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HVDC RELAYS GREEN SOLUTIONS



www.hongfa.com

HONGFA



-



COMPANY PROFILE

Hongfa (stock code: SH600885) is the largest relay research and production center and export base in China, with an annual production capability of 3.0 billion pieces. Hongfa's enterprising spirit is based on the motto "Persevere for Progress, Strive for Excellence." and the operational philosophy of "Focusing on the market; Winning through quality." These beliefs have led Hongfa to its position world-class base for relay research and production, with 30 subsidiaries worldwide.

Hongfa's core products are electromechanical relays. Over the year, Hongfa has expanded its product portfolio to include low-voltage and high-voltage devices, high-precision components, and automation equipment. Hongfa exports relays to more than 120 countries and has local sales, customer service, and application engineering outposts across the globe. Hongfa serves customers in a wide range of markets, including industry, energy, transportation, communication, household appliances, medical technology, and defense.

Hongfa "Strives for Excellence" by embracing technology, focusing on product development while adopting the latest advances in the field. Hongfa has a national level R&D center with the largest testing laboratory in the industry. Hongfa developed the first post-doctoral research program in China. Hongfa engineers and scientists are constantly pushing the relay industry forward and influencing changes to many professional and national standards.

Hongfa recognizes that our Earth has limited resources, and highlights all efforts toward from environmental protection, science, technology, and the green industry. Hongfa understands and supports the worldwide trend of support for alternative energy vehicles, PV, and wind power, and assembled a professional research team at a very early stage in the process. Hongfa is the first HVDC relay manufacturer in China to independently develop the ability to manufacture in volume, producing HVDC relays to meet the growing demands of the PV industry, alternative energy vehicle manufacturers, charging station developers, and more.

HVDC RELAYS

- Mechanically tested to ISO 16750 standards.
- Safety guaranteed, insulation compliant with IEC 60664-1 & ISO 6469-3 standards.





HV vacuum-sealing machine

Laser-welding machine

450VDC / 750VDC PHEV & BEV Solutions



High short circuit current capability 12kA Small size to save mounting space

450VDC Pre-charge Solutions



HFE80V-20C

Ideal for micro EV and High voltage applications up to 500VDC Strong structure for arc extinguishing

Large contact gap

48VDC / 200VDC Battery Systems



HFV19-100, HFV29-200

- High reliability 48VDC monostable automotive relay
- With lower noise level as similar relays
- Breaking capability up to 55VDC 3000A

HFE80V-60

1000VDC / 1500VDC Energy Storage Solutions

HFE82P- / HFE85P- / HFE88P- Series

Hongfa's Technology Strengths:

- Largest relay research and production center China.
- World class mold design, plastic producing and precision metal fabrication capabilities.
- Quality design and manufacturing of automation assembly equipment.
- Largest test laboratory with latest test equipment in the relay industry.
- Complete quality-control system.















Round shape with small size



- - - With Auxiliary contact integrated





60A 85°C permanent current carrying capability

- No polarity for coil and load











HFE82V-Series (Small size, high capability for short circuit current, ceramic chamber structure)



Ceramic chamber with arc blowing structure, water and dust proof contacts, oxidation-resistant + High reliability and long service life, low and stable contact resistance until end of life Wide load range, current switching range 10-1000A, working voltage range 12-1000VDC

> (Plastic-package Structure Series with High Price-Performance Ratio)



200V system preferred products for mini electric vehicle (Mild Hybrids)



Ceramic chamber with arc blowing structure, water and dust proof contacts, oxidation-resistant

High reliability and long service life, low and stable contact resistance until end of life Current switching range 20-350A, working voltage range 12-1500VDC The full sealed structure enables the relay to withstand hostile environment



APPLICATIONS

Hongfa's HVDC-relays can be used to switch DC power for a wide range of applications - alternative energy vehicles (E-Mobility), transportation shuttles, power-charging devices, PV- and wind-power systems, construction and industry vehicles, DC-server-power and UPS, medical instruments, and more.



Power Generated



Power Consumed

HVDC relays are one of the key components in the construction of alternative energy vehicle. The "alternative energy vehicles" includes not only EVs , but also HEVs, PHEV/PEVs, and fuel cell vehicles.

HVDC relays are used in various functions of alternative energy vehicles as follows:

- Main relays (electric protection / safety control): Often rated for large currents (from 80A to 600A), mainly used to disconnect the battery.
- + Fast charge relays: This type of relays are used to control the fast charging process. The rated current is from 32A to 600A.
- Auxiliary applications relays: Relays for these applications are mainly used for air conditioning, heating systems, DC/AC-converters, etc. The typical rating is between 20A and 40A.
- + HV Pre-chargerelays: Used in pre-charge circuits.





Electric & Hybrid Vehicles ***



1 Main relays: HFE82V-100B, HFE82V-150D, HFE82V-200D, HFE82V-250C, HFE82V-300C, HFE82V-400M, HFE82V-500M, HFE82V-600, HFE82V-200B, HFE82V-400D

2 Pre-charge relays: HFE80V-20D, HFE80V-20C, HFV30-20, HFK9-TC

3 Fast charge relays: HFE82V-100B, HFE82V-150D, HFE82V-200D, HFE82V-250C, HFE82V-300C, HFE82V-400M, HFE82V-500M, HFE82V-600, HFE82V-200B, HFE82V-400D

4 Normal charge relays: HFE80V-20C, HFE80V-40, HFE82V-40E, HFE82V-60B

5 HV auxiliary relays: HFE80V-20C, HFE80V-40, HFE82V-40E, HFE82V-60B



Power Charging Devices *******

Alternative energy vehicles use a system of charging stations, wall boxes, and charging posts to power up.

