

PETOL[®] Drill Pipe Tong

DA8184

Operating Manual



4450 S. Hwy. 6 | P.O. Box 192
Clifton, TX 76634 | USA
www.PETOL.com

sales@petol.com | 254.675.8651

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DA8184 PETOL[®] Drill Pipe Tong Description

The PETOL[®] Drill Pipe Tongs were designed for making up and breaking out drill pipe, and tubular products. The DA8184 will work diameters from 4 inches to 14-1/2 inches and up to 95,000 foot-pounds of torque depending upon diameter and handle configuration.

The tongs are adjusted by adding or removing chain sections and adjusting a chain screw nut to work the various diameters.

The Drill Pipe Tongs have the following features:

- A high strength, heat treated alloy chain for rugged, dependable service.

- High strength alloy steels used throughout for long life with the toughest jobs.

- A hanger attached to the tong handle to suspend the tong during operation when used on vertical pipe applications. A hanger is not available for the DH8184-C09 handle.

- A chain screw and nut to provide for fine adjustment of the chain.

- Loop and clevis handle ends in various lengths for most any application.

PETOL® Limited Warranty

What Is Covered

PETOL® tools are expressly warranted to you, the purchaser, to be free of defects in material and workmanship.

How Long Coverage Lasts

This express warranty lasts for the lifetime of the PETOL tool. Warranty coverage ends when the tool becomes unusable for reasons other than defects in workmanship or material.

How Can You Get Warranty Service

To obtain the benefit of this warranty, contact a PETOL sales representative in Clifton, Texas.

PETOL 4450 S. Highway 6 · P.O. Box 192 · Clifton, TX 76634

What Will We Do To Correct Problems

Warranted products will be repaired or replaced, at PETOL's option, and returned at no charge to you, the original purchaser; or, if after three attempts at repair or replacement during the warranty period, the product defect in material or workmanship persists, you can elect to receive a full refund of your original purchase price for the product.

What Is Not Covered

Defects, failures or conditions that are due to normal wear and tear, abuse or misuse, are not covered by this limited warranty. In addition, this limited warranty is in lieu of all other warranties, express or implied, verbal or written. To the maximum extent allowed by law PETOL disclaims all implied warranties, including implied warranties of merchantability and/or fitness for a particular purpose. PETOL also specifically denies any liability for any incidental damages and/or consequential damages, including but not limited to property damage to property other than the product itself, loss of sales profits, down time, costs or any other damages measurable in money, whether or not included in the foregoing enumeration.

Please be advised that some states do not allow the exclusion or limitation of incidental or consequential damages, so this limitation or exclusion may not apply to you. This warranty gives you specific rights, and you may also have other rights, which vary from state to state, province to province, or country to country.

Are Personal Injuries Covered

In the event you, someone working for you, or any other person sustain a personal injury as a result of using the PETOL tool, PETOL limits its potential liability for such a claim or injury to the fullest extent allowed by law, and disclaims and denies any liability for such personal injury.

Please be advised that some states do not allow the exclusion or limitation of liability for personal injuries, so the above limitation or exclusion may not apply to you, or the individual claiming injury.

No Other Express Warranty Applies

This PETOL LIMITED WARRANTY is the sole and exclusive warranty, express or implied for PETOL products. No employee, agent, dealer or other person is authorized to alter, modify, expand or reduce the terms of this warranty or to make any other warranty on behalf of PETOL.

Law Applicable

All matters related to the sale and/or use of the PETOL tool that is the subject of this limited warranty, along with the construction and enforcement of the terms of this limited warranty itself, shall be subject to the substantive and procedural laws of the state of Texas, not the conflicts of laws provisions of Texas, but rather the laws of Texas themselves.

Forum Selection Clause

Any dispute arising out of the sale and/or use of the PETOL tool that is the subject of this limited warranty shall be presented in the form of a claim or lawsuit to the offices of PETOL in Clifton, Bosque County, Texas. No claim or suit may be brought against PETOL, arising out of the sale and/or use of the tool, or arising out of the terms of this warranty, except in such forum. Purchase and/or use of the PETOL tool makes you subject to the benefits and limitations of this limited warranty. Accordingly, any writ, judgment or other enforcement, obtained from a jurisdiction, county, parish, state or federal court or other country, other than from the forum identified above, shall be void and unenforceable against PETOL.

Arbitration Clause

In the event of dispute or claim arises out of the sale and/or use of the PETOL tool that is the subject of this limited warranty, or arises out of the interpretation or enforcement of the terms and conditions of this limited warranty, such dispute shall be submitted to binding arbitration pursuant to the rules of the American Arbitration Association. If required to accomplish the purpose of this Arbitration clause, the purchaser hereby expressly waives any right to demand trial by jury.

Complete Agreement

This express limited warranty contains the entire agreement regarding express or implied warranties related to the PETOL tool that is the subject of it. No writing or language contained in the purchase order or any other document of the purchaser, or invoice of PETOL or any intermediate seller, shall be construed as modifying, in any way, the rights and liabilities contained in this limited warranty. PETOL expressly disclaims any obligations expressed in any customer purchase order or document that are contrary to the terms and limitations of this warranty.

Severability

If any term or limitation contained in this limited warranty is deemed unenforceable by law, then the term shall be severed from the remaining portions of the limited warranty which shall remain enforceable.

All communications to PETOL regarding the use of the tool and any aspect of the sale of the tool of this limited warranty should be addressed to PETOL.

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Safe Practices and Procedures**Responsibility**

"It is the responsibility of the employer to train the employee in the proper selection and usage of tools, chains, etc., and to ensure that they are selected and used in that manner. In many instances, injury results because it is assumed that anybody knows how to use common hand tools. Observations and the record show that this is not the case. A part of every job instruction program should therefore be detailed training in the proper use of hand tools (and of all other special tools and equipment needed to accomplish the job)." - (Source: National Safety Council)

"Employers are responsible for the safe condition of tools and equipment used by employees, including tools and equipment which may be furnished by employees." - (Source: OSHA 1910.242A)

Replacement Parts

Use only PETOL[®] replacement parts - no other parts are of comparable strength, quality and interchangeability.

Safety

While we pride ourselves on the quality and dependability that we build into PETOL tools and products, we caution users that it is only prudent to know and follow the simple rules of safety when using our products, or anyone else's.

Always follow safe practices and procedures in accordance with the recommendations of OSHA, The National Safety Council (NSC), The Hand Tools Institute (HTI), The International Association of Drilling Contractors (IADC), Etc. All applicable Governmental rules, regulations or restrictions, now in effect or which may be promulgated, take precedence over the suggestions in this publication. The information in this publication is designed to supplement standard safe practices and procedures, not in lieu of, or replacement thereof.

Safe Practices

(Source: The National Safety Council)

Failure to observe one or more of the following five safe practices accounts for most hand and powered tool accidents:

1. ALWAYS WEAR SAFETY GOGGLES TO PROTECT EYES
2. SELECT THE RIGHT TOOL FOR THE JOB
3. KEEP TOOLS IN GOOD CONDITION
4. USE TOOLS CORRECTLY
5. KEEP TOOLS IN A SAFE PLACE

Safety Goggles must always be worn by persons in any area where hand and powered tools are being used.

Never apply excess leverage to a wrench or tool by means of a "Cheater Bar". Never strike wrenches and tools with hammers or other objects.

All tools should be kept clean, inspected on a regular basis, and replaced when they show signs of wear.

Be especially careful not to place yourself in a position that could result in bodily injury in the event of a failure. Brace yourself firmly and pull rather than push when wrenching. (If necessary, to push, do so with the flat of the hand rather than gripping around the wrench.)

