

# Marine and Industry 2012







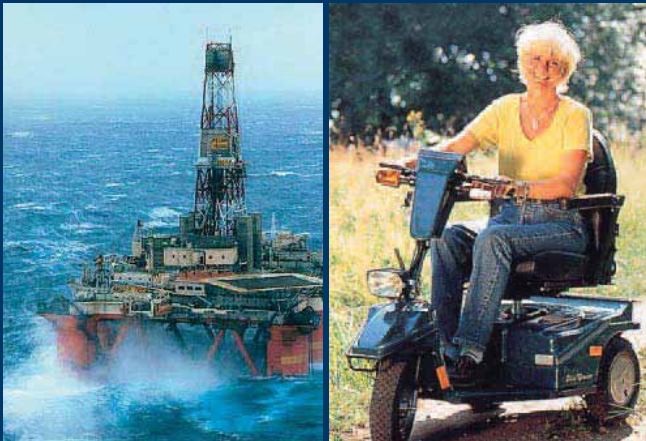
# Contents

## DEFA PowerSystems



**DEFA** aims to continue to be present in the area of charging. Our concept is to give customers optimum use of products powered by lead/acid (AGM/GEL) batteries.

**DEFA PowerSystems** consists of a series of charging products which give the user maximal utilization of their batteries. Our batterychargers and charging systems have gone through a continuous development over decades and appear today as state-of-the-art for the customer who demands functionality, flexibility, safety and high quality.



Areas such as rescue vehicles and boats, ambulances, lifeboats, electric wheelchairs and other lifesaving equipment impose the strictest standards both on us and our products.

**DEFA PowerSystems** has been developed to include our own splash proof and protected cables with PlugIn connectors. The system has been developed to ease installation of complete 230VAC for boats, mobile units, defence and 42VAC charging systems for rescue and lifeboats.

The system eliminates need of tools for connection, which means the system can be installed without assistance from authorized personnel. The system is very simple, reliable and durable.



The 230VAC shore power system for boats features a power distribution box which contains fuses, ground leakage circuit breaker, galvanic isolators to reduce the risk of galvanic corrosion and earth leakage from shore power, main connections, outlets and PlugIn battery chargers. This is a module based system, facilitating the addition of other functions such as engine heaters and auxiliary equipment.

Our customers are professional and private users in such areas where strict demands are required to meet expectations on functionality and a high degree of readiness. Quality control, knowledge and customer demand is an important part of our development and product philosophy.



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# DEFA PowerSystems obligations are to such elements as:

- Long economic life and availability
- Function and reliability
- Safety
- Guarantee

## Our customers are professional and private users in such areas as:

- Electric wheelchairs
- The transport sector
- Marine areas
- Industry
- Pleasure boats
- Defence

## Cooperative partners

Our ambition is to be an active cooperative partner with our customers, contributing to making day-to-day routines easier and safer for those dependant on batteries. Safety during the charging process is essential in those areas we serve. Cooperation and partnership with our customers result in correct solutions with quality, function and economic working life in focus.

## Highest standards

Areas such as rescue vehicles, ambulances, lifeboats, medical health back-up systems and other lifesaving equipment impose the strictes standards on our products We deliver solutions produced to the highest functional standards.

## Trust

Trust in our solutions and products is global. Solutions are used by many acknowledged producers within the life- and rescue boat sector for shipping and offshore.

# Diagram

www.defa.com

Diagram 1 (42VAC)	
Content	1 pcs. LifeboatCharger 2x5A 1 pcs. MiniPlug/PlugIn Inlet cable (Adapted lenght?) 1 pcs. MiniPlug Connection cable (Adapted lenght?)
Option	LifeboatCharger 2x5A is also available in 48VAC and 55VAC.

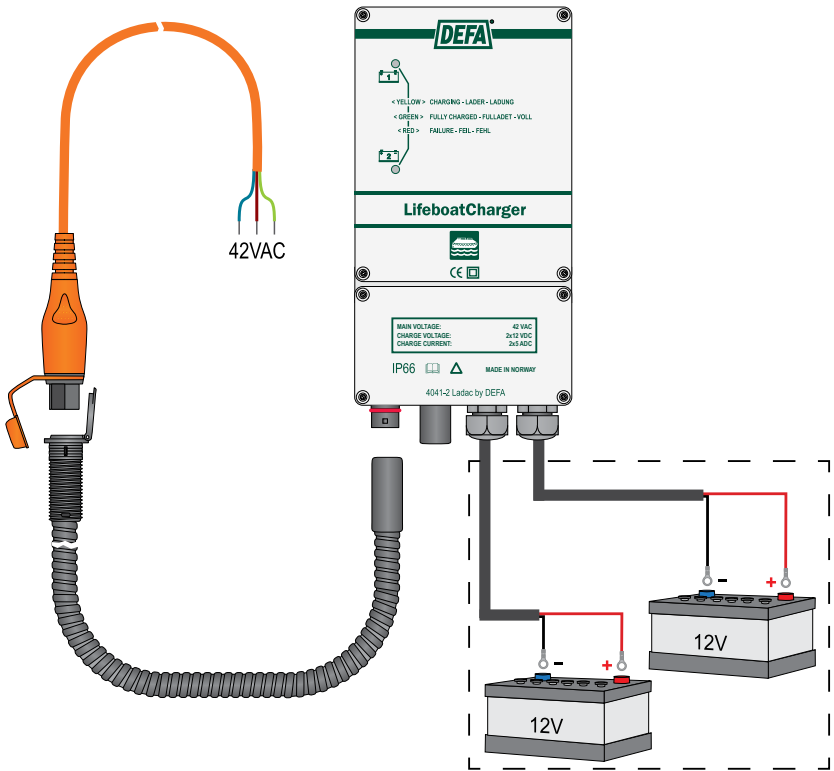
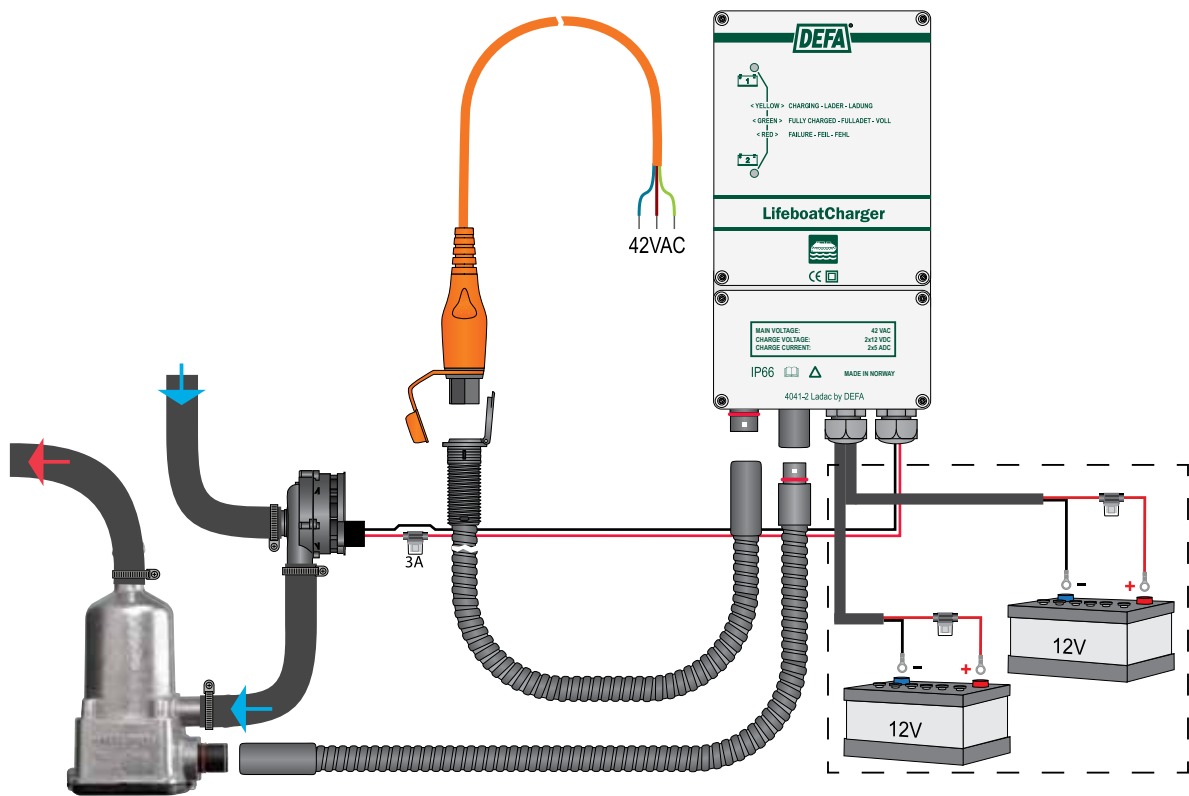




Diagram 2 (42VAC)	
Content	1 pcs. LifeboatCharger 2x5A 1 pcs. MiniPlug/PlugIn Inlet cable (Adapted lenght?) 1 pcs. MiniPlug Connection cable (Adapted lenght?) 1 pcs. PlugIn Extension cable 1 pcs. 12VAC Water pump 1 pcs. 42VAC Engine heater 1 pcs. MountingKit (Hoses, cable ties, etc.)

