

PRODUCT CATALOGUE

- Sensor Technology -



The FAUDI Aviation AFGUARD® is a measurement system, which supervises the quality of Jet Fuels.

The AFGUARD® is recommended for insitu measurement of particulate matter in Jet Fuel like free water. The AFGUARD® is a scattered light sensor and is designed to provide inline control solution for a variety of processes.



Functionality: A precisely defined, constant light beam penetrates the process medium. Scattered light from particles (undissolved liquids like free water or gas bubbles) in the medium is detected by photo diodes. It is also possible to determine a water slug in Jet Fuel.

The AFGUARD® can be used perfectly to detect the functionality of Filter Water Separators or to measure the water absorbing performance of Filter Monitors. This can be done by measuring the level of free water detected by AFGUARD® sensors, placed at the vessel inlet and outlet. Free water will be detected and, with AFGUARD® in place, the monitors are under constant surveillance to insure their proper function.

Extended service life for FAUDI Aviation Elements could be a result – provided that the indicated differential pressure range is observed.



Technical Details

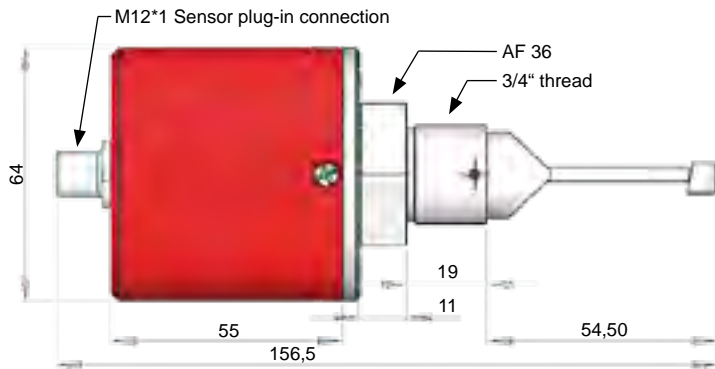
Measurement range	0 - 50 ppm or 0 - 100 ppm	
Accuracy	+/- 3 ppm	
Linear analog output signal	4 to 20 mA	
Contact Load DC	24 V DC	
Available variants	intrinsically safe / safe area version	
Hazardous area approvals		II 1/2G Ex ib [ia] IIB T4 II 1/2G Ex ia IIB T4
		II 3G Ex ic IIB T4
Ingress protection	IP 67	
Operating temperature	-30 to + 60 °C	
Storage temperature	-30 to + 70 °C	
Relative humidity	10 to 90 %	
Pressure range	10, 16 bar	
Wrench size	AF 36	
Torque	50 Nm	

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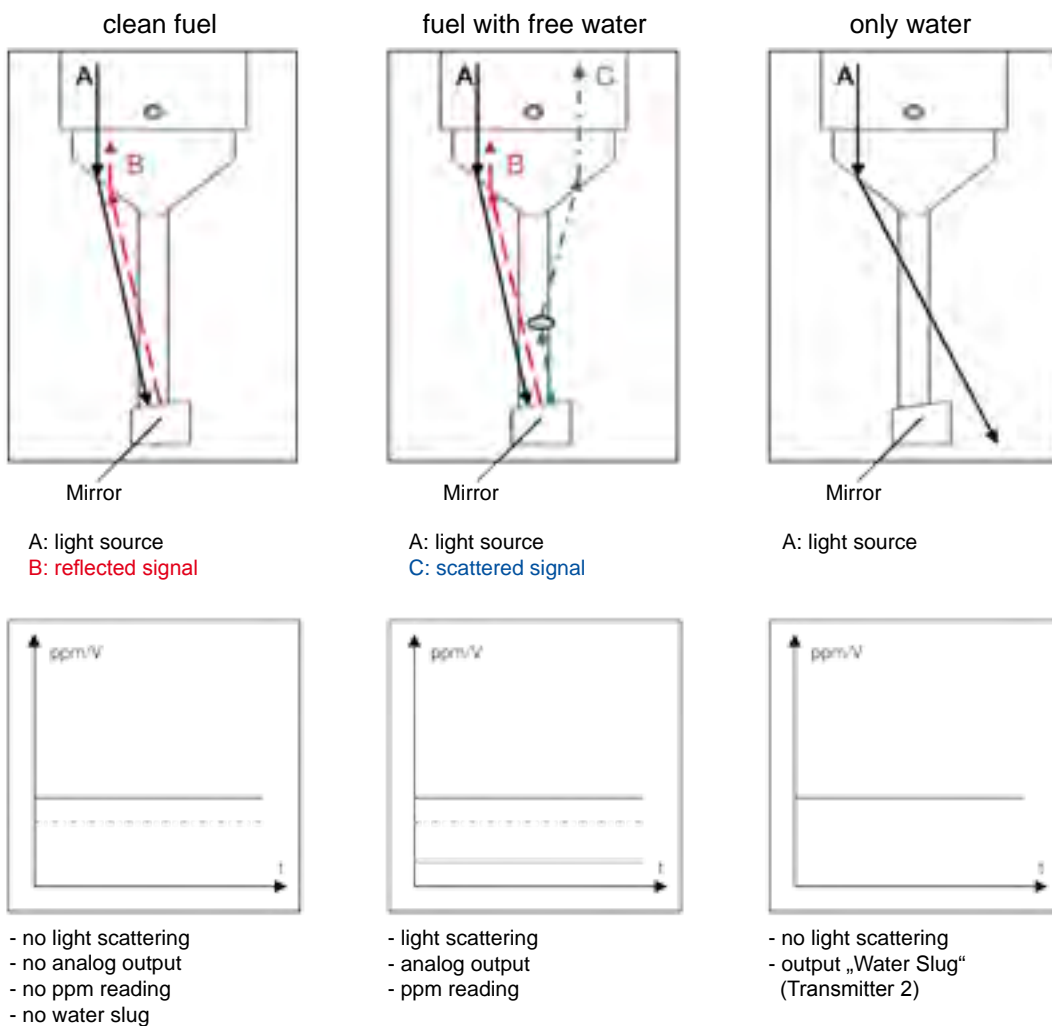
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Dimensions



