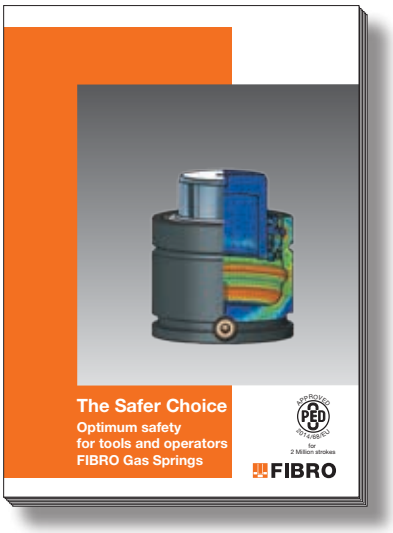
Controllable Gas Springs

FIBRO

Overview of Gas Springs



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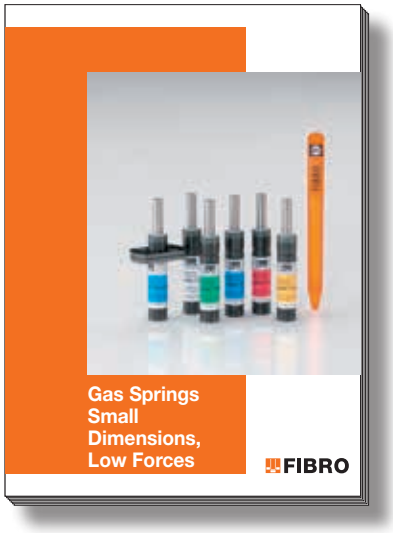

Order No. 2.5506.

see main catalogue

FIBRO Standard Parts main catalogue with our wide range of Gas Springs

Order No. 2.5505.

Order No. 2.5502.

Order No. 2.5507.

Order No. 2.5501.

Order No. 2.5504.

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FIBRO – an internationally successful company.

As a market leader in Standard Parts and Rotary Indexing Tables, FIBRO provides products and solutions to ensure your production keeps moving.

So what is the secret of the FIBRO success?
Products developed in-house, tailor-made for the market with uncompromising quality.

But good products are not enough on their own.

FIBRO combines excellent products, the know-how and service competence of an internationally focused company, matched to the actual needs of customers - wherever they are.

Hassmersheim plant

Standard Parts

Today the Standard Parts Division operates from the Hassmersheim and Weinsberg works, which manufacture a comprehensive range of standard parts and maintain stocks ready for immediate despatch world-wide.
The machine tool, mechanical engineering and systems engineering product ranges have been developed to meet the needs of customers.

They include die sets, precision ground plates and flat bars, lifting and clamping devices, guide elements, oilless guide elements and precision components such as punches and matrixes, special steel compression springs, gas springs, forming materials, metal bonding agents, moulding resins, peripheral equipment for pressing and tool making, electronic thread molding units, tool slides with cam or roller slides and hydraulic cam systems.

FIBRO has become renowned world-wide for its comprehensive range of products in stock and its readiness to deliver.

FIBRO is customer-focused – world-wide. A well-developed network of sales and service points and strategic partners ensure that help is always at hand. This ensures technical advance, world-wide experience in applications and rapid availability of products.

Facts and figures on FIBRO:

- founded 1958
- approximately 770 staff
- more than 70 representatives and service stations world-wide
- branches in France, USA, India, Switzerland, Singapore, Korea and China
- ISO 9001:2000 Quality Assurance and ISO 14001 environmental certification

Manufacturing of precision parts

Rotary Tables

FIBRO – The worldwide pioneer in the field of rotary tables

A comprehensive range of types:

FIBROPLAN® – NC rotary table with worm drive

FIBRODYN® – NC rotary table with direct torque drive

FIBROMAX® – Heavy-duty NC rotary table with Twin Drive

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FIBROTOR® – Electromechanical rotary indexing table for applications that do not involve machining

Rotary tables for all applications – from flexible workpiece positioning through rotary and multiple-axis machining to assembly automation

Used in all branches of industry – from the automobile industry through solar energy to machine tools

A wide range of sizes – from micro-machining to processing of very large parts

Customer-oriented design – from the standard modular table to customer-specific special solutions

Controllable Gas Springs

Introduction

Controllable gas springs (KF springs) are gas springs which can be locked in their bottom position. The timing of the return stroke can be controlled to suit the application. Controllable gas springs are available in 15 kN, 30 kN, 50 kN and 75 kN versions.

For best results the stroke length must always be used to the full with a tolerance of ± 0.5 mm. For this reason the springs are available with any stroke length from 4 to 167 mm in 1 mm increments.

The gas spring return stroke can be controlled electrically or pneumatically from either the tool or the press end. In the basic version of the gas spring (KF), it returns about 1 mm before it is held in the bottom position. This spring back effect can be eliminated, if required, by connecting the KF gas spring to a passive gas spring (KP) via a valve block. This is known as a KF + KP system. Both variants are illustrated in this brochure.

General instructions

You can ensure system safety and reliability by supplying FIBRO with the application data and drawings of the installation arrangements for checking.

Please note that the number of the screwed connections and the hose lengths for installation in the system must be determined.

Assembly, commissioning, maintenance and servicing of controllable gas springs require special knowledge and may only be carried out by FIBRO appropriately trained, specialist personnel.

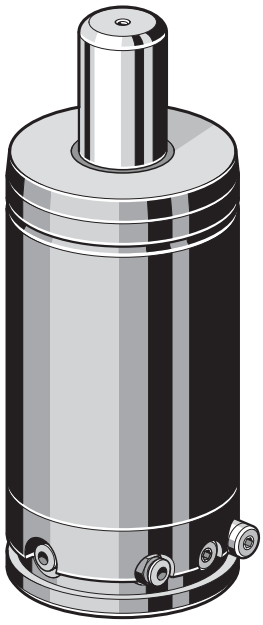
You can arrange for the work to be completed by a FIBRO customer service engineer, the invoiced cost including the assembly kits.

Just contact us to schedule the work for you.
We shall be pleased to answer any technical queries you may have, now or at any time in the future.

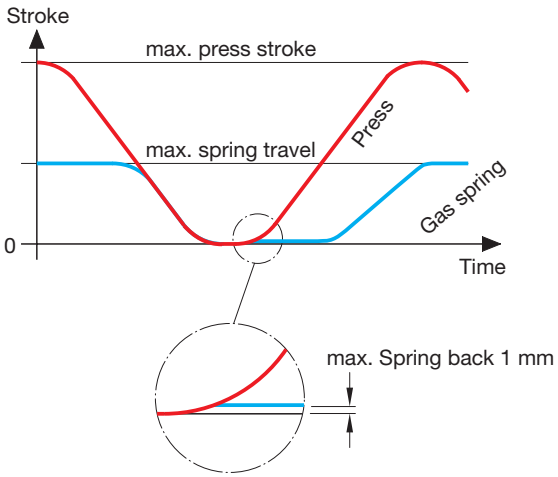
As controllable gas springs include parts which are specially made to specific stroke length, we recommend that you keep reserve systems in stock to avoid the risk delay when the need arises.

2489.14.

KF (max. spring back 1 mm)

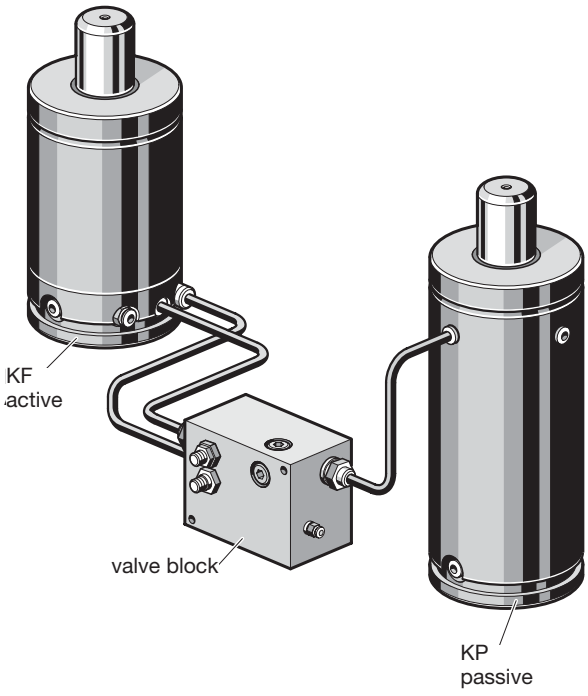


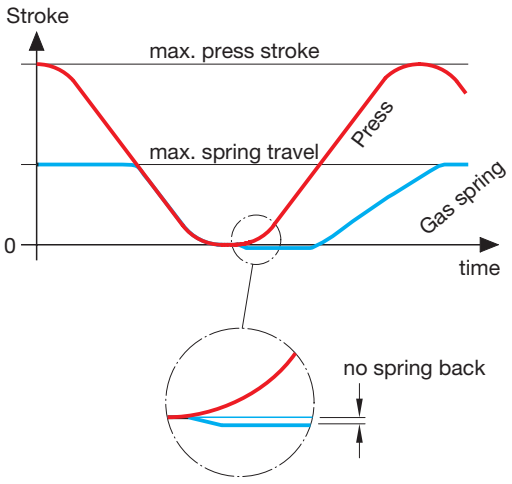
KF



2489.14. + 2489.16.

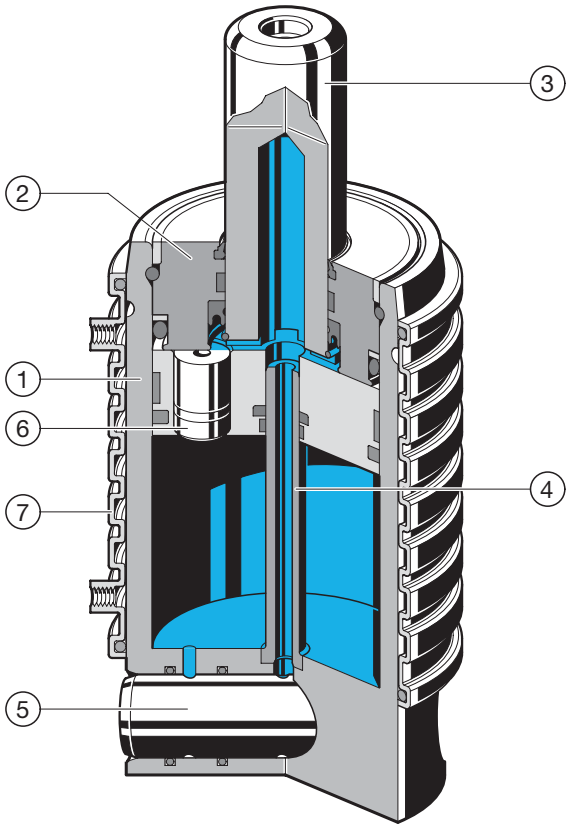
KF+KP system (without spring back)





Controllable Gas Springs

2489.14.



Description of the components

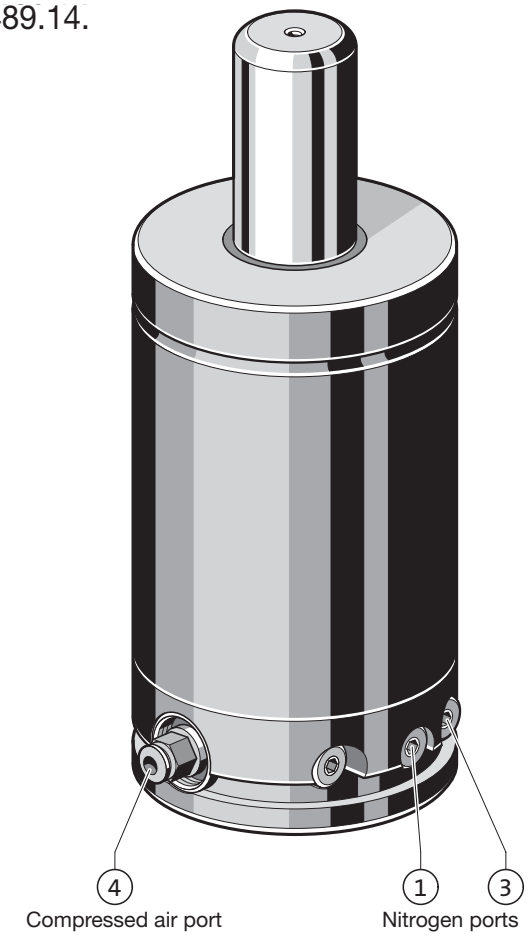
Active gas springs KF 2489.14.

The KF controlled Gas Spring 2489.14. can be locked in its bottom position.

The Gas Spring consists of a cylinder (1), a guide (2), the piston and piston rod assembly (3), return valves (6), and internal piston rod (4) and a cartridge valve in the bottom of the Gas Spring (5).

There is also a version with a cooling jacket (7)
(see pp 15 & 56).

2489.14.



There are three ports in the base of the Gas Spring: two nitrogen (1) and (3), connected to the gas cavities in the Gas Spring, and a compressed air port (4) for the compressed air to operate the cartridge valve.

Port (1) is used for emptying the Gas Spring via the passive GDF (KP), port (3) for filling it with nitrogen.

Compressed air applied at port (4) closes the cartridge valve. In the absence of air pressure the valve opens.

Passive gas springs (KP) 2489.16.

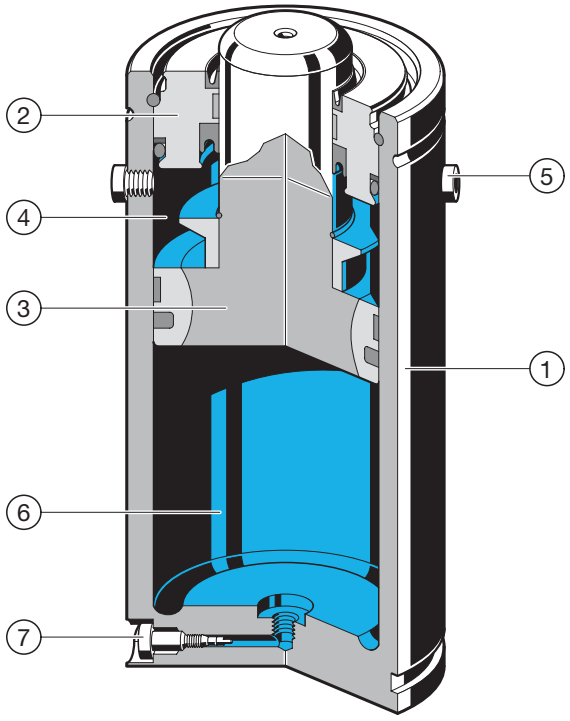
The passive KP gas spring 2489.16 is used to prevent the KF gas spring(s) springing back.

The KP gas spring must not be used in the operational working area of the tool, but must be compressed by the tool.

The passive gas spring consists of one cylinder (1), a guide (2) and piston and piston rod (3). The piston divides the gas spring into two gas compartments, the upper (4) and the lower (6).

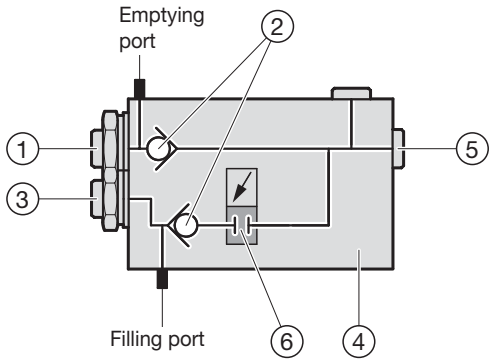
The upper compartment has four G$^{1}/_{8}$" ports (5), the lower a G$^{1}/_{8}$" gas filling port (7).

2489.16.



Controllable Gas Springs

Valve block 2489.00.47.01



Valve block with no facilities for filling or emptying (2489.00.47.01)

This valve block is used for controlling the flow of gas from the KF Gas Spring to the KP Gas Spring.

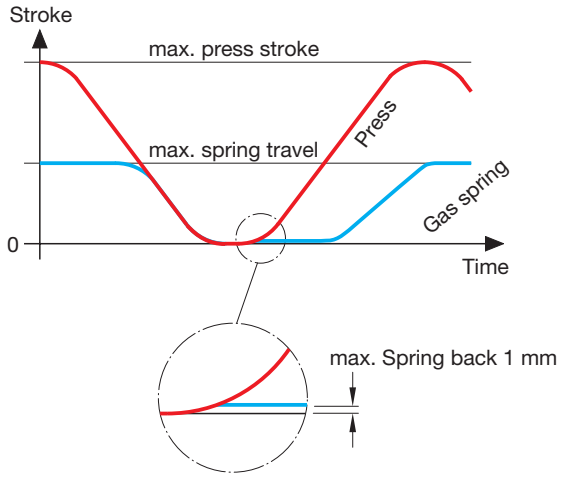
This valve block must be used with control fitting 2480.00.31.01 for filling or emptying nitrogen .

The valve block consists of a block (4), return valves (2) and a cartridge valve (6). The block has two ports (1,3) for connecting to the KF Gas Spring(s) and a port (5) for connecting the passive KP spring. The compressed air port (C) is used for controlling the cartridge valve.

Description of the functions

Controllable gas springs KF 2489.14.

The KF gas spring has a locking function at the bottom position. Before the gas spring is held completely at the bottom position there is a slight spring back of 1 mm (or less). The complete stroke must be used, with a tolerance of ± 0.5 mm.



Note:

If the full stroke length is not used the spring back is more than 1 mm.

Down stroke

The KF gas spring has two compartments, an upper one (1) and a lower one (2) which are separated by the piston of the gas return spring. The gas flow between these two compartments is as follows:

Fig. A shows the gas spring piston down stroke. During the down stroke the gas flows unimpeded through the return valve of the piston (3) from the lower (2) to the upper (1) gas compartment of the gas spring. The cartridge valve (4) in the base of the spring is closed.

As soon as the press and the gas spring reach the bottom position the return valves (3) close. (Fig. B). The gas spring is now "locked".

The pressure of the gas above and below the piston is the same. But as the surface exposed to the gas on the underside of the piston is larger than that on the upper side, there is a greater force applied. On the return stroke of the press (relief of spring) this force is released and causes the spring to return 1 mm. This results in a reduction of the pressure under the piston as the gas has been allowed to expand. The pressure in the upper compartment increases until there is a state of equilibrium. At this moment the gas spring stops completely.

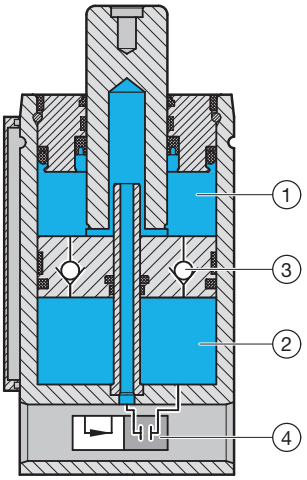


Fig. A, return stroke

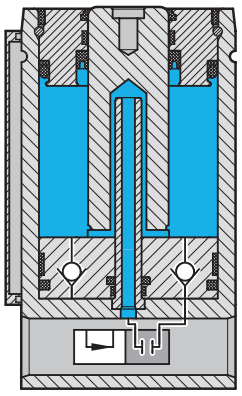


Fig. B, Gas spring at bottom position.

Controllable Gas Springs
Description of the functions

Return stroke

The Gas Spring is released from its locked position when the cartridge valve (4) in the Gas Spring base is opened by the removal of pressure. (Fig. C). This causes the gas to flow through the piston rod (5) from the upper compartment (1) via the cartridge valve (4) back into the lower chamber (2).
The speed of the upstroke is approximately 0.2 m/s in models 2489.14.01500. and .03000. and approximately 0.08 - 0.15 m/s in models 2489.14.05000. and .07500.

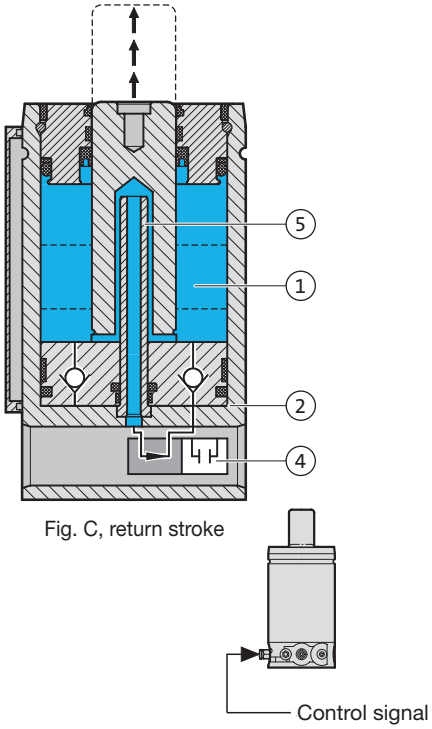
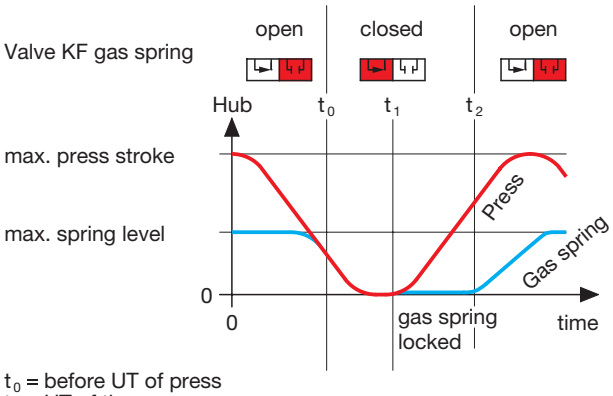


Fig. C, return stroke

KF control system

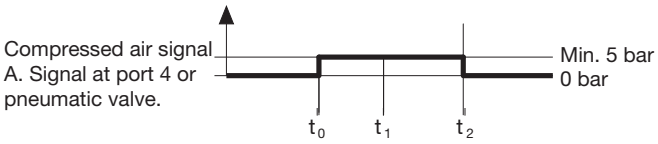
As described above, the return stroke of the Gas Spring is controlled by the cartridge valve in the base of the Gas Spring. The valve is closed by compressed air and opened by the absence of pressure.



t_0 = before UT of press
t_1 = UT of the press
t_2 = beginning of return stroke of gas spring

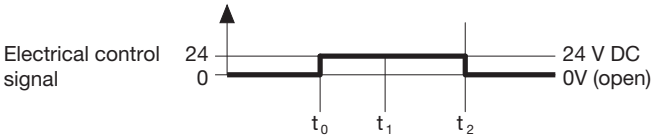
Pneumatic control
(controlled compressed air available from the press)

If there is a line for controlled compressed air from the press, this can be used directly to operate the cartridge valve.



Electric control (electric control signal from the press available)

If there is an electrical control signal available from the press then the 2489.00.41.32 electro-pneumatic control valve can be used to convert the electrical signal into a pneumatic one.



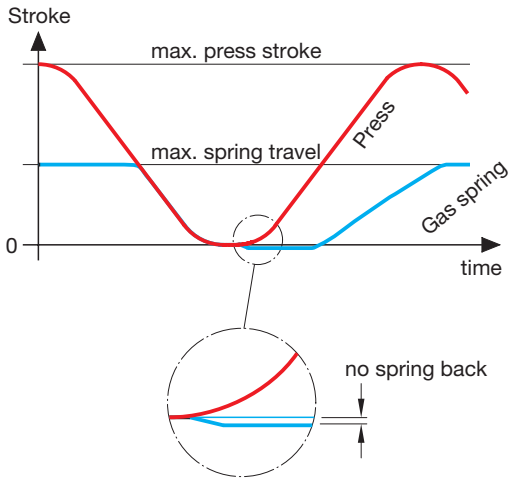
A constant supply of compressed air is required for both the pneumatic and the electro-pneumatic valves. The required minimum pressure is 5 bar.

A control valve can control up to 6 Gas Springs.

The control signals for the Gas Springs and the valves are shown in the diagrams.

Controllable gas springs 2489.14. + 2489.16. KF + KP system without spring back

In a KF + KP system the locking function can be arranged that a spring back is completely eliminated.



Between one and four controlled gas springs (1) can be connected to a passive KP gas spring (2) via a valve block (3).
The KF spring is connected to the valve block by 2 hoses. The valve block has a hose connection to the upper gas compartment. There is the same gas pressure in all parts of the system at the start of the working cycle.
During the down stroke the KF gas spring works as described on page 11.

At the end of the press stroke the KP gas spring is compressed. This increases the volume of the upper gas compartment in the KP gas spring with a resultant decrease in pressure. The gas pressure has increased in the KF gas spring(s) as the gas has been compressed.

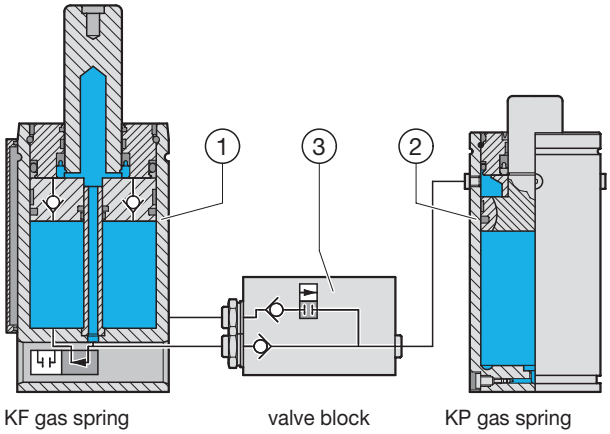


Fig. A

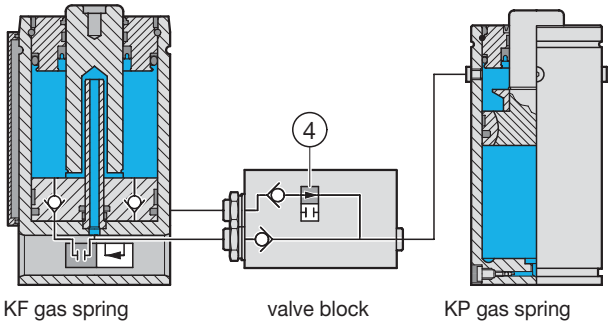


Fig. B

At bottom dead center (Fig. B) the cartridge valve (4) in the valve block opens so that the gas from the bottom gas compartment of the KF gas spring can flow into the upper compartment of the KF gas spring.

There is a resultant decrease in pressure in the bottom compartment of the KF gas spring, so that the force pushing the piston of the KF gas spring upwards is less than that from the upper compartment acting in a downward direction.

This means there is no spring back of the KF spring when the press relieves the load. The KP gas spring follows the press stroke to its home position (Fig. C).

The return stroke of the KF spring is as described on page 12.

To ensure the effectiveness of the locking function, the supply to the KP gas spring must be separate from the supply to the KF gas spring. This means that unlike the KF gas spring, the KP gas spring must not be used in the operational working area.

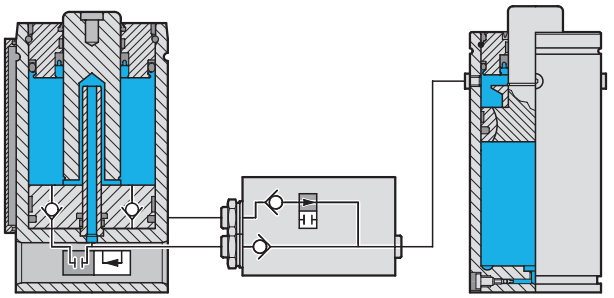


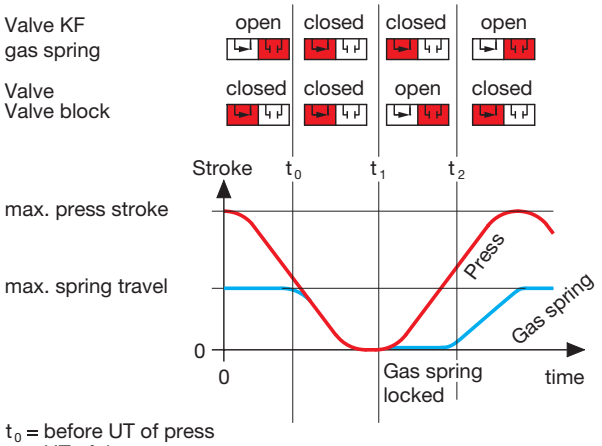
Fig. C

Controllable Gas Springs
Description of the functions

KF + KP control system

The control signals for a KF + KP system are shown in the diagram.

