

# Fuel Condition Monitoring & Control Solutions



# Proven Laser Detection Technology

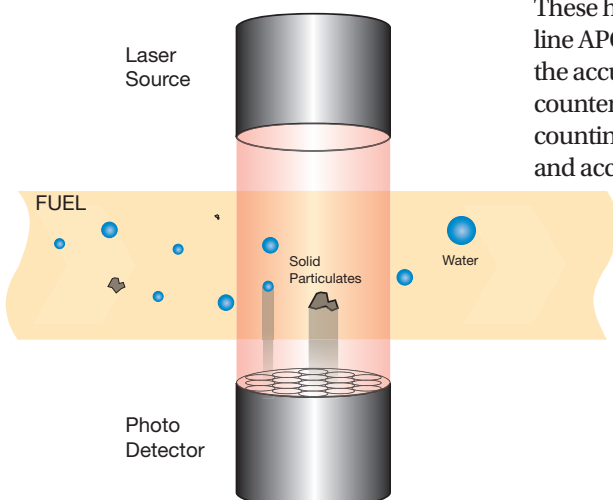
## Accurate and reliable detection of contaminants

Parker's IPM, VCA and icount products use technology based on proven principles of light obscuration, refraction and light scattering.

### PARTICLE COUNTERS

Particle counters, also known as Automatic particle counters (APC) measure the size and concentration of contaminants in fluids. Particle counters make use of a technology called light obscuration. All particle counters measure the size of particulates in microns (1 millionth of a meter).

Fluid is directed through a small chamber in the sensor called a flow cell. Light is passed through this chamber at 90 degrees to the fuel stream. Placed on the opposite side of the light source is a light sensitive detector. When a particle in the fluid stream passes the light source, it obscures the light from reaching the detector. This lack of light (or shadow created by the particle) can be measured and counted by the detector.



Parker's experience in developing laser light obscuration or blockage and applying that technology in portable particle counting and detection is what makes Parker's range of icount contamination analyzers so special.

APC's have been widely used for many years in condition monitoring. However, it is only recently that APC's have become flexible enough to enable the instruments to be taken out of the laboratory and used on-line in order to obtain the most credible form of results. Portability also allows for use over a wider range of applications and situations.

Parker has developed technology to ensure the APC was able to test a sample without the conventional laboratory technique which requires dilution - a practice that would have been simply impossible with a portable unit.

By careful design and window sizing, gravimetric levels as high as 310mg of dirt per litre, (equivalent to up to 4 million particles >6 micron per 100 ml), can be achieved without making the instrument susceptible to counter saturation.

These high saturation point on-line APC's, whilst losing none of the accuracy of their laboratory counterparts, enable particle counting to be carried out quickly and accurately.



Fig 1. In simple terms a controlled column of contaminated fluid enters the laser optical scanner chamber. This design maintains contamination distribution within the fluid.

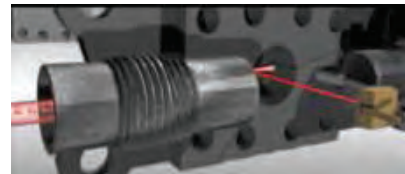


Fig 2. On reaching the photo diode cell, the highly accurate laser light is applied and projected through that oil column. The laser diode projects an image of the sample onto a photo diode cell.



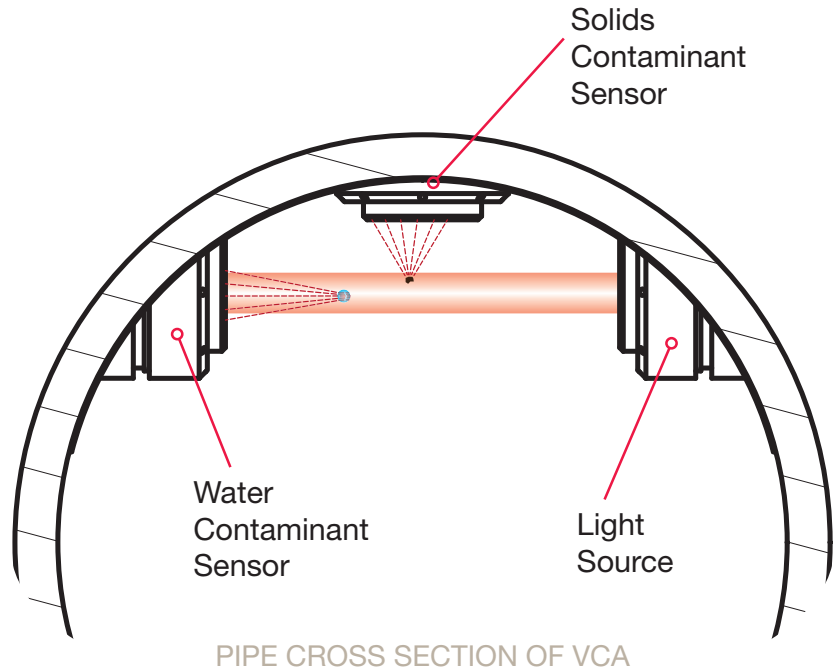
Fig 3. A cast image or shadow created by the contaminant in the oil creates a measurable change in the light intensity.

## VELCON CONTAMINANT ANALYZERS (VCA)

The Velcon Contaminant Analyzers measure the weight of solid particulate matter as well as the concentration of free water in a fluid. Contaminant analyzers use milligrams per liter (mg/l) to measure solid contaminants, and further use parts per million (ppm) to quantify free water contamination. Contaminant analyzers make use of light refraction technologies.

Focused light refracts differently when striking solid particles compared to free water droplets. A contaminant analyzer projects a laser beam across the full internal diameter of a pipe. Water droplets tend to scatter/refract light at low angles and produce a distinctive signature. Directly opposite the laser is a specialized water detection sensor to capture and measure this low angle refracted light and recognizable signatures.

In addition, located at 90 degrees to the laser beam is a solid contamination detection sensor. Solid particles tend to scatter light at right angles to a light source. Solid contaminants also produce a recognizable signature that can be quantified and measured by the specialized solid contamination sensor.



## COMPARISON OF CONTAMINANT SENSING TECHNOLOGIES

	Light Obscuration Technology	Light Scattering Technology
<b>Common Name</b>	Particle Counters	Contaminant Analyzer
<b>Brand Names</b>	icount, IPM	VCA (Velcon Contaminant Analyzer)
<b>Contaminant detection</b>	Solids	Solids and water
<b>Contaminant differentiation</b>	No	Yes
<b>Installation</b>	Online (feeds from sample port) Offline (bottle sampler)	In-line (part of the pipe) full flow
<b>Cost</b>	Low-Medium-High	Medium to High
<b>Compliant Standards</b>	ISO 4406 (1999), ISO 11171 (2009)	ASTM D2276, ASTM D5452
<b>Detection range</b>	>4 micron	> 1 micron



