

hydroll

THE PISTON ACCUMULATOR COMPANY



THE PISTON
ACCUMULATOR
COMPANY



WHY PISTON ACCUMULATOR

Each type of accumulator technology has its advantages and limitations that must be considered when the accumulator is specified in the hydraulic system. Requirements for response time, system speed, mounting orientation, fluid type, pressure, temperature, diagnostics, maintenance and service intervals as well as costs of down time and servicing affect the selection. Hydroll piston accumulators have been designed to meet these requirements.

COMPARISON OF ACCUMULATOR TECHNOLOGIES

	PISTON 	BLADDER 	MEMBRANE 
Oil flow rate	High	Low	Medium
Compression ratio (max. pressure to pre-charge pressure)	10:1 ^(20:1)	4:1	6:1
Horizontal mounting position	Yes	No	Yes
Size optimization for system requirements	Yes	No	No
Space requirement	Small	Large	Medium
Sensing (e.g. pressure and piston position monitoring)	Yes	No	No
Temperature tolerance (low)	-45 °C	-20 °C ^(-40 °C)	-20 °C ^(-40 °C)
Extra gas tank connection	Yes	No	No
Dual functionality (dual piston or gas chamber)	Yes	No	No
Gas permeation (loss of pre-charge pressure)	Low	High	High
Service interval	Long	Short	Short
Response time	Medium	Medium	High
Tolerance for dirt	Low	High	High
Pre-charge lost in case of failure	Gradual	Immediate	Immediate
			Better

KEY ADVANTAGES



HIGHEST FLOW RATE

The piston accumulator structure enables the highest flow rates for hydraulic fluid.



OPTIMISATION FOR SYSTEM REQUIREMENTS

Piston accumulators can be short and wide or long and thin. Hydroll has a unique capability for effective mass customization.



LOWEST GAS PERMEATION

Multiple times slower pre-charge gas permeation makes piston the safest and most reliable alternative with long service interval.



FLEXIBLE MOUNTING POSITION

The piston accumulator can also be mounted horizontally without losing reliability.

The simple, compact, cylindrical design of piston accumulators ensures dependable performance, maximum efficiency, and a long service life. Various mounting positions, high oil flow rate and optimizability really set Hydroll piston accumulators apart from our competitors and competing technologies.



DESIGN FEATURES AND CONSTRUCTION

HOW DOES IT WORK

STRUCTURE AND OPERATING PRINCIPLE

CHARGING VALVE

Gas filling is conducted through the end flange by a dedicated gas valve. M16x2 as standard (arctic and M28x1.5 "bladder" type as an option)

END FLANGE (GAS)

The end flange is connected to the tube by threads or by crimping. The end flange can host sensing, e.g. pressure or piston position monitoring.

SHELL

The piston accumulator shell is made of special steel for pressure vessel constructions. The interior is roller burnished to ensure the highest quality. Before assembly each and every tube is inspected.

PISTON

The piston separates gas and fluid. It should be noted that the piston floats in the cylinder according to pressure changes. There are no radial forces impacting on the piston during operation, enhancing the piston accumulators durability.

PISTON SEALING SYSTEM

The typical piston sealing system comprises a piston seal and guide rings. The pressure difference over the piston seal is minimal despite enabling high system pressures.

END FLANGE (OIL)

The end flange is connected to the tube by threads or by crimping. The oil connection is tailored according to customer needs.

END FLANGE SEALING SYSTEM

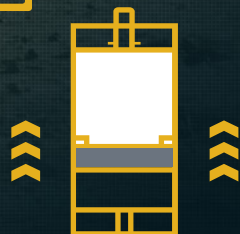
Static sealing consist of dual sealing system for the highest reliability in the toughest conditions.

A



The accumulator is pre-charged and ready for operation.

B



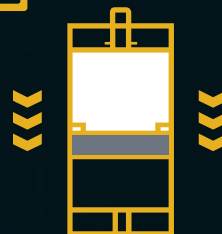
The hydraulic system is pressurized. The system pressure exceeds the precharge pressure, and the fluid flows into the accumulator.

C



The system pressure is at its peak pressure and maximum fluid capacity.

D



The system pressure falls and pressurized gas in the accumulator forces the fluid from the accumulator back into the system.

A large yellow and black excavator is shown in a snowy, wooded environment. The excavator's arm is raised, and its bucket is open. The background is a dense forest of tall, thin trees. The ground is covered in snow, and the excavator's tracks are visible in the foreground.

PISTON ACCUMULATOR

FOR EXTREME USE

Hydroll supplies piston accumulator solutions to customers for a wide range of applications in various industries. The one thing they have in common is the high demands that are set by heavy duty applications as well as remote and extreme operating environments.

Our products and solutions offer efficiency and functionality as well as operational safety and reliability to meet and exceed the needs and expectations of our customers.



MOBILE EQUIPMENT

Safety, ergonomics, reliability, productivity and efficiency are some of the most important features of any mobile equipment in today's mines, construction sites, farmlands or forests.

Originally developed to meet the extreme needs of Finnish forest harvesters, Hydroll mobile equipment accumulator solutions have proven their operations in extreme conditions, from Siberia to Chile and from Australia to North America.

Piston accumulators in mobile equipment improve:

- › Safety
- › Productivity
- › Reliability
- › Energy efficiency
- › Ergonomics

**HYDROLL
ACCUMULATORS
CAN BE EFFECTIVELY
CUSTOMISED TO
YOUR SYSTEM
REQUIREMENTS**



ENERGY STORAGE IN HYBRID SYSTEMS

Piston accumulators have been proven to be the superior solution in hybrid systems. Hydroll's groundbreaking piston accumulator technology enables reductions in energy expenditure. In boom lowering motions for example, most of the potential energy is first stored in the accumulators and then recovered in the following lifting motions.



AXLE SUSPENSION

Reliable and smooth suspension for variable loads is built with single or double piston accumulators. Piston accumulators, due to their reliability, ability to withstand higher pressure peaks and freedom of installation are high performance solutions for heavy machinery in the most demanding operating environments.



EMERGENCY BACK-UP

As an emergency back-up, the piston accumulator's function is to store energy, which is available regardless of fluctuations in hydraulic pressure and provides a continued fail-safe application in the event of any loss of hydraulic power.

Piston accumulators are a long-life solution in which the failure mode is gradual, making them superior alternatives to diaphragm and bladder accumulators, that has total failure in case of damage.

