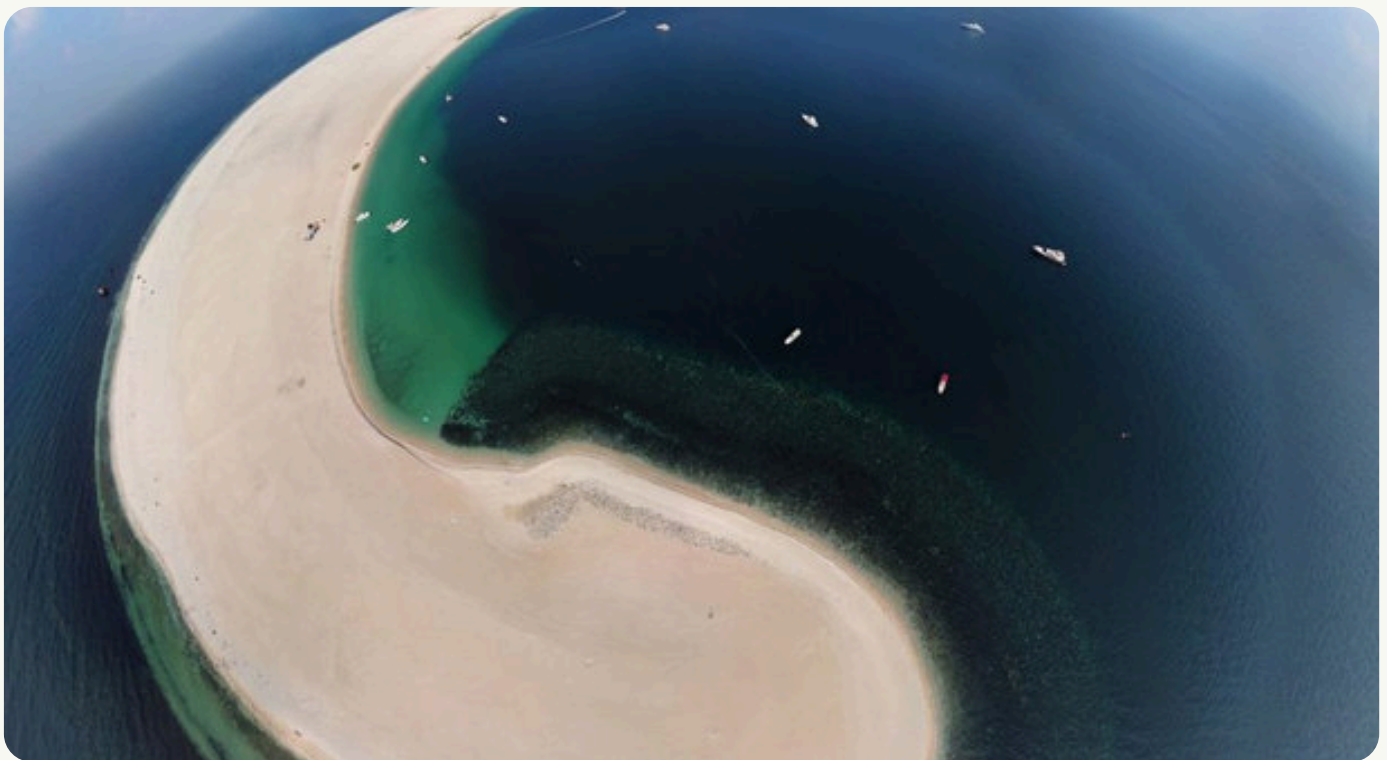


CHAPTER 03

Power & batteries

RATIO ELECTRIC · TBS ELECTRONICS · SUPER B



IN THIS CHAPTER

- Shore power inlets & cordsets
- AC16 shore power system
- Powersine inverters
- Powersine Combi inverter/chargers
- Omnicharge battery chargers
- Expert battery monitors
- DC modular distribution
- Super B lithium batteries

PAGES 159-209

Shore power connection systems

RATIO ELECTRIC — POWERED BY SIMPLICITY · THE MARINE STANDARD ALL OVER EUROPE

A TRADITION IN INNOVATION

Ratio Electric

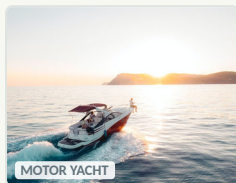
Ratio
ELECTRIC



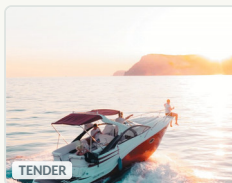
ON BOARD



UNDER SAIL



MOTOR YACHT



TENDER

Ratio Electric develops, produces and sells electrical power connection and distribution systems. The company is based in The Netherlands and active throughout Europe. During half a century it gathered a huge amount of experience that is used to meet the latest demands in its markets — building a tradition in innovation with state-of-the-art, reliable, certified and affordable products.

The **MP16/32/50** boat inlets and cables are stylish, certified and safe. Every marine product is designed to be user-friendly and still able to withstand the rigors of life at sea.

Market	What Ratio Electric supplies
Marine	The shore power connection system that is the marine standard all over Europe — boat inlets, cord sets and accessories
Industry and Office	Power cords, cord sets, power strips, power plugs, power connectors and other components; custom made power connections with the required approvals on request
ICT	Modular solutions for power distribution and power management in 19" racks — intelligent Power Distribution Units and power cords
E-Mobility	High quality AC connection and charging systems for electric and plug-in hybrid vehicles, complying with the latest European standards

MP16 · MP32 · MP50

MP waterproof connection system

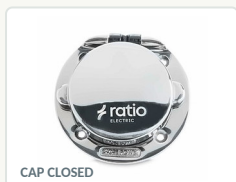
Ratio
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INLET



CAP OPEN



CAP CLOSED



REAR BODY

Ratio Electric designed the MP16 (16A/250V), MP32 (32A/250V) and MP50 (50A/250V) system to offer a waterproof, stylish and approved shore power connection for your boat. The system is based on the world standard for outdoor connections (IEC 60309) and features a boat inlet and a mating connector, moulded or assembled.

The MP16, MP32 and MP50 inlets are made from solid cast marine grade **316 stainless steel** and include an easy locking waterproof cap.

	System	Rating	Boat inlet	Cable connector	Connector types	Inlet IP	Connector IP
a	MP16	16A/250V	MP16-10	MP16-110	Moulded and assembly (rewireable)	IP56	IP44
	MP32	32A/250V	MP32-10	MP32-110	Moulded and assembly (rewireable)	IP56	IP44
	MP50	50A/250V	MP50-10	MP50-110	Assembly (rewireable) only	IP56	IP44

The requirements for installation of electrical systems on craft of hull length up to 24 m are specified in the ISO13297 standard. MP16, MP32 and MP50 inlets will not accept standard CEE couplers.

Custom Marine is the regional partner for every brand on these pages. We size the shore inlet, cord set and galvanic isolator against the berth; the charger against the bank and the available shore current; the inverter against the load list; and the fusing, busbars and cable against the resulting fault currents. Complete distribution assemblies are built, labelled and tested in Dubai before they reach the vessel, and commissioning, handover and crew familiarisation can be arranged at the yard. Drawings, mounting dimensions, wiring diagrams and 3D models are issued on request to naval architects, project managers and refit yards throughout the UAE and the wider Gulf. Talk to us at the design stage: the shore connection, the charging source, the battery chemistry, the distribution grid and the monitoring all interact, and the specification is far easier and cheaper to get right before the loom is cut — 800BOATS · 800YACHTS · custommarine.ae.

Shore power connection systems

RATIO ELECTRIC — POWERED BY SIMPLICITY · THE MARINE STANDARD ALL OVER EUROPE — CONTINUED

MOULDED & ASSEMBLY

Cable connectors

Ratio
ELECTRIC



The MP16 and MP32 cable connectors are available in a moulded watertight version as well as an assembly (rewireable) type. The MP50 cable connector is only available in an assembly version. All types include a weatherproof sealing cap to ensure CE compliance.

	Connector type	Features	Available in
a	Moulded connector	LED power indication · watertight moulded construction	16A and 32A version
b	Assembly connector	Weatherproof marine construction · easy assembly	16A, 32A and 50A version

APPROVALS & PROTECTION

What the MP system is built to

Ratio
ELECTRIC

Standard or rating	Where it applies
IEC 60309	The world standard for outdoor connections on which the MP boat inlet and mating connector are based
ISO13297	Specifies the requirements for installation of electrical systems on craft of hull length up to 24m
CE	Marking carried by every inlet, connector, cord set and outlet socket in the MP range
IP56	Boat inlets and the MP16-230 outlet socket, with the bayonet or locking cap closed
IP44	Cable connectors and cord sets, moulded and assembly types alike
KEMA	Approval held by the H07BQ-F PUR cable used for every Ratio Electric cord set

MP16, MP32 and MP50 inlets will not accept standard CEE couplers, so a shore lead cannot be plugged directly into the boat inlet without the correct MP connector.

SOLID CAST 316 STAINLESS STEEL

MP16-10 & MP16-10-SQ

Ratio
ELECTRIC



The MP16-10 inlet features a sleek and modern design that complements any boat. Its compact yet robust build ensures durability without compromising performance. Safety is prioritized in its design, and installation is straightforward, as expected from the Ratio Electric Shore Power portfolio.

Round flange (a) and square flange (b) versions share the same solid cast body and easy locking waterproof cap.

	Part no.	Material	Flange	Rating	Waterproof	Marking
a	MP16-10	Solid cast 316 stainless steel	Round	16A/250V	IP56	CE
b	MP16-10-SQ	Solid cast 316 stainless steel	Square	16A/250V	IP56	CE

Custom Marine supplies the complete Ratio Electric shore power programme — inlets, cord sets, adapters, AC16 distribution and CCS charging inlets — alongside the TBS Electronics power conversion equipment on the following pages. Custom Marine is the regional partner for every brand on these pages. We size the shore inlet, cord set and galvanic isolator against the berth; the charger against the bank and the available shore current; the inverter against the load list; and the fusing, busbars and cable against the resulting fault currents. Complete distribution assemblies are built, labelled and tested in Dubai before they reach the vessel, and commissioning, handover and crew familiarisation can be arranged at the yard. Drawings, mounting dimensions, wiring diagrams and 3D models are issued on request to naval architects, project managers and refit yards throughout the UAE and the wider Gulf. Talk to us at the design stage: the shore connection, the charging source, the battery chemistry, the distribution grid and the monitoring all interact, and the specification is far easier and cheaper to get right before the loom is cut — 800BOATS · 800YACHTS · custommarine.ae.

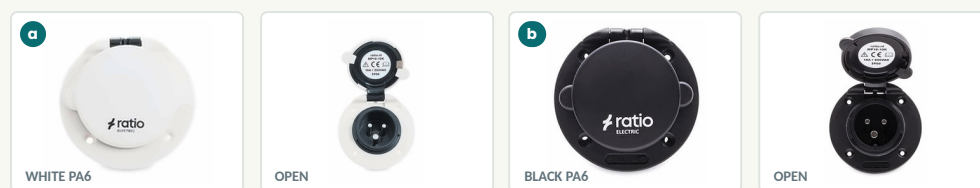
MP16 shore power inlets

16A/250V · FIVE FINISHES · SOLID CAST 316 STAINLESS STEEL, CHROMED ABS OR GLASS FILLED PA6

POLYAMID & CHROMED

MP16-10-K, -KZ and -KX

Ratio
ELECTRIC



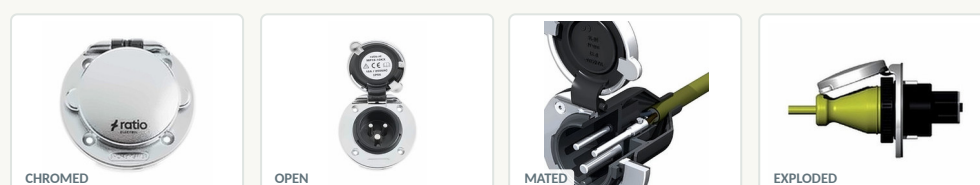
Glass filled PA6 inlets in white (c) and black (d) give the same IP56 sealing and CE marking in a lighter, non-metallic body — the natural choice on a painted or moulded topside. The chrome plated ABS version (e) matches chromed deck hardware.

	Part no.	Material	Finish	Rating	Waterproof	Marking
a	MP16-10-K	Glass filled PA6	White	16A/250V	IP56	CE
b	MP16-10-KZ	Glass filled PA6	Black	16A/250V	IP56	CE
	MP16-10-KX	ABS chrome plated	Chrome	16A/250V	IP56	CE

MATING & SEALING

Chromed inlet & connector interface

Ratio
ELECTRIC



The three-pin MP interface is keyed so the boat inlet will not accept a standard CEE coupler; the locking collar and the hinged cap together seal the connection to IP56 on the inlet side and IP44 at the connector. The rear body (f) is designed for a straightforward panel cut-out on any transom, coaming or cockpit locker face.

	Part no.	Component	Rating	Waterproof	Notes
	MP16-110	16A/250V cable connector	16A/250V	IP44	Recommended cable H07BQ-F 3G 1,50mm2 and 3G 2,50mm2

All MP16 inlets ship with the easy locking waterproof cap fitted. Marking CE throughout the range.

PUR H07BQ-F · CE · IP44

MP16 cord sets

Ratio
ELECTRIC



Marking CE · waterproof IP44 · PUR cable (H07BQ-F) · watertight moulded plug and connector · LED power indication. The 16A/250V connector **MP16-110** mates every MP16 inlet; recommended cable H07BQ-F 3G 1,50mm2 and 3G 2,50mm2.

	P/N	MP16 cord sets	Length	Max. rating
a	2801	MP16 Cord Set with H07BQ-F 3G 1,50mm2 (PUR) Yellow cable	15m	16A
	2823	MP16 Cord Set with H07BQ-F 3G 2,50mm2 (PUR) Yellow cable	5m	16A
	2821	MP16 Cord Set with H07BQ-F 3G 2,50mm2 (PUR) Yellow cable	15m	16A
	2822	MP16 Cord Set with H07BQ-F 3G 2,50mm2 (PUR) Yellow cable	25m	16A
	2803	MP16 Cordset, 10A/250V (supplied in the MP16 Shore Power Kit)	10m	10A

Custom Marine is the regional partner for every brand on these pages. We size the shore inlet, cord set and galvanic isolator against the berth; the charger against the bank and the available shore current; the inverter against the load list; and the fusing, busbars and cable against the resulting fault currents. Complete distribution assemblies are built, labelled and tested in Dubai before they reach the vessel, and commissioning, handover and crew familiarisation can be arranged at the yard. Drawings, mounting dimensions, wiring diagrams and 3D models are issued on request to naval architects, project managers and refit yards throughout the UAE and the wider Gulf. Talk to us at the design stage: the shore connection, the charging source, the battery chemistry, the distribution grid and the monitoring all interact, and the specification is far easier and cheaper to get right before the loom is cut — 800BOATS · 800YACHTS · custommarine.ae.

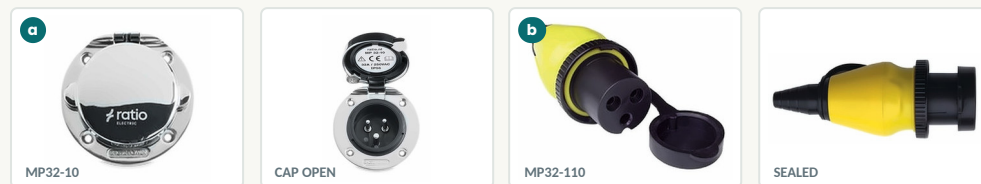
MP16 cord sets & the MP32 system

WATERTIGHT MOULDED PUR CORD SETS WITH LED POWER INDICATION · 32A/250V FOR LARGER CRAFT

32A/250V

MP32 inlet & rewirable connector

Ratio
ELECTRIC



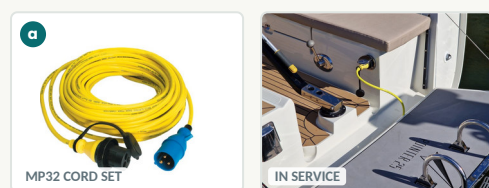
The 32A/250V stainless steel inlet (c) is solid cast 316 stainless steel, IP56, CE marked. The rewirable 32A/250V connector (d) is IP44 and accepts H07BQ-F 3G 4,00mm2 and H07BQ-F 3G 6,00mm2 cable.

	Part no.	Component	Material	Rating	Waterproof	Marking
a	MP32-10	32A/250V stainless steel inlet	Solid cast 316 stainless steel	32A/250V	IP56	CE
b	MP32-110	32A/250V rewirable connector	Weatherproof marine construction	32A/250V	IP44	CE

PUR H07BQ-F · CE · IP44

MP32 cord sets

Ratio
ELECTRIC



Watertight moulded plug and connector with LED power indication on PUR cable, marking CE, waterproof IP44. Two cable sections cover the range: 4,00mm2 for shorter runs and 6,00mm2 where the full 32A must be carried over 25m.

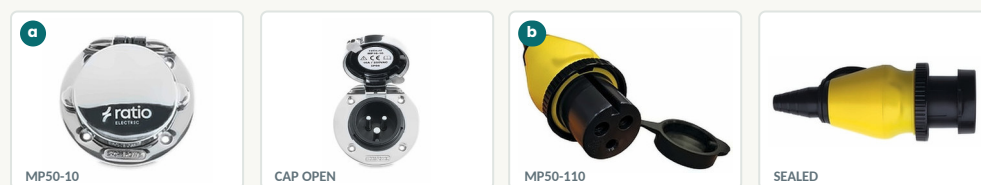
	P/N	MP32 cord sets	Length	Max. rating
a	2836	MP32 Cord Set with H07BQ-F 3G 4,00mm2 (PUR) Yellow cable	15m	32A
	2832	MP32 Cord Set with H07BQ-F 3G 4,00mm2 (PUR) Yellow cable	25m	25A
	2837	MP32 Cord Set with H07BQ-F 3G 6,00mm2 (PUR) Yellow cable	15m	32A
	2838	MP32 Cord Set with H07BQ-F 3G 6,00mm2 (PUR) Yellow cable	25m	32A

The 25m cord set on 4,00mm2 cable is rated 25A; specify the 6,00mm2 version where the full 32A supply must be carried the whole length of the pontoon.

50A/250V

MP50 inlet & connector

Ratio
ELECTRIC



The 50A/250V stainless steel inlet is solid cast 316 stainless steel, IP56, CE marked, shown front view and side view. The 50A/250V connector MP50-110 is available in the assembly version only, IP44, and takes H07BQ-F 3G 10mm2 cable up to a maximum run of 25m.

	Part no.	Component	Material / construction	Rating	Waterproof	Marking
a	MP50-10	50A/250V stainless steel inlet	Solid cast 316 stainless steel	50A/250V	IP56	CE
b	MP50-110	50A/250V connector, assembly type	Watertight assembled plug and connector	50A/250V	IP44	CE

Custom Marine is the regional partner for every brand on these pages. We size the shore inlet, cord set and galvanic isolator against the berth; the charger against the bank and the available shore current; the inverter against the load list; and the fusing, busbars and cable against the resulting fault currents. Complete distribution assemblies are built, labelled and tested in Dubai before they reach the vessel, and commissioning, handover and crew familiarisation can be arranged at the yard. Drawings, mounting dimensions, wiring diagrams and 3D models are issued on request to naval architects, project managers and refit yards throughout the UAE and the wider Gulf. Talk to us at the design stage: the shore connection, the charging source, the battery chemistry, the distribution grid and the monitoring all interact, and the specification is far easier and cheaper to get right before the loom is cut — 800BOATS · 800YACHTS · custommarine.ae.

MP50 system & MP16 shore power kit

50A/250V FOR SUPERYACHT TENDERS AND LARGE MOTOR YACHTS · A COMPLETE 10A SYSTEM FOR SMALL BOATS

ASSEMBLY TYPE · 63A BLUE CEE PLUG

MP50 cord sets

Ratio
ELECTRIC



Marking CE · watertight assembled plug and connector · PUR cable (H07BQ-F) · MP50-110 connector on the boat end and a 63A blue CEE plug on the shore end.

	P/N	MP50 cord sets	Length	Max. rating
a	2851	MP50 Cord Set with H07BQ-F 3G 10,00mm2 (PUR) Yellow cable	15m	50A
	2852	MP50 Cord Set with H07BQ-F 3G 10,00mm2 (PUR) Yellow cable	25m	50A

63A MP-series to be introduced. Check with Custom Marine or with Ratio Electric to explore the available options before specifying a 63A inlet.

COMPLETE SYSTEM — 10A/250 VAC

MP16 shore power kit & electrical cabinets

Ratio
ELECTRIC



A complete shore power system for small boats, 10A/250 Vac. Each kit contains the MP16 inlet in stainless steel, polyamid or chromed version, the MP16 Cordset 10A/250V, length 10m (p/n 2803), and the Electrical Cabinet Single.

Electrical cabinet circuitbreaker 16A · earth leakage protection 30mA · LED power indication · Schuko outlet · IP65 housing.

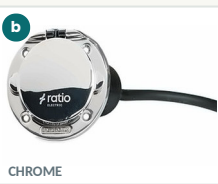
	P/N	Description	Inlet supplied
a	MP16-Kit	MP16 Kit Stainless Steel Inlet	MP16-10
	MP16-K-Kit	MP16 Kit Polyamid Inlet	MP16-10-K
	MP16-KX-Kit	MP16 Kit Chromed Inlet	MP16-10-KX
b	70051	Electrical Cabinet Single (1x Schuko outlet)	—
	70052	Electrical Cabinet Dual (2x Schuko outlet)	—

Kit codes follow the inlet finish: MP16 stainless steel, MP16-K polyamid, MP16-KX chromed — each supplied with the 10m cordset 2803 and the Electrical Cabinet Single.

