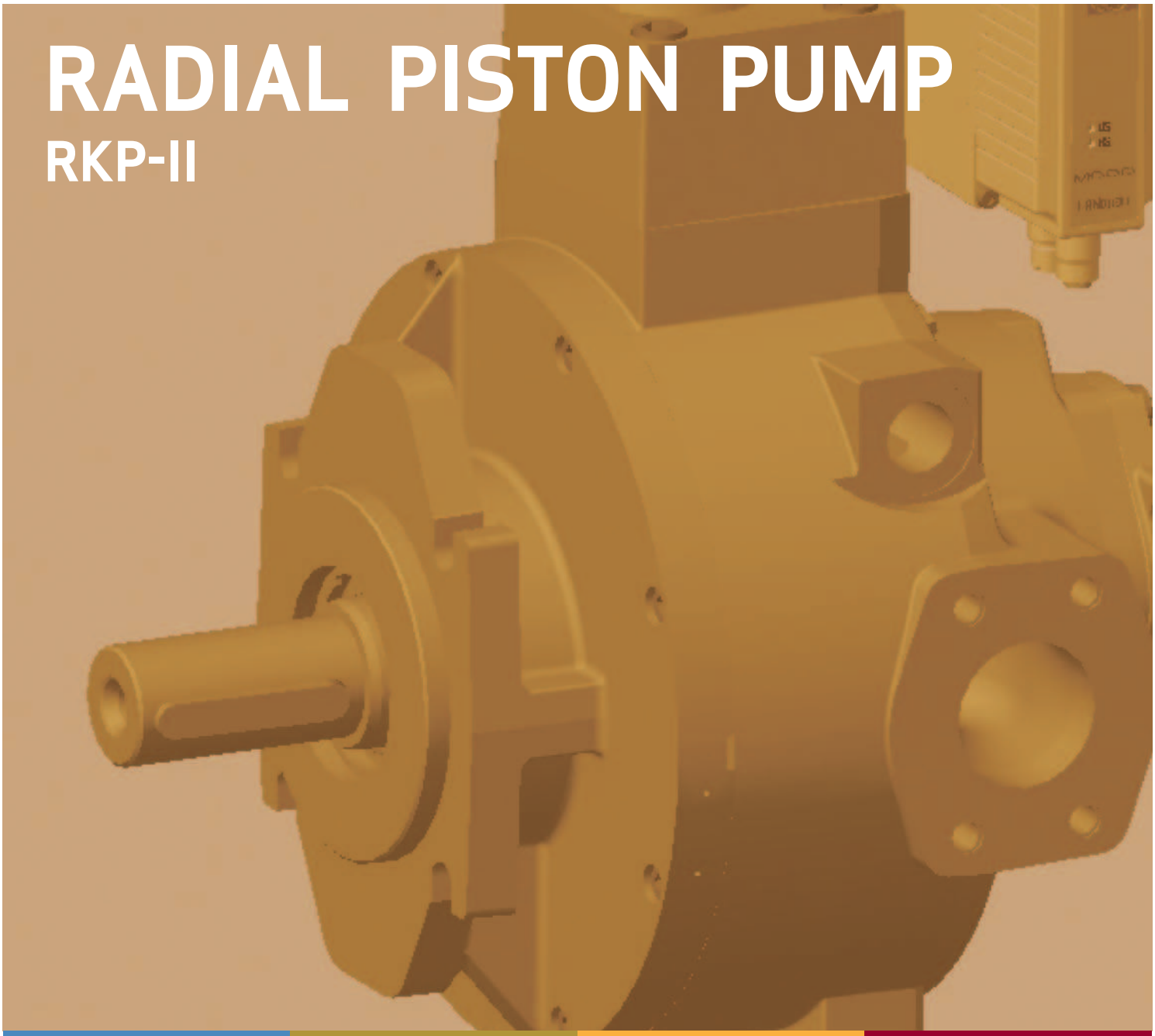
RADIAL PISTON PUMP
RKP-II



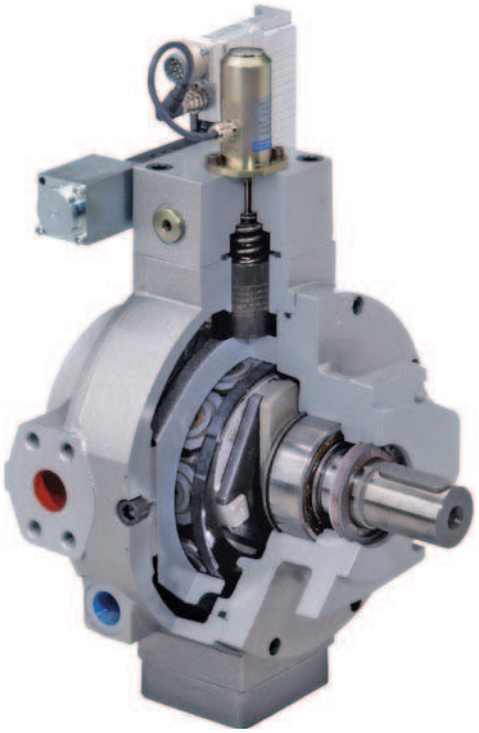
Rev. E, February 2012

MODULAR DESIGN FOR SUPERIOR PERFORMANCE
QUIET AND ROBUST

WHAT MOVES YOUR WORLD

MOOG

Whenever the highest levels of motion control performance and design flexibility are required, you'll find Moog expertise at work. Through collaboration, creativity and world-class technological solutions, we help you overcome your toughest engineering obstacles. Enhance your machine's performance. And help take your thinking further than you ever thought possible.



GENERAL INFORMATION

Outstanding motion control solutions

For over 50 years, we have been a leader in motion control technology, specialising in the manufacture and application of high performance products. Today, we incorporate the latest motion control technology into our products and offer innovative ideas that can help our customers achieve new levels of machine performance.

Proven pump technology

The Radial Piston Pump product line (also known as RKP), is a range of high performance variable displacement pumps intended for use in industrial applications. Based on a proven concept, the RKP's robust and contamination resistant design results in long life and a high degree of reliability.

Its rapid response time and high volumetric efficiency have led to it being the first choice for many machines with demanding flow and pressure control needs.

We produce a wide range of radial piston pumps of different sizes, single and multiple arrangements, with various forms of control (mechanical, hydro-mechanical, electro-hydraulic, digital and analog) in order to provide maximum flexibility to machine builders.

Applications

Thanks to the flexible, high performance design, the RKP is the ideal solution for all types of industrial applications. The RKP is already used in machines for injection molding, die casting, forming equipment such as presses and rolls, as well as in general hydraulic applications. In the field of plastic and metal processing, the RKP is used on equipment to produce plastic and metal parts, for the packaging and automotive industries. The RKP is also used in test equipment, construction, rubber processing, and the mining industry.

The RKP is particularly well suited to applications where power, low noise and robust design, in combination with precision and speed are needed.

Low-noise and rugged design

With a number of innovative design features we have been able to reduce both the primary and the secondary noise level from the RKP. For sizes 63 and 80 cm^3/rev, the number of pistons have been increased from 7 to 9, reducing the working piston diameter leading to lower dynamic transverse forces acting on the housing.

As a result the flow and pressure pulsations on the high pressure side have been reduced, enabling the RKP to help machine manufacturers comply with EU directive "2003/10/EC" on noise emissions.

The design minimizes wear on the internal pump components, even under the most demanding operating conditions, thereby extending the service life of the machine.

RKP-II and RKP

During the introduction of the new pump design we have used the term „RKP-II" for clarity. By now only a very small portion of the deliveries remain on the old design, used mainly for replacements in existing equipment. The actual configuration is unequivocal in the model number. Therefore we have discontinued the use of the term „RKP-II" in our publications. In this catalog we use only the term „RKP" when we refer to the radial piston pump. On the cover page we have kept „RKP-II" in the header to help distinguish from older catalogs.

Digital or analog control

The control technology of the RKP pump has been significantly improved with a new integral closed-loop proportional valve, with digital on-board electronics for flow and pressure regulation, tuning, and diagnostics.

The RKP can be digitally controlled via a CANopen interface or controlled by analog command signals.

Details of the significant benefits available from running the RKP in either CANopen or analog modes are outlined in a separate catalog for the RKP-D pump.

PRODUCT DESCRIPTION
Quiet and Robust

Design

The RKP pumps benefit from low noise levels Sizes 32 to 140 are fitted with a sliding stroke ring. The big suction port supports the use of wide suction lines. The control port of the compensators is build in G 1/4".

RKP stands for reliability, low noise, and durability and this is underlined by its extended warranty. Under the conditions described on page 5, warranty for mineral oil is covered for 10,000 operating hours or 24 months.

Further advantages of the Moog radial piston pump RKP are:

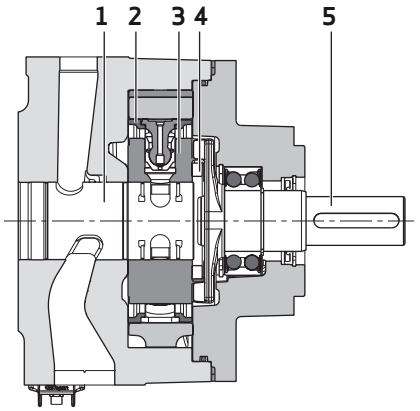
- Fast response
- Compact modular design enabling the pump selection to match the application
- Good suction characteristics
- Low pressure ripple

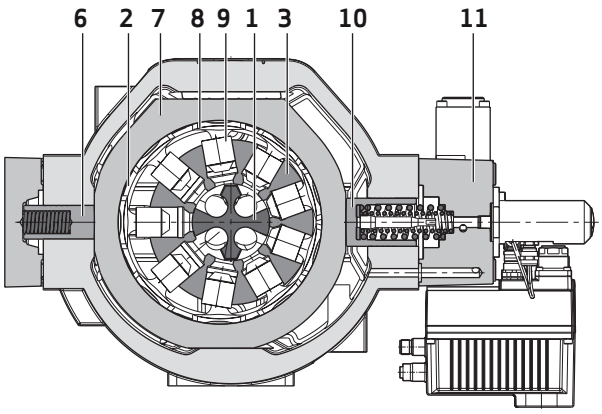
The following RKP features are available:

- Medium pressure series (280 bar (4,000 psi)) and high pressure series (350 bar (5,000 psi)) for mineral oil
- Large selection of compensators including mechanical, hydraulic and electro-hydraulic (analog or digital with CAN bus)
- Mechanical flow limitation
- Multiple pumps by tandem mounting
- Various drive flanges
- Suitable for most hydraulic oils such as mineral oil,transmission oil, biodegradable oil and synthetic esters (HFD)
- Suitable pump versions are also available for special fluids such as oil in water emulsions, (HFA and HFB), water-glycol (HFC), lubricating oils and cutting emulsions. See the catalog Radial Piston Pump RKP for Low-Flammability Fluids for details of these pumps.

Mode of operation

The shaft (1) transfers the drive torque to the star-shaped cylinder block (3), free of any axial forces, via a crossdisc coupling (2). The cylinder block is hydrostatically supported on the control journal (4). The radial pistons (5) in the cylinder block run against the stroke ring (7) through hydrostatically balanced slipper pads (6). The pistons and slipper pads are joined by ball and socket joints and locking rings. The slipper pads are guided in the stroke ring by two retaining rings (8) and, when running, are held against the stroke ring by centrifugal force and oil pressure. As the cylinder block rotates, the pistons reciprocate due to the eccentric positioning of the stroke ring, the piston stroke being twice the eccentricity. The eccentric position of the stroke ring is controlled by two diametrically opposed control pistons (9, 10) and the pressure compensator (11). The oil flow to and from the pump passes through the pump ports and into and out of the pistons through the porting in the control journal. The bearing supporting the drive shaft is only subjected to external forces. The compensator setting limits the system pressure and adjusts the pump flow between zero and full flow to maintain the set pressure.





PRODUCT OVERVIEW

Parameters							
Displacement [cm³/rev]	**19**	**32**	**45**	**63**	**80**	**100**	**140**
Type of construction	Pump for open circuit with various control devices						
Type of mounting	End mounting, centering and hole-circle dia. to ISO 3019-2 (metric) Mounting flange to ISO 3019-1 (inch), Mounting flange to ISO 3019-2 (metric)						
Mounting position	Optional						
Weight [kg (lb)]	22 (49)	33 (73)	33 (73)	71 (157)	71 (157)	71 (157)	105 (232)
Mass moment of inertia [kg cm² (10⁻⁴ lbf in s²)]	17.7 (157)	61.0 (540)	61.0 (540)	186.3 (1,649)	186.3 (1,649)	186.3 (1,649)	380.0 (3,363)
Line connections according to ISO 6162: **Medium pressure series 4,000 psi** **Pressure port** **Suction port** **High pressure series 5,000 psi** **Pressure port** **Suction port**	 SAE 3/4" 3,000 psi SAE 3/4" 3,000 psi SAE 3/4" 6,000 psi SAE 3/4" 6,000 psi	 SAE 1" 3,000 psi SAE 1 1/2" 3,000 psi SAE 1" 6,000 psi SAE 1 1/2" 3,000 psi	 SAE 1" 3,000 psi SAE 1 1/2" 3,000 psi	 SAE 1 1/4" 3,000 psi SAE 2" 3,000 psi SAE 1 1/4" 6,000 psi SAE 2" 3,000 psi	 SAE 1 1/4" 3,000 psi SAE 2" 3,000 psi SAE 1 1/4" 6,000 psi SAE 2" 3,000 psi	 SAE 1 1/4" 6,000 psi SAE 2" 3,000 psi	 SAE 1 1/2" 6,000 psi SAE 2 1/2" 3,000 psi
Recommended pipe OD for drain lines (lightweight version) [mm (in)]	15 (5/8")	18 (3/4")	18 (3/4")	22 (7/8")	22 (7/8")	22 (7/8")	22 (7/8")
Drain	The drain line is to be routed so that the pump housing is always full of the pumped fluid. The pressure at the drain port must not exceed 1 bar (15 psi) gauge pressure (2 bar (29 psi) absolute). The drain line to be piped directly to tank without filter, cooler, check valve etc. and must terminate below the minimum fluid level.						
Type of drive	Direct drive with coupling (please inquire from your Moog contact for other types)						
Ambient temperature range	-15 to +60 °C (+5 to +140 °F)						
Maximum speed at inlet pressure **0.8 bar (12 psi) abs. [min⁻¹]** **1 bar (15 psi) abs. [min⁻¹]**	2,700 2,800	2,500 [3] 2,600 [3]	2,000 [3] 2,100 [3]	2,400 [3] 2,500 [3]	2,000 [3] 2,050 [3]	1,800 1,850	1,800 1,900
Maximum speed for quiet running [min⁻¹]	1,800	1,800	1,800	1,800	1,800	1,800	1,800
Minimum inlet pressure suction connection	0.8 bar (12 psi) absolute						
Maximum housing pressure	2 bar (29 psi) (1 bar (15 psi) gauge pressure)						

For special fluids e.g., HFA, HFC and emulsions the above pressure, viscosity and filtration parameters may be changed. See the relevant special fluids catalog for details.

[1] Maximum pressure to DIN 24 312
[2] Dirt particles retention rate > 20 µm is 1: 75, i.e. 98,67%
[3] Maximum speed increase on request

1,000 psi = 70 bar

PRODUCT OVERVIEW

Parameters								
Displacement [cm³/rev]		**19**	**32**	**45**	**63**	**80**	**100**	**140**
Medium pressure series	Continuous pressure [4]	280 (4,000)	280 (4,000)	280 (4,000)	280 (4,000)	280 (4,000)	280 (4,000)	280 (4,000)
	Maximum pressure [1] [4]	315 (4,500)	315 (4,500)	315 (4,500)	315 (4,500)	315 (4,500)	315 (4,500)	315 (4,500)
	Pressure peak [4]	350 (5,000)	350 (5,000)	350 (5,000)	350 (5,000)	350 (5,000)	350 (5,000)	350 (5,000)
High pressure series	Continuous pressure [4]	350 (5,000)	350 (5,000)		350 (5,000)	350 (5,000)		
	Maximum pressure [1] [4]	385 (5,500)	385 (5,500)		385 (5,500)	385 (5,500)		
	Pressure peak [4]	420 (6,000)	420 (6,000)		420 (6,000)	420 (6,000)		
Hydraulic fluid		Mineral oil to DIN 51 524						
Hydraulic fluid temperature range		-15 to +80 °C (+5 to +176 °F)						
Viscosity		Allowable operational range 12 to 100 mm²/s (cSt); recommended 16 to 46 mm²/s (cSt) Hydraulic fluid according to viscosity class ISO VG 46 or VG 32 Maximum viscosity 500 mm²/s (cSt) during start-up with electric motor at 1,800 min^{-1}						
Filtering		NAS 1638, class 9; ISO 4406, class 20/18/15; obtained with filter fineness of β 20 = 75 [2] NAS 1638, class 7; ISO 4406, class 18/16/13; with electro-hydraulic control (RKP-D)						

For special fluids e.g., HFA, HFC and emulsions the above pressure, viscosity and filtration parameters may be changed. See the relevant special fluids catalog for details.

[1] Maximum pressure to DIN 24 312
[2] Dirt particles retention rate > 20 µm is 1: 75, i.e. 98,67%
[3] Maximum speed increase on request
[4] [bar (psi)]

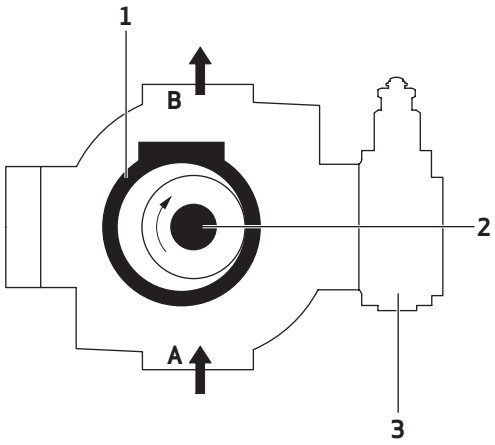
1,000 psi = 70 bar

PERFORMANCE CURVES

Adjustment range

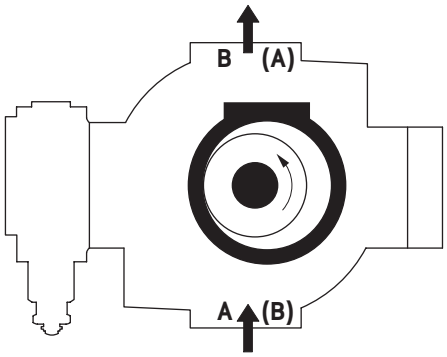
Caution: The rotation of the pump cannot be changed

Clockwise rotation



1 Stroke ring
2 Control journal
3 Compensator

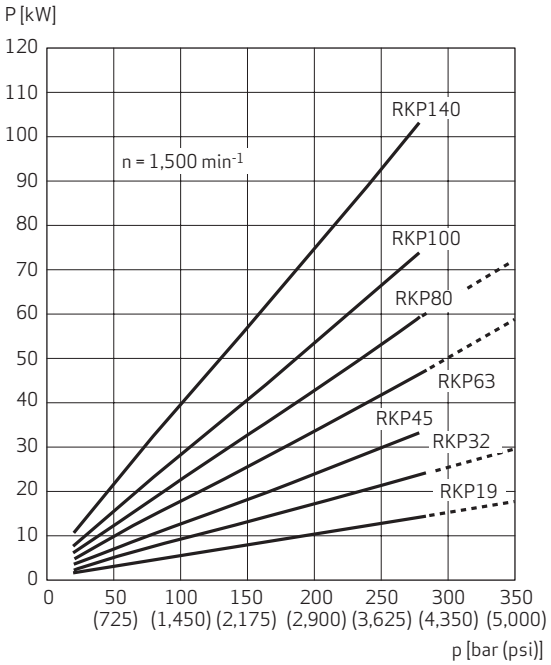
Counterclockwise rotation



Suction port A
Suction port B

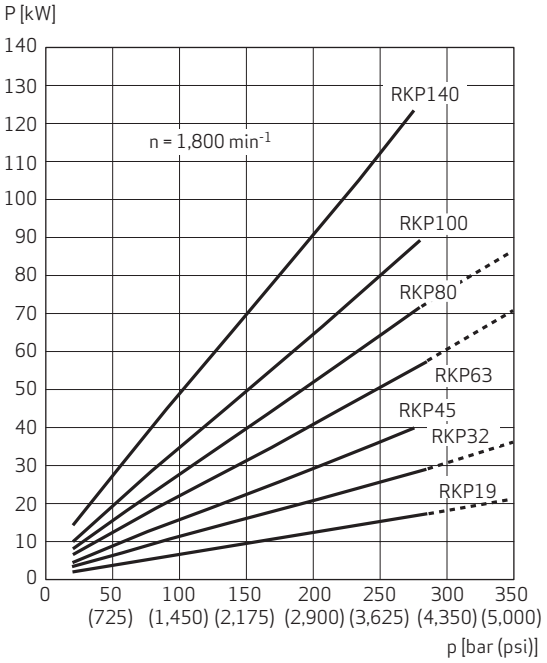
Power consumption P

at maximum flow
hydraulic fluid: mineral oil
viscosity ν = 35 mm²/s (cSt)
temperature T = +50 °C (+122 °F)



Note: For RKP 19

Suction port (B)
Pressure port (A)

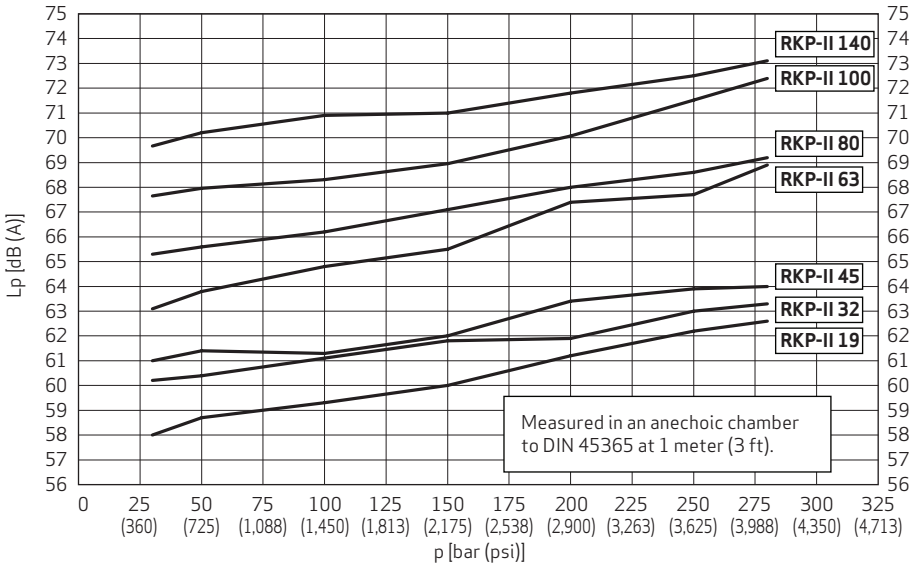


——— Standard version
····· High-pressure version

PERFORMANCE CURVES

Noise diagram

n = 1,500 min^{-1} at $Q_{maximum}$

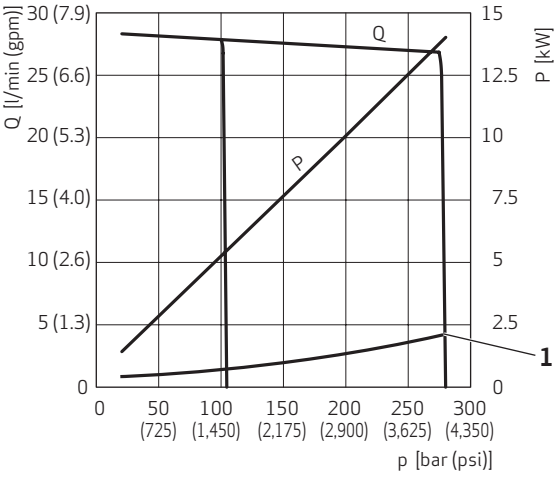


Noise emission values with combined pressure/flow compensator. These are average values over the operating range.

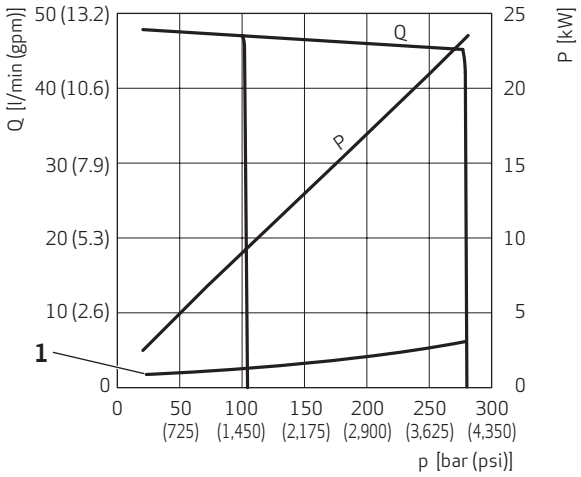
Performance curves of drive power and displacement

Response time $V_{maximum}$ –> $V_{minimum}$: 20 to 50 ms (approx. value)
Response time $V_{minimum}$ –> $V_{maximum}$: 50 to 100 ms
from 70 bar (1,015 psi) pressure setting (approx. value)
n = 1,500 min^{-1}; ν = 35 mm^2/s (cSt); T = +50 °C (+122 °F)

V = 19 cm³/rev



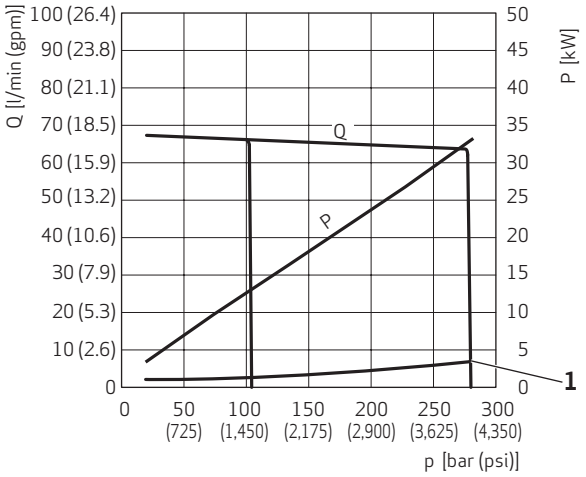
V = 32 cm³/rev



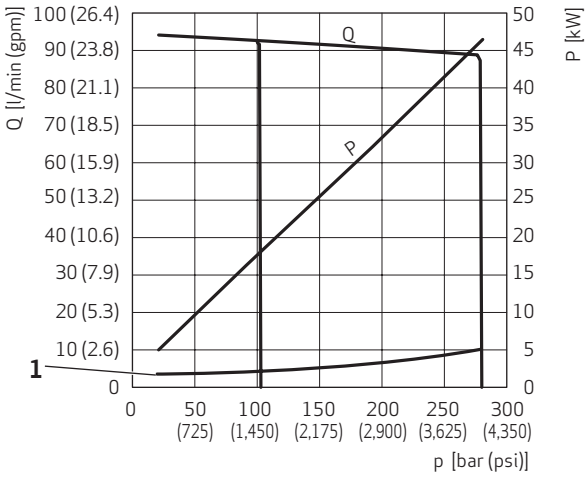
1 P at zero stroke

PERFORMANCE CURVES

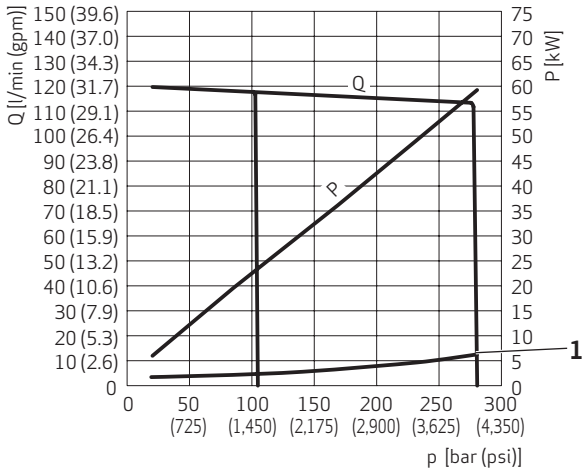
V = 45 cm³/rev



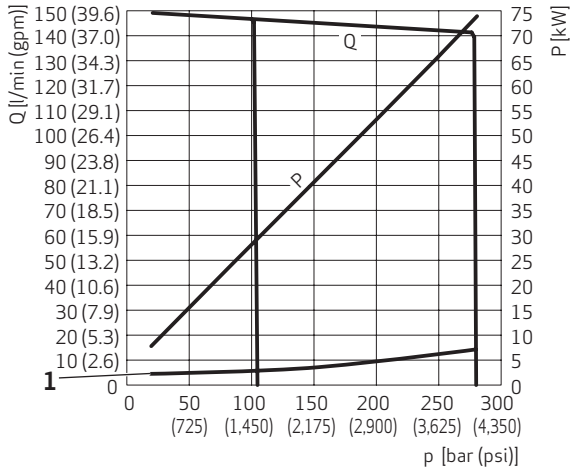
V = 63 cm³/rev



V = 80 cm³/rev

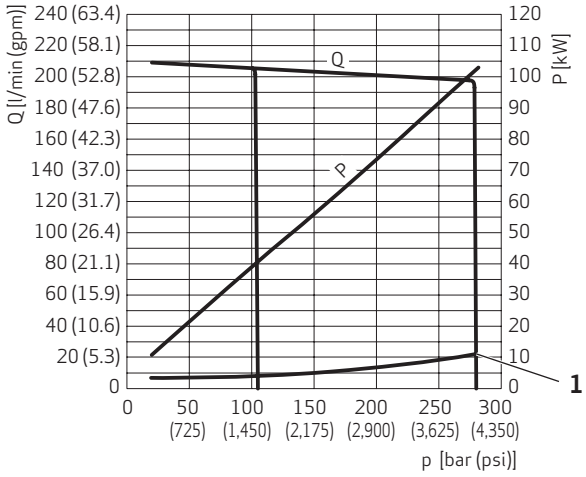


V = 100 cm³/rev



1 P at zero stroke

V = 140 cm³/rev



COMPENSATOR OPTIONS

RKP enables a variety of compensator options to be used thereby ensuring maximum flexibility.

The following options are described in more detail in appendix A.

Compensator option, Model code	**Description / characteristics / application**
1. Adjustable pressure compensator, Type F	For constant pressure systems with a fixed pressure setting
2. Remote pressure compensator, Type H1	For constant or variable pressure systems with remote pressure
3. Pressure compensator with Mooring control, Type H2	For constant pressure systems with a variable pressure setting for mooring control
4. Combined pressure and flow compensator, Type J	For displacement systems with a variable flow and load sensing pressure control
5. Combined pressure and flow compensator with P-T control notch, Type R	As 4. with additional active reduction of pressure peaks in the event of dynamic control process
6. Mechanical stroke adjustment, Type B	For displacement systems with a fixed displacement that may be manually adjusted as needed
7. Servo control, Type C1	Adjustment of displacement using a hand lever or an actuator
8. Constant horse-power control (force comparison system), Typ S1	Automatic reduction of displacement in the event of an increasing load so that the capacity of the drive motor is not exceeded
9. Constant horsepower control with remote pressure and flow control, Type S2	As 8. but with additional adjustable maximum limit for pressure and flow
10. Electro-hydraulically adjustable compensator with digital on-board electronics, Type D	For displacement systems with variable flow and/or pressure limitation
11. Dual-displacement, Type N1	For use in both speed variable operation and displacement controlled systems with two displacements at constant speed

MULTIPLE ARRANGEMENTS

Additional pumps can be tandem mounted on the radial piston pump, so that all pump stages can be driven by the same shaft. Radial piston pumps (the same size or smaller than the first pump stage) can be mounted directly.

Other pumps may be added on using adapter flanges for SAE-A, SAE-B or SAE-C respectively. For the maximum permitted through-drive torque for driving add-on pumps, please refer to the table below.

Adding on RKP, SAE-A, SAE-B or SAE-C adapters Permissible through-drive torques

Pump stage 1	**Pump stage 2**						
RKP	**RKP**				**SAE-A**	**SAE-B**	**SAE-C**
Size (cm^3/rev)	19	32 45	63 80 100	140			
19	90 Nm (797 lbf in)	–	–	–	90 Nm (797 lbf in)	–	–
32/45	185 Nm (1,637 lbf in)	185 Nm (1,637 lbf in)	–	–	110 Nm (974 lbf in)	185 Nm (1,637 lbf in)	–
63/80/100	400 Nm (3,540 lbf in)	400 Nm (3,540 lbf in)	400 Nm (3,540 lbf in)	–	110 Nm (974 lbf in)	280 Nm (2,478 lbf in)	400 Nm (3,540 lbf in)
140	400 Nm (3,540 lbf in)	400 Nm (3,540 lbf in)	400 Nm (3,540 lbf in)	620 Nm (5,487 lbf in)	110 Nm (974 lbf in)	280 Nm (2,478 lbf in)	620 Nm (5,487 lbf in)

The through-drive torque required to drive add-on pumps is determined by reference to the following variables:

V [cm^3/rev]	Displacement
p [bar]	Pressure
ηhm [%]	Hydro-mechanical efficiency
M [Nm]	Through-drive torque

Through-drive torque from pump stage 1 to 2:

$$M_1 = 1.59 \cdot \sum_{i=2}^{n} \frac{V_i \cdot p_i}{\eta_{hmi}}$$

Example

If we take the following pump combination
RKP 63 + RKP 63 + RKP 32 + AZP 16
280 bar (4,000 psi), 210 bar (3,000 psi),
150 bar (2,176 psi), 50 bar (725 psi),
the following considerations apply:

Design of 1st through-drive

The pressure and flow of the 1st pump stage are irrelevant to the torque transferred by the through-drive. This torque can be calculated using the above formula.

$$M_1 = 1.59 \cdot \left(\frac{V_2 \cdot p_2}{\eta_{hm2}} + \frac{V_3 \cdot p_3}{\eta_{hm3}} + \frac{V_4 \cdot p_4}{\eta_{hm4}} \right)$$

$$M_1 = 1.59 \cdot (63 \cdot 210 / 95 + 32 \cdot 150 / 93 + 16 \cdot 50 / 90)\ \text{Nm}$$

$$M_1 = 318\ \text{Nm}$$

The value 318 Nm (2,814 lbf in) is below the threshold value of 400 Nm (3,540 lbf in) specified in the above table for mounting an RKP 63 on another RKP 63.

Design of 2nd through-drive torque

$$M_2 = 1.59 \cdot \left(\frac{V_3 \cdot p_3}{\eta_{hm3}} + \frac{V_4 \cdot p_4}{\eta_{hm4}} \right)$$

$$M_2 = 1.59 \cdot (32 \cdot 150 / 93 + 16 \cdot 50 / 90)\ \text{Nm}$$

$$M_2 = 96\ \text{Nm}$$

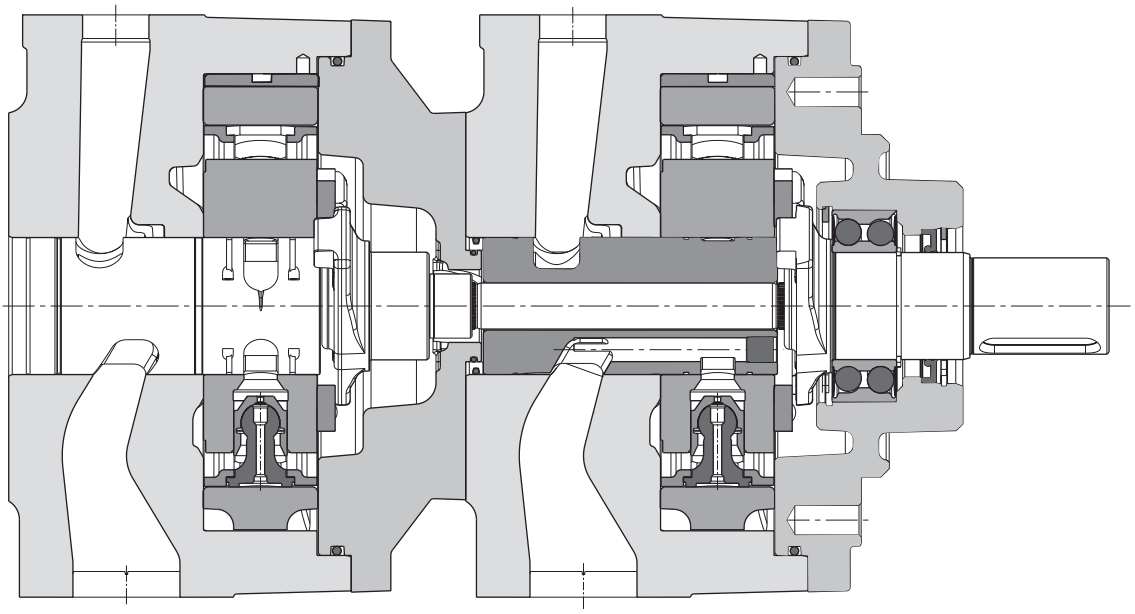
Likewise, the value 96 Nm (850 lbf in) lies below the relevant threshold value of 400 Nm (3,540 lbf in) for the through-drive from RKP 63 to an RKP 32.

Design of 3rd through-drive torque

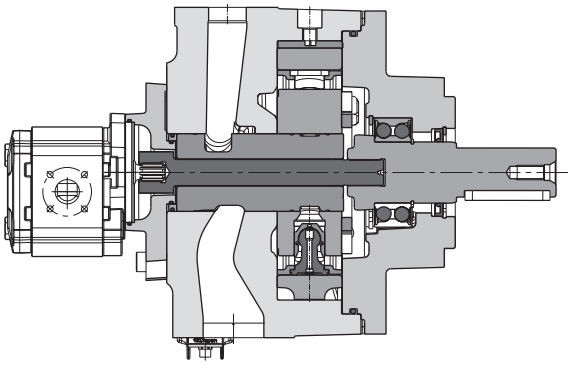
Similarly, a value of 14 Nm (124 lbf in) is obtained for the torque required to drive the add-on gear pump. Thus, the through-drives for this pump combination are permissible with the stated pressures.

MULTIPLE ARRANGEMENTS

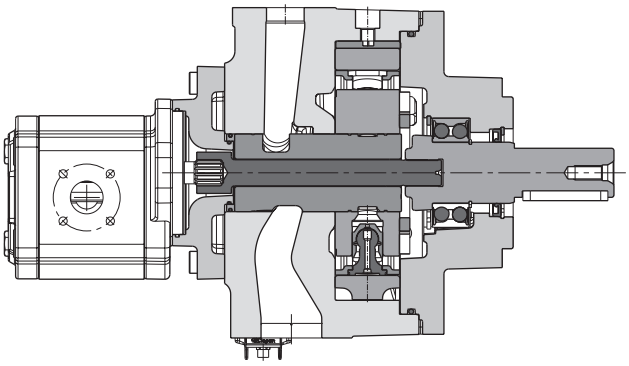
Radial piston pump with heavy-duty through-drive and tandem mounted radial piston pump.



Radial piston pump with tandem mounted gear pump using SAE-A adapter. Technical data see page 56.

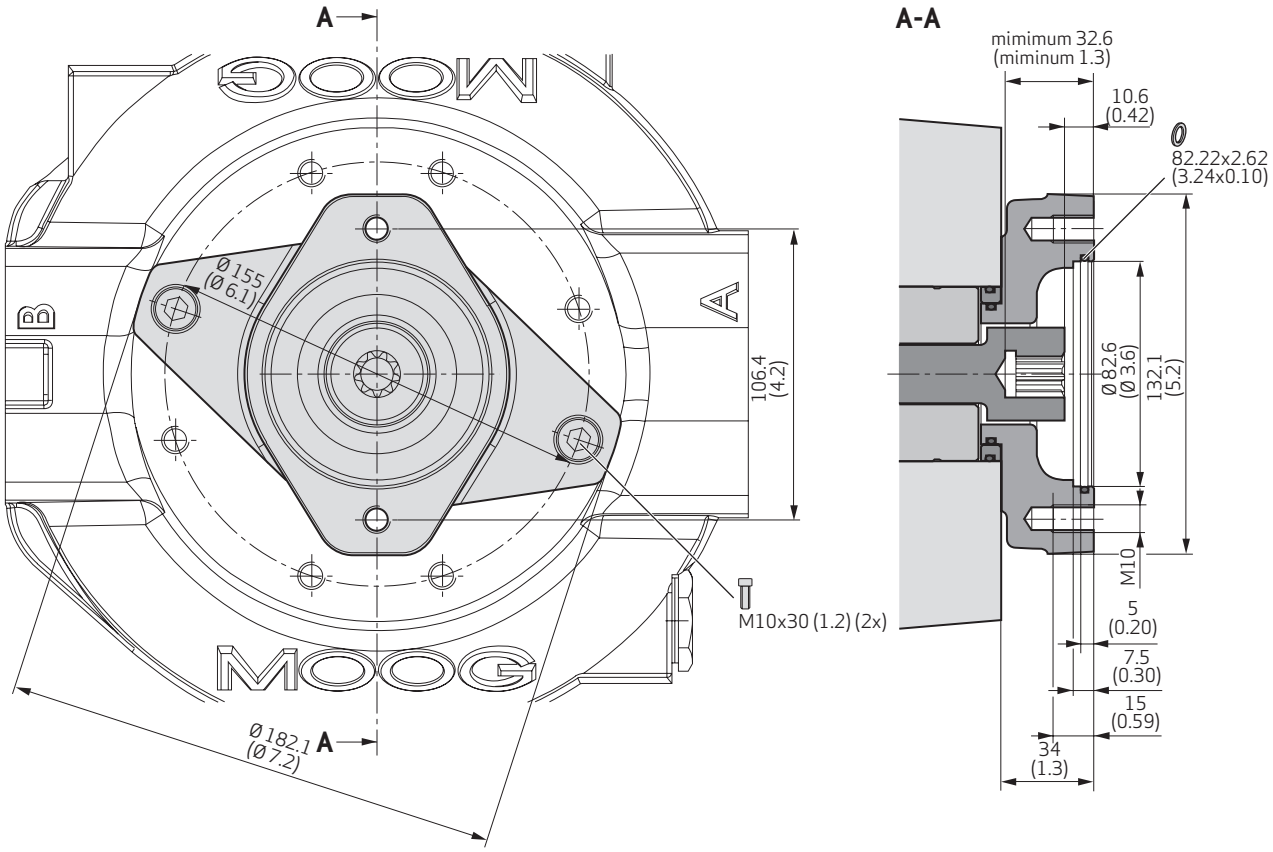


Radial piston pump with tandem mounted gear pump using SAE-B adapter. Technical data see page 57.



MULTIPLE ARRANGEMENTS

Adapter Flange for fitting an external Pump using Flange SAE-A according to ISO 3019-1 and 9-Tooth Shaft



Flange code: 82-2

Shaft code: 16-4

Toothing to: ANSI B92.1 9T 16/32 DP Flat root side fit

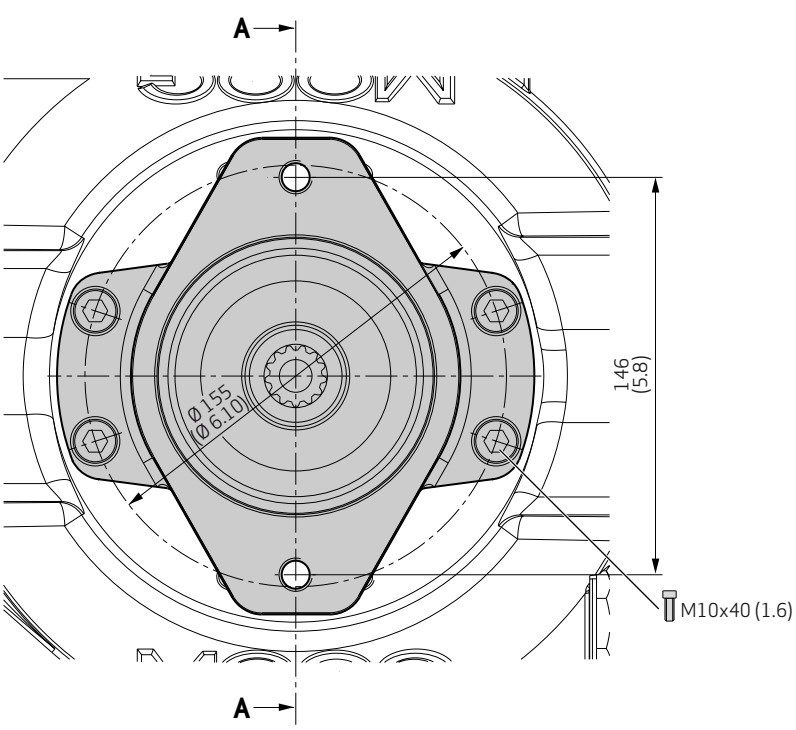
Conditions for attachment: RKP with heavy-duty through-drive

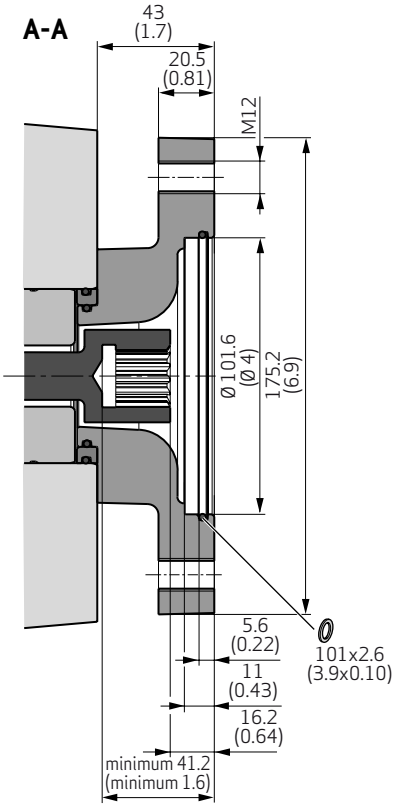
Adaptor including through-drive shaft, seals (HNB-R), intermediate ring for RKP 63-140 and 2 fastening screws.

RKP 19	**CA41832-001**
RKP 32/45	**CA51553-001**
RKP 63/80/100	**CA64727-001**
RKP 140	**CA64728-001**

MULTIPLE ARRANGEMENTS

Adapter Flange for fitting an external Pump using Flange SAE-B according to ISO 3019-1 and 13-Tooth Shaft





Flange code: 101-2

Shaft code: 22-4

Toothing to: ANSI B92.1 13T 16/32 DP Flat root side fit

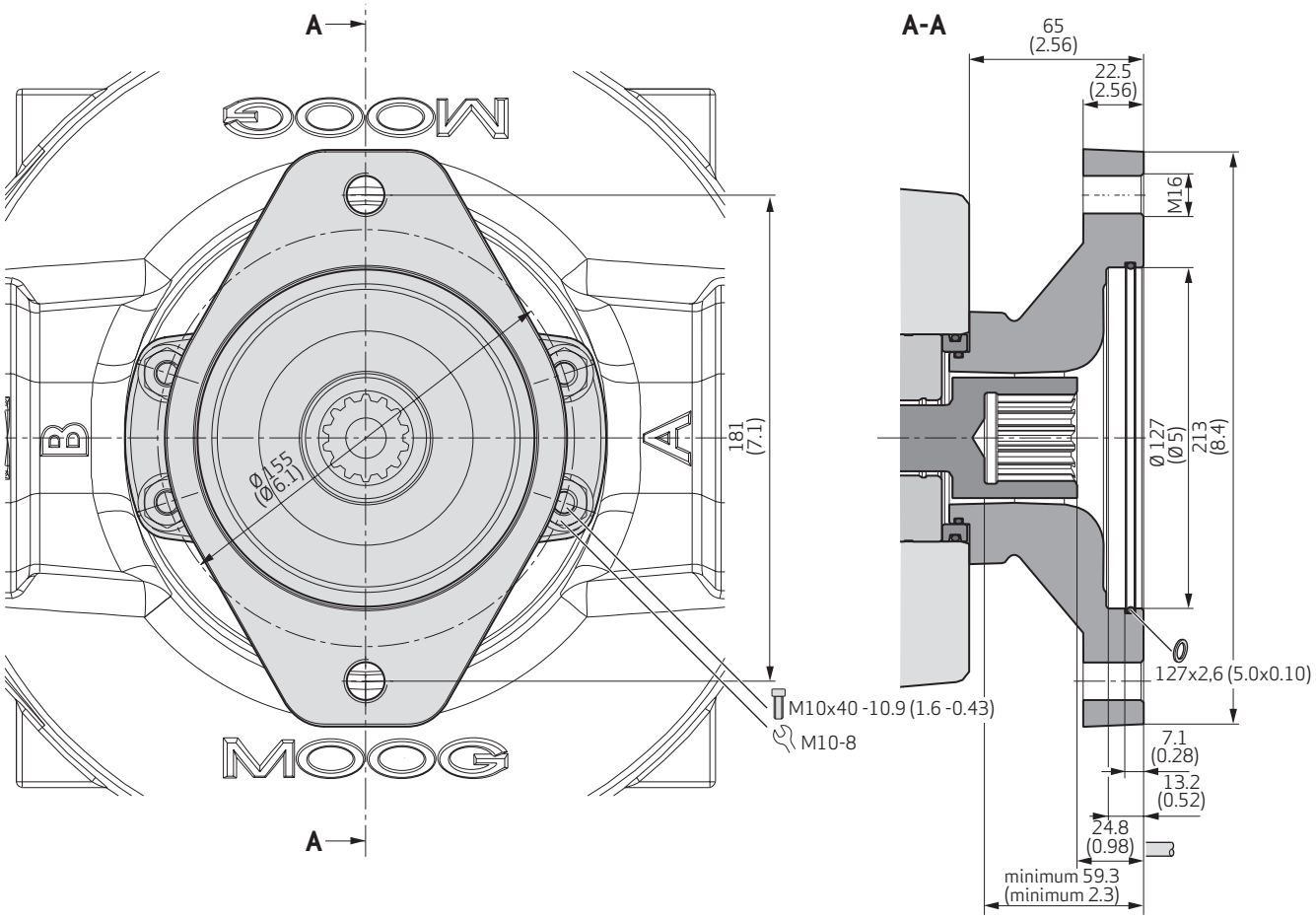
Conditions for attachment: RKP with heavy-duty through-drive

Adaptor including through-drive shaft, seals (HNB-R), intermediate ring for RKP 63-140 and 4 fastening screws.

RKP 32/45	**CA36273-001**
RKP 63/80/100	**CA34793-001**
RKP 140	**CA50487-001**

MULTIPLE ARRANGEMENTS

Adapter Flange for fitting an external Pump using Flange SAE-C according to ISO 3019-1 and 14-Tooth Shaft



Flange code: 127-2

Shaft code: 32-4

Toothing to: ANSI B92.1 14T 12/24 DP Flat root side fit

Conditions for attachment: RKP with heavy-duty through-drive

Adaptor including through-drive shaft, seals (HNB-R), intermediate ring for RKP 140 and 4 fastening screws.

RKP 63/80/100	**CA64621-001**
RKP 140	**CA64622-001**

TECHNICAL INFORMATION

⚠ Important

The pump must be put into service by a trained hydraulic systems engineer.

Installation

The radial piston pump can be mounted in any position The drive shaft must not be subject to radial or axial loads and should therefore to be driven through a flexible coupling. The pump must be driven in the correct direction of rotation. All plugs on the pump should only be removed immediately before the pipes are connected and standard hydraulic cleanliness procedures to be used. The use of cold drawn seamless steel pipes in accordance with DIN 2391 is recommended.

Suction line (A)

It is recommended that final piping connections to the pump are flexible hoses. The shortest possible suction line should be used with a diameter large enough to give a fluid velocity below 1.5 m/s (0.06 in/s).

Sharp angles and screwed pipe joints should be avoided due to the danger of air ingress and excessive pressure drop therefore, pipe bends and/or hoses should be used.

The minimum permissible inlet pressure must be maintained. If a suction filter (minimum 0.15 mm (0.01 in) mesh aperture) or an isolating valve is to be used, it must be installed below the fluid level.

Pressure line (B)

Ensure the pressure pipework is securely clamped and the screws are correctly torque tightened.

Drain line (L)

The upper drain port must be used for the drain line and the pipework is to be routed to ensure the housing isalways full of fluid. The pipe should lead directly to the tank, separate from other return lines.
It must terminate below the lowest fluid level and should be as far away from the suction take off as possible.
Do not fit a filter, cooler or non-return valve in the drain line. The maximum recommended length for the drain line is 3 metres (10 ft). The pressure at drain port is not to exceed 1 bar gauge (15 psi) (2 bars absolute (29 psi)).
The recommended outside pipe diameters for drain lines (lightweight version) are:

RKP 19: 15 mm (5/8“)
RKP 32 and 45: 18 mm (3/4“)
RKP 63, 80, 100 and 140: 22 mm (7/8“)

Flushing the housing

If the pump is operated at low pressure without flow for long periods (t > 15 min, p < 30 bar (435 psi), Q = 0 l/min), pump sizes 63 to 100 cm^3/rev must be flushed with approximately 4 to 6 l/min (1 to 1.5 US gal/min) to dissipate the heat generated. The 140 cm^3/rev pump must always be flushed with 6 to 8 l/min (1.5 to 2 US gal/min). The flushing line to the pump must be connected to the lower drain port.

Noise development

Radial piston pumps have a low primary noise level. However, the overall noise level hydraulic of the unit depends on the pump mounting and piping layout and the transmitted noise can be prevented by:

- connecting the pump to the bellhousing using an anti-vibration flange.
- use flexible hoses instead of solid pipes.
- clamp the pipework with elastic insert clamps.

Connections

Suction line to port A and pressure line from port B. Except for RKP 19 counterclockwise: suction port B, pressure port A.

Putting into service

Do not start up the pump without hydraulic fluid. Before switching on, the pump housing must be filled with hydraulic fluid using the higher drain port.

Jog start the electric motor to check the correct direction of rotation. Run the pump at low pressure until the hydraulic system has been fully de-aerated. When putting pumps for HF fluids into operation, the system must be run at low pressure of between 30 to 50 bar (435 to 725 psi) for approximately 1 hour.

Important

The oil temperature in the tank must not exceed the temperature of the pump by more than +25 °C (+77 °F).

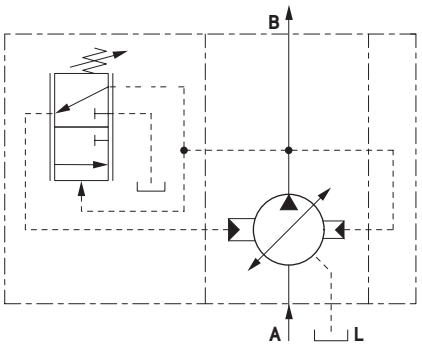
If this should occur, the pump must be jog started for intervals of approximately 1 to 2 seconds until pump casing has heated up. When changing a pump, clean the suction pipe, drain line and tank. Refill the tank with filtered oil.