Operation Mode



Features

- Output for Water Slug
- Installation 3/4" Thread
- Detects water inline
- Easy installation retrofit in existing systems
- Self check of diodes and contaminations
- Hazardous Area Approval
- Power Supply 24 VDC

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Applications

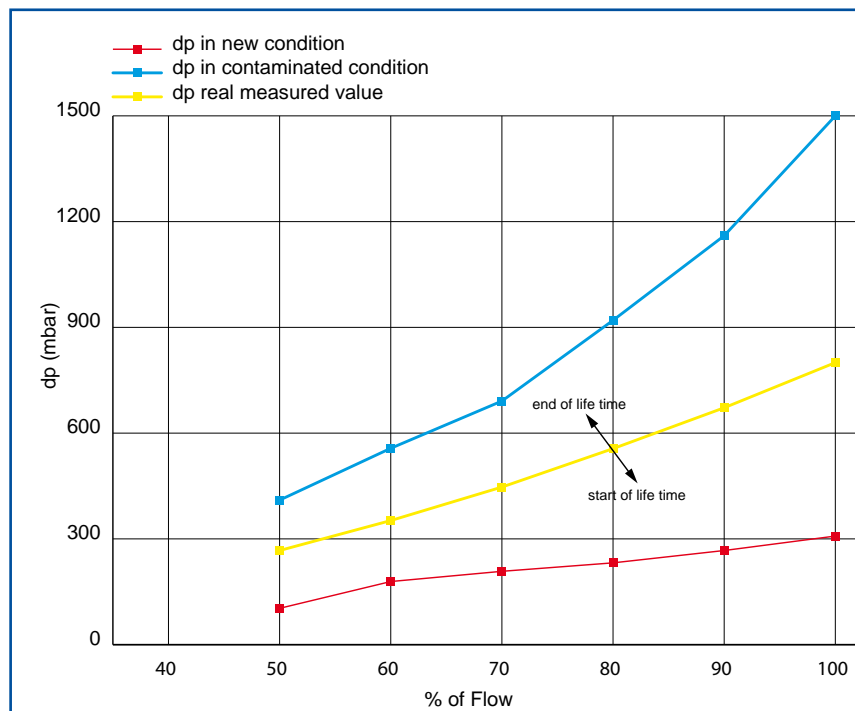
FAUDI Aviation DPGUARD® is a fully automated touch screen operated calculator to give out the corrected differential pressure across the filter elements (Monitor filters or Coalescers) in mobile or fixed filter vessels being operated at less than maximum rated flow.

The DPGUARD® automatically calculates the condition of the filter elements inside the vessel using the signal inputs of flow rate and differential pressure across the elements. It monitors the changing condition of the elements and provides a history (Oscillograph) so that element change times can be anticipated and abnormal conditions could be detected. It gives out the overall throughput (flow volume during lifetime) of the elements. It does a continuous differential pressure check calculating the corrected differential pressure, logging it and comparing the results against previously calculated numbers. If things are going wrong – Alarm functionality behind can be addressed to automatically stop the fuelling process without further interaction.



The system based upon the related joint standards as described in EI 1581, EI 1583, EI 1590 and EI 1596.

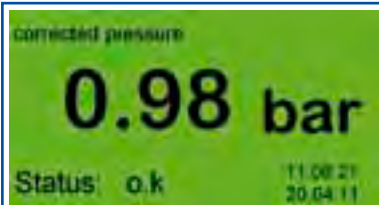
Sample Graph



Differential pressure values of monitor elements contaminated versus new elements

Function

The DPGUARD® catches up electrical signals from flow measurement (analogue input signals) and differential pressure measurement (one or two analogue signals) across the filter elements. These signals are the main information to calculate and give out the corrected differential pressure value. It does a continuous differential pressure check calculating the corrected differential pressure, logging it and comparing the results against previously calculated numbers. If things are going wrong – Alarm functionality behind can be addressed to automatically stop the fuelling process without further interaction.



Status ok

The corrected differential pressure as a mathematical calculation is ok. The calculation based on internal calculation relation and could be self adjusted during fully automated self learning step. (Patent pending).



Status Warning!

The corrected differential pressure is between user defined limits (predefined between ... % and 100 % of corrected differential pressure) Warning levels could be user defined and could be used to address Relay or digital output for further action.



Status Alarm! (blinking)

The corrected differential pressure is above the alarm limit (limit could be user defined in the configuration menu – in this case it is predefined to 1.5 bar) Alarm Status could be used to automatically stop fuelling processes due to Relay or digital output signal.

The main screen shows measured values like differential pressure and actual flow and gives out the calculated differential pressure value. Three different function / alarm-level related screen colours are available.

