Operating Manual

MAXIMATOR®

Pneumatically-Operated Relief Valves

3710.2853
3710.2854
3710.2855
3710.2856
3710.1358 (ab Rev.H)

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07.09.2011 - MAXIMATOR GmbH - Rev.2

1 General Information

1.1 User Manual Information

This user manual describes safe and appropriate handling of the valve. Compliance with all specified safety notes and instructions and all local accident prevention regulations and general safety provisions that are valid in the operational area of the machine is imperative.

Before beginning all work on the valve, this user manual and particularly the chapter on "Safety" and the corresponding safety notes must be fully read. The contents must be understood.

1.2 Explanation of Symbols

Important safety-related notes are marked with symbols in this user manual.

It is compulsory that the notes provided on work safety are complied with and followed. Take particular care in these cases in order to avoid accidents, personal damage and damage to property.

 **WARNING! Danger of injury or death!**

This symbol identifies notes that may result in an impairment of health, injuries, permanent bodily harm or even death if they are not observed.

 **WARNING! Electric current hazard!**

This symbol points out a dangerous situation caused by electric currents. Failure to observe these safety notes can result in the risk of major injuries or death. The work to be performed may only be carried out by an inducted electrical specialist.

 **CAUTION! Damage to property!**

This symbol identifies advice, non-compliance with which may result in damages, malfunctions and / or failure of the valve.

 *NOTE!*

This symbol provides tips and information that should be observed for efficient and trouble-free handling of the valve.

1.3 Liability and Warranty

All details and notes in this user manual have been compiled under consideration of the valid regulations, current state of technology and our years of knowledge and experience.

This user manual must be carefully read before beginning **all** work on and with the valve. The manufacturer cannot be held liable for any damage or malfunctions resulting from non-observance of these operating instructions.

The text and visual presentations do not necessarily correspond with the scope of supply. Illustrations and graphics do not correspond with a scale of 1:1.

In the case of special designs, use of additional order options or due to the latest technological modifications, the actual scope of supply may differ from the details and information as well as the visual presentations described or shown here. Please contact the manufacturer in case of any questions.

We reserve technical modifications of our product as part of enhancing its usage properties and further development.

1.4 Copyrights

This user manual should be treated confidentially. It is exclusively intended for persons deployed to work on and with the valves.

All contained data, texts, drawings, pictures and other images are protected under applicable copyright law and further industrial property rights. Any misuse is liable to prosecution.

Distribution to third parties as well as reproduction in any kind and form – also of extracts – as well as exploitation and/or notification of the contents are not permitted without prior written approval of the manufacturer. Violations shall give rise to damages. The originator reserves the right to make further claims.

We reserve all rights to exercise our industrial property rights.

1.5 Spare Parts

Only use the manufacturer's original spare parts.

! CAUTION!

Wrong or faulty spare parts may result in damages, malfunctions or total failure of the valve.

In the case of use of any unapproved spare parts, all guarantee, service, compensation for damages and liability claims against the manufacturer, his agents, traders or representatives are not applicable.

1.6 Disposal

Unless no other return or disposal agreement has been arranged, the individual components shall be recycled after having been properly disassembled.

- Scrapping of metallic material
- Recycling of plastic components

- Sorting and disposing of other components in accordance with material type.

CAUTION!

Waste from electronic and electrical equipment, electronic components, lubricants and other auxiliary materials are subject to hazardous waste treatment and must be disposed of by specialised companies only!

2 Safety

The valve has been built in accordance with the generally accepted engineering standards valid at the time of development and manufacture and is deemed to be operationally safe.

The system may be the source of hazards if it is used by staff who have not been professionally trained, or is used incorrectly or abnormally.

The chapter "Safety" provides an overview of all significant safety aspects for optimum protection of persons as well as safe and trouble-free operation of the valve.

Furthermore, the following chapters of this user manual contain specific safety notes, marked with symbols, for the avoidance of hazards. The pictograms, signs and labelling on the valve must be observed. They have to be kept in a legible condition and must not be removed.

2.1 Intended Use

The valve is to be exclusively used to relieve pressure from bearing parts in machines.

! CAUTION!

Any usage beyond the intended use and/or any different type of use of the valve is forbidden and is not valid as the intended use.

All types of claims against the manufacturer and/or his authorised representative due to damages caused by unintended use of the valve are excluded.

