



(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 07 ATEX 2060 X



(4) Equipment: Hygrophil Power Supply HCDT Typ 1510-1..

(5) Manufacturer: BARTEC GmbH

(6) Address: Schulstraße 30, 94239 Gotteszell, Deutschland

(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 08-27350.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0:2006 EN 60079-1:2004 EN 60079-11:2007

(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 (1) G Ex d [ia] IIC T4**

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, January 16, 2008


Dr.-Ing. U. Johannsmeyer
Direktor und Professor



(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

(15) Description of equipment

The Hygrophil Power Supply HCDT type series 1510-1.. are used e.g. to supply the optical dewpoint sensors Hygrophil DT / DTP / HCDT type series 1510-... .

The permissible ambient temperature range amounts to -20 °C ... +60 °C.

Electrical data

Supply circuit
(terminals 24V (KL1), 0V (KL2), PE (KL3))

DC 24 V \pm 10 %
max. 7.2 W (0.3 A, DC 24 V)
max. voltage under fault conditions $U_m = 250$ V

Intrinsically safe supply circuit
(terminals „+“ (KL4), „-“ (KL5), „S“ (KL6))

in type of protection Intrinsic Safety Ex ia IIC / IIB / IIA

max. values:

$U_o = 11.6$ V

$I_o = 2.1$ A

$P_o = 7.2$ W

$R = 6.5$ Ω

trapezoidal characteristic

$C_i = 0.6$ μ F

$L_i \approx 0$ mH

The following values apply to the simultaneous existence of external inductances and capacitances. With the given L_o and C_o values the effective internal capacities C_i and L_i are taken into consideration.

Ex ia	IIC	IIB	IIA
C_o [μ F]	1.0	5.7	6.6
L_o [μ H]	10	55	80

Max. inductance to resistance ratio of the connected circuit

L_o / R_o [μ s= μ H/ Ω]	4.4	20	30

The supply circuits are safely electrically isolated from each other up to a peak value of the nominal voltage of 375 V.

The terminal "S" (KL6) is electrically isolated from the enclosure through infallible capacitors.

(16) Test report PTB Ex 08-27350

(17) Special conditions for safe use

1. The design parameters of the flameproof joints of the equipment partially exceed the requirements of the table values, specified in the EN 60079-1. Any repair at the flameproof joints must be carried out on the base of the design specifications of the manufacturer. Repair according to the values of the table 1 resp. 2 of the EN 60079-1 is not permissible. An appropriate notice about this circumstance is to be added to the operating manual.
2. The isolation of the cable or single wire within the enclosure shall not have a thickness of lower than 1 mm.

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionschutz
By order:


Dr.-Ing. U. Johannsmeyer
Direktor und Professor



Braunschweig, January 16, 2008

1. SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X (Translation)

Equipment: Hygrophil Power Supply HCDT Typ 1510-1..

Marking:  II 2 (1) G Ex d [ia] IIC T4

Manufacturer: BARTEC GmbH

Address: Schulstraße 30, 94239 Gotteszell, Deutschland


Description of supplements and modifications

The Hygrophil Power Supply HCDT type series 1510-1.. are used e.g. to supply the optical dewpoint sensors Hygrophil DT / DTP / HCDT type series 1510-.. . They are extended by the type 1510-101.

Further modifications concern the application of the standards, the marking, the special conditions and the electrical data.

Hygrophil Power Supply HCDT type series 1510-100

Test specification: EN 60079-0:2006, EN 60079-1:2004, EN 60079-11:2007

Marking:  II 2 (1) G Ex d [ia] IIC T4

Hygrophil Power Supply HCDT type series 1510-101

Test specification: EN 60079-0:2006, EN 60079-1:2004

Marking:  II 2 G Ex d IIC T4

The permissible ambient temperature range amounts to -20 °C ... +60 °C.

