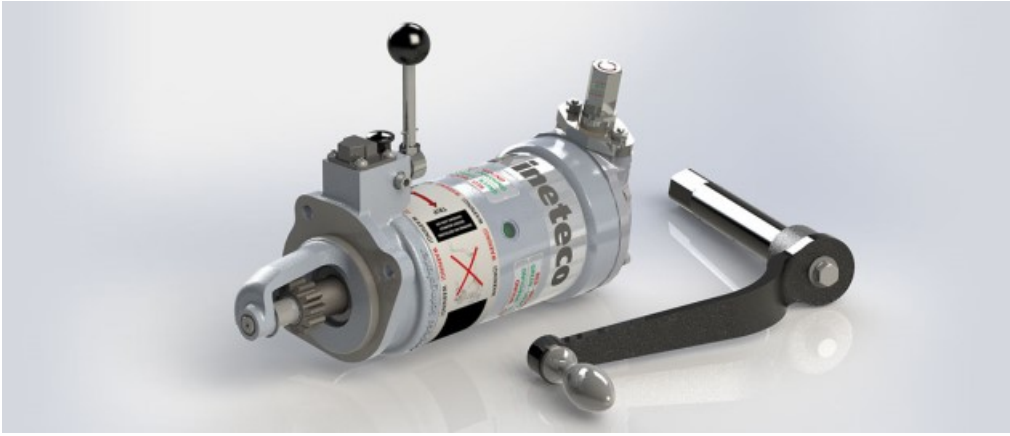
User Handbook

DISC SPRING STARTERS
SS/HSS & SR/HSR Models



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Kineteco Spring Starters are the sole product of

Hatraco Technische Handelsonderneming B.V.

and are manufactured in The Netherlands

Contents

WARNING

Please ensure the warranty card supplied with the spring starter is filled out and returned to Kineteco. **Failure to do so will invalidate the warranty**

The spring starter must be installed and operated as described in this handbook. **Failure to do so will invalidate the warranty**


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1. Introduction

The following pages of this handbook should be worked through in sequence. This will ensure the spring starter is correctly set up for the engine it is to be fitted to, and the user will have a full understanding of the safe and reliable operation of the spring starter.

Allow **at least 30 minutes** to follow these instructions step-by-step to ensure correct operation.

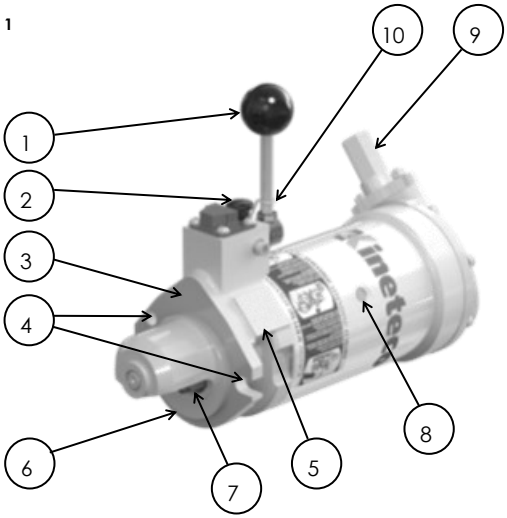
If there are any queries about your spring starter that are not explained in the handbook, please get in touch with Kineteco via the contacts at the bottom of the page.

Once the handbook has been used to setup, install and operate the spring starter for the first time, please keep it in a safe place for future reference.

2. Your Spring Starter

Please take a moment to familiarise yourself with the features of the product shown in **Fig 1**. The instructions contained in this handbook will use these descriptions.

Fig 1



(Exact configuration will vary)

Number	Description
1	Trip lever
2	Release pin
3	Mounting flange
4	Mounting holes
5	Nosepiece
6	Spigot
7	Pinion gear
8	Inspection window
9	Winding adaptor
10	Torsion spring

3. Assembling the Winding Handle

Your spring starter comes supplied with a winding handle that needs to be assembled before use.

