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Uneven charging - a big problem with 24V

When serial connecting two 12V batteries to a 24V-installation, the battery closest to minus will always receive the lowest charging. This reduces the total capacity in the plant and results in bad operating economy.

UNEVEN CHARGING

Uneven charging is a quite unknown concept for most owners of trucks and buses, although such problems are quite normal. In order to explain this problem a little better, we have to get into simple battery technology.

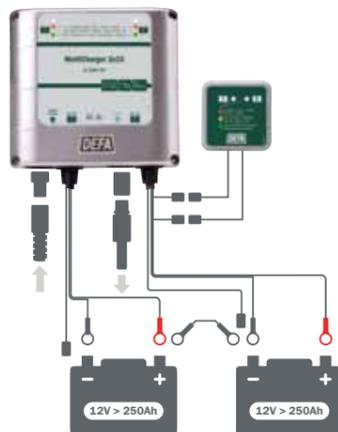
A battery is really a collection of cells which create energy. Normally we call a collection of six cells for a "12V battery". Due to physical laws it is most suitable for a cell to contain a voltage of 2V. Batteries are produced in 12V because this is absolutely the most used voltage in cars, boats etc.

Trucks, buses and heavy vehicles require more "pressure" in order to get started and to function. One has therefore discovered that 24V is a practical voltage.

The voltage is still quite low, so there is no danger in getting "electrified" when working with the installation. To create a 24V-installation we choose two 12V batteries and connect these together in a serial.

LONGEVITY

One can generally say that low charging voltage gives the batteries a short lifespan. When charging it is necessary that the charger's voltage is high enough to fill the batteries completely. Correct charging voltage for a lead/acid car battery is 14,4V (for a "12V" battery) at 20°C. Most cars give too low charging voltage and in 24V installations negative charging will intensify the problem even more. It is therefore important to charge the batteries separately (see figure below) during the night. In that way both batteries achieve the correct voltage. When choosing a charger one should also make sure that the charger automatically changes to maintenance voltage when the batteries are full. This voltage should stay a little lower in order to make sure that the batteries are not "cooked", i.e. that the batteries consume too much fluid.



Avoid negative charging in 24V-installations. Charge each battery separately with MultiCharger 2x15.

SUMMARISE

One achieves excellent operating economy in a 24V installation by giving the batteries correct charging voltage - 14,4V at 20°C:

- Compensating for negative charging by using a charger that is able to charge the batteries individually.
- Using a charger which switches to maintenance voltage when the batteries are full.
- Keeping batteries and wires clean, and make sure the level of fluid in the batteries is correct.

SERIES OF CHARGING PRODUCTS

DEFA charging program consist of a series of charging products which give the user maximal utilization of their batteries. Our battery chargers 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 charging program 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 250VAC 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.

WarmUp

When starting a cold engine, pollution and consumption is at its very worst. It does not 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.

START THE CAR WITH A WARM ENGINE

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 car heating is the most environmentally friendly way to preheat your car. If you start driving with a warm engine, both emissions and fuel consumption will be reduced the first 4-5 kilometers.

THINK OF THE ENVIRONMENT

If all cars had engine heaters, the environment would benefit in several ways. Today the authorities throughout Europe are taking dramatic measures to restrict the use of cars. Introduction of car free zones and times, increased car taxes and environmental taxes during rush-hour are a result of the environmental threat. At the same time the society depends on efficient solutions for collective transportation.

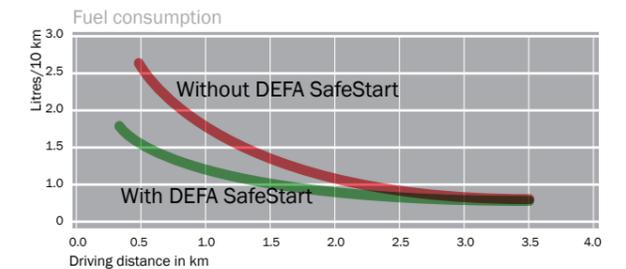
Every car owner is able to give the environment a helping hand by starting their car every day with a warm engine. One single car owner will not be able to make such a big difference one winter morning – but the entire European car fleet will absolutely make a big difference within a year.

TERMINA AND TERMINI™

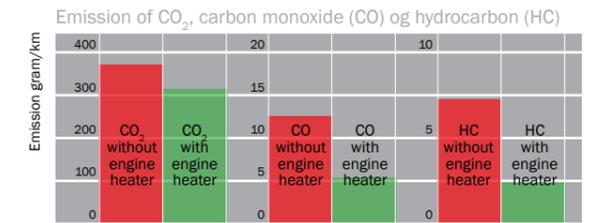
With DEFA interior heaters you do not have to get into a cold and uncomfortable car. DEFA's interior heaters preheat the compartment in a fast and effective way. You can forget about ice scraping and avoid unpleasant dew which blocks the view. DEFA's interior heaters come in two series, Termina and Termini™.

ADVANTAGES WITH ELECTRICAL CAR HEATING

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



Starting a preheated engine reduces fuel consumption with 50% the first 4 km

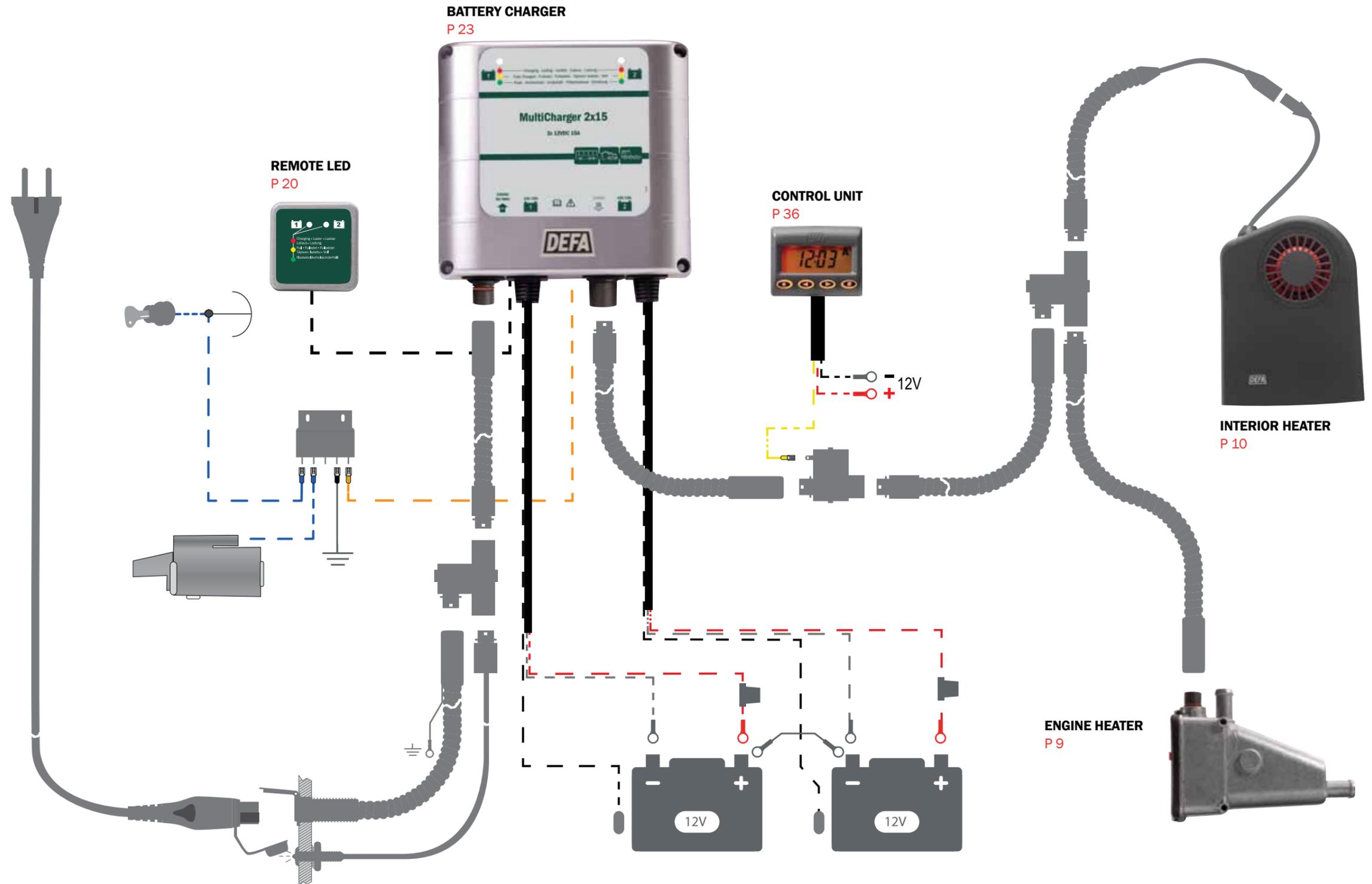


Starting a preheated engine gives 15-30% less pollution the first 4 km



System overview

The circuit diagram shows temperature/time control of engine- and interior heaters by using DEFA Futura as winter/summer switch. The battery charger will charge independent of winter/summer settings. In addition the diagram shows the "starter kill" device function through a separate relay. Remote light diode shows the charging status of two batteries with red, yellow or green LED light.



