	UPDATING CONSTANTLY
	GAMMA THRESHOLD 	0 through 15000 counts	1900 Counts
	LOOKTIME GATE 	1 through 120 milliseconds	20 ms
	TARGET HEAD HEIGHT 	0 through 999 ticks	500 TICK(S)

Use this key...	To display the function...	Which you can set to...	Or use default value...
-----------------	----------------------------	-------------------------	-------------------------

Finishing Key 2



EXTERNAL REJECT STATUS

ON or OFF

OFF

EXTERNAL REJECT STATUS
ON

HIGH CAP STATUS

ON or OFF

OFF

HIGH CAP STATUS
ON



MISSING CAP STATUS

ON or OFF

OFF

MISSING CAP STATUS
ON

WIDTH AT SMASHED BOTTLE

1 through 250 millimeters

66 mm

WIDTH AT SMASHED BOTTLE
66 mm

SMASHED BOTTLE STATUS

ON or OFF

OFF

SMASHED BOTTLE STATUS
ON

DIA. MISSING CAP STATUS

ON or OFF

OFF

DIA. MISSING CAP STATUS
ON

DIA. MISSING CAP WIDTH

1 through 65535 samples per interval

DIA. MISSING CAP WIDTH
0 SAMPLES/INTERVAL

MINIMUM DIA. MISSING CAP

1 through 65535 samples per interval

MINIMUM DIA. MISSING CAP
55 SAMPLES/INTERVAL

Counters Key 3



TOTAL THROUGHPUT

0 through 65535 (0.00%) containers

TOTAL THROUGHPUT
0 BOTTLE(S)

TOTAL REJECTS

0 through 65535 (0.00%) containers

TOTAL REJECTS
0 (0.00%) BOTTLE(S)

TOTAL UNDERFILL

0 through 65535 (0.00%) containers

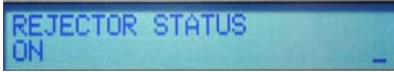
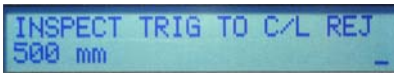
TOTAL UNDERFILL
0 (0.00%) BOTTLE(S)

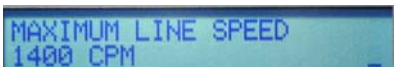
TOTAL OVERFILL

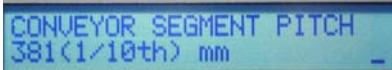
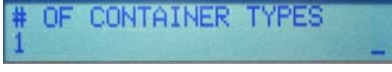
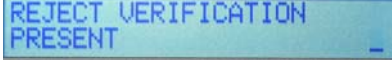
0 through 65535 (0.00%) containers

TOTAL OVERFILL
0 (0.00%) BOTTLE(S)

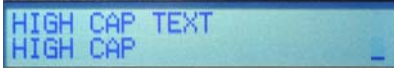
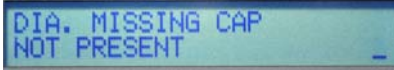
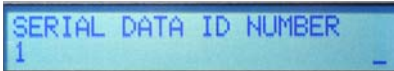
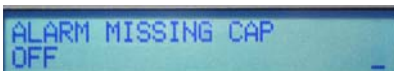
Use this key...	To display the function...	Which you can set to...	Or use default value...
	TOTAL MISSING CAP 	0 through 65535 (0.00%) containers	
	TOTAL HIGH CAP 	0 through 65535 (0.00%) containers	
	TOTAL SMASHED BOTTLE 	0 through 65535 (0.00%) containers	
	TOTAL DIA. MISSING CAP 	0 through 65535 (0.00%) containers	
	TOTAL EXTERNAL REJECT 	0 through 65535 (0.00%) containers	
	RESET ALL COUNTERS 	(EXECUTE)	
	RESET TOTAL THROUGHPUT 	(EXECUTE)	
	RESET TOTAL REJECTS 	(EXECUTE)	
	RESET UNDERFILL 	(EXECUTE)	
	RESET OVERFILL 	(EXECUTE)	
	RESET MISSING CAP 	(EXECUTE)	
	RESET HIGH CAP 	(EXECUTE)	
	RESET EXTERNAL REJECT 	(EXECUTE)	

Use this key...	To display the function...	Which you can set to...	Or use default value...
	RESET DIA. MISSING CAP 	(EXECUTE)	
Rejector Key 4			
	REJECTOR STATUS 	ON or OFF	OFF
	FIRE REJECTOR ON DEMAND 	(EXECUTE)	OFF
	REJECTOR PULSE WIDTH 	0 through 250 milliseconds	10 ms
	REJECT NEXT BOTTLE 	(EXECUTE)	
	INSPECT TRIG TO C/L REJ 	67 through 4000 millimeters	500 mm
	REJECTOR REACTION DELAY 	1 through 150 milliseconds	11 ms
System Key 5			
	CLEAR SYSTEM 	(EXECUTE)	
	LAST REJECT DETECTED 	NONE to the actual reject	
	CURRENT LANGUAGE 	ENGLISH PORTUGUESE SPANISH GERMAN FRENCH	ENGLISH
	BEACON STATUS 	ON OFF HIGH PRIORITY ONLY	ON

Use this key...	To display the function...	Which you can set to...	Or use default value...
	SPT/MON P16 PORT STATUS 	LC= RX= TX=	LC=0 RX=0 TX=0
	PLC OUTPUT PULSE WIDTH 	1 through 120 milliseconds	20 ms
	CURRENT BOTTLE TYPE 	1 through 32	1
	LINE SPEED (CPM) 	0 through 2500 containers per minute	
	LINE SPEED (CPH) 	0 through 150000 containers per hour	
	SYSTEM DISPLAY 	OPERATE CALIBRATE	OPERATE
	TIME WIDTH OF BOTTLE 	0 through 65535 milliseconds	
	CHAIN VELOCITY 	0 through 300 meters per minute	
	LOAD DEFAULT CONSTANTS 	(EXECUTE)	
	BOTTLE WIDTH AT TRIG 	1 through 250 millimeters	55 mm
	MAXIMUM BOTTLE DIAMETER 	1 through 400 millimeters	66 mm
	MAXIMUM LINE SPEED 	1500 containers per minute	1400 cpm
	CONVEYOR DRIVE SPROCKET 	18 through 29 teeth	22 TEETH

Use this key...	To display the function...	Which you can set to...	Or use default value...
	CONVEYOR SEGMENT PITCH 	50 through 700 (1/10th) millimeters	381 (1/10th) mm
	TEETH/CONVEYOR SEGMENT 	1 through 3 teeth	2
	MAXIMUM CONVEYOR SPEED 	21 through 120 meters per minute	120 METERS/MIN
	CALIBRATE ENCODER VALUE 	Encoder pulses per 10 meters	Encoder pulses per 10 meters
	ENCODER PRE-SCALER VALUE 	2 through 50 encoder pulses	4 ENC PULSES
	GAMM SAMPLE CUTOFF LIMIT 	0 through 50 samples	4 SAMPLES
	GAMM SAMPLES PER ENCODER 	0 through 50 samples	0 SAMPLES
	CHANGE PASSWORD 	(EXECUTE) Note: You can specify up to three digits. Each digit can range from 1 through 6 only.	222
	VIEW PLC PIN ASSIGNMENTS 	(EXECUTE)	
	# OF CONTAINER TYPES 	1 through 32	5
	FILL LEVEL 	PRESENT or NOT PRESENT	PRESENT
	XRAY SOURCE 	PRESENT or NOT PRESENT	PRESENT
	REJECT VERIFICATION 	PRESENT or NOT PRESENT	NOT PRESENT

Use this key...	To display the function...	Which you can set to...	Or use default value...
	REJECTOR TYPE 	H.S. LS-3 SLAT SERVOTEC SERVOTEC II Std. PROLINE H.S. PROLINE SLAT H.L. SLAT Std. LS-3 SLAT	STD. PROLINE
	ENCODER RESOLUTION 	500 ENC PULSES through 5000 ENC PULSES	500 ENC PULSES
	KNOWN CHAIN PITCH & TEETH 	PRESENT or NOT PRESENT	PRESENT
	REMOTE CLEAR INPUT 	NOT PRESENT TB1_2 bit 0 TB1_8 bit 1 TB1_5 bit 2 TB1_11 bit 3 TB1_23 bit 4 TB1_14 bit 5 TB1_17 bit 6 TB1_20 bit 7 TB4_5 bit 8 TB4_6 bit 9 TB1_7 bit 10 TB4_8 bit 11	TB4_8 bit 11
	SAVE DEFAULT CONSTANTS 	(EXECUTE)	
	BOTTLE TEXT 	Up to 10 alphanumeric characters maximum	BOTTLE
	CONTAINER TYPE TEXT 	Up to 17 alphanumeric characters maximum	1
	UNDERFILL TEXT 	Up to 17 alphanumeric characters maximum	UNDERFILL
	OVERFILL TEXT 	Up to 17 alphanumeric characters maximum	OVERFILL
	MISSING CAP 	NOT PRESENT STANDARD NONFERROUS CAP UNDER FOIL	NOT PRESENT
	MISSING CAP TEXT 	Up to 17 alphanumeric characters maximum	MISSING CAP

Use this key...	To display the function...	Which you can set to...	Or use default value...
	HIGH CAP 	PRESENT or NOT PRESENT	NOT PRESENT
	HIGH CAP TEXT 	Up to 17 alphanumeric characters maximum	HIGH CAP
	SMASHED BOTTLE 	PRESENT or NOT PRESENT	NOT PRESENT
	SMASHED BOTTLE TEXT 	Up to 17 alphanumeric characters maximum	SMASHED BOTTLE
	DIA. MISSING CAP 	PRESENT or NOT PRESENT	NOT PRESENT
	DIA. MISSING CAP TEXT 	Up to 17 alphanumeric characters maximum	DIA. MISSING CAP
	SERIAL DATA ID NUMBER 	1 through 62	
	HOST MODBUS PORT STATUS 	LC= RX= TX=	LC=0 RX=0 TX=0
	MODBUS MESSAGE COUNTERS 	OK= BAD= OTHER=	OK=0 BAD=0 OTHER=0
	ALARM UNDERFILL 	ON or OFF	OFF
	ALARM OVERFILL 	ON or OFF	OFF
	ALARM MISSING CAP 	ON or OFF	OFF
	ALARM HIGH CAP 	ON or OFF	OFF

Use this key...	To display the function...	Which you can set to...	Or use default value...
	ALARM SMASHED BOTTLE 	ON or OFF	OFF
	ALARM DIA. MISSING CAP 	ON or OFF	OFF
	ALARM EXTERNAL REJECT 	1 through 125 containers or OFF	OFF
	VIEW TB1&4 PIN ASSIGN. 	(EXECUTE) TRIGGER BEAM 3 MISSING CAP BACKUP SENSOR REJECT VERIFIER UPSTM EXT REJ LOW RES ENCODER REJECTOR POWER REJECTOR DRIVER HIGH RES ENCODER OILER DRIVER SLAT SENSOR XRAY ENABLED XRAY FAILED INPUT TB4- 6 EXTERNAL REJECT TB4- 7 REMOTE CLEAR **COMPLETED**	
	VIEW PLC PIN ASSIGNMENTS 	(EXECUTE)	
	EXTERNAL REJECT 	PRESENT or NOT PRESENT	NOT PRESENT
	EXTERNAL REJECT TEXT 	Up to 17 alphanumeric characters maximum	
	SERIAL INTERFACE 	NOT PRESENT IDC INTERFACE MODBUS INTERFACE	NOT PRESENT
	CALIBRATE ENCODER 	(EXECUTE)	

Use this key...

To display the function...

Which you can set to...

Or use default value...

Diagnostics Key 6



SYSTEM DIAGNOSTIC ERROR

SYSTEM DIAGNOSTIC ERROR
124 (ARROWS CLEAR ERROR_

0 through 179
(ARROWS CLEAR ERROR)

4.4 Software Function Descriptions

4.4.1 Introduction

This section contains function descriptions for each function group. Depending on the type of Filtec 3-G system that you have, machine configuration, and options package, some of these options might not apply to your Filtec 3-G.

