

# SATAM

A Guidant Measurement Company



# Measuring Systems

**Satam measuring systems are designed for the custody transfers measurement of liquid hydrocarbons and non-corrosive liquid chemicals.**

## Areas of activity

- Oil depots
- Transportation of fuel and other energy source liquids
- Aircraft fuelling operations
- Marine and general vehicle fuelling operations
- Additive control, colouring, and blending of fuels

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ZCE5



ZCE6



EMS

## DEPOT APPLICATIONS

### Measuring systems for truck and railcar loading

**ZCE5**  
**ZCE6**  
**EMS48**

The Satam line of metering units for depot applications is designed for truck and train tankers loading stations in a top or bottom loading configuration. The compact, vertical or horizontal measuring unit enables easy installation in smaller facilities.

## Sectors of application

- Tanker trucks and railcars loading meters
- Preparation of bio-fuels by means of online or batch blending
- Measurement of white products and bio-fuels
- Additive injection control



## Key Points

### Low maintenance cost

Simple and robust construction with minimal moving mechanical components

### Low installation cost

Compact metering unit for installation in smaller areas

### Safe Use

Measuring system supplied "fully assembled" and tested in the factory in order to ensure maximum reliability

### Measurement stability and accuracy

Measurement accuracy guaranteed over a period of many years without any deviation in the calibration curve

### Modular Design

Extensive line of accessories to create customised measurement applications

## Measuring systems for truck and railcar loading

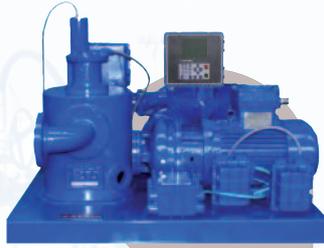
Application			Truck and railcar loading				Truck loading
Measuring system			ZCE5	ZCE6	ZCE6 M	ZCE6 T	EMS48
Strainer-gas elimination device	EC42/FS24	3" / 2"					•
	EC29	3" - 4"	•				
	EC31	3"		•	•	•	
	EC32	4"		•	•	•	
	EC39	6"		•	•	•	
Meter	ZC17-48	2"	•				•
	ZC17-80 150	3" - 4"	•	•			
	ZC17-250	6"		•			
	ZC17-330	8"		•			
	MFM	2" à 4"			•		
Flow register	Turbine	3" - 4"				•	
	VR (mechanical)		•	•			•
Multi-function valve	Equalis (electronic)		•	•	•	•	•
	XAD39	2"					•
Multi-function valve	XAD37	3"	•	•	•	•	
	XAD36	4"	•	•	•	•	
	XAD	6"		•	•	•	
	XAD	8"		•	•	•	

Measuring system		ZCE5	ZCE6	ZCE6 M	ZCE6 T	EMS48
Maximum flow rate	m³/h	80-150	80-150-250-330	430	300	48
	l/mn	1333-2500	1333-2500-4166-5500	7167	4888	800
	USGPM	360-660	360-660-1100-1453	1935	1320	210
Description		Vertical unit	Horizontal unit	Vertical or horizontal unit		Horizontal unit
Measured parameters		Actual volume, temperature-corrected/base volume*, mass*, flow rate**, temperature* (*: only for electronic register version) (**: option for mechanical register version)				
Measured liquids		Petrol, premium fuels, diesel, E5 ... E85, bio-diesel, ethanol, methanol, kerosene, fatty acid methyl ester, oils				
Equipment		50 to 450µ Filtering (270 to 40 Mesh) depending on the liquid – not necessary for ZCE6 M Gas release controlled by float and differential valve				
	Strainer - Gas elimination device					
	Meter	PD Meter		Mass flowmeter	Turbine	PD Meter
	Temperature measurement	4-wire Pt100 (option for electronic calculator version)				
	Multi-function valve	Small and large flow, authorisation, flow limitation Electrical control for DN 2" to 6" and mechanical control for DN 2" to 4"				
	Flow register	Mechanical register with preset*, printer*, pulser* or Equalis electronic register with display, secure archiving of transactions				
Operating Conditions						
	Maximum pressure	10 bar				8 bar
	Maximum viscosity	20cSt - Ask us about greater viscosities.				
	Temperature	Ambient -20 to +60°C / Liquid -10 to +80°C Ask us about higher or lower temperatures				
Metrological performances						
	Volume accuracy	< 0.15% - Option < 0.1% - for measurement range of 10 : 1				
	Volume repeatability	< 0,02%				
	Temperature accuracy	≤ 0.5°C				
Installation						
	Protection class	IP66 for electronic register version				
Custody Transfer approvals		MID - EC Type Exam. Certificate n° LNE 6184 OIMLR117 n°LNE 24351	MID-EC Evaluation Certificate n°LNE 11052 (ZC17) OIML R117 Type Compliance Certificate n° LNE-24351 (ZC17, Equalis)			MID - EC Type Exam. Certificate n° LNE 11123 OIMLR117 n°LNE 24351

