

# Volume counter

## Operation and Maintenance Manual



VCA 0,2  
VCA 2

KRACHT

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## Safety

### Identification of safety instructions

The safety instructions given in this operating manual are identified with the warning symbol.



Failure to follow these instructions could lead to personal injury or damage to equipment.

Other instructions that are not hazard warnings, but give tips for better working, are indicated by a hand.



### General safety instructions



**The safety in operation of the equipment supplied is only guaranteed if it is operated properly (see chapter entitled "Description of the equipment"). The limits given (see also chapter entitled "Technical specifications") must not be exceeded under any circumstances.**

**The personnel entrusted with the fitting, operation and maintenance of the volume counter must be suitably qualified; this can be through training or by appropriate instruction. The instructions given in this manual must be made known to these persons.**

**All work done must conform to the existing national regulations on accident prevention and health and safety at work, and to any internal regulations of the operator, even if they are not set out in this manual.**

**Leaks of hazardous materials that are conveyed must be collected and disposed of in such a way that there is no danger to persons or to the environment. Statutory regulations must be observed in these cases.**

**The connecting leads must be unpressurised for all work on the volume counter and before it is dismantled.**

**The operator must ensure that this operating manual is permanently accessible to the persons concerned.**

### Manufacturer's address

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## The documentation

This manual describes the construction, operation and maintenance of the VC volume counters manufactured by KRACHT GmbH.

Different models are available. The model is shown on the name plate of each meter. An explanation of the type code and a more detailed description of the individual series and nominal sizes are given under "Technical specifications" in the section entitled "Description of the equipment".

## Description of the equipment

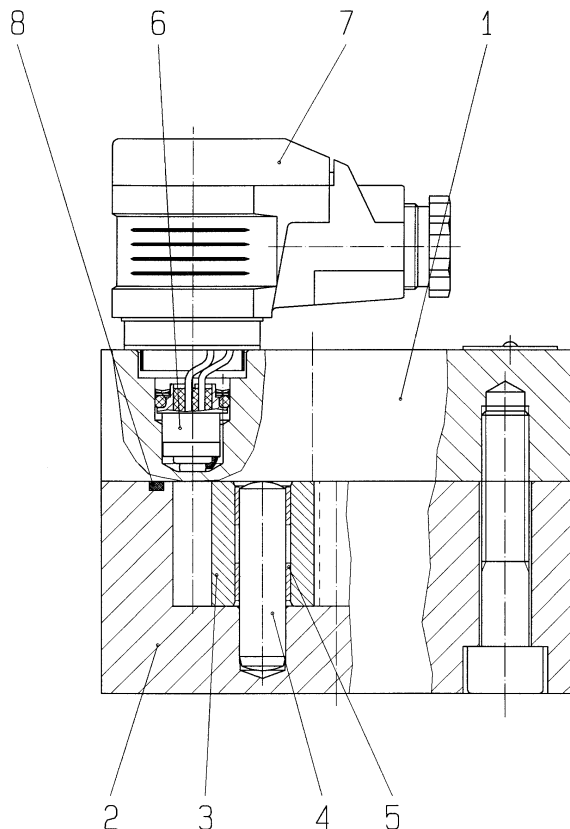
### Proper use

The volume counter is measuring device for the continuous measurement of the flow of a fluid. The various series enable it to be used for media of differing viscosities and lubricities. The user must ensure that the medium to be metered is compatible with the materials used in the VC (see under "Technical specifications").

The maximum permissible operating conditions given under "Technical specification" must on no account be exceeded.

