

The AMETEK logo is displayed in white, bold, uppercase letters on a red background. The background features a large, stylized arrow pointing to the right, composed of several overlapping red and dark red geometric shapes. The logo includes a registered trademark symbol (®) to the upper right of the word.

AMETEK®

The i-BEAM logo features the word "i-BEAM" in a bold, black, sans-serif font. The lowercase "i" has a red square dot. A green leaf icon is positioned to the right of the "M".

i-BEAM

intelligent-**Bidirectional Energy AMplified**

AMETEK PROGRAMMABLE POWER



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- I-BEAM Introduction
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 - Capacitor Box
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I-BEAM INTRODUCTION

intelligent-Bidirectional Energy AMplified

The newest addition to the AMETEK Programmable Power portfolio of high-power testing solutions

- Features full DC source and sink capabilities with power levels from 60 kW up to 1.3 MW
- Voltage ranges of 80V, 300V, 600V, 800V and 1,000VDC
- Current ranges of ± 200 A, ± 600 A and $\pm 1,000$ A, up to $\pm 2,000$ A in parallel
- Available in 1, 2 or 4 channel configurations
- Regenerative to 96%
- Large 15-inch color touch panel
- Short circuit proof
- Designed for safety to EN ISO 13849-1
- Dedicated Battery Testing/Simulation Modes
- Seamless transition between source and sink
- High reliability, long life components



I-BEAM STANDARD SYSTEM



■ Bidirectional DC supply (Source / Sink)

- Highly dynamic: Current rise time < 1 ms
- High control accuracy
 - Current accuracy 0.1% full scale (fs)
 - Voltage accuracy 0.1% fs
- Energy recovery to grid
 - Saving of energy costs
 - Reduction of maximum demand
 - Reduction of heat loss (compared to “burning energy”)
- Operator Safety Standard:
 - Performance Level “d” per ISO 13849-1 (Safety of machinery: Safety-related parts of control systems),
 - EN 60204-1 (Safety of machinery - Electrical equipment of machines)



OVERVIEW AND BLOCK DIAGRAM

▀ Cabinet design

- Rugged free-standing cabinet

▀ IP 20 Protection Class (per EN 60529)

▀ Dangerous parts covered - Air cooled system

- No distance to rear wall necessary
- All internal access from front of system

▀ Cable entry from below - Noise-reduced design

- Transformers and chokes mounted on rubber buffers
- Fan speed control (temperature dependent)



OVERVIEW AND BLOCK DIAGRAM

Equipment – front view – 2-Channel i-BEAM

Rectifier

DC Converter



Operating Indicators

Voltmeters

TFT Display

Emergency STOP Button
(Optional)

Stop Buttons

AC Mains Switch

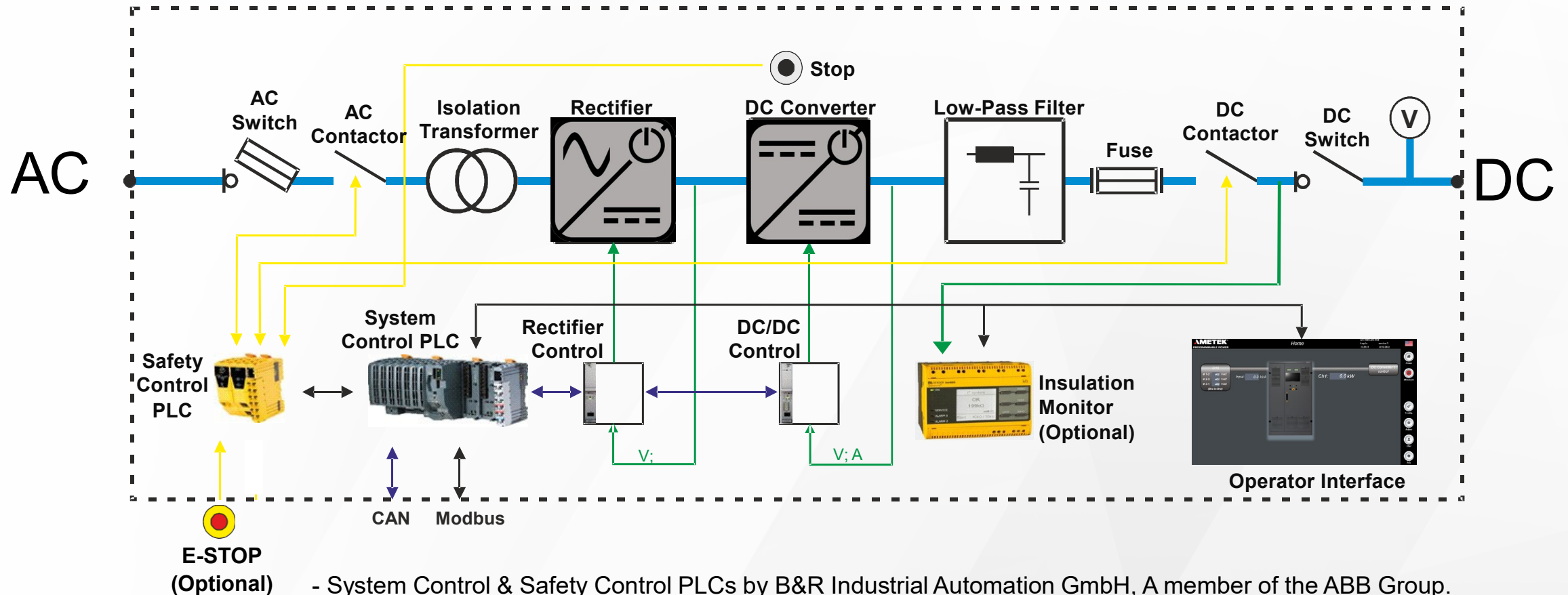
OVERVIEW

New Acronyms

- CBOX – Capacitor Box, optional
- DCC – DC Converter, output stage of i-BEAM
- DCU – Discharge Unit, optional cabinet to discharge DUT
- DL – DC Link, internal i-BEAM shared DC Link on 2- and 4-channel i-BEAMs
- i-BEAM – *intelligent*-**B**idirectional **E**nergy **A**Mplified
- PDSB – Power Distribution Switch Box, optional
- PDU – Power Distribution Unit, optional
- PLC – Programmable Logic Controller
- RE - Rectifier

OVERVIEW AND BLOCK DIAGRAM

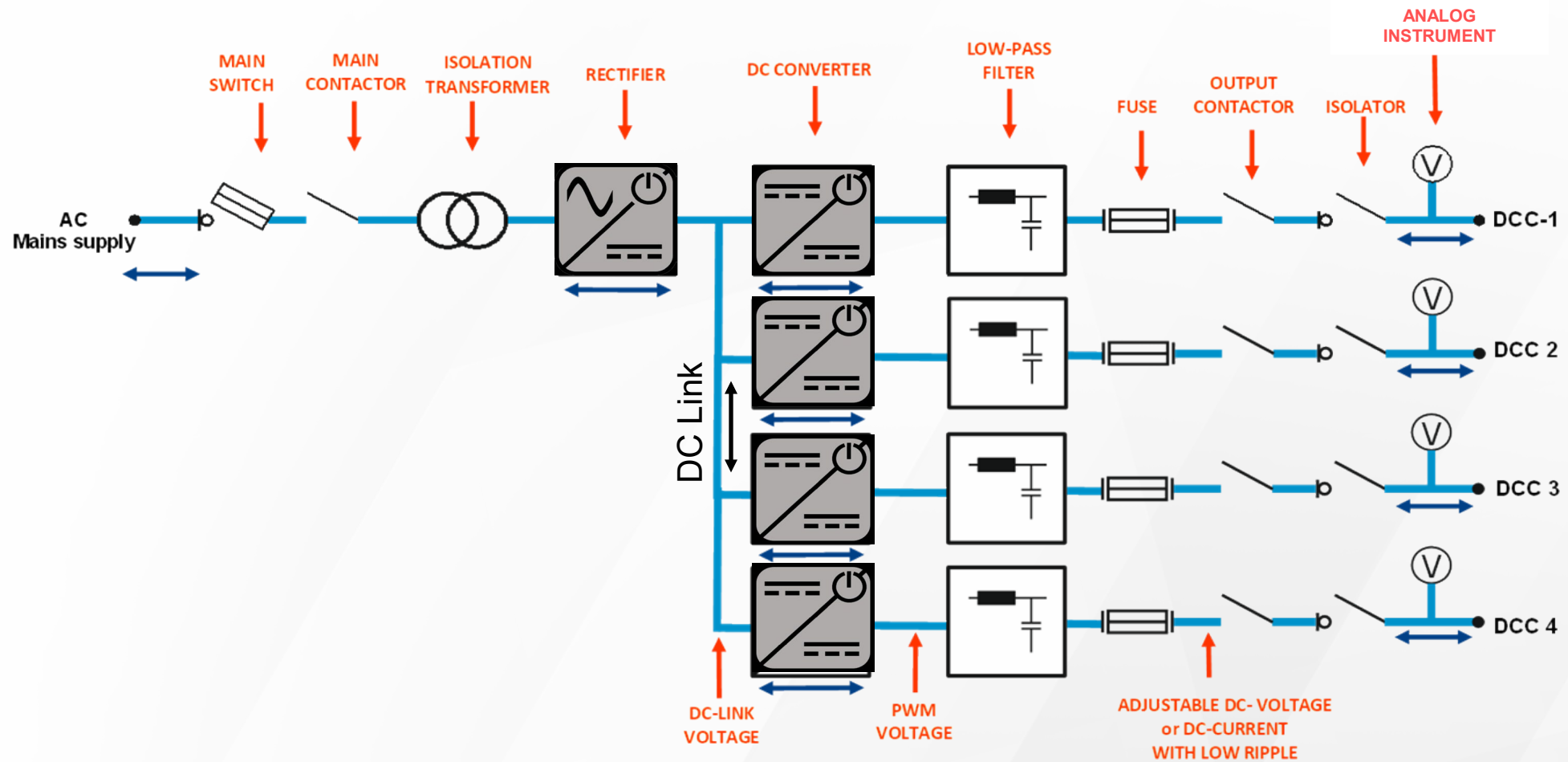
Block Diagram – Single Channel i-BEAM



- System Control & Safety Control PLCs by B&R Industrial Automation GmbH, A member of the ABB Group.
- Optional Insulation Monitor by Bender, ISOMETER® iso685.