- + Charging stations can charge a multiple alternative energy vehicles at the same time. These types of stations are mainly used for public alternative energy vehicles and person shuttle buses.
- + Charging posts are typically located in residential or business areas and are mainly used for private vehicle charging.

HVDC relays function within charging devices is by switching DC power. These devices generally use HFE82, HFE85P relay types with rated currents from 40A to 350A.



48VDC Start-stop System has good performance in reducing fuel consumption and high price-performance ratio, which can increase the energy efficiency about 5% to 10%. It is a big trend of automotive industry. DC relays of Hongfa can provide safe and reliable functionality for 48VDC system, and can be used for fuel pump control, power steering, air conditioning and PTC heater.





48VDC Battery Systems ***

- Significantly improvement of motor efficiency
- Electric safety is mandatory





PV & Energy Storage Solutions ***

The energy storage industry is a forward-looking technology to promote the development of new energy industry. It has developed into various technical types such as physical energy storage, electrochemical energy storage, heat storage and hydrogen storage.

HVDC relays can be used in energy storage for different applications such as new energy grid-connected, electric vehicles, smart grids, microgrids, distributed energy systems, home energy storage systems, and power supply projects in areas without electricity etc. It can solve the intermittent and unstable problems brought by the grid connection of energy storage and power generation, ensure the reliability of the power supply of the microgrid system, and realize the dynamic adjustment of high power and reduce the impact on the power grid.





HVDC power supply systems can exceed 90% of energy efficiency compared to standard systems.

UPS DC power supply devices in the data center can convert the single-phase 230VAC of commercial power into 380VDC, then supply power for end applications. This reduces power consumption losses caused by conversion by more than 97%, while also reducing the power consumption required to air condition the servers.







◆ Compared to AC power conversion, DC power supply mode can save 10%-20% of the power.







Main relays: HFE88P-150, HFE88P-250, HFE88P-350

Type HFE82V-20		HFE82V-20	HFE82V-40E	
Appearance		CHIPESZY.20 Tso.12 H 02.11		
Dimensions(mm) 78.0 × 39.8 × 46.1		78.0 × 39.8 × 46.1	67.0 × 32.6 × 47.0	
Contact	Arrangement	1H	1H	
Contact	Resistance	4.5mΩ max.(at 20A)	4.5mΩ max.(at 40A)	
Operatio	on Voltage	75% Un max.	75% Un max.	
Rated L	oad Current	20A	40A	
Load Vo	oltage	450VDC Type	450VDC Type	
Max Bre	aking Current	200A (1000VDC,1op)	400A (300VDC,1op)	
Max Sw	itching Voltage	1000VDC	1000VDC	
Max Switching Power		18kW	18kW	
Electrical Endurance		Switching: 7.5×10^4 ops (450V/20A) Switching: 5×10^4 ops (750V/20A) Switching: 3×10^4 ops (1000V/20A)	Switching: 2×10 ⁴ ops (450V/40A) Making: 7.5×10 ⁴ ops (450V/40A) Switching: 1×10 ³ ops (750V/40A) Making: 7.5×10 ⁴ ops (750V/40A) Switching: 500 ops (1000V/40A) Making: 5×10 ⁴ ops (1000V/40A)	
Dielectric	Between Coil & Contacts	4000VAC 1min	4000VAC 1min	
Strength	Between Open Contacts	3000VAC 1min	3000VAC 1min	
Mechan	ical Endurance	2×10 ⁵ ops	2×10⁵ ops	
Non	ninal Voltage (DC)	12, 24	12, 24	
Coi	l Power	2.6W	2.6W	
Coil Inpu	ut Terminal	QC	Connector	
Load Inp	out Terminal	QC	Bolt terminal female	
Unit We	ight	Approx. 140g	Approx. 140g	
Vibratio	n	10Hz to 500Hz 49m/s ²	10Hz to 500Hz 49m/s ²	
Humidity	/	5% to 85% RH	5% to 85% RH	
Ambient Temperature		-40°C to 85°C	-40°C to 85°C	
Layout (Bottom View)		2XØ 6.1±0.1	- O	

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Туре			HFE82V-60B
Appearance		nce	C ATELY AND BE LOAD CONTRACTOR
Dim	ensio	ons(mm)	64.0 × 33.0 × 52.8
Con	tact A	Arrangement	1H
Con	itact F	Resistance	1mΩ max.(at 60A)
Ope	ratior	n Voltage	75% Un max.
Rate	ed Lo	ad Current	60A
Loa	d Volt	age	450VDC Type
Max	Brea	aking Current	600A (450VDC,1op)
Max	Swit	ching Voltage	800VDC
Max	Swit	ching Power	54kW
Elec	trical	Endurance	Making: 7.5×10 ⁴ ops (450V/60A) Making: 5×10 ⁴ ops (750V/60A) Switching: 1×10 ³ ops (450V/60A Breaking: 2×10 ⁴ ops (750V/30A)
Diele	ectric	Between Coil & Contacts	3600VAC 1min
Stre	ngth	Between Open Contacts	3000VAC 1min
Med	hanic	al Endurance	2.5×10⁵ ops
Coil	Nomi	nal Voltage (DC)	12, 24
001	Coil	Power	5.2W
Coil	Input	Terminal	L: wire
Loa	d I npu	ut Terminal	Bolt terminal female
Unit	Weig	jht	Approx. 170g
Vibr	ation		10Hz to 500Hz 49m/s ²
Hun	nidity		5% to 85% RH
Am	pient ⁻	Temperature	-40°C to 85°C
Layout (Bottom View)		Bottom View)	⁷⁰ ¹ ¹ ^{2ר6.2±0.1} 52±0.2

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Electric & Hybrid Vehicles

HFE82V-100D



76.0 × 40.0 × 75.0

1H

1mΩ max.(at 20A)

75% Un max.

