

DuoXpert LB 473 Level Switch

Technical Information



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1. Information on 2-Wire Technology

The DuoSeries/DuoXpert measuring system consists of a scintillation detector and a sophisticated evaluation unit (DuoXpert) for display and operation.

The evaluation unit is a state-of-the-art control unit with robust 3.5" TFT touch panel, powerful Dual Core CPU and diverse operator interfaces. Advanced self-diagnostics and monitoring features ensure a safe function of the system. Furthermore, the data logging functionality allows operators to analyze their processes in depth, e.g. develop trends, track process changes etc.

Sophisticated Measuring System in 2-Wire Technology

- Real 2-wire technology, only 2 wires in the field
- Advanced self-diagnostics and monitoring features
- Easy to use touch screen panel for local display and operation
- Interfaces with all 2-wire detectors LB 4700, LB 44xx and LB 54xx

2. Evaluation Unit

The master evaluation units can be installed either in wall housings or 19" subracks. Both can be equipped differently, depending on requirements. The rear terminal blocks are used for the electrical connection.

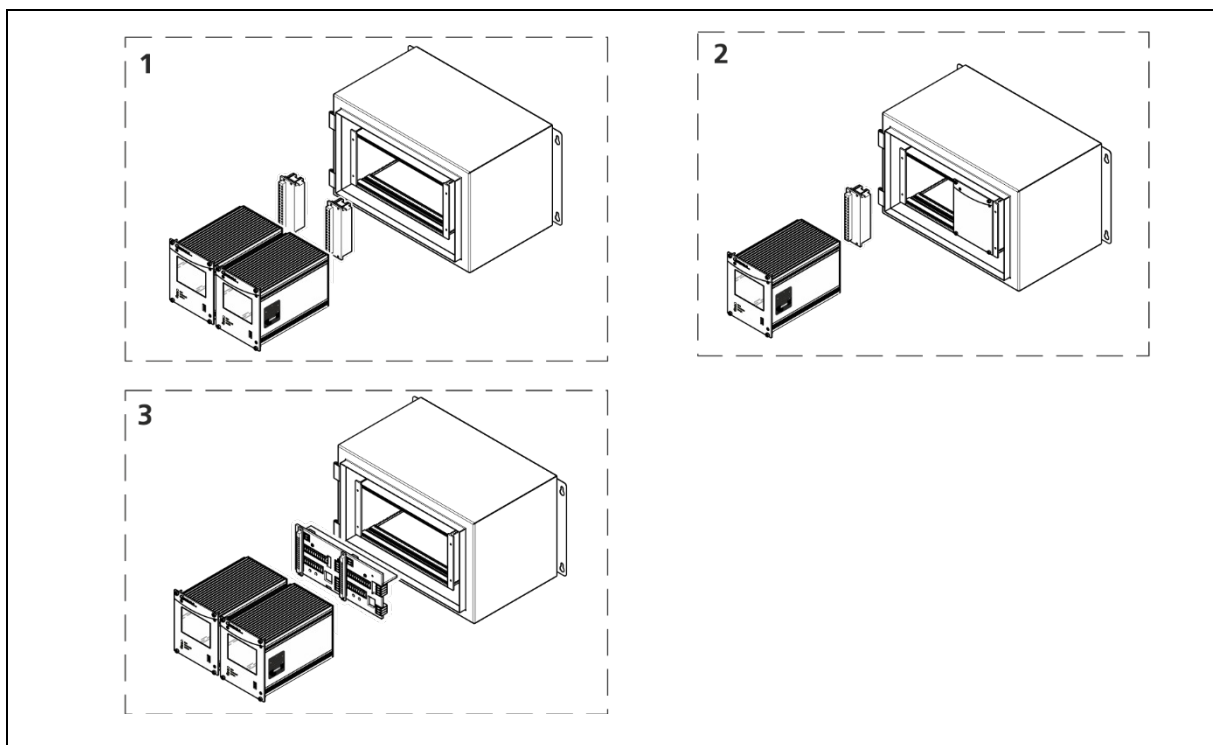
WARNING



Danger to life due to explosion!

- ▶ This version of the evaluation unit is not explosion protected and is not designed for hazardous environments.
- ▶ Please note the applicable documents for versions of the evaluation unit for intrinsically safe operation, see operating manual chapter 1.1.

2.1. Installation Variants Wall Housing

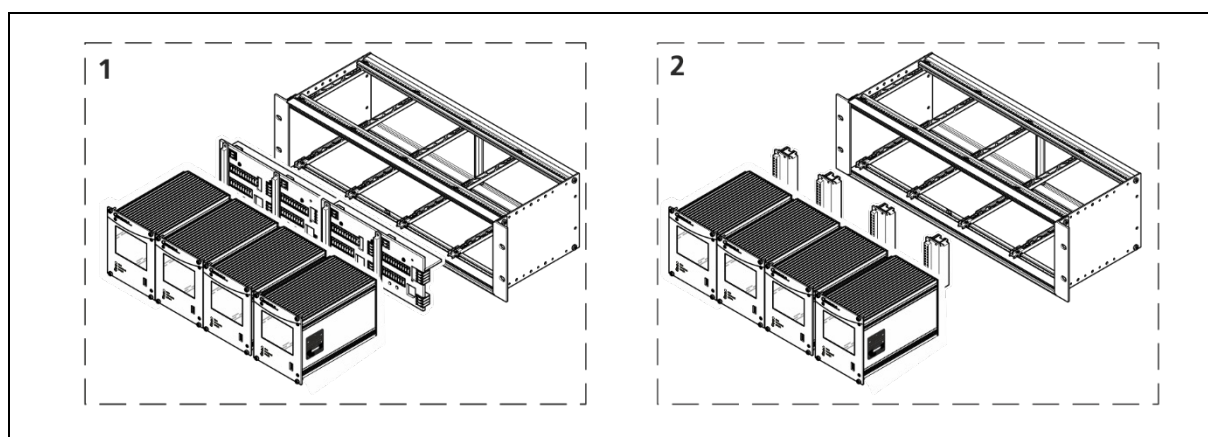


TI-Fig. 1 Installation variants wall housing

Item	Components	Connection
1	2 Masters	2 Terminal blocks
2	1 Master	1 Terminal block
3	2 Master	1 Terminal panel master/master ¹

