RSG Series

High Pressure 2-way and 3-way Coaxial Valves

Installation, Operation, & Maintenance Manual

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1. General information

To ensure successful and safe use of our fittings and valves, please make sure that you read through the entire operating instructions and all of the safety instructions prior to installation and commissioning. The "General Operating Instructions" contain important basic information and safety instructions that will help to ensure safe handling of all fittings and valves from RSG Regel- und Steuergeräte GmbH.

1.1 Target group

The operating instructions are intended for persons who are entrusted with installation planning, installation, commissioning or maintenance/repairs and who are suitably qualified to perform these activities, i.e. persons who, on the basis of their professional training and qualifications, their knowledge and experience, as well their understanding of the relevant standards, are capable of assessing the tasks assigned to them and identifying potential hazards.

This also includes the knowledge of pertinent occupational health and safety legislation, accident prevention regulations, generally recognized safety rules, EC regulations and country-specific standards and rulings.

1.2 Data sheets

The data sheets contain technical data and necessary additional information for the individual types of fitting or valve. Always use the data sheets together with these General Operating Instructions. In the event of difficulties that cannot be resolved with the aid of the data sheets or the operating instructions, please contact the supplier/manufacturer.

1.3 Retention and storage

Access to the operating instructions must be provided at all times at the location in which the fittings or valves are used.

2. Product description

2.1 Important information about the valve

2.1.1 Intended purpose

The limit values stated in the data sheet for the pressure and temperature of the medium used must be complied with. Any use that differs from or goes beyond the intended purpose is not permitted. The area of use of the valve is under the responsibility of the plant planner. Any special requirements relating to the use of the unit or to the ambient conditions (humidity, vibrations, switching frequency, electromagnetic field, potentially explosive atmosphere etc.) must be clearly defined when the order is placed. Special markings/labels on the valve must be observed.

2.1.2 Precautions

When using the fittings/valves, all currently applicable laws and regulations must be followed, such as the EC regulations and national regulations, industrial codes, accident prevention regulations, Steam Boiler Code (Germany: *Dampfkesselverordnung*), Pressure Equipment Directive, High Pressure Gas Pipeline Ordinance (Germany: *Verordnung über Gashochdruckleitungen*), Combustible Liquids Ordinance (Germany: *Verordnung für brennbare Flüssigkeiten*), the technical codes VDE, TAB, TRD, TRG, TRbF, TRGL, TRAC, AD 2000 Code on Pressure Vessels (Germany: *AD-Merkblätter*), and the accepted rules of good engineering practice, such as the DIN standards, VDI guidelines and VDMA standardization sheets.

Always follow the operating instructions whenever carrying out any work on or handling the valve.

2.1.3 Conformity

The fittings and valves from RSG Regel- und Steuergeräte GmbH comply with the state of the art (including the European Pressure Equipment Directive 2014/68/EU).

3. Safety regulations

This section contains important general safety information.

3.1 Representation/depiction

Dangers are highlighted with a signal word and are assigned safety colors in accordance with ANSI Z535 depending on their severity and likelihood of occurrence:

Symbol for an imminent danger that could lead to serious physical injuries or death.

Symbol for a potentially dangerous situation that could lead to serious physical injuries or death.

Symbol for a potentially dangerous situation in which the product or persons in the surroundings could be harmed.

However, it is equally important to ensure that all other instructions are also followed, even if they are not specially marked, in order to prevent malfunctions that could, in turn, directly or indirectly cause personal injuries or material damage.

3.2 Product-specific hazards

3.2.1 Exceeding the maximum permitted pressure, with danger of bursting

One cause for such over-high pressure could e.g. be water hammer effects or cavitation. The term "water hammer" is used to describe pressure peaks that arise when a pipe is closed off via a valve.

The pressure peaks that occur during valve closing can reach magnitudes several times the resting pressure. The user needs to select the operating pressure rating for the valve so that the pressure peaks that may occur in the specific installation situation will not exceed the maximum permitted operating pressure of the valve. When designing the flow, the static pressure of a liquid medium must also always be higher than the vapor pressure of the medium in order to prevent cavitation.

3.2.2 Escape of dangerous substances

Dangerous substances can e.g. escape from pressure relief bores or during disassembly of a valve. Dangerous media (e.g. leakages at pressure relief bores or leftover media remaining in the valve during disassembly) must be collected and disposed of in such a way that they do not represent a hazard for people or the environment. Legal requirements must be met.