Technical Details

Power Supply	24 VDC ±10%
Memory	Internal Datalogger
Signal Transfer	Ethernet; USB; LAN/WLAN

Signal In- /Outputs			
	Qty.	Parameters	
Digital Input	8	24 VDC ±10%	10 mA
Digital Output	8	24 VDC	500 mA
Analog Input	4	0...10 VDC / 0...20 mA / Pt 1000	12 Bit
Analog Output	2	0...10 VDC	12 Bit
Counting Input	2	up to 5 kHz	min. pulse step 0,1 ms

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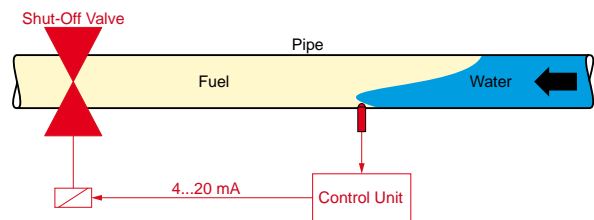
SLUGGUARD® - Water slug indication

Applications

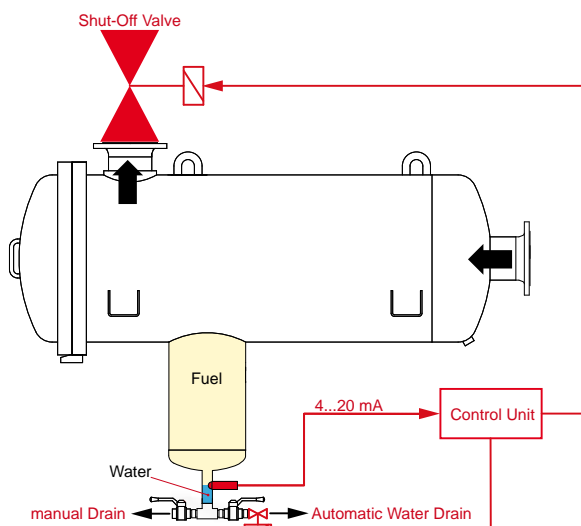
The SLUGGUARD of FAUDI Aviation GmbH is the best way to differentiate media with just one sensor to be installed in water sumps, drain-pipes, filter heads or wherever a clear indication about the actual water-situation is required. Connected to a control system enables the user to easily configure automated drainage of vessels according to JIG requirements.



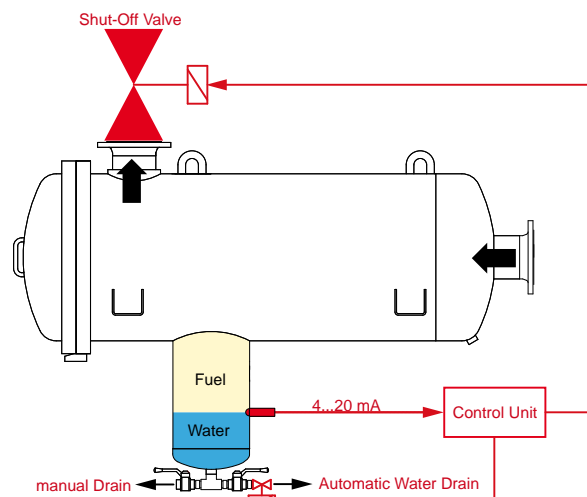
Slugguard



Sample of Application: Installation in a pipe



Sample of Application: Filter Water Separator



Sample of Application: Filter Water Separator

Technical Details

- Wetted parts in stainless steel and PEEK
- Compact design
- LED switch indicator available
- Preconfigured by FAUDI Aviation
- Process temperature -40 ... +115°C
- Precise switching point with no requirement for calibration
- Maintenance free
- Best for media separation
- ATEX approval
- Measures and differentiates media like water, Jet A1, Diesel (ask for different media)

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SLUGGUARD® - Water slug indication

Technical Data

Sensor

Radiated signal	100...180 MHz
Process connection	Refer to dimensional drawing
Insulating material	PEEK

Mechanical Data

Housing	Stainless steel
Amb. temperature	-40...85°C
Process temperature	-40...115°C
Protection class	IP67 (IEC 529)
Media pressure	max. 100 bar
Vibrations	IEC 60068-2-6, GL test 2
Installation	any position

Electrical Connection

Cable	10 meter, 4 wire
Plug M12	Plastic or Stainless steel 304

Other Electrical Data

Power supply	12...30 VDC, 35 mA max.
Damping	0...10 sec.
Power-up time	< 2 sec.
Hysteresis	± 1 mm
Repeatability	± 1 mm
Reaction time	0,1 sec. (100 ms)

Disposal of Product and Packing

According to national laws	
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EMC Data and Packing

Immunity	EN 61326
Emission	EN 61326
Internal inductivity	$L_i \leq 10\mu\text{H}$
Internal capacity	$C_i \leq 43\text{ nF}$
Barrier data	$U \leq 30\text{ VDC}; I < 0.1\text{ A}; P < 0.75\text{ W}$

Approval Ex ia IIC, ATEX II 1G

Supply range	24...30 VDC
Temperature class	T1...T4: $-40 < T_{\text{amb}} < 85^\circ\text{C}$ T1...T5: $-40 < T_{\text{amb}} < 74^\circ\text{C}$

Approval Ex ta IIIC T100 Da, ATEX II 1D

Supply range	12...30 VDC
Temperature class	T100°C: $-40 < T_{\text{amb}} < 85^\circ\text{C}$

Approval Ex NA II T5, ATEX II 3G

Supply range	12...30 VDC
Temperature class	T1...T5: $-40 < T_{\text{amb}} < 85^\circ\text{C}$

Output

Output (active)	Max. 20 mA, short-circuit and high-temperature protected
Output type	PNP or NPN
Output polarity	NO and NC
Active „High“	PNP (VDC -1.5V) ± 0.5V; $R_{\text{load}} 10\text{ kOhm}$
Active „Low“	NPN (VDC -1.5V) ± 0.5V; $R_{\text{load}} 10\text{ kOhm}$
Off leak current	± 100 µA max.

