

13. ACCESSORIES

13.1. Braking resistors

13.1.1. APPLICATION TABLES

From size S05 to size S30, SINUS K inverters are supplied with a built-in braking unit. The braking resistor is to be incorporated in the inverter and connected to terminal B and terminal + (see section "Wiring"). For IFD SW only, the braking unit is enabled through programming parameter C57, Special Functions submenu. An external braking unit is used for greater sizes (BU200, BU720, BU1440). When choosing the braking resistor, consider its Ohm value and rated power. The Ohm value determines the instant power dissipated in the braking resistor and is relating to the motor power; the rated power determines the mean power to be dissipated in the braking resistor and is relating to the duty cycle of the equipment, i.e. to the resistor activation time with respect to the duty cycle full time (the duty cycle of the resistor is equal to the motor braking time divided by the equipment duty cycle).

It is not possible to connect resistors with an Ohm value lower than the min. value acknowledged by the inverter.

The following pages contain application tables stating the resistors to be used depending on the inverter size, the application requirements and the supply voltage. The braking resistor power is stated as an approximate value. A correct dimensioning of the braking resistor is based on the equipment duty cycle and the power regenerated during the braking stage.

For more details on the connection and features of the external braking unit, refer to section 13.2.

13.1.1.1. BRAKING RESISTORS FOR APPLICATIONS WITH A BRAKING DUTY CYCLE OF 10% AND 380-500VAC SUPPLY VOLTAGE

Size	Inverter Model SINUS K 4T	Braking Unit	Min resistor To be Connected To the inverter Ω	DUTY CYCLE 10%		
				type	Degree of Protection	Cod.
S05	0005	internal	50	75 Ω -550W	IP33	RE3063750
	0007	internal	50	75 Ω -550W	IP33	RE3063750
	0009	internal	50	50 Ω -1100W	IP55	RE3083500
	0011	internal	50	50 Ω -1100W	IP55	RE3083500
	0014	internal	50	50 Ω -1100W	IP55	RE3083500
S10	0016	internal	50	50 Ω -1500W	IP54	RE3093500
	0017	internal	50	50 Ω -1500W	IP54	RE3093500
	0020	internal	50	50 Ω -1500W	IP54	RE3093500
	0025	internal	20	25 Ω -1800W	IP54	RE3103250
	0030	internal	20	25 Ω -1800W	IP54	RE3103250
	0035	internal	20	25 Ω -1800W	IP54	RE3103250
S15	0038	internal	15	15 Ω -4000W	IP20	RE3483150
	0040	internal	15	15 Ω -4000W	IP20	RE3483150
	0049	internal	10	15 Ω -4000W	IP20	RE3483150
S20	0060	internal	10	10 Ω -8000W	IP20	RE3763100
	0067	internal	10	10 Ω -8000W	IP20	RE3763100
	0074	internal	8.5	10 Ω -8000W	IP20	RE3763100
	0086	internal	8.5	10 Ω -8000W	IP20	RE3763100
S30	0113	internal	6	6.6 Ω -12000W	IP20	RE4022660
	0129	internal	6	6.6 Ω -12000W	IP20	RE4022660
	0150	internal	5	6.6 Ω -12000W	IP20	RE4022660
	0162	internal	5	6.6 Ω -12000W	IP20	RE4022660
S40	0179	2*BU200	6	2*10 Ω -8000W (*)	IP20	2*RE3763100
	0200	2*BU200	6	2*6.6 Ω -12000W (*)	IP20	2*RE4022660
	0216	2*BU200	6	2*6.6 Ω -12000W (*)	IP20	2*RE4022660
	0250	2*BU200	6	2*6.6 Ω -12000W (*)	IP20	2*RE4022660
S50	0312	3*BU200	6	3*6.6 Ω -12000W (*)	IP20	3*RE4022660
	0366	3*BU200	6	3*6.6 Ω -12000W (*)	IP20	3*RE4022660
	0399	3*BU200	6	3*6.6 Ω -12000W (*)	IP20	3*RE4022660
S60	0457	3*BU200	6	3*6.6 Ω -12000W (*)	IP20	3*RE4022660
	0524	4*BU200	6	4*6.6 Ω -12000W (*)	IP20	4*RE4022660
S65	0598	BU1440 2T-4T	0.48	1.2Ohm/64000W(*)	IP23	RE4562120
	0748	BU1440 2T-4T	0.48	1.2Ohm/64000W(*)	IP23	RE4562120
	0831	BU1440 2T-4T	0.48	2*1.6Ohm/48000W(*)	IP23	2*RE4462160

(note1): For the connection of BU200 and the braking resistor, see Chapter below 13.2 "Braking Unit"



DANGER

Braking resistors may reach temperatures higher than 200°C.



CAUTION

Power dissipated by braking resistors may be equal to approx. 10% of the connected motor rated power. Use a proper air-cooling system. Do not install braking resistors near heat-sensitive equipment or objects.



CAUTION

Do not connect any braking resistor with an Ohm value lower than the value stated in the application tables.

13.1.1.2. BRAKING RESISTORS FOR APPLICATIONS WITH A BRAKING DUTY CYCLE OF 20% AND 380-500VAC SUPPLY VOLTAGE

Size	Inverter Model SINUS K 4T	Braking Unit	Min resistor To be Connected To the inverter	DUTY CYCLE 10%		
			Ω	type		Cod.
S05	0005	internal	50	50 Ω -1100W	IP55	RE3083500
	0007	Internal	50	50 Ω -1100W	IP55	RE3083500
	0009	Internal	50	50 Ω -1100W	IP55	RE3083500
	0011	Internal	50	50 Ω -1500W	IP54	RE3093500
	0014	Internal	50	50 Ω -1500W	IP54	RE3093500
S10	0016	Internal	50	50 Ω -2200W	IP54	RE3113500
	0017	Internal	50	50 Ω -2200W	IP54	RE3113500
	0020	Internal	50	50 Ω -4000W	IP20	RE3483500
	0025	Internal	20	25 Ω -4000W	IP20	RE3483250
	0030	Internal	20	25 Ω -4000W	IP20	RE3483250
	0035	Internal	20	25 Ω -4000W	IP20	RE3483250
S15	0038	Internal	15	15 Ω -4000W	IP20	RE3483150
	0040	Internal	15	15 Ω -4000W	IP20	RE3483150
	0049	Internal	10	10 Ω -8000W	IP20	RE3763100
S20	0060	Internal	10	10 Ω -8000W	IP20	RE3763100
	0067	Internal	10	10 Ω -12000W	IP20	RE4023100
	0074	Internal	8.5	10 Ω -12000W	IP20	RE4023100
	0086	Internal	8.5	10 Ω -12000W	IP20	RE4023100
S30	0113	Internal	6	2*3.3 Ω -8000W (*)	IP20	2*RE3762330
	0129	Internal	6	2*3.3 Ω -8000W (*)	IP20	2*RE3762330
	0150	Internal	5	2*10 Ω -12000W (**)	IP20	2*RE4023100
	0162	Internal	5	2*10 Ω -12000W (**)	IP20	2*RE4023100
S40	0179	2* BU200	6.6	2*6.6 Ω -12000W (***)	IP20	2*RE4022660
	0200	2* BU200	6.6	2*6.6 Ω -12000W (***)	IP20	2*RE4022660
	0216	3* BU200	6.6	3*6.6 Ω -12000W (***)	IP20	3*RE4022660
	0250	3* BU200	6.6	3*6.6 Ω -12000W (***)	IP20	3*RE4022660
S50	0312	4* BU200	6.6	4*6.6 Ω -12000W (***)	IP20	4*RE4022660
	0366	4* BU200	6.6	4*6.6 Ω -12000W (***)	IP20	4*RE4022660
	0399	4* BU200	6.6	4*6.6 Ω -12000W (***)	IP20	4*RE4022660
S60	0457	5*BU200	6.6	5*10 Ω -12000W (***)	IP20	5*RE4023100
	0524	5*BU200	6.6	5*10 Ω -12000W (***)	IP20	5*RE4023100
S65	0598	BU1440 2T-4T	0.48	2*2.4 Ω -64000W(***)	IP23	2*RE4562240
	0748	BU1440 2T-4T	0.48	2*2.4 Ω -64000W(***)	IP23	2*RE4562240
	0831	BU1440 2T-4T	0.48	2*1.6 Ω -64000W(***)	IP23	2*RE4562160

(note 1): Two series-connected resistors, 3.3 Ω /8000W

(note 2): Two parallel-connected resistors, 10 Ω /12000W

(note 3): For the connection of BU200 and the braking resistor, see Chapter below 13.2 "Braking Unit"



DANGER

Braking resistors may reach temperatures higher than 200°C.



CAUTION

Power dissipated by braking resistors may be equal to approx. 20% of the connected motor rated power. Use a proper air-cooling system. Do not install braking resistors near heat-sensitive equipment or objects.



CAUTION

Do not connect any braking resistor with an Ohm value lower than the value stated in the application tables.

13.1.1.3. BRAKING RESISTORS FOR APPLICATIONS WITH A BRAKING DUTY CYCLE OF 50% AND 380-500VAC SUPPLY VOLTAGE

Size	Inverter Model SINUS K 4T	Braking Unit	Min resistor To be Connected To the inverter	DUTY CYCLE 10%		
			Ω	type		Code
S05	0005	Internal	50	50 Ω -4000W	IP23	RE3503500
	0007	Internal	50	50 Ω -4000W	IP23	RE3503500
	0009	Internal	50	50 Ω -4000W	IP23	RE3503500
	0011	Internal	50	50 Ω -4000W	IP23	RE3503500
	0014	Internal	50	50 Ω -4000W	IP23	RE3503500
S10	0016	Internal	50	50 Ω -8000W	IP23	RE3783500
	0017	Internal	50	50 Ω -8000W	IP23	RE3783500
	0020	Internal	50	50 Ω -8000W	IP23	RE3783500
	0025	Internal	20	20 Ω -12000W	IP23	RE4053200
	0030	Internal	20	20 Ω -12000W	IP23	RE4053200
	0035	Internal	20	20 Ω -12000W	IP23	RE4053200
S15	0038	Internal	15	15 Ω -16000W	IP23	RE4163150
	0040	Internal	15	15 Ω -16000W	IP23	RE4163150
	0049	Internal	10	15 Ω -16000W	IP23	RE4163150
S20	0060	Internal	10	10 Ω -24000W	IP23	RE4293100
	0067	Internal	10	10 Ω -24000W	IP23	RE4293100
	0074	Internal	8.5	10 Ω -24000W	IP23	RE4293100
	0086	Internal	8.5	10 Ω -24000W	IP23	RE4293100
S30	0113	Internal	6	6 Ω -48000W	IP23	RE4462600
	0129	Internal	6	6 Ω -48000W	IP23	RE4462600
	0150	Internal	5	5 Ω -64000W	IP23	RE4562500
	0162	Internal	5	5 Ω -64000W	IP23	RE4562500
S40	0179	3 * BU200	10	3*10 Ω -24000W (*)	IP23	3*RE4293100
	0200	3 * BU200	10	3*10 Ω -24000W (*)	IP23	3*RE4293100
	0216	3 * BU200	10	3*10 Ω -24000W (*)	IP23	3*RE4293100
	0250	4 * BU200	10	4*10 Ω -24000W (*)	IP23	4*RE4293100
S50	0312	4 * BU200	10	4*10 Ω -24000W (*)	IP23	4*RE4293100
	0366	6 * BU200	10	6*10 Ω -24000W (*)	IP23	6*RE4293100
	0399	6 * BU200	10	6*10 Ω -24000W (*)	IP23	6*RE4293100
S60	0457	8 * BU200	10	8*10 Ω -24000W (*)	IP23	8*RE4293100
	0524	10 * BU200	10	10*10 Ω -24000W (*)	IP23	10*RE4293100
S65	0598	BU1440 2T-4T	0.48	4*1.2 Ω -64000W(*)	IP23	4*RE4562120
	0748	BU1440 2T-4T	0.48	4*1.2 Ω -64000W(*)	IP23	4*RE4562120
	0831	BU1440 2T-4T	0.48	4*0.8 Ω -64000W(*)	IP23	4*RE4561800

(note 1): For the connection of BU200 and the braking resistor, see Chapter below 13.2 "Braking Unit"



DANGER

Braking resistors may reach temperatures higher than 200°C.



