

**FILON FUTURE®**

CHARGING AT ITS BEST

# ONE TOUCH TO ~~MAXIMAL~~ EFFICIENCY

CHARGING SYSTEMS RESONANCE FREQUENCY TECHNOLOGY





Exterior view of a modern industrial building at night, illuminated by blue lights, with the logo 'IEB' visible.

# SAUERLAND POWERLAND GREEN BY NATURE

Our company headquarters is located in the middle of the Sauerland region of Germany in a town called Brilon. Brilon is called the "City of the Forest". Just like the green environment that surrounds us, "green" is how we think.

During times of strong growth in our core market segments:

- Logistics/ Intralogistics
  - Traction batteries
  - Rehabilitation Products
  - Cleaning machines
  - Electric mobility
- an effective, efficient and ecological charging system plays an increasingly important role.

For this purpose, our mission statement must be to continue to achieve optimization in power electronics and charging technologies.

Only a combination of a maximally efficient charging system with an ecologically sustainable design will achieve the best results. This is not only for the user, but also for our environment.

SAUERLAND-ENERGY

97%  
**MAXIMAL  
EFFICIENCY**

## IT CAN NOT BE MORE **EFFECTIVE** MINIMIZED POWER LOSSES

With the Filon FuturE, we present the first fully resonant switching RF charging system in the world.

In principle, HF chargers are „switching power supplies“, which means that electronic switches are switched on and off at high frequency (50-100 kHz). In the commercially available HF chargers, this process is „quasi-resonant“ or „hard“, which inevitably leads to switching losses.

With the new Filon FuturE, IEB has developed a state-of-the-art charger that is ahead of its time: A new multi-resonance converter technology as a core innovation guarantees

very „soft“, lossless, high frequency switching (from 50 kHz to 170 kHz) over the entire operating range of a full charging cycle.

This RF technology is new for charging devices and guarantees a maximum efficiency of up to 97%. In addition, a maximum total charging efficiency is achieved in connection with the improved Futur characteristic.

In multi-module operation, an innovative, intelligent module activation management also optimizes energy consumption even further during partial load operation and increases the service life.

**SOFT-ON-OFF-FUNCTION**



# IT'S SO COOL

THE CLEAN SOLUTION

An innovative, „encapsulated active cooling“ system for the power electronics guarantees a longer service life and saves money as well as resources.

The high efficiency of the Filon FuturE with the new full resonance converter simultaneously minimizes heat losses. For this reason, direct active cooling of the electrical

system using a fan is not necessary. The passive convection cooling system prevents dirt and grime from penetrating into the device and thus protects the electronic modules. This increases the service life of the charger and significantly minimizes contamination by water, dust, and acid. This permanently reduces the service, replacement part, and material costs.

COOL PASSIVE - SAVE ACTIVE



# SMART CONTROL

## MONITORING AND MANAGEMENT SYSTEM

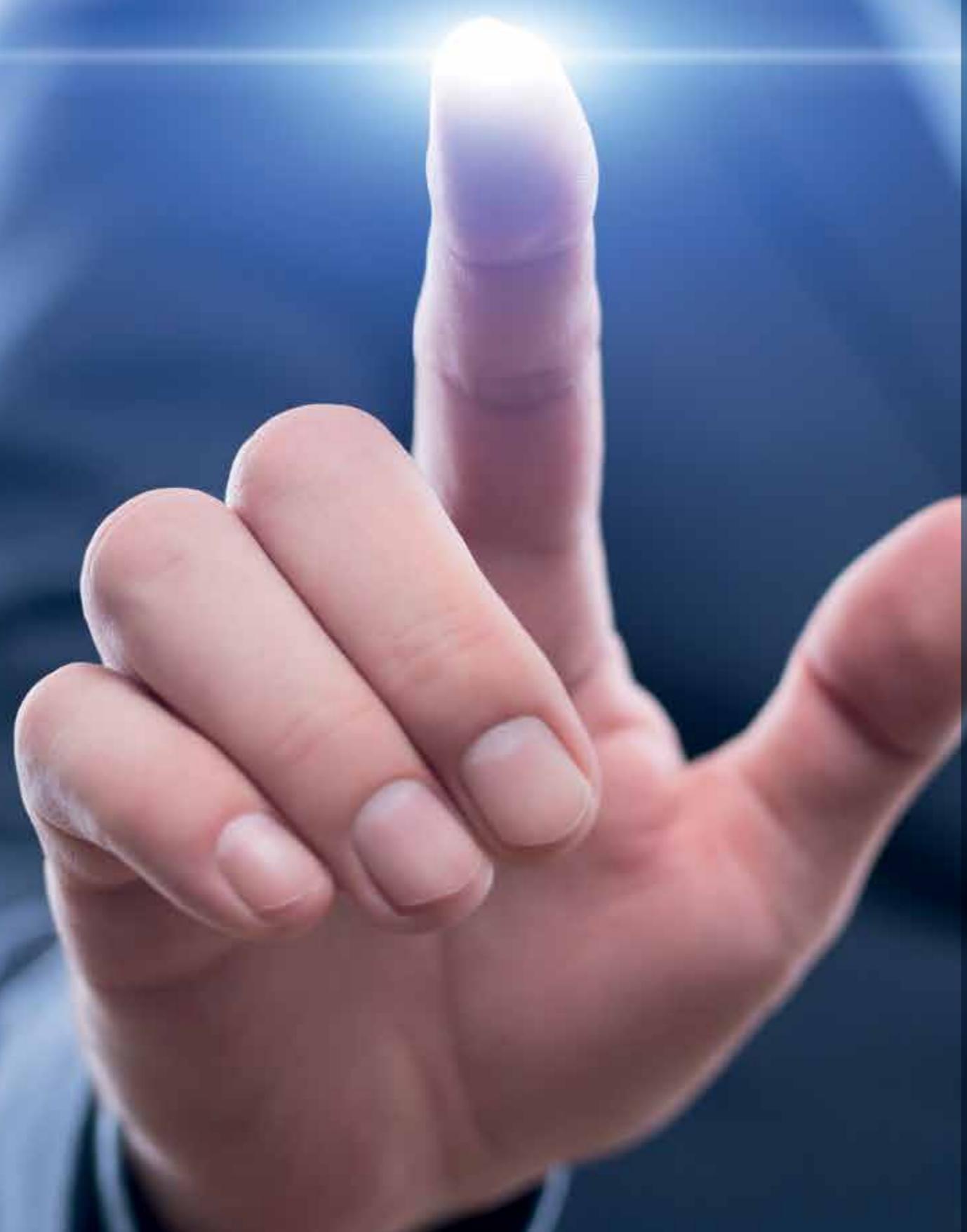
The new Smart Control wireless monitoring and management system permanently optimizes battery usage and the vehicle management, and thus saves resources.