Never stand under or near loads being hoisted off the ground.

READ SAFE PRACTICES AND PROCEDURES MANUAL, CATALOG INFORMATION AND PRODUCT LABELING PRIOR TO OPERATION.

Safety Sources and Publications

In the interest of Safety the following sources of Safety information is furnished:

The Hand Tools Institute (HTI)
25 North Broadway
Tarrytown, New York 10591
(914) 332-0040
www.hti.org

The National Safety Council (NSC)
1121 Spring Lake Drive
Itasca, Illinois 60143-3201
(630) 285-1121
www.nsc.org

International Safety Council
1121 Spring Lake Drive
Itasca, Illinois 60143-3201
(630) 285-1121

Responsibility of Distributors

IT IS THE RESPONSIBILITY OF THE PURCHASERS OF PETOL™ PRODUCTS TO CONVEY THE INFORMATION IN THIS PUBLICATION AND ANY OTHER INFORMATION RELATING TO THE INDIVIDUAL PRODUCT, THROUGH THE CHANNELS OF DISTRIBUTION, DOWN TO AND INCLUDING THE INDIVIDUAL USING THE PRODUCT

NOTE:

In view of the fact that the actual use determines whether safety requirements have been met, the ultimate responsibility to comply rests with the end user.

The service life of leaf chains can be altered by a variety of adverse operating conditions. The following information discusses the most important of these conditions for consideration when operating or scheduling replacement of leaf chain systems.

Overloading / Shock Loads / Side Loading

Attempting to “inch loads which are beyond the rated capacity of the tool.

Striking the tool with a hammer or other object while force is being exerted in an attempt to loosen a “frozen” joint.

Side pull can be caused by pulling or pushing on the tong in a direction that is not along a perpendicular plane, unlevelled mounting of the tong or vise, inadequate support of the part being broken out, and improper seating of the part being broken out in the tong or vise. Improper seating will occur when the diameter of the part is not consistent within the width of the tong or vise jaw.

Environmental Conditions

Wrench chains operate in widely varying environments, from wet outdoor conditions to mildly or highly corrosive industrial atmospheres. They can also be exposed to abrasives such as sand or grit.

The possible effects include:

Moisture - Corrosion and rust reduce chain strength by causing pitting and cracking.

Temperature - Very cold temperatures reduce chain strength by embrittlement.

Chemical Solutions or Vapors - Corrosive attack of the chain components' grain structure and/or the mechanical connections between the chain components (crevice corrosion) may occur. Cracking often is microscopic. Propagation to complete failure can be eventual or sudden.

Abrasives - Accelerated wearing and scoring of the articulating chain members (pins and plates) may occur, with a corresponding reduction in chain strength. Due to inaccessibility of the bearing surfaces (pin surfaces and plate apertures), wear and scoring are not readily noticeable.

These conditions, when coupled with normal chain wear and inherent residual stress (normally in the chain as constructed), can result in environmentally assisted failure. It is impossible to predict chain life under complex conditions, as the degree of hostility and its effects are dependent on many variables such as temperature, time of exposure, concentration of corrosive atmosphere or medium, degree of abrasive wear, etc. Establishing the degree and frequency of unpredictable dynamic loading is also difficult.

Normal Life Expectancy

A leaf chain's normal life expectancy can be expressed as a maximum percent of elongation. This is generally between 2% and 3% of pitch. As the chain flexes back and forth, the bearing joints (pins and inside link plates) gradually wear from articulation. As with all steel bearing surfaces, the precision hardened steel joints of leaf chain require a constant film of oil between mating parts to prevent wear and to resist corrosion.

Lubrication

One of the most important but often overlooked factors is adequate lubrication. In addition to reducing internal friction, maintaining a film of oil on all chain surfaces will inhibit rusting and corrosion, this is important as corrosion of highly stressed, hardened steel chain components can cause a major reduction in the load capacity of leaf chain and result in link plate cracking.

Protection from corrosion is important in storage as well as in service. The factory lubricant applied to PETOL[®] Chain is a "Fingerprint Neutralizing Water-Displacing Corrosion Preventative." This is an excellent rust and corrosion inhibitor for chains in storage.

Do not attempt to paint chains. Though painting may help inhibit corrosion, it will seal off critical clearances and restricts oil from reaching the pin surfaces where it is needed for good joint lubrication. Do not plate chains or chain components. Highly stressed alloy steel components are subject to hydrogen embrittlement caused by plating. Periodic relubrication of chains is the most important factor in extending the life of the chains. There is no lubricant that is ideal for all situations.

A heavy oil lubricant provides excellent protection during prolonged storage, but is messy to apply, will attract dirt and other contaminants and is messy to use. These contaminants could lead to premature abrasive wear of the moving components. When operating in dusty environments, lubricated chains will accumulate a paste like buildup of grime. At periodic intervals, this buildup should be removed by cleaning and the chain should be immediately relubricated. Do not use caustic or acid type cleaners; use a stiff brush and a certified safe petroleum base solvent.

Light oil-based lubricants penetrate into articulated joints easily but can also be washed off or rubbed off during use. A light oil-based lubricant must have periodic reapplication of the lubricant to maintain coverage.

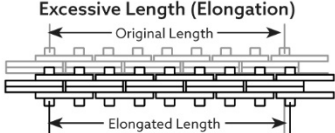
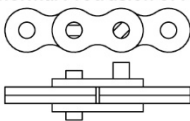
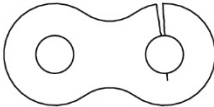
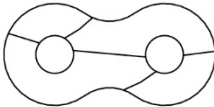
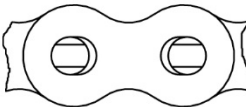
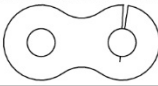
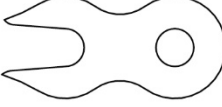
Specialty chain lubricants (wax-based) provide excellent lubrication. They have no oily residue. They are easy to apply. They can be more expensive than other lubricants and are subject to being washed off or worn off. Wax-based lubricants must have periodic reapplication of the lubricant to maintain coverage.

The frequency of relubrication is the most important factor. It will depend on frequency of use, length of storage between uses, exposure to dust and other contaminants, and exposure to salt water or other corrosion accelerants. The end user should establish a good preventative maintenance program for relubrication of all chains and articulated components.

Periodic Inspection List for PETOL® Special Chain

PERIODIC INSPECTION LIST FOR PETOL® SPECIAL CHAIN

1. Prior to each use, Leaf Chain and tools should be inspected for serviceability and lubrication.
2. Use Only PETOL® Replacement Parts – No other parts are of comparable strength, quality, and interchangeability.