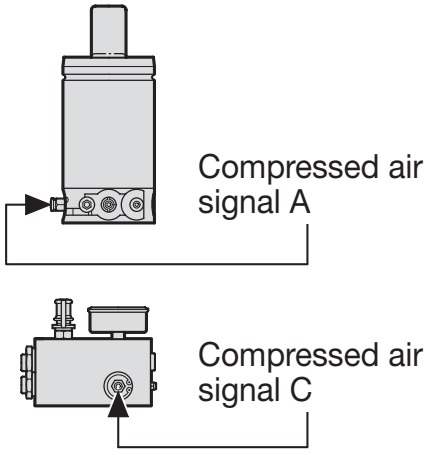
The system function, as described, is controlled by the cartridge valves in the base of the KF gas spring(s) and in the valve block. These two valves are not opened and closed simultaneously.

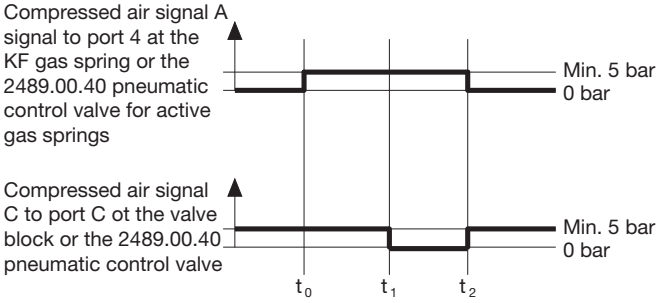


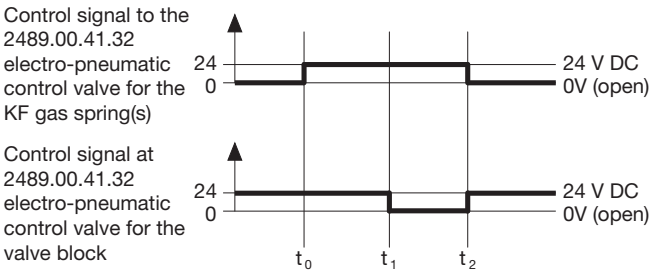
t_0 = before UT of press
t_1 = UT of the press
t_2 = beginning of return stroke of gas spring

Pneumatic control
(controlled compressed air available from the press)

If there are two lines for controlled compressed air from the press, these can be used directly to operate the cartridge valves.







Electric control (electric control signal from the press available)

If there are two electrical control signals available from the press then two 2489.00.41.32 electro-pneumatic control valves can be used to convert the electrical signals into pneumatic ones.

A constant supply of compressed air is required for both the pneumatic and the electro-pneumatic valves. The required minimum pressure is 5 bar.

The control signals for the gas springs and the valves are shown in the diagrams in the next column.

A maximum of four KF gas springs can be linked to one KP gas spring. The stroke length of the KP gas spring does not depend on the stroke length of the KF gas spring(s). The extent to which the KP gas spring has to be compressed depends on the number of KF gas springs in the system. (see page 25)

Controllable Gas Springs
Description of the functions

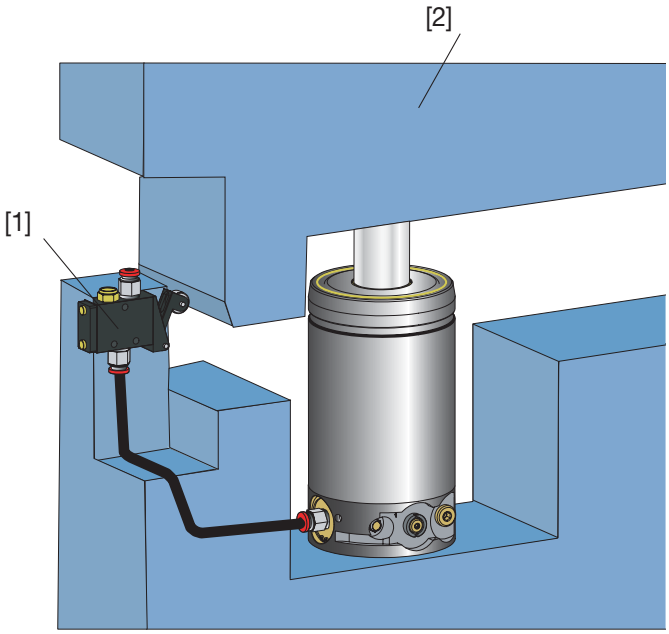
In-tool control system

The control system required for locking the KF Gas Spring can be integrated in the tool as a mechanical pressure switch. Then the control system required for locking and unlocking the KF Gas Spring(s) is independent of the press control system.

The KF Gas Spring or Springs remain locked as long as the mechanical pressure switch [1] is operated by the tool [2].

A control system integral within the tool requires a constant supply of compressed air (at least 5 bar) for the mechanical pressure switch.

Please note:
It can also be used for controlling the valve of the valve block for forced locking systems.



Heating - cooling

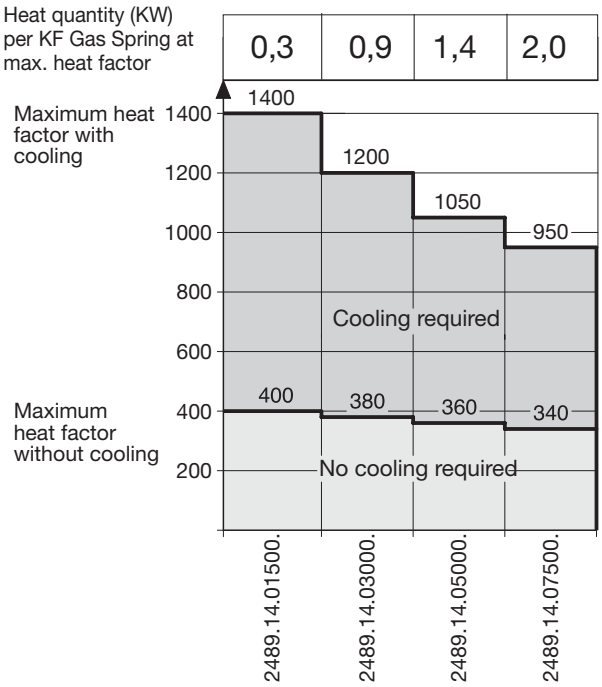
When a gas spring is compressed, a certain amount of energy is transmitted by the press to the gas spring. This amount of energy can be calculated by multiplying the spring force by the stroke length. In a conventional gas spring, the piston rod follows the gas spring during the press return stroke. The amount of energy generated, excluding any losses due to friction etc, is transmitted back to the press.

If controlled gas springs are used, the active gas spring does not follow the return stroke of the press. Indeed it generally requires a very low energy value for its own return stroke compared to the spring force used during compression. The difference between the amount of energy transmitted to the gas spring during compression and the amount of energy consumed during the return stroke is converted into heat.

This means that in some applications gas springs need cooling to prevent overheating. The amount of cooling required is calculated using the "heat factor".

The heat factor is calculated by multiplying the stroke rate by the stroke length of the gas spring.
If this heat factor exceeds the values shown in the diagram opposite for various sizes of gas spring, then the gas spring must be cooled. The heat factor is calculated on the basis of a filling pressure of 150 bar.

(See also page 56)



Heat factor = stoke length (mm) x number of strokes (strokes/min)

Selecting the components

Controllable Gas Springs

Selecting the components

This section describes step by step how to select the various components for a complete KF system. As each tool offers different options, the step by step procedure should be followed in each case. Select the components for your system. Use the information pages, then decide on the system you need, and the parameters and components. We shall be pleased to answer any queries you may have.
Fill in the order form list (KF on p. 20, KF + KP on p. 21) and for each component you select enter the order code and the number you require.

Components	Catalogue page
Information to select components	Additional information

Step 1
Type of system, KF or KF + KP

The KF system has a locking function with a maximum spring back of 1 mm. If you need to eliminate spring back totally use a KF + KP system. A KF system can be converted into a KF + KP system by the addition of a KP spring.

Components	Catalogue page
KF - max. spring back 1 mm	11 - 12
or	
KF+KP - no spring back	13- 14

Step 2.1
KF gas springs 2489.14.
Technical data

KF gas springs do not work like traditional gas springs. KF springs generate heat which is determined by the force (filling pressure), stroke and stroke rate. If the filling pressure is less than 80 bar then a low pressure cartridge valve is required.

The full stroke length of the KF gas spring must always be used.

Components	Catalogue page
Force per gas spring	24
Number of gas springs	
Filling pressure	
Stroke (4-167 mm)	24
Stroke rate (strokes/min)	
Cooling required	56

Step 2.2
KP gas spring 2489.16.
Technical data

The passive KP gas spring must not be used in a tool. A maximum of four KF gas springs can be linked to one KP gas spring.

Components	Catalogue page
Size of gas spring	25
Stroke used	25

Step 2.3
Valve block

Every KP gas spring must have a valve block connected.

Components	Catalogue page
Valve block	38

Controllable Gas Springs

Step 3.1
Control system

Check whether there is a pneumatic signal or an electrical signal (24 V) available from the press. In either case the control valves need compressed air (at least 5 bar) to control the cartridge valves. Do not connect more than four KF gas springs to one control valve.

Components	Catalogue page
Pneumatic signal from the press or Electrical signal from the press	33
Pneumatic hose, blue	31
Compressed air connections	31 - 32
Example	30

Step 3.2
Overheating protection

Fit a thermal relay to protect the gas springs from overheating.

Components	Catalogue page
Thermal relay	48

Step 4.1
Filling and emptying gas in the KF system.

KF Gas Springs can be used independently of each other or in conjunction with each other. For each KF Gas Spring two hoses are required: one for filling and one for emptying.

Components	Catalogue page
Control unit	39
Measuring hose	40
Measuring connector	41
Example	35

Step 4.2
Filling and emptying gas in the KF + KP system

KF and KP gas springs must always be connected to each other. You need hoses of different sizes for filling and emptying.

Components	Catalogue page
Valve block + control unit	38 - 39
Control fitting for KP Gas Spring	39
Gauging hose	40
Gauging coupling	41
24° cone hose	45
24° cone hose adapter	44
Example	37

Step 5
Fixing

We recommend that you use the tapped bore in the base of the gas spring for fixing. Alternatively you could use the mounting variations 2480.055./057./064./007.

Components	Catalogue page
Fixings	24 - 26
	main catalogue standard parts, chapter F

Step 6
Cooling system

2 cooling systems are available.

- cooling unit, external

- gas cooler

Choose the cooling system according to the cooling capacity you require.

Components	Catalogue page
Cooling unit 10 kW / 25 kW	64
Gas cooler 1,5 kW	57 - 61
Connections	62, 67
Hose	63, 67
Connector block	66
Quick-release coupling	66

Controllable Gas Springs
KF order list

Customer: _____

Tool no.: _____

Technical contact: _____

Tel: _____

Fax: _____

Comment: _____

Step 1
KF gas springs technical data

Components	information required	
Force per gas spring	daN	
Number of gas springs		
Filling pressure	bar	
Stroke (4-167 mm)	mm	
Stroke rate (strokes/min)		
Cooling required	☐ yes	☐ no

Step 2
KF gas springs

Components	Order no.	Number
KF gas spring	2489.14.	

Step 3
Control system

Components	Order no.	Number
Control valve		
Electrical/pneumatic		
Compressed air hose, blue	2489.00.42.06.11 xx	m
Compressed air connections		
Compressed air connections		
Compressed air connections		
Compressed air connections		
Thermal relay	2489.00.70	

Step 4
Filling and emptying gas in the KF system

Components	Order no.	Number
Control unit	2480.00.31.01	
Gauging hose		
Gauging hose		
Gauging hose		
Gauging hose		
Gauging coupling G$^{1}/_{8}$"	2480.00.24.01	

Step 5
Fixing

Components	Order no.	Number
Fixings		

Step 6
Cooling system

Components	Order no.	Number
Cooling unit 10 kW	2489.00.50.10	
Cooling unit 25 kW	2489.00.50.25	
Gas cooler 1,5 kW	2489.00.20.15	
Hose connector		
Hose connector		
Hose, blue, Ø 16	2489.00.52.16.11	
Hose, red, Ø 16	2489.00.52.16.12	
Distributor block	2489.00.54	
Hose, blue, Ø 23	2489.00.52.23.11	
Hose, red, Ø 23	2489.00.52.23.12	
Connector block	2489.00.55	
Quick connector, plug	2489.00.55	
Quick connector, socket	2489.00.57	

Controllable Gas Springs
KF + KP order list

Customer: _____

Tool no.: _____

Technical contact: _____

Tel: _____

Fax: _____

Comment: _____

Step 1
KF gas springs technical data

Components	information required	
Force per gas spring	daN	
Number of gas springs		
Filling pressure	bar	
Stroke (4-167 mm)	mm	
Stroke rate (strokes/min)		
Cooling required	☐ yes	☐ no

Step 2
KF+KP gas spring groups

Components	Order no.	Number
KF gas springs		
KP gas springs		
KP gas springs: stroke used		mm
Valve block		

Step 3
Control system

Components	Order no.	Number
Control valve		
electrical		
Compressed air hose, blue	2489.00.42.06.11 xx	m
Compressed air connections		
Compressed air connections		
Compressed air connections		
Compressed air connections		
Thermal relay	2489.00.70	

Step 4
Filling and emptying gas, KF + KP system

Components	Order no.	Number
Valve block without manometer*	2489.00.47.01	
Gauging hose		
Gauging hose		
Gauging hose		
Gauging hose		
Compressed air connections G$^{1}/_{8}$"	2480.00.26.03	
Control unit	2480.00.31.01	
24° cone hose	2480.00.25.0x.xx	
24° cone threaded connectors		
24° cone threaded connectors		
Threaded coupling G $^{1}/_{4}$"	2480.00.26.04	
* Control unit with manometer for valve block without manometer	2480.00.31.01	

Step 5
Fixing

Components	Order no.	Number
Fixings		

Step 6
Cooling system

Components	Order no.	Number
Cooling unit 10 kW	2489.00.50.10	
Cooling unit 25 kW	2489.00.50.25	
Gas cooler 1,5 kW	2489.00.20.15	
Hose connector		
Hose connector		
Hose, blue, Ø 16	2489.00.52.16.11	
Hose, red, Ø 16	2489.00.52.16.12	
Distributor block	2489.00.54	
Hose, blue, Ø 23	2489.00.52.23.11	
Hose, red, Ø 23	2489.00.52.23.12	
Connector block	2489.00.55	
Quick connector, plug	2489.00.55	
Quick connector, socket	2489.00.57	

Dimensions and Order Numbers

(Controllable Gas Springs)

Controllable Gas Springs
Active Gas Springs (KF)

Description:

In some applications it is difficult to establish in advance the exact stroke length required. We have designed the active Gas Spring with ad-justable stroke length to solve this problem.

The stroke is adjustable by means of four special adjusting washers (2489.14.451. xxxxx.01, 2489.14.451.xxxxx.02, 2489.14.451. xxxxx.04 and 2489.14.451.xxxxx.08) in the Gas Spring. The total adjustment available is 15 mm (-8 mm and +7 mm relative to rated stroke).

For information on adjusting the stroke length see pages 77/78.

The table on the opposite page shows the stroke length adjustments and the resulting installation heights.

Technical data:

Pressure medium	nitrogen
Filling pressure max.	150 bar
Filling pressure min.	25 bar
Operating temperature	0 bis +80°C
Temperature related force increase	±0,3 %/°C
Piston rod speed max	0.8 m/s
max. piston rod return speed*	
2489.14.01500.-.03000.	ca. 0.2 m/s
2489.14.05000.	ca. 0.15-0.12 m/s
2489.14.07500.	ca. 0.13-0.08 m/s

* Longer stroke lengths reduce the return stroke speed

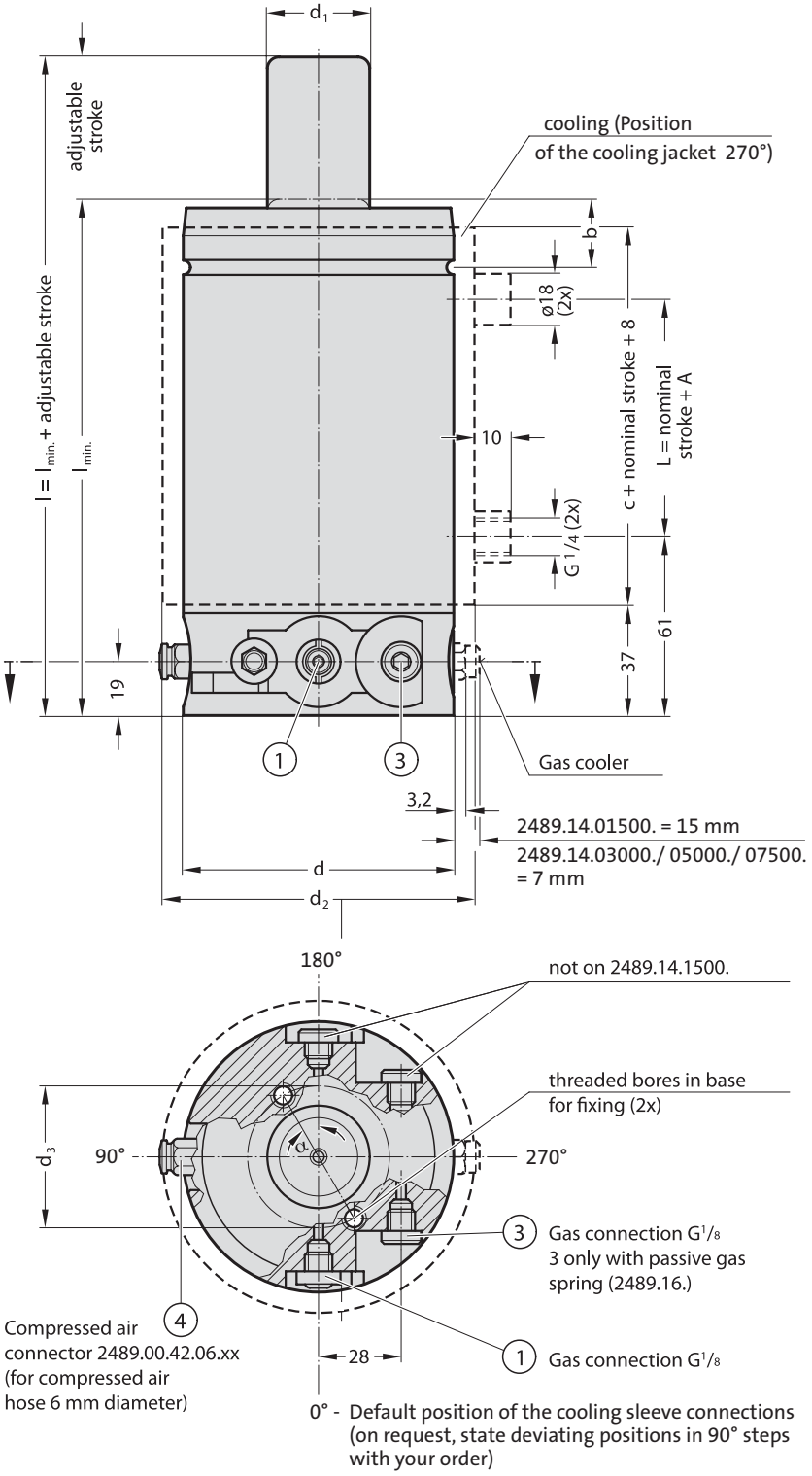
For further information, please contact your contractor, or FIBRO GmbH, Business Area Standart Parts.

Note:

For best results, the stroke length of the Gas Spring must always be fully utilized with a tolerance of ±0.5 mm.

- the Gas Springs are normally supplied with connections as above and unfilled.
- We recommend that you use the tapped bores in the base of the Gas Spring for fixing.
- Alternatively the fixing versions 2480.055./057./064./007. can be used. See Standard Parts Catalogue Chapter F.

2489.14.



Controllable Gas Springs
Active Gas Springs (KF)

Order no.	Rated stroke	Adjustable stroke $_{min.}$	stroke $_{max}$	force inicial [daN]	force* final [daN]	l $_{min.}$	L	b	c	d	d_1	d_2^{+5}	d_3	a	M	A
2489.14.01500.	010.	004	017	1500	2200	142	45	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	020.	012	027	1500	2200	152	55	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	030.	022	037	1500	2200	162	65	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	040.	032	047	1500	2200	172	75	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	050.	042	057	1500	2200	182	85	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	060.	052	067	1500	2200	192	95	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	070.	062	077	1500	2200	202	105	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	080.	072	087	1500	2200	212	115	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	090.	082	097	1500	2200	222	125	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	100.	092	107	1500	2200	232	135	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	110.	102	117	1500	2200	242	145	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	120.	112	127	1500	2200	252	155	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	130.	122	137	1500	2200	262	165	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	140.	132	147	1500	2200	272	175	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	150.	142	157	1500	2200	282	185	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.01500.	160.	152	167	1500	2200	292	195	23,8	75	95	36	110	50	30°	M12x15	35
2489.14.03000.	010.	004	017	3000	4200	152	55	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	020.	012	027	3000	4200	162	65	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	030.	022	037	3000	4200	172	75	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	040.	032	047	3000	4200	182	85	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	050.	042	057	3000	4200	192	95	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	060.	052	067	3000	4200	202	105	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	070.	062	077	3000	4200	212	115	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	080.	072	087	3000	4200	222	125	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	090.	082	097	3000	4200	232	135	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	100.	092	107	3000	4200	242	145	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	110.	102	117	3000	4200	252	155	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	120.	112	127	3000	4200	262	165	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	130.	122	137	3000	4200	272	175	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	140.	132	147	3000	4200	282	185	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	150.	142	157	3000	4200	292	195	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.03000.	160.	152	167	3000	4200	302	205	25,5	85	120	50	135	95	60°	M12x15	45
2489.14.05000.	010.	004	017	5000	7400	177	80	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	020.	012	027	5000	7400	187	90	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	030.	022	037	5000	7400	197	100	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	040.	032	047	5000	7400	207	110	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	050.	042	057	5000	7400	217	120	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	060.	052	067	5000	7400	227	130	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	070.	062	077	5000	7400	237	140	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	080.	072	087	5000	7400	247	150	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	090.	082	097	5000	7400	257	160	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	100.	092	107	5000	7400	267	170	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	110.	102	117	5000	7400	277	180	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	120.	112	127	5000	7400	287	190	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	130.	122	137	5000	7400	297	200	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	140.	132	147	5000	7400	307	210	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	150.	142	157	5000	7400	317	220	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.05000.	160.	152	167	5000	7400	327	230	27,5	110	150	65	165	110	60°	M16x18	70
2489.14.07500.	010.	004	017	7500	9800	197	100	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	020.	012	027	7500	9800	207	110	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	030.	022	037	7500	9800	217	120	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	040.	032	047	7500	9800	227	130	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	050.	042	057	7500	9800	237	140	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	060.	052	067	7500	9800	247	150	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	070.	062	077	7500	9800	257	160	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	080.	072	087	7500	9800	267	170	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	090.	082	097	7500	9800	277	180	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	100.	092	107	7500	9800	287	190	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	110.	102	117	7500	9800	297	200	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	120.	112	127	7500	9800	307	210	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	130.	122	137	7500	9800	317	220	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	140.	132	147	7500	9800	327	230	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	150.	142	157	7500	9800	337	240	33,5	130	195	80	210	120	60°	M16x18	90
2489.14.07500.	160.	152	167	7500	9800	347	250	33,5	130	195	80	210	120	60°	M16x18	90

* with complete stroke
Stroke lengths from 4 to 167 mm, in increments of 1 mm

Ordering example:

Controllable Gas Springs (active)	= 2489.14.	Controllable Gas Springs (active)	= 2489.14.
initial spring force = 3000 daN	= 03000.	initial spring force = 3000 daN	= 03000.
Rated stroke = 80 mm	= 080.	Rated stroke = 80 mm	= 080.
stroke set = 78 mm	= 078	stroke set = 78 mm	= 078
Cooling external (optional)	= K	Gas cooling (optional)	= N
Order number	= 2489.14. 03000. 080. 078 K	Order number	= 2489.14. 03000. 080. 078 N

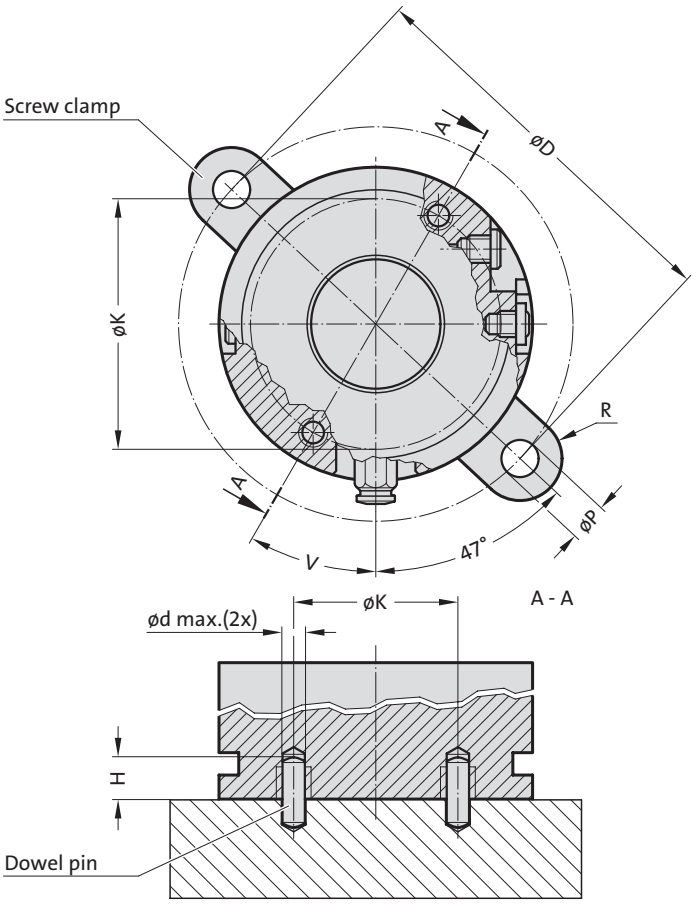
Controllable Gas Springs
Active Gas Springs (KF)
Alternative Mounting

For upside down installations the threaded holes in the base of the 2489.14. should always be used when mounting the Controllable Gas Springs (KF) to the tool.

For upright installations an alternative is to mount the Controllable Gas Springs using two 2480.007. in combination with dowel pins, as shown below.

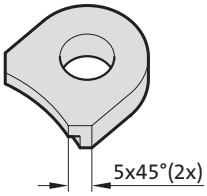
The dowel pins will engage the threaded holes in the bottom of the spring (M12 respective M16) and will prevent the spring from moving out of position even if the lugs would come loose.

The dowel pins will also ensure that the springs are installed in the correct position.