Smart Control offers the ability to use the proven IEB management systems more effectively (through an innovative wireless networking capability) and can be expanded selectively using our new monitoring modules. The following system modules can be combined:

- ILight Wireless, the proven, intelligent monitoring system with wireless networking
- All Pairs Battery Management, with the new wireless battery controller
- Central monitoring of batteries and chargers (can be configured individually)
- NetVision, remote access to batteries and chargers via the Internet/mobile phone network
- IEB ConVision app with a monitoring and scanning function for tablets and smartphones



WIRELESS



# EASY TOUCH

PROGRAMMING VIA TOUCH DISPLAY

The Filon FuturE resonant frequency charging devices are now available with the new Easy Touch graphic display in addition to the proven „one button“ operating unit.

Using the Easy Touch resistive touch screen with its clear and structured

menus, you can quickly select between 32 different charging programs for different types of batteries and different battery capacities and can switch to an optional Expert Charger in the settings menu for individual programming of parameters.

SIMPLE HANDLING



## QUICK CHECK & CHANGE

SERVICE-FRIENDLY DESIGN

The modular IEB system that has proven itself over many years is also continued in the Filon FutureE and further optimized with Quick Check & Change.

Quick Check & Change allows very effective inspection of the charging device and quick, time-saving servicing.

The status of the charger and possible application errors can be queried very quickly via the IEB ConVision app, the Easy Touch display, or

the USB interface. When service is required, the service technician has very quick access to the charger (via the handy front panel) and has at a glance a full overview of the status of the charging controller, the power module, and the power phases available. If necessary, the power modules can be swapped quickly and easily using the new plug-in system on the side panel.

The charger can continue to operate in the „In-Service“ mode even when fewer modules are installed.

SIMPLY FAST

NEW



# THAT FITS

## ONE CHARGER FOR ALL BATTERIES

Benefit from our new and innovative battery management system called AllPairs.

In combination with Abertax's battery sensor „e<sup>2</sup>BMS“ and the matching IEB interface „AllPairs“, wireless communication between the battery and the charger is made possible. This allows the charger to automatically adapt to batteries with varying nominal data (battery voltage, battery capacity, battery type). This prevents misuse by the user and guarantees optimum

charging from each properly matched battery charger.

Advantages:  
**Significant extension of battery life**  
Consideration and adaptation to the usage profile of the battery

**Highest level of security**  
Charging profile optimally adapted to the battery

**Maximum flexibility**  
„AllPairs“ - every charger can charge every battery

ALL PAIRS

THE INTELLIGENT SYSTEM



# ECO ENERGY

## INTELLIGENT CHARGING

The foremost design goal in IEB innovations, regardless of whether they are used individually or in a group, is always to conserve natural resources and reduce the environmental impact.

Regardless of whether the new high efficiency Filon FuturE is used

in combination with the patented Futur charging process or the charging station is managed with Smart Control, the environment as well as the users benefit equally from innovative energy-, time-, cost-, and resource-saving system solutions designed by IEB.

