



BPT-S 5 Hybrid

The intelligent storage solution



BOSCH

Invented for life

The day is done, but the sun remains

Rising electricity prices is increasing the desire amongst more and more people to become as energy self-sufficient as possible. This is the case both for customers who already operate a photovoltaic system and for people who are just beginning to concern themselves with the topic of generating electricity on their own roof. The internal consumption of solar electricity is very limited without the use of storage systems. However, by using the BPT-S 5 Hybrid a 4-person household can cover up to 75% and more of their entire electricity consumption in the house with environmentally-friendly, self-generated electricity.

The BPT-S 5 Hybrid – intelligent energy management and storage solution in one

Bosch offers an intelligent and pioneering solution with the BPT-S 5 Hybrid. The fully integrated system can be integrated into the house grid without building work. Previously existing PV systems can also be easily extended with the storage system. The BPT-S 5 Hybrid is available in 5 storage sizes – the perfect solution for every power

requirement and easily expandable with modules. The BPT-S 5 Hybrid is design-approved and also has all the relevant safety certificates. Additionally, Bosch Power Tec offers extensive warranties and services and, with its service team, is always a competent and direct contact for you and your customer.

You can also find further information at www.bosch-solar-storage.com





Store solar power on 60 x 70 cm.

Alexander Grone, Product Manager

Storage and inverter in one

- ▶ Integrated inverter.
- ▶ Intelligent Energy Management System.
- ▶ High-performance lithium ion batteries.

Planning a PV system with a BPT-S 5 Hybrid is no different from planning and installing a system without a storage system. Existing systems can simply be supplemented with a BPT-S 5 Hybrid, or the previously used inverter can be exchanged for the fully-integrated system.

Intelligent Energy Management

The intelligent energy management system of the BPT-S 5 Hybrid automatically takes on the control of all energy flows. If the sun is shining then solar power is created, and the BPT-S 5 Hybrid distributes the power to the appliances that currently need power. The power which is not immediately consumed is used to charge the high-performance lithium ion batteries. If these are

fully charged and more power is still being created than is being consumed, then this excess power is fed into the public grid and remunerated according to the valid tariff.

When evening comes, and the PV system is not creating any more power, then power is fed into the internal grid from the storage system.

Only once all the power has been drained from the batteries is power drawn from the public grid. The Energy Management System of the BPT-S 5 Hybrid controls these events completely independently. This ensures that the internally created solar power can be optimally used.

Fully-integrated system



The BPT-S 5 Hybrid is a fully-integrated system. All components are perfectly coordinated to one another as the BPT-S 5 Hybrid was developed as a fully-integrated system right from the start. Furthermore, the components have already been successfully in use for years in other applications.

Hardly any conversion losses

The BPT-S 5 Hybrid is a DC system. This means that the DC solar power is fed directly into the battery from the module via the intermediate circuit of the inverter. No unnecessary AC/DC and DC/AC conversions take place, which are tainted with energy losses. An additional meter does not have to be added, since the system is assessed as a normal inverter by the network operator.

Simple connection

The system can be connected to the house grid without a diversion of the appliances. The BPT-S 5 Hybrid is the only system in the world that can supply solar energy to both one- and three-phase households at any time, day or night. This is based on the closing meter principle. A further benefit for your customers: the energy management system monitors and controls the energy flows of the entire household and automatically controls the optimum use of the generated energy. There does not have to be a change in consumer behavior in order to reach up to 75% or more supply with your own solar electricity.

- ▶ Fully-integrated system means less installation effort.
- ▶ DC system.
- ▶ No unnecessary conversion losses.
- ▶ Connection without diversion of appliances in the house grid.
- ▶ Simple connection with a click process.

Plus

As the BPT-S 5 Hybrid is a DC system which counts as part of the solar system, it is input tax deductible. The 19% sales tax on the purchase price is refunded by the tax office.*

* Please have the tax requirements checked by your financial advisor.

I am independent.

Julia F., Entrepreneur



Independent of daylight, independent of power grid

- ▶ Store solar electricity by day, use it around the clock.
- ▶ Self-sufficiency level of 75% or more.
- ▶ Optimum use of the internally generated solar electricity.