CAUTION

Power dissipated by braking resistors may be equal to approx. 50% of the connected motor rated power. Use a proper air-cooling system. Do not install braking resistors near heat-sensitive equipment or objects.



CAUTION

Do not connect any braking resistor with an Ohm value lower than the value stated in the application tables.

13.1.1.4. BRAKING RESISTORS FOR APPLICATIONS WITH A BRAKING DUTY CYCLE OF 10% AND 200-240VAC SUPPLY VOLTAGE

Size	Inverter Model SINUS K 4T	Braking Unit	Min resistor To be Connected To the inverter	DUTY CYCLE 10%		
			Ω	type		Code
S05	0005	Internal	25.0	56 Ω -350W	IP55	RE2643560
	0007	Internal	25.0	56 Ω -350W	IP55	RE2643560
	0009	Internal	25.0	2*56 Ω -350W (*)	IP55	2*RE2643560
	0011	Internal	25.0	2*56 Ω -350W (*)	IP55	2*RE2643560
	0014	Internal	25.0	2*56 Ω -350W (*)	IP55	2*RE2643560
S10	0016	Internal	25.0	2*56 Ω -350W (*)	IP55	2*RE2643560
	0017	Internal	25.0	2*56 Ω -350W (*)	IP55	2*RE2643560
	0020	Internal	25.0	2*56 Ω -350W (*)	IP55	2*RE2643560
	0025	Internal	10.0	15 Ω -1100W	IP55	RE3083150
	0030	Internal	10.0	15 Ω -1100W	IP55	RE3083150
	0035	Internal	10.0	15 Ω -1100W	IP55	RE3083150
S15	0038	Internal	7.5	2*15 Ω -1100W (*)	IP55	2*RE3083150
	0040	Internal	7.5	2*15 Ω -1100W (*)	IP55	2*RE3083150
	0049	Internal	5.0	5 Ω -4000W	IP20	RE3482500
S20	0060	Internal	5.0	5 Ω -4000W	IP20	RE3482500
	0067	Internal	5.0	5 Ω -4000W	IP20	RE3482500
	0074	Internal	4.2	5 Ω -4000W	IP20	RE3482500
	0086	Internal	4.2	5 Ω -4000W	IP20	RE3482500
S30	0113	Internal	3.0	3.3 Ω -8000W	IP20	RE3762330
	0129	Internal	3.0	3.3 Ω -8000W	IP20	RE3762330
	0150	Internal	2.5	3.3 Ω -8000W	IP20	RE3762330
	0162	Internal	2.5	3.3 Ω -8000W	IP20	RE3762330
S40	0179	2 * BU200	3.0	2*3.3 Ω -8000W (**)	IP20	2*RE3762330
	0200	2 * BU200	3.0	2*3.3 Ω -8000W (**)	IP20	2*RE3762330
	0216	2 * BU200	3.0	2*3.3 Ω -8000W (**)	IP20	2*RE3762330
	0250	2 * BU200	3.0	2*3.3 Ω -8000W (**)	IP20	2*RE3762330
S50	0312	3 * BU200	3.0	3*3.3 Ω -8000W (**)	IP20	3*RE3762330
	0366	3 * BU200	3.0	3*3.3 Ω -8000W (**)	IP20	3*RE3762330
	0399	3 * BU200	3.0	3*3.3 Ω -8000W (**)	IP20	3*RE3762330
S60	0457	3 * BU200	3.0	3*3.3 Ω -8000W (**)	IP20	3*RE3762330
	0524	4 * BU200	3.0	4*3.3 Ω -8000W (**)	IP20	4*RE3762330
S65	0598	BU1440 2T-4T	0.24	0.45 Ω -48000W (**)	IP23	RE4461450
	0748	BU1440 2T-4T	0.24	0.45 Ω -48000W (**)	IP23	RE4461450
	0831	BU1440 2T-4T	0.24	0.3 Ω -64000W (**)	IP23	RE4561300

(note 1): Two parallel-connected resistors, 56Ohm/350W

(note 2): Four parallel-connected resistors, 15Ohm/1100W



DANGER

Braking resistors may reach temperatures higher than 200°C.



CAUTION

Power dissipated by braking resistors may be equal to approx. 10% of the connected motor rated power. Use a proper air-cooling system. Do not install braking resistors near heat-sensitive equipment or objects.



CAUTION

Do not connect any braking resistor with an Ohm value lower than the value stated in the application tables.

13.1.1.5. BRAKING RESISTORS FOR APPLICATIONS WITH A BRAKING DUTY CYCLE OF 20% AND 200-240VAC SUPPLY VOLTAGE

Size	Inverter Model SINUS K 4T	Braking Unit	Min resistor To be Connected To the inverter	DUTY CYCLE 10%		
			Ω	type		Code
S05	0005	Internal	25.0	56 Ω -350W	IP55	RE2643560
	0007	Internal	25.0	2*100 Ω -350W (*)	IP55	2*RE2644100
	0009	Internal	25.0	2*56 Ω -350W(*)	IP55	2*RE2635560
	0011	Internal	25.0	2*56 Ω -350W(*)	IP55	2*RE2635560
	0014	Internal	25.0	4*100 Ω -350W (*)	IP55	4*RE2644100
S10	0016	Internal	25.0	4*100 Ω -350W (*)	IP55	4*RE2644100
	0017	Internal	25.0	4*100 Ω -350W(*)	IP55	4*RE2644100
	0020	Internal	25.0	25 Ω -1800	IP54	RE3103250
	0025	Internal	10.0	6*75 Ω -550W (*)	IP33	6*RE3063750
	0030	Internal	10.0	6*75 Ω -550W (*)	IP33	6*RE3063750
	0035	Internal	10.0	6*75 Ω -550W (*)	IP33	6*RE3063750
S15	0038	Internal	8.0	2*25 Ω -1800W (*)	IP54	2*RE3103250
	0040	Internal	8.	2*25 Ω -1800W (*)	IP54	2*RE3103250
	0049	Internal	5	5 Ω -4000W	IP20	RE3482500
S20	0060	Internal	5.0	5 Ω -8000W	IP20	RE3762500
	0067	Internal	5.0	5 Ω -8000W	IP20	RE3762500
	0074	Internal	4.2	5 Ω -8000W	IP20	RE3762500
	0086	Internal	4.2	5 Ω -8000W	IP20	RE3762500
S30	0113	Internal	3.0	3.3 Ω -12000W	IP20	RE4022330
	0129	Internal	3.0	3.3 Ω -12000W	IP20	RE4022330
	0150	Internal	2.5	3.3 Ω -12000W	IP20	RE4022330
	0162	Internal	2.5	3.3 Ω -12000W	IP20	RE4022330
S40	0179	2 * BU200	3.3	2*3.3 Ω -8000W (**)	IP20	2*RE3762330
	0200	2 * BU200	3.3	2*3.3 Ω -8000W (**)	IP20	2*RE3762330
	0216	2 * BU200	3.3	2*3.3 Ω -12000W (**)	IP20	2*RE4022330
	0250	2 * BU200	3.3	2*3.3 Ω -12000W (**)	IP20	2*RE4022330
S50	0312	3 * BU200	3.3	3*3.3 Ω -12000W (**)	IP20	3*RE4022330
	0366	3 * BU200	3.3	3*3.3 Ω -12000W (**)	IP20	3*RE4022330
	0399	3 * BU200	3.3	3*3.3 Ω -12000W (**)	IP20	3*RE4022330
S60	0457	3 * BU200	3.3	3*3.3 Ω -12000W (**)	IP20	3*RE4022330
	0524	4 * BU200	3.3	4*3.3 Ω -12000W (**)	IP20	4*RE4022330
S65	0598	BU1440 2T-4T	0.24	0.45-64000W (**)	IP23	RE4561450
	0748	BU1440 2T-4T	0.24	0.45-64000W (**)	IP23	RE4561450
	0831	BU1440 2T-4T	0.24	2*0.6-48000W (**)	IP23	2*RE4461600

(*) Parallel-connection is required.

(**): For the connection of the modules and their braking resistors, refer to the relevant sections in this manual.



DANGER

Braking resistors may reach temperatures higher than 200°C.



CAUTION

Power dissipated by braking resistors may be equal to approx. 20% of the connected motor rated power. Use a proper air-cooling system. Do not install braking resistors near heat-sensitive equipment or objects.



CAUTION

Do not connect any braking resistor with an Ohm value lower than the value stated in the application tables.