¹ NRTL certification US/CAN

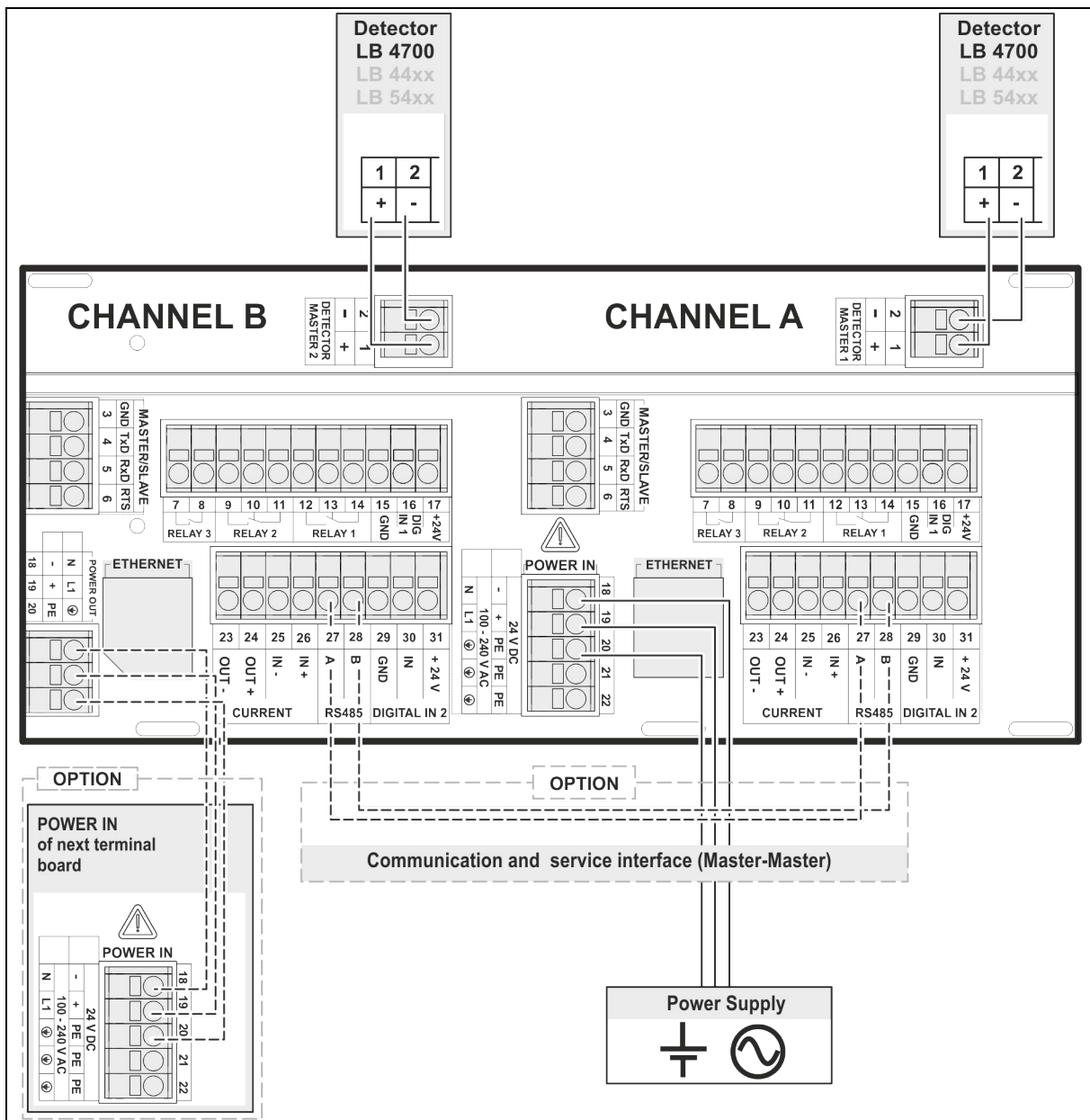
2.2. Installation Variants 19" Subrack



TI-Fig. 2 Installation variants 19" subrack

Item	Components	Connection
1	4 Masters	2 Terminal panel master
2	4 Masters	4 Terminal blocks