3.2.3 Painting work and contamination

The fittings/valves must be covered effectively if work needs to be performed in the area around the fittings/valves that will cause dirt or contamination to be spread – e.g. construction work, painting work or sandblasting.

Otherwise, e.g. the thermal radiation from the magnets can be influenced, or blocked ventilation holes could block the switching function.

3.3 Emergency information

In the event of fire, only use extinguishing agents that are suitable for extinguishing fires on corresponding electrical systems. Make sure that the extinguishing agent does not react dangerously with any escaping medium.

4. Storage information

During storage, the valves and their replacement parts must be protected against external influences (including direct UV radiation or direct sunlight) and dirt/contamination. Do not remove the protective caps from the valves. In addition, good ventilation, desiccants or

heating should be used to prevent the formation of condensation water. The fittings and valves must be stored in such a way that they will still work perfectly even after extended storage. To do this, make sure that the guidelines of DIN 7716 (Elastomer products; Requirements for storage) in particular are also complied with. The storage temperature must not be outside the specified range from –10°C to +50°C. We recommend using up existing stocks first in order to keep storage times to the shortest possible time.

5. Installation Information

5.1 Installation of the valve

Valves must only be installed by qualified staff, and the pipe system must be depressurized when doing this. Check the valves for transport damage prior to installation. Damaged valves must not be installed. Prior to installation, check whether the valve matches the required design and whether it is suitable for the intended purpose. In the case of pressure limiting valves, also check and comply with the requirements for flow-calming sections stated in the data sheet.

Flush the pipes prior to installation. Residue in pipes can damage the seals in the valve and can lead to leaks or malfunctions.

Do not remove the protective caps on the connections until just before installation, and make sure that the existing sealing surfaces or threads are not damaged in the process. The sealing surfaces must be in technically perfect condition.

The pressure rating, connections and installation length of the pipe system must match the valve. Always comply with the correct installation length as stated on the data sheet. Make sure that the direction of flow stated on the valve is correct, as otherwise the valve will not be able to perform its intended function. The valve is designed for a single direction of flow and has a defined function. The valve will not work correctly if it is installed the wrong way around. The risk of incorrect installation is eliminated via the permanently legible markings that are applied to the connections. "P" is for inlet, "A" for outlet and "R" for return flow, or in the case of 3/2-way directional valves for the 2nd outlet.

When tightening the unions, use a suitable tool to hold the opposite part. Take care to ensure that no external bending moments, tensile forces or strains are allowed to act on the valve.

5.1.1 Installation with a threaded connection

Use suitable seals for the different thread types (NPT, G etc.). Make use of the full screwing-in depth of the thread. Check that the sealing material meets the requirements. Make sure that no residue of the sealing material or other contamination (e.g. welding residue from the pipes) can make its way into the valve.

5.1.2 Installation with a flanged connection

Use the specified bolts and all of the holes drilled in the flange for this purpose. Insert a suitable seal and center it between the flanges. Check that the seal is correctly seated. Uniformly tighten the bolts, working diagonally to make sure there is no distortion. Tighten the bolts to the specified tightening torque. After installation, perform a leak tightness test and a functional test. Before being welded in place, valves with welding ends must be dismantled due to the heat generated. During the welding work, the center piece should be replaced with a spacer.

During installation of the valve, make sure that no large tensile forces or pressure loads are allowed to act on the connection unions.

5.2 Electrical connection

The electrical connections of the valve must only by carried out by a skilled electrician or by an instructed person under the guidance and supervision of a skilled electrician in accordance with the rules of good engineering practice (DIN EN 60204-1 – Safety of machinery – Electrical equipment of machines). The VDE regulations including the safety rules and accident prevention regulations must be complied with.

Before carrying out any electrical work on the valve, always make sure that all poles are deenergized and secure it accordingly. Ground the valve in accordance with local regulations. Use the device socket included in the scope of supply. Check for the required voltage and polarity to prevent the risk of damage or hazards. Use shielded cable for signal wires, and avoid routing them close to power lines. Refer to the type plate for the electrical parameters.

5.3 Pneumatic connections

Use processed air for pneumatically actuated valves (install an upstream air maintenance unit if necessary). The control pressure must be within the limits stated on the data sheet.