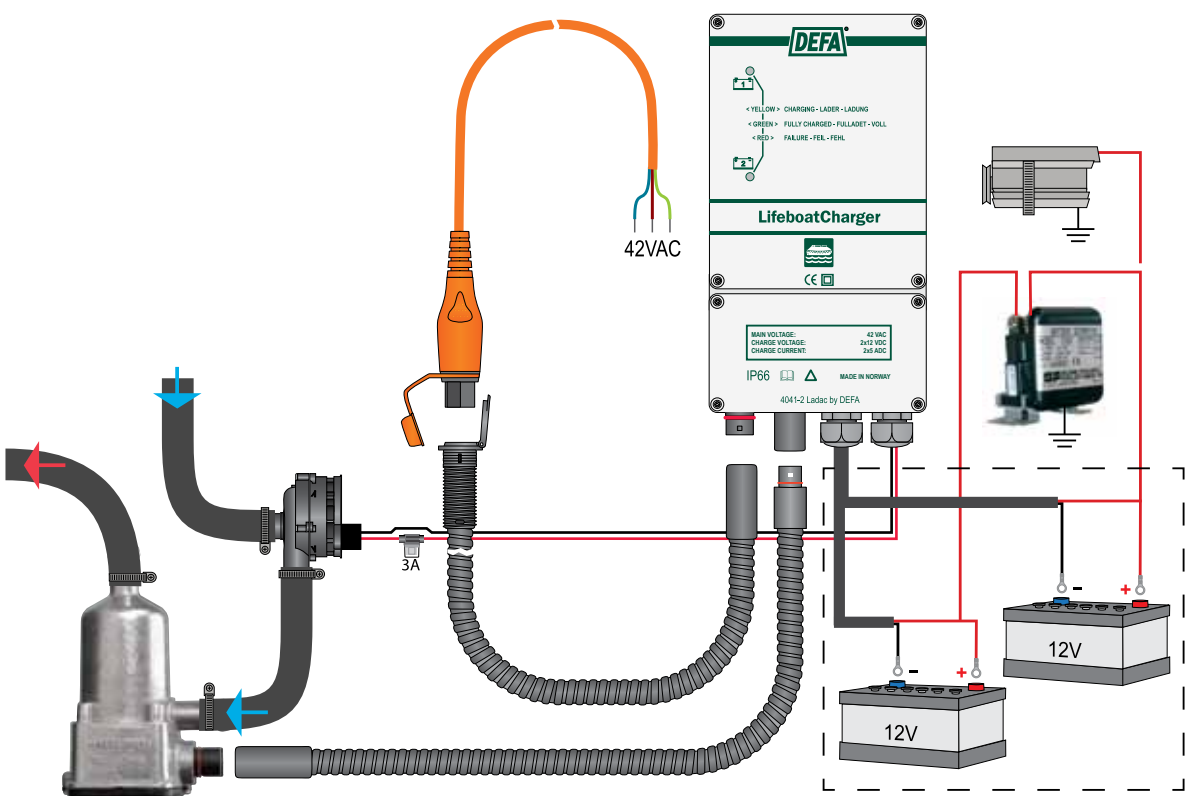


Note! DEFA offers many types of engine heaters, depending on whether the vehicle is air or water cooled and the amount of coolant.

DEFA conducts trial installations, tests and obtains certification for all of its solutions, and creates specific installation manuals for individual vehicles and engines. We are always looking for the simplest, most ideal solution for each individual vehicle. Engine technology which eludes DEFA's monitoring functions may result in solutions which involve a longer installation process than for other engine heaters.

It is imperative that the instructions in the enclosed installation manual are followed during the installation of the engine heater.

Diagram 3 (42VAC)	
Content	1 pcs. LifeboatCharger 2x5A 1 pcs. MiniPlug/PlugIn Inlet cable (Adapted lenght?) 1 pcs. MiniPlug Connection cable (Adapted lenght?) 1 pcs. PlugIn Extension cable 1 pcs. 12VAC Water pump 1 pcs. 42VAC Engine heater 1 pcs. MountingKit (Hoses, cable ties, etc.) 1 pcs. Battery separator

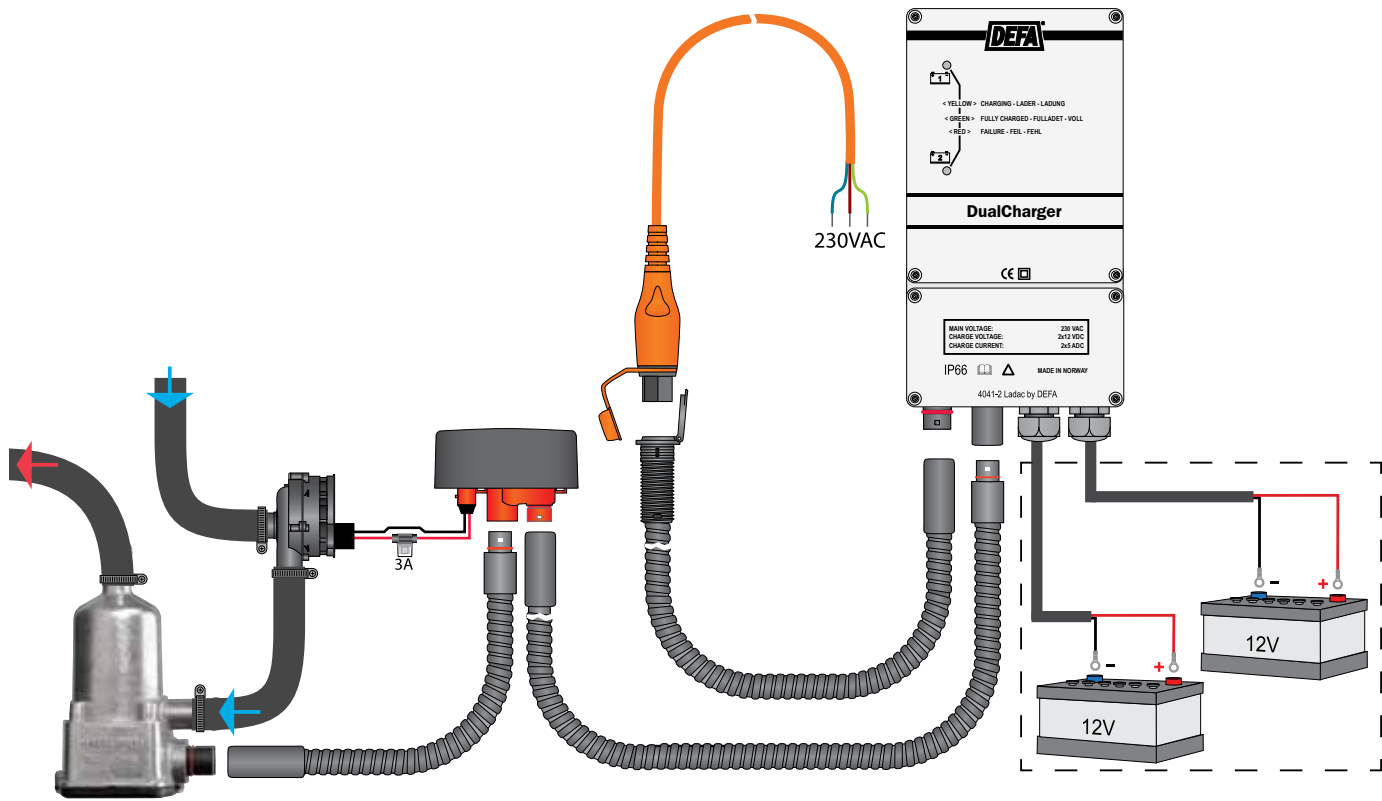


Note! DEFA offers many types of engine heaters, depending on whether the vehicle is air or water cooled and the amount of coolant.

