

AUTOFLUG FUEL GAUGING SYSTEM OVERVIEW



	Sensor Type	Mechanical Interface	Measurement Principle	Function	Specialty
	Fuel Gauge Transmitter Type 1	flange mounted bottom	capacitance	fuel height sensing fuel type compensation	multifunctional sensor package, independent level sensing
			optical	high level sensing low level sensing	
	Fuel Gauge Transmitter Type 2	flange mounted bottom or sloping	capacitance	fuel height sensing	light weight, independent level sensing
			optical	high level sensing	
	Fuel Gauge Transmitter Type 3	flange mounted top, bottom or sloping	capacitance	fuel height sensing	light weight
	Fuel Gauge Transmitter CAN bus	flange mounted top or bottom	capacitance	fuel height sensing	CAN bus, fuel mass calculation
			thermistor	fuel temperature compensation	
	Fuel Gauge Transmitter Flexible	flange mounted top or bottom (in guiding tube)	capacitance	fuel height sensing	precise gauging capabilities in difficult and complex fuel tank geometries
	Fuel Level Sensor	clamp mounted	capacitance	fuel level sensing	high accuracy and extended temperature range
	Fuel Gauge Transmitter	clamp-clamp mounted top, bottom or sloping	capacitance	fuel height sensing	light weight, easy to install, internal fuel tank mounting
	Signal Conditioning Unit (SCU)	wall mounted	communication with other avionic systems via CAN bus, ARINC 429, MIL BUS 1553 B and others e.g. TTP, RS 232, discrete I/O		
			fuel quantity calculation in consideration of fuel type and fuel characteristics as well as flight attitude and acceleration compensation		
			pump and valve control		
			independent level sensing		
	Auxiliary Fuel Tanks	Crashworthy Fuel Tanks for Helicopters			



PIONEER AND DRIVER OF INNOVATION IN RESCUE AND SAFETY TECHNOLOGY.

Thinking Safety – AUTOFLUG is true to this motto. A medium-sized family firm now in the third generation, AUTOFLUG has been a leading provider of products and services since the early days of aviation, specifically focusing on rescuing people and ensuring their safety.

As a globally recognized supplier and service partner of the international aviation industry and for defence technology, the company with approximately 250 employees develops, produces and services a wide range of textile, mechanical and electronic components and systems, among others.

AUTOFLUG, based in Rellingen (Schleswig-Holstein, Germany), has decades of experience and expertise in the areas of rescue and safety, ergonomics, textiles, mechanical systems, precision engineering, electronics, software as well as measurement and control technology.

The AUTOFLUG range of products and services comprises:

- Safety seats for helicopters, transport aircraft and land vehicles
- Maintenance and repair of Martin-Baker ejection seats for the German Air Force
- Harnesses and restraint systems for aircraft and land vehicles
- Protective equipment for pilots, such as NBC and anti-G suits
- Personal survival packs (PSPs)
- Rescue parachutes, brake parachutes and recovery parachute systems
- Fuel measuring and control systems for aircraft and land vehicles
- Technical / logistical support: technical logistics, technical documentation, training solutions, obsolescence management

AUTOFLUG GMBH • INDUSTRIESTR. 10 • 25462 RELINGEN, GERMANY
 PHONE: +49 4101 307-0 • FAX: +49 4101 307-110 • SALES@AUTOFLUG.DE
 WWW.AUTOFLUG.DE

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Fuel Systems
 for Aerospace, Land Vehicle and Industrial Applications



RECOGNIZED SYSTEM EXPERTISE IN FUEL MEASURING TECHNOLOGY AND CONTROL ENGINEERING.

AUTOFLUG FUEL SYSTEM CAPABILITIES

For decades AUTOFLUG has designed and developed Fuel Quantity Measurement and Fuel Management Systems for fixed-wing aircraft, helicopters, unmanned aerial systems (UAS) and armoured land vehicles. AUTOFLUG delivers:

AUTOFLUG fueISENS

- Fuel Gauge Transmitter (rigid and flexible)
- Free Water Detector
- Fuel Level Sensor
- Fuel Compensator
- Temperature Sensor

AUTOFLUG fueIDATA

- Fuel Management Controller
- Data Concentrator
- Signal Conditioning Unit
- Cockpit Fuel Panel
- External Fuel Panel

AUTOFLUG fueIPLUS

- Crashworthy Fuel Tanks for Helicopters

Fuel Sensor Technologies

Active Capacitance Type, Optical Rigid and Flexible Versions

Sensor Output Signals

Frequency modulated, Pulse Width Modulated (PWM), CAN bus, TTP and others.

