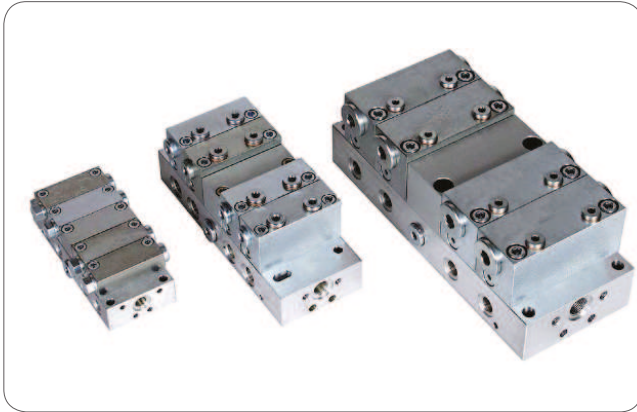


Modular Feeders of Product Series PSG

for oil, grease, and fluid grease, for use in SKF
ProFlex, MultiFlex, and circulating oil centralized lubrication
systems



Version 01

Masthead

These assembly instructions pursuant to EC Machinery Directive 2006/42/EC are an integral part of the product described here and must be kept for future use.

Warranty

The instructions do not contain any information on the warranty. This can be found in the General Conditions of Sales, which are available at:
www.skf.com/lubrication.

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Explanation of symbols and signs

You will find these symbols, which warn of specific dangers to persons, material assets, or the environment, next to all safety instructions in this lifecycle manual.

Read the instructions completely and follow all operating instructions and the warning and safety instructions.

Warning level		Consequence	Probability
	DANGER	Death / serious injury	Immediate
	WARNING	Serious injury	Possible
	CAUTION	Minor injury	Possible
	NOTE	Property damage	Possible

Information symbols within the text	
Symbol	Meaning
●	Prompts an action
○	Used for itemizing
	Refers to other facts, causes, or consequences
→	Provides additional information within procedures

Possible symbols	
Symbol	Meaning
	Note
	Electrical component hazard, electric shock hazard
	Slipping hazard
	Hazard from hot components Hazard from hot surface
	Risk of being drawn into machinery
	Crushing hazard
	Danger from suspended load
	Pressure injection hazard
	Explosion-proof component
	Electrostatic sensitive components
	Wear personal safety equipment (goggles)
	Secure (lock) the closing device against accidental starting of the machine
	Environmentally sound disposal

Instructions placed directly on the product, such as:

- o Arrow indicators
 - o Fluid connection labels
 - o Warnings
- must be followed and kept in fully legible condition.

Abbreviations and conversion factors

Abbreviations

°C	degrees Celsius
s	seconds
dB (A)	sound pressure level
i.e.	that is
<	less than
±	plus or minus
>	greater than
e.g.	for example
∅	diameter
incl.	including
K	Kelvin
kg	kilogram
rh	relative humidity
kW	kilowatt
l	liter
Min.	minute
max.	maximum
min.	minimum
mm	millimeter
ml	milliliter
N	Newton
Nm	Newton meter
oz.	ounce
psi	pounds per square inch
hp	horsepower
lb.	pound
sq.in.	square inch

sq.in.	square inch
kp	kilopond
cu.in.	cubic inch
mph	miles per hour
fpsec	feet per second
°F	degrees Fahrenheit
fl.oz.	fluid ounce
in.	inch
gal.	gallon

Conversion factors

Length	1 mm = 0.03937 in.
Area	1 cm ² = 0.155 sq.in.
Volume	1 ml = 0.0352 fl.oz.
	1 l = 2.11416 pints (US)
Mass	1 kg = 2.205 lbs
	1 g = 0.03527 oz.
Density	1 kg/cm ³ = 8.3454 lb./gal. (US)
	1 kg/cm ³ = 0.03613 lb./cu.in.
Force	1 N = 0.10197 kp
Speed	1 m/s = 3.28084 fpsec
	1 m/s = 2.23694 mph
Acceleration	1 m/s ² = 3.28084 ft./s ²
Pressure	1 bar = 14.5 psi
Temperature	°C = (°F-32) x 5/9
Power	1 kW = 1.34109 hp

1. Safety instructions

1.1 General safety instructions

The operator must ensure that the instructions are read and fully understood by all persons tasked with working on the product or who supervise or instruct such persons. The instructions must be kept readily available together with the product.

The manual forms part of the product and must accompany the product if sold to a new owner.

The product described here was manufactured according to the state of the art.

Risks may, however, arise from its usage and may result in personal injury or damage to property.

Any malfunctions affecting safety must be remedied immediately.

In addition to the lifecycle manual, all statutory regulations and other regulations for accident prevention and environmental protection must be observed.

- o The product may only be used in awareness of the potential dangers, in proper technical condition, and according to the information in this manual.

1.2 General behavior when handling the product

- o Personnel must familiarize themselves with the functions and operation of the product. The specified assembly and operating steps and their sequences must be observed.

- o Any unclear points regarding proper condition or correct assembly/operation must be clarified. Operation is prohibited until issues have been clarified.

- o Unauthorized persons must be kept away.

- o All safety instructions and in-house instructions relevant to the particular activity must be observed.

- o Responsibilities for different activities must be clearly defined

and observed. Uncertainty seriously endangers safety.

- o Protective and safety mechanisms cannot be removed, modified, nor disabled during operation and must be checked for proper function and completeness at regular intervals.

If protective and safety mechanisms must be removed, they must be installed immediately following conclusion of work and checked for proper function.

- o Any malfunctions that occur must be resolved according to responsibility. The supervisor must be notified immediately in case of malfunctions outside one's individual scope of responsibility.

- o Wear personal protective equipment.

- o Observe the relevant safety data sheets when handling lubricants/equipment.

1.3 Qualified technical personnel



Only qualified technical personnel may install, operate, maintain, and repair the products described here.

Such persons are familiar with the relevant standards, rules, accident prevention regulations, and assembly conditions as a result of their training, experience, and instruction. They are qualified to carry out the required activities and in doing so recognize and avoid any potential hazards. The definition of qualified personnel and the prohibition against employing non-qualified personnel are laid down in DIN VDE 0105 and IEC 364. Relevant country-specific definitions of qualified technical personnel apply for countries outside the scope of DIN VDE 0105 or IEC 364. The operator is responsible for assigning tasks and the area of responsibility.



The personnel must be trained and instructed prior to beginning work if they do not possess the requisite knowledge.



Product training can also be performed by SKF in exchange for costs incurred.

1.4 Electric shock hazard

	 WARNING
	<p>Electric shock</p> <p>Assembly, maintenance, and repair work may only be performed by qualified technical personnel. De-energize the product prior to beginning work. Local conditions for connections and local regulations (e.g., DIN, VDE) must be observed.</p>

1.5 System pressure or hydraulic pressure hazard

	 WARNING
	<p>System pressure</p> <p>The product described here is pressurized during operation. Depressurize the product before starting any assembly, maintenance, or repair work.</p>

	 WARNING
	<p>Hydraulic pressure</p> <p>The product described here is pressurized during operation. Depressurize the product before starting any assembly, maintenance, or repair work.</p>

1.6 Operation

The following must be observed while working on the product.

- o All information within this manual and the information within the referenced documents
- o All laws and regulations that the operator must observe
- o The information on explosion protection according to Directive 1999/92/EC (ATEX 137), if applied

1.7 Assembly / maintenance / malfunction / decommissioning / disposal

All relevant persons (e.g., operating personnel, supervisors) must be informed of the activity prior to beginning work. Precautionary operational measures / work instructions must be observed.

- o Take appropriate measures to ensure that moving/detached parts are immobilized during the work and that no body parts can be pinched by unintended movements.
- o Assemble the product only outside the operating range of moving parts, at an adequate distance from sources of heat or cold.
- o Prior to performing work, the product and the machine/system in which the product will be integrated must be depressurized and secured against unauthorized activation.
- o All work on electrical components may be performed only with voltage-insulated tools.
- o Fuses must not be bridged. Always replace fuses with fuses of the same type.

- o Ensure proper grounding of the product.
- o Drill holes required for assembly only on non-critical, non-load-bearing parts.
- o Other units of the machine/the vehicle must not be damaged or impaired in their function by the installation.
- o No parts of the centralized lubrication system may be subjected to torsion, shear, or bending.
- o Use suitable lifting gear when working with heavy parts.
- o Avoid mixing up/incorrectly assembling disassembled parts. Label parts.

1.8 Intended use

Modular feeders (progressive feeders) of the series PSG are designed for positively driven distribution of lubricants (oils/greases) in centralized lubrication systems.

The maximum inlet volumetric flow of the PSG1 is 0.8 l/min, 2.5 l/min for the PSG2, and 6.0 l/min for the PSG3.

The maximum permissible operating pressure is 200 bar in all three basic designs. This may be lower if attachments are connected.

Consult and comply with the relevant data from Chapter 4, "Technical data."

The inlet and outlet screw unions and their connecting lines must be designed for the permissible maximum pressure.

The technical requirements for the installation of the modular feeders are set out in Chapter 6, "Assembly." These requirements must be complied with. The same applies to the technical specifications in Chapter 4, "Technical data."

Any other or additional usage of modular feeders of the series PSG is deemed non-compliant with the intended use.

Modular feeders of the series PSG are classified as components according to the VDMA Position Paper "Umsetzung der Maschinenrichtlinie 2006/42/EG in Zentralschmiertechnik" (implementation of the Machinery Directive 2006/42/EC in centralized lubrication systems). This documentation is designed as documentation for these feeders.

PSG feeders are also available in designs compliant with the ATEX Directive.

PSG ATEX feeders may only be used in the permitted potentially explosive atmosphere, which is indicated on the feeder rating plate. Any alterations or attachments to ATEX feeders are strictly prohibited.

This documentation is designed as operating instructions according to EC Directive 94/9/EC (ATEX) for these feeders.

1.9 Foreseeable misuse

Any usage of the product differing from the aforementioned conditions and stated purpose is strictly prohibited. Particularly prohibited are use:

- o In another, more critical explosion protection zone
- o To feed / forward / store Group 1 dangerous fluids according to Directive 67/548/EEC
- o To feed / forward / store gases, liquefied gases, dissolved gases, vapors, or fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible operating temperature

1.10 Disclaimer of liability

The manufacturer shall not be held liable for damage resulting from:

- o Failure to comply with these instructions
- o The use of lubricants/media not approved for the feeder type
- o Contaminated or unsuitable lubricants
- o Installation of non-original SKF components
- o Inappropriate usage
- o Improper assembly, configuration or filling
- o Improper reaction to malfunctions
- o Non-observance of maintenance intervals
- o Independent modification of system components

1.11 Explosion protection in ATEX

Only the feeder types tested and approved by SKF in accordance with ATEX Directive 2014/34/EU are permitted to be used in potentially explosive atmospheres. The relevant class of explosion protection is indicated on the feeder rating plate.

- o A written work authorization from the operator is required prior to starting installation in potentially explosive atmospheres.
- o Assembly work can be performed only if it is ensured that no explosive atmosphere is present.
- o Before commissioning the product, the operator must take all ATEX-relevant safety precautions and conduct all relevant ATEX tests.
- o The introduction of ignition sources such as sparks, open flames, and hot surfaces into potentially explosive atmospheres is prohibited.

- o The electrical circuit of the piston detector or proximity switch must be established by an intrinsically safe circuit, e.g., through the installation of an ATEX-compliant isolating switch by the customer. Only lines that are made of corrosion-resistant stainless steel may be used. These must also be grounded.
- o When installing the product, make sure that the setup location is flat and low-vibration.
- o While working, use only ESD tools or ensure that no potentially explosive atmosphere is present.
- o The product must undergo a function and leak test at regular intervals.
- o Perform appropriate repairs in the event of damage, leaks, or rust. Replace the product if necessary.
- o The operator must make sure through the choice of the lubricant to be delivered that no reactions capable of serving as ignition sources will occur in conjunction with the

anticipated potentially explosive atmosphere.

- o The lubricant's ignition temperature has to be at least 50 kelvin above the maximum surface temperature (temperature class).
- o Explosion protection measures must never be deactivated, changed, or bypassed.

ATEX approval is nullified by:

Any usage of the product differing from the aforementioned conditions and stated purpose is strictly prohibited.

Particularly prohibited are:

- o Use in another, more critical explosion protection zone
- o Use to feed / forward / store Group 1 dangerous fluids according to Directive 67/548/EEC
- o Non-compliant usage
- o Installation of non-original SKF components
- o Failure to comply with this manual and referenced manuals.

- o Use of non-specified equipment
- o Failure to observe the prescribed maintenance/refilling and repair intervals.
- o Unauthorized alterations.

1.12 Referenced documents

In addition to this manual, the following documents must be observed by the respective target group:

- o The explosion protection document of the operator
- o Operational instructions / approval rules
- o Instructions from suppliers of purchased parts
- o Manual for the insulation resistance tester
- o Safety data sheet of the lubricant / equipment used
- o Project planning documents and other relevant documents

The operator must supplement these documents with applicable regulations for the country of use. The documentation must be included if the product is transferred to a new operator.

1.13 Residual risks

Residual risk	Remedy
Life cycle: Assembly	
People slipping due to contamination of floor with spilled/leaked lubricant	<ul style="list-style-type: none"> • Exercise caution when connecting the product's hydraulic connections • Promptly apply suitable binding agents and remove the leaked/spilled lubricant. • Follow operational instructions for handling lubricants and contaminated parts
Tearing/damage to lines when installed on moving machine components	<ul style="list-style-type: none"> • If possible, do not install on moving parts; if this cannot be avoided, use flexible hose lines.
Life cycle: Commissioning / operation	
Lubricating oil spraying out due to faulty component fitting/line connection.	<ul style="list-style-type: none"> • Tighten all components securely or using the specified torques. Use hydraulic connections and lines suitable for the indicated pressures. These must be checked for proper connection and for damage prior to commissioning.
Life cycle: Setup/retrofit/malfunction/troubleshooting/maintenance, repair/shutdown/disposal	
Environmental contamination by lubricants and wetted parts	<ul style="list-style-type: none"> • Dispose of contaminated parts according to the applicable legal/company rules
People slipping due to floor contamination with spilled/leaked lubricant	<ul style="list-style-type: none"> • Exercise caution when disconnecting the product's hydraulic connections • Promptly apply suitable binding agents and remove the leaked/spilled lubricant. • Follow operational instructions for handling lubricants and contaminated parts
Environmental contamination by lubricants and wetted parts	<ul style="list-style-type: none"> • Dispose of contaminated parts according to the applicable legal/company rules

2. Lubricants

2.1 General information

NOTE

All products from SKF Lubrication Systems may be used only for their intended purpose and in accordance with the information in the product's operating instructions.

Intended use is the use of the products for the purpose of providing centralized lubrication/lubrication of bearings and friction points using lubricants within the physical usage limits which can be found in the documentation for the devices, e.g., operating instructions and the product descriptions, e.g., technical drawings and catalogs. Particular attention is called to the fact that hazardous materials of any kind, especially those materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Para. 2, may only be filled into SKF centralized lubrication systems and components and delivered and/or distributed with such systems and components after consulting with

and obtaining written approval from SKF Lubrication Systems.

No products manufactured by SKF Lubrication Systems are approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature.

Other media which are neither lubricant nor hazardous substance may only be fed after consultation with and written approval from SKF Lubrication Systems.

SKF Lubrication Systems considers lubricants to be an element of system design that must always be factored into the selection of components and the design of centralized lubrication systems. The lubricating properties of the lubricants are critically important in making these selections.

2.2 Selection of lubricants

NOTE

Observe the instructions from the machine manufacturer regarding the lubricants that are to be used.

The amount of lubricant required at a lubrication point is specified by the bearing or machine manufacturer. It must be ensured that the required quantity of lubricant is provided to the lubrication point. The lubrication point may otherwise not receive adequate lubrication, which can lead to damage and failure of the bearing.

Selection of a lubricant suitable for the lubrication task is made by the machine/system manufacturer and/or the operator of the machine/system in cooperation with the lubricant supplier.

When selecting a lubricant, the type of bearings/friction points, their expected load during operation, and the anticipated ambient conditions must be taken into account. All economic and environmental aspects must also be considered.

2.3 Approved lubricants

NOTE

If necessary, SKF Lubrication Systems can help customers to select suitable components for feeding the selected lubricant and to plan and design their centralized lubrication system.

Please contact SKF Lubrication Systems if you have further questions regarding lubricants. It is possible for lubricants to be tested in the company's laboratory for their suitability for pumping in centralized lubrication systems (e.g., "bleeding"). You can request an overview of the lubricant tests offered by SKF Lubrication Systems from the company's Service department.

NOTE

Only lubricants approved for the product may be used. Unsuitable lubricants can lead to failure of the product and to property damage.

NOTE

Different lubricants must not be mixed together. Doing so can cause damage and require costly and complicated cleaning of the product/lubrication system. It is recommended that an indication of the lubricant in use be attached to the lubricant reservoir in order to prevent accidental mixing of lubricants.

The product described here can be operated using lubricants that meet the specifications in the technical data. Depending on the product design, these lubricants may be oils, fluid greases, or greases.

Mineral, synthetic, and/or rapidly biodegradable oils and base oils can be used. Consistency agents and additives may be added depending on the operating conditions.

Note that in rare cases, there may be lubricants whose properties are within the permissible limits values but whose other characteristics render them unsuitable for use in centralized lubrication systems. For example, synthetic lubricants may be incompatible with elastomers.

2.4 Lubricants and the environment


NOTE

Lubricants can contaminate soil and waterways. Lubricants must be properly used and disposed of. Observe the local regulations and laws regarding the disposal of lubricants.

It is important to note that lubricants are environmentally hazardous, flammable substances which require special precautionary measures during transport, storage, and processing. Consult the safety data sheet from the lubricant manufacturer for information regarding transport, storage, processing, and environmental hazards of the lubricant that will be used.

The safety data sheet for a lubricant can be requested from the lubricant manufacturer.

2.5 Lubricant hazards

	 WARNING Lubricants Pumps must always be free of leaks. Leaking lubricant is hazardous due to the risk of slipping and injury. Beware of any lubricant leaking out during assembly, operation, maintenance, or repair of centralized lubrication systems. Leaks must be sealed off without delay.
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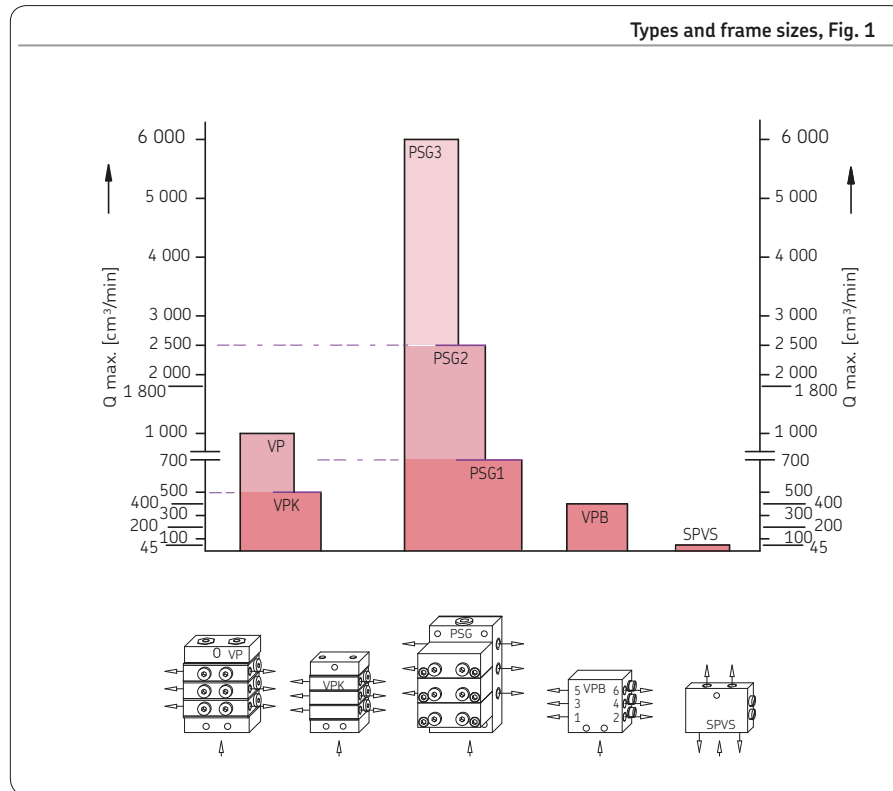
Leaking lubricant is a serious hazard. Leaking lubricant can create risks that may result in physical harm to persons or damage to other material assets.

NOTE

Follow the safety instructions on the lubricant's safety data sheet.

3. Overview / functional description

3.1 Overview of progressive feeders



General

Modular feeders (progressive feeders) of the series PSG are designed for positively driven distribution of lubricants (oils/greases) in centralized lubrication systems.

The inlet and all outlets of the feeders are located in the baseplate. The functional sections are attached to the baseplate and can be replaced without loosening the tubing.

The volumetric flow fed via a tube is forcibly distributed in a predetermined ratio to the outlets, i.e., to the lubrication points or downstream progressive feeders. Pistons aligned in series meter the lubricant for two opposite outlets each and control the function of the neighboring piston. In this way, the function of the modular feeder can be checked by monitoring any piston (with a cycle indicator or piston detector) or the inlet volumetric flow (with gear-type flow indicator).

3.2 Information on volume data

In centralized lubrication systems, the nominal volume is indicated per stroke. This is calculated from the piston diameter and the maximum possible stroke of the particular metering piston, the maximum stroke. The maximum achievable piston capacity is typically used as the nominal volume when configuring a progressive feeder, though the movement of the piston is influenced by various factors such as:

- o Differences in back pressures at the outlets, for example due to long tubing lengths or connected roller bearings or shaft bearings.
- o Stroke frequency (dynamics)
- o Working temperature, viscosity
- o fluctuations due to strong temperature changes

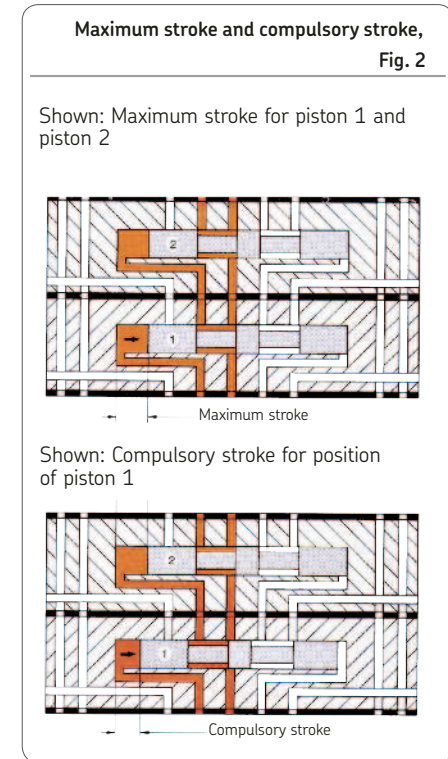
The maximum stroke and thus the piston capacity/metered quantity can reduce due to these factors.

The minimum piston stroke, also referred to as the compulsory stroke, is determined by the position of the control borings in the

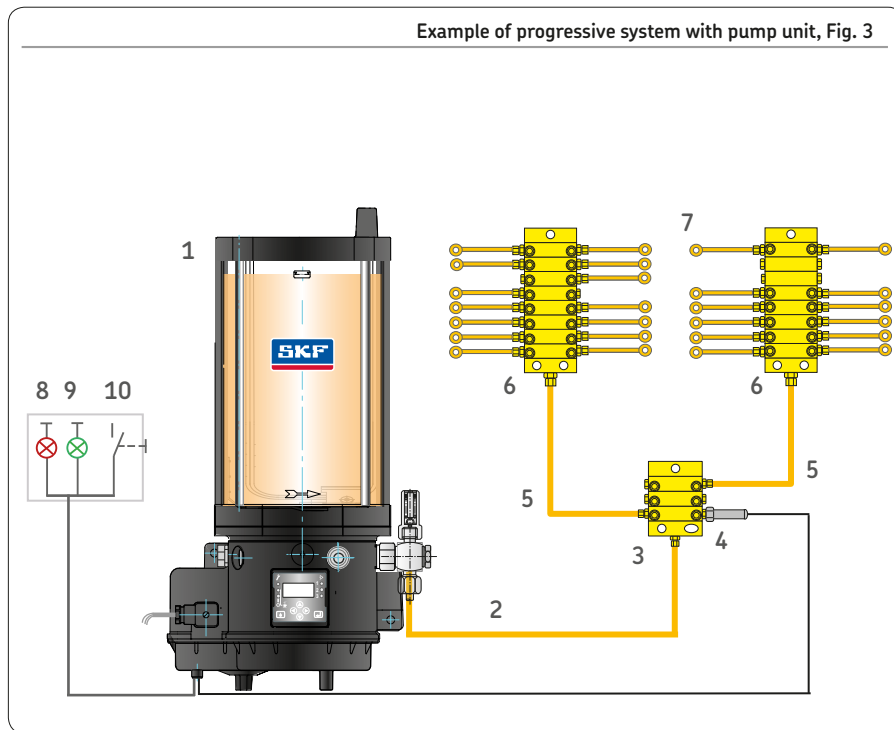
feeder and the control edges on the metering piston. If only the compulsory stroke is performed, the metered quantity at the affected outlet is reduced, which also increasing the effective number of piston strokes. The theoretically determined number of piston strokes can therefore deviate from the actual measured value. This must be considered when evaluating pulses on feeders with a mounted piston detector.

The ratio of piston capacity per feeder outlet determines the distribution ratio of the quantity of lubricant supplied to the feeder. This distribution ratio is usually constant under all operating conditions.

Figure 2 shows the piston positions of a feeder module at maximum stroke and at compulsory stroke (minimum stroke).



3.3 Overview of a general progressive system



Legend to Fig. 3

Progressive system with function monitoring

- 1 Pump unit with:
 - Control unit
 - Fill level control
- 2 Main lubricant line
- 3 Master feeder (VP)
- 4 Function monitoring (piston detector)
- 5 Lubricant branch lines
- 6 Secondary feeder (VPK)
- 7 Lubrication point lines
- 8 External fault indicator light
- 9 External pump operation monitoring
- 10 Pushbutton for interim lubrication

3.3.1 Functional description of a general progressive system

A general progressive feeder system consists of the following components:

- o Pump unit with pump element and pressure regulating valve
- o Possibly function monitoring (piston detector)
- o Main lubricant line
- o Master and possible secondary feeder
- o Branch and lubricant lines

When the pump motor is turned on, the lubricant pump delivers lubricant from its lubricant reservoir to the lubricant outlet. The pump element attached to the outlet delivers the lubricant further, into the downstream main line. The lubricant flows through the main line to the progressive feeder. There, the lubricant is distributed according to the volume required by the lubrication point being supplied.

