



**KRACHT Singapore**  
**[kracht@raycontrol.com](mailto:kracht@raycontrol.com)**  
**+65 88103634 | +65 88491139**

**Marine Products**

**KRACHT®**

# Content

3	Company
4 – 5	Pumps and Valves for Marine Engineering
6 – 8	Flow Measurement in Maritime Applications
9	Quality Assurance
10	Customer Service
11	Sales

# Company

## 100 years of experience make us stand out as a reliable partner.

We are a leading manufacturer of transfer pumps and flow meters. 270 employees at the Werdohl site and an additional 85 employees in our subsidiary companies in China, USA and Hungary design, produce and sell products in both standard versions as well as special solutions tailor-made to customer wishes.

These high-quality components are used for gear lubrication, for instance in wind power plants and ships gears, in dosing and mixing plants e.g. for manufacturing PU foams, and in testing technology. The range is supplemented by products for mobile hydraulics and industrial hydraulics which are used, for example, in construction machinery, agricultural machines, in general mechanical engineering and a multitude of stationary applications.

Dependable delivery and high-quality standards are just as important a part of the corporate philosophy as fairness to customers, suppliers and employees alike.

 **Made in Germany**

### 1911

Registration in the commercial register under the name „Hillebrand & Kracht OHG“

### 1971

Construction of today's company premises on a total area of over 50,000 square meters

### 1983... 1993

Sale through the Swedish group BAHCO through Investmentholding Industrierärdén to the COMAC Group

### 1992

Purchase of a gear-manufacturer in Hungary, now KRACHT Hidraulik KFT.

### 1995

First certification according to DIN EN ISO 9001, KRACHT Hidraulik KFT., Budapest according to DIN EN ISO 9002 by Lloyd's Register Quality Company

### 1996

KRACHT is once again in private ownership

### 1999

Mr. Peter Zahn becomes 100% proprietor of KRACHT GmbH

### 2000

First certification according to DIN EN ISO 14001

### 2002

Mr. Heiko Zahn is appointed as Second Managing Director

### 2003

Certification based on the ATEX Directive 94/9/EEC (ATEX 95)

### 2009

In New York, USA the KRACHT Corporation is founded

### 2009

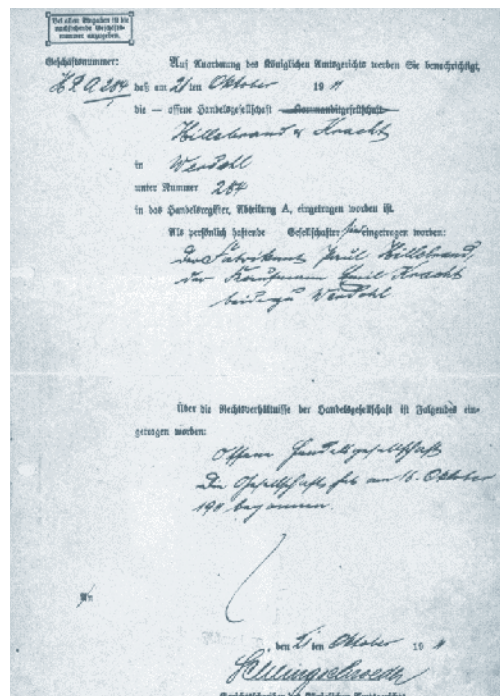
Establishment of the subsidiary in Shanghai, China

### 2011

Opening of the in-house health center on a area of approximately 270 square meters

### October 2011

The company KRACHT has existed for 100 years manufacturing robust high quality components



Certificate of incorporation of today's Kracht GmbH

# Pumps and Valves for Marine Engineering

Lubricating oil Gear Pumps KF for marine gearboxes  
KF main lubrication and pre-lubrication  
pumps for ship diesel engines