2.3. Connection Diagram Terminal Board Master



TI-Fig. 3 Connection diagram terminal board Master

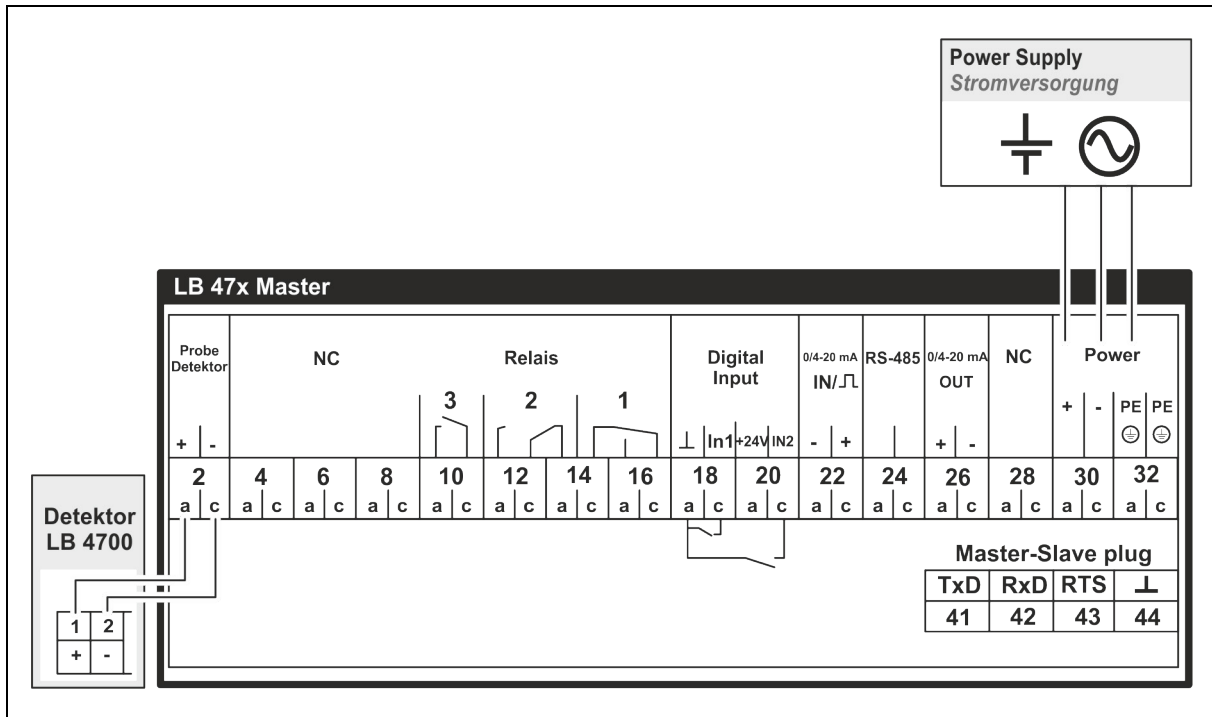
IMPORTANT

In a 19 "subrack for 4 masters (Mat. No. 59484), there is another one with Channel C / D next to the connector board for Channel A / B. The channel assignment of Channel C / D is identical to that of Channel A / B.

Terminals terminal board Master/Master

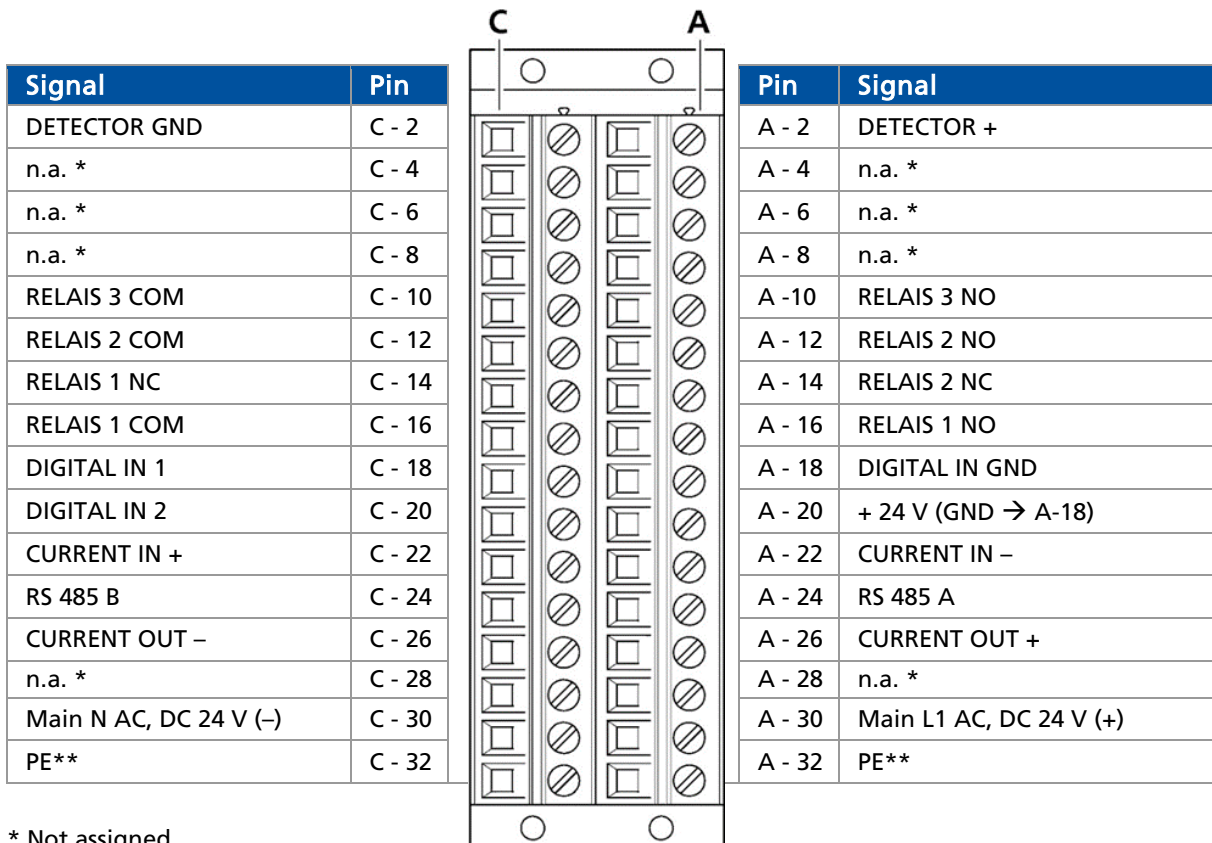
#	Connection	Function
1	DETECTOR MASTER +	Connection Detector LB 4700 / LB 44xx / LB 54xx
2	DETECTOR MASTER -	
3	MASTER/SLAVE GND	Connection of additional slave units
4	MASTER/SLAVE TxD	
5	MASTER/SLAVE RxD	
6	MASTER/SLAVE RTS	
7	RELAIS 3 NC	DIGITAL OUT
8	RELAIS 3 COM	
9	RELAIS 2 NC	DIGITAL OUT
10	RELAIS 2 NO	
11	RELAIS 2 COM	
12	RELAIS 1 NC	Error DIGITAL OUT
13	RELAIS 1 NO	
14	RELAIS 1 COM	
15	DIGITAL IN 1 GND	GND
16	DIGITAL IN 1 IN	Logic Input
17	+ 24 V (GND → 15)	24 V out (max. 200 mA)
18	POWER DC 24 V – / AC N	24 V DC / 100-240 V AC
19	POWER DC 24 V + / AC L1	
20	PE	
21	PE	
22	PE	
23	CURRENT OUT –	4 mA ... 20 mA
24	CURRENT OUT +	
25	CURRENT IN –	Not used for LB 473
26	CURRENT IN +	
27	RS 485 A	Communication and service interface (Master-Master)
28	RS 485 B	
29	DIGITAL IN 2 GND	GND
30	DIGITAL IN 2 IN	Logic Input
31	+ 24 V (GND → 29)	24 V out (max. 200 mA)

