

CONTOIL® VZFA/VZOA 15...50, versions for special requirements / applications

For applications requiring an increased accuracy of $\pm 0.5\%$ or better, such as:

- Measurement of EL heating fuel or diesel in testing facilities
- Differential measurement
- Commercial transactions for which the meters are legally required to have type approval or official verification.

These products require dirt filters with smaller mesh size.

Versions for differential measurements

For differential measurements, the flow is measured in the supply and return pipes. The difference between the two measurements is regarded as the consumption.

To obtain optimal measurement results, VZFA or VZOA CONTOIL® fuel oil meters calibrated in pairs should only be used, which are adapted precisely to the plant/system operating conditions. The flow rate occurring in each meter, the permissible pressure drop and the viscosity of the fluid must all be considered during the design phase. The load on the meter is obtained as follows: flow in supply section less consumption = flow in return section.

When the order is placed, the following information is required:

- application e.g. differential measurement for diesel engines in an emergency power system
- fuel type e.g. diesel fuel
- temperature e.g. 15 ... 40° C
- operating pressure e.g. 4 bar
- flow rate in supply section e.g. fixed pumping rate 200 l/h
- flow rate in return section e.g. 120 ... 190 l/h (for a consumption of 10 ... 80 l/h)

The meters are marked "supply" and "return" during calibration and final testing in the factory. They must then be installed in the correct pipes.

For further information on the subject of differential measurement, see the sections "How to obtain an optimal measurement" and "Application examples".

Versions with type approval or official verification

CONTOIL® fuel oil meters are used almost exclusively for the measurement of the consumption of fuel oil. The metrological standards (such as MID or EC guideline 71/319/EEC), however, regulate the requirements for meters and systems used for commercial transactions as well as the procedures for design approval and official verification. Measuring installations where a fluid is sold are regarded as transfer points that require official verification. These include petrol pumps at petrol stations, measuring devices for road tankers and measuring stations for loading and unloading all types of road vehicles. As a rule, a metering system must be ready for use and be checked and sealed by the local office responsible for transfer verification.

Typical of these applications is the narrow range of use with regard to liquid, flow rate and temperature. Subject to type approval restrictions, CONTOIL® oil meters are also available with metrological type approval or official verification. The differences in products relate only to the design or specifications of the meter and not to the quality of the product.

Technical data ¹⁾



- Versions for optimal results from differential measurement or for fiscal or commercial transactions
- VZFA with electronic display of total volume, resettable volume and flow rate; units of measurement: litres, US gallons ²⁾ or m³.
- VZOA with display of total volume on roller counter; units of measurement: litres. Optional versions with counter in US gallons.
- VZOA option: with RV reed or IN inductive pulser
- threaded or flanged connections available
- mounting in horizontal or vertical positions possible (for calibrated meters horizontally only).
- VZFA: User-friendly, interactive parameter input. Easy integration into control systems.

Further Versions available on request:

- different flange drillings, such as ANSI, JIS

Type	VZFA/VZOA						
Nominal diameter	DN	mm	15	20	25	40	50
		inch	1/2	3/4	1	1 1/2	2
Installation length		mm	165	165	190	300	350
Nominal pressure with threaded ends	PN	bar	16				
with flanges	PN	bar	25				
Maximum temperature	T _{max}	°C	130, 180				
Maximum flow rate	Q _{max} ³⁾	l/h	600	1500	3000	9000	30000
Nominal flow rate	Q_n ³⁾	l/h	400	1000	2000	6000	20000
Minimal flow rate	Q _{min}	l/h	10	30	75	225	750
Approx. starting flow rate		l/h	4	12	30	90	300
Max. permissible error	< 0.5% of actual value						
Repeatability	± 0.1%						
Safety filter mesh size		mm	0.400	0.400	0.400	0.800	0.800
Dirt filter mesh size		mm	0.100	0.100	0.250	0.250	0.250
Volume of the measuring chamber		approx. cm ³	12	36	100	330	1200
Housing finish	enamelled red RAL 3013						
Weight with threaded ends ⁴⁾		approx. kg	2.2	2.5	4.2	17.3	–
with flanges PN 25		approx. kg	3.8	4.5	7.5	20.3	41.0
VZFA							
Smallest readable amount:							
Total volume		l	No decimals				
Resettable volume		l	1 decimal place				
Digital flow rate display		l/h	1 decimal place				
Registration capacity		l	100 000 000				
Registration time at Q _n until overrunning to zero		h	128 000	100 000	50 000	16 667	5 000
Outputs ⁵⁾							
Pulse value for totaliser	V/Imp		pulse value and width parameterisable				
Current 4..20 mA for flow rate	I ₄ / Q ₁ , I ₂₀ / Q ₂		flow rates to 4 and 20 mA parameterisable				
Frequency for flow rate	f ₁ / Q ₁ , f ₂ / Q ₂		frequency and flowrate parameterisable				
Limiting value switch	Q _{min} , Q _{max}		minimum, maximum and hysteresis parameterisable				
VZOA							
Smallest readable amount		l	0.01	0.1	0.1	0.1	1
Registration capacity		m ³	1000	10 000	10 000	10 000	100 000
Registration time at Q _n until overrunning to zero		h	2 500	10 000	5 000	1 667	5 000
Pulse values of pulsers:							
IN inductive according to IEC 60947-5-6		l/pulse	0.01	0.01	0.1	0.1	1
RV Reed		l/pulse	0.1	1	1	1	10
RV Reed		l/pulse	1	–	–	10	100

1) Manufacturer's specification, valid for the reference conditions as specified under "APPENDIX: Meter data".