The BPT-S 5 Hybrid stores the electricity that the photovoltaic system creates during the day and feeds it into the in-house grid when required – for example, in the evening, when most energy consumers are running.

The internal consumption of a private household can easily be over 75% with a storage system, and in the bright, sunny summer months even 100%! This makes the BPT-S 5 Hybrid truly independent with its self-producing solar power.

The BPT-S 5 Hybrid is a game-changer

It is not the power from the internal photovoltaic system that extends the supply of the energy supplier. Instead, the energy sup-

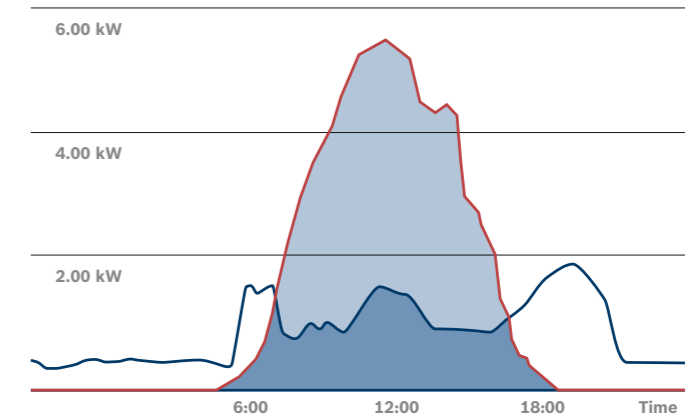
plier supplements the internal power production. A four-person household uses from 70 to 80% of its solar power itself with the BPT-S 5 Hybrid. This means significant savings when buying electricity from the public grid and therefore a greater level of independence from the constantly rising power prices. The highlight: if the photovoltaic system produces more electricity with the batteries charged than is currently being used, then, if the conditions are right, the BPT-S 5 Hybrid feeds this electricity into the public grid.

It pays off double

Saving with the optimum use of the solar electricity and additional earning by selling the excess electricity.

Solar power creation and use

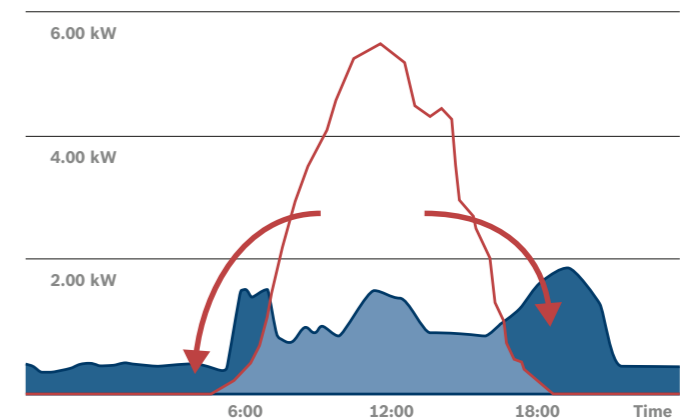
At times when the most solar power is created, only a small part can be used internally. The rest is fed into the public grid.



Solar electricity optimization

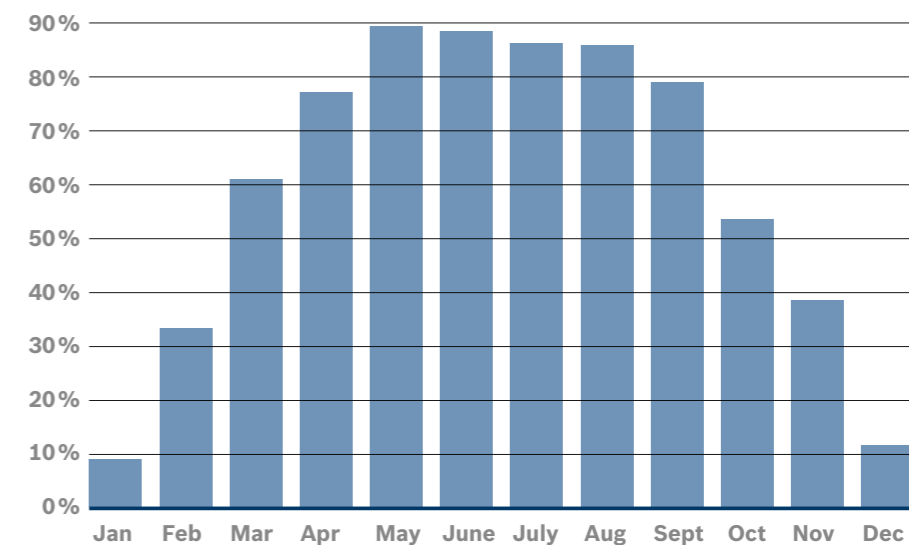
With the BPT-S 5 Hybrid this solar power created over the course of the day can be stored and later used internally.