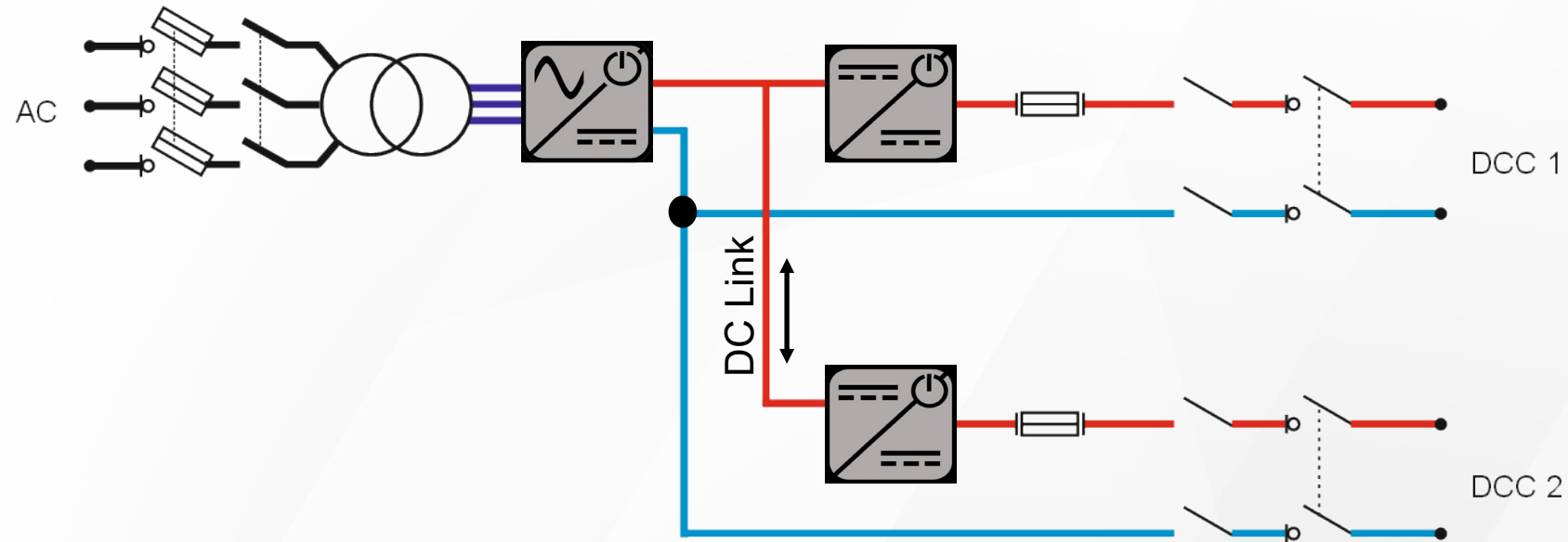
OVERVIEW AND BLOCK DIAGRAM

Block Diagram – 4-Channel i-BEAM



OVERVIEW AND BLOCK DIAGRAM

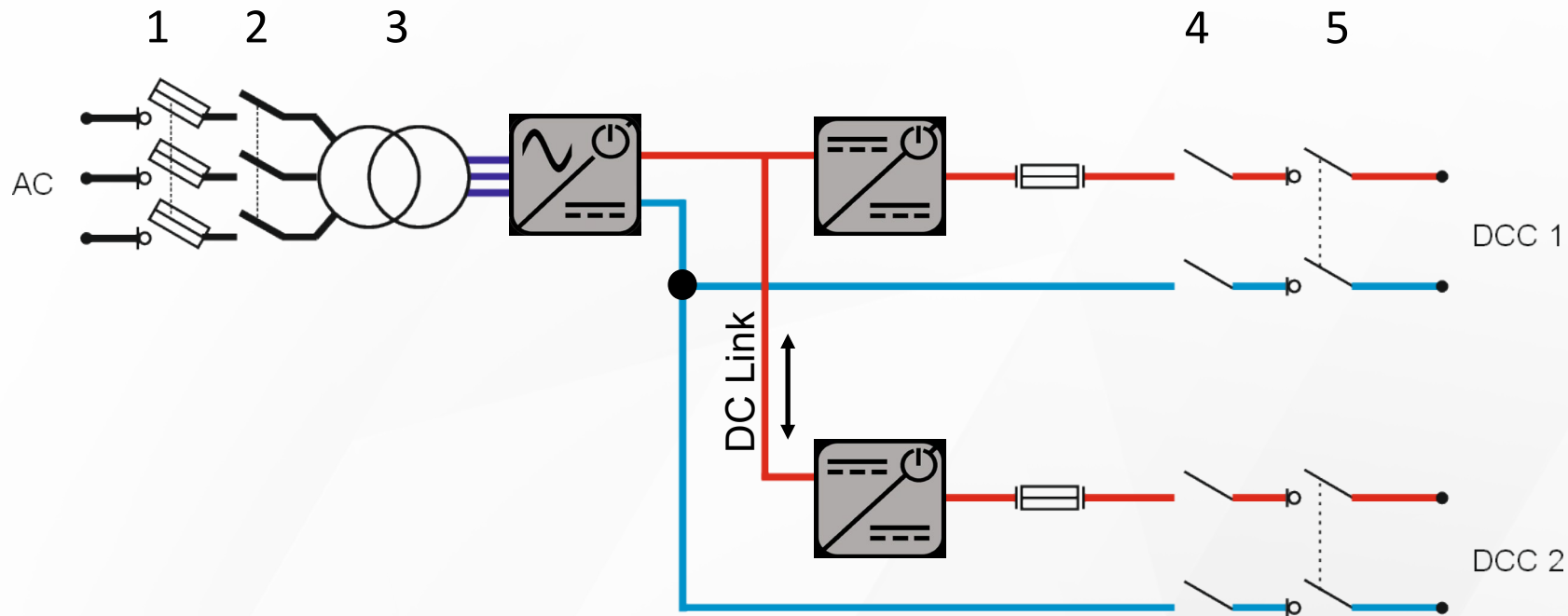
Galvanic Isolation



No galvanic isolation between the output channels

OVERVIEW AND BLOCK DIAGRAM

Output Negative Poles are Connected on 2- and 4-Channel i-BEAMs

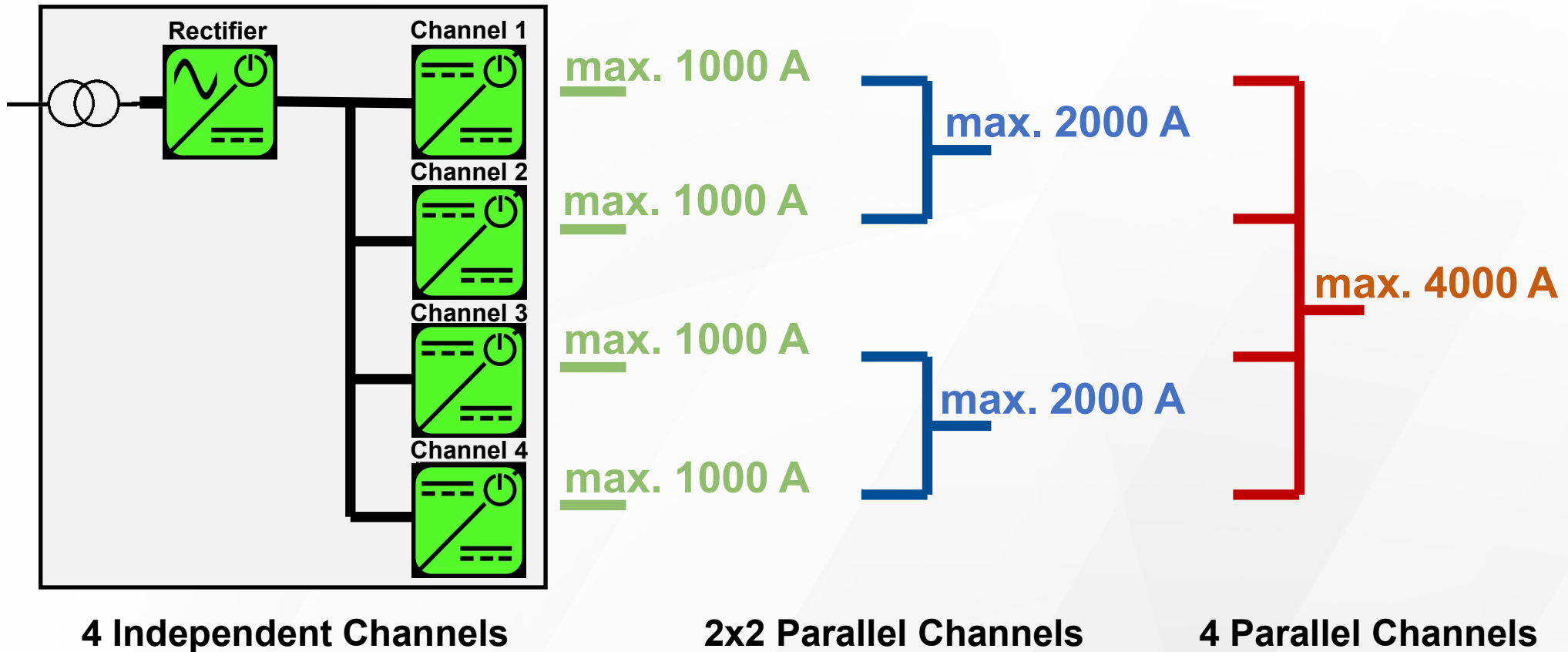


- The negative poles of the individual DC terminals are connected to each other inside the system.
- The current in the negative pole per channel must not exceed the rated current of the DC terminal.
- If DC converters are connected in parallel, the same cables (same number, same cable type, same cross-section and same length) must be connected to all negative poles.



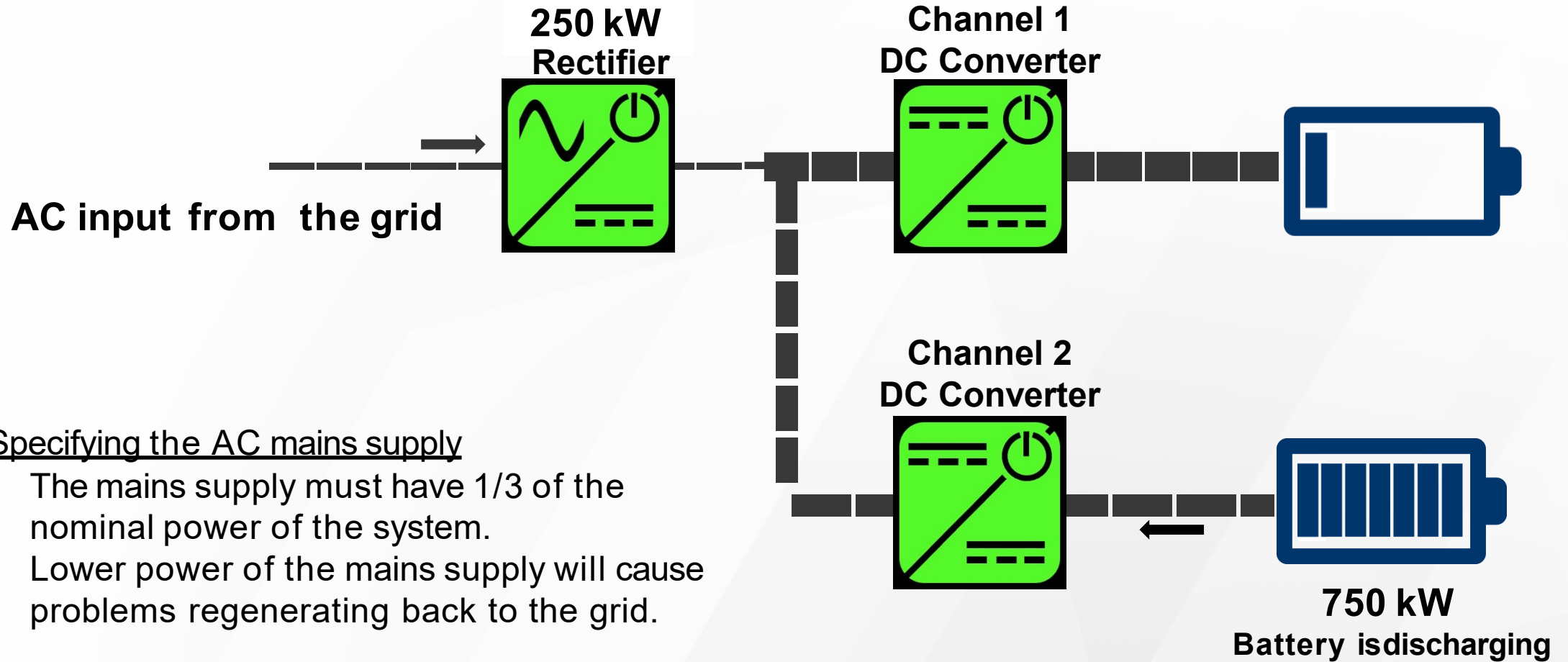
OVERVIEW AND BLOCK DIAGRAM

4-Channel i-BEAM Operating Modes



APPLICATION EXAMPLES

High-power battery test



Specifying the AC mains supply

- The mains supply must have 1/3 of the nominal power of the system.
- Lower power of the mains supply will cause problems regenerating back to the grid.

