

# TRANSLATED OPERATING MANUAL

# **Cleanroom systems**



Spetec GmbH Am Kletthamer Feld 15 85435 Erding

Phone Fax E-mail Website	+49 8122 95909-0 +49 8122 95909-55 spetec@spetec.de www.spetec.de
Appliances: Appliancestypes:	Cleanroom systems Cleanroom systems: FMS Series SuSi / FMS Basic / FBS Series SuSi / FBS-V Series SuSi / FBS Series Standard / EBS Series SuSi / EFBS Series SuSi / EFBS-V Series SuSi Cleanroom systems with acid-resistant fume cupboard: EFBS Series SuSi / EFBS-V Series SuSi / EBS Series SuSi Cleanroom workstations: CleanBoy Maxi / CleanBoy Mini / CleanBoy Basic
Year built:	See type plate
Version of the operating manual: Date of issue of the operating manual:	01 31.07.2024

#### **Product changes**

Year	Туре	Changes

#### **Revisions of the document**

Date	Version	Changes
31.07.2024	01	First draft

#### Permissions

This document requires the following permissions:

Name	Title

© 2024 by Spetec GmbH

This operating manual and all figures it contains are protected by copyright law. Every use outside the bounds of copyright law without prior written permission from the publisher is impermissible and punishable. This applies in particular to reproduction, translation, microfilming, computer storage and processing in electronic systems. To request permission, please contact the publisher.

# Contents

Сс	ontent	S		3
Li	st of f	igures		6
1	Intro	duction		8
	1 1	Signs a	ind symbols	0 Q
	1.1	1 1 1	Section-related warning notices	۰۵ ۵
		1.1.1	Embedded warning notices	
		1.1.2	Other signs and symbols	
		1.1.3	Symbols used in the operating manual	10
	1 2	List of a		10
	1.2	Warran	ty and liability	
	1.0	Convrio	ty and nability	
	1.4 Copyright		15	
	1.6	Service	/customer service	
2	Safet	t <b>y</b>		
	2.1	Proper	use	
		2.1.1	Programming changes to the Cleanroom systems	
		2.1.2	Structural changes to the Cleanroom systems	
		2.1.3	Foreseeable misuse	18
	2.2	Person	nel requirements	19
		2.2.1	Trainees	19
		2.2.2	Instructed personnel	
		2.2.3	Qualified personnel	
		2.2.4	Qualified electricians	20
		2.2.5	Responsibilities	20
		2.2.6	Obligations of the personnel	21
		2.2.7	Unauthorised persons	21
		2.2.8	Instruction	21
	2.3	Basic s	afety instructions	
	2.4	Environ	mental protection measures	
	2.5	Special	danger warnings/residual dangers	23
		2.5.1	Symbols used on the Appliances	23
		2.5.2	Danger from electrical energy	
		2.5.3	Dangers due to height-adjustable table	
		2.5.4	Dangers due to damage (climbing)	
		2.5.5	Dangers arising from supplier components	
		2.5.6	Danger due to hot surfaces	27
		2.5.7	Danger when working at great heights	27
		2.5.8	Danger of crushing	27
		2.5.9	Dangers from Lubricants and cleaning fluids	
		2.5.10	Dangers from components from the	
		2.5.11	Dangers due to tripping	29
		2.5.12	Dangers due to slipping	29
		2.5.13	Danger due to incorrect programming	29

	2.6 2.7 2.8 2 9	2.5.14 2.5.15 2.5.16 2.5.17 2.5.18 Person Safety Emerge	Danger due to improper placement Danger due to use of incorrect replacement parts Dangers due to automatic start-up Dangers for unauthorised persons Danger of insufficient qualifications al protective equipment and protective systems ency measures	29 30 30 30 30 31 32 32 33
	2.0	Respon		00
3	Desc	ription of	of Cleanroom systems	34
	3.1	Descrip	Dation of the Cleanroom systems	34
		3.1.1	Laminar Flow Module	35
		3.1.2	Laminar flow boxes	36
		3.1.3	Protection Box	40
		3.1.4	Exhaust (Protection) Box	41
		3.1.3 2.1.6	Cleanroom stations and workstations	41
	2.2	3.1.0 Sofoty		44
	3.Z	Operati	ing modes	44
	3.5	2 2 1	Automatic mode	45
	3 /	Technic		45
	0.4	3 4 1	Cleanroom systems	45
		342	Power consumption	47
		343	Filter dimensions	48
		344	Dimensions	50
		345	Airborne noise emissions	53
		3.4.6	Intended service life	53
	_			
4	Trans	sport an	d storage	54
	4.1	Deliver	y by an authorised transport company	54
	4.2	Inspect	ions when handed over to recipient	54
	4.3	Раскад	Jing	54
		4.3.1		55
	4 4	4.3.2	Repackaging	55
	4.4		tion on trononort doncero	
	4 5	Informa	ation on transport dangers	55
	4.5	Reliable	ation on transport dangers e transport aids of delivery Cleanzage systems	55 56
	4.5 4.6	Reliable Scope	ation on transport dangers e transport aids of delivery Cleanroom systems	55 56 56
	4.5 4.6 4.7	Reliable Scope 4.6.1	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage	55 56 56 56 57
	4.5 4.6 4.7	Reliable Scope 4.6.1 Interme	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage	55 56 56 56 57
5	<ul><li>4.5</li><li>4.6</li><li>4.7</li><li>Asset</li></ul>	Reliable Scope 4.6.1 Interme	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage	55 56 56 56 57 <b>58</b>
5	<ul> <li>4.5</li> <li>4.6</li> <li>4.7</li> <li>Asse</li> <li>5.1</li> </ul>	Reliable Scope 4.6.1 Interme mbly	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage ation on dangers during assembly	55 56 56 56 57 <b>58</b> 58
5	4.5 4.6 4.7 <b>Asse</b> 5.1 5.2	Action and a second and a second a seco	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage ation on dangers during assembly atory measures	55 56 56 57 <b>58</b> 58 59
5	4.5 4.6 4.7 <b>Asse</b> 5.1 5.2	Action and a second sec	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage ation on dangers during assembly atory measures General	55 56 56 57 57 58 59 59
5	4.5 4.6 4.7 <b>Asse</b> 5.1 5.2	Action and a second sec	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage ation on dangers during assembly atory measures General Preparatory measures	55 56 56 57 57 <b>58</b> 59 59 59
5	<ul> <li>4.5</li> <li>4.6</li> <li>4.7</li> <li>Asse</li> <li>5.1</li> <li>5.2</li> <li>5.3</li> </ul>	Action and a second sec	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage ation on dangers during assembly atory measures General Preparatory measures of deployment location	<ul> <li>55</li> <li>56</li> <li>56</li> <li>56</li> <li>57</li> <li>58</li> <li>59</li> <li>59</li> <li>59</li> <li>59</li> </ul>
5	<ul> <li>4.5</li> <li>4.6</li> <li>4.7</li> <li>Asse</li> <li>5.1</li> <li>5.2</li> <li>5.3</li> </ul>	A.6.1 Interme Moly Informa Prepara 5.2.1 5.2.2 Choice 5.3.1	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage ation on dangers during assembly atory measures General Preparatory measures of deployment location Required operating and maintenance areas	55 56 56 57 <b>58</b> 59 59 59 59 60
5	<ul> <li>4.5</li> <li>4.6</li> <li>4.7</li> <li><b>Asse</b></li> <li>5.1</li> <li>5.2</li> <li>5.3</li> </ul>	Action and a second sec	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage ation on dangers during assembly atory measures General Preparatory measures of deployment location Required operating and maintenance areas Requirements of the area of deployment	55 56 56 56 57 <b>58</b> 59 59 59 59 60 60
5	<ul> <li>4.5</li> <li>4.6</li> <li>4.7</li> <li>Asse</li> <li>5.1</li> <li>5.2</li> <li>5.3</li> <li>5.4</li> </ul>	And the formation of th	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage ation on dangers during assembly atory measures General Preparatory measures of deployment location Required operating and maintenance areas Requirements of the area of deployment ng the Appliances	55 56 56 57 <b>58</b> 59 59 59 59 60 60 60
5	<ul> <li>4.5</li> <li>4.6</li> <li>4.7</li> <li>Asse</li> <li>5.1</li> <li>5.2</li> <li>5.3</li> <li>5.4</li> </ul>	Informa Reliable Scope 4.6.1 Interme <b>mbly</b> Informa Prepara 5.2.1 5.2.2 Choice 5.3.1 5.3.2 Mountin 5.4.1	ation on transport dangers e transport aids of delivery Cleanroom systems Scope of delivery of operating manual ediate storage ation on dangers during assembly atory measures General Preparatory measures of deployment location Required operating and maintenance areas Requirements of the area of deployment ng the Appliances Requirements of the place of deployment	55 56 56 57 <b>58</b> 59 59 59 59 60 60 62 62

		5.4.3	Installing the FMS-Basic	66
		5.4.4	FBS-V Series SuSi and EFBS-V Series SuSi installation	
	5.5	Connec	cting power	
		5.5.1	Connecting the electricity supply	69
6	Com	mission	ing	76
0	6.1	Safety	measures before commissioning	76
	0.1	Ouroty		
7	Oper	ation		
	7.1	Safety	measures in normal operation	
		7.1.1	General inspection activities	
		7.1.2	Inspection activities for electrical lines	
	7.2	SuSi C	leanroom systems	
	7.3	Basic c	leanroom systems	
	7.4	Cleanro	com systems from the EFBS, EFBS-V and EBS Series	
8	Elimi	nate fau	Ilts/errors	
	8.1	Errors a	and corrective measures	
_				
9	Main	tenance	and cleaning	
	9.1	Safety	measures during maintenance	85
	0.0	9.1.1	General satety measures during maintenance	85
	9.2		Mointenance work	
		9.2.1	Proparatory electrical measures	00
		9.2.2	Maintenance – daily	
		924	Maintenance – weekly	90
		9.2.5	Maintenance – monthly	
		9.2.6	Maintenance – annual	
		9.2.7	Special maintenance intervals	
		9.2.8	Servicing third-party components	
10	Doco	mmisei	oning and disassombly	0.9
10	10.1	Decom	missioning	98
	10.1	10 1 1	Decommissioning the electrical systems	98
	10.2	Disasse	embly	
		10.2.1	Disassembly at great heights	
	10.3	Dispos	al	
		10.3.1	Disposal of electrics	
		10.3.2	Disposal of auxiliary and operating materials	
44	٨٠٠٠	ndiv		400
11	Appe		aformity Doclaration	
	11.1	Spare r	normity Decidiation	102
	11.2	Mainte	nance manual	
	11 4	Append	ded documents	
	11+	11 4 1	Manufacturer documentation of the purchased components	

# List of figures

Figure 1: FMS Series SuSi
Figure 2: FMS Series Basic
Figure 3: FBS Series
Figure 4: FBS Series Standard
Figure 5: FBS-V Series
Figure 6: EFBS Series
Figure 7: EFBS-V Series
Figure 8: PBS Series
Figure 9: EBS Series
Figure 10: CleanBoy Mini
Figure 11: CleanBoy Maxi
Figure 12: CleanBoy Basic Mini 43
Figure 13: CleanBoy Basic Maxi 43
Figure 14: Example type plate Cleanroom systems 44
Figure 15: Dimensions FMS Series SuSi
Figure 16: Dimensions FMS Series Basic
Figure 17: Dimensions FBS Series Standard
Figure 18: Dimensions FBS / EFBS / PBS / EBS Series
Figure 19: examples of symbols on packaging54
Figure 20: Mounting the FMS Series SuSi from the top63
Figure 21: Mounting the FMS Series SuSi from the underside - 1
Figure 22: Mounting the FMS Series SuSi from the underside - 2
Figure 23: Installing laminar flow modules on the building ceiling
Figure 24: Mounting on a support frame - 1
Figure 25: Mounting on a support frame - 267

Figure 26: FBS-V Series SuSi and EFBS-V Series SuSi installation
Figure 27: Plug-in connections SuSi cleanroom system71
Figure 28: Basic cleanroom system plug connections72
Figure 29: Standard module housing73
Figure 30: Standard module housing73
Figure 31: Standard module housing74
Figure 32: Connection option 1 SuSi cleanroom system74
Figure 33: Connection option 2 Cleanroom system SuSi75
Figure 34: LCD display, four lines79
Figure 35: Basic 1 controls
Figure 36: Basic 2 controls81
Figure 37: Operating elements EFBS, EFBS-V and EBS Series
Figure 38: Changing the pre-filter92
Figure 39: Changing the main filter for freestanding appliances93
Figure 40: Changing the main filter for cleanroom cells / suspended laminar flow modules - 1 
Figure 41: Changing the main filter in cleanroom cells / suspended laminar flow modules - 2.95
Figure 42: Changing the main filter for cleanroom cells / suspended laminar flow modules - 3 

# 1 Introduction

This operating manual provides you with all the information you need for the seamless operation of the Cleanroom systems (hereafter also called the "Appliances").

The operating manual must be read, understood and applied by all persons tasked with the assembly / installation, transport, commissioning, operation, maintenance, cleaning, troubleshooting, decommissioning, dismantling and disposal of the Appliances. This applies in particular to the listed safety notices.

After studying the operating manual, you will be able to

- transport the Cleanroom systems in a safe manner,
- assemble / install the Cleanroom systems in accordance with safety requirements,
- commission the Cleanroom systems in accordance with safety requirements,
- operate and run the Cleanroom systems in a safe manner,
- take appropriate action when a malfunction occurs,
- maintain the Cleanroom systems properly,
- clean the Cleanroom systems properly
- decommission the Cleanroom systems in a safe manner,
- dismantle the Cleanroom systems in a safe manner,
- dispose of the Cleanroom systems in accordance with regulations.