Please follow instructions below:

a. Fit male square drive of sleeve into crank handle as shown in **Fig 2i**

b. Screw together with supplied M10 bolt, spring washer and plain washer in order shown in **Fig 2i**, tighten with 17mm spanner, to result in completed assembly as shown in **Fig 2ii**

Fig 2i

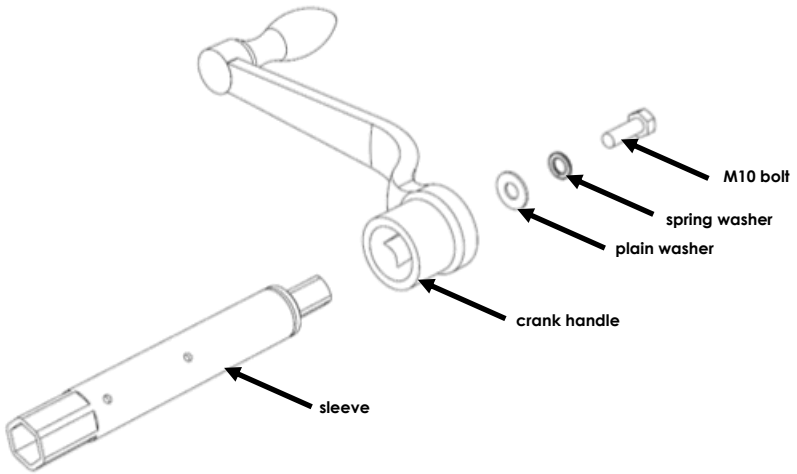
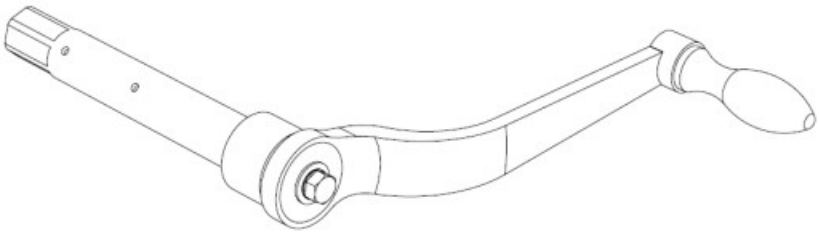


Fig 2ii



4. Pre-Installation Checks

Before installing or using the spring starter the following checks should be made.

These checks will determine whether the starter rotates in the correct direction for the engine it is to be fitted to; whether the pinion will have enough clearance from the engine's ring gear; and lastly whether the pinion engages correctly with the ring gear.

It is very important to make these checks before using the spring starter. If the starter is not correctly matched to the engine, the spring starter, engine, or both, could be damaged.

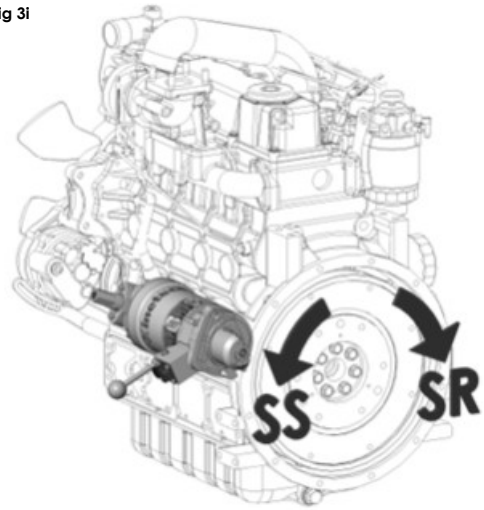
If at any stage of these checks the spring starter does not appear to be correct, please contact Kineteco immediately where our trained technical staff will be able to help with any issues.

a. To check that the spring starter will rotate the engine in the correct direction, check the spring starter model number:

- An 'SS' starter pinion rotates clockwise viewed from pinion end
- An 'SR' starter pinion rotates anti-clockwise viewed from pinion end

On an engine where the starter fits along the side of the engine block as per **Fig 3i**, an SS starter rotates the flywheel anti-clockwise viewed from the flywheel end. An SR starter rotates the flywheel clockwise viewed from the flywheel end