\* option



ZCE11-80



ZCE21



ZCE29

## DEPOT APPLICATIONS

### Reception units - Transfer units

### Process measuring systems

**ZCE 6**  
**ZCE11**  
**ZCE21**  
**ZCE29**

Satam reception units are designed for applications that involve the delivery of hydrocarbons to oil depots and service stations made by tanker truck, tanker train, tanker ship and pipeline.

The ZCE11 is designed for the measurement of fuels delivered by gravity from the tank to an underground storage tank. Equipped with a mechanical register and a mechanical printer, it can operate in a completely autonomous mode, if necessary.

The ZCE21 has an integrated pumping unit and is supplied pre-cabled, tested and mounted on a support frame.

It allows for immediate use without requiring electrical cabling and complex hydraulic connections. It is a compact design and can be easily installed in small areas.

The ZCE6 and ZCE29 are reception units dedicated to the measurement of pressurized liquids.

The ZCE 6 serie is a large capacity metering system for the measurement of refined products transported through pipelines and via ship tankers.

## Areas of application

- Tanker truck unloading operation
- Fuel delivery to service stations
- Measurement of products transferred via pipeline
- Ship loading and unloading



## Key Points

### > Low maintenance costs

Simple and robust construction with few moving mechanical components

### Available in an autonomous version (ZCE11)

Compact measurement system that operates without an electrical or pneumatic power source.

### Flexibility of installation

The measuring equipment comes completely assembled and tested.

Direct Connection to truck and storage tank tubing

### Safe to use

Automatic gas purge system to allow start-up with empty tubing

Filtering with automatic clogging detection

## Reception units - Transfer units - Process measuring systems

Application			Gravity feed truck reception units		Reception units with pump for truck and railcar			Metering systems for pipelines and ships loading and unloading	
Measuring Equip. Set			ZCE11 48	ZCE11 80	ZCE21	ZCE29	ZCE6	ZCE6	ZCE6 T ZCE6 U
Strainer - gas elimination device	EC42/FS24	3"/2"	•						
	Air vent valve (before pump)					•	•		
	EC41/60				•				
	EC31	3"				•	•	•*	•*
	EC32	4"				•	•	•*	•*
	EC35			•					
Meter	EC39	6"					•*	•*	
	ZC17-48	2"	•						
	ZC17-80	3"		•	•	•	•	•	
	ZC17-150	4"				•	•	•	
	ZC17-250	6"						•	
Flow register	ZC17-330	8"						•	
	Turbine/Ultrasonic								•
Multi-fonction valve	VR (mechanical)		•	•	•	•	•	•	•
	Equalis (electronic)		•	•	•	•	•	•	•
Electro-pump	XAD39	2"							
	XAD37	3"			•		•	•*	•*
	XAD36	4"					•	•*	•*
	XAD	6"					•	•*	•*
	XAD	8"						•*	•*
	XAD49	3"		•					
Check valve						•			
					•	•*	•*		