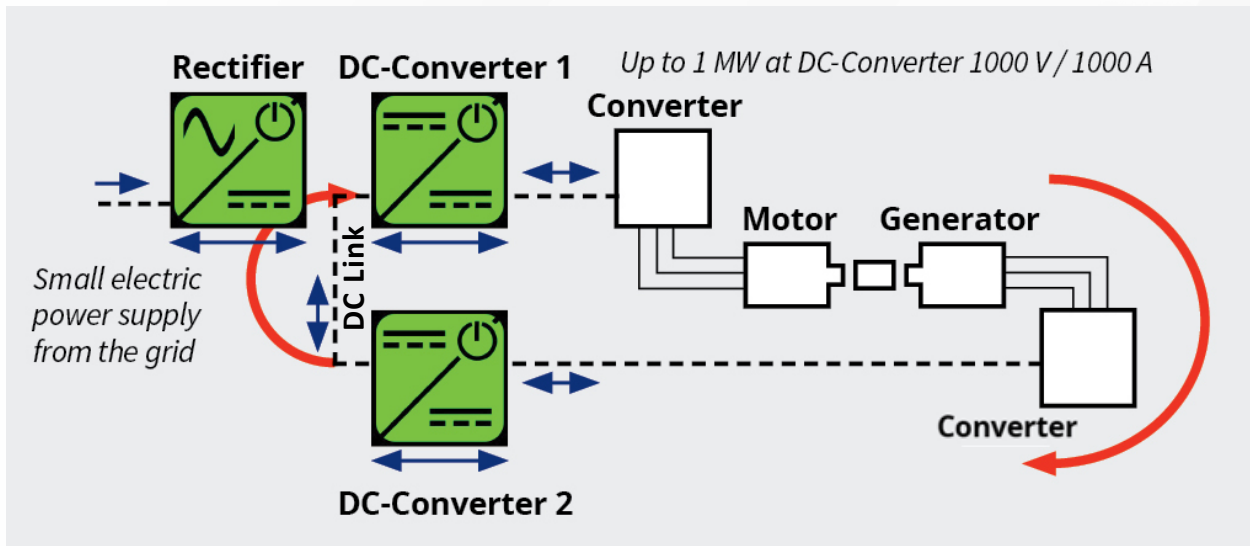
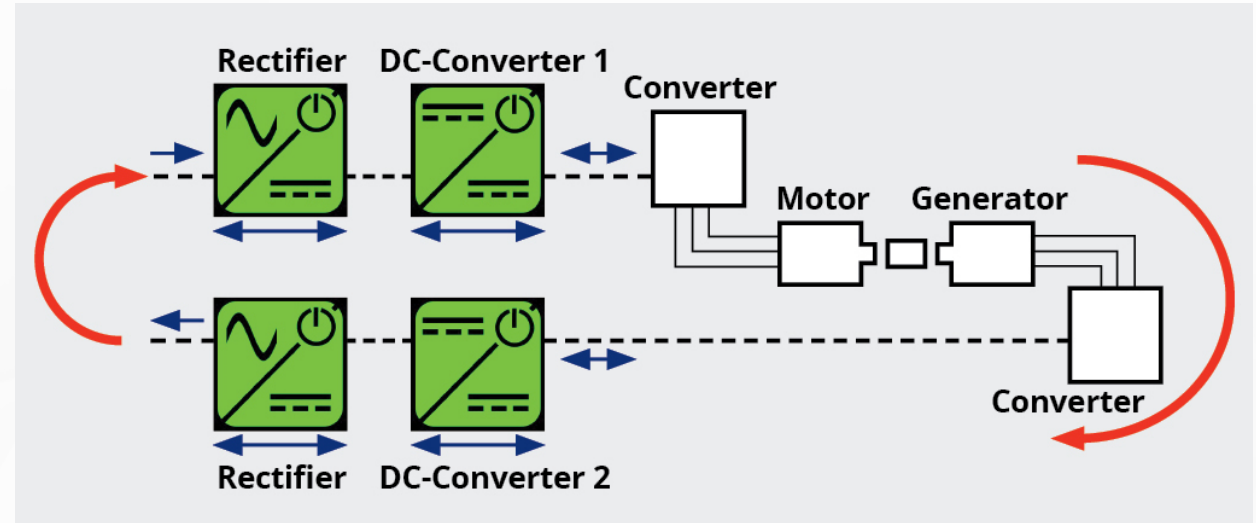


APPLICATION EXAMPLES

Differences between 1-channel and multiple channels

Two, Single-Channel Systems

- Max. DUT power depends on the nominal power of the rectifier.
- Energy flow via the AC Grid mains supply.



2-Channel System

- Max. DUT power depends on voltage and current of DC converter.
- Energy flow is shared up to 2MW via the internal DC Link



BIDIRECTIONAL RECTIFIER

/// Main AC switch

- Switch disconnecter with fuses in the AC input; lockable in the off position

/// Isolating transformer with shield winding, reduced noise

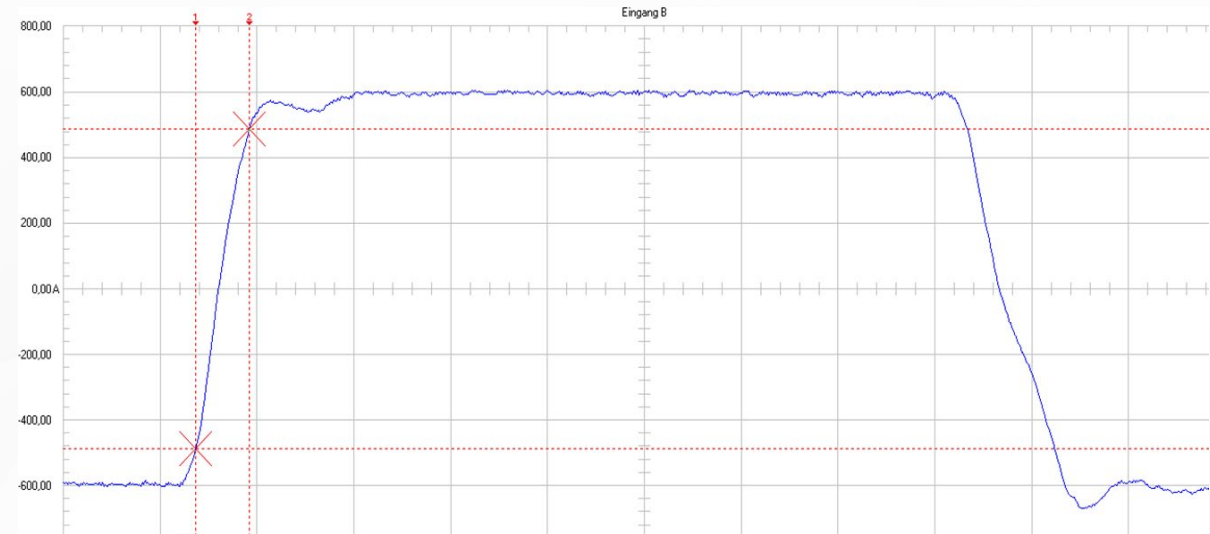
- Galvanic isolation between AC and DC
- AC input voltage Standard: 380 / 400 V ($\pm 10\%$) 3/PE, 50 or 60Hz ($\pm 5\%$)
- Optional: 480 V ($\pm 10\%$) 3/PE, 50 or 60Hz ($\pm 5\%$)

/// Power stack in IGBT technology (PWM)

- THDI $< 6\%$
- Power factor at the input > 0.99 (internal reactive power compensation)
- Sinusoidal input current
- Energy recovery to grid
- Internal monitoring devices

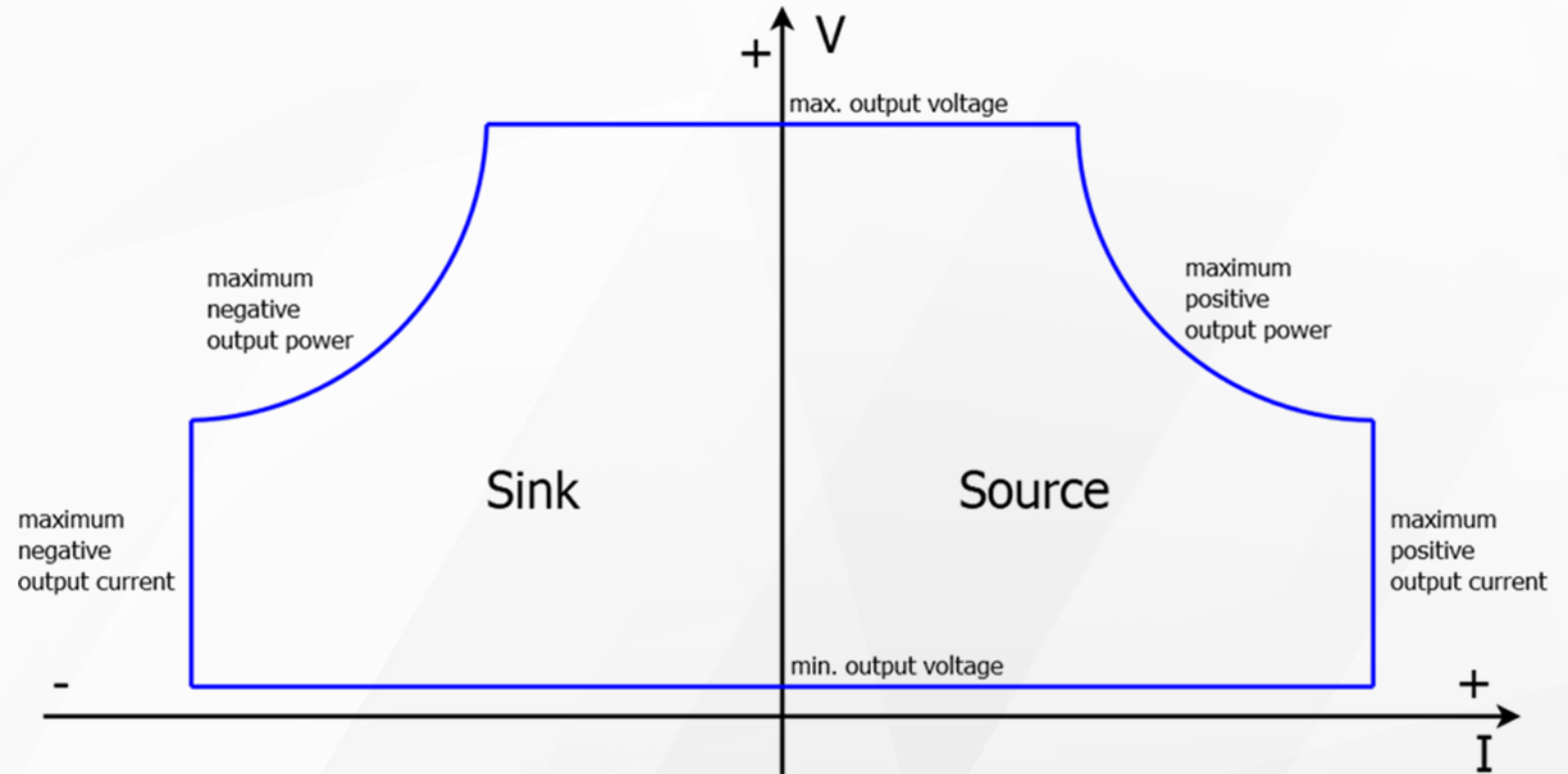
BIDIRECTIONAL DC-CONVERTER

- High dynamic behavior
- High control accuracy
- Operation modes
 - Constant Voltage (CV)
 - Constant Current (CC)
 - Constant Power (CP)
 - Adjustable internal Constant Resistance (CR)
- IGBT-technology (PWM)
 - Ripple < 0.1% fsrms
 - Control of the energy flow (source or sink operation)
- Internal monitoring devices