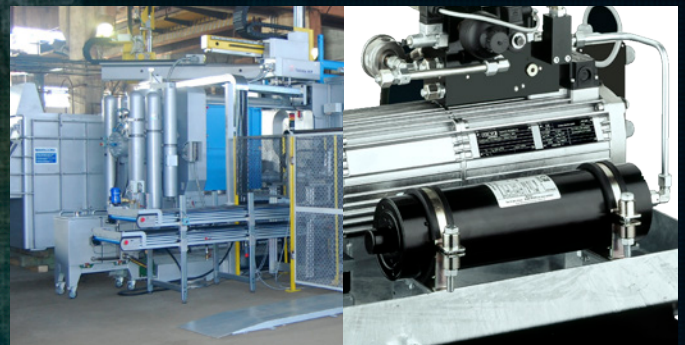


BOOM SUSPENSION

Active or passive boom suspension or soft ride control is a shock absorber for the bucket or boom. While tramming, the material should stay in place. This means a smoother ride for the operator and less stress on the machine.

**PROVEN
RELIABILITY
IN THE MOST
DEMANDING
CONDITIONS**

INDUSTRY AND PROJECTS



In **industrial hydraulics**, accumulators are used in a wide variety of functions. Hydroll's comprehensive accumulator selection can support even the most demanding needs in the markets.

- › Molding machines
- › Press systems
- › Casting systems
- › Hydro power plant

EXAMPLE APPLICATIONS

- › Damping element
- › Energy intensifier
- › Energy storage in a hybrid system
- › Energy storage to support pumps
- › Back up energy storage

MARINE AND OFFSHORE

Hydrolic accumulators serve marine and offshore customers in a broad variety of functions. Our accumulators are designed to perform even in the toughest conditions, including arctic waters. The products are tailored to meet your requirements.

- › Classifications on demand (e.g. DNV, Lloyds Register, Bureau Veritas, ABS, GL Group)
- › Special coatings available on demand
- › Arctic packages -45°C

EXAMPLE APPLICATION

- › Heave compensation in cranes
- › Brake release in winch systems
- › Emergency back-up for lifeboats
- › Damping elements



ENERGY STORAGE OR SAFETY BACK-UP

The piston accumulator is the safest accumulator technology for system back-up. Furthermore its oil flow rates are the highest to provide fast system function. Hence the piston accumulator is the optimal choice for the demanding needs of the marine and offshore industry.



**OVER 200 000
HYDROLL PISTON
ACCUMULATORS
IN OVER 20 000
WIND TURBINES**



WIND TURBINE HYDRAULIC PITCH CONTROL SYSTEMS AND BRAKES

Hydraulic pitch control constantly adjusts the angle of the blades to the wind to optimize the wind turbine's energy production. Also hydraulic pitch systems act as a main brake in extreme weather or wind conditions protecting the high value turbine.

Piston accumulators have a vital role in hydraulic pitch systems. Typically they perform three functions:

- › Damping pulsations from the pump and the proportional valve
- › During emergency stops accumulators supply extra oil/energy to the cylinders that pitches the blades to a safe position
- › Manual decompression is used during service

The wind turbine industry tends to use either bladder or piston accumulators. However, there are strong factors suggesting the superiority of piston accumulators in wind turbine applications such as:

- › Multiple times lower gas permeation
- › Superior reliability
- › The failure of piston accumulator is controlled
- › High and low temperature tolerances
- › Ability to withstand centrifugal forces
- › Ease of installing real time pressure monitoring diagnostics

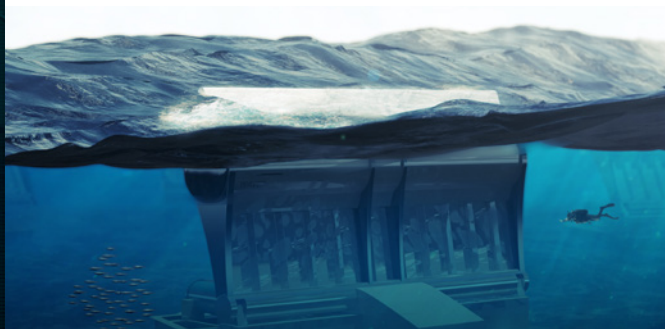
RENEWABLE ENERGY

Hydroll's **piston accumulator solutions** have gained the position of the leading piston accumulator provider for the wind turbine industry.



SOLAR ENERGY

In concentrated photovoltaic (CPV) and concentrated solar power (CSP) systems, tracking the sun all day is key for system efficiency. In remote locations high reliability with minimum maintenance is one of the key demands for hydraulic systems. Low cost series of HPS14 are built for this purpose.



WAVE ENERGY

Hydroll, working closely together with its customers, has developed accumulator solutions to help utilize the huge potential of wave and tidal energy in the ocean. Hydroll accumulators are used in PTO (power take-off) to increase power quality.



OUR MISSION:

TO REPLACE THE BLADDER

It is our passion to put all our focus and efforts into developing our piston accumulator technology to become even more competitive against bladder and membrane accumulators. We – and most importantly our customers worldwide – believe in the technical superiority of our products.



**WE CAN PROVIDE
THE BENEFITS OF A
PISTON ACCUMULATOR
FOR YOU FOR THE
COST OF BLADDER**

- › **OVER 20 YEARS OF EXPERIENCE IN PISTON ACCUMULATOR TECHNOLOGY**
- › **THE ONLY COMPANY IN THE WORLD WITH 100% FOCUS ON PISTON ACCUMULATOR TECHNOLOGY**
- › **STRONG IN-HOUSE R&D IN CLOSE CO-OPERATION WITH CUSTOMERS**
- › **EFFICIENT GLOBAL SUPPLY CHAIN - FAST AND ACCURATE DELIVERIES**
- › **RECOGNIZED FOR HIGH LEVEL AND FLEXIBLE CUSTOMER SERVICE**

UNCOMPROMISING QUALITY AND SAFETY

At Hydroll, we are committed to continuously developing both the piston accumulator technology as well as our products and our own know-how. In everything we do we put safety first. Our committed staff make sure that our production is always precise and the materials and components used are of the highest possible quality. All products are thoroughly tested before they are approved for delivery. Hydroll is ISO9001:2015 and ISO14001:2015 quality certified.

HYDROLL - THE STRENGTH OF THE ETOLA GROUP

As a member of the Etola Group, Hydroll has the backing of a Finnish industrial partner operating internationally, with operations in Finland, Sweden and the Baltics. The Etola Group is a family-owned business that consists of approximately 30 specialist companies. The company's main product groups include hydraulics, fasteners, seals, industrial rubber and plastics, tapes and wire products, bearings and power transmission, tools and safety products. The Etola Group has a cumulative annual turnover of approximately €400 million.

