

Safety and technical Product Documentation/Manual for Gas Springs Type 016, lockable Gas Springs type 018, 027, 028, 029, 030 and Hydraulic Dampers Type 011




1. GENERAL INFORMATION

SUSPA GmbH is manufacturing gas springs, lockable gas springs and hydraulic dampers for more than 45 years. The products are manufactured with the most modern production lines using permanent highest quality level assurance. The products are constructed and designed according to today's "state of the art". SUSPA uses quality and environmental management systems which fulfill the current requirements of IATF 16949, ISO 9001 and DIN ISO 14001 and thus the highest quality standards. You will find the relevant certificates on the internet: www.suspa.com.

In order to fully meet your expectations regarding the function of our products, we recommend to strictly obey the following instructions in this technical product documentation. SUSPA will not assume any liability or guarantee for personal injury, injury of animals or property damage nor for dysfunctions or damage for example of equipment, machines or devices, which result from the failure or insufficient attention to follow this technical product documentation (exclusion of liability acc. to GTC).

The present technical product documentation is only allowed to be copied or forwarded to third parties after written consent. This is also valid if only extracts from this technical product documentation are copied or forwarded. The same conditions are valid for the digital transfer. Violations will result in compensation. All rights for patent and utility patent registration are expressly reserved.

The following symbols will be used in the technical product documentation and mean the following:

	GEFAHR! ➤ Nichtbeachtung des Hinweises kann schwere Verletzungen oder den Tod zur Folge haben!	DANGER! ➤ Failure to follow these instructions can result in severe personal injury or death!
	WARNUNG! ➤ Nichtbeachtung des Hinweises kann leichte bis schwere Verletzungen oder Sachschäden zur Folge haben!	WARNING! ➤ Failure to follow these instructions can result in slight or severe personal injury or property damage!
	VORSICHT! ➤ Nichtbeachtung des Hinweises kann Fehlfunktionen oder Sachschäden zur Folge haben!	ATTENTION! ➤ Failure to follow these instructions can result in malfunctions or property damage!

2. SAFETY, TRANSPORTATION AND STORAGE



SUSPA products (gas springs and hydraulic dampers) can be under high pressure. They must not be heated or opened. They are produced put in circulation in accordance with the Pressure Equipment Directive 2014/68/EU¹⁾. Thus it is guaranteed that SUSPA gas springs or hydraulic dampers filled with gas can be used safely (as defined by the directive).

SUSPA gas springs and hydraulic dampers stay below the limit values mentioned in article 4 (1) a) i) of the directive for pressure and volume. Thus, they meet article 4 (3) of the Pressure Equipment Directive 2014/68/EU and are designed and produced according to the "well known engineering principles" valid in one member state.

The fluids used are fluids of group 2 according to the classification in article 13 of the directive.

SUSPA gas springs and hydraulic dampers are characterized according to article 4 (3) by means of which the manufacturer can be determined as well as a warning which refers to the possible high inside pressure and resulting dangers. A CE-label must not be attached.

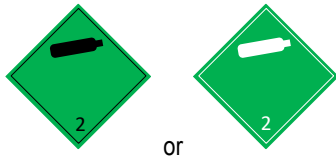
¹⁾ 2014/68/EU is only valid for gas springs with a pressure $p > 30$ bar. For gas springs at $p < 30$ bar the directive for Single Pressure Reservoirs 2014/29 (incl. all other related directives) is relevant.

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In case of SUSPA gas springs and pressurized hydraulic dampers will be dangerous goods according to transportation directives or laws (DOT, IATA oder ADR 3.3.1/283), it will be **explicitly called out** on the shipping documents and the packing (packing units) will be **labelled** accordingly (see below).

Identification marks (UN-No.: 3164, Class 2.2, „Articles, pressurized, pneumatic“, Tunnel Restriction Code: E, Transport Category: 3) for inflammable, non-poisonous gas inside dangerous goods: Symbol (transportable gas container): Black or white on green background; Number „2“ in lower corner.