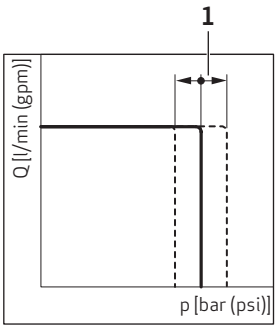
APPENDIX A – COMPENSATOR OPTIONS

1. Adjustable Pressure Compensator F1, F2

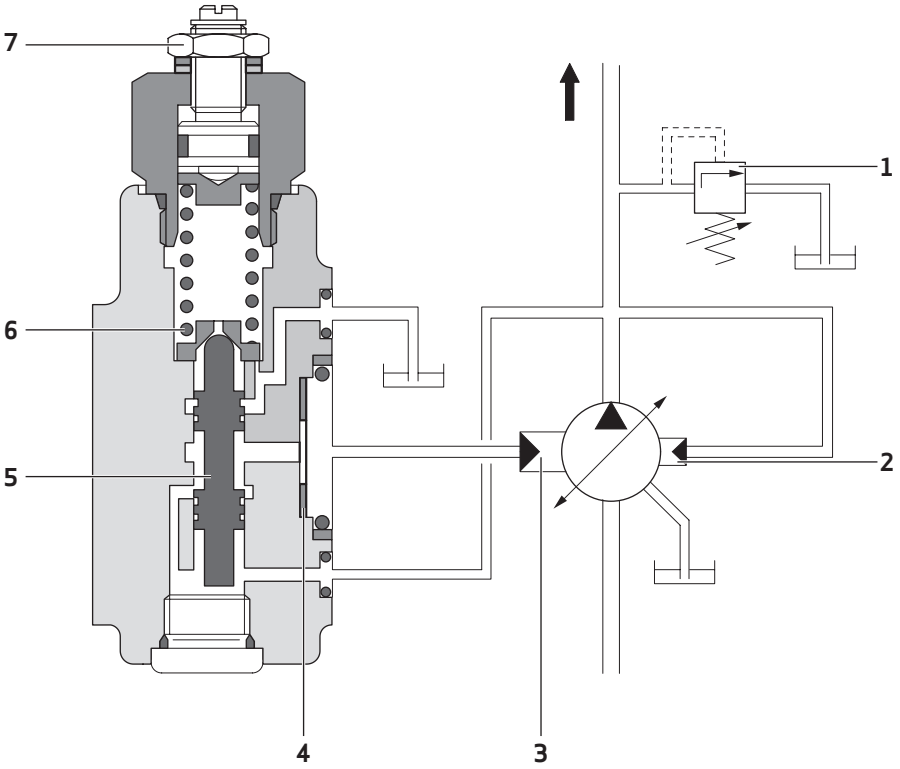
Pressure range:

F1: 30 to 105 bar (435 to 1,523 psi)
F2: 80 to 350 bar (1,160 to 5,000 psi)





1 Screw adjustment



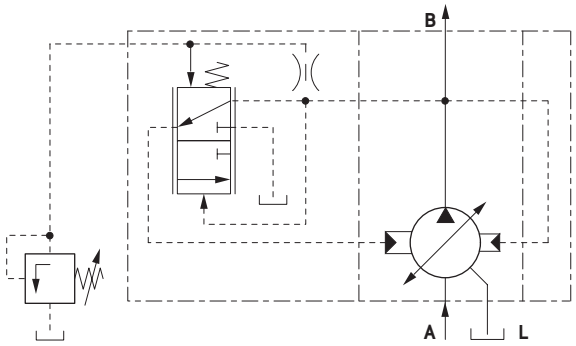
1 Safety valve p = $p_{maximum}$ + 30 bar (435 psi)
2 Control piston 2
3 Control piston 1
4 Adjustment of zero stroke
5 Valve spool
6 Valve spring
7 Adjustment screw

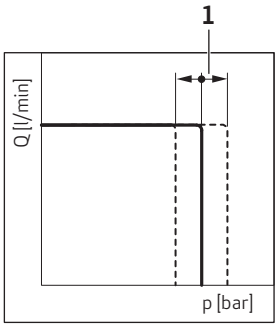
APPENDIX A – COMPENSATOR OPTIONS

2. Remote Pressure Compensator H1

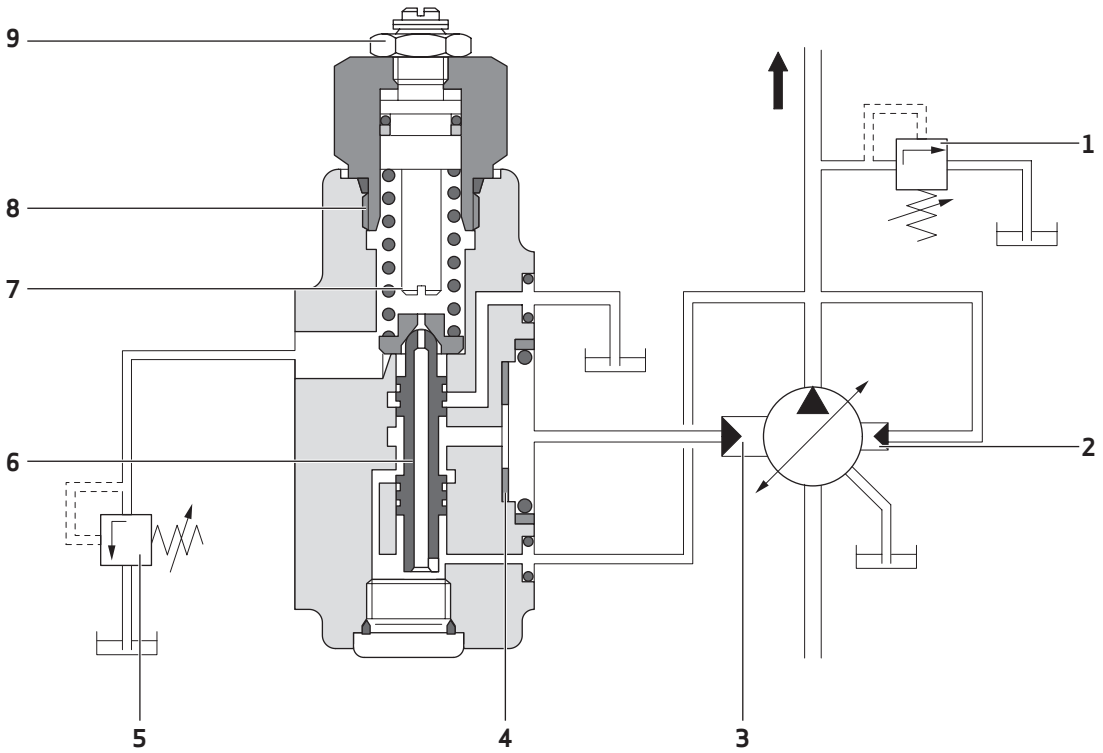
Pressure pilot valve:

Manual remote adjustable or proportional pressure valve.
Q = 0.5 to 1.5 l/min (0.1 to 0.4 gpm)





1 Set at pilot valve



1 Safety valve p = $p_{maximum}$ + 30 bar (435 psi)

2 Control piston 2

3 Control piston 1

4 Adjustment of zero stroke

5 Pressure pilot valve

6 Valve spool

7 Orifice

8 $p_{minimum}$-spring

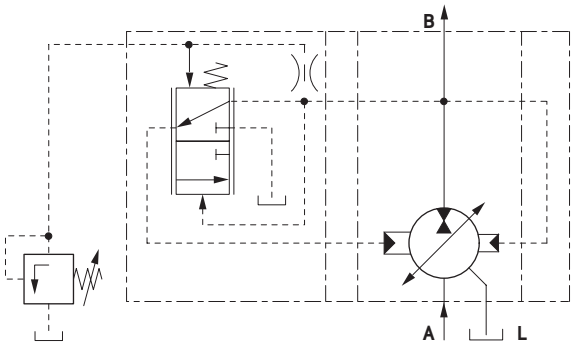
9 Locked screw

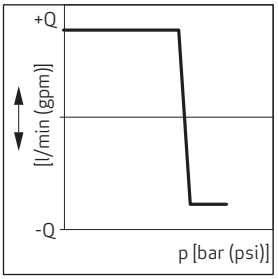
APPENDIX A – COMPENSATOR OPTIONS

3. Remote Pressure Compensator with Mooring Control H2

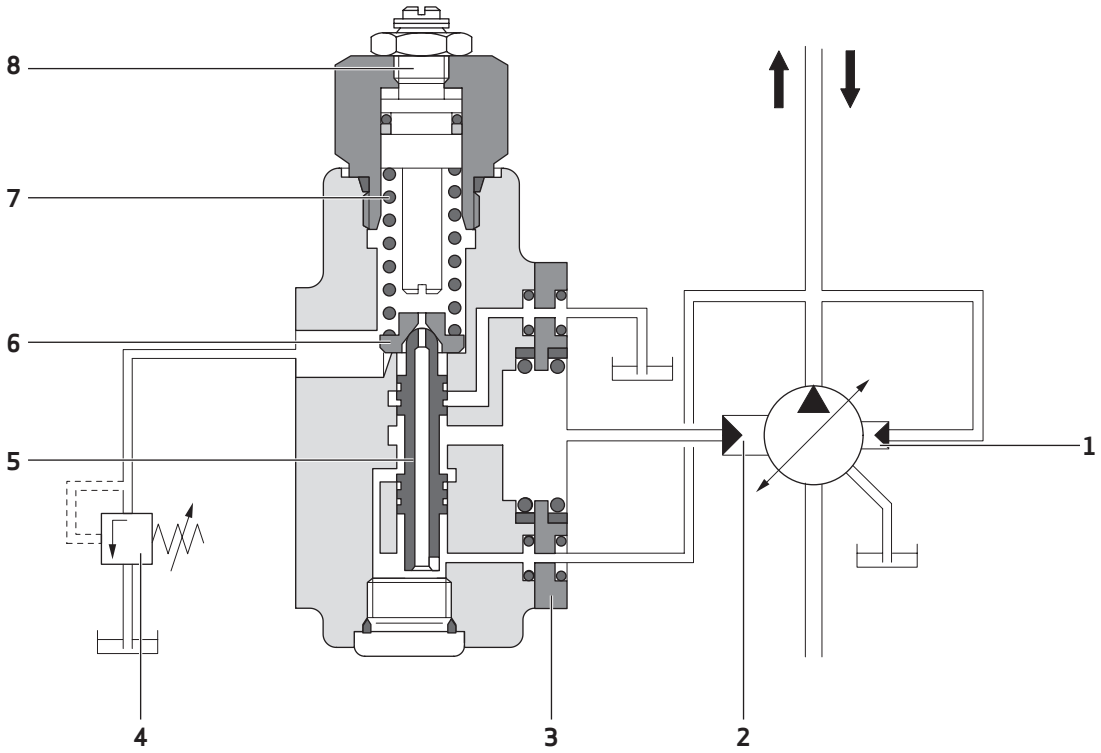
The „Mooring“ control consists of a pressure compensator which has an intermediate plate inserted between the pump body and the pressure compensator.

The thickness of the intermediate plate corresponds to the eccentricity of the stroke ring.





1 Intermediate plate



1 Control piston 2

2 Control piston 1

3 Intermediate plate

4 Pressure pilot valve

5 Valve spool

6 Orifice

7 $p_{minimum}$-spring

8 Locked screw

APPENDIX A – COMPENSATOR OPTIONS

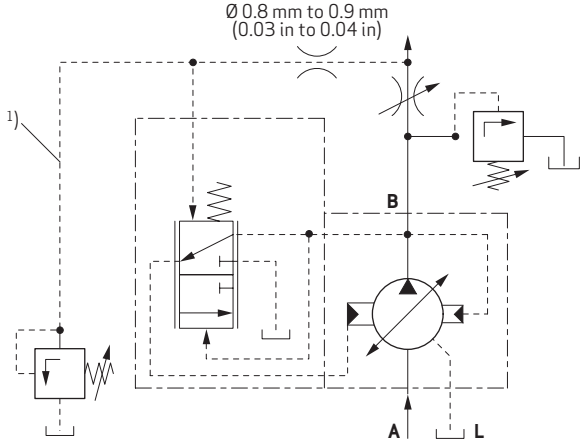
4. Combined Pressure and Flow Compensator („Loading sensing“) J1

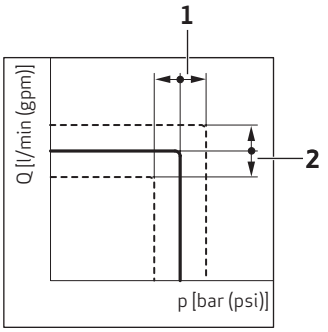
Metering throttle:

Manual adjustable throttle valve or proportional throttle valve.

Pressure pilot valve:

Manual adjustable or proportional pressure valve.
Q = 0.5 to 1.5 l/min (0.1 to 0.4 gpm)

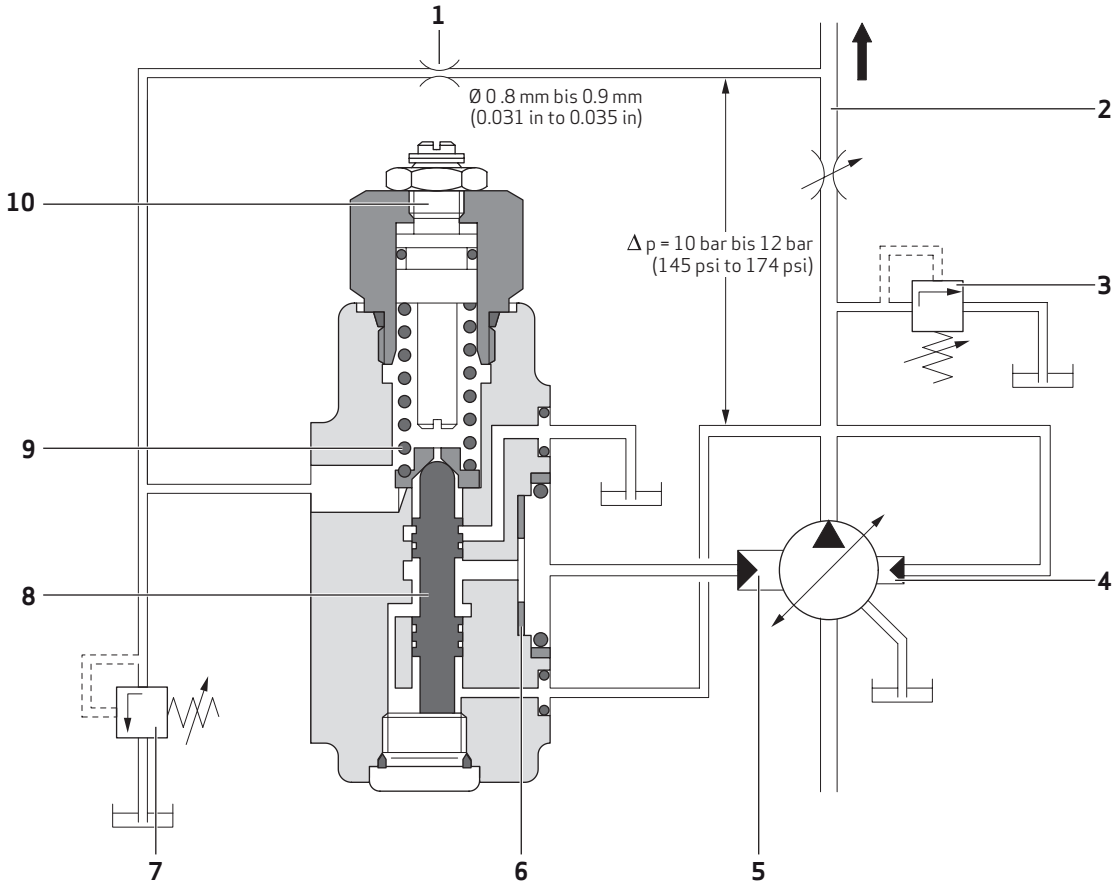




1 Set at pilot valve

2 Set at metering throttle

1) Hose recommendation for control line see page 42



1 Orifice

2 Metering throttle for flow control

3 Safety valve p = $p_{maximum}$ + 30 bar (435 psi)

4 Control piston 2

5 Control piston 1

6 Adjustment of zero stroke

7 Pressure pilot valve

8 Valve spool

9 Δp spring

10 Locked screw

APPENDIX A – COMPENSATOR OPTIONS

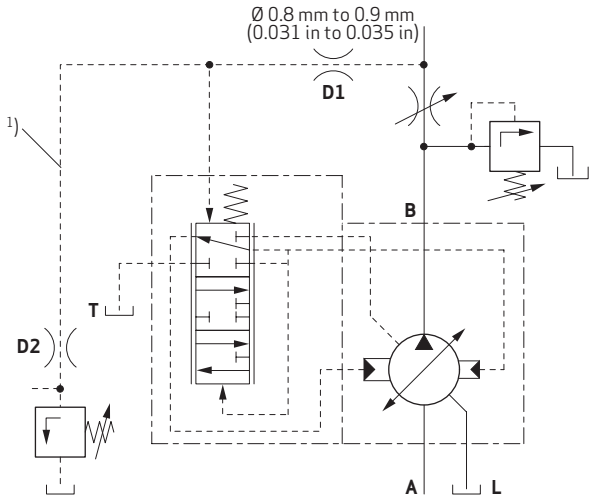
5. Combined Pressure and Flow Compensator with P-T Control Notch R1

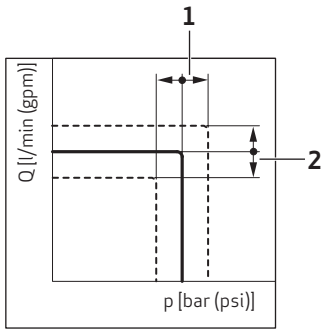
Metering throttle:

Manual adjustable throttle valve or proportional throttle valve.

Pressure pilot valve:

Manual adjustable or proportional pressure valve.
Q = 1 to 1.5 l/min (0.1 to 0.4 gpm)
In multiple pumps feeding in one common line, only one compensator with P-T control notch may be installed.
This compensator must be set to a higher Δp.

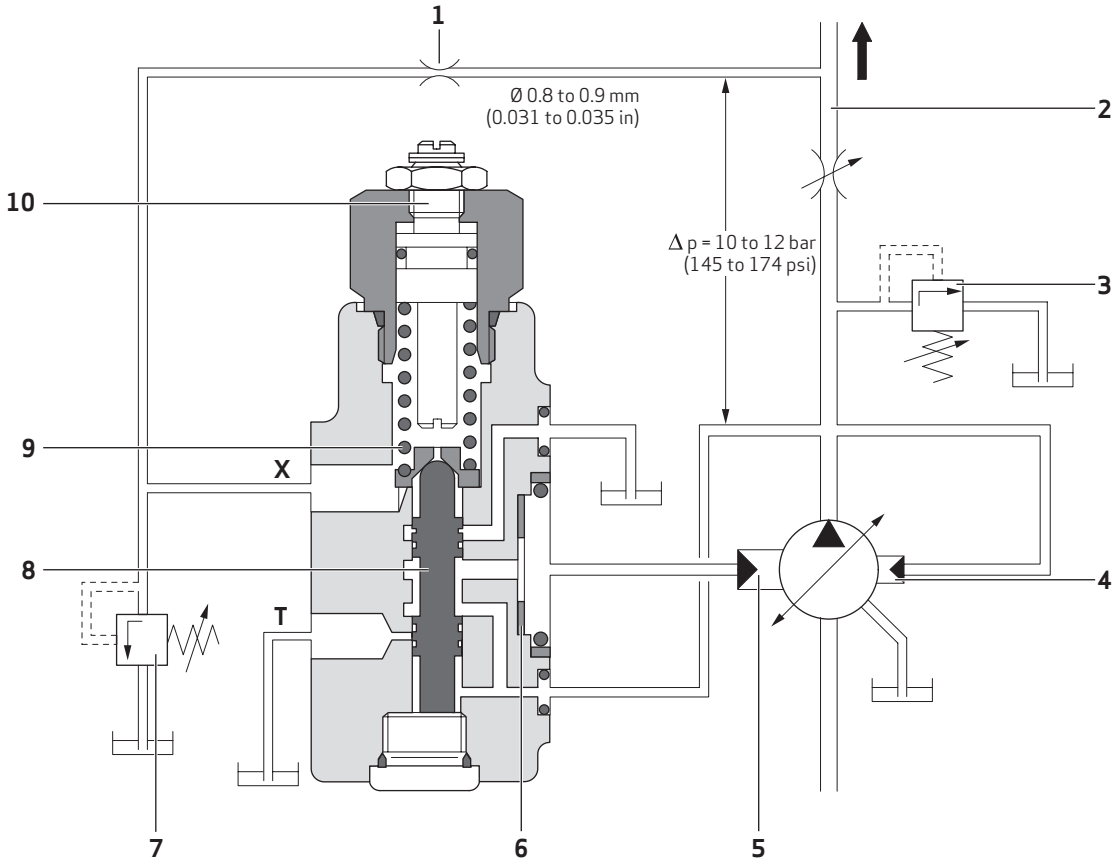




1 Set at pilot valve

2 Set at metering throttle

1) Hose recommendation for control line see page 43



1 Orifice

2 Metering throttle for flow control

3 Safety valve p = $p_{maximum}$ + 30 bar (435 psi)

4 Control piston 2

5 Control piston 1

6 Adjustment of zero stroke

7 Pressure pilot valve

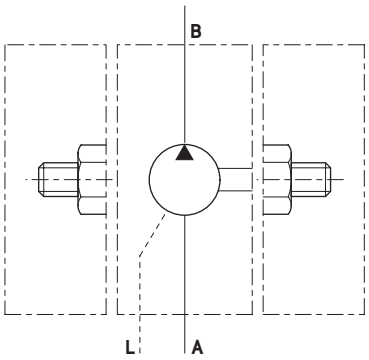
8 Valve spool

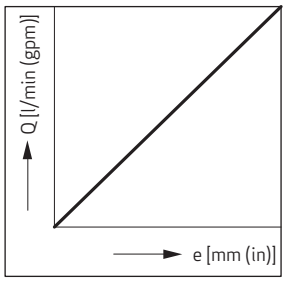
9 Δp spring

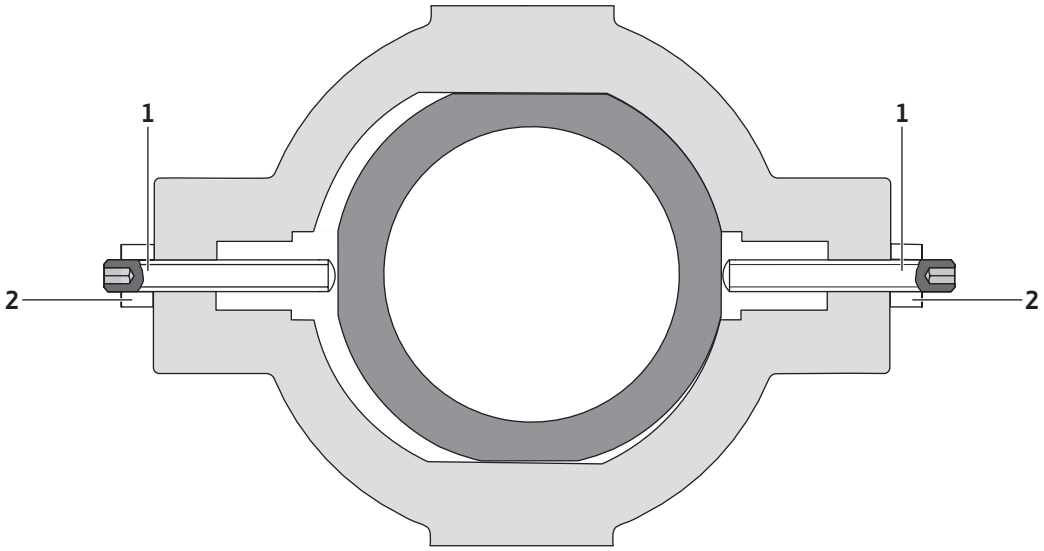
10 Locked screw

APPENDIX A – COMPENSATOR OPTIONS

6. Mechanical Stroke Adjustment B1







1 Adjustment screw

2 Sealing nut

	RKP 19	RKP 32	RKP 45	RKP 63/80	RKP 100	RKP 140
ΔV [cm³/rev] for 1 mm (0.04 in) travel of adjusting screw (pitch 1.5 mm/rev (0.06 in/rev))	3.6	5.5	6.4	8.8	11.2	11.4

Important

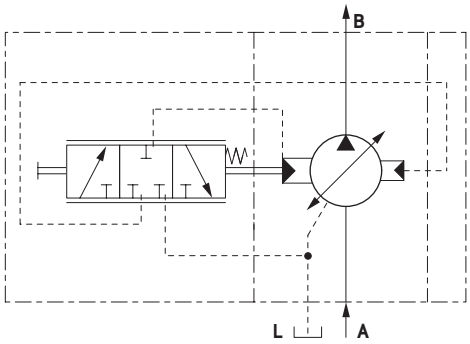
When adjusting for the required delivery, ensure that the stroke ring remains held between the two adjusting screws. When delivered, the pump is set $V_{maximum}$.

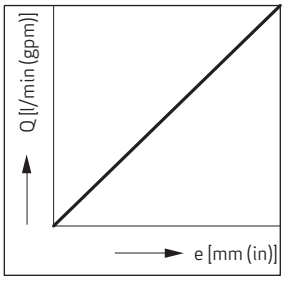
APPENDIX A – COMPENSATOR OPTIONS

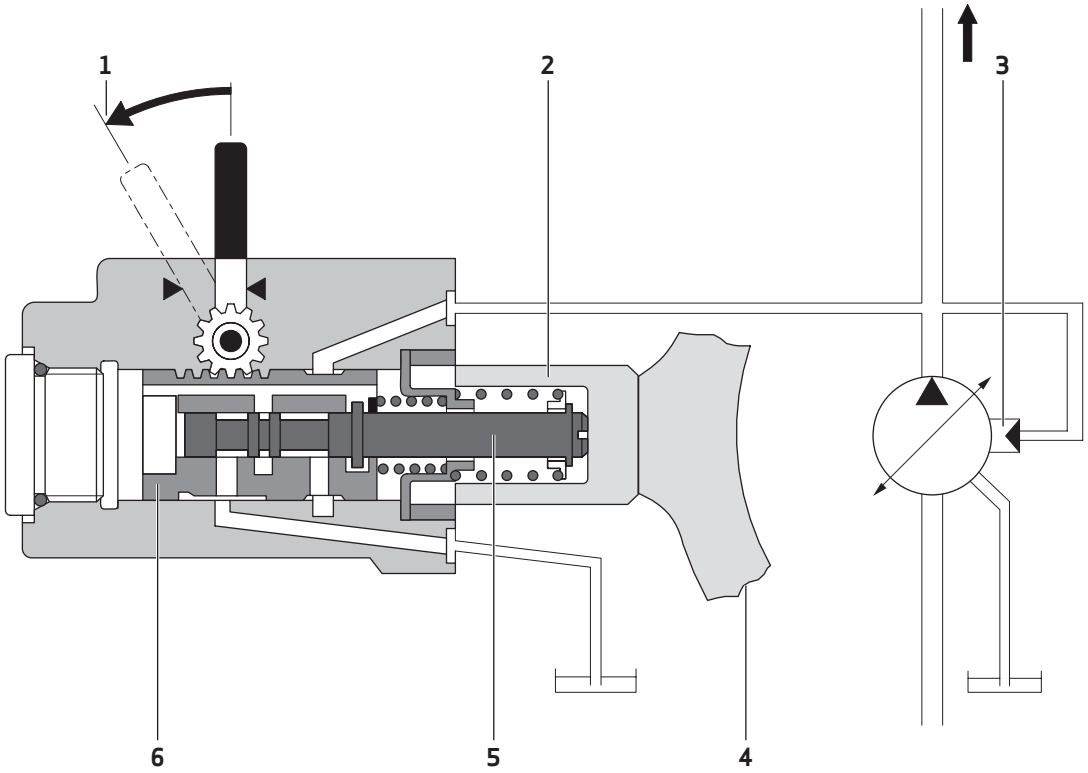
7. Servo Control C1

Actuated manually or mechanically by means of a lever. The pump displacement is controlled by the position of the lever.

Lever is not part of delivery. Measurements for lever mounting see page 46.





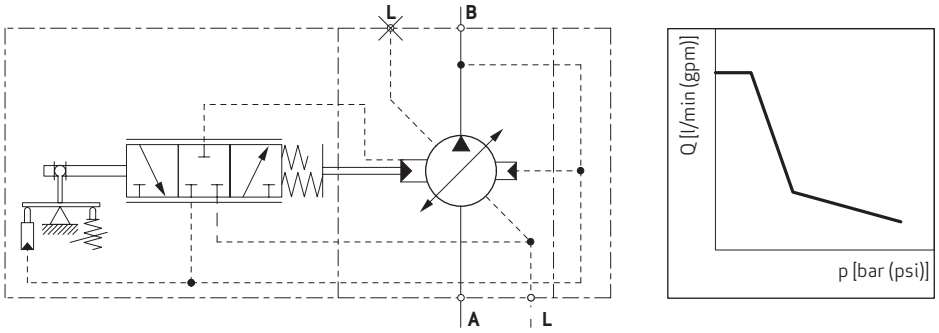


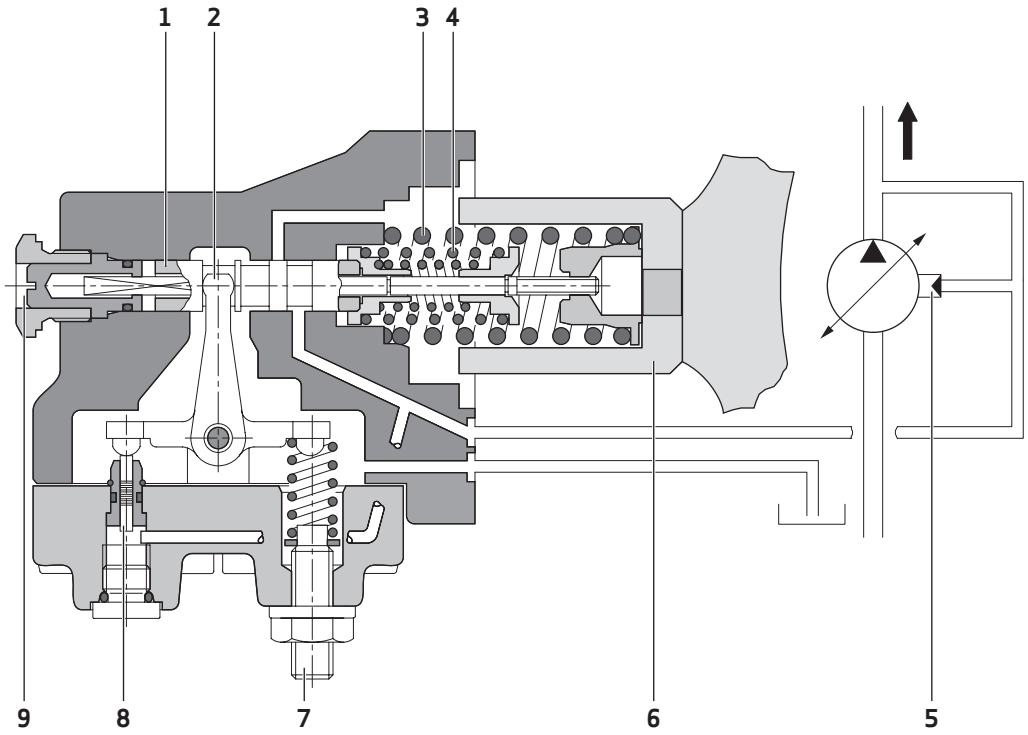
1 Lever for control shaft
2 Control piston 1
3 Control piston 2
4 Stroke ring
5 Pilot spool
6 Spool sleeve

	Control torque		
	Neutral position	**Final position**	**Maximum permissible**
RKP 19	1.2 Nm (11 lbf in)	1.7 Nm (15 lbf in)	8 Nm (71 lbf in)
RKP 32/45	1.2 Nm (11 lbf in)	1.7 Nm (15 lbf in)	8 Nm (71 lbf in)
RKP 63/80	1.6 Nm (14 lbf in)	2.4 Nm (21 lbf in)	8 Nm (71 lbf in)
RKP 100	1.6 Nm (14 lbf in)	2.4 Nm (21 lbf in)	8 Nm (71 lbf in)

APPENDIX A – COMPENSATOR OPTIONS

8. Constant Horsepower Control S1





1 Pilot spool

2 Rocker

3 Spring 2

4 Spring 1

5 Control piston 2

6 Control piston 1

7 Power set on test bench, **do not change**

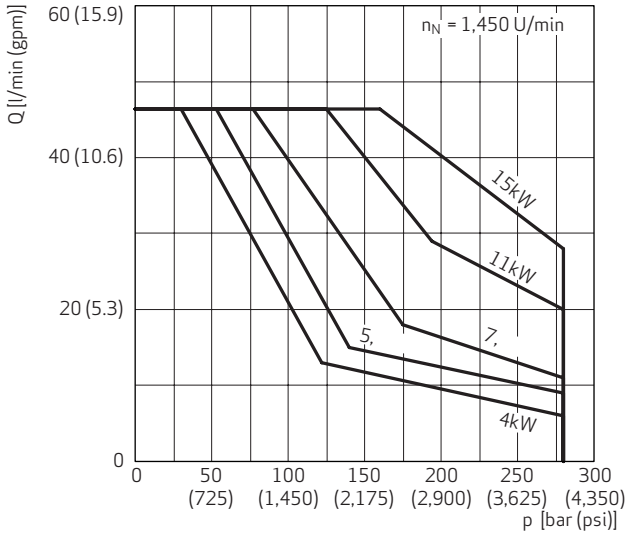
8 Sensing piston

9 Power set on test bench, **do not change**

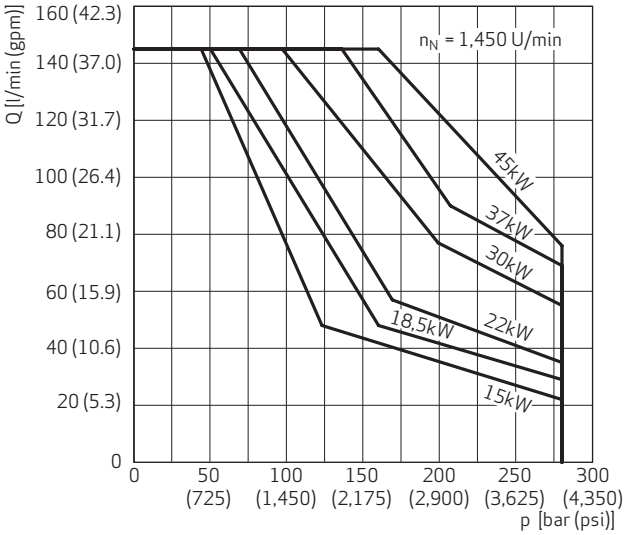
APPENDIX A – COMPENSATOR OPTIONS

8. Constant Horsepower Control S1

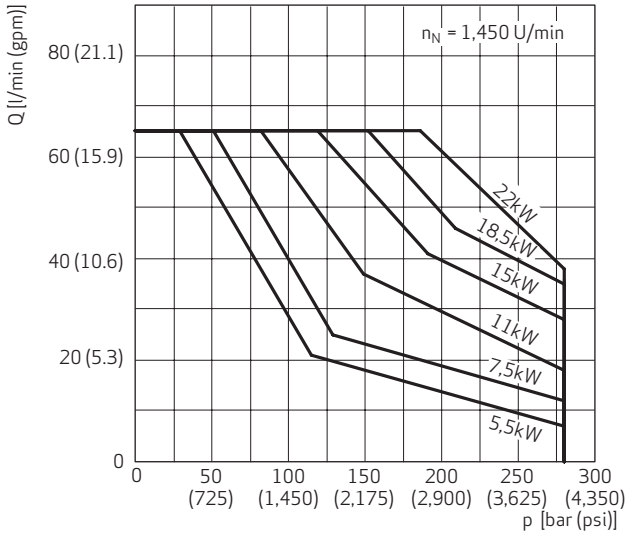
V = 32 cm³/rev



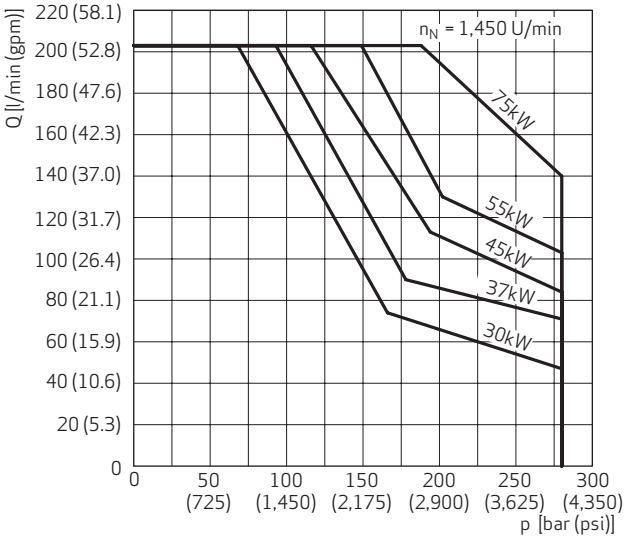
V = 100 cm³/rev



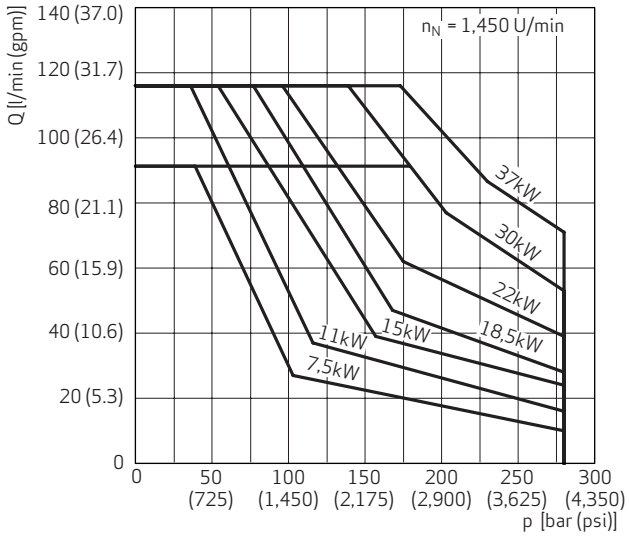
V = 45 cm³/rev



V = 140 cm³/rev



V = 63 cm³/rev



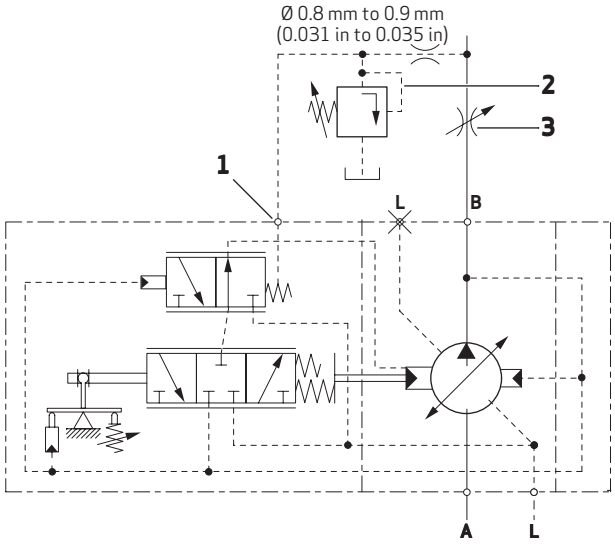
Approximation of the power hyperbola by 2 springs.

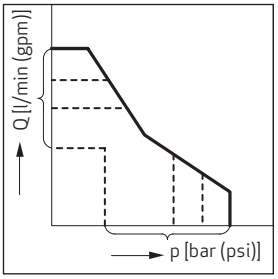
Referenced $n = 1{,}450\ min^{-1}$
For other speeds is valid:

$$P = \frac{P_N \cdot n}{1{,}450}$$

APPENDIX A – COMPENSATOR OPTIONS

9. Constant Horsepower Control with Remote Pressure and Flow Limiter S2





1 Control port

2 p Adjustment

3 Q Adjustment

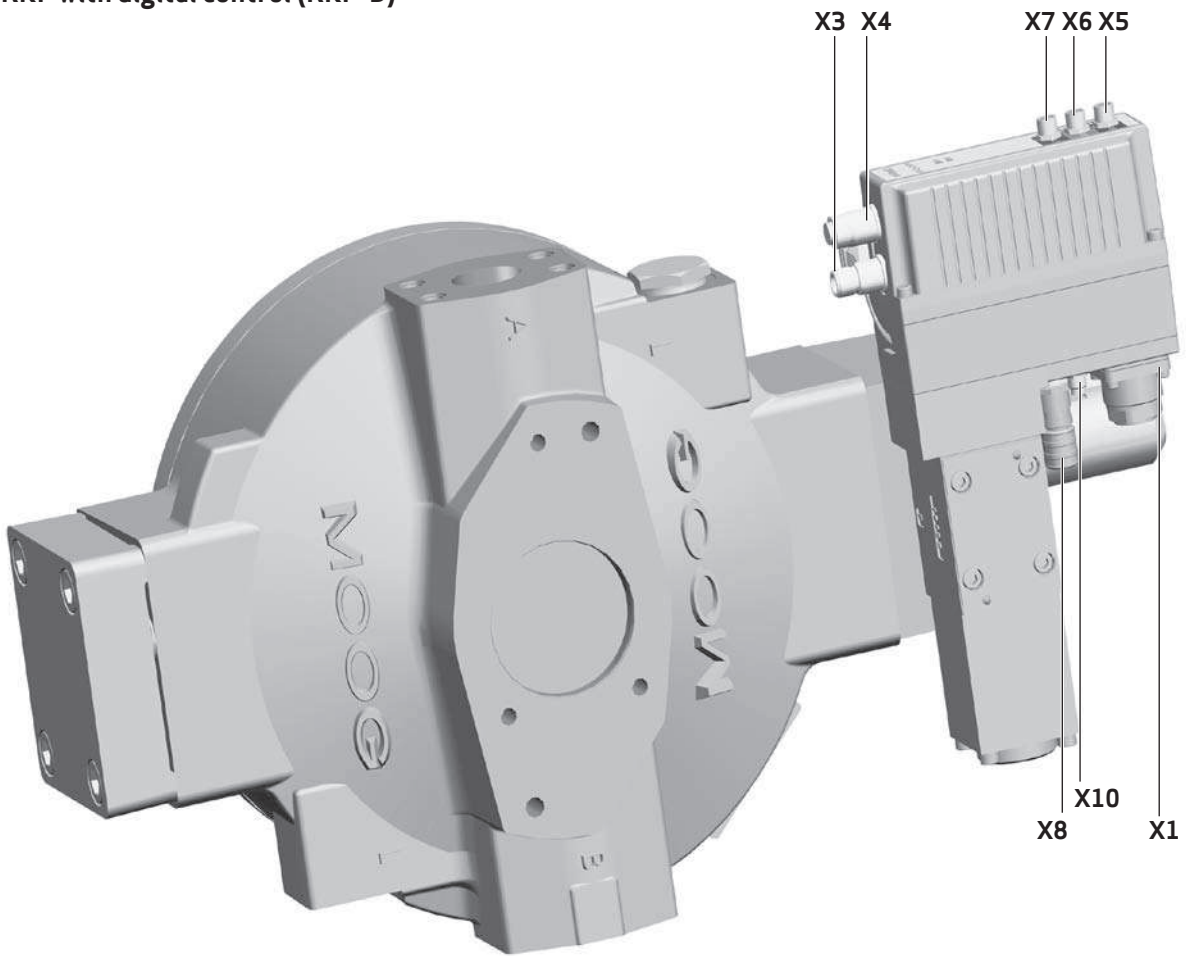
APPENDIX A – COMPENSATOR OPTIONS

10. Electro-Hydraulic Control with Digital On-Board Electronics, D1 to D8

- Control p/Q: Analog 0 to 10 V or using CAN bus
- Pressure controller with 16 selectable parameter sets
- 2 pressure sensors may be connected
- Integrated horse power controller
- Master/slave mode
- Pressure range up to 350 bar (5,000 psi) constant pressure

For a detailed description and other applications, see catalog for RKP with digital controller (RKP-D).

RKP with digital control (RKP-D)



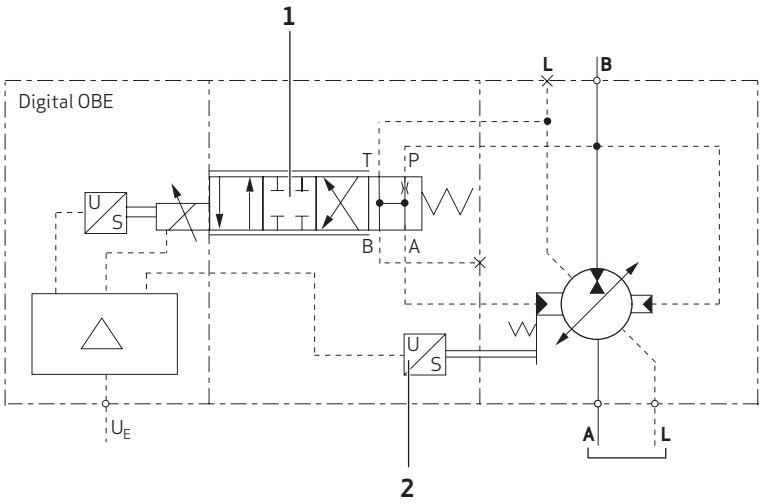
No.	Description	Type	
X1	Main connector	11+PE	11-pole pin contact
X3	CAN-In	M12x1	5-pole pin contact
X4	CAN-Out	M12x1	5-pole socket contact
X5	Pressure sensor 2	M8 x 1	4-pole socket contact
X6	Pressure sensor 1	M8 x 1	4-pole socket contact
X7	Analog selection of parameter sets	M8 x 1	4-pole socket contact
X8	LVDT	M12x1	5-pole socket contact
X10	LocalCAN (optional) for master/slave mode	M8 x 1	3-pole pin contact

Shielding of valve and LVDT: IP67 (with connected and locked receptacles respectively)

APPENDIX A – COMPENSATOR OPTIONS

10. Electro-Hydraulic Control with Digital On-Board Electronics, D1 to D8

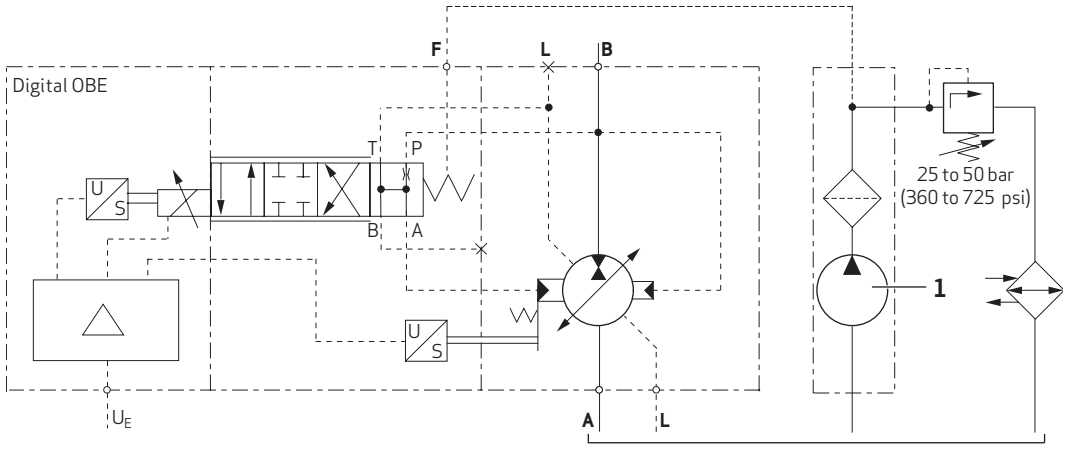
Internal Pressure Supply D1



1 Servo pilot valve D930

2 Path encoder

External Pressure Supply D2



For more information on electro-hydraulically adjustable pumps, see catalog „RKP with digital control“ (RKP-D).

APPENDIX A – COMPENSATOR OPTIONS

11. Dual-displacement, N1

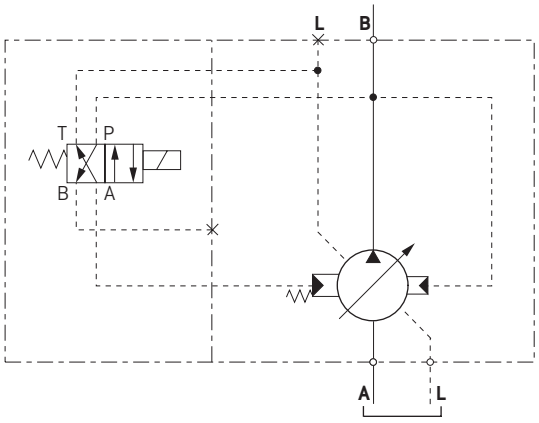
To switch displacement volume from one defined stroke ring position to another, a switching valve is used.

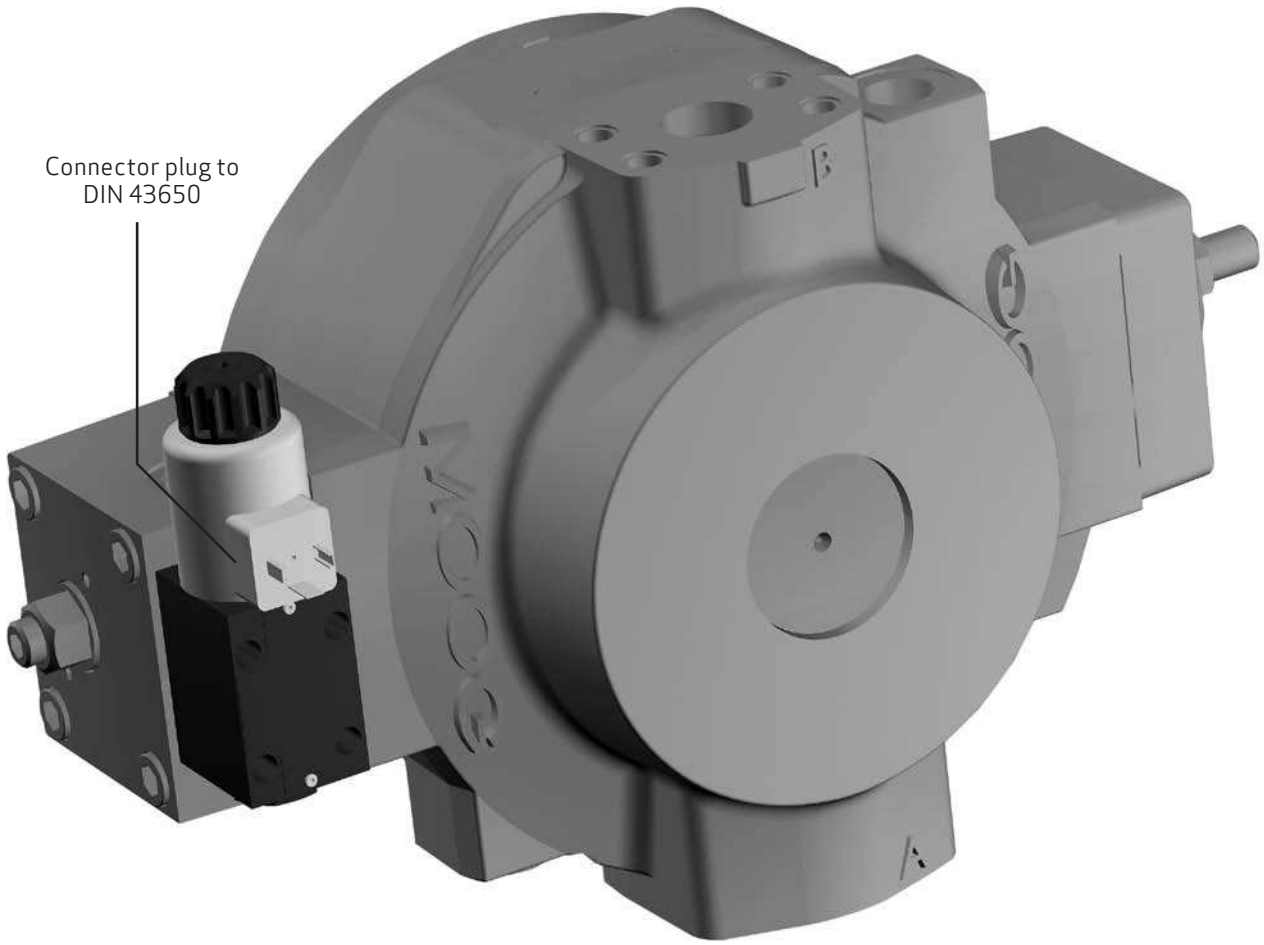
The required minimum displacement volume ($V_{minimum}$) and maximum displacement volume ($V_{maximum}$) values can be mechanically set using an adjusting screw.

Factory setting: $V_{minimum} = 0.5 \times V_{maximum}$

This control option is suitable for both variable speed operation as well as displacement control with two displacement stages and a constant speed.

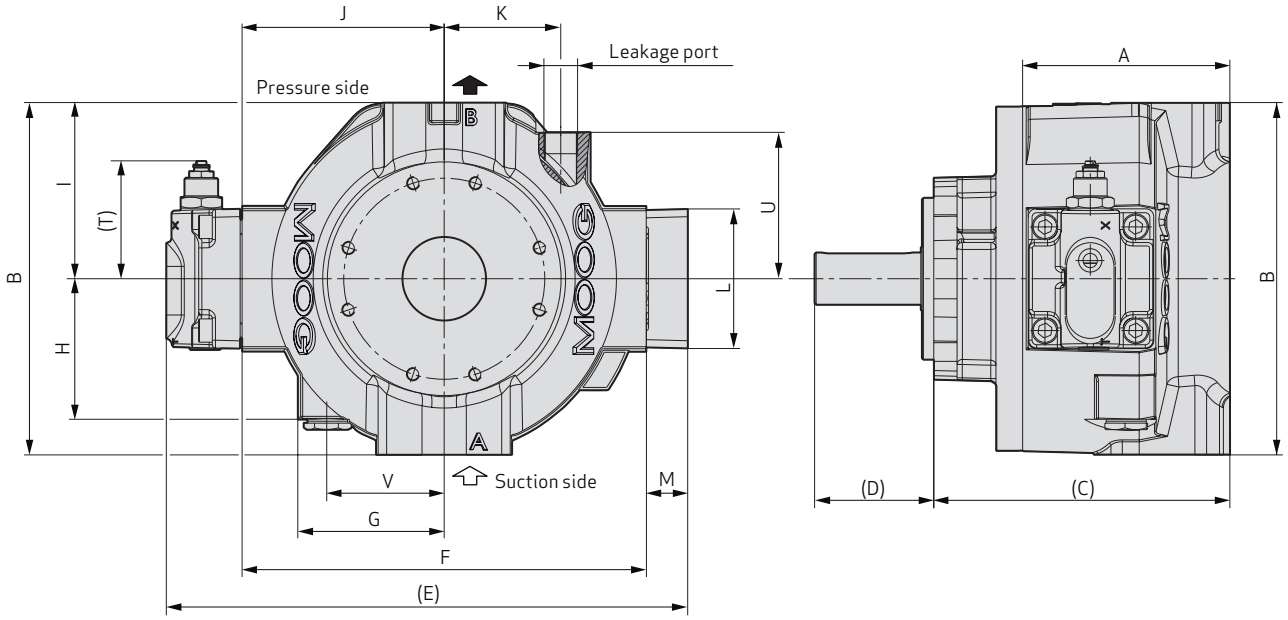
When used as a variable speed pump, the displacement volume can be adjusted to the respective point in the cycle by switching between $V_{minimum}$ and $V_{maximum}$. As the pump drive torque is reduced with $V_{minimum}$, both the motor and frequency inverter may be smaller, depending on the machine cycle.

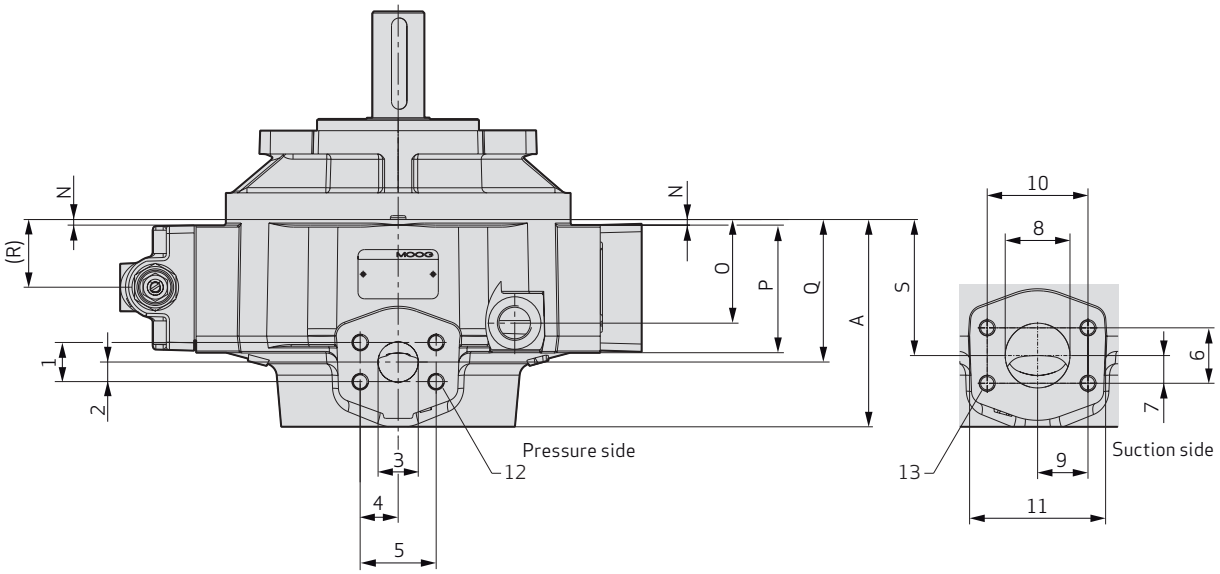




APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

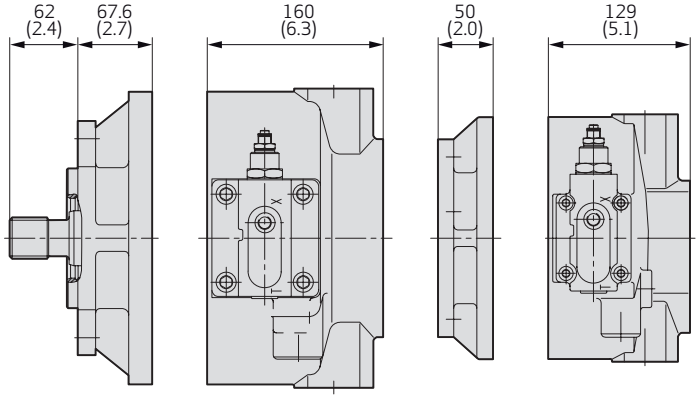
1. Housings





Caution! Figure presents clockwise direction.
For counterclockwise direction the compensator is build for the opposite side. Change of rotation is **not** possible.