- PV production
- Power consumption
- Own consumption
- Feed-in supply
- Own consumption of stored energy



Self-reliance level

(for 4 people, approx. 4,000 kWh)



Fast charging times and long service life

- ▶ High-performance lithium ion batteries.
- ▶ Proven quality.
- ▶ Extremely short charging times.
- ▶ Storage capacity can be extended modularly from 4.4 to 13.2 kWh.
- ▶ Expected service life of 20 years (approx. 7,000 charge and discharge cycles).
- ▶ Industrial components for the household.

The centrepiece of the BPT-S 5 Hybrid are the high-performance lithium ion batteries. Industrial components that have proven themselves in aircraft and vehicle construction are used here. These lithium ion batteries have a very high storage capacity ranging from 4.4 to 13.2 kWh, depending on model.

High performance – immediately accessible

The BPT-S 5 Hybrid ensures that the household is supplied with electricity from the internal PV system even during the day thanks to the high and rapid charging discharging performance. If PV production suddenly fails (e.g. due to a cloud passing overhead), then these energy requirements are also covered by stored electricity from the storage system.

Even peak loads, created by switching on high-power electric devices, and which can sometimes momentarily exceed the performance of the PV system, are covered by the BPT-S 5 Hybrid. In both cases no electricity has to be additionally bought from the public grid.

Furthermore, the high charge performance guarantees that excess from the photovoltaic system can be immediately stored.

Long service life

The service life of the lithium ion batteries used was calculated to be 7,000 charge and discharge cycles by respected independent institutes. This means an expected service life of at least 20 years.

Superlative security standards

The safest storage system on the market

It is the only system in the world which is entirely component-certified. This means the highest international safety standards are guaranteed. Particular attention was paid to the safety of the batteries. Innovative software for the individual monitoring of each individual battery cell as well as construction solutions in the casing make this system unique in terms of safety. The highly efficient lithium ion batteries are TÜV certified and have already been in use in aircraft and vehicle construction for years.

And it goes without saying that the BPT-S 5 Hybrid adheres to all relevant guidelines regarding electromagnetic radiation.

Quality through experience and innovation

The battery management module was developed especially for this system and takes on numerous quality and safety functions. This way, it ensures that all battery cells have exactly the same charge status. This ensures a long and maintenance-free service life. Furthermore, it monitors the temperature, voltage and electricity of the cells and automatically implements corrections in the case of irregularities or ensures the system is safely switched off.

Extensive experience, intelligent problem solving approaches and constant development in the area of solar technology ensure the high quality of the BPT-S 5 Hybrid. Therefore, for example, the used inverter has already been tested for years through use in PV systems.

- ▶ Design-approved system.
- ▶ Guaranteed safety standard.
- ▶ TÜV-certified lithium ion batteries.
- ▶ High quality in all components.

Safe, through and through.

Michael Küchler, Quality Assurance Manager





Care-free
through and
through!

Klaus A., Civil Engineer

Everything under control – from any location

- ▶ Integrated webservice.
- ▶ Free e.UserApp for remote monitoring.
- ▶ Simple energy flow optimisation.

The BPT-S 5 Hybrid is equipped with an integrated webservice. It allows the storage system to be comfortably monitored at any time – be it from an adjoining room, the office, the garden or on vacation.

Thanks to the free e.UserApp, available on iPhone and iPad, all system data can be read-out and compared at any time. User-friendly graphic depictions show the current performance of the photovoltaic system, the charge status of the battery, the energy flows of the created electricity

into the internal and public grid, or the generated solar power yields and the CO₂ savings.

The relationships between electricity consumption, money earned and solar power use can be seen at a glance and balanced out using the e.UserApp. This allows self-consumption to be optimized simply.

The registration of the system on the e.Web online portal (www.bpte-web.com) is a requirement.