In case there are **no** such **declarations** or labels in place, the products are **NOT dangerous** as defined by the above directives!

Storage in original packaging must be preferred. The products should always be stored in a dry place. After longer periods of storage, a slight film of oil may materialize at the piston rod of the gas springs or hydraulic dampers. Normally such is not a matter of leakage or other defects und thus has no impact on the function. Storage of the parts should not be longer than 3 months with piston rod pointing downward. In case of longer storage time cycle the parts at least once after 6 months (at least 1 full stroke).

The specified resp. imprinted force is the so-called nominal force at the time of delivery. By natural permeation this nominal force can underrun the admissible tolerance limit even without operation.

In order to dispose of the gas springs and hydraulic dampers the listed disposal keys in section 5 must be obeyed.

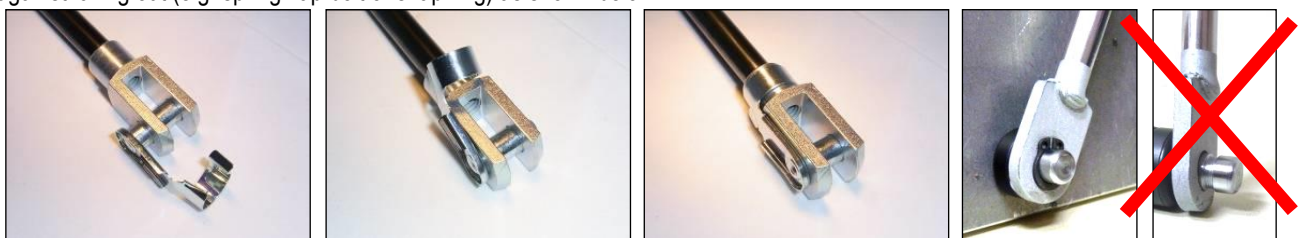
3. ASSEMBLY AND DISASSEMBLY



SUSPA products (gas springs and hydraulic dampers) may contain highly pressurized nitrogen. They must not be heated or opened.

The products are only allowed to be fixed at/with the specified or supplied end fittings. A fixed mounting must be avoided. Never use it without protection!

In case of installations where the products will be fixed with a bolt, the bolt resp. the gas spring or the hydraulic damper must be retained against falling out (e.g. spring flap bolt or snap ring) as shown below:



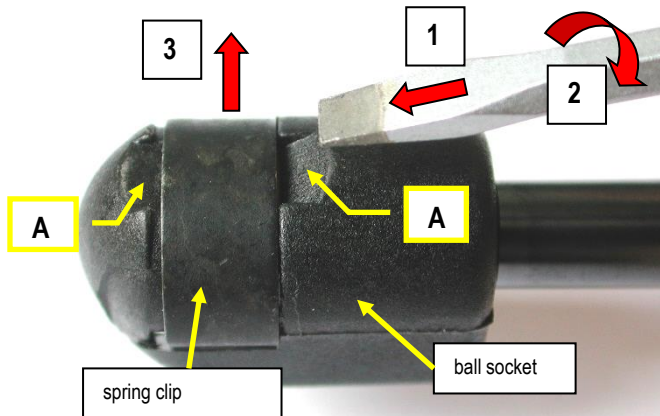
If, for example DIN ball sockets are used for assembly, we recommend using an additional retaining clip:



Other retaining procedures are possible.

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Disassembly of ball sockets with retaining clip:



1. Slip a small suitable screw driver in one of the two grooves "A" under the spring clip.
2. By turning the screw driver, slightly lift the spring clip, until the ball socket comes clear from the ball stud.
3. Lift off the gas spring with the ball socket. The spring clip must spring back into the original position after releasing it (push it into position, if necessary).
4. In order to reassemble it, just clip onto the ball head and let it click into place audibly. Reassembly is not allowed when the clip is missing.

Products which were damaged by improper disassembly cannot

be accepted as customer complaint.



Unless otherwise agreed, the **gas springs** and **hydraulic dampers with bottom valve** must be mounted into the application with the **piston rod showing downward**.