In progressive systems with a master feeder and secondary feeder, the lubricant coming from the pump unit is delivered to the master feeder. The master feeder distributes the

lubricant to the secondary feeders according to their individual volume requirements.

From there, the lubricant flows to the lubrication points.

Depending on the pump design with control unit, the following configuration, monitoring, and connections options are available:

- o Interval time and pump cycle time can be adjusted independently, including on monitored systems
- o Recording of remaining intervals and remaining lubrication times
- o Data backup in case of voltage failure
- o Non-volatile memory with PIN code protection
- o Connectivity for inductive piston detector to monitor the feeder function
- o Connectivity for an external fault indicator light
- o Connectivity for external fault pump operation monitoring
- o Connectivity for an external

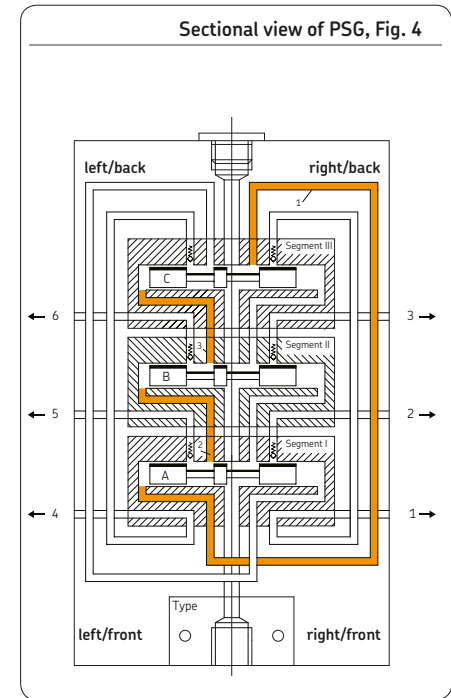
- o pushbutton to trigger an interim lubrication
- o Internal fill level monitoring; the lubrication cycle stops and fault notification is displayed if the level falls below minimum
- o Fault memory

3.4 Functioning of a PSG progressive feeder

☞ See Figure 4

Observation of the movements beginning with the moment that all three pistons (**A**, **B**, **C**) on the left end stop shows that the lubricant and operating pressure reach from the inlet through the through-duct to the pistons **C-right**, **B-right** and **A-left**; that is, while pistons **C** and **B** retain their positions, the **A** piston is pushed right. The lubricant volume specified by the piston diameter and stroke is pressed into a duct on whose end (outlet 4) the same quantity exits. This stroke movement of piston **A** closes or opens multiple control ducts. Control duct 2, through which the lubricant reaches piston **B-left** and shifts it right, is now open. The corresponding metering volume is pressed into the outlet duct and exits at outlet 2. The stroke movement of piston **B** has now closed or opened control ducts. Control duct 3 is now open. The lubricant pressure moves piston **C** to the right, pushing the corresponding metering volume into the

duct to outlet 3. This movement of piston **C** opens, among others, the reversing duct that reconnects the through-duct with piston **A-right**. Analogous to the piston movement just described, pistons **A**, **B**, and **C** now move consecutively back to the left.



3.5 Information on the design of a PSG progressive feeder

The general criteria for the design of progressive feeders also apply without restrictions to the PSG modular feeders. The stroke rate is the most important criterion. It should be kept as low as possible by selecting high-volume modules (recommended value for feeder stroke rate ≤ 200 rpm). This also reduces pressure losses and noise levels.

For the purpose of self-venting, the smallest stroke module should not be placed in the first position (as viewed from the inlet). In case of installation on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must **not** match the direction of movement of the machine part.

The volumetric flow of an outlet can be doubled by internal consolidation of two opposite outlets.

To do this, the setscrew in the baseplate (the right input as seen from the feeder inlet) must be unscrewed. The outlet in the

baseplate that is no longer needed is to be closed using a washer and a screw plug; see Chapter 6.10.

Adjacent outlets can be consolidated using external bridges (crossporting). One bridge can consolidate either two or three outlets. It is still possible to use bridges with (a) check valve(s); see Chapter 6.24.

Dummy and functional modules can be varied as desired within the frame size. A minimum of three functional modules are required per feeder.

If dummy modules are installed, the two lubricant outlets under the dummy module must be closed in the baseplate.

Increased pressure loss must be expected if two dummy modules are installed side-by-side or if dummy modules are used as the start or end modules.

All modules can be monitored directly by means of a piston detector (**P3**) and can be retrofitted. If, however, piston movement is recorded using a cycle indicator (**ZY**) or a proximity switch (**ZS**), the modules intended

for this purpose are to be used. The smallest module should not be used for attachment (PSG1=50 mm³/stroke, PSG2 =60 mm³/stroke, PSG3 =800 mm³/stroke).

The modular structure of modular feeders becomes particularly apparent in the range of attachments. Depending on the feeder, it can be equipped with an upstream flow controller, flow limiter, 2/2 or 4/2 directional solenoid valve.

For PSG1 modular feeders, we recommend outlet port screws with check valves.

4. Technical data

4.1 PSG1 technical data

PSG1, Technical data (Table 1 of 2)

General

Design	Hydraulically controlled
Mounting position	Any ¹⁾
Ambient temperature range	-15°C to + 110°C
with piston detector	-15°C to + 80°C
with cycle indicator	-15°C to + 75°C
with proximity switch	-15°C to + 70°C
Baseplate with occupied outlets without bridges	6, 8, 10, 12, 14, 16, 18, 20 outlets 3 to 20
occupied outlets with bridges	1 to 19

Material

Baseplate	AlCuMgPb F38
Modules	9SMnPb28K
Seals	FKM (FPM)

Hydraulic system

Operating pressure max.	200 bar
with cycle indicator	150 bar
with proximity switch	150 bar
Inlet volumetric flow	Up to 0.8 l/min
Volume per outlet and cycle	50, 100, 150, 200, 250 mm ³
Piston stroke rate	Max. 200/min
Dividing ratio of displacements	1:1 to 1:10 ²⁾
Required starting pressure for oil	min. 2 bar
Pressure loss	see pressure loss charts Page 27

1) In case of installation on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must not match the direction of movement of the machine part.

2) Larger dividing ratios are possible when consolidated. (up to 1:10)

PSG1, Technical data (Table 2 of 2)

Lubricant	Mineral oils, greases based on mineral oil, environmentally friendly and synthetic oils and greases	
Operating viscosity	> 12 mm ² /s	
Worked penetration	≥ 265 x 0.1 mm (up to NLGI Grade 2)	
Weight	Piston detector	0.12 kg
	Cycle indicator	0.06 kg
	Proximity switch	0.039 kg
Bracket for	proximity switch	0.012 kg

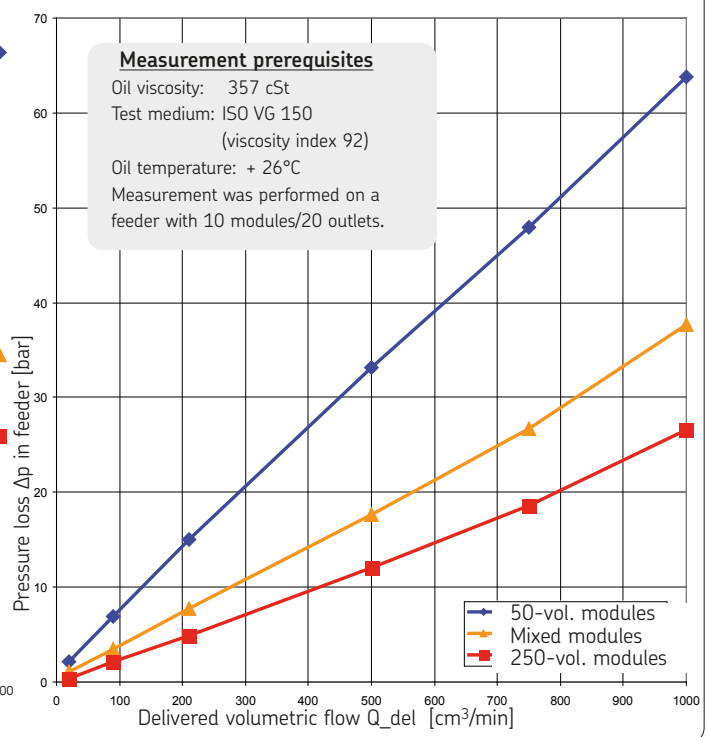
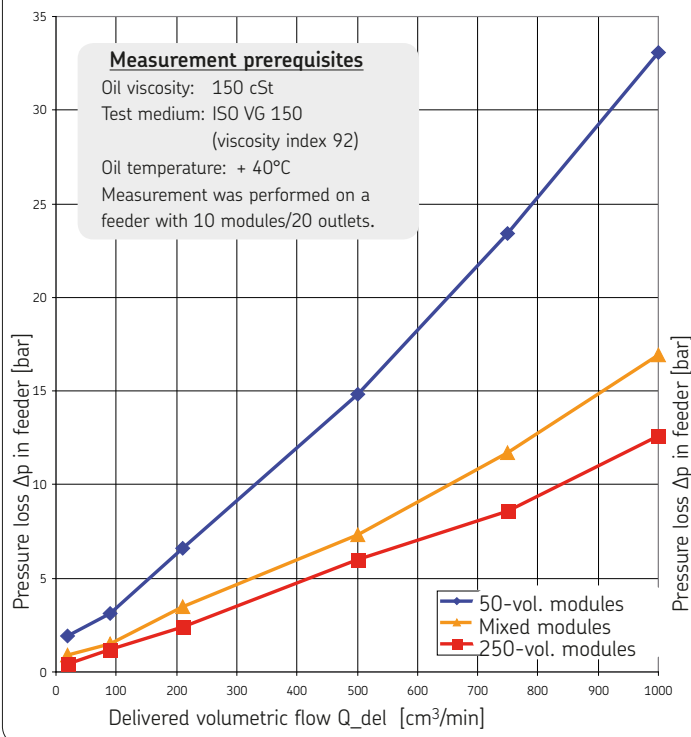
Electrical system**Piston detector**

Design	PNP with 4-point LED, 3-pin connection	
Rated voltage	10 to 36 V DC	
Load current	Max. 100 mA	
Residual ripple	≤ 10%	
Protection class	IP 67	
Outlet function	NC contact (electricity flows if switch undamped)	

Proximity switch

Design	PNP with LED	
Rated voltage	10 to 30 V DC	
Load current	Max. 130 mA	
Protection class	IP 67	
Outlet function	NO-contact (current flows if switch damped)	

PSG1, Technical data, Pressure loss chart, Fig.



4.2 PSG2 technical data

PSG2, Technical data, (Table 1 of 4)

General

Design	Hydraulically controlled	
Mounting position	Any ¹⁾	
Ambient temperature range	-15°C to	+110°C
with Piston detector	-15°C to	+80°C
Cycle indicator	-15°C to	+90°C
Proximity switch	-15°C to	+70°C
Gear-type flow indicator	-15°C to	+70°C
Flow controller	-15°C to	+75°C
Flow limiter	-15°C to	+90°C
4/2 directional solenoid valve	-15°C to	+75°C
2/2 directional solenoid valve	-15°C to	+75°C

Baseplate with	6, 8, 10, 12, 14, 16,
	18, 20 outlets
occupied outlets without bridges	3 to 20
occupied outlets with bridges	1 to 19

Material

Baseplate	AlCuMgPb F38
Modules	GGC 25 ²⁾
Seals	FKM (FPM)

Hydraulic system

Operating pressure max.	200	bar
with Cycle indicator	150	bar
Proximity switch	150	bar
Gear-type flow indicator	85	bar
4/2 directional solenoid valve	150	bar

PSG2, Technical data, (Table 2 of 4)

Inlet volumetric flow	Up to 2.5 l/min ⁵⁾
with flow limiter	0.08 to 2.5 l/min
Volume per cycle and outlet	60, 120, 240, 360, 480, 600, 720, 840 mm ³
Piston stroke rate	Max. 200/min
Dividing ratio of displacements	1:1 to 1:28 ³⁾
Differential pressure (for oil)	5 to 15 bar ⁴⁾
Required starting pressure for oil	Min. 2 bar
Lubricant	Mineral oils, greases based on mineral oil, environmentally friendly and synthetic oils and greases
with Flow controller	Mineral oils, environmentally friendly and synthetic oils
Flow limiter	Mineral oils, environmentally friendly and synthetic oils
4/2 directional solenoid valve	Mineral oils, environmentally friendly and synthetic oils
Operating viscosity	> 12 mm ² /s
with Flow controller	12 to 350 mm ² /s
Flow limiter	20 to 600 mm ² /s
Worked penetration	≥ 265 x 0.1 mm (up to NLGI Grade 2)

1) In case of attachments on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must not match the direction of movement of the machine part.

2) Also available in corrosion-resistant design (chemically nickel-plated)

3) Larger dividing ratios are possible when consolidated.

4) Depending on volume index and viscosity or penetration and volumetric flow.

5) Grease available on request

PSG2, Technical data, (Table 3 of 4)

Weight

Piston detector	0.12 kg
Cycle indicator	0.05 kg
Proximity switch	0.09 kg
Bracket for proximity switch	0.01 kg
Gear-type flow indicator	0.90 kg
Flow controller	1.40 kg
Flow limiter	0.41 kg
4/2 directional solenoid valve	1.60 kg
2/2 directional solenoid valve	1.94 kg

Piston detector ^{1) 2)}

Design	PNP with 4-point LED, 3-pin connection
Rated voltage	10 to 36 V DC
Load current	max. 100 mA
Residual ripple	≤ 10%
Protection class	IP 67
Outlet function	NC contact

Proximity switch ¹⁾

Design	PNP with LED
Rated voltage	10 to 30 V DC
Load current	Max. 130 mA
Protection class	IP 67
Outlet function	NO-contact

1) Other specification available on request

2) 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 consult the manufacturer in cases of doubt.

PSG2, Technical data, (Table 4 of 4)

Gear-type flow indicator

Design	Hall sensor (PNP technology)
Rated voltage	24 V DC
Residual ripple	≤ 10%
Protection class	IP 65
Proportionality factor	4.6 cm ³ /pulse
Filter unit/interchangeable strainer	0.3 mm

Flow controller

Design	2-way flow control valve
Settings range	0.1 to 2.5 l/min
Filter unit/interchangeable strainer	0.3 mm
Scale graduation	1 - 10

Flow limiter

Design	2-way flow control valve
Filter unit/interchangeable strainer	0.3 mm

4/2 directional solenoid valve

Design	Directional solenoid valve With 4/2 directional solenoid, continuity to feeder normally closed With 4/2 directional solenoid valve, continuity to feeder normally open NG6 DIN 24 340
Connection	24 V DC
System voltage	24 V DC

2/2 directional solenoid valve

Design	2/2 directional solenoid valve continuity to feeder normally closed NG6 DIN 24 340
Connection	to customer specification
System voltage	

4.3 PSG3 technical data

PSG3, Technical data (Table 1 of 5)

General

Design	Hydraulically controlled
Mounting position	Any ¹⁾
Ambient temperature range	-15°C to +110°C
with Piston detector	-15°C to +80 °C
Cycle indicator	-15°C to +90°C
Proximity switch	-15°C to +70°C
Gear-type flow indicator	-15°C to +70°C
Flow controller	-15°C to +75°C
Flow limiter	-15°C to +90°C
4/2 directional solenoid valve	-15°C to +75°C
2/2 directional solenoid valve	-15°C to +75°C

Baseplate with	6, 8, 10, 12, 14, 16, 18, 20 outlets
occupied outlets without bridges	3 to 20
occupied outlets with bridges	1 to 19

Material

Baseplate	AlCuMgPb F38
Modules	GGC 25 ²⁾
Seals	FKM (FPM)

Hydraulic system

Operating pressure max.	200 bar
with Cycle indicator	150 bar
Proximity switch	150 bar
Gear-type flow indicator	85 bar
4/2 directional solenoid valve	150 bar

PSG3, Technical data (Table 2 of 5)

Inlet volumetric flow	Up to 6 l/min ⁵⁾
with flow limiter	0.1 to 6.2 l/min
Gear-type flow indicator	2 l/min to 6 l/min
Flow controller	0.6 - 6 l/min
Volume per cycle	
and outlet	800, 1200, 1600, 2400, 3200 mm ³
Piston stroke rate	Max. 200/min
Dividing ratio	
of displacements	1:1 to 1:14 AM ³⁾
Differential pressure (for oil)	5 to 15 bar ⁴⁾
Required starting pressure for oil	min. 2 bar
Lubricant	Mineral oils, greases based on mineral oil, environmentally friendly and synthetic oils and greases
with Flow controller	Mineral oils, environmentally friendly and synthetic oils
with Flow limiter	Mineral oils, environmentally friendly and synthetic oils
4/2 directional solenoid valve	Mineral oils, environmentally friendly and synthetic oils
Operating viscosity	> 12 mm ² /s
with Flow controller	12 to 350 mm ² /s
Flow limiter	20 to 600 mm ² /s
Gear-type flow indicator	20 to 600 mm ² /s
Worked penetration	≥ 265 x 0.1 mm (up to NLGI Grade 2)

PSG3, Technical data (Table 3 of 5)

Filter unit/interchangeable strainer flow indicator	0.3 mm	Gear-type
	Flow controller	0.3 mm
	Flow limiter	0.3 mm
Scale graduation	Flow controller	1 - 10

Weight

Piston detector	0.12 kg
Cycle indicator	0.05 kg
Proximity switch	0.15 kg
Bracket for proximity switch	0.01 kg
Gear-type flow indicator	0.90 kg
Flow controller	1.40 kg
Flow limiter	0.86 kg
4/2 directional solenoid valve	1.60 kg
2/2 directional solenoid valve	1.94 kg

Piston detector ^{6) 7)}

Design	PNP with 4-point LED, 3-pin connection
Rated voltage	10 to 36 V DC
Load current	max. 100 mA
Residual ripple	≤ 10%
Protection class	IP 67
Outlet function	PNP, NC contact

PSG3, Technical data (Table 4 of 5)

Proximity switch ⁶⁾

Design	PNP with LED
Rated voltage	10 to 30 V DC
Load current	Max. 130 mA
Protection class	IP 67
Outlet function	NO-contact

Gear-type flow indicator

Design	Hall sensor (PNP technology)
Rated voltage	24 V DC
Residual ripple	≤ 10%
Protection class	IP 65
Proportionality factor	4.6 cm ³ /pulse

1) In case of attachments on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must not match the direction of movement of the machine part.

2) Also available in corrosion-resistant design (chemically nickel-plated)

3) Larger dividing ratios are possible when consolidated.

4) Depending on volume index and viscosity or penetration and volumetric flow.

5) Grease available on request

6) Other specification available on request

7) 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 consult the manufacturer in cases of doubt.

PSG3, Technical data (Table 5 of 5)**Flow controller**

Design	2-way flow control valve
Settings range	0.1 to 2.5 l/min
Filter unit/interchangeable strainer	0.3 mm
Scale graduation	1 - 10

Flow limiter

Design	2-way flow control valve
Filter unit/interchangeable strainer	0.3 mm

4/2 directional solenoid valve

Design	Directional solenoid valve
Ordering code 08	With 4/2 directional solenoid, continuity to feeder normally closed
Ordering code 09	With 4/2 directional solenoid valve, continuity to feeder normally open
Connection	NG6 DIN 24 340
System voltage	24 V DC

5. Delivery, returns, and storage


5.1 Checking the delivery

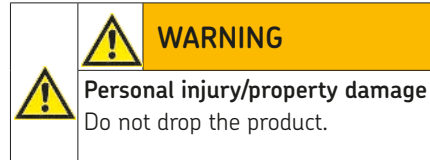
Immediately after receipt, the delivery must be checked for completeness according to the shipping documents. Any transport damage must be reported to the transport company immediately. The packaging material should be preserved until any discrepancies are resolved.

5.2 Returns

All parts must be cleaned and properly packed before return shipment (i.e., according to the requirements of the recipient country). There are no restrictions for land, air, or sea transport.

The following must be marked on the packaging of return shipments:

	Do not top load / This side up
	Keep dry
	Handle with care, Do not drop



The following conditions apply to storage:

5.3 Storage

5.3.1 Lubrication units

- o Dry and dust-free surroundings, storage in well ventilated dry area
- o Storage time: Max. 24 months
- o Relative humidity: < 65%.
- o Storage temperature: -15 - +70°C.
- o No direct sun or UV exposure
- o Protected against nearby sources or heat or cold

5.3.2 Electronic and electrical devices

- o Dry and dust-free surroundings, storage in well ventilated dry area
- o Storage time: Max. 24 months
- o Relative humidity: < 65%.
- o Storage temperature: + 10 - +40°C.
- o No direct sun or UV exposure
- o Protected against nearby sources or heat or cold

5.3.3 General notes

- o The product(s) can be enveloped in plastic film to provide low-dust storage.
- o Protect against ground moisture by storing on a shelf or wooden pallet.
- o Bare metallic surfaces must be protected using anti-corrosion agents. Check corrosion protection every 6 months and reapply if necessary.
- o Motors must be protected from mechanical damage. Do not store motors on the fan cowl.

6. Assembly

6.1 Installation information

Modular feeders (progressive feeders) of the series PSG can be used in the context of the technical specifications given in the chapter "Technical data." They can be mounted in any alignment. In case of installation on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must not correspond with the direction of movement of the machine part.

To prevent flow resistance, ensure that both the customer-provided supply line and the output lines are sufficiently large.

The feeder should be installed in an easily accessible position that protects it from humidity and vibration. The minimum mounting dimensions indicated below should be adhered to so that all other components can be connected later without problems. During assembly and during any drilling work, always pay attention to the following:

- o Before installing the feeder, ensure that all holes, screw unions, and connecting lines that the feeder contacts are clean and free of metal chips.
- o Existing supply lines must not be damaged by assembly work.
- o Other units must not be damaged by assembly work.
- o The feeder must not be installed within range of moving parts.
- o The feeder must be installed at an adequate distance from sources of heat.
- o Maintain safety clearances and comply with local regulations for assembly and accident prevention.

Only qualified technical personnel may install, operate, maintain, and repair feeders of the series PSG. Qualified technical personnel are persons who have been trained, assigned and instructed by the operator of the final product into which the feeders described here are incorporated.

Such persons are familiar with the relevant standards, rules, accident prevention regulations, and operating conditions as a result of their training, experience, and instruction. They are qualified to carry out the required activities and in doing so recognize and avoid potential hazards.

The definition of qualified personnel and the prohibition against employing non-qualified personnel are laid down in DIN VDE 0105 and IEC 364.

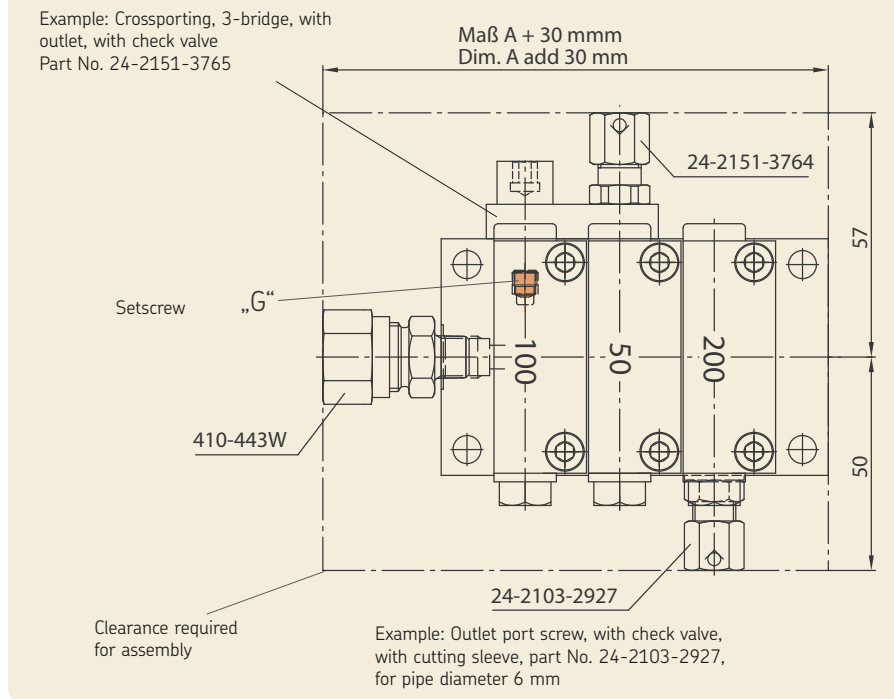
Before assembling/setting up the product, the packaging material and any shipping braces (e.g., plugs) must be removed.

The mounting position of the product is as shown in the assembly drawing.

6.2 Installing the PSG1

6.2.1 Minimum mounting dimensions/clearance and tightening torques

Minimum mounting dimensions/clearance for installation, Fig. 6



Legend to Fig. 6

Number of modules	Dim. A+30 mm [mm]
3	120
4	142
5	164
6	186
7	208
8	230
9	252
10	274

Tightening torques

Item	Quantity	Torque [Nm]
Baseplate	4	9
Module	2	6
Screw union		
-Inlet	1	35
-Outlet max.	20	35
Banjo bolt (crossporting)		12
Setscrew "G"		Approx. 8 1)

Specifications for screws of strength class 8.8, subject to the following installation instructions, base material: steel

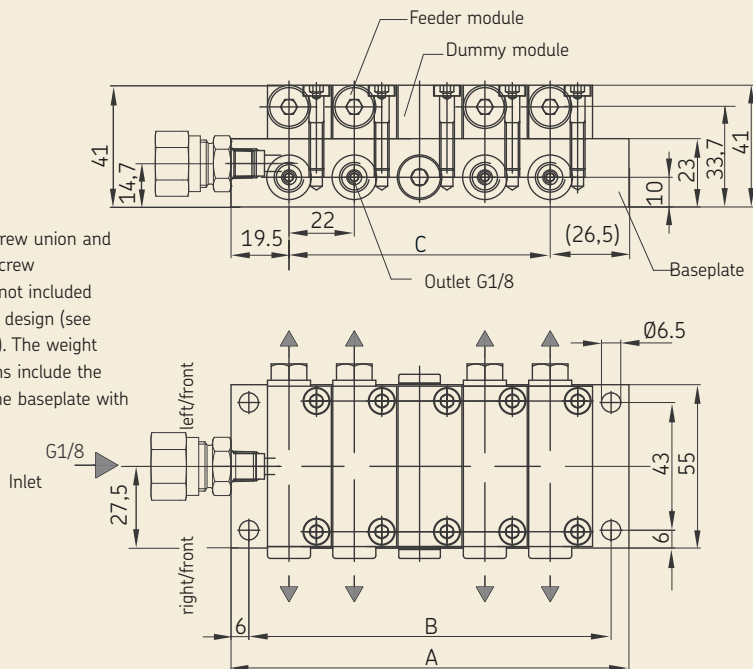
1) Strength class to DIN EN ISO 898, Part 5

6.2.2 PSG1 basic design

PSG1 in basic design, Fig. 7

**Note!**

The inlet screw union and the outlet screw unions are not included in the basic design (see Accessories). The weight specifications include the weight of the baseplate with modules.



