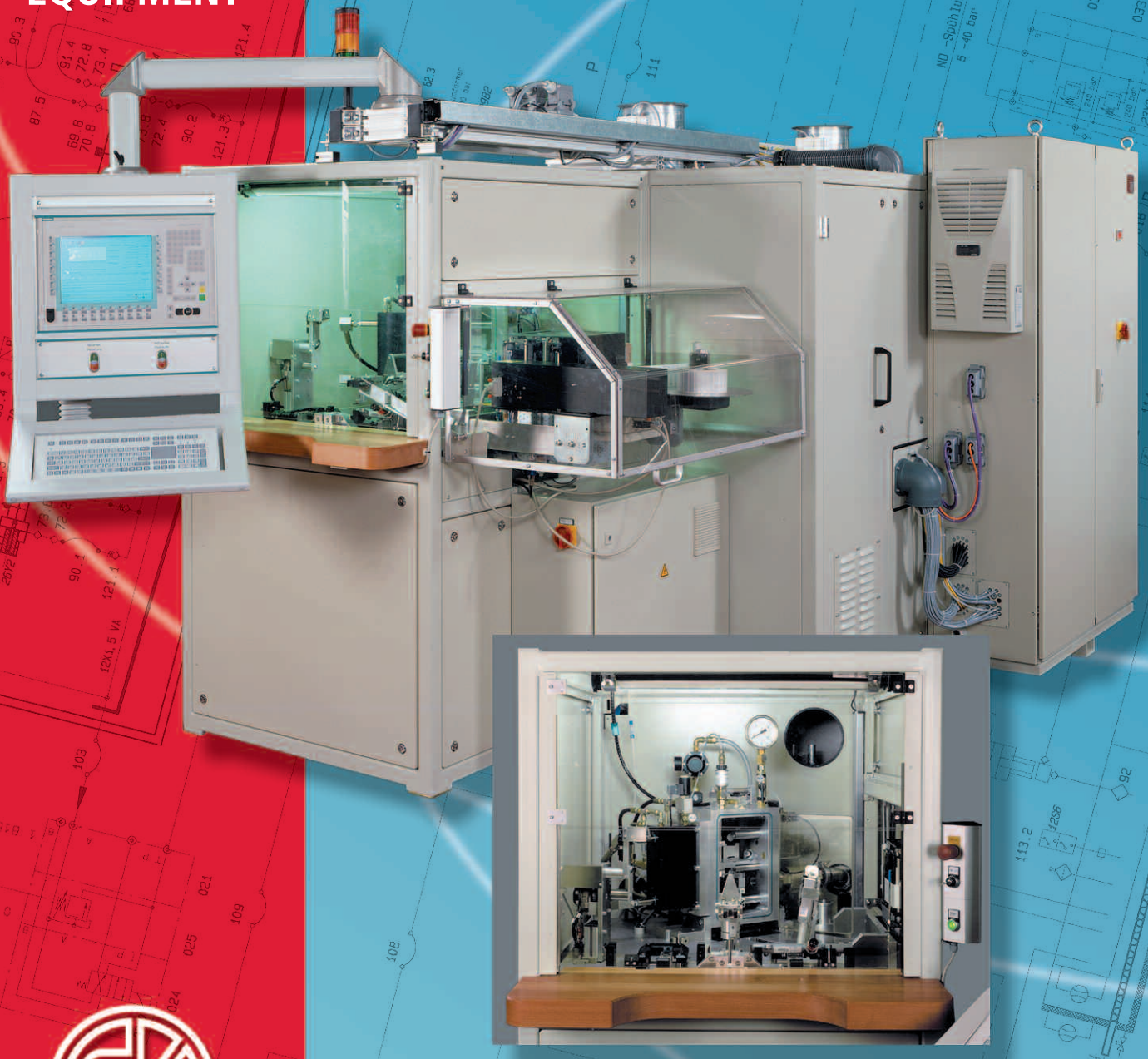
MAXIMATOR®

HIGH PRESSURE TECHNOLOGY

HYDRAULICS

PNEUMATICS

TESTING EQUIPMENT



Test Benches

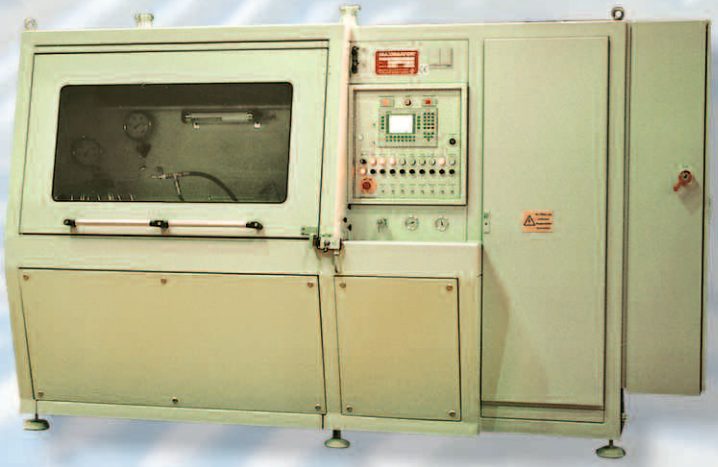
MAXIMATOR GmbH

MAXIMATOR®

MAXIMATOR has an extensive know-how concerning concept, development, construction and manufacturing of test benches and pressure-generating systems.

Hoses, pipes, tanks, accumulators, valves, fittings, plastic and ceramic parts as well as special components of the diesel injection technique (rails, nozzles, nozzle brackets injectors) and other vehicle components (e.g. air bag accumulators, camshafts and intermediate shafts, gears) are tested or manufactured with MAXIMATOR stations successfully.

As complete supplier with many years of experiences concerning components, power packs and systems we offer our customers individual solutions tailored to their specific requirements. From the making out of the performance specification up to the setting into operation and the training of the personnel, you will be accompanied by well versed engineers and technicians for obtaining an optimum solution of your test task.



MAXIMATOR high-pressure station

MAXIMATOR test benches and pressure-generating systems obtain pressures up to maximally 15,000 bar and can be operated with a multitude of liquids, such as oil, water, water-to-oil mixture(1:9)), pentosin, brake fluid or gases (e.g. nitrogen, oxygen, helium).