In addition to the operating manual, general, legal and other binding regulations regarding accident prevention and environmental protection in the country of use are to be complied with.

The operating manual must always be kept at the place of deployment of the Cleanroom systems.

## 1.1 Signs and symbols

To give information and direct warning of any dangers, certain passages of text of particular note in this operating manual are labelled as follows:

## 1.1.1 Section-related warning notices

Section-related warning notices are not only relevant for a particular action, but apply to all actions within a section.

Structure



A medium-risk threat which, if not avoided, could lead to death or severe injury.

#### 

A low-risk threat which, if not avoided, could lead to slight to moderate injury.

#### NOTICE

A low-risk threat which, if not avoided, could lead to material damage.

## **1.1.2 Embedded warning notices**

Embedded warning notices apply to particular actions and are directly integrated in the action in question.

#### Structure

**A** SIGNAL WORD Type and source of the danger

Potential consequence of non-observance

Measures to avoid the danger

#### Danger levels

#### - **A** DANGER / WARNING / CAUTION

- **NOTICE** (without warning triangle)

## 1.1.3 Other signs and symbols

The info symbol indicates useful information.

- Texts following this label are lists.
- ► Texts following this label describe measures in warning notices and action steps.
- a) Texts following this label describe activities to be carried out in the order given.
- "" Texts in quotation marks are references to other chapters or sections.

## **1.1.4** Symbols used in the operating manual

In warning notices, special hazards are additionally marked as follows:

Symbol	Description
	Warning signs
	<b>Danger of hand injury</b> This symbol warns of hand injuries.
	Warning of falling objects This symbol warns of objects that could fall from above.
	<b>Danger of getting pulled into machinery</b> This symbol warns of the danger of getting pulled in by rotating parts.
	Warning against automatic start-up This symbol warns of dangers due to automatic start-up.
	<b>Danger of cutting injuries</b> This symbol warns of the risk of cutting injuries.
<u>A</u>	<b>Risk of impediments on the floor</b> This symbol warns of risk of tripping due to obstacles on the ground.

Symbol	Description
	Warning of danger of slipping
	This symbol warns of the danger of slipping on the ground.
	Fall warning
	This symbol warns of the danger of falling from work stations located at a higher level. There is a risk of falling from heights over 1 metre above the ground.
	Danger of suspended load
	This symbol warns of the danger of standing under suspended loads.
	Danger of electrical hazard
4	This symbol warns of electrical hazards.
	Danger of hot surface
	This symbol warns of a danger of burns from hot surfaces.
Δ	Warning of loads tipping over
	This symbol warns of tipping loads.
	Prohibition sign
	No entry to unauthorised persons
	This symbol prohibits unauthorised access to the danger zone. Dangers cannot be detected by unauthorised persons.
	Appliances may only be operated by one person
	This symbol prohibits the operation of Appliances by more than one person.
	Entering the area is prohibited
	This symbol prohibits access to certain areas.
	Do not reach in
	This symbol prohibits reaching in.
	Mandatory sign
	Take note of the operating manual
	This symbol indicates that the operating manual must be observed.

Symbol	Description
	Disconnect mains plug before opening
	This symbol indicates that electrical equipment must be disconnected from the power supply before cleaning, maintenance or repair.
	Use safety goggles
	This symbol indicates that safety goggles must be worn in the area of deployment.
	Use safety shoes
	This symbol indicates that safety shoes must be worn in the area of deployment.
(III)	Use hand protection
	This symbol indicates that hand protection must be worn in the area of deployment.
	Use protective work clothing
	This symbol indicates that protective clothing must be worn in the area of deployment.
	Use head protection
	This symbol indicates that head protection must be worn in the area of deployment.
0)	Use fall protection
	This symbol indicates that fall protection must be worn in the area of deployment.
	Danger signs
	Danger of environmentally hazardous substances
	This symbol warns of environmentally hazardous substances.
	Danger – Systemic health hazard
	This symbol warns of systemic health hazards if inhaled or swallowed.
	Danger – Toxic (hazardous to health) / corrosive or irritant /
$\langle ! \rangle$	lower-level systemic health hazard
V	This symbol warns of substances that are hazardous to health.

Symbol	Description
Other symbols	
X	<b>Disposal instructions</b> This symbol indicates that the marked product must not be disposed of with household waste.
23	<b>Recycling</b> This symbol stands for the reuse of materials (recycling).
CE	<b>CE marking</b> The CE marking on the product is the manufacturer's declaration that the product meets the essential requirements of the relevant European health, safety and environmental legislation.

# 1.2 List of abbreviations

Term	Definition
EBS	Exhaust Box Spetec
EFBS	Exhaust Flow Box Spetec
FBS	Flow Box Spetec
FBS-V	Flow Box Spetec curtain
FMS	Flow Module Spetec
PBS	Protection Box Spetec
SuSi	Super Silent

# 1.3 Warranty and liability

The obligations agreed in the delivery contract, the general terms and conditions, the conditions of delivery of the Cleanroom systems and the legal regulations in force at the time the contract was concluded apply.

All information and instructions given in this operating manual have been drawn up in compliance with valid standards and regulations, taking into account the state of technical progress and our own long years of experience and understanding.

This operating manual is not intended to be a substitute for the suitability or reliability of the Cleanroom systems for any particular user application and should not be used to determine its suitability or reliability.

The Cleanroom systems may only be used for the applications described by the manufacturer. All other applications are improper and are considered dangerous. The manufacturer cannot be held liable for any damage caused by errors, or unintended or improper use of the Cleanroom systems.

Warranty and liability claims for personal injury and damage to property are ruled out if they are attributable to one or more of the following causes:

- improper or incorrect use of the Cleanroom systems,
- improper transport, assembly / installation, commissioning, operation, troubleshooting, maintenance / cleaning, decommissioning, dismantling and disposal of the Cleanroom systems,
- operation of the Cleanroom systems with defective safety systems or with improperly integrated or non-functional safety and protective systems,
- failure to comply with the operating manual and the information in the operating manual regarding assembly, commissioning, operation, maintenance and cleaning of the Cleanroom systems,
- use of unqualified or untrained personnel,
- structural changes to the Cleanroom systems (conversions or other changes to the Appliances may not be made without the prior written consent of Spetec GmbH; in case of infringements the Cleanroom systems loses its suitability for use),
- improperly performed repairs,
- use of non-approved spare parts or use of spare parts that do not meet technical specifications,
- disasters, extraneous causes, and force majeure.

Furthermore, Spetec GmbH reserves the right to revise this publication at any time if technical changes are made to improve usage characteristics or to make technical improvements, without the obligation to notify anyone of the revisions.

# 1.4 Copyright

This operating manual is subject to copyright protections and is exclusively intended for internal use.

Transfer of the operating manual to third parties, reproduction of any kind and form – in whole or in part – and exploitation and disclosure of the contents, except for internal purposes, are only permissible with the written approval of Spetec GmbH.

Infringement will necessitate the payment of damages. We reserve the right to make further claims.

# 1.5 Warranty provisions

The warranty provisions are contained in the General Terms and Conditions of the Spetec GmbH. Spetec GmbH offers a 24-month warranty on the appliances, with the exception of parts subject to wear such as the fan, main filter and pre-filter.

# 1.6 Service/customer service



For technical information, please contact our customer service department:

#### Phone: +49 8122 95909-0

In addition, our employees are always interested in new information and insights resulting from their use which can be valuable for the improvement of our products.

# 2 Safety

## 

# Failure to observe the following safety instructions can have serious consequences:

Danger to persons due to electrical, mechanical or chemical influences, failure of important Appliances functions and damage to the environment!

- Read through the safety and danger instructions in this section thoroughly before starting up the Cleanroom systems.
- In addition to the instructions in this operating manual, observe the generally applicable safety and accident prevention regulations.
- In addition to the instructions in this operating manual, observe the existing national occupational, operational and safety regulations. Also comply with any existing internal factory regulations.
- In addition to the remarks in this operating manual, also observe the third-party documentation provided.

## 2.1 **Proper use**

The operational safety of the Cleanroom systems is only guaranteed if it is used as intended.

The cleanroom system is used to create and maintain a controlled clean environment in private, public, industrial and research facilities.

The Cleanroom systems are designed as standard for operation by one person and may only be installed, commissioned and operated by trained and instructed specialist personnel familiar with the safety regulations.

The Cleanroom systems are intended for Automatic mode.

The Cleanroom systems may only be used within the scope of their technical data. Proper use also includes adherence to the specifications in the technical data, upholding the operating manual, complying with the maintenance and servicing regulations and following the nationally applicable safety, occupational health and safety and accident prevention regulations. Any operation beyond this is considered improper use.

The specified maxima in the technological data must not be exceeded. The area of deployment of the Cleanroom systems is in the industrial sector inside buildings (never use outdoors). The Cleanroom systems are not intended for any other use than the use listed here; other use is considered as improper.

In particular, to use defective or unsuitable accessories

- is prohibited,
- to operate the Cleanroom systems when its safety systems have been deactivated, tampered with or are faulty,
- to operate the Cleanroom systems at times when untrained persons are present in the danger zone,
- to operate the Cleanroom systems in potentially explosive atmospheres, such as when flammable liquids, gases or dust are present, as the equipment generates sparks that can ignite the dust or fumes,
- to operate the Cleanroom systems if they are not ready for operation or have been modified,
- to operate the Cleanroom systems without prior training,
- to place objects inside or on the Cleanroom systems that are not to be used for the intended purpose or necessary for this purpose; remove all un-intended objects that are inside or on the Cleanroom systems,
- to get on or climb up the Cleanroom systems,
- to operate the Cleanroom systems when there is a risk of direct lightning or impact in the vicinity,
- to suspend additional loads from the Cleanroom systems, in the case of ceiling mounting,
- to expose the equipment of the Cleanroom systems to rain or wet conditions. Water entering the Cleanroom systems equipment increases the risk of electric shock.

#### Proper use also includes

- observing all instructions in the operating manual and the third-party documentation,
- complying with the inspection and maintenance intervals,
- using equipment and auxiliary materials in accordance with applicable safety regulations,
- compliance with national, regional and local safety and accident prevention regulations and provisions,
- complying with the operational conditions.

The technical specifications given in the technical data must be adhered to without exception.



 Only use the Cleanroom systems as intended, otherwise safe operation cannot be guaranteed.

It is the operator of the Cleanroom systems, not the manufacturer, who is responsible for all personal injuries and material damages resulting from improper use!

## 2.1.1 **Programming changes to the Cleanroom systems**

It is prohibited to make programming changes to the Cleanroom systems that affect the safety of the Appliances (e.g. disabling safety functions).

#### 2.1.2 Structural changes to the Cleanroom systems

Engineering and manufacturer approval are provided on the basis of the German product safety law (ProdSG). No changes, additions or conversions may be made to the Cleanroom systems without the prior written authorisation of Spetec GmbH .

In the event of non-compliance, the Cleanroom systems loses its suitability for use. The warranty from the manufacturer of the Cleanroom systems is thus rendered void.

Replace any parts that are not in perfect condition immediately.

Only use original spare parts/wear parts/accessories. These parts are specifically designed for the Cleanroom systems. When using externally sourced parts, there is no guarantee that they have been designed and manufactured to withstand stresses and ensure safety.

Parts and special equipment not supplied by Spetec GmbH are not approved for use on the Cleanroom systems.

#### 2.1.3 Foreseeable misuse

Every use in addition to or deviation from proper use of the Cleanroom systems can lead to severe injury.

- Only use the Cleanroom systems according to proper use.
- Only use the Cleanroom systems if maintenance and inspection have been carried out correctly.
- ▶ Do not place the Cleanroom systems in rescue or emergency escape routes.

#### 2.1.3.1 Reasonably foreseeable misuse

- Do not use the Cleanroom systems as a personal safety device.
- Keep persons who are unable or only partially able to assess potential hazards and who pose a danger to themselves and others (especially children) away from the cleanroom systems.
- ▶ Keep animals away from the cleanroom systems.
- Please note that the cleanroom systems must not be used by children or persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge. Children must not play with the appliance. Cleaning and user maintenance must not be carried out by children without supervision.
- ► Avoid tangling the cables.
- Do not apply tension to the cables.
- Only connect the Cleanroom systems to a socket outlet equipped with a protective earth connection.
- ► Never reach into the mechanically moving parts.
- Disconnect the mains plug before changing the fuse. Only use the fuse types listed here.

# 2.2 **Personnel requirements**

The Cleanroom systems may only be transported, assembled, installed, commissioned, operated, maintained, cleaned, repaired, decommissioned, inspected, dismantled or disposed of by persons who are qualified and/or instructed to do so. If the personnel concerned do not already have the necessary knowledge and skills, appropriate training and instruction must be provided. All local regulations must be observed.

These personnel must know and accordingly heed the operating manual. The assignments of all personnel must be clearly defined.

Persons with limited physical, sensory or mental capabilities or a lack of experience and knowledge must be supervised or instructed in the safe use of the Cleanroom systems and understand the hazards involved.

In the operating manual the following qualifications for various activities are specified:

#### 2.2.1 Trainees

Trainees, such as apprentices or part-time workers, do not know all the dangers that may arise when operating the Cleanroom systems. Work on the Cleanroom systems may only be carried out under the supervision of qualified or instructed personnel.

### 2.2.2 Instructed personnel

Instructed personnel have been trained in the tasks assigned to them and the potential dangers of improper behaviour through training provided by the operator or by qualified personnel.

