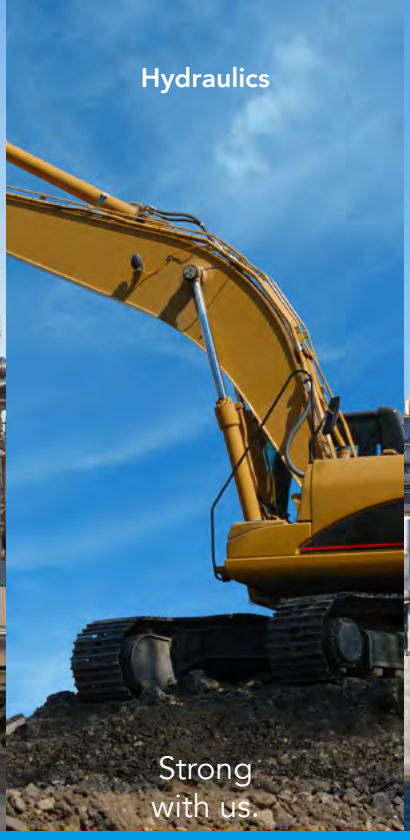


Fluid solutions

KRACHT®

Your fluid solution partner

KRACHT®

Your fluid solution partner

Content

KRACHT®

Gear Pumps

RELIABLE AND ROBUST

Displacement	**0.5 … 3 150 cm³/rev**
Media temperature	**-40 … 220 °C**
Maximum pressure	**… 315 bar**

In addition to our standard products, in close cooperation with our customers we have developed a wide range of application-specific special solutions for fluidic applications. On-schedule performance and a complete all-round service are our top priorities.

Benefit from our developments!
Get in touch with us. We would be glad to advise you.

Standard gear pumps
KF

Low speed pumps for high viscosity media
BT

Coated for abrasive media
DT

Process pumps with special coating
KF coated

High precision metering pumps
ADP

High pressure gear pumps
KP

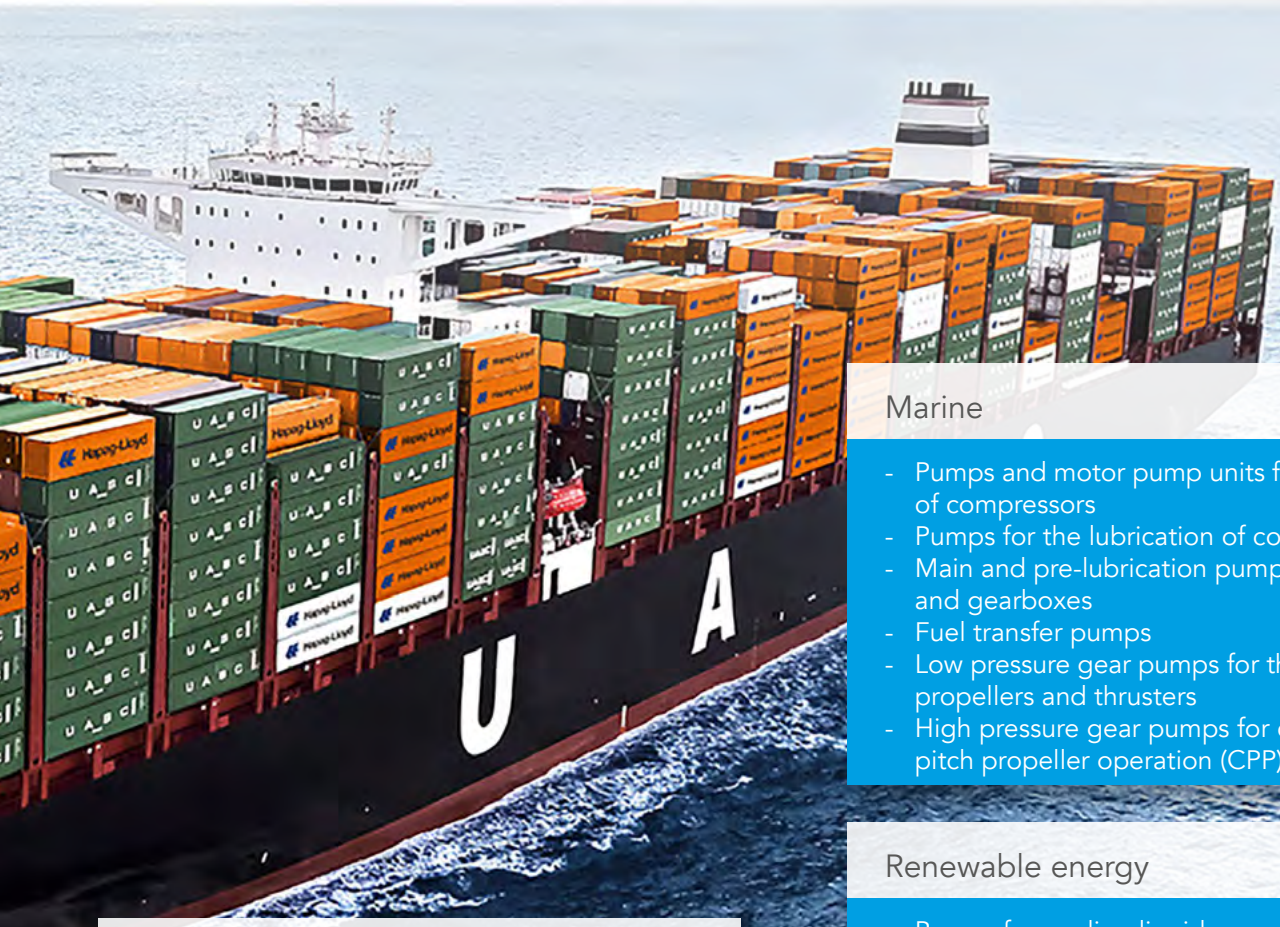
Special pumps
SOP

Your fluid solution partner

Reliable with us.

Applications and media

Our gear pumps can be used to pump fluids that have a certain lubricity. These fluids include, among others, oils, brake fluid, diesel, Skydrol, paints, polyol + isocyanate, adhesives, resins, greases, silicones, lacquers, wax, antifreeze and solvents.



Marine

- Pumps and motor pump units for the lubriction of compressors
- Pumps for the lubrication of couplings
- Main and pre-lubrication pumps for engines and gearboxes
- Fuel transfer pumps
- Low pressure gear pumps for the lubrication of propellers and thrusters
- High pressure gear pumps for controllable pitch propeller operation (CPP)

Renewable energy

- Pumps for cooling liquids
- Low pressure gear pumps and motor pump units for filtration and cooling systems
- Gear pumps with universal valve for lubrication of wind power gearboxes
- Pumps for adhesive dosing systems and for machines for fibre reinforcement (rotor blade production)

Fuels

- Low pressure fuel pumps as feed or booster pump
- Fuel pumps for marine diesel oil (MDO), heavy fuel oil (HFO) and marine gas oil (MGO)

Process technology

- Pumps and motor pump units for dosing systems and mixing units
- Dosing pumps for dosing and insulating, block and sandwich panel machines and RTM lines

Hydraulics

- Low pressure pumps for gear lubrication as well as for filter and cooling units
- Gear motors for fan drives
- High pressure pumps for mobile and stationary hydraulic systems

Gear pumps

Overview

KRACHT is one of the leading German manufacturers of gear pumps for the marine, renewable energy, process technology, lubricating oil technology and hydraulics sectors.
In addition to our standard products, we develop special pumps for a wide range of fluid technology applications in close cooperation with our customers.

