CERTIFICATE

(1) EU-Type Examination

(2) **Component intended for use on/in equipment or protective systems intended for use in potentially explosive atmospheres - Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number: **DEKRA 19ATEX0028 U** Issue Number: **1**

(4) Product: **Thermostat "KELVIN", Types BHT*-SC-PR1-*-***

(5) Manufacturer: **Barksdale GmbH**

(6) Address: **Dorn-Assenheimer Str. 27, 61203 Reichelsheim, Germany**

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

(8) DEKRA Certification B.V., Notified Body number 0344 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential test report number NL/DEK/ExTR19.0020/01.

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

EN IEC 60079-0 : 2018 **EN 60079-7 : 2015 +A1 : 2018** **EN 60079-11 : 2012**
EN 60079-18 : 2015 + A1 : 2017 **EN 60079-30-1 : 2017**

except in respect of those requirements listed at item 18 of the Schedule.

(10) The sign "U" is placed after the certificate number. It indicates that this certificate must not be mistaken for a certificate intended for an equipment or protective system. This partial certification may be used as a basis for certification of an equipment or protective system.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

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

II 2 G Ex eb mb [ib] [60079-30-1] IIC Gb
II (2) D [Ex ib 60079-30-1 Db] IIIC

For details of marking see see Annex 1 to this certificate.

Date of certification: 14 January 2021

DEKRA Certification B.V.

R. Schuller
Certification Manager

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(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0028 U** Issue No. **1**

(15) **Description**

The Thermostat, Types BHT*-SC-PR1-*-* is an electronic temperature measuring/monitoring and controlling device, specially designed for electrical trace heating units.
It is intended to be installed in an enclosure with one or more suitable types of protection per EN 60079-0.

The Thermostat comprises terminals in type of protection Ex eb for its power supply, for a heater relay, optionally for an alarm relay and for communication. Terminals in type of protection Ex ib are provided for a three-wire RTD temperature sensor. The electronics are partially encapsulated providing type of protection Ex mb in combination with type of protection Ex ib.

For setting up key features of the Thermostat one or more of the following features are provided depending on the model code:

- Modbus data communication for setting up as well as for communication
- Bluetooth communication
- Dial and LED interface

Versions without rotary (dial) switches have a fixed temperature set point configured in the factory.

For programming and monitoring purpose, the local user interface comprises a Bluetooth wireless communication port and an LED is provided in the intrinsically safe electronics. This allows local regular configuration of the equipment without the need to open the enclosure of the final application. Care shall be taken that the Bluetooth programming device is approved and suitable for use in the environment where the temperature controller is being located at that time.

Remote programming and monitoring is possible utilizing the Modbus data communication terminals in type of protection Ex eb.

The Thermostat, Type BHTC-SC-PR1-*-*, complies with the requirements for temperature control devices as specified in EN-IEC/IEEE 60079-30-1 for trace heating located in environments requiring EPL Gb or Db.

The Thermostat, Type BHTL-SC-PR1-*-*, complies with the requirements for temperature limiting devices as specified in EN-IEC/IEEE 60079-30-1 for trace heating located in environments requiring EPL Gb or Db.

The Thermostat, Types BHTLC-SC-PR1-*-* complies with the requirements for a combination of temperature control and limiting device as specified in EN-IEC/IEEE 60079-30-1 for trace heating located in environments requiring EPL Gc or Dc.

For nomenclature, electrical data and thermal data see the attached Annex 1 to Report NL/DEK/ExTR19.0020/01.

Installation instructions

The instructions provided with the product shall be followed in detail to assure safe operation.

(16) **Report Number**

No. NL/DEK/ExTR19.0020/01.

(13) # SCHEDULE

(14) **to EU-Type Examination Certificate DEKRA 19ATEX0028 U** Issue No. **1**

(17) **Schedule of Limitations**

1. The Thermostat shall be mounted in an enclosure in accordance with installation drawing 926-1549 or 926-1550, that provides a degree of protection of at least IP65 in accordance with EN 60079-0 and EN 60529.
   Mounting shall be in such a way that the Thermostat is not susceptible to UV light.

2. The intrinsically safe terminals and (if applicable) field wiring shall be separated from all non-intrinsically safe conductors including earth/frame, per EN 60079-11.

3. Thermostats Types BHT*-SC-PR1-*-L* (with LED interface) have a component surface temperature of maximum 150 °C when considering a local service temperature as well as the application of faults per EN 60079-11.

4. The user of the temperature limiting function of the Thermostat, Types BHTL-SC-PR1-*-* and/or BHTLC-SC-PR1-*-* shall demonstrate his ability to predict the offset (ΔT_{offset}) between the trace heating sheath temperature and the Thermostat's set point in accordance with clause 4.5.3.1 of EN 60079-30-1 : 2017.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at item (9).

(19) **Test documentation**

As listed in Report No. NL/DEK/ExTR19.0020/01.