#### 2.2.3 Qualified personnel

Qualified personnel are those who, because of their specialist training, knowledge, experience and understanding of the relevant regulations, are able to properly carry out the tasks assigned to them, recognising and avoiding any potential dangers independently.

#### 2.2.4 Qualified electricians

Due to their technical training, knowledge and experience as well as their knowledge of the relevant standards and regulations, qualified electricians are able to carry out work on electrical equipment and to independently detect and avoid possible dangers.

Qualified electricians are trained for the specific location in which they work and know the relevant standards and regulations.

#### 2.2.5 Responsibilities

Improper handling can lead to severe personal injury and material damage.

- Only persons who can be expected to reliably carry out their work are authorised as personnel. Persons whose ability to react is impaired my drugs, alcohol, medication, or similar are not permitted to work at the Cleanroom systems.
- All personsworking on the Cleanroom systemsn must read the operating manual and sign to confirm that they have understood it.
- Personnel undergoing training may initially only work on the Cleanroom systems under the supervision of qualified personnel. Complete and successful instruction must be confirmed in writing.
- ▶ Note the personnel requirements for the different use phases/operating modes.

Personnel requirements	Use phase/operating mode
Qualified specialist personnel, qualified electrician	Transport, installation, commissioning, malfunction, maintenance, decommissioning, disassembly, disposal
Trainees, instructed personnel	Normal operation and cleaning

The operator is responsible for the instruction of the personnel.

## 2.2.6 Obligations of the personnel

All persons who are engaged in work on the Cleanroom systems undertake, before commencing their work,

- to observe the basic requirements of occupational safety and accident prevention,
- to read the safety and warning signs in the operating manual and confirm with a signature that they have understood them.

## 2.2.7 Unauthorised persons

Unauthorised persons who do not meet the qualification requirements for the personnel are not aware of the dangers in the area of deployment.

- Keep unauthorised persons away from the area of deployment.
- ▶ If in doubt, speak to such persons and instruct them to leave the area.
- ▶ Interrupt work as long as unauthorised persons are in the area of deployment.

#### 2.2.8 Instruction

The personnel must be regularly instructed by the operator. Make records about the execution of the instruction so it can be better tracked.

Date	Name	Type of instruction	Instruction given by	Signature

# 2.3 Basic safety instructions

- The Cleanroom systems may be put into operation and serviced only after these operating manual have been acknowledged.
- Only use the Cleanroom systems as intended.
- Only operate the Cleanroom systems if there are no other persons in the danger zone.
- When operating the Cleanroom systems, refrain from any mode of work that affects the safety of personnel or the Cleanroom systems.
- Only operate the Cleanroom systems with the corresponding protective and safety devices in place. Ensure that the built-in safety devices have not been deactivated.
- Keep the area of deployment of the Cleanroom systems clean and tidy at all times to avoid dangers caused by dirt and objects lying around.
- Only operate the Cleanroom systems within the scope of its technical performance data.
- Keep all safety and danger notices on the Cleanroom systems in a legible condition and renew them as necessary.
- Operation of and work on the Cleanroom systems may only be carried out by qualified or instructed personnel.
- If functionality is impaired, switch off the Cleanroom systems immediately. Have faults rectified by appropriately trained specialists or by Spetec GmbH.
- Keep the operating manual at the place where the Cleanroom systems is used at all times. It must be ensured that all persons carrying out work on the Cleanroom systems can view the operating manual at any time.

# 2.4 Environmental protection measures

When working, comply with all requirements related to waste avoidance and proper recycling or disposal of materials.

Particularly during assembly and maintenance work, as well as during decommissioning, care must be taken to ensure that groundwater-polluting substances such as Lubricants and cleaning fluids do not pollute the ground or enter the sewer system. These substances must be collected in suitable containers and stored, transported and disposed of according to local regulations.

# 2.5 Special danger warnings/residual dangers

# 2.5.1 Symbols used on the Appliances

Symbol	Description	Place of attachment
	Warning signs	
	Warning of falling objects This symbol warns of objects that could fall from above.	For ceiling mounting on the housing
	Warning against automatic start-up This symbol warns of dangers due to automatic start-up.	In the area of automatically starting parts
	<b>Danger from electrical voltage</b> This symbol warns of electrical hazards.	All housings containing electrical equipment
	<b>Danger of hot surface</b> This symbol warns of a danger of burns from hot surfaces.	At surface temperatures greater than +45 °C
	Prohibition sign	
N	Entering the area is prohibited This symbol prohibits access to certain areas.	On all areas that must not be entered
Mandatory sign		
	<b>Comply with the operating manual</b> This symbol indicates that the operating manual must be observed.	In the front area
	<b>Disconnect mains plug before opening</b> This symbol indicates that electrical equipment must be disconnected from the power supply before cleaning, maintenance or repair.	In the areas that must be cut off from the power before opening

Symbol	Description	Place of attachment
Other symbols		
	<b>Disposal instructions</b> This symbol indicates that the marked product must not be disposed of with household waste.	Type plate
CE	<b>CE marking</b> The CE marking on the product is the manufacturer's declaration that the product meets the essential requirements of the relevant European health, safety and environmental legislation.	Type plate

Keep all safety and danger notices on the Cleanroom systems in a legible condition. Replace the notices as necessary.

## 2.5.2 Danger from electrical energy

#### DANGER

#### There is a risk of electric shock when touching live parts!

Failure to observe this will lead to death or severe injury!

- ► Always keep electrical components closed.
- Only allow work on the electrical equipment to be carried out by a qualified electrician who is specially trained for work on electrical equipment and who can recognise and avoid dangers.
- 4
- ► Do not attach any earthing to mechanical connecting elements.
- Disconnect the mains plug of the clean room system before opening it.



- Apply the five safety rules:
  - 1. Disconnect from power.
  - 2. Secure against switching on.
  - 3. Check for zero potential.
  - 4. Gounding and short-circuit.
  - 5. Cover or cordon off live parts.

## 🛕 DANGER



Failure to observe this will lead to death or severe injury!

- ► Follow the five safety rules when working on the electrical equipment.
- Have work on the electrical equipment carried out by qualified electricians only.

- Before working on the electrical systems, isolate the Cleanroom systems from the current and secure them against being switched on again.
- Only allow work on the electrical equipment to be carried out by a competent and qualified electrician – e.g. an industrial electrician.
- Regularly check the electrical systems for defects such as loose connections or scorched cables. Have defects rectified immediately.
- Have the electrical equipment and stationary electrical equipment checked by a qualified electrician at least every 4 years.
   Stationary electrical equipment is permanently installed equipment or equipment which has no carrying parts and whose weight is such that it cannot easily be moved. This includes electrical equipment that is temporarily fixed in place and can be operated via mobile connection lines.
- Have portable electrical equipment, plugs, sockets, connecting cables, extension cables and Appliances connection cables checked by a qualified electrician at least every 12 months if they are used.
- Equipment is considered mobile if it can be moved during normal operation while connected to a source of electricity.
- Modifications to electrical equipment carried out after the test must comply with the currently applicable standards and directives.
- Check all safety systems of the Cleanroom systems regularly for functionality.
- Only use original fuses.
- Always keep electrical housing or all housings containing electrical equipment closed.
- Repair or replace damaged enclosures and cables immediately before switching on.
- For leakage currents above 10 mA, additional measures must be taken (earthing). Do not attach any earthing to mechanical connecting elements.

## A DANGER

Danger to life due to residual voltage in the fan motors caused by capacitors!



Touching the fan motors can lead to death or serious injury!

- ► Do not touch any metal parts.
- Only carry out conversions and maintenance with the clean room systems switched off and secured against being switched on again.

## 2.5.3 Dangers due to height-adjustable table

### **WARNING**

#### The height-adjustable table poses a risk!

A failure to observe this can lead to death or severe injury!

- ▶ Do not reach into the moving parts of the height-adjustable tables.
- Ensure that no cables / lines are laid in the area of movement of the height-adjustable tables.



- Do not place any objects in the range of movement of the height adjustment.
- ▶ Please note that there is a risk of tipping when the table is raised.
- ► Retract the table for transport or moving.

### 2.5.4 Dangers due to damage (climbing)

### 

#### Risk of damage when climbing onto the Cleanroom systems!

Non-observance can result in injuries and damage!

Do not climb onto the Cleanroom systems, the ceiling area is not designed for this.

## 2.5.5 Dangers arising from supplier components

#### 

# Risks arise at the Cleanroom systems because of purchased components!

Failure to observe the manufacturers' operating and assembly instructions from suppliers can result in injury!

Observe the design, function and mode of operation of the purchased components, which are described in detail in the external manufacturers' operating and assembly instructions. These are components of the technical documentation and are included with it. Observe the sections on safety, maintenance and servicing in particular. The operating / assembly instructions for the supplier parts can be found in the documentation folder provided with these Cleanroom systems. Observe the manufacturer's operating and assembly instructions. Failure to do so may result in personal injury or material damages.

## 2.5.6 Danger due to hot surfaces

### A WARNING

Contact with hot components (motors) can cause burns!

A failure to observe this can lead to severe injury!



- During all work near hot components, wear protective clothing and gloves. Components that can become hot are marked with the graphic symbol "Warning: hot surface".
- Allow such components to cool down to ambient temperature before carrying out maintenance or repair work.

## 2.5.7 Danger when working at great heights

#### WARNING

When working at the Cleanroom systems there is a risk of falling from a great height!

A failure to observe this can lead to death or severe injury!



- Wear fall protection equipment (e.g. safety rope and safety harness) when working at heights of more than 1 metre.
- If a harness is used as fall protection: comply with the rescue concept for persons wearing harnesses. A person must not remain hanging in the harness for longer than 15 minutes, otherwise shock and possible death may occur.

#### **WARNING**

Risk of injury due to falling from a great height!



A failure to observe this can lead to death or severe injury!

- Only allow work at great heights to be carried out by instructed and authorised personnel.
- ► Use fall protection.

# 2.5.8 Danger of crushing

### 

#### Risk of injury from crushing!

Injuries can occur if protective devices are not installed!



- Only operate the Cleanroom systems with the corresponding protective and safety devices. Ensure that the built-in safety devices are not out of order.
- Keep a sufficient distance from the area where the moving components are to be deployed.

# 2.5.9 Dangers from Lubricants and cleaning fluids

### **WARNING**



At the Cleanroom systems there are dangers from Lubricants and cleaning fluids!

A failure to observe this can lead to severe injury!

- When handling, observe the safety regulations applicable to the product for Lubricants and cleaning fluids.
- When working, always wear the protective equipment necessary for the work procedure in question (respiratory protection, protective clothing, protective goggles and protective gloves).

## 2.5.10 Dangers from components from the

#### 

```
The following special hazards are to be expected during the lifting process, ceiling installation and main/filter change of the Cleanroom systems or the components:
```

Suspended and overhead loads can fall, posing a risk to life! Unsecured loads can tip over!

Protruding edges can cause crushing or cutting injuries!



 Only use approved lifting attachment points/couplings.
 Always wear the personal protective equipment necessary for the work in question (protective clothing, protective gloves, safety helmet and safety shoes).



- Ensure that neither you nor other people loiter under suspended loads.
- Observe the marked stop points (if present).
- Secure the Cleanroom systems against slipping and tipping during all loading and transport activities.
- ► Always transport and store the Cleanroom systems horizontally.
- ▶ Do not stand under the main filter when changing it.
- ► Only carry out the main filter change with two employees.

## 2.5.11 Dangers due to tripping



Tripping risk due to improperly laid energy supply cables!

A failure to observe this can result in injuries!



- Always lay cables in the supply shaft in such a way as not to cause barriers or risk of tripping.
- ► Indicate unavoidable tripping hazards with bright colours.

## 2.5.12 Dangers due to slipping

#### 

Risk of slipping due to spilt lubricant or leaking liquids!



- Clean the floor immediately if it becomes dirty.
- Dispose of the cleaning cloths in the collection containers/waste bins provided for this purpose.

## 2.5.13 Danger due to incorrect programming

#### A WARNING

Danger of injury due to incorrect programming!

A failure to observe this can lead to severe injury!

Do not make any changes to the software on programmable systems that go beyond the measures required during normal operation (e.g. change of input parameters).

### 2.5.14 Danger due to improper placement

### 

#### Danger due to improper placement of objects!

Improper placement of objects within or on the Cleanroom systems can lead to damage, faults or total failure and can affect safety!

Take note that it is forbidden to put down objects within or on the Cleanroom systems. Remove all objects to be found within or on the Cleanroom systems.

## 2.5.15 Danger due to use of incorrect replacement parts

### 

#### Danger due to use of incorrect replacement parts!

Faulty or incorrect replacement parts can lead to damage, faults or total failure and can compromise safety!

- ► Only use original replacement parts.
- Acquire your replacement parts from Spetec GmbH. You can find the necessary information on replacement parts in the accompanying parts lists or in "1.6 Service/customer service".

### 2.5.16 Dangers due to automatic start-up

#### WARNING

#### Dangers due to automatic start-up!

A failure to observe this can lead to severe injury!

- ► Maintain a sufficient safe distance.
- Before carrying out any work on the Appliances, make sure that they have been switched off and disconnected from the power supply.

### 2.5.17 Dangers for unauthorised persons

## 

#### The Appliances pose dangers for unauthorised persons!

Failure to observe this can lead to death or severe injury!



- Check that no unauthorised persons are present on site.
- Ensure that unauthorised persons (anyone not part of the operational and servicing personnel) are prevented from entering the operating area.