The aim is to offer our customers the highest level of reliability and efficiency.
Our gear pumps are suitable for the promotion of a wide range of media in numerous industrial areas. The main areas of application are lubricating oil and process technology as well as applications in mobile and industrial hydraulics.

Transfer pumps

Our gear pumps are external gear pumps and are used as transfer pumps in the chemical and plastics industries, in marine applications, general fluid transfer, in lubricating oil technology, in fuels and within renewable energies.

Pages 10-11

Process pumps

Gear pumps for dosing liquids in process engineering processes. The pumps are used, for example, in hot melt adhesive systems and in 1 C, 2 C or multi-component dosing systems.

Pages 12-14

Hydraulic pumps

The hydraulic pumps are primarily used in oil-hydraulic systems. They are suitable for general hydraulic fluids and motor oils.

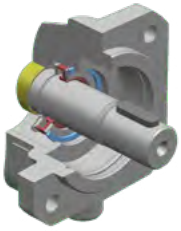
Page 15

Special pumps

In addition to our standard products, we develop special pumps for a wide range of fluid technology applications in close cooperation with our customers. Feel free to get in touch with us.

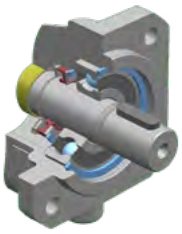
Page 15

Shaft seals



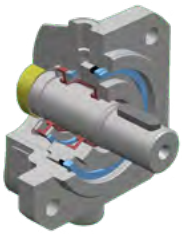
Single radial lip-type seal

Example: for general fluid pumping



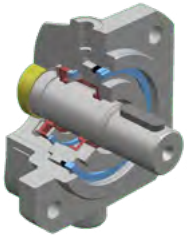
Single radial lip-type seal and outboard bearing

Example: to absorb radial forces



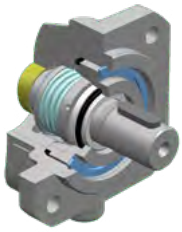
Double radial lip-type seal with connection possibility for quench

Example: for crystallizing media



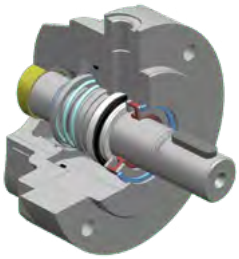
Double radial lip-type seal for vacuum operation with connection possibility for quench

Example: for vacuum applications



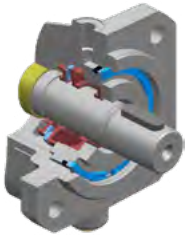
Mechanical seal

Example: for increased upstream pressures



Mechanical seal with single radial lip-type seal and connection possibility for quench

Example: for increased upstream pressures in conjunction with crystallising media



Triple radial lip-type seal with connection possibility for quench

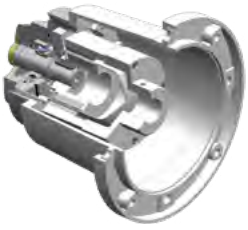
Example: for normal and vacuum operation

Without shaft sealing

Example: Direct mounting to the motor or gearbox

Without shaft sealing with outboard bearing

Example: Direct mounting to the motor or gearbox in connection with the absorption of radial forces



Magnetic coupling

Example: for applications that require absolute tightness

Gland packing

Example: for slow running pumps with highly viscous media

Options

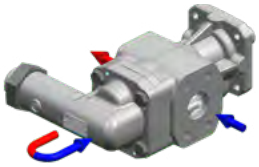
Versions

- ATEX version
- Stainless steel version
- Motor-pump unit (electrically / mechanically driven)
- Noise-optimised version
- Outboard bearing to absorb radial forces
- Low temperature version
- Vacuum version
- Multiple pumps
- Heating jacket
- Follower plate pump

Valve options

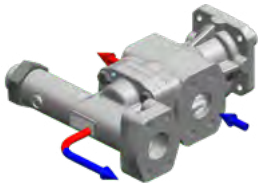
D-Valve D15/D25 (mounted valve)

Gear pumps of the KF series can optionally be equipped with a directly controlled pressure relief valve (D-valve D15 / D25). The built-up pressure relief valve is a direct operated valve with a rising characteristic. It is used to protect the pump from short-term, impermissible pressure peaks. It must not be operated permanently as overpressure protection, as the valve or pump may overheat due to its design.
If the valve responds over a longer period of time, valves with a separate tank connection, such as the T-valve (T-15/25) or valves in pipe construction such as the SPV valve, should be used.



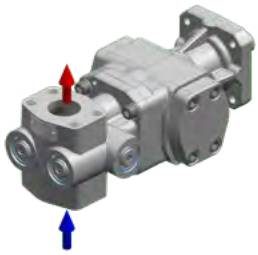
T-Valve T15/T25 (mounted valve)

The T-valve is an attached, directly controlled pressure relief valve with separate tank connection. To dissipate heat, the handled fluid flowing out via the T-valve is fed directly into the storage tank. Thanks to adapted damping, the valve offers very good control characteristics and outstanding dynamics with vibration-free operation at all operating points of the pump.



Universal valve (mounted valve)

Pumps with universal valve pump to the same pressure connection even when the direction of rotation of the drive shaft changes. This property guarantees lubrication of the gearing mechanisms in pendulum mode, for instance, in wind turbines and marine propulsion systems.



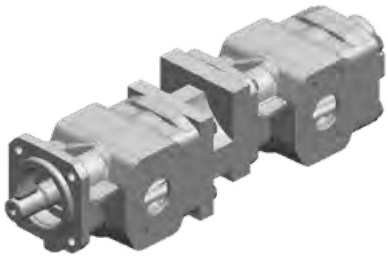
SPV/DV-valve (integrable valves)

The SPV valve is a directly controlled pressure relief valve for installation in pipelines and is used to protect hydraulic circuits.
DV series valves are hydraulically pilot-controlled and are available as DV B pressure relief valves, DV S pressure stage control valve and DV R pressure control valves.

Options

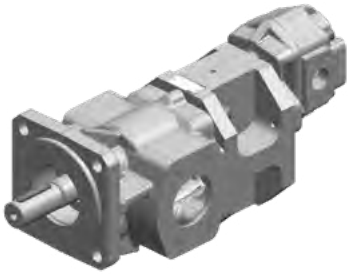
Multiple pumps KF / KP

Gear pump KF
+ Gear pump KF



High pressure gear pump KP
+ High pressure gear pump KP

Gear pump KF
+ High pressure gear pump KP



High pressure gear pump KP
+ High pressure gear pump KP
+ High pressure gear pump KP

Multiple combinations KF / KP + KM

Gear pump KF
+ High pressure gear motor KM

High pressure gear pump KP
+ High pressure gear motor KM

Transfer pumps

Overview KF / BT

KRACHT gear pumps are external gear pumps and are used as transfer pumps in the chemical and plastics industries, in marine applications, general fluid transfer, in lubricating oil technology, in fuels and within renewable energies. The pump housings are made of cast iron, spheroidal cast iron and stainless steel, the gear parts are made from high-quality steel. A wide range of sealing variants is available for the most diverse requirements.

KF

Gear pumps KF are used to pump a wide range of liquids. The pumps impress in particular with their wide range of variants, which can be combined as required and also extended at a later date thanks to their modular design. The pumps are also great for media with low lubricating properties.

Page 11

BT

BT and BTH series pumps are low speed gear pumps for pumping a wide range of medium to high viscosity liquids, provided they ensure a certain minimum lubrication, do not contain solid particles and are chemically compatible.

