

## BAT-Series

Grid Inverter. Battery Charger.

With the BAT-series, WSTECH offers a wide range of power converters for small to large energy storage applications.

The BAT-series inverters offer a power range from 20 kVA up to 900 kVA with the following options and features:

- ✓ **Modbus TCP interface** that operates all control values, monitoring of all status values and overall configuration of the device. Modbus TCP is a wide-spread Ethernet-based fieldbus.
- ✓ **EtherCAT interface (Ethernet-based real time field bus)** prepared for active exchange of selected control and status values (configurable) in very fast control applications (millisecond-range).
- ✓ **Touch Display** for monitoring of selected status and configuration data, error messages review and on/off machine operation for maintenance work.
- ✓ **Internal Data Logger** capable of recording all status and control values with a sample time of 10 s for up to 1 year on the integrated USB-memory.
- ✓ **Grid stabilization** in compliance with local grid code.
- ✓ Supply of **reactive power** for different applications.
- ✓ **Outdoor models** available for demanding weather conditions.



## BAT-Series – Indoor

30 ... 280 kVA

### (I) TECHNICAL DATA

	BATI 20	BAT 50	BAT 100	BAT 280	COMMENTS
<b>GRID SIDE</b>					
<b>Maximum AC-power (<math>S_{max}</math>)</b>	30 kVA (for 10 s)	55 kVA	120 kVA (2 h)	280 kVA	At rated grid voltage
<b>Rated AC-power (<math>P_{N(AC)}</math>)</b>	20 kW	50 kW	100 kW	280 kW	At ( $\cos \phi$ ) = 1.0
<b>Rated grid voltage (<math>U_{N(AC)}</math>)</b>	1 x (400 V, 3~ + neutral, TN)				Other values on request
<b>Rated grid frequency (<math>f</math>)</b>	50 Hz				Other values on request
<b>Maximum AC-current (<math>I_{max(AC)}</math>)</b>	30 A	79 A	173 A	404 A	
<b>Maximum short circuit level (<math>I_{SC(AC)}</math>)</b>	6 kA	36 kA			
<b>Power factor (<math>\cos \phi</math>)</b>	> 0.98				At > 20 % of rated power
<b>AC-current distortion (THD)</b>	< 3 %				
<b>BATTERY SIDE</b>					
<b>Nominal voltage (<math>U_{N(DC)}</math>)</b>	-	750 V <sub>DC</sub>			
<b>Voltage range (<math>U_{range(DC)}</math>)</b>	120 ... 375 V <sub>DC</sub>	530 ... 890 V <sub>DC</sub>	450 ... 890 V <sub>DC</sub>		
<b>Currents (<math>I_{range(DC)}</math>)</b>	+ / - 130 A	+ / - 110 A	+ / - 250 A	+ / - 630 A	
<b>Maximum short circuit current (<math>I_{SC(DC)}</math>)</b>	200 kA	40 kA			
<b>Current THD</b>	< 3 %				
<b>Number of DC inputs</b>	1				

## BAT-Series – Indoor

30 ... 280 kVA

### (II) TECHNICAL DATA

	BATI 20	BAT 50	BAT 100	BAT 280	COMMENTS
<b>GENERAL</b>					
<b>Control strategy</b>	CC-CV, power controlled, island mode				
<b>Efficiency in %</b>	-	( 94.0   96.5   96.5   96.0   95.2 ) %	( 93.9   96.9   97.1   97.0   96.7 ) %	( 92.2   97.1   97.2   96.8   96.4 ) %	At ( 10   30   50   75   100 ) % power
<b>Standby losses at night</b>	< 6 W	< 30 W			
<b>Maximum auxiliary power</b>	< 120 W	< 250 W		< 600 W	Plus heating power
<b>MEASURING ACCURACY</b>					
<b>Grid Frequency</b>	+/- 20 mHz	+/- 40 mHz			Average value of 8 grid periods

