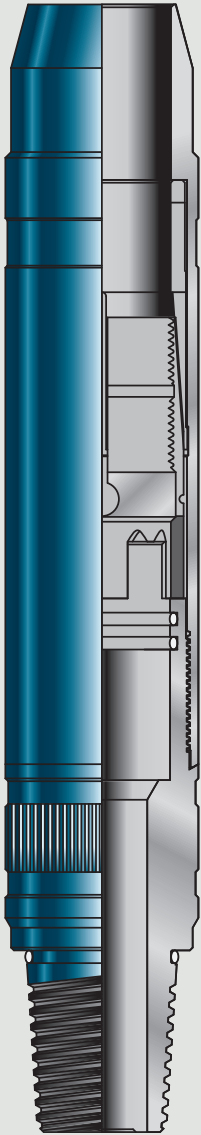


# COILED TUBING TOOLS

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## 'TORCONNECT' EXTERNAL SLIP COIL CONNECTOR

The 'Torconnect' External Slip Connector has been primarily developed to withstand the most extreme high-torque, high-tensile applications.

Unlike existing slip connectors, the 'Torconnect' External Slip Connector does not rely on grub screws to transmit torque from the toolstring, through to the coiled tubing. This feature is provided through a unique non-rotational slip arrangement, providing high bi-directional torque resistance. The slip is positively engaged into the bottom sub, via drive teeth, therefore transmitting any rotational torque from the tool string directly to the pipe.

### Design Features/Benefits:

- High tensile strength
- Non rotational
- Internal pressure seal
- Replaceable slips

### SPECIFICATIONS

Part Number	Coiled Tubing Diameter	Max OD	Min ID	Thread
	(in)	(in)	(in)	
D97-1125-100	1 1/4	1.687	0.75	1" AMMT
D97-1150-100	1 1/2	2.125	1.00	1.5"AMMT
D97-1175-100	1 3/4	2.375	1.00	
D97-1200-100	2.00	2.875	1.50	2 3/8" PAC
D97-1237-100	2 3/8	3.125	1.50	
D97-1287-100	2 7/8	3.625	1.50	2 7/8" PAC

## 'SLIMCONNECT' EXTERNAL SLIP CONNECTOR

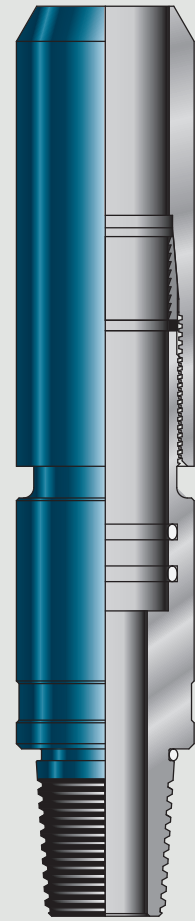
The 'Slimconnect' External Slip Connectors allow the attachment of coiled tubing to the CT Tool Workstring, via the provision of a threaded connection.

The 'Slimconnect', as its name suggests, has an O.D. which is smaller than a standard 'Torconnect'. This enables the 'Slimconnect' to be used in operations where a maximum diameter of coiled tubing is required to be run in a minimal I.D. restriction.

The design of the 'Slimconnect' utilizes a set of helical 'wicker' type slips that grip the tubing in a 'wedging' action, thus, an increase in tension results in increased grip.

### Design Features/Benefits:

- High tensile strength for size
- Slimline body O.D.
- Internal pressure seal
- Replaceable slips

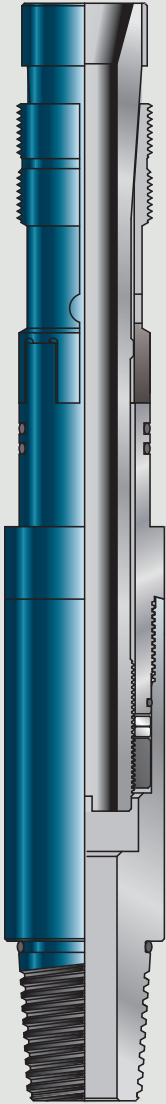


### SPECIFICATIONS

Part Number	Coiled Tubing Diameter	Max OD	Min ID	Thread
	(in)	(in)	(in)	
D97-1125-102	1 1/4	1.687	0.750	1" AMMT
D97-1150-102	1 1/2	2.125	1.000	1.5" AMMT
D97-1175-102	1 3/4	2.375		
D97-1200-102	2	2.875	1.500	2 3/8" PAC
D97-1237-102	2 3/8	3.125	1.500	

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## 'TORCONNECT' INTERNAL SLIP CONNECTOR

Unlike existing slip connectors, the 'Torconnect' Internal Slip Connector does not rely on grub screws to transmit torque from the toolstring, through to the coiled tubing. This feature is provided through a unique non-rotational slip arrangement, providing high bi-directional torque resistance. The slip is positively engaged into the bottom sub via drive teeth, therefore transmitting any rotational torque from the toolstring directly to the pipe.

The basic installation to the coiled tubing does not require any specialized tooling or make-up torque. The connector is simply fitted to the pipe and an overpull taken to test and set the connector.

The Internal 'Torconnect' also has only 4 main components and includes an enclosed lock nut feature to prevent the connector from being jarred free from the pipe.

Both Internal and External versions of the 'Torconnect' Slip Connector feature an interchangeable service connection sub allowing the operator to easily change from one thread connection to another.

Because the 'Torconnect' can withstand extremely high tensile and torsional loads, it is ideally suited for high-end CT drilling, milling, under-reaming and fishing applications.

### Design Features/Benefits

- High tensile strength
- Non rotational
- Internal pressure seal
- Replaceable slips

### SPECIFICATIONS

Part Number	Coiled Tubing Diameter	Max OD	Min ID	Thread
	(in)	(in)	(in)	
D97-1150-202	1 1/2*0.125	1.50	0.500	1" AMMT
D97-1175-202	1 3/4*0.134	1.75	0.625	
D97-1200-203	2*0.175	2.00	0.812	1.5"AMMT
D97-1237-201	2 3/8*0.175	2.375	1.000	

## ROLL-ON CONNECTOR

### Roll-On Connector

The Roll-On Connector allows the attachment of Coiled Tubing to the CT Tool/Workstring via the provision of a threaded connection.

The Roll-On Connectors are available to suit all standard sizes of coiled tubing.

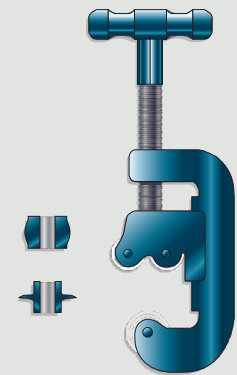
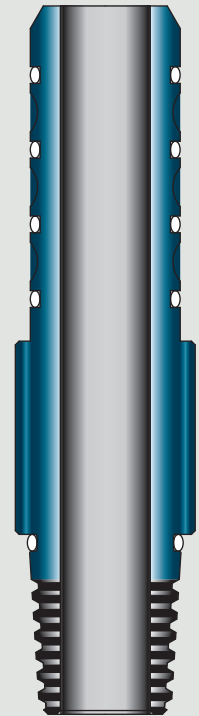
#### Design Features/Benefits:

- High tensile strength
- Internal pressure seal
- Easy make up

### Roll-On Connector Crimping Tool

The Roll-On Connector Crimping tool ensures easy field installation of the Roll-On Connector to the coiled tubing.

The crimping tool has two interchangeable wheels, one of which is used to swage the coiled tubing onto the Roll-On Connector. The other is a cutting wheel which can be used to cut the coiled tubing.

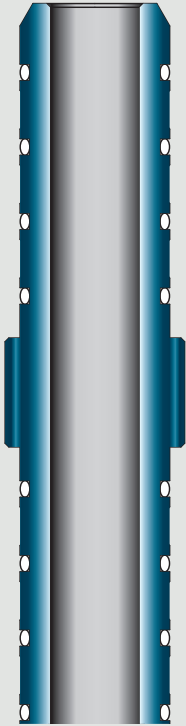


#### SPECIFICATIONS

Part Number	Coiled Tubing Diameter	Max OD (in)	Min ID (in)	Pressure Psi	Tensile Strength	Thread	Crimping Tool Part Number
	(in)				Lbs		
D97-1125-300	1 1/4*1/8	1.500	0.50	10,000	25,000	1" AMMT	D97-1150-301
D97-1150-300	1 1/2*1/8				35,000	1" AMMT	
D97-1150-304	1 1/2*0.102						
D97-1150-305	1 1/2*0.109						
D97-1150-306	1 1/2*0.156	1.750	0.75	45,000	1" AMMT		
D97-1175-300	1 3/4*1/8				1.5" AMMT		
D97-1175-304	1 3/4*0.175						
D97-1175-303	1 3/4*0.175	2.125	1.00	2.000	65,000	1.5" AMMT	
D97-1200-300	2*0.188	2.000	1.00				
D97-1200-301	2**0.145"				65,000		
D97-1200-303	2**0.175"					60,000	
D97-1200-304	2**0.156"				60,000		
D97-1237-300	2 3/8**0.175"	2.375"	1.00		60,000	1.5" AMMT	

# COILED TUBING TOOLS

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## DOUBLE ENDED ROLL-ON CONNECTOR

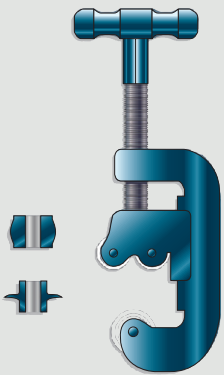
Double Ended Coiled Tubing Roll-On Connectors allow the inline attachment of two lengths of coiled tubing.

Double Ended Roll-On Connectors have the same outside diameter as the coiled tubing.

Double Ended Roll-On Connectors attach to the coiled tubing's internal diameter. The connector is secured by crimping the tubing into the connectors preformed channels with a Roll-On Connector Crimping Tool.

### Design Features/Benefits:

- High tensile strength
- Internal pressure seal
- Easy make up



### SPECIFICATIONS

Part Number	Coiled Tubing Diameter	Max OD	Min ID	Pressure	Tensile Strength	Crimping Tool Part Number
	(in)	(in)	(in)	Psi	Lbs	
D97-1125-302	1 1/4*1/8	1 1/4	0.500	10,000	23,000	D97-1150-301
D97-1125-303	1 1/4*0.109	1 1/4	0.500	10,000	16,000	
D97-1150-302	1 1/2*1/8	1 1/2	0.750	10,000	25,000	
D97-1150-308	1 1/2*0.134	1 1/2	0.750	10,000	32,000	
D97-1175-305	1.75 *0.156	1.75	0.750	10,000	38,000	
D97-1200-302	2*0.175	2	1.000	10,000	45,000	
D97-1200-305	2 *0.156	2	1.000	10,000	42,000	
D97-1237-302	2 3/8*0.175	2 3/8	1.500	10,000	65,000	

## DIMPLE/GRUB SCREW CONNECTOR

The Grub Screw/Dimple Connector allows the attachment of coiled tubing to the CT Tool/ Workstring, via the provision of a threaded connection.

The connector is attached to the coiled tubing by grub screws that engage in preformed dimples in the tubing wall.

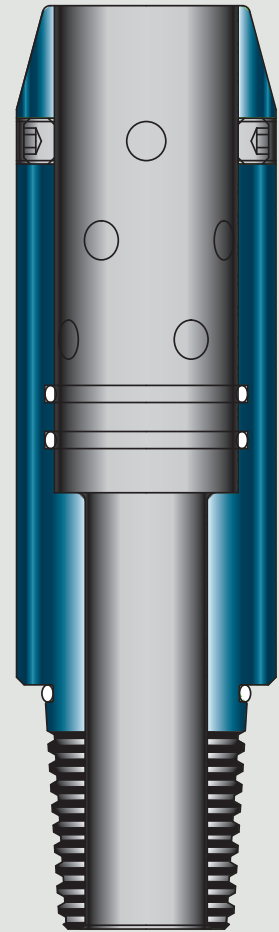
The dimples are formed by using the Dimple Hammer/Extractor Tool that places the indents in identical positions to the screws on the connector.

The Dimple/Grub Screw/ Connectors have 'o' ring pressure seals as standard, and are also available with 'v' packings as an option to create the pressure seal.