PROTECT NATURE



## STATE OF THE ART HF-CHARGING SYSTEMS OF THE HIGHEST QUALITY



Charging voltage max. rated output	2 V - 48V 1,5kW	2 V - 96V 3,4kW	2 V - 96V 40kW
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- Maximum energy efficiency with a highest efficiency of up to  $\eta = 97\%$ , realized through:
  - A pioneering multi-resonance converter technology for charging devices that is one-of-a-kind in the world.
  - An intelligent activation management system for the charging modules when operating under a partial load for 3-phase devices
  - A significantly reduced standby power consumption
- Very high flexibility and dynamic characteristics settings (up to 32 characteristics can be stored)
- „In-Service“ operation after the removal of individual modules with reduced charging performance corresponding to the power available from the remaining modules
- Encapsulated cooling of the power semiconductors using heat sinks to keep dust and grime to a minimum
- Improved, noise-optimized electrolyte circulation unit
- Separate signaling of a „missing battery“ using an additional white LED
- Charger with a support operation function available in 12 and 24 V for automobile and truck applications

### Suitable Battery Types

- Lead acid batteries – low-maintenance (PzS, PzB, GiS) and maintenance-free (PzV, GiV, AGM,...)
- Nickel cadmium batteries
- Li-ion batteries (optionally available with a CAN interface)
- Programming of further battery types on request

### Guaranteed Quality

IEB high-frequency charging systems comply with the EU standards for EMC and electrical safety.  
The IEB Company is certified according to DIN EN ISO 9001:2015.

### Futur Charging Technology – Intelligent and Flexible

- Patented brand quality for highly efficient and very smooth battery charging
  - IEB charging characteristic for monobloc batteries
  - IEB charging characteristic for tray batteries
- Ideal charging DC with very low ripple
- Dynamic adjustment to the battery's age, temperature and state of charge
- Soft-start function after deep discharge from 0.5V per cell (corresponds to 1/4 of the nominal battery voltage)

### ECO Energy – Charging with the highest possible energy efficiency

- High system efficiency of up to 97%
- In connection with the improved Futur characteristic, a maximum charging efficiency will be achieved
- Intelligent solution for wireless networking – save resources using an easy-to-install battery monitor

### Easy operation and application – flexible and safe

- Standard USB interface for communication with data media:
  - Update the firmware
  - Read out the charging history
  - Activation of additional functions
  - Ability to control access to the charger settings
- Intuitive operation via a 4.3" multilingual touch screen with a real-time clock and time zone setting
- Filon Futur Expert – extended operating functionality and optimized, intuitive operation using touch screen menus

### Quick Check & Change

- Quick and easy inspection of the charger using the IEB ConVision app, the USB interface, and the Easy Touch display
- Faster access to the charger through the front panel since there is only one screw to loosen
- Modular design of the charger with an innovative plug-in technology and an cabinet concept that includes access from the side
- Expanded charging history with additional data records and more space

### Smart Control

- The new Smart Control wireless monitoring and management system permanently optimizes battery usage and the vehicle management system, and thus saves resources. The following system modules can be combined:
  - ILight Wireless, the proven, intelligent monitoring system with wireless networking
  - All Pairs Battery Management, with the new wireless battery controller
  - BatVision, connects non-IEB-chargers to the ILight system
  - Central monitoring of batteries and chargers (can be configured individually)
  - NetVision, remote access to batteries and chargers via the Internet/mobile phone network
  - IEB ConVision app with a monitoring and scanning function for tablets and smartphones



### CHARGER SPECIFICATION

#### FILON FUTURE<sup>®</sup> Characteristics

Charging voltages: 12V, 24V, 36V or 48V  
 Max. rated output: 1,5 kW  
 Mains voltages: 200-230V 50/60 Hz  
 Protection category: IP 21 higher protection categories up to IP 54 on request  
 Protection class: I

M	Cabinet	Width	Height	Depth
	RF 190	293	170	115
	RF 210	330	245	115
	RF 450.2	430	270	130

#### FILON FUTURE<sup>®</sup> Options

- Easy Touch graphic display clear and structured menus guide you intuitively to select and change charger settings. It also shows essential charging data. Optionally Easy Touch graphic display is available as remote application
- Automotive Support-Mode operation available in 12 and 24 V for automotive applications. Provides dc power supply for car electronics without having a battery connected
- CAN-Interface e.g. to establish data transfer and communication between Li-Ion batteries, vehicles and chargers
- IEB App ConVision Monitoring and read-out App for tablets and smartphones
- I-Light (Wireless) the proven, intelligent monitoring system for charging stations, now available with wireless networking
- Filon Future Expert with extended operation features, optimized handling and intuitive setting via Touchscreen menus
- ID-Chip Battery identification and assignment with ID chip. The charger will be set automatically.
- Cool Down Indication Indication of the cool-down phase when charging is completed
- Timer-function allows to program and set charging start time per weekday to prevent peak loads
- Temperature compensation Temperature-controlled charging, e. g. for cold store applications
- Signal lights External machine lamp to view the signaling of the state of charge over a long distance

