SENS®
STORED ENERGY SYSTEMS

SuperTorque 8Z

Genset Starting System

Super High-Performance Battery + Integrated Charger System

Solves Genset Starting Problems. Guaranteed.

Super powerful, safe NiZn battery - contains no hazardous materials – air shippable!
10-year full warranty - say goodbye to regular battery replacements
More power, less space - 75% smaller than comparable lead-acid – including charger!
Long life, no maintenance - cuts ongoing cost of truck rolls and electrolyte top-ups
Sustainable - no hazardous materials; 96% lower lifetime GHG emissions than lead-acid
Lowest total cost of ownership (TCO) - greater than 50% lower cost over ten years than lead-acid

Solves genset starting problems for good

SENS SuperTorque 8Z Genset Starting System solves the #1 problem with emergency generators: starting battery failure. Unless lead-acid starting batteries on gensets are replaced every one to three years they fail suddenly, without warning. Even if replaced this often they sometimes explode.

Offering a full 10-year warranty, the heart of SuperTorque 8Z is the high performance nickel-zinc (NiZn) battery. Like other nickel-based batteries, NiZn is very stable and long-lived.

SuperTorque 8Z is also the sustainable choice. Lifetime GHG emissions from NiZn batteries in SuperTorque 8Z are 96% lower than for a comparable performance lead-acid battery.

Offering superb reliability, better than a 50% TCO advantage over lead-acid batteries and a vastly smaller environmental footprint, SuperTorque 8Z is the overwhelming best choice for genset starting energy storage.

SuperTorque 8Z benefits

Long-life, super high-rate battery

Well proven in data center UPS, the super high-rate NiZn battery combines phenomenal high-rate performance with great endurance. The inherent advantage of NiZn technology is that battery voltage changes little with state of charge. Even at a low state of charge SuperTorque 8Z still delivers powerful starting performance. In contrast, voltage of lead-acid batteries quickly drops too low to crank an engine, leaving most of the lead-acid battery's capacity stranded in the battery.

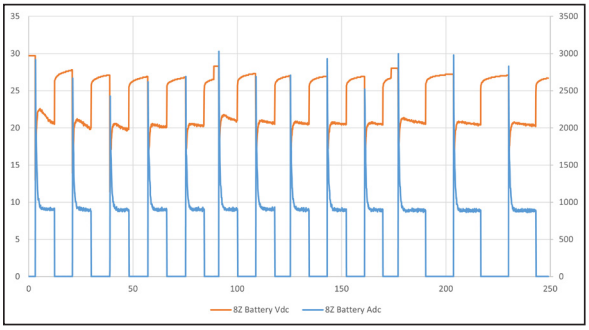


Chart of ONE SuperTorque 8Z cranking 70L diesel genset 13 times without recharge – still going strong at the end!

Embedded MicroGenius 2 charger

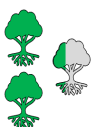
Inside SuperTorque 8Z is a reliable SENS charger, optimized for NiZn charging. Factory installation means no separate charger installation or wiring. The charger accepts universal AC input (100-240 volts, 50 or 60Hz) via either IEC 320 connector and cord or hardwired conduit.

The clear sustainable choice

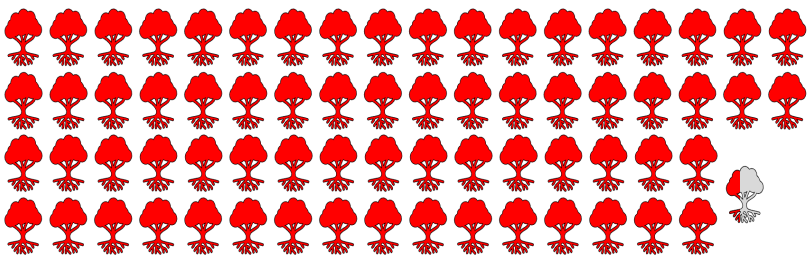
The SuperTorque 8Z NiZn battery results in 96% lower lifetime carbon emissions than lead-acid starting batteries. NiZn technology is much more energy efficient to manufacture, transport, and recycle than lead-acid. It weighs less. Its long service life retires the need for regular replacement. There is no periodic watering required. SuperTorque 8Z uses no hazardous materials. The on-board MicroGenius charger is up to 93% efficient, and consumes less than 3 watts at idle. SuperTorque 8Z is the most sustainable genset energy storage solution available.

