Turning Power into Motion.
Product Catalogue.

Linde Hydraulics

Linde Hydraulics Media.
Information.

Our media at a glance.
All documents can be found in the download area of our website.

PRODUCT CATALOGUE	DATASHEETS	BROCHURES	FACT SHEETS	CAD DOWNLOADS
General technical data.	General technical data.	General technical data.	General technical data.	3D models in *.stp file.
Design characteristics & Product advantages.	Design characteristics & Product advantages.	Design characteristics & Product advantages.	Design characteristics & Product advantages.	
Portfolio overview.	Technical specification.	Application examples.	Application examples.	
	Functional descriptions.			

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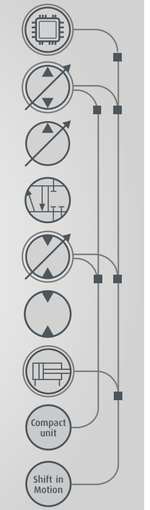
MEDIA & DOWNLOADS

www.linde-hydraulics.com

Linde Hydraulics Product Catalogue.
Content.



Our Services.
Linde Hydraulics Lifecycle.

Inquiry & Layout

Regardless of whether you contact us in person or by other means, with us you will always find your solution as quickly as possible.

Linde Hydraulics offers you a wide range of solutions for your construction, forestry or agricultural machinery. Get an overview on our website. In the download area you will not only find layout examples for your application, but also data and fact sheets with technical details of our portfolio. In addition, 3D (step) models of our products can be used to determine the required installation space. A global network of sales partners always offers you a local contact person - together with our team of application engineers we will support and verify your layout.

→ You can find a **sales partner** close to you on our website at **www.linde-hydraulics.com/network**

Development & Application Engineering

Regardless of whether you need standard or customized solutions, our engineers will develop what brings you forward – under all operating conditions.

Benefit from our expertise and the wealth of experience of our engineers in every step of the product development process:

- Common product development
- Worldwide project support
- Pulse and endurance testing beyond the application requirements
- Customized project coaching
- System training for specific applications

OUR SERVICES

Commissioning & Series Production

Regardless of being at the prototyping and commissioning stage or series production, with systems and expert knowledge, we always ensure high quality and reliability.

We are already well prepared before we come to you to commission your machine. During the development of the iCon® controller, for example, we use the design parameters of your machine to create a simulation model, with which a majority of the functions can already be programmed and tested by computer. During commissioning on site, we can then fully concentrate on the fine adjustment of the parameters. The so-called partial integration by means of Hardware-In-The-Loop test systems significantly shortens the development period of the controls and offers you more flexibility in designing your machine functions.

Even when our products are finally ready for series production, we do not lean back or rest on the fact that we have a very competent and experienced team. With a holistic quality concept, we ensure consistently high quality and reliability - completely independent of variance or quantity.

Our Services.
Linde Hydraulics Lifecycle.

Spare parts & Remanufacturing

You matter to us!
We are there for you -
for more than one lifetime.

In case you have to hurry! With our outstanding parts availability, our global network of service partners and the accustomed Linde quality, we are there for you when you need us. It doesn't matter whether you need a single part in the event of a breakdown or whether we prepare your units for the next harvest.

→ Just visit our **online-shop** at **shop.linde-hydraulics.com**
Here you can find all spare parts tailored to your needs easily via the serial number of your unit. A defined stock of parts is available within 24 hours!

→ For repair and remanufacturing services you can find a **service partner** close to you on our website at **www.linde-hydraulics.com/network**

Compact unit
Shift in Motion
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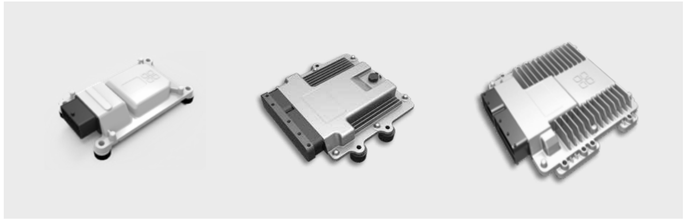
Electronics.
Controllers. **iCon®.**

Product advantages

- Cost-efficient configuration of manifold functions: from simple controls to complex and safety-critical systems
- Software with customer-specific adaptations
- Short development cycles
- Demand-oriented extension and simple implementation in overall vehicle network



Fields of application

iCon®	CB 16-02	CD 88-02	CD 97-02
Simple controls	✓	✓	✓
Underspeed control	✓	✓	✓
Dual path drive		✓	✓
On-road drive		✓	✓
Complex controls			✓

General technical data

		Controller		Connector			Outputs									Inputs								Comm.	
	Safety level	Function	Safety	60+94 pin	Tyco TE	Tyco Family	HighSide Out, max. 3 A	HighSide Out (switched in groups)	LowSide Out	LowSide current controller	Sens. power supply, 5 V at 150 mA	Sens. power supply, 2V - 10V at 250 mA	Sens. power supply, 10V at 250 mA	Sens. power supply, 24V at 1000 mA	Analog In, 0-5 V	Frequency In	Inductive sensors (frequency)	PWM In	Digital PullUp	Digital PullDown	Ignition	CAN	Ethernet 100
CB 16-02	PLb	✓				✓	0	2	0	4	2			1	8	2	0		0	0	1	1	✓
CD 88-02	PLd	✓	✓			✓	6	10	2	22	2		1		19	7	1		10	12	1	3	
CD 97-02	PLd	✓	✓	✓			19	8	8	8	2	2			24	14	4	✓	4	12	1	4	