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Engine heaters

Easy-to-start engine, less engine wear, reduced fuel consumption and a more environmentally friendly start of the day.

DEFA SafeStart

A preheated engine starts easier, is exposed to less wear, gives reduced fuel consumption and up to 30% reduced harmful emissions of exhaust during the first few kilometers. An electric engine heater is the most environmentally friendly way to preheat the engine. When you start driving with a preheated engine, both emissions and consumption will be reduced the first 4-5 kilometers. If all cars had electric engine heaters, it would save the environment for large amounts of harmful emissions. The purpose with an engine heater is to create and transfer heat to the engine on 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.

With the DEFA engine heater connected you will raise the temperature of the engine up to 30-40 °C above the outside temperature, depending on where the heater is placed, type of heater and antifreeze volume. The ideal connection time depends on the outside temperature. After being connected for 3 hours in -15 °C a thermal balance is achieved, which means that supplied energy after this only contributes to maintain the temperature. The rest dissolves into the surroundings. The engine heater can be connected for longer periods without either engine or heater being damaged, and will only result in unnecessary power consumption. This is where it is wise to use the SmartStart remote control, Futura control unit or the completely new DEFA Link in order to reduce electricity expenses.

DEFA offers several engine heater solutions either the car is air- or water-cooled, and for large or small antifreeze volume. We also have smart solutions for tractors, trucks and other engine vehicles and stationary engines. DEFA strives to find the optimal solution for each and every engine. Regarding engine types that do not have available frost plugs or caps, there are DEFA engine heaters with special flanges, engine heaters for hose mounting or contact heaters. The main goal of all DEFA engine heaters is to preheat the engine optimal, regardless of fitting principals.

NOTICE! IT IS IMPORTANT THAT ONLY RECOMMENDED ENGINE HEATER IS USED ON THE ACTUAL CAR MODEL. INSTALLATION OF ENGINE HEATER, WHICH IS NOT RECOMMENDED BY DEFA OR PLACING WHICH IS NOT ACCORDING TO INSTALLATION GUIDE, CAN RESULT IN THE ENGINE HEATER NOT FUNCTIONING AND THE ELECTRONICS OF THE ENGINE BEING AFFECTED.

In order to find the correct engine heater for the correct car model/engine, go to www.defa.com and 'Find your heater'. When correct car model and engine type has been chosen it will be possible to download the last version of the installation guide.

For more information regarding engine heaters and installation, look up 'Technical Handbook' on www.defa.com under 'Support'.



Termini™

DEFA interior heaters use a PTC (PTC = Positive Temperature Coefficient) heating element which self adjusts the output power according to the inside temperature of the car.

A 20°C temperature increase will result in a 10% power reduction and as the interior temperature increases the power will gradually be reduced accordingly. The interior heater is equipped with an automatic over-temperature protection. All interior heaters are approved by: Safety EN 60335-1 and EN 50408.



Termini™ II 1400 **NEW!**

Item No. Mini contact	430055
Item No. Schuko	430056
Collection box - pcs	12
Output -25°C - W	0/1400
Height/Width/Depth - mm	32/138/182
Weight - gr	595
Bracket weight - gr	20
IP rate	20



Termini™ 1350

Item No. Mini contact	430050
Item No. Schuko	430051
Item No. Schuko in blister package	430052
Collection box - pcs	12
Output -25°C - W	0/1350
Height/Width/Depth - mm	35/138/181
Weight - gr	595
Bracket weight - gr	20
IP rate	20

Termini™



Termini™ 1850

Item No. Mini contact	430062
Item No. Schuko	430063
Collection box - pcs	10
Output -25°C - W	0/850/1850
Height/Width/Depth - mm	47/141/183
Weight - gr	745
Bracket weight - gr	20
IP rate	20



Termini™ 2100

Item No. Mini contact	430060
Item No. Schuko	430061
Collection box - pcs	10
Output -25°C - W	0/1350/2100
Height/Width/Depth - mm	47/141/183
Weight - gr	745
Bracket weight - gr	20
IP rate	20

Termina

DEFA interior heaters use a PTC (PTC = Positive Temperature Coefficient) heating element which self adjusts the output power according to the inside temperature of the car.

A 20°C temperature increase will result in a 10% power reduction and as the interior temperature increases the power will gradually be reduced accordingly. The interior heater is equipped with an automatic over-temperature protection. All interior heaters are approved by; Safety EN 60335-1 and EN 50408.



Termina 1200

Item No. Schuko	430012
Collection box - pcs	8
Output -25°C - W	1200
Height/Width/Depth - mm	75/146/165
Weight - gr	890
Bracket weight - gr	20
IP rate	20



Termina 1400 S

Item No. Schuko	430015
Collection box - pcs	8
Output -25°C - W	0/800/1400
Height/Width/Depth - mm	75/146/165
Weight - gr	890
Bracket weight - gr	20
IP rate	20



Termina 2000 S

Item No. Schuko	430022
Collection box - pcs	8
Output -25°C - W	0/1100/2000
Height/Width/Depth - mm	90/200/200
Weight - gr	1300
Bracket weight - gr	20
IP rate	20

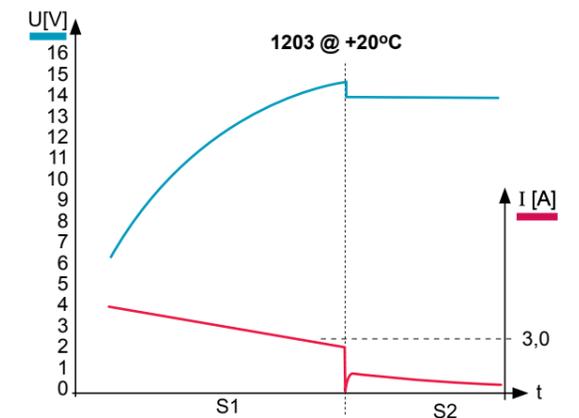
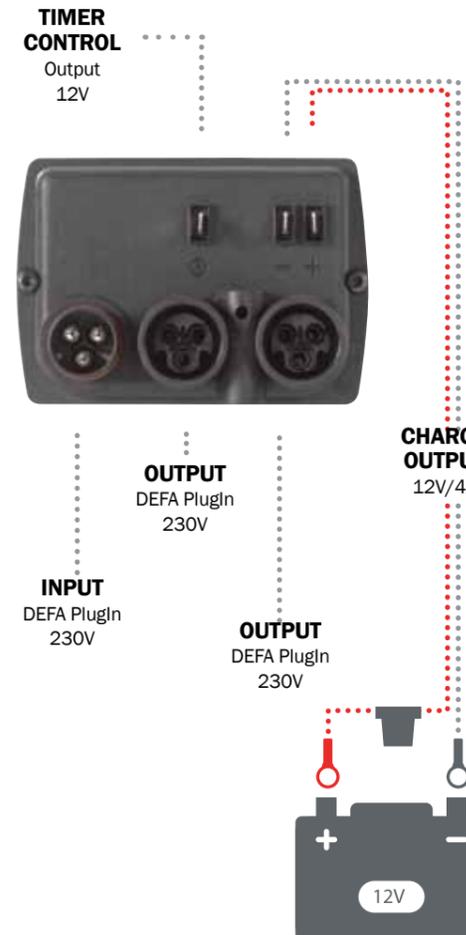
MultiCharger 1203

DEFA MultiCharger 1203 is a maintenance charger which is adjusted to modern battery technology, and it extends the lifespan of the battery. This charger has internal relay function for control of the engine- and interior heater and is primary meant for private cars and light trucks.



MultiCharger 1203 with relay

Item No.	450009
Collection box - pcs.	8
Rated output - W	45
Voltage - V / Charging current - A	12/3
Charging voltage boost mode - V	> 14,7
Float voltage - VDC	13,7
Height/Width/Depth - mm	80/70/45
Weight - gr	252
Fuse - A	5
IP rate	44



S1: Charging - Charges with 3A until voltage reaches 14,7V.
S2: Float voltage 13,7V.

MultiCharger 1204

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.



MultiCharger 1204

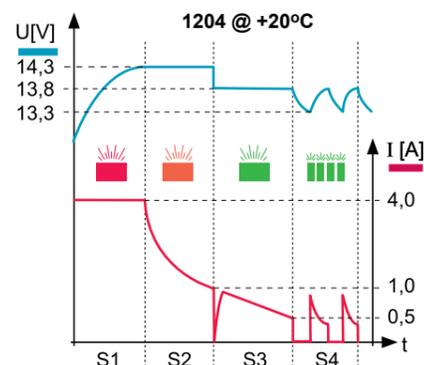
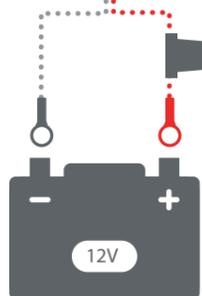
Item No.	450020
Collection box - pcs	8
Rated output - W	65
Voltage - V / Charging current - A	12/4
Charging voltage boost mode - V	> 14,3
Float voltage - VDC	13,3 - 13,8
Height/Width/Depth - mm	84/103/42
Weight - gr	260
Fuse - A	7,5
IP rate	65



INPUT
DEFA PlugIn
230V

OUTPUT
DEFA PlugIn
230V

CHARGING OUTPUT
12V/4A



- S1: Boost Mode - Charges with 4A until voltage reaches 14,3V or for max. 24 hours. LED shows red.
- S2: Top charging - At 14,3V until charging current is below 1,0A or for max. 10 hours. LED shows orange.
- S3: Maintenance charging - At constant voltage 13,8V until charging current is lower than 0,5A or for max. 48 hours. LED shows green.
- S4: Puls maintenance charging - The voltage pulsates between 13,3V and 13,8V with low charging current. LED shows green.