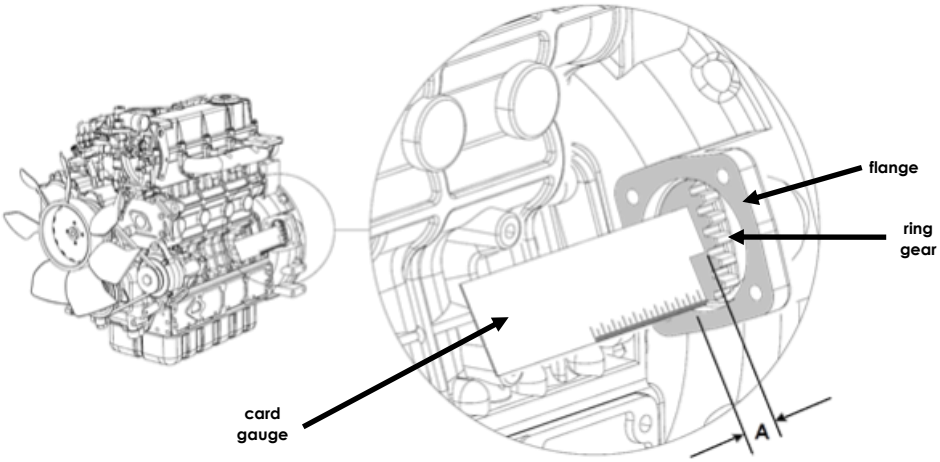
Fig 3i



b. Next, check the pinion's clearance from the ring gear. Cut out the card gauge from the back page of this handbook following the dashed lines

c. Measure the 'flange to ring gear' dimension **A**, as shown in **Fig 3ii**

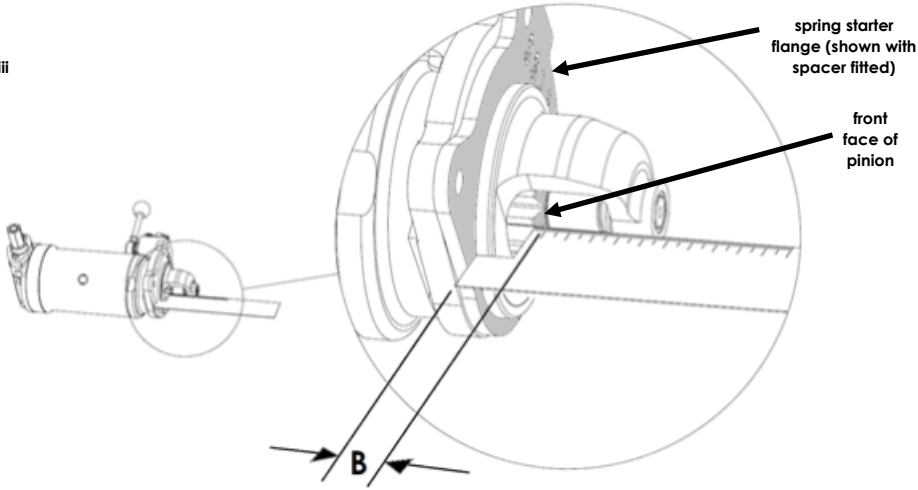
Fig 3ii



d. Make sure the spring starter's pinion is as far back into the starter body as it can go, known as the 'pinion at rest' position

e. Measure the 'pinion at rest' dimension **B**, as shown in **Fig 3iii**, making sure any spacers are fitted to the starter flange face if supplied with the spring starter