\* optional according to the application conditions

Ensemble de mesurage		ZCE11 48	ZCE11 80	ZCE21	ZCE29	ZCE6	ZCE6 T/U
Maximum flow rate	m <sup>3</sup> /h	27	45	60	80 - 150	80-150-250-330	2500
	l/mn	450	750	1000	1333-2500	1333-2500-4166-5500	41660
	USGPM	121	200	264	360 - 660	360-660-1100-1453	11000
Description		Gravity group		Pump-equipped group	Horizontal group	Horizontal group	Vertical or horizontal group
Measured parameters		Actual volume, temperature-corrected/base volume*, mass*, flow rate**, temperature* (* : only for electronic register version) (**:option for mechanical register version)					
Measured liquids		Petrol, premium fuels, diesel, E5 .. E85, bio-diesel, ethanol, methanol, kerosene, fatty acid methyl ester, oils					
Equipment							
	Gas elimination device - Strainer	Filtering 50 to 450µ (270 to 40 Mesh) depending on the liquid– not necessary for ZCE6 U Gas release controlled by float and differential valve					
	Meter	PD Meter					Turbine/Ultrasonic
	Temperature measurement	4-wire Pt100 (option for electronic calculator version)					
	Multi-fonction valve	Small and large flows, authorisation, flow limitation Electrical Control for DN 2" to 6" Mechanical Control for DN 2" to 4"					
	Flow register	Mechanical register, preset *, printer*, pulser *, (* : option) or Equal is electronic register with display, secure archiving of transactions					
	Electro-pump	-	-	Centrifugal	-	-	-
Operating Conditions							
	Maximum pressure	8 bar	10 bar				
	Maximum viscosity	20cSt – Contact us about higher viscosities					
	Temperature	Ambient -20 to +60°C / Liquid -10 to +50°C – Contact us about higher and lower temperatures					
Metrological performance							
	Volume accuracy	< 0.15% - Option < 0.1% - for measurement range of 10 : 1					
	Volume repeatability	< 0,02%					
	Temperature accuracy	≤ 0.5°C					
Installation	Protection class	IP 66 for electronic register version					
Custody transfer approvals		MID-EC Evaluation Certificate n° LNE 11052 (ZC17) MID-EC Type Examination Certificate n°LNE 19549 (ZCE21) MID-EC Type Examination Certificate n°LNE 28039 (ZCE11) OIML R117 Type Compliance Certificate n°LNE-24351 (ZC17, Equalis, ZCE5, ZCE21)					



EMS



ZCE26

## TANKER TRUCK MEASUREMENT

### Onboard metering units

## EMS

### ZCE 26

Satam onboard metering units are designed for measurement under pressure on a tanker truck and, in particular, for fuel tankers.

They can be supplied with an electronic batch controller that ensures secure archiving of transactions but also monitoring of controls associated with the loading operations such as bottom valve, pump, throttle valve control, and injection of additives. It also ensures, as a standard feature, the transmission of data to an onboard IT system by means of a field network or a USB port.

They can also be equipped with a wireless system that provides direct transmission of the delivery transactions to a host station located in the local administrative building.

### Sectors of application

- **Delivery of heating oil to individuals**
- **Delivery of fuels to service stations**
- **Delivery of fuels to worksites, ships, boiler rooms**



### Key Points

#### > **Compact design**

Simplified installation on the fuel delivery tanker

#### **Flexibility of use**

Flow computer with secure archiving of transactions and monitoring of commands associated with the loading (throttle valve, pump clutch, bottom valve, publishing of the delivery notice or invoice).

#### **Easy to use**

Mechanical register and printer version with autonomous operation without an external electrical or pneumatic power source

#### **Multi-product metering**

Automatic hose purge management software included into batch controller

#### **Safe to use**

"Dry" gas eliminator with no need of gas removal pipe connected to the first compartment

#### **Environmental protection**

Sealed system to prevent any possibility of spilling liquid if the tanker falls upside down

## Onboard metering units

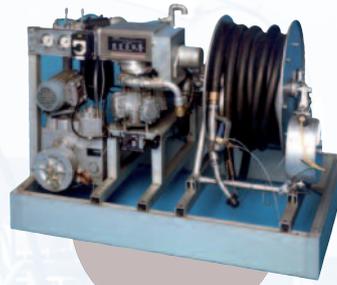
Application		Measuring unit for tank truck distribution		
		ZCE26 With "dry" gas eliminator	EMS24	EMS48
Strainer – gas elimination device	EC42/FS24 3"/2" with check valve		•	•
	EC48 3"/2" with check valve	•		
Meter	ZC17-24 2"	•	•	
	ZC17-48 2"	•		•
Flow register	VR (mechanical)		•	•
	Equalis (electronic)	•	•	•
Multi-function valve	XAD39 mechanical		•*	•*
	XAD39 electrical	•*	•*	•*
	XAD54 pneumatic	•*	•*	•*

