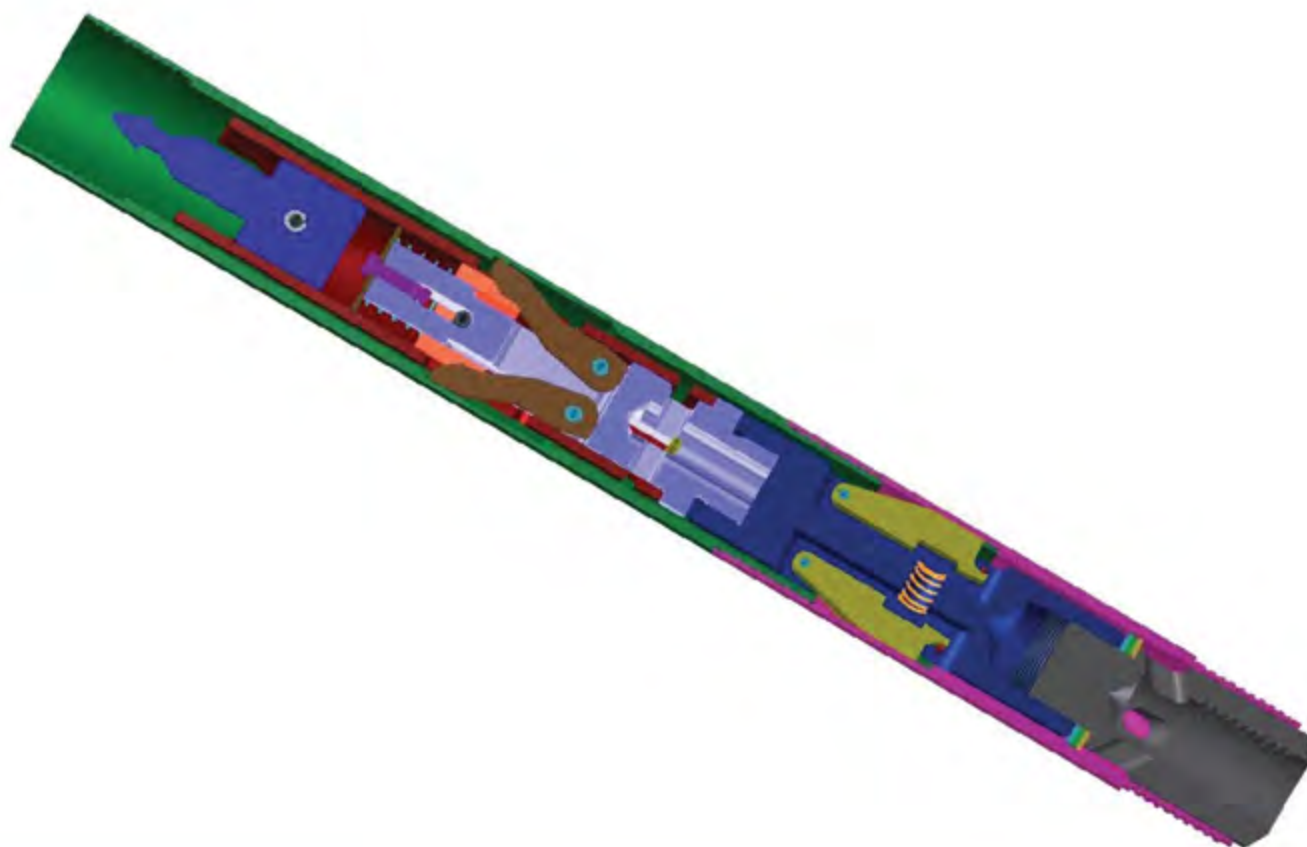


Operator's instructions

# Casing Advancer Standard/ Excure and DiscovOre



**FORDIA**®

Powered by Epiroc

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# 1 Operating Safety

Dear Operator,

Before putting your new equipment into use, we would like to direct your attention to the safety aspects. Drilling can be a hazard to you and to the environment. Good order, training, and well maintained equipment are the key factors to safe operation. This instruction book is no replacement for thorough training, but will, as a training aid and a reference book, help you maintain a safe working environment and keep the rig in good operational condition.