Multiple arrangement Example RKP 63 + 32



APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

1. Housings

[mm (in)]		RKP 19	RKP 32/45	RKP 63/80/100
Length	**A**	104.00 (4.09)	129.00 (5.08)	160.00 (6.30)
Height	**B**	181.00 (7.13)	225.00 (8.87)	272.00 (10.72)
	(C)	163.10 (6.43) [1)]	193.10 (7.60) [1)]	228.60 (9.00) [1)]
	(D)	46.10 (1.81) [1)]	78.00 (3.07) [1)]	92.00 (3.62) [1)]
	(E)	290.50 (11.45)	319.30 (12.58)	402.50 (15.86)
	F	212.00 (8.35)	241.00 (9.50)	312.10 (12.30)
Width	**G**	78.00 (3.07)	97.00 (3.82)	113.00 (4.45)
	H	83.00 (3.27)	87.00 (3.42)	108.00 (4.26)
	I	90.50 (3.57)	112.50 (4.43)	136.00 (5.36)
	J	106.00 (4.18)	120.50 (4.75)	156.00 (6.14)
	K	56.00 (2.20)	84.00 (3.30)	90.00 (3.55)
Leakage port		M18 x 1.5 (0.06) to 13 mm (0.51 in) deep	M22 x 1.5 (0,06) to 14 mm (0.55 in) deep	M26 x 1.5 (0.06) to 16 mm (0.63 in) deep
	L	80.00 (3.15)	81.40 (3.20)	107.70 (4.24)
	M	26.00 (1.02)	26.00 (1.02)	32 .00 (1.26) (51.7 (2.04) at D2, D3, D6)
	N	1.00 (0.03)	7.50 (0.31)	4.30 (0.17)
	O	55.00 (2.17)	66.00 (2.60)	80.00 (3.15)
	P	70.00 (2.76)	75.50 (2.98)	98.50 (3.88)
	Q	67.00 (2.63)	88.00 (3.47)	110.00 (4.33)
	(R)	35.00 (1.38) [2)]	41.20 (1.62) [2)]	52.25 (2.06) [2)]
	S	67.00 (2.63)	85.00 (3.35)	105.00 (4.13)
	(T)	Maximum 103.00 (4.06) [2)]	Maximum 103.00 (4.06) [2)]	Maximum 98.00 (3.86) [2)]
	U	83.00 (3.27)	87.00 (3.42)	113.00 (4.45)
	V	56.00 (2.20)	78.00 (3.07)	90.00 (3.55)

[1)] Value for flange A7

[2)] Value for compensators F, H, J, R

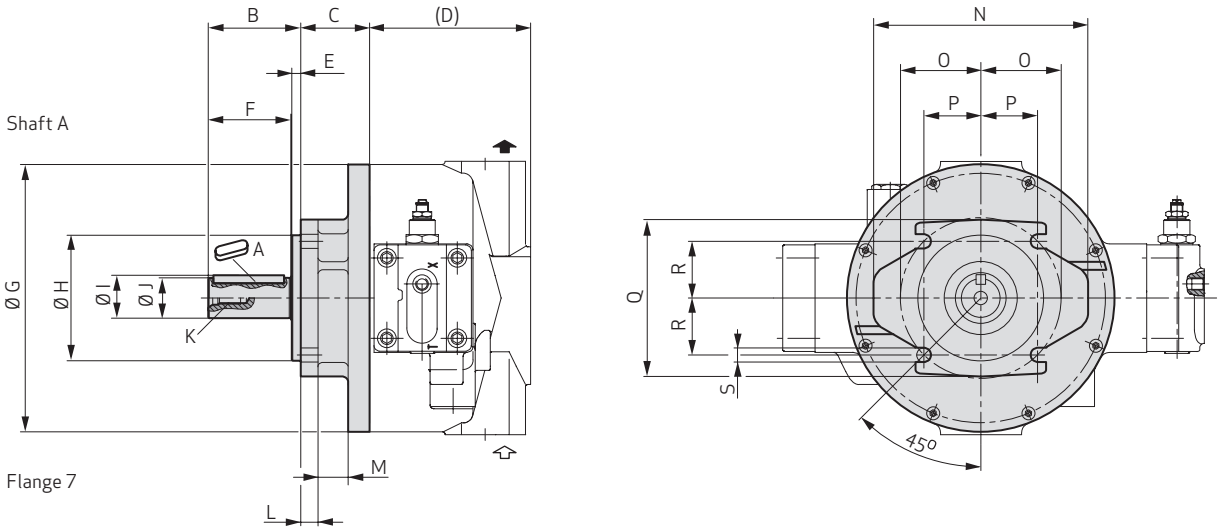
APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

1. Housings

[mm (in)]		RKP 19		RKP 32/45		RKP 63/80/100	
Pressure port		SAE 3/4" 3,000 psi	SAE 3/4" 6,000 psi	SAE 1" 3,000 psi	SAE 1" 6,000 psi	SAE 1 1/4" 3,000 psi	SAE 1 1/4" 6,000 psi
	1	22.20 (0.87)	23.90 (0.94)	26.20 (1.05)	27.80 (1.10)	30.16 (1.19)	31.70 (1.25)
	2	11.10 (0.44)	11.95 (0.47)	13.10 (0.52)	13.90 (0.55)	15.08 (0.59)	15.85 (0.62)
	3	19.00 (0.75)	19.00 (0.75)	25.00 (0.98)	25.00 (0.98)	26.00 (1.02)	31.00 (1.22)
	4	23.81 (0.94)	25.40 (1.00)	26.20 (1.05)	28.60 (1.13)	29.37 (1.16)	33.34 (1.31)
	5	47.60 (1.87)	50.80 (2.00)	52.40 (2.06)	57.20 (2.25)	58.74 (2.31)	66.68 (2.63)
	12	M10 16 mm (0.63 in) deep	M10 16 mm (0.63 in) deep	M10 16 mm (0.63 in) deep	M12 21 mm (0.83 in) deep	M12 21 mm (0.83 in) deep	M14 24 mm (0.94 in) deep
Suction port		SAE 3/4" 3,000 psi	SAE 3/4" 6,000 psi	SAE 1 1/2" 3,000 psi		SAE 2" 3,000 psi	
	6	22.20 (0.87)	23.90 (0.94)	35.70 (1.41)		42.80 (1.69)	
	7	11.10 (0.44)	11.95 (0.47)	17.85 (0.70)		21.40 (0.84)	
	8	19.00 (0.75)	19.00 (0.75)	38.00 (1.50)		50.00 (1.97)	
	9	23.81 (0.94)	25.40 (1.00)	34.95 (1.38)		38.90 (1.53)	
	10	47.60 (1.87)	50.80 (2.00)	69.90 (2.75)		77.80 (3.06)	
	11	71.00 (2.80)	71.00 (2.80)	98.00 (3.86)		105.00 (4.13)	
	13	M10 16 mm (0.63 in) deep	M10 16 mm (0.63 in) deep	M12 24 mm (0.94 in) deep		M12 22.5 mm (0.89) deep	

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

2. Drive Flanges A7

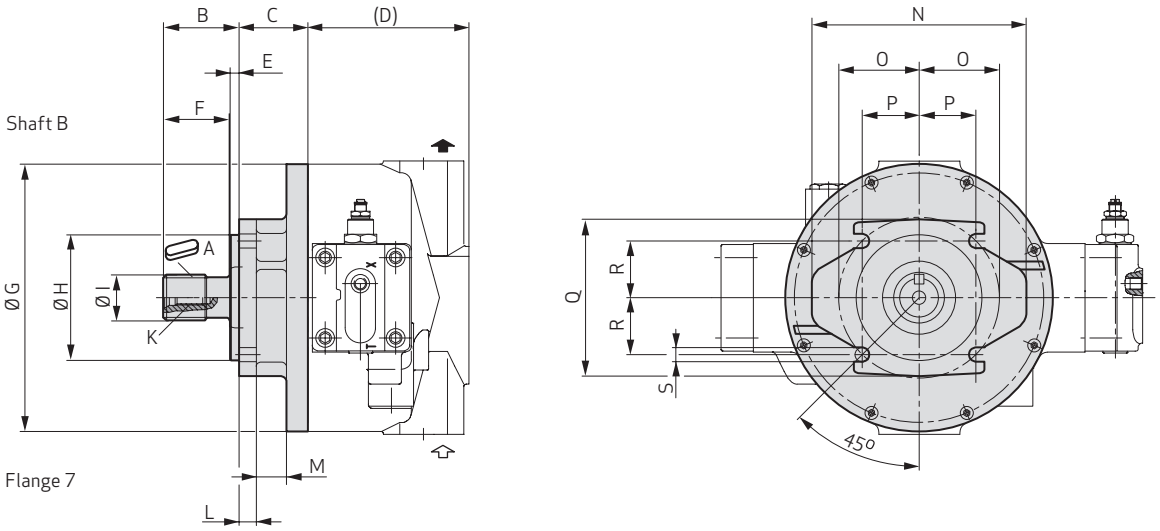


Key to DIN 6885
ISO mounting flange to ISO 3019-2 (metric dimensions)

[mm (in)]	RKP 19	RKP 32/45	RKP 63/80/100
A	A 8 x 7 x 36 mm DIN 6885	A 10 x 8 x 50 mm DIN 6885	A 12 x 8 x 70 mm DIN 6885
B	52.00 (2.05)	68.00 (2.68)	92.00 (3.62)
C	58.10 (2.29)	64.10 (2.52)	68.60 (2.70)
(D)	104.00 (4.09)	129.00 (5.08)	160.00 (6.30)
E	9.00 (0.35)	9.00 (0.35)	9.00 (0.35)
F	42.00 (1.65)	58.00 (2.28)	82.00 (3.23)
G	177.00 (6.97)	220.00 (8.66)	267.00 (10.51)
H	100.00 (3.94) - 0.054 (-0.0021)	125.00 (4.92) - 0.063 (-0.0025)	125.00 (4.92) - 0.063 (-0.0025)
I	27.75 (1.09)	34.75 (1.37)	42.75 (1.68)
J	25.00 + 0.009 / - 0.004 (0.98) (+ 0.0003 / - 0.00016)	32.00 + 0.018 / + 0.002 (1.26) (+ 0.0007 / + 8.877 x 10^{-5})	40.00 + 0.018 / + 0.002 (1.57) (+ 0.0007 / + 8.877 x 10^{-5})
K	M8 22 mm (0.87 in) deep	M10 22 mm (0.87 in) deep	M10 32 mm (1.26 in) deep
L	11.20 (0.44)	17.20 (0.68)	17.20 (0.68)
M	30.00 (1.18)	30.00 (1.18)	30.00 (1.18)
N	174.00 (6.85)	213.00 (8.39)	213.00 (8.39)
O	62.50 (2.46)	80.00 (3.15)	80.00 (3.15)
P	44.20 (1.74)	56.58 (2.23)	56.58 (2.23)
Q	126.00 (4.96)	156.00 (6.14)	156.00 (6.14)
R	44.20 (1.74)	56.58 (2.23)	56.58 (2.23)
S	11.00 (0.43)	14.00 (0.55)	14.00 (0.55)

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

3. Drive Flanges B7

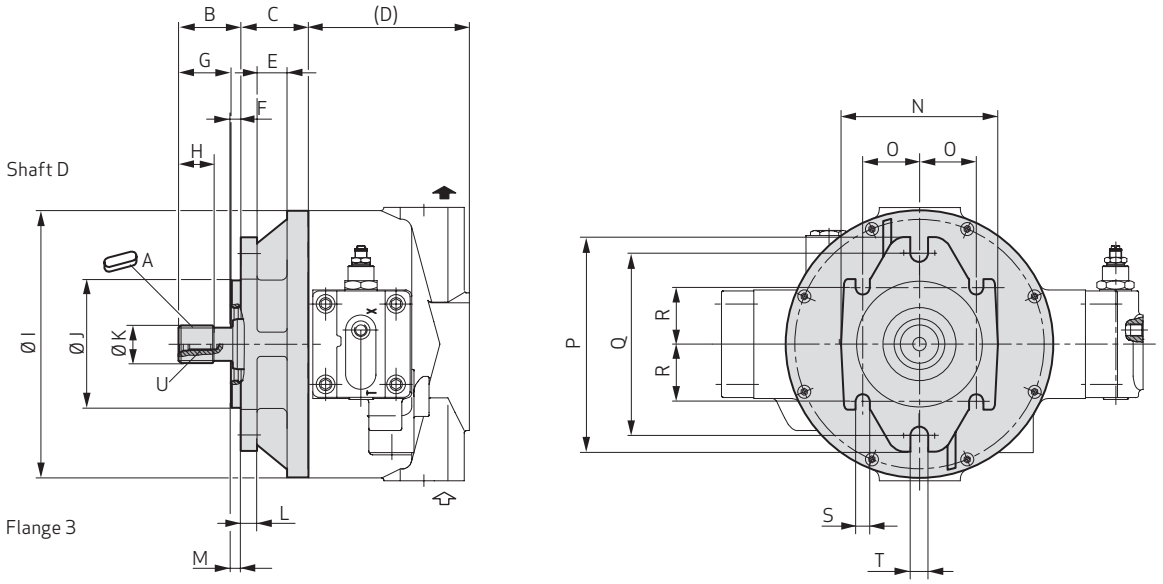


Involute spline to DIN 5480 (obligatory with multiple arrangement of RKP and SAE-B)
ISO mounting flange to ISO 3019-2 (metric dimensions)

[mm (in)]	RKP 19	RKP 32/45	RKP 63/80/100
A	W25 x 1.25 x 30 x 18 mm x 8f DIN 5480	W32 x 2 x 30 x 14 mm x 8f DIN 5480	W40 x 2 x 30 x 18 mm x 8f DIN 5480
B	42.00 (1.65)	46.00 (1.81)	54.00 (2.13)
C	58.10 (2.29)	64.10 (2.52)	68.60 (2.70)
(D)	104.00 (4.09)	129.00 (5.08)	160.00 (6.30)
E	9.00 (0.35)	9.00 (0.35)	9.00 (0.35)
F	32.00 (1.26)	36.00 (1.42)	44.00 (1.73)
G	177.00 (6.97)	220.00 (8.66)	267.00 (10.51)
H	100.00 (3.94) - 0.054 (-0.0021)	125.00 (4.92) - 0.063 (-0.0024)	125.00 (4.92) - 0.063 (-0.0024)
I	25.00 (0.98)	32.00 (1.26)	40.00 (1.57)
K	M8 22 mm (0.87 in) deep	M10 22 mm (0.87 in) deep	M10 32 mm (1.26 in) deep
L	11.20 (0.44)	17.20 (0.68)	17.20 (0.68)
M	30.00 (1.18)	30.00 (1.18)	30.00 (1.18)
N	174.00 (6.85)	213.00 (8.39)	213.00 (8.39)
O	62.50 (2.46)	80.00 (3.15)	80.00 (3.15)
P	44.20 (1.74)	56.58 (2.23)	56.58 (2.23)
Q	126.00 (4.96)	156.00 (6.14)	156.00 (6.14)
R	44.20 (1.74)	56.58 (2.23)	56.58 (2.23)
S	11.00 (0.43)	14.00 (0.55)	14.00 (0.55)

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

4. Drive Flanges C3

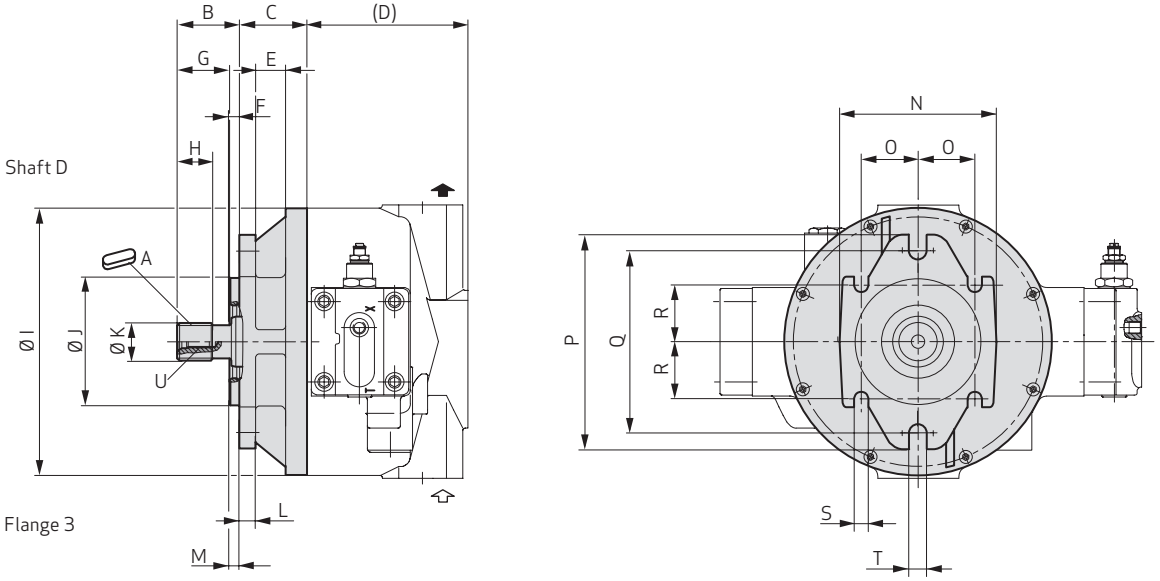


Key to SAE standard, SAE mounting flange to ISO 3019-1 (imperial dimensions)

[mm (in)]	RKP 19	RKP 32/45	RKP 63/80/100
A	6.35 x 6.35 x 25.4 mm	7.94 x 7.94 x 32.0 mm	9.53 x 9.53 x 42.0 mm
B	46.10 (1.81)	57.50 (2.27)	62.00 (2.44)
C	59.10 (2.33)	63.10 (2.48)	67.60 (2.66)
(D)	104.00 (4.09)	129.00 (5.08)	160.00 (6.30)
E	30.00 (1.18)	30.00 (1.18)	30.00 (1.18)
F	8.00 (0.31)	10.00 (0.39)	10.00 (0.39)
G	36.70 (1.44)	46.00 (1.81)	54.00 (2.13)
H	177.00 (6.97)	220.00 (8.66)	267.00 (10.51)
I	101.60 (4.00) - 0.05 (-0.0019)	127.00 (5.00) - 0.05 (-0.0019)	127.00 (5.00) - 0.05 (-0.0019)
J	28.09 (1.11)	35.21 (1.39)	42.27 (1.66)
K	25.40 (1.00) - 0.05 (-0.0019)	31.75 (1.25) - 0.05 (-0.0019)	38.10 (1.50) - 0.05 (-0.0019)
L	12.20 (0.48)	16.20 (0.64)	16.20 (0.64)
M	9.40 (0.37)	11.50 (0.45)	8.00 (0.31)
N	126.00 (4.96)	156.00 (6.14)	156.00 (6.14)
O	45.00 (1.77)	57.25 (2.25)	57.25 (2.25)
P	174.00 (6.85)	213.00 (8.39)	213.00 (8.39)
Q	146.00 (5.75)	181.00 (7.13)	181.00 (7.13)
R	45.00 (1.77)	57.25 (2.25)	57.25 (2.25)
S	14.40 (0.57)	14.40 (0.57)	14.40 (0.57)
T	14.40 (0.57)	17.60 (0.69)	17.60 (0.69)
U	3/8"-16UNC-2B 22 mm (0.87 in) deep	3/8"-16UNC-2B 22 mm (0.87 in) deep	7/16"-14UNC-2B 32 mm (1.26 in) deep

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

5. Drive Flanges D3

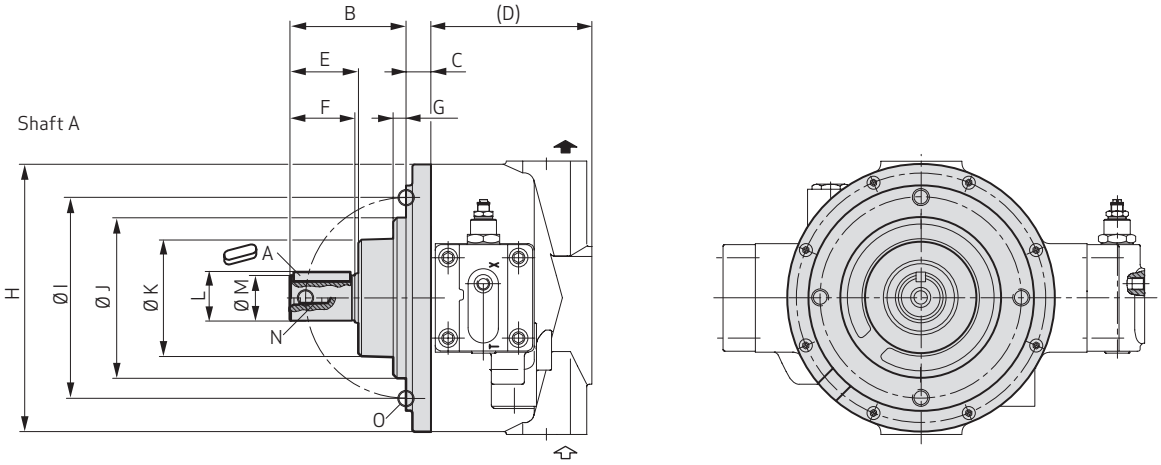


Involute spline to SAE 744 C, (obligatory with multiple arrangement of RKP and SAE-B)
SAE mounting flange to ISO 3019-1 (imperial dimensions)

[mm (in)]	RKP 19	RKP 32/45	RKP 63/80/100
A	ANSI B92.1-1970, Class 5 30PA. 15T, 16/32DP, Flat root side fit	ANSI B92.1-1970, Class 5 30PA. 14T, 12/24DP, Flat root side fit	ANSI B92.1-1970, Class 5 30PA. 17T, 12/24DP, Flat root side fit
B	46.00 (1.81)	56.00 (2.20)	62.00 (2.44)
C	59.10 (2.33)	63.10 (2.48)	67.60 (2.66)
(D)	104.00 (4.09)	129.00 (5.08)	160.00 (6.30)
E	30.00 (1.18)	30.00 (1.18)	30.00 (1.18)
F	8.00 (0.31)	10.00 (0.39)	10.00 (0.39)
G	38.00 (1.50)	48.00 (1.89)	54.00 (2.13)
H	23.00 (0.91)	29.00 (1.14)	34.00 (1.34)
I	177.00 (6.97)	220.00 (8.66)	267.00 (10.51)
J	101.60 (4.00)	127.00 (5.00)	127.00 (5.00)
K	25.20 (0.99)	31.50 (1.24)	37.70 (1.48)
L	12.20 (0.48)	16.20 (0.64)	16.20 (0.64)
M	8.00 (0.31)	8.00 (0.31)	8.00 (0.31)
N	126.00 (4.96)	156.00 (6.14)	156.00 (6.14)
O	45.00 (1.77)	57.25 (2.25)	57.25 (2.25)
P	174.00 (6.85)	213.00 (8.39)	213.00 (8.39)
Q	146.00 (5.75)	181.00 (7.13)	181.00 (7.13)
R	45.00 (1.77)	57.25 (2.25)	57.25 (2.25)
S	14.40 (0.57)	14.40 (0.57)	14.40 (0.57)
T	14.40 (0.57)	17.60 (0.69)	17.60 (0.69)
U	3/8"-16UNC-2B 22 mm (0.87 in) deep	3/8"-16UNC-2B 22 mm (0.87 in) deep	7/16"-14UNC-2B 32 mm (1.26 in) deep

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

6. Drive Flanges A1



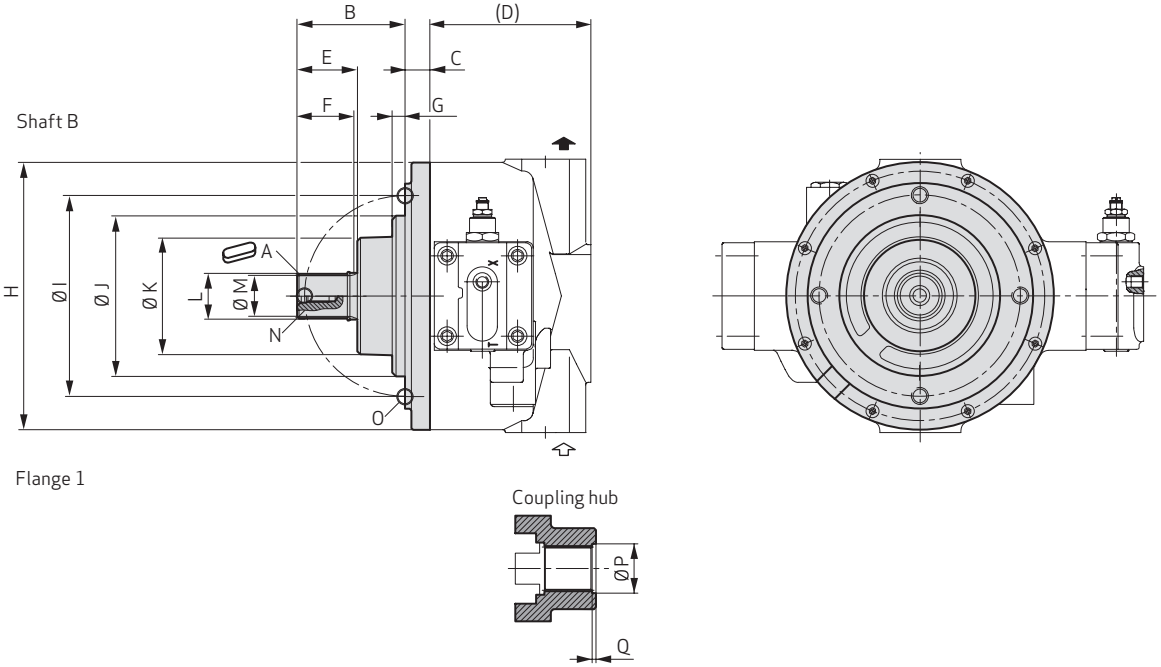
Flange 1

Key to DIN 6885
Metric round flangem

[mm (in)]	RKP 19	RKP 32/45	RKP 63/80/100
A	A 8 x 7 x 32 mm DIN 6885	A 10 x 8 x 45 mm DIN 6885	A 14 x 9 x 56 mm DIN 6885
B	70.70 (2.78)	94.50 (3.72)	116.00 (4.57)
C	17.10 (0.67)	18.10 (0.71)	24.70 (0.97)
(D)	104.00 (4.09)	129.00 (5.08)	160.00 (6.30)
E	42.90 (1.69)	57.50 (2.27)	68.50 (2.70)
F	41.20 (1.62)	55.00 (2.17)	65.00 (2.56)
G	11.40 (0.45)	11.00 (0.43)	13.00 (0.51)
H	177.00 (6.97)	220.00 (8.66)	267.00 (10.51)
I	125.00 (4.92) ± 0.15 (± 0.0059)	160.00 (6.30) ± 0.15 (± 0.0059)	200.00 (7.87) ± 0.15 (± 0.0059)
J	100.00 - 0.036 / - 0.09 (3.94) (- 0.0014 / - 0.0035)	125.00 - 0.043 / - 0.106 (4.92) (- 0.0017 / - 0.0041)	160.00 - 0.043 / - 0.106 (6.30) (- 0.0017 / - 0.0041)
K	79.00 (3.11)	101.00 (3.98)	116.00 (4.57)
L	30.75 (1.21)	37.85 (1.49)	48.40 (1.91)
M	28.00 (1.10) - 0.013 (- 0.0005)	35.00 (1.38) - 0.016 (- 0.0006)	45.00 (1.77) - 0.016(- 0.0006)
N	M10 22 mm (0.87 in) deep	M10 22 mm (0.87 in) deep	M10 32 mm (1.26 in) deep
O	M10 15 mm (0.59 in) deep	M12 16 mm (0.63 in) deep	M16 23 mm (0.91 in) deep

APPENDIX B – TECHNICAL DRWAINGS RKP 19 TO 100

7. Drive Flanges B1



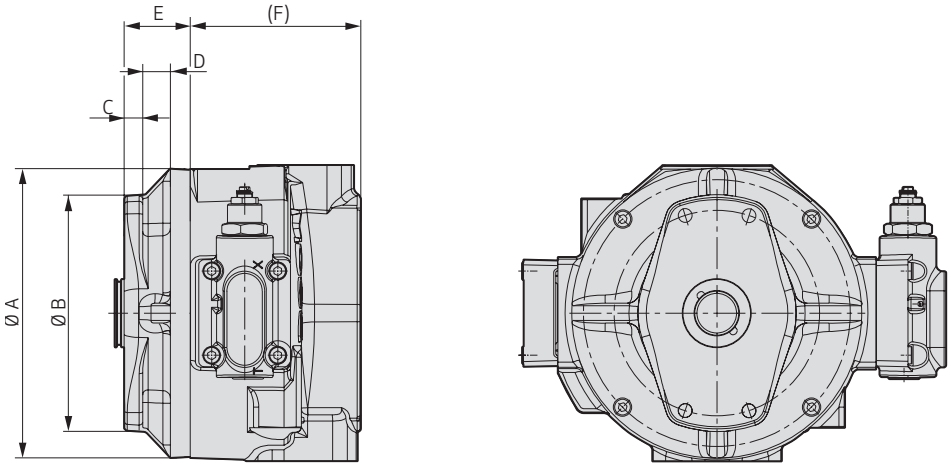
Involute spline to DIN 5482 (for B1), (obligatory with multiple arrangement of RKP and SAE-B), Metric round flange

[mm (in)]	RKP 19	RKP 32/45	RKP 63/80/100
A	B 28 x 25 mm e9 DIN 5482	B 35 x 31 mm e9 DIN 5482	B 45 x 41 mm e9 DIN 5482
B	72.60 (2.86)	95.50 (3.76)	107.90 (4.25)
C	17.10 (0.67)	18.10 (0.71)	24.70 (0.97)
(D)	104.00 (4.09)	129.00 (5.08)	160.00 (6.30)
E	44.80 (1.76)	58.50 (2.30)	60.40 (2.38)
F	30.00 (1.18)	40.00 (1.57)	50.00 (1.97)
G	11.40 (0.45)	11.00 (0.43)	13.00 (0.51)
H	177.00 (6.97)	220.00 (8.66)	267.00 (10.51)
I	125.00 (4.92) ± 0.15 (± 0.0059)	160.00 (6.30) ± 0.15 (± 0.0059)	200.00 (7.87) ± 0.15 (± 0.0059)
J	100.00 - 0.09 / - 0.036 (3.94) (- 0.0035 / - 0.0014)	125.00 - 0.043 / - 0.106 (4.92) (- 0.0017 / - 0.0041)	160.00 - 0.043 / - 0.106 (6.30) (- 0.0017 / - 0.0041)
K	79.00 (3.11)	101.00 (3.98)	116.00 (4.57)
L	30.80 (1.21) ± 0.25 (± 0.0098)	38.50 (1.52) ± 0.25 (± 0.0098)	48.45 (1.91) ± 0.25 (± 0.0098)
M	27.50 (1.08) - 0.13 (- 0.0051)	34.44 (1.36) - 0.16 (- 0.0051)	44.50 (1.75) - 0.16 (- 0.0051)
N	M10 22 mm (0.87 in) deep	M10 22 mm (0.87 in) deep	M10 32 mm (1.26 in) deep
O	M10 15 mm (0.59 in) deep	M12 16 mm (0.63 in) deep	M16 23 mm (0.91 in) deep
P	31.30 (1.23) + 0.20 (± 0.0078)	39.00 (1.53) + 0.20 (± 0.0078)	49.00 (1.93) + 0.20 (± 0.0078)
Q	4.00 (0.16)	4.00 (0.16)	4.00 (0.16)

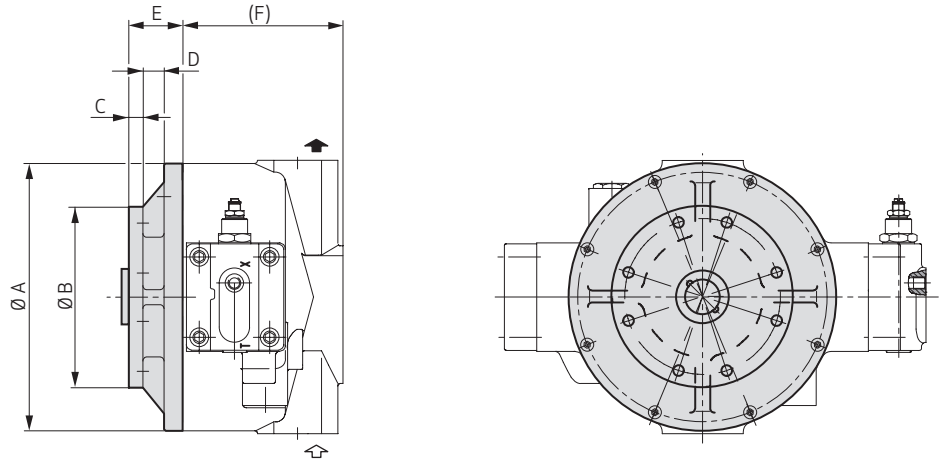
APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

8. Intermediate Drive Flange XX (RKP-RKP)

RKP 19/32/45



RKP 63/80/100



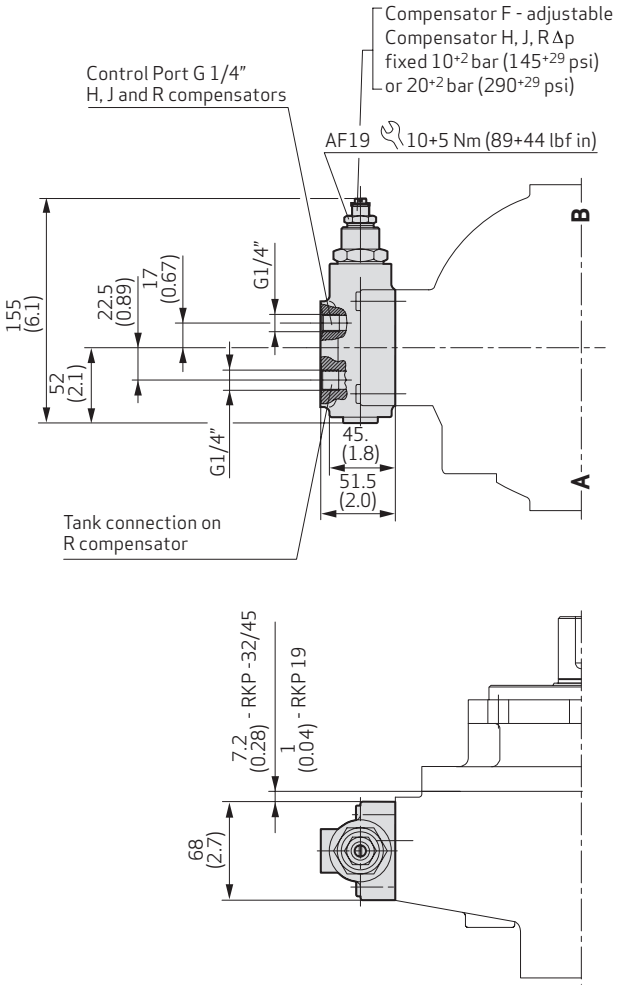
[mm (in)]	RKP 19	RKP 32/45	RKP 63/80/100
A	177.00 (6.97)	220.00 (8.66)	266.00 (10.47)
B	180.00 (7.09)	180.00 (7.09)	180.00 (7.09)
C	14.00 (0.55)	14.00 (0.55)	14.00 (0.55)
D	23.50 (0.93)	21.00 (0.83)	21.00 (0.83)
E	50.00 (1.97)	50.00 (1.97)	53.50 (2.11)
(F)	104.00 (4.09)	129.00 (5.08)	160.00 (6.30)

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

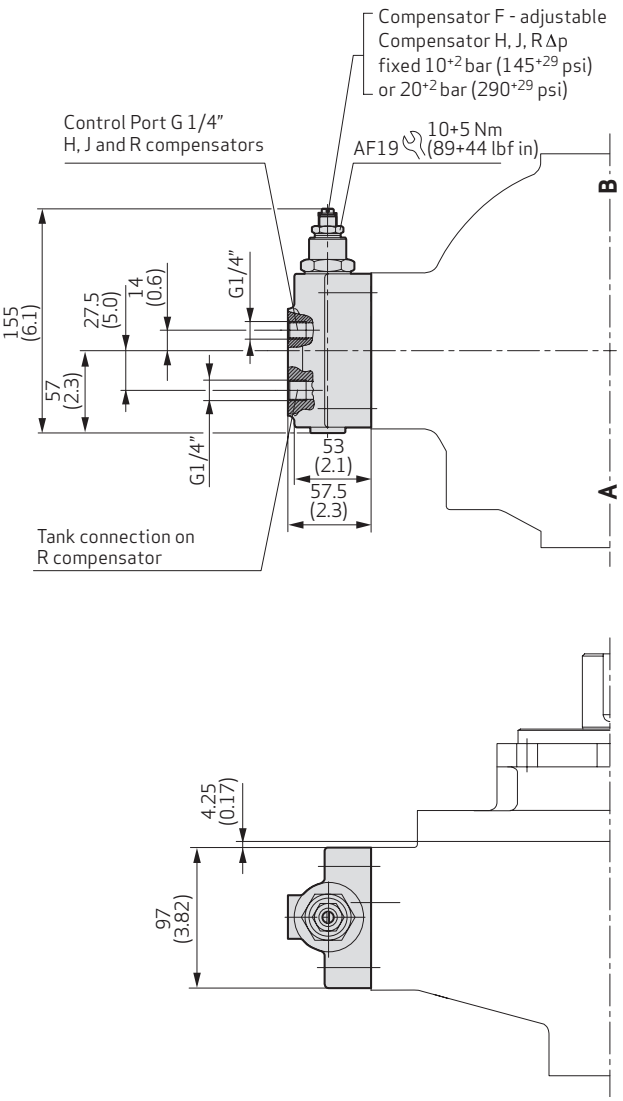
9. Compensators

Adjustable Pressure Compensator F1, F2
Remote Pressure Compensator H1
Combined Pressure and Flow Compensator J1, J2
Combined Pressure and Flow Compensator with P-T Control Notch R1

RKP 19/32/45



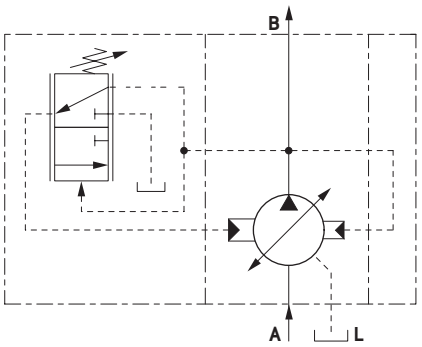
RKP 63/80/100

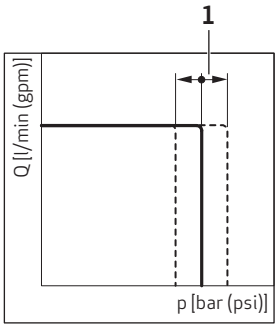


APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

9. Compensators

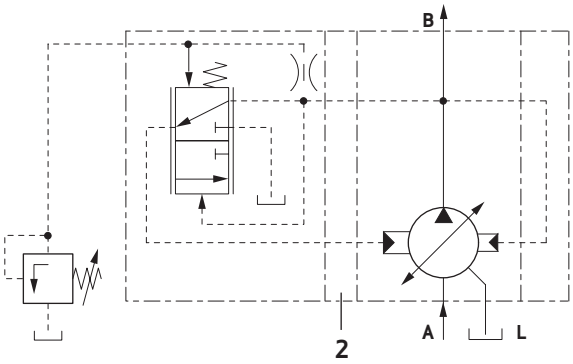
Adjustable Pressure Compensator F1, F2

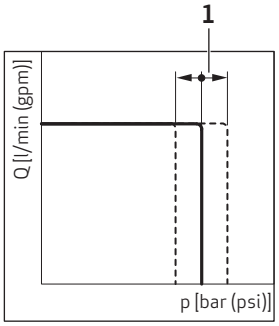




1 Screw adjustment

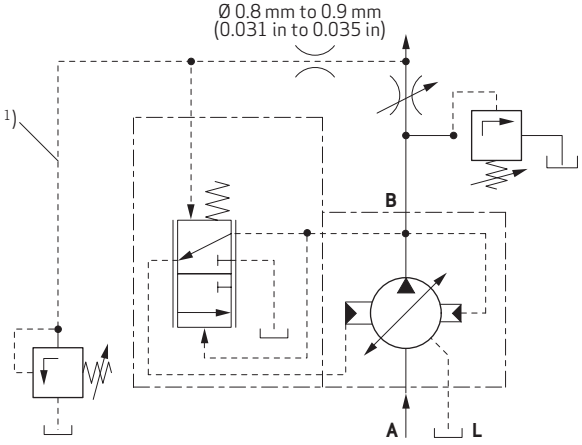
Remote Pressure Compensator H1



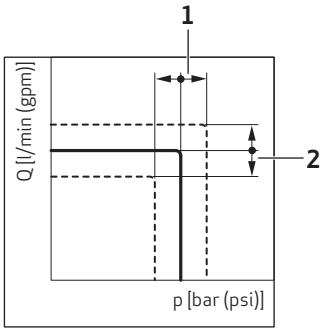


1 Set at pilot valve

Combined Pressure and Flow Compensator J1, J2



When high dynamics are required for flow control, adjust orifice and control line accordingly.



1 Set at pilot valve

2 Set at metering throttle

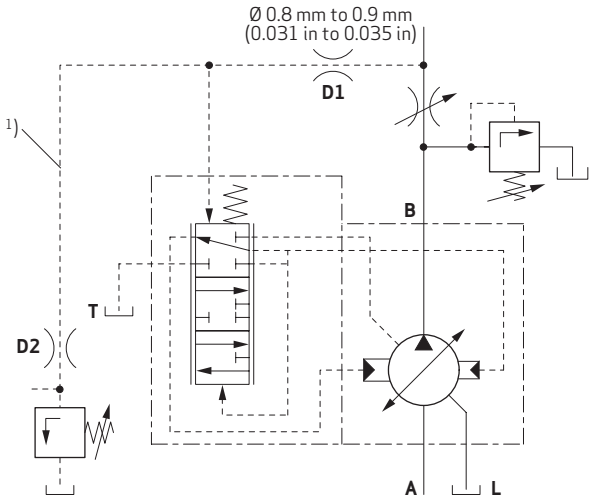
1) Hose recommendation for control line

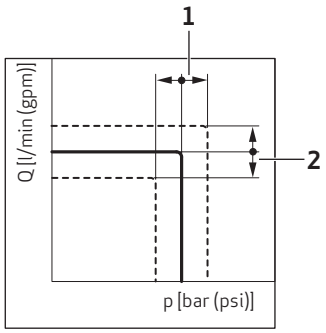
RKP 19	DN 6
RKP 32, RKP 45	DN 8
RKP 63, RKP 80, RKP 100	DN 10
l = 800 mm (31.50 in)	

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

9. Compensators

Combined Pressure and Flow Compensator with P-T Control Notch R1





1 Screw adjustment

2 Set at metering throttle

1) Hose recommendation for control line

		D1 [mm (in)]	D2 [mm (in)]
RKP 19 to 45	DN 6	0.9 (0.04)	1.2 (0.05)
RKP 63 to 100	DN 8	0.9 (0.04)	1.2 (0.05)
l = 800 mm (31.50 in)			

Notes on multiple pump circuits

In the case of multiple pumps, which deliver into one circuit, the P-T control notch may only be activated for the compensator of the first pump by connecting the T-connection to the tank. The T-connection of the compensators of add-on pumps must be sealed off.

Caution!

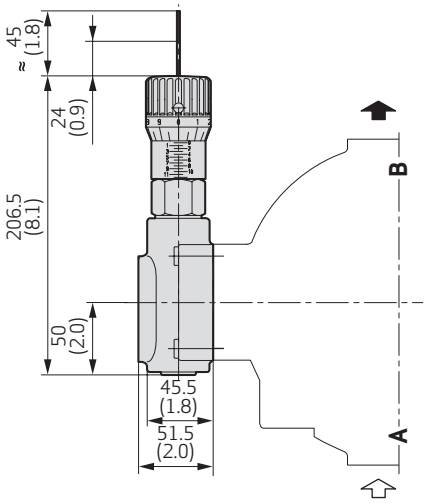
The tank line of the compensator must not be combined with the drain line of the pump.

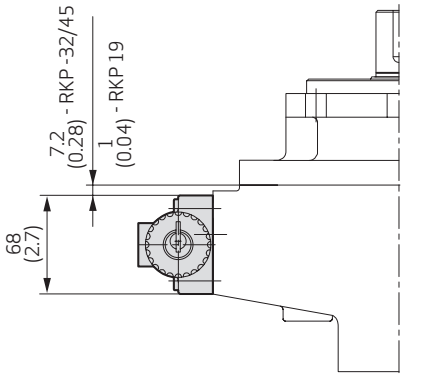
APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

9. Compensators

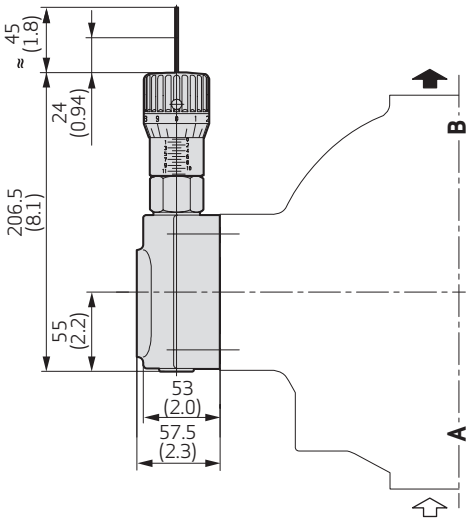
Adjustable Pressure Compensator, Lockable Knob with H Key G1, G2

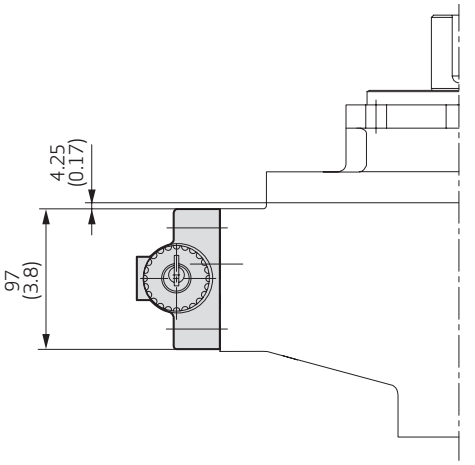
RKP 19/32/45





RKP 63/80/100



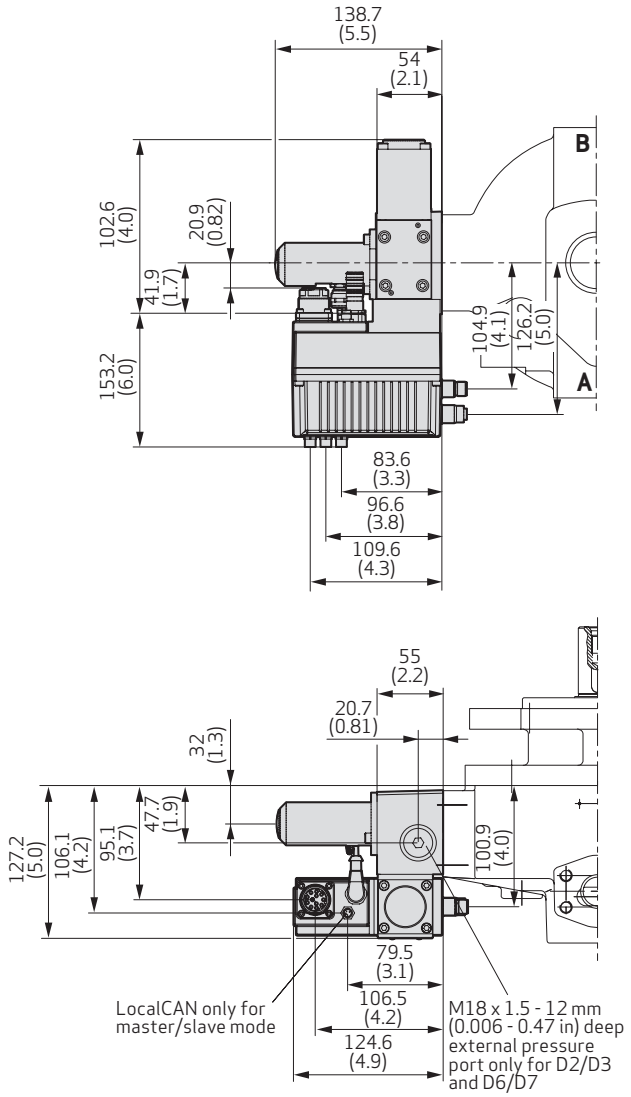


APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

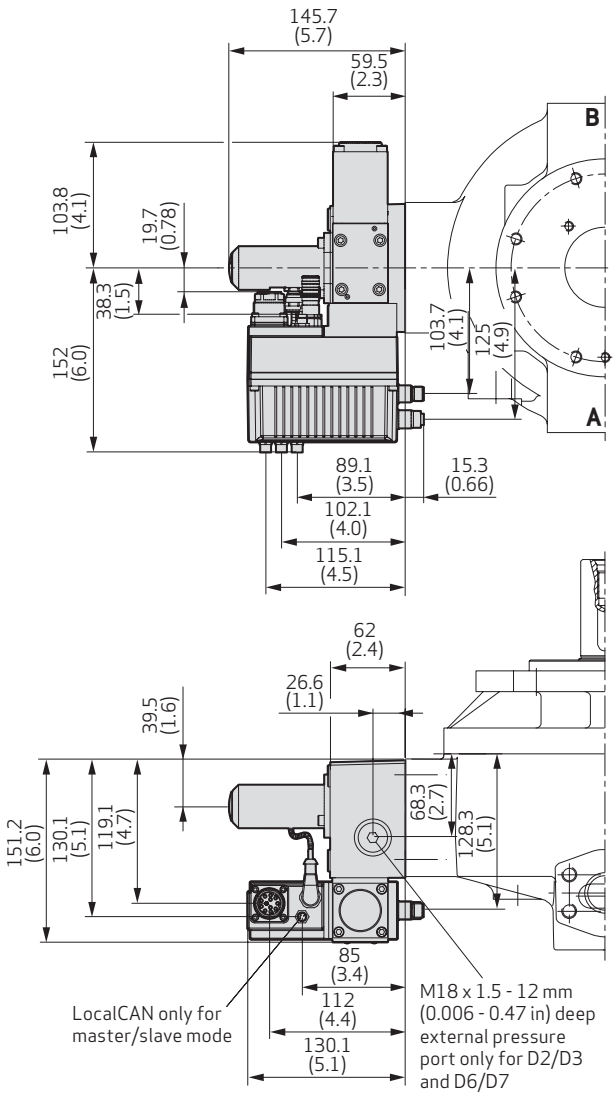
9. Compensators

Electro-Hydraulic Control with Digital On-Board Electronics D1 to D8

RKP 19/32/45



RKP 63/80/100

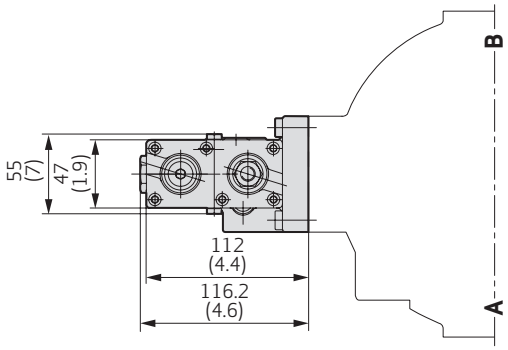


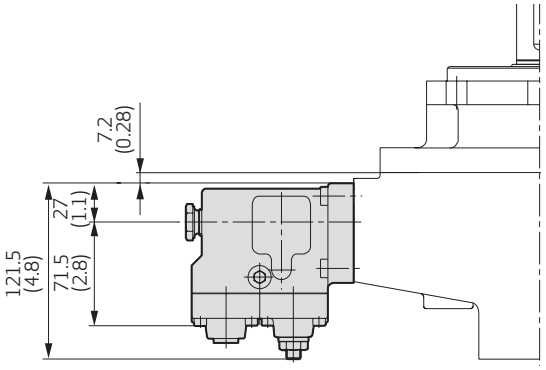
APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

9. Compensators

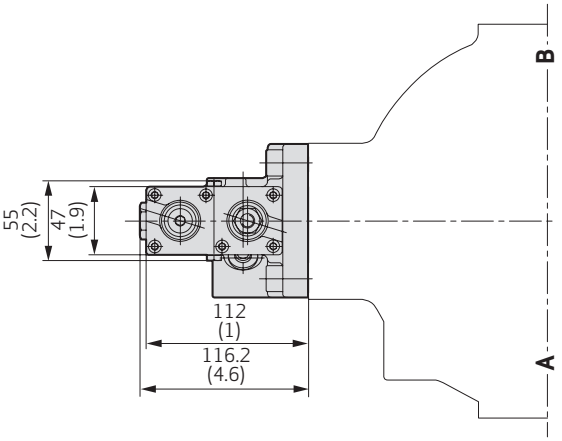
Constant Horsepower Control S1

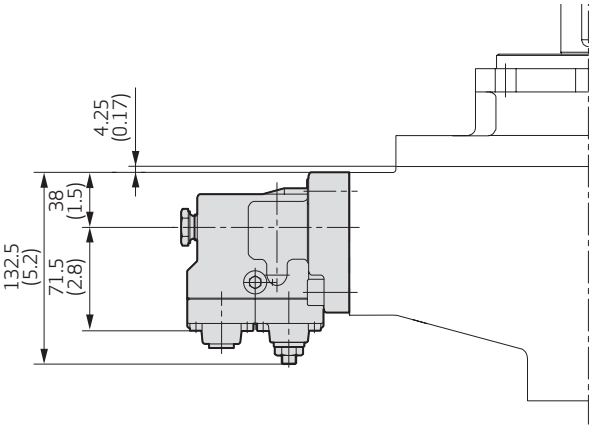
RKP 32

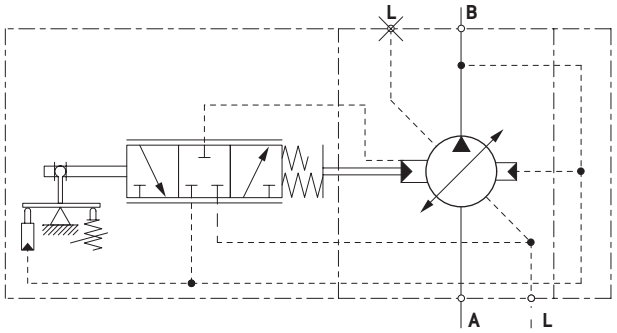


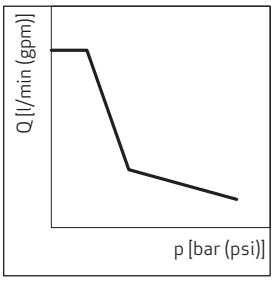


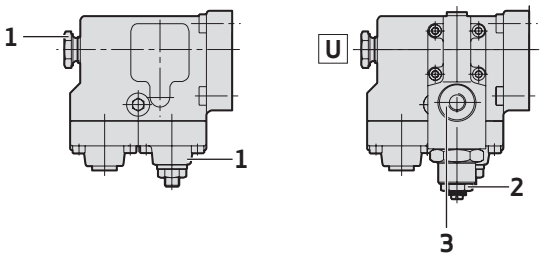
RKP 63/100











1 Horsepower adjustment (set at factory, do not change)

2 Set at factory ($\Delta p = 10^{+2}$ bar (145^{+29} psi))

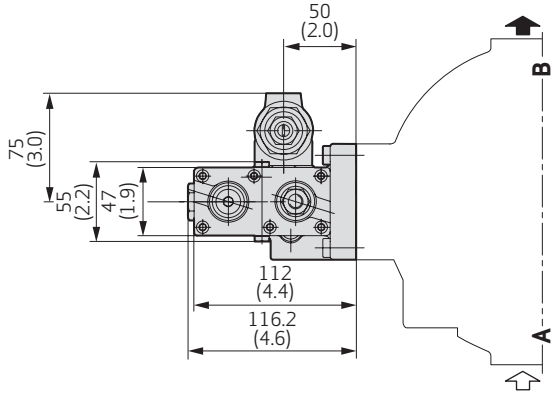
3 Control port
For control line information,
see H and J controller details.

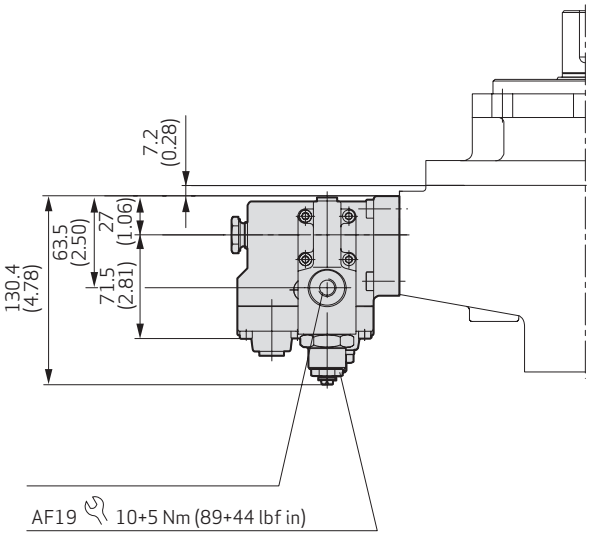
APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

9. Compensators

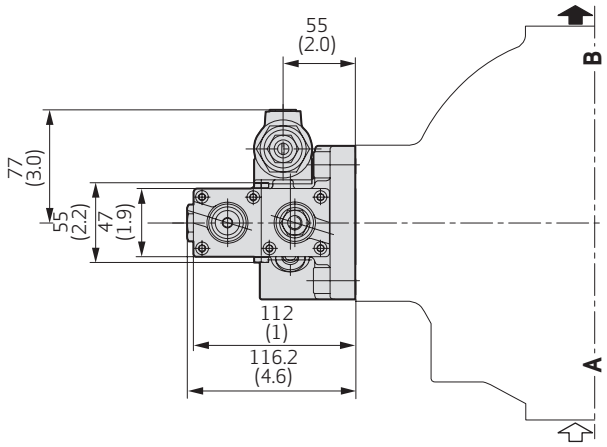
Constant Horsepower Control with Remote Pressure and Flow Control S2

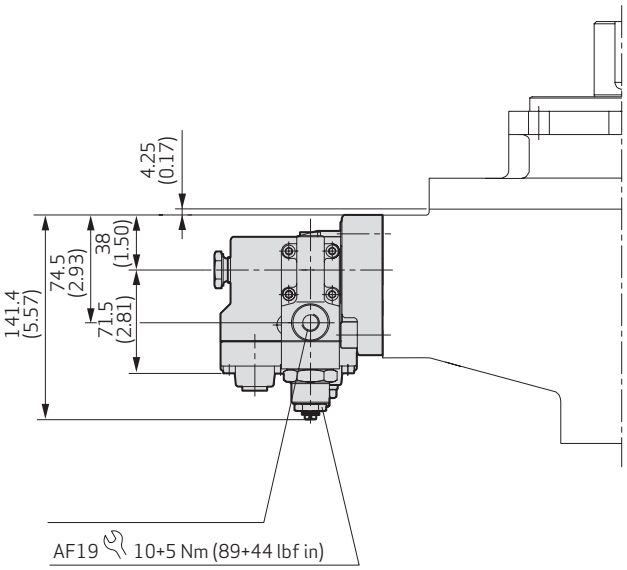
RKP 32

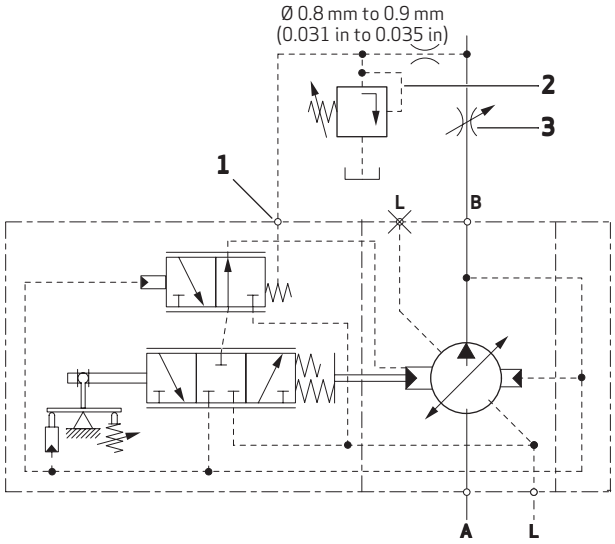


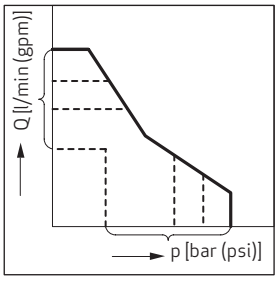


RKP 63/100









1 Control port

2 p Adjustment

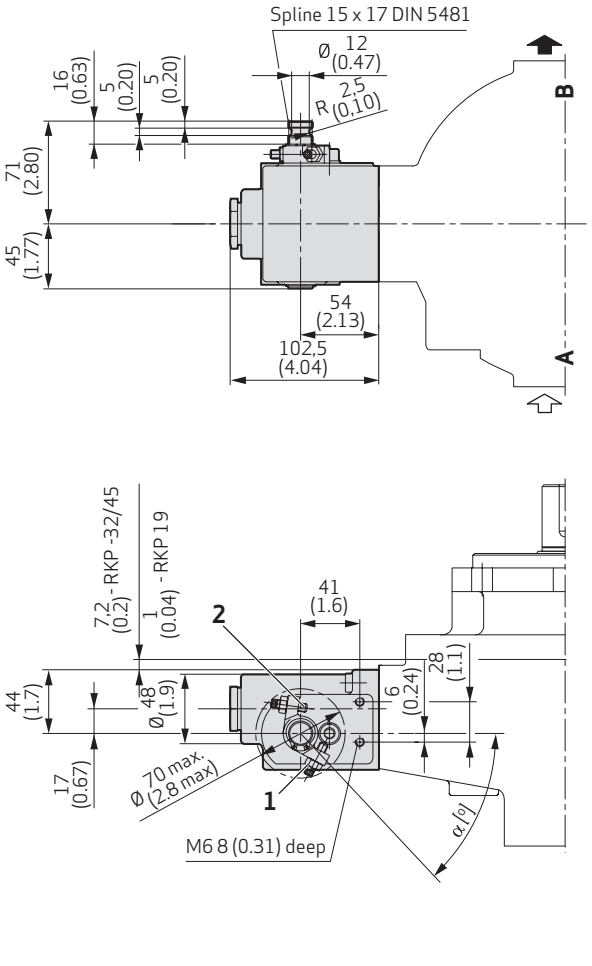
3 Q Adjustment

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

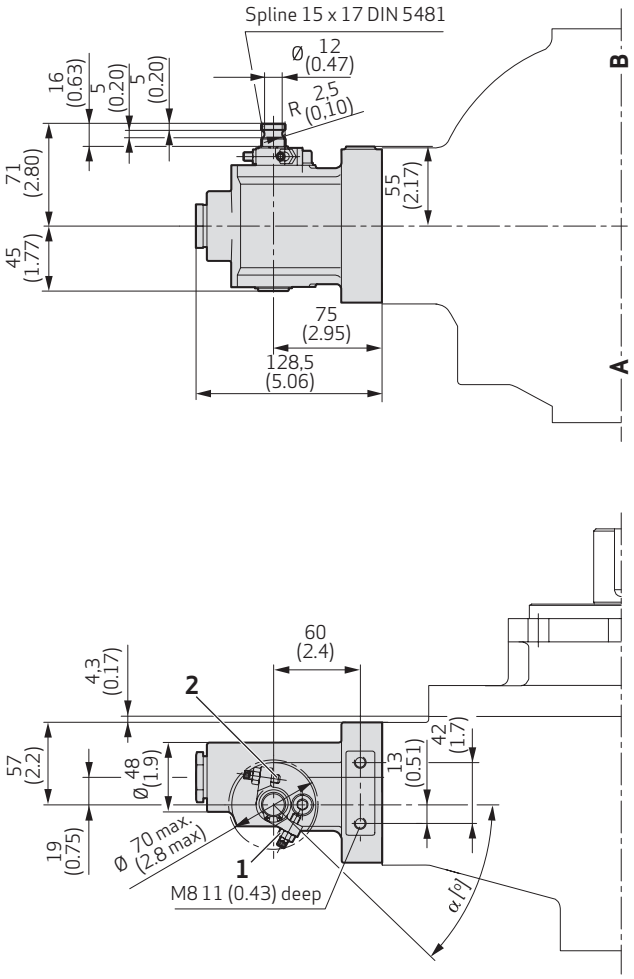
9. Compensators

Servo Control C1

RKP 19/32/45



RKP 63/80/100



	V [cm³/rev]	19	32	45	63	80	100
	α [°]	44	47	57	44	56	56
Torque M [Nm (lbf in)]	**Zero position**	1.2 (11)			1.6 (14)		
	End position	1.6 (14)	1.7 (15)		2.4 (21)	2.6 (23)	2.6 (23)
	Maximum	8 (71)					

1 Zero stroke stop (set at factory)

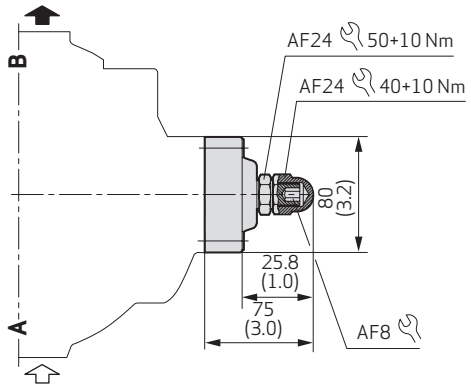
2 End stop / $\pm V_{maximum}$ (set at factory)

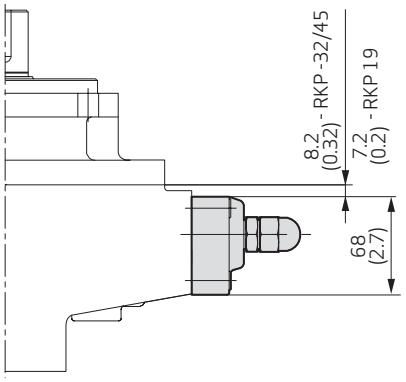
APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

9. Compensators

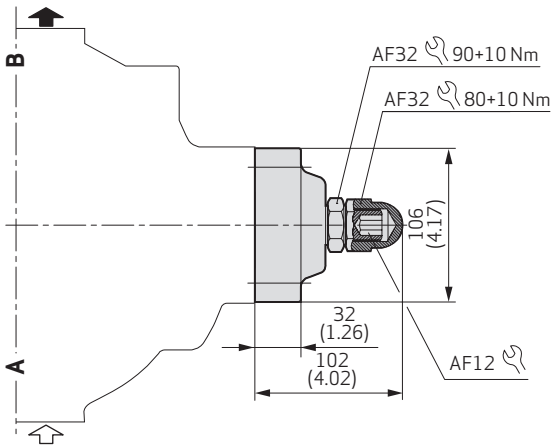
Maximum Flow Limiter Y

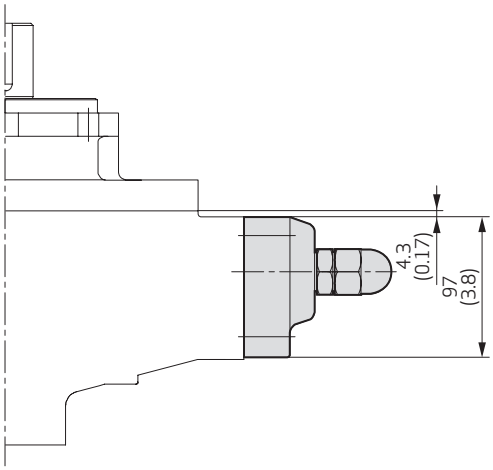
RKP 19/32/45





RKP 63/80/100





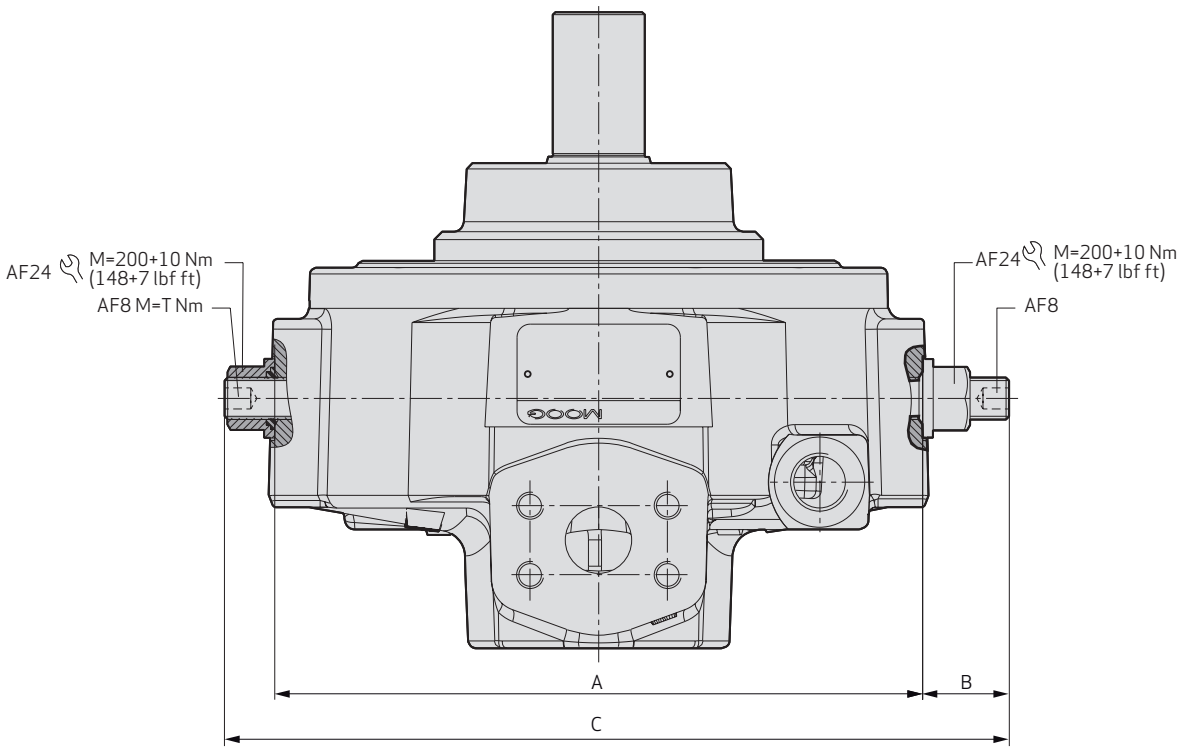
	RKP 19	RKP 32	RKP 45	RKP 63/80	RKP 100
ΔV [cm³/rev] for 1 mm (0.04 in) travel of adjusting screw (pitch 1.5 mm/rev (0.06 in/rev))	3.6	5.5	6.4	8.8	11.2

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

9. Compensators

Mechanical Stroke Adjustment B1

RKP 19 - 100



	RKP 19	RKP 32	RKP 45	RKP 63	RKP 80	RKP 100
A [mm (in)]	212 (7.95)	246 (9.69)	246 (9.69)	312 (12.28)	312 (12.28)	312 (12.28)
B [mm (in)]	32.9 (1.30)	31.8 (1.25)	33.0 (1.30)	40.8 (1.61)	42.7 (1.68)	42.5 (1.67)
C [mm (in)]	267 (10.51)	298 (11.73)	298 (11.73)	379 (14.92)	379 (14.92)	379 (14.92)
T [Nm (lbf in)]	15+5 (133+44)	15+5 (133+44)	15+5 (133+44)	26+4 (230+35)	26+4 (230+35)	26+4 (230+35)
ΔV [cm^3/rev] for 1 mm (0.04 in) travel of adjusting screw (pitch 1.5 mm/rev (0.06 in/rev))	3.6	5.5	6.4	8.8	8.8	11.2

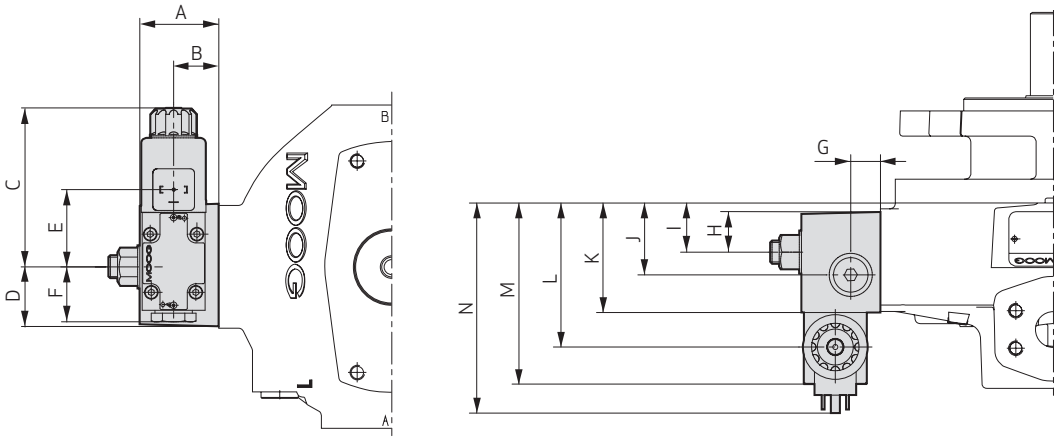
Important

When adjusting for the required delivery, ensure that the stroke ring remains held between the two adjusting screws. When delivered, the pump is set to $V_{maximum}$.