### Construction and function

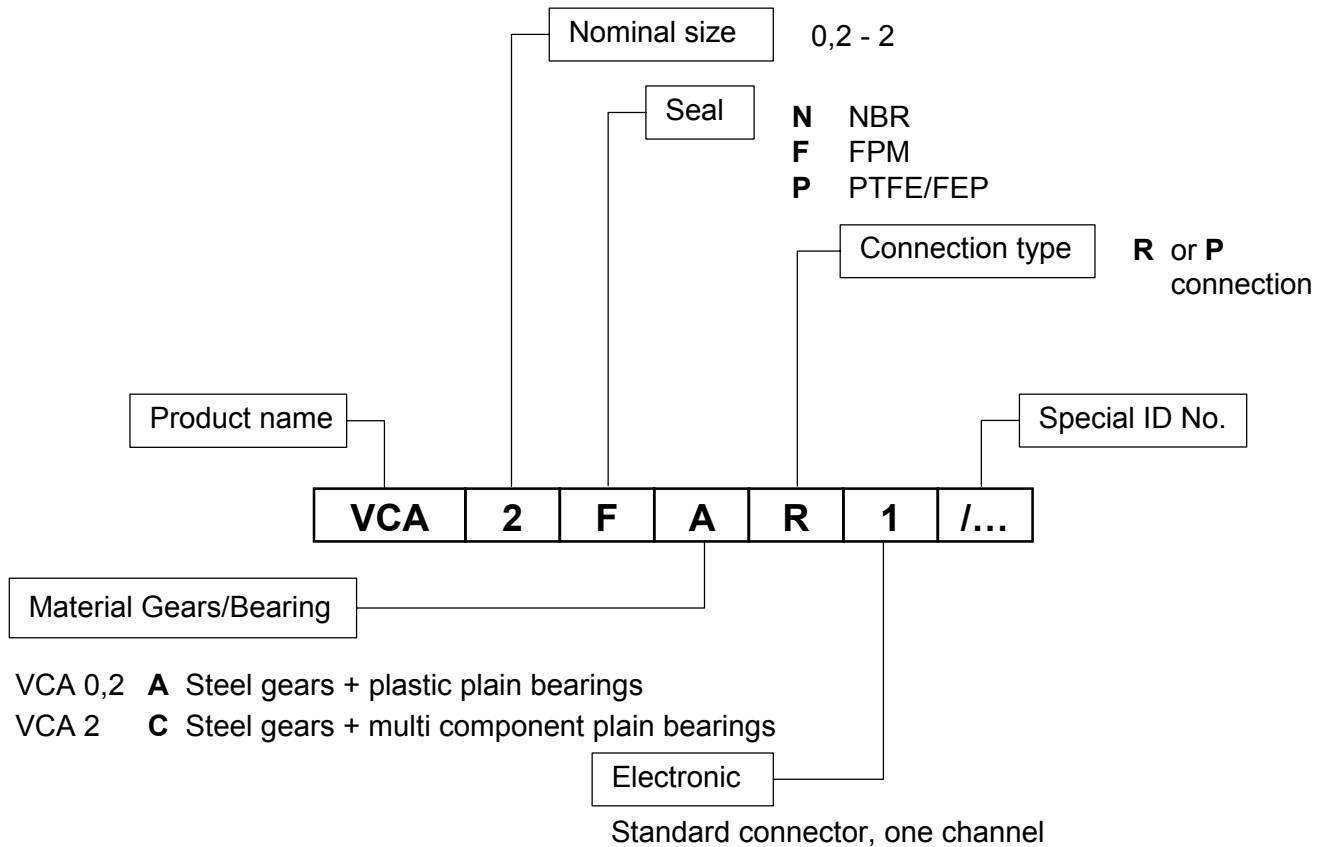
Inside the VCA-housing are two gear wheels and their low-friction bearings. During operation these are drive by the moving fluid. The movement of the gear wheels is sampled by two contactless sensors and converted into electrical signals. The signals are conveyed via a preamplifier to the display unit that is connected to the meter.



- 1 Cover
- 2 Housing
- 3 Gear
- 4 Journal
- 5 Bearing
- 6 Sensor
- 7 Connector socket with preamplifier and LED display
- 8 O-Ring

## Technical specifications

### The type code explained



### General specifications

Type	gear motor
Materials	see survey of series
Connection of leads	Pipe thread
Installed position/direction of flow	any
permissible ambient temperature	-10 ... +80 °C

### Permitted temperature of operating medium

Type of seal	° C
N = NBR	-10 ... +80
F = FPM	-10 ... +80
P = PTFE/ FEP	-10 ... +80

### Series VCA

Nominal size*	0,2	2
Housing/cover material	Aluminium Al Mg Si 1 (anodized)	Aluminium Al Mg Si 1 (anodized)
Measuring unit material	Case hardened steel W.-Nr. 1.7139	Case hardened steel W.-Nr. 1.7139
Bearing	plastic plain bearing	multi component plain bearing
measuring accuracy from viscosity                      mm <sup>2</sup> /s	± 3% 20	± 2,5% 20
Viscosity of the medium conveyed                                  mm <sup>2</sup> /s	20 ... 4000	20 ... 4000
Max. size of foreign matter in medium conveyed                      μm	30	30

\* see Type code on unit: VC ...