Page 11

Transfer pumps

Gear pumps KF

In the standard version, the housing parts are made of cast iron. The gears are made of high-strength case-hardened steel, hardened and mounted in special multi-material plain bearing bushes. In the standard version, the drive shaft end is sealed by a rotary shaft seal. All sizes are made with helical gearing. This, in combination with a special gearing geometry, results in extremely low noise levels and low-pressure pulsation.

Characteristics	
Displacement	0.5 … 3 150 cm³/rev
Nominal sizes	0.5 · 0.8 · 1 · 1.6 · 2 · 2.5 · 3 · 4 · 5 · 6 · 8 · 10 · 12 · 16 · 20 · 25 · 32 · 40 · 50 · 63 · 80 · 100 · 112 · 125 · 150 · 180 · 200 · 250 · 315 · 400 · 500 · 630 · 730 · 1000 · 1250 · 1500 · 3150
Operating pressure	... 25 bar
Speed	… 3 600 1/min
Viscosity	1.4 … 100 000 mm²/s
Media temperature	-40 … 200 °C
Housing	Grey cast iron
	Spheroidal cast iron
	Stainless steel
Gear	Steel
	Stainless steel

Applications	
	Lubricating oil supply for marine gear-boxes, wind turbines and compressors
	Pre- and main lubrication of diesel engines
	Oil delivery in filter systems
	Fuel delivery

Gear pumps BT

In the standard design, the housing and bearings are made of cast iron. The shafts and gears are made of hardened and ground case-hardened steel. A mechanical seal or gland packing is provided for shaft sealing. The standard program is supplemented by a variety of special designs.

Characteristics	
Displacement BT	6.9 … 494 cm³/rev
Displacement BTH	97 ... 1056 cm³/rev
Nominal sizes BT	6.9 · 32 · 43 · 91 · 197 · 254 · 352 · 494
Nominal sizes BTH	97 · 186 · 393 · 510 · 1056
Operating pressure	… 8 bar
Speed	… 750 1/min
Viscosity	76 … 30 000 mm²/s
Media temperature	-10 … 220 °C
Housing	Grey cast iron (Sizes 0 … 7)
	Bronze (Sizes 1 … 4)
	Stainless steel (Size 2)
Gear	Steel (Sizes 0 … 7)
	Stainless steel (Sizes 1 … 4)
Bearing	without bearing bushes (Sizes 0 … 4)
	with iron bearing bushes (Sizes 1 … 7)
	with bronze bushings (Sizes 1 … 7)

Applications	
	Pumping of bitumen
	Pumping of paints / inks / varnishes
	Pumping of resin
	Pumping of glue
	Pumping of wax

Process pumps

Overview DT / KF coated / ADP

Dosing liquids is the main task in numerous process engineering processes. Polyol, isocyanate, plasticizers, resins and adhesives are some of the most important liquids with a wide range of applications. Risks in dosing these partly toxic, corrosive and flammable fluids must be excluded. Discover our process pumps. Standard and customised pumps from KRACHT – for your application, too.

DT

DuroTec® gear pumps DT for abrasive and poorly lubricating liquids.

Page 13

KF coated

Gear pumps KF coated for dosing fluids in process engineering processes.

Page 13

ADP

High precision gear metering pump.

Page 14

Process pumps

DT

The DuroTec® gear pumps are primarily designed for multi-component systems in process technology. This pump offers a reliable alternative wherever liquids with hard fillers have to be processed, where standard pumps do not achieve satisfactory service lives.

Characteristics	
Nominal sizes	DT 1 = 3.0 · 5.5 · 6.3 · 8 · 11 · 16 · 22 cm³/rev
	DT 3 = 63 · 100 · 125 cm³/rev
	DT 5 = 150 · 200 · 250 cm³/rev
Operating pressure	... 150 bar
Speed	… 1 500 1/min
Viscosity	30 … 50 000 mm²/s
Media temperature	… 150 °C
Housing	Grey cast iron
	Spheroidal cast iron
	Stainless steel
Gear	Special steel with wear-resistant and corrosion-resistant coating

Applications	
	Hot melt adhesive systems and in 1 C, 2 C or multi-component dosing systems

KF coated

Dosing liquids is the main task in numerous process engineering processes. The accuracy, uniformity and reproducibility with which these liquids can be processed are decisive for the quality of the end product. The KRACHT process pump KF coated is particularly well-suited for these applications.

Characteristics	
Displacement	4.6 ... 24.8 cm³/rev
Nominal sizes	4 · 8 · 11 · 16 · 20 · 24
Operating pressure	… 50 bar
Speed	… 2 000 1/min
Viscosity	12 … 15 000 mm²/s
Media temperature	-10 … 200 °C
Housing	Grey cast iron
	Spheroidal cast iron
Gear	Special steel with wear-resistant and corrosion-resistant coating

Applications	
	As a dosing pump for PU components, plasticizers, resins, adhesives, lacquers, paints etc.

Process pumps

ADP

The ADP is a high precision external gear metering pump. With extremly small clearances and an optimal gear geometry the ADP has a very high volumetric efficiency also at difficult combinations e.g. high pressure together with low turning speed and low viscosities. The main parts of the pump are made of stainless steel. Because of that a wide range of fluids can be pumped.

Characteristics

Displacement	0.1 … 20.0 cm³/rev
Nominal sizes	0.1 · 0.3 · 0.6 · 1.2 · 1.8 · 2.4 · 3.0 · 4.8 · 6.0 · 12.0 · 20.0
Operating pressure	... 200 bar
Speed	… 200 1/min
Viscosity	ν_{min} 1.0 mm²/s (depending on pressure and speed) ν_{max} depending on inlet conditions, speed and motor power
Media temperature	-20 … 200 °C
Housing	Stainless steel
Gear	Stainless steel

Applications

Metering of polyols and isocyanates in polyurethane plants
Metering of resin and hardener in two and multi-components plants
Lubricating oil metering

Hydraulic pumps

KP

High pressure KP gear pumps are preferably used in oil hydraulic systems. The main components include the housing and the flange cover. They can withstand high dynamic loads which means they are insensitive to pressure peaks and continuous vibrations. Thanks to their design and the materials used, the pumps are ideal for deployment under the toughest operating conditions.

Characteristics

Displacement	1.4 … 300 cm³/rev
Nominal sizes	KP 0 1 · 2 · 3 · 4 · 6 · 8 KP 1 3 · 4 · 5.5 · 6.3 · 8 · 11 · 14 · 16 19 · 22 KP 1 S2 3 · 4 · 5.5 · 8 · 11 · 16 · 20 KP 2 20 · 25 · 28 · 32 · 40 · 50 · 62 KP 3 63 · 71 · 82 · 100 · 112 · 125 KP 5 160 · 200 · 250 · 300
Operating pressure	... 315 bar
Speed	… 4 000 1/min
Viscosity	1.2 … 1400 mm²/s
Media temperature	-20 … 150 °C
Housing	Aluminium
	Grey cast iron
	Spheroidal cast iron
Gear	Steel

Applications

Mobile and stationary plants
Construction and agricultural machinery, municipal and special vehicles

Special pumps

SOP

In addition to our standard products, we develop special pumps in close cooperation with our national and international customers. They provide specific solutions for the most diverse fluid technology applications.
Feel free to get in touch with us. We would be glad to advise you.