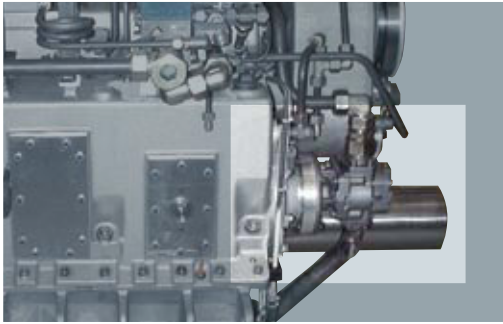


Fig. 1

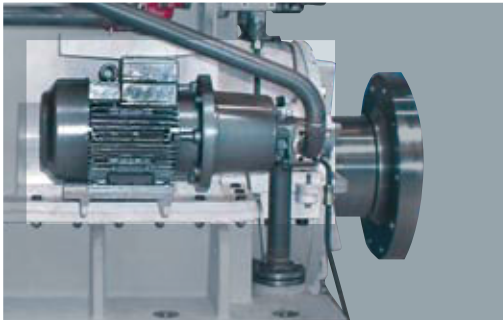


Fig. 2

- noise optimized for air containing oils
- very robust construction for a long life
- high efficiency over large ranges of speed
- version with outboard bearing for direct mounting on the gearbox (Fig. 1)
- pump assembly version with electric motor for standby operation (Fig. 2)
- version in EN-GJL-250 (grey cast iron) or EN-GJS-400-15 (spheroidal cast iron)
- with inspection certificate EN10204-3.2 from all classification authorities upon request
- Utilizing the latest 3D-CAD modeling software to meet customer specific placement solutions
- optionally comes with a flanged pressure relief valve



Pre-lubrication pump  
KF 112



Main lubrication oil pump  
KF 6/730

## Characteristics

Displacement	0.5... 730 cm³/r
Working pressure	max. 25 bar / 363 psi
Speed	... 3000 1/min
Viscosity	12... 20 000 cSt (standard pumps)
Option	integrated safety valve



Pre-lubrication pump  
KF 80 with pressure relief valve (motor-pump assembly)

## Customised Solutions

We are able to provide client specific individual solutions up to supply volumes of 1300 cm³/r. Give us a call.

## Gear pumps KF-F for marine fuels

- for marine diesel (MDO), heavy fuel oil (HFO) and marine gas oil (MGO)
- optional with magnetic coupling for a high level of operational security and a long life
- with inspection certificate EN 10204-3.2 from all classification authorities upon request
- special design configurations for low viscous and low sulphur fuels



Marine fuel pump  
KF-F with magnetic coupling (motor-pump assembly)

### Characteristics

<b>Material</b>	Housing and Cover: Spheroidal cast iron EN-GJS-400-15
<b>Displacement</b>	2.5... 112 cm <sup>3</sup> /r
<b>Working pressure</b>	p max = 6 bar / 87 psi at 1.2 cSt p max = 25 bar / 363 psi at 12 cSt
<b>Speed</b>	200... 3600 1/min
<b>Shaft end seals</b>	Rotary shaft lip-type seal FKM Mechanical seal FKM Magnetic coupling

### Properties of fuels

<b>Viscosity</b>	1.2... 20 000 cSt (dependent on pressure, speed and lubricity)
<b>Lubricity HFRR-test *</b> (according to ISO 12156)	WSD ≤ 520 µm (meet the requirements of ISO 8217 for marine fuels)

\* The HFRR test acc. ISO 12156 is a recognized method for measuring the lubricity of diesel fuels. The characteristic value determined using this method is referred to as Wear Scar Diameter (WSD) and increases with decreasing lubricity. This characteristic value is stated by the fuel manufacturers and can be included when assessing the stability of components.