**No abrasive media permitted !**

### Nominal sizes

Nominal size*	0,2	2
geom. tooth volume                      cm <sup>3</sup>	0,2	2
Resolution                                  Imp/l	5000	500
max. Operating pressure                  bar	160	160
peak pressure                                  bar	200	200
Measuring range                              l/min	0,25...10	1...65
Sound pressure level                      dB(A)	< 60	< 60
Thread port	G 3/8	G 3/4

\* see Type code on unit: VC...



**The max. pressure loss in the volume counter must not exceed 10 bar (VCA 0,2) and 16 bar (VCA 2).**

## Fitting an removing the volume counter

Before delivery the volume counter was tested in the factory and is ready to use as soon as it has been fitted and the electrical leads connected. Safe access to the integral measuring unit for visual inspection should be provided at all times, including while the unit is in operation.



**When fitting and transporting the volume counter, make sure that it is secured by the housing only and not by the plug-in unit above it.**

## Mechanical construction

The unit is connected to the plant via pipe connectors located in the centre of the housing. (See under "Nominal sizes").



**Only piping and connectors that are permitted for the anticipated pressure range may be used. The specifications of the manufacturer concerned must be complied with.**

## Pipe connection

- Before mounting the volume counter, thoroughly clean the piping system.
- Connect the pipes to the inlet and outlet of the meter unit, observing the manufacturer's instructions.
- When installing, ensure that no sealant enters the pipes.



**The volume counter must not be distorted during installation.**

- After starting the plant up, check all connections for leaks.

## Electrical connection

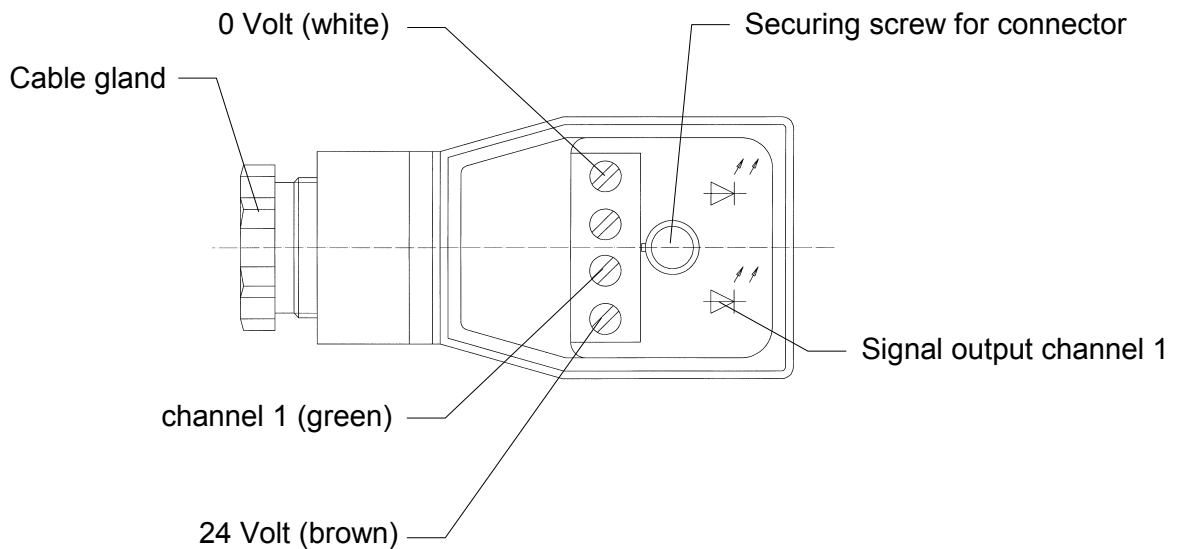
### Elektrical specification

Number of measuring channels	1
Operating voltage	$U_B = 12 \dots 30 \text{ V DC}$ polarized
Pulse amplitude	$U_A \geq 0,8 U_B$
Pulse shape with symmetrical output signals	Squars wave, pulse duty Factor/channel $1:1 \pm 15 \%$
Power requirement	$P_{b \text{ max}} = 0,6 \text{ W}$
Output power/channel	$P_{b \text{ max}} = 0,3 \text{ W}$ short-circuit-proof
Degree of protection std.	IP 65 DIN 40050

- The electrical connections must conform to the terminal connection diagram below.