Factory Settings

Damping	0.1 sec.
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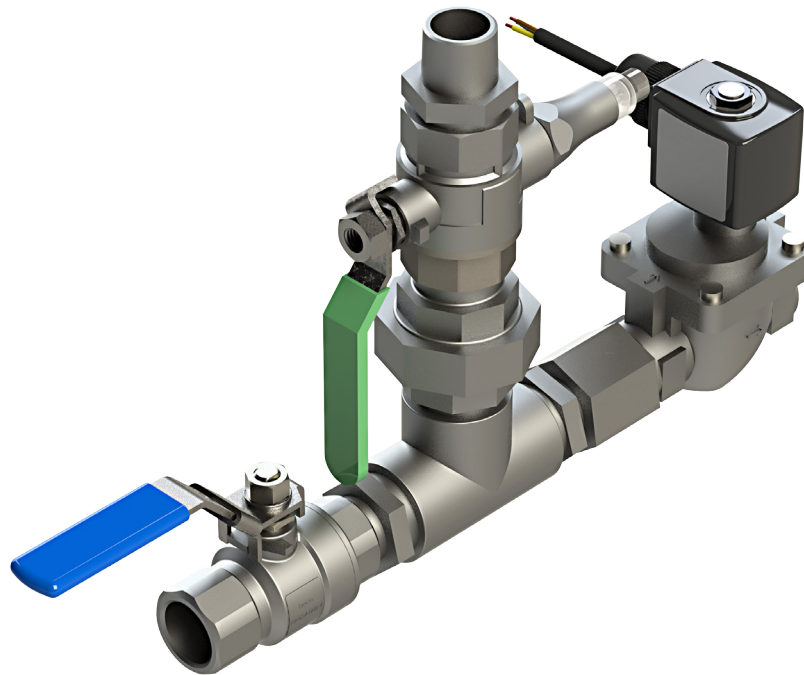
Approvals/Conformities

Approvals/ conformities	DNV Marine Approval EN 50155 Railway 3A, EHEDG, FDA, WHG (pending)
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Scope of delivery

	Article Description	Part No.
SLUGGUARD	SLUGGUARD ATEX approved, SS, <u>without</u> LED, process connection: G ½" nipple, electrical connection via M12 plug connector, PNP output	600 040
	SLUGGUARD ATEX approved, SS, <u>with</u> LED, process connection: G ½" nipple, electrical connection via M12 plug connector, PNP output	600 001
	Barrier with power supply LBFS	600 041
	Process Socket PM 20 G ½"	600 042
	Connection cable with M12 connector, 10 m	526 000

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Application

The **DRAINGUARD®- Sump** is a fully automated drainage system for water sumps of filter water separators. It is the preferred state of the art retrofit kit including about everything needed to generate a failsafe drainage system including the water defense functionality to shut down the flow in case of excessive water. The heart of the **DRAINGUARD®- Sump** is the FAUDI Aviation SLUGGUARD® sensor to detect and differentiate between water and fuel. In case of water the SLUGGUARD® sensor activates the enclosed electrical drain valve. The **DRAINGUARD®- Sump** is including a service valve to externally check the SLUGGUARD® sensor when required (even during operation).

Technical Details

- 24 VDC Power Supply
- Digital Signal Output
- Process temperature: 0 to +90°C*
- Ambient temperature: max. 55°C
- Process flow: 1 l/min
- Compact design
- LED switch indicator
- Best for sump water drainage
- ATEX approved**
- All Process Connections (G 3/4")
- Cable Length: 5 m
- Max. Design pressure: 16 bar

*Media temperature

** electrical components

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DRAINGUARD® - Sump

Scope of supply

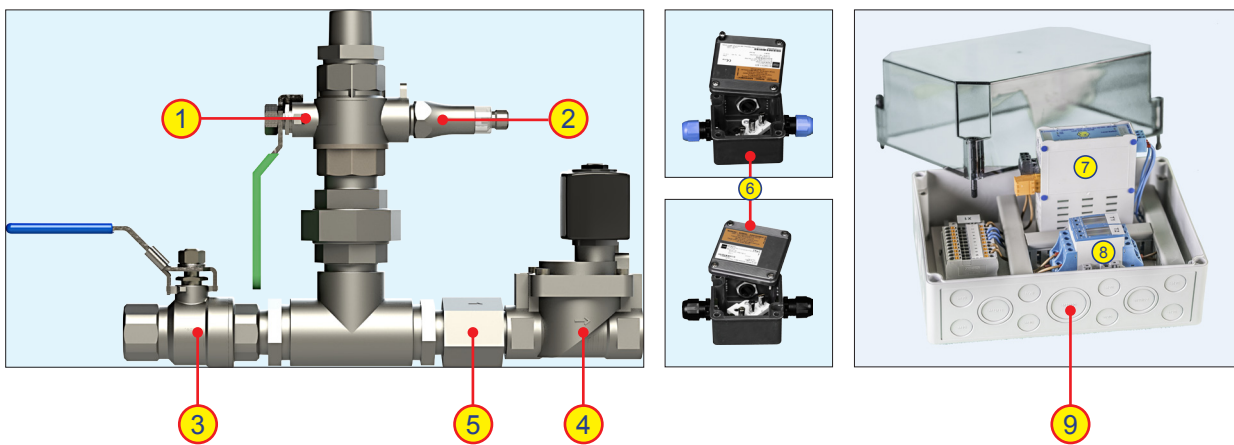
DRAINGUARD®- Sump unit consisting of:

①	1 x Service Valve for sensor access
②	1 x SLUGGUARD® Sensor
③	1 x Ball Valve (spring-loaded)
④	1 x 2/2-Way Solenoid Valve*
⑤	1 x Flow Limiter

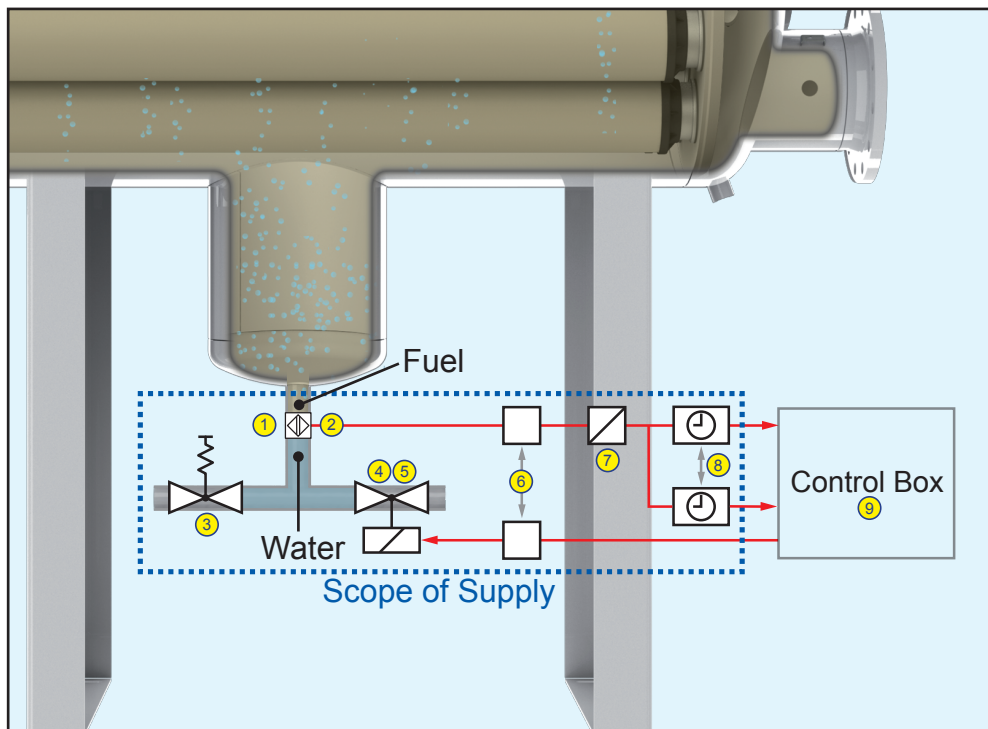
* servo assisted

⑥	2 x Cable Terminal (stand-alone)
⑦	1 x Barrier (stand-alone)
⑧	2 x Timing Relay (stand-alone)
⑨	1 x Connection Box** (optionally)

** Connection Box can be ordered when a switchboard is not available on-site. It consists the connecting block, separation stage (⑦) & the timing relays (⑧).



Sample of Application



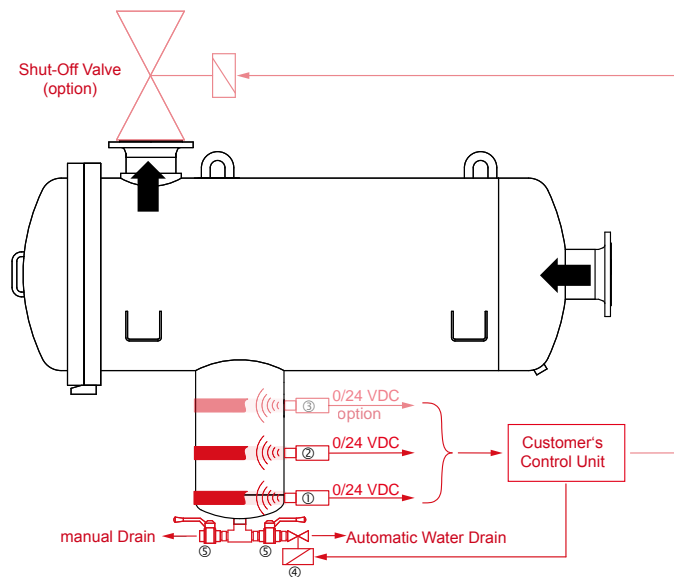
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* **SENSOR**

Applications

For contactless detection of interlayers in kerosine and other media to drain water from water sumps of filter water separators automatically and residual-free. The unit can be fitted on existing water sumps without any metall-cutting. A new pressure test of the vessel is not necessary after installation of the unit. SonicGuard® is working by modern ultrasonic technology and provides a binary signal (0/24VDC) for processing in electronic control units.



Technical Details

- For mobile and stationary applications
- Suitable for Jet A1, Jet A. Other fuels upon request
- Contactless measurement by ultrasonic
- Power supply: 18-24 VDC, max. 80 mA
- Output: NPN or PNP, 20 mA on 24 VDC power supply
- Accuracy: Static ± 1 mm (to Sensor center)
- Safety class: IP 67 (oil resistant), Hazardous area approved ATEX zone 1
- Residual-free water draining by timing relay possible if available by end user. (time for draining must be corresponding to the volume of water sump)
- Suitable for diameters of water sump up to 950 mm

Ordering Details

Pos.	Qty.	Article Description	Article No.	Spare Part	Wear Part
1	2 (3)*	Ultrasonic-Sensor SONICGUARD®	170 000	X	
2	1	High Performance Adhesive SONICGUARD®	530 000	X	
3	2 (3)*	Mounting Plate DN200 to DN1000 SONICGUARD®	531 000	X	
4	2 (3)*	Tie Strap SONICGUARD®	532 000	X	

* 3 pcs. on optional „Water Slug Detection“

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The dp-SWITCH conversion kit fully complies to JIG 58 bulletin requirements. It is stated there that all Hydrant Servicers with Filter Monitor vessels should be retrofitted by end of December 31th 2013.

