

## TSB003-NCD Series

Digital Universal Battery Charger

100W



### **Turtle Charger (100W) - NiCd** Pre-programmed Battery Charger for Nickel Cadmium



### **GENERAL SPECIFICATIONS**

Input Voltage	10-75VDC				
Output Voltage	1.2V-36V for battery packs up to: – 30 cells in series (NiCd)				
Output Current	5A (Buck) 60W (Boost)				
Voltage Accuracy	<1%				
Voltage Limit	1.55V ±1% p/cell				
Current Accuracy	<5%				
Tolerance on Timing	±5%				
Town Account	Internal: <1°C				
Temp. Accuracy	External: <1%, resolution 0.01°C				
Dimensions	L80mm x W61mm x H14.5mm (PCB only)				
Weight	60 grams (PCB only)				
LED PATTERNS - ROUTINE					
Traffic light (red-orange-green):	System reset. Occurs at power on and battery connection.				
Traffic light (red-orange-green): Slow orange blink:	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected.				
Traffic light (red-orange-green): Slow orange blink: Solid orange:	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed)				
Traffic light (red-orange-green): Slow orange blink: Solid orange: Orange with green blink:	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed) Constant voltage phase				
Traffic light (red-orange-green): Slow orange blink: Solid orange: Orange with green blink: Solid green	System reset. Occurs at power on and battery connection.   System waiting. Battery disconnected.   Constant current phase. (inc. pre-condition if programmed)   Constant voltage phase   Charge Complete. Float Charge continues (if programmed)				
Traffic light (red-orange-green): Slow orange blink: Solid orange: Orange with green blink: Solid green LED PATTERNS - EXCE	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed) Constant voltage phase Charge Complete. Float Charge continues (if programmed) CONSERVIEW				
Traffic light (red-orange-green): Slow orange blink: Solid orange: Orange with green blink: Solid green LED PATTERNS - EXCE Three red flashes:	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed) Constant voltage phase Charge Complete. Float Charge continues (if programmed) PTIONS Charge suspended. Battery volts too low.				
Traffic light (red-orange-green): Slow orange blink: Solid orange: Orange with green blink: Solid green LED PATTERNS - EXCE Three red flashes: Two red flashes:	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed) Constant voltage phase Charge Complete. Float Charge continues (if programmed) PTIONS Charge suspended. Battery volts too low. Charge suspended. Battery volts too logh.				
Traffic light (red-orange-green): Slow orange blink: Solid orange: Orange with green blink: Solid green LED PATTERNS - EXCE Three red flashes: Two red flashes: Slow red blinking: (1 flash every 5 sec)	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed) Constant voltage phase Charge Complete. Float Charge continues (if programmed) PTIONS Charge suspended. Battery volts too low. Charge suspended. Battery volts too logh. Charge suspended. Battery or PCB too hot (PCB self protected to 75°C)				
Traffic light (red-orange-green): Slow orange blink: Solid orange: Orange with green blink: Solid green LED PATTERNS - EXCE Three red flashes: Two red flashes: Slow red blinking: (1 flash every 5 sec) Fast red blinking:	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed) Constant voltage phase Charge Complete. Float Charge continues (if programmed) PTIONS Charge suspended. Battery volts too low. Charge suspended. Battery volts too logh. Charge suspended. Battery or PCB too hot (PCB self protected to 75°C) Thermistor Error. (Needs Power Reset)				
Traffic light (red-orange-green):   Slow orange blink:   Solid orange:   Orange with green blink:   Solid green   LED PATTERNS - EXCE   Three red flashes:   Two red flashes:   Slow red blinking: (1 flash every 5 sec)   Fast red blinking:   Orange blinking: (1 flash every ½ sec)	System reset. Occurs at power on and battery connection.   System waiting. Battery disconnected.   Constant current phase. (inc. pre-condition if programmed)   Constant voltage phase   Charge Complete. Float Charge continues (if programmed)   PTIONS   Charge suspended. Battery volts too low.   Charge suspended. Battery volts too high.   Charge suspended. Battery or PCB too hot (PCB self protected to 75°C)   Thermistor Error. (Needs Power Reset)   Timeout. Time limit is customisable on request				
Traffic light (red-orange-green): Slow orange blink: Solid orange: Orange with green blink:	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed) Constant voltage phase Charge Complete. Float Charge continues (if				
Traffic light (red-orange-green): Slow orange blink: Solid orange: Orange with green blink: Solid green LED PATTERNS - EXCE Three red flashes: Two red flashes: Slow red blinking: (1 flash every 5 sec) Fast red blinking:	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed) Constant voltage phase Charge Complete. Float Charge continues (if programmed) Charge complete. Float Charge continues (if programmed) Charge suspended. Battery volts too low. Charge suspended. Battery volts too high. Charge suspended. Battery or PCB too hot (PCB self protected to 75°C) Thermistor Error. (Needs Power Reset)				
Traffic light (red-orange-green): Image:   Slow orange blink: Image:   Solid orange: Image:   Orange with green blink: Image:   Solid green Image:   LED PATTERNS - EXCE Image:   Three red flashes: Image:   Thou red flashes: Image:   Slow red blinking: Image:   (1 flash every 5 sec) Image:   Orange blinking: Image:   (1 flash every ½ sec) Image:	System reset. Occurs at power on and battery connection. System waiting. Battery disconnected. Constant current phase. (inc. pre-condition if programmed) Constant voltage phase Charge Complete. Float Charge continues (if programmed) PTIONS Charge suspended. Battery volts too low. Charge suspended. Battery volts too logh. Charge suspended. Battery or PCB too hot (PCB self protected to 75°C) Thermistor Error. (Needs Power Reset) Timeout. Time limit is customisable on request				