4.4.2 Fill Level Functions Group



UNDERFILL STATUS

This function turns on and turns off the rejection of underfilled containers.

Deactivating this function inhibits the rejection of containers with fill levels below the underfill threshold. It does not turn off underfill inspection, it only stops the rejector from rejecting underfills.

Underfill and overfill cannot be active simultaneously on selected configurations of the Filtec 3-G.

OVERFILL STATUS

This function turns on and turns off the rejection of overfilled containers.

Deactivating this function inhibits the rejection of containers with fill levels above the overfill threshold. It does not turn off overfill inspection, it only stops the rejector from rejecting overfills.

Underfill and overfill cannot be active simultaneously on selected configurations of the Filtec 3-G.

GAMMA COUNTS

This function indicates the gamma ray count for the container that was most recently rejected or inspected.

You can specify that you want to update the count constantly by pressing an arrow key and selecting **UPDATING CONSTANTLY** or you can specify that you want to update the count only when the Filtec 3-G rejects a container by pressing an arrow key and selecting **UPDATING ON REJECT ONLY**.

The gamma count is the amount of radiation that passes through the container and is captured by the radiation sensor. Each container's gamma count is compared to the target fill level, underfill, and overfill thresholds for that container type. If the gamma count falls outside these threshold parameters, the Filtec 3-G rejects the container.

GAMMA THRESHOLD

Establishes the threshold value that the gamma counts must:

- Exceed for underfill rejection
- Not exceed for overfill rejection

Any gamma count value that falls outside of the **GAMMA THRESHOLD** value that you specify triggers a rejection.

LOOKTIME GATE

The time, in milliseconds, during which Filtec 3-G records gamma ray counts for each container.

The looktime gate value is determined by the container's width at the inspection point and the conveyor speed. In simplified terms, it is the amount of time that the container requires to pass through the gamma ray inspection beam.

See also **TIME WIDTH OF BOTTLE**.

TARGET HEAD HEIGHT

This function displays the head height setting for the current container type. When your Filtec 3G is working correctly, this setting and the height that is indicated in the head height counter (Figure 3-4-1 on page 3-2) match.

4.4.3 Container Finish Functions Group



HIGH CAP STATUS

This function activates and deactivates high cap detection. High cap detection is based on the difference between the height of the container with a correctly seated cap and height of the container with an incorrectly seated cap.

MISSING CAP STATUS

This function activates and deactivates missing cap detection. Missing cap detection uses proximity and optical sensors to detect the presence or absence of a cap.

SMASHED BOTTLE STATUS

This function activates and deactivates smashed bottle detection.

DIAMETER MISSING CAP STATUS

This function activates and deactivates diameter missing cap detection. Diameter missing cap detection is based on the difference between the diameter of the container without a cap and diameter of the container with a cap.

EXTERNAL REJECT STATUS

This function activates and deactivates the external reject function. When activated, the Filtec 3-G accepts the reject signal from an outside inspection source and activates the rejector.

SMASHED BOTTLE STATUS

This function activates and deactivates the down bottle detection function for bottles.

WIDTH AT SMASHED BOTTLE

This function indicates the container diameter at the point where it intersects the smashed bottle sensor beam.

DIA. MISSING CAP WIDTH

This function indicates the cap diameter of the container translated into encoder pulses. In simplified terms, this value indicates the amount of time, converted into encoder pulses, that is required for the cap to pass through the inspection beam.

MINIMUM DIA. MISSING CAP

This function indicates the minimum number of encoder pulses that defines a container with a cap. This function allows you to compensate for variances in the production and inspection processes.

4.4.4 Counters Functions Group



The counters record operational and performance data about the Filtec 3-G and the production line on which it is operating. This data is useful for plant performance management and for machine maintenance. Here are some other issues of which you should be aware:

- The counters are active only for those functions that are active. If you disable a function, the associated counter (or counters) no longer include that function in the count.
- When you reset a counter, the current count is erased. If you need the current count, you should record it before you reset the counter.

TOTAL THROUGHPUT

This function displays the total number of containers that passed through the trigger beam. The counter automatically resets at 65535.

TOTAL REJECTS

This function displays the total number of containers that the Filtec 3-G rejected. The counter automatically resets at 65535.

This function indicates the sum of the rejections from all active inspection functions. If two functions reject the same container, only one total reject count is recorded.

The reject next bottle function is included in the value that the total rejects function displays.

TOTAL UNDERFILL

This function indicates the total number of underfilled containers that failed the fill level inspection. The counter automatically resets after 65535.

TOTAL OVERFILL

This function displays the total number of overfilled containers that failed the fill level inspection. The counter automatically resets after 65535.

TOTAL MISSING CAP

This function displays the total number of bottles that the Filtec 3-G detected that had missing caps. The counter automatically resets at 99999999.

TOTAL HIGH CAP

This function displays the total number of bottles that the Filtec 3-G detected that had high caps. The counter automatically resets after 65535.

TOTAL SMASHED BOTTLE

This function displays the total number of smashed containers that the Filtec 3-G detected. The counter automatically resets after 65535.

TOTAL DIA. MISSING CAP

The total number of bottles that the Filtec 3-G detected that had missing caps. This counter is separate from, and not included in, the total missing cap counter. The counter automatically resets after 65535.

TOTAL EXTERNAL REJECT

This function displays the total number of external reject signals that the Filtec 3-G received. The counter automatically resets after 65535.

RESET ALL COUNTERS

This function clears and resets all counters to zero.



Caution: Record all valuable data before executing this function.

To reset this counter:

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET ALL COUNTERS** on the two-line display.
2. Press the arrow key to execute.

RESET TOTAL THROUGHPUT

This function clears and resets the total throughput counter to zero.



Caution: Record all valuable data before executing this function.

To reset this counter:

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET TOTAL THROUGHPUT** on the two-line display.
2. Press the arrow key to execute.

RESET TOTAL REJECTS

This function clears and resets the total rejects counter to zero.



Caution: Record all valuable data before executing this function.

To reset this counter:

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET TOTAL REJECTS** on the two-line display.
2. Press the arrow key to execute.

RESET UNDERFILL

This function clears and resets the total underfill counter to zero.



Caution: Record all valuable data before executing this function.

To reset this counter:

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET TOTAL UNDERFILL** on the two-line display.
2. Press the arrow key to execute.

RESET OVERFILL

This function clears and resets the total overflow counter to zero. Record all valuable data before executing this function.

To reset this counter:

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET OVERFILL** on the two-line display.
2. Press the arrow key to execute.

RESET MISSING CAP

This function clears and resets the total missing cap counter to zero.



Caution: Record all valuable data before executing this function.

To reset this counter:

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET MISSING CAP** on the two-line display.
2. Press the arrow key to execute.

RESET HIGH CAP

This function clears and resets the total high cap counter to zero.



Caution: Record all valuable data before executing this function.

To reset this counter:

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET HIGH CAP** on the two-line display.
2. Press the arrow key to execute.

RESET TOTAL SMASHED BOTTLE

This function clears and resets the total smashed bottle counter to zero.



Caution: Record all valuable data before executing this function.

To reset this counter:

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET TOTAL SMASHED BOTTLE** on the two-line display.

2. Press the arrow key to execute.

RESET DIA. MISSING CAP

This function clears and resets the total diameter missing cap counter to zero.



Caution: Record all valuable data before executing this function.

To reset this counter.

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET DIA. MISSING CAP** on the two-line display.
2. Press the arrow key to execute.

RESET EXTERNAL REJECT

This function clears and resets the total external rejects counter to zero.



Caution: Record all valuable data before executing this function.

To reset this counter.

1. On the operator control panel, press key 3 until your Filtec 3-G displays **RESET EXTERNAL REJECT** on the two-line display.
2. Press the arrow key to execute.

4.4.5 Rejector Functions Group



REJECTOR STATUS

This function disables or enables the reject signal transmitted by the Filtec 3-G to the rejector. This function also affects the external reject function in the same way. Although the actual rejection is disabled all counters and alarms continue to accumulate.

FIRE REJECTOR ON DEMAND

This function fires the rejector manually. This function is used to test the rejector mechanism or to manually activate it during start-up to provide initial lubrication under no load.

To execute this function:

1. On the operator control panel, press key 4 until your Filtec 3-G displays **FIRE REJECTOR ON DEMAND**.
2. Press the arrow key.

Result: Your Filtec 3-G fires the rejector.

REJECTOR PULSE WIDTH

This function specifies the amount of time, in milliseconds, that your Filtec 3-G applies voltage to the rejector solenoid. This translates into the speed with which the rejector ram extends and returns to the ready position.

REJECT NEXT BOTTLE

This function defines the number of containers that you want to consecutively reject (also called batch reject).

You specify the number of containers to reject and the Filtec 3-G continues to reject containers until the counter reaches zero.

All containers that are rejected with this function are included in the total rejects counter.

This function is useful during testing and calibration procedures.

To activate this function:

1. On the operator control panel, press key 4 until your Filtec 3-G displays **REJECT NEXT BOTTLE**.
2. Press the arrow key to enter the number of containers to reject.

INSPECT TRIG TO C/L REJ

This function specifies the distance, in millimeters, from the center line of the inspection trigger beam to the center line of the rejector pad.

This value is required to establish the correct time for the rejector to actuate so the center line of the rejector pad impacts the center line of the container.

REJECTOR REACTION DELAY

You use this function to specify the response time in milliseconds between when the container fails inspection and when the reject signal is sent to the rejector. The Filtec 3-G's processor uses this value to establish a lead time for the rejector pulse to compensate for the inertia of the rejector mechanism.

4.4.6 System Functions Group



CURRENT BOTTLE TYPE

This function specifies the system parameters that describe a particular container type.

Your Filtec 3-G automatically uses the parameters that you specify when you later change over to and activate a container type.

You specify the number of container types that you intend to use by using the **# OF CONTAINER TYPES** function. You specify the name of each container type with the **BOTTLE TEXT** function.

If your production line is set up for more than one container type, this function enables you to switch to different container production without having to reconfigure the software function parameters.

This function is only available if your Filtec 3-G is configured for multiple container types.

To select the **CURRENT BOTTLE TYPE**:

1. On the operator control panel, press key 5 until your Filtec 3-G displays **CURRENT BOTTLE TYPE**.
2. Press the arrow key until your Filtec 3-G displays the container type that you want.

LAST REJECT DETECTED

This function indicates the type of failure that caused the most recent reject container. The failure classification can be any of the inspection capabilities installed and active on your Filtec 3-G.

SPT/MON P16 PORT STATUS

This function displays the character information in a FILTEC Intellect product communication string. The FILTEC Intellect product is usually connected to the serial port located on connector P16 of the Filtec 3-G CPU card. The counters have a range from 0 to 255 inclusive and are then reset.

- LC is the last character that was received by the Filtec 3-G.
- RX is a count of the characters received by the Filtec 3-G.
- TX is a count of the characters transmitted by the Filtec 3-G.

BEACON STATUS

This function determines the operational status of the warning beacon. There are three status choices:

- **ON**: the beacon flashes once for each rejected container and continuously when a diagnostic error occurs. The beacon stops flashing when you clear the diagnostic error.
- **OFF**: The beacon will flash once for each rejected container.

- **HIGH PRIORITY ONLY:** The beacon flashes once for each rejected container and continuously when a high priority diagnostic error occurs. The beacon stops flashing when you clear the diagnostic error.

LINE SPEED (CPM)

This function indicates the speed of the production line measured by the number of containers per minute (cpm).

The measurement is the number containers that intercept the Filtec 3-G's trigger beam within 60 seconds inclusive. To calculate the number of containers per minute from the number of containers per hour, use the formula:

$$\frac{\text{cph}}{60} = \text{cpm}$$

LINE SPEED (CPH)

This function indicates the speed of the production line measured by the number of containers per hour.

The measurement is the number containers that intercept the Filtec 3-G's trigger beam within 60 minutes. To calculate the number of containers per hour from the number of containers per minute, use the formula:

$$\text{cpm} \times 60 = \text{cph}$$

SYSTEM DISPLAY

This function switches the system between operate mode and calibrate mode.