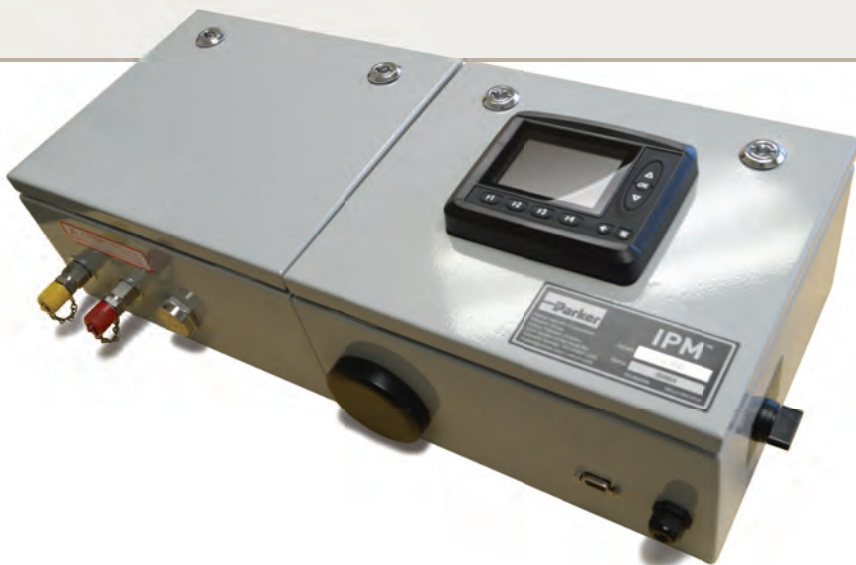
# Fuel Condition Monitoring

Solutions to ensure clean dry fuel



## Integrated Particulate Monitor (IPM™)

Fuel Particle Contaminant Analyzer  
for Fixed Installation



## icountACM20

Fuel Contamination Testing  
Wherever You Need





### FAST AND RELIABLE

In the past testing fuel quality has always been costly, time consuming, and done in laboratories. Some test can take days resulting in slow response to prevent poor quality fuel from contaminating components in expensive equipment. Although on-board filtration systems are in place to perform some filtration, these systems were not designed to deal with high contaminant levels.

As a result, strain on these systems leads to frequent maintenance and even bypass of contaminants. This results in costly downtime, repairs and/or replacements.

### THE VELCON SOLUTIONS

Velcon's line of fuel condition monitoring solutions range from fixed on-line systems such as the Velcon Contaminant Analyzer (VCA®) and Integrated Particulate Monitor (IPM™) to portable in-field systems such as the icountACM20, icountFS, and icountBSplus. All are designed to provide reliable accurate results in a short amount of time.

The VCA is an online monitoring system with the capability of detecting solid and liquid contaminants and can be configured to shut off flow when contaminant levels exceeds your define threshold. In addition, the telemetry option allows for remote

monitoring on a global scale via cellular network.

The icount particle analyzers are designed for monitoring and testing of solid contaminants. Velcon offers four types of system depending on your application needs. All products can be used as an on-line monitoring system or be completely portable while providing real-time or immediate results with the capability of storing of test results.

## icountBSplus

The Benchtop Solution to Fuel Bottle Sampling



## icountFS

Portable Condition Monitoring for Fuel Systems



## FDPM®

Flow Differential Pressure Module



## VCA®

Velcon Contaminant Analyzer On-Line Monitoring of Solid and Water Contaminants





# Integrated Particulate Monitor (IPM™)

## Fuel Particle Contaminant Analyzer for Fixed Installation

### DESCRIPTION

Parker Velcon IPM™ Series represents the most up-to-date technology in solid particle contamination analysis. The IPM is a compact, permanently-mounted laser-based particle detector module that provides a cost-effective solution to fluid management and contamination control.

The IPM-200 Series measures particle contamination continuously utilizing the Parker icountPD (iPD) technology, updates the display, and outputs ISO code values to an RS-232, CAN bus, or Cellular Data Acquisition Module.

The IPM-100 Series are design for integration into existing control systems.

The laser based, leading-edge technology is a cost effective market solution to fluid management and contamination control.

### BENEFITS

- Independent online monitoring of system contamination trends
- Cost effective solution in monitoring fuel cleanliness and reducing machine downtime
- LCD display with alarm output warnings (IPM-200 Series)
- Continuous performance for dependable analysis
- Diesel, kerosene fuel compatible construction
- Self-diagnostic software
- CANBUS/RS-232 output to customer supplied control systems

- Cellular Telemetry/RS-232
- Reporting interval through visual display

### PRINCIPLE OF OPERATION

The IPM measures particle contamination continuously updates the display, output options and limit relay every second, and does not perform a “one-off” test. This means that even if the Measurement Period is set to 60 seconds, the display, output and limit relay all report the presence of dirt in the oil in just a few seconds—it does not wait until the end of the Measurement Period before reporting the result.

The IPM has just one setting to control the accuracy, stability and sensitivity of the measurements and that is the “Measurement Period.” This can be set from five seconds to 180 seconds. The longer the Measurement Period, the

more contaminant is measured, averaging out any spikes seen on a smaller sample. The shorter the Measurement Period the more sensitive the IPM is to variation of contaminant level, but also the performance on clean systems can be reduced. Thus, the user can select how sensitive the IPM is to spikes of contaminant, and how quickly it responds to contamination levels above the set point (“limits”).

The Measurement Period is factory set to 60 seconds, updated on a second by second basis, giving an effectively continuous readout of the level of contamination.



IPM-110-SS



IPM-230

**MODELS AVAILABLE**

MODEL	110	110-FR	120	120-FR	210	220	230
Cust Power Control	X	X	X	X	NA	NA	NA
MD-3	NA	NA	NA	NA	X	X	X
CANBus/RS-232	X	X	NA	NA	X	NA	X
MODBus/RS-232	NA	NA	X	X	NA	X	NA
Telemetry/RS-232	NA	NA	NA	NA	NA	NA	X
Timer	NA	NA	NA	NA	X	X	X
Pump	X	NA	X	NA	X	X	X
Flow Regulator	NA	X	NA	X	-	-	-
Data Storage	NA	NA	NA	NA	X	X	X
CE Mark	X	X	X	X	-	-	-

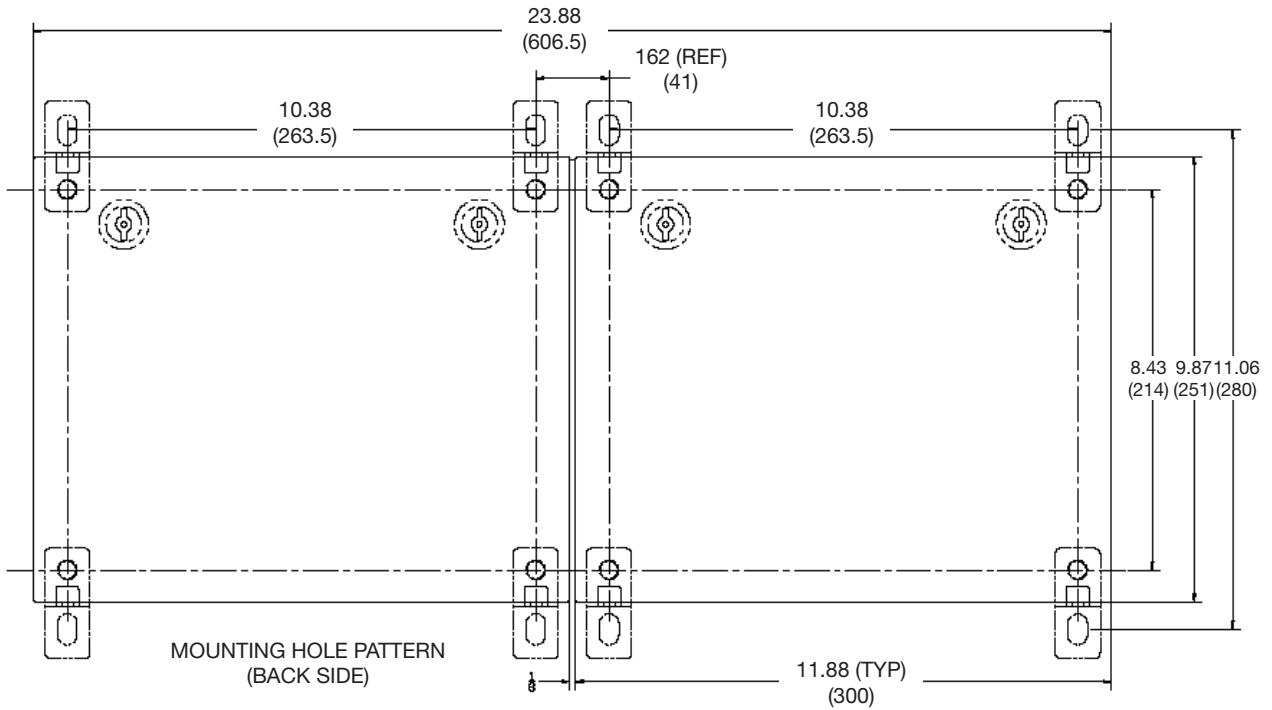
**IPM-200 SERIES STANDARD COMPONENTS**



Qty.	Description
1	IPM-200 Series Unit Enclosure
1	Installation and Operation Manual
1	Software, OEM, CD's
1	Sampling Hose Set, 5 m long, P/N ACC6NN005
1	Probe, Twin Sample Port, P/N ACC6NN046
1	Mounting Hardware
1	Enclosure Lid Key

