



# Tough, simple and cost-effective starting for diesel engines

## SPRING STARTERS

For diesel engines up to 12 litres

IPU's spring starter motors are a reliable and cost-effective way of providing manual starting for diesel engines.

They deliver reliability through simplicity. To start an engine you simply engage the start motor, wind the handle until a coloured indicator shows the motor is fully charged and remove the winding handle. Then pull on the trip lever and the starter motor will turn the engine. It's that simple!

IPU spring starters are perfect for harsh environments such as offshore and marine applications as they are unaffected by temperature extremes and damp conditions.

### Simple

Spring starters require no electricity, no air pressure or hydraulic fluid. It is a simple alternative or back-up start system for most applications.

### Cost-Effective

Spring starters are a direct 'bolt-on' alternative to electric starters providing quick and easy installation.

### Tough

They are resistant to damp and extremes of temperature making them an ideal choice for offshore and marine environments.



# Spring Starter Applications

## Applications

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There are many different applications for spring starters, including:

- Where simplicity, robustness and reliability are essential and the apparent convenience of push-button starting is less important
- For environments such as mines and oil refineries where electrical equipment can be illegal or dangerous
- Where problematic conditions such as vibration, heat, dust, salt water need to be overcome
- In remote locations or where poor operational skills mean simplicity is more important than sophistication
- For emergency and strategic use such as on lifeboats or with military, emergency or backup generators

An IPU spring starter can be used on any direct injection diesel engine between 0.5 and 12 litre capacity with sufficient space to accommodate the starter.

Spring starters are ideal for many applications:

- Boats
- Tractors
- Grain mills
- Pumps
- Generator sets and compressors
- Dump trucks
- Fork lifts
- Construction equipment
- Hydraulic power units
- Winches
- Welders
- Drilling equipment

IPU's Spring starters are suitable for numerous engines:

- Deutz
- Farymann
- Hatz
- Lister
- Lombardini
- Kubota
- Perkins
- Ruggerini
- Caterpillar
- Cummins
- Detroit
- Man
- Perkins
- Scania
- Volvo

## Customer Benefits

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- **Guaranteed starting:** manual operation makes cranking unaffected by long shutdowns, damp, cold or harsh environments. IPU's Spring Starters even come with 30 months warranty!
- **Reliability:** many spring starters are still operating after decades in service.
- **Space and weight saving:** the smallest spring starters are only 12kg, less than 50% the weight of a conventional electric starter.
- **Operator safety:** the crank will not kick back during operation and the motor can be unwound.
- **Ease of use:** spring starters are a direct 'bolt-on' alternative to electric starters.
- **Reduces battery costs:** for certain applications, such as pumps, welders and gen-sets you can remove the need for a battery completely.
- **Lower electrical equipment costs:** with no electric starter a lighter duty alternator can be fitted.

## Additional Information

### **Anti-Clockwise Spring Starter**

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Although niche, there is a clear demand for anti-clockwise rotation starters. The need is especially strong where engines do not have a second pocket for a backup starter or where there is insufficient space on the engine to mount a second starter. Once engine companies developed flywheel housings with an extra pocket for a backup starters (especially common with lifeboat engines) the opportunity was there to develop anti-clockwise mechanical starters.

The mini, midi, heavy duty midi, maxi and super maxi spring starters are available in clockwise and anti-clockwise format.

### **How long can a spring starter be left fully-charged?**

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It is anticipated that a spring starter can be left fully-charged for up to one year without any noticeable energy loss. If the starter motor is designed to be a secondary start system it should not be left fully-charged.

### **How many revolutions of the flywheel will I get with an IPU Spring Starter?**

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That depends on the size of the engine. As a rule of thumb, a six litre multi-cylinder engine will turn through 1.5 to 2.5 revolutions and a small single or multi-cylinder engine with capacity of 0.7 to 1.5 litres will turn through 5 to 8 revolutions.

### **How does an engine start with so few revolutions?**

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On a small engine the IPU Spring Starter rotates the engine through almost the same number of revolutions as an average electric starter but at approximately three times the speed.