**ETOLA
GROUP**



**STATE OF THE ART QUALITY
AND DESIGN FROM FINLAND**




ACCUMULATOR SERIES

HPS, HPD, HDC, ACCUMULATOR STATIONS

OFFERINGS

Hydroll has the **widest** available selection of piston accumulator solutions, products and related services. We offer reliability, durability and supreme functionality for demanding tasks and conditions around the world.



**THIS IS WHAT
MAKES HYDROLL
DIFFERENT -
EFFICIENT MASS
CUSTOMIZATION.**

ENGINEERING SERVICES

Our starting point is the customer's application. The design of an optimal accumulator solution is conducted in three steps to precisely meet the customer application's specific needs.

1

APPLICATION ANALYSES

In-depth analyses of the application's specific requirements. Recommendations for optimized solutions.

2

SIZING THE ACCUMULATOR

Accumulator sizing is carried out together with the customer by simulation and testing.

3

TECHNICAL SUPPORT

Prototype
0-series
Serial production

OFFERING

HPS-SINGLE ACTION ACCUMULATOR

The HPS series is divided into two product lines. HPS 14 is the most cost effective non-repairable crimped structure and HPS 10 has one piece end-flange.

HPS 14

SPECIFICATIONS

50-90 mm ID
250-350 bar max working pressures
0,1-5 L volume

KEY FEATURES

- › Cost-efficient non-repairable accumulator
- › Suitable for heavy duty static and dynamic load applications and harsh weather conditions
- › Excellent gas sealing properties
- › Installation into any position

EXAMPLE APPLICATION:

- › Solar sun tracking systems
- › Brake system back-up
- › Boom suspension
- › Compensator for pump pulsations



HPS 10

SPECIFICATIONS

50-250 mm ID
250, 350, 415, 500, 650 bar max working pressure
0,1-100 L volume

KEY FEATURES

- › Suitable for heavy duty static and dynamic load applications and harsh weather conditions
- › Excellent gas sealing properties
- › Easy to install optional sensors or piston position monitoring equipment
- › Optimized structure
- › Wide range of size and working pressures

EXAMPLE APPLICATION:

- › Wind turbines
- › Mobile equipment
- › Energy storage
- › Industrial hydraulics



HPD-DOUBLE ACTION ACCUMULATOR

The HPD series by Hydroll is a range of double hydropneumatic piston accumulators. The design of HPD double piston accumulators has combined two accumulators into one product. The double action pistons allow for the suspension of two movements by one accumulator. The HPD double piston accumulator has a fluid connection in both end flanges and the gas is contained between two pistons within the one unit.

HPD 10

SPECIFICATIONS

50–80 mm ID
250 bar max working pressures
0,4–3 L volume, other sizes on request

KEY FEATURES

- › Proven and robust design
- › Space-saving structure combining two accumulators into one
- › Excellent dampening features
- › Installation to into any position

EXAMPLE APPLICATION:

- › Boom swing suspensions
- › Forest harvesters heads



HDC-DOUBLE CHAMBER ACCUMULATOR

Hydroll's double chamber structure enables smooth suspension for variable loads. The HDC is an accumulator solution designed for axle and boom suspension. A double gas chamber with a pre-charged pressure difference is the key to smooth suspension for variable payloads. The HDC is based on the proven design and components from the HPS series.

HDC 10

SPECIFICATIONS

80–125 mm ID
250 bar max working pressures
2x1–2x3,5 L volume, other sizes on request

KEY FEATURES

- › Smooth suspension for variable payloads
- › Proven and robust design
- › Space saving structure

EXAMPLE APPLICATION:

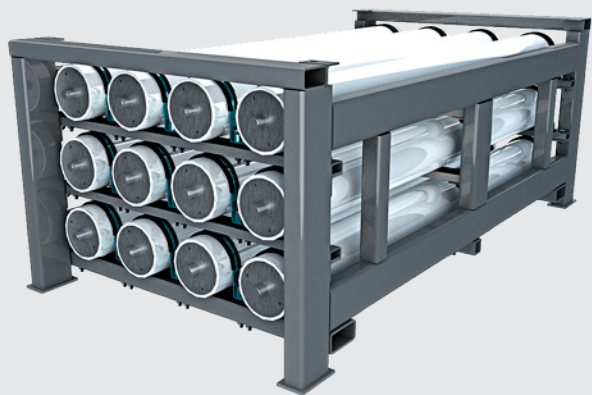
- › Axle suspension
- › Front loader boom suspension
- › Tele handler boom suspension
- › Tractor front loader suspension



OFFERING

ACCUMULATOR STATIONS

Accumulator stations with frame, piping, plus all necessary valves and safety devices enable our customers to get plug-and-play modules for their assembly process. Hydroll accumulator stations provide easy-to-install solutions tailored to our customer needs.



OPTIONAL EQUIPMENT

› ARCTIC PACKAGE

Hydroll has vast experience in the design and production of accumulators for arctic conditions. Operational temperatures as follows:

- › -25°C to +80°C (Standard)
- › -45°C to +80°C (Arctic package)

› PRESSURE MONITORING

Simple and reliable on-line pre-charge pressure monitoring systems available. Enquire for details.

› SAFETY VALVE

PED certified safety valves and blocks available on request.

› GAS VALVE

Hydroll standard gas valve is named HGV1620. List of alternative arctic and "bladder" type gas valves in table below.



Features of gas valves

Product	Product name	Pressure rating	Connection thread	Low temp.
Standard gas valve, M16 x 2	HGV M16x2	630 bar	G $\frac{1}{4}$ "	-25°C
Arctic gas valve M16 x 2	HGV M16x2 arctic	630 bar	G $\frac{1}{4}$ "	-45°C
Gas valve M16 x 1,5	HGV M16x1,5	630 bar	G $\frac{1}{4}$ "	-25°C
M28x1,5 type gas valve	HGV M28x1,5 gas valve	630 bar	G $\frac{1}{2}$ "	-45°C

ACCESSORIES



CHARGING UNIT

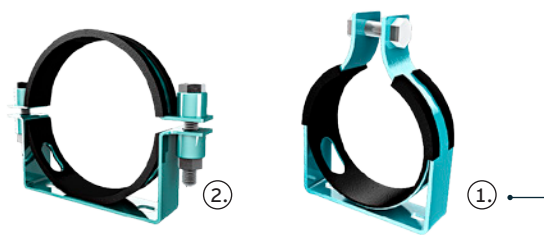
The HPCK charging kit is required to check the pre-charge pressure of an accumulator. The HPCK charging kit can be used with all Hydroll piston accumulators and is compatible with the HGV 1620 gas valve with M16x2 mm thread.