Operate mode is the normal operating mode for the Filtec 3-G and allows access only to those functions required for production operation.

Calibrate mode grants you complete access to all system functions, including configuration and container programming functions.

When you activate the password function, you must enter the password before you are granted access to calibrate mode.

When you place the Filtec 3-G in calibrate mode, if the Filtec 3-G is idle (that is, you do not press any keys) for 30 minutes, the system automatically returns to operate mode.

To switch operating modes:

1. On the operator control panel, press key 5 until your Filtec 3-G displays **SYSTEM DISPLAY**.
2. Press the arrow key to select either operate or calibrate mode. If the password protect function is enabled, you must enter the password before you can access calibrate mode.

CONVEYOR DRIVE SPROCKET

This function specifies the number of teeth on the sprocket that is physically contacting the conveyor chain. This is the primary value that your Filtec 3-G uses to calibrate the encoder.

SERIAL DATA ID NUMBER

This function specifies the Filtec 3-G's serial port identification number. This function applies only to units equipped with either the IDC or Modbus serial communications options.

HOST/MODBUS PORT STATUS

This function displays the character information in a Modbus serial communication string. The counters have a range from 0 to 255 inclusive and then reset.

- LC is the last character that was received by the Filtec 3-G.
- RX is a count of the characters received by the Filtec 3-G.
- TX is a count of the characters transmitted by the Filtec 3-G.

Pressing the arrow key sends the test message **IDC HOST/MODBUS TEST MESSAGE** and the Filtec 3-G increments the TX counter by 30.

MODBUS MESSAGE COUNTERS

This function displays the number of Modbus messages that the Filtec 3-G receives and defines as good, bad, or other.

- Good is the number of good messages that the Filtec 3-G receives.

- Bad is the number of bad messages that the Filtec 3-G receives.
- Other is the number of messages that Filtec 3-G receives that have an incorrect serial identification number.

PLC OUTPUT PULSE WIDTH

This function defines the output pulse width of all pulsed PLC outputs.

You can adjust the range from 1 to 120 milliseconds (ms). The output pulse from inspection functions is timed to pulse at the moment detection is made.

The total reject output pulse occurs when the Filtec 3-G fires the rejector. The total throughput pulse occurs when the container passes through the inspection trigger.

TIME WIDTH OF BOTTLE

This function indicates the time, in milliseconds, that it takes a container to pass through the trigger beam. See also **LOOKTIME GATE**.

To change this value:

1. On the operator control panel, press key 5 until your Filtec 3-G displays **TIME WIDTH OF BOTTLE**.
2. Ensure that the conveyor is running at maximum production speed.
3. Place a sample production container on the conveyor far enough upstream of the Filtec 3-G so that the container is positioned correctly and does not slip on the conveyor chain as it passes through the inspection area.

Result: Your Filtec 3-G displays a value after the **TIME WIDTH OF BOTTLE** function on the two-line display.

4. Record the value that your Filtec 3-G displays.
5. Repeat [step 3](#) and [step 4](#) four more times and then calculate the looktime using the following equation.

$$\left(\frac{a + b + c + d + e}{5} \right) \times 0.6 = \text{Looktime}$$

6. On the operator control panel, press key 1 until your Filtec 3-G displays **LOOKTIME GATE**.

7. Use the arrow key to enter the value that you calculated for the looktime.

CHAIN VELOCITY

This function calculates the velocity of the conveyor chain in meters per minute (mpm).

Your Filtec 3-G automatically calculates this value.

ALARM UNDERFILL

This function specifies the minimum number of consecutive underfill rejects that trigger an alarm condition.

Your Filtec 3-G a resets the count to zero when it detects a good container.

This function can alert you to filler malfunctions.

ALARM OVERFILL

This function specifies the minimum number of consecutive overfill rejects that trigger an alarm condition.

Your Filtec 3-G a resets the count to zero when it detects a good container.

This function can alert you to filler malfunctions.

ALARM MISSING CAP

This function specifies the minimum number of consecutive missing cap rejects that trigger an alarm condition.

Your Filtec 3-G resets the count to zero when it detects a good container.

This function also can alert you when capper or crowner malfunctions occur.

ALARM HIGH CAP

This function specifies the minimum number of consecutive high cap rejects that trigger an alarm condition.

Your Filtec 3-G resets the count to zero when your Filtec 3-G detects a good container.

This function also can alert you when capper or crowner malfunctions occur.

ALARM SMASHED BOTTLE

This function specifies the minimum number of consecutive smashed bottle rejects that trigger an alarm condition.

Your Filtec 3-G resets the count to zero when your Filtec 3-G detects a good container.

This function also can alert you when capper or crowner malfunctions and disturbances on the conveyor occur.

ALARM DIA. MISSING CAP

This function specifies the minimum number of consecutive diameter missing cap rejects that trigger an alarm condition.

Your Filtec 3-G resets the count to zero when your Filtec 3-G detects a good container.

This function also can alert you when capper or crowner malfunctions occur.

ALARM EXTERNAL REJECT

This function specifies the minimum number of consecutive external rejects that trigger an alarm condition.

Your Filtec 3-G resets the count to zero when chain of consecutive external reject signals is broken.

This function also can alert you when inspection problems occur at the external inspection unit.

LOAD DEFAULT CONSTANTS

This function retrieves the user defaults that your Filtec 3-G saved when an operator last ran the **SAVE USER DEFAULTS** function.

When you save the user defaults, they become the new active configuration for your Filtec 3-G.

To load the default constants:

1. On the operator control panel, press key 5 until your Filtec 3-G displays **LOAD DEFAULT CONSTANTS**.
2. Press the arrow key.

Result: Your Filtec 3-G loads the default constants.

BOTTLE WIDTH AT TRIG

This function specifies the width, in millimeters, of the container at the point where it intercepts the trigger beam as it travels on the conveyor.

Your Filtec 3-G requires this value to establish the correct time for the rejector to actuate so that the center line of the rejector pad contacts the center line of the container.

MAXIMUM BOTTLE DIAMETER

This function specifies the maximum diameter of the current container type that you are running. You need to set this value for all container types.

MAXIMUM LINE SPEED

This function specifies the maximum production speed of the conveyor, which is defined as containers per minute (CPM).

MAXIMUM CONVEYOR SPEED

This function specifies the maximum production speed of the conveyor, which is defined as meters per minute (MPM).

CHANGE PASSWORD

This function enables you to enter a three (3) digit password.

When the password option is active, you must enter the password to enter calibrate mode.

FILTEC sets the password to 222 at the factory. To change the password:

1. Remove the cover of your Filtec 3-G to gain access to dip switch S1-8.
2. Close dip switch S1-8.



Note: S1-8 is located on the processor card.

You must close dip switch S1-8 to display the **CHANGE PASSWORD** function. To disable the password protect function, close dip switch S1-8.

3. On the operator control panel, press key 5 until your Filtec 3-G displays **SYSTEM DISPLAY**.

4. Press the arrow key.

Result: Your Filtec 3-G enter calibrate mode.

5. Press key 5 until your Filtec 3-G displays **CHANGE PASSWORD**.

6. Press the arrow key.

Result: Filtec 3-G displays the Enter Password prompt.

7. Use the number keys (keys 1 through 6) to enter each of the three digits.

Best Practice: Write down and remember the password that you specify for future reference.

8. After a few seconds, your Filtec 3-G displays **COMPLETED**.

9. Inside your Filtec 3-G, open dip switch S1-8.

Result: You activate the password option. Whenever you or another operator attempts to enter calibrate mode, you or the operator must specify this password.

10. Press key 5 until Filtec 3-G displays **SYSTEM DISPLAY**.

11. Press the arrow key.

Result: Your Filtec 3-G returns to operate mode.

12. Replace the cover of your Filtec 3-G.

VIEW TB1&4 PIN ASSIGN.

This function displays the signal wiring assignments for pins in terminal blocks TB1 and TB4. It also lists the normal voltage levels that are associated with the signals.

To check which Filtec 3-G inputs have been assigned to pins on terminal block TB1 and TB4:

1. On the operator control panel, press key 5 until your Filtec 3-G displays **VIEW TB1&4 PIN ASSIGN.**
2. Continue to press the arrow key to scroll through the list.
 - The top line on the two-line display shows the sensor or function and its assigned terminal pin.
 - The bottom line on the two-line display lists the voltage level and triggered action.

For example, **BLKD <1V, UNBLOCKED >17V** indicates that if the signal voltage is less than 1 volt, the trigger is blocked, and if the signal is greater than 17 volts, the trigger is unblocked.

When you reach the end of the list, your Filtec 3-G displays **COMPLETED.**

VIEW PLC PIN ASSIGNMENTS

This function displays the programmable logic controller (PLC) signal wiring assignments. It also lists the normal voltage levels associated with the signals.

To check the PLC pin assignments:

1. On the operator control panel, press key 5 until your Filtec 3-G displays **VIEW PLC PIN ASSIGNMENTS.**
2. Press the arrow key to display the first pin assignment.
3. Continue pressing the arrow key to scroll through the list.

When you reach the end of the list, your Filtec 3-G displays **COMPLETED.**

CLEAR SYSTEM

This function clears the system by resetting all function parameters to factory defaults.

Best Practice: Because your Filtec 3-G erases all current settings, ensure that you use the **SAVE DEFAULTS** function before you execute this function, if you want to save them.

CURRENT LANGUAGE

This function selects the language that you want your Filtec 3-G to use.

Available languages that you can select include English, Portuguese, Spanish, German, French, and Italian. You can always select English.

BOTTLE TEXT

This function enables you to create a custom name that replaces the word that represents a particular container.

Any instance in which the text string “Bottle” appears in the software is replaced by the text string that you specify.

To create a custom name:

1. On the operator control panel, press the arrow key until your Filtec 3-G displays the character that you want.
2. Press key 6 to advance to the next space.
3. Repeat the previous steps until you type the text string that you want.
4. Press key 5 once.

Result: Your Filtec 3-G uses the text string that you typed.

OF CONTAINER TYPES

This function specifies the maximum number of different container types that are inspected by this Filtec 3-G.

The value that you specify determines the number of current container types that you can create.

CONTAINER TYPE TEXT

This function enables you to create a name for each container type.

Your Filtec 3-G displays the name that you specify in the list of current container types.

To create container type text:

1. On the operator control panel, press the arrow key until your Filtec 3-G displays the character that you want.
2. Press key 6 to advance to the next space.
3. Repeat the previous steps until you type the container type text string that you want.
4. Press key 5 once.

Result: Your Filtec 3-G uses the text string that you typed.

REJECT VERIFICATION

This function detects whether a container is rejected by using a sensor downstream from the rejector. This sensor verifies that the container is missing from the conveyor.

FILL LEVEL

This function tells the Filtec 3-G that the fill level function is present and makes the fill level function available to users.

When you set **FILL LEVEL** to **NOT PRESENT**, it prevents users from accessing the fill level status function.

This function does not activate or deactivate fill level. This function only readies your Filtec 3-G.

This function does not activate or deactivate fill level inspection, it only readies the machine.

To turn fill level on or turn fill level off, you must use the **FILL LEVEL STATUS** function.

UNDERFILL TEXT

This function enables you to create a custom name that replaces the word that represents a particular container.

Any instance in which the text string “Underfill” appears in the software is replaced by the text string that you specify.

The following options are affected:

- **UNDERFILL STATUS**
- **TOTAL UNDERFILL**
- **RESET UNDERFILL**
- **ALARM UNDERFILL**
- **UNDERFILL TEXT**



Note: This document uses the text string “Underfill” throughout to represent the underfill text string. If you use this function to change the “Underfill” text string, remember that the new name that you specify represents “Underfill” used in this document.

To create a custom underfill text string:

1. On the operator control panel, press the arrow key until your Filtec 3-G displays the character that you want.
2. Press key 6 to advance to the next space.
3. Repeat the previous steps until you type the text string that you want.
4. Press key 5 once.

Result: Your Filtec 3-G uses the text string that you typed.