Damage resulting from unintended use is the sole responsibility of the operator.

Intended use also refers to correct compliance with the operating conditions, as well as the details and instructions in this user manual.

The valve may only be operated with the parts listed in the scope of supply.

2.2 Predictable Improper Use

- Never use other fluids than those authorised.
- Never perform any unauthorized conversions or technical changes to the valve.
- Never use the valve in any other way than described in this operating manual.
- Never exceed the technical limits or pressures stated in this operating manual.
- The valve may only be operated when in perfect technical condition.
- The valve may not be directly used for pharmaceutical or sanitary purposes with foods.
  - Always pay attention to all information on installation, maintenance or troubleshooting in this operating manual.
  - Never use the valve for safe shut-off.

2.3 User Manual Contents

Each and any person commissioned with performing work on or with the valve must have read and understood these assembly instructions prior to commencing work on the valve. This also applies if the person in question has already operated on this type of valve or a similar type, or received training from the manufacturer.

Familiarity with the content of the user manual is one of the prerequisites for protecting personnel against hazards and for avoiding errors and hence for operating the valve safely and without malfunction.

We recommend that the operating company should obtain written confirmation from staff that they are familiar with the user manual.

2.4 Changes and Modifications to the Valve

To avoid hazards and to ensure optimal performance, no modifications, additions or conversions may be made to the valve which have not been explicitly authorised by the manufacturer.

All pictograms, signs and labelling found on the valve must be kept in a legible condition and must not be removed. Damaged or illegible pictograms, signs and labelling must be replaced immediately.

2.5 Responsibility of the Operating Company

These instructions have to be kept in the immediate vicinity of the valve and have to be accessible at any time for persons working on or with the valve.

The valve may only be operated in a technically appropriate and operationally safe state. The valve must be checked for intactness prior to each and any start.

All user manual instructions shall be observed fully and without limitation.

Along with the specified safety notes and instructions in this user manual, the local accident prevention regulations and general safety provisions that are valid in the operational area of the valve, as well as valid environmental protection regulations, must be observed and complied with.

The operating company and the company's authorised personnel are responsible for fault-free operation of the valve as well as for clear specifications on areas of responsibility for installation, operation, maintenance and cleaning of the valve.

2.6 Requirements on Staff

Only authorised and instructed skilled personnel may work on and with the valve. Members of personnel must have received an induction on possible risks.

The term **specialised personnel** refers to persons who are capable of assessing their work and recognising the possible risks involved due to their specialist training, knowledge and experience, as well as knowledge of the relevant regulations.

If members of personnel do not have the necessary knowledge, training must be provided accordingly.

The areas of responsibility for work on and with the valve (installation, operation, maintenance, repair) must be clearly specified and complied with so that areas of competency are clear from a safety point of view.

Only such persons may work on and with the valve that can be expected to perform their duties reliably. Please refrain from any working processes which impair personal safety, environmental safety or have a negative impact on the machine.

People who are under the influence of drugs, alcohol or medication that may affect their reactions strictly may not work with the valve.

The valid age and specific job regulations for the site where the valve is used must be observed when choosing personnel.

The operator must ensure that unauthorised persons are kept at a sufficient distance from the valve.

Any changes to the valve that affect safety must be immediately reported by staff to the operating company.

2.7 Work Safety

Personal damages and damages to property when working with and on the valve can be avoided by following the specified safety notes and instructions in this user manual.

Non-observance of these notes may result in hazards for persons and damage or destruction of the valve.

In the case of failure to comply with all specified safety notes and instructions in this user manual and all local accident prevention regulations and general safety provisions that are valid in the operational area, all liability claims and claims for compensation for damages against the manufacturer or a commissioned agent are excluded.

2.8 Personal Protection Equipment

When working on or with the valve, the following shall be worn:

(To be supplemented by customers' internal regulations or may deviate due to these directives)

Protective clothing
Closely fitting work clothes (low tearing strength, no loose sleeves, no rings and other jewellery etc.).

Safety shoes
to protect feet against heavy falling parts and slipping on flooring that is not skid resistant.

– **Protective goggles**
to protect eyes from flying parts and fluids.

Additional requirement for cleaning work:

– **Working gloves**
to protect against friction, abrasion, puncture and severe injuries of the hands as well as against contact with hot surfaces and substances hazardous to health.

2.9 Hazards Originating from the Valve

The valve has been subjected to a risk assessment. The resulting construction and design of the valve corresponds with the current state of technology.