ChargerKit 1204

Easily connect DEFA ChargerKit by connecting the DEFA MiniPlug inlet discreetly in the front part of the car, with the connection cable to the mains.

Because of the battery's advanced and electronic controlled charging course, the battery is charged when other chargers give up. DEFA MultiCharger 1204 makes sure your battery stays fully charged and ready for the next start.



ChargerKit 1204

Item No.	450030
Collection box - pcs	12
MultiCharger 1204	450020
Cable set 12V	418902
MiniPlug inlet cable 1,5 m	460915
MiniPlug connection cable 2,5 m	460920
MiniPlug inlet cable - fitting equipment	418801

QUALITIES

- High efficient switch mode operation advanced charging profiles prevent from damaging the battery.
- The charger can therefore be continuously connected
- Temperature compensated charging voltage ensures that the battery is fully charged whatever battery condition. No risk for excess charging.
- Light indication of charging mode
- The chargers are short circuit and reverse polarity protected
- Does not harm advanced electronics
- Small dimensions
- Protects the battery from breaking down (sulphating) and extends the batteries lifetime.

DEFA's chargers are all approved by; Safety EN 50081-1, EN 50082-1, EN 60335-1, EN 60 335-2-29.

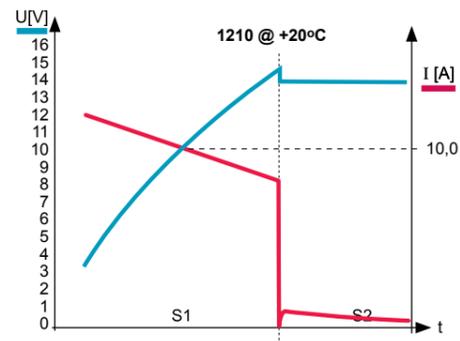
MultiCharger 1210

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



MultiCharger 1210

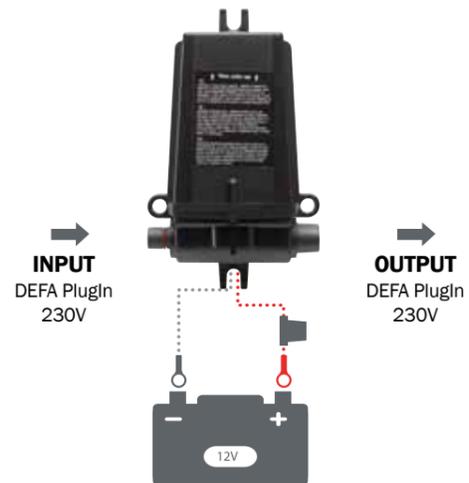
Item No.	450011
Collection box - pcs	8
Rated output - W	125
Voltage - V / Charging current - A	12/10
Charging voltage boost mode - V	> 14,7
Float voltage - VDC	13,7
Height/Width/Depth - mm	205/120/65
Weight - gr	505
Fuse - A	15
IP rate	44



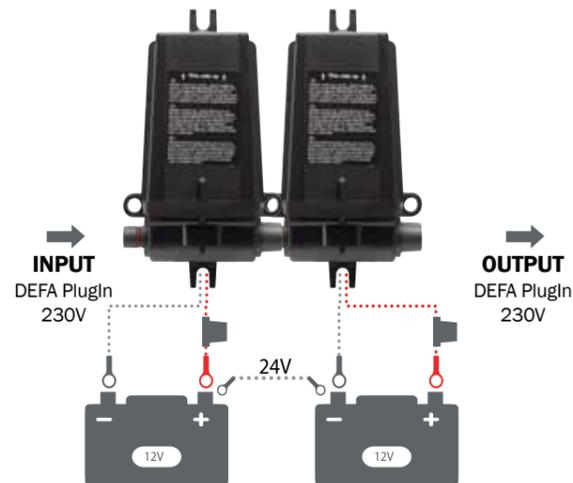
The charging progress shows Voltage (U) over time (t) and current (I) over time (t). The LED indicator, which is placed at the top of the front of the charger, indicates the status of the different charging steps (S1,S2...).

The LED indicates:
 S1 - Red: Main charging
 S2 - Green: Float voltage

12V SYSTEM

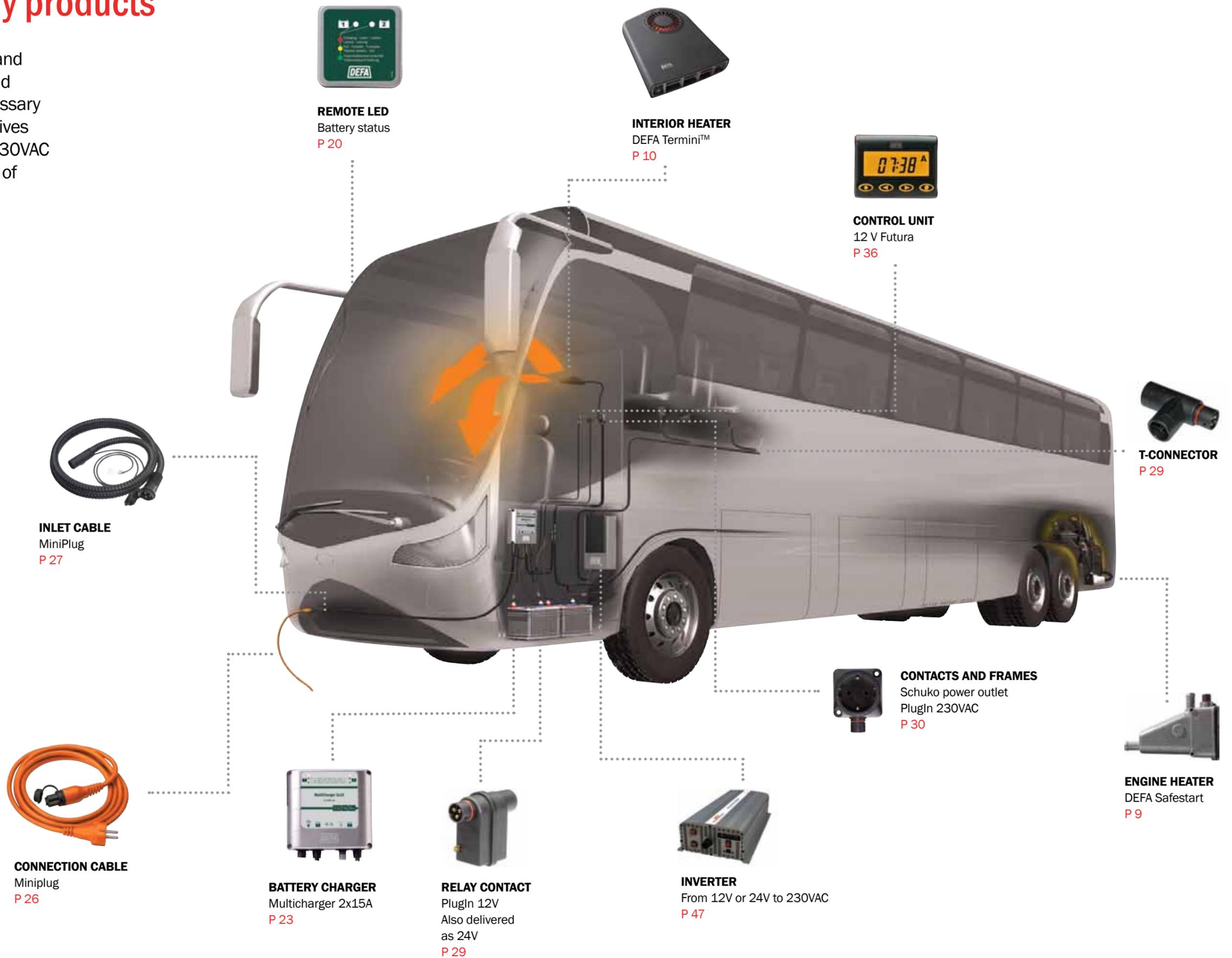


24V SYSTEM



Auto Industry products

In addition to charging and preheating of engine and compartment, it is necessary with an inverter which gives 230VAC while driving. 230VAC is used for PC, charging of telephone etc.



MultiCharger 1x7

DEFA MultiCharger 1x7 is a 12V/7A battery charger. The charger is suitable for fitting in vehicles with battery sizes up to 200Ah. It gives a galvanic isolation between net earth and the battery (dual isolation).