5.4 Commissioning

Valves and fittings must only be used for the stated media and within the specified temperature and pressure limits. If the valve or fitting forms part of a machine in accordance with directive 2006/42/EC, the component must not be taken into operation until the requirements of the directive are met.

Caution: AC magnets must only be taken into operation if they are seated on the iron part. If they are operated without the iron part, this will enable a higher current to flow through the winding than is permitted and will therefore cause thermal self-destruction of the magnet.

6. Maintenance and Repairs

The valves are largely maintenance-free, but for reasons of operational reliability all valves should be regularly inspected, for example to check their external condition and accessories. As a general rule, the valves should be regularly operated to ensure that all moving parts remain freely movable even when the unit is not used for a long time.

Particularly if the medium contains minerals then the valve needs to be switched regularly to prevent moving parts from seizing up. The maintenance and service intervals are to be defined by the operator in accordance with the operating conditions. It is also possible to send in the valve to us at any time for an inspection.

Risk of death when opening pressurized valves!

The valve and the connected pipes can be very cold or very hot due to the temperature of the medium. Caution – risk of burns! Valves with a magnetic drive can become very hot as a result of electrical power dissipation. Care must be taken to ensure that valves operated at very low (< 0°C) or very high (> 50°C) temperatures are insulated before they are touched. Install suitable warning signs to inform about the dangers of touching them. Connecting cables and lines must be suitable and approved for the corresponding temperature range and intended application. Before removing the valve, depressurize the valve and the pipe system. Valves must only be removed by qualified personnel.

In the case of dangerous media, make sure that the pipe system and the valve are completely emptied. Take care if any residue can still flow in. Corresponding protective clothing must be worn.

7. Warranty

If the valve is dismantled or taken apart, it can be damaged irreparably. For this reason, the warranty will become null and void if the valve is dismantled or taken apart. All repairs must always be carried out at the manufacturing plant or by personnel who have been trained by the manufacturer.

All claims, particularly for redhibitory action, reduction or replacement due to direct or indirect damage are ruled out.

8. Packaging

Valves that have come into contact with media that are harmful to health must be decontaminated prior to packaging.

Package the valves in such a way that any present coatings or accessories, such as plug and socket devices, controllers, and sensors cannot be damaged during the subsequent transport. Protect connection openings against the ingress of dirt or contamination. Comply with all the national regulations relating to packaging in your country.

9. Transport

Valves that have come into contact with media that are harmful to health must be decontaminated prior to transport. Always follow the applicable accident prevention regulations when handling the valves.

10. Disposal

Valves that have come into contact with media that are harmful to health must be decontaminated before they are disposed of.

To ensure that the disposal is performed professionally and in the safest possible way for the environment, always ensure that all applicable legal regulations are complied with.

11. Replacement Parts

Please contact your supplier or the manufacturer if you need replacement parts.

12. Potential Malfunctions and their Causes

- **Valve not closing:**
  - Rated voltage still being applied
  - Control pressure not being relieved (possibly check the adjustment screw on the pilot valve)
  - Control bores dirty
  - Incorrect installation position
  - Armature blocked
  - No/inadequate pressure drop Δp or flow rate present
  - Direction of arrow does not match direction of flow