13.1.1.6. BRAKING RESISTORS FOR APPLICATIONS WITH A BRAKING DUTY CYCLE OF 50% AND 200-240VAC SUPPLY VOLTAGE

Size	Inverter Model SINUS K 4T	Braking Unit	Min resistor To be Connected To the inverter	DUTY CYCLE 10%		
			Ω	type		Code
S05	0005	Internal	Internal	50 Ω -1100W	IP55	RE3083500
	0007	Internal	Internal	50 Ω -1100W	IP55	RE3083500
	0009	Internal	Internal	25 Ω -1800W	IP54	RE3103250
	0011	Internal	Internal	25 Ω -1800W	IP54	RE3103250
	0014	Internal	Internal	25 Ω -4000W	IP20	RE3483250
S10	0016	Internal	Internal	25 Ω -4000W	IP20	RE3483250
	0017	Internal	Internal	25 Ω -4000W	IP20	RE3483250
	0020	Internal	Internal	25 Ω -4000W	IP20	RE3483250
	0025	Internal	Internal	10 Ω -8000W	IP20	RE3763100
	0030	Internal	Internal	10 Ω -8000W	IP20	RE3763100
	0035	Internal	Internal	10 Ω -8000W	IP20	RE3763100
S15	0038	Internal	Internal	10 Ω -8000W	IP20	RE3763100
	0040	Internal	Internal	10 Ω -8000W	IP20	RE3763100
	0049	Internal	Internal	6.6 Ω -12000W	IP20	RE4022660
S20	0060	Internal	5.0	6.6 Ω -12000W	IP20	RE4022660
	0067	Internal	5.0	2*10 Ω -8000W (*)	IP20	2*RE3762500
	0074	Internal	4.2	2*10 Ω -8000W (*)	IP20	2*RE3763100
	0086	Internal	4.2	2*10 Ω -8000W (*)	IP20	2*RE3763100
S30	0113	Internal	3.0	2*6.6 Ω -12000W (*)	IP20	2*RE4022660
	0129	Internal	3.0	2*6.6 Ω -12000W (*)	IP20	2*RE4022660
	0150	Internal	2.5	3*10 Ω -12000W (*)	IP20	RE4023100
	0162	Internal	2.5	3*10 Ω -12000W (*)	IP20	RE4023100
S40	0179	3*BU200	5.0	3*6.6 Ω -12000W (**)	IP20	3*RE4022660
	0200	4*BU200	5.0	4*6.6 Ω -12000W (**)	IP20	4*RE4022660
	0216	4*BU200	5.0	4*6.6 Ω -12000W (**)	IP20	4*RE4022660
	0250	5*BU200	5.0	5*6.6 Ω -12000W (**)	IP20	5*RE4022660
S50	0312	6*BU200	5.0	6*6.6 Ω -12000W (**)	IP20	6*RE4022660
	0366	6*BU200	5.0	6*6.6 Ω -12000W (**)	IP20	6*RE4022660
	0399	7*BU200	5.0	7*6.6 Ω -12000W (**)	IP20	7*RE4022660
S60	0457	8*BU200	5.0	8*6.6 Ω -12000W (**)	IP20	8*RE4022660
	0524	10*BU200	5.0	10*6.6 Ω -12000W (**)	IP20	10*RE4022660
S65	0598	BU1440 2T-4T	0.24	4*0.45/48000W (**)	IP23	4*RE4461450
	0748	BU1440 2T-4T	0.24	4*0.45/48000W (**)	IP23	4*RE4461450
	0831	BU1440 2T-4T	0.24	4*0.3/64000W (**)	IP23	4*RE4561300

(*) Parallel-connection is required.

(**): For the connection of the modules and their braking resistors, refer to the relevant sections in this manual.



DANGER

Braking resistors may reach temperatures higher than 200°C.



CAUTION

Power dissipated by braking resistors may be equal to approx. 50% of the connected motor rated power. Use a proper air-cooling system. Do not install braking resistors near heat-sensitive equipment or objects.



CAUTION

Do not connect any braking resistor with an Ohm value lower than the value stated in the application tables.

13.1.2. AVAILABLE MODELS

13.1.2.1. MODEL 56-100 OHM/350W

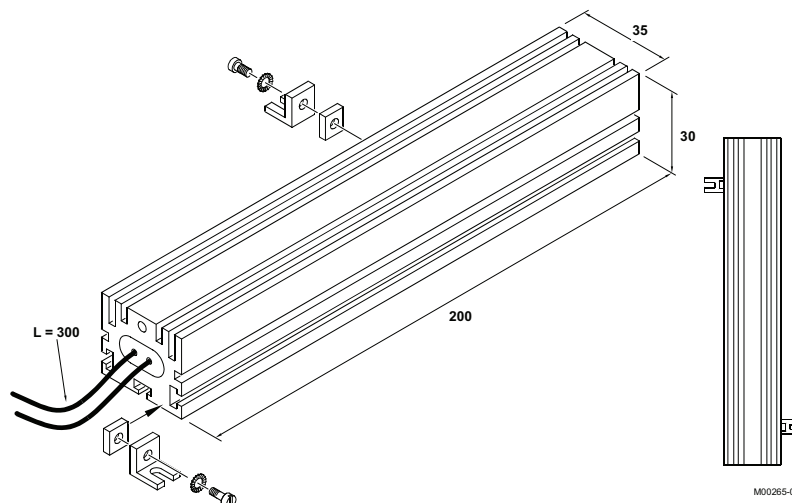


Fig. 36: Overall Dimensions, Resistor 56-100Ω/350W

Type	Wgt (g)	Degree of protection	Mean pwr to be dissipated (W)	Max. duration of continuous operation for 200-240VAC (s)*
56 Ohm/350W RE2643560	400	IP55	350	3.5
100 Ohm/350W RE2644100	400	IP55	350	3.5

(*) max. value to be set for the Brake Enable parameter (C68 (IFD SW) or C60 (VTC SW)). Set Brake Disable C67 (IFD SW) or C59 (VTC SW) so as not to exceed the max. power to be dissipated by the braking resistor. Set Brake Disable=0 and Brake enable≠0 not to limit the operation of the built-in braking unit.

13.1.2.2. MODEL 75 OHM/1300W

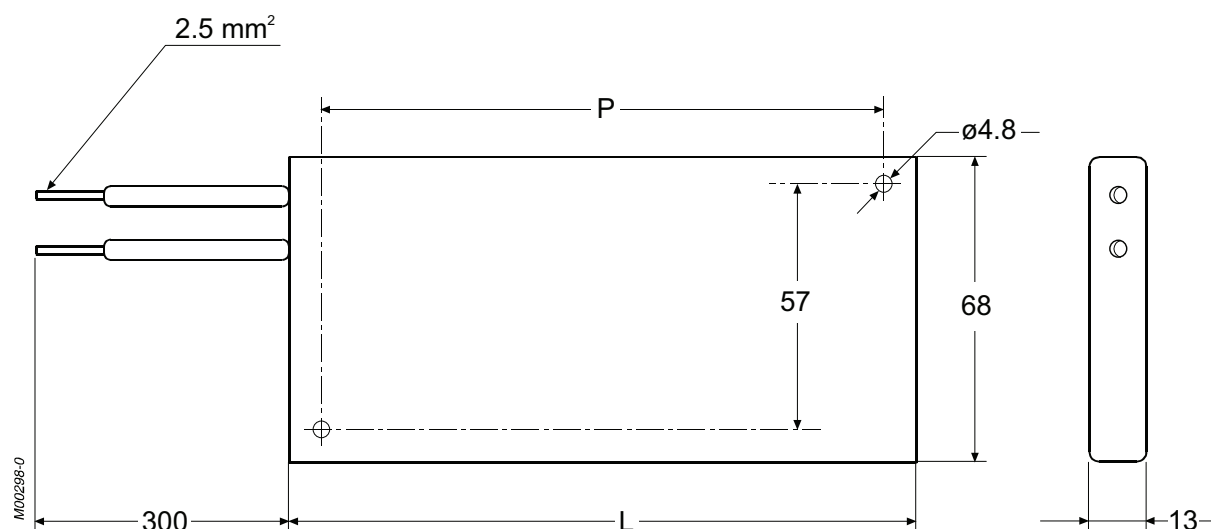
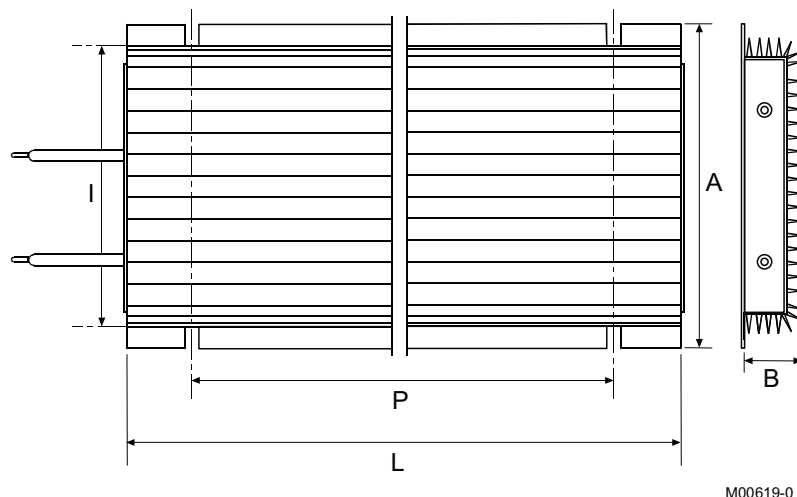


Fig. 37: Overall Dimensions and Ratings for Braking Resistor 75Ω/1300W

Type	L (mm)	D (mm)	Wgt (g)	Degree of protection	Mean power to be dissipated (W)	Max. duration of continuous operation for 380-500VCA (s)*
75 Ohm/750W RE3063750	195	174	500	IP33	550	2.25

(*) max. value to be set for the Brake Enable parameter (C68 (IFD SW) or C60 (VTC SW)). Set Brake Disable C67 (IFD SW) or C59 (VTC SW) so as not to exceed the max. power to be dissipated by the braking resistor. Set Brake Disable=0 and Brake enable≠0 not to limit the operation of the built-in braking unit.

13.1.2.3. MODELS FROM 1100W TO 2200W**Fig. 38: Overall Dimensions and Mechanical Features for Braking Resistors from 1100 to 2200 W**

Type	A (mm)	B (mm)	L (mm)	I (mm)	D (mm)	Wgt (g)	Degree of protection	Mean power to be dissipated (W)	Max. duration of continuous operation	
									380- 500Vac (s)*	380- 500Vac (s)*
15 Ohm/1100W RE3083150	95	30	320	80- 84	240	1250	IP55	950	not applic.	6
20 Ohm/1100W RE3083200									not applic.	8
50 Ohm/1100W RE3083500									5	20
10 Ohm/1500W RE3093100	120	40	320	107- 112	240	2750	IP54	1100	not applic.	4,5
39 Ohm/1500W RE3093390									4.5	18
50 Ohm/1500W RE3093500										
25 Ohm/1800W RE310250	120	40	380	107- 112	300	3000	IP54	1300	3	12
50 Ohm/2200W RE3113500	190	67	380	177- 182	300	7000	IP54	2000	8	Not limited
75 Ohm/2200W RE3113750									11	
Wire standard length: 300mm										

(*)max. value to be set for the Brake Enable parameter (C68 (IFD SW) or C60 (VTC SW)). Set Brake Disable C67 (IFD SW) or C59 (VTC SW) so as not to exceed the max. power to be dissipated by the braking resistor. Set Brake Disable=0 and Brake enable≠0 not to limit the operation of the built-in braking unit.

13.1.2.4. MODELS 4kW-8kW-12kW

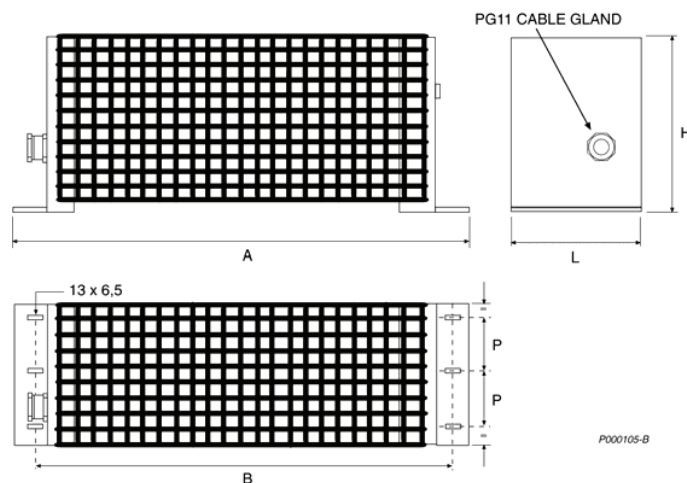


Fig. 39: Overall Dimensions for Resistor 4kW, 8kW, 12kW

RESISTOR	A (mm)	B (mm)	L (mm)	H (mm)	P (mm)	Peso (Kg)	Degree of protection	Mean power to be dissipated (W)	Max. duration of continuous operation		Wire cross section (mm ²)**
									380- 500Vac (s)*	380- 500Vac (s)*	
5Ω4kW RE3482500	620	600	100	250	40	5,5	IP20	4000	not applic.	10	10
15Ω4kW RE3483150									5	100	6
25Ω4kW RE3483250									20	Not limited	6
39Ω4kW RE3483390									60		6
50Ω4kW RE3483500									90		4
3.3Ω/8kW RE3762330	620	600	160	250	60	10,6	IP20	8000	not applic.	5	16
5Ω/8kW RE3762500									not applic.	40	10
10Ω/8kW RE3763100									2	100	10
3.3 Ω/12kW RE4022330	620	600	200	250	80	13,7	IP20	12000	not applic.	70	25
6.6Ω/12kW RE4022660									5	200	16
10Ω/12kW RE4023100									12	Not limited	10

(*)max. value to be set in the Brake Enable parameter (C68 (IFD SW) or C60 (VTC SW)). Set Brake Disable C67 (IFD SW) or C59 (VTC SW) so as not to exceed the max. power to be dissipated by the braking resistor. Set Brake Disable=0 and Brake enable≠0 not to limit the operation of the built-in braking unit.