Electronics.
Diagnostics. **iDiag®.**

Design characteristics

- Diagnostic system compatible with iCon® Controllers
- Parameterization
- "Teach in" of components
- Harness checking
- Data logger suited for PC/laptop with Windows operating system with serial or USB interface

Product advantages

- Optimum system usage by teach-in function
- Efficient trouble shooting
- Easy usage by self-explanatory user surface
- Practical-minded partition of control elements by functional groups
- Modular set-up: individual functions can be added optionally later

Modern machines benefit from the advantages provided by an intelligent electronic control: Increased comfort, machine variants realised by software instead of differing components and a further reduction of fuel consumption and emissions. Linde Hydraulics accompanies this development from the very beginning and complements the components of the power-train with electronic products of the iCon® family, in the accustomed quality and reliability.

Compact unit
Shift in Motion
LEARN MORE ICON®
LEARN MORE IDIAG®

Closed Circuit.
Variable Displacement Pump. **HPV-02.**

Design characteristics

- Axial piston pump in swashplate design
- Clockwise or counter clockwise rotation
- Integrated high pressure relief valves with charge function
- Hydrostatic plain bearing of the swashplate

Product advantages

- Precise and load-independent
- High power density
- Long service life

All the controls used in the Series 02 are based on a load-independent control mechanism. No matter which control is used: identical commands always result in the same response in the machine. The sensitive and precise machine control makes work easier and increases productivity. Various customer system options for mechanical, hydraulic and electric input solutions are available. Further special regulating features like torque control and pressure cut-off are also available. The reliable control of the pump can easily be integrated into any kind of vehicle management control system.

General technical data

HPV-02									
Nominal size			**55**	**75**	**105**	**135**	**165**	**210**	**280**
Displacement	Max. displacement	cc/rev	54.7	75.9	105	135.7	165.6	210.1	281.9
Speed	Max. operating speed	rpm	3900	3400	3200	3000	2750	2300	2400
	Max. speed*	rpm	4150	3600	3400	3200	2950	2500	2550
Pressure	Nominal pressure	bar	450	450	450	450	450	450	450
	Max. pressure**	bar	500	500	500	500	500	500	500
	Max. housing pressure	bar	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Torque	Torque (Δp=430 bar; charge press.=20 bar)	Nm	374	519	719	929	1133	1438	1929
Corner power (theor.)	(V_{max} x n_{max} x Δp 430 bar)	kW	153	185	241	292	326	346	485
Weight (approx.)***	(with H1-control, without oil)	kg	46	49	66	72	113	132	164

Customer interfaces

Control options****						Sensors	
	Proportional	3-Position	Pressure cut-off	Enable function	Torque Control	Swash angle	Pressure
Electro-hydraulic	✓	✓	✓	✓	✓	✓	✓
Hydraulic	✓	✓	✓	✓	✓		
Mechanic	✓			✓			

Flanges						Shafts****			PTO	Ports		
	2 hole	2 hole, additional threads M12	2 hole, additional threads M16	2 hole, additional holes (d=17,5mm)	4 hole	ISO 3019-1 (SAE J 744) ANSI B92.1-1970	Compagnion flange SAE J 1946 Typ A	DIN 5480	Power take-off		ISO 6162-2 Radial twin ports	ISO 6149-1
SAE-B												
SAE-C	✓	✓								Work ports	✓	
SAE-D	✓		✓	✓		✓	✓	✓	✓			
SAE-E					✓					Threaded ports		✓

* highest transient speed, that can temporarily occur | ** highest transient pressure, that can temporarily occur | *** inclusive internal gear pump (size 55-135) or external gear pump (size 165-280) | **** Availability depends on nominal size

Open Circuit.
Self-Regulating Pump. **HPR-02.**

Legal emission regulations force manufacturers of mobile machinery to optimize the noise emission of their products. Since secondary measures tend to be expensive and less efficient Linde Hydraulics prefers to fight the noise where it is generated: by optimally connecting an additional volume directly next to the commutation of the HPR-02 pump, Linde Hydraulics invented the SPU silencer. The adaptive SPU reduces pressure pulsations in the regulating pump over the entire range of operation – without loss of power.