### DESCRIPTION

The TSB003-NCD Series offer a wide range of single output DC **NICKEL CADMIUM** battery chargers up to 100 Watts.

It is custom programmed by our engineers to fit specific design requirements.

Pre-programming includes functions setting, charging current and charging voltage, constant current, constant voltage, preconditioning, float charging, charge termination methods and setting. Input and output cabling and connector options for all international markets are available upon request.

#### Features:

- Choice of 50 different models.
- Wide input voltage range.
- Single voltage output up to 100W.
- Constant current limiting overload.
- Proven field reliability and performance.
- Status LED indicator (NOT available in DIN-V version).
- Chassis and DIN rail mounting options.
- High operating temperature +71°C.

#### **MOUNTING OPTIONS:**

Modules available as PCB stand-alone or DIN mounting case. See options below.

 $\ensuremath{\text{PCB}}$  : PCB stand-alone charger with 5 (five) electric isolated screw terminals for panel mounting.

ENCLOSURE: Housed enclosure for environmental protection.

**DIN-V:** DIN Rail mounting case in vertical format. Suitable for Top hat IEC/EN 60715 and G section rail types.

**DIN-H:** DIN Rail mounting case in horizontal format. Suitable for Top hat IEC/EN 60715 and G section rail types.





### PART NUMBER SELECTION KEY



\*Termination of choice available.

#### **SELECTION TABLE**

Part Number	Chemistry	Battery Pack Voltage	Input Voltage	Output Current	Mounting Option
TSB003-NCD01S5	NiCd	1.2VDC (1 cell)	10-75VDC	5A max.(7.75W)	
TSB003-NCD01S4	NiCd	1.2VDC (1 cell)	10-75VDC	4A (6.2W)	
TSB003-NCD01S3	NiCd	1.2VDC (1 cell)	10-75VDC	3A (4.65W)	
TSB003-NCD01S2	NiCd	1.2VDC (1 cell)	10-75VDC	2A (3.1W)	
TSB003-NCD01S1	NiCd	1.2VDC (1 cell)	10-75VDC	1A (1.55W)	
TSB003-NCD02S5	NiCd	2.4VDC (2 cells)	10-75VDC	5A max.(15.5W)	
TSB003-NCD02S4	NiCd	2.4VDC (2 cells)	10-75VDC	4A (12.4W)	
TSB003-NCD02S3	NiCd	2.4VDC (2 cells)	10-75VDC	3A (9.3W)	
TSB003-NCD02S2	NiCd	2.4VDC (2 cells)	10-75VDC	2A (6.2W)	
TSB003-NCD02S1	NiCd	2.4VDC (2 cells)	10-75VDC	1A (3.1W)	
TSB003-NCD03S5	NiCd	3.6VDC (3 cells)	10-75VDC	5A max.(23.25W)	
TSB003-NCD03S4	NiCd	3.6VDC (3 cells)	10-75VDC	4A (18.6W)	
TSB003-NCD03S3	NiCd	3.6VDC (3 cells)	10-75VDC	3A (13.95W)	
TSB003-NCD03S2	NiCd	3.6VDC (3 cells)	10-75VDC	2A (9.3W)	Select from options
TSB003-NCD03S1	NiCd	3.6VDC (3 cells)	10-75VDC	1A (4.65W)	above
TSB003-NCD04S5	NiCd	4.8VDC (4 cells)	10-75VDC	5A max.(31W)	
TSB003-NCD04S4	NiCd	4.8VDC (4 cells)	10-75VDC	4A (24.8W)	
TSB003-NCD04S3	NiCd	4.8VDC (4 cells)	10-75VDC	3A (18.6W)	
TSB003-NCD04S2	NiCd	4.8VDC (4 cells)	10-75VDC	2A (12.4W)	
TSB003-NCD04S1	NiCd	4.8VDC (4 cells)	10-75VDC	1A (6.2W)	
TSB003-NCD05S5	NiCd	6VDC (5 cells)	10-75VDC	5A max.(38.75W)	
TSB003-NCD05S4	NiCd	6VDC (5 cells)	10-75VDC	4A (31W)	
TSB003-NCD05S3	NiCd	6VDC (5 cells)	10-75VDC	3A (23.25W)	
TSB003-NCD05S2	NiCd	6VDC (5 cells)	10-75VDC	2A (15.5W)	
TSB003-NCD05S1	NiCd	6VDC (5 cells)	10-75VDC	1A (7.75W)	
TSB003-NCD06S5	NiCd	7.2VDC (6 cells)	10-75VDC	5A max.(46.5W)	
TSB003-NCD06S4	NiCd	7.2VDC (6 cells)	10-75VDC	4A (37.2W)	
TSB003-NCD06S3	NiCd	7.2VDC (6 cells)	10-75VDC	3A (27.9W)	