DEFA conducts trial installations, tests and obtains certification for all of its solutions, and creates specific installation manuals for individual vehicles and engines. We are always looking for the simplest, most ideal solution for each individual vehicle. Engine technology which eludes DEFA's monitoring functions may result in solutions which involve a longer installation process than for other engine heaters.

It is imperative that the instructions in the enclosed installation manual are followed during the installation of the engine heater.

Diagram 4 (230VAC)	
Content	1 pcs. DualCharger 2x5A 1 pcs. MiniPlug/PlugIn Inlet cable (Adapted lenght?) 1 pcs. MiniPlug Connection cable (Adapted lenght?) 2 pcs. PlugIn Extension cables 1 pcs. 12VAC Water pump 1 pcs. 230VAC/12VAC trafo 1 pcs. 230VAC Engine heater 1 pcs. MountingKit (Hoses, cable ties, etc.)



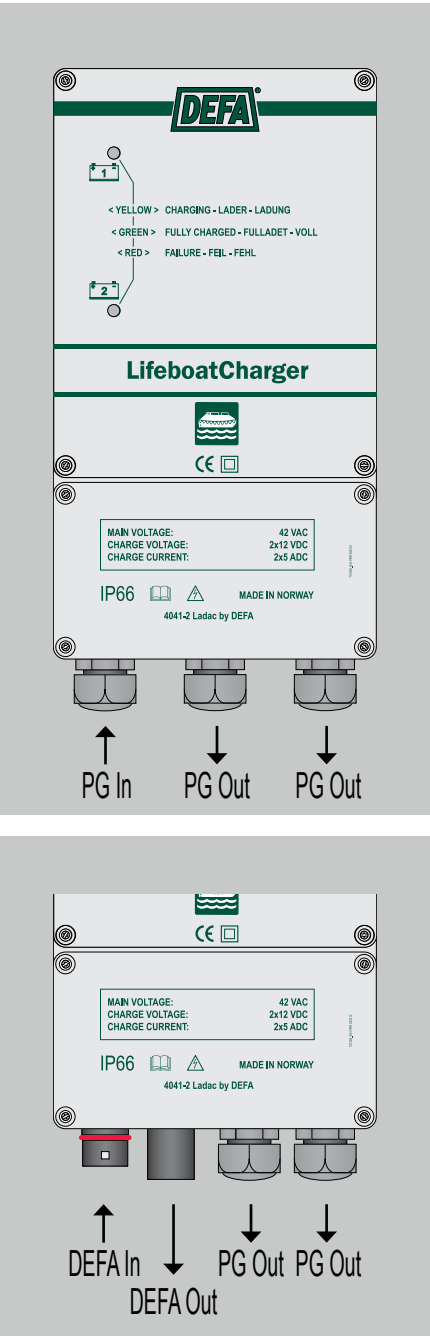
Note! DEFA offers many types of engine heaters, depending on whether the vehicle is air or water cooled and the amount of coolant.

DEFA conducts trial installations, tests and obtains certification for all of its solutions, and creates specific installation manuals for individual vehicles and engines. We are always looking for the simplest, most ideal solution for each individual vehicle. Engine technology which eludes DEFA's monitoring functions may result in solutions which involve a longer installation process than for other engine heaters.

It is imperative that the instructions in the enclosed installation manual are followed during the installation of the engine heater.

A water proof and compact 2 x 12V trickle charger for permanent fitting in lifeboats with battery sizes up to 2x100Ah.

The charger uses no power from the battery when 42VAC is disconnected. It has its own inlet box containing a relay function (on/off) controlled by mains power. Several connection clamps for 42VAC for connection of mains to other applications e.g. engine heaters. The charger is supplied without cables for 42VAC and 12VDC. Cabling available as optional equipment. A 230VAC version can be supplied for MOB boats etc.



LifeboatCharger 2x5	
Item No. (1xPG In/2xPG Out)	700110
Item No. (1xDEFA In/1xDEFA Out + 2xPG Out)	700112
Mains voltage [VAC]	42
Charging voltage [VDC]	14,4
Float voltage [VDC]	13,3
Charging current [A]	2x5
Height/Width/Depth [mm]	245/135/80
Weight [kg]	4,5
IP Rating [IP]	66

Note!

DEFA In = DEFA PlugIn Male contact

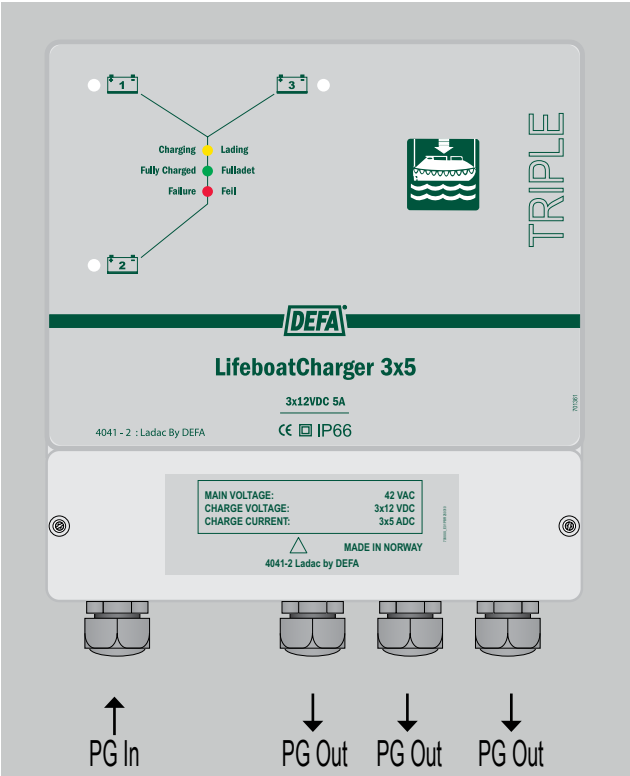
DEFA Out = DEFA PlugIn Female contact

PG Out = Nipple M20

# Battery charger 42VAC

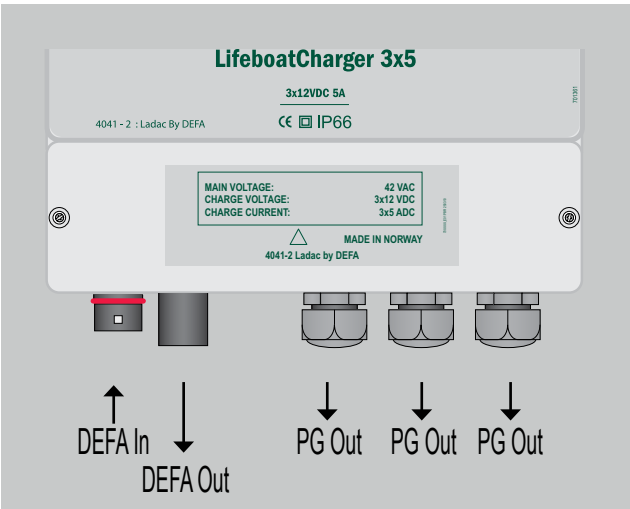
A water proof and compact 3 x 12V trickle charger for permanent fitting in lifeboats with battery sizes up to 3x100Ah.

The charger uses no power from the battery when 42VAC is disconnected. It has its own inlet box containing a relay function (on/off) controlled by mains power. Several connection clamps for 42VAC for connection of mains to other applications e.g. engine heaters. The charger is supplied without cables for 42VAC and 12VDC. Cabling available as optional equipment.  
A 230VAC version can be supplied for MOB boats etc.



LifeboatCharger 3x5	
Item No. (1xPG In/3xPG Out)	700116
Item No. (1xDEFA In/3xPG Out)	700114
Mains voltage [VAC]	42
Charging voltage [VDC]	14,4
Float voltage [VDC]	13,3
Charging current [A]	3x5
Height/Width/Depth [mm]	245/220/110
Weight [kg]	9,3
IP Rating [IP]	66

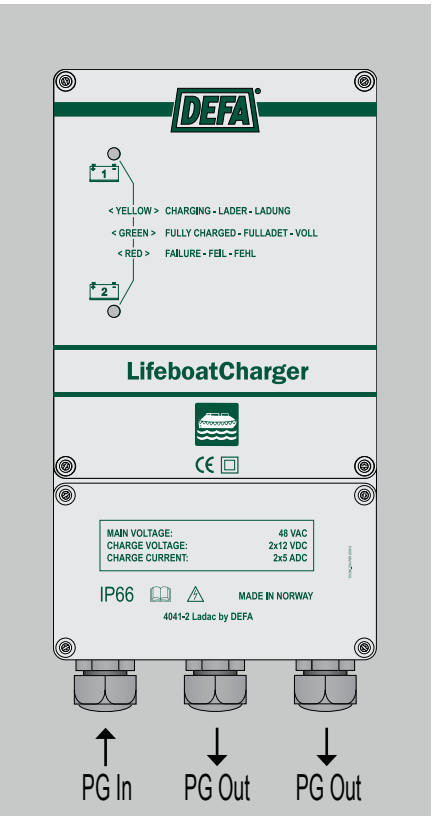
Note!  
DEFA In = DEFA PlugIn Male contact  
DEFA Out = DEFA PlugIn Female contact  
PG Out = Nipple M16



# Battery charger 48VAC

A water proof and compact 2 x 12V trickle charger for permanent fitting in lifeboats with battery sizes up to 2x100Ah.

