S-H

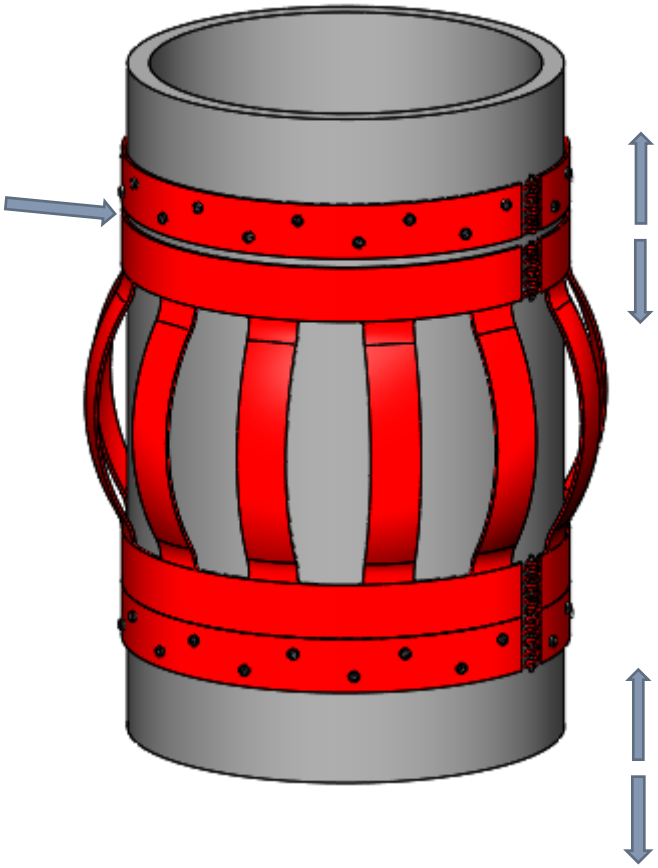
Recommended Product Installation Procedure

Installation Order – Stop Collar | Centraliser | Stop Collar

Diagram showing gap allowance and the correct direction of pin installation.

EXAMPLE - GAP
Min 11mm (0.433")
Max 27mm (1.062")

See tabulated data below for individual product sizes.



Gap Allowance per Product Size.

Product Size	Minimum Gap	Maximum Gap
0512-0812S-H	7mm (0.276")	23mm (0.901")
0958-1214S-H	5mm (0.197")	21mm (0.827")
1338-1712S-H	15mm (0.591")	31mm (1.220")
2000-2400S-H	10mm (0.394")	26mm (1.024")
2000-2600S-H	29mm (1.142")	45mm (1.772")
2200-2600S-H	11mm (0.433")	27mm (1.063")

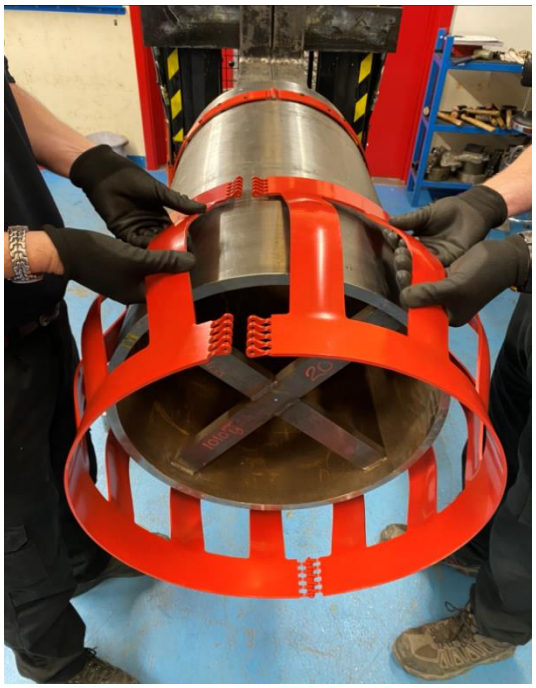
1. Install the first stop collar at the lowest point required on the casing.

2. Manually interlock the hinge fingers, squeeze together and insert the pin into the first two fingers by hand. Ensure pin head is adjacent to centraliser.
3. Insert the supplied 3mm (0.118") spacer inbetween the second and third fingers ensuring alignment with the holes in the twisted fingers.

4. Hammer the pin fully home.
5. Twist the body of the spacer until it breaks away, leaving the spacer in position.
6. Tighten and torque all set screws following appendices 1.

7. The installed stop collar can then be used to rest the centraliser during installation.

8. Remove the centraliser from packing and wrap around the casing. Please note that due to the weight of the larger units Centek recommend a 2 man lift.



9. Interlock the hinge fingers together and using your hands, insert the pin into the first two twisted fingers. Ensure pin head is adjacent to stop collar.
10. Insert the supplied 3mm (0.118") spacer inbetween the second and third fingers ensuring alignment with the holes in the twisted fingers.

11. Hammer the pin fully home.
12. Twist the body of the spacer until it breaks away, leaving the spacer in position.
13. Repeat steps 9-12 for the opposing endband.
14. At this point the centraliser can be allowed to rest back onto the stop collar.