### CHARGER SELECTION TABLE

Output Voltage	Charger Type	Nominal Current [A]	Charging Curve/Charging Time/Battery Capacity K <sub>sh</sub> [Ah]								Current [A]	Cabinet	Weight [kg]	Type No.
			Wet <sup>1</sup> -Batt. Wet <sup>1</sup> -Futur Wet <sup>1</sup> -EUW GiV; PzV	7,5-8,5 h 6,5-7,5 h <sup>2</sup> 5,5-6,5 h	8,5-9,5 h 7,5-8,5 h <sup>2</sup> 6,5-7,5 h	9,5-11 h 8,5-10 h <sup>2</sup> 7,5-9 h	11-14 h 10-14 h 9-12 h	IUla (GiV)	IUla (PzV)	IUla				
12 V	E 230 G 12 / 6	B45-FP	0,4	30 - 48	38 - 48	48 - 60	60 - 75	34 - 51	40 - 50	102	RF 190	4,5	731006	
	E 230 G 12 / 8	B45-FP	0,6	40 - 50	50 - 64	64 - 80	80 - 100	45 - 67	54 - 67	136	RF 190	4,5	731010	
	E 230 G 12 / 10	B45-FP	0,7	50 - 62	63 - 80	80 - 100	100 - 125	56 - 84	67 - 83	169	RF 190	4,5	731010	
	E 230 G 12 / 12	B45-FP	0,9	60 - 75	75 - 96	96 - 120	120 - 150	67 - 100	80 - 100	203	RF 190	4,5	731012	
	E 230 G 12 / 15	B45-FP	1,1	75 - 93	94 - 120	120 - 150	150 - 187	84 - 126	100 - 125	254	RF 190	4,5	731015	
	E 230 G 12 / 20	B45-FP	1,5	100 - 125	125 - 160	160 - 200	200 - 250	112 - 168	134 - 167	339	RF 190	4,5	731020	
	E 230 G 12 / 25	B45-FP	1,8	125 - 156	157 - 200	200 - 250	250 - 312	139 - 208	167 - 208	424	RF 190	4,5	731025	
	E 230 G 12 / 30	B45-FP	2,2	150 - 187	188 - 240	240 - 300	300 - 375	167 - 250	200 - 250	508	RF 190	4,5	731030	
	E 230 G 12 / 35	B45-FP	2,6	175 - 218	219 - 280	280 - 350	350 - 437	195 - 292	234 - 292	593	RF 190	4,5	731035	
	E 230 G 12 / 40	B45-FP	2,9	200 - 250	250 - 320	320 - 400	400 - 500	223 - 334	267 - 333	678	RF 190	4,5	731040	
	E 230 G 12 / 45	B45-FP	3,3	225 - 281	282 - 360	360 - 450	450 - 562	250 - 375	300 - 375	762	RF 190	4,5	731045	
	E 230 G 12 / 50	B45-FP	3,7	250 - 312	313 - 400	400 - 500	500 - 625	278 - 417	334 - 417	847	RF 190	4,5	731050	
	E 230 G 24 / 6	B45-FP	0,9	30 - 48	38 - 48	48 - 60	60 - 75	34 - 51	40 - 50	196	RF 190	4,5	730006	
	E 230 G 24 / 8	B45-FP	1,1	40 - 50	50 - 64	64 - 80	80 - 100	45 - 67	54 - 67	261	RF 190	4,5	730008	
	E 230 G 24 / 10	B45-FP	1,4	50 - 62	63 - 80	80 - 100	100 - 125	56 - 84	67 - 83	326	RF 190	4,5	730010	
	E 230 G 24 / 12	B45-FP	1,7	60 - 75	75 - 96	96 - 120	120 - 150	67 - 100	80 - 100	391	RF 190	4,5	730012	
	E 230 G 24 / 15	B45-FP	2,1	75 - 93	94 - 120	120 - 150	150 - 187	84 - 126	100 - 125	489	RF 190	4,5	730015	
	E 230 G 24 / 20	B45-FP	2,8	100 - 125	125 - 160	160 - 200	200 - 250	112 - 168	134 - 167	652	RF 190	4,5	730020	
	E 230 G 24 / 25	B45-FP	3,5	125 - 156	157 - 200	200 - 250	250 - 312	139 - 208	167 - 208	815	RF 190	4,5	730025	
	E 230 G 24 / 30	B45-FP	4,3	150 - 187	188 - 240	240 - 300	300 - 375	167 - 250	200 - 250	978	RF 190	4,5	730030	
	E 230 G 24 / 35	B45-FP	5	175 - 218	219 - 280	280 - 350	350 - 437	195 - 292	234 - 292	1140	RF 190	4,5	730035	
	E 230 G 24 / 40	B45-FP	5,7	200 - 250	250 - 320	320 - 400	400 - 500	223 - 334	267 - 333	1303	RF 190	4,5	730040	
	E 230 G 24 / 45	B45-FP	6,5	225 - 281	282 - 360	360 - 450	450 - 562	250 - 375	300 - 375	1466	RF 190	4,5	730045	
	E 230 G 24 / 50	B45-FP	7,1	250 - 312	313 - 400	400 - 500	500 - 625	278 - 417	334 - 417	1620	RF 190	4,5	730050	
36 V	E 230 G 36 / 10	B45-FP	2,1	50 - 62	63 - 80	80 - 100	100 - 125	56 - 84	67 - 83	482	RF 190	4,5	733010	
	E 230 G 36 / 12	B45-FP	2,5	60 - 75	75 - 96	96 - 120	120 - 150	67 - 100	80 - 100	579	RF 190	4,5	733012	
	E 230 G 36 / 15	B45-FP	3,1	75 - 93	94 - 120	120 - 150	150 - 187	84 - 126	100 - 125	723	RF 190	4,5	733015	
	E 230 G 36 / 20	B45-FP	4,2	100 - 125	125 - 160	160 - 200	200 - 250	112 - 168	134 - 167	964	RF 190	4,5	733020	
	E 230 G 36 / 25	B45-FP	5,2	125 - 156	157 - 200	200 - 250	250 - 312	139 - 208	167 - 208	1206	RF 190	4,5	733025	
	E 230 G 36 / 30	B45-FP	6,3	150 - 187	188 - 240	240 - 300	300 - 375	167 - 250	200 - 250	1447	RF 190	4,5	733030	
	E 230 G 36 / 35	B45-FP	7,1	175 - 218	219 - 280	280 - 350	350 - 437	195 - 292	234 - 292	1629	RF 190	4,5	733035	
48 V	E 230 G 48 / 10	B45-FP	2,8	50 - 62	63 - 80	80 - 100	100 - 125	56 - 84	67 - 83	639	RF 190	4,5	734010	
	E 230 G 48 / 12	B45-FP	3,3	60 - 75	75 - 96	96 - 120	120 - 150	67 - 100	80 - 100	766	RF 190	4,5	734012	
	E 230 G 48 / 15	B45-FP	4,2	75 - 93	94 - 120	120 - 150	150 - 187	84 - 126	100 -					