The charger uses no power from the battery when 48VAC is disconnected. It has its own mains inlet box containing a relay function (on/off) controlled by mains power. Several connection clamps for 48VAC for connection of mains to other applications e.g. engine heaters. The charger is supplied without cables for 48VAC and 12VDC. Cabling available as optional equipment.



LifeboatCharger 2x5	
Item No. (1xPG In/2xPG Out)	700108
Mains voltage [VAC]	48
Charging voltage [VDC]	14,4
Float voltage [VDC]	13,3
Charging current [A]	2x5
Height/Width/Depth [mm]	245/135/80
Weight [kg]	4,5
IP Rating [IP]	66

# Battery charger 55VAC

A waterproof and compact 2 x 12V trickle charger for permanent fitting in lifeboats with battery sizes up to 2x100Ah.

The charger uses no power from the battery when 55VAC is disconnected. It has its own inlet box containing a relay function (on/off) controlled by mains power. Several connection clamps for 55VAC for connection of mains to other applications e.g. engine heaters. The charger is supplied without cables for 55VAC and 12VDC. Cabling available as optional equipment.


LifeboatCharger 2x5	
Item No. (1xPG In/2xPG Out)	700109
Mains voltage [VAC]	55
Charging voltage [VDC]	14,4
Float voltage [VDC]	13,3
Charging current [A]	2x5
Height/Width/Depth [mm]	245/135/80
Weight [kg]	4,5
IP Rating [IP]	66

Note! PG In, PG Out = Nipple M20

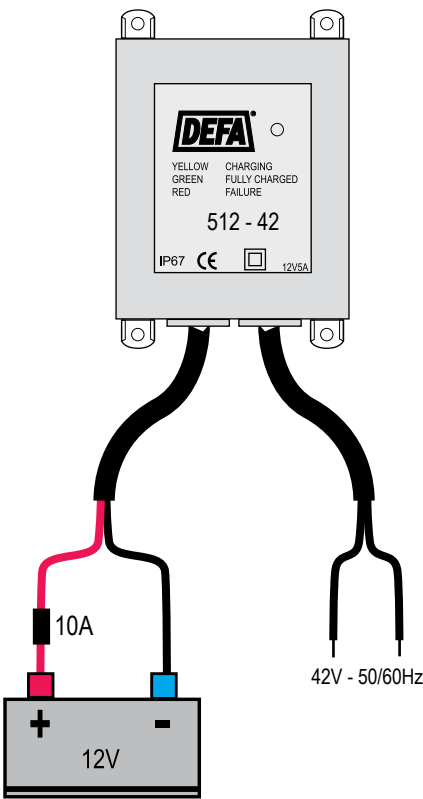
# Battery charger 42VAC

A waterproof and compact 12V trickle charger for permanent fitting in MOB boats with battery sizes up to 100Ah.

The charger uses no power from the battery when 42VAC is disconnected. Permanent mains cable and charging cable with ring cable clip.

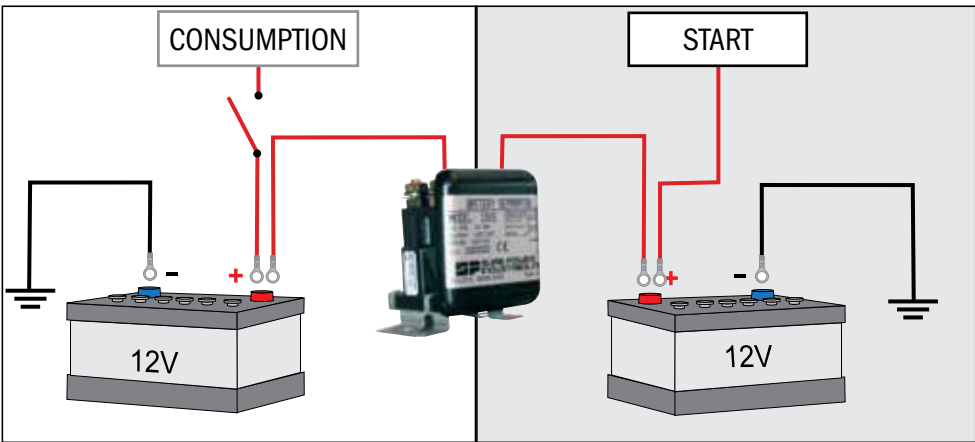



BatteryCharger 1x5A	
Item No. (Input: Without plug)	700101
Item No. (Input: DEFA PlugIn)	700103
Main voltage [VAC/Hz]	42
Charging voltage [VDC]	14,4
Float voltage [VDC]	13,5
Charging current [A]	5
Height/Width/Depth [mm]	108/74/81
Weight [kg]	1,5
IP rate [IP]	67




# Battery separators

The battery separator connects two separate battery groups, for instance start and consumption battery during charging. When charging is interrupted the batteries are separated again. The battery separators measure voltage on both battery groups and is activated automatically. It is very easy to install, including in the existing installation. An optimal and easy solution for a 2-circuit system without having to work on the original installation.






Battery separator 12V 100A	
Item No.	700595
Function	Separator
Continuous current [A]	100
Max output [A]	400
On function (typical) [V]	13,2
Off function (typical) [V]	12,8
Height/Width/Depth [mm]	76/83/64
Special characteristics: Both batteries will activate the separator.	



Battery separator 12V 200A	
Item No.	700596
Function	Separator
Continuous current [A]	200
Max output [A]	1000
On function (typical) [V]	13,2
Off function (typical) [V]	12,8
Height/Width/Depth [mm]	76/83/64
Special characteristics: Both batteries will activate the separator.	



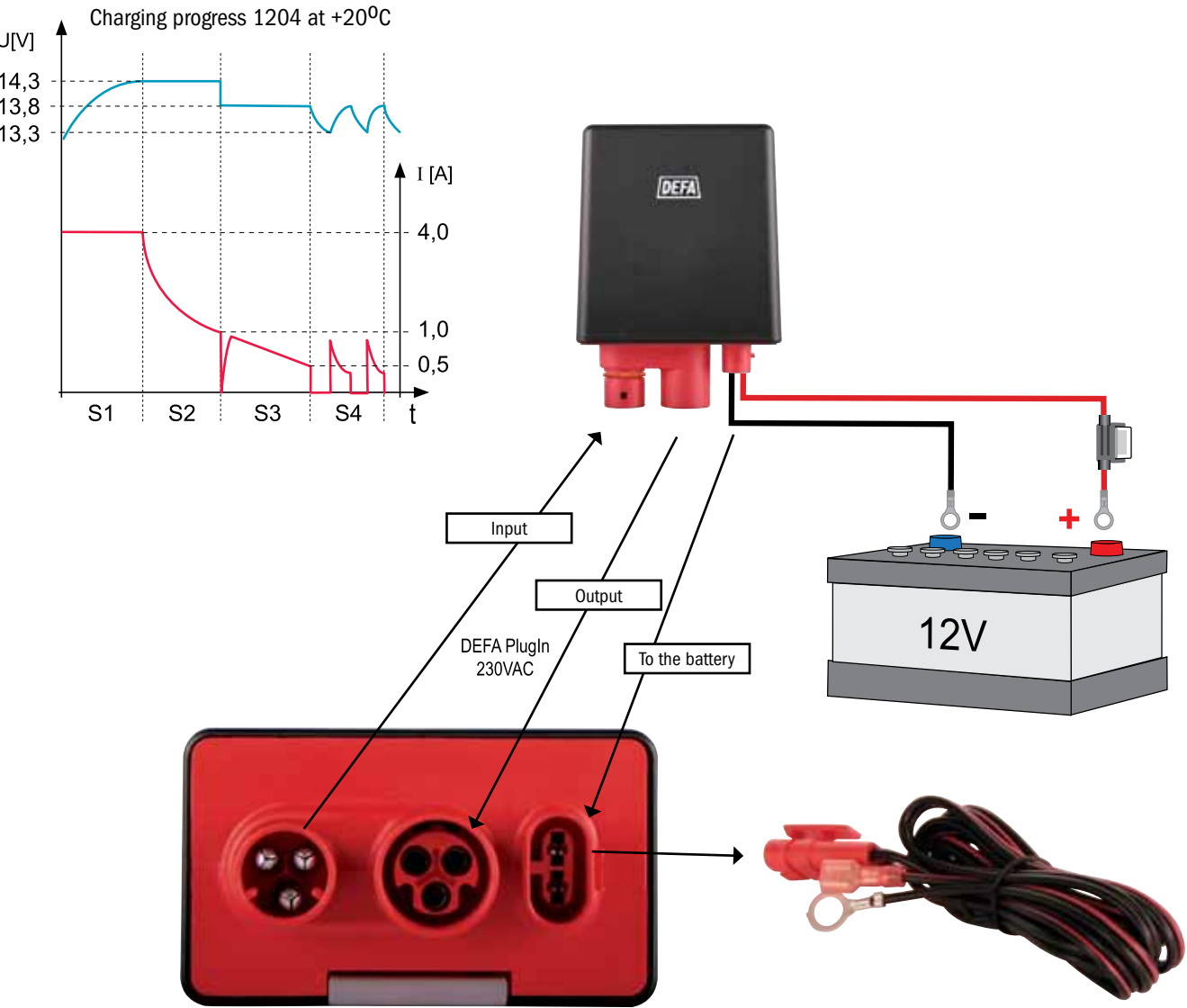
Battery separator 24V 100A	
Item No.	700598
Function	Separator
Continuous current [A]	100
Max output [A]	400
On function (typical) [V]	26,8
Off Function (typical) [V]	25,7
Height/Width/Depth [mm]	76/83/64
Special characteristics: Both batteries will activate the separator.	