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

9. Compensators

Dual-displacement N1



[mm (in)]	RKP 19	RKP 32	RKP 45	RKP 63	RKP 80	RKP 100
A	55 (2.17)	55 (2.17)	55 (2.17)	64 (2.52)	64 (2.52)	64 (2.52)
B	31 (1.22)	31 (1.22)	31 (1.22)	37 (1.46)	37 (1.46)	37 (1.46)
C	111 (4.37)	111 (4.37)	111 (4.37)	111 (4.37)	111 (4.37)	111 (4.37)
D	41 (1.61)	41 (1.61)	41 (1.61)	53 (2.09)	53 (2.09)	53 (2.09)
E	54 (2.13)	54 (2.13)	54 (2.13)	54 (2.13)	54 (2.13)	54 (2.13)
F	38 (1.50)	38 (1.50)	38 (1.50)	38 (1.50)	38 (1.50)	38 (1.50)
G	21 (0.83)	21 (0.83)	21 (0.83)	27 (1.06)	27 (1.06)	27 (1.06)
H	28 (1.10)	28 (1.10)	28 (1.10)	38 (1.50)	38 (1.50)	38 (1.50)
I	28 (1.10)	34 (1.34)	34 (1.34)	42 (1.65)	42 (1.65)	42 (1.65)
J	44 (1.73)	50 (1.97)	50 (1.97)	68 (2.68)	68 (2.68)	68 (2.68)
K	70 (2.76)	76 (2.99)	76 (2.99)	101 (3.98)	101 (3.98)	101 (3.98)
L	94 (3.70)	100 (3.94)	100 (3.94)	125 (4.92)	125 (4.92)	125 (4.92)
M	120 (4.72)	126 (4.96)	126 (4.96)	151 (5.94)	151 (5.94)	151 (5.94)
N	140 (5.51)	146 (5.75)	146 (5.75)	171 (6.73)	171 (6.73)	171 (6.73)

APPENDIX B – TECHNICAL DRAWINGS RKP 19 TO 100

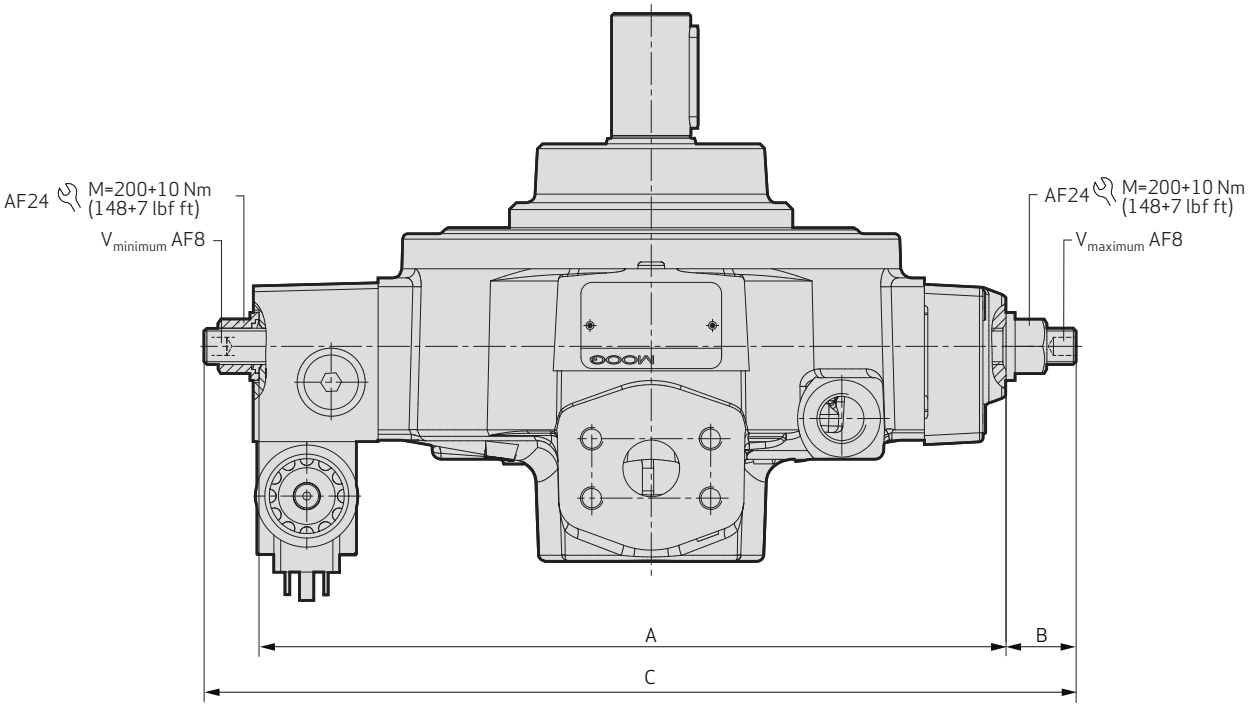
9. Compensators

Dual-displacement N1

Adjusting screw dimension $V_{minimum}$ and $V_{maximum}$

Illustrated setting:

Adjusting screw $V_{maximum}$ = 100 % displacement volume
Adjusting screw $V_{minimum}$ = 50 % displacement volume

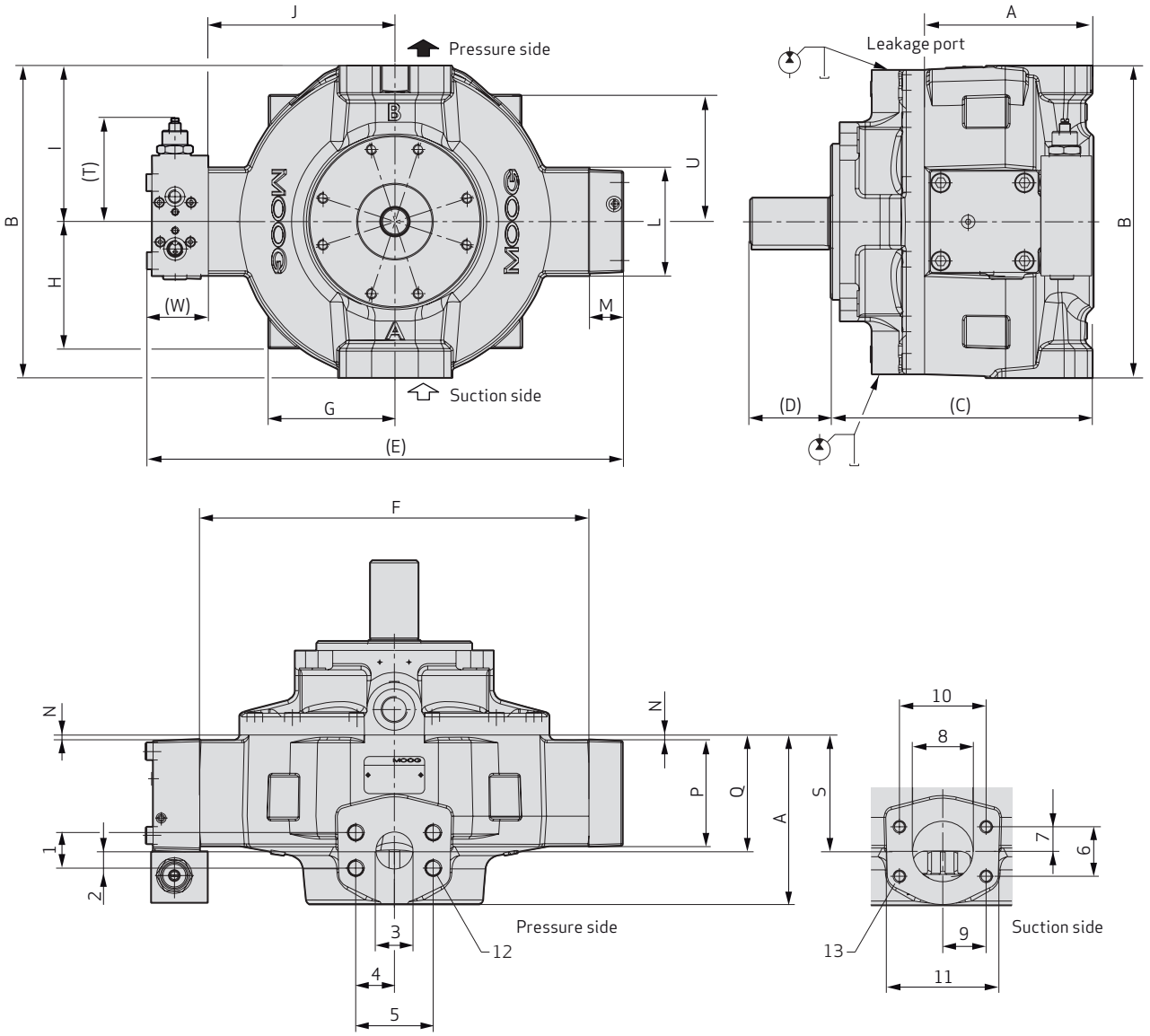


	RKP 19	RKP 32	RKP 45	RKP 63	RKP 80	RKP 100
A [mm (in)]	301 (11.85)	329 (12.95)	329 (12.95)	421 (16.95)	421 (16.95)	421 (16.95)
B [mm (in)]	29 (1.14)	30 (1.18)	31 (1.22)	38 (1.50)	40 (1.57)	40 (1.57)
C [mm (in)]	357 (14.06)	384 (15.12)	384 (15.12)	481 (18.94)	485 (19.09)	485 (19.09)
ΔV [cm³/rev] for 1 mm (0.04 in) travel of adjusting screw (pitch 1.5 mm/rev (0.06 in/rev))	3.6	5.5	6.4	8.8	8.8	11.2

APPENDIX C – TECHNICAL DRAWINGS RKP 140

1. Housings

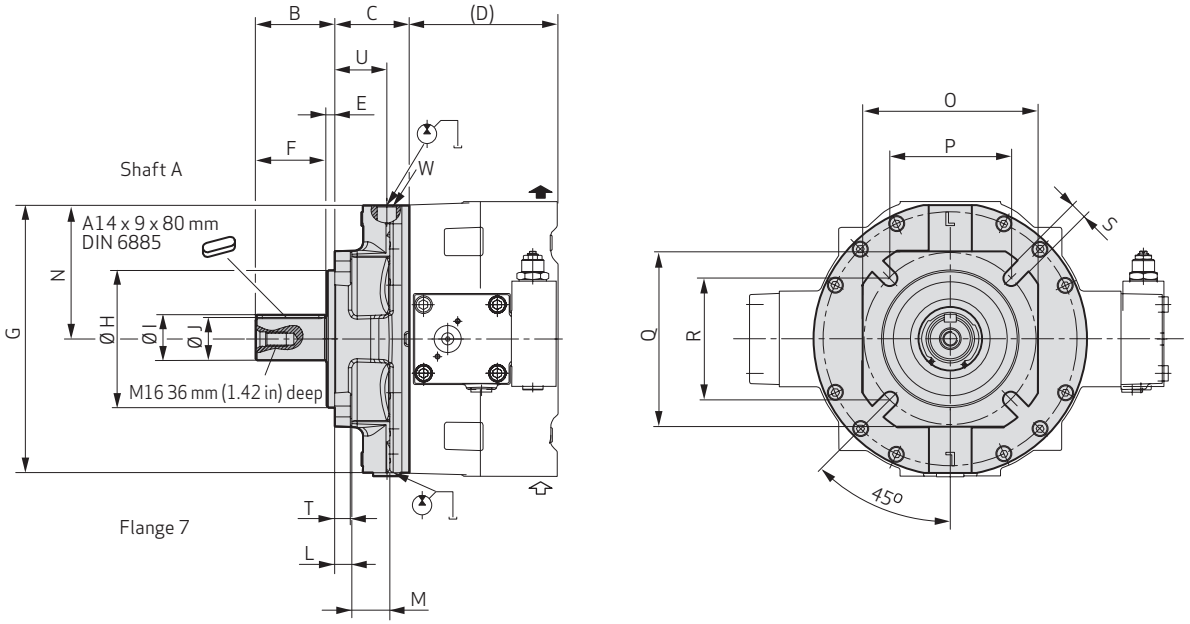
RKP 140 with Flange A7 and Compensator R1



[mm (in)]	A	B	(C)	(D)	(E)	F	G	H	I	J	K	L
	173.5 (6.83)	320.0 (12.60)	260.3 (10.25) 1)	92.4 (3.64) 1)	483.2 (19.04)	398.4 (15.70)	130.0 (5.12)	130.0 (5.12)	160.0 (6.30)	199.2 (7.85)	-	112.0 (4.41)
	M	**N**	**O**	**P**	**Q**	**(R)**	**S**	**(T)**	**U**	**V**	**(W)**	
	34.8 (1.37)	5.0 (0.20)	-	109.4 (4.31)	118.0 (4.65)	-	118.0 (4.65)	105.6 (4.16) 2)	130.0 (5.12)	-	63.0 (2.45)	
	1	**2**	**3**				**4**	**5**	**6**	**7**		
	36.5 (1.44)	18.25 (0.72)	38.0 (1.50) Pressure port SAE 1 1/2" - 6,000 psi				39.65 (1.56)	79.3 (3.12)	50.8 (2.00)	25.4 (1.00)		
	8			**9**	**10**	**11**	**12**			**13**		
	62.0 (2.44) Suction port SAE 2 1/2" - 3,000 psi			44.45 (1.75)	88..9 (3.50)	115.0 (4.53)	M16 25.5 mm (1.00 in) deep			M12 22 mm (0.87 in) deep		

APPENDIX C – TECHNICAL DRAWINGS RKP 140

2. Drive Flange A7

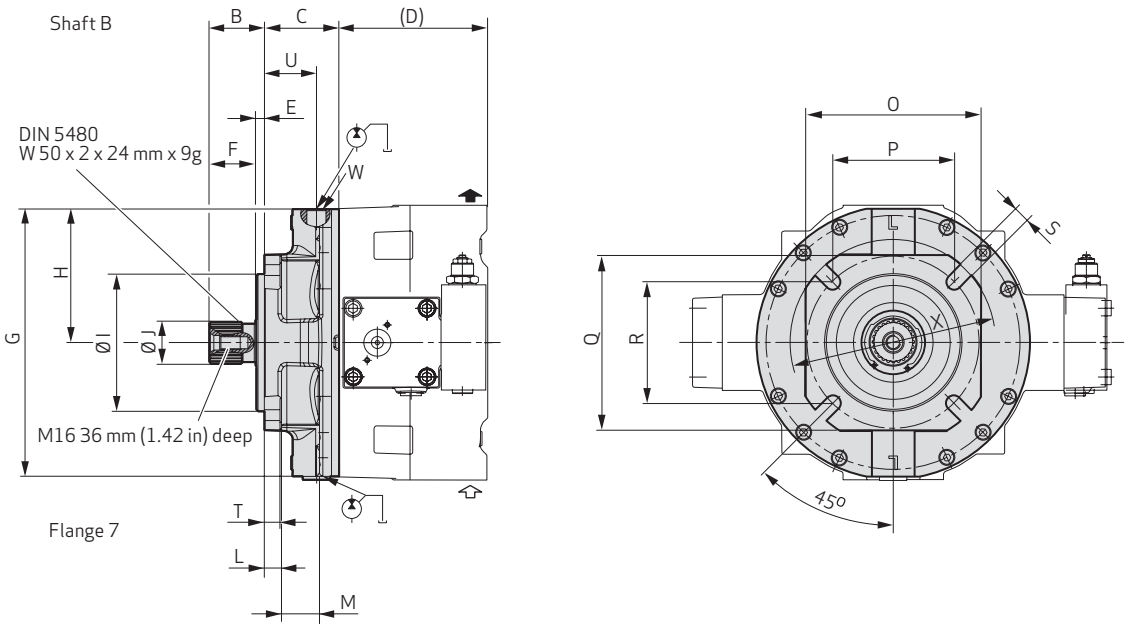


[mm (in)]	B	C	(D)	E	F	G	ØH		I	ØJ	L
	92.4 (3.64)	86.8 (3.42)	173.5 (6.83)	9.3 (0.37)	82.0 (3.23)	312.0 (12.28)	$160^{-0.043}_{-0.106}$ ($6.30^{-0.020}_{-0.004}$)		53.5 (2.11)	$50.0^{-0.018}_{-0.002}$ ($1.97^{-0.001}_{-0.001}$)	20.0 (0.79)
	M	**N**	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**W**	
	44.2 (1.74)	155.5 (6.12)	204.0 (8.03)	141.4 (5.57)	204.0 (8.03)	141.4 (5.57)	18.0 (0.71)	18.0 (0.71)	60.7 (2.39)	M26 x 1.5 – 17 mm (0.06 – 0.67 in) deep	

Key to DIN 6885
ISO mounting flange to ISO 3019-2 (metric dimensions)

APPENDIX C – TECHNICAL DRAWINGS RKP 140

3. Drive Flange B7

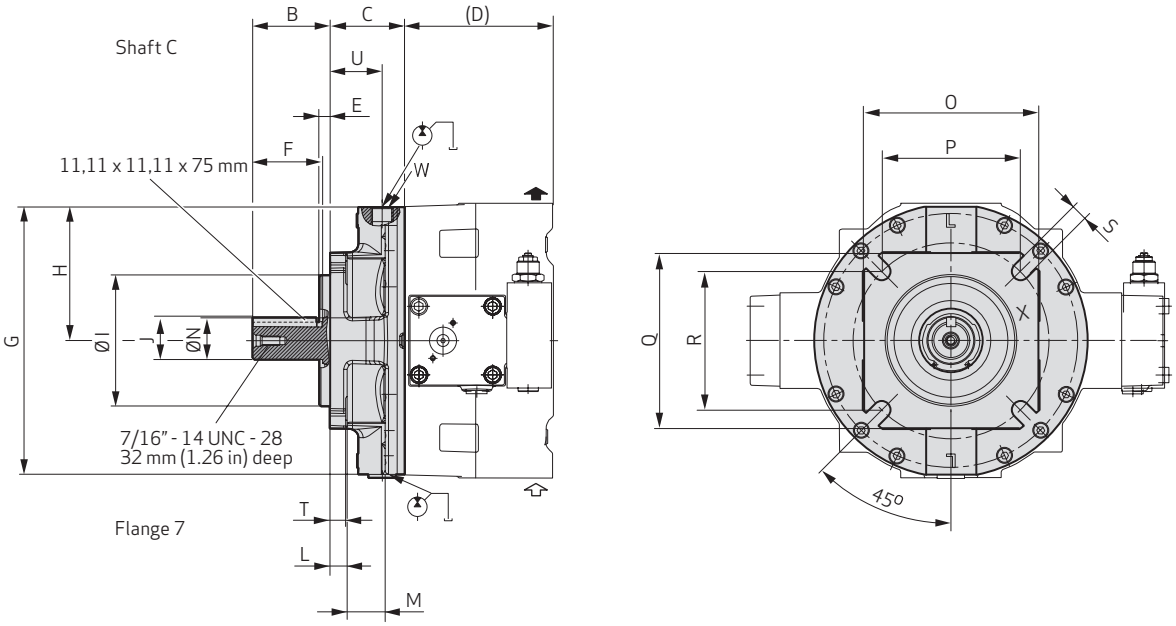


[mm (in)]	B	C	(D)	E	F	G	H	ØI	ØJ	L
	64.4 (2.54)	86.8 (3.42)	173.5 (6.83)	9.3 (0.37)	54.0 (2.13)	312.0 (12.28)	155.5 (6.12)	$160.0^{-0.043}_{-0.106}$ ($6.30^{-0.002}_{-0.004}$)	$49.6^{0}_{-0.16}$ ($1.95^{0}_{-0.006}$)	20.0 (0.79)
	M	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**W**	
	44.2 (1.74)	204.0 (8.03)	141.4 (5.57)	204.0 (8.03)	141.4 (5.57)	18.0 (0.71)	18.0 (0.71)	60.7 (2.39)	M26 x 1.5 – 17 mm (0.06 – 0.67 in) deep	

Involute spline to DIN 5480 (for RKP mounting obligatory)
ISO mounting flange to ISO 3019-2 (metric dimensions)

APPENDIX C – TECHNICAL DRAWINGS RKP 140

4. Drive Flange C3

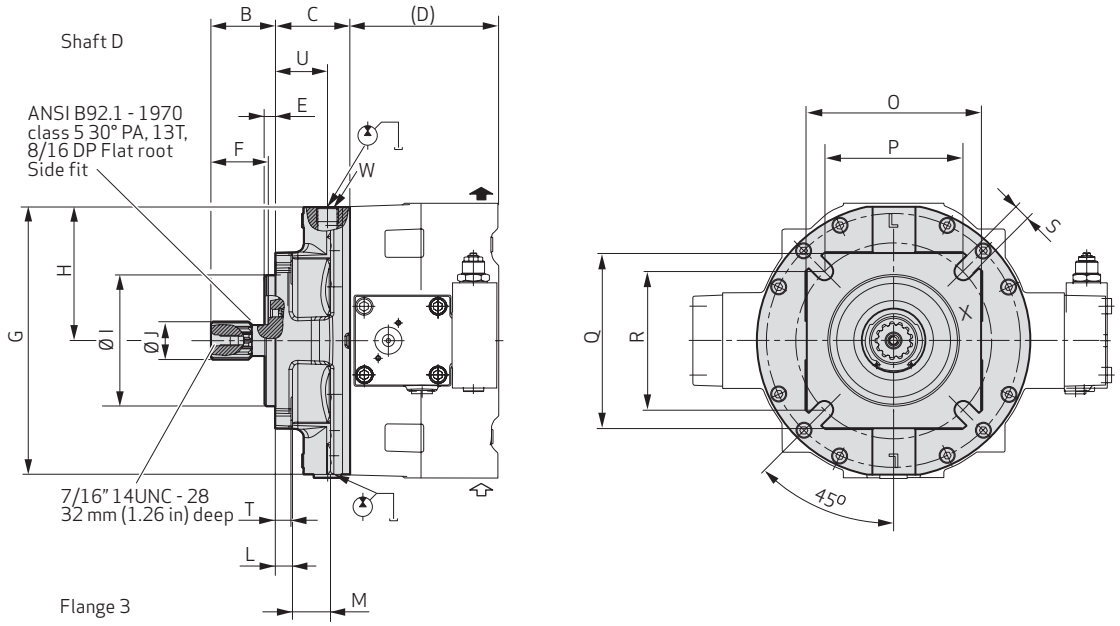


[mm (in)]	B	C	(D)	E	F	G	H	ØI		J	L
	90.4 (3.56)	86.8 (3.42)	173.5 (6.83)	12.7 (0.50)	82.0 (3.23)	312.0 (12.28)	155.5 (6.12)	152.4 $^{0}_{-0.05}$ ($6.0\,^{0}_{-0.002}$)		49.3 (1.94)	20.0 (0.79)
	M	**ØN**		**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**W**
	44.2 (1.74)	44.45 $^{0}_{-0.05}$ ($1.75\,^{0}_{-0.002}$)		204.0 (8.03)	161.6 (6.36)	204.0 (8.03)	161.6 (6.36)	20.5 (0.81)	18.0 (0.71)	60.7 (2.39)	M26 x 1.5 – 17 mm (0.06 – 0.67 in) deep

Key to SAE Standard
SAE mounting flange to ISO 3019-1 (imperial dimensions)

APPENDIX C – TECHNICAL DRAWINGS RKP 140

5. Drive Flange D3

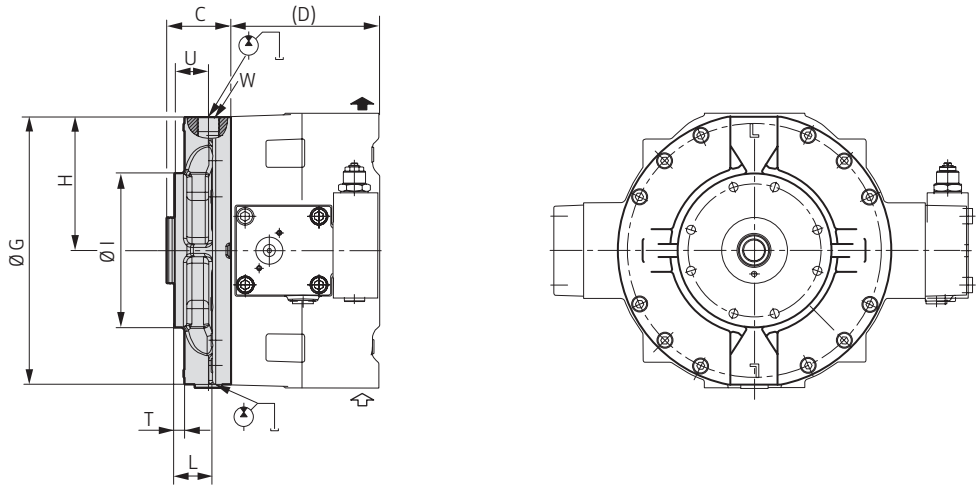


[mm (in)]	B	C	(D)	E	F	G	H	ØI	ØJ	L
	75.4 (2.97)	86.8 (3.42)	173.5 (6.83)	12.7 (0.50)	67.0 (2.64)	312.0 (12.28)	155.5 (6.12)	152.4 $^{0}_{-0.05}$ (6.0 $^{0}_{-0.002}$)	44.45 $^{0}_{-0.25}$ (1.75 $^{0}_{-0.002}$)	20.0 (0.79)
	M	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**W**	
	44.2 (1.74)	204.0 (8.03)	161.6 (6.36)	204.0 (8.03)	161.6 (6.36)	20.5 (0.81)	18.0 (0.71)	60.7 (2.39)	M26 x 1.5 – 17 mm (0.06 – 0.67 in) deep	

Involute spline to SAE 744 C (for RKP mounting obligatory)
SAE mounting flange to ISO 3019-1 (imperial dimensions)

APPENDIX C – TECHNICAL DRAWINGS RKP 140

6. Intermediate Drive Flange RKP 140 - 140

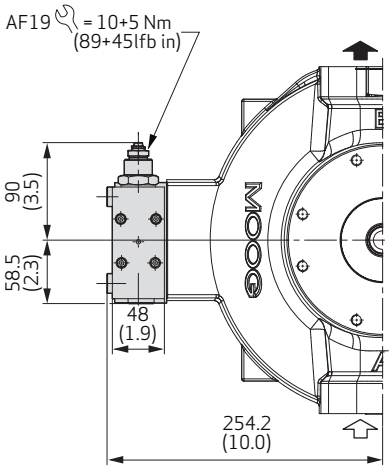


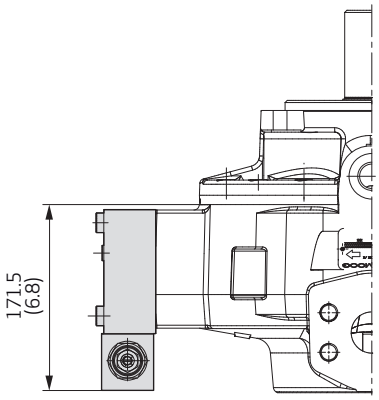
[mm (in)]	C	(D)	ØG	H	ØI	L	N	T	U	V	W
	65.8 (2.59)	173.5 (6.83)	312.0 (12.28)	155.5 (6.12)	180.0 (7.09)	44.2 (1.56)	488.2 (19.22)	11.7 (0.46)	39.7 (1.74)	320.0 (12.60)	M26 x 1.5 – 17 mm (0.06 – 0.67 in) deep

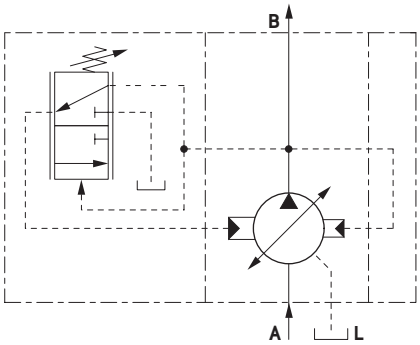
APPENDIX C – TECHNICAL DRAWINGS RKP 140

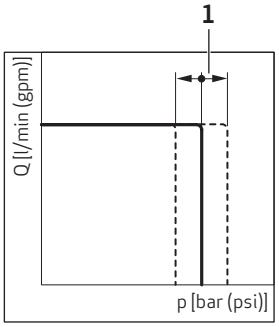
7. Compensators

Adjustable Pressure Compensator F1, F2







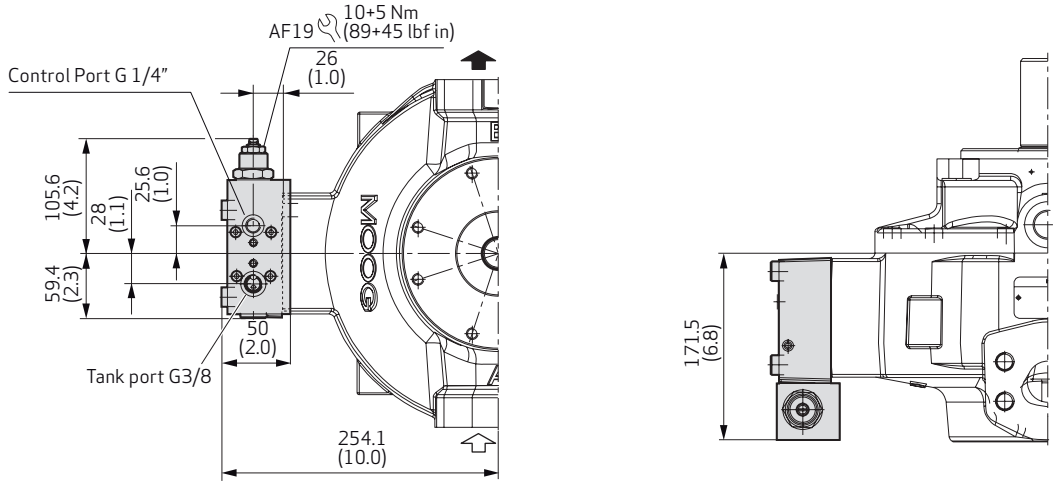


1 Screw adjustment

APPENDIX C – TECHNICAL DRAWINGS RKP 140

7. Compensators

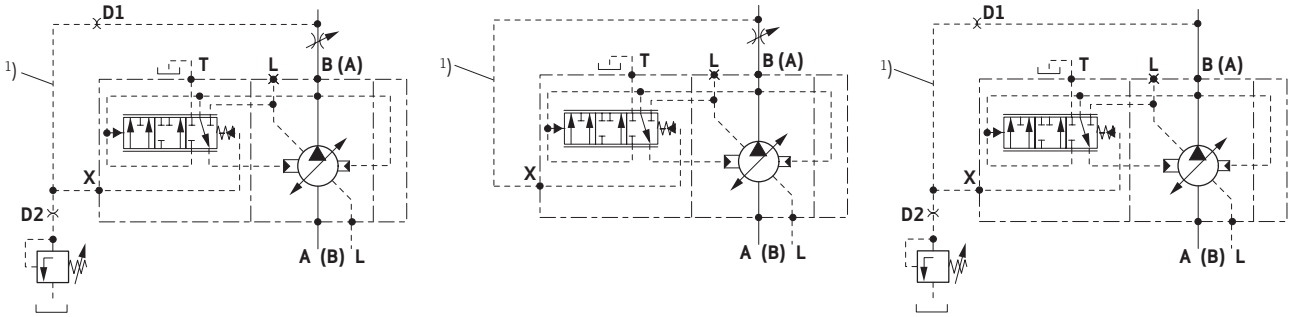
Combined Pressure and Flow Compensator „Loading Sensing" with P-T Control Notch R1



Caution!

The tank line of the compensator must not be combined with the drain line of the pump.

Following circuits are illustrated:



Load sensing

Flow control

Pressure control

[1] Hose recommendation for control line

		D1 [mm (in)]	D2 [mm (in)]
RKP 140	DN 8	0.8 (0.03)	1.1 (0.04)
l = 800 mm (31.50 in)			

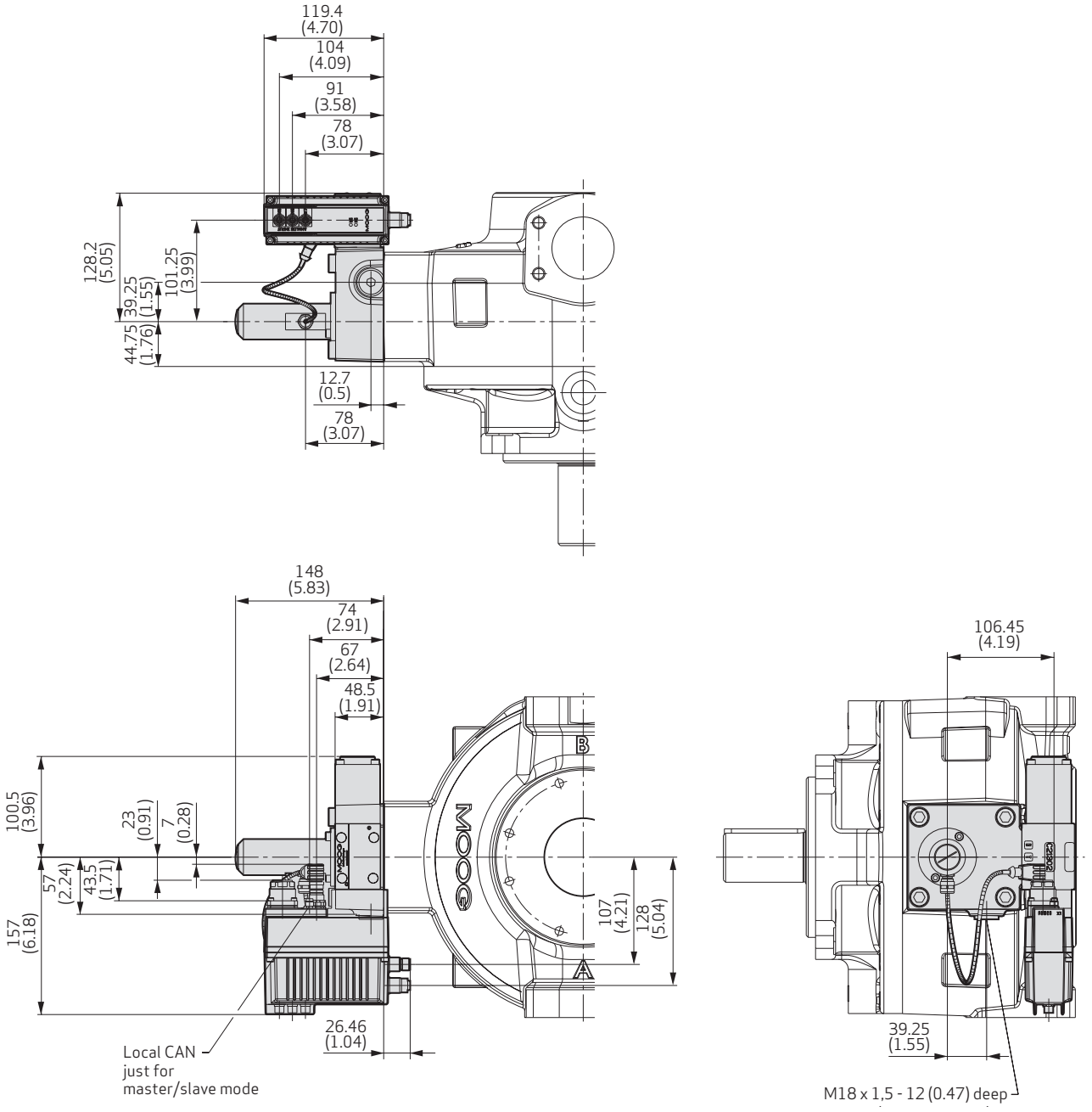
Notes on multiple pump circuits

In the case of multiple pumps, which deliver into one circuit, the P-T control notch may only be activated for the compensator of the first pump by connecting the T-connection to the tank. The T-connection of the compensators of add-on pumps must be plugged.

APPENDIX C – TECHNICAL DRAWINGS RKP 140

7. Compensators

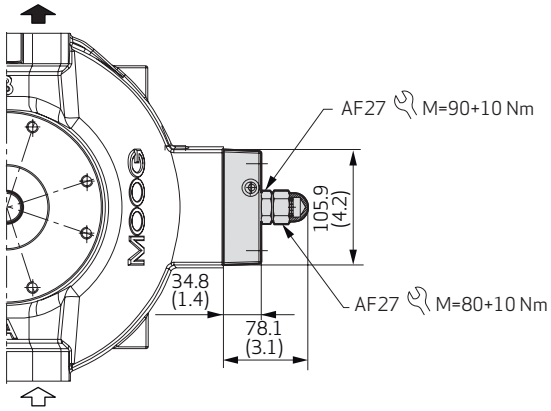
Electro-Hydraulic Control with Digital On-Board Electronics D1 to D8

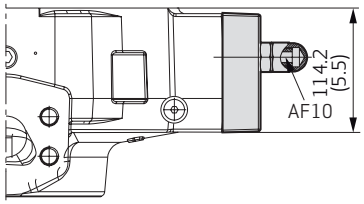


APPENDIX C – TECHNICAL DRAWINGS RKP 140

7. Compensators

Maximum Flow Limiter Y



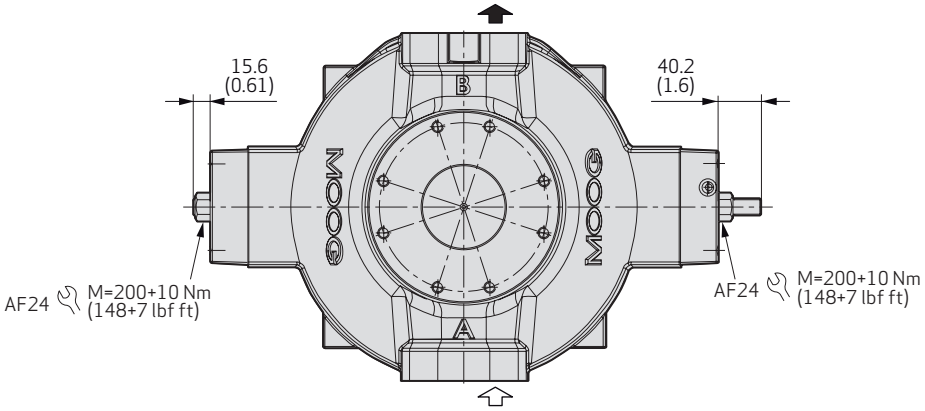


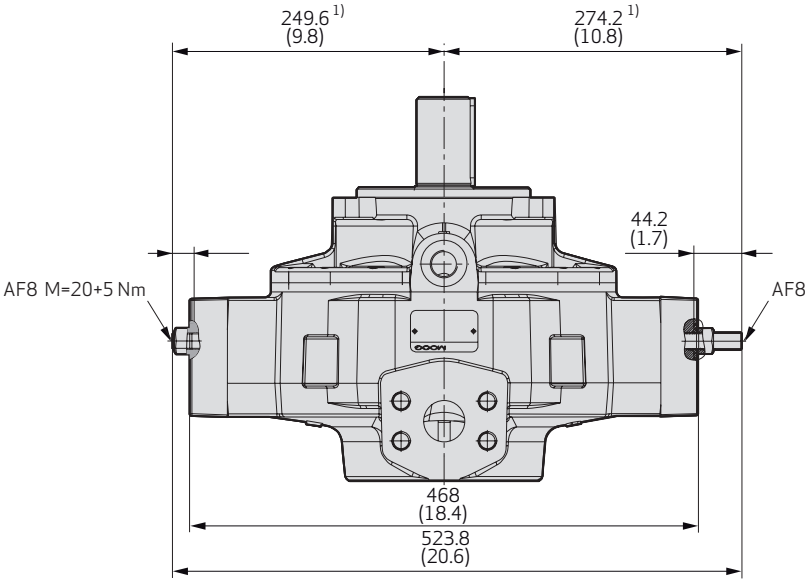
	RKP 140
ΔV [cm³/rev] for 1 mm (0.04 in) travel of adjusting screw (pitch 1.5 mm/rev (0.06 in/rev))	11.4

APPENDIX C – TECHNICAL DRAWINGS RKP 140

7. Compensators

Mechanical Stroke Adjustment B



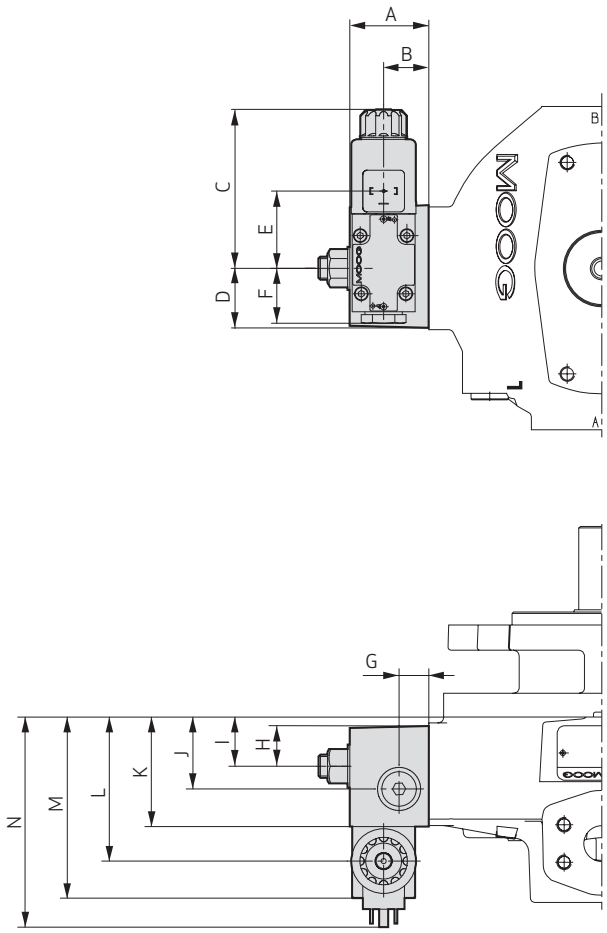


	RKP 140
ΔV [cm³/rev] for 1 mm (0.04 in) travel of adjusting screw (pitch 1.5 mm/rev (0.06 in/rev))	11.4

APPENDIX C – TECHNICAL DRAWINGS RKP 140

7. Compensators

Dual-displacement N1



[mm (in)]	RKP 140
A	55 (2.17)
B	26 (1.02)
C	107 (4.21)
D	62 (2.44)
E	51 (2.01)
F	42 (1.65)
G	13 (0.51)
H	40 (1.57)
I	45 (1.77)
J	84 (3.31)
K	119 (4.69)
L	143 (5.63)
M	169 (6.65)
N	189 (7.44)

APPENDIX C – TECHNICAL DRAWINGS RKP 140

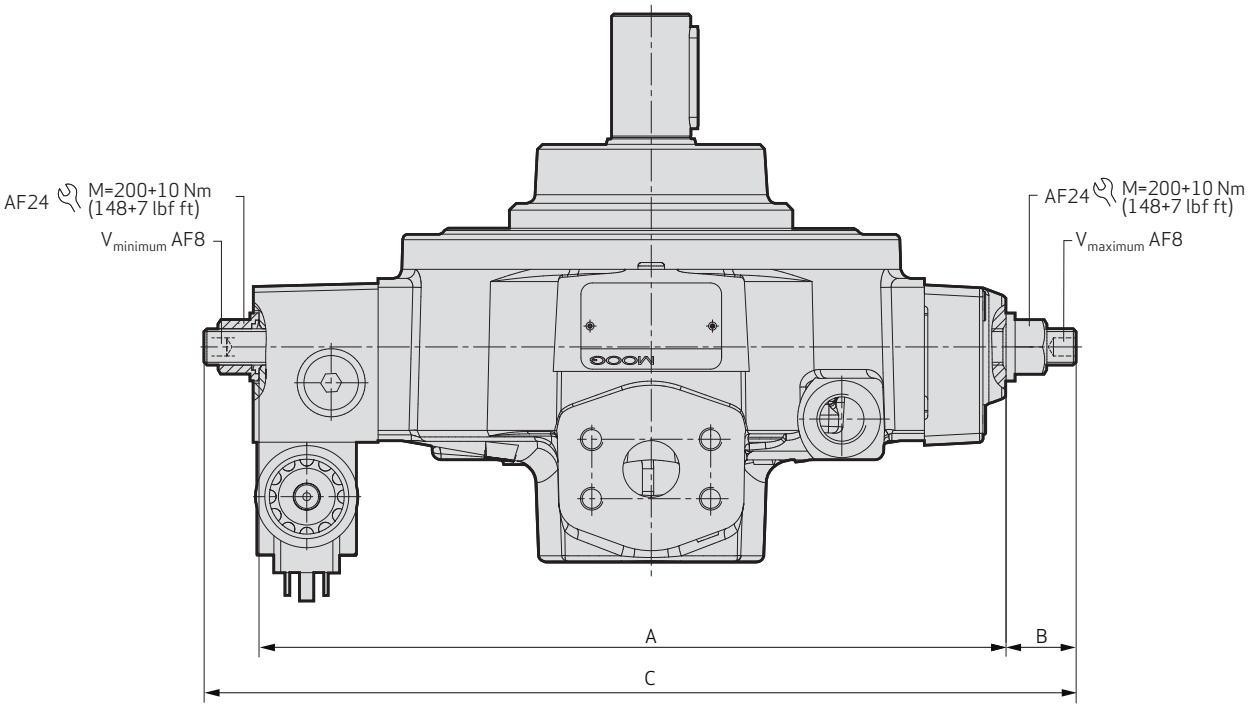
7. Compensators

Dual-displacement N1

Adjusting screw dimension $V_{minimum}$ and $V_{maximum}$

Illustrated setting:

Adjusting screw $V_{maximum}$ = 100% displacement volume
Adjusting screw $V_{minimum}$ = 50% displacement volume



	RKP 140
A [mm (in)]	477 (18.78)
B [mm (in)]	35 (1.38)
C [mm (in)]	543 (21.38)
ΔV [cm³/rev] for 1 mm (0.04 in) travel of adjusting screw (pitch 1.5 mm/rev (0.06 in/rev))	11.4

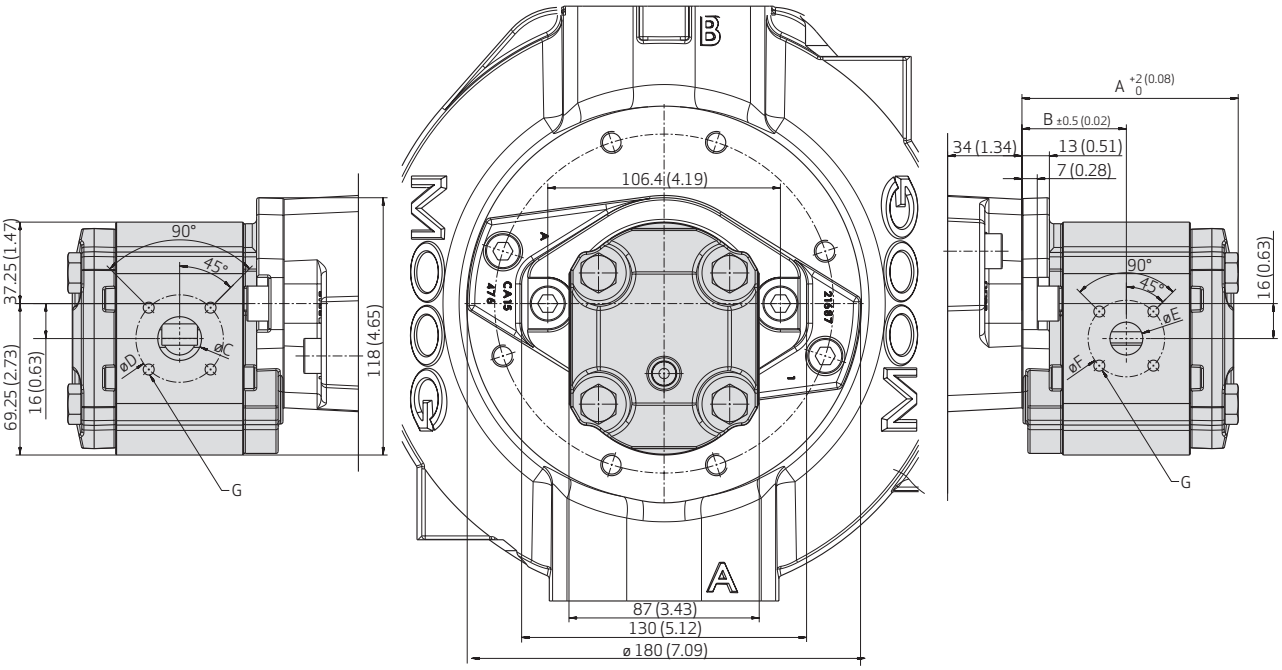
APPENDIX D - EXTERNAL GEAR PUMP

1. SAE-A, Type W900

Pump operation with HFC fluid permitted for 50 bar (725 psi) permanent pressure. Mounting pattern according to COD 150, shaft design FA.

SAE-A Suction side, side view

SAE-A Pressure side, side view



Part number [1]	Rotation	V [cm³/rev]	p [bar (psi)]	N maximum [min⁻¹]	A [2]	B [2]	C [2]	D [2]	E [2]	F [2]	G [3]
CA36039-001	R	5	276 (4,003)	4,000	90.10 (3.55)	43.30 (1.70)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36040-001	L	5	276 (4,003)	4,000	90.10 (3.55)	43.30 (1.70)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36037-001	R	8	276 (4,003)	4,000	94.60 (3.72)	45.50 (1.79)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36038-001	L	8	276 (4,003)	4,000	94.60 (3.72)	45.50 (1.79)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36035-001	R	11	276 (4,003)	3,600	99.00 (3.90)	47.70 (1.88)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36036-001	L	11	276 (4,003)	3,600	99.00 (3.90)	47.70 (1.88)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36033-001	R	16	276 (4,003)	3,000	106.40 (4.19)	51.40 (2.02)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6

[1] Gear pump with different displacement and multiple pumps on request.
[2] [mm (in)]
[3] 13 mm (0.51 in) deep

APPENDIX D - EXTERNAL GEAR PUMP

1. SAE -A, Type W900

Part number [1]	Rotation	V [cm^3/rev]	p [bar (psi)]	$N_{maximum}$ [min^{-1}]	A [2]	B [2]	C [2]	D [2]	E [2]	F [2]	G [3]
CA36034-001	L	16	276 (4,003)	3,000	106.40 (4.19)	51.40 (2.02)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36031-001	R	19	265 (3,844)	3,000	110.90 (4.37)	53.70 (2.11)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36032-001	L	19	265 (3,844)	3,000	110.90 (4.37)	53.70 (2.11)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36029-001	R	23	221 (3,205)	2,800	116.80 (4.60)	56.60 (2.23)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA36030-001	L	23	221 (3,205)	2,800	116.80 (4.60)	56.60 (2.23)	20.00 (0.79)	40.00 (1.57)	15.00 (0.59)	35.00 (1.38)	M6
CA77100-001	L	31	165 (2,393)	2,500	128.70 (5.07)	62.60 (2.46)	26.00 (1.02)	55.00 (2.17)	18.00 (0.71)	55.00 (2.17)	M8
CA77101-001	R	31	165 (2,393)	2,500	128.70 (5.07)	62.60 (2.46)	26.00 (1.02)	55.00 (2.17)	18.00 (0.71)	55.00 (2.17)	M8

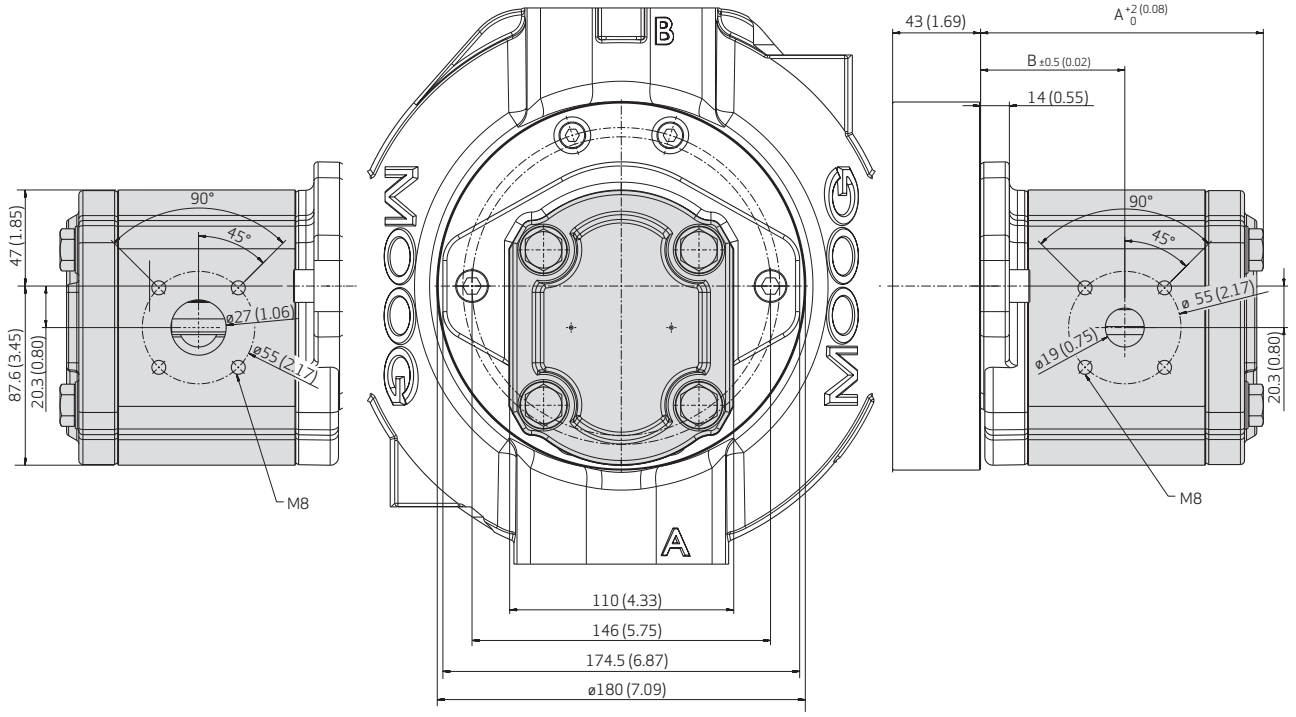
[1] Gear pump with different displacement and multiple pumps on request.
[2] [mm (in)]
[3] 13 mm (0.51 in) deep

APPENDIX D - EXTERNAL GEAR PUMP
2. SAE-B, Type W900

Mounting pattern according to COD 151, shaft design KA.