**DIMENSION**

in (mm)





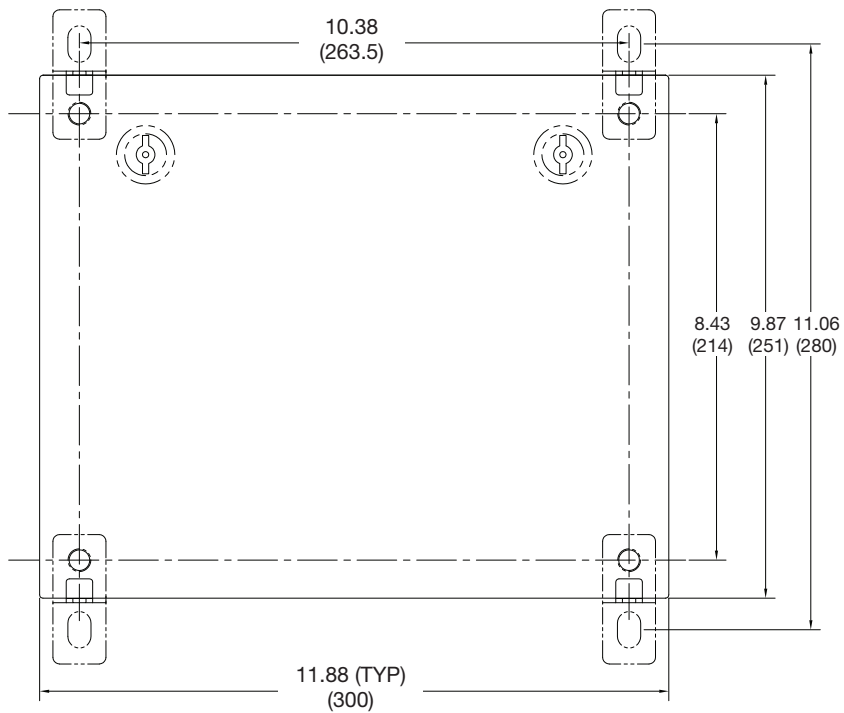
**IPM-100 SERIES STANDARD COMPONENTS**



Qty.	Description
1	IPM-100 Series Unit Enclosure
1	Installation and Operation Manual
1	Sampling Hose Set, 5 m long, P/N ACC6NN005
1	Probe, Twin Sample Port, P/N ACC6NN046
1	Mounting Hardware
1	Enclosure Lid Key

**DIMENSION**

in (mm)



# Portable Condition Monitoring for Fuel Systems

## icountFS

The icountFS (iFS) is an innovative solution to the challenge of measuring the quality of hydrocarbon fuels in many different applications: from renewable energy, marine and offshore, to manufacturing, mobile, agriculture, military and aerospace.

Compact, lightweight and robust, the truly portable iFS makes field analysis simple, quick and easy.



Lightweight and portable

Able to sample directly from a barrel, vehicle fuel tank or from pipes in a fuel system with the addition of a pressure reducing adaptor; the iFS is undoubtedly the most adaptable contamination service tool available today.

The system is completely self contained, with laser detection particle counter, battery and pump plus memory with web page generator for data download onto any PC or laptop - combined into a single unit. The iFS uses Parker's proven laser detection technology, which delivers precise, repeatable, reproducible results, in real time



detection of both particulates, down to 4 microns (c) and dissolved water.

Just as importantly, the iFS has been developed to offer a wealth of features, combined with simplicity and ease of use, at a cost

that is far lower than competing systems, and which fits within most maintenance budgets. Fluid viscosity as high as 300cSt (usable range) will be able to pass through the detector at the proper flow rate



Powerful and easy to use

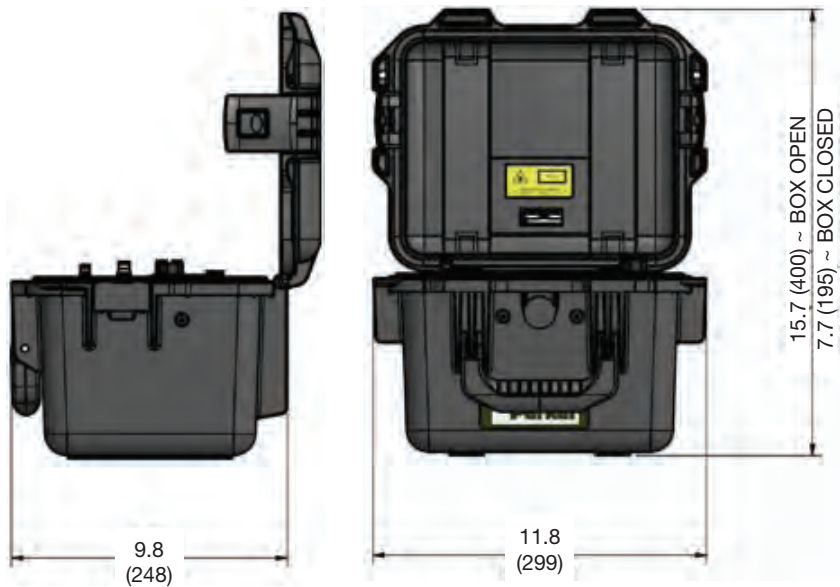
### FEATURES AND BENEFITS:

- Quick connections for testing fluid online and offline
- Reporting Standards ISO4406:1999, NAS1638 and RH% moisture sensor display in high intensity OLED format
- Data Storage up to 250,000 test points of information
- Compact, lightweight and robust, truly portable iFS makes field analysis simple, quick and easy

- Able to sample directly from a barrel and vehicle fuel tank or from an online fueling system with the addition of a pressure reducing adaptor
- Completely self contained, with laser detection particle counter (icountPD), rechargeable battery and flow management pump
- No special software needed
- Embedded web page generator for data downloading. Connect via Ethernet (universal RJ45) or WiFi to PC, laptop, or smartphone.
- Fast detection of the presence of contamination with a sampling period from 5 seconds to 999 seconds

## DIMENSIONS

in. (mm)



The iFS quality condition monitor for hydrocarbon fuels uses advanced technology to produce extremely repeatable results.

At the heart of the system is a sophisticated laser detector, using a light obscuration flow cell, providing continuous measurement of fluid flow passing through a sample tube.

Measurements are taken every second as standard, although measurement intervals and test period can be defined by the user, with results being reported immediately and updated in real time.

Data is displayed on a built-in OLED digital display and can also be stored for subsequent upload via the embedded icount's web page interface connecting through an RJ45 cable.





