

MAXIMATOR®

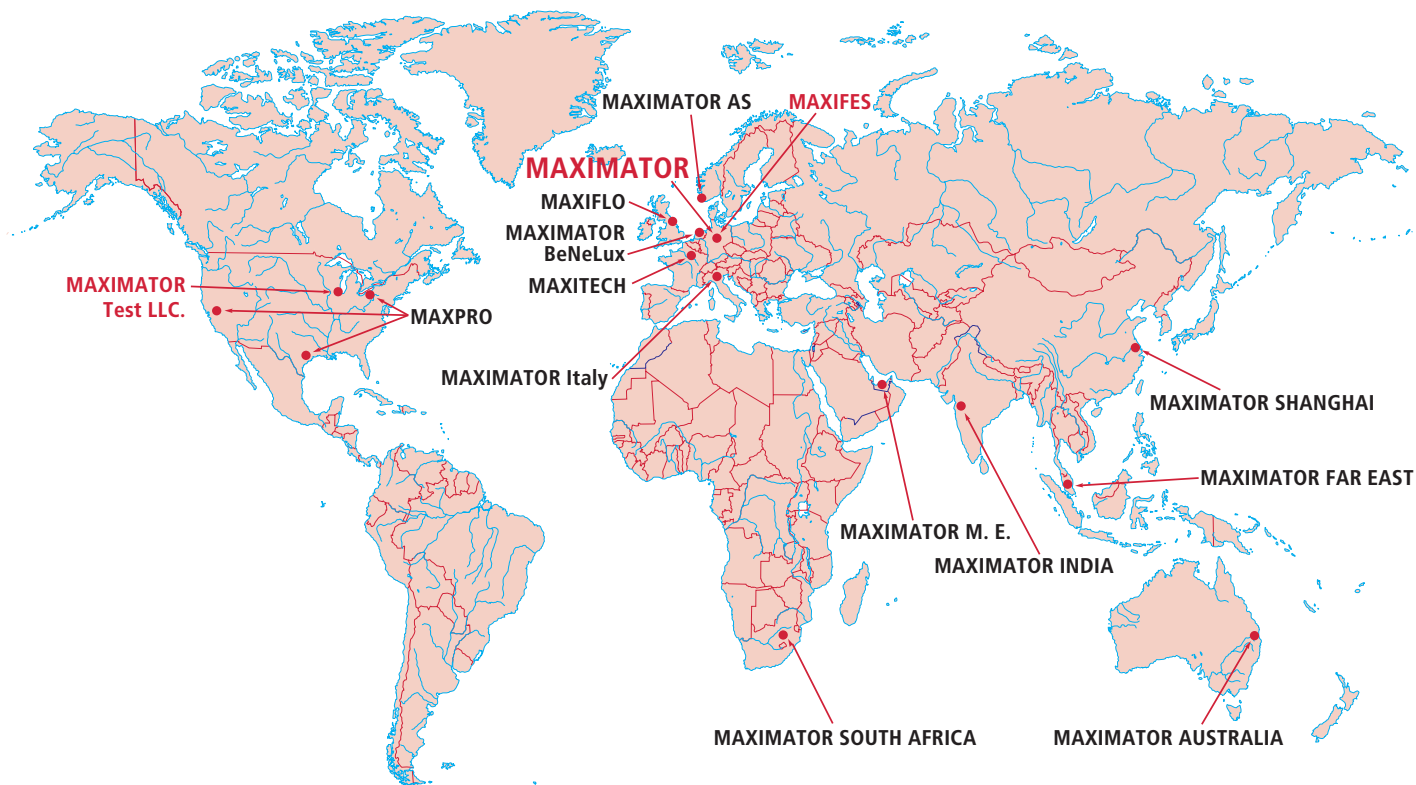
GLOBAL PRESSURE SOLUTIONS



**HIGH PRESSURE
TECHNOLOGY
HYDRAULICS
PNEUMATICS
TESTING EQUIPMENT**

Customer Testing Services

MAXIMATOR worldwide



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For over a decade MAXIMATOR has led the world in both production and testing of high pressure components up to 217,550 psi (15,000 bar). As a strong partner for renowned companies in the automotive and component supplier industry as well as the general engineering and chemical industry we boast the unique expertise to develop not only high-pressure test equipment but, custom stand-alone and serial testing as well.