SAE-B Suction side, side view

SAE-B Pressure side, side view



Part number [1]	Rotation	V [cm³/rev]	p [bar (psi)]	$N_{maximum}$ [min⁻¹]	A [mm (in)]	B [mm (in)]	M8
CA36045-001	R	33	276 (4,003)	3,000	138.60 (5.46)	70.60 (2.78)	13 mm (0.51 in) deep
CA36044-001	L	33	276 (4,003)	3,000	138.60 (5.46)	70.60 (2.78)	13 mm (0.51 in) deep
CA36043-001	R	44	221 (3,205)	2,700	150.00 (5.91)	76.30 (3.00)	13 mm (0.51 in) deep
CA36042-001	L	44	221 (3,205)	2,700	150.00 (5,91)	76.30 (3.00)	13 mm (0.51 in) deep
CA45165-001	R	50	200 (2,900)	2,300	182.20 (7.17)	105.40 (4.15)	13 mm (0.51 in) deep
CA45164-001	L	50	200 (2,900)	2,300	182.20 (7.17)	105.40 (4.15)	13 mm (0.51 in) deep

[1] Gear pump with different displacement and multiple pumps on request.

ABOUT MOOG

Moog Inc. is a worldwide designer, manufacturer and integrator of precision control components and systems. Moog's Industrial Group designs and manufactures high performance motion control solutions combining electric, hydraulic, and hybrid technologies with expert consultative support in a range of applications including energy production and generation machinery, industrial production machinery and simulation and test equipment. We help performance-driven companies design and develop their next-generation machines. Moog's Industrial Group, with fiscal year 2011 sales of USD 629 million and over 40 locations worldwide, is part of Moog Inc. (NYSE:MOGA and MOG.B) which has sales of USD 2.3 billion.

Moog maintains facilities in 25 countries around the globe. This vast scope ensures that our engineers remain close to the needs of machine builders and provide flexible design solutions and technical expertise tailored to our customers' toughest challenges.

Moog experts work in close collaboration with machine builders and application engineers to design motion control systems for greater productivity, higher reliability, superior connectivity, less costly maintenance and more effective operations. Our regional presence, industry knowledge and design flexibility ensures Moog motion control solutions are tailored to their environment – from meeting operating regulations and performance standards, to taking machine performance to a higher level.

Servo Drives

Servo Motors

Servo Valves

Radial Piston Pumps

Products

At the heart of every Moog solution is an array of products engineered for precision, high performance and reliability. For more than six decades, Moog products have been specified for critical machine applications.

Some are developed specifically for unique operating environments. Others are standard equipment on machines across many industries. All are continuously improved to take advantage of the latest technology breakthroughs and advancements.

Moog products include:

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- Servo Motors and Servo Drives
- Servo Controllers and Software
- Radial Piston Pumps
- Actuators
- Integrated Hydraulic Manifold Systems and Cartridge Valves
- Slip Rings
- Motion Bases

ABOUT MOOG

Hydraulic solutions

Since Bill Moog invented the first commercially viable Servo Valve in 1951, Moog has set the standard for world-class hydraulic technology. Today, Moog products are used in a variety of applications - providing high power, enhanced productivity and ever better performance for some of the worlds most demanding applications.

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Clean operation, low noise generation, less maintenance and reduced power consumption make Moog electric solutions ideal for applications worldwide. Moog is the ideal partner for applications where transitioning technologies requires special expertise.

Hybrid solutions

By incorporating the advantages of existing hydraulic and electric technologies - including modular flexibility, increased efficiency and cleanliness - into innovative hybrid solutions, Moog offers new performance potential in specialized applications.

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Moog Global Support™ is our promise to offer world-class Repair and Maintenance Services delivered expertly by our trained technicians. With the reliability only available from a leading manufacturer with facilities around the world, Moog offers you service and expertise you can count on to keep your equipment operating as it should.

This promise offers many benefits to our customers including:

- Reduce your downtime by keeping critical machines running in peak performance
- Protect your investment by ensuring reliability, versatility and long-life of products
- Better plan your maintenance activities and make systematic upgrades
- Leverage our flexible programs to meet the unique service requirements of your facility

Look to Moog for global support including:

- Repair services using OEM parts are performed by trained technicians to the latest specifications
- Stock management of spare parts and products to prevent unplanned downtime
- Flexible programs, tailored to your needs such as upgrades, preventative maintenance and annual/ multi-year contracts
- On-site services bring the expertise to you, providing quicker commissioning, set-up and diagnostics
- Access to reliable services that are guaranteed to offer consistent quality anywhere in the world

For more information on Moog Global Support™, visit www.moog.com/industrial/service.

MOOG GLOBAL SUPPORT™

CONVERSION TABLE

General Conversion Table

1 bar	=	14.5038 psi (lb/in^2)
1 psi	=	0.06895 bar
1 mm	=	0.0394 in
1 in	=	25.4 mm
1 cm^3	=	0.0610 in^3 = 0.000264 gal (US)
1 in^3	=	16.3871 cm^3 = 0.004329 gal (US)
1 l (Liter)	=	0.26417 gal (US) = 61.024 in^3
1 gal (US)	=	3.7854 l (Liter) = 231 in^3
1 kg	=	2.2046 lb
1 lb	=	0.4536 kg
1 Nm	=	8.8507 lbf in
1 lbf in	=	0.1130 Nm
1 kW	=	1.3596 PS = 1.3410 hp (UK)
1 hp (UK)	=	1.0139 PS = 0.7457 kW
+1 °F	=	-17 °C
+1 °C	=	+34 °F
		(°F - 32) x 0.5556 = °C
		(°C / 0.5556) + 32 = °F
0 °F	=	-18 °C
0 °C	=	+32 °F
+100 °F	=	+38 °C
+100 °C	=	+212 °F

Mass Moment of Inertia

1 kg cm^2	=	0.3417 lb in^2
1 lb in^2	=	2.9264 kg cm^2
1 kg cm^2	=	8.85 10^{-4} lbf in s^2
1 lbf in s^2	=	1,130 kg cm^2

Kinematic Viscosity

1 mm^2/s	=	1 cSt = 0.00155 in^2/s
1 in^2/s	=	645.16 cSt = 645.16 mm^2/s

Calculation of Power Consumption

$$P = \frac{p \times Q}{6 \times \eta}$$

P [kW]

p [bar]

Q [l/min]

η [%]

Example: RKP 63 cm^3/rev, 280 bar, 1,450 rpm:

p = 280 bar

Q = (63 x 1.450) = 91.3 l/min

η = 95%

P = 280 x 91.3 kW / (6 x 95)

P = 45 kW

Calculation of Drive Torque

$$M = \frac{1.59 \times V \times p}{\eta}$$

M [Nm]

V [cm^3/rev]

p [bar]

η [%]

Example: RKP 63 cm^3/rev, 280 bar:

V = 63 cm^3/rev

p = 280 bar

η = 95%

M = 1.59 x 63 x 280 Nm / 95

M = 295 Nm

MODEL CODE

Selection

Standard version (280 bar (4,000 psi)), single pump, clockwise rotation, mineral oil operation standard drive flange, metric, key shaft

Compensator	Displacement cm^3/rev	Model code	Order number
Pressure compensator, adjustable from 80 to 350 bar (1,160 to 5,000 psi)	19	HPR18A1 RKP019SM28F2Z00	D951-2079-10
	32	HPR18A1 RKP032KM28F2Z00	D952-2007-10
	45	HPR18A1 RKP045KM28F2Z00	D953-2015-10
	63	HPR18A1 RKP063KM28F2Z00	D954-2003-10
	80	HPR18A1 RKP080KM28F2Z00	D955-2003-10
	100	HPR18A1 RKP100TM28F2Z00	D956-2003-10
	140	HPR18A7 RKP140TM28F2Z00	D957-2075-10
Pressure compenstor, hydraulically controlled	19	HPR18A1 RKP019SM28H1Z00	D951-2009-10
	32	HPR18A1 RKP032KM28H1Z00	D952-2009-10
	45	HPR18A1 RKP045KM28H1Z00	D953-2017-10
	63	HPR18A1 RKP063KM28H1Z00	D954-2013-10
	80	HPR18A1 RKP080KM28H1Z00	D955-2013-10
	100	HPR18A1 RKP100TM28H1Z00	D956-2011-10
	140	-	-
Combined pressure and flow compensator	19	HPR18A1 RKP019SM28J1Z00	D951-2007-10
	32	HPR18A1 RKP032KM28J1Z00	D952-2001-10
	45	HPR18A1 RKP045KM28J1Z00	D953-2001-10
	63	HPR18A1 RKP063KM28J1Z00	D954-2011-10
	80	HPR18A1 RKP080KM28J1Z00	D955-2017-10
	100	HPR18A1 RKP100TM28J1Z00	D956-2017-10
	140	-	-
RKP-D (digital pQ control)	19	HPR18A1 RKP019SM28D1Z00	D951-2013-10
	32	HPR18A1 RKP032KM28D1Z00	D952-2005-10
	45	HPR18A1 RKP045KM28D1Z00	D953-2059-10
	63	HPR18A1 RKP063KM28D1Z00	D954-2075-10
	80	HPR18A1 RKP080KM28D1Z00	D955-2031-10
	100	HPR18A1 RKP100TM28D1Z00	D956-2039-10
	140	HPR18A7 RKP140TM28D1Z00	D957-2039-10

MODEL CODE

The model code describes pump options

There are design interfaces (flange, shaft end and ports), hydraulic parameters (volume flow, operating pressure and hydraulic fluid) and control options.

Examples

Position number	1		2	3	4			
Drive	HP	–	R	18	B1	–		

Position number	5	6	7	8	9	10	11	12
Pump 1	RKP	100	T	M	28	D1	Z	00
Pump 2	RKP	063	K	M	28	D2	Z	00
Pump 3	AZP	008	R	M	28	TP	0	00

		Drive			Radial Piston Pump							
Position	1	2	3	4	5	6	7	8	9	10	11	12
Code	HP	R	18	B1	RKP	100	T	M	28	D1	Z	00

Radial Piston Pump

5	6	7	8	9	10	11	12
RKP	063	K	M	28	D2	Z	00

Radial Piston Pump

5	6	7	8	9	10	11	12
AZP	008	R	M	28	TP	0	00

MODEL CODE

Position	Code	Radial Piston Pump
1		**Code**
	HP	**Hydraulic Pump**
	HK	Explosion protection pump (ATEX)
	HZ	Pump with special features
2		**Rotations**
	R	Clockwise, looking at drive shaft
	L	Counterclockwise, looking at drive shaft
3	18	**Speed** Maximum speed for low noise operation or rated speed for power controlled pumps, e. g. 18 => n = 1,800 min^{-1}
4		**Drive flange**
	A1	Straight key according to DIN 6885, metric round flange (not for RKP 140)
	B1	Spline according to DIN 5482, metric round flange (not for RKP 140)
	A7	Straight key according to DIN 6885, 4 holes ISO flange according to ISO 3019-2 (metric)
	B7	Spline according to DIN 5480, 4 holes ISO flange according to ISO 3019-2 (metric)
	C3	Straight key according to SAE 744 C, 2/4 holes SAE-flange according to ISO 3019-1 (inch)
	D3	Spline according to SAE 744 C (ISO 3019-1), 2/4 holes SAE-flange according to ISO 3019-1 (inch)
	A5	Straight key according to DIN 6885, metric round flange for polyurethane foam
	C6	Straight key according to SAE 744 C, 2/4 holes SAE-flange according to ISO 3019-1 (inch) for polyurethane foam
	XX	Intermediate flange RKP/RKP
5		**Pump type**
	RKP	Radial piston pump, variable displacement
	AZP	Moog gear pump with SAE-A and SAE-B flange
		Attachment of other pumps
	DS1	Heavy-duty through-drive for RKP attachment and adapter flange for SAE-A, SAE-B or SAE-C
6		**Displacement RKP**
	019	19 cm^3/rev
	032	32 cm^3/rev
	045	45 cm^3/rev
	063	63 cm^3/rev
	080	80 cm^3/rev
	100	100 cm^3/rev
	140	140 cm^3/rev
		Displacement and attachment flange of Moog gear pumps (AZP)
	005	5 cm^3/rev SAE-A
	008	8 cm^3/rev SAE-A
	011	11 cm^3/rev SAE-A
	016	16 cm^3/rev SAE-A
	019	19 cm^3/rev SAE-A
	023	23 cm^3/rev SAE-A
	031	31 cm^3/rev SAE-A
	033	33 cm^3/rev SAE-B
	044	44 cm^3/rev SAE-B
	050	50 cm^3/rev SAE-B
7		Pump ports
	K	Medium pressure series (to 280 bar (4,000 psi)) sizes 32, 45, 63 and 80 cm^3/rev
	T	Medium pressure series (to 280 bar (4,000 psi)) sizes 100 cm^3/rev and 140 cm^3/rev
	T	High pressure series (to 350 bar (5,000 psi)) sizes 32, 63 and 80 cm^3/rev
	S	**Medium pressure series (to 280 bar (4,000 psi)) size 19 cm^3/rev**
	H	High pressure series (to 350 bar (5,000 psi)) size 19 cm^3/rev
	R	German 4 bolt flange (only for gear pumps)

[1] See catalog RKP with digital control (RKP-D)
Options may increase price. Not all combinations may be available.
Prefered configurations are highlighted. Subject to change.

MODEL CODE

Position	Code	Radial Piston Pump
8		**Operating fluid**
	M	**Mineral Oil**
	A	HFA (oil in water)
	B	HFB (oil in water)
	C	HFC (water glycol)
	D	HFD (synthetic esther)
	E	Cutting Emulsion
9		Operating pressure
	28	**Maximum operating pressure e.g., 28 => 280 bar (4,000 psi)**
	35	Maximum operating pressure e.g., 35 => 350 bar (5,000 psi)
10		**Control/Compensators**
	B1	Mechanical stroke adjustment (V = constant)
	C1	Servo control
	D1 [1)]	**RKP-D (electro-hydraulic control with digital on-board electronics), internal pressure supply**
	D2 [1)]	**RKP-D (electro-hydraulic control with digital on-board electronics), external pressure supply**
	D3 [1)]	RKP-D with external pressure supply, useable for hybrid operation
	D4 [1)]	RKP-D with internal pressure supply, useable for hybrid operation
	D5 [1)]	RKP-D with internal pressure supply useable for master/slave operation
	D6 [1)]	RKP-D with external pressure supply useable for master/slave operation
	D7 [1)]	RKP-D with external pressure supply useable for master/slave and hybrid operation
	D8 [1)]	RKP-D with internal pressure supply useable for master/slave and hybrid operation
	F1	**Pressure compensator, adjustable from 30 to 105 bar (435 to 1523 psi)**
	F2	**Pressure compensator, adjustable from 80 to 350 bar (1,160 to 5,000 psi)**
	G1	Pressure compensator, adjustable and lockable, from 30 to 105 bar (435 to 1,523 psi)
	G2	Pressure compensator, adjustable and lockable, from 80 to 350 bar (1,160 to 5,000 psi)
	H1	**Pressure compensator, hydraulically controlled**
	H2	Mooring control
	J1	**Combined pressure and flow compensator Δp = 10 bar (145 psi)**
	J2	Combined pressure and flow compensator Δp = 20 bar (290 psi)
	N1	Dual-displacement
	R1	**Combined pressure and flow compensator with P-T control notch**
	S1	Constant horsepower control
	S2	Constant horsepower control with pressure-flow limitation, Δp = 10 bar (145 psi)
	S3	Constant horsepower control with pressure-flow limitation, Δp = 20 bar (290 psi)
	TP	Gear pump
11		**Additional equipment**
	Z	**No Accessories**
	Y	Maximum flow limiter
	0	Only at gear pump
12		**Additional information**
		For Compensators D1 to D8
	00	Actual value 4 to 20 mA
	01	**Actual value 2 to 10 V**
		For compensators S1, S2, S3 power consumption for specified speed
	04	4 kW (RKP 32)
	05	5.5 kW (RKP 32)
	07	7.5 kW (RKP 32, 63)
	11	11 kW (RKP 32, 63)
	15	15 kW (RKP 32, 63, 100)
	18	18 kW (RKP 63, 100)
	22	22 kW (RKP 63, 100)
	30	30 kW (RKP 63, 100)
	37	37 kW (RKP 100)
	45	45 kW (RKP 100)
		For tandem gear pumps:
		Displacement of the 2nd gear pump
	05-50	5 to 50 cm^3/rev

[1)] See catalog RKP with digital control (RKP-D)
Options may increase price. Not all combinations may be available.
Prefered configurations are highlighted. Subject to change.

TAKE A CLOSER LOOK.

Moog designs a range of motion control products that complement the performance of those featured in this catalog. Visit our website for more information and contact the Moog facility nearest you.

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RKP Radial Piston Pump
GUT/PDF/ Rev. E, February 2012, Id. CDL29951-en

RADIAL PISTON PUMP RKP-II

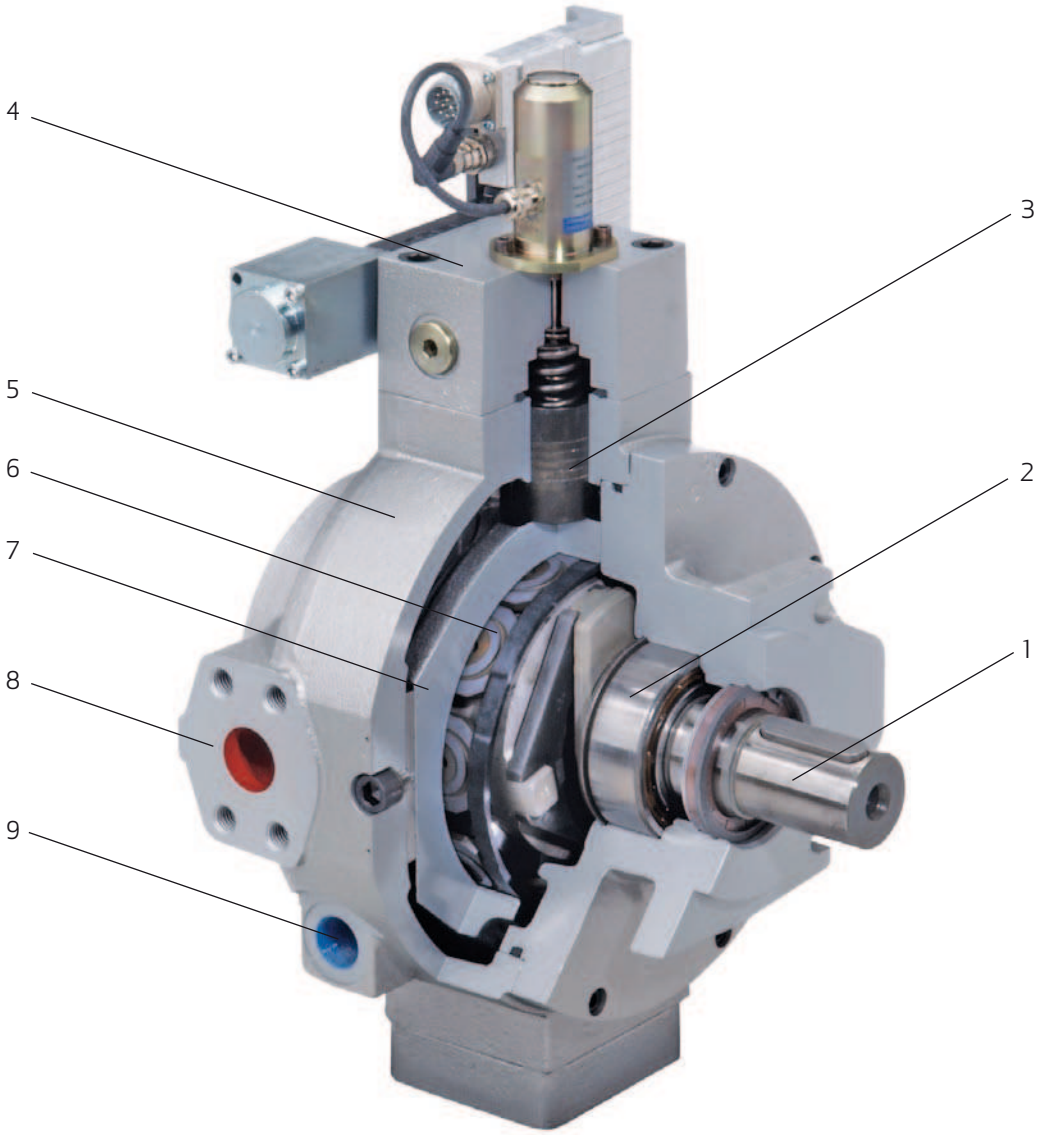
FOR LOW-FLAMMABILITY FLUIDS HFA, HFB, HFC, HFD

Rev. 3.1, May 2010

MOOG RKP PUMPS OFFER LOW NOISE, UNSURPASSED RELIABILITY, LONG LIFE, AND A WIDE VARIETY OF CONTROL OPTIONS FOR DEMANDING APPLICATIONS

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

CUTAWAY VIEW



1 Drive shaft
2 Roller bearing
3 Control piston
4 Compensator
5 Housing
6 Slipper pads
7 Sliding stroke ring
8 SAE connection
9 Drain port

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS
TABLE OF CONTENTS

TABLE OF CONTENTS

IMPORTANT NOTE

This catalog is intended for users with some technical knowledge. To ensure that all necessary characteristics for function and safety are covered, the user must check the suitability of the products described herein. The products are subject to change without notice. In case of doubt, please contact Moog.

For the most up-to-date information please visit our website at www.moog.com/industrial

All dimensions in mm

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS
INTRODUCTION

GENERAL INFORMATION

Outstanding motion control solutions

For over 50 years, we have been a leader in motion control technology, specializing in the manufacture and application of high-performance products. Today, we incorporate the latest motion control technology into our products and offer innovative ideas that can help our customers achieve new levels of machine performance.

Proven pump technology

The Radial Piston Pump product line (also known as RKP), is a range of high-performance variable displacement pumps intended for use in industrial applications. Based on a proven concept, the RKP's robust and contamination-resistant design results in long life and a high degree of reliability.
Its rapid response time and high volumetric efficiency have led to it being the first choice for many machines with demanding flow and pressure control needs.
We produce a wide range of radial piston pumps of different sizes, single and multiple arrangements, with various forms of control (mechanical, hydro-mechanical, electro-hydraulic, digital and analog) in order to provide maximum flexibility to machine builders.

Applications

Thanks to the flexible, high-performance design, the new RKP–II is the ideal solution for all types of industrial applications. The RKP is already used in machines for injection molding, die casting, forming equipment such as presses and rolls, as well as in general hydraulic applications. In the field of plastic and metal processing, the RKP is used on equipment to produce plastic and metal parts, for the packaging and automotive industries. The RKP is also used in test equipment, construction, rubber processing, and the mining industry.

The new RKP–II is particularly well suited to applications where power, low noise and robust design, in combination with precision and speed are needed.

Low-noise and rugged design

With a number of innovative design features we have been able to reduce both the primary and the secondary noise level from the RKP-II. For pump sizes 63 cm^3/rev (3.84 cu.in/rev) and 80 cm^3/rev (4.88 cu.in/rev) the number of working pistons has also been increased from 7 to 9. This has made it possible to reduce the diameter of the working pistons, resulting in reduced dynamic variable forces acting on the housing and reduced flow and pressure ripple on the high-pressure and intake sides. Moog RKP–II helps machine manufacturers comply with EU directive "2003/10/EC" on noise emissions.

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS
NEW DESIGN

NEW DESIGN

The new generation of RKP pumps, the RKP–II, benefits from reduced noise levels. They are now fitted with a sliding stroke ring. The suction port has been significantly increased in size, allowing a wide suction line to be directly connected.
The control ports on the compensators are designed as G 1/4".

RKP–II stands for reliability, low noise, and durability. This is underlined by its extended warranty. Under the conditions described on Page 6, warranty for mineral oil is covered for 10,000 operating hours or 24 months. The existing modular system enables the user to choose a pump or pump combination individually tailored to the respective application.

Further advantages of the Moog radial piston pump RKP–II are:

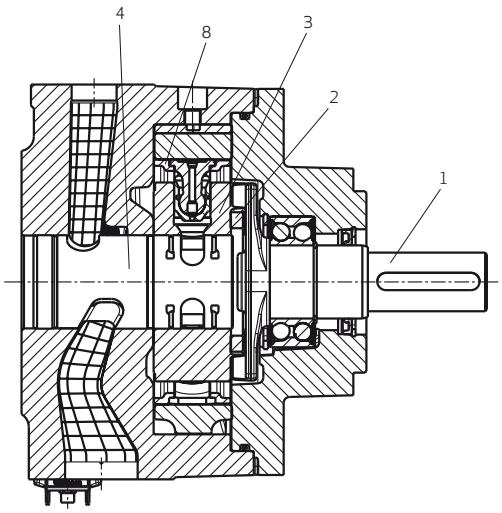
- Fast response
- Compact modular design
- Good suction characteristics
- Low pressure ripple

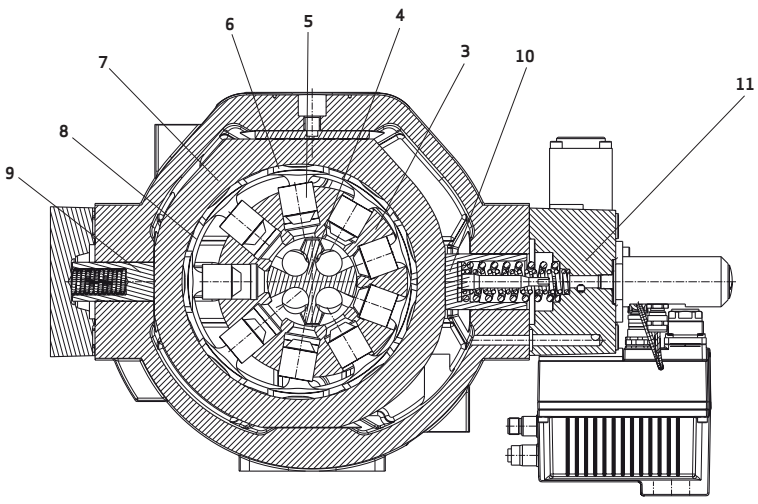
The following RKP–II features are available:

- Medium-pressure series (280 bar (4,000 psi)) and high-pressure series (350 bar (5,000 psi)) for mineral oil
- Large selection of compensators including mechanical, hydraulic and electro-hydraulic (analog or digital with CAN bus)
- Mechanical flow limitation
- Multiple pumps by tandem mounting
- Various drive flanges
- Suitable for most hydraulic oils such as mineral oil, transmission oil, biodegradable oil
- Suitable for special fluids such as oil-in-water emulsions, (HFA), water-glycol (HFC), synthetic esters (HFD), and polyhydric alcohol

Mode of operation

The shaft (1) transfers the drive torque to the star-shaped cylinder block (3), free of any axial forces, via a crossdisc coupling (2). The cylinder block is hydrostatically supported on the control journal (4). The radial pistons (5) in the cylinder block run against the stroke ring (7) through hydrostatically balanced slipper pads (6). The pistons and slipper pads are joined by ball and socket joints and locking rings. The slipper pads are guided in the stroke ring by two retaining rings (8) and, when running, are held against the stroke ring by centrifugal force and oil pressure. As the cylinder block rotates, the pistons reciprocate due to the eccentric positioning of the stroke ring, the piston stroke being twice the eccentricity. The eccentricity is altered by two opposing control pistons (9, 10) in the pump housing. The oil flow to and from the pump passes through the pump ports and into and out of the pistons through the porting in the control journal. This is controlled by means of intake and pressure slits in the control journal. A compensator (11) monitors the system pressure and the stroke ring position (delivery).
The hydraulic forces are not supported on the roller bearing. The bearing is thus free from load to a large extent.





RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS
CLASSIFICATION OF HF FLUIDS

Classification of low-flammability fluids
Minimum technical requirements of low-flammability hydraulic fluids as per VDMA 24317

Class	HFA[1)]	HFB	HFC	HFD[2)]
Composition	Oil-in-water emulsion approximately 95 % water	Water-in-oil emulsion approximately 40 % water	Aqueous polymer solutions (water-glycols)	Water-free, synthetic fluids Fatty acid ester (HFD-U) Phosphate ester (HFD-R)
Spontaneous ignition temperature °C (°F)	Possible	After evaporation of water below 1,000 °C (1,832 °F)	After evaporation of water below 1,000 °C (1,832 °F)	> 530 °C (> 986 °F)
Environmental protection, biodegradability	Good (synthetic)	Not possible	Not possible	Not possible
Lubricity	Satisfactory	Medium to good	Good	Excellent
Possible operating temperature	+5 °C to +50 °C (+41 °F to +122 °F)	+5 °C to +50 °C (+41 °F to +122 °F)	-10 °C to +55 °C (+14 °F to +131 °F)	0 °C to +80 °C (+32 °F to +176 °F)
Corrosion protection	Satisfactory	Good	Good	Satisfactory
Gasket material	HNBR	HNBR	HNBR	FPM, e.g. Viton
Seal compatibility	Good	Good	Excellent	Medium
Water content	80 % to 95 %	approximately 40 %	35 % to 55 %	< 0.1 %

[1)] Subdivision of HFA fluids VDMA 24317, see Page 6
[2)] Subdivision of HFD fluids VDMA 24317, see Page 7

HFA fluids
These are characterized by a particularly high water content of approximately 95 %. The viscosity of these media is naturally very low, placing great demands on the pumps and other components.

These fluids can be broken down into the following different subcategories:

HFAE mineral oil or macroemulsions
Made up of approximately 95 % water and approximately 5 % mineral oil (frequent mixture ratio), emulsifying agents and additives. This 2-phase system is known as emulsion. In this milky-white emulsion oil particles (40 µm to 250 µm (0.0016 in to 0.01 in)) are dispersed in the water.

HFAE microemulsion
In microemulsion the oil particles (2 µm to 25 µm (0.00008 in to 0.001 in)) are smaller than in macroemulsion.
The transparent microemulsion contains highly effective additives which improve the lubrication of aqueous fluids, thus resulting in high wear protection.

HFAS synthetic fluids
These solutions are mineral-oil-free. They are characterized by a high resistance to microbes and are extremely stable. There is no possibility of phase separation, as can occur in emulsions. Dyes are sometimes added to the normally clear fluid to make it more visible.

Storage life
HFA fluids are stable in the temperature range T = 0 °C to approximately +50 °C (+32 °F to approximately +122 °F). Below 0 °C (32 °F) the fluid freezes; alternate freezing and thawing will cause phase separation of the emulsion. Synthetic fluids, however, are not subject to phase separation. These fluids evaporate more quickly at temperatures in excess of 50 °C (122 °F).

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS
CLASSIFICATION OF HF FLUIDS

HFB fluids
These are water-in-oil emulsions with a water content of approximately 40 %. They are ready to use on delivery and have a nominal viscosity similar to that of hydraulic oils. They are used relatively rarely, because they do not always comply with fire test regulations. They are of practical importance particularly in British coal mining operations.

HFC fluids
These fluids are the closest to mineral-oil-based hydraulic oils in terms of their physical and chemical properties, and comply with most fire test regulations. Their importance in the market is relatively high. Many hydraulic components can be easily converted from mineral oil to HFC fluids.

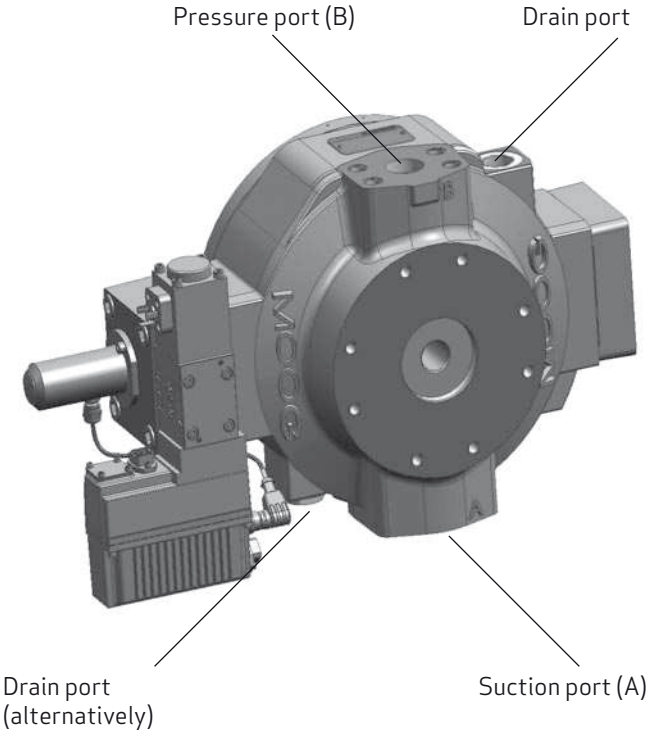
HFC fluids are aqueous polymer solutions. They are ready to use on delivery and, depending on the viscosity requirements of the drive, can be used at hydraulic fluid temperatures of -10 °C to +55 °C (+14 °F to +131 °F).

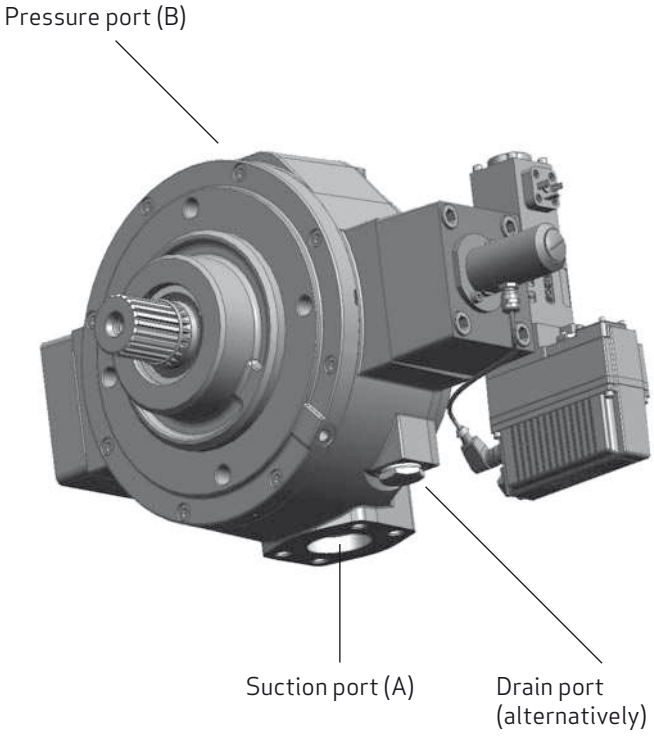
In order to keep the loss of water content due to evaporation to a minimum, the hydraulic fluid temperature should if possible not exceed 50 °C. The water content must be monitored during operation and, in the event of a marked deviation, kept at the desired level by adding demineralized water.

HFD fluids
These synthetic fluids are water-free and are usually based on phosphoric esters (HFD-R) and synthetic or natural fatty acid esters (HFD-U). They are characterized by their resistance to aging and good wear protection, and can be used in wide temperature ranges. Occasionally they require special seals and can be aggressive to various metal compounds, paints and lacquers (refer to the manufacturer's instructions). RKP-II pumps for HFD fluids are supplied with FPM seals as standard.

Flushing the bearing in the case of HFC fluids
Flushing the bearing is mandatory for size 32 to 140 pumps. Flushing is generally performed automatically via a corresponding hole in the bearing cap, and in some case via an external flushing port on the bearing cap. The cleanness of the flushing fluid is governed by the same requirements as those for the pump.

Disposal
These fluids must be disposed of in accordance with the manufacturer's instructions (see DIN safety data sheet for the fluid) and/or statutory provisions.





RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS
INSTALLATION GUIDELINES

Installation guidelines for HFA pumps

1 Pump layout exclusively with a horizontal drive shaft.

2 The shafts of the pump and electric motor must be perfectly flush. Use a properly centered pump carrier with a flexible coupling.

3 Pump layout below the minimum fluid level, i.e. directly next to or under the tank. Installation in the tank is not permitted.

4 Suction line should have short and large nominal diameters where possible, avoid bends; $V_{max} \leqq 1.5$ m/s (4 ft 11 in/s)

5 Drain line: use an upper drain port; large nominal diameters where possible; end of line below the min. fluid level; use flexible material.

6 Lay high-pressure lines and other lines so that they are silently mounted.

7 Tank: corrosion-resistant, particularly above the fluid level (condensation water).
Take care on coats of paint - HFA is occasionally alkaline.
Electric fill level monitoring.

8 Filtering:

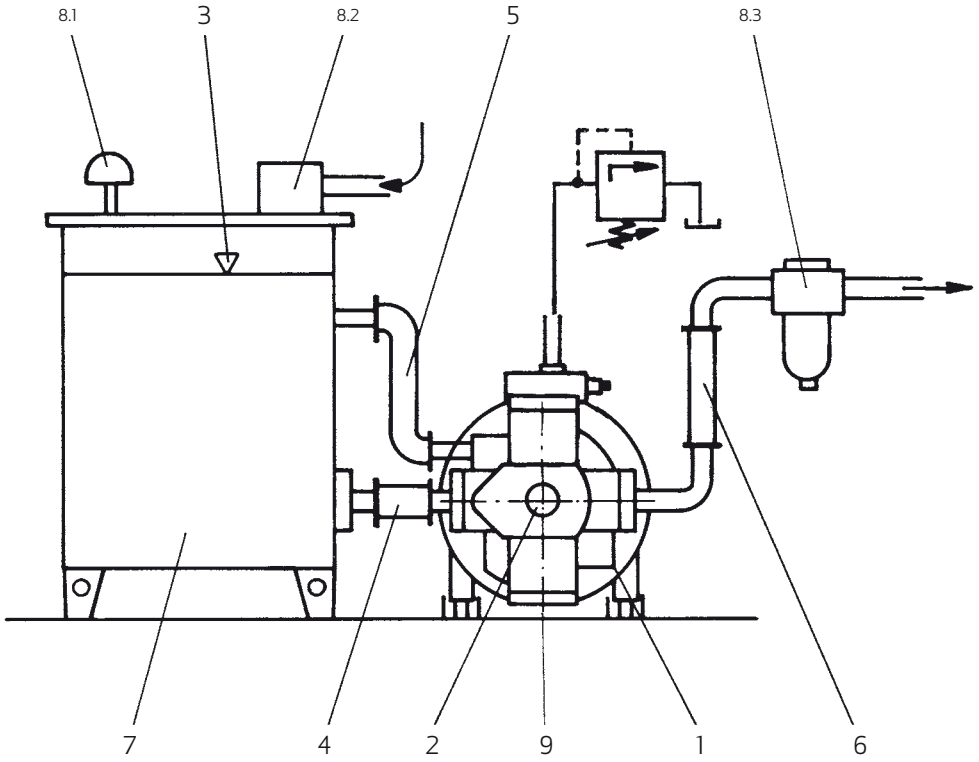
8.1 Tank ventilation 3 µm (> 0.00012 in), corrosion-resistant

8.2 Return line $_{\beta}10 = 75$

8.3 High-pressure line $_{\beta}10 = 75$

8.2 and 8.3 without a bypass valve, but with a contamination indicator. Filter surface approximately 3 to 5 times that for mineral oils. Use HFA-compatible filters.

9 Inspection hole in the pump carrier vertically at the bottom so as to detect possible leakage at the shaft seal. The unplugged inspection hole must always be at the bottom. If necessary, the mounting flange must be rotated.



Preparing and maintaining the HFA fluid
The HFA fluid must be prepared and maintained in accordance with the manufacturer's instructions. The hydraulic fluid temperature should be kept as low as possible within the range of + 5 °C to + 40 °C (+41 °F to +104 °F). A maximum temperature of 50 °C (122 °F) is permitted for radial piston pumps. At high hydraulic fluid temperatures there is an increased risk of cavitation (gap to the vapor phase gets smaller) and there is an increased build-up of bacteria. The tank should therefore be fitted with a temperature monitor.

Starting up an HFA system
Before it is started up for the first time, the pump must be filled with HFA fluid via the drain port. The first revolutions must be completed at a pressure p ≦ 20 bar (≦ 290 psi), where the temperature difference between the tank and the pump must not exceed 25 °C (> 77 °F). When the suction and drain lines are free of air bubbles, the pump may be subjected to load after a few minutes.

The unit must remain filled with fluid through periods of extended shutdown. Before being returned to service, the valves and pumps must be checked to ensure that they move freely.

If the pump can be rotated slightly by hand at the electric motor (fan impeller), it can be returned to service. A pump must always be treated with preservative agent after being removed from a system. The housing, inlet port and pressure port are drained. The housing is then filled with hydraulic oil, in the course of which the drive shaft is rotated until oil emerges from the pressure and inlet ports.
The pump is now sealed at the suction, pressure and drain ports.

For further details, refer to the RKP–II user information.

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

TECHNICAL DATA FOR USE WITH HFA/HFB FLUIDS

Parameters			
Displacement [cm³/rev] ([cu.in/rev])	**19 (1.16)**	**32 (1.95)**	**63/80 (3.84/4.88)**
Type of construction	Pump for open circuit with various control devices		
Type of mounting	Drive flange A7: Straight key according to ISO 2491, 4-hole ISO flange according to ISO 3019/2 (metric)		
Mounting position	Horizontal (drive shaft horizontal)		
Weight [kg] ([lb])	22 (48.5)	33 (72.8)	71 (156.5)
Mass moment of inertia [kg cm²] ([lb sq.in])	17.7 (6.05)	33 (11.28)	186.3 (63.7)
Line connections acc. to ISO 6162: Pressure port Suction port	 SAE 3/4“ 3,000 psi SAE 3/4“ 3,000 psi	 SAE 1“ 3,000 psi SAE 1 1/2“ 3,000 psi	 SAE 1 1/4“ 3,000 psi SAE 2“ 3,000 psi
Recommended pipe outside diameter for drain lines (lightweight version) [mm] ([in])	15 (0.59)	18 (0.71)	22 (0.87)
Drain port	The drain line is to be routed so that the housing is always full of the hydraulic fluid. The pressure at the Drain port must not exceed 2 bar (29.0 psi) absolute (1 bar (14.5 psi) gage pressure). End of line below the fluid level. No filter or non-return valve in the drain line.		
Type of drive	Direct drive with flexible coupling (please inquire from your Moog contact for other types)		
Ambient temperature range	0 °C to +60 °C (+32 °F to +140 °F)		
Maximum speed at inlet pressure 0.8 bar (11.6 psi) absolut [rpm] 1.0 bar (14.5 psi) absolut [rpm]	 1,500 1,800	 1,500 1,800	 1,500 1,800
Min. inlet pressure suction port	0.8 bar (11.6 psi) absolute		
Maximum housing pressure	2 bar (29.0 psi) (1 bar (14.5 psi) gage pressure)		
Continuous pressure [bar] ([psi]) Maximum pressure [1)] [bar] ([psi]) Pressure peak [bar] ([psi])	120 (1,740) 160 (2,320) 210 (3,000)	120 (1,740) 160 (2,320) 210 (3,000)	120 (1,740) 160 (2,320) 210 (3,000)
Hydraulic fluid	HFA, oil-in-water emulsions		
Hydraulic fluid temperature range	+5 °C to +50 °C (+41 °F to +122 °F)		
Viscosity	approximately 1 mm²/s		
Filtering	NAS 1638, class 7; ISO 4406, class 18/16/13; obtained with filter fineness $\beta_{10} = 75$ [2)]		

1) Maximum pressure according to DIN 24 312

2) Dirt particles retention rate > 10 µm (> 0.0004 in) is 1: 75, i.e. 98.67 %
1,000 psi = 70 bar

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

TECHNICAL DATA FOR USE WITH HFC FLUIDS

Parameters							
Displacement [cm³/rev] ([cu.in/rev])	**19 (1.16)**	**32 (1.95)**	**45 (2.75)**	**63 (3.84)**	**80 (4.88)**	**100 (6.10)**	**140 (8.54)**
Type of construction	Pump for open circuit with various control devices						
Type of mounting	End mounting, centering and hole-circle dia. according to ISO 3019/2 (metric) Mounting flange according to ISO 3019/1 (imperial dimensions) Mounting flange according to ISO 3019/2 (metric)						
Mounting position	Optional						
Weight [kg] ([lb])	22 (48.5)	33 (72.8)	33 (72.8)	71 (156.5)	71 (156.5)	71 (156.5)	105 (231.5)
Mass moment of inertia [kg cm²] ([lb sq.in])	17.7 (6.05)	61.0 (20.84)	61.0 (20.84)	186.3 (63.7)	186.3 (63.7)	186.3 (63.7)	380.0 (130)
Line connections acc. to ISO 6162: Pressure port Suction port	 SAE 3/4" 3,000 psi SAE 3/4" 3,000 psi	 SAE 1" 3,000 psi SAE 1 1/2" 3,000 psi	 SAE 1" 3,000 psi SAE 1 1/2" 3,000 psi	 SAE 1 1/4" 3,000 psi SAE 2" 3,000 psi	 SAE 1 1/4" 3,000 psi SAE 2" 3,000 psi	 SAE 1 1/4" 6,000 psi SAE 2" 3,000 psi	 SAE 1 1/2" 6,000 psi SAE 2 1/2" 3,000 psi
Recommended pipe outside diameter for drain lines (lightweight version) [mm] ([in])	15 (0.59)	18 (0.71)	18 (0.71)	22 (0.87)	22 (0.87)	22 (0.87)	22 (0.87)
Drain port	The drain line is to be routed so that the housing is always full of the hydraulic fluid. The pressure at the drain port must not exceed 2 bar (29.0 psi) absolute (1 bar (14.5 psi) gage pressure). End of line below the fluid level. No filter or non-return valve in the drain line.						
Recommended flushing quantity l/min (gpm)	-	4 to 5 (0.88 to 1.10)	4 to 5 (0.88 to 1.10)	6 to 7 (1.32 to 1.54)	5 to 7 (1.10 to 1.54)	5 to 7 (1.10 to 1.54)	7 to 10 (1.54 to 2.20)
Type of drive	Direct drive with flexible coupling (please inquire from your Moog contact for other types)						
Ambient temperature range	0 °C to +60 °C (+32 °F to +140 °F)						
Maximum speed at inlet pressure 0.8 bar (11.6 psi) abs. [rpm] 1.0 bar (14.5 psi) abs. [rpm]	 1,800 1,800	 1,800 1,800	 1,800 1,800	 1,800 1,800	 1,500 1,800	 1,500 1,800	 1,500 1,800
Maximum speed for low-noise operation [rpm]	1,800	1,800	1,800	1,800	1,800	1,800	1,800
Min. inlet pressure suction port	0.8 bar (11.6 psi) absolute						
Maximum housing pressure	2 bar (29.0 psi) (1 bar (14.5 psi) gage pressure)						
Continuous pressure [bar] ([psi]) Maximum pressure [1] [bar] ([psi]) Pressure peak [bar] ([psi])	210 (3,000) 230 (3,340) 260 (3,770)	210 (3,000) 230 (3,340) 260 (3,770)	210 (3,000) 230 (3,340) 260 (3,770)	210 (3,000) 230 (3,340) 260 (3,770)	210 (3,000) 230 (3,340) 260 (3,770)	210 (3,000) 230 (3,340) 260 (3,770)	210 (3,000) 230 (3,340) 260 (3,770)
Hydraulic fluid	HFC, aqueous polymer solutions						
Hydraulic fluid temperature range	-10 °C to +55 °C (+14 °F to +131 °F)						
Viscosity	Allowable operational range 12 mm²/s to 100 mm²/s; recommended operational range 16 mm²/s to 46 mm²/s Hydraulic fluid according to viscosity class ISO VG 46 or VG 32 Maximum viscosity 500 mm²/s during start-up with electric motor at 1,800 rpm						
Filtering	NAS 1638, class 9; ISO 4406, class 20/18/15; obtained with filter fineness $\beta_{20} = 75$ [2] NAS 1638, class 7; ISO 4406, class 18/16/13; with electro-hydraulic control (RKP-D)						

[1] Maximum pressure according to DIN 24 312

[2] Dirt particles retention rate > 20 µm is 1: 75, i.e. 98.67 %
1,000 psi = 70 bar

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

TECHNICAL DATA FOR USE WITH HFD FLUIDS

Parameters							
Displacement [cm³/rev] ([cu.in/rev])	**19 (1.16)**	**32 (1.95)**	**45 (2.75)**	**63 (3.84)**	**80 (4.88)**	**100 (6.10)**	**140 (8.54)**
Type of construction	Pump for open circuit with various control devices						
Type of mounting	End mounting, centering and hole-circle dia. according to ISO 3019/2 (metric) Mounting flange according to ISO 3019/1 (imperial dimensions) Mounting flange according to ISO 3019/2 (metric)						
Mounting position	Optional						
Weight [kg] ([lb])	22 (48.5)	33 (72.8)	33 (72.8)	71 (156.5)	71 (156.5)	71 (156.5)	105 (231.5)
Mass moment of inertia [kg cm²] ([lb sq.in])	17.7 (6.05)	61.0 (20.84)	61.0 (20.84)	186.3 (63.7)	186.3 (63.7)	186.3 (63.7)	380.0 (130)
Line connections according to ISO 6162: Medium-pressure series 280 bar (4,000 psi) Pressure port Suction port High-pressure series 350 bar (5,000 psi) Pressure port Suction port	 SAE 3/4“ 3,000 psi SAE 3/4“ 3,000 psi SAE 3/4“ 6,000 psi SAE 3/4“ 6,000 psi	 SAE 1“ 3,000 psi SAE 1 1/2“ 3,000 psi SAE 1“ 6,000 psi SAE 1 1/2“ 3,000 psi	 SAE 1“ 3,000 psi SAE 1 1/2“ 3,000 psi	 SAE 1 1/4“ 3,000 psi SAE 2“ 3,000 psi SAE 1 1/4“ 6,000 psi SAE 2“ 3,000 psi	 SAE 1 1/4“ 3,000 psi SAE 2“ 3,000 psi SAE 1 1/4“ 6,000 psi SAE 2“ 3,000 psi	 SAE 1 1/4“ 6,000 psi SAE 2“ 3,000 psi	 SAE 1 1/2“ 6,000 psi SAE 2 1/2“ 3,000 psi
Recommended pipe outside diameter for drain lines (lightweight version) [mm] ([in])	15 (0.59)	18 (0.71)	18 (0.71)	22 (0.87)	22 (0.87)	22 (0.87)	22 (0.87)
Drain port	The drain line is to be routed so that the housing is always full of the hydraulic fluid. The pressure at the drain port must not exceed 2 bar (29.0 psi) absolute (1 bar (14.5 psi) gage pressure). End of line below the fluid level. No filter or non-return valve in the drain line.						
Type of drive	Direct drive with flexible coupling (please inquire from your Moog contact for other types)						
Ambient temperature range	0 °C to +60 °C (+32 °F to +140 °F)						
Maximum speed at inlet pressure 0.8 bar abs. [rpm] 1.0 bar abs. [rpm]	 2,700 2,900	 2,500 2,900	 1,800 2,100	 2,100 2,300	 1,500 1,800	 1,500 1,800	 1,500 1,800
Maximum speed for low-noise operation [rpm]	1,800	1,800	1,800	1,800	1,800	1,800	1,800
Min. inlet pressure suction port	0.8 bar (11.6 psi) absolute						
Maximum housing pressure	2 bar (29.0 psi) (1 bar (14.5 psi) gage pressure)						
Medium-pressure version Continuous pressure Max. pressure [1] [bar] ([psi]) Pressure peak High-pressure version Continuous pressure Max. pressure [1] [bar] ([psi]) Pressure peak	280 (4,000) 315 (4,570) 350 (5,000) 350 (5,000) 385 (5,580) 420 (6,000)	280 (4,000) 315 (4,570) 350 (5,000) 350 (5,000) 385 (5,580) 420 (6,000)	280 (4,000) 315 (4,570) 350 (5,000)	280 (4,000) 315 (4,570) 350 (5,000) 350 (5,000) 385 (5,580) 420 (6,000)	280 (4,000) 315 (4,570) 350 (5,000) 350 (5,000) 385 (5,580) 420 (6,000)	280 (4,000) 315 (4,570) 350 (5,000)	280 (4,000) 315 (4,570) 350 (5,000)
Hydraulic fluid	HFD-U (HFD-R after consultation)						
Hydraulic fluid temperature range	0 °C to +80 °C (+32 °F to +176 °F)						
Viscosity	Allowable operational range 12 mm²/s to 100 mm²/s; recommended operational range 16 mm²/s to 46 mm²/s. Hydraulic fluid according to viscosity class ISO VG 46 or VG 32 Maximum viscosity 500 mm²/s during start-up with electric motor at 1,800 rpm						
Filtering	NAS 1638, class 9; ISO 4406, class 20/18/15; obtained with filter fineness $\beta_{20} = 75$ [2] NAS 1638, class 7; ISO 4406, class 18/16/13; with electro-hydraulic control (RKP-D)						

[1] Maximum pressure according to DIN 24 312

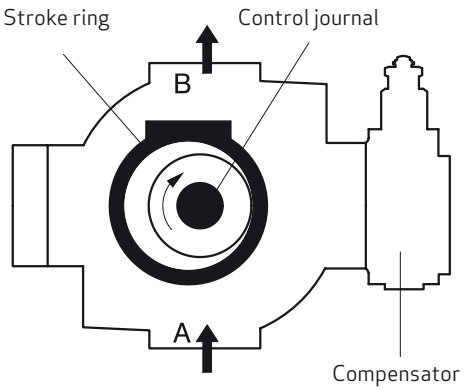
[2] Dirt particles retention rate > 20 µm (> 0.0008 in) is 1: 75, i.e. 98.67 %

1,000 psi = 70 bar

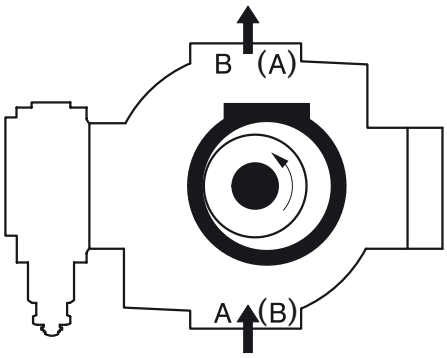
ADJUSTMENT RANGE

⚠ **Caution**
The direction of rotation cannot be changed!

Clockwise rotation

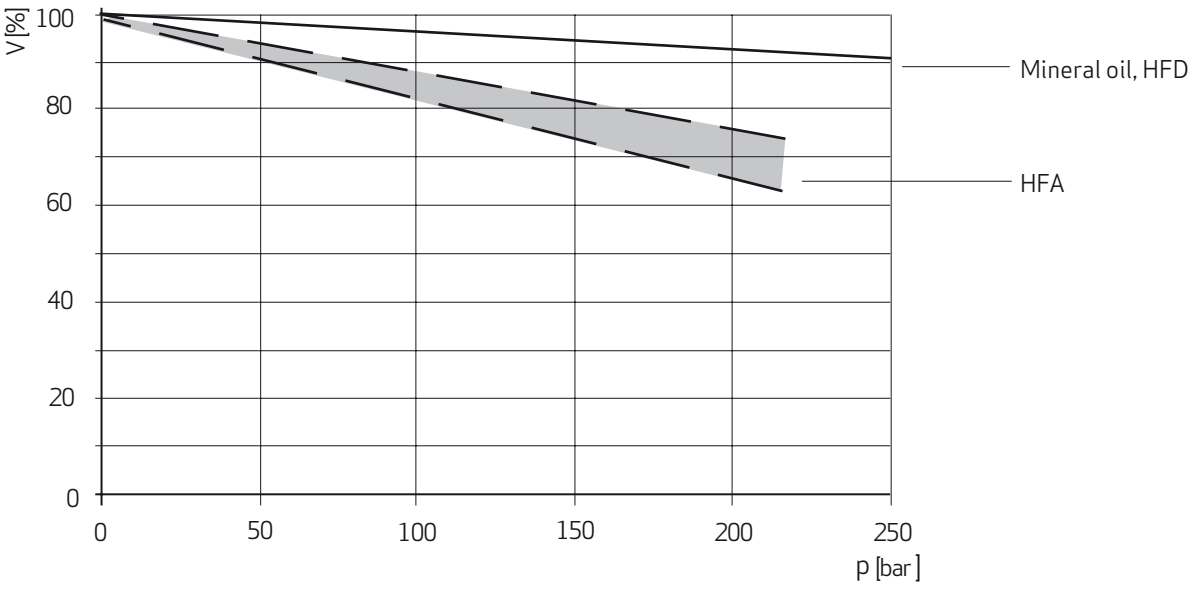


Counterclockwise rotation



Note: Except for RKP 19
Counterclockwise rotation:
Suction port (B)
Pressure port (A)

Volumetric efficiency for HFA



RKP – MULTIPLE PUMPS

Additional pumps can be tandem-mounted on the radial piston pump, so that all pump stages can be driven by the same shaft. Radial piston pumps (the same size or smaller than the first pump stage) can be mounted directly.

Other pumps may be added on using adapter flanges for SAE-A, SAE-B or SAE-C respectively. For the maximum permitted through-drive torque for driving add-on pumps, please refer to the table below.

Adding on RKP, SAE-A, SAE-B or SAE-C adapters Permissible through-drive torques

Pump stage 1	**Pump stage 2**						
RKP-II	**RKP-II**				**SAE-A**	**SAE-B**	**SAE-C**
Size (cm^3/rev) (cu.in/rev)	19 (1.16)	32 (1.95) 45 (2.75)	63 (3.84) 80 (4.88) 100 (6.10)	140 (8.54)			
19 (1.16)	90 Nm (66.4 lbf ft)	–	–	–	90 Nm (66.4 lbf ft)	–	–
32/45 (1.95/2.75)	185 Nm (136.4 lbf ft)	185 Nm (136.4 lbf ft)	–	–	110 Nm (81.1 lbf ft)	185 Nm (136.4 lbf ft)	–
63/80/100 (3.84/4.88/6.10)	400 Nm (295.0 lbf ft)	400 Nm (295.0 lbf ft)	400 Nm (295.0 lbf ft)	–	110 Nm (81.1 lbf ft)	280 Nm (206.5 lbf ft)	400 Nm (295.0 lbf ft)
140 (8.54)	400 Nm (295.0 lbf ft)	400 Nm (295.0 lbf ft)	400 Nm (295.0 lbf ft)	620 Nm (457.3 lbf ft)	110 Nm (81.1 lbf ft)	280 Nm (206.5 lbf ft)	620 Nm (457.3 lbf ft)

The through-drive torque required to drive add-on pumps is determined by reference to the following variables:

V [cm^3/rev]	Displacement
p [bar]	Pressure
ηhm [%]	Hydro-mechanical efficiency
M [Nm]	Through-drive torque

Through-drive torque from pump stage 1 to 2:

$$M_1 = 1.59 \cdot \sum_{i=2}^{n} \frac{V_i \cdot p_i}{\eta_{hmi}}$$

Example
Referred to a pump combination RKP63 + RKP 63 + RKP32 + AZP 16 280 bar, 210 bar, 150 bar, 50 bar this means:

Design of 1st through-drive

The pressure and flow of the 1st pump stage are irrelevant to the torque transferred by the through-drive. This torque can be calculated using the above formula:

$$M_1 = 1.59 \cdot \left(\frac{V_2 \cdot p_2}{\eta_{hm2}} + \frac{V_3 \cdot p_3}{\eta_{hm3}} + \frac{V_4 \cdot p_4}{\eta_{hm4}} \right)$$

$M_1 = 1.59 \cdot (63 \cdot 210 / 95 + 32 \cdot 150 / 93 + 16 \cdot 50 / 90)$ Nm

$M_1 = 318$ Nm (234.5 lbf ft)

The value 318 Nm (234.5 lbf ft) is below the threshold value of 400 Nm (295.0 lbf ft) specified in the above table for mounting an RKP 63 on another RKP 63.