### 2.5.18 Danger of insufficient qualifications

#### A WARNING

#### Risk of injury if insufficiently qualified!

Improper handling of the Cleanroom systems can lead to severe personal injury and material damages!

Only allow qualified personnel to carry out all activities.

# 2.6 Personal protective equipment

When operating the Cleanroom systems, regardless of the workplace risk assessment, personal protective equipment is to be worn to minimize health hazards. The personal protective equipment must be designed in particular with regard to the corresponding risk.

- When working, always wear the personal protective equipment necessary for the respective work procedure.
- ► Do not wear any rings, chains or other jewellery.
- ► Follow all the instructions on personal protective equipment.

The symbols have the following meaning:

Symbol	Description
	Safety shoes
	Wear non-slip safety shoes to protect against heavy falling objects or slipping on smooth surfaces.
	Protective clothing
	Protective clothing is tight-fitting work clothing that has low tear- resistance, close-fitting sleeves and no protruding parts. It serves above all to protect against getting caught in moving Appliances parts.
rith)	Protective gloves
	Wear protective gloves to protect the hands against abrasion, scraping, piercing or deeper injuries and against coming in contact with hot surfaces or chemical substances.
	Helmet
	To protect against falling or flying objects, wear a helmet.
	Protective goggles
	Wear protective goggles to protect against media escaping at high pressure or flying objects.
	Fall protection
	Wear suitable fall protection (safety rope and safety harness) when working at great heights.
he nereced and	active equipment is to be previded by the exerciser and must estimate the

The personal protective equipment is to be provided by the operator and must satisfy the applicable requirements.

In addition, the national regulations as well as specifications from the risk assessment for the area of use and, if necessary, internal instructions of the operator must be observed.

# 2.7 Safety and protective systems

- Before switching on the Cleanroom systems, always check that all safety and protective systems are properly in place and functional.
- If partial components are supplied, the safety systems are to be applied by the operator according to regulations.
- During operation you may not bypass, remove or otherwise disable safety and protective systems.
- Protective systems may only be removed after shut-down and when the Cleanroom systems have been secured against being switched on again.
- Check all safety systems of the Cleanroom systems regularly for functionality.

## 2.8 Emergency measures

#### **Precautionary measures**

- ► Always be prepared for accidents or fire.
- Keep first-aid equipment (first-aid kit, blankets, etc.) and fire extinguishers close to hand.
- Instruct personnel about accident reporting, first aid, fire extinguishing and rescue equipment.
- ► Keep access routes for emergency services free.

#### Measures in case of accidents

- Disconnect the power supply to the Cleanroom systems.
- Rescue people from the danger zone.
- Immediately begin resuscitation if the heart or breathing have stopped.
- In case of injury to persons, notify the first aid officer and an emergency doctor or the ambulance services.
- Clear access routes for emergency services. If necessary, delegate someone to instruct the emergency services.
- Extinguish a fire in the electrical control unit with a CO2 extinguisher.

# 2.9 Responsibilities of the operator

The Cleanroom systems are used in industrial areas. The operator of the Cleanroom systems is thus subject to legal occupational safety obligations.

Alongside the safety information given in this operating manual, the safety, accident prevention and environmental regulations valid at the place of deployment of the Cleanroom systems must be complied with. In particular:

- The operator must ensure that the Cleanroom systems are only used as intended.
- The operator must always keep the operating manual in a legible and complete state at the place of deployment of the Cleanroom systems.
- The operator must clearly assign and specify responsibilities for installation, commissioning, operation, maintenance and cleaning.
- The operator may only allow persons towork at the Cleanroom systems who have reached the minimum age permitted by law.
- The operator may only allow sufficiently qualified and instructed personnel to work at the Cleanroom systems.
- The operator must ensure that all persons handling the Cleanroom systems have read and understood the operating manual.
   In addition, the operator must verifiably train the personnel at regular intervals and inform them about dangers.
- The operator must provide the personnel with personal protective equipment and make sure that it is used.
- The operator must ensure that only persons whose ability to react is not impaired by drugs, alcohol, medication or similar work at the Cleanroom systems.
- The operator must ensure sufficient lighting in the area of deployment of the Cleanroom systems.
- The operator must ensure sufficient anti-virus protection / a firewall on its IT infrastructure.

In addition, the operator is responsible for keeping the Cleanroom systems constantly in technically faultless condition. For this reason, the following applies:

- The operator must ensure that the maintenance intervals described in this operating manual are adhered to.
- The operator must have all safety systems checked regularly for their functionality and completeness.
- The operator must regularly check that all safety and warning notices attached to the Cleanroom systems are clearly legible and remain permanently attached to them.

# **3 Description of Cleanroom systems**

All illustrations in this document are meant to provide a basic understanding and may differ from the actual design.

# **3.1 Description of the Cleanroom systems**

Product series:

- Laminar Flow Module
  - FMS Series SuSi
  - FMS Series Basic
- Laminar flow boxes
  - FBS Series
  - FBS Series Standard
  - FBS-V Series
- Exhaust Flow Box
  - EFBS Series
  - EFBS-V Series
- Protection Box (PBS Series)
  - PBS Series
- Exhaust (Protection) Box (EBS Series)
  - EBS Series
- Clean room stations and workstations (CleanBoy)
  - CleanBoy Mini
  - CleanBoy Maxi
  - CleanBoy Basic

The family of appliances has a modular structure, i.e. the individual components are compatible with each other and can be expanded.

## 3.1.1 Laminar Flow Module

The laminar flow modules are available in the following variants:

- FMS Series SuSi
- FMS Series Basic

The FMS Series is a filter module equipped with prefilters and a main filter of type H 14.

#### FMS Series SuSi

The FMS Series SuSi is a filter module with a display and can be converted into a laminar flow box.



Figure 1: FMS Series SuSi

There are three versions of the SuSi appliance:

- Standard module:
   The operating terminal is installed in landscape format in the housing of the appliance.
- Primary Module:
   Does not have an operating terminal in the housing, but an external cable remote control and control cable (5 m). Several secondary modules of the same size can be controlled with one primary module.
- Secondary module:
   Without control unit, with control cable (3m). A maximum of 50 secondary modules can be connected to one primary module.

The type plate indicates which variant is involved (without labelling = standard module).

#### **FMS Series Basic**

The FMS Basic Series does not include a display and cannot be converted into a laminar flow box.



Figure 2: FMS Series Basic

- Standard module:

Has a main switch and a potentiometer, which are built directly into the housing of the appliance.

- Primary Module:

Has an external cable remote control without error and filter change indicator and a control cable (5 m). Several secondary modules of the same size can be controlled with one primary module.

Secondary module:
 Without control unit, with control cable (3m). A maximum of 50 secondary modules can be connected to one primary module.

### 3.1.2 Laminar flow boxes

#### 3.1.2.1 Laminar Flow Box

The Laminar Flow Box is available in the following variants:

- FBS Series
- FBS Series Standard
- FBS-V Series

The Laminar Flow Box is designed as a table-top unit and is used for product protection in the manufacture of products and for storing items under cleanroom conditions.
#### **FBS Series**

The FBS Series is a tabletop appliance with sliding door and perforated shelf.





#### **FBS Series Standard**

The FBS Series Standard is a tabletop appliance without sliding door and without perforated shelf.



Figure 4: FBS Series Standard

#### **FBS-V Series**

The FBS-V Series is a laminar flow module with a cleanroom strip curtain. The curtain length is 2000 mm, but can be customised.



Figure 5: FBS-V Series

#### 3.1.2.2 Exhaust Flow Box

The Exhaust Flow Box is available in the following variants:

- EFBS Series
- EFBS-V Series

The EFBS Series is a laminar flow box that is also equipped with an acid-resistant suction device. The extraction system is connected to the building's exhaust air system via a pipe.

# NOTICE

- Please note that no mechanical or activated charcoal filters are installed in the appliance.
- Make the connection to the internal building extraction system or route the connection outside. Pay attention to the currently valid environmental regulations.
- ▶ Please note that the Exhaust Flow Boxes have no explosion protection.
- Please note that the extraction system does not guarantee personal protection.

#### **EFBS Series**

The EFBS Series is a laminar flow box with an integrated acid-resistant suction device.

Figure 6: EFBS Series

#### **EFBS-V Series**

The EFBS-V Series is a laminar flow box with an integrated acid-proof suction device and a cleanroom strip curtain. The curtain length is 2000 mm, but can be customised.



Figure 7: EFBS-V Series

# 3.1.3 **Protection Box**

#### **PBS Series**

The Protection Box is a tabletop appliance. It does not have a filter attachment. It can be retrofitted at any time with a filter attachment to form a laminar flow box.

The PBS Series is deployed as a cleanroom workstation and is used for the dust-proof storage of objects.





# NOTICE

- Please note that no mechanical or activated charcoal filters are installed in the appliance.
- Make the connection to the internal building extraction system or route the connection outside. Pay attention to the currently valid environmental regulations.
- ▶ Please note that the Protection Box has no explosion protection.
- Please note that the extraction system does not guarantee personal protection.

# 3.1.4 Exhaust (Protection) Box

#### **EBS Series**

The EBS Series is a bench-mounted fume cupboard with an integrated acid-proof extraction unit.







# 3.1.5 Cleanroom stations and workstations

The cleanroom stations and workstations are available in the following variants:

- CleanBoy Mini
- CleanBoy Maxi
- CleanBoy Basic

The CleanBoy consists of a laminar flow module from the SuSi Series and a support frame.

#### **CleanBoy Mini**

The CleanBoy Mini is a tabletop appliance.



Figure 10: CleanBoy Mini

#### **CleanBoy Maxi**

The CleanBoy Maxi is a floor-standing appliance.



Figure 11: CleanBoy Maxi

#### **CleanBoy Basic Mini**

The CleanBoy Basic Mini is a table-top appliance and is equipped with a laminar flow module from the Basic series.



Figure 12: CleanBoy Basic Mini

#### **CleanBoy Basic Maxi**

The CleanBoy Basic Maxi is a floor-standing appliance and is equipped with a laminar flow module from the Basic series.





# 3.1.6 Type plate

A type plate is attached to each product group to record the key data in accordance with the Machinery Directive 2006/42/EC.

If a cleanroom system consists of several parts, a unit number (Unit No.) and a type plate are affixed to each.

For customised solutions, the type plate is attached to the cable remote control.

Reinraumsystem					
Item No.		Serial No.		Date of Mfr.	
XX-XXXX		11XXXXX2X XX/2		XX/20XX	
230 V ~	50/	60 Hz	285 W	-	— — M 3,15 A
Spetec <sup>®</sup> GmbH Am Kletthamer Feld 15 85435 Erding Made in Germany Tel. +49 8122 95909-0 Fax. +49 8122 95909-55 E-Mail: spetec@spetec.de www.spetec.de					

Figure 14: Example type plate Cleanroom systems

# 3.2 Safety systems

The cleanroom systems do not have a mechanical emergency stop / emergency off.

Safety system	Function
Protection against intrusion	The pre-filter is secured by a grille to prevent objects from falling into the fan inlet.

# 3.3 Operating modes

The Cleanroom systems is designed for the following operating modes:

# 3.3.1 Automatic mode

# 

# The Cleanroom systems can be dangerous when used improperly in automatic mode!

Failure to comply with the instructions may result in injury!

- Please note that Cleanroom systems runs automatically in this operating mode. Automatic operation can endanger the operator if the Cleanroom systems are used improperly.
- Check that all enclosures are fitted in this operating mode.

# 3.4 Technical data

# 3.4.1 Cleanroom systems

- FMS Series SuSi
- FMS Basic
- FBS Series SuSi
- FBS-V Series SuSi
- FBS Series Standard
- EBS Series SuSi
- EFBS Series SuSi
- EFBS-V Series SuSi

Voltage supply	230 V AC
Frequency	50 / 60 Hz
Fuse protection	Fuse: T 3.15 A
Temperature range	+10 to +50 °C
Air humidity	20 to 80 % non-condensing

# 3.4.1.1 Cleanroom systems with acid-resistant fume cupboard

- EFBS Series SuSi
- EFBS-V Series SuSi
- EBS Series SuSi

Performance data of the acid-resistant extraction unit		
Voltage supply	230 V AC	
Frequency	50 / 60 Hz	
Power consumption	20 W	
Fuse protection	Fuse: T 1.60 A	
Suction capacity	max. 60 <sup>m3/h</sup>	
Exhaust air connection, diameter	100 mm	
Temperature range	+10 to +50 °C	
Air humidity	20 to 80 % non-condensing	



The performance data refers only to the acid-resistant extraction system.