100A

450VDC Type

1000A (300VDC,1op)

800VDC

90kW

4000VAC 1min

3000VAC 1min

2×10⁵ ops

12, 24

5.5W

Connector

Bolt terminal female

Approx. 280g

10Hz to 500Hz 49m/s²

5% to 85% RH

-40°C to 85°C



Type HFE82V-150D		HFE82V-150H
Appearance	C antico and and and antico an	
Dimensions(mm)	76.0 × 36.0 × 66.8	69.0 × 34.0 × 60.8
Contact Arrangement	1H	1H
Contact Resistance	0.5mΩ max.(at 150A)	≤0.5mΩ(at 150A)
Operation Voltage	75% Un max.	75% Un max.
Rated Load Current	150A	150A
Load Voltage	450VDC Type	750VDC Type
Max Breaking Current	1200A (300VDC,1op)	1200A (300VDC,1op)
Max Switching Voltage	800VDC	750VDC
Max Switching Power	135kW	225kW
Electrical Endurance	Switching: 1×10 ³ ops (450V/150A) Switching: 3×10 ³ ops (200V/120A) Switching: 1×10 ² ops (750V/150A)	Making: 1×10 ⁴ ops (22.5V/150A) Breaking: 500 ops (450V/150A) Breaking: 100 ops (750V/150A)
Between Coil & Dielectric Contacts	4000VAC 1min	3000VAC 1min
Strength Between Open Contacts	3000VAC 1min	3000VAC 1min
Mechanical Endurance	2×10 ⁵ ops	2×10 ⁵ ops
Nominal Voltage (DC)	12, 24	12, 24
Coil Power	5.5W	5.2W
Coil Input Terminal	Connector	Connector
Load Input Terminal	Bolt terminal female	Bolt terminal female
Unit Weight	Approx. 280g	Approx. 170g
Vibration	10Hz to 500Hz 49m/s ²	10Hz to 500Hz 49m/s ²
Humidity	5% to 85% RH	5% to 85% RH
Ambient Temperature	-40°C to 85°C	-40°C to 85°C
Layout (Bottom View)	2ר6.2±0.1 62±0.2	2ר6.2° ^{0.1} 57±0.3

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Туре		HFE82V-200D	HFE82V-250C
Appear	ance	C return nor ta case B B B B B B B B B B B B B B B B B B B	Constant Sectors Secto
Dimensions(mm)		78.7 × 36.0 × 72.0	88.3 × 42.5 × 74.5
Contac	t Arrangement	1H	1H
Contac	t Resistance	0.5 mΩ (at 200A)	0.5mΩ max.(at 250A)
Operati	on Voltage	75% Un max.	75% Un max.
Rated L	_oad Current	200A	250A
Load V	oltage	450VDC Type	500VDC Type
Max Br	eaking Current	1200A (300VDC,1op)	2000A (450VDC,1op)
Max Sv	vitching Voltage	800VDC	800VDC
Max Sv	vitching Power	135kW	250kW
Electric	al Endurance	Making: 1.5 ×10 ⁴ ops (22.5VDC, 200A) Breaking: 800 ops (450VDC, 200A) Breaking: 3000 ops (200VDC, 120A) Breaking: 100 ops (450VDC, -200A) Breaking: 1 ops (300VDC, 120A)	Breaking: 1 ×10 ³ ops (450VDC, 250A) Breaking: 1×10 ³ ops (450VDC, -250A) Breaking: 2×10 ² ops (750VDC, 250A) Breaking: 2×10 ² ops (750VDC, -250A)
Dielectri	Between Coil & Contacts	4000VAC 1min	2600VAC 1min
Strength	Between Open Contacts	3000VAC 1min	2600VAC 1min
Mechar	nical Endurance	2×10⁵ ops	2×10⁵ ops
No	minal Voltage (DC)	12, 24	12, 24
Coll	oil Power	5.5W	6.0W
Coil Inp	out Terminal	Connector	Connector
Load In	put Terminal	Bolt terminal female	Bolt terminal female
Unit We	eight	Approx. 280g	Approx. 360g
Vibratio	n	10Hz to 500Hz 49m/s ²	10Hz to 500Hz 49m/s ²
Humidit	ty	5% to 85% RH	5% to 85% RH
Ambier	nt Temperature	-40°C to 85°C	-40°C to 85°C
Layout (Bottom View)		⁶ ⁴ ⁵ ⁶ ⁶ ⁶ ² ר6±0.1 ⁶ ⁶ ⁶ ⁶ ⁶ ⁶ ⁶ ⁶ ⁶ ⁶	2ר6° ^{40.1} 70.5±0.2