# Battery charger 230VAC

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DEFA MultiCharger 1204 is a maintenance charger which is adjusted to modern battery technology, and it extends the lifespan of the battery. If you are looking for a reliable start of your car and a fully charged battery during the winter season, or maintenance charging of your battery over a longer period of time, then DEFA MultiCharger 1204 is the solution for you.

DEFA MultiCharger 1204	
Item No.	450020
Mains voltage [VAC/Hz]	230/50-60
Charging voltage [VDC]	14,3
Float voltage [VDC]	13,3 - 13,8
Charging current [A]	4
Height/Width/Depth [mm]	84/103/42
Weight [kg]	0,26
IP rate	65

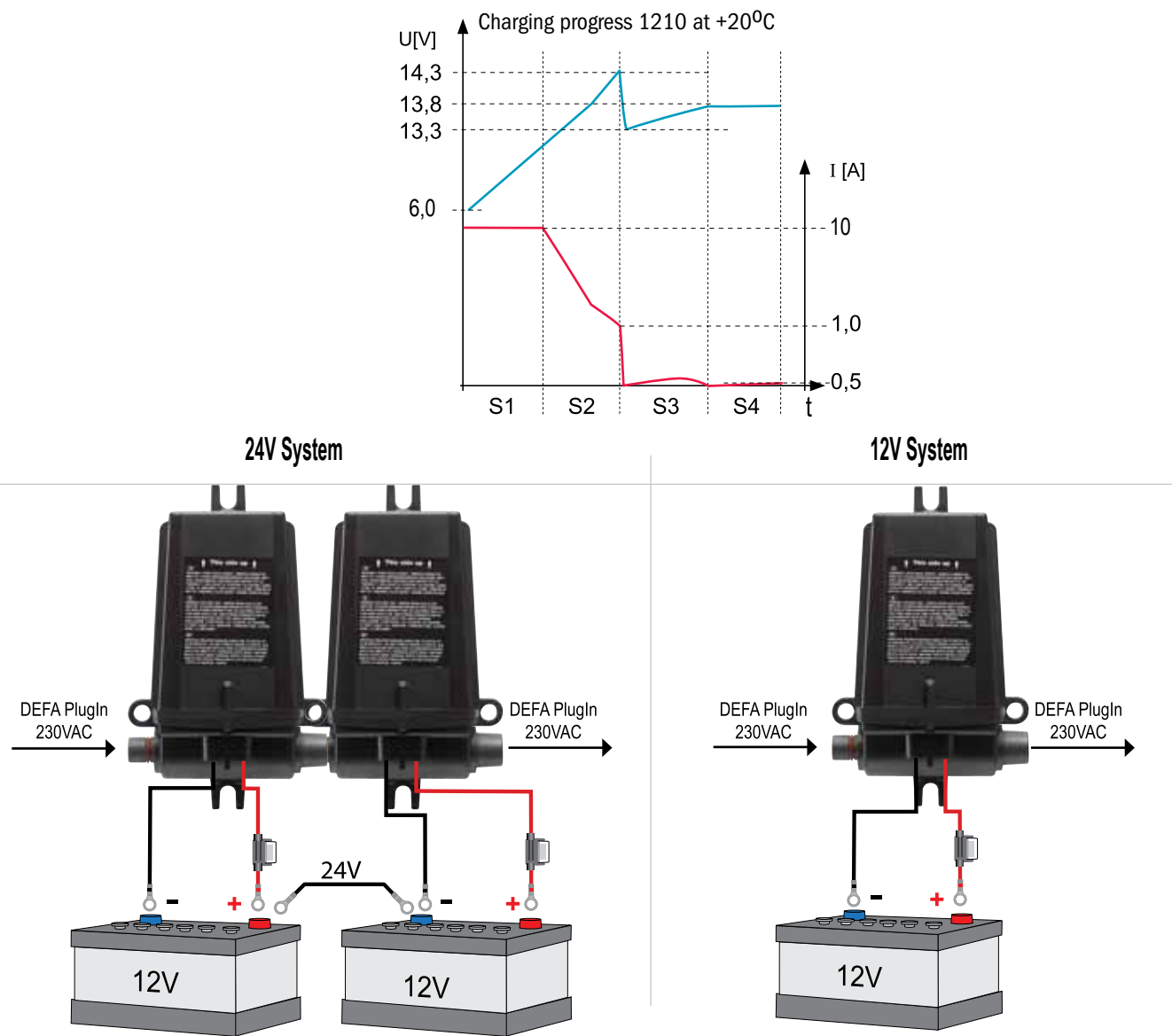


# Battery charger 230VAC

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MultiCharger 1210 is a 12V/10A battery charger which can be used for transportation vehicles, caravans, tractors, construction machines and generators.

DEFA MultiCharger 1210	
Item No.	450011
Rated output [W]	125
Charging current [A]	10A
Charging voltage boost mode [V]	>14,7
Maintenance charging [V]	13,7
Height/Width/Depth [mm]	205/120/65
Fuse [A]	15
Weight [kg]	0,505
IP rate	44





# Battery charger 230VAC

DEFA MarineCharger 1X7 is a 12V/7A battery charger.

The charger is suitable for fitting in boats with battery sizes up to 200Ah. It gives a galvanic isolation between net earth and the battery (dual isolation). DEFA MarineCharger 1x7 tolerates parallel loads up to 5A usage, charging the batteries at the same time. The charging voltage is temperature compensated. DEFA MarineCharger 1x7A is filled with silicon compound and is therefore 100% waterproof.



DEFA MarineCharger 1x7	
Item No. with PlugIn	701227
Item No. with Schuko	701228
Mains voltage [VAC/Hz]	230/50-60
Charging voltage [VDC]	14,4
Float voltage [VDC]	13,5
Charging current [A]	7
Height/Width/Depth [mm]	145/100/40
Weight [kg]	1,0
IP rate (PlugIn/Schuko)	44/67

Remote LED panel with 10m cable	
Item No. (for 1 battery)	700129
Remote light diode shows the charging status of one battery with red, yellow or green LED light.	

# Battery charger 230VAC

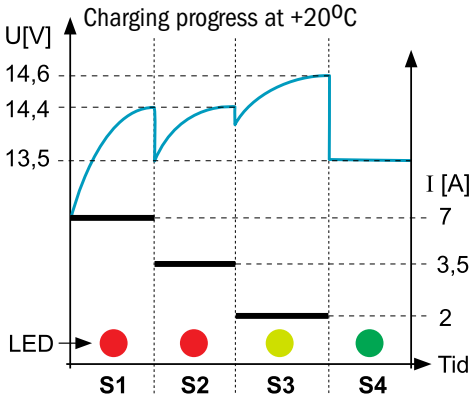
DEFA MarineCharger 2X7 is a 12V/2X7A battery charger.