2.4. Assignment Terminal Block EVU



TI-Fig. 4 Assignment Terminal Block EVU

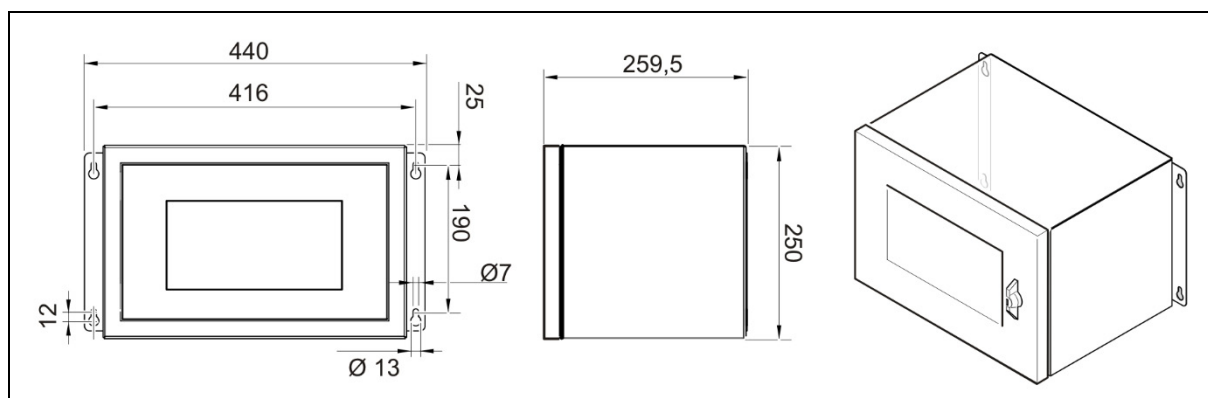
Terminal Block EVU



* Not assigned

** Protective conductor

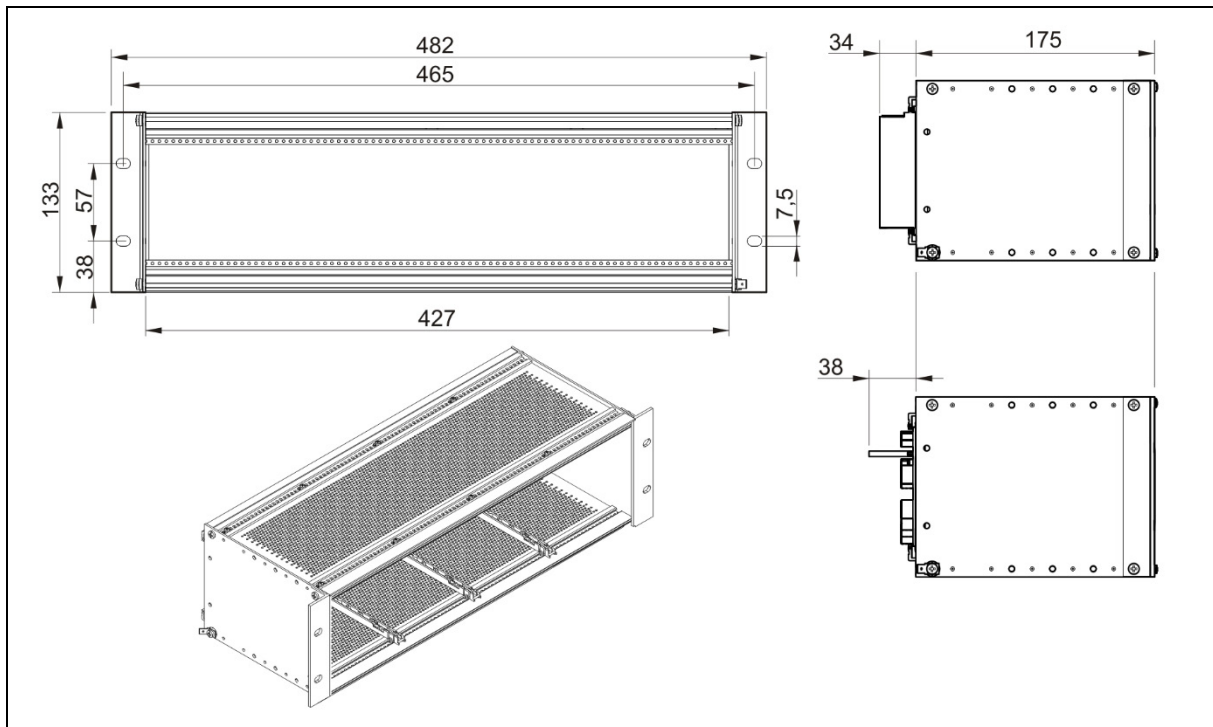
3. Wall Housing



TI-Fig. 5 Dimensions wall housing

Technical Data	
Max. assembly	2 Master
Weight (without modules)	8.8 kg
Degree of protection	IP65
Operational temperature	-20°C ... +40°C
Storage temperature	-25°C ... 80°C
General ambient conditions	Overvoltage category: II Pollution Degree: 2 Altitude: up to 2000 m Rel. humidity: 93% or less
User interface, colors	powder coated, grey
Cable entry	8 x M16, 2 x M32