Product	Product name
HPCK Charging kit with 5meter hose	HPCK
Gas connector (for std. Gas bottle)	
For special connectors, ask for more information.	

CLAMPS

Hydroll clamps are used to mount all types of accumulators safely and simply into position. A suitable clamp has been designed for every accumulator type.

- › To keep the accumulator in position
- › To carry the weight of the accumulator



Product name	Suitability for cylinder diameters	Weight / kg	H / mm	Material thickness	Model number
HP Clamp 60	58 mm–62 mm	0.3	100	3 mm	1
HP Clamp 90	85 mm–92 mm	0.45	140	3 mm	1
HP Clamp 95	92 mm–98 mm	0.45	140	3 mm	1
HP Clamp 95–2	90 mm–100 mm	0.8	120	3 mm	2
HP Clamp 120	110 mm–125 mm	0.9	145	3 mm	1
HP Clamp 120 Heavy	110 mm–125 mm	1.1	145	5 mm	1
HP Clamp 165	155 mm–165 mm	1.2	205	3 mm	2
HP Clamp 185	170 mm–185 mm	1	220	3 mm	2
HP Clamp 185 Heavy	170 mm–185 mm	1.3	220	5 mm	2
HP Clamp 205	195 mm–205 mm	1.5	230	3 mm	2
HP Clamp 205 Heavy	195 mm–205 mm	2	230	5 mm	2
HP Clamp 230	220 mm–230 mm	1.8	270	3 mm	2
HP Clamp 300	280 mm–300 mm	2	325	3 mm	2

SEAL KITS

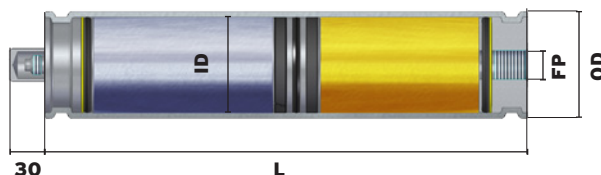
Hand inspected seal kits should be selected according to the accumulator type. A seal kit includes:

- › Piston seal
- › Piston guide ring
- › O-ring seals
- › Support rings

Product	Suitability for type
Sealkit HPS 50	HPS Ø 50
Sealkit HPS 80	HPS Ø 80
Sealkit HPS 100	HPS Ø 100
Sealkit HPS 125	HPS Ø 125
Sealkit HPS 140	HPS Ø 140
Sealkit HPS 150	HPS Ø 150
Sealkit HPS 160	HPS Ø 160
Sealkit HPS 180	HPS Ø 180
Sealkit HPS 200	HPS Ø 200
Sealkit HPS 250	HPS Ø 250

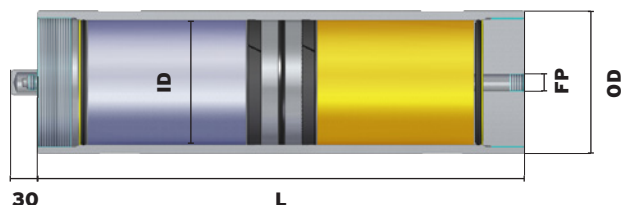
SPECIFICATIONS

HPS 14 PISTON ACCUMULATORS



Product name	Max Allowable Pressure / bar	Gas capacity / liter	Dimensions ID / OD / L	Standard Fluid Port	Weight / kg
ID Ø 50					
HPS14-250-050-0001	250	0,1	50/60/136	G $\frac{1}{2}$ "	1,9
HPS14-250-050-0002	250	0,2	50/60/187	G $\frac{1}{2}$ "	2,2
HPS14-250-050-0003	250	0,3	50/60/238	G $\frac{1}{2}$ "	2,6
HPS14-250-050-0004	250	0,4	50/60/289	G $\frac{1}{2}$ "	2,9
HPS14-250-050-0005	250	0,5	50/60/340	G $\frac{1}{2}$ "	3,3
HPS14-250-050-0007	250	0,7	50/60/442	G $\frac{1}{2}$ "	4,0
HPS14-250-050-0010	250	1	50/60/594	G $\frac{1}{2}$ "	5,0
ID Ø 80					
HPS14-250-080-0005	250	0,5	80/90/207	G $\frac{1}{2}$ "	5,8
HPS14-250-080-0010	250	1	80/90/306	G $\frac{1}{2}$ "	6,8
HPS14-250-080-0015	250	1,5	80/90/406	G $\frac{1}{2}$ "	7,9
HPS14-250-080-0020	250	2	80/90/505	G $\frac{1}{2}$ "	8,9
HPS14-250-080-0030	250	3	80/90/704	G $\frac{1}{2}$ "	11,0
HPS14-250-080-0040	250	4	80/90/903	G $\frac{1}{2}$ "	13,1
HPS14-250-080-0050	250	5	80/90/1102	G $\frac{1}{2}$ "	15,2
HPS14-350-080-0005	350	0,5	80/95/239	G $\frac{1}{2}$ "	8,1
HPS14-350-080-0010	350	1	80/95/338	G $\frac{1}{2}$ "	9,7
HPS14-350-080-0015	350	1,5	80/95/438	G $\frac{1}{2}$ "	11,3
HPS14-350-080-0020	350	2	80/95/537	G $\frac{1}{2}$ "	12,9
HPS14-350-080-0030	350	3	80/95/736	G $\frac{1}{2}$ "	16,1
HPS14-350-080-0040	350	4	80/95/935	G $\frac{1}{2}$ "	19,4
HPS14-350-080-0050	350	5	80/95/1134	G $\frac{1}{2}$ "	22,6
ID Ø 90					
HPS14-300-090-0005	300	0,5	90/105/216	G $\frac{1}{2}$ "	9,5
HPS14-300-090-0010	300	1	90/105/295	G $\frac{1}{2}$ "	10,9
HPS14-300-090-0015	300	1,5	90/105/373	G $\frac{1}{2}$ "	12,3
HPS14-300-090-0020	300	2	90/105/452	G $\frac{1}{2}$ "	13,7
HPS14-300-090-0030	300	3	90/105/609	G $\frac{1}{2}$ "	16,5
HPS14-300-090-0040	300	4	90/105/766	G $\frac{1}{2}$ "	19,4
HPS14-300-090-0050	300	5	90/105/924	G $\frac{1}{2}$ "	22,2