DEFA MultiCharger 1x7 tolerates parallel loads up to 5A usage, charging the batteries at the same time. The charging voltage is temperature compensated. DEFA MultiCharger 1x7A is filled with silicon compound and is therefore 100% waterproof.



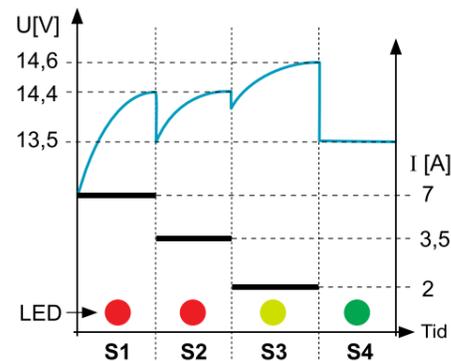
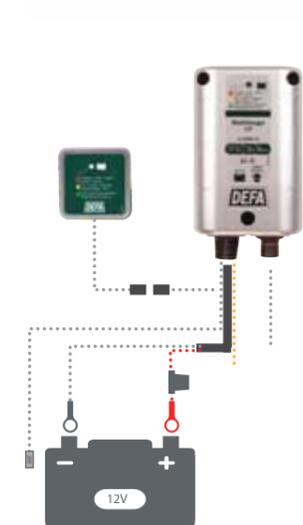
MultiCharger 1x7

Item No. with PlugIn	701231
Item No. with Schuko	701232
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	147/98/45
Weight - kg	1,3
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 at the 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: Float voltage
- Green: Fully charged

MultiCharger 2x7

DEFA MultiCharger 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 MultiCharger 2x7 tolerates a parallel load up to 10A usage charging batteries at the same time. The charging voltage is temperature compensated. DEFA MultiCharger 2x7A is filled with silicon compound and is therefore 100% waterproof. The charger is suitable for 24V installations.



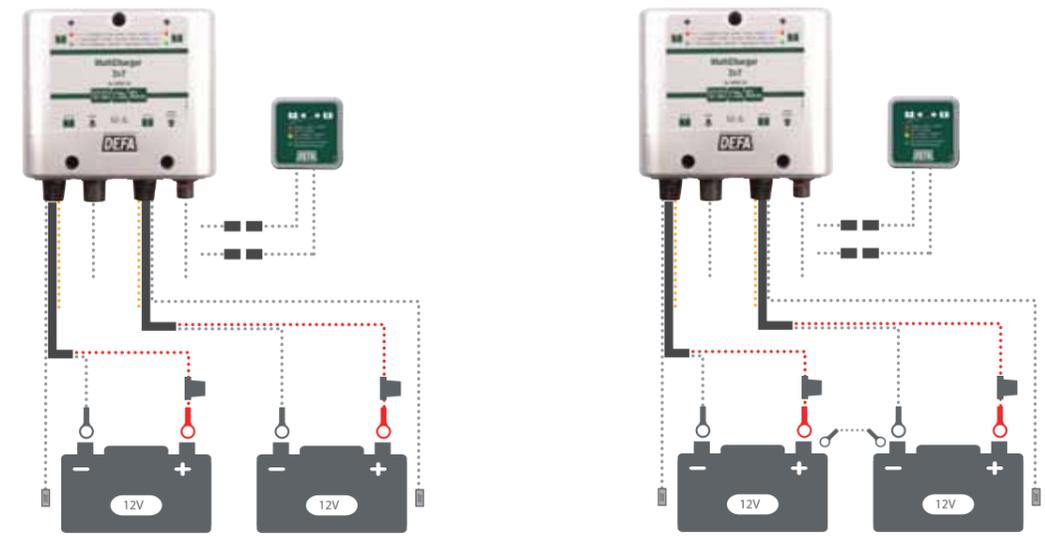
MultiCharger 2x7

Item No. with PlugIn	701233
Item No. with Schuko	701234
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	155/183/42
Weight - kg	2,6
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/14A charger. The charge cycle for each channel equals the charge cycle for MultiCharger 1x7.

MultiCharger 1x15

DEFA MultiCharger 1X15 is a 12V/15A battery charger. 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 MultiCharger 1x15 tolerates parallel loads up to 10A usage, charging the batteries at the same time. The charging voltage is temperature compensated. DEFA MultiCharger 1x15A is filled with silicon compound and is therefore 100% waterproof.



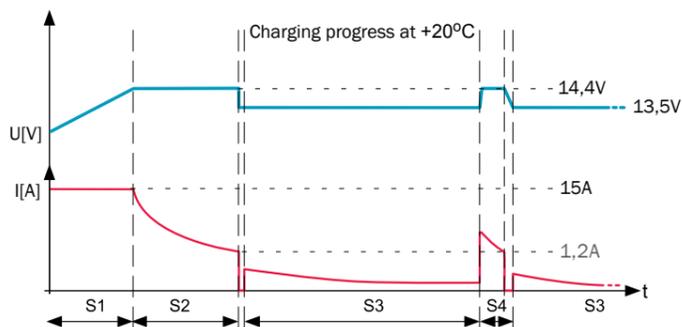
MultiCharger 1x15

Item No. with PlugIn	700132
Item No. with Schuko	700130
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 at the top of the front of the charger, indicates the status of the different charging steps (S1,S2...). The LED indicates:

- Red: (S1) Main charging
- Red: (S2) Sluttlading - End charging: more than 80% recharged / battery disruption.*
- Green: (S3) Float voltage with lower voltage which starts after a minimum of four hours and after maximum sixteen hours of main charging.
- Green: (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).



MultiCharger 2x15

DEFA MultiCharger 2X15 is a 12V/2X15A battery charger. 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 MultiCharger 2x15 tolerates parallel loads up to 20A usage charging batteries at the same time. The charging voltage is temperature compensated. DEFA MultiCharger 2x15A is filled with silicon compound and is therefore 100% waterproof. The charger is suitable for 24V installations.



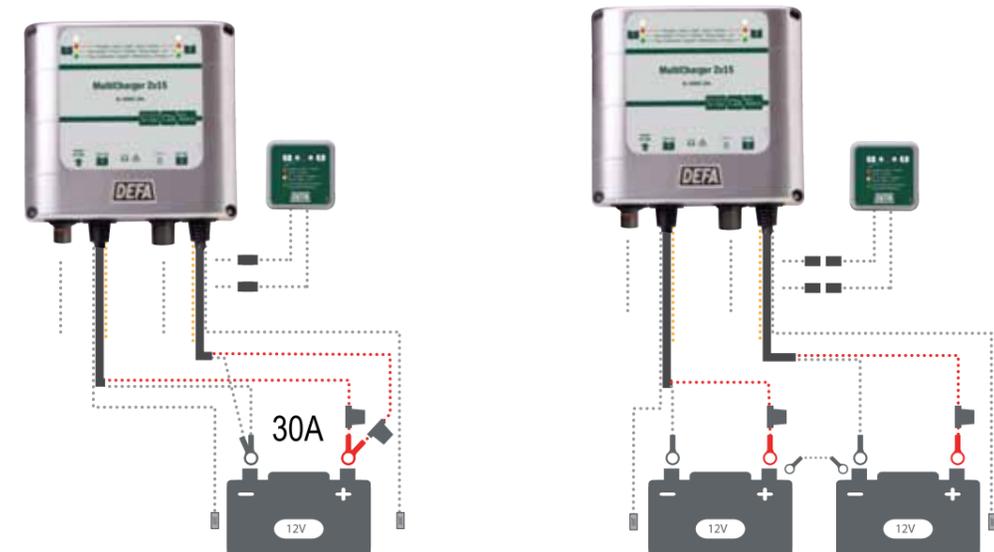
MultiCharger 2x15

Item No. with PlugIn	700135
Item No. with Schuko	700133
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 MultiCharger 1x15.

RescueCharger 1x15

DEFA RescueCharger 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 RescueCharger 1x15 tolerates a parallel load up to 10A usage charging batteries at the same time. The charging voltage is temperature compensated. DEFA RescueCharger 1x15A is filled with silicon compound and is therefore 100% waterproof.



RescueCharger 1x15

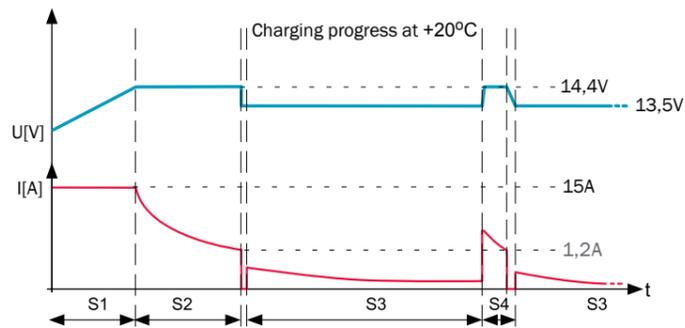
Item No. with PlugIn	701479
Item No. with Schuko	701480
Mains voltage - VAC/Hz	230/50-60
Charging voltage - VDC	14,4
Float voltage - VDC	13,5
Charging current - A	15
Height/Width/Depth - mm	200/115/45
Weight - kg	1,9
IP rate (PlugIn/Schuko)	44/67



Remote LED panel with 10m cable

Item No. (for 1 battery)	700129
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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 at the top of the front of the charger, indicates the status of the different charging steps (S1,S2...). The LED indicates:

- Red: (S1) Main charging
- Red: (S2) Sluttlading - End charging: more than 80% recharged / battery disruption.*
- Green: (S3) Float voltage with lower voltage which starts after a minimum of four hours and after maximum sixteen hours of main charging.
- Green: (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).