### Design Features/Benefits:

- High tensile strength
- Internal pressure seal
- Easy make up
- High Torque

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### SPECIFICATIONS

Part Number	Coiled Tubing Diameter	Max OD	Min ID	Thread	Dimple Hammer / Extractor Tool Part Number
	(in)	(in)	(in)		
D97-1125-400	1 1/4	1.750	0.687	1" AMMT	D97-1125-401
D97-1150-400	1 1/2	2.125	1.000	1.5" AMMT	D97-1150-401
D97-1175-400	1 3/4	2.375	1.000		D97-1175-401
D97-1200-400	2	2.875	1.500	2 3/8" PAC	D97-1200-401
D97-1237-400	2 3/8	3.125	1.500	2 3/8" PAC	D97-1237-401

# COILED TUBING TOOLS



## PULL PLATE FOR COIL CONNECTOR

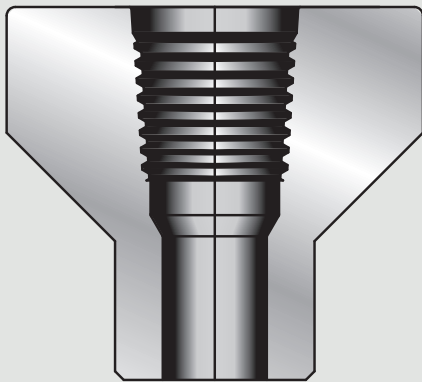
The Pull Plate is used as an accessory with the Coil Tubing Connector. Once the Connector is installed on the coil, install the Pull Plate onto the connector.

This will allow the connector to enter the lubricator, but the bottom of the pull plate will seat on the end of the lubricator, preventing further travel. Now apply the proper overpull to test the connector. The pull plate also prevents the connector from being pulled against the seals of the lubricator.

After a successful pull test, remove the pull plate and proceed with installing the remainder of the toolstring. The pull plate can also be built with 3/16" hole and a 1/2" tap for a needle and be used also as a test plug.

### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-1125-110	5	0.75	1" AMMT
D97-1150-110	5	1.00	1.5"AMMT
D97-1237-110	6	1.50	2 3/8"PAC
D97-1238-110	6	1.50	2 3/8"REG
D97-1287-110	6	1.50	2 7/8"PAC



## DUAL FLAPPER CHECK VALVE

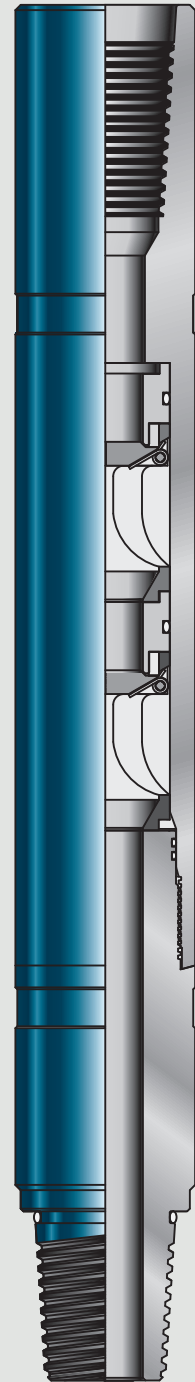
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The Dual Flapper Check Valve is used in situations where the operator wishes to eliminate the flow, or potential flow, of fluids back through the workstring, while running or retrieving pipe under pressure.

The Dual Flapper Check Valve is designed so that the flow area through the valve is equal to or greater than the cross sectional area of I.D. of the valve seat. The Dual Flapper Check Valves are easy to assemble or disassemble, a new flapper cartridge can be inserted in a matter of minutes. The Dual Flapper Check Valve combines reliability, minimum flow restrictions, and the ability to pump wiper plugs or to drop balls through the valve for disconnects, etc.

As with ball type check valves, rust, scale, paraffin, dried hydrocarbons or materials do not pose a threat of plugging this flapper check valve due to the ability to pump through the valve at all times.

The flapper valve and seat are directly exposed to the pumped fluid and some erosion may occur on the seat surface and possibly the flapper valve itself, depending on a variety of factors including velocity through the valve, abrasiveness of the fluid pumped, solids content, and duration of the exposure. The flappers and valve seats should be checked and replaced when required.



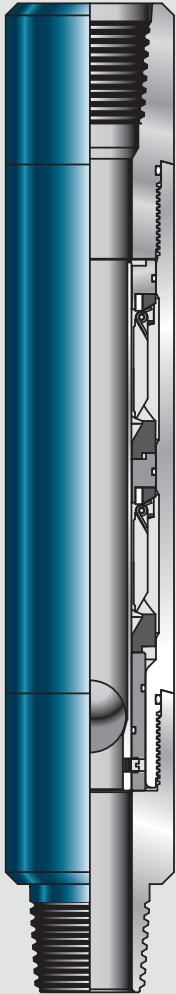
### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D96-5150-100	1.500	0.620	1" AMMT
D96-5168-100	1.687	0.687	
D96-5175-100	1.750	0.687	
D96-5212-100	2.125	0.891	1.5" AMMT
D96-5225-100	2.250	1.031	
D96-5237-100	2.375	1.000	
D96-5287-100	2.875	1.369	2 3/8" PAC
D96-5312-100	3.125	1.442	
D96-5312-102	3.125	1.442	2 3/8" EUE
D96-5387-101	3.875	2.125	2 7/8" EUE



# COILED TUBING TOOLS

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## TWIN FLAPPER CHECK VALVE WITH LOCK-OUT SLEEVE

The Twin Flapper Check Valve with Lock-Out Sleeve is a coiled tubing string component that can be run in the locked out position and activated with a drop ball when required to perform as a downhole safety barrier. Its use provides a means of preventing the back flow of well fluids into the coiled tubing in the event of failure or damage to the coiled tubing string or surface equipment.

The design of the Twin Flapper Check Valve incorporates a dual sealing system in each flapper assembly for increased safety. A Teflon seat provides the primary low pressure seal, while at higher pressure the flapper seals on a metal to metal arrangement.

It is ideally suited to CT velocity string systems, allowing activation by a drop ball prior to pulling the string from the well.

### Design Features/Benefits:

- Dual sealing in each flapper cartridge (i.e. low pressure Teflon seat/seal and high pressure full metal to metal seat/seal)
- Full bore fluid passage for balls, darts & plugs
- Removable flapper cartridges
- Simple drop ball activation

### SPECIFICATIONS

Part Number	Max OD	Min ID	Ball OD	Thread
	(in)	(in)	(in)	
D96-5175-300	1.750	0.470	5/8	1" AMMT
D96-5218-300	2.187	0.750	13/16	1.5"AMMT
D96-5287-300	2.875	1.000	1 1/16	
D96-5312-300	3.125	1.000	1 1/16	2 3/8"REG
D96-5350-300	3.500	1.375	1 1/2	2 7/8"PAC

## BALL CHECK VALVE

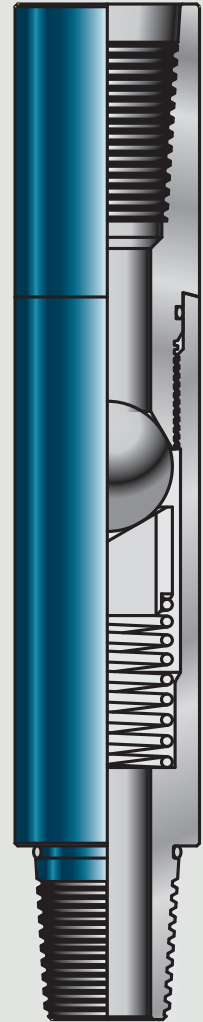
The Ball Check Valve is a standard coiled tubing string component. Its use in a toolstring, provides a means of preventing the back flow of fluids into the coiled tubing, in the event of failure or damage to the surface equipment.

Ball Check Valves are used when devices such as balls and darts do not need to pass through the valve. In the event of a ball or dart needing to be dropped, a Flapper Valve must be used.

### Design Features/Benefits:

- Large flow area
- Easy redress
- Metal to metal sealing

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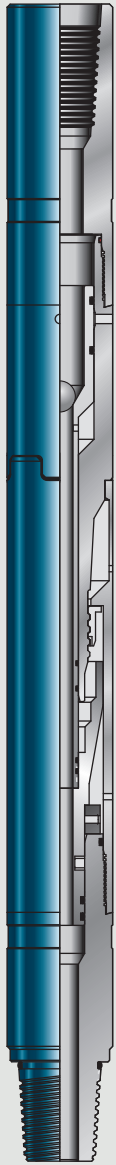


### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D96-5168-200	1.687	0.750	1" AMMT
D96-5212-200	2.125	1.000	1.5" AMMT
D96-5225-200	2.250	1.031	
D96-5237-200	2.375	1.031	2 3/8" PAC
D96-5287-200	2.875	1.375	
D96-5312-200	3.125	1.500	

# COILED TUBING TOOLS

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## HEAVY DUTY HYDRAULIC DISCONNECT

The Heavy Duty Hydraulic Disconnect (HDHD) allows the toolstring to detach at a predetermined point via the deployment of a suitable drop/trip ball through the coiled tubing. The drop ball locates on a piston sleeve creating sufficient back pressure to shear the pins and disconnect the tool. The piston sleeve pushes the tool apart to ensure a clean disconnect. Circulation is immediately returned to the toolstring, providing a surface indication of a positive disconnect. All piston sleeves and drop balls are returned to surface leaving a standard 'GS' internal fish neck for retrieval purposes.

The 'HDHD' utilizes a heavy duty, one piece, threaded collet slip to hold the tool together. The collet slip endures higher tensile loading than collet finger type release mechanisms and is far less susceptible to fatigue. The collet slip is backed up with a collet slip sleeve to give maximum tensile strength to the disconnect during heavy jarring operations. Only by dropping a ball and shearing the pins can the collet sleeve shift, allowing the collet and top sub to part. The piston sleeve is pressure balanced, therefore internal pressure does not affect the hydraulic configuration and shear values.

High torque capabilities are achieved through positive torque drive teeth between the top sub and the main body of the tool. The 'HDHD' is therefore ideally suited for high torque, heavy duty coiled tubing drilling operations, where maximum performance and durability is essential.

Shear screws can be supplied in either brass or steel to give a comprehensive pressure range to suit virtually any coiled tubing application. Shear screws are also integrally situated to eliminate the possibility of shear screws vibrating free during CT drilling operations.

By interchanging the piston sleeve, the drop/trip ball size can be varied to suit the desired toolstring requirements. This is a particularly useful feature when the 'HDHD' is situated below jars and accelerators, and ID restrictions are a factor for consideration. Running the 'HDHD' below jars and accelerators ensures that if disconnection of the toolstring is necessary, a greater proportion of the toolstring is safely returned to surface.

A major design consideration is that of simple field redress. The 'HDHD' has been designed to ensure assembly & disassembly of the tool is trouble free. No special assembly tools are required and all seals are standard 'o' rings.

### SPECIFICATIONS

Part Number	Max OD	Min ID	Ball OD	Max Ball OD	Fishing neck	Thread
	(in)	(in)	(in)	(in)		
D97-1150-500	1.500	0.438	1/2	3/8	1.5"GS	1" AMMT
D97-1168-500	1.687	0.468	5/8	7/16	2"GS	
D97-1175-500	1.750				2 1/2"GS	
D97-1212-500	2.125	0.531	13/16	3/4	3"GS	1.5" AMMT
D97-1212-502	2.125	0.531				1.9" AMMT
D97-1225-500	2.250	0.782				13/16
D97-1237-500	2.375		2 3/8" PAC			
D97-1287-500	2.875	0.875	15/16	13/16	3.5"GS	2 3/8" EUE
D97-1312-500	3.125	1.299	1 3/8	1 3/16	3.5"GS	2 3/8" EUE
D97-1312-502	3.125	1.299	1 3/8	1 3/16	3.5"GS	2 3/8" EUE
D97-1387-501	3.875	1.875	2	1 13/16	4"GS	2 7/8" EUE

## SHEAR RELEASE JOINT

The Shear Release Joint allows the parting of the coiled tubing workstring by applied predetermined tension.

The Shear Release Joint was designed for and used primarily in cement stinger operations as a simple effective emergency release.