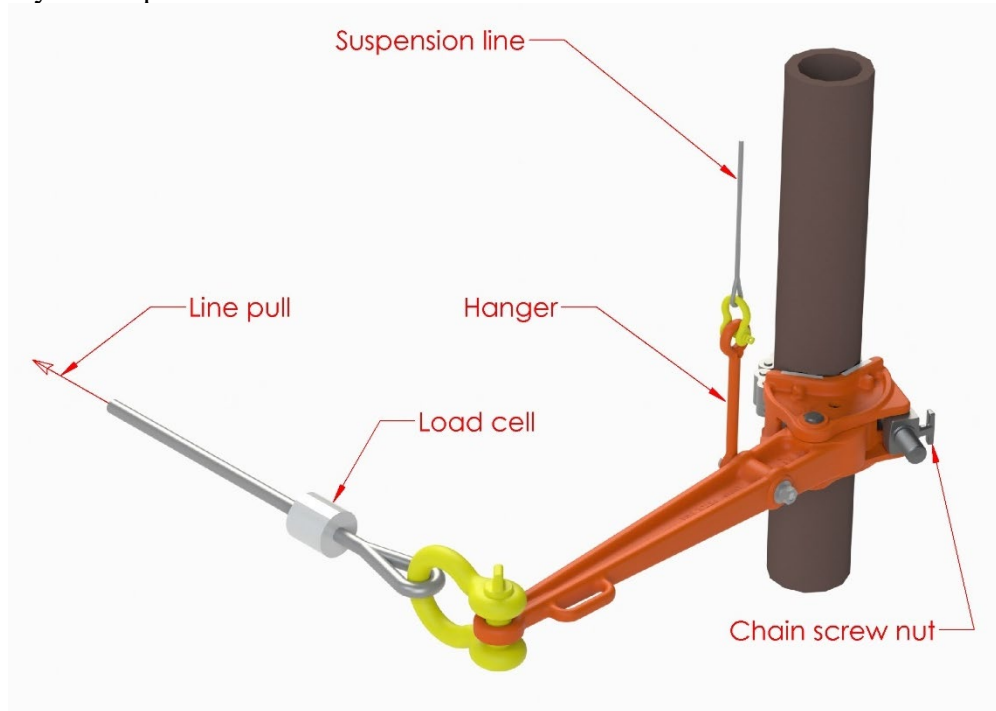
APPEARANCE AND/OR SYMPTOM	PROBABLE CAUSE	CORRECTION
Excessive Length (Elongation) 	Normal Wear Permanent deformation (stretch) from overload	Replace chain Replace chain and correct cause of overload
Abnormal Protrusion of Pins 	Overloading Inadequate lubrication Side Loading	Replace chain and correct cause of overload Replace chain and improve lubrication Replace chain and correct cause of side load
Cracked Plates (Fatigue) 	Overloading Side Loading	Replace chain and correct cause of overload Replace chain and correct cause of side load
Arc-Like Cracked Plates (Stress Corrosion) 	Severe rusting or exposure to acidic or caustic medium, plus static stress at press fit between pin and plate.	Replace chain and protect from hostile environment
Enlarged Holes 	Overloading	Replace chain and correct cause of overload
Cracked Plates (Corrosion Fatigue) Perpendicular to Pitch Line, plus rust or other evidence of chemical corrosion 	Corrosive Environment	Replace chain and protect from hostile environment
Fractured Plates (Tension Mode) 	Overloading	Replace chain and correct cause of overload
Tight Joints 	Dirt or foreign substance packed in joints Corrosion and rust Bent Pins	Clean and relube Replace chain and protect from hostile environment Replace chain

Safety Precautions

1. Always wear safety goggles to protect eyes.
2. Select the right tool for the job.
3. Keep tools in good condition.
4. Use tools correctly.
5. Keep tools in a safe place.
6. Wear protective clothing, gloves and safety shoes as appropriate.
7. Use lengths of assembled chain. Do not build lengths from individual components.
8. Do not attempt to rework damaged chain by replacing only the components obviously faulty. The entire chain may be compromised and should be discarded.
9. Never electroplate assembled leaf chains or components. Plating will result in failure from hydrogen embrittlement.
10. Do not weld any chain or component. Welding spatter should never be allowed to come into contact with chain or components.
11. Leaf chains are manufactured exclusively from heat-treated steels and therefore must not be annealed. If heating a chain with a cutting torch is absolutely necessary for removal, the chain must not be reused.
12. Inspect chains frequently and regularly for link plate cracking, pin turning, pin protrusion and corrosion.
13. Use only PETOL replacement parts to ensure proper strength.

Operation

The typical application of one Drill Pipe Tong is shown in the figure below. Normally an additional tong is used as a backup. The backup tong is not shown for clarity. The tong will exert torque when pulled in the direction as shown. The tong will ratchet when moved in the opposite direction. Ratcheting is used when the tong must be pulled more than once to completely makeup or breakout the connection.

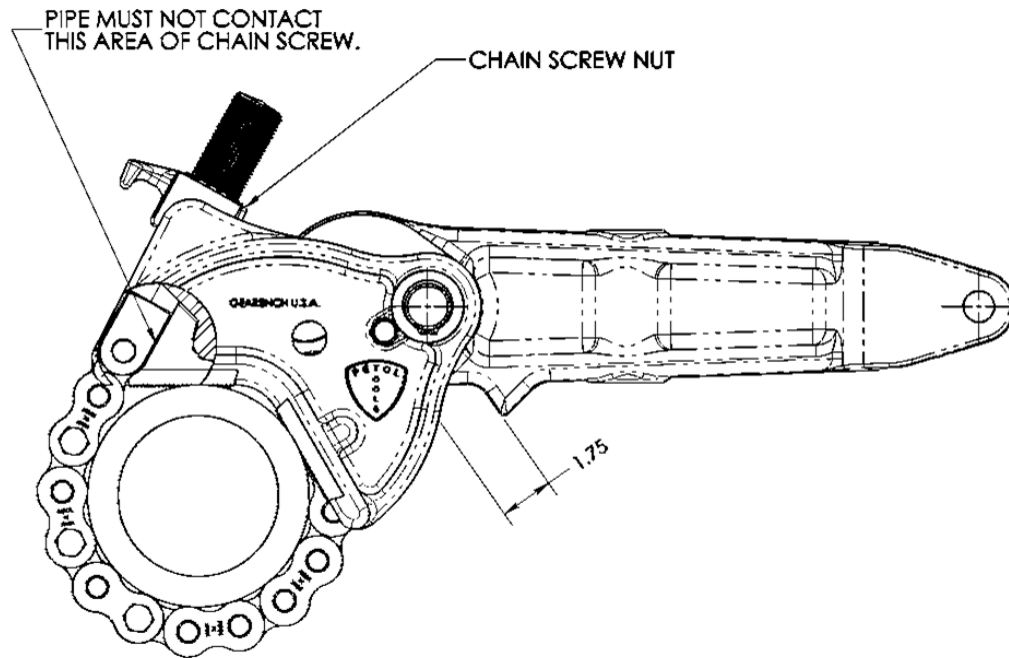


Suspension

When working vertical pipe, the tong should be suspended by the attached hanger. Adjust the hanger to obtain the best possible balance of the tong. Always use a suspension line of adequate capacity to safely hold up the tong during operation.

Chain Screw Adjustment

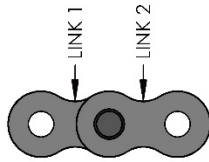
Adjust the chain screw nut for approximately 1-3/4" clearance between the lower handle bumper and the contact surface on the jaw as shown in the diagram below. The jaw spring must be compressed to latch the chain screw nut.



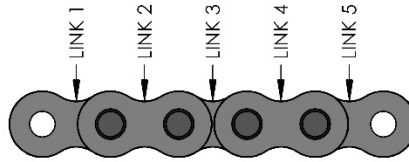
Warning! The pipe must NOT contact the side of the chain screw as shown above. Contact will cause premature breakage of the chain screw and could cause injury or death. If the chain screw contacts the pipe, the chain MUST be lengthened by adding 2 pitches of chain.

