



(1) EC-TYPE-EXAMINATION CERTIFICATE (Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 02 ATEX 2085 X



(4) Equipment: Actuation electro-magnets for solenoid valves, type 46..

(5) Manufacturer: IMI Norgren-Herion Fluidtronic GmbH & Co. KG

(6) Address: Stuttgarter Straße 120; 70736 Fellbach; Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 01-20256 and 02-10167.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 + A1 + A2
EN 50028:1987

EN 50018:2000



EN 50019:2000

EN 50281-1-1:1998

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

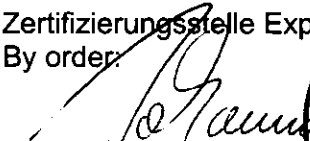
(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

 **II 2 G EEx md IIC T4 or EEx md IIC T5 or EEx md IIC T6 and EEx me II T4 or**
Ex me II T5 or EEx me II T6 and  **II 2 D IP 66 T 130 °C**

Zertifizierungsstelle Explosionschutz
By order:

Braunschweig, September 30, 2002


Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 2085 X

(15) Description of equipment

The actuation electro-magnets of series 46.. consist of an encapsulated magnet coil of type of protection EEx m and a terminal compartment of type of protection EEx d or EEx e. The type EEx md and EEx me magnets are absolutely identical in design. The respective type of protection is determined by the cable gland used, which are certified by EC-type examination certificate. The tripping overvoltage is limited by a varistor that is adapted to meet the given operating conditions.

Electrical data

Type name	4600; 4650; 4602 and 4652
Type of current	D.C.
Rated voltage	12 V - 125 V
Rated current	0.12 A - 0.008 A
Maximum power	1.4 W
Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T5
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated

Type name	4600; 4650; 4602 and 4652
Type of current	D.C.
Rated voltage	12 V - 125 V
Rated current	0.12 A - 0.008 A
Maximum power	1.4 W
Max.permissible ambient temperature	-40 °C to +70 °C
Temperature class	T6
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated

Type name	4601; 4651; 4603; 4653;
Type of current	universal current
Rated voltage	24 V
Rated current	0.05 A
Maximum power	1.4 W
Max.permissible ambient temperature	-40 °C to +80 °C
Temperature class	T5
Frequency	0 Hz - 60 Hz

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Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4601; 4651; 4603; 4653;
Type of current	universal current
Rated voltage	24 V
Rated current	0.05 A
Maximum power	1.4 W
Max.permissible ambient temperature	-40 °C to +70 °C
Temperature class	T6
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4601; 4651; 4603 and 4653
Type of current	A.C.
Rated voltage	25 V - 238 V
Rated current	0.07 A - 0.005 A
Maximum power	1.4 W
Max.permissible ambient temperature	-40 °C to +80 °C
Temperature class	T5
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4601; 4651; 4603 and 4653
Type of current	A.C.
Rated voltage	25 V - 238 V
Rated current	0.07 A - 0.005 A
Maximum power	1.4 W
Max.permissible ambient temperature	-40 °C to +70 °C
Temperature class	T6
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4604; 4654; 4606 and 4656
Type of current	D.C.
Rated voltage	12 V - 250 V
Rated current	0.12 A - 0.005 A
Maximum power	1.4 W

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Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T5
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4604; 4654; 4606 and 4656
Type of current	D.C.
Rated voltage	12 V - 250 V
Rated current	0.1 A - 0.005 A
Maximum power	1.4 W
Max. permissible ambient temperature	-40 °C to +70 °C
Temperature class	T6
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4605; 4655; 4607 and 4657
Type of current	universal current
Rated voltage	24 V
Rated current	0.05 A
Maximum power	1.4 W
Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T5
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4605; 4655; 4607 and 4657
Type of current	universal current
Rated voltage	24 V
Rated current	0.05 A
Maximum power	1.4 W
Max. permissible ambient temperature	-40 °C to +70 °C
Temperature class	T6
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4605; 4655; 4607 and 4657
Type of current	A.C.
Rated voltage	25 V - 400 V
Rated current	0.05 A - 0.003 A