*Attention:

The 2480.007.03000 will require a slight modification, according to the sketch, before they can be fitted to the active Controllable Gas Springs (KF) 2489.14.01500.



Modification of 2480.007.03000

Spring size	øD	ød max.	H	øK	V	øP	R	quantity	Screw clamp
2489.14.01500.	130	8	10	50	60	17.5	20	2	2480.007.03000*
2489.14.03000.	155	8	10	95	30	17.5	25	2	2480.007.05000
2489.14.05000.	195	12	10	110	30	21.5	25	2	2480.007.07500
2489.14.07500.	240	12	10	120	30	21.5	29	2	2480.007.10000

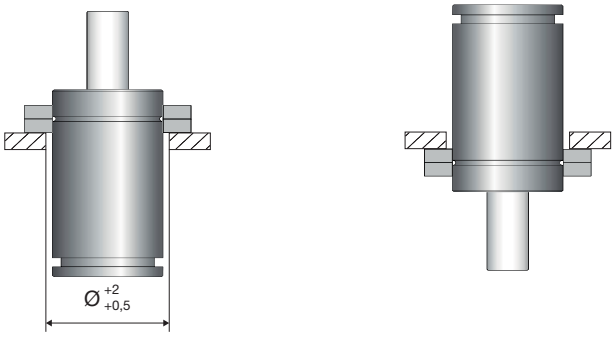
It is also possible to mount the active controllable gas springs (KF) as well as the passive gas springs (KP) using an 2480.055./ 057./ 064.

Note:

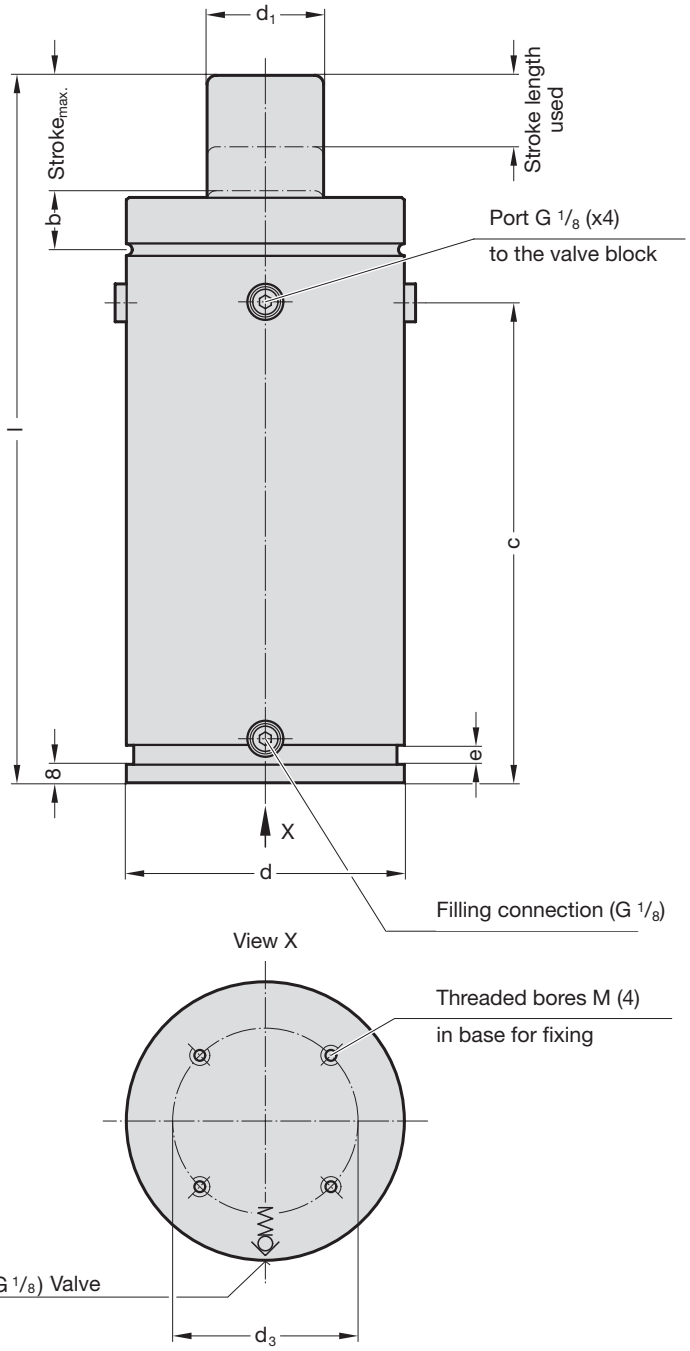
Not for active gas springs with cooling jacket.

Spring size	Mounting flange
2489.14./.16.01500.	2480.055./057./064.03000
2489.14./.16.03000.	2480.055./057./064.05000
2489.14./.16.05000.	2480.055./057./064.07500
2489.14.07500.	2480.057.10000

Mounting example:



2489.16.



Description:

The same size should be selected for the KP Gas Spring 2489.16. as for the KF Gas Spring 2489.14. The only exception is 2489.14.07500 (see below).

The extent to which the KP Gas Spring has to be compressed depends on the number of KF Gas Springs in the system. The recommended stroke length is 5 mm per KF Gas Spring. For example, if there are four KF Gas Springs in the system then the stroke length used should be 4 x 5 mm = 20 mm.

Use KP 2489.16.05000 for type 2489.14.07500. The stroke used should then be 7.5 mm per KF Gas Spring in the tool.

The passive Gas Spring does not require cooling. The passive Gas Spring is always connected to a valve block using the 24° cone hose system via one of the four G 1/8" connections.

The connection at the base of the Gas Spring is for filling and emptying the lower gas compartment in the KP Gas Spring. It must be filled before the KF system is filled. When the KP Gas Spring is mounted in a tool, a filling fitting 2480.00.31.01 can be used for filling.

The KP Gas Spring is filled to the same pressure as the KF Gas Springs in the system, i.e. up to a maximum of 150 bar.

Technical data:

Pressure medium	nitrogen
Filling pressure max.	150 bar
Filling pressure min.	25 bar
Operating temperature	0 up to +80°C
Temperature related force increase	±0.3 %/°C
Piston rod speed max	0.8 m/s

Additional information is available in Section F Gas Springs in the Standard Parts main catalogue.

2489.16.

	Force in daN for given stroke length in mm*						
Order no	5	10	15	20	25	30	35
2489.16.01500	3600	5200	6700	8200	9900	11900	–
2489.16.03000	6000	8300	10400	12300	14400	16800	–
2489.16.05000	7800	10200	12500	14700	16800	19000	21300

*Forces are calculated on the basis of a filling pressure of 150 bar in the KP and the KF Gas Springs.

Order no	d	d_1	d_3	b	e	l	c	Stroke max.	M
2489.16.01500	95	36	60	24	7	220	140	30	M8x12.5
2489.16.03000	120	50	80	25.5	7	220	140	30	M10x16
2489.16.05000	150	65	100	27.5	8	300	182	35	M10x16

Control System

Filling and Emptying the System

Controllable Gas Springs
Control system

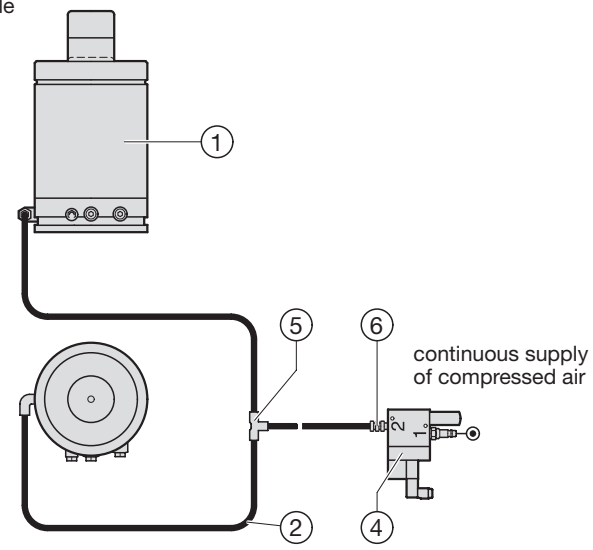
Control system

KF Gas Springs and the valve block for KF+KP are supplied with compressed air connections for DN 6 hoses. Never control more than six KF Gas Springs or one valve block from one control valve. Select suitable connections for the system. Cut the hoses to the correct length at installation (Push-Lock connects). Select the control valve on p. 33 to suit the type of signal from the press (pneumatic or electric).

The control valve requires a continuous supply of filtered compressed air at a pressure of at least 5 bar. A KF Gas Spring (or a group of KF Gas Springs) requires one control valve, but a KF+KP system requires two control valves.

KF gas spring control system

Example

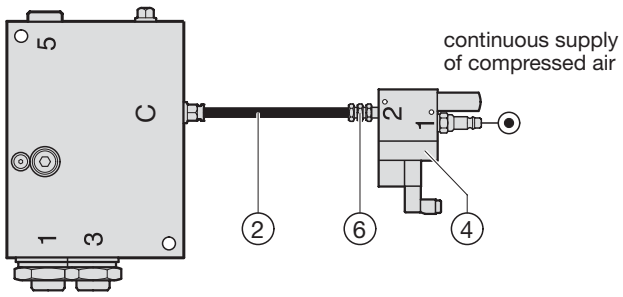


KF-gas spring control system, Example

Item.	No.	Description	Order no.	Page
1	2	KF gas springs	2489.14.03000	24
2	3	Compressed air hose, blue	2489.00.42.06.11.xx	31
4	1	Electric-pneumatic valve	2489.00.41.32	33
		or		
		regulated compressed air from the press		
5	1	T connector	2489.00.44.06.05	31
6	1	straight screwed connector G1/4"	2489.00.43.02.01	31

Control system for valve block for KF + KP system

Example



Control system for valve block for KF + KP system, Example

Item.	No.	Description	Order no.	Page
2	1	Compressed air hose, blue	2489.00.42.06.11.xx	31
4	1	Electric-pneumatic valve	2489.00.41.32	33
		or		
		regulated compressed air from the press		
6	1	straight screwed connector G1/4"	2489.00.43.02.01	31

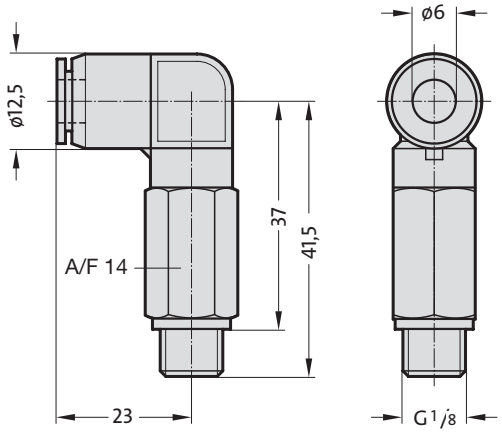
Compressed air connections for DN 6 hose connections

Note:

Material	polyurethane
Maximum temperature	60°C
Maximum pressure	16 bar

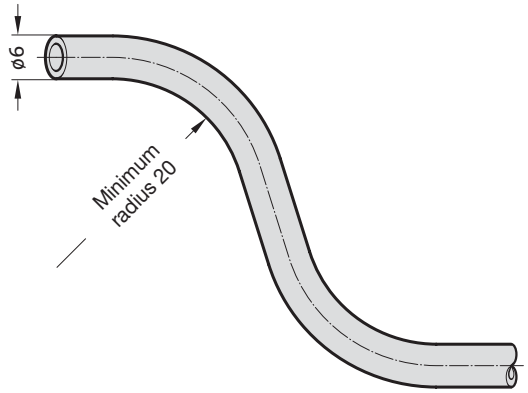
2489.00.43.01.02

Right angle connector, simple, 90° - G 1/8



2489.00.42.06.11.

Compressed air hose

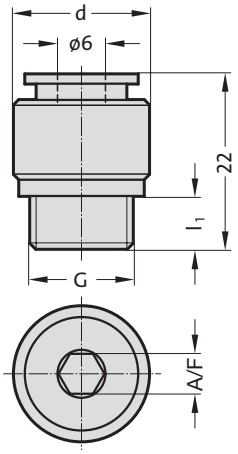


Order no.		Colour	Min. radius permitted
Compressed air hose	= 2489.00.42.06.11.xx	blue	20

Lenght .xx, order in complete metres

2489.00.43. _ _ .01

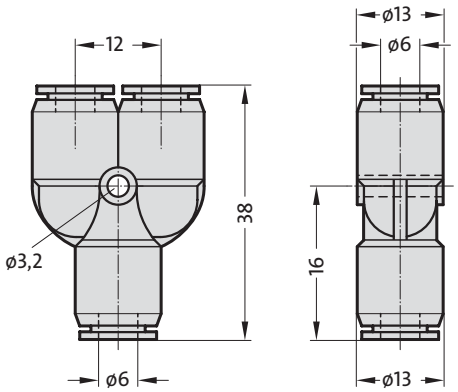
Straight plug-in connector



Order no.		G	d	l_1	A/F
Straight plug-in connector	= 2489.00.43.01.01	1/8"	13	4,6	4
	= 2489.00.43.02.01	1/4"	17	6,6	4

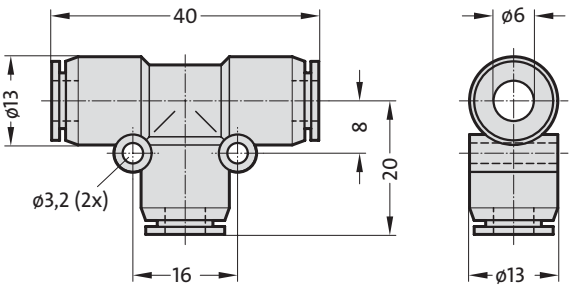
2489.00.44.06.06

Y connector (hose to hose)



2489.00.44.06.05

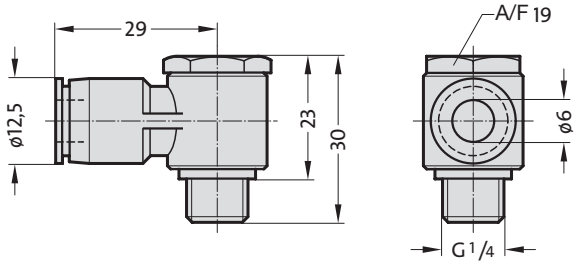
T connector (hose to hose)



Controllable Gas Springs
Control system

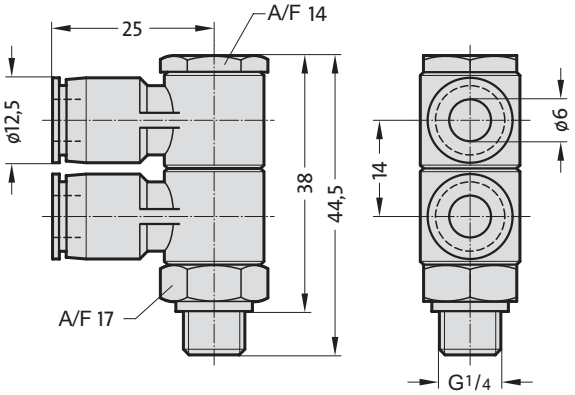
2489.00.43.02.02

Right angle plug-in connector, one way 90°



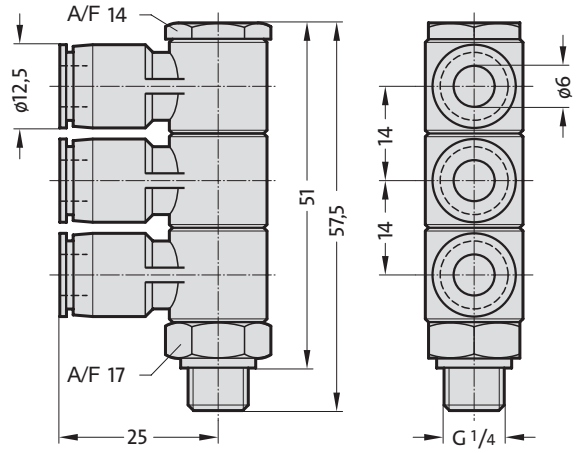
2489.00.43.02.03

Right angle plug-in connector, two way, 90°



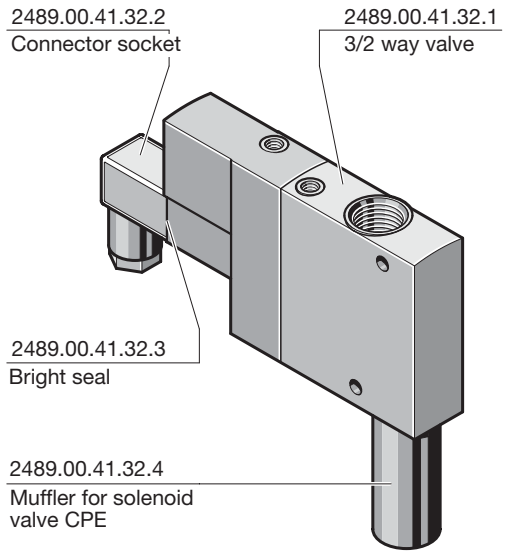
2489.00.43.02.04

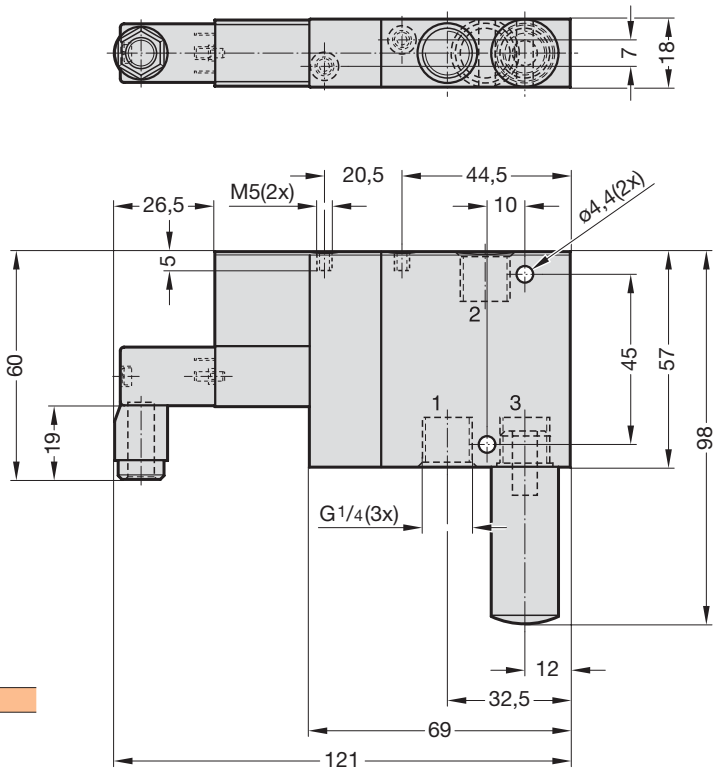
Right angle plug-in connector, three way, 90°



Controllable Gas Springs
Control system

2489.00.41.32.



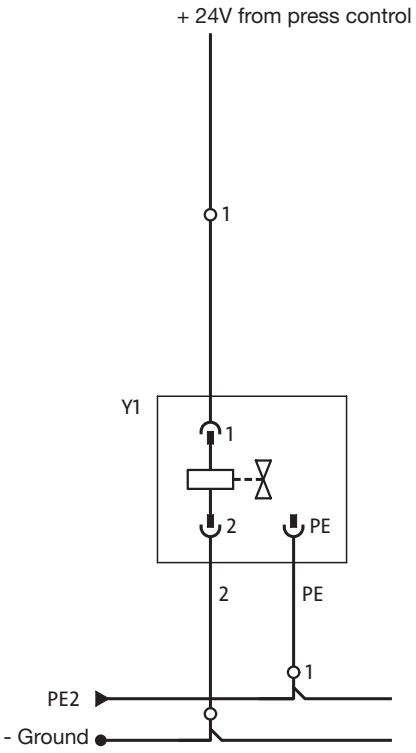


Technical data:

Fluid:	Air or inert gas, filtered oily or dry
Voltage:	24V — (1.5 W)

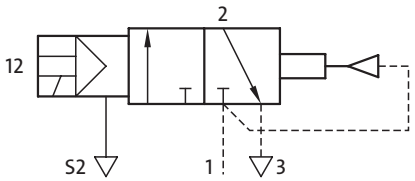
- the valve is supplied complete with muffler.
- One valve can control up to 6 Gas Springs or one valve block (KF+KP system).

Connetion symbol: socket



Connetion symbol: valve

Normally closed when GL control air assistance



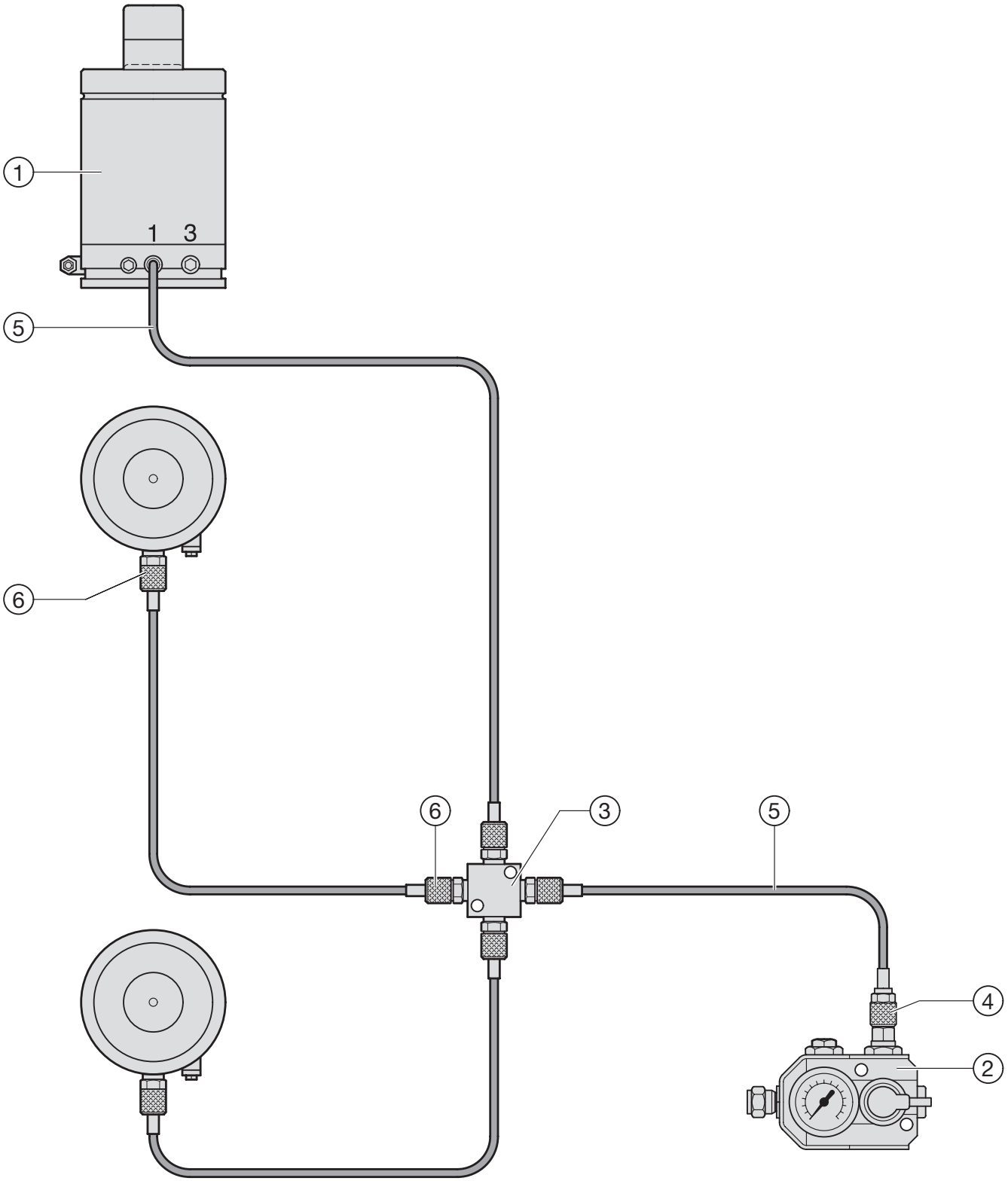
Controllable Gas Springs
Filling and Emptying gas, KF

Filling and Emptying gas, KF

KF Gas Springs have to be connected to a control fitting for filling and checking the gas pressure. For each KF Gas Spring one hose is required for filling and emptying. This hose is connected to the control fitting via a distributor block.

We recommend the use of the micro hose system (2480.00.23./24. see pp. 40-41) and the correct connectors. As supplied, connections 1 & 3 of the KF Gas Spring are closed off with blanking plugs. The filling valve in connection 1 must be removed before the hose system is installed.

Example of a micro hose system (2480.00.23./24.) for three KF Gas Springs



Order no.

Item.	No.	Description	Order no.	Page
1	3	KF gas springs	2489.14.01500.030.031	24
2	1	Control unit	2480.00.31.01	39
3	1	G 1/8" distributor block with 4 ports	2480.00.24.34	42
4	1	Gauging coupling with G 1/4" valve	2480.00.24.02	41
5	4	Hose straight – straight	2480.00.23.01.xxxx	40
6	7	Gauging coupling with G 1/8" valve	2480.00.24.01	41

Controllable Gas Springs
Filling and Emptying gas, KF + KP

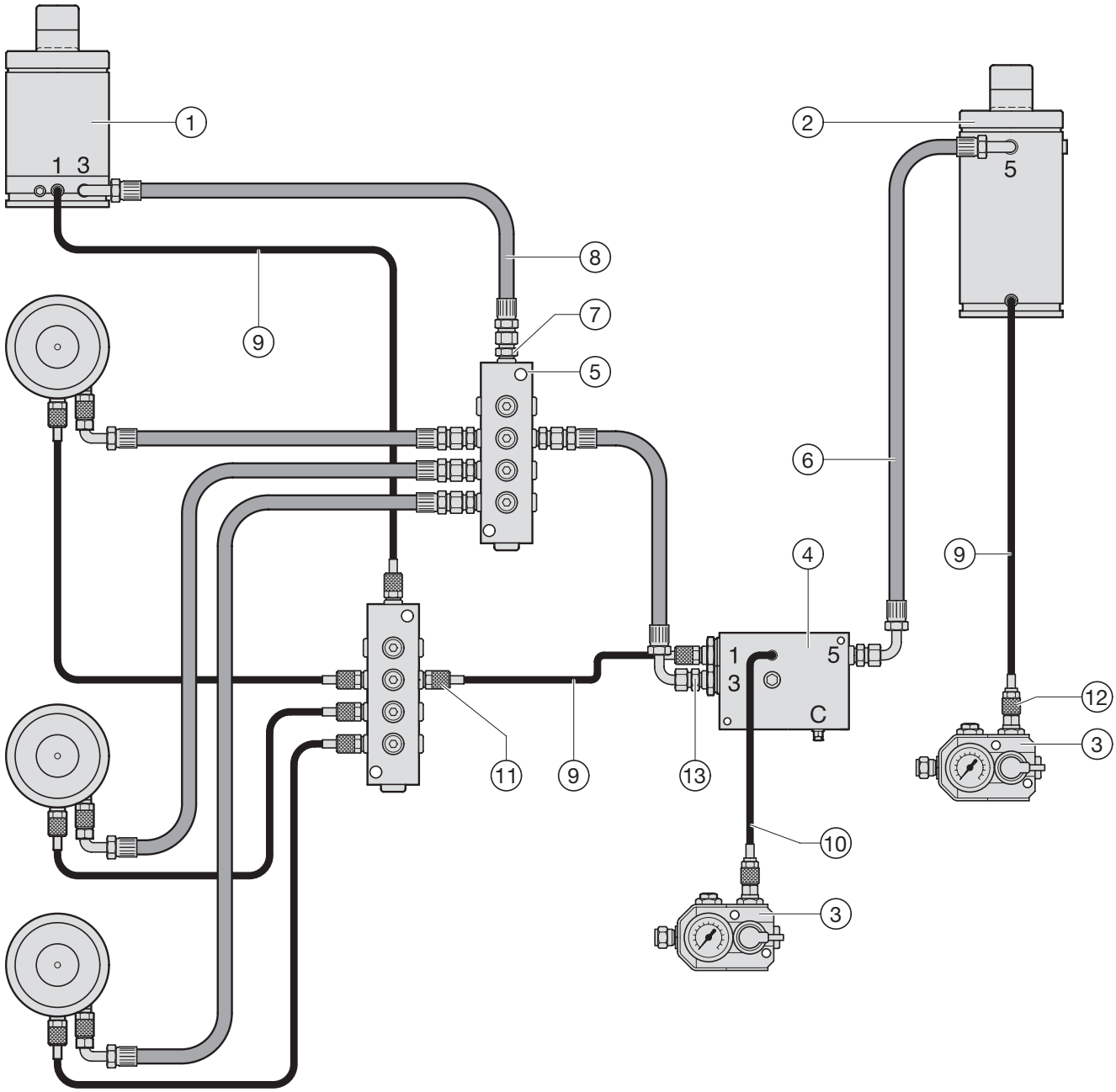
Filling and Emptying gas, KF+KP

These have to be connected to each other for checking or modifying the filling pressure of KF Gas Springs. There are two hoses for each KF Gas Spring - one to fill it and one to empty it. The micro hose system (2480.00.23./24. see page 40-41) is used for port 1. A more robust hose is required for the connection between port 3 of the KF Gas Spring, the valve block and port 5 of the KP Gas Spring. We recommend our 24° cone hose system (2480.00.25./26. see page 44-46).