Your success – Our responsibility

Presently, there are well over one thousand MAXIMATOR machines in operation worldwide performing a wide variety of testing and production tasks.

MAXIMATOR Global Service Solutions boasts decade-long experience in customer support and provides new opportunities to realize your objectives.

MAXIMATOR will provide you the support you need to optimally and efficiently solve your testing assignments, from determining testing parameters to plant start-up and staff training, our service team can efficiently assist your plant operations. High-pressure technology, control and handling – professionalism is our hallmark.

Testing “on demand”

Our test laboratories in Germany and the USA are equipped to perform static pressure testing and burst testing, pressure fatigue testing, as well as autofrettage services – swiftly and precisely. Our services provide you the opportunity to determine the performance parameters and quality features of your products while still in the prototype stage and under real-life conditions.

Our labs can support you with: material validation testing, PPAP testing, and component/assembly validation testing, etc... In short, we can provide you with the data you need to make informed decisions.

Your guarantee - MAXIMATOR Global Service Solutions

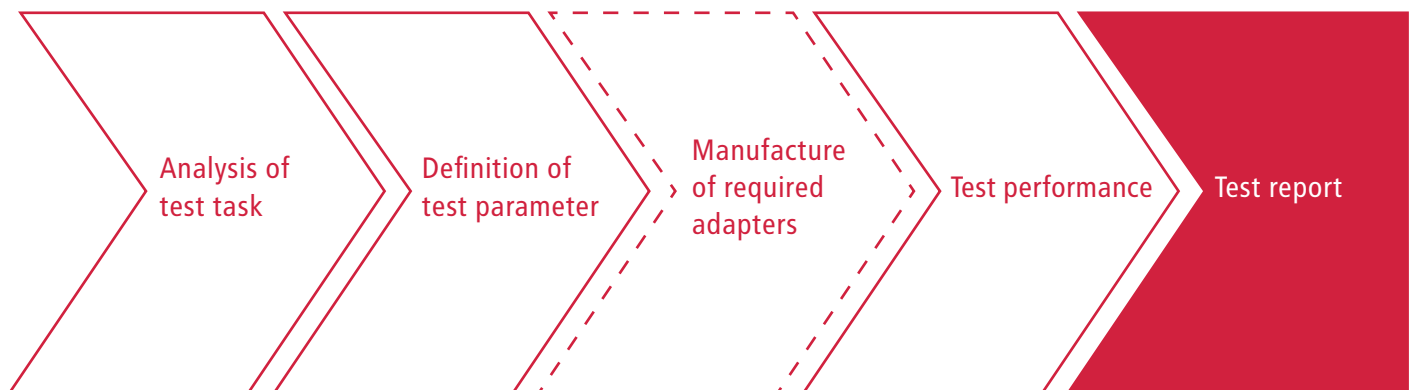
Overview MAXIMATOR Testing Services

Testing services

- ☒ Pulsation and durability testing
- ☒ Pressure testing (also with temperature-controlled environment)
- ☒ Leakage testing
- ☒ Burst pressure testing
- ☒ Autofrettage
- ☒ Rail flushing and assembly



Optimally designed processes



Documentation

When it comes to test reports and documentation, attention to detail is vital and this is exactly why our test reports are accepted by leading automobile manufacturers the world over – without question. We provide comprehensive photo documentation and detailed test results for each test sample or job-lot series. Our standard operating procedure is complete traceability of test results.