MAXIMATOR pulse test bench

Our delivery programme comprises:

- Pressure and bursting pressure test benches
- Pulse and durability test benches
- Leak test benches
- Functional test benches
- High-pressure generating systems
- Pressure gauge adjusting systems
- Autofrettage systems
- Mandrel extraction machines for hoses
- Air bag filling and controlling systems

The worldwide service offers you, among others, erection and setting into operation of the system, training of the staff and rotational maintenances.

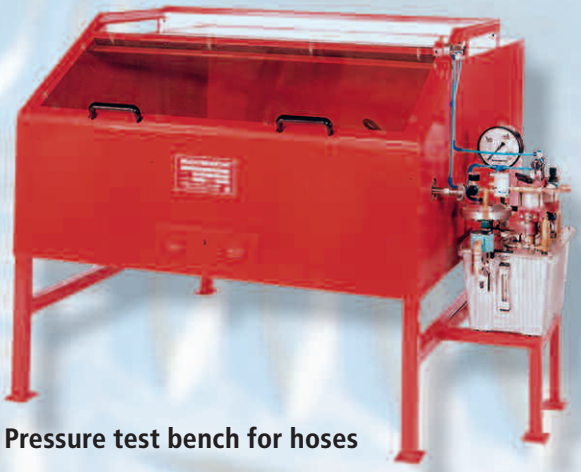
As development partner of the automobile and components supplying industry we are well acquainted with the demands on test, recording of measured data and documentation of the test results and test data management. On your request, we also take on the measuring equipment check and the calibration of the installed measuring devices.

In our service center we can realize for you pressure, bursting pressure and pulse pressure tests as well as autofrettage services. Feasability studies, component inspections, test and autofrettage of pilot series or small batches can be realized without any problem. This offer range will be extended continuously. Please consult us.