PSG1 in basic design

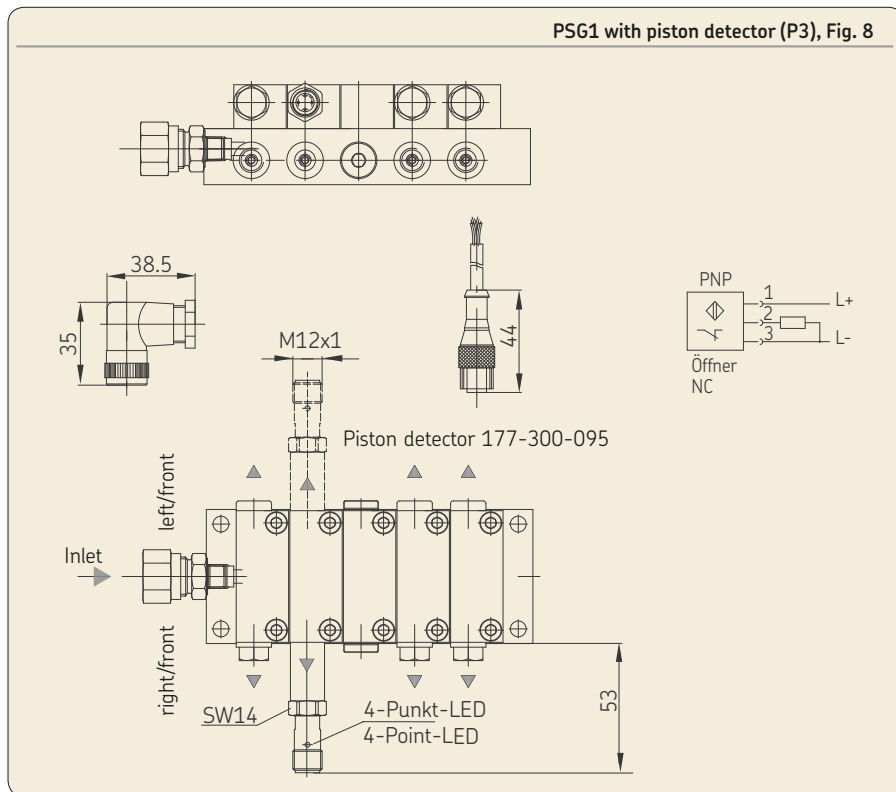


Legend to Fig. 7

Technical data - see Chapter 4.1

Number of modules	Dim. A [mm]	Dim. B [mm]	Dim. C [mm]	Weight [kg]
3	90	78	44	0.77
4	112	100	66	1.00
5	134	122	88	1.23
6	156	144	110	1.46
7	178	166	132	1.69
8	200	188	154	1.92
9	222	210	176	2.15
10	244	232	198	2.39

6.2.3 PSG1 with piston detector (P3)

**Legend to Fig. 8**

Technical data- see Chapter 4.1

Minimum mounting dimensions:

Fig. 6, Legend 6

Feeder dimensions:

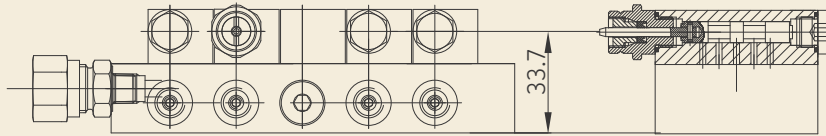
Basic design Fig. 7, Legend 7

! Note!

The piston detector can be attached to either the left or right side of the feeder modules. It is attached to the right side at the factory. Chapter 6.13 describes how to convert it to left-side attachment. It should not be attached to the first or last module.

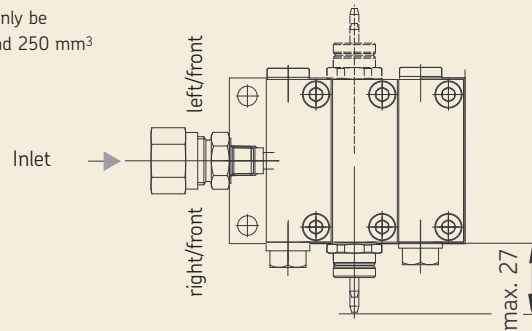
6.2.4 PSG1 with visual cycle indicator (ZY)

PSG1 with visual cycle indicator (ZY), Fig. 9

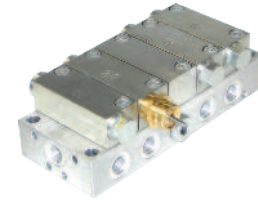


Note!

A visual cycle indicator can only be attached to the 200 mm³ and 250 mm³ modules of design ZY.



PSG1 with visual cycle indicator (ZY)



Legend to Fig. 9

Technical data - see *Chapter 4.1*

Minimum mounting dimensions:

Fig. 6, Legend 6

Feeder dimensions:

Basic design

Fig. 7, Legend 7

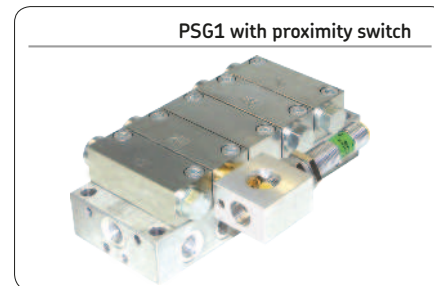
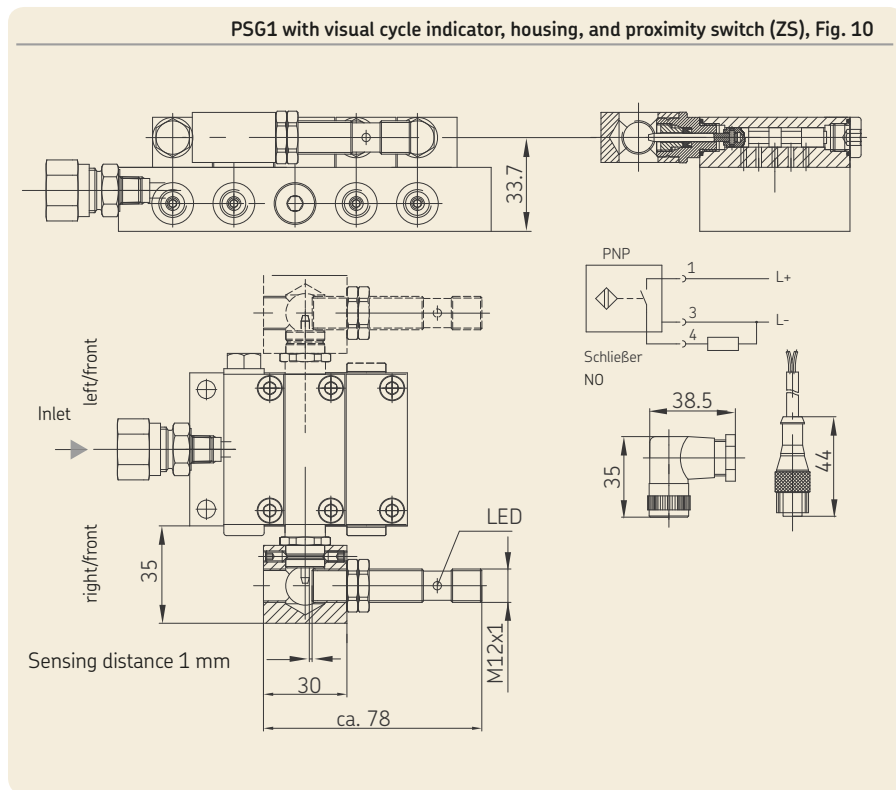


Note:

The cycle indicator can be attached to either the left or right side of the 200 mm³ and 250 mm³ feeder modules.

It is attached to the right side at the factory. Chapter 6.12 describes how to convert it to left-side attachment. It should not be attached to the first or last module.

6.2.5 PSG1 with visual cycle indicator, housing, and proximity switch (ZS)



Legend to Fig. 10

Technical data - see Chapter 4.1

Minimum mounting dimensions:

Fig. 6, Legend 5

Feeder dimensions:

Basic design

Fig. 7, Legend 7

! Note!

The proximity switch can be attached to either the left or right side of the 200 mm³ and 250 mm³ modules of design ZY. It is attached to the right side at the factory. Chapter 6.12 describes how to convert it to left-side attachment. It should not be attached to the first or last module.

6.3 PSG1 feeders for ATEX-compliant applications

PSG1 feeders for potentially explosive atmospheres according to ATEX Directive 2014/34/EU.

For PSG1 these are:

ATEX basic design

Order No.: **24-3710-0044-ATEX**

ATEX feeder with proximity switch

Order No.: **24-3710-0039-ATEX**



The inductive ATEX proximity switch (part No. 24-1884-2288) may be operated in an ATEX area only with intrinsically safe electrical circuits certified for the categories and explosion groups [Ex ia] IIC or [Ex ib] IIC. The sensor has a type examination certificate and is marked in accordance with the ATEX Directive.



The feeder may, with reference to EC Directive 97/23/EC concerning pressure equipment, only be used in accordance with its intended use and in conformity with the instructions provided in the documentation. The following must be observed in this regard:

The product is neither designed nor approved for use in conjunction with fluids of Group 1 (Dangerous Fluids) as defined in Article 2, Para. 2 of Directive 67/548/EEC of June 27, 1967. The product is neither designed nor approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature. When used in conformity with their intended use, the products supplied by SKF Lubrication Systems Germany AG do not reach the limit values listed in Article 3, Para. 1, Clauses 1.1 to 1.3 and Para. 2 of Directive 97/23/EC. They are therefore not subject to the requirements of Annex 1 of the Directive.

Consequently, they do not bear a CE marking in respect of Directive 97/23/EC. SKF Lubrication Systems Germany AG classifies them according to Article 3, Para. 3 of the Directive.

6.3.1 Information on PSG1 ATEX feeders

	 DANGER
	<p>Explosion hazard from non-ATEX-compliant attachments and monitoring equipment</p> <p>Only attachments and monitoring equipment approved by SKF for the PSG1 feeder may be installed on a PSG1 ATEX feeder.</p>

	 DANGER
	<p>Excessive switching voltage hazard</p> <p>An isolating amplifier must be inserted if the sensor will be used in a potentially explosive atmosphere (ATEX). The maximum permissible voltage U_i must not be exceeded.</p>

	 DANGER
	<p>Hazard from incorrect tool or equipment</p> <p>Use only tools and clothing approved for use in potentially explosive atmospheres (ESD).</p>

NOTE

Observe the technical data (Chapter 4) as well as the data for ATEX feeders with/without attachments.

ATEX feeders of the PSG series, without attachments and monitoring units, differ from conventional PSG versions in that they also have a ground terminal attached. It is attached to the feeder baseplate and grounds leakage current that could possibly be triggered by the customer and pass to the feeder. Volumes and the number of modules, however, are irrelevant for the ATEX assessment.

Attachments and monitoring equipment that are installed on the feeder and contain electrical components must possess ATEX certification.

Only attachments and monitoring equipment approved by SKF for the PSG1 feeder may be installed on a PSG ATEX feeder.

For PSG1 these are:

PSG1 basic design 24-3710-0044-ATEX
Proximity switch 24-3710-0039-ATEX

The installation of other ATEX-compliant attachments or monitoring equipment requires mandatory consultation with and approval from SKF Lubrication Systems Germany GmbH.

☞ See Figure 11

Only technical personnel may mount, connect, and put into operation the ATEX PSG feeders described here. The technical personnel must have detailed knowledge of the various types of protection and the rules and regulations for devices and equipment in potentially explosive atmospheres. The applicable national regulations and rules must be observed.

Assembly work can be performed only if it is ensured that no explosive atmosphere is present.

Before assembling/setting up the product, the packaging material and any shipping braces (e.g., plugs) must be removed.

Port dimensions, assembly holes, minimum mounting dimensions, and the assembly procedure are the same as for the PSG1 basic design and must be observed accordingly (Chapter 6.2). The same applies to the assembly procedure.

- Connect the grounding cable (provided by customer) to the ground terminal **(1)**.

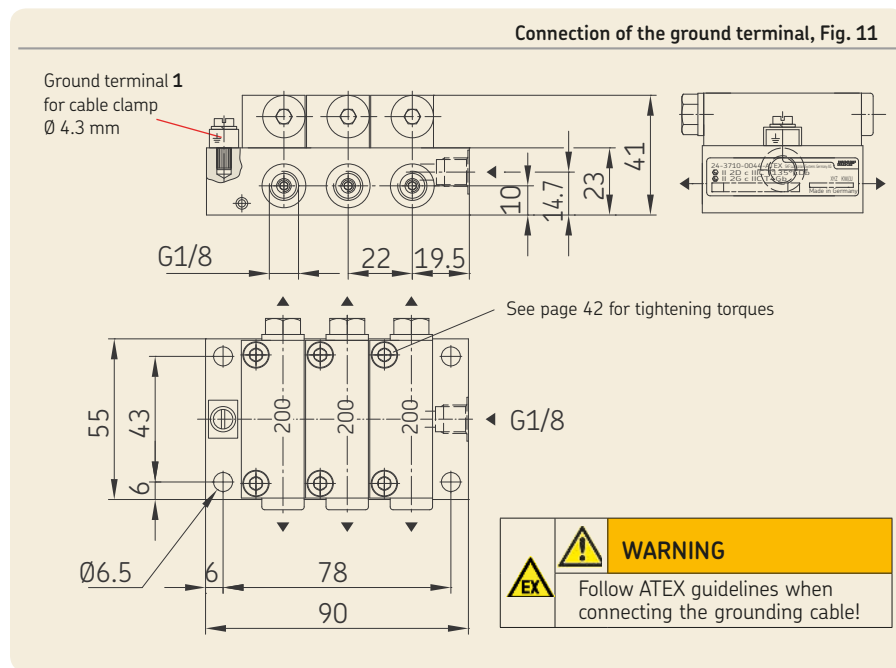
Tightening torques

Item	Quantity Screws	Torque [Nm]
Baseplate	4	9
Module	2	6
Screw union		
-Inlet	1	35
-Outlet max.	20	35
Banjo bolt (crossporting)		12
Setscrew "G"		Approx. 8 ¹⁾

Specifications for screws of strength class 8.8, subject to the following installation instructions, base material: steel

1) Strength class to DIN EN ISO 898, Part 5

6.3.2 PSG1 ATEX basic design 24-3710-0044-ATEX



1) In case of attachments on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must not match the direction of movement of the machine part.

Technical data**ATEX basic design****General**

Design	Hydraulically controlled
Mounting position	Any 1)
Ambient temperature range	-15°C to +110°C
Baseplate with	6, 8, 10, 12, 14, 16, 18, 20 outlets

occupied outlets

without bridges	3 to 20
with bridges	1 to 19

Material

Baseplate	Al
Modules	Galvanized steel
Seals	FKM (FPM)

Hydraulic system

Operating pressure	
min.	5 to 15 bar
max.	200 bar
Inlet volumetric flow	Up to 0.8 l/min

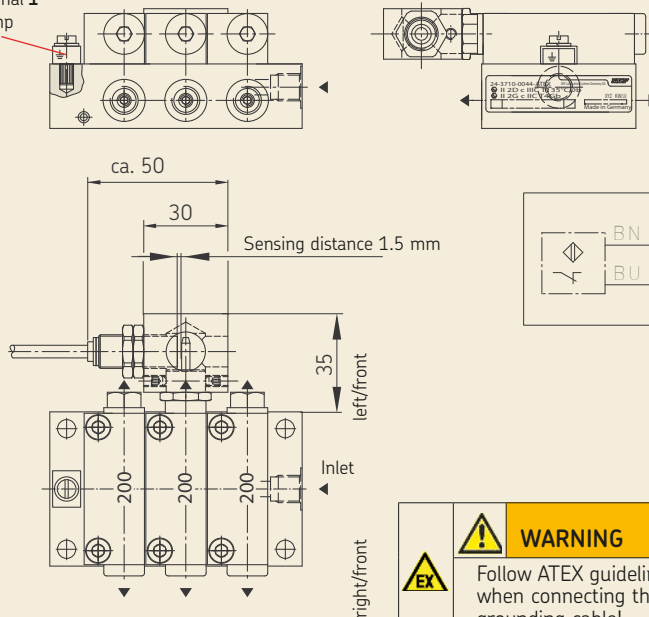
Volume per cycle

and outlet	200 mm ³
Piston stroke rate	max. 200/min
Lubricant	Mineral oils, greases based on mineral oil, environmentally friendly and synthetic oils and greases
Operating viscosity	> 12 mm ² /s
Worked penetration	≥ 265 x 0.1 mm (up to NLGI Grade 2)

6.3.3 PSG1 ATEX feeder with plunger rod and inductive proximity switch (24-3710-0039-ATEX)

PSG1 with cycle indicator, housing, and inductive proximity switch, Fig. 12

Ground terminal 1
for cable clamp
Ø 4.3 mm



Technical data

Inductive proximity switch

Part No. **24-1884-2288**

Design NAMUR DIN EN 50227

Connection To approved switching amplifiers with max. values
U=15 V; I=50 mA; P=120 mW

Function NC contact
System voltage 7.5 to 30 VDC

Power consumption
Undamped > 2.1 mA
Damped < 1 mA

Internal capacitance < 140 nF
Internal inductance < 130 µH
Switching frequency 1500 Hz
Ambient temperature -20°C to +70°C

Protection class
II 2G Ex ia IIC T6 Gb
IP67 EN60947-5-6

Housing material
Brass, specially coated
Active area: PC

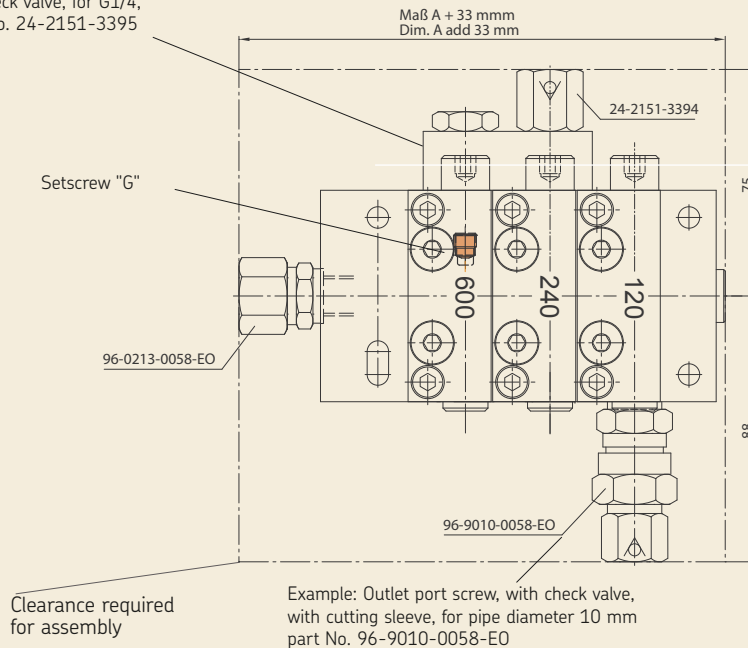
Elect. connection
PVC cable, 2 m long,
2x0.34 mm²

6.4 Installing the PSG2

6.4.1 Minimum mounting dimensions/clearance and tightening torques

Minimum mounting dimensions/clearance for installation, Fig. 13

Example: Crossporting, 3-bridge, with outlet,
with check valve, for G1/4,
order No. 24-2151-3395



Legend to Fig. 13

Number of modules	Dim. A+30 mm [mm]
3	161
4	189
5	217
6	245
7	273
8	301
9	329
10	357

Tightening torques

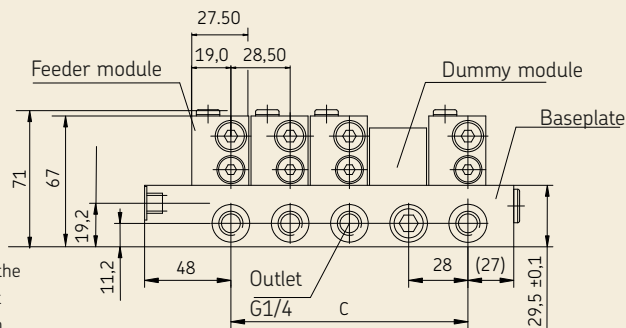
Item	Quantity	Torque [Nm]
Baseplate	4	11
Module	2	10
Screw union		
-Inlet	1	35
-Outlet max.	20	35
Banjo bolt (crossporting)		12
Setscrew "G"		Approx. 8 ¹⁾

Specifications for screws of strength class 8.8, subject to the following installation instructions, base material: steel

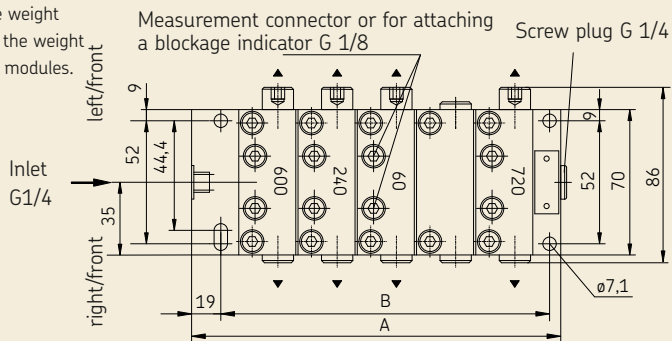
1) Strength class to DIN EN ISO 898, Part 5

6.4.2 PSG2 basic design

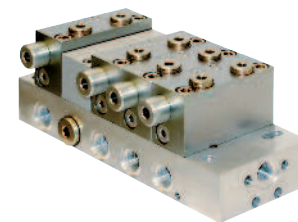
PSG2 in basic design, Fig. 14

**Note!**

The inlet union screw and the outlet screw unions are not included in the basic design (see Accessories). The weight specifications include the weight of the baseplate with modules.



PSG2 in basic design



6

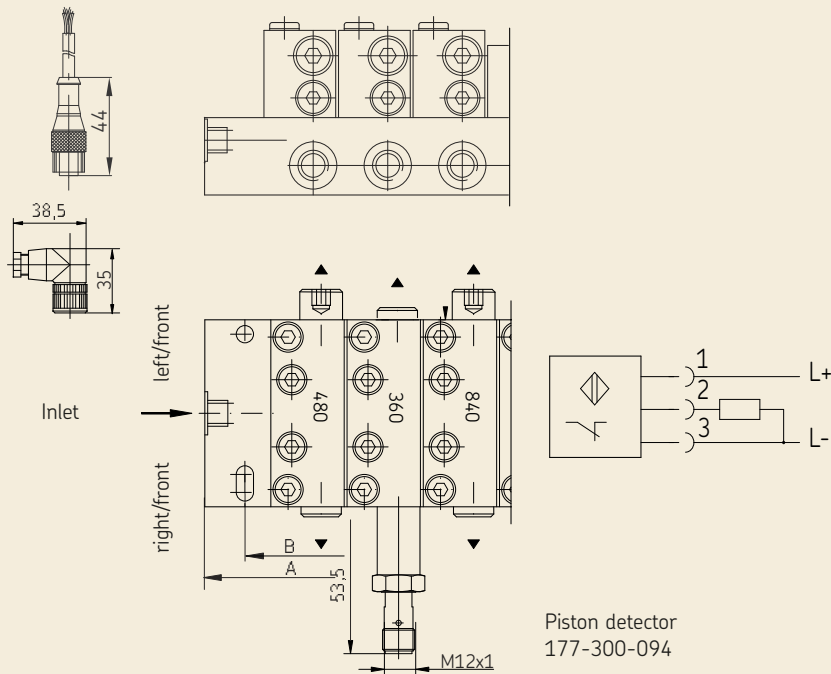
Legend to Fig. 14

Technical data - see Chapter 4.2

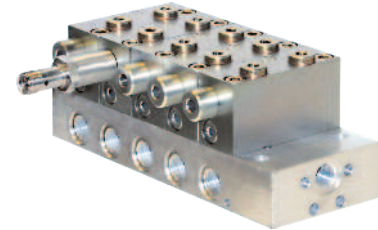
Number of modules	Dim. A [mm]	Dim. B [mm]	Dim. C [mm]	Weight [kg]
3	131	103	56	2.24
4	159	131	84	2.85
5	187	159	112	3.49
6	215	187	140	4.10
7	243	215	168	4.78
8	271	243	196	5.42
9	299	271	224	6.06
10	327	299	252	6.73

6.4.3 PSG2 with piston detector (P3)

PSG2 with piston detector (P3), Fig. 15



PSG2 with piston detector



Legend to Fig. 15

Technical data - see Chapter 4.2

Minimum mounting dimensions:
Fig. 13, Legend 13

Feeder dimensions:

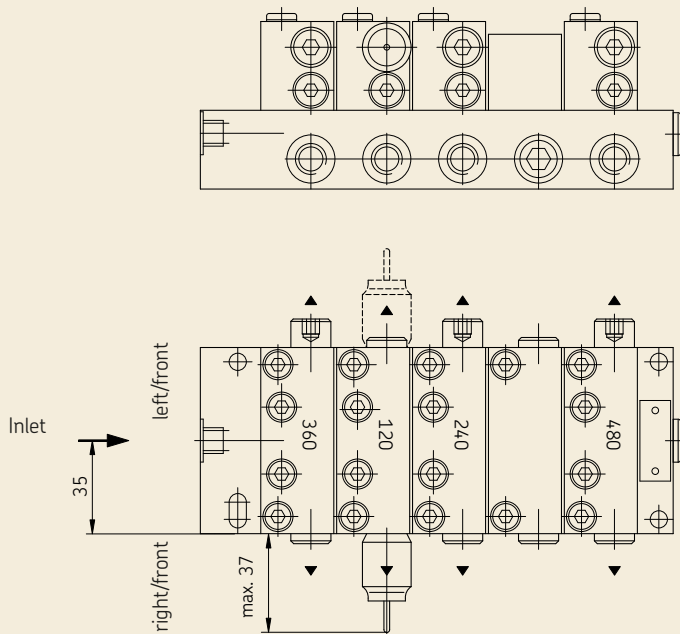
Basic design Fig. 14, Legend 14

Note!

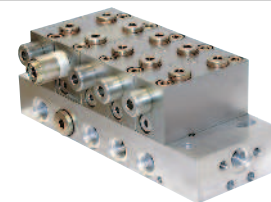
The piston detector can be attached to either the left or right side of the feeder modules. It is attached to the right side at the factory. Chapter 6.13 describes how to convert it to left-side attachment. It should not be attached to the first or last module.

