Sectional metering devices

Product series VPK

For oil and grease
For use in SKF CircOil circulating and SKF ProFlex progressive centralized lubrication systems

Fields of application

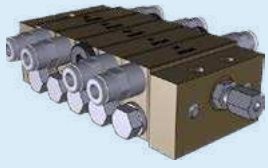
- Metal-forming machinery
- Vehicles
- Construction machinery
- Production systems in the automotive industry
- Packaging and printing machines

Advantages

- For universal use in continuous or intermittent operations
- Versatile – features metering sections with variable dosing amounts and internal and external consolidation of outlets
- Expandable by attaching directional solenoid valves
- Can be monitored using piston detectors or visual cycle indicators
- Simple to service – separator plates feature vulcanized seals that cannot be detached
- owerful – max. 20 outlets for volumetric flow of up to 500 cm^3/min

Table of contents

Important information on product usage
SKF and Lincoln lubrication systems or their components are not approved for use with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1 013 mbar) by more than 0,5 bar at their maximum permissible temperature.



CAD models for the products shown in this brochure can be downloaded at: **skf-lubrication.partcommunity.com**

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SKF

Sectional metering device, product series VPK

Product overview

Basic design

Visual cycle indicator

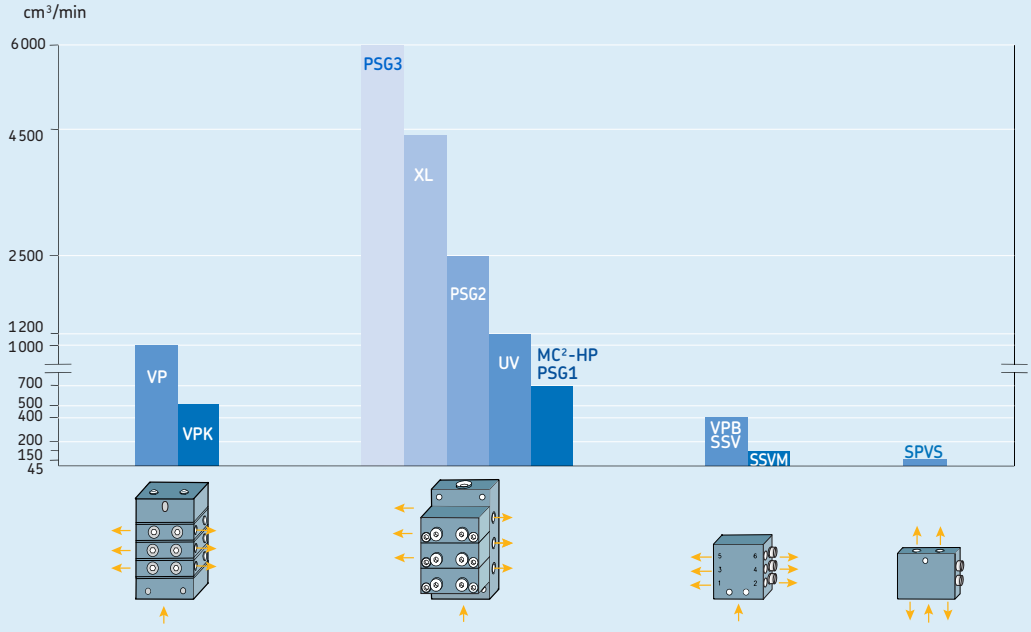
Piston detector

NAMUR proximity switch

4/2-Directional solenoid valve

2/2-Directional solenoid valve

Overview SKF progressive feeders, inlet volume



The maximum recommended flow rate values relate to lubricating oil at the highest selectable piston-stroke volume.

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Sectional metering device, product series VPK

Product description

General

The sectional metering device VPK, which belongs to the progressive feeder range, is available in the designs VPKM (metric-threaded connectors) and VPKG (inch-threaded connectors). With their metering sections, VPM and VPG cover a metering volume per outlet and cycle of 0.05 cm^3 (T-section) to 0.6 cm^3 (S-section). The inlet of the feeder is located at an inlet section and the outlets are at the downstream feeder sections. The delivery ducts are sealed by elastic seals. An end section is located downstream of the last feeder section. All sections are interconnected with tie-rods. They seal the feeder assembly.