- ☒ Results for each test sample
- ☒ Description of special events
- ☒ Exact description of failure location
- ☒ Presentation of test accuracy
- ☒ Photo documentation
- ☒ Factory certificates of pressure gauging instruments



Introduction MAXIMATOR Service Testing Centers

Our test labs MAXFES (Germany) and MAXIMATOR Test, LLC (USA) provide innovative and cost-efficient services to help you solve your high-pressure test tasks. Experienced test engineers and technicians carry out

tests for you, swiftly and reliably. Our unique equipment is capable of performing a wide variety of contract testing orders:

- Pulsation pressure testing
65,250 psi (4,500 bar)/15 Hz
- Pressure and burst pressure testing
up to 217,550 psi (15,000 bar)
- Autofrettage machine
up to 217,550 psi (15,000 bar)
- Temperature chamber
-40°C up to +200°C

Pressure Fatigue Test Service

i Pressure fatigue tests are carried out to evaluate component and material behavior under real-life conditions.

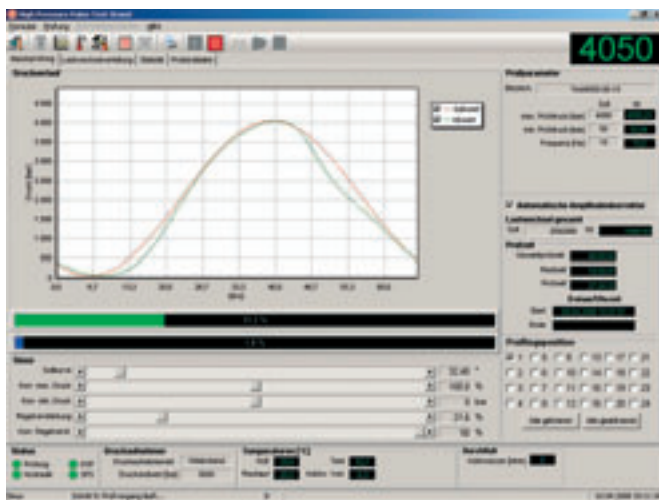
Finite element and durability calculations are often used to determine fatigue strengths. MAXIMATOR pulsation pressure test stands take it to the next level and can be used to correlate FEA results.

Our machines are employed for pressure-exposed hollow parts to validate and evaluate their fracture mechanics.



Whether your goal is determination of pressure fatigue endurance of a component or review of design and calculation concepts (FEA simulations), MAXIMATOR pressure pulsation tests provide assurance. Our Service

Centers perform verification of both prototypes in the development phase and qualities of serial production components.



Our services program:

- ☞ Wöhler fatigue tests, also as sequence of variable load parameters
- ☞ Operating load duplication tests
- ☞ All types of pressure cycle testing



High-performance test equipment:

- ☒ Capable of high test pressures up to 65,250 psi (4,500 bar)
- ☒ Capable of high test frequencies up to 15 Hz
- ☒ Simultaneous testing of multiple test samples (depending on test volumes)
- ☒ High test accuracies (documented)

Benefits:

- ☒ Long-term experience and competence in high-pressure and test technologies
- ☒ Support of new developments
- ☒ Ensuring test reproducibility
- ☒ Performance of tests on short notice
- ☒ Shortening of product development cycles
- ☒ Cost-efficient solutions for your testing needs