OPERATING MODES

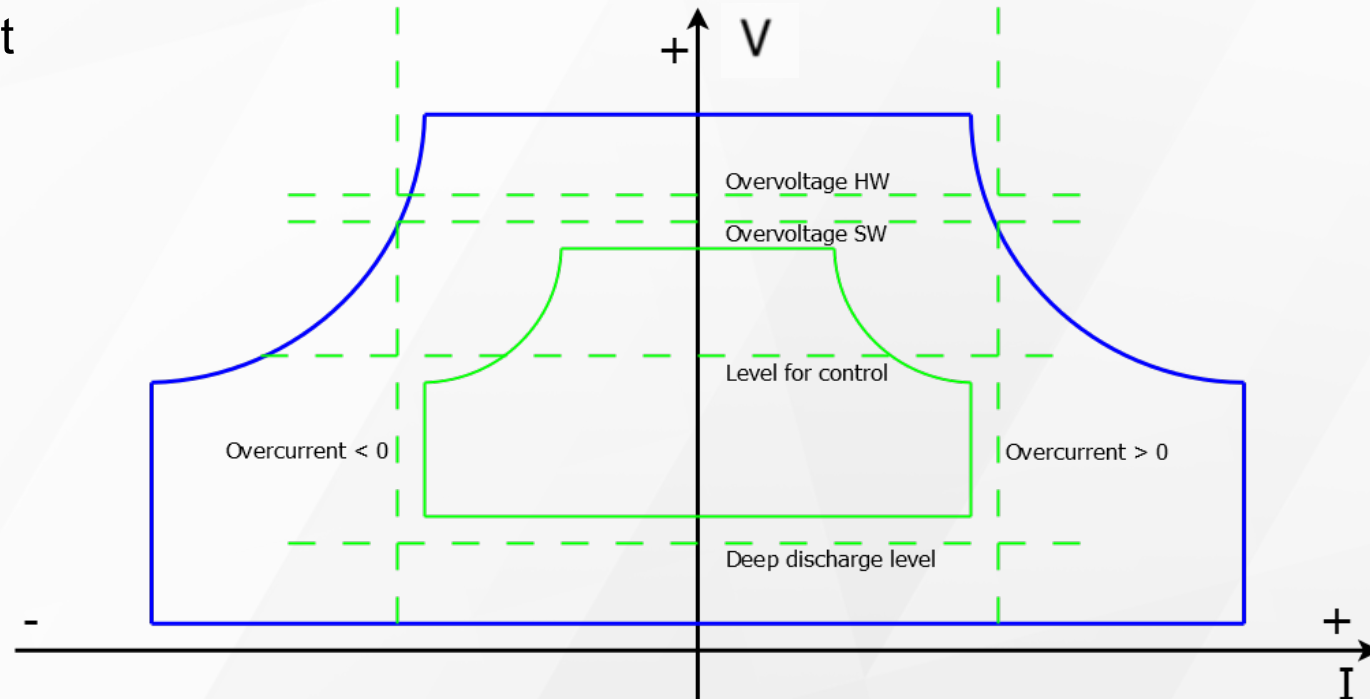
- ▀ The i-BEAM rectifier establishes the maximum power and voltage levels
- ▀ The DC converter establishes the maximum output current
- ▀ Operating modes include
 - Constant Voltage (CV)
 - Constant Current (CC)
 - Constant Power (CP)
 - Constant Resistance (CR)
 - -10 mΩ to +1,000 mΩ



OPERATING MODES

Setpoints, supervisory and safety features to protect the DUT

- All setpoints can be changed 'on-the-fly' and are updated every 10 ms
- Software overvoltage setpoint with programmable time delay
- Hardware overvoltage setpoint reacts in less than 1 ms
- Overcurrent +/- setpoint with programmable time delay
- Deep discharge level setpoint



SAFETY EQUIPMENT

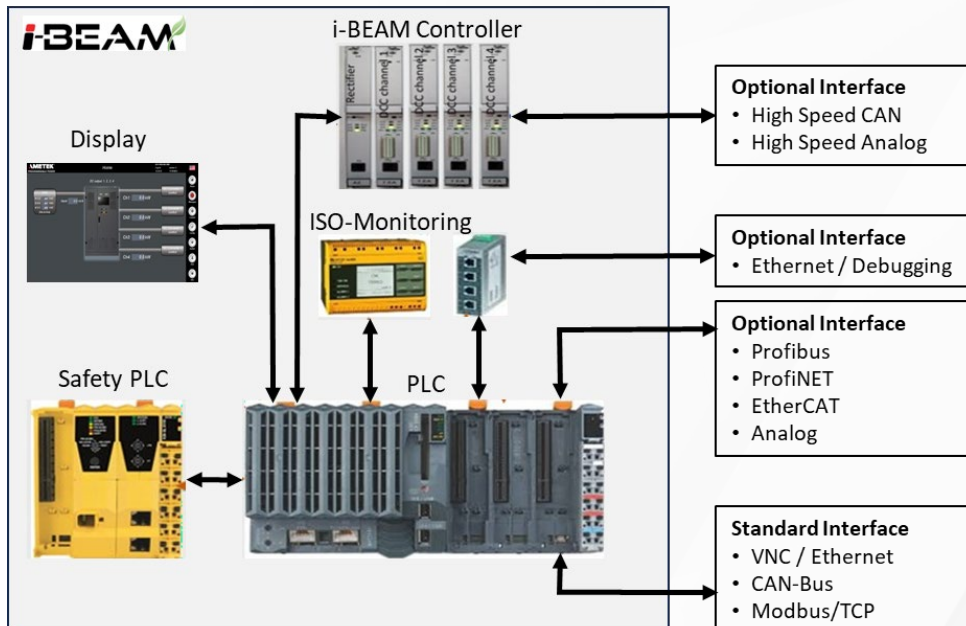
- Safety controller to achieve performance level d (PLd) per ISO 13849-1 / EN 60204-1
- Redundant contactors at DC output (+ and - terminals)
- STOP button (black button) on the cabinet door
- Connection terminals for external emergency STOP and STOP
- Voltmeter and operating indicator light on the cabinet door
- Protection against accidental contact of dangerous parts even when the cabinet doors are open
- Main switch can be locked in the off position
- Emergency STOP (red mushroom button) on the cabinet door is available as an option



INTERFACES

Standard Interfaces

- 15.1" TFT with touch panel
- CAN 2.0 (100Hz)
- Modbus TCP
- VNC (Ethernet)



Optional Interfaces

- Relay contacts
- Safe signal contacts
- SCPI
- EtherCAT
- Profibus DP
- Profinet
- Analog inputs / outputs
- High speed analog input
- High speed CAN (1 kHz)
- LabVIEW
- MATLAB/Simulink Integration
- Access for remote maintenance

TOUCH PANEL INTERFACE

General Screen Layout



- Menu Name
- Device Designation
- User
- Language
- Time & Date
- Home Button
- Messages Button
- Configuration Button
- Adjust Button
- User Button
- Info Button