Chain Identification Guide

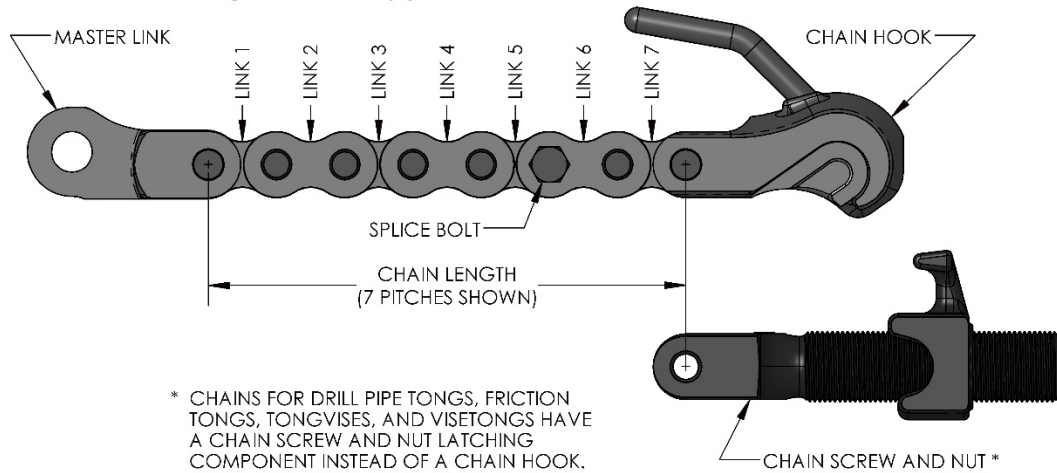
2 LINK SECTION



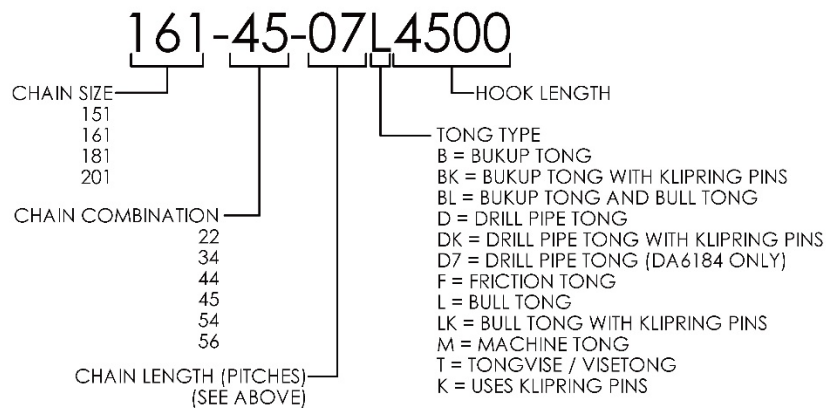
5 LINK SECTION



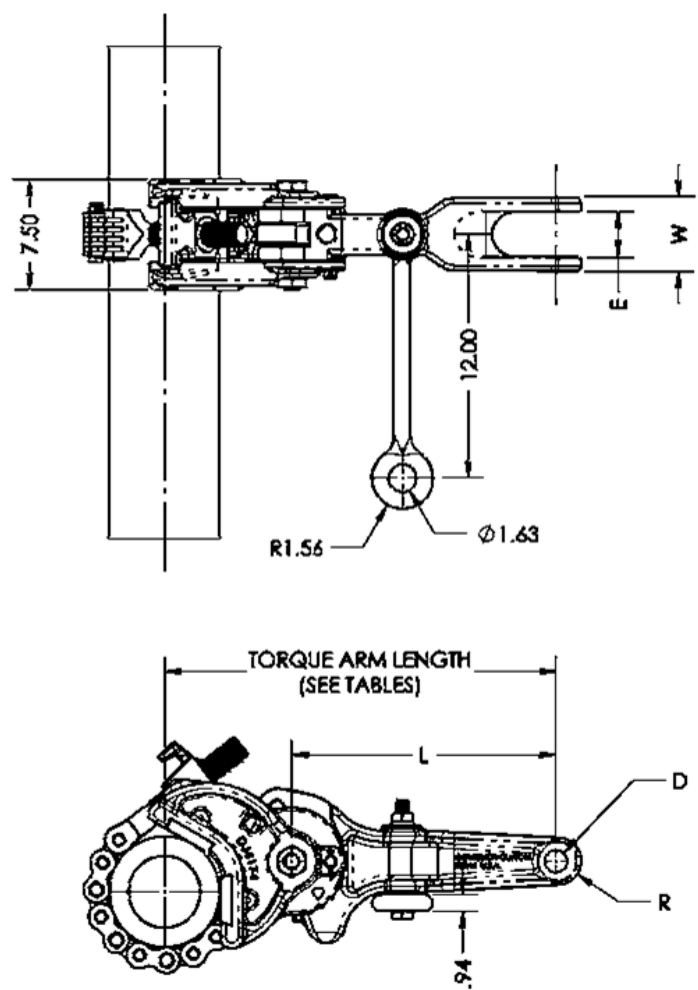
CHAIN ASSEMBLY



THIS IS WHAT A CHAIN PART NUMBER TELLS YOU

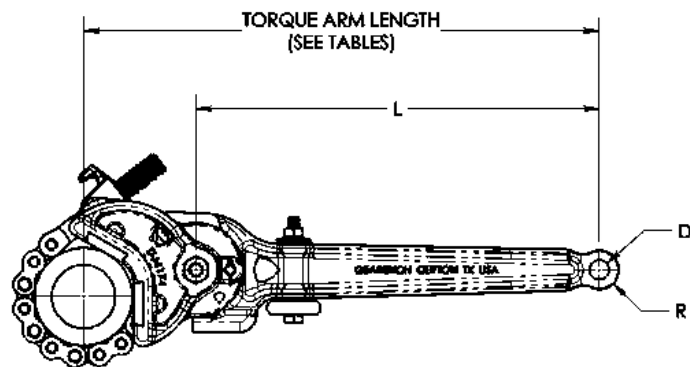
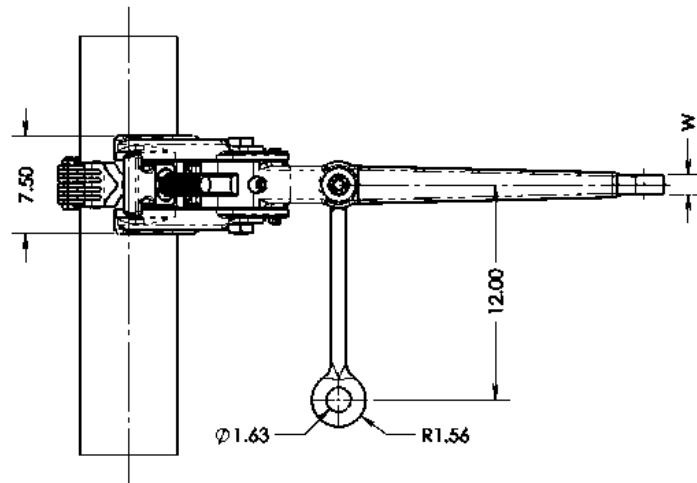


Dimensions – clevis handles



Assembly	L	D	R	E	W
DA8184-C09	9.00	1.640	1.50	2.02	4.00
DA8184-C18	18.00	1.015	1.13	2.24	4.03
DA8184-C36	36.00	2.000	1.88	2.50	4.00

Dimensions – loop handles



Assembly	L	D	R	W
DA8184-L23	23.00	1.750	1.50	2.25
DA8184-L28	28.00	1.631	1.50	2.00
DA8184-L36	36.00	2.00 (CAST)	1.94	1.38

Torque and Diameter capacity

The following tables lists the maximum working torques and the corresponding handle loads for the diameter range of the assembly. The table used must match the handle and pipe used in the assembly. Torque arm lengths, maximum torque and maximum handle load will vary with each diameter and handle combination.