Different versions of dp-switch conversion kits are available:

- Safe Area conversion kit
- Hazardous area approved conversion kit

All kits consists about stainless steel proximity switches to be retrofitted on existing dp gauges, sensor cable to inter connect with related electronic with safety relay and key operated switch to reset the safety relay when activated. There is no additional need. FAUDI Aviation GmbH dp-switches adapts to all refueling vehicles anywhere across the globe independent of manufacturers / year of construction or dp gauge manufacturer. They could easily be retrofitted by your own or by the use of our worldwide service support.

Technical Details

Power Voltage	18 - 30 VDC	
Power Consumption	10 mA	
Signal Voltage	18 - 30 VDC	
Signal Current	10 mA	
Max. Switching Power	50 W	
Max. Switching Voltage	100 VDC	
Max. Switching Current	2 A	
Hazardous area approved version		II (1) GD [EEx ia] IIC
Operating Temperature	-30 to + 60 °C	

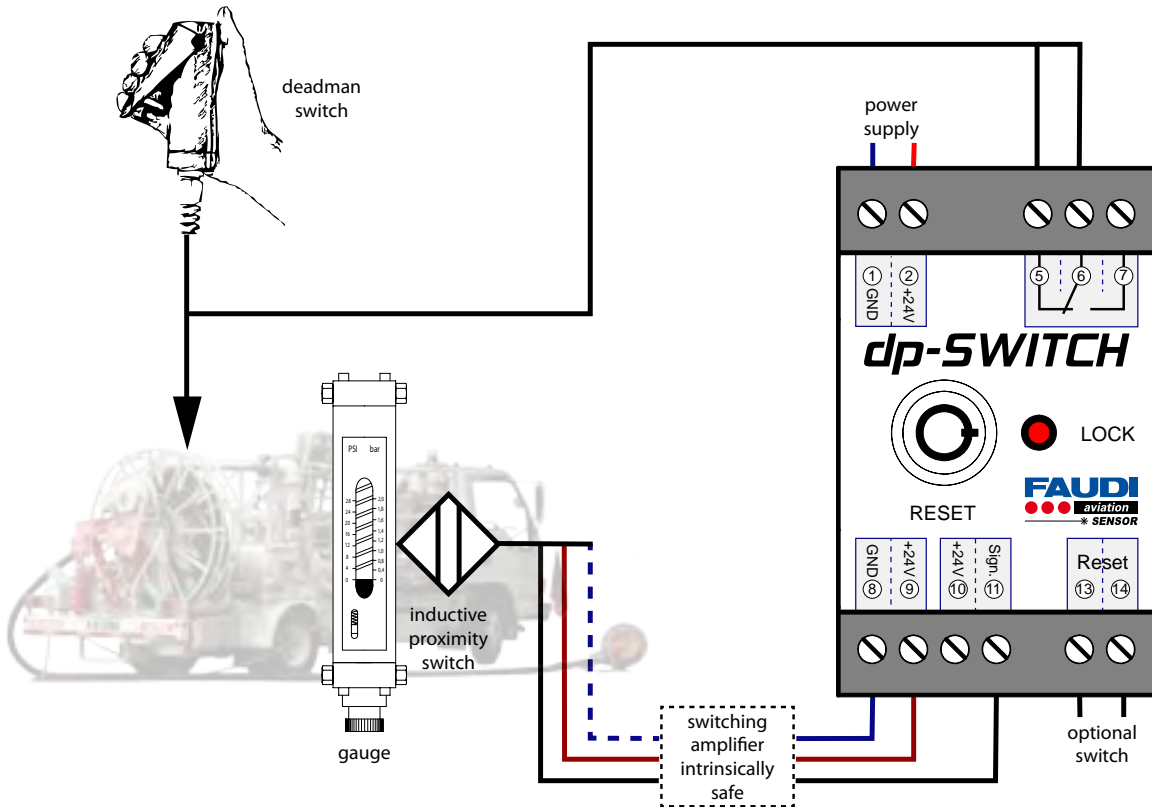
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dp-SWITCH

Schematic Diagram



Scope of Delivery

dp-SWITCH Safe Area Kit	Article Description	Part No.
	Conversion Kit (consisting of)	160 000
	- Mounting Parts	360 000
	- Proximity Switch	524 000
	- Connection Cable (10 m)	526 000
	- dp-SWITCH Safety Relais (with Reset Key)	600 025

dp-SWITCH ATEX Kit	Article Description	Part No.
	Conversion Kit (consisting of)	160 500
	- Mounting Parts	360 000
	- Proximity Switch (ATEX)	524 100
	- Intrinsically Safe Barrier (with Power Supply)	525 000
	- Connection Cable (10 m)	526 100
	- dp-SWITCH Safety Relais (with Reset Key)	600 025

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WTS Water Treatment System

Application

The intended use of the Water Treatment System WTS is the recovery of collected water being contaminated with solid particulates and fuel (oil) that will need to be separated from the water before it can be discharged to surface water drains.