#### 3.4.1.2 Cleanroom workstations

- CleanBoy Maxi
- CleanBoy Mini
- CleanBoy Basic

Voltage supply	230 V AC
Frequency	50 / 60 Hz
Fuse protection	Fuse: M 3.15 A
Temperature range	+10 to +50 °C
Air humidity	20 to 80 % non-condensing

# 3.4.2 Power consumption

# 3.4.2.1 Laminar Flow Module

# FMS Series SuSi

Identifier	Average power consumption at 0.4 m/s in W	Maximum power consumption in W
Laminar flow module FMS 37	60	265
Laminar flow module FMS 56	85	265
Laminar flow module FMS 75	125	510
Laminar flow module FMS 93	155	510
Laminar flow module FMS 112	140	510

#### **FMS Series Basic**

Identifier	Average power consumption at 0.4 m/s in W	Maximum power consumption in W
Laminar flow module FMS 75 - Basic	115	285

# 3.4.2.2 Clean room stations and workstations

#### **CleanBoy Basic**

Identifier	Average power consumption at 0.4 m/s in W	Maximum power consumption in W
CleanBoy 75 - Basic	115	285

# 3.4.3 Filter dimensions

# 3.4.3.1 Laminar Flow Module

# FMS Series SuSi

Identifier	Filter dimensions in mm	Weight in kg
Laminar flow module FMS 24 *	610 x 400	20
Laminar flow module FMS 37	610 x 610	31
Laminar flow module FMS 56	915 x 610	37
Laminar flow module FMS 75	1220 x 610	52
Laminar flow module FMS 93	1525 x 610	58
Laminar flow module FMS 112	1830 x 610	64

\* Special version

#### FMS Series Basic

Identifier	Filter dimensions in mm	Weight in kg
Laminar flow module FMS 75	1220 x 610	30

## 3.4.3.2 Laminar flow boxes

#### **FBS Series SuSi**

Identifier	Filter dimensions in mm	Weight in kg
Laminar Flow Box FBS 37	610 x 610	71
Laminar Flow Box FBS 56	915 x 610	92
Laminar Flow Box FBS 75	1220 x 610	114
Laminar Flow Box FBS 93	1525 x 610	129
Laminar Flow Box FBS 112	1830 x 610	145

#### **FBS Series Standard**

Identifier	Filter dimensions in mm	Weight in kg
Laminar Flow Box FBS 37 Standard	610 x 610	71
Laminar Flow Box FBS 56 Standard	915 x 610	92
Laminar Flow Box FBS 75 Standard	1220 x 610	114
Laminar Flow Box FBS 93 Standard	1525 x 610	129
Laminar Flow Box FBS 112 Standard	1830 x 610	145

#### **EFBS Series SuSi**

Identifier	Filter dimensions in mm	Weight in kg
Laminar Flow Box EFBS 37	610 x 610	84
Laminar Flow Box EFBS 56	915 x 610	99
Laminar Flow Box EFBS 75	1220 x 610	121
Laminar Flow Box EFBS 93	1525 x 610	136
Laminar Flow Box EFBS 112	1830 x 610	152

#### EFBS-V Series SuSi

Identifier	Filter dimensions in mm	Weight in kg
Laminar Flow Box EFBS-V 37	610 x 610	71
Laminar Flow Box EFBS-V 56	915 x 610	81
Laminar Flow Box EFBS-V 75	1220 x 610	101
Laminar Flow Box EFBS-V 93	1525 x 610	115
Laminar Flow Box EFBS-V 112	1830 x 610	126

#### **FBS-V Series SuSi**

Identifier	Filter dimensions in mm	Weight in kg
Laminar Flow Box FBS-V 37	610 x 610	64
Laminar Flow Box FBS-V 56	915 x 610	74
Laminar Flow Box FBS-V 75	1220 x 610	94
Laminar Flow Box FBS-V 93	1525 x 610	108
Laminar Flow Box FBS-V 112	1830 x 610	119

#### 3.4.3.3 Cleanroom stations and workstations

# CleanBoy Mini/Maxi

Identifier	Filter dimensions in mm
CleanBoy 37	610 x 610
CleanBoy 56	915 x 610
CleanBoy 75	1220 x 610
CleanBoy 93	1525 x 610
CleanBoy 112	1830 x 610

#### CleanBoy Mini/Maxi Basic

Identifier	Filter dimensions in mm
CleanBoy 75	1220 x 610

# 3.4.4 Dimensions

#### 3.4.4.1 Dimensions FMS Series SuSi



Figure 15: Dimensions FMS Series SuSi

Identifier	V in mm	W in mm	X in mm	Y in mm	Z in mm
Laminar flow module FMS 37	685	705	645	610	580
Laminar flow module FMS 56	990	1010	950	915	885
Laminar flow module FMS 75	1295	1315	1255	1220	1190

Identifier	V in mm	W in mm	X in mm	Y in mm	Z in mm
Laminar flow module FMS 93	1600	1620	1560	1525	1495
Laminar flow module FMS 112	1905	1925	1865	1830	1800

#### 3.4.4.2 Dimensions FMS Series Basic



Figure 16: Dimensions FMS Series Basic

### 3.4.4.3 Dimensions FBS Series Standard



Figure 17: Dimensions FBS Series Standard

Identifier	X in mm	Y in mm
Laminar Flow Box FBS 37 Standard	645	610
Laminar Flow Box FBS 56 Standard	950	915
Laminar Flow Box FBS 75 Standard	1255	1220
Laminar Flow Box FBS 93 Standard	1560	1525
Laminar Flow Box FBS 112 Standard	1865	1830

# 3.4.4.4 Dimensions FBS / EFBS / PBS / EBS Series



#### Figure 18: Dimensions FBS / EFBS / PBS / EBS Series

Identifier	X in mm	Y in mm
FBS / EFBS / PBS / EBS Series 37	645	735
FBS / EFBS / PBS / EBS Series 56	950	1040
FBS / EFBS / PBS / EBS Series 75	1255	1345
FBS / EFBS / PBS / EBS Series 93	1560	1650
FBS / EFBS / PBS / EBS Series 112	1865	1955

# 3.4.5 Airborne noise emissions

A-weighted airborne acoustic emissions	< 70 dB(A)
Information on the measurement method:	According to EN ISO 11204, EN ISO 3746

# 3.4.6 Intended service life

The intended service life of the Cleanroom systems, assuming proper use and maintenance intervals, is 15 years.

# 4 Transport and storage

# 4.1 Delivery by an authorised transport company

The Appliances will be delivered to the customer by a transport company authorized by Spetec GmbH.



If the location of the Appliances is changed, please ask Spetec GmbH for information regarding transport.

# 4.2 Inspections when handed over to recipient

The Cleanroom systems must be investigated for visible transport damage upon arrival at the customer's base of operations.

Report transport damage immediately to the delivery company.

# 4.3 Packaging

The Cleanroom systems are shipped on a wooden pallet.

• Observe the symbols applied to the packaging:

Examples of symbols on packaging:



Figure 19: examples of symbols on packaging

# 4.3.1 Unpacking

When unpacking the Cleanroom systems, proceed as follows:

- Remove the packaging. Dispose of materials such as plastic foil and adhesive tapes properly.
- Always remove all packaging before installing the Cleanroom systems.
- ► Keep the original packaging for reuse/further transport.
- Check the completeness of the delivery against your order.
- Make sure to keep the accompanying documents; they contain important information on handling the Cleanroom systems.
- Check the contents of the package for visible transport damage.
- If you detect transport damage or discrepancies between the contents and your order, inform Spetec GmbH.

# 4.3.2 Repackaging

See chapter "4.3.1 Unpacking".

# 4.4 Information on transport dangers

#### WARNING

# When transporting the Cleanroom systems or its components, the following special dangers must be considered:

Suspended loads can fall, posing a danger to life!

Unsecured loads can tip over!

Protruding edges can cause crushing or cutting injuries!

► Only use approved lifting attachment points/couplings.



- Always wear the personal protective equipment necessary for the work in question (protective clothing, protective gloves, safety helmet and safety shoes).
- Ensure that areas under suspended loads always remain clear of persons.
- Observe the marked stop points (if present).
- ► Also refer to chapter "2 Safety".
- The transportation of the Cleanroom systems or of components thereof may only be carried out by suitably qualified and trained personnel (forklift / crane drivers with certification) and while upholding all the safety instructions.
- When selecting suitable lifting devices and lifting accessories, always consider the weight of the heaviest components.
- When working, wear protective clothing, safety shoes, protective gloves, and a helmet.

- ► Always have an additional person secure the transport route.
- Ensure that transport routes and areas under suspended loads always remain clear of persons.
- Do not use any supply lines or mounted parts as attachment points. Lifting lugs on components (if present) are intended only for lifting the individual components, not for lifting the entire assembly. Only lift the Cleanroom systems or its components at the points intended for this.
- Always lift components of the Cleanroom systems slowly and carefully, to ensure stability and safety.
- Do not remove transport safeguards until the component has been finally fixed in place at the place of deployment.

# 4.5 Reliable transport aids

Shackles, hooks or similar equipment must be selected to suit the transport weight of the Cleanroom systems / its components, and are to be affixed only to the attachment points intended for them.

- Avoid contact between the suspension chains or ropes and the Cleanroom systems or its components. If this is not possible, take suitable preventive measures to exclude the possibility of damage to the Cleanroom systems or its components.
- Set the length of the suspension aids so that the Cleanroom systems or components can be transported horizontally.

# 4.6 Scope of delivery Cleanroom systems

The following components are included in the scope of delivery of the Cleanroom systems:

Cleanroom systems

# 4.6.1 Scope of delivery of operating manual

The operating manual consists of the following documents:

- operating manual
- Manufacturer documentation of the purchased components

# 4.7 Intermediate storage

If the Cleanroom systems is not immediately set up after delivery, it must be stored carefully in a protected location. The Cleanroom systems must be stored so that it is protected from cold, damp, dirt, chemical and mechanical influences. Please find the recommended storage conditions for the Cleanroom systems in the chapter "Ambient conditions".

In case of improper storage, no liability will be accepted for any resulting damages!

Observe also the storage conditions specified in the external manufacturers' or suppliers' operating or assembly instructions.

# 5 Assembly

Check the Cleanroom systems for damages before installation. If there is visible damage, the Cleanroom systems must not be installed and the manufacturer must be contacted.

# 5.1 Information on dangers during assembly

# DANGER



#### Risk of electrocution!

Failure to observe this will lead to death or severe injury!

- ► Do not touch any live parts!
- ► Do not attach any grounding to mechanical connecting elements.

# 

# Danger of injury when lifting components at points that are not intended for attachment.

Failure to observe this can lead to death or severe injury!



- Only lift the components of the Cleanroom systems at the marked attachment points (if available).
- Ensure that areas under suspended loads always remain clear of persons.

# 

#### Tripping risk due to improperly laid energy supply cables!



A failure to observe this can result in injuries!

- Always lay cables in the supply shaft in such a way as not to cause barriers or risk of tripping.
- ► Indicate unavoidable tripping hazards with bright colours.

# 

#### Risk of injury due to unsuitable assembly materials!

Unsuitable installation materials can lead to serious injuries during operation!

Only use the supplied installation materials.

# **A** CAUTION

#### Overexertion can occur when lifting heavy parts!

A failure to observe this can result in injuries!

- Heavy components should always be lifted by several persons or with the aid of lifting gear.
- Observe the regional health and safety regulations.

# 5.2 **Preparatory measures**

# 5.2.1 General

Before assembly of the Cleanroom systems , make sure

- the floor of the place of deployment is clean and free from dust,
- the tools required for assembly are at hand,

# 5.2.2 **Preparatory measures**

Before assembly of the Cleanroom systems , make sure

- connections for the power supply have been prepared.
- a suitable lifting device is used for the laminar flow module.
  - Please note that Spetec handles can be purchased for better handling during assembly.

# 5.3 Choice of deployment location

#### WARNING

#### Risk of injury due to improper deployment location!

Failure to observe this can lead to death or severe injury!

► Do not place the Cleanroom systems in emergency or escape routes.

# 5.3.1 Required operating and maintenance areas



When selecting the place of deployment, take into account the ambient conditions.

- When selecting the place of deployment, take into account the need for operational and maintenance areas.
- Please note that the free space at the Cleanroom systems100 mm to the ceiling (basic module) should be (ceiling mounting).

The operator must ensure sufficient lighting in the area of deployment of the Cleanroom systems.

# 5.3.2 Requirements of the area of deployment

# **WARNING**

#### Danger of injury due to instability!

If incorrectly assembled, a risk of severe injury can arise when setting up the Cleanroom systems due to the instability of individual components!

- ▶ Note that the area where the appliance is deployed must be:
  - flat, horizontal,
  - temperature-resistant,
  - non-combustible, and

vibration-free.

- Only have assembly work carried out by authorised and instructed personnel.
- Place or hang the Cleanroom systems on/from a surface (ceiling, support frame etc.) suitably dimensioned for the occurring weights and loads and fasten it in place.
- ► Ensure that the fixtures are sufficiently dimensioned.
- ▶ During assembly, observe the tightening torque of all bolt connections.
- When working, always wear the personal protective equipment necessary for the procedure in question (e.g. protective clothing and safety shoes).

# **WARNING**

#### Risk of injury due to loss of load-bearing capacity!

A loss of load-bearing capacity can lead to considerable risk of injury!

- ► Check that the floor where the appliance is deployed is level.
- Check that the floor where the appliance is deployed has the necessary load-bearing capacity. The operator is responsible for the statics of the floor where the appliance is used. Observe the manufacturer's requirements regarding the area where the appliance is used.

# **WARNING**

#### Danger of injury due to lack of space!

A risk of serious injuries such as scratches, stabbing or broken bones arises where work equipment and/or components are arranged too closely together!

- Select the place of deployment of the Cleanroom systems in such a way that the personnel has the necessary room to move around the operating area without hindrance or restriction.
- Ensure enough space for movement in accordance with ergonomic guidelines and standards.
- ► Cordon off the danger zone.
- ► Keep unauthorized persons away.
- ► Specify a person in charge.
- Lay energy supply lines without creating trip risks or barriers (e.g. under covers).
- ► Mark places where there are trip risks.
- When selecting the place of deployment, take into account the need for operational and maintenance areas.
- Please note that the free space at the Cleanroom systems should be n100 mm to the ceiling (basic module)(ceiling mounting).