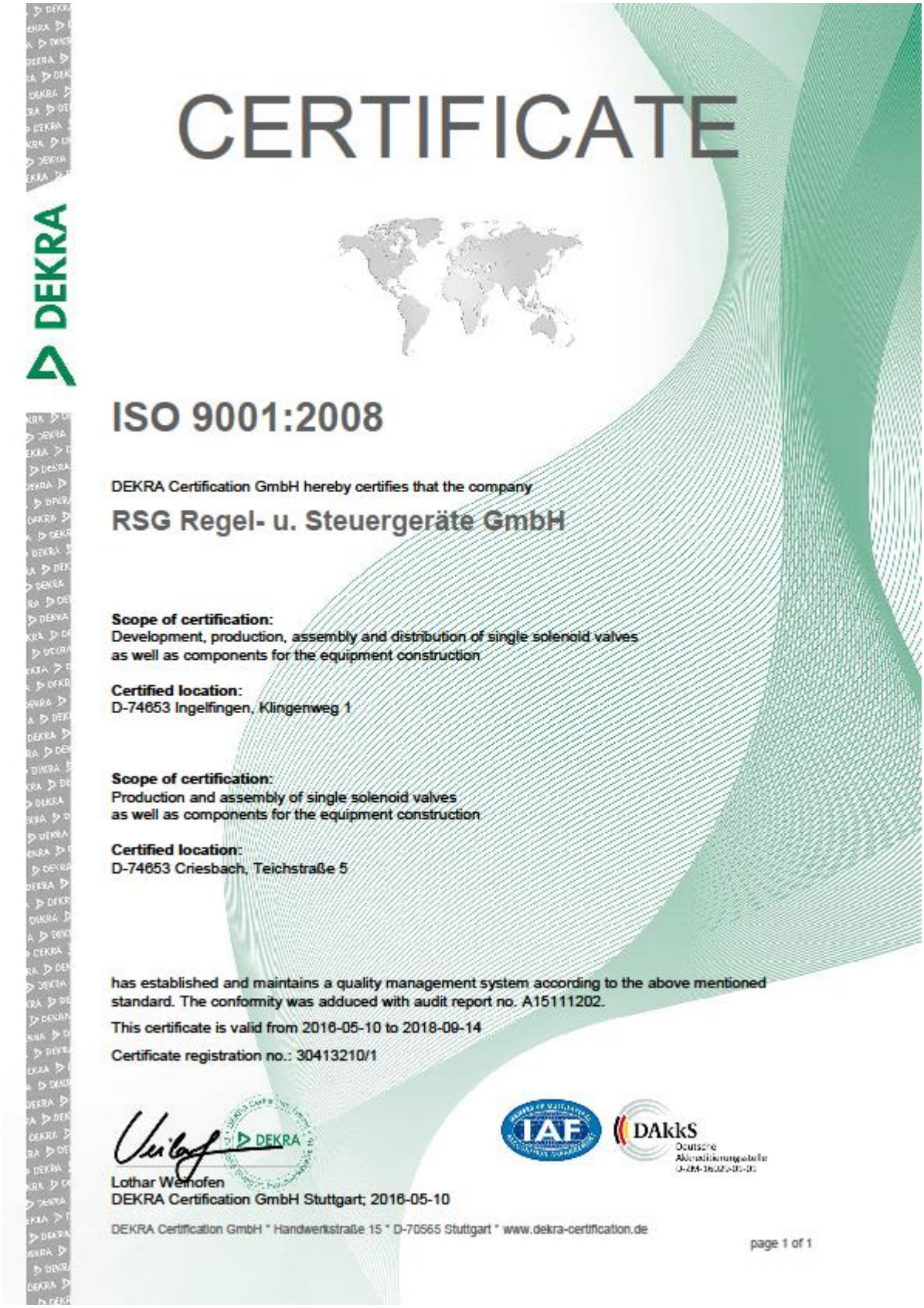
- **Valve not opening:**
  - Operating pressure too high
  - Pressure relief bore blocked
  - Armature not picking up (audible strike, "clicking" noise)
  - Supply voltage interrupted or too low
  - Control pressure too low
  - Solenoid or rectifier defective
  - Rated voltage and coil voltage different
  - Armature blocked in dirty armature housing (if the armature fails to reach the stroke end position, this will cause the coil to fail after just a short time when the AC coil is excited (thermal overload))

13. Warnings

No parts of the armature such as connection pieces, lids or housings may be drilled into, modified, welded-on (exception: welding ends) or loosened.

- Repairs must only be performed by the manufacturer.
- Do not release connections while they are under pressure.
- Do not disassemble the armature. If the armature is disassembled by unqualified personnel, this will render all warranty and liability claims against the manufacturer null and void.
- These operating instructions do not override higher-level occupational health and safety instructions.

14. Certificates



CERTIFICATE

ISO 9001:2008

DEKRA Certification GmbH hereby certifies that the company

RSG Regel- u. Steuergeräte GmbH

Scope of certification:
Development, production, assembly and distribution of single solenoid valves as well as components for the equipment construction

Certified location:
D-74653 Ingelfingen, Klingenweg 1

Scope of certification:
Production and assembly of single solenoid valves as well as components for the equipment construction

Certified location:
D-74653 Criesbach, Teichstraße 5

has established and maintains a quality management system according to the above mentioned standard. The conformity was adduced with audit report no. A15111202.