15. Remove the second collar from the pallet and wrap around the casing, approximately 2 inches above the centraliser. Ensure pin heads are adjacent to each other.
16. Repeat steps 2-5
17. Now lower the collar to the Centek recommended minimum gap allowance distance shown in the above table. tighten and torque set screws as in appendices 1.

Appendices 1

Installation Instructions for Stop Collars

Background

The function of the Stop Collar within the borehole is considered vital for the effective installation of the Centraliser and hence subsequent Cementation. Therefore, it is strongly advised to use the correct equipment and installation methods.

Centek Stop Collars are supplied with 'Cup point Socket Head Set screws' which are
M12 dia. X 1.5mm pitch thread, with a 6 mm A/F female hex socket.

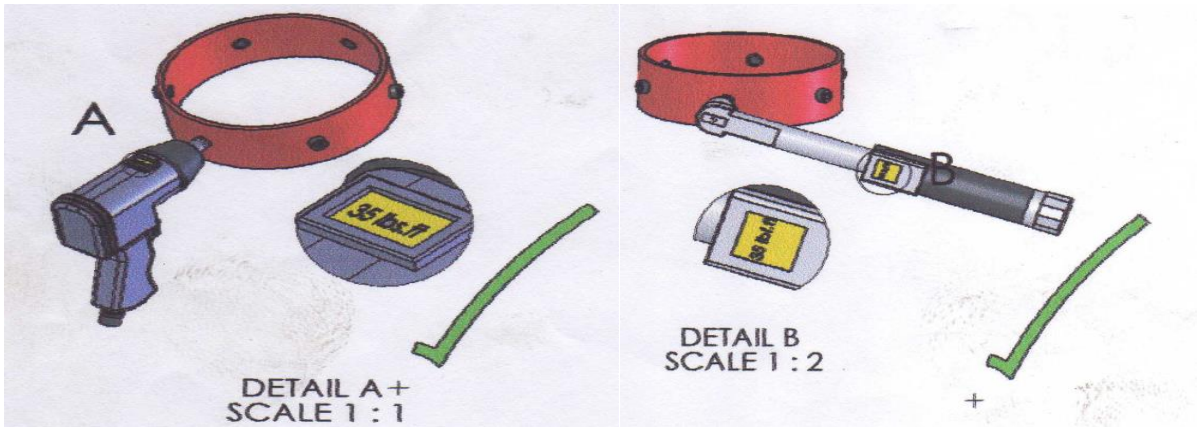
Centek supplied screws are specially selected for thread form and pitch commensurate with design and axial holding loads – the use of non Centek supplied screws is not permitted.

Clearance of stop collars either side of a centraliser

Should the centraliser be fully compressed, its developed length must not be greater than the distance between inner edges of the stop collars.

It is recommended to remain within the range of the "minimum and maximum gap allowance" values shown in the above table. Which is the clearance from either side of the centraliser to the inner edges of the stop collar.

Applying torque to 35 lb.ft. - correct tooling alternatives



(Products / suppliers are given below in good faith as a form of assistance and example. Ultimate
choice will be purchasers responsibility).

Pneumatic Tools

This is the preferred method of installation, following Centek Engineering investigations.
We recommend that the latest generation pneumatic tool be used with positive, accurate mechanical torque control built in. Supplier outlets are available worldwide, which may carry out calibration services as required.

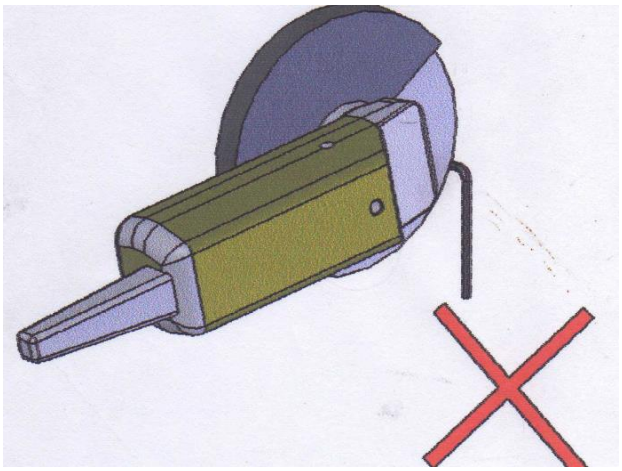
Example - typical UK Supplier
'Uryu' Pulse Tool
Model Number ULT70, 30-55NM (23-41 lb.ft.) torque range.

Hand operated Torque wrenches (must be calibrated)

Typically 'Snap' type with clear sight window for setting of desired torque.

Example - typical UK Supplier
Britool Torque Wrench Pt. No. 651-383. 15 to 75 lb.ft. (20 to 100 Nm) 1/2" A/F Square drive
Norbar Torque Wrench Pt. No. 2202-183196. 0 to 45 lb.ft. (0 to 60 Nm) 1/2" A/F Square drive

A 6 mm A/F drive key must be used with either of the above options. Do not 'cut down' regular Allen keys for use in a torque wrench or pneumatic tool.