Part Number	Chemistry	Battery Pack Voltage	Input Voltage	Output Current	Mounting Option
TSB003-NCD06S2	NiCd	7.2VDC (6 cells)	10-75VDC	2A (18.6W)	•••
TSB003-NCD06S1	NiCd	7.2VDC (6 cells)	10-75VDC	1A (9.3W)	
TSB003-NCD07S5	NiCd	8.4VDC (7 cells)	10-75VDC	5A max.(54.25W)	
TSB003-NCD07S4	NiCd	8.4VDC (7 cells)	10-75VDC	4A (43.4W)	
TSB003-NCD07S3	NiCd	8.4VDC (7 cells)	10-75VDC	3A (32.55W)	
TSB003-NCD07S2	NiCd	8.4VDC (7 cells)	10-75VDC	2A (21.7W)	
TSB003-NCD07S1	NiCd	8.4VDC (7 cells)	10-75VDC	1A (10.85W)	
TSB003-NCD08S5	NiCd	9.6VDC (8 cells)	10-75VDC	5A max.(62W)	
TSB003-NCD08S4	NiCd	9.6VDC (8 cells)	10-75VDC	4A (49.6W)	
TSB003-NCD08S3	NiCd	9.6VDC (8 cells)	10-75VDC	3A (37.2W)	
TSB003-NCD08S2	NiCd	9.6VDC (8 cells)	10-75VDC	2A (24.8W)	
TSB003-NCD08S1	NiCd	9.6VDC (8 cells)	10-75VDC	1A (12.4W)	
TSB003-NCD09S5	NiCd	10.8VDC (9 cells)	10-75VDC	5A max.(69.75W)	
TSB003-NCD09S4	NiCd	10.8VDC (9 cells)	10-75VDC	4A (55.8W)	
TSB003-NCD09S3	NiCd	10.8VDC (9 cells)	10-75VDC	3A (41.85W)	
TSB003-NCD09S2	NiCd	10.8VDC (9 cells)	10-75VDC	2A (27.9W)	
TSB003-NCD09S1	NiCd	10.8VDC (9 cells)	10-75VDC	1A (13.95W)	
TSB003-NCD10S5	NiCd	12VDC (10 cells)	10-75VDC	5A max.(77.5W)	
TSB003-NCD10S4	NiCd	12VDC (10 cells)	10-75VDC	4A (62W)	
TSB003-NCD10S3	NiCd	12VDC (10 cells)	10-75VDC	3A (46.5W)	
TSB003-NCD10S2	NiCd	12VDC (10 cells)	10-75VDC	2A (31W)	
TSB003-NCD10S1	NiCd	12VDC (10 cells)	10-75VDC	1A (15.5W)	
TSB003-NCD11S5	NiCd	13.2VDC (11 cells)	10-75VDC	5A max.(85.25W)	Select from options
TSB003-NCD11S4	NiCd	13.2VDC (11 cells)	10-75VDC	4A (68.2W)	above
TSB003-NCD11S3	NiCd	13.2VDC (11 cells)	10-75VDC	3A (51.15W)	
TSB003-NCD11S2	NiCd	13.2VDC (11 cells)	10-75VDC	2A (34.1W)	
TSB003-NCD11S1	NiCd	13.2VDC (11 cells)	10-75VDC	1A (17.05W)	
TSB003-NCD12S5	NiCd	14.4VDC (12 cells)	10-75VDC	5A max.(93W)	
TSB003-NCD12S4	NiCd	14.4VDC (12 cells)	10-75VDC	4A (74.4W)	
TSB003-NCD12S3	NiCd	14.4VDC (12 cells)	10-75VDC	3A (55.8W)	
TSB003-NCD12S2	NiCd	14.4VDC (12 cells)	10-75VDC	2A (37.2W)	
TSB003-NCD12S1	NiCd	14.4VDC (12 cells)	10-75VDC	1A (18.6W)	
TSB003-NCD13S5	NiCd	15.6VDC (13 cells)	10-75VDC	4.96A (100W max.)	
TSB003-NCD13S4	NiCd	15.6VDC (13 cells)	10-75VDC	4A (80.6W)	
TSB003-NCD13S3	NiCd	15.6VDC (13 cells)	10-75VDC	3A (60.45W)	
TSB003-NCD13S2	NiCd	15.6VDC (13 cells)	10-75VDC	2A (40.3W)	
TSB003-NCD13S1	NiCd	15.6VDC (13 cells)	10-75VDC	1A (20.15W)	
TSB003-NCD14S5	NiCd	16.8VDC (14 cells)	10-75VDC	4.61A (100W max.)	
TSB003-NCD14S4	NiCd	16.8VDC (14 cells)	10-75VDC	4A (86.8W)	
TSB003-NCD14S3	NiCd	16.8VDC (14 cells)	10-75VDC	3A (65.1W)	
TSB003-NCD14S2	NiCd	16.8VDC (14 cells)	10-75VDC	2A (43.4W)	
TSB003-NCD14S1	NiCd	16.8VDC (14 cells)	10-75VDC	1A (21.7W)	
TSB003-NCD15S5	NiCd	18VDC (15 cells)	10-75VDC	4.3A (100W max.)	
TSB003-NCD15S4	NiCd	18VDC (15 cells)	10-75VDC	4A (93W)	
TSB003-NCD15S3	NiCd	18VDC (15 cells)	10-75VDC	3A (69.75W)	
TSB003-NCD15S2	NiCd	18VDC (15 cells)	10-75VDC	2A (46.5W)	