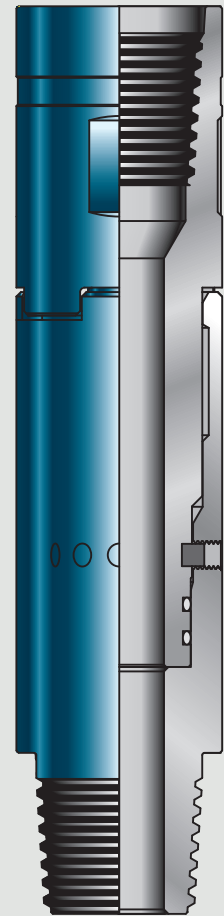
The Shear Release Joint incorporates shear screws that can be used in various combinations to allow a wide range of predetermined shear settings.

The released part of the Shear Release Joint can be retrieved using a 'GS' type Pulling Tool.

### Design Features/Benefits:

- Simple design
- On location adjustable settings
- Internal pressure seal
- Internal 'GS' type fish neck after release
- Torque Thru capability

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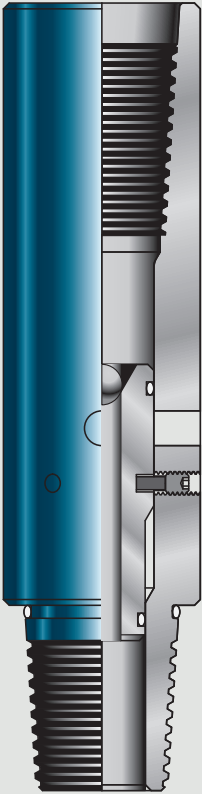


### SPECIFICATIONS

Part Number	Max OD (in)	Min ID (in)	Fishing neck	Thread
D97-1168-700	1.687	0.500	2"GS	1" AMMT
D97-1175-700	1.750			1.5" AMMT
D97-1212-700	2.250	0.750	2 1/2"GS	1.90"NU
D97-1212-703	2.250	0.750		1.5" AMMT
D97-1237-700	2.375	1.000		3"GS
D97-1287-700	2.875	1.250	3.5"GS	2 7/8"EUE
D97-1312-700	3.125	1.500	4"GS	
D97-1375-701	3.750	2.125		

# COILED TUBING TOOLS

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## DUAL ACTIVATED CIRCULATION VALVE (DROP BALL/OVER PRESSURE)

The Dual Activated Circulation Valve offers the traditional method of returning circulation of the toolstring, through use of a drop ball. In addition, the valve is capable of operating through internal overpressure within the tubing string.

Conventional dual circulation valves use a burst or rupture disc to facilitate the function of returning circulation through overpressure; however, the Dual Activated Circulation Valve offers a pressure differential activated piston. The piston activation pressure can be predetermined at surface through shear pins, offering superior flexibility and considerable savings on redress.

As with many other tools in the standard BHA tool range, the emphasis is on simplicity and the Dual Activated Circulation Valve has very few component parts, seals and thread connections.

### Design Features/Benefits:

- Simple drop ball design and pressure differential to operate

### SPECIFICATIONS

Part Number	Max OD	Min ID	Length	Per shear pin		Thread
	in	in		Drop ball pressure PSi	Over pressure PSi	
D96-6168-200	1.687	0.406	7.500	940-1090	2620-3030	1" AMMT
D96-6175-200	1.750	0.406	7.500	940-1090	2620-3030	
D96-6212-200	2.125	0.406	8.500	650-750	2140-2460	1.5" AMMT
D96-6225-200	2.250	0.625	8.500	590-670	1560-1800	
D96-6237-200	2.375	0.625	8.500	590-670	1560-1800	
D96-6287-200	2.875	0.812	9.500	316-358	830-960	2 3/8" PAC
D96-6312-200	3.125	0.812	9.500	316-358	830-960	

## BURST DISC CIRCULATION SUB

The Burst Disc Circulation Sub is a standard coiled tubing toolstring component that is used in conjunction with tools that require drop balls etc., and that need to be circulated into the coiled tubing.

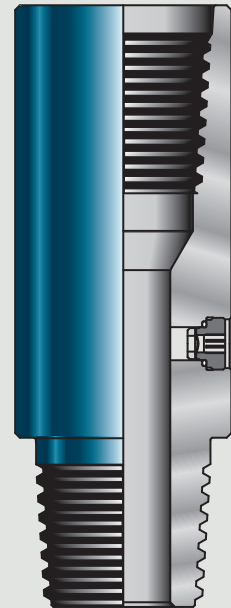
The Burst Disc Circulation Sub is incorporated into the coiled tubing toolstring just below the tool that requires a drop ball.

Should circulation be lost due to a down hole restriction, a predetermined pressure applied to the coil will burst the disc in the sub and re-establish circulation.

### Design Features/Benefits:

- Various burst disc pressure rating available

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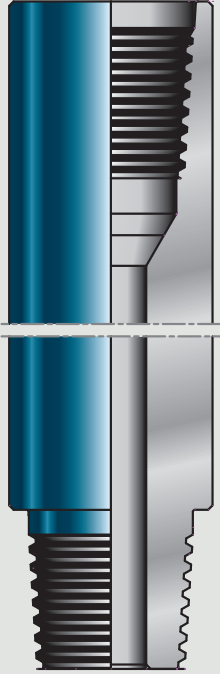


### SPECIFICATIONS

Part Number	Max OD	Min ID	Burst disc pressure	Thread
	(in)	(in)	(PSI)	
D96-6168-300	1.687	0.406	Optional	1" AMMT
D96-6175-300	1.750			1.5" AMMT
D96-6212-300	2.125	0.875		2 3/8" PAC
D96-6237-300	2.375	1.000		
D96-6287-300	2.875	1.250		
D96-6312-300	3.125	1.250		

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## STRAIGHT BAR

The Straight Bar provides a means of extending the toolstring, while maintaining the maximum through bore. The tubular section between the top & bottom sub can be interchanged to vary the length of the straight bar. This approach offers an ideal way of spacing out tools within the toolstring, without compromising the flow requirements of flow activated or jetting tools.

### Design Features/Benefits:

- Full flow through bore
- Solid construction

### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-3168-000	1.687	0.500	1" AMMT
D97-3175-000	1.750		
D97-3212-000	2.125		1.5" AMMT
D97-3225-000	2.250		
D97-3287-080	2.875	1.000	2 3/8" PAC
D97-3312-000	3.125	1.250	

## DOWN-STROKE INTENSIFIER

The Down-Stroke Intensifier is used in conjunction with the Down-Stroke Hydraulic Jar. Its purpose is to provide the necessary even pull and acceleration power for the Coiled Tubing Down-Stroke Hydraulic Jar to operate efficiently, especially in long reach wells where there is limited coiled tubing push.

The Coiled Tubing Down-Stroke Intensifier stores downward energy in a powerful compression spring, which is suddenly released when the Hydraulic Jar 'releases', thus intensifying the downward jarring impact.

The Down-Stroke Intensifier is fully vented to the well bore to prevent damping effect and has full 'pump through' capability, compatible with the PCE Coiled Tubing Hydraulic Jar.

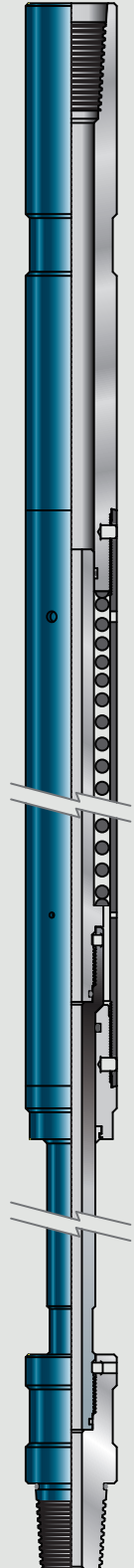
The Down-Stroke Intensifier is manufactured from high grade low alloy steel and stainless steel and is extremely robust and durable in construction.

Under normal conditions, the Down-Stroke Intensifier will function at temperatures of up to 200°C, if circulation is maintained during operations.

### Design Features/Benefits:

- Full flow through bore
- Heavy duty construction

HT CO<sub>2</sub> H<sub>2</sub>S



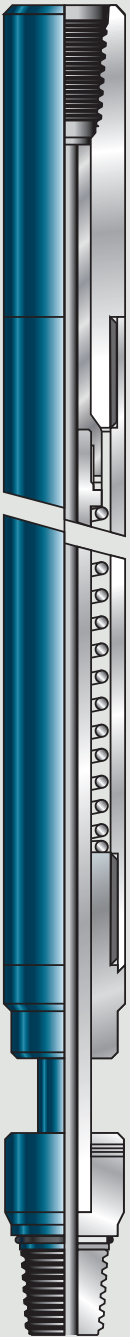
### SPECIFICATIONS

Part Number	Max OD	Min ID	Load to close	Thread
	(in)	(in)	Lbs	
D97-4175-100	1.750	0.375	614	1" AMMT
D97-4212-100	2.125	0.500		1.5" AMMT
D97-4225-100	2.250			
D97-4287-100	2.875	0.625	650	2 3/8" PAC
D97-4312-100	3.125			



# COILED TUBING TOOLS

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## UP-STROKE INTENSIFIER

The Up-Stroke Intensifier is used in conjunction with the Up-Stroke Hydraulic Jar.

Its purpose is to provide the necessary even pull and acceleration power for the Coiled Tubing Up-Stroke Hydraulic Jar to operate efficiently, especially at shallow depths where there is limited coiled tubing stretch.

The Coiled Tubing Up-Stroke Intensifier stores upward energy in a powerful compression spring, which is suddenly released when the Hydraulic Jar 'releases', thus intensifying the upward jarring impact.

The Up-Stroke Intensifier is fully vented to the well-bore to prevent damping effect, and has full 'pump through' capability, compatible with the CT Hydraulic Jar.

The Up-Stroke Intensifier is manufactured from high grade low alloy steel and stainless steel and is extremely robust and durable in construction.

Under normal conditions, the Coiled Tubing Up-Stroke Intensifier will function at temperatures of up to 200°C, if circulation is maintained during operations.

### Design Features/Benefits:

- Full flow through bore
- Heavy duty construction

### SPECIFICATIONS

Part Number	Max OD	Min ID	Load to close	Thread
	(in)	(in)	Lbs	
D97-4175-400	1.750	0.375	614	1" AMMT
D97-4212-400	2.125	0.500		1.5" AMMT
D97-4225-400	2.250			
D97-4287-400	2.875	0.625	650	2 3/8" PAC
D97-4312-400	3.125			

## DOWN-STROKE HYDRAULIC JAR

The Down-Stroke Hydraulic Jar (DSHJ) provides the means for repeatable, controlled downward jarring, when required during coiled tubing operations.

The 'DSHJ' has a highly dependable closed and balanced hydraulic system for hydrostatic pressure. This allows the coiled tubing operator to control the intensity of the jarring action to suit the field application, by applying a sustained downward load, which can be infinitely variable, according to the usage application.

The 'DSHJ' is normally used in conjunction with the CT Down-Stroke Intensifier. It is suitable for most coiled tubing applications, where the deployment of downhole service and manipulation tools is required, including setting and pulling plugs, gas lift valves, opening and shutting sliding side doors and the general fishing of downhole retrievables.

The 'DSHJ' is also used in most standard coiled tubing toolstrings, during other coiled tubing services, such as, swabbing, jetting, logging, and stimulating, especially in deviated wells, where there is a possibility of the toolstring becoming stuck. The closed hydraulic system prevents contamination from well bore fluids thus giving greater operational dependability. Under normal conditions, the 'DSHJ' will function at temperatures of up to 100°C, if circulation is maintained during operations. The 'DSHJ' is manufactured from high grade low alloy steel and stainless steel and is extremely robust and durable in construction.

### Design Features/Benefits:

- Full flow through bore
- Specifically designed for CT use
- Efficient Valve Seating for deviated applications
- Closed & balanced hydraulic system
- Also available with 'Torque Thru' capability

### SPECIFICATIONS

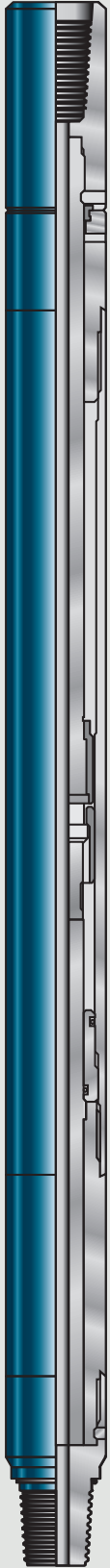
Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-4175-200	1.750	0.375	1" AMMT
D97-4181-200	1.810		
D97-4212-200	2.125	0.500	1.5" AMMT
D97-4225-200	2.250		
D97-4287-200	2.875	0.750	2 3/8" PAC
D97-4312-200	3.125	1.000	

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# COILED TUBING TOOLS

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## UP-STROKE HYDRAULIC JAR

The Up-Stroke Hydraulic Jar (USHJ) provides the means for repeatable, controlled upward jarring when required during coiled tubing operations.