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

Electrical data

	Hygrophil Power Supply HCDT type series 1510-101
Supply circuit (terminals L, N)	100 240 V AC 50-60Hz, max.140W
Output circuit (Klemmen 3,4)	12 V DC, 5 A
PTB 100 sensor circuit (terminals 5,6)	3 mA

	Hygrophil Power Supply HCDT type series 1510-100
Supply circuit (terminals 24V (KL1), 0V (KL2), PE (KL3))	DC 24 V \pm 10 % max. 7.2 W (0.3 A, DC 24 V) max. voltage under fault conditions $U_m = 250$ V

Intrinsically safe supply circuit (terminals „+“ (KL4), „-“, (KL5), „S“ (KL6))	in type of protection Intrinsic Safety Ex ia IIC / IIB / IIA max. values: $U_o = 11.6$ V $I_o = 2.1$ A $P_o = 7.2$ W $R = 6.5$ Ω trapezoidal characteristic $C_i = 0.6$ μ F $L_i \approx 0$ mH The following values apply to the simultaneous existence of external inductances and capacitances. With the given L_o and C_o values the effective internal capacities C_i and L_i are taken into consideration.
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Ex ia	IIC	IIB	IIA
C_o [μ F]	1.0	5.7	6.6
L_o [μ H]	10	55	80

Max. inductance to resistance ratio of the connected circuit

L_o / R_o [μ s= μ H/ Ω]	4,4	20	30

The supply circuits of the Hygrophil Power Supply HCDT type series 1510-100 are safely electrically isolated from each other up to a peak value of the nominal voltage of 375 V and the terminal "S" (KL6) is electrically isolated from the enclosure through infallible capacitors.

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

Special Conditions

Hygrophil Power Supply HCDT type series 1510-100

1. The design parameters of the flameproof joints of the equipment partially exceed the requirements of the table values, specified in the EN 60079-1. Any repair at the flameproof joints must be carried out on the base of the design specifications of the manufacturer. Repair according to the values of the table 1 resp. 2 of the EN 60079-1 is not permissible. An appropriate notice about this circumstance is to be added to the operating manual.
2. The isolation of the cable or single wire within the enclosure must not have a thickness of lower than 1 mm.
3. Suitable cable entries and sealing plugs must be used, which meet the requirements of EN 60079-1, and for which a separate certificate has been issued.
4. Cable entries and sealing plugs of simple design must not be used.

Hygrophil Power Supply HCDT type series 1510-101

5. The design parameters of the flameproof joints of the equipment partially exceed the requirements of the table values, specified in the EN 60079-1. Any repair at the flameproof joints must be carried out on the base of the design specifications of the manufacturer. Repair according to the values of the table 1 resp. 2 of the EN 60079-1 is not permissible. An appropriate notice about this circumstance is to be added to the operating manual.
6. Suitable cable entries and sealing plugs must be used, which meet the requirements of EN 60079-1, and for which a separate certificate has been issued.
7. Cable entries and sealing plugs of simple design must not be used.

Applied standards

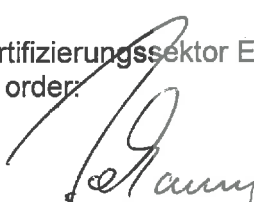
EN 60079-0:2006

EN 60079-1:2004

EN 60079-11:2007

Assessment and test report PTB Ex 09-28213

Zertifizierungssektor Explosionsgeschützt
By order:


Dr.-Ing. U. Johannsmeyer
Direktor und Professor



Braunschweig, January 28, 2009

2. SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

(Translation)

Equipment: Hygrophil Power Supply HCDT Typ 1510-1..

Marking:  II 2(1) G Ex d [ia] IIC T4 bzw. II 2 G Ex d IIC T4

Manufacturer: Bartec GmbH

Address: Schulstraße 30, 94239 Gotteszell, Deutschland

Description of supplements and modifications

The Hygrophil Power Supply HCDT type series 1510-1.. are used e.g. to supply the optical dewpoint sensors Hygrophil DT / DTP / HCDT type series 1510-... They are extended by the type 1510-102 and may be used and manufactured in acc. With the test documents listed under clause 3a of the test report.