The volumetric flow, which is sent via a tube, is forcibly distributed in a predetermined ratio to the outlets, i.e. to the lubrication points or the downstream progressive feeders. Pistons, which are aligned in series, meter the lubricant for two opposite outlets each and control the function of the neighboring piston. This way, the function of the sectional metering device can be checked by monitoring **any** piston with a cycle indicator or a piston detector.

Operation (→ Fig. 1)

The task of the progressive feeder is to distribute consecutively specified portions of the pressure-fed lubricant (grease or oil) to the connected lubrication points.

The discharge of the lubricant continues as long as it is pressure-fed to the progressive feeder. The specified portions are generated through the piston movement. Two lubricant outlets on the two end positions of the piston travel are allocated to each piston.

The number of pistons within a feeder is from 3–10 variable. If lubricant is pressure-fed, the pistons of a feeder move in turn to their end position. The piston movement displaces a portion of the lubricant that is downstream of the piston to the downstream outlet. The movement of a piston can only start after the upstream piston has been moved to its end position. If all pistons are in their left or right end position, internal connecting bores in the feeder ensure a defined and continued running of the pistons.

When all pistons have been moved once to the left as well as to the right end position, all connected lubricant points have been supplied once with the preset lubricant quantity.

The portions for both outlets are determined by the diameter and the travel of the piston. The selection of the required portion is made during the design of the feeder.

A subsequent change of the portions is only possible through a modification of the feeder.

Information on the design

The general criteria for the design of progressive feeders also apply without restrictions to the sectional metering device VP. The most important criterion is the number of cycles (stroke rate). They should be held as low as possible by selecting high-volume feeders. Maximum value of 200 cycles/min should not be exceeded

Thus, pressure losses and noise level will also be reduced. In case of an installation on movable machine parts or in case of strong vibrations (e.g. on presses), the piston position of the feeder should not be the same as the direction of movement of the machine part.

For the VPK feeder, the minimum number of feeder sections is 3 and the maximum number is 10.

Quantity distribution

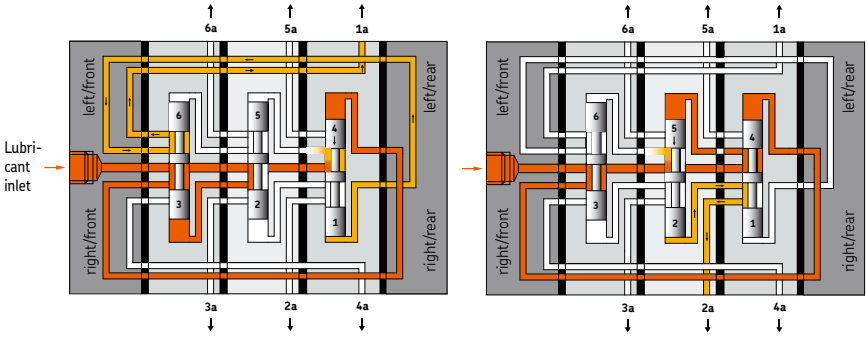
Sectional metering devices distribute an amount delivered by a pump to several outlets while the feeder determines the volumetric ratio.

The different output quantities within a feeder are achieved by the use of various piston diameters or the joining of two or more outlets. The indicated lubricant quantities result from the piston diameter and the maximum travel of the piston. Depending on the system design, these capacities may vary by 40 percent.

For the sectional metering devices VPKM and VPKG, sections for two connections (**T** = twin) or for one connection (**S** = single) are available. In case of single sections, the two opposite outlets are connected internally, whereby one outlet is closed.

Fig. 1

Section view



Piston side **4** is pressurized by the pump, piston side **1** has delivered lubricant to outlet **1a**. The connection between the main line and piston side **5** has become free due to the stroke of piston **1/4**.

Piston side **5** is pressurized and piston side **2** delivers the lubricant via outlet **2a**. Piston side **6** is the next to be pressurized, etc.

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Sectional metering device, product series VPK

Monitoring and attachments

Tightening torques

During the installation of the VKP feeder, consisting of inlet section, inlet plate, twin and single sections, separator plates as well as end plate and end section, the following tightening torques have to be adhered to for the tie-rods and nuts:

Tightening torque		
Tie-rod (2x)	each	2,5 Nm
Nut for tie-rod M6 (2x)	each	12,0 Nm

Monitoring

All standard sections can be monitored directly by means of a piston detector. Furthermore, the piston movement can be monitored by visual stroke monitoring.

Both monitoring models can be used for oil as well as for grease.

Attachments

The sectional metering device VPK can be equipped with upstream directional solenoid valves for oil.