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Maximum power	1.4 W
Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T5
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4605; 4655; 4607 and 4657
Type of current	A.C.
Rated voltage	25 V - 400 V
Rated current	0.07 A - 0.003 A
Maximum power	1.4 W
Max. permissible ambient temperature	-40 °C to +70 °C
Temperature class	T6
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4610; 4660; 4612 and 4662
Type of current	D.C.
Rated voltage	12 V - 125 V
Rated current	0.4 A - 0.03 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T4
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4610; 4660; 4612 and 4662
Type of current	D.C.
Rated voltage	12 V - 125 V
Rated current	0.4 A - 0.03 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +55 °C
Temperature class	T6
Medium temperature	-40 °C to +55 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4611; 4661; 4613 and 4663
Type of current	universal current
Rated voltage	24 V

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Rated current	0.22 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T4
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4611; 4661; 4613 and 4663
Type of current	universal current
Rated voltage	24 V
Rated current	0.22 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +55 °C
Temperature class	T6
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +55 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4611; 4661; 4613 and 4663
Type of current	A.C.
Rated voltage	25 V - 238 V
Rated current	0.22 A - 0.015 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T4
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4611; 4661; 4613 and 4663
Type of current	A.C.
Rated voltage	25 V - 238 V
Rated current	0.22 A - 0.015 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +55 °C
Temperature class	T6
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +55 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated

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Type name	4614; 4664; 4616 and 4666
Type of current	D.C.
Rated voltage	12 V - 250 V
Rated current	0.38 A - 0.016 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T4
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated

Type name	4614; 4664; 4616 and 4666
Type of current	D.C.
Rated voltage	12 V - 250 V
Rated current	0.38 A - 0.016 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +55 °C
Temperature class	T6
Medium temperature	-40 °C to +55 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated

Type name	4615; 4665; 4617; 4667
Type of current	universal current
Rated voltage	24 V
Rated current	0.22 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T4
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated

Type name	4615; 4665; 4617; 4667
Type of current	universal current
Rated voltage	24 V
Rated current	0.22 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +55 °C
Temperature class	T6
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +55 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated

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Type name	4615; 4665; 4617 and 4667
Type of current	A.C.
Rated voltage	25 V - 400 V
Rated current	0.22 A - 0.01 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +80 °C
Temperature class	T4
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +80 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated

Type name	4615; 4665; 4617 and 4667
Type of current	A.C.
Rated voltage	25 V - 400 V
Rated current	0.22 A - 0.01 A
Maximum power	4.5 W
Max. permissible ambient temperature	-40 °C to +55 °C
Temperature class	T6
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +55 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated

Type name	4620; 4670; 4622 and 4672
Type of current	D.C.
Rated voltage	12 V - 125 V
Rated current	0.7 A - 0.058 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +70 °C
Temperature class	T4
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated

Type name	4620; 4670; 4622 and 4672
Type of current	D.C.
Rated voltage	12 V - 125 V
Rated current	0.7 A - 0.058 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T6
Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated

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Type name	4621; 4671; 4623 and 4673
Type of current	universal current
Rated voltage	24 V
Rated current	0.4 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +70 °C
Temperature class	T4
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated

Type name	4621; 4671; 4623 and 4673
Type of current	universal current
Rated voltage	24 V
Rated current	0.4 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T6
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated

Type name	4621; 4671; 4623 and 4673
Type of current	A.C.
Rated voltage	25 V - 238 V
Rated current	0.42 A - 0.02 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +70 °C
Temperature class	T4
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated

Type name	4621; 4671; 4623 and 4673
Type of current	A.C.
Rated voltage	25 V - 238 V
Rated current	0.42 A - 0.02 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T6
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +40 °C
Individual installation	yes

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Battery installation	no
Fuse	incorporated
Type name	4624; 4674; 4626 and 4675
Type of current	D.C.
Rated voltage	12 V - 250 V
Rated current	0.7 A - 0.026 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +70 °C
Temperature class	T4
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4624; 4674; 4626 and 4675
Type of current	D.C.
Rated voltage	12 V - 250 V
Rated current	0.7 A - 0.026 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T6
Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4625; 4675; 4627 and 4677
Type of current	universal current
Rated voltage	24
Rated current	0.4 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +70 °C
Temperature class	T4
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4625; 4675; 4627 and 4677
Type of current	universal current
Rated voltage	24
Rated current	0.4 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T6
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +40 °C