## BAT-Series – Indoor

600 ... 900 kVA

### (III) TECHNICAL DATA

	BATI 600	BATI 720	BATI 900	COMMENTS
<b>GRID SIDE</b>				
<b>Maximum AC-power (<math>S_{max}</math>)</b>	600 kVA	720 kVA	900 kVA	At rated grid voltage
<b>Rated AC-power (<math>P_{N(AC)}</math>)</b>	500 kW	615 kW	770 kW	At ( $\cos \phi$ ) = 1.0
<b>Rated grid voltage (<math>U_{N(AC)}</math>)</b>	1 x (270 V, 3~, IT)	1 x (300 V, 3~, IT)	1 x (380 V, 3~, IT)	Other values on request Recommendation of vector group: -Medium-voltage connection: Dd -Low-voltage connection: YNd or Yd -d: delta connection of inverter
<b>Rated grid frequency (<math>f</math>)</b>		50 Hz		Other values on request
<b>Maximum AC-current (<math>I_{max(AC)}</math>)</b>	1283 A	1385 A	1367 A	
<b>Maximum short circuit level (<math>I_{SC(AC)}</math>)</b>		50 kA		
<b>Power factor (<math>\cos \phi</math>)</b>		> 0.98		At > 20 % of rated power
<b>AC-current distortion (THD)</b>		< 3 %		
<b>BATTERY SIDE&gt;</b>				
<b>Nominal voltage (<math>U_{N(DC)}</math>)</b>		750 V <sub>DC</sub>		
<b>Voltage range (<math>U_{range(DC)}</math>)</b>	450 ... 890 V <sub>DC</sub>	500 ... 890 V <sub>DC</sub>	630 ... 890 V <sub>DC</sub>	
<b>Currents (<math>I_{range(DC)}</math>)</b>	+ / - 1136 A	+ / - 1360 A	+ / - 1400 A	
<b>Maximum short circuit current (<math>I_{SC(DC)}</math>)</b>		6,4 kA		
<b>Current THD</b>		< 3 %		
<b>Number of DC inputs</b>		1		

## BAT-Series – Indoor

600 ... 900 kVA

### (IV) TECHNICAL DATA

	BATI 600	BATI 720	BATI 900	COMMENTS
<b>GENERAL</b>				
<b>Control strategy</b>	CC-CV, power controlled, island mode			
<b>Efficiency in %</b>	(97.1   97.5   97.5   97.3   97.1) %	(97.4   97.9   97.9   97.7   97.5) %	(97.6   98.0   98.0   97.8   97.6) %	At ( 10   30   50   75   100 ) % power
<b>Standby losses at night</b>	< 30 W			
<b>Maximum auxiliary power</b>	< 1000 W			Plus heating power
<b>MEASURING ACCURACY</b>				
<b>Grid Frequency</b>	+/- 40 mHz			Average value of 8 grid periods