Pressure test benches

Pressure test bench for hoses and tanks

Maximum test pressure:	2,000 bar
Number of the test pieces:	1 pressure port
Test medium:	Mineral oil or water-oil emulsion
Generation of pressure:	MAXIMATOR pumps
Energy demand:	compressed air min. 6 bar
Dimensions of the test chamber (width x depth x height):	approx. 1,500x1,600x480 mm



Pressure test bench for hoses

Pressure test bench for hose lines

Pressure and bursting pressure test bench for hose lines

Maximum test pressure:	2,500 bar
Number of the test pieces:	1 pressure port
Test medium:	Hydraulic oil
Generation of pressure:	Pressure intensifiers
Geometric displacement volume:	257.5 cm^3
Energy demand:	3.2 kW
Dimensions of the test chamber: (width x depth x height):	approx. 1,500x800x700 mm

Pressure test bench for expansion hoses

Pressure and leak test bench for expansion hoses

Maximum test pressure:	300 bar
Number of the test pieces:	maximum 8 pieces
Test medium:	Water, emulsion, apresol
Generation of pressure:	MAXIMATOR pumps
Energy demand:	5.5 kW
Dimensions of the test chamber (width x depth x height):	approx. 1,720x1,150x2,000 mm

Other pressure ranges, test media, pressure generations or dimensions are available on demand.

Burst pressure test benches

Bursting pressure tests at undercarriage hoses and hydraulic components with media tempering

Maximum burst pressure:	630 bar
Number of the test pieces:	1 pressure port
Test medium:	Pentosin-CHF 11s
Generation of pressure:	MAXIMATOR pump and pressure intensifier
Energy demand:	3 kW
Dimensions of the test chamber (width x depth x height):	approx. 1,500x800x750 mm

Bursting pressure test bench for undercarriage hoses

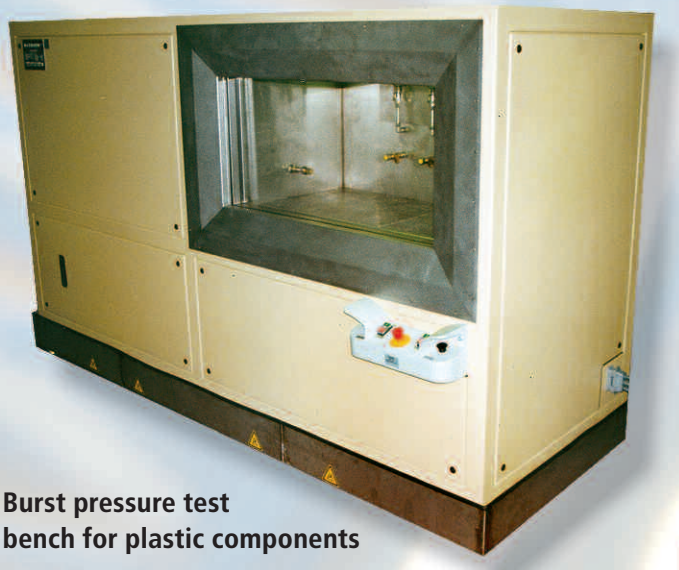
Bursting pressure test bench for air bag cold gas tank

Burst pressure and pulse pressure tests at air bag cold gas tanks

Maximum burst pressure:	1,400 bar
Maximum pulse pressure:	700 bar
Number of the test pieces:	1 pressure port
Test medium:	Water, water-glycol
Pressure generation:	MAXIMATOR pump and pressure intensifier
Dimensions of the test chamber (width x depth x height):	approx. 1,250x750x1,000 mm

Pressure and burst pressure tests at plastic components with temperature and mass flow metering and evaluation

Maximum bursting pressure:	20 bar
Number of the test pieces:	1 pressure port
Test medium:	Tap water
Generation of pressure:	MAXIMATOR pumps
Energy demand:	3.5 kW
Dimensions of the test chamber (width x depth x height):	approx. 1,450x600x750 mm



Burst pressure test bench for plastic components

MAXIMATOR – Complete solutions for high-pressure technique

Pulse test benches

Pulse and fatigue tests at components

Max. pulse pressure (dynamic):	20 bar (sine) 5 bar (trapezoid)
Max. test pressure (static):	150 bar
Test medium:	Shell Myrina TX
Generation of pressure:	Pressure intensifier
Geometric displacement volume:	125 cm^3
Energy demand:	15 kW
Dimensions of the test chamber (width x depth x height):	approx. 1,200x600x800 mm

Pulse test bench for filter housings

Pulse test bench for high-pressure components

Pulse tests at high-pressure components of the diesel injection technique

Maximum pulse pressure:	4,000 bar
Test medium:	Hydraulic oil HLP 46
Generation opf pressure:	Pressure intensifier
Geometric displacement volume:	18 cm^3
Energy demand:	48 kW
Dimensions of the test chamber (width x depth x height):	approx. 1,050x1,200x1,000 mm

Pulse tests at hose lines

Maximum pulse pressure:	180 bar
Test medium:	Pentosin and ATF oils
Generation of pressure:	Pressure intensifier i = 0,79
Geometric displacement volume:	900 cm^3
Energy demand:	20 kW
Dimensions of the test chamber (width x depth x height):	approx. 900x700x800 mm

Pulse test bench for hose lines

Other pressure ranges, test media, pressure generations or dimensions are available on request.