A KF+KP system is filled in two stages. First the lower gas compartment of the KP Gas Spring is filled and then the KF Gas Springs. If the valve block and the KP Gas Spring are mounted in a tool, control units may be used to make the job of filling and emptying the system easier. As supplied, connections 1 & 3 of the KF Gas Spring are closed off with blanking plugs. The filling valve in connection 1 must be removed before the hose system is installed.

Controllable Gas Springs
Filling and Emptying gas, KF + KP

Example of a KF + KP system with four active gas springs and one passive gas spring



Order no.

Item.	Quantity	Description	Order No	Page
1	4	KF Gas Spring	2489.14.01500.030.031	24
2	1	KP Gas Spring	2489.16.01500	27
3	2	Control unit	2480.00.31.01	39
4	1	Valve block without pressure gauge	2489.00.47.01	38
5	2	Distributor block G 1/8"	2480.00.24.33	42
6	1	24° cone hose 90°/90°	2480.00.25.03.xxxx	45
7	10	Connector thread G 1/8"	2480.00.26.03	44
8	5	24° cone hose 90°/straight	2480.00.25.02.xxxx	45
9	6	Gauging hose straight/straight	2480.00.23.01.xxxx	40
10	1	Gauging hose, 90°/straight	2480.00.23.02.xxxx	40
11	11	Gauging coupling with G 1/8" valve	2480.00.24.01	41
12	3	Gauging coupling with G 1/4" valve	2480.00.24.02	41
13	2	Connector thread G 1/4"	2480.00.26.04	44

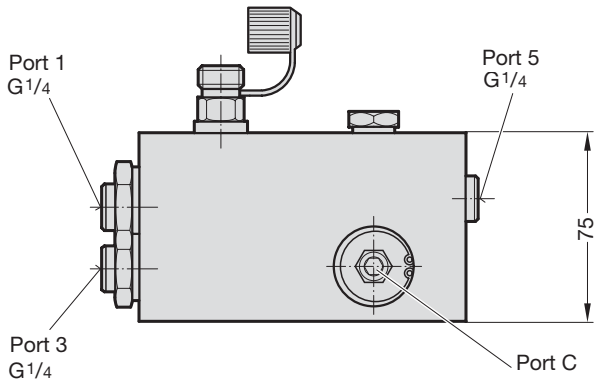
Controllable Gas Springs
Valve block without manometer

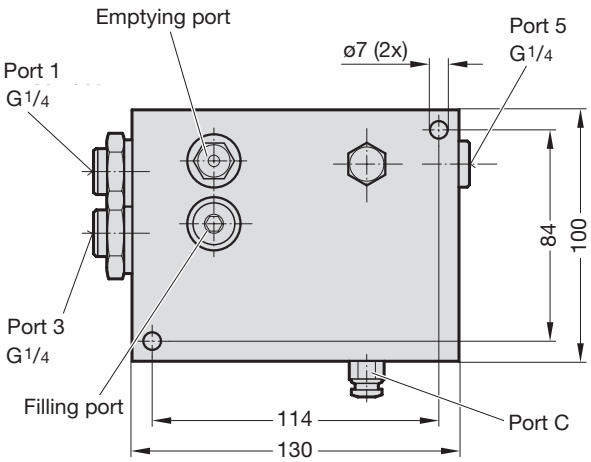
Valve block without manometer

Valve block **without** facility for emptying and filling

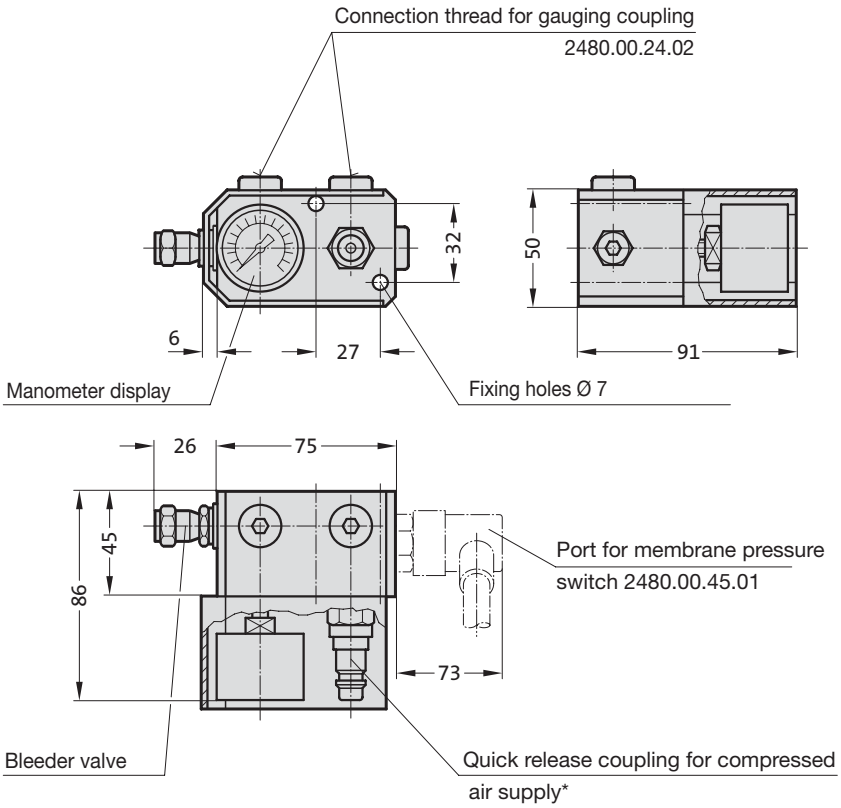
Order no 2489.00.47.01
(Filling pressure 25 -150 bar)

2489.00.47.01





2480.00.31.01 Control unit



Description:

The control unit 2480.00.31.01 provides continuous monitoring of the filling pressure of the KF+KP Gas Springs.

During operation the pressure can be checked in two ways:

a) by watching the pressure display

b) by automatic monitoring using a membrane pressure switch.This turns the machine off or triggers a signal if the pressure drops.

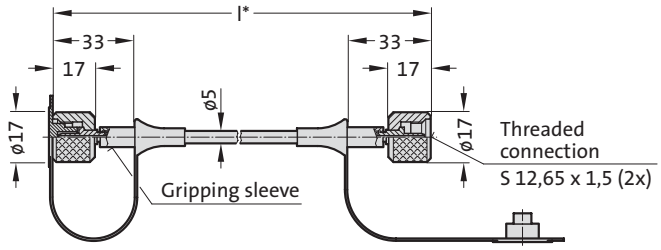
Note:

* 2m long filling hose with quick release coupling and gas bottle connector Order no: 2480.00.31.02 (order separately)

Controllable Gas Springs
Gauging hoses

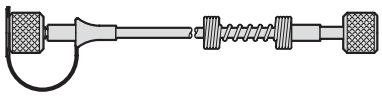
2480.00.23.01.

Gauging hose -
both ends straight



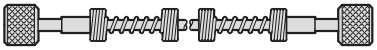
2480.00.23.01.----.1

Antikink spiral, at one end



2480.00.23.01.----.2

Antikink spiral, at both ends



2480.00.23.01.

Order no.	l*
2480.00.23.01. 0200	200
2480.00.23.01. 0300	300
2480.00.23.01. 0400	400
2480.00.23.01. 0500	500
2480.00.23.01. 0630	630
2480.00.23.01. 0800	800
2480.00.23.01. 1000	1000
2480.00.23.01. 1200	1200
2480.00.23.01. 1500	1500
2480.00.23.01. 2000	2000
2480.00.23.01. 2500	2500
2480.00.23.01. 3000	3000

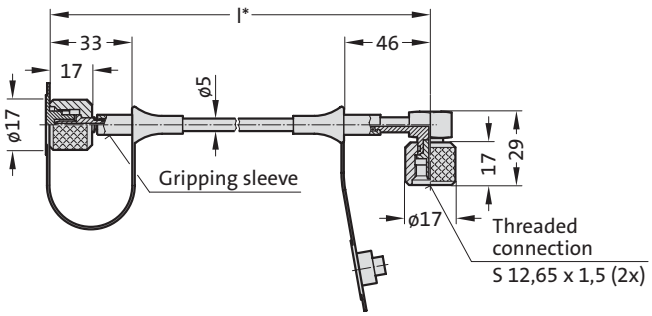
other lengths available in 5 mm steps,

shortest factory lengths:

without antikink protection	90 mm
antikink protection at one end	150 mm
antikink protection at both ends	300 mm

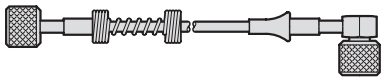
2480.00.23.02.

Gauging hose -
one end straight
90°-angle



2480.00.23.02.----.1

Antikink spiral, at one end, straight

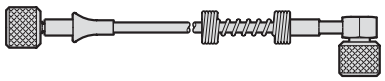


2480.00.23.02.----.2

Antikink spiral, at both ends

2480.00.23.02.----.3

Antikink spiral, at one end, 90°



2480.00.23.02.

Order no.	l*
2480.00.23.02. 0200	200
2480.00.23.02. 0300	300
2480.00.23.02. 0400	400
2480.00.23.02. 0500	500
2480.00.23.02. 0630	630
2480.00.23.02. 0800	800
2480.00.23.02. 1000	1000
2480.00.23.02. 1200	1200
2480.00.23.02. 1500	1500
2480.00.23.02. 2000	2000
2480.00.23.02. 2500	2500
2480.00.23.02. 3000	3000

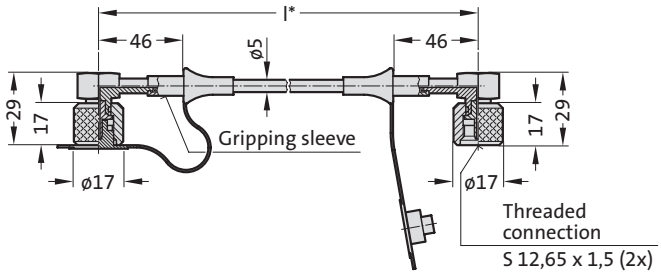
other lengths available in 5 mm steps,

shortest factory lengths:

without antikink protection	90 mm
antikink protection at one end	150 mm
antikink protection at both ends	300 mm

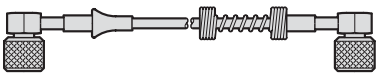
2480.00.23.03.

Gauging hose -
both ends
90°-angle



2480.00.23.03.----.3

Antikink spiral, at one end



2480.00.23.03.----.2

Antikink spiral, at both ends

2480.00.23.03.

Order no.	l*
2480.00.23.03. 0200	200
2480.00.23.03. 0300	300
2480.00.23.03. 0400	400
2480.00.23.03. 0500	500
2480.00.23.03. 0630	630
2480.00.23.03. 0800	800
2480.00.23.03. 1000	1000
2480.00.23.03. 1200	1200
2480.00.23.03. 1500	1500
2480.00.23.03. 2000	2000
2480.00.23.03. 2500	2500
2480.00.23.03. 3000	3000

other lengths available in 5 mm steps,

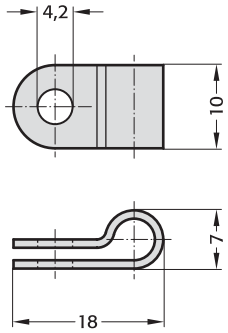
shortest factory lengths:

without antikink protection	105 mm
antikink protection at one end	150 mm
antikink protection at both ends	300 mm

Controllable Gas Springs
Gauging coupling

2480.00.23.12.01

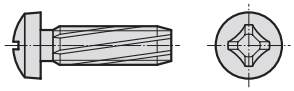
Hose clamp for gauging hose DN2 (Ø 5 mm)



Material: Polyamide
Note:
Supplied without screws

2192.50.04.012

self-tapping screw
A M4x12 DIN 7516



Note:
self-tapping
Diameter of hole for self-tapping screw = 3,6 mm

2480.00.23.13.

Anti-scuff spiral for subsequent installation over hoses and tubing

Order No.	l in mm
2480.00.23.13.0001	1000
2480.00.23.13.0002	2000
2480.00.23.13.0005	5000
2480.00.23.13.0010	10000

Material:
Polyamide
Description:
The anti-scuff spiral is used to protect against abrasion, is resistant to air, water, oil, hydraulic fluids petrol and other liquids.

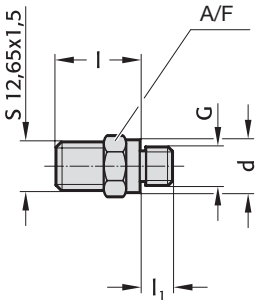
Inner-Ø	7 mm
For hose/tubing outer-Ø	5-11 mm
Temperature range	-30 °C up to +100 °C

Gauging coupling for connecting to Gas Spring

2480.00.24.01 with valve
2480.00.24.03 without valve

Gauging coupling for connecting to Control Fitting

2480.00.24.02 with valve
2480.00.24.04 without valve

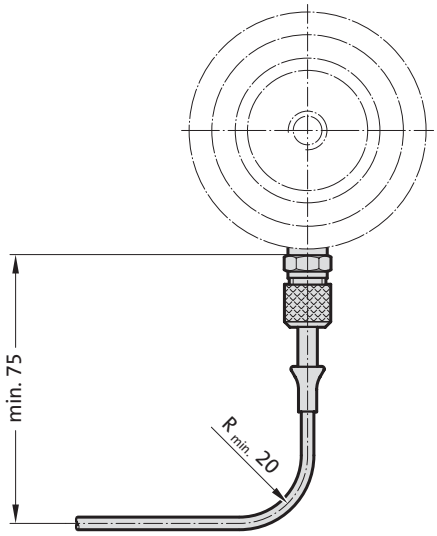


Note:

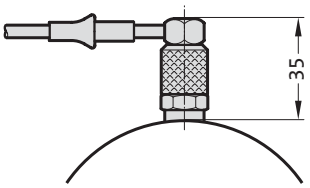
The gauging coupling with valve is used in standard permanent connections. The valveless gauging coupling is used in systems where changes to the filling pressure are necessary on a regular basis (e.g. die cushions)

Order No.	G	d	A/F	l	l_1
2480.00.24.01	G 1/8"	14	14	22	8
2480.00.24.02	G 1/4"	19	19	21	10
2480.00.24.03	G 1/8"	14	14	22	8
2480.00.24.04	G 1/4"	19	19	21	10

Installation dimensions 1



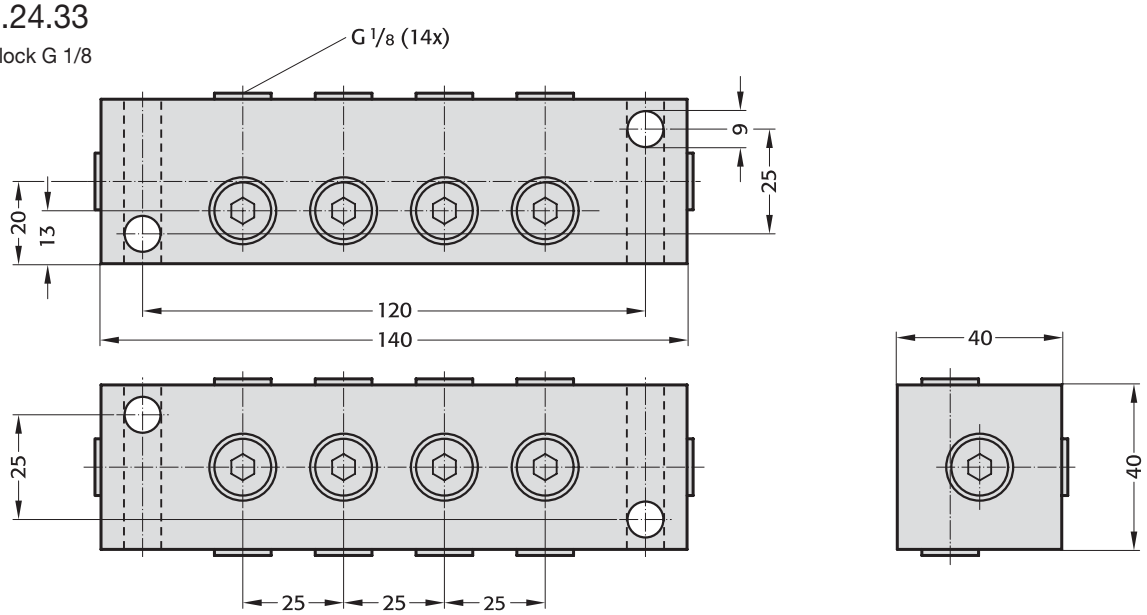
Installation dimensions 2



Controllable Gas Springs
Distributor block

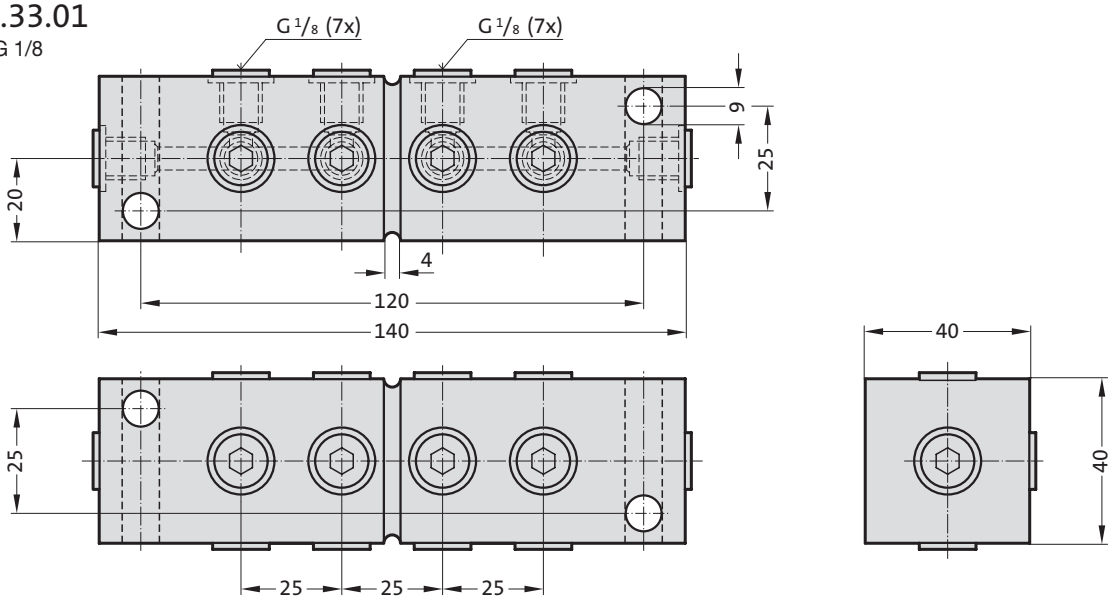
2480.00.24.33

Distributor block G 1/8
14 ports



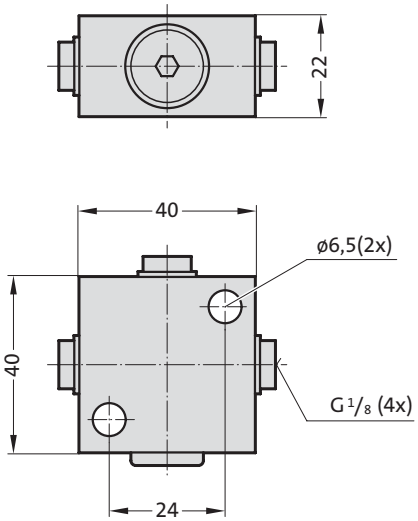
2489.00.24.33.01

Distributor block G 1/8
2x7 ports



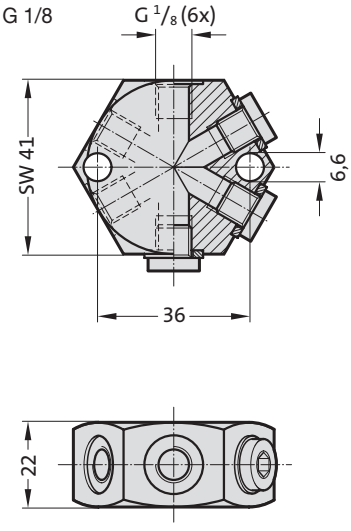
2480.00.24.34

Distributor block G 1/8
4 ports



2480.00.24.31

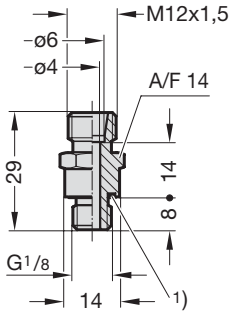
Distributor block G 1/8
6 ports



Controllable Gas Springs
24° cone threaded connectors
(DIN 2353/DIN EN ISO 8434-1)

2480.00.26.03

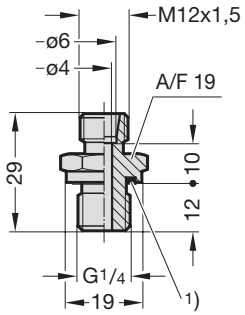
Connector thread-G1/8



1) Elastic seal ED

2480.00.26.04

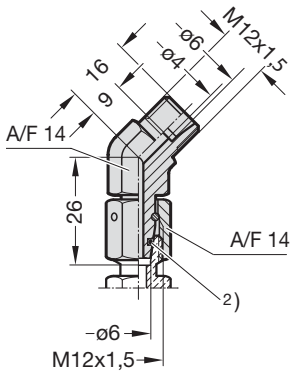
Connector thread-G1/4



1) Elastic seal ED

2480.00.26.21

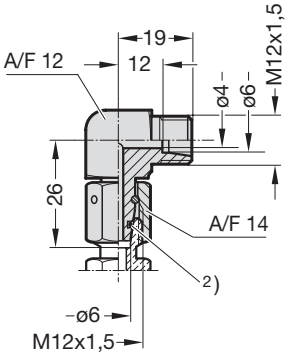
45° swivel coupling, complete



2) O-Ring

2480.00.26.22

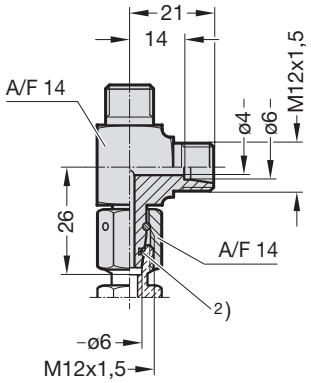
90° swivel coupling, complete



2) O-Ring

2480.00.26.23

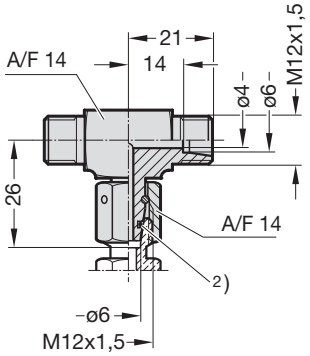
L-shaped swivel coupling, complete



2) O-Ring

2480.00.26.24

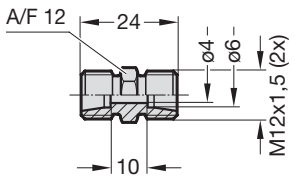
T-shaped swivel coupling, complete



2) O-Ring

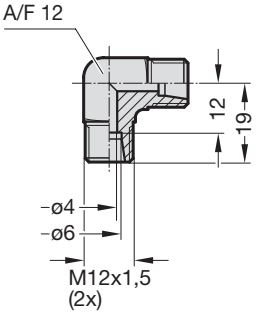
2480.00.26.25

Hose to hose adapter, straight



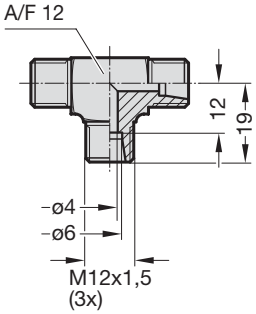
2480.00.26.26

90° hose to hose adapter



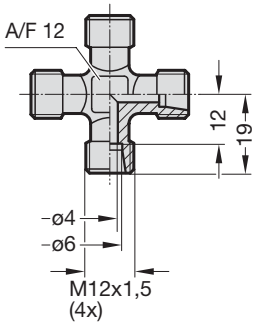
2480.00.26.27

T-shaped hose to hose adapter



2480.00.26.28

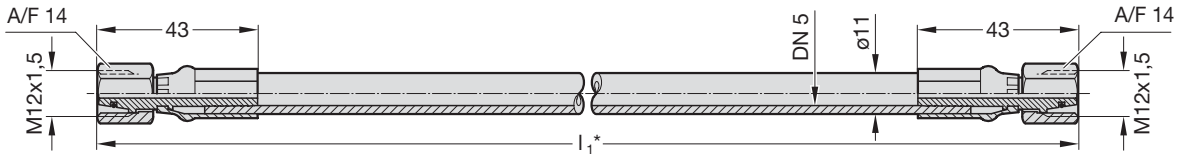
Adapter, K
Hose to hose



Controllable Gas Springs
24° cone threaded connectors
(DIN 2353/DIN EN ISO 8434-1)

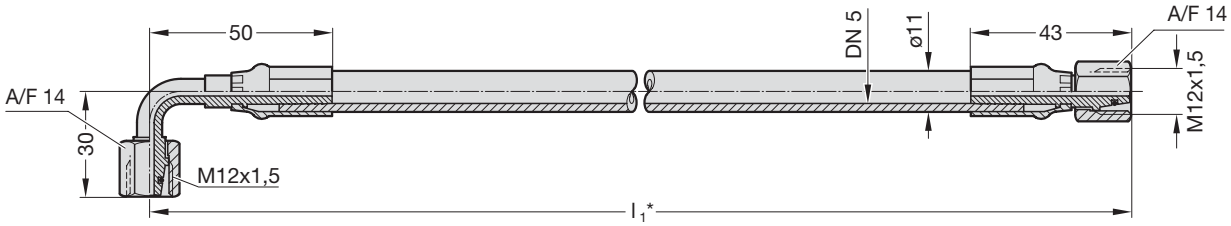
2480.00.25.01. Hose with seal cones with union nuts and O-ring (straight/straight)