6.4.4 PSG2 with visual cycle indicator (ZY)

PSG2 with visual cycle indicator (ZY), Fig. 16



PSG2 with visual cycle indicator



6

Legend to Fig. 16

Technical data- see Chapter 4.2

Minimum mounting dimensions:

Fig. 13, Legend 13

Feeder dimensions:

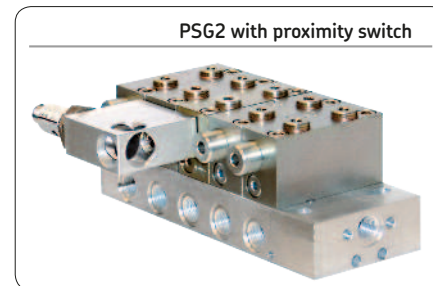
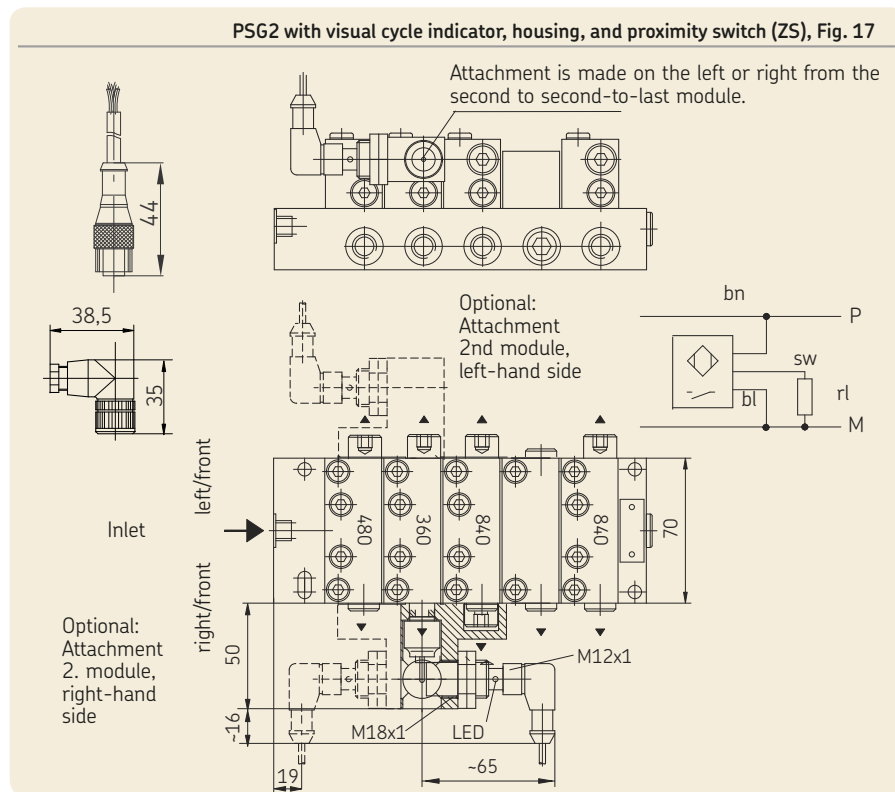
Basic design Fig. 14, Legend 14

Note!

The cycle indicator can be attached to either the left or right side of the feeder modules (not on the 60 mm³ module).

It is attached to the right side at the factory. Chapter 6.12 describes how to convert it to left-side attachment. It should not be attached to the first or last module.

6.4.5 PSG2 with visual cycle indicator, housing, and proximity switch (ZS)



Legend to Fig. 17

Technical data - see Chapter 4.2

Minimum mounting dimensions:

Fig. 13, Legend 13

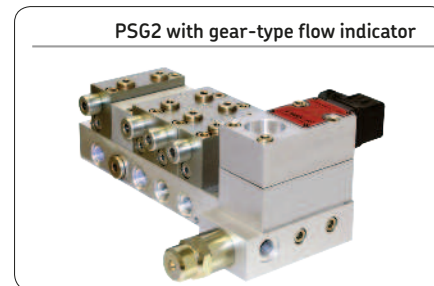
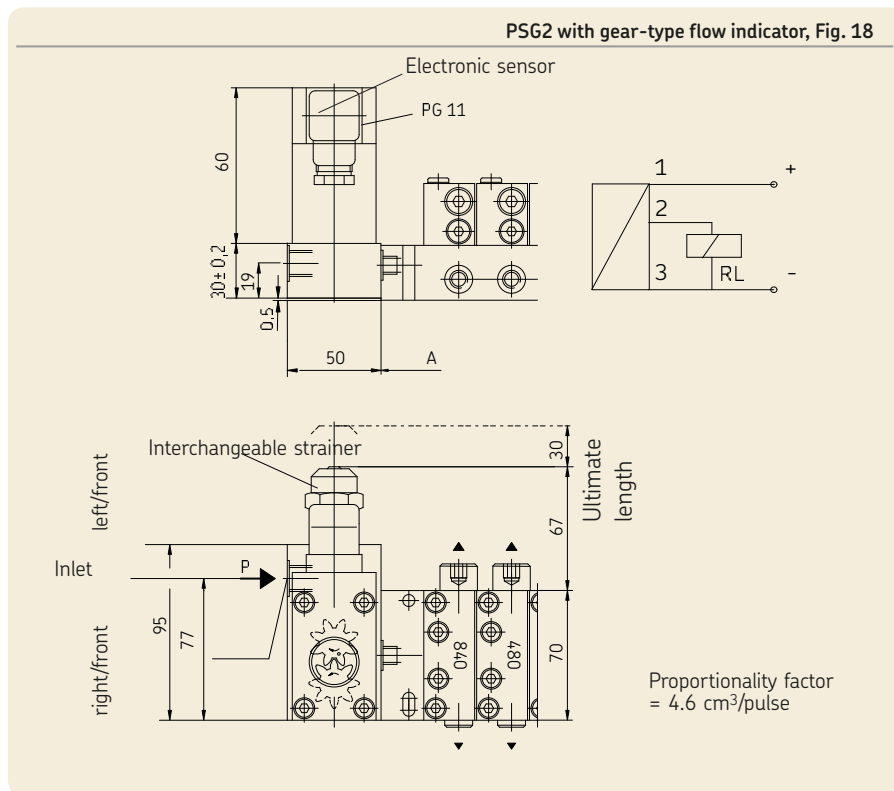
Feeder dimensions:

Basic design Fig. 14, Legend 14

! Note!

The proximity switch can be attached to either the left or right side of the modules on design ZY. It is attached to the right side at the factory. Chapter 6.12 describes how to convert it to left-side attachment. It should not be attached to the first or last module.

6.4.6 PSG2 with gear-type flow indicator



6

Legend to Fig. 18*Technical data- see Chapter 4.2*

Minimum mounting dimensions:

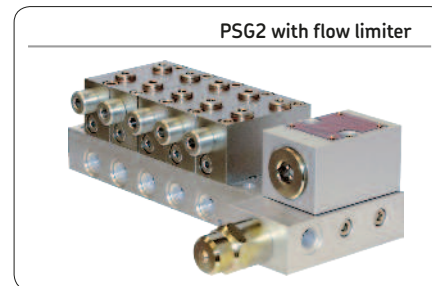
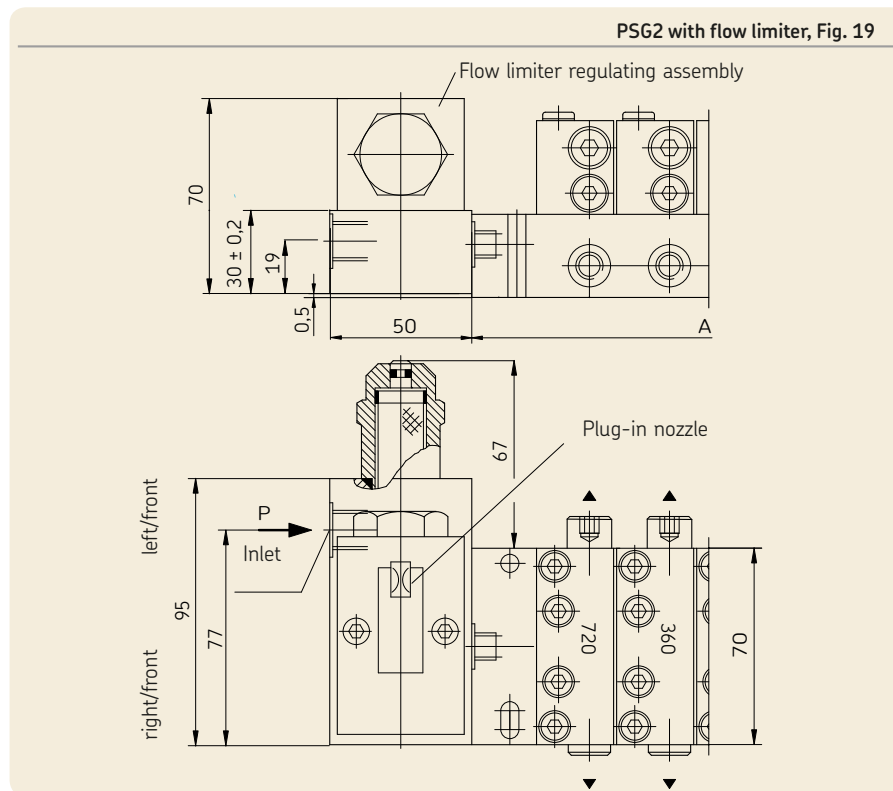
Fig. 13, Legend 13

Feeder dimensions:

Basic design

Fig. 14, Legend 14

6.4.7 PSG2 with flow limiter for oil applications

**Legend to Fig. 19**

Technical data- see Chapter 4.2

Minimum mounting dimensions:

Fig. 13, Legend 13

Feeder dimensions:

Basic design Fig. 14, Legend 14

See plug-in nozzle table for SP/SMB8 flow limiter

Rated volumetric flow 1) [l/min]	Nozzle [Ø mm]	Spare part - complete plug-in nozzle D1 Order number
0.08	0.50	24-0455-2574
0.12	0.55	24-0455-2575
0.15	0.60	24-0455-2576
0.21	0.65	24-0455-2577
0.25	0.70	24-0455-2578
0.29	0.75	24-0455-2579
0.35	0.80	24-0455-2580
0.41	0.85	24-0455-2581
0.47	0.90	24-0455-2582
0.56	0.95	24-0455-2583
0.65	1.00	24-0455-2584
0.73	1.05	24-0455-2585
0.79	1.10	24-0455-2586
0.88	1.15	24-0455-2587
0.98	1.20	24-0455-2588
1.09	1.25	24-0455-2589
1.18	1.30	24-0455-2590
1.30	1.35	24-0455-2591
1.43	1.40	24-0455-2592
1.56	1.45	24-0455-2593
1.67	1.50	24-0455-2594
1.79	1.55	24-0455-2595
1.92	1.60	24-0455-2596
2.07	1.65	24-0455-2597
2.21	1.70	24-0455-2598
2.36	1.75	24-0455-2599
2.52	1.80	24-0455-2600

1) The table values are based on a pressure differential of 20 bar and a viscosity of 300 mm²/s.

Other differential pressures or viscosities result in slightly different delivery rates.

These can be determined using the following charts for delivery rates and correction factors for the pressure.

The table values for nozzle diameters of 1.5 and above are valid without correction over the entire viscosity range from 150 to 600 mm²/s and pressure differentials of 20 to 150 bar.

Selection of nozzle sizes of 0.50 to 1.45 mm at differential pressures of 20 to 150 bar and viscosities of 150 to 600 mm²/s

Example of use for nozzle selection

Given:

Desired delivery rate 0.690 l/min

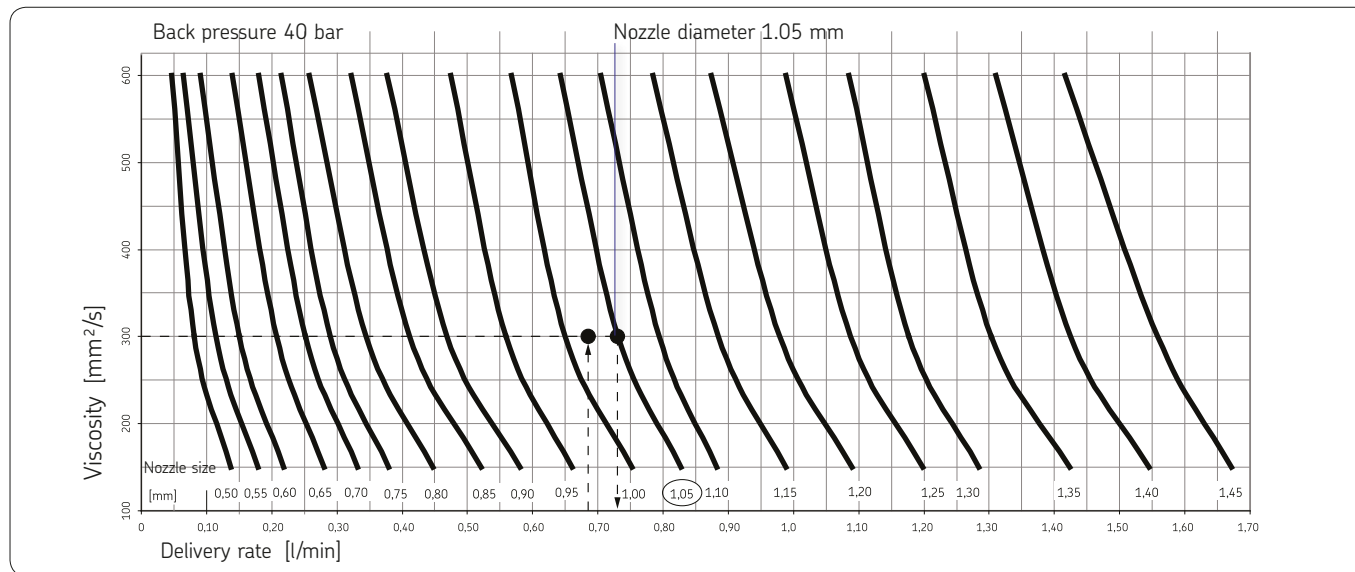
Operating viscosity 300 mm²/s

Pressure differential 50 bar (e.g., system pressure 90 bar, back pressure 40 bar)

1) Preselection of the nozzle diameter

- Determine the intersection between the desired delivery rate (0.690 l/min) and operating viscosity (300 mm²/s)
- The closest curve defines the nozzle diameter (1.05 mm).

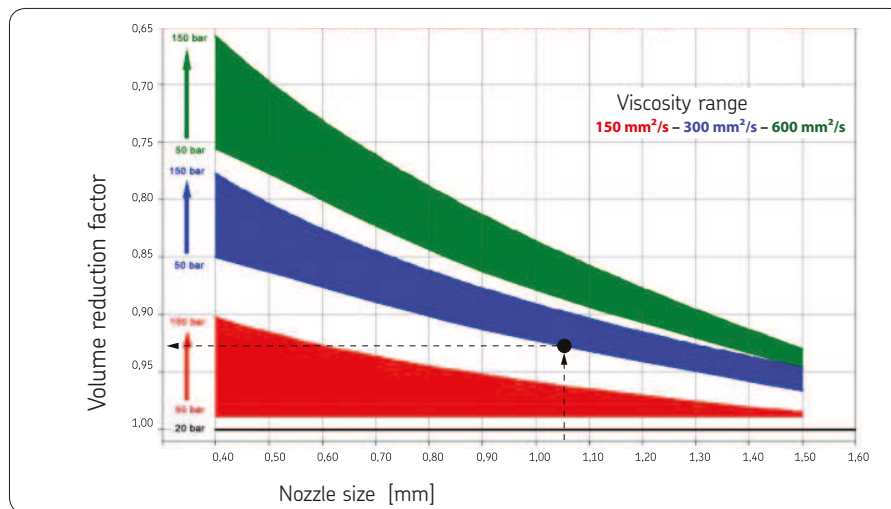
- The target volume for the selected nozzle at 20 bar is derived from the intersection of the nozzle characteristic curve (1.05 mm) and the operating viscosity (300 mm²/s). In this example, it is **0.735 l/min**.



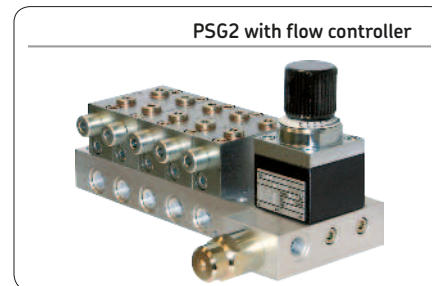
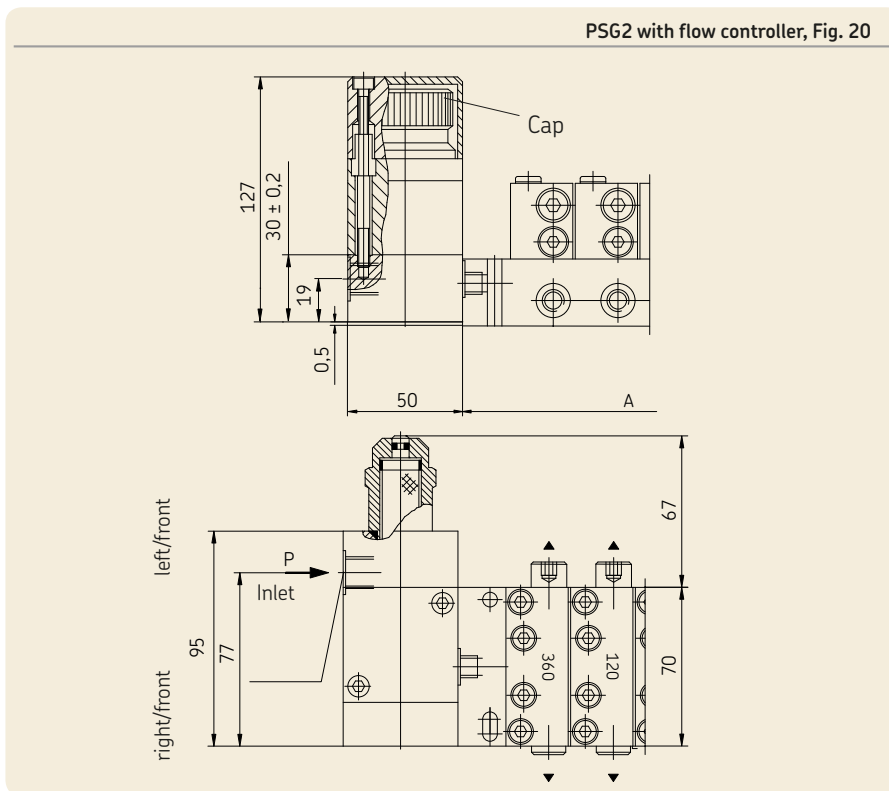
2) Determine the correction factor for the pressure differential and calculate the actual delivery volume.

The chart for nozzle size selection is based on a pressure differential of 20 bar. Higher pressure differentials reduce the delivery rate. The reduced delivery rate can be calculated using a correction factor.

- For 300 mm²/s, the middle blue band must be used. The band covers the pressure range ascending from 50 bar to 150 bar.
- In our example with the 1.05-mm nozzle diameter, the vertical intersection is determined by the blue band at 50 bar.
- The correction factor is derived from the horizontal intersection with the vertical axis (volume reduction factor), here 0.925.
- The actual delivery rate is obtained from the determined target volume with 20 bar multiplied by the correction factor:
 $0.735 \text{ l/min} \times 0.925 = 0.680 \text{ l/min}$.



6.4.8 PSG2 with flow controller for oil applications



Legend to Fig. 20

Technical data- see Chapter 4.2

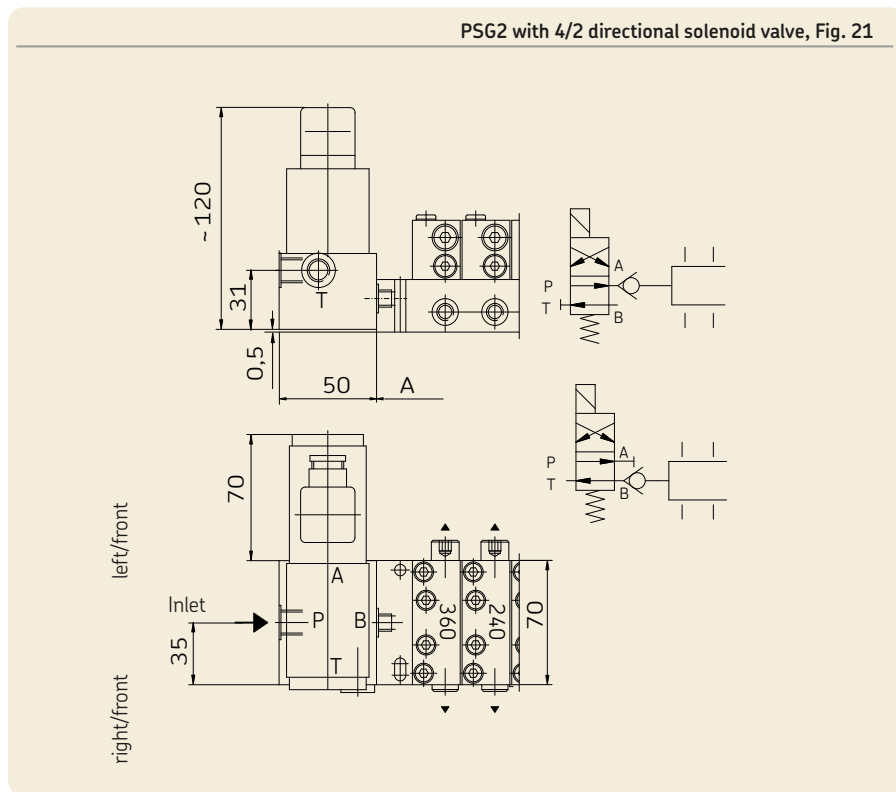
Minimum mounting dimensions:

Fig. 13, Legend 13

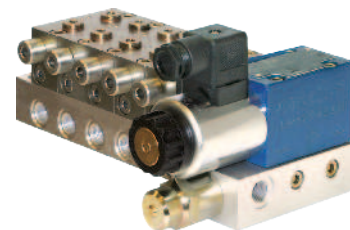
Feeder dimensions:

Basic design Fig. 14, Legend 14

6.4.9 PSG2 with 4/2 directional solenoid valve for oil applications



PSG2 with 4/2 directional solenoid valve



Legend to Fig. 21

Technical data- see Chapter 4.2

Minimum mounting dimensions:

Fig. 13, Legend 13

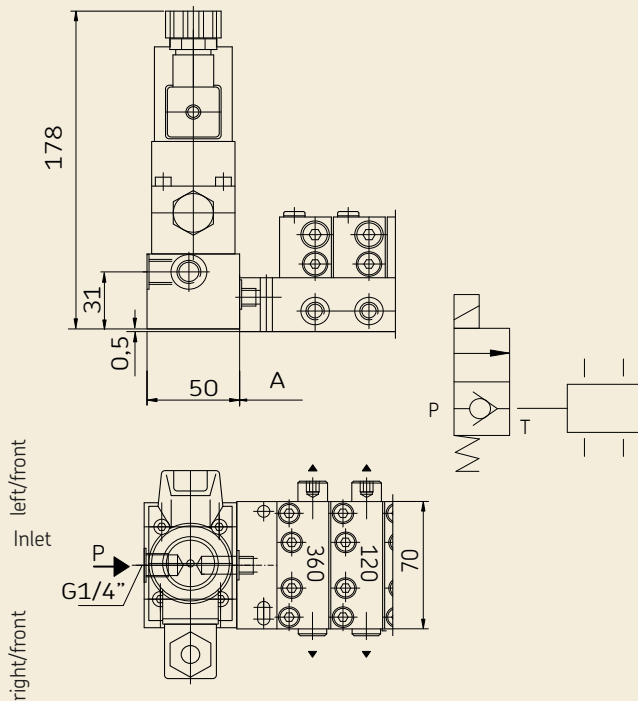
Feeder dimensions:

Basic design

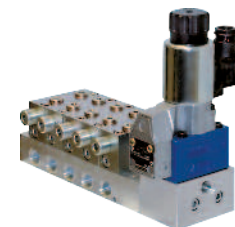
Fig. 14, Legend 14

6.4.10 PSG2 with 2/2 directional solenoid valve for oil applications

PSG2 with 2/2 directional solenoid valve, Fig. 22



PSG2 with 2/2 directional solenoid valve



Legend to Fig. 22

Technical data- see Chapter 4.2

Minimum mounting dimensions:

Fig. 13, Legend 13

Feeder dimensions:

Basic design Fig. 14, Legend 14

6.5 PSG2 feeders for ATEX-compliant applications

PSG2 feeders for potentially explosive atmospheres according to ATEX Directive 2014/34/EU.

For PSG2 these are:

ATEX basic design

Order No.: **24-3720-4327-ATEX**

ATEX feeder with proximity switch and 2/2 directional solenoid valve

Order No.: **24-3720-4282-ATEX**

The inductive ATEX proximity switch may be operated in an ATEX area only with intrinsically safe electrical circuits certified for the categories and explosion groups [Ex ia] IIC or [Ex ib] IIC.

The sensor has a type examination certificate and is marked in accordance with the ATEX Directive.

The 2/2 directional seat valve has a type examination certificate and is marked in accordance with the ATEX Directive.



The feeder may, with reference to EC Directive 97/23/EC concerning pressure equipment, only be used in accordance with its intended use and in conformity with the instructions provided in the documentation.



The following must be observed in this regard:

The product is neither designed nor approved for use in conjunction with fluids of Group 1 (Dangerous Fluids) as defined in Article 2, Para. 2 of Directive 67/548/EEC of June 27, 1967. The product is neither designed nor approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature. When used in conformity with their intended use, the products supplied by SKF Lubrication Systems Germany GmbH do not reach the limit values listed in Article 3, Para. 1, Clauses 1.1 to 1.3 and Para. 2 of Directive 97/23/EC. They are therefore not subject to the requirements of Annex 1 of the Directive.

Consequently, they do not bear a CE marking in respect of Directive 97/23/EC. SKF Lubrication Systems Germany GmbH classifies them according to Article 3, Para. 3 of the Directive.

6.5.1 Information on PSG2 ATEX feeders

	 DANGER
	<p>Explosion hazard from non-ATEX-compliant attachments and monitoring equipment</p> <p>Only attachments and monitoring equipment approved by SKF for the PSG2 feeder may be installed on a PSG2 ATEX feeder.</p>

	 DANGER
	<p>Excessive switching voltage hazard</p> <p>An isolating amplifier must be inserted if the sensor will be used in a potentially explosive atmosphere (ATEX). The maximum permissible voltage U_i must not be exceeded.</p>

	 DANGER
	<p>Hazard from incorrect tool or equipment</p> <p>Use only tools and clothing approved for use in potentially explosive atmospheres (ESD).</p>

NOTE
Observe the technical data (Chapter 4) as well as the data for ATEX feeders with/without attachments.

