CTRT

“Downhole Tool Solutions”

Address: 129 Southpark Road
City: Lafayette State: Louisiana 70508
Office PH: +1 (337) 837-1062 hrs 8am-5pm

CTRT

"Downhole Tool Solutions"

MISSION

We will provide superior products and services to operate a vigorous, growing, diversified, and profitable business in the balance best interest of our customers, employees, shareholders and suppliers.

PHILOSOPHY

In our commitment to excellence, we will:

- Provide our Customers with only the highest quality products and services that meet their needs through a common sense approach to research and development that serves to add value from us as a supplier.
- Provide a system of Employee involvement, motivation and training.
- Commit to long-term growth and profitability to fulfill Shareholder expectations.
- Maintain and encourage Supplier involvement in all phases of product and service development.
- Provide a system of Continuous Improvement in business, products and services processes that add value to our customer.

CTRT, Inc. | 129 Southpark Road, Lafayette, LA 70508 | PH: 337-837-1062 | e-mail: sales@ctrt.us.com

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COIL CONNECTOR PULL (TENSION) PLATES				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Coil Dia.**	Threads
1.688	CT-PP-1001 &1002	Pull Plate, 5.50" Base	1.00"/1-1/4"	**1.00" MT/CS**
2.250	CT-PP-1004	Pull Plate, 6.00" Base	1-1/4"	**1.25" CS/1.50" MT**
2.950	CT-PP-1003	Pull Plate, 8.00" Base	2.00"/2-3/8"	**2-3/8"/2-7/8" PAC/Reg**
Note:	**Available with alternate connections and with needle valves**			

EXTERNAL SLIP COIL CONNECTORS				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Coil Dia.**	Threads
1.687	100CTC169A	1.00" Coil Connector Assy	1.00"	**1.00"MT/CS**
1.687	125CTC169A	1.25" Coil Connector Assy	1-1/4"	**1.00"MT/CS**
1.850	125CTC185A	1.25" Coil Connector Assy	1-1/4"	**1.00"/1.25" CS**
2.125	125CTC212A	1.25" Coil Connector Assy	1-1/4"	**1.25" CS/1.50" MT**
3.170	125CTC317	1.25" Coil Connector Assy	1-1/4"	**1502 Union**
1.930	150CTC193	1.50" Coil Connector Assy-SL	1-1/2"	**1.00" MT/CS,1.25" CS**
2.120	150CTC212	1.50" Coil Connector Assy	1-1/2"	**1.25" CS/1.50" MT**
2.875	150CTC287	1.50" Coil Connector Assy	1-1/2"	**2-3/8" PAC**
3.170	150CTC317	1.50" Coil Connector Assy	1-1/2"	**1502 Union**
2.180	175CTC218	1.75" Coil Connector Assy-SL	1-3/4"	**1.25" CS/1.50" MT**
2.875	175CTC287	1.75" Coil Connector Assy	1-3/4"	**2-3/8" PAC**
2.875	200CTC287	2.00" Coil Connector Assy	2.00"	**2-3/8" PAC**
2.940	200CTC294	2.00" Coil Connector Assy	2.00"	**2-3/8" PH-6**
3.060	200CTC306	2.00" Coil Connector Assy	2.00"	**2-3/8" EUE 8-Rd**
3.120	200CTC312	2.00" Coil Connector Assy	2.00"	**2-3/8" API Reg**
3.170	200CTC317	2.00" Coil Connector Assy	2.00"	**1502 Union**
3.125	237CTC312	2-3/8" Coil Connector Assy-SL	2-3/8"	**2-3/8" PAC/REG**
3.250	237CTC325	2-3/8" Coil Connector Assy	2-3/8"	**2-3/8" PAC/REG**
3.375	262CTC338	2-5/8" Coil Connector Assy-SL	2-5/8"	**2-3/8" PAC/REG/8-RD**
3.500	262CTC350	2-5/8" Coil Connector Assy	2-5/8"	**2-3/8" PAC/REG/8-RD**
Note:	**Alternate connection and O.D.'s available upon request. Also, bottom subs available with setscrews.**			

EXTERNAL "DUAL" SLIP COIL CONNECTORS				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Coil Dia.**	Threads
1.687	100DCC169A	1.00" DS Coil Connector Assy	1.00"	**1.00"MT/CS**
1.687	125DCC169A	1.25" DS Coil Connector Assy	1-1/4"	**1.00"MT/CS**
1.850	125DCC185A	1.25" DS Coil Connector Assy	1-1/4"	**1.00"/1.25" CS**
2.125	125DCC212A	1.25" DS Coil Connector Assy	1-1/4"	**1.25" CS/1.50" MT**
3.170	125DCC317	1.25" DS Coil Connector Assy	1-1/4"	**1502 Union**
1.930	150DCC193	1.50" DS Coil Connector Assy	1-1/2"	**1.00" MT/CS,1.25" CS**
2.120	150DCC212	1.50" DS Coil Connector Assy	1-1/2"	**1.25" CS/1.50" MT**
2.875	150DCC287	1.50" DS Coil Connector Assy	1-1/2"	**2-3/8" PAC**
3.170	150DCC317	1.50" DS Coil Connector Assy	1-1/2"	**1502 Union**
2.180	175DCC218	1.75" DS Coil Connector Assy	1-3/4"	**1.25" CS/1.50" MT**
2.875	175DCC287	1.75" DS Coil Connector Assy	1-3/4"	**2-3/8" PAC**
2.875	200DCC287	2.00" DS Coil Connector Assy	2.00"	**2-3/8" PAC**
940	**200DCC294**	**2.00" DS Coil Connector Assy**	**2.00"**	**2-3/8" PH-6**

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3.120	200DCC312	2.00" DS Coil Connector Assy	2.00"	**2-3/8" API Reg**
3.170	200DCC317	2.00" DS Coil Connector Assy	2.00"	**1502 Union**
3.125	237CTC312	2-3/8" DS Coil Connector Assy-SL	2-3/8"	**2-3/8" PAC/REG**
3.250	237DCC325	2-3/8" DS Coil Connector Assy	2-3/8"	**2-3/8" PAC/REG**
3.500	237DCC350	2-3/8" DS Coil Connector Assy	2-3/8"	**2-7/8" PAC**
3.500	262DCC350	2-5/8" DS Coil Connector Assy	2-5/8"	**2-3/8" PAC/REG/8-RD**
Note:	**Alternate connection and O.D.'s available upon request. Also, bottom subs available with setscrews.**			

IES DIMPLE CONNECTOR ASSEMBLY				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Coil Dia.**	Threads
2.875	238IES287-134	2.38" IES Dimple Connector, .134W	2-3/8"	**2-3/8" PAC**
2.875	238IES287-156	2.38" IES Dimple Connector, .156W	2-3/8"	**2-3/8" PAC**
2.850	**238IES287-175**	**2.38" IES Dimple Connector, .175W**	**2-3/8"**	**2-3/8" PAC**

HD4 INTEGRATED MOTORHEAD ASSEMBLY (DFCV, HD4 Hydraulic Disconnect,Circulation Sub)				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	Threads
1.688	168MHA4-XX	1-11/16" HD4 MotorHead Assy	1-11/16"	**1.00" MT/CS**
2.125	212MHA4-XX	2-1/8" HD4 MotorHead Assy	2-1/8"	**1.25" CS/1.50" MT**
2.875	287MHA4-XX	2-7/8" HD4 MotorHead Assy	2-7/8"	**PAC/API Reg**
3.125	312MHA4-XX	3-1/8" HD4 MotorHead Assy	3-1/8"	**PAC/API Reg**
Note:	**This MHA incorporates the our latest HD4 Disconnect with InterLOC system**			

HD INTEGRATED MOTORHEAD ASSEMBLY (DFCV, Hydraulic Disconnect, Circulation Sub)				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	Threads
1.688	168MHA3-XX	1-11/16" MotorHead Assy	1-11/16"	**1.00" MT/CS**
2.125	212MHA3-XX	2-1/8" MotorHead Assy	2-1/8"	**1.25" CS/1.50" MT**
2.875	**287MHA3-XX**	**2-7/8" MotorHead Assy**	**2-7/8"**	**PAC/API Reg**

DUAL FLAPPER CHECK VALVES (2-Cartridges)				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	Threads
1.688	168DFCV-XX	1-11/16" Dual Flapper Check Valve	1-11/16"	**1.00" MT/CS**
2.125	212DFCV-XX	2-1/8" Dual Flapper Check Valve	2-1/8"	**1.25" CS/1.50" MT**
2.875	287DFCV-XX	2-7/8" Dual Flapper Check Valve	2-7/8"	**PAC/API Reg**
3.125	312DFCV-XX	3-1/8" Dual Flapper Check Valve	3-1/8"	**PAC/API Reg**
Note:	**All cartridges are designed for low pressure viton seal and metal to metal high pressure seal**			

QUAD FLAPPER CHECK VALVES (4-Cartridges)				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	Threads
1.688	168QFCV-XX	1-11/16" Quad Flapper Check Valve	1-11/16"	**1.00" MT/CS**
2.125	212QFCV-XX	2-1/8" Quad Flapper Check Valve	2-1/8"	**1.25" CS/1.50" MT**
2.875	287QFCV-XX	2-7/8" Quad Flapper Check Valve	2-7/8"	**PAC/API Reg**
3.125	312QFCV-XX	3-1/8" Quad Flapper Check Valve	3-1/8"	**PAC/API Reg**
Note:	**All cartridges are designed for low pressure viton seal and metal to metal high pressure seal**			

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HD4 "INTER-LOC" HYDRAULIC DISCONNECTS				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	**Threads**
1.688	168HD4-XX	1-11/16" HD4 Hydraulic Disconnect	1-11/16"	**1.00" MT/CS**
2.125	212HD4-XX	2-1/8" HD4 Hydraulic Disconnect	2-1/8"	**1.25" CS/1.50" MT**
2.875	287HD4-XX	2-7/8" HD4 Hydraulic Disconnect	2-7/8"	**PAC/API Reg**
3.125	312HD4-XX	3-1/8" HD4 Hydraulic Disconnect	3-1/8"	**PAC/API Reg**
Note:	**Available with Different Drop & Drift Ball Sizes**			

HD3 HYDRAULIC DISCONNECTS-Standard				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	**Threads**
1.688	168HD-XX	1-11/16" HD Hydraulic Disconnect	1-11/16"	**1.00" MT/CS**
2.125	212HD-XX	2-1/8" HD Hydraulic Disconnect	2-1/8"	**1.25" CS/1.50" MT**
2.875	**287HD-XX**	**2-7/8" HD Hydraulic Disconnect**	**2-7/8"**	**PAC/API Reg**

GS PULLING TOOLS				
GS Profile	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	**Threads**
2.000	200GSPT-XX	2.00" GS Pulling Tool	1-11/16"	**1.00" MT/CS**
2.500	250GSPT-XX	2.50" GS Pulling Tool	2-1/8"	**1.25" CS/1.50" MT**
3.000	**300GSPT-XX**	**3.00" GS Pulling Tool**	**2-7/8" & 3-1/8"**	**PAC/API Reg**

DUAL CIRCULATION SUB (Ball Drop), Burst Disc Capable				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	**Threads**
1.688	168DCS-XX	1-11/16" Dual Circulation Sub	1-11/16"	**1.00" MT/CS**
2.125	212DCS-XX	2-1/8" Dual Circulation Sub	2-1/8"	**1.25" CS/1.50" MT**
2.875	287DCS-XX	2-7/8" Dual Circulation Sub	2-7/8"	**PAC/API Reg**
3.125	**312DCS-XX**	**3-1/8" Dual Circulation Sub**	**3-1/8"**	**PAC/API Reg**

TORQUE-THRU KNUCKLE JOINT				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	**Threads**
1.688	168TTKJ-XX	1-11/16" Torque Thru Knuckle Joint	1-11/16"	**1.00" MT/CS**
2.125	212TTKJ-XX	2-1/8" Torque Thru Knuckle Joint	2-1/8"	**1.25" CS/1.50" MT**
2.875	287TTKJ-XX	2-7/8" Torque Thru Knuckle Joint	2-7/8"	**PAC/API Reg**
3.125	**312TTKJ-XX**	**3-1/8" Torque Thru Knuckle Joint**	**3-1/8"**	**PAC/API Reg**

LOCKING SWIVEL JOINT				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	**Threads**
1.688	168LSJ-XX	1-11/16" Locking Swivel Joint	1-11/16"	**1.00" MT/CS**
2.125	212LSJ-XX	2-1/8" Locking Swivel Joint	2-1/8"	**1.25" CS/1.50" MT**
2.875	287LSJ-XX	2-7/8" Locking Swivel Joint	2-7/8"	**PAC/API Reg**
3.125	**312LSJ-XX**	**3-1/8" Locking Swivel Joint**	**3-1/8"**	**PAC/API Reg**

HYDRAULIC ACTIVATED BOW SPRING CENTRALIZER				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Max Dia.**	**Threads**
1.688	168BSC-XX	1-11/16" Hyd. Bow Centralizer	6.50"	**1.00" MT/CS**
2.125	212BSC-XX	2-1/8" Hyd. Bow Centralizer	7.00"	**1.25" CS/1.50" MT**
2.875	287BSC-XX	2-7/8" Hyd. Bow Centralizer	8.00"	**PAC/API Reg**
3.125	**312BSC-XX**	**3-1/8" Hyd. Bow Centralizer**	**8.00"**	**PAC/API Reg**

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MULTI JET BI-DIRECTIONAL SPINNING WASH TOOL (UP & DOWN FLOW)				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Nozzles**	Threads
1.250	125SWT-XX	1-1/4" Spinning Wash Tool	13	**1.00" MT/CS**
1.688	168SWT-XX	1-11/16" Spinning Wash Tool	13	**1.00" MT/CS**
2.125	212SWT-XX	2-1/8" Spinning Wash Tool	13	**1.25" CS/1.50" MT**
2.875	287SWT-XX	2-7/8" Spinning Wash Tool	17	**PAC/API Reg**
3.125	312SWT-XX	3-1/8" Spinning Wash Tool	21	**PAC/API Reg**
Note:	**Nozzle jets are replaceable and are configured for standard well bore. Customer or engineered specific nozzles available**			

FULL BORE SINGLE PORT WASH NOZZLE				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Port Dia**	Threads
1.250	125FBWN-XX	1-1/4" Full Bore Wash Nozzle	1/2"	**3/4" MMT/CS**
1.688	168FBWN-XX	1-11/16" Full Bore Wash Nozzle	3/4"	**1.00" MT/CS**
2.125	212FBWH-XX	2-1/8" Full Bore Wash Nozzle	3/4"	**1.25" CS/1.50" MT**
2.875	287FBWN-XX	2-7/8" Full Bore Wash Nozzle	1.00"	**PAC/API Reg**
3.125	**312FBWN-XX**	**3-1/8" Full Bore Wash Nozzle**	**1.00"**	**PAC/API Reg**

5-PORT WASH NOZZLE				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Port Dia**	Threads
1.250	168PWN-XX	1-11/16" 5-Port Wash Nozzle	11/64"	**3/4" MMT/CS**
1.688	168PWN-XX	1-11/16" 5-Port Wash Nozzle	3/16"	**1.00" MT/CS**
2.125	212PWN-XX	2-1/8" 5-Port Wash Nozzle	3/16"	**1.25" CS/1.50" MT**
2.875	287PWN-XX	2-7/8" 5-Port Wash Nozzle	1/4" or 5/16"	**PAC/API Reg**
3.125	**312PWN-XX**	**3-1/8" 5-Port Wash Nozzle**	**1/4" or 5/16"**	**PAC/API Reg**

STRAIGHT WEIGHT BARS - 3 FT. MAKE-UP LENGTH				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**I.D.**	Threads
1.250	125WTB-30-XX	1-1/4" Weight Bar	1/2"	**3/4" MMT/CS**
1.688	168WTB-30-XX	1-11/16" Weight Bar	3/4"	**1.00" MT/CS**
2.125	212WTB-30-XX	2-1/8" Weight Bar	1.00"	**1.25" CS/1.50" MT**
2.875	287WTB-30-XX	2-7/8" Weight Bar	1.00"	**PAC/API Reg**
3.125	**312WTB-30-XX**	**3-1/8" Weight Bar**	**1.00"**	**PAC/API Reg**