**ICOUNTFS**

Part Number	Description		Part Number	Description	
IFS3220VEL (Ethernet) IFS3221VEL (Wi-Fi)	icountFS Portable Fuel Condition Monitoring for Fuel Systems		ACC6NK001	1pair Sample Bottles	
ACC6NE000	In/Out Sample Probe		ACC6ND001	10pair Sample Bottles	
ACC6NE034	1m Hose		ACC6NE002	50pair Sample Bottles	
ACC6NN046	On-line Probe		SERMISC067	500ml Verification Fluid	
ACC6NE003	1m Extension Hose & Couplings Set - 2 Hoses		ACC6NE008	UK Power Supply	
ACC6NN003	2m Hose Set - 2 Hoses		ACC6NE009	EUR Power Supply	
ACC6NN005	5m Hose Set - 2 Hoses		ACC6NE010	US Power Supply	

# icountACM20

## State-of-the-art Fuel Contamination Monitoring

The icountACM20 Portable Particle Counter has been developed from existing technology for monitoring contamination in AVTur and other hydrocarbon fuels, in accordance with Energy Institute (EI) Method IP 564.

In addition, the ACM can also be used to monitor fuels from existing sampling points in locations from refineries, pipelines, distribution terminals, fuel supply storage.

### APPLICATIONS

- Fuel Testing Laboratories - DEFSTAN 91-91 Issue 6
- Distribution Terminals/Hubs: use on receipt and outbound supply. Also provide checks for filtration performance, tank cleanliness and product quality
- Storage: reduce settling time by monitoring to determine if dispersed contamination are below acceptable levels
- Airport Fuel Farm: monitoring of fuels into storage, through fuel farm, hydrant system and during uplift into wing
- Oil and Gas Platforms: monitor filtration performance, system cleanliness and quality of delivered product

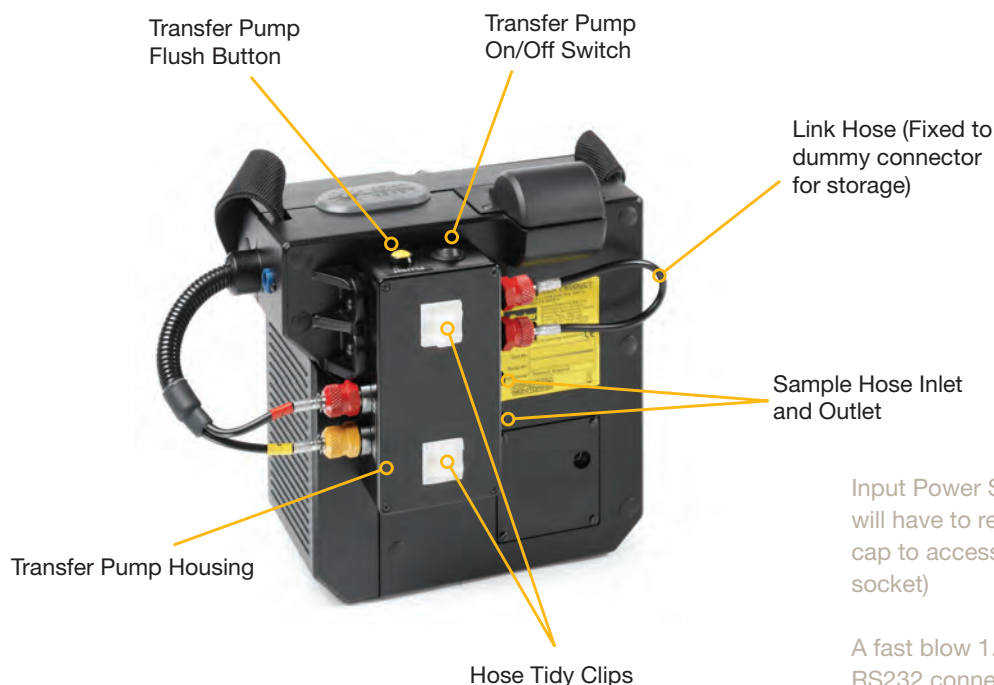


### FEATURES & BENEFITS

- 2 minutes test time
- Optical scanning analysis and measurement of actual particles and inference to water presence
- Primary outputs: 4, 6, 14, 21, 25, 30 $\mu$  counts per ml
- % Volume distribution, via graphical display on handset and printout
- ISO 7-22 in accordance with ISO 4406-1999
- 32 Character two line dot matrix LCD. Full alphanumeric entry facility on keypad
- Access up to 300 saved test
- Calibration in accordance with Parker Calibration Procedure CM20-N, which complies to ISO11171:1999, Clause 6 (Omitting Annex F)
- Re-calibration every 12 months by a dedicated Parker Service Center
- 420 bar Max. Working Pressure
- +5° C to +80° C
- Interface via RS232 (USB serial cable to RS232 option available)
- On-board rear mounted pump for lab sampling
- On-board battery and carry case with wheels (13 kg total weight)
- 12v DC input, 6 "D" cell batteries or rechargeable battery pack
- Integrated 16 column printer for hard copy data
- Complies with all relevant EC declarations of conformity
- Integrated Mounted Pump:
  - Powered directly from ACM20
  - Direct sampling from fuel sample bottles or tank via 3 meter inlet suction tube
  - Incorporated double speed flush and test sequence
  - Managed flow rate/correct volume sample as per IP 564 test method



## icountACM20 - Rear View



Input Power Socket (note that you will have to remove the plastic dust cap to access the 12Vdc power socket)

A fast blow 1.25A fuse and the RS232 connection are located behind the removable cover plate. The RS232 interface is provided to download all test data stored in the instrument.

### SPECIFICATIONS

- Construction:
  - Case: ABS Structural Foam and Injection Molded
  - Handheld Display: ABS
  - Keypad: Fluorosilicone Rubber
- Mechanical Components: Brass, plated steel, stainless steel and aluminum
- Seals: fluorocarbon
- Hoses: Nylon (Kevlar braided microbore), stainless steel armored ends
- Flow rate: 25 - 28 ml/min (dictated by CMP) 100 ml/min with additional flush button
- Fluid Compatibility: Hydrocarbon Fuel, Mineral Oil. For other fluids consult Parker
- Fuse: 1.25 amp fast blow fuse included for overload protection (spare supplied)
- icountACM20 Technology: Flow cell, light obscuration
- Repeatability/Accuracy: As per or better than ISO 11171
- Coincidence: 40,000 particles per ml
- Viscosity range: 1 - 100 centistoke(s)
- icountACM20 Weight: 8 kg (17.6 lb)
- Monitor Carrying Case: Astra Board case
- Carrying Case Weight: 5 kg (11 lb)



### Field Monitoring

For use in non-hazardous areas, the icountACM20 is designed for online sampling of hydrocarbon fuels, utilizing existing "quick connect" sampling points such as the Millipore Adaptor.



**ICOUNTACM20**

Part Number	Description		Part Number	Description	
ACM202024US ACM202024UK ACM202024EU	icountACM20 Portable Particle Counter with US,UK or EU Plug		ACC6NE023	UK Battery Charger	
ACC6NE008	UK Power Supply		ACC6NE024	EUR Battery Charger	
ACC6NE009	EUR Power Supply		ACC6NE025	US Battery Charger	
ACC6NE010	US Power Supply		ACC6NW003	Waste Bottle	
ACC6ND000	1m Process Cable Assembly		ACC6NE013	Re-Chargeable Battery Pack Assembly	
ACC6NE027	2m Process Cable Assembly		ACC6NE006	Parsmart Downloader Software	
ACC6NE029	Throttle Kit		ACC6NE019	Carrying Case for ACM202024	
			ACC6NE028	Carrying Case for ACM202032	
ACC6NE015	Printer Paper 5 Rolls		ACC6NW003	Vapor/Waste Bottle	
SERMISC067	500ml Verification Fluid		ACC6NE014	Printer Ribbon	

# icountBSplus

## Advanced Bottle Sampler Testing - Cost Effective and Time Saving Alternative to External Laboratory Services

### ADVANCED CONTAMINATION TESTING

The revolutionary icountBSplus is an advanced, fully contained bottle sampling system that ensures fast, accurate and repeatable detection of contamination in diesel fuels.