* Shortest factory lengths: 140 mm
Minimum bending radius R40



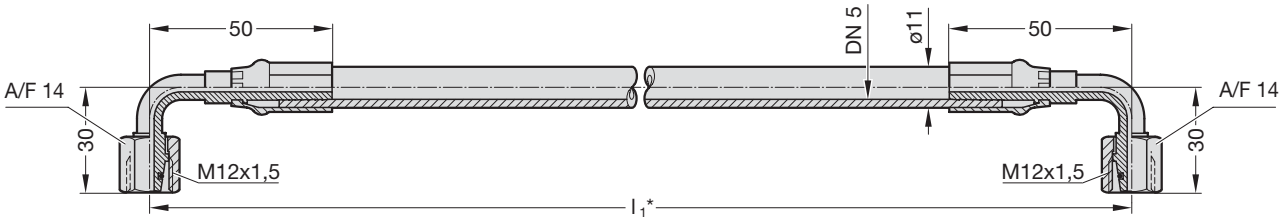
Dimension l_1 specified in the order, e.g. 765 mm, gives order no. 2480.00.25.01.0765

2480.00.25.02. Hose seal cones with union nuts and O-ring (90° elbow/straight)



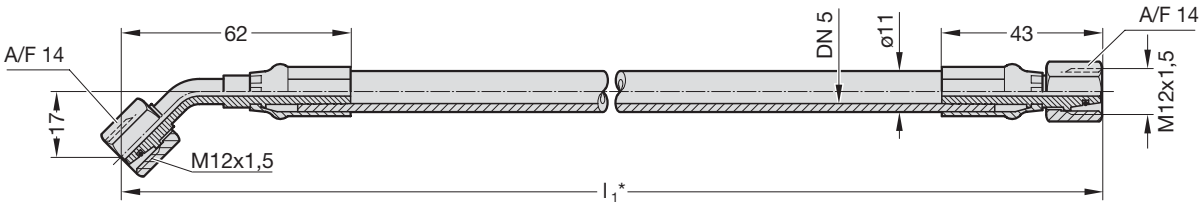
Dimension l_1 specified in the order, e.g. 765 mm, gives order no. 2480.00.25.02.0765

2480.00.25.03. Hose seal cones with union nuts and O-ring (90° elbow at both ends)



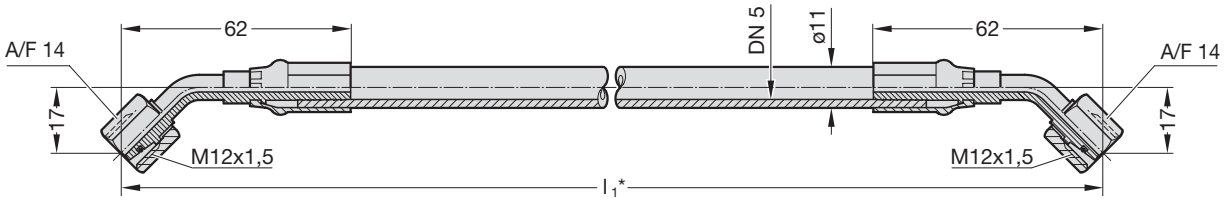
Dimension l_1 specified in the order, e.g. 765 mm, gives order no. 2480.00.25.02.0765

2480.00.25.04. Hose seal cones with union nuts and O-ring (45° elbow/straight)



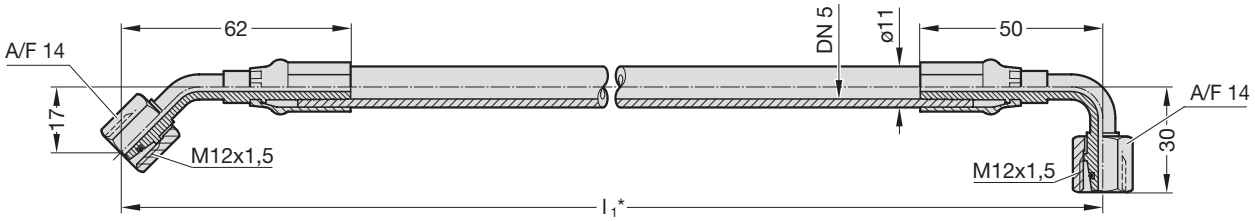
Dimension l_1 specified in the order, e.g. 765 mm, gives order no. 2480.00.25.03.0765

2480.00.25.05. Hose seal cones with union nuts and O-ring (45° elbow at both ends)



Dimension l_1 specified in the order, e.g. 765 mm, gives order no. 2480.00.25.04.0765

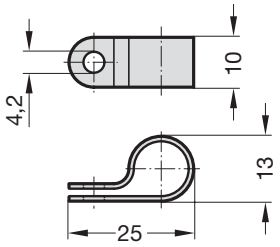
2480.00.25.06. Hose seal cones with union nuts and O-ring (45° elbow / 90° elbow)



Dimension l_1 specified in the order, e.g. 765 mm, gives order no. 2480.00.25.06.0765

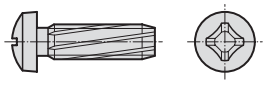
Controllable Gas Springs
Direct connection dimensions
24° cone threaded connectors (DIN 2353/DIN EN ISO 8434-1)

2480.00.25.12.01
Hose clamp for gauging hose DN5 (Ø11 mm)



Material: Polyamide
Note:
Supplied without screws

2192.50.04.012
self-tapping screw
A M4x12 DIN 7516



Note: self-tapping
Diameter of hole for self-tapping screw = 3,6 mm

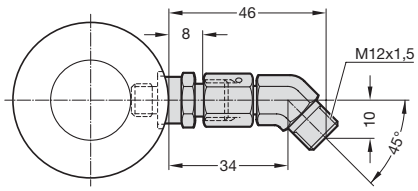
2480.00.23.13.
Anti-scuff spiral for subsequent installation over hoses and tubing

Order No.	l in mm
2480.00.23.13.0001	1000
2480.00.23.13.0002	2000
2480.00.23.13.0005	5000
2480.00.23.13.0010	10000

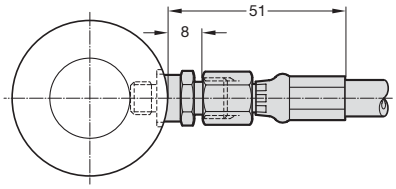
Inner-Ø	7 mm
For hose/tubing outer-Ø	5 – 11 mm
Temperature range	-30 °C to +100 °C

Material: Polyamide
Description:
The anti-scuff spiral is used to protect against abrasion, is resistant to air, water, oil, hydraulic fluids petrol and other liquids.

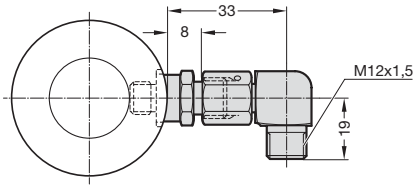
Direct connection
with 45° connector
2480.00.26.21



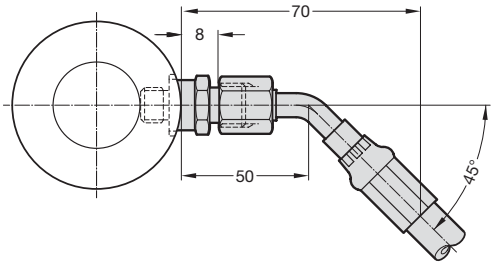
Direct connection
Hose, straight
Adapter 2480.00.26.03



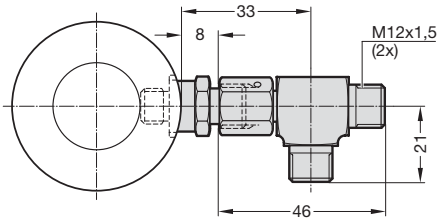
Direct connection with 90°
angle connector
2480.00.26.22



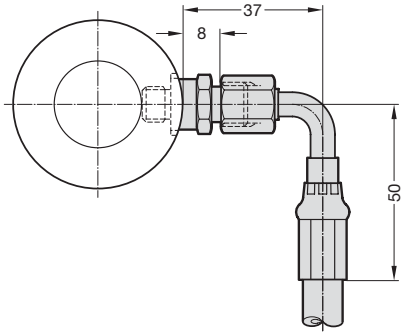
Direct connection
hose with 45° adapter
2480.00.26.03



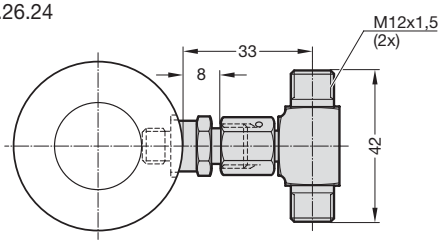
Direct connection
with L-shaped connector
2480.00.26.23



Direct connection
Hose with 90° adapter
2480.00.26.03.



Direct connection
with T-shaped connector
2480.00.26.24



Monitoring Process Safety

Controllable Gas Springs
System monitoring

Overheating protection

A bimetallic thermostatic relay should be used for protection against overheating, which will stop the press or prevent locking of the KF gas springs. The thermostatic relay opens if the temperature of the gas spring exceeds 80°C. The thermostatic relay closes again automatically when the gas spring returns to its normal temperature range. Operating the gas spring at higher temperatures would shorten its service life.

In a gas spring system without cooling it is sufficient to fit one gas spring with a thermostatic relay.

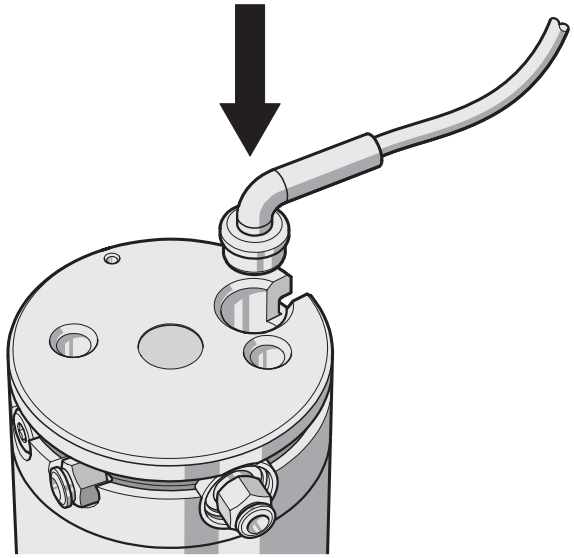
In a cooled gas spring system each spring must have a thermostatic relay. The thermostatic relays must then be switched sequentially.

The thermostatic relay is supplied with the active gas spring (KF).

Technical data:

Initial position	closed
Trigger temperature	85 ± 3°C
Hysteresis	< 7°C
Maximum voltage	110V ~

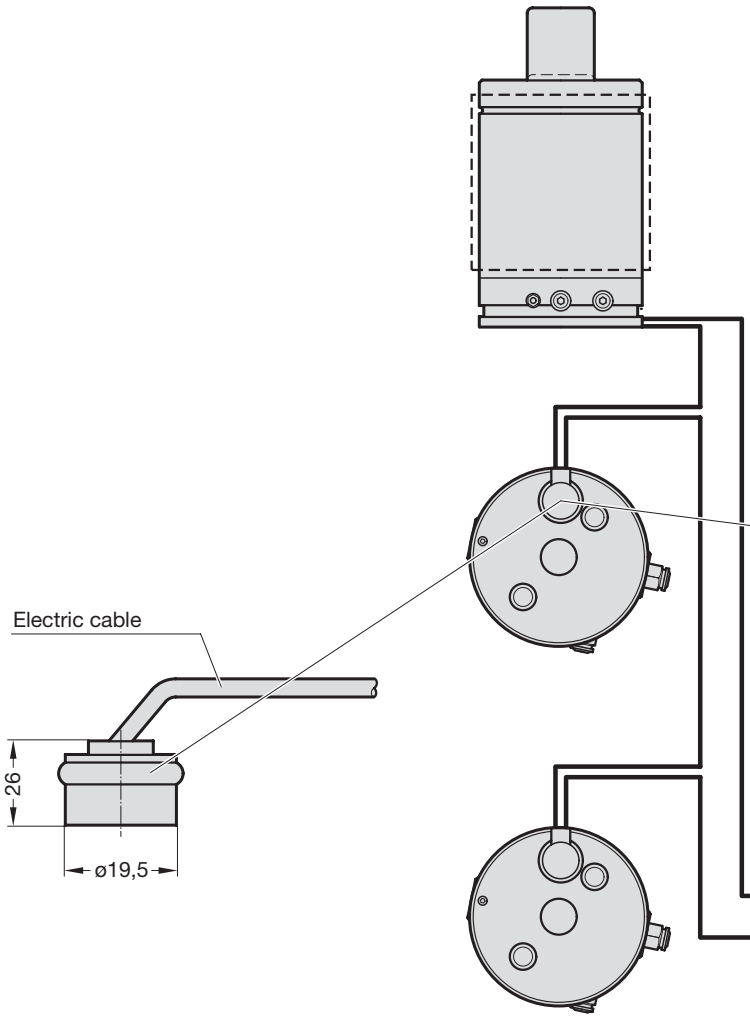
Supplied with a 1500 mm electrical cable.



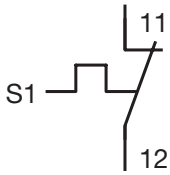
The thermostatic relay is a push fit in the base of the gas spring.

Thermostatic relay 2489.00.70

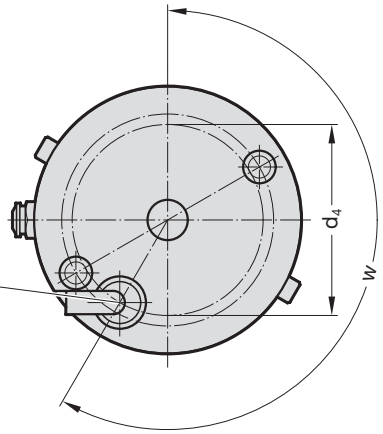
(for repeat order)



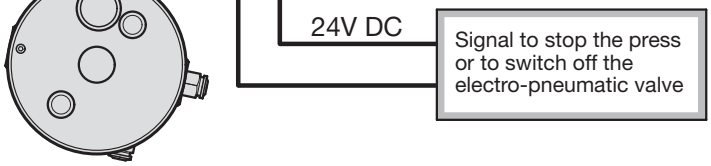
Connection symbol



Position of the thermostatic relay

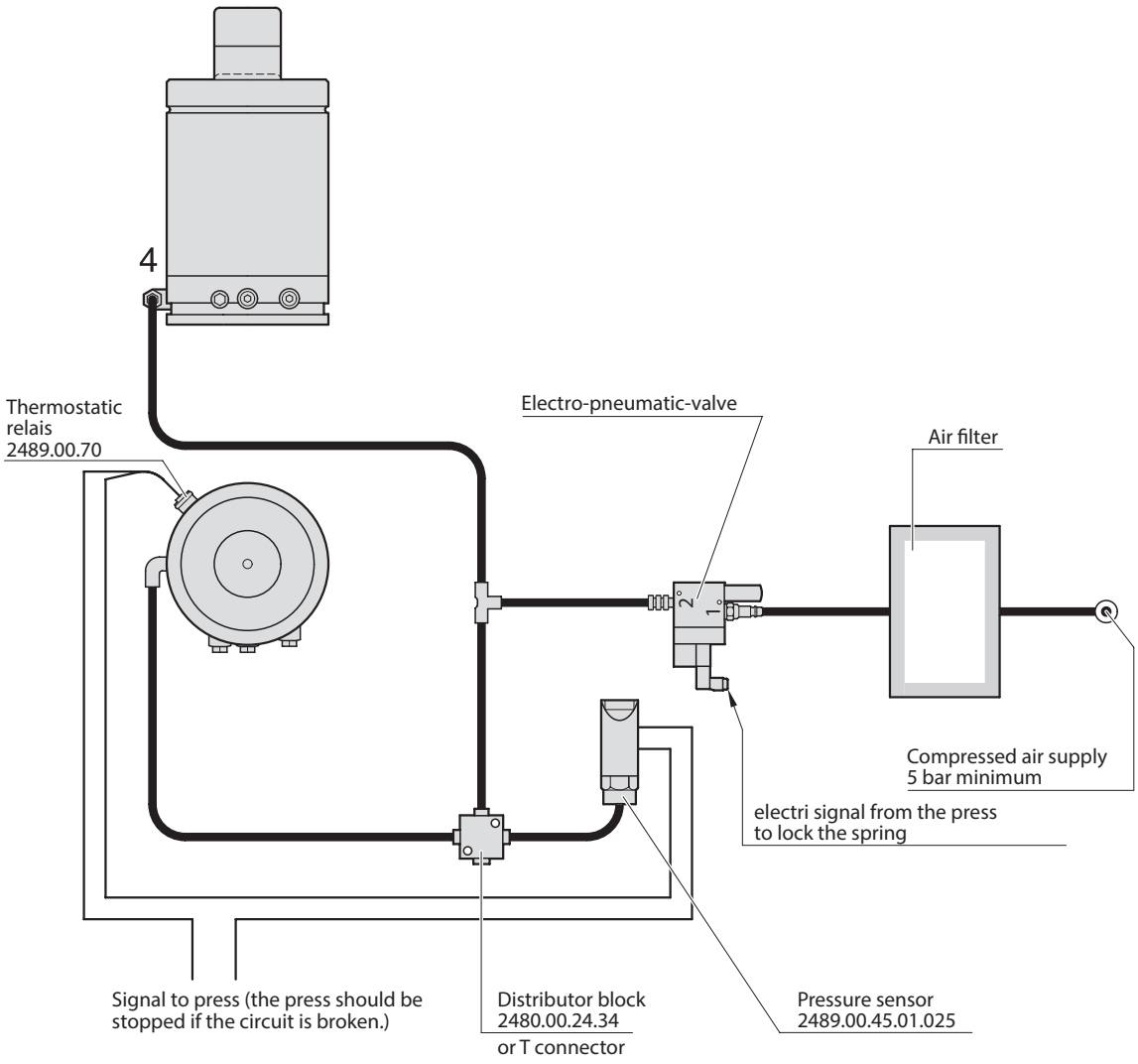


Order No	d_4	w
2489.14.01500.	60	170°
2489.14.03000.	86	210°
2489.14.05000.	96	305°
2489.14.07500.	100	305°



Monitoring air pressure

A pressure sensor can be used to ensure that gas springs receive the locking signal. If the pressure sensor is linked to the compressed air supply at port 4 of the gas springs, the press can be stopped if the KF gas springs have not received the locking signal or the control pressure is too high or too low.

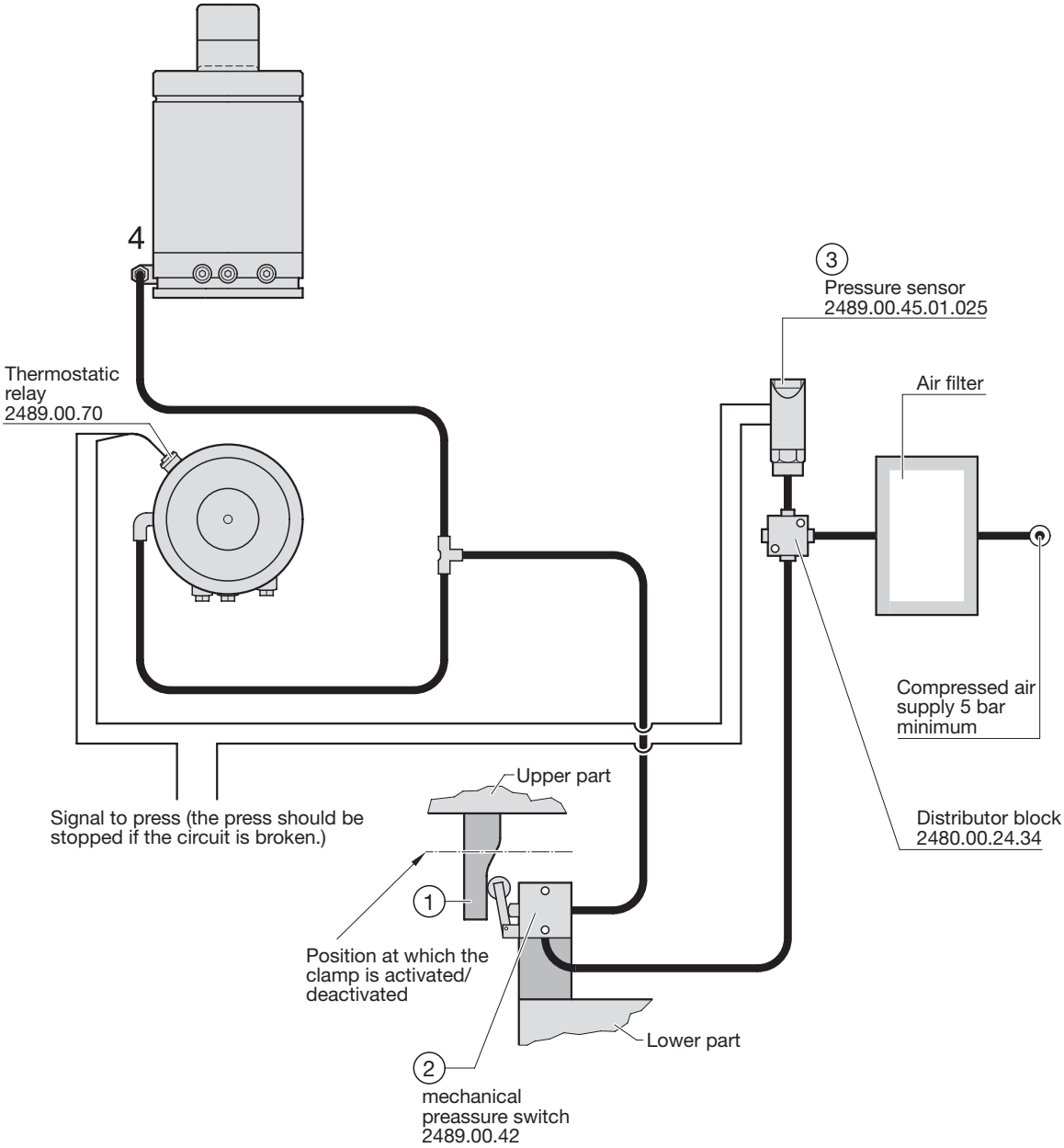


Controllable Gas Springs
System monitoring

Mechanical control system

This system does not require a control signal from the press. The locking function control is integrated completely in the tool. The KF gas springs remain locked as long as the mechanical pressure switch (2) is activated by the tool (1).

A pressure sensor is included to ensure that the compressed air supply is working. The pressure sensor (3) should be connected in series with the thermostatic relay in the gas spring(s).

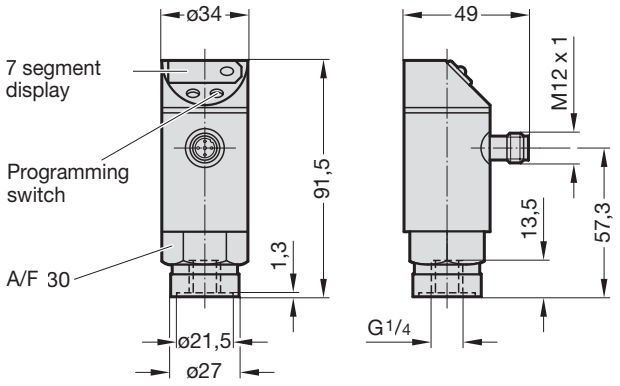


Please note:

Up to 6 KF Gas Springs or valve blocks can be controlled with one mechanical pressure switch. The mechanical pressure switch requires a continuous supply of filtered compressed air at a pressure of at least 5 bar.

2489.00.45.01.025

Electronic pressure sensor PN

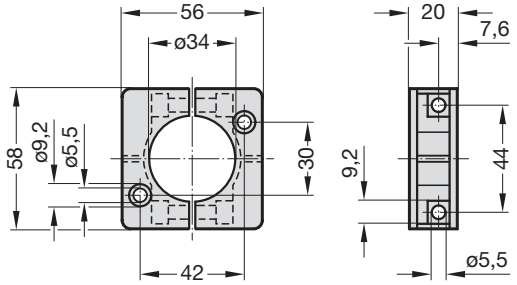


Technical data

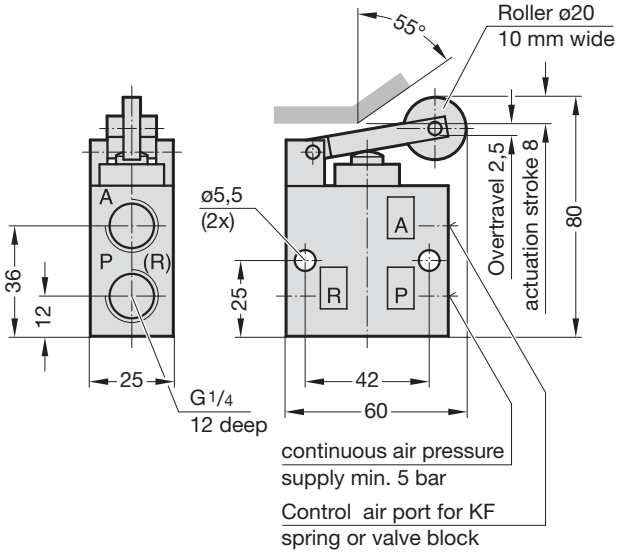
Measuring range	0...25 bar
Permitted overload pressure	100 bar
Setting range	
Switching point sP1	1,25...25 bar
Release point rP1	0,75...24,5 bar
Switching increments	0,25 bar
Protection	IP 65
Repeat accuracy	< ± 1,0%
Ambient temperature	- 25°C...+ 80°C
Operating voltage [V]	18...30 DC

2489.00.45.01.01

Mountings for pressure sensor 2489.00.45.01.025



2489.00.42

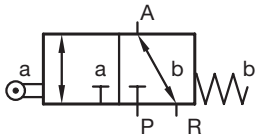


Technical data:
Pressure switches

Aluminium casing

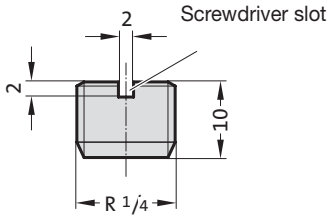
Min. permitted pressure	pe 0 bar
Rated pressure	pe 10 bar
Ambient temperature	80° C

Pressure switch with roller
3/2 way valve NG 6 (G 1/4) mechanical



2489.00.42.01

Muffler for pressure switch



Controllable Gas Springs
ID plate

We recommend that the ID plate should be mounted in an easily visible position on the tool when controllable gas springs are incorporated.

Controllable Gas Spring Systems

FIBRO

Tool no.							
Number of active KF gas springs			No.				
max. KF spring force			daN				
Stroke KF			mm				
Number of KP passive gas springs							
Size KP							
Stroke length used							
max. stroke rate			Strokes/min				
Filling pressure - active gas springs KF	min.		bar	max.		bar	
Pressure of filtered compressed air	min.	5	bar	max.	10	bar	

The following must be checked before the start of production or after a fault:

1. Filling pressure of the gas spring
2. Compressed air pressure
3. Compressed air signal or electrical signal from the press
4. Temperature of gas spring (max. 70 °C)

Attention!
NEVER WORK INSIDE THE TOOL WHEN THE GAS SPRING IS LOCKED

Note:
- The termostatic relay must be in use.