The valve is operationally safe when used as intended. However, a residual risk always remains!

The valve is driven by pneumatic components and high pressure is applied during use in the valve body.

 **WARNING!**

Pneumatic or hydraulic energy can cause major injuries. In the case of damage to individual components, highly pressurised mediums can escape and lead to physical and/or property damages! Therefore:

- Depressurise the valve before beginning any work
- Do not remove, modify or put safety installations out of operation.
- Pressure settings may not be changed beyond the values and tolerance ranges specified in the user manual.

 **WARNING! Hazard of flying particles!**

Very high pressures can be relieved with the valve.

Therefore, it is mandatory to maintain a proper safety distance, follow adequate safety precautions and to use suitable lines. The fluid with strain relief through the valve must be able to be channeled without counterpressure so that no danger is caused.

3 Technical Data

3.1 Dimensions and weight

Illu. 1: Dimensions

MAXIMATOR relief valve		3710.2853	3710.2854	3710.2855	3710.2856	3710.1358
Width	mm	202*	202*	114	202*	114
Depth	mm	170*	170*	114	170*	114
Height	mm	264	264	213	240	223
Mass	kg	7.25	7.25	2.9	7.5	2.9

* The drive part of the valve is 170*170 mm in size. 202 mm result with soundproofing. The position of the soundproofing is not defined.

3.2 Characteristics

MAXIMATOR relief valve		3710.2853	3710.2854	3710.2855	3710.2856	3710.1358
Max. drive pressure (control pressure)	bar	10	10	10	10	10
Max. outlet pressure	bar	1000	1500	4500	7000	4500
Fluid temperature	°C	4 - 150	4 - 150	4 - 80	4 - 80	4 - 80
Environmental temperature	°C	4 - 50	4 - 50	4 - 50	4 - 50	4 - 50
Connections						
Drive		G1/4	G1/4	G1/8	G1/4	G1/8
Input (P) pressure connection		9M	9M	4H	5U	6H
Output (T) relief connection		9M	9M	4H	5U	4H

NOTE!

9M, 4H, 6H and 5U are special high pressure connections from the company MAXIMATOR. Further information on the production and processing of these high pressure connections and the corresponding screw connections can be found in the MAXIMATOR catalogue "Valves-Fitting-Tubing" and in the "Cone and thread-cutting tools operating instructions". These documents can be found on the homepage www.maximator.de or can be requested from MAXIMATOR.

For use as intended, the $MTTF_d$ values of DIN EN ISO 13849-1 table C1 can be used as a basis. As a hydraulic component, this corresponds with a $MTTF_d$ of 150 years.

Requirements on compressed air quality (control air):

- Solid matter
  Maximum particle size 5 µm
  Maximum particle concentration 5 mg/m³
- Dew point
  Up to +10 °C, water content of 9.4 g/m³
  Up to + 2 °C, water content of 5.6 g/m³

Requirements of the high pressure fluid:

Required cleanliness class:

21/18/13 according to ISO 4406 or better; particles larger than or equal to 50µm are not permitted.

Authorised high pressure fluids:

Drinking water
Hydraulic oil
Maxifluid

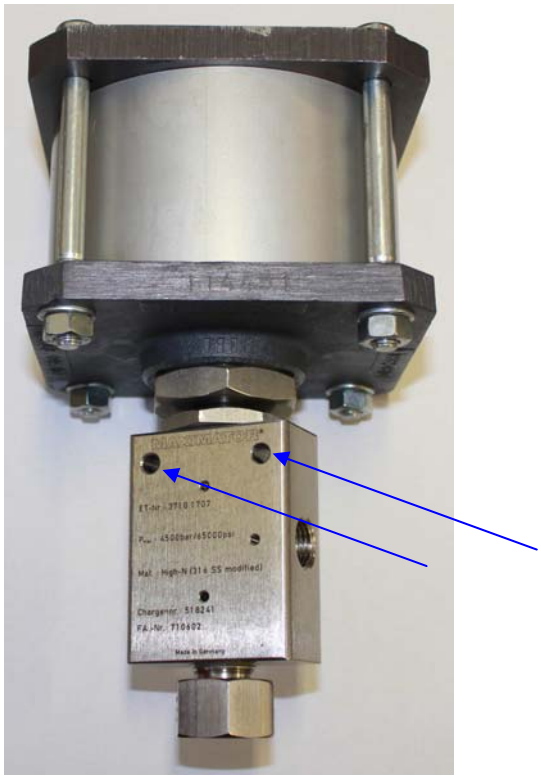
4 Layout and Function

4.1 General Information

The valves covered by these instructions are intended to relieve high pressure applications in machines. The valves are equipped with a pneumatic piston. The valve closes when applying the corresponding control pressure to the piston. If the control pressure is reduced, the valve opens with the help of a spring and therefore relieves the pressure.