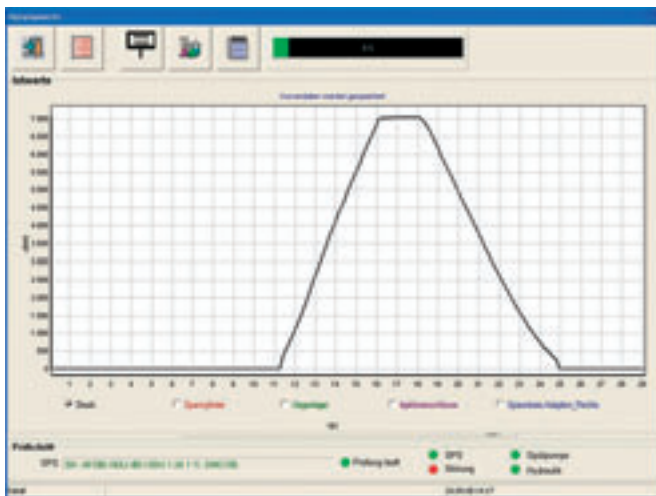
Autofrettage Service

i Autofrettage (Fr.: auto = self
frettage = generation of tensions) is
the name of a method designed to
enhance durability, in particular of
pressure-cycle stressed components.
Subjected to autofrettage are typically
ductile steel components that are
installed into high-pressure plants in
the chemical industry, diesel injection
systems and high internal pressure
forming.
One-time admission of ultra-high pres-
sure up to 217,550 psi (15,000 bar) to a
component generates residual stresses
between inner and outer component
walls that counteract premature
fatigue due to vibration failure.



The autofrettage process can mean significant cost savings as autofrettaged components are able to achieve infinite life or extended life at desired operating pressures – without any design or material modifications.

Applications where autofrettage may be beneficial include diesel injection system components (common rails, fuel lines, injection nozzles, pump housings, etc.), components for water-jet systems and components in high- and extreme-pressure systems (tubes, fittings).



Our services program:

- ☞ Assistance in determining autofrettage pressure levels
- ☞ Autofrettage up to 217,550 psi (15,000 bar)
- ☞ Ability to provide custom proportional clamping equipment
- ☞ Design and manufacture of fixtures and adaptors
- ☞ Test documentation for traceability



MAXIMATOR provides autofrettage services for you. We are capable of processing autofrettage orders at pressures up to 217,550 psi (15,000 bar) swiftly, safely and reliably.

High-performance machines:

- ☒ Generation of autofrettage pressures up to 217,550 psi (15,000 bar)
- ☒ Long-term experience with the autofrettage of components of all shapes and sizes
- ☒ Machines are "German Engineered" by highly trained and competent engineers, designers and technicians
- ☒ Proprietary sealing concepts (proportional clamping equipment)
- ☒ High machine availability
- ☒ High level of reproducibility

Convincing benefits:

- ☒ MAXIMATOR engineers have long-term experience and competence in high-pressure technology
- ☒ Long-term experience in developing sealing elements
- ☒ Cooperation with autofrettage specialists worldwide
- ☒ Consultation and support in determining optimal / maximum autofrettage pressures

Pressure and Burst Pressure Test Service

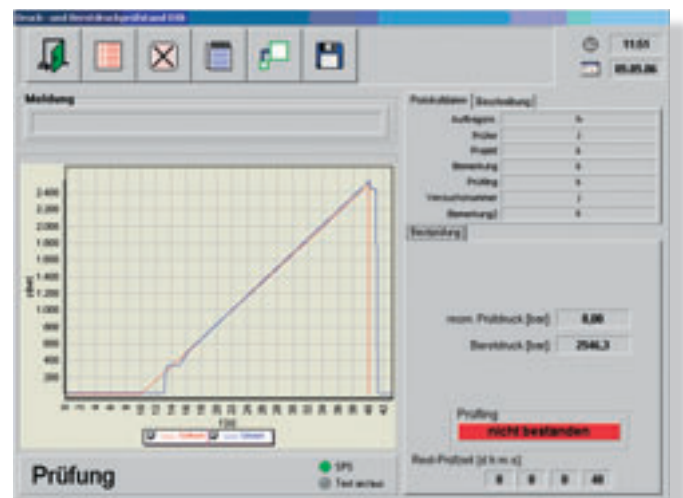
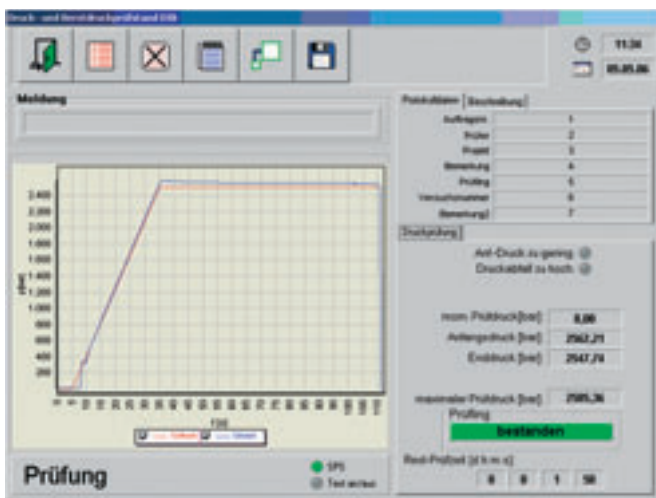
i Burst pressure is a quality feature of tubes and pipes, hosepipes, tanks and pressure-stressed components.