Further modifications concern the change of the company name, the application of the standards, the marking, the internal construction, the special conditions and the electrical data.

The company name is change to BARTEC BENKE GmbH.

The marking is changed as follows:

Hygrophil Power Supply HCDT type series 1510-100

Test specification: EN 60079-0:2009, EN 60079-1:2007, EN 60079-11:2007

Marking:  II 2 (1) G Ex db [ia] IIC T4 or

 II 2 (1) G Ex d [iaGa] IIC T4 Gb

Hygrophil Power Supply HCDT type series 1510-101/-102

Test specification: EN 60079-0:2009, EN 60079-1:2007

Marking:  II 2 G Ex db IIC T4 or

 II 2 G Ex d IIC T4 Gb

The permissible ambient temperature range amounts to -20 °C ... +60 °C.

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2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

Electrical data

Supply circuit (terminals L, N) Output circuit (terminals 3,4) PT 100 sensor circuit (terminals 5,6)	Hygrophil Power Supply HCDT type series 1510-101 100 240 V AC 50-60Hz, max.140W 12 V DC, 5 A 3 mA
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Supply circuit (terminals L, N) Output circuit (terminals 3,4) PT 100 sensor circuit (terminals 5,6)	Hygrophil Power Supply HCDT type series 1510-102 18 V -36 V DC, max. 70 W 12 V DC, 5 A 3 mA
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Supply circuit (terminals 24V (KL1), 0V (KL2), PE (KL3))	Hygrophil Power Supply HCDT type series 1510-100 DC 24 V ± 10% max. 7.2 W (0.3 A, DC 24 V) max. voltage under fault conditions $U_m = 250 V$
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Intrinsically safe supply circuit (terminals „+“ (KL4), „-“, (KL5), „S“ (KL6))	in type of protection Intrinsic Safety Ex ia IIC / IIB / IIA max. values: $U_o = 11.6 V$ $I_o = 2.1 A$ $P_o = 7.2 W$ $R = 6.5 \Omega$ trapezoidal characteristic $C_i = 0.6 \mu F$ $L_i \approx 0 mH$
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The following values apply to the simultaneous existence of external inductances and capacitances. With the given L_o and C_o values the effective internal capacities C_i and L_i are taken into consideration.

Ex ia	IIC	IIB	IIA
$C_o [\mu F]$	1.0	5.7	6.6
$L_o [\mu H]$	10	55	80

Max. inductance to resistance ratio of the connected circuit

L_o / R_o [$\mu s = \mu H / \Omega$]	4.4	20	30

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

The supply circuits of the Hygrophil Power Supply HCDT type series 1510-100 are safely electrically isolated from each other up to a peak value of the nominal voltage of 375 V and the terminal "S" (KL6) is electrically isolated from the enclosure through infallible capacitors.

Special Conditions

Hygrophil Power Supply HCDT type series 1510-100

1. The design parameters of the flameproof joints of the equipment partially exceed the requirements of the table values, specified in the EN 60079-1. Any repair at the flameproof joints must be carried out on the base of the design specifications of the manufacturer. Repair according to the values of the table 1 resp. 2 of the EN 60079-1 is not permissible. An appropriate notice about this circumstance is to be added to the operating manual.
2. The isolation of the cable or single wire within the enclosure must not have a thickness of lower than 1 mm.
3. Suitable cable entries and sealing plugs shall be used, which meet the requirements of EN 60079-1, and for which a separate certificate has been issued.
4. Cable entries and sealing plugs of simple design shall not be used.

Hygrophil Power Supply HCDT type series 1510-101/-102

5. The design parameters of the flameproof joints of the equipment partially exceed the requirements of the table values, specified in the EN 60079-1. Any repair at the flameproof joints must be carried out on the base of the design specifications of the manufacturer. Repair according to the values of the table 1 resp. 2 of the EN 60079-1 is not permissible. An appropriate notice about this circumstance is to be added to the operating manual.
6. Suitable cable entries and sealing plugs shall be used, which meet the requirements of EN 60079-1, and for which a separate certificate has been issued.
7. Cable entries and sealing plugs of simple design shall not be used.