OVERFILL TEXT

This function enables you to create a custom name that replaces the word that represents a particular container.

Any instance in which the text string “Overfill” appears in the software is replaced by the text string that you specify.

The following options are affected:

- **OVERFILL STATUS**
- **TOTAL OVERFILL**

- **RESET OVERFILL**
- **ALARM OVERFILL**
- **OVERFILL TEXT**



Note: This document uses the text string “Overfill” throughout to represent the overfill text string. If you use this function to change the “Overfill” text string, remember that the new name that you specify represents “Overfill” used in this document.

To create a custom overfill text string:

1. On the operator control panel, press the arrow key until your Filtec 3-G displays the character that you want.
2. Press key 6 to advance to the next space.
3. Repeat the previous steps until you type the text string that you want.
4. Press key 5 once.

Result: Your Filtec 3-G uses the text string that you typed.

MISSING CAP

This function tells the Filtec 3-G that the missing cap function is present and makes the missing cap function available to users.

When you set **MISSING CAP** to **NOT PRESENT**, it prevents users from accessing the missing cap status function.

This function does not activate or deactivate missing cap. This function only readies your Filtec 3-G.

To turn missing cap on or turn missing cap off, you must use the **MISSING CAP STATUS** function.

MISSING CAP TEXT

This function enables you to create a custom name that replaces the word that represents a particular container.

Any instance in which the text string “Missing Cap” appears in the software is replaced by the text string that you specify.

The following options are affected:

- **MISSING CAP STATUS**
- **TOTAL MISSING CAP**
- **RESET MISSING CAP**
- **ALARM MISSING CAP**
- **MISSING CAP TEXT**



Note: This document uses the text string “Missing Cap” throughout to represent the missing cap text string. If you use this function to change the “Missing Cap” text string, remember that the new name that you specify represents “Missing Cap” used in this document.

To create a custom missing cap text string:

1. On the operator control panel, press the arrow key until your Filtec 3-G displays the character that you want.
2. Press key 6 to advance to the next space.
3. Repeat the previous steps until you type the text string that you want.
4. Press key 5 once.

Result: Your Filtec 3-G uses the text string that you typed.

HIGH CAP

This function tells the Filtec 3-G that the high cap function is present and makes the high cap function available to users.

When you set **HIGH CAP** to **NOT PRESENT**, it prevents users from accessing the high cap status function.

This function does not activate or deactivate high cap. This function only readies your Filtec 3-G.

To turn high cap on or turn high cap off, you must use the **HIGH CAP STATUS** function.

HIGH CAP TEXT

This function enables you to create a custom name that replaces the word that represents a particular container.

Any instance in which the text string “High Cap” appears in the software is replaced by the text string that you specify.

The following options are affected:

- **HIGH CAP STATUS**
- **TOTAL HIGH CAP**
- **RESET HIGH CAP**
- **ALARM HIGH CAP**
- **HIGH CAP TEXT**



Note: This document uses the text string “High Cap” throughout to represent the high cap text string. If you use this function to change the “High Cap” text string, remember that the new name that you specify represents “High Cap” used in this document.

To create a custom high cap text string:

1. On the operator control panel, press the arrow key until your Filtec 3-G displays the character that you want.
2. Press key 6 to advance to the next space.
3. Repeat the previous steps until you type the text string that you want.
4. Press key 5 once.

Result: Your Filtec 3-G uses the text string that you typed.

SMASHED BOTTLE

This function tells the Filtec 3-G that the smashed bottle function is present and makes the smashed bottle function available to users.

When you set **SMASHED BOTTLE** to **NOT PRESENT**, it prevents users from accessing the smashed bottle status function.

This function does not activate or deactivate smashed bottle. This function only readies your Filtec 3-G.

To turn smashed bottle on or turn smashed bottle off, you must use the **SMASHED BOTTLE STATUS** function.

SMASHED BOTTLE TEXT

This function enables you to create a custom name that replaces the word that represents a particular container.

Any instance in which the text string “Smashed Bottle” appears in the software is replaced by the text string that you specify.

The following options are affected:

- **SMASHED BOTTLE STATUS**
- **TOTAL SMASHED BOTTLE**
- **RESET SMASHED BOTTLE**
- **WIDTH AT SMASHED BOTTLE**
- **ALARM SMASHED BOTTLE**
- **SMASHED BOTTLE TEXT**



Note: This document uses the text string “Smashed Bottle” throughout to represent the underfill text string. If you use this function to change the “Smashed Bottle” text string, remember that the new name that you specify represents “Smashed Bottle” used in this document.

To create a custom smashed bottle text string:

1. On the operator control panel, press the arrow key until your Filtec 3-G displays the character that you want.
2. Press key 6 to advance to the next space.
3. Repeat the previous steps until you type the text string that you want.
4. Press key 5 once.

Result: Your Filtec 3-G uses the text string that you typed.

DIA. MISSING CAP

This function tells the Filtec 3-G that the diameter missing cap function is present and makes the diameter missing cap function available to users.

When you set **DIAMETER MISSING CAP** to **NOT PRESENT**, it prevents users from accessing the diameter missing cap status function.

This function does not activate or deactivate diameter missing cap. This function only readies your Filtec 3-G.

To turn diameter missing cap on or turn diameter missing cap off, you must use the **DIAMETER MISSING CAP STATUS** function.

DIA. MISSING CAP TEXT

This function enables you to create a custom name that replaces the word that represents a particular container.

Any instance in which the text string “Dia Missing Cap” appears in the software is replaced by the text string that you specify.

The following options are affected:

- **DIA MISSING CAP STATUS**
- **TOTAL DIA. MISSING CAP**
- **RESET DIA. MISSING CAP**
- **DIA MISSING CAP WIDTH**
- **ALARM DIA. MISSING CAP**
- **DIA. MISSING CAP TEXT**



Note: This document uses the text string “Dia Missing Cap” throughout to represent the diameter missing cap text string. If you use this function to change the “Dia Missing Cap” text string, remember that the new name that you specify represents “Dia Missing Cap” used in this document.

To create a custom diameter missing cap text string:

1. On the operator control panel, press the arrow key until your Filtec 3-G displays the character that you want.
2. Press key 6 to advance to the next space.
3. Repeat the previous steps until you type the text string that you want.
4. Press key 5 once.

Result: Your Filtec 3-G uses the text string that you typed.

EXTERNAL REJECT

This function tells the Filtec 3-G that the external reject function is present and makes the external reject function available to users.

When you set **EXTERNAL REJECT** to **NOT PRESENT**, it prevents users from accessing the external reject status function.

This function does not activate or deactivate external reject. This function only readies your Filtec 3-G.

To turn external reject on or turn external reject off, you must use the **EXTERNAL REJECT STATUS** function.

EXTERNAL REJECT TEXT

This function enables you to create a custom name that replaces the word that represents a particular container.

Any instance in which the text string “External Reject” appears in the software is replaced by the text string that you specify.

The following options are affected:

- **EXTERNAL REJECT STATUS**
- **TOTAL EXTERNAL REJECT**
- **RESET EXTERNAL REJECT**
- **ALARM EXTERNAL REJECT**
- **EXTERNAL REJECT TEXT**



Note: This document uses the text string “External Reject” throughout to represent the underfill text string. If you use this function to change the “External Reject” text string, remember that the new name that you specify represents “External Reject” used in this document.

To create a custom external reject text string:

1. On the operator control panel, press the arrow key until your Filtec 3-G displays the character that you want.
2. Press key 6 to advance to the next space.
3. Repeat the previous steps until you type the text string that you want.
4. Press key 5 once.

Result: Your Filtec 3-G uses the text string that you typed.

REJECTOR TYPE

This function enables you to select the rejector model that you are using with, and is controlled by your Filtec 3-G.

At present, depending on your configuration, values to which you can set this parameter include:

- High speed LS-3 Slat
- Servotec
- Servotec II
- Standard Proline
- High speed Proline
- Slat
- Hazardous location Slat
- Standard LS-3 Slat

SERIAL INTERFACE

This function activates or deactivates the **SERIAL INTERFACE** function, which provides serial network communication over RS-232, RS-422, RS-423, and RS-485 networks. This function enables you to directly control your Filtec 3G from a host system or PLC.

KNOWN CHAIN PITCH & TEETH

This function enables you to configure your encoder.

If you know the conveyor chain pitch and the number of teeth per chain link, you set this function to **PRESENT**. If you do not know the conveyor chain pitch and the number of teeth per chain link, you set this function to **NOT PRESENT**.

If you set this function to **PRESENT**, you must also use the **CONVEYOR SEGMENT PITCH** and **TEETH/CONVEYOR SEGMENT** functions to adjust parameters for your encoder.

CALIBRATE ENCODER

This function initiates the routine that you use to calibrate the encoder.

ENCODER RESOLUTION

This function specifies the resolution of the encoder that you install with your Filtec 3-G. The standard encoder is 500 pulse. The high resolution encoder is 5000 pulse and is required when you use the **DIAMETER MISSING CAP** option.

SAVE DEFAULT CONSTANTS

This function permanently saves the current operating configuration.

When you use this function, your Filtec 3-G stores parameters until you save the default constants again.

To recall the settings, you use the **LOAD DEFAULT CONSTANTS** function.

To save the default constants:

1. On the operator control panel, press key 5 until your Filtec 3-G displays **SAVE DEFAULT CONSTANTS**.
2. Press the arrow key.

Result: Your Filtec 3-G saves the constants.

CONVEYOR SEGMENT PITCH

This function specifies the distance from one point on a conveyor chain segment to the same point on the next conveyor segment.

This function defines the conveyor segment pitch, which equals the length of 10 conveyor segments, or plates, measured in millimeters, divided by 10.

TEETH/CONVEYOR SEGMENT

This function defines the number of sprocket teeth on the drive sprocket that contacts the chain segment.

The typical value that you specify is 2, but for some conveyors you might specify a value of 1.

CALIBRATE ENCODER VALUE

This function specifies the number of encoder pulses emitted for every 10 meters of conveyor travel.

ENCODER PRE-SCALER VALUE

This function specifies the conversion factor that your Filtec 3-G uses to process the encoder prescaler value.

This value enables the Filtec 3-G to process data at a faster rate.

GAMMA SAMPLE CUTOFF LIMIT

This function displays the value that your Filtec 3-G calculates automatically when you calibrate the encoder.

The typical value range is 3 to 4 and should be equal to or 1 more than the number of gamma ray samples per encoder when using a high speed production line.

GAMMA SAMPLES PER ENCODER

This function displays the number of 500-microsecond gamma ray samples that occurred between the last two encoder interrupts. This value verifies the correct **GAMMA SAMPLE CUTOFF LIMIT**.

The encoder interrupt is determined by the line speed and prescaler value.

4.4.7 Diagnostics Function Group



This function displays the current diagnostic error.

Clearing the error stops both the signal beacon from flashing and the remote alarm PLC output signal from being generated.

How to Access Diagnostic Error Codes



Note: Do *not* use the reset switch to clear diagnostic errors.

To view the error:

1. On the operator control panel, press key 6 until your Filtec 3-G displays the current diagnostic error number.
2. Press the arrow key to scroll through the error definitions.
3. When you reach the end of the message, press the arrow key once again to clear the error.

5. Maintenance Procedures

This chapter covers maintenance scheduling, procedures, and other maintenance issues.

