



## EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

- (1) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**
- (2) EC-type-examination Certificate Number:



**PTB 03 ATEX 2049 X**

- (3) Equipment: Magnet, type K 20 Ex-....
- (4) Manufacturer: müller co-ax ag
- (5) Address: Gottfried-Müller-Straße 1; 74670 Forchtenberg, Germany
- (6) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.
- (7) 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 03-23006 .
- (8) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
- EN 50014:1997 + A1 + A2      EN 50019:2000      EN 50028:1987**  
**EN 50281-1-1:1998**
- (9) 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.
- (10) 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.
- (11) The marking of the equipment shall include the following:

 **II 2 G EEx em II T4 and II 2 D IP 65 T 130 °C**

Zertifizierungsstelle Explosionsschutz

Braunschweig, May 12, 2003

By order:

(signature)

Dr.-Ing. U. Johannsmeyer  
Regierungsdirektor

**6 pages, correct and complete as regards content.**

By order:

Dr.-Ing. Johannsmeyer, Braunschweig, November 11, 2005  
Direktor und Professor

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## SCHEDULE

(13)

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2049 X**

(15) Description of equipment

The magnet consists of a coil wound on a plastic bobbin which is installed in a housing with inner tube and magnetic ring. The coil is completely potted. The connection is performed through certified cable entry fittings to certified terminal clamps inside a terminal box.

### Electrical data

Type designation	K 20 Ex-220
Type of current	direct current
Nominal voltage	220 V
Rated current	0.14 A
Limit power	26 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

Type designation	K 20 Ex-220
Type of current	two-way rectified alternating current
Nominal voltage	220 V
Rated current	0.14 A
Limit power	26 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Frequency	48 Hz ... 62 Hz
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

Type designation	K 20 Ex-200
Type of current	direct current
Nominal voltage	200 V
Rated current	0.17 A
Limit power	28 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

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Type designation	K 20 Ex-200V
Type of current	two-way rectified alternating current
Nominal voltage	200 V
Rated current	0.17 A
Limit power	28 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Frequency	48 Hz ... 62 Hz
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

Type designation	K 20 Ex-110
Type of current	direct current
Nominal voltage	110 V
Rated current	0.28 A
Limit power	27 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

Type designation	K 20 Ex-110
Type of current	two-way rectified alternating current
Nominal voltage	110 V
Rated current	0.28 A
Limit power	27 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Frequency	48 Hz ... 62 Hz
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

Type designation	K 20 Ex-98
Type of current	direct current
Nominal voltage	98 V
Rated current	0.32 A
Limit power	26 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

Type designation	K 20 Ex-98
Type of current	two-way rectified alternating current
Nominal voltage	98 V
Rated current	0.32 A
Limit power	26 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Frequency	48 Hz ... 62 Hz
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

Type designation	K 20 Ex-48
Type of current	direct current
Nominal voltage	48 V
Rated current	0.73 A
Limit power	28 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

Type designation	K 20 Ex-48
Type of current	two-way rectified alternating current
Nominal voltage	48 V
Rated current	0.73 A
Limit power	28 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Frequency	48 Hz ... 62 Hz
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

Type designation	K 20 Ex-24
Type of current	direct current
Nominal voltage	24 V
Rated current	1.34 A
Limit power	28 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no



Type designation	K 20 Ex-24 V
Type of current	two-way rectified alternating current
Nominal voltage	24 V
Rated current	1.34 A
Limit power	28 W
Max. permissible ambient temperature	40 °C
Temperature class	T4
Frequency	48 Hz ... 62 Hz
Medium temperature	40 °C
Single mounting	yes
Butt mounting	no

(16) Test report PTB Ex 03-23006

(17) Special conditions for safe use

1. A fuse corresponding to magnet's rated current (max.  $3xI_{rat}$  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. For very low rated magnet currents, the fuse with the lowest current rating according to the above mentioned IEC standard will be sufficient. The fuse may be accommodated in the corresponding power supply unit or it shall be separately connected in series. The rated voltage of the fuse shall be as high as, or higher than the rated voltage specified for the magnet. The breaking capacity of the fuse link shall be as high as, or higher than the maximum short-circuit current expected to occur at the place of installation (usually 1500 A).
2. Since temperatures higher than 70 °C occur at the magnet's cable entry resp. higher than 80 °C at the strand junction, this equipment shall be marked with the higher temperature (information label at the cable entry). In this case only a heat resistant cable may be used.
3. When using a silicone (or silicone-containing) connecting line or a cable which is not scratch-proof, this shall be protected against mechanical damage (e.g. interrupted conduit system).
4. A maximum permissible ripple of 20 % applies to all magnets of d.c.-design.
5. When the magnets of d.c.-design are operated with a two-way rectified alternating voltage, the bridge-type rectifier shall be installed either outside the hazardous area or inside the hazardous area in a certified apparatus.
6. The magnets shall be mounted only as a single unit.

7. It shall be guaranteed by suitable measures that the breaking overvoltage is not exceeded:

rated voltage up to 30 V, breaking overvoltage	480 V
rated voltage up to 60 V, breaking overvoltage	800 V
rated voltage up to 110 V, breaking overvoltage	1200 V
rated voltage up to 250 V, breaking overvoltage	1600 V

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz  
By order:

Braunschweig, May 12, 2003

*(signature)*

Dr.-Ing. U. Johannsmeyer  
Regierungsdirektor

## 1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2049 X  
(Translation)

Equipment: Valve magnet, type K 20 Ex-...