# 5.4 Mounting the Appliances

# 5.4.1 Requirements of the place of deployment

The following requirements must be met at the place of deployment:

- Ensure that the place of deployment has sufficient load-bearing capacity and is level.
- Use the Cleanroom systems in sufficiently illuminated rooms.
- Protect the Cleanroom systems from direct sunlight and avoid locations with heatsensitive surfaces or in the vicinity of heaters, air conditioning systems or flammable materials.
- Avoid locations for the Cleanroom systems that are close to impermissible electromagnetic fields.
- Do not install the Cleanroom systems in locations where a corrosive or explosive atmosphere is present.
- ▶ Note that the Cleanroom systems is intended for indoor use only.
- ▶ Do not use the Cleanroom systems in areas with a potentially explosive atmosphere.
- Observe the ambient conditions.
- Note that the Cleanroom systems must be protected against the risk of accidental impact. No use of vehicles (manual or electric lifting vehicles, fork-lifts) in the vicinity of the Cleanroom systems.
- Note that the Cleanroom systems is intended for use in an industrial environment that is well lit, adequately ventilated, clean and dry.
- Observe the space requirements of 100 mm to the ceiling (basic module) for repairs.
- Note that only persons who are trained and familiar with the safety regulations may work on or with the Cleanroom systems.
- Please note that regarding tidiness and cleanliness care must be taken to ensure that:
  - all lines and cables are properly laid and covered if necessary,
  - tools around the Cleanroom systems are cleared up,
  - peripheral devices (if any) are positioned in such a way that they do not restrict operation or use,
  - parts lying around and incidental waste (if any) are removed regularly.

# 5.4.2 Installing the FMS Series SuSi

The FMS Series SuSi can be mounted in the following locations:

- At a machine.
- Above a table or workstation:
   The support frame is provided by the operator. Please note the weights and statics of the appliances.
- On the ceiling of the building:
   Please note the ceiling load-bearing capacity of the building and the correct choice of fixing material.

# NOTICE

 You can find the dimensions in Section 3.4.4.1 Dimensions FMS Series SuSi

#### Mounting the FMS Series SuSi from the top



Figure 20: Mounting the FMS Series SuSi from the top

- 1 FMS Series SuSi
- 2 Profile frame
- 3 M6 pan-head bolts
- a) Place the FMS Series SuSi flush on the profile frame.
- b) Refer to the technical data for the internal dimensions of the profile frame.
- c) Bolt the FMS Series SuSi to the profiled frame using M6 raised-countersunk bolts.
- d) Check the FMS Series SuSi for a tight fit.

#### Mounting the FMS Series SuSi from the underside



Mounting a laminar flow module from the underside enables the main filter to be changed from below.



Figure 21: Mounting the FMS Series SuSi from the underside - 1

- 1 Bolts
- 2 Suspension (not included in the scope of delivery)



Figure 22: Mounting the FMS Series SuSi from the underside - 2

- 3 FMS Series SuSi
- 4 Bolts

- a) Slide the FMS Series SuSi through the profile frame from below.
- b) Refer to the technical data for the internal dimensions of the profile frame.
- c) Attach the FMS Series SuSi with a suspension bracket.
- d) Bolt the FMS Series SuSi to the profile frame.
- e) Check that the profile frame is above the module frame and holds the ceiling bracket on which the ceiling panels rest.

#### Installing laminar flow modules on the building ceiling



Figure 23: Installing laminar flow modules on the building ceiling

- 1 Ceiling fixings
- a) Install the four ceiling suspensions fixtures on the building ceiling.
- b) Attach the four ceiling mounts to the FMS Series SuSi.
- c) Hook the FMS Series SuSi into the ceiling suspension mounts.
- d) Check the FMS Series SuSi for a tight fit.

# 5.4.3 Installing the FMS-Basic

# **WARNING**

#### Risk of injury due to the main filter falling out!

Failure to observe this can lead to death or severe injury!

- ► Only undo the locking plates during installation and maintenance.
- ► Only carry out the installation with two persons.

The FMS Basic Series can be used in the following locations:

- As a separate filter unit on a machine.
- In combination with a cleanroom cell.

#### NOTICE

 You can find the dimensions in Section 3.4.4.2 Dimensions FMS Series Basic

#### Mount on a support frame



Figure 24: Mounting on a support frame - 1

- 1 Locking plate
- 2 Countersunk bolts



Figure 25: Mounting on a support frame - 2

- 3 FMS Series Basic
- 4 Mounting frame
- 5 M6 bolts
- a) Loosen the countersunk bolts (2) with a 2.5 mm Allen key or Torx Tx20.
- b) Remove the locking plates (1).
- c) Place the FMS Series Basic flush on the support frame.
- d) Bolt the FMS Series Basic to the support frame using M6 bolts.
- e) Check the FMS Series Basic for tight fit.

# 5.4.4 FBS-V Series SuSi and EFBS-V Series SuSi installation

# NOTICE

► Observe the weight and suspension points of your laminar flow module.

The FBS-V Series SuSi and EFBS-V Series SuSi have a cleanroom strip curtain instead of a box made of acrylic glass panes. It is therefore necessary to mount the four suspension points of the FMS SuSi Series on a ceiling suspension.



Figure 26: FBS-V Series SuSi and EFBS-V Series SuSi installation

- 1 FMS Series SuSi
- 2 Profile
- 3 Slot nut
- 4 Cleanroom strip curtain
- 5 Washer
- 6 Cap nut
- a) Install the FMS Series SuSi on the building ceiling.
- b) Attach the cleanroom strip curtain according to the markings on the front and back by sliding the holes of the cleanroom strip curtain onto the threaded rods.
- c) Adjust the cleanroom strip curtain so that its ends are flush with the appliance housing.
- d) Attach the curtain to the left and right side of the appliance. Please note that the curtain is 200 mm longer at the front and back. Bend the curtain around the corners to close them off.
- e) Secure the clean room strip curtain with washers and cap nuts.

# 5.5 Connecting power

# 5.5.1 Connecting the electricity supply

#### IEC plug

The supplied IEC plug is used to provide a power supply and is pluggedinto the "power" socket.

#### Control cables

The 7-pin control cable (remote) is used to connect several modules (primary / secondary) and to connect a cable remote control. This connection is only wired internally; no signals can be processed.

#### IEC sockets

Additional devices such as lighting or signalling lamps can be connected to the IEC sockets. The maximum load of 200 W must not be exceeded at either connection.

# WARNING Danger of injury through unexpected start-up of the Cleanroom systems! An unexpected start-up of the Cleanroom systems when the power is

connected can lead to severe injury!

Before connecting the power supply, make sure that the main switch is set to "0".

# **A** CAUTION

#### Tripping risk due to improperly laid energy supply cables!



A failure to observe this can result in injuries!

- Always lay cables in the supply shaft in such a way as not to cause barriers or risk of tripping.
- Indicate unavoidable tripping hazards with bright colours.
- Before connecting the Cleanroom systems to the power supply, make sure that the local mains voltage corresponds to the voltage specified on the Cleanroom systems. If you are unsure about the voltage of the power supply, contact your electricity provider.
- Only insert the mains plug into sockets with a permissible voltage.
- Please note that the mains socket you are using must be installed near the Cleanroom systems and be easily accessible.
- Be attentive and careful when connecting. Only connect the Cleanroom systems if you are able to concentrate properly or if you are not at risk of fainting.

The mains plug must not be subjected to mechanical stress such as tension or overstretching, nor be allowed to fall. Damage to the mains plug can lead to complete failure of the Cleanroom systems.

- Contact the manufacturer before using an adapter or extension cable.
- Only use damage-free mains plugs, power cables, accessories or other peripheral devices. Contact the manufacturer or an electrician if parts are damaged.
- To avoid interference only use shielded cables to connect the components. Failure to comply will invalidate the authorisation to operate the Cleanroom systems.
- Before performing the electrical installation, check the Cleanroom systems and the cable for damage. In the event of visible damage, strong odours or excessive heating of components, the power supply must be disconnected immediately and the Cleanroom systems must not be used.
- Only connect the Cleanroom systems to an earthed socket with a residual current circuit breaker that is connected in accordance with the legal guidelines.
- Protect the mains cable from overloading, crushing or kinking and place it in such a way that people cannot trip over it. Take particular care to avoid damaging the plug and the point where the cable exits the Cleanroom systems.
- Use the Cleanroom systems with a suitable, properly installed and easily accessible mains socket. Make sure that the Cleanroom systems can be disconnected from the mains at any time.
- Make sure that the plug is fully inserted into the socket.
- ► Never touch the plug with wet hands.
- Protect disconnected plugs from rain and keep them away from moisture.
- The plug must match the socket. Never modify the plug in any way. Unmodified plugs and matching sockets reduce the risk of electric shock.
- Only use the Cleanroom systems when they are installed correctly and completely. Be aware that the manufacturer cannot be held responsible for any property damage and / or personal injury resulting from incorrect installation of the Cleanroom systems.
- Please note that there is no fixed sequence for connecting the cables. However, Spetec recommends connecting the control cables first and then the IEC plug for the 230 V power supply.
- Please note that the maximum power consumption of the light output and the mains output is 200 W and that this value must not be exceeded.



For the connection to the power supply, the relevant VDE provisions and technical connection provisions (TAB) of local electricity supply companies must be taken account of (applies in Germany).

#### 5.5.1.1 Plug connections



#### Plug-in connections SuSi cleanroom system

Figure 27: Plug-in connections SuSi cleanroom system

- 1 7-pin plug / connection exclusively to the secondary or cable remote control
- 2 Light output (3-pin)
- 3 Mains output (3-pin)
- 4 Power supply
- 5 Device fuse
- 6 PLC connection (12-pin)\*

#### NOTICE

- Please note that a maximum of 200 W may be connected to the light and mains output.
- a) If required, connect several modules (7-pin / remote connection).
- b) If necessary, connect an IEC plug to the light output.
- c) If necessary, connect an IEC plug to the mains output.
- d) Connect the supplied IEC power cable to the power supply.
- e) Plug the power supply cable into a vacant socket.

The cleanroom system is ready for operation.

i

\*PLC connection can be optionally installed at the time of purchase. Please refer to the additional instructions.

The PLC connection is located in the cable remote control on a primary device.

#### SuSi plug types

There are three different plug types with four different functions:

- 7-pin plug:
   For connecting the cable remote control and modules to each other.
- 12-pin plug: For connection to PLC interface.
- 3-pin plug:
   Function 1 LED lighting:
   Connection 24 V supply voltage of the LED lighting

Function 2 Ioniser: Supply voltage connection

#### Basic cleanroom system plug connection



Figure 28: Basic cleanroom system plug connections

- 7 Remote connection
- 8 Device fuse
- 9 Power supply
- a) Connect the supplied IEC power cable to the power supply.
- b) Plug the power supply cable into a vacant socket.

The cleanroom system is ready for operation.



Only downstream devices or a wired remote control may be connected to the rear of the devices.
#### 5.5.1.2 SuSi cleanroom system versions

There are three versions of the SuSi device:

- Standard module:
   The operating terminal is installed in landscape format in the housing of the appliance.
- Primary Module:

Does not have an operating terminal in the housing, but an external cable remote control and control cable (5 m). Several secondary modules of the same size can be controlled with one primary module.

Secondary module:
 Without control unit, with control cable (3m). A maximum of 50 secondary modules can be connected to one primary module.

The type plate indicates which variant is involved (without labelling = standard module).

#### Standard module:

The operating terminal is located in the housing.



Figure 29: Standard module housing

#### **Primary Module:**

operating terminal via cable remote control. The cover plate has an open hole.



Figure 30: Standard module housing

#### Secondary module:

operating terminal via cable remote control. The cover plate has a closed hole (white plug).





#### 5.5.1.3 Connection options for the SuSi cleanroom system

Up to 50 modules can be connected. Only one standard module or one primary module may be present in the entire system; all subsequent modules must be secondary modules.

#### **Connection option 1:**

- 1x standard module and up to 50x secondary modules



Figure 32: Connection option 1 SuSi cleanroom system

#### **Connection option 2:**

- 1x primary module and up to 50x secondary modules



Figure 33: Connection option 2 Cleanroom system SuSi

# 6 Commissioning

# 6.1 Safety measures before commissioning

# WARNING

#### Danger of injury due to lack of space!

A risk of injuries such as scratches, puncture wounds or broken bones exists if work equipment and/or components are arranged too closely together!

- Select the place of deployment of the Cleanroom systems in such a way that the personnel has the necessary room to move around without hindrance or restriction in the operation area.
- ► Only have commissioning carried out by specialist personnel.
- ► Cordon off the danger zone.
- ► Keep unauthorized persons away.
- ► Specify a person in charge.
- Lay energy supply lines without creating trip risks or barriers (e.g. under covers).
- Mark places where there are trip risks.

# DANGER

# Danger to life due to residual voltage in the fan motors caused by capacitors!



Touching the fan motors can lead to death or serious injury!

- ► Do not touch any metal parts.
- Only carry out conversions and maintenance with the cleanroom systems switched off and secured against being switched on again.
- Make sure you are sufficiently acquainted with
  - the operating and control elements of the Cleanroom systems,
  - the equipment of the Cleanroom systems,
  - the working method of the Cleanroom systems,
  - the immediate environment of the Cleanroom systems,
  - the safety systems of the Cleanroom systems,
  - the measures to be taken in case of emergency.

- Carry out the following activities before initial commissioning or subsequent repeat commissioning:
  - Check and ensure that all safety systems have been attached and are functioning.
  - Check the Cleanroom systems for visible damage; rectify any defects immediately or report them to the supervisory staff - the Cleanroom systems may only be operated when in perfect condition.
  - Check and ensure that only authorized personnel are present in the operating area of the Cleanroom systems and that no other persons could be put in danger by the start-up of the Cleanroom systems.
  - Remove all objects and other materials from the operating area that are not necessary for operation of the Cleanroom systems.
  - Keep a commissioning log.