The 'USHJ' has a highly dependable closed and balanced hydraulic system for hydrostatic pressure. This allows the coiled tubing operator to control the intensity of the jarring action to suit the field application, by applying a sustained downward load, which can be infinitely variable, according to the usage application.

CT 'USHJ's' are normally used in conjunction with the coiled tubing Up-Stroke Intensifier. It is suitable for most coiled tubing applications where the deployment of downhole service and manipulation tools is required, including setting and pulling plugs, gas lift valves, opening and shutting sliding side doors and the general fishing of downhole retrievables.

CT 'USHJ's' are also used in most standard CT toolstrings, during other coiled tubing services, such as, swabbing, jetting, logging, and stimulating, especially in deviated wells, where there is a possibility of the toolstring becoming stuck. The closed hydraulic system prevents contamination from well bore fluids thus giving greater operational dependability. Under normal conditions, the 'USHJ' will function at temperatures of up to 100°C, if circulation is maintained during operations. 'USHJ' is manufactured from high grade low alloy steel and stainless steel and is extremely robust and durable in construction.

### Design Features/Benefits:

- Full flow through bore
- Specifically designed for CT use
- Efficient Valve Seating for deviated applications
- Closed & balanced hydraulic system
- Also available with 'Torque Thru' capability

### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-4175-500	1.750	0.375	1" AMMT
D97-4181-500	1.810		
D97-4212-500	2.125	0.500	1.5" AMMT
D97-4225-500	2.250		
D97-4287-500	2.875	0.750	2 3/8" PAC
D97-4312-500	3.125	1.000	

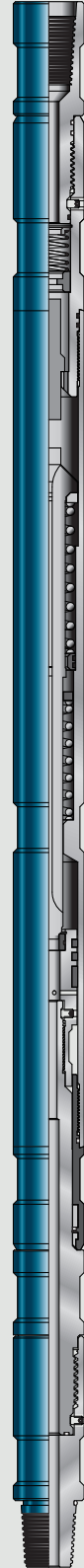
## ROTO-HAMMER IMPACT DRILL JAR

The Roto-Hammer is a tool that transmits multiple downward impact forces at high frequency when fluid is pumped through it, thus eliminating the need to cycle the coil. The tool operates through a combination of layoff weight and controlled flow activation through the toolstring, converting flow and pressure into mechanical energy.

### Applications:

- Underbalanced & overbalanced clean outs
- Shifting stubborn sliding sleeves
- Breaking ceramic & glass discs
- Swaging collapsed tubing & screens
- Broaching operations
- Driving debris downhole
- Scale clean out including: cement, resin coated sand, plastic, barium, calcium & iron

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### SPECIFICATIONS

Part Number	Tool OD	Operating Pressure	Pump Rate	Set Down Weight	Thread
	(in)	(psi)	(L/min)	(lbs)	
D97-4168-300	1.687	500-2500	37.8-158.7	500-1800	1"AMMT
D97-4212-300	2.125	500-2500	37.8-264.6	500-2850	1.5"AMMT

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## HYDRAULIC UP/DOWN JARS

The Hydraulic Up/Down Jars use a piston (metering device) and oil to create a time delay. This time delay allows energy to be stored in stretched tubing. Once the energy is stored, the jar piston bypasses (step), creating a hammer-and-anvil effect that imparts an impact load to the end of the tool assembly. As the jar is pulled in tension, a piston moves through a restricted bore containing oil. This process enables the system to store energy and the continued upward pull moves the piston over the step, which releases the stored energy and allows the mass to rapidly accelerate to the top of its stroke. This process creates an impact force that can be twice as great as the tension that can be pulled on the tubing alone. The force supplied depends upon the force applied at the tool. The Hydraulic Up/Down Jars can be supplied either up acting, down acting or bi-directional.

### Design Features/Benefits:

- Jar is shorter than most hydraulic jars
- Higher impact capability, it can hit harder than any other jar of the same size
- Maximum operating temperature 500°F
- Large bore for drop ball
- Jar has high tensile strength for higher impact service capability
- Jar is hydrostatic pressure balanced
- Jar can be run in compression or tension

### SPECIFICATIONS

Part Number	Max OD	Min ID	Max overpull	Max overpush	Torsional yield strength	Total stroke	Thread
	(in)	(in)	(lbs)	(lbs)	(lbs)	(in)	
D97-4168-700	1.687	0.56	10000	10000	950	12	1"AMMT
D97-4212-700	2.125	0.75	18000	15000	2000	12	1.5"AMMT
D97-4287-700	2.875	1.00	34000	20000	2700	12	2 3/8"PAC
D97-4312-700	3.125	1.25	45000	35000	3100	12	2 3/8"REG

## HYDRAULIC UP/DOWN INTENSIFIERS

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The Hydraulic Up/Down Intensifiers is a double acting accelerator used to increase the impact effect of the Hydraulic Up/Down Jars. The Intensifiers stores concentrated energy in an optimal position in the Jar string. It helps to absorb impact shock waves that travel up the drill pipe allowing the drill string to be utilized closer to their yield loads. This permits higher pull loads to be placed on the hydraulic drilling jars. The Intensifiers provides the operator the ability to perform impact operation at or near the surface. The compressibility provides the necessary “stretch” to operate the Jarring equipment. The Intensifiers supplies drive for the concentrated weights in the jars string in the same manner as the long resilient drill string. It is an efficient reservoir for storing energy since its stretch is confined to a short tool length. The increased efficiency and stretch provides a much harder hitting Jar system and increases the impact up to approximately a factor of three and can impact at much higher impacts depending on conditions. It will work on any drill string and provides a means to get higher impact load in a crooked or extended reach well, where drag is a significant factor. The Intensifiers /Jar system should be placed as close to the stuck point as possible. The impact effect diminishes as the distance increases between the intensifiers and the Jar and the stuck point.

### Design Features/Benefits:

- Higher intensifiers capability, it can hit harder than any other jar/ Intensifiers of the same size
- Maximum operating temperature 500°F
- Large bore for drop ball
- Intensifiers have high tensile strength for higher impact service capability
- Intensifiers can be run in compression or tension

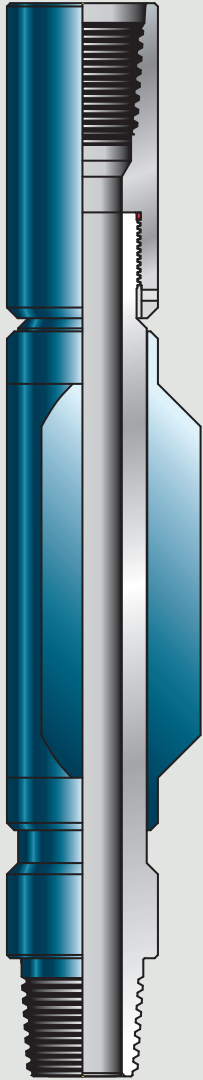


### SPECIFICATIONS

Part Number	Max OD	Min ID	MAX detent working load	MAX lift load after jarring	Tensile strength	Free stroke-up	Thread
	(in)	(in)	(N)	(lbs)	(lbs)	(in)	
D97-4168-900	1.687	0.56	33360	50000	70500	5	1"AMMT
D97-4212-900	2.125	0.75	44480	100000	135000	5	1.5"AMMT
D97-4287-900	2.875	1.00	115650	200000	250000	7 5/8	2 3/8"PAC
D97-4312-900	3.125	1.25	133440	280000	325000	4 5/8	2 3/8"REG

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## FLUTED CENTRALIZER

The Fluted Centralizer is designed to be included as part of the coiled tubing workstring, to assist in providing centralization to allow easier location of tools during fishing, or to provide general stability in the tubing.

The Fluted Centralizer has a full flow through bore allowing passage of darts or drop balls and is available in any specific length.

### Design Features/Benefits:

- Full flow through bore
- Solid one piece construction

### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-6225-310	2.250	0.750	1" AMMT
D97-6268-310	2.677		
D97-6275-310	2.750	1.000	1.5" AMMT
D97-6300-310	3.000		
D97-6350-310	3.500	1.500	2 3/8" PAC
D97-6375-310	3.750		
D97-6400-310	4.000		
D97-6425-310	4.250		
D97-6450-310	4.500		

## BOW SPRING CENTRALIZER

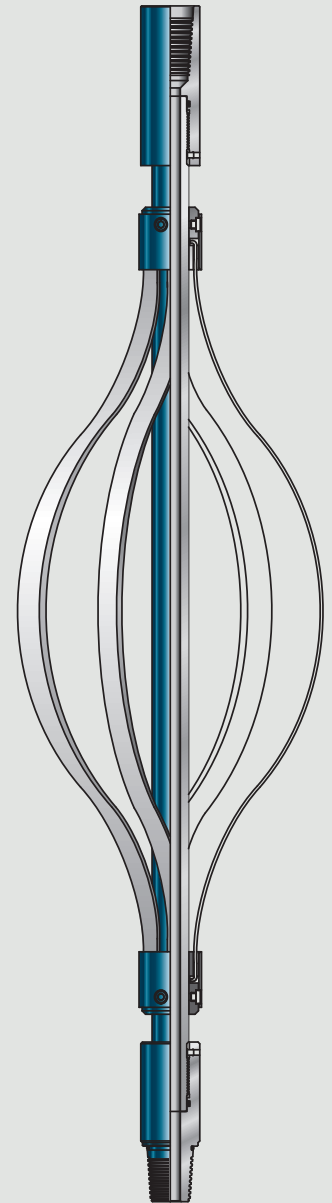
The Bow Spring Centralizer provides a fast and effective method of attaching centralizers to a toolstring. This approach allows several centralizers to be attached to a coiled tubing toolstring without adding any significant length to the string.

By simply positioning the Centralizer Carrier Subs in the toolstring, the Bow Spring Centralizers can be placed in the optimum position to centralize the string.

The tool is specifically designed to allow worn or damaged bowsprings to be changed, without removing the whole centralizer assembly. Also, the centralizer assemblies can be removed without breaking out the string.

The upper centralizer sleeve is anchored to the toolstring via retainer pins. The lower centralizer sleeve is allowed to ride freely up and down the toolstring as the bow springs compress and expand. This ensures the minimum of interference as the toolstring passes through restrictions in the tubing.

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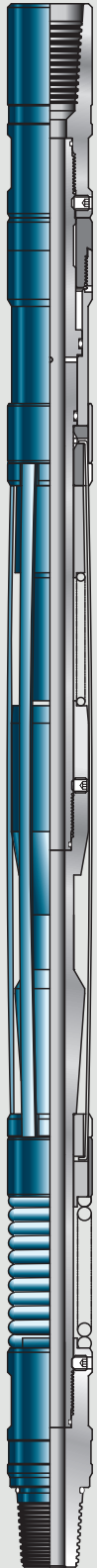
### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-6168-100	1.687	0.625	1" AMMT
D97-6212-101	2.125	0.730	1.5" AMMT
D97-6212-100	2.250		
D97-6287-100	2.875	1.250	2 3/8" PAC
D97-6312-100	3.125		



# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## FLOW ACTIVATED BOW SPRING CENTRALIZER

The Flow Activated Bow Spring Centralizer is designed to allow toolstrings or parts of toolstrings to be centralized in the tubing/casing for various operations.

The Flow Activated Bow Spring Centralizer is designed so that its bow springs are normally retracted. The bow springs only expand when a pressure differential is achieved across the tool. This enables the centralizer to pass, for example, through the restricted bores of the tail pipe and expand into the casing liner below, without any unnecessary wear on the bow springs.

As a safety precaution, the bow springs are mounted above a coil spring. This is to allow the bow springs the necessary movement they require in order to pass through a restricted bore, whilst still expanded.