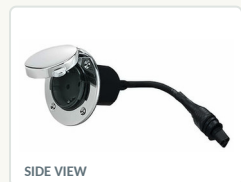
SYSTEM COMPONENTS

Inlets with cord

Ratio
ELECTRIC



The Ratio Electric AC16 Power System provides a complete plug & play shore power and battery charger system for boats. The system is flexible and easy to extend or modify. All components use snap-in connections for easy installation — shore power inlet, shore power cord set, electrical cabinet, internal cable, cable splitter, wall sockets and galvanic isolator all clip together without loose terminations.



	P/N	Inlet with Cord	Max. rating
a	AC16-01	Stainless Steel Inlet	16A
	AC16-01-K	Polyamid Inlet	16A
b	AC16-01-KX	Chrome plated Inlet	16A

AC16 plug & play shore power system

COMPLETE SHORE POWER AND BATTERY CHARGER SYSTEM FOR BOATS · SNAP-IN CONNECTIONS THROUGHOUT

1XRCBO AND 3XRCBO · 30mA/16A

Electrical cabinets

Ratio
ELECTRIC



The cabinet is the heart of the AC16 system: it takes the incoming shore supply from the inlet, protects it with residual-current breakers with overcurrent protection and feeds the snap-in internal cables to the sockets. Type 16-03 is the BASIC single-circuit cabinet; type 16-13 is the PRO cabinet with three protected circuits.

	P/N	Electrical cabinet	Protection	Max. rating
a	AC16-03	Electrical Cabinet BASIC	1xRCBO	30mA/16A
	AC16-13	Electrical Cabinet PRO	3xRCBO	30mA/16A

There are more varieties of Electrical Cabinets — check with Custom Marine or with Ratio Electric on possibilities.

SNAP-IN WIRING · H07RN-F 3G 2,50MM2

Internal cables

Ratio
ELECTRIC



Snap-in internal cables link the AC16 inlet, the electrical cabinet, the splitter and the wall sockets. Five stocked lengths keep runs short and installation fast, with no exposed terminations anywhere in the system.

	P/N	Internal Cable	Length	Max. rating
a	AC16-02-1	Internal Cable H07RN-F 3G 2,50mm2	1m	20A
	AC16-02-2	Internal Cable H07RN-F 3G 2,50mm2	2m	20A
	AC16-02-3	Internal Cable H07RN-F 3G 2,50mm2	3m	20A
	AC16-02-4	Internal Cable H07RN-F 3G 2,50mm2	4m	20A
	AC16-02-5	Internal Cable H07RN-F 3G 2,50mm2	5m	20A

IP44, FLUSH AND IP56

Wall sockets

Ratio
ELECTRIC



Surface mounted one-way and two-way sockets serve engine room, lazarette and locker; the flush socket drops into a bulkhead or joinery panel in white, black or brown; and the IP56 socket takes the same snap-in feed out into an exposed position.

	P/N	Wall socket	Mounting	Max. rating
a	AC16-07-1	Wall Socket 1-way IP44	Surface	16A
	AC16-07-2	Wall Socket 2-way IP44	Surface	16A
b	AC16-17	Wall Socket 1-way FLUSH white	Flush	16A
	AC16-18	Wall Socket 1-way FLUSH black	Flush	16A
	AC16-19	Wall Socket 1-way FLUSH brown	Flush	16A
	AC16-23	Wall Socket IP56	Surface, exposed	16A

Every part number on these pages is stocked or indented to order. Custom Marine builds and tests complete distribution assemblies to your schematic before they reach the vessel, supplies cable, lugs, fuses and fuseholders as a matched set, and provides specification support, mounting drawings, wiring diagrams and 3D models to naval architects, yards and refit managers throughout the UAE and the wider Gulf. Talk to us early: the power and distribution plan is easiest to get right before the loom is cut — 800BOATS · 800YACHTS · custommarine.ae.

AC16 sockets, splitter & galvanic isolator

BELOW-DECK OUTLETS, THREE-WAY DISTRIBUTION AND STRAY-CURRENT PROTECTION — ALL SNAP-IN

DISTRIBUTION & PROTECTION

Splitter 1:3 and galvanic isolator

Ratio
ELECTRIC



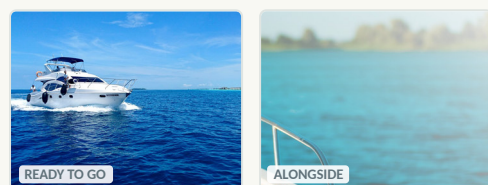
The 1:3 splitter takes one snap-in feed from the cabinet and branches it to three internal cables, so a single protected circuit can serve three separate outlet positions. The in-line galvanic isolator sits in the shore earth conductor and blocks the low-voltage DC potentials that drive stray-current corrosion of shafts, props and underwater metals while leaving the protective earth intact for fault currents.

	P/N	Component	Function	Max. rating
a	AC16-06	Splitter 1:3	One feed to three snap-in internal cables	16A
b	AC16-20	Galvanic Isolator	In-line in the shore earth conductor	16A

ONE PART NUMBER — AC16-BASICKIT

AC16 Basic Kit

Ratio
ELECTRIC



The AC Power System is also available as the AC16 Basic Kit (p/n **AC16-BASICKIT**) — everything needed to bring 16A shore power aboard a small or mid-size boat in one box, with no loose terminations to make up.

P/N	Description	P/N	Description
2801	Shore Power Cord Set 15m	AC16-02-1	Internal Cable 1m
AC16-01	Stainless Steel Inlet with cord	AC16-02-2	Internal Cable 2m
AC16-03	Electrical Cabinet	AC16-07-2	Wall Socket 2-way IP44

16A/250V · CE

Marinco compatible & CEE extension cord sets

Ratio
ELECTRIC



Marinco MCP16 Cord Set (a) moulded 3-pin CEE plug · moulded Marinco compatible plug (Nema L5-30) · threaded locking ring · weatherproof protection cap · LED power indication · marking CE. For boats already fitted with an American-style inlet.

CEE extension cord sets (b) moulded 3-pin (male) CEE plug · moulded 3-pin (female) CEE connector with weatherproof protection cap and LED power indication · marking CE.

	P/N	Cord set	Length	Max. rating
a	2811	MCP16 Cord Set with H07BQ-F 3G 2,50mm2 (PUR) Yellow cable	15m	16A
	2812	MCP16 Cord Set with H07BQ-F 3G 2,50mm2 (PUR) Yellow cable	25m	16A
b	2834	CEE16 Cord Set with H07BQ-F 3G 2,50mm2 (PUR) Yellow cable	15m	16A
	2835	CEE16 Cord Set with H07BQ-F 3G 2,50mm2 (PUR) Yellow cable	25m	16A

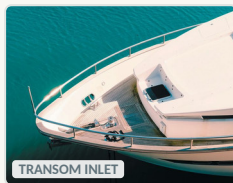
Ratio Electric supplies the AC side; TBS Electronics supplies the DC side. Custom Marine engineers the two into one system — shore inlet, isolator, cabinet, charger, battery bank and monitoring — 800BOATS.

Cord sets, cable & cord management

MARINCO AND CEE COMPATIBILITY · KEMA APPROVED PUR CABLE BY THE 50M RING · DECK AND DOCK CLIPS

H07BQ-F PUR — APPROVAL KEMA

Shore power cable on 50m rings

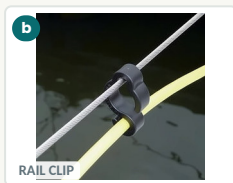
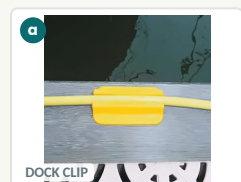
Ratio
ELECTRIC


Ratio Electric uses PUR (H07BQ-F) cable for all its cord sets; the same cable can also be supplied on 50m rings. PUR offers the best available features for boat owners: good resistance to oil and other chemicals · extremely robust and noted for its good tear and abrasion resistance · suitable for outdoor use and resistant to UV radiation, ozon and oxygen.

	P/N	Description	Max. rating
a	70030	Shore Power H07BQ-F 3G 1,50mm ² (PUR) Yellow cable	10A
	70031	Shore Power H07BQ-F 3G 2,50mm ² (PUR) Yellow cable	16A
	70032	Shore Power H07BQ-F 3G 4,00mm ² (PUR) Yellow cable	25A
	70033	Shore Power H07BQ-F 3G 6,00mm ² (PUR) Yellow cable	32A
	70034	Shore Power H07BQ-F 3G 10,00mm ² (PUR) Yellow cable	40A

SAFETY ON AND AROUND THE BOAT

Shore power cord clips

Ratio
ELECTRIC


Loose power cords on the dock and on the deck can create dangerous situations.

Dock clip (d) is used on the edge of the dock or deck, keeps power cords organised and out of the water, and is packaged as a set of 6 clips with stainless steel mounting screws. **Rail clip (e)** keeps the power cord off the deck and clips onto tube or wire rails; packaged as a set of 6 clips.

	P/N	Cord clip	Packaging	For cable
a	70040	Shore Power cord dock clip	Set of 6 clips, stainless steel screws	H07BQ-F 3G 1,50mm ²
	70041	Shore Power cord dock clip	Set of 6 clips, stainless steel screws	H07BQ-F 3G 2,50mm ²
b	70038	Shore Power cord rail clip	Set of 6 clips	For 16A cords

SOCKET IP56 — MP16-230

Stainless steel outlets

Ratio
ELECTRIC


The Schuko socket is a high quality in-wall outlet designed for outdoor use. The high-gloss polished stainless steel cap and flange guaranty a long lasting stylish look. When the bayonet cap is closed the outlet is protected against water ingress (IP56).

Part no.: **MP16-230** · material: solid cast 316 stainless steel · waterproof: IP56 · marking: CE · rating: 16A/230V.

	Part no.	Material	Flange	Rating	Waterproof	Marking
a	MP16-230	Solid cast 316 stainless steel	Round, polished	16A/230V	IP56	CE
b	MP16-230-SQ	Solid cast 316 stainless steel	Square, polished	16A/230V	IP56	CE

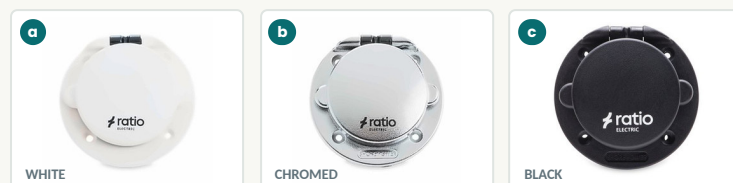
Outlet Socket IP56

SCHUKO OUTLET SOCKET FOR EXTERIOR APPLICATIONS · 16A/230V · HIGH-GLOSS POLISHED 316 STAINLESS STEEL

POLYAMIDE

White, chromed & black outlets

Ratio
ELECTRIC



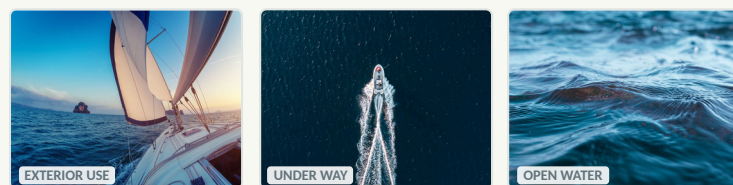
The polyamide body carries the same bayonet cap and the same IP56 rating in a lighter, non-metallic housing. White and chromed versions share the part number **MP16-230-K**; the black version is **MP16-230-KZ**.

	Part no.	Material	Finish	Rating	Waterproof	Marking
a	MP16-230-K	Polyamide	White	16A/230V	IP56	CE
b	MP16-230-K	Polyamide	Chromed	16A/230V	IP56	CE
c	MP16-230-KZ	Polyamide	Black	16A/230V	IP56	CE

SPECIFYING THE OUTLET

Where each finish belongs

Ratio
ELECTRIC



The outlet socket range mirrors the MP16 inlet finishes, so inlet and outlet match on the same boat: polished stainless steel for exposed positions on transom and coaming, chromed for a match with chromed deck hardware, and white or black polyamide for cockpit lockers and joinery faces.

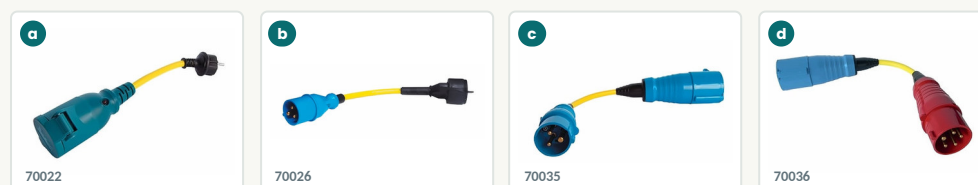
Position	Recommended outlet	Matching inlet
Exposed transom or coaming	MP16-230 / MP16-230-SQ	MP16-10 / MP16-10-SQ
Chromed deck hardware	MP16-230-K (chromed)	MP16-10-KX
White joinery or GRP panel	MP16-230-K (white)	MP16-10-K
Dark joinery or black hardware	MP16-230-KZ	MP16-10-KZ

Both the inlet and the outlet socket seal to IP56 only with the bayonet cap closed — keep the cap shut whenever a cord is not connected.

16A/250V · SHORT LEADS

Adapter cord sets

Ratio
ELECTRIC



Short adapter cord sets bridge between Schuko and CEE outlets on the pillar, step between 16A and 32A systems and bring a 32A 3-phase supply down to single phase — so the boat connects whatever the marina offers, without improvised leads.

	Part no.	Adapter cord set	Rating	Length
a	70022	Shore Power Adapter Schuko-Coupler CEE	16A/250V	0,30m
b	70026	Shore Power Adapter CEE-Coupler Schuko	16A/250V	0,30m
c	70035	Adapter Cord Set 16A to 32A/250V	16A to 32A/250V	0,50m
d	70036	Adapter Cord Set 32A 3-phase to single phase	32A	0,50m

Every part number on these pages is stocked or indented to order. Custom Marine builds and tests complete distribution assemblies to your schematic before they reach the vessel, supplies cable, lugs, fuses and fuseholders as a matched set, and provides specification support, mounting drawings, wiring diagrams and 3D models to naval architects, yards and refit managers throughout the UAE and the wider Gulf. Talk to us early: the power and distribution plan is easiest to get right before the loom is cut — 800BOATS · 800YACHTS · custommarine.ae.

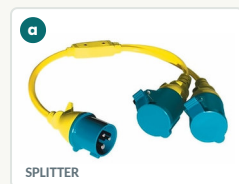
Adapters, splitters & electric boating

CONNECT TO WHATEVER THE MARINA OFFERS — AND CHARGE AN ELECTRIC BOAT VIA CCS OR TYPE 2

SPLITTER & STOWAGE

Splitter cord set and organiser bag

Ratio
ELECTRIC



The splitter cord set takes one CEE 16A/250V supply and gives two, so two boats or two circuits share a single pontoon outlet. The organiser bag stows the shore power cord cleanly in a locker when under way.

	Part no.	Accessory	Rating	Length
a	70024	Splitter Cord Set CEE 16A/250V	16A/250V	0,50m
b	32409	Organiser bag for shore power cords	—	—

ELECTRIC BOATING — CCS AND TYPE 2

Charging inlets

Ratio
ELECTRIC



Ratio Electric's Shore Power portfolio (MP16, MP32 and MP50, with the MP63 on its way) is well equipped to charge your electric boat. Besides the MP-series, boats are also charged via CCS. The Combined Charging System is a standard for charging electric vehicles, using Combo 1 or Combo 2 connectors — extensions of the IEC 62196 Type 1 and Type 2 connectors with two additional direct current contacts to allow high-power DC fast charging. Ratio Electric offers the CCS inlets in two versions: 32A and 63A.



	Part no.	Boat inlet	Max. current AC	Max. current DC	Waterproof
a	CCS-10	CCS Boat Inlet	32A/480V	60A/1000V	IP55
	CCS-20	CCS Boat Inlet	63A/415V	200A/1000V	IP55
b	32101	Inlet Type 2	32A/400V	—	IP54

SHORE POWER SELECTOR

Building the connection, rating by rating

Ratio
ELECTRIC

Supply	Boat inlet	Cable connector	Cord sets	Cord set cable	Cable on 50m ring
16A/250V	MP16-10 / -SQ / -K / -KZ / -KX	MP16-110	2801 • 2821 • 2822 • 2823	H07BQ-F 3G 1,50mm2 and 3G 2,50mm2	70030 • 70031
32A/250V	MP32-10	MP32-110	2832 • 2836 • 2837 • 2838	H07BQ-F 3G 4,00mm2 and 3G 6,00mm2	70032 • 70033
50A/250V	MP50-10	MP50-110	2851 • 2852	H07BQ-F 3G 10,00mm2, max. 25m	70034
16A CEE	Marina pillar outlet	Moulded CEE connector	2834 • 2835	H07BQ-F 3G 2,50mm2	70031
16A Marinco	American style boat inlet	Nema L5-30 moulded plug	2811 • 2812	H07BQ-F 3G 2,50mm2	70031
16A/230V	MP16-230 / -SQ / -K / -KZ	Schuko outlet socket, IP56	—	—	—

Every MP inlet is IP56 with the cap closed and every MP connector is IP44. MP16, MP32 and MP50 inlets will not accept standard CEE couplers; use the matching MP connector or one of the adapter cord sets on this page.

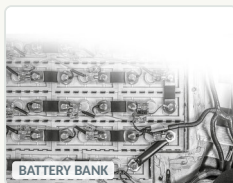
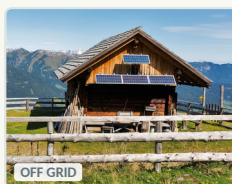
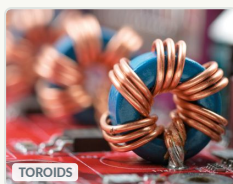
Shore power in; clean AC and charged banks out. The TBS Electronics inverters, chargers, battery monitors and DC distribution on the following pages complete the onboard power system.

TBS Electronics — professional power systems

DESIGNED AND BUILT IN THE NETHERLANDS SINCE 1984 · ISO 9001:2015 CERTIFIED · 24 MONTH WARRANTY

AN ENGINEERING DRIVEN FAMILY BUSINESS

Who TBS are



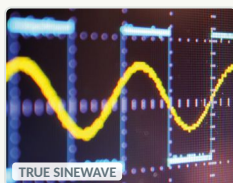
TBS Electronics BV is a privately owned ISO 9001:2015 certified Dutch company founded in 1984, best described as an engineering driven family business. It started with the design and production of toroidal transformers, followed by electronics and software design in the early nineties. Until 2006 TBS mainly operated as an Original Design Manufacturer for other companies; since then the focus has been on TBS branded equipment.

The current lineup consists of professional sinewave inverters, battery chargers, inverter-charger combinations, battery monitors and DC protection or distribution products — all with an excellent reputation for reliability and innovation, and all designed in The Netherlands.

Product family	Models in this catalogue
Powersine true sinewave inverters	300-12, 350-24, 450-48, 600-12, 800-24 and 800-48 · 1000-12, 1400-24, 1600-12, 1800-24 and 1800-48 · 2000-12, 2500-24, 3000-12, 3500-24 and 3500-48
Omnicharge programmable battery chargers	12-40, 12-60, 24-20 and 24-30 · 12-90, 24-50, 24-80 and 48-40 · 100-20, 100-30, 100-50, 150-60 and 250-70 · 12/12-50 and 12/24-30
Powersine Combi inverter/charger units	1600-12-60 and 1800-24-35 · 2000-12-80, 2500-24-50, 3000-12-120 and 3500-24-70
Expert Series high precision battery monitors	Lite, Pro and Pro-hv · Modular
DC Modular high current distribution	Premium quality Busbars, Fuseholders and Contactors
Other products	DC to DC converters · Automatic Charging Relay · Manual Battery Switch

SWITCH MODE TECHNOLOGY DONE CORRECTLY

Why TBS equipment lasts



With a long history in switch mode power supply design, TBS knows the common pitfalls that result in poor reliability, short product lifetimes, low efficiency and poor radio frequency interference performance. Every product is carefully designed with great attention to detail.

Design measure	What it delivers on board
PCB and capacitor hot spots avoided	Increased long term reliability and efficiency
Power semiconductors decoupled for RF	Clean radio and electronics performance; all devices well over dimensioned
Optimized internal thermal management	Charge current does not drop away through internal overheating
Active power factor correction	Maximum charge current per AC Watt on every AC powered Omnicharge
Universal AC input on most models	Correct operation worldwide and maximum charge current at low AC input voltage

WHERE TO FIND IT

TBS product families in this chapter



Product family	What it does on board
Powersine true sinewave inverters — 300W to 3500W in three frame sizes	Clean 230Vac from the ship's bank
Powersine Combi inverter/charger units — inverter, charger and transfer switch in one case	Shore, generator and battery in one enclosure
Omnicharge programmable battery chargers — AC, solar MPPT and DC to DC	Three isolated outputs on every AC model
Expert Series high precision battery monitors — Lite, Pro, Pro-hv and Modular	True state of charge for lead and lithium
DC Modular high current busbars, fuseholders and contactors	Grid Optimized DC distribution and protection
Other products — DC to DC converters, Automatic Charging Relay, Manual Battery Switch	Completing the installation

TBS Electronics – professional power systems

DESIGNED AND BUILT IN THE NETHERLANDS SINCE 1984 · ISO 9001:2015 CERTIFIED · 24 MONTH WARRANTY — CONTINUED

WHAT'S NEW IN THIS EDITION

Latest additions to the range



Three additions extend the DC distribution and battery-isolation side of the range: professional grade 300A Dual Row busbars, a solidly crafted six-way blade fuseholder built from the same high-end materials as the rest of the DC Modular family, and an innovative manually controlled battery switch from Littelfuse.