Example applications

1 Two-stage lubricating oil pump of a diesel engine
2 Pre-lubrication pump of a dual fuel diesel engine
3 Direct driven diesel oil pump
4 Direct driven main lubricating oil pump with control valve
5 Direct driven main lubricating oil pump for installtion in the engine sump
6 Internal gear pump for gear lubrication
7 Gear pump for the lubrication of wind power gears
8 Pumps with heavy-duty outboard bearing

KRACHT®

Flow Measurement

PRECISE | ECONOMICAL | ROBUST

Measuring range	**0.001 ... 3 750 l/min**
Media temperature	**-60 ... 210 °C**
Maximum pressure	**... 480 bar**

In addition to our standard products, in close cooperation with our customers we have developed application-specific special solutions for fluidic measurement technology. The associated high-performance electronics process the signals supplied by the flow meter and ensure that processes are precisely monitored, regulated and controlled.

Benefit from our developments!
Get in touch with us. We would be glad to advise you.

Gear type flow meters

VC
Spheroidal cast iron
Stainless steel

Gear type flow meters

VCA
Aluminium

Screw type flow meters

SVC
Spheroidal cast iron

Turbine flow meters

TM
Stainless steel

Valve position indicators

VOLUMEC

Electronics

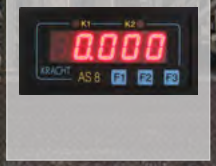
ASR 30
Control unit

Electronics

ASR 14
Control unit

Electronics

AS 8
Control unit



Electronics

SD 1
Plug-on display

Your fluid solution partner

Exactly with us.

Applications and media

Pumpable liquids can be measured. These fluids include oils, brake fluid, diesel, Skydrol, paints, polyol + isocyanate, adhesives, resins, greases, silicones, paints, propellants, wax, water and solvents.

Automotive and marine

- Test benches and plants
- Dosing and filling operating materials such as engine oils, brake fluids, antifreeze, preservatives, etc.
- Fuel consumption measurement
- Valve position indicator

Chemical industry

- Flow rate and volume measurement in plants and plant systems
- Dosing and filling chemicals with and without abrasive fillers
- Measurement of extremely small amounts and microdosing
- Use in potentially explosive atmospheres

Paint and varnish industry

- Printing presses
- Painting systems
- Coating machines
- Dosing and filling
- Quantity, flow rate and consumption measurements
- Monitoring the mixing ratio

Hydraulics

- Flow and volume measurement
- Indirect, volumetric cylinder stroke measurement
- Cylinder synchronisation controllers
- Measurement, control, regulation of flow rates and volumes
- Test benches for pumps, motors and valves
- Leakage monitoring
- Characteristic curve generation of hydraulic components
- Gear oil filling

Plastics Industry

- Mixing and dosing systems (single and multi-component systems)
- Consumption measurements
- Measurement and control of individual components and mixing ratios
- Flow rate and volume measurements
- Polyurethane (polyol and isocyanate)
- Low and high pressure dosing machines
- Dosing systems for pentane processing
- Block foam plants
- Paint dosages
- Premixing stations
- Hot melt adhesives

Flow measurement

General

Flow measurement: that means highly dynamic and highly precise volume and flow measurement, evaluated in an application-oriented method, from simple display devices to intelligent controller solutions. The powerful electronics processes the signals supplied by the flow meter and ensures that processes are precisely monitored, regulated and controlled.

For example in process technology as a controller unit for dosing and mixing systems or as flexible measuring and recording electronics for differentiated applications in test bench construction.

Gear type flow meters

Application-optimized specifications with differing clearances, bearing variants and materials.

Pages 19-20

Screw type flow meters

Particularly suitable for highly viscous media with abrasive fillers.

Page 21

Turbine flow meters

Predestined for use with low-viscosity media, such as water, cooling lubricants etc.

Page 22

IO-Link version with internal calculation of measured values

For bidirectional communication between any control level and the VC or SVC IO-Link.

Page 23

Electronics

The powerful electronics processes the signals supplied by the flow meter and ensures that processes are precisely monitored, regulated and controlled.

Page 24

Valve position indicators

For the control of hydraulically operated ship fittings

Page 25

Gear type flow meters

VC

Gear type flow meters for the most demanding tasks in fluid technology measurement technology. Our expertise guarantees functional solutions. Standardised and application-optimised.

Characteristics

Measuring range	0.001 … 700 l/min
Nominal sizes	0.025 · 0.04 · 0.1 · 0.2 · 0.4 · 1 · 3 · 5 · 12 · 16
Typical measurement accuracy	up to +/- 0.3% of the measured value from a viscosity of 20 mm²/s
Measured value resolution	… 160 000 Imp/l
Maximum pressure	… 480 bar
Viscosity	… 2 500 000 mm²/s
Media temperature	-60 … 210 °C
Housing	Spheroidal cast iron
	Stainless steel
Gear	Steel
	Stainless steel

Applications

	Fuel consumption measurement
	Characteristic curve generation of hydraulic components
	Gear oil filling
	Indirect, volumetric cylinder stroke measurement
	Ratio measurement in 2- and multi-component dosing systems
	Micro-flow measurement and micro-dosing

Product characteristics

- High-precision measurement with outstanding reproducibility
- Wide measuring ranges with sizes graduated to meet specific requirements
- Application-optimized specifications
- Low pressure drop
- Any flow direction

Encoder version with maximised measurement resolution

Compared with standard sensors, encoders are capable of generating considerably more pulses, thus increasing measurement resolution by orders of magnitude. Encoder-equipped VC flow meters generate up to 2 500 pulses per revolution and can recognise the direction of flow.
Encoders, like the standard versions, send square-wave signals to the electronics.

Characteristics

Measuring range	0.004 l/min … 80 l/min
Nominal sizes	0.04 · 0.2 · 1
Typical measurement accuracy	up to +/- 0.3% of the measured value from a viscosity of 20 mm²/s
Measured value resolution	… 13 157 896 Imp/l
Maximum pressure	… 480 bar
Viscosity	… 2 500 000 mm²/s
Media temperature	-20 … 80°C
Housing	Spheroidal cast iron
Gear	Steel

- No flow conditioners nesessary
- Wide temperature range
- High working pressure
- Low noise emission
- High-response measurement
- Electronics in EMC compliant design
- RoHS compliant

Gear type flow meters

VCA

Precise flow meters made of aluminium

Characteristics

Measuring range	0.004 … 200 l/min
Nominal sizes	0.04 · 0.1 · 0.2 · 2 · 5
Typical measurement accuracy	up to +/- 1.0 % of the measured value from a viscosity of 20 mm²/s
Measured value resolution	… 50 000 Imp/l
Maximum pressure	… 240 bar
Viscosity	… 2 500 000 mm²/s
Media temperature	-10 … 80 °C
Housing	Aluminium
Gear	Stainless steel
	Steel

Applications

Lubrication oil control
Fuel consumption measurement
Cylinder stroke measurement

Product characteristics

- Precise measurements with outstanding reproducibility
- Low pressure drop
- Any flow direction
- No flow conditioners nesessary
- Wide temperature range
- High working pressure
- Low noise emission
- High-response measurement
- Electronics in EMC compliant design
- RoHS compliant

Screw type flow meters

SVC

Our screw type flow meters incorporate the product characteristics robustness, high-precision measuring accuracy, good handling as well as durability and economy. Further advantages are resistance and insensitivity to contamination, pulsation free and low pressure drop. Particularly suitable for highly viscous media with abrasive fillers.