Fig 3iii

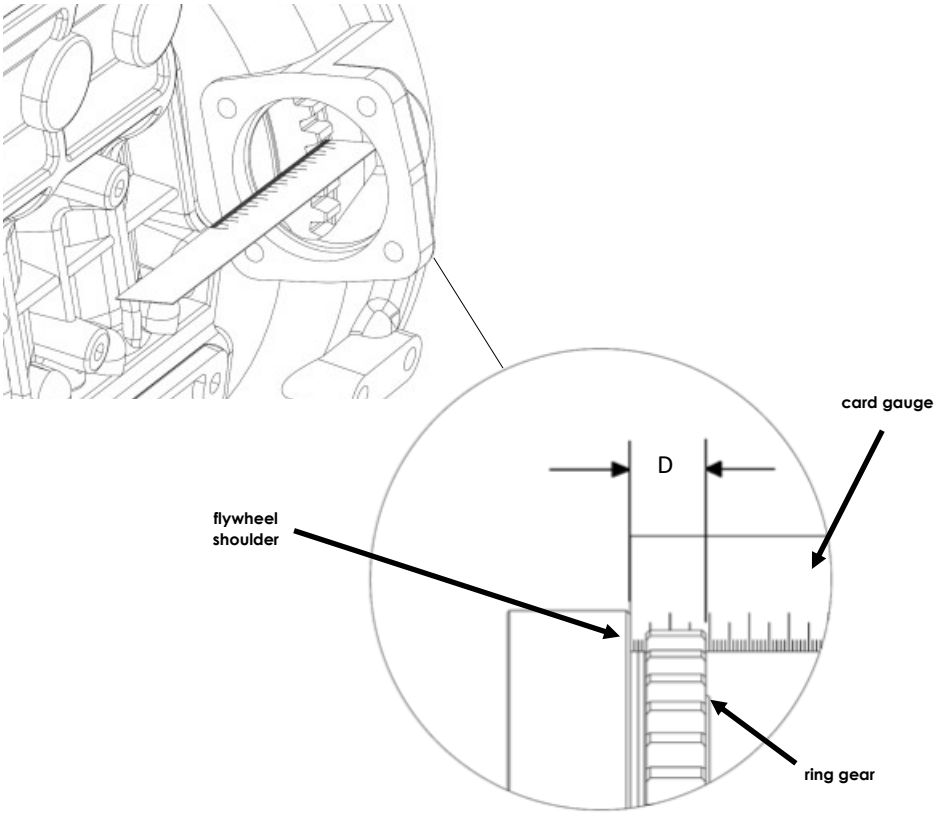


f. Then, **A-B=C**, where **C** is the clearance between the pinion and ring gear. This should be between **3 to 5mm**

The last pre-installation check ensures the pinion will not hit the flywheel when fully extended. (This is only necessary on engines with a flywheel that has a shoulder of larger diameter than the root diameter of the ring gear.)

g. Use the card gauge to measure from the front face of the ring gear to the shoulder of the flywheel, dimension **D**, as shown in **Fig 3iv**

Fig 3iv



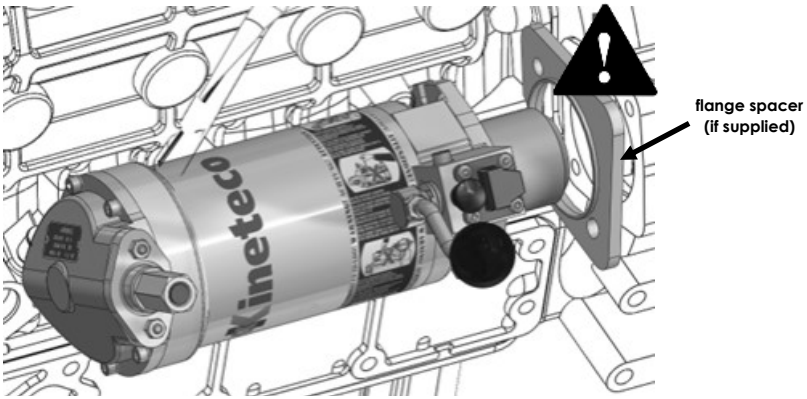
h. Then, **C+D=E**, where **E** must be greater than 20mm, as this is the distance that the pinion will travel forward when engaged in the ring gear

5. Fitting the Spring Starter

The next steps check that the spring starter fits onto the engine. The starter will be mounted to the engine in this step but **DO NOT** attempt to start the engine. The starter will be removed from the engine after this step.

a. Mount the spring starter into the pocket (not forgetting to include any spacers supplied with the spring starter) as shown in **Fig 4i** using existing studs and nuts torqued to the engine manufacturer's specifications. Kineteco do not supply these studs or nuts

Fig 4i



b. Ensure the spring starter flange face sits flat on the mounting plate and is not jammed at an angle against the engine block, by passing a piece of paper between the spring starter and the engine block, **Fig 4ii**. **Fig 4iii** shows a correctly installed starter

Fig 4ii

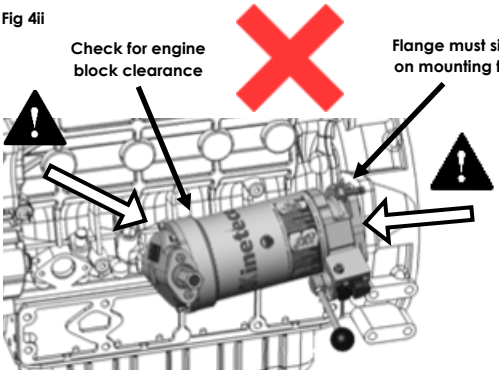
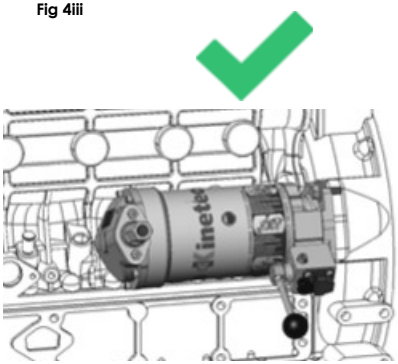