The charger is suitable for fitting in vehicles with battery sizes up to 400Ah. It gives a galvanic isolation between net earth and the battery (dual isolation). DEFA MarineCharger 2x7 tolerates a parallel load up to 10A usage charging batteries at the same time. The charging voltage is temperature compensated. DEFA MarineCharger 2x7A is filled with silicon compound and is therefore 100% waterproof.  
The charger is suitable for 24V installations.



DEFA MarineCharger 2x7	
Item No. with PlugIn	701229
Item No. with Schuko	701230
Mains voltage [VAC/Hz]	230/50-60
Charging voltage [VDC]	14,4
Float voltage [VDC]	13,5
Charging current [A]	14/2x7
Height/Width/Depth [mm]	155/185/40
Weight [kg]	1,7
IP rate (PlugIn/Schuko)	44/67

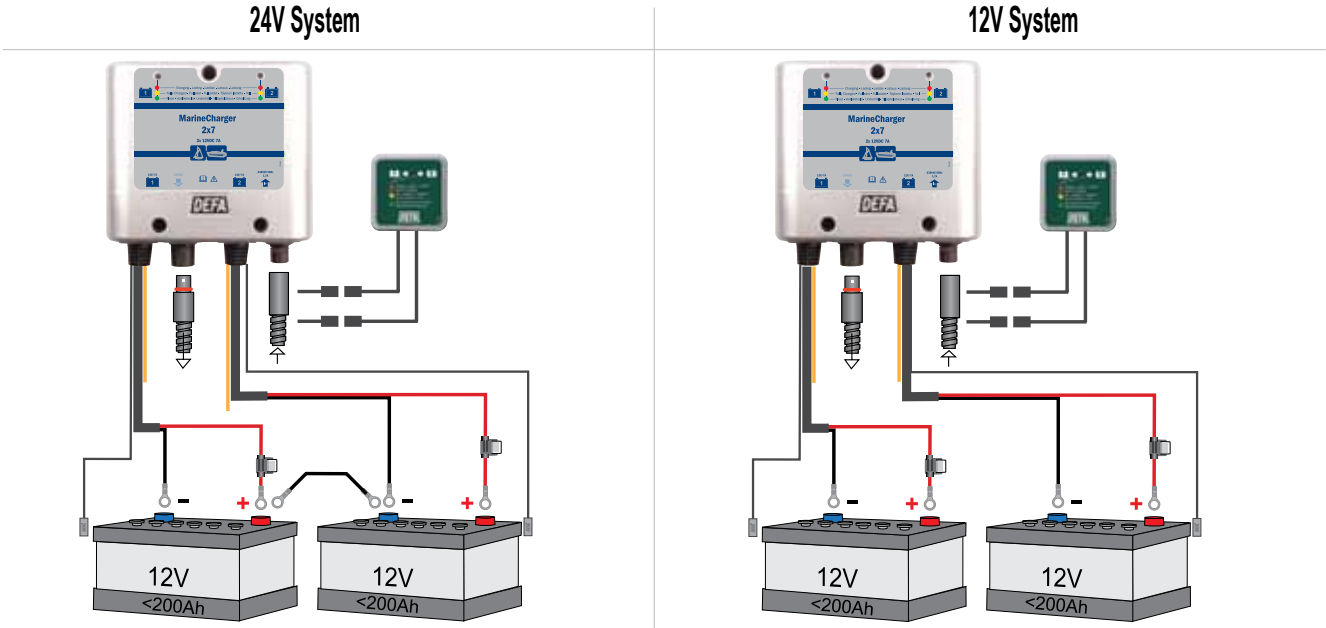
Remote LED panel with 10m cable	
Item No. (for 2 batteries)	700136
Remote light diode shows the charging status of two batteries with red, yellow or green LED light.	



The charging progress shows Voltage (U) over time (t) and current (I) over time (t). The LED indicator, which is placed on top of the front of the charger, indicates the status of the different charging steps (S1,S2...).  
The LED indicates:

- Red - Main charging
- Red - End charging: more than 80% recharged/disruption of battery
- Yellow - Maintenance charging
- Green - Fully charged

The sketches show an optimal charging of 24V constructions where each battery is charged separately in order to avoid offset charging. The charger can together with interconnected outputs be used as a 12V/14A charger. The charge cycle for each channel equals the charge cycle for MarineCharger 1x7 shown on page 10.



# Battery charger 230VAC

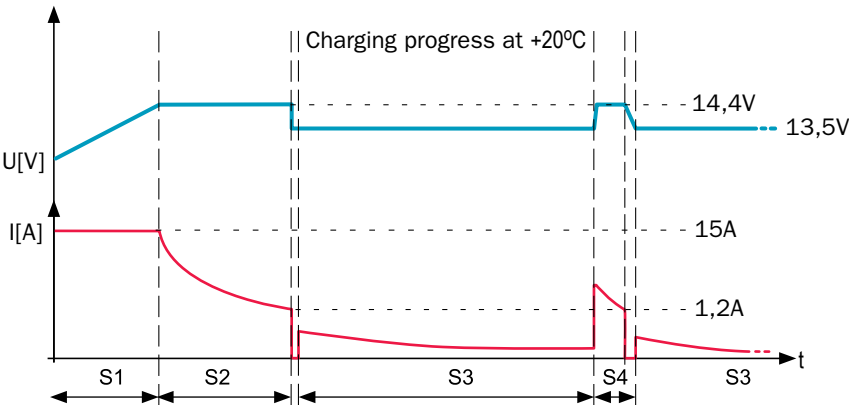
DEFA MarineCharger 1X15 is a 12V/15A battery charger.

DEFA MarineCharger 1x15 is specially adjusted to emergency response vehicles which are connected on and off several times during a 24-hour period. The charger is suitable for fitting in vehicles with battery sizes up to 250Ah. It gives a galvanic isolation between net earth and the battery (dual isolation). DEFA MarineCharger 1x15 tolerates a parallel load up to 10A usage charging batteries at the same time. The charging voltage is temperature compensated. DEFA MarineCharger 1x15A is filled with silicon compound and is therefore 100% waterproof.



DEFA MarineCharger 1x15	
Item No. with PlugIn	700124
Item No. with Schuko	700125
Mains voltage [VAC/Hz]	230/50-60
Charging voltage [VDC]	14,4
Float voltage [VDC]	13,5
Charging current [A]	15
Height/Width/Depth [mm]	200/115/45
Weight [kg]	1,9
IP rate (PlugIn/Schuko)	44/67

Remote LED panel with 10m cable	
Item No. (for 1 battery)	700129
Remote light diode shows the charging status of one battery with red, yellow or green LED light.	



The charging progress shows Voltage (U) over time (t) and current (I) over time (t). The LED indicator, which is placed on top of the front of the charger, indicates the status of the different charging steps (S1,S2...). The LED indicates:

- Red** (S1) Main charging. Maksimum 1 hour.
- Yellow** (S2) End charging: more than 80% recharged / battery disruption.\*
- Green** (S3) Maintenance charging with lower voltage starts after maximum four hours (S1+S2= maximum four hours).
- Red pulse** (S4) Fully charged.

\* The yellow lamp will light up (end charging mode) in cases of disruption of battery or change of fuse. This continues until the charger is reset (net on/off).

# Battery charger 230VAC

DEFA MarineCharger 2X15 is a 12V/2X15A battery charger.