5.1 Maintenance Schedules

5.1.1 Daily Schedule

Action	Description
Inspect	Trigger beam emitter and receiver lenses
Clean	Trigger beam emitter and receiver lenses
Inspect	High cap beam emitter and receiver lenses*
Clean	High cap beam emitter and receiver lenses
Inspect	Smashed bottle emitter and receiver lenses*
Clean	Smashed bottle emitter and receiver lenses
Inspect	Down bottle beam emitter and receiver lenses*
Clean	Down bottle beam emitter and receiver lenses

* If your Filtec system is equipped with this option

5.1.2 Weekly Maintenance

Action	Description
Inspect	Inspection head cover attachment
Clean	Inspection head housing
Inspect	Air supply regulator pressure adjustment
Inspect	Air filter
Clean	Purge air filter
Clean	Purge air flow to inspection head
Inspect	Rejector pad
Replace	Rejector pad

5.1.3 Monthly Maintenance

Action	Description
Check	Inspection head cover gaskets
Lubricate	Trigger raising mechanism lead screw and ways
Check	All external wiring
Check	All beacon lamps

Action	Description
Inspect	Nameplate, stickers, and instruction plates
Service	Pneumatic components according to the rejector documentation
Inspect	Inspection head housing for dirt and moisture

5.1.4 120 Day Maintenance

Action	Description
Inspect	Nameplate, stickers, and instruction plates
Service	Pneumatic components according to the rejector documentation
Inspect	Inspection head housing for dirt and moisture
Inspect	Wiring, insulation, terminals, and terminal blocks inside the inspection head and external junction box*
Inspect	Source autoshutter assembly
Inspect	Source housing safety wire and lead seal
Inspect	Source window for damage
Inspect	Gamma ray emitter and detector apertures for damage or blockage

* Not all FILTEC systems are equipped with the optional external junction box.

5.2 Maintenance Procedures

5.2.1 Before You Perform Any Maintenance Procedure

For your safety, power down the equipment to be serviced before you begin any maintenance procedure. To power down the rejector, turn off the main power switch on the junction box.



Warning: Turn off *all* power before performing any procedure or serious injury can occur.

5.2.2 Trigger Beam and Emitter Lenses

1. Inspect each lens for debris and damage.
2. Clean each lens with a cotton swab, lens tissue, or a soft cloth. Do not use paper towels because they are abrasive and can scratch the lens.
3. Apply several drops of medium viscosity oil to the lead screw on the trigger raising mechanism. Be careful not to disturb the trigger raising mechanism.
4. Inspect the beacons for cracks in the lenses and moisture inside the lenses.

5.2.3 High Cap and Missing Cap Sensors, Smashed Bottle, Down Bottle

1. Inspect each sensor for debris and damage.
2. Clean each sensor with a cotton swab, lens tissue, or a soft cloth. Do not use paper towels because they are abrasive and can scratch the lens.
3. Insure that all parts are firmly attached to the mounting brackets and locking knobs are tight.



Important: Do not disturb the position of the mounting brackets.

5.2.4 Filtec 3-G Housing

1. Inspect for damage to metal housing and for wear on the cover gaskets.
2. Check to be sure the cover is securely tightened
3. Clean using a non-caustic nonabrasive soap, water, and a soft brush.
 - Do not wash with a high pressure nozzle
 - Do not steam clean
4. Rinse with clean water.

5.2.5 Autoshutter Assembly

If your Filtec 3-G is equipped with this option, check the motion of armature by hand and under power. The armature should move freely without binding.

5.2.6 Source Housing Assembly

Check for presence of safety wire and lead seal.

5.2.7 Pressure Regulator and Air Filter

1. Inspect the polycarbonate sediment bowl for cracks and abrasion.
2. Clean and drain the air filter sediment bowl.
3. Inspect the air filter in the inspection head for clogging.

5.2.8 External Wiring

1. Check the external wiring between the sensors and the Filtec 3-G for damage. Check all connections carefully to be sure they are not loose.
2. Check that insulating sleeves are in place.

5.2.9 Replacing the Rejector Pad

The actual life span of the rejector pad depends upon the operating conditions of your production line. Inspect the pad weekly and replace if worn, cracked, or hardened.



Warning: Turn off all power to your system before attempting any repair procedure. See *Before You Perform Any Maintenance Procedure*, at the beginning of this section.

1. Power down the rejector.
2. Remove the retaining screw and washer on the top of the rejector shoe.
3. Slide the pad up to remove it from the shoe.
4. Insert the new pad by sliding it onto the shoe. Be sure the notch in the pad backing is positioned at the bottom.
5. Replace the retaining screw and washer.
6. Power up the rejector.

5.2.10 Servicing the Regulator and Coalescing Air Filters

Servicing the air filter consists of cleaning and/or replacing the air filter, sediment bowl, and gasket. You can obtain replacement parts for these items from the air controls manufacturer.



Warning: Turn off all power to your system before attempting any repair procedure. See *Before You Perform Any Maintenance Procedure*, at the beginning of this section.

1. Turn off the air flow control valve and depressurize all connected air lines.
2. Remove and clean the sediment bowl. If your unit contains a polycarbonate bowl, inspect it for cracking or cloudiness; if present, replace it.



Warning: Cracked or cloudy polycarbonate bowls can explode when repressurized, causing serious injury.

3. Clean other parts using soap and water.
4. Dry the bowl and other parts, and blow out internal passages in the body using filtered, dry compressed air.
5. Using filtered, dry compressed air, blow through the filter element from inside to outside to dislodge surface contaminants. If the filter element is plugged, replace it.

Apply a light coating of Dow Corning 44M grease (or equivalent) to the bowl gasket, and reassemble.

6. Diagnostic and Repair Procedures

This chapter includes a list of diagnostic error messages and describes how to view and clear them. This chapter also includes troubleshooting and repair procedures.

6.1 Diagnostic Errors

6.1.1 Introduction

This section contains a diagnostic error code list to help you quickly identify error codes and diagnostic error descriptions to provide additional information on the error.

6.1.2 Diagnostic Error Codes

The following list contains the Filtec 3-G error codes. Depending upon your machine type, some of these errors may not apply to your Filtec 3-G.

0	NO DIAGNOSTIC ERROR
* 2	REJECTOR STATUS IS OFF
5	CONSECUTIVE REJECT QUEUE ERROR
6	CONSECUTIVE REJECT TIMING ERROR-MISSED ENCODER PULSE
8	THE EEPROM CANNOT BE ERASED
9	THE WRITE TO EEPROM WAS NOT SUCCESSFUL
10	FILL LEVEL DETECTION ERROR-EXCEEDED CONSECUTIVE REJECT LIMIT
11	MISSING CAP DETECTION ERROR-EXCEEDED CONSECUTIVE REJECT LIMIT
12	HIGH CAP DETECTION ERROR-EXCEEDED CONSECUTIVE REJECT LIMIT
13	X-RAY COUNTS BELOW REJECT THRESHOLD ERROR
14	X-RAY DETECTOR ERROR
15	MISSING CAP SENSOR ERROR
16	TRIGGER BEAM ERROR
17	ENCODER SENSOR ERROR
18	SLAT REJECTOR BACKUP SENSOR IS BLOCKED
19	MORE THAN 32 CONTAINERS BETWEEN TRIGGER BEAM AND LABEL SENSOR
20	CONSECUTIVE LABEL TIMING ERROR WITH ENCODER: ENCODER PULSE MISSED
22	ENCODER PULSE MISSED
23	EXTRA ENCODER PULSE DETECTED
24	HIGH RESOLUTION ENCODER MINIMUM DISTANCE ERROR
25	HIGH RESOLUTION ENCODER MINIMUM TIME ERROR
* 27	HIGH RESOLUTION ENCODER FAILURE
28	CONSECUTIVE MISSING LABEL (FRONT/BACK) ALARM
* 33	SMASHED BOTTLE DETECTION ERROR-EXCEEDED CONSECUTIVE REJECT LIMIT
* 34	SMASHED BOTTLE DETECTION ERROR-FALSE TRIGGER
* 46	CONSECUTIVE EXTERNAL REJECT ALARM
47	ENCODER RESOLUTION TOO LOW
* 48	AC INPUT VOLTAGE LOW, BROWNOUT DETECTED
* 49	USER DEFAULTS CLOSED FOR ONE OR MORE SETTINGS
50	SYSTEM DEFAULTS LOADED FOR ONE OR MORE SETTINGS

51	CONTAINER PASSED WITH NO ENCODER PULSES
52	CONTAINER LESS THAN 10 MS
53	REJECT WATCHDOG DETECTED QUEUE ERROR
54	REJECT QUEUE COUNT
58	ABNORMALLY LARGE CONTAINER DETECTED
61	REJECT DELAY POSITION ERROR
64	LABEL LOOK DISTANCE IS TOO SHORT
66	FILL LEVEL REJECT DETECTION IS TURNED OFF DURING INSPECTION
67	DIAMETER MISSING CAP ERROR-EXCEEDED CONSECUTIVE REJECT LIMIT
68	DIAMETER MISSING CAP ERROR-NO ENCODER PULSE
72	PRODUCTION LINE SPEED TOO HIGH
86	BBU RAM BATTERY IS LOW
87	BROKEN SLAT OR PIN
88	BROKEN SLAT SENSOR FAILURE
89	SLAT SENSOR IS OFF
90	BROKEN SLAT SENSOR ADJUSTMENT ERROR
* 91	BROKEN SLAT PUSHPLATE
92	TOO MANY CONTAINERS IN DUD QUEUE
93	POSSIBLE SLIDING CONTAINER, MISSING LID, BULGED END, OR IMPROPER DUD SENSOR POSITION
94	CONTAINER DIAMETER IS SMALLER THAN DUD REFERENCE DIAMETER
95	DUD REFERENCE READINGS ARE TOO DISSIMILAR
96	CALCULATED DUD INSPECTION WINDOW IS TOO SMALL
97	DIFFERENCE BETWEEN GOOD AND BAD DUD IS LESS THAN 10
98	THE NUMBER OF DUD CONTAINERS IN THE SERIES ALARM WAS EXCEEDED
99	THE NUMBER OF DUD CONTAINERS IN THE SERIES ALARM WAS EXCEEDED
100	DUD SIGNAL WAS TOO SHORT FOR DUD REFERENCE DIAMETER
108	DUD SENSOR SIGNAL LATE OR CONTAINER EDGE NOT FOUND
109	DUD SENSOR SIGNAL EARLY OR CONTAINER EDGE NOT FOUND
111	DUD INSPECTION WINDOW LENGTH EXCEEDED
112	DUD REFERENCE DIAMETER CALIBRATED LARGER THAN INSPECTION WINDOW
113	POSSIBLE SLIDING CONTAINER OR BULGED END. MISSED LEADING REFERENCE
114	POSSIBLE SLIDING CONTAINER OR BULGED END. MISSED TRAILING REFERENCE
116	DUD REFERENCE POINT LESS THAN 3/4 CALIBRATED REFERENCE DIAMETER

117	MODBUS SERIAL INTERFACE FRAMING ERROR
118	MODBUS SERIAL RX OVERRUN ERROR
119	MODBUS SERIAL PARITY ERROR
120	MODBUS SERIAL RX RECEIVE RATE ERROR
121	MODBUS CTS LINE RATE ERROR

* An asterisk in the preceding table indicates that Filtec 3-G activates an alarm only when the **BEACON STATUS** function is set for **HIGH PRIORITY ONLY**.

Table 6-1. Diagnostic Error Codes

6.1.3 How to Display Error Codes

An amber warning beacon on top of the inspection head signals an alarm or error condition by blinking rapidly. To view the error code:

1. On the operator control panel, press key 6.

Result: Your Filtec 3-G displays the error.

2. Press the arrow key to scroll through the error description and to clear the error condition.

Result: When you clear an error, the message resets to zero.

6.2 Diagnostic Error Messages

6.2.1 Introduction

The amber warning beacon on top of the inspection head signals an alarm or error condition by blinking rapidly.

6.2.2 Descriptions of Diagnostic Error Messages

Error Number 2

An attempt was made to activate the rejector while the rejector status function is turned off.

To correct this error, turn on the rejector status function.

Error Number 5

The maximum limit of 32 containers between the trigger beam and the rejector has been exceeded.

Measure the container's width at the point where the inspection trigger contacts the container and verify that this value is the value in the **BOTTLE WIDTH AT TRIG** function.

Error Number 6

A consecutive reject timing error that occurs when an encoder pulse is missed. One pulse per container is required, and starting and stopping the conveyor suddenly while a container is in the inspection trigger zone, or incorrect encoder calibration caused a missed pulse.

To correct this error, calibrate the encoder, or replace the encoder.

Error Number 8

The EEPROM cannot be erased. This error indicates that either switch S11 is not set to the Write Enabled position or that EEPROM chip U29 is faulty.