## BAT-Series – Outdoor

120 ... 280 kVA

### (I) TECHNICAL DATA

	BAT 100-400	BAT 100-480	BAT 280-400	BAT 280-480	COMMENTS
<b>GRID SIDE</b>					
<b>Maximum AC-power (<math>S_{max}</math>)</b>	120 kVA (2 h)		280 kVA		At rated grid voltage
<b>Rated AC-power (<math>P_{N(AC)}</math>)</b>	100 kW		280 kW		At ( $\cos \phi$ ) = 1.0
<b>Rated grid voltage (<math>U_{N(AC)}</math>)</b>	1 x (400 V, 3~ + neutral, TN)	1x (480Y / 277 V, solidly grounded wye , 3 phase, 4 wire)	1 x (400 V, 3~ + neutral, TN)	1x (480Y / 277 V, solidly grounded wye , 3 phase, 4 wire)	Other values on request
<b>Rated grid frequency (<math>f</math>)</b>	50 Hz	60 Hz	50 Hz	60 Hz	
<b>Maximum AC-current (<math>I_{max(AC)}</math>)</b>	173 A	144 A	404 A	337 A	
<b>Maximum short circuit level (<math>I_{SC(AC)}</math>)</b>	36 kA	35 kA	36 kA	35 kA	
<b>Power factor (<math>\cos \phi</math>)</b>	> 0.98				At > 20 % of rated power
<b>AC-current distortion (THD)</b>	< 3 %				
<b>BATTERY SIDE</b>					
<b>Nominal voltage (<math>U_{N(DC)}</math>)</b>	750 V <sub>DC</sub>				
<b>Voltage range (<math>U_{range(DC)}</math>)</b>	450 ... 890 V <sub>DC</sub>				
<b>Currents (<math>I_{range(DC)}</math>)</b>	+ / - 250 A	+ / - 266 A	+ / - 630 A	+ / - 600 A	
<b>Maximum short circuit current (<math>I_{SC(DC)}</math>)</b>	40 kA	5 kA	40 kA	10 kA	
<b>Current THD</b>	< 3 %				
<b>Number of DC inputs</b>	1				
<b>GENERAL</b>					
<b>Control strategy</b>	CC-CV, power controlled, island mode				
<b>Efficiency in %</b>	( 93.9   96.9   97.1   97.0   96.7 ) %	( 93.9   96.9   97.1   97.0   96.7 ) %	( 92.2   97.1   97.2   96.8   96.4 ) %	( 92.2   97.1   97.2   96.8   96.4 ) %	At ( 10   30   50   75   100 ) % power
<b>Standby losses at night</b>	< 30 W				
<b>Maximum auxiliary power</b>	< 250 W		< 600 W		Plus heating power

## BAT-Series – Outdoor

120 ... 280 kVA

### (II) TECHNICAL DATA

	BAT 100-400	BAT 100-480	BAT 280-400	BAT 280-480	COMMENTS
<b>MEASURING ACCURACY</b>					
<b>DC-voltage</b>	-	1% of maximum DC-voltage	-	1% of maximum DC-voltage	
<b>AC-voltage</b>	-	1% of rated voltage	-	1% of rated voltage	
<b>DC-current</b>	-	1% of maximum DC-current	-	1% of maximum DC-current	
<b>AC-current</b>	-	1% of rated current	-	1% of rated current	
<b>Active Power (AC)</b>	-	2% of maximum AC-power	-	2% of maximum AC-power	
<b>Apparent Power (AC)</b>	-	2% of maximum AC-power	-	2% of maximum AC-power	
<b>Reactive Power (AC)</b>	-	2% of maximum AC-power	-	2% of maximum AC-power	
<b>Active Power (DC)</b>	-	2% of maximum DC-power	-	2% of maximum DC-power	
<b>Grid Frequency</b>	+/- 40 mHz				Average value of 8 grid periods

## BAT-Series – Indoor

30 ... 280 kVA

### (I) GENERAL DATA

	BATI 20	BAT 50	BAT 100	BAT 280	COMMENTS
<b>GENERAL</b>					
<b>Ambient temperature</b>	0 °C ... 40 °C	0 °C ... 50 °C			Other values on request
<b>Maximum humidity</b>	< 95 %				Not condensing
<b>Ambient storage temperature</b>	-	-25 °C ... 60 °C			
<b>Storage relative humidity</b>	-	< 90 %			Not condensing
<b>Maximum operating altitude</b>	1500 m above sea level				Without power derating
<b>Cooling type</b>	Forced air				
<b>Air cooling volume</b>	360 m <sup>3</sup> /h	800 m <sup>3</sup> /h	1500 m <sup>3</sup> /h	3000 m <sup>3</sup> /h	Class 3S2 (EN60721-3-3)
<b>Protection class</b>	IP20				
<b>Dimensions (Length x Width x Height)</b>	19 inch rack, 7 RU	611 x 647 x 1902	1009 x 862 x 1903	1409 x 846 x 1906	In mm
<b>Weight</b>	< 60 kg	< 800 kg	< 1050 kg	< 1600 kg	
<b>Color</b>	Aluminum	RAL7035			Others on request
<b>Noise Level</b>	< 70 dBA	< 80 dBA			
<b>EMI</b>	EN61000-6-2, EN61000-6-4				
<b>Medium voltage directive</b>	-	BDEW			Others on request
<b>Low voltage directive</b>	VDE-AR-N 4105				
<b>CE-conformity</b>	Comply				