Leak test benches

Leak test bench for pressure valves

Leak tests at pressure valves for injection pumps

Maximum test pressure:	1,450 bar
Number of test pieces:	2
Test medium:	Test oil V 1404
Generation of pressure:	MAXIMATOR pumps
Energy demand:	1 kW
Dimensions of the test chamber (width x depth x height):	approx.700x500x600 mm

Leak test bench for expansion hoses

Leak test at expansion hoses

Maximum test pressure:	40 bar
Number of the test specimen:	2
Test medium:	Test oil Apresol
Generation of pressure:	MAXIMATOR pumps
Energy demand:	1 kW
Dimensions of the test chamber (width x depth x height):	approx. 1,000x600x250 mm

Leak test bench for Common Rails

Leak test bench for Common Rails

Maximum pressure:	2,500 bar
Test medium:	Test oil V 1407
Generation of pressure:	Pressure intensifier
Geometric displacement volume:	250 cm^3
Energy demand:	16 kW
Dimensions of the test chamber (width x depth x height):	approx. 1,360x78x950 mm

MAXIMATOR – Complete solutions for high-pressure technique

Functional test benches

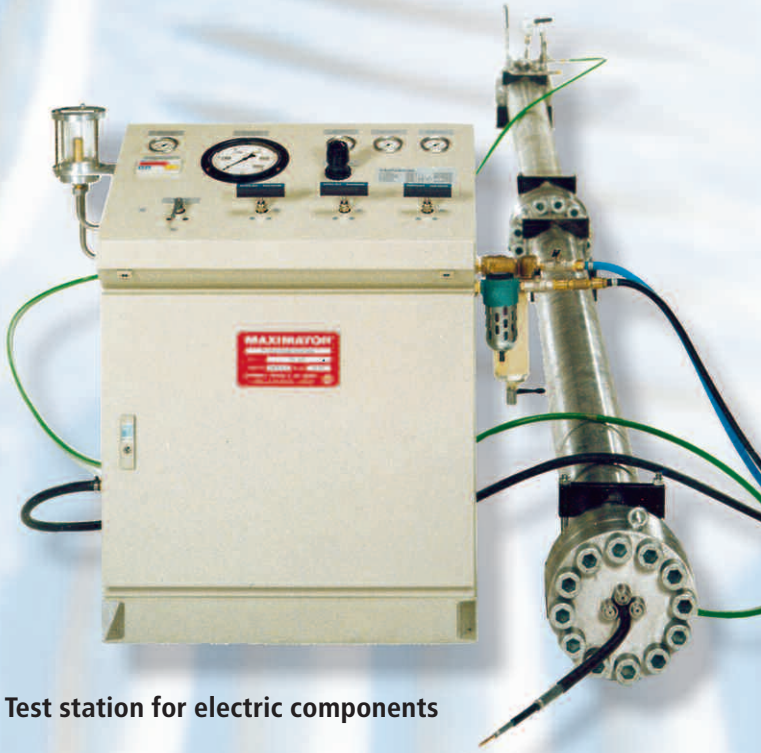
Test bench for determining the flow characteristic of valves

Determination of the flow characteristic of cooling water valves and heating valves

Maximum test pressure:	3.5 bar, 85° C
Test medium:	Water – glycol 50 : 50
Generation of pressure:	Gear pump
Energy demand:	75 kW
Dimensions (WxDxH):	approx. 1,780x1,150x1,674 mm

Functional and fatigue tests at electric components

Maximum test pressure:	800 bar
Test medium:	Water
Generation of pressure:	MAXIMATOR pump
Voltage supply:	220 V
Compressed air:	min. 6 bar
Dimension of the high-pressure generating system: (width x depth x height):	approx. 800x1,200x1,120 mm
Dimension of the high-pressure chamber (width x depth):	approx. 350x7,720 mm



Test station for electric components

Test bench for gears

Inspection of hydraulic gears

Maximum test pressure:	110 bar
Maximum volumetric rate:	60 l/min
Test medium:	ATF oil
Generation of pressure:	Screw pump
Energy demand:	38 kW
Dimensions (WxDxH):	approx. 4,000x2,200x1,650 mm
Dimensions of the test chamber (width x depth x height):	approx. 2,000x1,120x795 mm

Other pressure ranges, test media, pressure generations or dimensions are available on request.