To correct this error, set switch S11 to the Write Enabled position (position A), or replace EEPROM chip U29.

Error Number 9

The write to EEPROM was not successful. This error indicates that either switch S11 is not set to the Write Enabled position or that EEPROM chip U29 is faulty.

To correct this error:

- Set switch S11 to the Write Enabled position (position A), execute the **SAVE DEFAULT CONSTANTS** function, and then set switch S11 to position C.
- Check EEPROM U29 by executing the **LOAD DEFAULT CONSTANTS** function. If an error occurs, replace U29 and then execute the **SAVE DEFAULTS** function.

Error Number 10

This error occurs when the number of consecutively rejected containers exceeds the limit set in the **CONSECUTIVE FILL LEVEL REJECT ALARM** function.

Error Number 11

This error occurs when the number of consecutively rejected containers exceeds the limit set in the **CONSECUTIVE MISSING CAP REJECT ALARM** function.

Error Number 12

This error occurs when the number of consecutively rejected containers exceeds the limit set in the **CONSECUTIVE HIGH CAP REJECT ALARM** function.

Error Number 13

This error indicates the gamma counts detected by the scintillation tube are 12 percent below the of the reject threshold level.

To correct this problem:

- Check the manual source shutter rod to be sure it is open. If your system has the autoshutter option, check that the shutter is in the full up position.
- Calibrate the scintillation tube.

Error Number 14

The gamma counts detected by the scintillation tube decreased rapidly to a value that is 75 percent below the average count for the last eight containers.

- Check the manual source shutter rod to be sure it is open. If your system has the autoshutter option, check that the shutter is in the full up position.
- Calibrate the scintillation tube.

Error Number 15

The missing cap sensor input state logic level remains high. This occurs when two or more consecutive signals are received from the trigger beam, which indicates containers are passing through the unit, and no signals are received from the missing cap sensor.

To correct this problem:

- Check light emitting diode (LED) 7 (dip switch S2-7 closed and S2-8 closed). If the LED is lit, the input level is high.
- Check the signal level on terminal block TB1-5 (if you are using a nonferrous sensor, check TB1-11). If no container is under the sensor, the voltage range should be 3 to 5 volts. If a container is under the sensor, the voltage range should be 13 to 15 volts. If the voltage is not within these ranges, replace the sensor.

Error Number 16

The trigger beam is not sensing containers. The gamma count pattern indicates containers are passing through the gamma beam, however no trigger signal is received.

To correct this problem:

- Check to see that the trigger amplifier sensitivity is correctly adjusted. The sensitivity may be set too low.
- Check to see if LED 8 is on when no container is present. If so it is blocked, clean the trigger lens.
- Check the signal at TB1-2. It should be less than 1 volt when the beam is blocked by a container, and 17 to 20 volts when the beam is clear.
- Check to see that the gamma threshold is set correctly. It may be set slightly high. False errors can occur when the line is stopped and the gamma threshold is too high.

- Check to see that the source shutter is fully open (the handle shows red) and verify the auto shutter is fully open.

Error Number 22

This error occurs when an encoder pulse is missed. The encoder may be failing.

To correct this error:

Check light emitting diode (LED) 3 and the signal at TB1-23 while the conveyor is running. LED 3 should pulse regularly and the signal at TB1-23 should be smooth and regular. If LED 3 pulses irregularly or remains dark, encoder pulses are missing. Replace the encoder.

Error Number 23

This error occurs when an extra encoder pulse is detected. This error can occur when the conveyor stops or starts suddenly.

To correct this error:

- Check light emitting diode (LED) 3 and the signal at TB1-23 while the conveyor is running. LED 3 should pulse regularly and the signal at TB1-23 should be smooth and regular. If LED 3 pulses irregularly extra encoder pulses are occurring.
- Check the encoder wiring for water shorting problems.

Error Number 24

This error indicates the high resolution encoder is scaled lower than the minimum allowable distance. The minimum allowable distance between the scaled encoder pulses must be greater than 1mm (0.040 inch).

To correct this error:

Increase the encoder prescaler until this error no longer occurs. When decreasing the prescaler value, the calibrate encoder value is automatically increased to compensate for the higher resolution.

Error Number 25

This error indicates the high resolution encoder is scaled lower than the minimum allowable time. There must be a minimum of 1.0 millisecond between the encoder pulses at maximum speed.

To correct this error:

- Check the encoder cable and the connection at P6. This error can be caused by noise on the encoder cable which connects to P6.
- Increase the encoder prescaler value until this error no longer occurs at high speed.

Error Number 27

Containers are passing the inspection station, but the encoder is not sending pulses: at least five consecutive inspection triggers occurred without sensor transition.

To correct this error:

- Check the voltage at P6-2. The signal voltage should be between 0 and 12 volts.
- Check TB4-2 and light emitting diode (LED) 3 with dip switch S2-7 open.

Error Number 33

This error occurs when the number of consecutively rejected smashed containers exceeds the limit set in the **CONSECUTIVE SMASHED BOTTLE REJECT ALARM** function.

Error Number 34

Two or more consecutive inspection triggers have occurred with no smashed bottle sensor transition.

Check LED 5 on the control card (ON indicates high-level). Also check the signal on TB1-14. Blocking the sensor should give 17 to 22 volts on TB1-14. When the sensor is not blocked, the voltage should be less than 1 volt. If the voltage is not in this range, replace the sensor.

Error Number 46

The number of containers in the consecutive external reject alarm was exceeded.

This is a high priority error condition and will cause the warning beacon to flash if **BEACON STATUS** is set to **HIGH PRIORITY ONLY**.

Error Number 47

The encoder resolution is too low. Replace the encoder with an encoder that has a higher resolution.

Error Number 48

The AC input voltage dropped below 90 volts on a 110 VAC system or below 185 volts on a 220 VAC system. During the time the voltage was low, no containers were inspected for any defect. When the power returns to normal, the system resets with no data being lost. This is a high priority error condition and will cause the warning beacon to flash if **BEACON STATUS** is set to **HIGH PRIORITY ONLY**.

Error Number 49

The User Defaults loaded for one or more settings are out of range. Check all settings to be sure they are correct.

This is a high priority error condition and will cause the warning beacon to flash if **BEACON STATUS** is set to **HIGH PRIORITY ONLY**.

Error Number 50

The System defaults loaded for one or more settings are out of range. A complete software setup must be performed.

This is a high priority error condition and will cause the warning beacon to flash if **BEACON STATUS** is set to **HIGH PRIORITY ONLY**.

Error Number 51

A container passed without any encoder pulses. This can be caused by:

- Blocking the trigger with the line stopped
- Encoder failure
- Trigger reflections
- Line jams

Check the gain on the trigger amplifier.

This error condition is low priority and will not cause the warning beacon to flash during **HIGH PRIORITY ONLY** operation.

Error Number 52

A container passed the trigger in less than 10 milliseconds. This can be caused by trigger reflections or line jams.

To correct this problem:

Adjust the gain on the trigger amplifier.

Error Number 53

The Reject Watchdog detected a queue error. If this error occurs repeatedly, call FILTEC Customer Support.

Error Number 54

This error displays the Reject Queue Count. If this error occurs repeatedly, call FILTEC Customer Support.

Error Number 58

An abnormally large container was detected. The reject delay encoder count exceeded the current encoder count. This condition is generally caused by line jams. If this error occurs continuously, the rejector may be installed too near the trigger.

Error Number 61

The reject delay position at the rejection queue output exceeded the current encoder count. If this error occurs repeatedly, call FILTEC Customer Support.

Error Number 66

A fill level reject was detected while the fill level status was turned off. Turn the fill level status on to correct this condition.

Error Number 67

The number of containers specified by the **CONSECUTIVE DIAMETER MISSING CAP REJECT ALARM** function was exceeded.

This is a high priority error condition and will cause the warning beacon to flash if **BEACON STATUS** is set to **HIGH PRIORITY ONLY**.

Error Number 68

No encoder pulses were received for the **DIAMETER MISSING CAP WIDTH** function.

Make sure switch S05 is in the “A” position and jumper S12 is in the “AB” position.

This error condition is low priority and will not cause the warning beacon to flash during **HIGH PRIORITY ONLY** operation.

Error Number 72

This error condition indicates the line speed is too high. You might need to calibrate the encoder or the gamma sample cutoff limit might be set too high. This error can also be caused by noise on the encoder cable which connects to TB4-2.

Error Number 86

This error condition indicates the BBU RAM Battery is low. Replace the smart socket for U27, or replace the nonvolatile SRAM at U27.

Error Number 117

This error condition indicates there is a host or Modbus serial interface framing error or reply timeout (timeout must be a minimum of 15 seconds.) Most communication errors are caused by excessive noise.

Check the termination of RX input.

Check the baud rate (S2-1)

- S2-1 Closed = 9600
- S2-1 Open = 1200

Check the character size (S2-5)

- S2-5 Closed = 8 bit, 1 stop.
- S2-5 Open = 7 bit, 2 stop

Check the RX with a voltmeter. Perform the check when the line is in a steady state (No transmission).

RS-485

- RX(-A) = GND
- RX(+B) = +5VDC

RS-232

- RX(-A) = -12VDC to -4VDC
- RX(+B) = GND

Error Number 118

This error indicates a host or Modbus serial RX overrun error. The baud rate may be set incorrectly.

To correct this error, check the baud rate setting which is controlled by dip switches S2-1 and S2-4:

- S2-1 closed = 9600 baud
- S2-2 open = 1200 baud

Error Number 119

This error indicates a host or Modbus serial parity error occurred. To correct this error, check the parity setting which is controlled by dip switches S2-3 and S2-4:

- S2-3 closed = no parity
- S2-4 closed = odd
- S2-4 open = even

Error Number 120

This error indicates there is a RX receive rate error. Too many characters have been received in one second. This error may be caused by line noise.

To correct this error:

- Check the termination of the RX input.
- Check the RX input with a voltmeter while the line is in a steady state (no transmission):

RS-485:	RX(-A) = GND
	RX(+B) = +5VDC
RS-232:	RX(-A) = -12VDC to -4VDC
	RX(+B) = GND

Error Number 121

This error indicates the Clear To Send (CTS) line is changing too rapidly for normal communication and therefore appears busy. This error is usually caused by excessive noise.

- Check the termination of the CTS input.
- Check the CTS input with a voltmeter while the line is in a steady state (no transmission):

CTS(-A) = GND
CTS(+B) = +5VDC



Note: For a quick solution you can connect TB1-5 and TB1-6 together.

6.2.3 How to View and Clear a Diagnostic Error Message

Complete these steps to view and clear a diagnostic error message.

1. On the operator control panel, press the question mark key

Result: Your Filtec 3-G displays the error number.

2. Press the arrow key to scroll through the error description and to clear the error condition.

Result: When you clear the error the message resets to zero.

6.3 Troubleshooting Procedures

6.3.1 Introduction

The troubleshooting procedures in this section are designed to help you isolate machine malfunctions and determine the corrective action. Once you determine the problem source, you will be directed to the appropriate corrective procedures that are contained in other sections of this guide.

6.3.2 Major Component Subsystems

System failures fall into one or more of the following subsystem categories:

Power Supply System

- Main power supply
- Power transformer

Processing System

- Main processor card
- Serial communications card
- Control panel

Sensor System

- Scintillation tube detector (STD)
- Optical sensors: inspection triggers, missing cap, high cap, smashed bottle
- Proximity sensors: missing cap, missing foil
- Encoder

Rejector Systems

- Proline rejector
- Servotec II rejector

6.3.3 Before You Begin

Before you attempt any diagnostic or troubleshooting procedure:

- Read and understand the procedures thoroughly
- Understand and comply with all safety precautions
- Have the correct diagnostic equipment on-hand

6.3.4 What You Should Do First

Before you begin detailed and time consuming troubleshooting methods check the following items first. These are simple things that are often overlooked, but can cause a wide range of system problems:

1. Is the power turned on?

Verify that both the main power switch on the I/O junction box and the internal power switch located on the power filter junction box are turned on.

