Hi-Force®

HYDRAULIC TOOLS




Global Brand

Local Service




Jacks - Pumps - Cutters - Presses - Cylinders - Puller kits - Spreaders - Pipe benders
Torque tools - Bolt tensioners - Nut splitters - Hole punchers
Moving skates - Crimping tools - Hydrotest pumps - ToughLift jacking systems

HI-FORCE COMPANY INFORMATION

OUR MISSION STATEMENT

To support our valued customers through the design, manufacture and supply of first class products and services of exceptional quality, to assist them to gain competitive advantage in their markets.

To sustain our vision and mission by constantly seeking improvement via continuous education and learning, and the application of the best available technology and business practices.

To provide a pleasant, nurturing and growth orientated environment, which encourages our employees to be highly productive and to grow both personally and professionally.

To develop diversified markets, that provide stability, and adequate financial returns and allow us to achieve our vision and provide opportunities for existing and future employees.

HI-FORCE CATALOGS

In addition to this new 2016 catalog, other product specific and condensed catalogs are available in several languages including Chinese, Dutch, English (both in imperial and metric), French, German, Italian, Norwegian, Portuguese, Russian and Spanish. To request copies of our catalog(s) contact your local sales representative, or alternatively you can access our catalogs online! Simply go to www.hi-force.com.

HI-FORCE UK FACILITIES

HI-FORCE WEBSITE

Check out the Hi-Force Website for the latest company and product information.

www.hi-force.com

Hi-Force®
HYDRAULIC TOOLS

CONTENTS

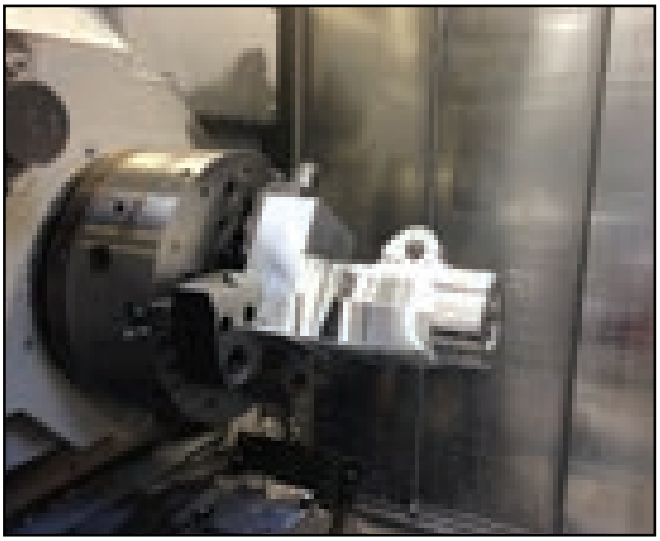
ABOUT HI-FORCE, PRODUCTS & MARKETS

Welcome to the 2016 Hi-Force catalog comprising of 208 pages, packed full of product and technical information from the fastest growing hydraulic tools manufacturer in the world today. Our continually expanding Regional Office, Service Center and Distribution network continue to fuel our desire to ensure that Hi-Force products and after sales services are both available to hydraulic tools users anywhere in the world.

Hi-Force is and will continue to be a fiercely independent Company, managed by hard working Shareholders & Directors, ably supported by a highly motivated and conscientious workforce, all of whom retain the same passion, for success, that helped Hi-Force to produce its first hydraulic tools over 30 years ago.

ABOUT HI-FORCE, PRODUCTS & MARKETS

During the past five years Hi-Force has invested a significant amount of money in twelve "state of the art" Mori Seiki CNC Machines. Our latest addition, a brand new 4 axis machine, capable of machining hydraulic cylinders up to 1115 tons capacity and 47 inches stroke, was received in May 2014 along with an additional milling machine, bringing our total fleet of production machines to 15. Hi-Force is totally committed to manufacturing products of the highest quality, using the best machinery available, to ensure that our products meet the most stringent quality requirements possible, whilst also retaining a competitive price in the global market for hydraulic tools. Our research, development and design office is working hard and continuing to expand, ensuring that our products remain at the leading edge of currently available hydraulic tool technology.



Following our UK head office relocation in 2010, to a brand new, state of the art facility in Daventry, UK, we also added a further 20,000 square feet of purpose built Logistics Center in 2012. In just 4 short years we have increased in size by more than five fold, which is surely testament to our claims, of being the fastest growing hydraulic tools manufacturer in the world. Within our new Logistics Center we have also invested a significant amount of money in our new, purpose built, Training School. Covering an area of over 1,500 square feet, this new facility is fully equipped with a classroom and two separate practical training areas, one for product training and one for service & repair training.

The Training School has also been approved by the ECITB (Engineering Construction Industry Training Board), to deliver ECITB approved courses in Flange Management, a critical area within the Oil & Gas industry. By the end of 2015, our UK Training School will have delivered over 30 ECITB approved training courses, with almost 150 delegates trained and certified. Our Malaysia and Middle East facilities have now also been approved by the ECITB, with plans already in place to complete ECITB approval in South Africa by early 2016. There is no doubt that the huge investment in facilities, personnel, product design and manufacturing capabilities, that we are making today, will see Hi-Force continue to grow at a significant rate over the coming years.

With over 30 years of hydraulic tool manufacturing and technical sales experience in place, we believe that Hi-Force is certainly a company that can be trusted with your current and future demands for hydraulic tools, safe in the knowledge that when you need us we will be ready to support you worldwide, 24 hours a day, 7 days a week, 365 days per year.

ABOUT HI-FORCE, PRODUCTS & MARKETS

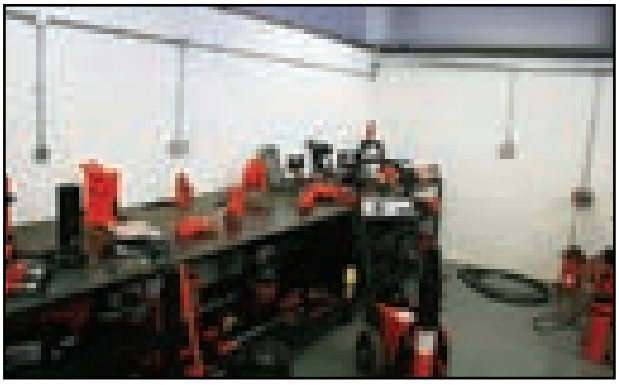
Hi-Force products are in use every day in a wide variety of industries including Oil & Gas, Petrochemical & Refining, Power Generation, Steel & Aluminum Plants, Paper Mills, Sugar Refineries, Railways, Mining, Construction, Ship Building & Ship Repair, Aerospace, Defence, Heavy Engineering and the many thousands of industrial service companies supporting these market sectors. Hi-Force hydraulic tools continually satisfy the demands of industry during construction, production, breakdown and routine shutdown repair and maintenance. Every year more and more companies continue to join the ever growing list of satisfied Hi-Force hydraulic tool users.

We are very proud of our latest edition of the Hi-Force hydraulic tools catalog which now includes over 2000 products. A large number of new products are being launched in this catalog including spring return stud bolt tensioners, three speed hydraulic torque wrench pumps, a new range of manual hydrotest pumps, improved range of manual and pneumatic torque multipliers and hand torque wrenches, hydraulic pin and bush removal and installation kits, hollow bore, lightweight, aluminum cylinders, increased capacity and range of heavy lift cylinders and remote controlled, high tonnage trolley mounted pullers.

Furthermore, our innovative new BOLTRIGHT PRO software, designed to accurately calculate the correct torque and tension figures for a wide variety of bolted joints, is now available in English, with the addition of further language options an ongoing process. The continuous expansion of the Hi-Force product range enables us to offer our valued customers a “one stop” solution for all of their hydraulic tool requirements.

ABOUT HI-FORCE, PRODUCTS & MARKETS

Hi-Force is fully committed to improving levels of technical capability, both within our own workforce and also throughout our distributor network, and we believe that training is a key element to help us in achieving our goals. Hi-Force continues to invest considerable time and money in the establishment of first class technical sales and service training courses for both our distributors and product users. Courses are held on a regular basis at our UK head office and at selected regional offices worldwide. All training is carried out in our ECITB approved Training Schools; located in the UK, Malaysia & Middle East, with additional ECITB approved Training School being set up in South Africa by 2016. Please refer to pages 181 to 186 for further information or contact your local Hi-Force office.



Our Sales & Marketing teams provide the essential link between Hi-Force and our customers, to ensure that our 30 plus years of expertise and experience continues to anticipate the needs of tomorrow's market today! Another key link with our customers is provided by our Regional Office service centers, each fully equipped with the latest "state of the art" service, repair, calibration and testing facilities ensuring that the after sales service provided for Hi-Force products is second to none in the industry. Additionally, over the past few years many of our authorized distributors have established their own accredited Hi-Force Service Center, further enhancing the Hi-Force "Global Brand, Local Service" philosophy. The appointment of additional strategically placed service centers, authorized by and compliant with Hi-Force's strict levels of competence, is continuing year on year.

May I thank you on behalf of everyone at Hi-Force, for taking the time to read this section of our 2016 catalog, which yet again has increased in size and product range compared to its predecessor. I am confident that the products and technical information, detailed on the following pages, will greatly assist you when selecting the most suitable Hi-Force tool for the application at hand. We are justifiably very proud of our achievements to date, none of which could have been realized without the continued support of our many customers and distributors worldwide. Be assured Hi-Force will continually strive to improve in everything we do.

Kevin P. Brown
Group Managing Director

QUALITY & SAFETY

All Hi-Force products are designed and manufactured to meet or exceed the requirements of current national and international standards and codes of practice, which are essential to ensure that Hi-Force manufactures hydraulic tools and equipment of the highest possible quality, both today, and in the future. All items are manufactured in accordance with the quality assurance requirements of ISO 9001:2008 and ISO 14001:2004 as verified by our certificate of registration number A2I INT 212, originally issued in January 1998 and valid until September 2018 at which time it will be renewed for a further three year period.

All Hi-Force tools are permanently marked with their respective model number and a unique serial number, which are both traceable to an individually issued test certificate. Every Hi-Force tool manufactured is individually tested in accordance with the latest international test procedures, applicable to hydraulic tools and equipment.

All Hi-Force products are covered by a comprehensive warranty against material and/or workmanship defects. All warranty claims must, in the first instance, be registered via our website online warranty claim registration procedure at www.hi-force.com/warranty. The procedure is easy to complete and enables Hi-Force to provide an initial response, within 48 hours of registration of the warranty claim. Following a detailed evaluation of the online warranty claim by our technical department, claims can, in most cases, be approved immediately avoiding the need for costly and time consuming return shipment of the faulty items to Hi-Force. Dependant on whether the approval is to repair or replace, Hi-Force will authorize the warranty through your local authorized Hi-Force Distributor or Service Center.

Hi-Force reserves the right to request the return of defective or faulty product for a more detailed evaluation and inspection should the information provided in the online warranty claim prove inconclusive. All warranty claim rejections will be supported by a report explaining the reasons why warranty has not been approved.

High pressure hydraulic power provides one of the simplest means of applying a high force in confined spaces, however respect for common sense safety precautions is essential at all times. Every Hi-Force employee is fully conversant with all Hi-Force safety procedures, applicable to the safe operation and use of our products and we feel it is our duty to ensure that all users of hydraulic tools are equally aware of these procedures. With every product that we supply, we provide operation and maintenance instructions to ensure that all operators are equally aware of these safety issues.


Certificate

CERTIFICATE OF REGISTRATION

HI-FORCE LTD

ISO 9001:2008 & ISO 14001:2004

CYLINDERS

B

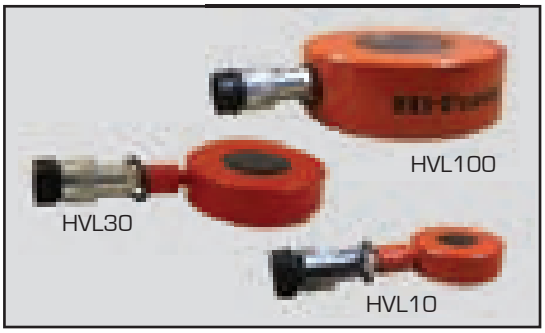
SELECTION TABLE FOR HI-FORCE STANDARD RANGE CYLINDERS

Choice of 129 standard cylinder models and unlimited specials made to order, Hi-Force will provide the best cylinder for the job !

Cylinder stroke inch	Nominal lifting capacity of cylinder in tons												
	5	11 to 12	16 to 22	25 to 35	36 to 41	55 to 57	67 to 80	112 to 121	162 to 167	220 to 287	353 to 439	573 to 882	1115
0.24	HPS50	HVL10	HVL20	HVL30		HVL50		HVL100					
0.39		HPS100											
0.43			HPS200										
0.47				HPS300									
0.59						HPS500							
0.63	HPS51						HPS750	HPS1000	HPS1500				
1.00	HSS51	HSS101						HLS1001					
1.00		HHS101		HLS301		HLS501			HLS1501				
1.58		HLS101											
1.73			HLS201										
1.77									HFL1502	HFL2502	HFL4002	HFL5002	
1.97	HSS52	HHS102	HSS152	HHS202	HHS302			HFL1002	HLS1502	HFG2002			
2.00					HHR302	HSS502							
2.00			HHA182	HSS252	HHA372	HFL502							
2.00						HFG502		HFG1002	HFG1502				
2.21		HSS102											
2.36				HLS302		HLS502		HLS1002					
2.96	HSS53												
3.00							HHS603	HHS1003					
3.00							HHR603	HHR1003					
3.94	HSS54	HSS104	HSS154					HFG1004	HFG1504				
4.02				HSS254		HSS504							
4.02						HFG504		HSS1004					
4.14						HHA504							
4.93	HSS55												
5.91		HSS106	HSS156	HHS206	HHR306	HFG506		HFG1006					
5.91				HSS256			HHS606	HHS1006	HFG1506		HFG3006		
5.92											HFG4006		
6.00		HHS106		HDA256		HSS506	HSS756	HDA1006		HDA2006	HDA3006	HDA5006	
6.00				HAS306	HHS306	HDA506	HHR606	HHR1006	HDA1506	HFG2006	HDA4006	HFG5006	HDA10006
6.00						HAS506		HAS1006	HSG1506	HSG2006		HDA8006	HFG10006
6.00										HFG2506		HFG8006	
6.03								HSS1006			HSG3006		
6.11									HGG1506	HGG2006	HGG3006		
6.93	HSS57												
8.00				HSS258		HSS508			HHR1508	HHR2508			
8.08				HSS308									
8.12		HSS108											
8.98	HSS59												
9.85		HSS1010	HSS1510	HSS2510									
10.01							HHR6010	HSS10010					
12.02		HSS1012			HHR3012				HDA15012	HDA20012			
13.00						HDA5013							
13.00						HSS5013		HDA10013					
14.03				HSS2514									
18.00				HSS2518									

Cylinder Range	Page	Main characteristics of Hi-Force cylinder range				
		Cylinder principle	Return action	Piston feature	Saddle	Stroke limiting device
HVL	11	single acting	load/gravity return	solid piston	integrated	stop ring
HPS	12	single acting	spring assisted return	solid piston	integrated	stop ring
HLS	13	single acting	spring assisted return	solid piston	integrated	stop ring
HSS	14-15	single acting	spring assisted return	solid piston	several options available	stop ring
HAS	16	single acting	spring assisted return	solid piston	flat saddle	stop ring
HHA	17	single acting	spring assisted return	hollow piston	several options available	stop ring
HHS	18	single acting	spring assisted return	hollow piston	several options available	stop ring
HHR	19	double acting	hydraulic return	hollow piston	several options available	stop ring
HDA	20	double acting	hydraulic return	solid piston	several options available	stop ring
HFL	21	single acting	load/gravity return	threaded piston & lock ring	tilting saddle	restriction port
HFG	22	single acting	load/gravity return	threaded piston & lock ring	tilting saddle	restriction port
HGG	23	single acting	load/gravity return	solid piston	tilting saddle	stop ring
HSG	23	single acting	load/gravity return	solid piston	tilting saddle	restriction port

HVL - SINGLE ACTING VERY LOW HEIGHT PANCAKE CYLINDERS



Capacities from 11 to 115 tons

Stroke length 0.24 inches

Working pressure 10000 PSI

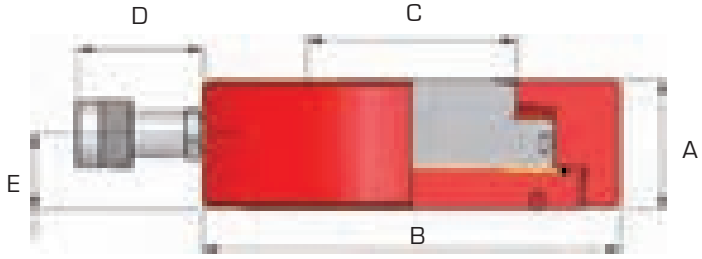
The HVL pancake cylinder range combines a very low closed height with a 0.24 inch stroke, providing a precise adjusting and lifting force in very confined work areas. Ideally suited for applications requiring alignment of machinery, turbines, heavy structures etc. All models are single acting, load return design. The base of all HVL cylinders must be fully supported during use.

- Single acting load return
- Nitrocarburized piston rod
- Low friction bearing surfaces
- Anti-extrusion seals

HVL10 also available with 15" extension hose and coupling.
Please add suffix 'H' to model no.

Did you know.....

Hi-Force HVL pancake cylinders are the lowest closed height hydraulic cylinders available on the market.
If you don't have the space, we have the solution!



Note: All models, excluding HVL100, are fitted with extension nipple for required coupling clearance (drawing is without coupling extension nipple).

Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HVL10	11	0.24	0.55	2.23	3.5
HVL20	22	0.24	1.04	4.43	5.7
HVL30	35	0.24	1.65	7.07	6.6
HVL50	55	0.24	2.62	11.05	15.9
HVL100	115	0.24	5.37	22.71	34.4

Dimensions in inches				
A	B	C	D	E
1.10	3.43	1.50	4.37	0.63
1.26	4.10	2.05	4.37	0.75
1.34	4.73	2.36	4.37	0.77
1.77	6.23	2.96	4.37	1.14
2.56	7.88	3.94	3.00	1.46

HPS - SINGLE ACTING LOW HEIGHT PAD CYLINDERS

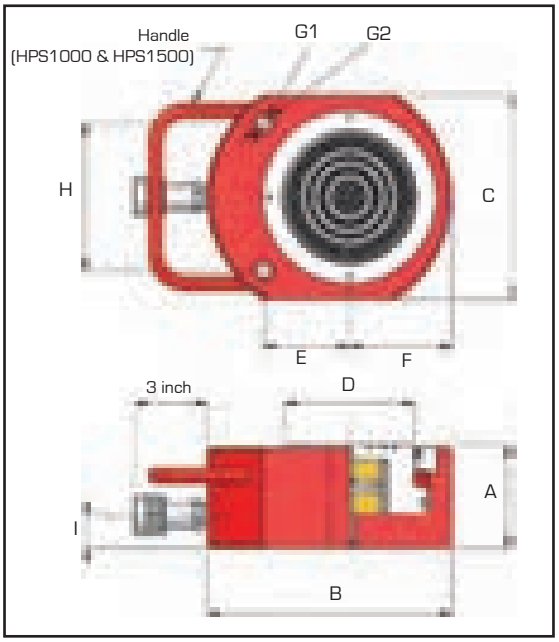
Capacities from 5 to 162 tons

Stroke lengths from 0.24 to 0.63 inches

Working pressure 10000 PSI

The HPS pad cylinder range offers the best capacity, closed height and stroke length combination, spring assisted return cylinders in the industry. Ideally suited for applications where a low closed height and maximum possible stroke is of prime importance, these highly versatile cylinders are extensively used for maintenance, structural weld positioning, rigging, flange separating and many other applications.

- Single acting, spring assisted return
- Nitrocarburized piston rod
- Low friction bearing surfaces
- Anti-extrusion seals



Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HPS50	5	0.24	0.24	0.99	1.8
HPS51	5	0.63	0.61	0.99	2.0
HPS100	11	0.39	0.85	2.23	3.5
HPS200	22	0.43	1.89	4.43	5.7
HPS300	35	0.47	3.36	7.07	9.3
HPS500	55	0.59	6.53	11.05	14.6
HPS750	80	0.63	10.00	15.92	22.9
HPS1000	120	0.63	14.95	23.78	51.1
HPS1500	162	0.63	20.13	31.96	62.8

Dimensions in inches									
A	B	C	D	E	F	G1	G2	H	I
1.26	2.36	1.50	0.95	0.79	0.75	0.22	0.38	1.02	0.75
1.65	2.36	1.50	0.95	0.79	0.75	0.22	0.38	1.02	0.75
1.81	3.19	2.21	1.50	1.34	1.10	0.27	0.44	1.46	0.75
2.05	3.94	3.00	2.01	1.58	1.54	0.35	0.56	1.97	0.75
2.32	4.53	3.74	2.36	1.81	1.89	0.35	0.56	2.05	0.75
2.64	5.52	4.49	2.76	2.13	2.36	0.43	0.68	2.64	0.79
3.19	6.50	5.52	3.23	2.64	2.76	0.51	0.75	3.00	0.83
3.59	8.47	7.09	4.49	2.96	3.55	0.50	0.75	5.12	1.14
3.94	8.47	7.53	4.49	3.27	3.74	0.51	0.75	4.61	1.14

HLS - SINGLE ACTING LOW HEIGHT CYLINDERS

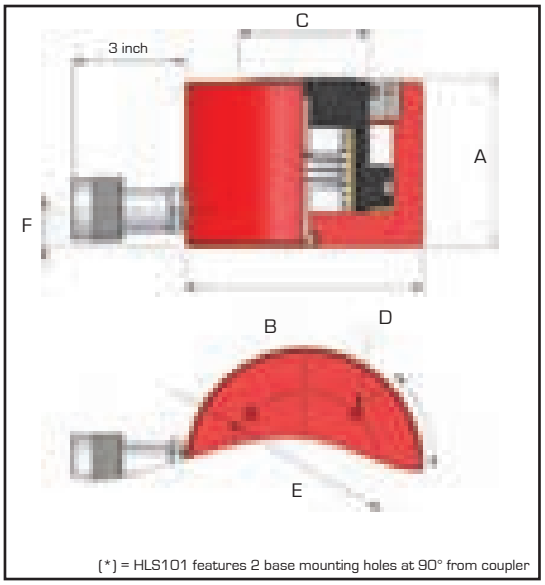
Capacities from 11 to 162 tons

Stroke lengths from 1 to 2.36 inches

Working pressure 10000 PSI

The HLS low height cylinder range is the most widely used Hi-Force cylinder design in the world today. All models have spring assisted return pistons and combine low closed height with optimum stroke lengths. Offering a compact, powerful force for a wide variety of applications in many industries including power generation, ship building & repair, construction, railways, mining, steel works, oil & gas and many others. The HLS range offers a compact, portable option in an inexpensive package.

- Spring assisted return
- Nitrocarburized piston rod
- Low friction bearing surfaces
- Anti-extrusion seals



Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HLS101	11	1.58	3.54	2.23	5.3
HLS201	22	1.73	7.69	4.43	10.6
HLS301	35	1.00	6.95	7.07	11.0
HLS302	35	2.36	16.71	7.07	15.4
HLS501	55	1.00	10.86	11.05	18.5
HLS502	55	2.36	26.11	11.05	22.9
HLS1001	120	1.00	23.42	23.78	43.7
HLS1002	120	2.36	56.18	23.78	52.9
HLS1501	162	1.00	31.48	31.96	81.6
HLS1502	162	2.36	62.89	31.96	92.6

Dimensions in inches					
A	B	C	D	E	F
3.74	2.76	1.50	M8	1.58	0.75
4.02	3.55	2.01	M8	2.36	0.75
3.27	4.02	2.36	M8	3.15	0.75
4.69	4.02	2.36	M8	3.15	0.75
3.59	5.00	2.76	M8	3.15	0.79
4.96	5.00	2.76	M8	3.15	0.79
4.26	7.01	4.49	M12	5.52	1.18
5.63	7.01	4.49	M12	5.52	1.18
5.12	8.51	4.49	M12	6.50	1.62
6.11	8.51	4.49	M12	6.50	1.62

HSS - SINGLE ACTING MULTI-PURPOSE CYLINDERS

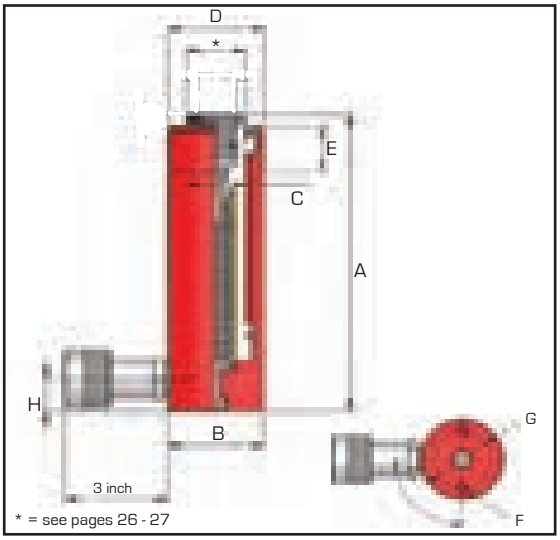
Capacities from 5 to 120 tons

Stroke lengths from 1 to 18 inches

Working pressure 10000 PSI

The HSS single acting multi-purpose cylinder range offers the widest choice of stroke lengths and lifting capacities available, and provides an excellent choice for maintenance, production, fabrication and construction applications. All models are provided with a collar thread and thread protector, cylinder base and piston rod mountings for easy fixturing, making the HSS range the most versatile and adaptable multi-purpose cylinders available. Major user industries include power generation, railways, steelworks, mining, shipyards and oil & gas.

- Spring assisted return
- Nitrocarburized piston rod
- Low friction bearing surfaces
- Anti-extrusion seals
- Collar threads withstand full load
- Piston rod thread on all models up to 33 tons
- Base mounting holes on all models (except HSS308)
- Optional piston rod saddles (see pages 26 - 27)
- Collar thread protector supplied as standard

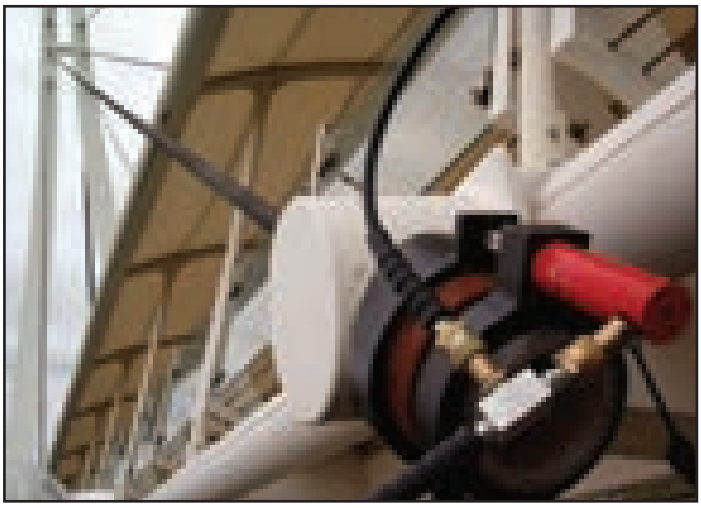


Lightweight aluminum alternatives available (see page 16)

Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HSS51	5	1.00	0.98	1.00	2.2
HSS52	5	1.97	1.95	1.00	2.6
HSS53	5	2.96	2.93	1.00	3.1
HSS54	5	3.94	3.90	1.00	3.3
HSS55	5	4.93	4.88	1.00	4.0
HSS57	5	6.93	6.89	1.00	4.4
HSS59	5	8.98	8.91	1.00	5.3
HSS101	11	1.00	2.20	2.23	4.0
HSS102	11	2.21	4.94	2.23	5.3
HSS104	11	3.94	8.78	2.23	6.6
HSS106	11	5.91	13.24	2.23	9.3
HSS108	11	8.12	18.12	2.23	11.0
HSS1010	11	9.85	22.02	2.23	11.9
HSS1012	11	12.02	26.84	2.23	13.7

Dimensions in inches (unless otherwise stated)							
A	B	C	D	E	F	G	H
4.22	1.50	0.95	1 ½"-16un	1.10	M6	1.00	0.75
5.20	1.50	0.95	1 ½"-16un	1.10	M6	1.00	0.75
6.19	1.50	0.95	1 ½"-16un	1.10	M6	1.00	0.75
7.17	1.50	0.95	1 ½"-16un	1.10	M6	1.00	0.75
8.16	1.50	0.95	1 ½"-16un	1.10	M6	1.00	0.75
10.17	1.50	0.95	1 ½"-16un	1.10	M6	1.00	0.75
12.14	1.50	0.95	1 ½"-16un	1.10	M6	1.00	0.75
3.94	2.25	1.38	2 ¼"-14un	1.06	M8	1.58	0.75
5.16	2.25	1.38	2 ¼"-14un	1.06	M8	1.58	0.75
6.90	2.25	1.38	2 ¼"-14un	1.06	M8	1.58	0.75
8.87	2.25	1.38	2 ¼"-14un	1.06	M8	1.58	0.75
11.07	2.25	1.38	2 ¼"-14un	1.06	M8	1.58	0.75
12.81	2.25	1.38	2 ¼"-14un	1.06	M8	1.58	0.75
14.93	2.25	1.38	2 ¼"-14un	1.06	M8	1.58	0.63

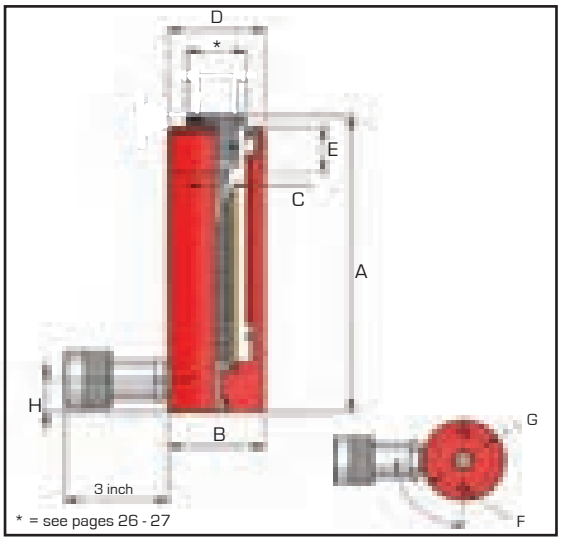
HSS - SINGLE ACTING MULTI-PURPOSE CYLINDERS



Spring assisted return

Nitrocarburized piston rod

Working pressure 10000 PSI



- Capacities from 5 to 120 tons
- Stroke lengths from 1 to 18 inches
- Low friction bearing surfaces
- Anti-extrusion seals
- Collar threads withstand full load
- Piston rod thread on all models up to 33 tons
- Base mounting holes on all models (except HSS308)
- Optional piston rod saddles (see pages 26 - 27)
- Collar thread protector supplied as standard

Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HSS152	16	1.97	6.16	3.15	7.5
HSS154	16	3.94	12.38	3.15	11.0
HSS156	16	5.91	18.54	3.15	14.6
HSS1510	16	9.85	30.93	3.15	19.4
HSS252	27	2.00	10.86	5.41	14.3
HSS254	27	4.02	21.72	5.41	17.6
HSS256	27	5.91	31.96	5.41	21.2
HSS258	27	8.00	43.25	5.41	24.7
HSS2510	27	9.85	53.31	5.41	27.8
HSS2514	27	14.03	75.76	5.41	37.0
HSS2518	27	18.00	97.42	5.41	47.2
HSS308	32	8.08	52.46	6.49	41.0
HSS502	55	2.00	22.20	11.05	28.7
HSS504	55	4.02	44.41	11.05	37.0
HSS506	55	6.00	66.12	11.05	44.1
HSS508	55	8.00	88.33	11.05	51.1
HSS5013	55	13.00	143.59	11.05	74.1
HSS756	80	6.00	95.22	15.92	68.3
HSS1004	120	4.02	95.47	23.78	91.7
HSS1006	120	6.03	143.17	23.78	109.8
HSS10010	120	10.00	237.66	23.78	144.4

Dimensions in inches (unless otherwise stated)							
A	B	C	D	E	F	G	H
6.07	2.76	1.62	2 3/4"-16un	1.54	M10	1.89	0.75
8.04	2.76	1.62	2 3/4"-16un	1.54	M10	1.89	0.75
10.00	2.76	1.62	2 3/4"-16un	1.54	M10	1.89	0.75
13.95	2.76	1.62	2 3/4"-16un	1.54	M10	1.89	0.75
6.86	3.39	2.13	3 5/16"-12un	1.93	M12	2.36	1.00
8.87	3.39	2.13	3 5/16"-12un	1.93	M12	2.36	1.00
10.76	3.39	2.13	3 5/16"-12un	1.93	M12	2.36	1.00
12.77	3.39	2.13	3 5/16"-12un	1.93	M12	2.36	1.00
14.74	3.39	2.13	3 5/16"-12un	1.93	M12	2.36	1.00
18.91	3.39	2.13	3 5/16"-12un	1.93	M12	2.36	1.00
24.07	3.39	2.13	3 5/16"-12un	1.93	M12	2.36	1.00
14.74	4.02	2.25	3 5/16"-12un	1.97	-	-	1.97
5.91	5.00	3.11	5"-12un	2.17	M12	3.35	0.79
7.92	5.00	3.11	5"-12un	2.17	M12	3.35	0.79
9.89	5.00	3.11	5"-12un	2.17	M12	3.35	0.79
11.90	5.00	3.11	5"-12un	2.17	M12	3.35	0.79
16.90	5.00	3.11	5"-12un	2.17	M12	3.35	0.79
10.72	5.75	3.74	5 3/4"-12un	1.77	M12	4.53	1.24
8.79	7.29	4.49	6 7/8"-12un	1.97	M12	5.75	1.26
10.80	7.29	4.49	6 7/8"-12un	1.97	M12	5.75	1.26
14.78	7.29	4.49	6 7/8"-12un	1.97	M12	5.75	1.26

HAS - SINGLE ACTING LIGHTWEIGHT ALUMINUM CYLINDERS

HAS1006

Capacities from 35 to 121 tons

Stroke length 6 inches

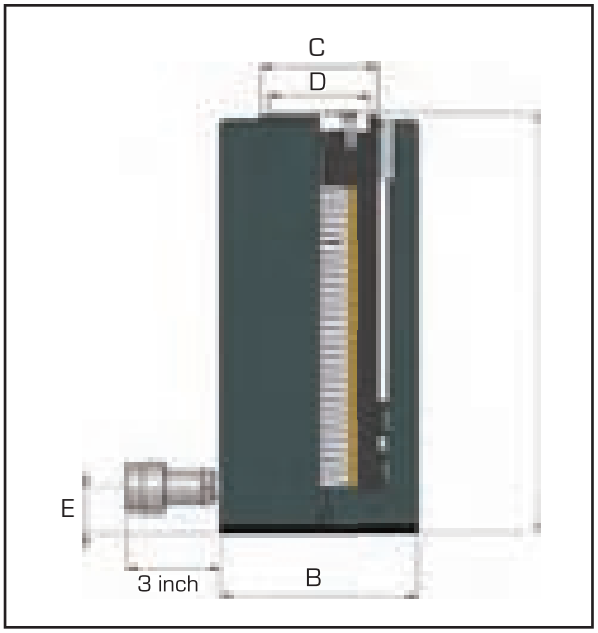
Working pressure 10000 PSI

The HAS range of single acting, lightweight, aluminum cylinders is specifically designed for applications where weight and ease of positioning are features of prime importance. With an average weight of approximately 50% of comparable capacity steel construction cylinders, all models are supplied with a hard anodized, wear resistant, piston rod and cylinder body and a steel cylinder base protection plate. Available lifting capacities range from 35 to 121 tons capacity, at maximum working pressure of 10000 PSI. All models are commonly used in a wide variety of industrial applications in shipyards, steel mills, construction and power plants. Other capacities and stroke length options available on request.

- Spring assisted return
- Hard anodized piston rod and cylinder
- Steel base plate to protect cylinder body
- Low friction bearing surfaces
- Optional piston rod saddles (see pages 26 - 27)

Please Note .....

Aluminum cylinders offer the benefit of greatly reduced weight compared to conventional steel cylinders. However, due to the inherent nature of the material, are not recommended for use in high cycle production applications. The recommended life cycle is estimated at approximately 5000 operations at maximum pressure, which in most lifting and maintenance applications represents a more than acceptable period of usage.



Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HAS306	35	6	41.00	6.85	13.2
HAS506	56	6	65.70	11.00	19.8
HAS1006	121	6	142.74	23.85	50.7

Dimensions in inches				
A	B	C	D	E
11.11	4.10	2.36	1.97	0.79
11.31	5.32	3.15	2.76	1.00
12.49	7.68	4.33	3.94	1.38

Note: Other capacities and stroke lengths available on request

HHA - SINGLE ACTING HOLLOW PISTON ALUMINUM CYLINDERS


HHA504

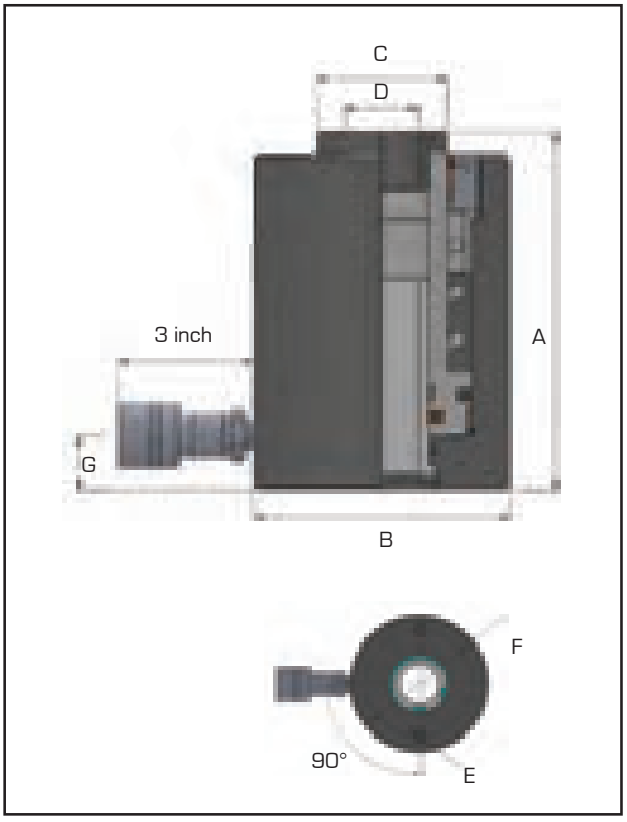
Capacities from 20 to 57 tons

Stroke lengths from 2 to 4.14 inches

Working pressure 10000 PSI

The HHA range of single acting hollow piston aluminum cylinders are specifically designed for applications where weight and ease of positioning are of prime importance. Similar in design to the HHS range, the HHA cylinder models have a hollow piston to enable a rod or cable to be passed through the entire cylinder length making it suitable for applications where a pulling force is required. All models are supplied with a hard anodized, wear resistant, piston rod and cylinder body and a steel cylinder base protection plate. Available lifting capacities range from 20 to 57 tons, at maximum working pressure of 10000 PSI.

- Spring assisted return
- Hard anodized piston rod and cylinder
- Steel base plate to protect cylinder body
- Low friction bearing surfaces
- Optional piston rod saddles (see pages 26 - 27)



Please Note.....

Aluminum cylinders offer the benefit of greatly reduced weight compared to conventional steel cylinders. However, due to the inherent nature of the material, are not recommended for use in high cycle production applications. The recommended life cycle is estimated at approximately 5000 operations at maximum pressure, which in most lifting and maintenance applications represents a more than acceptable period of usage.

Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HHA182	20	2.00	7.87	3.91	7.9
HHA372	41	2.00	16.23	8.08	15.9
HHA504	57	4.14	46.67	11.28	29.5

Dimensions in inches (unless otherwise stated)						
A	B	C	D	E	F	G
6.90	3.86	1.77	1.02	M8x10	2.60	1.02
7.60	5.36	2.72	1.54	M10x15	4.14	1.26
11.03	6.30	3.11	2.00	M10x15	5.13	1.54

HHS - SINGLE ACTING HOLLOW PISTON CYLINDERS

HHS302 HHS202

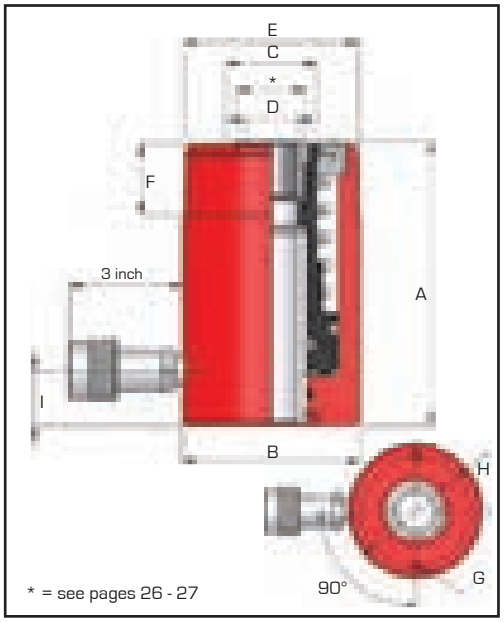
Capacities from 12 to 112 tonnes

Stroke lengths from 1 to 6 inches

Working pressure 10000 PSI

The HHS single acting hollow piston cylinder range is extremely versatile for use in tooling, maintenance and tensioning applications. Specifically designed with a hollow piston to enable a rod or cable to be passed through the entire cylinder length for applications where a pulling force is required, the HHS range is used extensively in post-tensioning and pre-stressing applications as well as testing of various bonded or mechanical anchoring systems. HHS cylinders can also be used for general lifting applications, when fitted with readily available interchangeable hardened steel piston rod saddles.

- Spring assisted return
- Nitrocarburized piston rod
- Low friction bearing surfaces
- Anti-extrusion seals
- Optional piston rod saddles (see pages 26 - 27)
- Collar thread protector supplied as standard



Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HHS101	12	1.00	2.38	2.45	6.2
HHS102	12	1.97	4.82	2.45	6.6
HHS106	12	6.00	14.64	2.45	22.5
HHS202	25	1.97	10.19	5.16	15.4
HHS206	25	5.91	30.50	5.16	30.4
HHS302	36	1.97	14.21	7.24	23.4
HHS306	36	6.00	43.31	7.24	42.3
HHS603	67	3.00	39.71	13.28	61.7
HHS606	67	5.91	78.39	13.28	89.5
HHS1003	112	3.00	66.37	22.18	141.1
HHS1006	112	5.91	130.97	22.18	165.3

Dimensions in inches (unless otherwise stated)								
A	B	C	D	E	F	G	H	I
4.33	2.76	1.50	0.79	2 3/4"-16un	1.18	M8	2.01	0.75
5.52	2.76	1.50	0.79	2 3/4"-16un	1.18	M8	2.01	0.75
11.70	2.76	1.50	0.79	2 3/4"-16un	1.18	M8	2.01	0.75
6.30	3.94	2.01	1.18	3 7/8"-12un	1.58	M8	3.25	1.22
12.06	3.94	2.01	1.18	3 7/8"-12un	1.58	M8	3.25	1.22
6.50	4.53	2.36	1.38	4 1/2"-12un	1.58	M8	3.62	1.22
12.61	4.53	2.36	1.38	4 1/2"-12un	1.58	M8	3.62	1.22
8.90	6.30	3.62	2.17	6 1/4"-12un	2.32	M12	5.12	1.22
12.41	6.30	3.62	2.17	6 1/4"-12un	2.32	M12	5.12	1.22
10.87	8.39	5.00	3.19	8 3/8"-12un	2.36	M16	7.01	1.77
13.79	8.39	5.00	3.19	8 3/8"-12un	2.36	M16	7.01	1.77

HHR - DOUBLE ACTING HOLLOW PISTON CYLINDERS

Capacities from 36 to 272 tons

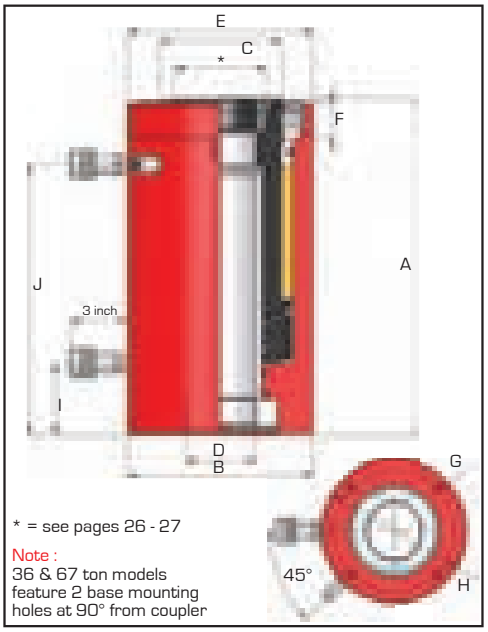
Stroke lengths from 2 to 12.02 inches

Working pressure 10000 PSI

B

The HHR double acting hollow piston cylinder range incorporates all of the design features of the HHS range with the added benefit of double acting design, which greatly enhances speed of operation and performance particularly in the longer length stroke options. Additionally a substantial hydraulic pulling force is available in the piston retraction mode of operation. Standard range models are featured in this catalog, however other stroke and tonnage options are available on request.

- Double acting design
- Nitrocarburized piston rod
- Annular area overload protection valve
- Low friction bearing surfaces
- Anti-extrusion seals
- Optional piston rod saddles (see pages 26 - 27)
- Collar thread protector supplied as standard



* = see pages 26 - 27

Note :
36 & 67 ton models feature 2 base mounting holes at 90° from coupler

Model number	Capacity Push tons	Capacity Pull tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs	Dimensions in inches (unless otherwise stated) A	B	C	D	E	F	G	H	I	J
HHR302	36	26	2.00	14.52	7.24	26.9	7.09	4.53	2.38	1.38	4 ½"-12un	1.58	M8	3.62	1.10	4.69
HHR306	36	26	5.91	42.76	7.24	38.8	11.00	4.53	2.38	1.38	4 ½"-12un	1.58	M8	3.62	1.10	8.59
HHR3012	36	26	12.02	86.86	7.24	56.7	17.10	4.53	2.38	1.38	4 ½"-12un	1.58	M8	3.62	1.10	14.70
HHR603	67	42	3.00	39.77	13.28	67.5	9.42	6.30	3.62	2.17	6 ¼"-12un	1.77	M12	5.12	1.22	6.54
HHR606	67	42	6.00	79.54	13.28	91.7	12.41	6.30	3.62	2.17	6 ¼"-12un	1.77	M12	5.12	1.22	9.53
HHR6010	67	42	10.00	132.92	13.28	112.7	16.43	6.30	3.62	2.17	6 ¼"-12un	1.77	M12	5.12	1.22	13.55
HHR1003	112	47	3.00	66.31	22.18	151.0	12.21	8.39	5.52	3.15	8 ⅜"-12un	1.58	M16	7.01	3.23	9.22
HHR1006	112	47	6.00	132.61	22.18	198.4	15.21	8.39	5.52	3.15	8 ⅜"-12un	1.58	M16	7.01	3.23	12.21
HHR1508	167	78	8.00	263.52	32.98	374.8	19.82	10.64	7.25	4.02	n/a	n/a	n/a	n/a	3.86	15.33
HHR2508	272	84	8.00	429.38	53.71	593.0	19.90	13.79	10.01	5.91	n/a	n/a	n/a	n/a	3.86	15.33

HDA - DOUBLE ACTING HIGH TONNAGE CYLINDERS

Capacities from 27 to 1115 tons

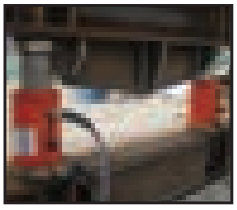
Stroke lengths from 6 to 13 inches

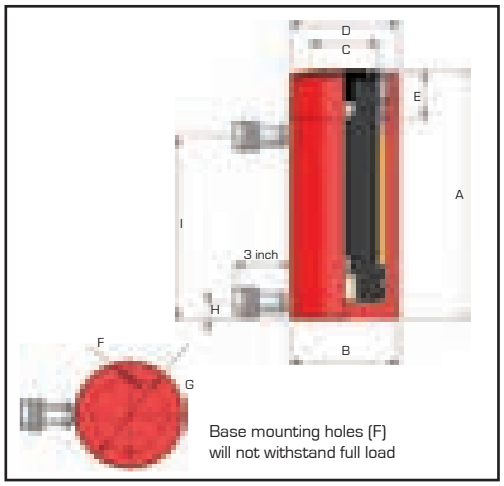
Working pressure 10000 PSI

The HDA double acting cylinder range offers the utmost in versatility and durability. Specifically designed for heavy duty lifting, construction and maintenance applications as well as presswork and industrial production, the double acting design provides substantial pulling force in the piston retraction mode as well as providing fast, controlled retraction for continuous duty cycle operation. All models up to 224 tons are supplied with flat saddle, piston rod threads and collar threads as standard. Models from 359 tons and upwards are supplied without collar thread and piston rod thread, however include replaceable tilting saddle as standard. Standard range models are featured in this catalog, however other stroke and tonnage options are available on request.