TOUCH PANEL INTERFACE

General Screen Layout

Control Screen

AC Mains Contactor

Rectifier Status

DC Converter Status

Message Window

AMETEK PROGRAMMABLE POWER

Control

DC Converter: 1

Log In: service /5
09:38:54 11/16/2023

Flow direction

V	600.00	V	0.0	V
I+	0.00	I-	0.90	I
P+	0.00	P-	0.00	P
				1.0 kW

11/16/2023 09:19:03004 053 Confirm emergency stop -> Reset

11/16/2023 09:19:03004 163 DCC2: Confirm Stop -> Reset

11/16/2023 09:19:03004 094 DCC: Confirm Stop -> Reset

11/16/2023 09:19:03004 165 DCC4: Confirm Stop -> Reset

11/16/2023 09:19:03004 164 DCC3: Confirm Stop -> Reset

11/16/2023 09:19:01002 000 System started

11/16/2023 09:19:03002 008 DCC: Off

Reset stop / emergency stop

Rectifier test operation

DC Contactor Status

Flow Direction

Measured Values

Setpoint Values

Active Controller

Reset / Stop

Operation Mode



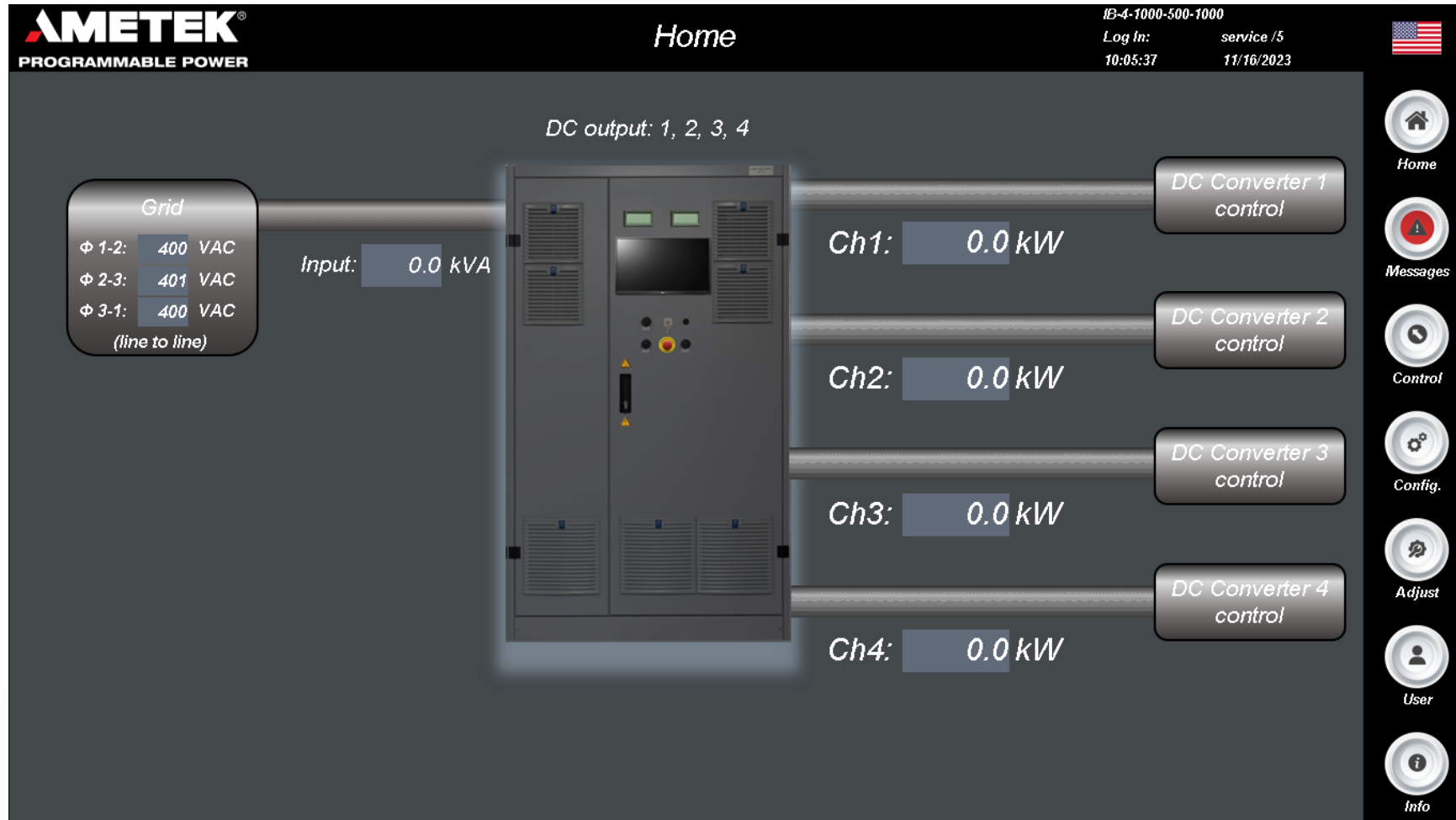
TOUCH PANEL INTERFACE

General Screen Layout, 2-Channel i-BEAM



TOUCH PANEL INTERFACE

General Screen Layout, 4-Channel i-BEAM



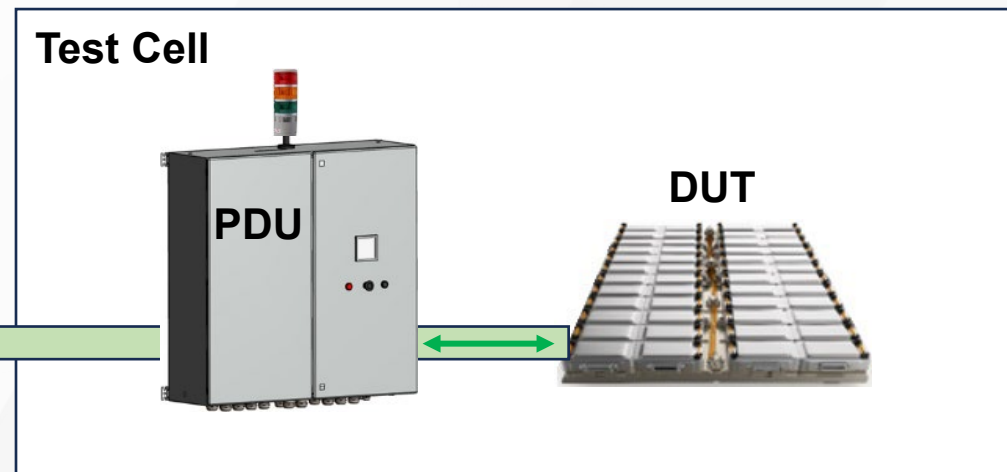
CONNECTION OPTIONS

Power Distribution Unit (PDU)

- The PDU extends the i-BEAM functionality for integration into a test cell or other separated areas
 - Separates i-BEAM from test cell, rated at 1,000V / 1,000A
 - Includes Analog Voltmeter, Stop Button, Reset Button and Status Light Tower
 - Dimensions 1000 x 310 x 1000mm (39.4" x 12.2" x 39.4")
 - Available in 1 Input/1 Output, 2 Input/1 Output, & 4 Input/1 Output configurations



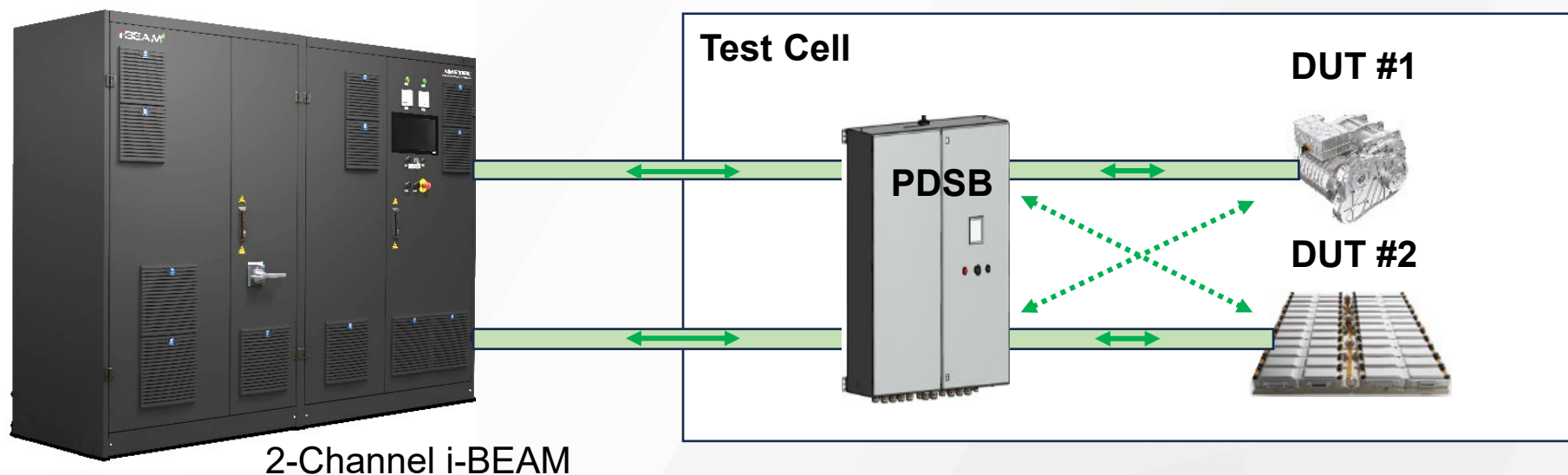
Single Channel i-BEAM



OVERVIEW

Power Distribution Switch Box (PDSB)

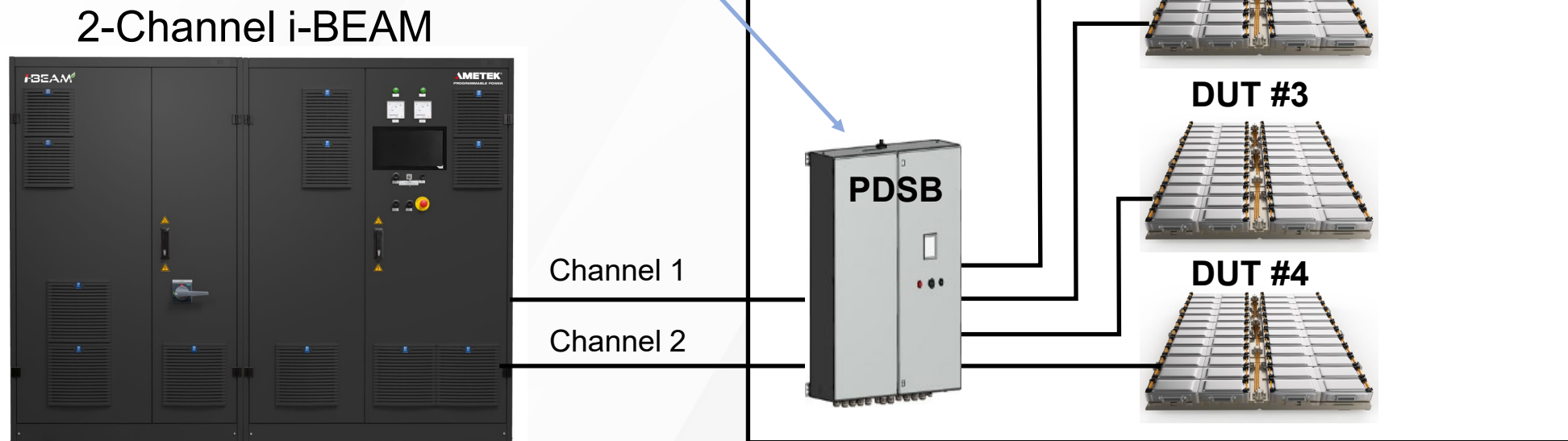
- The PDSB extends the i-BEAM functionality for integration into test cells or other separated areas
 - Separates i-BEAM from test cell
 - Include a Discharge Unit (DCU) for the DUT
 - Connect parallel i-BEAMs
 - Switching to additional DUTs



OVERVIEW

Power Distribution Switch Box (PDSB)

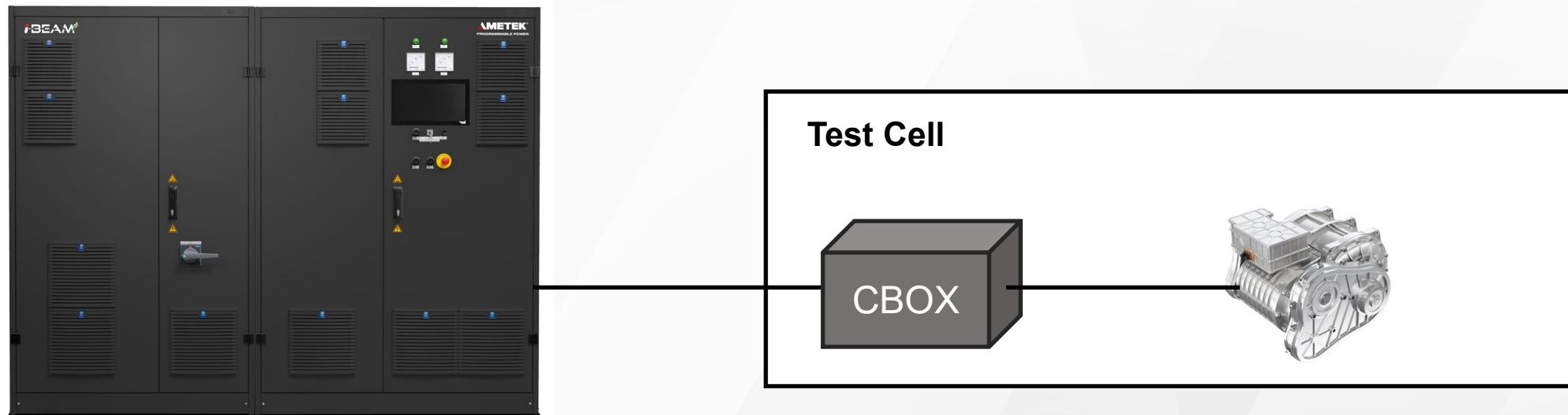
- Multiple switching options available
 - 1 Input / 2 Output
 - 1 Input / 4 Output
 - 2 Input / 2 Output
 - 2 Input / 4 Output



OVERVIEW

Capacitor Box

- The optional Capacitor Box is available as an energy buffer to reduce voltage peaks to the DUT in simulation mode
 - Rated at 1,000V
 - Various capacitance values available; 9,660uF, 2.5mF, 5.8mF, and 176mF



UNIQUE VALUE PROPOSITIONS



intelligent-**B**idirectional **E**nergy **A**Mplified

- 80V to 1000V, +/-1000A, 35 to 650kW in 1, 2 or 4 channel configurations.
- Large 15-inch color touch panel.
- Designed for safety performance level d (PLd) per ISO 13849-1 and EN 60204-1.
- Short circuit proof ($I_{CW} < 3 \text{ kA}$).
- High reliability, long life components – MTBF of 180,000 hours.
- Over voltage, under voltage, over current and over temperature protection.
- AC input protection for voltage, frequency and phase loss. Regenerative to 96%.
- Designed for testing today's complex, high power applications with dedicated battery simulation and testing modes.
- Fast dynamics and high stability to seamlessly switch between source and sink modes with $\leq 0.1\%$ full scale accuracy.
- Easily test battery packs, DC motors, electric powertrains, fuel cells, solar panels, and high-power fuses, contactors and circuit breakers.