2) 1 US gallon corresponds to 3.785 litres

3) For burners and engines or motors, the meter must be selected on the basis of the permanent flow rate. For higher viscosities, or if the meter is installed on the suction side, the pressure drop and any reduction in the measuring range must also be taken into consideration.

4) Weight without couplings.

5) Two freely selectable outputs are available, totally independent of each other.

Technical data for VZOA with PTB certification: 5.232 / 04.37 Class 1

Type			VZOA 15	VZOA 20	VZOA 25	VZOA 40	VZOA 50
Temperature max.	T_{max}	° C	130				
Maximum flow rate	Q_{max} 1)	l/h	400	1000	2000	6000	20000
Nominal flow rate	Q_n 1)	l/h	400	1000	2000	6000	20000
Minimal flow rate	Q_{min}	l/h	40	100	200	600	2000
Accuracy class				1	1	1	1 1
Max. permissible error	± % of actual value		0.5	0.5	0.5	0.5	0.5

Technical data for VZOA with type approval / EC verification: D 04 / 5.232.14

Type			VZOA 15	VZOA 20	VZOA 25	VZOA 40	VZOA 50
Temperature max.	T_{max}	° C	50				
Maximum flow rate	Q_{max} 1)	l/h	400	1000	2000	6000	20000
Nominal flow rate	Q_n 1)	l/h	400	1000	2000	6000	20000
Minimal flow rate	Q_{min}	l/h	40	100	200	600	2000
Accuracy class			0.5	0.5	0.5	0.5	0.5
Max. permissible error	± % of actual value		0.3	0.3	0.3	0.3	0.3

Two items are required when ordering: the VZOA meter and EU verification, Order No. 96026.

1) For burners and engines or motors, the meter must be selected on the basis of the permanent flow rate. For higher viscosities, or if the meter is installed on the suction side, the pressure drop and any reduction in the measuring range must also be taken into consideration.

Electronic display and Outputs VZFA

Please refer to Electronic display and Outputs of VZF on pages 6 and 7.

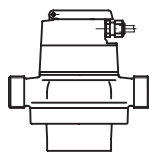
RV Pulsers and IN Pulsers VZOA

Please refer to RV Pulsers and IN Pulsers of VZF on page 15.

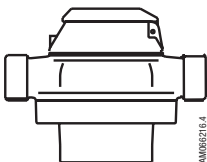
Pressure drop curves

See "APPENDIX: Meter data"

Dimensions VZFA

Type	mm	VZFA 15	VZFA 20	VZFA 25	VZFA 40	VZFA 50
	Length	165	165	190	300	350
	Width	105	105	130	210	280
	Height	155	164	191	243	299

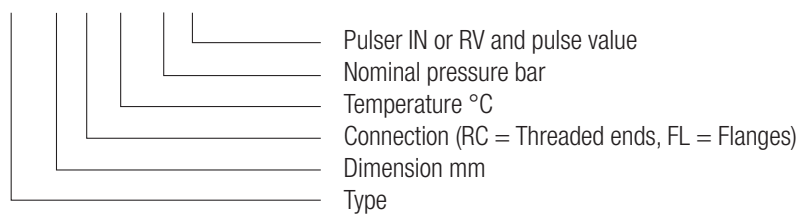
Dimensions VZOA

Type	mm	VZOA 15	VZOA 20	VZOA 25	VZOA 40	VZOA 50
	Length	165	165	190	300	350
	Width	105	105	130	210	280
	Typ ... 130 °C					
	Height	106	115	142	235	291
	Height -RV	130	139	166	259	315
	Height -IN	185	194	221	273	329
	Typ ... 180 °C					
	Height	147	156	183	235	291
	Height -RV	171	180	207	259	315
	Height -IN	225	234	261	313	369

Detailed dimensional diagrams in "APPENDIX: Meter data"

Type designation key

VZOA 25 FL 130/25-IN 0.1



Information required to process orders

When the order is placed, information is required on the plant operating conditions (as stated at the beginning of this section). For fiscal and commercial transactions only VZOA type meters may be used.