Design characteristics

- Axial piston pump in swashplate design
- Exact controllers with and without position feedback
- Adaptive noise optimization SPU
- Hydrostatic plain bearing of the swashplate

Product advantages

- Excellent suction up to rated speed
- High power density
- Energy saving operation by 'flow on demand'-control

General technical data

HPR-02														
Nominal size			**55**	**75**	**95**	**105**	**135**	**165**	**210**	**249**	**280**	**105 D**	**125 D**	**165 D**	**210 D**	**249 D**
Displacement	Max. displacement	cc/rev	55	75.9	94.7	105	135.7	163.6	210.1	249.9	281.9	210	2x125	2x165	2x210	2x249
Speed	Max. operating speed (without tank pressurization)	rpm	2700	2500	2500	2500	2350	2400	2100	2300[2]	2000	2450	2400	2100	2100	2000
Volume flow	Max. volume flow*	l/min	148.5	189.8	237.5	246.8	312.1	392.6	441.2	574.8[2]	563.8	514.5	600.0	695.5	882	1000
Pressure	Nominal pressure	bar	420	420	350	420	420	350	420	350	420	420	350	420	350	350
	Max. pressure**	bar	500	500	420	500	500	420	500	420	500	500	420	500	420	420
	Max. housing pressure	bar	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Torque	Torque	Nm	368	507	528	702	907	911	1404	1392	1884	1245	1392	1964	2339	2785
Corner power (theoretical)		kW	104	132.8	138	172.7	218.5	229	308.8	335.3[2]	394.7	319.4	337	431.8	514	583
Weight (approx.)	(without oil)	kg	39	39	44.5	50	65	74	116	125	165	96	113	177	180	340

Customer interfaces

Control options****								Sensors		Shafts****		
		pressure cut-off	hydraulic ΔpLS – override	electrical ΔpLS – override	electric stroke limiter and pressure cut-off	hyperbolic power limiter	hyperbolic power limiter and pressure cut-off	Swash angle	Speed sensor	ISO 3019-1 (SAE J 744) ANSI B92.1-1970	Compagnion flange SAE J 1946 Typ A	DIN 5480
Load sensing		✓	✓	✓	✓	✓		✓		✓	✓	✓
Electro-proportional	✓						✓					

* theoretical data of a single unit without efficiency effects | ** highest transient pressure, that can temporarily occur | **** Availability depends on nominal size | [2]Consultation with Linde Hydraulics required

Compact unit

Shift in Motion

LEARN MORE HPV-02

LEARN MORE HPR-02

Open Circuit.
Monoblock Control Valves.

Design characteristics

- Basic block: five directional control valves of identical nominal size in one cast housing
- Designed for the Linde Synchron Control (LSC) -
- Load Sensing System
- Nominal sizes 30, 25, 22 and 18
- Flows up to 600 l/min (size 30)
- Broad dimensioned diameters and flow-optimized design of the supply channels
- Extendable with directional control valves in sandwich design, in identical or differing nominal size
- Pressure cut-off and additional functions integrated in connection plate
- Special functions via intermediate plates
- Optionally with hydraulic or electric piloting

Product advantages

- All advantages of the LSC valve technology
- Compact design
- Full-size expandability
- High efficiency achieved by flow-optimized channels even for applications with numerous actuators

Five directional control valves in a common housing form the base of the manifold valve plate in monoblock design. This results in the most compact package.

With its latest LSC generation, Linde Hydraulics combines the design characteristics of the proven LSC system with the benefits of the electric control. The powerful electronic control unit recognises the operator's command by the amplitude and the speed with which the joysticks are being moved. It then sets the pump and the valves according to the dynamic demand. Due to the overlaid, classic load-sensing control mechanism, no sensors are needed.

All components are provided by a single source and matched perfectly with each other. The operator can change the system's behaviour electronically with regard to its dynamics and fine control, as well as its dependency or independency on the load. This enables multi-purpose machines which can quickly be optimized to the specific use by the operator. With completely opened valves, the actuators can be controlled exclusively via the pump's control to achieve the maximum possible efficiency.

Open Circuit.
Modular Control Valves.

Manifold valve plates of series VT modular are made up of individual components of a modular building block system. This is why manifold valve plates can be configured to optimally match any application with one up to eight actuators.

The directional control valves are at the core of every manifold plate in LSC technology. Compared to other load sensing directional control valves, LSC directional control valves stand apart, in particular, thanks to the integrated downstream pressure compensators and pressure copiers. This arrangement prevents the actuator from lowering when the function starts.

As a result of the compact design, the oil flow only needs to pass through the valve once and not several times. This ensures optimized flow passages in the directional control valve. Due to the high-precision production of the directional control valves, there is only minimal leakage even at high load, which is beneficial to the load holding function of the valves.

Design characteristics

- Directional control valves available as sub plate mounted valves
- Designed for the Linde Synchron Control (LSC) – Load Sensing System
- Nominal sizes 25 and 30
- Flows up to 600 l/min (size30)
- Modular design for the configuration of valve plates for 1-8 actuators
- Optionally with hydraulic, electric or combined piloting

Product advantages

- All advantages of the LSC valve technology
- Easy to configure building block system
- Adjustable to the target application
- Quick availability
- Ideal for machines with low production volume

Compact unit
Shift in Motion
LEARN MORE MONOBLOCK
LEARN MORE VT MODULAR

Open & Closed Circuit.
Variable Displacement Motor. **CMV.**

Design characteristics

- Axial piston motor in bent axis design
- Standardized interfaces
- Speed sensor optional

Product advantages

- High speeds
- High power density
- Low windage losses

With the next generation of the bent axis motors, Linde Hydraulics expands its customer oriented portfolio of high-quality components for hydraulic systems. Due to their standardized interfaces, e.g. the plug-in flange according to ISO, the CMV and CMF fit a high variety of applications, without the need of adaptors. The motors enable a more cost effective operation of the respective applications thanks to low windage losses and lighter weight.