Check valves

Screw unions with check valves are recommended when using greases due to the air inclusions caused by production processes.

Consolidation of outlets (→ Fig. 2)

Two neighboring outlets are joined from the end section towards the inlet section. The plug (order No. **917-006-101**) of the outlet nearest to the end section must be unscrewed and the outlet bore must be sealed with a screw plug. The fluid of the two outlets will then flow out of the outlet near the inlet section.

Note:

To avoid damages the feeder section behind the inlet section must not be closed!

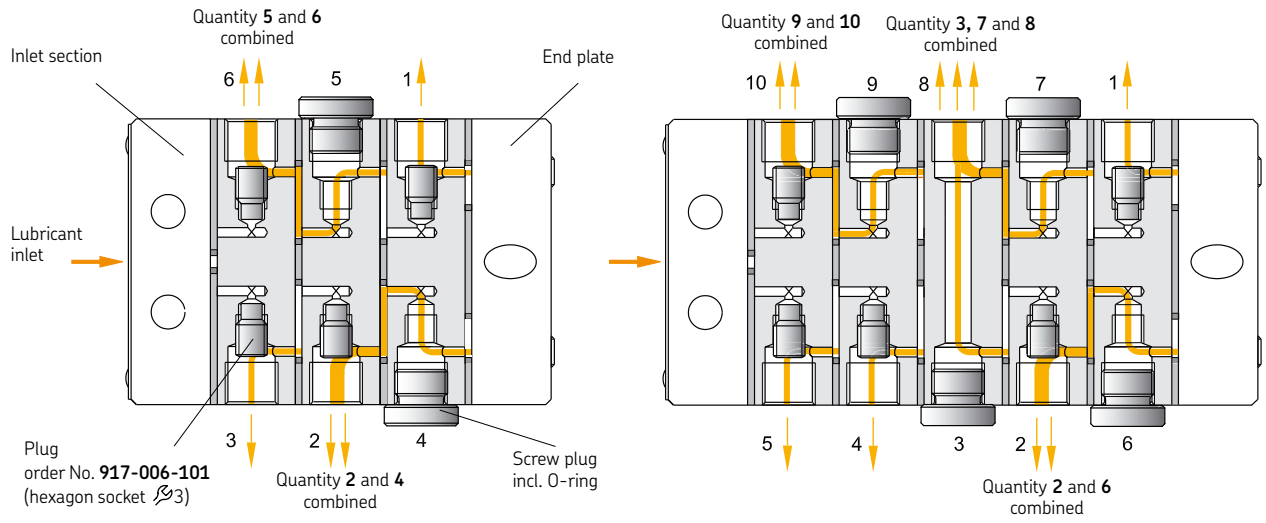
Important!

To avoid damages it is absolutely essential, that the plug (order No. **917-006-101**) has been removed before screwing in the screw plug, otherwise the feeder may block.

This consolidation of outlets can be combined, as long as there is no single section in-between. The single section completes the group formation; a new group formation can only be carried out behind the single section. If it turns out that the fluids of two neighboring outlets have to be separated again (e.g. due to an additional lubrication point), this will be a simple matter. The only thing to do is to screw in a plug (order No. **917-006-101**) and to connect the previously closed outlet to the new lubrication point.

Fig. 2

Example for the consolidation of several neighboring outlets



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Sectional metering device, product series VPK

Basic design for oil and grease

Technical data

Type	Hydraulically controlled
Mounting position	Any
Ambient temperature range	–25 to +90 °C
Feeder section	→ Table 1
Occupied outlets	1 to 20

Material

Inlet, separator and end section	Steel, galvanized, NBR
Sections	Steel, galvanized

Hydraulic system

Operating pressure, max.	Oil 200 bar, grease 300 bar
Volume per outlet and cycle	→ Table 2
Lubricant	Mineral oils, greases based on mineral oil, environmentally friendly and synthetic oils and greases
Operating viscosity	> 12 mm²/s
Worked penetration	≥ 265 x 0.1 mm (up to NLGI Grade 2)

