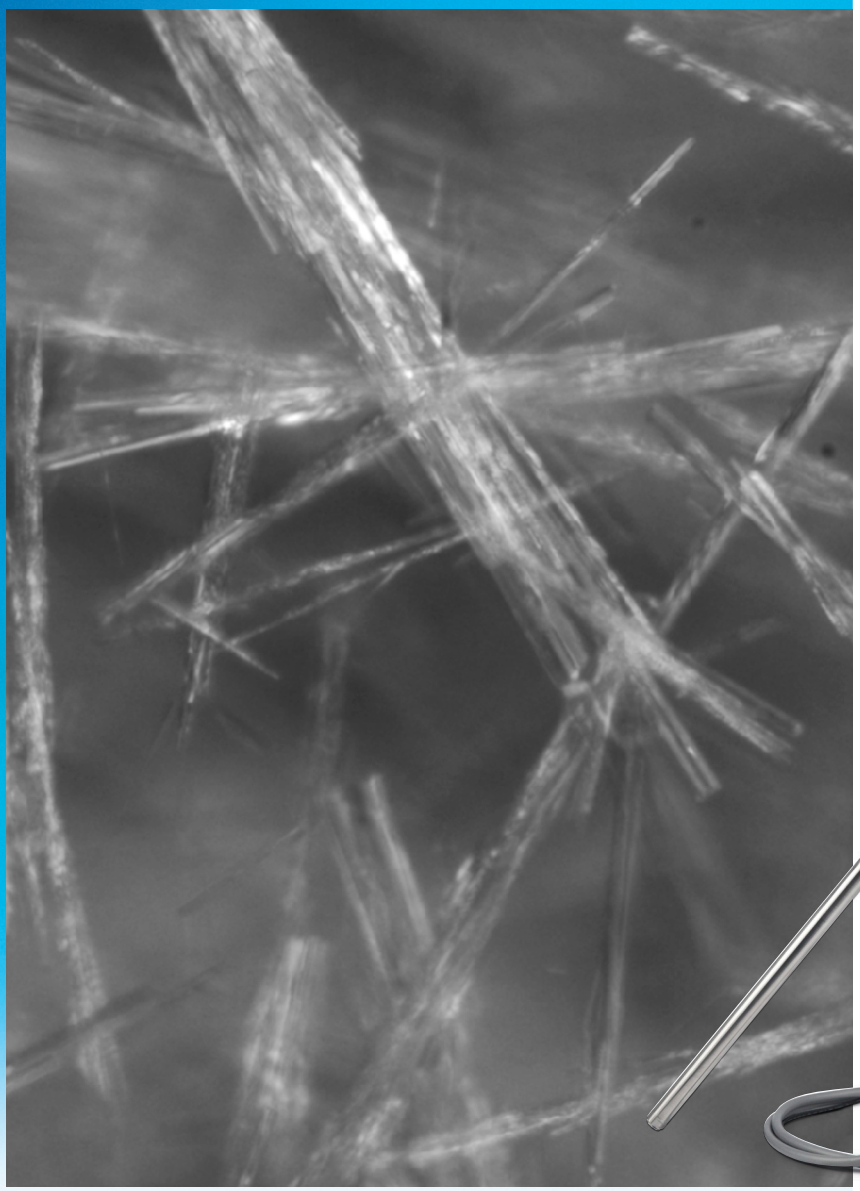
Safety Manual



February 2015

MK-PB-0113-AC Rev A

DCN 2303

ParticleView™ V19

View Particles in Real Time

METTLER TOLEDO

Copyright and Trademarks

3 February 2015

METTLER TOLEDO probes with Focused Beam Reflectance Measurement (FBRM®) technology are covered by patents or pending patents including:
USPN 6,449,042
USPN 6,940,064
USPN 8,468,642

Address comments to:
Mettler-Toledo AutoChem, Inc.
7075 Samuel Morse Drive
Columbia, MD 21046
Tel: + 1 866.333.6822
Fax: +1 410.910.8600
www.mt.com/pvm
For technical support, contact: AutoChemCustomerCare@mt.com

In conformance with the European Directive 2002/96/EC on Waste from Electrical and Electronic Equipment (WEEE), this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed onto other parties for private or professional use, the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

Contents

Contents

1

Introduction

Caution—Read this safety manual before ParticleView™ V19 installation, operation, and maintenance. Failure to follow the instructions and caution/warning statements in this manual could result in personal injury and/or product damage that could void the warranty.