SPECIFICATIONS

AC Input

i-BEAM Series Technical Specifications	
AC Input Specifications	
AC Input Voltage and Frequency	380/400*/440/480/500/690 V $\pm 10\%$, 3-phase, 50/60 Hz $\pm 6\%$
Power Consumption	113 kVA
Maximum Power Loss	12.2 kW
Power Factor (at rated power)	> 0.99 ind.
Total Efficiency at Full Load	Voltage: 94.8 % Current: 89.1%
Current (maximum per phase)	181 A at 400 V -10%
Rated Conditional Short Circuit Current	50 kA
Recommended Pre-Fuse	3 each Class <u>gL/gG</u> 200A
Recommended Cable Cross Section	1 x 95 mm ² per terminal, ≥ 50 mm ² PE
Recommended Cable Lug	M10
Rectifier Implementation	Isolation Transformer (DC terminal is floating)

SPECIFICATIONS

DC Output

DC Output Specifications	
Power	35 kW to 650 kW
Voltage	5 – 1,000 VDC
Voltage Ripple	≤ 0.1% Effective Full Scale
Current	± 1,000 A
Current Rise Time	< 1 ms (300V – 800V) < 1.3 ms (1,000V)
Current Ripple	≤ 0.1% Effective Full Scale
Internal Resistance (single operation) ¹	-10 mΩ to +1,000 mΩ
Internal Resistance (parallel operation) ¹	-10 mΩ to +100 mΩ
Accuracy	Voltage/Current: 0.1% Full Scale Power: 0.2% Full Scale of maximum DC power
Tolerance (Static at setpoint value)	Voltage/Current: ± 0.1% Full Scale
Tolerance (Dynamic, 0-100% I _{nom} in 3 ms)	Simulation mode < 1%, Test mode < 3%
Measurement Accuracy / Resolution	Voltage/Current: 0.1% Full Scale / 16-bit Resolution
Short Circuit Performance	Short circuit proof (I _{cw} < 3 kA, short circuit not for longer time) At 200A/600A: Standard 3 kA (optional 8 kA) At 1000A: Always 8 kA
Overvoltage Category	II per EN 60664-1
Remote Sense Compensation	5% maximum of rated output voltage

Notes:

1. Internal resistance can be reset via interface every 100 ms. New setpoints are calculated every 1 ms and smoothed with a low-pass filter for 10 ms.



SPECIFICATIONS

Environmental

Environmental Specifications	
Protection	IP 20 per EN 60529
Protection Class	1 per EN 61140
Operating and Storage Temperature	+5°C to +40°C (+41°F to +104°F); EN 60721-3-3
Transportation Temperature	-45°C to +70°C (-49°F to +158°F); EN 60721-3-2
Operating Humidity	5% - 85% relative humidity without condensation
Operating Altitude	1,000 m (3,280 ft.) with minimum 870 hPa air pressure
Acoustic Noise ²	< 77 dB(a)
Installation Site Recommendations	Operating area with restricted access and installation on a level, Non-Flammable Floor
Cable Entry	From Below
Connection Points	Bottom Front, accessible after doors are open

Notes:

2. The acoustic noise level of the system depends on the load, the loading duration and the environmental conditions; Measurement takes place from front in 1 m high and 1 m distance.



SPECIFICATIONS

Regulatory & Protection

Regulatory Agency Compliance	
EMC Directive	2014/30/EU
EMC Standards	EN 61000-2-4 Class 3, EN 61000-6-2, EN 6100-6-4, EN 55011, EN 61800-3 Cat. C2 (A1)
RoHS Directive	2011/65/EU
General and Safety Standards	EN 60146-1-1, EN 60146-2, EN 62040-1, EN 61439-1, EN 61439-2, EN 62477-1, EN 63000, EN 60529, EN 60721-X, EN 61140
Machine Safety Standards	EN 60204-1, EN 61800-5-2, EN ISO 13849-1, EN ISO 13849-2

Unit Protection	
Output Overvoltage Protection (OVP)	Overvoltage Hardware (HW) Protection. Programmable within voltage range, reaction time less than 1 ms.
	Overvoltage Software (SW) Protection. Software triggered shutdown with a programmable time delay. Limit can be set closer to the maximum voltage level but should be less than the Overvoltage HW set point.
Output Current Limit Protection	Overcurrent (source) and Undercurrent (sink) are programmable within the current range.
Reverse Polarity Protection	Reverse polarity protection active when the DC Converter is off and detected by the sense lines.
AC Input Protection	Automatic shutdown if AC Inputs fall out of nameplate specifications for voltage, frequency or phase loss.
Overtemperature Protection (OTP)	Automatic Overtemperature Protection shutdown when internal component temperature exceeds +40°C (+104°F).

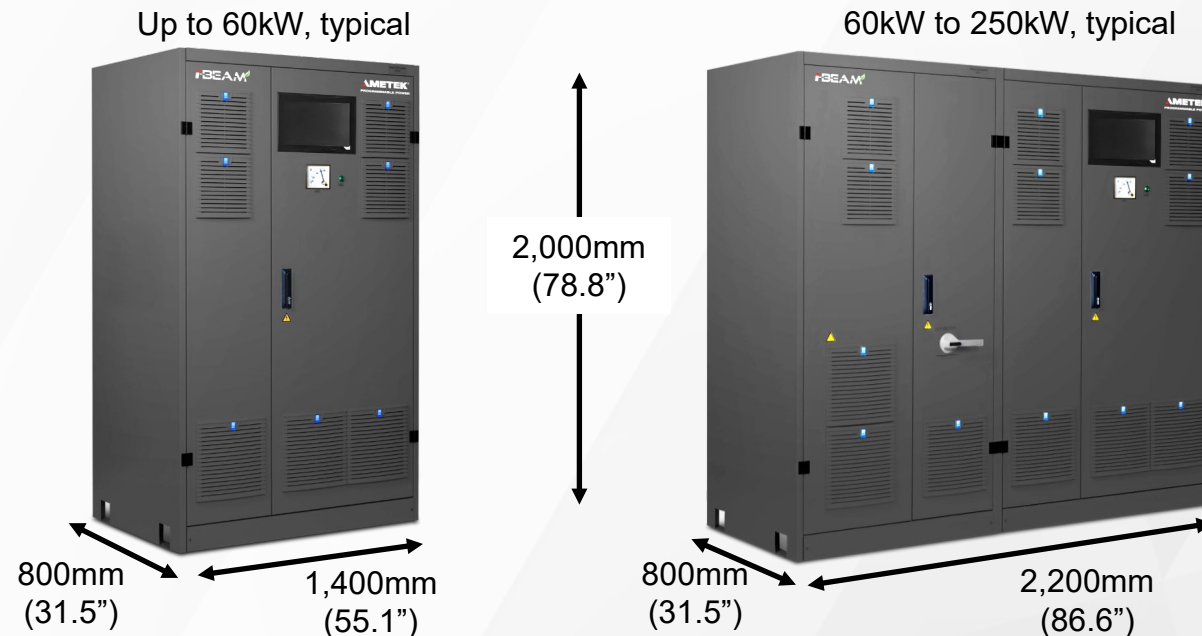


SPECIFICATIONS

Dimensions and Weight (typical)

- Actual dimensions and weights vary by system configuration, options and power rating
- i-BEAM configurations of 320kW and higher require additional cabinets

Cabinet No.	Width	Depth	Height	Weight
1	1,000 mm (39.4 inch)	800 mm (31.5 inch)	2,000 mm (78.8 inch)	1,000 kg (2,205 lbs.)
2	1,200 mm (47.3 inch)	800 mm (31.5 inch)	2,000 mm (78.8 inch)	900 kg (1,984 lbs.)
3	1,200 mm (47.3 inch)	800 mm (31.5 inch)	2,000 mm (78.8 inch)	900 kg (1,984 lbs.)



ORDERING INFORMATION

Basic Equipment

- Input voltage (standard): 3x400V, 3x380V, 50/60Hz: Optional 3x480V
- Main AC switch (switch disconnecter with fuses; lockable in Off-Position)
- Safety control for Performance Level d (PLd) per ISO 13849-1 / EN 60204-1
- 15-inch Display with touch operation
- "Battery tester" version
- Stop button (black button) on cabinet door
- Voltmeter and ready indicator light on cabinet door
- DC output contactors (standard contactor)
- DC current measurement with 0.1 % fs accuracy
- Connection terminals for DC voltage measurement (0.1 % fs accuracy with sense lines)
- Connection terminals for external "Emergency Stop"
- Connection terminals for external "Stop"
- Connection terminals for calibration
- Interface Modbus TCP
- Interface CAN-bus ("100 Hz" with dbc file)
- Interface VNC over Ethernet
- Protection type IP 20
- Noise-reduced version (rubber buffer, fan control)

ORDERING INFORMATION

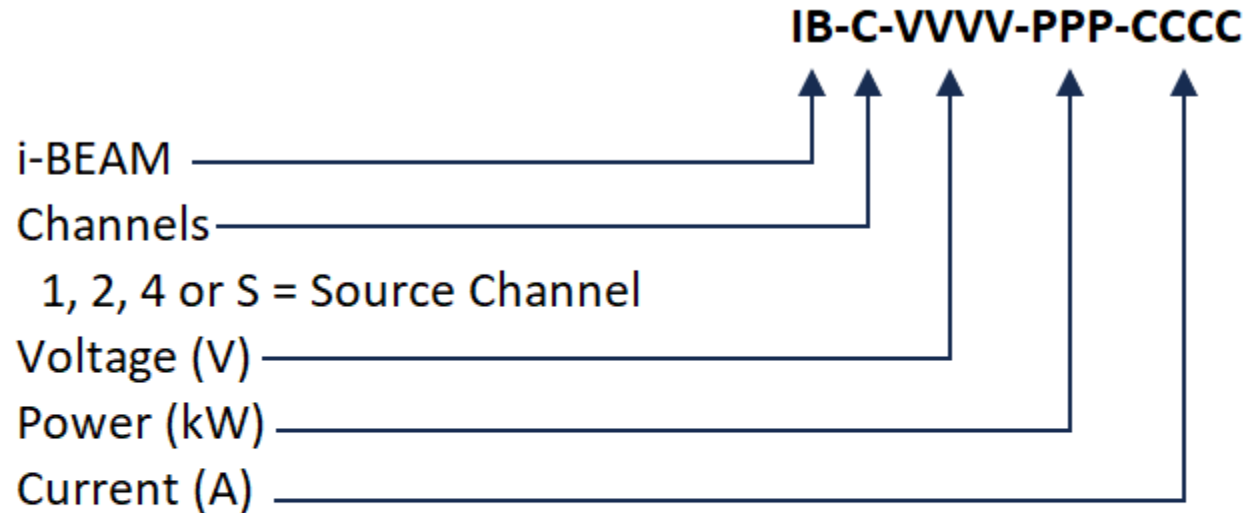
- Structure type name

- System type
- Rated voltage
- Rated power
- Rated current

- Example / IB-1-600-160-1000

- i-BEAM
- 1-Channel
- Nominal voltage 600V
- Rated power 160kW
- Rated current 1000A

i-BEAM Model Number Format



Note: When selecting either 2 or 4 channel products a DC Rectifier Source must also be selected that meets the minimum power requirements (in kW) of the 2 or 4 channel unit.