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Electric & Hybrid Vehicles

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Туре		HFE82V-300C	HFE82V-400C
Appearance			
Dim	ensions(mm)	88.3 × 42.5 × 74.5	88.3 × 42.5 × 74.5
Con	tact Arrangement	1H	1H
Con	tact Resistance	0.5mΩ max.(at 250A)	0.16mΩ max.(at 400A)
Ope	ration Voltage	75% Un max.	75% Un max.
Rate	ed Load Current	300A	400A
Loa	d Voltage	500VDC Type	750VDC Type
Max	Breaking Current	2000A (750VDC,1op)	3500A (450VDC,1op)
Max	Switching Voltage	800VDC	1000VDC
Max Switching Power		300kW	1575kW
Electrical Endurance		Breaking: 1 ×10 ³ ops (450VDC, 300A) Breaking: 1×10 ³ ops (450VDC, -300A) Breaking: 5×10 ² ops (750VDC, 300A) Breaking: 5×10 ² ops (750VDC, -300A)	Making: 7.5×10 ⁴ ops (20V/140A) Breaking: 400 ops (450V/400A) Breaking: 100 ops (750V/400A) Breaking: 20 ops (1000V/400A)
Diele	Between Coil & Contacts	2600VAC 1min	3000VAC 1min
Stre	ngth Between Open Contacts	2600VAC 1min	3000VAC 1min
Mec	hanical Endurance	2×10 ⁵ ops	2×10⁵ ops
Coil	Nominal Voltage (DC)	12, 24	12, 24
001	Coil Power	6.0W	6.0W
Coil	Input Terminal	Connector	Connector
Load	l Input Terminal	Bolt terminal female	Bolt terminal female
Unit	Weight	Approx. 360g	Approx. 395g
Vibr	ation	10Hz to 500Hz 49m/s ²	10Hz to 500Hz 49m/s ²
Hum	idity	5% to 85% RH	5% to 85% RH
Ambient Temperature		-40°C to 85°C	-40°C to 85°C
Layout (Bottom View)		2ר6₀°°.1 92 70.5±0.2	70.5±0.2

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Туре			HFE82V-300E
Арр	Appearance		Contraction Contr
Dim	ensio	ons(mm)	43.0 × 85.0 × 74.0
Con	tact A	Arrangement	1H
Con	tact F	Resistance	0.2mΩ max.(at 300A)
Ope	ratior	n Voltage	75% Un max.
Rate	ed Lo	ad Current	300A
Loa	d Volt	age	750VDC Type
Max	Brea	aking Current	3500A (450VDC,1op)
Max	Swit	ching Voltage	1000VDC
Max	Swit	ching Power	1575kW
Elec	trical	Endurance	Making: 7.5×10 ⁴ ops (20V/140A Breaking: 500 ops (450V/300A) Breaking: 200 ops (750V/300A)
Diele	ectric	Between Coil & Contacts	3000VAC 1min
Stre	ngth	Between Open Contacts	3000VAC 1min
Mec	hanic	al Endurance	2×10 ⁵ ops
Coil	Nomi	nal Voltage (DC)	12
001	Coil	Power	6.0W
Coil	Input	Terminal	Connector
Loa	d I npu	ut Terminal	Bolt terminal female
Unit	Weig	jht	Approx. 395g
Vibr	ation		10Hz to 500Hz 49m/s ²
Hum	nidity		5% to 85% RH
Amb	pient ⁻	Temperature	-40°C to 85°C
Laye	out (E	Bottom View)	2ר6 ⁰⁰¹ 2×05 ⁰⁰¹ 705+0.2

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Electric & Hybrid Vehicles

HFE82V-400M



95.8 × 49.0 × 93.0

1H

0.5mΩ max.(at 250A)

75% Un max.

400A

450VDC Type

2000A (450VDC,1op)

800VDC

360kW

Making: 7.5×10^4 ops (22.5VDC, 140A) Breaking: 7.5×10^4 ops (450VDC, 5A) Breaking: 2.5×10^4 ops (450VDC, 10A) Breaking: 3×10^3 ops (750VDC, 200A)

3000VAC 1min

3000VAC 1min

2×10⁵ ops

12, 24

6.0W

Connector

Bolt terminal female

Approx. 740g

10Hz to 500Hz 49m/s²

5% to 85% RH

-40°C to 85°C



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Electric & Hybrid Vehicles

Туре		HFE82V-500M	HFE82V-600
Appearance			
Dimensions(mm)		74.0 × 64.2 × 83.5	146.0 × 66.6 × 132.8
Cont	act Arrangement	1H, AUX: 1B	1H
Cont	act Resistance	Main: $0.15m\Omega$ max.(at 200A), AUX: $\leq 150m\Omega$ (at 0.1A)	0.15mΩ max.(at 20A)
Oper	ation Voltage	75% Un max.	75% Un max.
Rate	d Load Current	500A, AUX: 6VDC 10mA	600A
Load	Voltage	1000VDC Type	450VDC Type
Max	Breaking Current	1500A (1000VDC,1op)	2500A (800VDC,1op)
Max	Switching Voltage	1000VDC	800VDC
Max	Switching Power	750kW	720kW
Electrical Endurance		Making: 2.5 ×10 ⁴ ops (200VDC, 100A) Breaking: 50 ops (1000VDC, 500A) Breaking: 100 ops (750VDC, 500A) Breaking: 500 ops (500VDC, 500A)	Making: 5 ×10 ⁴ ops (750VDC, 120A) Switching: 5×10 ² ops (750VDC, 600A) Switching: 1×10 ³ ops (750VDC, -300A) Switching: 1×10 ² ops (1000VDC, 600A)
Be Dielectric Co	Between Coil & Contacts	4000VDC 1min	4000VAC 1min
Stren	gth Between Open Contacts	4000VDC 1min	3000VAC 1min
Mech	anical Endurance	20×10 ⁴ ops	2×10 ⁵ ops
Coil	Nominal Voltage (DC)	12, 24	12, 24
COI	Coil Power	6.0W	Driving: 50.0W, Holding: 10.0W
Coil	nput Terminal	Connector	Wire
Load	Input Terminal	Bolt terminal female	Bolt terminal female
Unit	Weight	Approx. 600g	Approx. 1850g
Vibra	ition	490m/s ²	10Hz to 500Hz 49m/s ²
Hum	dity	5% to 85% RH	5% to 85% RH
Amb	ient Temperature	-40°C to 85°C	-40°C to 85°C
Layo	ut (Bottom View)	<u>3ר6.2°°2</u>	73.6±0.4