- Internal annular area overload protection valve
- Low friction bearing surfaces
- Nitrocarburized piston rod
- Anti-extrusion seals
- Lifting ring comes as standard on models from 55 to120 tons
- Eyebolts come as standard on models from167 to 1115 tons
- Base mounting holes*

*Base mounting holes are for location of cylinder only. They are not designed to resist the full capacity of the cylinder





Base mounting holes (F) will not withstand full load

Optional piston rod saddles on pages 26 - 27

Model number	Capacity Push tons	Capacity Pull tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HDA256	27	11	6.00	32.34	5.41	33.1
HDA506	55	16	6.00	65.90	11.05	62.6
HDA5013	55	16	13.00	143.41	11.05	93.9
HDA1006	120	40	6.00	142.18	23.76	142.2
HDA10013	120	40	13.00	308.78	23.76	196.2
HDA1506	167	87	6.00	198.94	33.20	198.4
HDA15012	167	87	12.02	398.48	33.20	265.7
HDA2006	224	104	6.00	264.23	44.21	286.2
HDA20012	224	104	12.02	530.30	44.21	369.1
HDA3006	359	-	6.00	424.11	70.90	425.5
HDA4006	439	-	6.00	518.09	86.63	630.5
HDA5006	573	-	6.00	676.75	113.13	820.1
HDA8006	892	-	6.00	1054.49	175.79	1433.0
HDA10006	1115	-	6.00	1319.33	220.00	1984.1

Dimensions in inches (unless otherwise stated)								
A	B	C	D	E	F*	G	H	I
11.31	3.62	1.97	3 5/16"-12un	2.09	M10	2.36	1.18	8.35
11.62	5.00	3.11	5"-12un	2.17	M12	3.35	0.79	8.51
18.64	5.00	3.11	5"-12un	2.17	M12	3.35	0.79	15.52
11.98	7.01	4.49	6 7/8"-12un	2.01	M12	5.75	1.18	8.90
19.00	7.01	4.49	6 7/8"-12un	2.01	M12	5.75	1.18	15.92
12.21	8.27	4.49	8"-12un	2.17	M16	6.30	1.38	9.10
18.24	8.27	4.49	8"-12un	2.17	M16	6.30	1.38	15.13
12.88	10.01	5.52	9 3/4"-12un	2.56	M20	7.29	1.69	9.38
18.91	10.01	5.52	9 3/4"-12un	2.56	M20	7.29	1.69	15.41
16.11	12.29	6.50	Optional	Optional	M20	6.23	1.97	10.32
16.98	14.18	8.51	Optional	Optional	M24	8.00	2.17	10.91
18.52	15.64	8.00	Optional	Optional	M24	8.00	2.56	11.82
21.08	19.70	11.82	Optional	Optional	Optional	Optional	2.76	12.53
23.25	21.28	12.61	Optional	Optional	Optional	Optional	3.90	14.07

HFL - SINGLE ACTING LOW HEIGHT FAILSAFE LOCK RING CYLINDERS

Capacities from 55 to 573 tons

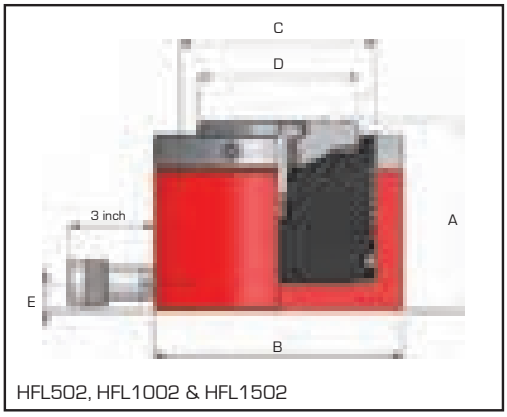
Stroke lengths from 1.77 to 2 inches

Working pressure 10000 PSI

The HFL low height single acting failsafe lock ring cylinder range combines all the versatility and efficiency of hydraulic power with the safety of mechanical load support, offering a sustainable lifting force in very confined work areas. Ideally suited for applications requiring load holding for extended periods, such as bridge support work. The HFL range features a single acting load return piston, threaded throughout its stroke length to suit the threaded mechanical load holding lock ring. All models are suitable for vertical lifting only and are supplied with tilting saddles as standard.

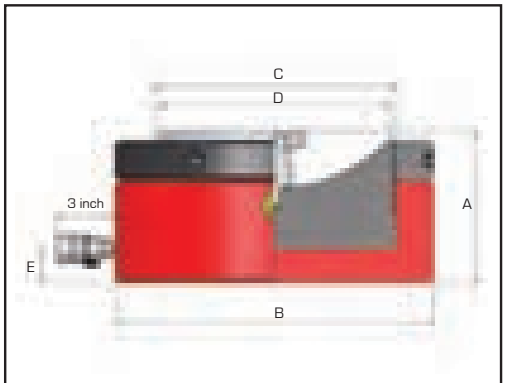
- Single acting load return design
- Nitrocarburized cylinder and piston rod for corrosion protection
- Low friction bearing surfaces
- Anti-extrusion seals
- Tilting saddle fitted as standard
- Overstroke restrictor port
- See pages 29 - 50 for pumps suitable for use with all Hi-Force cylinders

Saddle and piston rod details, see pages 26 - 27



HFL502, HFL1002 & HFL1502

For easy rotation of the load holding locking ring, Hi-Force recommends the purchase of tommy bar(s). Model numbers of suitable tommy bars are listed in below table.



HFL2502, HFL4002 & HFL5002

Model number	Capacity tons	Stroke inch	Oil cap. inch^3	Cyl. eff. area inch^2	Weight lbs	Tommy bar
HFL502	55	2.00	21.96	11.05	31.3	TTB10
HFL1002	120	1.97	47.00	23.78	55.3	TTB10
HFL1502	167	1.77	65.29	33.22	97.0	TTB10
HFL2502	287	1.77	100.69	56.75	153.0	TTB14
HFL4002	439	1.77	153.18	86.65	266.8	TTB16
HFL5002	573	1.77	200.77	113.13	410.1	TTB16

Dimensions in inches				
A	B	C	D	E
4.93	5.00	3.74	2.76	0.75
5.40	7.01	5.52	4.53	0.79
5.91	8.51	6.50	5.32	1.10
6.26	10.76	8.51	7.88	1.22
7.01	14.18	10.52	10.24	1.42
7.56	15.76	12.02	11.43	1.69

HFG - SINGLE ACTING FAILSAFE LOCK RING CYLINDERS

Capacities from 55 to 1115 tons

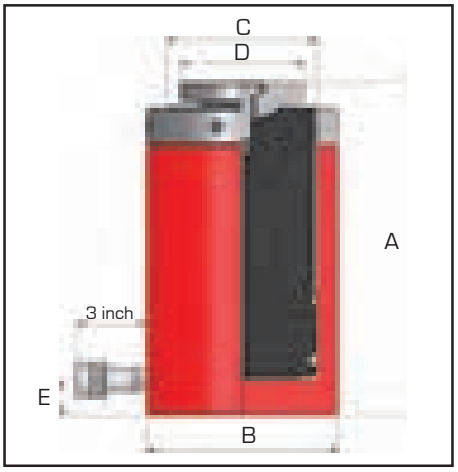
Stroke lengths from 1.97 to 6 inches

Working pressure 10000 PSI

The HFG single acting failsafe lock ring cylinder range combines all the versatility and efficiency of hydraulic power with the safety of mechanical load support. Ideally suited for applications requiring sustained load holding for extended periods, such as bridge support work, the HFG range features a single acting, load return piston, threaded throughout its stroke length to suit the threaded mechanical load holding lock ring. Simply jack up the load, wind down the mechanical lock ring until it comes into contact with the cylinder body, release the hydraulic pressure and sustain the load mechanically. All models are suitable for vertical lifting only and are supplied with tilting saddles as standard to reduce the risk of side loading the cylinder. Standard models are featured in this catalog, however other stroke and tonnage options are available on request.

- Single acting load return design
- Nitrocarburized cylinder and piston rod for corrosion protection
- Low friction bearing surfaces
- Anti-extrusion seals
- Tilting saddle fitted as standard
- Overstroke restrictor port

For easy rotation of the load holding locking ring, Hi-Force recommends the purchase of tommy bar(s). Model numbers of suitable tommy bars are listed in below table.



Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs	Tommy bar
HFG502	55	2.01	21.97	11.05	35.7	TTB10
HFG504	55	4.02	44.55	11.05	45.4	TTB10
HFG506	55	5.91	65.30	11.05	55.1	TTB10
HFG1002	120	2.01	46.38	23.78	77.2	TTB10
HFG1004	120	3.94	93.37	23.78	104.7	TTB10
HFG1006	120	5.91	140.35	23.78	135.6	TTB10
HFG1502	167	2.01	65.30	33.22	172.0	TTB10
HFG1504	167	3.94	130.60	33.22	185.2	TTB10
HFG1506	167	5.91	195.87	33.22	197.3	TTB10
HFG2002	224	1.97	86.65	44.19	210.3	TTB14
HFG2006	224	6.00	264.23	44.19	302.0	TTB14
HFG2506	282	6.00	335.65	56.81	377.0	TTB14
HFG3006	359	5.91	419.26	70.94	503.8	TTB14
HFG4006	439	5.95	515.07	86.65	680.1	TTB14
HFG5006	573	6.00	677.36	113.13	1007.5	TTB16
HFG8006	892	6.00	1066.15	175.79	1620.4	TTB14
HFG10006	1115	6.00	1318.80	220.00	2239.9	TTB16

Dimensions in inches				
A	B	C	D	E
6.82	5.00	3.74	2.76	1.00
8.83	5.00	3.74	2.76	1.00
10.72	5.00	3.74	2.76	1.00
7.45	7.29	5.52	4.53	1.08
9.46	7.01	5.52	4.53	1.08
12.25	7.01	5.52	4.53	1.08
9.34	8.51	6.50	5.32	1.65
11.35	8.51	6.50	5.32	1.65
13.32	8.51	6.50	5.32	1.65
10.28	10.01	7.49	5.32	1.97
14.26	10.01	7.49	5.32	1.97
15.80	10.76	8.51	5.91	1.97
16.43	12.21	9.50	5.91	1.97
18.08	14.18	10.52	7.09	2.76
19.62	15.76	12.02	7.09	3.15
22.26	18.91	14.97	13.40	3.15
24.43	21.28	16.75	13.40	3.55

Note: Other capacities and stroke lengths available on request

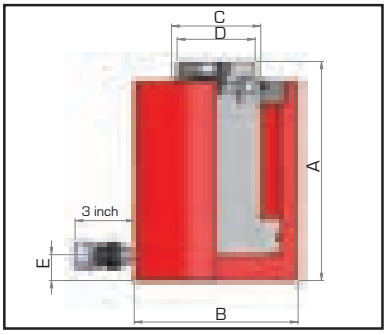
HGG - SINGLE ACTING LOAD RETURN INDUSTRIAL CYLINDERS


HGG2006

Capacities from 167 to 359 tons

Stroke length 6.11 inches

Working pressure 10000 PSI



The HGG range of load return industrial cylinders is specifically designed for lifting and maintenance applications. These single acting cylinders are supplied with a tilting saddle to reduce risks of damage caused by side loading and an integral stop ring for stroke limitation is fitted as standard. Standard range models are featured in this catalog, however additional capacities and stroke options are available on request.

Model number	Capacity tons	Stroke inch	Oil cap. inch^3	Cyl. eff. area inch^2	Weight lbs
HGG1506	167	6.11	202.59	33.22	128.5
HGG2006	224	6.11	282.54	44.19	210.1
HGG3006	359	6.11	433.27	70.94	338.4

Dimensions in inches				
A	B	C	D	E
11.70	8.27	4.49	3.94	1.46
12.21	10.00	5.52	5.32	1.97
13.51	12.29	6.50	5.91	1.97

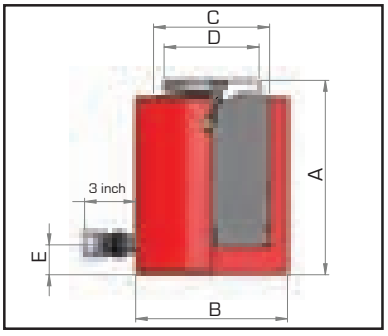
HSG - SINGLE ACTING LOAD RETURN CONSTRUCTION CYLINDERS


HSG2006

Capacities from 167 to 359 tons

Stroke length 6.00 to 6.03 inches

Working pressure 10000 PSI

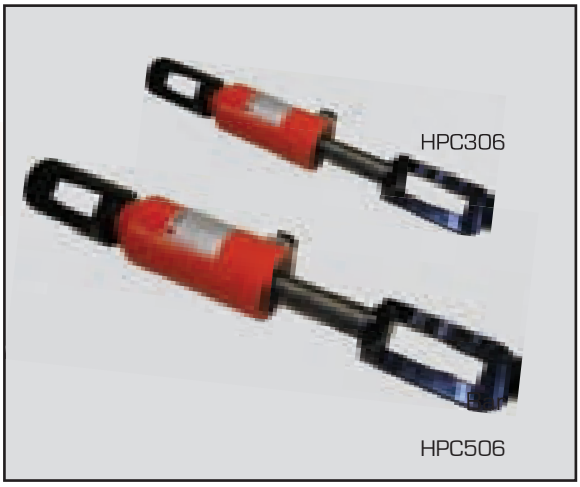


The HSG single acting load return construction cylinders are ideally suited for construction, civil engineering, heavy fabrication and maintenance applications. These cylinders are supplied with a tilting saddle fitted as standard and have a stroke limitation device incorporated for safety. Standard range models are featured in this catalog, however additional capacities and stroke options are available on request.

Model number	Capacity tons	Stroke inch	Oil cap. inch^3	Cyl. eff. area inch^2	Weight lbs
HSG1506	167	6.00	195.88	33.22	170.9
HSG2006	224	6.00	264.84	44.19	237.4
HSG3006	359	6.03	426.56	70.94	386.2

Dimensions in inches				
A	B	C	D	E
11.54	8.51	6.50	5.32	1.77
11.66	10.00	7.51	5.32	1.77
12.84	12.29	9.51	5.91	1.97

HPC - SINGLE ACTING PULL CYLINDERS



Capacities from 11 to 55 tons

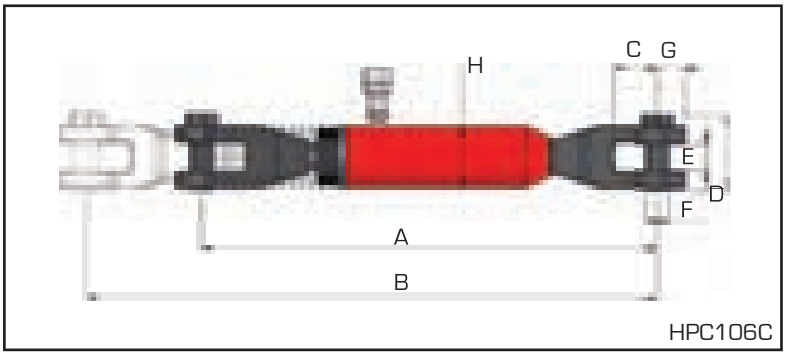
Stroke length 6 inches

Working pressure 10000 PSI

Hand and powered pumps suitable for use with HPC range pull cylinders are detailed on pages 29 to 50

The HPC pull cylinder range comprises of four models, with capacities ranging from 11 to 55 tons of pulling force. All models are 10000 PSI maximum working pressure and feature a single acting, spring assisted return piston, with a 6 inch stroke length. Fitted with easily replaceable machined pulling eyes on the piston rod and cylinder base, the 11 tons capacity version can also be supplied with clevis eye attachments. Typical applications for HPC pull cylinders are plate alignment prior to welding in shipyards, cable tensioning and heavy load moving using chains or wire ropes.

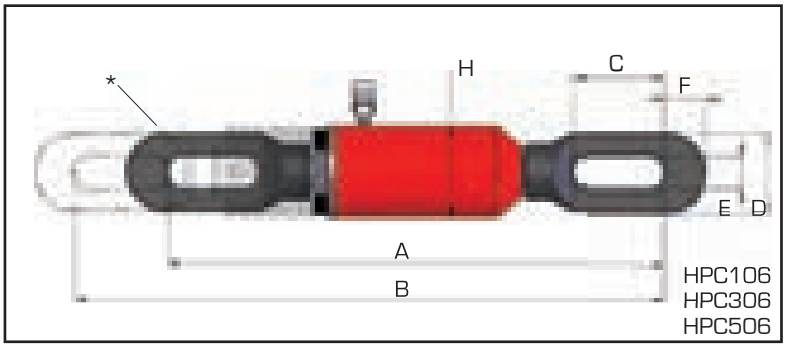
- Spring assisted return
- Surface treated piston rod
- Replaceable pulling and clevis eyes
- Piston wiper prevents contamination



HPC106C

Protective bellows are fitted as standard


HPC106 c/w bellows



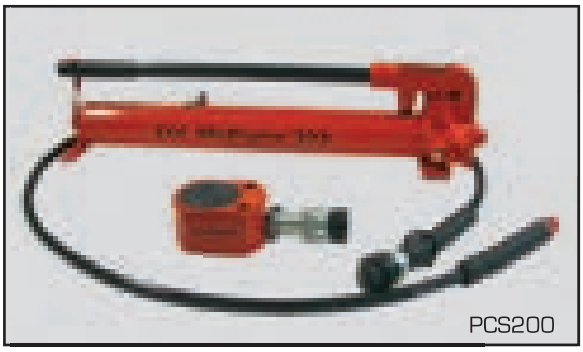
HPC106
HPC306
HPC506

* Eye bolt thickness: HPC106 = 0.87", HPC306 = 1.38", HPC506 = 1.57"

Model number	Capacity tons	Stroke inch	Oil cap. inch³	Cyl. eff. area inch²	Weight lbs
HPC106	11	6	13.91	2.33	26.5
HPC106C	11	6	13.91	2.33	34.2
HPC306	33	6	38.80	6.48	68.3
HPC506	55	6	65.76	11.00	119.0

Dimensions in inches							
A	B	C	D	E	F	G	H
23.64	29.63	4.49	2.64	1.26	1.30	-	3.15
23.72	29.71	2.29	3.90	1.38	1.18	1.42	3.15
27.38	33.37	5.71	4.14	1.65	1.97	-	4.81
32.27	38.26	5.87	5.12	2.05	2.72	-	6.03

PCS - PUMP AND CYLINDER SETS


PCS200

Capacities from 5 to 120 tons

Stroke lengths from 0.39 to 6.03 inches

Working pressure 10000 PSI

Hi-Force PCS pump and cylinder sets provide the simplest and most cost effective way to start your job immediately. All sets comprise of a Hi-Force hydraulic cylinder (wide choice available), suitable Hi-Force manual pump and a 6.5 feet hose with high flow, quick release coupler.

- 18 standard sets
- Cylinders are spring assisted return design
- Manual pumps include factory set relief valve
- Optional piston rod (tilting) saddles are available for most cylinder models (see pages 26 - 27)

For optional pressure gauges please refer to pages 53 - 54.

Set		Pump		Cylinder			Hose		
Model number	Cylinder capacity tons	Model number	Capacity inch^3	Model number	Stroke inch	Closed height inch	Model number	Length feet	Weight lbs
PCS50	5	HP110	61	HPS51	0.63	1.65	HC2	6.5	16.3
PCS53	5	HP110	61	HSS53	2.96	6.19	HC2	6.5	17.6
PCS100	11	HP110	61	HPS100	0.39	1.81	HC2	6.5	18.1
PCS101	11	HP110	61	HLS101	1.58	3.74	HC2	6.5	19.8
PCS102	11	HP110	61	HSS102	2.21	5.16	HC2	6.5	19.8
PCS106	11	HP110	61	HSS106	5.91	8.87	HC2	6.5	23.8
PCS200	22	HP110	61	HPS200	0.43	2.05	HC2	6.5	20.7
PCS201	22	HP110	61	HLS201	1.73	4.02	HC2	6.5	24.9
PCS256	27	HP110	61	HSS256	5.91	10.76	HC2	6.5	35.3
PCS300	35	HP110	61	HPS300	0.47	2.32	HC2	6.5	23.8
PCS302	35	HP110	61	HLS302	2.36	4.69	HC2	6.5	30.9
PCS502	55	HP110	61	HLS502	2.36	4.69	HC2	6.5	37.5
PCS506	55	HP232	122	HSS506	6.00	9.89	HC2	6.5	68.3
PCS1002	120	HP232	122	HLS1002	2.36	5.63	HC2	6.5	78.3
PCS1006	120	HP252	305	HSS1006	6.03	10.80	HC2	6.5	145.5
PCS202H	25	HP110	61	HHS202	1.97	6.30	HC2	6.5	30.6
PCS302H	36	HP110	61	HHS302	1.97	6.30	HC2	6.5	37.9
PCS603H	67	HP232	122	HHS603	3.00	8.90	HC2	6.5	76.3

Note : Models PCS202H, PCS302H & PCS603H are supplied with a hollow piston cylinder.

CYLINDER SADDLES & PISTON ROD THREAD SPECIFICATIONS

Cylinder Range	Saddles: Standard Saddle Model No.	Standard Saddle Figure	Optional Saddle Model No.	Optional Saddle Figure	Piston rod thread: Dimensions in inch A	B	C	Thread Size D	Figure
HSS Cylinder Range									
HSS5	HA5	1	-	-	-	-	0.79	¾"-16UNF	12
HSS10	HA10	1	HAT10	9	-	-	0.55	1"-8UNC	12
HSS15	HA15	1	HAT10	9	-	-	0.55	1"-8UNC	12
HSS25	HA25	1	HAT25	9	-	-	1.18	1½"-16UN	12
HSS30	HA30	1	HAT25	9	-	-	1.18	1½"-16UN	12
HSS50	HA50	2	HAT50	7	2.76	0.43	-	-	10
HSS75	HA75	2	HAT75	7	3.15	0.47	-	-	10
HSS100	HA100	2	HAT100	7	3.94	0.47	-	-	10
HAS Cylinder Range									
HAS30	HA30	2	HAT30	7	1.97	0.39	-	-	10
HAS50	HA50	2	HAT50	7	2.76	0.43	-	-	10
HAS100	HA100	2	HAT100	7	3.94	0.47	-	-	10
HHS Cylinder Range									
HHS11	HA102	4	HA102T, HA102G	5,6	1.26	0.28	0.83	M28x1.5	13
HHS23	HA202	4	HA202T, HA202G	5,6	1.69	0.39	1.22	M39x1.5	13
HHS33	HA302	4	HA302T, HA302G	5,6	2.05	0.39	1.22	M48x1.5	13
HHS61	HA603	4	HA603T, HA603G	5,6	3.15	0.39	1.22	M70x1.5	13
HHS102	HA1003	4	HA1003T, HA1003G	5,6	4.49	0.47	1.50	M105x2	13
HHA Cylinder Range									
HHA18	HA18	4	HA18T	5	-	-	1.10	M35x1.5	12
HHA37	HA37	4	HA37T	5	-	-	1.38	M50x1.5	12
HHA50	HA50	4	HA50T	5	-	-	1.46	M60x1.5	12
HHR Cylinder Range									
HHR33	HA302	4	HA302T, HA302G	5,6	2.05	0.39	1.26	M48x1.5	13
HHR61	HA603	4	HA603T, HA603G	5,6	3.15	0.39	1.26	M70x1.5	13
HHR102	HA1003	4	HA1003T, HA1003G	5,6	4.49	0.47	1.50	M105x2	13
HHR150	HA1508	4	HA1508G	6	6.70	0.53	1.97	M150x3	13
HHR250	HA2508	4	HA2508G	6	9.53	0.53	2.92	M220x3	13
HDA Cylinder Range									
HDA25	HD25	3	HD25T	9	1.77	0.35	1.38	1"-12UNF	11
HDA50	HD50	3	HD50T	9	2.76	0.43	1.77	1"-12UNF	11
HDA100	HD100	3	HD100T	9	3.94	0.47	2.17	1¾"-12UNF	11
HDA150	HD150	3	HD150T	9	3.94	0.47	2.05	3 "-16UN	11
HDA200	HD200	3	HD200T	9	4.33	0.47	2.76	2½"-12UN	11
HDA300	HD300T	7	HD300	2	5.91	1.00	-	-	-
HDA400	HD400T	7	HD400	2	7.09	1.00	-	-	-
HDA500	HD500T	7	HD500	2	7.09	1.00	-	-	-
HDA800	TS800	8	-	-	7.09	-	2.01	M24x3	14
HDA1000	TS1000	8	-	-	7.09	-	2.01	M24x3	14
HFG Cylinder Range									
HFG50	TS50	8	-	-	0.59	-	1.18	M8x1.25	14
HFG100	TS100	8	-	-	0.71	-	2.36	M12x1.75	14
HFG150	TS150	8	-	-	0.71	-	2.36	M12x1.75	14
HFG200	TS200	8	-	-	0.71	-	2.36	M12x1.75	14
HFG300	TS300	8	-	-	0.63	-	2.76	M10x1.5	14
HFG400	TS400	8	-	-	0.67	-	4.93	M12x1.75	14
HFG500	TS500	8	-	-	0.67	-	4.93	M12x1.75	14
HFG800	TS800	8	-	-	1.97	-	6.90	M24x3	14
HFG1000	TS1000	8	-	-	2.01	-	6.90	M24x3	14
HFL Cylinder Range									
HFL50	TS50	8	-	-	0.59	-	1.22	M8x1.25	14
HFL100	TS100	8	-	-	0.71	-	2.36	M12x1.75	14
HFL150	TS150	8	-	-	0.71	-	4.73	M12x1.75	14
HFL250	TS250	8	-	-	1.58	-	5.52	M10x1.5	14
HFL400	TS400	8	-	-	1.58	-	7.09	M12x1.75	14
HFL500	TS500	8	-	-	1.58	-	7.88	M12x1.75	14
HGG Cylinder Range									
HGG150	TS150	8	-	-	0.71	-	2.36	M12x1.75	14
HGG200	TS201	8	-	-	0.71	-	4.91	M12x1.75	14
HGG300	TS301	8	-	-	0.83	-	3.74	M12x1.75	14
HSG Cylinder Range									
HSG150	TS150	8	-	-	0.71	-	2.36	M12x1.75	14
HSG200	TS201	8	-	-	0.71	-	4.91	M12x1.75	14
HSG300	TS302	8	-	-	1.10	-	6.30	M22x2.5	14

CYLINDER SADDLES & PISTON ROD THREAD SPECIFICATIONS

SADDLE DRAWINGS (for specifications, see facing page)

Fig. 1

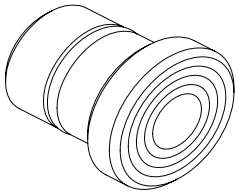


Fig. 2

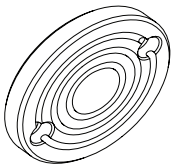


Fig. 3

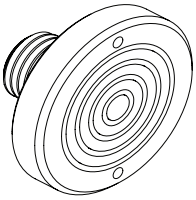


Fig. 4

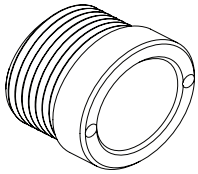
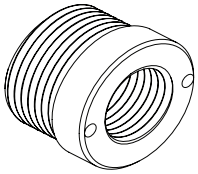


Fig. 5



Note: See below table for details on internal saddle thread

Fig. 6

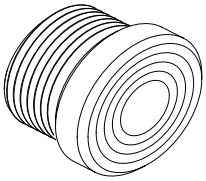


Fig. 7

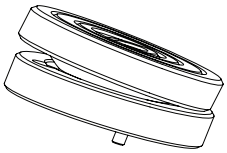
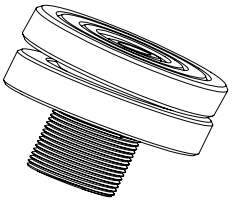


Fig. 8

Fig. 9



PISTON ROD DRAWINGS (for specifications, see facing page)

Fig. 10

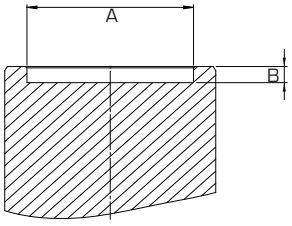


Fig. 11

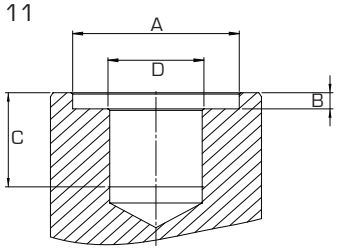


Fig. 12

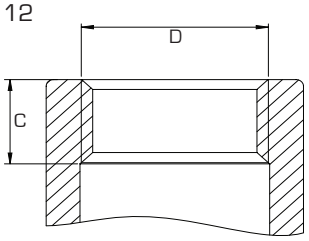


Fig. 13

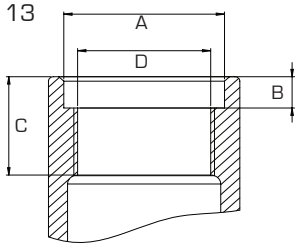
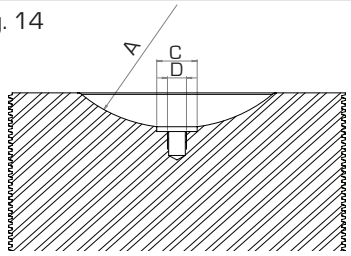
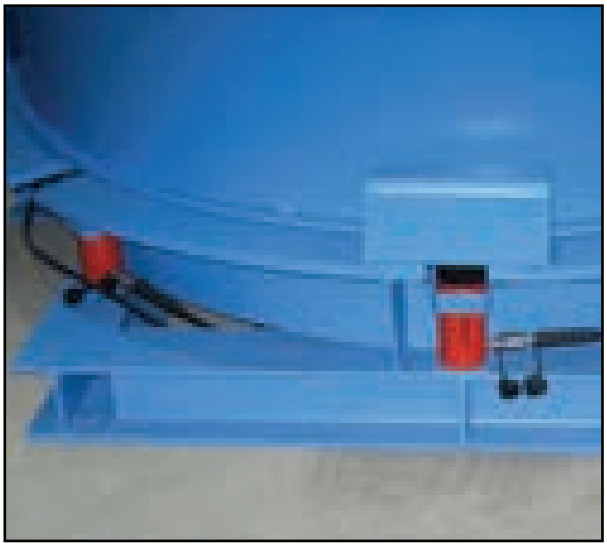


Fig. 14



Saddle Model	Internal saddle thread specification
HA18T	M24
HA37T	
HA50T	M48
HA102T	¾" - 16 UNF
HA202T	1" x 8 UNC
HA302T	1¼" x 7 UNC
HA603T	1⅝" x 5½" UNS
HA1003T	2½" x 8 UN

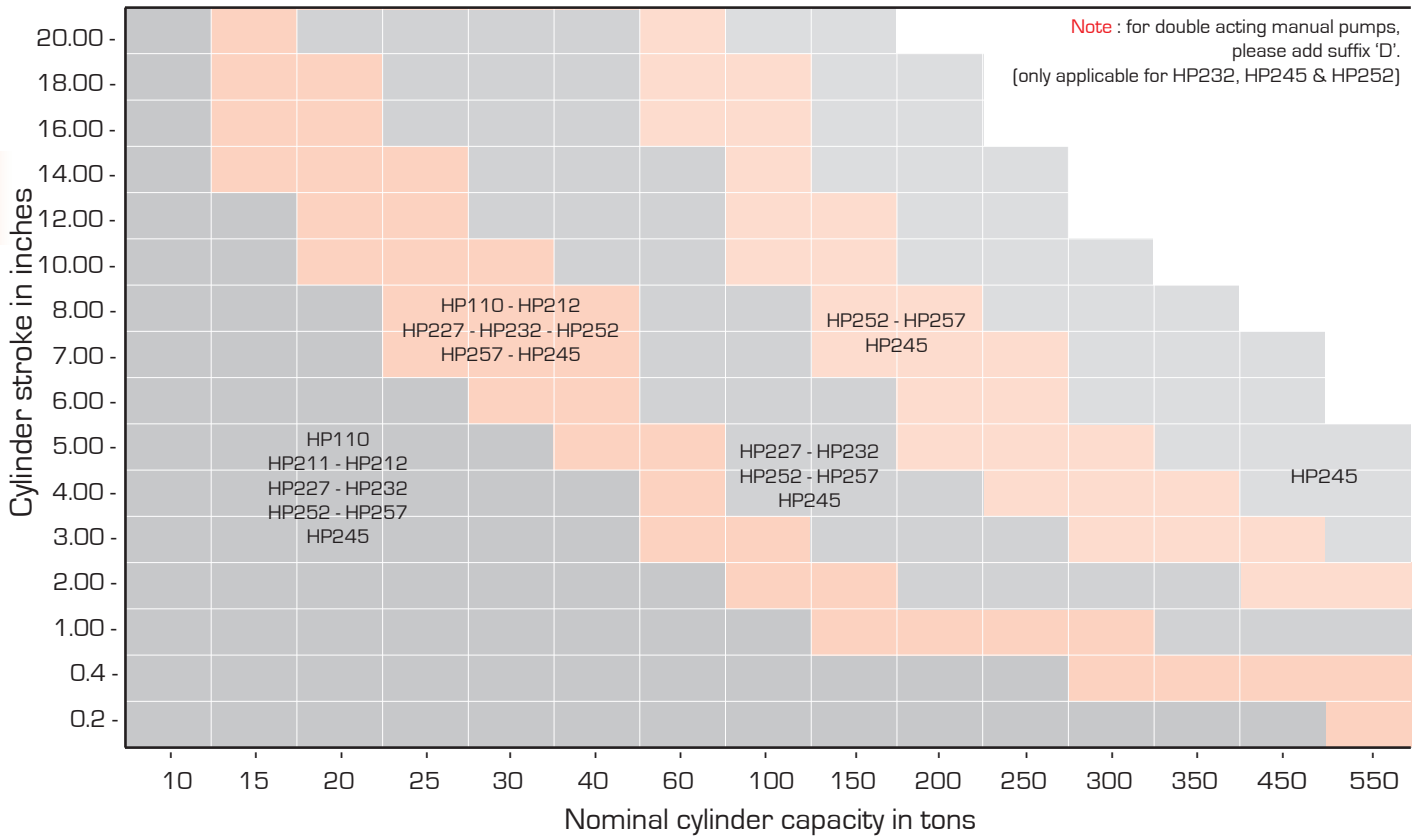
HYDRAULIC CYLINDER APPLICATIONS



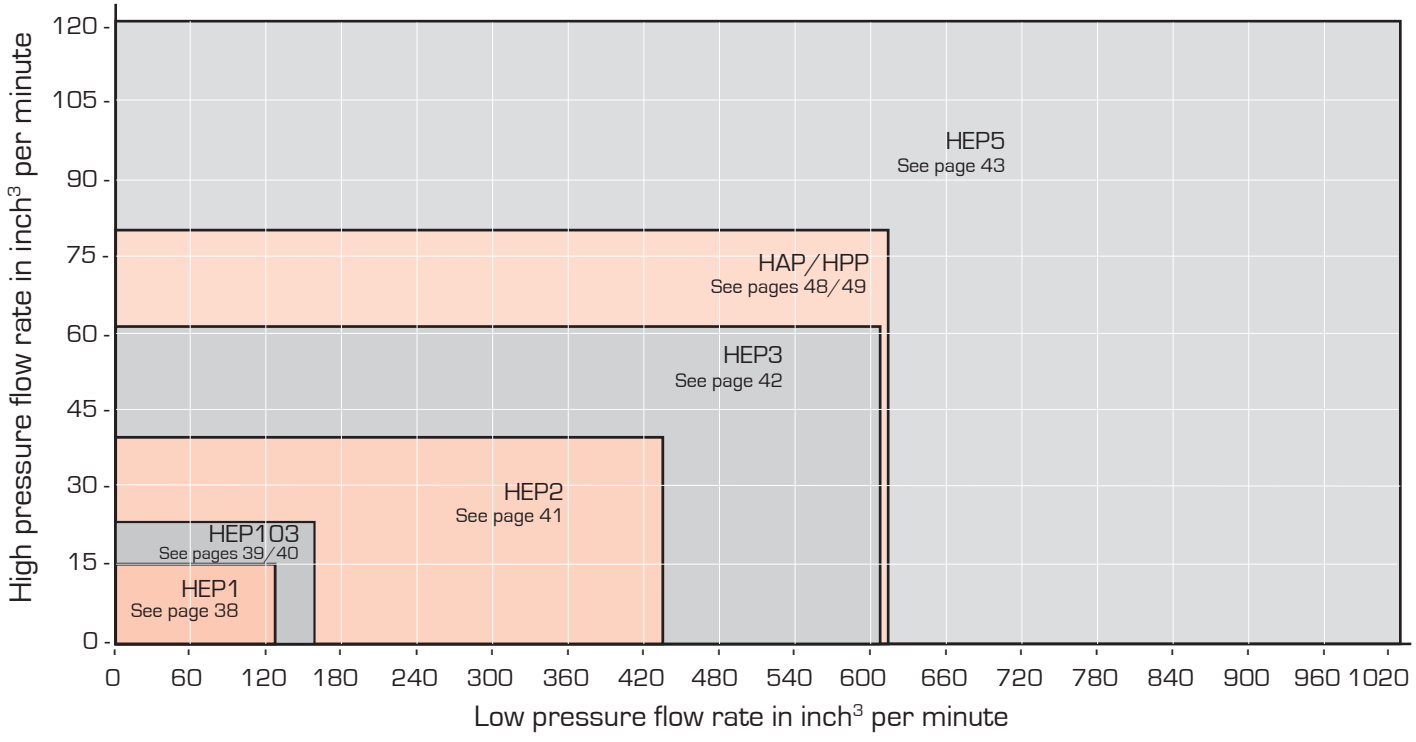
PUMPS

SELECTION TABLE FOR HI-FORCE HYDRAULIC PUMPS

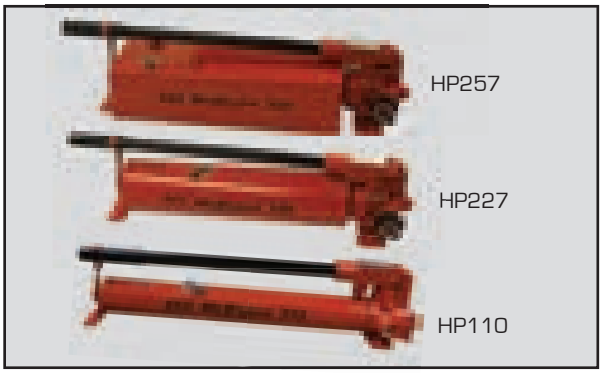
MANUAL PUMPS



POWERED PUMPS



HP - MANUALLY OPERATED PUMPS - STEEL



Single or two speed operation

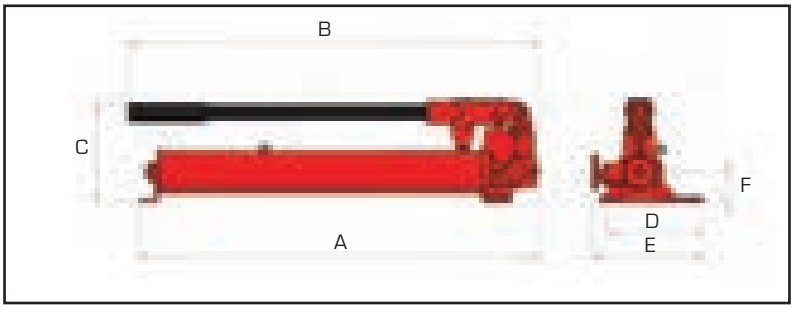
Choice of control valves

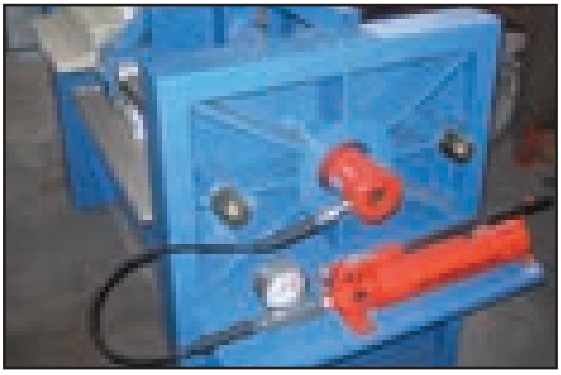
Working pressure 10000 PSI

C

The HP manually operated pump range offers a choice of single or two speed operation and all models are supplied complete with a pre-filled oil reservoir, ready for immediate use. All models have a maximum working pressure of 10000 PSI and the range includes pump models suitable for use with either single acting cylinders or tools. The HP range offers the ideal solution for applications where completely independent, portable hydraulic power is required. With low handle effort characteristics for easy operation, all models are of strong durable construction. Hi-Force HP manually operated pumps have a proven track record industry wide and offer excellent value for money in portable hydraulic power. A full range of system components suitable for use with HP manually operated pumps is detailed on pages 51 - 60.

- Oil reservoir capacity up to 250.2 inch^3
- Durable steel construction
- External pressure release valve
- Factory set safety relief valve
- Changeover pressure for two speed models is 203 PSI

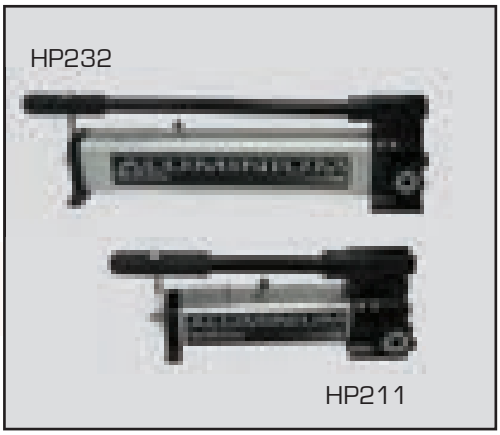




Model number	Valve type	Displacement per stroke inch^3 1st stage	2st stage	Usable oil cap. inch^3	Handle effort lbs	Weight lbs
Single speed hand operated pumps for single acting cylinders and tools						
HP110	2-way	0.18	-	61.02	99	12.3
Two speed hand operated pumps for single acting cylinders and tools						
HP227	2-way	0.79	0.14	140.35	84	23.1
HP257	2-way	0.79	0.14	250.20	84	33.5

Dimensions in inches A	B	C	D	E	F
22.00	22.30	5.04	5.28	5.71	1.58
21.43	23.52	6.62	5.32	5.71	2.09
21.47	23.52	6.62	5.32	5.91	2.09

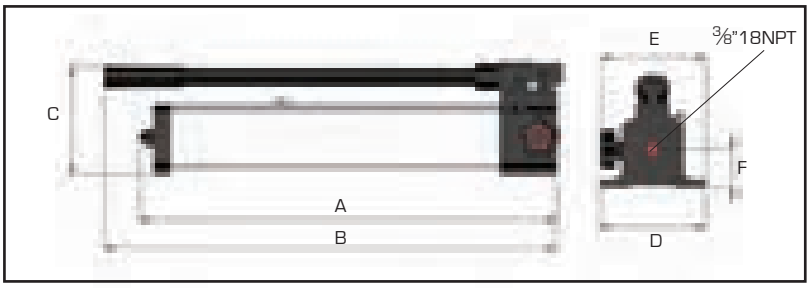
HP - MANUALLY OPERATED PUMPS - ALUMINUM



- Two speed operation
- Working pressure 10000 PSI
- Six models with choice of control valve

The HP manually operated aluminum pump range offers two speed operation and all models are supplied complete with a pre-filled oil reservoir, ready for immediate use. All models have a maximum working pressure of 10000 PSI and the range includes pump models suitable for use with either single or double acting cylinders and tools. The HP range offers the ideal solution for applications where completely independent, portable hydraulic power is required. With low handle effort characteristics for easy operation and lightweight design, all models are of strong durable construction. Hi-Force HP manually operated pumps have a proven track record industry wide and offer excellent value for money in portable hydraulic power.

- Oil reservoir capacity up to 305.12 inch^3
- Lightweight aluminum construction
- External pressure release valve
- Factory set safety relief valve
- Changeover pressure 203 PSI



Model number	Valve type	Displacement per stroke inch^3 1st stage	Displacement per stroke inch^3 2nd stage	Usable oil cap. inch^3	Handle effort lbs	Weight lbs	Dimensions in inches A	B	C	D	E	F
Two speed hand operated pumps for single acting cylinders and tools												
HP211	2-way	0.79	0.06	30.51	60	4.4	13.20	15.29	5.32	3.94	4.93	1.58
HP212	2-way	0.79	0.14	61.02	88	8.8	22.06	24.03	5.52	3.94	4.93	1.58
HP232	2-way	0.79	0.14	122.05	88	15.2	22.06	24.03	6.30	5.52	6.11	1.97
HP252	2-way	0.79	0.14	305.12	88	21.2	23.05	24.03	6.30	6.62	5.71	1.97
Two speed hand operated pumps for double acting cylinders and tools												
HP232D	4-way	0.79	0.14	122.05	88	19.2	22.85	24.63	6.30	5.52	6.90	1.18
HP252D	4-way	0.79	0.14	305.12	88	30.0	23.84	24.63	6.30	6.62	6.90	1.18

HP - MANUALLY OPERATED PUMPS - HIGH FLOW


HP245D

High flow manual pump

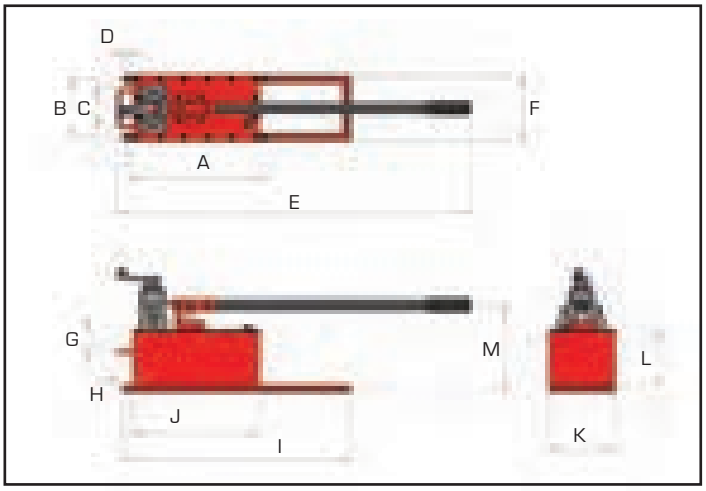
Working pressure 10000 PSI

2 stage with semi automatic change-over

C

The HP245 range of high flow, two speed, manually operated pumps is ideally suited for applications where high tonnage cylinders are to be used on sites, without any available electric or compressed air power supply. Both models are suitable for working pressures up to 10000 PSI and the very high, low pressure displacement (6.89 inch^3 per stroke), enables fast piston extension (and retraction) under no load. These high performance pumps are also ideally suited to multiple cylinder lifting applications where a larger volume of oil is required to complete the job. Available with a 2-way valve for single acting cylinders or a 4-way valve for double acting cylinders, both models are supplied with a pre-filled 2.64 gallon oil reservoir and are ready for immediate use.

- Durable steel construction
- Factory set safety relief valve
- Changeover pressure 406 PSI
- Low handle effort characteristics
- 2.64 gallons of usable oil capacity



Model number	Valve type	Displacement per stroke inch^3 1st stage	2nd stage	Usable oil cap. gallons	Handle effort lbs	Material	Weight lbs
Two speed hand operated pump for single acting cylinders and tools							
HP245	2-Way	6.89	0.24	2.64	88	Steel	65.0
Two speed hand operated pump for double acting cylinders and tools							
HP245D	4-Way	6.89	0.24	2.64	88	Steel	68.3

Model number	Dimensions in inches A	B	C	D	E	F	G	H	I	J	K	L	M
HP245	16.55	7.09	4.89	0.59	41.37	7.88	2.48	1.85	27.58	15.37	8.08	6.82	10.64
HP245D	16.55	7.09	4.89	0.59	41.37	7.88	2.48	1.85	27.58	15.37	8.08	6.82	10.64

HPX - MANUALLY OPERATED HIGH PRESSURE PUMP

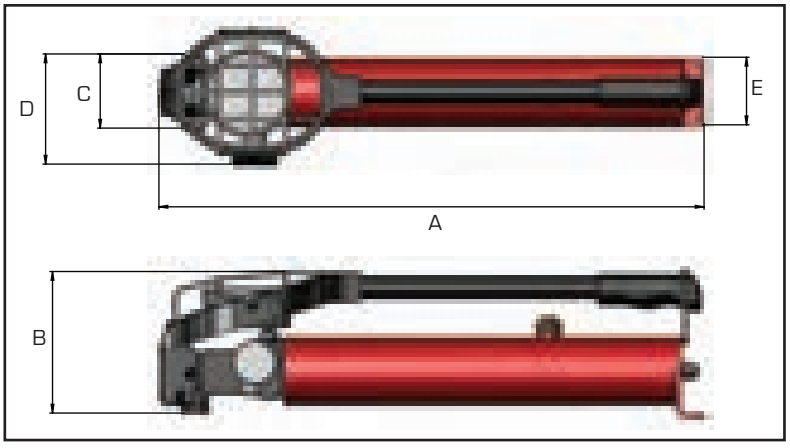
Compact design

Two speed operation

Working pressure up to 40600 PSI

The HPX range of manually operated ultra high pressure hydraulic pumps is specifically designed for high pressure applications such as oil injection for bushing removal, valve testing, calibration of high pressure equipment and instruments, laboratory burst and proof testing, etc. The two speed operation, on both the HPX1500 and HPX2800 incorporate automatic changeover from low to high pressure at 290 PSI, enabling smooth and low operator handle effort. Both models are fitted with a dual scale gauge reading Bar and PSI, inside a bespoke loop handle and feature a mesh casing to protect the gauge from accidental damage.