	New product	Description
a	DCM Dual Row Busbars, M4 and M6	New DC Modular professional grade 300A Dual Row busbars, available in 12x M4 and 8x M6 versions
b	DCM 6-channel ATO Blade Fuseholder	Built with the same high-end materials as the existing DC Modular family members; Class-T fuseholders now also available for 110A - 200A fuses
c	Manual Battery Switch (32V/300A)	Innovative manually controlled battery switch from Littelfuse, added to the 'Other products' assortment

TECHNOLOGY WITHOUT COMPROMISE

Hybrid HF/LF with a toroidal transformer



More than 25 years ago TBS introduced the first Powersine true sinewave inverter, offering clean reliable power in a compact yet affordable package. All Powersine inverters are built around superior hybrid HF/LF technology using a single power stage and a very efficient toroidal transformer.

An inverter transforms the DC electricity stored in batteries into standard household AC power, so there is no need to rely on hard-to-find DC-powered appliances or a noisy generator.

Benefit of the hybrid HF/LF topology	What it means in service
Very high peak power delivery	Starts compressors, pumps and power tools that stall other inverters
Low no-load power consumption	The inverter can be left switched on without draining the bank
Capable of powering the most difficult loads	Inductive, capacitive and non-linear loads handled without derating
Less active components = higher reliability	Only first class components inside; large numbers of first generation inverters are still in service today
Cleaner than grid power	Very low total harmonic distortion — a true sine wave output identical to, or better than, the public grid, with no flicker and no voltage sag

SYSTEM DESIGN FLEXIBILITY

Stand-alone inverter, any charging source



Using a stand-alone inverter gives the freedom to choose the best battery charging source for the application: determine the right current rating to match battery capacity and desired charging time, or choose to charge from an alternator, the grid or the sun. Where shore power and charging must be integrated in one enclosure, the Powersine Combi covers the same power band with a charger and transfer switch built in.

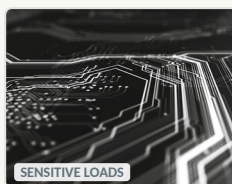
Series	Pnom range	Psurge range	DC input voltages	Remote on/off	TBSLink	Alarm relay
Powersine 300 - 800	250W - 600W	700W - 1250W	12Vdc, 24Vdc, 48Vdc	PS600-12, PS800-24, PS800-48 only	No	No
Powersine 1000 - 1800	850W - 1400W	2000W - 3000W	12Vdc, 24Vdc, 48Vdc	Yes	Readout only	Yes
Powersine 2000 - 3500	1800W - 2800W	4000W - 6500W	12Vdc, 24Vdc, 48Vdc	Yes, plus trigger input	Readout only	Yes

Powersine true sinewave inverters

PURE SINE WAVE AC POWER FROM A DC SOURCE — CLEANER THAN GRID POWER · THD < 5% AT P_{NOM}

DESIGNED TO POWER YOUR...

Applications and loads



Small models are designed for lower power AC loads such as TVs, computers and electric tool chargers; high power units provide electricity for larger installations on board. Because the output is clean and interference free, sensitive equipment such as displays, test equipment and battery chargers operates correctly.

Applications	Designed to power your...
Marine applications	TV · Computer · Battery charger
Solar power systems · Remote homes	Portable work light · Test & measurement equipment
Industrial systems	Smart phone charger · Thermal printer
Mobile entertainment systems	Displays, instrumentation and other sensitive electronics

RANGE OVERVIEW

All sixteen Powersine models at a glance



Model	Art #	P _{nom}	P _{10minutes}	P _{surge}	Input voltage	Max. efficiency	Enclosure
PS300-12	5003000-1	250W	330W	700W	12Vdc	91%	184 x 98 x 130 mm
PS350-24	5003100-1	300W	360W	800W	24Vdc	93%	184 x 98 x 130 mm
PS450-48	5003300-1	300W	450W	800W	48Vdc	95%	184 x 98 x 130 mm
PS600-12	5004000-1	500W	600W	1000W	12Vdc	92%	228 x 113 x 163 mm
PS800-24	5004100-1	600W	800W	1200W	24Vdc	93%	228 x 113 x 163 mm
PS800-48	5004300-1	600W	800W	1250W	48Vdc	94%	228 x 113 x 163 mm
PS1000-12	5006100	850W	1050W	2000W	12Vdc	92%	351 x 210 x 114 mm
PS1400-24	5006120	1000W	1450W	2800W	24Vdc	92%	351 x 210 x 114 mm
PS1600-12	5006300	1300W	1600W	2500W	12Vdc	92%	351 x 210 x 114 mm
PS1800-24	5006320	1400W	1800W	3000W	24Vdc	92%	351 x 210 x 114 mm
PS1800-48	5006360	1400W	1800W	3000W	48Vdc	94%	351 x 210 x 114 mm
PS2000-12	5008100	1800W	2100W	4000W	12Vdc	92%	370 x 431 x 132 mm
PS2500-24	5008120	2000W	2500W	5500W	24Vdc	93%	370 x 431 x 132 mm
PS3000-12	5008300	2600W	3200W	5000W	12Vdc	92%	370 x 431 x 132 mm
PS3500-24	5008320	2800W	3800W	6500W	24Vdc	93%	370 x 431 x 132 mm
PS3500-48	5008360	2800W	3800W	6500W	48Vdc	93%	370 x 431 x 132 mm

P_{nom} is the continuous rating at 25°C; P_{10minutes} may be drawn for ten minutes and P_{surge} covers motor and compressor starting.

FEATURES

What is standard on every unit



Feature	Detail
Automatic Standby function	Standard in all Powersine inverters — reduces the no-load consumption by an extra 70%
Cooling	Variable speed fan for silent operation
AC outlet	Schuko type AC outlet; other outlet types are optionally available
Supplied with	1.5 meters DC connection cable and a very clear installation and operating instruction manual
Certification & warranty	CE and e-mark certified · 24 month warranty

Powersine 300-12 to 800-48

COMPACT PROFESSIONAL DC TO AC TRUE SINEWAVE INVERTERS · SCHUKO OUTLET · CE AND E-MARK CERTIFIED

SIX MODELS — 250W TO 600W

Output ratings & DC input



The PS300-12 up to PS800-48 professional DC to AC true sinewave inverters offer superior performance for a wide range of applications. Unlike many other inverters, the very clean and interference free output of a Powersine inverter ensures correct operation of sensitive equipment like displays, test equipment and battery chargers.

The very robust electronic and mechanical design makes the Powersine inverter series the best choice for reliability — designed for an extremely long lifespan and protected against short circuits, overloading and high temperatures.

	Model	Art #	Output power1) Pnom	P10minutes	Psurge	Input voltage	Range	Max. efficiency
a	PS300-12	5003000-1	250W	330W	700W	12Vdc	10.5 - 16.0Vdc	91%
a	PS350-24	5003100-1	300W	360W	800W	24Vdc	21.0 - 31.0Vdc	93%
a	PS450-48	5003300-1	300W	450W	800W	48Vdc	41.0 - 60.0Vdc	95%
b	PS600-12	5004000-1	500W	600W	1000W	12Vdc	10.5 - 16.0Vdc	92%
b	PS800-24	5004100-1	600W	800W	1200W	24Vdc	21.0 - 31.0Vdc	93%
b	PS800-48	5004300-1	600W	800W	1250W	48Vdc	41.0 - 60.0Vdc	94%

Power ratings measured with resistive load at 25°C ambient, subject to a tolerance of 4%, and decreasing as temperature rises with a rate of approx. 1.2%/°C starting from 25°C. The undervoltage limit is dynamic: it decreases with increasing load to compensate the voltage drop across cables and connections.

TECHNICAL SPECIFICATIONS

Consumption, protection & construction



Parameter	PS300-12	PS350-24	PS450-48	PS600-12	PS800-24	PS800-48
No load power consumption3)	<3W	<3.5W	<6.5W	<4.8W	<6.5W	<8.2W
[ASB]	[0.7W]	[0.8W]	[1.3W]	[0.4W]	[0.7W]	[0.5W]
ASB threshold	Pout=12W	Pout=15W	Pout=15W	Pout=15W	Pout=15W	Pout=15W
Remote on/off	No	No	No	Yes	Yes	Yes
DC input connections	Two wires, length 1.5 meters, 4 mm2			Two wires, length 1.5 meters, 10 mm2		
Enclosure body size	184 x 98 x 130 mm (without mounting brackets)			228 x 113 x 163 mm (without mounting brackets)		
Total weight	3.5 kg			6.2 kg		
Output voltage	230Vac ± 2% (115Vac ± 2% optional) / True sinewave (THD < 5% @ Pnom)					
Output frequency	50Hz ± 0.05% (60Hz ± 0.05% optional)					
Operating temperature range	-20°C ... +50°C (humidity max. 95% non condensing)					
Storage temperature range	-40°C ... +80°C (humidity max. 95% non condensing)					
Cooling	Variable speed fan controlled by temperature and load					
Communication port	No					
Protected against	Short circuit, overload, high temperature, low battery voltage					
Indications	Power on, error and ASB mode					
AC output connections	Schuko outlet4)					
Protection class	IP20					
Standards	CE marked meeting EMC directive 2014/30/EU and LVD 2014/35/EU complying with EN60335-1, e4-95/54/EC, RoHS 2011/65/EU					

4) Also available are the following AC outlet types: BS 1363 and AS/NZS 3112.

Powersine 1000-12 to 1800-48

ROBUST INDUSTRIAL DESIGN · REMOTE ON/OFF, ALARM RELAY AND TBSLINK · EASY-ACCESS CONNECTION BAY

FIVE MODELS — 850W TO 1400W

Output ratings & DC input



The PS1000-12 up to PS1800-48 professional DC to AC true sinewave inverters offer superior performance for a wide range of applications. The easy to access connection bay takes AC, DC and control wiring; remote on/off, an alarm relay and remote control capability via TBSLink integrate the inverter into the vessel's systems.

Parameter	PS1000-12	PS1400-24	PS1600-12	PS1800-24	PS1800-48
Art #	5006100	5006120	5006300	5006320	5006360
Output power1) Pnom	850W	1000W	1300W	1400W	1400W
P10minutes	1050W	1450W	1600W	1800W	1800W
Psurge	2000W	2800W	2500W	3000W	3000W
Input voltage nominal	12Vdc	24Vdc	12Vdc	24Vdc	48Vdc
Input voltage range	10.5 - 16.0Vdc	21.0 - 31.0Vdc	10.5 - 16.0Vdc	21.0 - 31.0Vdc	41.0 - 60.0Vdc
Maximum efficiency	92%	92%	92%	92%	94%
No load power consumption3)	<9.6W	<12W	<9.6W	<12W	<12W
[ASB]	[2.5W]	[3.5W]	[2.5W]	[3.5W]	[4.7W]
Total weight	10.2 kg			10.5 kg	
DC input connections	Cable length 1.5m — PS1000-12 / PS1400-24 / PS1800-48: 2 x 25 mm2 · PS1600-12 / PS1800-24: 2 x 35 mm2				

COMMON TO ALL FIVE MODELS

Technical specifications



Parameter	Value	Parameter	Value
Output voltage	230Vac ± 2%	ASB threshold	Pout=10W
Output frequency	50Hz or 60Hz ± 0.05% (selectable)	Output waveform	True sinewave (THD < 5% @ Pnom)
Operating temperature range	-20°C ... +50°C (humidity max. 95% non condensing)	Storage temperature range	-40°C ... +80°C (humidity max. 95% non condensing)
Cooling	Variable speed fan controlled by temperature and load	Communication port	TBSLink (readout only)
Protected against	Short circuit, overload, high temperature, AC back feed, high/low battery voltage and high input ripple voltage		
Indications	Power on, output power bar, error and ASB mode	AC output connections	Screw terminals
Enclosure body size	351 x 210 x 114 mm	Protection class	IP21 (mounted in upright position)
Standards	CE marked meeting EMC directive 2014/30/EU and LVD 2014/35/EU complying with EN60335-1, e4-95/54/EC, RoHS 2011/65/EU		

Power ratings measured with resistive load at 25°C ambient, subject to a tolerance of 10%, decreasing as temperature rises at approx. 1.2%/°C from 25°C. Measured at nominal input voltage and 25°C.

ACCESSORIES

Remote controls & TBSLink interface



Switch and monitor the inverter from the helm or nav station with the Universal Remote Control (LCD) or the Basic Inverter Remote Control (LEDs), or connect a Windows device over TBSLink for full readout with the included TBS Dashboard software.

	Art #	Accessory	Notes
a	5095500	Universal Remote Control	LCD readout — also serves Omnicharge and Powersine Combi
b	5095200	Basic Inverter Remote Control	LED status indicators
c	5092120	TBSLink to USB Interface Kit	Includes TBS Dashboard for monitoring the Powersine inverters

Powersine 1000-12 to 1800-48

ROBUST INDUSTRIAL DESIGN · REMOTE ON/OFF, ALARM RELAY AND TBSLINK · EASY-ACCESS CONNECTION BAY — CONTINUED

FEATURES, APPLICATIONS & ACCESSORIES

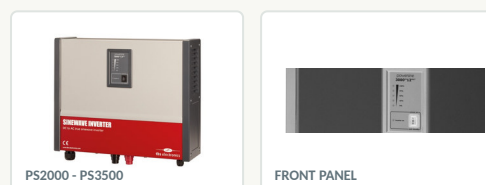
Specifying the mid-range inverter



Features	Applications
True sinewave AC output	Marine applications
Robust industrial design	Solar power systems
High surge power output · very efficient	Industrial systems
Protected against high/low battery voltage, high temperature, overload, short circuit and high ripple voltage	Mobile entertainment systems
Automatic Standby function to reduce no-load power consumption	Accessories: Universal Remote Control with LCD
Variable speed fan for silent operation	Accessories: Basic Remote Control with LEDs
Remote on/off capability · alarm relay	Accessories: TBSLink communication kit including software
Remote control capability via TBSLink	—
Easy to access connection bay for installing AC-, DC and control wiring	—
1.5 meters DC connection cable included · CE certified · 24 month warranty	—

FIVE MODELS — 1800W TO 2800W

Output ratings & DC input



The PS2000-12 up to PS3500-48 professional DC to AC true sinewave inverters offer superior performance for a wide range of applications. Due to smart connection bay mapping of AC, DC and control connectors, all wiring can be installed in a fast and logical way.

Parameter	PS2000-12	PS2500-24	PS3000-12	PS3500-24	PS3500-48
Art #	5008100	5008120	5008300	5008320	5008360
Output power1) Pnom	1800W	2000W	2600W	2800W	2800W
P10minutes	2100W	2500W	3200W	3800W	3800W
Psurge	4000W	5500W	5000W	6500W	6500W
Input voltage nominal	12Vdc	24Vdc	12Vdc	24Vdc	48Vdc
Input voltage range	10.0 - 16.5Vdc	20.0 - 33.0Vdc	10.0 - 16.5Vdc	20.0 - 33.0Vdc	40.0 - 64.0Vdc
Maximum efficiency	92%	93%	92%	93%	93%
No load power consumption3)	<19W	<20W	<19W	<20W	<21W
[ASB]	[2.0W]	[2.0W]	[2.0W]	[2.0W]	[2.4W]
Total weight		18.2 kg			18.5 kg

FEATURES, APPLICATIONS & ACCESSORIES

Specifying the high power series



True sinewave AC output · robust industrial design · high surge power output · very efficient · variable speed fan for silent operation · remote on/off capability · alarm relay · remote control capability via TBSLink · easy to access connection bay for installing AC, DC and control wiring · trigger input.

Art #	Accessory	Function
5095500	Universal Remote Control	LCD remote with inverter status readout
5095200	Basic Inverter Remote Control	LED remote on/off and status
5092120	TBSLink to USB Interface Kit	Includes TBS Dashboard for monitoring the Powersine inverters

Applications: marine applications · solar power systems · industrial systems · mobile entertainment systems · remote homes.

Powersine 2000-12 to 3500-48

HIGH POWER INVERTERS WITH SMART CONNECTION BAY MAPPING, TRIGGER INPUT AND ALARM RELAY

COMMON TO ALL FIVE MODELS

Technical specifications



Parameter	Value	Parameter	Value
Output voltage	230Vac ± 2%	ASB threshold	Pout=10W
Output frequency	50Hz or 60Hz ± 0.05% (selectable)	Output waveform	True sinewave (THD < 5% @ Pnom)
Operating temperature range	-20°C ... +50°C (humidity max. 95% non condensing)	Storage temperature range	-40°C ... +80°C (humidity max. 95% non condensing)
Cooling	Variable speed fan controlled by temperature and load	Communication port	TBSLink (readout only)
Protected against	Short circuit, overload, high temperature, AC back feed, high/low battery voltage and high input ripple voltage		
Indications	Power on, output power bar, error and ASB mode	DC input connections	M10 bolt terminals
AC output connections	Screw terminals	Enclosure body size	370 x 431 x 132 mm
Protection class	IP21 (mounted in upright position)	Warranty	24 month warranty · CE certified
Standards	CE certified — EMC Directives UNECE Regulation 10 and 2014/30/EU, Low voltage Directive 2014/35/EU, RoHS Directive 2011/65/EU		

FEATURES

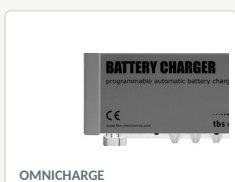
Standard on the high power series



Features	Applications
True sinewave AC output	Marine applications
Robust industrial design	Solar power systems
High surge power output · very efficient	Industrial systems
Protected against high/low battery voltage, high temperature, overload, short circuit and high ripple voltage	Mobile entertainment systems
Variable speed fan for silent operation	Remote homes
Remote on/off capability · alarm relay · trigger input	CE certified · 24 month warranty
Remote control capability via TBSLink	—
Easy to access connection bay for installing AC-, DC and control wiring	—

CHARGE YOUR BATTERIES QUICKLY AND SAFELY

A decade of continuous duty charging



More than a decade ago the Omnicarrier battery chargers set new standards by combining a true continuous duty capable power section with almost unlimited programming capabilities — a popular choice for applications that require extensive daily bulk charging or specific charge programs to fit the connected batteries.

All Omnicarrier chargers operate fully automatically, so batteries can always stay connected. The charger detects when a recharge is needed and equally detects when a battery is fully charged, reducing the charge voltage to increase battery life and avoid self-discharge.

Charger family	Outputs	Coverage in this catalogue
Omnicharge2 (medium power)	Three fully independent outputs, individually programmable	12V chargers 12-40 and 12-60 · 24V chargers 24-20 and 24-30
Omnicharge (high power)	Three equal outputs that redirect available power to the lowest battery	12-90 · 24-50 · 24-80 · 48-40, parallelable to six units
Omnicharge Solar (OCS)	MPPT solar charge controllers, 100Vdc to 250Vdc inputs	100-20, 100-30, 100-50, 150-60 and 250-70
Omnicharge DC (OCD)	DC to DC battery chargers with a 12Vdc input	12/12-50 and 12/24-30

Omnicharge programmable battery chargers

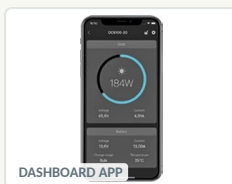
TRUE CONTINUOUS DUTY POWER SECTIONS · ALMOST UNLIMITED PROGRAMMING · THREE OUTPUTS ON EVERY AC MODEL

THE BEST CHARGER FOR EVERY APPLICATION

Three outputs & lithium compatibility



FRONT PANEL



DASHBOARD APP

All AC powered Omnicharge battery chargers are equipped with three outputs, so three battery banks can be charged at once. The high power Omnicharge models have three equal charge outputs that automatically redirect the available power to the lowest battery for faster charging. The medium power Omnicharge2 models have three fully independent outputs, each with individually programmable charge voltages, currents and stages — so a combination of different battery types and sizes can be charged by a single battery charger.