### CHARGER SPECIFICATION

#### FILON FUTURE Characteristics

Charging voltages: 24V, 36V, 48V or 80V  
 Max. rated output: 3,4kW  
 Mains voltages: 100-230V 50/60 Hz  
 Protection category: IP 21 higher protection categories up to IP 54 on request  
 Protection class: I

	Cabinet	Width	Height	Depth
RF 450	430	270	130	
RF 455	430	415	165	

#### FILON FUTURE Options

- Easy Touch graphic display clear and structured menus guide you intuitively to select and change charger settings. It also shows essential charging data. Optionally Easy Touch graphic display is available as remote application
- Automotive Support-Mode operation available in 12 and 24 V for automotive applications. Provides dc power supply for car electronics without having a battery connected
- CAN-Interface e.g. to establish data transfer and communication between Li-Ion batteries, vehicles and chargers
- IEB App ConVision Monitoring and read-out App for tablets and smartphones
- I-Light (Wireless) the proven, intelligent monitoring system for charging stations, now available with wireless networking
- Filon Futur Expert with extended operation features, optimized handling and intuitive setting via Touchscreen menus
- ID-Chip Battery identification and assignment with ID chip. The charger will be set automatically.
- Cool Down Indication Indication of the cool-down phase when charging is completed
- Timer-function allows to program and set charging start time per weekday to prevent peak loads
- Temperature compensation Temperature-controlled charging, e. g. for cold store applications
- Signal lights External machine lamp to view the signaling of the state of charge over a long distance