On larger engines it rotates the engine approximately twice as fast as an electric starter, allowing much less time for the heat to dissipate through the cylinder walls during a compression stroke. This helps the engine cylinder rapidly reach its ignition point.



## SPRING STARTERS

# Spring Starter Product Range

### SureStart S20

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The SureStart S20 Spring Starter is our smallest and lightest starter weighing a modest 12 kg (26.5 lb). The S20 Spring Starter is suitable for diesel engines from 0.5 to 2.5 litres (30.5 to 152.5 cubic inches) and is available as a clockwise and anti-clockwise model. The S20 Spring Starter brings reliable non-electric backup starter to smaller engines.



### SureStart S30

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The SureStart S30 Spring Starter is suitable for diesel engines from 1.1 to 6.6 litres (67.1 to 402.7 cubic inches) and is available as a clockwise and anti-clockwise rotation model. The SureStart S30 Spring Starter has a two piece mounting bracket which means this starter is easy to convert to another model, simply replace part of the mounting bracket (mounting flange). This makes the S30 an efficient and economical unit.



### SureStart S40

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The SureStart S40 Spring Starter is suitable for diesel engines up to 7.8 litres (476 cubic inches) and is available as a clockwise model only. The SureStart S40 Spring Starter serves engines which have a slightly larger capacity than the S30 starter can handle or engines that need low temperature starting.



## Spring Starter Product Range

### **SureStart S50**

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The SureStart S50 Spring Starter is suitable for diesel engines up to 10 litres (610.2 cubic inches) and is available as a clockwise model only. Compared to other non electrical starting systems, the SureStart S50 Spring Starter is by far the most economical option. It competes with electrical starting systems and as a result has drawn custom from a large number of shipping companies all over the world.



### **SureStart S60**

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The SureStart S60 Spring Starter is suitable for diesel engines up to 12 litres (732.3 cubic inches). It is available as a clockwise rotation model only. This model was developed following the success of the S50 Spring Starter range. Some of the components were redesigned and the patented multi-rate spring pack transformed the S50 into a new S60 Spring Starter.



### **SureStart S70**

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The SureStart S70 Spring Starter is suitable for diesel engines up to 12 litres (732.3 cubic inches) and is available as a clockwise model only. The SureStart S70 Spring Starter provides ship builders with an easy-to-install starter range that can provide reliable starting for engines and emergency generators.



**SPRING STARTERS**

# Technical Specifications

	SureStart S20	SureStart S30	SureStart S40
<b>Rotation</b>	S20C: clockwise S20A: anti-clockwise	S30C: clockwise S30A: anti-clockwise	S40C: clockwise
<b>Mounting</b>	Flange-mounted SAE 1; SAE 2	Flange-mounted SAE 1; SAE 2; SAE 3; SAE 4	Flange-mounted SAE 1; SAE 2; SAE 3; SAE 4
<b>Engine Capacity</b>	0.5 litres (30.5 cubic inches) per cylinder; 4 cylinders maximum	1.1 litres (67.1 cubic inches) per cylinder; 6 cylinders maximum	1.3 litres (79.3 cubic inches) per cylinder; 6 cylinders maximum
<b>Pinion Type</b>	11 to 13 teeth 10/12 F/stub 11 to 13 teeth 8/10 F/stub 9 to 13 teeth Mod 3 10 to 13 teeth Mod 2.5	11 to 13 teeth 10/12 F/stub 11 to 13 teeth 8/10 F/stub 9 to 13 teeth Mod 3 10 to 13 teeth Mod 2.5	11 to 13 teeth 10/12 F/stub 11 to 13 teeth 8/10 F/stub 11 teeth 6/8 F/stub 9 to 13 teeth Mod 3 10 to 13 teeth Mod 3
<b>Pinion to flange face</b>	20mm or 28mm	20mm, 28mm, 47mm and other variations	20mm, 28mm, 47mm and other variations.
<b>Maximum torque at pinion</b>	91 Nm (71 ft/lb)	115 Nm (90 ft/lb)	126 Nm (93 ft/lb)
<b>Maximum winding handle torque</b>	64 Nm (50 ft/lb)	64 Nm (50 ft/lb)	81 Nm (60 ft/lb)
<b>Winding handle position</b>	Variable in 8.5 degree increments	Variable in 8.5 degree increments	Variable in 8.5 degree increments
<b>Turns to fully wind</b>	2.0 turns to engage 9.5 turns to fully charge	2.0 turns to engage 12.0 turns to fully charge	2.0 turns to engage 11.5 turns to fully charge
<b>Weight</b>	12 kg (26.5 lb)	16 kg (35.3 lb)	18 kg (39.7 lb)
<b>Cold Start</b>	Starting aid below 5 degrees Celsius	Starting aid below 5 degrees Celsius	Starting aid below 5 degrees Celsius
<b>Finish</b>	Standard finish: zinc-plated body and housing; body painted with a further coat of primer and topcoat. Body can also be powder-coated.	Marine finish as standard: zinc-plated body and housing; powder-coated paint all over to withstand marine environment. Electroless nickel-plated shaft and pinion.	Standard finish: zinc-plated body and housing; body painted with a further coat of primer and topcoat.

