EU Type Examination Certificate CML 15ATEX2128X Issue 3

1 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

2 Equipment **Isolating Amplifier D461**

3 Manufacturer **Braun GmbH Industrie-Elektronik**

4 Address Esslinger Straße 26,
DE 71334, Waiblingen, Germany

5 The equipment is specified in the description of this certificate and the documents to which it refers.

6 CML B.V., Chamber of Commerce No 67386717, Koopvaardijweg 32, 4906CV Oosterhout, The Netherlands, Notified Body Number 2776, 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 equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 12.

7 If an 'X' suffix appears after the certificate number, it indicates that the equipment is subject to conditions of safe use (affecting correct installation or safe use). These are specified in Section 14.

8 This EU Type Examination certificate relates only to the design and construction of the specified equipment or component. Further requirements of Directive 2014/34/EU Article 13 apply to the manufacture of the equipment or component and are separately certified.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the confidential report, has been demonstrated through compliance with the following documents:

EN IEC 60079-0:2018 EN 60079-11:2012

10 The equipment shall be marked with the following:

II (1) G

[Ex ia Ga] IIC

Ta= -20°C to +60°C

11 Description

The Isolating Amplifier D461 is an intrinsic safety associated apparatus for use in a safe area. It provides power to external speed sensors from an isolating switching transformer and conditions the associated speed signals for electronic measurements, alarms, totalizators, or controllers using an opto-coupler circuit.

The non-intrinsically safe circuity is powered by an isolating switching transformer and monitors the speed sensor supply circuit for lead faults and annunciated by an alarm relay. The enclosure of the Isolating Amplifier D461 is designed to be installed on a DIN rail and meets the requirements of environmental protection IP 20.

Nomenclature:

D461	**R1**	**.**	******	**U**	*****
A	**B**		**C**		**D**

Where

A =	D461	Type of Device
B =	R1	Release 1
C =	11	Device one signal channel input, one signal channel output.
	12	Device one signal channel input, two signal channel output parallel.
	21	Device two signal channel input, two signal channel output
D =	1	Supply Voltage 18 to 40 Vac/Vdc
	2	Supply Voltage 85 to 250 Vac

Ratings

IS Sensor Outputs:

Terminals:	S1/4	22	Signal 2
	S1/3	23	Signal 1
	S1/2	24	+Sensor Feed
	S1/1	25	GND/Sensor Feed
Uo:	8.7 V		
Io:	64 mA		
Po:	384 mW		
Lo:	IIC	7.9 mH	
	IIB	38 mH	
Co:	IIC	5.9 µF	
	IIB	50 µF	
Note: Combined Lo and Co for Signal 1 and Signal 2			

Power Supply:

Terminals	S3/1	1	L
	S3/2	2	N
Um (U1):	60 V		
Um (U2):	250 V		

Signal Outputs

Terminals:	S2/1	10	Output reference
	S2/2	11	Signal Output 1
	S2/3	12	Signal Output 2
	S2/4	13	Logic Alarm Output
Um:	60 V		

Signal Outputs

Terminals:	S3/3	6	Relay Alarm Output
	S3/4	8	Relay Alarm Output
Um: Relay Contacts:	60 V 30 Vdc, 2 A		

Variation 1

This variation introduces the following modifications:

i. Repositioning of fuses F1 and F2 in the circuit
ii. Removal of fuse F4
iii. Change of thyristor package
iv. Change of capacitor values
v. Addition of a capacitor
vi. Addition of 2 ferrite inductors
vii. Addition of conformal coating to 230V version
viii. Modification to PCB tracking

Variation 2

This variation introduces the following modifications:

i. Increase the upper temperature range from +50°C to +60°C
ii. Update applied standard- EN 60079-0:2012: A11:2013 Corr3 to EN IEC 60079-0:2018

12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	18 Jan 2017	R606A/00	Issue of prime certificate
1	13 Oct 2017	R11323A/00	Introduction of Variation 1
2	21 Jan 2019	R12231A/00	To transfer certificate to CML B.V
3	03 Apr 2024	R17191A/00	Introduction of Variation 2

Note: Drawings that describe the equipment or component are listed in the Annex.

13 Conditions of Manufacture

The following conditions are required of the manufacturing process for compliance with the certification.

i. Where the product incorporates certified parts or safety critical components, the manufacturer of the product defined on this certificate shall continually monitor these parts/components for any modifications introduced by the manufacturer(s) of these constituent parts. If the manufacturer of any constituent part introduces any changes which affect the compliance of the certified product that is the subject of this certificate, the manufacturer is required to have this certificate updated.

ii. IEC 60079-11:2011 CL 11.2 Routine Tests for Infallible Transformers All transformers are shall subjected to following routine verification and test voltages:

- 2,500 V, between input and output windings;
- 1,000 V between all the windings and the core;
- 1,500 V between each winding which supplies an intrinsically safe circuit and any other output winding;

The test voltage shall be applied for a period of at least 60 s.

Alternatively, the test may be carried out at 1,2 times the test voltage, but with reduced duration of at least 1 s.