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HFE85V&HFE80V

Туре		HFE85V-	300M	HFE80V-20C
Appearance				C HENRY CONTROL
Dimensi	ions(mm)	62.5 × 84.5	× 72.5	30.1 × 30.0 × 29.2
Contact	Arrangement	1H, no polarity // AUX: 1 Form B (NC)		1H
Contact	Resistance	$0.25m\Omega$ max.(at 200A), typ. $0.15m\Omega$		5mΩ max.(at 20A)
Operatio	on Voltage	75% Un	max.	75% Un max.
Rated L	oad Current	300A	A Contraction of the second seco	20A
Load Vo	ltage	750VDC	Туре	450VDC Type
Max Bre	aking Current	2000/ (450VDC	A ,1op)	30A (450VDC,5ops)
Max Sw	itching Voltage	750VE	C	750VDC
Max Sw	itching Power	300kW		18kW
Electrica	al Endurance	Making: 140A (cap.) @ 20VDC -> 75.000 ops Switching: 100A @ 500VDC -> 3.000 ops Breaking -300A @ 750VDC -> 500 ops Breaking 2000A @ 450VDC -> 1 ops	Making 100A @ 200VDC -> 25.000 ops Breaking 300A @ 750VDC -> 500 ops Breaking 300A @ 450VDC -> 1.000 ops	Making: 7.5×10^4 ops (450V/20A) Switching: 1×10^4 ops (450V/10A) Switching: 3×10^3 ops (450V/20A)
Dielectric	Between Coil & Contacts	3000VAC 1min		3000VAC 1min
Strength	Between Open Contacts	3000VAC	1min	2000VAC 1min
Mechan	ical Endurance	2×10 ⁵ ops		2×10⁵ ops
Non	ninal Voltage (DC)	12, 2	4	12, 24, 48
Coi	Power	Driving: 60W, He	olding: 4.3W	3.0W
Coil Inpu	ut Terminal	Connector (MC	QS, 4-pole)	QC or PCB
Load Inp	out Terminal	Screw terminal male M6		QC or PCB
Unit We	ight	420g + 20g		Approx. 50g
Vibration	n	10Hz to 500H	z 49m/s ²	10Hz to 500Hz 49m/s ²
Humidity	/	5% to 85% RH		5% to 85% RH
Ambient	t Temperature	-40°C to	85°C	-40°C to 85°C
Layout (Bottom View)		704 2ר7.5±0. 1 1		<u>2×4.5±0.1</u> 45

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HFE80V

Туре

Appearance

Dimensions(mm)

Contact Arrangement

Contact Resistance

Operation Voltage

Rated Load Current

Max Breaking Current Max Switching Voltage

Max Switching Power

Electrical Endurance

Dielectric Between Coil & Contacts

Contacts Mechanical Endurance

Nominal Voltage (DC)

Coil Power

Coil Input Terminal

Load Input Terminal

Ambient Temperature

Layout (Bottom View)

Unit Weight

Vibration Humidity

Between Open

Strength

Coil

Load Voltage

Pre-charge Solution

HFE80V-40

30.1 × 30.0 × 29.2

1H

5mΩ max.(at 20A)

75% Un max.

40A

450VDC Type

50A (450VDC,1ops)

750VDC

27kW

Making: 7.5×10⁴ ops (450V/35A)

Switching: 1×10⁴ ops (450V/10A)

Switching: 1×10^3 ops (450V/40A)

3000VAC 1min

2000VAC 1min

2×10⁵ ops

12, 24, 48

3.0W

QC or PCB

QC or PCB

Approx. 51g 10Hz to 500Hz 49m/s²

5% to 85% RH

-40°C to 85°C

2ר4.5

HFE80V-60

55.1 × 42.6 × 38.9

1A

 \leq 1.5m Ω (at 20A)

75% Un max.

60A

200VDC Type

100A (200VDC 1op)

250VDC

24kW

Switching: 5x10⁴ ops (48V/60A) Switching: 3x10⁴ ops (72V/60A)

Switching: 1x10⁴ ops (150V/60A) Switching: 7.5x10⁴ ops (150V/10A)

Switching: 5000 ops (200V/60A) Switching: 5000 ops (250V/40A)

2500VAC 1min

3000VAC 1min

2×10⁵ ops

12

3.0W

QC / P: PCB terminal

QC / P: PCB terminal

Approx. 200g

10Hz to 500Hz 49m/s²

5% to 85% RH

-40°C to 85°C

2ר6.2±0.1

 60.6 ± 0.3

Switching: 2000 ops (250V/60A)