General technical data

CMV								
Nominal size			**60**	**85**	**115**	**140**	**170**	**215**
Displacement	Max. displacement	cc/rev	62	87.7	115.3	144.1	170	217.9
Speed	Max. operating speed at V_{max}	rpm	4450	3900	3550	3250	3100	2900
	Max. speed at V_{max}*	rpm	on request					
	Max. operating speed at V_{min}	rpm	7200	6800	6150	5600	4900	4600
	Max. speed at V_{min}*	rpm	on request					
Pressure	Nominal pressure	bar	450	450	450	450	450	450
	Max. pressure**	bar	500	500	500	500	500	500
	Max. housing pressure	bar	2.5	2.5	2.5	2.5	2.5	2.5
Torque	Output torque (Δp=430 bar and Vmax)	Nm	411	582	787	958	1163	1471
Corner power (theor.)	(Vmax x nmax at Vmin x Δp 430 bar)	kW	320	427	508	578	597	718
Weight	approx. (without oil)	kg	27.7	36.3	44.8	59.2	62.1	76.4

Customer interfaces

Control options						Sensors		Flanges			Shafts****			Ports****			
	Proportional	2-Position	default = Vmin (positive control)	default = Vmax (negative control)	Pressure override	Speed		ISO 3019-1 (SAE) 744)	ISO 3019 – 2 (metric)	Plug-in ISO 3019 – 2	ISO 3019-1 (SAE) 744) ANSI B92.1-1970	Companion flange SAE J 1946 Typ A	DIN 5480		ISO 6162-2 Side ports	ISO 6162-2 Twin ports (rear)	ISO 6149 – 1
Electro-hydraulic	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	Work ports	✓	✓	
Hydraulic	✓	✓	✓	✓	✓									Threaded ports			✓

* highest transient speed, that can temporarily occur | ** highest transient pressure, that can temporarily occur | **** Availability depends on nominal size

Compact unit
Shift in Motion
LEARN MORE CMV

Open & Closed Circuit.
Variable Displacement Motor. **HMV-02.**

Standard hydraulic motors at low speeds in their starting phase cannot generate the necessary torque. Therefore, the power of the fast spinning hydraulic motors has to be reduced by means of several step gearboxes down to the speed needed on the wheel. Somewhat higher windage losses and poorer mechanical efficiency are benevolently accepted in this context. Quite the opposite holds true for the motors by Linde Hydraulics: The motors of the Series 02 are capable of transmitting the required torque even at low speed and make it possible to start smoothly and sensitively.

Design characteristics

- Axial piston motor in swashplate design
- Optimized starting and low speed behaviour
- Swivelling to 0 cc/rev
- Hydrostatic plain bearing of the swashplate

Product advantages

- PTO through-drive motor
- Jerk-free low speed
- Large conversion range
- Extremely high angular acceleration possible

General technical data

HMV-02										
Nominal size			**55**	**75**	**105**	**135**	**165**	**210**	**280**	**105 D**	**165 D**
Displacement	Max. displacement	cc/rev	54.7	75.9	105	135.6	165.6	210	281.9	210	331.2
Speed	Max. operating speed at V_{max}	rpm	4300	3800	3700	3200	3100	2700	2400	3300	2900
	Max. speed at V_{max}*	rpm	4400	4100	3800	3500	3400	3000	2700	3400	3100
	Max. operating speed at V_{min}	rpm	4700	4400	4100	3700	3500	3200	2900	4100	3500
	Max. speed at V_{min}*	rpm	5300	5000	4700	4000	3900	3500	3200	4400	3700
Pressure	Nominal pressure	bar	450	450	450	450	450	450	450	450	450
	Max. pressure**	bar	500	500	500	500	500	500	500	500	500
	Max. housing pressure	bar	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Torque	Output torque (Δp=430 bar and Vmax)	Nm	374	519	719	928	1133	1438	1929	1437	2267
Corner power (theor.)	(Vmax x nmax at Vmin x Δp 430 bar)	kW	184	239	309	360	415	482	586	677	878
Weight	approx. (without oil)	kg	28	32	42	56	76	101	146	98	149

Customer interfaces

Control options							Sensors		Flanges			Shafts****			Through drive	Ports****			
	Proportional	2-Position	default= Vmin	default= Vmax	Pressure override	Pressure side selection	Speed		2 hole	4 hole		ISO 3019-1 (SAE) 744) ANSI B92.1-1970	Companion flange SAE J 1946 Typ A	DIN 5480	Only for nominal sizes 105, 135, 165, 210, 280, 1050, 1650		ISO 6162-2 Radial	ISO 6162-2 Axial	ISO 6149 – 1
Electro-hydraulic	✓	✓	✓	✓	✓	✓	✓				SAE C	✓				Work ports	✓	✓	
Hydraulic	✓	✓		✓	✓						SAE D	✓							
											SAE E		✓			Threaded ports			✓