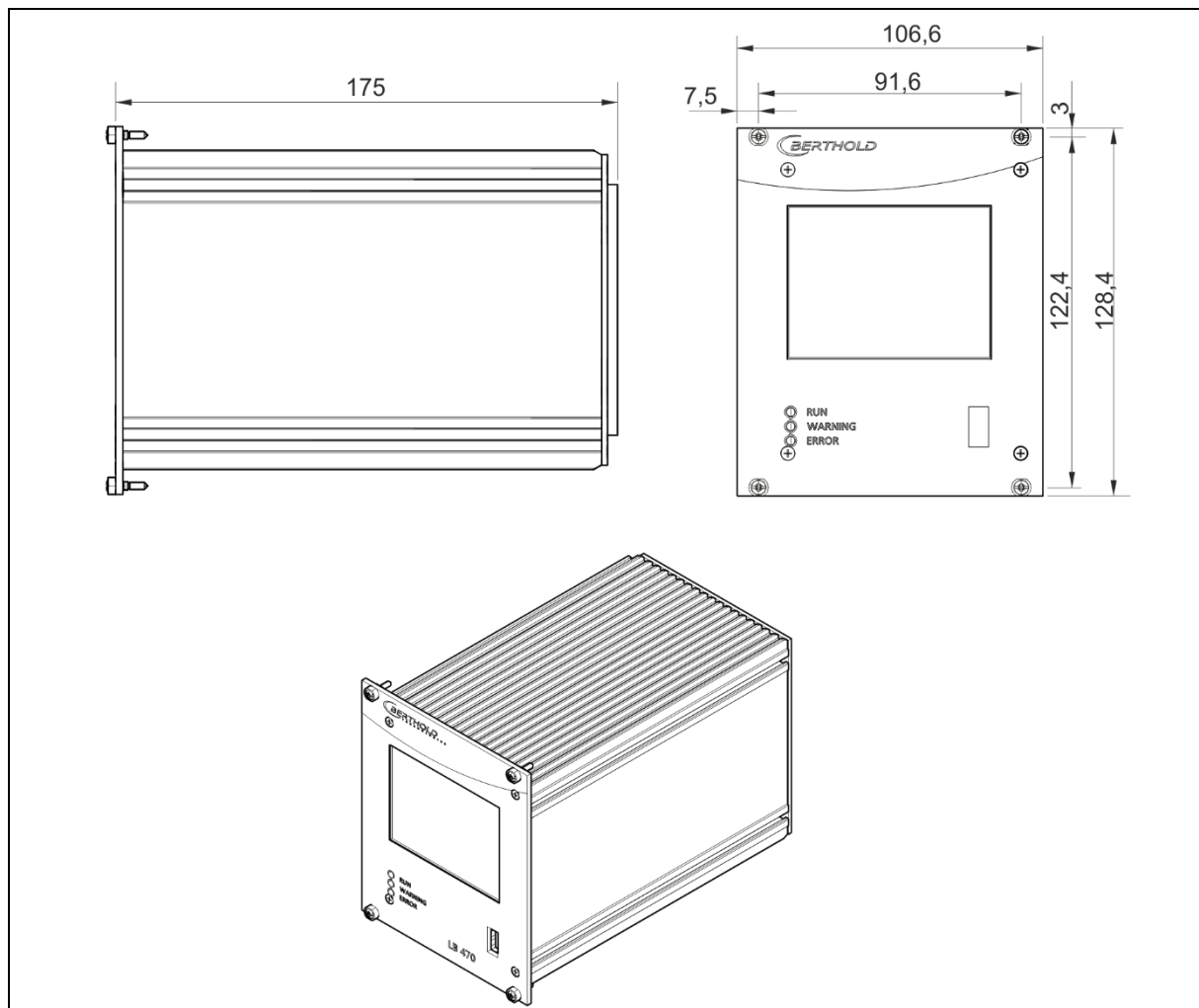
4. 19" Subrack



TI-Fig. 6 Dimensions 19" subrack

Technical Data	
Standard units	3HE/84TE/5T
Max. Assembly	4 master
Weight (without EVUs)	1.4 kg
Weight terminal block	220 g
Operational temperature	-20°C ... +50°C, not condensing
Storage temperature	-25°C ... +80°C
Degree of protection	IP20

5. EVU



TI-Fig. 7 Dimensions EVU

Technical Data	
Weight	1200 g
Operational temperature	-20°C ... +50°C not condensing. Avoid direct sunlight. Unobstructed air circulation must be provided to the subrack.
Storage temperature	-30°C ... +80°C
General ambient conditions	Overvoltage category: II Pollution Degree: 2 Altitude: up to 2000 m Rel. humidity: 93% or less
Degree of protection	IP20 ¹
Connections	- USB port for the connection to the USB storage medium - Master/slave connection (4-pin) and plug - RJ45 connection for Ethernet (on back wall) - 32-pin plug connector according to DIN 19465 Series C