## Pressure relief valves SPV/SPVF for pressure setting for the protection of lubricating oil and fuel circuits

### Characteristics

<b>Materials</b>	Grey cast iron (EN-GJL-250) Spheroidal cast iron (EN-GJS-400-15)
<b>Valve cone material</b>	Steel
<b>Connection type</b>	SAE flange (3000 psi) Whitworth thread G ½"
<b>Max. flow rate</b>	40... 800 l/min / 11... 211 gal/min
<b>Working pressure</b>	... 30 bar / 435 psi



Pressure relief valve  
SPV / SPVF

# Flow Measurement in Maritime Applications

Gear Type Flow Meters VC  
Screw-Type Flow Meters SVC  
Turbine Flow Meters TM

## Flow Meters

	Gear Type Flow Meters <b>VC</b>	Gear Type Flow Meters <b>VCA / VCN</b>
		
<b>Materials</b>	VC 0.025... VC 16 Spheroidal cast iron VC 0.025... VC 5 Stainless steel	VCA Aluminum VCN Stainless steel
<b>Measuring range (l/min / gal/min)</b>	0.008 ... 700 / 0.002 ... 185	0.04 ... 200 / 0.1 ... 53
<b>Turndown ratio</b>	1 : 300	1 : 200
<b>Working pressure (bar / psi)</b>	... 400 / 5802	... 200 / 2901
<b>Viscosity (cSt)</b>	... 1 000 000	20 ... 4 000
<b>Measuring accuracy</b>	up to $\pm 0.3\%$ deviation from measured value	up to $\pm 1\%$ deviation from measured value
<b>Temperature (<math>^{\circ}\text{C}</math> / <math>^{\circ}\text{F}</math>)</b>	$-30 \dots 220$ / $-22 \dots 428$	$-10 \dots 80$ / $14 \dots 176$
<b>Option</b>	ATEX	ATEX
<b>Applications</b>	- Consumption measurement - Filling of gear lubricant	- Lubrication oil control

- optimized for individual applications because the series have been rendered media-specific by means of differing clearances, bearing variants and materials
- wide measuring ranges with sizes graduated to meet specific requirements
- measurement independent of viscosity within the specified ranges
- low pressure drop
- high-response measurement
- high resistance to pressure
- low noise emission
- high-precision measurement with outstanding reproducibility
- temperature-independent output signals over a wide temperature range
- high degree of accuracy, even with low flow rates at the bottom end of the measuring range

#### Gear Type Flow Meters

#### VCG



Spheroidal cast iron

1.0 ... 240 / 0.3 ... 63

–

... 315 / 4569

20 ... 4 000

up to  $\pm 2.5\%$  deviation from measured value

–15 ... 120 / 5 ... 248

–

–

#### Screw-Type Flow Meters

#### SVC



Spheroidal cast iron

1.0 ... 1500 / 0.3 ... 396

1 : 150

... 250 / 3626

1 ... 1 000 000

up to  $\pm 0.2\%$  deviation from measured value

–30 ... 150 / –22 ... 302

ATEX

– Consumption measurement

#### Turbine Flow Meters

#### TM



Stainless steel

4.6 ... 9167 / 1.2 ... 2422

1 : 10

... 400 / 5802

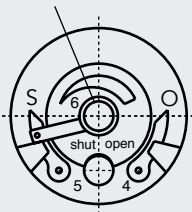
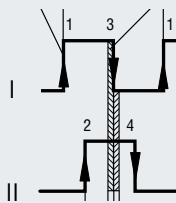

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up to  $\pm 0.5\%$  deviation from measured value

–30 ... 120 / –22 ... 248

–

– for low viscosity fluids

	Valve Position Indicator <b>VOLUMEK</b>	Valve Position Measuring Instrument <b>VOLUTRONIC®</b>	Valve Position Indicator with Encoder <b>VOLUCODEC</b>
			