NiZn 40KW Starter Battery Solution Lifetime Emmissions

"Lifetime" = 10-15 years



Lead Acid 40KW Starter Battery Solution Lifetime Emmissions



= 10 mature trees Number of trees required to offset CO2 emissions from equivalent performance starting battery

SENS®
STORED ENERGY SYSTEMS

SuperTorque 8Z

More power in less space

A single 24-volt SuperTorque 8Z system, the size of one 12-volt 8D battery, replaces up to four 8D lead-acid starting batteries and a premium charger.

89.0lb (40.4kg)

Sizing considerations

The primary limit governing how big an engine one SuperTorque 8Z will start is depth of voltage drop during the initial ~200 milliseconds "locked rotor" condition at the beginning of the crank cycle. Most engine control computers (ECU) on 24V systems tolerate voltages down to12 volts. Larger current draw at locked rotor reduces available voltage at the starter.

One 24-volt SuperTorque 8Z will crank diesel engines with two starters up to 70 liters displacement. The number of starters is relevant. For any given displacement engine, more starter motors typically means higher current during the locked rotor condition.

SuperTorque 8Z TCO advantage

Lead-acid batteries require regular maintenace and replacement every 1-3 years. The table below illustrates the significant financial benefit of SuperTorque 8Z's much longer life.

	SuperTorque 8Z Single 8Z	**Lead-acid Technology** 4 Lead-acid 8D batteries + charger
Initial Costs (includes installation & commission)	$8,500	$6,900
Replace Batteries - Yr 2	$0	$2,100
Replace Batteries - Yr 4	$0	$2,100
Replace Batteries - Yr 6	$0	$2,100
Replace Batteries - Yr 8	$0	$2,100
10-yr Maintenance	$0	$2,500
10-yr Cost to Own	$8,500	$17,800
8Z Advantage	**$9,300**	**52%**

Assumptions:

1. Lead-acid batteries modeled at $275 each.
2. Labor for battery replacements based on $125/hour, 2-person team, four hour job ($1000 total).
3. Lead-acid battery maintenance includes check and water every six months. Assume 1 hour @ $125/hr ($250/year).
4. The NiZn battery is maintenance-free. It requires no electrolyte check or top-up.