Service and support Maintenance from near and far

We are the direct contact for you and your customers. We support you if you have any questions regarding setup and installation of the system. As a certified installation company you have access to the online partner area in which all documents, certificates and marketing materials, such as the video on the product, are stored. We offer a warranty of 5 years on the entire system including the battery. This means, during this time Bosch Power Tec will eliminate any occurring defects without charge.

Remote monitoring

Thanks to the integrated webservice in the BPT-S 5 Hybrid, our technicians can log into every

registered system via the internet in order to check its optimum functionality and to make corrections in the case of a malfunction. The installing of updates is also possible in this way, at any time. This ensures that every device is always completely up-to-date.

Of course, Bosch Power Tec also has a team of specially trained service technicians who can render all services on-site with speed and expertise. Remote monitoring allows technicians to be sent before the customer even realises there is a fault message in their system. Potential yield losses are therefore reduced to a minimum.

- ▶ Comprehensive support and services by Bosch Power Tec.
- ▶ Remote monitoring and control via the internet or the e.UserApp.
- ▶ Comfortable evaluation of all data.
- ▶ User-friendly graphical representation.
- ▶ Remote maintenance by BPT-S 5 Hybrid experts as part of the maintenance contract.

Award-winning design and innovative technology



Clear design – intuitive user navigation

The BPT-S 5 Hybrid hides its sophisticated technology behind an exceptionally sleek and clear design.

All components are integrated into the free-standing casing ensuring no wall mounting is necessary. The BPT-S 5 Hybrid only requires two connections and one electrical connection – there is no laborious additional cabling. The monitoring of all relevant data and status messages occurs via a color touch display with intuitive menu navigation.

This complete design, including its fully developed user navigation, has already won numerous awards in international design competitions.

Deliver, install, connect – electricity.

Martin Datko, installation Engineer



Two connections: electricity in, electricity out – done

As wide a refrigerator and almost 1.75 m tall

The BPT-S 5 Hybrid is self-contained, fully integrated system. It has a surface area of less than one square meter and a height of almost 1.75 metres, or roughly the size of a refrigerator. All components necessary for the storage and provision of self-generated solar power are integrated into the attractive casing, as the system was developed as a complete, self-contained system right from the start.

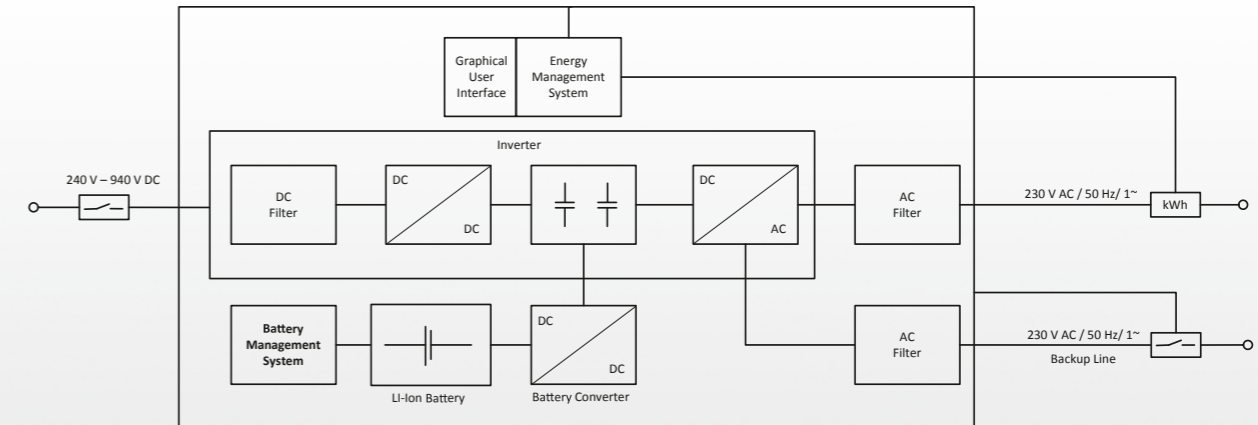
Minimal installation effort

The required installation work is therefore minimal. A dry room is required for set-up, for example, a cellar or a garage. All that is needed is a wall socket and an internet connection. The components are delivered on three pallets and constructed on site. The lithium ion batteries are connected with secure click connections, as are the AC and DC connections. This ensures that no mistakes can be made during installation.