### Design Features/Benefits:

- Full flow through bore
- Safety feature which allows bow springs movement when meeting restrictions in expanded condition, therefore preventing bow spring damage

### SPECIFICATIONS

Part Number	Max OD	Min ID	Expansion Range	Thread
	(in)	(in)		
D97-6168-201	1.687	0.450	1 11/16"-6 1/2"	1" AMMT
D97-6168-200	1.810			
D97-6212-200	2.125	0.750	2 1/8"-7"	1.5" AMMT
D97-6225-200	2.250		2 1/4"-7"	
D97-6270-200	2.700	2 3/4"-8 1/2"		
D97-6287-200	2.875	0.937	2 7/8"-8 1/2"	2 3/8" PAC
D97-6312-200	3.125		3 1/8"-8"	

## TORQUE THRU KNUCKLE JOINT

The Torque Thru Knuckle Joint, when incorporated between the jars and the manipulation tool, will provide additional flexibility in the toolstring. This additional flexibility is often necessary when the bore of the hole the tool is running through is restricted and/or highly deviated. The Torque Thru Knuckle Joint can be used when rotation of the toolstring is not required, for example, coiled tubing drilling applications.

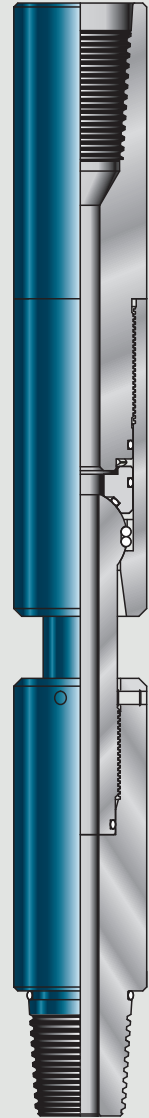
The Coiled Tubing Knuckle Joint provides full 15° angular deviation and internal pressure sealing throughout the full deviation of the tool. The ball and socket of the knuckle have a key that prevents rotation but still allows full angular movement.

The full flow through bore also allows the use of flow activated tools below the Knuckle Joint. Multiple coiled tubing torque thru knuckle joints can be incorporated in particularly long toolstrings.

### Design Features/Benefits:

- Full flow through bore
- Internal pressure seal
- 15° angular deviation
- Torque Thru capability

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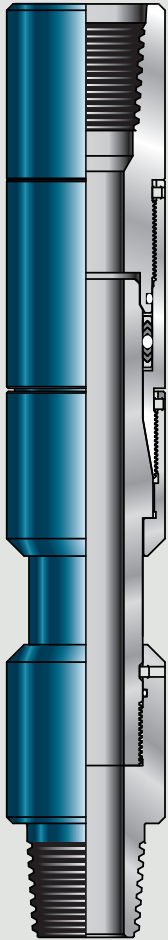


### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-3168-200	1.687	0.531	1" AMMT
D97-3175-200	1.750		
D97-3212-200	2.125	0.594	1.5" AMMT
D97-3225-200	2.250	0.750	
D97-3237-200	2.375		
D97-3312-200	2.875	1.270	2 3/8" PAC
D97-3312-200	3.125		

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## C.A.R.S.A.C. 'HT' CONNECTOR

The C.A.R.S.A.C. HT is designed to assist with the tubing 'make-up' where it is difficult to rotate the tools to engage threads and is particularly suited for long toolstring applications. It is especially useful when utilized in conjunction with integral ball valves and deployment bars.

### Design Features/Benefits:

- Anti-rotation
- High Tensile/High Torque
- Self-aligning
- Easy stabbing/easy break-out

### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-3168-300	1.687	0.500	1" AMMT
D97-3175-300	1.750		
D97-3212-300	2.125	0.875	1.5" AMMT
D97-3225-300	2.250		
D97-3237-300	2.375	1.000	2 3/8" PAC
D97-3287-300	2.875		
D97-3312-300	3.125	1.250	2 7/8" PAC
D97-3450-300	4.500		
		1.500	

## SWIVEL JOINT

The Swivel Joint is a standard toolstring component which when used, permits full rotation of the BHA made up below the joint.

The Swivel's design includes integral sealed bearings which ensure full integrity of flow through the joint.

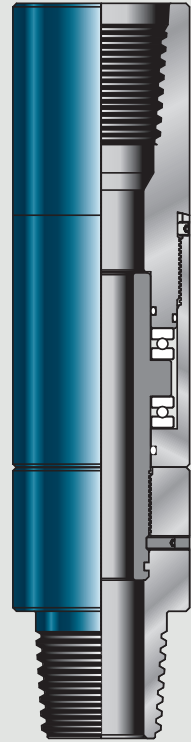
The inclusion of a Swivel Joint in a typical BHA gives the operator orientation flexibility. A CT Swivel Joint in a BHA will allow the toolstring to be broken and made-up below the joint, without the need to disconnect from the coil.

The Swivel Joint is necessary where tool sting orientation is required, such as, in the running and pulling of gas lift mandrels.

### Design Features/Benefits:

- Full range of sizes available
- Sealed bearings for integrity of flow
- Maximum flow area

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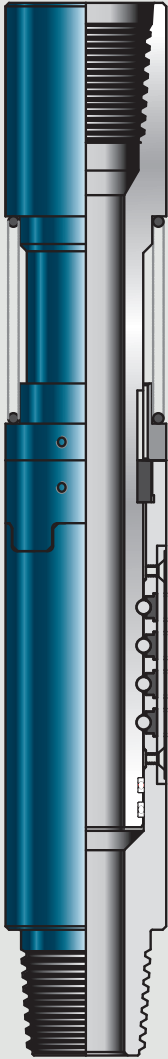


### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-3168-400	1.687	0.340	1" AMMT
D97-3212-400	2.125	0.687	1.5" AMMT
D97-3237-400	2.375	0.750	
D97-3287-400	2.875	1.125	2 3/8" PAC
D97-3312-400	3.125		

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## LOCKING SWIVEL JOINT

The Locking Swivel Joint was designed to allow the assembly of long coil tubing strings with minimum lubricator length. Many times it is necessary to have long lengths of lubricator to accommodate the toolstring, creating a difficult and dangerous situation.

Now with the Locking Swivel Joint, it allows for sections of the toolstring to be made up and lowered into the well bore. The String is spaced out and a pup joint is inserted, allowing the pup joint to seal in the rams of the BOP. The Locking Swivel is placed on top of the section of tools and dropped in the lubricator. Pull the coupling back and tighten the set screws, allowing the clutches to disengage and letting the swivel free spin.

The other section of toolstring can now be assembled. Before lowering the swivel in the hole, loosen the set screws so the coupling can slide back down, engaging the clutches. If rotation is required in the toolstring, simply take the brass drive pins out from under the coupling and this will prevent any back torque through the string. If run below the motor, the clutches must be engaged and brass drive pins installed.

### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-3168-500	1.687	0.531	1" AMMT
D97-3175-500	1.750	0.560	
D97-3212-500	2.125	0.812	1.5"AMMT
D97-3225-500	2.250		
D97-3287-500	2.875	1.000	2 3/8"PAC
D97-3312-500	3.125	1.500	2 7/8"PAC
D97-3350-500	3.500		

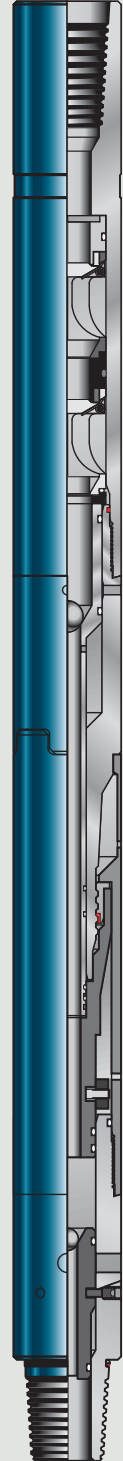
## MOTORHEAD ASSEMBLY

The Motorhead Assembly (M.A) has been developed in recognition to industry demands for compact, heavy duty, integrated BHA components. The M.A combines the Double Flapper Check Valve with the Heavy Duty Hydraulic Disconnect and the Dual Circulation Valve, standard components for virtually all toolstring designs. The tubing connector has been deliberately eliminated to give the added flexibility of operator choice for the connector type and coil tubing size.

**The M.A. provides the operator with a compact, versatile, upper BHA and offers the following features:**

- The M.A's compact design gives an overall length saving of approximately 30% over the use of conventional individual components.
- The high torque capability of the M.A. provides the ideal Motorhead for today's high demand coiled tubing drilling applications.
- The choice of tubing connector is not dictated by the M.A.; therefore, giving the operator the flexibility to choose the most appropriate connector to suit the application.
- With a considerable reduction in the number of component parts, seals and thread connections, the M.A. is uncomplicated to assemble/disassemble and inexpensive to redress.

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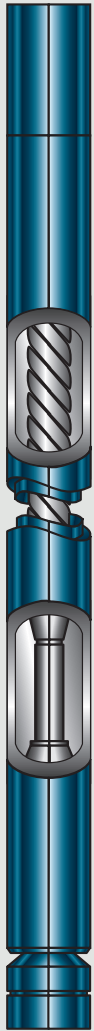


### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D96-1168-200	1.687	0.406	1" AMMT
D96-1175-200	1.750		
D96-1212-200	2.125	0.625	1.5" AMMT
D96-1237-200	2.375		
D96-1287-200	2.875	0.750	2 3/8" PAC
D96-1312-200	3.125	0.812	

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## MOTOR

A positive displacement drilling motor that uses hydraulic horsepower of the drilling fluid to drive the drill bit. Mud motors are used extensively in directional drilling and coiled tubing operations, and can be assembled with a variety of power section to meet the customer's well conditions. From hot holes to harmful power fluids, such as drilling mud or nitrogen. When ordering specify these parameters to provide the best power section to do the job quickly and get the most life out of your motors.

### SPECIFICATIONS

Part Number	Max OD	Lobe	Stage	Flow rate	Working torque	Rotary speed	Thread
	(in)			L/min	N.m	R/min	
D96-1169-100	1.687	5:6	5.0	90-210	280	390-860	1"AMMT
D96-1169-101	1.687	5:6	3.0	90-170	180	400-720	
D96-1212-100	2.125	5:6	6.0	80-190	430	260-640	1 1/2"AMMT
D96-1212-101	2.125	5:6	2.5	110-230	350	200-400	
D96-1287-100	2.875	5:6	4.0	90-380	890	100-420	2 3/8"PAC
D96-1287-101	2.875	7:8	4.5	190-470	1045	140-360	
D96-1312-100	3.125	5:6	3.5	380-660	1450	230-390	

## 'GS' RUNNING/PULLING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S

The 'GS' Type Running/Pulling Tool is designed to run and retrieve downhole tools with conventional internal fish necks. The latching mechanism is a robust dog/core design, which releases positively from the internal fish neck, when a hydraulic differential is applied to the tool.

The tool does not require shear pins or drop balls, since the differential required to activate the tool is provided by circulating through a choke insert in the core.

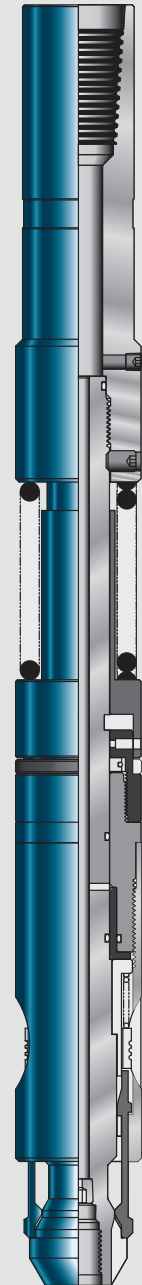
'GS' Type Running/Pulling Tools are available for all standard internal fish neck sizes.

