

Safety Equipment for Hydraulic Accumulators



1. DESCRIPTION

1.1. GENERAL

Hydraulic accumulators are pressure vessels, as defined by PED 97/23/EC, and as such their manufacture is subject to the statutory pressure equipment regulations.

For safety in the workplace, system manufacturers and operators must draw up a risk assessment for the particular site.

These must take into account possible risks at the installation site, particularly in combination with external factors.

Fundamental risks affecting hydraulic accumulators are:

- Excessive pressure and
- Temperature increase (e.g. in the event of an external fire).

HYDAC provides the appropriate safety equipment to protect accumulators from excessive values on the gas and fluid side; see also catalogue section:

- Accumulators No. 3.000

2. PROTECTION ON THE GAS SIDE

2.1. TEMPERATURE FUSE

HYDAC offers two different kinds of temperature fuse.

In addition to the proven temperature fuse in carbon steel and stainless steel, HYDAC also offers a temperature fuse of the type GMP6, which is approved according to PED 97/23/EC.

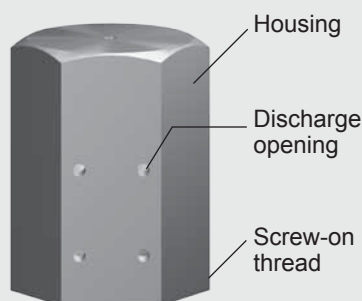
It is made of stainless steel and has a CE mark.

2.1.1 Mode of operation

Temperature fuses are "devices with a safety function" and are used to release the gas pressure by discharging the nitrogen completely when a rise in temperature reaches unacceptable levels (e.g. in the case of fire).

2.1.2 Design / Technical specifications

Temperature fuse design



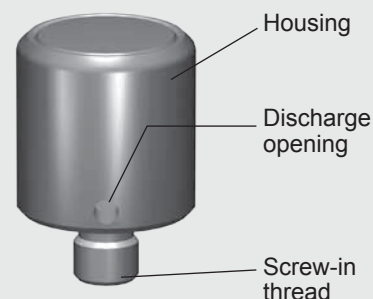
Technical specifications

Permitted operating pressure:
≤ 450 bar

Temperature range:
-10 °C ... +80 °C

Melting point:
between +160 °C and +170 °C

Temperature fuse GMP6 design



Technical specifications

Permitted operating pressure:
50 ... 350 bar

Temperature range:
-40 °C ... +80 °C

Melting point:
between +160 °C and +180 °C

2.1.3 Preferred models

Part no.	Description
363501	Temperature fuse 7/8-14UNF
3114417	Temperature fuse 7/8-14UNF with crane hook
3517438	GMP6-10-CE1637... for piston accumulators
3521196	GMP6-10-CE1637... for bladder and diaphragm accumulators

2.1.4 Installing the temperature fuse

Simple to retrofit by replacing the sealing cap with the temperature fuse.



Gas side of the accumulator shown with sealing cap



Gas side of the accumulator shown with temperature fuse

Installing the temperature fuse GMP6

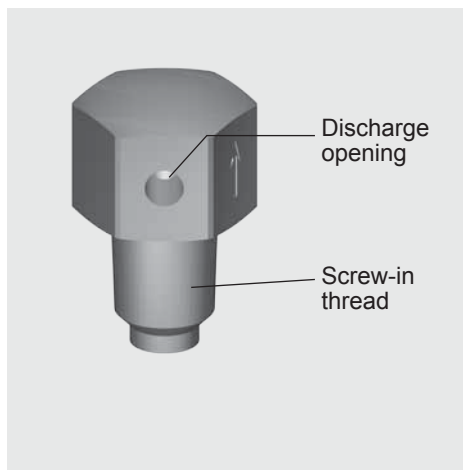
Please read the Operating Manual!

- GSV/GMP No. 3.504.CE

2.2. BURSTING DISC

2.2.1 Design

Protection by discharging the nitrogen completely when the pressure exceeds the permitted level.



2.2.2 Function

If the pressure exceeds the permitted level, the bursting disc shatters, permanently opening the port. This reduces the gas pressure by discharging the nitrogen completely.