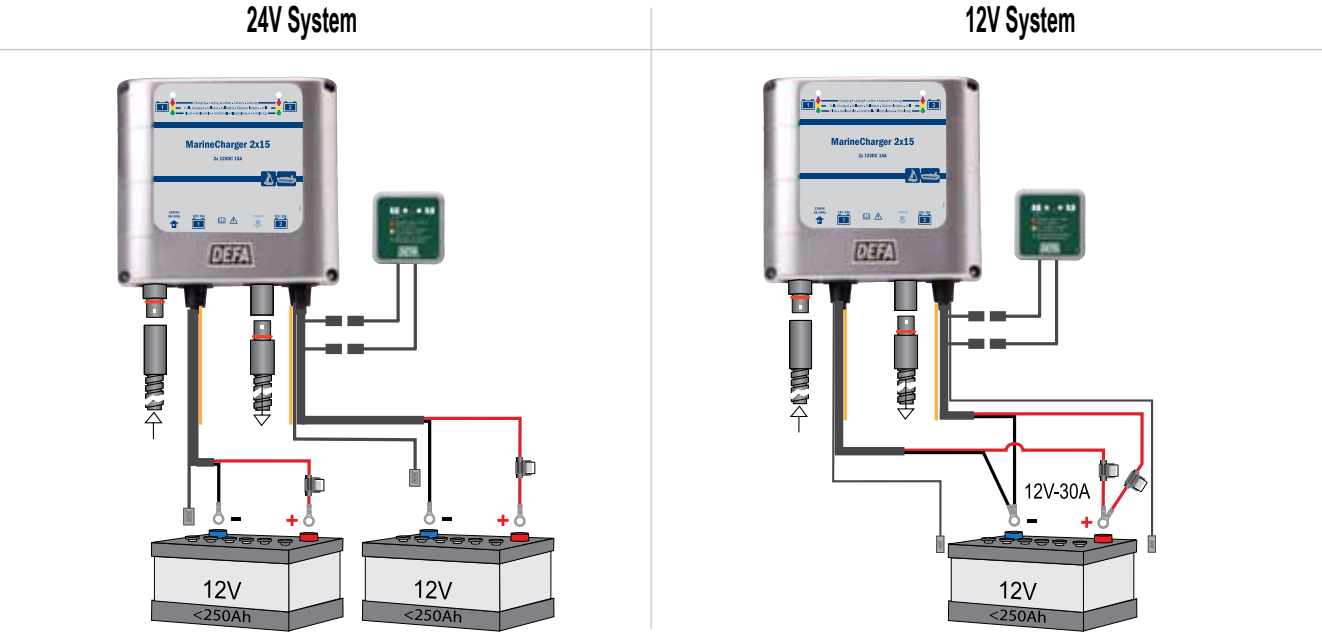
DEFA MarineCharger 2x15 is specially adjusted to emergency response vehicles which are connected on and off several times during a 24-hour period. The charger is suitable for fitting in vehicles with battery sizes up to 500Ah. It gives a galvanic isolation between net earth and the battery (dual isolation). DEFA MarineCharger 2x15 tolerates a parallel load up to 20A usage charging batteries at the same time. The charging voltage is temperature compensated. DEFA MarineCharger 2x15A is filled with silicon compound and is therefore 100% waterproof.



DEFA MarineCharger 2x15	
Item No. with PlugIn	700127
Item No. with Schuko	700128
Mains voltage [VAC/Hz]	230/50-60
Charging voltage [VDC]	14,4
Float voltage [VDC]	13,5
Charging current [A]	30/2x15
Height/Width/Depth [mm]	200/215/45
Weight [kg]	3,5
IP rate (PlugIn/Schuko)	44/67

Remote LED panel with 10m cable	
Item No. (for 2 batteries)	700136
Remote light diode shows the charging status of two batteries with red, yellow or green LED light.	

The sketches show an optimal charging of 24V constructions where each battery is charged separately in order to avoid offset charging. The charger can together with interconnected outputs be used as a 12V/30A charger. The charge cycle for each channel equals the charge cycle for MarineCharger 1x15 shown on page 12.



# Connection cable

DEFA Connection cable is adjusted to DEFA MiniPlug and gives a reliable and good connection from electricity outlets to the car.

DEFA Connection Cable 2,5 mm<sup>2</sup>. Applicable to vehicles with special requirements to power cable, for instance ambulances and fire trucks with special equipment. Maximum power consumption is 16A, even if the cable is supplied with 2,5mm<sup>2</sup> cross-section.



DEFA Shore power cable 2,5mm <sup>2</sup>	
Item No. with DEFA MiniPlug, 2,5m	460960
Item No. with DEFA MiniPlug, 5,0m	701107
Item No. with DEFA MiniPlug, 10,0m	701108
Item No. with DEFA MiniPlug, 15,0m	701279
Item No. with DEFA MiniPlug, 25,0m	701109
Voltage [VAC]	230
Current [A], Max.	16
Weight [gr]	530/840/1565/2260/3745
Length [m]	2,5/5,0/10,0/15,0/25,0
Test and approval	EN 50066-1, EN 60309-1

# Extension cables



DEFA CEE Connection Cable	
Item No. (2,5m)	460820
Item No. (5,0m)	460821
Voltage [VAC]	230
Current [A]	16
Weight (2,5m/5,0m) [kg]	0,465/0,805



DEFA CEE Inlet Cable with DEFA PlugIn	
Item No. (1,5m)	460815
Item No. (2,0m)	460839
Voltage [VAC]	230
Current [A]	16
Weight (1,5m/2,0m) [kg]	0,510/0,630



DEFA CEE Contact with DEFA PlugIn	
Item No.	701150
Voltage [VAC]	230
Current [A]	16
Weight [kg]	0,158

# Inlet plug - PlugIn

DEFA MiniPlug Inlet Cable is adjusted to all new cars. It is as functional and easy to install flush mounted as with bracket. During the development of DEFA MiniPlug we have emphasized on correct design, safety, optimal installation- and user friendliness.



Inlet DEFA MiniPlug	
Item No. - m - colour	701098 - 0,6 - chrome
Item No. - m - colour	701099 - 1,5 - chrome
Item No. - m - colour	701100 - 3,0 - chrome
Voltage [VAC]	230
Current [A], Max.	16
Weight [gr]	915/410 -939/570
Test and approval	EN 50066-, EN 60309-1

# Extension cables - PlugIn

The components in DEFA PowerSystems are easily connected together with DEFA's armoured PlugIn extension cables. The system is guaranteed a reliable and tight connection and eliminates incorrectly connections.



DEFA PlugIn Extension cable	
Voltage [VAC]	230
Current [A]	16
IP rate	44

DEFA PlugIn Extension cable	
Item No.	Length [m]
460802	0,5
460803	1,0
460843	1,5
460804	2,0
460844	3,0
460846	4,0
460809	5,0
460847	8,0
460851	10
460850	12,0





DEFA PlugIn Y-connector	
Item No.	460853
Mains voltage [VAC]	230
Weight [kg]	0,023
IP rate	44
DEFA Y-connector is an all-welded connector for connecting engine and interior heater or MultiCharger battery charger.	



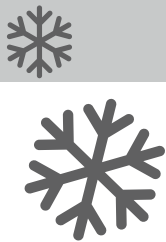
DEFA PlugIn T-connector 90°	
Item No.	460831
Mains voltage [VAC]	230
Weight [IP]	0,022
IP rate	44
DEFA Y-connector is an all-welded connector for connecting engine and interior heater or MultiCharger battery charger.	



DEFA PlugIn relay connector	
Item No. (12V)	460854
Item No. (24V)	460856
Mains voltage [VAC]	230
Weight [kg]	0,059
IP rate	44



DEFA PlugIn relay box	
Item No. (12V)	460838
Item No. (24V)	460863
Mains voltage [VAC]	230
Weight [kg]	0,101
IP rate	44

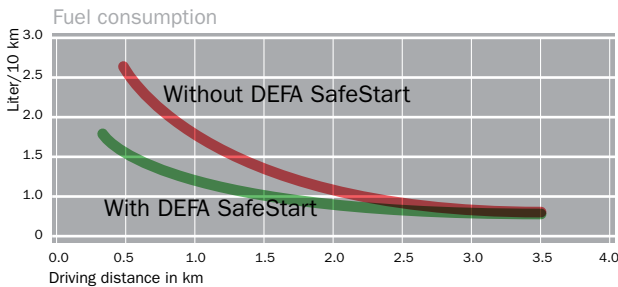


When starting a cold engine, pollution and consumption is at its very worst.

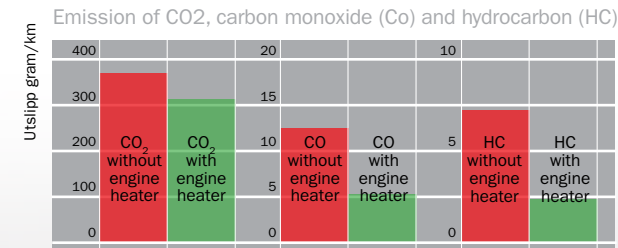
It doesn't matter if the temperature outside is -15 or +4°C. The engine is cold anyway, and cold engines consume a lot more fuel to get started. Additionally, the emissions are much higher during this cycle. The catalyst, which cleans the emissions from the engine, does not work properly before the temperature exceeds 600°C. Electrical boat heating is the most environmentally friendly way to preheat your boat. If you start driving with a warm engine, both emissions and fuel consumption will be reduced the first 4-5 kilometers. If all boats had engine heaters, the environment would benefit in several ways.

Every boat owner is able to give the environment a helping hand by starting their boat every day with a warm engine. One single boat owner will not be able to make such a big difference one winter morning – but the entire European boat fleet will absolutely make a big difference during a year.

Electrical boat heating has only environmental advantages. In contrast to solutions based on fuel, DEFA boat heating ensures less emissions and fuel consumption. A preheated engine during the cold winter season will also ensure less engine wear and tear.