- Lightweight aluminum construction
- Factory set safety relief valve
- External pressure release valve
- Low handle effort
- Oil reservoir capacity of 73.23 inch^3



Model number	Working pressure PSI	Usable oil capacity inch^3	Displacement per stroke (inch^3) 1st stage	2nd stage	Outlet port	Weight lbs
HPX1500	21750	73.23	1.22	0.06	1/4" BSP	14.3
HPX2800	40600	73.23	1.22	0.05	9/16"-18 UNF	14.3

Dimensions in inches A	B	C	D	E
24.31	6.34	3.31	4.93	3.00
24.31	6.34	3.31	4.93	3.00

Optional hoses :

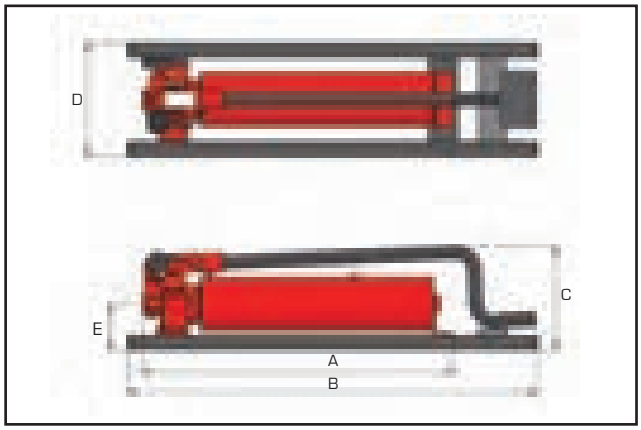
Model number	Working pressure PSI	Description
HPX15HH3	21750	10 feet hose with 1/4" BSP male thread each end
HPX15HH5	21750	16.5 feet hose with 1/4" BSP male thread each end
HPX28HH3	43500	10 feet hose with 9/16" UNF male coned thread each end
HPX28HH5	43500	16.5 feet hose with 9/16" UNF male coned thread each end

HP227FPC & HP227FP - MANUALLY OPERATED FOOT PUMPS

- Working pressure 10000 PSI
- Two stage operation
- Complete with accessories

The HP227FPC manually operated foot pump is supplied complete with a 4 inch diameter pressure gauge, gauge mounting block and 10 feet length hydraulic hose with CM1 quick connect male coupler. Ideally suited for use with Hi-Force CH series crimper heads (see pages 139 and 140) and all other Hi-Force 10000 PSI maximum working pressure, hydraulic tools that require a remote pump operation, the HP227FPC has a superb two speed low pressure displacement (0.79 inch^3 per stroke) with automatic changeover to high pressure displacement (0.14 inch^3 per stroke) up to 10000 PSI. Supplied with a pre-filled oil reservoir offering a usable oil capacity of 140.35 inch^3, the HP227FPC is supplied ready for immediate use.

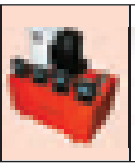
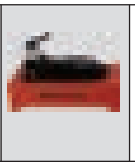
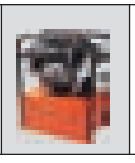
The HP227FP pump incorporates the same specification and features of the HP227FPC pump however is supplied without the pressure gauge, gauge mounting block and 10 feet hose assembly.



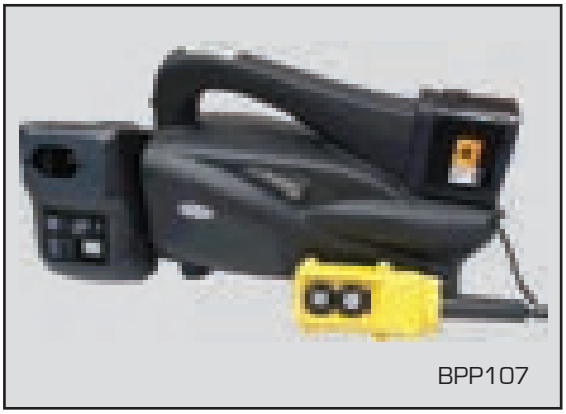
Model number	Valve type	Displacement per stroke inch^3 1st stage	2nd stage	Usable oil cap. inch^3	Handle effort lbs	Material	Weight lbs
HP227FPC	2-way	0.79	0.14	140.35	86	Steel	32.0
HP227FP	2-way	0.79	0.14	140.35	86	Steel	27.6

Dimensions in inches A	B	C	D	E
21.43	30.06	8.94	7.88	3.07
21.43	28.17	7.29	7.88	3.07

POWERED PUMPS - GENERAL INFORMATION

Light - Battery		On page 37 the BPP107 battery powered hydraulic pump is designed for operator convenience in terms of handling (only 17.6 lbs) and is driven by a powerful 14.4V long life battery. The pump incorporates an automatic pressure relief and release valve meaning that the pressure automatically relieves once the pump reaches its maximum pressure of 10000 PSI, making the pump ideal for use with Hi-Force CH series crimping tools, NS series Nut Splitters, HCH Cutters and HKP series knockout punchers.
Light		On page 38 the HEP1 series two stage electric driven hydraulic mini pump range offers a choice of 110 or 240 Volt motor, with both models being suitable for 10000 PSI maximum working pressure. The two stage design offers a low pressure flow rate up to 122.05 inch^3/min with automatic changeover to high pressure, with a flow rate up to 12.2 inch^3/min. Incorporating a 2-way solenoid valve and internal safety overload valve, both models are extremely compact & lightweight, suitable for use with single acting Hi-Force cylinders or tools.
Standard		On pages 39 & 40 the HEP103 series two stage electric driven hydraulic pump range offers a choice of 110 or 240 Volt electric driven motors. All models are suitable for 10000 PSI maximum working pressure. The two stage design offers a low pressure flow rate up to 152.56 inch^3/min with automatic changeover to high pressure, with a flow rate up to 21.36 inch^3/min. Available with manual or solenoid valve options, suitable for both single acting and double acting cylinders and tools in a wide variety of applications.
Intermediate		On page 41 the HEP2 series two stage electric driven hydraulic pump range offers a low pressure flow rate of 427.17 inch^3/min with automatic changeover to high pressure flow rate of 39.66 inch^3/min up to 10000 PSI with a choice of 110, 240 or 380/440 Volt motor options. With 2, 3 or 4-way manual and electric solenoid valve options the HEP2 series is suitable for a wide range of applications and is the most commonly selected Hi-Force electric pump. All HEP2 series pumps are also fitted with an externally adjustable pressure relief valve for easy adjustment up to the maximum working pressure of 10000 PSI.
Continuous		On page 42 the HEP3 series two stage electric driven hydraulic pump range has all the features of the HEP2 series, but with an increased flow of 610.24 inch^3/min at low pressure and 61.02 inch^3/min at high pressure (up to 10000 PSI) these pumps are particularly useful when operating high tonnage or long stroke cylinders. Both HEP2 and HEP3 range of electric pumps are fitted with totally enclosed, fan cooled, low noise, electric motors, making them ideal for quiet in-works operation or outdoor site use in most environments.
Heavy duty		On page 43 the HEP5 series two stage electric driven hydraulic pump range offers the highest flow rate combination in the Hi-Force range. Offering a low pressure flow rate of 1037.4 inch^3/min with automatic changeover to a superb high pressure flow rate of 122.05 inch^3/min. The HEP5 offers all the features of the HEP2 and HEP3 series with the addition of a 3 hp high speed, heavy duty motor, making it the ideal pump unit for all heavy duty applications, requiring a high flow and intensive usage over longer time periods.
Intermediate		On pages 44 - 45 the HSP series electric driven split flow hydraulic pump range offers users the opportunity to operate up to 8 independent hydraulic outlets from within a single pump assembly. With easy to operate controls HSP series pumps are ideally suited for synchronous lift applications particularly where there is uneven load distribution between the multiple jacking points. All models are 380/440 volt three phase electrical supply operation.
Light		On pages 46 & 47 the AHP11 series of air driven single stage pumps offer an economical and faster working alternative to basic hand operated pumps. Available with both 2-way and 4-way manually operated control valves AHP11 series pumps incorporate an ergonomically designed pedal offering the operator the choice of hand or foot operated control (excludes 4-way valve models). Remote air powered pendant control options also available.
Intermediate		On page 48 the HAP series two stage air driven hydraulic pump range offers a low pressure flow rate of 610.24 inch^3/min, with automatic changeover to high pressure flow rate, of 79.33 inch^3/min up to the 10000 PSI maximum working pressure. The modular construction of these pumps ensures that many similar features to the HEP2 & HEP3 series are included with the air motor driven motive force being the principle design difference.
Intermediate		On page 49 the HPP series two stage gasoline engine driven hydraulic pump range offers all the modular design and performance characteristics of the HAP series with the only principle difference being the change of motive force from air driven to gasoline engine driven. HPP series pumps are ideally suited for job site locations where electrical or compressed air power supply are not readily available.

BPP - BATTERY POWERED HYDRAULIC PUMP



BPP107

- Working pressure 10000 PSI
- Lightweight design
- 14.4V long life battery

The Hi-Force BPP107 battery powered hydraulic pump is designed for operator convenience in terms of handling and power supply. Driven by a powerful 14.4V long life battery, the unit takes away the physical effort required by a manually operated hand or foot pump, whilst at the same time eliminating the need for an external power source. The pump is supplied with a shoulder strap and its ergonomic lightweight design (17.6 lbs) makes the unit very portable and user friendly. The pump incorporates an automatic pressure relief and release valve meaning that the pressure automatically relieves once the pump reaches its maximum pressure of 10000 PSI, making the pump ideal for use with Hi-Force CH series crimping tools, NS series nut splitters, HCH cutters and HKP series knockout punchers.

Model number	Max working pressure	Voltage	Oil Cap inch³	Oil Flow inch³/min 1st stage	Oil Flow inch³/min 2nd stage	Weight lbs	Dimensions in inches Length	Width	Height
BPP107-A	10000 PSI	110V	42.72	30.51	9.15	17.6	14.00	6.30	10.24

ACCESSORIES

BP12

Model No	Description
BP12	Battery Pack 14.4V

Note: Charger supplied separately

CCU144

Model No	Description
CCU144	Car cigarette lighter charger unit

CU12

Model No	Description
CU12	Charger 110V - 230V

MP220

Model No	Description
Power supply to operate unit directly from mains	
MP110	110V
MP220	220/230V

HEP1 - ELECTRIC DRIVEN LIGHTWEIGHT MINI PUMPS WITH CARRYING STRAP


HEP1212S

Working pressure 10000 PSI

Two-stage design, changeover pressure 145 PSI

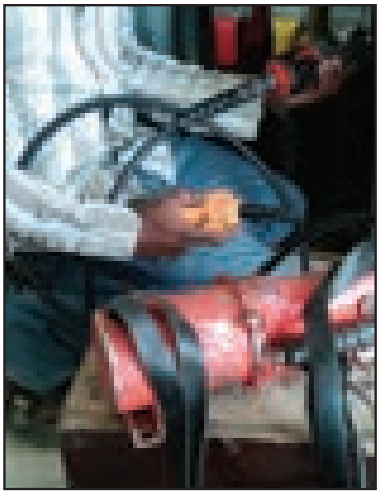
Extremely compact, lightweight & powerful

The HEP1 range of two stage electric driven hydraulic mini pumps, offers the smallest and lightest weight, electric powered pump in the Hi-Force product range. Available with a choice of 110 volt or 240 volt single phase electric motor, both models feature an electric solenoid operated valve, complete with remote hand pendant controller and 10 feet control cable as standard. The two stage design of these pumps incorporates an automatic changeover from low to high pressure ensuring that an optimum pressure and flow rate combination is achievable from an extremely compact pump.

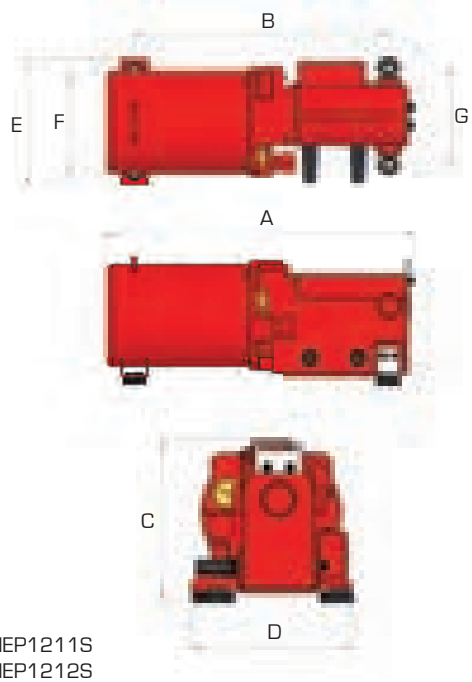
- 110 or 240V single phase motor options
- Internal safety overload valve
- Supplied with carrying strap

Model number	Motor voltage	Maximum pressure PSI	Maximum flow rate inch³/min 1st stage	2nd stage	Valve type	Usable oil cap. inch³	Weight lbs
HEP1211S	110 V - 1 Ph	10000	122.05	12.20	2-way	48.82	16.5
HEP1212S	240 V - 1Ph	10000	122.05	12.20	2-way	48.82	16.5

Note: All motors are dual frequency (50/60 Hz)



Model number	Dimensions in inches A	B	C	D	E	F	G
HEP1211S	13.12	10.6	5.52	5.48	5.44	4.33	4.14
HEP1212S	13.12	10.6	5.52	5.48	5.44	4.33	4.14



HEP1211S
HEP1212S

HEP103 - ELECTRIC DRIVEN TWO STAGE COMPACT PUMPS


HEP103442

Working pressure 10000 PSI

Choice of valve options

Compact, lightweight & powerful

C

The HEP103 range of two stage electric driven hydraulic pumps is suitable for a wide variety of applications and pumps are available in either 110 volt or 240 volt single phase electric motor options. Both voltage options also offer a choice of manual or electrically operated control valves, available as 2-way, 3-way or 4-way options with additional features like open center, closed center and locking valve designs available. Maximum working pressure is 10000 PSI with automatic low to high pressure changeover fitted as standard. All models are supplied complete with a glycerin filled hydraulic pressure gauge, pre-filled 1.06 gallons usable oil capacity reservoir with oil sight level gauge and an integral carrying handle for easy transportation of these lightweight, compact and versatile pumps to the job site.

Model number	Motor voltage	Maximum pressure PSI	Maximum flow rate inch³/min 1st stage	2nd stage	Changeover pressure PSI	Remote pendant functions	Usable oil capacity gallons	Weight lbs
Models featuring 2-way solenoid valve, normally closed (hold function), suitable for use with single acting cylinders and tools, requiring hold.								
HEP103241LS	110 V - 1 Ph	10000	152.55	21.36	2175	advance/retract	1.06	42.3
HEP103242LS	240 V - 1 Ph	10000	152.55	21.36	2175	advance/retract	1.06	42.3
Models featuring 2-way solenoid valve, normally open (auto retract function), suitable for use with single acting cylinders and tools, requiring auto retract.								
HEP103241S	110 V - 1Ph	10000	152.55	21.36	2175	advance/retract	1.06	45.2
HEP103242S	240 V - 1 Ph	10000	152.55	21.36	2175	advance/retract	1.06	45.2
Models featuring 3-way manually operated valve, suitable for use with single acting cylinders and tools.								
HEP103341	110 V - 1Ph	10000	152.55	21.36	2175	motor on/off	1.06	39.9
HEP103342	240 V - 1 Ph	10000	152.55	21.36	2175	motor on/off	1.06	39.9
Models featuring 4-way manually operated valve, suitable for use with double acting cylinders and tools.								
HEP103441	110 V - 1Ph	10000	152.55	21.36	2175	motor on/off	1.06	39.9
HEP103442	240 V - 1 Ph	10000	152.55	21.36	2175	motor on/off	1.06	39.9
Models featuring 4-way solenoid valve, locking feature on A and B port, suitable for use with double acting cylinders and tools, requiring hold.								
HEP103441LS	110 V - 1Ph	10000	152.55	21.36	2175	advance/retract	1.06	45.2
HEP103442LS	240 V - 1 Ph	10000	152.55	21.36	2175	advance/retract	1.06	45.2

Note: All motors are dual frequency (50/60 Hz)

HEP103 - ELECTRIC DRIVEN TWO STAGE COMPACT PUMPS

HEP103442

Working pressure 10000 PSI

Choice of valve options

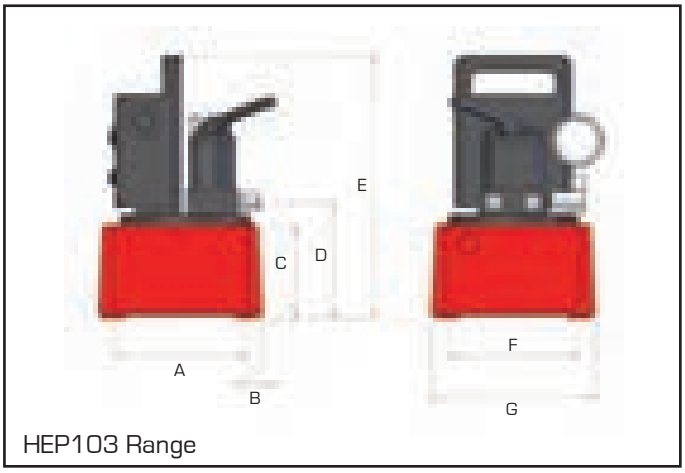
Compact, lightweight & powerful

- Integral carrying handle
- Pressure gauge and remote control fitted as standard
- Suitable for single and double acting cylinders and hydraulic tools
- All models are fitted with dual frequency (50/60 Hz) motor

Did you know .....

Hi-Force manufactures powered pumps with flow rates up to 1037.4 inch^3 per minute in low pressure and 122.05 inch^3 per minute up to 10000 PSI

See pages 41 to 43 for more details



HEP103 Range

All models	Dimensions in inches
A	7.68
B	1.00
C	4.63
D	5.58
E	13.47
F	8.27
G	10.24

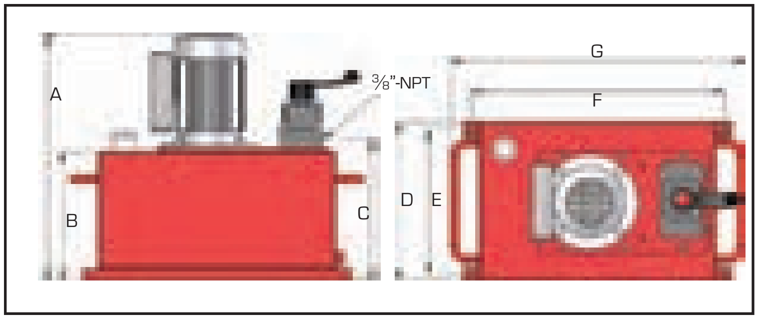
HEP2 - ELECTRIC DRIVEN PUMPS - GENERAL DUTY MEDIUM FLOW

Low pressure flow rate 427.17 in^3/min. up to 1000 PSI

High pressure flow rate 39.66 in^3/min. up to 10000 PSI

Two stage hydraulic pump unit

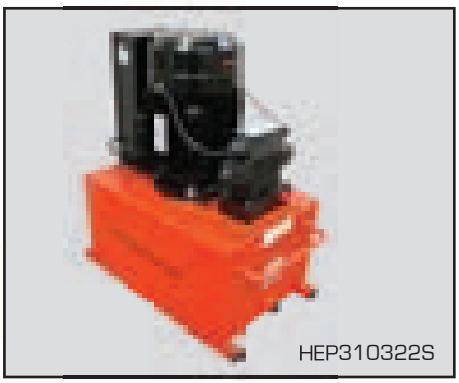
- Externally adjustable pressure relief valve
- Manual valve with load holding feature fitted as standard (excl. 2-way valves)
- Solenoid valve options available



Model number	Valve type	Oil cap. gallons	Motor hp	Motor voltage	Weight lbs	Dimensions in inches A	B	C	D	E	F	G
HEP207111H	P-T Plate	2.64	2.04	110 / 115 V - 1Ph	103.6	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207112H	P-T Plate	2.64	2.04	220 / 240 V - 1Ph	103.6	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207114H	P-T Plate	2.64	2.04	380 / 440 V - 3Ph	103.6	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207121H	P-T Plate	6.60	2.04	110 / 115 V - 1Ph	138.9	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207122H	P-T Plate	6.60	2.04	220 / 240 V - 1Ph	138.9	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207124H	P-T Plate	6.60	2.04	380 / 440 V - 3Ph	138.9	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207211H	2-way	2.64	2.04	110 / 115 V - 1Ph	104.7	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207212H	2-way	2.64	2.04	220 / 240 V - 1Ph	104.7	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207214H	2-way	2.64	2.04	380 / 440 V - 3Ph	104.7	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207221H	2-way	6.60	2.04	110 / 115 V - 1Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207222H	2-way	6.60	2.04	220 / 240 V - 1Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207224H	2-way	6.60	2.04	380 / 440 V - 3Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207311H	3-way	2.64	2.04	110 / 115 V - 1Ph	104.7	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207312H	3-way	2.64	2.04	220 / 240 V - 1Ph	104.7	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207314H	3-way	2.64	2.04	380 / 440 V - 3Ph	104.7	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207321H	3-way	6.60	2.04	110 / 115 V - 1Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207322H	3-way	6.60	2.04	220 / 240 V - 1Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207324H	3-way	6.60	2.04	380 / 440 V - 3Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207411H	4-way	2.64	2.04	110 / 115 V - 1Ph	104.7	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207412H	4-way	2.64	2.04	220 / 240 V - 1Ph	104.7	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207414H	4-way	2.64	2.04	380 / 440 V - 3Ph	104.7	19.62	7.80	9.06	9.69	8.71	14.50	17.26
HEP207421H	4-way	6.60	2.04	110 / 115 V - 1Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207422H	4-way	6.60	2.04	220 / 240 V - 1Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP207424H	4-way	6.60	2.04	380 / 440 V - 3Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46

Note: For optional extras please see page 50

HEP3 - ELECTRIC DRIVEN PUMPS - GENERAL DUTY HIGH FLOW

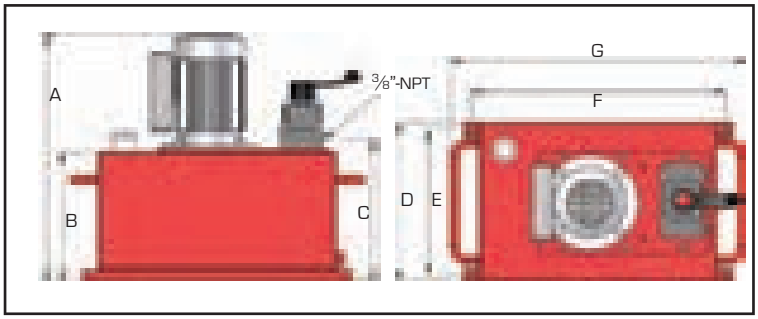


Low pressure flow rate 610.24 in^3/min. up to 1000 PSI

High pressure flow rate 61.02 in^3/min. up to 10000 PSI

Two stage hydraulic pump unit

- Externally adjustable pressure relief valve
- Manual valve with load holding feature fitted as standard (excl. 2-way valves)
- Solenoid valve options available



Model number	Valve type	Oil cap. gallons	Motor hp	Motor voltage	Weight lbs	Dimensions in inches A	B	C	D	E	F	G
HEP310121H	P-T Plate	6.60	3.0	110 / 115 V - 1Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310122H	P-T Plate	6.60	3.0	220 / 240 V - 1Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310124H	P-T Plate	6.60	3.0	380 / 440 V - 3Ph	140.0	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310141H	P-T Plate	10.56	3.0	110 / 115 V - 1Ph	195.1	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310142H	P-T Plate	10.56	3.0	220 / 240 V - 1Ph	195.1	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310144H	P-T Plate	10.56	3.0	380 / 440 V - 3Ph	195.1	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310221H	2-way	6.60	3.0	110 / 115 V - 1Ph	141.1	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310222H	2-way	6.60	3.0	220 / 240 V - 1Ph	141.1	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310224H	2-way	6.60	3.0	380 / 440 V - 3Ph	141.1	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310241H	2-way	10.56	3.0	110 / 115 V - 1Ph	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310242H	2-way	10.56	3.0	220 / 240 V - 1Ph	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310244H	2-way	10.56	3.0	380 / 440 V - 3Ph	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310321H	3-way	6.60	3.0	110 / 115 V - 1Ph	141.1	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310322H	3-way	6.60	3.0	220 / 240 V - 1Ph	141.1	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310324H	3-way	6.60	3.0	380 / 440 V - 3Ph	141.1	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310341H	3-way	10.56	3.0	110 / 115 V - 1Ph	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310342H	3-way	10.56	3.0	220 / 240 V - 1Ph	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310344H	3-way	10.56	3.0	380 / 440 V - 3Ph	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310421H	4-way	6.60	3.0	110 / 115 V - 1Ph	141.1	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310422H	4-way	6.60	3.0	220 / 240 V - 1Ph	141.1	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310424H	4-way	6.60	3.0	380 / 440 V - 3Ph	141.1	20.76	8.94	10.20	12.06	11.07	19.31	22.46
HEP310441H	4-way	10.56	3.0	110 / 115 V - 1Ph	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310442H	4-way	10.56	3.0	220 / 240 V - 1Ph	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP310444H	4-way	10.56	3.0	380 / 440 V - 3Ph	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06

Note: For optional extras please see page 50

HEP5 - ELECTRIC DRIVEN PUMPS - HEAVY DUTY HIGH FLOW

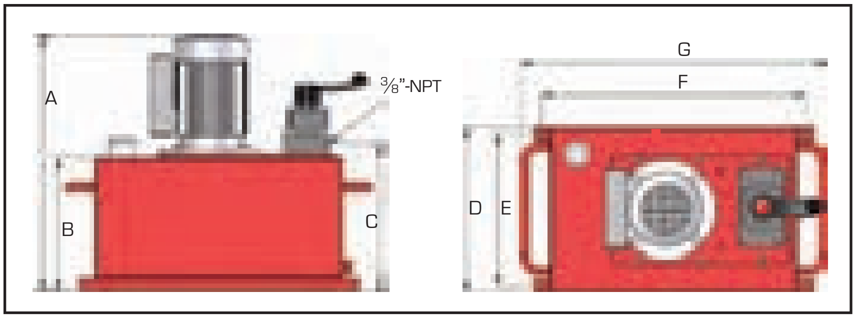
HEP517464

Low pressure flow rate 1037.4 in^3/min up to 1000 PSI

High pressure flow rate 122.05 in^3/min up to 10000 PSI

Two stage hydraulic pump unit

- Externally adjustable pressure relief valve
- Manual valve with load holding feature fitted as standard (excl. 2-way valves)
- Solenoid valve options available



Model number	Valve type	Oil cap. gallons	Motor hp	Motor voltage	Weight lbs	Dimensions in inches A	B	C	D	E	F	G
HEP517142H	P-T Plate	10.56	3.0	220 / 240	195.1	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP517144H	P-T Plate	10.56	3.0	380 / 440	195.1	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP517162H	P-T Plate	15.84	3.0	220 / 240	264.6	25.89	14.07	15.33	16.00	15.01	20.21	22.97
HEP517164H	P-T Plate	15.84	3.0	380 / 440	264.6	25.89	14.07	15.33	16.00	15.01	20.21	22.97
HEP517242H	2-way	10.56	3.0	220 / 240	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP517244H	2-way	10.56	3.0	380 / 440	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP517262H	2-way	15.84	3.0	220 / 240	264.6	25.89	14.07	15.33	16.00	15.01	20.21	22.97
HEP517264H	2-way	15.84	3.0	380 / 440	264.6	25.89	14.07	15.33	16.00	15.01	20.21	22.97
HEP517342H	3-way	10.56	3.0	220 / 240	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP517344H	3-way	10.56	3.0	380 / 440	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP517362H	3-way	15.84	3.0	220 / 240	264.6	25.89	14.07	15.33	16.00	15.01	20.21	22.97
HEP517364H	3-way	15.84	3.0	380 / 440	264.6	25.89	14.07	15.33	16.00	15.01	20.21	22.97
HEP517442H	4-way	10.56	3.0	220 / 240	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP517444H	4-way	10.56	3.0	380 / 440	196.2	25.06	13.24	14.50	12.06	11.07	19.31	22.06
HEP517462H	4-way	15.84	3.0	220 / 240	264.6	25.89	14.07	15.33	16.00	15.01	20.21	22.97
HEP517464H	4-way	15.84	3.0	380 / 440	264.6	25.89	14.07	15.33	16.00	15.01	20.21	22.97

Note: For optional extras please see page 50

HSP - ELECTRIC DRIVEN SPLIT FLOW MULTI-OUTLET PUMPS


HSP44E104

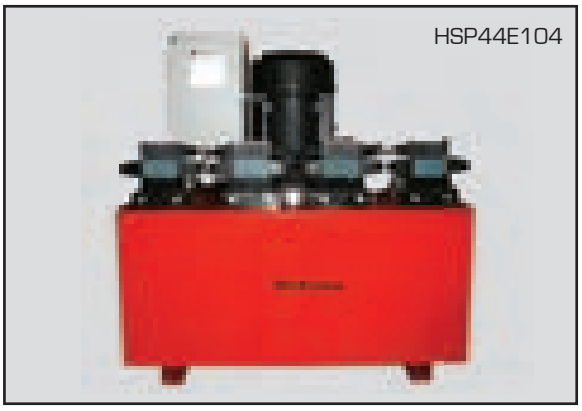
- Working pressure 10000 PSI
- Multiple outlet valve options
- Precise control to achieve synchronized lift

The HSP range of electric driven, split flow, hydraulic pumps is designed to deliver equal volumes of oil from each individual control valve regardless of any variations in the hydraulic pressure. The range offers a selection of outlet valve configurations ranging from a 2-outlet model with manually operated directional control valves, through to a 8-outlet model with electric solenoid operated valves. Each valve outlet is connected directly to an independent internal piston pump which is driven by a common electric motive force. This technology allows each internal piston pump to deliver an equal amount of oil flow per minute regardless of any variations in the required operating pressure at each control valve outlet. With HSP split flow pumps lifting and positioning large, unevenly weighted loads using multiple jacking points in a synchronized, level lift and controlled manner is easily achievable. Individual control of each valve on all electric valve versions, is via a specially made electric control box with easily identifiable on/off switches for each applicable valve plus a synchronized lift control button for all of the selected control valves. Maximum working pressure of all HSP pumps is 10000 PSI with an externally adjustable pressure relief valve on each outlet for easy pressure adjustment between 1000 and 10000 PSI. A full range of system components is available and detailed on pages 51 to 60.

Optional extra's include a fully automatic PLC controlled synchronized lifting system, with a variety of user settings, such as target lifting height, maximum tolerance between the jacking points and other key settings, all controlled from a centralized touch screen computer.

Model number	Valve configuration	Valve type	Oil capacity gallons	Oil flow per outlet inch^3/min	Motor voltage	Weight lbs
HSP23M54	2 x 3-way	manual	13.21	54.92	380 / 440	392.4
HSP24M54	2 x 4-way	manual	13.21	54.92	380 / 440	392.4
HSP33M104	3 x 3-way	manual	26.41	109.84	380 / 440	734.1
HSP34M104	3 x 4-way	manual	26.41	109.84	380 / 440	734.1
HSP43M104	4 x 3-way	manual	26.41	67.13	380 / 440	599.7
HSP44M104	4 x 4-way	manual	26.41	67.13	380 / 440	599.7
HSP23E54	2 x 3-way	electric	13.21	54.92	380 / 440	396.8
HSP24E54	2 x 4-way	electric	13.21	54.92	380 / 440	396.8
HSP33E104	3 x 3-way	electric	26.41	109.84	380 / 440	738.5
HSP34E104	3 x 4-way	electric	26.41	109.84	380 / 440	738.5
HSP43E104	4 x 3-way	electric	26.41	67.13	380 / 440	604.1
HSP44E104	4 x 4-way	electric	26.41	67.13	380 / 440	604.1
HSP63E104	6 x 3-way	electric	26.41	54.92	380 / 440	738.5
HSP64E104	6 x 4-way	electric	26.41	54.92	380 / 440	738.5
HSP83E104	8 x 3-way	electric	39.62	42.72	380 / 440	815.7
HSP84E104	8 x 4-way	electric	39.62	42.72	380 / 440	815.7

HSP - ELECTRIC DRIVEN SPLIT FLOW MULTI-OUTLET PUMPS



Choice of manual or electric valve options

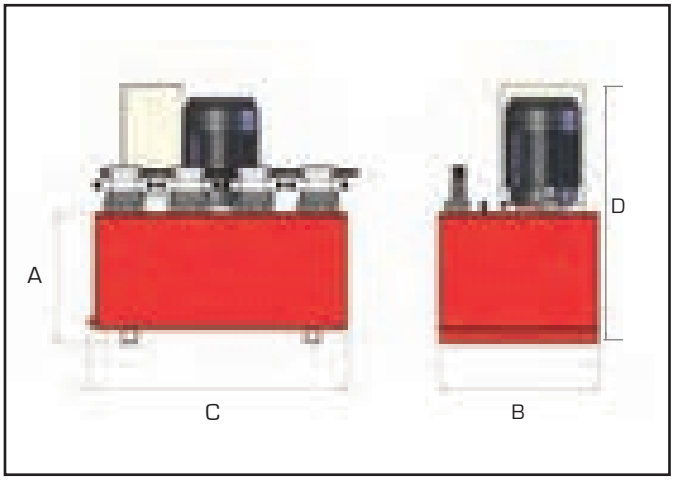
Reservoir capacity 13.21 to 39.62 gallons

Consistent single speed flow rate

C

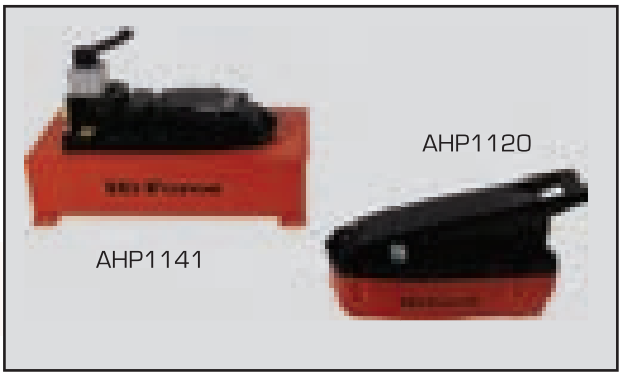
- Working pressure 10000 PSI
- Equal output flow regardless of pressure
- Control panel with selector switches for each individual outlet, allowing for single or multiple (synchronized) operation
- Externally adjustable pressure relief valve for control of maximum system pressure

Hi-Force HSP series split flow pumps fitted with low voltage solenoid valves are complete with a low voltage control system, which allows the user to individually or simultaneously control each valve and the movement of the lifting cylinder pistons. Once the load is correctly supported, by the selected cylinder pistons, the synchronized lift operation can commence. The operation of the HSP Pump Unit can be entirely controlled from the remote control panel, which features individual valve on/off switches and a set of cylinder piston lift and lower buttons that can be individually selected for inclusion in the lift operation.



Model number	Oil capacity gallons	Dimensions in inches A	B	C	D
HSP2 (all models)	13.21	18.12	22.46	19.70	32.19
HSP3 (all models)	26.41	18.12	22.46	36.25	36.25
HSP4 (all models)	26.41	18.12	22.46	36.25	36.25
HSP6 (all models)	26.41	18.52	31.52	29.55	36.25
HSP8 (all models)	39.62	18.52	31.52	39.79	42.75

AHP11 - AIR DRIVEN SINGLE STAGE HAND OR FOOT OPERATED PUMPS



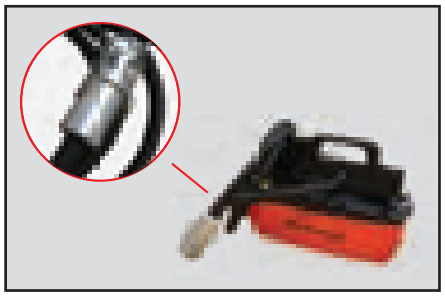
Working pressure 10000 PSI

Operates from standard 100 PSI air supply

Compact, lightweight & powerful

The AHP11 single stage air powered hydraulic pump range provides an economical, portable alternative to manually operated hydraulic pumps. Designed to operate from a standard 100 PSI compressed air supply, these versatile compact pumps are ideally suited for use with Hi-Force hydraulic cylinders and tools in maintenance and construction applications. The ergonomically designed pump treadle can be operated by hand or foot for better versatility. With a choice of reservoir capacities, all models are supplied pre-filled with hydraulic oil ready for immediate use. A full range of system components suitable for use with AHP11 series pumps is detailed on pages 51 - 60.

- Choice of 2-way or 4-way control valves
- Internal safety overload valve
- Reservoir oil sight level gauge
- Standard oil reservoir capacities up to 2.64 gallons



OPTIONAL REMOTE PENDANT:

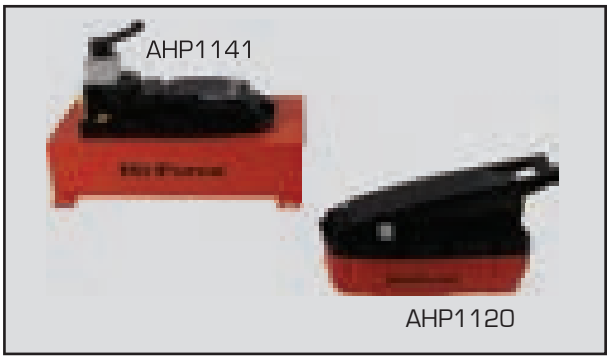
Please suffix model number with 'R' for remote pendant options to suit AHP1120, AHP1121 and AHP1122.

Filter, regulator & lubricator units for use in combination with air driven pump units are also available.

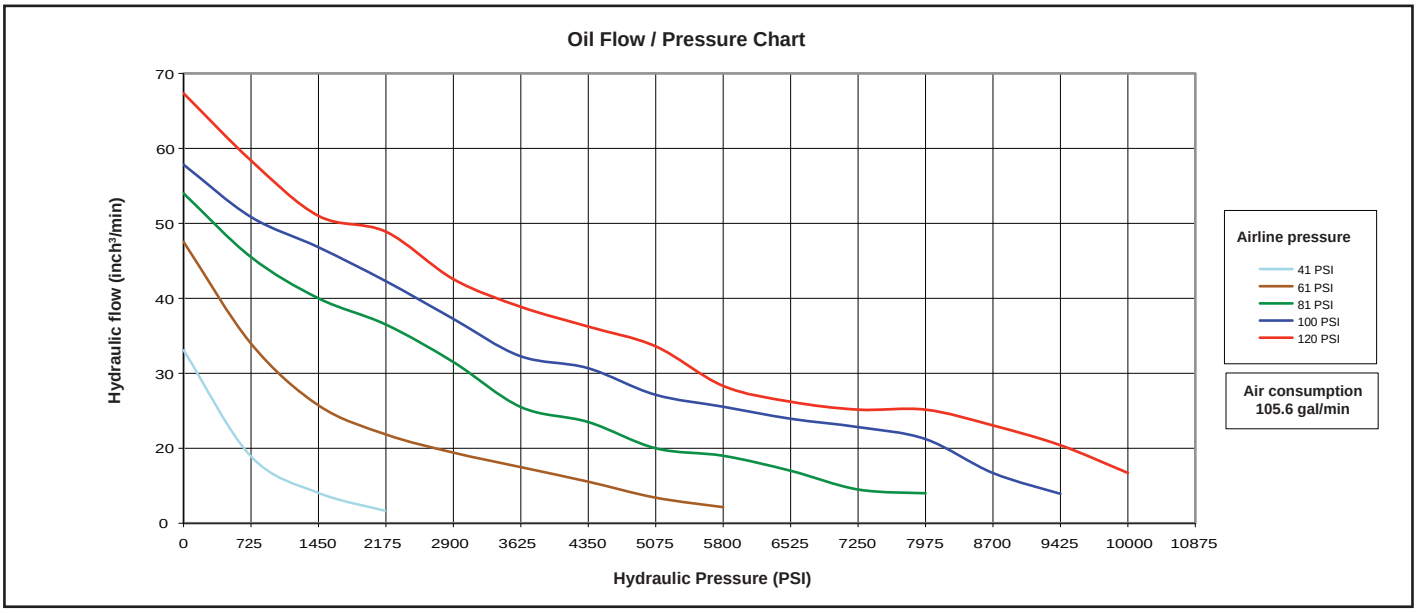
Please see page 91 for more details.

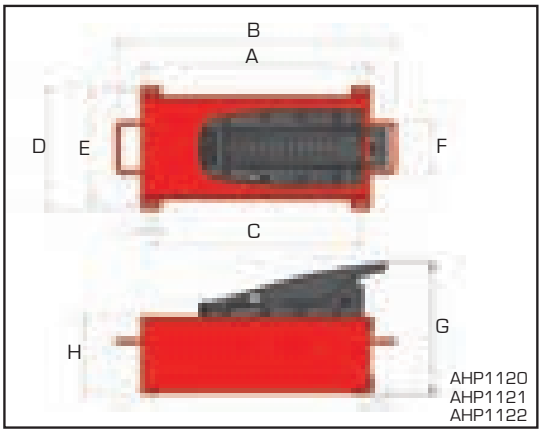
Model number	Maximum pressure PSI	Maximum flow rate inch^3/min	Valve type	Usable oil capacity gallons	Air inlet connection G	Oil outlet connection NPTF	Weight lbs
AHP1120	10000	48.82	2-way	0.63	1/4"	3/8"	10.4
AHP1121	10000	48.82	2-way	1.32	1/4"	3/8"	19.8
AHP1122	10000	48.82	2-way	2.64	1/4"	3/8"	39.2
AHP1141	10000	48.82	4-way	1.32	1/4"	3/8"	20.9
AHP1142	10000	48.82	4-way	2.64	1/4"	3/8"	40.3

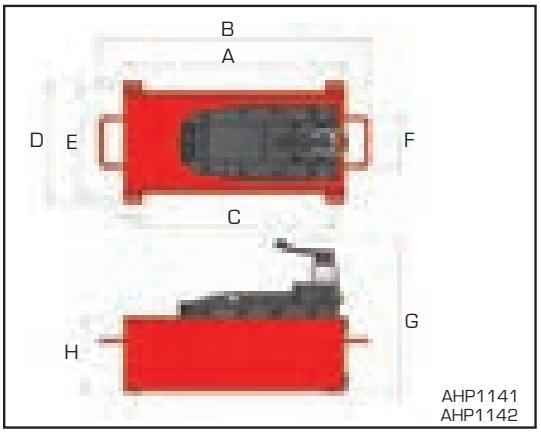
AHP11 - AIR DRIVEN SINGLE STAGE HAND OR FOOT OPERATED PUMPS



- Working pressure 10000 PSI
- Operates from standard 100 PSI air supply
- Compact, lightweight & powerful







Model number	Dimensions in inches							
	A	B	C	D	E	F	G	H
AHP1120	14.38	*	9.34	6.19	2.60 - 3.55	*	8.27	4.93
AHP1121	16.55	*	14.97	9.46	8.67	*	8.79	4.49
AHP1122	18.28	22.06	*	8.27	*	4.26	10.80	6.23
AHP1141	16.55	*	14.97	9.46	8.67	*	10.44	4.49
AHP1142	18.28	22.06	*	8.27	*	*	12.41	6.23

* Not applicable

HAP - AIR DRIVEN PUMPS - GENERAL DUTY HIGH FLOW

HAP21026

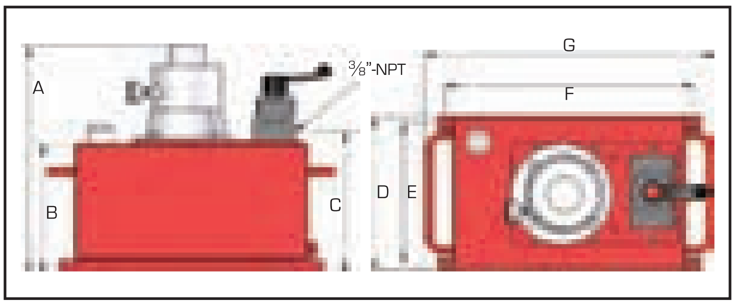
Low pressure flow rate 610.24 in^3/min up to 1000 PSI

High pressure flow rate 79.33 in^3/min

Working pressure 10000 PSI

The HAP two stage air powered hydraulic pump range offers a low pressure flow of 610.24 in^3/min with automatic changeover to 10000 PSI high pressure flow rate of 79.33 in^3/min. Driven by a powerful 4.08 hp rotary air motor with a maximum air consumption of 84.75 cubic feet per minute at 100 PSI inlet air pressure, the HAP range offers a choice of pump mounted or remote control valves (page 59) and oil reservoirs all fitted with filler and drain plugs. A full range of system components suitable for use with HAP pump units is detailed on pages 51 - 60.

- Two stage hydraulic pump unit
- Powerful air motor
- Externally adjustable pressure relief valve
- Choice of control valves
- Manual valve with load holding feature fitted as standard



Model number	Valve type	Oil cap. gallons	Motor hp	Weight lbs
HAP21011	P-T Plate	2.64	4.08	91.5
HAP21012	P-T Plate	6.60	4.08	126.8
HAP21014	P-T Plate	10.56	4.08	157.6
HAP21016	P-T Plate	15.84	4.08	212.7
HAP21021	2-way	2.64	4.08	92.6
HAP21022	2-way	6.60	4.08	127.9
HAP21024	2-way	10.56	4.08	158.7
HAP21026	2-way	15.84	4.08	213.8
HAP21031	3-way	2.64	4.08	92.6
HAP21032	3-way	6.60	4.08	127.9
HAP21034	3-way	10.56	4.08	158.7
HAP21036	3-way	15.84	4.08	213.8
HAP21041	4-way	2.64	4.08	92.6
HAP21042	4-way	6.60	4.08	127.9
HAP21044	4-way	10.56	4.08	158.7
HAP21046	4-way	15.84	4.08	213.8

Dimensions in inches						
A	B	C	D	E	F	G
15.48	7.80	9.06	9.69	8.71	14.50	17.26
16.63	8.94	10.20	12.06	11.07	19.31	22.46
20.92	13.24	14.50	12.06	11.07	19.31	22.06
21.75	14.07	15.33	16.00	15.01	20.21	22.97
15.48	7.80	9.06	9.69	8.71	14.50	17.26
16.63	8.94	10.20	12.06	11.07	19.31	22.46
20.92	13.24	14.50	12.06	11.07	19.31	22.06
21.75	14.07	15.33	16.00	15.01	20.21	22.97
15.48	7.80	9.06	9.69	8.71	14.50	17.26
16.63	8.94	10.20	12.06	11.07	19.31	22.46
20.92	13.24	14.50	12.06	11.07	19.31	22.06
21.75	14.07	15.33	16.00	15.01	20.21	22.97
15.48	7.80	9.06	9.69	8.71	14.50	17.26
16.63	8.94	10.20	12.06	11.07	19.31	22.46
20.92	13.24	14.50	12.06	11.07	19.31	22.06
21.75	14.07	15.33	16.00	15.01	20.21	22.97

Note: For optional extras, please see page 50

HPP - GASOLINE ENGINE DRIVEN PUMPS - GENERAL DUTY HIGH FLOW

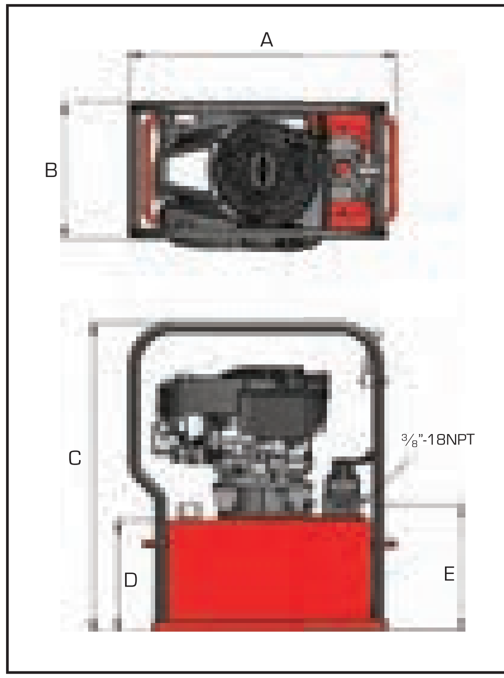

HPP21044

Low pressure flow rate 610.24 in^3/min up to 1000 PSI

High pressure flow rate 79.33 in^3/min

Working pressure 10000 PSI

The HPP range of two stage gasoline engine driven hydraulic pumps is ideally suited for applications in locations where there is no electricity or compressed air supply available. The range has similar reservoir and valve options (excluding solenoid valves) as electric and air powered pumps. All models are 10000 PSI maximum working pressure and offer a low pressure flow rate of 610.24 in^3/min with automatic changeover to a high pressure flow rate of 79.33 in^3/min. Powered by a 4.55 hp rated four stroke engine, the HPP range provides reliable, independent hydraulic power. All models are fitted with a protective roll bar carrying frame for easy transportation and handling. A full range of system components suitable for use with HPP pumps is detailed on pages 51 - 60.