(**) cross sections refer to the applications covered in this manual

13.1.2.5. MODELS OF BOX RESISTORS IP23, 4kW-64kW

OVERALL DIMENSIONS

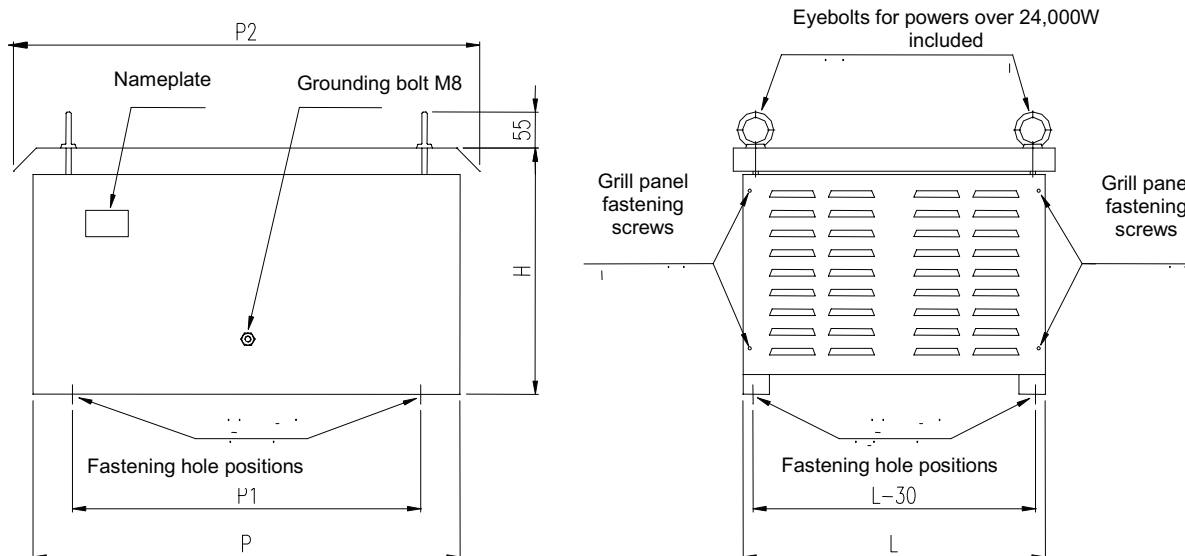


Fig. 40: Box Resistors IP23

ELECTRICAL CONNECTIONS

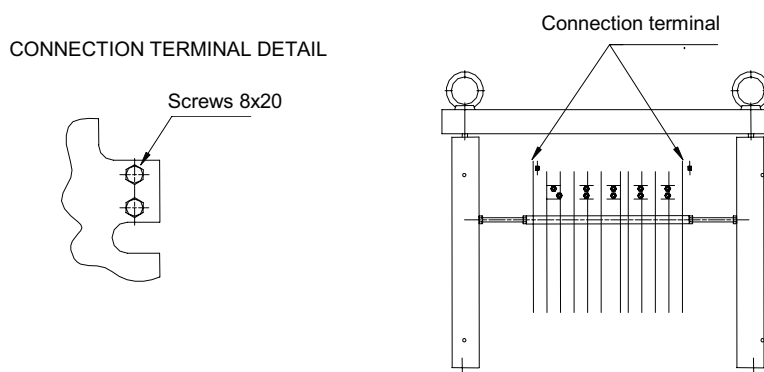


Fig. 41: Position of Electrical Connections in Box Resistors

Remove grids to gain access to wiring terminals.

Important: Figure shows resistor 20 Ohm/12kW. In certain models, remove both panels to gain access to wiring terminals.

RESISTOR	D (mm)	D1 (mm)	D2 (mm)	L (mm)	H (mm)	Weight (Kg)	Degree of protection	Mean power to be dissipated (W)	Max. duration of continuous operation (s)*		Wire cross section (mm ²)**
									380-500Vac	200-240Vac	
50Ω/4KW RE3503500	650	530	710	320	375	20	IP23	4000	not limited	30	4
50Ω/8KW RE3783500	650	530	710	380	375	23	IP23	8000	not limited	50	4
20Ω/12KW RE4053200	650	530	710	460	375	34	IP23	12000	not limited	50	6
15Ω/16KW RE4163150	650	530	710	550	375	40	IP23	16000	not limited	58	10
10Ω /24kW RE4293100	650	530	710	750	375	54	IP23	24000	not limited	62	16
6.6Ω/32kW RE4362660	650	530	710	990	375	68	IP23	32000	not limited	62	25
6Ω/48kW RE4462600	650	530	710	750	730	101	IP23	48000	not limited	90	35
6Ω/64kW RE4562600	650	530	710	990	730	128	IP23	64000	not limited	120	50
5Ω/48kW RE4462500	650	530	710	750	730	101	IP23	48000	not limited	75	35
5Ω/64kW RE4562500	650	530	710	990	730	128	IP23	64000	not limited	106	50
2.4Ω/48kW RE4462240	650	530	710	750	730	101	IP23	48000	150	37	70
2.4Ω/64kW RE4562240	650	530	710	990	730	128	IP23	64000	not limited	50	90
1.6Ω/48kW RE4462160	650	530	710	750	730	101	IP23	48000	100	25	90
1.6Ω/64kW RE4562160	650	530	710	990	730	128	IP23	64000	130	35	120
1.2 Ω /64kW RE4562120	650	530	710	990	730	128	IP23	64000	100	25	120
0.8Ω/64kW RE4561800	650	530	710	990	730	128	IP23	64000	70	18	185
0.6Ω/48kW RE4461600	650	530	710	750	730	101	IP23	48000	36	9	120
0.45Ω/48kW RE4461450	650	530	710	750	730	101	IP23	48000	48	not applicable	120
0.45Ω/64kW RE4561450	650	530	710	990	730	128	IP23	64000	38	not applicable	210
0.3Ω/64kW RE4561300	650	530	710	990	730	128	IP23	64000	25	not applicable	240

(*) max. value to be set in the Brake Enable parameter (C68 (IFD SW) or C60 (VTC SW)). Set Brake Disable C67 (IFD SW) or C59 (VTC SW) so as not to exceed the max. power to be dissipated by the braking resistor. Set Brake Disable=0 and Brake enable≠0 not to limit the operation of the built-in braking unit.

(**) cross sections refer to the applications covered in this manual

13.2. Braking Unit BU200

A braking module is available to be connected to terminals + and – (see chapter 8 “Wiring”) of the inverter for sizes S40 to S65. Braking modules can be used when a high braking torque is needed, particularly when a prompt braking is needed for high inertial loads (e.g. fans).

The braking power required to brake a rotating object is proportional to the total moment of inertia of the rotating object, to speed variations, and to absolute speed, while it inversely proportional to the deceleration time required.

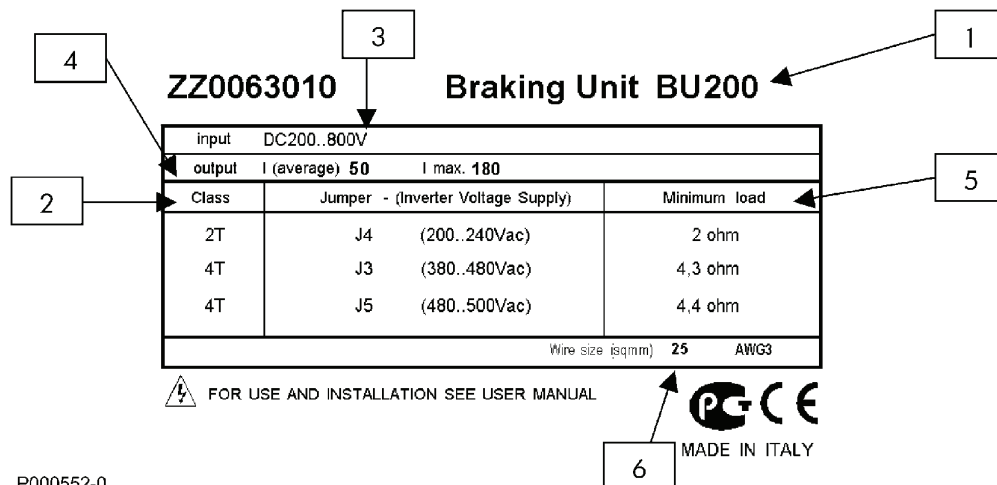
This braking power is dissipated on a resistor (external to the braking unit) with an Ohm value depending on the inverter size and the mean power to be dissipated.

13.2.1. INSPECTION UPON RECEIPT OF THE GOODS

Make sure that the equipment is not damaged and it complies with the equipment you ordered by referring to the nameplate located on the inverter front part (see figure below). If the equipment is damaged, contact the supplier or the insurance company concerned. If the equipment does not comply with the one you ordered, please contact the supplier as soon as possible.

If the equipment is stored before being started, make sure that temperatures range from -20 °C to +60 °C and that relative humidity is <95% (non-condensing).

The equipment guarantee covers any manufacturing defect. The manufacturer has no responsibility for possible damages due to the equipment transportation or unpacking. The manufacturer is not responsible for possible damages or faults caused by improper and irrational uses; wrong installation; improper conditions of temperature, humidity, or the use of corrosive substances. The manufacturer is not responsible for possible faults due to the equipment operation at values exceeding the equipment ratings and is not responsible for consequential and accidental damages.



- | | |
|-------------------------|--|
| 1. Model: | BU200-braking unit |
| 2. Voltage class: | List of applicable voltage classes |
| 3. Supply ratings: | 200 ÷ 800 VDC (DC supply voltage produced by the inverter terminals) |
| 4. Output current: | 50A (average): mean current in output cables
180A (Peak): peak current in output cables |
| 5. Min. load: | Minimum value of the resistor to be connected to the output terminals (see application tables) |
| 6. Cable cross-section: | Dimensioning of the power cables |

13.2.2. OPERATION

The basic size of the braking unit can be used with a braking resistor avoiding exceeding a max. instant current of 180 A, corresponding to a peak braking power of approx. 138 kW and to a mean power of 69 kW. For applications requiring higher braking power values, multiple braking units can be parallel-connected in order to obtain a greater braking power based on the number of braking units.