48VDC Battery Systems

Туре		HFV19-100	HFV29-200	
Appearance		CELEVITA-SEC Sectors Sectors CELEVITA-SEC Sectors Sectors Sectors Sectors Sectors		
Dimensions(mm)		52.0 × 41.6 × 27.0	82.1 × 70.0 × 36.0	
Conta	act Arrangement	1H	1H	
Conta	act Resistance	0.75 mΩ max. @100A BOL	0.5mΩ max. (300A 10s) @BOL 1.0mΩ max. (300A 10s) @EOL	
Oper	ation Voltage	70% Un max.	70% Un max.	
Rate	Load Current	100A	200A	
Load	Voltage	48VDC Type	60VDC Type	
Max Breaking Current		2500A (55VDC 1ops)	2500A (60VDC 1ops)	
Max	Switching Voltage	60VDC	60VDC	
Max Switching Power		12kW	15kW	
Electrical Endurance		$\begin{array}{llllllllllllllllllllllllllllllllllll$	$\begin{array}{l} \mbox{Making: } 2.2 \times 10^5 \mbox{ ops } (60 \mbox{V/±3A}) \mbox{ Breaking: } 1.5 \times 10^5 \mbox{ ops } (60 \mbox{V/10A}) \mbox{ Breaking: } 1.0 \times 10^5 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 1.0 \times 10^5 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ Breaking: } 0.5 \times 10^4 \mbox{ ops } (60 \mbox{V/20A}) \mbox{ ops } (60$	
Dieleo	Between Coil & Contacts	1000VAC 1min	1000VAC 1min	
Stren	gth Between Open Contacts	1000VAC 1min	1000VAC 1min	
Mech	anical Endurance	5×10 ⁵ ops	5×10⁵ ops	
l Coil	Nominal Voltage (DC)	12, 24, 48	12, 24, 48	
(Coil Power	2.88W	3.2W	
Coil I	nput Terminal	Cable and connector (connector version coming soon) $^{\!\!\!\!*1}$	Connector	
Load	Input Terminal	(M6)	Welding connection / Bolt connection (M8)	
Unit \	Veight	Approx.120g	Approx. 315g	
Vibra	tion	Random vibration (misoperation) GS95024-3-1, M4 curve D half sine (misoperation) 22 to 500Hz,min. 10g	GS95024-3-1, M4 Profile D	
Humi	dity	5% to 85% RH	5% to 85% RH	
Ambi	ent Temperature	-40°C to 85°C	-40°C to 85°C	
Layout (Bottom View)		*1): Connector version HEV/19-100B will be available from June 2021	56±0.3	

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HFE82P

Туре	HFE82P-20	HFE82P-150W
Appearance	C INFERTS	C concernent C
Dimensions(mm)	78.0 × 39.8 × 46.1	88.8 × 43.0 × 83.3
Contact Arrangement	1H	1H
Contact Resistance	4.5mΩ max.(at 20A)	0.3mΩ max.(at 250A)
Operation Voltage	80% Un max.	80% Un max.
Rated Load Current	20A	150A
Load Voltage	1000VDC Type	1500VDC Type
Max Breaking Current	200A (1000VDC,1op)	1500A (1000VDC,1op)
Max Switching Voltage	1500VDC	1500VDC
Max Switching Power	20kW	337kW
Electrical Endurance	Switching: 1×10 ⁴ ops (1000V/15A) Switching: 1×10 ⁴ ops (1500V/15A) Making: 1.5×10 ⁴ ops (1500V/40A)	Breaking: 1.5×10 ⁴ ops (1500V/20A) Breaking: 500 ops (1500V/60A) Breaking: 150 ops (1500V/150A)
Between Coil & Dielectric Contacts	4000VAC 1min	4000VAC 1min
Strength Between Open Contacts	4000VAC 1min	4000VAC 1min
Mechanical Endurance	2×10 ⁵ ops	2×10 ⁵ ops
Nominal Voltage (DC)	12, 24	12, 24
Coil Power	2.6W	Driving: 36W, Holding: 6W
Coil Input Terminal	QC	C: Connector
Load Input Terminal	QC	5: Bolt terminal female
Unit Weight	Approx. 160g	Approx. 370g
Vibration	10Hz to 55Hz, 1.5mm double amplitude	10Hz to 55Hz 49m/s ²
Humidity	5% to 85% RH	5% to 95% RH
Ambient Temperature	-40°C to 85°C	-40°C to 85°C
Layout (Bottom View)	<u>2ר6.1±0.1</u> 64±0.2	00 07 07 07 07 07 07 07 07 07 07 07 07 0

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Туре	HFE82P-250W	HFE82P-500K-HA
Appearance		
Dimensions(mm)	88.8 × 43.0 × 83.3	91.2 × 44.0 × 95.0
Contact Arrangement	1H	1H, 1A
Contact Resistance	0.3mΩ max.(at 250A)	0.2mΩ max.(at 500A)
Operation Voltage	80% Un max.	75% Un max.
Rated Load Current	250A	500A
Load Voltage	1500VDC Type	1000VDC Type
Max Breaking Current	2000A (1000VDC,1op)	1200A (1000VDC,1op)
Max Switching Voltage	1500VDC	1500VDC
Max Switching Power	562kW	750kW
Electrical Endurance	Breaking: 1.5×10 ⁴ ops (1500V/20A) Breaking: 500 ops (1500V/140A) Breaking: 100 ops (1500V/250A)	Making: 5×10 ⁴ ops (20V/200A) Breaking: 20 ops (1000V/500A) Breaking: 80 ops (750V/500A) Breaking: 6000 ops (1500V/60A)
Between Coil & Dielectric Contacts	4000VAC 1min	4000VAC 1min
Strength Between Open Contacts	4000VAC 1min	4000VAC 1min
Mechanical Endurance	2×10 ⁵ ops	2×10 ⁵ ops
Nominal Voltage (DC)	12, 24	12, 24
Coil Power	Driving: 36W, Holding: 6W	6W
Coil Input Terminal	C: Connector	Connector
Load Input Terminal	5: Bolt terminal female	Bolt terminal female
Unit Weight	Approx. 370g	Approx. 510g
Vibration	10Hz to 55Hz 49m/s ²	10Hz to 500Hz 49m/s ²
Humidity	5% to 95% RH	5% to 75% RH
Ambient Temperature	-40°C to 85°C	-40°C to 85°C
Layout (Bottom View)	2xØ6±0.1 69±0.3	74±0.3 2xØ6.5±0.1