Brake pipes/hoses, power-steering hosepipes, cooling and air-conditioning system components, gasoline injection and diesel system components must endure certain minimum pressures and therefore are often subjected to pressures up to bursting point.



Tightness tests of components using the pressure drop method and the performance of pressure or burst pressure tests are cost-effective methods to determine characteristic component values. MAXIMATOR is capable of carrying out these test methods with or without temperature impacts, hence, certain mechanical strength properties can be arithmetically verified directly on the

component under real-life conditions. As manufacturers of pressure, burst pressure and leakage test equipment we boast long-term experience to optimally meet your testing requirements. Use our know-how, expertise, and the services of our test labs to help you obtain the data you need to make cost saving decisions.





We test components to your exact specifications:

- ☒ Pipelines (low-pressure and high-pressure)
- ☒ Hosepipes
- ☒ Components for diesel and gasoline injection systems
- ☒ High-pressure components and bolted unions
- ☒ Tanks and accumulators

Our comprehensive documentation of test results provides you with the confidence to make precise statements regarding the qualities of your products.

Our services program:

- ☒ Burst pressure tests (with or without temperature)
- ☒ Leakage tests (with or without temperature) with pressure drop method
- ☒ Leakage tests with hydrogen (forming gas 90%N₂/10%H₂)

High-performance machines:

- ☒ Pressure range up to 217,550 psi (15,000 bar)
- ☒ Manufacturer expertise and competence in adaption and pressure-proof sealing
- ☒ Temperature chamber (-40°C up to +200°C)

Benefits:

- ☒ Long-standing competence and experience in high-pressure technology
- ☒ Long-standing experience in developing adapters and sealing elements
- ☒ High level of machine availability for swift performance of your tests

Overview Service



Your success is our top priority. Our 17-strong service team is available to you 24/7 for professional

maintenance, inspection, retrofitting and repair of your equipment – Worldwide.

Our services program:

- ☒ Machine installation and start-up
- ☒ Inspection services
- ☒ MAXIMATOR training service
- ☒ Remote maintenance
- ☒ Maintenance contracts
- ☒ Pressure transducer calibration
- ☒ Installation and placing of pipelines and ring circuits
- ☒ Review of pressure gauging instruments
- ☒ Plant overhaul and upgrading

Your benefits:

- ☒ Installation and start-up by experts with manufacturer know-how
- ☒ On-site training by competent MAXIMATOR service professionals
- ☒ Maintenance and application consultation to safeguard your investment



Machine Installation and Initial Start-Up

Our experienced and competent specialists perform installation and initial start-up in your facility and carefully check to optimize every machine parameter to meet your testing or production requirements.

Save time and costs right from the beginning with our competent product training. After installation and initial start-up of your machine, our MAXIMATOR experts will train your operators on application and maintenance of your machine. Thus, you can increase the service life of your machine, prevent unnecessary downtime and safeguard your investment in the long term.