To ensure that the overall braking power is evenly distributed to all braking units, configure one braking unit in MASTER mode and the remaining braking units in SLAVE mode, and connect the output signal of the MASTER unit (terminal 8 in connector M1) to the forcing input for all SLAVE braking units (terminal 4 in connector M1).

13.2.2.1. TECHNICAL DATA

SIZE	Maximum braking current (A)	Average braking current (A)	INVERTER SUPPLY VOLTAGE and CONFIGURATION JUMPER POSITION		
			200-240Vac (2T class)	380-480Vac (4T class)	480-500Vac 4T class
			J4	J3	J5
			MINIMUM BRAKING RESISTOR (Ohm)	MINIMUM BRAKING RESISTOR (Ohm)	MINIMUM BRAKING RESISTOR (Ohm)
BU200	180	50	2	4,3	4,4

13.2.2.2. JUMPERS

Jumpers located on board ES839 are used for the configuration of the braking unit:

JP1	when on, configures braking unit in SLAVE mode
JP2	when on, configures braking unit in MASTER mode



NOTE

One of the two jumpers must always be "on". Do not enable both jumpers at a time.

JP3	For 400 VAC mains voltage
JP4	For 230 VAC mains voltage
JP5	For 500 VAC mains voltage
JP6	Position for special adjustment



NOTE

One of the four jumpers must always be "on". Enable one jumper only at a time.

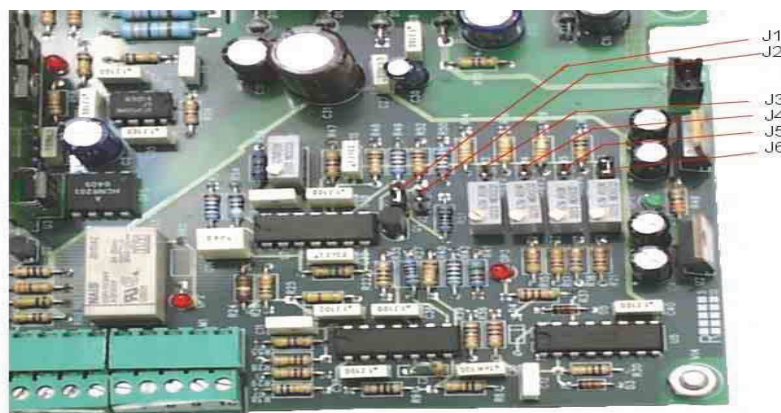


Fig. 42: Position of jumpers on ES839 BU200 control board

**DANGER**

Before changing jumper positions, remove voltage from the equipment and wait at least 5 minutes.

**CAUTION**

Never set jumpers to a voltage value lower than the inverter supply voltage, to avoid continuous activation of the braking unit.

13.2.2.3. TRIMMERS

Four trimmers are installed on control board ES839. Depending on the jumper configuration, each trimmer allows a fine-tuning of the braking unit voltage threshold trip.

Jumper-trimmer matching:

J3	Activates trimmer RV2
J4	Activates trimmer RV3
J5	Activates trimmer RV4
J6	Activates trimmer RV5

The rated voltage for the braking unit activation and its range to be set with the trimmers for each of the 4 configuration possibilities are stated in the table below:

mains voltage	jumper	trimmer	min. braking voltage	rated braking voltage	max. braking voltage
V _{ac}			V _{cc}	V _{cc}	V _{cc}
200-240 (2T)	J4	RV2	339	364	426
380-480 (4T)	J3	RV3	700	764	826
481-500 (4T)	J5	RV4	730	783	861
230-500	J6	RV5	464	650	810

Braking voltage adjustment range

**CAUTION!**

Max. values in the table below are theoretical values only for special applications; their use must be authorized by Elettronica Santerno. For standard applications, don't move the trimmers.

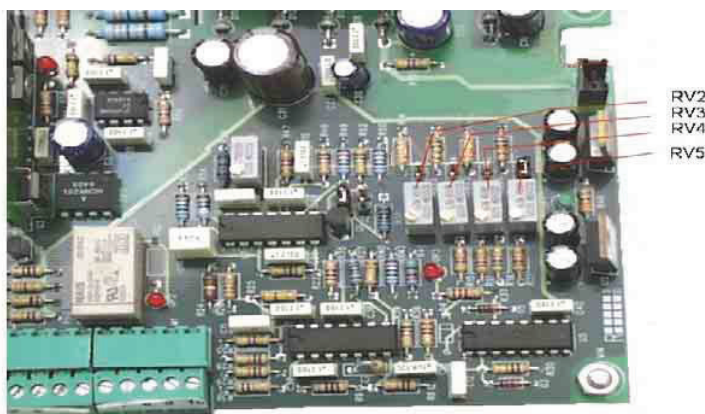


Fig. 43: Position of trimmers on ES839 BU200 control board

13.2.2.4. INDICATOR LEDs

The indicator LEDs below are located on the front part of the braking units:

OK LED	Normally "on"; the equipment is running smoothly. This LED turns off due to overcurrent or power circuit failure.
B LED	Normally off"; this LED turns on when the braking unit activates.
TMAX LED	Normally "off"; this LED turns on when the thermoswitch located on the heatsink of the braking unit trips; if overtemperature protection trips, the equipment is locked until temperature drops below the alarm threshold.

13.2.3. INSTALLING THE BRAKING UNIT

MOUNTING

- Install vertically;
- Make sure to allow a min. clearance of 5 cm on both sides and 10 cm on top and bottom;
- use cable-glands to maintain degree of protection IP20.

ENVIRONMENTAL REQUIREMENTS FOR THE BRAKING UNIT INSTALLATION, STORAGE AND TRANSPORT

Operating ambient temperatures	0-40°C with no derating from 40°C to 50°C with a 2% derating of the rated current for each degree beyond 40°C
Ambient temperatures for storage and transport	- 25°C - +70°C
Installation environment	Pollution degree 2 or higher. Do not install in direct sunlight and in places exposed to conductive dust, corrosive gases, vibrations, water sprinkling or dripping; do not install in salty environments.
Altitude	Up to 1000 m above sea level. For higher altitudes, derate the output current of 2% every 100m above 1000m (max. 4000m).
Operating ambient humidity	From 5% to 95%, from 1g/m ³ to 25g/m ³ , non condensing and non freezing (class 3k3 according to EN50178)
Storage ambient humidity	From 5% to 95%, from 1g/m ³ to 25g/m ³ , non condensing and non freezing (class 1k3 according to EN50178).
Ambient humidity during transport	Max. 95%, up to 60g/m ³ ; condensation may appear when the equipment is not running (class 2k3 according to EN50178)
Storage and operating atmospheric pressure	From 86 to 106 kPa (classes 3k3 and 1k4 according to EN50178)
Atmospheric pressure during transport	From 70 to 106 kPa (class 2k3 according to EN50178)



CAUTION

Ambient conditions strongly affect the inverter life. Do not install the equipment in places that do not have the above-mentioned ambient conditions.

COOLING SYSTEM AND DISSIPATED POWER

The braking unit is provided with a heatsink reaching a max. temperature of 70 °C.
Make sure that the bearing surface for the braking unit is capable of withstanding high temperatures. Max. dissipated power is approx. 150 W and depends on the braking cycle required for the operating conditions of the load connected to the motor.

13.2.3.1. MECHANICAL INSTALLATION

The braking unit BU200 must be installed in an upright position inside a cabinet. Fix the BU200 with four M4 screws.