Example for differential measurement:

Application: Differential measurement diesel, supply 200 l/h, return 120. ... 190 l/h
 2 Units Order No. 93758 CONTOIL® fuel oil meter, type VZFA 20 RC 130/16
 2 Units Order No. 96112 Modification for differential measurement

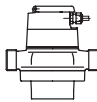
Example for fiscal or commercial transactions:

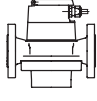
Application: Commercial transactions in Germany, extra light heating oil, flow rate 200...400 l/h, temperature approximately 20 °C
 1 Unit Order No. 92290 CONTOIL®, fuel oil meter, type VZOA 20 RC 130/16
 1 Unit Order No. 96026 Modification with EC official verification

Example for standard applications without options:

Application: Measurement of Diesel fuel on testing facility, flow rate 200...400 l/h, temperature 20...50 °C
 1 Unit Order No. 93758 CONTOIL®, fuel oil meter, type VZFA 20 RC 130/16

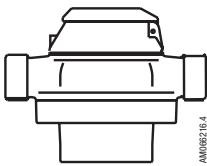
Ordering details for VZFA (meters with electronic counters and parameterisable outputs)

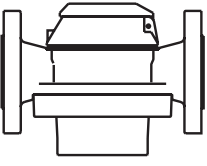
Threaded ends, PN16	Type 130 °C	Order No.	
	VZFA 15 RC 130/16	93755	
	VZFA 20 RC 130/16	93758	
	VZFA 25 RC 130/16	93763	
	VZFA 40 RC 130/16	93768	

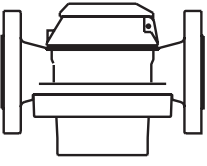
Flanges, PN25	Type 130 °C	Order No.	Type 180 °C	Order No.
	VZFA 15 FL 130/25	93756	VZFA 15 FL 180/25	93757
	VZFA 20 FL 130/25	93759	VZFA 20 FL 180/25	93760
	VZFA 25 FL 130/25	93764	VZFA 25 FL 180/25	93765
	VZFA 40 FL 130/25	93769	VZFA 40 FL 180/25	93770
	VZFA 50 FL 130/25	93773	VZFA 50 FL 180/25	93774

Modifications		Order No.
	For differential measurement	96112
	For marine type approval (e.g. GL, LRS, DNV)	96295

Ordering details for VZOA (meter with roller counter)

Threaded ends, PN16	Type 130° C	Order No.	Type 130° C	Order No.
		VZOA 15 RC 130/16	92286	VZOA 25 RC 130/16
VZOA 15 RC 130/16-RV 0.1		92287	VZOA 25 RC 130/16-RV 1	92294
VZOA 15 RC 130/16-RV 1		92288	VZOA 25 RC 130/16-IN 0.1	92295
VZOA 15 RC 130/16-IN 0.01		92289		
VZOA 20 RC 130/16		92290	VZOA 40 RC 130/16	92296
VZOA 20 RC 130/16-RV 1		92291	VZOA 40 RC 130/16-RV 1	92297
VZOA 20 RC 130/16-IN 0.01		92292	VZOA 40 RC 130/16-IN 0.1	92298

Flanges, PN25	Type 130° C	Order No.	Type 130° C	Order No.
		VZOA 15 FL 130/25	92299	VZOA 40 FL 130/25
VZOA 15 FL 130/25-RV 0.1		92300	VZOA 40 FL 130/25-RV 1	92310
VZOA 15 FL 130/25-RV 1		92301	VZOA 40 FL 130/25-IN 0.1	92311
VZOA 15 FL 130/25-IN 0.01		92302		
VZOA 20 FL 130/25		92303	VZOA 50 FL 130/25	92312
VZOA 20 FL 130/25-RV 1		92304	VZOA 50 FL 130/25-RV 10	92313
VZOA 20 FL 130/25-IN 0.01		92305	VZOA 50 FL 130/25-IN 1	92314
VZOA 25 FL 130/25		92306		
VZOA 25 FL 130/25-RV 1		92307		
VZOA 25 FL 130/25-IN 0.1		92308		

Flanges, PN25	Type 180° C	Order No.	Type 180° C	Order No.
		VZOA 15 FL 180/25	92315	VZOA 40 FL 180/25
VZOA 15 FL 180/25-RV 0.1		92316	VZOA 40 FL 180/25-RV 1	92326
VZOA 15 FL 180/25-RV 1		92317	VZOA 40 FL 180/25-IN 0.1	92327
VZOA 15 FL 180/25-IN 0.01		92318		
VZOA 20 FL 180/25		92319	VZOA 50 FL 180/25	92328
VZOA 20 FL 180/25-RV 1		92320	VZOA 50 FL 180/25-RV 10	92329
VZOA 20 FL 180/25-IN 0.01		92321	VZOA 50 FL 180/25-IN 1	92330
VZOA 25 FL 180/25		92322		
VZOA 25 FL 180/25-RV 1		92323		
VZOA 25 FL 180/25-IN 0.1		92324		

Modifications	For differential measurement	96112
	For marine type approval (e.g. GL, LRS, DNV)	96295
	With EC official verification	96026
Option / Accessory	Cable mounted on IN	80019