DA8184-C09 torque ratings and chain selection					
Diameter	Torque Arm Length (inches)	Maximum Torque (foot-	Maximum Handle Load	Standard	Alternate Chain Number
4	15.59	49,300	37,900	161-45-07D	N/A
4-1/2	15.74	54,000	41,200	(4 – 4-1/2)	161-54-08D
5	15.88	58,800	44,400	161-45-09D	(4-1/4 – 5-1/8)
5-1/2	16.03	63,500	47,500	(4-5/8 – 5-3/4)	161-54-10D
6	16.17	68,000	50,500	161-45-11D (5-7/8 – 7)	(5-1/4 – 6-3/8)
6-1/2	16.31	72,600	53,400		161-54-12D
7	16.46	77,000	56,100		(6-1/2 – 7-5/8)
7-1/2	16.60	81,600	59,000	161-45-13D	161-54-14D
8	16.75	86,000	61,600	(7 – 8-1/8)	
8-1/2	16.89	88,500	62,900	161-45-15D	(7-1/2 – 8-3/4)
9	17.04	89,500	63,000	(8-1/8 – 9-1/4)	161-54-16D
9-1/2	17.18	89,500	62,500	161-45-17D	(8-5/8 – 9-7/8)
10	17.33	90,500	62,600	(9-1/4 – 10-3/8)	161-54-18D
10-1/2	17.47	90,500	62,100	161-45-19D (10-3/8 – 11-1/2)	(9-7/8 – 11)
11	17.61	91,800	62,500		161-54-20D (10-7/8 – 12-1/8)
11-1/2	17.76	91,800	62,000		
12	17.90	93,000	62,300	161-45-21D	161-54-22D
12-1/2	18.05	93,000	61,800	(11-1/2 – 12-5/8)	
13	18.19	94,000	62,000	161-45-23D	(12 – 13-1/4)
13-1/2	18.34	94,000	61,500	(12-5/8 – 13-3/4)	161-54-24D (13-1/8 – 14-1/2)
14-1/2	18.48	95,000	61,600	161-45-25D (13-3/4 – 14-1/2)	

DA8184-C09 Torque – Handle Load Formulas

The following formula is used to determine the handle force required to produce a known torque:

$$F = T / (D * 0.024 + 1.203)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the desired torque in foot-pounds. To find the torque produced from an observed handle force, use the following formula:

$$T = F * (D * 0.024 + 1.203)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the produced torque in foot-pounds.

WARNING: Under no circumstances should the maximum working load be exceeded. Overloading may result in injury or death. Always use a load cell or other calibrated indicating device to monitor the line pull on the tong to avoid an overload.

DA8184-C18 torque ratings and chain selection					
Diameter	Torque Arm Length (inches)	Maximum Torque (foot-pounds)	Maximum Handle Load (pounds)	Standard Chain Number	Alternate Chain Number
4	24.59	45,800	22,300	161-45-07D	N/A
4-1/2	24.74	49,900	24,200	(4 – 4-1/2)	161-54-08D
5	24.88	54,000	26,000	161-45-09D	(4-1/4 – 5-1/8)
5-1/2	25.03	57,900	27,700	(4-5/8 – 5-3/4)	161-54-10D
6	25.17	61,800	29,400	161-45-11D (5-7/8 – 7)	(5-1/4 – 6-3/8)
6-1/2	25.31	63,500	30,100		161-54-12D
7	25.46	67,000	31,500		(6-1/2 – 7-5/8)
7-1/2	25.60	67,000	31,400	161-45-13D	161-54-14D (7-1/2 – 8-3/4)
8	25.75	67,800	31,500	(7 – 8-1/8)	
8-1/2	25.89	67,800	31,400	161-45-15D	161-54-16D
9	26.04	68,300	31,400	(8-1/8 – 9-1/4)	(8-5/8 – 9-7/8)
9-1/2	26.18	68,300	31,300	161-45-17D	161-54-18D (9-7/8 – 11)
10	26.33	68,800	31,300	(9-1/4 – 10-3/8)	
10-1/2	26.47	68,800	31,100	161-45-19D (10-3/8 – 11-1/2)	161-54-20D (10-7/8 – 12-1/8)
11	26.61	69,300	31,200		
11-1/2	26.76	69,300	31,000	161-45-21D	161-54-22D (12 – 13-1/4)
12	26.90	69,900	31,100	(11-1/2 – 12-5/8)	
12-1/2	27.05	69,900	31,000	161-45-23D	161-54-24D (13-1/8 – 14-1/2)
13	27.19	70,400	31,000	(12-5/8 – 13-3/4)	
13-1/2	27.34	70,400	30,800	161-45-25D	
14-1/2	27.48	70,900	30,900	(13-3/4 – 14-1/2)	

DA8184-C18 Torque – Handle Load Formulas

The following formula is used to determine the handle force required to produce a known torque:

$$F = T / (D * 0.024 + 1.953)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the desired torque in foot-pounds. To find the torque produced from an observed handle force, use the following formula:

$$T = F * (D * 0.024 + 1.953)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the produced torque in foot-pounds.

WARNING: Under no circumstances should the maximum working load be exceeded. Overloading may result in injury or death. Always use a load cell or other calibrated indicating device to monitor the line pull on the tong to avoid an overload.

DA8184-C36 torque ratings and chain selection					
Diameter	Torque Arm Length (inches)	Maximum Torque (foot-pounds)	Maximum Handle Load (pounds)	Standard Chain Number	Alternate Chain Number
4	42.59	43,300	12,200	161-45-07D	N/A
4-1/2	42.74	47,000	13,200	(4 – 4-1/2)	161-54-08D
5	42.88	50,700	14,200	161-45-09D	(4-1/4 – 5-1/8)
5-1/2	43.03	54,100	15,100	(4-5/8 – 5-3/4)	161-54-10D
6	43.17	57,200	15,900	161-45-11D (5-7/8 – 7)	(5-1/4 – 6-3/8)
6-1/2	43.31	57,300	15,900		161-54-12D
7	43.46	57,200	15,800		(6-1/2 – 7-5/8)
7-1/2	43.60	57,400	15,800	161-45-13D	161-54-14D
8	43.75	57,600	15,800	(7 – 8-1/8)	
8-1/2	43.89	57,400	15,700	161-45-15D	(7-1/2 – 8-3/4)
9	44.04	57,600	15,700	(8-1/8 – 9-1/4)	161-54-16D
9-1/2	44.18	57,800	15,700	161-45-17D	(8-5/8 – 9-7/8)
10	44.32	57,900	15,700	(9-1/4 – 10-3/8)	161-54-18D
10-1/2	44.47	57,800	15,600	161-45-19D (10-3/8 – 11-1/2)	(9-7/8 – 11)
11	44.61	57,900	15,600		161-54-20D
11-1/2	44.76	58,100	15,600	161-45-21D (11-1/2 – 12-5/8)	(10-7/8 – 12-1/8)
12	44.90	57,900	15,500		161-54-22D
12-1/2	45.05	58,100	15,500	161-45-23D	(12 – 13-1/4)
13	45.19	58,300	15,500	(12-5/8 – 13-3/4)	161-54-24D (13-1/8 – 14-1/2)
13-1/2	45.34	58,500	15,500	161-45-25D	
14-1/2	45.48	58,300	15,400	(13-3/4 – 14-1/2)	

DA8184-C36 Torque – Handle Load Formulas

The following formula is used to determine the handle force required to produce a known torque:

$$F = T / (D * 0.024 + 3.453)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the desired torque in foot-pounds. To find the torque produced from an observed handle force, use the following formula:

$$T = F * (D * 0.024 + 3.453)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the produced torque in foot-pounds.