- Two stage hydraulic pump unit
- Powerful 4.55 hp four stroke gasoline engine
- Externally adjustable pressure relief valve
- Roll bar protection frame included
- Manual valve with load holding feature fitted as standard

Model number	Valve type	Oil cap. gallons	Motor hp	Weight lbs	Dimensions in inches A	B	C	D	E
HPP21012	P-T Plate	6.60	4.55	155.4	22.46	12.06	27.03	8.94	10.20
HPP21014	P-T Plate	10.56	4.55	188.5	22.46	12.06	31.32	13.24	14.50
HPP21016	P-T Plate	15.84	4.55	250.2	22.97	16.00	32.15	14.07	15.33
HPP21022	2-way	6.60	4.55	156.5	22.46	12.06	27.03	8.94	10.20
HPP21024	2-way	10.56	4.55	189.6	22.46	12.06	31.32	13.24	14.50
HPP21026	2-way	15.84	4.55	251.3	22.97	16.00	32.15	14.07	15.33
HPP21032	3-way	6.60	4.55	156.5	22.46	12.06	27.03	8.94	10.20
HPP21034	3-way	10.56	4.55	189.6	22.46	12.06	31.32	13.24	14.50
HPP21036	3-way	15.84	4.55	251.3	22.97	16.00	32.15	14.07	15.33
HPP21042	4-way	6.60	4.55	156.5	22.46	12.06	27.03	8.94	10.20
HPP21044	4-way	10.56	4.55	189.6	22.46	12.06	31.32	13.24	14.50
HPP21046	4-way	15.84	4.55	251.3	22.97	16.00	32.15	14.07	15.33

ACCESSORIES FOR POWERED PUMPS

Protective roll frame

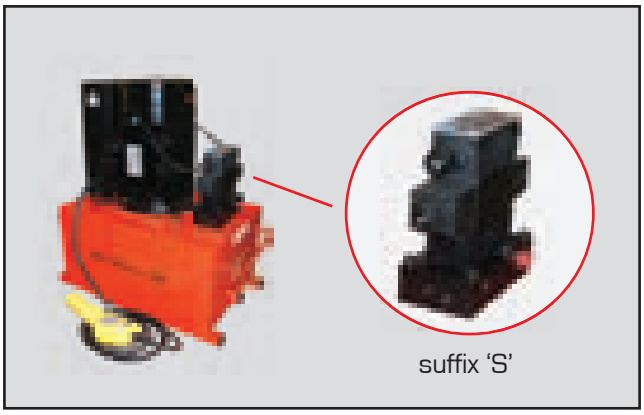
Model number	For all HEP and HAP models
PPA10RF	All pumps with 2.64 gallons tank
PPA25RF	All pumps with 6.60 gallons tank
PPA40RF	All pumps with 10.56 gallons tank
PPA60RF	All pumps with 15.84 gallons tank

All pumps can be supplied with roll frame factory fitted.
Just suffix pump model number with 'P'.

Wheel trolley

Model number	For all HEP, HAP and HPP models
PPA40WT	Wheel trolley for all 6.60 and 10.56 gallons model pumps.
PPA60WT	Wheel trolley for all 15.84 gallons model pumps.

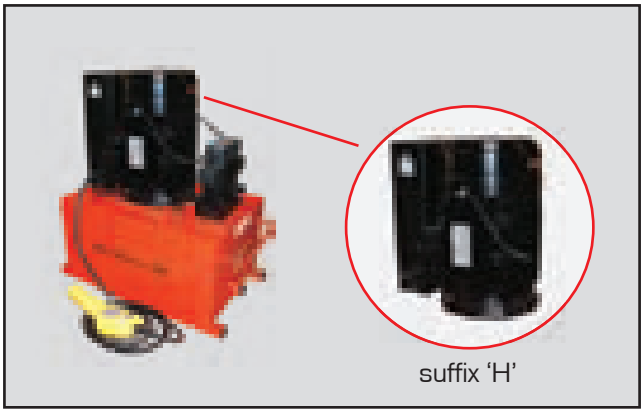
All pumps can be supplied with wheel trolley factory fitted.
Just suffix pump model number with 'WT'.



Low voltage solenoid valve with hand pendant controller

Suffix	Description
S	All HEP2, 3 and 5 series electric pumps can be supplied with low voltage (24V) solenoid valve, either in 3-way or 4-way versions, both featuring a locking feature and remote pendant control as standard

To order pump with solenoid valve,
just suffix pump model number with 'S'.



60Hz Electric Motor

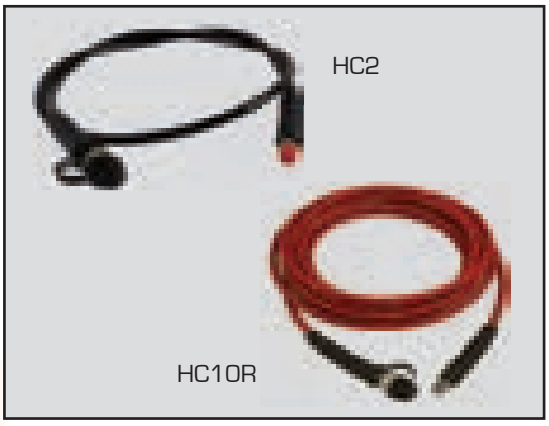
Suffix	Description
H	All HEP2, 3 and 5 series electric pumps can be supplied with an electric motor suitable for 50 Hz.

To order pump with 50Hz motor,
just remove suffix 'H' from pump model number.

SYSTEM COMPONENTS

D

HIGH PRESSURE HYDRAULIC HOSES - BLACK & RED



- Working pressure 10000 PSI
- 4:1 Factor of safety
- Hand grip protective strain relievers

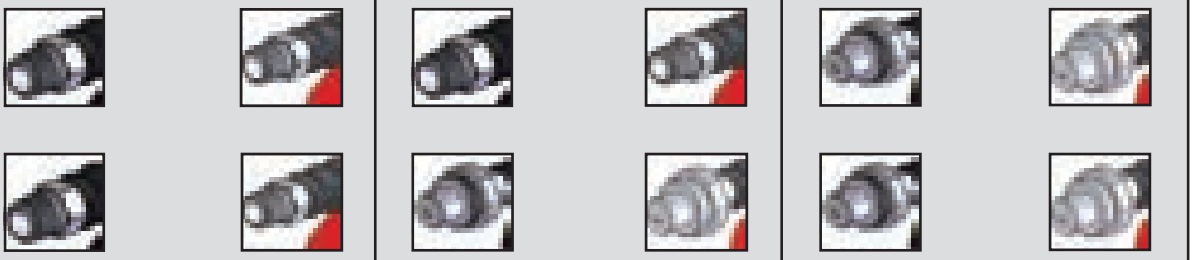
D

Hi-Force high pressure hydraulic hoses provide the vital, high quality, safe connection for your hydraulic equipment. Available in black and red and supplied complete with an ergonomically designed protective strain reliever at both ends, Hi-Force high pressure hoses are suitable for working pressures up to 10000 PSI with a 4 : 1 factor of safety.

Tip for double acting systems ...

By using black hoses for the advance lines and red hoses for the retract lines, identification is made easy and the possibility of incorrectly connected hoses is reduced.

Hose bore is ¼" and outside diameter is ½"



Length Feet	No couplers ⅜" - 18 NPT male fittings both ends Model number		⅜" - 18 NPT male fitting one end with CM1 coupler fitted one end Model number		CM1 male couplers fitted both ends Model number	
1.5	HH0.5	HH0.5R	HC0.5	HC0.5R	HC0.5C	HC0.5CR
3.0	HH1	HH1R	HC1	HC1R	HC1C	HC1CR
6.5	HH2	HH2R	HC2	HC2R	HC2C	HC2CR
10.0	HH3	HH3R	HC3	HC3R	HC3C	HC3CR
13.0	HH4	HH4R	HC4	HC4R	HC4C	HC4CR
16.5	HH5	HH5R	HC5	HC5R	HC5C	HC5CR
19.5	HH6	HH6R	HC6	HC6R	HC6C	HC6CR
33.0	HH10	HH10R	HC10	HC10R	HC10C	HC10CR
39.5	HH12	HH12R	HC12	HC12R	HC12C	HC12CR
49.0	HH15	HH15R	HC15	HC15R	HC15C	HC15CR
65.5	HH20	HH20R	HC20	HC20R	HC20C	HC20CR
82.0	HH25	HH25R	HC25	HC25R	HC25C	HC25CR
98.5	HH30	HH30R	HC30	HC30R	HC30C	HC30CR

PRESSURE GAUGES & GAUGE MOUNTING BLOCKS

- Clear precise dual scale readings
- Manufactured to EN837-1
- Calibration certificates on request

D

Hi-Force hydraulic pressure gauges are your "window" to the system and are recommended for use within all hydraulic systems to allow the user to constantly monitor the system pressure. Hi-Force hydraulic pressure gauges are manufactured to EN837-1 and are accurate to +/- 1% of full scale. Standard range models having dual scale reading in PSI and Bar are featured in this catalog, however gauges to suit Hi-Force high tonnage cylinders are available on request. For digital pressure gauges, please see page 54. Always specify Hi-Force pressure gauges for use with your Hi-Force hydraulic tools.

Gauges :

Model number	Gauge diameter inch	Gauge type	Reading Inner scale	Reading Outer scale	Inlet thread	Compatible Hi-Force cylinders	Weight lbs
HG63G	2.5	glycerin	0-700 Bar	0-10000 PSI	¼"-18NPT	All models	0.4
HG1	4.0	dry	0-700 Bar	0-10000 PSI	½"-14NPT	All models	2.0
HG1G	4.0	glycerin	0-700 Bar	0-10000 PSI	½"-14NPT	All models	2.2
HG2	6.0	dry	0-700 Bar	0-10000 PSI	½"-14NPT	All models	3.5
HG2G	6.0	glycerin	0-700 Bar	0-10000 PSI	½"-14NPT	All models	3.7

Gauge mounting blocks :

	Dimensions						
Model number	Length inch	Width inch	Height inch	Gauge thread	Inlet thread	Outlet thread	Weight lbs
HGA1	2.96	1.26	1.26	½"-14NPT	⅜"-18NPT male	⅜"-18NPT female	0.6
HGA2	6.70	1.26	1.26	½"-14NPT	⅜"-18NPT male	⅜"-18NPT female	1.9
HGA1-25	2.96	1.26	1.26	¼"-18NPT	⅜"-18NPT male	⅜"-18NPT female	0.7
HGA2-25	6.70	1.26	1.26	¼"-18NPT	⅜"-18NPT male	⅜"-18NPT female	2.0
AGA1-25	2.96	1.26	1.97	¼"-18NPT	⅜"-18NPT male	⅜"-18NPT female	1.2

DIGITAL GAUGE


HDG1

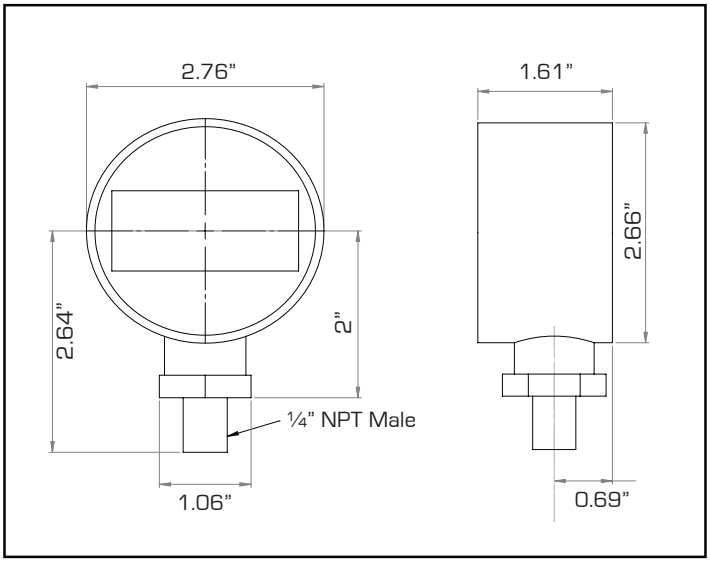
- 5 digit LCD display
- Choice of pressure readings
- 0.5% full scale accuracy

D

The Hi-Force HDG1 digital general purpose gauge is capable of measuring hydraulic pressure up to 14500 PSI (1000 Bar) and can display in a variety of units of measure that include Bar, PSI, mPa, kg/cm^2, as well as one additional user defined, programmable unit.

This high quality gauge offers an accuracy of 0.5% across its full scale range and incorporates a laser welded, stainless steel sensor & socket making it suitable for use with a wide variety of fluids. Standard features also include tare, min and max memory, blue backlight display, rubber protective enclosure and IP67 weatherproof enclosure rating.

- LCD display with 0.47 inches, 5 digit upper line pressure reading and 0.24 inches, 5 digit lower line unit reading
- Blue backlight allows reading in low visibilty situations
- 20 segment graphical display of pressure
- 0.5% terminal point accuracy
- Minimum 2000 hours battery life (3 VDC)
- Supplied with protective rubber enclosure
- Suitable gauge mounting blocks can be found on Page 53



Model number	Gauge diameter inches	Pressure reading PSI	Pressure reading Bar	Pressure reading mPa	Pressure reading kg/cm^2	Inlet thread	Weight lbs
HDG1	2.76	0-14500	0-1000	0-100	0-1019.7	¼”-18NPT	0.4

PRESSURE TRANSDUCER & DIGITAL DISPLAY

Maximum working pressure 10000 PSI

Pressure readings in PSI and Bar

0.5% full scale accuracy

The Hi-Force HPT1 pressure transducer is capable of measuring hydraulic pressure up to 10000 PSI (700 Bar) and is supplied complete with a 6.5 foot connecting cable. Offering an accuracy of 0.5%, this universal pressure transducer offers an economical solution for precise pressure measurement in many different applications.

The Hi-Force HDD1 digital display complements the HPT1 pressure transducer for applications where remote pressure reading is preferred. A choice of pressure unit in Bar or PSI is easily selected via panel buttons, conveniently located below the LCD display that provides clear easy to read measurements. Additional features include minimum and maximum value, average value, tare offset and reset.

- IP65 enclosure rating
- Compact size with large LCD display
- 0.5% full scale accuracy
- Pressure reading in PSI or Bar
- Display voltage 18-32 VDC, supplied including power supply unit
- Suitable gauge mounting blocks can be found on Page 53

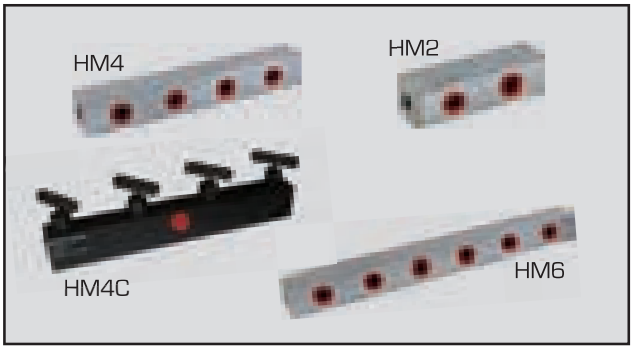
Pressure transducer:

Model number	Pressure range PSI	Pressure range Bar	Connection thread	Accuracy percentage full scale	Cable length feet	Weight lbs
HPT1	0-10000	0-700	¼"-18NPT	0.5	6.5	0.2

Digital diplay unit:

Model number	Pressure reading PSI	Pressure reading Bar	Display size L x H inches	Overall size L x W x H inches	Voltage VDC	Weight lbs
HDD1	0-10000	0-700	3 x 1	4.73 x 4.33 x 1.58	18 - 32	0.7

MANIFOLDS



Working pressure 10000 PSI

Choice of open or controlled manifolds

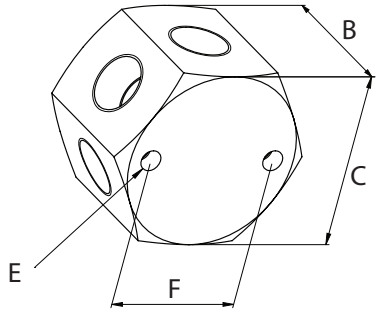
2, 4, 5, 6 or 8 outlet port models available

D

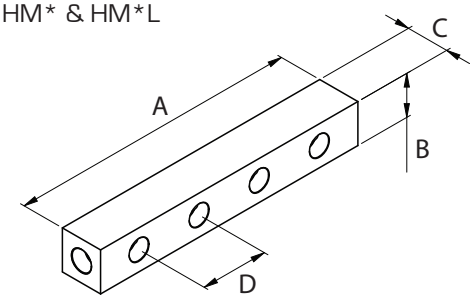
Hi-Force manifolds are designed specifically to allow easy control of the direction of flow of the hydraulic fluid within the system. Supplied either as open manifold blocks or with individual needle type shut off/throttle valves on each 3/8" NPT outlet, Hi-Force manifolds provide even greater versatility in your hydraulic system. The range offers 9 models with a choice of up to 8 outlets per manifold and all models are suitable for 10000 PSI maximum working pressure.

Manifolds are used in conjunction with Hi-Force manual and powered pumps. Refer to catalog pages 29 - 50 for a full of range of pumps.

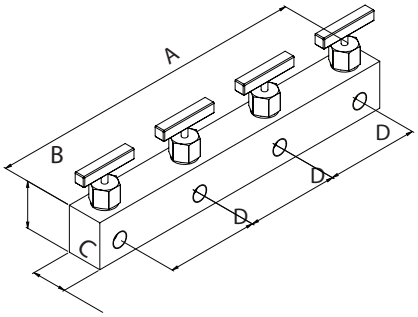
HM5



HM* & HM*L

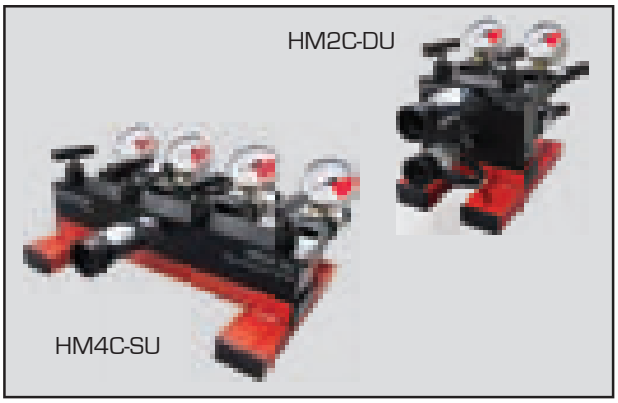


HM*C



Model number	Type	Design	Number of outlets	Female Threads Inlet	Female Threads Outlet	Weight lbs	Dimensions in inches A	B	C	D	E	F
HM2	manifold	parallel	2	3/8"-18NPT	2 x 3/8"-18NPT	2.2	4.49	1.26	1.26	1.97	-	-
HM4	manifold	parallel	4	3/8"-18NPT	4 x 3/8"-18NPT	3.3	8.43	1.26	1.26	1.97	-	-
HM5	manifold	hexagon	5	3/8"-18NPT	5 x 3/8"-18NPT	1.5	-	1.62	2.01	-	M6	1.50
HM6	manifold	parallel	6	3/8"-18NPT	6 x 3/8"-18NPT	4.4	12.37	1.26	1.26	1.97	-	-
HM8	manifold	parallel	8	3/8"-18NPT	8 x 3/8"-18NPT	5.5	16.31	1.26	1.26	1.97	-	-
HM4L	manifold	extended parallel	4	3/8"-18NPT	4 x 3/8"-18NPT	5.3	15.52	1.26	1.26	4.33	-	-
HM6L	manifold	extended parallel	6	3/8"-18NPT	6 x 3/8"-18NPT	8.2	24.19	1.26	1.26	4.33	-	-
HM2C	controlled manifold	parallel	2	3/8"-18NPT	2 x 3/8"-18NPT	4.4	5.91	2.01	1.50	3.94	-	-
HM4C	controlled manifold	parallel	4	3/8"-18NPT	4 x 3/8"-18NPT	7.7	13.79	2.01	1.50	3.94	-	-

MANIFOLDS



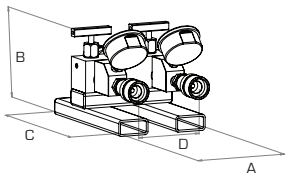
Working pressure 10000 PSI

Designed for single or double acting systems

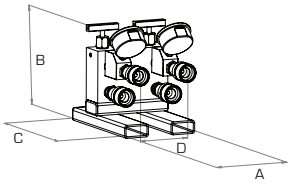
2 or 4 outlet port models available

Hi-Force controlled manifold units are designed specifically to allow easy control of the direction of flow of the hydraulic fluid, within a single acting or double acting system. These controlled manifold units are mounted in a sturdy framework and are available as 2-outlet or 4-outlet options and are supplied with pressure gauges, reading 0-700 Bar on the inner scale and 0-10000 PSI on the outer scale, fitted to each outlet port. All models are fitted with quick connect couplings on all inlet and outlet ports, including the 2-Way and 4-Way open manifold return flow lines on double acting versions.

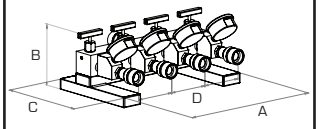
HM2C-SU



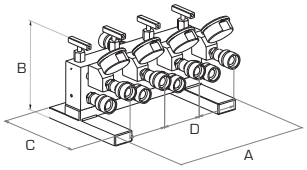
HM2C-DU



HM4C-SU



HM4C-DU



Model number	Type	Weight lbs	Dimensions in inches A	B	C	D
HM2C-SU	2-Way controlled manifold unit, suitable for single acting systems	4.4	5.91	2.00	2.00	3.94
HM2C-DU	2-Way controlled manifold unit, suitable for double acting systems	6.6	5.91	4.02	2.00	3.94
HM4C-SU	4-Way controlled manifold unit, suitable for single acting systems	7.7	13.79	2.00	2.00	3.94
HM4C-DU	4-Way controlled manifold unit, suitable for double acting systems	13.2	13.79	4.02	2.00	3.94

HYDRAULIC OIL

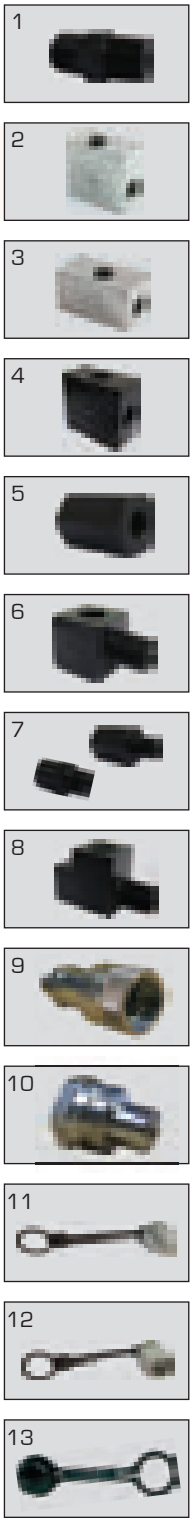
Hi-Force premium grade hydraulic oil is specially formulated for use with Hi-Force hydraulic tools, providing optimum performance throughout all working conditions.

HF046-5 HF032-1

Model number	Capacity gallons	For use with
HF032-1	0.26	Manually operated pumps
HF032-5	1.32	Manually operated pumps
HF032-25	6.60	Manually operated pumps
HF046-1	0.26	Powered pumps
HF046-5	1.32	Powered pumps
HF046-25	6.60	Powered pumps

HIGH PRESSURE COUPLERS AND FITTINGS

Hi-Force high pressure couplers and fittings are designed for easy system connection and assembly of your Hi-Force hydraulic equipment. All Hi-Force couplers and fittings are suitable for 10000 PSI maximum working pressure. Hi-Force recommends the use of threaded dust caps with quick connect couplers to protect the thread of the coupler and at the same time prevent any contaminants entering your hydraulic system. Always specify Hi-Force couplers and fittings for use with your Hi-Force hydraulic tools.



Safety first !

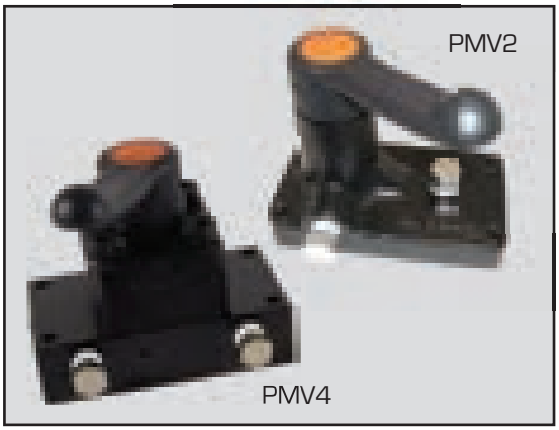
Be sure to use genuine Hi-Force couplers and fittings which are designed to withstand the full 10000 PSI working pressure.

Large selection of standard adaptors

Working pressure 10000 PSI

Model number	See picture	Description	Thread specification
HF7	1	Nipple	1/4" NPT male to 1/4" NPT male
HF8	5	Adaptor	1/4" NPT female to 1/4" NPT female
HF10	2	Elbow	3/8" NPT female to 3/8" NPT female
HF12	3	Equal tee	3/8" NPT female
HF13	4	Cross	3/8" NPT female
HF14	5	Adaptor	3/8" NPT female to 3/8" NPT female
HF15	5	Reducer	3/8" NPT female to 1/4" NPT female
HF16	6	Elbow	3/8" NPT female to 3/8" NPT male
HF17	1	Nipple	3/8" NPT male to 3/8" NPT male
HF19	1	Long nipple	3/8" NPT male to 3/8" NPT male
HF24	7	Adaptor	3/8" NPT male to 3/8" BSP female
HF27	1	Nipple	1/4" NPT male to 3/8" NPT male
HF30	7	Reducer	3/8" NPT male to 1/4" NPT female
HF31	8	Tee	3/8" NPT female to 3/8" NPT male
HF33	7	Reducer	3/8" NPT male to 1/4" BSP female
HF55	7	Reducer	3/8" NPT female to 1/4" NPT male
HF69	7	Adaptor	1/2" BSP male to 3/8" NPT female
CF1	9	Female coupler	3/8" NPT male
CM1	10	Male coupler	3/8" NPT female
CMF1	9 + 10	Complete coupler	3/8" NPT
CF2	9	Female coupler	1/4" NPT male
CM2	10	Male coupler	1/4" NPT female
CMF2	9 + 10	Complete coupler	1/4" NPT
CFD1	11	Metal dust cap for CF1	
CMD1	12	Metal dust cap for CM1	
CFD2	11	Metal dust cap for CF2	
CMD2	12	Metal dust cap for CM2	
PPC1	13	Moulded universal dust cap to suit CF1 & CM1	

DIRECTIONAL CONTROL VALVES



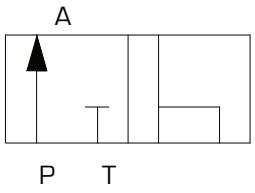
Working pressure 10000 PSI

Pump or remote mounted design

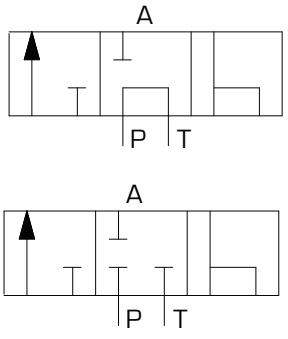
Manual or solenoid options available

Hi-Force control valves are designed to provide precise control of the hydraulic system either by accurate pressure or directional flow control. The PMV range of pump mounted valves is identical to the valves fitted to the Hi-Force powered pumps featured on pages 41-43, 44-45, 48, 49 and can be easily interchanged, making your powered pump even more versatile. The RMV range allows for remote mounting away from the pump. Always specify Hi-Force control valves for use with your Hi-Force hydraulic tools. Flow control values are featured on the next page.

PMV2

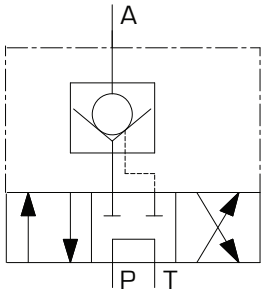


PMV3
RMV3

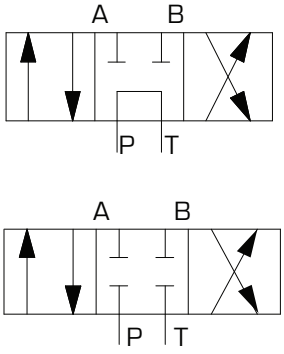


PMV3C
RMV3C

PMV3L
RMV3L

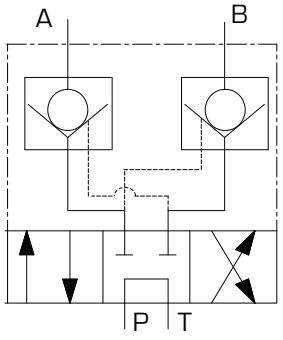


PMV4
RMV4



PMV4C
RMV4C

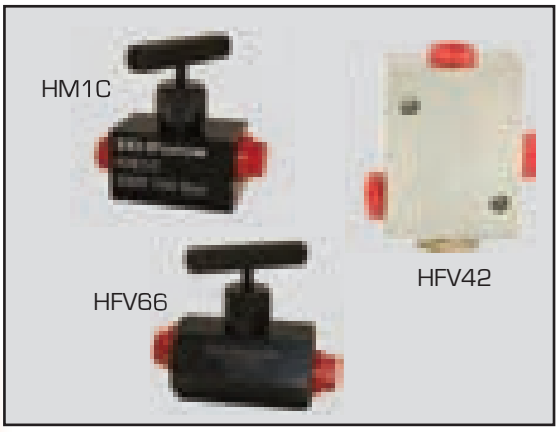
PMV4L
RMV4L



Directional control valves :

Description	Model number Manual valve no load holding	Manual valve with load holding	Solenoid valve 24V incl. control	Manual valve closed centre
Pump mounted, 2-way, 2 position valve	**PMV2**	-	-	-
Pump mounted, 3-way, 3 position valve	**PMV3**	**PMV3L**	**PMV3S**	**PMV3C**
Pump mounted, 4-way, 3 position valve	**PMV4**	**PMV4L**	**PMV4S**	**PMV4C**
Remote mounted, 3-way, 3 position valve	**RMV3**	**RMV3L**	**RMV3S**	**RMV3C**
Remote mounted, 4-way, 3 position valve	**RMV4**	**RMV4L**	**RMV4S**	**RMV4C**

FLOW CONTROL VALVES

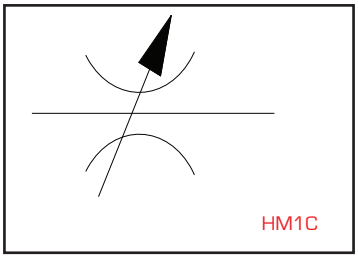


Working pressure 10000 PSI

3/8"-18 NPT connections

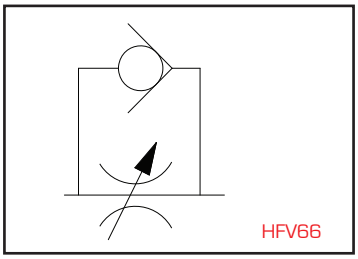
Ensures system safety and control

D



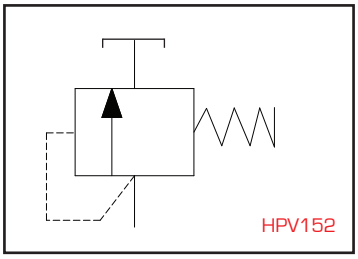
Manual shut off valve with needle type flow control. Used for load holding and throttling functions. Can also be used as a gauge isolator.

	Dimensions in inches		
Model Number	Height	Length	Width
HM1C	3.23	2.52	1.50



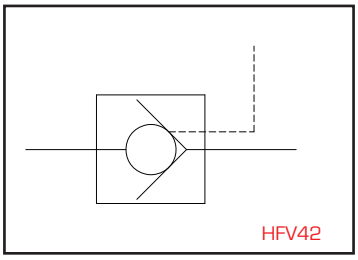
Manual check valve used for automatic load locking, with precise manual load lowering feature.

	Dimensions in inches		
Model Number	Height	Length	Width
HFV66	3.39	2.96	1.85



Adjustable pressure relief valve, for pressure setting from 800 to 10000 PSI. Supplied complete with return line hose.

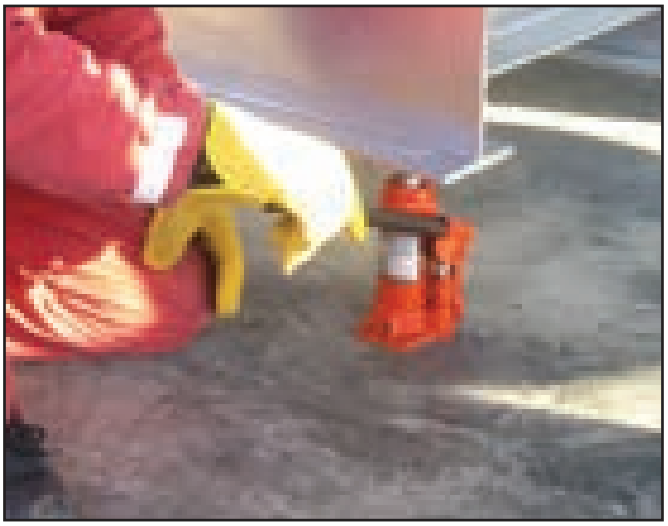
	Dimensions in inches		
Model Number	Height	Length	Width
HPV152	4.02	2.52	1.26



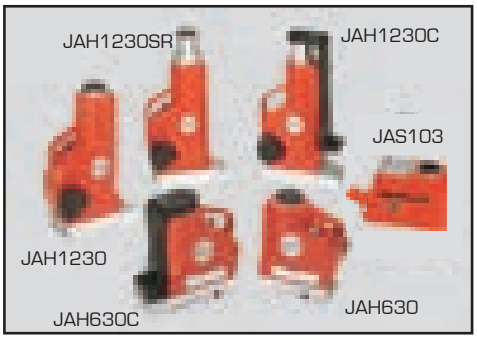
Pilot operated check valve used as a safety valve for double acting cylinders. Pilot port connects to cylinder retract line.

	Dimensions in inches		
Model Number	Height	Length	Width
HFV42	3.31	2.52	1.26

JACKS



JAH & JAS - ALUMINUM JACKS



Capacities from 11 to 66 tons

Stroke lengths from 2.96 to 12.02 inches

Internal safety overload device

D

The JAH and JAS ranges of lightweight aluminum jacks offers a wide variety of capacities and lift height options. Available as either plain ram lifting jacks, with or without "failsafe" mechanical lock ring, or optional low height claw lifting design, all models are constructed predominantly of lightweight aluminum alloy with all critical functioning parts manufactured from high quality steel. Used extensively in maintenance, construction, heavy plant and machinery applications, these high quality jacks are the proven industry standard.

- Lightweight construction
- Stroke limiting device
- Available as plain ram jack, claw jack or "failsafe" locking ring design

Model number	Jack capacity tons	Claw capacity tons	Stroke inch	Weight lbs	Dimensions in inches: Closed height	Toe height	Base length	Base width
Multi purpose superjack								
JAS103	11	-	2.96	9.5	5.16	-	6.38	2.96
JAS105	11	-	4.93	12.6	7.13	-	6.38	2.96
Jack with plain piston								
JAH620	22	-	6.00	24.3	10.36	-	7.01	4.77
JAH1220	22	-	12.02	37.5	17.26	-	9.69	4.77
JAH630	33	-	6.00	35.3	10.36	-	8.00	5.52
JAH1230	33	-	12.02	52.9	17.77	-	10.76	5.52
JAH660	66	-	6.00	61.7	11.54	-	9.89	7.49
JAH1260	66	-	12.02	97.0	19.70	-	13.47	7.49
Jack with plain piston & lifting claw & with extended base								
JAH620C	22	9	6.00	33.1	11.03	2.64	9.69	4.77
JAH1220C	22	9	12.02	50.7	17.97	2.64	9.69	4.77
JAH630C	33	13	6.00	46.3	11.07	2.88	10.76	5.52
JAH1230C	33	13	12.02	70.5	18.60	2.88	10.76	5.52
JAH660C	66	26	6.00	97.0	12.88	2.88	13.47	7.49
JAH1260C	66	26	12.02	143.3	21.28	2.88	13.47	7.49
Jack with "failsafe" locking ring								
JAH620SR	22	-	6.00	28.7	11.39	-	7.01	4.77
JAH1220SR	22	-	12.02	41.9	18.28	-	9.69	4.77
JAH630SR	33	-	6.00	37.5	11.50	-	8.00	5.52
JAH1230SR	33	-	12.02	55.1	18.87	-	10.76	5.52
JAH660SR	66	-	6.00	66.1	13.00	-	9.89	7.49
JAH1260SR	66	-	12.02	101.4	21.12	-	13.47	7.49

Note: JAS103 and JAS105 feature spring assisted piston retraction

JCS - COMPACT JACKS - SOLID PISTON

Capacities from 11 to 33 tons

Operate in any position

Lightweight and compact

The Hi-Force JCS range of compact jacks is ideally suited for applications requiring a lifting or positioning force in confined spaces. Lightweight, easy to operate and manufactured from high grade steel (JCS10) and aluminum (JCS20 & JCS30), all models incorporate a spring assisted return, wear coated piston. The pumping mechanism rotates through 360° providing maximum versatility in any application. With the removable operating handle measuring only 9.46 inches in length, these compact lifting jacks will fit in any toolbox.

- Spring assisted return piston
- Multi-position pump mechanism
- Internal safety overload valve
- Nitrocarburized piston rod
- Sealed hydraulic system

Model number	Capacity tons	Material	Stroke inch	Weight lbs	Dimensions in inches				
					Length	Closed Height	Piston Dia.	Max handle height	Width
JCS10	11	Steel	1.38	9.9	9.46	3.00	1.50	10.48	2.76
JCS20	22	Aluminum	1.62	12.1	10.13	4.02	2.01	11.07	4.02
JCS30	33	Aluminum	1.77	17.6	11.07	4.41	2.36	11.23	4.93

JCH - COMPACT JACKS - HOLLOW PISTON

Capacity of 14 and 23 tons

Operate in any position

Lightweight and compact

The JCH range of compact jacks is of similar design to the JCS range detailed above, however JCH models feature a hollow piston design for even greater versatility. Suitable for use in tooling, maintenance and tensioning applications, where a pulling force is required. With many common parts to the JCS range these multi-purpose JCH jacks can also be used for general lifting applications.

Model number	Capacity tons	Material	Stroke inch	Weight lbs	Dimensions in inches					
					Length	Closed Height	Piston Dia.	Max handle height	Center Hole	Width
JCH13	14	Aluminum	1.62	12.1	10.13	3.74	2.01	11.07	1.00	4.00
JCH21	23	Aluminum	1.77	17.6	11.07	4.49	2.36	11.23	1.38	4.93

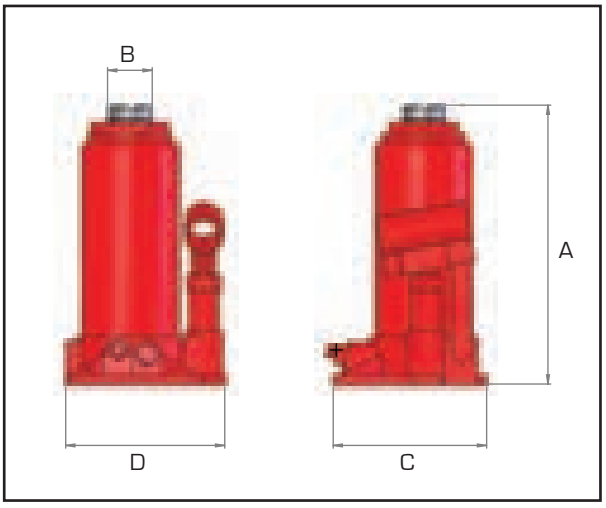
JSS - STEEL BOTTLE JACKS

- Capacities from 3 to 110 tonnes
- Strong rigid steel construction
- Working pressure 10000 PSI

E

The Hi-Force JSS range of steel bottle jacks offers capacities from 3 to 110 tonnes, with stroke lengths from 5.32 to 7.68 inches. Models up to 18 tonnes capacity feature heat-treated piston rod extension with saddle, that allows for low pick-up height adjustment and maximum lift height. All models are supplied with a tubular operating lever and have a wide base for increased strength and stability during lifting.

- Low handle effort for easy operation
- Stroke lengths up to 7.68 inches
- Internal safety overload valve
- Screw extension spans the gap between piston ram cap and load
- Suitable for industrial and automotive use



Model number	Capacity tons	Stroke inch	Screw extension inch	Weight lbs
JSS35	3	5.32	2.76	6.6
JSS55	6	5.32	3.55	8.8
JSS106	11	6.86	3.55	15.4
JSS166	18	7.01	3.74	22.0
JSS207	22	7.49	-	33.1
JSS327	35	7.49	-	48.2
JSS507	55	7.68	-	70.5
JSS1007	110	7.68	-	152.1

Dimensions in inches			
A	B	C	D
7.68	1.10	3.94	3.94
7.88	1.26	4.73	4.33
9.57	1.69	4.33	4.93
10.05	2.09	5.91	6.30
11.03	2.21	5.04	6.58
11.23	2.80	5.91	7.37
11.82	3.35	7.09	8.47
13.40	4.61	10.44	9.46

HMJ - STEEL MACHINE LIFT JACKS

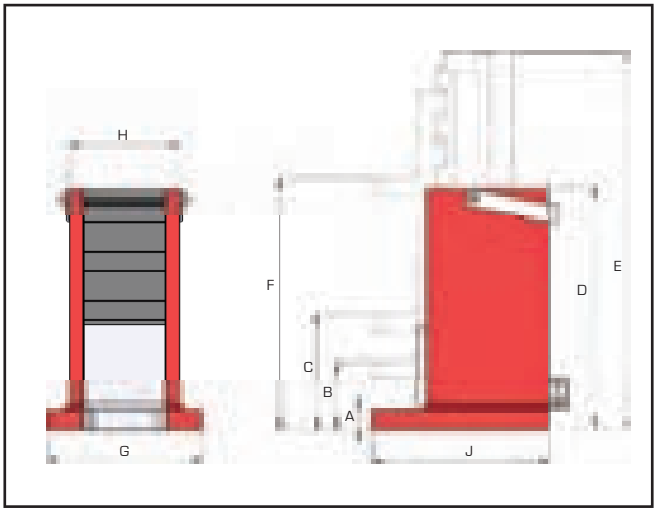
Capacities of 11 and 27 tons

Working pressure 10000 PSI

Minimum toe height as low as 0.83 inches

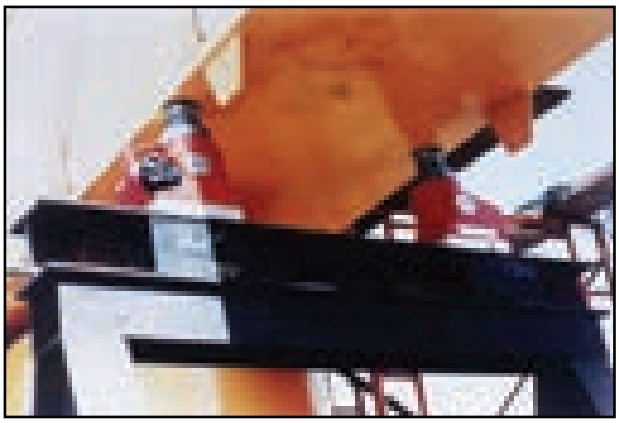
The HMJ range of hydraulic machine lifting jacks are designed specifically for lifting heavy equipment and machinery where a minimum low height lifting access point is available. The low height lifting toe is precision guided throughout its lifting stroke to reduce friction and prevent the hydraulic cylinder from potential side loading. Both models are 10000 PSI maximum working pressure and incorporate a 5.91 inch hydraulic lift with a lifting toe, which can be preset at three different initial lifting positions, for even greater flexibility. Suitable manual or powered pumps for use with HMJ jacks can be found on pages 29 to 50 of this catalog.

- Multi-position lifting toe
- Remote operation gives improved operator safety
- Stroke length 5.91 inches
- Can be used for simultaneous multiple lift point applications
- See pages 29 to 50 for compatible pumps
- See pages 51 to 60 for system components



Model number	Capacity Toe tons	Capacity Head tons	Stroke inch	Weight lbs	Dimensions in inches A	B	C	D	E	F	G	H	J
HMJ10	9	11	5.91	64.4	1.00	3.11	5.24	10.72	16.63	11.15	7.96	4.81	7.37
HMJ25	22	27	5.91	121.5	1.38	4.61	7.84	13.00	18.91	13.75	11.50	6.00	8.31

HYDRAULIC JACK APPLICATIONS



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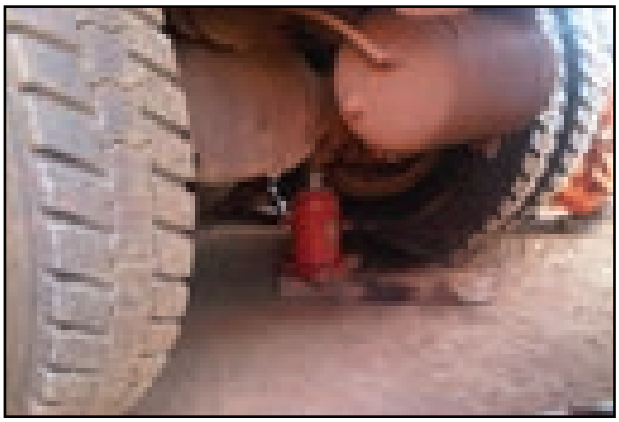
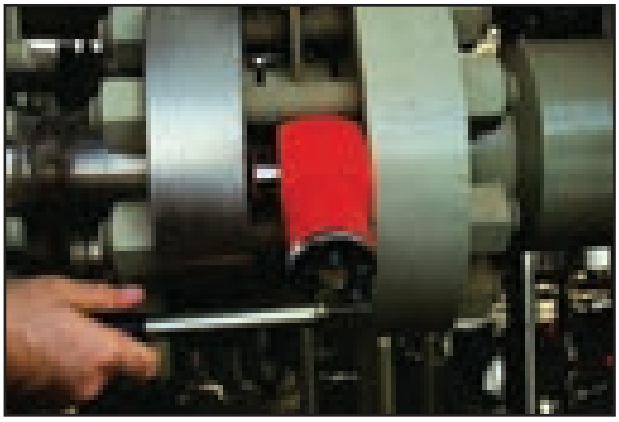
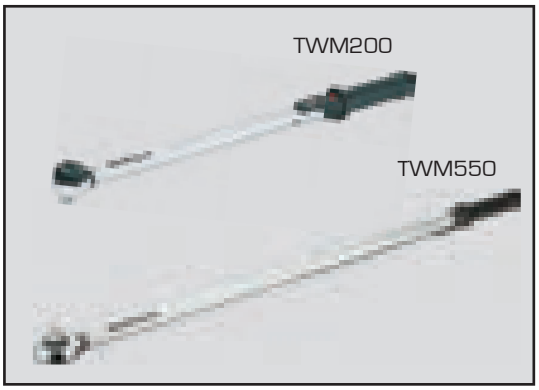




TORQUE TOOLS

TWM - MANUAL TORQUE WRENCHES - CLICK TYPE



Torque capacities from 3.5 to 630 lbf.ft

Repeatable accuracy +/- 3%

Dual scale Nm & lbf. ft.

The TWM range of industrial manual torque wrenches offers 7 models with torque capacities from 3.5 to 630 lbf.ft (5 to 850 Nm) having square drive sizes from 3/8" to 3/4". All models are designed and manufactured to meet or exceed the highest demands of industry and are marked with a unique serial number and supplied with a calibration certificate.