Starting of a preheated engine reduces the fuel consumption with 50% the first 2 nautic miles.



Starting of a preheated engine gives 15-30% less pollution the first 2 nautic miles.



The purpose with an engine heater is to create and transfer heat to the engine in an effective and best possible way. This can be done directly through heating the antifreeze fluid or oil, or indirectly through heating the engine block or oil pan utilizing a contact heater.

DEFA offers optimal engine heater solutions for most air- and water-cooled petrol- and diesel engines on the market. We also have smart solutions for cars, tractors, trucks and other engine vehicles and stationary engines. More than 600 different engine heaters are on the market supporting more than 3400 different engines. We have basically 9 series in our product range where the differences are to be found in the manner of operation and the principal of installation.



DEFA SafeStart 000-series	
Characteristic	Flat conic flange
DEFA No.	001-099
The 000-series can only be used on engines with cast iron block. The heaters flange consists of a conic slice, and the heater is kept in place in the engines frost hole by a press fit solution.	



DEFA SafeStart 100-series	
Characteristic	Conic cup flange
DEFA No.	101-199
100-series heaters are only used on vehicles with cast iron block. The heater's flange is formed as a cup in order to keep a small profile on the active heating area. The heater is used on engines with little space inside the water jacket. Press fit heater.	



DEFA SafeStart 200-series	
Characteristic	Threaded flange
DEFA No.	201-299, 2201-2299
The flange of the 200-series is threaded and is used on cars which have a threaded plug into the water jacket.	



DEFA SafeStart 300-series	
Characteristic	T- or spread rail
DEFA No.	301-399
The heater is fastened to the engine block with a fixed spreader rail or a T- rail. The 300-series is also used in areas where there is too little space around the element for press fit on cast iron block or in aluminum blocks.	



DEFA SafeStart 400-series	
Characteristic	Hose heater without thermostat
DEFA No.	401-499, 2401-2499
Heaters with DEFA number series from 401 to 499. Number series from 420 to 423 are heaters with thermostat. The flange on this type of engine heater consists of a metal pipe. This pipe can encompass the whole or parts of the active element. The heater is attached to a specific point in one of the engines coolant hoses.	

Installation and use

Read the instruction manual for your vehicle closely. The engine heater should ONLY be installed in vehicles which are described in the fitting instructions. Installation of engine heater is to be carried out at an authorized workshop.

DEFA engine heaters are dimensioned for "normal use". Normal use is defined as: 3 connections x 3 hours per 24 hours, based on 150 usage days per year (approx. 5 months per year). If an engine heater is used in emergency response vehicles, emergency power aggregates, and so on, where the engine heater is continuously connected when boats no longer are in use, it will be necessary with a yearly service/control.



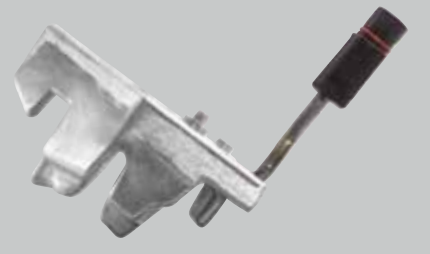
DEFA SafeStart 500-series	
Characteristic	Special fastening point of the bracket
DEFA No.	501-599, 2501-2599
Some engine types have hatches in different shapes which open to the water jacket of the engine block. This heater has a flange which is identical to the original hatch.	



DEFA SafeStart 600-series	
Characteristic	Oil heater
DEFA No.	601-699
The oil heater is used on air cooled engines or in combination with engine heater for coolant.	



DEFA SafeStart 700-series	
Characteristic	Hose heater
DEFA No.	700-799, 2700-2799
Heaters which have DEFA serial numbers from 701 to 799. Engine heaters in this series are supplied with or without thermostat.	

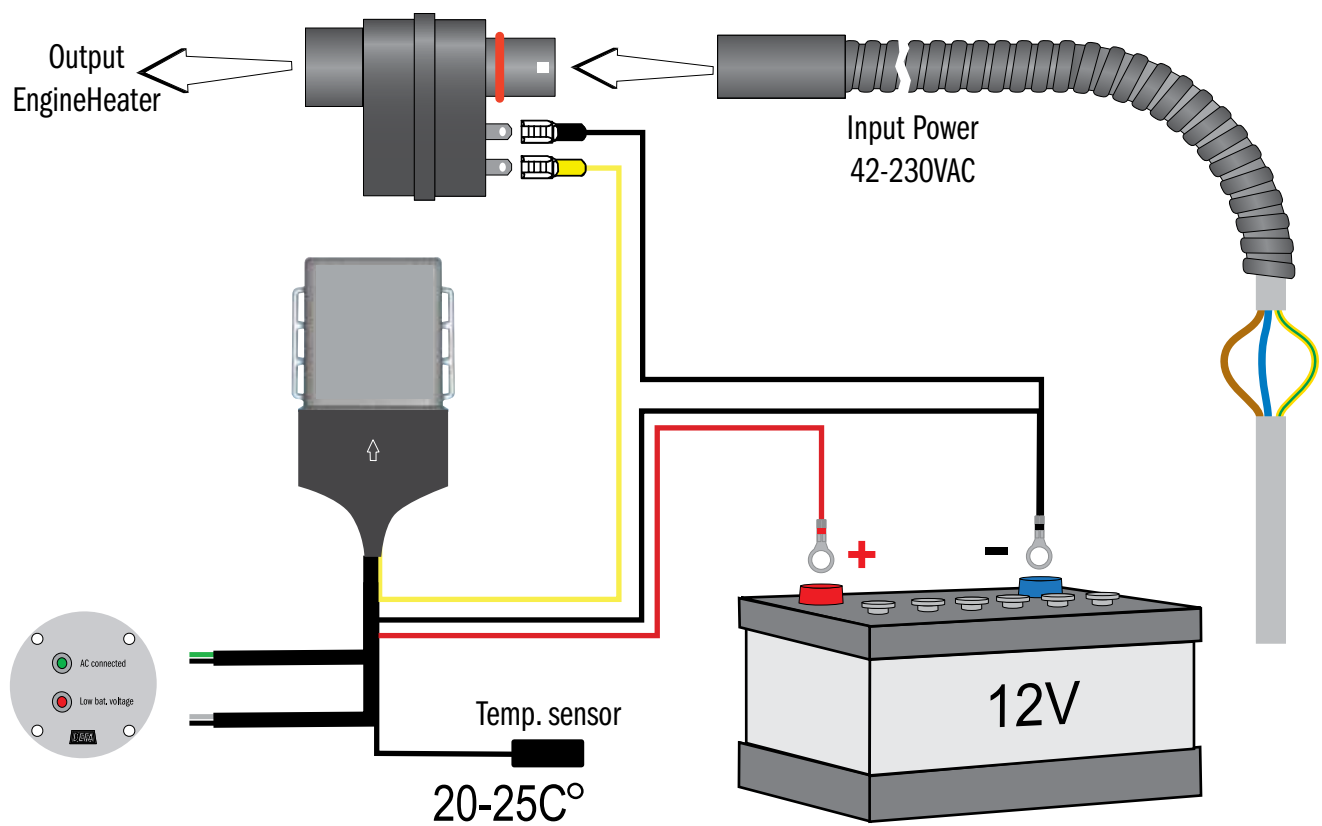


DEFA SafeStart 800-series	
Characteristic	Contact heater
DEFA No.	800-899, 2800-2899, 3800-3899, 4800-4899
The contact heater can be divided into two categories: Heaters for engine block and heaters for sump. The contact heaters consist of an element cast in aluminum, adapted to the place of installation.	

# Battery voltage monitor

Battery Voltage Monitor - Ensures that your batteries are always ready for action! The LED indicator can be placed on a suitable place for inspection.

701512 Battery Voltage Monitor - Inclusive thermostat\*



\* Cut the temperature sensor cable to disable the thermostat function.

# Safety transformer

SOLAS regulations specify a maximum voltage of 55V aboard lifeboats. This means a “step down” transformer needs to be used from the vessel power supply down to the intake voltage of the lifeboat. This “safety transformer” is installed to make being in and around the lifeboat less dangerous in an emergency situation. IP54 encapsulation standard.



Item No.	700466	700470	700467
Voltage In [V] - [Hz]	230 - 50/60	440 - 50/60	200/230/250 - 50/60
Voltage Out [V]	42	42	42
Effect [W]	500	500	1000
Height/Width/Depth [mm]	270/180/180		360/270/180
Weight [kg]	9,5		19,0

Can also be delivered in 48 VAC and 55 VAC.



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