



OBC V2X

Onboard Charger with bidirectional
charging mode and Universal Grid
Compatibility (UGC)

OBC V2X 550/950

NEXT GENERATION 22KW BIDIRECTIONAL ONBOARD CHARGER



BIDIRECTIONAL CHARGING

V2X charging enables bidirectional energy flow between electric vehicles (EVs) and the following external sources:

- **V2L** vehicle supplies external or internal AC Loads
- **V2B/V2H** Vehicle supplies AC to building or home
- **V2G** Vehicle supplies AC directly into the public grid
- **V2V** vehicle supplies AC into another vehicle/trailer or vice versa



Grid Home Charging Station Vehicle External AC-Load



Vehicle to Anything Operation (V2X)

Let your e-vehicle's battery earn money. Stabilize your grid and store regenerative energy for self consumption.

Vehicle to Load Operation (V2L)

Supply internal or external AC-loads from your traction battery.

*All information in this brochure preliminary and subject to change without notice.

HIGHLIGHTS



High DC Voltage Levels in two Versions of the OBC V2X:

- OBC_V2X_550 (200-550/70A)
- OBC_V2X_950 (420-950V/40A)



Universal Grid Compatibility (UGC)

Support of nearly all grid-topologies worldwide, and generator supply



Scalable

Parallelable/Scalable in most operation modes with up to 4 Units



Adaptive Charging

Adaptive Charging for all type of HV Batteries, Wired-Vehicle-Operation (optional without battery)



Efficiency

Outstanding efficiency up to 97%



Functional Safety

Functional Safety ISO-26262 and DIN 61508 compliant



Enhanced Vehicle Charge Control (EVCC)

Integrated DC Charge Control using EPLC (Embedded Power Line Communication).



Universal Charging Standards

Type 1/2, CCS 1/2, AC Direct Mode, optional: CHAdeMO, GB/T, NACS

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THE ALL-IN-ONE SOLUTION

The **OBC V2X** offers *Universal Grid Compatibility* that seamlessly integrates with global charging standards and diverse network topologies. Utilizing cutting-edge technology and achieving exceptional efficiency, it stands out as the ideal solution for a wide range of applications.

APPLICATIONS



COMMERCIAL VEHICLES/ TRUCKS



OFF HIGHWAY HEAVY DUTY



TRAINS



E- NAUTICS



MUNICIPAL VEHICLES



PUBLIC TRANSPORTATION

ALLROUNDER FOR GLOBAL APPLICATION

Charging standards: Type2, Type1, CCS 1/2, optional: CHAdeMO, GB/T, NACS

AC Direct Mode

Universal Grid-topologies:

- Standard three phase TT/TN/IT w/ or w/o neutral
- Single phase (EU:L1-N) / Split phase (USA: L1-L2/N)
- Generator and range extender operation



DURABILITY AND SAFETY

- High IP protection level IP6K9K/IP67
- Functional Safety ISO 26262 ASIL B for on road vehicle application.
- ECE R10/IEC 61581 compliant
- ISO 16740-4 (Environmental Durability) compliant
- Cyber Security ISO 21434



COMMUNICATION AND DIAGNOSTICS

CAN 1

- SAE J1939 vehicle CAN interface
- UDS Diagnostic Services – ISO 14229

CAN 2 Internal

- Enhanced diagnostics
- Inter cluster communication in Master-/Slave- Mode



OUTSTANDING PERFORMANCE AND EFFICIENCY

- Outstanding efficiency using high frequency Silicon Carbide (SiC) technology
- Extremely compact and lightweight design
- Shortest charging time due to continuous full load performance
- Fully EMI/EMC compliant according to ECE R10



TECHNICAL DATA

*All Data preliminary and subject to change.

ADAPTIVE FORWARD CHARGE MODE (V1G)

Name	Description	MIN	NOM	MAX	UNIT
Input voltage @ 3-phase	Nominal operating range		400/480		Vac
	Absolute operation range	360		525	Vac
Input voltage @ 1-phase	Nominal operating range		230/240		Vac
	Absolute operation range	85		305	Vac
Input current	G2V-FCM Mode			32	Arms
Type 1 Split Phase Mode				80	Arms
Input frequency		45	50/60	65	Hz
Leakage current	@528Vac, 65Hz; 3-phase			3.5	mA
	@305Vac, 65Hz; 1-phase			3.5	
Power factor	@ 3-phase operation	>= 0.98 if over 20% full-load >=0.99 if over 50% full-load			
Starting inrush current	Pre-charge Relay available			15	A

REVERSE CHARGE MODE (V2G-RCM)

Name	Description	MIN	NOM	MAX	UNIT
Output voltage	3-phase		3x400 3x480		Vac
Phase current	On-grid Connected Mode		3x32		Aac
	Auxiliary Power (V2L off-grid Mode)		16	40	Aac
AC Power	@ 400Vac			22	kVA
	@480Vac			25	
Output frequency	@50Hz Mode	49.9	50	50.1	Hz
	@60Hz Mode	59.9	60	60.1	
Load step response	15Aac step and back again	-10%	0	10%	Vac
Voltage total harmonic distortion	Load current 0-32Aac			5	%
Turn-On/off delay	Turn-on Delay			2	sec
	Turn-off Delay			1	

DC HV SYSTEM PERFORMANCE DATA (ALL MODES)

Name	Description	OBC V2X 550			OBC V2X 950			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
Battery Voltage Range		200		550	420		950	Vdc
Battery Current		-70		70	-40		40	Adc
(@ nominal battery voltage)								
Output/Input current ripple	@3-phase		2					%
Output/Input capacitor	Without battery		80					μF
Output/Input voltage tolerance	@3-phase		5					%

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PROTECTIONS

Name	Description
Isolation input/output	DIN EN 61851-1 2012-01
Functional safety	ASIL B related vehicle system configuration
AC overvoltage protection	✓
AC undervoltage protection	✓
Short circuit/ overcurrent protection	✓
Over temperature protection	✓
Insulation resistance	> 5 MΩ
+24V/12V reverse polarity protection	✓
Communication failure protection	✓

MECHANICAL DATA/COOLING

Name	Description
Housing	Aluminum Die-Casting
Weight	19 kg
Outline dimensions	570 x 350 x 96 in mm
Nom. liquid volume flow required	8ltr/min
Nom. liquid pressure drop	80mbar@8ltr/min
Liquid temperature range	-30 to +65°C
Max. liquid temperature	70°C
Liquid output temperature rise	<5°C
IP Protection	IP6K9K/ IP67

APPLICABLE STANDARDS

Name	Description
DIN EN 61851-1:2012-01	Electric vehicle conductive charging system
DIN EN 61851-21-1:2018-04	EMI requirements
ECE R10 V6 20 November 2019	Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility
IEC 62196-2	Type 2 AC inlet
IEC 62196-3	CCS2 AC/DC inlet
SAE J1939	Car vehicle CAN Bus standard
DIN SPEC 70121:2012-08	CCS DC charging
DIN ISO 15118-2 -20	CCS DC charging
IEC 60068-2-6: 2007-1	Environmental testing – Part 2-6: Tests Test Fc: Vibration (sinusoidal)
IEC 60068-2-27: 2008-02	Environmental testing – Part 2-27: Tests Test Ea and guidance: Shock
IEC 60068-2-64: 2019-10	Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broad-band random and guidance

ENVIRONMENTAL SPECIFICATIONS

Name	Description	MIN	NOM	MAX	UNIT
Operating temperature	T_coolant @ 8ltr/min	-30		60	°C
Storage temperature		-40		85	°C
Humidity				95	%
Altitude		-2500		3000	m

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