4.2 Mounting and connection of the valve

The valve is to be fixed using two fixing screws in the high pressure part. Suitable screws are to be selected for this.



4.3 Type Label

The type label is fixed to the drive part.

The type label (adhesive label) shows the following information

Illustrated example:

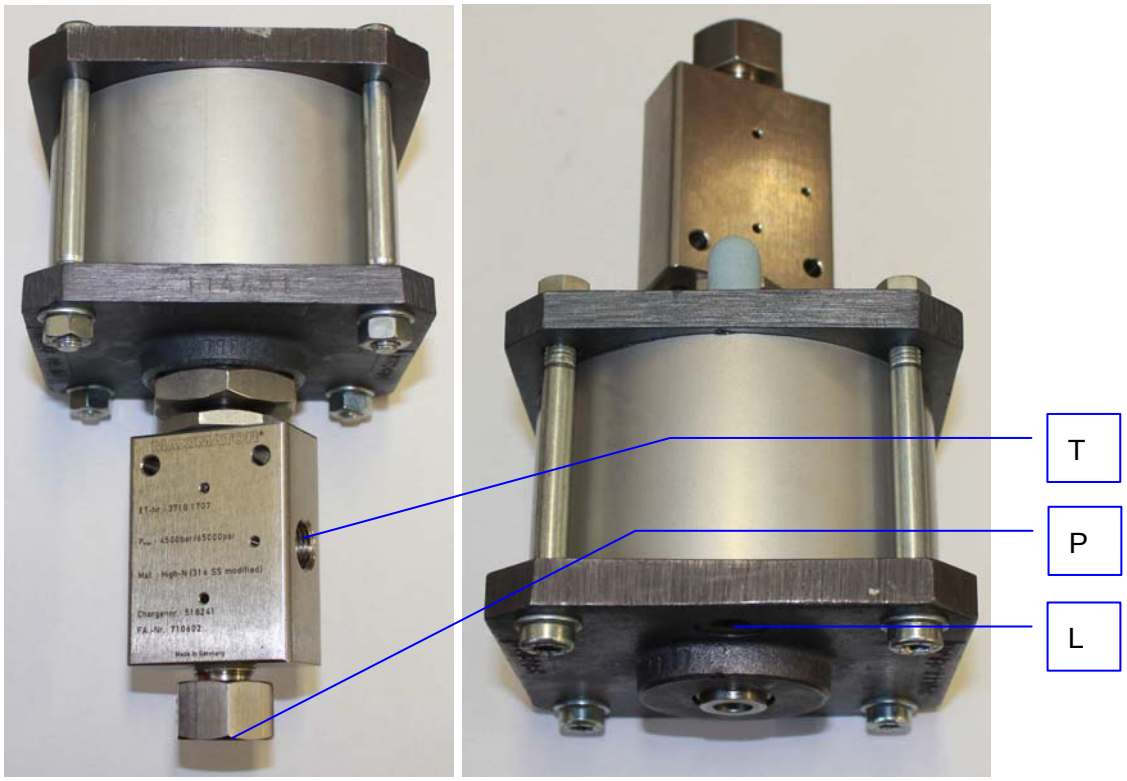
Serial number

Year of manufacture

Article number

Manufacturer

4.4 Supply Line Connections



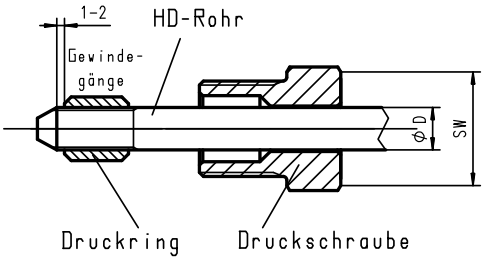
Illus. 6: Connections						
Pos.	**Description**	**Dimensions**				
		3710.2853	3710.2854	3710.2855	3710.2856	3710.1358
L	Drive	G1/4	G1/4	G1/8	G1/4	G1/8
P	Input pressure connection	9M	9M	4H	5U	6H
T	Output relief connection	9M	9M	4H	5U	4H

HP pipe:

1. Slide the pressure screw over the HP pipe.
2. Screw the pressure ring onto the thread end and turn back one turn (left thread). Attention must be paid that 1-2 threads are free between the sealing cone and the sealing ring.
3. Screw the pressure screw into the body connection drill hole and tighten with the specified torque according to the below table.