Inspection Services

With a MAXIMATOR Maintenance Contract we will conduct inspections at regular intervals automatically, carefully and to our exact specifications, to ensure that your MAXIMATOR machines are maintained in top condition. Any necessary repairs are performed during inspection upon request.



MAXIMATOR Training

MAXIMATOR's "hands-on" training develops your personnel into qualified users of MAXIMATOR machines. Our experts will train your in-house service team on preventative maintenance and servicing, and train your engineers and operators on all features of your machine to take full advantage of the machines capabilities.



MAXIMATOR Maintenance Contracts

With the purchase of a MAXIMATOR Service Package you place the maintenance and servicing of your investment into our capable hands and keep tight control over your costs. We ensure not a single inspection is missed and make sure your machine is continually maintained as required. MAXIMATOR Maintenance Contracts offer decisive benefits:

- ☞ Reduction of machine downtime at fixed costs
- ☞ Customer services by one provider
- ☞ Inspections/maintenance/repairs by trained MAXIMATOR service teams
- ☞ Use of OEM parts in all repairs



Hotline – Telephone Technical Support

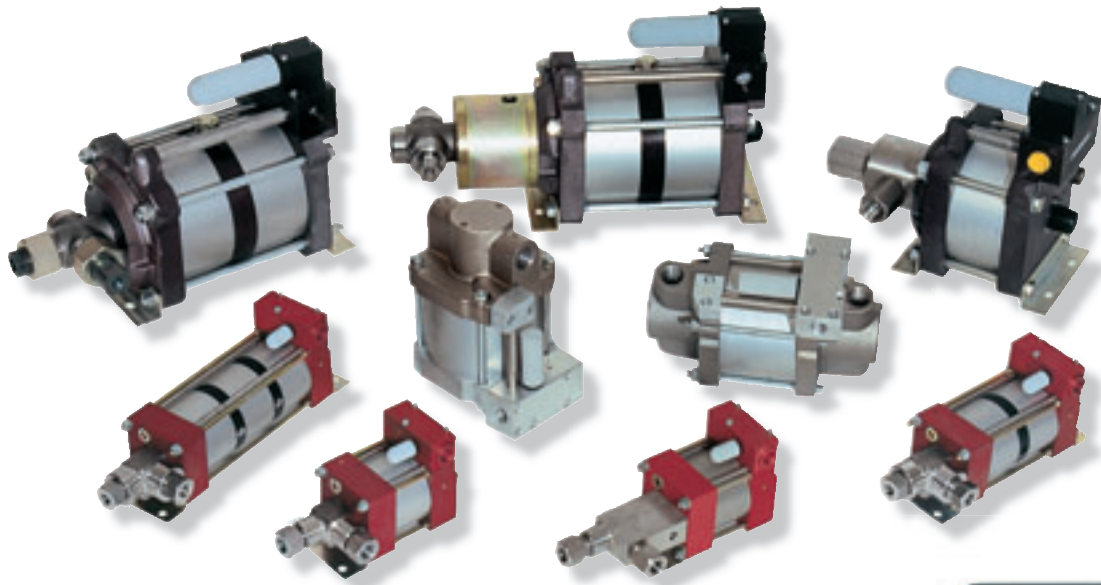
Our service hotline provides optimal and immediate assistance in technical issues. Our qualified engineers and technicians will analyze the fault or malfunction and propose suitable remedial actions.

Hotline: +49 1805-MAXIMATOR · [+49 1805-629 462]*

* with costs · Mon-Fri: 8 am - 10 pm CET; Sat-Sun and Public Holidays: 8 am - 8 pm CET

Product program

MAXIMATOR stands for pressure increase with liquids



Air driven liquid pumps

- ☒ Operating pressure up to 79,750 psi (5,500 bar)

Hydraulic power packs for oil, water and other media

- ☒ Tool hydraulic systems
- ☒ Hydraulic clamping systems
- ☒ Water hydraulic systems