RescueCharger 2x15

DEFA RescueCharger 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 RescueCharger 2x15 tolerates a parallel load up to 20A usage charging batteries at the same time. The charging voltage is temperature compensated. DEFA RescueCharger 2x15A is filled with silicon compound and is therefore 100% waterproof.



RescueCharger 2x15

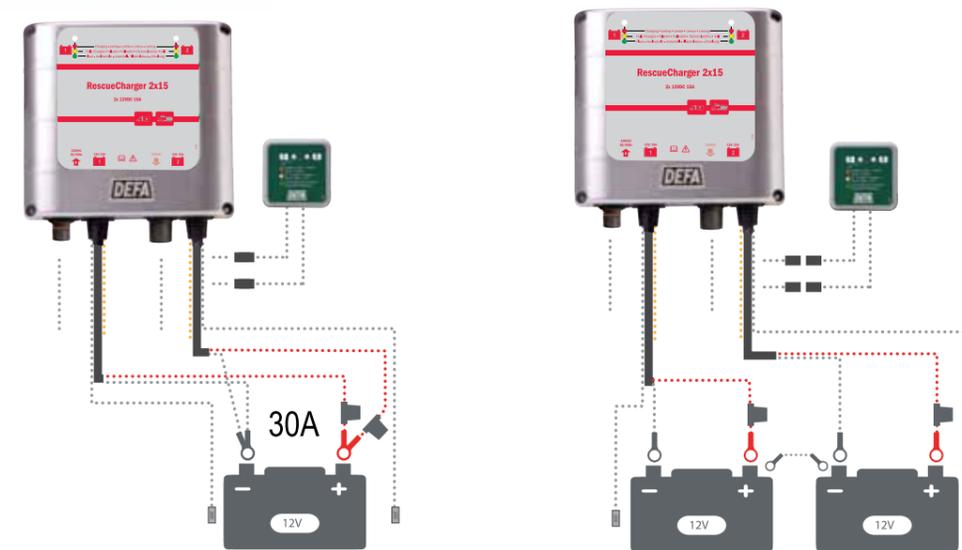
Item No. with PlugIn	701481
Item No. with Schuko	701482
Mains voltage - VAC/Hz	230/50-60
Charging voltage - VDC	14,4
Float voltage - VDC	13,5
Charging current - A	30/2x15
Height/Width/Depth - mm	200/215/45
Weight - kg	3,5
IP rate (PlugIn/Schuko)	44/67



Remote LED panel with 10m cable

Item No. (for 2 batteries)	700136
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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 RescueCharger 1x15.

Connection cables

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



MiniPlug Connection cable 1,5mm²

Item No. - 2,5m	460920
Item No. - 2,5m with angle contact	460933
Item No. - 2,5m in blister package	460930
Item No. - 5m in blister package	460943
Item No. - 3,5m	460938
Item No. - 3,5m with angle contact	460942
Item No. - 5,0m	460921
Item No. - 10,0m	460924
Item No. - 15,0m	460936
Number of pcs in collection box	920/22 - 921/12 - 924 and 936 indiv.
Voltage - VAC	230
Current, max. - A	16
Weight - gr	920/420 - 921/695 - 924/1180 - 936/1700



MiniPlug Connection cable 2,5mm²

Item No. - 2,5m	460960
Item No. - 5,0m	460961
Item No. - 10,0m	460962
Number of pieces in collection box	960/22 - 961/12 - 962/1
Voltage - VAC	230
Current, max. - A	16
Weight - gr	530/915/1520 (2,5/5,0/10,0m)

DEFA Connection cable 2,5 mm² is used for vehicles with special requirements for connection cables, for instance ambulances and fire engines with special equipment. Even if the cable is available with a 2,5mm² core cross-section, the maximum power consumption is 16A.

Connection set 460785

MiniPlug Inlet cable - 1,5 m	460915
MiniPlug Connection cable - 2,5 m	460920
MiniPlug Inlet cable - fitting equipment	418801

Connection set 460787

MiniPlug Inlet cable - 1,5 m	460915
MiniPlug Connection cable - 5,0 m	460921
MiniPlug Inlet cable - fitting equipment	418801



Inlet cables

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.



CEE Connection cable

Item No. 2,5m	460820
Item No. 5,0m	460821
Item No. loose Inlet contact	460824
Number of pcs in collection box	820/22 - 821/12
Voltage - VAC	230
Current, max. - A	16
Weight - gr	465/805 [2,5/5,0m]
Test and approval	EN 50066-1, EN 60309-1



MiniPlug Inlet cables

Item No. (0,6m)	460902
Item No. (1,0m)	460901
Item No. (1,5m)	460915
Item No. (2,0m)	460939
Voltage - VAC	230
Current - A	16
Weight (Length/Weight) - m/kg	1,5/0,410 - 2,0/0,570

The Inlet cable has a MiniPlug 'female-contact' with a cap in one end and DEFA PlugIn, in the other end. In addition it has an earth connector for earthing the system.



CEE / PlugIn contact

Item No.	701150
Voltage - VAC	230
Voltage - A	16
Weight	0,158

PlugIn extension cables

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



PlugIn extension cables

Length - m	0,5 - 1 - 2 - 3 - 4 - 5 - 8 - 12
Voltage - VAC	230
Current - A	16
IP rate	44

PlugIn extension cables

Item No.	Length - m	Weight - gr	Pcs. in collection box
460802	0,5	145	22
460803	1,0	265	22
460843	1,5	380	22
460804	2,0	497	22
460844	3,0	731	12
460846	4,0	965	12
460809	5,0	1200	1
460847	8,0	1900	1
460850	12,0	2838	1

Termini™ interior heater cable with Mini-contact



Item No.	460860
Length - m	1,75 (soft part 0,6m - armoured part 1,15m)
Number of pcs in collection box	Single box or 22
Voltage - VAC	230
Current, max. - A	16
Weight - gr	250
IP rate	44

PlugIn branches and contacts

DEFA relay contact is adapted to DEFA PlugIn contacts and used for controlling the engine and interior heater together with DEFA control units. Can also be used for separat control of engine and interior heater together with DEFA SmartStart. At branching, use T- or Y- connectors



PlugIn T-connector 90°

Item No.	460831
Height/Width/Depth - mm	42/63/21
Mains voltage - VAC	230
Current, max. - A	16
Weight - kg	0,022
IP rate	44

DEFA T-connector is an all-welded connector for connecting engine and interior heater or MultiCharger battery charger.



PlugIn Relay contact

Item No. 12V	460854
Item No. 24V	460856
Range of use °C	-40 / +80
Height/Width/Depth - mm	61/31/67
Mains voltage- VAC	230/12, 230/24
Current - A	Maks 16
Weight - gr	59
Insulation class - cl	II
IP rate	44



PlugIn Y-connector

Item No.	460853
Height/Width/Depth - mm	53/48/24
Mains voltage - VAC	230
Current, max. - A	16
Weight - gr	23
IP rate	44

DEFA Y-connector is an all-welded connector for connecting engine and interior heater or MultiCharger battery charger.

PlugIn branches and contacts



LED Indicator Kit **NEW!**

Item No.	460881
Mains voltage - VAC	110-240
Current, max. - A	16
IP rate, PlugIn/LED	44/67



PlugIn relay box

Item No. 12V	460838
Item No. 24V	460863
Range of use °C	-40 / +80
Height/Width/Depth - mm	63/56/70
Mains voltage - VAC	230/12, 230/24
Current, max. - A	16
Weight - gr	101
Insulation class - cl	II
IP rate	44



PlugIn interior heater socket

Item No.	460829
Height/Width/Depth - mm	70/54/41
Voltage - V	250/12
Current, max. - A	10
IP rate	20



Termini™ Adapter cable

Item No.	418069
Length - m	0,25
Voltage - V	250/12
Current, max. - A	16
Weight - gr	54
IP rate	44

Contacts and frames

All 230VAC Schuko connections have DEFA PlugIn connections for single installations. The connections are supplied both for flush mounted and on-wall mounted.