F

The TWM manual torque wrenches have a dual scale reading both Nm and lbf.ft and are ideally suited for applications requiring repeatable, accurate torqueing of bolts and nuts. The push-through square drive and integrated ratchet head allows the wrench to be used for controlled bi-directional torqueing. All models incorporate an ergonomic handgrip and integrated locking mechanism to prevent accidental alteration of the torque setting during operation. The click system is activated immediately once the required torque is achieved.

- Heavy duty ratchet head
- Accuracy +/- 3%
- Push-through square drive
- Supplied with calibration certificate
- Micrometer scale for setting accurate interim values

See pages 69 & 70 for manual torque wrenches with higher torque capacities.

Model number	Square drive	Torque range lbf. ft	Torque range Nm	Main scale grad. Nm	Micro scale grad. Nm	Overall length inch	Ratchet head dia inch	Weight lbs
TWM50	3/8"	3.5 - 37	5 - 50	2.50	0.25	13.16	1.38	1.1
TWM100	1/2"	15 - 75	20 - 100	5.00	0.50	15.52	1.73	2.0
TWM200	1/2"	30 - 150	40 - 200	10.00	1.00	19.11	1.73	2.4
TWM300	1/2"	45 - 220	60 - 300	10.00	1.00	22.73	1.81	3.1
TWM400	3/4"	60 - 300	80 - 400	10.00	1.00	27.03	2.64	4.4
TWM550	3/4"	80 - 405	110 - 550	10.00	1.00	37.67	2.72	8.4
TWM850	3/4"	185 - 630	250 - 850	10.00	1.00	54.33	2.72	10.4

HTW - MANUAL TORQUE WRENCHES - BREAK BACK TYPE

Torque capacities from 220 to 1500 lbf.ft

Repeatable accuracy +/- 4%

Dual scale Nm & lbf. ft.

Hi-Force HTW industrial manual torque wrenches offer output torque capacities ranging from 220 to 1500 lbf.ft (300 to 2000 Nm) with repeatable accuracy of +/- 4% and a choice of ¾" and 1" square drives. All HTW break-back type models provide a large break angle, to prevent the possibility of over torqueing. The cam control of the internal mechanism will ensure a controlled "break" once the required preset torque is achieved, which reduces the risk of the operator losing balance. The wrench automatically resets when hand pressure is released.

All models are designed and manufactured to meet or exceed the highest demands of industry and are marked with a unique serial number and supplied with a calibration certificate. All HTW manual torque wrenches incorporate a push-through square drive which allows for torque control in both clockwise and anti-clockwise directions.

F

- Heavy duty ratchet head
- Accuracy +/- 4%
- Push-through square drive
- Supplied with calibration certificate
- Complete with carrying & storage case

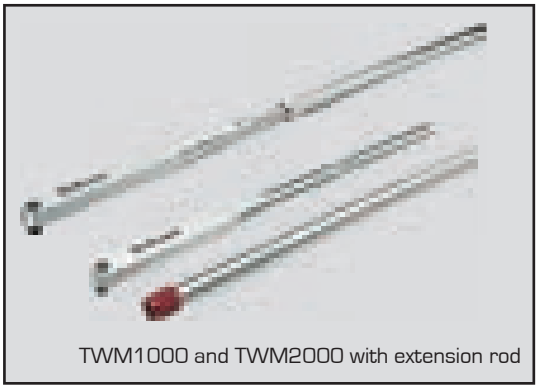
Need a higher torque capacity .....

Please check our mechanical and pneumatic torque multipliers on pages 71 to 73.

Alternatively see pages 74 to 83 for hydraulic torque wrench options.

Model number	Square drive	Torque range lbf. ft	Torque range Nm	Overall length inch	Ratchet head dia inch	Weight lbs
HTW1000B	¾"	220 - 750	300 - 1000	58.12	2.76	16.1
HTW1500B	¾"	500 - 1000	700 - 1500	58.12	2.76	22.9
HTW1800B	1"	500 - 1000	700 - 1500	58.12	2.76	22.9
HTW2000B	1"	600 - 1500	900 - 2000	75.65	2.76	28.7

TWM - MANUAL TORQUE WRENCHES - ALUMINUM HIGH CAPACITY



TWM1000 and TWM2000 with extension rod

Torque capacities from 380 to 1476 lbf.ft

Repeatable accuracy +/- 3%

Lightweight design

Hi-Force TWM aluminum, high capacity manual torque wrenches offer comparable output torque capacities to the HTW range of manual torque wrenches but with the added benefit of reduced weight owing to the aluminum housing construction. The range offers a choice of 3 models with torque capacities from 380 to 1476 lbf.ft and square drive sizes of ¾" and 1".

F

All models are supplied with extension rods ideal for extending the lever arm which enables high torque values. Optional ratchet heads available for use with the TWM aluminum manual torque wrenches are detailed below under accessories.

Model number	Square drive	Torque range lbf. ft	Torque range Nm	Scale grad. Nm	No. of ext rods	Overall length inch	Recom. ratchet head	Weight lbs
TWM1000	¾"	380 - 730	520 - 1000	10	1	55.67	TWM075R	12.3
TWM1500	1"	-	600 - 1500	25	1	63.36	TWM100R	23.8
TWM2000	1"	-	750 - 2000	50	2	92.71	TWM100R	25.6

ACCESSORIES

- Ratchet heads for use with high capacity aluminum manual torque wrench models
- Clockwise controlled torqueing
- Output square drives of ¾" and 1"

TWM100R

Model number	Square drive input	Square drive output	Max. torque capacity lbf.ft	Height inch	Diameter inch	Weight lbs
TWM075R	¾"	¾"	738	2.09	2.56	2.2
TWM100R	1"	1"	1476	2.48	2.88	4.0

TWG - MECHANICAL TORQUE MULTIPLIERS

Torque capacities up to 7330 lbf.ft

Lightweight aluminum housing

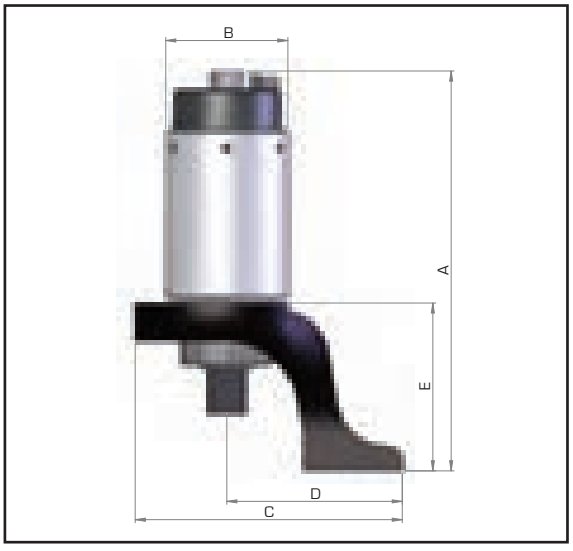
Supplied complete with reaction arm

The Hi-Force TWG range of mechanical torque multipliers offers output torque capacities from 40 to 7330 lbf.ft with gearbox multiplication ratios from 1:4 to 1:28.5. Available in a choice of 6 models, each fitted with a high performance aluminum housing, all models are ideal for use in bolting applications in many industries including oil & gas, construction, railways, ship building, machinery & plant engineering and heavy vehicle workshops.

F

All models are supplied with an offset reaction arm and models TWG40, TWG60 and TWG100 are additionally fitted with an anti-wind up ratchet and non-destructive overload safety mechanism for enhanced gear protection. Hi-Force manual torque wrenches recommended for use with TWG torque multipliers are detailed on page 68 of this catalog.

- Single stage planetary gear in models up to 2050 lbf.ft
- Two stage planetary gear in models up to 7330 lbf.ft
- Output square drives of ¾", 1" and 1½"



Model number	Torque capacity lbf.ft	Torque capacity Nm	Gearbox ratio	Input square drive	Output square drive	Recom. torque wrench	Weight lbs	Dimensions in inches A	B	C	D	E
TWG13	950	1300	1:5	½"	¾"	**TWM300**	2.9	5.24	3.15	4.89	3.78	3.86
TWG20	1500	2000	1:4	¾"	1"	**TWM550**	4.0	5.16	3.47	7.49	5.91	3.15
TWG28	2050	2800	1:5.5	¾"	1"	**TWM550**	5.3	5.75	4.18	6.15	6.26	3.27
TWG40	2930	4000	1:16	½"	1"	**TWM300**	9.3	8.94	3.47	6.90	5.32	4.33
TWG60	4400	6000	1:18	¾"	1½"	**TWM400**	14.6	10.09	4.02	9.46	7.49	5.71
TWG100	7330	10000	1:28.5	¾"	1½"	**TWM400**	24.0	11.50	5.59	10.52	8.47	6.42

TWP - PISTOL GRIP PNEUMATIC TORQUE MULTIPLIERS


TWP15S

Torque capacities up to 4400 lbf.ft

Repeatable accuracy of +/- 5%

Lightweight and durable construction

F

The TWP pistol grip, pneumatic, torque multiplier, range is designed to provide smooth, controllable, bolt tightening operations, without impacting or pulsing. Offering a repeatable torque accuracy of +/-5%, this low noise, ultra lightweight range of tools, reduce operator fatigue, increase safety and ensure fast, consistently accurate, tightening of bolted components. The powerful, but lightweight, reversible, pistol grip design air motor, allows the tool to be used for tightening and loosening of bolts. The non-impacting design of the planetary gears, ensures that there is minimum wear to sockets and bolted components. The high grade, steel, gear box has a bright electro coating galvanized surface offering even greater corrosion protection and reduces the importance of lubrication, in the gear box. All models are supplied with an airline pressure and lubrication control unit, in a handy carrying frame with 10 feet length connecting hose with quick connect couplings. Accurate pre-set and consistent torque repeatability is easily achieved by adjusting the input air pressure, to the tool, in conjunction with the calibration graph, supplied with each tool. Average air consumption is 49.5 cubic feet per minute at 116 PSI.

- Slim gear box allows excellent access
- Sensitive trigger control allows for easy reaction arm positioning
- Smooth, quiet, non-impacting design with reversible air motor
- Wide range of attachments and accessories available
- Two speed models available on request
- Supplied complete with FRL filter, regulator and lubricator unit including class 1.0 air inlet pressure gauge and connecting hose

For FRL Unit, see more details on page 91.

Model number	Torque capacity * lbf.ft	Nm	Square drive size	R.P.M. at max pressure	Overall length inches	Gearbox dia inches	Weight lbs
TWP09S	150-670	200-900	¾"	24	12.92	3.15	7.1
TWP15S	220-1110	300-1500	1"	12	13.51	3.47	10.4
TWP22S	370-1620	500-2200	1"	7	14.18	3.47	11.2
TWP32S	590-2360	800-3200	1"	4	15.09	3.47	12.8
TWP40S	620-3100	850-4200	1"	4	15.09	3.47	12.8
TWP60S	880-4400	1200-6000	1½"	4	15.76	4.02	17.0

(*) Low torque value at 22 PSI, maximum torque value at 116 PSI airline pressure. Weight is without reaction arm.

TWP-OG - PISTOL GRIP PNEUMATIC TORQUE MULTIPLIERS

TWP30S-OG1

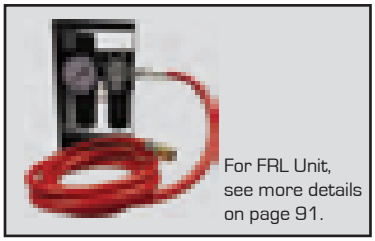
Torque capacity 3500 lbf.ft

Repeatable accuracy of +/- 5%

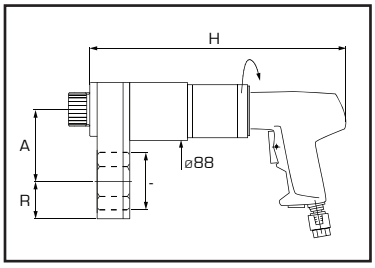
Lightweight and durable construction

The TWP-OG pistol grip, pneumatic torque multiplier, with integrated offset gearbox is designed to provide smooth, controllable bolt tightening operations, without impacting or pulsing. Offering a repeatable torque accuracy of +/-5%, this low noise, ultra lightweight tool, reduces operator fatigue, increases safety and ensures fast, consistently accurate tightening of bolted components. The powerful, but lightweight, reversible, pistol grip design air motor allows the tool to be used for tightening and loosening of bolts. The non-impacting design of the planetary gears ensures that there is minimum wear to sockets and bolted components. The high grade steel gearbox has a electro coated galvanized surface offering even greater corrosion protection and reduces the importance of lubrication in the gear box. All models are supplied complete with an airline pressure and lubrication control unit, in a handy carrying frame, with a 10 feet length connecting hose with quick connect couplings. Accurate preset and consistent torque repeatability is easily achieved by adjusting the input air pressure to the tool, in conjunction with the pressure table supplied with the tool. Average air consumption is 49.5 cubic feet per minute from a standard airline pressure of 116 PSI.

- Offset gearbox specially designed for heat exchangers
- Sensitive trigger control allows for easy reaction arm positioning
- Smooth, quiet, non-impacting design with reversible air motor
- Wide range of attachments and accessories available
- Two speed models available on request
- Supplied complete with FRL filter, regulator and lubricator unit including class 1.0 air inlet pressure gauge and connecting hose



For FRL Unit, see more details on page 91.



Model number	Torque capacity * lbf.ft	Nm	R.P.M. at max pressure	Weight lbs	Female Hexagon	Dimensions in inches A	H	R
TWP30S-OG1	2200	3000	7	22.0	60 mm AF	4.41	15.60	2.40
TWP30S-OG2	2650	3600	5	26.5	80 mm AF	4.65	15.60	2.96
TWP30S-OG3	3500	4800	4	28.7	95 mm AF	5.32	15.60	3.74

(*) Maximum torque value at 116 PSI airline pressure.

TWS-N - HYDRAULIC TORQUE WRENCHES - SQUARE DRIVE

Working pressure 10000 PSI

Compact, lightweight, aluminum construction

Fitted with 360° Uni-Swivel quick release couplings

Hi-Force TWS-N series lightweight aluminum hydraulic torque wrenches are designed to handle the toughest bolting jobs accurately and quickly. All models provide a torque accuracy of +/- 3%. The internal reaction arm spline allows the operator to easily position the tool and, if necessary, react directly off the tool body in very confined access applications. All models incorporate an easily reversible high grade alloy steel square drive enabling the operator to quickly switch from tightening to loosening applications. Uni-Swivel quick release couplers are fitted as standard to all models enabling easy positioning of the hydraulic hoses away from any possible "pinch points". Optional allen hex drives are available (see page 76) along with a comprehensive range of high quality torque wrench sockets. (See pages 77 & 78).

F

- Accurate to +/- 3% with calibration chart supplied
- Multi-position reaction foot with safety lock feature
- Reversible square drive for tightening and loosening applications
- Suitable for continuous operation at maximum pressure

Allen hex drive adaptors
(see page 76)

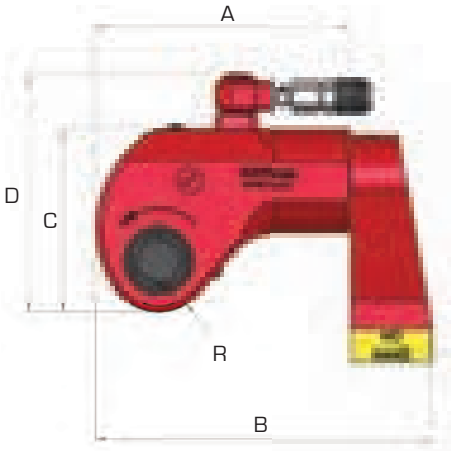
Did you know.....

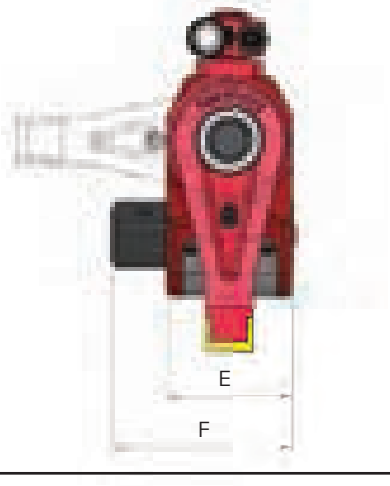
Hi-Force hydraulic torque tools are manufactured on the latest "State of the art" CNC machining centers, guaranteed to manufacture components to the highest quality standards available.

TWS-N - HYDRAULIC TORQUE WRENCHES - SQUARE DRIVE


TWS100N

- Designed for tightening and loosening
- Internal reaction arm spline
- Accurate to +/- 3%

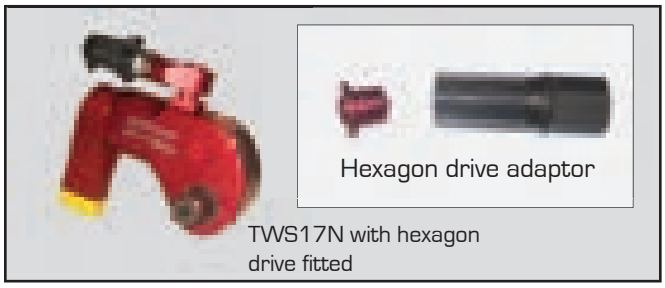




Model number	Torque Capacity lbf .ft at 10,000 PSI	Torque Capacity Nm at 700 Bar	Square drive size	Weight incl. reaction foot lbs
TWS17N	1254	1727	¾"	4.2
TWS45N	3289	4529	1"	10.6
TWS100N	7308	10064	1 ½"	19.8
TWS150N	10873	14974	1 ½"	33.1
TWS370N	26860	36992	2 ½"	71.6

Dimensions in inches						
A	B	C	D	E	F	R
5.08	6.58	3.55	5.16	2.01	2.88	1.00
6.58	8.59	4.77	6.70	2.68	3.86	1.34
8.79	11.54	6.42	8.31	3.62	5.32	1.81
9.73	12.73	7.56	9.30	3.94	5.56	2.13
12.96	17.02	9.46	11.35	5.40	8.04	2.60

TWS-N - ACCESSORIES



TWS17N with hexagon drive fitted

Sizes available for all TWS-N wrenches

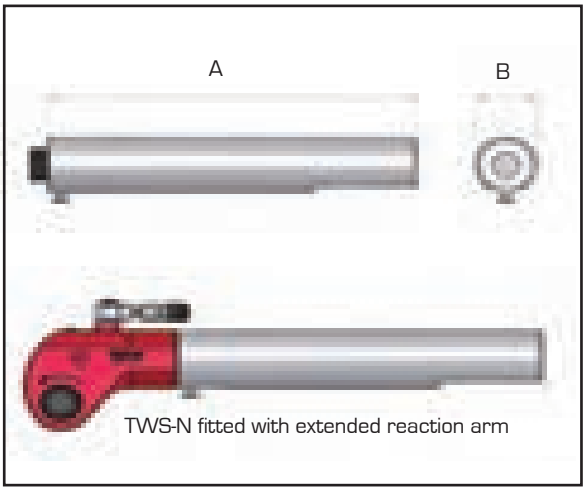
Limitations on applied torque (check before use)

Suitable for tightening & loosening applications

For tool Model number	Imperial Allen Hexagon Drive Adaptors			Metric Allen Hexagon Drive Adaptors		
	Model Number	Hexagon Size	Maximum Torque load lbf.ft	Model Number	Hexagon Size	Maximum Torque load lbf.ft
TWS17N	IH17N-008	½"	347	MH17N-14	14mm	546
	IH17N-010	⅝"	686	MH17N-17	17mm	996
	IH17N-012	¾"	1181	MH17N-19	19mm	1190
	IH17N-014	⅞"	1255	MH17N-22	22mm	1254
	IH17N-100	1"	1255	MH17N-24	24mm	1254
TWS45N	IH45N-010	⅝"	686	MH45N-17	17mm	811
	IH45N-012	¾"	1180	MH45N-19	19mm	1180
	IH45N-014	⅞"	1881	MH45N-22	22mm	1881
	IH45N-100	1"	2803	MH45N-24	24mm	2730
	IH45N-102	1⅛"	3319	MH45N-27	27mm	3319
	IH45N-104	1¼"	3319	MH45N-32	32mm	3319
TWS100N	IH100N-014	⅞"	1394	MH100N-22	22mm	1830
	IH100N-100	1"	2803	MH100N-24	24mm	2730
	IH100N-102	1⅛"	4012	MH100N-27	27mm	3430
	IH100N-104	1¼"	5517	MH100N-30	30mm	4705
	IH100N-106	1⅜"	7316	MH100N-32	32mm	5623
	IH100N-108	1½"	7375	MH100N-36	36mm	7375
TWS150N	IH150N-104	1¼"	5458	MH150N-30	30mm	5163
	IH150N-106	1⅜"	7301	MH150N-32	32mm	5531
	IH150N-108	1½"	11063	MH150N-36	36mm	8040
	IH150N-110	1⅝"	11063	MH150N-41	41mm	11063
	IH150N-112	1¾"	11063	MH150N-46	46mm	11063
TWS370N	IH370N-108	1½"	9514	MH370N-36	36mm	7375
	IH370N-110	1⅝"	12021	MH370N-41	41mm	12021
	IH370N-112	1¾"	15045	MH370N-46	46mm	16594
	IH370N-114	1⅞"	18511	MH370N-50	50mm	22568
	IH370N-200	2"	22568	MH370N-55	55mm	27288
	IH370N-204	2 ¼"	27288	MH370N-60	60mm	27288

Extended Reaction Arms

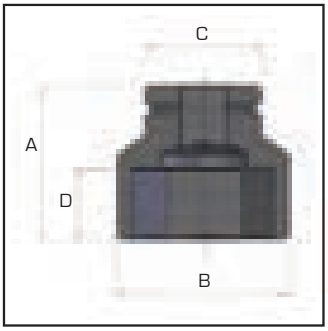
For tool Model number	Model Number	Length A		Diameter B	
		Inch	mm	Inch	mm
TWS17N	ERA17-21	21"	533	1 ¾"	44.5
	ERA17-24	24"	610	1 ¾"	44.5
	ERA17-36	36"	914	1 ¾"	44.5
TWS45N	ERA45-21	21"	533	2 ½"	63.5
	ERA45-24	24"	610	2 ½"	63.5
	ERA45-36	36"	914	2 ½"	63.5
TWS100N	ERA100-21	21"	533	3 ½"	88.9
	ERA100-24	24"	610	3 ½"	88.9
	ERA100-36	36"	914	3 ½"	88.9
TWS150N	ERA150-21	21"	533	3 ½"	88.9
	ERA150-24	24"	610	3 ½"	88.9
	ERA150-36	36"	914	3 ½"	88.9
TWS370N	ERA370-21	21"	533	4 ¾"	120.6
	ERA370-24	24"	610	4 ¾"	120.6
	ERA370-36	36"	914	4 ¾"	120.6



TWS-N fitted with extended reaction arm

IS - IMPERIAL HEXAGON AF SIZE HEAVY DUTY SOCKETS

- Square drives from ¾" to 2½"
- Across flat sizes up to 6⅞"
- Supplied complete with retaining ring and pin



Hi-Force high quality imperial size heavy duty sockets are designed and manufactured for use with all Hi-Force bolting products, including hydraulic torque wrenches and impact wrenches. The IS range of imperial impact sockets offers 47 models, with square drives from ¾" to 2½" and across flat sizes up to 6⅞" . Long length, bi-hexagonal and special sockets are available on request.

Model number	Square drive	Nut AF inches	Dimensions in inches A	B	C	D
IS2-101	¾"	1 1/16"	2.05	1.58	1.50	0.63
IS2-104	¾"	1 1/4"	2.05	1.73	1.73	0.79
IS2-107	¾"	1 7/16"	2.21	2.01	1.73	0.91
IS2-110	¾"	1 5/8"	2.44	2.29	1.73	1.06
IS2-113	¾"	1 13/16"	2.68	2.64	1.73	1.26
IS2-200	¾"	2"	2.84	2.80	2.13	1.38
IS2-203	¾"	2 3/16"	2.92	3.03	2.13	1.38
IS2-206	¾"	2 3/8"	2.96	3.31	2.13	1.38
IS9-101	1"	1 1/16"	2.29	1.73	2.01	0.67
IS9-104	1"	1 1/4"	2.36	2.01	2.01	0.83
IS9-107	1"	1 7/16"	2.44	2.21	2.05	1.02
IS9-110	1"	1 5/8"	2.44	2.44	2.05	1.02
IS9-113	1"	1 13/16"	2.52	2.68	2.29	1.06
IS9-200	1"	2"	2.76	2.92	2.29	1.22
IS9-203	1"	2 3/16"	2.84	3.15	2.44	1.26
IS9-206	1"	2 3/8"	3.07	3.43	2.44	1.38
IS9-209	1"	2 9/16"	3.15	3.66	2.44	1.42
IS9-212	1"	2 3/4"	3.35	3.86	2.44	1.58
IS9-215	1"	2 15/16"	3.74	4.10	3.39	1.89
IS9-302	1"	3 1/8"	3.94	4.29	3.39	2.05
IS9-308	1"	3 1/2"	4.14	4.93	3.39	2.05
IS9-314	1"	3 7/8"	4.14	5.36	3.74	2.05
IS5-113	1 ½"	1 13/16"	3.31	3.00	3.39	1.06
IS5-200	1 ½"	2"	3.43	3.23	3.39	1.14

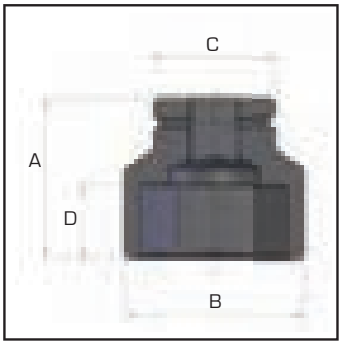
Model number	Square drive	Nut AF inches	Dimensions in inches A	B	C	D
IS5-203	1 ½"	2 3/16"	3.55	3.39	3.39	1.42
IS5-206	1 ½"	2 3/8"	3.62	3.66	3.39	1.50
IS5-209	1 ½"	2 9/16"	3.74	3.82	3.39	1.58
IS5-212	1 ½"	2 3/4"	3.94	4.14	3.39	1.69
IS5-215	1 ½"	2 15/16"	4.06	4.33	3.39	1.77
IS5-302	1 ½"	3 1/8"	4.33	4.57	3.39	1.97
IS5-308	1 ½"	3 1/2"	4.65	5.12	3.39	2.17
IS5-314	1 ½"	3 7/8"	4.93	5.52	3.74	2.29
IS5-404	1 ½"	4 1/4"	4.93	5.91	3.74	2.29
IS5-410	1 ½"	4 5/8"	5.32	6.50	3.74	2.56
IS5-500	1 ½"	5"	5.52	7.05	5.00	2.76
IS5-506	1 ½"	5 3/8"	5.91	7.68	5.00	2.96
IS6-302	2 ½"	3 1/8"	5.52	4.89	5.00	2.01
IS6-308	2 ½"	3 1/2"	5.52	5.32	5.00	2.01
IS6-314	2 ½"	3 7/8"	5.91	5.79	5.00	2.25
IS6-404	2 ½"	4 1/4"	6.30	6.26	5.00	2.52
IS6-410	2 ½"	4 5/8"	6.70	6.78	5.00	2.80
IS6-500	2 ½"	5"	6.90	7.29	5.00	2.96
IS6-506	2 ½"	5 3/8"	7.09	7.76	5.00	3.11
IS6-512	2 ½"	5 3/4"	7.29	8.27	5.00	3.27
IS6-602	2 ½"	6 1/8"	7.49	8.79	5.00	3.59
IS6-608	2 ½"	6 1/2"	7.68	9.26	5.00	3.74
IS6-614	2 ½"	6 7/8"	7.88	9.77	5.00	4.14

MS - METRIC HEXAGON AF SIZE HEAVY DUTY SOCKETS

Square drives from ¾" to 2½"

Across flat sizes up to 145mm

Supplied complete with retaining ring and pin



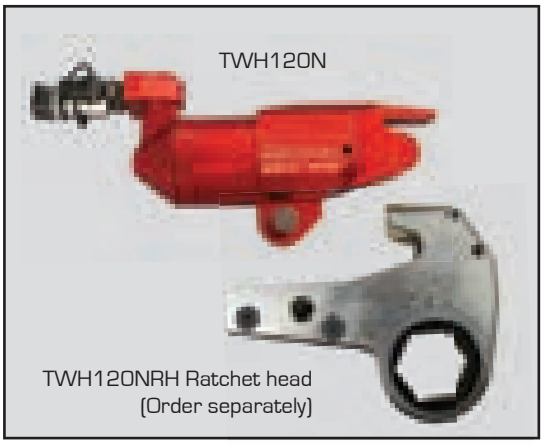
Hi-Force high quality metric size heavy duty sockets are designed and manufactured for use with all Hi-Force bolting products, including hydraulic torque wrenches and impact wrenches. The MS range of metric impact sockets offers 56 models, with square drives from ¾" to 2½" and across flat sizes up to 145mm. Long length, bi-hexagonal and special sockets are available on request.

F

Model number	Square drive	Nut AF mm	Dimensions in mm A	B	C	D
MS2-24	¾"	24	50	39	44	16
MS2-27	¾"	27	54	43	44	16
MS2-30	¾"	30	54	47	44	23
MS2-32	¾"	32	56	49	44	23
MS2-36	¾"	36	56	54	44	23
MS2-41	¾"	41	58	60	44	24
MS2-46	¾"	46	63	67	44	30
MS2-50	¾"	50	72	71	54	32
MS2-55	¾"	55	74	78	54	35
MS2-60	¾"	60	75	84	54	37
MS9-24	1"	24	58	42	54	17
MS9-27	1"	27	58	46	54	17
MS9-30	1"	30	60	50	54	21
MS9-32	1"	32	60	51	54	21
MS9-36	1"	36	65	56	54	30
MS9-41	1"	41	67	63	54	31
MS9-46	1"	46	74	69	54	36
MS9-50	1"	50	80	74	54	42
MS9-55	1"	55	84	80	54	44
MS9-60	1"	60	87	86	54	44
MS9-65	1"	65	90	92	54	46
MS9-70	1"	70	96	99	54	51
MS9-75	1"	75	98	106	86	45
MS9-80	1"	80	100	112	86	48
MS9-85	1"	85	105	118	86	52
MS9-90	1"	90	105	125	86	52
MS9-95	1"	95	115	131	86	52
MS9-100	1"	100	115	137	95	58

Model number	Square drive	Nut AF mm	Dimensions in mm A	B	C	D
MS5-36	1 ½"	36	78	64	86	23
MS5-41	1 ½"	41	80	70	86	26
MS5-46	1 ½"	46	84	76	86	27
MS5-50	1 ½"	50	87	81	86	29
MS5-55	1 ½"	55	90	86	86	36
MS5-60	1 ½"	60	92	93	86	38
MS5-65	1 ½"	65	95	97	86	40
MS5-70	1 ½"	70	100	105	86	43
MS5-75	1 ½"	75	103	110	86	45
MS5-80	1 ½"	80	110	116	86	50
MS5-85	1 ½"	85	118	125	86	55
MS5-90	1 ½"	90	118	130	86	55
MS5-95	1 ½"	95	118	137	95	55
MS5-100	1 ½"	100	125	140	95	58
MS5-105	1 ½"	105	125	150	95	58
MS5-110	1 ½"	110	125	156	95	58
MS5-115	1 ½"	115	135	160	95	65
MS5-130	1 ½"	130	140	185	127	70
MS6-80	2 ½"	80	140	124	127	51
MS6-85	2 ½"	85	140	130	127	51
MS6-90	2 ½"	90	145	136	127	54
MS6-95	2 ½"	95	145	143	127	54
MS6-100	2 ½"	100	150	149	127	57
MS6-105	2 ½"	105	155	155	127	61
MS6-110	2 ½"	110	160	161	127	64
MS6-115	2 ½"	115	165	167	127	67
MS6-130	2 ½"	130	175	188	127	75
MS6-145	2 ½"	145	185	208	127	83

TWH-N - HYDRAULIC TORQUE WRENCH - DRIVE CYLINDERS



Working pressure 10000 PSI

Powerful with low clearance design

Fitted with 360° x 360° Uni-Swivel couplings

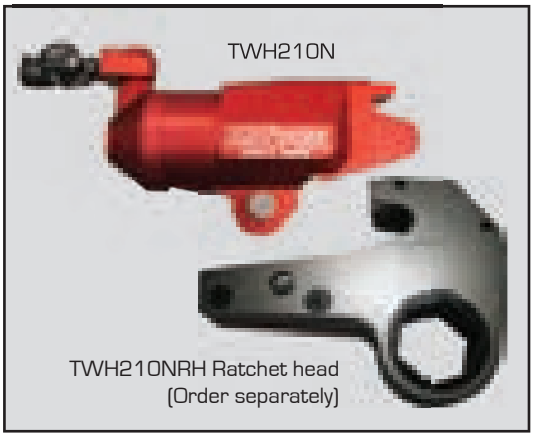
Hi-Force TWH-N series female hexagon cassette head hydraulic torque wrenches offer a choice of 5 models with output torque capacities from 1906 to 34985 lbf.ft (2625 to 48181 Nm). Manufactured from high grade aluminum (except TWH430N), all models provide direct in-line reaction and a minimal radius clearance for easy fitment in confined spaces. The user friendly design of the tool simply requires the operator to withdraw/insert a single pin to change the ratchet head. Ratchet heads are available in all standard metric and imperial AF sizes from 1 1/16" to 6 7/8" (24 to 175mm) with low cost hexagon reducer bushes also available (see pages 84 - 85). Uni-Swivel quick release couplers are fitted as standard to all models, enabling easy positioning of the hydraulic hoses.

F

- Compact, lightweight, aluminum drive unit (except TWH430N)
- Accurate to +/- 3% with standard torque chart supplied
- Low profile design for limited access applications
- Minimum radius cassette head for fitment in confined spaces
- Suitable for continuous operation at maximum pressure

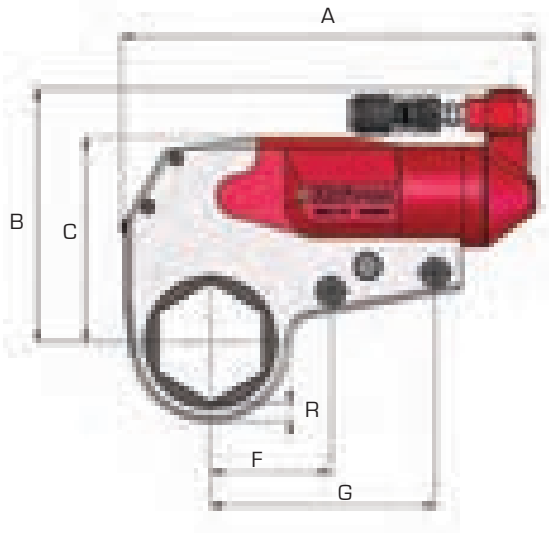
Note: Model TWH430N manufactured from high grade alloy steel

TWH-N - HYDRAULIC TORQUE WRENCH - DRIVE CYLINDERS



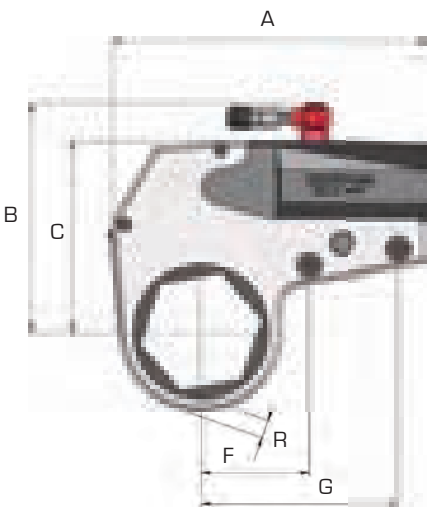
- Designed for tightening and loosening applications
- Easily assembled to selected ratchet head
- Minimal nose radius for fitment in confined spaces

TWH27N, TWH54N,
TWH120N, TWH210N



All Models

TWH430N



Note: Drawing shows drive cylinder, including ratchet head as detailed on pages 81 - 82.
Drive cylinder and ratchet head are separate items and must be ordered separately.

Model number (drive cyl.)	Torque capacity lbf. ft at 10,000PSI	Torque capacity Nm at 700 Bar	Hexagon AF size Imperial min	Imperial max	Metric min	Metric max	Weight lbs	Dimensions in inches A max	B max	C max	D	E	F	G	R min - max
TWH27N	1906	2625	1 1/16"	1 13/16"	24	46	3.1	7.60	4.93	3.82	1.26	2.01	2.13	4.29	0.37- 0.48
	2228	3068	2"	2 3/8"	50	60	3.1	7.60	5.36	4.26	1.26	2.01	2.13	4.29	0.40 - 0.41
TWH54N	3901	5372	1 7/16"	2 9/16"	36	65	5.1	9.85	6.23	4.93	1.62	2.52	2.88	5.40	0.42 - 0.54
	4384	6037	2 3/4"	3 1/8"	70	80	5.1	9.85	6.66	5.36	1.62	2.52	2.88	5.40	0.46 - 0.58
TWH120N	8522	11737	2 3/16"	3 1/8"	50	80	8.4	12.21	7.45	6.19	2.05	3.07	3.62	4.41	0.58 - 0.60
	10419	14349	3 1/2"	3 7/8"	85	100	8.4	12.21	8.43	7.17	2.05	3.07	3.62	4.41	0.63 - 0.74
TWH210N	15405	21216	2 3/4"	3 7/8"	70	100	14.1	14.89	8.79	7.53	2.52	3.82	4.49	8.39	0.71 - 0.73
	16791	23124	4 1/4"	4 5/8"	105	115	14.1	14.89	9.30	8.04	2.52	3.82	4.49	8.39	0.72 - 0.82
TWH430N	31798	43792	3 1/8"	4 5/8"	80	115	35.5	15.96	11.47	9.53	3.27	3.66	5.75	10.52	1.01 - 1.23
	34985	48181	5"	6 7/8"	130	175	35.5	16.75	12.06	10.24	3.27	3.66	5.75	10.52	0.98 - 1.08

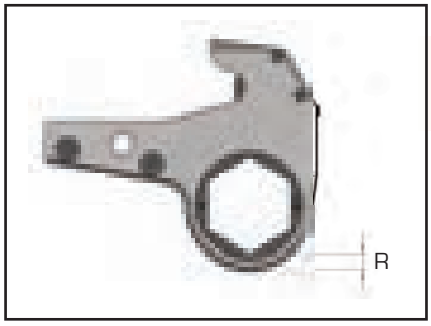
Note: Above selection table is for drive unit only. Ratchet head(s) to be ordered separately - see pages 81 - 82.
Weight as stated is drive cylinder only, exact radius size (R) varies according to ratchet AF size selected.

TWH-NRH - IMPERIAL SIZE RATCHET HEADS


TWH120NRH3.1/2

- Choice of standard imperial sizes
- Easily fitted to TWH-N drive units
- Strong steel construction

The TWH-NRH range of imperial hexagon ratchet heads, suitable for use with TWH-N series low profile hydraulic torque wrenches (see pages 79-80), provide exceptional flexibility with across flats (AF) sizes from 1 1/16" to 6 7/8" available as standard. All models feature extremely low profile design combined with a minimum nose radius (R) that enables fitment in very confined limited access places. For even greater versatility a comprehensive range of imperial hexagon reducer bushes (see page 84) and square drive conversion kits (see page 83) to suit TWH-NRH imperial ratchet heads are also available. Non standard and special design ratchet heads can be made to order.



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IMPERIAL RATCHET HEAD SELECTION TABLE:

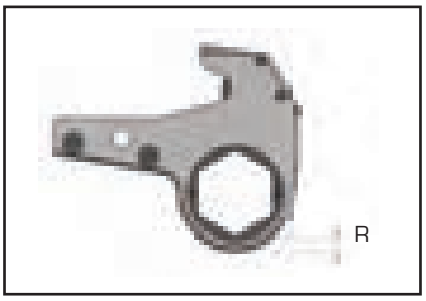
Bolt size	Nut AF size	For TWH27N			For TWH54N			For TWH120N			For TWH210N			For TWH430N		
		Model number	R inch	Wt lbs	Model number	R inch	Wt lbs	Model number	R inch	Wt lbs	Model number	R inch	Wt lbs	Model number	R inch	Wt lbs
5/8"	1 1/16"	TWH27NRH1.1/16	0.41	3.3												
3/4"	1 1/4"	TWH27NRH1.1/4	0.38	3.5												
7/8"	1 7/16"	TWH27NRH1.7/16	0.39	3.5	TWH54NRH1.7/16	0.53	6.4									
1"	1 5/8"	TWH27NRH1.5/8	0.39	3.5	TWH54NRH1.5/8	0.43	6.2									
1 1/8"	1 13/16"	TWH27NRH1.13/16	0.41	3.7	TWH54NRH1.13/16	0.42	6.4									
1 1/4"	2"	TWH27NRH2	0.41	3.7	TWH54NRH2	0.46	6.6									
1 3/8"	2 3/16"	TWH27NRH2.3/16	0.41	4.0	TWH54NRH2.3/16	0.46	6.8	TWH120NRH2.3/16	0.58	13.4						
1 1/2"	2 3/8"	TWH27NRH2.3/8	0.41	4.0	TWH54NRH2.3/8	0.46	7.1	TWH120NRH2.3/8	0.58	14.1						
1 5/8"	2 9/16"				TWH54NRH2.9/16	0.46	7.3	TWH120NRH2.9/16	0.58	14.1						
1 3/4"	2 3/4"				TWH54NRH2.3/4	0.46	7.5	TWH120NRH2.3/4	0.59	14.3	TWH210NRH2.3/4	0.72	26.7			
1 7/8"	2 15/16"				TWH54NRH2.15/16	0.58	7.7	TWH120NRH2.15/16	0.59	14.3	TWH210NRH2.15/16	0.72	26.9			
2"	3 1/8"				TWH54NRH3.1/8	0.48	7.7	TWH120NRH3.1/8	0.59	14.3	TWH210NRH3.1/8	0.72	27.1	TWH430NRH3.1/8	1.02	51.1
2 1/4"	3 1/2"							TWH120NRH3.1/2	0.67	17.4	TWH210NRH3.1/2	0.76	27.3	TWH430NRH3.1/2	1.06	52.7
2 1/2"	3 7/8"							TWH120NRH3.7/8	0.77	18.7	TWH210NRH3.7/8	0.77	27.6	TWH430NRH3.7/8	1.04	56.7
2 3/4"	4 1/4"										TWH210NRH4.1/4	0.77	29.3	TWH430NRH4.1/4	1.06	57.5
3"	4 5/8"										TWH210NRH4.5/8	0.76	30.4	TWH430NRH4.5/8	1.02	58.0
3 1/4"	5"													TWH430NRH5	1.08	61.5
3 1/2"	5 3/8"													TWH430NRH5.3/8	1.02	62.4
3 3/4"	5 3/4"													TWH430NRH5.3/4	0.98	64.6
4"	6 1/8"													TWH430NRH6.1/8	1.00	66.4
4 1/4"	6 1/2"													TWH430NRH6.1/2	1.00	68.3
4 1/2"	6 7/8"													TWH430NRH6.7/8	1.08	70.1

TWH-NRH - METRIC SIZE RATCHET HEADS


TWH120NRH-65

- Choice of standard metric sizes
- Easily fitted to TWH-N drive units
- Strong steel construction

The TWH-NRH range of metric hexagon ratchet heads, suitable for use with TWH-N series low profile hydraulic torque wrenches (see pages 79-80), provide exceptional flexibility with across flats (AF) sizes from 24mm to 175mm available as standard. All models feature extremely low profile design combined with a minimum nose radius (R) that enables fitment in very confined limited access places. For even greater versatility a comprehensive range of metric hexagon reducer bushes (see page 85) and square drive conversion kits (see page 83) to suit TWH-NRH metric ratchet heads are also available. Non standard and special design ratchet heads can be made to order.



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METRIC RATCHET HEAD SELECTION TABLE:

Bolt size	Nut AF size	For TWH27N			For TWH54N			For TWH120N			For TWH210N			For TWH430N		
		Model number	R mm	Wt lbs	Model number	R mm	Wt lbs	Model number	R mm	Wt lbs	Model number	R mm	Wt lbs	Model number	R mm	Wt lbs
16	24	TWH27NRH-24	12.1	3.3												
18	27	TWH27NRH-27	10.4	3.3												
20	30	TWH27NRH-30	10.7	3.5												
22	32	TWH27NRH-32	9.5	3.5												
24	36	TWH27NRH-36	10.1	3.5	TWH54NRH-36	13.8	6.4									
-	38				TWH54NRH-38	12.6	6.2									
27	41	TWH27NRH-41	10.1	3.5	TWH54NRH-41	10.9	6.2									
30	46	TWH27NRH-46	10.5	3.7	TWH54NRH-46	10.7	6.4									
33	50	TWH27NRH-50	10.4	3.7	TWH54NRH-50	12.1	6.6	TWH120NRH-50	15.2	12.8						
36	55	TWH27NRH-55	10.1	4.0	TWH54NRH-55	12.1	6.8	TWH120NRH-55	15.0	13.4						
39	60	TWH27NRH-60	10.5	4.0	TWH54NRH-60	12.0	7.1	TWH120NRH-60	15.0	14.1						
42	65				TWH54NRH-65	11.7	7.3	TWH120NRH-65	14.9	14.1						
45	70				TWH54NRH-70	11.7	7.5	TWH120NRH-70	14.8	14.3	TWH210NRH-70	18.2	26.7			
48	75				TWH54NRH-75	14.6	7.7	TWH120NRH-75	14.7	14.3	TWH210NRH-75	18.1	26.9			
52	80				TWH54NRH-80	11.7	7.7	TWH120NRH-80	14.7	14.3	TWH210NRH-80	18.1	27.1	TWH430NRH-80	25.6	51.1
56	85							TWH120NRH-85	16.4	17.2	TWH210NRH-85	18.2	27.3	TWH430NRH-85	29.0	52.9
60	90							TWH120NRH-90	16.2	17.4	TWH210NRH-90	18.6	27.3	TWH430NRH-90	31.3	57.3
64	95							TWH120NRH-95	15.9	17.4	TWH210NRH-95	18.6	27.6	TWH430NRH-95	28.5	56.9
68	100							TWH120NRH-100	18.7	18.7	TWH210NRH-100	18.6	27.6	TWH430NRH-100	25.6	56.4
72	105										TWH210NRH-105	18.4	28.4	TWH430NRH-105	28.6	58.4
76	110										TWH210NRH-110	18.3	29.3	TWH430NRH-110	25.7	57.8
80	115										TWH210NRH-115	20.7	30.4	TWH430NRH-115	27.3	58.2
90	130													TWH430NRH-130	25.6	60.2
-	135													TWH430NRH-135	26.6	62.4
100	145													TWH430NRH-145	25.4	64.8
110	155													TWH430NRH-155	25.0	66.4
115	165													TWH430NRH-165	25.0	68.3
-	175													TWH430NRH-175	27.3	70.1

TWH-N ACCESSORIES

Suitable for TWH-N range up to 17055 lbf.ft

Square drive sizes from 1" to 2½"

Easily fitted, no special tools required

- Supplied complete with reaction foot
- Makes your hexagon drive torque wrench even more versatile
- Full range of heavy duty sockets available (see pages 77 & 78)

Hi-Force SDC square drive conversion kits, suitable for Hi-Force TWH-N hexagon drive hydraulic torque wrenches (see pages 79-82) are available for all models, excluding TWH430N. All models are supplied complete with an easily attachable reaction foot and a standard hexagon AF size adaptor, suitable for fitment to a commonly used size of imperial or metric ratchet head, per tool type (see table for more details). These SDC square drive conversion kits provide the most flexible and cost effective method of converting a female hexagon drive hydraulic torque wrench into a square drive wrench.