## BAT-Series – Indoor

600 ... 900 kVA

### (II) GENERAL DATA

	BATI 600	BATI 720	BATI 900	COMMENTS
<b>GENERAL</b>				
Ambient temperature		0 °C ... 50 °C		Other values on request
Maximum humidity		< 95 %		Not condensing
Ambient storage temperature		-25 °C ... 60 °C		
Storage relative humidity		< 90 %		Not condensing
Maximum operating altitude		1500 m above sea level		Without power derating
Cooling type		Forced air		
Air cooling volume		3600 m <sup>3</sup> /h		Class 3S2 (EN60721-3-3)
Protection class		IP20		
Dimensions (Length x Width x Height)		1813 x 867 x 2172		In mm
Weight		< 1600 kg		
Color		RAL7035		Others on request
Noise Level		< 80 dBA		
EMI		EN61000-6-2, EN61000-6-4		
Medium voltage directive		BDEW		Others on request
Low voltage directive		-		
CE-conformity		Comply		

## BAT-Series – Outdoor

120 ... 280 kVA

### GENERAL DATA

	BAT 100-400	BAT 100-480	BAT 280-400	BAT 280-480	COMMENTS
<b>GENERAL</b>					
<b>Ambient temperature</b>	-20 °C ... 50 °C	-10 °C ... 50 °C (14 °F ... 122 °F)	-20 °C ... 50 °C	-10 °C ... 50 °C (14 °F ... 122 °F)	Other values on request
<b>Maximum humidity</b>	100 %				Not condensing
<b>Ambient storage temperature</b>	-25 °C ... 60 °C				
<b>Storage relative humidity</b>	< 90 %				Not condensing
<b>Maximum operating altitude</b>	1500 m above sea level				Without power derating
<b>Cooling type</b>	Forced air				
<b>Air cooling volume</b>	1500 m <sup>3</sup> /h		3000 m <sup>3</sup> /h		Class 3S2 (EN60721-3-3)
<b>Protection class</b>	IP44	NEMA 3R	IP44	NEMA 3R	
<b>Dimensions (Length x Width x Height)</b>	1152 x 1250 x 2249		1597 x 1353 x 2249		In mm
<b>Weight</b>	< 950 kg		< 2000 kg		
<b>Color</b>	RAL7035				Others on request
<b>Noise Level</b>	< 80 dBA				
<b>EMI</b>	EN61000-6-2, EN61000-6-4	-	EN61000-6-2, EN61000-6-4	-	
<b>Medium voltage directive</b>	BDEW	-	BDEW	-	Others on request
<b>Low voltage directive</b>	VDE-AR-N 4105	-	VDE-AR-N 4105	-	
<b>CE-conformity</b>	Comply	-	Comply	-	
<b>UL 1741:2010 + SA:2016</b>	-	Comply	-	Comply	
<b>CSA Standard, C22.2 No. 107.1-01: 2011</b>	-	Comply	-	Comply	
<b>CEC Guideline</b>	-	Comply	-	Comply	
<b>Seismic standards</b>	-	IEEE 693-2005	-	IEEE 693-2005	To be ordered as an option

