ПРОМЫШЛЕННЫЕ ПРИВОДЫ
Техническое описание на модули
HES880

Mobile drive modules
HES880-104

Originally designed for full- and hybridelectric heavy working machines the HES880 takes the compact and rugged design of ACS880 platform even further. Unlike other drive modules HES880 always comes with IP67 cast aluminum casing and as such provides the ultimate solution in robustness and compactness for applications with tight spaces and harsh environment. HES880 can withstand 4g vibrations and 30g shocks.

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No maintenance needed

Maintenance free design
HES880 has no fans or electrolytic capacitors so it has no parts that would need maintenance during he product life cycle. Also the cleaning of the device is easy thanks to the high IP enclosure.

Advanced liquid cooling and compact design
Liquid cooling offers easy heat transfer without air filtering problems. Since the HES880 is fully liquid cooled, no additional filtered air cooling is needed. This improves the noise level and the total efficiency of the drive installation.

With a high input cooling temperature of up to 70 °C, the cooling system can be simplified and downsized, saving costs and reducing maintenance needs of the cooling system.

The HES880 liquid-cooled modules have extremely high power density making it the most compact drive in ABB offering. The small footprint enables significant space and weight reduction.

Rugged and reliable in hard conditions
With its high vibration tolerance, the HES880 offers the rugged, reliable performance in the harshest conditions.

Accurate, precise control without an encoder
With ABB's proven direct torque control (DTC) also encorderless control is possible with the motor. This also reduces your maintenance risk and costs. With DTC, the drive is designed to control induction, permanent magnet (PM), Synchronous reluctance (SynRM) and PM assisted Synchronous reluctance motors (PMaSynRM). DTC also extends the same control benefits to generators.

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One hardware, three operation modes

Versatile hardware
HES880 has three different firmwares. One hardware can be configured to operate in three modes.

When used in inverter mode, it controls the torque and speed of the electric motor. When used in its generator/line converter mode, it can control the DC-link voltage in your electrical drivetrain. The DC/DC mode lets you use the drive with a battery or super capacitor.

In optimal grid control (OGC) mode HES880 can generate off grid network e.g. hotel grid in vessels.

Mobile drive modules, HES880
- Inverter for motors up to 510 kW continuous and up to 760 kW peak electrical power (500 V and cosφ 0.98)
- Generator/line converter mode for grid connectivity
- DC/DC converter for battery, super capacitor or fuel cell interface, up to 620 kW
- As a fourth firmware option and slightly different hardware, the optimal grid control (OGC) mode HES880 can generate off grid network e.g. hotel grid in vessels
- High environmental protection class, IP67
- Wide ambient temperature range, -40 to +85 °C (-40 to 185 °F)
- Liquid cooling with high liquid input temperature, up to 70 °C (158 °F)

Main options:
- Liquid cooled, IP67 class chokes for DC/DC converter and LCLfilter for grid connection
- Internal brake chopper
- Encoded power connection and HVIL
- Drive Composer pro

Highlights
- Off-grid functionality ensures high quality grid
- Withstands heavy vibration and shocks
- Can be installed on deck or in machine room
- Dual winding control for higher power or redundant installation
- CAN-bus control interface
- Certified Safe Torque Off (STO) as a standard

Ratings and types
Mobile Drive modules, HES880-104, 500 V

Motor/generator converter (10…250 Hz)

Coolant		HES880-104-0352A-5		HES880-104-0602A-5		HES880-104-0902A-5	
Temperature (°C (°F))	Glycol (%)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)
70 (158)	0	233	350	400	600	565	900
70 (158)	60	186	350	320	600	452	900
45 (113)	0	350	350	600	600	900	900
45 (113)	60	280	350	480	600	720	900

At 0 to 10 Hz, 1 Hz increases current (I_{cont}, I_{peak}) by 3.33%. At 250 to 1000 Hz, 1 Hz decreases current (I_{cont}, I_{peak}) by 0.08%.