Lithium batteries	How the Omnicharge range handles them
Correct charging voltage	Omnicharge chargers seamlessly charge Lithium Ion batteries with the correct charging voltage
Non-standard voltages	Where the required charging voltage differs from the standard values it is easily modified via the TBS Dashboard software or on the unit's display (Omnicharge2 only)
BMS control	All chargers are equipped with a remote shut down input, which can be used to let a Lithium battery BMS stop the charging process

SWITCH MODE TECHNOLOGY DONE CORRECTLY

Inside every Omnicharge



Design feature	Result
Careful hot spot management	PCB and capacitor hot spots are avoided to increase long term reliability and efficiency
Decoupled, over dimensioned semiconductors	All power semiconductors properly decoupled for radio frequencies and well over dimensioned
Optimized internal thermal management	Avoids the charge current dropping due to internal overheating
Active power factor correction and smart rectifiers	Optimal efficiency and a maximum charge current per AC Watt
Universal AC input on most models	Correct operation all around the globe and maximum charge current even under low AC input voltage conditions

CHARGER SELECTOR

Matching the charger to the battery bank



Model	Art #	Output	Total current	Recommended battery capacity	AC input	Outputs
OC12-40	5026202-1	12Vdc	40A	80-400Ah	90-265Vac	3 isolated, programmable
OC12-60	5026402-1	12Vdc	60A	120-600Ah	90-265Vac	3 isolated, programmable
OC24-20	5026222-1	24Vdc	20A	50-200Ah	90-265Vac	3 isolated, programmable
OC24-30	5026422-1	24Vdc	30A	70-300Ah	90-265Vac	3 isolated, programmable
OC12-90	5027200	12Vdc	90A	180-900Ah	100-260Vac	3 isolated
OC24-50	5027220	24Vdc	50A	100-500Ah	100-260Vac	3 isolated
OC24-80	5027420	24Vdc	80A	160-800Ah	180-260Vac	3 isolated
OC48-40	5027440	48Vdc	40A	80-400Ah	180-260Vac	3 isolated
OCD 12/12-50	5022400	12Vdc	50A	From a 12Vdc start battery	—	1, DC to DC
OCD 12/24-30	5022420	24Vdc	30A	From a 12Vdc start battery	—	1, DC to DC

Always consult battery manufacturers specifications for the maximum allowable charge current. Up to six high power Omnicharge units can be paralleled for synchronized charging with currents up to 540A.

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Omnicharge2 12-40, 12-60, 24-20 and 24-30

THREE INDIVIDUALLY PROGRAMMABLE ISOLATED OUTPUTS · BACKLIT DISPLAY · TEMPERATURE SENSOR INCLUDED

FOUR MODELS — 20A TO 60A

Ratings & charge programs



The Omnicharge2 12-40, 12-60, 24-20 and 24-30 are fully programmable, three output, automatic battery chargers designed for professional applications. A clear backlit display shows the charge progress as well as the actual charge voltage and current for each output. All outputs are isolated from each other and individually programmable, so a combination of different battery types and sizes can be charged by a single charger. A 'Night Mode' prevents the fans from spinning when absolute silence is desired.

Parameter	OC12-40	OC12-60	OC24-20	OC24-30
Art #	5026202-1	5026402-1	5026222-1	5026422-1
Input voltage	90-265Vac / 47-63Hz / PF ≥ 0.95			
Full load consumption	700VA	1050VA	700VA	1050VA
AC input current (115V/230V)	6A/3A	9A/4.5A	6A/3A	9A/4.5A
Full load efficiency	> 82%			
Nominal output voltage1)	12Vdc		24Vdc	
Total output current1) 4)	40A	60A	20A	30A
Absorption voltage2)	14.4Vdc		28.8Vdc	
Float voltage2)	13.5Vdc		27.0Vdc	
Equalize voltage2)	15.5Vdc		31.0Vdc	
Recommended battery capacity3)	80-400Ah	120-600Ah	50-200Ah	70-300Ah
Enclosure body size (L x W x H)	295 x 206 x 86mm	356 x 206 x 99mm	295 x 206 x 86mm	356 x 206 x 99mm
Total weight	3.0 kg	4.0 kg	3.0 kg	4.0 kg

COMMON TO ALL FOUR MODELS

Technical specifications



Parameter	Value
Number of full current outputs	3 (internally isolated, individually programmable)
Charge characteristic2)	IUoUoP, intelligent 4-stage, temperature compensated
Supported Battery types2)	GEL / AGM / Flooded / LiFePO4 (programmable per output)
DC current draw (charger off)	< 2mA
Operating temp. range4)	-20°C ... +60°C (humidity max. 95% non condensing)
Storage temp. range	-40°C ... +70°C (humidity max. 95% non condensing)
Cooling	Variable speed fan controlled by temperature and load
Communication port	QuickLink
Protected against	Low AC voltage, output short circuit, high temperature, battery overcharging and reverse battery polarity
Indications	LCD showing charging status, voltage- and current levels, error
DC output connections	M6 studs (3x positive, 1x common negative)
AC input connections	Fixed AC cord with Schuko plug (1.5 meter length)
Protection class	IP32
Standards	CE marked meeting EMC directive 2014/30/EU and LVD 2014/35/EU complying with EN60335-1, EN60335-2-29 and RoHS 2011/65/EU

Maximum output current tolerance +/- 3%. Maximum setpoint voltage deviations +/- 0.1V for 12V and +/- 0.2V for 24V models; all setpoint voltages are temperature compensated when the battery temperature sensor is connected. Always consult battery manufacturers specifications for maximum allowable charge current. At higher ambient temperatures (>40°C) maximum output current may be reduced automatically.

Omnicharge2 12-40, 12-60, 24-20 and 24-30

THREE INDIVIDUALLY PROGRAMMABLE ISOLATED OUTPUTS · BACKLIT DISPLAY · TEMPERATURE SENSOR INCLUDED — CONTINUED

ACCESSORIES

QuickLink communication kits



Features include three full current outputs, robust industrial design, designed for continuous duty charging, universal power factor corrected auto ranging AC input, no charge current derating at 115VAC input, protection against battery failure, high temperature, overload, short circuit, low input voltage and reverse polarity, and remote on/off capability for interfacing to an external BMS.

	Art #	Accessory	Notes
a	5092030	QuickLink to RS-232 Communication Kit	Includes TBS Dashboard 2 for monitoring and programming the Omnicharge2 chargers
b	5092130	QuickLink to USB Communication Kit	Includes TBS Dashboard 2 for monitoring and programming the Omnicharge2 chargers
c	5092230	QuickLink to Bluetooth Communication Kit	Dashboard Mobile app available in Apple App Store and Google Play

FEATURES & APPLICATIONS

Specifying the Omnicharge2



Features	Applications
Three full current outputs, individually programmable	Marine applications
Robust industrial design · designed for continuous duty charging	Industrial systems
Clear backlit display for easy readout and configuration	Mobile entertainment systems
Very efficient · universal power factor corrected auto ranging AC input	Remote homes
No charge current derating at 115VAC input	Variable speed fan for low noise operation
Protected against battery failure, high temperature, overload, short circuit, low input voltage and reverse polarity	QuickLink communication port
Protects the battery from being overcharged	Easy to access connection bay for installing AC-, DC and control wiring
Remote on/off capability for interfacing to an external BMS	CE certified · 24 month warranty
Night Mode for silent operation	—
Temperature sensor included	—

ACCESSORIES

Remote controls & TBSLink interface



The standard TBSLink port enables connection to a number of accessories such as the TBS remote controls. All Omnicharge units are easy to install and come standard with a temperature sensor and a very clear installation and operating instruction manual.

	Art #	Accessory	Notes
a	5095500	Universal Remote Control (Omnicharge)	LCD readout of charge voltage, current, temperature and stage
b	5095220	Basic Charger Remote Control	LED state of charge and charger on indication
	5092120	TBSLink to USB Interface Kit	Includes TBS Dashboard software

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Omnicharge 12-90, 24-50, 24-80 and 48-40

ACTIVE RECTIFIER OUTPUT STAGE · UP TO SIX UNITS IN PARALLEL FOR SYNCHRONIZED CHARGING TO 540A

FOUR MODELS — 40A TO 90A

Ratings & charge voltages



The Omnicharge 12-90, 24-50, 24-80 and 48-40 are fully programmable, automatic battery chargers designed for professional applications. A unique active rectifier output stage ensures unmatched efficiency figures; combined with active PFC the chargers are very energy efficient, reducing running costs and guaranteeing a maximum charge current per AC Watt. Up to six charger units can be connected in parallel, allowing synchronized charging with currents up to 540A, and three separate battery banks can be charged simultaneously thanks to the triple output design.

Parameter	OC12-90	OC24-50	OC24-80	OC48-40
Art #	5027200	5027220	5027420	5027440
Input voltage	100-260Vac / 47-63Hz / PF ≥ 0.90		180-260Vac / 47-63Hz / PF ≥ 0.90	
Full load consumption	1550VA	1700VA	2750VA	2750VA
AC input current (115V/230V)	13.5A/6.8A	15A/7.5A	-/12A	-/12A
Nominal output voltage1)	12Vdc	24Vdc		48Vdc
Total output current1) 4)	90A	50A	80A	40A
Absorption voltage2)	14.4Vdc	28.8Vdc		57.6Vdc
Float voltage2)	13.5Vdc	27.0Vdc		54.0Vdc
Equalize voltage2)	15.8Vdc	31.6Vdc		63.2Vdc
Recommended battery capacity3)	180-900Ah	100-500Ah	160-800Ah	80-400Ah

COMMON TO ALL FOUR MODELS

Technical specifications



Parameter	Value	Parameter	Value
Number of full current outputs	3 (internally isolated)	Charge characteristic2)	IUoUoP, intelligent 4-stage, temperature compensated
Supported Battery types2)	Flooded / GEL / AGM / LiFePO4 / Custom	DC current draw (charger off)	< 0.1mA
Operating temp. range4)	-10°C ... +55°C (humidity max. 90% non condensing)	Storage temp. range	-20°C ... +70°C (humidity max. 90% non condensing)
Cooling	Variable speed fan controlled by temperature and load	Communication port	TBSLink
Protected against	Low AC voltage, output short circuit, high temperature, battery overcharging and reverse polarity (fuse)		
Indications	Power on, output current bar, state of charge bar, error	DC output connections	4x M8 bolts
AC input connections	Screw terminals	Enclosure body size (L x W x H)	370 x 270 x 132mm
Total weight	6.2 kg	Protection class	IP21 (mounted in upright position)
Standards	CE marked meeting EMC directive 2014/30/EU and LVD 2014/35/EU complying with EN60335-1, EN60335-2-29 and RoHS 2011/65/EU		

Maximum output current tolerance +/-10%; maximum setpoint voltage deviations +/- 1%. All setpoint voltages are temperature compensated when the battery temperature sensor is connected. Always consult battery manufacturers specifications for maximum allowable charge current; at higher ambient temperatures (>40°C) maximum output current may be reduced automatically. Programmable charging programs up to 8 stages via the TBS Dashboard software. Alarm relay standard, with an optional Alarm Output Expander available for additional relays. Up to six charger units can be connected in parallel, allowing synchronized charging with currents up to 540A.

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Omnicharge 12-90, 24-50, 24-80 and 48-40

ACTIVE RECTIFIER OUTPUT STAGE · UP TO SIX UNITS IN PARALLEL FOR SYNCHRONIZED CHARGING TO 540A — CONTINUED

FEATURES & APPLICATIONS

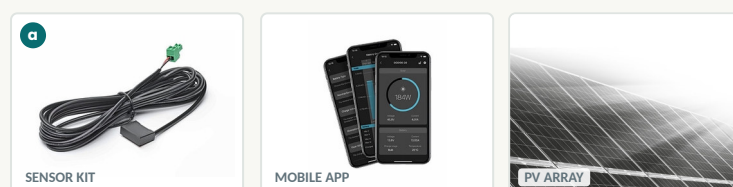
Specifying the high power Omnicharge



Features	Applications
Three full current outputs	Marine applications
Robust industrial design · designed for continuous duty charging	Industrial systems
Very efficient · universal power factor corrected auto ranging AC input	Mobile entertainment systems
Parallel capability up to 6 units	Remote homes
Protected against battery failure, high temperature, overload, short circuit, low input voltage and reverse polarity (fuse)	Variable speed fan for silent operation
Multistage intelligent charging programs, programmable up to 8 stages	Alarm relay, with optional Alarm Output Expander for additional relays
Protects the battery from being overcharged	Easy to access connection bay for installing AC-, DC and control wiring
Remote on/off capability for interfacing to an external BMS	CE certified · 24 month warranty
Remote control capability via TBSLink	—
Temperature sensor included	—

FEATURES & ACCESSORIES

App configuration & temperature sensing



Ultra fast MPPT · smart selectable charge programs for AGM, Gel, Flooded, Lithium and User defined battery types · monitoring and configuration via Dashboard Mobile app (iOS and Android) · highly efficient fanless design · automatic battery voltage detection · battery temperature sensor input · historical data storage up to 300 days · fully protected against battery reverse polarity, PV reverse polarity, short circuits, battery open circuit and charge controller overtemperature · detachable information display on OCS150-60 and 250-70 only.

	Art #	Accessory	Notes
a	5055319	OCS Temperature Sensor Kit 3m	Battery temperature sensor kit for the OCS controllers, with 3m cable length; provided as standard with the OCS 150 and 250 models

Applications: marine applications · stationary off-grid solar systems · industrial systems.

FEATURES & APPLICATIONS

Specifying the OCS controllers



Features	Applications
Ultra fast Maximum Power Point Tracking (MPPT) ensures most efficient utilization of solar power to charge your batteries	Marine applications
Smart selectable charge programs for AGM, Gel, Flooded, Lithium and User defined battery types	Stationary off-grid solar systems
Monitoring and configuration via Dashboard Mobile app (iOS and Android)	Industrial systems
Highly efficient fanless design · automatic battery voltage detection	Detachable information display (OCS150-60 and 250-70 only)
Battery temperature sensor input · historical data storage up to 300 days	PV array power levels from 260Wp up to 3.6kWp
Fully protected against battery reverse polarity, PV reverse polarity, short circuits, battery open circuit and charge controller overtemperature	—

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Omnicharge Solar MPPT charge controllers

OCS 100-20, 100-30, 100-50, 150-60 AND 250-70 · 260WP TO 3.6KW · FANLESS

FIVE MODELS — 20A TO 70A

System voltage, PV input & charge current



The Omnicharge Solar (OCS) MPPT solar charge controllers are advanced and modern battery chargers for off-grid photovoltaic (PV) energy systems. The family offers solutions for PV array maximum power levels from 260Wp up to 3.6kWp and battery system voltages of 12V up to 48V. Smart and rapid Maximum Power Point Tracking recognizes multiple power points during partial shading or other mixed PV panel conditions, continuously making sure that maximum PV power is transferred to your batteries.

Parameter	OCS 100-20	OCS 100-30	OCS 100-50	OCS 150-60	OCS 250-70
Art #	5024200	5024300	5024500	5024630	5024770
System voltage	12V / 24V		12V / 24V / 36V / 48V		
Maximum charge current1)	20A	30A	50A	60A	70A
Self consumption	0.12W		0.54W		
Battery voltage range	9.0 - 32.0Vdc		9.0 - 64.0Vdc		
Max. PV open circuit voltage	100Vdc		150Vdc		250Vdc
Max. PV short circuit current	20A	30A	50A	50A	40A
MPPT voltage range	Vbatt + 2 up to 75Vdc		Vbatt + 2 up to 120Vdc		Vbatt + 2 up to 180Vdc
Max. PV input power 12V	260W	400W	660W	800W	920W
Max. PV input power 24V	520W	800W	1320W	1600W	1840W
Max. PV input power 36V	n/a	n/a	n/a	2400W	2760W
Max. PV input power 48V	n/a	n/a	n/a	3200W	3680W
Display	No		Yes (detachable for remote use)		
Battery temperature sensor	Optional3)		Included		
Alarm relay	No		Yes (10A @ 230Vac or 30Vdc)		
Dimensions (L x H x D)	150x106x62mm	150x106x68mm	183x127x70mm	266x194x119mm	
Weight	0.70kg	0.88kg	1.39kg	3.6kg	

COMMON TO ALL FIVE MODELS

Technical specifications



Parameter	Value	Parameter	Value
Charge characteristic	IUoUo, intelligent 3-stage, temp. compensated	Supported battery types2)	Flooded / GEL / AGM / LiFePO4 / Custom (user defined)
Temperature compensation	-3mV / °C / Cell (lead based batteries only)	LED indicators	Charge mode, Battery state and Battery type
Maximum conversion efficiency	98%	Maximum MPPT efficiency	99%
Configuration	By Dashboard Mobile app for iOS and Android	Cooling	Natural convection (no fan)
Protections	Battery and PV reverse polarity, output short circuit and overtemperature		
Operating temperature	-35°C ... +60°C (humidity max. 90% non condensing)	Storage temperature	-40°C ... +80°C (humidity max. 90% non condensing)
Connections (PV + Battery)	Screw terminals (10mm2 / 8 AWG) on OCS 100 · screw terminals (35mm2 / 2 AWG) on OCS 150-60 and 250-70	Protection class	IP32 (mounted in upright position)
Standards	CE marked meeting EMC directive 2014/30/EU, Safety EN62109-1, Functionality EN62509-1 and RoHS 2011/65/EU		

Maximum charge current tolerance is +/-5%; automatic output current derating at Tambient > 45°C. Battery types selectable by program switch or through the Dashboard Mobile app; custom battery type charge voltages can also be modified by the app. An external battery temperature sensor is required when charge voltage compensation against varying temperature is desired.

Omnicharge DC — OCD 12/12-50 and 12/24-30

CHARGE THE SERVICE BATTERY FROM THE ENGINE START BATTERY · SMART ALTERNATOR COMPATIBLE (EUR 6+)

TWO MODELS — 900W FROM A COMPACT ENCLOSURE

Ratings & connections



The Omnicharge DC battery chargers are primarily intended to charge an auxiliary or service battery from an engine start battery. The input battery voltage can be above, below or equal to the output battery voltage, so the auxiliary battery is perfectly charged regardless of the input voltage while being protected against damage due to peak voltages — something conventional charging relays and fixed step-up / step-down converters cannot offer.

Parameter	OCD 12/12-50	OCD 12/24-30
Art #	5022400	5022420
Nominal input voltage	12Vdc	
Input voltage range	10.0 - 16.0Vdc	
Maximum input current	65A dc	
Current consumption (inactive)	< 0.25mA	
Current consumption (noload/standby)	< 35mA	< 45mA
Nominal output voltage	12Vdc	24Vdc
Output voltage range	12.0 - 16.0Vdc	24.0 - 32.0Vdc
Maximum output current ¹⁾	50A	30A
Enclosure body size (H x W x D)	70 x 128 x 170mm	
Total weight	1.2kg	

ACCESSORIES

QuickLink communication kits



Input start/stop voltages and delays are programmable, including the functionality of the status output. Simple intuitive LED indicators show the charger's status at a glance; full programming runs through the QuickLink interface.

	Art #	Accessory	Notes
a	5092030	QuickLink to RS-232 Communication Kit	Includes TBS Dashboard 2 for monitoring and programming the Omnicharge DC chargers
b	5092130	QuickLink to USB Communication Kit	Includes TBS Dashboard 2 for monitoring and programming the Omnicharge DC chargers
c	5092230	QuickLink to Bluetooth Communication Kit	Dashboard Mobile app available in Apple App Store and Google Play

Applications: marine applications · charge voltage drop compensation. Protects the alternator when charging lithium batteries.

FEATURES & APPLICATIONS

Specifying the Omnicharge DC



Features	Applications
Robust very compact industrial design	Marine applications
Designed for continuous duty charging · protects the output battery	Charge voltage drop compensation
Protects the alternator when charging lithium batteries	Fully programmable through the QuickLink interface
High efficiency · variable speed fan for low noise operation	Open collector status output
Simple intuitive LED indicators show the charger's status at a glance	Very easy installation · temperature sensor included
Remote on/off input (engine run) · BMS control input	24 month warranty
Protected against high temperature, short circuit, high/low input voltage and reverse polarity	—
CE certified	—

Omnicharge DC — OCD 12/12-50 and 12/24-30

CHARGE THE SERVICE BATTERY FROM THE ENGINE START BATTERY · SMART ALTERNATOR COMPATIBLE (EUR 6+) — CONTINUED

COMMON TO BOTH MODELS

Technical specifications



Parameter	Value
Charge characteristic	IUoUo, intelligent 3-stage, temp. compensated
Supported battery types ²⁾	Flooded / GEL / AGM / LiFePO4
Operating temperature range	-20°C ... +60°C
Storage temperature range	-30°C ... +70°C
Cooling	Variable speed fan
Communication port	QuickLink
Temperature sensor port	Yes (sensor included)
Engine run / activate input port	Yes (> 2.0V = Active and < 1.0V = Inactive)
BMS input port	Yes (> 3.0V = Standby and < 1.0V = Active, programmable polarity)
Status output port	Yes (open drain, 32V / 150mA max, five assignable status types)
Protections	High/low input voltage, high temperature, output short circuit and reverse battery polarity (input + output)
Indications	Input status, output (charge-) status, error
Battery connections	3x M6 screw terminal
Protection class	IP21
Standards	CE certified — EMC Directives UNECE Regulation 10 and 2014/30/EU, Low voltage Directive 2014/35/EU, RoHS Directive 2011/65/EU

Maximum output current tolerance is +/-10%; automatic output current derating at Tambient > 40°C. Battery types selectable by DIP switch; all standard charge voltages can also be modified by the TBS Dashboard application. Supplied with temperature sensor, cable lugs, cable grommets and clear installation and operating instructions.

AN IDEAL POWER STATION SOLUTION

How the Combi works



TBS Powersine Combi integrates a powerful inverter, a smart charger and an AC transfer switch in one robust and compact enclosure. A Powersine Combi recharges the house batteries when AC power from the grid or a generator is available at the input. The device also allows any surplus AC power to pass through and power downstream AC loads, such as a television or microwave oven. When there is no AC power available, the unit inverts DC battery power into clean true sine wave AC electricity — automatically, with an extremely fast transfer switch that does not disturb any AC loads connected to the output.