# 7 Operation

# 7.1 Safety measures in normal operation

# DANGER

#### Risk of electrocution!



Failure to observe this will lead to death or severe injury!

- ► Do not touch any live parts!
- ► Do not attach any grounding to mechanical connecting elements.
- ▶ Observe the safety instructions in chapter "2 Safety".
- ► Start the Cleanroom systems only from the specified position.
- Do not remove or disable any safety devices during operation of the Cleanroom systems.
- Stay outside of enclosures while the Cleanroom systems is in operation.
- Ensure that only authorised persons are present in the area of deployment of Cleanroom systems.

# 7.1.1 General inspection activities

- Carry out the following inspections once a day:
  - Check the Cleanroom systems for externally detectable damage.
  - Check the functionality of all safety devices.

# 7.1.2 Inspection activities for electrical lines

- Carry out the following inspections once a day:
  - Check that all electrical cables are connected correctly.

# 7.2 SuSi Cleanroom systems

NOTICE

► Contact customer service if the display shows "call service".

#### Display



Figure 34: LCD display, four lines

- 1 Type designation
- 2 Speed level
- 3 Flow velocity display in m/sec
- 4 Operating hours display / call service

### Settings

Key	Function	Explanation		
+	Increase flow velocity	<ul> <li>Flow speed can be adjusted in stages.</li> <li>The display shows: eco, 0.25 m/s, 0.30 m/s, 0.35 m/s, 0.40 m/s; 0.45 m/s, 0.50 m/s, max. speed: 0.50 m/s.</li> </ul>		
-	Reduce flow velocity	<ul> <li>Flow speed can be adjusted in stages.</li> <li>The display shows: eco, 0.25 m/s, 0.30 m/s, 0.35 m/s, 0.40 m/s; 0.45 m/s, 0.50 m/s, max. speed: 0.50 m/s.</li> </ul>		
max	Flow velocity max.	<ul><li>Fan rotates at maximum speed.</li><li>The cleanroom system is flushed.</li></ul>		
есо	Flow velocity min	<ul> <li>Cleanroom system is set to nighttime reduction.</li> <li>Fan runs gently to flush the cleanroom system with air continuously.</li> </ul>		
filter	LED main filter change	The main filter must be replaced.		
error	LED malfunction	There is a malfunction in the cleanroom system.		
light	Lighting on / off button	Switching the output light on / off. – LED lights up, output light is switched on.		
power	Mains on / off button	<ul> <li>Switching the fan on / off.</li> <li>LED lights up, cleanroom system is supplied with power.</li> </ul>		



Recommendations:

- eco = nighttime reduction
- Level 0.45 m/s = laminar air flow
- Level 0.3 0.4 m/s = recommended working range
- Level 0.5 or max. is for quickly rinsing the appliance.

# 7.3 Basic cleanroom systems

#### **Control elements**



#### Figure 35: Basic 1 controls

1 Mains on / off switch



Figure 36: Basic 2 controls

2 Setting the flow velocity

Function	Explanation
Mains on / off switch	Switching the fan on / off
Setting the flow velocity	Ungraduated regulation of the flow rate

# 7.4 Cleanroom systems from the EFBS, EFBS-V and EBS Series

#### **Control elements**



Figure 37: Operating elements EFBS, EFBS-V and EBS Series

- 1 Mains on / off switch
- 2 Setting the suction power

Function	Explanation	
Mains on / off switch	Switching the fan on / off	
Setting the suction power	Ungraduated regulation of the suction	
	power	

### NOTICE

- Please note that no mechanical or activated charcoal filters are installed in the appliance.
- Make the connection to the internal building extraction system or route the connection outside. Pay attention to the currently valid environmental regulations.
- Please note that the Exhaust (Protection) Box has no explosion protection.
- Please note that the extraction system does not guarantee personal protection.

# **Eliminate faults/errors**

# A WARNING

#### Hazards are posed by the Appliances during troubleshooting!

Failure to observe the instructions may result in damage, malfunctions, or total failure of the Cleanroom systems as well as impairment of the safety of Cleanroom systems.

- Disconnect the Cleanroom systems from all power sources before troubleshooting.
- ► Disconnect the mains plug of the cleanroom system before opening it.
- ► Have troubleshooting carried out only by qualified personnel.

# 8.1 Errors and corrective measures

 Contact customer service in the event of errors in the control unit or electronics.

Faulty supplier parts

► In the event of faults with purchased supplier parts, refer to the manufacturer's documentation.



8

Error/Fault	Cause	Corrective measure	
	Mains voltage not provided	Check mains voltage	
Device cannot be switched on	Fuses defective	Check fuse and replace if necessary	
	Error in the electronics	Repair by the manufacturer	
Individual laminar flow modules cannot be switched on	Fuse defective	Check fuse and replace if necessary	
Light cannot be switched	Fuse defective	Check fuse and replace if necessary	
on	Bulb defective	Replace light sources	
Unusual noise	Bearing damage to a fan	Contact customer service	
development	Balancing weights falling from the centrifugal fan	Contact customer service	
	Obstruction of the air inlet	Check the intake area and the exhaust air duct	
Not enough inter capacity	Main filter is clogged	Order main filter replacement	
Display reads "call service"	Maintenance must be carried out in accordance with the chapter "9.2.7.2"	Please contact customer service	
Filter dirty indicator lights up	The main filter is clogged	Please change the main filter	
ERROR indicator lights up	An error has occurred in the system	Please contact customer service	

# 9 Maintenance and cleaning

# 9.1 Safety measures during maintenance

### DANGER





- Touching the fan motors can lead to death or serious injury!
- ► Do not touch any metal parts.
- Only carry out conversions and maintenance with the cleanroom systems switched off and secured against being switched on again.

# 9.1.1 General safety measures during maintenance

Carry out the prescribed maintenance work such as cleaning, maintenance and inspections in good time. Irregular maintenance shortens operational and service life.

- ► Read chapter "2 Safety".
- Cordon off access to the area of deployment of the Cleanroom systems. Ensure that only authorised persons are present in the area of deployment of the Cleanroom systems.
- Ensure that suitable lifting gear and load-bearing equipment is available for replacing larger Appliancesparts.
- Only work on low-lying parts in a squatting position, not bent over. Carry out work on high-up parts with an upright, straight posture.
- Exchange all Appliances parts that are not without fault immediately.
- Only use original accessories and spare parts. The use of other parts will void the warranty and suitability for use and may lead to injury.
- Make sure that suitable collection containers are available for all substances hazardous to groundwater (Lubricants and cleaning fluids).

After completing maintenance work and before using the Cleanroom systems, carry out the following tasks:

- Re-check that all previously loosened bolt connections are tight.
- Check that all previously removed safety systems, covers, housing plates and any other components have been properly re-mounted.
- Make sure that all tools, materials and other equipment used have been removed from the area of deployment.
- Clean the area of deployment. Remove any liquids and similar substances that may have leaked.

Ensure that all safety systems of the Cleanroom systems are still completely functional.

# 9.2 Inspection and maintenance work

# 9.2.1 Maintenance intervals

Maintenance location	Maintenance work	See section
Daily		
Complete cleanroom system	Visual inspection	9.2.3.1
Complete cleanroom system	Cleaning	9.2.3.2
Weekly		
Complete cleanroom system	Cleaning	9.2.4.1
Complete cleanroom system	Visual inspection of warning and information signs	9.2.4.2
Monthly		
Complete cleanroom system	Visual inspection of cable connections	9.2.5.1
Complete cleanroom system	Visual inspection of bolt connections	9.2.5.2
Annually		
Complete cleanroom system	Check bolt connections	9.2.6.1
Filters	Check, replace if necessary	9.2.6.2
Special maintenance intervals		
Electrical equipment	Safety check	9.2.7.1
Complete cleanroom system	Spetec Service	9.2.7.2

# 9.2.2 **Preparatory electrical measures**

# A DANGER

#### Risk of fatal injury due to electrocution!

Live parts can lead to electrocution or severe injury when touched.

- Only allow work on the electrical equipment to be carried out by a qualified electrician who is specially trained for work on electrical equipment and who can recognise and avoid dangers.
- Before carrying out maintenance and inspection work on the Cleanroom systems, switch off the power supply to the Cleanroom systems.
- Disconnect the mains plug of the cleanroom system before opening it.
- Secure the Cleanroom systems against an unexpected restart by locking the main switch with a padlock.
- Attach a sign to the main switch to warn against it being switched on again.
- Please note that electrical and electronic components must not be cleaned.

# 9.2.3 Maintenance – daily

#### 9.2.3.1 Visual inspection

- a) Check the Cleanroom systems for
  - mechanical damage,
  - damaged seals,
  - degree of soiling of the pre-filter,
  - dirt deposits and
  - unusual sounds.
- b) Report damage immediately to a superior.



#### 9.2.3.2 Cleaning

### NOTICE

Never clean the acrylic glass panes and strip curtains with household cloths, as these will scratch the surface.

Regular maintenance and observance of a few basic requirements will ensure troublefree operation and a long service life.

When cleaning the Cleanroom systems, proceed as follows:

- a) Only clean the outside of the housing with a damp cloth. Do not use a water jet.
- b) Do not use harsh, abrasive or solvent-based cleaners.
- c) Make sure that no moisture gets into the appliance.
- d) Use special cleaning cloths suitable for cleanrooms to clean the inside of the appliance in order to avoid contamination with particles.

#### Cleaning and disinfecting devices in cleanroom technology

For the cleaning and disinfection of equipment used in cleanroom technology and made of materials such as anodised aluminium, acrylic glass, PVC curtain strips, TPE curtain strips, aluminium composite panels and aluminium sheet, specific cleaning agents and wipes should be used that are safe and effective and do not damage the materials.

#### **Cleaning cloths:**

- Microfibre cloths:
  - Features: Lint-free, antistatic, soft and gentle.
  - Utilisation: For general cleaning of surfaces.
- Disposable cleaning cloths:
  - Features: Lint-free, pre-soaked with cleaning solution or dry.
  - Utilisation: Ideal for single use to avoid cross-contamination.

#### **Cleaning agents:**

- Mild soap solution:
  - Composition: Water and a mild, non-abrasive soap.
  - Utilisation: General cleaning of anodised aluminium, aluminium sheet and PVC curtain strips.
- Isopropyl alcohol (IPA) 70%:
  - Properties: Fast drying, effective against a wide range of micro-organisms.
  - Utilisation: Cleaning and disinfection of anodised aluminium, aluminium sheet, aluminium composite panels, acrylic glass, PVC and TPE curtain strips. (Attention: May damage acrylic glass if used too frequently).
- Hydrogen peroxide (3%):
  - Properties: Efficient disinfectant.

- Utilisation: Cleaning and disinfection, especially for acrylic glass, aluminium composite panels and TPE. In the case of aluminium sheet and anodised aluminium, the exposure time should be kept short and the surfaces thoroughly wiped.
- Quaternary ammonium compounds (quats):
  - Properties: Effective against bacteria and viruses.
  - Utilisation: For disinfecting anodised aluminium, aluminium sheet and PVC.

# NOTICE

#### Instructions for cleaning and disinfection:

- Preparation: Remove coarse dirt and dust with a dry microfibre cloth before using a damp cloth or cleaning agent.
- ► Application: Apply the cleaning agent to a cloth, not directly to the surface. Wipe the surface evenly.
- ► **Post-cleaning:** After cleaning, wipe the surfaces with a slightly damp cloth to remove any cleaning agent residue.
- Drying: After cleaning, dry the surfaces with a clean, dry microfibre cloth to avoid water stains.
- Frequency: Clean and disinfect the devices regularly after use or as required, based on the frequency of use and the type of contamination.

#### Additional information:

- Compatibility: Test the cleaning agents and disinfectants on a small, inconspicuous area of the materials to ensure that no damage or discolouration occurs.
- Safety regulations: Follow the cleaning agent manufacturer's safety instructions and wear suitable personal protective equipment (gloves, safety goggles).
- ► **Disposal:** Dispose of used disposable cloths and cleaning solutions in accordance with the applicable regulations for hazardous waste.

These recommendations help to ensure the longevity and functionality of your appliances while maintaining high hygiene standards in clean room areas.

# 9.2.4 Maintenance – weekly

#### 9.2.4.1 Cleaning

#### NOTICE

Never clean the acrylic glass panes and strip curtains with household cloths, as these will scratch the surface.

Regular maintenance and observance of a few basic requirements will ensure troublefree operation and a long service life.

When cleaning the Cleanroom systems, proceed as follows:

- a) Only clean the outside of the appliance housing with a damp cloth. Do not use a water jet.
- b) Do not use harsh, abrasive or solvent-based cleaners.
- c) Make sure that no moisture gets into the appliance.
- d) Use special cleaning cloths suitable for clean rooms to clean the inside of the appliance in order to avoid contamination with particles.
- e) Observe the additional notes in the chapter "9.2.3.2 Cleaning".
- 9.2.4.2 Visual inspection of warning and information signs
  - a) Check all warning and information signage on the Cleanroom systems for completeness and legibility.
  - b) Report damage immediately to a superior.
- 9.2.5 Maintenance monthly
- 9.2.5.1 Visual inspection of cable connections
  - a) Check all cable connections are tight.
- 9.2.5.2 Visual inspection of bolt connections
  - a) Checkthat all bolt connections on the Cleanroom systems are tight.
  - b) Tighten loose bolt connections (bolt-tightening torque according to the bolt size and strength class).