VPK sectional metering device, basic design

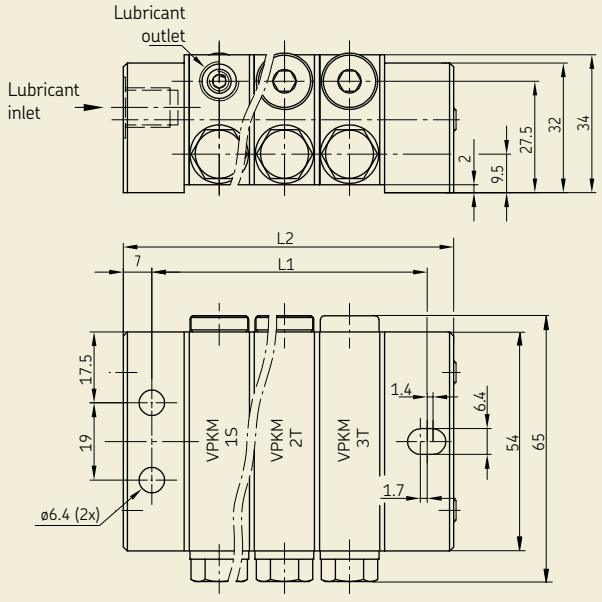

Table 1

Dimensions

Inlet: VPKM = M10×1, VPKG = G1/8 Outlet: VPKM = M10×1, VPKG = G1/8

Typ	Number of feeder sections	Number of possible outlets	L1 [mm]	L2 [mm]	Weight [kg]
VPKM-3 / VPKG-3	3	6	68.4	81.9	0.99
VPKM-4 / VPKG-4	4	8	84.6	98.1	1.18
VPKM-5 / VPKG-5	5	10	100.8	114.3	1.38
VPKM-6 / VPKG-6	6	12	117.0	130.5	1.57
VPKM-7 / VPKG-7	7	14	133.2	146.7	1.77
VPKM-8 / VPKG-8	8	16	149.4	162.9	1.96
VPKM-9 / VPKG-9	9	18	165.6	179.1	2.16
VPKM-10 / VPKG-10	10	20	181.8	195.3	2.35

Table 2

Selection of feeder sections

Quantity per cycle and outlet [cm]	Number of outlets	Description of the sections	Identification letter/Order code
0.05	2	05T	**A**
0.10	2	1T	**C**
0.20	2	2T	**E**
0.30	2	3T	**G**
0.10	1	05S	**B**
0.20	1	1S	**D**
0.40	1	2S	**F**
0.60	1	3S	**H**

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Sectional metering device, product series VPK

Monitoring with piston detector and cycle indicator, for oil and grease

With piston detector

With cycle indicator

Technical data

Basis design → Technical data page 6

Piston detector, electrical [1)]

Ambient temperature range	–25 to +80 °C
Operating pressure max.	350 bar
Design	4-point LED
Rated voltage	10 to 36 V DC
Internal thread	M10×1
Weight	30 g
Residual ripple (2-pin)	3 bis 15 %
Residual ripple (3-pin)	≤ 10 %
Max. load current	100 mA
Protection class	IP67
Min. load current (2-pin)	4 mA
Outlet function (2-pin)	NC contact
Outlet function (3-pin)	PNP contact

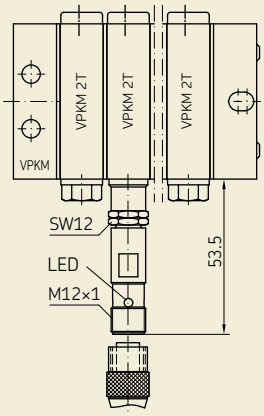
Cycle indicator, visual

Ambient temperature range	–15 to +75 °C
Weight	30 g

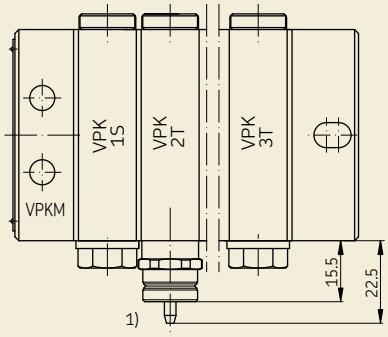
[1)] The piston detector is designed for a service life of approx. 10-15 million cycles. This value may be significantly exceeded depending on the application, external environmental influences, medium, pressure, and cycle speed. Please contact the manufacturer if in doubt.

Note!
Electrical plug and socket connections are ordered separately → **page 13.**

Sectional metering device VPK with piston detector



Sectional metering device VPK with visual cycle indicator



[1)] The installation of the cycle indicator with or without proximity switch is only possible from feeder section 2T/2S or larger.