Bursting discs are designed for different burst pressures and are supplied with a certificate of conformity.

Bursting discs are made either entirely of stainless steel, or from an alloy based on stainless steel and nickel.

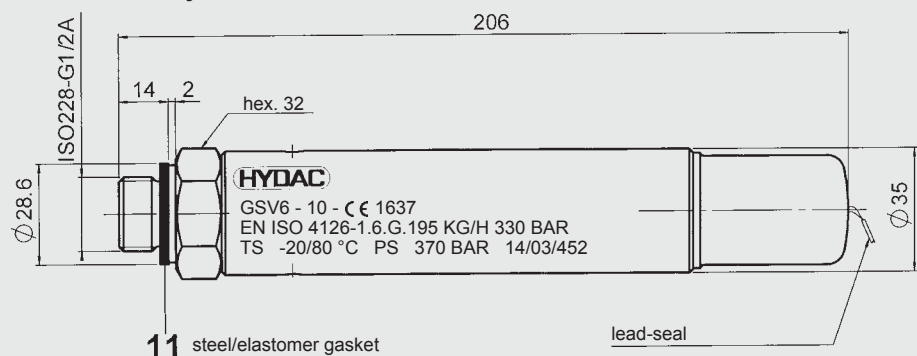
2.2.3 Preferred models

Part no. ¹⁾	Description	Burst pressure ± 10% at 50 °C
3156148	Bursting disc plug 1/4"NPT	210 bar
3156152	Bursting disc plug 1/4"NPT	350 bar
3156155	Bursting disc plug 1/4"NPT	450 bar

¹⁾ higher pressures, different threads and burst pressure tolerances on request

2.3. GAS SAFETY VALVE

2.3.1 Assembly and dimensions



2.3.2 Function

The gas safety valve provides protection by reducing the pressure in a controlled way if pressure exceeds the permitted level unexpectedly. It is pre-set on the pressure side and lead-sealed by the authorised representative. It is also supplied with a certificate of conformity and a type approval.

2.3.3 Model code

(also order example)

GSV6-10 - CE1637.ENISO4126-1.6.G. 195. 330

Gas safety valve

Component code

Flow rate Q [kg/h]
(see table, Point 2.3.5)

Pressure setting p [bar]
(see table, Point 2.3.5)

2.3.4 Technical specifications

Design

PED 97/23/EC, EN ISO4126-1, EN 13445-6, others on request

Module category

IV to PED 97/23/EC
Module B + D (EC prototype testing)
Module G (EC individual testing) on request

Nominal size

6 mm

Material

Stainless steel, closing element with flexible seat seal

Medium

Nitrogen (N₂)

Operating pressure range

30 ... 370 bar

Temperature range

-20 °C ... +80 °C

Weight

1.1 kg

2.3.5 Preferred models

Q [kg/h]	p [bar] ± 10 %	Part no. ¹⁾
15	30	3123965
20	40	3123966
28	50	3123967
35	60	3124028
40	70	3124029
45	80	3124030
50	90	3124031
58	100	3124032
65	110	3124033
70	120	3124034
75	130	3124035
83	140	3124036
88	150	3124037
95	160	3124038
100	170	3124039
105	180	3124040
110	190	3124041
118	200	3124042
125	210	3124043
130	220	3124044
135	230	3124045
140	240	3124046
148	250	3124047
155	260	3124048
160	270	3124049
165	280	3124050
170	290	3124051
178	300	3124052
185	310	3124053
190	320	3124054
195	330	3124055
200	340	3124056
205	350	3124057
210	360	3153706
216	370	3143015

¹⁾ others on request.