Feature	What it does on board
High performance conversion	Hybrid HF/LF power conversion with an ultra-fast Digital Signal Processor and the fastest, most accurate phase lock system in the market — it even operates correctly with very poor generators as AC source
AC Input Power Boost	When more power is required than the grid or generator can provide, the Combi supplements the shortage by automatically activating the inverter; once the peak demand has passed it recharges the battery again, allowing a smaller generator to be used
AC Input Current Limit	Limits the maximum current consumed from the AC input source in charger mode — the shore breaker stays in
Trigger-Action feature	An 'If This Then That' scheme where a user selectable state, event or trigger causes a certain action — for example ignoring incoming AC grid power while the battery voltage is above a set level, or setting the unit into a silent 'night mode' from a physical trigger input
Powerful charger section	Guarantees fast charging times and offers great flexibility by allowing many charge profile parameters to be customized through the TBS Dashboard software

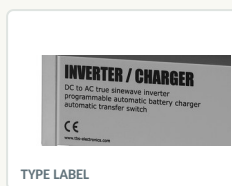
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Powersine Combi inverter/charger units

INVERTER, SMART CHARGER AND AC TRANSFER SWITCH IN ONE ROBUST AND COMPACT ENCLOSURE

SIX MODELS — 12V AND 24V

Powersine Combi range at a glance



Two enclosure sizes cover the range: the compact 1600 and 1800 units share the Powersine 1000 - 1800 case with a 16Arms transfer switch, while the 2000 to 3500 units use the large case with a 30Arms transfer switch, a two-output charger and two programmable relays.

Model	Art #	Inverter Pnom	Psurge	Battery	Charger current	AC transfer switch
PSC1600-12-60	5016300	1300W	2500W	12Vdc	60A	16Arms
PSC1800-24-35	5016320	1400W	3000W	24Vdc	35A	16Arms
PSC2000-12-80	5018100	1800W	4000W	12Vdc	80A (4A)	30Arms
PSC2500-24-50	5018120	2000W	5500W	24Vdc	50A (4A)	30Arms
PSC3000-12-120	5018300	2600W	5000W	12Vdc	120A (4A)	30Arms
PSC3500-24-70	5018320	2800W	6500W	24Vdc	70A (4A)	30Arms

The figure in brackets is the secondary charge output current, quoted by TBS for the PSC2000, PSC2500, PSC3000 and PSC3500 models. At high ambient temperatures the maximum output current is reduced automatically.

APPLICATIONS

Where a Combi replaces separate units



Application	Why the Combi suits it
Marine applications	One enclosure, one set of cables and one remote replace an inverter, a charger and a changeover switch in a tight engine space
Alongside on shore or generator power	Shore or generator power passes through to the sockets while the house bank recharges; the inverter takes over the moment the supply drops
Off-grid solar and remote homes	Trigger-Actions prioritise solar-charged battery power over metered grid power
Industrial and mobile entertainment systems	AC Input Power Boost covers short peaks that would otherwise need a larger generator

ACCESSORIES

Remotes & TBSLink interface



The Powersine Combi is equipped with a TBSLink port to connect to a remote control or to a Windows device running TBS Dashboard, for easy step by step configuration and readout. A fully configurable alarm relay output and a unique trigger input convert external trigger commands into Powersine Combi status changes.

	Art #	Accessory	Notes
a	5095500	Universal Remote Control (Powersine Combi)	LCD readout of battery voltage, charge current, temperature and stage
b	5095210	Basic Combi Remote Control	LED charger / inverter / AC in indication
	5092120	TBSLink to USB Interface Kit	Includes TBS Dashboard for monitoring and configuring the Powersine Combi inverter/chargers
	5093120	Alarm output expander	Adds additional alarm relays to the Combi

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Powersine Combi 1600-12-60 and 1800-24-35

LATEST GENERATION INVERTER ENGINE · POWERFUL INTELLIGENT CHARGER · ULTRA FAST AC TRANSFER SWITCH

INVERTER STAGE

Output ratings & DC input



The PSC1600-12-60 and PSC1800-24-35 Powersine Combi products are based on the latest generation Powersine inverter engine, which guarantees very reliable operation and huge output power reserves. Each unit comes standard with DC cables, a temperature sensor and a very clear installation and operating instruction manual.

Inverter stage	PSC1600-12-60	PSC1800-24-35
Art #	5016300	5016320
Output power1) Pnom	1300W	1400W
P10minutes	1600W	1800W
Psurge	2500W	3000W
Output voltage	230Vac ± 2%	
Output frequency	50Hz or 60Hz ± 0.05% (selectable)	
Output waveform	True sinewave (THD < 5% @ Pnom)	
Input voltage nominal	12Vdc	24Vdc
Input voltage range	10.0 - 16.5Vdc	20.0 - 33.0Vdc
Maximum efficiency	92%	94%
No load power consumption3) [ASB]	<10W [2.0W]	<12W [2.0W]

CHARGER STAGE, TRANSFER SWITCH & GENERAL

Technical specifications



Parameter	PSC1600-12-60	PSC1800-24-35
AC input voltage	185 - 270Vac / 45 - 65Hz / PF > 0.95	
Maximum continuous charging current4)	60A	35A
Standard charge voltage (bulk / float @ 25°C)	14.3Vdc / 13.3Vdc (programmable)	28.6Vdc / 26.6Vdc (programmable)
Charge algorithm	IUoUoP, intelligent 4-stage, temperature compensated (programmable)	
AC Transfer switch, max. continuous current	16Arms	
Transfer time (typical)	0ms (inverter to mains) / < 5ms (mains to inverter)	
Communication port	TBSLink	
Protected against	High/low battery voltage, high temperature, overload, short circuit, high ripple voltage and low AC input voltage	
Indications	Power on, output power bar, error and ASB mode	
DC input connections	Two wires, length 1.5 meters, 35 mm2	
AC output connections	Screw terminals	
Enclosure body size (height x width x depth)	351 x 210 x 114 mm	
Total weight	10.7 kg	
Protection class / operating temp. / storage temp.	IP21 / -20°C to +50°C / -40°C to +80°C (humidity max. 95% non condensing)	
Standards	CE marked meeting EMC directive 2014/30/EU and LVD 2014/35/EU complying with EN60335-1, EN60335-2-29 and RoHS 2011/65/EU	

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Powersine Combi 1600-12-60 and 1800-24-35

LATEST GENERATION INVERTER ENGINE · POWERFUL INTELLIGENT CHARGER · ULTRA FAST AC TRANSFER SWITCH — CONTINUED

FEATURES & APPLICATIONS

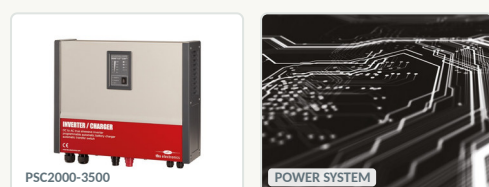
Specifying the compact Combi



Features	Applications
True sinewave AC output · robust industrial design	Marine applications
High surge power output · powerful 4-stage battery charger	Solar power systems
Power factor corrected AC input · fast AC transfer switch	Industrial systems
AC Input Power Boost · AC Input Current Limit	Mobile entertainment systems
Protected against high/low battery voltage, high temperature, overload, short circuit, high ripple voltage and low AC input voltage	Remote homes
Automatic Standby function to reduce no-load power consumption	Accessories: Universal Remote Control with LCD
Variable speed fan for silent operation · remote on/off capability	Accessories: Basic Remote Control with LEDs
Configurable alarm relay · versatile trigger input	Accessories: TBSLink communication kit · alarm output expander
Remote control capability via TBSLink	—
1.5 meters DC connection cable included · CE certified · 24 month warranty	—

INVERTER STAGE

Output ratings & DC input



The PSC2000-12-80 up to PSC3500-24-70 Powersine Combi products are based on the latest generation Powersine inverter engine, which guarantees very reliable operation and huge output power reserves. Each unit comes standard with a mounting kit, a temperature sensor, crimp terminals for DC cables and clear manuals.

Inverter stage	PSC2000-12-80	PSC2500-24-50	PSC3000-12-120	PSC3500-24-70
Art #	5018100	5018120	5018300	5018320
Output power1) Pnom	1800W	2000W	2600W	2800W
P10minutes	2100W	2500W	3200W	3800W
Psurge	4000W	5500W	5000W	6500W
Input voltage nominal	12Vdc	24Vdc	12Vdc	24Vdc
Input voltage range	10.0 - 16.5Vdc	20.0 - 33Vdc	10.0 - 16.5Vdc	20.0 - 33.0Vdc
Maximum efficiency	92%	93%	92%	93%
No load power consumption3) [ASB]	<19W [2.0W]	<20W [2.0W]	<19W [2.0W]	<20W [2.0W]
Total weight	18.5 kg	18.5 kg	19.0 kg	19.0 kg

FEATURES & ACCESSORIES

Relays, triggers and remote control



True sinewave AC output · robust industrial design · high surge power output · powerful 4-stage two output battery charger · power factor corrected AC input · fast 30A AC transfer switch · AC Input Power Boost · AC Input Current Limit · Automatic Standby function · variable speed fan for silent operation · remote on/off capability · two programmable 250V/16A relays · two trigger inputs · remote control capability via TBSLink · easy to access connection bay.

Art #	Accessory	Notes
5095500	Universal Remote Control (Powersine Combi)	LCD readout and configuration
5095210	Basic Combi Remote Control	LED status indication
5092120	TBSLink to USB Interface Kit	Includes TBS Dashboard for monitoring and configuring the Powersine Combi inverter/chargers
5093120	Alarm output expander	Additional alarm relays for separate alarm types

Powersine Combi 2000-12-80 to 3500-24-70

30A TRANSFER SWITCH · TWO-OUTPUT CHARGER · TWO PROGRAMMABLE 250V/16A RELAYS AND TWO TRIGGER INPUTS

CHARGER STAGE, TRANSFER SWITCH & GENERAL

Technical specifications



Parameter	PSC2000-12-80	PSC2500-24-50	PSC3000-12-120	PSC3500-24-70
AC input voltage	185 - 270Vac / 45 - 65Hz / PF > 0.95			
Max. continuous charging current ⁴ (Secondary output)	80A (4A)	50A (4A)	120A (4A)	70A (4A)
Standard charge voltage (bulk / float @ 25°C)	14.3Vdc / 13.3Vdc	28.6Vdc / 26.6Vdc	14.3Vdc / 13.3Vdc	28.6Vdc / 26.6Vdc
Charge algorithm	IUoUoP, intelligent 4-stage, temperature compensated (programmable)			
AC Transfer switch, max. continuous current	30Arms			
Transfer time (typical)	0ms (inverter to mains) / < 5ms (mains to inverter)			
Communication port	TBSLink			
Protected against	High/low battery voltage, high temperature, overload, short circuit, high ripple voltage and low AC input voltage			
Indications	Power on, output power bar, error and ASB mode			
DC input connections	M10 bolt terminals		AC output: screw terminals	
Enclosure body size (height x width x depth)	370 x 431 x 132 mm			
Protection class / operating temp. / storage temp.	IP21 / -20°C to +50°C / -40°C to +80°C (humidity max. 95% non condensing)			
Standards	CE certified — EMC Directives UNECE Regulation 10 and 2014/30/EU, Low voltage Directive 2014/35/EU, RoHS Directive 2011/65/EU			

APPLICATIONS

Where the large Combi is specified



Applications	Features
Marine applications	Powerful 4-stage two output battery charger
Solar power systems	Fast 30A AC transfer switch
Industrial systems	Two programmable 250V/16A relays
Mobile entertainment systems	Two trigger inputs
Remote homes	Remote control capability via TBSLink
—	Supplied with mounting kit, temperature sensor and crimp terminals
—	CE certified · 24 month warranty

MONITOR SELECTOR

Choosing an Expert battery monitor



Model	Art #	Battery banks	Supported voltages	Shunt	Time remaining	Comm port	Alarm relay
Expert Lite	5055010	2	12V/24V	Passive 500A / 50mV	X	X	Programmable
Expert Pro	5055030	2	12V/24V	Passive 500A / 50mV	•	•	Programmable
Expert Pro-hv	5055040	2	36V/48V	Passive 500A / 50mV	•	•	Programmable
Expert Modular	5056030	3	12V to 48V	Active 600A, Grid Optimized	•	•	5A/30Vdc (1A/70Vdc)

The Expert Pro accepts the 1:5 Active Prescaler Kit (art # 5055511) for 48 VDC up to 120 VDC systems, and the 1200A/50mV Shunt Kit (art # 5055180) where battery current exceeds the standard 500A shunt.

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Expert Series battery monitors

COMPLETE BATTERY STATUS AT A GLANCE — READ YOUR BATTERY BANK LIKE A FUEL GAUGE

WHY A VOLTMETER IS NOT ENOUGH

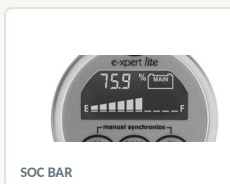
Complete battery status at a glance



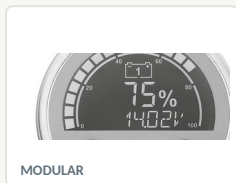
FUEL GAUGE



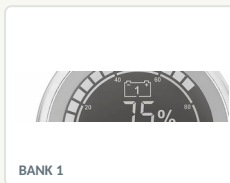
EXPERT LITE



SOC BAR



MODULAR



BANK 1

Operating your battery bank without good metering is like running your boat without any gauges: although possible to do, it is always better to know how much fuel is left in the tank. Defining the amount of energy available in a battery is a complex task — battery age, the intensity of the loads and the battery temperature all influence the actual capacity. A voltmeter gives only a rough indication of state of charge, and for accurate, reliable status information an Expert battery monitor is the best choice.

Readout	All Expert models show
State of charge	The primary function — the exact state of charge in percent, calculated by the advanced Expert algorithms
Battery voltage	Voltage under load, idle or charge — a quick reflection of the state of the battery
Charge / discharge current	Load intensity on the battery, so non-essential loads can be minimized or charging confirmed
Amphours	Accumulated amphours consumed over a set period; restarts from zero after the battery has been fully charged
Second battery bank	Voltage plus a rough state of charge indication of a second battery bank
Alarm contact	A potential free alarm contact on every model, configurable to activate at a chosen state of charge or voltage — for example to start a generator

MORE THAN A STATE OF CHARGE READOUT

Choosing between Lite, Pro and Modular



Model	Adds over the model below	Shunt	Banks monitored
Expert Lite	Voltage, current, amphours and a large state of charge bar graph — the ideal instrument for less technical end-users and relatively simple battery installations	Passive 500A	Two
Expert Pro / Pro-hv	Time remaining and battery temperature readout, extensive voltage and state of charge alarm programming, history event recall and a communication port; Pro-hv extends the input range to 70Vdc	Passive 500A	Two
Expert Modular	Power, operating and maintenance hours and the status of a third battery bank, with a Grid Optimized shunt that integrates into the DC Modular range	Active 600A	Three

PASSIVE AND ACTIVE SHUNTS

How the current is measured



PASSIVE 500A



ACTIVE SHUNT

The Expert Lite, Pro and Pro-hv are connected to a **passive shunt (a)** for current measurement — a cost effective solution with a small footprint that also allows the standard supplied 500Amp shunt to be exchanged for a smaller or larger capacity one. The Expert Modular contains an **active shunt (b)**: all measurement and control electronics are built inside the shunt, giving the highest accuracy, and information reaches the display over a digital cable connection instead of an analogue one, which is far more robust in noisy industrial environments. The active shunt can also run stand-alone without a display.

Monitoring lithium banks	Why an Expert monitor is required
Flat voltage response	A Lithium battery is known for its very flat voltage response against state of charge, so monitoring such a battery on voltage alone is no longer possible
Full compatibility	All Expert battery monitors are fully compatible with Lithium batteries and have been widely used in Lithium based applications for many years

Expert Lite, Pro and Pro-hv

ROUND 64 MM PANEL METERS · 500 AMP SHUNT INCLUDED · CE AND E-MARK CERTIFIED

THREE MODELS

Expert Lite, Expert Pro and Expert Pro-hv



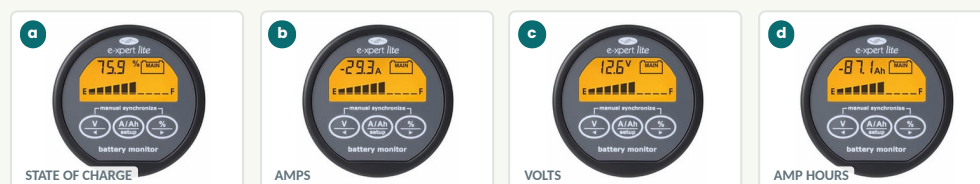
The entry model **Expert Lite** is focussed on a simple readout, utilizing most of the display area to show a large battery state of charge bar graph. The **Expert Pro** is physically identical to the Expert Lite but offers a larger amount of features and a more detailed display — programming voltage or state of charge alarms more extensively, recalling history events, or extending the input voltage range with an optional voltage prescaler. The **Expert Pro-hv** is identical to the Expert Pro with the exception of the input voltage range, which is extended up to 70Vdc. A passive 500A shunt is standard included in the package.

	Model	Art #	Supported battery voltages	Supply voltage range	Supply current1)	Shunt included
a	Expert Lite	5055010	12V/24V	9 .. 35Vdc	7mA @Vin=24Vdc · 9mA @Vin=12Vdc	500A / 50mV passive
b	Expert Pro	5055030	12V/24V	9 .. 35Vdc	7mA @Vin=24Vdc · 9mA @Vin=12Vdc	500A / 50mV passive
	Expert Pro-hv	5055040	36V/48V	14 .. 70Vdc	5mA @Vin=48Vdc · 6mA @Vin=36Vdc	500A / 50mV passive

Supply current measured with backlight and alarm relay turned off. With the standard delivered 500A/50mV shunt (350A continuous) the input current range is limited to -600 .. +600A.

EXPERT LITE AVAILABLE SCREENS

What the Lite displays

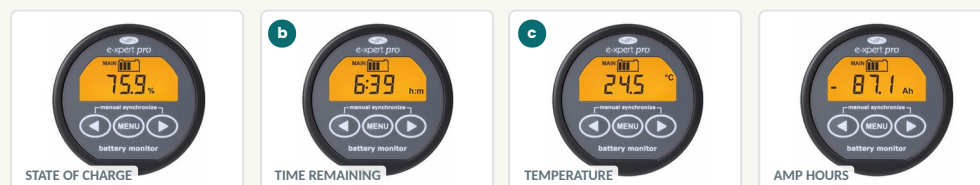


Four screens, selected with the front panel keys, cover everything the Lite reports. The large bar graph is permanently visible so the bank can be read at a glance from across the saloon.

	Screen	What it tells you
a	State of Charge	Shows the exact state of charge of your battery in percent — the most essential reading, as it represents the true status of your battery, being calculated by the advanced Expert algorithms
b	Amps	An excellent way to check the load intensity on your battery: it allows you to minimize the current draw of non essential loads, or to check if your battery is actually being charged
c	Volts	A simple reading to show the battery voltage under load, idle or charge — a quick reflection of the state of your battery, but it does not really let you know the true battery condition
d	Amp hours	Shows the accumulated amphotours consumed from the battery over a set period of time; this value will start from zero again after the battery has been fully charged

EXPERT PRO / PRO-HV AVAILABLE SCREENS

What the Pro adds



The Pro adds a time remaining calculation and a battery temperature readout to the four Lite screens, plus an Amps screen and a Volts screen at higher resolution.

	Screen	What it tells you
b	Time Remaining	Smart software calculates the time remaining in your battery based upon the current load — a good guide to when your battery has reached the discharge floor and must be recharged
c	Temperature	Only available when an external temperature sensor is connected to the battery monitor; shows the actual battery temperature
	Amps and Volts	Numeric readout of charge or discharge current (screen art shown at -29.3A) and battery voltage at 0.01Vdc resolution

Expert Lite, Pro and Pro-hv specifications

MEASURING RANGES, READOUT RESOLUTION AND THE FULL FEATURE COMPARISON

TECHNICAL SPECIFICATIONS

Ranges & readout resolution



All Expert battery monitors are equipped with high performance measuring circuits which, in combination with complex software algorithms, are used to exactly determine the remaining capacity of your battery.