Compact and portable, the icountBSplus is ideal for use in the laboratory, on-line or off-line applications.

The system is fully accredited to all particle counting standards - ISO, NAS, AS and GOST - including the latest ISO medium dust certification and is backed by Parker Hannifin's global customer support network.

The icountBSplus uses proven laser particle detection technology, with intuitive touch screen control, integrated long life rechargeable battery and a robust easy to clean enclosure, to deliver exceptional product quality and performance.

The icountBSplus is quick to setup and use, delivers rapid test results and offers a wide range of features to help you improve the reliability, productivity and profitability of your production equipment.



Aerospace: monitoring of ground support equipment, airframe laboratories, and aerospace testing facilities



Defense: airfield fuel supply and storage points, military laboratories



Mining: ideal for use in construction and land moving machinery maintenance



Oil and Gas: use in fuel refineries (DEF STAN 9191), fuel farm, fuel lab and airport fuel transfer

## BENEFITS

- Low cost solution for monitoring fluid life and reducing machine downtime
- Easy to set up and use this CE compliant instrument
- Selectable 12 language instruction manual menu
- Optional on-line fluid measurement capability
- Independent monitoring of contamination
- Calibration to ISO procedures
- 8 fixed channel size analysis
- Integrated relative humidity moisture sensor
- Selectable test sample sizes: 25, 50, 75 and 100ml
- Selectable flush sample sizes: 10, 15, 20, 25, 50, 75 & 100ml
- Selectable number of samples taken in one time: 1, 2, 3, 4 or 5 tests
- Mineral fluid/fuel compatible construction
- Percentage saturation reporting (for the moisture sensor option)
- Testing capability of up to 500 continuous tests (override auto warning option available)
- Data exporting method to USB (in XML format)
- Modular design for easy servicing
- On-board high quality pump and motor configuration
- High resolution color touch-screen panel and the
- Integrated printer (selectable on/off feature)
- Self-diagnostic software
- Power-saving sleep mode with integrated wake up/power button
- On and off line pressure capability

## PRECISION AND REPEATABILITY

The icountBSplus is capable of entrapped gas suppression and automatically ensures that each sample is carefully regulated prior to test.

Every sample is degassed using suppressed, cleaned air and then delivered to the measurement cell through a fixed displacement pumping system.

This eliminates many of the variables associated with traditional methods of contamination monitoring.

## PRODUCT FEATURES:

- Quick sample bottle analysis with variable test time options from 15 seconds and volume capacities from 25ml
- Repeatable and re-producible result performance to ISO4406:1999, NAS1638 AS4509E and GOST 17216:2001 (Differential and Cumulative) particle count distributions
- On-board compressor and 'shop' air capability
- Environmentally controlled front loading bottle chamber
- Selectable 12-language instruction manual menu
- Analysis of fluid moisture and temperature capability
- icountBSplus has the capability for on-line fluid measurement configuration as well as off-line fluid sampling
- Design concept allowing for portability. DC and rechargeable battery pack power option built in
- CE compliant
- Fluid resistant touch type screen panel
- On-board thermal printer
- 500 test memory (fully downloadable)

## SAMPLE BOTTLES



**250ML SAMPLE BOTTLE KIT**  
ACC6NW001: 1 PAIR  
ACC6NW002: 50 PAIRS



**250ML SAMPLE BOTTLE PACK**  
ACC6ND001: 10 PACK  
ACC6NE002: 50 PACK

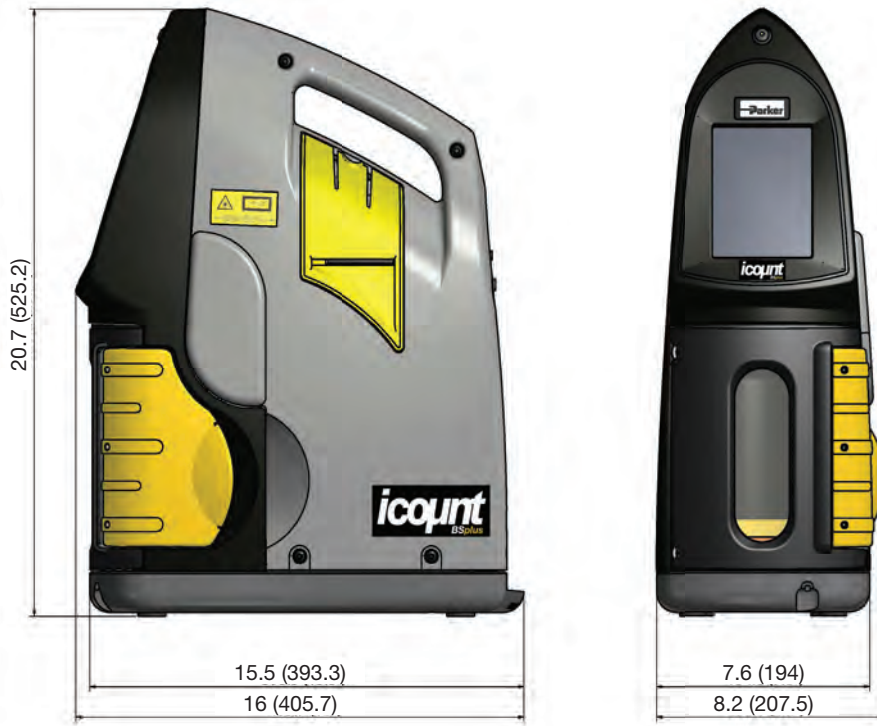


**250ML SAMPLE BOTTLE NO CAP**  
ACC6NK001: 1 PAIR



## DIMENSIONS

in. (mm)



## ICOUNTBSPLUS PARTNUMBERS AND ACCESSORIES

Part Number	Description		Part Number	Description	
IBS3100VEL	icountBSplus Advanced Bottle Sampler Testing		ACC6NW011	USB Memory Stick	
ACC6NW001	250ml Sample Bottle 2-Pack		ACC6NW012	Manual on CD	
ACC6NW002	250ml Sample Bottle 50-Pack		ACC6NW020	Transit Case	
ACC6NW003	Vapor/Waste Bottle		SERMISC049	500ml Verification Fluid	
ACC6NW005	Printer Paper Reel		ACC6NW009	1m Waste Tube Clear	
			ACC6NW010	1m Waste Tube Blue	

# Particulate & Water Contaminant Analyzer

VCA® Series. Real-time Simultaneous Monitoring of Particulate and Water Contaminants

## DESCRIPTION

The Velcon Contaminant Analyzer (VCA) system with a proper filtration system can provide assurance that the fueling system receives, maintains, and dispenses fuel that meets ASTM D975 and ISO 4406 cleanliness levels.

As a “full-flow” analyzer, the VCA mounts within a fuel delivery system thereby providing a true representation of the pipeline contents. The VCA analyzes fuel at varying flow rates but it can also analyze fuel at rates higher than 1000 gallons per minute through a 3 or 4-inch pipeline (contact Velcon for other sizes).

The VCA uses two separate sensor technologies to consistently differentiate between water and solid contaminants.

The VCA analyzes the contents of flowing fuel in a pipeline approximately 600 times a second, and outputs an averaged result every two seconds in mg/l, ppm, and a representative ISO 4406 code.