\* optional supply

Measurement Equipment		ZCE26	EMS24 / 48
Maximum Flow rate	m <sup>3</sup> /h	48	24/48
	l/mn	800	400/800
	USGPM	210	105/210
Description		Compact unit with "dry" gas eliminator	Compact unit
Measured parameters		Actual volume, temperature-corrected/base volume*, mass*, flow rate*, temperature* (* : only for electronic register version)	
Measured liquids		Petrol, premium fuels, diesel, E5 ... E85, D5 ... D85, bio-diesel, ethanol, methanol, kerosene, fatty acid methyl ester, oils, non-corrosive liquids	
Equipment	Strainer	Stainless steel, horizontal basket strainer 450µ (gas/oil) or 200µ (petrol)	
	Gas elimination device	<ul style="list-style-type: none"> <li>• Float to control pneumatic gas elimination valve</li> <li>• Sealed system for environmental protection</li> <li>• Pressure switch for high flow rate control</li> </ul>	<ul style="list-style-type: none"> <li>• Gas release controlled by float and differential valve</li> </ul>
	Meter	PD Meter model ZC 17 24 & ZC17 48	
	Temperature measurement	4-wire Pt100 (option for electronic register version)	
	Multi-function valve	Low and high flow rate, authorisation, restriction of flow rate, mechanical, electrical or pneumatic control	
	3-way valve	Distribution to hose on reel or to short hose	
	Flow register	Mechanical register with preset*, printer*, pulser* (* : option) or Equalis electronic register with display, secure archiving of the transactions, measured distribution control (bottom valve, pump, start/stop engine)	
Operating Conditions	Maximum pressure	8 bar	
	Maximum viscosity	20 cSt – Contact us about higher viscosities	
	Temperature	Ambient -20 to +60°C / Liquid -10 to +50°C - Contact us about higher or lower temperatures	
Metrological Performance	Volume accuracy	< 0.15% - Option < 0.1% - for measurement range 10 :1	
	Volume repeatability	< 0,02%	
	Temperature accuracy	≤ 0.5° C	
Installation	Protection class	IP66 for electronic register version	
	Custody transfer approvals	MID-EC Evaluation Certificate n° LNE 11052 (ZC17) MID-EC Type Examination Certificate n° LNE 11123 (EMS24 and EMS48) and LNE n° 15769 (ZEC26) OIML R117 Type Compliance Certificate n° LNE-24351 (ZC17, EMS24, EMS48)	



ZCE17



Aircraft refuelling unit



Q200

## FUEL DISTRIBUTION APPLICATIONS

**Measuring unit for aircraft refuelling,  
Fuel distribution for seaports, worksite  
machinery, industrial vehicles**

## ZCE17 REFUELLING UNIT FUEL DISPENSER

This product line is designed for the refuelling of aircrafts, ships and motorised vehicles. It consists of a distinct range of products which are perfectly tailored to the requirements for safety, reliability and accuracy specific to these three applications.

It is available in different versions to adapt to the constraints which are specific to each application. Thus, the range can be supplied in an autonomous version with motorised thermal pump, manual pump for operating safety and volume display with a mechanical printing system.

The versions equipped with an electronic register provide a secure backup of each transaction and direct transmission to the administrative and management system.

### Sectors of application

- Fuel distribution for airplanes and helicopters
- Metering dispenser on floating dock or on warf
- Fuel distribution for worksite machinery and industrial vehicles



### Key Points

**> Low installation cost**

Meter equipment is provided on a frame and is fully assembled, wired and tested.

**Reduced maintenance cost**

Simple and robust construction with minimal moving, mechanical parts

**Available in an autonomous version**

Operates without an external electrical or pneumatic power source

**Certified for custody transfer**

Meters certified for fuel custody transfers

**Safe to use**

Atex certification, robust and reliable meter technology

## Refuelling units, dispensers

Application			Fuel Distribution				
			Aviation		Marine and vehicles		
Equipment			Aircraft refuelling unit	Metering for aircraft refueller	ZCE17	Fuel distribution unit	Dispenser Q200
Strainer – gas elimination device	EC42/FS24	3”/2”			●	●	
	EC30-5	2”	●			●	
	EPZ75						●
Gas eliminator head	XAD 20 150			●			
Micro-filter separator			●	●*			
Micro-filter absorber			●	●*			
Meter	MA 26-5		●			●	
	ZC17 12	2”	●		●	●	●
	ZC17 24, ZC17 48	2”		●	●	●	
	ZC17 80, ZC17 150	3”,4”		●			
Flow register	ZC17 250	6”		●			
	VR (mechanical)		●	●	●	●	●
	Equalis (electronic)		●	●	●	●	
	Cecli						●
Authorization Valve			●		●*	●*	●*
Nozzle			●		●	●	●
Pump	Centrifugal or volumetric.		●*		●*	●*	●
	Manual		●*		●*	●*	●*