High pressure generating systems

Pressure generation in compact design

Maximum operating pressure:	2,000 bar
Operating medium:	Water
Generation of pressure:	MAXIMATOR pump
Energy demand:	approx. 4.5 mN³
Dimensions (WxDxH):	approx. 1,500x500x1,200 mm

High-pressure generation for the water-jet cutting

High-pressure generation for the production of camshafts

Pressure generation for the production of mounted camshafts

Maximum operating pressure:	4,000 bar
Operating medium:	Mineral oil VG 46 DIN 51519
Generation of pressure:	3x pressure circuits (for every single pressure intensifier 1 pressure circuit)
Geometric displacement volume each pressure intensifier:	23 cm³
Energy demand:	28 kW
Dimensions (WxDxH):	approx. 1,600x1,120x1,670 mm

Pressure generation for the production of steering shafts and components

Maximum operation pressure:	550 bar
Operating medium:	Mineral oil / HFA
Generation of pressure:	Pressure intensifier
Geometric displacement volume:	2,800 cm³
Energy demand:	34 kW
Dimensions (WxDxH):	approx. 2,340x1,620x2,350 mm

High-pressure generation for the production of steering shafts

MAXIMATOR – Complete solutions for high-pressure technique

Autofrettage systems

Autofrettage of components of the diesel injection technique (injectors, nozzles, nozzle brackets etc.)

Maximum autofrettage pressure:	10,000 bar
Operating medium:	Hydraulic fluid type Typ HFC (Ultra-Safe 360)
Generation of pressure:	Pressure intensifier
Geometric displacement volume:	70 cm^3
Energy demand:	8 kW
Dimensions of the test chamber (width x depth x height):	approx. 700x600x750 mm

Autofrettage system for high-pressure loaded vehicle components

Autofrettage system for high-pressure tubing

Autofrettage of diesel injection lines

Maximum autofrettage pressure:	6,000 bar
Operating medium:	Test oil ISO 4113
Generation of pressure:	Pressure transducer
Geometric displacement volume:	100 cm^3
Energy demand:	0.5 kW
Dimensions of the test chamber: (width x depth x height):	approx. 1,250x500x1,400 mm

Autofrettage system for pressure transducers

Autofrettage of components for pressure transducers, sensors and of components of the diesel injection technique

Maximum autofrettage pressure:	15,000 bar
Operating medium:	Sebacate
Generation of pressure:	Pressure intensifier
Geometric displacement volume:	16 cm^3
Energy demand:	13 kW
Dimensions of the test chamber (width x depth x height):	approx. 1,000x1,000x1,100 mm

Other pressure ranges, test media, pressure generations or dimensions are available on request.

Mandrel extraction system

Mandrel extraction system for hose lines

Mandrel extraction and testing of high-pressure hose lines

Maximum mandrel extraction pressure:	1,400 bar
Maximum test pressure:	1,400 bar
Operating medium:	Water emulsion (Water 15dt degrees of hardness)
Generation of pressure:	MAXIMATOR pump DPD 200
Energy demand:	78 kW
Dimensions of the complete system: (width x depth x height):	approx. 20,000x20,000x4,000 mm

Mandrel extraction and testing of high-pressure hose lines

Maximum mandrel extraction pressure:	1,400 bar
Maximum test pressure:	1,400 bar
Operating medium:	Water emulsion (Water 15dt degrees of hardness)
Generation of pressure:	MAXIMATOR pump DPD 200
Energy demand:	13 kW
Dimensions of the complete system (width x depth x height):	approx. 6,000x7,000x4,000 mm

Mandrel extraction system for hose lines

MAXIMATOR – Complete solutions for high-pressure technique

Air bag filling and control systems

Air driven gas booster station

Gas compression with air driven boosters

Maximum operating pressure:	200 – 500 bar
Maximum delivery rate:	400 standard litres per minute (dependent on inlet pressure)
Operating medium:	Nitrogen, helium, argon
Driving medium:	Compressed air
Generation of pressure:	MAXIMATOR compressors
Dimensions (WxDxH):	720x560x1,230 mm