Wall outlet - flush mounted single stainless steel

Item No.	700399
Mains voltage - VAC	230
Weight - kg	0,200
IP rate	44



Wall outlet - on-wall mounted single

Item No.	700401
Mains voltage - VAC	230
Weight - kg	0,100
IP rate	44



Wall outlet - on-wall mounted double

Item No.	700403
Mains voltage - VAC	230
Weight - kg	0,200
IP rate	44



Wall outlet - on-wall mounted double with PlugIn, in- and output

Item No.	702779
Mains voltage - VAC	230
Weight - kg	0,058
IP rate	44

Contacts and frames



Wall outlet - flush mounted single

Item No. (white)	701317
Item No. (brown)	701316
Item No. (grey)	701315



Frames for wall outlets

Item No. single frame for wall outlet - white	701307
Item No. single frame for wall outlet - brown	701306
Item No. single frame for wall outlet - grey	701305
Item No. double frame for wall outlet - white	701310
Item No. double frame for wall outlet - brown	701309
Item No. double frame for wall outlet - grey	701308



Manual summer and winter switch

Item No.	701123
Height/Width/Depth - mm	67/135/76
Weight - kg	0,200

The summer/winter switch is a manual switch which makes it possible for an engine heater/interior heater to be disconnected during the summer without the battery charger being disconnected. .

EI-centrals and panels

The system eliminates need of tools for connection, which means the system can be installed without assistance from authorized personnel.



EI-central

Item No. Main inlet cabinet 230VAC/16A 1 DEFA PlugIn inlet, 1 DEFA PlugIn outlet - Schuko outlet - grey	701433
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Front panel for 700433

Item No. Front panel for EI-central 700433, recessed - white	701101
Item No. Front panel for EI-central 700433, recessed - mahogany	701104



EI-central

Item No. Main inlet cabinet 230VAC/16A 1 DEFA PlugIn inlet, 3 DEFA PlugIn outlet - grey	700437
Item No. Main inlet cabinet 230VAC/16A 2 DEFA PlugIn inlet, 3 DEFA PlugIn outlet, with general switch - grey	700441



Front panel for 700437 / 700441

Item No. Front panel for recessed - mahogany	701102
Item No. Front panel for recessed - white	701103
Item No. Front panel for recessed - black	701121
Item No. Front panel for recessed - anthrasite	701122

WarmUp Link

Surveillance and control of DEFA WarmUp in your car. Wherever. Whenever. DEFA Link is a userfriendly system which will revolutionize the way you communicate with your car heating system.



Easily accessible on your Smart phone you will have full control of your car. Wherever you are. If anything should happen to your car while you are away, you will automatically be notified via the system.



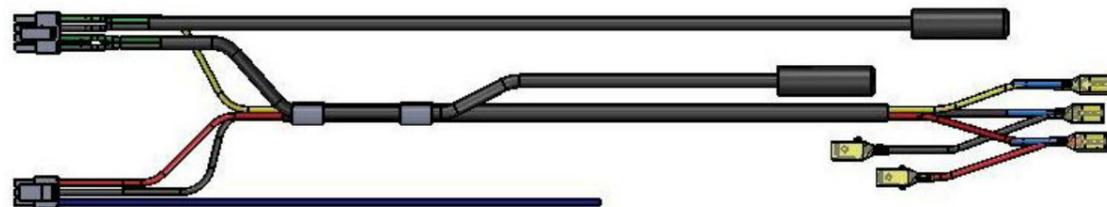
LinkHub NEW!

Item No.	440030
Height/Width/Depth - mm	78 (114)/78/23
Voltage - V	8 - 32V
Current draw, average - mA	25
Driftstempertur - °C	-40 - +85



Mounting Kit LinkHub WarmUp NEW!

Item No.	440036
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SmartStart™

The control unit DEFA SmartStart™ 12/24V, which is a part of DEFA WarmUp, makes sure the car is warm when you need it to be warm. DEFA SmartStart™ is a two-way wireless control unit.

The unit has two programmable departure times independent of each other. These periods of time repeat themselves every 24 hours, which is very practical for car owners who start their car at the same time every day. The connection time, which is the time the heating system is connected before the car is used, can easily be chosen. The connection time can also be automatically controlled by the system via a temperature sensor recording the outdoor temperature.

THE FOLLOWING PROGRAMS CAN BE USED:

- Automatic start controlled by the outside temperature
- 1 hour connection time
- 2 hours connection time
- 3 hours connection time
- 4 hours connection time (only DEFA SmartStart™)
- Control of fuel heat (analog control signal)
- DEFA WarmUp ON
- DEFA WarmUp OFF



SmartStart™

Item No. 12V with car unit	440020
Item No. 24V with car unit	440021
Operating temperture remote control (RC) - °C	-10 - +60
Operating temperature car unit (VU) - °C	-40 - +80
Battery RC ⚠	6V Lithium 2CR-1/3N
Range - m	up to 400
Frequency - MHz	868, 370
Current consumption RC	<5µA
Height/Width/Depth RC - mm	78/34/16
Height/Width/Depth VU - mm	69/54/23
Weight RC - gr	29
Test and approval	EN 301 489-1:2005-04, ETSI EN 300 220-1:2000-09 EN 301489-1



SmartStart™ spare parts

SmartStart™ remote control RC	418100
SmartStart™ VU 12V	418101
SmartStart™ VU 24V	418102
Lithium battery ⚠	418103
Cable mat	418072

Futura

The control unit DEFA Futura, which is a part of DEFA WarmUp, makes sure the car is warm when you need it to be warm. DEFA Futura is a control unit which is installed inside the compartment.

The unit has two programmable departure times independent of each other. These periods of time repeat themselves every 24 hours, which is very practical for car owners who start their car at the same time every day. The connection time, which is the time the heating system is connected before the car is used, can easily be chosen. The connection time can also be automatically controlled by the system via a temperature sensor recording the outdoor temperature.

THE FOLLOWING PROGRAMS CAN BE USED:

- Automatic start controlled by the outside temperature
- 1 hour connection time
- 2 hours connection time
- 3 hours connection time
- DEFA WarmUp ON
- DEFA WarmUp OFF



Futura control unit	
Item No. without relay box	440010
Best.nr. with relay box	440011
Voltage - V	12
Current consumption - mA	3,5
Height/Width/Depth - mm	37/47/13
Weight - gr	19
Test and approval	EN 50081-1, EN 50082-1
Futura spare parts	
Wire harness WarmUp with temperature sensor 12V	418007
Wire harness without temperature sensor 12V	418059
Temperature sensor	418071
Control unit	418067

PlugIn branch sets

DEFA branch set consists of DEFA PlugIn extension cables in different lengths and DEFA PlugIn Y-connector for connecting interior- and engine heaters.

The sets are also suitable for those who have engine heaters and wish to upgrade to a car heating system combined with an interior heater. If you wish to connect DEFA Termini™ together with Termini™ Mini Contact, you can use branch set 460750 or 460751. If the interior heater has a Schuko plug, use 760/762/766/768/769. The differences are the lengths of the cables. Whatever set that fits depends on the vehicle model. See Code Type List column 8.



Branch set - 460750	
PlugIn extension cable - 1,0 m	460803
PlugIn Y-connector	460853
Interior heater cable - 1,75 m	460860
Branch set - 460751	
PlugIn extension cable - 1,5 m	460843
PlugIn Y-connector	460853
Interior heater cable - 1,75 m	460860
Branch set - 460760	
PlugIn extension cable - 0,5 m	460802
PlugIn extension cable - 1,0 m	460803
PlugIn Y-connector	460853
PlugIn interior heater socket	460829
Forgreningssett - 460762	
PlugIn extension cable x 2 - 1,0 m	460803
PlugIn Y-connector	460853
PlugIn interior heater socket	460829
Branch set - 460765	
PlugIn extension cable - 1,0m	460803
PlugIn extension cable - 2,0m	460804
PlugIn Y-connector	460853
PlugIn interior heater socket	460829
Branch set - 460766	
PlugIn extension cable - 1,0m	460803
PlugIn extension cable - 1,5m	460843
PlugIn Y-connector	460853
PlugIn interior heater socket	460829
Branch set - 460768	
PlugIn extension cable - 0,5m	460802
PlugIn extension cable - 1,5m	460843
PlugIn Y-connector	460853
PlugIn interior heater socket	460829
Branch set - 460769	
PlugIn extension cable - 0,5m	460802
PlugIn extension cable - 2,0m	460804
PlugIn Y-connector	460853
PlugIn interior heater socket	460829

ComfortKit

An easy way to a warm engine and compartment. All you need in addition to a DEFA ComfortKit is an engine heater element. The sets are different because of different output on Termini™ interior heater 1350, 1400,1850 or 2100W.

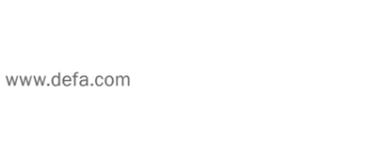
DEFA ComfortKit does NOT include a battery charger, DEFA Control Unit/SmartStart™ or engine heater.