Yours faithfully;

*Fordia Powered by Epiroc*

## INTENDED USE

The Casing Advancer is intended for Surface exploration and investigation drilling.

Any use going beyond this shall be considered “not intended use”. The manufacturer is then not liable for damage incurred as a result. Unintentional use shall be at the owner’s risk. Proper use also includes observing information in operation, service, and maintenance books as stipulated by the manufacturer.

The Casing Advancer should be run, serviced and repaired by personnel properly trained for their task. These personnel must have sound knowledge about hazards in their respective profession.

General safety regulations must be observed. Personnel should be aware of dangers resulting from abuse of drugs and alcohols as well as effects of medicines legally prescribed, or mixture of any of them. The manufacturer is not liable for any damage caused by unauthorized alterations made to the unit.

## 1.1 Organizational Measures

- 1.1.1 The Casing Advancer shall be operated only by personnel who have undergone theoretical and practical training on diamond core drilling. Particular emphasis shall be laid on Safety Precautions and Maintenance.
- 1.1.2 Keep this instruction book available on the rig at all times.
- 1.1.3 Always use personal protective equipment, as required by circumstances or demanded by regulations.
- 1.1.4 If, during operation of the unit, any abnormal action in the safety or operational systems is observed; the unit should be stopped and the problem be investigated and rectified.
- 1.1.5 Damaged components should be replaced immediately.
- 1.1.6 Welding repairs should NOT be carried out on this product. Special attention must be given to components which could cause injury or serious damage.
- 1.1.7 After repair make sure that the Casing Advancer has been inspected and approved by the proper authorities before being brought back to normal operation.
- 1.1.8 Never make alterations or modifications to components of the unit, particularly to the safety systems, which might result in hazardous consequences. Modifications done to the unit must be approved and accepted by Fordia Powered by Epiroc in writing, in which, a revised operating procedure will be provided if applicable.

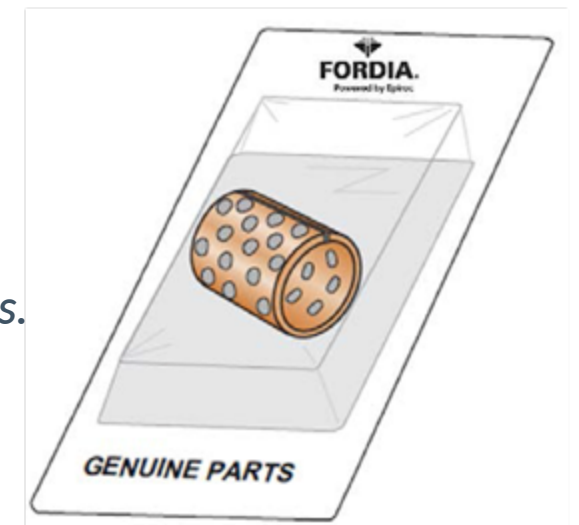


*Read the instruction book carefully before using the equipment.*

## 1.2 Operation & Maintenance

- 1.2.1 In addition to this manual you should also have a good knowledge of generally recognized safety and accident prevention regulations. If you follow the regulations you stand a better chance of accomplishing your task without harm to either man or equipment.
- 1.2.2 Prior to using any In The Hole Tool (ITH) for the first time, familiarize yourself with the tools features, its controls and their functions.
- 1.2.3 Various safety devices are built into the system of the Casing Advancer for your personal safety. These devices must be checked at least once at the beginning of each shift to ensure that they are in full working order. The equipment should not be used unless safety checks and maintenance have been carried out according to the schedule.
- 1.2.4 Operators and helpers should wear helmets, (with ear protectors when called for), safety glasses, safety shoes, gloves and suitable clothing. Loose fitting clothing and jewellery can become caught in the moving parts of the machinery, causing serious injury or even death.
- 1.2.5 Check the surroundings. During drilling and tramming no unauthorized person should be allowed near the rig.
- 1.2.6 **Use only authorized parts (Fordia Powered by Epiroc parts). Any damage or malfunction caused by the use of unauthorized parts is not covered by warranty nor will Fordia Powered by Epiroc be held responsible for any damage or injury.**
- 1.2.7 **Any warranty for work performed only covers Fordia Powered by Epiroc Products, Fordia Powered by Epiroc components and work performed by authorized personnel.**