Tightening torque for pressure screws:

Pressure connection	Pipe connection dimensions	∅D	Pressure screw Wrench size (WS)	Torque moment
Type	Inches	mm	WS in mm	Nm
9M	9/16“	14.3	23.8	75
4H	1/4“	6.35	15.9	35
6H	3/8”	9.53	20.6	70
5U	5/16	7.94	19.05	100



5 Transport, Packaging and Storage

5.1 Safety Instructions

WARNING! Injury hazard!

Transport, loading and unloading operations involve risk of injury by dropping parts.

CAUTION! Damage to property!

The valve may be damaged or destroyed by incorrect transportation.

The following safety instructions must strictly be observed:

- Never raise a load above a person's head.
- Always move the valve with the utmost care and caution.
- Pay attention to the centre of gravity when transporting (danger of tipping).
- Carry out the transportation as smoothly as possible in order to avoid transport damage.
- Avoid mechanical shocks.
- In the event of overseas transport, the valve must be tightly packaged and protected against corrosion (drying agents).

5.2 Transport

The valve is supplied ready to connect.

No aids are necessary for transport (it can be carried). A carriage can be used for longer transport distances. The valve should be protected against slipping. The valve may not be clamped in place without packaging.

5.3 Transport Inspection

Check the delivery for completeness and damage during transit immediately upon reception.

Do not accept a delivery or only conditionally if any transport damages are visible. Note the damage on the transport documents/shipper's delivery note. Make a complaint.

File a complaint on hidden defects immediately upon discovery because claims for replacement of damages can only be made during the valid period.

5.4 Packaging

If no agreement for the recovery of the packaging has been made, separate materials according to type and size and reuse or recycle.

CAUTION!

Always dispose of the packaging materials in an environmentally compatible manner and in accordance with the applicable local disposal regulations. If necessary, commission recycling companies.

NOTE! Good for environmental protection!

Packaging materials are valuable raw materials and in many cases they can be reused or reconditioned and recycled.

5.5 Storage

Keep packages closed up until assembly and store them observing the positioning and storage marks.

If no other information is provided, only store packages under the following conditions:

- Do not store outdoors.
- Store the equipment in a dry and dust-free environment.
- Do not expose to aggressive substances.
- Protect against sunlight.
- Avoid mechanical shocks.
- Storage temperature. 15 to 25°C
- Relative air humidity: max. 60%

- In case the equipment is stored for extended periods (longer than 3 months), the general condition of assembly groups and packaging should be inspected regularly. If necessary, conservation must be topped up or renewed.

6 Installation

6.1 Safety Instructions

WARNING! Injury hazard!

Improper installation or assembly may cause serious personal or property damage! This work may therefore only be carried out by authorised, inducted personnel members who are familiar with working with the valve, under observation of all safety regulations.

- Ensure that there is sufficient space for movement.
- Make sure that the workplace is orderly and clean. Components and tools that are loose or lying around are sources of accidents!
- Install protection equipment in accordance with the regulations and check its functionality.

Before positioning and installing the system, the system components must be checked for completeness and perfect technological condition.

WARNING! Injury hazard!

An incomplete, defective or damaged valve can lead to major personal injury or damage to property. Only install a fully intact valve.

6.2 Setup Instructions

6.2.1 Place of Installation

The valve can be installed both indoors and outdoors (protected from rain and under compliance with the environmental temperatures).

6.2.2 Minimum Distances

For installation and servicing, the valve must be mounted with sufficient clearance from walls, ceilings and other devices.

We recommend at least a 300 mm clearance.

6.2.3 Supply Line Connections

Lay the necessary supply lines to operate the valve in accordance with the valid regulations and safety conditions.

If possible, use a flexible hose for the connection to the compressed-air supply.