**SPRING STARTERS**

# Technical Specifications

	SureStart S50	SureStart S60	SureStart S70
<b>Rotation</b>	S50C: clockwise	S60C: clockwise	S70C: clockwise
<b>Mounting</b>	Flange-mounted SAE 1; SAE 2; SAE 3	Flange-mounted SAE 1; SAE 2; SAE 3	Flange-mounted SAE 1; SAE 2; SAE 3
<b>Engine Capacity</b>	1.5 litres (91.5 cubic inches) per cylinder; 6 cylinders maximum 1.25 litres (76.3 cubic inches) per cylinder; 8 cylinders maximum	2.0 litres (122.1 cubic inches) per cylinder; 6 cylinders maximum 1.75 litres (106.8 cubic inches) per cylinder; 8 cylinders maximum	2.0 litres (122.1 cubic inches) per cylinder; 6 cylinders maximum 1.5 litres (91.5 cubic inches) per cylinder; 8 cylinders maximum
<b>Pinion Type</b>	11 to 13 teeth 10/12 F/stub 11 to 12 teeth 6/8 F/stub 11 to 13 teeth Mod 3	11 to 13 teeth 8/10 F/stub 11 to 12 teeth 6/8 F/stub 11 teeth 6/8 F/stub 11 to 13 teeth Mod 3	11 to 13 teeth 10/12 F/stub 11 to 13 teeth 6/8 F/stub 11 to 12 teeth 6/8 F/stub 11 to 13 teeth Mod 3
<b>Pinion to flange face</b>	47mm (nominal)	47mm (nominal)	47mm (nominal)
<b>Maximum torque at pinion</b>	126 Nm (93 ft/lb)	146 Nm (108 ft/lb)	140 Nm (104 ft/lb)
<b>Maximum winding handle torque</b>	81 Nm (60 ft/lb)	75 Nm (55 ft/lb)	95 Nm (70 ft/lb)
<b>Winding handle position</b>	Variable in 8.5 degree increments	Variable in 8.5 degree increments	Variable in 8.5 degree increments
<b>Turns to fully wind</b>	2.0 turns to engage 15.0 turns to fully charge	2.0 turns to engage 18.0 turns to fully charge	2.0 turns to engage 17.5 turns to fully charge
<b>Weight</b>	21.5 kg (47.4 lb)	28.0 kg (61.7 lb)	28.0 kg (61.7 lb)
<b>Cold Start</b>	Starting aid below 5 degrees Celsius	Starting aid below 5 degrees Celsius	Starting aid below 5 degrees Celsius
<b>Finish</b>	Marine finish as standard: zinc-plated body and housing; powder-coated paint all over to withstand marine environment. Electroless nickel-plated shaft and pinion.	Marine finish as standard: zinc-plated body and housing; powder-coated paint all over to withstand marine environment. Electroless nickel-plated shaft and pinion.	Marine finish as standard: zinc-plated body and housing; powder-coated paint all over to withstand marine environment. Electroless nickel-plated shaft and pinion.