*Use only genuine Fordia Powered by Epiroc parts.*



# 2 Operation

## 2.1 Purpose

The Casing Advancer allows drillers to advance casing through overburden or soft and broken ground without pre-drilling holes or cleaning casing. The casing advancer method uses drilling fluid (bentonite and water) as a circulation medium and is a fluid rotary drilling method. This method is successful because the large diameter outer rods remain filled with drill fluid and keep the sand down. The casing advancer normally has a diamond bit and a tricone bit which can be removed via wire line. Where spot coring or soil samples are desired, the system's center-drill section is quickly and easily retrieved - via wireline - leaving the inside of the casing advancer clear for core barrel or sampling tools. After coring, the center-drill section can again be wirelined into place, the casing advanced and full-hole drilling resumed.

## 2.2 Application

The Casing Advancer can be used with lightweight, all-terrain drills to drill water wells. The typical applications are as following:

- Soil sampling and overburden coring in conjunction with casing advancement
- Casing through difficult overburden and caving bedrock formations
- Casing off the water environment from rivers and lakes, while drilling from barges or platforms
- Over drilling lost or stuck tooling
- Piezometer or well installations with minimal cuttings
- Well abandonment

## 2.3 Operation

### 2.3.1 How the system works

An oversized casing shoe - matched to formation hardness - is attached to drive coupling. A gauged center drill tricone bit connected to the center-drill section, is inserted into the casing, drive blade on the center-drill section, snap into driving ditches in the lower part of the drive coupling. As the casing is rotated, the blades contact the driving ditches inside the drive coupling, forcing rotation of the tricone bit. The downhole pressure on the center tricone bit is maintained by the two latches on the upper center-drill section, these latches are engaged with the upper part of drive coupling.

The system's oversized casing shoe allows passage of the large cuttings generated by the rock tricone bit, and the smaller diameter core-drill section allows free passage of fluid, cuttings and lost circulation materials.

The casing advancer must be operated very carefully to avoid sand disturbance. Fluid is pumped down the casing and up a narrow annulus along the exterior of the casing. Drilling the material with a slow advance rate and with low pressure while maintaining circulation is necessary to drill successfully with this system. If circulation return stops, blockage may be occurring; and if pump pressures increase, hydraulic fracturing could occur.