### Features/Benefits:

- Full hydraulic operation
- Multiple latch & release capability
- Proven dog/core design
- Available to catch internal fish necks from 2" to 7"
- Safety shear function

### SPECIFICATIONS

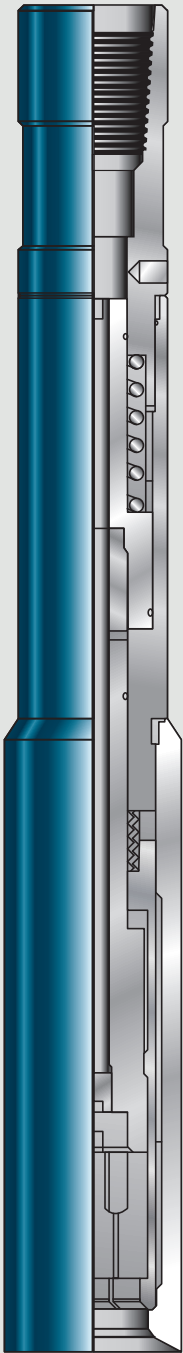
Part Number	Size	Max OD	Min ID	Internal fishneck	Thread
	(in)	(in)	(in)	(in)	
D96-3200-300	2	1.810	0.250	1.375	1" AMMT
D96-3250-300	2 1/2	2.250	0.390	1.812	1.5" AMMT
D96-3300-300	3	2.720		2.312	
D96-3350-300	3 1/2	3.110		2.625	2 3/8" PAC
D96-3400-300	4	3.620		3.312	





# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## 'JDC' RUNNING/PULLING TOOLS

The 'JDC' Running/Pulling Tool is a collet type running/pulling tool designed to run or retrieve downhole tools that have conventional external fishing necks.

The running/pulling tool design is extremely robust in construction and allows a full 360° engagement of the fishing neck to be latched.

The tool is fully hydraulically activated; therefore, does not require the use of shear pins or drop balls to operate, since this is achieved by circulating through a choke in the core of the tool.

### Features/Benefits:

- Full hydraulic operation
- Heavy duty construction
- Available to catch all standard external fish necks

### SPECIFICATIONS

Part Number	Size	Max OD	Min ID	Internal fishneck	Thread
	(in)	(in)	(in)	(in)	
D96-3200-100	2	1.875	0.390	1.375	1" AMMT
D96-3250-100	2 1/2	2.300		1.750	1.5" AMMT
D96-3300-100	3	2.875		2.312	2 3/8" PAC
D96-3400-100	4	3.750		3.125	

## FLOW ACTIVATED SHIFTING TOOLS

The Flow Activated Shifting Tools are designed to be used as a work tool for opening and closing sliding sleeves.

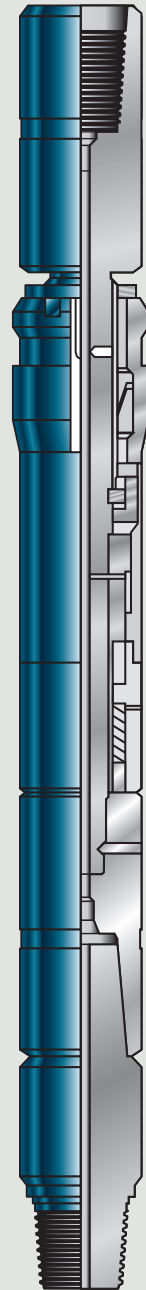
The normally closed shifting tool is flow activated and therefore does not require the use of drop balls to activate it. The Flow Activated Shifting Tools by design can be used to either open or close sliding sleeves.

Shifting Tools are supplied with a 'pin-pin' crossover, enabling the tool to be run shifting either up or down.

The Flow Activated Shifting Tools are available to suit all sizes and makes of sliding sleeves and can be supplied with either positive or selective keys.

### Features/Benefits:

- Flow activated (No drop balls required)
- Positive or selective key options
- Optional external fish neck

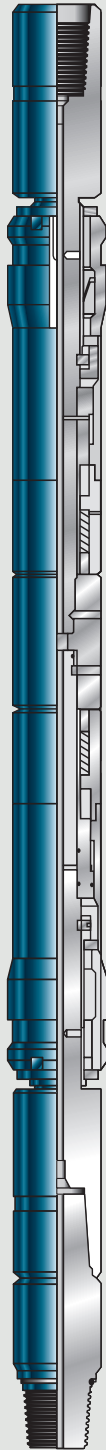


### SPECIFICATIONS

Part Number	SSD size	Min ID	Thread
	(in)	(in)	
D96-4231-100	2.313	0.390	1.5" AMMT
D96-4256-100	2.562		
D96-4275-100	2.750		
D96-4281-100	2.813	0.500	2 3/8" PAC
D96-4312-100	3.125		
D96-4331-100	3.313		
D96-4343-100	3.437	0.437	2 7/8" PAC
D96-4368-100	3.688		
D96-4381-100	3.813		
D96-4412-100	4.125	0.500	3 1/2" PAC
D96-4431-100	4.313		
D96-4456-100	4.562		

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## DOUBLE ENDED SELECTIVE SHIFTING TOOLS

The Double Ended Selective Shifting Tool (DESST) has been designed specifically to selectively shift PCE, Otis, Camco, Baker sliding sleeves (SSD's) in horizontal well bores.

The DESST shifting keys are normally retracted during the running operation and are hydraulically flow activated to the open shift position by increasing surface pump volume and therefore, pressure at the downhole location of the DESST and SSD.

The DESST can selectively open or close multiple SSD's in a single coiled tubing trip.

### Features/Benefits:

- Flow activated (No drop balls required)
- Dual action for opening or closing sliding sleeves
- Positive or selective key options
- Optional external fish neck

### SPECIFICATIONS

Part Number	SSD size	Min ID	Thread
	(in)	(in)	
D96-4231-200	2.313	0.390	1.5" AMMT
D96-4256-200	2.562		
D96-4275-200	2.750		
D96-4281-200	2.813		
D96-4312-200	3.125	0.500	2 3/8" PAC
D96-4331-200	3.313	0.437	
D96-4343-200	3.437	0.500	
D96-4368-200	3.688	0.437	2 7/8" PAC
D96-4381-200	3.813	0.500	3 1/2" PAC
D96-4412-200	4.125		
D96-4431-200	4.313		
D96-4456-200	4.562		

## TUBING ANCHORS

The Coiled Tubing Anchor provides a fixed anchor point within the tubing to assist in the performance of other coiled tubing downhole tools. The Coiled Tubing Anchor also can be supplied in a double unit for increased holding forces.

The Coiled Tubing Anchor is a flow activated tool. Increasing the flow at surface generates a back pressure at the tool. This back pressure activates the slip mechanism and the slips are set against the tubing wall. Once set, the anchor can withstand large axial loads, subject to the tool size and application.

The Anchor can be re-set at another location within the tubing string by reducing coiled tubing pressure. The slips are then able to retract away from the tubing wall and release the toolstring. Once the toolstring has been moved to a new location, the slips can again be set with the application of pressure. This operation can be repeated as many times as required in a single deployment.

### Features/Benefits:

- Completion Tubing Cutting where coil motors need to be stationary for knives to be effective
- Production Logging Surveys to hold coiled tubing deployed survey tools rigidly, and to dampen vibration caused by high production flow rates
- Accurate spotting of well treatments, where changes in flow pressures can cause the end of coiled tubing to move significantly

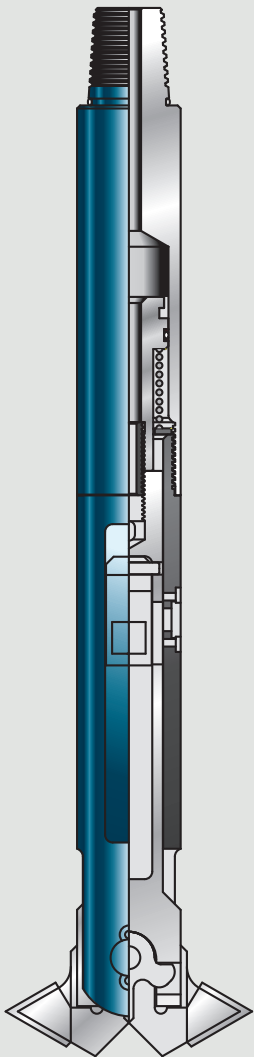
### SPECIFICATIONS

Part Number	Tubing size	Max OD	Thread
	(in)	(in)	
D98-5237-100	2 3/8	1.750	1" AMMT
D98-5287-100	2 7/8	2.180	1.5" AMMT
D98-5350-100	3 1/2	2.720	
D98-5450-100	4 1/2	3.625	2 3/8" PAC



# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## TUBING CUTTER

The Tubing Cutter is a tool designed to go through small restrictions in tubing and cut larger I.D. tubing below.

Blades are designed to extend from piston force created with hydraulic pressure.

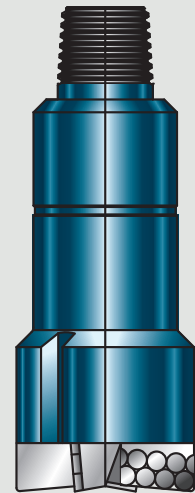
The tubing cutter is extremely important where wireline tools and mechanical tools have failed.

### SPECIFICATIONS

Part Number	Max OD	Rotary speed	Weight on bit	Max cut OD	Top thread
	(in)	RPM	BLS	(in)	
D96-8170-100	1.700	70-120	0-2,000	5	1"AMMT
D96-8212-100	2 1/8	70-120	0-2,000	5	1.5"AMMT
D96-8237-100	2 3/8	70-110	0-3,000	7	
D96-8287-100	2 7/8	70-110	0-3,000	8 1/4	2 3/8"PAC
D96-8350-100	3 1/2	70-110	0-4,000	9	2 7/8"REG
D96-8425-100	4 1/4	70-110	0-4,000	9	3 1/2"REG

## MILLS

Mills are used to mill-out all kinds of obstacles and debris in wellbore.

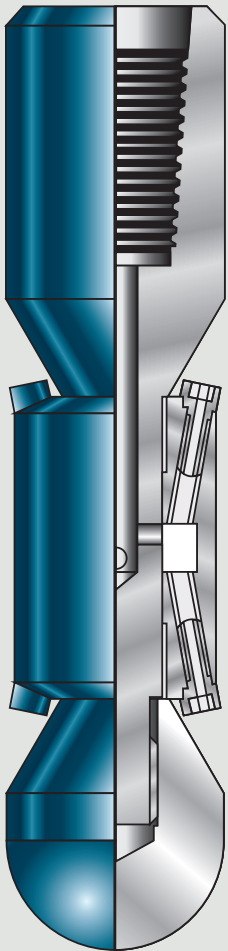


### SPECIFICATIONS

Part Number	Max OD	Blade number	Top thread
	(in)		
D08-2810-000	2.28	/	1"AMMT
D08-4510-105	3.50	3	2 3/8"IF
D08-4510-106	3.50	3	2 3/8"PAC
D08-4510-114	3.62	5	2 3/8"PAC
D08-5510-106	4.33	3	2 3/8"PAC
D08-5510-118	4.21	5	2 3/8"PAC
D08-5510-105	4.33	3	2 3/8"IF
D08-7010-000	5.51	/	NC38

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## ROTARY JET WASH TOOLS

The Rotary Jet Wash Tool is designed to be used for both jetting and circulating operations when cleaning and washing the inside of the tubing. It can also be used to assist in the manipulation of the coiled tubing string, both in and out of the well.

The design of the Rotary Jet Wash Tool works on the principal of applied fluid pressure, causing the nozzle to rotate and jet the fluid against the tubing wall in a full 360° rotating action.

### Features/Benefits:

- Forward and reverse jetting
- Numerous jetting options
- Simple design

### SPECIFICATIONS

Part Number	Max OD	Thread
	(in)	
D96-7168-500	1.687	1" AMMT
D96-7175-500	1.750	
D96-7212-500	2.125	1.5" AMMT
D96-7237-500	2.375	
D96-7287-500	2.875	2 3/8" PAC
D96-7312-500	3.125	

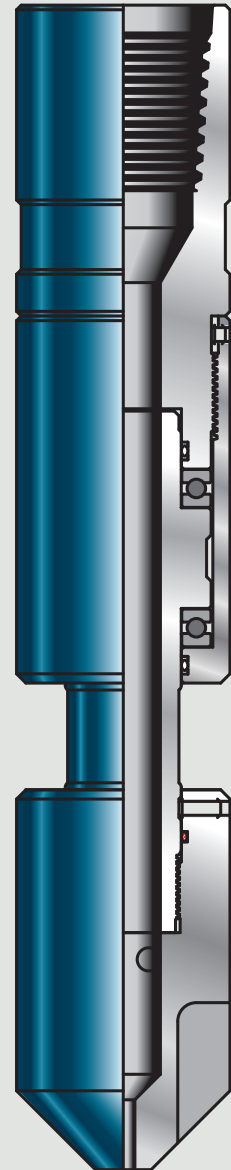
## SPINNING WASH TOOL

The Spinning Wash tool is a self-rotating swivel designed for coil tubing well service. The powerful rotating jets cover a large area for efficient cleaning. Jet reaction force powers rotation of the head.