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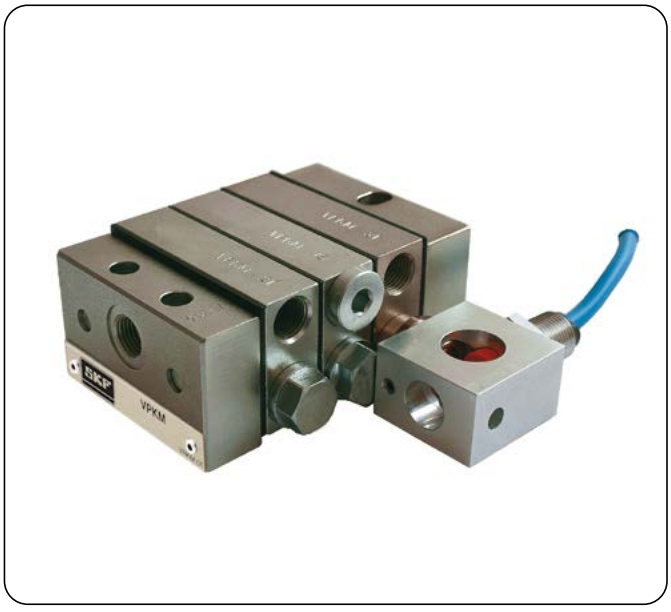
Sectional metering device, product series VPK

Monitoring with cycle indicator and NAMUR proximity switch, for oil and grease



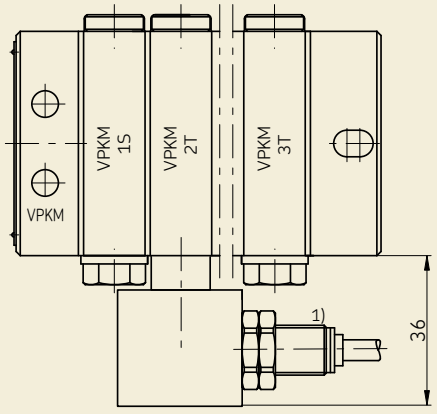
Technical data

Basis design → Technical data page 6

Proximity switch	
Ambient temperature range	–15 bis +70 °C
Operating pressure max.	350 bar
Rated voltage	8,2 V DC
Internal thread	M12×1
Weight	30g
Design	PVC, with 2 m cable 2x 0.34 mm²
Power consumption	conducting > 2.2 mA, blocking < 1.0 mA
Protection class	IP 67
Outlet function	Öffner normal geschlossen (NC)
Weight total (Cycle indicator, housing, proximity switch)	85 g

Note!
Use proximity switch only with NAMUR switching amplifier.

Sectional metering device VPK with proximity switch



[1] The installation of the cycle indicator with or without proximity switch is only possible from feeder section 2T/2S or larger.

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Sectional metering device, product series VPK

with directional solenoid valve, for oil

With 4/2-directional solenoid valve

With 2/2-directional solenoid valve

Technical data

Basis design → Technical data page 6

3/2- and 4/2-directional solenoid valve

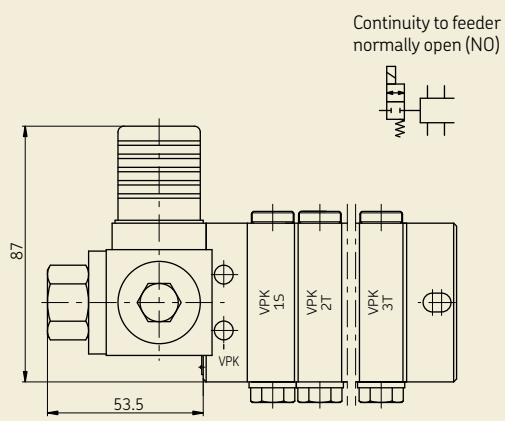
Ambient temperature range	–15 to +75 °C
Operating pressure max.	150 bar
Rated voltage	24 V DC
Rated current	1.3 A
Weight	1560 g
Lubricant	Mineral oils, environmentally friendly and synthetic oils
Operating viscosity	20–1 000 mm²/s
Elektrische Bauart	Pusher/solenoid
Plug/electrical connection	DIN EN 175301-803
ON-time	100% ED
Protection class	IP65
Design	4/2 continuity to feeder normally open (NO); 3/2 continuity to feeder normally closed (NC)

2/2-directional solenoid valve (only for VPKG)