by	<b>ENEP</b>	OWEF
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Part Number	Chemistry	Battery Pack Voltage	Input Voltage	Output Current	Mounting Option
TSB003-NCD15S1	NiCd	18VDC (15 cells)	10-75VDC	1A (23.25W)	
TSB003-NCD16S4	NiCd	19.2VDC (16 cells)	10-75VDC	4A (100W max.)	
TSB003-NCD16S3	NiCd	19.2VDC (16 cells)	10-75VDC	3A (74.4W)	
TSB003-NCD16S2	NiCd	19.2VDC (16 cells)	10-75VDC	2A (49.6W)	
TSB003-NCD16S1	NiCd	19.2VDC (16 cells)	10-75VDC	1A (24.8W)	
TSB003-NCD17S4	NiCd	20.4VDC (17 cells)	10-75VDC	3.8A (100W max.)	
TSB003-NCD17S3	NiCd	20.4VDC (17 cells)	10-75VDC	3A (79.05W)	
TSB003-NCD17S2	NiCd	20.4VDC (17 cells)	10-75VDC	2A (52.7W)	
TSB003-NCD17S1	NiCd	20.4VDC (17 cells)	10-75VDC	1A (26.35W)	
TSB003-NCD18S4	NiCd	21.6VDC (18 cells)	10-75VDC	3.58A (100W max.)	
TSB003-NCD18S3	NiCd	21.6VDC (18 cells)	10-75VDC	3A (83.7W)	
TSB003-NCD18S2	NiCd	21.6VDC (18 cells)	10-75VDC	2A (55.8W)	
TSB003-NCD18S1	NiCd	21.6VDC (18 cells)	10-75VDC	1A (27.9W)	
TSB003-NCD19S4	NiCd	22.8VDC (19 cells)	10-75VDC	3.4A (100W max.)	
TSB003-NCD19S3	NiCd	22.8VDC (19 cells)	10-75VDC	3A (88.35W)	
TSB003-NCD19S2	NiCd	22.8VDC (19 cells)	10-75VDC	2A (58.9W)	
TSB003-NCD19S1	NiCd	22.8VDC (19 cells)	10-75VDC	1A (29.45W)	
TSB003-NCD20S4	NiCd	24VDC (20 cells)	10-75VDC	3.23A (100W max.)	
TSB003-NCD20S3	NiCd	24VDC (20 cells)	10-75VDC	3A (93W)	
TSB003-NCD20S2	NiCd	24VDC (20 cells)	10-75VDC	2A (62W)	
TSB003-NCD20S1	NiCd	24VDC (20 cells)	10-75VDC	1A (31W)	
TSB003-NCD21S4	NiCd	25.2VDC (21 cells)	10-75VDC	3.1A (100W max.)	
TSB003-NCD21S3	NiCd	25.2VDC (21 cells)	10-75VDC	3A (97.65W)	Select from options
TSB003-NCD21S2	NiCd	25.2VDC (21 cells)	10-75VDC	2A (65.1W)	above
TSB003-NCD21S1	NiCd	25.2VDC (21 cells)	10-75VDC	1A (32.55W)	
TSB003-NCD22S3	NiCd	26.4VDC (22 cells)	10-75VDC	2.93A (100W max.)	
TSB003-NCD22S2	NiCd	26.4VDC (22 cells)	10-75VDC	2A (68.2W)	
TSB003-NCD22S1	NiCd	26.4VDC (22 cells)	10-75VDC	1A (34.1W)	