Installation Options

Rigid Sensors available in flange, clamp and spring loaded versions. Flexible Sensors installed in guiding tubes (straight or bended as required.)

AUTOFLUG ENGINEERING CAPABILITIES

The AUTOFLUG design and development capabilities include:

- Fuel gauging and fuel management layout, design and integration
- Hardware, Software and Functional Specifications
- Multifunctional fuel sensor design and integration
- Sensor adaptation to customer requirements
- Control Unit system design
- Software design
- Reliability, Maintainability, Testability predictions
- Qualification
- Documentation
- Integrated Logistic Support (ILS)

AUTOFLUG fueISENS & fueIDATA - FLEXIBLE, SMART AND MODULAR SOLUTIONS.



AUTOFLUG fueISENS

AUTOFLUG provides a wide range of Fuel Gauge Transmitters and Fuel Level Sensors. AUTOFLUG Fuel Sensors are based on company standardised components such as tubes, flanges, level sensors, electronics, cables and connectors.

In short time prototypes can be configured, built, tested and qualified. Series production can follow immediately thereafter.

AUTOFLUG performs fuel tank studies based on customer supplied CAD data in order to define the required quantity and position of Fuel Sensors. A Fuel Compensator can be integrated into the Fuel Quantity Measurement System to improve accuracy by compensation for different fuel types and fuel temperatures.

The fuel gauging length can be adapted in accordance with customer requirements.



FLEXIBLE FUEL GAUGE TRANSMITTER

The AUTOFLUG flexible Fuel Gauge Transmitter is designed to measure fuel in complex, difficult to access and/or large tank geometries. The sensor is mounted by means of a flange.

For installation in the fuel tank, a guiding tube for the Fuel Gauge Transmitter will be pre-installed into a complex fuel tank section. The flexible sensor part will be installed into this guiding tube and the flexible sensitive element follows the shape of the guiding tube. As an alternative the sensor can be provided with a guiding tube and the complete assembly will thereafter be mounted into the fuel tank.

The flexible sensor is an active capacitance type sensor. The capacitor's conductive surfaces are provided by a plastic structure. The measured capacitance is dependent on the fuel height at the sensor.

AUTOFLUG fueIPLUS - EXTENDED RANGE SYSTEMS - CRASHWORTHY, SAFE, RELIABLE, MAINTAINABLE.



AUTOFLUG AUXILIARY FUEL SYSTEMS

AUTOFLUG provides crashworthy Auxiliary Fuel Tanks for helicopters. The Auxiliary Fuel Tanks are used to extend flight time and operating range.

The crashworthy design of the Auxiliary Fuel Tanks protects the occupants such that survivable crashes do not result in post-crash fires leading to fatalities or thermal injuries.

Tanks are available in different shapes and sizes ranging from as low as 30 gallons up to 800 gallons of fuel. Auxiliary Fuel Tanks are easily installed or removed without the use of tools. Auxiliary Fuel Tanks can be provided with self-sealing capability.

Fuel Quantity Gauging of Auxiliary Fuel Tanks is provided by AUTOFLUG active capacitance type Fuel Gauge Transmitters that can either be interfaced directly to the avionics or be connected to an AUTOFLUG Indicator or Signal Conditioning Unit.

Auxiliary Fuel Tanks can provide gravity or pressure refueling capabilities.

AUTOFLUG fueIDATA

The AUTOFLUG Signal Conditioning Units (SCU) are designed and manufactured in various configurations for Fuel Quantity Measurement Systems (FQMS) and Fuel Management Systems (FMS).

AUTOFLUG Signal Conditioning Units perform the following major functions:

- Fuel Quantity Measurement
- Fuel Level Sensing (independent)
- Fuel Management
- System Monitoring and Built-In Test

The SCU contains different electronic circuitry designed in accordance with RTCA/DO-254 to satisfy all functional and environmental requirements.

The AUTOFLUG SCU software is of modular design and can be tailored to a specific application with minimized programming effort. The Software is developed and verified in accordance with RTCA/DO-178B.