Design of 2nd through-drive

$$M_2 = 1.59 \cdot \left(\frac{V_3 \cdot p_3}{\eta_{hm3}} + \frac{V_4 \cdot p_4}{\eta_{hm4}} \right)$$

$M_2 = 1.59 \cdot (32 \cdot 150 / 93 + 16 \cdot 50 / 90)$ Nm

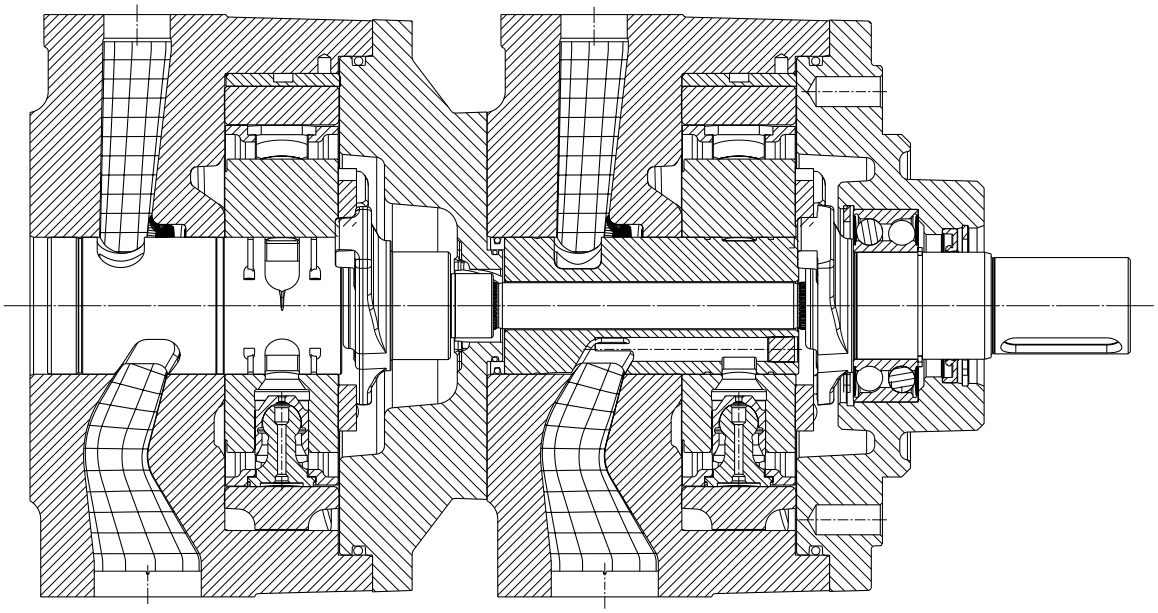
$M_2 = 96$ Nm (70.8 lbf ft)

Likewise, the value 96 Nm (70.8 lbf ft) lies below the relevant threshold value of 400 Nm (295.0 lbf ft) for the through-drive from an RKP–II 63 to an RKP–II 32.

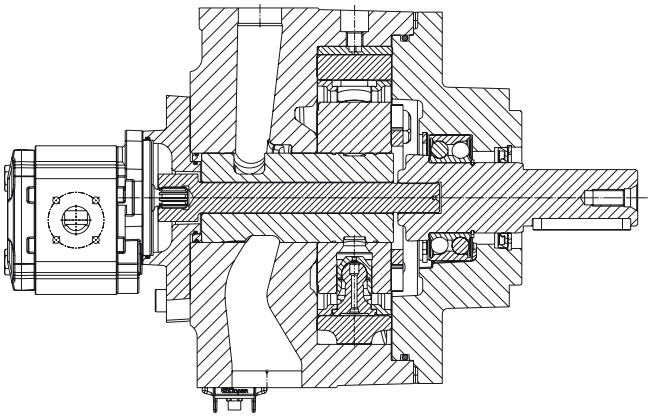
Design of 3rd through-drive

Similarly, a value of 14 Nm (10.3 lbf ft) is obtained for the torque required to drive the add-on gear pump. Thus, the through-drives for this pump combination are permissible with the stated pressures.

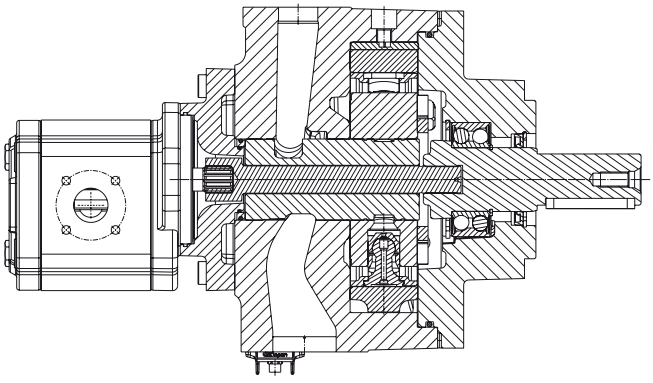
Radial piston pump with through-drive and tandem-mounted radial piston pump



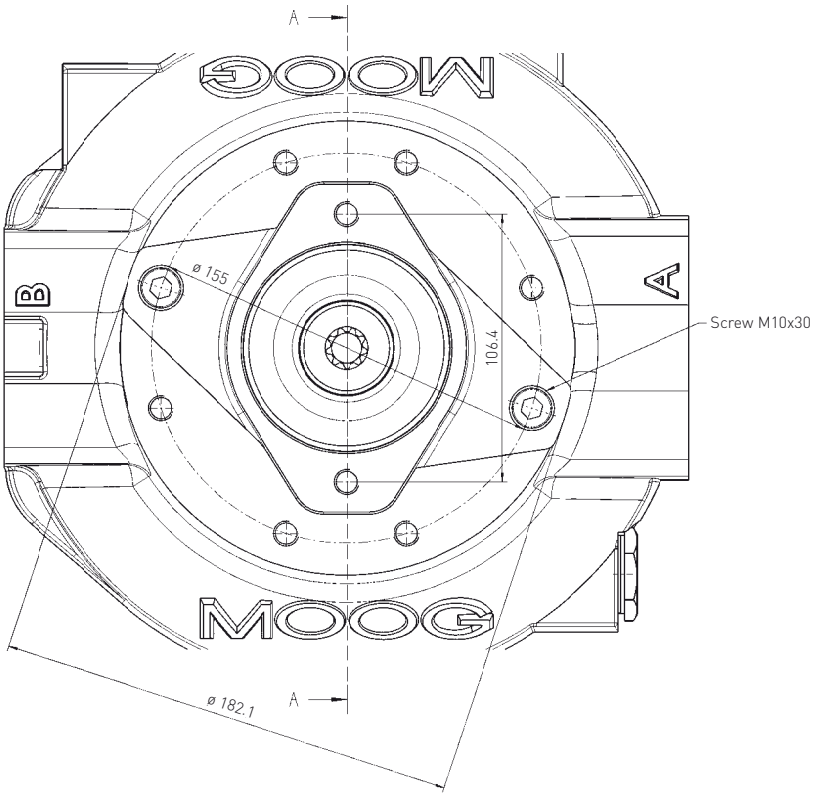
Radial piston pump with tandem-mounted gear pump using SAE-A adapter

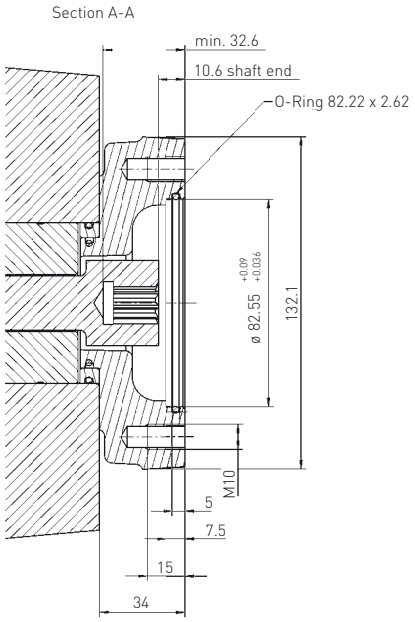


Radial piston pump with tandem-mounted gear pump using SAE-B adapter



ADAPTER FLANGE FOR FITTING AN EXTERNAL PUMP WITH SAE-A FLANGE AND 9-TOOTH SHAFT





Flange code: 82-2

Shaft code: 16-4

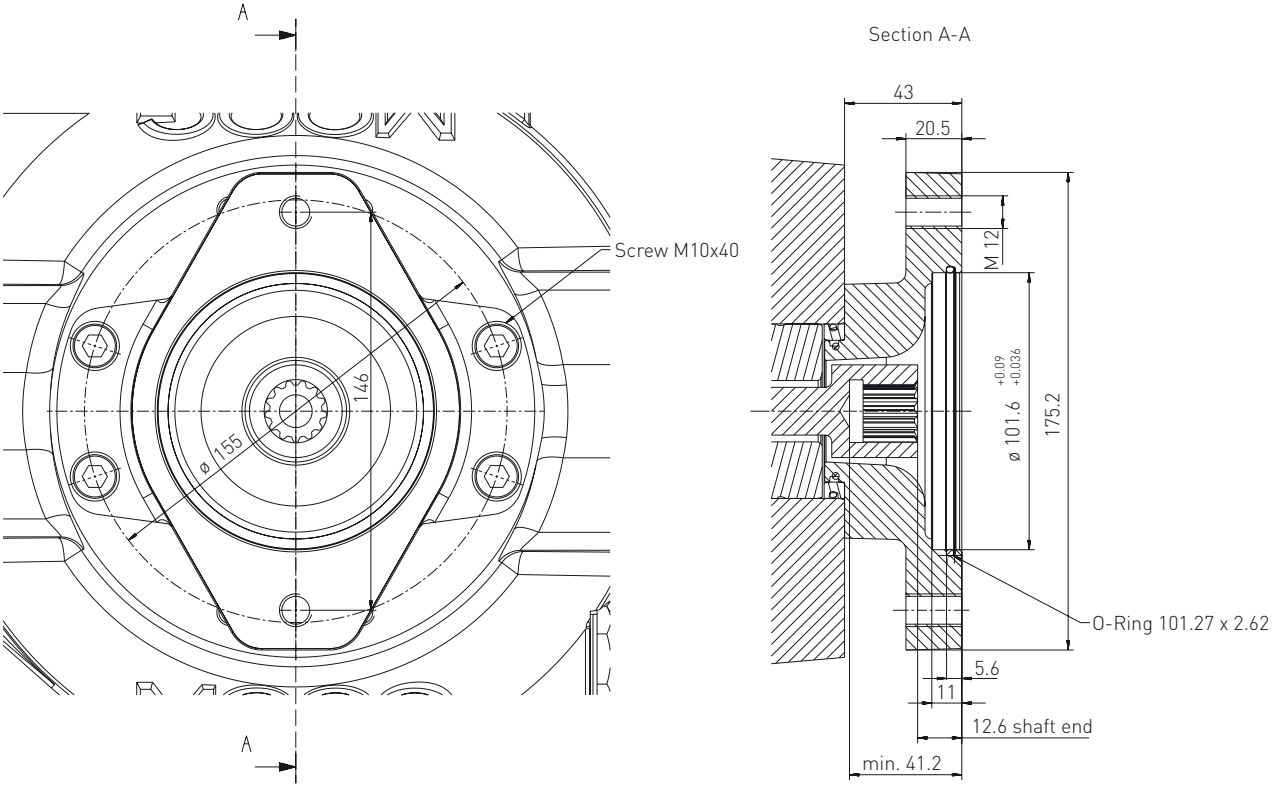
Toothing to: ANSI B92.1 9T 16/32 DP Flat root side fit

Conditions for attachment: RKP with heavy-duty through-drive

Adapter including through-drive shaft, seals (HNB-R), intermediate ring for RKP 63-140 and 2 fastening screws.

RKP 19	**CA41832-001-00**
RKP 32/45	**CA51553-001-00**
RKP 63/80/100	**CA64727-001-00**
RKP 140	**CA64728-001-00**

ADAPTER FLANGE FOR FITTING AN EXTERNAL PUMP WITH SAE-B FLANGE ACCORDING TO ISO 3019-1 AND 13-TOOTH SHAFT



Flange code: 101-2

Shaft code: 22-4

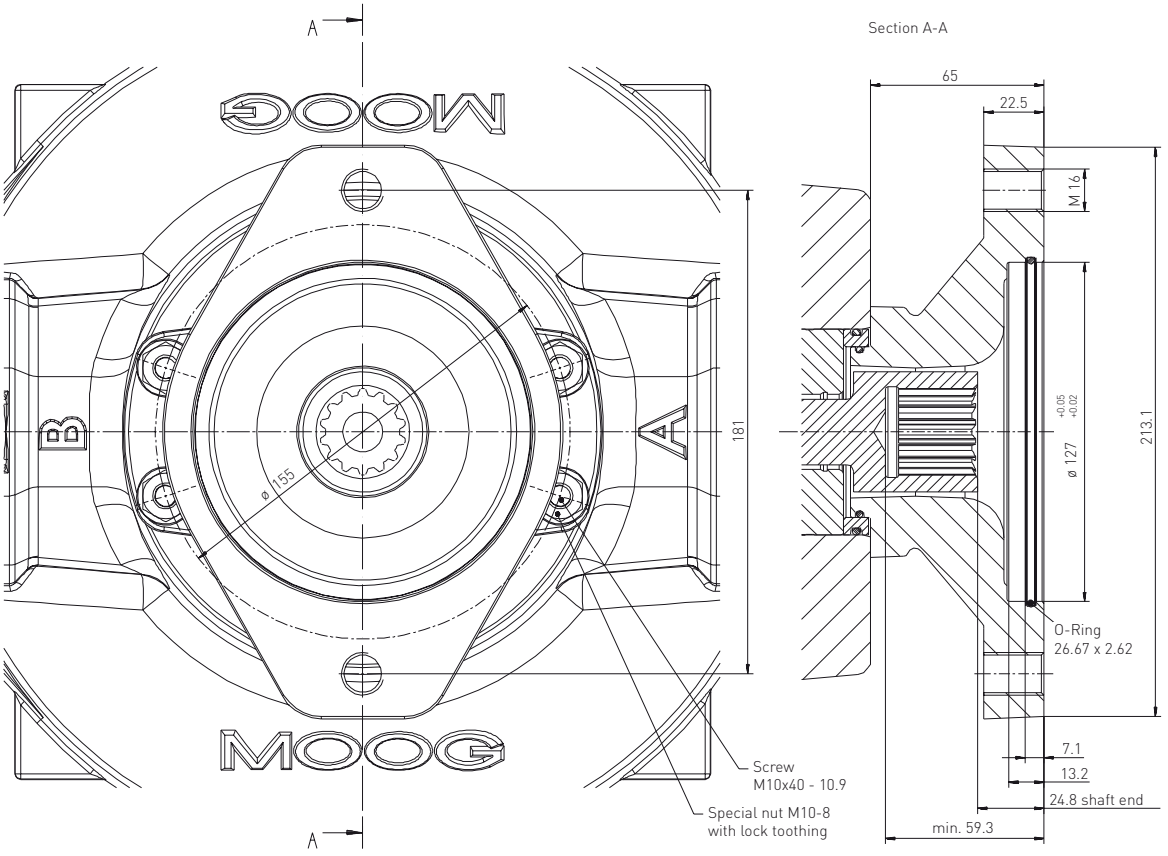
Toothing to: ANSI B92.1 13T 16/32 DP Flat root side fit

Conditions for attachment: RKP with heavy-duty through-drive

Adapter including through-drive shaft, seals (HNB-R), intermediate ring for RKP 63-140 and 2 fastening screws.

RKP 32/45	**CA36273-001**
RKP 63/80/100	**CA34793-001**
RKP 140	**CA50487-001**

ADAPTER FLANGE FOR FITTING AN EXTERNAL PUMP WITH SAE-C FLANGE ACCORDING TO ISO 3019-1 AND 14-TOOTH SHAFT



Flange code: 127-2

Shaft code: 32-4

Toothing to: ANSI B92.1 14T 12/24 DP Flat root side fit

Conditions for attachment: RKP with heavy-duty through-drive

Adapter including through-drive shaft, seals (HNB-R), intermediate ring for RKP 140 and 4 fastening screws and special nut.

RKP 63/80/100	**CA64621-001**
RKP 140	**CA64622-001**

COMPENSATOR OPTIONS

A wide range of compensator options can be realized with the RKP-II, thereby guaranteeing maximum flexibility. The following options are described in more detail in Appendix A.

Compensator options	Description/characteristics/application
1. Adjustable pressure compensator, Type F	For constant pressure systems with a fixed pressure setting.
2. Remote pressure compensator, Type H1	For constant or variable pressure systems with remote pressure
3. Pressure compensator with Mooring control, Type H2	For constant pressure systems with a variable pressure setting for mooring control
4. Combined pressure and flow compensator, Type J	For displacement systems with a variable flow and load sensing pressure control (hydromechanical compensator concept).
5. Combined pressure and flow compensator with P-T control notch, Type R	As 4. with additional active reduction of pressure peaks in the event of dynamic control process
6. Mechanical stroke adjustment, Type B	For displacement systems with a fixed displacement that may be manually adjusted as needed.
7. Servo control, Type C1	Adjustment of displacement using a hand lever or an actuator.
8. Electro-hydraulically adjustable compensator with digital on-board electronics, Type D	For displacement systems with a variable flow and load sensing pressure control

Radial piston pump for potentially explosive atmospheres

In conjunction with all the hydraulic/mechanical compensators the radial piston pump is available in a version for potentially explosive atmospheres. This pump can be installed and operated in an environment conforming to Group II, Category 2 GD, Explosion Groups II A, II B and II C. The following range of application according to the EC Directive 94/9/EC is permissible:

II --/2 GD +135 °C (+275 °F) (T4) –15 °C (+5 °F) ≤ Ta ≤ +60 °C (+140 °F)

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

TYPE CODE HFA/HFB (1)

THE TYPE CODE DESCRIBES PUMP OPTIONS

Design interfaces (flange, shaft end and ports), hydraulic parameters (volume flow, operating pressure and hydraulic fluid), and compensator/control options are defined.

EXAMPLE

Position no.	1		2	3	4			
Drive	HP	-	R	18	B7	-		
Position no. (pump)	5	6	7	8	9	10	11	12
Pump 1	RKP	100	T	A	12	J1	Y	00
Pump 2	RKP	063	K	A	12	F2	Z	00
Pump 3	RKP	019	S	A	12	B1	Z	00

		Drive			Radial piston pump							
Pos.	1	2	3	4	5	6	7	8	9	10	11	12
Sym.	HP	R	18	B7	RKP	100	T	A	12	D1	Z	00

Radial piston pump

5	6	7	8	9	10	11	12
RKP	063	K	A	12	D2	Z	00

Additional Pump stage

5	6	7	8	9	10	11	12
AZP	008	R	A	05	TP	0	00

Type code for version for HFA/HFB fluid

Position	Sym.	Drive
1		**Code**
	HP	Hydraulic pump
	HK	RKP for potentially explosive atmospheres
	HZ	Pump with special features
2		**Direction of rotation**
	R	Clockwise, looking at drive shaft
	L	Counterclockwise, looking at drive shaft
3	18	**Speed**
		Maximum speed for low-noise operation or rated speed for power-controlled pumps, e.g. 18 ≙ 1,800 rpm
4		**Drive flange**
	A7	Straight key according to ISO 2491, 4-hole ISO flange according to ISO 3019/2 (metric)

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

TYPE CODE HFA/HFB (2)

Position	Sym.	Radial piston pump
5		**Pump type**
	RKP	Radial piston pump, variable displacement
	AZP	Moog gear pump with SAE-A and SAE-B flange
		Attachment of other pumps
	DS1	Through-drive for RKP attachment and adapter flange for SAE-A, SAE-B and SAE-C
6		**Displacement RKP-II**
	019	19 cm^3/rev (1.16 cu.in/rev)
	032	32 cm^3/rev (1.95 cu.in/rev)
	063	63 cm^3/rev (3.84 cu.in/rev)
	080	80 cm^3/rev (4.88 cu.in/rev)
		Displacement and attachment flange of Moog gear pumps (AZP)
	005	5 cm^3/rev (0.31 cu.in/rev) SAE-A
	008	8 cm^3/rev (0.49 cu.in/rev) SAE-A
	011	11 cm^3/rev (0.67 cu.in/rev) SAE-A
	016	16 cm^3/rev (0.98 cu.in/rev) SAE-A
	019	19 cm^3/rev (1.16 cu.in/rev) SAE-A
	023	23 cm^3/rev (1.40 cu.in/rev) SAE-A
	031	31 cm^3/rev (1.89 cu.in/rev) SAE-A
	033	33 cm^3/rev (2.01 cu.in/rev) SAE-B
	044	44 cm^3/rev (2.68 cu.in/rev) SAE-B
	050	50 cm^3/rev (3.05 cu.in/rev) SAE-B
7		**Pump ports**
	K	Medium-pressure series (to 280 bar (4,000 psi)) sizes 32, 45, 63 and 80 cm^3/rev (1.95, 2.75, 3.84 and 4.88 cu.in/rev)
	S	Medium-pressure series (to 280 bar (4,000 psi)) size 19 cm^3/rev (1.16 cu.in/rev)
	R	German 4 bolt flange (only for gear pumps)
8		**Hydraulic fluid**
	A	HFA (oil in water)
9		**Operating pressure**
	12	Maximum operating pressure, e.g. 12 ≙ 120 bar (1,740 psi)
10		**Control/Compensators**
	B1	Mechanical stroke adjustment (V = constant)
	C1	Servo control
	D1	RKP-D (electro-hydraulic control with digital on-board electronics), analog or digital activation and internal pressure supply
	D2	RKP-D (electro-hydraulic control with digital on-board electronics), analog or digital activation and external pressure supply
	F1	Adjustable pressure compensator 30 bar to 105 bar (435 psi to 1,520 psi)
	F2	Adjustable pressure compensator 80 bar to 280 bar (1,160 psi to 4,000 psi)
	G1	Adjustable pressure compensator, lockable 30 bar to 150 bar (435 psi to 2,175 psi)
	G2	Adjustable pressure compensator, lockable 80 bar to 350 bar (1,160 psi to 5,000 psi)
	H1	Hydraulically actuated pressure compensator
	J1	Combined pressure and flow compensator Δp = 10 bar (145 psi)
	J2	Combined pressure and flow compensator Δp = 20 bar (290 psi)
	TP	Gear pump: without compensator
11		**Additional equipment**
	Z	No accessories
	Y	Maximum flow limiter
	0	Only at gear pump
12		**Additional information:**
		General:
	00	Without
		For compensators D1 and D2:
	00	Actual value 4 mA to 20 mA
	01	Actual value 2 V to 10 V
		For tandem gear pumps: Displacement of the 2nd gear pump stage
	05 to 50	5 cm^3/rev (0.31 cu.in/rev) to 50 cm^3/rev (3.05 cu.in/rev)

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

TYPE CODE HFC (1)

Position	Sym.	Drive
1		**Code**
	HP	Hydraulic pump
	HK	RKP for potentially explosive atmospheres
	HZ	Pump with special features
2		**Direction of rotation**
	R	Clockwise, looking at drive shaft
	L	Counterclockwise, looking at drive shaft
3		**Speed**
	18	Maximum speed for low-noise operation or rated speed for power-controlled pumps, e.g. 18 ≙ 1,800 rpm
4		**Drive flange**
	A1	Straight key according to ISO 2491, metric round flange (not for RKP 140)
	B1	Involute spline according to DIN 5482, metric round flange (not for RKP 140)
	A7	Straight key according to ISO 2491, 4-hole ISO flange according to ISO 3019/2 (metric)
	B7	Involute spline according to DIN 5480, 4-hole ISO flange according to ISO 3019/2 (metric)
	C3	Straight key according to SAE 744 C, 2/4-hole SAE flange according to ISO 3019/1 (imperial)
	D3	Involute spline according to SAE 744 C (ISO 3019/1), 2/4-hole SAE flange according to ISO 3019/1 (imperial)
	XX	Intermediate flange RKP/RKP
5		**Pump type**
	RKP	Radial piston pump, variable displacement
	AZP	Moog gear pump with SAE-A and SAE-B flange
		Attachment of other pumps
	DS1	Through-drive for RKP attachment and adapter flange for SAE-A, SAE-B and SAE-C
6		**Displacement RKP-II**
	019	19 cm^3/rev (1.16 cu.in/rev)
	032	32 cm^3/rev (1.95 cu.in/rev)
	045	45 cm^3/rev (2.75 cu.in/rev)
	063	63 cm^3/rev (3.84 cu.in/rev)
	080	80 cm^3/rev (4.88 cu.in/rev)
	100	100 cm^3/rev (6.10 cu.in/rev)
	140	140 cm^3/rev (8.54 cu.in/rev)
		Displacement and attachment flange of Moog gear pumps (AZP)
	005	5 cm^3/rev (0.31 cu.in/rev) SAE-A
	008	8 cm^3/rev (0.49 cu.in/rev) SAE-A
	011	11 cm^3/rev (0.67 cu.in/rev) SAE-A
	016	16 cm^3/rev (0.98 cu.in/rev) SAE-A
	019	19 cm^3/rev (1.16 cu.in/rev) SAE-A
	023	23 cm^3/rev (1.40 cu.in/rev) SAE-A
	031	31 cm^3/rev (1.89 cu.in/rev) SAE-A
	033	33 cm^3/rev (2.01 cu.in/rev) SAE-B
	044	44 cm^3/rev (2.68 cu.in/rev) SAE-B
	050	50 cm^3/rev (3.05 cu.in/rev) SAE-B
7		**Pump ports**
	K	Medium-pressure series (to 280 bar (4,000 psi)) sizes 32, 45, 63 and 80 cm^3/rev (1.95, 2.75, 3.84 and 4.88 cu.in/rev)
	T	Medium-pressure series (to 280 bar (4,000 psi)) sizes 100 cm^3/rev (6.10 cu.in/rev) and 140 cm^3/rev (8.54 cu.in/rev)
	S	Medium-pressure series (to 280 bar (4,000 psi)) size 19 cm^3/rev (1.16 cu.in/rev)
	R	German 4 bolt flange (only for gear pumps)
8		**Hydraulic fluid**
	C	HFC (water glycol)

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS
TYPE CODE HFC (2)

Position	Sym.	Radial piston pump
9		**Operating pressure**
	21	Maximum operating pressure, e.g. 21 ≙ 210 bar (3,000 psi)
10		**Control/Compensators**
	B1	Mechanical stroke adjustment (V = constant)
	C1	Servo control
	D1 [1]	RKP-D (electro-hydraulic control with digital on-board electronics), analog or digital activation and internal pressure supply
	D2 [1]	RKP-D (electro-hydraulic control with digital on-board electronics), analog or digital activation and external pressure supply
	D3 [1]	RKP-D with external pressure supply, usable for hybrid operation
	D4 [1]	RKP-D with internal pressure supply, usable for hybrid operation
	D5 [1]	RKP-D with internal pressure supply usable for master/slave operation
	D6 [1]	RKP-D with external pressure supply usable for master/slave operation
	D7 [1]	RKP-D with external pressure supply usable for master/slave and hybrid operation
	D8 [1]	RKP-D with internal pressure supply usable for master/slave and hybrid operation
	F1	Adjustable pressure compensator 30 bar to 105 bar (435 psi to 1,520 psi)
	F2	Adjustable pressure compensator 80 bar to 280 bar (1,160 psi to 4,000 psi)
	H1	Hydraulically actuated pressure compensator
	J1	Combined pressure and flow compensator Δp = 10 bar (145 psi)
	J2	Combined pressure and flow compensator Δp = 20 bar (290 psi)
	R1	Combined pressure and flow compensator with P-T control notch
	TP	Gear pump: without compensator
11		**Additional equipment**
	Z	No accessories
	Y	Maximum flow limiter
	0	Only at gear pump
12		**Additional information**
		General:
	00	Without
		For compensators D1 to D8:
	00	Actual value 4 mA to 20 mA
	01	Actual value 2 V to 10 V
		For tandem gear pumps: Displacement of the 2nd gear pump stage
	05 to 50	5 cm^3/rev (0.31 cu.in/rev) to 50 cm^3/rev (3.05 cu.in/rev)

[1] See Supplementary Catalog RKP with digital control (RKP-D)

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

TYPE CODE HFD (1)

Pos.	Sym.	Drive
1		**Code**
	HP	Hydraulic pump
	HK	RKP for potentially explosive atmospheres
	HZ	Pump with special features
2		**Direction of rotation**
	R	Clockwise, looking at drive shaft
	L	Counterclockwise, looking at drive shaft
3	18	**Speed** Maximum speed for low-noise operation or rated speed for power-controlled pumps, e.g. 18 ≙ 1,800 rpm
4		**Drive flange**
	A1	Straight key according to ISO 2491, metric round flange (not for RKP 140)
	B1	Involute spline according to DIN 5482, metric round flange (not for RKP 140)
	A7	Straight key according to ISO 2491, 4-hole ISO flange according to ISO 3019/2 (metric)
	B7	Involute spline according to DIN 5480, 4-hole ISO flange according to ISO 3019/2 (metric)
	C3	Straight key according to SAE 744 C, 2/4-hole SAE flange according to ISO 3019/1 (imperial)
	D3	Involute spline according to SAE 744 C (ISO 3019/1), 2/4-hole SAE flange according to DIN ISO 3019/1 (imperial)
	XX	Intermediate flange RKP/RKP
5		**Pump type**
	RKP	Radial piston pump, variable displacement
	AZP	Moog gear pump with SAE-A and SAE-B flange
		Attachment of other pumps
	DS1	Through-drive for RKP attachment and adapter flange for SAE-A, SAE-B and SAE-C
6		**Displacement RKP-II**
	019	19 cm^3/rev (1.16 cu.in/rev)
	032	32 cm^3/rev (1.95 cu.in/rev)
	045	45 cm^3/rev (2.75 cu.in/rev)
	063	63 cm^3/rev (3.84 cu.in/rev)
	080	80 cm^3/rev (4.88 cu.in/rev)
	100	100 cm^3/rev (6.10 cu.in/rev)
	140	140 cm^3/rev (8.54 cu.in/rev)
		Displacement and attachment flange of Moog gear pumps (AZP)
	005	5 cm^3/rev (0.31 cu.in/rev) SAE-A
	008	8 cm^3/rev (0.49 cu.in/rev) SAE-A
	011	11 cm^3/rev (0.67 cu.in/rev) SAE-A
	016	16 cm^3/rev (0.98 cu.in/rev) SAE-A
	019	19 cm^3/rev (1.16 cu.in/rev) SAE-A
	023	23 cm^3/rev (1.40 cu.in/rev) SAE-A
	031	31 cm^3/rev (1.89 cu.in/rev) SAE-A
	033	33 cm^3/rev (2.01 cu.in/rev) SAE-B
	044	44 cm^3/rev (2.68 cu.in/rev) SAE-B
	050	50 cm^3/rev (3.05 cu.in/rev) SAE-B
7		**Pump ports**
	K	Medium-pressure series (to 280 bar (4,000 psi)) sizes 32, 45, 63 and 80 cm^3/rev (1.95, 2.75, 3.84 and 4.88 cu.in/rev)
	T	Medium-pressure series (to 280 bar (4,000 psi)) sizes 100 cm^3/rev (6.10 cu.in/rev) and 140 cm^3/(8.54 cu.in/rev)
	T	High-pressure series (to 350 bar (5,000 psi)) sizes 32, 45, 63 and 80 cm^3/rev (1.95, 2.75, 3.84 and 4.88 cu.in/rev)
	S	Medium-pressure series (to 280 bar (4,000 psi)) size 19 cm^3/rev (1.16 cu.in/rev)
	H	High-pressure series (to 280 bar (4,000 psi)) size 19 cm^3/rev (1.16 cu.in/rev)
	R	German 4 bolt flange (only for gear pumps)

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS
TYPE CODE HFD (2)

Pos.	Sym.	Radial piston pump
8		**Hydraulic fluid**
	D	HFD (synthetic ester)
9		**Operating pressure**
	28	Maximum operating pressure, e.g. 28 ≙ 280 bar (4,000 psi)
	35	Maximum operating pressure, e.g. 35 ≙ 350 bar (5,000 psi)
10		**Control/Compensators**
	B1	Mechanical stroke adjustment (V = constant)
	C1	Servo control
	D1 [1]	RKP-D (electro-hydraulic control with digital on-board electronics), analog or digital activation and internal pressure supply
	D2 [1]	RKP-D (electro-hydraulic control with digital on-board electronics), analog or digital activation and external pressure supply
	D3 [1]	RKP-D with external pressure supply, usable for hybrid operation
	D4 [1]	RKP-D with internal pressure supply, usable for hybrid operation
	D5 [1]	RKP-D with internal pressure supply usable for master/slave operation
	D6 [1]	RKP-D with external pressure supply usable for master/slave operation
	D7 [1]	RKP-D with external pressure supply usable for master/slave and hybrid operation
	D8 [1]	RKP-D with internal pressure supply usable for master/slave and hybrid operation
	F1	Adjustable pressure compensator 30 bar to 105 bar (435 psi to 1,520 psi)
	F2	Adjustable pressure compensator 80 bar to 280 bar (1,160 psi to 4,000 psi)
	H1	Hydraulically actuated pressure compensator
	J1	Combined pressure and flow compensator Δp = 10 bar (145 psi)
	J2	Combined pressure and flow compensator Δp = 20 bar (290 psi)
	R1	Combined pressure and flow compensator with P-T control notch
	TP	Gear pump
11		**Additional equipment**
	Z	No accessories
	Y	Maximum flow limiter
	0	Only at gear pump
12		**Additional information**
		General:
	00	Without
		For compensators D1 to D8:
	00	Actual value 4 mA to 20 mA
	01	Actual value 2 V to 10 V
		For tandem gear pumps:
		Displacement of the 2nd gear pump stage
	05 to 50	5 cm^3/rev (0.31 cu.in/rev) to 50 cm^3/rev (3.05 cu.in/rev)

[1] See Supplementary Catalog RKP with digital control (RKP-D)

TECHNICAL INFORMATION

⚠Important
The pump must be put into service by a trained hydraulic systems engineer.

Installation
The radial piston pump can be mounted in any position. No radial or axial forces are permitted to act on the drive shaft. The drive must therefore be effected via a flexible coupling. Only remove all the pump sealing plugs immediately before connecting the lines.
Ensure conditions of absolute cleanliness when installing.
The use of cold drawn seamless steel pipes in accordance with DIN 2391 is recommended.

Suction line
A short suction line with a large inside diameter is required to ensure a short acting time and low noise.
Suction rate < 1.5 m/sec (< 4 ft 11 in/s).
Avoid sharp deviations and pipe couplings (risk of air intake and air separation, high flow resistance). Use bent pipes or hoses instead. The minimum permissible inlet pressure must be maintained.
Reduce the suction line only at the pump inlet. If a suction filter (min. 0.15 mm (0.006 in) mesh aperture) or an isolating valve is to be used, it must be installed below the fluid level.

Pressure line
Make sure the line is sufficiently secure.
Check the screw tightening torques.

Drain line (L)
The upper drain port must be used for the drain line and the pipework is to be routed to ensure the housing is always full of fluid. The pipe should lead directly to the tank, separate from other return lines.
The end of the line must be located below the fluid level even when the fluid level is at its lowest in the tank.
Ensure the distance to the suction line is a large as possible.
Do not fit a filter, cooler or non-return valve in the leakage oil line. The maximum recommended length is 3 meters (9 ft 10 in).
Pressure at the drain port maximum 2 bar (29,0 psi) absolute (1 bar (14.5 psi) gage pressure).
The recommended outside pipe diameters for drain lines (lightweight version) are:
RKP 19: 15 mm (0.59 in)
RKP 32 and 45: 18 mm (0.71 in)
RKP 63, 80, 100 and 140: 22 mm (0.87 in)

Flushing the housing
If the pump is operated at low pressure without flow for long periods (t > 15 min, p < 30 bar (< 435 psi), Q = 0 l/min (0 gpm)), pump sizes 63 cm^3/rev (3.84 cu.in/rev) to 100 cm^3/rev (6.10 cu.in/rev) must be flushed with approximately 4 l/min to 6 l/min (0.88 gpm to 1.32 gpm) to dissipate the heat generated. The 140 cm^3/rev (8.54 cu.in/rev) pump must always be flushed with 6 l/min to 8 l/min (1.32 gpm to 1.76 gpm). The flushing line to the pump must be connected to the lower drain port. On pumps for HFC fluid the housing is flushed when the bearing is flushed.

Noise generation
Radial piston pumps have a low primary noise level. However, the level of noise generated by the entire hydraulic unit is very much dependent on the mounting of the pump and on the routing of the lines.
Prevent structure-borne noise from being transmitted to radiating machine components covering a large area by:
– mounting the pump using an anti-vibration flange
– using flexible hoses instead of solid pipes
– clamping the pipework with elastic insert clamps

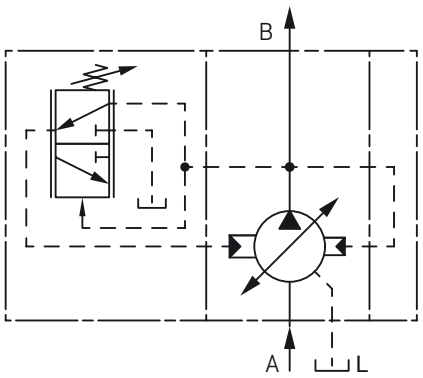
Connections
Suction line to port A and pressure line from port B.
Except for RKP 19 counterclockwise: suction port B, pressure port A.

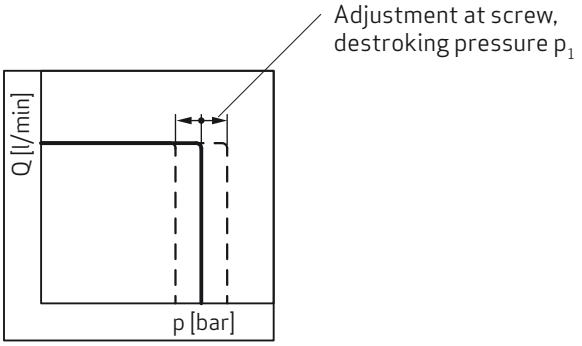
Putting into service
Do not start up the pump without hydraulic fluid. Before switching on, the pump housing must be filled with hydraulic fluid using the drain port.
Jog-start the electric motor to check the correct direction of rotation. Run the pump at low pressure until the hydraulic system has been fully de-aerated.
When putting pumps for HF fluids into operation, the system must be run at low pressure of between 30 bar to 50 bar (435 psi to 725 psi) for approximately 1 hour.

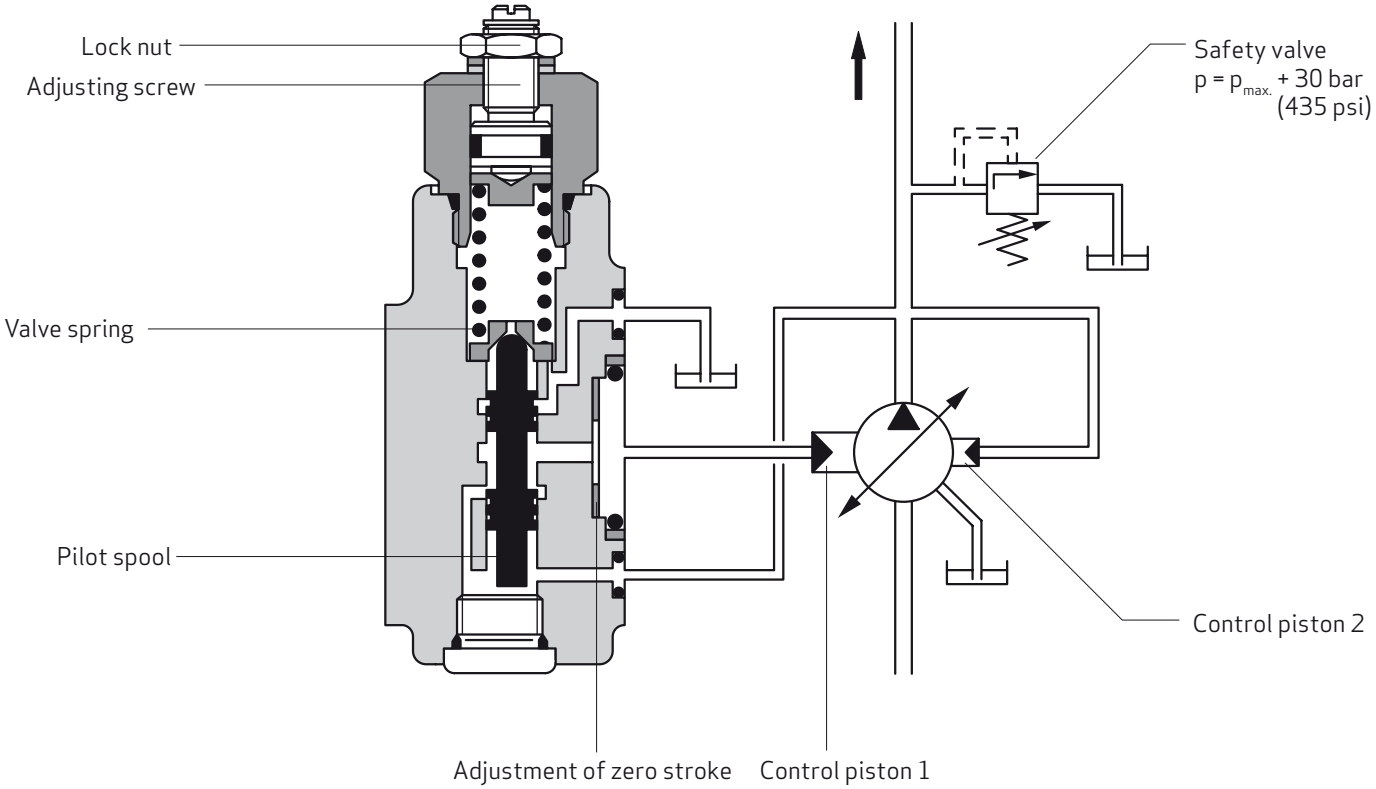
Important
The oil temperature in the tank must not exceed the temperature of the pump by more than 25 °C (77 °F). If this should occur, the pump must be jog-started for intervals of approximately 1 to 2 seconds until the pump casing has heated up.
When changing a pump, clean the suction pipe, drain line and tank. Refill the tank with filtered oil only.

1. ADJUSTABLE PRESSURE COMPENSATOR, F1, F2

Pressure range:
F1: 30 bar to 105 bar (435 psi to 1,520 psi)
F2: 80 bar to 350 bar (1,160 psi to 5,000 psi)

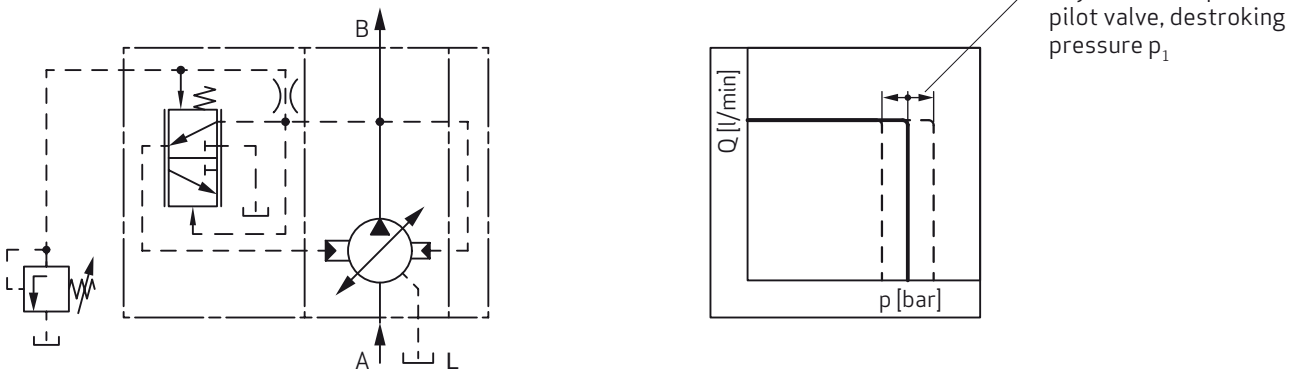


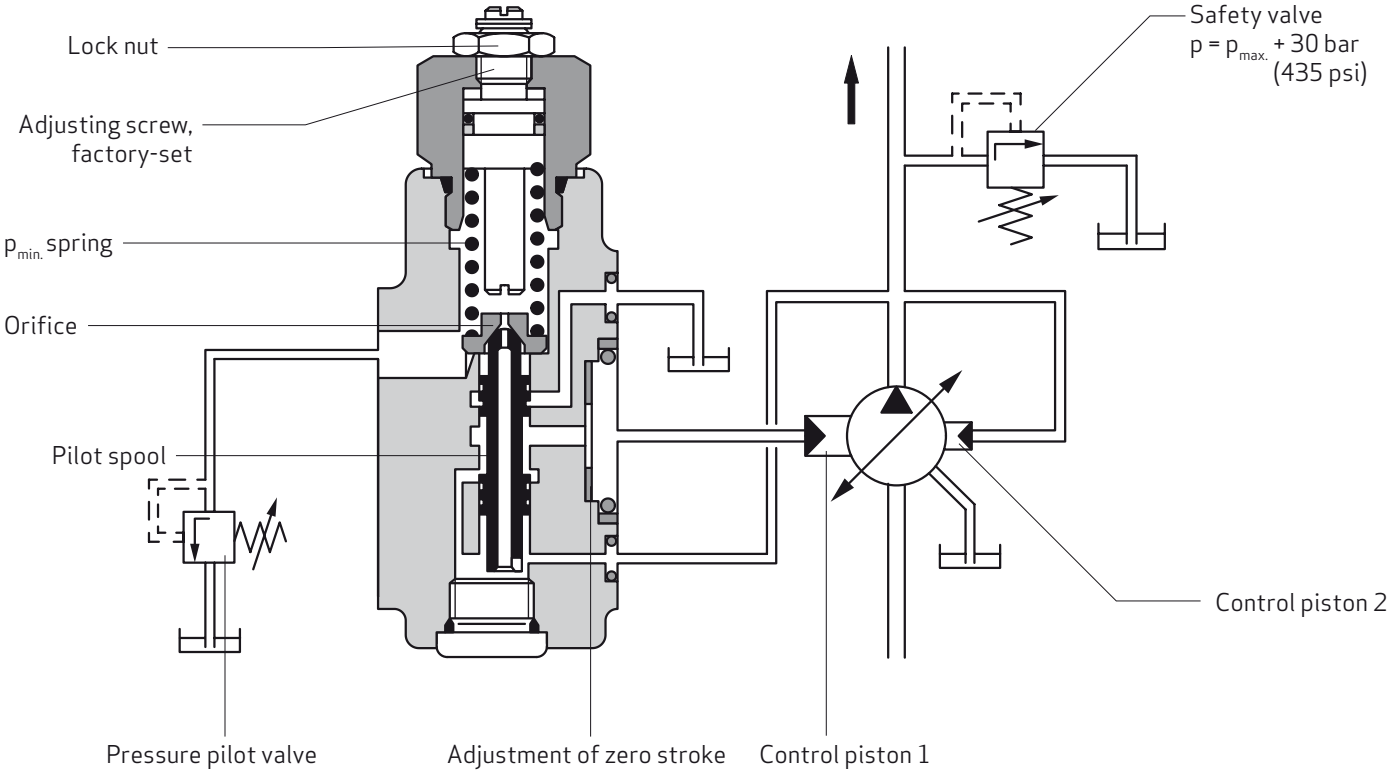




2. Remote pressure compensator H1

Pressure pilot valve:
Manual adjustable or proportional pressure valve
Q = 0.5 l/min to 1.5 l/min (0.11 gpm to 0.33 gpm)

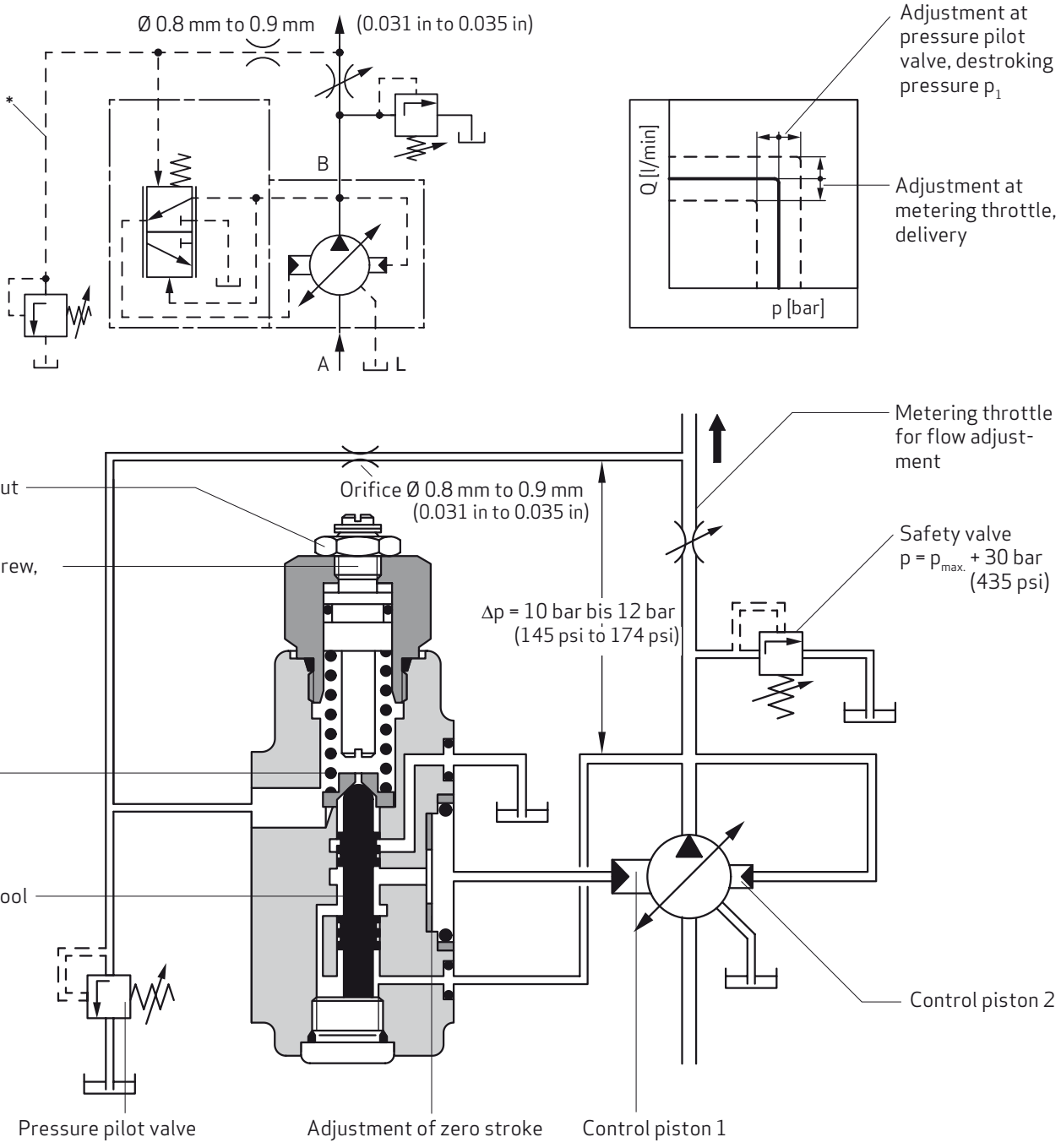




3. COMBINED PRESSURE AND FLOW COMPENSATOR ("load sensing") J1

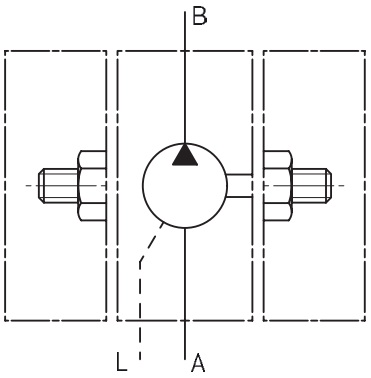
Metering throttle:
Manual adjustable throttle valve or proportional throttle valve.

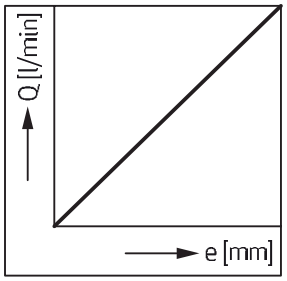
Pressure pilot valve:
Manual adjustable or proportional pressure valve
Q = 0.5 l/min to 1.5 l/min (0.22 gpm to 0.33 gpm)



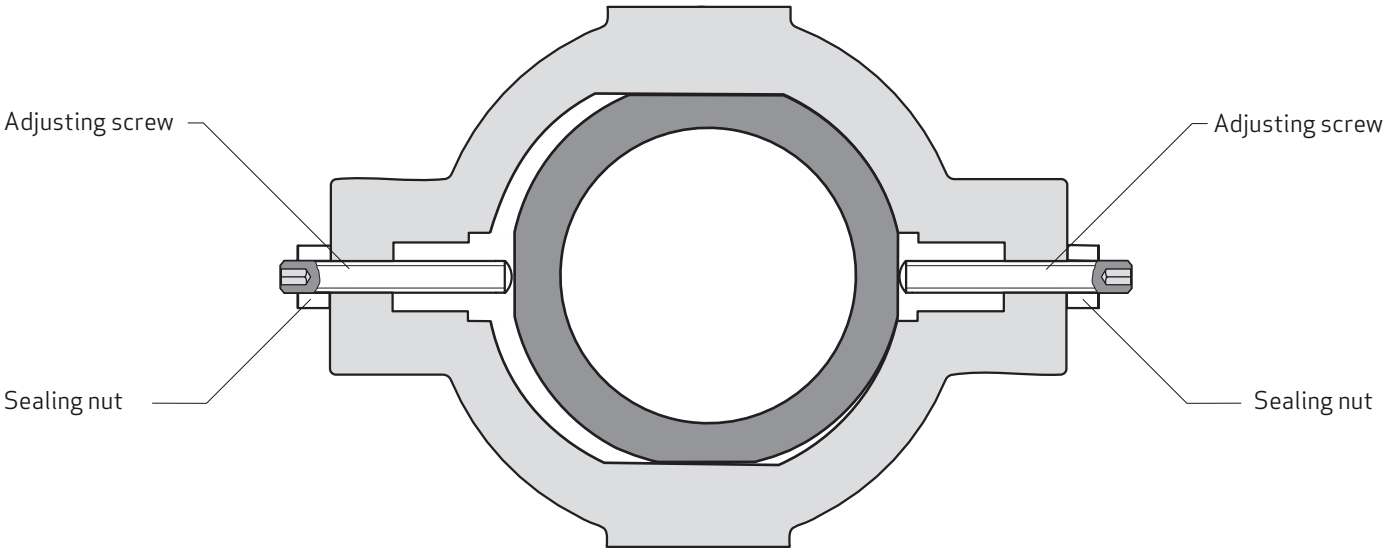
* Recommendation: Hose for pilot oil line, see Page 45

4. MECHANICAL STROKE ADJUSTMENT, B 1





Eccentricity of stroke ring



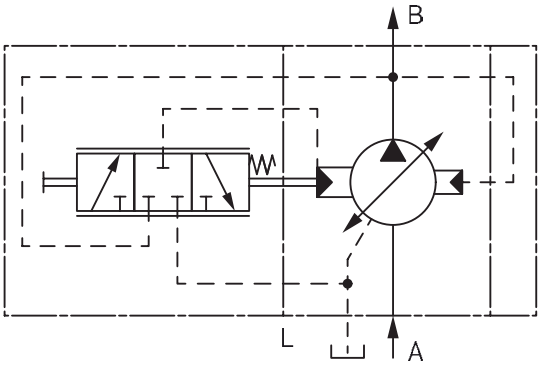
V [cm³/rev] ([cu.in/rev])	19 (1.16)	32 (1.95)	45 (2.75)	63/80 (3.84/4.88)	100 (6.10)	140 (8.54)
ΔV for 1 mm (0.039 in) adjusting spindle travel (pitch 1.5 mm/rev (0.059 in/rev)	3.6 (0.22)	5.6 (0.34)	6.5 (0.40)	8.9 (0.54)	11.3 (0.69)	11.5 (0.70)

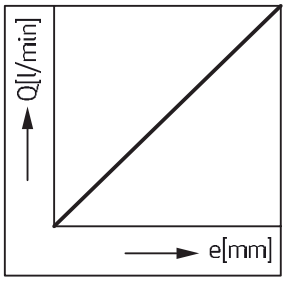
Important

When adjusting for the required delivery, ensure that the stroke ring remains held between the two adjusting spindles. When delivered, the pump is set as standard to $V_{max.}$.

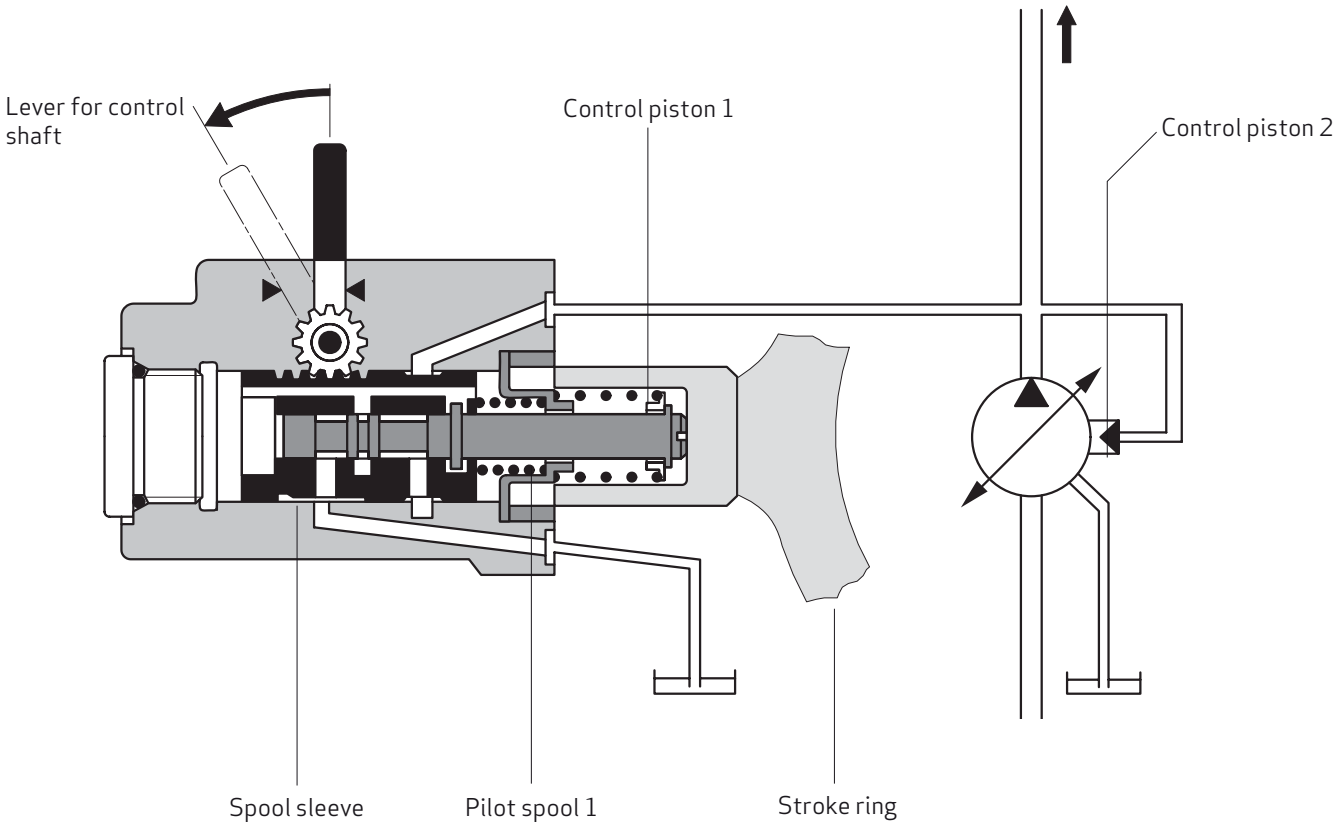
5. SERVO CONTROL, C1

Actuated manually or mechanically by means of a lever. The pump displacement is controlled by the position of the lever.