## BAT-Series – Indoor

30 ... 600 kVA

### (I) FEATURES AND OPTIONS

	BATI 20	BAT 50	BAT 100	BAT 280	BATI 600
<b>FEATURES</b>					
Overvoltage protection	-	X	X	X	X
Earth leakage monitor with adjustable limit	-	X	X	X	X
Enable switch	-	X	X	X	X
DC-disconnector	X	-	-	-	X
DC-circuit breaker	-	X	X	X	-
DC-contactor with fuses	X	-	-	-	-
AC-circuit breaker	-	X	X	X	X
Modbus TCP interface	-	X	X	X	X
CAN interface	X	-	-	-	-
Internal data logger	-	X	X	X	X
<b>OPTIONS</b>					
Island grid function	O	O	O	O	O
Interface for SBB16-10	-	O	O	O	-
Cabinet heating	-	O	O	O	O
EtherCAT interface	-	O	O	O	O
Graphical display (HMI)	-	O	O	O	-

X = included

- = not included / not available

O = optional

## BAT-Series – Indoor

720 ... 900 kVA

### (II) FEATURES AND OPTIONS

	BATI 720	BATI 900
<b>FEATURES</b>		
Overvoltage protection	X	X
Earth leakage monitor with adjustable limit	X	X
Enable switch	X	X
DC-disconnector	X	X
DC-circuit breaker	-	-
DC-contactor with fuses	-	-
AC-circuit breaker	X	X
Modbus TCP interface	X	X
CAN interface	-	-
Internal data logger	X	X
<b>OPTIONS</b>		
Island grid function	O	O
Interface for SBB16-10	-	-
Cabinet heating	O	O
EtherCAT interface	O	O
Graphical display (HMI)	-	-

X = included

- = not included / not available

O = optional

## BAT-Series – Outdoor

120 ... 280 kVA

### FEATURES AND OPTIONS

	BAT 100-400	BAT 100-480	BAT 280-400	BAT 280-480
<b>FEATURES</b>				
Overvoltage protection	X	X	X	X
Earth leakage monitor with adjustable limit	X	X	X	X
Enable switch	X	X	X	X
DC-disconnector	-	-	-	-
DC-circuit breaker	X	X	X	X
DC-contactor with fuses	-	-	-	-
AC-circuit breaker	X	X	X	X
Modbus TCP interface	X	X	X	X
CAN interface	-	-	-	-
Internal data logger	X	X	X	X
Cabinet heating	X	X	X	X
<b>OPTIONS</b>				
Island grid function	O	O	O	O
EtherCAT interface	O	O	O	O
Seismic IEEE 693	-	O	-	O

X = included

- = not included / not available

O = optional

## BAT-Series – Indoor

30 ... 120 kVA

### (I) MECHANICAL DRAWINGS

BATI 20



19 inch rack - 7 RU

BAT 50



BAT 100



## BAT-Series – Indoor

280 ... 900 kVA

### (II) MECHANICAL DRAWINGS

BAT 280



BATI 600 / BATI 720 / BATI 900



## BAT-Series – Outdoor

120 ... 280 kVA

### MECHANICAL DRAWINGS

BAT 100-400 / BAT 100-480



BAT 280-400 / BAT 280-480





## BAT-Series

30 ... 900 kVA

### EQUIVALENT MODEL NAME

#### BAT-Series – INDOOR

BATI 20	HW 300	BATI0020
BAT 50	HW 130	BATD0050-ES-1-400-1
BAT 100	HW 040	BATx0100-ES-1-400-1
BAT 280	HW 020	BATx0280-ES-1-400-1
BATI 600	HW 100	BATI0600-ES-1-270-1
BATI 720	HW 100	BATI0720-ES-1-300-1
BATI 900	HW 100	BATI0900-ES-1-380-1

#### BAT-Series – OUTDOOR

BAT 100-400	HW 000	BATx0100-ES-1-400-1 (Outdoor)
BAT 100-480	HW 010	BATD0100-ES-1-480-1 (Outdoor)
BAT 280-400	HW 010	BATx0280-ES-1-400-1 (Outdoor)
BAT 280-480	HW 020	BATD0280-ES-1-480-1 (Outdoor)

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