**The connector may be removed from the housing cover to facilitate the job of connecting the cable. Remember to replace it afterwards.**



Once mounting is completed the securing screw and the cable gland must be tightened. Only tighten the securing screw lightly.



**This work may only be done by a qualified electrician.**

### Removing the volume counter



**Ensure that the conduits are unpressurised and the electrical connection is offcircuit. The equipment and conduits can still contain the conveyed medium or a cleaning agent. All regulations concerning this medium must be complied with. Sufficiently large collecting containers should be placed in readiness.**

- Release the securing screw on the connector
- Remove the connector from the housing.
- Release pipe connectors from the housing and if necessary remove the housing from the holding device.



**When using media that harden, clean the volume counter with a suitable cleansing agent as promptly as possible!**



## Operation



**The volume counter must only be operated within the permitted limits, which are given under "Technical specifications". Ensure that the medium to be measured does not attack the materials of the volumetric meter (see "Technical specifications"). The medium must not contain any abrasive particles. In case of doubt, consult the manufacturer.**

The volume counter has been factory-tested before delivery. It is ready to use as soon as it has been mounted and the electrical leads connected. When it is in use the two LEDs in the connector light up to indicate a continuous flow of fluid through the measuring unit. Faults are shown on the analysing unit that is connected to it. The section entitled "Recognising and dealing with faults" outlines the action to be taken should a fault occur.

### Permitted operating limits



**The flow resistance  $\Delta p$  must not exceed 10 bar (VCA 0,2) and 16 bar (VCA 2), otherwise the mechanism could be damaged.**

The ambient conditions must comply with the limits given in the technical specifications.

## Maintenance

Volume counters are basically maintenance-free. However, if the fluids conveyed leave deposits in the measuring unit, it may become necessary to clean it (see below). Otherwise the unit can be cleaned with the rest of the plant at the usual times.



**When using media that harden, clean the volumetric meter with a suitable cleansing agent as promptly as possible.**

**Whenever work is done on the volume counter and before removing it, ensure that the conduits are unpressurised!**

## Cleaning



**Ensure that the conduits are unpressurised and the electrical connection is off-circuit. The equipment and conduits may still contain the conveyed medium or a cleaning agent. All regulations concerning this medium must be complied with. Sufficiently large collecting containers should be placed in readiness.**

- Remove the volume counter (see section on mounting and removing the unit).
- Drain the measuring unit.
- Loosen the securing screws that hold the two halves of the housing together. The 4 hexagon socket screws are accessible from below the housing.



**When removing the upper section of the volume counter, do not use screwdrivers or similar tools as levers. Pliers must not be used to remove the gear wheels from the housing.**

## Cleaning

- Clean the interior of the housing, the gear wheels and the bearings with a suitable cleaning agent.



If mechanical damage is found in the interior of the housing or on the gear wheels the complete unit must be returned to the manufacturer for repair.

- Insert both gear wheels and their bearings in the lower section of the housing.
- Lay the O-ring in the groove of the housing.
- Place the upper section of the housing over the lower section.
- Tighten all the screws that hold the housing together, going across from one to the next, using the correct torque (see below).



**All parts must be free of contamination. Ensure that no foreign matter remains inside the volume counter on mounting**

## Tightening torques

Nominal size*		0,2	2
<b>Tightening torque</b>	<b>Nm</b>	14	50

\* see Type code on unit: VC...

- Remount the housing in the plant as described above under “Fitting and removing the volume counter”.

## Recognising and dealing with faults

If the volume counter is not operating perfectly, first check the electrical components while the unit is operating.



**This work may only be done by a qualified electrician.**

If troubleshooting software is not available, use the diagnostic table:

Fault	Possible cause	Remedy
The LED on the volume counter is lit but the values displayed are wrong	Faulty connection between the volume counter and the analysing unit	Check the connection and replace the cable or connector if necessary
The LED is dark during operation	Damaged wiring between sensor and circuit board, or individual soldered points on the board.	Renew the defective cable or soldering
	The corresponding sensor is defective	Send the meter to the manufacturer for repair
	Faulty preamplifier	Check preamplifier and replace if necessary
	Power supply failure	Check supply cable and fuses
	Measuring unit has stopped	<b>Switch the volume counter off immediately!</b> The volume counter can be dismantled and cleaned (see under "Maintenance")
Leakage, escaping medium	Faulty O-ring in housing	Check the compatibility of the seal, consult the manufacturer if necessary and fit a new seal