# 9.2.6 Maintenance – annual

- 9.2.6.1 Check bolt connections
  - a) Check that all bolt connections on the Cleanroom systems are tight.
  - b) Tighten loose bolt connections (bolt-tightening torque according to the bolt size and strength class).

# 9.2.6.2 Filter change



### 

#### Risk of injury due to voltage in the cleanroom system!

Failure to observe this can lead to death or severe injury!

▶ Disconnect the mains plug of the cleanroom system before opening it.

# 

#### Risk of injury from falling components!

Failure to observe this can lead to death or severe injury!

- ► Do not stand under the main filter when changing it.
- ► Only carry out the main filter change with two employees.
- Do not stand under suspended loads when servicing the clean room system.

### **WARNING**

#### Risk of injury from rotating components!

Failure to observe this can lead to death or severe injury!

- ► Do not reach into mechanically moving parts.
- Only carry out conversions and maintenance with the cleanroom systems switched off and protected against being switched on again.

#### Changing the pre-filter



Figure 38: Changing the pre-filter

- 1 Bolts (6 pieces)
- 2 Pre-filter with filter grille
- 3 Filter grille
- 4 Pre-filter
- a) Remove the bolts.
- b) Remove the pre-filter with the filter grille.
- c) Slide the pre-filter out of the filter grille.
- d) Insert the new pre-filter into the filter grille.
- e) Fit the pre-filter with the filter grille.

#### Changing the main filter for freestanding appliances

- NOTICE
   Do not change the main filter from below on floor-standing appliances. To carry out this operation, lift the laminar flow module upwards.
   Please note that to avoid damage to the main filter, the inner area of the
  - main filter must not be subjected to high loads over a small area.



Figure 39: Changing the main filter for freestanding appliances

- 1 Filter module
- 2 Main filter
- 3 Bolts
- a) Undo the inner bolts.
- b) Lift the filter module upwards.
- c) Remove the main filter.
- d) Insert the new main filter.
- e) Replace the filter module.
- f) Bolt the filter module together from the inside.

The laminar flow module can be put back into operation. After relaunch, a filter leak test in accordance with DIN 14644 is recommended.

Changing the main filter for clean room cells and suspended laminar flow modules

# WARNING

#### Risk of injury due to the main filter falling out!

Failure to observe this can lead to death or severe injury!

- ▶ Only undo the locking plates during installation and maintenance.
- ► Only carry out the main filter change with two employees.

# NOTICE

- Please note that the threaded rods must not turn with the wing nuts when they are turned.
- ► Hold the threaded rod in position using the star grip.

In cleanroom cells and suspended laminar flow modules, the main filter is changed from below. For this purpose, the profile frame can be lowered using a changing device and the main filter replaced.

a) Undo the three countersunk bolts shown.



Figure 40: Changing the main filter for cleanroom cells / suspended laminar flow modules - 1

1 Countersunk bolts

- b) Bolt in the changing device until the red mark is no longer visible.
- c) Check that the changing device for a tight fit.
- d) Loosen the remaining countersunk bolts.



Figure 41: Changing the main filter in cleanroom cells / suspended laminar flow modules - 2

- 2 Changing device
- e) Undo the wing bolts of the changing device alternately in steps of approx. 50 80 mm until the main filter can be removed.
- f) Insert the new main filter.



Figure 42: Changing the main filter for cleanroom cells / suspended laminar flow modules - 3

#### 3 Main filter

- g) Install the main filter in reverse order.
- h) Check the main filter for tight fit.

The laminar flow module can be put back into operation. After relaunch, a filter leak test in accordance with DIN 14644 is recommended.

# 9.2.7 Special maintenance intervals

#### 9.2.7.1 Electrical equipment

#### 

#### Risk of fatal injury due to electrocution!

Contact with live components can lead to electrocution or serious injury!



- Only have work on the electrical equipment carried out by a qualified electrician.
- Before all maintenance and inspection works, switch off the Cleanroom systems.
- a) Carry out the preparatory measures.
- b) Carry out the safety inspection as per specific local rules and guidelines.

#### 9.2.7.2 Service by Spetec

Regular maintenance is required to ensure consistent functioning and quality of the cleanroom system.

Annual maintenance of the cleanroom system by a service technician is recommended. If "call service" appears on the display, maintenance by a service technician is required.

The following work is carried out as part of this maintenance:

- Particle count according to EN ISO 14644-1
- Replacing the pre-filter
- Replacing the main filter if necessary
- Mechanical inspection and repair if necessary
- Certification with confirmation of the cleanroom class
- Indication of the measured particle count inside and outside the Spetec cleanroom system

### 9.2.8 Servicing third-party components

Further information on servicing work on third-party components can be found in the supplier documentation.

# **10** Decommissioning and disassembly

# 

Risk of serious injury due to improper decommissioning/disposal!

Failure to observe this can lead to death or severe injury!

- Only have disassembly work carried out by qualified or instructed personnel. Note that personnel must have practical experience in the maintenance and repair of the Appliances.
- ► Before disassembling, switch off the Cleanroom systems.
- Always wear the protective equipment required for the work in question (e.g. protective clothing, safety shoes, protective gloves and safety helmet).
- ► If in doubt, consult Spetec GmbH.

# 10.1 Decommissioning

# **10.1.1** Decommissioning the electrical systems

- a) Switch off the Cleanroom systems.
- b) Prevent or restrict access to the Cleanroom systems.
- c) Have the energy supply lines disconnected by suitably specialised personnel.

### **DANGER**

#### Risk of fatal injury due to electrocution!

When working on the electrical equipment, non-qualified personnel may be at risk of death!



- Only have work on the electrical system carried out by qualified electricians. Qualified electricians are specially trained for work on electrical equipment, know the dangers of electrical voltage and can independently avoid possible hazards by acting correctly.
- Before all decommissioning and disassembly work, switch off the Appliances.

# 

#### Risk of fatal injury due to unintentional restart and electric shock!

Unintentional restart and electric shock can lead to severe injury or death!

Only have the decommissioning work carried out by authorised and qualified specialist personnel.



- ► Apply the 5 safety rules:
  - 1. Disconnect from power.
  - 2. Secure against switching on.
  - 3. Check for zero potential.
  - 4. Gounding and short-circuit.
  - 5. Cover or cordon off neighbouring live parts.

# 10.2 Disassembly

# 

#### Danger due to disassembly work!

During disassembly there is a risk of injuries such as scratches, cuts or crushing!

- Only have disassembly work carried out by instructed and authorised personnel.
- Always wear the protective equipment required for the work in question (e.g. protective clothing, safety goggles, safety shoes and safety helmet).

### **WARNING**

#### Risk of injury due to components arranged too closely together!

A failure to observe this can lead to severe injury!

- ► Cordon off the danger zone.
- ► Keep unauthorised persons out of the danger zone.
- ► Specify a person to be in charge of dismantling work.
- Always wear the protective equipment required for the work in question (e.g. protective clothing, safety goggles, safety shoes and safety helmet).

# **10.2.1** Disassembly at great heights

# A WARNING

#### Risk of injury due to falling from a great height!

Failure to observe this will lead to death or severe injury!

- Only allow instructed and authorised personnel to carry out work at great heights.
- Use fall protection.

# 10.3 Disposal

# A WARNING

#### Risk of environmental pollution/waste of resources!

A failure to observe this can lead to harm to the environment!

- Only have disposal work carried out by instructed and authorized personnel.
- Separate the materials and packaging waste according to type and have them recycled. Recycle the materials labelled with a recycling symbol. The packaging is made from various materials that can be disposed of at your local recycling centre. By disposing of the packaging correctly, you help to avoid potential risks to the environment and public health.
- ► Observe local recycling regulations.
- Please note that the pre- and main filters must be disposed of by the operator.
- Please note that the clean room system without pre- and main filters can be disposed of in recycling plants.
   The disposal number (EAR number) is:

EN 66147005

# **10.3.1** Disposal of electrics

#### **WARNING**

#### Risk of environmental pollution/waste of resources!

A failure to observe this can lead to harm to the environment!

- Only have disposal work carried out by instructed and authorized personnel.
- Disconnect electrical and electronic components in accordance with Directive 2012/19/EU.



# 

#### Risk of environmental pollution/waste of resources!

A failure to observe this can lead to harm to the environment!

 Only have disposal work carried out by instructed and authorized personnel.



Do not dispose of Appliances with household waste. They are subject to the Hazardous Waste Ordinance. For this reason, please dispose of Appliances at a local collection point for the recycling of waste electrical and electronic equipment. Do not attempt to open the Appliances.

# 10.3.2 Disposal of auxiliary and operating materials

### 🛕 WARNING

#### Risk of environmental pollution/waste of resources!

A failure to observe this can lead to harm to the environment!

- Only have disposal work carried out by instructed and authorized personnel.
- Dispose of cleaning products and auxiliary materials used to clean the Appliances in accordance with local provisions and taking account of the information in the manufacturer's safety data sheets.
- ► Collect and separate liquids (if applicable).
- Ensure that auxiliary and operating materials do not get into the groundwater, bodies of water or the sewage system.
- ► Dispose of auxiliary and operating materials in accordance with the applicable regulations or, if necessary, contact Spetec GmbH.



# 11 Appendix

# 11.1 EC Conformity Declaration

On the following pages you will find the EC Conformity Declaration for these Appliances and the appended documents.

CE

# **EC Conformity Declaration**

(translated conformity declaration)

Manufacturer / authorized representative:	Spetec GmbH Am Kletthamer Feld 15 85435 Erding
Person authorized to compile the technical documents:	Spetec GmbH Am Kletthamer Feld 15 85435 Erding
Product:	Cleanroom systems
Device number:	See type plate
Function:	The cleanroom system is used to create and maintain a controlled clean environment in private, public, industrial and research facilities.

We herewith declare that the above-mentioned Appliances is in accordance with all applicable regulations in the Machinery Directive 2006/42/EC.

Further applied directives and harmonized standards:

- EMC Directive 2014/30/EU
- The safety objectives of the Low Voltage Directive 2014/35/EU have been complied with as per Annex I, No. 1.5.1 of the Machinery Directive
- RoHS Directive 2011/65/EU
- REACH Regulation No. 1907/2006
- EN ISO 12100
- EN 60204-1
- EN 60335-1
- EN 61000-6-2, -6-4
- EN ISO 13857

aul Ste

Christian Brandl, Projektleiter

85435 Erding, 26.02.2025

# **11.2** Spare parts list

Identifier	Item No.
Microfuse T 1.60 A	40-0040 acid fume cupboard
Microfuse T 3.15 A	40-0070 (size 24 to 112)
Device supply line	42-0025
Centrifugal fan	22-0203
Front assembly incl. display	06-0053
Front assembly Primary	06-0051
Rear assembly Primary	06-0050
Rear assembly Secondary	06-0052
Cable remote control	11-0499
H14 Filter FMS 24	11-0302
H14 Filter FMS 37	11-0303
H14 Filter FMS 56	11-0304
H14 Filter FMS 75	11-0305
H14 Filter FMS 93	11-0306
H14 Filter FMS 112	11-0307
Replacement pre-filter incl. filter grille	11-0622
Replacement pre-filter without filter grille	11-0623
Pre-filter fleece for stainless steel pre-filter grille	11-0635
Device for changing the main filter	11-0106

# 11.3 Maintenance manual

Device / room: \_\_\_\_\_

Serial number: \_\_\_\_\_

1. Maintenance in	nterval			
Visual inspection			□ YES	□ NO
Functional inspection			□ YES	□ NO
Pre-filter change			□ YES	□ NO
Main filter change			□ YES	□ NO
Particle measurem	ent		□ YES	□ NO
Other:			□ YES	□ NO
Operating hours:				
Order number:				
Note:				
Carried out:	Name:	Date:	Stamp / signature:	
2. Maintenance in	nterval			
Visual inspection			□ YES	□ NO
Functional inspection	on		YES	□ NO
Pre-filter change				□ NO
Main filter change			□ YES	□ NO
Particle measurem	ent		YES	□ NO
Other:			□ YES	□ NO
Operating hours:				
Order number:				
Note:			·	
Carried out: Name: Date:		Stamp / signature:		

11.3 Maintenance manual

3. Maintenance interval			
Visual inspection			□ YES □ NO
Functional inspection			□ YES □ NO
Pre-filter change			□ YES □ NO
Main filter change			□ YES □ NO
Particle measurement			□ YES □ NO
Other:			□ YES □ NO
Operating hours:			
Order number:			
Note:			
Carried out:	Carried out: Name: Date:		
4. Maintenance interval			
Visual inspection			□ YES □ NO
Functional inspection			□ YES □ NO
Pre-filter change			□ YES □ NO
Main filter change			□ YES □ NO
Particle measurement			□ YES □ NO
Other:			□ YES □ NO
Operating hours:			
Order number:			
Note:			
Carried out:	Name:	Date:	Stamp / signature:
5. Maintenance interval	l	l	
Visual inspection			□ YES □ NO
Functional inspection			□ YES □ NO
Pre-filter change			□ YES □ NO
Main filter change			□ YES □ NO
Particle measurement			□ YES □ NO
Other:			🗆 YES 🗆 NO
Operating hours:			
Order number:			
Note:			
Carried out:	Name:	Date:	Stamp / signature:

# 11.4 Appended documents

The following documents are appended to this operating manual:

# **11.4.1** Manufacturer documentation of the purchased components

The appendices to the operating manual consist of the following documents:

- Manufacturer documentation of the purchased components

