



# IC

# 650



Available models:

24 V / 27 A

36 V / 18 A

48 V / 13.5 A

# Delta-Q IC650

## 650 W Industrial Battery Charger

Capable of charging lead acid (wet, AGM, gel) and lithium battery chemistries, the IC650 Charger is available in on- and off-board configurations. Optional CAN bus communication ensures seamless machine integration and AC/DC cabling is completely customizable. Applications include: scissor lifts, lift trucks, floor care machines, and golf cars.



### High Reliability

Engineered using design for reliability. Validated for long service life in worst-case operating conditions. Manufactured in a world class facility specializing in high reliability solutions.



### Easy to Integrate

Assists machine troubleshooting with built-in charge cycle tracking. Download data / upgrade software through USB host port. Optional CAN bus communication enables deep machine integration, diagnostics and control.



### Charge Quality

Charge profiles to precisely charge deep-cycle lead acid and lithium batteries. Developed in Delta-Q's battery lab to balance charge time, battery life and application requirements.



### Global + Efficient

Capable of operating reliably on any single-phase grid worldwide. High-efficiency performance for electricity savings and shorter charge times.

# IC650 Charger Specifications



## Usability Features

- + Optional CAN bus communication for machine integration or lithium BMS
- + Multi-color LED indicator for AC source, battery status, charging, error, fault
- + Numeric display for charge profile, alarm/fault codes
- + Field programmable with up to 25 charge profiles
- + Auto-recharge in maintenance mode
- + OEM customizable, field replaceable cable design
- + Optional carrying handle

DC Output	24 VDC	36 VDC	48 VDC
Maximum DC output voltage	36 V	54 V	72 V
Maximum DC output current	27.1 A	18.1 A	13.5 A
Maximum DC output power	650 W		
Deep discharge recovery (minimum voltage)	1.2 V	1.8 V	2.4 V
Maximum interlock current	1 A (10 A with external interlock device)		
Battery type	Lead acid (Wet / AGM / GEL), lithium-ion		
Reverse polarity	Electronic protection with auto-reset		
Short circuit	Electronic current limit		

AC Input	
AC input voltage range	85-270 VAC
Nominal AC input voltage	100-240 VAC
Nominal AC input frequency	50 / 60 Hz
Maximum AC input current	7.5 A
Nominal AC input current	7.3 A @ 100 VAC
	3.1 A @ 230 VAC
Power factor	6.0 A @ 120 VAC
	2.9 A @ 240 VAC
	>0.99 @ 120 VAC
	>0.98 @ 230 VAC

Regulatory	
Efficiency	93.5% peak, California Energy Commission compliant
Safety	UL1564, CSA 107.2, EN 60335-2-29
Emissions	FCC Part 15 / ICES 003 Class A, EN55011
Immunity	EN 61000-3-2, EN 61000-3-3, EN 61000-6-2, EN 61000-6-4

Environmental		
Operating temperature	-40°C to +65°C (-40°F to 149°F)	Derated output at >40°C (104°F)
Storage temperature	-40°C to +85°C (-40°F to 185°F)	
Ingress protection	Charger rated IP66 (Complete protection against contact, dust, and powerful water jets) with sealed Delta-Q AC cord AC input connector rated to IP20 (protect against dust and water -- keep clean and dry), with a non-Delta-Q AC cord	
Chemical	MIL 810-G, Method 504.1: Withstands exposure to chemicals typically found in application (battery acid, salt, cleaners, fertilizers, etc.)	
Salt	Withstands 720 hours (30 days) salt spray test per GMW 3172 with 5% (w/w) salt solution (pH 6.5-7.2) at 35°C (95°F) without degradation of performance	
Shock / vibration	Infrequent shock: 100g, 11ms half-sine pulse, 3 cycles in each of 3 axes Repetitive shock (bump): 25g, 11ms, 2400 cycles Vibration: Random vibration of 4.55g from 10-1000Hz for 8 hours in each of 3 axes, using the sprung mass profile of GMW 3172	
Humidity	0 to 95% non-condensing	
Altitude	< 15,000 feet derated above 20°C	

USB Host Port	
Required equipment	Standard USB flash drive with FAT formatting
Charge tracking data Points	VAC, IAC, VDC, IDC, temperature (battery & charger) Ahr returned, charge duration, end of charge voltage, fault / error codes logged
Software update	Allows updating of software using USB flash drive, replacing software and / or charge profiles