2. Is the power filter circuit breaker tripped?

The internal power switch is an integrated switch/circuit breaker. When the breaker is tripped, the power switch turns off. Verify the power switch is turned on, if not turn it on to reset the breaker.

3. Is power reaching the Filtec 3-G?

Verify the power from the factory power system is reaching the Filtec 3-G and that the power selector switch is set to the correct voltage (110 volts or 220 volts).

The power selector switch is located on the power filter junction box.

4. Are all dip switches and jumpers configured correctly?

Verify the dip switches and jumpers on the processor circuit board are configured correctly. You can find the factory settings by looking at the Configuration Sheet that is included with each machine and is stored in the plastic sleeve attached to the inside of the Filtec 3-G inspection head cover.

6.4 Troubleshooting the Power Supply System

6.4.1 Introduction

Power supply instability and failures account for many malfunctions. We recommended testing the power supply voltages as a starting point when troubleshooting. You need a digital voltmeter with an impedance of at least 20,000 ohms per volt to perform these procedures.

6.4.2 Testing the Power Supply

Complete these steps to test the power supply.

1. Remove the Filtec 3-G's cover to access the power supply inside.
2. Using test point TP3 as ground, test all voltages at the appropriate test points.

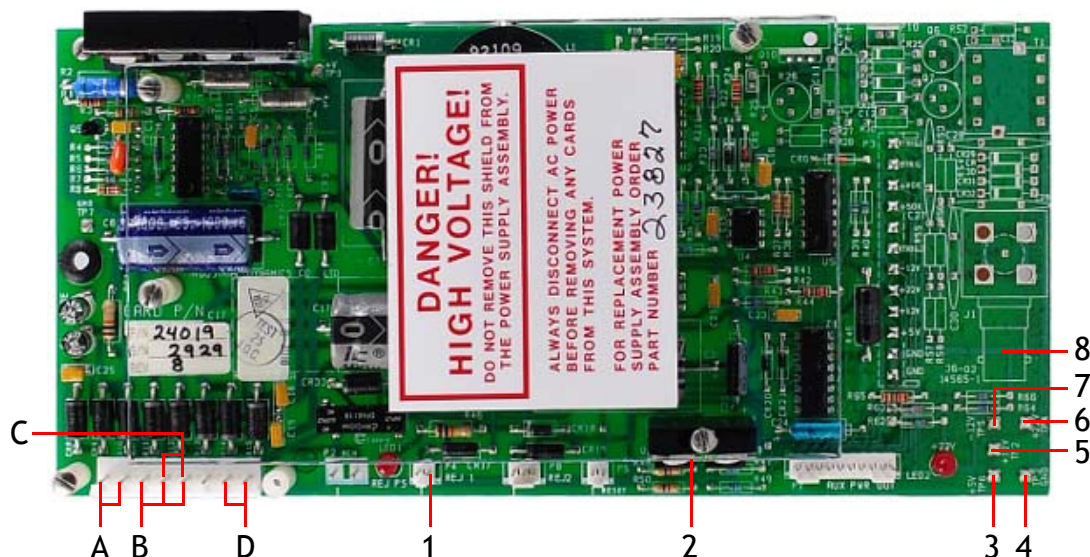


Figure 6-1. Power Supply Circuit Board Test Points

Reference	Test Point	Output VDC	Range VDC	Xfmr winding	Source supply	Description
1	P4-2	+60	50/60	36 VAC	Unreg	Rejector driver, rejector
2	Q8-3	-5	4.9/5.1	28 VAC	-12 VDC	RS232, RS422 drivers
3	TP-6	+5	5.0/5.2	28 VAC	+V	Processor logic, scintillation detector
4	TP-3					Ground

Reference	Test Point	Output VDC	Range VDC	Xfmr winding	Source supply	Description
5	TP-2	+12	11.5/12.5	28 VAC	+V	Scintillation tube pulse preamplifier, control panel, serial port drivers
6	TP-4	+22	18.0/22.0	28 VAC	+V	Sensor emitters/amplifiers, input comparators
7	TP-5	12	11.5/12.5	28 VAC	Unreg	Control panel, serial port drivers
8	J-1	+1000*	800/1200	28 VAC	+22 VDC	Scintillation detector

6.4.3 Testing the Power Transformer

If the power supply is not functioning, the failure may be caused by the loss of input power. If the input power is missing, test the power transformer.

1. Turn off all power to the Filtec 3-G.
2. Remove the Filtec 3-G's cover to access the power transformer inside.



Warning: Failure to turn off the power can result in severe electrical shock.

3. Disconnect plug P1 from the transformer and turn the power to the Filtec 3-G on.
4. Refer to Figure 8-1 and test the following pins in the P1 connector on the processor card.

Reference	Rated Voltage	Voltage Range	Connections
A	36 VAC	38 - 43 VAC	Pin 1 to Pin 2 (red to red)
B	14 VAC	15 - 17 VAC	Pin 3 to Pin 4 (yellow to blue) Pin 3 to Pin 5 (yellow to blue)
C	28 VAC	30 - 34 VAC	Pin 4 to Pin 5 (blue to blue)
D	24 VAC	25 - 29 VAC	Pin 7 to Pin 8 (brown to brown)

6.5 Troubleshooting the Processing System

6.5.1 Main Processor Card

If the main processor card fails a total system shutdown will occur. Check to be sure that all power sources are functioning correctly. If they are functioning correctly, replace the processor card.

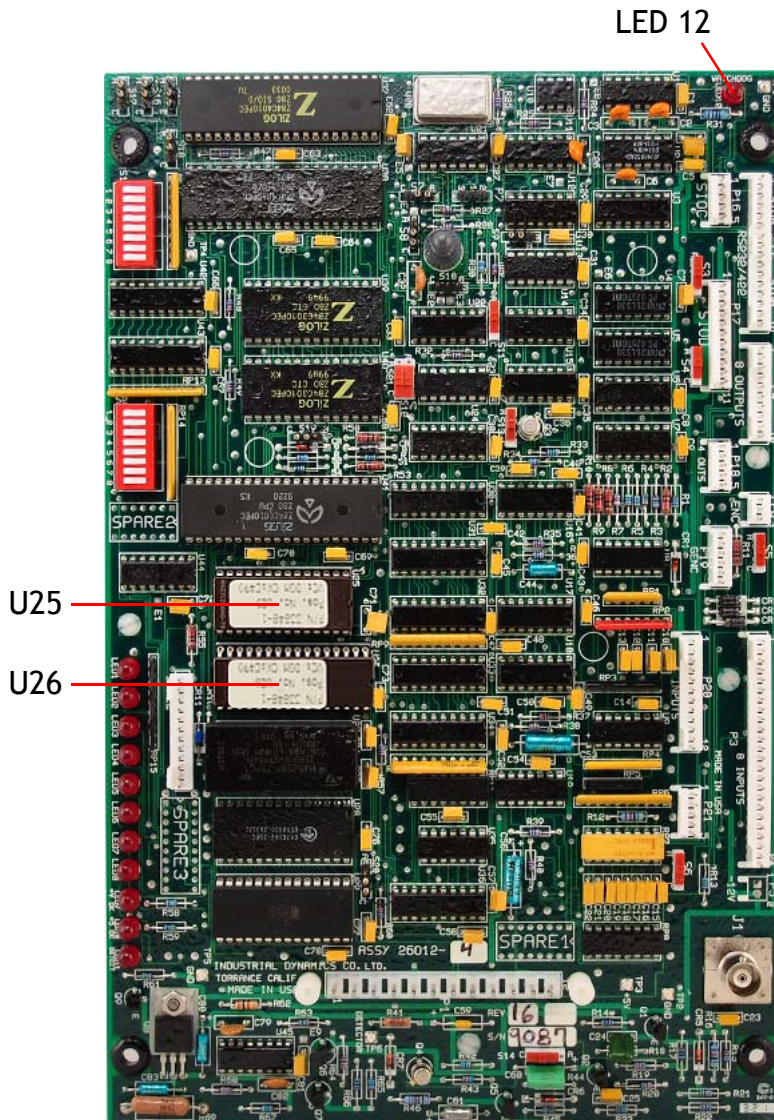


Figure 6-2. Main Processor Card

6.5.2 Serial Communications Card

Serial communications cease

Check to be certain serial communications has not been deactivated. If not, the terminal board is malfunctioning and you must replace it.

6.5.3 Control Panel

The display does not respond when you press keys

1. Turn the Filtec 3-G's power off and press the reset button and turn on the power to the machine. Wait for the three beeps before releasing the reset button.
2. Remove the Filtec 3-G's cover and verify the ribbon cable from the touchpad is undamaged and correctly connected to the terminal board.
3. Inspect the control panel display touchpad for water damage. If moisture is present, replace the control panel.

Filtec 3-G displays a blinking cursor on the two-line display and the warning beacon is on and solid

1. Check to be sure the reset switch is not stuck.
2. Check to be sure all PROMs on the processor card are seated correctly.
3. Replace the processor card.

Filtec 3-G displays nothing on the two-line display and the beacon is off

1. If you are using a remote control panel check that it is plugged into the connector on the inspection head correctly.
2. Reset the Filtec 3-G by pressing the reset button for three seconds while turning the machine off and on.
 - If the beacon does not flash, replace the beacon bulb and test again.
 - If the beacon is solid there is a problem with the processor card.

- If the beacon flashes once and stops, there is a problem with the terminal card.

The display is garbled or operates erratically

1. Replace the processor card.
2. Replace the terminal card.

6.6 Troubleshooting the Sensor System

6.6.1 Scintillation Tube Detector (STD)

Unable to calibrate the scintillation tube detector

If the calibration light emitting diode (LED) does not double peak during the calibration procedure, the detector is faulty and you must replace it.

Gamma counts decrease significantly within a short period of time

If the gamma counts suddenly decrease significantly and continues to decrease, the STD is worn out and must be replaced. You can view the active gamma counts by using the **GAMMA COUNTS** function.

High or erratic gamma counts

If the gamma counts suddenly increase significantly or become erratic, check to be certain the STD is grounded correctly:

1. Remove the STD and wipe it with a clean cloth.
2. Wipe the mounting clamp and chassis also.
3. Check to be sure the grounding wire is secure at both ends.
4. Replace the STD making sure the mounting clamp contacts the STD firmly and cleanly.

6.6.2 Optical Sensors

False triggers suddenly increase, or reject timing malfunctions occur.

1. Inspect and clean the lenses. Use a cotton swab and isopropyl alcohol to clean the lens. If the lens is scratched, chipped, cracked, or discolored, replace it.
2. Fiber optic strands in the cable may be broken. Remove the cable from the sensor amplifier and shine a flashlight into the lens. Looking at the cable end you removed, the light should be solid and round. If there are any dark spots, the cable contains fiber optic strands. Replace the cable.

3. If the rejector timing is erratic and you are certain that all settings are configured correctly, the encoder might not be installed correctly, or the encoder coupling might be slipping. The encoder has a built in diagnostic that displays error 22 when the encoder has failed and must be replaced.
4. Pass a reject test container through the inspector and observe the time delay synchronization. The rejector pad's center line should contact the container's center line at the point of impact. If not, contact your service department.

6.6.3 Proximity Sensors

No triggering occurs.

- Check light emitting diode (LED) 7 on the processor board. If the LED blinks when a container passes under the sensor, the sensor is working. Check to be sure the sensor height is set correctly.
- The height of the sensor has been changed. Check to see that the Filtec 3-G head height has not been altered.

6.6.4 Encoder

Your encoder fails or works erratically.

- The encoder has a built in diagnostic that displays error 22 when the encoder has failed and must be replaced.
- If the rejector timing is erratic and you are certain all settings are configured correctly, the encoder may not be installed correctly, or the encoder coupling may be slipping.

6.7 Troubleshooting Problems With Rejectors

6.7.1 Troubleshooting the Proline Rejector

The rejector is operating erratically

1. The air supply may be erratic. Verify the air pressure is in the correct operational range for the rejector.
2. Check to see if the cylinder is binding by shutting of the air pressure to the rejector and moving the rejector in and out by hand. If it is binding, rebuild the rejector with a rebuild kit.
3. The rejector Pulse Width function may need adjustment. Contact FILTEC Customer Support for assistance.