Unless otherwise agreed, the so-called hydraulic **2-tube dampers** (type HD34 and HD38) must be mounted with the **piston rod showing upward** in order to ensure the function.

All other **hydraulic dampers** can be mounted in any position. If you have questions regarding the best mounting position, please contact your customer service or our application engineers.

If you wish to install Bowden cables in order to operate lockable gas springs or adjustable dampers please take care to avoid pinching or crushing hazards. The maximum bend radius of the Bowden cable must not fall below 15x the cable diameter. Loops > 180° as well as S-formed bends must be avoided.

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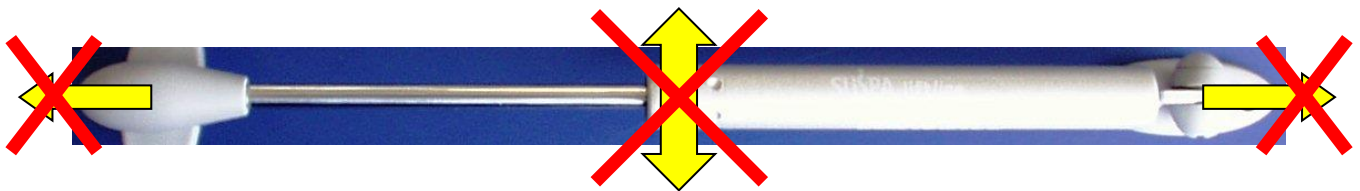
4. HANDLING / USAGE / OPERATION:

Gas springs or hydraulic dampers can be damaged when being dropped. Please check if the gas springs or hydraulic dampers are damaged before mounting them. Do not ever use damaged gas springs or hydraulic dampers.



SUSPA products (gas springs or hydraulic dampers) may contain highly pressurized nitrogen. They must not be heated or opened. In order not to affect lifetime, safety and functionality of our products unauthorized changes of the product are forbidden. Defective or damaged products must not be used resp. must be replaced.

- The piston rod must not be damaged, deformed, scratched, painted, laminated or treated with aggressive / corrosive materials.
- The rod must not be damaged (deformed, drilled or otherwise opened), see section 5.
- No radial forces resp. side impacts must impact on the products.
- Undefined² tensile strains can damage **gas springs**.
The load on lockable gas springs must not exceed the admissible pressure or tension³.



Any change or misuse can lead to breakdown of the products and thus to a failure of the application. This may result in danger to life.

In case of damage, change or manipulation of the product or in case of improper use the guarantee automatically will expire.



Any change or type of manipulation, e.g. opening, heating above the admissible operating temperature, repainting, removal of imprints, bulk handling as well as extreme influence of muddy water or salt water or the use as end stop are not allowed. Avoid contact with plastic foils or paper materials for packaging (electrostatic charge).

Cleaning with high pressure, chemicals or dissolvers are also not allowed. Avoid application of corrosive cleaning agents. Clean the product with a water-damped, lint-free cloth.

Your special application is the basis for the technical design of the SUSPA products. Please clarify special requirements (as e.g. environmental influences, operating temperatures, operating frequency) with your customer support or our application engineers beforehand. Our products fulfill the specifications given in the SUSPA drawings. In general, the use is possible at a temperature range of **-25°C up to +60°C** (for lockable gas springs: **-10°C up to +60°C**). Other conditions of use must be discussed and agreed on with your customer support or our application engineers, if necessary. The duration of use is dependent on the strain in the relevant application. We cannot give any guarantee for the possible lifetime.



Gas springs and hydraulic dampers are free of maintenance and cannot be repaired. Gas springs and hydraulic dampers must not be refilled. If catalogue products are used which are not designed and chosen by SUSPA or an authorized dealer for a special application, please pay attention that the maximum lift will not be exceeded and that always a lift buffer (≥ 5 mm recommended) is provided. The suitability of a gas spring or a hydraulic damper for an application which was not specified or which is unknown to SUSPA or an authorized dealer is not guaranteed and is subject to the responsibility of the customer. We recommend checking the suitability in an appropriate test before using.