### 2.3.2 Retrieve center-drill section

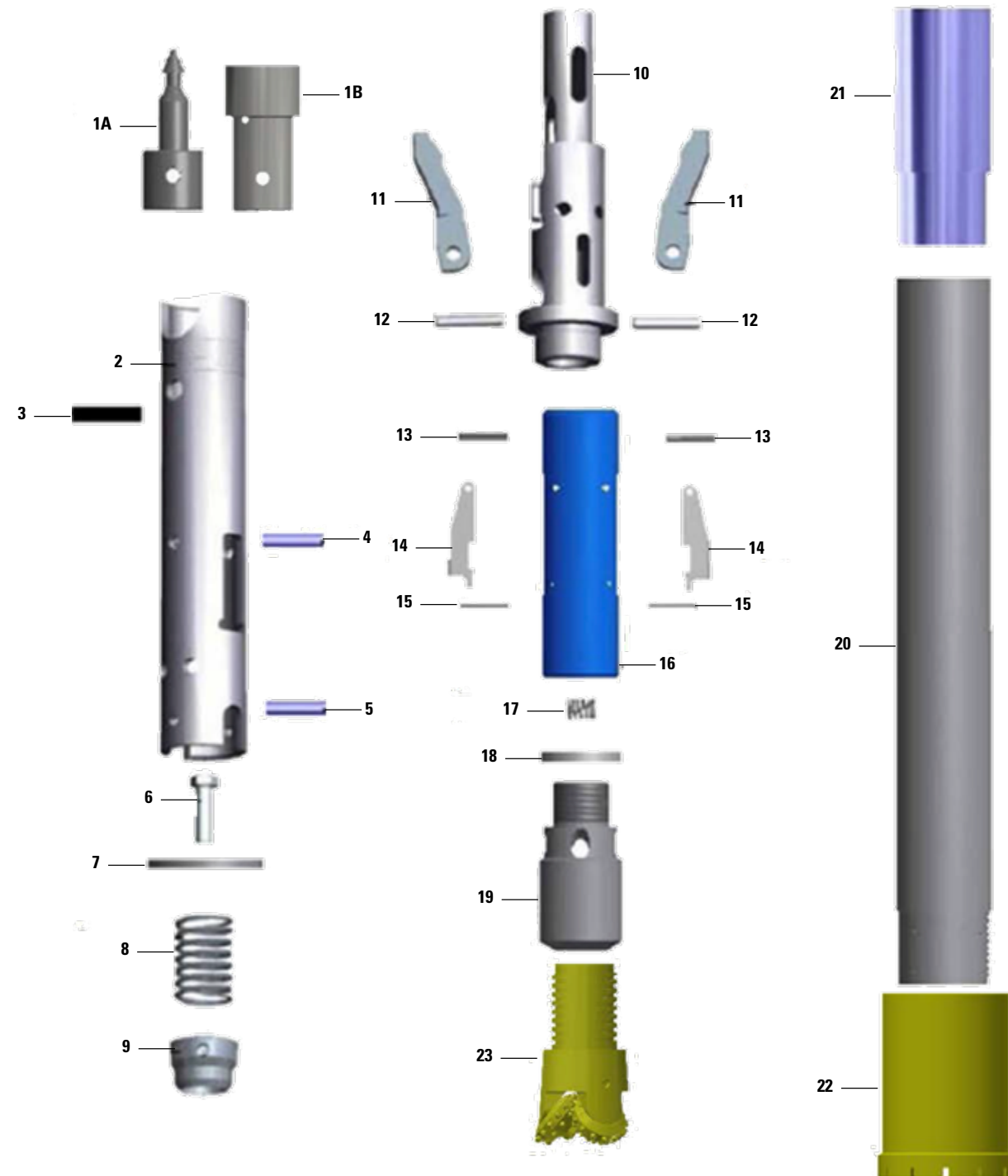
Core or drive samples are available at any time simply by wirelining the overshot recovery tool into the hole and recovering the center-drill section. When the center-drill section is retrieved, the spear head is locked inside the overshot and pull up the retracting case to force the latches to release their engaged on the drive coupling, overshot and wirelining can thus deliver the center-drill section to the surface, then return it downhole to its drilling position.

Since casing advancers are «oversize», they require the next size larger overshot. For example, a NW casing advancer uses a H size overshot.