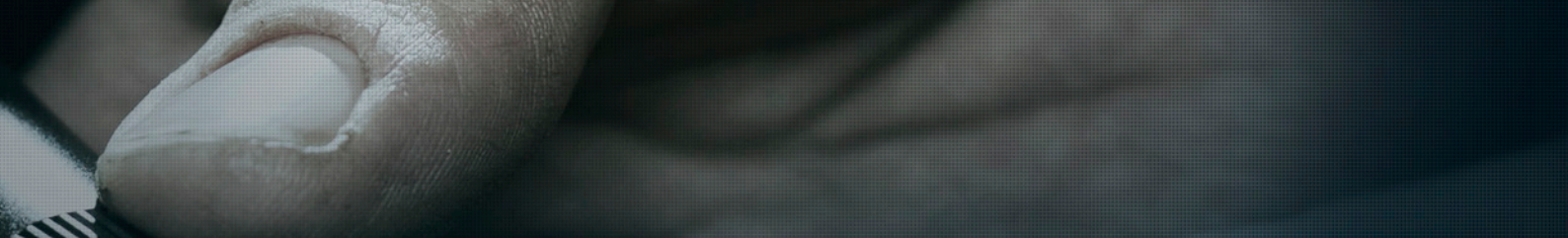
HPS 10 PISTON ACCUMULATORS



Product name	Max Allowable Pressure / bar	Gas capacity / liter	Dimensions ID / OD / L	Standard Fluid Port	Weight / kg
ID Ø 50					
HPS10-350-050-0001	350	0,1	50/60/130	G $\frac{3}{4}$ "	1,9
HPS10-350-050-0002	350	0,2	50/60/181	G $\frac{3}{4}$ "	2,2
HPS10-350-050-0003	350	0,3	50/60/232	G $\frac{3}{4}$ "	2,6
HPS10-350-050-0004	350	0,4	50/60/283	G $\frac{3}{4}$ "	3,0
HPS10-350-050-0005	350	0,5	50/60/334	G $\frac{3}{4}$ "	3,3
HPS10-350-050-0007	350	0,7	50/60/435	G $\frac{3}{4}$ "	4,0
HPS10-350-050-0010	350	1	50/60/588	G $\frac{3}{4}$ "	5,0
ID Ø 80					
HPS10-250-080-0004	250	0,4	80/90/166	G $\frac{3}{4}$ "	4,7
HPS10-250-080-0005	250	0,5	80/90/186	G $\frac{3}{4}$ "	4,9
HPS10-250-080-00075	250	0,75	80/90/236	G $\frac{3}{4}$ "	5,5
HPS10-250-080-0010	250	1	80/90/286	G $\frac{3}{4}$ "	6,0
HPS10-250-080-0015	250	1,5	80/90/385	G $\frac{3}{4}$ "	7,0
HPS10-250-080-0020	250	2	80/90/485	G $\frac{3}{4}$ "	8,1
HPS10-250-080-0030	250	3	80/90/684	G $\frac{3}{4}$ "	10,2
HPS10-250-080-0040	250	4	80/90/883	G $\frac{3}{4}$ "	12,2
HPS10-350-080-0004	350	0,4	80/95/166	G $\frac{3}{4}$ "	5,7
HPS10-350-080-0005	350	0,5	80/95/186	G $\frac{3}{4}$ "	6,0
HPS10-350-080-00075	350	0,75	80/95/236	G $\frac{3}{4}$ "	6,8
HPS10-350-080-0010	350	1	80/95/286	G $\frac{3}{4}$ "	7,6
HPS10-350-080-0015	350	1,5	80/95/385	G $\frac{3}{4}$ "	9,2
HPS10-350-080-0020	350	2	80/95/485	G $\frac{3}{4}$ "	10,8
HPS10-350-080-0030	350	3	80/95/684	G $\frac{3}{4}$ "	14,1
HPS10-350-080-0040	350	4	80/95/883	G $\frac{3}{4}$ "	17,3
HPS10-500-080-0004	500	0,4	80/95/173	G $\frac{3}{4}$ "	6,1
HPS10-500-080-0005	500	0,5	80/95/193	G $\frac{3}{4}$ "	6,4
HPS10-500-080-00075	500	0,75	80/95/243	G $\frac{3}{4}$ "	7,2
HPS10-500-080-0010	500	1	80/95/292	G $\frac{3}{4}$ "	8,1
HPS10-500-080-0015	500	1,5	80/95/392	G $\frac{3}{4}$ "	9,6
HPS10-500-080-0020	500	2	80/95/491	G $\frac{3}{4}$ "	11,3
HPS10-500-080-0030	500	3	80/95/670	G $\frac{3}{4}$ "	14,5
HPS10-500-080-0040	500	4	80/95/889	G $\frac{3}{4}$ "	17,7

SPECIFICATIONS

Product name	Max Allowable Pressure / bar	Gas capacity / liter	Dimensions ID / OD / L	Standard Fluid Port	Weight / kg
ID Ø 100					
HPS10-350-100-0020	350	2	100/115/381	G1"	14,8
HPS10-350-100-0030	350	3	100/115/509	G1"	17,4
HPS10-350-100-0040	350	4	100/115/636	G1"	19,9
HPS10-350-100-0060	350	6	100/115/891	G1"	24,9
HPS10-350-100-0080	350	8	100/115/1146	G1"	30,0
HPS10-350-100-0100	350	10	100/115/1400	G1"	35,1
HPS10-500-100-0020	500	2	100/120/381	G1"	17,4
HPS10-500-100-0030	500	3	100/120/509	G1"	20,9
HPS10-500-100-0040	500	4	100/120/636	G1"	24,4
HPS10-500-100-0060	500	6	100/120/891	G1"	31,3
HPS10-500-100-0080	500	8	100/120/1146	G1"	38,2
HPS10-500-100-0100	500	10	100/120/1400	G1"	45,1
ID Ø 125					
HPS10-250-125-0040	250	4	125/140/441	G1"	26,1
HPS10-250-125-0050	250	5	125/140/522	G1"	28,8
HPS10-250-125-0060	250	6	125/140/604	G1"	31,6
HPS10-250-125-0080	250	8	125/140/767	G1"	37,0
HPS10-250-125-0100	250	10	125/140/930	G1"	42,5
HPS10-250-125-0120	250	12	125/140/1093	G1"	47,9
HPS10-250-125-0150	250	15	125/140/1337	G1"	56,0
HPS10-250-125-0200	250	20	125/140/1745	G1"	69,6
HPS10-350-125-0040	350	4	125/140/457	G1"	28,2
HPS10-350-125-0050	350	5	125/140/538	G1"	30,9
HPS10-350-125-0060	350	6	125/140/620	G1"	33,7
HPS10-350-125-0080	350	8	125/140/783	G1"	39,1
HPS10-350-125-0100	350	10	125/140/946	G1"	44,5
HPS10-350-125-0120	350	12	125/140/1109	G1"	49,9
HPS10-350-125-0150	350	15	125/140/1353	G1"	58,1
HPS10-350-125-0200	350	20	125/140/1761	G1"	71,7