ATEX feeders of the PSG series, without attachments and monitoring units, differ from conventional PSG versions in that they also have a ground terminal attached. It is attached to the feeder baseplate and grounds leakage current that could possibly be triggered by the customer and pass to the feeder.

Volumes and the number of modules, however, are irrelevant for the ATEX assessment. Attachments and monitoring equipment that are installed on the feeder and contain electrical components must possess ATEX certification. Only attachments and monitoring equipment approved by SKF for the PSG2 feeder may be installed on a PSG ATEX feeder.

For PSG2 these are:

PSG2 24-3720-4327-ATEX

with proximity switch 24-3720-4326-ATEX

with proximity switch and 2/2 directional solenoid valve 24-3720-4282-ATEX

The installation of other ATEX-compliant attachments or monitoring equipment requires mandatory consultation with and approval from SKF Lubrication Systems Germany GmbH.

☞ See Figure 23

Only technical personnel may mount, connect, and put into operation the ATEX PSG feeders described here. The technical personnel must have detailed knowledge of the various types of protection and the rules and regulations for devices and equipment in potentially explosive atmospheres. The applicable national regulations and rules must be observed.

Assembly work can be performed only if it is ensured that no explosive atmosphere is present.

Before assembling/setting up the product, the packaging material and any shipping braces (e.g., plugs) must be removed.

Port dimensions, assembly holes, minimum mounting dimensions, and the assembly procedure are the same as for the PSG2 basic design and must be observed accordingly (Chapter 6.4). The same applies to the assembly procedure.

- Connect the grounding cable (provided by customer) to the ground terminal **(1)**.

Tightening torques

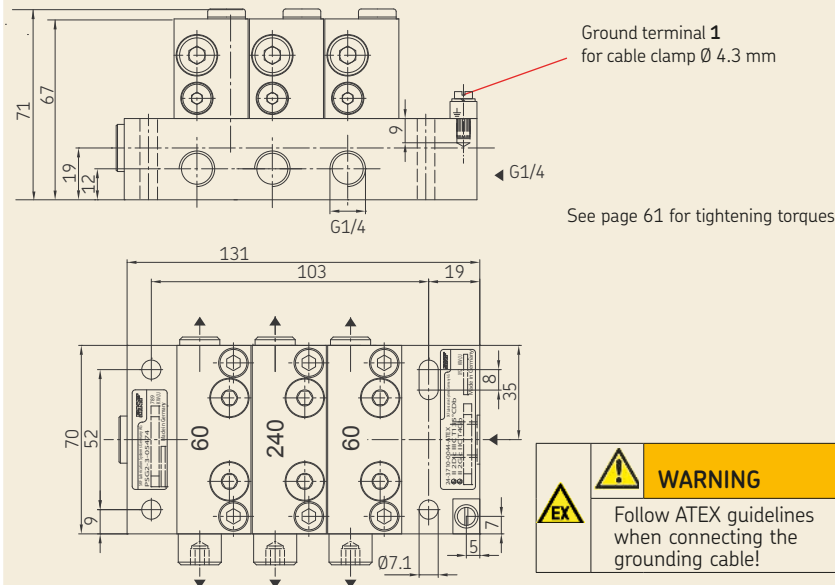
Item	Quantity Screws	Torque [Nm]
Baseplate	4	11
Module	2	10
Screw union		
-Inlet	1	35
-Outlet max.	20	35
Banjo bolt (crossporting)		12
Setscrew "G"		Approx. 8 ¹⁾

Specifications for screws of strength class 8.8, subject to the following installation instructions, base material: steel

1) Strength class to DIN EN ISO 898, Part 5

6.5.2 PSG2 ATEX basic design 24-3720-4327-ATEX

Connection of the ground terminal, Fig. 23



1) In case of attachments on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must not match the direction of movement of the machine part.

Technical data

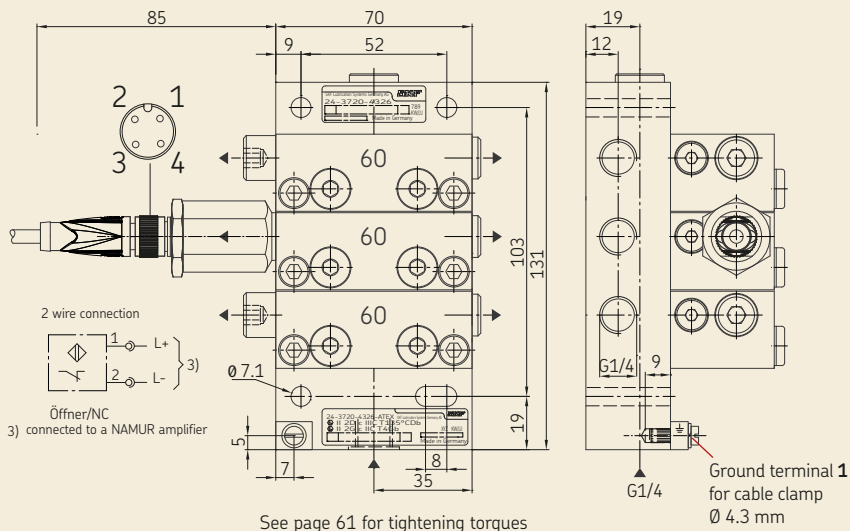
ATEX basic design

General

Design	Hydraulically controlled
Mounting position	Any ¹⁾
Ambient temperature range	-15°C to +110°C
Baseplate with	6, 8, 10, 12, 14, 16, 18, 20 outlets
occupied outlets	
without bridges	3 to 20
with bridges	1 to 19
Material	
Baseplate	Al
Modules	Galvanized steel
Seals	FKM (FPM)
Hydraulic system	
Operating pressure	
Min.	5 to 15 bar
Max.	200 bar
Inlet volumetric flow	Up to 2.5 l/min
Volume per cycle and outlet	60/200 mm ³
Piston stroke rate	max. 200/min
Lubricant	Mineral oils, greases based on mineral oil, environmentally friendly and synthetic oils and greases
Operating viscosity	> 12 mm ² /s
Worked penetration	≥ 265 x 0.1 mm (up to NLGI Grade 2)

6.5.3 PSG2 ATEX feeder with proximity switch 24-3720-4326-ATEX

ATEX feeder with proximity switch, Fig. 24



- 1) In case of attachments on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must not match the direction of movement of the machine part.
- 2) Cable with Cable socket, V1-G-N-15M-PUR NAMUR, included in delivery



! WARNING

Follow ATEX guidelines when connecting the grounding cable!
Inductive ATEX proximity switch - may be operated in an ATEX area only with certified intrinsically safe electrical circuits!

Technical data

ATEX basic design ¹⁾

Feeder data: see technical data from basic feeder 24-3720-4327-ATEX

Inductive proximity switch,

NAMUR EN 60947-5-6:2000
IEC 60947-5-6:1999

Licensing UL und CSA
Material No. 24-1884-2613
Cycle volumes 0,64 cm³ per pulse
Nominal switching distance

S_n 1,5 mm
flush mountable

Assured switching distance

S_a 0 to 1,22 mm

Operation in certified intrinsically safe electrical circuit with:

max. U_i = 16 V DC;
 I_i = 25 mA; P_i = 34 mW
NC contact

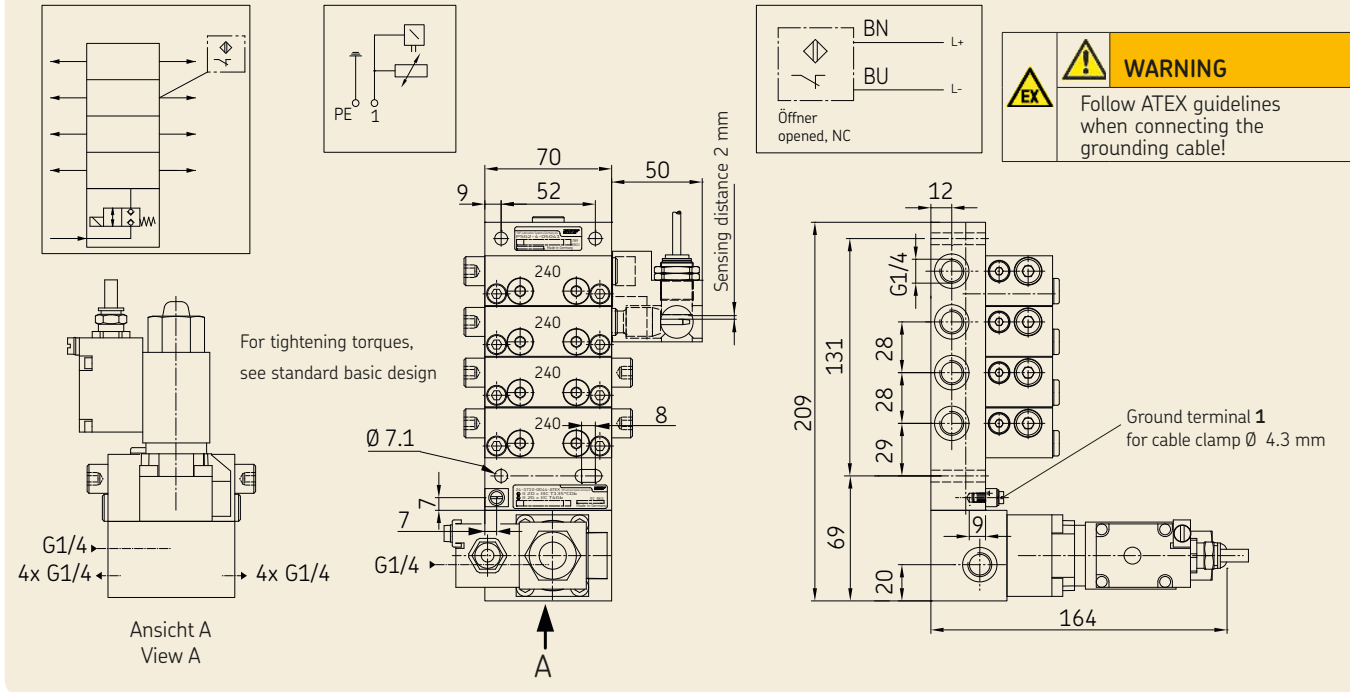
Function
Power consumption Undamped \geq 3 mA
Damped $<$ 1 mA

Internal capacitance C_i $<$ 50 nF
Internal inductance L_i $<$ 60 μ H
Switching frequency $<$ 400 Hz
Ambient temperature -20°C to +70°C
Protection class II 2G Ex ia IIC T6 Gb
IP66/IP68

Electrical connection
PVC cable, 15 m, 2x0.34 mm² ²⁾

6.5.4 PSG2 ATEX feeder with 2/2 directional solenoid valve and proximity switch 24-3720-4282-ATEX

PSG2 ATEX feeder with 2/2 directional solenoid valve and proximity switch, Fig. 25



Technical data

PSG2 ATEX feeder with 2/2 directional solenoid valve and proximity switch**ATEX feeder****General**

Design	Hydraulically controlled
Mounting position	Any ¹⁾

Ambient temperature range	-15°C to +110°C
---------------------------	-----------------

Baseplate with occupied outlets	6, 8, 10, 12, 14, 16, 18, 20 outlets without bridges 3 to 20, with bridges 1 to 19
---------------------------------	---

Material

Baseplate	Al
Modules	Galvanized steel
Seals FKM (FPM)	

Hydraulic system

Operating pressure	Min. 5 to 15 bar, max. 200 bar
--------------------	--------------------------------

Inlet volumetric flow	Up to 2.5 l/min
Volume per cycle and outlet	240 mm ³
Piston stroke rate	Max. 200/min

Lubricant

Worked penetration	Grease (NLGI Grade 2) ≥ 265 x 0.1 mm
Fluid grease/oil	>12 mm ² /s

2/2 directional seat valve

Design	Seat valve, double-sided locking
Function	Normally closed (NC)
Operating media	Oils ISO VG 10 to 68 Greases of NLGI Grades 000 to 2
Media temperature	Max. 70°C
Operating pressure	Max. 400 bar
Volumetric flow	Max. 15 l/min
Air-break magnet	
Rated voltage	24 V DC
Rated current	0.83 A
Rated output	23 W
ON-time	100% ON-time, until ambient temp. 35°C
Protection class	IP 67
EX protection class	II 2 G Ex d IIB+H2 T4; II 2 D Ex mbD 21 T135°C
Connection type	10m cable 3x 0.5 mm ²

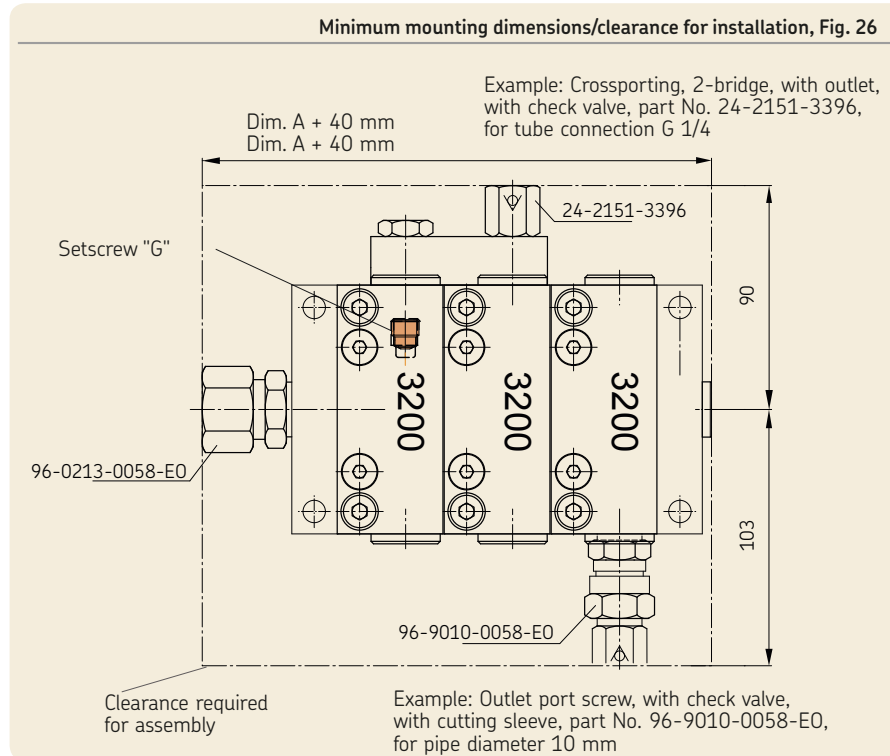
Inductive proximity switch, NAMUR DIN EN 50227

Material No.	24-1884-2292
Operation in intrinsically safe electrical circuit with	
Function	Max. U=15 V; I=50 mA; P=120 mW NC contact
Power consumption	Undamped >2.1 mA; Damped <1 mA
Internal capacitance	< 155 nF
Internal inductance	< 50 μH
Switching frequency	300 Hz
Ambient temperature	-20°C to +70°C
Protection class	II 2G Ex ia IIC T6 Gb IP67
Electrical connection	PVC cable, 2 m, 2x0.5 mm ²

1) In case of attachments on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must not match the direction of movement of the machine part.

6.6 Installing the PSG3

6.6.1 Minimum mounting dimensions/clearance and tightening torques



Legend to Fig. 26

Number of modules	Dim. A+30 mm [mm]
3	195
4	238
5	281
6	324
7	367
8	410
9	453
10	496

Tightening torques

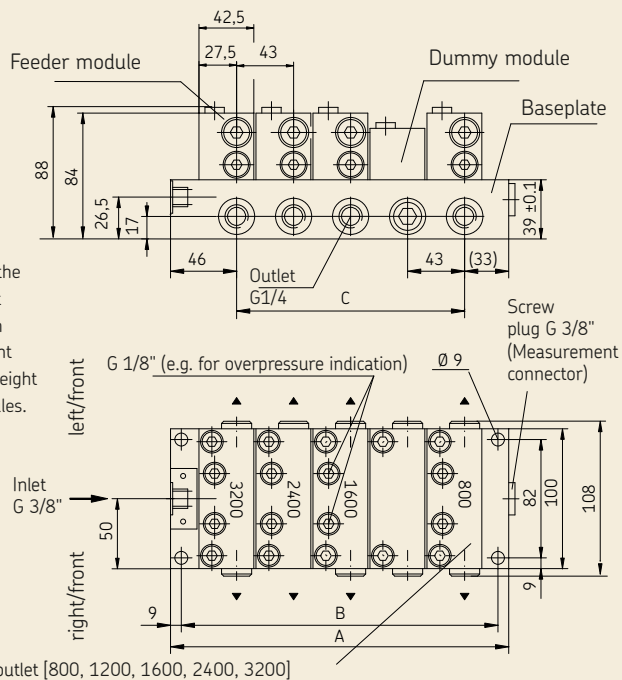
Item	Quantity	Torque [Nm]
Baseplate	4	25
Module	2	23
Screw union		
- Inlet	1	45
- Outlet max.	20	35
Banjo bolt (crossporting)		20
Setscrew "G"		Approx. 8 1)

Specifications for screws of strength class 8.8, subject to the following installation instructions, base material: steel

1) Strength class to DIN EN ISO 898, Part 5

6.6.2 PSG3 basic design

PSG3 in basic design, Fig. 27



PSG3 in basic design

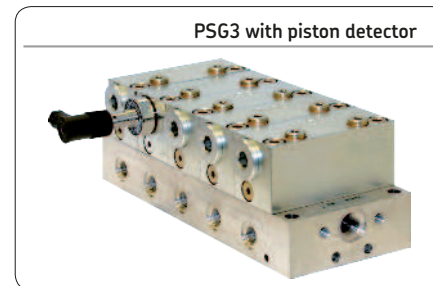
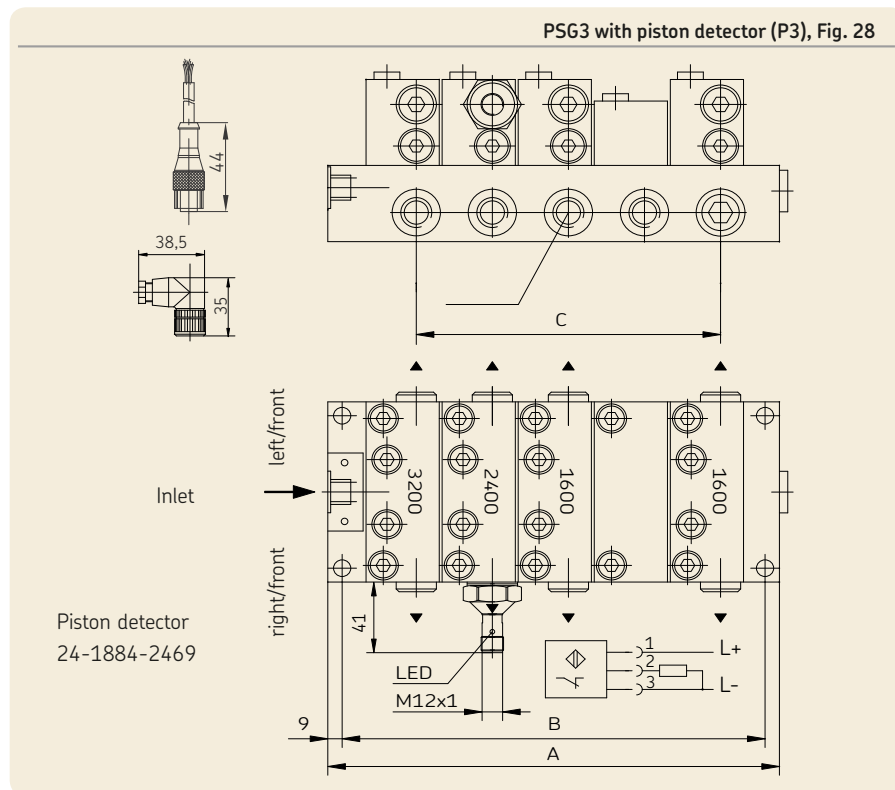


Legend to Fig. 27

Technical data- see Chapter 4.2

Number of modules	Dim. A [mm]	Dim. B [mm]	Dim. C [mm]	Weight [kg]
3	165	147	86	6.83
4	208	190	129	8.55
5	251	233	172	10.27
6	294	276	215	11.99
7	337	319	258	13.71
8	380	362	301	15.43
9	423	405	344	17.15
10	466	448	387	18.87

6.6.3 PSG3 with piston detector (P3)



Legend to Fig. 28

Technical data - see Chapter 4.3

Minimum mounting dimensions:

Fig. 26, Legend 26

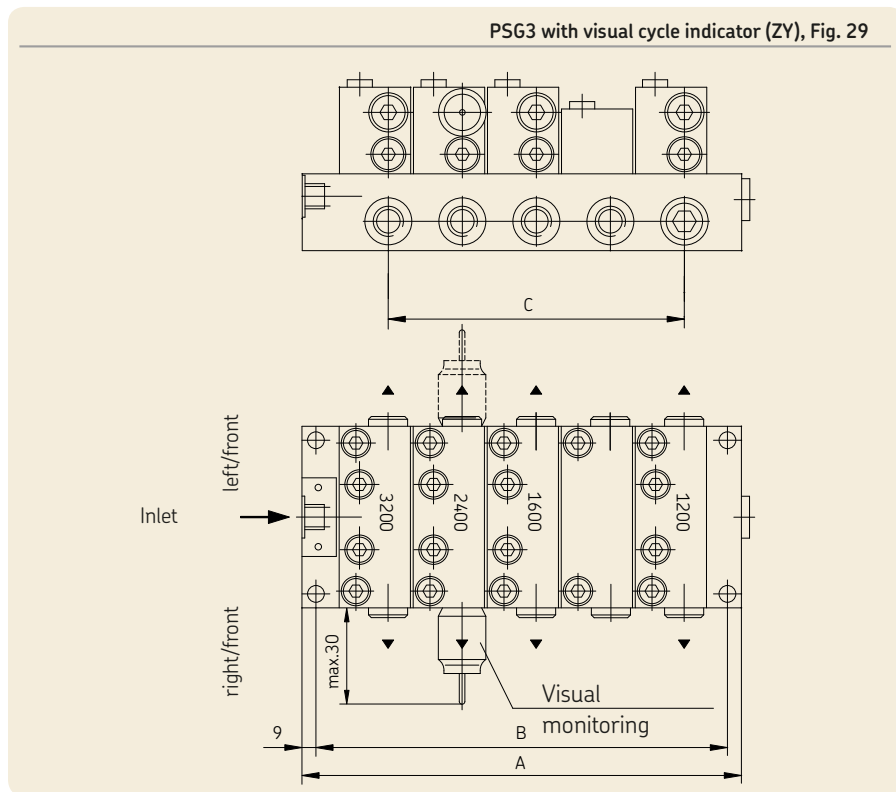
Feeder dimensions:

Basic design Fig. 27, Legend 27

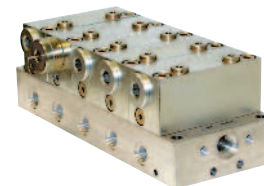
! Note!

The piston detector can be attached to either the left or right side of the feeder modules. It is attached to the right side at the factory. It should not be attached to the first or last module.

6.6.4 PSG3 with visual cycle indicator (ZY)



PSG3 with visual cycle indicator



Legend to Fig. 29

Technical data- see Chapter 4.3

Minimum mounting dimensions:

Fig. 26, Legend 26

Feeder dimensions:

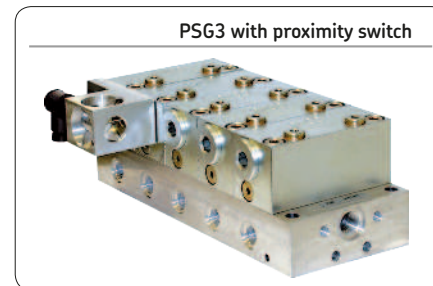
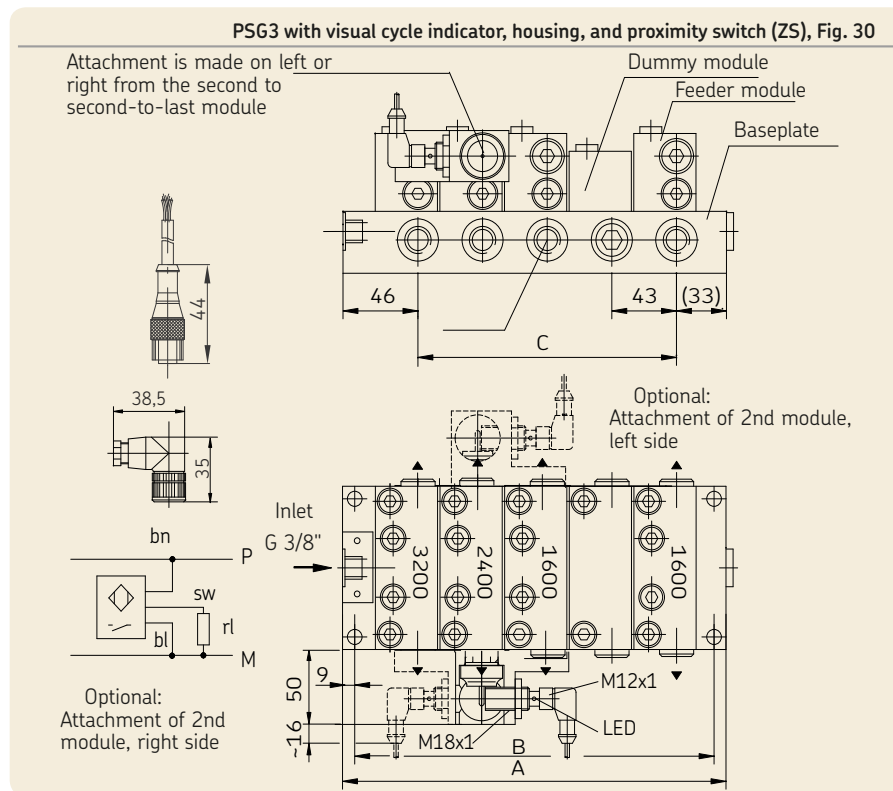
Basic design

Fig. 27, Legend 27

! Note!

The cycle indicator can be attached to either the left or right side of the feeder modules. It is attached to the right side at the factory. Chapter 6.12 describes how to convert it to left-side attachment. It should not be attached to the first or last module.