Fig 4iii



6. Engine 'Walk Over' to Check Pinion Engagement

This procedure ensures the pinion teeth engage correctly with the engine's ring gear so that starting will be smooth and excessive wear will not occur.

a. Disconnect the battery negative lead, if electrical starting system is present, and ensure the engine is out of gear

b. **RESET** the spring starter:

1. Lift the release pin with one hand holding the trip lever with the other, **Fig 5i**
2. Pull the trip lever up against the spring force, **Fig 5ii**
3. Let go of release pin and the trip lever will click and lock in vertical position, **Fig 5iii**

Fig 5i

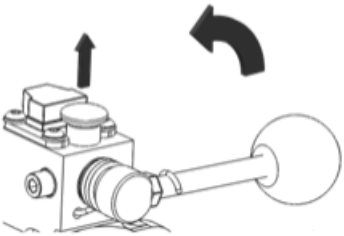


Fig 5ii

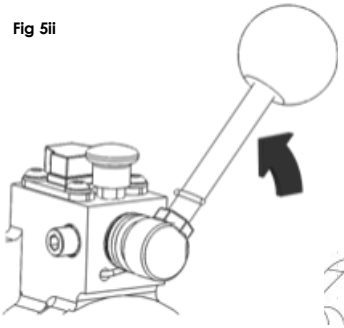
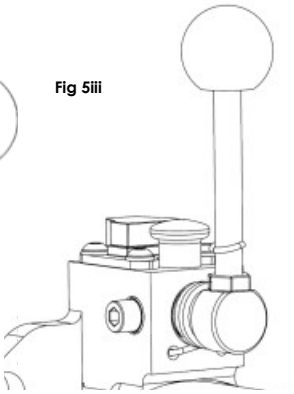
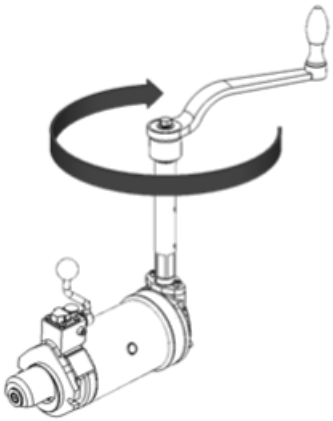


Fig 5iii



c. Fit the winding handle onto the winding adaptor and wind **CLOCKWISE**, **Fig 5iv.** Stop winding as soon as an increase in winding load is detectable (approx. two turns). This will pre-engage the pinion into the engine's ring gear.

Fig 5iv



d. **TRIP** the spring starter:

- Grasp the trip lever in one hand and lift the release pin with the other, **Fig 5v**
- Push lever firmly across 90 degrees, **Fig 5vi**
- Let go of release pin and the trip lever will lock in horizontal position as shown, **Fig 5vii**

Fig 5v

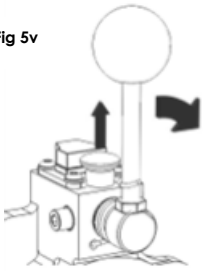


Fig 5vi

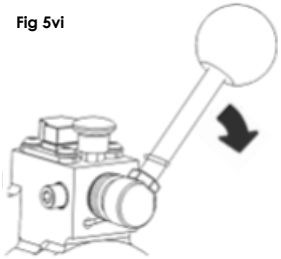
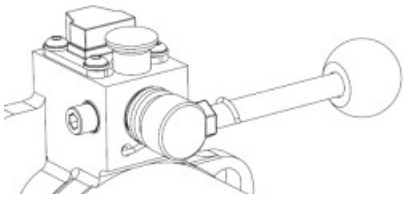


Fig 5vii



e. Continue winding the handle **CLOCKWISE**, which should now be turning the engine over

f. Ensure there are no tight spots in the pinion to ring gear mesh by making a complete revolution of the ring gear in this fashion

g. Disengage the pinion by unwinding the starter. This is done by winding the handle **ANTI-CLOCKWISE** for at least 3 turns, **Fig 5viii**. (An increase in effort will be needed to begin with. During unwinding no ratchet click will be heard)

h. Dismount the spring starter from the engine and inspect the pinion teeth. Engagement is correct if witness/wear marks show across most of the driven surface of the gear tooth, **Fig 5ix**

If the starter engages correctly, remount the starter and continue to the next section of this handbook. If all the instructions have been followed and the starter does not engage as specified, please contact Kineteco for further guidance.