The VCA is an ideal tool to either measure the quality of fuel at receipt, assuring agreed upon cleanliness specification are met, or at dispensing points. The VCA provides data to reassure the user that fuel cleanliness is within limits, and where not, it can be set to alarm or signal delivery system shutdown.

## BENEFITS

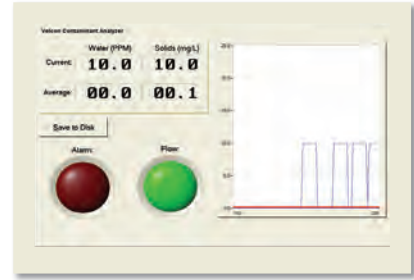
- Ability to simultaneously differentiate between free water and solid particulates allows for a greater diagnostic accuracy of contamination sources
- Fuel quality accountability upon receipt with record of fuel quality at dispensing point
- System alarm or relay signal to shutdown control when fuel contaminant level is exceeded
- Reduce equipment downtime by preventing particulate and water from entering fuel storage
- Fuel system peace of mind with real-time constant monitoring of fuel condition
- Fully Compliant with EI 1598 Second Edition
- Flow sensor operates VCA® only during fueling (US Patent No. 7,518,719)
- Full flow analysis – no sampling errors
- Isokinetic Compliance
- Minimal Pressure Loss
- Fouling Resistant Windows
- Real-time PC-Based Graphical User Interface for data viewing/capturing
- Real-time RS-232 Data Stream to tie into Data Management Systems (optional)
- Easy installation cable/wiring
- Optional On-line Data Viewing/Storage System



VCA - U.S. Patent No. 7,518,719  
VCA-CV - U.S. Patent No. 8,498,750

## PRODUCT SPECIFICATIONS

- Contaminant Measurement/ Standard
  - Particulate Contaminant
    - mg/l (milligrams per liter)
    - ISO 4406 Reference Codes
  - Water Contaminant
    - ppm (parts per million)
- Mechanical
  - Pressure Rating: 150 psi (10 bar)
  - Flange Class: ANSI 150
  - Wetted Materials: Powder Coated Steel, Stainless Steel, and Glass
- Electrical
  - Configurable Output Control Alarm Relay
  - Certification: Class 1 Zone 2, IP65, NEMA 4x
- Cable Length: 15 ft (4.57 m)
- Requirements: 12-36VDC 4A or 110-240VAC
- Control Box Dimensions: 12"W x 16"H x 8"D
- Data Output
  - PC-Based Interface
    - Graphical User Interface (GUI)
    - Real-Time Data
    - Scalable data graphing
  - Local Data Storage
    - On-Board Data Logging (CSV)
    - User Configurable Alarms (Current & Average Values)
    - Downloadable to USB Storage Device
  - Additional SCADA integration (optional)

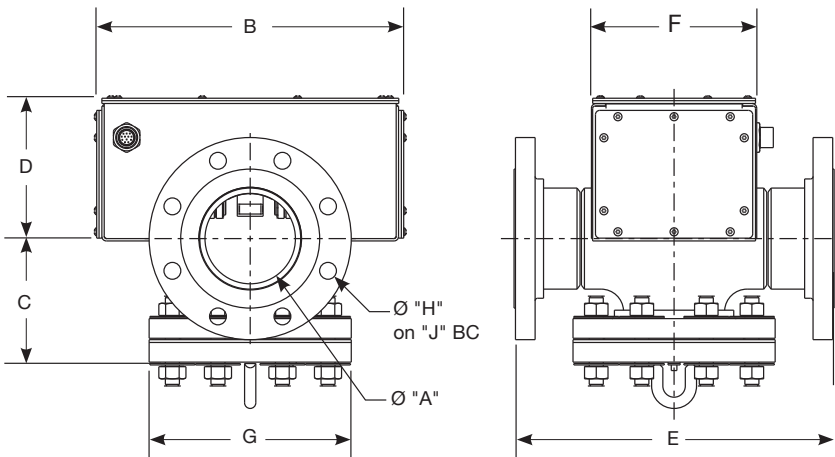


Real-time Data:  
Water and Solids Concentration



Per Fueling Session:  
E-mail Field Data Reporting  
(with cellular telemetry option)

## DIMENSIONS



### Part Numbers:

#### For Aviation:

VCA-A3 for 3" DIA

VCA-A4 for 4" DIA

#### For Diesel:

VCA-D3 for 3" DIA

VCA-D4 for 4" DIA

Pipe Diameter (in.)	Dimensions in (mm)								
	A	B	C	D	E	F	G	H	J
3	3 (76)	13 11/16 (348)	4 3/4 (121)	5 11/16 (144)	13 5/8 (346)	8 1/8 (206)	7 1/2 (191)	3/4 (19)	6 (152)
4	4 (102)	13 11/16 (348)	5 1/2 (140)	6 1/4 (159)	14 1/4 (362)	7 3/8 (187)	9 (229)	3/4 (19)	7 1/2 (191)

Dimensions shown are for estimating purposes only. For exact dimensional detail, please contact Velcon Filters or your Velcon representative.



# Flow Differential Pressure Module (FDPM®)

## Automatic Calculation of Corrected Differential Pressure for Varying Flow Rates

The FDPM® MK II builds on its field tested predecessor. Designed to comply with the requirements of industry standards such as ATA 103 and JIG Guidelines, the FDPM® MK II eliminates this normally complicated calculation by automatically calculating the condition of the filters inside a vessel based on the inputs from differential pressure and flow-rate sensors. FDPM® MK II can be used with either mobile or stationary equipment.

### BENEFITS

- Designed with A4A 103 & JIG Guidelines data collection requirements in mind
- Removes human judgment regarding condition of filters
- Simplified for the refueling operator yet highly configurable by the fuel master
- Interactive touch screen display enables easy operation even for gloved users
- Condition based alarms can be set to halt the fueling operation

- Intelligent detection of sudden increases or decreases in differential pressure
- Security codes prevent resetting of key values by unauthorized personnel
- Over 3 years of data logging automatically stored via a MicroSD card



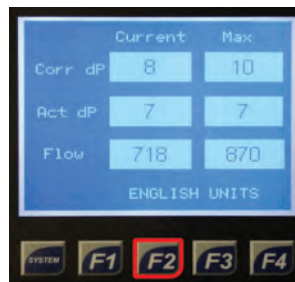
### DISPLAY OUTPUTS

- Corrected DP
- Actual DP
- Flow Rate
- Peak corrected and actual DP
- DP rise or drop alarm

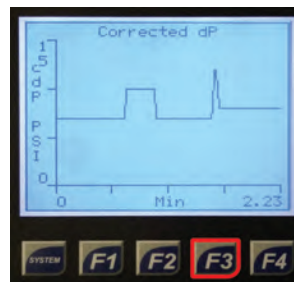
### INTERACTIVE TOUCH SCREEN DISPLAY



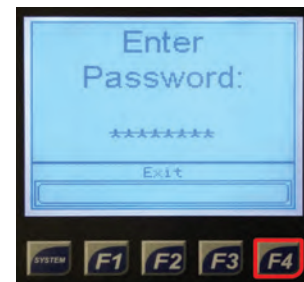
F1- Corrected dP and Flow Information



F2- Tabulated Averaged and Maximum Values for the Refueling Session



F3- Real-time Corrected dP Chart



F4- Supervisor Menu

# Specifications

## INPUTS

- 12 -24VDC, 300 mA (Power), AC/DC Converter
- Flow Rate Input: 0-8 Volts Minimum (24 Volts Max)
- One of the Following:
  - 2 Pressure Transducers: 4 -20 mA
  - 1 Differential Pressure Transducer: 4 -20 mA