STRAIGHT WEIGHT BARS - 4 FT. MAKE-UP LENGTH				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**I.D.**	Threads
1.250	125WTB-40-XX	1-1/4" Weight Bar	1/2"	**3/4" MMT/CS**
1.688	168WTB-40-XX	1-11/16" Weight Bar	3/4"	**1.00" MT/CS**
2.125	212WTB-40-XX	2-1/8" Weight Bar	1.00"	**1.25" CS/1.50" MT**
2.875	287WTB-40-XX	2-7/8" Weight Bar	1.00"	**PAC/API Reg**
3.125	**312WTB-40-XX**	**3-1/8" Weight Bar**	**1.00"**	**PAC/API Reg**

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STRAIGHT WEIGHT BARS - 5 FT. MAKE-UP LENGTH				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**I.D.**	Threads
1.250	125WTB-50-XX	1-1/4" Weight Bar	1/2"	**3/4" MMT/CS**
1.688	168WTB-50-XX	1-11/16" Weight Bar	3/4"	**1.00" MT/CS**
2.125	212WTB-50-XX	2-1/8" Weight Bar	1.00"	**1.25" CS/1.50" MT**
2.875	287WTB-50-XX	2-7/8" Weight Bar	1.00"	**PAC/API Reg**
3.125	**312WTB-50-XX**	**3-1/8" Weight Bar**	**1.00"**	**PAC/API Reg**

"SLAMMER" IMPACT HAMMERS-DOWN				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**I.D.**	Threads
1.375	138SDS-XX	1-3/8" Slammer Impact Hammers	N/A	**3/4" MMT/CS**
1.688	168SDS-XX	1-11/16" Slammer Impact Hammers	N/A	**1.00" MT/CS**
2.125	**212SDS-XX**	**2-1/8" Slammer Impact Hammers**	**N/A**	**1.25" CS/1.50" MT**

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SRT-G2 DRILL MOTORS; MUD LUBRICATED				
O.D.	**Part Number**	**PARTS DESCRIPTION**	**Tool Size**	Threads
1.688	168SRT2-XX	1-11/16" SRT-G2 Drill Motor; 5/6 Lobe, 1.0 Stage Conventional Power Section	1-11/16"	**1.00" MT/CS**
1.688	168SRT2-XX	1-11/16" SRT-G2 Drill Motor; 5/6 Lobe, 2.3 Stage Even Wall Power Section	1-11/16"	**1.00" MT/CS**
1.688	168SRT2-XX	1-11/16" SRT-G2 Drill Motor; 5/6 Lobe, 2.3 Stage Conventional Power Section	1-11/16"	**1.00" MT/CS**
1.688	168SRT2-XX	1-11/16" SRT-G2 Drill Motor; 5/6 Lobe, 3.5 Stage Conventional Power Section	1-11/16"	**1.00" MT/CS**
2.125	212SRT2-XX	2-1/8" SRT-G2 Drill Motor; 5/6 Lobe, 6.0 Stage Even Wall Power Section	2-1/8"	**1.25" CS/1.50" MT**
2.125	212SRT2-XX	2-1/8" SRT-G2 Drill Motor; 5/6 Lobe, 6.0 Stage Conventional Power Section	2-1/8"	**1.25" CS/1.50" MT**
2.875	287SRT2-XX	2-7/8" SRT-G2 Drill Motor; 5/6 Lobe, 3.5 Stage Even Wall Power Section	2-7/8"	**PAC/API Reg**
2.875	287SRT2-XX	2-7/8" SRT-G2 Drill Motor; 5/6 Lobe, 3.5 Stage Conventional Power Section	2-7/8"	**PAC/API Reg**
2.875	287SRT2-XX	2-7/8" SRT-G2 Drill Motor; 5/6 Lobe, 4.7 Stage Conventional Power Section	2-7/8"	**PAC/API Reg**
3.125	312SRT-XX	3-1/8" SRT-G2 Drill Motor; 5/6 Lobe, 3.5 Stage Conventional Power Section	3-1/8"	**PAC/API Reg**
3.125	312SRT-XX	3-1/8" SRT-G2 Drill Motor; 7/8 Lobe, 3.0 Stage Conventional Power Section	3-1/8"	**PAC/API Reg**
3.750	375SRT-XX	3-3/4" SRT-G2 Drill Motor; 4/5 Lobe, 3.5 Stage Conventional Power Section	3-3/4"	**PAC/API Reg**
Note:	**The SRT-G2 Lower Bearing Assembly is the shortest, most robust & efficient lower bearing on the market today and can be adapted to an y manufacturer power section. Down hole conditions dictate configuration and f it of rotor and stator.**			

1. All Prices are in US Dollars
2. All tools & accessories can be machined to any customer thread specification

3.	**Company Contacts E-mail**	Phone
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North America Market	Jerry Werlla (jerry@ctrt.us.com)	**432-853-5762 (Cell)**
INTERNATIONAL MARKET	**Gilbert Donatti (gilbert@ctrt.us.com)**	832-681-0091 (Cell)

4. Tool Catalog does not include all BHA supplied by CTRT, call for information on tools not listed.

Coil Connector Pull/Tension Plates

The CTRT **Coil Connector Pull/Tension Plate** is utilized to confirm the make-up integrity of any Coiled Tubing End Connector following installation to the Coiled Tubing. It is a standard test component to validate pull capability of the coil connector.

The test sub incorporates a large diameter integrated base plate which is sized to prevent the tool form being pulled through the Stuffing Box Union, allowing a straight pull to be performed on the coil tubing connector prior to make-up of the tool string. The test sub can be provided with a lower box thread to allow installation of a needle valve for pressure testing purposes.

DESIGN ADVANTAGES & BENEFITS

- Simple, robust design
- Multiple connection options to suit customer requirements
- Flow thru-bore for fluid bypass
- Optional threaded port for needle valve
- Coil tubing diameters from 1.00" to 2-5/8"

Especificaciones técnicas

Test Sub Minor O.D.	I.D.	Base Diameter	Test Pull Range	Connection(s)
1.688"	.625"	5.50"	10,000 lbs	**1.00" MT or CS**
2.250"	.875"	6.00"	12,000-18,000 lbs	**1.25 CS or 1.50 MT**
2.950"	1.00"	8.00"	25,000 lbs	**2-3/8" PAC**
3.125"	**1.00"**	**9.00"**	**30,000-40,000 lbs**	**2-3/8" Reg, 2-7/8" PAC**

Note: Test pull ranges are to be used only as a guide. End user to determine actual requirements based on coil unit, coil diameter, operator preference, specific tool string and well conditions.

External Slip Coil Connector Assembly

The ***CTRT, Inc. Coiled Tubing External Slip Connector Assembly*** has been designed for capabilities of handling higher tensile and torsional loads during increasingly demanding Thru-Tubing operations while providing efficient and reliable make-up to the coil tubing on location.

The connector consists of a top and bottom sub, slip and brass crush ring. The assembly primary components are manufactured of high strength alloy or stainless (available in Hostile Environment) and are designed to surpass the tensile and burst of the coil tubing and meet the tensile and torsional loads of Motor Head Assemblies, PDM Motors and **"Slammer"®** Impact Hammer operations. O-rings seals are incorporated to insure pressure integrity of Coiled Tubing during down-hole operation. Each designed Coil Connector has undergone *actual* pull test to validate strengths.

Design Advantages

- Dual O'Rings Seals
- 10,000 PSI Rating
- Non Rotational
- Maximum Flow Rates
- Replaceable Slips

Technical Specifications

Coiled Tubing Diameter	1.00"	1.25"		1.50"		
Max O.D.	1.688"	1.688"	1.850"	1.935"-SL	2.125"	**2.188"**
Min I.D.	.750"	.750"	1.00"	.750"(1.00")	1.00."	**1.00"**
Thread Connection (*)	1.0" CS	1.0" CS/MT	1.25" CS	1.0" CS/MT(1.25" CS)	1.50" MT/1.25" CS	**1.25" CS**
Max Over-Pull @ 80% (lbs)	40,000	38,000	38,000	37,000	50,000	**50,000**
Make-up Length	8.875"	8.17"	9.375"	9.375"	9.000"	**9.750**
Max Torsional Yield (ft-lbs)	1,710	1,400	2,630	1,400	2,100	**3.275**
O'Ring Size	-214	-218	-218	-222	-222	**-222**
Coil Minimum Dia. for Seal	.990"	1.240"	1.240"	1.490"	1.490"	**1.490"**
Commodity Order No.	**100CTC169**	**125CTC169**	**125CTC185**	**150CTC193**	**150CTC212**	**150CTC 218**

Coiled Tubing Diameter	1.75"	2.00"		2-3/8"		2-5/8"
Max O.D.	2.188"-SL	2.875"	2.875"	3.125"-SL	3.250"	**3.375"-SL/3.500"**
Min I.D.	1.00"	1.375"	1.375"	1.375"/1.000"	1.375"/1.000"	**1.500"**
Thread Connection (*)	1.25" CS	2.37" PAC	2.37" PAC	2.37" PAC/API Reg	2.37" PAC/API Reg	**2.38" Reg/ 2.87" PAC**
Max Over-Pull @ 80% (lbs)	43,000	74,000	75,000	87,000	104,000	**129,581**
Max Torsional Yield (ft-lbs)	2,525	4,800	4,800	7,850	9,800	**12,000**
Make-up Length	9.375"	10.000"	9.875"	11.375"	11.375"	**14.125"**
O'Ring Size	-224	-224	-226	-332	-332	**-334**
Coil Minimum Dia. for Seal	1.740"	1.740"	1.990"	2.365"	2.365"	**2.615"**
Commodity Order No.	**175CTC218**	**175CTC287**	**200CTC287**	**237CTC312**	**237CTC325**	**262CTC350**

(*) Typical thread connections. Customer specified thread connections available upon request.

External "Dual" Slip Coil Connector Assembly

The **CTRT, Inc. Coiled Tubing External "DUAL" Slip Coil Connector Assembly** has been designed to incorporate two independent slips in one tool for additional safety capabilities in the event one slip fails. This combination provides a backup slip and allows for handling higher tensile and torsional loads during increasingly demanding Thru-Tubing operations while providing efficient and reliable make-up to the coil tubing on location.

The connector consists of a top, center and bottom sub, two slips and brass crush rings. The assembly primary components are manufactured of high strength alloy or stainless (available in Hostile Environment) and are designed to surpass the tensile and burst of the coil tubing and meet the tensile and torsional loads of Motor Head Assemblies, PDM Motors and "Slammer"® Impact Hammer operations. O-rings seals are incorporated to insure pressure integrity of Coiled Tubing during down-hole operation. Each designed Dual Slip Coil Connector has undergone actual pull test to validate strengths.

Design Advantages

- Dual O'Rings Seals
- 10,000 PSI Rating
- Non Rotational
- Maximum Flow Rates
- Two Replaceable Slips

Coiled Tubing Diameter	1.00"	1.25"			1.50"	
Max O.D.	1.688"	1.688"	1.850"	1.935"-SL	2.125"	**2.188"**
Min I.D.	.750"	.750"	1.00"	.750"(1.00")	1.00"	**1.00."**
Thread Connection (*)	1.0" CS	1.0" CS/MT	1.25" CS	1.0" CS/MT(1.25" CS)	1.50" MT/1.25"CS	**1.25" CS**
Max Over-Pull @ 80% (lbs)	40,000	38,000	38,000	37,000	50,000	**50,000**
Make-up Length	10.875"	10.125"	11.375"	11.375"	9.000"	**11.750"**
Max Torsional Yield (ft-lbs)	1,710	1,400	2,630	1,400	2,100	**3,275**
O'Ring Size	-214	-218	-218	-222	-222	**-222**
Coil Minimum Dia. for Seal	.990"	1.240"	1.240"	1.490"	1.490"	**1.490"**
Commodity Order No.	**100DCC169**	**125DCC169**	**125DCC185**	**150DCC193**	**150CTC212**	**150DCC218**

Coiled Tubing Diameter	1.75"	2.00"		2-3/8"		2-5/8"
Max O.D.	2.188"	2.875"	2.875"	3.125"-SL	3.250"	**3.500"**
Min I.D.	1.00"	1.375"	1.375"	1.375"/1.000"	1.375"/1.000"	**1.500"/1.000"**
Thread Connection (*)	1.25" CS	2.37" PAC	2.37" PAC	2.37" PAC/API Reg	2.37" PAC/API Reg	**2.87" PAC/Reg**
Max Over-Pull @ 80% (lbs)	43,000	74,000	75,000	87,000	104,000	**108,000**
Max Torsional Yield (ft-lbs)	2,525	4,800	4,800	7,850	9,800	**12,000**
Make-up Length	11.375"	12.000"	11.875"	11.375	13.375"	**13.375"**
O'Ring Size	-224	-224	-226	-332	-332	**-334**
Coil Minimum Dia. for Seal	1.740"	1.740"	1.990"	2.365"	2.365"	**2.615"**
Commodity Order No.	**175DCC218**	**175DCC287**	**200DCC287**	**237DCC325**	**237DCC325**	**262DCC350**

(*) Typical thread connections. Customer specified thread connections available upon request.

External Dimple Connectors

The CTRT **External Dimple Connector** has been designed as an alternate tool that allows the attachment of the tool string to the coil tubing. Instead of slip type coil connectors that uses an engagement slip that bites into the coil upon being torque, the external dimple connector, engages via grub screws that perform dimples in the coil tubing wall.

The dimple radius and depth geometry is created in the coil by use of a dimple installation guide with compressive setting screws that precisely places the progressive radius dimple locations to match the exact location of the external dimple connector being used.

DESIGN ADVANTAGES & BENEFITS

- Dual O'Ring Seals
- 10,000 PSI Rating
- Non-Rotational
- Maximum Flow Rates
- High Torque

The External Dimple Connector consist of one main body component threaded with pin connection. Available in coil tubing sizes **1-1/4" to 2-7/8"**. Contact your CTRT representative who can assist you with your coil connector specifications.

Coiled Tubing Diameter	2.00"	2-3/8"		2-5/8"
Max O.D.	2.875"	2.875"	3.125"	**3.250"**
Min I.D.	1.375"	1.375"	1.000"	**1.000"**
Thread Connection (*)	2-3/8" PAC	2-3/8" PAC	2-3/8" Reg	**2-3/8" Reg**
Max Over-Pull @ 80% (lbs)	40,000	55,000	55,000	**62,000**
Make-up Length	8.000"	8.000"	8.000"	**9.375"**
Max Torsional Yield (ft-lbs)	TBD	13,000	16,600	**16,000**
O'Ring Size	-214	-229	-229	**-231**
Coil Minimum Dia. for Seal	1.990"	2.365"	2.365"	**2.615"**
Commodity Order No.	**200DCC200**	**238DCC312**	**238DCC312**	**262DCC350**

IES Slim Line Dimple Connectors

The CTRT **IES Slim Line Coil Tubing Dimple Connector** has been designed to integrate the benefits of both an internal and external dimple style connector as an alternate connector makeup that allows the attachment of the tool string to the coil tubing. Instead of slip type coil connectors that uses an engagement slip that bites into the coil upon being torqued, the IES dimple connector, engages via grub screws that perform dimples in the coil tubing wall and engages the coil thru support from both the I.D and O.D. of the coil tubing.

The dimple radius and depth geometry is created in the coil by use of a dimple installation guide fixture with compressive indention plugs that precisely places the radius dimple locations to match the exact location of the IES dimple internal mandrel being used. Radius setting plugs are threaded and torqued from the external housing that locks to the O.D. of the coil at the exact dimple indention location.

DESIGN ADVANTAGES & BENEFITS

- Dual O'Ring Seals
- 10,000 PSI Rating
- Non-Rotational
- Maximum Flow Rates
- Coil Supported From Both the I.D. & O.D.

The **IES Slim Line Coil Dimple Connector** consist of two main body components that encapsulate the coil with a threaded pin connection for BHA makeup. Currently available in coil tubing sizes **2.00" to 2-5/8"**. Contact your CTRT representative who can assist you with your coil connector specifications.

Dimple Connector Technical Specifications

Coiled Tubing Diameter	2.00" SL	2-3/8" SL		2-5/8" SL
Max O.D.	2.875"	2.875"	3.125"	**3.125"**
Min I.D.	1.000"	1.000"	1.000"	**1.000"**
CT Wall	.134",.145",.156"	.134", .156",.175"	.134",.156",.175"	**TBD**
Thread Connection (*)	2-3/8" PAC	2-3/8" PAC	2-3/8" Reg	**2-3/8" Reg**
Max Over-Pull @ 80% (lbs)	TBD	82,500	82,500	**TBD**
Make-up Length	12.250"	12.250"	12.250"	**12.250"**
Max Torsional Yield (ft-lbs)	TBD	TBD	TBD	**TBD**
O'Ring Size	-214	-229	-229	**-231**
Coil Minimum Dia. for Seal	1.990"	2.365"	2.365"	**2.615"**
Commodity Order No.	**200IES287-XXX**	**238IES287-XXX**	**238IES312-XXX**	**262IES312-XXX**

Note: Coil wall thickness must be identified at time of order to correctly size.