The rejector arm remains extended

1. Turn the Filtec 3-G's power off. If the rejector remains extended, repair or replace the Rejector Assembly.
2. Close dip switch S2-8 on the Filtec 3-G processor card and then turn cycle the power.
 - If LED 2 remains on, replace the processor card.
 - If the warning beacon is on and LED 2 is off, replace the power supply.

Rejected container trajectory is sloppy or inconsistent

1. Fatigued or worn pads cause the rejected container's trajectory to change.
2. Replace the rejector pad.

The rejector does not function

1. Is the rejector activated? Turn the rejector status function on.
2. If you hear a clicking sound, but the rejector does not activate, the air pressure is not turned on. Turn on air pressure to the rejector.

3. The rejector pulse width function may need adjustment. Contact FILTEC Customer Support for assistance.
4. Disconnect the wire at TB1-26 and use a digital voltmeter to measure the resistance between the wire and TB1-25. The resistance should be 165 ohms (± 10 percent).
5. Turn the Filtec 3-G on and off and then use the Fire Rejector On Demand function to fire the rejector. LED 2 on the processor card should flash for each reject pulse.
 - If the LED flashes, but the rejector does not fire; replace the power supply.
 - If the LED does not flash, replace the processor card.

6.7.2 Troubleshooting the Servotec II Rejector

The rejector is operating erratically

1. Check all circuit breakers and fuses that power the AC branch circuit to the Servotec II rejector. Replace or reset any blown fuses or breakers.
2. Check all electrical and/or electronic fuses located in the inspection unit the Servotec II is linked to, and in the Servotec II rejector. Replace or reset any blown fuses.
3. Verify the AC input voltage range to both the inspection unit and to the rejector unit are within the specified tolerances for your unit. Refer to your Filtec 3-G manual for specifications.
4. Check the cable between the rejector and the inspection units for broken or frayed wires. If damaged, repair or replace it.
5. Check the continuity between the rejector and inspection units using the inspection unit's wiring diagram. Refer to your Filtec 3-G manual.

Unstable main power

Surges, sags, and transients in the AC mains can cause the inspection system to falsely reject good containers. If this occurs, try the following procedures.

1. Check the AC power mains powering the inspection unit using line voltage measuring equipment to detect surges, sags, and transients.

2. Check the AC power mains neutral and ground lines for common-mode voltages and currents.

Terminal and conductor damage

Terminal and conductor damage can cause intermittent open circuits. If this occurs, try the following procedures.

1. Check all the cable connections for terminal and conductor damage. If damaged, replace the cable.
2. Check all inspection unit and valve terminals for signs of moisture or water deposits. If moisture is found, use filtered, dry compressed air to dry the unit.



Note: If intermittent or erratic rejector operation continues, contact FILTEC Customer Support for assistance.

Containers are not rejected

Possible Cause	Corrective Action
Rejector is not being energized by inspection unit.	Is the inspector detecting any rejects? Pass a reject test container through the Inspection System. With the reject switch set to ON, the rejector should fire and the Reject LED on the should flash.
Rejector assembly has malfunctioned.	Inspect the rejector arm as described in the Routine Preventative Maintenance procedures
Containers incorrectly positioned on the conveyor.	Review the Installation section for correct installation.

All containers are rejected

The fill level calibration is incorrect and all containers are registering as rejects.

Containers are rejected erratically

Possible Cause	Corrective Action
Time Delay is incorrectly set.	Pass reject test container through the inspector and observe the time delay synchronization. The rejector pad's center line should contact the container's center line at the point of impact. If not, adjust the reject timing settings in the inspection unit.
Rejector is not in the correct position.	Verify the Rejector Pad, when completely retracted, is 1/8 inch from the containers as they move down the conveyor line. If not adjust the Stroke Offset.
Rejector Pad fatigue or failure.	Fatigued or worn pads cause the rejected container's trajectory to change. Replace Rejector Pad.
Rejector sticking or binding.	Check the rejector piston for smooth movement. If it is binding, you must replace the Servo unit. See your Servotec II documentation for parts information.



Note: If intermittent or erratic rejector operation continues, contact FILTEC Customer Support for assistance.

Index

A

ALARM DIA. MISSING CAP 4-30
ALARM EXTERNAL REJECT 4-30
ALARM HIGH CAP 4-29
ALARM MISSING CAP 4-29
ALARM OVERFILLS 4-29
ALARM SMASHED BOTTLE 4-30
ALARM UNDERFILL 4-29

B

BEACON STATUS 4-25
BOTTLE TEXT 4-34
BOTTLE WIDTH AT TRIG 4-31

C

CALIBRATE ENCODER 4-43
CALIBRATE ENCODER VALUE 4-44
Caution 1-2
center line trigger bracket
 adjusting 3-6
CHAIN VELOCITY 4-29
CHANGE PASSWORD 4-31
CLEAR SYSTEM 4-34
container finish functions group 4-16
CONTAINER TYPE TEXT 4-35
control panel 4-2
CONVEYOR DRIVE SPROCKET 4-27
conveyor guide rails
 adjusting 3-6
CONVEYOR SEGMENT PITCH 4-44
CURRENT BOTTLE TYPE 4-24
CURRENT LANGUAGE 4-34

D

DIA. MISSING CAP 4-40
DIA. MISSING CAP TEXT 4-41
Diagnostic Error Codes
 Listing 6-3
diagnostic error codes
 accessing 4-45
Diagnostic Error Messages 6-2, 6-6

DIAMETER MISSING CAP STATUS 4-16
DIAMETER MISSING CAP WIDTH 4-17
DOWN BOTTLE STATUS 4-16

E

ENCODER PRESCALER VALUE 4-44
ENCODER RESOLUTION 4-43
EXTERNAL REJECT 4-41
EXTERNAL REJECT STATUS 4-16
EXTERNAL REJECT TEXT 4-42

F

FILL LEVEL 4-35
FIRE REJECTOR ON DEMAND 4-23

G

GAAMA SAMPLES PER ENCODER 4-45
GAMMA COUNTS 4-14
GAMMA SAMPLE CUTOFF LIMIT 4-45
GAMMA THRESHOLD 4-15

H

HIGH CAP 4-38
HIGH CAP STATUS 4-16
HIGH CAP TEXT 4-38
HOST/MODBUS PORT STATUS 4-27

I

INSPECT TRIG TO C/L REJ 4-24
inspection trigger (bottles)
 aligning 3-12

K

keys
 arrow 4-3

- function 4-3
- function group 4-3
- KNOWN CHAIN PITCH & TEETH** 4-43

L

- LAST REJECT DETECTED** 4-25
- LINE SPEED (CPH)** 4-26
- LINE SPEED (CPM)** 4-26
- LOAD DEFAULT CONSTANTS** 4-30
- LOOKTIME GATE** 4-15

M

- Main Processor Card 6-20
- Maintenance
 - Autoshutter Assembly 5-5
 - External Wiring 5-5
 - High Cap and Missing Cap Sensors 5-4
 - Housing 5-5
 - Pressure Regulator and Air Filter 5-5
 - Regulator and Coalescing Air Filters 5-6
 - Replacing the Rejector Pad 5-6
 - Schedule 5-2
 - schedules
 - 120-day 5-3
 - daily 5-2
 - monthly 5-2
 - weekly 5-2
 - Source Housing Assembly 5-5
 - Trigger Beam and Emitter Lenses 5-4
- master container profile 2-3
- MAXIMUM BOTTLE DIAMETER** 4-31
- MAXIMUM CONVEYOR SPEED** 4-31
- MAXIMUM LINE SPEED** 4-31
- MINIMUM DIAMETER MISSING CAP** 4-17
- MISSING CAP** 4-37
- missing cap sensor
 - types 3-8
- MISSING CAP STATUS** 4-16
- MISSING CAP TEXT** 4-37
- MODBUS MESSAGE COUNTERS** 4-27

N

- NUMBER OF CONTAINER TYPES** 4-34

O

- optional sensors
 - adjusting 3-6
- options
 - down bottle 2-6
 - dud detection 2-5
 - foil seal 2-6
 - high cap 2-5
 - high cap sensor 3-9
 - label 2-6
 - low foam 2-6

- missing cap 2-5
- missing cap sensor 3-7
- programmable logic controller (PLC) 2-7
- reject sorting 2-6
- serial interface 2-6
- smashed bottle 2-6
- smashed bottle sensor 3-10

- OVERFILL STATUS** 4-14
- OVERFILL TEXT** 4-36

P

- PLC OUTPUT PULSE WIDTH** 4-28

R

- REJECT NEXT BOTTLE** 4-23
- REJECT VERIFICATION** 4-35
- REJECTOR PULSE WIDTH** 4-23
- REJECTOR REACTION DELAY** 4-24
- REJECTOR STATUS** 4-23
- REJECTOR TYPE** 4-42
- RESET ALL COUNTERS** 4-19
- RESET EXTERNAL REJECT** 4-22
- RESET TOTAL DIAMETER MISSING CAP** 4-22
- RESET TOTAL HIGH CAP** 4-21
- RESET TOTAL MISSING CAP** 4-21
- RESET TOTAL OVERFILL** 4-20
- RESET TOTAL REJECTS** 4-20
- RESET TOTAL SMASHED BOTTLE** 4-21
- RESET TOTAL THROUGHPUT** 4-19
- RESET UNDERFILL** 4-20

S

- safety
 - labels 1-2
 - notices 1-2
- SAVE DEFAULT CONSTANTS** 4-43
- Serial Communications Card 6-21
- SERIAL DATA ID NUMBER** 4-27
- SERIAL INTERFACE** 4-43
- SMASHED BOTTLE** 4-39
- SMASHED BOTTLE STATUS** 4-16
- SMASHED BOTTLE TEXT** 4-39
- software
 - function descriptions
 - counters functions group 4-17
 - diagnostics function group 4-45
 - fill level functions group 4-14
 - rejector functions group 4-23
 - system functions group 4-24
- SPT/MON P16 PORT STATUS** 4-25
- SYSYSTEM DISPLAY** 4-26

T

- TARGET HEAD HEIGHT** 4-15
- TEETH/CONVEYOR SEGMENT** 4-44

TIME WIDTH OF BOTTLE 4-28
TOTAL DIA. MISSING CAP 4-19
TOTAL EXTERNAL REJECT 4-19
TOTAL HIGH CAP 4-18
TOTAL MISSING CAP 4-18
TOTAL OVERFILLS REJECTED 4-18
TOTAL REJECTS 4-18
TOTAL SMASHED BOTTLE 4-18
TOTAL THROUGHPUT 4-17
TOTAL UNDERFILLS REJECTED 4-18
troubleshooting 6-16
 Control Panel 6-21
 Power Supply 6-18
 Power Transformer 6-19
 Proline Rejector 6-25
 Servotec II Rejector 6-26

U

UNDERFILL STATUS 4-14
UNDERFILL TEXT 4-36

V

VIEW PLC PIN ASSIGNMENTS 4-33
VIEW TB1 & TB4 PIN ASSIGNMENTS 4-33

W

Warning 1-2
Warning Beacon 6-5
WIDTH AT SMASHED BOTTLE 4-17

Documentation Feedback

Help Us Improve

Please help us provide you with better documentation. Submit comments, suggestions, and corrections to the Technical Publications Department at FILTEC.

Ways to Submit Feedback

You can submit your comments, suggestions, and corrections in any of the following ways:

Electronic mail	FILTECpubs@FILTEC.com
Fax	Use the Documentation Feedback Form
Mail	Use the Documentation Feedback Form

Thank you!

Technical Publications Department at FILTEC

Documentation Feedback Form

Fax to 310-530-1000

Mail to FILTEC
Technical Publications Department
3100 Fujita Street
Torrance, CA 90505

Your full name

Your telephone

Your email address

**Your business' name
and address**

Page numbers about which you
are submitting feedback

Provide your comment, suggestion, or correction below and fax or mail this completed form to the fax number of address above.

[illegible]