Control module with 2 valves

Gas pressure control with high reproducibility

Pressure control range:	5 – 500 bar
Number of valves:	2 pieces
Control tolerance:	± 500 mbar
Reaction time:	28 ms
Pressure steps:	10
Voltage supply:	220 V
Dimensions (WxDxH):	720x560x1,230 mm

Gas compression with hydraulically operated compressor

Maximum operating pressure:	200 – 500 bar
Maxium delivery rate:	250 standard litres per minute
Operating medium:	Nitrogen, helium, argon
Generation of pressure:	MAXIMATOR gas compressor (in 3 stages)
Energy demand:	11 kW max.
Dimensions (WxDxH):	2,180x1,000x1,900 mm

Other pressure ranges, test media, pressure generations or dimensions are available on request.

MAXIMATOR offers an extensive service – worldwide.

Our offer:
- Planning & development
- Manufacturing, setting into operation
- Maintenance, repair, training

Test service in your facility:
- Generation of pressure
- Pressure test
- Measuring equipment check

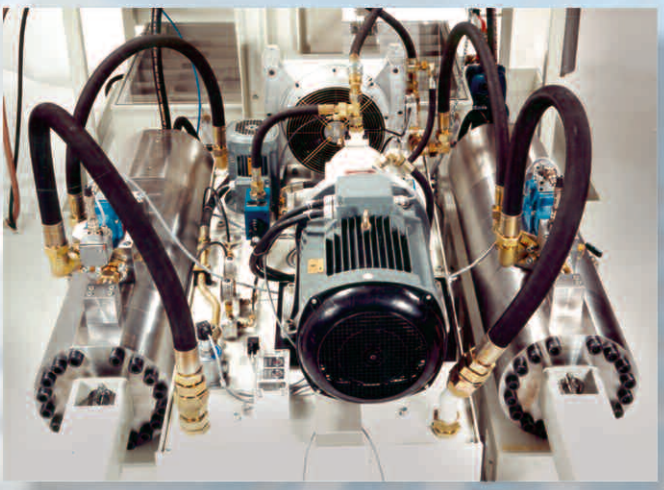
Upgrade through autofrettage:
- Autofrettage in our house on your request
- Components for the generation of pressure
- Complete systems

Test service in our works on our most modern systems:
- Pressure tests
- Bursting pressure tests
- Fatigue tests

Process consult:
- Test procedure
- Gas assist injection technique
- Mold design

MAXIMATOR *Service*

MAXIMATOR – Complete solutions for high-pressure technique



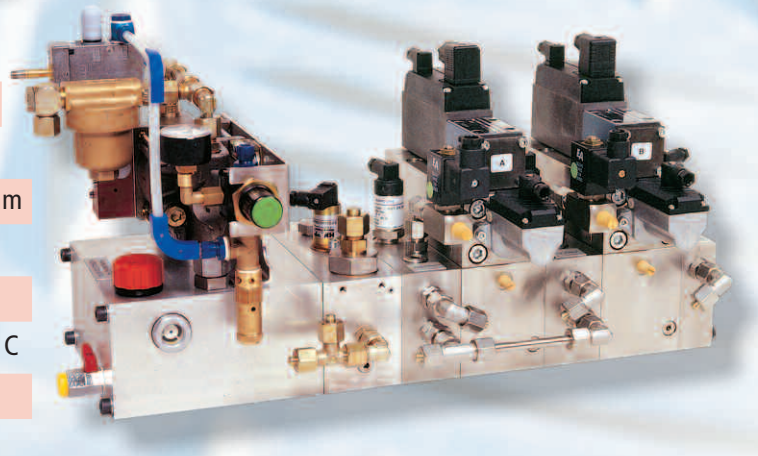
Components

Pressure intensifiers
with pneumatic or hydraulic drive

Maximum operating pressure:	15,000 bar
Frequencies:	up to approx. 30 cps
Operating medium:	Oil, water, HFA, HFC

Proportional valves for liquids and gases

Nominal size:	HPV 10	HPV 4
Weight:	20.5 kg	10.5 kg
Dimensions (WxDxH):	300x105x230 mm	290x80x180 mm
Norminal width:	10 mm	4 mm
Max. operating pressure:	1000 bar	1000 bar
Operating temperature:	-10° C to +80° C	-10° C to +80° C
Sealing:	metallic	metallic