Dimple Installation Guide Technical Specifications

Coiled Tubing Diameter	2.00" SL	2-3/8" SL		2-5/8" SL
Max O.D.	3.500"	3.500"	3.500"	**TBD**
Min I.D.	2.875"	2.875"	3.125"	**TBD**
CT Wall	.134",.145",.156"	.134", .156",.175"	.134", .156",.175"	**TBD**
Length	12.250"	12.250"	12.250"	**TBD**
Redress Kits	200IES-DCT-RDK	238IES-DCT-RDK	238IES-DCT-RDK	**TBD**
Commodity Order No.	**200-DCT-01**	**238-DCT-01**	**238-DCT-01**	**262-DCT-01**

Note: The Dimple Installation Guide is used to accurately align and produce the indentations in the coil tubing wall by using dimple indention plugs.

HD Motor Head Assembly

The **CTRT HD Motor Head Assembly (MHA)** has been developed to support industry demand for shorter, stronger integrated BHA components. The MHA combines the Dual Flapper Check Valve, Hydraulic Disconnect and Dual Circulation Sub, standard components for virtually all tool string designs. The external slip connector is a separate tool that is made up to the MHA to give multiple options on coil connector type and size.

DESIGN ADVANTAGES & BENEFITS

- Versatile compact design that reduces overall length instead of running tools individually.
- Ability to separate and run as individual tools as needed by adding top and/or bottom subs.
- Easy assembly and disassembly with supplied redress tools

Dual Flapper Check Valve

The MHA includes the Dual Flapper Check Valve which prevents wellbore fluid from flowing up the coil tubing to the surface and incorporates two stainless steel cartridge assemblies. These flapper cartridges are manufactured utilizing corrosion and flow resistant materials. Dual sealing virtually eliminates the risk of seal failure. Each flapper cartridge incorporates a primary low pressure viton seal, backed up with a secondary metal to metal high pressure seal.

Hydraulic Disconnect

The Hydraulic Disconnect has been designed to withstand vibration, torque and impact for today's long milling, drilling and impact drill applications. It allows the tool string to detach at a predetermined release point via the deployment of a suitable drop/trip ball through the coil tubing. A key design is the one piece collet that is locked in place by a collet sleeve to hold the tool together. This high strength combination allows for heavy jarring operations. The release piston is pressure balanced to eliminate hydraulic pressure that could affect shear values. A clean disconnect is accomplished when a drop ball locates on the release piston creating enough back pressure to shear the setting screws and disconnect the tool. Circulation is immediately returned to the tool string. The release piston and drop ball is returned to the surface leaving only a standard "GS" internal fish neck for retrieval purposes.

Dual Circulation Sub

The MHA also incorporates the Dual Circulation Sub, which offers the traditional method used to divert circulation if the string below the sub becomes plugged, eliminating unnecessary wear on the mud motor. For **"Slammer"®** Impact Hammer operations, the circulation sub is removed to prevent potential shearing of setting screws or rupture of burst disk.

Technical Specifications

MHA O.D.	Min I.D.	Makeup Length	MHA OverPull Yield @ 80%	Dual Flapper I.D.	Fishneck Internal Profile	GS Profile Over-Pull Yield @ 80%	Hydraulic Disconnect Min. I.D.	Hydraulic Release Drop Ball	Dual Circ Drop Ball	Working Pressure	Connection
1.688"	.406"	23.43"	47,000 lbs	.687"	2.00" GS	39,400	.468"	1/2"or 5/8"	7/16"	10,000 PSI	**1.00" MT/CS**
2.125"	.406"	33.00"	60,000 lbs	.891"	2.00" GS	170,000	.468"	1/2" or 5/8"	7/16"	10,000 PSI	**1.00" MT/CS**
2.125"	.406"	33.00"	60,100 lbs	.891"	2.50" GS	56,800	.531"	5/8"	1/2"	10,000 PSI	**1.50 MT or 1.25 CS**
2.875"	**.750"**	**36.43"**	**93,000 lbs**	**1.034"**	**3.00" GS**	**140,000**	**.875"**	**15/16"**	**13/16"**	**10,000 PSI**	**2-3/8" PAC**

Note: The strength calculations are considered accurate within +/- 20% and are to be used only as a guide. They do not constitute any actual or implied warranty or guarantee.

Dual Flapper Check Valve-G2

The CTRT **Dual Flapper Check Valve** is a standard coiled tubing BHA component. It provides a means of preventing the back flow of well fluids into the coiled tubing in the event of a failure or damage to the coiled tubing string or surface equipment.

This check valve incorporates a dual sealing system in each cartridge assembly which virtually eliminates the risk of failure. A machined viton seal provides the primary low pressure seal, while at higher pressure, incorporates a metal to metal seal. Maximum flow area through the flapper cartridges reduces unnecessary back pressure on the surface pumps. The flow path through the cartridges does not restrict the passage of drop balls if required during operations.

DESIGN ADVANTAGES & BENEFITS

- Dual seal in each flapper cartridge-low pressure & high pressure
- Tight tolerance machined viton seals
- Cartridges made from corrosion & wear resistance stainless

Technical Specifications

Tool O.D.	Tool I.D.	Makeup Length	Over-Pull Yield @ 80%	Torsional Yield @ 80%	Working Pressure	Thread Connection
1.688"	.687"	10.62"	65,000 lbs	3,800 Ft/lbs	10,000 PSI	**1.00" CS or MT**
2.125"	.687"	12.50"	127,000 lbs	6,500 Ft/lbs	10,000 PSI	**1.25 CS or 1.50 MT**
2.875"	1.015"	15.62"	267,000 lbs	14,500 Ft/lbs	10,000 PSI	**2-3/8" PAC**
3.125"	**1.078"**	**16.25"**	**267,000 lbs**	**15,000 Ft/lbs**	**10,000 PSI**	**2-3/8" PAC, API Reg**

Note: The strength calculations are considered accurate within +/- 20% and are to be used only as a guide. They do not constitute any actual or implied warranty or guarantee.

Quad Flapper Check Valve-G2

The CTRT **Quad Flapper Check Valve** is an alternate coiled tubing BHA component that replaces the need for two dual flapper check vales within the coil tubing string of tools with a single shorter unit with four cartridges with one tool. It provides a means of preventing the back flow of well fluids into the coiled tubing in the event of a failure or damage to the coiled tubing string or surface equipment.

This check valve incorporates a dual sealing system in each cartridge assembly which virtually eliminates the risk of failure. A machined viton seal provides the primary low pressure seal, while at higher pressure, incorporates a metal to metal seal. Maximum flow area through the flapper cartridges reduces unnecessary back pressure on the surface pumps. The flow path through the cartridges does not restrict the passage of drop balls if required during operations.

DESIGN ADVANTAGES & BENIFITS

- Dual seal in each flapper cartridge-low pressure & high pressure
- Tight tolerance machined viton seals
- Cartridges made from corrosion & wear resistance stainless
- Eliminate two connections

Technical Specifications

Tool O.D.	I.D.	Makeup Length	Overpull Yield	Working Pressure	Connection
1.688”	.687”	TBD	65,000 lbs	10,000 PSI	**1.00” CS or MT**
2.125”	.687”	TBD	127,000 lbs	10,000 PSI	**1.25 CS or 1.50 MT**
2.875”	1.015”	24”	267,000 lbs	10,000 PSI	**2-3/8” PAC**
3.125”	**1.078”**	**24”**	**267,000 lbs**	**10,000 PSI**	**2-3/8” PAC, API Reg**

Note: The strength calculations are considered accurate within +/- 20% and are to be used only as a guide. They do not constitute any actual or implied warranty or guarantee.

Dual Circulation Sub

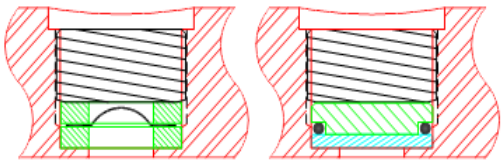
The CTRT **Dual Circulation Sub** is a ball activated coiled tubing BHA component. It is typically run above the drilling motor to provide a circulation path to the annulus for increased flow rate during milling operations or if plugged along the drilling motor flow path.

The tool is activated by means of a drop ball and applied surface pressure to shear the setting screws allowing the internal piston to shift, opening flow to the annulus through circulation ports. Once activated, increased fluid volume can bypass from the tubing to the annulus.

An alternate rupture disk with predetermined pressure ratings can be activated by applying flow rates that exceed the burst disk rating. This method is typically used when the drill motor is plugged off and circulation is lost. Upon disc rupture, circulation is regained. It is not recommended that the tool be dressed with a rupture disc if used with our **"Slammer"®** Impact Drill-Jar.

DESIGN ADVANTAGES & BENEFITS

- Dual activation option by drop ball or rupture disk
- Simple, robust design that captures ball in piston
- Large flow area to annulus when activated
- Tool can be dressed with rupture disc or without
- Alternate piston I.D. available to meet tool string need



Technical Specifications

Tool O.D.	Min I.D.	Drop Ball	Makeup Length	Overpull Yield @ 80%	Working Pressure	Connection
1.688"	.406"	7/16"	11.50"	60,000 lbs	10,000 PSI	**1.00" CS or MT**
2.125"	.438"	1/2"	12.50"	102,000 lbs	10,000 PSI	**1.25 CS or 1.50 MT**
2.875"	.562"	5/8"	17.00"	225,000 lbs	10,000 PSI	**2-3/8" PAC**
3.125"	**.562"**	**5/8"**	**17.00"**	**235,000 lbs**	**10,000 PSI**	**2-3/8" PAC, API Reg**

Note: The strength calculations are considered accurate within +/- 20% and are to be used only as a guide. They do not constitute any actual or implied warranty or guarantee.

HD4 "INTER-LOC"™ Hydraulic Disconnect

The HD4 "INTER-LOC"™ Hydraulic Disconnect has been designed to withstand high vibration, extreme torque and axial impact for today's long milling, drilling and impact hammer applications. The Patent Pending "INTER- LOC"™ and Rotation Lock Technology features minimal components and a method for clean disconnect while leaving only the GS profile left in the hole.

A clean disconnect is accomplished when a drop ball locates on a piston, creating enough back pressure to shear the setting screws and disconnect the tool. Circulation is immediately returned to the tool string, providing a surface indication of a positive disconnect. All internal components, drop ball and top sub are returned to the surface leaving a standard "GS" internal fish neck profile for retrieval purposes.

DESIGN ADVANTAGES & BENEFITS

- The HD4 "INTER-LOC"™ incorporates a patent pending design that utilizes a internal inter-locking profile, release method and rotation lock make-up that allows for the shortest disconnect on the market today.
- The uniquely designed HD4 "INTER-LOC"™ features a simple release system and robust anti-rotation method There are no external castles. There also is no internal thread makeup required to any specific torque to hold disconnect together. Optional drift ball sizes available to suit any remediation or tool string requirement through the use of different interchangable piston I.D. sizes.
- We have designed into the HD4 increases in internal and external cross sectional wall thicknesses to enable the tool to provide strength, torque and pull improvements unmatched by competing down-hole tools. Full operation with extended reach tools and stick pipe.
- Through value added engineering, the HD4 "INTER-LOC"™ Disconnect is truly the next generation of Hydraulic Release Down-Hole Tools. It is simply the easiest to assemble, disassemble and maintenance free disconnect on the market today.

RELEASE OPERATIONS

The HD4 "INTER-LOC"™ Disconnect is supplied with brass setscrews to give compressive pressure ranges to suit virtually any coiled tubing application. Shear screws are ideally situated inside housing that eliminates the possibility of shear screws vibrating free during coiled tubing drilling operations.

REDRESS PROCESS

Two redress tools are utilized to assemble and disassemble the HD4 "INTER-LOC"™. These tools allow for complete assembly and disassembly. It is assembled completely by hand, bottom sub threaded on, then torque into the tool string. These tools allow for easy field redressing. There is no internal make-up thread torque specification that holds release mechanism together like some of today's release tools because there is no internal thread.

Technical Specifications

O.D.	Min I.D.	Makeup Length	Tool Overpull Yield @ 80%	Fishneck Internal Profile	GS Profile Overpull Yield @ 80%	Release Ball Options	Drift Ball Options	Working Pressure	Connection
1.69"	.468"	16-1/4"	55,500	2.00" GS	39,400	1/2"	7/16"	10,000 PSI	**1.00" MT/CS**
1.75"	.468"	16-1/4"	55,000	2.00" GS	58,400	1/2"	7/16"	10,000 PSI	**1.00" MT/CS**
2.12"	.468"	16-1/4"	55,500	2.00" GS	170,000	1/2"	7/16"	10,000 PSI	**1.50" MT**
2.12"	.531"	17-3/8"	116,000	2.50" GS	56,800	9/16"	1/2"	10,000 PSI	**1.50" MT**
2.87"	.687" or .906"	22-5/8"	140,000	3.00" GS	140,000	3/4" or 15/16"	5/8" or 7/8"	10,000 PSI	**2-3/8" PAC**
3.12"	**.687" or .906"**	**22-5/8"**	**140,000**	**3.00" GS**	**140,000**	**3/4" or 15/16"**	**5/8" or 7/8"**	**10,000 PSI**	**2-3/8" REG**

Note: The strength calculations are considered accurate within +/- 20% and are to be used only as a guide. They do not constitute any actual or implied warranty or guarantee

HD Hydraulic Disconnect

The CTRT **HD Hydraulic Disconnect** has been designed and proven to withstand the most rigorous demanding coiled tubing applications. The tool is held together by a heavy duty, one piece collet enclosed within a collet sleeve that locks the main upper and lower release housings together to give maximum tensile strength.

A clean disconnect is accomplished when a drop ball locates on a piston, creating enough back pressure to shear the setting screws and disconnect the tool. Circulation is immediately returned to the tool string, providing a surface indication of a positive disconnect. Release piston, drop ball and top sub are returned to the surface leaving a standard "GS" internal fish neck profile for retrieval purposes.

DESIGN ADVANTAGES & BENEFITS

- External torque locking spline between main bodies.
- Locking heavy duty collet
- Interchangeable release pistons for varied drop ball sizes.
- Pressure balanced release piston

RELEASE OPERATIONS

The Hydraulic Disconnect is supplied with brass or stainless setscrews to give compressive pressure ranges to suit virtually any coiled tubing application. A drop ball locates on the release piston creating sufficient back pressure to shear the pins and disconnect the tool.

REDRESS PROCESS

Redress tools are utilized to assemble and disassemble the complete tool. One tool allows the placement of the locking collet and another for unlocking. These tools allow for easy field redressing.

O.D.	Min I.D.	Makeup Length	Tool Overpull Yield @ 80%	Fishneck Internal Profile	GS Profile Overpull Yield @ 80%	Release Ball Options	Drift Ball Options	Working Pressure	Connection
1.69"	.468"	15.00"	47,000	2.00" GS	39,400	1/2"	7/16"	10,000 PSI	**1.00" MT**
2.12"	.468"	17-3/8"	60,000	2.00" GS	170,000	1/2"	7/16"	10,000 PSI	**1.50" MT**
2.12"	.531"	17-3/8"	60,000	2.50" GS	56,800	5/8"	1/2"	10,000 PSI	**1.50" MT**
2.87"	**.875"**	**20-7/8"**	**93,000**	**3.00" GS**	**140,000**	**15/16"**	**13/16"**	**10,000 PSI**	**2-3/8" PAC**

Note: The strength calculations are considered accurate within +/- 20% and are to be used only as a guide. They do not constitute any actual or implied warranty or guarantee

CTRT
"Downhole Tool Solutions"

THRU-TUBING
DOWNHOLE MOTORS

"SRT"™-G2 DOWNHOLE JARRABLE
Thru-Tubing Performance Motor (1.50" – 3.75")

The SRT™-G2 Downhole Thru-Tubing Motor incorporated our Patented Short Radius Technology that features a wide range of torque, speed, and flow rates to convert hydraulic fluid energy, created by flow and pressure, into mechanical energy. The SRT™-G2 was designed for optimal performance in deviated wells with today's higher torque power sections and a mud lubricated lower bearing assembly. This positive displacement motor produces optimum power output with maximum efficiency for today's Thru-Tubing Drilling demands.