FIBRO GmbH · Business Area Standard Parts · D-74855 Hassmersheim · August-Läpple-Weg · **T** +49 6266 73-0* · **Made in Germany**

Order No. 2489.00.110.150.2

DIN dimension: 105 x 210 mm, holes ∅ 3,6 mm, hole pitch 85/190 mm

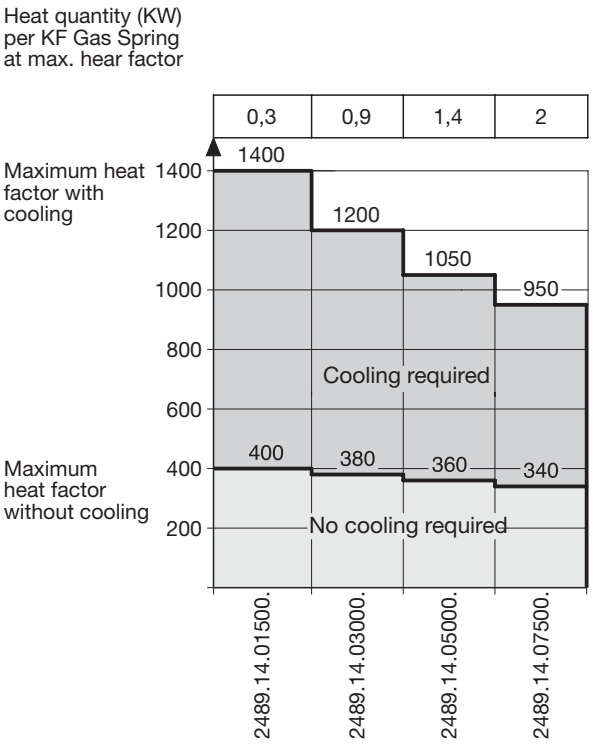
Order no.:

ID plate = 2489.00.110.150.2

To be affixed to all machines wich incorporate KF gas springs.

Cooling

Controllable Gas Springs
Cooling



Heat factor = stoke length (mm) x number of strokes (strokes/min)

Cooling

In every cycle energy is transferred from the press to the gas cylinder. This energy is converted into heat on the gas spring return stroke after locking.

The heat factor is calculated by multiplying the stroke rate by the stroke length of the gas spring. The gas spring requires cooling if the heat factor for a specific gas spring exceeds the values shown in the diagram.

Example:

Let us take a Gas Spring KF 2489.14.03000.060 with a stroke of 60 mm. The number of strokes is 8 strokes per minute. The heat factor is:

stroke length x stroke count = 60 x 8 = 480.

As can be seen from the diagram below, cooling is required when the heat factor exceeds 380, so cooling is necessary for this KF 2489.14.03000.060.

Method for reducing the cooling requirement

The cooling requirement reduces in the case of a larger Gas Spring operating at a lower pressure.

The example above could for example be resolved in this way:

We can use the next larger Gas Spring KF 2489.14.05000. instead of the KF 2489.14.03000. The pressure in the KF 2489.14.05000. is reduced to bring the Gas Spring force down from 5000 daN to 3000 daN. The new filling pressure is 3000/5000 x 150 bar = 90 bar. The cooling requirement for the 5000 Gas Spring reduces by the same proportion as the filling pressure.

The heat factor = 60 x 8 x 3000/5000 = 228

The heat factor is under 360, the maximum for the 5000 Gas Spring, so no cooling is required.

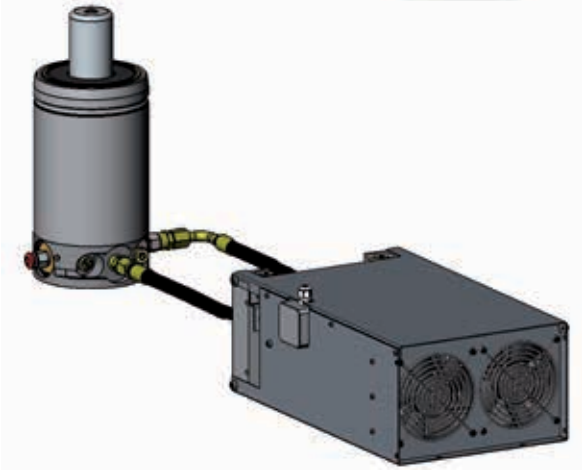
Controllable Gas Springs
Gas cooler

The table below compares the different cooling versions.

Opt.	Advantages	Difficulties
1	+ No additional hoses required	- Risk of overheating
2	+ Cooling integrated in the tool + Up to 4 active gas springs can be used	- 60% slower return stroke speed
3	+ Can be used for several active gas springs + High cooling capacity (up to 25 kW)	- External cooling unit required

1. Active gas springs 2489.14. without cooling

Controllable gas springs can be operated autonomously or combined like standard gas springs. The stroke of the active spring 2489.14 can be adjusted. Very easy installation in the tool.
For applications with a short stroke length or low stroke frequency.



2. Active gas springs 2489.14. ...N with gas cooler 2489.00.20.15

Gas coolers 2489.00.20.15 can optimally be used where a few active gas springs are operated at a higher production rate (longer stroke length and/or higher stroke frequency) or where not sufficient space for an external liquid cooling system is available.

3. Active gas springs 2489.14. ...K with liquid cooling system 2489.00.50.

For applications with several active gas springs at a high production rate (longer stroke length and/or higher stroke frequency). 10 kW and 25 kW cooling systems are available depending on the required cooling capacity.

Controllable Gas Springs
Gas cooler

Gas coolers have been developed for integrating the cooling of active gas springs in the tool for high production rates.

The gas cooler has a very compact design and a cooling capacity of 1.5 kW. Up to 4 active gas springs can be cooled per gas cooler.

For connecting a gas cooler to the active gas springs, the mounted standard cartridge valve must initially be replaced by a special cartridge valve provided with an additional gas connection.

Active gas springs 2489.14. with article numbers ending with "...N" can be ordered with a factory-mounted special cartridge valve. Alternatively, existing springs can easily be refitted with conversion kit 2489.14.1001. .N.

Gas cooler
Order no. 2489.00.20.15

Order example for active gas springs with gas cooler connection:

2489.14. xxxxx . xxx . xxx N

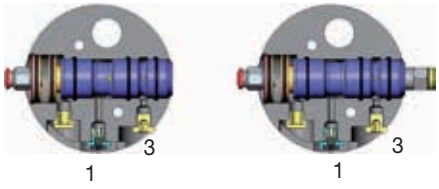
Initial spring force:
- 1500 daN
- 3000 daN
- 5000 daN
- 7500 daN

- Gas cooler
- Set stroke length
- Nominal stroke length

Order example for the gas cooling conversion kit:

Gas cooling conversion kit	for gas spring
2489.14.1001.015.N	2489.14.01500.
2489.14.1001.030.N	2489.14.03000.
2489.14.1001.050.N	2489.14.05000.
2489.14.1001.075.N	2489.14.07500.

Cartridge valve design



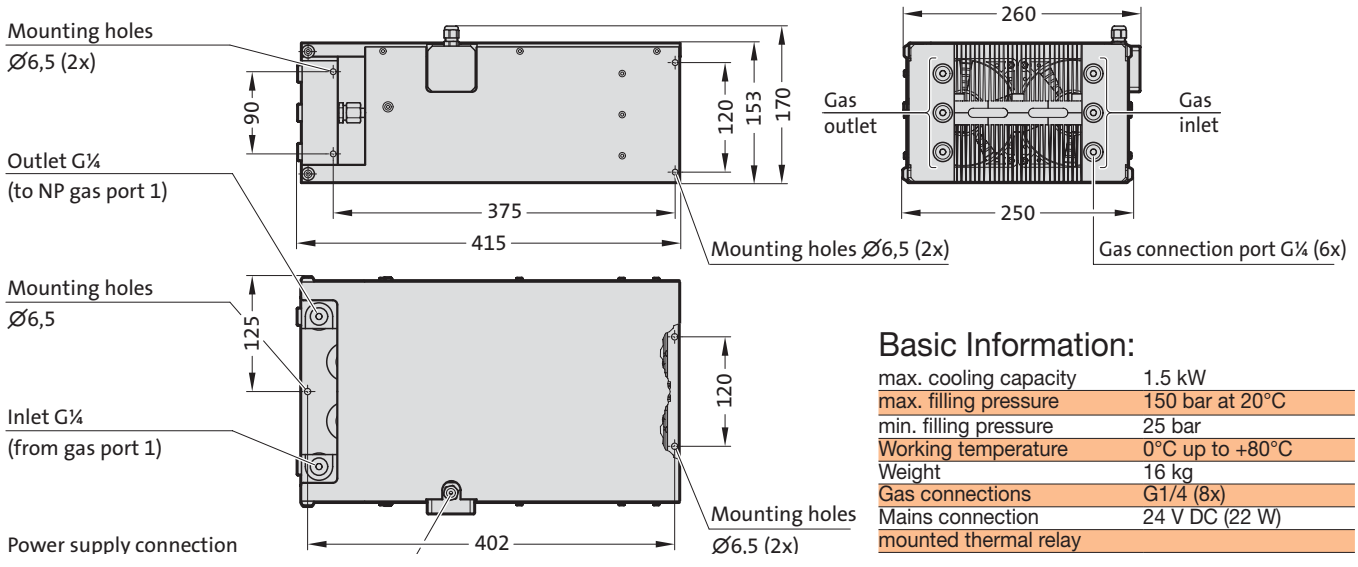
Gas cooler Connection

Standard 2489.14.1001

Gas cooling 2489.14.1001. .N

Dimensions

The gas cooler 2489.00.20.15 is operated at 24 Volt DC (22 W). It can be installed both vertically and horizontally in or outside the tool. The gas cooler 2489.00.20.15 has been approved according to protection class IP 64 and does not have to be removed when the tool is cleaned.



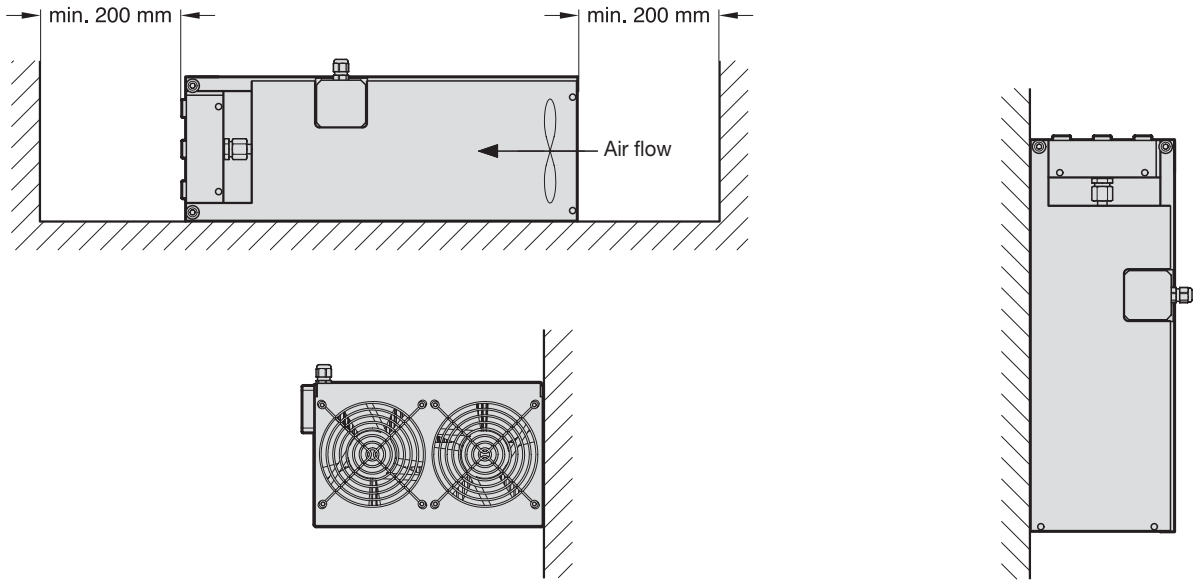
Basic Information:

max. cooling capacity	1.5 kW
max. filling pressure	150 bar at 20°C
min. filling pressure	25 bar
Working temperature	0°C up to +80°C
Weight	16 kg
Gas connections	G1/4 (8x)
Mains connection	24 V DC (22 W)
mounted thermal relay	

Controllable Gas Springs
Gas cooler

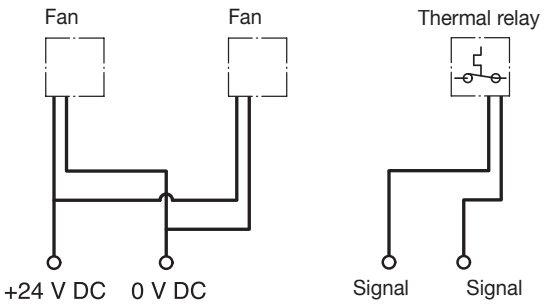
Installation options

The gas cooler can be installed both vertically and horizontally. During installation, make sure **NOT** to obstruct air circulation to the gas cooler. Reduced air supply to the ventilator will reduce performance.

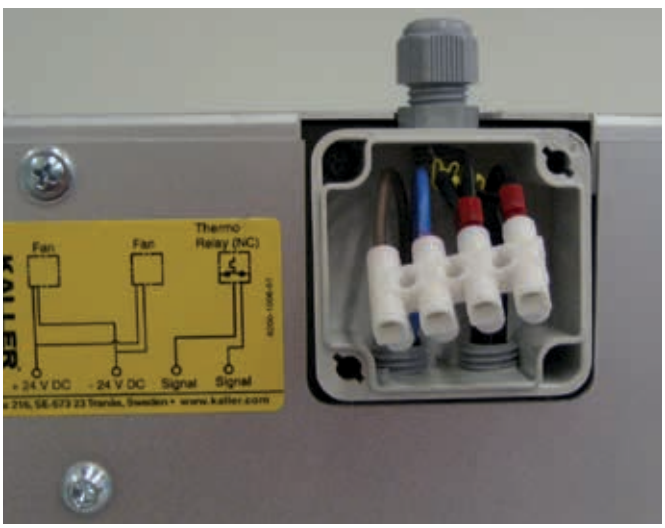


Electrical connection

Below is the connection diagram of the gas cooler. The connection diagram is also attached on the side next to the electrical connection box. The gas cooler includes a mounted thermal relay. When a temperature of 85 °C (±5%) is exceeded, the thermal relay will interrupt the electric circuit. To prevent overheating of the controllable gas springs, the thermal relay should beconnected to the press control.



Electric circuit is interrupted if temperature exceeds 85 °C



Controllable Gas Springs
Gas cooler

Gas cooler performance data

Depending on the heat that is generated by the gas springs in the tool, up to four gas springs can be connected to one gas cooler. The following diagrams show the max. number of strokes/min. for the use of 1, 2, 3 or 4 active gas springs 2489.14. ...N for a filling pressure of 150 bar (connected to a gas cooler). The four curves show the upper limit value of a thermal output of 1.5 kW of the gas cooler for the respectively connected number of springs.Each diagram serves for selecting the number of active springs 2489.14. ...N to be connected to a gas cooler. The curve may not be exceeded for each stroke length specified, depending on the strokes/min.

Note:

When using the gas cooler, the return stroke speed of the piston rod changes as follows:

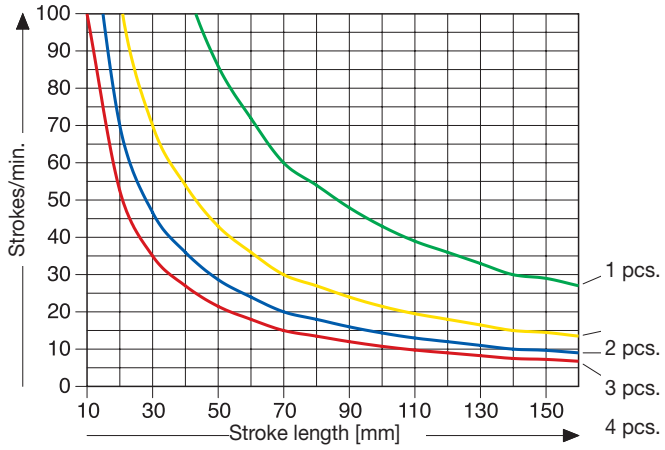
2489.14.01500. ...N approx. 0,08 m/s
2489.14.03000. ...N approx. 0,08 m/s
2489.14.05000. ...N approx. 0,04 – 0,05 m/s
2489.14.07500. ...N approx. 0,03 – 0,08 m/s

Piston rod return stroke speed is dependent on the filling pressure.

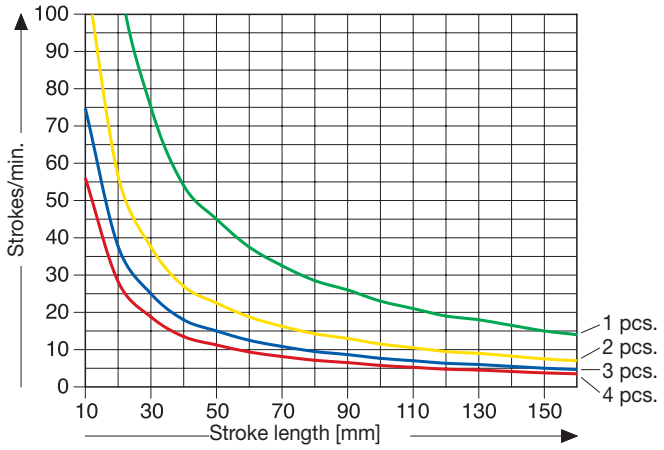
Observe:

The piston rod return stroke speeds apply to cooling hose lengths up to 1.5 m.
Longer cooling hose lengths slow down the piston rod return stroke.

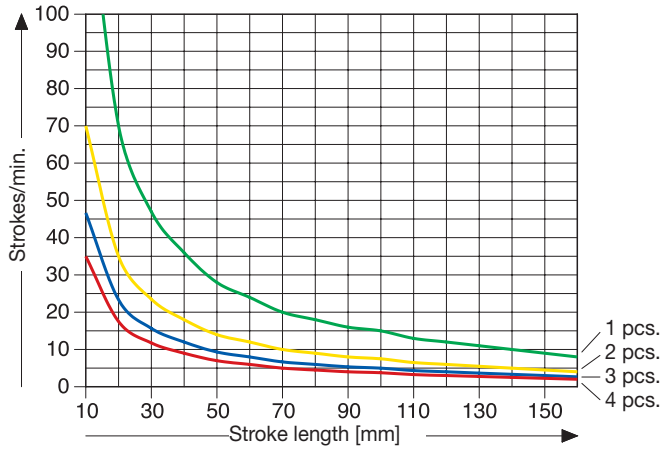
2489.14.01500.



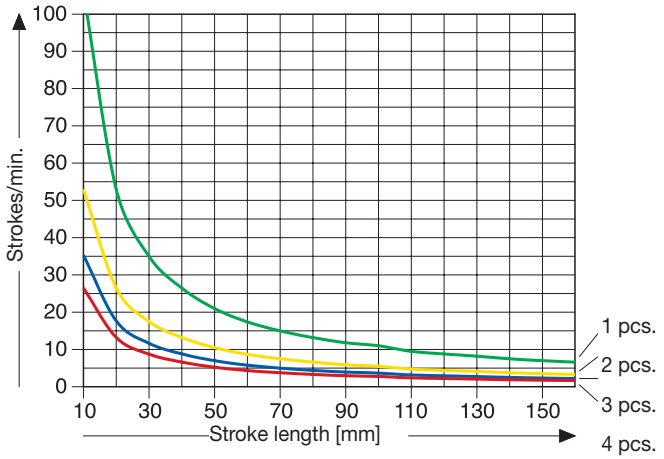
2489.14.03000.



2489.14.05000.



2489.14.07500.



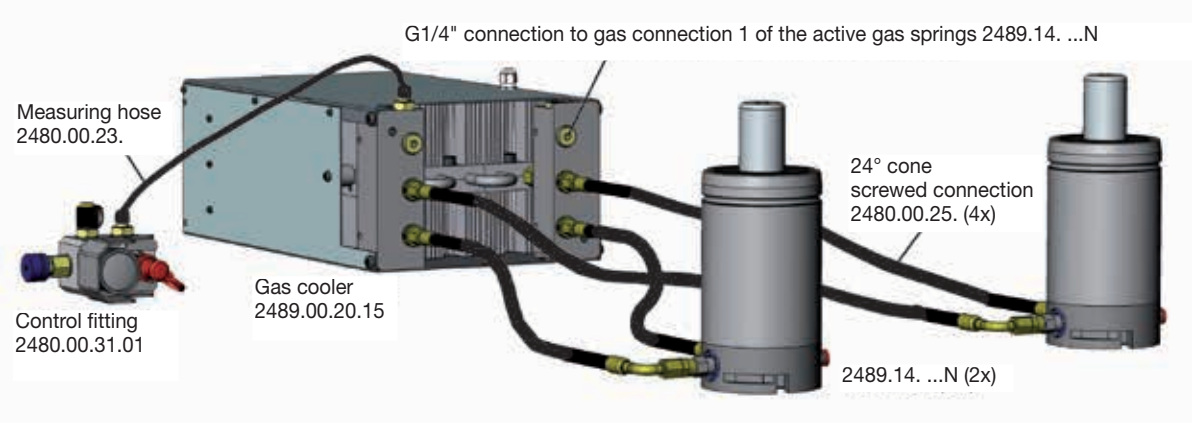
Controllable Gas Springs
Gas cooler

Connection examples

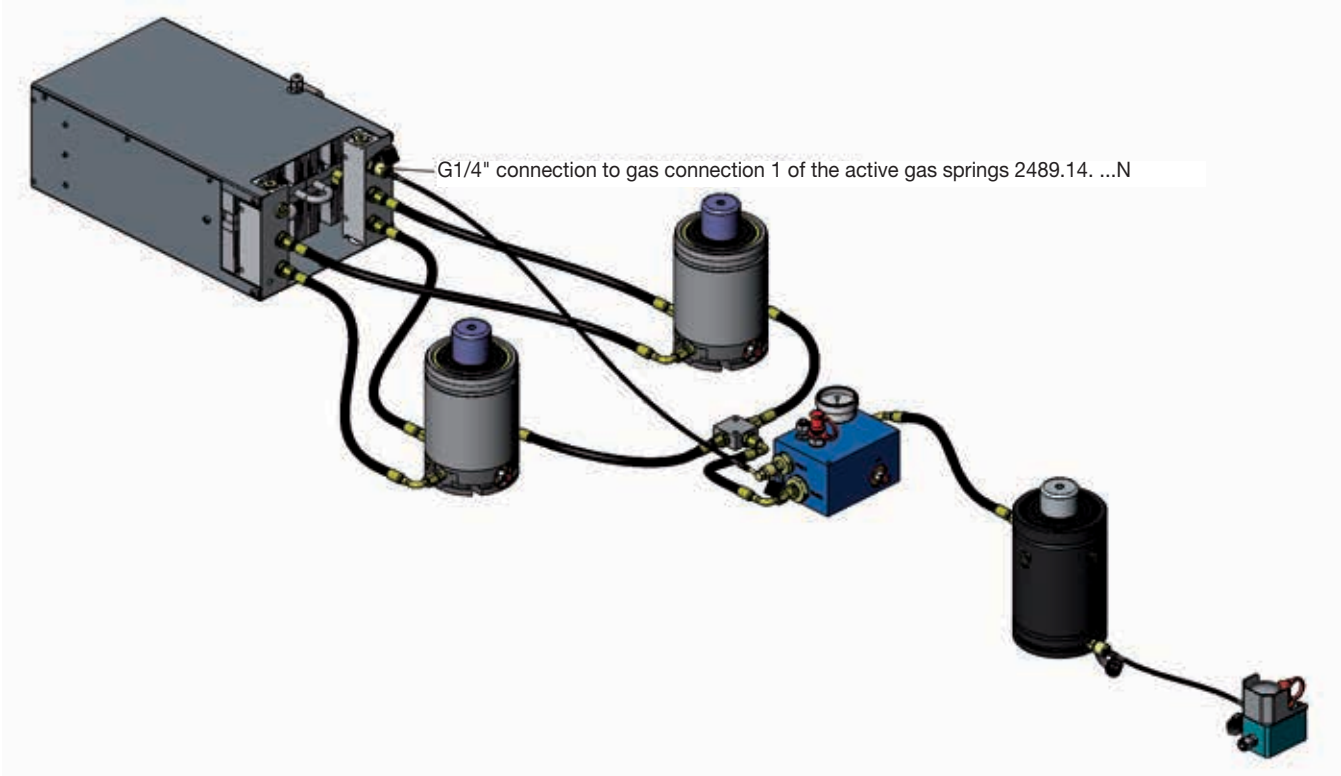
The active gas springs 2489.14. …N are provided with an additional connection for the gas cooler. This connection is attached to one of the output connections of the gas cooler.

Caution!

The active gas springs 2489.14. ...N must be connected in parallel to the gas cooler.



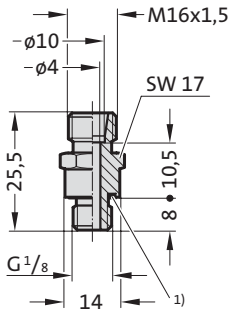
Gas cooler 2489.00.20.15 can also be used with a KF + KP system.
The picture shows the connection for a KF + KP system.