6.6.5 PSG3 with visual cycle indicator, housing, and proximity switch (ZS)



Legend to Fig. 30

Technical data - see Chapter 4.3

Minimum mounting dimensions:

Fig. 26, Legend 26

Feeder dimensions:

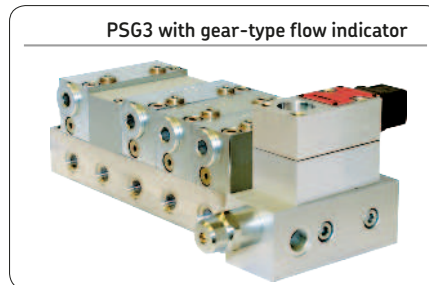
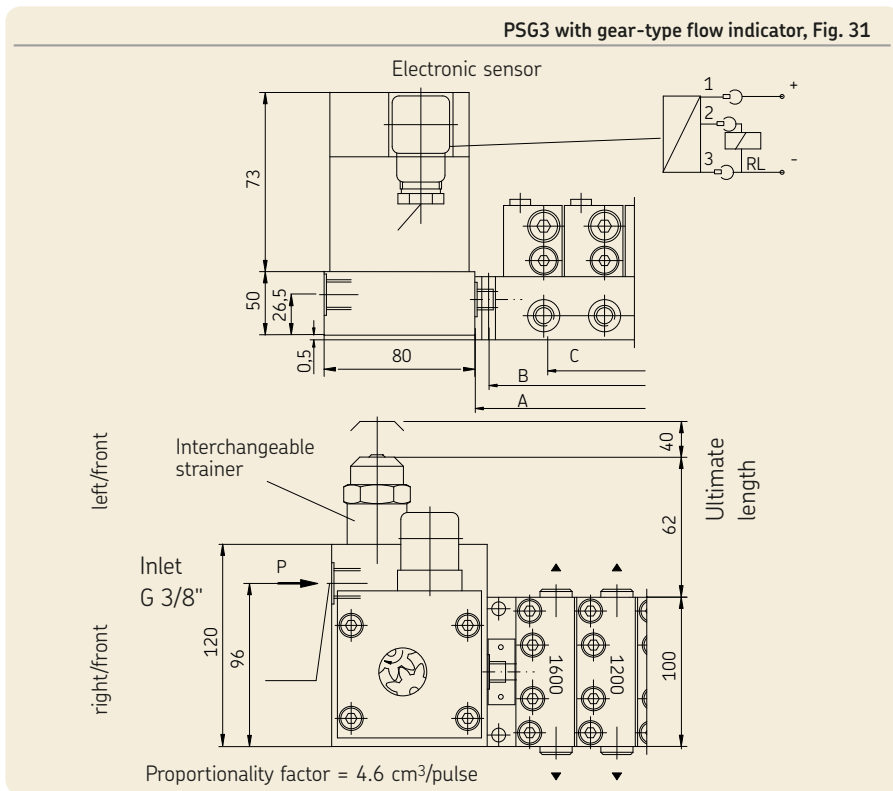
Basic design

Fig. 27, Legend 27

! Note!

The proximity switch can be attached to either the left or right side on design ZY. It is attached to the right side at the factory. Chapter 6.12 describes how to convert it to left-side attachment. It should not be attached to the first or last module.

6.6.6 PSG3 with gear-type flow indicator

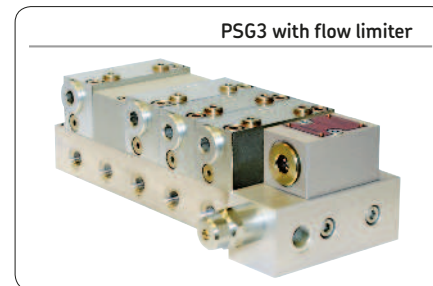
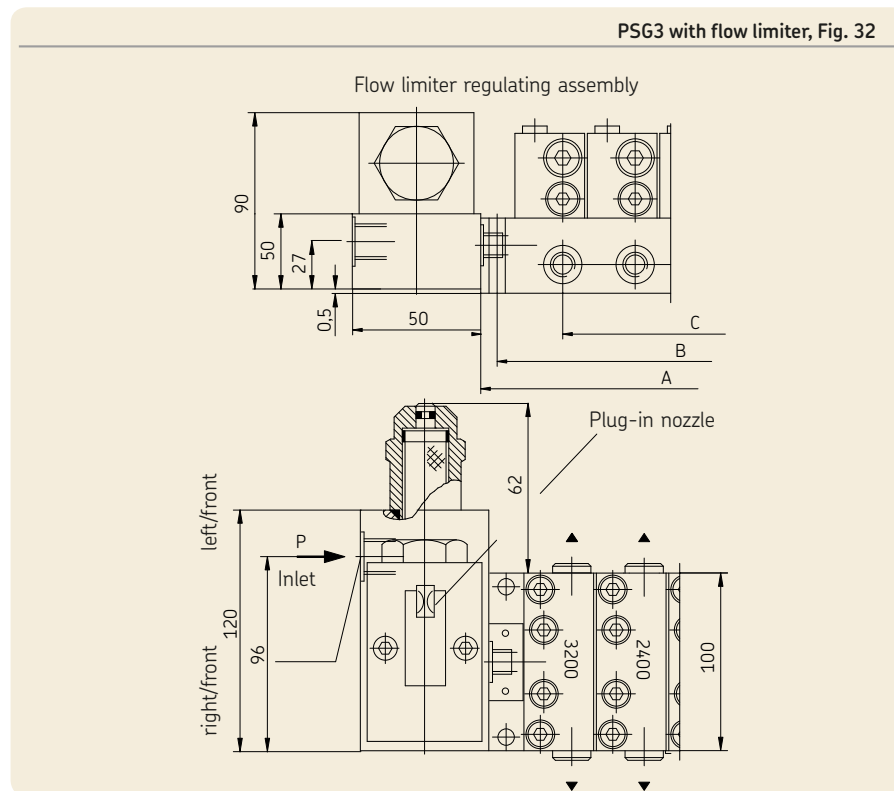
**Legend to Fig. 31**

Technical data- see Chapter 4.3

Minimum mounting dimensions:
Fig. 26, Legend 26

Feeder dimensions:
Basic design Fig. 27, Legend 27

6.6.7 PSG3 with flow limiter for oil applications



Legend to Fig. 32

Technical data - see Chapter 4.3

Minimum mounting dimensions:

Fig. 26, Legend 26

Feeder dimensions:

Basic design Fig. 27, Legend 27

Plug-in nozzle table for SP/SMB8 flow limiter, (Table 1 of 2)

Rated volumetric flow ¹⁾ [l/min]	Nozzle [Ø mm]	Spare part - complete plug-in nozzle D1 Order number
0.08	0.50	24-0455-2574
0.12	0.55	24-0455-2575
0.15	0.60	24-0455-2576
0.21	0.65	24-0455-2577
0.25	0.70	24-0455-2578
0.29	0.75	24-0455-2579
0.35	0.80	24-0455-2580
0.41	0.85	24-0455-2581
0.47	0.90	24-0455-2582
0.56	0.95	24-0455-2583
0.65	1.00	24-0455-2584
0.73	1.05	24-0455-2585
0.79	1.10	24-0455-2586
0.88	1.15	24-0455-2587
0.98	1.20	24-0455-2588
1.09	1.25	24-0455-2589
1.18	1.30	24-0455-2590
1.30	1.35	24-0455-2591
1.43	1.40	24-0455-2592
1.56	1.45	24-0455-2593
1.67	1.50	24-0455-2594
1.79	1.55	24-0455-2595
1.92	1.60	24-0455-2596
2.07	1.65	24-0455-2597
2.21	1.70	24-0455-2598
2.36	1.75	24-0455-2599
2.52	1.80	24-0455-2600

1) The table values are based on a pressure differential of 20 bar and a viscosity of 300 mm²/s.

Other differential pressures or viscosities result in slightly different delivery rates. These can be determined using the following charts for delivery rates and correction factors for the pressure.

The table values for nozzle diameters of 1.5 and above are valid without correction over the entire viscosity range from 150 to 600 mm²/s and pressure differentials of 20 to 150 bar.

Plug-in nozzle table for SP/SMB8 flow limiter, (Table 2 of 2)

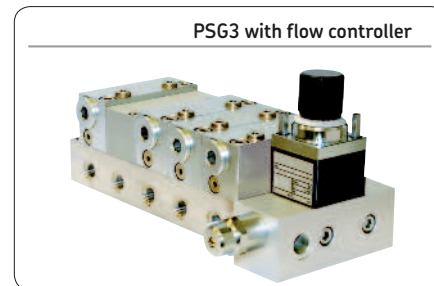
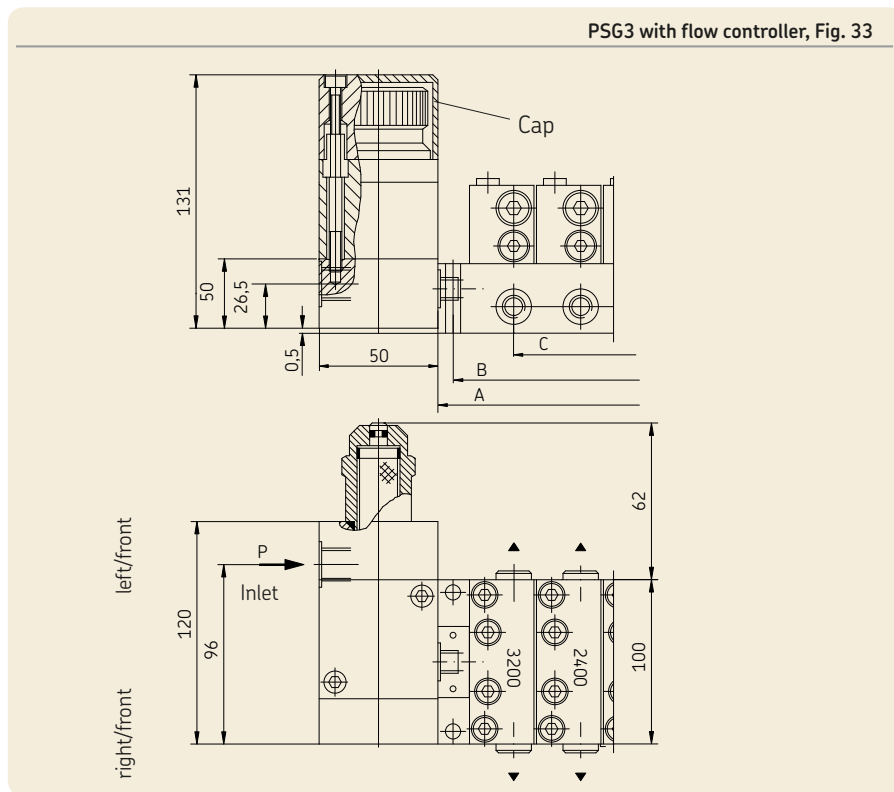
Rated volumetric flow ¹⁾	Nozzle	Spare part - complete plug-in nozzle D1
[l/min]	[Ø mm]	Order number
1.79	1.55	24-0455-2595
1.92	1.60	24-0455-2596
2.07	1.65	24-0455-2597
2.21	1.70	24-0455-2598
2.36	1.75	24-0455-2599
2.52	1.80	24-0455-2600
2.67	1.85	24-0455-2601
2.80	1.90	24-0455-2602
2.98	1.95	24-0455-2603
3.16	2.00	24-0455-2604
3.30	2.05	24-0455-2605
3.43	2.10	24-0455-2606
3.58	2.15	24-0455-2607
3.79	2.20	24-0455-2608
3.98	2.25	24-0455-2609
4.18	2.30	24-0455-2610
4.37	2.35	24-0455-2611
4.57	2.40	24-0455-2612
4.80	2.45	24-0455-2613
5.00	2.50	24-0455-2614
5.19	2.55	24-0455-2615
5.37	2.60	24-0455-2616
5.55	2.65	24-0455-2617
5.77	2.70	24-0455-2618
5.99	2.75	24-0455-2619

1) The table values are based on a pressure differential of 20 bar and a viscosity of 300 mm²/s.

Other differential pressures or viscosities result in slightly different delivery rates. These can be determined using the following charts for delivery rates and correction factors for the pressure.

The table values for nozzle diameters of 1.5 and above are valid without correction over the entire viscosity range from 150 to 600 mm²/s and pressure differentials of 20 to 150 bar.

6.6.8 PSG3 with flow controller for oil applications



Legend to Fig. 33

Technical data- see Chapter 4.3

Minimum mounting dimensions:

Fig. 26, Legend 26

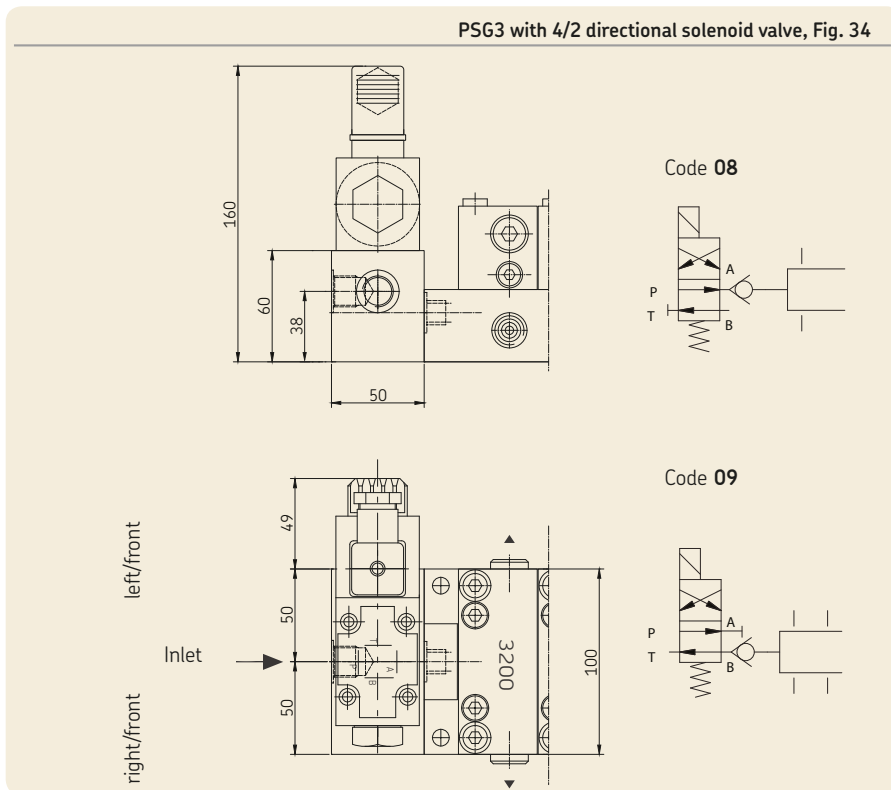
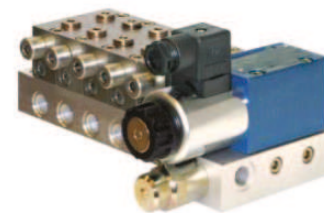
Feeder dimensions:

Basic design Fig. 27, Legend 27

Variants

Flow limiter variants
up to 0.6, 1.6, 2.5, 4.0, 6.0 l/min

6.6.9 PSG3 with 4/2 directional solenoid valve for oil applications

**PSG2 with 4/2 directional solenoid valve****Legend to Fig. 33**

Technical data- see Chapter 4.3

Minimum mounting dimensions:

Fig. 26, Legend 26

Feeder dimensions:

Basic design Fig. 27, Legend 27

6.7 PSG3 feeders for ATEX-compliant applications

PSG3 feeders for potentially explosive atmospheres according to ATEX Directive 2014/34/EU.

For PSG3 these are:

ATEX basic design

Order No.: **24-3730-3863-ATEX**

ATEX feeder with proximity switch

Order No.: **24-3730-3861-ATEX**

The inductive ATEX proximity switch may be operated in an ATEX area only with intrinsically safe electrical circuits certified for the categories and explosion groups [Ex ia] IIC or [Ex ib] IIC.

The sensor has a type examination certificate and is marked in accordance with the ATEX Directive.



The feeder may, with reference to EC Directive 97/23/EC concerning pressure equipment, only be used in accordance with its intended use and in conformity with the instructions provided in the documentation.



The following must be observed in this regard:

The product is neither designed nor approved for use in conjunction with fluids of Group 1 (Dangerous Fluids) as defined in Article 2, Para. 2 of Directive 67/548/EEC of June 27, 1967. The product is neither designed nor approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature. When used in conformity with their intended use, the products supplied by SKF Lubrication Systems Germany GmbH do not reach the limit values listed in Article 3, Para. 1, Clauses 1.1 to 1.3 and Para. 2 of Directive

97/23/EC. They are therefore not subject to the requirements of Annex 1 of the Directive. Consequently, they do not bear a CE marking in respect of Directive 97/23/EC. SKF Lubrication Systems Germany GmbH classifies them according to Article 3, Para. 3 of the Directive.

6.7.1 Information on PSG3 ATEX feeders

	 DANGER
	<p>Explosion hazard from non-ATEX-compliant attachments and monitoring equipment</p> <p>Only attachments and monitoring equipment approved by SKF for the PSG3 feeder may be installed on a PSG3ATEX feeder.</p>

	 DANGER
	<p>Excessive switching voltage hazard</p> <p>An isolating amplifier must be inserted if the sensor will be used in a potentially explosive atmosphere (ATEX). The maximum permissible voltage U_i must not be exceeded.</p>

	 DANGER
	<p>Hazard from incorrect tool or equipment</p> <p>Use only tools and clothing approved for use in potentially explosive atmospheres (ESD).</p>

NOTE

Observe the technical data (Chapter 4) as well as the data for ATEX feeders with/without attachments.

ATEX feeders of the PSG series, without attachments and monitoring units, differ from conventional PSG versions in that they also have a ground terminal attached. It is attached to the feeder baseplate and grounds leakage current that could possibly be triggered by the customer and pass to the

feeder. Volumes and the number of modules, however, are irrelevant for the ATEX assessment.

Attachments and monitoring equipment that are installed on the feeder and contain electrical components must possess ATEX certification.

Only attachments and monitoring equipment approved by SKF for the PSG3 feeder may be installed on a PSG ATEX feeder.

For PSG3 these are:

PSG3	24-3730-3863-ATEX
with proximity switch	24-3730-3861-ATEX

The installation of other ATEX-compliant attachments or monitoring equipment requires mandatory consultation with and approval from SKF Lubrication Systems Germany GmbH.

☞ See Figure 35

Only technical personnel may mount, connect, and put into operation the ATEX PSG feeders described here. The technical personnel must have detailed knowledge of the various types of protection and the rules and regulations for devices and equipment in potentially explosive atmospheres. The applicable national regulations and rules must be observed.

Assembly work can be performed only if it is ensured that no explosive atmosphere is present.

Before assembling/setting up the product, the packaging material and any shipping braces (e.g., plugs) must be removed.

Port dimensions, assembly holes, minimum mounting dimensions, and the assembly procedure are the same as for the PSG3 basic design and must be observed accordingly (Chapter 6.6). The same applies to the assembly procedure.

- Connect the grounding cable (provided by customer) to the ground terminal (1).

Tightening torques

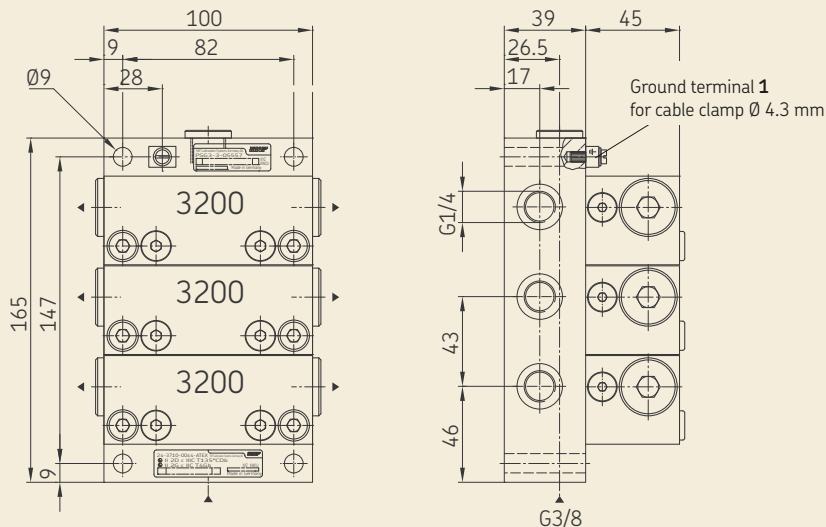
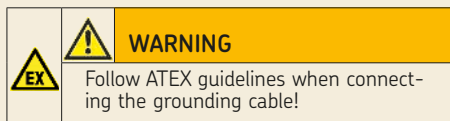
Item	Quantity Screws	Torque [Nm]
Baseplate	4	25
Module	2	23
Screw union		
-Inlet	1	45
-Outlet max.	20	35
Banjo bolt (crossporting)		20
Setscrew "G"		Approx. 8 1)

Specifications for screws of strength class 8.8, subject to the following installation instructions, base material: steel

1) Strength class to DIN EN ISO 898, Part 5

6.7.2 PSG3 ATEX basic design 24-3730-3863-ATEX

Connection of the ground terminal, Fig. 35



1) In case of attachments on moving machine parts or in case of strong vibrations (e.g., on pressing machines), the piston position of the feeder must not match the direction of movement of the machine part.

Technical data

ATEX basic design

General

Design	Hydraulically controlled
Mounting position	Any ¹⁾
Ambient temperature range	-15°C to +110°C
Baseplate with	6, 8, 10, 12, 14, 16, 18, 20 outlets

occupied outlets	
without bridges	3 to 20
with bridges	1 to 19

Material

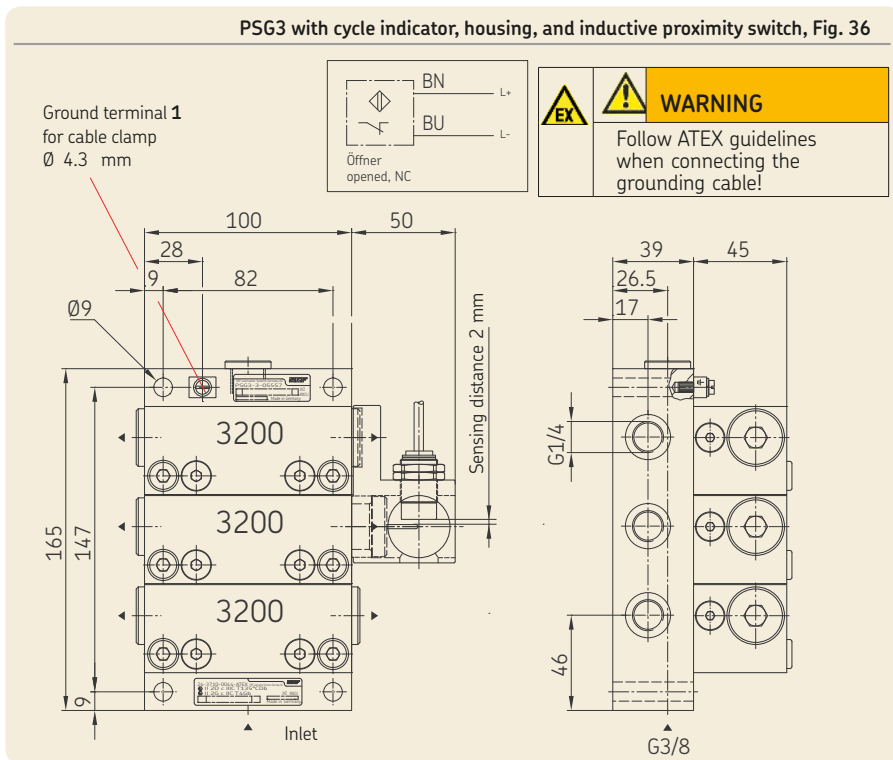
Baseplate	Al
Modules	Galvanized steel
Seals	FKM (FPM)

Hydraulic system

Operating pressure	
min.	5 to 15 bar
max.	200 bar
Inlet volumetric flow	Up to 6 l/min
Volume per cycle and outlet	2300 mm ³
Piston stroke rate	max. 200/min
Lubricant	Mineral oils, greases based on mineral oil, environmentally friendly and synthetic oils and greases
Operating viscosity	> 12 mm ² /s
Worked penetration	≥ 265 x 0.1 mm (up to NLGI Grade 2)

6.7.3 PSG3 ATEX feeder with plunger rod and inductive proximity switch 24-3730-3861-ATEX

PSG3 with cycle indicator, housing, and inductive proximity switch, Fig. 36



Technical data

Inductive proximity switch

Design NAMUR DIN EN 50227
 Connection To approved switching
 amplifiers with max. values
 $U=15$ V; $I=50$ mA; $P=120$ mW

Function NC contact
 System voltage 7.5 to 30 VDC

Power consumption
 Undamped > 2.1 mA
 Damped < 1 mA

Internal capacitance < 155 nF
 Internal inductance < 50 μ H
 Switching frequency 300 Hz
 Ambient temperature
 -20°C to +70°C

Protection class
 II 2G Ex ia IIC T6 Gb
 IP67 EN60947-5-6

Housing material
 Brass, white bronze
 coated
 Active area: PBT

Elect. connection
 PVC cable, 2 m long
 2×0.5 mm²

6.8 Installing a PSG modular feeder

See:

☞ PSG1 - See Chapter 6.2.1, Figure 1 and Chapter 6.2.2, Figure 2

☞ PSG2 - See Chapter 6.4.1, Figure 13 and Chapter 6.4.2, Figure 14

☞ PSG3 - See Chapter 6.6.1, Figure 26 and Chapter 6.6.2, Figure 27

- Check the parallelism of the surface on which the component is to be installed. Stress-free installation of the component must be ensured.
- Check for any fouling on the threaded holes for feeder installation and on the surface on which the component is to be installed, and clean if needed.

- Place the modular feeder on the mounting surface and fasten it finger-tight using four galvanized cylinder hexagon socket screws.

Cheese-head screws EN ISO 4762:

PSG1 = M6x30-8.8

PSG2 = M6x40-8.8

PSG3 = M8x50-8.8

- Align the modular feeder.
- Tighten cylinder hexagon socket screws diagonally using a torque of:
PSG1 = 9 Nm
PSG2 = 9 Nm
PSG3 = 25 Nm

If necessary:

Tighten the inlet screw union

- Apply the inlet screw union to the feeder inlet and tighten using a torque of:
PSG1 (G 1/8) = 9 Nm
PSG2 = (G 1/4) = 35 Nm
PSG3 = (G 3/8) = 45 Nm

Tighten the outlet port screws

- Apply outlet port screws to the feeder outlet and tighten using a torque of:
PSG1 (G 1/8) = 9 Nm
PSG2/PSG3 = (G 1/4) = 35 Nm

NOTE

Environmental pollution

Lubrication lines must always be free of leaks. Lubricants can contaminate soil and waterways. Lubricants must be properly used and disposed of. Observe the local regulations and laws regarding the disposal of lubricants.

6.9 Lubrication line connection

The lubrication lines must be connected to the feeder in such a way that no forces can be transferred to it once assembled (stress-free connection).