<b>Design</b>	Gear type volume counter	Gear type volume counter	Gear type volume counter
<b>max. flow rate</b>	02: 4 l/min / 1.1 gal/min 04: 7 l/min / 1.8 gal/min 5: 150 l/min / 40 gal/min	0.25 up to 10 l/min 0.7 up to 2.6 gal/min	02: 4 l/min / 1.1 gal/min 04: 7 l/min / 1.8 gal/min
<b>max. working pressure</b>	02 / 04: 200 bar / 2901 psi 5: 300 bar / 4351 psi	160 bar / 2321 psi	02 / 04: 160 bar / 2321 psi
<b>Display</b>	mechanical	by downstream electronic possible	LED
<b>Current-independent display</b>	Yes	-	No
<b>Current-independent position detection</b>	Yes	No	Yes
<b>Leakage detection</b>	Yes	by downstream electronic possible	Yes
<b>Reset function</b>	at slipping clutch	by downstream electronic possible	Yes
<b>Calibration to actuator size</b>	by gear reducing	by downstream electronic possible	free programmable
<b>Flow direction</b>	must be defined	A-B / B-A	free programmable
<b>Error message</b>	No	by downstream electronic possible	Yes

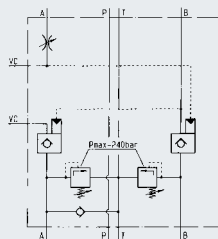
## Hydraulic Manifolds

### HB 4 0311

#### Description

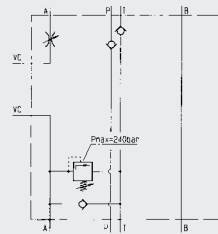
- double pilot operated check valve for holding the actuator position
- two pressure relief valves for limiting the pressure caused by increased temperature
- throttle valve in port A for speed regulation of the actuator
- check valve for filling the piping to avoid wrong indications when temperature fluctuates

#### Schematic



### HB 4 0324

- check valve in P for holding the actuator position when switching parallel actuators
- check valve in T to avoid indicator fluctuations due to pressure pulsation
- one temperature pressure relief valve for limiting the pressure caused by increased temperature
- throttle valve in port A for speed regulation of the actuator
- check valve for filling the piping to avoid wrong indications when temperature fluctuates



# Quality Assurance at KRACHT

All products are put through a 100% pre-delivery inspection. Along with the functions, all working parameters are set on the testbench.

**KRACHT GmbH, Werdohl**  
according to DIN EN ISO 9001  
according to DIN EN ISO 14001  
according to ATEX 94/9/EEC  
(ATEX 95)

**KRACHT Hidraulik Kft, Budapest**  
according to DIN EN ISO 9002



## Machinery

Our focus is on the latest production machinery acquisitions, and we have significantly improved the age distribution of our machines within our plants.

The current average machine age is 2 years, which allows faster processing with higher finish accuracies. With that, we are achieving substantial quality increases in our products



# Customer Service

## Fair, reliable and competent

We have been developing, designing and manufacturing high-quality products for 100 years. Special solutions are implemented in close cooperation with our customers. On schedule performance and full comprehensive service are our top priorities.



# Sales International



Australia	<b>China</b>	France	<b>Hungary</b>	Luxembourg	Portugal	Spain	United Kingdom
Austria	Czech Republic	<b>Germany</b>	Italy	Norway	Slovakia	Sweden	<b>USA</b>
Belgium	Denmark	Holland	Japan	Philippines	Slovenia	Switzerland	
Canada	Finland	Hong Kong	Korea	Poland	South Africa	Turkey	

We are ready to support you around the world with the professional mastery of specific applications and complete solutions based on our one-hundred years of experience. A closely woven network of sales and customer specialists provide the right tools for national and international consulting and optimal customer service.

# KRACHT®

KRACHT CORP. · 8600 S Wilkinson Way Unit A · Perrysburg, OH 43551 · USA  
*phone* +1 419 874 1000 · *fax* +1 419 874 1006  
*mail* [pumps@krachtcorp.com](mailto:pumps@krachtcorp.com) | [flowmeters@krachtcorp.com](mailto:flowmeters@krachtcorp.com)  
*web* [www.krachtcorp.com](http://www.krachtcorp.com)