Controllable Gas Springs
Gas cooling
24° cone threaded connectors (DN10) (DIN 2353/DIN EN ISO 8434-1)

2480.00.26.03.10

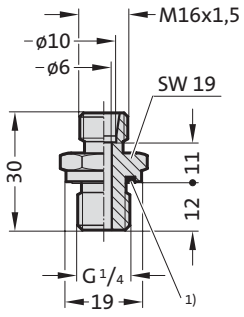
Connector thread-G1/8
(DN10)



1) Elastic seal ED

2480.00.26.04.10

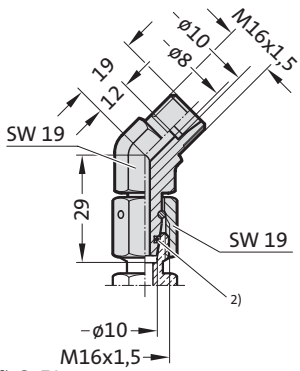
Connector thread-G1/4
(DN10)



1) Elastic seal ED

2480.00.26.21.10

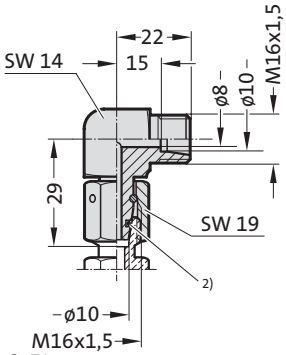
45° swivel coupling, complete
(DN10)



2) O-Ring

2480.00.26.22.10

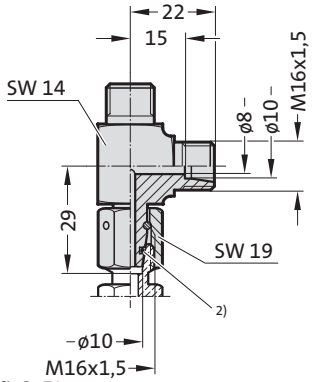
90° swivel coupling, complete
(DN10)



2) O-Ring

2480.00.26.23.10

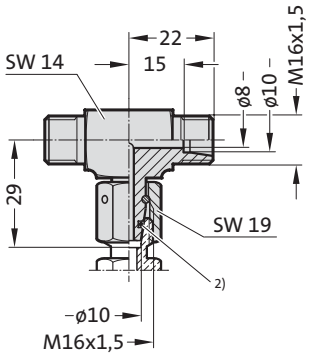
L-shaped swivel coupling, complete
(DN10)



2) O-Ring

2480.00.26.24.10

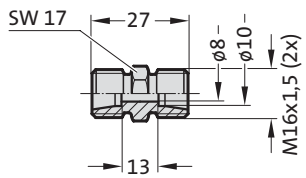
T-shaped swivel coupling, complete
(DN10)



2) O-Ring

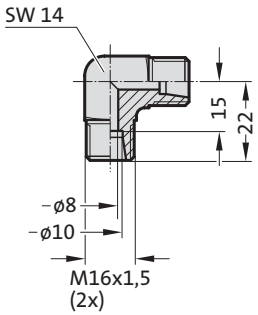
2480.00.26.25.10

Hose to hose adapter, straight
(DN10)



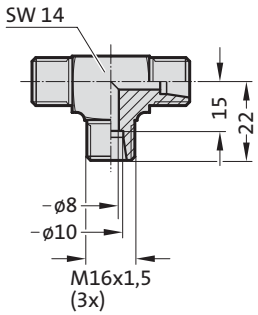
2480.00.26.26.10

90° hose to hose adapter
(DN10)



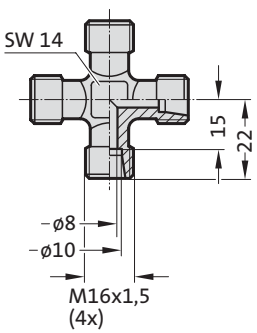
2480.00.26.27.10

T-shaped hose to hose adapter
(DN10)



2480.00.26.28.10

Adapter, K
Hose to hose
(DN10)

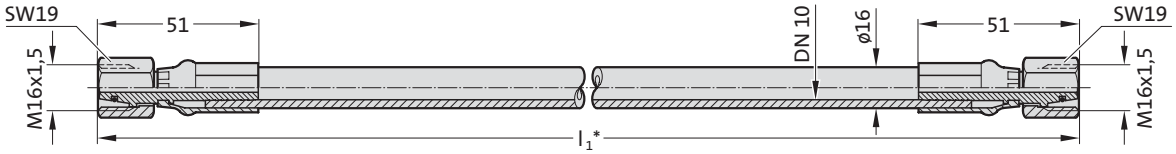


SW = A/F

2480.00.25.01.10.

* Shortest factory lengths: 150 mm
Minimum bending radius R64

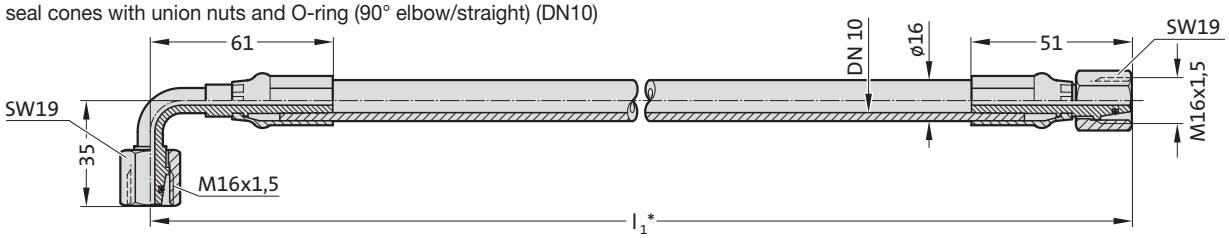
Hose with seal cones with union nuts and O-ring (straight/straight) (DN10)



Dimension l_1 specified in the order (Gradation: 10 mm; l_1 > 1500 mm: 50 mm), e.g. 760 mm, gives order no. 2480.00.25.01.10.0760

2480.00.25.02.10.

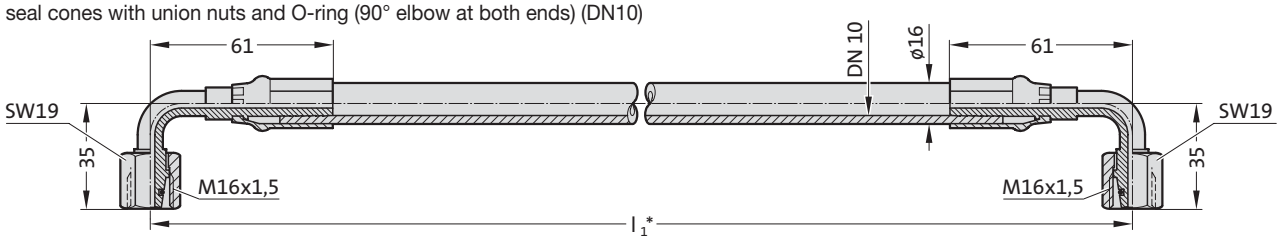
Hose seal cones with union nuts and O-ring (90° elbow/straight) (DN10)



Dimension l_1 specified in the order (Gradation: 10 mm; l_1 > 1500 mm: 50 mm), e.g. 760 mm, gives order no. 2480.00.25.02.10.0760

2480.00.25.03.10.

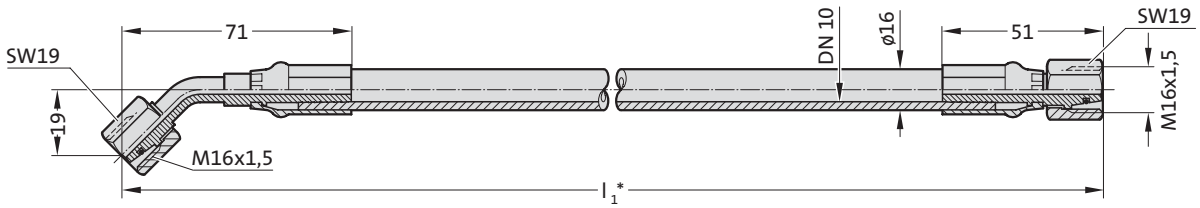
Hose seal cones with union nuts and O-ring (90° elbow at both ends) (DN10)



Dimension l_1 specified in the order (Gradation: 10 mm; l_1 > 1500 mm: 50 mm), e.g. 760 mm, gives order no. 2480.00.25.03.10.0760

2480.00.25.04.10.

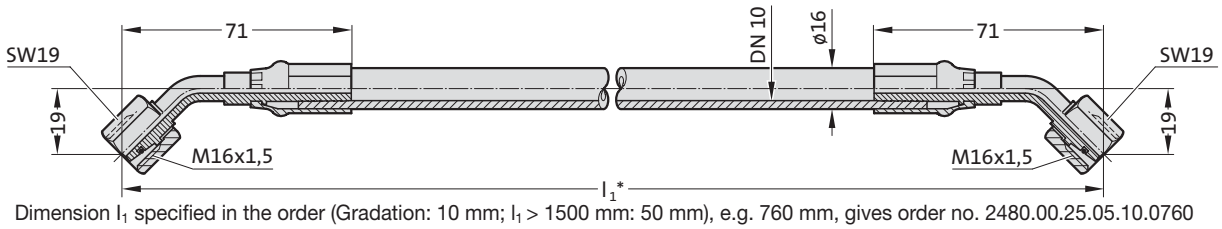
Hose seal cones with union nuts and O-ring (45° elbow/straight) (DN10)



Dimension l_1 specified in the order (Gradation: 10 mm; l_1 > 1500 mm: 50 mm), e.g. 760 mm, gives order no. 2480.00.25.04.10.0760

2480.00.25.05.10.

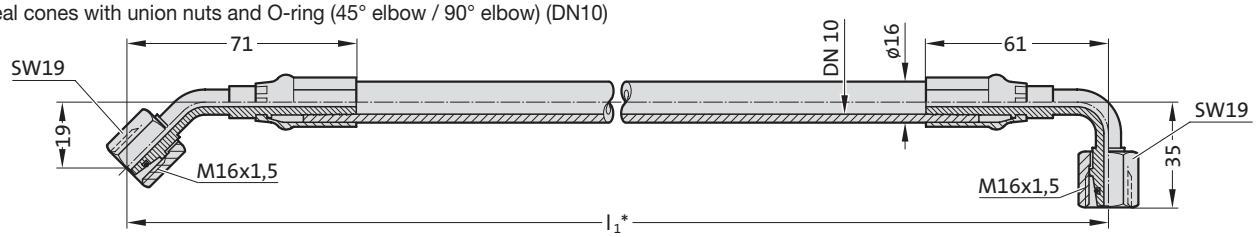
Hose seal cones with union nuts and O-ring (45° elbow at both ends) (DN10)



Dimension l_1 specified in the order (Gradation: 10 mm; l_1 > 1500 mm: 50 mm), e.g. 760 mm, gives order no. 2480.00.25.05.10.0760

2480.00.25.06.10.

Hose seal cones with union nuts and O-ring (45° elbow / 90° elbow) (DN10)



Dimension l_1 specified in the order (Gradation: 10 mm; l_1 > 1500 mm: 50 mm), e.g. 760 mm, gives order no. 2480.00.25.06.10.0760

Controllable Gas Springs
Cooling, external

Cooling unit 2489.00.50.10
for controlled Gas Springs, KF (10 kW)

Dimensions	H	= 1000
	L	= 900
	B	= 700
Circulation rate	40 l/min	
Tank capacity		= ca. 60 l
Electric motor		= 1.5 kW
Supply voltage		= 380 V AC
Weight		= 170 kg

Cooling unit 2489.00.50.25
for controlled Gas Springs, KF (25 kW)

Dimensions	H	= 1070
	L	= 1070
	B	= 890
Circulation rate	60 l/min	
Tank capacity		= ca. 90 l
Electric motor		= 3 kW
Supply voltage		= 380 V AC
Weight		= 220 kg

Pressure gauge for monitoring system pressure

Flow connector, red

Electric motor
380 V ~ 1.5 / 3 kW

Circulation pump
Check direction of rotation on start.

Filter

Return flow connector, blue

Note:
Never start the cooling unit without coolant in it. Running the unit without coolant may cause damage.

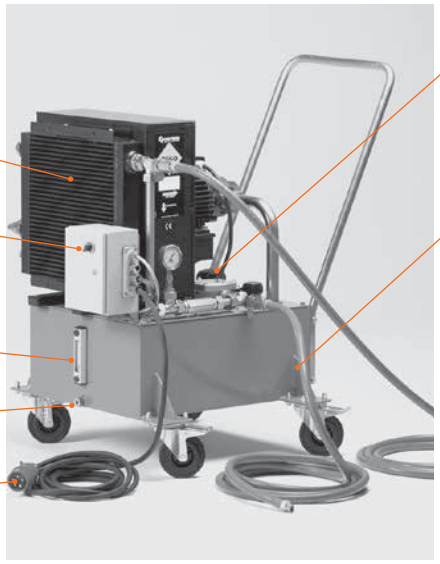
Cooling unit

Switch
On/off button

Fluid level gauge

Drain connection

Power plug
380V AC



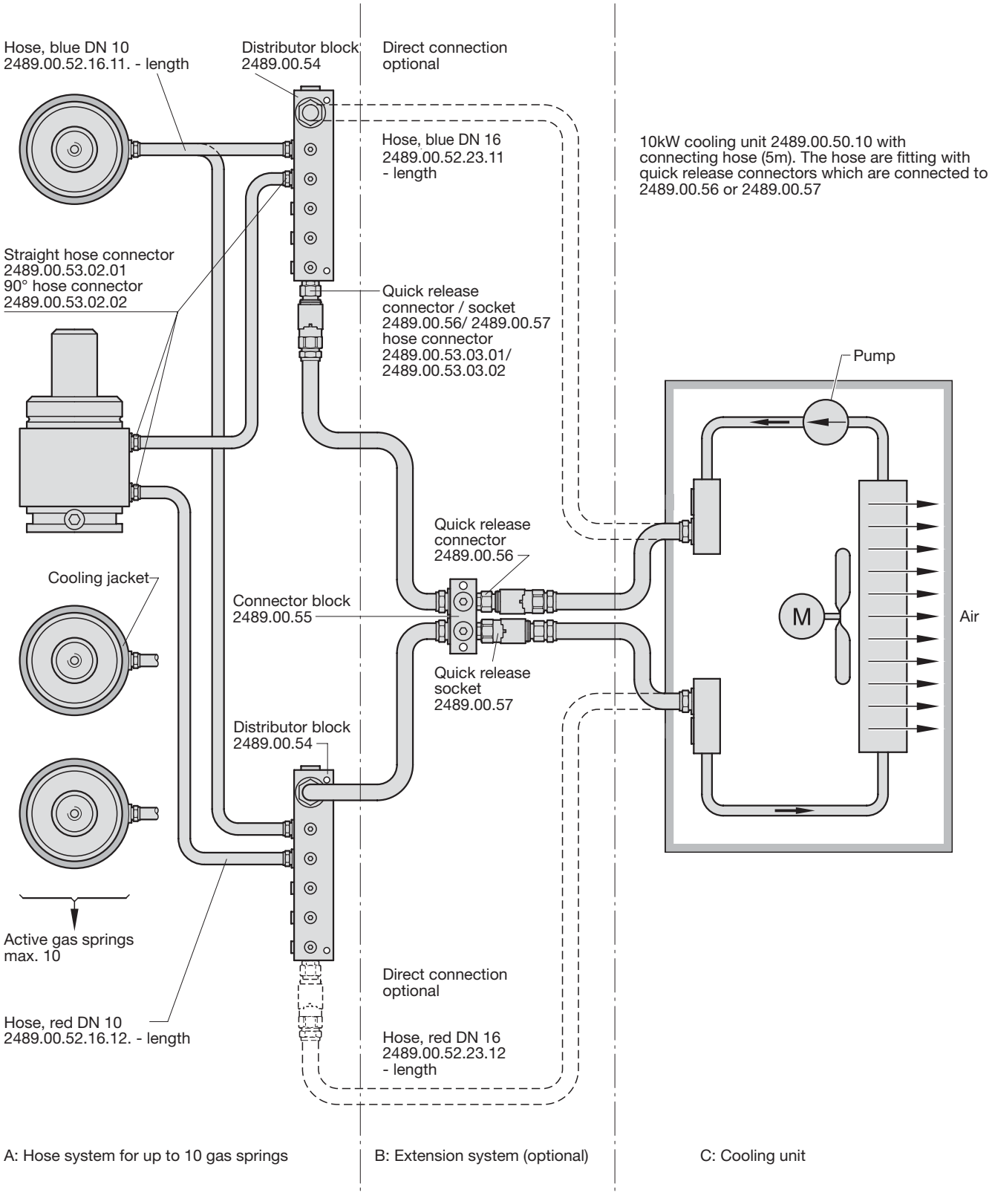
Coolant filler
connector 60 l / 90 l

Thermostatic valve
max. temp. = 70°C

Coolant
The cooling unit is supplied without coolant. The cooling unit must always be run using a special coolant which is available from FIBRO, part no. 281.620.05 (5 litres), 281.620.10 (10 litres) or 281.620.50 (50 litres).

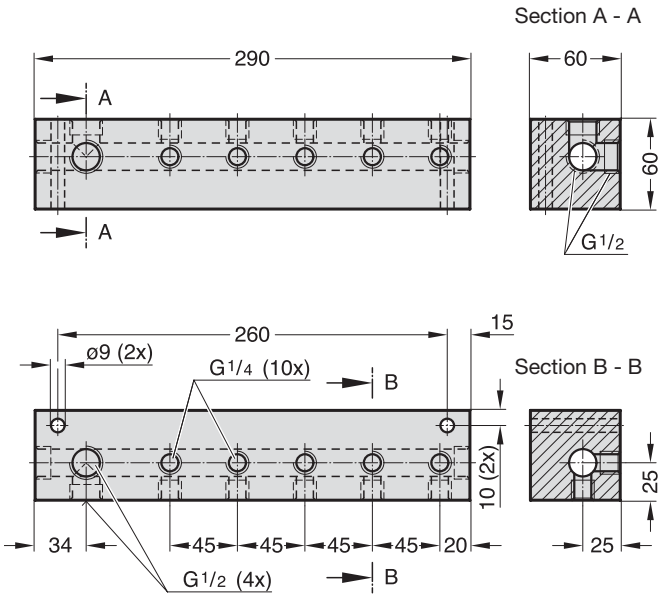
Controllable Gas Springs
Cooling, external

Example of a cooling system arrangement



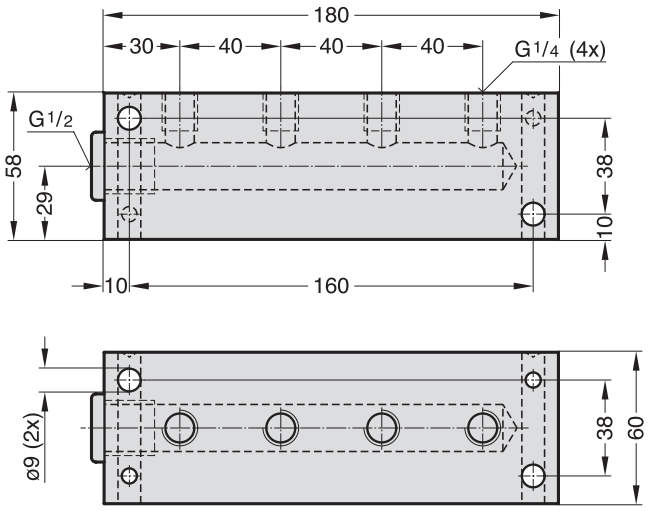
2489.00.54

Distributor block, cooling system



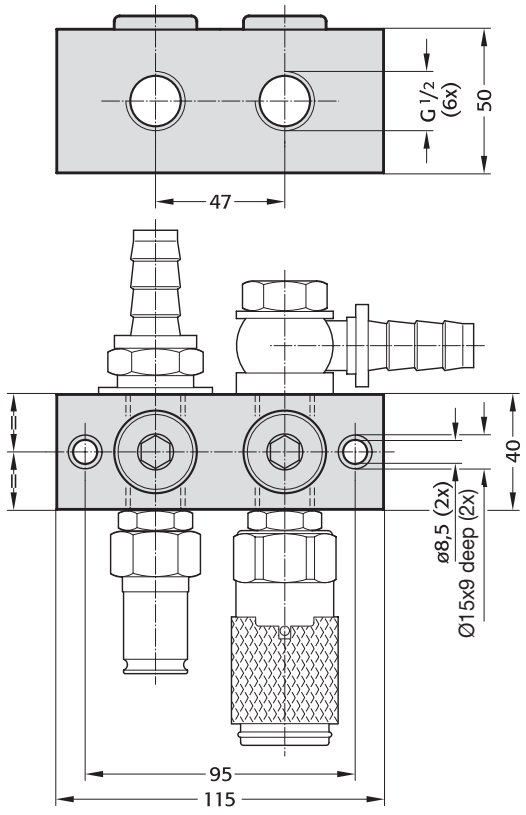
2489.00.54.04

Distributor block 4x, cooling system



2489.00.55

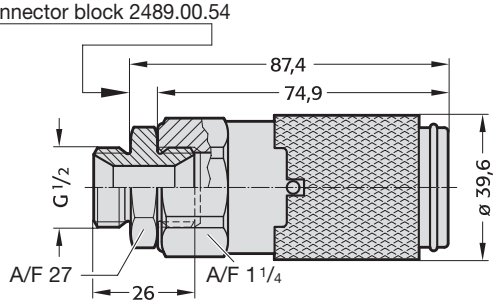
Connector block, cooling system



2489.00.57

Quick connector, socket

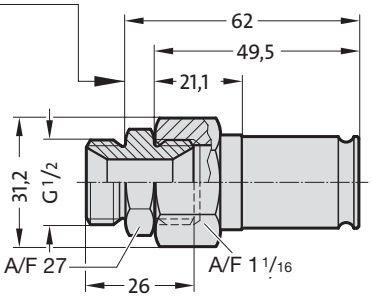
Connector block 2489.00.55 or
connector block 2489.00.54



2489.00.56

Quick connector, plug

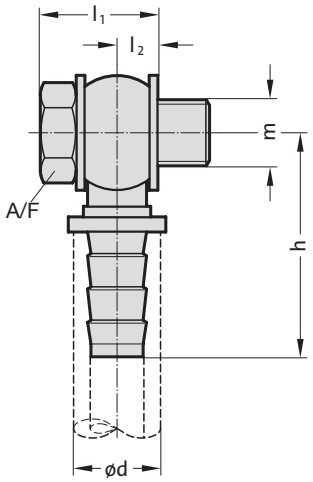
Connector block 2489.00.55 or
distributor block 2489.22.54



Hose and hose connector, cooling system
90° hose connector

Order No.	m	l_1	l_2	h	ød	A/F
2489.00.53.02.02	G1/4"	23	8	44	16	19
2489.00.53.03.02	G1/2"	30	12	68	23	27

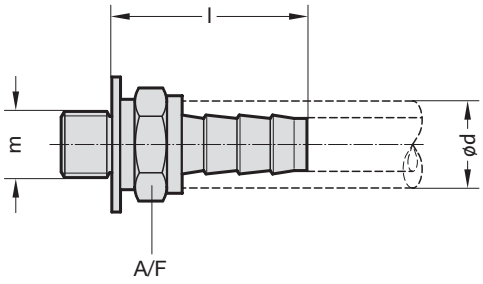
2489.00.53.
90° hose connector



Hose connector, straight

Order No.	m	ød	l	A/F
2489.00.53.02.01	G1/4"	16	28	19
2489.00.53.03.01	G1/2"	23	58	27

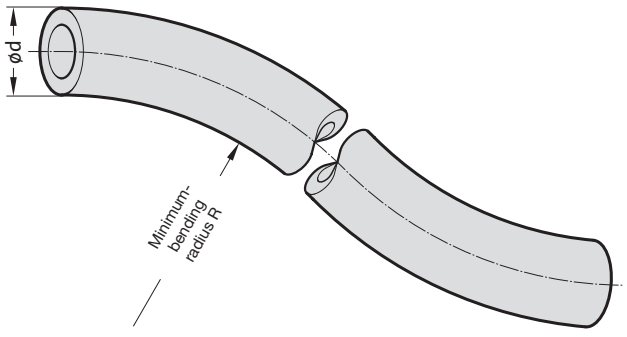
2489.00.53.
Hose connector, straight



Hose

Order No.	ød	DN	Colour	R min
2489.00.52.16.11	16	10	blue	75
2489.00.52.16.12	16	10	red	75
2489.00.52.23.11	23	16	blue	150
2489.00.52.23.12	23	16	red	150

2489.00.52.
Hose



Ordering example:

Hose DN 10 Colour blue	=	2489.00.52.16.11
Length 10 m	=	.10
Order No.	=	2489.00.52.16.11 .10

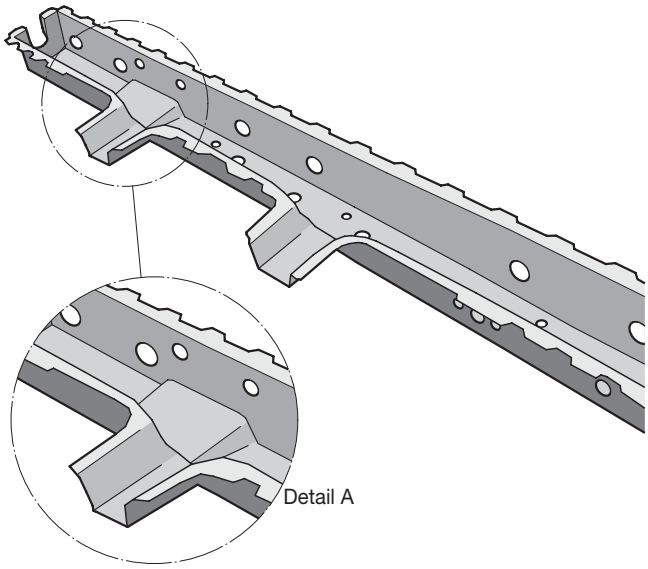
Typical Applications

Controllable Gas Springs
Examples of applications

Example of application with KF gas spring system (1 mm return)

Dies are used for drawing a beam (detail A). The dies have to be locked at the bottom position to avoid distortion of the workpiece on the return stroke.

In this application a KF gas spring is used for each drawing die.



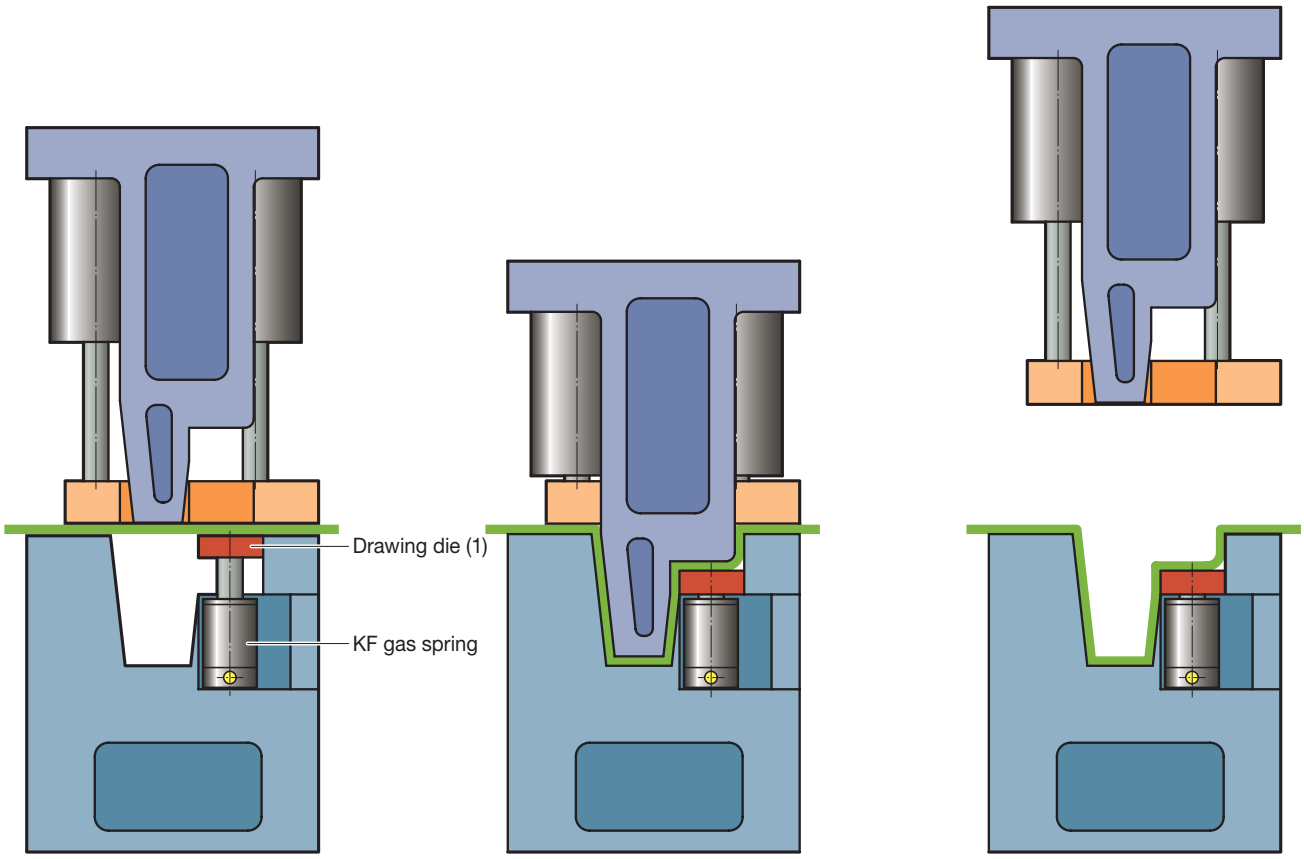
Working cycle

The drawing die (1) is activated when the upper part of the tool descends.