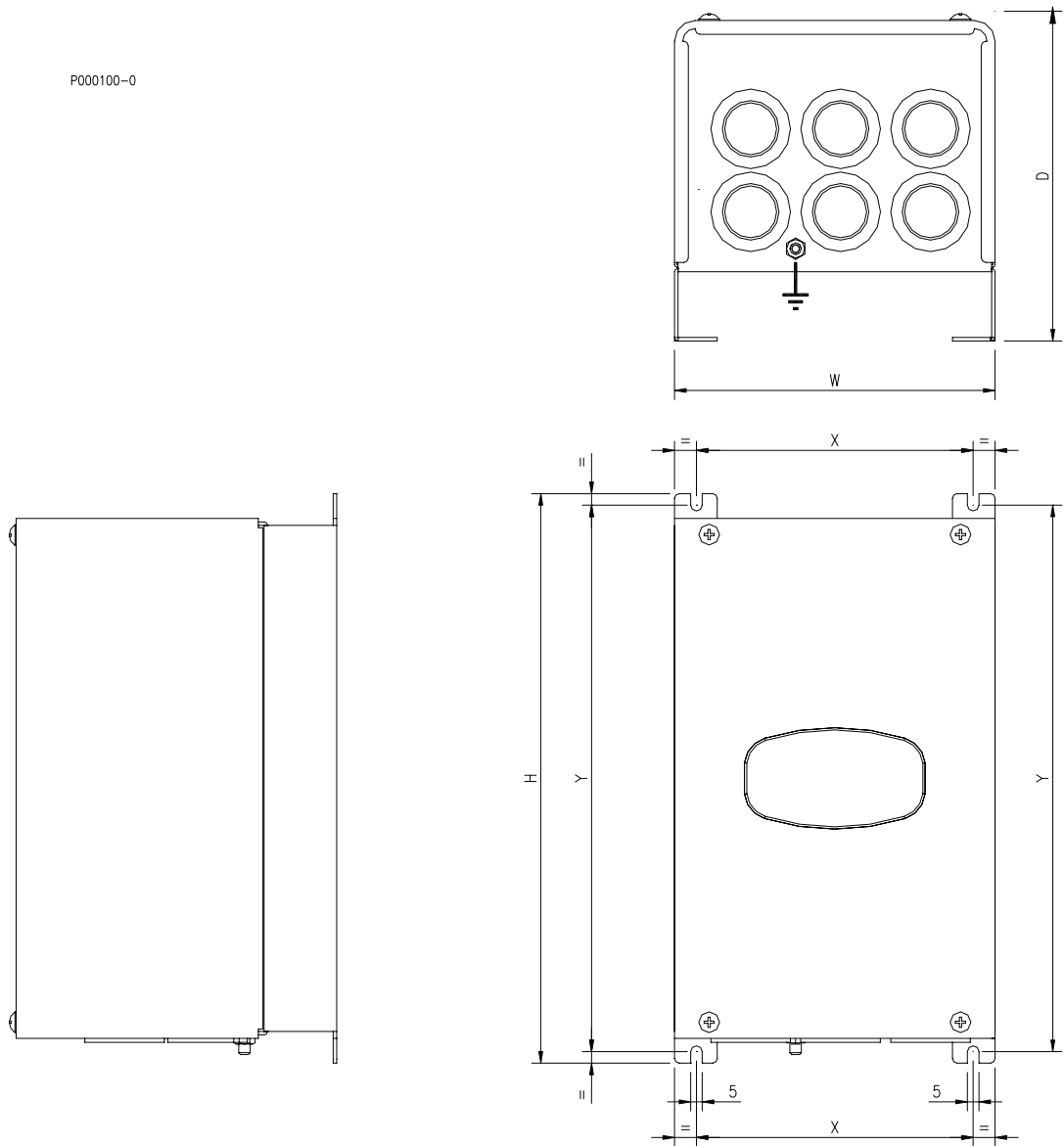


Fig. 44: Dimensions and fixing points of BU200



NOTE

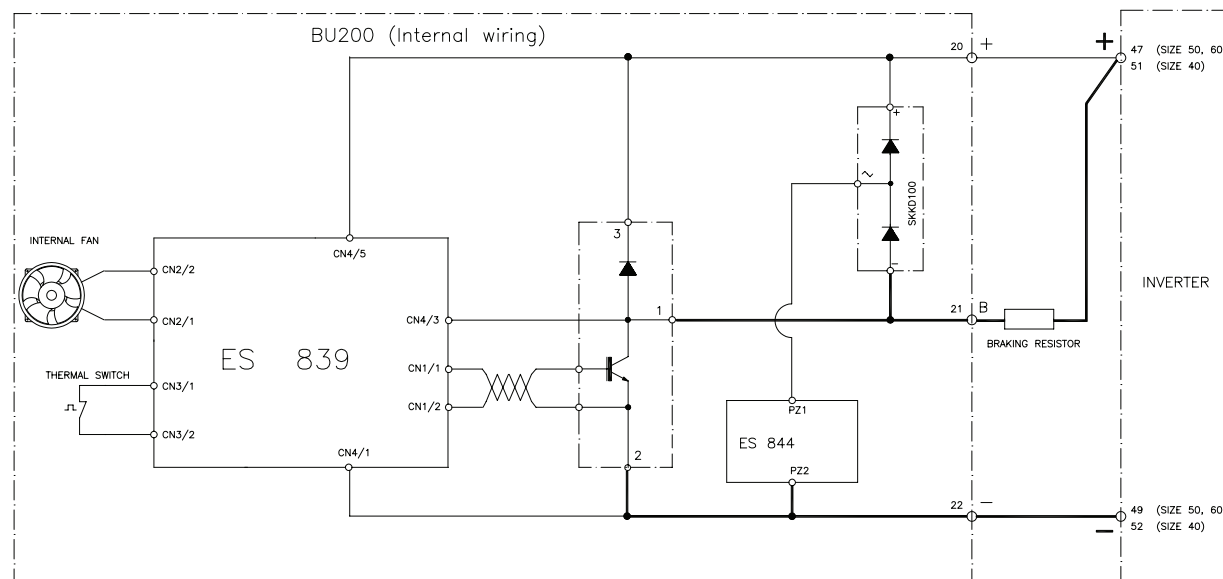
Elettronica Santerno reserves the right to make any technical changes to this manual and to the device without prior notice

13.2.3.2. ELECTRIC INSTALLATION

The braking unit must be connected to inverter and to the braking resistor.

The connection to the inverter must be done between the terminals **+** and **-** of the braking unit and the terminals **+** and **-** of the inverter. The braking resistor must be connected at one side to the inverter (terminal **+**) and at the other side to the braking unit (terminal **B**)

The figure below shows the wiring diagram:



P000107-B

Fig. 45: Power connections of one BU200.



NOTE!!

The braking resistor must be connected between the braking unit BU200 terminal **B** and the inverter terminal **+**. In this way braking current high peaks don't flow through the plus connection line between inverter and braking unit BU200. For limiting electromagnetic radiated emissions when the BU200 works must be kept as small as possible the loop made by the connections between the inverter terminal **+**, braking resistor, terminals **B** and **-** of BU200 and inverter terminals **+** and **-**.

13.2.3.3. MASTER – SLAVE CONNECTION

The Master-Slave connection must be used when multiple braking units are connected to the same inverter; a connection between the master output signal (M1 for terminal 8) and the slave input signal (M1 for terminal 2); the ground signal of the master unit control terminal block M1 (terminal 2) must be connected to the ground signal of the slave unit control terminal block M1 (terminal 2). The connection of more than two modules must always be done by configuring one module like a master and the other modules like slaves through the configuration jumpers.

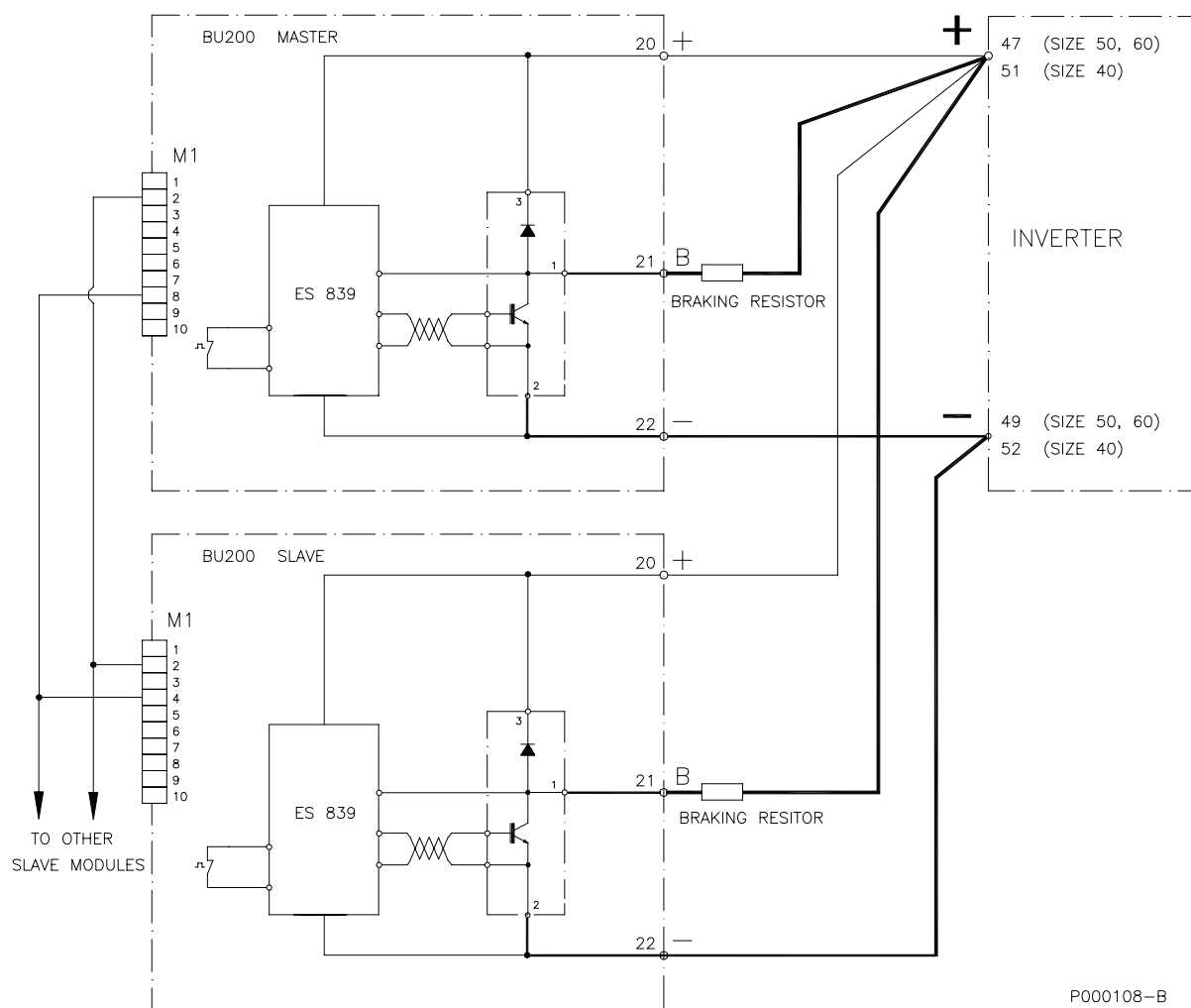


Fig. 46: Master – Slave multiple connection



NOTE!!

Never connect the ground of the control signals (M1 terminal 2) to zero volt of power connections (-).



CAUTION

When a Master-Slave connection is required, make sure that jumpers are properly set up.

13.2.3.4. LOCATION OF POWER AND CONTROL TERMINALS

To gain access to the terminal blocks, remove the inverter cover; just loosen the four fixing screws of the cover located on the bottom side and on the top side of the braking unit.

Loosen the fastening screws to slide off the cover from above.

Power terminals consist of copper bars, that can be reached through the three front holes.

+:/20	copper bar	Inverter DC side connected to terminal +
B:21	copper bar	Connection to braking resistor
-:/22	copper bar	Inverter DC side connected to terminal -

Control terminal M1:

Terminal	Name	Description	Notes	Features
M1:1	Not used			
M1:2	OVE	Signal zero volt		Control board zero volt
M1:3	Vin	Analog input (0÷10 V);	for special applications	Rin=10kOhm
M1:4	Sin	Logic input for signal sent from Master	The SLAVE brakes if a signal > 6 V is sent	30Vmax
M1:5	RL-NO	NO contact of "thermoswitch on" relay	The relay energizes when an overtemperature alarm trips for BU200	250Vac,3A 30Vdc,3A
M1:6	RL-C	Common terminal of "thermoswitch on" relay		
M1:7	RL-NC	NC contact of "thermoswitch on" relay		
M1:8	Mout	Digital output for Slave command signal	high level output when Master is braking	PNP output (0-15V)
M1:9	Not used			
M1:10	Not used			

Signal terminal block M1 can be accessed through its hole (see figure below).

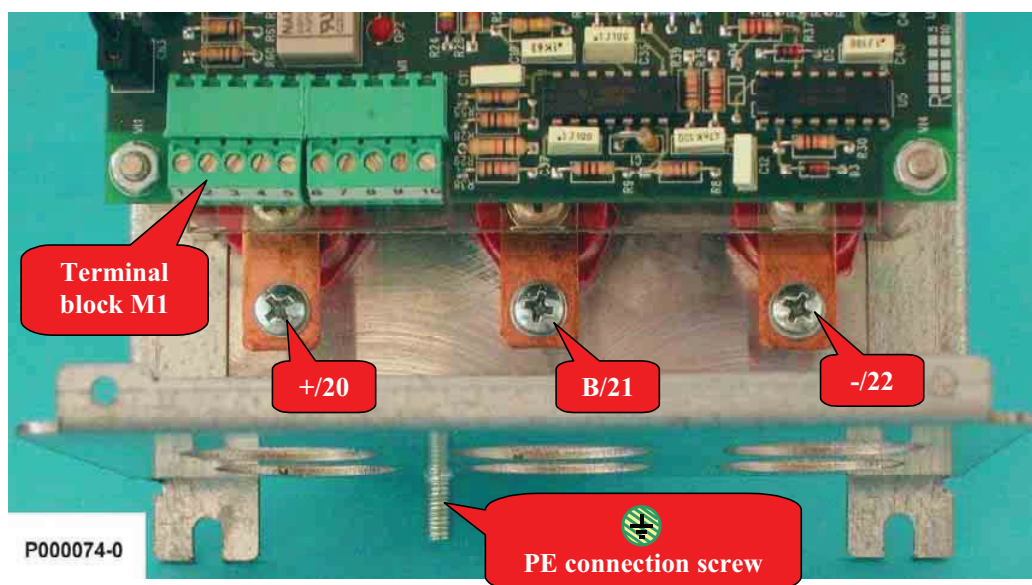


Fig. 47: Terminals of BU200

13.2.3.5. CROSS SECTION OF WIRINGS

Use 25mmq wires for power connection wirings and 0.5 or 1mmq wires for control wirings. The connection to the braking resistor must be done with a cable suitable for the high temperature (200°C) that could reach the surface of the braking resistor .