The standard nozzle sleeve has 13 ports; seven forward, and 6 backwards. Some of the ports may be plugged in a balanced pattern to concentrate the flow in a particular direction.

Whether your deposits are paraffin, asphaltine, hydrates, calcium carbonate, barium sulfate, corrosion products, or mineral scale – the Spinning Wash tool is ready to restore production.

HT CO<sub>2</sub> H<sub>2</sub>S



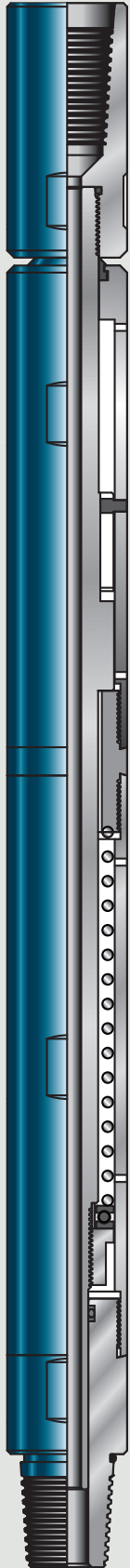
### SPECIFICATIONS

Part Number	Max OD	Nozzle size	Thread
	(in)		
D96-7168-200	1.687	3/16"*5	1" AMMT
D96-7212-200	2.125	7/32"* 4+1/4"	1.5" AMMT
D96-7237-200	2.375	1/4"*5	
D96-7287-200	2.875	5/16"*5	2 3/8" PAC
D96-7312-200	3.125		



# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## FLOW ACTIVATED HYDRAULIC JETTING INDEXING TOOLS

The Flow Activated Hydraulic Jetting Indexing Tool is designed to rotate jetting wash nozzles, to allow full 360° bore coverage.

The Jetting Indexing Tool is rotated in a controlled 45° or 60° incremental manner by applying intermittent surface pump pressure.

When flow pressure is increased to the index operating pressure, the lower half of the tool strokes downwards and indexes. Maintaining the pressure then allows the increased flow to jet through the jetting wash nozzle. When the flow pressure is decreased the tool strokes back and completes the indexing cycle. By repeating this operation a full 360° wash cycle can be achieved.

A range of jetting nozzles can be supplied with the Jetting Indexing Tool for more detail.

### Features/Benefits:

- Flow activated (No drop balls required)
- Low pressure actuation
- Full bore opening for high pressure rates
- Easy to operate
- Simple construction
- 6 x 60° or 8 x 45° rotation options available

### SPECIFICATIONS

Part Number	Max OD	Min ID	Thread
	(in)	(in)	
D97-5168-500	1.687	0.375	1" AMMT
D97-5212-500	2.125"	0.500"	1.5" AMMT
D97-5287-500	2.875	1.000"	2 3/8" PAC
D97-5312-500	3.125	1.000"	

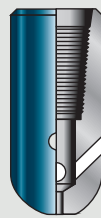
## NOZZLE OPTIONS



SPECIFICATIONS									
Part Number	Nozzle type	Max OD	Min ID	Nozzle Configuration	Part Number	Nozzle type	Max OD	Min ID	Nozzle Configuration
D96-7168-100	Single Port Flow Thru Nozzle	1.687"	0.250"	1x0.250"	D96-7168-110	Multiple Back Flow Port Nozzle	1.687"	0.250"	1x0.250" 4x0.250"@45°
D96-7212-100		2.125"	0.500"	1x0.500"	D96-7212-110		2.125"	0.250"	1x0.250" 4x0.250"@45°
D96-7237-100		2.375"	0.750"	1x0.750"	D96-7237-110		2.375"	0.312"	1x0.312" 4x0.312"@45°
D96-7312-100		3.125"	0.875"	1x0.875"	D96-7312-110		3.125"	0.375"	1x0.375" 4x0.375"@45°
D96-7168-120	Multiple Side Flow Port Nozzle	1.687"	0.250"	4x0.250"@90°	D96-7168-130	Multiple Flow Port Nozzle	1.687"	0.250"	1x0.250" 4x0.250"@135°
D96-7212-120		2.125"	0.250"	4x0.250"@90°	D96-7212-130		2.125"	0.250"	1x0.250" 4x0.250"@135°
D96-7237-120		2.375"	0.312"	4x0.312"@90°	D96-7237-130		2.375"	0.312"	1x0.312" 4x0.312"@135°
D96-7312-120		3.125"	0.375"	4x0.375"@90°	D96-7312-130		3.125"	0.375"	1x0.375" 4x0.375"@135°
D96-7168-140	Multiple Up Flow Port Nozzle	1.687"	0.250"	1x0.500" 4x0.187"@45° 4x0.187"@90°	D96-7168-150	Single Flow Port Muleshoe Nozzle	1.687"	0.625"	1x0.625"@45°
D96-7212-140		2.125"	0.250"	1x0.500" 4x0.250"@45° 4x0.250"@90°	D96-7212-150		2.125"	0.875"	1x0.875"@45°
D96-7237-140		2.375"	0.312"	1x0.625" 4x0.312"@45° 4x0.312"@90°	D96-7237-150		2.375"	0.875"	1x0.875"@45°
D96-7312-140		3.125"	0.375"	1x0.750" 4x0.375"@45° 4x0.375"@90°	D96-7312-150		3.125"	1.000"	1x1.000"@45°



Single Port Flow Thru Nozzle



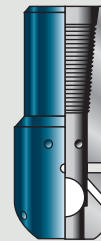
Multiple Back Flow Port Nozzle



Multiple Side Flow Port Nozzle



Multiple Flow Port Nozzle

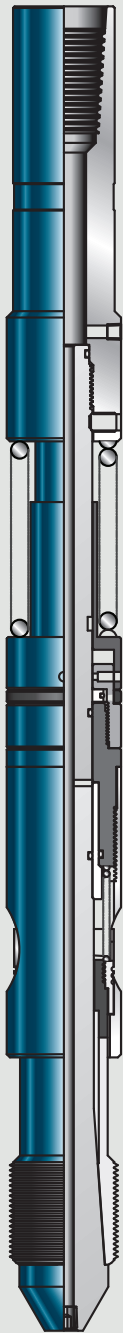


Multiple Up Flow Port Nozzle



Single Flow Port Muleshoe Nozzle

# COILED TUBING TOOLS



## FLOW ACTIVATED RELEASABLE FISHING/BULLDOG SPEARS

The Flow Activated Releasable Fishing/Bulldog Spear is a variable catch internal spear used to retrieve a lost cylindrical fish from the well bore.

A complete range of slips is available for each size tool. To operate simply, run into the fish and set down weight, pick up, and retrieve the fish.

To release from the fish simply set down weight, circulate in conjunction with a Hydraulic Sequencing Tool above the spear. The spear will then release, due to the flow created differential.

A complete range of hardened slips are available for each size tool. See table for slip and catch size details.

### Features/Benefits:

- Flow or drop ball activated
- Hardened & double tempered slips
- Robust construction
- Variable slip sizes for each tool

### SPECIFICATIONS

Part Number	Max OD	Min ID	Catch Range	Thread
	(in)	(in)	(in)	
D98-4200-300	1.850"	0.250	1 3/8"-1 1/2"	1" AMMT
D98-4250-300	2.250"	0.390	2"-2 1/8"	1.5" AMMT
D98-4300-300	2.625"		2 1/4"-2 3/8"	
D98-4350-300	3.110"		2 5/8"-2 3/4"	2 3/8" PAC
D98-4400-300	3.625"		3 1/8"-3 1/2"	2 7/8" PAC

### RELEASABLE FISHING/BULLDOG SPEAR SLIPS

Nominal Size	2"	2 1/2"	3"	3 1/2"	4"
Max OD	1.850"	2.250"	2.625"	3.110"	3.6"
Nominal Slip Size	Catch Range	Catch Range	Catch Range	Catch Range	Catch Range
1 1/8"	1 1/8"-1 1/4"	-	-	-	-
1 1/4"	1 1/4"-1 3/8"	-	-	-	-
1 3/8"	1 3/8"-1 1/2"	-	-	-	-
1 1/2"	1 1/2"-1 5/8"	--	-	-	-
1 5/8"	1 5/8"-1 3/4"	-	-	-	-
2"	-	2-2 1/8"	-	-	-
2 1/8"	-	2 1/8"-2 1/4"	--	-	-
2 1/4"	-	2 1/4"-2 3/8"	-2 1/4"-2 3/8"	-	-
2 3/8"	-	2 3/8"-2 1/2"	2 3/8"-2 1/2"	-	-
2 1/2"	-	-	2 1/2"-2 5/8"	-	-
2 5/8"			2 5/8"-2 3/4"	2 5/8"-2 3/4"	
2 3/4"			2 3/4"-2 7/8"	2 3/4"-2 7/8"	
2 7/8"				2 7/8"-3"	
3"				3"-3 1/8"	
3 1/8"					3 1/8"-3 1/4"
3 1/4"					3 1/4"-3 3/8"
3 3/8"					3 3/8"-3 1/2"
3 1/2"					3 1/2"-3 5/8"
3 5/8"					3 5/8"-3 3/4"

## FLOW ACTIVATED RELEASABLE OVERSHOTS



The Flow Activated Releasable Overshot is a variable catch external overshoot used to retrieve a lost cylindrical fish from the wellbore.

The Flow Activated Releasable Overshot operates in the same way as a standard non-releasable overshoot. The tool is run in hole until it latches on the fish and butts out. Pulling up will cause the slips to set into the fish.

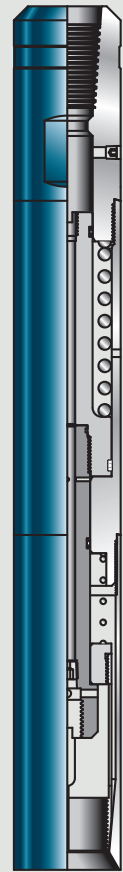
Should the fish be irretrievable, the tool can be released from the fish by flow activation and returned to surface.

The Flow Activated Releasable Overshot can be used to fish lost or broken tubing, coil and also coiled tubing tools that have backed off down hole.

The Flow Activated Releasable Overshot can be supplied to overshoot and seal onto a specific fish, in order to form a pressure tight seal. This is of importance if there is a flow activated tool beneath the fish that requires operation before the fish can be retrieved.

### Features/Benefits:

- Internal hammer action assists release
- Flow or drop ball activated
- Hardened & double tempered slips
- Robust construction
- Variable slips sizes for each tool
- Optional bell guides available



### SPECIFICATIONS

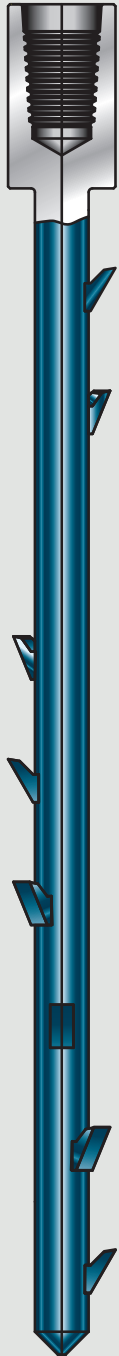
Part Number	Max OD	Min ID	Catch Range	Thread
	(in)	(in)	(in)	
D98-4200-400	1.850	0.390	15/16-1 1/16	1" AMMT
D98-4250-400	2.250		1 7/16-1 9/16	1.5" AMMT
D98-4300-400	2.625		1 7/16-2 1/16	
D98-4350-400	3.250		2-2 3/16	2 3/8" PAC
D98-4400-400	3.800		2 3/8-2 5/8	
D98-4450-400	4.250		2 7/8"-3 1/8"	

### SPECIFICATIONS

Nominal Size	2"	2 1/2"	3"	3 1/2"	4"
Max OD	1.850"	2.250"	2.625"	3.250"	3.800"
Nominal Slip Size	Catch Range	Catch Range	Catch Range	Catch Range	Catch Range
1/2"	7/16"-9/16"	7/16"-9/16"	3/8"-9/16"	-	3/8"-5/8"
5/8"	9/16"-11/16"	9/16"-11/16"	9/16"-3/4"	1/2"-11/16"	-
3/4"	11/16"-13/16"	11/16"-13/16"	-	11/16"-7/8"	5/8"-7/8"
7/8"	13/16"-15/16"	13/16"-15/16"	3/4"-15/16"	-	-
1"	15/16"-1 1/16"	15/16"-1 1/16"	15/16"-1 1/8"	7/8"-1 1/16"	7/8"-1 1/8"
1 1/8"	1 1/16"-1 3/16"	1 1/16"-1 3/16"	-	1 1/16"-1 1/4"	-
1 1/4"	1 3/16"-1 5/16"	1 3/16"-1 5/16"	1 1/8"-1 5/16"	-	1 1/8"-1 3/8"
1 3/8"	1 5/16"-1 7/16"	1 5/16"-1 7/16"	1 5/16"-1 1/2"	1 1/4"-1 7/16"	-
1 1/2"	1 7/16"-1 9/16"	1 7/16"-1 9/16"	-	1 7/16"-1 5/8"	1 3/8"-1 5/8"
1 5/8"	-	1 9/16"-1 11/16"	1 1/2"-1 11/16"	-	-
1 3/4"	-	1 5/8"-1 3/4"	1 11/16"-1 7/8"	1 5/8"-1 13/16"	1 5/8"-1 7/8"
1 7/8"	--	-	-	1 13/16"-2"	-
2"	-	-	1 7/8"-2 1/16"	2"-2 3/16"	1 7/8"-2 1/8"
2 1/4"	-	-	--	2 1/8"-2 5/16"	2 1/8"-2 3/8"
2 1/2"	-	-	-	-	2 3/8"-2 5/8"
2 3/4"	-	-	-	-	2 5/8"-2 7/8"

# COILED TUBING TOOLS

HT CO<sub>2</sub> H<sub>2</sub>S



## ROPE SPEAR

The Rope Spear is efficient for removal of wireline, electric line, or braided line that has been left in the wellbore.