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Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4625; 4675; 4627 and 4677
Type of current	A.C.
Rated voltage	25 V - 400 V
Rated current	0.42 A - 0.018 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +70 °C
Temperature class	T4
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +70 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4625; 4675; 4627 and 4677
Type of current	A.C.
Rated voltage	25 V - 400 V
Rated current	0.42 A - 0.018 A
Maximum power	8 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T6
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4630; 4680; 4632 and 4682
Type of current	D.C.
Rated voltage	12 V - 125 V
Rated current	1.2 A - 0.09 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +50 °C
Temperature class	T4
Medium temperature	-40 °C to +50 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4630; 4680; 4632 and 4682
Type of current	D.C.
Rated voltage	12 V - 125 V
Rated current	1.2 A - 0.09 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T5

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Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4631; 4681; 4633 and 4683
Type of current	universal current
Rated voltage	24 V
Rated current	0.6 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +50 °C
Temperature class	T4
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +50 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4631; 4681; 4633 and 4683
Type of current	universal current
Rated voltage	24 V
Rated current	0.6 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C .to..+40 °C
Temperature class	T5
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4631; 4681; 4633 and 4683
Type of current	A.C.
Rated voltage	25 V - 238 V
Rated current	0.65 A - 0.05 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +50 °C
Temperature class	T4
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C ... +50 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4631; 4681; 4633 and 4683
Type of current	A.C.
Rated voltage	25 V - 238 V
Rated current	0.65 A - 0.05 A
Maximum power	13.1 W

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Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T5
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	incorporated
Type name	4634; 4684; 4636 and 4686
Type of current	D.C.
Rated voltage	12 V - 250 V
Rated current	1.2 A - 0.047 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +50 °C
Temperature class	T4
Medium temperature	-40 °C to +50 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4634; 4684; 4636 and 4686
Type of current	D.C.
Rated voltage	12 V - 250 V
Rated current	1.2 A - 0.047 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T5
Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4634; 4684; 4637 and 4687
Type of current	universal current
Rated voltage	24 V
Rated current	0.6 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +50 °C
Temperature class	T4
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +50 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4634; 4684; 4637 and 4687
Type of current	universal current
Rated voltage	24 V
Rated current	0.6 A

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Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T5
Frequency	0 Hz - 60 Hz
Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4635; 4685; 4637 and 4687
Type of current	A.C.
Rated voltage	25 V - 400 V
Rated current	0.65 A - 0.025 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +50 °C
Temperature class	T4
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +50 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated
Type name	4635; 4685; 4637 and 4687
Type of current	A.C.
Rated voltage	25 V - 400 V
Rated current	0.65 A - 0.025 A
Maximum power	13.1 W
Max. permissible ambient temperature	-40 °C to +40 °C
Temperature class	T5
Frequency	40 Hz - 60 Hz
Medium temperature	-40 °C to +40 °C
Individual installation	yes
Battery installation	no
Fuse	not incorporated

(16) Test report PTB Ex 01-20256 and 02-10167

(17) Special conditions for safe use

1. A fuse corresponding to the magnet's rated current (max. $3xI_B$, according to IEC 60127-2-1) or a motor protecting switch with short-circuit or thermal instantaneous tripping (adjusted to rated current) shall be connected in series to each magnet if no fuse is provided. If the magnet's rated current is very low, the fuse with the lowest current rating according to the above IEC standard will be sufficient. The fuse may be accommodated in the required power supply unit or it shall be connected in series separately.

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The rated fuse voltage shall be equivalent to or higher than the voltage rating specified for the magnet. The breaking capacity of the fuse link shall be equivalent to or higher than the highest short-circuit current expected to occur at the place of installation (normally 1500 A).

2. The breaking capacity of the built-in fuses is 35 A. If the maximum short-circuit current expected to occur at the place of installation is higher, suitable measures shall be taken.
3. At temperatures higher than +70 °C at the cable entry, or higher than +80 °C at the wire junction, this equipment shall be labelled to show the higher temperature (information label at the cable entry). In this case only a heat resistant cable may be used. For the different ratings, reference is made to table 1 in the operating instructions.
4. When using a silicone connecting cable, or a connecting cable containing silicone, or if the cable is not scratch-proof, the cable shall be protected against mechanical damage (e.g. discontinuous conduit system with edge protection).
5. The maximum permissible ripple for all D.C.-type magnets is 20 %.
6. The gap as well as the quality of the surface finish shall be examined as part of the routine test. High-pressure testing can be dispensed with, because the unit has passed the static overpressure test at four times the reference pressure.

(18) Essential health and safety requirements

Covered by the standards mentioned above.

Zertifizierungsstelle Explosionschutz
By order:


Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



Braunschweig, September 30, 2002