Line converter

Coolant		HES880-104-0352A-5		HES880-104-0602A-5		HES880-104-0902A-5	
Temperature (°C (°F))	Glycol (%)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)
70 (158)	0	233	350	400	600	575	900
70 (158)	60	186	350	320	600	460	900
45 (113)	0	262	350	500	600	680	900
45 (113)	60	210	350	400	600	544	900

DC/DC converter

Coolant		HES880-104-0352A-5		HES880-104-0602A-5		HES880-104-0902A-5	
Temperature (°C (°F))	Glycol (%)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)
70 (158)	0	321	483	600	750	900	1125
70 (158)	60	257	483	480	750	720	1125
45 (113)	0	360	483	675	750	1014	1125
45 (113)	60	288	483	540	750	811	1125

DC choke

Coolant		HES880-104-0352A-5		HES880-104-0602A-5		HES880-104-0902A-5	
Temperature (°C (°F))	Glycol (%)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)
70/85 (158/185)	0	321	600	490	750	900	1125
70/85 (158/185)	60	257	600	392	750	720	1125
45/45 (113/113)	0	360	600	580	750	1014	1125
45/45 (113/113)	60	288	600	464	750	811	1125

A smaller DC choke can be used in combination with a larger DC/DC converter module (for example, an HES880-HDCL-0320A-5 choke can be used with an HES880-104-0602A-5 converter). In such a case, the user is responsible for setting the maximum current limits of the converter according to the limits of the smaller choke.

In an application with a cyclic load, the rms current and the on/off relation eventually determine the suitability of the choke. The peak currents shown must not be exceeded in any application.

Noise damping potting is available for DC chokes as option.

Loadability in certain application depends on several parameters, like coolant temperatur, coolant flow and glycol content in coolant. In addition DC-voltage and output frequency in inverter have effect to loadability.

LCL filter

Coolant		HES880-104-0352A-5		HES880-104-0602A-5		HES880-104-0902A-5	
Temperature (°C (°F))	Glycol (%)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)	I_{cont} (A)	P_{peak} (A)
70/85 (158/185)	0	233	350	400	600	575	900
70/85 (158/185)	60	186	350	320	600	460	900
45/45 (113/113)	0	262	350	500	600	680	900
45/45 (113/113)	60	210	350	400	600	544	900

Derating temperature is 40 °C (104 °F) for HLCL-0902A-5+V991 filter.

Ratings

I_{cont}	Continuous output current
I_{peak}	Maximum output ripple current to/from energy storage

HES880 Mobile Drive modules

Converter module type	Height	Width	Depth	Weight			
				Without brake chopper		With brake chopper (option +D150)	
	(mm)	(mm)	(mm)	(kg)	(lb)	(kg)	(lb)
HES880-104-0352A-5	174.5	429.5	469.5	35	77	38	84
HES880-104-0602A-5	174.5	429.5	469.5 [1]	35	77	38	84
HES880-104-0902A-5	174.5	429.5	552.5	45	99	49	108

[1] Optimal Grid Control (OGC) option increases depth to 537.5 mm

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HES880
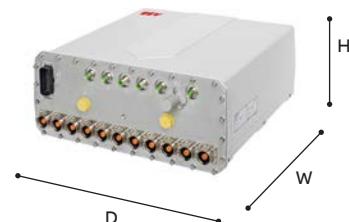
HES880 Mobile Drive modules

Filter module type	Height	Width	Depth	Weight			
				Without potting		With potting (HDCL only)	
	(mm)	(mm)	(mm)	(kg)	(lb)	(kg)	(lb)
HES880-HDCL-0320A-5	201.7	420	761.8	90	198	125	276
HES880-HDCL-0602A-5	254	429	900	120	265	170	375
HES880-HDCL-0902A-5	260	505	900	150	331	200	441
HES880-HLCL-0352A-5+V991	410	480	648	125	276	–	–
HES880-HLCL-0602A-5+V991	407	639	783	235	518	–	–
HES880-HLCL-0902A-5+V991	407	639	874	280	617	–	–

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HES880-HDCL
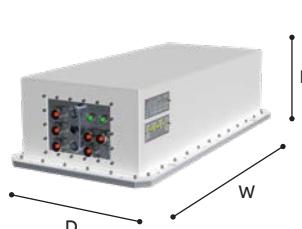
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HES880-HLCL
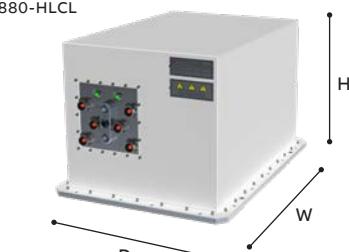
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