This safety manual supplements the "ParticleView V19 Hardware Manual."

Per the ISO 9001 procedures followed at METTLER TOLEDO, the ParticleView V19 system adheres to applicable regulations and standards in the area of intended use. Requirements for compliance with local regulations may be different. The end user of the equipment is responsible for compliance with all local, corporate, or other applicable regulations.

ParticleView V19—Intended Use of Equipment

The ParticleView™ V19 system with Particle Vision and Measurement (PVM®) technology is a probe-based instrument that visualizes particles and particle mechanisms in real time. High resolution images are continually captured under a wide range of process conditions without the need for sampling or manual offline analysis. The *in situ* instrument collects images for use during laboratory and scale-up campaigns. ParticleView V19 is an integrated solution that includes a probe (with interface unit) and control software.

The area of intended use:

- Non-explosive atmosphere
- Laboratory/scale-up applications such as under a fume hood
- Recommended purge requires instrument quality air

General Information

This section introduces the system configuration.

System Configuration

The ParticleView V19 configuration (Figure 1-1) includes the following components:

- **Instrument**—ParticleView V19 probe and interface unit
- **Power**—External power through USB 3.0 port on control computer
- **Communication**—USB 2.0 cable to USB 3.0 port
- **Control software**—iC PVM

A purge control unit is recommended to prevent condensation in the probe when wetted temperatures are below the dew point.

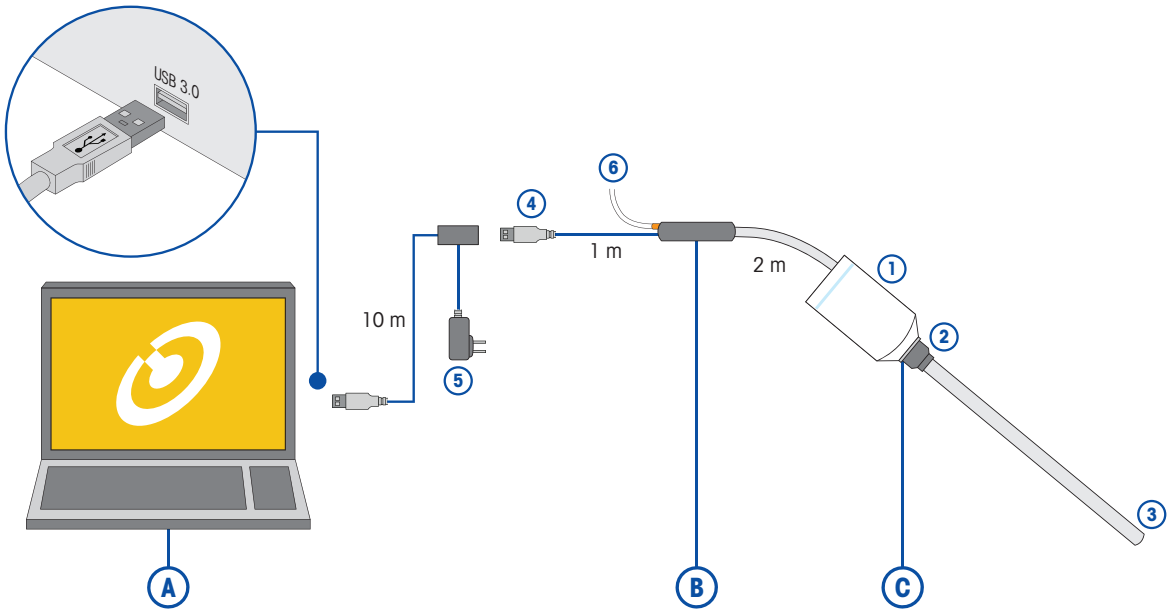


Figure 1-1 System configuration

A = iC PVM instrument control software
- **1** = Probe back end
- **2** = Probe flexible mounting adapter
- **3** = Probe sapphire window

B = ParticleView V19 interface unit
- **4** = Fixed USB cable (1 m)
- **5** = Powered USB 2.0 extension cable (10 m)
- **6** = Air inlet (optional)

C = ParticleView V19 instrument

Equipment Ratings

Table 2-2 on page 11 provides details on the probe that is inserted in the particle or droplet system and the probe back end that contains the camera and laser light sources. Table 2-1 on page 10 provides power, temperature, and optional air specifications for the interface unit.