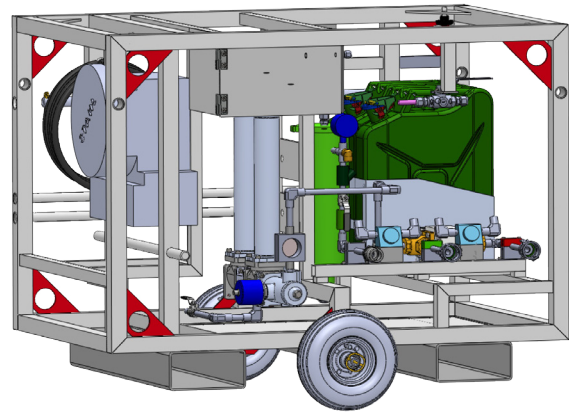
The WTS provides the capability to pump the collected water from the contaminated area into a system that separates any oil and solid particulates from the water.

WTS is been ATEX approved for operation within a zone 2 hazardous area (minimum requirement) and therefore compliant with the ATEX directive.

The WTS has been designed for simple operation and calibration. It incorporates a calibrated oil/alarm/monitor that controls the separation process. This monitors the oil ppm content in the treated water and only permit discharge if the oil ppm content is below the alarm level. If the oil content in the treated water is greater than Alarm level then the discharge will be stopped and the treated water returned to the contaminated area retained for further treatment.

The control system provides the user with clear information on the quality of the water being discharged from the system. This information is been displayed in terms of ppm of oil in the water. If the discharged water is introduced into the seas, strict directives require special attention. Depending on area, different oil content limits must be complied with.

If PW or bilge water is to be introduced into the seas, the residual oil content must not exceed a concentration of 15 to 40 ppm on average, depending on area. Other inland applications require much harder limits (e.g. 5 ppm).



WTS is been designed to achieve residual hydrocarbon levels of less than 5 ppm.

Technical Data

- Zone 1 ATEX approval
- Semi automated
- Hydraulic driven
- Three stage filtration (pre-filter, two stage coalescers)
- Two 20 l waste containers
- Scattering light sensor
- Automatic filter head drainage
- Manual flow valve
- Automatic valves for drainage
- Automatic valve for treated water
- Mobile (handles, wheels and fork lifting pockets)
- Manual differential pressure
- Manual level control

Available Systems

Type	Performance (m ³ /h)	Target (ppm)	Max oil content (%)	Size (without pump) L x W x H (mm)	Weight (kg)
WTS-500	0.5 m ³ /h	5 ppm	3%	1,200 x 800 x 900	145
WTS-1000	1.0 m ³ /h	5 ppm	3%	1,200 x 800 x 900	148
WTS 2000	2.0 m ³ /h	5 ppm	1.5 %	1,200 x 800 x 1.300	160
WTS-4000	4.0 m ³ /h	5 ppm	1.5 %	1,200 x 800 x 1.300	180