ORDERING INFORMATION

Standard System, 1-Channel

Nominal voltage

- 300 V
- 600 V
- 800 V
- 1000 V

Nominal power

- 60 kW
- 100 kW
- 160 kW
- 250 kW
- 320 kW
- 400 kW
- 500 kW
- 650 kW

Nominal current

- 200 A
- 600 A
- 1000 A

Two variants for low voltage requirements

- IB-1-80-35-1000 (80 V, 35 kW, 1000 A)
- IB-1-120-50-1000 (120 V, 50 kW, 1000 A)



ORDERING INFORMATION



Standard System, 1-Channel

i-BEAM Series Single Channel Output Models			
MODEL	Voltage (V)	Power (kW)	Current (A)
IB-1-80-35-1000	80	35	1000
IB-1-120-50-1000	120	50	1000
IB-1-300-60-200	300	60	200
IB-1-300-60-600	300	60	600
IB-1-300-60-1000	300	60	1000
IB-1-300-120-600	300	120	600
IB-1-300-120-1000	300	120	1000
IB-1-300-160-1000	300	160	1000
IB-1-600-60-200	600	60	200
IB-1-600-60-600	600	60	600
IB-1-600-60-1000	600	60	1000
IB-1-600-100-200	600	100	200
IB-1-600-100-600	600	100	600
IB-1-600-100-1000	600	100	1000
IB-1-600-160-600	600	160	600
IB-1-600-160-1000	600	160	1000
IB-1-600-250-600	600	250	600
IB-1-600-250-1000	600	250	1000
IB-1-600-320-600	600	320	600
IB-1-600-320-1000	600	320	1000
IB-1-600-400-1000	600	400	1000
IB-1-600-500-1000	600	500	1000
IB-1-800-100-200	800	100	200
IB-1-800-100-600	800	100	600
IB-1-800-100-1000	800	100	1000

i-BEAM Series Single Channel Output Models			
MODEL	Voltage (V)	Power (kW)	Current (A)
IB-1-800-160-200	800	160	200
IB-1-800-160-600	800	160	600
IB-1-800-160-1000	800	160	1000
IB-1-800-250-600	800	250	600
IB-1-800-250-1000	800	250	1000
IB-1-800-320-600	800	320	600
IB-1-800-320-1000	800	320	1000
IB-1-800-400-1000	800	400	1000
IB-1-800-500-1000	800	500	1000
IB-1-1000-60-200	1000	60	200
IB-1-1000-100-200	1000	100	200
IB-1-1000-100-600	1000	100	600
IB-1-1000-100-1000	1000	100	1000
IB-1-1000-160-200	1000	160	200
IB-1-1000-160-600	1000	160	600
IB-1-1000-160-1000	1000	160	1000
IB-1-1000-250-600	1000	250	600
IB-1-1000-250-1000	1000	250	1000
IB-1-1000-320-600	1000	320	600
IB-1-1000-320-1000	1000	320	1000
IB-1-1000-400-600	1000	400	600
IB-1-1000-400-1000	1000	400	1000
IB-1-1000-500-600	1000	500	600
IB-1-1000-500-1000	1000	500	1000
IB-1-1000-650-1000	1000	650	1000



ORDERING INFORMATION

2 and 4-Channel Systems

Nominal voltage

- 300 V
- 600 V
- 800 V
- 1000 V

Nominal power

- 60 kW
- 100 kW
- 160 kW
- 250 kW
- 320 kW
- 400 kW
- 500 kW
- 650 kW

Nominal current

- 200 A
- 600 A
- 1000 A

Note:

- The power and the output voltage of the overall system is determined by the rectifier (Basic DC Source).
- The output current and the number of output channels are determined by the DC converter.
- When selecting the DC converter, make sure that the nominal voltage of the rectifier (Basic DC Source) is the same as the nominal voltage of the DC converter.
- In addition, when selecting the DC converter, make sure that the power of the rectifier (Basic DC Source) does not fall below the minimum required power of the rectifier (value in the price list).

ORDERING INFORMATION

2 and 4-Channel Systems

i-BEAM Series 300V Multichannel Output Models				
MODEL	Channels	Voltage (V)	Power (kW)	Current (A)
IB-2-300-60-200 (Min. 15kW Source Required)	2	300	60	200
IB-4-300-60-200 (Min. 30kW Source Required)	4	300	60	200
IB-2-300-120-600 (Min. 45kW Source Required)	2	300	120	600
IB-4-300-120-600 (Min. 90kW Source Required)	4	300	120	600
IB-2-300-160-1000 (Min. 75kW Source Required)	2	300	160	1000
IB-4-300-160-1000 (Min. 150kW Source Required)	4	300	160	1000

For each product ordered above select one DC Rectifier Source from the list below that meets the Minimum Source Requirement.

i-BEAM Series 300V DC Rectifier Source Models		
MODEL	Voltage (V)	Power (kW)
IB-S-300-60	300	60
IB-S-300-120	300	120
IB-S-300-160	300	160



ORDERING INFORMATION

2 and 4-Channel Systems

i-BEAM Series 600V Multichannel Output Models				
MODEL	Channels	Voltage (V)	Power (kW)	Current (A)
IB-2-600-100-200 (Min. 30kW Source Required)	2	600	100	200
IB-4-600-100-200 (Min. 60kW Source Required)	4	600	100	200
IB-2-600-320-600 (Min. 90kW Source Required)	2	600	320	600
IB-4-600-320-600 (Min. 180kW Source Required)	4	600	320	600
IB-2-600-500-1000 (Min. 150kW Source Required)	2	600	500	1000
IB-4-600-500-1000 (Min. 300kW Source Required)	4	600	500	1000

For each product ordered above select one DC Rectifier Source from the list below that meets the Minimum Source Requirement.

i-BEAM Series 600V DC Rectifier Source Models		
MODEL	Voltage (V)	Power (kW)
IB-S-600-60	600	60
IB-S-600-100	600	100
IB-S-600-160	600	160
IB-S-600-250	600	250
IB-S-600-320	600	320
IB-S-600-400	600	400
IB-S-600-500	600	500



ORDERING INFORMATION

2 and 4-Channel Systems

i-BEAM Series 800V Multichannel Output Models				
MODEL	Channels	Voltage (V)	Power (kW)	Current (A)
IB-2-800-100-200 (Min. 40kW Source Required)	2	800	100	200
IB-4-800-100-200 (Min. 80kW Source Required)	4	800	100	200
IB-2-800-400-600 (Min. 120kW Source Required)	2	800	400	600
IB-4-800-400-600 (Min. 240kW Source Required)	4	800	400	600
IB-2-800-500-1000 (Min. 200kW Source Required)	2	800	500	1000
IB-4-800-500-1000 (Min. 400kW Source Required)	4	800	500	1000

For each product ordered above select one DC Rectifier Source from the list below that meets the Minimum Source Requirement.

i-BEAM Series 800V DC Rectifier Source Models		
MODEL	Voltage (V)	Power (kW)
IB-S-800-100	800	100
IB-S-800-160	800	160
IB-S-800-250	800	250
IB-S-800-320	800	320
IB-S-800-400	800	400
IB-S-800-500	800	500

ORDERING INFORMATION

2 and 4-Channel Systems

i-BEAM Series 1000V Multichannel Output Models				
MODEL	Channels	Voltage (V)	Power (kW)	Current (A)
IB-2-1000-250-200 (Min. 50kW Source Required)	2	1000	250	200
IB-4-1000-250-200 (Min. 100kW Source Required)	4	1000	250	200
IB-2-1000-500-600 (Min. 150kW Source Required)	2	1000	500	600
IB-4-1000-500-600 (Min. 300kW Source Required)	4	1000	500	600
IB-2-1000-650-1000 (Min. 250kW Source Required)	2	1000	650	1000
IB-4-1000-650-1000 (Min. 500kW Source Required)	4	1000	650	1000

For each product ordered above select one DC Rectifier Source from the list below that meets the Minimum Source Requirement.

i-BEAM Series 1000V DC Rectifier Source Models		
MODEL	Voltage (V)	Power (kW)
IB-S-1000-100	1000	100
IB-S-1000-160	1000	160
IB-S-1000-250	1000	250
IB-S-1000-320	1000	320
IB-S-1000-400	1000	400
IB-S-1000-500	1000	500
IB-S-1000-650	1000	650



ORDERING INFORMATION

Equipment Options

- UL-489 Compliant Cabinet Options
- 3-phase, 480VAC Options
- Interface Options
- Test Application Options
- Safety and Cabinet Options
- Capacitor Box (CBOX) Options
- Power Distribution Unit (PDU) Option
- Power Distribution Switch Box (PDSB) Options

ORDERING INFORMATION

Cabinet Options for USA / Canada

i-BEAM Series Options	
OPTION MODEL	DESCRIPTION
Cabinet Options for USA / Canada	
IB-CAB-USA-100	UL-489 Compliant Cabinet, 100kW Version USA / Canada
IB-CAB-USA-160	UL-489 Compliant Cabinet, 160kW Version USA / Canada
IB-CAB-USA-250	UL-489 Compliant Cabinet, 250kW Version USA / Canada
IB-CAB-USA-320	UL-489 Compliant Cabinet, 320kW Version USA / Canada
IB-CAB-USA-400	UL-489 Compliant Cabinet, 400kW Version USA / Canada
IB-CAB-USA-500	UL-489 Compliant Cabinet, 500kW Version USA / Canada
IB-CAB-USA-650	UL-489 Compliant Cabinet, 650kW Version USA / Canada
IB-PDSB-CAB-USA	UL-489 Compliant Power Distribution Switch Box USA / Canada
IB-AC-IN-480	480VAC $\pm 10\%$, 3-Phase Input; 480VAC $\pm 10\%$ standard mains voltage of 3 / PE, for Single-Channel Units.
IB-M-AC-IN-480	480VAC $\pm 10\%$, 3-Phase Input; 480VAC $\pm 10\%$ standard mains voltage of 3 / PE, for 2-Channel and 4-Channel Units.



Interface and Control Communication Options

Interface and Control Communication Options	
IB-IF-ETHERCAT	EtherCAT Interface (2 each RJ45 Connectors); 100 Mbit/s Transmission Rate
IB-IF-PROFIBUS	Profibus Interface (9-pin DSUB Connector); 12 Mbit/s Transmission Rate
IB-IF-PROFINET	Profinet Interface (2 each RJ45 Connectors); 12 Mbit/s Transmission Rate
IB-IF-HSCAN	High-Speed CAN Bus Interface (1 kHz Rate)
IB-IF-SCPI	SCPI Interface, Single Channel Units Only.
IB-IF-ANALOG-IN	Analog Input Signal (Voltage = 0-10V Full Scale; Current = $\pm 10V$ Full Scale)
IB-IF-ANALOG-OUT	Analog Output Signal (Voltage = 0-10V Full Scale; Current = $\pm 10V$ Full Scale)
IB-IF-HS-ANALOG	High-Speed Analog Control ($\pm 10V = \pm$ Full Scale) for Single Channel Units Only
IB-RC-100MB-VPN	Remote Control VPN for AMETEK Maintenance
IB-RC-100-RENT	Rental fee for remote service module (Tosi-Box) - Provision of the remote service module to install a software update on the B&R controller.
IB-REMOTE-UPDATE	Software Adjustment via Remote Control Please note: Lead time approx. 2 weeks
IB-TEAM-VIEW	Software adjustment via <u>Teamviewer</u> For the adjustment of the software, a "communication PC" with Internet access is required on site. Please note: Lead time approx. 2 weeks
IB-IF-LABVIEW	LabVIEW (NI) Interface with USB to CAN Converter
IB-IF-MATLAB	MATLAB/Simulink Interface, includes PC and B&R Automation Studio Software

Test Application Options

IB-BAT-S-300	Battery Simulator for 300V Systems. One each required per channel. For systems $\leq 600A$ the short-time withstand DC Output Capacitors are recommended, IB-DC-1000. Output filter is optimized for battery simulation by additional MKP capacitors.
IB-BAT-S-600	Battery Simulator for 600V Systems. One each required per channel. For systems $\leq 600A$ the short-time withstand DC Output Capacitors are recommended, IB-DC-1000. Output filter is optimized for battery simulation by additional electrolytic capacitors.
IB-BAT-S-800	Battery Simulator for 800V Systems. One each required per channel. For systems $\leq 600A$ the short-time withstand DC Output Capacitors are recommended, IB-DC-1000. Output filter is optimized for battery simulation by additional electrolytic capacitors.
IB-BAT-S-1000	Battery Simulator for 1000V Systems. One each required per channel. For systems $\leq 600A$ the short-time withstand DC Output Capacitors are recommended, IB-DC-1000. Output filter is optimized for battery simulation by additional electrolytic capacitors.