WARNING: Under no circumstances should the maximum working load be exceeded. Overloading may result in injury or death. Always use a load cell or other calibrated indicating device to monitor the line pull on the tong to avoid an overload.

DA8184-L23 torque ratings and chain selection					
Diameter	Torque Arm Length (inches)	Maximum Torque (foot-pounds)	Maximum Handle Load (pounds)	Standard Chain Number	Alternate Chain Number
4	29.59	44,800	18,100	161-45-07D	N/A
4-1/2	29.74	48,800	19,600	(4 – 4-1/2)	161-54-08D
5	29.88	52,700	21,100	161-45-09D	(4-1/4 – 5-1/8)
5-1/2	30.03	56,500	22,500	(4-5/8 – 5-3/4)	161-54-10D
6	30.17	60,200	23,900	161-45-11D (5-7/8 – 7)	(5-1/4 – 6-3/8)
6-1/2	30.31	62,900	24,900		161-54-12D
7	30.46	62,900	24,700		(6-1/2 – 7-5/8)
7-1/2	30.60	62,900	24,600	161-45-13D	161-54-14D (7-1/2 – 8-3/4)
8	30.75	63,400	24,700	(7 – 8-1/8)	
8-1/2	30.89	63,400	24,600	161-45-15D	161-54-16D
9	31.04	63,400	24,500	(8-1/8 – 9-1/4)	(8-5/8 – 9-7/8)
9-1/2	31.18	63,900	24,500	161-45-17D	161-54-18D (9-7/8 – 11)
10	31.32	63,900	24,400	(9-1/4 – 10-3/8)	
10-1/2	31.47	63,900	24,300	161-45-19D (10-3/8 – 11-1/2)	161-54-20D (10-7/8 – 12-1/8)
11	31.61	64,500	24,400		
11-1/2	31.76	64,500	24,300	161-45-21D	161-54-22D (12 – 13-1/4)
12	31.90	64,500	24,200	(11-1/2 – 12-5/8)	
12-1/2	32.05	65,000	24,300	161-45-23D	161-54-24D (13-1/8 – 14-1/2)
13	32.19	65,000	24,200	(12-5/8 – 13-3/4)	
13-1/2	32.34	65,000	24,100	161-45-25D	
14-1/2	32.48	65,000	24,000	(13-3/4 – 14-1/2)	

DA8184-L23 Torque – Handle Load Formulas

The following formula is used to determine the handle force required to produce a known torque:

$$F = T / (D * 0.024 + 2.370)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the desired torque in foot-pounds. To find the torque produced from an observed handle force, use the following formula:

$$T = F * (D * 0.024 + 2.370)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the produced torque in foot-pounds.

WARNING: Under no circumstances should the maximum working load be exceeded. Overloading may result in injury or death. Always use a load cell or other calibrated indicating device to monitor the line pull on the tong to avoid an overload.

DA8184-L28 torque ratings and chain selection					
Diameter	Torque Arm Length (inches)	Maximum Torque (foot-pounds)	Maximum Handle Load (pounds)	Standard Chain Number	Alternate Chain Number
4	34.59	44,000	15,200	161-45-07D	N/A
4-1/2	34.74	48,000	16,500	(4 – 4-1/2)	161-54-08D
5	34.88	51,800	17,800	161-45-09D	(4-1/4 – 5-1/8)
5-1/2	35.03	55,500	19,000	(4-5/8 – 5-3/4)	161-54-10D
6	35.17	59,000	20,100	161-45-11D (5-7/8 – 7)	(5-1/4 – 6-3/8)
6-1/2	35.31	60,000	20,300		161-54-12D
7	35.46	60,000	20,300		(6-1/2 – 7-5/8)
7-1/2	35.60	60,000	20,200	161-45-13D	161-54-14D (7-1/2 – 8-3/4)
8	35.75	60,500	20,300	(7 – 8-1/8)	
8-1/2	35.89	60,500	20,200	161-45-15D	161-54-16D (8-5/8 – 9-7/8)
9	36.04	60,500	20,100	(8-1/8 – 9-1/4)	
9-1/2	36.18	60,900	20,100	161-45-17D	161-54-18D (9-7/8 – 11)
10	36.32	60,900	20,100	(9-1/4 – 10-3/8)	
10-1/2	36.47	60,900	20,000	161-45-19D (10-3/8 – 11-1/2)	161-54-20D (10-7/8 – 12-1/8)
11	36.61	60,900	19,900		
11-1/2	36.76	61,500	20,000	161-45-21D	161-54-22D (12 – 13-1/4)
12	36.90	61,500	20,000	(11-1/2 – 12-5/8)	
12-1/2	37.05	61,500	19,900	161-45-23D	161-54-24D (13-1/8 – 14-1/2)
13	37.19	61,900	19,900	(12-5/8 – 13-3/4)	
13-1/2	37.34	61,900	19,800	161-45-25D	
14-1/2	37.48	61,900	19,800	(13-3/4 – 14-1/2)	

DA8184-L28 Torque – Handle Load Formulas

The following formula is used to determine the handle force required to produce a known torque:

$$F = T / (D * 0.024 + 2.786)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the desired torque in foot-pounds. To find the torque produced from an observed handle force, use the following formula:

$$T = F * (D * 0.024 + 2.786)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the produced torque in foot-pounds.

WARNING: Under no circumstances should the maximum working load be exceeded. Overloading may result in injury or death. Always use a load cell or other calibrated indicating device to monitor the line pull on the tong to avoid an overload.

DA8184-L36 torque ratings and chain selection					
Diameter	Torque Arm Length (inches)	Maximum Torque (foot-pounds)	Maximum Handle Load (pounds)	Standard Chain Number	Alternate Chain Number
4	42.59	43,500	12,200	161-45-07D	N/A
4-1/2	42.74	47,200	13,200	(4 – 4-1/2)	161-54-08D
5	42.88	50,900	14,200	161-45-09D	(4-1/4 – 5-1/8)
5-1/2	43.03	54,400	15,100	(4-5/8 – 5-3/4)	161-54-10D
6	43.17	57,300	15,900	161-45-11D (5-7/8 – 7)	(5-1/4 – 6-3/8)
6-1/2	43.31	57,300	15,800		161-54-12D (6-1/2 – 7-5/8)
7	43.46	57,300	15,800		
7-1/2	43.60	57,300	15,700	161-45-13D	161-54-14D (7-1/2 – 8-3/4)
8	43.75	57,300	15,700	(7 – 8-1/8)	
8-1/2	43.89	57,300	15,600	161-45-15D	161-54-16D (8-5/8 – 9-7/8)
9	44.04	57,800	15,700	(8-1/8 – 9-1/4)	
9-1/2	44.18	57,800	15,600	161-45-17D	161-54-18D (9-7/8 – 11)
10	44.32	57,800	15,600	(9-1/4 – 10-3/8)	
10-1/2	44.47	57,800	15,500	161-45-19D (10-3/8 – 11-1/2)	161-54-20D (10-7/8 – 12-1/8)
11	44.61	57,800	15,500		
11-1/2	44.76	57,800	15,400	161-45-21D	161-54-22D (12 – 13-1/4)
12	44.90	57,800	15,400	(11-1/2 – 12-5/8)	
12-1/2	45.05	58,400	15,500	161-45-23D	161-54-24D (13-1/8 – 14-1/2)
13	45.19	58,400	15,500	(12-5/8 – 13-3/4)	
13-1/2	45.34	58,400	15,400	161-45-25D	
14-1/2	45.48	58,400	15,400	(13-3/4 – 14-1/2)	

DA8184-L36 Torque – Handle Load Formulas

The following formula is used to determine the handle force required to produce a known torque:

$$F = T / (D * 0.024 + 3.453)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the desired torque in foot-pounds. To find the torque produced from an observed handle force, use the following formula:

$$T = F * (D * 0.024 + 3.453)$$

Where F is the handle force in pounds, D is the diameter in inches and, T is the produced torque in foot-pounds.