The applied voltage shall remain constant during the test. The current flowing during the test shall not increase above that which is expected from the design of the circuit and shall not exceed 5 mA r.m.s. at any time. During these tests, there shall be no breakdown of the insulation between windings or between any winding and the core or the screen.

14 Specific Conditions of Use (Special Conditions)

The following conditions relate to safe installation and/or use of the equipment.

i. The values of Co and Lo apply when one of the two conditions below is given:

- The total Li of the external circuit (excluding the cable) is < 1% of the Lo value, or
- The total Ci of the external circuit (excluding the cable) is < 1% of the Co value.

The above parameters are reduced to 50% when both of the two conditions below are given:

- The total Li of the external circuit (excluding the cable) > 1% of the Lo, and
- The total Ci of the external circuit (excluding the cable) > 1% of the Co.

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1 uF for IIB and 600 nF for IIC.

Certificate Annex

Certificate Number CML 15ATEX2128X

Equipment Isolating Amplifier D461

Manufacturer Braun GmbH Industrie Elektronik

The following documents describe the equipment or component defined in this certificate:

Issue 0

Drawing No	Sheets	Rev	Approved date	Title
4HEX11 LP795v3	1 of 1	B	18 Jan 2017	4HEX11-Schematic
4HEX11-Layout (LP795v3)	1 of 8	B	18 Jan 2017	4HEX11-Layout
4HEX11-Layout(LP795v3)	2 of 8	B	18 Jan 2017	Components
4HEX11-Layout(LP795v3)	3 of 8	B	18 Jan 2017	Components and Solder Mask Top
4HEX11-Layout(LP795v3)	4 of 8	B	18 Jan 2017	Copper Side Top
4HEX11-Layout(LP795v3)	5 of 8	B	18 Jan 2017	Copper Inner Layer 1
4HEX11-Layout(LP795v3)	6 of 8	B	18 Jan 2017	Copper Inner Layer 2
4HEX11-Layout(LP795v3)	7 of 8	B	18 Jan 2017	Copper Inner Layer 2
4HEX11-Layout(LP795v3)	8 of 8	B	18 Jan 2017	Copper Bottom Side
4HEX11-Layout(LP795v3)	1 to 2	B	18 Jan 2017	Solder Mask Bottom Side
4HEX11SMD-BOM	1 of 1	A	18 Jan 2017	EX-20103-4HEX11SMD-BOM
4HEX11U1-BOM	1 of 1	A	18 Jan 2017	EX-20104-4HEX11U1-BOM
4HEX11U1-BOM	1 of 2	-	18 Jan 2017	EX-20104-4HEX11U1-BOM
411 00188 ET209	2 of 2	-	18 Jan 2017	ATEX - Certification Sectional view TOP-Switch ET209
411 00188 ET209	1 of 1	-	18 Jan 2017	ATEX - Certification Potted/ Unpotted/ Explosion
612045	1 of 2	-	18 Jan 2017	ET210 TopSwitch EF20
411 00186 ET210	2 of 2	-	18 Jan 2017	ATEX - Certification Sectional view TOP-Switch ET210
411 00186 ET210	1 of 1	-	18 Jan 2017	ATEX - Certification Potted/ Unpotted/ Explosion
612046	1 of 1	B	18 Jan 2017	ET209 TopSwitch EF20

Certificate Annex

Certificate Number CML 15ATEX2128X

Equipment Isolating Amplifier D461

Manufacturer Braun GmbH Industrie Elektronik

Drawing No	Sheets	Rev	Approved date	Title
Ex-20113- Type Plate	1 of 1	1.1	18 Jan 2017	Type Plate Braun D461R1
Ex-20112-CD-D461R1.11	1 of 1	1.1	18 Jan 2017	Control Drawing D461R1.11U*
Ex-20112-CD-D461R1.12	1 of 1	1.1	18 Jan 2017	Control Drawing D461R1.12U*
Ex-20112-CD-D461R1.21	1 of 1	-	18 Jan 2017	Control Drawing D461R1.21U*
Ex-20111-Enclosure	1 of 1	B	18 Jan 2017	Enclosure of Braun D461R1

Issue 1

Drawing No	Sheets	Rev	Approved date	Title
4HEX11 LP795v6	1 of 1	D	13 Oct 2017	4HEX11-Schematic
4HEX11-Layout (LP795v6)	1 of 8	D	13 Oct 2017	4HEX11-Layout
4HEX11SMD-BOM	1 to 2	D	13 Oct 2017	EX-20103-4HEX11SMD-BOM
4HEX11U1-BOM	1 of 1	D	13 Oct 2017	EX-20104-4HEX11U1-BOM
4HEX11U2-BOM	1 of 1	D	13 Oct 2017	EX-20105-4HEX11U1-BOM
4HEX11-Coating-U2-Version	1 to 2	D	13 Oct 2017	EX-20106-4HEX11-LP795v2-Coating

Issue 2

No new drawings

Issue 3

Drawing No	Sheets	Rev	Approved date	Title
Ex-20113 C Type plate D461R1	1 to 2	C	03 Apr 2024	Type label of Barrier D461R1