DESIGN ADVANTAGES & BENEFITS

- The SRT™-G2 incorporates a unique patented design that utilizes thrust bearings in an on-bottom and off- bottom operation which allows for one of the shortest bearing assembly on the market today.
- NO spacers or shims are needed to make-up slack in the thrust bearings during assembly as typically associated with today's angular contact bearings. Instead a preload tension system is utilized that eliminates any special spacing requirements.
- The uniquely designed SRT™-G2 is radial stabilized at the bit box and throughout the length of the bearing assembly to significantly reduce side loading in deviated wells.
- We have designed into the SRT™-G2 increases in internal and external cross sectional wall thicknesses to enables the SRT™-G2 to provide strength improvements unmatched by competing down hole motors.
- Through value added engineering, the SRT™-G2 is truly the next generation of downhole motors. It is simply the easiest to assemble and most reliable motor on the market today.

TRANSMISSION

The bearing assembly incorporates three different designs for transmission systems depending on tool size, operator requirements, well design & preference. **Option 1** is the single-piece flexible shaft and is the simplest transmission for standard applications in a small-diameter motor. **Option 2** is the "CV-Hybrid"™ transmission that incorporates the flex shaft and the flow diverter into a patented sealed (Bootless) universal ball joint & flex shaft to match strength & eccentric rotation into a unique transmission system. **Option 3** is short integral sealed (Bootless) universal ball joints opposite each other with a center mandrel.

The Internal Sealed Universal Transmission incorporates the patented "Bootless" drive system. This eliminates the external rubber boots found in many of today's universal systems that hold lubrication. This "Bootless" system extends the life of the transmission and ultimately reduce transmission failures commonly found when rubber boots fail.

BEARING ASSEMBLY

The SRT™-G2 Downhole Motor's jarrable bearing assembly is well suited for weight on bit, side loading, and over pulls. It utilizes thrust bearings split internally for weight on bit in drilling mode and for off-bottom operation. It does not use a two piece (Inner/Outer) bearing assembly associated with today's current drilling motors, but rather a single unison dual bearing assembly. This bearing assembly is designed for a mud lubrication bearing system typically utilized in Thru-Tubing operations. The thrust bearings serve to efficiently operate with static and dynamic loads in drilling operations. The radial bearings provide perpendicular side loading strength to maintain optimal rotational support. The motor also incorporates an internal catch system in case of drive shaft failure that keeps the lower end intact when pulling out of hole and a top sub catch system if stator connection was to fail to keep rotor & lower end together and allow for evacuation of motor assembly from hole.

POWER SECTION

The power section consists of a steel rotor, and an elastomeric lined stator tailored to the planned well intervention whether it is a high temperature application or an aggressive fluid application. The SRT™-G2 bearing assembly can be adapted to any manufacturer's rotor and stator.

CTRT
"Downhole Tool Solutions"

PN: 168SRT2-EW562.3

1.68" 5/6 Lobe, 2.3 Stage

Revision: C 4/5/2016

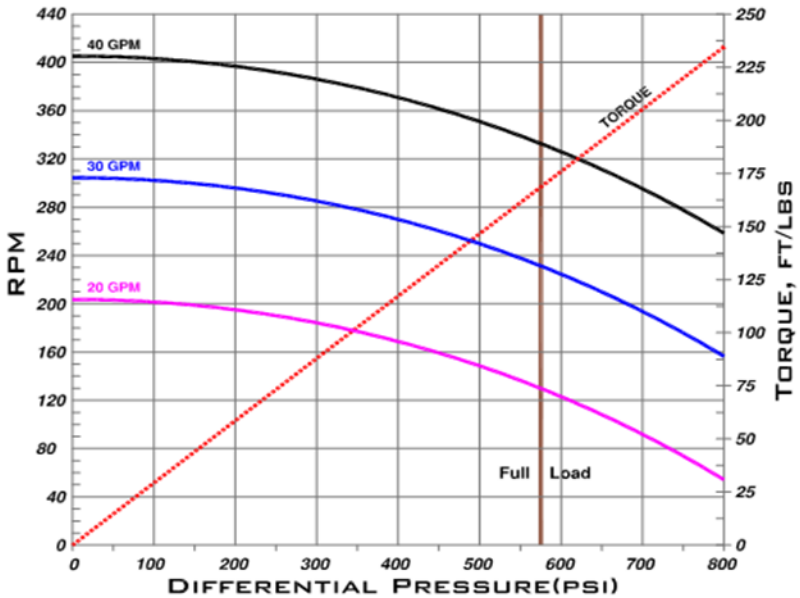
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
PhysicalData		Inches	MM	Axial Bearing Load Ratings		
Motor Overall Length	83.00	2,108		**lbs**	**Kg**
Motor Weight	34	15	Dynamic Compression/Tension	1,600	**726**
Bearing Assy MU Length	20.75	527	Static Compression/Tension	6,000	**2,722**
Top Connection	1.00" MT	1.00" MT	Max Overpull to Re-Run	6,000	**2,722**
Bit Connection	1.00" MT	1.00" MT	Max Bit Overpull (80%)	55,000	**24,948**
Bit Size	**1-7/8"-2-3/4**	**47.62-69.85**	**Max Body Overpull (80%)**	**60,972**	**27,657**

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS					
Rotor	**Inches**	**MM**	**Stator**	**Inches**	**MM**
Overall Length	50.625	1,286	Overall Length	58	**1,461**
Contour Length	48.375	1,229	Tube O.D.	1.688	**43**
Major Diameter	1.22	30.99	Tube I.D.	1.25	**32**
Minor Diameter	0.873	22	Rubber Cutback-Top	3.5	**89**
Eccentricity	0.076	1.93	Rubber Cutback-Bottom	6.75	**171**
Head O.D.	1.125	29	Stages	2.3	**58**
Weight-lbs (kg)	13	6	Weight-lbs (kg)	14	**6**
Thread Form	**T1 or T2**		**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY					
Flow Range gpm (lpm)	20-40	76-151	Max Diff Pressure-psi (kPa)	575	**3,964**
Bit Speed Range (rpm)	202-405	202-405	Stall Diff Pressusre-psi (kPa)	780	**5,378**
Torque Slope ft-lbs/psi (nm/kPa)	0.29	0.06	Max Torque ft-lbs (nm)	168	**228**
Rotation Rev/Gal (Rev/liter)	10.13	2.58	Stall Torque ft-lbs (nm)	230	**312**
Off Bottom Pressure-psi (kPa)	**50**	**345**	**Max HP (kW)**	**21**	**16**

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 168SRT2-RP562.3

1.68" 5/6 Lobe, 2.3 Stage

Revision: C 4/5/2016

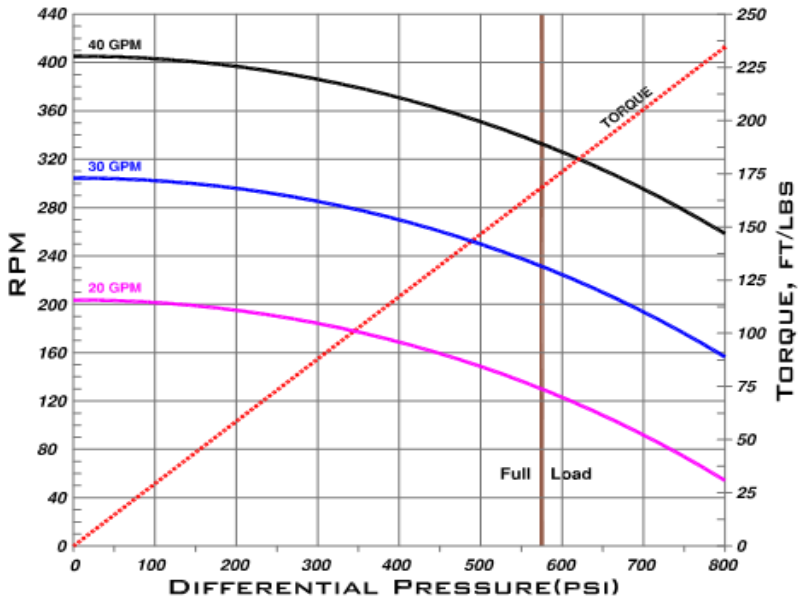
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
PhysicalData	Inches	MM		Axial Bearing Load Ratings		
					lbs	Kg
Motor Overall Length	83.00	2,108				
Motor Weight	34	15		Dynamic Compression/Tension	1,600	**726**
Bearing Assy MU Length	20.75	527		Static Compression/Tension	6,000	**2,722**
Top Connection	1.00" MT	1.00" MT		Max Overpull to Re-Run	7,000	**3,175**
Bit Connection	1.00" MT	1.00" MT		Max Bit Overpull (80%)	55,000	**24,948**
Bit Size	**1-7/8"-2-3/4"**	**47.62-69.85**		**Max Body Overpull (80%)**	**60,972**	**27,657**

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	Inches	MM		Stator	Inches	MM
Overall Length	50.625	1,286		Overall Length	58	**1,461**
Contour Length	48.375	1,229		Tube O.D.	1.688	**43**
Major Diameter	1.22	30.99		Tube I.D.	1.25	**32**
Minor Diameter	0.873	22		Rubber Cutback-Top	3.5	**89**
Eccentricity	0.076	1.93		Rubber Cutback-Bottom	6.75	**171**
Head O.D.	1.125	29		Stages	2.3	**58**
Weight-lbs (kg)	13	6		Weight-lbs (kg)	14	**6**
Thread Form	**T1 or T2**			**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY						
Flow Range gpm (lpm)	20-50	76-151		Max Diff Pressure-psi (kPa)	520	**3,585**
Bit Speed Range (rpm)	210-530	210-530		Stall Diff Pressusre-psi (kPa)	780	**5,378**
Torque Slope ft-lbs/psi (nm/kPa)	0.29	0.06		Max Torque ft-lbs (nm)	150	**203**
Rotation Rev/Gal (Rev/liter)	10.60	2.07		Stall Torque ft-lbs (nm)	230	**312**
Off Bottom Pressure-psi (kPa)	**50**	**345**		**Max HP (kW)**	**21**	**16**

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 168SRT2-PP563.5

1.68" 5/6 Lobe, 3.5 Stage

Revision: C 4/5/2016

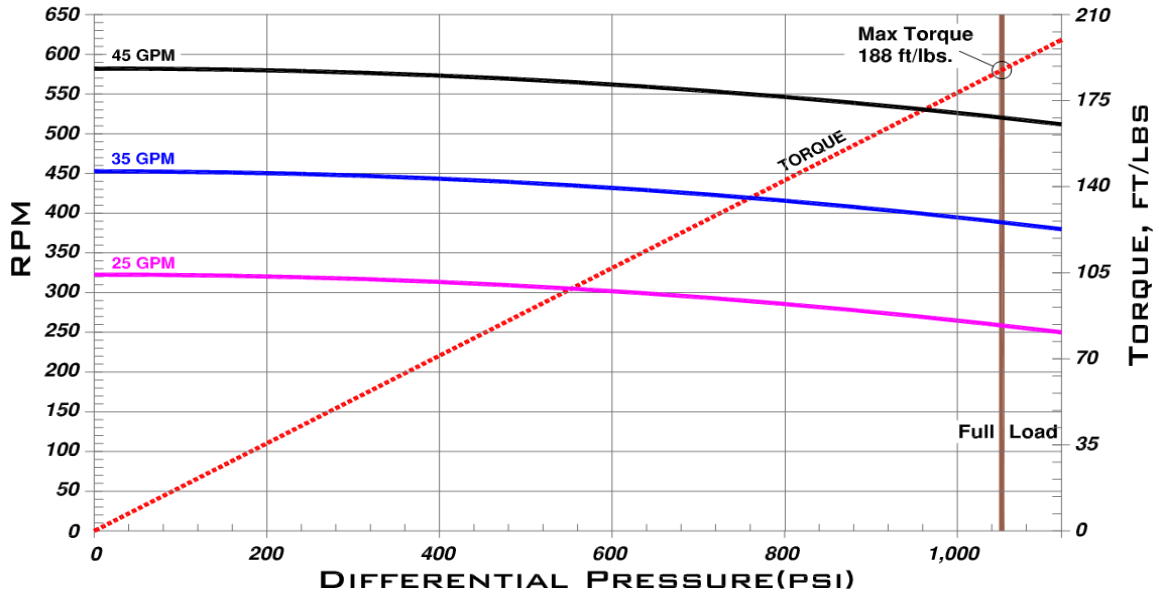
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
Physical Data	Inches	MM		Axial Bearing Load Ratings		
Motor Overall Length	122.00	3,099			lbs	Kg
Motor Weight	36	16		Dynamic Compression/Tension	1,600	**726**
Bearing Assy MU Length	20.75	527		Static Compression/Tension	6,000	**2,722**
Top Connection	1.00" MT	1.00" MT		Max Overpull to Re-Run	6,000	**2,722**
Bit Connection	1.00" MT	1.00" MT		Max Bit Overpull (80%)	55,000	**24,948**
Bit Size	**1-7/8"-2-3/4"**	**47.62-69.85**		**Max Body Overpull (80%)**	**60,972**	**27,657**

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	**Inches**	**MM**		**Stator**	**Inches**	**MM**
Overall Length	65.375	1,661		Overall Length	71	**1,810**
Contour Length	62.375	1,584		Tube O.D.	1.688	**43**
Major Diameter	1.22	30.99		Tube I.D.	1.25	**32**
Minor Diameter	0.873	22		Rubber Cutback-Top	3.5	**89**
Eccentricity	0.07	1.78		Rubber Cutback-Bottom	6.75	**171**
Head O.D.	1.125	29		Stages	2.3	**58**
Weight-lbs (kg)	13	6		Weight-lbs (kg)	14	**6**
Thread Form	**T1 or T2**			**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY						
Flow Range gpm (lpm)	20-50	76-189		Max Diff Pressure-psi (kPa)	1,050	**7,239**
Bit Speed Range (rpm)	323-582	323-582		Stall Diff Pressusre-psi (kPa)	2,783	**19,188**
Torque Slope ft-lbs/psi (nm/kPa)	0.18	0.04		Max Torque ft-lbs (nm)	188	**255**
Rotation Rev/Gal (Rev/liter)	11.64	3.08		Stall Torque ft-lbs (nm)	500	**678**
Off Bottom Pressure-psi (kPa)	**100**	**689**		**Max HP (kW)**	**21**	**16**

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 212SRT2-EW566.0

2.12" 5/6 Lobe, 6.0 Stage

Revision: C 4/5/2016

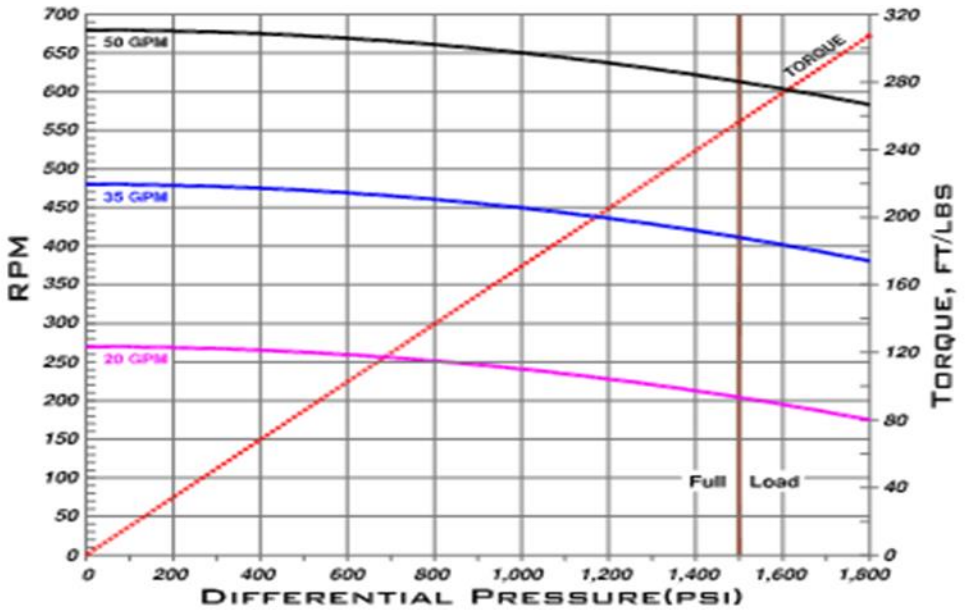
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
Physical Data		Inches	MM	Axial Bearing Load Ratings		
					lbs	Kg
Motor Overall Length	120.50	3,061				
Motor Weight	65	29		Dynamic Compression/Tension	7,000	3,175
Bearing Assy MU Length	25.375	645		Static Compression/Tension	11,000	4,990
Top Connection	1.50" MT	1.50" MT		Max Overpull to Re-Run	11,000	4,990
Bit Connection	1.50" MT	1.50" MT		Max Bit Overpull (80%)	83,000	37,649
Bit Size	2.187-3.25	88.90-114.30		Max Body Overpull (80%)	83,000	37,649