### CHARGER SELECTION TABLE

Output Voltage	Charger Type	Nominal Current [A]	Charging Curve/Charging Time/Battery Capacity K <sub>sh</sub> [Ah]								Current [A]	Cabinet	Weight [kg]	Type No.				
			IULa		IULa		IULa		IULa									
			Wet <sup>1</sup> -Batt. Wet <sup>1</sup> -Futur Wet <sup>1</sup> -EUW GiV; PzV	7,5-8,5 h 6,5-7,5 h <sup>2</sup> 5,5-6,5 h	8,5-9,5 h 7,5-8,5 h <sup>2</sup> 6,5-7,5 h	9,5-11 h 8,5-10 h <sup>2</sup> 7,5-9 h	11-14 h 10-14 h 9-12 h	11-14 h 10-14 h 9-12 h	-	-								
<b>24 V</b>	E 230 G 24 / 40 B30-FP	40	200 - 250	250 - 320	320 - 400	400 - 500	222 - 333	267 - 333	5,5	RF 450	12	772040						
	E 230 G 24 / 45 B30-FP	45	225 - 281	282 - 360	360 - 450	450 - 562	250 - 375	300 - 375	6,2	RF 450	12	772045						
	E 230 G 24 / 50 B30-FP	50	250 - 312	313 - 400	400 - 500	500 - 625	278 - 417	333 - 417	6,9	RF 450	12	772050						
	E 230 G 24 / 60 B30-FP	60	300 - 375	375 - 480	480 - 600	600 - 750	333 - 500	400 - 500	8,2	RF 450	12	772060						
	E 230 G 24 / 65 B30-FP	65	325 - 406	407 - 520	520 - 650	650 - 812	362 - 543	434 - 542	8,9	RF 450	12	772065						
	E 230 G 24 / 70 B30-FP	70	350 - 437	438 - 560	560 - 700	700 - 875	389 - 583	467 - 583	9,6	RF 450	12	772070						
	E 230 G 24 / 75 B30-FP	75	375 - 468	469 - 600	600 - 750	750 - 937	416 - 625	500 - 625	10,3	RF 450	12	772075						
	E 230 G 24 / 80 B30-FP	80	400 - 500	500 - 640	640 - 800	800 - 1000	444 - 667	533 - 667	11,0	RF 450	12	772080						
	E 230 G 24 / 90 B30-FP	90	450 - 562	563 - 720	720 - 900	900 - 1125	500 - 750	600 - 750	12,4	RF 450	12	772090						
	E 230 G 24 / 100 B30-FP	100	500 - 625	625 - 800	800 - 1000	1000 - 1250	556 - 833	667 - 833	13,7	RF 450	12	772100						
	E 230 G 24 / 110 B30-FP	110	550 - 687	688 - 880	880 - 1100	1100 - 1375	611 - 916	733 - 916	13,4	RF 450	12	772110						
	E 230 G 24 / 120 B30-FP	120	600 - 750	750 - 960	960 - 1200	1200 - 1500	667 - 1000	800 - 1000	14,6	RF 450	12	772120						
<b>36 V</b>	E 230 G 36 / 30 B30-FP	30	150 - 187	188 - 240	240 - 300	300 - 375	167 - 250	200 - 250	6,1	RF 450	12	773030						
	E 230 G 36 / 35 B30-FP	35	175 - 218	219 - 280	280 - 350	350 - 437	194 - 292	233 - 292	7,1	RF 450	12	773035						
	E 230 G 36 / 40 B30-FP	40	200 - 250	250 - 320	320 - 400	400 - 500	222 - 333	267 - 333	8,1	RF 450	12	773040						
	E 230 G 36 / 45 B30-FP	45	225 - 281	282 - 360	360 - 450	450 - 562	250 - 375	300 - 375	9,1	RF 450	12	773045						
	E 230 G 36 / 50 B30-FP	50	250 - 312	313 - 400	400 - 500	500 - 625	278 - 417	333 - 417	10,2	RF 450	12	773050						
	E 230 G 36 / 60 B30-FP	60	300 - 375	375 - 480	480 - 600	600 - 750	333 - 500	400 - 500	12,2	RF 450	12	773060						
	E 230 G 36 / 65 B30-FP	65	325 - 406	407 - 520	520 - 650	650 - 812	362 - 543	434 - 542	13,2	RF 450	12	773065						
<b>48 V</b>	E 230 G 48 / 35 B30-FP	35	175 - 218	219 - 280	280 - 350	350 - 437	194 - 292	233 - 292	9,4	RF 450	12	774035						
	E 230 G 48 / 40 B30-FP	40	200 - 250	250 - 320	320 - 400	400 - 500	222 - 333	267 - 333	10,8	RF 450	12	774040						
	E 230 G 48 / 45 B30-FP	45	225 - 281	282 - 360	360 - 450	450 - 562	250 - 375	300 - 375	5,5	RF 450	12	774045						
	E 230 G 48 / 50 B30-FP	50	250 - 312	313 - 400	400 - 500	500 - 625	278 - 417	333 - 417	13,5	RF 450	12	774050						
	E 230 G 48 / 55 B30-FP	55	275 - 343	344 - 440	440 - 550	550 - 687	306 - 459	367 - 458	14,8	RF 450	12	774060						
	E 230 G 48 / 60 B30-FP	60	300 - 375	375 - 480	480 - 600	600 - 750	333 - 500	400 - 500	14,3	RF 450	12	774065						
	E 230 G 48 / 65 B30-FP	65	325 - 406	407 - 520	520 - 650	650 - 812	362 - 543	434 - 542	15,0	RF 450	12	774070						
<b>80 V</b>	E 230 G 80 / 10 B30-FP	10	50 - 62	63 - 80	80 - 100	100 - 125	56 - 83	67 - 83	4,4	RF 450	12	778010						
	E 230 G 80 / 15 B30-FP	15	75 - 93	94 - 120	120 - 150	150 - 187	83 - 125	100 - 125	6,7	RF 450	12	778015						
	E 230 G 80 / 20 B30-FP	20	100 - 125	125 - 160	160 - 200	200 - 250	111 - 167	133 - 167	8,9	RF 450	12	778020						
	E 230 G 80 / 25 B30-FP	25	125 - 156	157 - 200	200 - 250	250 - 312	139 - 208	167 - 208	11,1	RF 450	12	778025						
	E 230 G 80 / 30 B30-FP	30	150 - 187	188 - 240	240 - 300	300 - 375	167 - 250	200 - 250	13,3	RF 450	12	778030						
	E 230 G 80 / 35 B30-FP	35	175 - 218	219 - 280	280 - 350	350 - 437	194 - 292	233 - 292	13,7	RF 450	12	778035						
	E 230 G 80 / 40 B30-FP	40	200 - 250	250 - 320	320 - 400	400 - 500	222 - 333	267 - 3										



### CHARGER SPECIFICATION

#### FILON FUTURE<sup>®</sup> Characteristics

Charging voltages:	24V, 36V, 48V or 80V
Max. charging current:	400A
Max. rated output:	40kW
Mains voltages:	220-400V 50/60Hz
Protection category:	IP 21 higher protection categories up to IP 54 on request
Protection class:	I

	Cabinet	Width	Height	Depth
	RF 550	430	415	355
	RF 560	430	520	355
	RF 650	430	735	355
	RF 750	430	840	355
	RF 950	430	1015	355
	RF 1250	455	1240	545

#### FILON FUTURE<sup>®</sup> Options

- Easy Touch graphic display clear and structured menus guide you intuitively to select and change charger settings. It also shows essential charging data. Optionally Easy Touch graphic display is available as remote application
- CAN-Interface e.g. to establish data transfer and communication between Li-Ion batteries, vehicles and chargers
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- Timer-function allows to program and set charging start time per weekday to prevent peak loads
- Temperature compensation Temperature-controlled charging, e. g. for cold store applications
- Signal lights External machine lamp to view the signaling of the state of charge over a long distance