Gas springs or hydraulic dampers are not preparations or substances, but technical devices or so-called products. Therefore, Safety data sheets cannot be issued. The greases and oils used for ensuring the function are predominantly inside of the products and will be prevented by design from leakage with hermetic sealing when used appropriately resp. as intended. Should leakages still occur, please observe the following instructions:

The used greases and oils ($< 100 \text{ cm}^3$) are preparations from highly refined mineral oils with additives which are imperiling for human beings and environment under longer lasting influence. However, the following applies:

² In case your special application will induce tensile loads into the gas spring, please contact your customer service or our application engineers beforehand

³ Please inform yourself at your customer service or our application engineers about the admissible limit loads of your product
This information was issued automatically and is thus valid without signature

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The used lubricants are not presumed to be dangerous as defined by the EU regulations. There are no significant health risks when gas springs and hydraulic dampers are used as intended. As always possible with lubricants in general, often and long lasting contact with the skin can lead to skin irritations (dermatitis).

When obeying the safety measures as usual when handling mineral oil products, the information regarding treatment and personal protective equipment, no special dangers are known of:

- Personal protective equipment: eye protection: protection glasses in case of danger of sputtering, body protection: oil resistant boots
- Hand protection: protection gloves in case of frequent, longer lasting or intensive contact with the skin
- Information regarding fire and explosion protection: keep free from sources of ignition. Fire class according to DIN EN 2: B
- These materials must not get into canalization, groundwater or surface water. Collect leaked oil with suitable binder agents and dispose of it according to regional disposal regulations.

First Aid Measures

- General information: influence on the skin can result in defatting and skin irritations.
- Change soaked clothing and shoes immediately
- After aspiration: fresh air, normally no further measures necessary. Consult a doctor in case of continuous complaints
- After contact with the skin: Wash moistened skin with water and soap
- After contact with the eyes: rinse thoroughly with water, at least 10 minutes, afterwards consult a doctor without delay
- After choking: do not cause vomiting, danger of aspiration. Consult a doctor immediately.
- Information for the doctor: in case of choking or vomiting mineral oil components can enter into the lung.

When disposing of gas springs and dampers please observe the keys of the disposal regulations in section 5.

How to behave in case of fire:



Gas Springs and hydraulic dampers must kept off from open fires and other sources of ignition.

The fire department must:

- start fighting the fire out of cover
- Cautious approach is indispensable.
- Cool components with massive use of water.

5. EXPLANATION REGARDING CONTENTS, MATERIALS AND DISPOSAL

Dispose of transport packaging according to environmental regulations. Unless otherwise agreed, the delivered packaging consists of material which can be recycled and must be returned to the material circuit.

As far as we know today, our products, gas springs type 016 and hydraulic dampers type HD, do not contain any materials in concentrations or applications whose publication is prohibited in products according to the valid requirements of the following regulations:

- **EU directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment as well as its changes**
- **EU directive 2000/53/EG („EU End of Live Vehicle Act“), as well as its changes**
- **GADSL, former VDA 232 – 101 (substances in components and materials) and**
- **EU directive 1907/2006 (REACH)**

All substances of these products can be gathered from a detailed list. This list is available in **IMDS** and is maintained there on a regular basis. Therein contained materials and preparations, which must not be used, fall in the following exceptions mentioned in the annex or are not technically applicable at the moment (cited in extracts):

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■ „DIRECTIVE 2011/65/EU consolidated 21. November.2018...

ANNEX III

Applications excluded from the limitations in article 4 paragraph 1...

- | | | |
|----|--|--|
| 6a | Lead as alloying element in steel for processing and in galvanized steel | with a mass fraction of max. 0.35 % lead |
| 6b | Lead as alloying element in aluminum | with a mass fraction of max. 0.4 % lead |
| 6c | Copper alloy | with a mass fraction of up to 4% lead |
- ...“

■ “DIRECTIVE 2000/53/EC ... amended by Directive 2018/849/EU 30 May 2018 ...