Parameter	Expert Lite	Expert Pro	Expert Pro-hv
Art #	5055010	5055030	5055040
Input voltage range (auxiliary battery)	2 .. 35Vdc	2 .. 35Vdc	2 .. 35Vdc
Input voltage range (main battery)	0 .. 35Vdc	0 .. 35Vdc	0 .. 70Vdc
Input current range2)	-999 .. +999A	-9999 .. +9999A	
Battery capacity range	20 .. 999Ah	20 .. 9990Ah	
Operating temperature range	-20 .. +50°C		
Storage temperature range	-30 .. +70°C		
Readout resolution: Voltage	± 0.1Vdc (0 .. 35V)	± 0.01Vdc (0 .. 35V)	± 0.01Vdc (0 .. 70V)
Current	± 0.1A (0 .. 100A) · ± 1A (100 .. 999A)		± 0.1A (0 .. 200A) · ± 1A (200 .. 9999A)
Amphours	± 0.1Ah (0 .. 100Ah) · ± 1Ah (100 .. 999Ah)		± 0.1Ah (0 .. 200Ah) · ± 1Ah (200 .. 9990Ah)
State-of-charge	± 0.1% (0 .. 100%)		
Time remaining	X	± 1minute (0 .. 24hrs) · ± 1hr (24 .. 240hrs)	
Temperature	X	± 0.5°C (-20 .. +50°C)3)	
Voltage measurement accuracy	± 0.5%		
Current measurement accuracy	± 0.8%		

FEATURES & APPLICATIONS

Specifying an Expert round meter



Features	Applications
Read your battery bank like a fuel gauge	Marine applications
Provides critical information about the status of your battery bank	Electric vehicles
Displays voltage, current, consumed amphours, remaining battery capacity and time remaining (Pro only)	Solar power systems
Two battery inputs · large display with backlight	Industrial systems
Quick nut mounting construction · splash proof frontpanel	Mobile entertainment systems
Programmable alarm relay	Remote homes
Shunt selection capability, enables flexible system integration	—
Communication/expansion port and history event storage (Pro only)	—
500 Amp shunt included · CE and e-mark certified · 24 month warranty	—

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Expert Lite, Pro and Pro-hv specifications

MEASURING RANGES, READOUT RESOLUTION AND THE FULL FEATURE COMPARISON — CONTINUED

GENERAL FEATURE COMPARISON

What each model offers



Feature	Expert Lite	Expert Pro	Expert Pro-hv
Supported battery voltages	12V/24V	12V/24V	36V/48V
Advanced battery modelling engine	•	•	•
Lithium compatible	•	•	•
State of Charge bar	•	•	•
Alarm relay	•	•	•
Two battery inputs	•	•	•
Time remaining readout	X	•	•
History event storage	X	•	•
Communication port	X	•	•
Temperature sensor input	X	•	•

MECHANICAL & STANDARDS

Meter, shunt and certification



Parameter	Value
Meter dimensions	Ø 64 mm (front diameter) / Ø 52 mm (body diameter) / 79 mm (depth)
Meter weight	95 gr
Shunt dimensions (length x width x height)	87 x 45 x 35 mm
Shunt weight	145 gr
Protection class	IP20 (front panel only IP65)
Standards	CE marked meeting EMC directive 2014/30/EU and LVD 2014/35/EU complying with EN60335-1, RoHS 2011/65/EU and e4-95/54/EC
Mounting & sealing	Quick nut mounting construction · splash proof frontpanel · large display with backlight
Warranty	24 month warranty

Applications: marine applications · electric vehicles · solar power systems · industrial systems · mobile entertainment systems · remote homes.

PC CONNECTION

Communication kits



These kits enable you to control, readout and configure the Expert Pro from your Windows PC. Another possibility is to use the PC as a datalogger to record all measured parameters for further analysis.

	Art #	Accessory	For
a	5092100	USB Communication Kit	Expert Pro / Pro-hv only
b	5055200	RS-232 Communication Kit	Expert Pro / Pro-hv only

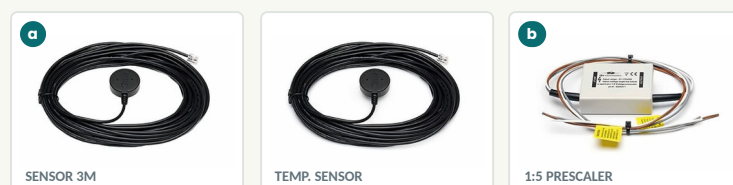
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Expert Lite, Pro & Pro-hv accessories

CONNECTION KITS, SHUNTS, PRESCALERS, TEMPERATURE SENSORS AND PC INTERFACES

SENSING & RANGE EXTENSION

Temperature sensor & prescaler

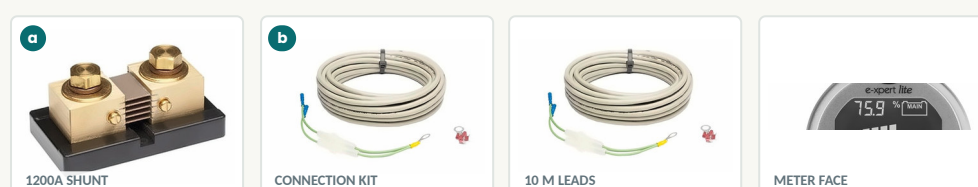


By connecting the temperature sensor kit to your Expert Pro or Expert Modular, the exact temperature of your battery can be determined, resulting in even more precise battery monitoring. The Expert Pro 1:5 active voltage prescaler kit extends the input voltage range of the Expert Pro to enable implementation in 48 VDC up to 120 VDC battery systems (maximum input voltage is 175VDC).

	Art #	Accessory	For
a	5055310	Temperature Sensor Kit 3m — also available in 10m length	Expert Pro / Pro-hv and Expert Modular
b	5055511	1:5 Active Prescaler Kit	Expert Pro only — 48 VDC up to 120 VDC systems

CURRENT MEASUREMENT & INSTALLATION

Shunt kit and connection kit



The Expert Pro 1200A/50mV Shunt kit can be used in applications where the battery current would exceed the maximum ratings of the standard supplied 500A shunt. The Expert professional connection kit makes life easier during installation of your battery monitor: it contains all necessary items for a professional and safe connection of the Expert battery monitor to your battery and shunt.

	Art #	Accessory	For
a	5055180	1200A/50mV Shunt Kit	Expert Pro / Pro-hv only
b	5055440	Professional Connection Kit 10m	All Expert round meters

Shunt selection capability enables flexible system integration — the standard supplied 500Amp shunt can be exchanged for a smaller or larger capacity one to suit the bank.

FEATURES & APPLICATIONS

Specifying the Expert Modular



Features	Applications
Read your battery bank like a fuel gauge	Marine applications
Very simple 'plug and play' installation	Electric vehicles
Displays voltage, current, consumed amhours, remaining battery capacity, time remaining and power	Solar power systems
Extensive alarm programming capability · programmable alarm relay	Industrial systems
Three battery inputs · large display with backlight	Mobile entertainment systems
Very small installation depth of the display unit	Remote sites
Perfect integration with TBS DC Modular products	Provides critical information about the status of your battery bank
QuickLink communication port · history event storage	—
Active shunt supports two display units or can also run stand alone	—
Splash proof front panel · CE and EN50498 certified · 24 month warranty	—

Every part number on these pages is stocked or indented to order. Custom Marine builds and tests complete distribution assemblies to your schematic before they reach the vessel, supplies cable, lugs, fuses and fuseholders as a matched set, and provides specification support, mounting drawings, wiring diagrams and 3D models to naval architects, yards and refit managers throughout the UAE and the wider Gulf. Talk to us early: the power and distribution plan is easiest to get right before the loom is cut — 800BOATS · 800YACHTS · custommarine.ae.

Expert Modular battery monitor

ART # 5056030 — INTELLIGENT ACTIVE 600A SHUNT PLUS A 36 MM DEEP CONTROL & DISPLAY UNIT

LATEST GENERATION

Active shunt and Control & Display Unit



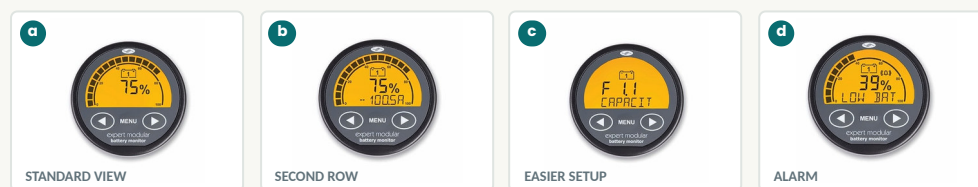
The Expert Modular is the latest generation, highly advanced battery monitor. It consists of an intelligent shunt and a remote control and display unit. The shunt has a Grid Optimized footprint for perfect integration with the DC Modular products. It monitors up to three battery banks, lead based or Lithium (LiFePO4), measuring DC currents up to 600Amps (500Amp continuous) and voltages up to 70Vdc — so any bank from 12V up to 48V can be monitored.

Installation time is minimal: one supply wire to the intelligent shunt base and a single QuickLink cable between shunt base and Control & Display Unit; the battery minus cable is interrupted to insert the shunt. The fused supply wire and QuickLink cable are both included, avoiding the need for a separate connection kit.

Highlight	Detail
Ultra low loss shunt module	Custom made, handles 500A continuously; stainless steel studs, nuts and washers for optimal corrosion resistance
Fiber reinforced base material	Excellent high temperature properties, good chemical resistance and high strength
Voltage sense inputs	+B1 for the main bank (also the positive supply input); +B2 and +B3 for banks 2 and 3, or assignable to midpoint voltage measurement, keyswitch input, setup lock or backlight control
Programmable alarm relay	Potential free 5A/30Vdc (1A/70Vdc) contact to control external equipment
Dual QuickLink port	For connection to the Control & Display Unit or other accessories; supports two display units, or runs stand alone
Multi purpose indicator	Provides status, error and battery state of charge information in three colours; input port for optional battery temperature sensor
Control & Display Unit	Compact round unit with splash proof front panel, large backlit display and only 36 mm installation depth; three button interface

READOUT EXAMPLES

What the display shows



A large circular bar graph provides a clear battery state of charge indication, with smart display animations indicating whether the battery is being charged or discharged and by which intensity.

	Readout mode	What it shows
a	Standard view	Normal operating mode with the second parameter row disabled — a clean display area showing only the battery state of charge (%) and the bar graph; a perfect mode for less technical end users
b	Second parameter row	Scroll through Volt, Amp, Ah, time remaining, temperature and Watts; the row can be set to hide automatically after a while or stay present permanently
c	Easier setup	During function setup, status or history readout each parameter is clearly explained using scrolling text, so there is no need to consult a list of parameter numbers
d	Alarm indications	The alarm bell icon lights and an explanation of the alarm type scrolls through the display; an audible alarm can be enabled as well

Features: read your battery bank like a fuel gauge · very simple 'plug and play' installation · displays voltage, current, consumed amphotours, remaining battery capacity, time remaining and power · extensive alarm programming capability · three battery inputs · history event storage · CE and EN50498 certified · 24 month warranty.

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Expert Modular specifications & accessories

GRID OPTIMIZED FOOTPRINT · QUICKLINK EXPANSION TO PC, PHONE AND NMEA2000

TECHNICAL SPECIFICATIONS

Ranges, resolution & construction



The Expert Modular active shunt base has a Grid Optimized footprint, enabling perfect system integration with busbars and fuseholders from the TBS DC Modular product lineup — a neat way to avoid stacking all battery negative return cables on the single “System side” stud of the shunt.

Parameter	Expert Modular, art # 5056030
Supply voltage range	7 .. 70Vdc
Supply current (@ 12V/ 24V/48V)	10mA / 6mA / 5mA
Input voltage range main battery (+B1)	7 .. 70Vdc1)
Input voltage range second and third battery (+B2, +B3)	1 .. 70Vdc
Input current range	-600 .. +600A2)
Battery capacity range	10 .. 10000Ah
Operating / storage temperature range	-20 .. +50°C / -30 .. +70°C
Readout resolution	Voltage (0 .. 70V) ± 0.01Vdc · Current (0 .. 10A) ± 0.01A · Current (10 .. 100A) ± 0.1A · Current (100 .. 600A) ± 1A
Readout resolution, energy	Amphours (0 .. 10000Ah) ± 0.01Ah - 10Ah (variable) · Power (0 .. 42kW) ± 0.01W - 1kW (variable)
Readout resolution, time	State-of-charge ± 1% · Time remaining (0 .. 24hrs) ± 1 min · Time remaining (24 .. 240hrs) ± 1 hr · Maintenance hours (0 .. 10000hrs) ± 1 hr
Temperature readout	-20°C .. +50°C at ± 0.5°C
Voltage / current measurement accuracy	± 0.3% / ± 0.4%
Display unit dimensions / weight	Ø64 mm (front diameter) / Ø51.5 mm (body diameter) / 36 mm (depth) · 70 gr
Shunt dimensions / weight	100 x 100 x 64.5 mm · 260 gr
Protection class (Display + Shunt)	IP20 (display front panel only IP65)
Standards	CE certified meeting EMC Directive 2014/30/EU, LVD 2014/35/EU complying with EN60335-1, EN50498 EMC, RoHS 2011/65/EU

1) When input +B1 is only used for supply and +B2 for main battery voltage measurement, the input voltage range for the main battery is 1..70Vdc. 2) +/- 600A is the maximum rating for 20 minutes; the continuous input current range is +/- 500A.

ACCESSORIES

QuickLink expansion kits



QuickLink kits let you control, read out and configure the Expert Modular from a Windows PC, an iOS or Android phone, or put battery bank data onto the vessel's NMEA2000 network. The PC can also be used as a datalogger to record all measured parameters for further analysis.

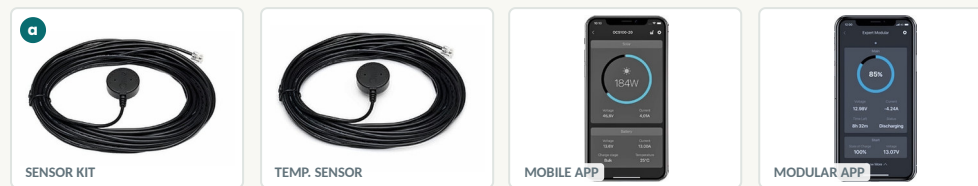
	Art #	Accessory	Function
a	5092130	QuickLink to USB Communication Kit	Windows readout, configuration and datalogging
b	5092030	QuickLink to RS-232 Communication Kit	Windows readout, configuration and datalogging
c	5092230	QuickLink to Bluetooth Communication Kit	Dashboard Mobile app in the Apple App Store and Google Play
d	5092530	QuickLink to NMEA2000 Communication Kit	Shows extensive battery bank data on any NMEA2000 compatible display
	5093120	QuickLink Alarm Output Expander Kit	Adds two additional alarm relays when each alarm type must be assigned to a separate relay

Expert Modular specifications & accessories

GRID OPTIMIZED FOOTPRINT · QUICKLINK EXPANSION TO PC, PHONE AND NMEA2000 — CONTINUED

TEMPERATURE SENSING & WIRING

Sensor kits and system diagram

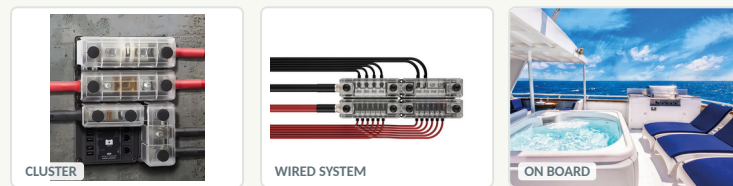


Notice the small amount of cables needed to get the Expert Modular up and running: the supply and CDU cables are both included, along with rubber caps to cover unused I/O ports against pollution.

	Art #	Accessory	Function
a	5055310	Temperature Sensor Kit 3 m — also available in 10 m length	Determines the exact battery temperature for even more precise monitoring

A UNIFORM SET OF PRODUCTS

Why DC Modular exists

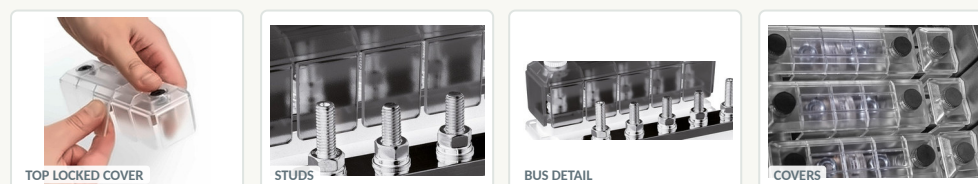


Due to the ever increasing complexity of electrical DC systems onboard vessels or in stationary applications, there is a growing need for a uniform set of products that significantly improves installation time and flexibility. The TBS DC Modular product range offers a perfect solution: a wide range of high current busbars, fuseholders, contactors and interconnection materials that, unlike more traditional and often incompatible DC distribution products, work as one system.

System feature	What it delivers
Grid Optimized Footprint	All products carrying the logo are easy to cluster along with each other, considerably reducing the mounting footprint and allowing installation in tight spaces
Common interconnection height	Quick and easy combining of multiple products using optional link plates — avoiding assembled interconnection cables, increasing the safety and efficiency of the high current link
Stainless steel hardware	Studs, washers and nuts in stainless steel for optimal corrosion resistance
Tin plated high purity copper busses	Maximum conductivity, reducing heat and improving efficiency
Fiber reinforced base material	Excellent high temperature properties, good chemical resistance and high strength — operating temperature range -25°C .. +80°C
Designed and assembled in The Netherlands	Long lifetimes in harsh environments

DC MODULAR HIGHLIGHTS

Covers, terminals and labelling



Transparent polycarbonate covers carry break-out side skirts at each side for easy cable entry from any direction, and recessed locations on the top to properly add custom labels. Smart terminal design allows dual mirrored cable lug connections, and easy in-system connection access comes from top locked covers with convenient thumb screws.

Detail	Benefit
Top locked covers, thumb screws	Easy in-system connection access without removing the device from its mounting
Transparent cover with break-outs	Robust cover allowing wire access from any direction, with the fuse or link visible at a glance
Recessed label locations	Custom circuit labels sit flush on top of the cover
Smart terminal design	Dual mirrored cable lug connections on each stud
Optional adapter plate	Allows a mixture of high- and low power cables to be connected to the same stud
Optional link plates	Multiple fuseholders and busbars connected directly to each other

DC Modular power protection & distribution

HIGH CURRENT BUSBARS, FUSEHOLDERS AND CONTACTORS ON ONE GRID OPTIMIZED FOOTPRINT

COMPATIBILITY

Expert Modular & premium fuses



RBS ARRAY



IN PRODUCTION

The DC Modular product range is also a perfect companion for the TBS Expert Modular battery monitor: the footprint of this advanced battery monitor fits perfectly into the DC Modular grid, allowing optimal integration with the busbars and fuse holders. An application example of a compact DC Modular cluster contains the Expert Modular active shunt, a 3-Stud Busbar and two Fuseholders.

Topic	Detail
Intelligent contactors	The lineup contains the Remote Battery Switch (RBS) and Battery Protect Relay (TBP) — intelligently controlled 500A contactors that can switch voltages up to 60Vdc and, being magnetically latching, draw no current from the battery between switching actions
Why fuse brand matters	Tests have shown that a reasonable amount of low cost fuses on the market deviate greatly between specified and actual melting currents versus time, up to fuse housings almost catching fire at continuous rated current
Authorized A-brand dealer	TBS is an authorized dealer of Littelfuse and SIBA and stocks a wide range of values from the MEGA, ANL and Class-T fuse families

GRID PLANNER

Grid size and footprint of every DC Modular product



Product	Art #	Grid size	Stud	Dimensions
DCM 1xM8 / 1xM10 Single Stud	5071160 / 5071180	1 x 1	M8 / M10	50.0 x 50.0 x 66.5 mm
DCM 2xM8 / 2xM10 Dual Stud	5072160 / 5072180	1 x 1.5	M8 / M10	75.0 x 50.0 x 66.5 mm
DCM 3xM8 / 3xM10 Busbar	5073160 / 5073180	1 x 2	M8 / M10	100.0 x 50.0 x 66.5 mm
DCM 5xM8 / 5xM10 Busbar	5075160 / 5075180	1 x 3	M8 / M10	150.0 x 50.0 x 66.5 mm
DCM 8xM6 / 12xM4 Dual Row Busbar	5071042 / 5071024	1 x 3	M8	150.0 x 50.0 x 66.5mm
DCM 6-channel ATO Blade Fuseholder	5073036	1 x 3	M8	150.0 x 50.0 x 66.5mm
DCM Mega Fuseholder (300A)	5073300	1 x 1.78	M8	89.0 x 50.0 x 53.0 mm
DCM Mega Fuseholder (500A)	5073350	1 x 3	M8	150.0 x 50.0 x 66.5 mm
DCM ANL Fuseholder (300A)	5073500 / 5073510	1 x 2	M8 / M10	100.0 x 50.0 x 53.0 mm
DCM ANL Fuseholder (600A)	5073550 / 5073560	1 x 3	M8 / M10	150.0 x 50.0 x 66.5 mm
DCM Class-T Fuseholder	5073830 / 5073850 / 5073880	1 x 3	M10	150.0 x 50.0 x 66.5 mm
DCM RBS / TBP contactor	5074410 .. 5074540	1 x 3	M10	150.0 x 50.0 x 94.0 mm
Expert Modular active shunt	5056030	1 x 2	M10	100 x 100 x 64.5 mm

One grid position is 50 mm wide. Products sharing the common interconnection height are joined with the link plates rather than assembled interconnection cables.

3 STUD BUSBAR

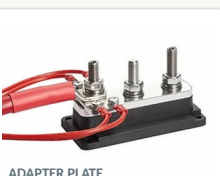
DCM 3xM8 and 3xM10



3 STUD



3 STUD, COVERED



ADAPTER PLATE



DUAL LUGS

The DC Modular high current busbars are used to distribute high DC currents to a number of connected cables, or other DC Modular family members. The solid and compact design, as well as the possibility to link up multiple busbars on a fixed grid, make these products the best choice for all professional DC power systems.

	Model	Art #	Grid size	Nom. Current1)	Max. Voltage2)	Stud size	Dimensions
a	DCM 3xM8 Busbar	5073160	1 x 2	600A	60V	M8	100.0 x 50.0 x 66.5 mm
	DCM 3xM10 Busbar	5073180	1 x 2	600A	60V	M10	100.0 x 50.0 x 66.5 mm

Nominal current at +40°C ambient temperature. Overloading the busbar up to twice its nominal capacity (= 1200A) is permitted for a maximum duration of 5 minutes. Higher voltages may require additional protection to prevent access to live parts.

