



# POWERFLOW

Energy Recovery Systems

Complexity Made Simple



Made in England



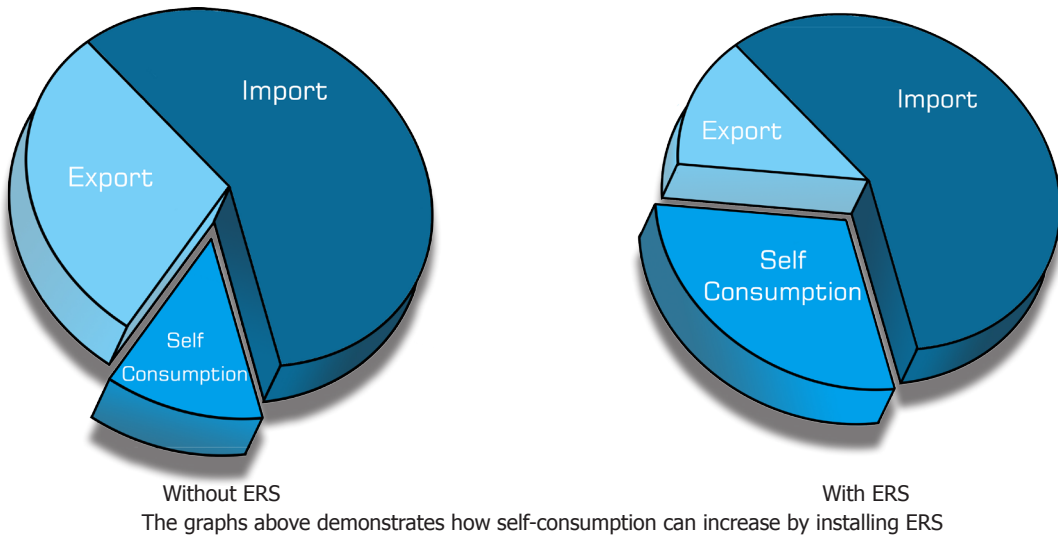
Energy Recovery System



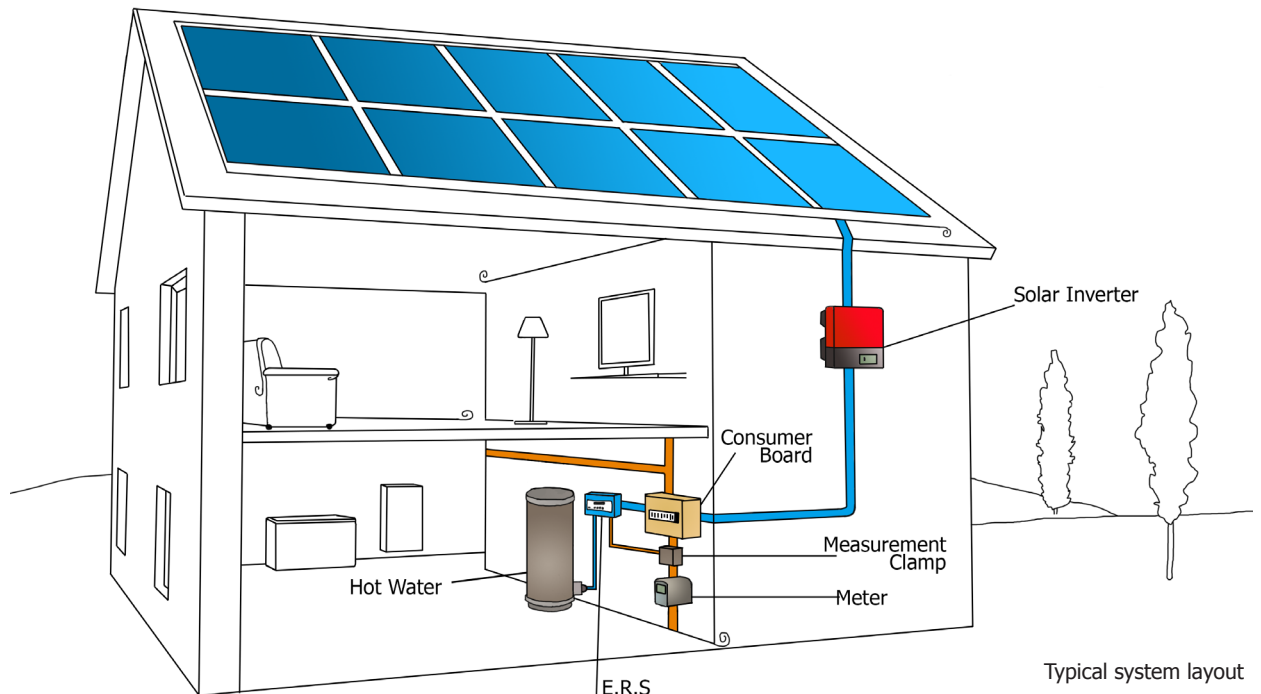
# Why choose an Energy Recovery System?