Display	- graphical LCD display - 320 x 240 points, 262,000 colors - Dimmable LED background lighting - Touchscreen
Computer core	- Processor: Dual Core DSP/ARM Controller - clock frequency: 300 MHz internal (20 MHz external quartz) - ROM: 512 KByte - RAM: 64 MByte ext. SDRAM, 128 KByte int. shared RAM - FLASH: 8 MByte external serial

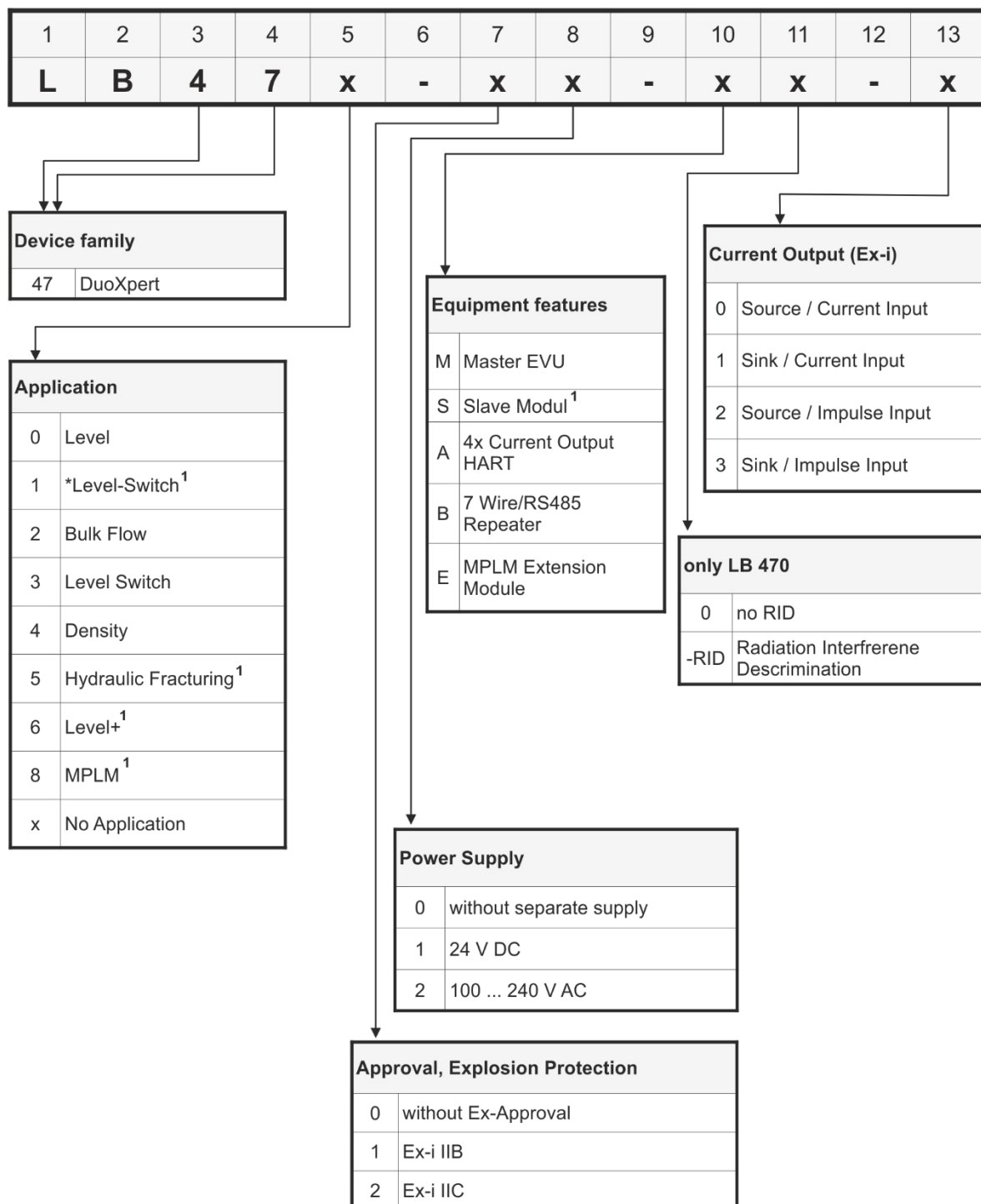
Power Supply

Voltage	100 ... 240 V AC 50/60 Hz (wide range input) +/- 10% 21 ... 32 V DC (24 V DC power input)
Power consumption	22 VA, 15 W
Fuses	Internal, 2x 250 V, 1A delayed, 5x20 mm, 1500 A breaking capacity IEC 60127-2, 1x 250 V TR5 T80 mA (Ø 8,5 mm)

¹Designed for indoor use. Outdoor use only possible if installed in wall housing.

Interfaces	
Current Output	4-20mA internally switched from power source to sink current (according to NAMUR recommendation NE 006 and NE 043). Dip switch source/sink on the electronic board of the LB 47x. Standard setting is source current. Continuous short circuit proof and galvanically isolated (500 V). Internal resistance about 105 ohms max. Burden when operating as a power source: 850 ohms. Internal monitoring of the loop current and additional error signaling by hardware on detection of a fault condition.
Digital outputs	3 relays, $U_{\max} = 33 \text{ V AC}_{\text{eff}}, 46 \text{ V DC}; I_{\max} = 1 \text{ A}$ functions: - Relay 1: SPDT for error signaling - Relay 2: SPDT assignable by software - Relay 3: SPST assignable by software
Digital inputs	2x together electrically isolated (500 V) Switch between DigIn and GND, U_{outmax} approx. 24 V Function configurable via software
External supply	Output voltage: 24 V DC Output current: max. 150 mA
RS485	For master/master communication, and testing and evaluation purposes. not isolated from main electronics and USB port electrically isolated from remaining I/Os (500 V)
USB port	1x USB 2.0 Type A (Host) via front plate to the connection of an ext. mouse, keyboard or storage medium $U_{\text{out}} = 5 \text{ V}, I_{\text{outmax}} = 0.5 \text{ A}$
Ethernet	RJ45 connection via back wall, 10 Mbit, DHCP supported, max. 3 m Designed for maintenance purposes. Not designed for long-term operation.