DC Modular high current busbars

3 STUD AND 5 STUD BUSBARS • 600A NOMINAL • 60V • M8 OR M10 CONNECTION POINTS

5 STUD BUSBAR

DCM 5xM8 and 5xM10



The five stud version spans three grid positions and takes up to ten cable lugs on its dual mirrored terminals — the natural main positive or main negative distribution point for a complete DC system.

	Model	Art #	Grid size	Nom. Current1)	Max. Voltage2)	Stud size	Dimensions
a	DCM 5xM8 Busbar	5075160	1 x 3	600A	60V	M8	150.0 x 50.0 x 66.5 mm
	DCM 5xM10 Busbar	5075180	1 x 3	600A	60V	M10	150.0 x 50.0 x 66.5 mm

DUAL ROW BUSBAR — 300A

DCM 8xM6 and 12xM4



The Dual Row busbars carry a 300A main bus with a second row of small screw terminals, so a heavy main feed and a bank of light circuits share one Grid Optimized housing — twelve M4 screws or eight M6 screws, with M8 studs on the main bus.

	Model	Art #	Grid size	Nom. Bus current1)	Max. voltage2)	No. of screws	Screw Size	Stud Size
a	DCM 12xM4 Busbar	5071024	1 x 3	300A	60V	12	M4	M8
	DCM 8xM6 Busbar	5071042	1 x 3	300A	60V	8	M6	M8

Both Dual Row busbars measure 150.0 x 50.0 x 66.5mm. Nominal current at +40°C ambient temperature; overloading the busbar up to twice its nominal capacity (= 600A) is permitted for a maximum duration of 5 minutes.

COMMON TO EVERY BUSBAR AND STUD

Features



Every member of the range shares the same materials, the same cover system and the same grid, so a distribution assembly can be built up from studs, busbars, fuseholders and contactors and grow with the installation.

Feature	Detail
Stainless steel studs, nuts and washers	Optimal corrosion resistance in a wet bilge or engine space
Tin plated high purity copper busses	Maximum conductivity, reducing heat and improving efficiency
Special fiber reinforced base material	Excellent high temperature properties (operating temperature range -25°C .. +80°C), good chemical resistance and high strength
Unique grid optimized footprints	Space saving arrangements of multiple products
Common interconnection heights	Easy combining of multiple products using link plates
Robust transparent covers with breakouts	Wire access from any direction; easy in-system connection access due to top locked covers
Smart terminal design	Dual mirrored cable lug connections

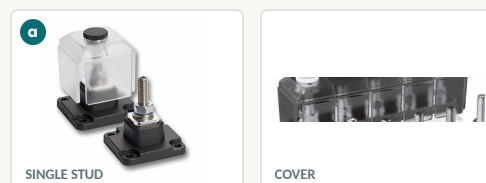
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DC Modular insulated studs

EXTEND CABLES, ADD POWER TAPS OR FORM TERMINATION END-POINTS ON THE SAME GRID

SINGLE INSULATED STUD

DCM 1xM8 and 1xM10



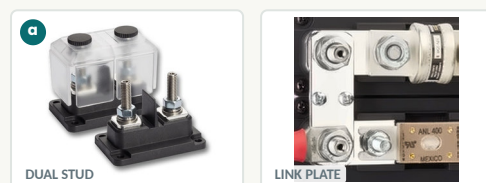
The DC Modular single and dual insulated studs are ideal parts to extend cables, add power taps or form termination end-points. The solid and compact design, as well as the possibility to link these up with other DC Modular family members, make these products the best choice for all professional DC power systems.

	Model	Art #	Grid size	Maximum Current	Max. Voltage1)	Stud size	Dimensions
a	DCM 1xM8 Single Stud	5071160	1 x 1	N/A	60V	M8	50.0 x 50.0 x 66.5 mm
	DCM 1xM10 Single Stud	5071180	1 x 1	N/A	60V	M10	50.0 x 50.0 x 66.5 mm

Higher voltages may require additional protection to prevent access to live parts.

DUAL INSULATED STUD

DCM 2xM8 and 2xM10



The dual insulated stud spans one and a half grid positions and gives two isolated tap points under one transparent cover. Top sides of the transparent covers are equipped with recessed locations to properly add custom labels — dual insulated stud only.

	Model	Art #	Grid size	Maximum Current	Max. Voltage1)	Stud size	Dimensions
a	DCM 2xM8 Dual Stud	5072160	1 x 1.5	N/A	60V	M8	75.0 x 50.0 x 66.5 mm
	DCM 2xM10 Dual Stud	5072180	1 x 1.5	N/A	60V	M10	75.0 x 50.0 x 66.5 mm

6-CHANNEL ATO BLADE FUSEHOLDER

1A to 30A on a 300A bus



A wide range of fuseholders is available in the DC Modular lineup, covering fuse Amp ratings from 1A up to 600A. The all new 6-channel ATO Blade Fuseholder is solidly crafted using the same high-end materials as the existing DC Modular family members, feeding six protected branch circuits from one 300A bus.

	Model	Art #	Grid size	Fuse range	Nom. Bus current1)	Max. Voltage2)	Stud size	Dimensions
a	6-channel ATO Blade Fuseholder	5073036	1 x 3	1 .. 30A	300A	60V	M8	150.0 x 50.0 x 66.5mm

Nominal current at +40°C ambient temperature. Overloading the busbar up to twice its nominal capacity (= 600A) is permitted for a maximum duration of 5 minutes.

COMMON TO EVERY FUSEHOLDER

Features



Feature	Detail
Stainless steel studs, nuts and washers	Optimal corrosion resistance
Tin plated high purity copper busses	Maximum conductivity, reducing heat and improving efficiency
Special fiber reinforced base material	Excellent high temperature properties (operating temperature range -25°C .. +80°C), good chemical resistance and high strength
Unique grid optimized footprints	Space saving arrangements of multiple products
Common interconnection heights	Easy combining of multiple products using link plates
Top locked covers	Easy in-system connection access — except the Mega (300A) and ANL (300A) fuseholders

DC Modular fuseholders — ATO & Mega

FUSE AMP RATINGS FROM 1A UP TO 600A ACROSS THE ATO, MEGA, ANL AND CLASS-T FAMILIES

MEGA FUSEHOLDERS

300A and 500A versions



Fuseholders are offered for the ATO, Mega, ANL and Class-T type of fuses, providing solutions for a wide range of applications. The solid and compact design, as well as the possibility to link up multiple fuseholders on a fixed grid, make these products the best choice for all professional DC power systems.

	Model	Art #	Grid size	Fuse range1)	Max. Voltage2)	Stud size	Dimensions3)
a	DCM Mega Fuseholder	5073300	1 x 1.78	40 .. 300A	60V	M8	89.0 x 50.0 x 53.0 mm
b	DCM Mega Fuseholder (500A)	5073350	1 x 3	40 .. 500A	60V	M8	150.0 x 50.0 x 66.5 mm

Compatible with Littelfuse 'Mega' and Cooper Bussmann 'AMG' fuses. The 300A Mega fuseholder is optimized for standalone use, but remains compatible with the 75A Link Plate for optional connection to other DCM components.

ANL FUSEHOLDER (300A)

M8 and M10 versions



The 300A ANL fuseholder is optimized for standalone use but remains compatible with the 75A Link Plate for optional connection to other DCM components. It is available with M8 or M10 studs to suit the cable lugs already on the boat.

	Model	Art #	Grid size	Fuse range1)	Max. Voltage2)	Stud size	Dimensions3)
a	DCM ANL Fuseholder (300A) M8	5073500	1 x 2	35 .. 300A	60V	M8	100.0 x 50.0 x 53.0 mm
	DCM ANL Fuseholder (300A) M10	5073510	1 x 2	35 .. 300A	60V	M10	100.0 x 50.0 x 53.0 mm

ANL FUSEHOLDER (600A)

M8 and M10 versions



The 600A ANL fuseholder spans three grid positions with top locked covers and full link plate compatibility — the standard main battery fuse for large lead and lithium banks.

	Model	Art #	Grid size	Fuse range1)	Max. Voltage2)	Stud size	Dimensions
a	DCM ANL Fuseholder (600A) M8	5073550	1 x 3	35 .. 600A	60V	M8	150.0 x 50.0 x 66.5 mm
	DCM ANL Fuseholder (600A) M10	5073560	1 x 3	35 .. 600A	60V	M10	150.0 x 50.0 x 66.5 mm

M8 version compatible with Littelfuse 'CNN' and 'CNL' plus Cooper Bussmann 'ANL' and 'ANN' fuses. M10 version compatible with Littelfuse '157.57' plus SIBA '90 058 05' fuses.

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DC Modular fuseholders — ANL & Class-T

35A TO 600A ANL · 110A TO 600A CLASS-T · M8 AND M10 STUD VERSIONS

CLASS-T FUSEHOLDER

200A, 400A and 600A versions



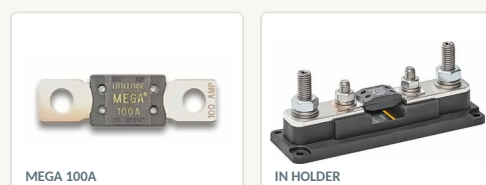
Class-T fuses carry the very high interrupting capacity that lithium banks demand, and the DC Modular holder puts them on the same grid as the rest of the system. The newly added 110A - 200A holder completes the range at the lower end.

	Model	Art #	Grid size	Fuse range1)	Max. Voltage2)	Stud size	Dimensions
a	DCM Class-T Fuseholder (200A)	5073830	1 x 3	110 .. 200A	60V	M10	150.0 x 50.0 x 66.5 mm
	DCM Class-T Fuseholder (400A)	5073850	1 x 3	225 .. 400A	60V	M10	150.0 x 50.0 x 66.5 mm
	DCM Class-T Fuseholder (600A)	5073880	1 x 3	450 .. 600A	60V	M10	150.0 x 50.0 x 66.5 mm

Compatible with Littelfuse 'JLLN', Cooper Bussmann / Edison 'JJN' and 'TJN' and Mersen 'A3T' fuses. Higher voltages may require additional protection to prevent access to live parts.

MEGA FUSES

32Vdc and 70Vdc values



In order to complement the high current fuseholders from the DC Modular lineup, TBS supplies the required fuses as well, as a reseller of premium fuse brands Littelfuse and SIBA. For optimal safety always use fuses from well known brands — the tables show the fuse values per type that TBS always aims to have in stock. Other fuse values on request.

Art #	Value	Art #	Value	Art #	Value
5097319-2	40A / 32Vdc	5097337-2	150A / 32Vdc	5097357-2	350A / 32Vdc
5097323-2	60A / 32Vdc	5097340-2	175A / 32Vdc	5097427-2	80A / 70Vdc
5097327-2	80A / 32Vdc	5097343-2	200A / 32Vdc	5097434-2	125A / 70Vdc
5097331-2	100A / 32Vdc	5097349-2	250A / 32Vdc	5097443-2	200A / 70Vdc
5097334-2	125A / 32Vdc	5097355-2	300A / 32Vdc	5097455-2	300A / 70Vdc

CROSS-REFERENCE

Fuseholder, fuse family and stocked values



Fuseholder	Art #	Fuse range	Fuse family accepted	Stocked art # series
6-channel ATO Blade Fuseholder	5073036	1 .. 30A	ATO blade fuses	Standard blade fuses
DCM Mega Fuseholder (300A)	5073300	40 .. 300A	Littelfuse Mega, Cooper Bussmann AMG	5097319-2 .. 5097357-2
DCM Mega Fuseholder (500A)	5073350	40 .. 500A	Littelfuse Mega, Cooper Bussmann AMG	5097319-2 .. 5097455-2
DCM ANL Fuseholder (300A) M8	5073500	35 .. 300A	Littelfuse CNN / CNL, Bussmann ANL / ANN	5097521-2 .. 5097555-2
DCM ANL Fuseholder (300A) M10	5073510	35 .. 300A	Littelfuse 157.57, SIBA 90 058 05	5097621-2 .. 5097655-2
DCM ANL Fuseholder (600A) M8	5073550	35 .. 600A	Littelfuse CNN / CNL, Bussmann ANL / ANN	5097521-2 .. 5097565-2
DCM ANL Fuseholder (600A) M10	5073560	35 .. 600A	Littelfuse 157.57, SIBA 90 058 05	5097621-2 .. 5097663-2
DCM Class-T Fuseholder (200A)	5073830	110 .. 200A	Littelfuse JLLN, Bussmann / Edison JJN and TJN, Mersen A3T	5097832-1 .. 5097843-1
DCM Class-T Fuseholder (400A)	5073850	225 .. 400A	Littelfuse JLLN, Bussmann / Edison JJN and TJN, Mersen A3T	5097846-1 .. 5097859-1
DCM Class-T Fuseholder (600A)	5073880	450 .. 600A	Littelfuse JLLN, Bussmann / Edison JJN and TJN, Mersen A3T	5097861-1 .. 5097865-1

TBS is an authorized dealer of Littelfuse and SIBA; other fuse values are available on request. Contact Custom Marine for advice on which type of fuse to select for your application.

DC Modular fuses — MEGA, ANL & Class-T

LITTELFUSE AND SIBA STOCKED VALUES — PROFESSIONAL FUSEHOLDERS DESERVE SAFE HIGH QUALITY FUSES

ANL FUSES — 80VDC

M8 and M10 art numbers



Too often things go bad due to the use of cheap 'no-name' fuses — deviations between specified and actual melting currents, or housings that overheat at continuous rated current. Fuses are installed to protect against fire or equipment damage, not to become a safety hazard themselves.

Art # (M8)	Art # (M10)	Value	Art # (M8)	Art # (M10)	Value
5097521-2	5097621-2	50A / 80Vdc	5097555-2	5097655-2	300A / 80Vdc
5097531-2	5097631-2	100A / 80Vdc	5097557-2	5097657-2	350A / 80Vdc
5097537-2	5097637-2	150A / 80Vdc	5097559-2	5097659-2	400A / 80Vdc
5097543-2	5097643-2	200A / 80Vdc	5097563-2	5097663-2	500A / 80Vdc
5097549-2	5097649-2	250A / 80Vdc	5097565-2	—	600A / 80Vdc

CLASS-T FUSES — 125VDC

110A to 600A

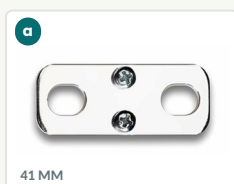


Class-T is the fuse type specified for large lithium banks because of its very high interrupting rating in a compact body. Contact Custom Marine for advice on which type of fuse to select for your application.

Art #	Value	Art #	Value
5097832-1	110A / 125Vdc	5097849-1	250A / 125Vdc
5097834-1	125A / 125Vdc	5097855-1	300A / 125Vdc
5097837-1	150A / 125Vdc	5097859-1	400A / 125Vdc
5097843-1	200A / 125Vdc	5097861-1	450A / 125Vdc
5097846-1	225A / 125Vdc	5097865-1	600A / 125Vdc

END TO END & END TO SIDE LINKING

Link Plate 41 mm and 50 mm



Due to the common interconnection heights, smart space saving arrangements of multiple DC Modular products can be made by linking these together using the optional Link Plates. A wide range of types offers the best solution for each connection arrangement; all Link Plates are compatible with M8 and M10 studs, and some carry M4 screws to provide convenient connection points for smaller cables.

	Model1)	Art #	Nom. Current2)	Dimensions (L x W)	Accepts stud size
a	DCM Link Plate 41mm	5079062	600A	63.0 x 25.0 mm	M8 + M10
b	DCM Link Plate 50 mm	5079072	600A	75.0 x 25.0 mm	M8 + M10
c	DCM Link Plate 3 Way 50 mm	5079073	600A	125.0 x 25.0 mm	M8 + M10

For linking to and from: DCM 2xM8/M10 Dual Stud · DCM 3xM8/M10 Busbar · DCM 5xM8/M10 Busbar · DCM Dual Row Busbar · DCM 6-channel ATO Blade Fuseholder · DCM Mega Fuseholder (500A) · DCM ANL Fuseholder (600A) · DCM Class-T Fuseholder · DCM RBS / TBP.

Every part number on this page is stocked or indented to order by Custom Marine. Complete distribution assemblies are built and tested to your schematic before they reach the vessel, and specification support, drawings and 3D models are available to naval architects, yards and refit managers throughout the region — 800BOATS · 800YACHTS · custommarine.ae.

DC Modular link plates & adapter plate

SPACE SAVING ARRANGEMENTS WITHOUT ASSEMBLED INTERCONNECTION CABLES · M8 AND M10 COMPATIBLE

SIDE TO SIDE LINKING

Dual Row Link Plates 2x2, 2x3 and 2x4



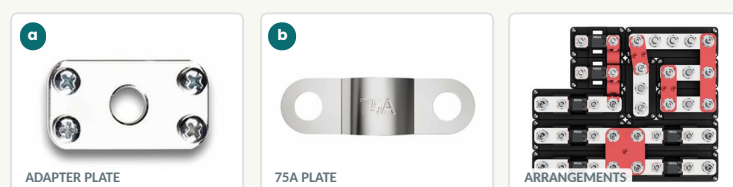
The Dual Row Link Plate 38 x 50 mm and the 2x2, 2x3 and 2x4 plates link two rows of devices side to side in two, three or four positions — the neat way to parallel a battery system without loose cable jumpers.

	Model(1)	Art #	Nom. Current(2)	Dimensions (L x W)	Accepts stud size
a	DCM Link Plate 2x2	5079092	600A	75.0 x 63.0 mm	M8 + M10
b	DCM Link Plate 2x3	5079093	600A	125.0 x 63.0 mm	M8 + M10
c	DCM Link Plate 2x4	5079094	600A	175.0 x 63.0 mm	M8 + M10

Not compatible with "Mega (300A)" and "ANL (300A)" fuseholders. Nominal current per connection point at +40°C ambient; overloading the Link Plate up to twice its nominal capacity (= 1200A) is permitted for a maximum duration of 5 minutes, and capacity can be doubled by stacking two Link Plates.

SMALL CABLE CONNECTIONS

Adapter Plate & Link Plate 75A



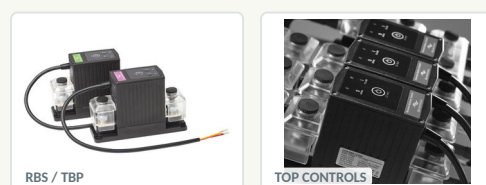
The Adapter Plate allows a mixture of high and low power cables to be connected to the same stud: it can be used on M8 and M10 studs and offers four connection points for smaller cables, converting an M8 or M10 stud to 4xM4 fork/ring terminals.

	Model	Art #	Nom. Current	Dimensions (L x W)	Accepts stud size
a	Adapter Plate (1xM8/M10 to 4xM4)	5079020	600A	46.0 x 25.0 mm	M8 + M10
b	DCM Link Plate 75A 50 mm	5079042	75A	70.0 x 20.0 mm	M8 + M10

Overloading the 75A Link Plate up to 200A is permitted for a maximum duration of 5 minutes; capacity can be increased by stacking more Link Plates, with a maximum advised number of four. The 75A plate also links to and from the DCM 1xM8/M10 Single Stud, the Mega Fuseholder (300A) and the ANL Fuseholder (300A).

DCM RBS AND DCM TBP

Six models



The DC Modular Remote Battery Switch (RBS) and Battery Protect Relay (TBP) are smart high current magnetic latching contactors that handle continuous DC currents of up to 500Amps in continuous service. They install in an engine room or battery compartment while being controlled from a more convenient location by a small panel mounted switch, a battery monitor or a managed lithium battery. Buttons on top also open or close the main contact locally, as required by Marine Standards, and status LEDs show whether the main contact is open or closed.

Model	Art #	Coil / supply voltage (+Vdc)	Coil / supply current (state change)1)	Battery protect	Number of control modes
DCM-RBS-12-500	5074510	7.5 - 17Vdc	< 6A	x	5
DCM-RBS-24-500	5074520	15 - 34Vdc	< 3A	x	5
DCM-RBS-48-350	5074540	34 - 68Vdc	< 1.5A	x	5
DCM-TBP-12-500	5074410	7.5 - 17Vdc	< 6A	•	7
DCM-TBP-24-500	5074420	15 - 34Vdc	< 3A	•	7
DCM-TBP-48-350	5074440	34 - 68Vdc	< 1.5A	•	7

Due to the magnetic latch construction the DCM RBS and TBP draw virtually no current in the ON or OFF state; a current draw only exists shortly (500ms max) when changing the state of the contact.