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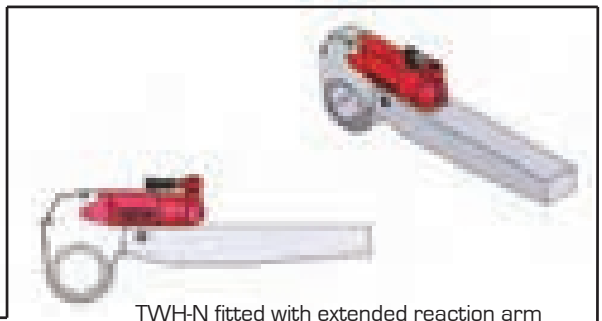
Model number	Square drive	Hexagon AF Size	Maximum torque lbf.ft	Maximum torque Nm	Suitable for drive cylinder incl. ratchet head		Weight lbs
SDC27-I	1"	1 13/16"	2263	3068	TWH27N	TWH27NRH1.13/16	2.4
SDC27-M	1"	46mm	2263	3068	TWH27N	TWH27NRH-46	2.4
SDC54-I	1½"	2 9/16"	4453	6037	TWH54N	TWH54NRH2.9/16	6.6
SDC54-M	1½"	65mm	4453	6037	TWH54N	TWH54NRH-65	6.6
SDC120-I	1½"	3⅛"	10583	14349	TWH120N	TWH120NRH3.1/8	9.7
SDC120-M	1½"	80mm	10583	14349	TWH120N	TWH120NRH-80	9.7
SDC210-I	2½"	3⅞"	17055	23124	TWH210N	TWH210NRH3.7/8	20.1
SDC210-M	2½"	100mm	17055	23124	TWH210N	TWH210NRH-100	20.1

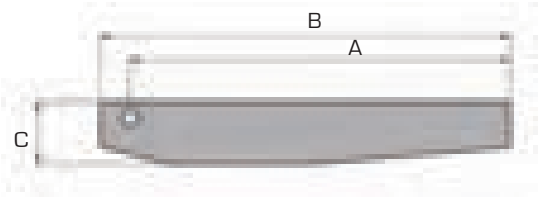
Extended Reaction Arms

Model Number	Length A Inch	Length A mm	Length B Inch	Length B mm	Height C Inch	Height C mm	Width D Inch	Width D mm
ERA27-20	19.6"	499	20.7"	525	1.8"	45	2.0"	50
ERA54-20	20.2"	513	21.1"	535	2.2"	55	2.5"	65
ERA120-21	20.8"	527	21.7"	550	3.0"	75	3.4"	85
ERA210-21	21.5"	545	23.2"	588	3.7"	95	3.7"	95
ERA430-22	22.2"	565	24.7"	628	4.7"	120	4.7"	120



TWH-N fitted with extended reaction arm

Extended reaction arm



IB - IMPERIAL HEXAGON REDUCER BUSHES

To reduce the female hexagon AF size of the TWH-NRH imperial ratchet heads (see page 81), these Hi-Force hexagon reducer bushes offer an easy and economical solution. Just select your outside AF size (i.e ratchet head AF size) and the required inside AF size to determine the model number. Please note that wall thickness (specified below as 'W' dimension) must be added to the minimum radius dimension of your ratchet head when using a reducer bush.

Outside AF size	Inside AF size	For TWH27NRH		For TWH54NRH		For TWH120NRH		For TWH210NRH		For TWH430NRH	
		Model number	W inch	Model number	W inch	Model number	W inch	Model number	W inch	Model number	W inch
1 1/4"	1 1/16"	IB27-104-101	0.09								
1 7/16"	1 1/16"	IB27-107-101	0.19								
1 7/16"	1 1/4"	IB27-107-104	0.09								
1 5/8"	1 1/4"	IB27-110-104	0.19	IB54-110-104	0.19						
1 5/8"	1 7/16"	IB27-110-107	0.09	IB54-110-107	0.09						
1 13/16"	1 7/16"	IB27-113-107	0.19	IB54-113-107	0.19						
1 13/16"	1 5/8"	IB27-113-110	0.09	IB54-113-110	0.09						
2"	1 5/8"	IB27-200-110	0.19	IB54-200-110	0.19						
2"	1 13/16"	IB27-200-113	0.09	IB54-200-113	0.09						
2 3/16"	1 5/8"	IB27-203-110	0.28	IB54-203-110	0.28						
2 3/16"	1 13/16"	IB27-203-113	0.19	IB54-203-113	0.19						
2 3/16"	2"	IB27-203-200	0.09	IB54-203-200	0.09						
2 3/8"	1 13/16"	IB27-206-113	0.28	IB54-206-113	0.28						
2 3/8"	2"	IB27-206-200	0.19	IB54-206-200	0.19						
2 3/8"	2 3/16"	IB27-206-203	0.09	IB54-206-203	0.09	IB120-206-203	0.09				
2 9/16"	2"			IB54-209-200	0.28	not available	-				
2 9/16"	2 3/16"			IB54-209-203	0.19	IB120-209-203	0.19				
2 9/16"	2 3/8"			IB54-209-206	0.09	IB120-209-206	0.09				
2 3/4"	2 3/16"			IB54-212-203	0.28	IB120-212-203	0.28				
2 3/4"	2 3/8"			IB54-212-206	0.19	IB120-212-206	0.19				
2 3/4"	2 9/16"			IB54-212-209	0.09	IB120-212-209	0.09				
2 15/16"	2 3/8"			IB54-215-206	0.28	IB120-215-206	0.28				
2 15/16"	2 9/16"			IB54-215-209	0.19	IB120-215-209	0.19				
2 15/16"	2 3/4"			IB54-215-212	0.09	IB120-215-212	0.09	IB210-215-212	0.09		
3 1/8"	2 9/16"			IB54-302-209	0.28	IB120-302-209	0.28	not available	-		
3 1/8"	2 3/4"			IB54-302-212	0.19	IB120-302-212	0.19	IB210-302-212	0.19		
3 1/8"	2 15/16"			IB54-302-215	0.09	IB120-302-215	0.09	IB210-302-215	0.09		
3 1/2"	2 15/16"					IB120-308-215	0.28	IB210-308-215	0.28		
3 1/2"	3 1/8"					IB120-308-302	0.19	IB210-308-302	0.19	IB430-308-302	0.19
3 7/8"	3 1/8"					IB120-314-302	0.37	IB210-314-302	0.37	IB430-314-302	0.37
3 7/8"	3 1/2"					IB120-314-308	0.19	IB210-314-308	0.19	IB430-314-308	0.19
4 1/4"	3 1/2"							IB210-404-308	0.37	IB430-404-308	0.37
4 1/4"	3 7/8"							IB210-404-314	0.19	IB430-404-314	0.19
4 5/8"	3 7/8"							IB210-410-314	0.37	IB430-410-314	0.37
4 5/8"	4 1/4"							IB210-410-404	0.19	IB430-410-404	0.19
5"	4 1/4"									IB430-500-404	0.37
5"	4 5/8"									IB430-500-410	0.19
5 3/8"	4 5/8"									IB430-506-410	0.37
5 3/8"	5"									IB430-506-500	0.19
5 3/4"	5"									IB430-512-500	0.37
5 3/4"	5 3/8"									IB430-512-506	0.19
6 1/8"	5 3/8"									IB430-602-506	0.37
6 1/8"	5 3/4"									IB430-602-512	0.19
6 1/2"	5 3/4"									IB430-608-512	0.37
6 1/2"	6 1/8"									IB430-608-602	0.19
6 7/8"	6 1/8"									IB430-614-602	0.37
6 7/8"	6 1/2"									IB430-614-608	0.19

MB - METRIC HEXAGON REDUCER BUSHES

To reduce the female hexagon AF size of the TWH-NRH metric ratchet heads (see page 82), these Hi-Force hexagon reducer bushes offer an easy and economical solution. Just select your outside AF size (i.e ratchet head AF size) and the required inside AF size to determine the model number. Please note that wall thickness (specified below as 'W' dimension) must be added to the minimum radius dimension of your ratchet head when using a reducer bush.

Outside AF size mm	Inside AF size mm	For TWH27NRH		For TWH54NRH		For TWH120NRH		For TWH210NRH		For TWH430NRH	
		Model number	W mm	Model number	W mm	Model number	W mm	Model number	W mm	Model number	W mm
30	24	MB27-30-24	3.0								
32	24	MB27-32-24	3.0								
32	27	MB27-32-27	3.0								
36	30	MB27-36-30	3.0	MB54-36-30	3.0						
41	36	MB27-41-36	2.5	MB54-41-36	2.5						
46	36	MB27-46-36	5.0	MB54-46-36	5.0						
46	41	MB27-46-41	2.5	MB54-46-41	2.5						
50	41	MB27-50-41	4.5	MB54-50-41	4.5						
50	46	MB27-50-46	2.0	MB54-50-46	2.0						
55	41	MB27-55-41	7.0	MB54-55-41	7.0						
55	46	MB27-55-46	4.5	MB54-55-46	4.5						
55	50	MB27-55-50	2.5	MB54-55-50	2.5	MB120-55-50	2.5				
60	46	MB27-60-46	7.0	MB54-60-46	7.0	not available					
60	50	MB27-60-50	5.0	MB54-60-50	5.0	MB120-60-50	5.0				
60	55	MB27-60-55	2.5	MB54-60-55	2.5	MB120-60-55	2.5				
65	50			MB54-65-50	7.5	MB120-65-50	7.5				
65	55			MB54-65-55	5.0	MB120-65-55	5.0				
65	60			MB54-65-60	2.5	MB120-65-60	2.5				
70	55			MB54-70-55	7.5	MB120-70-55	7.5				
70	60			MB54-70-60	5.0	MB120-70-60	5.0				
70	65			MB54-70-65	2.5	MB120-70-65	2.5				
75	60			MB54-75-60	7.5	MB120-75-60	7.5				
75	65			MB54-75-65	5.0	MB120-75-65	5.0				
75	70			MB54-75-70	2.5	MB120-75-70	2.5	MB210-75-70	2.5		
80	65			MB54-80-65	7.5	MB120-80-65	7.5	not available	-		
80	70			MB54-80-70	5.0	MB120-80-70	5.0	MB210-80-70	5.0		
80	75			MB54-80-75	2.5	MB120-80-75	2.5	MB210-80-75	2.5		
85	70					MB120-85-70	7.5	MB210-85-70	7.5		
85	75					MB120-85-75	5.0	MB210-85-75	5.0		
85	80					MB120-85-80	2.5	MB210-85-80	2.5	MB430-85-80	2.5
90	75					MB120-90-75	7.5	MB210-90-75	7.5	not available	-
90	80					MB120-90-80	5.0	MB210-90-80	5.0	MB430-90-80	5.0
90	85					MB120-90-85	2.5	MB210-90-85	2.5	MB430-90-85	2.5
95	80					MB120-95-80	7.5	MB210-95-80	7.5	MB430-95-80	7.5
95	85					MB120-95-85	5.0	MB210-95-85	5.0	MB430-95-85	5.0
95	90					MB120-95-90	2.5	MB210-95-90	2.5	MB430-95-90	2.5
100	85					MB120-100-85	7.5	MB210-100-85	7.5	MB430-100-85	7.5
100	90					MB120-100-90	5.0	MB210-100-90	5.0	MB430-100-90	5.0
100	95					MB120-100-95	2.5	MB210-100-95	2.5	MB430-100-95	2.5
105	90							MB210-105-90	7.5	MB430-105-90	7.5
105	95							MB210-105-95	5.0	MB430-105-95	5.0
105	100							MB210-105-100	2.5	MB430-105-100	2.5
110	95							MB210-110-95	7.5	MB430-110-95	7.5
110	100							MB210-110-100	5.0	MB430-110-100	5.0
110	105							MB210-110-105	2.5	MB430-110-105	2.5
115	100							MB210-115-100	7.5	MB430-115-100	7.5
115	105							MB210-115-105	5.0	MB430-115-105	5.0
115	110							MB210-115-110	2.5	MB430-115-110	2.5
130	105									MB430-130-105	12.5
130	110									MB430-130-110	10.0
130	115									MB430-130-115	7.5
145	110									MB430-145-110	17.5
145	115									MB430-145-115	15.0
145	130									MB430-145-130	7.5

BW - BACKUP WRENCHES


BWH with BWM-50

Suitable for use with TWS-N & TWH-N Wrenches

Interchangeable hexagon links

Positive release mechanism

The Hi-Force BW series of back up wrenches provide an easily fitted and easily removable back nut reaction arm to prevent both nuts rotating during tightening applications. The 'T-Bar' design adjustable reaction point prevents lock up once tightening is completed.

Complete set:

Model Number	Description	Backup wrench holder incl. set of links: From Imperial	From Metric	To Imperial	To Metric
BWI-SET	Holder complete with imperial link set (12 pcs)	1 7/16"	-	3 7/8"	-
BWM-SET	Holder complete with metric link set (14 pcs)	-	36mm	-	100mm

Individual components:

Model Number	Description	Hexagon AF size Imperial	Hexagon AF size Metric
Holder			
BWH	Backup wrench holder	-	-
Hexagon links			
BWI-107	Female hexagon link for backup wrench (imperial)	1 7/16"	-
BWI-110	Female hexagon link for backup wrench (imperial)	1 5/8"	-
BWI-113	Female hexagon link for backup wrench (imperial)	1 13/16"	-
BWI-200	Female hexagon link for backup wrench (imperial)	2 "	-
BWI-203	Female hexagon link for backup wrench (imperial)	2 3/16"	-
BWI-206	Female hexagon link for backup wrench (imperial)	2 3/8 "	-
BWI-209	Female hexagon link for backup wrench (imperial)	2 9/16"	-
BWI-212	Female hexagon link for backup wrench (imperial)	2 3/4"	-
BWI-215	Female hexagon link for backup wrench (imperial)	2 15/16"	-
BWI-302	Female hexagon link for backup wrench (imperial)	3 1/8"	-
BWI-308	Female hexagon link for backup wrench (imperial)	3 1/2"	-
BWI-314	Female hexagon link for backup wrench (imperial)	3 7/8"	-
BWM-36	Female hexagon link for backup wrench (metric)	-	36 mm
BWM-41	Female hexagon link for backup wrench (metric)	-	41 mm
BWM-46	Female hexagon link for backup wrench (metric)	-	46 mm
BWM-50	Female hexagon link for backup wrench (metric)	-	50 mm
BWM-55	Female hexagon link for backup wrench (metric)	-	55 mm
BWM-60	Female hexagon link for backup wrench (metric)	-	60 mm
BWM-65	Female hexagon link for backup wrench (metric)	-	65 mm
BWM-70	Female hexagon link for backup wrench (metric)	-	70 mm
BWM-75	Female hexagon link for backup wrench (metric)	-	75 mm
BWM-80	Female hexagon link for backup wrench (metric)	-	80 mm
BWM-85	Female hexagon link for backup wrench (metric)	-	85 mm
BWM-90	Female hexagon link for backup wrench (metric)	-	90 mm
BWM-95	Female hexagon link for backup wrench (metric)	-	95 mm
BWM-100	Female hexagon link for backup wrench (metric)	-	100 mm

HTWP - TORQUE WRENCH PUMPS

HTWP2142AR

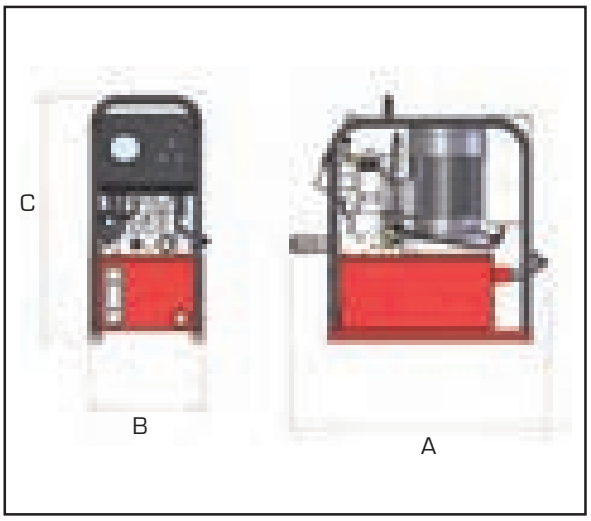
HTWP2140P

- Working pressure 10000 PSI
- Choice of air or electric power options
- Supplied complete with hand pendant controller

Hi-Force hydraulic torque wrench pumps are compatible for use with all Hi-Force hydraulic torque wrenches. All models are 10000 PSI maximum working pressure, fitted with an easily accessible and adjustable torque setting pressure relief valve, and are available as air driven or electric driven pump units. All pumps are supplied with a remote operation, push button hand pendant controller with 10 feet of control line cable. Glycerin filled, easy to read, dual scale (0-700 Bar/0-10000 PSI) hydraulic pressure gauges are fitted as standard to all models. Air driven versions also include an integral inline filter, regulator, lubricator system with airline pressure gauge and an exhaust air cooling system.

F

- Dual scale glycerin filled pressure gauge
- Two speed operation
- Externally adjustable torque setting valve
- Protective rollbar carrying frame
- Air pressure gauge and filter-regulator-lubricator unit (air powered pumps only)
- Integral oil cooling system (air powered pumps only)
- Reservoir oil sight level gauge
- Auto retract function (electric powered pumps only)
- Choice of standard hose length available, see page 90



Model number	Max pressure PSI	Power supply	Motor rating hp	Displacement inch³/min low pressure	Displacement inch³/min high pressure	Changeover pressure PSI	Weight lbs	Dimensions in inches A	B	C
HTWP2140P	10000	100 PSI	2.01	372.24	31.12	870	61.7	18.44	8.08	17.53
HTWP2141AR	10000	110 volt	1.01	238.00	21.97	870	75.0	18.44	8.08	17.53
HTWP2141ARH	10000	110 volt	1.01	238.00	21.97	870	75.0	18.44	8.08	17.53
HTWP2142AR	10000	240 volt	1.01	238.00	21.97	870	75.0	18.44	8.08	17.53
HTWP2142ARH	10000	240 volt	1.01	238.00	21.97	870	75.0	18.44	8.08	17.53

Note: Pumps with suffix 'H' in the model number are supplied with 60Hz electric motor.

TPA / TPE - TORQUE WRENCH PUMPS - PREMIUM LINE


TPE25A

High flow 3-stage pump unit

Choice of air or electric power options

Rigid, compact & lightweight

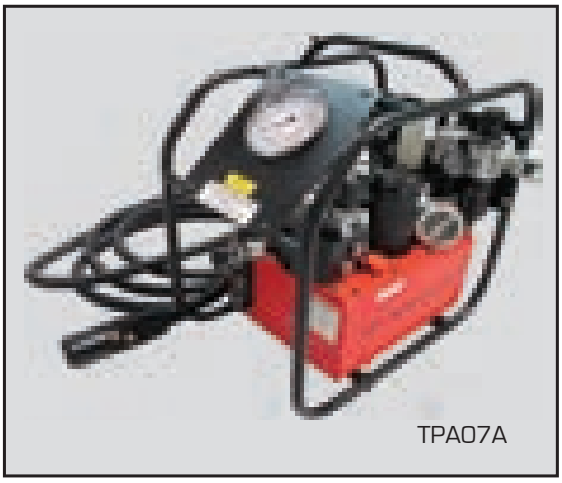
The Hi-Force TPA & TPE range of high speed torque wrench pumps offers the following features:

- High speed 3-stage, 8 piston pump unit
- Multi outlet 4-way split block for simultaneous operation of up to 4 hydraulic wrenches
- Compact design, fitted within a rigid rollbar protection & carrying frame
- Automatically activated oil cooling heat exchanger fitted as standard on all electric driven models
- Exhaust air radiator cooling system on air driven models
- Adjustable torque setting pressure relief valve with locking nut
- Models with suffix 'A' fitted with analog pressure gauge
- Models with suffix 'D' fitted with pressure transducer and digital pressure gauge
- Pendant controlled choice of manual with auto retract or full automatic cycle operation (automatic cycle functions only available on electric driven models)
- Solenoid valve with pendant control including motor on/off and 16.5 feet cable

Model number	Max. pressure PSI	Power supply	Pressure gauge	Gauge reading (*)	Displacements inch³/min 1st stage 0-943 PSI	2nd stage 943-4713 PSI	3rd stage 4713-10000 PSI
Air driven pump units							
TPA07A	10000	100 PSI air	analog	Bar/PSI	427.17	97.64	48.82
TPA07D	10000	100 PSI air	digital	Bar/PSI/Nm/Lbf.Ft	427.17	97.64	48.82
Electric driven pump units							
TPE15A	10000	110V-1Ph-50Hz	analog	Bar/PSI	396.65	91.54	45.77
TPE15D	10000	110V-1Ph-50Hz	digital	Bar/PSI/Nm/Lbf.Ft	396.65	91.54	45.77
TPE16A	10000	120V-1Ph-60Hz	analog	Bar/PSI	475.98	109.84	54.92
TPE16D	10000	120V-1Ph-60Hz	digital	Bar/PSI/Nm/Lbf.Ft	475.98	109.84	54.92
TPE25A	10000	230V-1Ph-50Hz	analog	Bar/PSI	396.65	91.54	45.77
TPE25D	10000	230V-1Ph-50Hz	digital	Bar/PSI/Nm/Lbf.Ft	396.65	91.54	45.77
TPE26A	10000	230V-1Ph-60Hz	analog	Bar/PSI	475.98	109.84	54.92
TPE26D	10000	230V-1Ph-60Hz	digital	Bar/PSI/Nm/Lbf.Ft	475.98	109.84	54.92
TPE45A	10000	400V-3Ph-50Hz	analog	Bar/PSI	396.65	91.54	45.77
TPE45D	10000	400V-3Ph-50Hz	digital	Bar/PSI/Nm/Lbf.Ft	396.65	91.54	45.77
TPE46A	10000	480V-3Ph-60Hz	analog	Bar/PSI	475.98	109.84	54.92
TPE46D	10000	480V-3Ph-60Hz	digital	Bar/PSI/Nm/Lbf.Ft	475.98	109.84	54.92

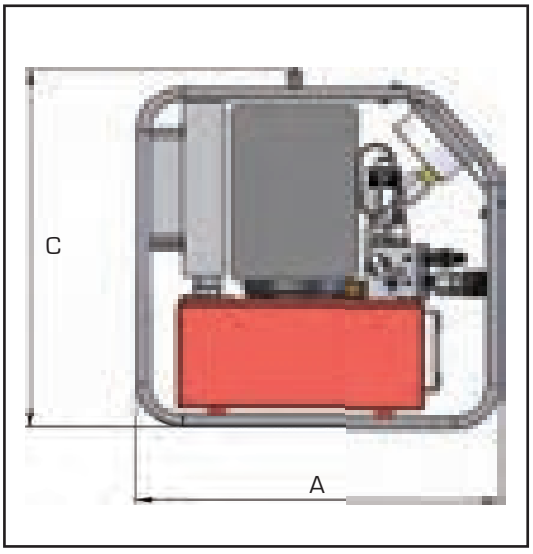
Note: (*) Torque value reading only available on software controlled, programmable pump unit

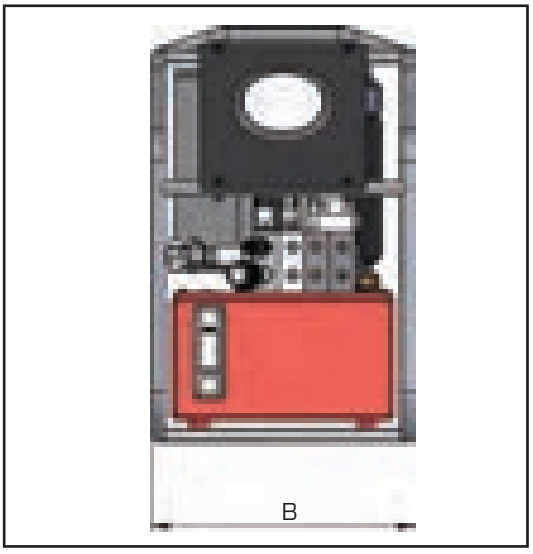
TPA / TPE - TORQUE WRENCH PUMPS - PREMIUM LINE


TPA07A

- Maximum working pressure 10000 PSI
- High speed, 3-stage pump
- Multi-outlet block for operation of 4 wrenches

>> Optional extras include a full software controlled pump unit, enabling the user to select the hydraulic torque wrench in use via the digital display and have torque readings (in Nm or Lbf.ft) on the digital gauge. All Hi-Force TWS-N and TWH-N hydraulic torque wrenches are programmed and selectable as standard.





Pump Model	Oil capacity	Max. noise level	Max. oil temp	Weight incl. oil	Dimensions in inches Length (A)	Width (B)	Height (C)
All TPA air driven models	1.85 gallons	90 db (A)	80 °C	66.1 lbs	17.97	11.27	18.75
All TPE electric driven models	1.85 gallons	88 db (A)	80 °C	86.0 lbs	17.97	11.27	18.75

Optional coupler sets for simultaneous operation of multiple torque wrenches (one set supplied fitted as standard):

Model number	Description
TP-CS1	Single set of male / female flatface couplers, for simultaneous operation of two hydraulic wrenches
TP-CS2	Double set of male / female flatface couplers, for simultaneous operation of three hydraulic wrenches
TP-CS3	Triple set of male / female flatface couplers, for simultaneous operation of four hydraulic wrenches

TORQUE WRENCH HOSES, COUPLERS & HOSE REEL

- Hose lengths up to 330 feet
- Supplied with quick connect couplings
- Working pressure 10000 PSI

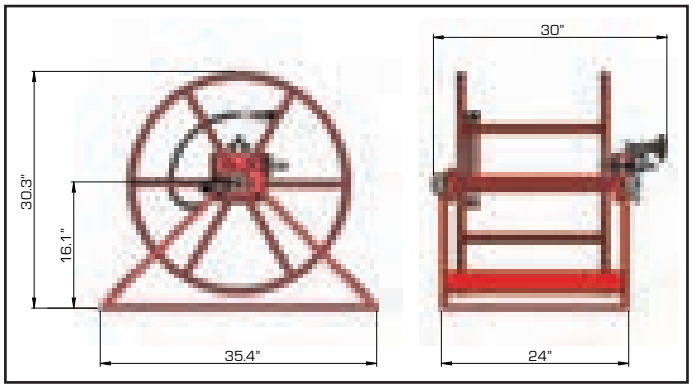
Hi-Force torque wrench hydraulic hoses are compatible for use with all Hi-Force hydraulic torque wrenches and torque pumps up to a maximum of 10000 PSI working pressure. The torque wrench hoses are available as bonded twin hoses with quick connect couplings on both ends. Standard hose lengths from 13 to 330 feet and alternative lengths are available on request.

F

Model number	Maximum pressure PSI	Description
HTWH4	10000	Bonded twin hoses with quick connect couplers, length 13 feet
HTWH5	10000	Bonded twin hoses with quick connect couplers, length 16.5 feet
HTWH6	10000	Bonded twin hoses with quick connect couplers, length 19.5 feet
HTWH8	10000	Bonded twin hoses with quick connect couplers, length 26 feet
HTWH10	10000	Bonded twin hoses with quick connect couplers, length 33 feet
HTWH50	10000	Bonded twin hoses with quick connect couplers, length 164 feet
HTWH75	10000	Bonded twin hoses with quick connect couplers, length 246 feet
HTWH100	10000	Bonded twin hoses with quick connect couplers, length 330 feet
CF4F	10000	Female half coupler, ¼" NPT Female
CM4F	10000	Male half coupler, ¼" NPT Female

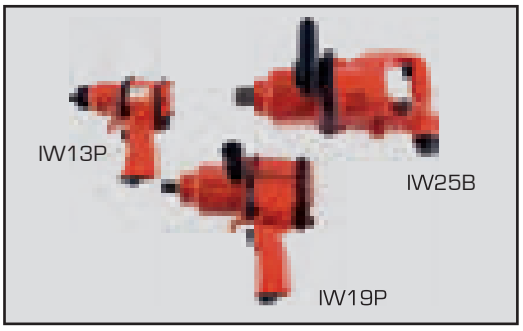
Note: We recommend the use of HTWR1 hose reel with hose lengths of 164 feet or more.

The Hi-Force HTWR1 hose reel is designed for use with Hi-Force torque wrenches when there is a requirement for the wrench and pump to be separated by significant distance such as subsea applications and can accommodate twin line hoses up to a length of 330 feet. The reel is supplied with twin 1.5 feet length lead hose connections enabling the connection of either the HTWH50, HTWH75 or HTWH100 hose sets depending on customer requirements.



- Disc brake for speed control
- Latching mechanism for positive locking
- Central oil feed for hose deployment whilst connected
- Fixing holes at the base of hose reel frame

IW - PNEUMATIC IMPACT WRENCHES



- Industrial heavy duty design
- Square drive sizes from ½" to 1½"
- Operates from standard 90 PSI air pressure

The IW range of heavy duty pneumatic impact wrenches is designed for high volume production, heavy maintenance and construction work. A choice of four models in square drive sizes ½", ¾", 1" or 1½" is available all offering an excellent power to weight ratio, compact design and low vibration. Available with pistol grip (models IW13P and IW19P) and back handle grip (models IW25B and IW38B), these high quality tools offer increased durability, low noise level and reduced operator fatigue. All models can be used for tightening and loosening applications and incorporate a four position adjustable power output device. A full range of impact quality sockets, in bolt imperial and metric sizes, for use with Hi-Force impact wrenches is detailed on pages 77 and 78.

Model number	Square drive size	Bolt capacity inch	Bolt capacity mm	Free speed R.P.M.	Free speed I.P.M.	Max. torque lbf.ft	Max. torque Nm	Recommended torque lbf.ft	Recommended torque Nm	Air Consumption cfm	Air Consumption m³/min	Weight lbs
Pistol grip versions												
IW13P	½"	⅝"	16	6300	1200	300	450	65-260	90-350	12.5	0.35	6.2
IW19P	¾"	⅞"	22	3800	1100	640	870	185-590	250-800	21.4	0.60	14.1
Back handle grip versions												
IW25B	1"	1¾"	45	3700	700	1980	2700	740-1772	1000-2450	26.7	0.75	23.4
IW38B	1½"	2"	50	3000	600	2600	3500	740-2370	1000-3200	29.2	0.82	35.1

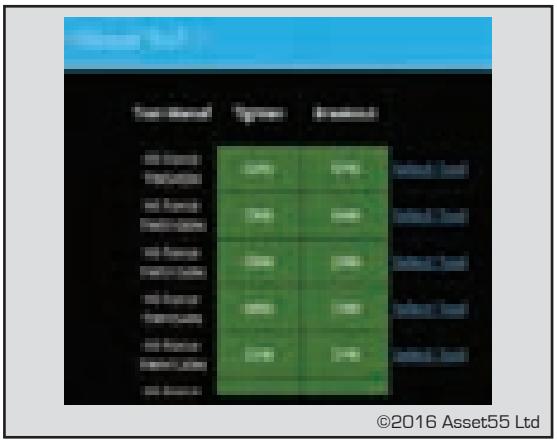
FRL11 - FILTER REGULATOR LUBRICATOR UNIT

- Protective carrying frame
- Complete with air inlet hose
- Air pressure gauge fitted as standard

The Hi-Force FRL11 filter regulator lubricator unit is designed to be used in conjunction with air operated tools such as TWP, TWP-OG, IW and AHP11 series foot operated air driven pumps. The unit allows the air pressure to be adjusted to suit the requirements of the tool. The unit will also remove dust and water from the air supply and inject lubricant to the tool to ensure smooth operation. Supplied in a robust steel carrying and protective frame as standard, the unit comes complete with dual scale (Bar/PSI) air inlet pressure gauge and 10 feet air hose with end fittings.

Model number	Air inlet connection	Air outlet connection	Weight lbs	Dimensions in inches Length	Width	Height
FRL11	½" NPT	½" NPT	6.6	7.88	7.88	12.21

BOLTRIGHT PRO SOFTWARE - POWERED BY ASSET55



Online access compatible with all operating systems

Offline version available

Covers bolt torqueing requirements

BOLTRIGHTPRO

Hi-Force's answer to joint integrity

BOLTRIGHT PRO is an innovative, bolted joint integrity software program, designed to assist engineers, with the provision of accurate bolt load calculations, based on key input data, related to each specific bolted joint. BOLTRIGHT PRO has been primarily designed for use in the Oil & Gas industry, where the safe movement of hydrocarbons in a leak free environment is absolutely critical, however it can also assist in many other industries, where bolted joints are present.

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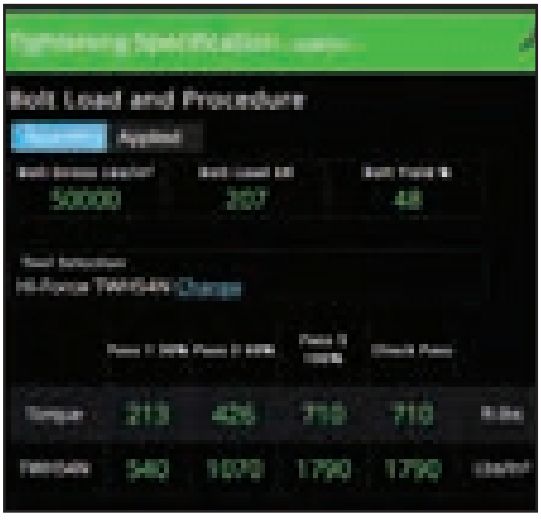
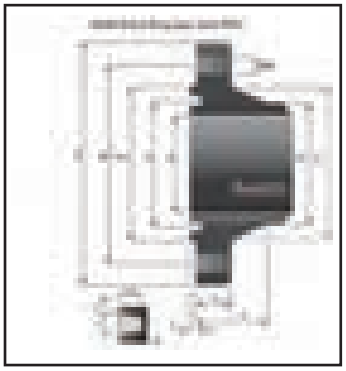
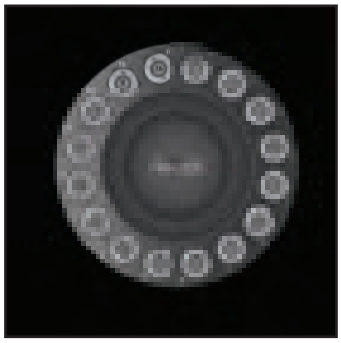
The user enters all available data about the joint including flange size, material and rating, gasket type, bolt size and material grade, lubricant type and operating temperature. BOLTRIGHT PRO will analyze this data and produce a comprehensive calculation, of the required torque to be applied to all of the flange joint bolts to achieve a leak free joint, first time every time! Additionally, BOLTRIGHT PRO will produce a clear and easy to follow bolt tightening procedure, which will include the correct tool selection, from within Hi-Force's extensive range of bolting tools, along with the correct sequence of applying the loads, onto the respective flange joint bolts, including the applicable pump hydraulic pressure settings, for each stage of the bolt tightening process.

The methodology of the BOLTRIGHT PRO software calculations is fully traceable to industry standards, ensuring that the latest best practice procedures are followed at all times. As part of the software joint integrity review process, BOLTRIGHT PRO will also display all of the relevant combined stresses within the joint, once the bolt tightening is completed. This includes not only bolt stress but also gasket and flange stress, to ensure all of the stresses within the joint are within acceptable levels. The flexibility of the BOLTRIGHT PRO software enables the user to change any of the input data in order that optimum integrity can be achieved within each and every joint. As an example a change of bolt material and lubricant type can and will affect the BOLTRIGHT PRO software calculations and bolt tightening procedures.







BOLT TENSIONERS

SBT - SPRING RETURN BOLT TENSIONERS - IMPERIAL

SBT3-187B1

Capacities from 51 to 298 tons

Maximum working pressure 21750 PSI

Spring assisted piston retraction

The SBT imperial range of hydraulic bolt tensioners, offers all of the features and benefits of our standard STS range (see pages 102 and 103), but with the added feature of spring assisted return hydraulic pistons. Designed primarily for topside operation, this additional spring return piston feature will reduce bolt tensioning cycle times considerably, as the tensioner piston will automatically retract, after the hydraulic pressure is released. The range currently comprises of 22 models, suitable for standard size bolts from 1¼" to 4" diameter.

The versatility of the SBT bolt tensioner range, is identical to our standard STS range, with a variety of interchangeable threaded pullers and nut rotating sockets available, either as bolt size conversion kits or individual parts. Further details on SBT imperial conversion kits are detailed on pages 96 & 97. All SBT bolt tensioners are designed and manufactured with a wear coated piston, maximum stroke indicator, self energizing high pressure seals, dual quick connect couplers, for easy multiple tensioner hook up and operate at pressures up to 21750 PSI maximum.

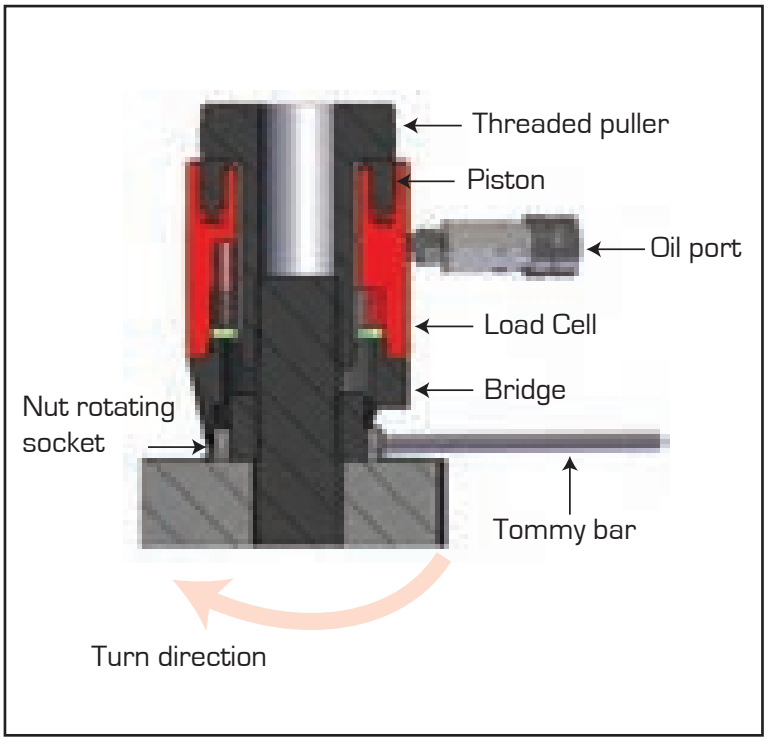
G

Suitable hydraulic pumps and high pressure hydraulic hose assemblies for use with SBT tensioners are detailed on pages 115 & 116 of this catalog.

- Nitrocarburized piston
- Maximum piston stroke indicator
- Spring assisted return
- User friendly operating and maintenance procedure

Don't forget to order your tommy bars when purchasing Hi-Force hydraulic tensioners. We recommend the purchase of one tommy bar for every four hydraulic tensioners.

Tensioner range	Tommy bar
SBT2	TTB08
SBT3	TTB10
SBT4	TTB10
SBT5	TTB14
SBT6	TTB14

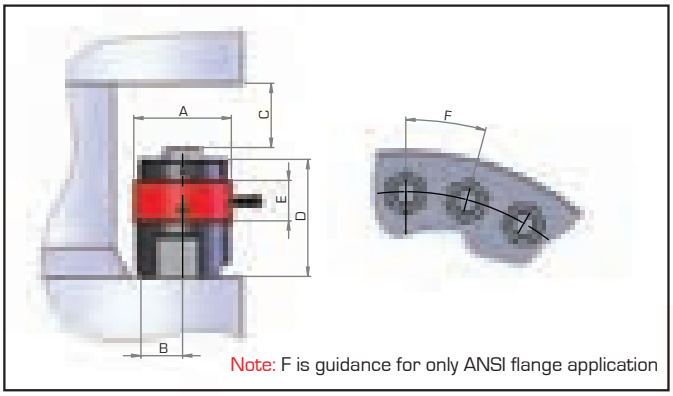


SBT - SPRING RETURN BOLT TENSIONERS - IMPERIAL

SBT3-187B1

- Bolt sizes from 1¼" to 4"
- Modular design for optimum versatility
- Dual quick connect couplings for easy connection

Conversion kits for SBT imperial range of bolt tensioners can be found on pages 96 and 97 of this catalog.



Note: F is guidance for only ANSI flange application

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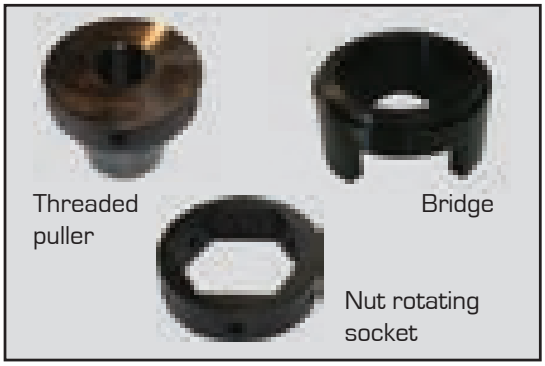
Model number	Bolt thread size	Threads per inch	Capacity Tons	Capacity kN	Effective area inch²	Stroke inch	Weight lbs
SBT2-125B1	1 1/4"	8	51	457	4.73	0.59	8.8
SBT2-137B1	1 3/8"	8	51	457	4.73	0.59	8.8
SBT2-150B1	1 1/2"	8	51	457	4.73	0.59	8.8
SBT3-162B1	1 5/8"	8	92	822	8.49	0.59	14.8
SBT3-175B1	1 3/4"	8	92	822	8.49	0.59	14.8
SBT3-175B2	1 3/4"	8	92	822	8.49	0.59	14.8
SBT3-187B1	1 7/8"	8	92	822	8.49	0.59	14.8
SBT3-187B2	1 7/8"	8	92	822	8.49	0.59	14.8
SBT3-200B2	2"	8	92	822	8.49	0.59	14.8
SBT4-187B1	1 7/8"	8	142	1264	13.07	0.59	24.3
SBT4-200B1	2"	8	142	1264	13.07	0.59	24.3
SBT4-200B2	2"	8	142	1264	13.07	0.59	24.3
SBT4-225B2	2 1/4"	8	142	1264	13.07	0.59	24.3
SBT4-250B2	2 1/2"	8	142	1264	13.07	0.59	24.3
SBT5-250B1	2 1/2"	8	206	1833	18.94	0.59	36.4
SBT5-275B1	2 3/4"	8	206	1833	18.94	0.59	36.4
SBT5-300B1	3"	8	206	1833	18.94	0.59	36.4
SBT6-300B1	3"	8	298	2649	27.37	0.59	52.9
SBT6-325B1	3 1/4"	8	298	2649	27.37	0.59	52.9
SBT6-350B1	3 1/2"	8	298	2649	27.37	0.59	52.9
SBT6-375B3	3 3/4"	8	298	2649	27.37	0.59	52.9
SBT6-400B3	4"	8	298	2649	27.37	0.59	52.9

Dimensions in inches					
A	B	C min	D	E	F
4.02	1.54	5.00	6.46	3.59	2.92
4.02	1.54	5.00	6.46	3.59	3.03
4.02	1.54	4.85	6.46	3.59	3.15
5.40	1.85	5.75	7.41	3.70	3.62
5.40	1.85	5.63	7.41	3.70	3.66
5.40	1.97	5.83	7.60	3.70	3.70
5.40	1.85	5.48	7.41	3.70	3.82
5.40	1.97	5.67	7.60	3.70	4.10
5.40	1.97	5.56	7.60	3.70	4.10
6.58	1.97	5.79	7.76	3.82	4.10
6.58	1.97	5.63	7.76	3.82	4.10
6.58	2.44	6.11	8.39	3.82	4.18
6.58	2.44	5.91	8.39	3.82	4.77
6.58	2.44	5.71	8.39	3.82	5.00
8.23	2.88	6.38	9.02	4.02	5.28
8.23	2.88	6.15	9.02	4.02	5.52
8.23	2.88	5.87	9.02	4.02	5.79
9.69	3.31	6.86	10.01	4.06	6.34
9.69	3.31	6.66	10.01	4.06	6.58
9.69	3.31	6.38	10.01	4.06	6.78
9.69	4.14	7.64	11.62	4.06	7.53
9.69	4.14	7.45	11.62	4.06	7.72

Note: Weight is for load cell and bridge only. Total weight of complete assembly depends on size of puller and nut rotating socket selected.
Tommy bars are not included. Hi-Force recommends one tommy bar for every four tensioners, please see page 94 for ordering code.

SBT - BOLT TENSIONER COMPONENTS - IMPERIAL



Use with SBT Imperial Spring Return Tensioners

Modular design

Offers greater versatility

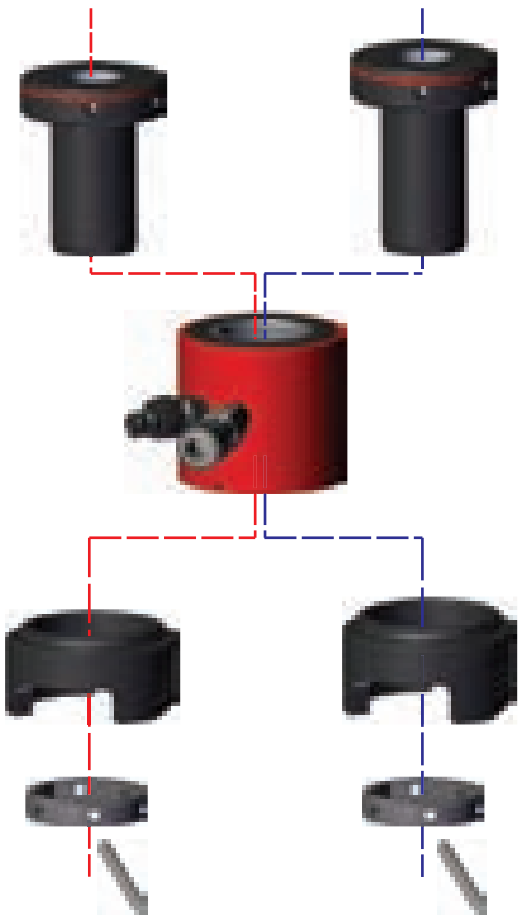
The modular design of Hi-Force SBT series spring return hydraulic bolt tensioners enables the user to adapt an existing SBT tensioner assembly to another thread size, within the tensioner range, by purchasing individual components or a simple conversion kit. By changing the required components (see drawing and table on the next page), Hi-Force SBT bolt tensioners offer the user even greater versatility at an economical cost.

Tensioner models SBT3, SBT4 and SBT6 are available with two different bridge sizes, hence always check whether or not the required thread change is possible within the bridge size (please follow coloured lines in below drawing). Make sure that all components match up. DO NOT mix components from different colour lines. A large bridge will require the usage of a long threaded puller to ensure sufficient thread engagement, as well as a large size nut rotating socket.

G

Changes within the same colour code DO NOT require a bridge change however, changes from the red to blue line (or vice versa) MUST include a relative bridge also.

The next page will provide part numbers for all the tensioner components, for which the same colour coding is used, i.e. red represents the smaller bolt sizes within the tensioner range, comprising of short threaded adapter, load cell, small bridge, small nut rotating socket and tommy bar. The blue line represents the larger bolt sizes within the tensioner range, in which case the tensioner is built from the long threaded adaptor, load cell, large bridge, large nut rotating socket and tommy bar.



Note: SBT2 & SBT5 models both have only one tensioner bridge available.

Don't forget to order your tommy bars when purchasing Hi-Force Bolt tensioners, Hi-Force recommends the purchase of one tommy bar for every four tensioners.

SBT - BOLT TENSIONER COMPONENTS - IMPERIAL

Principle of SBT spring return bolt tensioner

A = Load cell
B = Tommy bar
C = Bridge
D = Threaded puller
E = Nut rotating socket

This table provides all the information to select the components to modify your existing tensioner to suit another bolt size. Changes are only possible within the same tensioner size. It is essential that all the components or selected conversion kits have the same suffix as the target tensioner size (i.e. B1, B2 or B3).

Examples:
To change from SBT3-162B1 to SBT3-187B1 would require conversion kit CKS3-187B1 only.
To change from SBT3-187B1 to SBT3-200B2 would require conversion kit CKS3-200B2 and bridge STS3-B2.

- Denotes smaller bridge size within tensioner range
- Denotes larger bridge size within tensioner range
- Denotes one bridge size within tensioner range

Complete tensioner		Individual components					D & E
		A	B	C	Available as conversion kit		
Model number	Bolt Thread	Load cell	Tommy bar	Bridge	D - Threaded puller	E - Rotating socket	Complete conversion kit
For tensioner range SBT2:							
SBT2-125B1	1 1/4"	SBT2-LC	TTB08	STS2-B1	TPS2-125B1	RS2-51B1	CKS2-125B1
SBT2-137B1	1 3/8"				TPS2-137B1	RS2-56B1	CKS2-137B1
SBT2-150B1	1 1/2"				TPS2-150B1	RS2-60B1	CKS2-150B1
For tensioner range SBT3:							
SBT3-162B1	1 5/8"	SBT3-LC	TTB10	STS3-B1	TPS3-162B1	RS3-65B1	CKS3-162B1
SBT3-175B1	1 3/4"				TPS3-175B1	RS3-70B1	CKS3-175B1
SBT3-187B1	1 7/8"				TPS3-187B1	RS3-75B1	CKS3-187B1
SBT3-175B2	1 3/4"			STS3-B2	TPS3-175B2	RS3-70B2	CKS3-175B2
SBT3-187B2	1 7/8"				TPS3-187B2	RS3-75B2	CKS3-187B2
SBT3-200B2	2"				TPS3-200B2	RS3-80B2	CKS3-200B2
For tensioner range SBT4:							
SBT4-187B1	1 7/8"	SBT4-LC	TTB10	STS4-B1	TPS4-187B1	RS4-75B1	CKS4-187B1
SBT4-200B1	2"				TPS4-200B1	RS4-80B1	CKS4-200B1
SBT4-200B2	2"			STS4-B2	TPS5-200B2	RS4-80B2	CKS4-200B2
SBT4-225B2	2 1/4"				TPS5-225B2	RS4-90B2	CKS4-225B2
SBT4-250B2	2 1/2"				TPS5-250B2	RS4-98B2	CKS4-250B2
For tensioner range SBT5:							
SBT5-250B1	2 1/2"	SBT5-LC	TTB14	STS5-B1	TP5-250B1	RS5-100B1	CKS5-250B1
SBT5-275B1	2 3/4"				TP5-275B1	RS5-108B1	CKS5-275B1
SBT5-300B1	3"				TP5-300B1	RS5-118B1	CKS5-300B1
For tensioner range SBT6:							
SBT6-300B1	3"	SBT6-LC	TTB14	STS6-B1	TPS6-300B1	RS6-118B1	CKS6-300B1
SBT6-325B1	3 1/4"				TPS6-325B1	RS6-127B1	CKS6-325B1
SBT6-350B1	3 1/2"				TPS6-350B1	RS6-137B1	CKS6-350B1
SBT6-375B3	3 3/4"			STS6-B3	TPS6-375B3	RS6-146B3	CKS6-375B3
SBT6-400B3	4"				TPS6-400B3	RS6-156B3	CKS6-400B3

Note: Remember to check bridge compatibility for SBT3, SBT4 and SBT6 models when ordering components.