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HFE85P & HFE88P

Туре		HFE85P-150	HFE85P-250	
Appearance				
Dimensions(mm)		80.4 × 62.3 × 72.8	80.4 × 62.3 × 72.8	
Con	tact Arrangement	1H, 1A	1H, 1A	
Con	tact Resistance	0.3mΩ max.(at 150A)	0.3mΩ max.(at 250A)	
Ope	ration Voltage	80% Un max.	80% Un max.	
Rate	ed Load Current	150A	250A	
Load	d Voltage	1000VDC Type	1000VDC Type	
Мах	Breaking Current	2000A (320VDC,1op)	2000A (320VDC,1op)	
Max	Switching Voltage	1000VDC	1000VDC	
Max	Switching Power	300kW	400kW	
Electrical Endurance		Making: 7.5×10 ⁴ ops (37.5V/150A) Breaking: 3000 ops (450V/150A) Breaking: 200 ops (450V/-150A) Breaking: 1500 ops (750V/150A) Breaking: 100 ops (750V/-150A) Breaking: 1000 ops 1000V/150A) Breaking: 1 ops (320V/1000A) Breaking: 1000 ops 1000V/150A)	Making: 7.5×10 ⁴ ops (37.5V/250A) Breaking: 1500 ops (450V/250A) Breaking: 100 ops (450V/-250A) Breaking: 1000 ops (750V/250A) Breaking: 50 ops (750V/-250A) Breaking: 500 ops (1000V/250A) Breaking: 1 ops 030V/2200A) Breaking: 500 ops 1000V/250A)	
Dielectric Strength	Between Coil & Contacts	3300VAC 1min	3300VAC 1min	
	ngth Between Open Contacts	3300VAC 1min	3300VAC 1min	
Mec	hanical Endurance	2×10 ⁵ ops	2×10 ⁵ ops	
Coil	Nominal Voltage (DC)	12, 24	12, 24	
001	Coil Power	Driving: 26.0W, Holding: 3.0W	Driving: 26.0W, Holding: 3.0W	
Coil	Input Terminal	L: wire	L: wire	
Load	I Input Terminal	Bolt terminal female	Bolt terminal female	
Unit	Weight	Approx. 400g	Approx. 400g	
Vibr	ation	10Hz to 55Hz, 1.5mm double amplitude	10Hz to 55Hz, 1.5mm double amplitude	
Humidity		5% to 85% RH	5% to 85% RH	
Ambient Temperature		-40°C to 85°C	-40°C to 85°C	
Layout (Bottom View)			<u>2×062°2</u> 68.4±0.2	

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Туре		HFE85P-3	HFE88P-150		
Appearance					
Dimensi	Dimensions(mm) 80.4 × 62.3 × 72.8		\$ 72.8	104.0 × 70.0 × 107.9	
Contact	Arrangement	1H, 1A		1H, 1A	
Contact	Resistance	0.3mΩ max.(at 250A)		0.25mΩ max.(at 150A)	
Operatio	on Voltage	80% Un max.		80% Un max.	
Rated L	oad Current	300A		150A	
Load Voltage		1000VDC Type		1500VDC Type	
Max Bre	eaking Current	2000A (320VDC,1op)		1000A (1000VDC,1op)	
Max Sw	itching Voltage	1500VDC		1500VDC	
Max Switching Power		450kW		450kW	
Electrical Endurance		Making: 7.5×10 ⁴ ops (37.5V/300A) Br Breaking: 50 ops (450V/-300A) Br Breaking: 20 ops (750V/-300A) Br Breaking: 1 ops(320V/2000A) Br	eaking: 1000 ops (450V/300A) eaking: 500 ops (750V/300A) eaking: 100 ops(1000V/300A)	Breaking: 3000 ops (1500V/100A) Breaking: 2000 ops (1500V/150A) Breaking: 1 ops(1500V/1000A)	
Dielectric	Between Coil & Contacts	3000VAC 1min		4000VAC 1min	
Strength	Between Open Contacts	3000VAC 1min		4000VAC 1min	
Mechan	ical Endurance	2×10 ⁵ ops		2×10⁵ ops	
Nor	minal Voltage (DC)	12, 24		12, 24	
Coil	il Power	Driving: 26.0W, Holding: 3.0W		Driving: 50.0W, Holding: 5.0W	
Coil Inp	ut Terminal	L: wire		Connector	
Load Inp	put Terminal	5: Bolt terminal female		Bolt terminal female	
Unit We	ight	Approx. 400g		Approx. 1020g	
Vibratio	n	10Hz to 55Hz, 1.5mm double amplitude		10Hz to 55Hz , 1.5mm double amplitude	
Humidity		5% to 85% RH		5% to 85% RH	
Ambien	t Temperature	-40°C to 85°C		-40°C to 85°C	
Layout (Bottom View)		<u>2ר62°2</u> 68.4±0.2		91±0.4 4ר6.5°°2 4ר6.5°°2	