6.2.4 Waste Disposal

Used working materials as well as as grease, oil and other residues (including cleaning cloths) must be collected in accordance with the valid local regulations. Use only authorized specialist companies for disposal.

6.3 Transport

Transport the valve in accordance with the information in the "Transport" chapter to the place of installation.

7 Maintenance

7.1 Safety Instructions

WARNING! Injury hazard!

Improper maintenance work may cause serious personal or property damage! This work may therefore only be carried out by authorised, inducted personnel members who are familiar with working with the valve, under observation of all safety regulations.

- Before beginning work, the valve must be pressure relieved and secured against pressure being applied.
- Ensure that there is sufficient space for movement.
- Make sure that the workplace is orderly and clean. Components and tools that are loose or lying around are sources of accidents!
- Install protection equipment in accordance with the regulations and check its functionality after maintenance work.

7.2 Maintenance Plan Maintenance Intervals

The valve is largely maintenance free. Nevertheless, it is necessary to observe maintenance intervals to ensure optimum service life and operational safety.

Action to be performed	Interval
1. Check tightness of screw connections	Daily
2. Check tightness of valve	Daily
3. Check status of drive	For each servicing measure
4. Change spring	For each servicing measure

Never carry out maintenance or repair work on pressurised piping or reservoirs.

8 Faults:

8.1 Safety Instructions

WARNING! Injury hazard!

Improper addressing of faults may cause serious personal or property damage. Faults may therefore only be addressed by authorised, inducted personnel members who are familiar with working with the valve, under observation of all safety regulations.

8.2 Reaction in the event of faults

The following strictly applies:

1. Immediately shut off the system in case of failures posing an imminent danger to persons, property and/or operational safety!
2. In addition, disconnect the system from the mains and protect against re-start!
3. Inform the responsible person on site of the failure!
4. Allow the type and extent of the fault to be established by an authorised specialist, and allow him to detect the cause and address the fault.

8.3 What To Do After Addressing Faults

WARNING! Injury hazard!

Unexpected start-up of the valve after addressing faults can lead to serious personal injury. Before reconnection, check that:

- Any faults and the cause of the faults have been professionally addressed
- All safety equipment has been mounted in accordance with the regulations and is in perfect technical and functional condition
- No persons are within the danger zone of the valve.

9 Spare Parts

Only use the manufacturer's original spare parts.

CAUTION!

Wrong or faulty spare parts and components from external manufacturers may result in major damages to the valve.

All guarantee and service claims become void without previous notification if unapproved spare parts are used.

9.1 Order for Spare Parts

The following information is compulsory for ordering spare parts:

- Type number
- Year of construction
- Parts number
- Quantity
- Description
- Requested shipment method (post, freight, sea, air, express)
- Shipping address

Orders for spare parts without the above information cannot be processed. If the shipping method is not provided, the manufacturer/supplier will select the shipping at his own discretion.

9.2 List of Spare Parts

See parts list on the sectional drawing of the valve.

10 Appendix

10.1 Declaration of conformity

MAXIMATOR®

HOCHDRUCKTECHNIK • HYDRAULIK • PNEUMATIK • PRÜFTECHNIK

EG-Konformitätserklärung

(EC Declaration of Conformity)
[Déclaration de conformité CE]

Im Sinne der EG-Richtlinie Druckgeräte 97/23/EG

(As defined by the regulations of the EC Pressure Equipment Directive 97/23/EC)
[Au sens de la directive CE d´équipements sous pression 97/23/CE]

Hiermit erklären wir, dass die Bauart von
(Herewith, we declare that the type and design of)
[Nous certifions que le modèle de]

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in der gelieferten Ausführung folgenden einschlägigen Bestimmungen entspricht:
(as supplied are in conformity with the following relevant regulations:)
[est conforme, à sa livraison, aux spécifications applicables suivantes:]

EG-Richtlinie Druckgeräte 97/23/EG
(EC Pressure Equipment Directive 97/23/EC)
[Directive CE d´équipements sous pression 97/23/CE]

Angewendete Konformitätsbewertungsverfahren:
(Conformity assessment procedures applied:)
[Procédures d'évaluation de la conformité appliquées:]

Modul A
(Module A)
[Module A]

Nordhausen, den 07.09.2011 (Nordhausen, 07 September 2011) [Nordhausen, le 07 septembre 2011]

i.V.

Jochen Diemer (Technischer Leiter) (Chief Technical Officer) [Directeur technique]

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