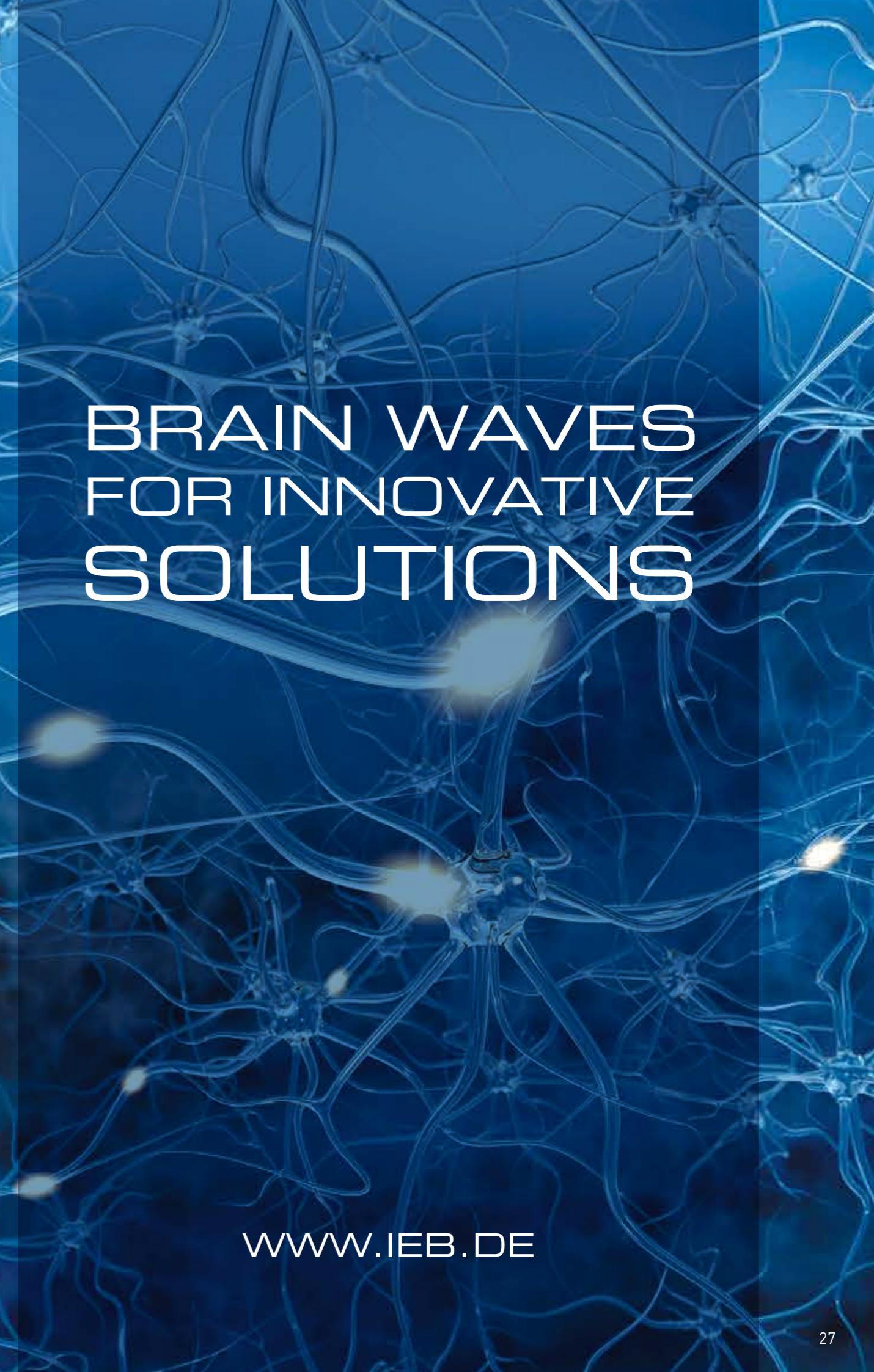
CHARGER SELECTION TABLE

Output Voltage	Charger Type	Nominal Current [A]	Charging Curve/Charging Time/Battery Capacity K <sub>sh</sub> [Ah]								Current [A]	Cabinet	Weight [kg]	Type No.
			Wet <sup>1</sup> -Batt.	8.5-8.5 h	8.5-9.5 h	9.5-11 h	11-14 h	-	-	-				
<b>24 V</b>	Wet <sup>1</sup> -Futur	7,5-7,5 h <sup>2</sup>	6,5-7,5 h <sup>2</sup>	7,5-8,5 h <sup>2</sup>	8,5-10 h <sup>2</sup>	10-14 h	-	-	-	-	11-14 h	12-14 h		
	Wet <sup>1</sup> -EUW	5,5-6,5 h	-	-	-	-	-	-	-	-	-	-		
	Giv; PzV	-	-	-	-	-	-	-	-	-	-	-		
	Z 400 G 24 / 110 B30-FP	110	550 - 687	688 - 880	880 - 1100	1100-1375	612 - 918	734 - 917	7,6	RF 550	30	772111		
	Z 400 G 24 / 120 B30-FP	120	600 - 750	750 - 960	960 - 1200	1200-1500	667-1000	800-1000	8,2	RF 550	30	772121		
	Z 400 G 24 / 130 B30-FP	130	650 - 812	813 - 1040	1040-1300	1300-1625	723-1084	867-1083	8,9	RF 550	30	772130		
	Z 400 G 24 / 140 B30-FP	140	700 - 875	875 - 1120	1120-1400	1400-1750	778-1167	934-1167	9,6	RF 550	30	772140		
	Z 400 G 24 / 150 B30-FP	150	750 - 937	938 - 1200	1200-1500	1500-1875	834-1251	1000-1250	10,3	RF 550	30	772150		
	Z 400 G 24 / 160 B30-FP	160	800 - 1000	1000-1280	1280-1600	1600-2000	889-1333	1067-1333	11,0	RF 550	30	772160		
	Z 400 G 24 / 170 B30-FP	170	850 - 1062	1063-1360	1360-1700	1700-2125	945-1417	1134-1417	11,7	RF 550	30	772170		
	Z 400 G 24 / 180 B30-FP	180	900 - 1125	1125-1440	1440-1800	1800-2250	1000-1500	1200-1500	12,4	RF 550	30	772180		
	Z 400 G 24 / 190 B30-FP	190	950 - 1187	1188-1520	1520-1900	1900-2375	1056-1584	1267-1583	12,9	RF 550	37	772250		
	Z 400 G 24 / 200 B30-FP	200	1000-1250	1250-1600	1600-2000	2000-2500	1162-1668	1334-1667	20,3	RF 560	45	772260		
	Z 400 G 24 / 210 B30-FP	210	1050-1312	1313-1680	1680-2100	2100-2625	1167-1750	1400-1750	21,3	RF 560	45	772270		
	Z 400 G 24 / 220 B30-FP	220	1100-1375	1375-1760	1760-2200	2200-2750	1223-1834	1467-1833	22,8	RF 550	37	772280		
	Z 400 G 24 / 230 B30-FP	230	1150-1437	1438-1840	1840-2300	2300-2875	1278-1917	1534-1917	22,4	RF 560	45	772230		