(20) **Certificate history**

Issue 0	-	223500600	initial certificate
Issue 1	-	225297400	name change of the product and minor constructional changes

Annex 1 to: Report NL/DEK/ExTR19.0020/01

Type designation

BHT	LC	-	SC	-	PR1	*	-	*
I	II		III		IV	V		VI

Designation	Explanation	Value	Explanation	Marking
I	Model	BHT	Barksdale Hazardous Temperature	
II	Function	C	Controller	IECEx: Ex eb mb [ib] [60079-30-1] IIC Gb [Ex ib 60079-30-1 Db] IIIC ATEX: II 2 G Ex eb mb [ib] [60079-30-1] IIC Gb II (2) D [Ex ib 60079-30-1 Db] IIIC
		L	Limiter	IECEx: Ex eb mb [ib] [60079-30-1] IIC Gb [Ex ib 60079-30-1 Db] IIIC ATEX: II 2 G Ex eb mb [ib] [60079-30-1] IIC Gb II (2) D [Ex ib 60079-30-1 Db] IIIC
		LC	Controller and Limiter	IECEx: Ex eb mb [ib] [60079-30-1] IIC Gc [Ex ib 60079-30-1 Dc] IIIC ATEX: II 3 G Ex eb mb [ib] [60079-30-1] IIC Gc II (3) D [Ex ib 60079-30-1 Dc] IIIC
III	No. of circuits	SC	Single Circuit	
IV	Power Relay	PR1	See below for allowed connections	
V	Alarm Relay	NA	No alarm relay present, not for BHTL or BHTLC	
		AR1	2 A alarm relay	
VI	Communication	N	No LED no dialswitch	
		L	LED interface only	
		D	Dial setpoint	
		LD	LED interface and Dial setpoint	
		S	Modbus	
		LS	LED interface and Modbus	
		B	Bluetooth	
		LB	LED interface and Bluetooth	
		SB	Modbus and Bluetooth	
		LSB	LED interface, Modbus and Bluetooth	

Annex 1 to: Report NL/DEK/ExTR19.0020/01

Thermal and electrical data

The relation between the ambient temperature range, maximum load current and maximum surface temperature is shown in the following table, based on installation in a non-metallic enclosure as specified installation drawings 926-1549 and 926-1550.

Ambient Temperature	$T_{surface} \leq 80$ °C	$T_{surface} \leq 95$ °C
	$I_{max\ load}$	$I_{max\ load}$
[°C]	[A]	[A]
-40 to +10	21.7	24.2 (22.0)*
-40 to +15	20.8	23.3 (22.0)*
-40 to +20	19.1	22.5 (22.0)*
-40 to +25	16.9	21.7
-40 to +30	14.3	20.8
-40 to +35	11.2	19.8
-40 to +40	6.9	18.8
-40 to +45		17.8
-40 to +50		16.4
-40 to +55		13.8
-40 to +60		10.5
-40 to +65		5.6
NOTE: * 22 A limitation of $I_{max\ load}$ applies to Thermostat, Type BHT**LC**-SC-PR1-*-* only		

Alternatively, the equivalent relation is given below using the service temperature, being the temperature inside any enclosure measured in the air above the compound surface.

Service Temperature	$T_{surface} \leq 80$ °C	$T_{surface} \leq 95$ °C
	$I_{max\ load}$	$I_{max\ load}$
[°C]	[A]	[A]
-40 to +15	30.0 (22.0)*	30.0 (22.0)*
-40 to +20	29.1 (22.0)*	30.0 (22.0)*
-40 to +25	27.8 (22.0)*	30.0 (22.0)*
-40 to +30	26.4 (22.0)*	30.0 (22.0)*
-40 to +35	24.9 (22.0)*	29.1 (22.0)*
-40 to +40	23.4 (22.0)*	27.8 (22.0)*
-40 to +45	16.3	26.4 (22.0)*
-40 to +50		24.9 (22.0)*
-40 to +55		23.4 (22.0)*
-40 to +60		21.7
-40 to +65		19.9
-40 to +70		12.5
NOTE: * 22 A limitation of $I_{max\ load}$ applies to Thermostat, Type BHT**LC**-SC-PR1-*-* only		

When used within the above specifications, components with a surface area smaller than 1000 mm^2 outside the casting compound becomes at most;

143 °C for variants where type designation 'b' contains 'L' (LED interface)

$T_{surface}$ °C for all other variants (no LED interface)

Annex 1 to: Report NL/DEK/ExTR19.0020/01

Supply circuit (terminals L - N) in type of protection Ex eb:

Rated voltage U_{supply}:	85 to 277 Vac 85 to 250 Vac (Thermostat, Type BHT**LC**-SC-PR1-*-* only)
U_m:	305 Vac
Rated power without load:	4.5 W

Load circuit (terminals L - N) in type of protection Ex eb:

Trace heating circuit or resistive heater, connected with power cable

Rated load voltage U_{load} (L1 - N):	85 to 277 Vac 85 to 250 Vac (Thermostat, Type BHT**LC**-SC-PR1-*-* only)
U_m:	305 Vac (phase-neutral-PE)
For use with trace heating (resistive load):	
Maximum breaker size:	shall be dimensioned to ensure not to exceed limits in tables under Thermal and electrical data, but not greater than 32A.

Alarm Relay, potential free contacts in type of protection Ex eb:

Rated voltage:	277 Vac or 36 Vdc
U_m:	305 Vac
Rated switch current, resistive load:	2 A

Modbus (terminals A, B and C) in type of protection Ex eb:

U_m:	250 Vac
Rated voltage:	5 Vdc

Sensor circuit (RTD/Pt100 terminals):

In types of protection intrinsic safety Ex ib IIC, Ex ib IIB, Ex ib IIIB and Ex ib IIIC with the following maximum values:

U_o = 6.6 V; I_o = 827 mA; P_o = 1.28 W; linear characteristic; C_o = see table below; L_o = see table below.

Ex ib IIC	L_o	32 µH
	C_o	6.7 µF
Ex ib IIB Ex ib IIIB Ex ib IIIC	L_o	128 µH
	C_o	484 µF

The Ex ib sensor circuit is infallibly galvanically separated from the Alarm Relay circuit.

The Ex ib sensor circuit is not infallibly galvanically separated from all other non-intrinsically safe circuits. Therefore the earth connection of the equipment shall be connected to the potential equalizing (P.E.) system in accordance with the applicable installation standard.