SBT - SPRING RETURN BOLT TENSIONERS - METRIC

SBT3-M42B1

Capacities from 51 to 298 tons

Maximum working pressure 21750 PSI

Spring assisted piston retraction

The SBT metric range of hydraulic bolt tensioners, offers all of the features and benefits of our standard STS range (see pages 106 and 107), but with the added feature of spring assisted return hydraulic pistons. Designed primarily for topside operation, this additional spring return piston feature will reduce bolt tensioning cycle times considerably, as the tensioner piston will automatically start to retract, after the hydraulic pressure is released. The range currently comprises of 26 models, suitable for standard size bolts from M30 to M100 diameter.

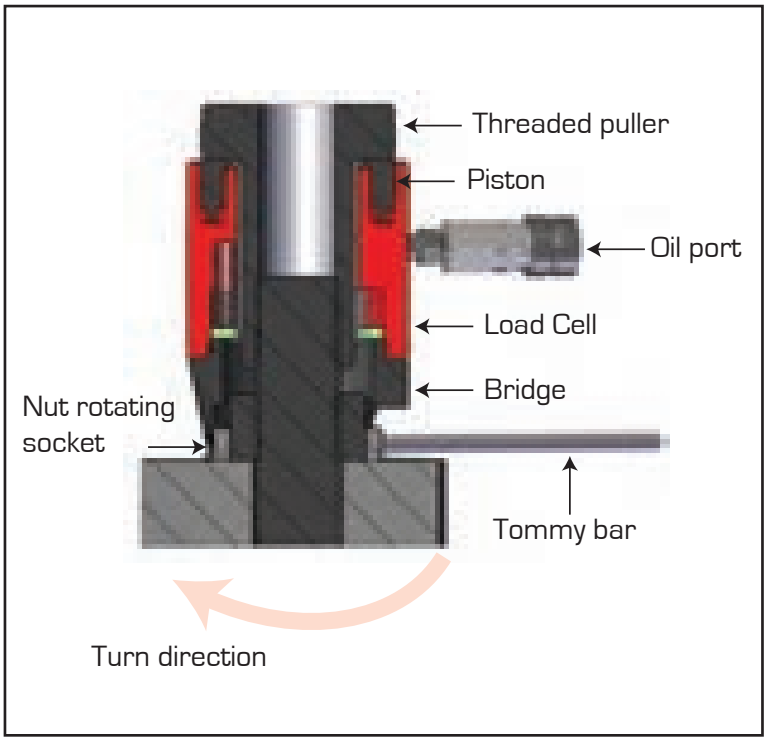
The versatility of the SBT bolt tensioner range, is identical to our standard STS range, with a variety of interchangeable threaded pullers and nut rotating sockets available, either as bolt size conversion kits or individual parts. Further details on SBT metric conversion kits are detailed on pages 100 & 101. All SBT bolt tensioners are designed and manufactured with a wear coated piston, maximum stroke indicator, self energizing high pressure seals, dual quick connect couplers, for easy multiple tensioner hook up and operate at pressures up to 21750 PSI maximum.

Suitable hydraulic pumps and high pressure hydraulic hose assemblies for use with SBT tensioners are detailed on pages 115 & 116 of this catalog.

- Nitrocarburized piston
- Maximum piston stroke indicator
- Spring assisted return
- User friendly operating and maintenance procedure

Don't forget to order your tommy bars when purchasing Hi-Force hydraulic tensioners. We recommend the purchase of one tommy bar for every four hydraulic tensioners.

Tensioner range	Tommy bar
SBT2	TTB08
SBT3	TTB10
SBT4	TTB10
SBT5	TTB14
SBT6	TTB14



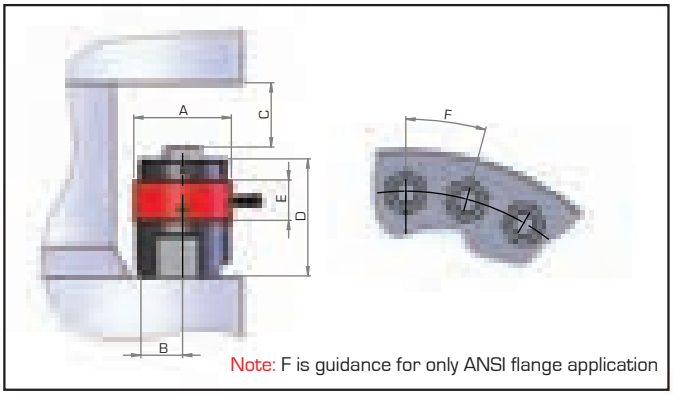
SBT - SPRING RETURN BOLT TENSIONERS - METRIC

SBT3-M42B1

Bolt sizes from M30 to M100

Modular design for optimum versatility

Dual quick connect couplings for easy connection



Note: F is guidance for only ANSI flange application

Conversion kits for SBT metric range of bolt tensioners can be found on pages 100 and 101 of this catalog.

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Model number	Bolt thread size	Threads per inch	Capacity Tons	Capacity kN	Effective area inch²	Stroke inch	Weight lbs	Dimensions in inches A	B	C min	D	E	F
SBT2-M30B1	M30	3.5	51	457	4.73	0.59	8.8	4.02	1.54	5.20	6.46	3.59	2.80
SBT2-M33B1	M33	3.5	51	457	4.73	0.59	8.8	4.02	1.54	5.00	6.46	3.59	2.92
SBT2-M36B1	M36	4	51	457	4.73	0.59	8.8	4.02	1.54	4.85	6.46	3.59	3.03
SBT2-M39B1	M39	4	51	457	4.73	0.59	8.8	4.02	1.54	4.85	6.46	3.59	3.15
SBT3-M42B1	M42	4.5	92	822	8.49	0.59	14.8	5.40	1.85	5.71	7.41	3.70	3.59
SBT3-M45B1	M45	4.5	92	822	8.49	0.59	14.8	5.40	1.85	5.59	7.41	3.70	4.14
SBT3-M45B2	M45	4.5	92	822	8.49	0.59	14.8	5.40	1.85	5.79	7.60	3.70	3.82
SBT3-M48B1	M48	5	92	822	8.49	0.59	14.8	5.40	1.85	5.48	7.41	3.70	4.14
SBT3-M48B2	M48	5	92	822	8.49	0.59	14.8	5.40	1.85	5.67	7.60	3.70	4.14
SBT3-M52B2	M52	5	92	822	8.49	0.59	14.8	5.40	1.85	5.52	7.60	3.70	3.82
SBT4-M48B1	M48	5	142	1264	13.07	0.59	24.3	6.58	1.97	5.91	7.76	3.82	4.14
SBT4-M52B1	M52	5	142	1264	13.07	0.59	24.3	6.58	1.97	5.71	7.76	3.82	4.26
SBT4-M52B2	M52	5	142	1264	13.07	0.59	24.3	6.58	2.44	6.30	8.39	3.82	4.73
SBT4-M56B2	M56	5.5	142	1264	13.07	0.59	24.3	6.58	2.44	6.11	8.39	3.82	4.73
SBT4-M60B2	M60	5.5	142	1264	13.07	0.59	24.3	6.58	2.44	5.91	8.39	3.82	4.89
SBT4-M64B2	M64	6	142	1264	13.07	0.59	24.3	6.58	2.44	5.71	8.39	3.82	4.96
SBT5-M64B1	M64	6	206	1833	18.94	0.59	36.4	8.23	2.88	6.46	9.02	4.02	5.28
SBT5-M68B1	M68	6	206	1833	18.94	0.59	36.4	8.23	2.88	6.26	9.02	4.02	5.36
SBT5-M72B1	M72	6	206	1833	18.94	0.59	36.4	8.23	2.88	6.15	9.02	4.02	5.48
SBT5-M76B1	M76	6	206	1833	18.94	0.59	36.4	8.23	2.88	5.87	9.02	4.02	5.59
SBT6-M76B1	M76	6	298	2649	27.37	0.59	52.9	9.69	3.31	6.93	10.01	4.06	6.23
SBT6-M80B1	M80	6	298	2649	27.37	0.59	52.9	9.69	3.31	6.78	10.01	4.06	6.30
SBT6-M85B1	M85	6	298	2649	27.37	0.59	52.9	9.69	3.31	6.66	10.01	4.06	6.38
SBT6-M90B1	M90	6	298	2649	27.37	0.59	52.9	9.69	3.31	6.38	10.01	4.06	6.70
SBT6-M95B3	M95	6	298	2649	27.37	0.59	52.9	9.69	3.78	7.64	11.62	4.06	7.25
SBT6-M100B3	M100	6	298	2649	27.37	0.59	52.9	9.69	3.78	7.45	11.62	4.06	7.49

Note: Weight is for load cell and bridge only. Total weight of complete assembly depends on size of puller and nut rotating socket selected. Tommy bars are not included. Hi-Force recommends one tommy bar for every four tensioners, please see page 98 for ordering code.

SBT - BOLT TENSIONER COMPONENTS - METRIC

Cost saving option

Easily fitted to existing tensioner assembly

Offers greater versatility

Similar to the imperial tensioner components (pages 96 & 97), the Hi-Force metric spring return hydraulic bolt tensioners are also modular in design and can be adapted to another thread size, within the tensioner range, by purchasing individual components or a simple conversion kit. By changing the required components (see drawing and table on the next page), Hi-Force SBT spring return bolt tensioners offer the user even greater versatility at an economical cost.

Tensioner models SBT3, SBT4 & SBT6 are available with two different bridge sizes, hence always check whether or not the required thread change is possible within the bridge size (please follow coloured lines in below drawing). Make sure that all components match up. DO NOT mix components from different colour lines. A large bridge will require the usage of a long threaded puller to ensure sufficient thread engagement, as well as a large size nut rotating socket.

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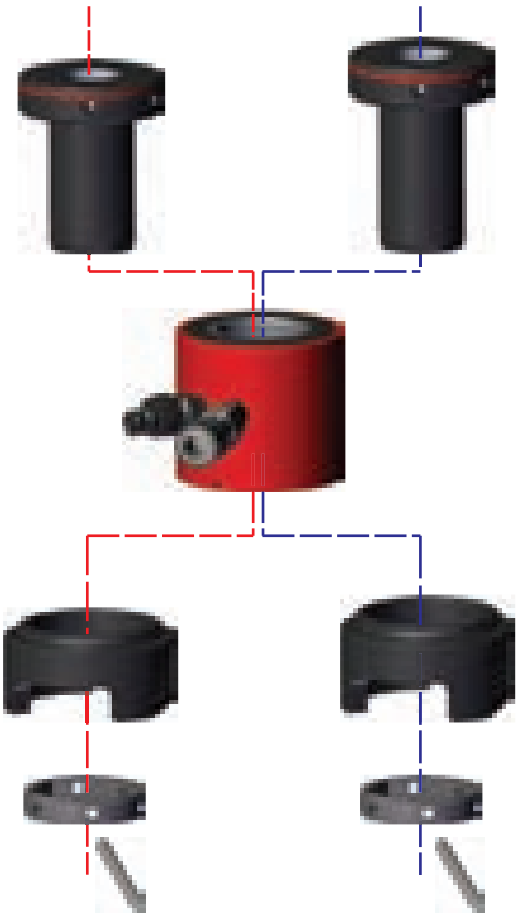
Changes within the same colour code DO NOT require a bridge change however, changes from the red to blue line (or vice versa) MUST include a relative bridge also.

The next page will provide part numbers for all the tensioner components, for which the same colour coding is used, i.e. red represents the smaller bolt sizes within the tensioner range, comprising of short threaded adapter, load cell, small bridge, small nut rotating socket and tommy bar. The blue line represents the larger bolt sizes within the tensioner range, in which case the tensioner is built from the long threaded adaptor, load cell, large bridge, large nut rotating socket and tommy bar.



Note: SBT2 & SBT5 models both have only one tensioner bridge available.

Don't forget to order your tommy bars when purchasing Hi-Force Bolt tensioners, Hi-Force recommends the purchase of one tommy bar for every four tensioners.

SBT - BOLT TENSIONER COMPONENTS - METRIC

Principle of SBT spring return bolt tensioner

A = Load cell
B = Tommy bar
C = Bridge
D = Threaded puller
E = Nut rotating socket

This table provides all the information to select the components to modify your existing tensioner to suit another bolt size. Changes are only possible within the same tensioner size. It is essential that all the components or selected conversion kits have the same suffix as the target tensioner size (i.e. B1, B2 or B3).

Examples:
To change from SBT3-M42B1 to SBT3-M48B1 would require conversion kit CKS3-M48B1 only.
To change from SBT3-M48B1 to SBT3-M52B2 would require conversion kit CKS3-M52B2 and bridge STS3-B2.

- Denotes smaller bridge size within tensioner range
- Denotes larger bridge size within tensioner range
- Denotes one bridge size within tensioner range

Complete tensioner		Individual components					D & E
Model number	Bolt Thread	A Load cell	B Tommy bar	C Bridge	Available as conversion kit: D - Threaded puller	E - Rotating socket	Complete conversion kit
For tensioner range SBT2:							
SBT2-M30B1	M30	SBT2-LC	TTB08	STS2-B1	TPS2-M30B1	RS2-46B1	CKS2-M30B1
SBT2-M33B1	M33				TPS2-M33B1	RS2-51B1	CKS2-M33B1
SBT2-M36B1	M36				TPS2-M36B1	RS2-56B1	CKS2-M36B1
SBT2-M39B1	M39				TPS2-M39B1	RS2-60B1	CKS2-M39B1
For tensioner range SBT3:							
SBT3-M42B1	M42	SBT3-LC	TTB10	STS3-B1	TPS3-M42B1	RS3-65B1	CKS3-M42B1
SBT3-M45B1	M45				TPS3-M45B1	RS3-70B1	CKS3-M45B1
SBT3-M48B1	M48				TPS3-M48B1	RS3-75B1	CKS3-M48B1
SBT3-M45B2	M45			STS3-B2	TPS3-M45B2	RS3-70B2	CKS3-M45B2
SBT3-M48B2	M48				TPS3-M48B2	RS3-75B2	CKS3-M48B2
SBT3-M52B2	M52				TPS3-M52B2	RS3-80B2	CKS3-M52B2
For tensioner range SBT4:							
SBT4-M48B1	M48	SBT4-LC	TTB10	STS4-B1	TPS4-M48B1	RS4-75B1	CKS4-M48B1
SBT4-M52B1	M52				TPS4-M52B1	RS4-80B1	CKS4-M52B1
SBT4-M52B2	M52			STS4-B2	TPS4-M52B2	RS4-80B2	CKS4-M52B2
SBT4-M56B2	M56				TPS4-M56B2	RS4-85B2	CKS4-M56B2
SBT4-M60B2	M60				TPS4-M60B2	RS4-90B2	CKS4-M60B2
SBT4-M64B2	M64				TPS4-M64B2	RS4-95B2	CKS4-M64B2
For tensioner range SBT5:							
SBT5-M64B1	M64	SBT5-LC	TTB14	STS5-B1	TP5-M64B1	RS5-95B1	CKS5-M64B1
SBT5-M68B1	M68				TP5-M68B1	RS5-100B1	CKS5-M68B1
SBT5-M72B1	M72				TP5-M72B1	RS5-105B1	CKS5-M72B1
SBT5-M76B1	M76				TP5-M76B1	RS5-110B1	CKS5-M76B1
For tensioner range SBT6:							
SBT6-M76B1	M76	SBT5-LC	TTB14	STS6-B1	TPS6-M76B1	RS6-110B1	CKS6-M76B1
SBT6-M80B1	M80				TPS6-M80B1	RS6-115B1	CKS6-M80B1
SBT6-M85B1	M85				TPS6-M85B1	RS6-120B1	CKS6-M85B1
SBT6-M90B1	M90				TPS6-M90B1	RS6-130B1	CKS6-M90B1
SBT6-M95B3	M95			STS6-B3	TPS6-M95B3	RS6-135B3	CKS6-M95B3
SBT6-M100B3	M100				TPS6-M100B3	RS6-146B3	CKS6-M100B3

Note: Remember to check bridge compatibility for SBT3, SBT4 and SBT6 models when ordering components.

STS - TOPSIDE BOLT TENSIONERS - IMPERIAL RANGE

Capacities from 26 to 298 tons

Working pressure 21750 PSI

Single acting design

- Nitrocarburized piston
- Maximum piston stroke indicator
- Suitable for single or multi-tensioning applications
- Specially designed tensioners available on request (see page 110)
- User friendly operating and maintenance procedure
- Choice of manually operated or air powered pumps available (see page 115)

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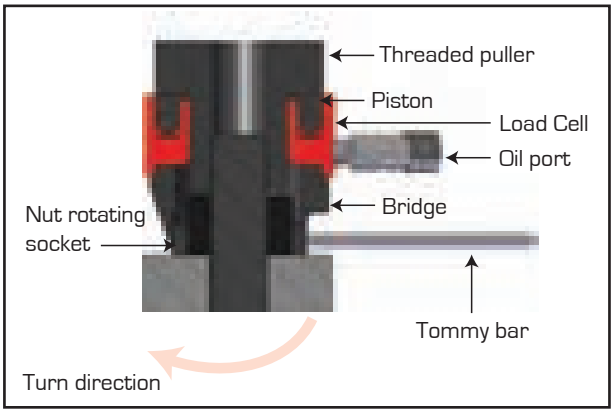
The STS imperial bolt tensioner range is designed for topside operation in a wide variety of applications including pipeline flanges, heat exchangers, pressure vessels, compressor covers, boiler feed pumps, anchor bolts and many others. The range comprises of 26 imperial size options ranging from ¾" to 4" thread size and all models are suitable for working pressures up to 21750 PSI. Each model of hydraulic tensioning cylinder within the tensioner range can be operated with a variety of threaded pullers and nut rotating sockets ensuring that the maximum possible range of bolt sizes can be accommodated using the minimum number of hydraulic cylinders. Threaded pullers, bridges and nut rotating sockets are available as individual components (see pages 104 & 105 for detailed information).

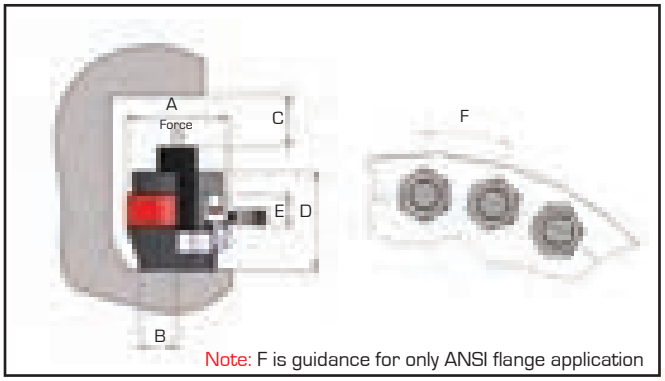
All Hi-Force hydraulic bolt tensioners are designed and manufactured to include a wear coated piston, maximum piston stroke indicator, self-energizing high pressure seals, dual quick connect couplings for easy multiple tensioner connection and a user friendly operation and maintenance procedure. Suitable manual and air driven hydraulic pumps, high pressure hoses and couplings for use with Hi-Force bolt tensioners are detailed on pages 115 & 116.

The STS range of tensioners are push back type tensioners.
For spring return tensioners, see pages 94-97 of this catalog.



STS - TOPSIDE BOLT TENSIONERS - IMPERIAL RANGE

- Bolt sizes from ¾" to 4"
- Modular design for optimum versatility
- Dual quick connect couplings for easy connection

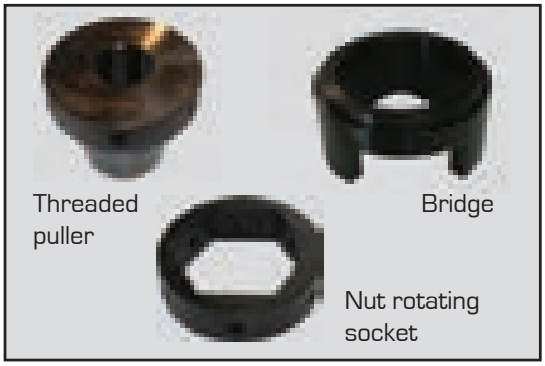


Note: F is guidance for only ANSI flange application

Model number	Bolt thread size	Threads per inch	Capacity tons	Capacity kN	Effective area inch²	Stroke inch	Weight lbs	Dimensions in inches A	B	C min	D	E	F
STS1-075B1	¾"	10	26	234	2.42	0.39	3.7	2.92	1.10	2.92	3.55	1.77	2.01
STS1-087B1	⅞"	9	26	234	2.42	0.39	3.7	2.92	1.10	2.92	3.55	1.77	2.13
STS1-100B2	1"	8	26	234	2.42	0.39	3.7	2.92	1.18	3.15	3.86	1.77	2.40
STS1-112B2	1 ⅛"	8	26	234	2.42	0.39	3.7	2.92	1.18	3.15	3.86	1.77	2.52
STS2-125B1	1 ¼"	8	51	457	4.73	0.59	7.7	4.02	1.54	4.06	5.04	2.13	2.92
STS2-137B1	1 ⅜"	8	51	457	4.73	0.59	7.7	4.02	1.54	4.06	5.04	2.13	3.03
STS2-150B1	1 ½"	8	51	457	4.73	0.59	7.7	4.02	1.54	4.06	5.04	2.13	3.15
STS3-162B1	1 ⅝"	8	92	822	8.49	0.59	13.4	5.24	1.85	4.53	5.91	2.21	3.62
STS3-175B1	1 ¾"	8	92	822	8.49	0.59	13.4	5.24	1.85	4.53	5.91	2.21	3.66
STS3-175B2	1 ¾"	8	92	822	8.49	0.59	13.4	5.24	1.97	4.61	6.11	2.21	4.10
STS3-187B1	1 ⅞"	8	92	822	8.49	0.59	13.4	5.24	1.85	4.53	5.91	2.21	3.82
STS3-187B2	1 ⅞"	8	92	822	8.49	0.59	13.4	5.24	1.97	4.61	6.11	2.21	4.10
STS3-200B2	2"	8	92	822	8.49	0.59	13.4	5.24	1.97	4.61	6.11	2.21	4.10
STS4-187B1	1 ⅞"	8	142	1264	13.07	0.59	23.4	6.42	1.97	4.69	5.87	2.25	4.10
STS4-200B1	2"	8	142	1264	13.07	0.59	23.4	6.42	1.97	4.69	5.87	2.25	4.10
STS4-200B2	2"	8	142	1264	13.07	0.59	23.4	6.42	2.44	4.69	5.87	2.25	4.18
STS4-225B2	2 ¼"	8	142	1264	13.07	0.59	23.4	6.42	2.44	5.32	6.50	2.25	4.77
STS4-250B2	2 ½"	8	142	1264	13.07	0.59	23.4	6.42	2.44	5.32	6.50	2.25	5.00
STS5-250B1	2 ½"	8	206	1833	18.94	0.59	35.3	7.60	2.88	5.71	7.37	2.36	5.28
STS5-275B1	2 ¾"	8	206	1833	18.94	0.59	35.3	7.60	2.88	5.71	7.37	2.36	5.52
STS5-300B1	3"	8	206	1833	18.94	0.59	35.3	7.60	2.88	5.71	7.37	2.36	5.79
STS6-300B1	3"	8	298	2649	27.37	0.59	51.8	9.18	3.31	7.01	8.51	2.52	6.34
STS6-325B1	3 ¼"	8	298	2649	27.37	0.59	51.8	9.18	3.31	7.01	8.51	2.52	6.58
STS6-350B1	3 ½"	8	298	2649	27.37	0.59	51.8	9.18	3.31	7.01	8.51	2.52	6.78
STS6-375B3	3 ¾"	8	298	2649	27.37	0.59	51.8	9.18	4.14	8.08	10.13	2.52	7.53
STS6-400B3	4"	8	298	2649	27.37	0.59	51.8	9.18	4.14	8.08	10.13	2.52	7.72

Note: Weight is for load cell and bridge only. Total weight of complete assembly depends on size of puller and nut rotating socket selected.
Tommy bars are not included. Hi-Force recommends one tommy bar for every four tensioners, please see page 105 column B for ordering code.

STS - BOLT TENSIONER COMPONENTS - IMPERIAL



Use with STS Imperial Tensioners

Modular design

Offers greater versatility

The modular design of Hi-Force STS series topside hydraulic bolt tensioners enables the user to adapt an existing STS tensioner assembly to another thread size, within the tensioner range, by purchasing individual components or a simple conversion kit. By changing the required components (see drawing and table on the next page), Hi-Force STS bolt tensioners offer the user even greater versatility at an economical cost.

Tensioner models STS1, STS3, STS4 and STS6 are available with two different bridge sizes, hence always check whether or not the required thread change is possible within the bridge size (please follow coloured lines in below drawing). Make sure that all components match up. DO NOT mix components from different colour lines. A large bridge will require the usage of a long threaded puller to ensure sufficient thread engagement, as well as a large size nut rotating socket.

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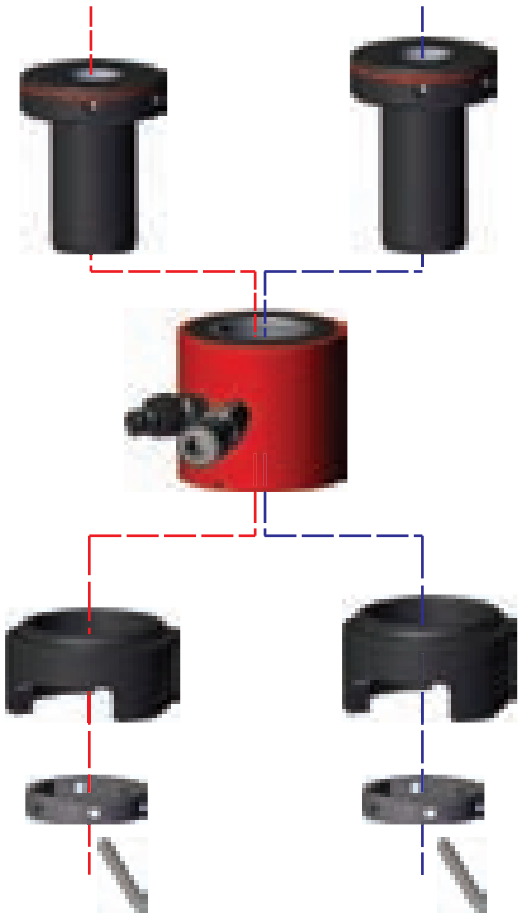
Changes within the same colour code DO NOT require a bridge change however, changes from the red to blue line (or vice versa) MUST include a relative bridge also.

The next page will provide part numbers for all the tensioner components, for which the same colour coding is used, i.e. red represents the smaller bolt sizes within the tensioner range, comprising of short threaded adapter, load cell, small bridge, small nut rotating socket and tommy bar. The blue line represents the larger bolt sizes within the tensioner range, in which case the tensioner is built from the long threaded adaptor, load cell, large bridge, large nut rotating socket and tommy bar.



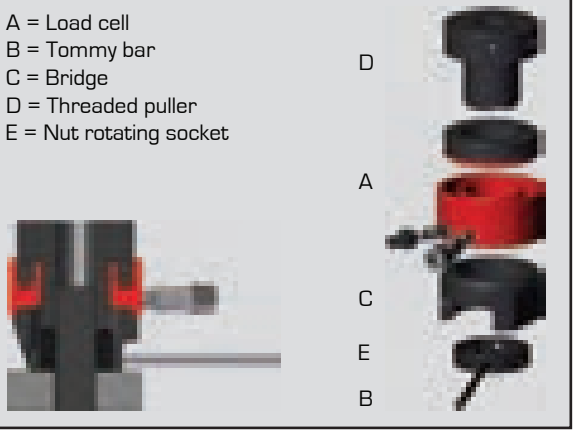
Note: STS2 & STS5 models both have only one tensioner bridge available.

Don't forget to order your tommy bars when purchasing Hi-Force Bolt tensioners, Hi-Force recommends the purchase of one tommy bar for every four tensioners.

STS - BOLT TENSIONER COMPONENTS - IMPERIAL

Principle of STS bolt tensioner

A = Load cell
B = Tommy bar
C = Bridge
D = Threaded puller
E = Nut rotating socket



This table provides all the information to select the components to modify your existing tensioner to suit another bolt size. Changes are only possible within the same tensioner size. It is essential that all the components or selected conversion kits have the same suffix as the target tensioner size (i.e. B1, B2 or B3).

Examples:
To change from STS3-162B1 to STS3-187B1 would require conversion kit CK3-187B1 only.
To change from STS3-187B1 to STS3-200B2 would require conversion kit CK3-200B2 and bridge STS3-B2.

- Denotes smaller bridge size within tensioner range
- Denotes larger bridge size within tensioner range
- Denotes one bridge size within tensioner range

Complete tensioner		Individual components					D & E
		A	B	C	Available as conversion kit		
Model number	Bolt Thread	Load cell	Tommy bar	Bridge	D - Threaded puller	E - Rotating socket	Complete conversion kit
For tensioner range STS1:							
STS1-075B1	3/4"	STS1-LC	TTB06	STS1-B1	TP1-075B1	RS1-32B1	CK1-075B1
STS1-087B1	7/8"				TP1-087B1	RS1-37B1	CK1-087B1
STS1-100B2	1"			STS1-B2	TP1-100B2	RS1-41B2	CK1-100B2
STS1-112B2	1 1/8"				TP1-112B2	RS1-46B2	CK1-112B2
For tensioner range STS2:							
STS2-125B1	1 1/4"	STS2-LC	TTB08	STS2-B1	TP2-125B1	RS2-51B1	CK2-125B1
STS2-137B1	1 3/8"				TP2-137B1	RS2-56B1	CK2-137B1
STS2-150B1	1 1/2"				TP2-150B1	RS2-60B1	CK2-150B1
For tensioner range STS3:							
STS3-162B1	1 5/8"	STS3-LC	TTB10	STS3-B1	TP3-162B1	RS3-65B1	CK3-162B1
STS3-175B1	1 3/4"				TP3-175B1	RS3-70B1	CK3-175B1
STS3-187B1	1 7/8"				TP3-187B1	RS3-75B1	CK3-187B1
STS3-175B2	1 3/4"			STS3-B2	TP3-175B2	RS3-70B2	CK3-175B2
STS3-187B2	1 7/8"				TP3-187B2	RS3-75B2	CK3-187B2
STS3-200B2	2"				TP3-200B2	RS3-80B2	CK3-200B2
For tensioner range STS4:							
STS4-187B1	1 7/8"	STS4-LC	TTB10	STS4-B1	TP4-187B1	RS4-75B1	CK4-187B1
STS4-200B1	2"				TP4-200B1	RS4-80B1	CK4-200B1
STS4-200B2	2"			STS4-B2	TP4-200B2	RS4-80B2	CK4-200B2
STS4-225B2	2 1/4"				TP4-225B2	RS4-90B2	CK4-225B2
STS4-250B2	2 1/2"				TP4-250B2	RS4-98B2	CK4-250B2
For tensioner range STS5:							
STS5-250B1	2 1/2"	STS5-LC	TTB14	STS5-B1	TP5-250B1	RS5-100B1	CK5-250B1
STS5-275B1	2 3/4"				TP5-275B1	RS5-108B1	CK5-275B1
STS5-300B1	3"				TP5-300B1	RS5-118B1	CK5-300B1
For tensioner range STS6:							
STS6-300B1	3"	STS6-LC	TTB14	STS6-B1	TP6-300B1	RS6-118B1	CK6-300B1
STS6-325B1	3 1/4"				TP6-325B1	RS6-127B1	CK6-325B1
STS6-350B1	3 1/2"				TP6-350B1	RS6-137B1	CK6-350B1
STS6-375B3	3 3/4"			STS6-B3	TP6-375B3	RS6-146B3	CK6-375B3
STS6-400B3	4"				TP6-400B3	RS6-156B3	CK6-400B3

Note: Remember to check bridge compatibility for STS1, STS3, STS4 and STS6 models when ordering components.

STS - TOPSIDE BOLT TENSIONERS - METRIC RANGE

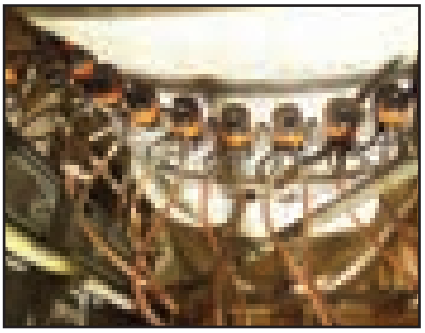
STS3-M52

Capacities from 26 to 298 tons

Working pressure 21750 PSI

Single acting design

- Nitrocarburized piston
- Maximum piston stroke indicator
- Suitable for single or multi-tensioning applications
- Specially designed tensioners available on request (see page 110)
- User friendly operating and maintenance procedure
- Choice of manually operated or air powered pumps available (see page 115)



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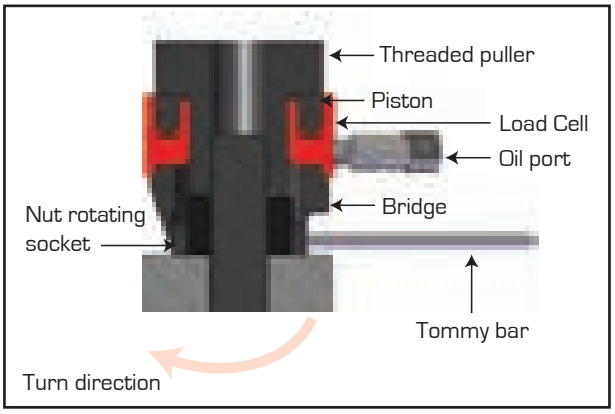
The STS metric bolt tensioner range is designed for topside operation in a wide variety of applications including pipeline flanges, heat exchangers, pressure vessels, compressor covers, boiler feed pumps, anchor bolts and many others. The range comprises of 32 metric size options ranging from M16 to M100 thread size and all models are suitable for working pressures up to 21750 PSI. Each model of hydraulic tensioning cylinder within the tensioner range can be operated with a variety of threaded pullers and nut rotating sockets ensuring that the maximum possible range of bolt sizes can be accommodated using the minimum number of hydraulic cylinders. Threaded pullers and nut rotating sockets are available as individual components (see pages 108 & 109 for detailed information).

All Hi-Force hydraulic bolt tensioners are designed and manufactured to include a wear coated piston, maximum piston stroke indicator, self-energizing high pressure seals, dual quick connect couplings for easy multiple tensioner connection and a user friendly operation and maintenance procedure. Suitable manual and air driven hydraulic pumps, high pressure hoses and couplings for use with Hi-Force bolt tensioners are detailed on pages 115 & 116.

The STS range of tensioners are push back type tensioners.
For spring return tensioners, see pages 98-101 of this catalog.



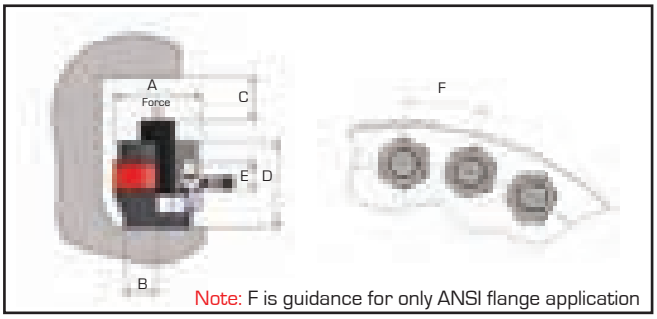
STS - TOPSIDE BOLT TENSIONERS - METRIC RANGE

STS3-M52

Bolt sizes from M16 to M100

Modular design for optimum versatility

Dual quick couplings for easy connection

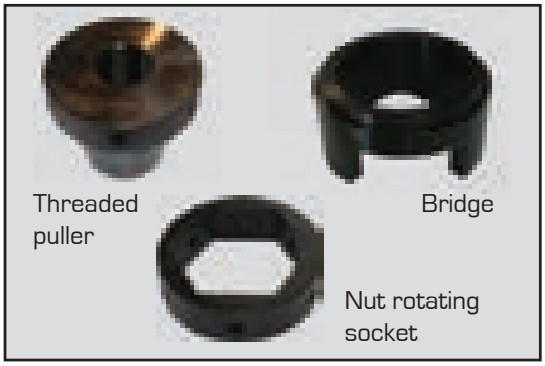


Note: F is guidance for only ANSI flange application

Model number	Bolt thread size	Thread pitch	Capacity tons	Capacity kN	Effective area inch²	Stroke inch	Weight lbs	Dimensions in inches A	B	C	D	E	F
STS1-M16B1	M16	2	26	234	2.42	0.39	3.7	2.92	1.10	2.92	3.55	1.77	1.85
STS1-M18B1	M18	2.5	26	234	2.42	0.39	3.7	2.92	1.10	2.92	3.55	1.77	1.93
STS1-M20B1	M20	2.5	26	234	2.42	0.39	3.7	2.92	1.10	2.92	3.55	1.77	2.01
STS1-M22B2	M22	2.5	26	234	2.42	0.39	3.7	2.92	1.18	3.15	3.86	1.77	2.21
STS1-M24B2	M24	3	26	234	2.42	0.39	3.7	2.92	1.18	3.15	3.86	1.77	2.32
STS1-M27B2	M27	3	26	234	2.42	0.39	3.7	2.92	1.18	3.15	3.86	1.77	2.40
STS2-M30B1	M30	3.5	51	457	4.73	0.59	7.7	4.02	1.54	4.06	5.04	2.13	2.80
STS2-M33B1	M33	3.5	51	457	4.73	0.59	7.7	4.02	1.54	4.06	5.04	2.13	2.92
STS2-M36B1	M36	4	51	457	4.73	0.59	7.7	4.02	1.54	4.06	5.04	2.13	3.03
STS2-M39B1	M39	4	51	457	4.73	0.59	7.7	4.02	1.54	4.06	5.04	2.13	3.15
STS3-M42B1	M42	4.5	92	822	8.49	0.59	13.4	5.24	1.85	4.53	5.91	2.21	3.59
STS3-M45B1	M45	4.5	92	822	8.49	0.59	13.4	5.24	1.85	4.53	5.91	2.21	3.70
STS3-M45B2	M45	4.5	92	822	8.49	0.59	13.4	5.24	1.97	4.61	6.11	2.21	4.14
STS3-M48B1	M48	5	92	822	8.49	0.59	13.4	5.24	1.85	4.53	5.91	2.21	3.82
STS3-M48B2	M48	5	92	822	8.49	0.59	13.4	5.24	1.97	4.61	6.11	2.21	4.14
STS3-M52B2	M52	5	92	822	8.49	0.59	13.4	5.24	1.97	4.61	6.11	2.21	4.14
STS4-M48B1	M48	5	142	1264	13.07	0.59	23.4	6.42	1.97	4.69	5.87	2.25	4.14
STS4-M52B1	M52	5	142	1264	13.07	0.59	23.4	6.42	1.97	4.69	5.87	2.25	4.26
STS4-M52B2	M52	5	142	1264	13.07	0.59	23.4	6.42	2.44	5.32	6.50	2.25	4.73
STS4-M56B2	M56	5.5	142	1264	13.07	0.59	23.4	6.42	2.44	5.32	6.50	2.25	4.73
STS4-M60B2	M60	5.5	142	1264	13.07	0.59	23.4	6.42	2.44	5.32	6.50	2.25	4.89
STS4-M64B2	M64	6	142	1264	13.07	0.59	23.4	6.42	2.44	5.32	6.50	2.25	4.96
STS5-M64B1	M64	6	206	1833	18.94	0.59	35.3	7.60	2.88	5.71	7.37	2.36	5.28
STS5-M68B1	M68	6	206	1833	18.94	0.59	35.3	7.60	2.88	5.71	7.37	2.36	5.36
STS5-M72B1	M72	6	206	1833	18.94	0.59	35.3	7.60	2.88	5.71	7.37	2.36	5.48
STS5-M76B1	M76	6	206	1833	18.94	0.59	35.3	7.60	2.88	5.71	7.37	2.36	5.59
STS6-M76B1	M76	6	298	2649	27.37	0.59	51.8	9.18	3.31	7.01	8.51	2.52	6.23
STS6-M80B1	M80	6	298	2649	27.37	0.59	51.8	9.18	3.31	7.01	8.51	2.52	6.30
STS6-M85B1	M85	6	298	2649	27.37	0.59	51.8	9.18	3.31	7.01	8.51	2.52	6.38
STS6-M90B1	M90	6	298	2649	27.37	0.59	51.8	9.18	3.31	7.01	8.51	2.52	6.70
STS6-M95B3	M95	6	298	2649	27.37	0.59	51.8	9.18	4.14	8.08	10.13	2.52	7.25
STS6-M100B3	M100	6	298	2649	27.37	0.59	51.8	9.18	4.14	8.08	10.13	2.52	7.49

Note: Weight is for load cell and bridge only. Total weight of complete assembly depends on size of puller and nut rotating socket selected.
Tommy bars are not included. Hi-Force recommends one tommy bar for every four tensioners, please see page 109 column B for ordering code.

STS - BOLT TENSIONER COMPONENTS - METRIC



Cost saving option

Easily fitted to existing tensioner assembly

Offers greater versatility

Similar to the imperial tensioner components (pages 104 & 105), the Hi-Force metric topside hydraulic bolt tensioners are also modular in design and can be adapted to another thread size, within the tensioner range, by purchasing individual components or a simple conversion kit. By changing the required components (see drawing and table on the next page), Hi-Force STS bolt tensioners offer the user even greater versatility at an economical cost.

Tensioner models STS1, STS3, STS4 and STS6 are available with two different bridge sizes, hence always check whether or not the required thread change is possible within the bridge size (please follow coloured lines in below drawing). Make sure that all components match up. DO NOT mix components from different colour lines. A large bridge will require the usage of a long threaded puller to ensure sufficient thread engagement, as well as a large size nut rotating socket.

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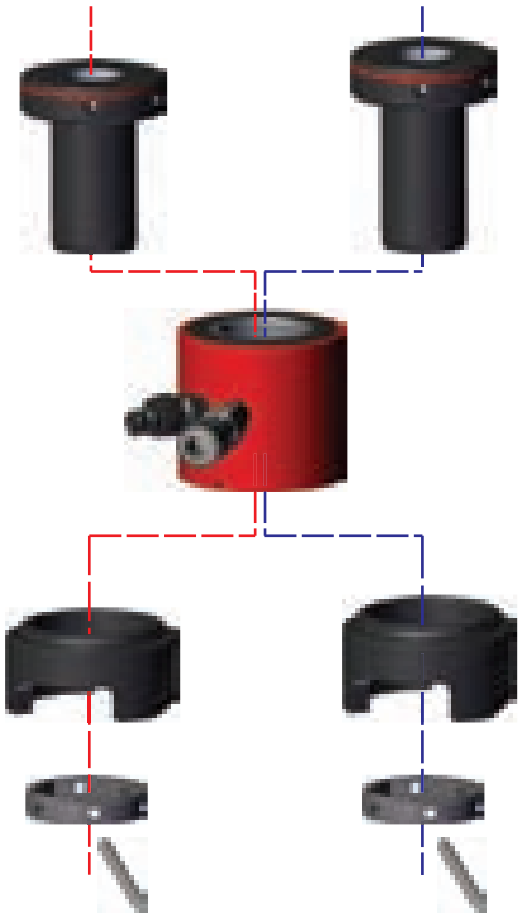
Changes within the same colour code DO NOT require a bridge change however, changes from the red to blue line (or vice versa) MUST include a relative bridge also.

The next page will provide part numbers for all the tensioner components, for which the same colour coding is used, i.e. red represents the smaller bolt sizes within the tensioner range, comprising of short threaded adapter, load cell, small bridge, small nut rotating socket and tommy bar. The blue line represents the larger bolt sizes within the tensioner range, in which case the tensioner is built from the long threaded adaptor, load cell, large bridge, large nut rotating socket and tommy bar.



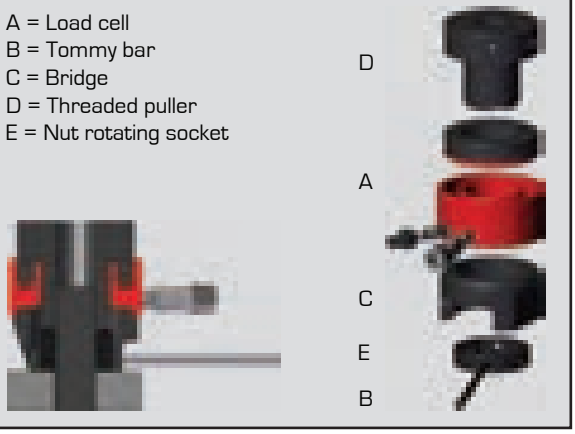
Note: STS2 & STS5 models both have only one tensioner bridge available.

Don't forget to order your tommy bars when purchasing Hi-Force Bolt tensioners, Hi-Force recommends the purchase of one tommy bar for every four tensioners.

STS - BOLT TENSIONER COMPONENTS - METRIC

Principle of STS bolt tensioner

A = Load cell
B = Tommy bar
C = Bridge
D = Threaded puller
E = Nut rotating socket



This table provides all the information to select the components to modify your existing tensioner to suit another bolt size. Changes are only possible within the same tensioner size. It is essential that all the components or selected conversion kits have the same suffix as the target tensioner size (i.e. B1, B2 or B3).

Examples:
To change from STS3-M42B1 to STS3-M48B1 would require conversion kit CK3-M48B1 only.
To change from STS3-M48B1 to STS3-M52B2 would require conversion kit CK3-M52B2 and bridge STS3-B2.

- Denotes smaller bridge size within tensioner range
- Denotes larger bridge size within tensioner range
- Denotes one bridge size within tensioner range

Complete tensioner		Individual components					D & E
		A	B	C	Available as conversion kit		
Model number	Bolt Thread	Load cell	Tommy bar	Bridge	D - Threaded puller	E - Rotating socket	Complete conversion kit
For tensioner range STS1:							
STS1-M16B1	M16	STS1-LC	TTB06	STS1-B1	TP1-M16B1	RS1-24B1	CK1-M16B1
STS1-M18B1	M18				TP1-M18B1	RS1-27B1	CK1-M18B1
STS1-M20B1	M20				TP1-M20B1	RS1-30B1	CK1-M20B1
STS1-M22B2	M22			STS1-B2	TP1-M22B2	RS1-32B2	CK1-M22B2
STS1-M24B2	M24				TP1-M24B2	RS1-37B2	CK1-M24B2
STS1-M27B2	M27				TP1-M27B2	RS1-41B2	CK1-M27B2
For tensioner range STS2:							
STS2-M30B1	M30	STS2-LC	TTB08	STS2-B1	TP2-M30B1	RS2-46B1	CK2-M30B1
STS2-M33B1	M33				TP2-M33B1	RS2-51B1	CK2-M33B1
STS2-M36B1	M36				TP2-M36B1	RS2-56B1	CK2-M36B1
STS2-M39B1	M39				TP2-M39B1	RS2-60B1	CK2-M39B1
For tensioner range STS3:							
STS3-M42B1	M42	STS3-LC	TTB10	STS3-B1	TP3-M42B1	RS3-65B1	CK3-M42B1
STS3-M45B1	M45				TP3-M45B1	RS3-70B1	CK3-M45B1
STS3-M48B1	M48				TP3-M48B1	RS3-75B1	CK3-M48B1
STS3-M45B2	M45			STS3-B2	TP3-M45B2	RS3-70B2	CK3-M45B2
STS3-M48B2	M48				TP3-M48B2	RS3-75B2	CK3-M48B2
STS3-M52B2	M52				TP3-M52B2	RS3-80B2	CK3-M52B2
For tensioner range STS4:							
STS4-M48B1	M48	STS4-LC	TTB10	STS4-B1	TP4-M48B1	RS4-75B1	CK4-M48B1
STS4-M52B1	M52				TP4-M52B1	RS4-80B1	CK4-M52B1
STS4-M52B2	M52			STS4-B2	TP4-M52B2	RS4-80B2	CK4-M52B2
STS4-M56B2	M56				TP4-M56B2	RS4-85B2	CK4-M56B2
STS4-M60B2	M60				TP4-M60B2	RS4-90B2	CK4-M60B2
STS4-M64B2	M64				TP4-M64B2	RS4-95B2	CK4-M64B2
For tensioner range STS5:							
STS5-M64B1	M64	STS5-LC	TTB14	STS5-B1	TP5-M64B1	RS5-95B1	CK5-M64B1
STS5-M68B1	M68				TP5-M68B1	RS5-100B1	CK5-M68B1
STS5-M72B1	M72				TP5-M72B1	RS5-105B1	CK5-M72B1
STS5-M76B1	M76				TP5-M76B1	RS5-110B1	CK5-M76B1
For tensioner range STS6:							
STS6-M76B1	M76	STS6-LC	TTB14	STS6-B1	TP6-M76B1	RS6-110B1	CK6-M76B1
STS6-M80B1	M80				TP6-M80B1	RS6-115B1	CK6-M80B1
STS6-M85B1	M85				TP6-M85B1	RS6-120B1	CK6-M85B1
STS6-M90B1	M90				TP6-M90B1	RS6-130B1	CK6-M90B1
STS6-M95B3	M95			STS6-B3	TP6-M95B3	RS6-135B3	CK6-M95B3
STS6-M100B3	M100				TP6-M100B3	RS6-146B3	CK6-M100B3

Note: Remember to check bridge compatibility for STS1, STS3, STS4 and STS6 models when ordering components.