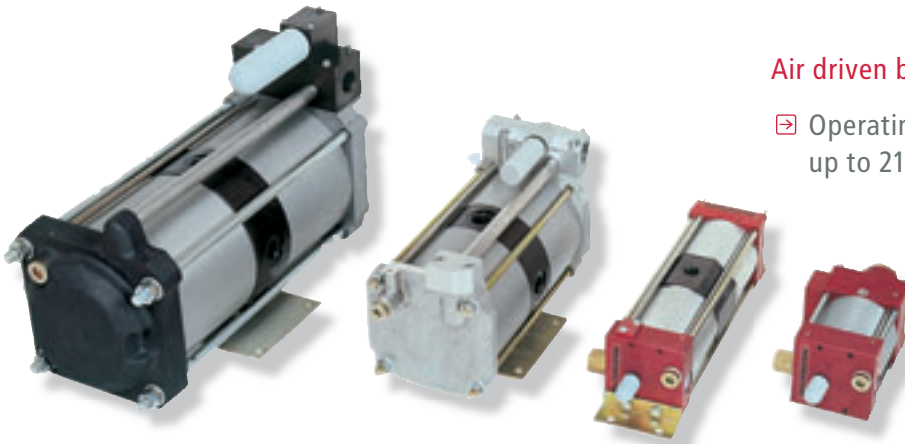


Test benches and pressure-generating systems

- ☒ Pressure, burst pressure and pulse test
- ☒ Leak and functional tests
- ☒ Autofrettage



MAXIMATOR stands for pressure increase of gases

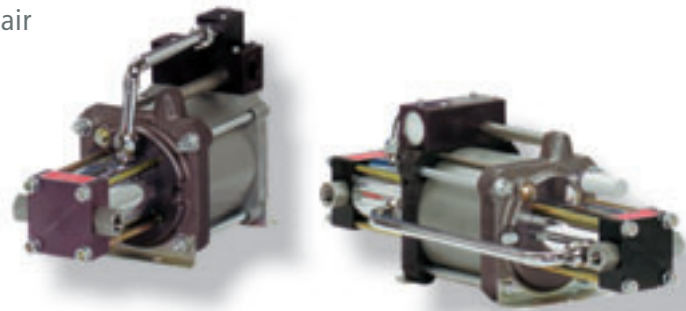


Air driven boosters and gas compressors

- ☞ Operating pressures up to 21,750 psi (1,500 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®

GLOBAL PRESSURE SOLUTIONS



High-pressure pumps for oil, water, emulsions

- Minimum maintenance, explosion-proof
- Low energy consumption
- Max. operating pressures 79,750 psi (5,500 bar)



Compressed air amplifiers

- For increasing air pressure
- Specific air pressure amplification custom to your application
- Pneumatically powered – no electric required
- Max. operating pressures 580 psi (40 bar)



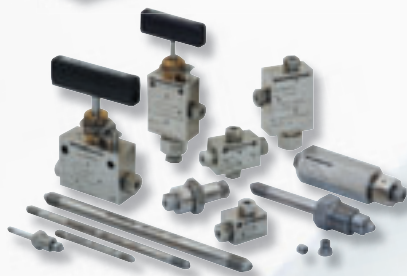
High Pressure Compressors

- For pressurizing gases (nitrogen, oxygen, inert gases)
- Simple operation
- Intrinsically safe and explosion proof pneumatically powered
- Operating pressures up to 21,750 psi (1,500 bar)



Testing and production rigs for autofrettage, pressure, burst pressure and pulse testing

- Expansion hoses, tubing
- Injector assemblies
- Common rails, fuel lines
- Valves, fittings, bolted unions
- Pressure gauges, pressure-operated switches
- Pressure transducers, vessels
- Special test rigs



Valves, tubing, fittings for high-pressure technology

- Stainless steel components in excellent workmanship
- Temperature range -250 °C to +650 °C
- Operating pressures up to 152,000 psi (10,500 bar)

MAXIMATOR GmbH

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