### SPECIFICATIONS

Part Number	Tubing	Top thread
D98-4237-200	2 3/8"	1"AMMT
D98-4287-200	2 7/8"	1.5"AMMT
D98-4350-200	3 1/2"	
D98-4450-200	4 1/2"	2 3/8"PAC

## FISHING GRABS

HT CO<sub>2</sub> H<sub>2</sub>S

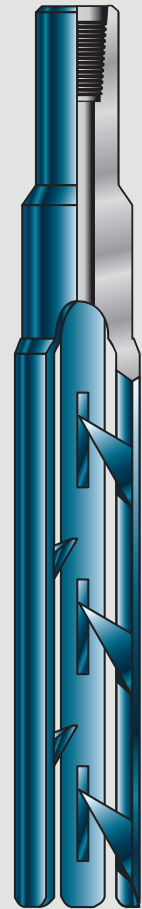
The Fishing Grab is a tool used to retrieve wire that has broken in the tubing.

The Fishing Grab consists of a box up connection in a housing with either two or three flexible prongs extending downwards. Pointed barbs are welded to the inside of the prongs, so as to form hooks that will catch the looped end of the broken line. The Coiled Tubing Fishing Grab also has a large flow through bore.

When a line breaks below the stuffing box, a full gauge, such as, a slotted skirt wirefinder, is normally used to both locate and ball up the broken end of the line before running the Fishing Grab. The Fishing Grab is flexible enough to bend and can be gauged for the tubing it is to be run in. The prong ends of the grab should fit snugly against the walls of the tubing to help prevent line bypass.

### Features/Benefits

- Flow through facility
- Simple flexible design
- Robust construction
- External fish neck available

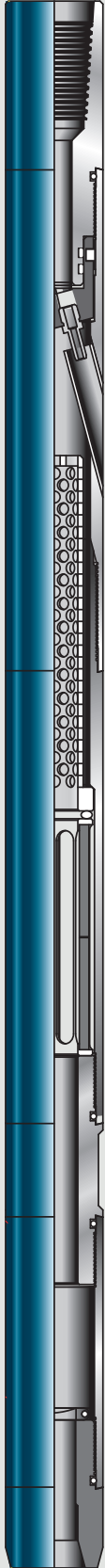


### SPECIFICATIONS

Part Number	Tubing	Top thread
D98-4237-201	2 3/8"	1"AMMT
D98-4287-201	2 7/8"	1.5"AMMT
D98-4350-201	3 1/2"	
D98-4450-201	4 1/2"	2 3/8"PAC

# COILED TUBING TOOLS

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## VENTURI JUNK BASKETS

The Venturi Junk Basket is a tool which is used to retrieve junk and debris out of the wellbore. When fluid is pumped through the string of the coiled tubing and out through the nozzles in the venturi chamber, a vacuum is created in the venturi chamber. Fluid is sucked from the bottom of the tool exit back through the venturi tubes. Most of this fluid mixes with the pressurized fluid to be re-circulated around the bottom of the tool.

The tool is essentially a high powered vacuum cleaner that may be used with fluid, nitrogenated fluids or gases. The nozzles in the tool are simply changed out for the available pump rate, fluid or gas. A debris filter screen is placed before the venturi chamber to prevent debris from blocking the venturi tubes.

A hollow magnetic section with a finger type trap catches junk and debris, which is then carried from the well inside the tool.

Barrel extensions are available to increase the volume of junk which may be carried.

The tool is not dependant on hole size to work, so for example, you could use a 38" o.d. tool to retrieve debris from 7" casing.

### SPECIFICATIONS

Part Number	Max OD	Number of Venturi Nozzles	Injection Nozzles Available	Thread
	(in)		(in)	
D98-4168-100	1.687	1	0.062; 0.078 0.094; 0.109 0.125; 0.140 0.156; 0.171 0.187	1" AMMT
D98-4206-100	2.062	2		1.5" AMMT
D98-4212-100	2.125	2		2 3/8" PAC
D98-4262-100	2.625	3		
D98-4312-100	3.125	3		

## LEAD IMPRESSION BLOCKS & HIGH POWERED MAGNET

### Lead Impression Blocks

The Lead Impression Block is an adapted standard wireline service tool, used to obtain impressions of foreign objects in the tubing string to assist in identification of the object and thus, selection of the correct fishing tool.

The Lead Impression Blocks are available in a range of sizes.

#### Features/Benefits:

- 'Wash out' prevention sleeve
- Easily refillable
- Optional external fish neck

#### SPECIFICATIONS

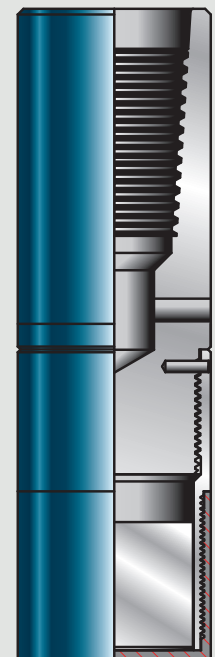
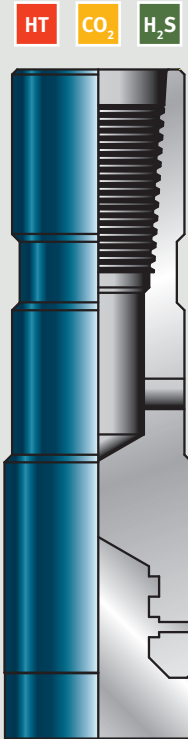
Part Number	Max OD	Thread
	(in)	
D98-7180-100	1.800	1" AMMT
D98-7230-100	2.250	1.5" AMMT
D98-7230-100	2.323	
D98-7275-100	2.750	
D98-7287-100	2.875	2 3/8" PAC
D98-7350-100	3.500	
D98-7448-100	4.488	

### High Powered Magnet

The High Powered Magnet is used to retrieve small objects, such as metal fragments, balls, small slips, springs, small tools and any other objects that have a magnetic attraction.

#### SPECIFICATIONS

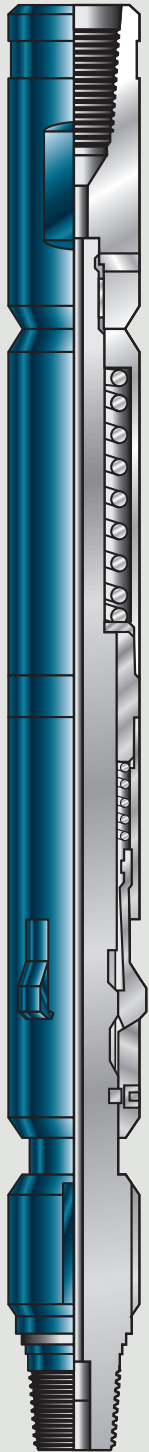
Part Number	Max OD	Thread
	(in)	
D98-7150-200	1.500	1" AMMT
D98-7175-200	1.750	1.5" AMMT
D98-7212-200	2.125	
D98-7225-200	2.250	
D98-7250-200	2.500	2 3/8" PAC
D98-7275-200	2.750	
D98-7287-200	2.875	





# COILED TUBING TOOLS

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## TUBING NIPPLE LOCATORS

The Tubing Nipple Locator is designed to locate nipples in the tubing while downhole coiled tubing operations are being performed. This makes the tool ideal for depth correlation by tagging a known datum in the production tubing.

The Nipple Locator can be positioned virtually anywhere in the Bottom Hole Assembly. As the Nipple Locator is purely mechanical, the operation of the tool does not require any hydraulic pressure to operate.

The Nipple Locator is run below the nipple to the desired position. A slow pick up will then allow the dogs to tag the back of the nipple profile. A small overpull (approximately 600-900lbs) will be seen on the weight indicator.

This procedure may be repeated indefinitely, ensuring that the datum points can be re-checked; therefore, a constant indication can be determined.

If a more positive indication is required, the Nipple Locator has the added feature of a shear pin sub. By pinning the shear sub with predetermined shear pins, the Nipple Locator can be configured to allow a significant increase in overpull.

This more positive surface indication of depth correlation can permit an overpull of up to 5,000 lbs. This operation is however, a one-shot operation, and once the pins are sheared, the Nipple Locator reverts back to the conventional 600-900 lbs repeatable overpulls.

The Nipple Locator comprises of a spring loaded dog assembly, which provides a reliable and repeatable means of tagging a range of common nipples within a specific tubing size. All springs are encapsulated, minimizing the risk of mechanical tool failure from debris ingress.

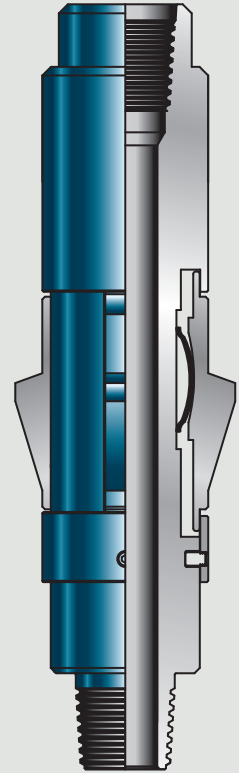
### SPECIFICATIONS

Part Number	Max OD	Min ID	Nipple Size	Thread
	(in)	(in)	(in)	
D97-7187-100	1.930	1.750	1.87X	1"AMMT
D97-7187-101	1.930	1.750	1.87XN	
D97-7231-100	2.380	2.175	2.31X	1.5AMMT
D97-7231-101	2.380	2.175	2.31XN	
D97-7275-100	2.900	2.620	2.75X	
D97-7275-101	2.900	2.620	2.75XN	
D97-7281-100	2.900	2.620	2.81X	2 3/8PAC
D97-7281-101	2.900	2.620	2.81XN	
D97-7381-100	3.900	3.600	3.81X	2 3/8PAC
D97-7381-101	3.900	3.600	3.81XN	

## COLLAR STOP

The Collar Stop is designed to locate in the collar recess of API upset and non-upset tubing. The depth can be measured by the value change of the load.

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### SPECIFICATIONS

Part Number	Casing size	ID	Length	Load	Thread
		(in)	(in)	T	
D99-1287-100	2 7/8" 6.5#	0.813	13	1	1 1/2" AMMT
D99-1450-100	4 1/2" 9.5-11.6#	1.500	16.875	2	2 3/8" P.A.C
D99-1550-100	5 1/2" 15.5-20#		17.92	2	
D99-1550-101	5 1/2" 15.5-20#		17.92	1	
D66-5510-001	5 1/2" 20-23#		17.92	2	
D66-5510-002	5 1/2" 23-26#		17.92	2	
D99-1700-100	7" 26-29#		19.26	2	