...Certain materials and components containing lead, mercury, cadmium or hexavalent chromium should continue to be exempted from the prohibition set out in Article 4(2)(a) of Directive 2000/53/EC without an expiry date, since the use of such substances in the specific materials and components listed in Annex II to that Directive is still technically or scientifically unavoidable...

Materials and components exempt from Article 4(2)(a)

A maximum concentration value up to 0,1 % by weight and in homogeneous material, for lead, hexavalent chromium and mercury and up to 0,01 % by weight in homogeneous material for cadmium shall be tolerated,

Spare parts put on the market after 1 July 2003 which are used for vehicles put on the market before 1 July 2003 shall be exempted from the provisions of Article 4(2)(a)

...

Lead as an alloying element

1(a). Steel for machining purposes and batch hot dip galvanised steel components containing up to 0,35 % lead by weight

...

2(c). Aluminium with a lead content

up to 0,4 % by weight ⁽²⁾

3. Copper alloy containing

up to 4 % lead by weight ⁽²⁾

... ⁽²⁾ This exemption shall be reviewed in 2021...

In case you have issued your own or additional banned substances or should any such list lie before you, they are not part of this declaration and will not be checked by us. In this case you can review the list of contents (IMDS) mentioned above from us and check if the product contains materials which are listed in your banned substances.



The necessary material safety data sheets for used substances or preparations are available to us (according to EU Regulation 1907/2006/EC (REACH), SUSPA GmbH is certified acc. to DIN ISO 14001). SUSPA products contain oil and are only allowed to be disposed of professionally according to the valid legislative requirements (e.g. 2008/98/EU, 2000/532/EU) or by SUSPA GmbH.

When handling with oils please observe the information in section 4.

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The waste-type classification is according to 2000/532/EC

Description	Material	Waste Code	Type of Waste	Type of Disposal	Comments
Piston rod	Steel	20 01 40	Metals	Recycle	Deliver for steel smelting
Tube(s)	Steel, Aluminium	20 01 40	Metals	Recycle	Deliver for steel smelting
Guide	Duroplastic PF	20 01 39	Plastic parts	Recycle	Sort by grade and deliver for recycling
	Brass	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
	Zn. Diecasting	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
Seal	Rubber-Metal	20 03 01	Mixed urban waste	Disposal	Waste disposal
Spacer	Aluminium	20 01 40	Metals	Recycle	Deliver for steel smelting
	Steel / Zinc	20 01 40	Metals	Recycle	Deliver for steel smelting
Piston	Plastic	20 01 39	Plastic parts	Recycle	deliver for recycling
	Aluminium/Zinc	20 01 40	Misc. Metals	Recycle	deliver for recycling
	Steel	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
	Sintered metal	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
Piston ring	Plastic	20 01 39	Plastic parts	Recycle	deliver for recycling
	Rubber	20 03 01	Mixed urban waste	Disposal	Waste disposal
Washers	Steel	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
	Sintered metal	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
Damping/Lubrication	Oil	13 01 10/11	Oil and greases	Recycle	Collect as old oil, deliver for recycling
Gas	Nitrogen	n.a.	n.a.	Entweichen	approx. 80% part of the breath air, no danger to health
End fittings / connections	Plastic	20 01 39	Plastic parts	Recycle	deliver for recycling
	Metal	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
	Zn. Diecasting	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
Bodenventil	Steel	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
	PTFE	20 01 39	Plastic parts	Recycle	deliver for recycling
	Rubber / Metal	20 03 01	Mixed urban waste	Disposal	Waste disposal
Separator piston	Aluminium	20 01 40	Misc. Metals	Recycle	Deliver for steel smelting
Bearing	Rubber	20 03 01	Mixed urban waste	Disposal	Waste disposal
	Rubber	20 03 01	Mixed urban waste	Disposal	Waste disposal

You will find information about guarantee and warranty in our GTC on www.suspa.com

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