* highest transient speed, that can temporarily occur | ** highest transient pressure, that can temporarily occur | **** Availability depends on nominal size

Compact unit
Shift in Motion
LEARN MORE HMV-02

Open & Closed Circuit.
Variable Displacement Motor. **HMV-02 D.**

Design characteristics

- Axial piston double motor in swash plate design
- "Dry case" capability
- Through-drive motor

Product advantages

- High starting torque and maximum speed
- Maximum efficiency
- No gearbox required

This axial piston double motor has been developed by Linde Hydraulics to achieve maximum speeds higher than conventional swash plate designs. Additionally, a large displacement volume in a compact design means wider transmission speed ranges, normally achieved with modular transmissions, are possible. The HMV-02 D is about 30 % lighter than a motor combined with transfer gear box, and has a smaller footprint.

However, maximum efficiency is achieved with suction of the leakage from the housing. The so called "dry case" significantly reduces the windage losses and thus also the power required to drive the double motor.

General technical data

HMV-02 D				
Nominal size			**105 D**	**165 D**
Displacement	Max. displacement	cc/rev	210	331.2
Speed	Max. operating speed at V_{max}	rpm	3300	2900
	Max. speed at V_{max}*	rpm	3400	3100
	Max. operating speed at V_{min}	rpm	4100	3500
	Max. speed at V_{min}*	rpm	4400	3700
Pressure	Nominal pressure	bar	450	450
	Max. pressure**	bar	500	500
	Max. housing pressure	bar	2.5	2.5
Torque	Output torque (Δp=430 bar and Vmax)	Nm	1437	2267
Corner power (theor.)	(Vmax x nmax at Vmin x Δp 430 bar)	kW	677	878
Weight	approx. (without oil)	kg	98	149

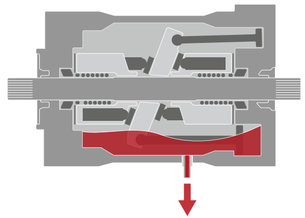
Customer interfaces

Control options							Sensors		Flanges****			Shafts****			Through drive	Ports****			
	Proportional	2-Position	default= Vmin	default= Vmax	Pressure override	Pressure side selection	Speed			2 hole	4 hole	ISO 3019-1 (SAE J 744) ANSI B92.1-1970	DIN 5480	Compagnion flange SAE J 1946 Typ A	Through drive		ISO 6162-2 Radial	ISO 6162-2 Axial	ISO 6149 – 1
Electro-hydraulic	✓		✓				✓		SAE C							Work ports	✓		
Hydraulic									SAE D		✓	✓		✓	✓	Threaded ports			✓
									SAE E		✓								

* highest transient speed, that can temporarily occur | ** highest transient pressure, that can temporarily occur | **** Availability depends on nominal size

Compact unit
Shift in Motion
LEARN MORE HMV-02 D

Open & Closed Circuit.
Variable Displacement Motor. **Dry Case.**



Besides the output power, the operation of machines is also generally associated with power loss. In the case of axial piston machines, the power loss is composed of flow, friction and windage losses.

Linde Hydraulics has now developed the ability to run the motors without oil in the housing. The moving parts of the motor rotating in the housing are thus hardly affected by circulating oil. This procedure significantly reduces windage losses and considerably increases efficiency. The active bearing lubrication ensures the supply of oil to the relevant points, that the so called "dry case" operation is guaranteed without any adverse effects.

Design characteristics

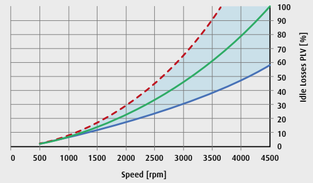
- Significant reduction of windage losses by suction of leakage from housing
- Maintaining lubrication via active bearing lubrication

Product advantages

- Maximization of efficiency
- Significantly reduced energy consumption
- Greatly improved performance
- No adverse effects on operation or service life

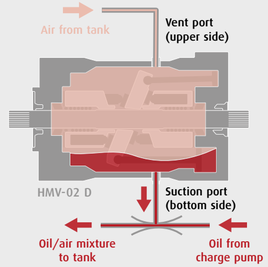
General technical data

Dry case
Idle losses



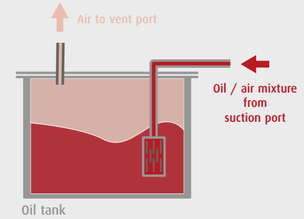
Idle losses are composed of flow losses in canals and kidneys, friction losses in gaps and bearings and windage losses. The diagram above shows the comparison between the losses of two motor concepts and the great effects of "dry case" under identical conditions.

Dry case
Suction of leakage



The feed flow generates a vacuum via the venturi nozzle. Oil is sucked up on motor bottom side.
Air to fill the vacuum is filled in on motor upper side.