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	Inches	MM		Stator	Inches	MM
Overall Length	79	2,007		Overall Length	88	2,235
Contour Length	77	1,956		Tube O.D.	2.125	54
Major Diameter	1.236	31.39		Tube I.D.	1.75	44
Minor Diameter	0.888	23		Rubber Cutback-Top	5.25	133
Eccentricity	0.087	2.21		Rubber Cutback-Bottom	9.5	241
Head O.D.	1.42	36		Stages	6	152
Weight-lbs (kg)	23	10		Weight-lbs (kg)	33	15
Thread Form	T1 or T2			Thread Form	Contact CTRT	

PERFORMANCE SUMMARY						
Flow Range gpm (lpm)	40-100	151-379		Max Diff Pressure-psi (kPa)	1,300	8,963
Bit Speed Range (rpm)	270-680	270-680		Stall Diff Pressusre-psi (kPa)	2,050	14,134
Torque Slope ft-lbs/psi (nm/kPa)	0.21	0.04		Max Torque ft-lbs (nm)	280	380
Rotation Rev/Gal (Rev/liter)	6.80	1.80		Stall Torque ft-lbs (nm)	430	583
Off Bottom Pressure-psi (kPa)	103	710		Max HP (kW)	89	66

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 212SRT2-PP566.0

2.12" 5/6 Lobe, 6.0 Stage

Revision:B 4/5/2016

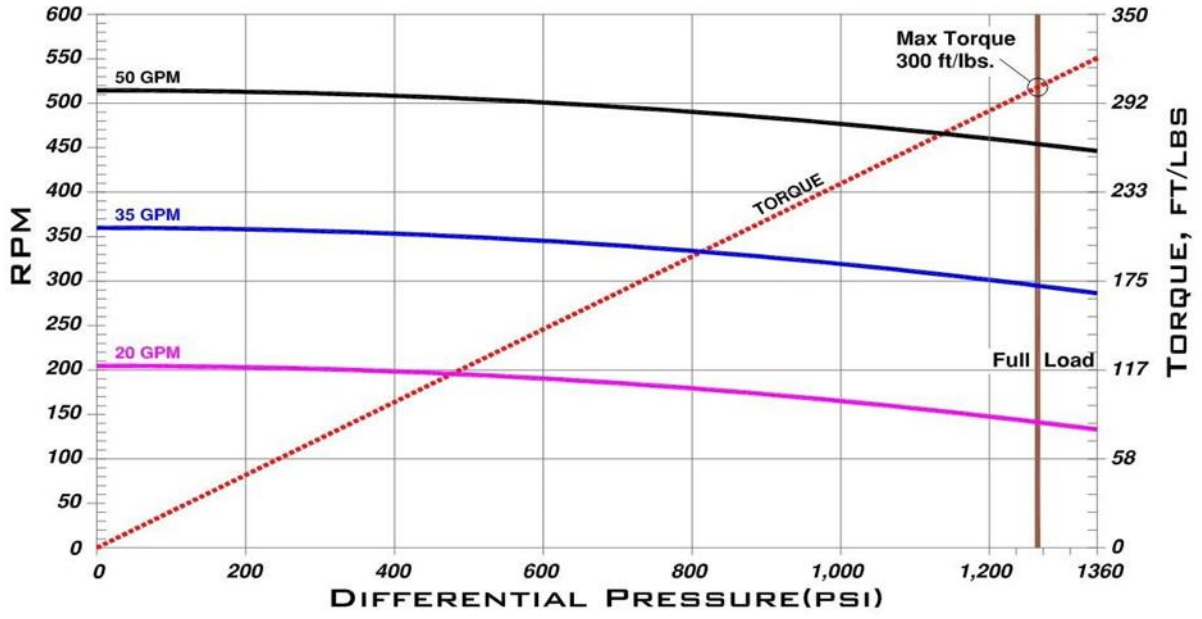
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
PhysicalData		Inches	MM	Axial Bearing Load Ratings		
Motor Overall Length	120.50	3,061			**lbs**	**Kg**
Motor Weight	65	29		Dynamic Compression/Tension	7,000	**3,175**
Bearing Assy MU Length	25.375	645		Static Compression/Tension	11,000	**4,990**
Top Connection	1.50" MT	1.50" MT		Max Overpull to Re-Run	11,000	**4,990**
Bit Connection	1.50" MT	1.50" MT		Max Bit Overpull (80%)	83,000	**37,649**
Bit Size	**2.187-3.25**	**88.90-114.30**		**Max Body Overpull (80%)**	**83,000**	**37,649**

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	**Inches**	**MM**		**Stator**	**Inches**	**MM**
Overall Length	79	2,007		Overall Length	88	**2,235**
Contour Length	77	1,956		Tube O.D.	2.125	**54**
Major Diameter	1.236	31.39		Tube I.D.	1.75	**44**
Minor Diameter	0.888	23		Rubber Cutback-Top	5.25	**133**
Eccentricity	0.087	2.21		Rubber Cutback-Bottom	9.5	**241**
Head O.D.	1.42	36		Stages	6	**152**
Weight-lbs (kg)	23	10		Weight-lbs (kg)	33	**15**
Thread Form	**T1 or T2**			**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY					
Flow Range gpm (lpm)	20-50	76-189	Max Diff Pressure-psi (kPa)	1,275	**8,791**
Bit Speed Range (rpm)	205-515	205-515	Stall Diff Pressusre-psi (kPa)	3,379	**23,297**
Torque Slope ft-lbs/psi (nm/kPa)	0.24	0.05	Max Torque ft-lbs (nm)	300	**407**
Rotation Rev/Gal (Rev/liter)	10.25	2.72	Stall Torque ft-lbs (nm)	795	**1,078**
Off Bottom Pressure-psi (kPa)	**103**	**710**	**Max HP (kW)**	**29**	**22**

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 287SRT2-EW563.5

2-7/8" 5/6 Lobe, 3.5 Stage

Revision:B 4/5/2016

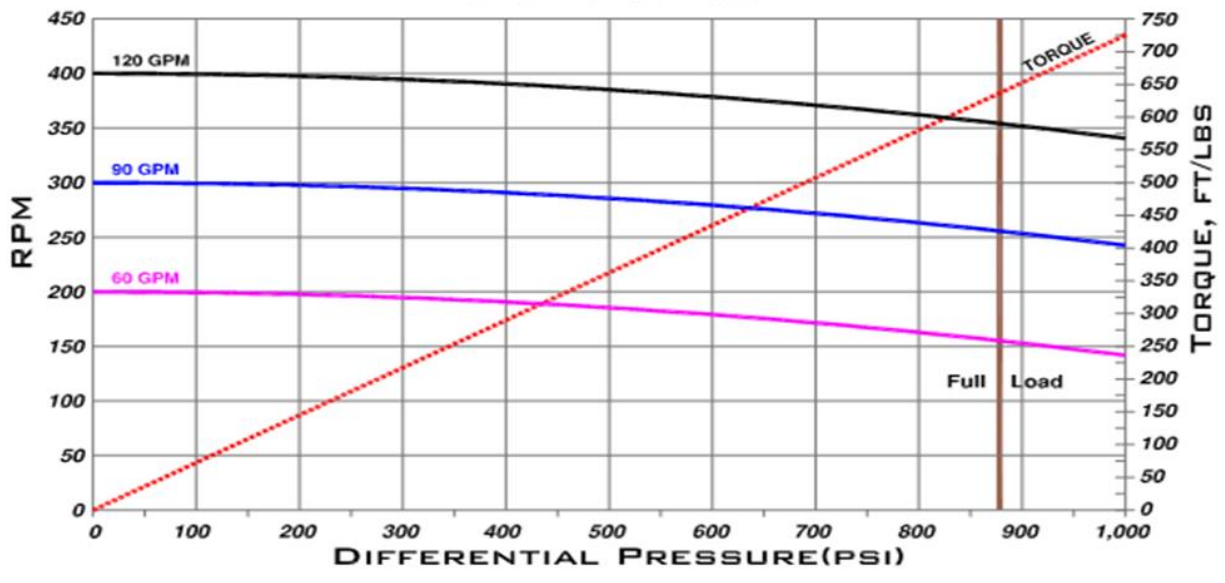
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
Physical Data		Inches	MM	Axial Bearing Load Ratings		
					lbs	Kg
Motor Overall Length	133.00	3,378		Dynamic Compression/Tension	10,000	4,536
Motor Weight	198	90		Static Compression/Tension	14,000	6,350
Bearing Assy MU Length	37	940		Max Overpull to Re-Run	14,000	6,350
Top Connection	2-3/8"PAC	2-3/8" PAC		Max Bit Overpull (80%)	156,000	70,762
Bit Connection	2-3/8"PAC	2-3/8" PAC		Max Body Overpull (80%)	158,824	72,043
Bit Size	3.50-4.50	88.90-114.30				

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	Inches	MM		Stator	Inches	MM
Overall Length	89	2,261		Overall Length	99	2,502
Contour Length	86	2,184		Tube O.D.	2.875	73
Major Diameter	1.65	41.91		Tube I.D.	2.375	60
Minor Diameter	1.65	42		Rubber Cutback-Top	7.375	187
Eccentricity	0.118	3.00		Rubber Cutback-Bottom	8.5	216
Head O.D.	1.77	45		Stages	3.5	89
Weight-lbs (kg)	45	20		Weight-lbs (kg)	67	30
Thread Form	T1 or T2			Thread Form	Contact CTRT	

PERFORMANCE SUMMARY						
Flow Range gpm (lpm)	60-126	227-477		Max Diff Pressure-psi (kPa)	883	6,088
Bit Speed Range (rpm)	60-126	200-400		Stall Diff Pressusre-psi (kPa)	1,324	9,129
Torque Slope ft-lbs/psi (nm/kPa)	0.83	0.16		Max Torque ft-lbs (nm)	740	1,003
Rotation Rev/Gal (Rev/liter)	3.17	0.84		Stall Torque ft-lbs (nm)	1,100	1,491
Off Bottom Pressure-psi (kPa)	22	152		Max HP (kW)	105	78

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 287SRT2-PP563.5

2-7/8" 5/6 Lobe, 3.5 Stage

Revision:B 4/5/2016

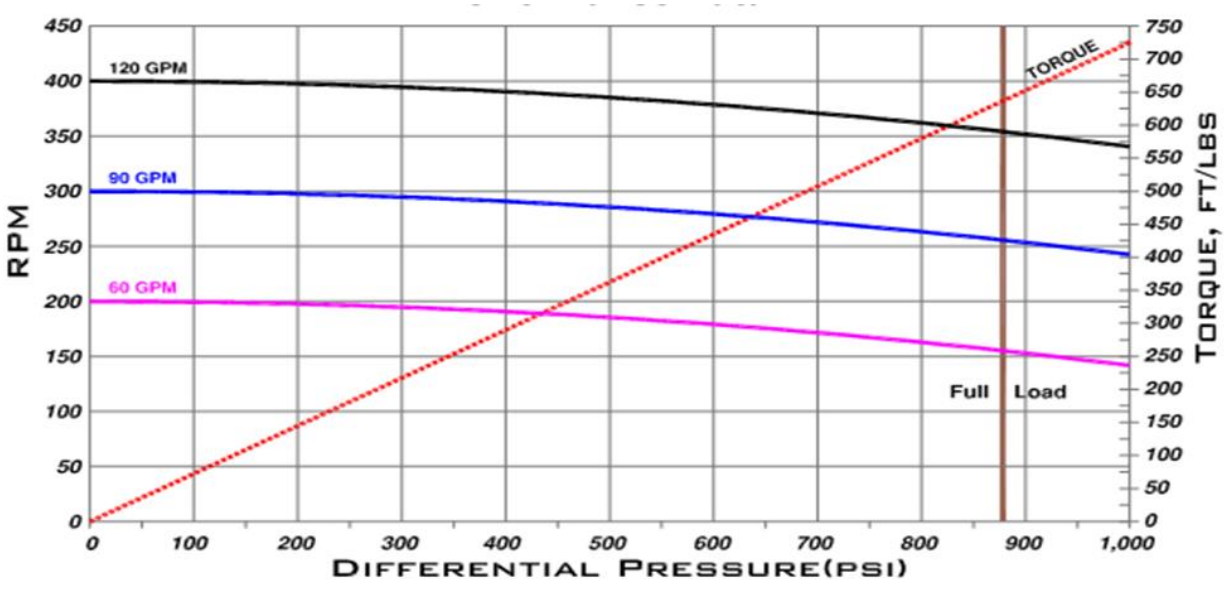
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
PhysicalData		Inches	MM	Axial Bearing Load Ratings		
					lbs	Kg
Motor Overall Length	133.00	3,378				
Motor Weight	198	90		Dynamic Compression/Tension	10,000	**4,536**
Bearing Assy MU Length	37	940		Static Compression/Tension	14,000	**6,350**
Top Connection	2-3/8"PAC	2-3/8" PAC		Max Overpull to Re-Run	14,000	**6,350**
Bit Connection	2-3/8"PAC	2-3/8" PAC		Max Bit Overpull (80%)	156,000	**70,762**
Bit Size	**3.50-4.50**	**88.90-114.30**		**Max Body Overpull (80%)**	**158,824**	**72,043**

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	**Inches**	**MM**		**Stator**	**Inches**	**MM**
Overall Length	89	2,261		Overall Length	99	**2,502**
Contour Length	86	2,184		Tube O.D.	2.875	**73**
Major Diameter	1.65	41.91		Tube I.D.	2.375	**60**
Minor Diameter	0	0		Rubber Cutback-Top	7.375	**187**
Eccentricity	0.118	3.00		Rubber Cutback-Bottom	8.5	**216**
Head O.D.	1.77	45		Stages	3.5	**89**
Weight-lbs (kg)	45	20		Weight-lbs (kg)	67	**30**
Thread Form	**T1 or T2**			**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY					
Flow Range gpm (lpm)	60-126	227-477	Max Diff Pressure-psi (kPa)	757	**5,219**
Bit Speed Range (rpm)	60-126	186-391	Stall Diff Pressusre-psi (kPa)	2,006	**13,831**
Torque Slope ft-lbs/psi (nm/kPa)	0.62	0.12	Max Torque ft-lbs (nm)	472	**640**
Rotation Rev/Gal (Rev/liter)	3.10	0.82	Stall Torque ft-lbs (nm)	1,251	**1,696**
Off Bottom Pressure-psi (kPa)	**95**	**655**	**Max HP (kW)**	**75**	**56**