High-pressure components

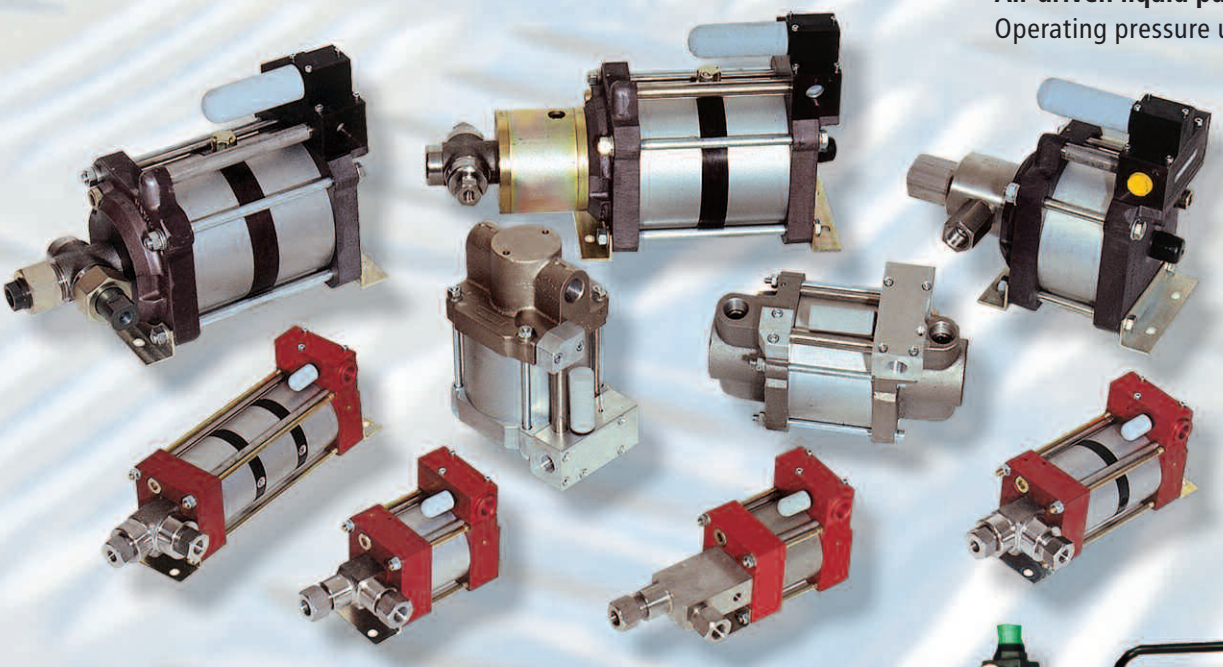
- Valves – fittings – tubing
- Fittings, screw fittings
- Non-return valves
- Air operated diaphragm and piston valves
- Pressure gauges, hoses, adapters
- As well as other extensive accessories

Maximum operating pressure:	10,500 (15,000) bar
Material:	Stainless steel
Nominal widths:	0,15 – 17,48 mm