Eccentricity of stroke ring



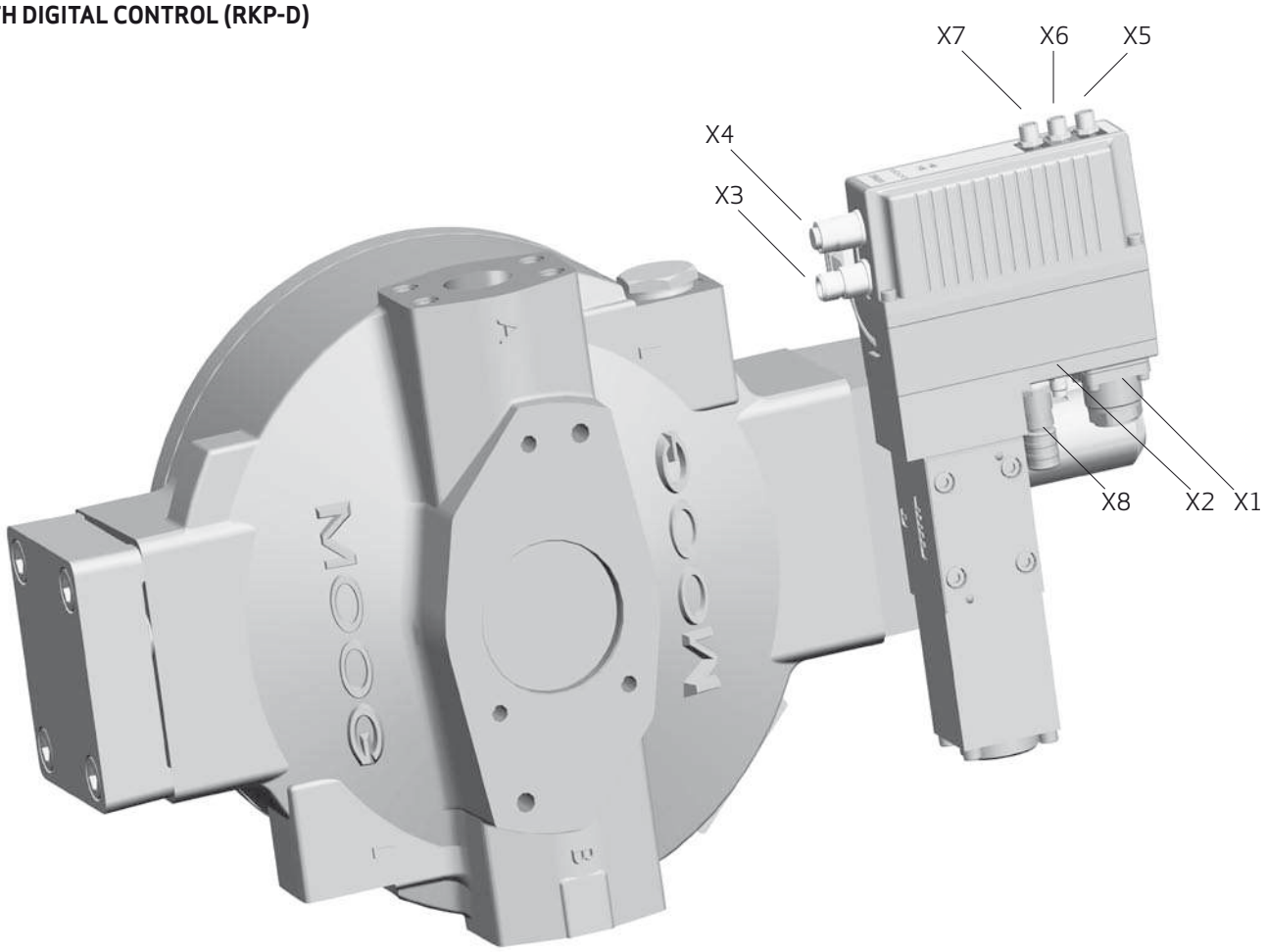
V [cm³/rev] ([cu.in/rev])	Control torque		
	Neutral position	Final position	Maximum permissible
19 (1.16)	1.2 Nm (0.89 lbf ft)	1.7 Nm (1.25 lbf ft)	8 Nm (5.90 lbf ft)
32, 45 (1.95, 2.75)	1.2 Nm (0.89 lbf ft)	1.7 Nm (1.25 lbf ft)	8 Nm (5.90 lbf ft)
63, 80 (3.84, 4.88)	1.6 Nm (1.18 lbf ft)	2.4 Nm (1.77 lbf ft)	8 Nm (5.90 lbf ft)
100 (6.10)	1.6 Nm (1.18 lbf ft)	2.4 Nm (1.77 lbf ft)	8 Nm (5.90 lbf ft)

6. ELECTRO-HYDRAULIC CONTROL WITH DIGITAL ON-BOARD ELECTRONICS, D1 TO D8

- Control p/Q: Analog 0 V to 10 V or 4 mA to 20 mA or via CAN bus
- Pressure compensator with 16 selectable parameter sets
- 2 pressure sensors may be connected
- Integrated horse power controller
- Master/slave mode
- Pressure range up to 350 bar (5,000 psi) constant pressure

For a detailed description and further applications, see Supplementary Catalog RKP with digital control (RKP-D)

RKP WITH DIGITAL CONTROL (RKP-D)

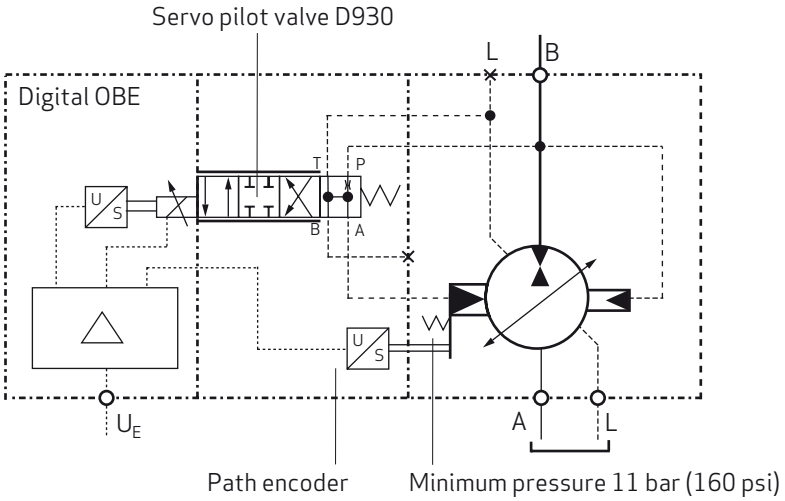


No.	Description	Type	
X1	Main connector	11+PE	12-pole pin contact
X2	Local CAN (optional) for master/slave mode	M8 x 1	3-pole pin contact
X3	CAN-In	M12x1	5-pole pin contact
X4	CAN-Out	M12x1	5-pole socket contact
X5	Pressure sensor 2	M8 x 1	4-pole socket contact
X6	Pressure sensor 1	M8 x 1	4-pole socket contact
X7	Analog selection of parameter sets	M8 x 1	4-pole socket contact
X8	LVDT	M12x1	5-pole socket contact

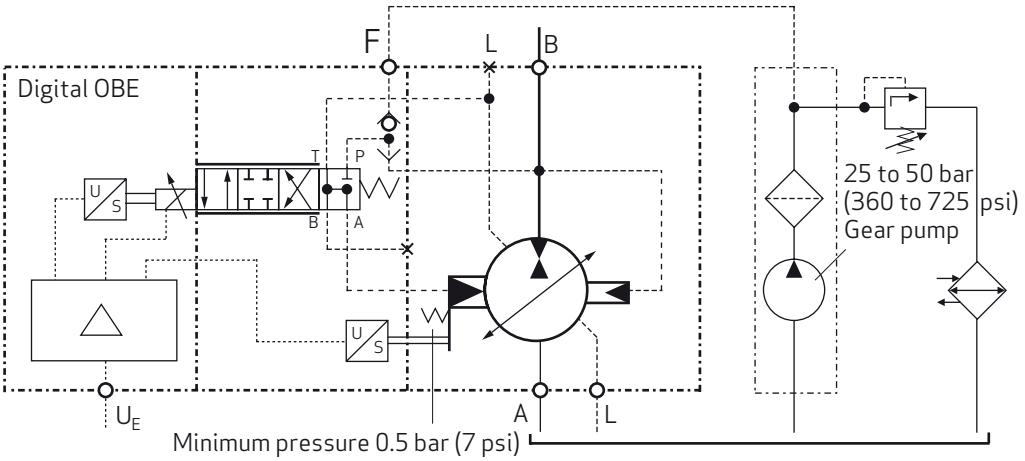
Protection class for valve and LVDT: IP67 (with connected and locked receptacles respectively)

ELECTRO-HYDRAULIC CONTROL WITH DIGITAL ON-BOARD ELECTRONICS, D1 TO D8

INTERNAL PRESSURE SUPPLY, D1



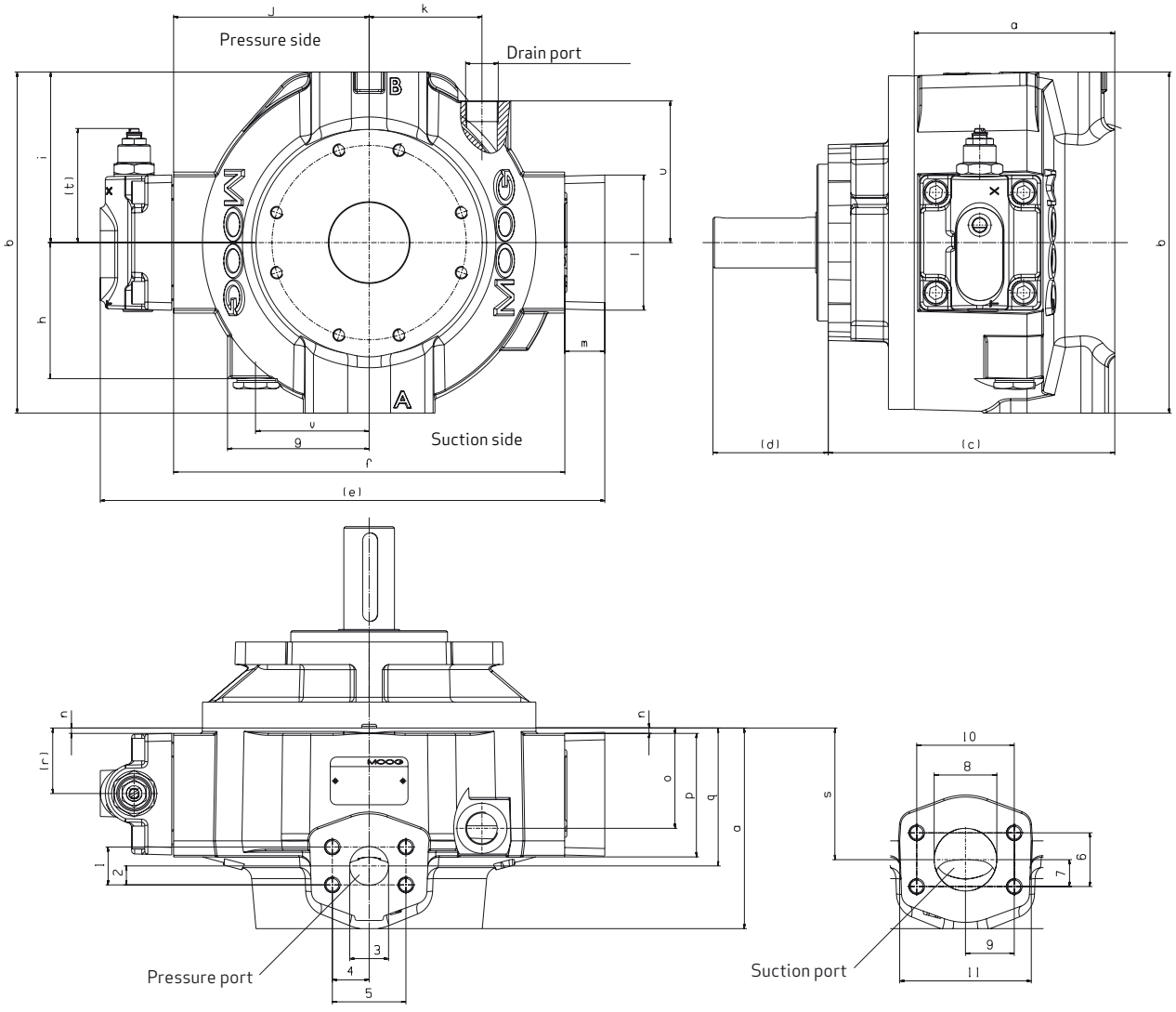
EXTERNAL PRESSURE SUPPLY, D2



For more information on electro-hydraulically adjustable pumps, see catalog "RKP with digital control" (RKP-D).

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

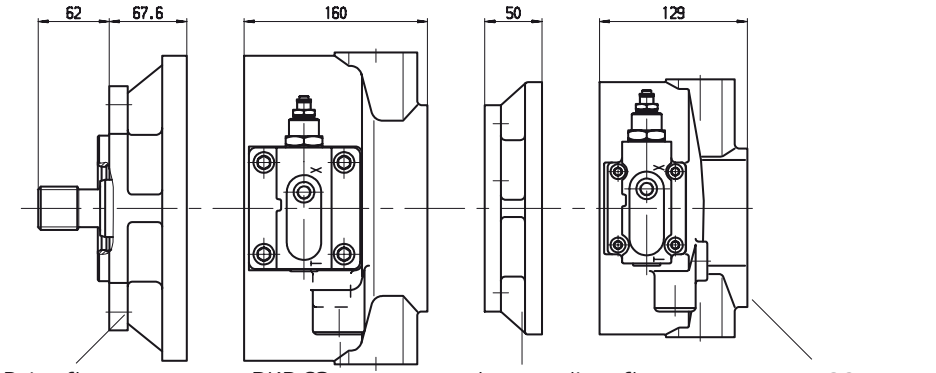
APPENDIX B – TECHNICAL DRAWINGS HOUSINGS RKP–II 19 - 100



Caution

Illustration shows arrangement for clockwise rotation. For counterclockwise rotation the compensator is mounted on the opposite side. Change of rotation not possible.

MULTIPLE ARRANGEMENT EXAMPLE RKP 63 + 32



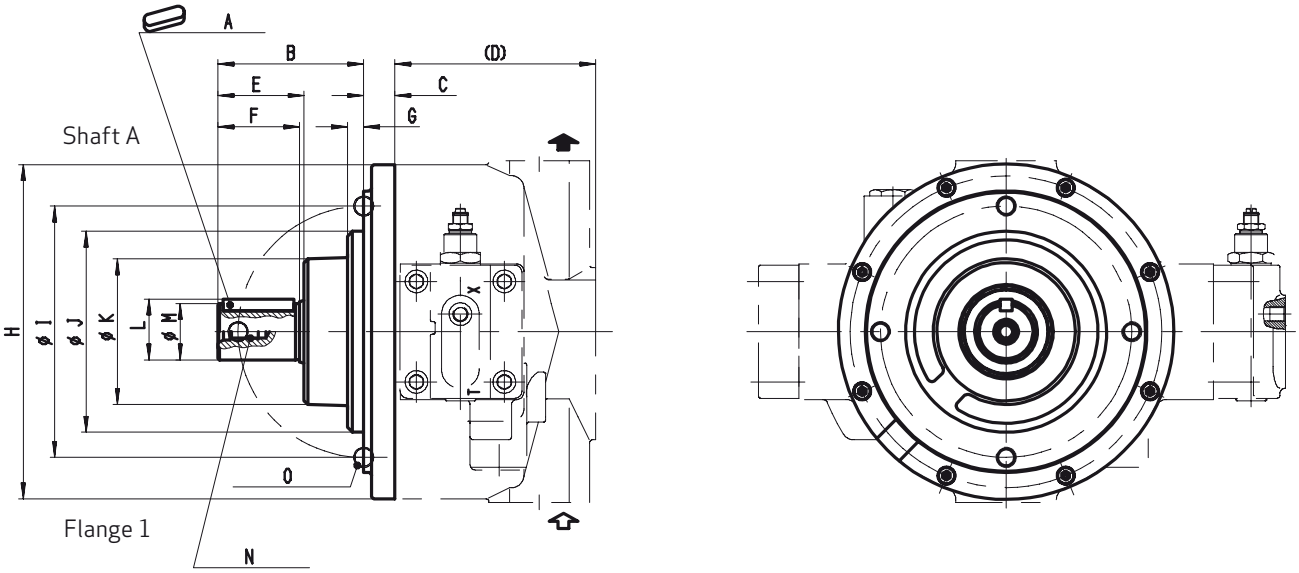
RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

APPENDIX B – TECHNICAL DRAWINGS HOUSINGS RKP-II 19 - 140

		RKP 19		RKP 32/45		RKP 63/80/100		RKP 140
Length [mm] ([in])	A	104.00 (4.100)		129.00 (5.080)		160.00 (6.300)		173.50 (6.830)
Height [mm] ([in])	B	181.00 (7.130)		225.00 (8.860)		272.00 (10.710)		320.00 (12.600)
	(C)	163.10 (6.420)		103.00 (4.060)		228.60 (9.000)		–
	(D)	46.10 (1.820)		78.00 (3.070)		92.00 (3.630)		–
	(E)	290.50 (11.440)		319.30 (12.570)		402.50 (15.850)		483.20 (19.020)
Width [mm] ([in])	F	212.00 (8.350)		241.00 (9.490)		312.10 (12.280)		398.40 (15.690)
	G	78.00 (3.070)		97.00 (3.820)		113.00 (4.450)		130.00 (5.120)
	H	83.00 (3.270)		87.00 (3.430)		108.00 (4.250)		130.00 (5.120)
	I	90.50 (3.560)		112.50 (4.430)		136.00 (5.350)		160.00 (6.300)
	J	106.00 (4.170)		120.50 (4.740)		156.00 (6.140)		199.20 (8.840)
	K	56.00 (2.200)		84.00 (3.310)		90.00 (3.540)		–
Drain port		M18 x 1.5 to 13 deep (M0.71 x 0.06 to 0.51)		M22 x 1.5 to 14 deep (M0.89 x 0.06 to 0.55)		M26 x 1.5 to 16 deep (M1.02 x 0.06 to 0.63)		see flange
[mm] ([in])	L	80.00 (3.150)		81.40 (3.210)		107.70 (4.240)		109.40 (4.310)
	(M)	26.00 (1.020)		26.00 (1.020)		32.00 (1.260) (51.7 to D2, D3, D6)		34.80 (1.370)
	N	1.00 (0.040)		7.50 (0.300)		4.30 (0.170)		5.00 (0.200)
	O	55.00 (2.170)		66.00 (2.600)		80.00 (3.150)		–
	P	70.00 (2.760)		75.50 (2.970)		98.50 (3.880)		114.00 (4.500)
	Q	67.00 (2.640)		88.00 (3.470)		110.00 (4.330)		118.00 (4.650)
	(R)	35.00 (1.380)		41.20 (1.620)		52.25 (2.060)		–
	S	67.00 (2.640)		85.00 (3.350)		105.00 (4.130)		118.00 (4.650)
	(T)	max. 103.00 (4.060)		max. 103.00 (4.060)		max. 98.00 (3.500)		–
	U	83.00 (3.270)		87.00 (3.430)		113.00 (4.450)		130.00 (5.120)
	V	56.00 (2.200)		78.00 (3.070)		90.00 (3.540)		–
Pressure port [mm] ([in])		SAE 3/4" 3,000 PSI	SAE 3/4" 6,000 PSI	SAE 1" 3,000 PSI	SAE 1" 6,000 PSI	SAE 1 1/4" 3,000 PSI	SAE 1 1/4" 6,000 PSI	SAE 1 1/2" 6,000 PSI
	1	22.20 (0.870)	23.90 (0.940)	26.20 (1.030)	27.80 (1.940)	30.16 (1.190)	31.70 (1.250)	36.50 (1.440)
	2	11.10 (0.440)	11.95 (0.470)	13.10 (0.520)	13.90 (0.550)	15.08 (0.590)	15.85 (0.620)	18.25 (0.720)
	3	19.00 (0.750)	19.00 (0.750)	25.00 (0.980)	25.00 (0.980)	26.00 (1.020)	31.00 (1.220)	38.00 (1.500)
	4	23.81 (0.940)	25.40 (1.000)	26.20 (1.030)	28.60 (1.130)	29.37 (1.160)	33.34 (1.310)	39.65 (1.560)
	5	47.60 (1.870)	50.80 (2.000)	52.40 (2.060)	57.20 (2.250)	58.74 (2.310)	66.68 (2.630)	79.30 (3.120)
	12	M10 16 deep (0.63)	M10 16 deep (0.63)	M10 16 deep (0.63)	M12 21 deep (0.83)	M12 21 deep (0.83)	M14 24 deep (0.94)	M16 25.5 deep (1.00)
Suction port [mm] ([in])		SAE 3/4" 3,000 PSI	SAE 3/4" 6,000 PSI	SAE 1 1/2" 3,000 PSI		SAE 2" 3,000 PSI		SAE 2 1/2" 3,000 PSI
	6	22.20 (0.870)	23.90 (0.870)	35.70 (1.410)		42.80 (1.690)		50.80 (2.000)
	7	11.10 (0.440)	11.95 (0.440)	17.85 (0.700)		21.40 (0.840)		25.40 (1.000)
	8	19.00 (0.750)	19.00 (0.750)	38.00 (1.500)		50.00 (1.970)		62.00 (2.440)
	9	23.81 (0.940)	25.40 (1.000)	34.95 (1.380)		38.90 (1.530)		44.45 (1.750)
	10	47.60 (1.870)	50.80 (2.000)	69.90 (2.750)		77.80 (3.060)		88.90 (3.500)
	11	71.00 (2.800)	71.00 (2.800)	98.00 (3.860)		105.00 (4.130)		117.50 (4.630)
	13	M10 16 deep (0.63)	M10 16 deep (0.63)	M12 24 deep (0.95)		M12 22.5 deep (0.89)		M12 22 deep (0.87)

( ) = as shown with flange A7 and with compensator, F, H, J, R and without maximum flow limiting.

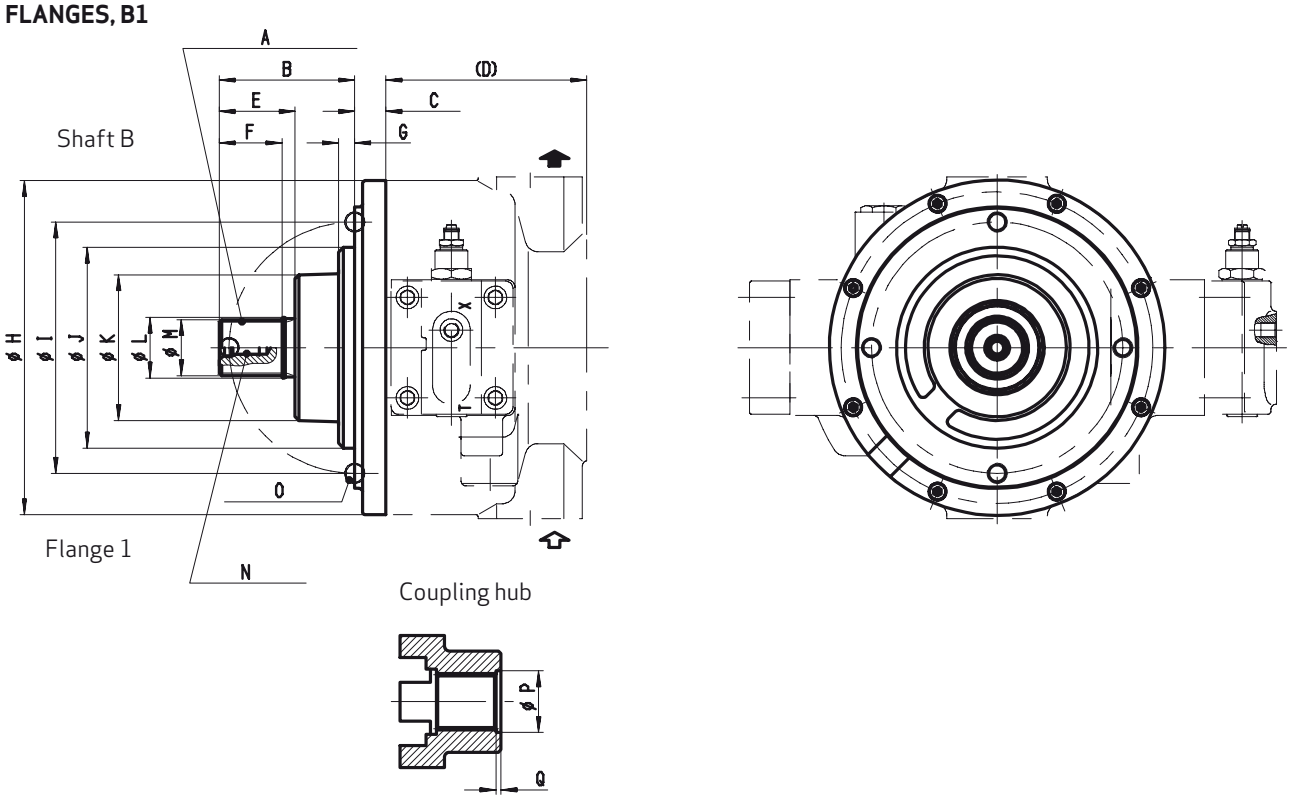
FLANGES, A1



Straight key according to ISO 2491
Metric round flange

	RKP 19 [mm] ([in])	RKP 32/45 [mm] ([in])	RKP 63/80/100 [mm] ([in])
A	A 8 x 7 x 32 ISO 2491	A 10 x 8 x 45 ISO 2491	A 14 x 9 x 56 ISO 2491
B	70.70 (2.780)	94.50 (3.720)	116.00 (4.570)
C	17.10 (0.670)	18.10 (0.710)	24.70 (0.970)
(D)	104.00 (4.090)	129.00 (5.080)	160.00 (6.300)
E	42.90 (1,690)	57.50 (2.260)	68.50 (2.700)
F	41.20 (1.620)	55.00 (2.170)	65.00 (2.560)
G	11.40 (0.450)	11.00 (0.430)	13.00 (0.510)
H	177.00 (6.970)	220.00 (8.660)	267.00 (10.510)
I	125.00 ±0.15 (4.920 ±0.006)	160.00 ±0.15 (6.300 ±0.006)	200.00 ±0.15 (7.870 ±0.006)
J	100.00 -0.036/-0.090 (3.940 -0.001/-0.003)	125.00 -0.043/-0.106 (4.920 -0.001/-0.004)	160.00 -0.043/-0.106(6.300 -0.001/-0.004)
K	79.00 (3.110)	101.00 (4.000)	116.00 (4.570)
L	30.75 (1.210)	37.85 (1.490)	48.40 (1.910)
M	28.00 -0.013 (1.100 -0.001)	35.00 -0.016 (1.380 -0.001)	45.00 -0.016 (1.770 -0.001)
N	M10 22 deep (0.87)	M10 22 deep (0.87)	M12 32 deep (1.26)
O	M10 15 deep (0.59)	M12 16 deep (0.63)	M16 23 deep (0.91)

FLANGES, B1



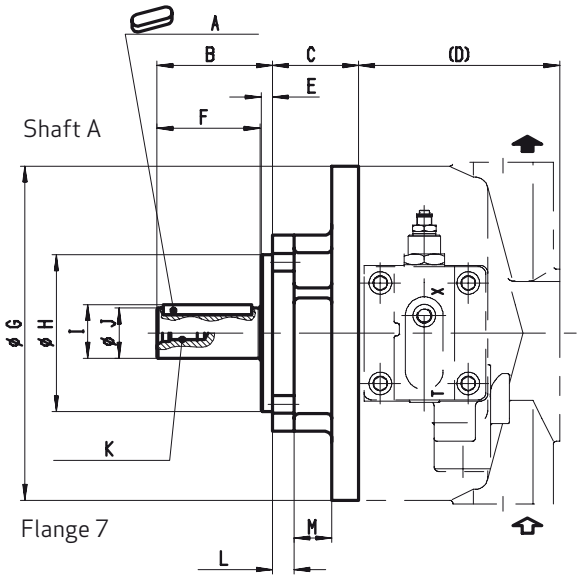
Involute spline according to DIN 5482 (for B1)
(obligatory with multiple arrangement of RKP and SAE-B)
Metric round flange

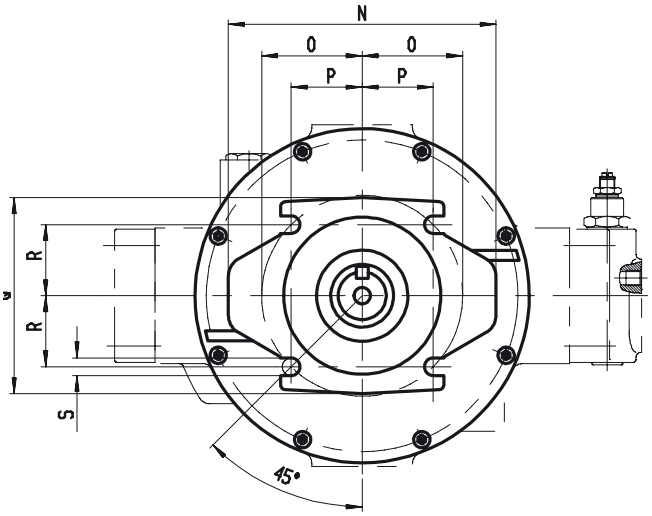
	RKP 19 [mm] ([in])	**RKP 32/45 [mm] ([in])**	**RKP 63/80/100 [mm] ([in])**
A	DIN 5482 B 28 x 25 e9	DIN 5482 B 35 x 31 e9	DIN 5482 B 45 x 41 e9
B	72.60 (2.860)	95.50 (3.760)	107.90 (4.250)
C	17.10 (0.670)	18.10 (0.710)	24.70 (0.970)
(D)	104.00 (4.090)	129.00 (5.080)	160.00 (6.300)
E	44.80 (1.760)	58.50 (2.300)	60.40 (2.380)
F	30.00 (1.180)	40.00 (1.570)	50.00 (1.970)
G	11.40 (0.450)	11.00 (0.430)	13.00 (0.510)
H	177.00 (6.970)	220.00 (8.660)	267.00 (10.510)
I	125.00 ±0.15 (4.920 ±0.006)	160.00 ±0.15 (6.300 ±0.006)	200.00 ±0.15 (7.870 ±0.006)
J	100.00 -0.036/-0.090 (3.940 -0.001/-0.003)	125.00 -0.043/-0.106 (4.920 -0.001/-0.004)	160.00 -0.043/-0.106(6.300 -0.001/-0.004)
K	79.00 (3.110)	101.00 (3.980)	116.00 (5.570)
L	30.80 ±0.25 (1.210 ±0.010)	38.50 ±0.25 (1.520 ±0.010)	48.45 ±0.25 (1.910 ±0.010)
M	27.50 -0.130 (1.080 -0.001)	34.44 -0.160 (1.360 -0.001)	44.50 -0.160 (1.750 -0.001)
N	M10 22 deep (0.87)	M10 22 deep (0.87)	M12 32 deep (1.26)
O	M10 15 deep (0.59)	M12 15 deep (0.59)	M16 23 deep (0.91)
P	31.30 +0.20 (1.230 +0.008)	39.00 +0.20 (1.340 +0.008)	49.00 +0.20 (1.930 +0.008)
Q	4.00 (0.160)	4.00 (0.160)	4.00 (0.160)

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

APPENDIX B – TECHNICAL DRAWINGS DRIVE FLANGES RKP-II 19 - 100

FLANGES, A7



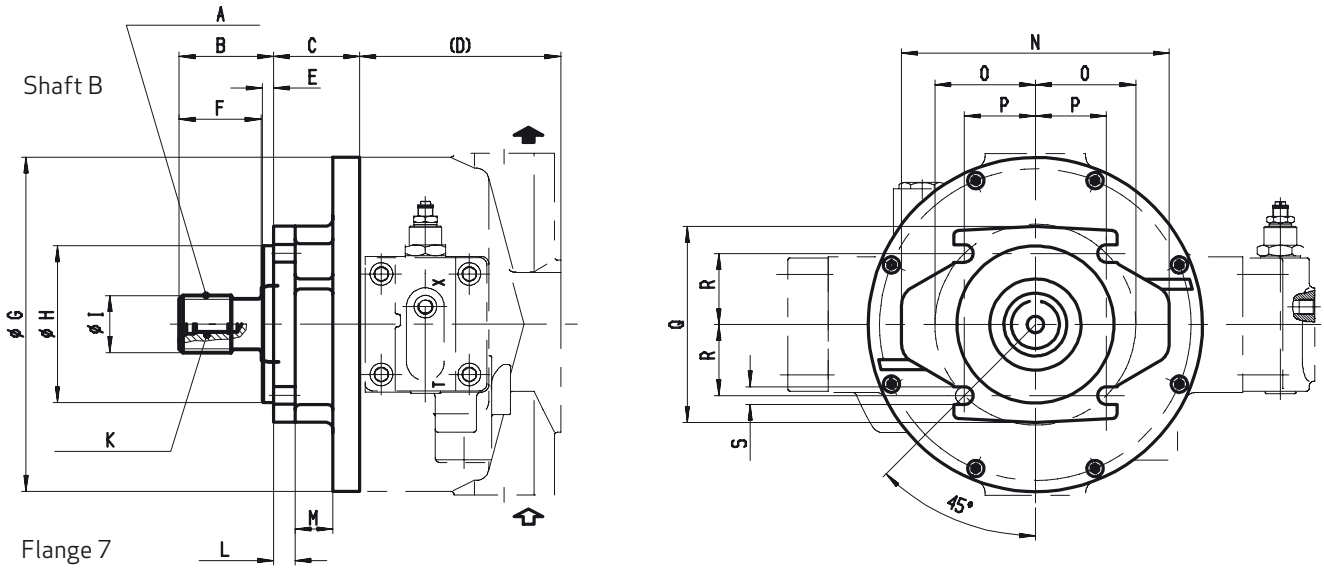


Straight key according to ISO 2491
ISO flange according to ISO 3019/2
(metric dimensions)

HFA pumps have an unplugged inspection hole in the drive flange which must always be located at the bottom.
If necessary, the mounting flange must be rotated.

	RKP 19 [mm] ([in])	RKP 32/45 [mm] ([in])	RKP 63/80/100 [mm] ([in])
A	A 8 x 7 x 36 ISO 2491	A 10 x 8 x 50 ISO 2491	A 12 x 8 x 70 ISO 2491
B	52.00 (2.050)	68.00 (2.680)	92.00 (3.620)
C	58.10 (2.870)	64.10 (2.520)	68.60 (2.700)
(D)	104.00 (4.090)	129.00 (5.080)	160.00 (6.300)
E	9.00 (0.350)	9.00 (0.350)	9.00 (0.350)
F	42.00 (1.650)	58.00 (2.280)	82.00 (3.230)
G	177.00 (6.970)	220.00 (8.660)	267.00 (10.510)
H	100.00 -0.054 (3.940 -0.002)	125.00 -0.063 (4.920 -0.002)	125.00 -0.063 (4.920 -0.002)
I	27.75 (1.090)	34.75 (1.370)	42.75 (1.680)
J	25.00 +0.009/-0.004 (0.980 -0.001/-0.001)	32.00 +0.018/+0.002 (1.260 -0.001/-0.001)	40.00 +0.018/+0.002 (1.570 -0.001/-0.001)
K	M8 22 deep (0.87)	M10 22 deep (0.87)	M12 32 deep (1.26)
L	11.20 (0.440)	17.20 (0.680)	17.20 (0.680)
M	30.00 (1.180)	30.00 (1.180)	30.00 (1.180)
N	174.00 (6.850)	213.00 (8.390)	213.00 (8.390)
O	62.50 (2.460)	80.00 (3.150)	80.00 (3.150)
P	44.20 (1.740)	56.58 (2.230)	56.58 (2.230)
Q	126.00 (4.960)	156.00 (6.140)	156.00 (6.140)
R	44.20 (1.740)	56.58 (2.230)	56.58 (2.230)
S	11.00 (0.430)	14.00 (0.550)	14.00 (0.550)

DRIVE FLANGES B7



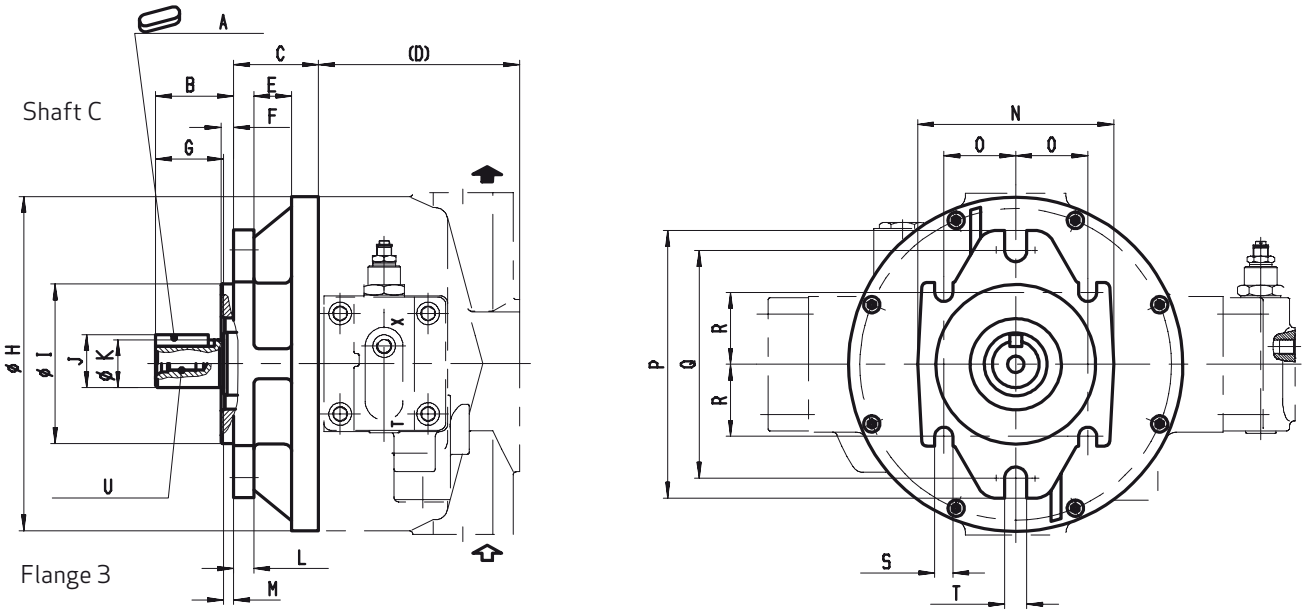
Involute spline according to DIN 5480
(obligatory with multiple arrangement of RKP and SAE-B)
ISO flange according to ISO 3019/2
(metric dimensions)

	RKP 19 [mm] ([in])		RKP 32/45 [mm] ([in])		RKP 63/80/100 [mm] ([in])	
A	W25 x 1.25 x 30 x 18 x 8f		W32 x 2 x 30 x 14 x 8f		W40 x 2 x 30 x 18 x 8f	
B	42.00	(1.650)	46.00	(1.810)	54.00	(2.130)
C	58.10	(2.870)	64.10	(2.520)	68.60	(2.700)
(D)	104.00	(4.090)	129.00	(5.080)	160.00	(6.300)
E	9.00	(0.350)	9.00	(0.350)	9.00	(0.350)
F	32.00	(1.260)	36.00	(1.420)	44.00	(1.730)
G	177.00	(6.970)	220.00	(8.660)	267.00	(10.510)
H	100.00 -0.054	(3.940 -0.002)	125.00 -0.063	(4.920 -0.002)	125.00 -0.063	(4.920 -0.002)
I	25.00	(0.980)	32.00	(1.260)	40.00	(1.570)
K	M8 22 deep	(0.87)	M10 22 deep	(0.87)	M12 32 deep	(1.26)
L	11.20	(0.440)	17.20	(0.680)	17.20	(0.680)
M	30.00	(1.180)	30.00	(1.180)	30.00	(1.180)
N	174.00	(6.850)	213.00	(8.390)	213.00	(8.390)
O	62.50	(2.460)	80.00	(3.150)	80.00	(3.150)
P	44.20	(1.740)	56.58	(2.230)	56.58	(2.230)
Q	126.00	(4.960)	156.00	(6.140)	156.00	(6.140)
R	44.20	(1.740)	56.58	(2.230)	56.58	(2.230)
S	11.00	(0.430)	14.00	(0.550)	14.00	(0.550)

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

APPENDIX B – TECHNICAL DRAWINGS DRIVE FLANGES RKP-II 19 - 100

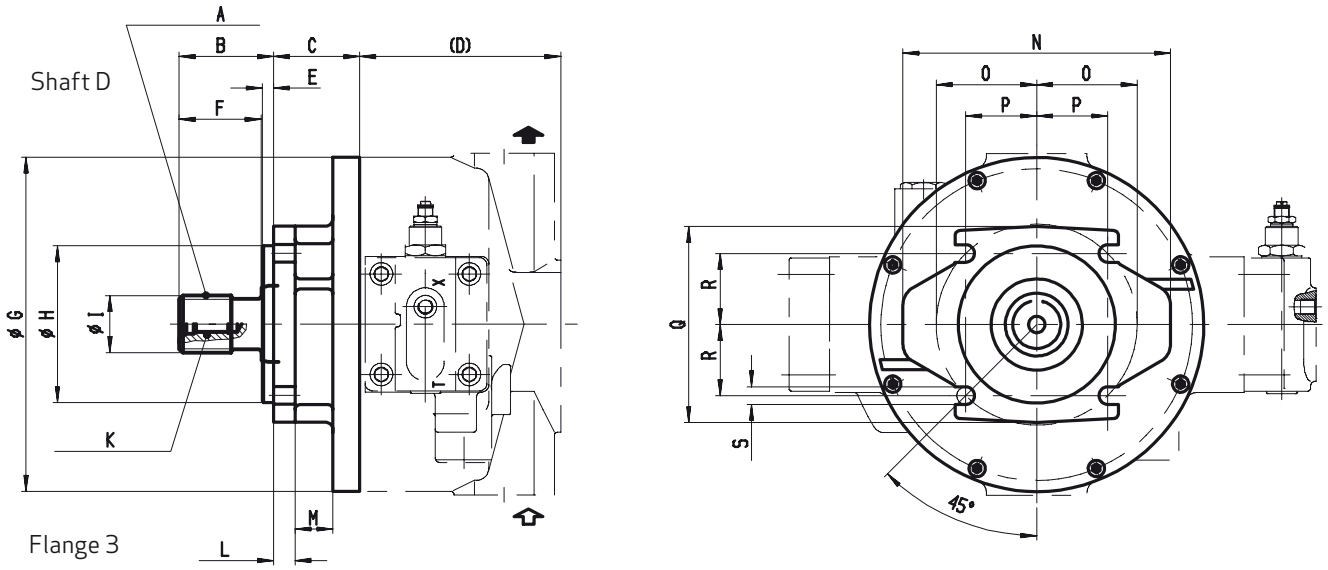
DRIVE FLANGES C3



Key to SAE Standard
SAE flange according to ISO 3019/1
(imperial dimensions)

	RKP 19 [mm] ([in])	RKP 32/45 [mm] ([in])	RKP 63/80/100 [mm] ([in])
A	6.35 x 6.35 x 25.4	7.94 x 7.94 x 32.0	9.53 x 9.53 x 42.0
B	46.10 (1.820)	57.50 (2.260)	62.00 (2.440)
C	59.10 (2.330)	63.10 (2.480)	67.60 (2.660)
(D)	104.00 (4.090)	129.00 (5.080)	160.00 (6.300)
E	30.00 (1.810)	30.00 (1.810)	30.00 (1.810)
F	8.00 (0.310)	10.00 (0.390)	10.00 (0.390)
G	36.70 (1.440)	46.00 (1.810)	54.00 (2.130)
H	177.00 (6.970)	220.00 (8.660)	267.00 (10.510)
I	101.60 -0.05 (4.000 -0.002)	127.00 -0.05 (5.000 -0.002)	127.00 -0.05 (5.000 -0.002)
J	28.09 (1.110)	35.21 (1.390)	42.27 (1.660)
K	25.40 -0.05 (1.000 -0.002)	31.75 -0.05 (1.250 -0.002)	38.10 -0.05 (1.500 -0.002)
L	12.20 (0.480)	16.20 (0.640)	16.20 (0.640)
M	9.40 (0.370)	11.50 (0.450)	8.00 (0.310)
N	126.00 (4.960)	156.00 (6.140)	156.00 (6.140)
O	45.00 (1.770)	57.25 (2.250)	57.25 (2.250)
P	174.00 (6.850)	213.00 (8.390)	213.00 (8.390)
Q	146.00 (5.750)	181.00 (7.130)	181.00 (7.130)
R	45.00 (1.770)	57.25 (2.250)	57.25 (2.250)
S	14.40 (0.570)	14.40 (0.570)	14.40 (0.570)
T	14.40 (0.570)	17.60 (0.690)	17.60 (0.690)
U	3/8"-16UNC-2B 22 deep (0.87)	3/8"-16UNC-2B 22 deep (0.87)	7/16"-14UNC-2B 32 deep (1.26)

DRIVE FLANGES D3



Involute spline according to SAE 744 C
(obligatory with multiple arrangement of RKP and SAE-B)
SAE flange according to ISO 3019/1
(imperial dimensions)

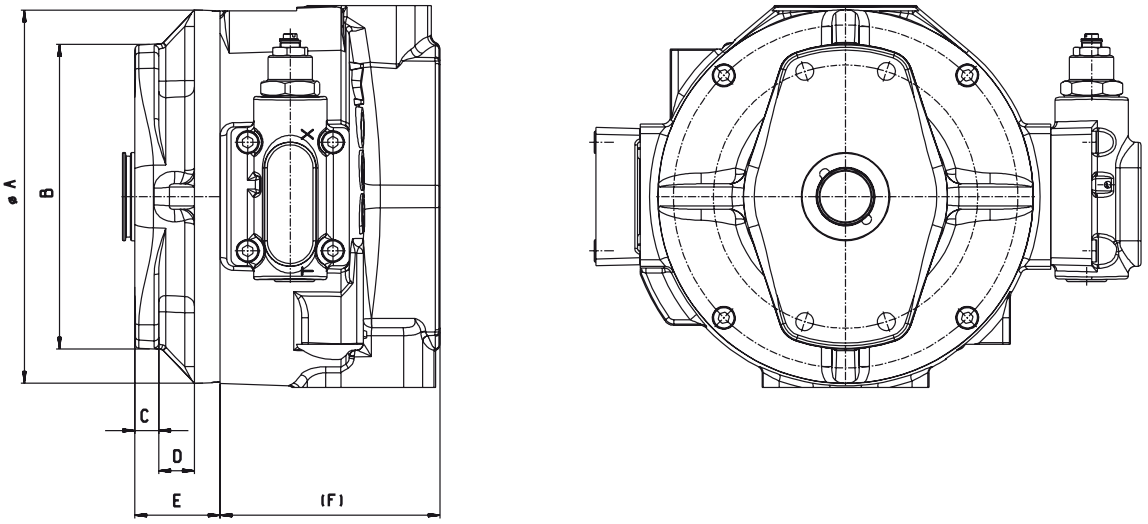
	RKP 19 [mm] ([in])		**RKP 32/45 [mm] ([in])**		**RKP 63/80/100 [mm] ([in])**	
A	ANSI B92.1-1970 Class 5 30PA. 15T, 16/32DP Flat root side fit		ANSI B92.1-1970 Class 5 30PA. 14T, 12/24DP Flat root side fit		ANSI B92.1-1970 Class 5 30PA. 17T, 12/24DP Flat root side fit	
B	46.00	(1.810)	56.00	(2.210)	62.00	(2.440)
C	59.10	(2.330)	63.10	(2.480)	67.60	(2.660)
(D)	104.00	(4.090)	129.00	(5.080)	160.00	(6.300)
E	30.00	(1.810)	30.00	(1.810)	30.00	(1.810)
F	8.00	(0.310)	10.00	(0.390)	10.00	(0.390)
G	38.00	(1.500)	48.00	(1.890)	54.00	(2.130)
H	23.00	(0.910)	29.00	(1.140)	34.00	(1.340)
I	177.00	(6.970)	220.00	(8.660)	267.00	(10.510)
J	101.60	(4.000)	127.00	85.00)	127.00	(5.000)
K	25.20	(0.990)	31.50	(1.240)	37.70	(1.480)
L	12.20	(0.480)	16.20	(0.640)	16.20	(0.640)
M	8.00	(0.310)	8.00	(0.310)	8.00	(0.310)
N	126.00	(4.960)	156.00	(6.140)	156.00	(6.140)
O	45.00	(1.770)	57.25	(2.250)	57.25	(2.250)
P	174.00	(6.850)	213.00	(8.390)	213.00	(8.390)
Q	146.00	(5.750)	181.00	(7.130)	181.00	(7.130)
R	45.00	(1.770)	57.25	(2.250)	57.25	(2.250)
S	14.40	(0.570)	14.40	(0.570)	14.40	(0.570)
T	14.40	(0.570)	17.60	(0.690)	17.60	(0.690)
U	3/8"-16UNC-2B 22 deep	(0.87)	3/8"-16UNC-2B 22 deep	(0.87)	7/16"-14UNC-2B 32 deep	(1.26)

RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

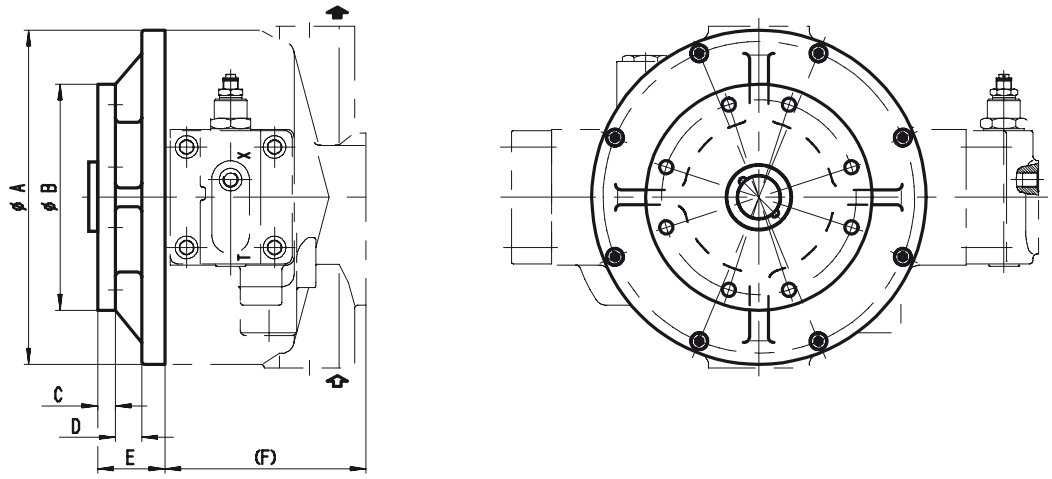
APPENDIX B – TECHNICAL DRAWINGS INTERMEDIATE FLANGES RKP-II 19 - 100

INTERMEDIATE FLANGE RKP-RKP, XX

RKP 19/32/45



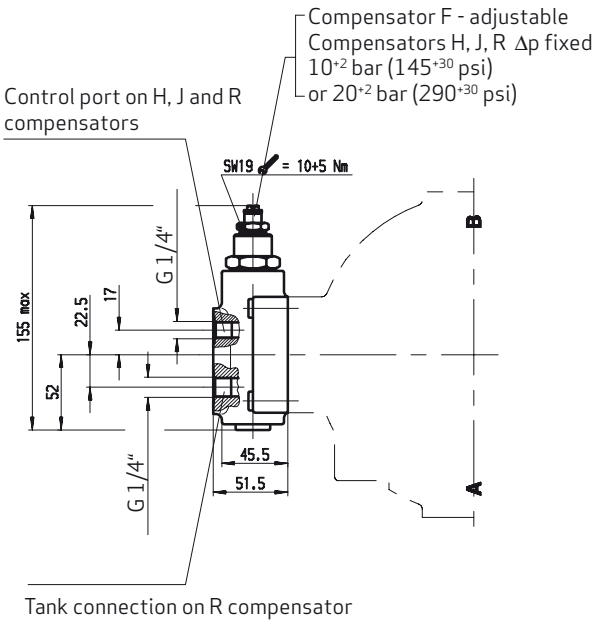
RKP 63/80/100

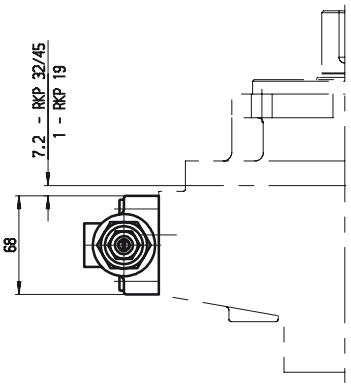


	RKP 19 [mm] ([in])		RKP 32/45 [mm] ([in])		RKP 63/80/100 [mm] ([in])	
A	177.00	(6.970)	220.00	(8.660)	266.00	(10.470)
B	180.00	(7.090)	180.00	(7.090)	180.00	(7.090)
C	14.00	(0.550)	14.00	(0.550)	14.00	(0.550)
D	23.50	(0.930)	21.00	(0.830)	21.00	(0.830)
E	50.00	(1.970)	50.00	(1.970)	53.50	(2.110)
(F)	104.00	(4.090)	129.00	(5.080)	160.00	(6.300)

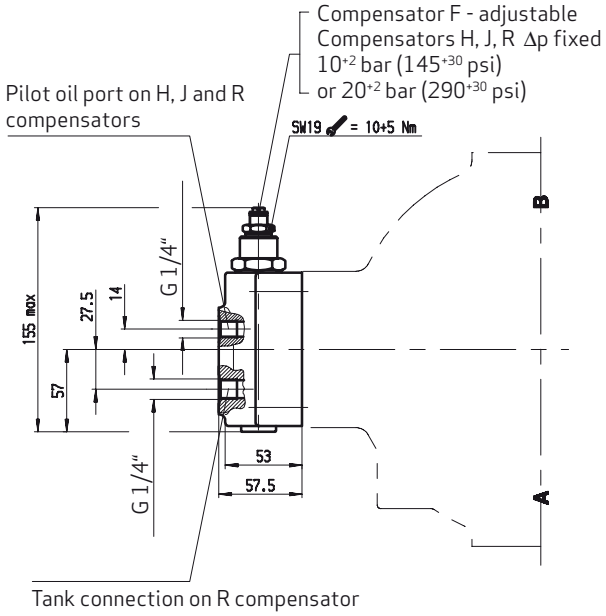
ADJUSTABLE PRESSURE COMPENSATOR, F1, F2
HYDRAULICALLY ACTUATED PRESSURE COMPENSATOR, H1
COMBINED PRESSURE AND FLOW COMPENSATOR, J1
PRESSURE AND FLOW COMPENSATOR WITH P-T LAND, R1

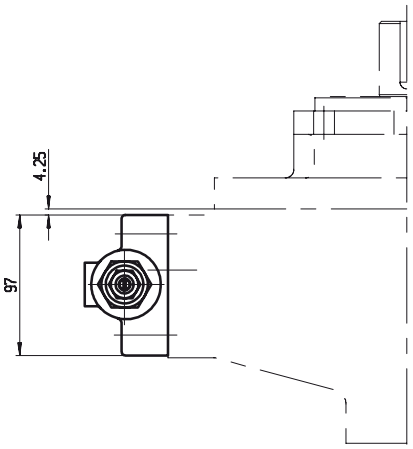
RKP 19/32/45



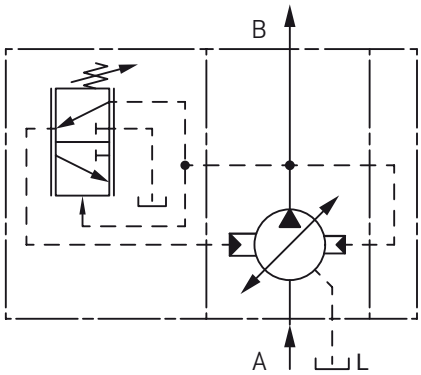


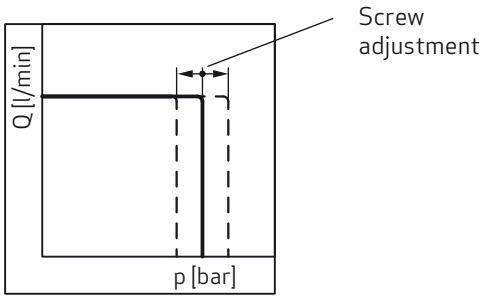
RKP 63/80/100



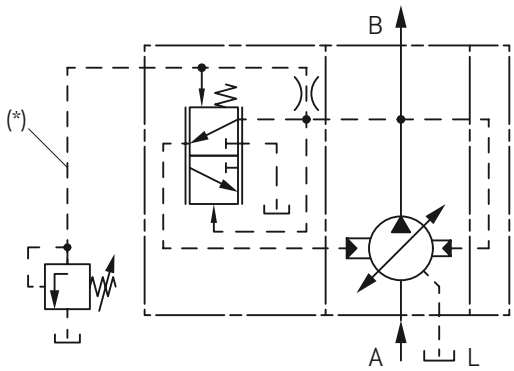


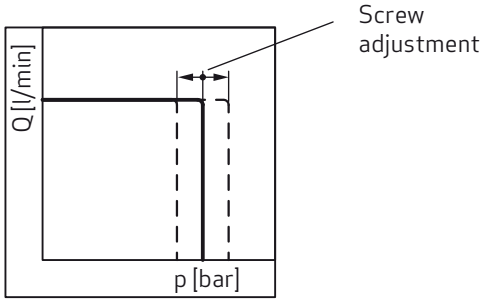
ADJUSTABLE PRESSURE COMPENSATOR, F1, F2



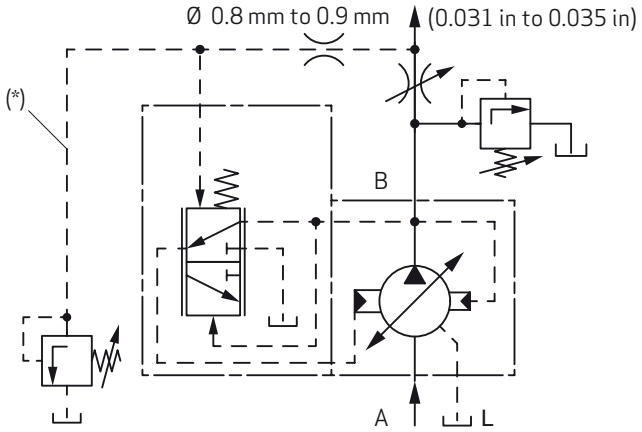


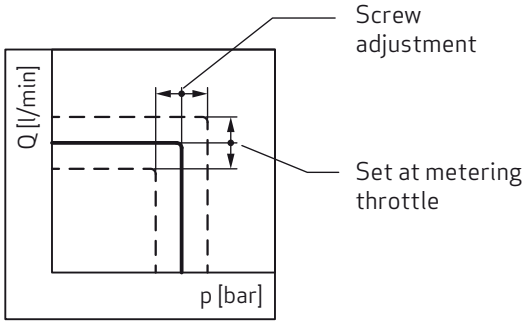
HYDRAULICALLY ACTUATED PRESSURE COMPENSATOR, H1





COMBINED PRESSURE AND FLOW COMPENSATOR, J1, J2



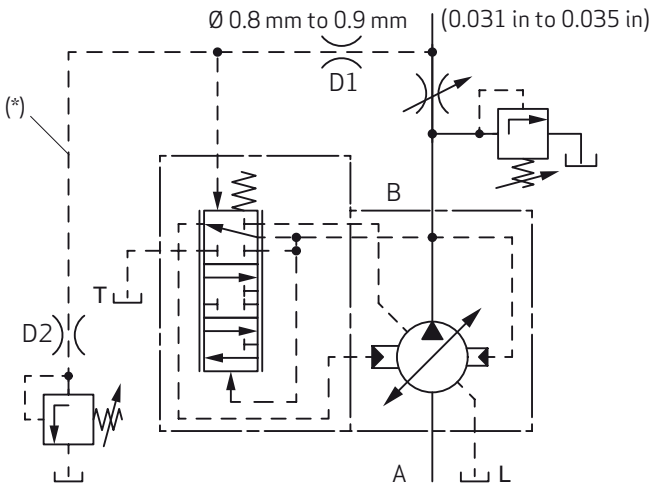


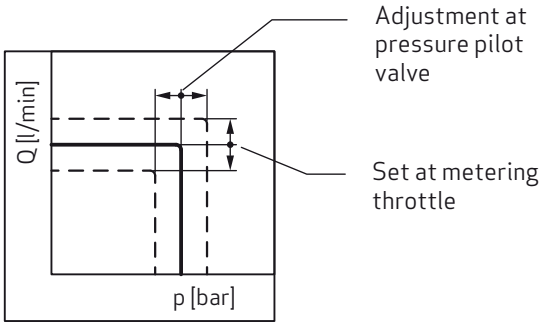
When high dynamics are required for flow control, adjust orifice and control line accordingly.