# 3 Set Up

## 3.1 Casing Advancer Parts

### 3.1.1 Parts Diagram



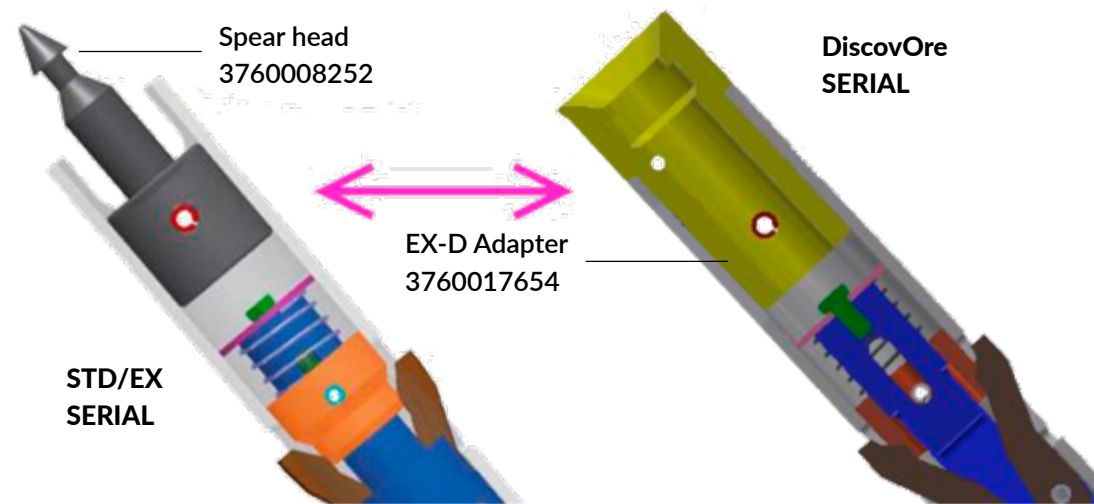
### 3.1.2 Casing Advancer Parts List

Item	Description	NW	HW	HWT	PW	PWT	QTY.
	<b>Standard &amp; Excore Casing advancer</b>	3760016233	3760016313	3760015073	3760015037	3760015074	
	<b>DiscovOre Casing advancer</b>	3760017565	3760017566	3760017567	3760017568	3760017569	
1A	Spearhead (for STD & EX Casing Advancer)			3760008252			1
1B	Adapter (for DiscovOre Casing Advancer)			3760017564			1
2	Latch retracting case		3760015671		3760015036		1
3	Spring pin 1/2 x 2 3/4			9469705229			1
4	Spring pin 3/8 x 2 3/4			3760014500			1
5	Spring pin 1/4 x 2 3/4			3760014502			1
6	Hex bolt 3/8-16 unc		9469705138		3760013477		1
7	Spring seat washer		3760016238		3760015677		1
8	Compressing spring			3760015675			1
9	Latch piston			3760015676			1
10	Upper latch body			3760015673			1
11	Latch	3760015672	3760016286		3760015043		2
12	Spring pin 3/8 x 1-1/2			3760009916			2
13	Dowel pin	3760016239	3760009370		3760014146		2
14	Drive blade	3760011053	3760008186		3760011152		2
15	Dowel pin/spring pin	3760011018	3760011052		3760009370		2
16	Drive latch body	3108110305	3760016315		3760015042		1
17	Compression spring	3760008185	3760009364		3760011058		1*
18	Shim set	3760008223	3760008225		3760011109		1
19	Tricone adapter	3760011090	3760008205		3760011137		1
20	Driving coupling assembly	3760016235	3760016316	3760015071	3760015041	3760015058	1
21	Loading funnel	3760015632	3760016319		3760015045		1
<b>Optional equipment</b>							
22	Casing shoe-gator super	9469704578	9469704507	9469704532	9469704662	9469704682	1
23	Tricone bit - steel tooth 3 7/8"	93002010		93002224		93002037	1
23	Tricone bit - tungsten carbide 3 7/8"	93002155		93002165		93002171	1
<b>Optional equipment (not shown)</b>							
24	Casing 0.6m	3760001266	3760001269	3760005093	3760007887	3760015060	1
25	Casing 1.5m	3760001267	3760001270	3760005094	3760007888	3760012066	1
26	Casing 3.0m	3760001268	3760001271	3760004281	3760007879	3760015062	1
27A	Ex safety plus overshot (for STD & EX Casing Advancer)	3760016280		3760016193		3760016192	1
27B	Arrow 3S overshot (for DiscovOre Casing Advancer)	3760017250		3760017250 or 3760017550		3760017550	1

Note:  
\*: the Qty is 2 for PW and PWT EX Casing Advancer

### 3.1.3 STD/EX& DiscovOre Casing Advancer Conversion

When use Arrow 3S Overshot, just use 3760017564 EX-D Casing Advancer Adapter to replace 3760008252 Spear head as below. Vice versa.



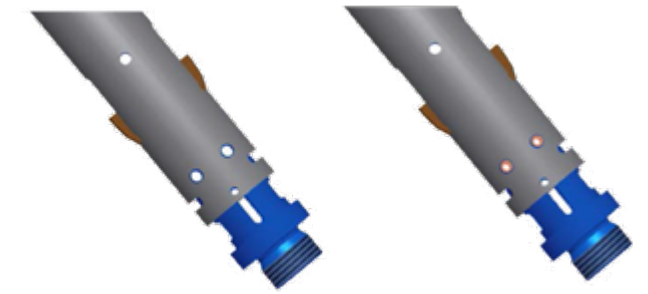
## 3.2 Assembly

- Use approved spare parts only. Any damage or malfunction that can be attributed to use of unauthorized spare parts is not covered by the warranty and invalidates production liability.
- Always use proper personal protective equipment while assembling the components of the hoisting plug.
- Always use proper tools while assembling the components of the hoisting plug.