During its daily cycle a grid connected renewable generator such as solar PV, wind or hydro, produces electrical power based on available natural energy. Due to the very nature of these renewable technologies the production of power does not always coincide with demand. When energy production is greater than demand the surplus is exported to the supply network, this results in lost opportunities to increase self consumption which would lead to greater energy savings.

**Wouldn't it be great if lost energy could be stored for use later on?**



A key accessory for solar PV or wind generators, PowerFlow's Energy Recovery System (ERS) is a true fully proportional export energy controller. This means, by accurately controlling resistive electrical loads, such as immersion or panel heaters, ERS can smoothly divert exported energy to be stored as hot water (for example, by using a hot water cylinder). It does this by cleverly controlling your existing immersion heating element meaning no other specialist heating equipment is required. Depending on how you heat your water, recovering energy in this way results in a gas, oil or electricity saving. It essentially gives you a solar thermal hot water system for a fraction of the cost. The foundation of PowerFlow's ERS is F-POINT *technology*® which is developed by our engineers from the ground up.



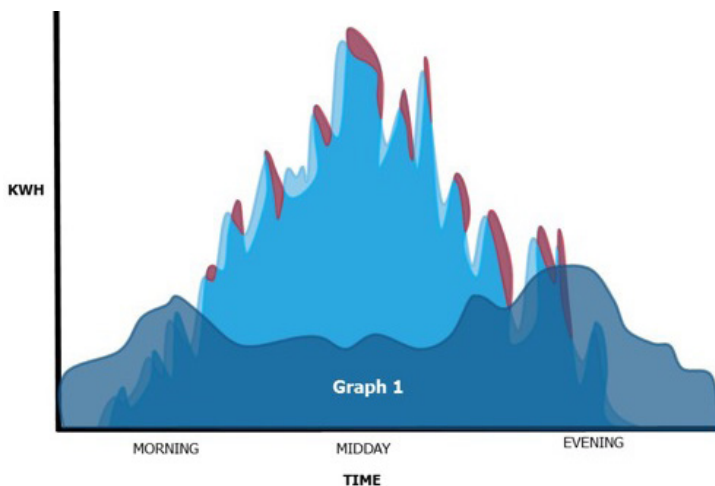
# F-Point technology®

## Focus-Point method; designed from the ground up.

F-POINT *technology*® combines an extremely fast and accurate measurement method which delivers information on imported and exported energy levels every 200ms, that's 5 times per second - **an industry first!** Combined with smart switching patterns for regulatory compliance and intelligent self-learning software, F-POINT *technology*® is in a class of its own.

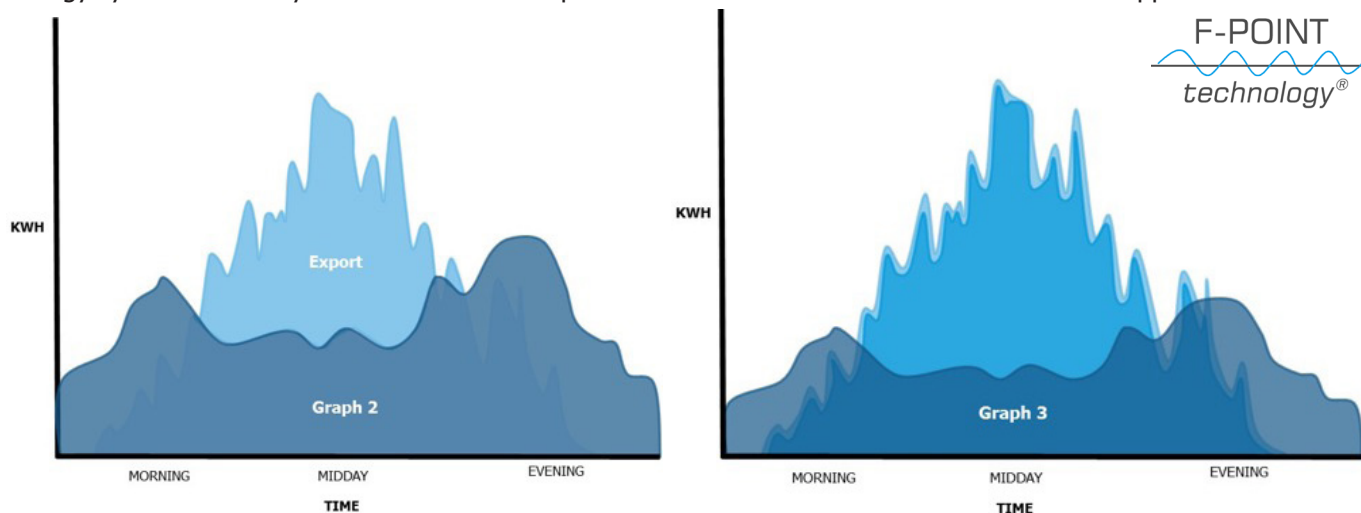
### Why are fast reactions so important?