> 350 bar = surcharge for individual EC testing

2.3.6 Installing the gas safety valve GSV

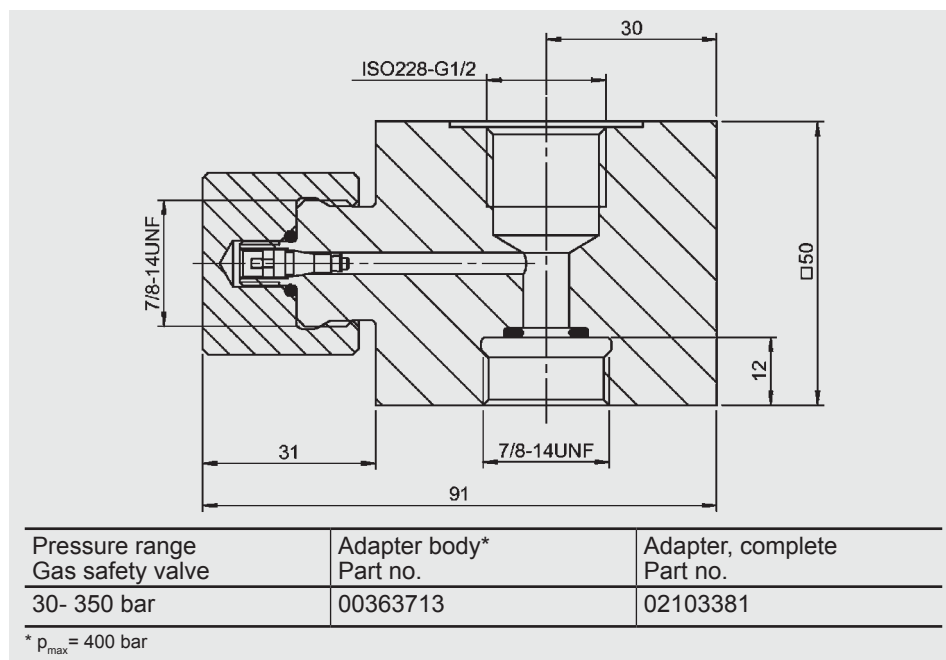
The self-centring gasket means that this valve can be installed simply and securely in any position.

Please read the Operating Manual!

- GSV/GMP
No. 3.504.CE

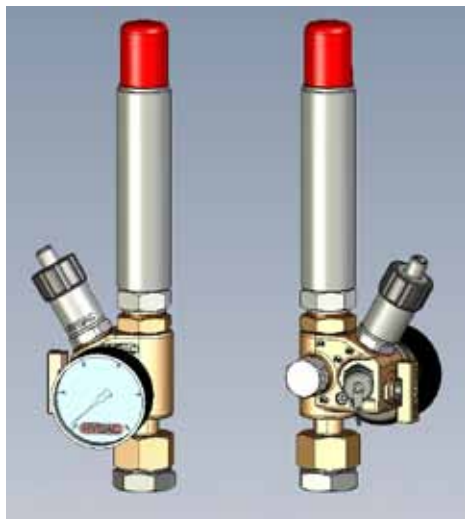
2.3.7 Adapter for gas safety valve GSV6

To protect standard and low pressure bladder accumulators, the adapter shown below must be ordered with the gas safety valve GSV6.



2.4. GAS SAFETY BLOCK

2.4.1 Design



The gas safety block GSB450 consists of a block made of brass (other materials on request) with integrated breather and shut-off valve plus ports for:

- Pressure gauge
- Gas safety valve (GSV6)
- Gas charging valve (e.g. Minimes)
- Pressure transmitter or pressure switch
- Bursting disc or temperature fuse

The connection for the gas safety valve is designed as a check valve. Therefore the valve can be changed, even if the system is pressurized.

2.4.2 Function

The GSB450 is an adapter block, which is mounted on an accumulator on the gas side and which can be fitted with various pressure devices, charging equipment, safety valves and other safety components.

2.4.3 Advantages

- Compact construction
- Flexible connection options
- Variable indication options: bar, MPa or psi, analogue or digital (optional)
- Pressure indication according to customer requirement
- Accumulator can be charged with nitrogen, directly via Minimes valve
- Pre-charge pressure can be checked without using FPU-1

2.4.4 Model code (also order example)

GSB450 - 1 - 1 - 5 - 1 - 1 - 350

Series _____

Material _____

- 1 = Standard
- 2 = Stainless steel

Accumulator connection _____

- 1 = Connection for SK / SBO
- 2 = Connection for SB
- 9 = Special connection

Monitoring options _____

- 0 = None
- 1 = 0 – 25 bar
- 2 = 0 – 100 bar
- 3 = 0 – 160 bar
- 4 = 0 – 250 bar
- 5 = 0 – 400 bar
- 9 = Special pressure gauge