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 287SRT2-PP.BT564.7

2-7/8" 5/6 Lobe, 3.5 Stage

Revision:B 4/5/2016

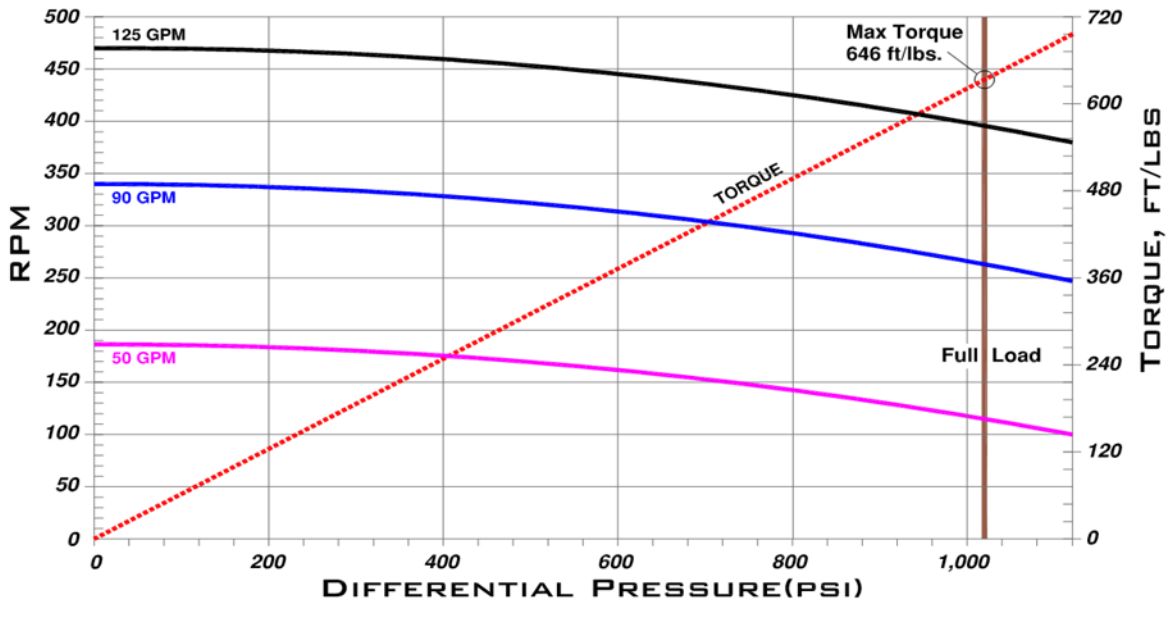
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
Physical Data		Inches	MM	Axial Bearing Load Ratings		
					lbs	Kg
Motor Overall Length	143.50	3,645				
Motor Weight	185	84		Dynamic Compression/Tension	10,000	**4,536**
Bearing Assy MU Length	37	940		Static Compression/Tension	14,000	**6,350**
Top Connection	2-3/8"PAC	2-3/8" PAC		Max Overpull to Re-Run	14,000	**6,350**
Bit Connection	2-3/8"PAC	2-3/8" PAC		Max Bit Overpull (80%)	156,000	**70,762**
Bit Size	**3.50-4.50**	**88.90-114.30**		**Max Body Overpull (80%)**	**158,824**	**72,043**

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	Inches	MM		Stator	Inches	MM
Overall Length	92	2,337		Overall Length	102	**2,578**
Contour Length	85	2,159		Tube O.D.	2.875	**73**
Major Diameter	1.909	48.49		Tube I.D.	2.375	**60**
Minor Diameter	0	0		Rubber Cutback-Top	4	**102**
Eccentricity	0.136	3.45		Rubber Cutback-Bottom	11.81	**300**
Head O.D.	1.875	48		Stages	4.7	**119**
Weight-lbs (kg)	55	25		Weight-lbs (kg)	70	**32**
Thread Form	**T1 or T2**			**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY						
Flow Range gpm (lpm)	60-126	189-556		Max Diff Pressure-psi (kPa)	1,020	**7,033**
Bit Speed Range (rpm)	50-147	188-533		Stall Diff Pressusre-psi (kPa)	2,703	**18,637**
Torque Slope ft-lbs/psi (nm/kPa)	0.63	0.12		Max Torque ft-lbs (nm)	646	**876**
Rotation Rev/Gal (Rev/liter)	3.63	0.96		Stall Torque ft-lbs (nm)	1,712	**2,321**
Off Bottom Pressure-psi (kPa)	**57**	**393**		**Max HP (kW)**	**100**	**75**

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 312SRT2-BT563.5
3.12" 5/6 Lobe, 3.5 Stage
Revision: D 7/25/2017

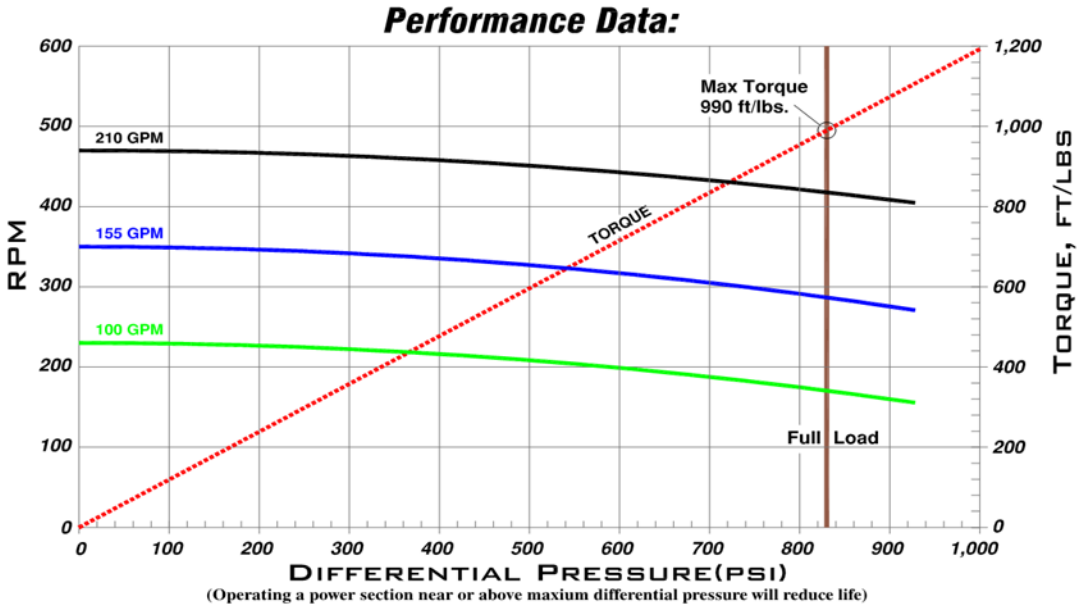
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
Physical Data	Inches	MM		Axial Bearing Load Ratings	lbs	Kg
Motor Overall Length	146.50	3,721				
Motor Weight	185	84		Dynamic Compression/Tension	12,000	**5,443**
Bearing Assy MU Length	42.75	1,086		Static Compression/Tension	36,000	**16,330**
Top Connection	2-3/8" Reg	2-3/8" Reg		Max Overpull to Re-Run	36,000	**16,330**
Bit Connection	2-3/8" Reg	2-3/8" Reg		Max Bit Overpull (80%)	145,000	**65,772**
Bit Size	**3.5"-4.5"**	**88.9-114.3**		**Max Body Overpull (80%)**	**182,000**	**82,555**

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	**Inches**	**MM**		**Stator**	**Inches**	**MM**
Overall Length	77.5	1,969		Overall Length	88.00	**2,235**
Contour Length	75.5	1,918		Tube O.D.	3.13	**80**
Major Diameter	2.174	55.22		Tube I.D.	2.63	**67**
Minor Diameter	0.000	0.000		Rubber Cutback-Top	4.00	**102**
Eccentricity	0.156	3.96		Rubber Cutback-Bottom	9.50	**241**
Head O.D.	2.18	55.25		Stages	3.5	**89**
Weight-lbs (kg)	80	36		Weight-lbs (kg)	72	**33**
Thread Form	**T1 or T2**			**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY						
Flow Range gpm (lpm)	100-210	380-795		Max Diff Pressure-psi (kPa)	830	**5,723**
Bit Speed Range (rpm)	230-470	230-470		Stall Diff Pressusre-psi (kPa)	1,300	**8,963**
Torque Slope ft-lbs/psi (nm/kPa)	1.20	0.24		Max Torque ft-lbs (nm)	990	**1,342**
Rotation Rev/Gal (Rev/liter)	2.25	0.59		Stall Torque ft-lbs (nm)	1,560	**2,115**
Off Bottom Pressure-psi (kPa)	**90**	**621**		**Max HP (kW)**	**125**	**93**

PERFORMANCE



(Operating a power section near or above maxium differential pressure will reduce life)

CTRT
"Downhole Tool Solutions"

PN: 312SRT2-BT782.5

3.12" 7/8 Lobe, 2.5 Stage

Revision: A 6/4/2017

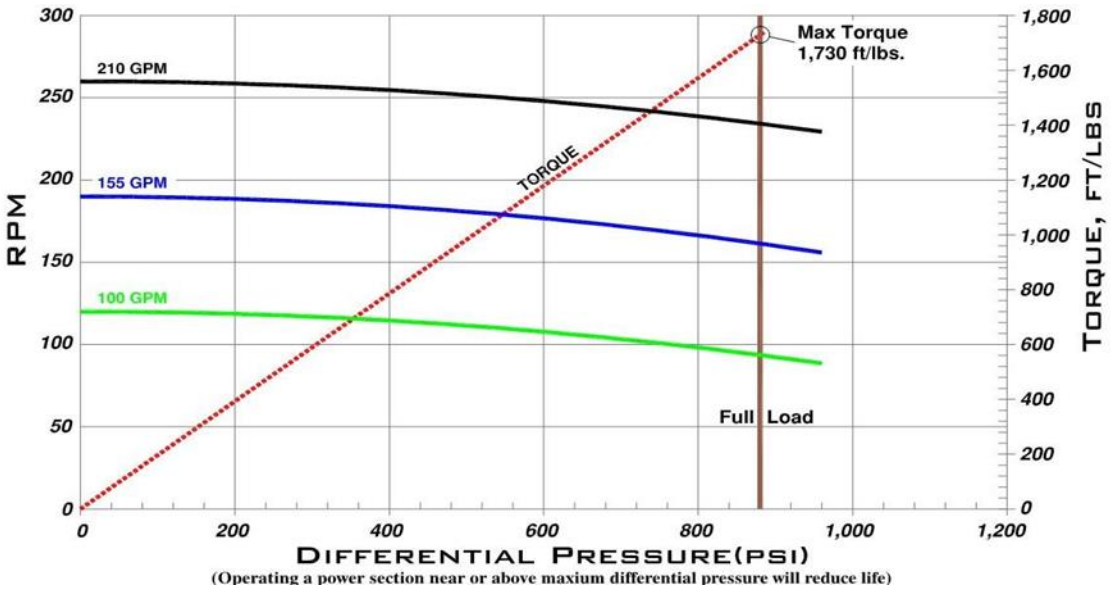
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
PhysicalData		Inches		MM	Axial Bearing Load Ratings	
Motor Overall Length	153.50	3,899			**lbs**	**Kg**
Motor Weight	235	107		Dynamic Compression/Tension	12,000	**5,443**
Bearing Assy MU Length	42.75	1,086		Static Compression/Tension	36,000	**16,330**
Top Connection	2-3/8" Reg	2-3/8" Reg		Max Overpull to Re-Run	36,000	**16,330**
Bit Connection	2-3/8" Reg	2-3/8" Reg		Max Bit Overpull (80%)	145,000	**65,772**
Bit Size	**4-1/8"-5-1/2"**	**104.7-139.7**		**Max Body Overpull (80%)**	**182,000**	**82,555**

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	**Inches**	**MM**		**Stator**	**Inches**	**MM**
Overall Length	89.25	2,267		Overall Length	99.87	**2,537**
Contour Length	86.5	2,197		Tube O.D.	3.13	**80**
Major Diameter	2.12	53.85		Tube I.D.	2.63	**67**
Minor Diameter	0.000	0.000		Rubber Cutback-Top	7.12	**181**
Eccentricity	0.122	3.10		Rubber Cutback-Bottom	9.87	**251**
Head O.D.	2.05	51.94		Stages	2.5	**64**
Weight-lbs (kg)	58	26		Weight-lbs (kg)	64	**29**
Thread Form	**T1 or T2**			**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY						
Flow Range gpm (lpm)	100-210	379-795		Max Diff Pressure-psi (kPa)	880	**6,067**
Bit Speed Range (rpm)	144-303	144-303		Stall Diff Pressusre-psi (kPa)	940	**6,481**
Torque Slope ft-lbs/psi (nm/kPa)	1.97	0.39		Max Torque ft-lbs (nm)	1,730	**2,346**
Rotation Rev/Gal (Rev/liter)	1.24	0.33		Stall Torque ft-lbs (nm)	1,850	**2,508**
Off Bottom Pressure-psi (kPa)	**60**	**414**		**Max HP (kW)**	**108**	**81**

PERFORMANCE



(Operating a power section near or above maxium differential pressure will reduce life)

CTRT
"Downhole Tool Solutions"

PN: 312SRT2-PP783.0

3.12" 7/8 Lobe, 3.0 Stage

Revision: D 4/5/2016

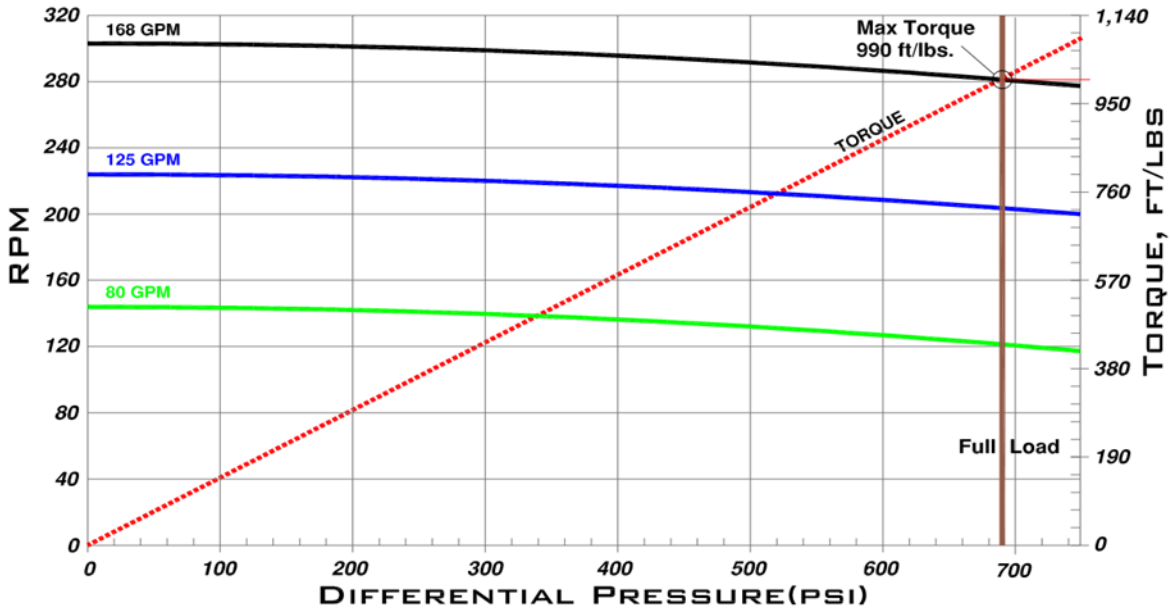
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
Physical Data	Inches	MM		Axial Bearing Load Ratings		
					lbs	Kg
Motor Overall Length	159.00	4,039				
Motor Weight	235	107		Dynamic Compression/Tension	12,000	5,443
Bearing Assy MU Length	42.75	1,086		Static Compression/Tension	36,000	16,330
Top Connection	2-3/8" Reg	2-3/8" Reg		Max Overpull to Re-Run	36,000	16,330
Bit Connection	2-3/8" Reg	2-3/8" Reg		Max Bit Overpull (80%)	145,000	65,772
Bit Size	4-1/8"-5-1/2"	104.7-139.7		Max Body Overpull (80%)	182,000	82,555

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	Inches	MM		Stator	Inches	MM
Overall Length	95.5	2,426		Overall Length	106.00	2,692
Contour Length	93	2,362		Tube O.D.	3.13	80
Major Diameter	1.971	50.06		Tube I.D.	2.63	67
Minor Diameter	0.000	0.000		Rubber Cutback-Top	5.50	140
Eccentricity	0.109	2.77		Rubber Cutback-Bottom	9.50	241
Head O.D.	2.05	51.94		Stages	3	76
Weight-lbs (kg)	70	32		Weight-lbs (kg)	72	33
Thread Form	T1 or T2			Thread Form	Contact CTRT	

PERFORMANCE SUMMARY						
Flow Range gpm (lpm)	80-168	303-636		Max Diff Pressure-psi (kPa)	690	4,757
Bit Speed Range (rpm)	144-303	144-303		Stall Diff Pressusre-psi (kPa)	1,829	12,611
Torque Slope ft-lbs/psi (nm/kPa)	1.43	0.28		Max Torque ft-lbs (nm)	990	1,342
Rotation Rev/Gal (Rev/liter)	2.25	0.48		Stall Torque ft-lbs (nm)	2,624	3,558
Off Bottom Pressure-psi (kPa)	194	1,338		Max HP (kW)	68	51