Slow reacting devices can result in energy import by not adjusting quickly to changes in export energy levels. This leads to an increase in electricity consumption, a known problem with this type of device. During the development of F-POINT *technology*® particular care was taken to eliminate this effect during periods when export energy levels are fluctuating. By designing smarter, faster, solid state electronics, PowerFlow have resolved this problem. This level of accuracy and reaction time in the control system is unparalleled and results in greater efficiency, increased savings and longer component life.



Graph 1 depicts that if reaction times are slow, energy import during operation occurs. This is highlighted by the red 'tail off' areas.

The efficiency increase in F-POINT *technology*® enables ERS to control even larger loads used in three phase commercial installations. An ERS device can be connected to each phase, maximising self consumption with three phase inverters. The reaction time of F-POINT *technology*® also enables ERS to be used as an export limiting device using the smart relay feature. F-POINT *technology*® doesn't impact in any way on the Feed In Tariff which solar energy systems currently receive and also compliments biomass boiler and thermal heat store applications.



Graphs 2 and 3 above show a comparison of a solar system with and without ERS. The light blue in graph 2 highlights the export that occurs during the day. Graph 3 shows how ERS tracks the export and recovers it without suffering from the 'tail off' resulting in imported energy during the operation as compared to graph 1.

The ERS is easy to use, quick to install and easy to understand. It can be retro-fitted, or integrated within a new system at the time of installation. PowerFlow's benchmark for quality is set extremely high so each ERS unit is individually calibrated and soak tested to ensure an ongoing level of quality. This is recognised through the extended PowerFlow factory warranty and the PowerFlow accredited installer scheme.

# ERS Features

**PowerFlow's devices have a range of features to suit every requirement.**

**ERS mini Edition** - designed as an entry level, no fuss unit, with F-POINT *technology*® and plug and play automated operation as standard. Suitable for domestic applications, it's a fit and forget solution.

**ERS 4 Silver Edition** - our most popular unit. With all the features of ERS mini, plus a live display and a host of new features to give flexibility when designing a system. ERS 4 is suitable for all domestic and most commercial applications.

**ERS 6 Blue Edition** - our most powerful flagship model. ERS 6 has all the features of ERS 4, but with more power and dual outputs that can be configured to suit any heating requirement up to 6kW. ERS 6 is suitable for large domestic or commercial applications that require more power to be diverted.



## **Convective Cooling Concept** ERS mini / 4 / 6

The custom made aluminium enclosure effectively dissipates the low level heat generated during operation, making the use of cooling fans unnecessary. The result: silent running, increased reliability and system efficiency.



## **Sealed Enclosure** ERS mini / 4 / 6

All ERS models are sealed against the ingress of dust and moisture to protect the internal electronics. ERS mini is to IP20 and ERS 4 / 6 are to IP54. The result: No dust ingress to overheat internal components and no moisture ingress to corrode the electronics. This increases reliability which leads to longer component life.



## **Crystal Clear Display** ERS 4 / 6

An inbuilt backlit LCD display is housed on the front of ERS 4 and ERS 6 to show live information about system status.

The display features:

- Auto time out: 5 minutes
- Live exported power
- Live imported power
- Live output power
- Operation status
- Total kWh savings



## **Total Bypass** ERS 4 / 6

ERS 4/6 incorporate a fully independent manual isolation and by-pass switch. Simply flick the switch to turn off the unit or by-pass the recovery function, supplying mains power directly to the electrical load. This feature can be used if the electrical device is required to be turned on manually or ERS is not required for a period of time. It can also be used for regulatory testing of the electrical load circuit without risking damage to the device.





## Plug and Play Connectors

### ERS mini 4 / 6

All ERS devices feature high quality German engineered connectors ensuring a high quality secure connection. This results in a quick and efficient, trouble free, installation.



## Manual Boost Function

### ERS mini / 4 / 6

The manual boost button, situated on the front of the ERS unit enables the user to override the ERS mode for a timed period. This will allow a boost of hot water or heating, if required. The timed period is adjustable through the menu from 10 to 120 minutes (ERS 4 / 6), 90 minutes fixed (ERS mini). The unit will display Boost and count down the timed period. After this period ERS will continue normal operation.



## Smart Boost Function

### ERS 4 / 6

ERS incorporates smart boost, which intelligently applies the boost function when generation is low for a period of time. Lack of export power will automatically trigger the boost function for the set period. The function can be turned on or off in the settings menu and is particularly useful in all electric single tariff households.