Gas charging connection _____

- 0 = None
- 1 = Standard Minimes series 1620
- 2 = Minimes gas charging valve series 1615
- 9 = Special

Safety equipment _____

- 0 = None
- 1 = GSV
- 2 = Bursting disc
- 3 = Temperature fuse

Pressure range of the safety equipment _____

2.4.5 Technical specifications

Medium

Nitrogen (N₂)

Permitted operating temperature

-20 °C ... +80 °C

Max. operating pressure

400 bar / 5800 psi

Accumulator connection

Bladder accumulator:

7/8-14UNF with adapter

For bladder accumulators, the appropriate adapter is supplied. All other connections are sealed with blanking plugs.

Piston and diaphragm accumulators:

M28x1.5

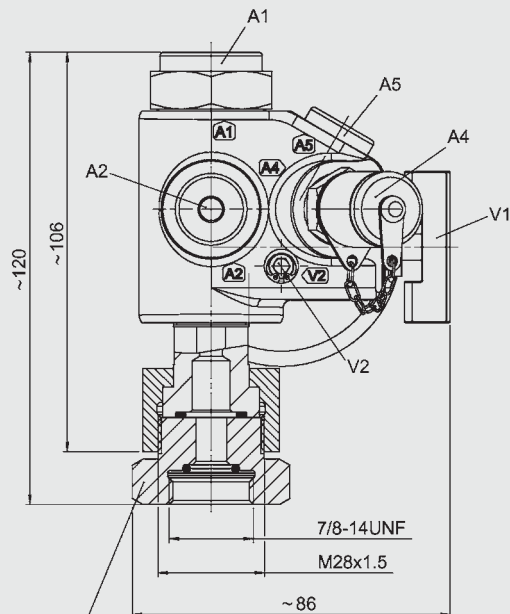
For piston and diaphragm accumulators the connection is a lock-nut with a M28x1.5 thread as standard.

2.4.6 Installation of gas safety block GSB Please read the Operating Manual!

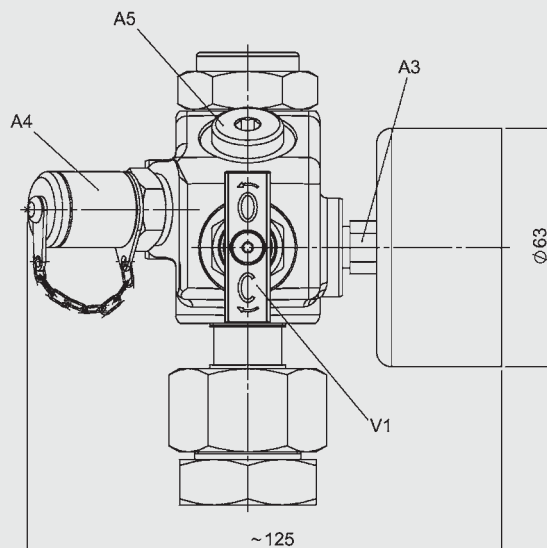
● GSB

No. 3.505.CE

2.4.7 Models



Hydraulic accumulator connection
Illustration with adapter M28x1.5 / 7/8-14UNF



Basic version

In the basic version, the GSB450 is supplied with shut-off valve, air bleed valve, pressure gauge (0 - 400 bar, Ø 63 mm) and gas charging connection in Minimes screw coupling series 1620 (M16x2).

Options The GSB450 can be supplied with the following options*:

- Pressure gauge with different display ranges (Ø 63 mm - at no additional cost) and different displays: bar, MPa or psi; analogue or digital
- Pressure gauges of various accuracy classes and glycerin-filled pressure gauges
- Minimes gas charging valve series 1615 (M16x1.5) in stainless steel version
- Version for lower and higher temperatures
- Version where all steel parts are stainless steel (A4)
- Gas safety valve GSV6
- Safety devices (bursting disc, temperature fuse)
- Pressure transmitter (e.g. HDA)
- Pressure switch (e.g. EDS)