Marking:  II 2 G EEx em II T4 und II 2 D IP65 T130°C

Manufacturer: müller co-ax ag

Address: Gottfried-Müller-Str. 1, 74670 Forchtenberg, Germany

Description of supplements and modifications

The ambient temperature range of the valve magnet, type K 20 Ex-... is extended to -40 °C.

The new type K 20 Ex-294 for a nominal voltage of 294 V and a maximum ambient and medium temperature of +40 °C is added. With a nominal voltage of 245 V this type may be operated up to a temperature of 60 °C.

In addition to the types listed below also solenoids with deviant voltages between 20 V and 294 V may be manufactured provided their limit power is below 26 W.

Electrical data

Type designation	K 20 Ex-294
Type of current	direct current or two-way rectified alternating current with 48 Hz ... 62 Hz
Nominal voltage	294 V
Rated current	0.161 A
Limit power	36.3 W
Max. permissible ambient temperature	40 °C
Medium temperature	40 °C



## 1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2049 X

Type designation	K 20 Ex-294
Type of current	direct current or two-way rectified alternating current with 48 Hz ... 62 Hz
Nominal voltage	245 V
Rated current	0.135 A
Limit power	26.9 W
Max. permissible ambient temperature	60 °C
Medium temperature	60 °C
Type designation	K 20 Ex-220
Type of current	direct current or two-way rectified alternating current with 48 Hz ... 62 Hz
Nominal voltage	220 V
Rated current	0.14 A
Limit power	26 W
Max. permissible ambient temperature	40 °C
Medium temperature	40 °C
Type designation	K 20 Ex-200
Type of current	direct current or two-way rectified alternating current with 48 Hz ... 62 Hz
Nominal voltage	200 V
Rated current	0.17 A
Limit power	28 W
Max. permissible ambient temperature	40 °C
Medium temperature	40 °C
Type designation	K 20 Ex-110
Type of current	direct current or two-way rectified alternating current with 48 Hz ... 62 Hz
Nominal voltage	110 V
Rated current	0.28 A
Limit power	27 W
Max. permissible ambient temperature	40 °C
Medium temperature	40 °C
Type designation	K 20 Ex-98
Type of current	direct current or two-way rectified alternating current with 48 Hz ... 62 Hz
Nominal voltage	98 V
Rated current	0.32 A
Limit power	26 W
Max. permissible ambient temperature	40 °C
Medium temperature	40 °C



## 1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2049 X

Type designation	K 20 Ex-48
Type of current	direct current or two-way rectified alternating current with 48 Hz ... 62 Hz
Nominal voltage	48 V
Rated current	0.73 A
Limit power	28 W
Max. permissible ambient temperature	40 °C
Medium temperature	40 °C

Type designation	K 20 Ex-24
Type of current	direct current or two-way rectified alternating current with 48 Hz ... 62 Hz
Nominal voltage	24 V
Rated current	1.34 A
Limit power	28 W
Max. permissible ambient temperature	40 °C
Medium temperature	40 °C

### Special conditions for safe use

1. A fuse corresponding to magnet's rated current (max.  $3xI_{\text{rat}}$  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. For very low rated magnet currents, the fuse with the lowest current rating according to the above mentioned IEC standard will be sufficient. The fuse may be accommodated in the corresponding power supply unit or it shall be separately connected in series. The rated voltage of the fuse shall be as high as, or higher than the rated voltage specified for the magnet. The breaking capacity of the fuse link shall be as high as, or higher than the maximum short-circuit current expected to occur at the place of installation (usually 1500 A).
2. Since temperatures higher than 70 °C occur at the magnet's cable entry resp. higher than 80 °C at the strand junction, this equipment shall be marked with the higher temperature (information label at the cable entry). In this case only a heat resistant cable may be used.
3. When using a silicone (or silicone-containing) connecting line or a cable which is not scratch-proof, this shall be protected against mechanical damage (e.g. interrupted conduit system).
4. A maximum permissible ripple of 20 % applies to all magnets of d.c.-design.
5. When the magnets of d.c.-design are operated with a two-way rectified alternating voltage, the bridge-type rectifier shall be installed either outside the hazardous area or inside the hazardous area in a certified apparatus.
6. The magnets shall be mounted only as a single unit.

## 1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2049 X

7. It shall be guaranteed by appropriate measures that the breaking overvoltage is not exceeded:

for nominal voltage up to 30 V, breaking overvoltage 480 V  
for nominal voltage up to 60 V, breaking overvoltage 800 V  
for nominal voltage up to 110 V, breaking overvoltage 1200 V  
for nominal voltage up to 250 V, breaking overvoltage 1600 V

In the future the equipment shall be marked as follows:

 II 2 G Ex mb e II T4

 II 2 D Ex tD A21 IP 65 T130 °C

### Applied standards

EN 60079-0:2006, EN 60079-7:2007, EN 60079-18:2004, EN 61241-0:2006, EN 61241-1:2004

Assessment and test report: PTB Ex 10-27230

Zertifizierungssektor Explosionsschutz

Braunschweig, May 17, 2010

By order:

  
Dr.-Ing. U. Johannsmeyer  
Direktor und Professor