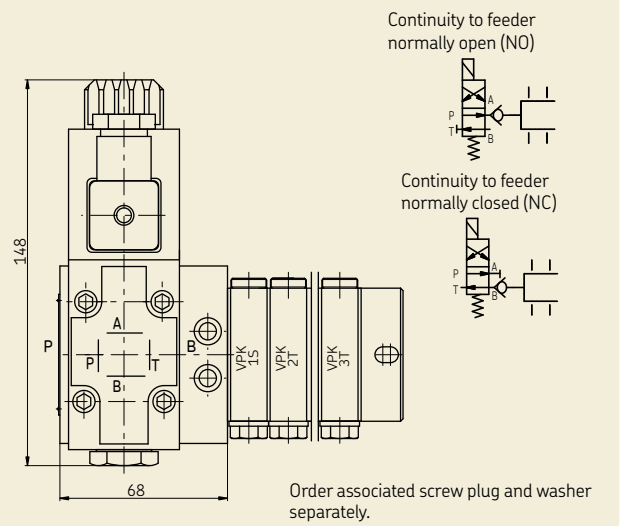
Ambient temperature range	–15 to +75 °C
Operating pressure max.	150 bar
Rated voltage	24 V DC
Rated current	1.3 A
Weight	610 g
Lubricant	Mineral oils, environmentally friendly and synthetic oils
Operating viscosity	20–1 000 mm²/s
Elektrische Bauart	Pusher/solenoid
ON-time	100% ED
Plug/electrical connection	DIN EN 175301-803
Protection class	IP65
Design	Continuity to feeder normally open (NO)

Note!
Electrical plug and socket connections are ordered separately → **page 13.**

Sectional metering device VPK with 2/2-directional solenoid valve



Sectional metering device VPK with 4/2-directional solenoid valve



Order associated screw plug and washer separately.

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Order code

Sectional metering device of product series VPK*)

Order code VPK 1 2 3 4 5 – [ ] – [ ] – [ ] – [ ] – [ ] – [ ] – [ ] – [ ] – [ ] – [ ]

Feeder information

Choice 6/7/8: information on sections 1 to 10 as seen from inlet (min. 3 sections)

Order example: VPKGYFXC–EMM–CMV–HSM–DMS–EMM (→ page 12)

1 Thread type

Inlet- and outlet thread M10×1	M
Inlet- and outlet thread G1/8	G

2 Selection of monitoring

none	X
Piston detector 2-pin, M12×1 plug	2
Piston detector 3-pin, M12×1 plug (wire breakage protection)	3
Cycle indicator, visual (plunger rod) 1)	Y
Cycle indicator with holder and proximity switch M12×1 1)	S
Cycle indicator with holder for proximity switch M12×1 (without proximity switch) 1)	G

1) The installation of the cycle indicator **is only** possible from feeder section 2T and 2S, respectively! Installation not recommended on first or last segment.

3 Selection of installation position for monitor

X none

left-hand side		right-hand side
U	10	V
S	9	T
Q	8	R
N	7	P
L	6	M
J	5	K
G	4	H
E	3	F
C	2	D
A	1	B

↑ Inlet

4 Selection of attachments

	VPKM	VPKG
none	X	X
4/2-directional solenoid valve for oil	B	B
3/2-directional solenoid valve for oil	D	D
2/2-directional solenoid valve for oil	–	E

5 Selection of inlet screw union

	VPKM	VPKG
none	X	X
Straight connector for tube ø6 mm, L 1)	A	A
Straight connector for tube ø6 mm, tapered LL 1)	B	–
Straight connector for tube ø8 mm, tapered LL 1)	C	C
Straight connector for tube ø10 mm, tapered L 1)	–	D
Straight connector, E02 for tube ø6 mm	E	E
Straight quick connector for tube ø6 mm	F	F
Straight quick connector for tube ø6 mm, tapered	G	G
Elbow for tube ø6 mm, tapered, L 1)	H	H
Elbow for tube ø6 mm, tapered, LL 1)	J	–
Elbow for tube ø8 mm, tapered, LL 1)	K	K
Elbow quick connector, ø6 mm, tapered	L	L
Banjo fitting for tube ø6 mm, L 1)	M	M
Banjo fitting for tube ø6 mm, LL 1)	N	–
Banjo fitting quick connector for tube ø6 mm	P	P
Banjo fitting quick connector for tube ø6 mm, tapered	Q	–

LL-series = extra light version, **L**-series = light version, **S**-series = heavy duty version

1) Solderless pipe unions with cutting sleeve acc. to DIN 2353

*) Online configurable under **skf-lubrication.partcommunity.com** (→ **page 12**).