The preferred drive is Centek Pt. No. SA12-HTLL special high performance hex key tool

The 'HEX PLUS' precision form on the hex flats allows higher torques and substantially reduced rounding of corners with resulting longer life

DO NOT use cut of lengths from conventional hand 'Allen' keys, that have been obtained by grinding or cutting wheel methods. This method generates sufficient heat to de-temper the key hardness
Use pre-made key lengths of suitable length to fit securely into socket head of the torque wrench tool etc., ensuring sufficient length protrudes for full depth location in the female hex socket of the set screws.

Typically, the keys are made from an impact resistant 'sintered carbide' approximately 1/2" to 5/8" long.
Some grades may not tolerate side loading through misalignment to the socket screw –
Centek uses a high quality tough Chrome Vanadium hex key that gives good torque transmission and excellent life of tooling.

Alternative example - typical UK Supplier

Draper Expert CR-V 6mm A/F Key Pt. No. GEE-15323K

Centek supplier: J & L Industrial, Wednesbury, West Midlands,WS10 7WP
Tel: 0800 66 33 55

Installation Information

1. Remove the Thread Protector and then slip on the Stop Collar from the pin end.

2. **To install the centraliser with 1 Stop Collar per joint;** Firstly slip on the Stop Collar and torque up the set screws using an Allen Key following Centek's recommended correct sequence of tightening installation procedure (see below).

3. Next, slide the centraliser over the pin end and allow a maximum distance of 27mm (1.062") from the side of the Centraliser and a minimum distance of 11mm (0.422")

4. **To install Centraliser with 2 Stop Collars per joint**; carry out Steps 1 to 3, then slip on the second stop collar and torque up the set screws using Allen Key following Centek's recommended correct sequence of tightening installation procedure (see below).

5. Replace the thread protector.

6. Use Casing Tongs on the rig floor to hold centraliser when making up joints.

7. Whether using 1 or 2 stop collars per centraliser, the Stop Collar must be installed first on the casing/tubing followed by the centraliser.

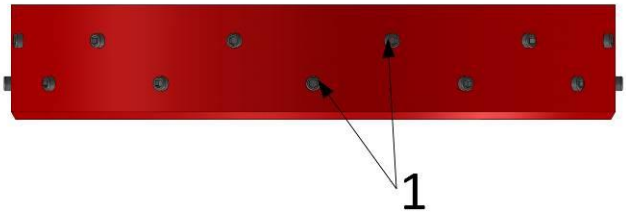
8. The centralizer must be placed approximately 6ft from the pin end, please refer to the recommended centraliser spacing patterns.

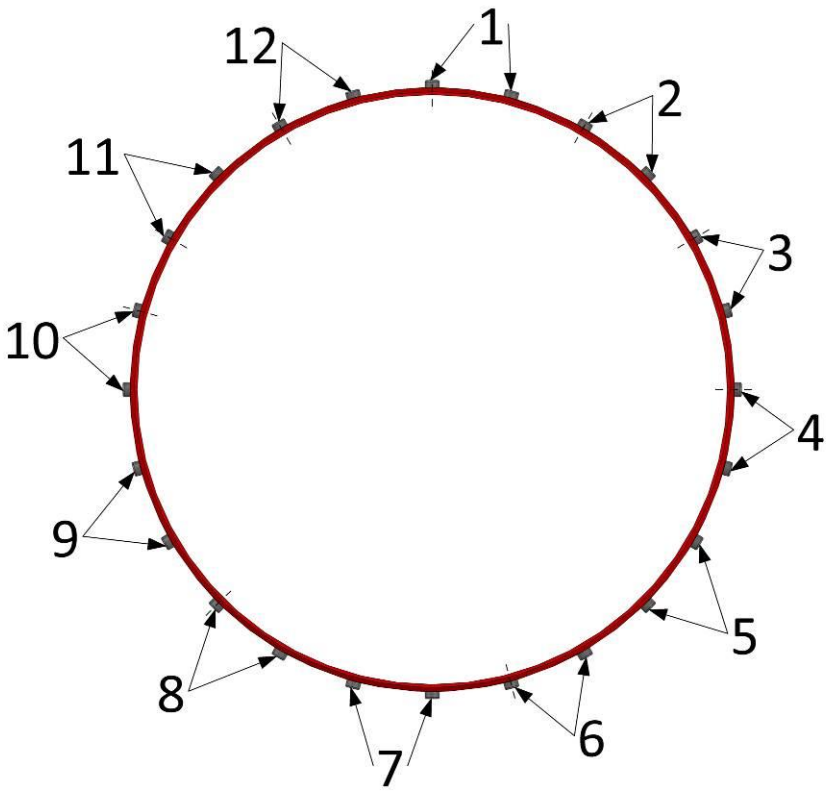
9. If using an air gun or torque wrench, ensure the tool has been calibrated and tested.

10. Set screws must be torqued to 35 ft/lbs (47Nm) to ensure the correct axial holding force of the set screws on the stop collar/casing.

Sequence of tightening - 24 Screws

Step	Screw pairs
1	1 & 7
2	4 & 10
3	2 & 8
4	5 & 11
5	3 & 9
6	6 & 12





Final torque to be applied 35 lb.ft. (47 Nm)