# IC650 Charger Specifications

Mechanical	
Dimensions	Charger: 25.2 x 18.6 x 8.0 cm (9.9 x 7.3 x 3.1")
	Shipping carton: 32.5 x 30.5 x 12.0 cm (12.8 x 12.0 x 4.5")
Weight	Charger: 2.4 kg (5.3 lbs)
	Shipping carton: 3.0 kg (6.6 lbs)
AC input connector	IEC320/C14 Receptacle with Delta-Q AC cord retention tabs
DC output connector	M6 threaded fasteners for ring terminals, field replaceable in the event of cross-threading or other damage
Signal Connector	IC650 BASE
	6.3 mm (1/4") blade terminals: C1 - Battery temp. sense '-' C2 - Battery temp. sense '+' C3 - Interlock signal
Signal Connector	IC650 COMM
	6.3 mm (1/4") blade terminals: C1 - Battery temp. sense '-' C2 - Battery temp. sense '+' C3 - Interlock signal  TE AmpSeal automotive connector (IP67 rated) mates with TE Connectivity AmpSeal Plug (p/n: 776273): Signals for CAN bus (isolated); Remote status indicators; Battery temperature sense; Interlock; Enable / disable; Modbus
Service port	Sealed (IP66) USB 2.0 Host Port (Type A) with dust cover
Mounting holes	6.3 mm (1/4") diameter slots in each corner for safe installation on shelf, wall or bulkhead
Cooling	Normal operation in any orientation with passive cooling only

Operation	
Status indicators	AC present, charging status (low state-of-charge, high state-of-charge, complete), alarm, fault, USB activity
Numeric display	Displays selected charging profile, alarm and / or fault codes
Long-term storage mode	Automatic restart to maintain battery state-of-charge and prevent sulphation or freezing
Power source	Charge control circuitry powered from AC input. Backup power provided by battery if AC not present.
Standby AC power consumption	2.40 W
Quiescent DC current (connected to battery only)	24 VDC
	27 mA (0.65 W)
Quiescent DC current (connected to battery only)	36 VDC
	18 mA (0.65 W)
Quiescent DC current (connected to battery only)	48 VDC
	15 mA (0.72 W)

Communications / Signals	IC650 BASE	IC650 COMM
Battery temperature input	Isolated temperature sensor signals (mates with Delta-Q isolated battery temperature sensors)	
Charge enable / disable input	Not available	PWM signal
Interlock signal	Standard (Battery positive signal when AC not present)	NO or NC (selectable) dry contact 0.5 A fast-blow fuse (>100 VDC rated) required
Remote status indicator	Not available	Tri-color red / yellow / green
CANbus	Not available	Isolated CAN-H, CAN-L, CAN-GND CANopen CiA 418: Battery and CiA 419: charger CANopen CiA 454: Light electrical vehicles (LEV)
Serial communications	Not available	Modbus RTU

# IC650 Charger Specifications

## Special Features

Charging profile selection	Up to 25 charging profiles stored on the charger. Button and LED numeric display allows default charging profile to be selected.
Datalogging	Flash memory for logging charge cycle parameters (V, I, T, Ah returned, charge duration), events and diagnostic information.
Service	No custom service tools needed. USB flash drive used to update charger software, load charging profiles, select default charge profile and download charge tracking and diagnostic information. Software can be upgraded and logged charge cycle information can be downloaded using CANbus (for OEM handhelds).
External communications	PC-based configuration software for field programmability, analyzing charging performance and troubleshooting issues

## Options

OEM-specific AC, DC & signal cords	Customized cords to suit OEM requirement, factory-installed for OEM convenience		
AC cord	Delta-Q's custom IEC-compliant AC power cords provide sealed, retained AC connection to the charger. Cords for North America, Europe, Great Britain, China, Japan, and Australia are available. The sealed connection prevents damage from fluids, dirt or acid corrosion, as well as maintaining a firm connection between the power cord and inlet. The charger can also be connected to any off-the-shelf, country-specific AC cord which has a standard IEC320 C13 plug. Contact your Delta-Q Sales Representative for more details.		
Isolated battery temperature sensor	p/n 900-0056 3m (9.8') bare wires	p/n 900-0059 0.14m (5.5") bare wires	p/n 900-0060 1.2m (47.2") bare wires
Tri-color remote status indicator	p/n 900-0058: Remote LED, 3m (9.8') shielded bare wires, tri-color red / yellow / green		
IC series handle & rubber feet kit	p/n 900-0111: Handle, rubber feet and associated mounting hardware		



Close-up view of battery temperature sense and interlock blade terminals within the IC650's DC output block.

## Dimensions