SENS®
STORED ENERGY SYSTEMS

Specifications for SuperTorque 8Z

AC input	VAC, Hz	90-265VAC, 47-63Hz. 24V: full charging current available above 170VAC input, 80% rated charging current 100-170VAC.
	Protection	Supplementary overcurrent protection fuse, transient protected to EN 61000-4-5 level 4
	Power factor & efficiency	PF >.95 typical; efficiency to 93%; meets CEC Title 20 Efficiency Regulations; standby AC draw < 3W
DC charging output	Volts	12V or 24V nominal with less than 30mV ripple, ensure engine high voltage DC alarm is set at 32VDC
	Recharge rate	80Ah battery capacity, 15A charge current
	Charging modes	NiZn-specific, multi-stage, non-adjustable
	Current limit	Factory set at 100% of rating
	Charging characteristic	Constant voltage, current limited; patented Dynamic Boost control
	Line & load regulation	±0.5%
	Battery temp. compensation	Standard
Engine starting performance	Typical cranking current	2,700 amps at breakaway while maintaining battery terminal voltage above 12.0 volts. Rolling current is typically ~30% of breakaway (locked rotor) current.
	Typical engine displacement per 8Z unit	70 liter per one 24-volt 8Z battery system. Actual performance depends on number of starters and installation configuration. Larger displacement engines use two or more 8Z systems connected in parallel.
	Typical crank cycles	Depends on number of starters and their configuration. Typically more than four cranks of 15 seconds.
	Redundancy	Combine 8Z units in parallel for increased starting performance and redundancy. Integrates seamlessly with Best Battery Selectors for isolated redundancy.
Status display	LEDs	Two multi-color front panel status LEDs
	Metering & status display	Optional. Battery voltage accurate to +1%; charger current to +1%; 20-character display of status & alarms.
Alarms	Alarms	Factory set, field reconfigurable. Alarm functions announced on the J1939 and Modbus ports and on the optional LCD. Any one of 20+ alarms or any combination of alarms is assignable to either Form C contact.
	Alarms: Form C contacts	Two Form C contacts, each rated 30V, 2A resistive, assignable
Networking	J1939 communications	CAN 2.0 extended ID on RJ45 port
	Modbus communications	Optional Modbus RS-485 or TCP/IP on RJ45 port
	SENSbus	Proprietary bus for connection of paralleled chargers and SENS accessories
Environmental	Operating temperature	-10C to +55C; charging 0C to +45C; storage -20C to +60C
	Humidity	5% to 95%, non-condensing
	Altitude	Full specification 0 to13,000ft (0 to 4000m)
	Ingress protection	NEMA2/IP22
	Vibration & shock resistance	Vib: Swept Sine (EN60068-2-6): 4G, 18-500Hz, 3 axes. Random: 20-500Hz, .01G²/Hz. Shock: EN 60068-2-27 (15G)
	Electrical transient	ANSI/IEEE C62.41 & EN 61000-4-12 on power terminals
Regulatory compliance	North America	C-UL Listed for US & Canada, UL 1973, category BBFX
		NFPA-70, NFPA-110
		FCC Part 15, Class B
		Seismic: Rigid base mount; max S_{DS} of 2.5G. IBC 2000-2021, Calif. BC 2007-2021
		American Bureau of Shipping, type approved
	European Union (CE), United Kingdom (UKCA)	EMC: 2014/30/EU, UK 2016 (EN 61000-6-2 & EN 61000-6-4)
		LVD/Safety: 2014/35/EU, UK 2016 (EN 60335-1 & EN 60335-2-29)
		RoHS: 2015/863, UK 2012 (EN 63000)
		Battery Directive: 2006/66/EC
Construction	Housing/configuration	Rainproof aluminum enclosure with non-conductive top
	AC connections	Dual IEC 320 connectors provide paralleling capability. Locking cord with NEMA 5-15R plug provided.
	DC connections	Standard: M8 threaded inserts for positive and negative. Optional: SAE battery terminal posts.
	Alarms & comms connections	J1939 and Modbus TCP/IP: RJ45; Modbus RS-485 and Form C alarms: 28-16AWG terminal blocks

How To Order SuperTorque 8Z

Product Type	-	Output Volts	-	Battery Cap	-	Output Current	-	Alms & Comms	-	Mount	-	Terms	-	Config
8Z	-	24	-	B	-	15	-	B	-	1	-	1	-	00
A		B		C		D		E		F		G		H

	Parameter	Code	Value
A	Product Family	8Z	SuperTorque 8Z
B	Output Voltage	12 24	12V 24V
C	Battery Capacity	B	80Ah
D	Charging Current	15	15A
E	Interface & Communication Options	A B C	Base model; includes status LEDs and 2 ea. Form C alarm relays Base model + LCD + keypad control + RS-485 Modbus Base model + LCD + keypad control + RS-485 & TCP/IP Modbus
F	Mounting	1 2	Standard, not for rigid mounting With rigid mounting brackets
G	Terminals	1 2	Threaded inserts for ring lug connection (M8) SAE battery terminal posts
H	Configuration	00	Standard

Order separately: Paralleling Kits (p/n 209665-20 end-to-end, 209665-21 side-to-side), Field Termination Kit (p/n 209665-22),
Starter Cable Kits - 4/0AWG - 1/2in ring lug to starter (6ft - p/n 209665-23, 10ft - p/n 209665-24, 15ft - p/n 209665-25)

Contact Information

Sales 1.866.736.7872 • 303.678.7500 • Fax 303.678.7504 • info@sens-usa.com • www.sens-usa.com
Stored Energy Systems, LLC 1840 Industrial Circle, Longmont, CO 80501 USA

c UL US LISTED CE IBC BC SENS STORED ENERGY SYSTEMS