TSB003-NCD23S3	NiCd	27.6VDC (23 cells)	10-75VDC	2.81A (100W max.)	
TSB003-NCD23S2	NiCd	27.6VDC (23 cells)	10-75VDC	2A (71.3W)	
TSB003-NCD23S1	NiCd	27.6VDC (23 cells)	10-75VDC	1A (35.65W)	
TSB003-NCD24S3	NiCd	28.8VDC (24 cells)	10-75VDC	2.69A (100W max.)	
TSB003-NCD24S2	NiCd	28.8VDC (24 cells)	10-75VDC	2A (74.4W)	
TSB003-NCD24S1	NiCd	28.8VDC (24 cells)	10-75VDC	1A (37.2W)	
TSB003-NCD25S3	NiCd	30VDC (25 cells)	10-75VDC	2.58A (100W max.)	
TSB003-NCD25S2	NiCd	30VDC (25 cells)	10-75VDC	2A (77.5W)	
TSB003-NCD25S1	NiCd	30VDC (25 cells)	10-75VDC	1A (38.75W)	
TSB003-NCD26S3	NiCd	31.2VDC (26 cells)	10-75VDC	2.48A (100W max.)	
TSB003-NCD26S2	NiCd	31.2VDC (26 cells)	10-75VDC	2A (80.6W)	
TSB003-NCD26S1	NiCd	31.2VDC (26 cells)	10-75VDC	1A (40.3W)	
TSB003-NCD27S3	NiCd	32.4VDC (27 cells)	10-75VDC	2.39A (100W max.)	
TSB003-NCD27S2	NiCd	32.4VDC (27 cells)	10-75VDC	2A (83.7W)	
TSB003-NCD27S1	NiCd	32.4VDC (27 cells)	10-75VDC	1A (41.85W)	
TSB003-NCD28S3	NiCd	33.6VDC (28 cells)	10-75VDC	2.3A (100W max.)	
TSB003-NCD28S2	NiCd	33.6VDC (28 cells)	10-75VDC	2A (86.8W)	
TSB003-NCD28S1	NiCd	33.6VDC (28 cells)	10-75VDC	1A (43.4W)	



Part Number	Chemistry	Battery Pack Voltage	Input Voltage	Output Current	Mounting Option
TSB003-NCD29S3	NiCd	34.8VDC (29 cells)	10-75VDC	2.22A (100W max.)	
TSB003-NCD29S2	NiCd	34.8VDC (29 cells)	10-75VDC	2A (89.9W)	
TSB003-NCD29S1	NiCd	34.8VDC (29 cells)	10-75VDC	1A (44.95W)	Select from options
TSB003-NCD30S3	NiCd	36VDC (30 cells)	10-75VDC	2.15A (100W max.)	above
TSB003-NCD30S2	NiCd	36VDC (30 cells)	10-75VDC	2A (93W)	
TSB003-NCD30S1	NiCd	36VDC (30 cells)	10-75VDC	1A (46.5W)	

\*\*\*IMPORTANT: The Part Number must have the mounting option code (-P, -E, -V, or -H) your project requires.

### **TECHNICAL DIAGRAMS (2D)**

### ENCLOSURE



DIN-V







### DIN-H









### **TECHNICAL DIAGRAMS (2D)**

### PCB





### **TERMINAL BLOCK PINOUT**