6. Number Key LB 47x



TI-Fig. 8 Number key

¹ Only available as standard version

* Other Hardware

7. Declaration of Conformity LB 47x



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EG-Konformitätserklärung (ORIGINAL)

Dok.Nr.: CE20028-1

Hiermit erklären wir in alleiniger Verantwortung, dass die Bauart des(r) nachfolgend bezeichneten Geräte / Systems / Anlage / Maschine in der von uns in den Verkehr gebrachten Ausführung den unten genannten einschlägigen Harmonisierungsvorschriften der EU entsprechen.

Durch nicht mit uns abgestimmte Änderungen oder nicht bestimmungsgemäßen Gebrauch verliert diese Erklärung ihre Gültigkeit.

Produktbezeichnung: **radiometrisches Auswertesystem DuoXpert**

Typenbezeichnung / Modell: **LB 47x**

	Richtlinie (Fundstelle)	angewendete Normen und weitere Spezifikationen
NSR	2014/35/EU	EN 61010-1 2010
RoHS	2011/65/EG	
EMV	2014/30/EU	EN 61326-1 2013 EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-4-11 EN 61000-3-2 Namur NE21 2012

Diese Erklärung wird verantwortlich für den Hersteller

BERTHOLD TECHNOLOGIES GmbH & Co. KG
 Calmbacher Str. 22, D-75323 Bad Wildbad

abgegeben durch


 Dr. Jürgen Briegleb

Leiter Entwicklung
 Bad Wildbad, den 1. September 2015

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 Geschäftsleitung / Management
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 Deutsche Steuernummer / German Tax No.
 WEEE-Reg. No.

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 Commerzbank 75105 Pforzheim

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SWIFT-BIC PZHS DE66
 SWIFT-BIC VBP1 DE66
 SWIFT-BIC DLAS DEFF 666

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EG-Declaration of Conformity (ORIGINAL)

File.No.: CE20028-2

We, hereby declare under our sole responsibility that the design of the following products / systems / units / machines brought into circulation by us comply with the relevant harmonized rules of the EU.

This declaration loses its validity should modifications or unsuitable and improper use take place without our authorisation.

Product name: **radiometric evaluation system
DuoXpert**

Type / model: **LB 47x**

directive		applied standards	
LVD	2014/35/EU	EN 61010-1	2010
RoHS	2011/65/EG		
EMC	2014/30/EU	EN 61326-1	2013
		EN 61000-4-2	
		EN 61000-4-3	
		EN 61000-4-4	
		EN 61000-4-5	
		EN 61000-4-6	
		EN 61000-4-11	
		EN 61000-3-2	
		Namur NE21	2012

This declaration is issued by the manufacturer

BERTHOLD TECHNOLOGIES GmbH & Co. KG
Calmbacher Str. 22, D-75323 Bad Wildbad, Germany

released by

Dr. Jürgen Briggmann

Head of R&D

Bad Wildbad, 1st of September, 2015

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WEEE-Reg. No.

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Konto/Account No. 8 511 120 (BLZ 566 880 12)

SWIFT-BIC: PZHSDE33
SWIFT-BIC: VPM0DE33
SWIFT-BIC: DRESDE33

IBAN: DE37 0660 0000 0000 0450 03
IBAN: DE85 6666 0000 0000 9520 04
IBAN: DE05 6668 0013 0651 1120 00

8. NTRL Certification US/CAN wall-mounted housing

		Certificate of Compliance	
Nemko-CCL, Inc.			
Certificate: NA201610530	Date Issued: January 20, 2016		
Project: 257087-7.1			
Issued to: Berthold Technologies GmbH & Co. KG Calmbacher Straße 22 75323 Bad Wildbad Germany			
<i>The products listed below have been certified as being compliant with all applicable requirements of the specifications listed and are eligible to bear the following certification mark</i>			
			
Issued by:		Robert Keller, Senior Engineer/Safety Supervisor	
Authorized by:		Thomas Jackson, Certification Manager	
PRODUCTS			
MEASUREMENT, CONTROL, OR LABORATORY EQUIPMENT – Certified to US and Canada Standards			
Product: Process measurement unit Model: Wall-mounted LB 47x, 1M/3S; Wall-mounted LB 47x, 2M (x can be 0 to 8 and describes different software versions for the master and slave modules not affecting safety). Ratings: Wall-mounted LB 47x, 1M/3S: 40VA 100-240V, 50/60Hz, Class I; Wall-mounted LB 47x, 2M: 44VA 100-240V, 50/60Hz, Class I			
The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3 Nemko-CCL, Inc. 1940 West Alexander Street Salt Lake City, Utah 84119-2039 Tel (801) 972-6146 Fax (801) 972-8432 NFCC-002 Issue 2 May 2014			
			
			Page 1 of 3

APPLICABLE REQUIREMENTS

UL Std. No. 61010-1 2nd Edition - Safety Requirements for Electrical Equipment for
Measurement, Control, and Laboratory Use – Part 1: General
Requirements

CAN/CSA-C22.2 No. 61010-1-04 Second Edition - Safety Requirements for Electrical Equipment for
Measurement, Control, and Laboratory Use – Part 1: General
Requirements

This certificate is issued on condition that the holder complies and will continue to comply with the requirements of the above mentioned specifications and
pursuant to the terms and conditions specified in the Certification Agreement.