Dry case
Separation and suction of air



The oil/air mixture is returned to tank via diffuser/filter. Oil/air mixture is calmed - air is separated out. The air for filling the motor housing is drawn from the tank above the liquid level.

Compact unit
Shift in Motion

Open & Closed Circuit.
Fixed Displacement Motor. **CMF.**

Design characteristics

- Fixed displacement bent axis motor
- Standardized interfaces
- Plug-in flange available

Product advantages

- High power density
- High speeds
- Very small dimensions

With the next generation of the bent axis motors, Linde Hydraulics expands its customer oriented portfolio of high-quality components for hydraulic systems. The fixed displacement motor CMF is characterized by its high external load and speed capacity. Due to its standardized interfaces, e.g. the plug-in flange according to ISO, the CMF fits a high variety of applications, without the need of adaptors. Low windage losses in combination with the low weight of the motor support the cost-effective operation of the application.

General technical data

CMF			
Nominal size			**80**
Displacement		cc/rev	80
Speed	Max. operating speed	rpm	4500
	Max. speed*	rpm	5000
Pressure	Nominal pressure	bar	450
	Max. pressure**	bar	500
	Max. housing pressure	bar	2.5
Torque	(Δp=430 bar; charge press.=20 bar)	Nm	547
Corner power (theor.)	(Vmax x nmax x Δp 430 bar)	kW	258
Weight (approx.)***	(without oil)	kg	23.0

Customer interfaces

Sensors		Flanges			Shafts****			Ports****		
Speed		ISO 3019-1 / SAE J744, SAE C 4-bolt 127-4	ISO 3019-2 metric, 140 mm, 4-bolt	Plug-in, similar to ISO 3019-2, 190 mm, 2-bolt	ISO 3019-1 (SAE J 744) ANSI B92.1-1970	Compagnion flange SAE J 1946 typ A	DIN 5480	ISO 6162-2 Radial twin ports	ISO 6162-2 Side ports	ISO 6149 – 1
✓		✓	✓	✓	✓	✓	✓			
								Work ports ✓	✓	
								Threaded ports		✓

* highest transient speed, that can temporarily occur | ** highest transient pressure, that can temporarily occur | **** Availability depends on nominal size

Open & Closed Circuit.
Fixed Displacement Motor. **HMF-02/HMA-02.**

Design characteristics

- Fixed displacement swashplate motor
- High pressure relief valves set fixed or variable opt.
- Robust and simple design
- Hydrostatic plain bearing of the swashplate

Product advantages

- Steady low speed
- High power density
- Reliable and easy to maintain

General technical data

HMF-02/HMA-02											
Nominal size			**35**	**55**	**63**	**75**	**85**	**105**	**135**	**165**	**210**	**280**
Displacement		cc/rev	35,6	54,7	63	75,9	85,6	105	135,6	165,6	210	281,9
Speed	Max. operating speed	rpm	4500	4100	3900	3800	3600	3500	3200	3100	2700	2400
	Max. speed*	rpm	4800	4400	4200	4100	3850	3800	3500	3400	3000	2700
Pressure	Nominal pressure	bar	450	450	450	450	450	450	450	450	450	450
	Max. pressure**	bar	500	500	500	500	500	500	500	500	500	500
	Max. housing pressure	bar	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
Torque	(Δp=430 bar; charge press.=20 bar)	Nm	244	374	431	519	586	719	928	1133	1438	1929
Corner power (theor.)	(Vmax x nmax x Δp 430 bar)	kW	115	161	176	207	221	263	311	368	407	485
Weight (approx.)***	(without oil)	kg	16	19	24	26	33	33	39	76	101	146

Customer interfaces

Sensors		Flanges			Shafts****			Through drive	Ports****		
Speed			2 hole	4 hole	ISO 3019-1 (SAE J 744) ANSI B92.1-1970	Compagnion flange SAE J 1946 typ A	DIN 5480	Only for nominal sizes 210, 280	ISO 6162-2 Radial	ISO 6149 – 1
✓		SAE B	✓		✓	✓	✓	✓	Work ports ✓		
		SAE C	✓								
		SAE D	✓						Threaded ports		✓
		SAE E		✓							

* highest transient speed, that can temporarily occur | ** highest transient pressure, that can temporarily occur | **** Availability depends on nominal size

Compact unit
Shift in Motion
LEARN MORE CMF
LEARN MORE HMF-02 / HMA-02

Closed Circuit.
Shift Actuator. **Actuator.**

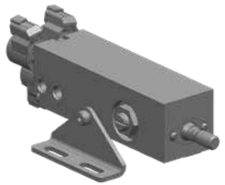
Design characteristics

- Electro-hydraulic multi-position cylinder (3 positions)
- Prepared for mounting of clevis or spherical head
- Simple and robust design

Product advantages

- Defined and exact switching operations
- Easy implementation in conventional gearboxes
- Small space requirement and high reliability

The use of hydraulic cylinders for shifting gears requires not only fast and precise shifting processes, but also defined and electronically sensable rest positions as well as a defined behavior in case of system failure. The actuator from Linde Hydraulics combines all these properties and accommodates them in a robust and compact housing. Together with the shift rod, which is prepared to accommodate conventional connections, all requirements for easy implementation are met. More information can be found in the "Shift in Motion" section.