ORDERING INFORMATION

Test Application Options

IB-BAT-TS-300	Battery Tester/Simulator for 300V Systems. One each required per channel. For systems $\leq 600A$ the short-time withstand DC Output Capacitors are recommended, IB-DC-1000. Output filter is optimized by switching in capacitors for the tester or simulator modes.
IB-BAT-TS-600	Battery Tester/Simulator for 600V Systems. One each required per channel. For systems $\leq 600A$ the short-time withstand DC Output Capacitors are recommended, IB-DC-1000. Output filter is optimized by switching in capacitors for the tester or simulator modes.
IB-BAT-TS-800	Battery Tester/Simulator for 800V Systems. One each required per channel. For systems $\leq 600A$ the short-time withstand DC Output Capacitors are recommended, IB-DC-1000. Output filter is optimized by switching in capacitors for the tester or simulator modes.
IB-BAT-TS-1000	Battery Tester/Simulator for 1000V Systems. One each required per channel. For systems $\leq 600A$ the short-time withstand DC Output Capacitors are recommended, IB-DC-1000. Output filter is optimized by switching in capacitors for the tester or simulator modes.



Test Application Options

IB-DC-1000	Output Contactors with Increased Short-time Withstand Current. One each required per channel. Vnom 1500V, thermal continuous current 1000A, <u>short-time</u> withstand current ICW 8kA.
IB-DUAL-CR-100-10	Current Range Switching. Single-Channel only. Range 1: 100% of nominal current, Range 2: 10% of nominal current for measuring low currents only. Switch change only when output is off.
IB-MEAS-05-CERT	0.05% Measurement Accuracy, Test Certificate Included. Required for each channel.
IB-FC-DEXT-1000	Protection Diode in a Separate Cabinet. Maximum Rating 1000V / 1000A, for Fuel Cell Testing. Cabinet dimensions: 600 x 800 x 2000mm (23.6 x 31.5 x 78.8 inch). Weight: 200kg (441 lbs.).
IB-FC-DINT-1000	Protection Diode Mounted in Cabinet. Only for 2-Channel or 4-Channel systems. Maximum Rating 1000V / 1000A, for Fuel Cell Testing. Cabinet width increases by 200mm (7.9 inch).
IB-PCD-1	Parallel Control Device. Upgrade to allow parallel operation of two single-channel units with same voltage/current rating. One required for each single-channel unit. Not available for 2-Channel and 4-Channel systems.
IB-PL-D-PAR	Safety Master Control for Parallel Operation for Performance Level 'd', mounted in an external cabinet. Cabinet dimensions: 600 x 250 x 800mm (23.6 x 9.8 x 31.5 inch).
IB-PL-D-FLOOR	Safety Master Control for Parallel Operation in a floor standing cabinet. Required to achieve "Performance Level d" in parallel operation of two i-BEAMs. <ul style="list-style-type: none"> - Dimensions: 600 x 250 x 800mm (23.6" x 9.8" x 31.5") - Safety control with operating mode selector switch (single and parallel operation)
IB-PL-D-DSB	Safety Master Control for Parallel Operation (PDSB) for Performance Level 'd', Installed in the Power Distribution Switch Box with 2 inputs and 1 output, ordered separately.



Safety and Cabinet Options

IB-ESTOP-PL-D	Change of safe shutdown time (Emergency Stop) Standard setting: 5 sec. Range is 0.5 to 100sec. Includes the verification of safety controller software to confirm "Performance level d" per DIN EN 13849.
IB-ESTOP-2CON	Emergency Stop (E-STOP) Switch (yellow/red) with Protective Collar installed in control cabinet door. Includes two potential-free normally open contact connections, contacts close when E-STOP activated.
IB-ESTOP-DOOR-CON	Door Closed Contacts. E-STOP activated when cabinet doors open, E-STOP cannot be reset while doors are open. Only available on 2-Channel and 4-Channel systems. One required for each cabinet.
IB-MAG-SAFE-DOOR	Magnetic Door Safety Interlocks. Doors cannot be opened while AC Mains switch is on. System cannot start with doors open. Only available on 2-Channel and 4-Channel systems. One required for each cabinet.
IB-DOOR-LOCK	Keyed Door Locks per Cabinet.
IB-CAB-LAMP	Cabinet Lamp. Cabinet lighting with motion sensor mounted on the cabinet ceiling in the front area. One per cabinet.
IB-CAB-BASE-200	Cabinet Base Frame. Raises the cabinet base 200mm (7.87 inch) to accommodate large cross-section cable entry. One per cabinet.
IB-CAB-WHEELS	Cabinet Wheels. Four wheeled castors per cabinet, two with stop latches. Adds 182 mm (7.17 inch) to cabinet height. For Rittal cabinet height is increased by 270mm (10.6 inch).
IB-LIFT-LUGS	Add 4 Lifting Lugs per Cabinet per DIN 580/582. Not available for cabinets > 1000 kg (2,204 lbs.).

ORDERING INFORMATION

Capacitor Box (CBOX) Options

IB-CBOX-800-19800	External Capacitor Box, 800 V, 19,800 μ F, plastic enclosure, includes discharge resistors and 5 m (16 foot) cables with M10 ring lugs for connection to DUT.
IB-CBOX-1000-8100	External Capacitor Box, 1000 V, 8100 μ F, plastic enclosure, includes discharge resistors and 5 m (16 foot) cables with M10 ring lugs for connection to DUT.
IB-CBOX-P-1000-20000	External Capacitor Box, 1000 V, 20,000 μ F, plastic enclosure, includes discharge resistors and 5 m (16 foot) cables with M10 ring lugs for connection to DUT.
IB-CBOX-800-20360	External Capacitor Box, 800 V, 20,360 μ F, metal enclosure, includes discharge resistors and 5 m (16 foot) cables with M10 ring lugs for connection to DUT.
IB-CBOX-1000-9660	External Capacitor Box, 1000 V, 9,660 μ F, metal enclosure, includes discharge resistors and 5 m (16 foot) cables with M10 ring lugs for connection to DUT.
IB-CBOX-1100-2500	External Capacitor Box, 1100V, 2500 μ F, metal enclosure, includes discharge resistors and 5 m (16 foot) cables with M10 ring lugs for connection to DUT.
IB-CBOX-M-1100-5800	External Capacitor Box, 1100V, 5800 μ F, metal enclosure, includes discharge resistors and 5 m (16 foot) cables with M10 ring lugs for connection to DUT.

Power Distribution Unit (PDU) Options

Power Distribution Unit (PDU) Options	
IB-PDU-1000-1-1	<p>PDU 1000V/1000A, 1 Input / 1 Output Connection cabinet for DUT, Installation next to test device</p> <ul style="list-style-type: none">- Electrical data: 1000V / 1000A- Dimensions 1000 x 310 x 1000mm (39.4" x 12.2" x 39.4")- STOP-button, Reset-button and Signal light in front door- Signaling columns with indicator lights (red, yellow, green, white)- Voltmeter "1000V"
IB-PDU-2000-2-1	<p>PDU 1000V/2000A, 2 Input / 1 Output Connection cabinet for DUT, Installation next to test device</p> <ul style="list-style-type: none">- Electrical data: 1000V / 2000A- Dimensions 600 x 600 x 1900mm (23.6" x 23.6" x 74.8")- STOP-button, Reset-button and Signal light in front door- Signaling columns with indicator lights (red, yellow, green, white)- Voltmeter "1000V"
IB-PDU-4000-4-1	<p>PDU 1000V/2000A, 4 Input / 1 Output Connection cabinet for DUT, Installation next to test device</p> <ul style="list-style-type: none">- Electrical data: 1000V / 4000A- Dimensions on request- STOP-button, Reset-button and Signal light in front door- Signaling columns with indicator lights (red, yellow, green, white)- Voltmeter "1000V"



Power Distribution Switch Box (PDSB) Options

Power Distribution Switch Box Options for Single Channel Units (No Test Bench Switching)	
IB-PDSB-1-1-1KA-2	<p>PDSB 1000V / 1000A (1 Input / 1 Output; space for 2 DCU) additional cabinet (PDSB) for i-BEAM for installation of 2 DCUs</p> <ul style="list-style-type: none"> - Empty space for the installation of max. 2 DCU - Dimensions: 600x800x2000mm (23.6x31.5x78.7 inches)
IB-PDSB-2-1-2KA-2	<p>PDSB 1000V / 2000A (2 Input / 1 Output; space for 2 DCU) additional control cabinet (PDSB) for paralleling two i-BEAMs and for installation of 2 <u>DCUs</u></p> <ul style="list-style-type: none"> - Empty space for the installation of max. 2 DCU - Dimensions: 800x800x2000mm (31.5x31.5x78.7 inches) <p>Note: To achieve DIN EN 13849 performance level 'd' order Safety Control IB-SAFE-MST-PDSB</p>
IB-SAFE-MST-PDSB	<p>Safety Master Control for Parallel Operation (PDSB) Required to achieve Performance Level 'd' in parallel operation of two i-BEAMs.</p> <ul style="list-style-type: none"> - Installation in PDSB with 2 Input / 1 Output (needs to be ordered separately)
Power Distribution Switch Box Options for Single Channel Units (with Test Bench Switching)	
IB-PDSB-E-1-2-600-2	<p>PDSB with contactor 1000V / 600A (1 Input / 2 Output; space for 2 DCU) additional control cabinet (PDSB) with the hardware equipment for power distribution from one i-BEAM to two test stands / DUT and the installation of max. 2 DCU consisting of:</p> <ul style="list-style-type: none"> - Dimensions: 800x800x2000mm (31.5x31.5x78.7 inches) - 4 changeover contactors (rated current 600A)



ORDERING INFORMATION

Power Distribution Switch Box (PDSB) Options

<p>IB-PDSB-E-1-2-1K</p>	<p>PDSB with contactor 1000V / 1000A (1 Input / 2 Output) Additional control cabinet (PDSB) with the hardware equipment for power distribution from one i-BEAM to two test stands / DUT and the installation of max. 4 DCU consisting of:</p> <ul style="list-style-type: none"> - Dimensions: 1200x800x2000mm (47.2x31.5x78.7 inches) - 4 changeover contactors (rated current 1000A) - 4 changeover relays for sense measuring cable - Switching contactors, switching relays and display elements wired to terminals <p>Note: <u>PLd</u> only for version with option "IB-PDSB-S-1-2-PL-6" A standard PDU can only be connected with the option "IB-PDSB-S-1-2-PL-6"</p>														
<p>IB-PDSB-S-1-2-PL-6</p>	<p>PDSB "safety control" (1 Input / 2 Output) Installation of the safety controller to achieve performance level "d" per DIN EN 13849 in the PDSB 1 input / 2 outputs consisting of:</p> <ul style="list-style-type: none"> - Safety control, operating and display elements for controlling the output contactors according to the selected operating mode - Power supply for controlling the change-over contactors (load circuit) and change-over relay (sensor measuring line) <table border="1" data-bbox="1014 1058 1857 1310"> <thead> <tr> <th rowspan="2">Operation mode</th> <th colspan="2">i-BEAM System</th> </tr> <tr> <th>TC 1 / DUT 1</th> <th>TC 2 / DUT 2</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Contactors open</td> <td>Contactors open</td> </tr> <tr> <td>2</td> <td><u>xxxkW/1000V/1000A</u></td> <td>Contactors open</td> </tr> <tr> <td>3</td> <td>Contactors open</td> <td><u>xxxkW/1000V/1000A</u></td> </tr> </tbody> </table>	Operation mode	i-BEAM System		TC 1 / DUT 1	TC 2 / DUT 2	1	Contactors open	Contactors open	2	<u>xxxkW/1000V/1000A</u>	Contactors open	3	Contactors open	<u>xxxkW/1000V/1000A</u>
Operation mode	i-BEAM System														
	TC 1 / DUT 1	TC 2 / DUT 2													
1	Contactors open	Contactors open													
2	<u>xxxkW/1000V/1000A</u>	Contactors open													
3	Contactors open	<u>xxxkW/1000V/1000A</u>													



THE END



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