Product name	Max Allowable Pressure / bar	Gas capacity / liter	Dimensions ID / OD / L	Standard Fluid Port	Weight / kg
HPS10-415-125-0040	415	4	125/145/471	G1"	30,1
HPS10-415-125-0050	415	5	125/145/552	G1"	32,8
HPS10-415-125-0060	415	6	125/145/634	G1"	35,5
HPS10-415-125-0080	415	8	125/145/797	G1"	40,9
HPS10-415-125-0100	415	10	125/145/960	G1"	46,3
HPS10-415-125-0120	415	12	125/145/1123	G1"	51,8
HPS10-415-125-0150	415	15	125/145/1367	G1"	59,9
HPS10-415-125-0200	415	20	125/145/1775	G1"	73,5

ID Ø 140

HPS10-350-140-0040	350	4	140/160/418	G 1½"	33,3
HPS10-350-140-0050	350	5	140/160/483	G 1½"	35,7
HPS10-350-140-0060	350	6	140/160/548	G 1½"	38,1
HPS10-350-140-0100	350	10	140/160/808	G 1½"	47,7
HPS10-350-140-0120	350	12	140/160/938	G 1½"	52,5
HPS10-350-140-0150	350	15	140/160/1133	G 1½"	59,7
HPS10-350-140-0200	350	20	140/160/1458	G 1½"	71,7
HPS10-350-140-0250	350	25	140/160/1783	G 1½"	83,7

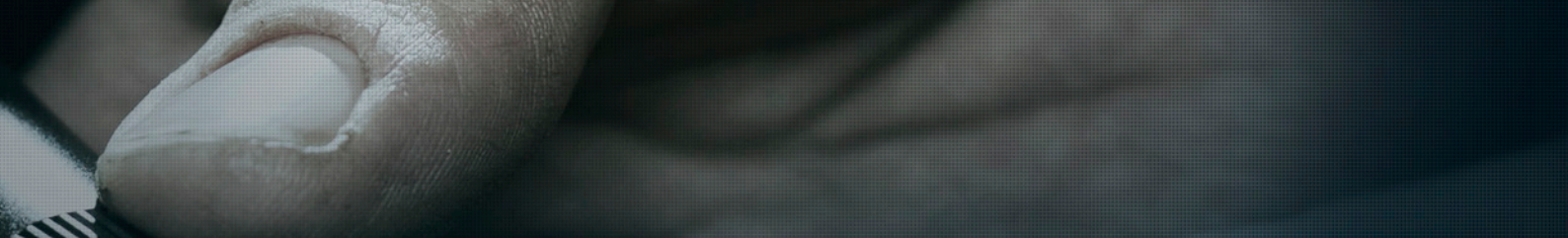
HPS10-415-140-0040	415	4	140/160/434	G 1½"	36,1
HPS10-415-140-0050	415	5	140/160/499	G 1½"	38,5
HPS10-415-140-0060	415	6	140/160/564	G 1½"	40,9
HPS10-415-140-0100	415	10	140/160/824	G 1½"	50,5
HPS10-415-140-0120	415	12	140/160/954	G 1½"	55,3
HPS10-415-140-0150	415	15	140/160/1149	G 1½"	62,5
HPS10-415-140-0200	415	20	140/160/1474	G 1½"	74,5
HPS10-415-140-0250	415	25	140/160/1799	G 1½"	86,6

ID Ø 150

HPS10-350-150-0050	350	5	150/170/445	G 1½"	39,0
HPS10-350-150-0060	350	6	150/170/502	G 1½"	41,3
HPS10-350-150-0100	350	10	150/170/728	G 1½"	50,2
HPS10-350-150-0120	350	12	150/170/841	G 1½"	54,6
HPS10-350-150-0150	350	15	150/170/1011	G 1½"	61,3
HPS10-350-150-0200	350	20	150/170/1294	G 1½"	72,5
HPS10-350-150-0250	350	25	150/170/1577	G 1½"	83,6
HPS10-350-150-0300	350	30	150/170/1860	G 1½"	92,5

SPECIFICATIONS

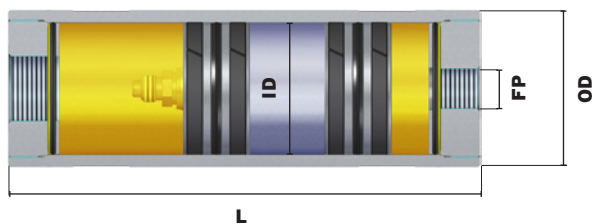
Product name	Max Allowable Pressure / bar	Gas capacity / liter	Dimensions ID / OD / L	Standard Fluid Port	Weight / kg
HPS10-415-150-0050	415	5	150/175/441	G 1½"	42,9
HPS10-415-150-0060	415	6	150/175/498	G 1½"	45,8
HPS10-415-150-0100	415	10	150/175/724	G 1½"	57,1
HPS10-415-150-0120	415	12	150/175/837	G 1½"	62,7
HPS10-415-150-0150	415	15	150/175/1007	G 1½"	71,3
HPS10-415-150-0200	415	20	150/175/1290	G 1½"	85,4
HPS10-415-150-0250	415	25	150/175/1573	G 1½"	99,6
ID Ø 160					
HPS10-350-160-0060	350	6	160/180/490	G 1½"	48,9
HPS10-350-160-0080	350	8	160/180/589	G 1½"	53,1
HPS10-350-160-0100	350	10	160/180/689	G 1½"	57,3
HPS10-350-160-0150	350	15	160/180/937	G 1½"	67,6
HPS10-350-160-0200	350	20	160/180/1186	G 1½"	78,1
HPS10-350-160-0250	350	25	160/180/1435	G 1½"	88,5
HPS10-350-160-0300	350	30	160/180/1684	G 1½"	99,0
HPS10-415-160-0060	415	6	160/185/480	G 1½"	52,3
HPS10-415-160-0080	415	8	160/185/579	G 1½"	57,6
HPS10-415-160-0100	415	10	160/185/679	G 1½"	62,9
HPS10-415-160-0150	415	15	160/185/927	G 1½"	76,1
HPS10-415-160-0200	415	20	160/185/1176	G 1½"	89,4
HPS10-415-160-0250	415	25	160/185/1425	G 1½"	102,6
HPS10-415-160-0300	415	30	160/185/1674	G 1½"	115,9
ID Ø 180					
HPS10-250-180-0080	250	8	180/200/484	G 1½"	59,2
HPS10-250-180-0100	250	10	180/200/563	G 1½"	63,0
HPS10-250-180-0120	250	12	180/200/641	G 1½"	66,6
HPS10-250-180-0150	250	15	180/200/759	G 1½"	72,1
HPS10-250-180-0200	250	20	180/200/956	G 1½"	81,4
HPS10-250-180-0250	250	25	180/200/1152	G 1½"	90,6
HPS10-250-180-0300	250	30	180/200/1349	G 1½"	99,8
HPS10-250-180-0350	250	35	180/200/1545	G 1½"	109,0
HPS10-250-180-0400	250	40	180/200/1742	G 1½"	118,2