General technical data

Actuator			
Force	Shifting force	N	1000 +/- 300
	Detent force	N	450 +/- 100
Stroke	Shifting stroke	mm	±9.5
Pressure	Supply pressure	bar	25±5 (Typically, this is charge pressure of the drive system)
	Tank pressure	bar	<2
Positions			3 (1-N-2)

Customer interfaces

Control options	12 V	24 V	AMP Connector	Deutsch Connector
Electro-hydraulic	✓	✓		✓

Thread of the shift rod	M 16
Metric thread	✓

Ports	ISO 6149-1, M14 x 1.5
Threaded ports	✓

Sensors	Proportional position sensor
	✓

Closed Circuit.
Pump/Motor - Compact Unit. **K-02.**

Together with the customer Linde Hydraulics defines new standards in technology. Advanced modular drive technology, realised in hydrostatic variators for variable speed transmission, form the core of power split gearboxes.

Compact units with a hollow shafts are available for mounting to conventional gearboxes in smaller machines. These compact units are used as fully hydrostatic systems with additional mechanical PTO drive. In this way, a further function can be operated independently of the travel function.

With customer-specific developments, Linde Hydraulics supports the change from power shift to continuous variable transmission technology.

Design characteristics

- HPV-02 and HMF-02 back-to-back in common unit
- Version for powersplit transmission and direct drive solutions (e.g. orchard tractors)
- Integrated high pressure relief valves with charge and purge function

Product advantages

- Precise crawling speed
- Compact design
- Low fuel consumption over entire operating range
- Mechanical throughdrive (in addition to travel drive)

General technical data

K-02					
Nominal size			**55/55**	**75/75**	**105/105**
Displacement	Max. displacement	cc/rev	55/55	75/75	105/105
Speed	Max. operating speed	rpm	3900	3400	3200
	Max. speed*	rpm	4150	3600	3400
Pressure	Nominal pressure	bar	450	450	450
	Max. pressure**	bar	500	500	500
	Max. housing pressure	bar	2.5	2.5	2.5
Torque	Torque (Δp=430 bar, charge press.=20 bar)	Nm	374	519	719
Corner power (theor.)	(V_{max} X n_{max} X Δp 430 bar)	kW	153	185	241

Customer interfaces

Control option	Proportional	3-Position	Pressure cut-off	Enable function
Electro-hydraulic	✓			✓

Sensors	Swash angle	Speed sensor
	✓	✓

Flanges	2 hole	2 hole, 4 additional threads M12	2 hole, 4 additional threads M16	2 hole, additional holes (ø17.5mm)	4 hole
SAE-B					
SAE-C	✓				
SAE-D					
SAE-E					

Shafts****	ISO 3019-1 (SAE J744) ANSI B92.1-1970	Compagnion flange SAE J 1946 Typ A
	✓	✓

Ports	ISO 6162-2 Side ports	ISO 6162-2 Twin ports	ISO 6149-1
Work ports			
Threaded ports			✓

* highest transient speed, that can temporarily occur | ** highest transient pressure, that can temporarily occur | **** Availability depends on nominal size

Compact unit
Shift in Motion
LEARN MORE ACTUATOR
Compact unit
Shift in Motion
LEARN MORE K-02

Closed Circuit.
Hydrostatic Drive. **Shift in Motion.**

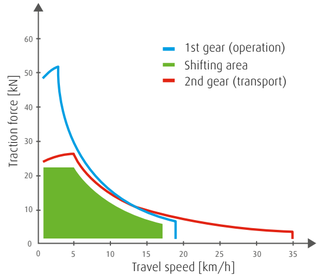
Design characteristics

- Hydrostatically controlled synchronization of stop to shift gearboxes
- Full utilization of the kinetic energy while changing the gears
- The system includes only two additional components compared to conventional drives

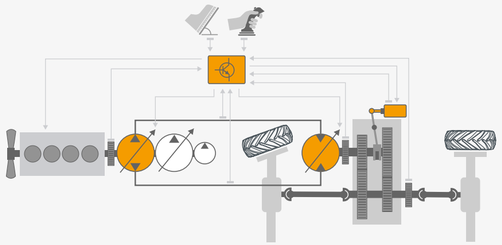
Product advantages

- Autom. and jerkless gear changes (<0.7 sec.) without standstill and the need of expensive synchromesh gear boxes
- Considerable reduction of fuel consumption and noise emission
- Minimum space requirement

Shift in Motion enables shifting procedures in a moving machine, equipped with a manual transmission that is intended to be shifted at standstill by electro-hydraulically synchronising the drivetrain. This system is particularly suitable for vehicles that often change between transport and operation, i.e. vehicles that require both high tractive effort and a high top speed above 25 kilometres per hour. The shifting procedure is load-free thanks to electro-hydraulically synchronised gears and the ability to adjust the drive component's speed and torque. This makes the shifting procedures wear-free and also increases the transmission's efficiency.