If everything is switched and connected, then the system can immediately begin operation. As a rule of thumb, two hours are required for set-up and connection.

- ▶ Fully-integrated system.
- ▶ Compact format.
- ▶ Quick and secure installation.
- ▶ Ready to go immediately after installation.

Technical data and internal design



In case of emergency: Emergency power mode

Ready to use in ten seconds

In the event of a power failure, the device automatically switches to emergency power mode in approximately ten seconds. Make sure that all appliances that are to be supplied in such an event are on the emergency power supply backup line. Furthermore, additional protection must be applied to the building connection box which separates the storage system from the grid.

In the emergency power mode the BPT-S 5 Hybrid can create maximum output power of 5 kVA and thus covers high peak loads that can occur in the starting power when switching on high-performance electrical devices, to name one example. However, the BPT-S 5 Hybrid cannot be used as an uninterruptible power supply (UPS) in order to operate PCs or life-support machines, for example.

System	4.4 kWh	6.6 kWh	8.8 kWh	11 kWh	13.2 kWh
Input Data					
Recommended DC output	5 kW	5 kW	5 kW	5 kW	5 kW
Max. DC input voltage (V_{dcmax})	940 V	940 V	940 V	940 V	940 V
Min. DC input voltage (V_{dcmin})	240 V	240 V	240 V	240 V	240 V
Max. MPP voltage (V_{mppmax})	750 V	750 V	750 V	750 V	750 V
Min. MPP voltage (V_{mppmin})	275 V	275 V	275 V	275 V	275 V
Max. input electricity (I_{dcmax})	19 A	19 A	19 A	19 A	19 A
Number of MPP trackers	1	1	1	1	1
Design of connection	Screw terminals (16 mm ² cross-section)				
Number of DC inputs	1	1	1	1	1
MPP precision	> 99 %	> 99 %	> 99 %	> 99 %	> 99 %
Output Data					
Nominal grid voltage ($V_{ac,r}$)	230 V	230 V	230 V	230 V	230 V
Max. output electricity (I_{acmax})	22 A	22 A	22 A	22 A	22 A
Power output ($S_{ac,r}$)	5 kVA ¹	5 kVA ¹	5 kVA ¹	5 kVA ¹	5 kVA ¹
Max. apparent power (S_{acmax})	5 kVA ¹	5 kVA ¹	5 kVA ¹	5 kVA ¹	5 kVA ¹
Nominal frequency (f_r)	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
Max. / Min. frequency (f_{max}) / (f_{min})	51.5 Hz / 47.5 Hz	51.5 Hz / 47.5 Hz	51.5 Hz / 47.5 Hz	51.5 Hz / 47.5 Hz	51.5 Hz / 47.5 Hz
Power factor (cos ϕ)	0.7 over-excited / 0.7 under-excited				
Type of infeed	single-phase	single-phase	single-phase	single-phase	single-phase
Design of connection	Screw terminal (4 mm ² cross-section)				
Required grid config.	TN grid / TT grid	TN grid / TT grid	TN grid / TT grid	TN grid / TT grid	TN grid / TT grid
Distortion factor (for power output)	≤ 3 %	≤ 3 %	≤ 3 %	≤ 3 %	≤ 3 %
Efficiency					
Max. efficiency (inverter)	97.7 %	97.7 %	97.7 %	97.7 %	97.7 %
Total system efficiency	90 %	90 %	90 %	90 %	90 %
Emergency power mode efficiency	94 %	94 %	94 %	94 %	94 %
Battery Data					
Nominal voltage ($V_{dc,r}$)	96 V	144 V	192 V	240 V	288 V
Max. output voltage ($V_{batdcmax}$)	112 V	168 V	224 V	280 V	336 V
Storage capacity	4.4 kWh	6.6 kWh	8.8 kWh	11 kWh	13.2 kWh
Battery type	Lithium ion	Lithium ion	Lithium ion	Lithium ion	Lithium ion
DOD ²	70 %	70 %	80 %	80 %	80 %
Expected lifespan	15 years	15 years	20 years	20 years	20 years
Max. charging and discharging	2.5 kW	3.75 kW	5 kW	5 kW	5 kW
Emergency power supply					
Emergency power compatible	restricted ³	restricted ³	Yes	Yes	Yes
Nominal voltage	230 V	230 V	230 V	230 V	230 V
Nominal current	13 A	13 A	13 A	13 A	13 A
Max. output current	22 A	22 A	22 A	22 A	22 A
Max. apparent output power	2.5 kW	3.75 kW	5 kW	5 kW	5 kW
Nominal frequency (f_r)	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
Emergency power relay control	24 V DC / 0.5 A	24 V DC / 0.5 A	24 V DC / 0.5 A	24 V DC / 0.5 A	24 V DC / 0.5 A
Design of connection	Screw terminals (10 mm ² cross-section)				
Type of infeed	single-phase	single-phase	single-phase	single-phase	single-phase