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 375SRT2-RP453.5

3.75" 4/5 Lobe, 3.5 Stage

Revision:B 4/5/2016

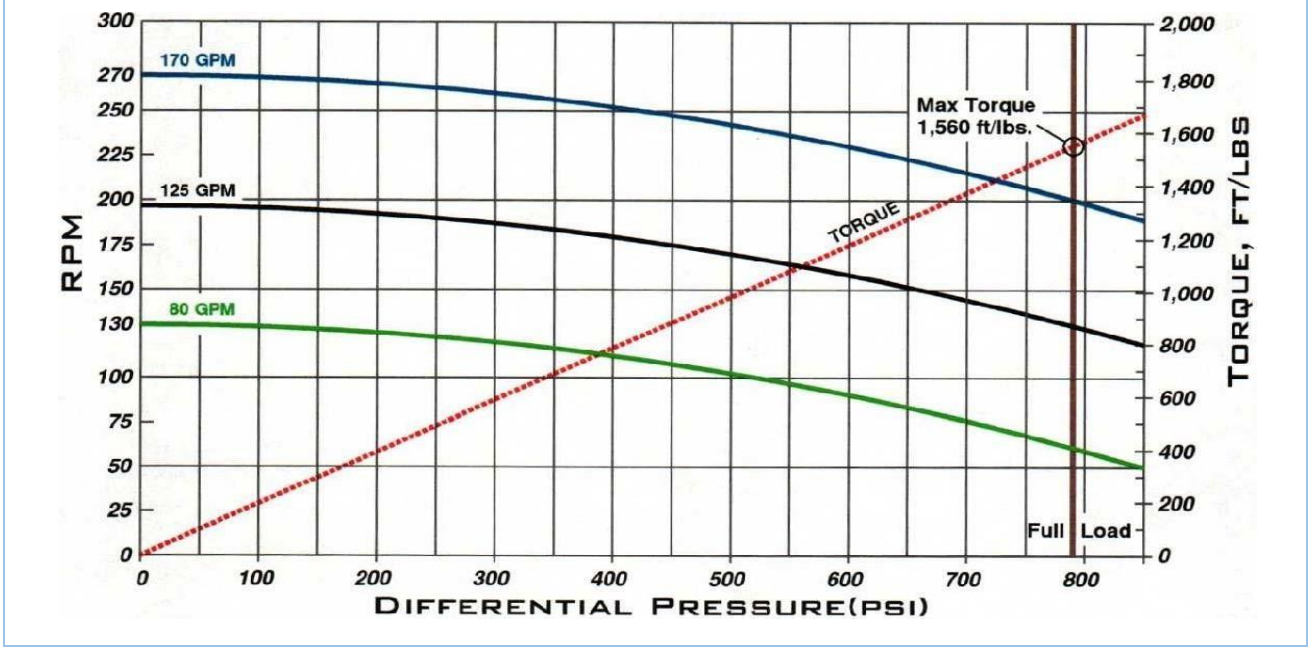
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
PhysicalData		Inches		MM	Axial Bearing Load Ratings	
Motor Overall Length	190.00	4,826			**lbs**	**Kg**
Motor Weight	325	147		Dynamic Compression/Tension	20,600	**9,344**
Bearing Assy MU Length	45	1,143		Static Compression/Tension	75,000	**34,020**
Top Connection	2-7/8" Reg	2-7/8" Reg		Max Overpull to Re-Run	75,000	**34,020**
Bit Connection	2-7/8" Reg	2-7/8" Reg		Max Bit Overpull (80%)	232,000	**105,235**
Bit Size	**4-1/8"-5-1/2"**	**104.7-139.7**		**Max Body Overpull (80%)**	**264,000**	**119,750**

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	**Inches**	**MM**		**Stator**	**Inches**	**MM**
Overall Length	129	3,277		Overall Length	135.00	**3,429**
Contour Length	124	3,150		Tube O.D.	3.75	**95**
Major Diameter	2.136	54.25		Tube I.D.	3.00	**76**
Minor Diameter	0.000	0.000		Rubber Cutback-Top	6.00	**152**
Eccentricity	0.178	4.52		Rubber Cutback-Bottom	6.00	**152**
Head O.D.	2.00	50.80		Stages	3.5	**89**
Weight-lbs (kg)	125	57		Weight-lbs (kg)	177	**80**
Thread Form	**T1 or T2**			**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY						
Flow Range gpm (lpm)	80-170	303-643		Max Diff Pressure-psi (kPa)	790	**5,447**
Bit Speed Range (rpm)	130-270	130-270		Stall Diff Pressusre-psi (kPa)	1,190	**8,205**
Torque Slope ft-lbs/psi (nm/kPa)	1.95	0.38		Max Torque ft-lbs (nm)	1,560	**2,115**
Rotation Rev/Gal (Rev/liter)	1.59	0.42		Stall Torque ft-lbs (nm)	2,320	**3,145**
Off Bottom Pressure-psi (kPa)	**75**	**517**		**Max HP (kW)**	**106**	**79**

PERFORMANCE



CTRT
"Downhole Tool Solutions"

PN: 338SRT2-BT563.5

3.38" 5/6 Lobe, 3.5 Stage
Revision:A 7/19/2018

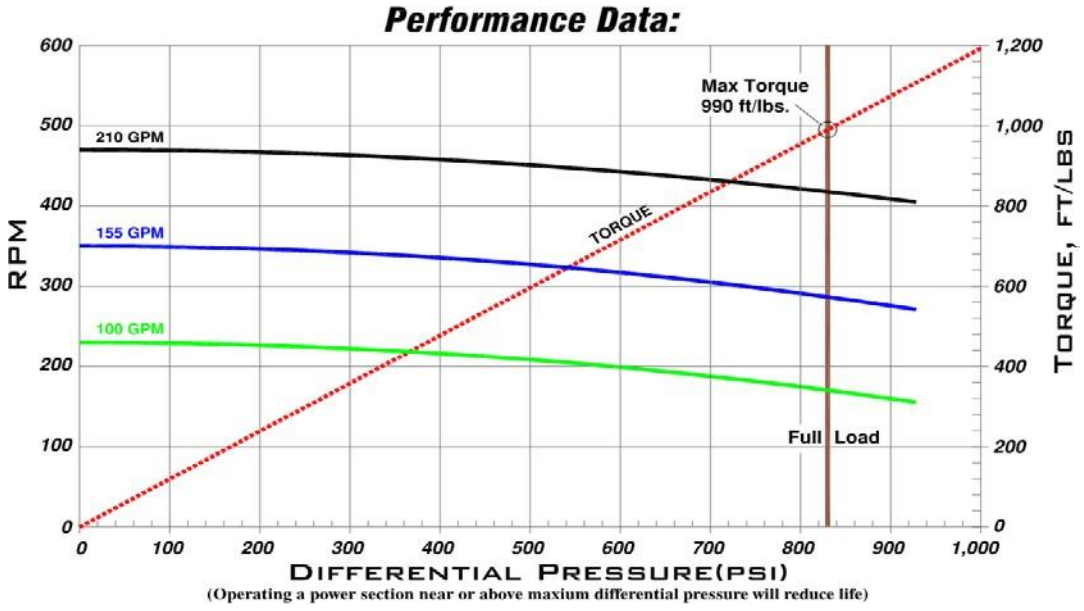
SRT-G2 THRU TUBING DRILL MOTOR SPECIFICATION						
Physical Data	**Inches**	**MM**		Axial Bearing Load Ratings		
					lbs	**Kg**
Motor Overall Length	162.00	4,115				
Motor Weight	205	93		Dynamic Compression/Tension	13,250	**6,010**
Bearing Assy MU Length	58.25	1,480		Static Compression/Tension	36,650	**16,624**
Top Connection	2-3/8" Reg	2-3/8" Reg		Max Overpull to Re-Run	36,650	**16,624**
Bit Connection	2-3/8" Reg	2-3/8" Reg		Max Bit Overpull (80%)	232,000	**105,235**
Bit Size	**4.25"-5.87"**	**107.95-149.10**		**Max Body Overpull (80%)**	**230,000**	104,328

Note: Load ratings can vary with different bit styles based on aggressive to non-aggressive

POWER SECTION SPECIFICATIONS						
Rotor	**Inches**	**MM**		**Stator**	**Inches**	**MM**
Overall Length	77.5	1,969		Overall Length	88.00	**2,235**
Contour Length	75.5	1,918		Tube O.D.	3.13	**80**
Major Diameter	2.174	55.22		Tube I.D.	2.63	**67**
Minor Diameter	0.000	0.000		Rubber Cutback-Top	4.00	**102**
Eccentricity	0.156	3.96		Rubber Cutback-Bottom	9.50	**241**
Head O.D.	2.18	55.25		Stages	3.5	**89**
Weight-lbs (kg)	80	36		Weight-lbs (kg)	72	**33**
Thread Form	**T1 or T2**			**Thread Form**	**Contact CTRT**	

PERFORMANCE SUMMARY					
Flow Range gpm (lpm)	100-210	380-795	Max Diff Pressure-psi (kPa)	830	**5,723**
Bit Speed Range (rpm)	230-470	230-470	Stall Diff Pressusre-psi (kPa)	1,300	**8,963**
Torque Slope ft-lbs/psi (nm/kPa)	1.20	0.24	Max Torque ft-lbs (nm)	990	**1,342**
Rotation Rev/Gal (Rev/liter)	2.25	0.59	Stall Torque ft-lbs (nm)	1,560	**2,115**
Off Bottom Pressure-psi (kPa)	**90**	**621**	**Max HP (kW)**	**125**	**93**

PERFORMANCE



(Operating a power section near or above maxium differential pressure will reduce life)

"Opti-DRILL"™ DOWNHOLE
Thru-Tubing Sealed Performance Motor (1.50" – 2.87")

The Patented "Opti-DRILL"™ Downhole Thru-Tubing Motor features a wide range of torque, speed, and flow rates to convert hydraulic fluid energy, created by flow and pressure, into mechanical energy. The "Opti-DRILL"™ was designed for optimal performance with today's higher torque power sections and an optional bearing assembly that is sealed for internal lubrication but will operate as a mud lubricated system if loss of seal occurs. This positive displacement motor produces optimum power output with maximum efficiency for today's Thru-Tubing Drilling demands.

DESIGN ADVANTAGES & BENEFITS

The "Opti-DRILL"™ incorporates a HTH™, *High Torque Hex Connection* that connects the bit box to the drive shaft to eliminate galling, cross threading, stress risers and ultimately a failed connection. The HTH Connection provides greater torque and over pull loads than those associated with current drilling motors using threaded connections.

The "Opti-DRILL"™ utilizes an internal piston inside a grease filled housing that keeps the internal components well lubricated through the drilling operation. The sealing medium used is a simple high temperature grease product instead of oil.

We have designed into the "Opti-DRILL"™, catch systems at the top sub and the bearing mandrel that keeps the tool intact in the event of a drive shaft failure. The significant increase in internal and external cross sectional wall thicknesses enables the "Opti-DRILL"™ to provide significant strength improvements throughout the length of the bearing assembly.

Through value added engineering, the "Opti-DRILL"™ is truly the next generation of sealed downhole motors. It is simply the easiest sealed bearing assembly to assemble and most reliable the market today.

TRANSMISSION

The motor's single-piece flexible shaft is the simplest and the most reliable transmission for standard applications in a small-diameter motor. The transmission incorporates the flex shaft and the flow diverter into a single piece unit for ease of assembly.

BEARING ASSEMBLY

The "Opti-DRILL™ Downhole Motor's bearing assembly is well suited for weight on bit, side loading, and over pulls. It utilizes an upper bearing stack for weight on bit in drilling mode and a lower bearing stack for off-bottom operation. It does not use a two piece (Inner/Outer) bearing assembly associated with today's current drilling motors, but rather a single unison bearing assembly. This bearing assembly is designed optionally for a sealed bearing system and in the case of a failed seal, will run more like a mud lubricated motor. It does not use needle type thrust bearings that will fail in the event of lost sealing.

POWER SECTION

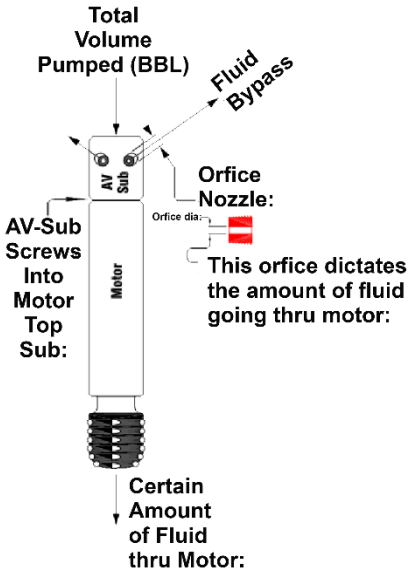
The power section consists of a steel rotor, and an elastomeric lined stator tailored to the planned well intervention whether it is a high temperature application or an aggressive fluid application. The "Opti- DRILL"™ bearing assembly can be adapted to any manufacturer's rotor and stator.

AV (Annular Velocity) By-Pass Sub

The CTRT **AV By-Pass Sub** is designed to run on top the SRT™ Drilling Motor. It allows fluid to bypass through the selected nozzles when excessive fluid rates are pumped down the string for maximum operational efficiency of the drilling motor. With increased pump rates, cuttings will return to surface more effectively. The interchangeable orifice nozzles will dictate how much fluid runs through the drilling motor.

DESIGN ADVANTAGES & BENEFITS

- Incorporates designed machined nozzles that minimizes flow cut.
- High tensile strength materials to match that of SRT™ Drill Motor.
- Increased cutting returns to surface to clear bit.
- Replaceable nozzle kits in standard or customer flow rates.



SIZES

The AV Bypass Subs are available from 1.50" to 3.75" diameters with any connection of choice.

Contact your CTRT representative who can assist in nozzle configuration to meet your most demanding requirements.

Tool O.D.	Min I.D.	Makeup Length	Nozzles per Tool	By Pass Rate	Connection (Box/Pin)
1.688"	.625"	6.25"	3	Call	**1.00" CS or MT**
2.125"	.750"	6.25"	3	Call	**1.25 CS or 1.50 MT**
2.875"	1.00"	6.75"	3	Call	**2-3/8" PAC**
3.125"	1.00"	7.00"	3	Call	**2-3/8" PAC, API Reg**
3.500"	1.00"	7.00"	3	Call	**2-3/8" API Reg**
3.750	**1.25"**	**7.50"**	**3**	**Call**	**2-7/8" API Reg**

Note: Nozzle bypass calculations are based on new power section differential pressures as published by individual manufacturer for each lobe/stage configuration and may vary depending on rotor/stator fit after multiple runs.

Bit Diverter Sub

The CTRT **Bit Diverter Sub** is designed to run below the SRT™ Drilling Motor with the drill bit threading into the **Bit Diverter Sub**. The sub creates a pressure differential through the use of a nozzle configuration that can create a balanced or unbalanced bypass through the selected nozzles to maximum cutting returns from the drilling motor. The interchangeable orfice nozzles will dictate how much fluid runs through to the bit or is directed away from the bit.

DESIGN ADVANTAGES & BENEFITS

- Incorporates designed machined nozzles that minimizes flow cut.
- High tensile strength materials to match that of SRT™ Drill Motor.
- Increased cutting returns to surface to clear bit.
- Replaceable nozzle in standard or customer flow rates.

SIZES

The Diverter Bit Subs are available from 1.50" to 3.75" diameters with any connection of choice.

Contact your CTRT representative who can assist in nozzle configuration to meet your most demanding requirements.

Multi Jet Bi-Directional Spinning Wash Tool

The CTRT Multi Jet Bi-Directional Spinning Wash Tool is designed to run in both a cleanout and circulating operation when washing the inside of tubing. The jetting action rotates in a continuous 360° action. It allows pressurized fluid through selected multi-pattern nozzles to remove scale of tubing obstruction to optimize well flow. The volume and speed of fluid can be modified based on engineering specifications or customer requirements thru numerous jetting options.

The center housing rotates on bearings through applied fluid pressure within an internal cavity. The mandrel O.D. of the box connection, by design, is larger than the rotational housing to minimize rotational stalls throughout the well cleanout process. Nozzles are positioned at strategic compound angles to maximize scale removal.

DESIGN ADVANTAGES & BENEFITS

- Incorporates designed nozzles that minimizes flow cut.
- High tensile stainless materials that resist corrosion.
- Replaceable nozzles in standard or customer flow rates
- Bi-Directional Up & Down jetting pattern

Technical Specifications

O.D.	Length	Rotational Nozzles	Center Static Nozzle	Connection
1.25"	6.50"	(12) @ .047" or .063"	(1) @ .047" or .063"	3/4" MMT or CS
1.69"	7.75"	(12) @ .063" or .078"	(1) @ .063" or .078"	1.00" MT or CS
2.12"	9.00"	(12) @ .078" or .093"	(1) @ .078" or .093"	1.50" MT or 1.25" CS
2.87"	11.25"	(16) @ .078",.093",.109"	(1) @ .078",.093",.109"	2-3/8" PAC
3.12"	11.25"	(20) @ .078",.093",.109"	(1) @ .078",.093",.109"	2-3/8" Reg or PAC

Note: Rotational nozzles are evenly split bi-directionally

Contact your CTRT representative who can assist in nozzle configuration to meet your most demanding requirements.