Concept



Implementation

Linde Hydraulics components	
Electronic control unit	iCon
Variable displacement pump	HPV-02
Variable displacement motor	HMV-02
Shift actuator	Actuator

Customer interface
Shift rod with clevis or spherical head
Multiple positions of rest and analog position signal
Defined default behavior

System requirements
Stop to shift gearbox with two or more gears and defined neutral position
Admissible tractive effort interruption of <0.7 sec

SYSTEMS

Closed Circuit.
Hydrostatic Drive. **Shift in Motion.**

Application examples

Category

45 kW — **70 kW** — 250 kW

Equipment	
A	1 x HPV 75-02 E2
B	1 x HMV 105-02 E6
C	1 x iCon®
D	1 x Actuator

Category

35 kW — **90 kW** — 250 kW

Equipment	
A	1 x HPV 105-02 E2
B	1 x HMV 135-02 E6
C	1 x iCon®
D	1 x Actuator

Compact unit
Shift in Motion
LEARN MORE
SHIFT IN MOTION

Linde Hydraulics Worldwide.
Sales Partners.

In addition to the Linde Hydraulics locations, our global network of sales partners offers you competent support in the following contexts:

- Development projects
- Application engineering
- Commissioning
- Series production

→ You can find a **sales partner** close to you on our website at **www.linde-hydraulics.com/network**

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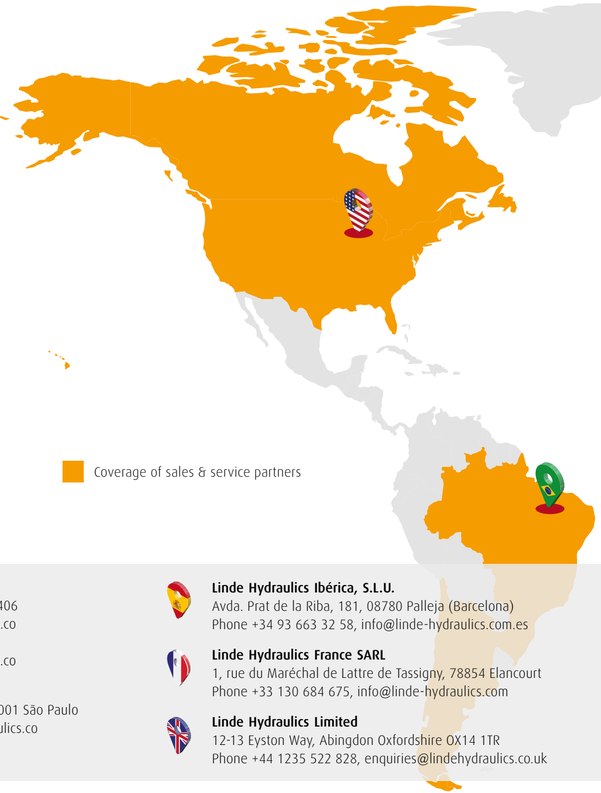
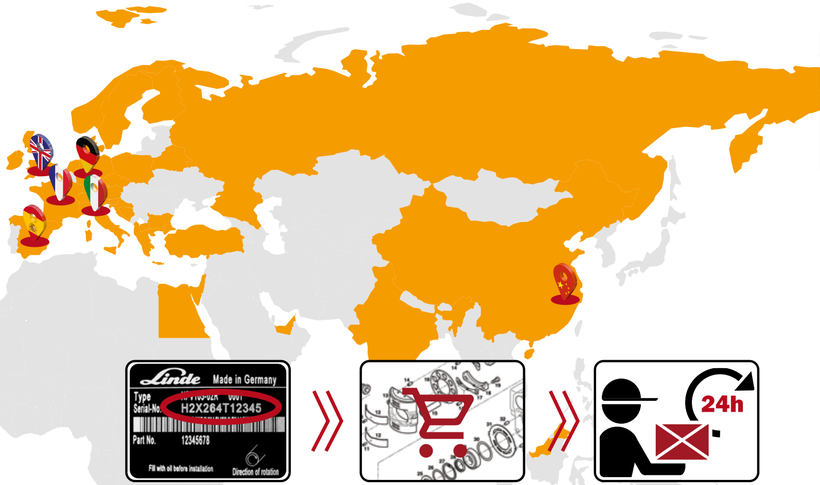


Coverage of sales & service partners

LINDE HYDRAULICS WORLDWIDE



Linde Hydraulics Worldwide.
Service Partners.

Our online spare parts shop and worldwide network of service partners offer you strong support in the following contexts:

- Spare parts supply
- Repair services
- Remanufacturing

→ Visit our **online shop** at **shop.linde-hydraulics.com** Here you can find all spare parts tailored to your needs easily via the serial number of your unit. A defined stock of parts is available within 24 hours!

→ For repair and remanufacturing services you can find a **service partner** close to you on our website at **www.linde-hydraulics.com/network**

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