\* optional supply

Measurement equipment		Aircraft refuelling unit	Metering for aircraft refueller	ZCE17	Fuel distribution unit	Dispenser Q200
Maximum flow rate	m <sup>3</sup> /h	5-12	250	10-20-30	5-24	10
	l/mn	83-200	4166	166-333-500	83-400	166
	USGPM	22-53	1100	44-88-132	22-105	44
Description		Small aircraft and helicopter re-fuelling	Hardware to be integrated into an aircraft refueller	Fuel distribution for vehicles, pleasure and fishing boats, worksite machinery		
Measured parameters		Actual volume, temperature-corrected/base volume (for versions with electronic register)				
Measured liquids		Jet A1, avgas		Diesel, premium fuel, bio-diesel, methanol, bio-fuels		
Equipment						
	Strainer	Micro-filter and water separator		200µm for diesel - 50 to 100µm for premium fuel included		
	Gas elimination device					
	Meter	Positive Displacement meter with blades (ZC17) or with piston ( MA26-50)				
	Temperature measurement	Pt100 sensor (optional for electronic register version)				
	Multifunction valve	Electronic or manual valve				
	Flow register	Mechanical (VR) or electronic (Equalis)				Electronic Q200IE Mechanical Q200IM Mechanical Q200LC Terminal Q200ID
	Pump equipment	Electro-pump	-	Electro-pump	Electro-pump or Thermal group or Manual pump	Electro-pump and emergency manual pump
	Delivery hose	10 à 30 m				6 m
	Retraction system	Manual Motorised Back spring	-	Manual Motorised Back spring		-
	Grounding system	Roller 15 m	-	Optional		-
	Nozzle	Aviation nozzle with manual shutoff		Nozzle with manual or automatic shutoff		Nozzle with automatic shutoff
Operating conditions	Maximum pressure	8 bar - 10 bar for flow rate over 80 m <sup>3</sup> /h				
	Temperature	Ambient: -20 to +40°C / Liquid: -10 to +50°C - Contact us about higher or lower temperatures				
Metrological performances	Volume accuracy	< 0.15% - Option < 0.1% - pour plage de mesure 10 :1				
	Volume repeatability	< 0.02%				
Installation						
	Protection class	IP65/66 pour version calculateur électronique				
Custody transfer approvals		MID-EC Evaluation Certificate n° LNE 11052 (ZC17) MID-EC Type Examination Certificate n° LNE 11123 (EMS24 and EMS48) OIML R117 Type Compliance Certificate n° LNE-24351 (ZC17, EMS24, EMS48)				



Equalis S for depot



Equalis S for truck

## Electronic register for measuring systems

# EQUALIS

The "Equalis register" product line is cutting edge technology that meets all the requirements for automation and management of loading systems.

This flow computer was developed by Satam engineers. They have taken advantage of their strong in-field experience to incorporate solutions for all installation, use, safety and maintenance constraints associated with the measurement of hydrocarbons in oil depots. Custody transfer certified, Equalis is an all-in-one flow computer compatible with the entire range of volumetric and mass meters used in the industry.

Equalis is a field instrument designed for fixed station applications in oil depots as well as for mobile metering systems on tank trucks or mobile refuelling systems. It meets all the requirements for tanker trucks, railcar and ships loading and unloading as well as for refuelling activities.

Equalis allows a comprehensive control of the key loading parameters such as delivered volume, blending rate, additive rate, pump operation, transaction start/stop, driver and/user identification, delivery ticket, bill of lading, ticket printing...

Equalis S can be linked to the supervisory PC using Equavision communication package. This plug and play multifunction tool allows data collection, remote control of loading operations, maintenance and configuration of Equalis S flow computer.

## Fields of Application

- **Tanker truck and rail car loading and off loading**
- **Bio-fuels online and batch blending**
- **Custody measurement of fuels and bio-fuels**
- **Delivery of heating oil to individuals**
- **Delivery of fuels to service stations**
- **Delivery of fuels to worksites, ships, boiler rooms.**