This certificate is valid from 2016-05-10 to 2018-09-14

Certificate registration no.: 30413210/1

Lothar Weihofen
DEKRA Certification GmbH Stuttgart; 2016-05-10

DEKRA Certification GmbH * Handwerkstraße 15 * D-70565 Stuttgart * www.dekra-certification.de

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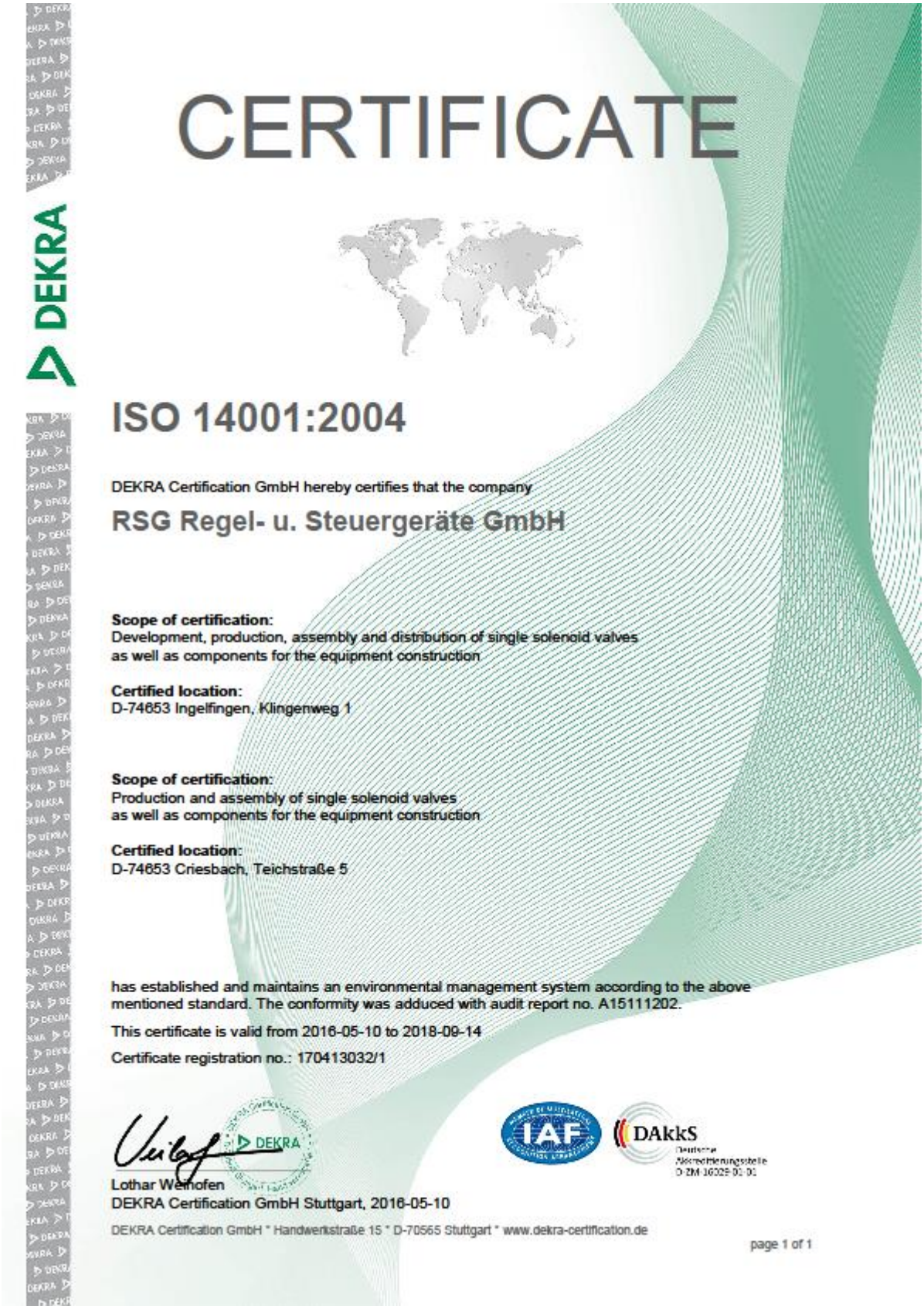

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