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HFE88P

Туре	HFE88P-250	HFE88P-350	
Appearance			
Dimensions(mm)	104.0 × 70.0 × 107.9	104.0 × 70.0 × 107.9	
Contact Arrangement	1H, 1A	1H, 1A	
Contact Resistance	0.25mΩ max.(at 250A)	0.25mΩ max.(at 350A)	
Operation Voltage	80% Un max.	80% Un max.	
Rated Load Current	250A	350A	
Load Voltage	100VDC Type, 1500VDC Type	100VDC Type, 1500VDC Type	
Max Breaking Current	1500A (1000VDC,1op)	2000A (1000VDC,1op)	
Max Switching Voltage	1000VDC, 1500VDC	1000VDC, 1500VDC	
Max Switching Power	562kW	787kW	
Electrical Endurance	Breaking: 3000 ops (1500V/100A) Breaking: 2000 ops (1500V/150A) Breaking: 1000 ops (1000V/250A) Breaking: 1 ops(1000V/1500A) Breaking: 1 ops(1500V/1000A)	Breaking: 5000 ops (1500V/100A) Breaking: 3000 ops (1500V/150A) Breaking: 1000ops (1000V/350A) Breaking: 500 ops (1500V/150A) Breaking: 1 ops (1000V/2000A) Breaking: 1 ops (1500V/1000A)	
Between Coil & Dielectric Contacts	4000VDC 1min	4000VDC 1min	
Strength Between Open Contacts	4000VDC 1min	4000VDC 1min	
Mechanical Endurance	2×10 ⁵ ops	2×10 ⁵ ops	
Nominal Voltage (DC)	12, 24	12, 24	
Coil Power	Driving: 50.0W, Holding: 5.0W	Driving: 50.0W, Holding: 5.0W	
Coil Input Terminal	C: Connector	C: Connector	
Load Input Terminal	5: Bolt terminal female	5: Bolt terminal female	
Unit Weight	Approx. 1020g	Approx. 1020g	
Vibration	10Hz to 55Hz 49m/s ²	10Hz to 55Hz 49m/s ²	
Humidity	5% to 85% RH	5% to 85% RH	
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	
Layout (Bottom View)	91±0.4 4ר6.5 ^{+0.2}	91±0.4 4ר6.5°2 4ר6.5°2	

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Туре		HFE88P-400	HFE88P-600	HFE88P-750	
Appearance					
Dimensions(mm)		104.0 × 52.0 × 104.0	104.0 × 70.0 × 106.0	104.0 × 70.0 × 106.0	
Contact Arrangement		1H, 1A	1H, 1A	1H	
Contact	Resistance	0.25mΩ max.(at 400A)	0.2mΩ max.(at 600A)	0.2mΩ max.(at 750A)	
Operatio	on Voltage	80% Un max.	80% Un max.	80% Un max.	
Rated L	oad Current	400A	600A	750A	
Load Vo	oltage	100VDC Type, 1500VDC Type	100VDC Type, 1500VDC Type	100VDC Type, 1500VDC Type	
Max Bre	eaking Current	2000A (1000VDC,1op)	2000A (1000VDC,1op)	2000A (1000VDC,1op)	
Max Switching Voltage		1000VDC, 1500VDC	1000VDC, 1500VDC	1000VDC, 1500VDC	
Max Sw	vitching Power	900kW	1350kW	1687kW	
Electrical Endurance		Breaking: 2×10 ⁴ ops (1500V/10A) Breaking: 1.5×10 ² ops (1500V/300A) Breaking: 1×10 ² ops (1500V/400A)	Breaking: 3×10 ³ ops (500V/600A) Breaking: 2×10 ³ ops (1000V/300A) Breaking: 1×10 ³ ops (1000V/600A)	Breaking: 1×10³ops (450V/750A) Breaking: 1×103 ops (1000V/600A) Breaking: 5×10² ops (1000V/750A)	
Dielectric	Between Coil & Contacts	4000VDC 1min	4000VDC 1min	4000VDC 1min	
Strength	Between Open Contacts	4000VDC 1min	4000VDC 1min	4000VDC 1min	
Mechan	ical Endurance	2×10⁵ ops	2×10⁵ ops	2×10⁵ ops	
Nor	minal Voltage (DC)	12, 24	12, 24	12, 24	
Coi	il Power	Driving: 50.0W, Holding: 5.0W	Driving: 50.0W, Holding: 5.0W	Driving: 50.0W, Holding: 5.0W	
Coil Inp	ut Terminal	C: Connector	C: Connector	C: Connector	
Load Inp	put Terminal	5: Bolt terminal female	5: Bolt terminal female	5: Bolt terminal female	
Unit We	ight	Approx. 785g	Approx. 1040g	Approx. 1040g	
Vibratio	n	10Hz to 55Hz 49m/s ²	10Hz to 55Hz 49m/s ²	10Hz to 55Hz 49m/s ²	
Humidity	у	5% to 85% RH	5% to 85% RH	5% to 85% RH	
Ambient Temperature		-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	
Layout (Bottom View)		3x06.0_0 ^{+0.1}	4x06.5 ^{+0.1} 91±0.4	4xØ6.5 ^{+0.1} 91±0.4	

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Suggested Connectors

Connector feature	Matched HVDC Relay Supplier	Supplier	Outline drawing	Connector PN
	HFE82V-250C HFE82V-200D HFE82V-300C HFE82V-400M	Yazaki		7283-1020
ZPIN		ТНВ		0435S eries
	HFE88P	Yazaki		_
4PIN		ТНВ		04387 Series
9-pole ISO-Socket	HFE80V-20	Hella		8JA 003 526-002 or similar





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