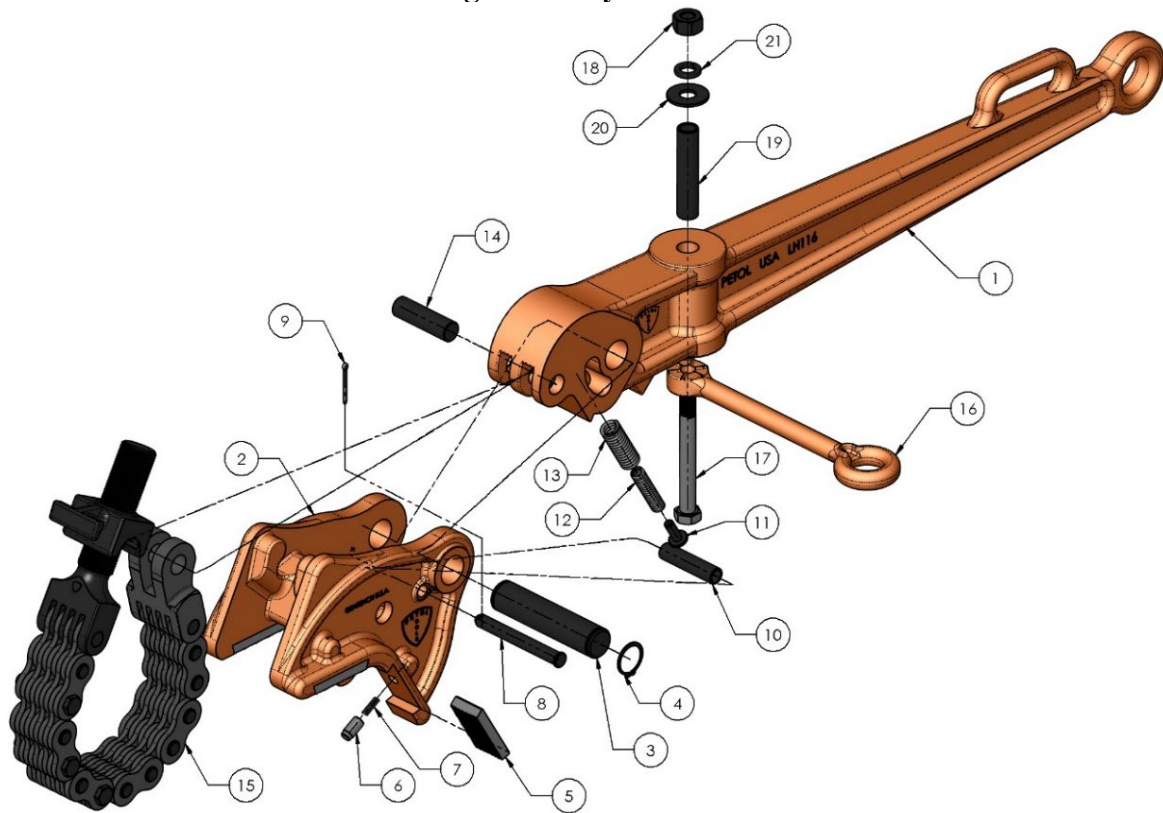
WARNING: Under no circumstances should the maximum working load be exceeded. Overloading may result in injury or death. Always use a load cell or other calibrated indicating device to monitor the line pull on the tong to avoid an overload.

Parts List

The following drawings, diagrams, and parts lists describe all parts, which may be needed as replacement items.

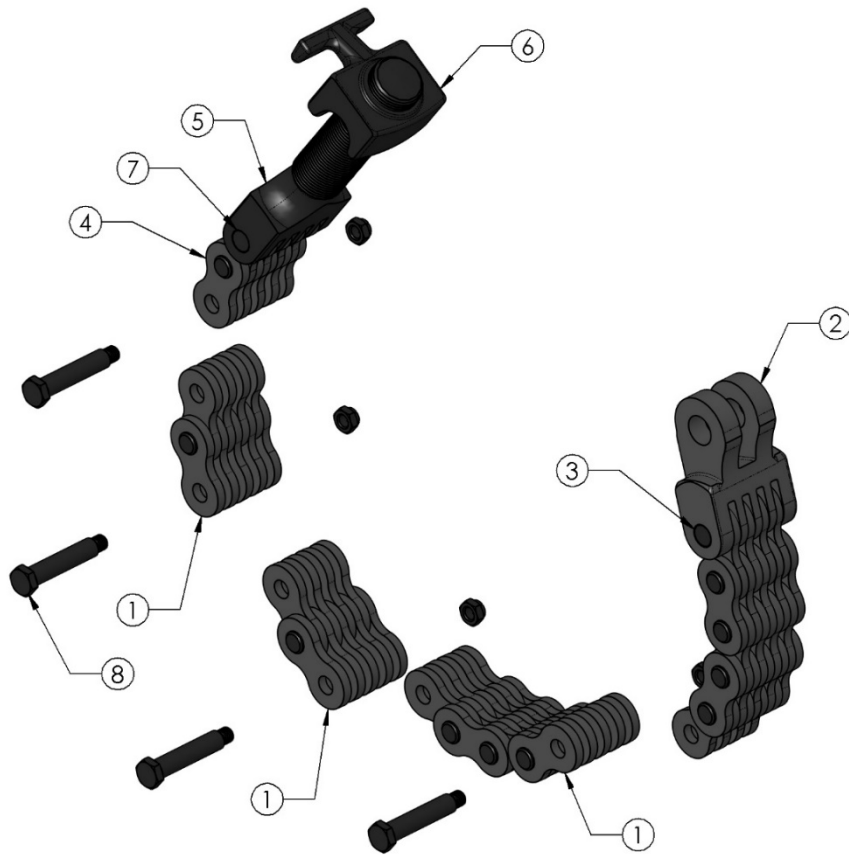
All tong components are manufactured only by PETOL®. DO NOT ATTEMPT TO SUBSTITUTE THESE COMPONENTS. The tong will not work properly unless these components are matched to the specific application. Consult our factory as your requirements change. Any non-PETOL substitutions of these components void all warranties and subject the user to assumption of liabilities resulting from subsequent use.