Characteristics	
Measuring range	0.01 ... 3 750 l/min
Nominal sizes	4 · 10 · 40 · 100 · 250
Typical measurement accuracy	up to +/- 0.2% of the measured value from a viscosity of 20 mm²/s
Measured value resolution	… 15 686 Imp/l
Maximum pressure	… 480 bar
Viscosity	… 2 500 000 mm²/s
Media temperature	-40 … 210°C
Housing	Spheroidal cast iron
Measuring spindles	Heat-treated steel

Applications	
	Fuel consumption measurement
	Dosing systems
	Process technology
	Test bench construction

Encoder version with maximised measurement resolution

Compared with standard sensors, encoders are capable of generating considerably more pulses, thus increasing measurement resolution by orders of magnitude. Encoder-equipped SVC flow meters generate up to 2 500 pulses per revolution and can recognise the direction of flow.Encoders, like the standard versions, send square-wave signals to the electronics.

Characteristics	
Measuring range	0.02 … 150 l/min
Nominal size	10
Typical measurement accuracy	up to +/- 0.2% of the measured value from a viscosity of 20 mm²/s
Measured value resolution	... 247 463 Imp./l
Maximum pressure	… 250 bar
Viscosity	… 2 500 000 mm²/s (durchflussabhängig)
Media temperature	-20 … 80°C
Housing	Spheroidal cast iron
Measuring spindles	Heat-treated steel

Product characteristics

- High-precision measurement with outstanding reproducibility
- Pulsation-free measuring principle
- Very low pressure drop
- Any flow direction
- Wide temperature range
- High working pressure
- High-response measurement
- Very low noise emission
- Electronics in EMC compliant design
- RoHS compliant

Turbine flow meters

TM

KRACHT TM turbine flow meters are proven and widely used measuring devices in industrial flow measurement technology. The instruments provide reliable, continuous and accurate measurement of liquids flowing under pressure in closed pipes. Thanks to the stainless steel design, the flow meters are suitable for a variety of even aggressive media.

Characteristics	
Measuring range	0.275 ... 4000 m^3/h (4.6 … 66 667 l/min)
Nominal sizes	0.275 · 0.55 · 1.1 · 2.2 · 4 · 8 · 16 · 34 · 68 · 135 · 270 · 550 · 1100 · 1900 · 2700 4000
Maximum pressure	… 400 bar
Media temperature	-30 … 400°C
Typical measurement accuracy	up to ± 0.5% of the measured value
Housing	Stainless steel

Applications	
	Flow measurement of water, cooling lubricants, emulsions and other lubricant and non-lubricant media.

Product characteristics

- Very large measuring range
- Very low pressure drop
- High working pressure
- Low noise emission
- Electronics in EMC compliant design
- RoHS compliant

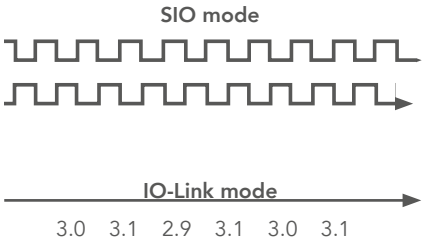
IO-Link version with internal calculation of measured values

I General

VC/SVC flow meters with IO-Link technology are based on standard flow meters with one or two sensors.
Unlike standard or encoder versions which always send a square wave signal to the electronics, IO-Link devices have the added capability of internally computing concrete measurement values. Therefore, these flow meters lend themselves for use in classic PLC and in IO-Link infrastructures.
Thanks to its international standardisation (IEC 61131-9), the IO-Link technology offers point-to-point connectivity with continuous monitoring between any desired control layer and the VC/SVC-IO-Link assembly.
Handling and startup is made easy by the associated IODD (IO Device Description) file.
The VC/SVC-IO-Link assembly directly delivers all measured values with units. In the preset SIO mode (standard input output), the volume counter gives square-wave signals if the IO-Link mode is not enabled by an IO-Link master. This provides downward compatibility of the VC-IO-Link assembly with the standard square-wave signal

I Communication of the IO-Link assembly

Signal processing and transfer to the IO-Link interface



SIO mode
- Same output of the two square-wave signals as in standard pre-amplifier

IO-Link mode
Signal output as described in the IODD according to the following units:
- number of pulses
- litres

...

Electronics

Control units and plug-on displays

The powerful electronics processes the signals supplied by the flow meter and ensures that processes are precisely monitored, regulated and controlled. It is used, for instance, in process technology as a control unit for dosing and mixing systems or as flexible measuring and recording electronics for differentiated applications in test bench technology for use.

Applications

- Flow control
- Dosing
- Fuel consumption measurement
- Cylinder stroke measurement and monitoring
- Display and monitoring of added amounts
- Display and monitoring of differential amounts
- Display and monitoring of mixing ratio
- Display and control of mixing ratio

Control unit ASR 30

The ASR 30 is a control unit which can be operated via touch screen. In addition, the unit can be expanded with manual operating units. This allows the implementation of numerous fluid technology applications. Standardised programs are available for various applications. The ASR 30 programming can be optimally adapted to the respective application.

Control unit ASR 14

The ASR 14 integrates control, operation and visualisation. The ASR 14 programming can be optimally adapted to the respective application.

Control unit AS 8

The AS 8 control unit processes incremental input signals from the flow meters. The input signals are filtered in the unit, converted, and computed into the physical sizes of flow rate or volumes.

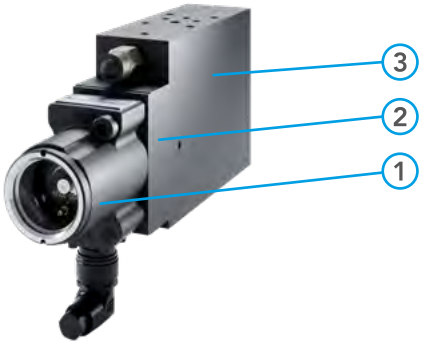
Plug-on display SD 1

The SD 1 plug-on display is a universally applicable local display for all volume counter series (VC, SVC, TM) with Hirschmann plugs. The display can show either flow rate or volume.

Valve position indicators

VOLUMEC

The valve position indicator VOLUMEC is an interlinking unit with the connection hole pattern for directly controlled NG 06 directional control valves. In detail, the module comprises a valve block, volume counter and display unit. Mounted on a connection plate and completed with a directional control valve, the VOLUMEC is used to control hydraulically operated ship valves for ballast, cargo or stripping systems, to measure and display the adjustment travel of the valve.
The control module is designed for installation in deck boxes. The display of the volumetrically detected valve position can be read visually directly on site or electrically via potentiometer or limit switches.



Display device AVC (1)

The display device is part of the volume counter and forms a measuring unit. It is completely separated from the hydraulic circuit.

Gear type flow meters VC (2)

Gear flow type meters of nominal sizes 02, 04 and 5 are available, which are designed for flows from 4 to 150 l/min and maximum pressures between 200 and 300 bar.

Hydraulic manifold HB (3)

The VOLUMEC valve position indicator can be combined with different hydraulic manifolds to meet individual requirements.

VOLUTRONIC®

The VOLUTRONIC® valve position indicator differs from the mechanical VOLUMEC by its electronic signal processing. 2 incremental signals with a 90 ° phase offset are transmitted to the control, which enables the direction to be displayed in addition to the flow volume. The VOLUTRONIC® valve position measuring instrument can be used for a wide range of actuator sizes and travel speeds.