Fig 5viii

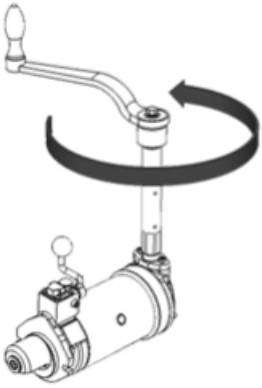
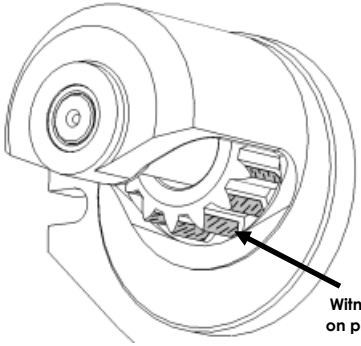


Fig 5ix



7. Spring Starting for the First Time

The starter may now be operated but only under a minimal load for the initial operations. Starting under full charge can reduce the spring life and is not always necessary. Follow these steps the first time you attempt to start the engine with the spring starter

a. Ensure all steps prior to this page in the handbook have been carried out thoroughly

b. Ensure that the engine and machinery are safely prepared for starting, including taking vehicles out of gear and cylinders are **NOT** decompressed

WARNING

Do not use spring starter when engine is decompressed

c. Check that the fuel tap is in the 'on' position, and that sufficient fuel is in the tank

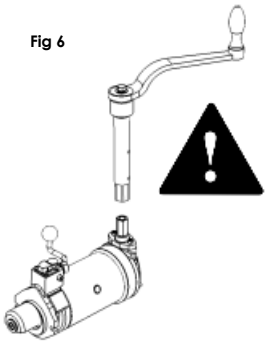
d. Position the throttle as per the engine manufacturer's instructions for starting. Most engines require at least a 3/4 open position

e. **RESET** the spring starter

f. Wind the starter **CLOCKWISE** five rotations of the handle. You should be able to hear the winding ratchet clicking while you do this, if not, keep winding until you do and then count rotations

g. Remove the winding handle from the winding adaptor, **Fig 6**

Fig 6



WARNING

Always remove the winding handle before tripping the starter

h. Operate the engine's manual fuel lift pump (if fitted) to ensure good fuel supply to the engine

i. **TRIP** the spring starter

j. If the engine starts continue to step **k**. If not, wait for rotation to stop. Then return to step **e**, adding an extra handle rotation during winding. Continue to increase winding amount in this way by one rotation each trip until engine starts

WARNING

DO NOT ATTEMPT TO WIND FURTHER THAN RED SPRINGS

k. When engine starts, adjust the throttle to the desired level

l. Make a note of the number of winds made when the engine started and mark on the quick reference operator's instructions label as the 'advised number of winds for starting'. Attach the label onto the equipment where the user will be able to refer to it

8. Standard Starting Procedure

Always take great care when operating your spring starter. Once the 'Spring Starting for the First Time' procedure has been followed, this standard procedure can be followed. The operator should have access to the quick reference operator's label as a reminder of this procedure in day-to-day use:

a. Follow points **a-k** of the first-time starting procedure, using advised number of winds for starting as previously marked on quick ref. instructions

b. It is possible the engine does not start due to difference in climate or increased load at start-up. If this is the case, always allow the engine to come to a complete rest before retrying. Then increase number of wind rotations incrementally from the advised number of winds for each subsequent start attempt. As a general rule, a warm engine will start with white springs showing through the inspection window and a cold engine could need winding to the red springs. Winding more than is necessary to start the engine will decrease the life of the springs. Never attempt to wind beyond the point when red springs show through the inspection window

c. In cold weather (below 0˚C) it may also be necessary to use a form of cold starting aid. **ONLY USE THE ENGINE MANUFACTURER'S RECOMMENDED/APPROVED COLD STARTING SYSTEM**

d. Once the engine has started, leave the trip lever in the **TRIPPED** position until the engine has stopped rotating and only **RESET** when the engine needs to be restarted by the spring starter