Warnings, Cautions, and Notes

To help you recognize information related to equipment and user safety, the following symbols appear throughout this manual. Please pay particular attention to the sections marked by these symbols.

⚠	**WARNING**—Important safety information—Failure to observe the warning may result in serious personal injury or equipment damage.
⚠	**Caution**—Risk of danger. Important information that tells you how to prevent damage to equipment or avoid a situation that may cause minor injury.
Note:	Informational content that is distinguished to receive special attention.

Service and Technical Assistance

METTLER TOLEDO has offices around the world. Contact the Mettler-Toledo AutoChem, Inc. headquarters in the USA for technical support or service. To arrange specific application assistance from a METTLER TOLEDO Technology and Applications Consultant or for general assistance, contact Mettler-Toledo AutoChem, Inc. through the toll-free number below.

Mettler-Toledo AutoChem, Inc. (Columbia, MD headquarters) http://www.mt.com/PVM http://www.mt.com/iCPVM	Tel: **+ 1.410.910.8500** Fax: **+1.410.910.8600** Email: **AutoChemCustomerCare@mt.com** Toll Free: **+1.866.333.6822**

2

Safety Certifications and Specifications

This section identifies certifications and safety-related technical specifications and ratings for the ParticleView™ V19 instrument in laboratory and scale-up areas. The ParticleView V19 is fully compliant with the United States and International safety standards listed on the system label for operation in normal (unclassified) locations.

For installation, safe use, and maintenance information, refer to Chapter 3. For intended use of equipment and general system information, refer to Chapter 1.

Equipment Certifications

ParticleView V19 complies with the standards and certifications listed in this section.

Caution—The certification marks apply only to unmodified instruments supplied by METTLER TOLEDO.

Laser Classification

All ParticleView V19 instruments are in compliance with the U.S. Department of Health and Human Services (DHHS) Radiation Performance and in accordance with International Standards.

Class 1 Laser Product
Compliant with **DHHS 21 CFR 1040.10** and **1040.11**
except for deviations per Laser Notice 50 Dated June 24, 2007

CE Compliance (EMC and LVD)

ParticleView V19 systems have been tested and comply, as required, with the Electromagnetic Capability (EMC) Directive and Low Voltage Directive (LVD).

- **EMC Directive 2004/108/EC**
  Electrical equipment for measurement, control, and laboratory use:
  IEC 61326-1:2006
- **Low Voltage Directive 2006/95/EC**
  Safety requirements for electrical equipment for measurement, control, and laboratory use:
  EN 61010-1:2010

CB Scheme Certification

ParticleView V19 systems are certified to the following CB Scheme international standard under Certification Number (TUV) **DE 3-3890**.

- IEC 61326:2006
- IEC 61010:2010
- IEC 60825-1:2007

NRTL Certification

The ParticleView V19 is Nationally Recognized Testing Laboratories (NRTL) listed under Certificate Number **E113433**.

ParticleView V19 System Ratings

Below are safety specifications for the ParticleView V19 system probe and interface unit.

Probe

Table 2-1 ParticleView V19 Probe

Material of construction	
Probe (wetted)	**C22 alloy**
Probe window (wetted)	**Sapphire, TM (standard, no o-rings)**
Probe back end	**Aluminum, anodized and powder coated**
Probe cable (exterior)	**PVC, 80 °C Flame Retardant VW-1**
Cover (flexible mounting)	**Delrin**
Environmental conditions	
Operating Temperature Range, probe	**–80 °C to 120 °C [–112 °F to 248 °F]**
Pressure Range, probe	**0 barg to 10 barg [0 psig to 145 psig]**, standard **up to 100 barg [1450 psig]**, custom
Degree of Protection, Probe and back end	**IP65 and 4X**
Laser light source	
Laser classification	**Class 1**
Wavelength	**800 nm**
Status indicator	
Power and communication	**External LED on probe back end**