	VOLUMEC	VOLUTRONIC®
Version	Gear type volume counter	Gear type volume counter
Flow range	... 150 l/min	... 10 l/min
Maximum pressure	... 300 bar	... 160 bar
Display	mechanical	by downstream electronic possible
Current-independent display	Yes	–
Current-independent position detection	Yes	No
Leakage detection	Yes	by downstream electronic possible

KRACHT®

Hydraulics

EFFICIENT | ECONOMICAL | ROBUST

Displacement KP/KM	**1.0 ... 300 cm³/rev**
Media temperature	**-20 ... 150 °C**
Maximum pressure	**... 315 bar**

High-pressure gear pumps and motors, fan drives, multiple combinations, valves and hydraulic manifolds as well as cylinders for construction machinery, municipal vehicles, agricultural machinery, special vehicles and truck bodies.

Benefit from our developments!
Get in touch with us. We would be glad to advise you.

High pressure gear pumps	High pressure gear motors	Flow dividers	Hydraulic manifolds	Cylinders	Fan drives
KP	**KM**	**KM + KM**	**HB**	**CNL BZ**	**KM 1**
					

Your fluid solution partner

Strong with us.

Hydraulic components for mobile and stationary applications

Our hydraulic components are used in a host of different areas. Our high-pressure gear pumps are employed wherever motion is produced by pressurised oil. Our high-pressure gear motors translate hydraulic into mechanical force. The valves and cylinders are used in a multitude of applications in the field of oil and working hydraulics.

Hydraulics

General

High pressure gear pumps and motors, fan drives, multiple combinations, valves and hydraulic manifolds as well as cylinders for construction machinery, municipal vehicles, agricultural machinery, special vehicles and truck bodies.

High pressure gear pumps KP

High-pressure KP gear pumps are preferably used in oil hydraulic systems. They are suitable for general hydraulic fluids and engine oils.

Page 29

High pressure gear motors KM

High-pressure gear motors for oil-hydraulic systems. Multiple motor combinations are possible and the motors can be supplied with mounted valves

Page 29

Flow dividers

Flow dividers for efficient distribution of pressures and flows.

Page 30

Hydraulic manifolds

Customised hydraulic manifolds for the driving and working hydraulics.

Page 30

Cylinders

Hydraulic and block cylinders as differential, synchronous, pull or push cylinders as well as plunger cylinders.

Page 31

Fan drives

Individual cooling through adaptable motors with different valve functions for each cooler brand.

Pages 32-33

High pressure gear pumps

KP

High pressure KP gear pumps are preferably used in oil hydraulic systems. The main components include the housing and the flange cover. They can withstand high dynamic loads which means they are insensitive to pressure peaks and continuous vibrations. Thanks to their design and the materials used, the pumps are ideal for deployment under the toughest operating conditions.

Characteristics

Displacement	1.4 … 300 cm³/rev
Nominal sizes	KP 0 1 · 2 · 3 · 4 · 6 · 8 KP 1 3 · 4 · 5.5 · 6.3 · 8 · 11 · 14 · 16 · 19 · 22 KP 1 S2 3 · 4 · 5.5 · 8 · 11 · 16 · 20 KP 2 20 · 25 · 28 · 32 · 40 · 50 · 62 KP 3 63 · 71 · 82 · 100 · 112 · 125 KP 5 160 · 200 · 250 · 300
Operating pressure	... 315 bar
Speed	… 4 000 1/min
Viscosity	1.2 … 1400 mm²/s
Media temperature	-20 … 150 °C
Housing	Aluminium Grey cast iron Spheroidal cast iron
Gear	Steel

Applications

	Mobile and stationary plants
	Construction and agricultural machinery, municipal and special vehicles

High pressure gear motors

KM

KRACHT KM external gear motors are suitable for deployment under the toughest operating conditions thanks to their design and the materials used. The main components are the housing and the flange cover. They can be dynamically highly loaded, making them insensitive to pressure peaks and continuous vibrations.

Characteristics

Displacement	5.5 … 300 cm³/rev
Nominal sizes	KM 1 5.5 · 6.3 · 8 · 9.6 · 11 · 14 · 16 · 19 · 22 · 25 KM 1 S2 5.5 · 8 · 11 · 16 · 20 KM 2 20 · 25 · 28 · 32 · 40 · 50 · 62 KM 3 63 · 71 · 82 · 100 · 112 · 125 KM 5 219 · 250 · 300
Operating pressure	... 315 bar
Speed	… 4 000 1/min
Viscosity	1.2 … 1 000 mm²/s
Media temperature	-20 … 150 °C
Housing	Grey cast iron Spheroidal cast iron Aluminium
Gear	Steel

Applications

	Mobile and stationary plants
	Construction and agricultural machinery, municipal and special vehicles as a fan or other driveb

Flow dividers

KM

The flow divider is a hydraulic component. It is used for the efficient distribution of pressures and flows. It divides or adds up a total volume flow uniformly or in a fixed division ratio. The consumer pressures are not important. As a result of its design, the flow divider is a proven solution for various dividing tasks.

Characteristics

Displacement	5.45 … 25.97 cm³/rev
	KM 1 5.5 · 6.3 · 8 · 9.6 · 11 · 14 ·16 · 19 · 22 · 25
Operating pressure	... 250 bar
Speed	… 4 000 1/min
Viscosity	10.0 … 600 mm²/s
Media temperature	… 90 °C
Housing	Aluminium
Gear	Steel

Applications

Mobile and stationary plants
Construction and agricultural machinery, municipal and special vehicles

Hydraulic manifolds

HB

Our hydraulic manifolds are custom-made control units for driving and working hydraulics for mobile work machines such as road and construction machines, municipal vehicles and agricultural equipment, or applications in the field of stationary hydraulics. The product range includes all necessary hydraulic functional elements and their designs (mono and sandwich blocks, installation and structural elements). It is topped off with integrated electronic sensors, controls and actuating elements.

Characteristics

Volume flow	… 3 000 l/min
Maximum pressure	... 480 bar
Media temperature	-30 … 200 °C

Applications

Road and construction machinery
Municipal vehicles and agricultural machinery
Water jet cutting machines
Clutch-operated manual gears
Gear control

Cylinders

Hydaulic cylinders CNL

Cylinders of the CNL type series are designed as pure bolted constructions. Cylinder heads and bottoms are made of steel. “Seamless precision steel tubes” according to DIN 2391 are used for the cylinder tubes and high-strength steel is used for the ground, polished and hard-chrome plated piston rods.

Characteristics	
Nominal pressure	200 bar
Piston diameter	40 … 100 mm
Stroke length	… 4 000 mm
Lifting speed	… 0.5 m/s
Pressure media temperature	-20 … 180 °C
Viscosity	2.8 … 380 mm²/s
Mounting position	optional

Applications	
	Differential cylinder
	Synchronised cylinder
	Push or pull cylinder
	Plunger cylinder

Block cylinders BZ

Block cylinders are used for lifting, pressing and clamping in tool, mould and fixture construction as well as in machine tools.
With a nominal pressure of 400 bar and a piston diameter of up to 125 mm, KRACHT provides precision and safety for a multitude of applications. The compact size as well as various mounting and connection options facilitate problem-free installation even where space is limited.

Characteristics	
Nominal pressure	400 bar
Piston diameter	40 … 125 mm
Stroke length	… 500 mm
Lifting speed	… 0.5 m/s
Pressure media temperature	-20 … 180 °C
Viscosity	2.8 … 380 mm²/s
Mounting position	optional

Applications	
	Differential cylinder
	Synchronised cylinder
	Push or pull cylinder
	Plunger cylinder

Fan drives

KM 1

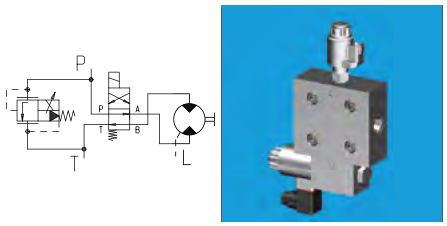
Individual cooling through adaptable motors with different valve functions for each cooler brand.