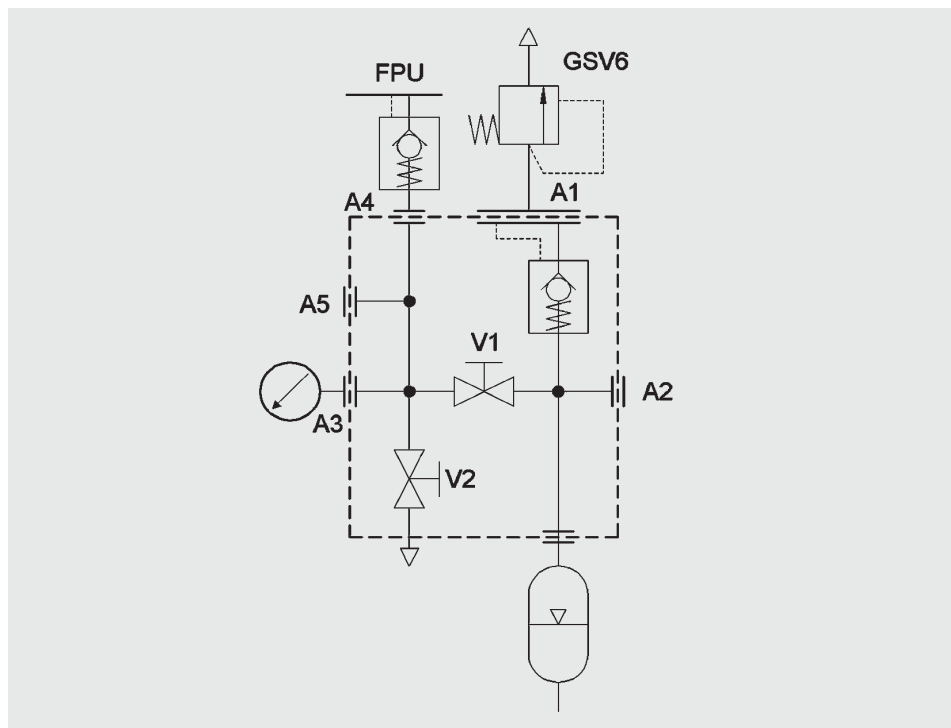
* on request and must be ordered separately and at additional cost

2.4.8 Block connections

Connections	Size	Description	Options available as accessories
A1	G 1/2-ISO228	GSV6 connection, incl. pilot-operated check valve	Sealing plug
A2	G1/4-ISO228	Connection for charging and safety devices	Charging connection for remote charging Bursting disc, temperature fuse
A3		Connection for pressure gauge	Pressure gauge in various models and various different indication ranges (0 - 400 bar, 0 - 5714 PSI)
A4		Gas charging connection	Minimess M16x2; M16x1.5 gas-tight
A5		General connections	Pressure transmitter e.g. HYDAC HDA, EDS

2.4.9 Valves

Type	Description
V1	Shut-off valve
V2	Air bleed valve (internal hex SW4)



2.4.10 Connecting hoses

Connecting hoses are suitable for the particular maximum permitted operating pressure printed on them and for 10,000 charging processes.

(HYDAC charging hoses comply with the EC Machinery Directive, DIN EN 982 and DIN EN 853 to 857.)

Gas connection of nitrogen bottles	Minimess port	Length [m]	Part no.
W30x2	M16x2	2.5	3434454
		4	3434457
W24.32x1/14	M16x2	2.5	3434424
		4	3434451
		10	3526858

Suitable adapters for foreign nitrogen bottles can be found in the following catalogue section:

- Universal Charging and Testing Unit FPU-1
No. 3.501

3. PROTECTION ON THE FLUID SIDE

3.1. GENERAL

The fluid side must be protected against pressures which exceed the permitted operating pressures by fitting approved and appropriate safety valves.

HYDAC offers pressure relief valves (DB12) which have a pressure setting of up to 400 bar (set by HYDAC). The valve carries the CE mark and is built into Safety and Shut-off Blocks in the series DSV10 and SAF in nominal sizes DN10 and DN50 and is lead-sealed.

Further information is available from the following catalogue section:

- Safety and Shut-off Block SAF/DSV
No. 3.551

4. NOTE

The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.