ComfortKit II 1400 - 470066 NEW!	
	Termini™ 1400 430055
	MiniPlug inlet cable - 1,5m 460915
	PlugIn extension cable - 1,0m 460803
	PlugIn Y-connector 460853
	Termini™ extension cable - 1,75m 460860
	MiniPlug inlet cable - fitting equipment 418801
	MiniPlug connection cable - 2,5m 460920
	Assembly equipment
ComfortKit 1350 - 470050	
	Termini™ 1350 430050
	MiniPlug inlet cable - 1,5 m 460915
	PlugIn extension cable - 1,0 m 460803
	PlugIn Y-connector 460853
	Termini™ extension cable - 1,75 m 460860
	MiniPlug inlet cable - fitting equipment 418801
	MiniPlug connection cable - 2,5 m 460920
	Assembly equipment
ComfortKit 1850 - 470062	
	Termini™ 1850 430062
	MiniPlug inlet cable - 1,5 m 460915
	PlugIn extension cable - 1,0 m 460803
	PlugIn Y-connector 460853
	Termini™ extension cable - 1,75 m 460860
	MiniPlug inlet cable - fitting equipment 418801
	MiniPlug connection cable - 2,5 m 460920
	Assembly equipment
ComfortKit 2100 - 470060	
	Termini™ 2100 430060
	MiniPlug inlet cable - 1,5 m 460915
	PlugIn extension cable - 1,0 m 460803
	PlugIn Y-connector 460853
	Termini™ extension cable - 1,75 m 460860
	MiniPlug inlet cable - fitting equipment 418801
	MiniPlug connection cable - 2,5 m 460920
	Assembly equipment

WarmUp

With DEFA WarmUp installed you will always have a warm and comfortable car ready to start with a fully charged battery. DEFA WarmUp reduces fuel expenses and harmful emissions.

DEFA WarmUp consists of everything a car heating system should include, except for engine heater which has to be ordered separately. DEFA WarmUp is delivered in different versions dependent on the output on DEFA Termini™ interior heater, with DEFA Futura, DEFA SmartStart™ control unit or the completely new DEFA Link.

WarmUp II 1400/Link - 471266 NEW!	
	Termini™ 1400 430055
	MultiCharger 1203 450009
	MiniPlug inlet cable - 1,5m 460915
	PlugIn extension cable - 1,0m 460803
	PlugIn extension cable - 0,5m 460802
	Termini™ extension cable - 1,75 m 460860
	MiniPlug connection cable - 2,5m 460920
	LinkHub 440030
	LinkHub mounting kit 440036
	Assembly equipment
WarmUp 1350/SmartStart™ - 471250	
	Termini™ 1350 430050
	MultiCharger 1203 450009
	MiniPlug inlet cable - 1,5m 460915
	PlugIn extension cable - 0,5m 460802
	PlugIn extension cable - 1,0m 460803
	SmartStart™ wireless control unit 440020
	Termini™ extension cable - 1,75m 460860
	MiniPlug inlet cable - fitting equipment 418801
	MiniPlug connection cable - 2,5m 460920
	Assembly equipment

WarmUp



WarmUp 1350/Futura - 471252

Termini™ 1350	430050
MultiCharger 1203	450009
MiniPlug inlet cable - 1,5m	460915
PlugIn extension cable - 0,5m	460802
PlugIn extension cable - 1,0m	460803
Futura control unit	440010
Termini™ extension cable - 1,75m	460860
MiniPlug inlet cable - fitting equipment	418801
MiniPlug connection cable - 2,5m	460920
Assembly equipment	

WarmUp 1850/SmartStart™- 471262

Termini™ 1850	430062
MultiCharger 1203	450009
MiniPlug inlet cable - 1,5m	460915
PlugIn extension cable - 0,5m	460802
PlugIn extension cable - 1,0m	460803
SmartStart™ wireless control unit	440020
Termini™ extension cable - 1,75m	460860
MiniPlug inlet cable - fitting equipment	418801
MiniPlug connection cable - 2,5m	460920
Assembly equipment	

WarmUp 1850/Futura - 471265

Termini™ 1850	430062
MultiCharger 1203	450009
MiniPlug inlet cable - 1,5m	460915
PlugIn extension cable - 0,5m	460802
PlugIn extension cable - 1,0m	460803
Futura control unit	440010
Termini™ extension cable 1,75m	460860
MiniPlug inlet cable - fitting equipment	418801
MiniPlug connection cable - 2,5m	460920
Assembly equipment	

SmartCharge

DEFA SmartCharge is a safe, efficient and smart solution for most charging purposes. Simply plug your DEFA SmartCharge to the mains, attach the clips to the battery and press the on-button. When the battery is fully charged, wind the SmartCharge up, click the parts in place and keep it handy.



SmartCharge **NEW!**

Item No.	701515
Height/Width/Depth - mm	110/90/54
Weight - gr	260
IP rate	65



EASY TO USE:

- One-button solution
- Backlit user friendly interface and display
- Adapts automatically to the size of your battery
- A meter to easily read the actual power level of your battery
- Integrated cable management
- It will never over-charge your battery. Ever.
- Temperature compensated charging cycle.



SmartCharge accessories

There exists a wide range of accessories for DEFA SmartCharge. These products reflect your everyday need for charging - that be for your car, boat or other battery-operated elements. The selection consists of cables, connectors, status displays and outlets which can be adapted to any need. For more information about the different accessories on www.defa.com.

CHARGE CONNECTOR AND POWER OUTLET - BOTH COMBINED AT THE SAME CONNECTOR POINT

With an extra DEFA power outlet installed in your vehicle, you can easily charge your mobile phone, connect your cooling box or other equipment which requires power. When the battery needs to be charged you connect SmartCharge directly through the same power outlet and charge the battery when docking and you have access to 230V - it could not be easier!



SmartCharge accessories



12V Battery status indicator

Item No.	701758
Length - mm	48
Cross section - mm ²	28
IP rate	65



12V Charger cable, compact

Item No.	701762
Cable length - m	1,3
Cross section - mm ²	1,3
IP rate	65



12V Charger cable, compact, with clips

Item No.	701764
Cable length - m	1,3
Cross section - mm ²	1,3
IP rate	65



12V Charger connector

Item No.	701759
Cable length - m	2,0
Cross section - mm ²	2,5
IP rate Flush-/Bracket mounted	65/20



12V Charger cable

Item No.	701760
Cable length - mm	0,75
Cross section - mm ²	1,3
IP rate	65



12V Charger cable kit

Item No.	701761
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Handy 70

A good charger has to give enough output, the right voltage and current. One will find a wide range of models of various quality on the market. Handy 70 from DEFA gives a safe, fast and efficient charging and is protected against misconnection.

CHOOSE THE CORRECT BATTERY CHARGER

With Handy 70 you meet all requirements for both cars, motorbikes, snow scooters, tractors, camping, boat and other equipment with all types of lead/acid batteries AGM/GEL from 4,0 - 240 Ah.

FLAT BATTERY?

It is important to keep the battery fully charged. Using the battery charger frequently will increase the batteries life span and give safe and secure start of your car. In case you have forgotten to turn the lights or other features off and are left with a dead battery and have to jumpstart your car, a charge is still needed to bring the battery back to life. If you have to recharge your battery over night, a minimum of 7 Ampere battery charger is needed. Handy 70 is adjusted to the sensitive electronics in modern cars.

MAINTENANCE CHARGING IS A SMART INVESTMENT

Motor cycles, snow scooters and other seasonal based equipment have periods during the year where they are not in use. By charging regularly you will have a guaranteed start and at the same time the lifespan of the battery will be extended.

HANDY 70 WITH BUILT-IN LIGHT

It can be difficult to orientate oneself. When Handy 70 is connected to 230V you will have a flashlight function in front of the charger. Handy 70 can also be used as power supply when changing batteries.

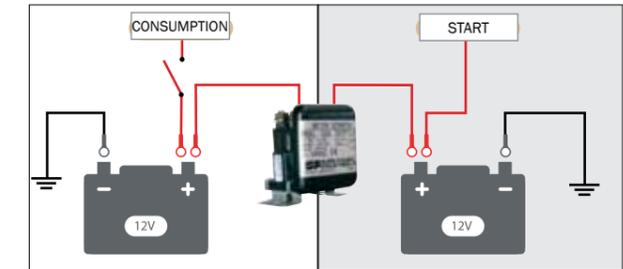
Model	Handy 70
Item No.	700121
Item No. 6-pack with sales display	700122
Mains voltage - VAC, Hz	207-253, 50/60
Current - A rms	0,9
Return current - mA	< 2
Charging voltage - VDC	13,7 / 14,4 / 14,7
Chargin voltage maintenance - VDC	13,3 / 13,7
Charging current - A	7
Rippel - mV rms	< 70
Surrounding temperature - °C	-40 til +50
Cooling	luft
Type of charging	tresteg IUoU Puls
Type of batteries	alle typer bly/syre inkl. AGM og GEL, åpne og lukkede
Battery capacity - Ah	4,0 til 240
Height/Width/Length - mm	50/50/230
Weight - kg	0,5
IP rate	54



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.

PowerSupply 15A

DEFA PowerSupply 15A is used as a pure current provider without being connected to batteries. DEFA PowerSupply 15A does not produce any noise at output (DC) and therefore does not interfere with any other electronics. DEFA PowerSupply 15A is 100% waterproof (IP67) and is therefore very suitable for rough environments such as oil drilling platforms, fish farms, back-up stations in the mountains, etc.



PowerSupply 15A

Item No.	700493
Mains voltage - VAC/Hz	230/50-60
Charging voltage - VDC	12,8 - 14,7
Float voltage - VDC	13,5
Max output - A	15
Height/Width/Depth - mm	200/115/45
Weight - kg	1,9
IP rate	67

Inverters

Our inverters belong to a series of high quality inverters. They are dimensioned to bear heavy use and give the utmost power. All models have a built-in “Power Save Mode”, which means that the power consumption from the battery will stay at a minimum if the inverter is working without being strained. The inverters deliver pure sinus.