Product name	Max Allowable Pressure / bar	Gas capacity / liter	Dimensions ID / OD / L	Standard Fluid Port	Weight / kg
HPS10-350-180-0080	350	8	180/205/496	G 1½"	68,3
HPS10-350-180-0100	350	10	180/205/574	G 1½"	73,0
HPS10-350-180-0120	350	12	180/205/653	G 1½"	77,6
HPS10-350-180-0150	350	15	180/205/771	G 1½"	84,6
HPS10-350-180-0200	350	20	180/205/968	G 1½"	96,3
HPS10-350-180-0250	350	25	180/205/1164	G 1½"	107,9
HPS10-350-180-0300	350	30	180/205/1361	G 1½"	119,6
HPS10-350-180-0350	350	35	180/205/1557	G 1½"	131,3
HPS10-350-180-0400	350	40	180/205/1754	G 1½"	143,0
HPS10-415-180-0080	415	8	180/205/520	G 1½"	74,5
HPS10-415-180-0100	415	10	180/205/598	G 1½"	79,2
HPS10-415-180-0120	415	12	180/205/677	G 1½"	83,8
HPS10-415-180-0150	415	15	180/205/795	G 1½"	90,8
HPS10-415-180-0200	415	20	180/205/992	G 1½"	102,5
HPS10-415-180-0250	415	25	180/205/1188	G 1½"	114,2
HPS10-415-180-0300	415	30	180/205/1385	G 1½"	125,8
HPS10-415-180-0350	415	35	180/205/1581	G 1½"	137,5
HPS10-415-180-0400	415	40	180/205/1778	G 1½"	149,2
ID Ø 200					
HPS10-415-200-0100	415	10	200/230/527	G 1½"	89,6
HPS10-415-200-0150	415	15	200/230/688	G 1½"	102,0
HPS10-415-200-0200	415	20	200/230/847	G 1½"	115,0
HPS10-415-200-0250	415	25	200/230/1006	G 1½"	127,0
HPS10-415-200-0300	415	30	200/230/1166	G 1½"	140,0
HPS10-415-200-0350	415	35	200/230/1325	G 1½"	153,0
HPS10-415-200-0400	415	40	200/230/1484	G 1½"	165,0
HPS10-415-200-0450	415	45	200/230/1643	G 1½"	178,0
HPS10-415-200-0500	415	50	200/230/1802	G 1½"	191,0
ID Ø 250					
HPS10-415-250-0400	415	40	250/300/1031	G 1½"	254,0
HPS10-415-250-0500	415	50	250/300/1234	G 1½"	289,0
HPS10-415-250-0600	415	60	250/300/1438	G 1½"	323,0
HPS10-415-250-0700	415	70	250/300/1642	G 1½"	358,0
HPS10-415-250-0800	415	80	250/300/1846	G 1½"	392,0
HPS10-415-250-0900	415	90	250/300/2050	G 1½"	427,0
HPS10-415-250-1000	415	100	250/300/2253	G 1½"	461,0