WARNING

Never operate the starter when not correctly installed on an engine

9. Unwinding the Spring Starter

It is possible to unwind the starter, should the need occur, by turning the handle **ANTI-CLOCKWISE** until the pinion has retracted and green springs are visible through the inspection window. Additional force will be required to overcome the initial friction

WARNING

Always make sure the green springs are visible through the inspection window before removing the spring starter from the engine

10. E-Pack Installation Instructions

(Applicable to E- suffixed models only)

WARNING

Failure to install the spring starter correctly will invalidate the warranty

Kineteco recommend a spring starter fitted with our 'E-Pack' system, if intended for use in a dual starter installation, where the second starter is electric. This is only possible with engines featuring a flywheel housing with two starter pockets, and is a good option as backup if the electric starter option fails.

In this type of installation, the two starters should never be operated at the same time as this can cause damage to both starters and the engine itself. To ensure this is prevented Kineteco have introduced a unique 'E-Pack' safety system in which the electric starter is disabled if the spring starter is primed for use. Spring starters featuring an 'E-Pack' will have an 'E' suffix on the model number. This guide will show you how to install and check the functionality of this safety feature.

Your E-Pack spring starter will come fitted with a 3-core cable: green/yellow, blue and brown. The integrated switch should be used to interrupt the electric starter solenoid or starter switch power.

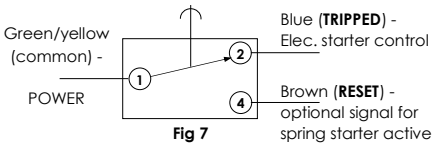


Fig 7

Circuit connections should be made as follows:

- With the spring starter in the **TRIPPED** position: ① - ② (electric starter solenoid/switch power active (state depicted in Fig 7))
- With the spring starter in the **RESET** position: ① - ④ (electric starter solenoid/switch power deactivated, can be used to indicate spring starter is in use, e.g., warning lamp)

NOTE: The integrated switch has a maximum 5A rating for 0-15VDC applications or 3A for 15-30 VDC, so should be used in conjunction with a relay if it is likely to see a load higher than this.

Once both the electric and spring starters have been installed and the wiring completed as instructed above, carry out the following test procedure:

a. Make sure the spring starter is unwound so that the pinion is disengaged

b. Position the lever into the **RESET** position, **DO NOT** wind the starter

c. Attempt to start the engine with the electric starter. The electric starter should **NOT** function

d. Move the lever into the **TRIPPED** position and test the electric starter again. The electric starter should run meaning the E-Pack circuit is functioning correctly. If not, check all wiring and re-run through test procedure

11. General Troubleshooting

If the engine does not start within three or four attempts, there are four possible explanations:

a. **Engine or fuel system is not primed for mechanical starting.** Check engine set up as prescribed in the 'Operating Instructions' section of this guide. The engine must be purely mechanical, or a bypass in place for any ECU controlled fuel cut-out, for total black-start functionality.

b. **Incorrect method of starting.** The throttle should be set between three quarters and fully open and the excess fuel device, if fitted, set to the excess fuel position. Make sure the fuel is 'up' and there is sufficient fuel in the tank. On cold engines, the starter will need to be wound further than when the engine is warm to start.

c. **Incorrect application.** The engine may exceed the maximum capacity of the spring starter or may have ancillary equipment which could cause excessive drag. Contact Kineteco if you believe this to be the case so that an alternative spring starter can be offered.

d. **The spring starter may be faulty.** If you believe the spring starter is in need of repair, please contact Kineteco. Our trained technical staff will be able to diagnose any problem and advise on the best course of action.

WARNING

Never attempt to dismantle a spring starter yourself

This process requires specialised tooling and experience

Always contact your local Kineteco distributor to arrange repair

WARRANTY TERMS

Hatraco B.V provides warranty repair for 12 months from the date of despatch. At our discretion, this may include complete replacement of the returned unit.

Warranty repair is subject to examination of the returned unit.

Detailed warranty conditions can be found on the Hatraco webpage : www.hatraco.com/support

In case you wish to return a starter to the factory, please click and follow the applicable procedure and instructions.

CE

Kineteco starters are the exclusive product of Hatraco BV and are manufactured in the Netherlands in accordance with CE guidelines and comply with the Machinery Directive.

96289 v3

Version 3
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