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Pump Energy Saver

hansa^{hc}consult
Ingenieurgesellschaft mbH

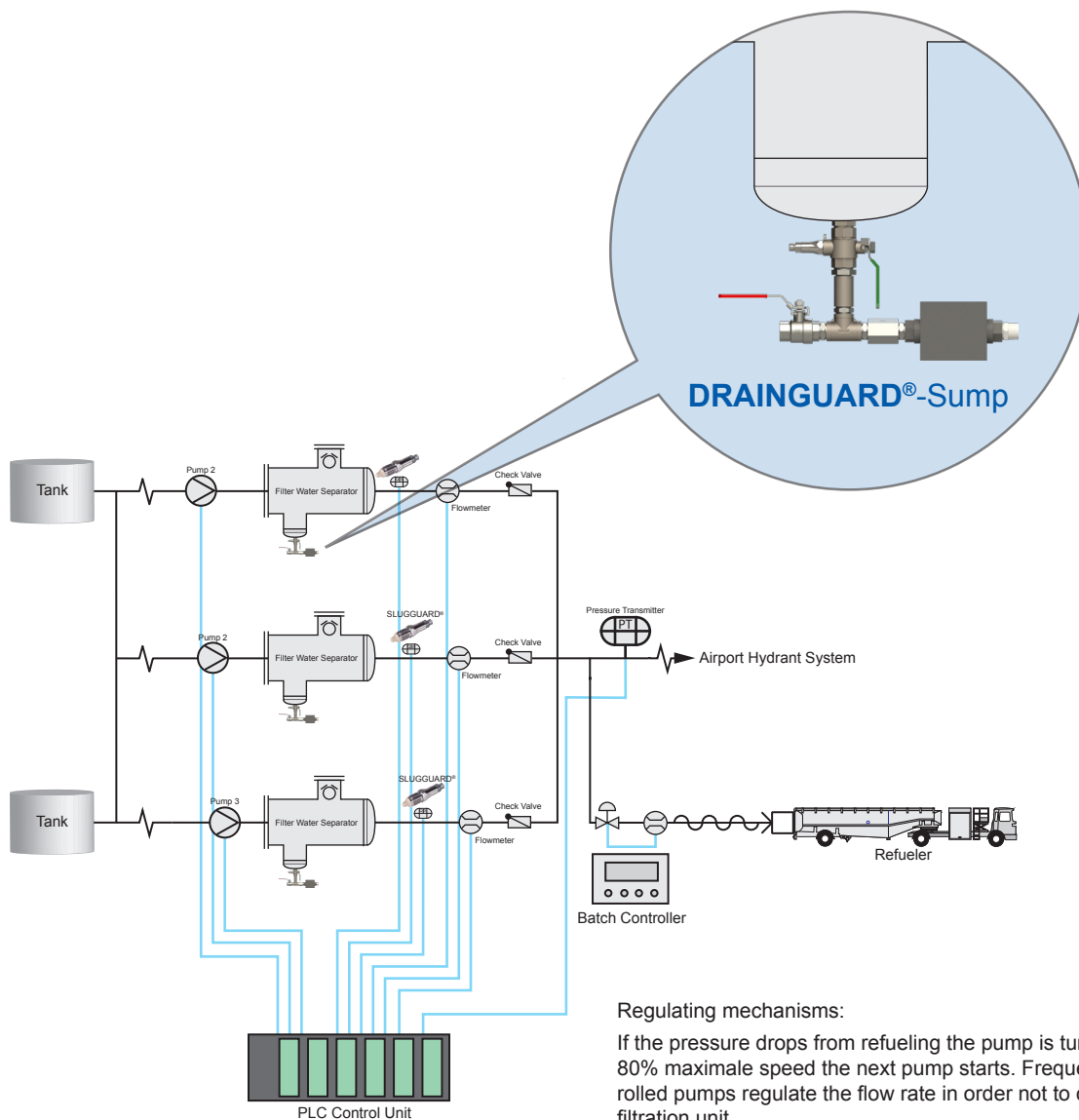
a joint product development

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In a joint product development HANSACONSULT and FAUDI Aviation has developed a solution to reduce this costs significant!

Application

A typical installation with the Pump Energy Saver is shown at the below diagram



INFORMATION

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Pump Energy Saver

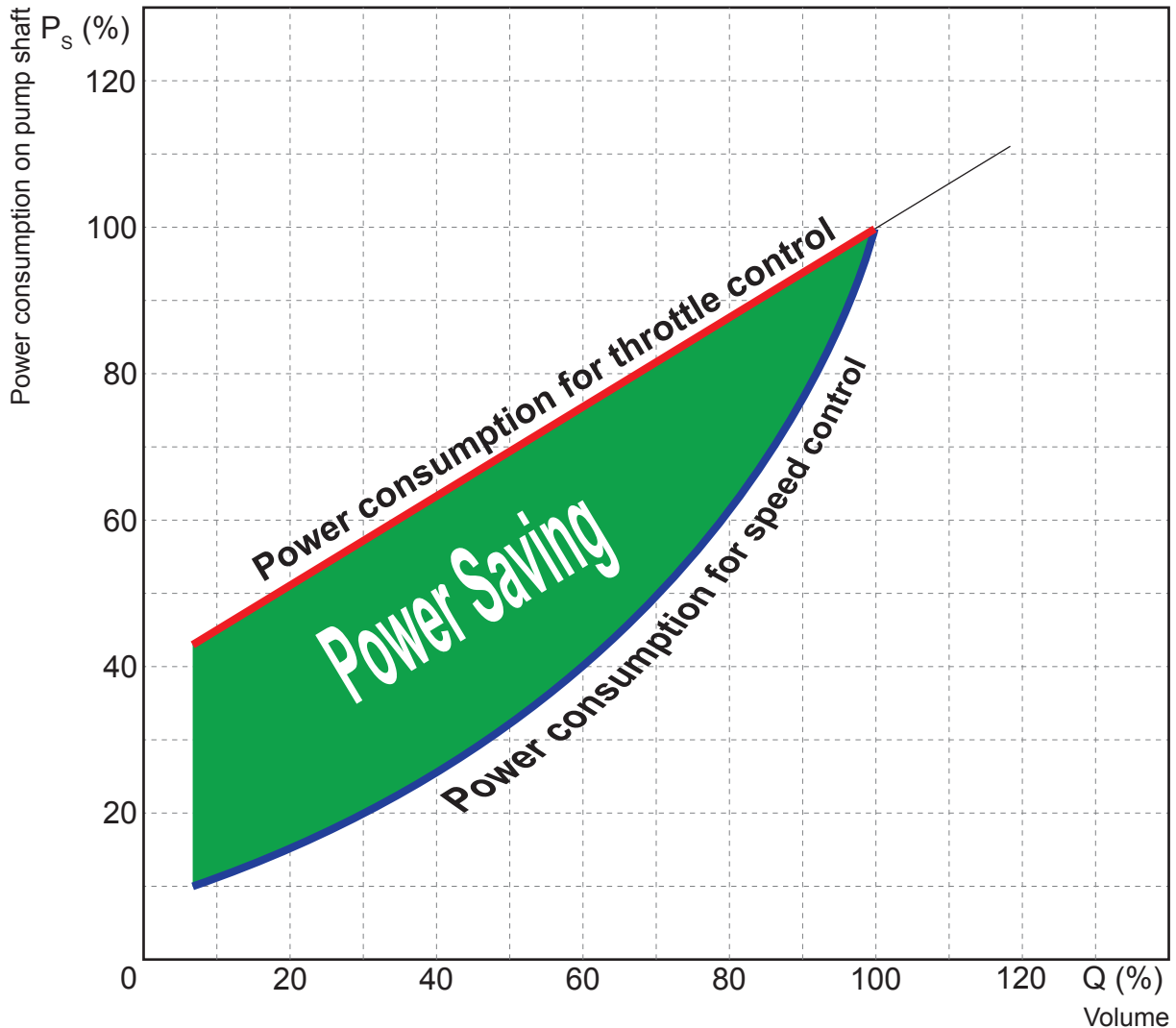
Increasing the pump speed by 10% means

- the volume flow increases with 10%
- the head increases with 21%
- the power consumption increases with 33%

The purchase price of a pump is only a fraction of the total life-cycle cost. Maintenance is a significant cost factor but the majority of operating costs is the energy consumed.

Extract from EI 1540 capt. 5.12.1:

Energy savings with Pump Energy Saver



- ▶ Save in electricity costs up to 30%
- ▶ Save investment costs by avoiding expensive mechanical parts
- ▶ Reduce electrical maintenance costs
- ▶ Reduce carbon footprint

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