Applied standards

EN 60079-0:2009, EN 60079-1:2007, EN 60079-11:2007

Test report: PTB Ex 12-21238

Zertifizierungsgeschäft / Explosionsschutz

On behalf of PTB

Dr.-Ing. U. Gerber
Oberregierungsrat



Braunschweig, May 10, 2012

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EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

3. SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

(Translation)

Equipment: Hygrophil Power Supply HCDT, type series 1510-1..

Marking:  II 2(1) G Ex d [ia Ga] IIC T4 Gb or II 2 G Ex d IIC T4 Gb
or
II 2(1) G Ex db [ia] IIC T4 or II 2 G Ex db IIC T4

Manufacturer: Bartec Benke GmbH

Address: Schulstraße 30, 94239 Gotteszell, Germany

Description of supplements and modifications

The Hygrophil Power Supply HCDT of type series 1510-1.. is used e.g. to supply the optical dewpoint sensors Hygrophil DT / DTP / HCDT, type series 1510-.. or to supply the Peltier cooling element of type 5985-103 .

The modifications concern the test specification, the internal construction and the electrical data. The internal construction was modified for the Hygrophil Power Supply units HCDT of types 1510-100, 1510-101 and 1510-102. The Hygrophil Power Supply units HCDT were extended by the Peltier controls of types 1510-104 and 1510-105.

In the future the Hygrophil Power Supply HCDT of type series 1510-1.. may also be manufactured and operated according to the test documents listed in section 3a of the test report.

The maximum permissible ambient temperature range is -20 °C ... +60 °C.

Electrical data

Supply circuit
(terminals 24V (KL1), 0V (KL2),
PE (KL3))

Hygrophil Power Supply HCDT, types 1510-100

DC 24 V \pm 10 %
max. 7.2 W (0.3 A, DC 24 V)
max. voltage under fault conditions $U_m = 253$ V

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3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

Intrinsically safe supply circuit
(terminals „+“ (KL4), „-“ (KL5), „S“ (KL6))

type of protection Intrinsic Safety Ex ia IIC / IIB / IIA
maximum values:

$$U_o = 11.6 \text{ V}$$

$$I_o = 2.1 \text{ A}$$

$$P_o = 7.2 \text{ W}$$

$$R = 6.5 \Omega$$

trapezoidal characteristic

$$C_i = 0.6 \mu\text{F}$$

$$L_j \approx 0 \text{ mH}$$

The following values apply to the simultaneous existence of external inductances and capacitances. The effective internal reactances C_i and L_j are already considered with the specified values.

Ex ia	IIC	IIB	IIA
C_o [μF]	1.0	5.7	6.6
L_o [μH]	10	55	80

Max. inductance to resistance ratio of the connected circuit

L_o / R_o [$\mu\text{s}=\mu\text{H}/\Omega$]	4.4	20	30

Supply circuit
(terminals L, N)

Hygrophil Power Supply HCDT, type 1510-101

100 V - 240 V AC

50-60Hz, max. 140 W

max. voltage under fault conditions

$$U_m = 253 \text{ V}$$

Output circuit
(terminals 3,4)

12 V DC, 4 A

max. voltage under fault conditions

$$U_m = 253 \text{ V}$$

Control circuit E2
(terminals 5, 6)

5 V DC, 7 mA

max. voltage under fault conditions

$$U_m = 253 \text{ V}$$

PT 100-sensor circuit
(terminals 7, 8)

1 mA

Supply circuit
(terminals „+“, „-“)