13.3. Braking Unit for Modular Inverters (BU720-BU1440)

A braking unit to be applied to modular inverters only is available. The inverter size must be equal to S65.

13.3.1. INSPECTION UPON RECEIPT OF THE GOODS

Make sure that the equipment is not damaged and that it complies with the equipment you ordered by referring to the nameplate located on the inverter front part (see figure below). If the equipment is damaged, contact the supplier or the insurance company concerned. If the equipment does not comply with the one you ordered, please contact the supplier as soon as possible.

If the equipment is stored before being started, make sure that temperatures range from -20 °C to +60 °C and that relative humidity is <95% (non-condensing).

The equipment guarantee covers any manufacturing defect. The manufacturer has no responsibility for possible damages occurred while shipping or unpacking the equipment. The manufacturer is not responsible for possible damages or faults caused by improper and irrational uses; wrong installation; improper conditions of temperature, humidity, or the use of corrosive substances. The manufacturer is not responsible for possible faults due to the equipment operation at values exceeding the equipment ratings. The manufacturer is not responsible for consequential and accidental damages.

The braking unit is covered by a 12-month guarantee starting from the date of delivery.

13.3.1.1. NAMEPLATE FOR BU720-1440

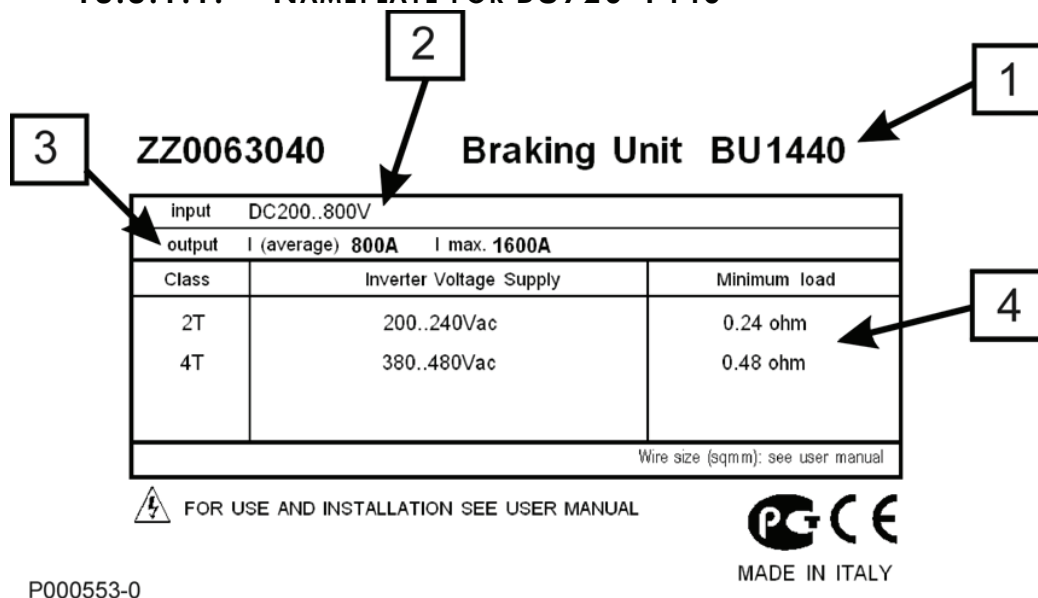


Fig. 48: Nameplate BU720-1440

1. Model (BU1440 – braking unit);
2. Supply ratings: 200 to 800 VDC for BU 720-1440 2-4T (DC supply voltage produced by the inverter terminals);
3. Output current: 800A (average): mean current in output cables, 1600A (Peak): peak current in output cables;
4. Minimum value of the resistor to be connected to the output terminals (see application table).

13.3.2. OPERATION

Each size of the braking unit can be used with a braking resistor avoiding exceeding the max. instant current stated in its specifications.

The braking unit is controlled directly by the control unit. Braking units cannot be parallel-connected when applied to modular inverters.

13.3.3. RATINGS

SIZE	Max. braking current (A)	Mean braking current (A)	Inverter supply voltage	Min. braking resistor (Ohm)	Dissipated power (at mean braking current) (W)
BU1440 2-4T	1600	800	200-240Vac/	0.24	1700
BU1440 2-4T	1600	800	380-500Vac/	0.48	1800

13.3.4. INSTALLATION

13.3.4.1. MOUNTING

- Install vertically;
- Make sure to allow a min. clearance of 2 cm on both sides and 10 cm on top and bottom;
- Use Lexan cable-glands to maintain degree of protection IP20.

ENVIRONMENTAL REQUIREMENTS FOR THE BRAKING UNIT INSTALLATION, STORAGE AND TRANSPORT

Operating ambient temperatures	0-40 °C with no derating from 40 °C to 50 °C with a 2% derating of the rated current for each degree beyond 40 °C
Ambient temperatures for storage and transport	- 25 °C - +70 °C
Installation environment	Pollution degree 2 or higher. Do not install in direct sunlight and in places exposed to conductive dust, corrosive gases, vibrations, water sprinkling or dripping; do not install in salty environments.
Altitude	Up to 1000 m above sea level. For higher altitudes, derate the output current of 2% every 100m above 1000m (max. 4000m).
Operating ambient humidity	From 5% to 95%, from 1g/m ³ to 25g/m ³ , non condensing and non freezing (class 3k3 according to EN50178)
Storage ambient humidity	From 5% to 95%, from 1g/m ³ to 25g/m ³ , non condensing and non freezing (class 1k3 according to EN50178).
Ambient humidity during transport	Max. 95%, up to 60g/m ³ ; condensation may appear when the equipment is not running (class 2k3 according to EN50178)
Storage and operating atmospheric pressure	From 86 to 106 kPa (classes 3k3 and 1k4 according to EN50178)
Atmospheric pressure during transport	From 70 to 106 kPa (class 2k3 according to EN50178)



CAUTION!!

Ambient conditions strongly affect the inverter life. Do not install the equipment in places that do not have the above-mentioned ambient conditions.

13.3.4.2. STANDARD MOUNTING

Install braking unit BU720-1440 for modular inverters in an upright position inside a cabinet, next to the other inverter modules. Its overall dimensions are the same as those of an inverter arm.

Dimensions (mm)			Fixing points (mm)				Screws	Weight (Kg)
W	H	D	X	Y	D1	D2	M10	110'
230	1400	480	120	237	11	25		

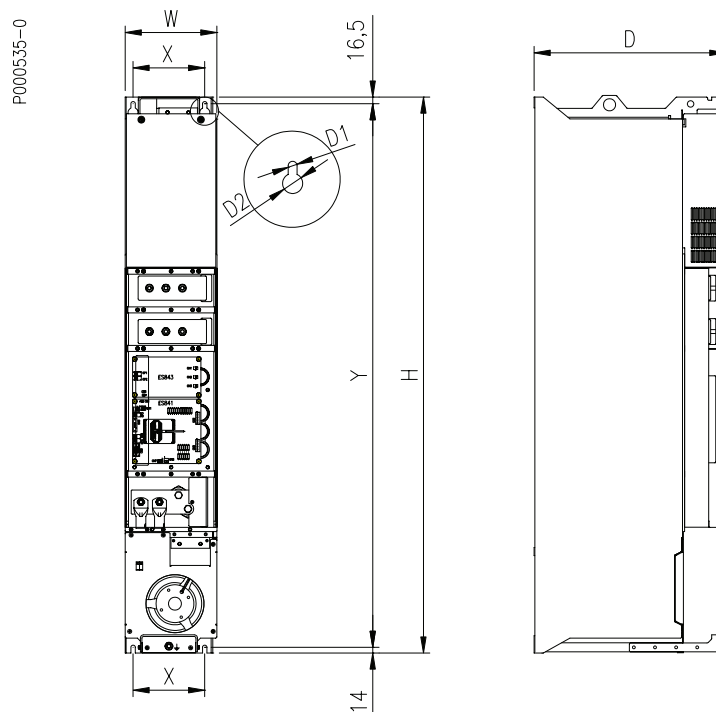


Fig. 49: Dimensions and fixing points of BU720-1440



NOTE

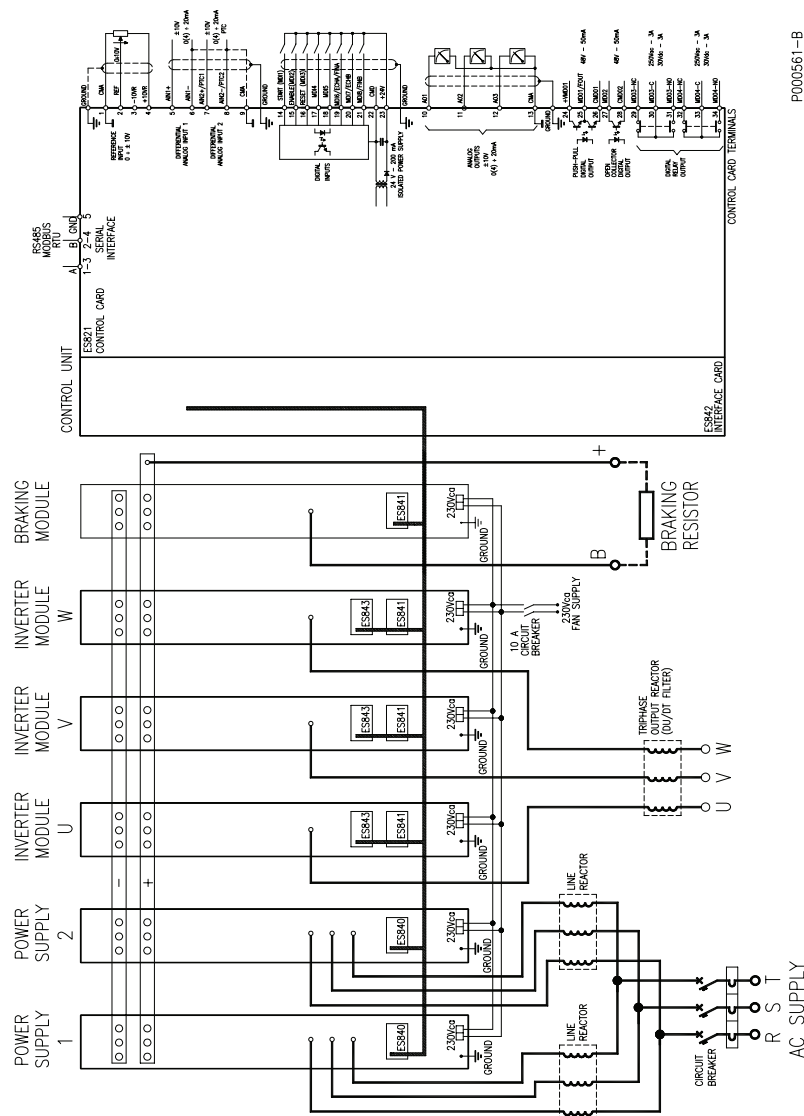
Elettronica Santerno reserves the right to make any technical changes to this manual and to the device described herein without prior notice.