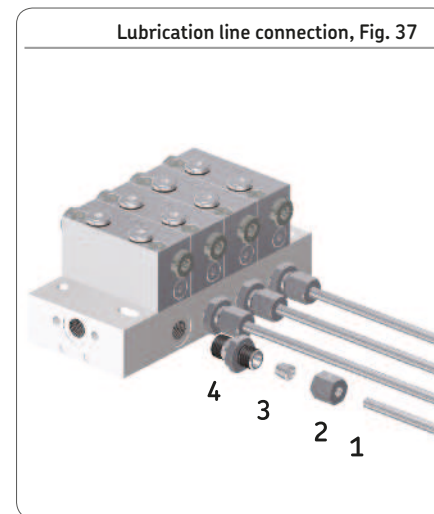
For higher operating pressures up to 250 bar, SKF cutting-sleeve screw unions conforming to DIN 2353 can be used. If using fittings from other manufacturers, pay careful attention to the assembly instructions and technical specifications provided by the manufacturer.

6.9.1 Assembly

☞ See Figure 37

- Deburr the connecting end of the lubrication line **(1)**.
- Loosen the union nut **(2)** and cutting sleeve **(3)** from the threaded socket **(4)**.
- Screw the threaded socket into the feeder outlet **(4)** and tighten.
- Insert the lubrication line **(1)** into the union nut **(2)** and cutting sleeve **(3)**.
- Insert the lubrication line **(1)**, union nut **(2)**, and cutting sleeve **(3)** into the threaded socket **(4)**.
- Apply the union nut **(2)** to the thread of the threaded socket **(4)** and gently tighten the union nut **(2)** by hand.
- Tighten the union nut **(2)** with an open-end wrench.

- see Chapter 6.8 for tightening torques.



6.9.2 Lubrication line arrangement

To ensure that the entire centralized lubrication system functions smoothly, observe the following instructions when arranging the lubrication lines:

The main lubricant line must be dimensioned in accordance with the maximum operating pressure occurring in the annular gear unit used and the displacement of that gear unit. If possible, the main lubricant line should rise upward from the gear pump unit and be ventable at the highest point on the lubrication line system.

Lubricant feeders at the end of the main lubricant line must be installed such that the outlets of the lubricant feeders point upwards. If the system configuration requires that the lubricant feeders be arranged below the main lubricant line, they should not be placed at the end of the main lubricant line.

The tubes, hoses, shutoff valves, directional control valves, fittings, etc. that will be used

must be designed for the maximum operating pressure of the annular gear unit, the permissible temperatures, and the lubricants that will be delivered. The lubrication line system also needs to be protected from excessive pressure by means of a pressure-limiting valve.

All components of the lubrication line system such as tubes, hoses, shutoff valves, directional control valves, fittings, etc. must be carefully cleaned before assembly. No seals in the lubrication line system should protrude inwards in a way that disrupts the flow of the lubricant and could allow contaminants to enter the lubrication line system.

Lubrication lines should always be arranged so that air pockets cannot form anywhere. Avoid changes in the cross-section of the lubrication line from small to large cross-sections in the direction of flow of the lubri-

cant. When the cross-section does change, the transition should be gentle.

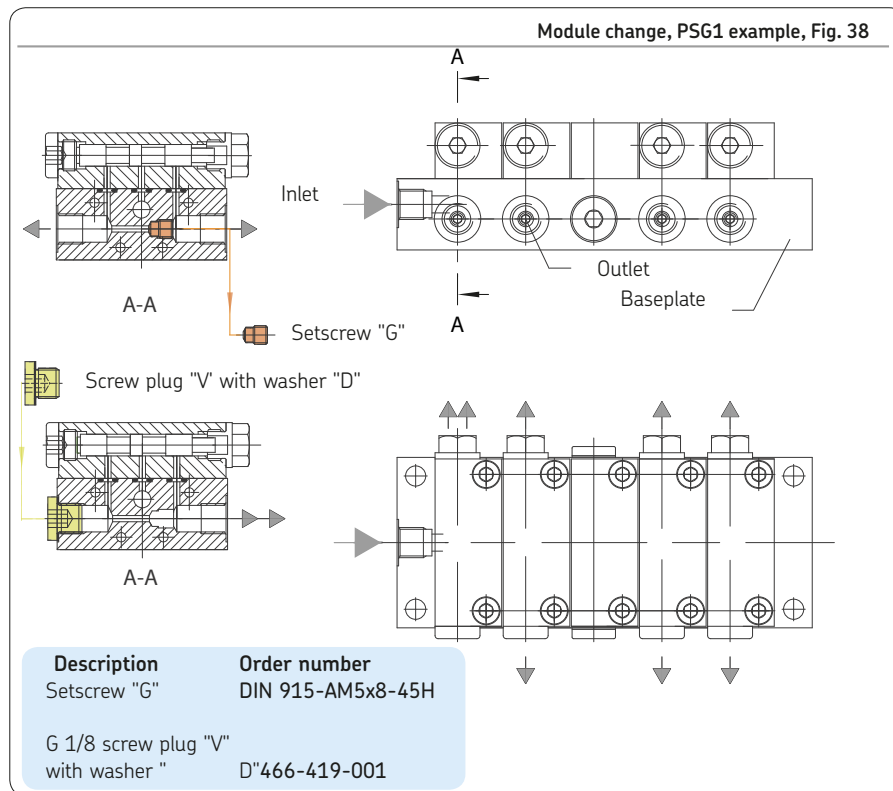
The flow of lubricant in the lubrication lines should not be hindered by the installation of sharp bends, angle valves, or flap valves. Unavoidable changes in the cross-section in lubrication lines must have smooth transitions. Sudden changes of direction should be avoided if possible.

6.10 Consolidation of outlets

☞ See Figure 38

The volumetric flow of an outlet can be doubled by internal consolidation of two opposite outlets. To do this, the setscrew **G** in the baseplate (the left outlet as seen from the feeder inlet) must be removed. The outlet in the baseplate that is no longer needed is to be closed using a washer **D** and a screw plug **V**.

- If fitted, loosen and remove the right and left outlet screw unions (from the consolidating module).
- Insert a hexagon socket screw key (WAF 2.5) into the left outlet hole.
- Unscrew and remove setscrew **G** and place it aside.
- Screw the screw plug **V** with washer **D** into the desired outlet hole.
- If fitted, screw in the right or left outlet screw union.



6.11 Changing a PSG module

☞ See Figure 39

NOTE

For the purpose of self-venting, the smallest module (PSG1 = 50 mm³/stroke, PSG2 = 60 mm³/stroke, PSG3 = 800 mm³/stroke) should not be installed in the first position (as viewed from the inlet).

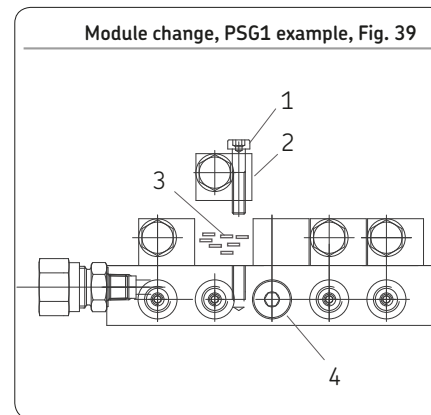
- Loosen and remove both cylinder hexagon socket screws **(1)** DIN6912
PSG1 = M5x25-8.8
PSG2 = M6x40-8.8 DIN 912
PSG3 = M8x50-8.8 DIN912
of the module being replaced **(2)**.
- Carefully detach the old module with O-rings **(3)** from the baseplate and place it aside.

- Lightly coat new O-rings **(3)** (7x) with oil, then carefully insert them in the baseplate.
- ☞ Prior to beginning installation of the new module, ensure that the O-rings are each properly seated in their grooves.
- Carefully place the new module **(2)** on the baseplate **(4)**.
- Insert both cylinder hexagon socket screws **(1)** into the module **(2)** and align the module.
- Tighten both cylinder hexagon socket screws **(1)** of the new module using a tightening torque of:

PSG1 = 6 Nm


PSG2 = 10 Nm

PSG3 = 23 Nm



6.12 Converting the cycle indicator (ZY) (PSG1/PSG2)

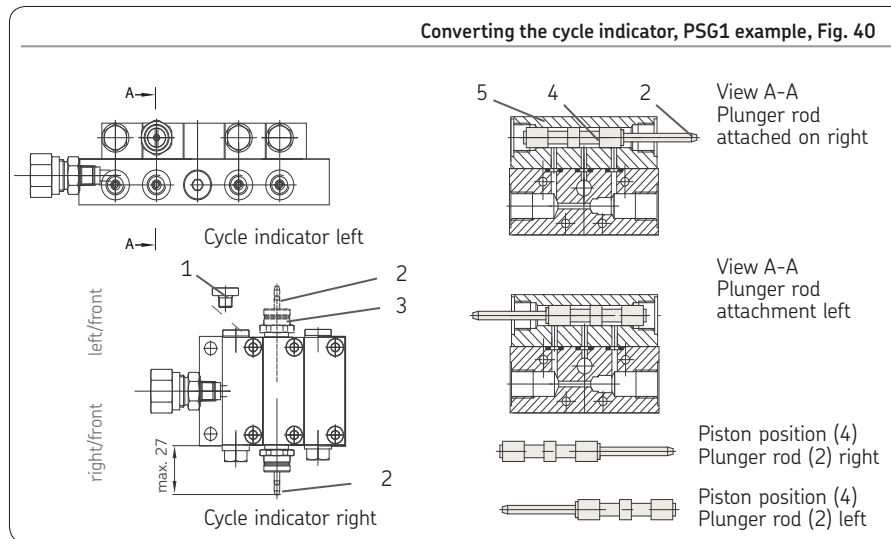
☞ See Figure 40

 WARNING	<p>System pressure</p> <p>Pressure must not be applied to the feeder module during the retrofitting described below. Conversion should therefore be performed before mounting the feeder module on the baseplate.</p>
--	--

- Unscrew and remove the screw plug (1) (left).
- Press the plunger rod (2) for visual stroke monitoring (right) into the plunger rod housing (3) (using your finger).
- Carefully remove the piston (4) with plunger rod (2) from the left side of the module housing (5).
- Loosen and remove the plunger rod housing (hexagon head bolt WAF17) (3) and install it on the left side (tightening torque 20 Nm).



- ☞ During subsequent insertion of the piston, (4) and plunger rod (2) afterwards, keep them straight so that the O-rings are not torn off!
- Rotate the piston (4) (with plunger rod (2)) by 180° and carefully insert it into the right side of the module housing (5).

- Carefully insert the plunger rod (2) into the plunger rod housing (3).
- Install the screw plug (1) on the right side.



6.13 Converting the piston detector (P3) (PSG1/PSG2)

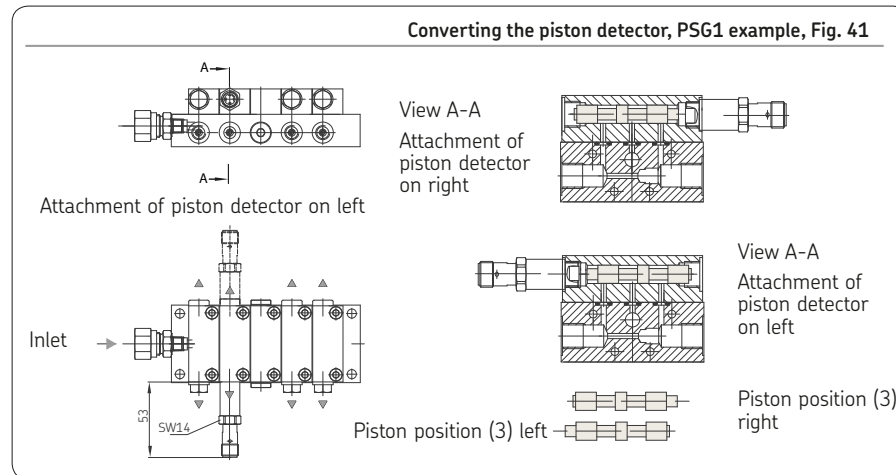
☞ See Figure 41

	WARNING
	<p>System pressure The product described here is pressurized during operation. Depressurize the product before starting any assembly, maintenance, or repair work.</p>

- Loosen and remove screw plug **(1)** (left) (with hexagon socket screw key WAF 5).
- Loosen and remove piston detector **(2)** (right) (WAF 14).
- Carefully push piston **(3)** out of the left side of the module housing **(4)** using an arbor (\varnothing 6 mm).

☞ During subsequent insertion of the piston **(3)**, ensure that it does not bend and that the O-ring is not sheared off.

- Turn piston **(3)** 180° and carefully insert into the right side of the module housing **(4)**.
- Install the screw plug **(1)** on the right side.



6.14 Attachment of bridges (crossporting)

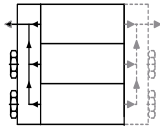
☞ See Figures 42 to 44

☞ The technical data for each bridge can be found in Chapter 11, Table 7.


- If fitted, unscrew and remove outlet screw unions on the right (right bridge mounting) or left (left bridge mounting).
- Using banjo bolts, attach the bridge to the relevant feeder outlets and screw on by hand.
- Align the bridge to the feeder.
- Tighten the banjo bolts using a tightening torque of 9 Nm.
- Perform a leak test.

PSG1 crossporting, Fig. 42

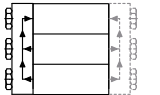
3-bridge, with one outlet, with check valve, (G1/8)
Order No.
 Tube Ø 4 mm
24-2151-3763
 Tube Ø 6 mm
24-2151-3765



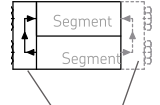
2-bridge, with one outlet, with check valve, (G1/8)
order No.
 Tube Ø 4 mm
24-2151-3762
 Tube Ø 6 mm
24-2151-3764



3-bridge, without outlet, (G1/8)
Order No.
24-2151-3761



2-bridge, without outlet, (G1/8)
Order No.
24-2151-3760



Crossporting, mounting position left or right

PSG2 crossporting, Fig. 43

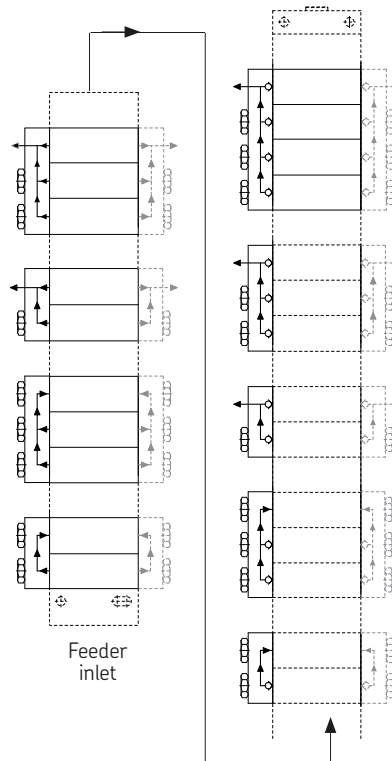
Description
3-bridge, with one outlet
order No.
G 1/4" 24-2151-3733

Description
2-bridge, with one outlet
order No.
G 1/4" 24-2151-3732

Description
3-bridge, without outlet
order No.
G 1/4" 24-2151-3731

Description
2-bridge, without outlet
order No.
G 1/4" 24-2151-3730

Bridge, installation position left
or
Bridge, installation position right



Description
4-bridge, with one outlet,
with check valves
order No.
G 1/4" 24-2151-3739
UNF 24-2151-3754

Description
3-bridge, with one outlet,
with check valves
order No.
G 1/4" 24-2151-3395
UNF 24-2151-3755

Description
2-bridge, with one outlet,
with check valves
order No.
G 1/4" 24-2151-3394
UNF 24-2151-3752

Description
3-bridge, without outlet,
with check valves
order No.
G 1/4" 24-2151-3397
UNF 24-2151-3751

Description
2-bridge, without outlet,
with check valve
order No.
G 1/4" 24-2151-3390
UNF 24-2151-3750

PSG3 crossporting, Fig. 44

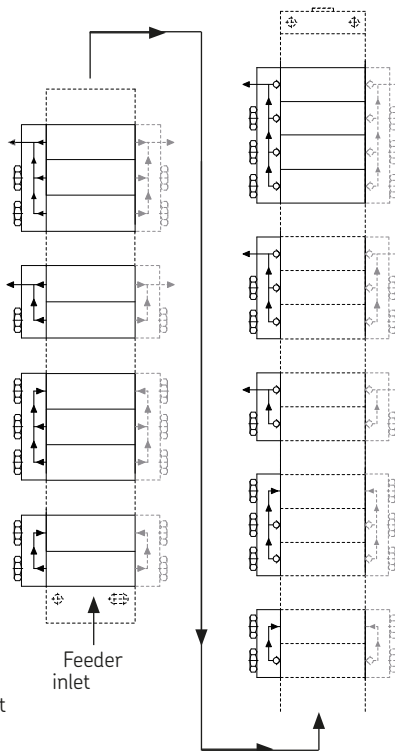
Description
3-bridge, with one outlet
order No.
G 1/4" 24-2151-3737

Description
2-bridge, with one outlet
order No.
G 1/4" 24-2151-3736

Description
3-bridge, without outlet
order No.
G 1/4" 24-2151-3735

Description
2-bridge, without outlet
order No.
G 1/4" 24-2151-3734

or
Bridge, installation position left
or
Bridge, installation position right



Description
4-bridge, with one outlet,
with check valves
order No.
on request

Description
3-bridge, with one outlet,
with check valves
order No.
G 1/4" 24-2151-3338
UNF 24-2151-4143

Description
2-bridge, with one outlet,
with check valves
order No.
G 1/4" 24-2151-3396
UNF 24-2151-3753

Description
3-bridge, without outlet,
with check valves
order No.
G 1/4" 24-2151-3393
UNF 24-2151-4142

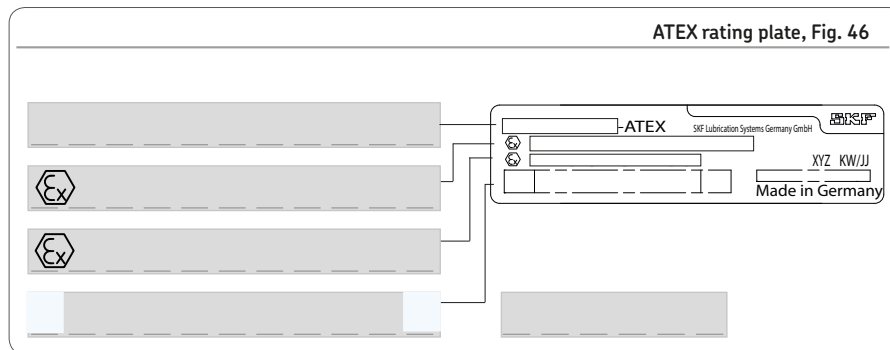
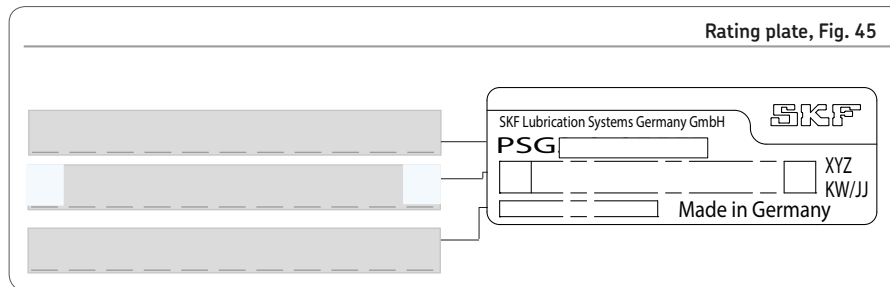
Description
2-bridge, without outlet,
with check valve
order No.
G 1/4" 24-2151-3392
UNF 24-2151-4141

6.15 Note on the rating plate

The rating plate provides important data such as the type designation, order number, barcode, and serial number.

To avoid loss of this data in case the rating plate becomes illegible, these characteristics should be entered in the following table.

- Enter key data from rating plate in the following table.



7. Commissioning

NOTE

Observe the instructions from the machine manufacturer regarding the lubricants that are to be used.

NOTE

Only fill using clean lubricant and an appropriate device. Contaminated lubricants lead to system malfunctions. The lubricant reservoir must be filled without introducing bubbles.

7.1 General information

The progressive feeders described here function automatically. The progressive feeder(s) and the lubricant transport in the lubrication lines should, however, be subjected to regular visual inspection.

7.2 Commissioning

PSG feeders are delivered in an operational state and can be used immediately following proper installation.

Ensure that the feeders and their connections are properly sealed.

The progressive system must be vented before commissioning.

☞ The lubricant may only be fed without bubbles. Air pockets in the lubricant adversely affect the function of the device and impair the reliability of lubricant delivery, which can result in damage to the bearings requiring lubrication.

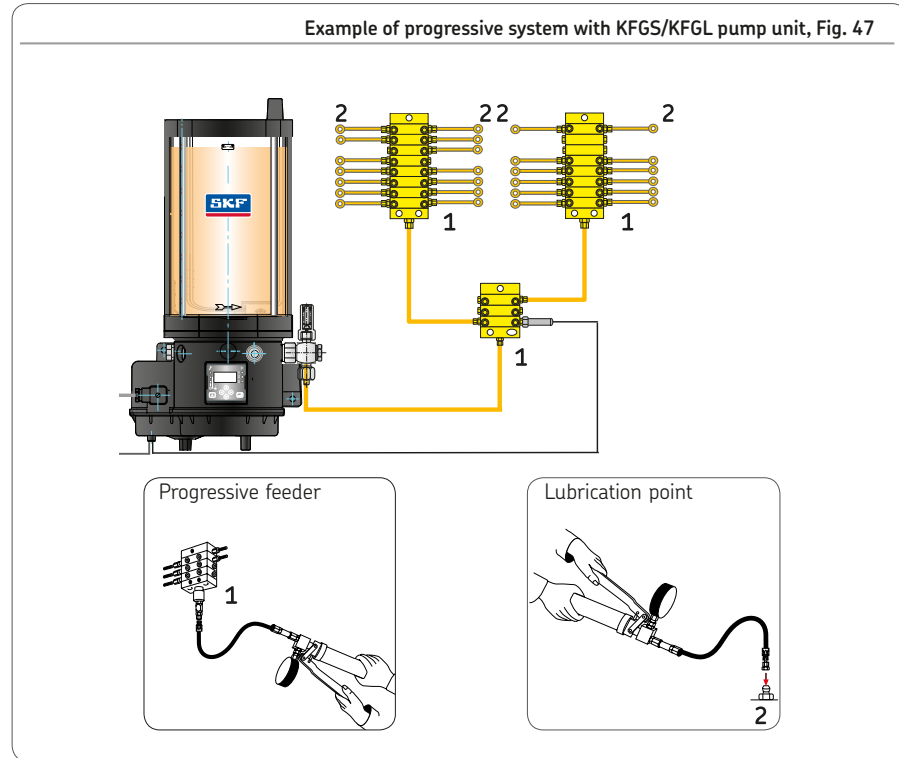
7.2.1 Venting a grease progressive system

-See Figure 47

The progressive feeders are subjected to functional monitoring using oil at the factory. It is possible that oil will discharge from the feeder at the start of commissioning. The venting process starts at the master feeder and proceeds to the secondary feeders, and from there to the lubrication points.

- Connect the hand lever grease gun or lubricating device to the feeder inlet **(1)** or, if present, to the emergency lubricant nipple attached to the feeder.
- Actuate the hand lever grease gun or lubricating device until bubble-free lubricant discharges at all feeder outlets.
- Use a hand lever grease gun or lubricating device to perform a flow check on or fill all lubrication points **(2)** that will be connected.

- Completely fill lubrication lines with grease and connect to the feeder outlets.
- Actuate the grease lubrication pump, hand lever grease gun, or lubricating device until bubble-free lubricant discharges at the ends of the lubrication lines.



7.2.2 Venting an oil progressive system

-See Figure 48

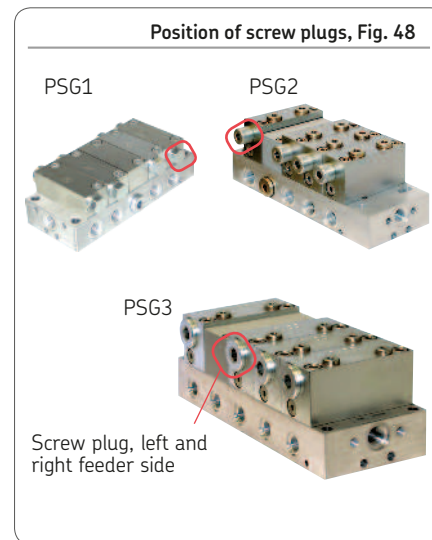
A requirement for venting an oil progressive system is that the system has already been fully assembled.

- Slightly loosen the main lubrication line on the hand pump or pump unit, actuate the pump/pump unit until bubble-free oil discharges at the main lubrication line.
- Retighten the main lubrication line at the pump.
- Slightly loosen the main lubrication line on the master feeder, actuate the pump/pump unit until bubble-free oil discharges at the main lubrication line/feeder.
- Retighten the main lubrication line at the master feeder.
- Slightly loosen the main lubrication lines of the master feeder at the outlets, actuate the pump/pump unit until bubble-free oil discharges at the outlets.
- Retighten the lubrication line at the master feeder.

- Repeat venting at the secondary lubrication lines, secondary feeder, and lubrication lines.

An additional venting as described below is necessary if problems occur while venting the feeders (air still in the feeder, too little lubricant discharge).

- Slightly loosen the right and left screw plugs at the last feeder module as viewed from the feeder outlet (do not unscrew!).
- Actuate the pump/pump unit until bubble-free oil discharges at the screw plugs.
- Retighten the left and right screw plugs.



8. Operation/decommissioning and disposal

8.1 Temporary shutdown

The modular feeder(s) can be temporarily shut down only by shutting down the progressive system in which the feeder(s) is (are) installed.

Be sure to follow the safety instructions in Chapter 1 and those of the progressive system in which the feeder(s) is (are) installed.

If the feeder(s) is (are) to be shut down for an extended period of time, follow the instructions in Chapter 3, "Transport, delivery, and storage" in this manual, especially the section on long-term corrosion protection.


8.2 Recommissioning

When recommissioning the machine/system after a long period of downtime with the PSG feeder removed, proceed as follows:

- Before installing a PSG feeder, anti-corrosion agents must be cleaned from bare metal surfaces, especially assembly surfaces.
- Perform installation of a PSG feeder in accordance with Chapter 6.8.

8.3 Decommissioning and disposal

If the product will be permanently shut down, the local regulations and laws regarding the disposal of contaminated equipment must be observed.

	NOTE
	<p>Environmental pollution</p> <p>Lubricants can contaminate soil and waterways. Lubricants must be properly used and disposed of. Observe the local regulations and laws regarding the disposal of lubricants.</p>

The product can also be returned to SKF Lubrication Systems Germany GmbH for disposal, in which case the customer is responsible for reimbursing the costs incurred.



The parts are recyclable.