## Key Points

> **Modularity**  
Open system with direct communication to SCADA system

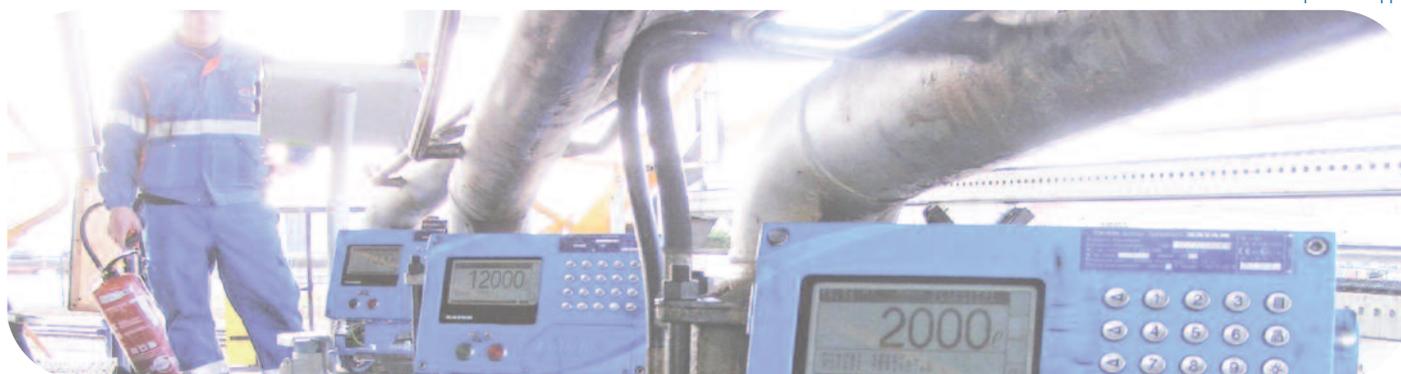
**User-friendly**  
Direct access to pre-programmed functions  
Screen to review data stored transactions

**Compact**  
Easy installation on tank trucks and compact assemblies  
Reduced installation cost

## Electronic register for measuring systems

Model	EQUALIS S
<b>Description</b>	Electronic register, batch controller for liquid petroleum products to be field mounted
<b>Functions</b>	Control of dosing valves and blending valves Additive injection control Management of safety devices Calculation of base volume and mass Secured back-up of metrological data transactions Depot version : Control of inputs and outputs associated with the loading arm Truck version : Control of functions associated with the fuel distribution on truck (motor, pump clutch, valve, drain valve, bottom valve)
<b>Metrology</b>	
Meter inputs	PD Meter, mass flow meter, ultrasonic meter, turbine meter
Temperature input	Pt100 or 4-20mA transmitter
Density, pressure inputs	4-20 mA transmitter or RS485
Temperature corrected / base volume & mass	Fuels: ASTM 54B table - Ethanol, methyl ester, bio-diesel : ASTM 54C table - Lubrication oils: ASTM 54D table - LPG: CFBP tables and ASTM API as per NF M80 17
<b>Equipment</b>	
User interface	Graphics screen 240x128 pixels back-lit Volume resolution : 999999 points Numeric keyboard with pre-programmed buttons, cycle start/stop pushbutton
Enclosure	Aluminium base with epoxy coating
Data storage	Capacity 60 000 transactions
<b>Inputs/Outputs</b>	
Meter inputs	1 or 2 inputs dual-pulse with flow direction -Intrinsic safety or NAMUR*
Pt100 inputs	1 or 2 inputs (4 wire Pt100)
Current inputs	1 or 2* for pressure, temperature or density measurements
Digital inputs	15 inputs (intrinsic safety) and 2* input (NAMUR) for grounding system, arm position, overfilling system, additive volume, vapour recovery, emergency stop
Safety stop input	1 input directly connected to the relay control module
Digital outputs	10 (+10*) relays (250V, 10A) for valve commands, pump, alarm, additive injection control
Pulse outputs	1 volume output for seal parcel delivery & additive injection
Current output	1 for flow rate, density, temperature, control valve (in preparation)
Databus	1 port RS485 or Ethernet TCP/IP : communication with supervisory system and measurements inputs 1 port RS485 or RS232 : printer Communication protocole : Modbus RTU 1 USB port : Data extraction
<b>Operating conditions</b>	
Ambient temperature	-20 °C to +55 °C - Contact us about higher or lower temperatures
<b>Installation</b>	
Ex approval	ATEX and IEC Ex Zone 1 - II 2 (1) 1 G Ex d [ia Ga] ia IIB T4 Gb
Protection class	IP66
Power supply	100 to 240 VAC 50 à 60 Hz - 19 to 36 VDC (only for truck version)
<b>Custody transfer approvals</b>	MID-EC Evaluation Certificate n° LNE-25874 Type Compliance Certificat OIML R117-1 n° LNE-24351

\* optional supply

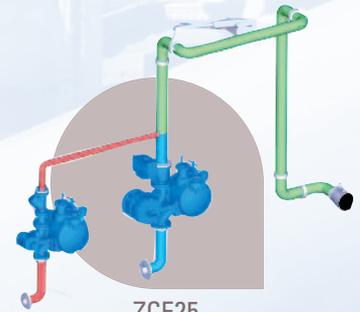




ZCE28



AIM



ZCE25

## Fuel blending and additive injection

## ZCE25 ZCE28 EQUALIS AIM

The Equalis flow computer can manage and control the fuel blending as well as the additives injection.