Interface Unit

Table 2-2 ParticleView V19 Interface Unit

Material of Construction	**Aluminum, anodized**
Electrical	
Power (via USB 3.0 on control computer)	**5 VDC, 1 A (maximum)**
Power (USB 2.0 powered extension cable to USB 3.0 port on control computer)	**100-240 VAC (auto-switching), 50/60 Hz, 0.3 A** includes three country-specific adapters
Communication	
USB cable (fixed, from interface unit)	**USB 2.0, 1 m [3.3 ft]**
USB powered extension cable (to USB 3.0 port on control computer)	**USB 2.0 Type A, male and female 10 m [32.8 ft]**
Environmental conditions: System is designed for Indoor laboratory or scale-up use.	
Operating Temperature Range	**0 °C to 40 °C [32 °F to 104 °F]**
Operating Humidity	**0 to 95% RH**
Air (Instrument quality for recommended purge)	
Inlet Air Pressure, Maximum	**3.4 barg [50 psig]**
Operating Pressure, Normal	**2.0 barg [30 psig]**
Operating Flow Rate, starting one (1) hour before use	**0.5 SLPM [0.02 SCFM]**

3

Safe Installation and Use

This section outlines the safe installation, use, and maintenance of the ParticleView™ V19 system. Review the information in Chapter 1, "Introduction" and Chapter 2, "Safety Certifications and Specifications".

Caution—In area of intended use, USB cable must be easily accessible for disconnecting the instrument power.

Instrument Installation

A qualified METTLER TOLEDO representative installs and commissions the ParticleView V19 instrument and trains key personnel on how to use the equipment and software.

Caution—Improper installation and operation of the ParticleView V19 can result in safety hazards.

System Inputs and Outputs

The ParticleView V19 system has two inputs: one that supplies USB power and communications and an optional purge air inlet to the interface unit (**B**). The interface unit controls power and purge to the probe (**A**) and provides USB communication between the probe and the control computer (not shown).

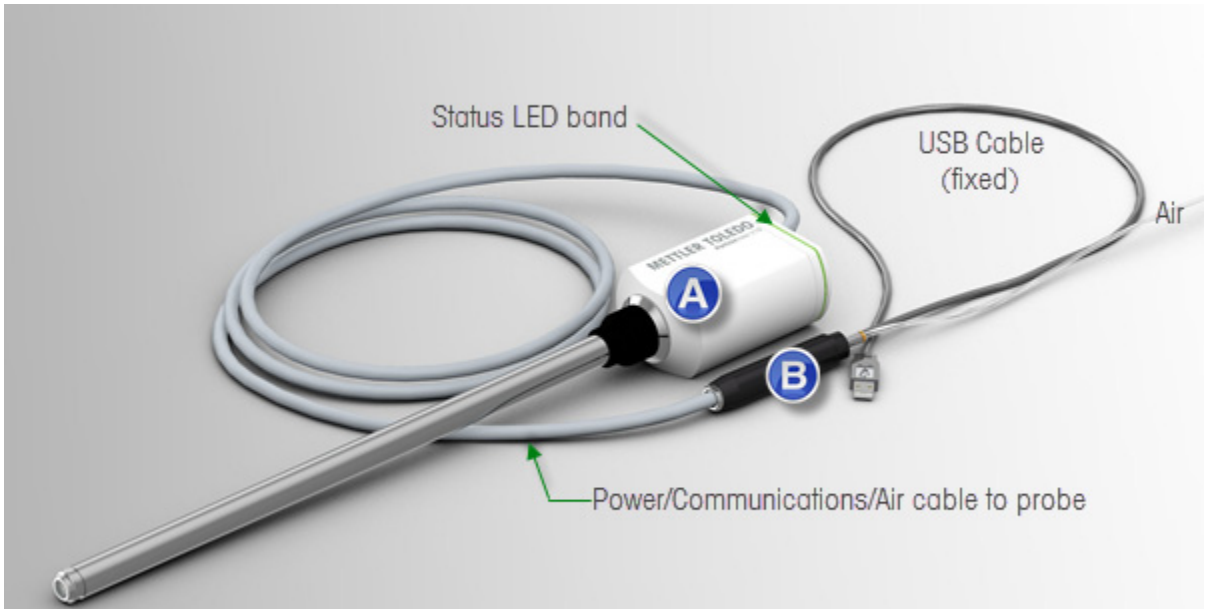


Figure 3-1 System configuration

Power Supply (USB)

ParticleView V19 is powered through the USB 3.0 port on the control PC. Table 2-2 lists the ParticleView V19 power specifications.