The KF gas springs are locked at the bottom position. Slight spring back will not damage the workpiece in this case.

When the press opens, the clamp releases the workpiece. The workpiece can then be removed and the gas spring unlocked.

Mounting examples

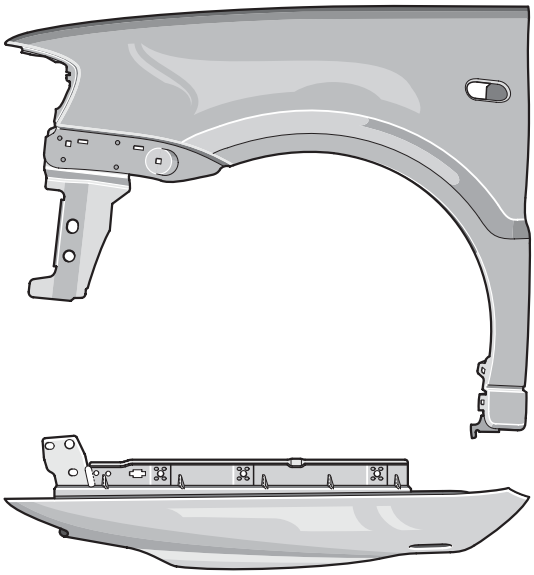


Controllable Gas Springs
Examples of applications

Example of application with KF + KP gas spring system

In the application described below an automobile fender gutter (1) is being shaped. The die (2) has to be locked in the back position to avoid distortion of the tool. In this case the problem was solved by using the KF + KP controlled gas system. The system consists of three KF gas springs connected to a passive KP gas spring.

The illustration shows only the KF gas springs.



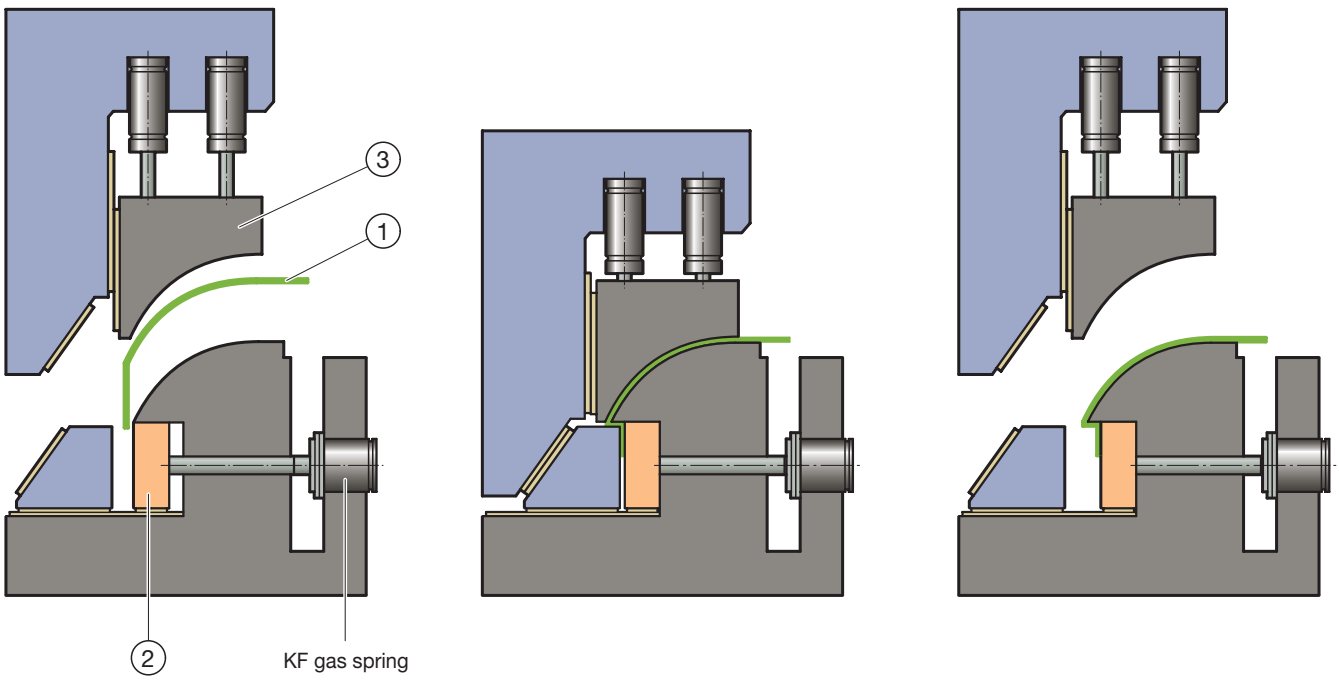
Working cycle

When the top part of the tool moves down, it actuates the clamping pad (3) that holds the sheet metal workpiece (1) in position.

At the bottom point the KF gas springs are locked with no spring back and the drawing die (2) remains in the back position. This prevents any deformation of the workpiece.

When the press opens, the clamp releases the workpiece and it can be removed. Then the gas spring is unlocked.

Mounting examples



Controllable Gas Springs
Examples of applications

Example of application with KF + KP gas spring system

The KF + KP-system is ideal for use in the manufacture of parts where Gas Springs without spring back are required. The press completes a two-stage drawing process in a single stroke.

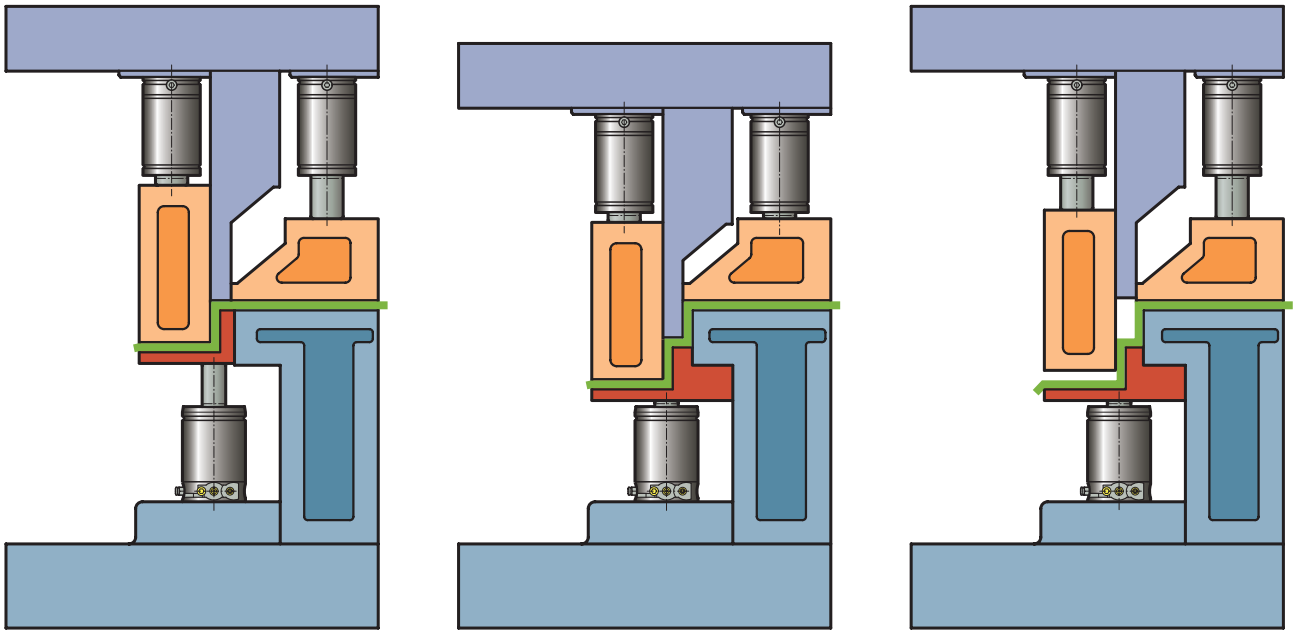
The KF + KP-system makes possible the locking of clamps which prevent distortion of the part on the press return stroke. This large pressing mould for an inner door panel uses a total of 12 KF Gas Springs in association with 3 KP passive Gas Springs

Working cycle

The lower part of the tool contains the controllable Gas Springs KF which provide the active clamping force for the most deeply drawn area of the part.

When the tool is closed, the passive Gas Springs KP (not shown) are compressed and this provides the necessary counter pressure for locking of the KF Gas Springs in the bottom part of the tool without spring back.

When the tool opens, the Gas Springs remain locked until receiving a signal from the press. Then the KF Gas Springs assist in ejecting the undamaged part from the tool.



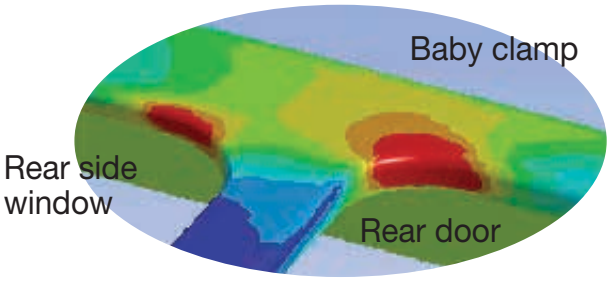
KF+KP gas spring system

Controllable Gas Springs
Examples of applications

Example of application with KF + KP gas spring system

The manufacture of high quality side panels often presents tool manufacturers with a major challenge. The areas where the side door posts interface with the outer panels are especially problematic If clamped down too hard, the part may tear, if not clamped down hard enough ripples may occur in the workpiece.

A current solution to this problem is to use “Baby” clamps for these problem areas, whose spring force can be controlled by controllable Gas Springs. The result is higher quality parts, improved control of the drawing process and a reduction in the number of rejects.



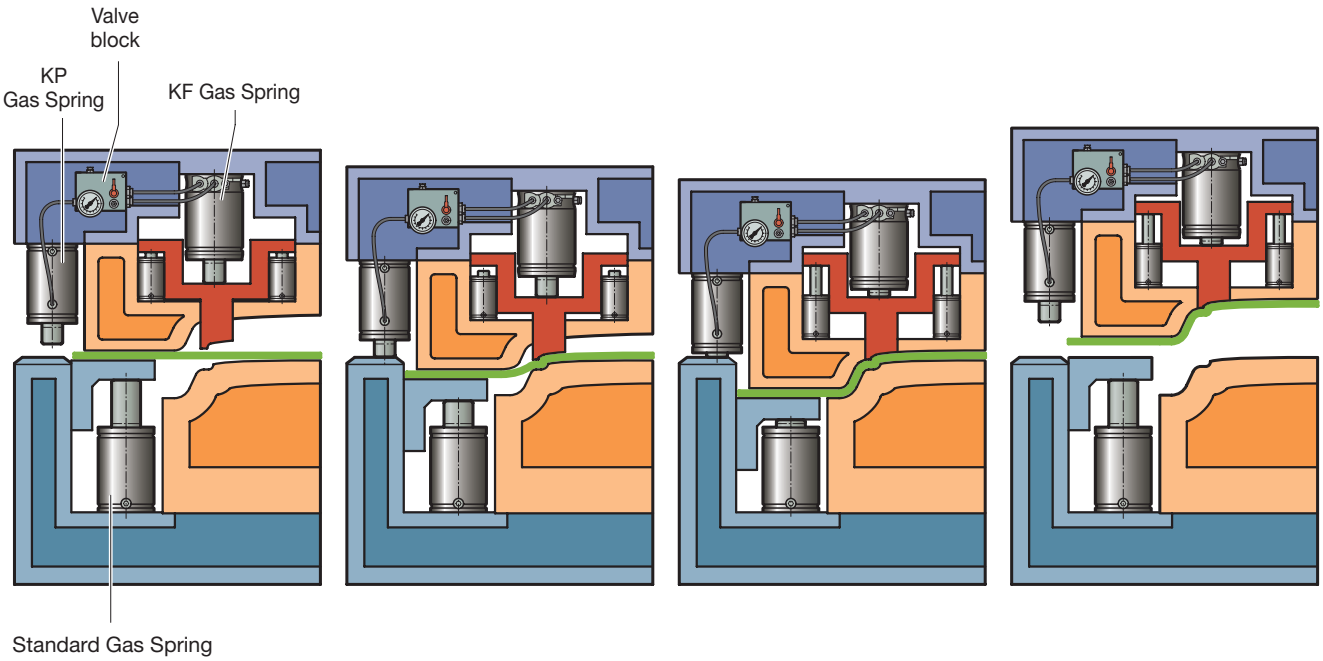
Working cycle

The upper part of the tool contains the controllable KF Gas Springs which provide the clamping force for the “Baby” clamps.

When the tool begins to close, the raw workpiece is first clamped down by the “Baby” clamps in the problem areas.

The valve in the valve block opens at bottom dead centre of the press and the KP Gas Spring is used to prevent a spring back of the KF Gas Springs.

When the tool opens, the Gas Springs remain locked until receiving a signal from the press. Then the KF Gas Springs assist in ejecting the finished part from the tool.



Controllable Gas Springs

FAQs
General

What is the air pressure required for operating cartridge valves?	To close the cartridge valve which is normally open (NO) an air pressure of at least 5 bar is required.
What is the maximum recommended pressure for operating cartridge valves?	The maximum permissible air pressure for operating cartridge valves is 10 bar.
What is the expected service life of a controllable Gas Spring (KF)?	When using a thermostatic relay the life expectancy is typically: For strokes up to 50 mm: 500,000 strokes. For strokes over 50 mm: 50,000 stroke/metres.
Can other hose systems be used?	We cannot guarantee correct functioning of the system if hoses other than those authorized in this manual are used. For further information please contact your agent or FIBRO GmbH, Standard Parts business division.
Can KF Gas Springs of different ratings be used in the same system?	No. For further information please contact your agent or FIBRO GmbH, Standard Parts business division.
Can an old active KF Gas Spring (2489.13.) be replaced by a new KF Gas Spring (2489.14.)?	Yes, but the new KF Gas Spring (2489.14.) is 7 mm longer. The KF Gas Spring 2489.13. xxxxx.xxx.E is interchangeable but the stroke is not adjustable

For KF gas spring system

Can the stroke length of the KF Gas Spring be adjusted or is it necessary always to use 100% of the nominal stroke ± 0.5 mm?	Two types of controllable KF Gas Springs are available. the standard model 2489.14. (adjustable) and model 2489.13.xxxxx.xxx.E (non adjustable) which can be used as a replacement for the previous 2489.13.
How fast can the KF Gas Spring be operated?	The maximum compression speed is 0.8 m/sec The maximum stroke count at which a KF Gas Spring can operate depends on the stroke length of the Gas Spring and the cooling capacity available. For further information see the section on Cooling.
How can I avoid KF spring back?	When using 100% of the stroke length of the KF Gas Spring ± 0.5 mm a spring back of up to 1 mm is to be expected. This can be prevented at any time by converting the standard locking arrangement to a forced locking system. For further information please contact your agent or FIBRO GmbH, Standard Parts business division.
Can a controllable KF Gas Spring be locked in any position?	Theoretically, yes. The less the KF controllable Gas Spring is compressed, the stronger the spring back. For further information please contact your agent or FIBRO GmbH, Standard Parts business division.

FAQs
on the Gas Spring System KF+KP

How many KF controllable Gas Springs can be connected to a KP passive gas spring?	Up to four KF gas springs can be linked to one KP gas spring.
How many valve blocks are needed in the system?	One valve block is needed for each KP passive gas spring in the system.
Can the KP Gas Spring in tht tool be used for pressing?	No. The KP gas spring in the tool cannot be used for any purpose other than prev-enting spring back of KF gas spring.
Can the mini-measuring hose system be used for connecting the KF + KP-system?	No. The 24° cone hose system (or corresponding product) must be used for connecting the KF gas spring(s), the valve block and the KP passive spring.
Can the 24° cone hose system be used for connecting the KF+KP-system?	Yes.

On cooling

Is cooling always necessary?	Not always. Generally speaking, greater stroke lengths and higher stroke counts usually require cooling. For further information see the section on Cooling.
How many KF controllable Gas Springs can be connected to one cooling unit?	The total maximum heating effect of all the springs must not exceed the cooling capacity of the cooling unit. See the table on page 15 or the one on page 56.
Can other cooling units be used?	Yes. The press cooling system or other cooling units can be used.
What coolant is approved for use?	We recommend a water/glycol based coolant.

Controllable Gas Springs

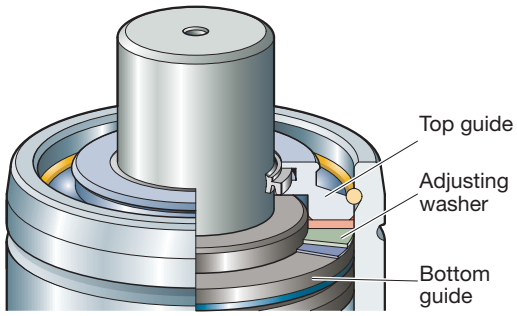
Trouble shooting

System	Problem	Solution
KF gas spring system	KF Gas Spring does not lock.	Ensure that there is at least 5 bar air pressure at compressed air port 4 of the KF Gas Spring before the press reaches bottom dead center.
		Check that all hose connections are OK.
	KF piston rod has more than 1 mm spring back.	Ensure that 100% of the nominal stroke of the KF Gas Spring (± 0.5 mm) is being used.
		Ensure that there is at least 5 bar air pressure at compressed air port 4 of the KF Gas Spring before the press reaches bottom dead center.
	KF piston rod does not return to its starting point.	Ensure that there is no pressure at compressed air port 4 of the KF Gas Spring when it is supposed to open.
		Check whether the piston rod is prevented from returning by obstructions in the tool.
		Check whether there is gas pressure in the KF Gas Spring.

System	Problem	Solution
KF + KP gas spring system	KF Gas Spring is not locking	Ensure that there is at least 5 bar air pressure at compressed air port 4 of the KF Gas Spring before the press reaches bottom dead center.
		Check that all hose connections are OK
	KF piston rod has more than 0 mm spring back	Ensure that the cartridge valve in the valve block is closed during the downward stroke of the press and that the KP passive Gas Spring is compressed sufficiently for this application.
		Ensure that 100% of the nominal stroke of the KF Gas Spring (± 0.5 mm) is being used.
		Check whether the cartridge valve in the valve block is opening at bottom dead centre. Check that the required gas pressure is present in the KP gas spring.
	KF piston rod does not return to its starting point.	Ensure that there is no pressure at compressed air port 4 of the KF Gas Spring when it is supposed to open.
		Check whether the piston rod is prevented from returning by obstructions in the tool.
		Check whether there is gas pressure in the KF Gas Spring.
	KP piston rod does not return to initial position	Check whether return of the piston rod is prevented by an obstruction in the tool.
		Check that the required gas pressure is present in the KP gas spring.

Matching the stroke length in KF Gas Springs (2489.14.)

The guide is made up of the following main components:



The length of the guide and the stroke are adapted by adding or removing adjusting washers between the top and bottom guide. The correct stroke can be obtained by adding adjusting washers as in Table 1.

Example 1:
The stroke length needs increasing to 4 mm longer than the rated stroke length.

Example 1:

Solution: Open the Gas Spring and the guide, remove the 4 mm adjusting washer. Leave the 1 mm and the 2 mm adjusting washers in the guide/Gas Spring. This process is described on the next page.

Important

- **Only qualified engineers experienced in the repair and maintenance of Gas Springs should modify the stroke length.**
- **The workbench for working on the Gas Springs must be clean and free from contamination.**
- **Never work on a Gas Spring containing air or gas under pressure.**

Thickness	FIBRO Order no
1 mm	2489.14.451.xxxxxx.01
2 mm	2489.14.451.xxxxxx.02
4 mm	2489.14.451.xxxxxx.04
8 mm	2489.14.451.xxxxxx.08
(not illustrated)	

Table 1

For modifying rated stroke length

		Adjusting washers (mm)			
	Stroke length	1	2	4	8
max.	+7	0	0	0	0
	+6	1	0	0	0
	+5	0	1	0	0
	+4	1	1	0	0
	+3	0	0	1	0
	+2	1	0	1	0
	+1	0	1	1	0
rated*	0	1	1	1	0
	-1	0	0	0	1
	-2	1	0	0	1
	-3	0	1	0	1
	-4	1	1	0	1
	-5	0	0	1	1
	-6	1	0	1	1
	-7**	0	1	1	1
min.	-8**	1	1	1	1

*The rated stroke length is always specified on the Gas Spring cylinder.
** Not for nominal stroke length of 10 mm.

Controllable Gas Springs - KF

Modifying the stroke length in KF Gas Springs (2489.14.) Instructions

1. Release any gas from the Gas Spring.

2. Using an assembly sleeve and a plastic hammer tap down the guide and remove the snap ring.

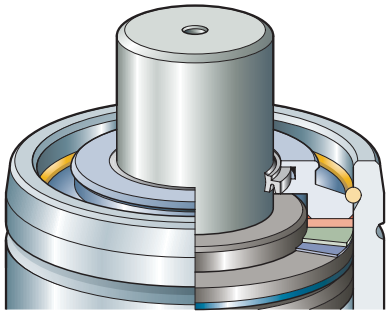
3. Remove the top guide and insert the combination of adjusting washers to produce the required stroke length.

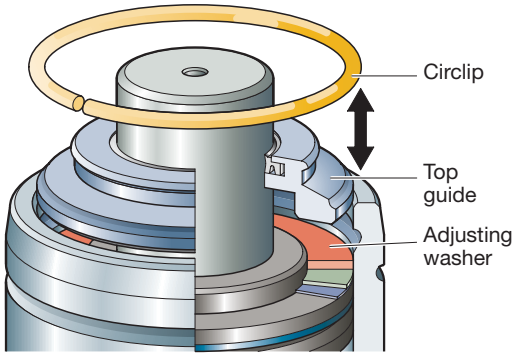
4. Insert the top guide again and tap down with the assembly sleeve and plastic hammer until the groove is clear for the snap ring.

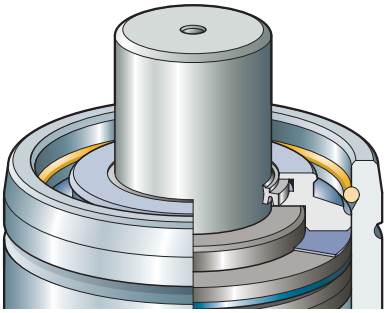
5. Fit circlip and raise the piston assembly with a T-handle.

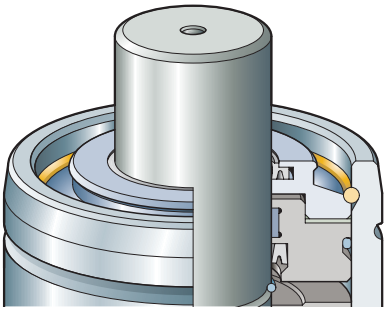
6. Ensure that the guide is flush with the top edge of the cylinder. (If not, check that the circlip is correctly seated.)

7. Fill the Gas Spring with gas.









Differences between the replacement model 2489.13.xxxxx.xxx.E and the earlier KF Gas Spring 2489.13:

The replacement model is usually fitted with an opened cartridge valve which has a number of advantages:

- simplified control system
- single port for filling and emptying
- low pressure version no longer necessary
- only 5 bar pressure required

How the replacement model is connected to existing KF systems:

Controllable Gas Springs 2489.13.xxxxx.xxx.E are completely compatible with existing KF Gas Springs (2489.13).

Example of KF-gas spring-system:

Replacing an existing 2489.13 with a replacement model

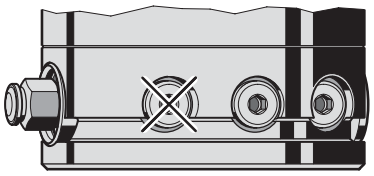
When replacing an existing KF Gas Spring with a new 2489.13.xxxxx.xxx.E in a standard locking system the only point to note is that the compressed air signal line connected to compressed air port 2 must be closed off.

Example of a KF + KP gas spring system:

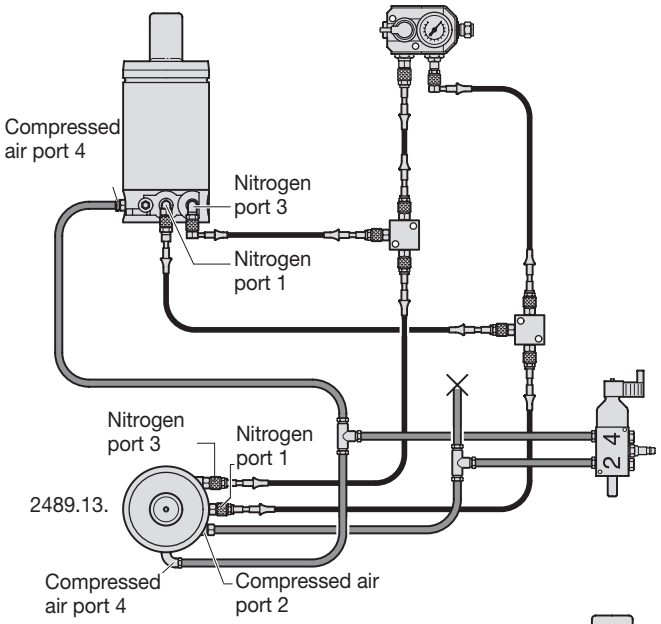
Replacing an existing 2489.13 with a replacement model

When replacing an existing KF Gas Spring with a new 2489.13.xxxxx.xxx.E in a KF + KP system the only point to note is that the compressed air signal line connected to compressed air port 2 must be closed off. If a new valve block (2489.00.47.01) is fitted, compressed air port 2 of the corresponding valve must be closed off.

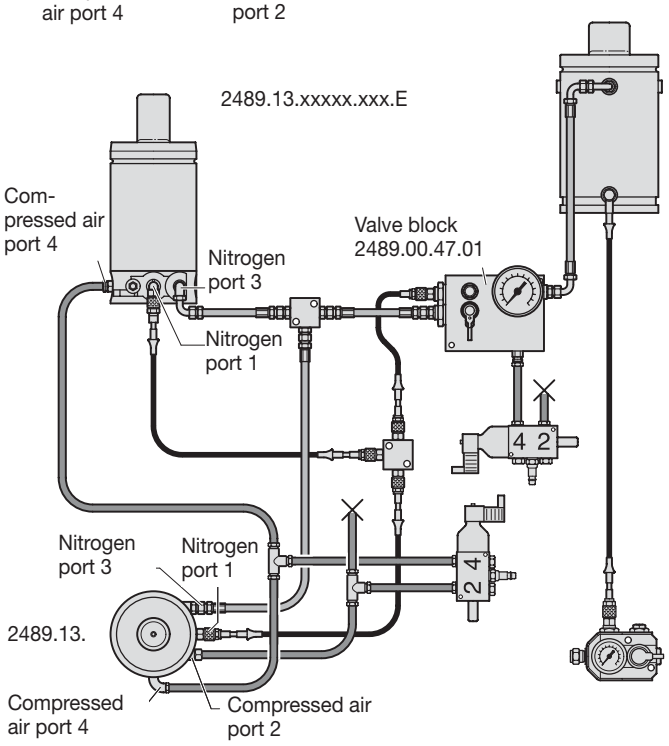
Always remember when replacing the old Gas Spring type 2489.13 with the KF Gas Spring 2489.14 (adjustable stroke) that it is 7 mm longer.



2489.13.xxxxx.xxx.E



2489.13.xxxxx.xxx.E



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