* Hose recommendation for control line

RKP 19	DN 6
RKP 32, RKP 45	DN 8
RKP 63, RKP 80, RKP 100	DN 10
l = 800 mm (31.50 in)	

COMBINED PRESSURE AND FLOW COMPENSATOR "LOAD SENSING" WITH P-T LAND, R1





* Recommendation: Hose for pilot oil line

		D1 [mm] ([in])	D2 [mm] ([in])
RKP 19 to 45	DN 6	0.9 (0.035)	1.2 (0.047)
RKP 63 to 100	DN 8	0.9 (0.035)	1.2 (0.047)
l = 800 mm (31.50 in)			

Notes on multiple pump circuits

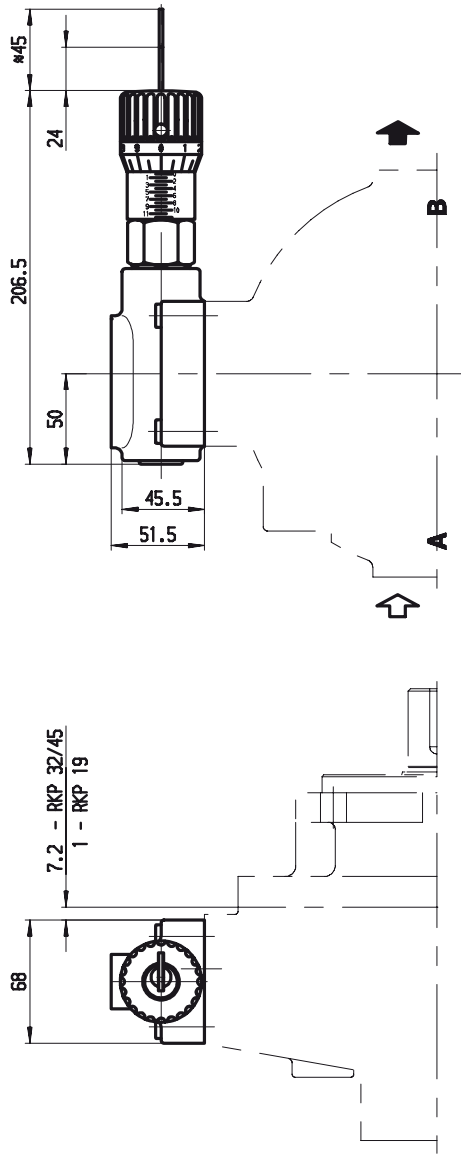
In the case of multiple pumps, which deliver into one circuit, the P-T control notch may only be activated for the compensator of the first pump by connecting the T-connection to the tank. The T-connection of the compensators of add-on pumps must be sealed off.

Caution!

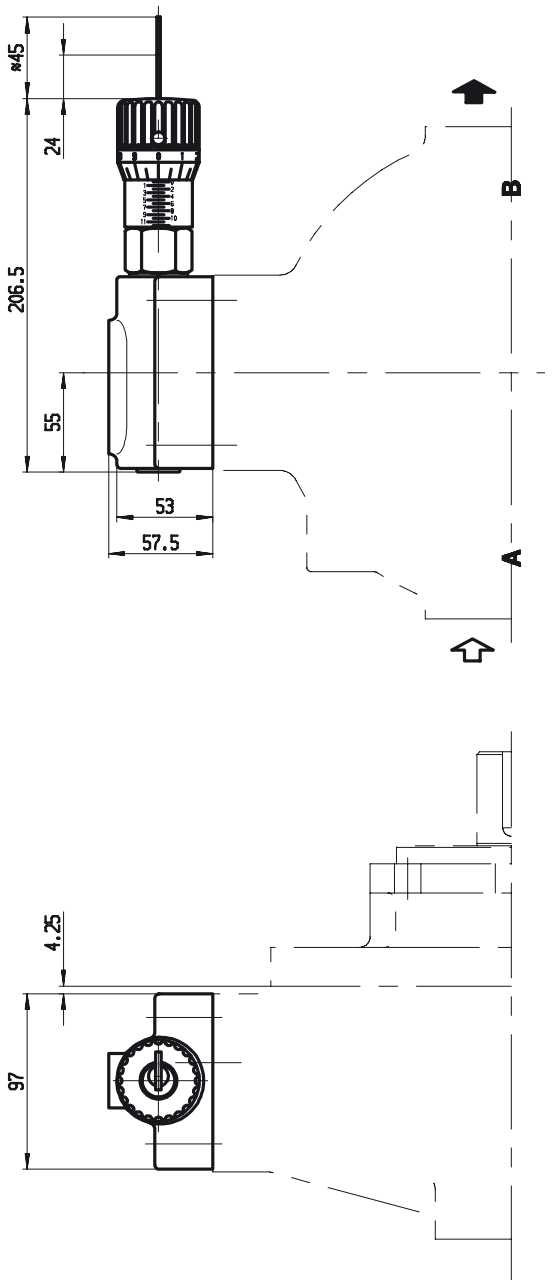
The tank line of the compensator must not be combined with the drain line of the pump.

ADJUSTABLE PRESSURE COMPENSATOR, LOCKABLE WITH H KEY, G1, G2

RKP 19/32/45

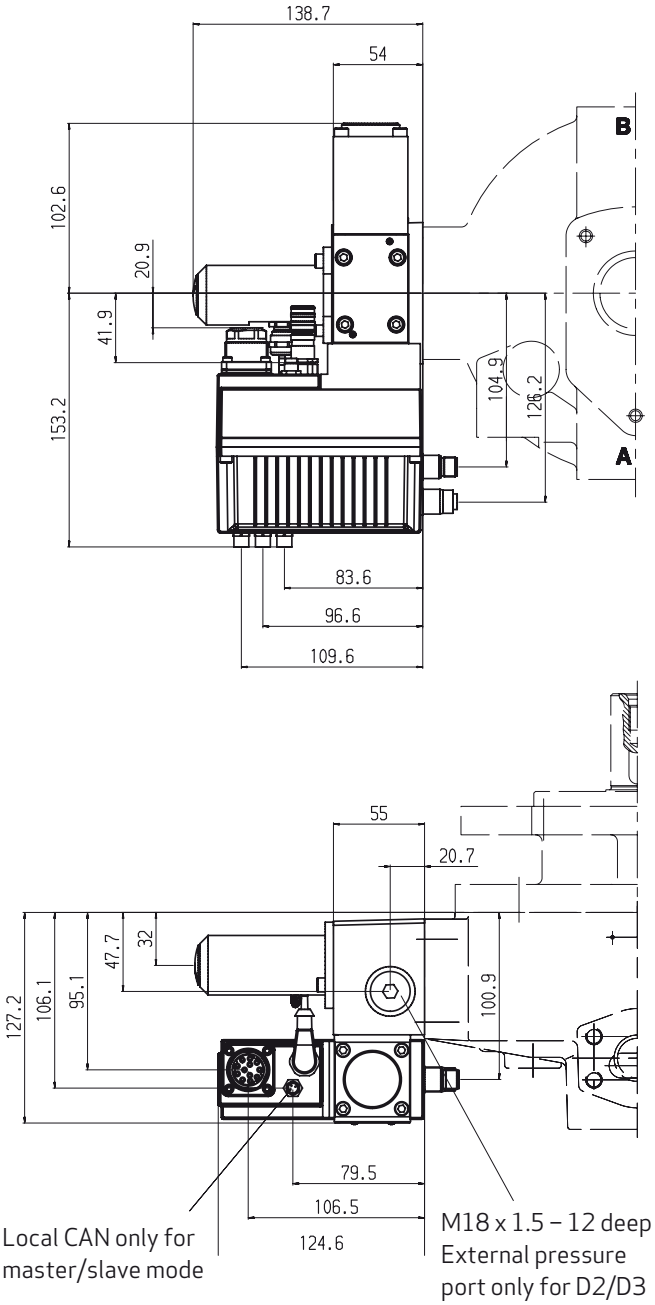


RKP 63/80/100

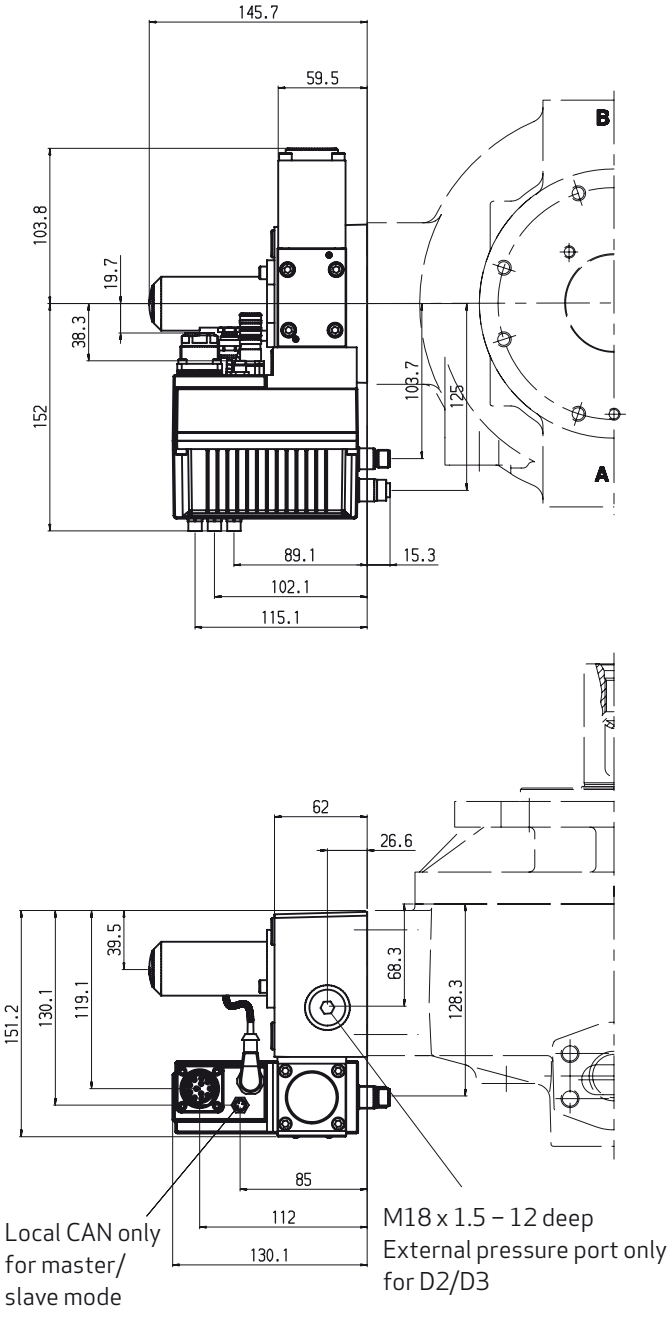


ELECTRO-HYDRAULIC CONTROL WITH DIGITAL ON-BOARD ELECTRONICS, D1 TO D8

RKP 19/32/45

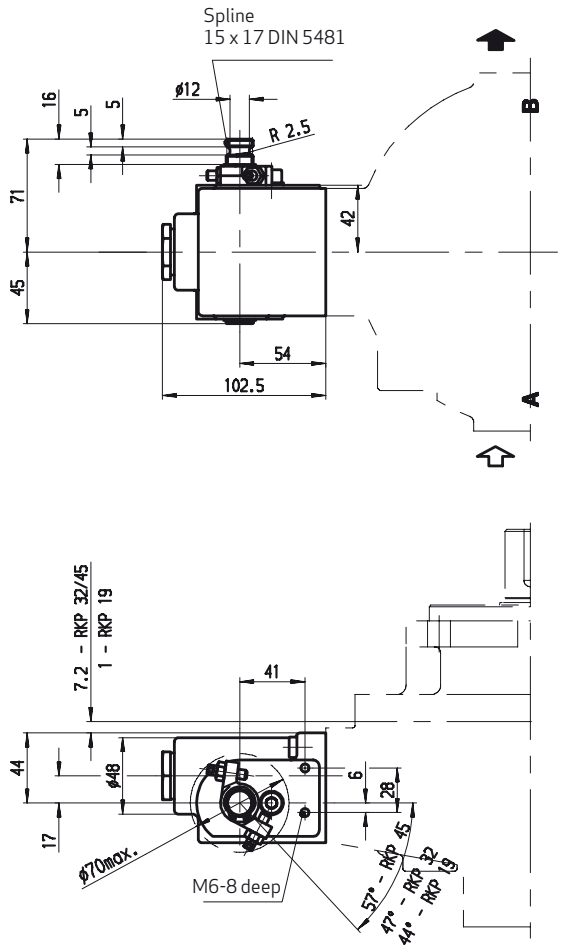


RKP 63/80/100

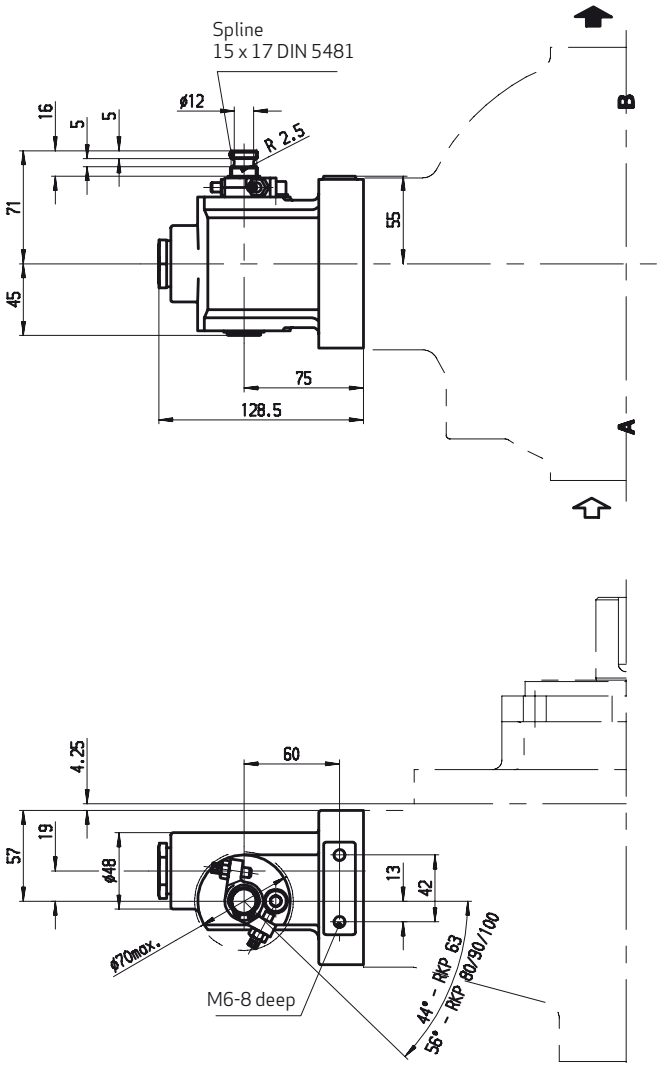


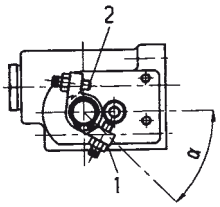
SERVO CONTROL C1

RKP 19/32/45



RKP 63/80/100



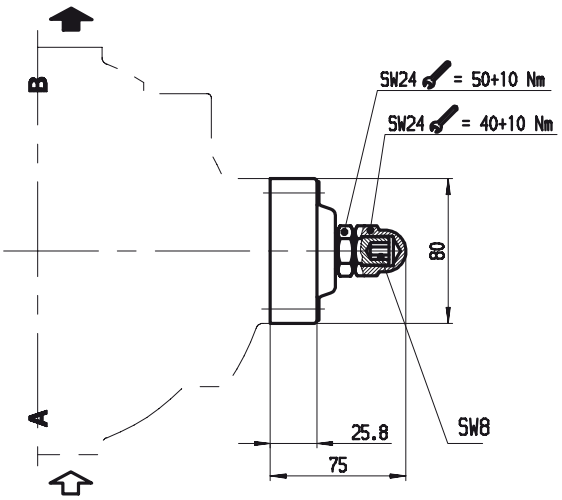


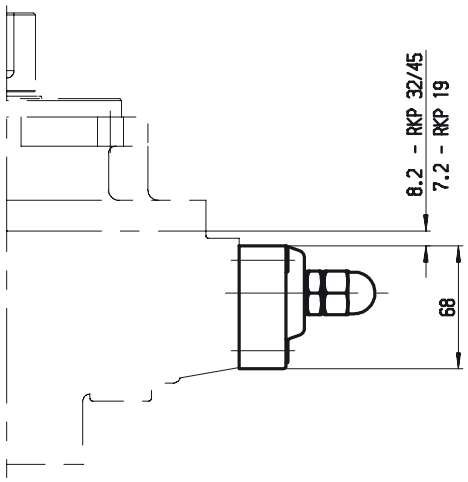
1 Zero stroke stop (set at factory)
2 End stop / $\pm V_{max.}$ (set at factory)

	V [cm³/rev] ([cu.in/rev])	19 (1.16)	32 (1.95)	45 (2.75)	63 (3.84)	80 (4.88)	100 (6.10)
	α [°]	44	47	57	44	56	56
Torque M [Nm] ([lbf ft])	Zero position	1.2 (0.89)			1.6 (1.18)		
	End position	1.6 (1.18)	1.7 (1.25)		2.4 (1.77)	2.6 (1.92)	2.6 (1.92)
	Maximum	8 (5.90)					

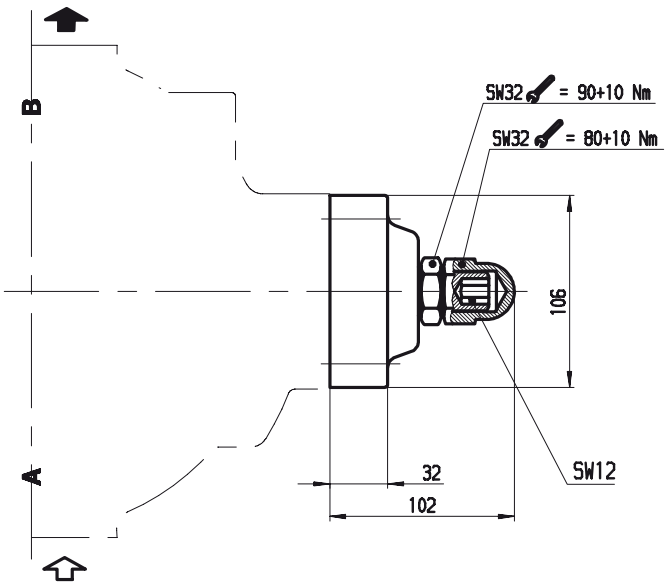
MAXIMUM FLOW LIMITER Y

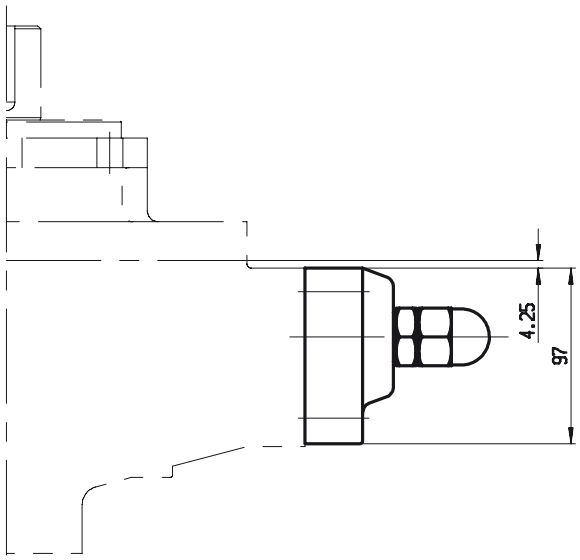
RKP 19/32/45





RKP 63/80/100

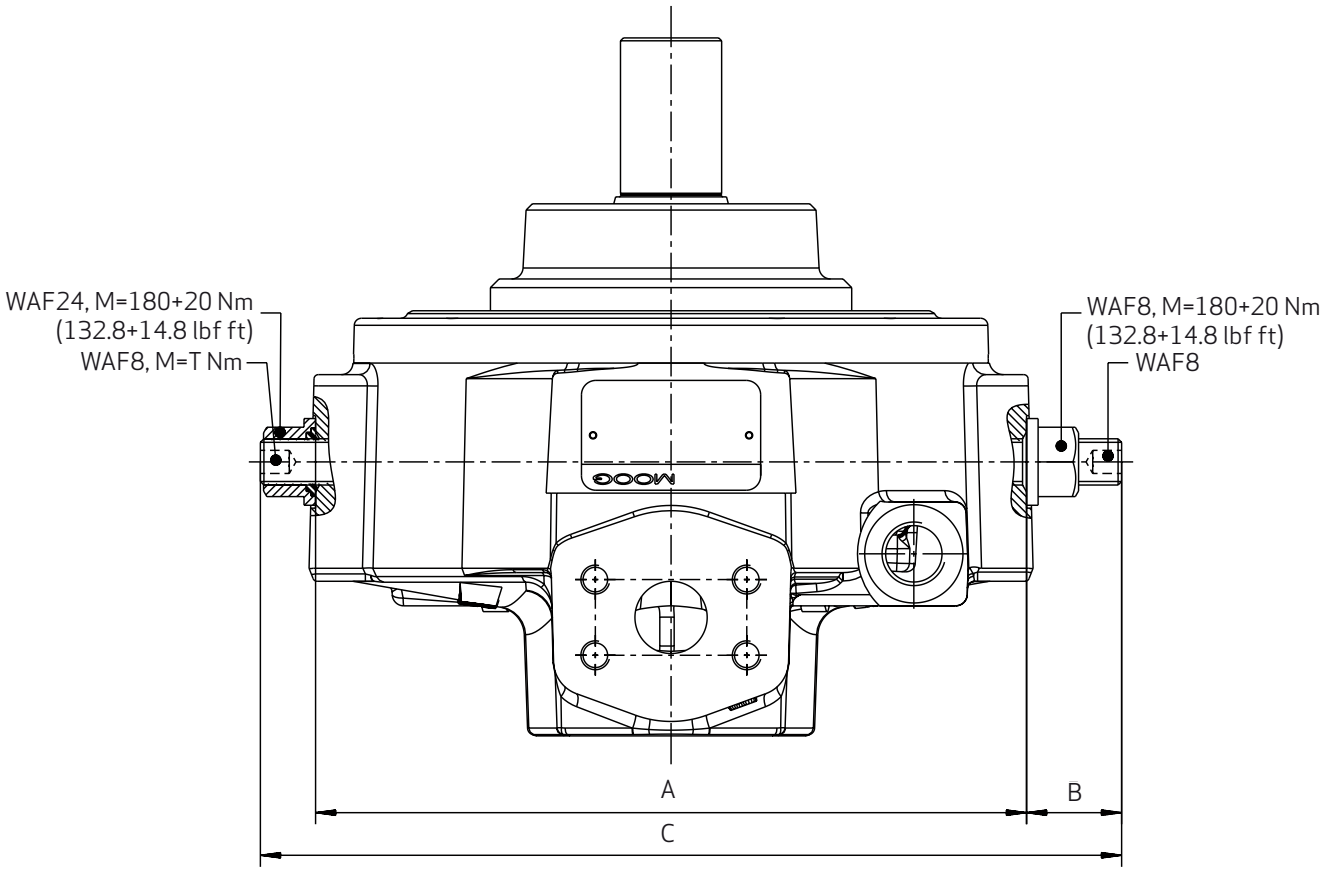




V [cm³/rev] ([cu.in/rev])	19 (1.16)	32 (1,95)	45 (2.75)	63/80 (3.48/4.88)	100 (6.10)
ΔV for 1 mm (0.039 in) travel of adjusting screw (pitch 1.5 mm/rev (0.059 in/rev))	3.6 (0.22)	5.6 (0.34)	6.5 (0.40)	8.9 (0.54)	11.3 (0.69)

MECHANICAL STROKE ADJUSTMENT B1

RKP 19-100

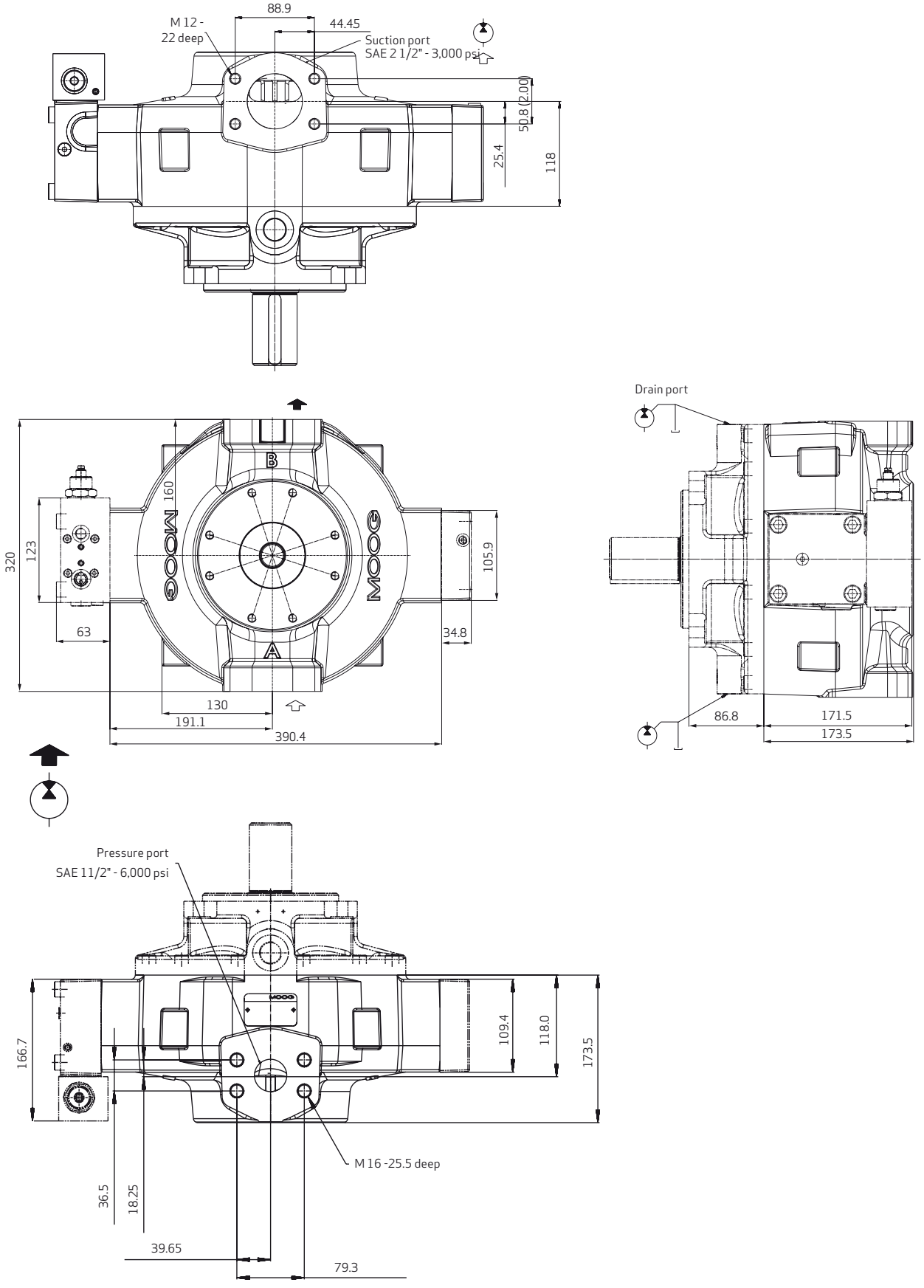


V [cm³/rev] ([cu.in/rev])	19 (1.16)	32 (1.95)	45 (2.75)	63 (3.84)	80 (4.88)	100 (6.10)
A [mm] ([in])	212 (8.35)	246 (9.69)	246 (9.69)	312 (12.28)	312 (12.28)	312 (12.28)
B [mm] ([in])	32.9 (1.30)	31.8 (1.25)	33.0 (1.30)	40.8 (1.61)	42.7 (1.68)	42.5(1.67)
C [mm] ([in])	267 (10.51)	298 (11.73)	298 (11.73)	379 (14.92)	379 (14.92)	379 (14.92)
T [Nm] ([lbf ft])	15+5 (11.1+3.7)	15+5 (11.1+3.7)	15+5 (11.1+3.7)	26+4 (19.2+3.0)	26+4 (19.2+3.0)	26+4 (19.2+3.0)
ΔV for 1 mm (0.039 in) travel of adjusting screw (pitch 1.5 mm/rev (0.059 in/rev))	3.6 (0.22)	5.6 (0.34)	6.5 (0.40)	8.9 (0.54)	8.9 (0.54)	11.3 (0.69)

Important

When adjusting for the required delivery, ensure that the stroke ring remains held between the two adjusting screws. When delivered, the pump is set to $V_{max.}$.

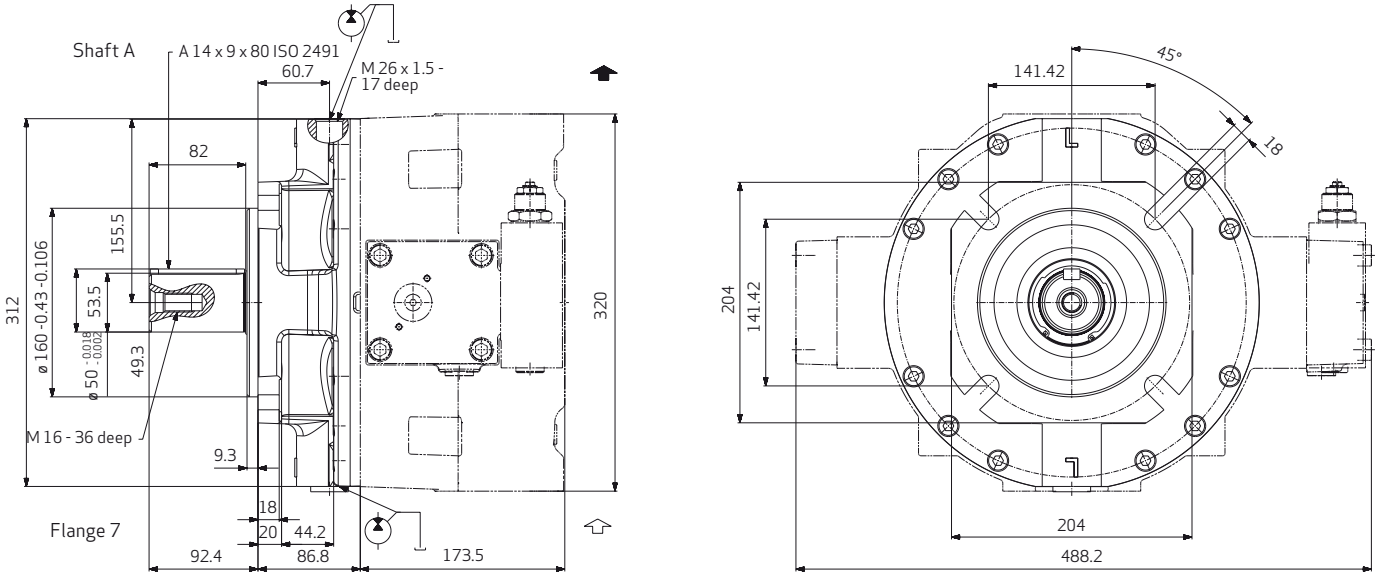
RKP 140 SHOWN WITH FLANGE A7 AND COMPENSATOR R1



RADIAL PISTON PUMPS RKP-II FOR LOW-FLAMMABILITY FLUIDS

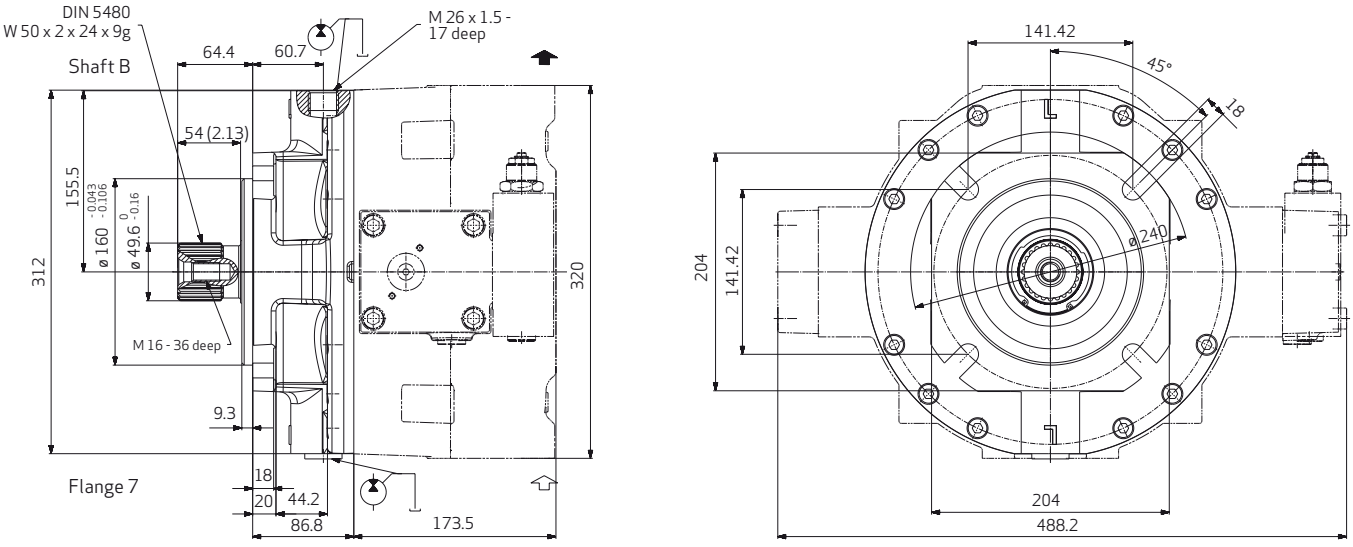
APPENDIX B – TECHNICAL DRAWINGS HOUSING RKP–II 140

DRIVE FLANGE A7



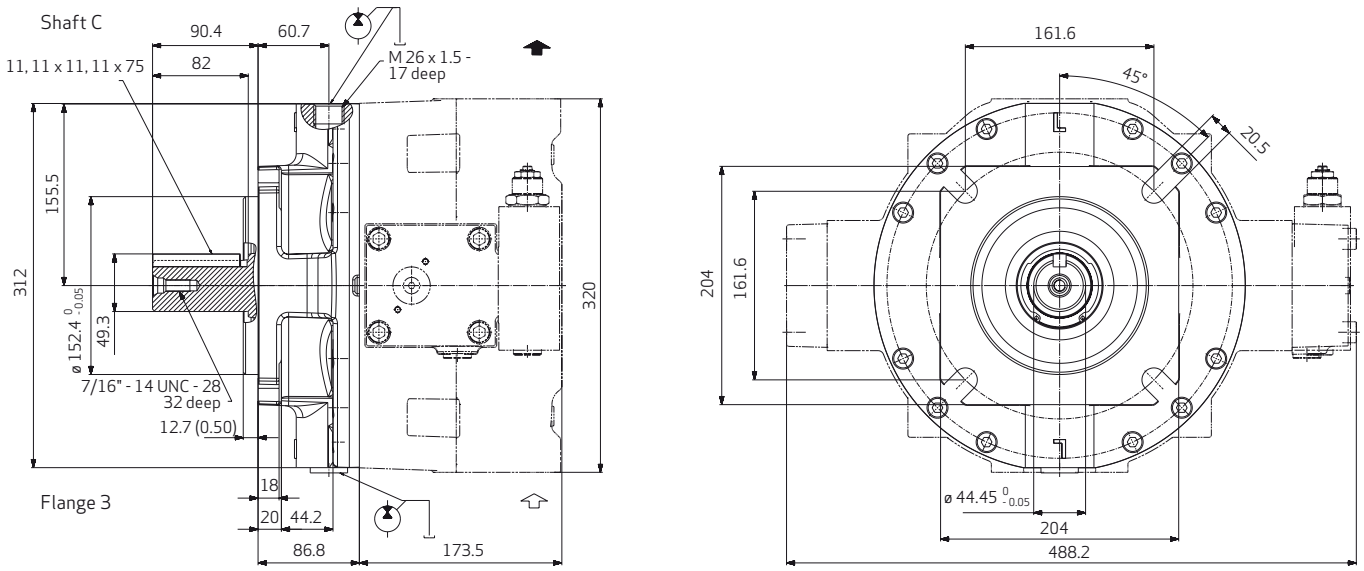
Straight key according to ISO 2491
ISO mounting flange to DIN ISO 3019/2 (metric dimensions)

DRIVE FLANGES B7



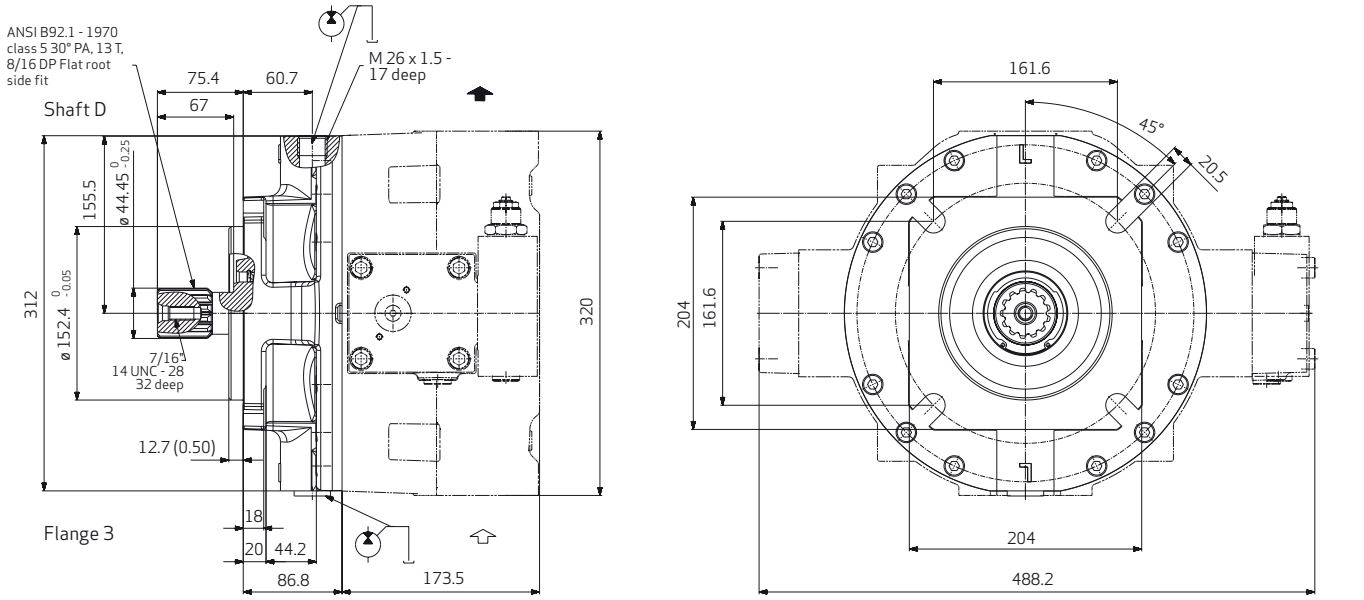
Involute spline according to DIN 5480 (for RKP mounting obligatory)
ISO mounting flange to DIN ISO 3019/2 (metric dimensions)

Drive flange C3



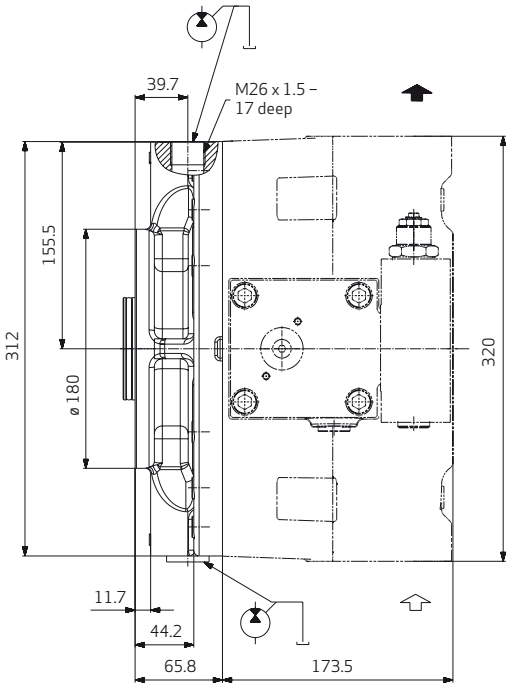
Key to SAE Standard
SAE mounting flange to DIN ISO 3019/1 (imperial dimensions)

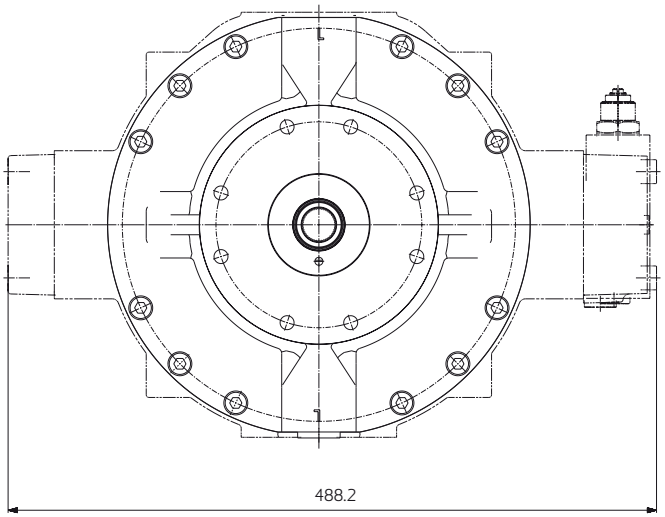
DRIVE FLANGE D3



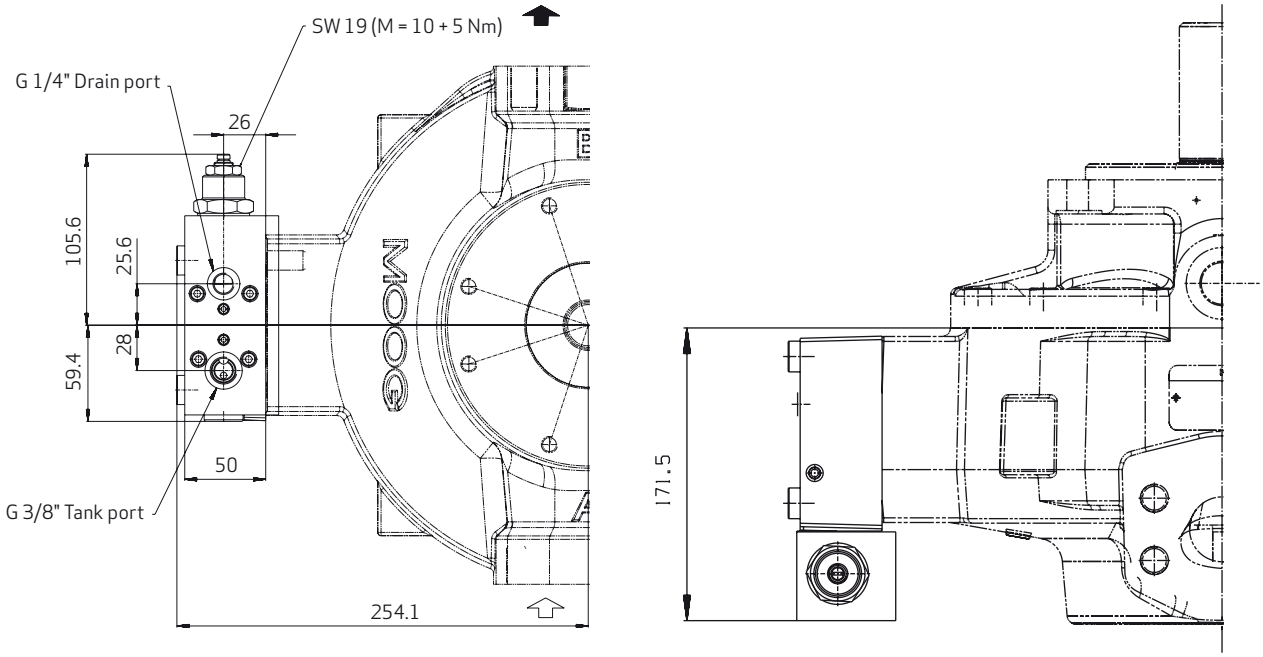
Involute spline according to SAE 744 C (for RKP mounting obligatory)
SAE mounting flange to DIN ISO 3019/1 (imperial dimensions)

INTERMEDIATE FLANGE RKP 140-140





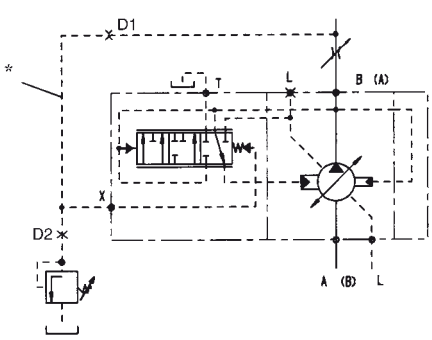
PRESSURE AND FLOW COMPENSATOR (LOAD SENSING) WITH P-T LAND, R1



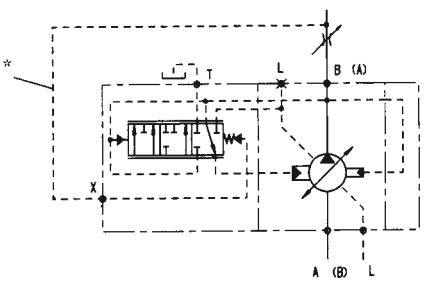
Caution!

The tank line of the compensator must not be combined with the drain line of the pump.

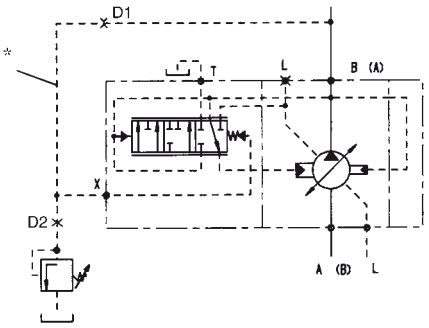
Following circuits are illustrated



Pressure and flow compensation "load sensing"



Flow compensation



Pressure compensation activated

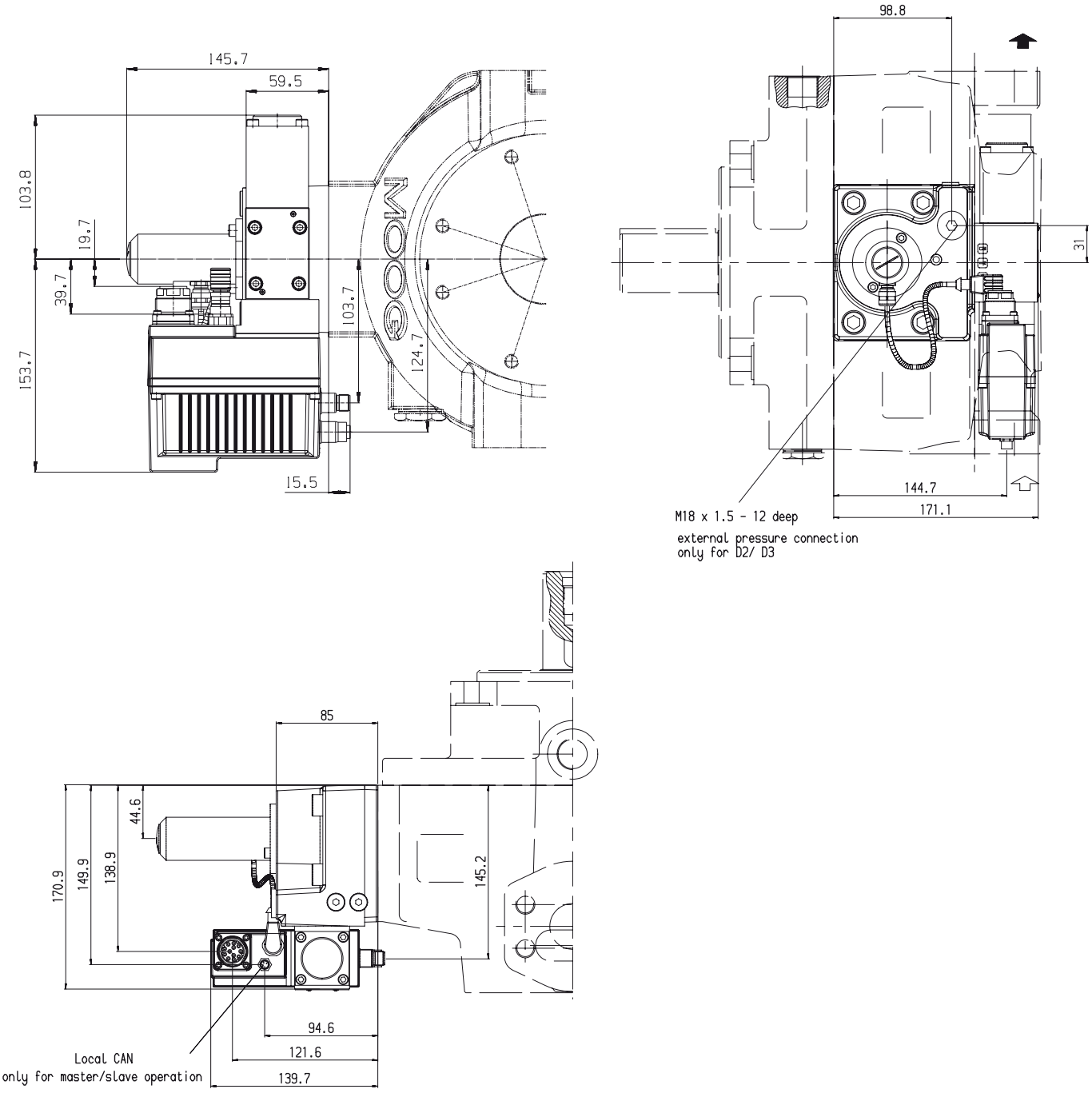
* Recommendation: Hose for pilot oil line

		D1 [mm] ([in])	D2 [mm] ([in])
RKP 140	DN 8	0.8 (0.031)	1.1 (0.043)
l = 800 mm (31.50 in)			

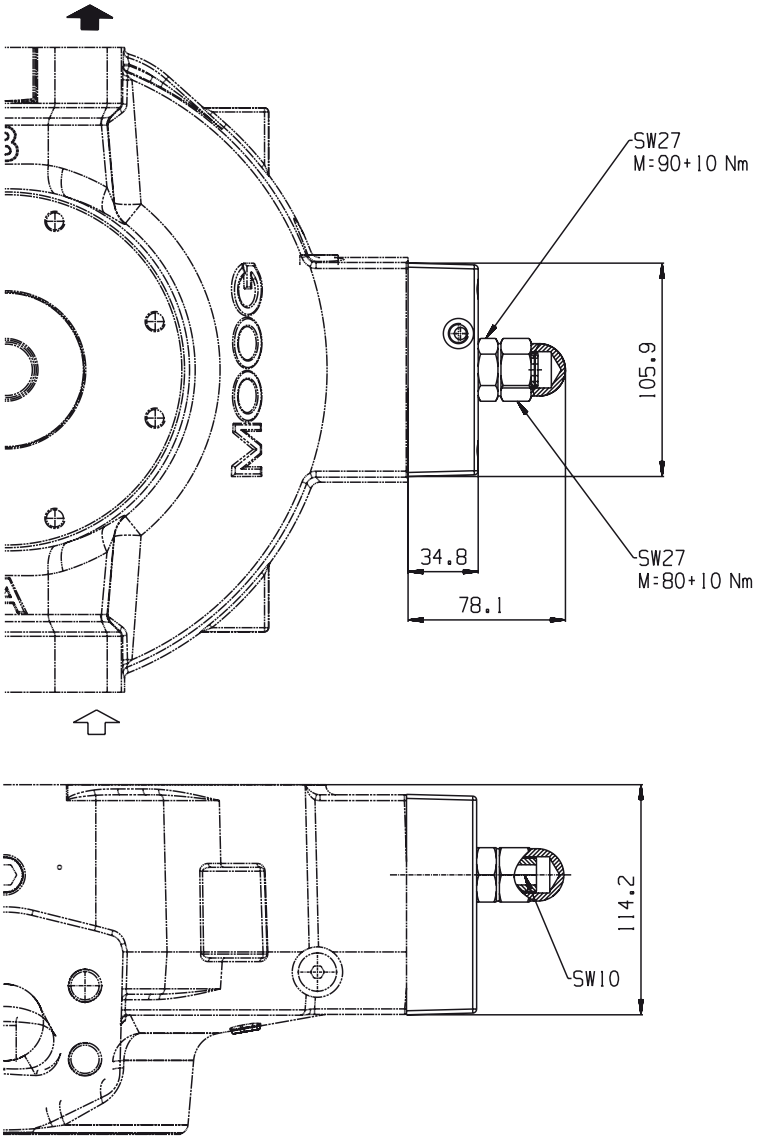
Notes on multiple pump circuits

In the case of multiple pumps which deliver into one circuit, the P-T land may only be activated for the compensator of the first pump by connecting the tank port to the tank. The tank port of the compensators of add-on pumps must be plugged.

ELECTRO-HYDRAULIC CONTROL WITH DIGITAL ON-BOARD ELECTRONICS D

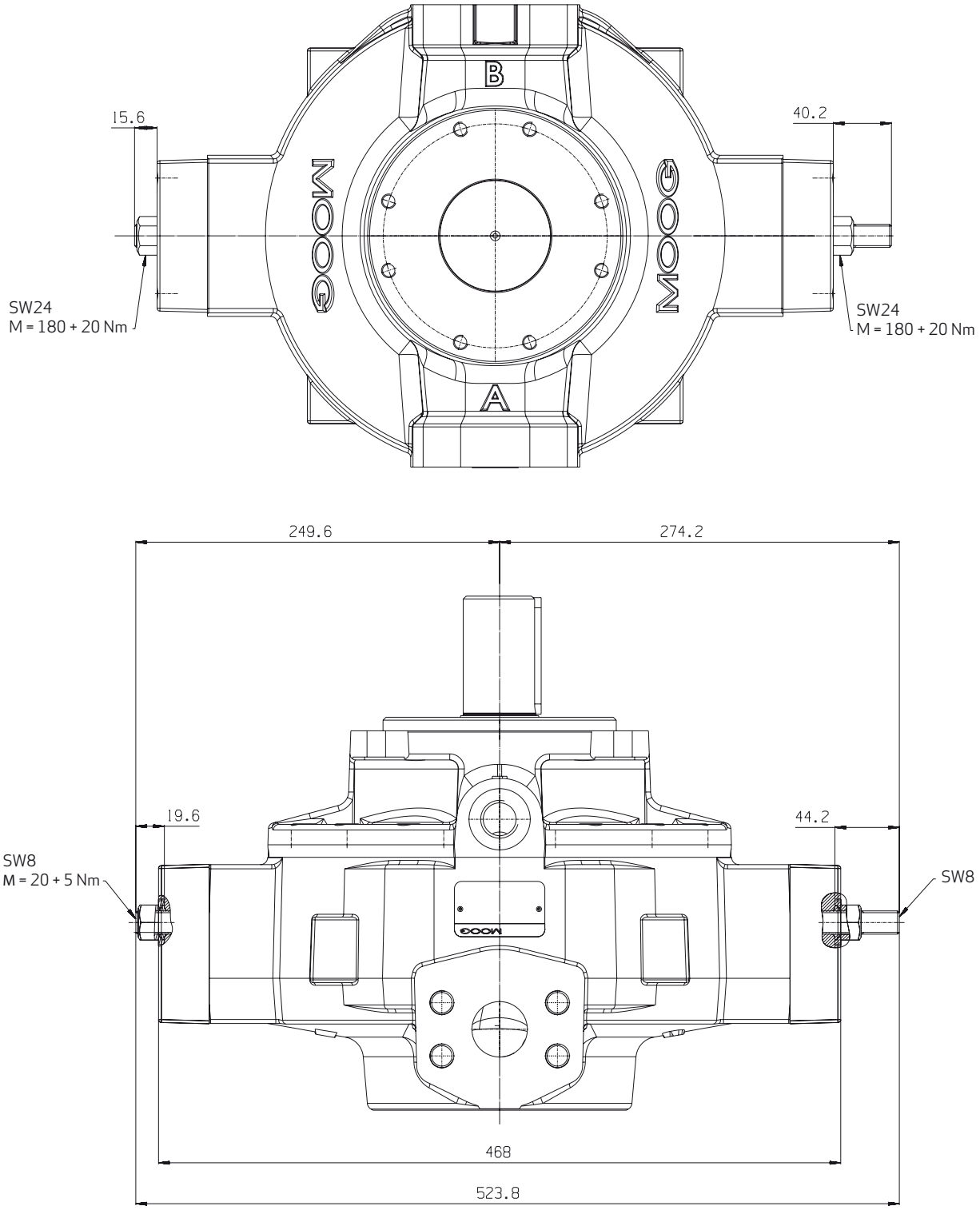


MAXIMUM FLOW LIMITER Y



V [cm³/rev] ([cu.in/rev])	140 (8.54)
ΔV for 1 mm (0.039 in) travel adjusting screw (pitch 1.5 mm/rev (0.059 in/rev))	11.5 (0.70)

MECHANICAL STROKE ADJUSTMENT B



V [cm³/rev] ([cu.in/rev])	140 (8.54)
ΔV for 1 mm (0.039 in) travel adjusting screw (pitch 1.5 mm/rev (0.059 in/rev))	11.5 (0.70)

MOOG GLOBAL SUPPORT

Moog Global Support™ is our promise to offer world-class Repair and Maintenance Services delivered expertly by our trained technicians. With the reliability only available from a leading manufacturer with facilities around the world, Moog offers you service and expertise you can count on to keep your equipment operating as it should.

This promise offers many benefits to our customers including:

- Reduce your downtime by keeping critical machines running in peak performance
- Protect your investment by ensuring reliability, versatility and long-life of products
- Better plan your maintenance activities and make systematic upgrades
- Leverage our flexible programs to meet unique service requirements of your facility

Look to Moog for global support including:

- Repair services using OEM parts are performed by trained technicians to the latest specifications
- Stock management of spare parts and products to prevent unplanned downtime
- Flexible programs, tailored to your needs such as upgrades, preventative maintenance and annual/multi-year contracts
- On-site services bring the expertise to you, providing quicker commissioning, set-up and diagnostics
- Access to reliable services that are guaranteed to offer consistent quality anywhere in the world

For more information on Moog Global Support™, visit www.moog.com/industrial/service.

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Radial Piston Pump RKP-II for low-flammability fluids
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