3.2.1 Insert Upper Latch Body (item 10) into Latch Retracting Case (item 2).



3.2.2 Insert the two Latch (item 11) into the slots on Retracting Case (item 2) and Upper Latch Body (item 10), adjust Retracting Case to ensure the pin holes on both Retracting Case and Upper Latch Body are concentric.



Hammer the two 3/8 X 1 1/2 Spring Pin (item 12) into the pin holes, ensure the pin end in correct position to easily move the Retracting Case without any obstruction.

3.2.3 Put Latch Piston (item 9) onto Upper Latch Body (item 10) through Retracting Case (item 2). Then adjust Retracting Case to ensure the pin holes on Retracting Case and Latch Piston are concentric and in the center line of slot on Upper Latch body, hammer the 3/8 X 2 3/4 Spring Pin (item 4) into the pin hole.





3.2.4 Put the Compress Spring (item 8) and Spring Seat Washer (item 7) onto Upper Latch Body (item 10) through the Retracting Casing (item 2), tighten the 3/8 - 16 screw (item 6) into the Upper Latch Body.

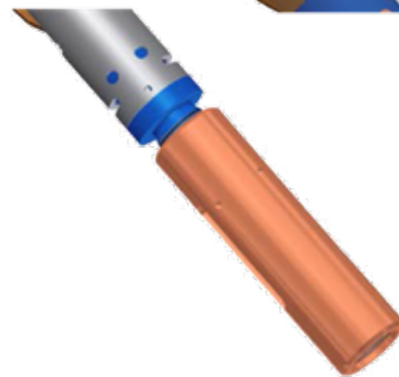
The compress spring and the latch piston keep the latch on opening.



3.2.5 Insert Spear Head (item 1) into the Retracting Case (item 2), hammer the 1/2 X 2 3/4 Spring Pin (item 3) into the pin hole.



3.2.6 Screw up Drive Latch Body (item 16) onto the Upper Latch Body (item 10).



3.2.7 Put Compress Spring (item 17) into the hole on Drive Latch Body (item 16).

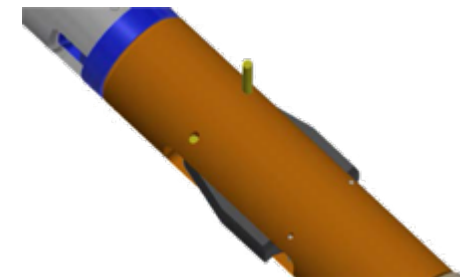
This spring keeps the drive latch on opening



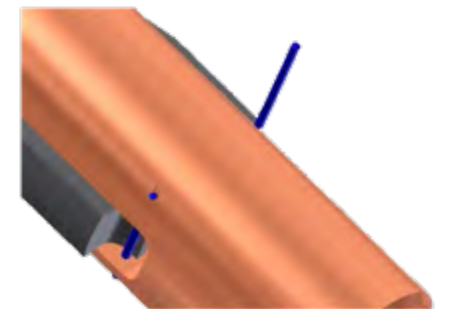
3.2.8 Insert Drive Blade (item 14) into the slots on the Drive Latch Body (item 16).



3.2.9 Hammer the two Dowel Pin (item 13) into the pin holes through Drive Blade and Drive Latch Body, ensure the Drive Blade rotate smoothly and the pin ends not exceed the outer surface of Drive Latch Body---important: spring is unacceptable .



3.2.10 Hammer the two Dowel Pin/Spring Pin (item 15) into the pin holes on Drive Latch Body, ensure the Drive Blade extension portion is between the Drive Latch Body and Dowel Pin, and the pin ends not exceed the outer surface of Drive Latch Body.



3.2.11 Screw up Tricone Adapter (item 19) onto Drive Latch Body (item 16) with Shim Set (item 18) between them. The quantities of Shim Set are as required



3.2.12 Screw up Tricone Bit Steel Tooth (item 23) into Tricone Adapter (item 19).



3.2.13 Screw up Casing Shoe (item 22) into Drive coupling assembly (item 20).



3.2.14 Insert Loading Funnel (item 21) into Drive coupling assembly (item 20), then insert the center-drill section (item 1 ~19, 23, Spear Head up) into Loading Funnel, push the Drive Blade close with fingers to let the Drive Blade into the Loading funnel, lower the center-drill section slowly until the Drive Blade open and engaged. Remove the Loading Funnel.



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