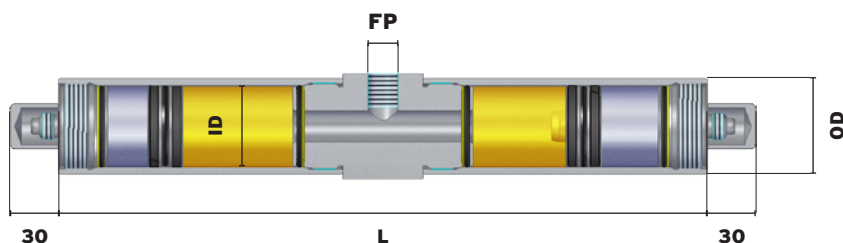
SPECIFICATIONS

HPD DOUBLE PISTON ACCUMULATORS

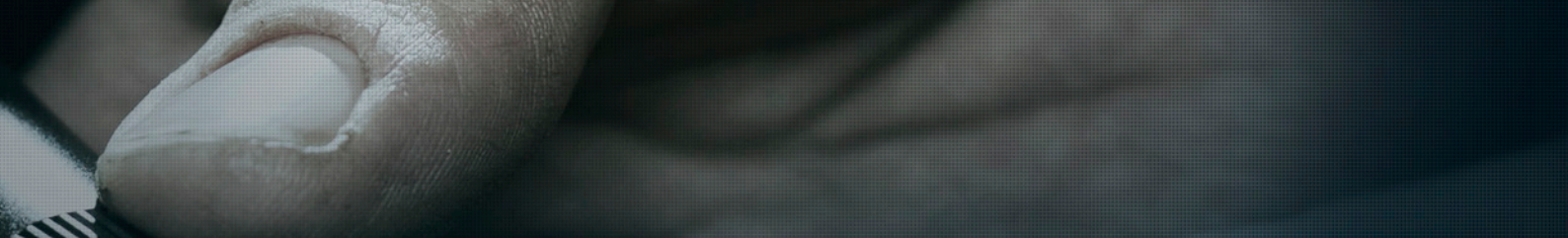


Product name	Max Allowable Pressure / bar	Gas capacity / liter	Dimensions ID / OD / L	Standard Fluid Port	Weight / kg
ID Ø 50					
HPD10-250-050-0004	250	0,4	50/60/330	G $\frac{3}{4}$ "	4,8
HPD10-250-050-0005	250	0,5	50/60/381	G $\frac{3}{4}$ "	5,1
HPD10-250-050-0007	250	0,7	50/60/457	G $\frac{3}{4}$ "	5,6
HPD10-250-050-0010	250	1	50/60/635	G $\frac{3}{4}$ "	6,8
ID Ø 80					
HPD10-250-080-0004	250	0,4	80/90/191	G $\frac{3}{4}$ "	6,0
HPD10-250-080-0005	250	0,5	80/90/211	G $\frac{3}{4}$ "	6,2
HPD10-250-080-0008	250	0,8	80/90/261	G $\frac{3}{4}$ "	6,7
HPD10-250-080-0010	250	1	80/90/311	G $\frac{3}{4}$ "	7,3
HPD10-250-080-0020	250	2	80/90/510	G $\frac{3}{4}$ "	9,4
HPD10-250-080-0030	250	3	80/90/709	G $\frac{3}{4}$ "	11,5

HDC DOUBLE CHAMBER PISTON ACCUMULATORS

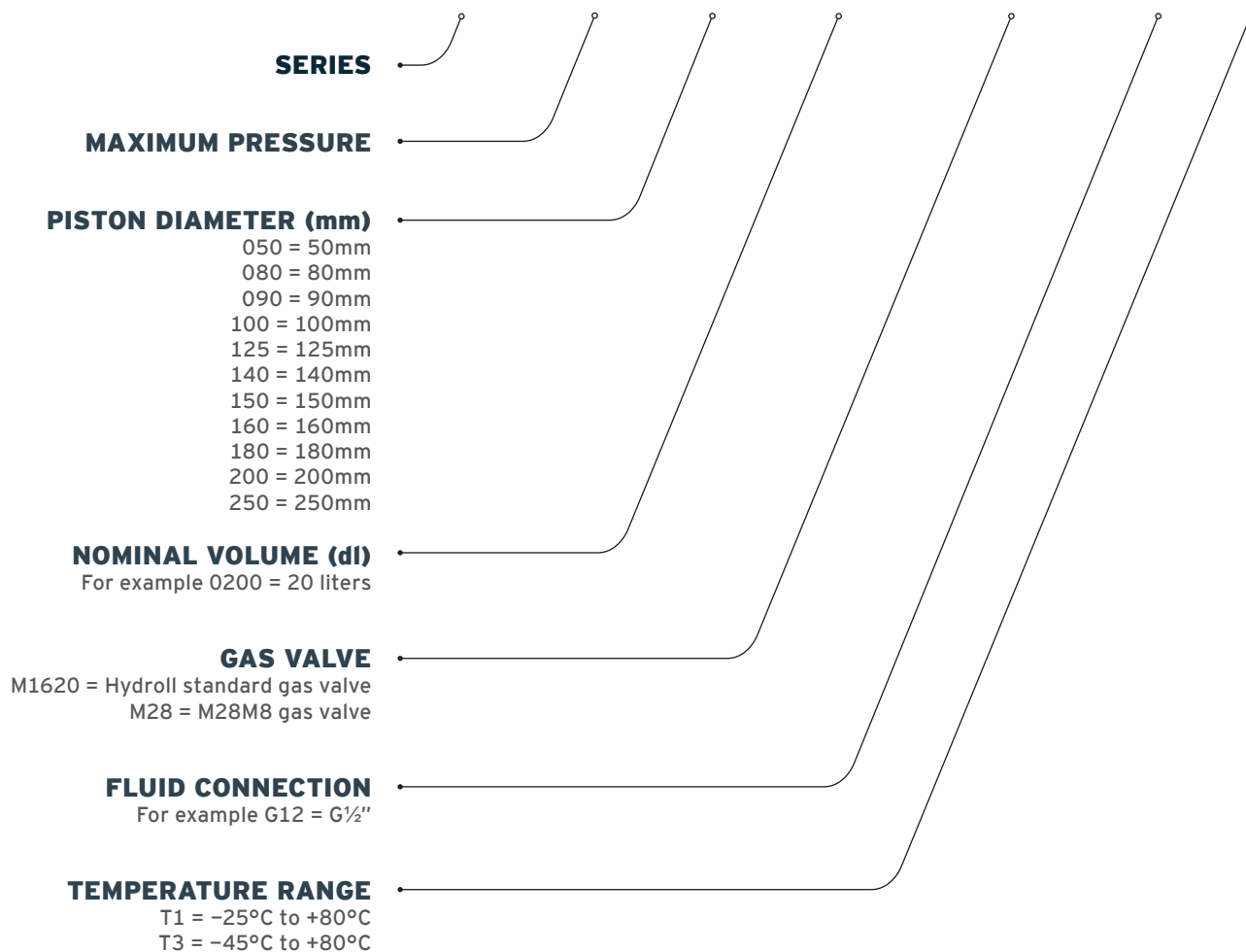


ID Ø 80					
HDC10-250-080-00075-00075	250	2 x 0,75	80/90/502	G $\frac{1}{2}$ "	11,5
HDC10-250-080-0010-0010	250	2 x 1	80/90/602	G $\frac{1}{2}$ "	12,5
HDC10-250-080-0015-0015	250	2 x 1,5	80/90/800	G $\frac{1}{2}$ "	14,5
HDC10-250-080-0020-0020	250	2 x 2	80/90/1000	G $\frac{1}{2}$ "	16,7
HDC10-250-080-0025-0025	250	2 x 2,5	80/90/1228	G $\frac{1}{2}$ "	18,6
ID Ø 125					
HDC10-250-125-0020-0020	250	2 x 2	125/140/594	G $\frac{3}{4}$ "	44,8
HDC10-250-125-0025-0025	250	2 x 2,5	125/140/676	G $\frac{3}{4}$ "	47,3
HDC10-250-125-0030-0030	250	2 x 3	125/140/758	G $\frac{3}{4}$ "	49,8
HDC10-250-125-0035-0035	250	2 x 3,5	125/140/838	G $\frac{3}{4}$ "	52,3



HYDROLL PISTON ACCUMULATOR MODEL CODE

HPS10-350-140-0200-M1620-G12-T1





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