Characteristics	
Flow range	4 … 60 l/min
Media temperature	… 80 °C
Constant pressure	… 250 bar

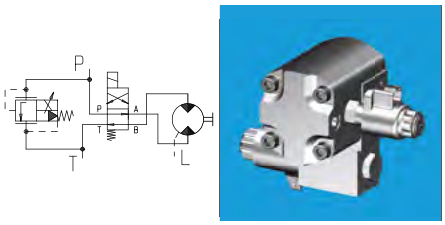
Fan drives

I Versions

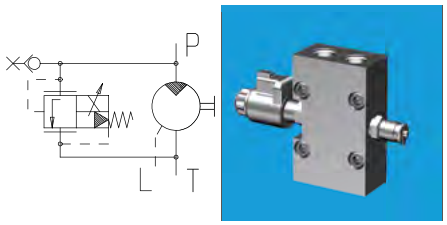
Standard and space-optimised versions with optional proportional valve and reversible unit, thermostatic and pressure relief valve, ON-OFF function, pressure relief valve and reversible unit.



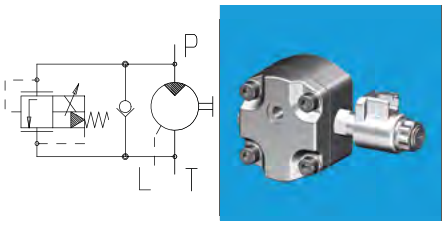
KM 1 “Space-optimised” proportional valve and reversible unit



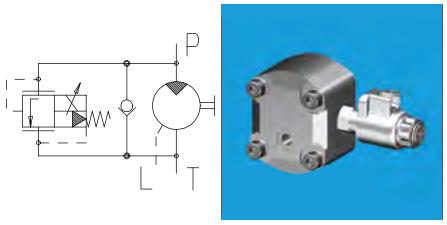
KM 1 “Standard” proportional valve and reversible unit



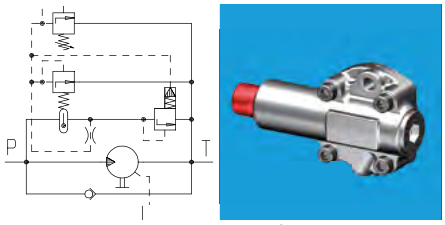
KM 1 “Space-optimised” proportional valve



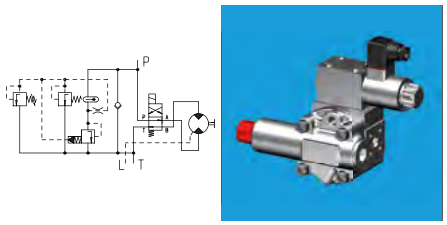
KM 1 “Standard” proportional valve



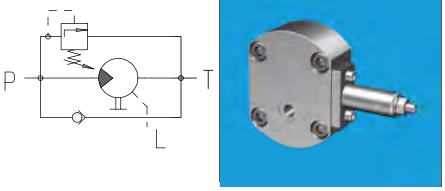
KM 1 “Standard” proportional valve



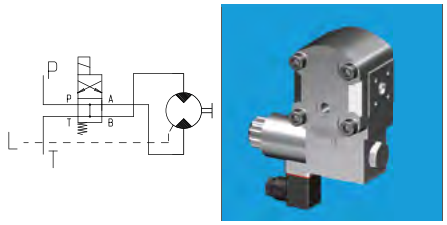
KM 1 Thermostatic valve and pressure relief valve



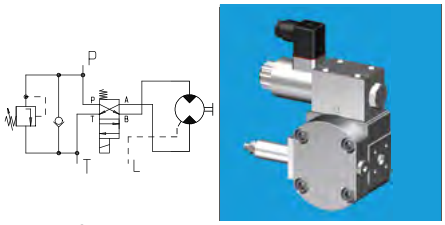
KM 1 Thermostatic valve and pressure relief valve with reversible unit



KM 1 Pressure relief valve



KM 1 ON-OFF function



KM 1 Pressure relief valve and reversible unit

KRACHT®

Valves

RELIABLE AND APPLICATION-OPTIMIZED

Volume flow	**... 1 800 l/min**
Media temperature	**-40 ... 220 °C**
Nominal pressure	**... 400 bar**

Cetop valves for all requirements stationary and mobile applications. Pressure, switching and stop valves with pipe connection for high flow rates. Special valves.

Benefit from our developments!
Get in touch with us. We would be glad to advise you.

Pressure relief valves	Pressure control valves	Pressure stage control valves	Universal valves	Hydraulic manifolds	Directional control valves
SPV / HV / T DBD / DV B / D	DV R	DV S	U2	HB	WL
					

Your fluid solution partner

Safe with us.

Valves

Main areas of application: General mechanical engineering, plant engineering, construction machinery, mining technology, chemical technology, diesel engines, vehicle technology, gear manufacturing, refrigeration technology, compressor construction, power plant technology, plastics technology, offshore technology, test bench construction, shipbuilding, rolling mill industry, machine tools, wind turbines, two- and multi-component systems.

Valves

Pressure relief valves

Pressure relief valves prevent system overloads. Depending on the operating pressure, volume flow, viscosity etc., appropriate valve solutions are available for all framework conditions, be it for rapid buffering of pressure peaks or extreme flow-off requirements.

Pages 37-39

Pressure stage control valves

The DV S pressure stage control valve is a pilot-control pressure relief valve with several parallel pilot valves set at two different pressures. The pressure stage switch valve has an integrated directional control valve. This valve is used to switch different pressure stages (upstream pressure) on and off. The control oil drain is internal or external. A typical application is clutch control in ship gearboxes.

Page 40

Hydraulic manifolds

Our hydraulic manifolds are custom-made control units for driving and working hydraulics for mobile work machines such as road and construction machines, municipal vehicles and agricultural equipment, or applications in the field of stationary hydraulics. The product range includes all necessary hydraulic functional elements and their designs (mono and sandwich blocks, installation and structural elements). It is topped off with integrated electronic sensors, controls and actuating elements.

Page 41

Pressure control valves

The DV R pressure control valve is a pilot-controlled pressure relief valve with external hydraulic activation. It allows for the system pressure to be controlled irrespective of the pressure losses occurring between the valve and the point of the external control oil tap. Typical applications include pressure control in lubricating grease circuits in diesel engines.

Page 40

Universal valves

Universal valves also deliver to the same connection when the direction of rotation of the pump changes. This means that the pressure and suction connection remain constant, thus ensuring lubrication of the gear of wind turbines in rolling operation or vessels in „forward backward operation“ when the direction of rotation changes.

Page 41

Directional control valves

Directional control valves are used to block or release different lines from one another and to create constantly changing line connections. In this way, the direction of action of pressures and volume flows is influenced and the consumer is controlled with regard to start, stop and direction of movement.

Page 41

Pressure relief valves

SPV/SPVF

The SPV/SPVF pressure relief valve is a directly controlled slide valve for installation in pipelines and is used to safeguard low-pressure hydraulic circuits. The line connection can be made using SAE flanges (3000 psi) or Whitworth pipe threads (G).