## DEADMAN SWITCHING RELAY

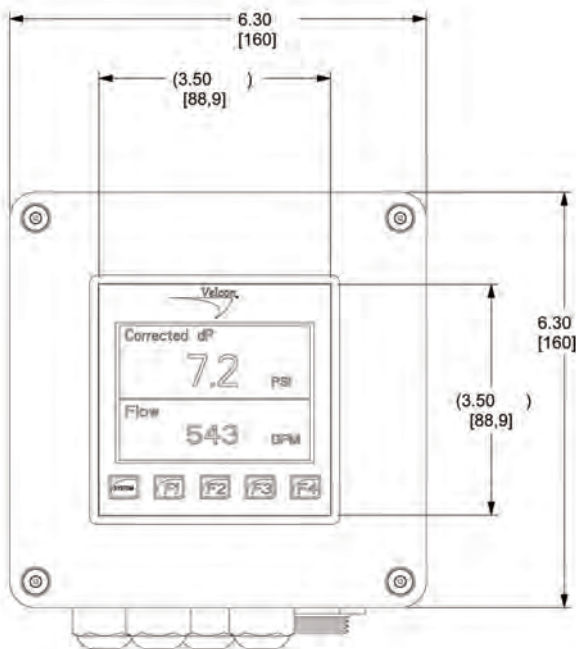
- 3A @250 VAC Max

## VISUAL OUTPUTS/INDICATORS

- Interactive Touch Screen
- Daylight Readable
- Optional Amber Light: Warning Indicator
- Optional Red Light: Critical Indicator
- Corrected Differential Pressure
- Actual Differential Pressure
- Flow Rate

## DIMENSIONS

- in. [mm]



Front View

- Peak Corrected and Actual Differential Pressure
- Real-Time Corrected Differential Pressure Charting
- Sudden DP Rise or Drop Alarm

## DATA LOGGING

- Removable Micro SD Card (Included)
- >36 Months Data (MS Excel Compatible)
- 60 Second Logging Interval (User Configurable)
- Data Download via USB (Optional)

## DATA OUTPUTS

- RS232 (ASCII Serial Data Stream)

## MEASUREMENT UNITS

- PSI, USGPM
- BAR, LPM

## ALARM TRIGGERS

- Warning Alarms (Amber Light)
  - 12 PSI or 0.8 BAR (User Configurable)
  - Pressure Greater than the System Rating
  - Change in DP (User Configurable)
- Critical Alarms (Red Light)
  - External Switch Relay (Deadman)
  - 15 PSI or 1.0 BAR (User Configurable)
  - Change in DP (User Configurable)

## WEIGHT

- 4 pounds (1.8 kg)

## SAFETY/COMPLIANCE

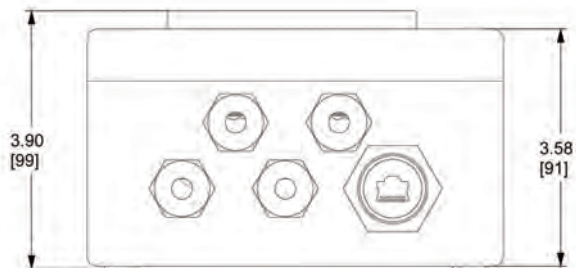
- IP 65
- NEMA 4X
- ATEX Directive Class 1 Zone 2 Group D

## PRODUCT OPTIONS

- Pressure Sensors
  - 2x Pressure Transducers - Class I Division I
  - 1x Differential Pressure Transducers - Class I Division I
  - 1x Differential Pressure Transducers - IP65 NEMA 4

### Part Numbers:

FDPM-MKII	FDPM Unit
764X021	Pressure Transducers (100 psi)



Bottom View

# Differential Pressure Monitor (DPM™)

## Differential Pressure Monitoring and Shutdown System

The DPM continuously monitors the differential pressure between the inlet and outlet of a filter monitor or filter water separator vessel. The DPM monitors the condition of internal filter elements. In the event that the filter differential pressure reaches maximum allowable pressure, the industrial strength relay onboard the DPM control unit breaks the deadman circuit, effectively terminating the refueling operation. The system can only be overridden by inserting a supervisor key. The DPM can also be placed in an override status in order to conduct the required DP Gauge free movement test.



### SIMPLE INSTALLATION

- Connect pressure sensors to the existing inlet and outlet lines on the piston type differential pressure gauge
- Connect existing deadman circuit loop to the DPM control unit
- Provide 12 or 24VDC to the DPM Control unit

### BENEFITS

- Low Cost
- Simple installation
- Mobile or Fixed installation
- Removes human judgment regarding condition of filters
- Works with a variety of pressure inputs including differential pressure gauges, pressure transducers and momentary switches

### SPECIFICATIONS:

#### POWER

- 12 - 24VDC, 300 mA (Power)

#### AVAILABLE INPUTS

- Normally closed latching switch
- 2 Pressure Transducers:
  - 4 -20 mA
- Differential Pressure Transducer:
  - 4 -20 mA
  - 0-5 V

### DEADMAN

#### SWITCHING RELAY

- 8A @ 250 VAC Max

#### VISUAL INDICATORS

- Green Ultra-bright LED: Power Indicator
- Red Ultra-bright LED: Shutdown Indicator

#### SHUTDOWN TRIGGERS

- 22 PSI (1.51 Bar) (mandatory JIG requirement)

#### WEIGHT

- 4 pounds (1.8 kg)

#### SAFETY/COMPLIANCE

- NEMA 4X
- ATEX Directive Class 1 Zone 2 Group D
- IP 65

#### OPTIONAL EXTRAS

- 2x Pressure Transducers - Class I Division I
- 1x Differential Pressure Transducer - Class I Division I

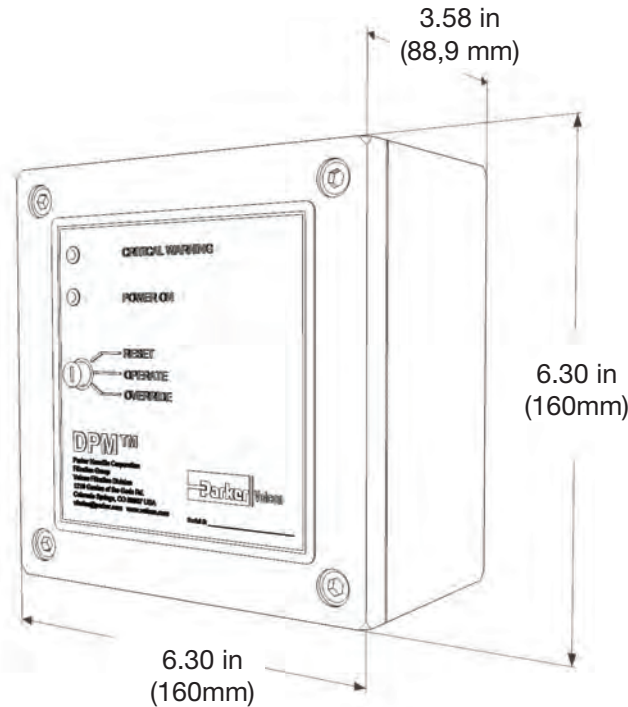
## Future Proof: Upgradable to FDPM MKII

- Add flow input
- Replace front panel on existing electrical box
- Less than 30 min. installation
- FDPM's interactive touchscreen display monitors, calculates and records corrected differential pressure
- Provides the ultimate in flow corrected differential pressure monitoring





## DIMENSIONS



## DIFFERENTIAL PRESSURE MODULE (DPM™)

Each DPM is custom configured and optimized to your application.