### Preparation of biofuels – Online and batch blending

ZCE25 is a complete measurement group dedicated to blending control and custody transfer measurements of final product and mixed products. Its state-of-the-art electronic register provides exceptional flexibility.

### Additive injection and fuel colouring

The Equalis flow computer is capable of controlling from 1 to 12 AIM injection modules operating simultaneously or individually on the loading pipe. ZCE28 is a custody transfer approved measuring system dedicated to additives measurement.

Application		Fuel blending Biofuel preparation		Additive Injection Fuel colouring	
		ZCE25	ZCE28	ZCE28	Equalis AIM
<b>Equipment</b>	<b>Gas elimination device</b>	FS24	•	•	
		EC29	•		
<b>Meter</b>		Oval gears			
		JZ10, JZ15		•	
		ZC17 -24, ZC17-48 3"	•		
<b>Multifunction valve</b>		ZC17-80, ZC17-150 3", 4"	•		
		XAD37 3"	•		
<b>Digital valve</b>		XAD36 4"	•		
		XAD 2" à 4"	•		
<b>Electrovalve</b>				•	
<b>Injection module</b> (including oval gears meter, electrovalve)		AIM			•
<b>Blending controller</b>		Equalis S	•	•	•
<b>Model</b>		<b>ZCE 25</b>	<b>ZCE 28</b>	<b>AIM</b>	
<b>Max flow rate</b>	m <sup>3</sup> /h - l/mn - USGPM	150 - 2500 - 660	1.2 - 20 - 5.3	0.6 - 10 - 2,64	
<b>Description</b>		Blending and measuring system	CT approved measuring system and additive injection control system	Additive injection control system (up to 12 additives)	
<b>Blending characteristics</b>		2 products	1 product 1 additive	1 to 12 additives per product	
<b>Measured and calculated parameters</b>		Actual and base volume, masse, blending rate	Additive volume, blending rate	Additives volumes, additives concentrations	
<b>Measured medium</b>		Petrol, premium fuels, diesel, biofuels	Additives		
<b>Equipement</b>	Measuring systems	2 measuring systems in parallel (ZCE 5 and/or EMS)	ZCE28	-	
	Gas elimination device - filter	Included	Strainer – air eliminator FS24 (option)	Filter 75µm	
	Meter	PD meter ZC17- 24 /48 /80/150	PD meter VAF JZ10 – VAF JZ15	Oval gear meter	
	Temperature measurement	Pt 100 4-wire (option)	-	-	
	Valve	Multifunction valve and digital valve	Electrovalve	Electrovalve	
	Bending controller		Equalis S		
<b>Operating conditions</b>	Max. pressure	10 bar	52 bar without air eliminator - 10 bar with air eliminator	20 bar	
	Max. viscosity	20cSt Contact us for higher viscosities	100 cSt	50 cSt	
	Temperature	10 to +80°C (liquid) /-20°C to +55°C (ambient)	-10 to +50°C (liquid) /-20°C to +55°C (ambient)	-10 to +80°C (liquid) /-20°C to +55°C (ambient)	
	Accuracy	Class 0.5 according to OIML R117-1			< 0.5% to 3cSt
<b>Custody transfer approvals</b>		MID-EC Type Approval Certificate n° LNE 11123 (EMS) - n°LNE 6184(ZCE5) OIML R117 Type Compliance Certificate n° LNE-24351 (ZC17, EMS24, EMS48)	MID-EC Type Examination Certificate n°TC10428	-	

## Master meter for instrument calibration



ZCV17

## ZCV17 MASTER METER

The Satam "Master Meter" product range is dedicated to periodic calibration of custody transfer measuring equipment. The ZCV17 is a working standard that can be used regularly to check and calibrate measuring instruments or measuring systems. With minimal dimensions, it can easily be moved to several different sites without the requirement for lifting tools. Equipped with an Equalis electronic register that ensures linearization of measurements, it can be used with liquids of various viscosities without no loss of accuracy.