	Z 400 G 24 / 240 B30-FP	240	1200-1500	1500-1920	1920-2400	2400-3000	1334-2083	1667-2083	23,4	RF 560	45	772240		
	Z 400 G 24 / 250 B30-FP	250	1250-1562	1563-2000	2000-2500	2500-3125	1389-2083	1667-2083	24,4	RF 560	45	772250		
	D 400 G 24 / 260 B30-FP	260	1300-1625	1625-2080	2080-2600	2600-3250	1445-2167	1734-2167	24,6	RF 560	45	772260		
	D 400 G 24 / 270 B30-FP	270	1350-1687	1688-2160	2160-2700	2700-3375	1500-2250	1800-2250	21,9	RF 650	65	772270		
	D 400 G 24 / 280 B30-FP	280	1400-1750	1750-2240	2240-2800	2800-3500	1556-2334	1867-2333	22,8	RF 650	65	772280		
	D 400 G 24 / 300 B30-FP	300	1500-1875	1875-2400	2400-3000	3000-3750	1667-2500	2000-2500	24,4	RF 650	65	772300		
<b>36 V</b>	Z 400 G 36 / 70 B30-FP	70	350 - 437	438 - 560	560 - 700	700 - 875	389 - 583	467 - 583	7,1	RF 550	30	773070		
	Z 400 G 36 / 75 B30-FP	75	375 - 468	469 - 600	600 - 750	750 - 937	417 - 625	500 - 625	7,6	RF 550	30	773075		
	Z 400 G 36 / 80 B30-FP	80	400 - 500	500 - 640	640 - 800	800-1000	445 - 667	534 - 667	8,1	RF 550	30	773080		
	Z 400 G 36 / 90 B30-FP	90	450 - 562	563 - 720	720 - 900	900-1125	500 - 750	600 - 750	9,1	RF 550	30	773090		
	Z 400 G 36 / 100 B30-FP	100	500 - 625	625 - 800	800 - 1000	1000-1250	556 - 834	667 - 833	10,2	RF 550	30	773100		
	Z 400 G 36 / 110 B30-FP	110	550 - 687	688 - 880	880 - 1100	1100-1375	612 - 918	734 - 917	11,2	RF 550	30	773110		
	Z 400 G 36 / 120 B30-FP	120	600 - 750	750 - 960	960-1200	1200-1500	667-1000	800-1000	12,2	RF 550	30	773120		
	Z 400 G 36 / 130 B30-FP	130	650 - 812	813 - 1040	1040-1300	1300-1625	723-1084	867-1083	13,2	RF 550	30	773130		
	Z 400 G 36 / 140 B30-FP	140	700 - 875	875-1120	1120-1400	1400-1750	778-1167	934-1167	12,6	RF 550	37	774140		
	Z 400 G 48 / 150 B30-FP	150	750 - 937	938-1200	1200-1500	1500-1875	834-1251	1000-1250	13,5	RF 550	37	774150		
	Z 400 G 48 / 160 B30-FP	160	800 - 1000	1000-1280	1280-1600	1600-2000	889-1333	1067-1333	14,4	RF 550	37	774160		
	Z 400 G 48 / 170 B30-FP													



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