9. Maintenance

9.1 General information

SKF progressive feeders are maintenance-free. All connections and fittings must be regularly inspected for proper seating to ensure proper function. If necessary, the product can be cleaned using mild cleaning agents that are compatible with the product's materials (non-alkaline, non-soap). Do not allow any cleaning agent to enter the interior of the product during cleaning. It is normally not necessary to clean the interior of the product.

The interior of the product must be cleaned if incorrect or contaminated lubricant is accidentally filled into the product. Contact the SKF Service department if this occurs.

	WARNING	
		<p>System pressure</p> <p>The product described here is pressurized during operation. Depressurize the product before starting any assembly, maintenance, or repair work.</p>

NOTE
Dismantling of the product or individual parts thereof within the statutory warranty period is prohibited and voids any claims.

NOTE
Only original SKF spare parts may be used. Unauthorized alterations to products and the use of non-original spare parts and accessories are prohibited and nullify the statutory warranty.

NOTE
Use only clean lubricant. The purity of the lubricants used is the decisive factor in the service life of the progressive feeder and the lubricated machinery elements.

SKF shall not be held liable for damages resulting from improperly performed assembly, maintenance, or repair work on the product.

10. Malfunctions, causes, and remedies


The following tables provide an overview of possible malfunctions and their causes. Contact the SKF Service department if you cannot remedy the malfunction.

NOTE

Dismantling of the progressive feeder is prohibited and voids any claims. Defective progressive feeders must be replaced. Only SKF Service is capable of repairing them.

NOTE

Only original SKF spare parts may be used. Unauthorized alterations to products and the use of non-original spare parts and accessories are prohibited.

	WARNING
	<p>System pressure Lubrication systems are pressurized during operation. Lubrication systems must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.</p>

NOTE

Outlets of a progressive feeder that are not needed must not be closed because this will cause the feeder to jam. Consolidate unneeded outlets with a neighboring outlet or connect them to the pump via the return line.

10.1 Prior to beginning troubleshooting

The only condition that can cause a properly configured progressive feeder to jam/clog is the entry of contaminants into the lubricant lines or an insufficient quantity of lubricant. Preventing contaminants from entering during work or when refilling the lubricant reservoir first and foremost requires a clean work environment.

The progressive feeder outlet is typically equipped with a screw union with check valve. Do not replace this with another connector because this may cause problems in the progressive feeder's operation. Each outlet of the progressive feeder can supply each bearing/each secondary feeder with a different, precalculated quantity of grease. Therefore, the position of each lubricant line to the progressive feeder outlet should be noted prior to starting work.

10.2 Feeder and system malfunctions

Malfunctions table

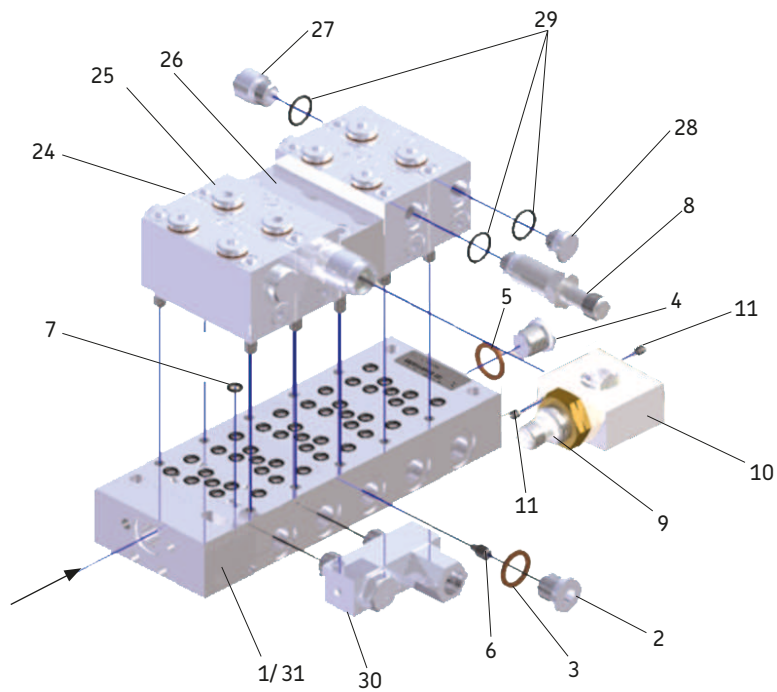
Malfunction	Cause	Remedy
No Lubricant supply	o Insufficient system pressure at feeder inlet	<ul style="list-style-type: none"> • Check the system pressure at the feeder inlet, increase system pressure if necessary
	o Feeder blockage o Contamination	<ul style="list-style-type: none"> • Trigger interim lubrication and release the outlet screw unions in order as seen from the feeder inlet. The feeder is working correctly if lubricant can be clearly seen discharging from all outlets. <p>On the feeder:</p> <ul style="list-style-type: none"> • If enough lubricant is discharged: <ul style="list-style-type: none"> • Check downstream lubrication lines for clogging, pinching, hardened grease, or twisting of the bearing shell. • If not enough lubricant is discharged: <ul style="list-style-type: none"> • Check the feed rate. • If no lubricant is discharged: <ul style="list-style-type: none"> • Switch off the progressive system and relieve pressure. Then loosen and remove both screw plugs on the left and right of the feeder module in order as seen from the feeder inlet. Use a suitable arbor to check that the feeder piston runs smoothly. If the feeder piston moves smoothly, reinstall both screw plugs and then perform the same procedure on the next module. <p><i>(Continued on the next page)</i></p>

Malfunction	Cause	Remedy
		<ul style="list-style-type: none"> • If the feeder piston moves sluggishly, replace the corresponding module (see Chapter 6.11).
No lubricant at the lubrication points	o Defective or blocked feed line	<ul style="list-style-type: none"> • Detach feed line, identify cause of blockage, replace feed line if necessary.
Lubricant discharge is too low	o Air cushion in master feeder or secondary feeder	<ul style="list-style-type: none"> • Perform venting on the affected feeder. <ul style="list-style-type: none"> • Grease progressive system - see Chapter 7.2.1 • Oil progress system - see Chapter 7.2.2
No lubricant at lubrication points	o Damaged lubricant line, detectable only by visual inspection and significant lubricant discharge. o Pinching and sharp bends are blocking the grease flow	<ul style="list-style-type: none"> • Replace the lubricant line • For grease progressive systems, use only original SKF replacement lines that have already been filled. Perform commissioning and functional inspection. • Perform visual inspection for mechanical damage, correct if necessary.
	o Lubricant supply is too low	<ul style="list-style-type: none"> • Check grease supply in the lubricant reservoir, refill if necessary. • Commissioning, functional inspection • Trigger interim lubrication.

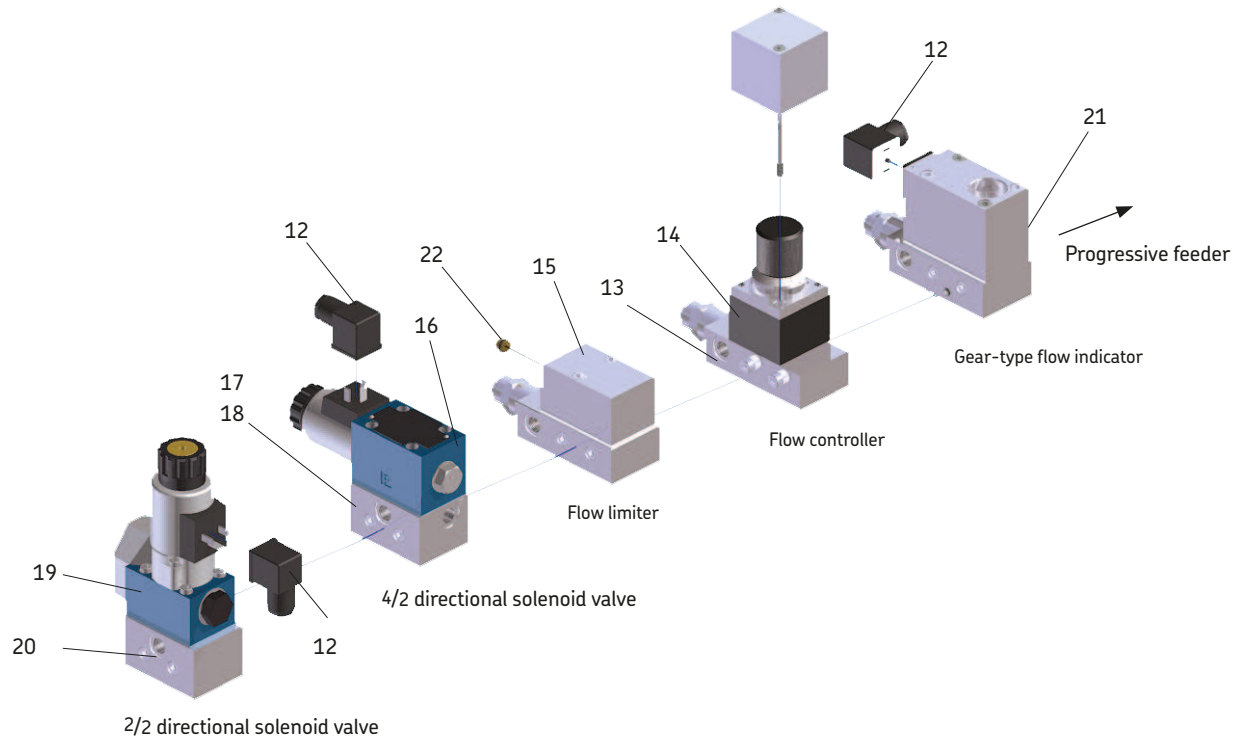
Malfunction	Cause	Remedy
No lubricant at lubrication points	<ul style="list-style-type: none"> o Defective lubrication point o Defective bearing o Bearing bush twisted 	<ul style="list-style-type: none"> • Check bearing for mechanical damage or contamination. • Check bearing for proper function (move the machine and check for bearing noise). • Use a high-pressure grease gun to make the bearing move freely. • If this is not possible, the bearing must be repaired or replaced by technical personnel. • Install all lines and screw unions that were removed during troubleshooting. • Perform commissioning and functional inspection.
System malfunction	<ul style="list-style-type: none"> o Piston detector on master feeder has indicated that the system is not working. 	<ul style="list-style-type: none"> • Loosen both lubrication lines on the last metering section of the master feeder, switch on the lubrication system, and check whether lubricant discharges without bubbles. If lubricant discharges without bubbles, tighten both lubrication lines and repeat the procedure on all secondary feeders, starting from the closest feeder. Vent the possibly defective feeder again; replace in the event of reoccurrence. • If all feeders function properly, check the electrical connection of the piston detector and the piston detector itself for proper function.
No pressure build up in the main line	<ul style="list-style-type: none"> o Pressure relief valve does not close o Unsuitable lubricant (see technical data) o Fill level too low 	<ul style="list-style-type: none"> • Clean or replace pressure relief valve. • Only use original SKF spare parts. • Remove lubricant from entire system and dispose of lubricant in the proper manner; fill system with suitable lubricant. • Top up lubricant.
	<ul style="list-style-type: none"> o Pump element is defective 	<ul style="list-style-type: none"> • Inspect pump element and replace if necessary

11. Spare parts

Progressive feeder spare parts, Fig. 49



Attachment spare parts, Fig. 50



Spare parts table 1

Baseplate		PSG1			PSG2		PSG3			
ItemDescription	Number of modules	Inlet Outlet	order No.	Inlet Outlet	order No.	Corrosion-resistant ¹⁾ order No.	Inlet Outlet	order No.	Corrosion-resistant ¹⁾ order No.	
1 Baseplate complete	3	G ^{1/8} G ^{1/8}	24-0714-3400	G ^{1/4} G ^{1/4}	24-0714-3300	24-0714-3320	G ^{3/8} G ^{1/4}	24-0714-3310	24-0714-3330	
	4		24-0714-3401		24-0714-3301	24-0714-3321		24-0714-3311	24-0714-3331	
	5		24-0714-3402		24-0714-3302	24-0714-3322		24-0714-3312	24-0714-3332	
	6		24-0714-3403		24-0714-3303	24-0714-3323		24-0714-3313	24-0714-3333	
	7		24-0714-3404		24-0714-3304	24-0714-3324		24-0714-3314	24-0714-3334	
	8		24-0714-3405		24-0714-3305	24-0714-3325		24-0714-3315	24-0714-3335	
	9		24-0714-3406		24-0714-3306	24-0714-3326		24-0714-3316	24-0714-3336	
	10		24-0714-3407		24-0714-3307	24-0714-3327		24-0714-3317	24-0714-3337	
	2 Screw plug for baseplate outlet				466-419-001 (incl. washer)	DIN908-R1-4-5.8		99-0014-0908	DIN908-R1-4-5.8	99-0014-0908
	3 Washer for screw plug item 2				–	508-108		99-1423-7603	508-108	99-1423-7603
4 Screw plug for measurement connector		–	DIN908-R1-4-5.8	99-0014-0908	DIN908-G3-8A-5.8	44-821-2917				
5 Washer for screw plug item 4		–	508-108	99-1423-7603	DIN7603-A17×21-CU	99-1823-7603				
6 Setscrew for feeder baseplate		DIN915-AM5×8-45H	95-0610-0915	95-0610-0915	95-0810-0915	95-0810-0915				
7 O-ring on baseplate		WVN532-3.5×1.5 (7 pieces/module)	WVN532-3.5×1.5	(9 pieces/module)	96-9026-0062	(9 pieces/module)				

1) Baseplate anodized aluminum, metering modules chemically nickel-plated.

Spare parts table 2

Item	Metering module Description	PSG1		PSG2			PSG3			
		Volumetric flow per cycle and outlet [mm ³]	order No.	Volumetric flow per cycle and outlet [mm ³]	order No.	Corrosion-resistant ¹⁾ order No.	Volumetric flow per cycle and outlet [mm ³]	order No.	Corrosion-resistant ¹⁾ order No.	
24	Feeder module (metering module) complete prepared for piston detector installation	50	24-2151-4590	60	24-2151-4500	24-2151-4260	800	24-2151-4240	24-2151-4274	
		100	24-2151-4591	120	24-2151-4501	24-2151-4261	1200	24-2151-4244	24-2151-4278	
		150	24-2151-4592	240	24-2151-4502	24-2151-4262	1600	24-2151-4241	24-2151-4275	
		200	24-2151-4593	360	24-2151-4503	24-2151-4263	2400	24-2151-4242	24-2151-4276	
		250	24-2151-4594	480	24-2151-4504	24-2151-4264	3200	24-2151-4243	24-2151-4277	
				600	24-2151-4505	24-2151-4265				
				720	24-2151-4506	24-2151-4310				
				840	24-2151-4507	24-2151-4311				
25	Feeder module (metering module) complete with plunger rod on right ²⁾ (attach from the second to second-to-last module)	200	24-2151-4664	120	24-2151-4230	-	800	24-2151-4250	-	
		250	24-2151-4665	240	24-2151-4231	-	1200	24-2151-4258	-	
				360	24-2151-4232	-	1600	24-2151-4251	-	
				480	24-2151-4233	-	2400	24-2151-4252	-	
				600	24-2151-4234	-	3200	24-2151-4253	-	
				720	24-2151-4300	-				
				840	24-2151-4301	-				
26	Complete dummy module without screw plug for baseplate		24-2151-4595		24-2151-4210	24-2151-4266		24-2151-4211	24-2151-4212	
27	Piston stop screw, pin side		VPKM.18		44-1855-2144	44-1821-2913		44-1855-2106	44-1855-2108	
28	Piston stop screw, opposite pin side		VPJ.14		44-1855-2143	44-1821-2913		44-1855-2106	44-1855-2108	
29	Washer for item 27, 28, 8		96-9120-0062		WVN532-12×1.5	-		44-0411-2046 (only for item 8)	44-0411-2046 (only for item 8)	

¹⁾ Baseplate anodized aluminum, metering modules chemically nickel-plated.

²⁾ Feeder module (metering module) with cycle indicator is supplied in the "plunger rod right" design.

Spare parts table 3

Monitoring

Item Description	PSG1 order No.	PSG2 order No.	PSG3 order No.
8 Piston detector (associated washer item 29)	177-300-095	177-300-094	24-1884-2469
9 Proximity switch	24-1884-2597	24-1884-2316	24-1884-2316
10 Proximity switch housing	VPKM.13	44-0711-2592	44-0711-2593
11 Setscrew for housing	DIN914-M4×6-45H (2 pieces/holder)	-	-

Attachments

12	Cable socket for solenoid valves	179-990-033	179-990-033
13	Baseplate	24-1883-2228	24-1883-2238
14	Flow controller up to 0.6 l/min	24-1883-2211	24-1883-2211
14	Flow controller up to 1.6 l/min	24-1883-2201	24-1883-2201
14	Flow controller up to 2.5 l/min	24-1883-2024	24-1883-2024
14	Flow controller up to 4.0 l/min	-	24-1883-2025
14	Flow controller up to 6.0 l/min	-	24-1883-2083
15	Flow limiter with baseplate G1/4	24-1883-2220	-
15	Flow limiter with baseplate G3/8	-	24-1883-2230
16	4/2 directional solenoid valve, normally open P-A, 24 V DC (NO)	24-1254-2396	24-1883-2233
17	Assoc. housing	24-1883-2223	24-1883-2223
16	4/2 directional solenoid valve, normally closed P-B, 24 V DC (NC)	24-1254-2396	24-1254-2396
18	Assoc. housing	24-1883-2222	24-1883-2222
19	2/2 directional solenoid valve	24-1254-2500	-
20	Assoc. housing	24-1883-2241	-
21	Gear-type flow indicator with baseplate	24-1883-2224	24-1883-2232

Spare parts table 4 (1 of 2)

Plug-in nozzles for flow limiters

Item	Nominal volumetric	Nozzle		PSG2/PSG3	Nominal volumetric	Nozzle		PSG2/PSG3
	flow ¹⁾ [l/min]	index	Nozzle ø [mm]	Plug-in nozzle order No.	current [l/min]	index	Nozzle ø [mm]	Plug-in nozzle order No.
22	0.08	050	0.50	24-0455-2574	1.67	150	1.50	24-0455-2594
	0.12	055	0.55	24-0455-2575	1.79	155	1.55	24-0455-2595
	0.15	060	0.60	24-0455-2576	1.92	160	1.60	24-0455-2596
	0.21	065	0.65	24-0455-2577	2.07	165	1.65	24-0455-2597
	0.25	070	0.70	24-0455-2578	2.21	170	1.70	24-0455-2598
	0.29	075	0.75	24-0455-2579	2.36	175	1.75	24-0455-2599
	0.35	080	0.80	24-0455-2580	2.52	180	1.80	24-0455-2600
	0.41	085	0.85	24-0455-2581	2.67	185	1.85	24-0455-2601
	0.47	090	0.90	24-0455-2582	2.80	190	1.90	24-0455-2602
	0.56	095	0.95	24-0455-2583	2.98	195	1.95	24-0455-2603
	0.65	100	1.00	24-0455-2584	3.16	200	2.00	24-0455-2604
	0.73	105	1.05	24-0455-2585	3.30	205	2.05	24-0455-2605
	0.79	110	1.10	24-0455-2586	3.43	210	2.10	24-0455-2606
	0.88	115	1.15	24-0455-2587	3.58	215	2.15	24-0455-2607
	0.98	120	1.20	24-0455-2588	3.79	220	2.20	24-0455-2608
	1.09	125	1.25	24-0455-2589	3.98	225	2.25	24-0455-2609
	1.18	130	1.30	24-0455-2590	4.18	230	2.30	24-0455-2610
	1.30	135	1.35	24-0455-2591	4.37	235	2.35	24-0455-2611
	1.43	140	1.40	24-0455-2592	4.57	240	2.40	24-0455-2612
	1.56	145	1.45	24-0455-2593	4.80	245	2.45	24-0455-2613

1) At an operating viscosity of 300 mm²/s and 20 pressure differential

Spare parts table 4 (2 of 2)

Plug-in nozzles for flow limiters

Item	Nominal volumetric flow ¹⁾ [l/min]	Nozzle index	Nozzle ø [mm]	PSG2/PSG3 Plug-in nozzle order No.
5.00		250	2.50	24-0455-2614
5.19		255	2.55	24-0455-2615
5.37		260	2.60	24-0455-2616
5.55		265	2.65	24-0455-2617
5.77		270	2.70	24-0455-2618
5.99		275	2.75	24-0455-2619
6.22		280	2.80	24-0455-2620

1) At an operating viscosity of 300 mm²/s and 20 pressure differential

Spare parts table 5

Inlet screw union

Item	Description	PSG1		PSG2		PSG3	
		Inlet	order No.	Inlet	order No.	Inlet	order No.
23	Pipe ø6 mm	G ¹ / ₈	406-403W	G ¹ / ₄	96-0204-0058-E0	G ³ / ₈	–
	Pipe ø8 mm	G ¹ / ₈	408-423W	G ¹ / ₄	96-0208-0058-E0	G ³ / ₈	96-0209-0058-E0
	Pipe ø10 mm	G ¹ / ₈	410-443W	G ¹ / ₄	96-0210-0058-E0	G ³ / ₈	96-0211-0058-E0
	Pipe ø12 mm	G ¹ / ₈	–	G ¹ / ₄	96-0213-0058-E0	G ³ / ₈	96-0212-0058-E0
	Pipe ø15 mm	G ¹ / ₈	–	G ¹ / ₄	–	G ³ / ₈	96-0217-0058-E0
	Pipe ø16 mm	G ¹ / ₈	–	G ¹ / ₄	–	G ³ / ₈	96-1117-0058-E0

Outlet port screw

Item	Description	PSG1		PSG2		PSG3	
		Outlet	order No.	Outlet	order No.	Outlet	order No.
31	Pipe ø6 mm, without check valve	–	–	G ¹ / ₄	96-1106-0058-E0	G ¹ / ₄	96-1106-0058-E0
	Pipe ø8 mm, without check valve	–	–	G ¹ / ₄	96-0208-0058-E0	G ¹ / ₄	96-0208-0058-E0
	Pipe ø10 mm, without check valve	–	–	G ¹ / ₄	96-0210-0058-E0	G ¹ / ₄	96-0210-0058-E0
	Pipe ø12 mm, without check valve	–	–	G ¹ / ₄	96-0213-0058-E0	G ¹ / ₄	96-0213-0058-E0
	Pipe ø4 mm, with check valve	G ¹ / ₈	24-2103-2933	–	–	–	–
	Pipe ø6 mm, with check valve	G ¹ / ₈	24-2103-2927	G ¹ / ₄	96-9606-0058-E0	G ¹ / ₄	96-9606-0058-E0
	Pipe ø8 mm, with check valve	–	–	G ¹ / ₄	96-9008-0058-E0	G ¹ / ₄	96-9008-0058-E0
	Pipe ø10 mm, with check valve	–	–	G ¹ / ₄	96-9010-0058-E0	G ¹ / ₄	96-9010-0058-E0

Spare parts table 6

Bridges (crossporting) ¹⁾

Item	Description	PSG1		PSG2		PSG3	
		Outlet	order No.	Outlet	order No.	Outlet	order No.
30	without outlet and without check valve						
	2-bridge	G ¹ / ₈	24-2151-3760	G ¹ / ₄	24-2151-3730	G ¹ / ₄	24-2151-3734
	3-bridge		24-2151-3761		24-2151-3731		24-2151-3735
	with outlet and without check valve						
	2-bridge	G ¹ / ₈	24-2151-3762	G ¹ / ₄	24-2151-3732	G ¹ / ₄	24-2151-3736
	3-bridge		24-2151-3763		24-2151-3733		24-2151-3737
	with outlet and with check valve						
	2-bridge		24-2151-3764		24-2151-3394		24-2151-3396
	3-bridge	G ¹ / ₈	24-2151-3765	G ¹ / ₄	24-2151-3395	G ¹ / ₄	24-2151-3738
	4-bridge		–		24-2151-3739		On request
	without outlet and with check valve						
	3-bridge	G ¹ / ₈	–	G ¹ / ₄	24-2151-3397	G ¹ / ₄	24-2151-3393
2-bridge		–		24-2151-3390		24-2151-3392	

1) The bridges listed are approved only for a maximum operating pressure of 100 bar.

12. Accessories

PSG accessories, Table

Description		Order No.	Weight [g]
E	Square connector per DIN EN 175301-803A cable diameter 6–10 mm, 3-pin +PE, max. 1.5 mm ²	179-990-033	
	Cable socket M12x1, 4-pin design without LED		
A	Circular connector, straight , without cable diameter 4–6 mm, 4-pin, max. 0.75 mm ²	179-990-371	15
B	Circular connector, straight , with 5-m integrally extruded cable, 4-pin, 4x0.25 mm ²	179-990-600	178
B	Circular connector, straight , with 10-m integrally extruded cable, 4-pin, 4x0.25 mm ²	179-990-603	325
C	Circular connector, angled , without cable diameter 4–6 mm, 4-pin, max. 0.75 mm ²	179-990-372	16
D	Circular connector, angled , with 5-m integrally extruded cable, 4-pin, 4x0.25 mm ²	179-990-601	182



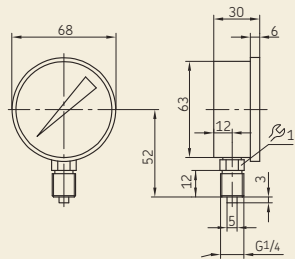
For other cable sockets, please refer to brochure No. 1-1730, "Electrical Plug-In Connections."

PSG2/PSG3 accessories

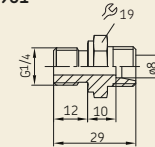
Pressure gauge and screw union
PSG2 / PSG3

Designation	Order No.
Pressure gauge 160 bar	24-1207-2158
Straight threaded socket	95-5080-3901
Pressure gauge screw union	96-0308-0060
Reduction fitting for PSG3	96-3120-0058

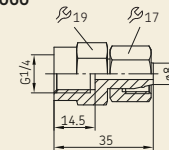
24-1207-2158



95-5080-3901



96-0308-0060

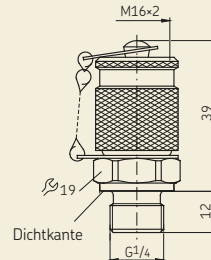


PSG2/PSG3 accessories

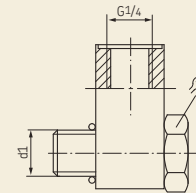
Measurement connection and screw union
PSG2 / PSG3

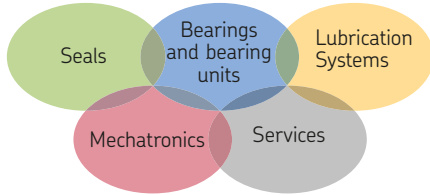
Designation	Order No.
Measurement connector	24-2105-2405
Measurement connector screw union for PSG2 - G1/4, WAF 19	24-2151-4115
for PSG3 - G3/8, WAF 22	24-2151-4116

24-2105-2405



24-2151-4115, 24-2151-4116





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