Application		Meter calibration by master meter	
		ZCV 17 IM	ZCV 17 IE
<b>Equipment</b>			
<b>PD Meter</b>	ZC17 24 to 250 2" to 6"	•	•
<b>Volume indication</b>	Mechanical register VR	•	
	Digital register Equalis		•
<b>Flow rate indication</b>	IDI	•	
	Digital register Equalis		•
<b>Temperature indication</b>	Local Indication	•*	•*
	PT100 Transmitter		•*
<b>Pressure indication</b>	Local Indication	•*	•*
<b>ZCV mounted on trolley</b>		•*	•*

\* optional supply

Model		24	48	80	150	250
<b>Flow rate</b>	Maximum Flow rate: (m <sup>3</sup> /h)	24	48	80	150	250
	l/mn	400	800	1333	2500	4166
	USGPM	105	210	360	660	1100
<b>Description</b>		Master meter with volume totalizer, adjustment system and flow rate indicator				
<b>Measured parameters</b>		Actual volume, base volume (only with IE version)				
<b>Connection</b>	Type	Flanges–TODO connection (optional)				
	Diameter	2"	2"	3"	4"	6"
<b>Equipment</b>		PD Meter ZC17 24 to ZC17 - 250				
	Indicating device	Mechanical register version (IM)		Electronic register version Equalis (IE)		
	Adjustment according viscosity of measured liquid	Manual calculation from calibration curves		Linearization curves per integrated product		
	Volume indication	Actual volume		Actual volume and temperature corrected/base volume		
	Flow rate indication	ROF module		Integrated into Equalis		
<b>Optional equipment</b>						
	Temperature measurement*	Local Indication		Local Indication / Pt100		
	Pressure measurement*	Local Indication				
	Drainage equipment*	Manual drainage pump with purge valves - 2 release valves				
	Connection	2 x 3m tubing with flanges or dry couplings				
	Trolley*	Unit mounted on chassis with 4 pivoting wheels				
<b>Operating conditions</b>	Maximum pressure	10 bar - 8 bar below 80 m <sup>3</sup> /h				
	Maximum viscosity	20 cSt (contact us for higher viscosities)				
	Temperature	-20 to +55°C (ambient) / -10 to +55°C (liquid)				
<b>Metrological performance</b>	Volume accuracy	0.1 % v.m.		< 0.05% v.m. with linearization		
	Volume repeatability	< 0.02% v.m.				
	Temperature accuracy	< 0.1%				
	Calibration certificate linearization curve	Calibration Certificate conform to OIML R117				
<b>Installation</b>	Electrical power supply	No (self-powered device)		24 VDC or 230 VAC		

\* optional supply

## Measuring systems for the oil transport chain

	Aircraft refuelling p.8	EMS24 –EMS48 p.2 /6	Equalis AIM p.12	Fuel distribution unit p. 8	O200 p.8	ZCE5 p.2	ZCE6 p.2/4	ZCE6 M p.2/4	ZCE6 T - ZCE6 U p.2/4	ZCE11 48 - 80 p.4	ZCE17 p.8	ZCE21 p.4	ZCE25 p.12	ZCE26 p.6	ZCE28 p.12	ZCE29 p.4
 Pipeline product transfer metering							●	●	●							
 Process metering							●	●	●							
 Ship Loading							●	●	●							
 Biofuels preparation online or batch blending													●			
 Fuel additive injection and colouring			●												●	
 Reception units for depots							●			●		●				●
 Tanker truck loading station		●				●	●	●	●				●			

		Aircraft refuelling p.8	EMS24 –EMS48 p.2/6	Equalis AIM p.12	Fuel distribution unit p. 8	O200 p.8	ZCE5 p.2	ZCE6 p.2/4	ZCE6 M p.2/4	ZCE6 T - ZCE6 U p.2/4	ZCE11 48 - 80 p.4	ZCE17 p.8	ZCE21 p.4	ZCE25 p.12	ZCE26 p.6	ZCE28 p.12	ZCE29 p.4
	Measuring unit for tanker truck distribution		●		●										●		
	Fuel delivery to service station										●		●				
	Aircraft refuelling	●															
	Ship refuelling				●	●						●					
	Vehicle and worksite machinery refuelling				●	●						●					

● : ideally suited



## World wide Location Chart

### Headquarters and Sales Department

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- Headquarters
- Manufacturing facility
- Agent



As Satam regularly improves its products to ever better respond to evolving market and regulatory requirements, it reserves the right to change any of the specifications of these products, and this without prior notice.