PUB LS/P2 16443 EN · 1-3015-EN

SKF

Order code

Sectional metering device of product series VPK VPK

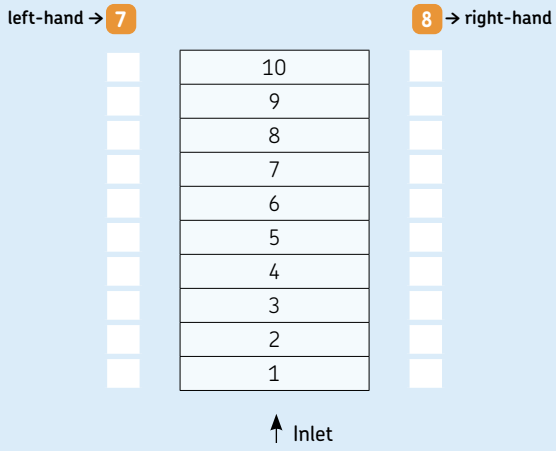
6 Selection of feeder sections

1st place section size [1] (seen from the inlet)

Number of outlets 2 (Twin) Volume per cycle and outlet [cm³]	Designation of sections		Number of outlets 1 (Single) Volume per cycle and outlet [cm³]	Designation of sections	
0.05	05T	A	0.10	05S	B
0.10	1T	C	0.20	1S	D
0.20	2T	E	0.40	2S	F
0.30	3T	G	0.60	3S	H

[1] Smallest possible feeder size = 3 effective sections

Selection of outlet ports
(indicate selections 7 and 8!)



7 8 2nd place outlet screw union, left-hand side; 3rd place outlet screw union, right-hand side	VPKM	VPKG
No outlet port, screw plug	S	S
Outlet port without screw unions	X	X
Outlet port with 4 mm outlet screw union [2], tapered, LL	A	–
Outlet port with 4 mm outlet screw union [2], LL	–	B
Outlet port with 6 mm outlet screw union [2], tapered, LL	C	–
Outlet port with 6 mm outlet screw union [2], L	D	D
Outlet port with 8 mm outlet screw union [3], tapered, LL	E	E
Outlet port with 10 mm outlet screw union [3], tapered, L	–	F
Outlet port with 4 mm outlet screw union, EO2	G	G
Outlet port with 6 mm outlet screw union, EO2	J	J
ø4 mm quick connector	K	K
ø4 mm quick connector, tapered	L	–
ø6 mm quick connector	M	M
ø6 mm quick connector, tapered	N	N
Outlet port with 6 mm outlet screw union, with CV	Q	Q
6 mm quick connector, with CV	R	–
Outlet port with 4 mm banjo fitting [2], LL	–	W
Outlet port with 6 mm banjo fitting [2], L	1	1
Outlet port with 6 mm banjo fitting [2], LL	2	–
4 mm quick connector-banjo fitting	3	3
4 mm quick connector-banjo fitting, tapered	4	–
6 mm quick connector-banjo fitting	5	5
6 mm quick connector-banjo fitting, tapered	6	–
Crossporting forwards (seen from the inlet)	V	V

[2] Solderless pipe unions with cutting sleeve acc. to DIN 2353
[3] cannot be mounted on 2 consecutive segments on the same side

LL-series = extra light version, **L**-series = light version
CV = Check valve

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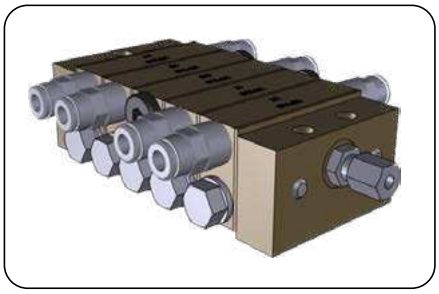
Order example

Sectional metering device of product series VPK

We recommend that you enter your desired sectional metering devices in Cadenas at **skf-lubrication.partcommunity.com s**o that you can configure it quickly.