¹ 4.6 kVA for Germany

² DOD data apply from Q4 2013

³ only with existing PV power

System	4.4-kWh	6.6-kWh	8.8 kWh	11-kWh	13.2 kWh
Stand-by supply					
Nominal voltage	230 V	230 V	230 V	230 V	230 V
Nominal frequency	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
Power consumption in standby	6.0 VA	6.0 VA	6.0 VA	6.0 VA	6.0 VA
Design of connection	Screw terminals (10 mm ² cross-section)				
Environmental conditions					
Temperature range	-10°C / +40°C	-10°C / +40°C	-10°C / +40°C	-10°C / +40°C	-10°C / +40°C
Max. temperature for continuous power output	+40°C	+40°C	+40°C	+40°C	+40°C
Relative humidity (non-condensing)	0–70%	0–70%	0–70%	0–70%	0–70%
Installation altitude above sea level	≤ 2,000 m	≤ 2,000 m	≤ 2,000 m	≤ 2,000 m	≤ 2,000 m
Safety / protection equipment					
Type of protection	IP 20	IP 20	IP 20	IP 20	IP 20
Protection class	Class I, according to IEC 62103				
Ground fault monitoring	Yes	Yes	Yes	Yes	Yes
Overload behaviour	Operating point adjustment				
Overload behaviour in emergency power mode	Switch off after < 5 sec	Switch off after < 5 sec	Switch off after < 5 sec	Switch off after < 5 sec	Switch off after < 5 sec
Excess temperature behaviour	Derating	Derating	Derating	Derating	Derating
Excess temperature behaviour in emergency power mode	Switch off	Switch off	Switch off	Switch off	Switch off
DC input surge diverter	Varistores (type 3 surge protection)				
AC output surge diverter	Varistores (type 3 surge protection)				
Integrated type B fault current switch, sensitive to universal current	Yes	Yes	Yes	Yes	Yes
DC circuit breaker	yes, external (scope of supply)				
Grid monitoring					
Switch time to emergency power mode	10 sec	10 sec	10 sec	10 sec	10 sec
Reaction time to grid faults	< 200 milliseconds				
Fulfilled requirements / clearance at hand	VDE 0126-1-1 Deutschland; VDE-AR-N 4105; CEI-021				
Standards					
Interference emission (EMV)	DIN EN 61000-6-3:2011-09				
Interference-resistance (EMV)	DIN EN 61000-6-2:2006-03				
System perturbation	IEC 61000-3-2 / -3-12 ; IEC 61000-3-3 / -3-11				
System	IEC 62109-1:2012; EN 62109-1:2011, IEC 62040-1:2008; EN 62040-1:2008				
Battery	DIN EN 61010-1; VDE 0411-1:2011-07, UN 38.3				
CE Mark compliant	Yes	Yes	Yes	Yes	Yes
BG test mark	Yes	Yes	Yes	Yes	Yes
Other					
Display	Graphic representation with touch display				
Communications interfaces	CAN, USB, RS 485, LAN, V-CAN				
Topology	transformerless	transformerless	transformerless	transformerless	transformerless
Warranty	5 years, optionally extendable				
Dimensions / weight					
Dimensions in mm (W x H x D)	597 x 1,693 x 706	597 x 1,693 x 706	597 x 1,693 x 706	597 x 1,693 x 706	597 x 1,693 x 706
Weight (incl. battery)	222 kg	242 kg	262 kg	280.5 kg	299 kg

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