Earth Grounding

The ParticleView V19 USB cable includes an earth/ground wire.

Mounting

Caution—Locate the ParticleView V19 system where it is readily accessible to air supply, as needed.

Transport

Caution—Transport the ParticleView V19 instrument from one location point to another with care. The probe and interface unit contain sophisticated electronics and the probe back end contains a high-resolution camera and light sources.

Installation—Power/Communications/Air

Refer to Figure 3-1 for location of USB (power and communications) and air inputs on the ParticleView V19 interface unit.

1. Connect the USB cable from the interface unit to the 10-meter powered USB cable, supplied, and plug in the cable power supply.
2. Plug in the control computer.
3. Plug the USB cable into the control computer's 3.0 port. The LED band on the probe back end displays solid blue.
4. If purging the ParticleView V19 system in particle systems with temperatures below dew point where condensation could be a factor, connect instrument-quality air to the air inlet on the interface unit.

Note: A purge controller (14160068) is recommended and should always be used when probe temperatures are below dew point to prevent condensation in the probe.

Instrument Operation

This section provides instructions for starting and stopping the system along with general conditions for safe use.

Starting and Stopping the ParticleView V19 System

After the ParticleView V19 system has been installed and commissioned for use and the end users have reviewed this safety manual, start and stop the system, as follows:

To start the system:

- Power the control computer ON.The LED band on the interface unit (Figure 3-1) is solid blue when power is established.

- If using the optional purge for particle systems with temperatures below dew point, apply air and regulate pressure and flow per specifications (page 11).
- Start the iC PVM control software.The LED band changes to flashing green when communication is established.
  The ParticleView V19 system is ready for use. A two-minute warm-up period is recommended before recording images.

To stop the system—Remove USB cable from the control computer.

General Conditions for Safe Use

- Ensure all operators are properly trained to follow safe operating and maintenance procedures as documented for this instrument.

Caution—Do not attempt to disconnect the ParticleView V19 probe fixed cable from the interface unit. Doing so will cause permanent damage to the probe and will void the warranty.

Caution—If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

- Wear appropriate safety equipment during installation, operation, and maintenance, as outlined in your standard operation procedures.
- When not in use for extended periods of time, the probe and interface unit should be stored in the original shipping container.
- Review and follow the recommended maintenance safety.
- Always ensure product use conforms to all applicable local laws, regulations, and codes.

Instrument Maintenance

A certified METTLER TOLEDO Field Service Engineer performs recommended annual system maintenance according to the service package ordered.

WARNING—There are no user-serviceable parts in the system. Contact a METTLER TOLEDO Field Service Engineer (FSE) for all service needs.

Cleaning Instructions

The ParticleView V19 system is designed for indoor use in laboratory and scale-up locations. Follow the cleaning instructions below.

- Clean all exterior surfaces with water and mild detergent.
- The probe back end is tested to IP65 and 4X and easily cleanable with solvent such as ethanol, isopropyl alcohol, or soap and water.
- Be careful not to submerse the interface unit in washing liquid.
- To manually clean the window surface, use a medium such as water, alcohol, or acetone. Rinse and use a clean, dry Kimwipe© to remove the cleaning solution.

Instrument Service

METTLER TOLEDO recommends an annual service and preventive maintenance service inspection, based on the service contract. Information on available service packages is in the ParticleView V19 Hardware Manual. Contact AutoChem Customer Care for service (see "Service and Technical Assistance" on page 7).

Index

S

T

V

Learn More with our
Technical Webinar Program

Our on-demand webinars (online seminars) provide application and industry information relevant to you. These interactive presentations, provided by industry experts and our own applications team, give you an opportunity to learn more about your specific area of interest.

Topics include:

- Improving Crystallization and Precipitation Processes
- The Importance of Mixing in Process Development
- Avoiding Incidents During Scale-up
- Calorimetry Best Practices
- Characterization of Catalytic Hydrogenations
- Plus other applications including green chemistry, organic synthesis, fermentation, high pressure chemistry and more

www.mt.com/ac-webinars

www.mt.com/autochem

For more information

Mettler-Toledo AutoChem, Inc.
7075 Samuel Morse Drive
Columbia, MD 21046

Email autochem@mt.com

MK-PB-0113-AC Rev A