You will receive:
- A 3D drawing
- A 2D drawing
- A dimensioned drawing
- A complete order code
- A legend

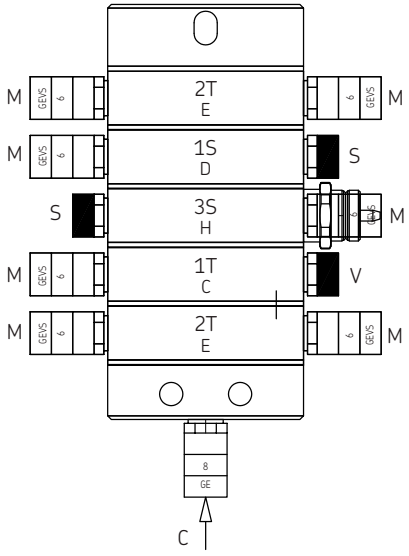


Order code: VPKGYFXC–EMM–CMV–HSM–DMS–EMM

Designation

Description	Clarification
Progressive sectional metering device	**VPK**
1 Thread type	**G** (inlet and outlet thread G1/8)
Feeder size	5 sections
2 Monitoring type	**Y** (cycle indicator, visual)
3 Mounting position of the monitoring system	**F** (right-side, on 3rd section)
4 Attachments	**X** (without)
5 Inlet screw union	**C** (straight connector for tube ø 8mm, tapered, LL)
1. Section	
6 Feeder section	**E** (2T – 0.20 cm³, 2 outlets)
7 left side of section	**M** (straight quick connector for tube ø6 mm)
8 right side of section	**M** (straight quick connector for tube ø6 mm)
2. Section	
6 Feeder section	**C** (1T – 0.10 cm³, 2 outlets)
7 left side of section	**M** (straight quick connector for tube ø6 mm)
8 right side of section	**V** (Crossporting nach vorne)
3. Section	
6 Feeder section	**H** (3S – 0.60 cm³, 1 outlet)
7 left side of section	**S** (no outlet port, screw plug)
8 right side of section	**M** (straight quick connector for tube ø6 mm)
4. Section	
6 Feeder section	**D** (1S – 0.20 cm³, 1 outlet)
7 left side of section	**M** (straight quick connector for tube ø6)
8 right side of section	**S** (no outlet port, screw plug)
5. Section	
6 Feeder section	**E** (2T – 0.20 cm³, 2 outlets)
7 left side of section	**M** (straight quick connector for tube ø6 mm)
8 right side of section	**M** (straight quick connector for tube ø6 mm)

Order example diagram



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Accessories

Electrical plug-in connections

Square connector

Order No.	Designation
179-990-033	Square connector per DIN EN 175301-803A, cable diameter 6–10 mm, 3-pin +PE, max. 1.5 mm²

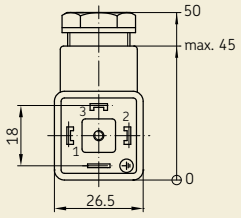
Circular connector M12x1

2360-00000316	Straight circular connector (A), cable diameter –6 mm, 4-pin, max. 0.75 mm²
179-990-600	Straight circular connector (B), 4-pin with integrally extruded cable, 5 m, 4×0,25 mm²
2360-00000317	Angled circular connector (C), cable diameter 4–6 mm, 4-pin, max. 0.75 mm²
179-990-601	Angled circular connector (D), with integrally extruded cable, 5 m, 4×0,25 mm²

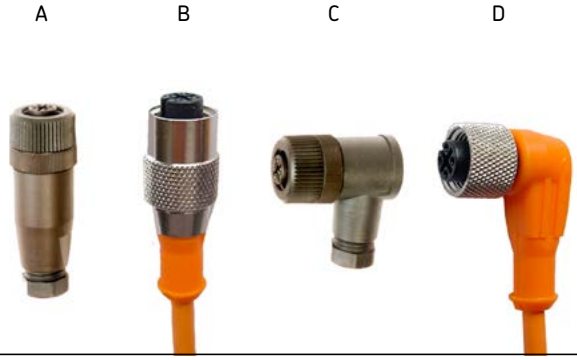
→ *Brochure 1-1730-EN*

Square connector 179-990-033

179-990-033



Circular connector M12×1



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Notes

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SKF

Further brochures:

1-0107-6-EN	*Accessories for Progressive Systems*
1-1730-EN	*Electric Plug and Socket Connectors*
1-3010-EN	*Modular feeder product series PSG*
1-3016-EN	*Sectional metering device product series VP*
1-3028-EN	*Flow limiter SP/SMB8*
1-9201-EN	*Transport of Lubricants in Centralized Lubrication Systems*

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