The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3

Nemko-CCL, Inc. 1940 West Alexander Street Salt Lake City, Utah 84119-3039 Tel (801) 972-6146 Fax (801) 972-8432

NFCC-002 Issue 2 May 2014



Page 2 of 3

Supplement to Certificate of Compliance

Certificate: NA201610530

Project: 257087-7.1

Nemko-CCL grants a license to the applicant to apply the Certification Mark to the certified products and that the mark shall only be affixed at the following factory locations

Factory Information

Factory Name	Location
Berthold Technologies GmbH & Co. KG	Calmbacher Straße 22 75323 Bad Wildbad Germany

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
257087-7.1	January 20, 2016	Original Certification: Model: Wall-mounted LB 47x, 1M/3S; Wall-mounted LB 47x, 2M (x can be 0 to 8 and describes different software versions for the master and slave modules not affecting safety). Ratings: Wall-mounted LB 47x, 1M/3S: 40VA 100-240V, 50/60Hz, Class I; Wall-mounted LB 47x, 2M: 44VA 100-240V, 50/60Hz, Class I

This Supplement forms an integral part of the Certificate of Compliance

The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3

Nemko-CCL, Inc. 1940 West Alexander Street Salt Lake City, Utah 84119-2039 Tel (801) 972-6146 Fax (801) 972-8432

NFCC-002 Issue 2 May 2014



Page 3 of 3

9. NTRL Certificate US/CAN DuoXpert LB 47x

		Certificate of Compliance	
Nemko-CCL, Inc.			
Certificate: NA201510498	Date Issued: September 17, 2015		
Project: 235982-14.1			
Issued to: Berthold Technologies GmbH & Co. KG Calmbacher Straße 22 75323 Bad Wildbad Germany			
<i>The products listed below have been certified as being compliant with all applicable requirements of the specifications listed and are eligible to bear the following certification mark</i>			
			
Issued by:			
	Robert Keller, Senior Engineer/Safety Supervisor		
Authorized by:			
	Thomas Jackson, Certification Manager		
<u>PRODUCTS</u>			
MEASUREMENT, CONTROL, OR LABORATORY EQUIPMENT – Certified to US and Canada Standards			
Product: Process measurement unit for building-in Model: DuoXpert LB47x-02-M; DuoXpert LB47x-02-S (x can be 0 to 8 and describes different software versions for the master and slave modules not affecting safety) Ratings: LB47x-02-M: 100-240V AC 22VA 50/60Hz; LB47x-02-S: 100-240V AC 6VA 50/60Hz			
<u>APPLICABLE REQUIREMENTS</u>			
UL Std.	No. 61010-1 3rd Edition - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements		
	CAN/CSA-C22.2 No. 61010-1-12 Third Edition – Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements		
This certificate is issued on condition that the holder complies and will continue to comply with the requirements of the above mentioned specifications and pursuant to the terms and conditions specified in the Certification Agreement.			
The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3			
Nemko-CCL, Inc. 1940 West Alexander Street Salt Lake City, Utah 84119-3039 Tel (801) 972-6146 Fax (801) 972-8432			
NFCC-002 Issue 2 May 2014		Page 1 of 2	

Supplement to Certificate of Compliance

Certificate: NA201510498

Project: 235982-14.1

Nemko-CCL grants a license to the applicant to apply the Certification Mark to the certified products and that the mark shall only be affixed at the following factory locations

Factory Information

Factory Name	Location
Berthold Technologies GmbH & Co. KG	Calmbacher Straße 22 75323 Bad Wildbad Germany

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
235982-14.1	September 17, 2015	Original Certification: Model: DuoXpert LB47x-02-M; DuoXpert LB47x-02-S (x can be 0 to 8 and describes different software versions for the master and slave modules not affecting safety) Ratings: LB47x-02-M: 100-240V AC 22VA 50/60Hz; LB47x-02-S: 100-240V AC 6VA 50/60Hz

This Supplement forms an integral part of the Certificate of Compliance

The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3

Nemko-CCL, Inc. 1940 West Alexander Street Salt Lake City, Utah 84119-2039 Tel (801) 972-6146 Fax (801) 972-8432

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10. Parts Overview

Mat. No.	Description
64653	LB 473-01-M0 Level Switch Transmitter (Master, 24 VDC)
64652	LB 473-02-M0 Level Switch Transmitter (Master, 100...240 VAC)
72063	LB 473-21-M0-0 Level Switch Transmitter Ex-i (Master, 24 VDC, Source)
72064	LB 473-22-M0-0 Level Switch Transmitter Ex-i (Master, 100...240 VAC, Source)
72370	LB 473-21-M0-1 Level Switch Transmitter Ex-i (Master, 24 VDC, Sink)
72369	LB 473-22-M0-1 Level Switch Transmitter Ex-i (Master, 100...240 VAC, Sink)
56925-3BA1	Operating Manual DuoSeries LB 473 Level Switch, German
56925-3BA2	Operating Manual DuoSeries LB 473 Level Switch, English
56925BA16	Safety Manual / Explosion Protection Manual LB 47x Ex-i (ATEX / IECEx), German
56925BA26	Safety Manual / Explosion Protection Manual LB 47x Ex-i (ATEX / IECEx), English
63783	Wall-mounted Housing for 2x LB 47x Master (24 VDC)
63784	Wall-mounted Housing for 2x LB 47x Master (110...240 VAC)
64402	Wall-mounted Housing for 2x LB 47x Master (terminal blocks)
72812	Wall-mounted Housing for 2x LB 47x Ex-i Master (with Ex-i terminal blocks)
59484	19" rack for LB 47x, 4x Master
64607	19" rack, 84 HP / 3 RU for use with terminal blocks
72051	19" rack Ex-i, 84 HP / 3 RU with 4x tension spring terminal blocks
37526	Front Cover Plate 21 HP / 3 RU (Master)