Non-Rotational Jetting Wash Nozzles Multi-Port & Full Bore

The CTRT **Jetting Wash Nozzles** are designed to run in tandem with a wash package. Fluid flow is jetted through the selected fix nozzles diameter. A full bore nozzle is primarily designed for the placement of slurry during shut-off operations. The multi-port nozzle is designed to give full radial coverage over the completion tubular during well intervention operations.

Porting can be manufactured in any combination with port sizes to match optimum performance including fluid diverted up, down, 90 degree side, angled jetting or customer specific flow rates and pattern.

DESIGN ADVANTAGES & BENEFITS

- Simple robust design
- Optimal nozzle port size to maximize clean-out requirements

SIZES

The wash nozzles are available from 1.25" to 3.75" diameters with any connection of choice.

Contact your CTRT representative who can assist in nozzle configuration to meet your most demanding requirements.

Hydraulic Bow Spring Centralizer

The CTRT **Hydraulic Bow Spring Centralizer** has been designed to pass through restricted bores such as production tubing, packers and nipples, then expand and centralize inside the casing and stabilize bottom hole assembly, to assist in drilling, fishing, underreaming, or wash over operations. This relatively large expansion is generally not within the operating range of conventional fixed centralizers.

The flow activated Bow Spring Centralizer operates in a retracted position until the designed pressure differential is reached across the tool to expand to centralizing operations against the casing wall to stabilize tool string. As flow rate is decreased and differential pressure is reduced, the bow springs will collapse and the bottom-hole assembly can be pulled from hole.

The expandable bow springs or centralizing arms are mounted above a coil spring to allow the necessary designed movement required in order to pass through restrictions. Care should be taken when running in and out of these restrictions so as to prevent any damage to the bow springs.

DESIGN ADVANTAGES & BENEFITS

- Centralizes tool string to prevent side loading in large tubing diameters
- Full flow through bore with optional choke nozzles for modified expansion activation pressures
- Large expansion rating with small run-in diameter

Technical Specifications

TOOL O.D.	TOOL I.D.	MAKE-UP LENGTH	EXPANSION RANGE	PSI RANGE TO ACTIVATE	THREAD TYPE
1.69"	.510"	40"	1-11/16" - 6.50"	300-1200 PSI	**1.00" MT or CS**
2.12"	.750"	40	2-1/8" - 7.00"	500-1000 PSI	**1.50" MT or 1.25" CS**
2.87"	1.00"	47"	2-7/8" - 8.50"	500-650 PSI	**2-3/8" PAC**
3.12"	**1.00"**	**45"**	**3-1/8" - 8.00"**	**500-1000 PSI**	**2-3/8" REG**

Integrated Centralizer

The CTRT **Integrated Centralizer** is designed to allow the disassembly of the fluted blade section to accommodate various blade O.D.'s in one tool. The integrated centralizer provides general stability of a tool string in tubing in drilling or fishing operations.

The centralizer is a full flow through bore to allow passage of drop balls. The bladed centralizer slides over the upper mandrel that is threaded into the lower sub and locked into place. This allows easy change out of the bladed section only to allow the option of many O.D. sizes to be used. The blades can be turned to size for any centralization requirement.

DESIGN ADVANTAGES & BENEFITS

- Three piece construction with locked in fluted blade
- Reduce cost by changing bladed centralizer only
- Full flow through bore

Technical Specifications

Tool O.D.	Tool I.D.	Makeup Length	Overpull Yield	Connection
1.688"			00,000 lbs	**1.00" MT or CS**
2.125"			00,000 lbs	**1.50 MT or 1.25 CS**
2.875"			000,000 lbs	**2-3/8" PAC**
3.125"			**000,000 lbs**	**2-3/8" PAC, API Reg**

Note: The strength calculations are considered accurate within +/- 20%and are to be used only as a guide. They do not constitute any actual or implied warranty or guarantee.

1.38", 1.69" & 2.12" "Slammer"®
IMPACT HAMMER

The CTRT **"Slammer"**® Impact Drill-Jar features a wide range of speed, impact force, and flow rates to convert hydraulic fluid energy, created by flow and pressure, into mechanical energy. This positive displacement impact drill produces optimum power output with maximum efficiency for today's tough thru-tubing demands.

Primary applications for the **"Slammer"**® is removal of scale, gravel, resin sand, paraffin, breaking ceramic disks and drilling in high temperature and H2S wells.

TRANSMISSION

The **"Slammer"**® has a single-piece non-flexible shaft; it is the simplest and the most reliable transmission for standard applications in a small-diameter impact drill.

POWER SECTION

The power section consists of no rubber components or chromed steel rotors. The advantage of eliminating these fragile, high cost parts is obvious. Operators are not limited to only liquid as a circulating medium, but rather can use nitrogen, foam, diesel, zylene, and *HcL (in hostile environment tool), and light bodied fluids up to 12#. The **"Slammer"**® is tailored to the planned well intervention whether it is a high temperature application or an aggressive fluid application. The **"Slammer"**® can be used in temperatures up to 700 degrees as well as in H2S, HcL, and carbonic acid environments.

BEARING ASSEMBLY

The **"Slammer"**® Impact Drill Jar's bearing assembly is well suited for weight on bit, side loading, and over pulls. Non-typical bearings are used and therefore conventional problems with lubrication failure and overheating are eliminated.

Especificaciones

DESIGNATION	FLOW RANGE (GPM)	HITS PER MINUTE (HPM)	TOOL OPERATING RANGE (PSI)
1-3/8"	10-40	70-800	300-1500
1-11/16"	11-50	60-700	500-2,000
2-1/8"	21-84	50-750	400-2,100

1.375" Performance Specifications
"SLAMMER"® Impact Drill-Jars

	U.S. UNITS	S.I. UNIT
Tool Diameter	**1-3/8" (1.375")**	**34.9 mm**
Overall Length	**26.50"**	673.1 mm
Weight	**9.0 lbs**	4.08 Kg
Top Connection	**3/4" CS Box**	3/4" CS Box
Bottom Connection (Screws into CTRT Impact Bits Only)	**CTRT Special**	CTRT Special
Flow Rates	**10-40 gpm**	38-151 lpm
Tool Operating Range	**300-1,500 psi**	21-103 bars
Weight on Tool	**150-1,200 lbs.**	68-544 Kg
Maximum Overpull	24,000 lbs.	10,886 Kg

1.687" Performance Specifications
"SLAMMER"® Impact Drill-Jars

	U.S. UNITS	S.I. UNIT
Tool Diameter	**1-11/16" (1.687")**	42.8 mm
Overall Length	**34.50"**	876.3 mm
Weight	**15.0 lbs**	6.80 Kg
Top Connection	**1.0" CS Box**	1.0" CS Box
Bottom Connection (Screws into CTRT Impact Bits Only)	**CTRT Special**	CTRT Special
Flow Rates	**11-50 gpm**	42-189 lpm
Tool Operating Range	**500-2,000 psi**	34-138 bars
Weight on Tool	**250-1,500 lbs.**	113-680 Kg
Maximum Overpull	29,000 lbs.	13,154 Kg

2.125" Performance Specifications
"SLAMMER"® Impact Drill-Jars

	U.S. UNITS	S.I. UNIT
Tool Diameter	**2-1/8" (2.125")**	54.0 mm
Overall Length	**38.50"**	977.9 mm
Weight	**27.0 lbs**	12.25 Kg
Top Connection	**1.5" MT Box**	1.5" MT Box
Bottom Connection (Screws into CTRT Impact Bits Only)	**CTRT Special**	CTRT Special
Flow Rates	21-84 gpm	79-318 lpm

Torque-Thru Knuckle Joint

The CTRT **Torque-Thru Knuckle Joint** provides additional flexibility in the tool string. It is used in highly deviated or restricted wells to aid when running a centralizer, stabilizer, or SRT-G2 Drill Motors. It can be placed above or below the Drill Motor, preventing any unnecessary side loads that could reduce operational life or damage to motor.

The knuckle joint provides a full 15° angular deviation and internal pressure seal with full deviation of the tool and still allows clearance for ball drops and fluid flow. The knuckle joint's torque capability meets or exceeds that of the drilling motor.

DESIGN ADVANTAGES & BENEFITS

- Torque Transmitting
- 15° Angular Deviation
- Flow Through Bore

SIZES

The Torque-Thru Knuckle Joints are available from 1.69" to 3.75" diameters with any connection of choice.

DATA SPECIFICATIONS

Tool O.D.	Min I.D.	Makeup Length	Overpull Yield @ 80%	Working Pressure	Connecton
1-11/16"	.500"	10.50"	40,000 Lbs	10,000 PSI	**1.00" CS or MT**
2-1/8"	.750"	10.75"	50,000 Lbs	10,000 PSI	**1.25" CS or 1.50"MT**
2-7/8"	1.00"	11.75"	80,000 Lbs	10,000 PSI	**2-3/8" PAC**
3-1/8"	1.00"	12.00"	100,000 Lbs	10,000 PSI	**2-3/8" PAC or Reg**
3-3/4"	**TBD**	**TBD**	**TBD**	**10,000 PSI**	**2-7/8" Reg**

Locking Swivel Joint

The CTRT **Locking Swivel Joint** allows for full rotation of the BHA made below the joint without the need to disconnect from the coil. It is designed for deploying long tool strings. Used in conjunction with a deployment sub, the locking swivel joint allows that tool string to be lowered into the wellbore and hung off in the blowout preventers (BOP) on a set of slip rams. It can then be made up to the tool string. By pulling the coupling back, tightening the screws, and disengaging the clutch, the upper string is ready for makeup.

DESIGN ADVANTAGES & BENEFITS

- Torque Transmitting
- Radial Ball Bearings for Rotation
- Large I.D. for Maximum Flow

SIZES

The Locking Swivel Joints are available from 1.69" to 3.75" diameters with any connection of choice.

DATA SPECIFICATIONS

Tool O.D.	Min I.D.	Makeup Length	Overpull Yield @ 80%	Working Pressure	Connecton
1-11/16"	.531"	15.50"	22,500 Lbs	10,000 PSI	**1.00" CS or MT**
1-13/16"	.560"	15.50"	25,000 Lbs	10,000 PSI	**1.00" CS or MT**
2-1/8"	.810"	15.25"	23,000 Lbs	10,000 PSI	**1.25" CS or 1.50"MT**
2-7/8"	1.00"	20.00"	60,000 Lbs	10,000 PSI	**2-3/8" PAC**
3-1/8"	1.00"	20.00"	85,000 Lbs	10,000 PSI	**2-3/8" PAC or Reg**
3-3/4"	**TBD**	**TBD**	**TBD**	**10,000 PSI**	**2-7/8" Reg**

WEIGHT BARS

The CTRT Weight Bar is manufactured from solid bar with a relatively small I.D. to ensure maximum weight displacement. It can be utilized in any BHA where additional weight or length is required and is offered in a range of diameters, I.D.'s and lengths up to 5 feet (60") and common thread connections.

It is typically used in coil tubing clean outs to extend the length of the BHA and the distance between the jetting nozzle and disconnect.

It can increase the amount of impact applied at the fish while running in tandem with a jar and accelerator.

The weight bar can also be utilized with any coiled tubing motor to act as a drill collar. The additional weight on the motor string can help provide more controlled "weight on bit" during coiled tubing drilling operations.

DESIGN ADVANTAGES & BENEFITS

- Full flow through bore
- One piece solid construction.
- Thread connection option to suit customer requirements

Tool O.D.	Min I.D.	Make-Up Length	Connections
1.250	.500	36",48",60"	**.75" MMT**
1.500	.625	36",48",60"	**.75" MMT**
1.687	.625	36",48",60"	**1.00" MT**
2.125	.750	36",48",60"	**1.50" MT**
2.875	1.00	36",48",60"	**2-3/8" PAC**
3.125	**1.00**	**36",48",60"**	**2-3/8" Reg**

Hydraulic "GS" Pulling Tools

The CTRT **Hydraulic "GS" Pulling Tool** has been designed to provide a strong reliable method of latching to and retrieving downhole tools using a standard or modified internal fishing neck profile.

Hydraulic differential pressure across the orifice allows the piston to pull the heavy duty latching mechanism (dogs) upward to release from the internal fish neck. When flow has been reduced, the springs shift the dogs back down to a "latched" position for multiple latch and release capability.

The tool does not require shear pins or drop balls as the designed hydraulics allow the latching and releasing process of the tool to operate.

DESIGN ADVANTAGES & BENEFITS

- Robust proven core/dog design
- Full hydraulic operation
- Multiple latch and release capability

Technical Specifications

TOOL O.D.	TOOL I.D. (without choke)	MAKE-UP LENGTH	"GS" SIZE	PSI TO RELEASE	THREAD TYPE
1.810"	.510"	18.250"	2.00"	1000 PSI	**1.00" MT or CS**
2.12"	.750"	18.250"	2.50"	1200 PSI	**1.50" MT or 1.25" CS**
2.87"	1.00"	17.750"	3.00"	1350 PSI	**2-3/8" PAC**
3.12"	**1.00"**	**17.750"**	**3.50"**	**1200 PSI**	**2-3/8" REG**

GS SIZE	TUBING O.D. SIZE	A	B	C	D
2.00"	2-3/8"	1.38"	1.59"	.54"	**1.47"**
2.50"	2-7/8"	1.81"	1.98"	.54"	**1.47"**
3.00"	**3-1/2"**	**2.31"**	**2.47"**	**.54"**	**1.47"**

"POWER-MAXX"™ JAR

The "POWER-MAXX"™ Hydraulic Jar has been designed to produce high impact loads during fishing operations or to be included in Milling, Drilling or Intervention BHA's as a contingency measure. The "POWER-MAXX" Hydraulic Jar represents the continued advancement of jar valve/fluid technology.

Our latest technology generation provides for optimum time delay and maximum velocity at detent release providing enhanced impact force.

DESIGN ADVANTAGES & BENEFITS

- Simple robust design for ease of operation.
- Minimal mechanical "drag" at detent release, permits the maximum acceleration of the mass to the anvil.
- Compact design ideal for restricted heights.
- Through value added engineering, the "POWER-MAXX"™ is truly the next generation of Hydraulic Jars. It is simply the easiest to assemble, disassemble and maintenance free jar on the market today.

Technical Specifications

O.D.	Min I.D.	Makeup Length	Operational Over-Pull Wt.	Operational Set-Down Wt.	Stroke Length	Max Detent Over-Pull Working Load	Max Detent Set-Down Working Load	Max Temp	Connection
1.69"	.562"	57-1/2"	8,000 lbs	8,000 lbs	3.50"	8,000 lbs	28,000 lbs	500°F	**1.00" MT**
2.12"	.625"	57-1/2"	76,000 lbs	5,500 Ft-Lbs	3.50"	26,000 lbs	46,000 lbs	500°F	**1.50" MT**
2.87"	1.030"	57-1/2"	100,000 lbs	8,000 Ft-Lbs	3.50"	45,000 lbs	70,000 lbs	500°F	**2-3/8" PAC**
3.12"	**1.030"**	**57-1/2"**	**200,000 lbs**	**14,000 Ft-bs**	**3.50"**	**70,000 lbs**	**95,000 lbs**	**500°F**	**2-3/8" REG**

O.D.	Max Over-Pull Weight (Recommended)	Max Set-Down Weight (Recommended)	Tool Overpull Yield @ 80%	Torsional Yield @ 80%
1.69"	28,000 lbs	28,000 lbs	56,000 lbs	**1,500 Ft-Lbs**
2.12"	46,000 lbs	36,000 lbs	76,000 lbs	**5,500 Ft-Lbs**
2.87"	70,000 lbs	50,000 lbs	100,000 lbs	**8,000 Ft-Lbs**
3.12"	**95,000 lbs**	**60,000 lbs**	**200,000 lbs**	**14,000 Ft-Lbs**

Note: The strength calculations are considered accurate within +/- 20% and are to be used only as a guide. They do not constitute any actual or implied warranty or guarantee

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