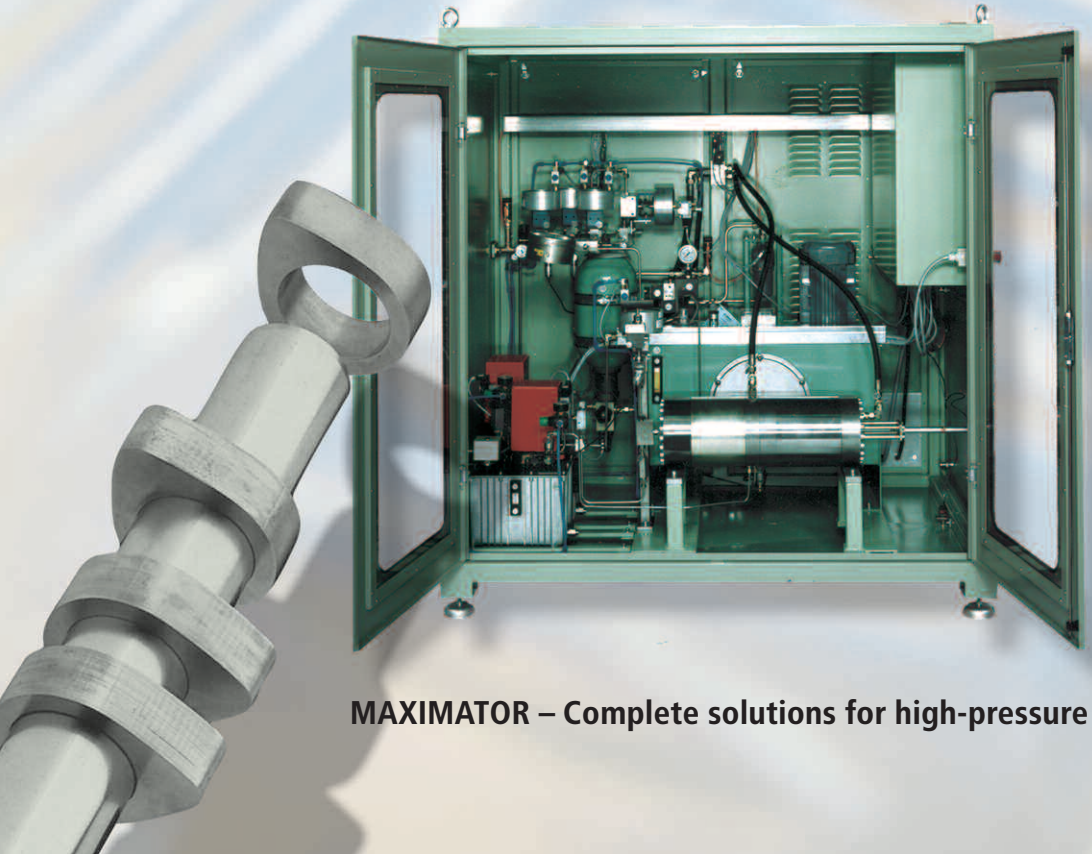
Other pressure ranges, test media, pressure generations or dimensions are available on request.

MAXIMATOR stands for pressure increase with liquids

Air driven liquid pumps
Operating pressure up to 5,500 bar



Hydraulic power packs for oil, water and other media
- Tool hydraulic systems
- Hydraulic clamping systems
- Water hydraulic systems



Test benches and pressure-generating systems
- Pressure, burst pressure and pulse test
- Leak and functional tests
- Autofrettage

MAXIMATOR – Complete solutions for high-pressure technique

MAXIMATOR stands for pressure increase of gases

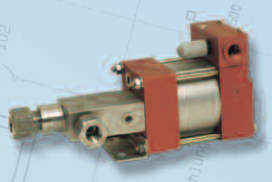
Air driven boosters and gas compressors
Operating pressures up to 1,300 bar

Booster stations and compressor stations
- Local pressure increase of industrial compressed air
- Cylinder transfer
- Charging of accumulators

Compressor, test and control systems
- Central supply for gas assist injection systems
- Test and control units for compressed air and gases
- Complete systems for filling air bag cartridges

MAXIMATOR – Complete solutions for high-pressure technique

MAXIMATOR®



High-pressure pumps for different liquids (oil, water, emulsion etc.)

- easy to maintain, ex-proof
- low energy consumption
- operating pressures up to max. 5,500 bar

Compressed Air Amplifiers

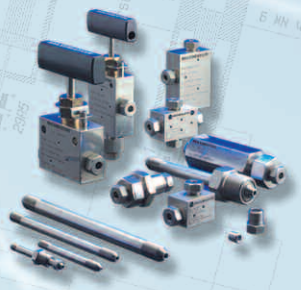
- For increasing air pressure
- Specific air pressure amplification to suit your requirements
- Connection to electrical supply not necessary
- Operating pressure max. 40 bar

High Pressure Compressors

- For pressurizing gases (nitrogen, oxygen, inert gases)
- Simple handling
- Intrinsically safe and explosion proof i. e. not electromotive, but pneumatically powered
- Operating pressure max. 1,000 bar

Gas Assist Injection Systems

- Compressor stations with pneumatic, electric or hydraulic drive
- Control modules with 2, 4 or 8 valves
- Control modules with integrated booster station
- External core pull control systems



High Pressure Valves, Fittings, Tubing

- Stainless steel design
- Temperatures from -250° C to +650° C for liquids and gases
- Maximum outlet pressures up to 10,500 bar

Your Representative:

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