FUNCTION

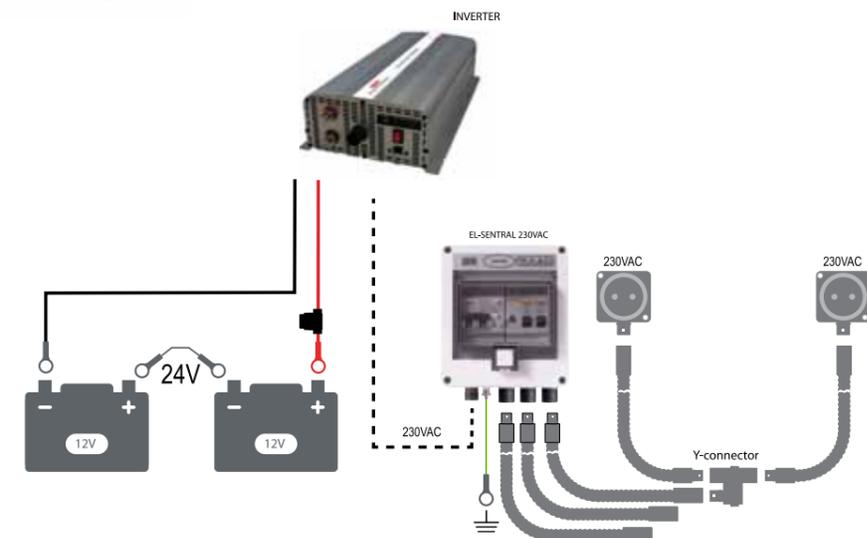
An inverter will give you access to 230VAC from 12/24V battery groups. DEFA inverters deliver pure sinus. DEFA inverters are excellent for for instance TV, video, DVD, parabol, PC, stereo, etc. It is necessary with enough battery capacity, as the power consumption from the battery will be quite high.

Item No.	Connection	Input - VDC	Output - VAC	Output power - W	Weight - kg	Dimensions - mm
702935	PlugIn	12	230	300	2,1	230x123x62
702937	PlugIn			600	3,5	324x170x68
702939	PlugIn			1000	5,2	390x223x101
702941	PlugIn			1500	6,2	420x223x101
702943	PlugIn			2000	6,5	420x289x100
702949	PlugIn	24	230	1000	5,2	390x223x101
702951	PlugIn			1500	6,2	420x223x101
702953	PlugIn			2000	6,5	420x289x100
702955	PlugIn			3000	TBD	TBD



Control panel

Item No.	702912	Remote panel for inverter 300/600VA
Item No.	702913	Remote panel for inverter 1000/1500/2000VA



Extractor tools

In order to use the tools one needs the main tools, extractor and taper clamping sleeve. Extractor and taper clamping sleeve can be purchased separately in 4 different sizes depending on the inside diameter of the frost plug being dismantled.

The tool is suitable for deep frost plugs and functions like an extractor. It is securely tightened around the side walls of the frost plug by tightening the nut. Next, a suitable adapter sleeve is attached. The frost plug is gradually pulled off by tightening the nut. Follow the instructions which come with the tools! These tools come separately or in a complete set.

	Complete extractor tools
Item No.	491012
Consists of main tools (491011), 4 extractor tools (491006) og 4 taper clamping sleeves (491005).	
	Main tools
Item No.	491011
	Extractor
Item No. complete set (4 extractors)	491006
Item No. (Ø20mm)	491001
Item No. (Ø27mm)	491002
Item No. (Ø34mm)	491003
Item No. (Ø42mm)	491004
	Taper clampings
Item No. complete set (4 taper clampings)	491005
Item No. (Ø31mm)	491007
Item No. (Ø36mm)	491008
Item No. (Ø39mm)	491009
Item No. (Ø46mm)	491010
	Extractor hook
Item No. 30,5mm	460835
Item No. 37,5mm	460836
Item No. 44,5mm	460837

Special tools

Tools for installation of MiniPlug and for installation of cables through the firewall.

	Pullwire tool
Item No.	460864
No. of pcs.	3
Tool for easier installation of DEFA Termini™ extension cable through the firewall. 3 equal.	
	Pullwire kit 866
Item No.	460866
No. of pcs.	1 set
Tool for easier installation of PlugIn extension cables with male or female contact through the firewall. Delivered with 2 extensions of 1m.	
	Pullwire kit 868
Item No.	460868
No. of pcs.	2
Tool for easier installation of PlugIn extension cables with male or female contact through the firewall. Delivered with 2 extensions of 1m.	
	Installation tool
Item No.	460840
Hole saw Ø24mm	For MiniPlug inlet cable
Hole saw Ø20mm	For Interior heater cable
File	For MiniPlug feed track
Hole saw retainer	With pilot hole drill
	Tools for feed through bulkhead
Item No.	460862
Put the tools on PlugIn male or female contact for easier installation through the firewall.	
	Crow foot tool
Item No.	460867
Crow foot 27mm. Mounting- and dismantling tool for easier installation of the following engine heaters: 241, 277, 292, 299.	
	Tool for heater 241
Item No.	460861
Steering tool for Allen wrench.	

Security

DVS90 is a modern alarm system designed on a flexible electronic platform that contributes to a very easy set up and installation. The alarm can be installed in all vehicles regardless of type of electric and electronic systems.

SECURITY ALARM

The alarm has digital interfaces for all types of CAN buses found in modern cars and also provides interfaces for analog as well as semi-digital inputs with corresponding functionality for support of older vehicles or boats. The alarm can be installed in all vehicles utilizing 12V or 24V battery systems. Assisted by car specific installation drawings and excellent support from www.defa.com the DVS90 will always be number one when it comes to installation time and reliability. To raise the security level further, additional plug and play sensors are available.



DVS90 CENTRAL UNIT

The brain of the alarm system, which communicates with sensors, the siren, and the car's electronic system.



WINDOW MODULE

The flashing blue LED inside the windscreen shows potential car thieves that the car is equipped with a DEFA alarm. The built-in glass breakage sensor triggers the alarm if a window is broken.



SIREN/BACK-UP SIREN

The siren emits a high pitched alarm sound when the alarm is triggered. The back-up siren also sounds if the power wire is cut or the car battery is disconnected.



WINDOW DECAL

The decals have a preventive effect: they inform intruders an alarm is installed. Thieves prefer cars without alarms!



MOTION SENSOR

Registers movement inside the car. The sensor uses microwave technology to provide optimum security without false alarms. (Accessory).



LEVEL SENSOR

Detects changes in angle and attempts to tow away the car. Provides the best security against jacking up and theft of wheels. (Accessory).



REMOTE CONTROL

An optional remote control for your car alarm, which can be used in addition to or instead of your car's original remote control.



2-CIRCUIT IMMOBILISER

For starter kill and fuel cut. (Accessory).



TRACKING UNIT - DT20

DEFA's Tracking unit can be connected to DVS90 for instant notification of triggered alarm. (Accessory).

Tracking

DT20 is a GSM/GPS-based tracking product where all electronic elements are gathered together in a small unit. The unit comes with a preinstalled SIM-card. The system is also suitable for installation in cars, outboard engines, motor cycles, ATV etc.



DT20

Fence alarm (initiate tracking)

Supply voltage 8-30 VDC

Built-in angle sensor (Accelerometer)

Built-in antennas

Preinstalled SIM-card

2 types of subscription (DEFA Basic and DEFA Basic Light)

Easy registration on web

GSM frequency band 900 and 1800 mHz (dual band)

Integrated back-up battery (48 hours operation)

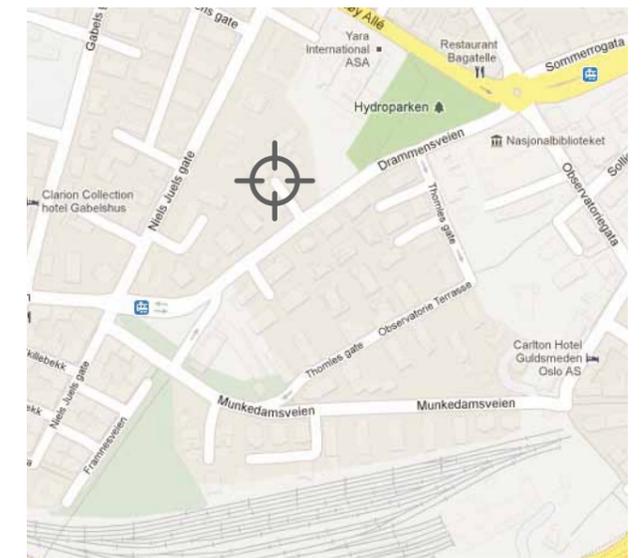
Super sensitive 16 channels GPS receiver

1 SMS controllable output (max. 500 mA)

1 input (e.g. alarm)

SMS alarms: battery alarm, power alarm, fence alarm, speed alarm.

Update of new software through GPRS.



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