13.3.4.3. WIRING

WIRING DIAGRAM

a) Power unit

The braking unit must be connected to the inverter and the braking resistor.
The connection to the inverter is direct through 60*10mm copper plates connecting the different inverter modules. The braking resistor is connected to the + bar and to the braking unit.
Also connect the single-phase 220Vac supply of the cooling fan.



P000561-B

Fig. 50: External power connections for modular inverters S65 provided with braking unit BU770-1440

Wire braking resistors as stated in the tables below.

Voltage class: 2T

Applications with a braking duty cycle of 10%

Inverter Size	Braking unit	Braking resistor			
		Quantity	Recommended rating(Ohm)	Power (W)	Wire cross-section mm ² (kcmils)
0598	BU1440 2T-4T	1	0.45	48000	120 (250)
0748	BU1440 2T-4T	1	0.45	48000	120 (250)
0831	BU1440 2T-4T	1	0.3	64000	210(400)

Applications with a braking duty cycle of 20%

Inverter Size	Braking unit	Braking resistors					
		Applicable resistors			Resistor wiring	Resultant rating (Ohm)	Wire cross-section mm ² (kcmils)
		Quantity	Recommended rating (Ohm)	Power (W)			
0598	BU1440 2T-4T	1	0.8	100000	--	0.4	210(400)
0748	BU1440 2T-4T	1	0.8	100000	--	0.4	210(400)
0831	BU1440 2T-4T	2	0.6	100000	parallel-connected	0.3	2*120 (250)

Applications with a braking duty cycle of 50%

Inverter Size	Braking unit	Braking resistor					
		Applicable resistors			Resistor wiring	Resultant rating (Ohm)	Wire cross-section mm ² (kcmils)
		Quantity	Recommended rating (Ohm)	Power (W)			
0598	BU1440 2T-4T	4	0.45	48000	series/parallel-connected	0.45	2*120 (250)
0748	BU1440 2T-4T	4	0.45	48000	series/parallel-connected	0.45	2*185(400)
0831	BU1440 2T-4T	4	0.3	64000	series/parallel-connected	0.3	2*240(400)

Voltage class: 4T

Applications with a braking duty cycle of 10%

Inverter size	Braking unit	Braking resistors				
		Quantity	Recommended rating(Ohm)	Power(W)	Resistor wiring	Wire cross-section mm ² (kcmils)
0598	BU1440 2T-4T	1	1.2Ohm	64000	-	120 (250)
0748	BU1440 2T-4T	1	1.2Ohm	64000	-	120 (250)
0831	BU1440 2T-4T	1	0.8Ohm	100000	Parallel connected	120 (250)

Applications with a braking duty cycle of 20%

Inverter size	Braking unit	Braking resistors					
		Applicable resistors			Resistor wiring	Resultant rating (Ohm)	Wire cross-section mm ² (kcmils)
		Quantity	Recommended rating (Ohm)	Power (W)			
0598	BU1440 2T-4T	2	2.4	64000	parallel-connected	1.2	2*95(400)
0748	BU1440 2T-4T	2	2.4	64000	parallel-connected	1.2	2*95(400)
0831	BU1440 2T-4T	2	1.6	100000	parallel-connected	0.8	2*120(500)

Applications with a braking duty cycle of 50%

Inverter size	Braking unit	Braking resistors					
		Applicable resistors			Resistor wiring	Resultant rating (Ohm)	Wire cross-section mm ² (kcmils)
		Quantity	Recommended rating (Ohm)	Power (W)			
0598	BU1440 2T-4T	4	1.2	64000	series/parallel-connected	1.2	2*120 (250)
0748	BU1440 2T-4T	4	1.2	64000	series/parallel-connected	1.2	2*120 (250)
0831	BU1440 2T-4T	4	0.8	100000	series/parallel-connected	0.8	2*185(400)

b) Signal wiring



CAUTION!!

Make sure that the control device is properly set-up when using the braking arm. When ordering the inverter, always state the inverter configuration you want to obtain.

Because the braking arm is controlled directly by the control device, the following wiring is required:

- connect +24V supply of gate unit ES841 of the braking unit through a pair of unipolar wires (AWG17-18 - 1 mm²)
- connect braking IGBT to the fault IGBT signal through 2 optical fibres (diameter: 1mm) made of plastic (typical attenuation coefficient: 0.22dB/m) provided with Agilent HFBR-4503/4513 connectors.

The wiring diagram is as follows:

Signal	Type of wiring	Wire marking	Component	Board	Connector	Component	Board	Connector
+24VD Driver board ES841 power supply	Unipolar wire 1mm ²	24V-GB	Phase W	ES841	MR1-3	Braking unit	ES841	MR1-1
0VD Driver board ES841 power supply	Unipolar wire 1mm ²		Phase W	ES841	MR1-4	Braking unit	ES841	MR1-2
Brake IGBT command	Single optical fibre	G-B	Control unit	ES842	OP-4	Braking unit	ES841	OP5
Brake IGBT fault	Single optical fibre	FA-B	Control unit	ES842	OP-3	Braking unit	ES841	OP3



CAUTION!!

Do not remove the cap of connector OP4 in control board ES841 for the braking module.

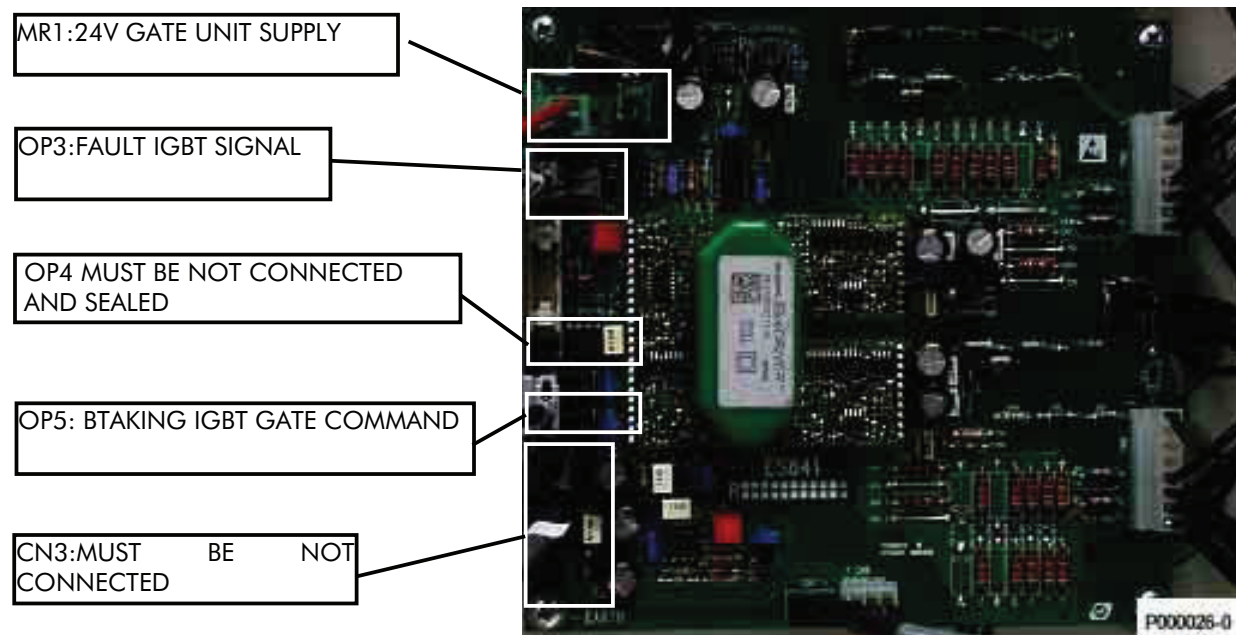


Fig. 51: Gate unit board ES841 for the braking unit

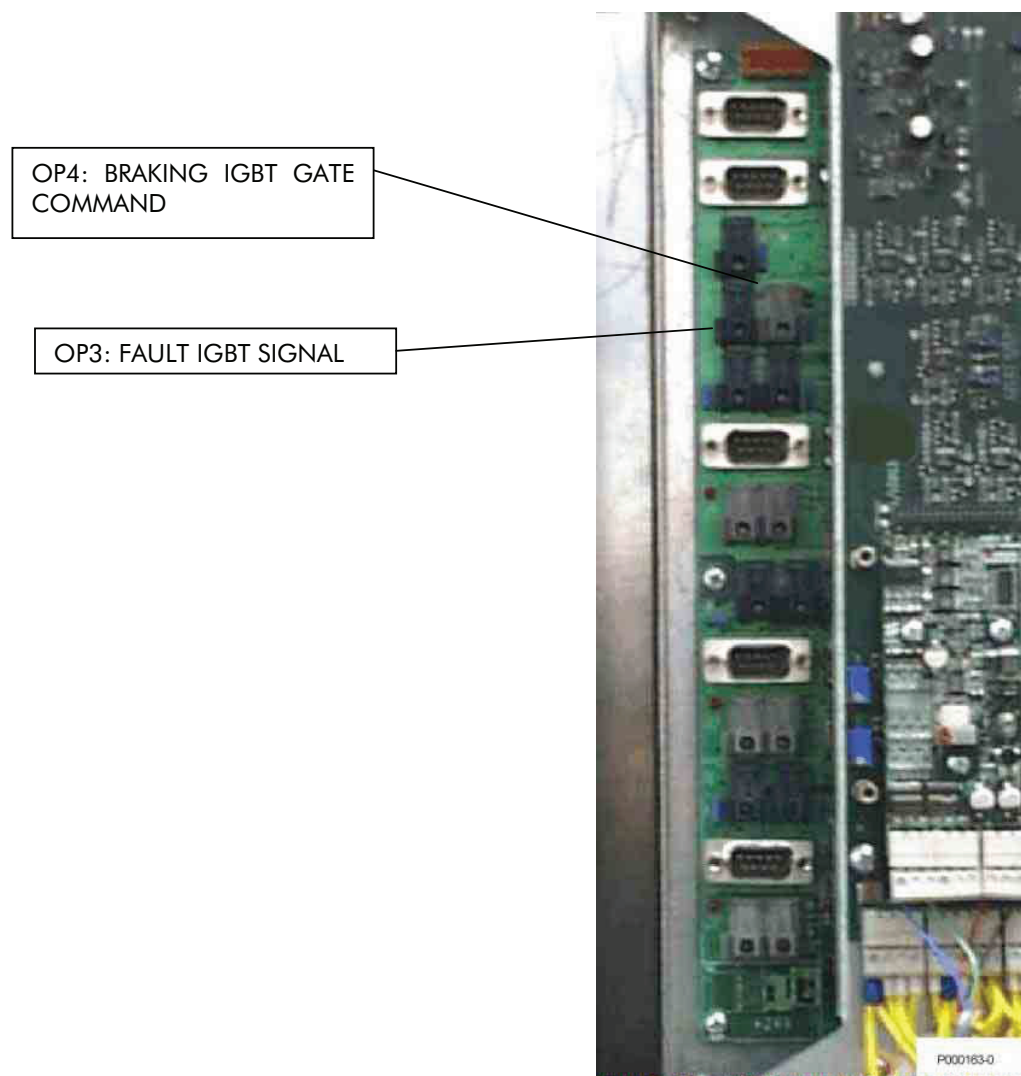


Fig. 52: wiring points of the optical fibres in control board ES482

The figure below shows the internal wiring of inverters S65 provided with a braking unit.