Characteristics	
Nominal sizes	10 · 20/25 · 32/40 · 50 · 80
Flow range	40 … 800 l/min
Operating pressure	30 bar
Viscosity	1.2 … 1 000 mm²/s
Media temperature	-40 … 220 °C
Housing	Gray cast iron
	Spheroidal cast iron
Applications	Protection of low-pressure hydraulic circuits

HV/HVF

The HV/HVF pressure relief valve is a pilot operated slide valve for installation in pipelines and thus serves to safeguard medium pressure hydraulic circuits up to max. 160 bar. The pipe connection can be made using SAE flanges (3000 psi) or Whitworth pipe threads (G). Thanks to the spool pilot control, the valve can also be used for higher viscosities.

Characteristics	
Nominal sizes	10 · 25 · 40
Flow range	50 … 350 l/min
Operating pressure	160 bar
Viscosity	13 … 600 mm²/s
Media temperature	-20 … 150 °C
Housing	Gray cast iron
	Spheroidal cast iron
Applications	Protection of medium pressure hydraulic circuits

Pressure relief valves

DV B

The DV B pressure relief valves is a hydraulically pilot controlled valves. The control oil can be discharged either internally or externally. As standard, all designs are equipped with a measuring port and a connection for external control oil regulation. Typical applications are oil hydraulics and lubrication technology.
On request, the DV B pressure relief valve is also available with an additional 2/2-directional control valve (e.g. for pressure-minimized circulation).

Characteristics	
Nominal sizes	50 · 80
Flow range	800 … 1 800 l/min
Operating pressure	… 210 bar
Viscosity	4 … 1 000 mm²/s
Pressure media temperature	-20 … 150 °C
Housing	Spheroidal cast iron

DBD

The DBD pressure relief valve is a directly controlled poppet valve for installation in pipelines or as a cartridge valve. The valve is used for pressure protection of hydraulic systems up to pmax = 400 bar. The housing has two connections with Whitworth pipe threads for pipe mounting. Without the housing, the valve cartridge can also be screwed into the specified bore contour in any body instead.

Characteristics	
Nominal sizes	06 · 08 · 10 · 20
Flow range	… 200 l/min
Operating pressure	… 400 bar
Viscosity	10 … 600 mm²/s
Pressure media temperature	-20 … 80 °C

Pressure relief valves

D-Valve

Gear pumps of the KF series can optionally be equipped with a directly controlled pressure relief valve (D-valve D15 / D25). The built-up pressure relief valve is a direct operated valve with a rising characteristic. It is used to protect the pump from short-term, impermissible pressure peaks. It must not be operated permanently as overpressure protection, as the valve or pump may overheat due to its design.
If the valve responds over a longer period of time, valves with a separate tank connection, such as the T-valve (T-15/25) or valves in pipe construction such as the SPV valve, should be used.

Characteristics	
Displacement KF pump	2.5 … 630 cm³/rev
Operating pressure	... 25 bar
Viscosity	1.4 … 100 000 mm²/s
Media temperature	-40 … 200 °C
Housing	Gray cast iron
	Spheroidal cast iron
Appliations	System protection of lubrication systems

T-Valve

The KF gear pumps can optionally be equipped with the T-valve. The T-valve is an attached, directly controlled pressure relief valve with separate tank connection. To dissipate heat, the handled fluid flowing out via the T-valve is fed directly into the storage tank. Thanks to adapted damping, the valve offers very good control characteristics and outstanding dynamics with vibration-free operation at all operating points of the pump.

Characteristics	
Displacement KF pump	32 … 80 cm³/rev
Operating pressure	... 25 bar
Viscosity	12 … 5 000 mm²/s
Media temperature	-40 … 200 °C
Housing	Spheroidal cast iron
Applications	System protection of lubrication systems

Pressure control valves

DV R

The DV R pressure control valve is a pilot-controlled pressure relief valve with external hydraulic activation. It allows for the system pressure to be controlled irrespective of the pressure losses occurring between the valve and the point of the external control oil tap. Typical applications include pressure control in lubricating grease circuits in diesel engines.

Characteristics	
Nominal sizes	50 · 80
Flow range	800 … 1 800 l/min
Operating pressure	… 210 bar
Viscosity	4 … 1 000 mm²/s
Pressure media temperature	-20 … 150 °C
Housing	Spheroidal cast iron

Pressure stage control valves

DV S

The DV S pressure stage control valve is a pilot-control pressure relief valve with several parallel pilot valves set at two different pressures. The pressure stage switch valve has an integrated directional control valve. This valve is used to switch different pressure stages (upstream pressure) on and off. The control oil drain is internal or external. A typical application is clutch control in ship gearboxes.

Characteristics	
Nominal sizes	50 · 80
Flow range	800 … 1 800 l/min
Operating pressure	… 210 bar
Viscosity	4 … 1 000 mm²/s
Pressure media temperature	-20 … 150 °C
Housing	Spheroidal cast iron

Universal valves

U2-Valves

The KF gear pumps can be optionally equipped with the universal valve. Pumps with universal valves pump to the same pressure connection even when the direction of rotation of the drive shaft changes. Thanks to its principle of operation, the pressure and intake connections remain the same for any drive direction. This property guarantees lubrication of the gearing mechanisms in oscillation mode, for instance, in wind power and marine propulsion systems.

Characteristics	
Displacement KF pump	2.5 … 112 cm³/rev
Operating pressure	... 25 bar
Viscosity	12 … 100 000 mm²/s
Media temperature	-40 … 200 °C
Housing	Gray cast iron
	Spheroidal cast iron
Applications	Wind turbines
	Marine

Directional control valves

WL

Characteristics	
Nominal sizes	6 · 10 · 16 · 25
Volume flow	… 700 l/min
Operating pressure	… 330 bar
Viscosity	13 … 400 mm²/s
Pressure media temperature.	-30 … 80 °C

Hydraulic manifolds

HB

Our hydraulic manifolds are custom-made control units for driving and working hydraulics for mobile work machines such as road and construction machines, municipal vehicles and agricultural equipment, or applications in the field of stationary hydraulics. The product range includes all necessary hydraulic functional elements and their designs (mono and sandwich blocks, installation and structural elements). It is topped off with integrated electronic sensors, controls and actuating elements.

Characteristics	
Volume flow	… 3 000 l/min
Maximum pressure	... 480 bar
Media temperature	-30 … 200 °C

Applications	
	Road and construction machinery
	Municipal vehicles and agricultural machinery
	Water jet cutting machines
	Clutch-operated manual gears
	Gear control

Product Portfolio

Gear Pumps

Low and high-pressure gear pumps for lubricating oil, hydraulic, process and test bench applications, fuel and metering systems.

Flow Measurement

Gear, turbine and screw type flow meters and electronics for volume and flow, metering and consumption in the chemical industry, hydraulic, process and test bench technology.

Hydraulics

Single and multistage high-pressure gear pumps, gear motors and valves for construction machinery, municipal vehicles, agricultural vehicles, special vehicles and truck bodies.

Valves

Cetop valves for all requirements stationary and mobile applications. Pressure, switching and stop valves with pipe connection for high flow rates. Special valves.

LLOYD'S REGISTER · LRQA · R · UKAS MANAGEMENT SYSTEMS · ISO 9001 · 001

LLOYD'S REGISTER · LRQA · R · UKAS MANAGEMENT SYSTEMS · ISO 14001 · 001

KRACHT®

KRACHT GmbH · Gewerbestraße 20 · 58791 Werdohl, Germany
Phone +49 2392.935 0 · Fax +49 2392.935 209
E-Mail info@kracht.eu · Web www.kracht.eu

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