Tong Assembly Parts List



Tong Assembly Parts List

Item	Qty	Part Number	Description
1	1	DH8184-C09	Handle, 9" clevis
1	1	DH8184-C18	Handle, 18" clevis
1	1	DH8184-C36	Handle, 36" clevis
1	1	LH116-23	Handle, 23" loop
1	1	LH116-28	Handle, 28" loop
1	1	LH116	Handle, 36" loop
2	1	DJ8184	Jaw
3	1	HP249	Jaw – handle pin with retaining rings
4	4	HXRR150	Jaw pin retaining ring only
5	4	HI09D	Diamond point insert (standard)
5	4	HI09K	Knurled insert (optional)
6	4	HP904	Insert key
7	4	HS21	Insert key spring
8	1	HP250	Spring pin with cotter
9	1	HXC003	Spring pin cotter only
10	1	HU36	Spring bushing
11	1	HG09	Spring guide
12	1	HS09	Spring (inner)
13	1	HS18	Spring (outer)
14	1	HP234	Master link – handle pin
15	1	*	Chain assembly (see next page for parts)
16	1	HH16	Hanger
17	1	HB19	Hanger bolt with nut
18	1	HXN023	Hanger nut only
19	1	HU49	Hanger bushing
20	1	HXW001	Hanger flat washer
21	1	HXW002	Hanger lock washer



Item	Part Number	Description
1	161-45-02	Special chain only
1	161-45-03	Special chain only
1	161-45-05	Special chain only
1	161-45-07	Special chain only
2	HM06-45	Master link
3	HP247	Master link – chain rivet
4	161-45-02-HV08	Chain screw assembly
4	161-54-03-HV08	Chain screw assembly
5	HV08-45	Chain screw only
5	HV08-54	Chain screw only
6	HN08	Chain screw nut
7	HP247	Chain screw – chain rivet (for HV08-45)
7	HP045	Chain screw – chain rivet (for HV08-54)
8	HB52	Splice bolt and nut
8	HXN016	Splice bolt nut only

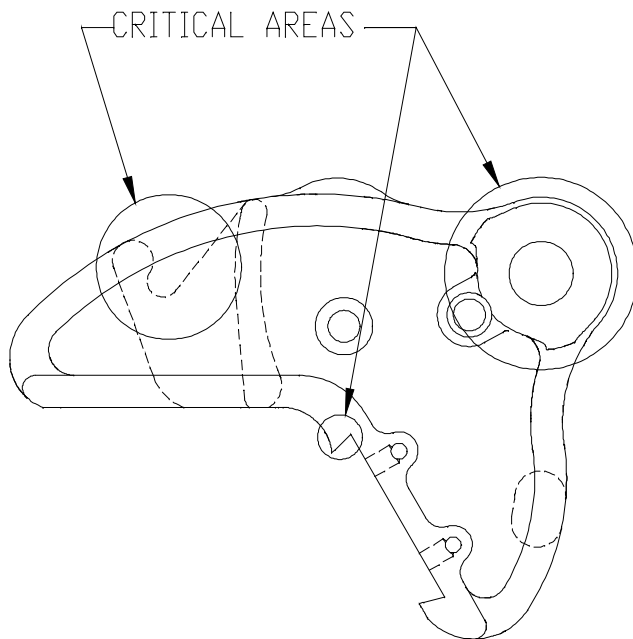
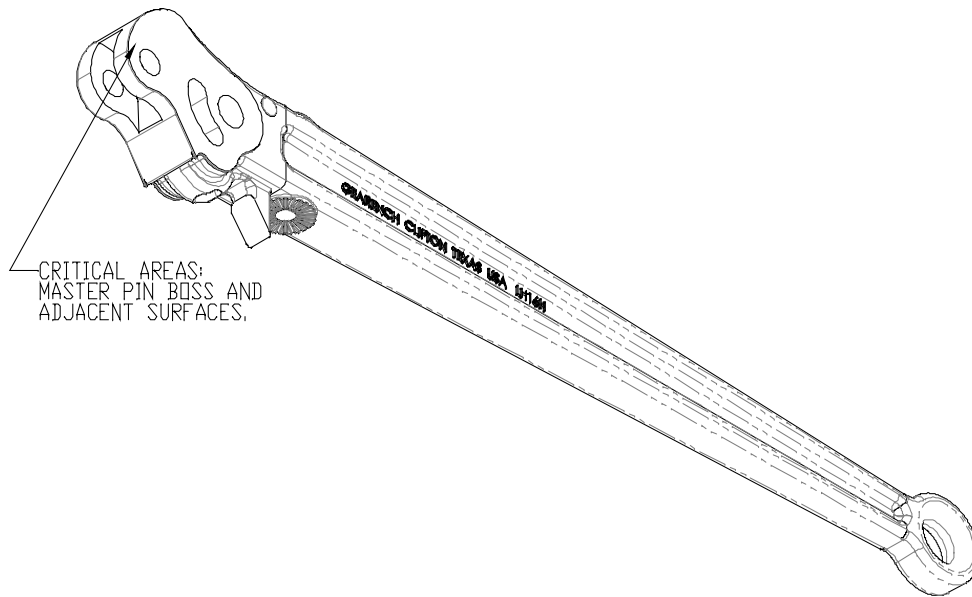
Wear Limits

The following table indicates limiting diameters on the components of the PETOL® Drill Pipe Tong. When localized wear is beyond any one of the limits indicated, the component should be replaced.

Part Number	Description	Location	Limit Dimension
HP249	Jaw – handle pin	Pin body diameter	1.482 (min)
HP234	Master link – handle pin	Pin body diameter	0.978 (min)
HB52	Chain splice bolts	Bolt body diameter	0.611 (min)
161-45-XX	Chain links	Pin hole diameter	0.640 (max)
161-45-XX	Chain links	Pitch center – center	1.739 (max per pitch)
DH8184-XXX LH116-XXX	Handle	Jaw pin hole diameter	1.525 (max)
DH8184-XXX LH116-XXX	Handle	Chain pin hole diameter (master link)	1.025 (max)
DH8184-C09	Handle	Load loop diameter	1.665 (max)
DH8184-C18	Handle	Load loop diameter	1.061 (max)
DH8184-C36	Handle	Load loop diameter	2.030 (max)
LH116-23	Handle	Load loop diameter	1.785 (max)
LH116-28	Handle	Load loop diameter	1.666 (max)
LH116	Handle	Load loop diameter	2.125 (max)
DJ8184	Jaw	Jaw pin hole diameter	1.525 (max)
HM06-45	Master link	Handle pin hole diameter	1.023 (max)
HM06-45	Master link	Chain pin hole diameter	0.641 (max)
HV08-45 HV08-54	Chain screw	Chain pin hole diameter	0.640 (max)

Non-Destructive Evaluation

The figures below indicate the critical areas of the tong handle and jaw. A critical area is defined as an area in which no unrepaired crack indications are permitted and in which no major weld repairs are permitted. There are no critical areas on the bar hanger. Weld repairs are only permitted on the handle, jaw, and bar hanger.



Weld Repairs

Scope:

This procedure is to be followed for minor repairs of crack indications in heat treated alloy steels. A weld repair shall be considered minor when the depth of the cavity does not exceed 30% of the actual wall thickness or 1 inch, whichever is smaller, or when the extent of the cavity does not exceed approximately 10 square inches. Major weld repairs must be performed by PETOL® or an approved repair center using appropriate procedures followed by full heat treatment and load testing.

Application:

This procedure applies to steel castings, forgings and, wrought with carbon content between 0.15% and 0.31%.

Weld preparation:

The crack indication is to be removed by carbon arc gouging, grinding, or machining until all indication is removed. Magnetic particle inspection shall be used to verify that the crack indication has been removed.

Filler material and process:

Repairs made with the FCAW process shall use a filler material of class E120T5-K4 or equivalent with CO₂ shielding gas. Repairs made with the SMAW process shall use a filler material of type E-12018-M. All welding is to be performed by a qualified welder.

Preheat:

Preheat the weld area to 300°F minimum.

Interpass temperature:

The interpass temperature is to be 600°F maximum. All weld slag to be removed prior to application of additional layers by chipping, grinding or wire brushing. Do not peen the weld repair.

Post weld heat treatment:

Do not allow weld to cool below 300°F before stress relief. Post heat immediately after welding to 1010 - 1040°F for 1 hour per inch of thickness, 2 hours minimum at temperature. Water quench after stress relief.

Weld blending and inspection:

The weld is to be ground flush with the adjacent parent material. The weld is to be inspected by magnetic particle to verify that the weld area is free of all crack indications.