Hygrophil Power Supply HCDT, type 1510-102

18 V - 36 V DC,

max. 70 W

max. voltage under fault conditions

$$U_m = 253 \text{ V}$$

3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

Output circuit (terminals 3,4)	12 V DC, 4 A max. voltage under fault conditions $U_m = 253 \text{ V}$
Control circuit E2 (terminals 5, 6)	5 V DC, 7 mA max. voltage under fault conditions $U_m = 253 \text{ V}$
PT 100-sensor circuit (terminals 7, 8)	1 mA
Supply circuit (terminals L, N)	Peltier control, type 1510-104 100 V - 240 V AC 50-60Hz, max. 140 W max. voltage under fault conditions $U_m = 253 \text{ V}$
Output circuit (terminals 3,4)	12 V DC, 4 A max. voltage under fault conditions $U_m = 253 \text{ V}$
Control circuit E2 (terminals 5, 6)	5 V DC, 7 mA max. voltage under fault conditions $U_m = 253 \text{ V}$
PT 100-sensor circuit (terminals 7, 8)	1 mA
Intrinsically safe control circuit E1 (terminals 9 (+), 10 (-))	type of protection Intrinsic Safety Ex ia IIC maximum values: $U_o = 8.0 \text{ V}$ $I_o = 1.2 \text{ A}$ $P_o = 1.0 \text{ W}$ $R = 6.8 \text{ } \Omega$ linear characteristic C_i and L_i are negligibly low $C_o = 8.4 \text{ } \mu\text{F}$ $L_o = 25.0 \text{ } \mu\text{H}$ The following values apply to the simultaneous existence of external inductances and capacitances. The effective internal reactances C_i and L_i are already considered with the specified values. $C_o = 3.4 \text{ } \mu\text{F}$ $L_o = 25.0 \text{ } \mu\text{H}$

3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

Supply circuit (terminals "+", "-")	Peltier control, type 1510-105 18 V - 36 V DC, max. 70 W max. voltage under fault conditions $U_m = 253 \text{ V}$
Output circuit (terminals 3,4)	12 V DC, 4 A max. voltage under fault conditions $U_m = 253 \text{ V}$
Control circuit E2 (terminals 5, 6)	5 V DC, 7 mA max. voltage under fault conditions $U_m = 253 \text{ V}$
PT 100-sensor circuit (terminals 7, 8)	1 mA
Intrinsically safe control circuit E1 (terminals 9 (+), 10 (-))	type of protection Intrinsic Safety Ex ia IIC maximum values: $U_o = 8.0 \text{ V}$ $I_o = 1.2 \text{ A}$ $P_o = 1.0 \text{ W}$ $R = 6.8 \text{ } \Omega$ linear characteristic C_i and L_i are negligibly low $C_o = 8.4 \text{ } \mu\text{F}$ $L_o = 25.0 \text{ } \mu\text{H}$

The following values apply to the simultaneous existence of external inductances and capacitances. The effective internal reactances C_i and L_i are already considered with the specified values.

$$C_o = 3.4 \text{ } \mu\text{F}$$
$$L_o = 25.0 \text{ } \mu\text{H}$$

The supply circuits of the Hygrophil Power Supply HCDT type series 1510-100 are safely electrically isolated from each other up to a peak value of the nominal voltage of 375 V. The terminal "S" (KL6) is electrically isolated from the enclosure through infallible capacitors.

3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 07 ATEX 2060 X

Special conditions

Hygrophil Power Supply HCDT and Peltier control, types 1510-1..

1. The design parameters of the flameproof joints of the equipment partially exceed the requirements of the table values, specified in the EN 60079-1. Any repair at the flameproof joints must be carried out on the basis of the manufacturer's design specifications. Repair according to the values of the table 1 resp. 2 of the EN 60079-1 is not permissible. An appropriate note concerning this matter shall be provided in the operating instructions manual.
2. The minimum thickness of the insulation of the cable or single wire inside the enclosure is 1 mm.
3. Suitable cable entries and sealing plugs shall be used, which meet the requirements of EN 60079-1, and for which a separate certificate has been issued.
4. Cable entries and sealing plugs of simple design shall not be used.
5. The Peltier controls of types 1510-104/-105 shall be included in the local equipotential bonding system.

Applied standards

EN 60079-0:2012, EN 60079-1:2007, EN 60079-11:2012

Test report: PTB Ex 14-23261

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Braunschweig, July 15, 2014


Dr.-Ing. U. Johanns
Direktor und Professor