Remote Battery Switch & Battery Protect Relay

MAGNETIC LATCHING 500A CONTACTORS · 60VDC · LOCAL AND EXTERNAL CONTROL · ISO 8846

TECHNICAL SPECIFICATIONS

Main contact, control circuit & general



Parameter	DCM-RBS	DCM-TBP
Rated voltage		60Vdc
Nominal current		500A
Cranking current (1min.)		1000A
Nominal make / break current		500A (0 - 34Vdc) · 350A (35 - 60Vdc)
Peak make / break current		1600A (0 - 34Vdc) · 1200A (35 - 60Vdc)
Coil / supply current (idle state)1)		< 100uA
Programmable disconnect voltages	x	9.0 - 12.2Vdc (12V) · 18.0 - 24.5Vdc (24V) · 36.0 - 49.0Vdc (48V)
Programmable reconnect voltages	x	10.5 - 13.8Vdc (12V) · 21.0 - 27.5Vdc (24V) · 42.0 - 55.0Vdc (48V)
Override mode2)	x	•
Remote control	By control wires — external open / close control wires and a contact status feedback wire	
Local control3)	Top side buttons (On/Standby, Close contact, Open contact)	Top side buttons (On/Standby, Close contact, Open contact, Override mode)
Indicators	Top side LEDs for Contact open, Contact closed, Error and Setup	
Mechanical / Electrical life	100000 cycles / 10000 cycles	
Operating temperature range	-20 .. +60°C	
Connection stud size / grid size	M10 · DC Modular grid size 1 x 3	
Protection class / dimensions / weight	IP65 · 150.0 x 50.0 x 94.0 mm · 800gr	
Standards	CE certified — EMC Directives UNECE Regulation 10 (only 12V and 24V models) and 2014/30/EU, Low voltage Directive 2014/35/EU, RoHS Directive 2011/65/EU and Ignition protection standard ISO 8846	

ACCESSORY

Panel switch



The TBP adds built-in battery protection: it automatically opens the main contact once the battery voltage drops below a programmable low voltage level, and closes it again when the voltage rises above the programmable reconnect voltage. Override mode allows the contact to be temporarily closed for one minute despite an undervoltage disconnect, so a low battery system can be jumpstarted.

	Art #	Accessory	Function
a	5095000-1	Panel Switch Momentary SPDT + LED	Sends open and close commands to the RBS and TBP contactors from a convenient location; the integrated LED indicates when the contact is closed or when the contactor is running in a certain mode

Applications: marine applications · battery management systems · off grid solar power systems · battery load shedding applications · industrial systems.

FEATURES & APPLICATIONS

Specifying a contactor



Features	Applications
Electronically controlled magnetic latching contactor	Marine applications
Extremely low power consumption (< 100uA)	Battery management systems
Up to 500Amp nominal current · 60Vdc contact rating	Off grid solar power systems
Local and external open / close control	Battery load shedding applications
Visual status indicators · small footprint	Industrial systems
DC Modular grid compatible for compact and easy arrangements of multiple devices	—
Selectable control modes · battery protection and Override mode (TBP only)	—

DC to DC converters — TDC, TDCi and TDCi-CH

12V, 24V OR 48V INPUTS AND 12V OR 24V OUTPUTS · ROBUST HIGH EFFICIENCY SWITCH MODE TECHNOLOGY

TDC SERIES — NON ISOLATED

Step down & step up converters



DC to DC converters are used to convert from one voltage level to another. The utilized switch mode technology ensures high efficiency low loss operation; careful design and over dimensioned components ensure trouble free operation for many years. The **TDC series** are compact non isolated DC to DC converters with an excellent price/performance ratio, available in Step Down and Step Up versions, for applications where the DC input source shares the same ground potential as the DC output load.

	Model	Art #	In/out isolation (500V)	Vin range (Vdc)	Vout (Vdc)	Iout (A)	Cooling	Dimensions (mm)	Weight (kg)
a	TDC-12/24-10	5020100	X	9..18	25.0	10	convection	127 x 88 x 49	0.36
	TDC-12/24-20	5020110	X	9..18	25.0	20	convection	150 x 88 x 98	1.20
	TDC-24/12-12	5020130	X	20..35	13.6	12	convection	98 x 88 x 49	0.30
	TDC-24/12-20	5020140	X	20..35	13.6	20	convection	127 x 88 x 49	0.45
	TDC-24/12-30	5020150	X	20..35	13.6	30	fan	150 x 88 x 49	0.53

TDCi SERIES — 500V ISOLATION

Isolated step down & step up converters



The **TDCi series** are isolated DC to DC converters, also available in Step Down and Step Up versions. These models are ideal when no electrical connection between the input source and the output load is desired.

	Model	Art #	In/out isolation (500V)	Vin range (Vdc)	Vout (Vdc)	Iout (A)	Cooling	Dimensions (mm)	Weight (kg)
a	TDCi-12/12-16	5020500	•	9..18	12.5	16	fan	175 x 88 x 49	0.62
	TDCi-24/12-16	5020510	•	20..35	12.5	16	fan	175 x 88 x 49	0.62
	TDCi-48/12-16	5020520	•	30..60	12.5	16	fan	175 x 88 x 49	0.62
	TDCi-12/24-8	5020530	•	9..18	24.5	8	fan	175 x 88 x 49	0.62
	TDCi-24/24-8	5020540	•	20..35	24.5	8	fan	175 x 88 x 49	0.62
	TDCi-48/24-8	5020550	•	30..60	24.5	8	fan	175 x 88 x 49	0.62
	TDCi-12/12-30	5020700	•	9..18	12.5	30	fan	190 x 132 x 83	1.36
	TDCi-24/12-30	5020710	•	20..35	12.5	30	fan	190 x 132 x 83	1.36
	TDCi-48/12-30	5020720	•	30..60	12.5	30	fan	190 x 132 x 83	1.36
	TDCi-12/24-15	5020730	•	9..18	24.5	15	fan	190 x 132 x 83	1.36
	TDCi-24/24-15	5020740	•	20..35	24.5	15	fan	190 x 132 x 83	1.36
	TDCi-48/24-15	5020750	•	30..60	24.5	15	fan	190 x 132 x 83	1.36

FEATURES & APPLICATIONS

Specifying a DC to DC converter



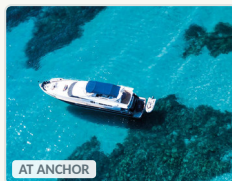
Features	Applications
Supply 12V consumers from a 24V system or vice versa	Marine applications
Supply 12V or 24V consumers from a 48V system	Machine building
Charge one battery from another (TDCi-CH only)	Process engineering
Compact and easy to install · robust industrial design	Industrial systems
High efficiency	Mobile entertainment systems
Protected against low battery voltage, high temperature and overload	Building automation
CE certified	—
24 month warranty	—

DC to DC converters — TDC, TDCi and TDCi-CH

12V, 24V OR 48V INPUTS AND 12V OR 24V OUTPUTS · ROBUST HIGH EFFICIENCY SWITCH MODE TECHNOLOGY — CONTINUED

TDCi-CH SERIES — CHARGE FUNCTIONALITY

Isolated charging converters



The **TDCi-CH series** are based on the standard TDCi products but are equipped with an automatic battery charging functionality. This enables a battery connected to the output to be charged from another battery connected to the input. One of the benefits is that the charging voltage of the input battery does not need to be exactly the same as the charge voltage requirements of the output battery, allowing two different battery types to be connected together.

Model	Art #	Charge functionality	Vin range (Vdc)	Vout (Vdc)	Iout (A)	Cooling	Dimensions (mm)	Weight (kg)
TDCi-12/12-20CH	5022000	•	9..18	14.4	20	convection	190 x 132 x 83	1.31
TDCi-12/24-10CH	5022020	•	9..18	28.8	10	convection	190 x 132 x 83	1.31

Features across the range: supply 12V consumers from a 24V system or vice versa · supply 12V or 24V consumers from a 48V system · charge one battery from another (TDCi-CH only) · compact and easy to install · robust industrial design · high efficiency · protected against low battery voltage, high temperature and overload · CE certified · 24 month warranty. Applications: marine applications · machine building · process engineering · industrial systems · mobile entertainment systems · building automation.

AUTOMATIC CHARGING RELAY — ART # 5075200

TACR-160 battery separator



In a boat with two battery banks it is useful to be able to charge both banks while underway. The TACR-160 allows two battery banks to be charged from a single source, such as an alternator, but keeps the batteries isolated when not charging, so one bank cannot discharge the other. If one bank becomes depleted anyway, there will be a charged bank available for emergency starting. It is a smart 12V/24V-160A mechanical relay with automatic system voltage detection.

Besides automatic combining or separation, the TACR-160 can act as a remote controlled DC switch, or only allow a load to be connected to the battery when it is being charged. A remote switch can also temporarily combine the auxiliary battery with the starter battery to increase the available power to start an engine.

Parameter	Value	Parameter	Value
Supply voltage	12Vdc / 24Vdc (auto detect)	Contact current (cont.)	160Adc
Contact current (peak)	480Adc (250ms)	Relay activation voltage	13.2Vdc (@12V) / 26.4Vdc (@24V)
Relay de-activation voltage	12.8Vdc (@12V) / 25.6Vdc (@24V)	Activation delay	5 sec.
De-activation delay	60 sec.	Quick de-activation voltage	11.8Vdc (@12V) / 23.6Vdc (@24V)
Quick de-activation delay	4 sec.	Overvoltage disconnect	16Vdc (@12V) / 32Vdc (@24V)
Current consumption (passive)	1.8mAdc (@12V) / 2.0mAdc (@24V)	Current consumption (active)	340mAdc (@12V) / 170mAdc (@24V)
Weight / dimensions	470 gr. / 108 x 72 x 58mm (L x W x H)	Connections	M8 (A1 & A2) + 6.3mm male Faston (other)

Features: automatically combines batteries during charging and isolates them when discharging or at rest · bi-directional operation · automatic system voltage detection (12V/24V) · forced ignition combine by external switch · use as voltage dependent switch · battery/accessory protection against high voltages · CE certified · 24 month warranty. Applications: marine applications · hybrid generators.

FEATURES & APPLICATIONS

TACR-160 and the manual battery switch



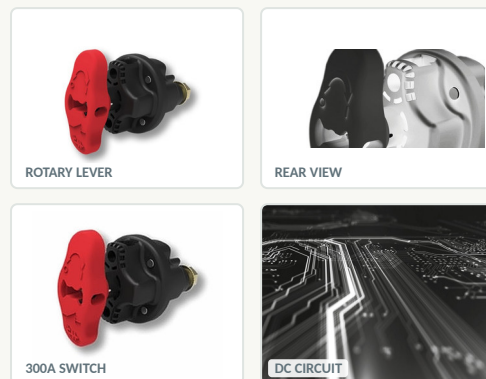
Features	Applications
TACR-160: automatically combines batteries during charging, isolates batteries when discharging or at rest	Marine applications
TACR-160: bi-directional operation · automatic system voltage detection (12V/24V)	Hybrid generators
TACR-160: forced ignition combine by external switch · use as voltage dependent switch	Agriculture and construction equipment
TACR-160: battery/accessory protection against high voltages · CE certified · 24 month warranty	Industrial systems
Manual Battery Switch: high inrush current capability · patented weld breaker safety feature	Battery isolation and emergency disconnect
Manual Battery Switch: lockable control lever · robust design with IP67 protection class	Maintenance operations
Manual Battery Switch: smart rear panel mounting system	—

Charging relay & manual battery switch

TACR-160 AUTOMATIC CHARGING RELAY · LITTELFUSE 32V/300A MANUAL BATTERY DISCONNECT

MANUAL BATTERY SWITCH (300A) — ART # 75940-01-BP

Manually controlled battery disconnect



Protect your battery from deep discharging while the vessel is not in use for a prolonged time, or disconnect the battery from the DC system in case of emergency. This switch supports continuous current loads up to 300 Amps and is a next-generation high quality solution from Littelfuse, with a unique patented weld breaker safety construction and an integrated lockout/tagout feature for the manual control lever.

Its advanced design includes a smart rear-panel mounting system that enables seamless, flush installation, keeping wiring clean and protected while saving space. Although primarily designed for panel mounting, the switch can be integrated into a DC Modular system as well via the 41mm Link Plates (art# 5079062).

Parameter	Value	Parameter	Value
Max. voltage rating	32Vdc	Switch circuit	Single pole, single throw (SPST)
Contact current (cont.)	200Adc with 90mm cable, 300A with 120mm cables	Contact current (peak)	500Adc for 60sec @ 23°C, 1000A for 15sec @ 23°C
Manual operation	by precision rotary lever	Connection terminals	2x M10
Operating temperature	-40 .. +85°C	Protection class	IP67
Global dimensions1)	Total length = 114mm, install. depth = 80.5mm, body diam. = 67mm		

Features: high inrush current capability · patented weld breaker safety feature · lockable control lever · robust design with IP67 protection class · smart rear panel mounting system. Suitable for battery isolation, emergency disconnect and maintenance operations in marine applications, agriculture and construction equipment and industrial systems. For more detailed mechanical specifications, download the datasheets via the manufacturer's website.

ACCESSORY COMPATIBILITY

Which remote or interface goes with what



Art #	Accessory	Powersine	Powersine Combi	Omnicharge	Omnicharge2 / DC	Expert Modular
5095500	Universal Remote Control, LCD	•	•	•	X	X
5095200	Basic Inverter Remote Control	•	X	X	X	X
5095210	Basic Combi Remote Control	X	•	X	X	X
5095220	Basic Charger Remote Control	X	X	•	X	X
5092120	TBSLink to USB Interface Kit	•	•	•	X	X
5092030	QuickLink to RS-232 Communication Kit	X	X	X	•	•
5092130	QuickLink to USB Communication Kit	X	X	X	•	•
5092230	QuickLink to Bluetooth Communication Kit	X	X	X	•	•
5092530	QuickLink to NMEA2000 Communication Kit	X	X	X	X	•
5093120	QuickLink Alarm Output Expander Kit	X	•	X	X	•
5055310	Temperature Sensor Kit 3 m (also 10 m)	X	X	X	X	•
5095000-1	Panel Switch Momentary SPDT + LED	X	X	X	X	DCM RBS / TBP

The Expert Pro and Pro-hv use their own USB (art # 5092100) and RS-232 (art # 5055200) communication kits.

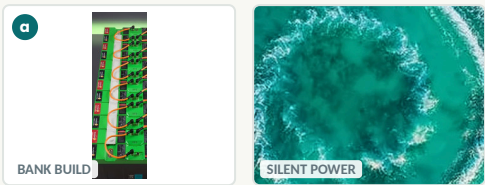
The complete TBS Electronics range — Powersine inverters, Powersine Combi, Omnicharge chargers, Expert battery monitors and DC Modular distribution — is supplied, installed and supported by Custom Marine. 800BOATS. Custom Marine is the regional partner for every brand on these pages. We size the shore inlet, cord set and galvanic isolator against the berth; the charger against the bank and the available shore current; the inverter against the load list; and the fusing, busbars and cable against the resulting fault currents. Complete distribution assemblies are built, labelled and tested in Dubai before they reach the vessel, and commissioning, handover and crew familiarisation can be arranged at the yard. Drawings, mounting dimensions, wiring diagrams and 3D models are issued on request to naval architects, project managers and refit yards throughout the UAE and the wider Gulf. Talk to us at the design stage: the shore connection, the charging source, the battery chemistry, the distribution grid and the monitoring all interact, and the specification is far easier and cheaper to get right before the loom is cut — 800BOATS · 800YACHTS · custommarine.ae.

Super B lithium marine batteries

MADE IN THE NETHERLANDS SINCE 2007 · LIFEPO4 WITH INTEGRATED BMS · DNV AND UN38.3 CERTIFIED

EPSILON · NOMIA · NOMADA

Marine batteries product range



Super B develops and produces high-end lithium batteries for a number of industries and applications, with power solutions for the marine, UPS and industrial markets. Every Super B battery is produced with 100% focus on quality: A-grade battery cells are selected and matched upfront, and not one single battery leaves the factory before it has been thoroughly tested, intermediate and end of line.

	Product name	Rated capacity	Energy	Nominal voltage	Max charge current	Discharge current continuous	Discharge pulse current
a	Epsilon 12V100Ah	100Ah	1280Wh	12.8 V	90A	190A	300A (10 sec)
	Epsilon 12V150Ah	150Ah	1920Wh	12.8V	135A	200A	350A (10 sec)
	Nomia 12V210Ah	210Ah	2688Wh	12.8V	210A	500A	800A (10 sec)
	Nomia 12V340Ah	340Ah	4352Wh	12.8V	300A	300A	900A (30 sec)
	Nomada 12V105Ah	105Ah	1344Wh	12.8V	105A	105A	315A (30 sec)

The Nomada 12V105Ah is supplied for systems only.

WEIGHT, PROTECTION & CASE SIZE

Mechanical data



Product name	Weight	Ingress Protection	Dimensions LxWxH	Case equivalent
Epsilon 12V100Ah	10.7 kg / 22.6 lbs	IP 56	278 x 175 x 190 mm	= DIN H6 / LN3
Epsilon 12V150Ah	15.5 kg / 34.2 lbs	IP 56	353 x 175 x 190 mm	= DIN H8 / LN5
Nomia 12V210Ah	23 kg / 50.7 lbs	IP 50	417 x 227 x 314 mm	—
Nomia 12V340Ah	33 kg / 72.7 lbs	IP 50	417 x 227 x 314 mm	—
Nomada 12V105Ah	10 kg / 22 lbs	IP 66	437 x 90 x 175 mm	Slim, for systems only

Epsilon case sizes match DIN standard battery footprints, allowing direct replacement of lead-acid blocks in an existing battery tray. At only 90 mm wide and IP 66 protected, the Nomada fits spaces no conventional battery can use.

PERFORMANCE

What every Super B battery delivers



Performance attribute	Detail
Safest lithium technology	LiFePO4 chemistry throughout the marine range
Integrated BMS	Battery management system built into every battery
High and stable discharge currents	Constant performance during lifetime, with high capacity in a compact, lightweight case
Fast charging	High charge acceptance minimises generator and shore power running hours
Certification	DNV and UN38.3 certified; certified by notified bodies such as TÜV and Dekra
In service with	Beneteau, Kawasaki, San Lorenzo, Lovers Canal Cruises, iCat, Venø Færgefart, Whisper Power and Zerojet

SYSTEM DESIGN

Matching the charger to the battery



Battery	Max charge current	Suitable TBS charger	Charge program
Epsilon 12V100Ah	90A	OC12-40, OC12-60 or OC12-90 (12Vdc)	LiFePO4
Epsilon 12V150Ah	135A	OC12-60 or OC12-90 (12Vdc)	LiFePO4
Nomia 12V210Ah	210A	OC12-90, or PSC3000-12-120 Powersine Combi	LiFePO4
Nomia 12V340Ah	300A	OC12-90 in parallel, or PSC3000-12-120	LiFePO4
Nomada 12V105Ah	105A	OC12-40, OC12-60 or OCD 12/12-50	LiFePO4

Never exceed the battery's stated maximum charge current. Every TBS charger family carries a selectable LiFePO4 program, and the battery BMS can stop charging through the charger's remote shut down or BMS control input.

The lithium difference

WHY LiFePO4 WINS ON BOARD — CHEMISTRY COMPARISON AND OWNERSHIP CASE

BENEFITS OF OUR LITHIUM CHEMISTRY COMPARED TO OTHERS

Chemistry comparison



Battery chemistries trade energy density, safety, cycle life and cost against each other. Lithium iron phosphate is the chemistry of choice on board: it combines the safety lead-acid owners expect with the cycle life, charge acceptance and low self-discharge that lead-acid can never reach — and although the initial cost is higher, the total cost over the battery's life is the lowest of the four.

Battery chemistry	Energy density	Self-discharge	Lifetime	C-rate	Cycles	Safety	Initial costs	Total costs
Lead-acid	--	--	--	--	--	+	++	-
NiMH	-	-	+-	-	-	+	+	+-
NMC	++	+	+	+	+	--	+	+
LiFePO4	+	++	++	++	++	+	+-	++

Rated as published by Super B: ++ strongest · + good · +- mixed · - weak · -- weakest of the four chemistries compared.

OWNERSHIP

Heavy on power, light on weight



Property	LiFePO4 in practice
Heavy on power, light on weight	Compared to lead-acid batteries lithium provides great energy density and is at least half the mass — go for lithium to reduce concerns about battery weight, performance and size
Long lifetime, lower costs	Lithium batteries operate ten times longer than lead-acid; Super B lithium batteries live up to 5000 cycles without decreasing in performance, resulting in lower long term costs
Quick and efficient	Lithium can charge and discharge at a high rate providing maximum versatility; fast charging minimizes downtime and the high rate of discharge is perfect for a burst of power
Low self-discharge	Super B lithium batteries have a very low self-discharge rate, below 3% per month — ten times lower than lead-acid
Maintenance free	Super B lithium batteries do not require active maintenance to extend their service life

WHY SUPER B

Made in the Netherlands



Reason	Detail
World class partners	With customers like Beneteau, Kawasaki, San Lorenzo, Lovers Canal Cruises, iCat, Venø Færgefart, Whisper Power and Zerojet, Super B's lithium batteries have been successfully used in the marine industry for several years
In-depth knowledge	Super B works with the best lithium experts available and has in-depth knowledge of battery cells, materials, casings, battery management systems and applications
Made in the Netherlands	Unique in having its own production facilities, engineering, testing and R&D department in the Netherlands
Proven experience since 2007	Super B has proven its reliable performance in the field in many industries for over 10 years
Highest quality	Every battery produced with 100% focus on quality — safety, reliability and durability, certified (e.g. UN38.3) by notified bodies

ONE SYSTEM

Charging, monitoring & BMS control



Companion equipment	LiFePO4 integration
Omnicharge2 chargers	LiFePO4 charge program selectable per output, individually programmable voltages and currents
Omnicharge, OCS and OCD	Flooded / GEL / AGM / LiFePO4 / Custom programs, with a remote shut down or BMS control input
Expert Modular battery monitor	Compatible with lead based and Lithium (LiFePO4) banks; monitors up to three banks from 12V to 48V
DCM Class-T fuseholders	The high interrupting capacity specified for large lithium banks, on the DC Modular grid

Custom Marine specifies the whole chain — Ratio Electric shore power in, TBS Electronics conversion and distribution, Super B lithium storage — and commissions it as one system. 800BOATS · 800YACHTS.