**Configuration for systems WITHOUT pressure transducers:** If you DO NOT have pressure sensors and need them please determine which of the two DPM kits to the right is appropriate for your application.

**Configuration for systems WITH pressure transducers:** If you DO have your own pressure sensors, please follow the part number scheme below to order your DPM control unit.

**DPM – X X XXX**

### Sensor Options:

K = Sensors are supplied by Velcon (Kit)  
0 = Sensors are not supplied

### Sensor Configurations:

D = Current Output / Differential  
S = Current Output / Single Ended  
F = Voltage Output / Fixed  
V = Voltage Output / Variable (0-5V)

### Sensor High End Pressure Range (psi):

High end of sensor pressure range in psi.  
Standard configurations are 025, 029, 050 and 100.

**DPM-KS100** – This part number includes two current output, single ended, 0-100 psi, Class 1, Division 1, pressure sensors (part number 764X021, pictured below) supplied by Parker Velcon.



**DPM-KD029** – This part number includes one current output, differential, 0-2 Bar (0-29 psid), Class 1, Division 1, pressure sensor (part number 764X008, pictured below) supplied by Parker Velcon.



# Water in Fuel Test Kit

Hydrokit® HK Series. Detects Excessive Free Water in Fuel



## FEATURES

- **Easy to Use** – Automatically controls the sample size. Simple evaluation by color comparison.
- **Shelf Life** – One year shelf life. Refer to date on box.
- **Responds Consistently** – Responds consistently in a wide variety of aviation jet fuels.
- **Carefully Controlled Quality** – Manufactured by Parker to strict quality control specifications.

## DESCRIPTION

The HYDROKIT® is an effective “Go, No-Go” field test designed to periodically check for free water, which is removed to ppm levels by properly operating filter/separators, Aquacon®, and monitor vessels. Samples are normally taken downstream of the vessel, but they can also be taken at other points in the fuel distribution system. The HYDROKIT® is designed to indicate free water in excess of 30\* ppm by changing the powder contained in the sample tube to a pink color. Thirty ppm is generally accepted as the maximum amount of water permissible when fueling aircraft.

The HYDROKIT® is designed for “fail-safe” operation, with false negative readings unlikely. Almost any error in performing the test will indicate the presence of wet fuel. If the sample indicates the presence of excessive water, it is always a good practice to repeat the test on a second sample

## APPLICATION

- Aviation Jet (Turbine) Fuels (Not recommended in Category M Fuels)
- Not for use with Avgas
- HKD Series Available for Non-Red Dyed Diesel Fuel

**ORDERING INFORMATION**

MODEL NO.	QTY OF TESTS	
HK600@	600	6 ea. HK100
HK600-15	600	6 ea. HK100-15, 15 ppm sensitivity
HK100@	100	
HK100-15	100	15 ppm sensitivity
HK25	25	
HK25-15	25	15 ppm sensitivity
HK3	3	
HK3-15	3	15 ppm sensitivity

Each model above comes complete with:

- Sample tubes
- Wide mouth glass sample jar(s)
- Needle holder assembly
- Instruction card
- Color indicator comparison card



HK-25



HK-100





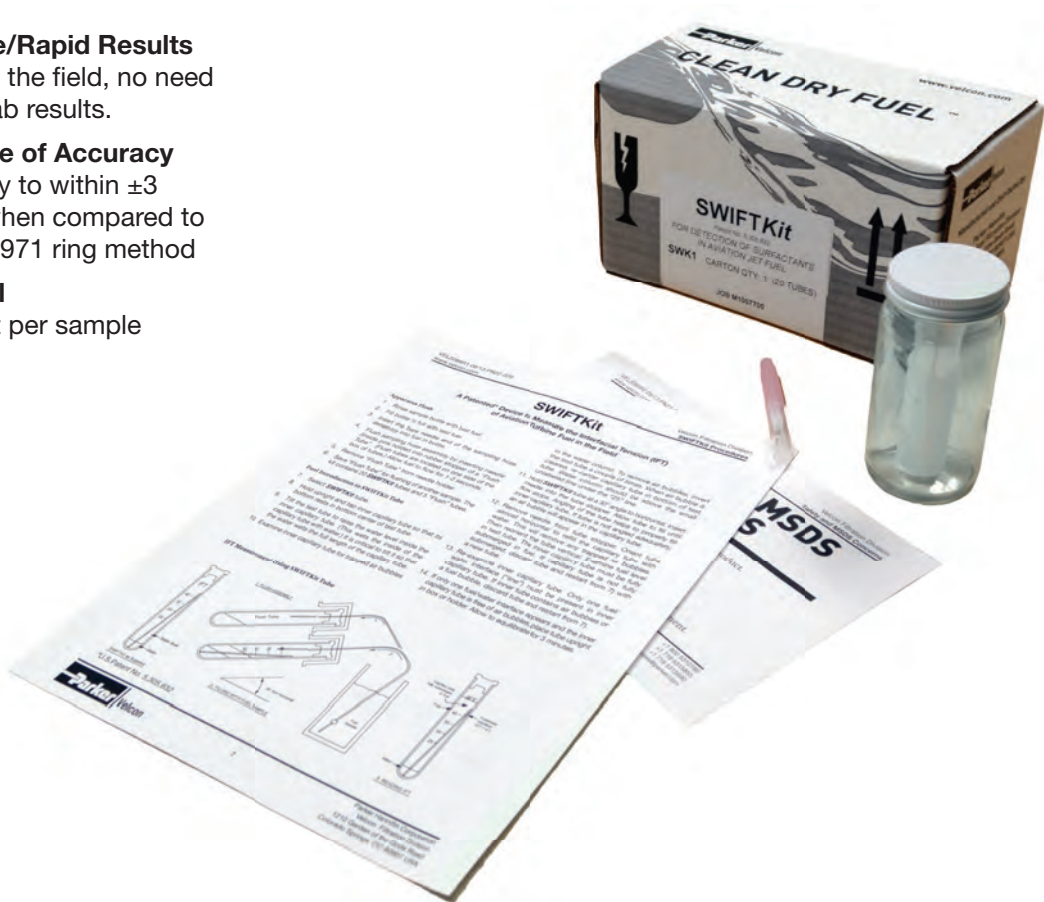
# Surfactant Detection Kit

SWK1. SWIFTKit Series.

Detects Surfactants in Aviation Jet Fuel

## FEATURES

- **Easy to Use/Rapid Results**  
Test done in the field, no need to wait for lab results.
- **High Degree of Accuracy**  
Repeatability to within  $\pm 3$  dynes/cm when compared to the ASTM D971 ring method
- **Economical**  
Lowest cost per sample analysis.



## DESCRIPTION

The patented\* SWIFTKit is the first practical device to determine the Interfacial Tension (IFT) of aviation jet fuel in the field. The IFT value is a general indication of the surfactant (surface active agent) level in fuel; higher IFT values indicate lower surfactant levels. Surfactants can disarm coalescer elements, which could allow excess water downstream and into the aircraft.

## APPLICATIONS

The SWIFTKit can be used for general quality checks on fuel during transfer and transportation, and particularly for receipts into airport storage. The SWIFTKit is especially useful to determine the condition of clay treatment cartridges by comparing the upstream and downstream IFT values. An increase in IFT value shows that the clay is still effectively doing its job of removing surfactants.

## ORDERING INFO

Specify Model **SWK1**

Each SWK1 SWIFTKit box includes:

- 20 sample SWIFTKit tubes
- 5 flush tubes
- 1 wide mouth glass sample jar
- 1 needle holder assembly
- 1 procedure sheet
- 1 illustration of procedure sheet
- 1 safety and MSDS sheet



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