## External Timer (Aux Connection)

### ERS 4 / 6

ERS houses an auxiliary connection which can be used with a standard external timer. The timer will override the ERS function during the timed period. The function can be turned on or off in the settings menu. This feature is particularly useful in all electric households with a night rate electricity tariff or in installations containing heat pumps.



## Smart Relay (Aux Connection)

### ERS 4 / 6 - Second Load & Export Limiter

ERS contains an internal smart relay which can control external devices. It can firstly enable a secondary device to be switched or controlled via a standard external contactor, allowing power to be shared intelligently between two devices when additional export power is available. This can be tailored for almost any application. Secondly it can control the disconnection of inverters and other devices based on export levels. Once a set export level is selected it will allow the disconnection of the solar inverter when this export level is reached. Due to the ultra-fast reaction time of F-POINT *technology*<sup>®</sup>, ERS can disconnect the inverter in just 400ms which aids regulatory compliance with the local DNO.



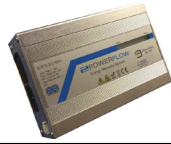
## Warranty

### ERS mini / 4 / 6

Each unit has a warranty backed by PowerFlow, whose founders have over a decade of industry experience in designing and developing renewable technologies for national manufacturers and government agencies. PowerFlow offer a range of warranties, for more information visit: [www.powerflowenergy.com/service/warranty-information/](http://www.powerflowenergy.com/service/warranty-information/)



TECHNICAL DATA	ERS mini Edition	ERS 4 Silver Edition	ERS 6 Blue Edition
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Operating Parameters			
Output power: Max / Nominal	3200 / 3000 Watts	4000 / 3000 Watts	6000 / 5000 Watts
Output current: Max / Nominal	13A / 12.5	16A / 13A	25A / 21A
Phase Operation	Single Phase	Single Phase	Single Phase
Voltage range / frequency	206-262V / 50 Hz	206-262V / 50 Hz	206-262V / 50 Hz
Fuse Protection (replaceable)	20A (internal)	20A (external)	32A (external)
Compatible Generator Type	Solar PV / Wind / Hydro	Solar PV / Wind / Hydro	Solar PV / Wind / Hydro
Recommended renewable generator size	2.0kW +	2.0kW +	10kW +
Output load	Resistive Only	Resistive Only	Resistive Only
Output control range	5% - 100%	5% - 100%	5% - 100%
Minimum output load	300 W	100 W	100 W
Minimum export power level / Export tracking range	25W / 25-200W	25W / 25-200W	25W / 25-350W

General Data			
Dimensions (without connectors) ( W / H / D ) mm	160 / 109 / 45	230 / 160 / 54	230 / 160 / 54
Weight	1.1kg	1.7kg	1.9kg
Noise emissions	<10dBA	<10dBA	<10dBA
Self-consumption (night)	8mA	8mA	8mA
Degree of protection	IP20	IP54	IP54
Operating temperature range	-10 °C to +60 °C	-10 °C to +60 °C	-10 °C to +60 °C
Cooling concept	Convective Cooling	Convective Cooling	Convective Cooling
Efficiency	99%	99%	99%
Compliant Standards	CE / RoHs / BS EN: EMC / LVD	CE / RoHs / BS EN: EMC / LVD	CE / RoHs / BS EN: EMC / LVD

Features			
Method of control	F-POINT <i>technology</i> ®	F-POINT <i>technology</i> ®	F-POINT <i>technology</i> ®
Number of proportional control outputs	1	1	2
Dynamic Load Control	No	Yes	Yes
Input / Output connections	External Plug and Play IP20	External Plug and Play IP65	External Plug and Play IP65
Integrated menu	No	Yes	Yes
Manual boost function (default OFF)	Yes (90mins non adjustable)	Yes (10-120 mins) default 90mins	Yes (10-120 mins) default 90mins
Smart boost function (default OFF)	No	Yes (1-8 hrs) default 4 hrs	Yes (1-8 hrs) default 4 hrs
External timer connection (default OFF)	No	Yes	Yes
2nd load Smart Relay (programmable)	No	Yes	Yes
Display	20 segment LED Bar display	Crystal clear LCD display	Crystal clear blue LCD display
Live import / export power	No	Yes	Yes
Output power bar	Yes	Yes	Yes
Total savings counter	No	Yes (kwh)	Yes (kwh)
Operational Status	Yes	Yes	Yes
Manual switch modes	No	On / Off / Bypass	On / Off / Bypass
Backlight	No	Yes (auto time-out)	Yes (auto time-out)
Internal over temperature protection	Yes	Yes	Yes
Hard anodized aluminium enclosure	Yes	Yes	Yes
Finish	Metallic Silver	Metallic Silver Anodised	Electric Blue Anodised
Warranty	2 years	2 / 3 / 5 Years	2 / 3 / 5 Years

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