STS - CUSTOMIZED & SPECIAL DESIGN BOLT TENSIONERS

Custom design & built to your requirements

Working pressure up to 33000 PSI

Short delivery lead time

In addition to the large range of standard topside and sub-sea bolt tensioners available, Hi-Force has the capability to manufacture tensioners to suit special requirements. Our product designs incorporate the latest Solid Works computer technology and together with our 'state of the art' CNC production machinery, we have the capability to offer a solution to meet your needs.

Example of situations where Hi-Force have been able to offer bespoke solutions include:

- Non standard sizes and shapes of nut requiring special bridges
- Nuts recessed into holes requiring special sockets
- Studs with two different thread sizes
- Larger size bolts
- Applications with restricted space requirements
- Systems with different operating pressures
- Bridges with increased load bearing area

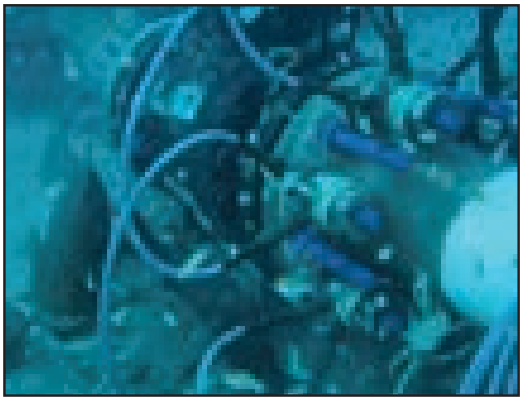
STU - SUB SEA BOLT TENSIONERS - IMPERIAL

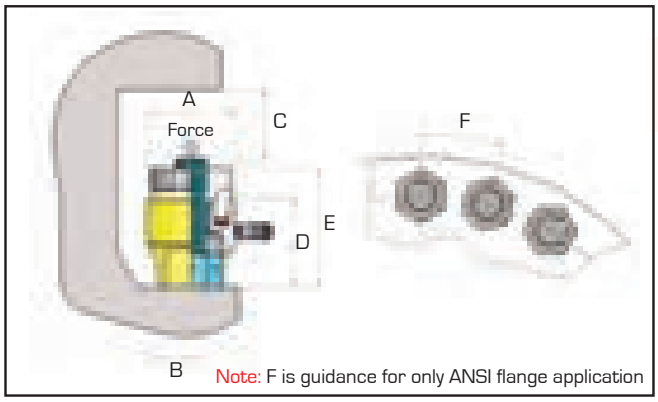
STU3-162

Topview Hi-Force quick fit threaded puller

- Working pressure 21750 PSI
- Interchangeable quickfit/release pullers
- Load cell with integral bridge

Hi-Force STU series sub-sea bolt tensioners are designed and manufactured to suit the demanding requirements of divers operating in harsh sub-sea environments. With an easy to operate two piece design comprising of a quick fit/release threaded puller and a hydraulic load cell with integral bridge and an extra long 1.18 inch piston stroke to reduce re-setting operations. Hi-Force STU series sub-sea bolt tensioners offer a consistent, reliable and cost effective method of tensioning sub-sea bolted joints. All hydraulic load cells are suitable for different thread sizes (see table below and on page 112) and interchangeable quick fit/release pullers can be ordered separately, as required, resulting in even greater flexibility and cost savings.





Note: F is guidance for only ANSI flange application

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Model number	Bolt thread size	Capacity Tons	Capacity kN	Effective area inch²	Stroke inch	Weight lbs	Tommy bar number	Dimensions in inches A	B	C	D	E	F
STU1-100	1" - 8UN	29	256.04	2.65	0.79	7.5	TTB06	3.23	0.87	4.69	4.69	5.52	2.40
STU1-112	1 1/8" - 8UN	29	256.04	2.65	0.79	7.5	TTB06	3.23	0.87	4.69	4.69	5.52	2.52
STU2-125	1 1/4" - 8UN	48	430.36	4.45	1.18	13.2	TTB08	4.02	1.18	5.52	5.52	6.46	2.88
STU2-137	1 3/8" - 8UN	48	430.36	4.45	1.18	13.2	TTB08	4.02	1.18	5.52	5.52	6.46	2.96
STU3-150	1 1/2" - 8UN	62	553.39	5.72	1.18	16.5	TTB10	4.49	1.38	5.59	5.59	6.66	3.23
STU3-162	1 5/8" - 8UN	62	553.39	5.72	1.18	16.5	TTB10	4.49	1.38	5.59	5.59	6.66	3.35
STU4-175	1 3/4" - 8UN	85	756.30	7.82	1.18	21.6	TTB10	5.04	1.62	5.95	5.95	7.13	3.70
STU4-187	1 7/8" - 8UN	85	756.30	7.82	1.18	21.6	TTB10	5.04	1.62	5.95	5.95	7.13	3.86
STU5-200	2" - 8UN	131	1168.19	12.07	1.18	32.0	TTB12	5.83	1.89	6.46	6.46	7.96	4.41
STU5-225	2 1/4" - 8UN	131	1168.19	12.07	1.18	32.0	TTB12	5.83	1.89	6.46	6.46	7.96	4.57
STU6-250	2 1/2" - 8UN	185	1649.12	17.04	1.18	50.3	TTB14	6.93	2.36	7.21	7.21	9.10	5.36
STU6-275	2 3/4" - 8UN	185	1649.12	17.04	1.18	50.3	TTB14	6.93	2.36	7.21	7.21	9.10	5.56
STU7-300	3" - 8UN	279	2483.44	25.66	1.18	78.5	TTB16	8.47	3.51	8.47	8.47	10.24	6.38
STU7-325	3 1/4" - 8UN	279	2483.44	25.66	1.18	78.5	TTB16	8.47	3.51	8.47	8.47	10.24	6.82
STU7-350	3 1/2" - 8UN	279	2483.44	25.66	1.18	78.5	TTB16	8.47	3.51	8.47	8.47	10.24	6.90

Note: Tommy bars are not included. Hi-Force recommends one tommy bar for every four tensioners.
Please note that the tommy bar listed will fit related quickfit puller; a different size may be required for the hexagon nut.

STU - SUB-SEA BOLT TENSIONERS - METRIC

STU3-42

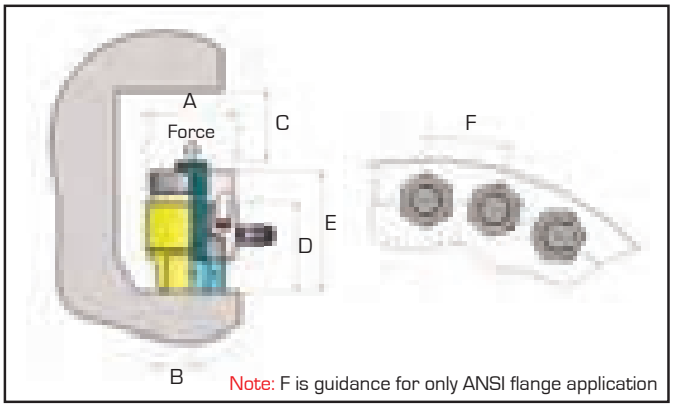
Topview Hi-Force quick fit threaded puller

Working pressure 21750 PSI

Interchangeable quickfit/release pullers

Load cell with integral bridge

- Dual hose connection for easy hook up
- Extra long 1.18 inches piston stroke to reduce re-setting time
- Maximum piston stroke indicator
- Corrosion protected for operation in harsh sub-sea environments



Note: F is guidance for only ANSI flange application

Model number	Bolt thread size	Capacity Tons	Capacity kN	Effective area inch²	Stroke inch	Weight lbs	Tommy bar number
STU1-24	M24 x 3	29	256.04	2.65	0.79	7.5	TTB06
STU1-27	M27 x 3	29	256.04	2.65	0.79	7.5	TTB06
STU2-30	M30 x 3.5	48	430.36	4.45	1.18	13.2	TTB08
STU2-33	M33 x 3.5	48	430.36	4.45	1.18	13.2	TTB08
STU2-36	M36 x 4	48	430.36	4.45	1.18	13.2	TTB10
STU3-39	M39 x 4	62	553.39	5.72	1.18	16.5	TTB10
STU3-42	M42 x 4.5	62	553.39	5.72	1.18	16.5	TTB10
STU4-45	M45 x 4.5	85	756.30	7.82	1.18	21.6	TTB10
STU4-48	M48 x 5	85	756.30	7.82	1.18	21.6	TTB12
STU5-52	M52 x 5	131	1168.19	12.07	1.18	32.0	TTB12
STU5-56	M56 x 5.5	131	1168.19	12.07	1.18	32.0	TTB14
STU6-60	M60 x 5.5	185	1649.12	17.04	1.18	50.3	TTB14
STU6-64	M64 x 6	185	1649.12	17.04	1.18	50.3	TTB16
STU6-68	M68 x 6	185	1649.12	17.04	1.18	50.3	TTB16
STU6-72	M72 x 6	185	1649.12	17.04	1.18	50.3	TTB16
STU7-76	M76 x 6	279	2483.44	25.66	1.18	78.5	TTB16
STU7-80	M80 x 6	279	2483.44	25.66	1.18	78.5	TTB16
STU7-85	M85 x 6	279	2483.44	25.66	1.18	78.5	TTB16
STU7-90	M90 x 6	279	2483.44	25.66	1.18	78.5	TTB16

Dimensions in inches					
A	B	C	D	E	F
3.23	0.87	4.69	4.69	5.52	2.40
3.23	0.87	4.69	4.69	5.52	2.52
4.02	1.18	5.52	5.52	6.46	2.88
4.02	1.18	5.52	5.52	6.46	2.96
4.02	1.18	5.52	5.52	6.46	3.07
4.49	1.38	5.59	5.59	6.66	3.23
4.49	1.38	5.59	5.59	6.66	3.35
5.04	1.62	5.95	5.95	7.13	3.70
5.04	1.62	5.95	5.95	7.13	3.86
5.91	1.89	6.46	6.46	7.96	4.41
5.91	1.89	6.46	6.46	7.96	4.57
6.93	2.36	7.21	7.21	9.10	5.36
6.93	2.36	7.21	7.21	9.10	5.36
6.93	2.36	7.21	7.21	9.10	5.36
6.93	2.36	7.21	7.21	9.10	5.56
8.47	3.51	8.47	8.47	10.24	6.46
8.47	3.51	8.47	8.47	10.24	6.46
8.47	3.51	8.47	8.47	10.24	6.90
8.47	3.51	8.47	8.47	10.24	6.90

Note: Tommy bars are not included. Hi-Force recommends one tommy bar for every four tensioners.
Please note that the tommy bar listed will fit related quickfit puller; a different size may be required for the hexagon nut.

HTN - HYDRAULIC TENSIONER NUTS - IMPERIAL

- Integral mechanical load retaining collar
- Working pressure 21750 PSI
- Imperial thread sizes from 1" to 4"

The Hi-Force HTN range of imperial top collar hydraulic nuts is specifically designed and manufactured for applications where regular, periodic opening of the joint, for inspection and maintenance purposes is required. Unlike conventional hydraulic bolt tensioners, Hi-Force HTN series hydraulic nuts are designed to permanently replace standard hexagon nuts, on one side of the bolted joint. Initially the bolt tension/elongation is applied hydraulically and once achieved, it is permanently retained via the integral mechanical load retaining collar.

Whilst initial investment in Hi-Force HTN series hydraulic nuts is significantly higher than the cost of standard hexagon nuts, this investment is quickly and easily recovered, if the user considers the huge time savings achieved, during joint opening and closing, when compared to using conventional hydraulic bolt tensioners or hydraulic torque wrenches. Standard range models are available for imperial bolt sizes from 1" to 4", with other sizes available to special order.

All models are 21750 PSI maximum working pressure and supplied with quick connect hydraulic couplings, compatible for use with Hi-Force air or manually operated hydraulic bolt tensioner pumps and hoses (see page 115 & 116).

Don't forget to order your tommy bars when purchasing Hi-Force hydraulic tensioner nuts. We recommend the purchase of one tommy bar for every four tensioners nuts.

Model Number	Bolt Size	Capacity Tons	Capacity kN	Effective area inch²	Stroke inch	Diameter inch	Height inch	Weight lbs	Tommy bar
HTN1-100	1" - 8 UN	22	198.27	2.05	0.20	2.84	2.17	4.2	TTB06
HTN2-112	1 ⅛" - 8 UN	24	216.30	2.24	0.20	2.96	2.17	4.4	TTB06
HTN3-125	1 ¼" - 8 UN	28	252.94	2.61	0.20	3.23	2.25	5.3	TTB06
HTN4-137	1 ⅜" - 8 UN	34	305.83	3.16	0.20	3.47	2.25	6.0	TTB06
HTN5-150	1 ½" - 8 UN	39	344.12	3.56	0.24	3.66	2.29	6.4	TTB06
HTN6-162	1 ⅝" - 8 UN	45	397.61	4.11	0.24	3.94	2.44	7.7	TTB06
HTN7-175	1 ¾" - 8 UN	53	475.01	4.91	0.24	4.18	2.52	8.8	TTB06
HTN8-187	1 ⅞" - 8 UN	56	501.40	5.18	0.24	4.33	2.52	9.3	TTB06
HTN9-200	2" - 8 UN	63	563.72	5.82	0.24	4.61	2.64	10.8	TTB06
HTN10-225	2 ¼" - 8 UN	84	746.44	7.71	0.32	5.04	2.92	14.1	TTB06
HTN11-250	2 ½" - 8 UN	102	905.13	9.35	0.32	5.56	3.03	17.6	TTB06
HTN12-275	2 ¾" - 8 UN	112	999.85	10.33	0.32	5.91	3.07	19.4	TTB08
HTN13-300	3"- 8 UN	135	1203.43	12.44	0.32	6.38	3.19	23.4	TTB08
HTN14-325	3 ¼" - 8 UN	159	1413.72	14.61	0.39	6.86	3.43	28.4	TTB08
HTN15-350	3 ½" - 8 UN	180	1605.04	16.59	0.39	7.37	3.74	35.7	TTB10
HTN16-375	3 ¾" - 8 UN	191	1704.59	17.61	0.39	7.64	4.02	40.3	TTB10
HTN17-400	4" - 8 UN	215	1911.46	19.75	0.39	8.08	4.33	48.3	TTB10

HTN - HYDRAULIC TENSIONER NUTS - METRIC

- Integral mechanical load retaining collar
- Working pressure 21750 PSI
- Metric thread sizes from M24 to M100

The Hi-Force HTN range of metric top collar hydraulic nuts is specifically designed and manufactured for applications where regular, periodic opening of the joint for inspection and maintenance purposes is required. Unlike conventional hydraulic bolt tensioners, Hi-Force HTN series hydraulic nuts are designed to permanently replace standard hexagon nuts on one side of the bolted joint. Initially the bolt tension/elongation is applied hydraulically and once achieved, it is permanently retained via the integral mechanical load retaining collar. Whilst initial investment in Hi-Force HTN series hydraulic nuts is significantly higher than the cost of standard hexagon nuts, this investment is quickly and easily recovered, when the user considers the huge time savings achieved, during joint opening and closing, when compared to using conventional hydraulic bolt tensioners or hydraulic torque wrenches. Standard range models are available for bolt sizes from M24 to M100, with other sizes available to special order.

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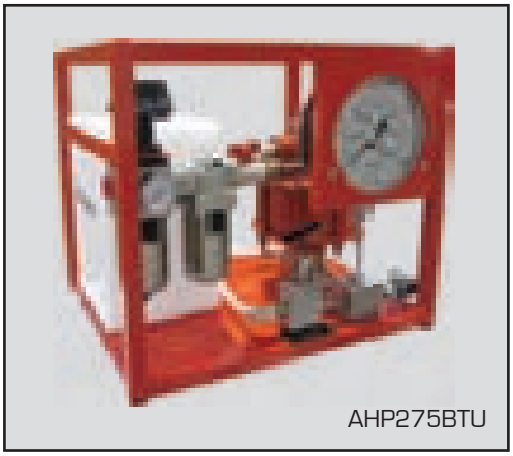
All models are 21750 PSI maximum working pressure and supplied with quick connect hydraulic couplings, compatible for use with Hi-Force air or manually operated hydraulic bolt tensioner pumps and hoses (see page 115 & 116).

Don't forget to order your tommy bars when purchasing Hi-Force hydraulic tensioner nuts. We recommend the purchase of one tommy bar for every four tensioners nuts.

Model number	Bolt size	Capacity tons	Capacity kN	Effective area inch²	Stroke inch	Diameter inch	Height inch	Weight lbs	Tommy bar
HTN1-M24	M24 x 3	22	198.27	2.05	0.20	2.84	2.17	4.2	TTB06
HTN2-M27	M27 x 3	24	216.30	2.24	0.20	2.96	2.17	4.4	TTB06
HTN3-M30	M30 x 3.5	28	252.94	2.61	0.20	3.23	2.25	5.3	TTB06
HTN3-M33	M33 x 3.5	28	252.94	2.61	0.20	3.23	2.25	5.3	TTB06
HTN4-M36	M36 x 4	34	305.83	3.16	0.20	3.47	2.25	6.0	TTB06
HTN5-M39	M39 x 4	39	344.12	3.56	0.24	3.66	2.29	6.4	TTB06
HTN6-M42	M42 x 4.5	45	397.61	4.11	0.24	3.94	2.44	7.7	TTB06
HTN7-M45	M45 x 4.5	53	475.01	4.91	0.24	4.18	2.52	8.8	TTB06
HTN8-M48	M48 x 5	56	501.40	5.18	0.24	4.33	2.52	9.3	TTB06
HTN9-M52	M52 x 5	63	563.72	5.82	0.24	4.61	2.64	10.8	TTB06
HTN10-M56	M56 x 5.5	84	746.44	7.71	0.32	5.04	2.92	14.1	TTB06
HTN11-M60	M60 x 5.5	102	905.13	9.35	0.32	5.56	3.03	17.6	TTB06
HTN11-M64	M64 x 6	102	905.13	9.35	0.32	5.56	3.03	17.6	TTB06
HTN12-M68	M68 x 6	112	999.85	10.33	0.32	5.91	3.07	19.4	TTB08
HTN13-M72	M72 x 6	135	1203.43	12.44	0.32	6.38	3.19	23.4	TTB08
HTN13-M76	M76 x 6	135	1203.43	12.44	0.32	6.38	3.19	23.4	TTB08
HTN14-M80	M80 x 6	159	1413.72	14.61	0.39	6.86	3.43	28.4	TTB08
HTN15-M85	M85 x 6	180	1605.04	16.59	0.39	7.37	3.74	35.7	TTB10
HTN15-M90	M90 x 6	180	1605.04	16.59	0.39	7.37	3.74	35.7	TTB10
HTN16-M95	M95 x 6	191	1704.59	17.61	0.39	7.64	4.02	40.3	TTB10
HTN17-M100	M100 x 6	215	1911.46	19.75	0.39	8.08	4.33	48.3	TTB10

AHP-BTU - AIR DRIVEN PUMP FOR BOLT TENSIONERS


AHP275BTU

- Operates from standard 100 PSI air supply
- Air consumption 28 scfm
- Working pressure 21750 PSI

The Hi-Force AHP-BTU range of air driven hydraulic pumps are compatible for use with Hi-Force STS, SBT and STU bolt tensioners as well as HTN hydraulic nuts. The pump unit is easy to operate and is supplied complete with a glycerin filled vibra-gauge and quick release outlet coupling. The complete system, including an air inlet filter, regulator and lubricator unit is fitted in a robust stainless steel frame. See page 116 for compatible high pressure hydraulic hoses and couplings.

Model number	Working pressure PSI	Usable oil capacity gallons	Oil flow per stroke inch^3	Outlet coupler	Weight lbs	Dimensions in inches Length	Width	Height
AHP275BTU	21750	1.85	0.10	STFC4	44.1	17.73	15.56	15.56
AHP2-237BTU	21750	1.85	0.37	STFC4	52.9	17.73	15.37	18.32

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HPX-BTU - MANUALLY OPERATED PUMP FOR BOLT TENSIONERS

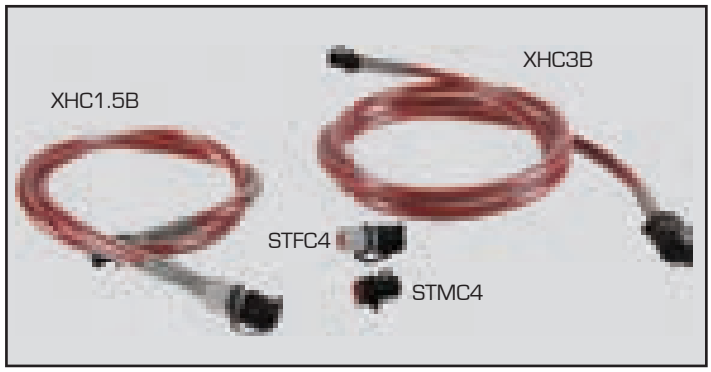

HPX1500BTU

- Compact & lightweight design
- Complete with pressure gauge
- Working pressure 21750 PSI

Hi-Force HPX1500BTU manually operated high pressure hydraulic pump is compatible for use with Hi-Force STS, SBT and STU bolt tensioners as well as HTN hydraulic nuts. Lightweight, compact and independent from any required power source, it is suitable for all tensioning applications on-site requiring reliable hydraulic power. The pump is easy to operate and supplied complete with a pressure gauge and quick release outlet coupling. See page 116 for compatible high pressure hydraulic hoses.

Model number	Working pressure PSI	Usable oil capacity inch^3	Displacement per stroke (inch^3) 1st stage	2nd stage	Outlet coupler	Weight lbs	Dimensions in inches Length	Width	Height
HPX1500BTU	21750	73.23	1.22	0.06	STFC4	14.3	24.03	6.70	7.09

BOLT TENSIONER HOSES, COUPLERS & HOSE REELS

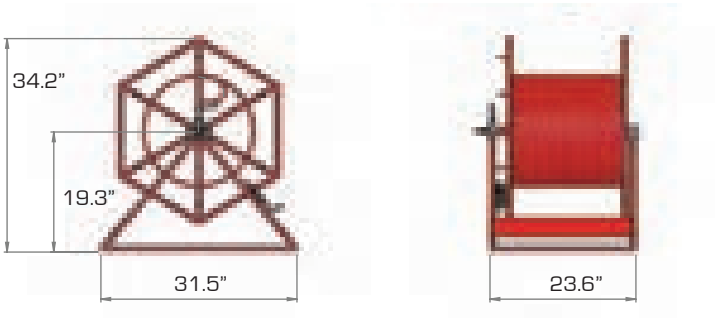


Safety factor 3 : 1

Working pressure up to 21750 PSI

Supplied with quick connect couplings

Hi-Force ultra-high pressure hoses are compatible for use with all Hi-Force bolt tensioning products up to a maximum of 21750 PSI working pressure. Each hose is supplied complete with quick connect couplings on each end (male/female) and has a safety factor of 3:1 on maximum working pressure. Eleven standard lengths are available with special lengths available on request.



Designed for sub-sea main line hose connection between the pump and the first tensioner, the reel above is suitable for off-shore use and can accommodate up to 984 feet of Hi-Force XHC hydraulic hose. The reel comes complete with quick connect couplings, integrated brake and a spring loaded locking bolt.

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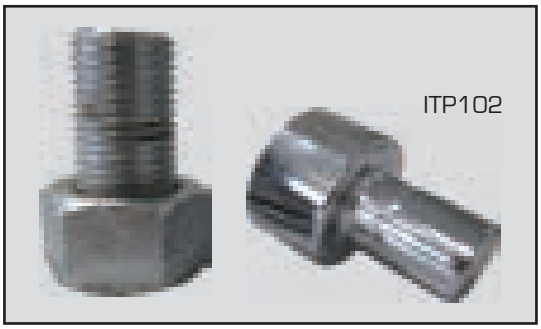
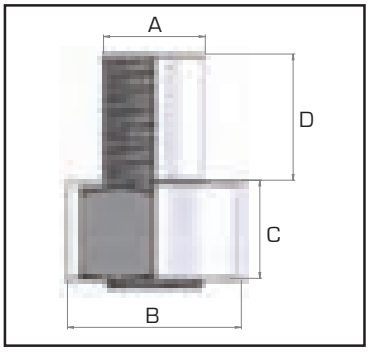
Model number	Maximum pressure PSI	Description
XHC1.5B	21750	Link hose complete with quick connect couplings, length 5 feet
XHC3B	21750	Link hose complete with quick connect couplings, length 10 feet
XHC5B	21750	Mainline hose complete with quick connect couplings, length 16.5 feet
XHC10B	21750	Mainline hose complete with quick connect couplings, length 33 feet
XHC25B	21750	Mainline hose complete with quick connect couplings, length 82 feet
XHC50B	21750	Mainline hose complete with quick connect couplings, length 164 feet
XHC100B	21750	Mainline hose complete with quick connect couplings, length 328 feet
XHC150B	21750	Mainline hose complete with quick connect couplings, length 492 feet
XHC200B	21750	Mainline hose complete with quick connect couplings, length 656 feet
XHC250B	21750	Mainline hose complete with quick connect couplings, length 820 feet
XHC300B	21750	Mainline hose complete with quick connect couplings, length 984 feet
XHR1	21750	Hose reel, suitable for up to 984 feet of XHC high pressure hose
STFC4	21750	Female coupling
STMC4	21750	Male coupling
STN1P2	21750	⅛" x ¼" BSP nipple for current model STS1 only
STN1P4	21750	¼" BSP nipple c/w bonded sealing washer (old design - not for STS1)
STN1P4-C	21750	¼" BSP nipple with cone seat seal (current design - not for STS1)

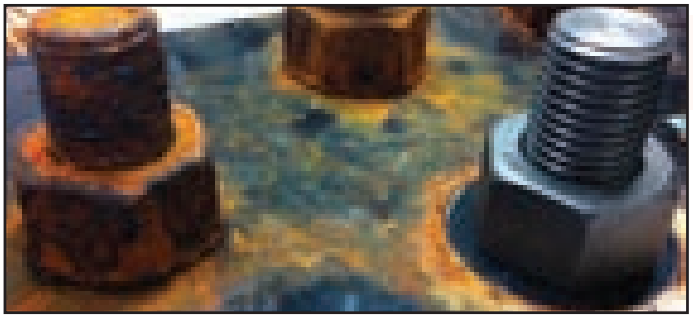
ITP & MTP - BOLT & NUT PROTECTION CAPS



- Protects exposed bolt threads and nuts
- Sizes from ¾" to 4" (M16 to M100)
- Strong and secure fixing

The ITP & MTP bolt and nut protection caps are designed to protect bolts and nuts from thread damage and to considerably help prevent corrosion. These screw-on metal caps have a special internal female thread matching the bolt thread, that ensures a strong and secure fixing to the bolt. These protection caps are commonly installed on heat exchangers and reactors operating at temperatures up to 550°C and over, where common plastic caps would melt. Ideal for use in refineries, petrochemical, LNG plants, offshore platforms and steel structures. The ITP caps are available to suit imperial bolt thread sizes from ¾" to 4" and MTP caps are suitable for metric bolt thread sizes from M16 to M100.





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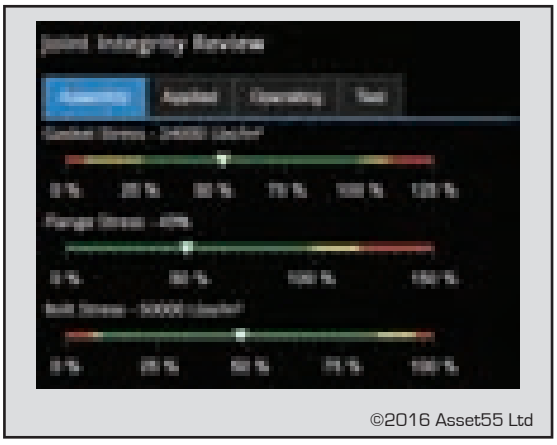
Imperial Sizes					
Model number	Bolt size	Dimensions in inches A	B	C	D
ITP012	¾"	0.75	1.54	0.87	0.91
ITP014	⅞"	0.88	1.73	1.02	1.30
ITP100	1"	1.00	1.89	1.14	1.46
ITP102	1⅛"	1.13	2.17	1.30	1.58
ITP104	1¼"	1.25	2.36	1.42	1.73
ITP106	1⅜"	1.38	2.56	1.54	1.89
ITP108	1½"	1.51	2.76	1.65	2.09
ITP110	1⅝"	1.63	3.03	1.81	2.32
ITP112	1¾"	1.75	3.27	1.93	2.52
ITP114	1⅞"	1.88	3.47	2.09	2.64
ITP200	2"	2.01	3.70	2.21	2.84
ITP204	2¼"	2.25	4.14	2.44	3.15
ITP208	2½"	2.50	4.49	2.72	3.59
ITP212	2¾"	2.76	4.93	2.96	3.90
ITP300	3"	3.01	5.36	3.19	4.22
ITP304	3¼"	3.26	6.00	3.43	4.57
ITP308	3½"	3.51	6.30	3.70	4.96
ITP312	3¾"	3.76	6.78	3.94	5.32
ITP400	4"	4.02	7.21	4.22	6.00

Standard material : plated steel
Optional material : aluminum & stainless steel

Metric Sizes					
Model number	Bolt size	Dimensions in inches A	B	C	D
MTP16	M16	0.63	1.22	0.71	0.87
MTP18	M18	0.71	1.34	0.83	0.91
MTP20	M20	0.79	1.54	0.91	1.00
MTP22	M22	0.87	1.58	1.00	1.26
MTP24	M24	0.95	1.77	1.14	1.34
MTP27	M27	1.06	2.01	1.18	1.46
MTP30	M30	1.18	2.17	1.30	1.58
MTP33	M33	1.30	2.40	1.42	1.81
MTP36	M36	1.42	2.56	1.54	1.89
MTP39	M39	1.54	2.76	1.65	2.05
MTP42	M42	1.65	3.03	1.81	2.32
MTP45	M45	1.77	3.27	1.93	2.52
MTP48	M48	1.89	3.47	2.09	2.64
MTP52	M52	2.05	3.70	2.21	2.84
MTP56	M56	2.21	4.02	2.36	3.31
MTP64	M64	2.52	4.45	2.72	3.59
MTP68	M68	2.68	4.69	2.88	3.86
MTP72	M72	2.84	4.93	3.03	3.94
MTP76	M76	3.00	5.16	3.19	4.14
MTP80	M80	3.15	5.36	3.35	4.22
MTP90	M90	3.55	6.26	3.74	4.96
MTP100	M100	3.94	7.21	4.14	5.67

BOLTRIGHT PRO SOFTWARE - POWERED BY ASSET55



- Online access compatible with all operating systems
- Offline version available
- Covers bolt tensioning requirements

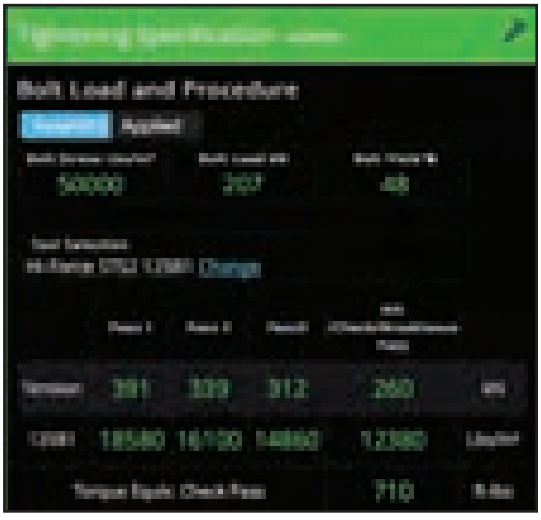
BOLTRIGHTPRO

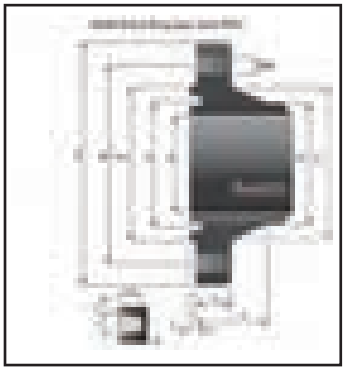
Hi-Force's answer to joint integrity

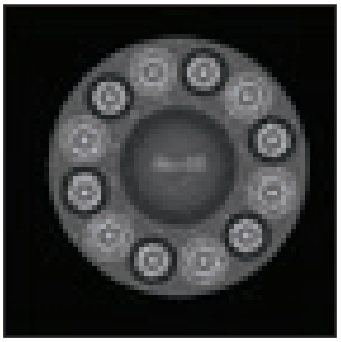
BOLTRIGHT PRO is an innovative, bolted joint integrity software program, designed to assist engineers, with the provision of accurate bolt load calculations, based on key input data, related to each specific bolted joint. BOLTRIGHT PRO has been primarily designed for use in the Oil & Gas industry, where the safe movement of hydrocarbons in a leak free environment is absolutely critical, however it can also assist in many other industries, where bolted joints are present.

The user enters all available data about the joint including flange size, material and rating, gasket type, bolt size and material grade, lubricant type and operating temperature. BOLTRIGHT PRO will analyze this data and produce a comprehensive calculation, of the required tension to be applied to all of the flange joint bolts to achieve a leak free joint, first time every time! Additionally, BOLTRIGHT PRO will produce a clear and easy to follow bolt tightening procedure, which will include the correct tool selection, from within Hi-Force's extensive range of bolting tools, along with the correct sequence of applying the loads, onto the respective flange joint bolts, including the applicable pump hydraulic pressure settings, for each stage of the bolt tightening process.

The methodology of the BOLTRIGHT PRO software calculations is fully traceable to industry standards, ensuring that the latest best practice procedures are followed at all times. As part of the software joint integrity review process, BOLTRIGHT PRO will also display all of the relevant combined stresses within the joint, once the bolt tightening is completed. This includes not only bolt stress but also gasket and flange stress, to ensure all of the stresses within the joint are within acceptable levels. The flexibility of the BOLTRIGHT PRO software enables the user to change any of the input data in order that optimum integrity can be achieved within each and every joint. As an example a change of bolt and gasket material can and will affect the BOLTRIGHT PRO software calculations and bolt tightening procedures.







HYDROTEST PUMPS

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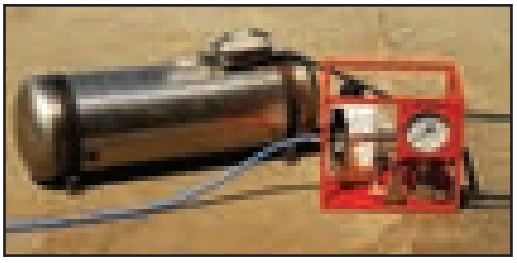

MHP - MANUALLY OPERATED HYDROTEST PUMPS


MHP700

Up to 14500 PSI working pressure

Suitable for use with a wide variety of fluids

Two stage with manual pressure changeover

The Hi-Force MHP series of manually operated two speed hydraulic pumps are suitable for use with a wide variety of fluids including water. Manufactured predominantly from high quality aluminum alloy, with stainless steel piston assemblies, the MHP pump series are lightweight, versatile and robust. The pumps two stage piston design gives a high flow low pressure stage of 3.05 in^3 up to 725 PSI pressure. The pump incorporates a reliable smooth manual changeover from low to high pressure output. The MHP series pumps are available in 5 different pressure capacities ranging from 1450 to 14500 PSI working pressure and all models are fitted with a factory pre-set relief valve for added safety. Each pump is supplied with a multi positional 24 inch operating lever for increased operator comfort during use. Major applications for the MHP series of pumps include hydro-testing of pipes, pressure vessels, valves, and also back-up systems and other pressure retaining equipment, prior to commissioning.

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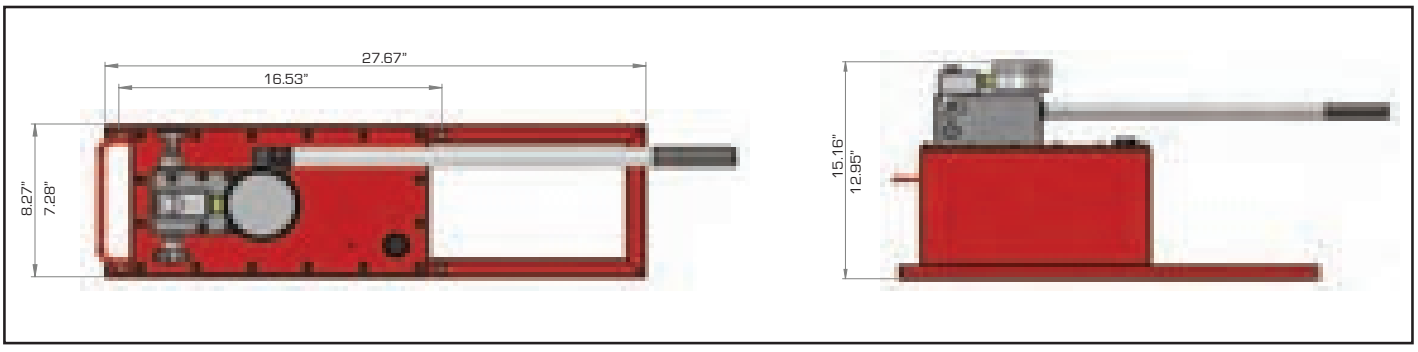
- Lightweight aluminum design with stainless steel pistons
- Relief valve incorporated as standard
- Standard 4 gallons capacity stainless steel powder coated fluid reservoir
- Optional pressure gauges available (see page 121)



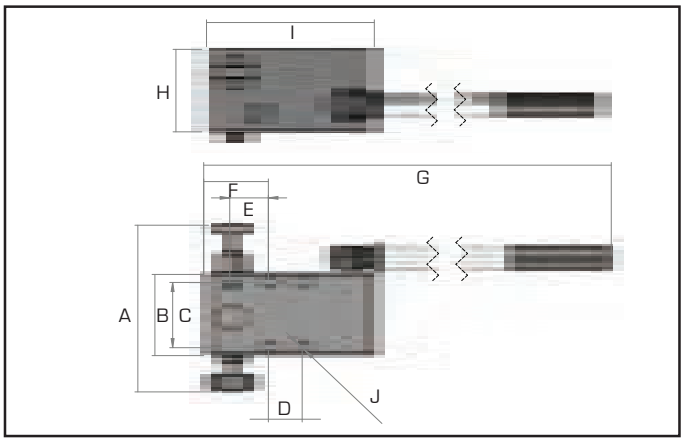
Model number (with tank)	Model number (pump only)	Working pressure PSI	Valve type	Displacement per stroke inch³ 1st stage	Displacement per stroke inch³ 2nd stage	Changeover pressure PSI	Outlet port	Suction port	Weight with tank lbs
MHP100	MHP100PU	1450	2-way	3.05	1.34	725	3/8" NPT	3/8" BSP	44.1
MHP300	MHP300PU	4350	2-way	3.05	0.49	725	3/8" NPT	3/8" BSP	44.1
MHP500	MHP500PU	7250	2-way	3.05	0.24	725	3/8" NPT	3/8" BSP	44.1
MHP700	MHP700PU	10150	2-way	3.05	0.18	725	3/8" NPT	3/8" BSP	44.1
MHP1000	MHP1000PU	14500	2-way	3.05	0.12	725	3/8" BSP	3/8" BSP	44.1

MHP-PU - MANUALLY OPERATED HYDROTEST PUMPS

MHP300PU

- Choice of 5 different models
- Supplied complete with fixing kit
- Compact, lightweight and easy to operate

The Hi-Force MHP-PU series offer the same features as the MHP range on page 120 however these are supplied as a pump unit only without a fluid reservoir. The pump unit is supplied complete with a mounting kit for easy attachment to any specially designed fluid reservoir and an operating lever.



Weight lbs	Dimensions in inches (all models)									
	A	B	C	D	E	F	G	H	I	J
11.0	7.21	3.51	2.82	1.38	1.58	2.64	29.94	3.62	6.97	4 X M8

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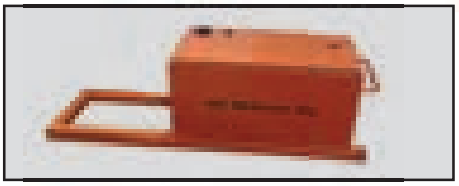
RESERVOIRS

Model number	Description
MHR15	4 gallons standard reservoir

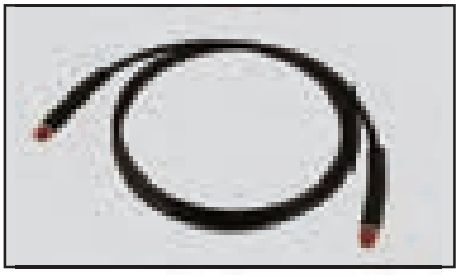


PRESSURE GAUGES

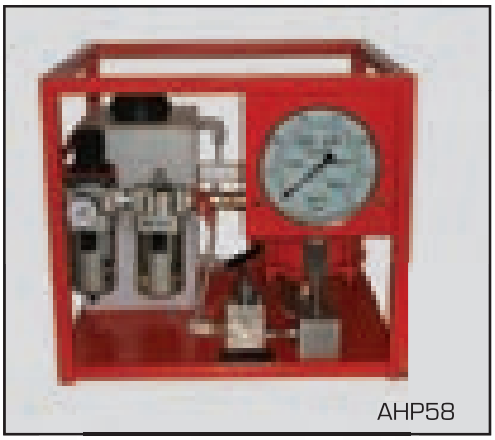
Model number	Pressure range PSI
MHP100GK	1600
MHP300GK	4500
MHP500GK	8000
MHP700GK	10000
MHP1000GK	14500

HOSES

Model number	Max W.P PSI	Length feet	End Fitting	For model number
HH3-6NMS-1	up to 4350	10	3/8" NPT Male Swivel	MHP100 & MHP300
HH3-6NMS-2	up to 10000	10	3/8" NPT Male Swivel	MHP500 & MHP700
HH3-6NMS-3	14500	10	3/8" BSP Male Swivel	MHP1000



AHP - AIR DRIVEN HYDROTEST PUMPS - STANDARD FLOW


AHP58

- Output pressures up to 42500 PSI
- Suitable for use with various fluids
- 6" dual scale vibra pressure gauge

>> Air consumption 28 scfm
>> Infinitely variable output pressure and flow
>> 1.85 gallons reservoir capacity

The Hi-Force AHP series of air driven hydrostatic pressure testing pumps offers a choice of eight models with output pressure capacities ranging from 87 PSI (6 Bar) to 42500 PSI (2931 Bar). All models are suitable for use with various fluids, including water and are supplied with a 6" diameter glycerin filled hydraulic pressure gauge (calibrated on request), inlet airline filter, lubricator and pressure regulator unit, lightweight fluid reservoir, pump start/stop valve and a robust stainless steel skid mounted framework. Optional extras include stainless steel reservoir, stroke counter system and pressure isolation valve. All units are of compact design with a maximum weight of 50.7 lbs.

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Model number	Max. output pressure (PSI) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (inch^3)	Outlet port thread	Weight lbs	Dimensions in inches Length	Width	Height
AHP10	87	493	1000	2.58	½" NPT	50.7	17.73	15.56	15.56
AHP26	203	1305	2625	0.98	½" NPT	46.3	17.73	15.56	15.56
AHP36	247	1769	3625	0.75	½" NPT	44.1	17.73	15.56	15.56
AHP58	406	2900	5800	0.46	½" NPT	44.1	17.73	15.56	15.56
AHP107	899	5409	10701	0.24	½" NPT	44.1	17.73	15.56	15.56
AHP187	1407	9251	18749	0.13	9/16"-18UNF	44.1	17.73	15.56	15.56
AHP275	2248	13500	27507	0.10	9/16"-18UNF	44.1	17.73	15.56	15.56
AHP425	5003	20996	42500	0.06	9/16"-18UNF	44.1	17.73	15.56	15.56

Hydraulic pressure PSI	Bar	Approximate rate of discharge (gallons/min) at air input pressure 100 PSI (7 Bar) AHP10	AHP26	AHP36	AHP58	AHP107	AHP187	AHP275	AHP425
0	0	6.10	2.32	1.58	0.94	0.52	0.30	0.19	0.11
500	35	3.17	1.54	1.16	0.81	0.40	0.28	0.18	0.11
1000	69	*	1.25	1.00	0.66	0.34	0.26	0.17	0.10
1500	104	*	1.03	0.88	0.63	0.33	0.24	0.16	0.10
2000	138	*	0.79	0.79	0.59	0.32	0.21	0.15	0.09
2500	173	*	0.32	0.68	0.54	0.31	0.20	0.13	0.09
3000	207	*	*	0.51	0.49	0.31	0.19	0.13	0.08
4000	276	*	*	*	0.41	0.27	0.18	0.12	0.08
5000	345	*	*	*	0.27	0.25	0.18	0.11	0.07
7500	517	*	*	*	*	0.20	0.16	0.11	0.07
10000	690	*	*	*	*	0.12	0.14	0.10	0.06
15000	1034	*	*	*	*	*	0.10	0.09	0.06
20000	1379	*	*	*	*	*	*	0.08	0.05
25000	1724	*	*	*	*	*	*	0.06	0.04
30000	2069	*	*	*	*	*	*	*	0.03
40000	2760	*	*	*	*	*	*	*	0.01

* Pressure exceeds pump capacity

AHP-CR AIR DRIVEN HYDROTEST PUMPS - WITH CHART RECORDER


AHP187-CR

Output pressures up to 42500 PSI

Suitable for use with various fluids

6" dual scale vibra pressure gauge

- Air consumption 28 scfm
- Infinitely variable output pressure and flow
- 1.85 gallons reservoir capacity
- Supplied with 50 recorder charts and one black chart pen, for additional charts and pens, please see page 128

The Hi-Force AHP-CR series of air driven hydrostatic pressure testing pumps offers a choice of 8 models with output pressure capacities ranging from 87 PSI (6 Bar) to 42500 PSI (2931 Bar) all fitted with on board, 4 hour, single pen chart recorder as standard. All models are suitable for use with various fluids including water and are supplied with a 6" diameter glycerin filled hydraulic pressure gauge (calibrated on request), inlet airline filter, lubricator and pressure regulator unit, lightweight fluid reservoir, pump start/stop valve and a robust stainless steel skid mounted framework. Recorder isolation valve and pressure release valve are fitted as standard. Optional extras include stainless steel reservoir, pressure isolation valve, stroke counter system, gauge calibration certificate and varying recorder clock speeds. All units are of compact design with a maximum weight of 68.3 lbs.

Model number	Max. output pressure (PSI) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (inch³)	Outlet port thread	Weight lbs	Dimensions in inches Length	Width	Height
AHP10-CR	87	493	1000	2.58	½" NPT	68.3	20.88	15.37	15.37
AHP26-CR	203	1305	2625	0.98	½" NPT	63.9	20.88	15.37	15.37
AHP36-CR	247	1769	3625	0.75	½" NPT	61.7	20.88	15.37	15.37
AHP58-CR	406	2900	5800	0.46	½" NPT	61.7	20.88	15.37	15.37
AHP107-CR	899	5409	10701	0.24	½" NPT	61.7	20.88	15.37	15.37
AHP187-CR	1407	9251	18749	0.13	9/16"-18UNF	61.7	20.88	15.37	15.37
AHP275-CR	2248	13500	27507	0.10	9/16"-18UNF	61.7	20.88	15.37	15.37
AHP425-CR	5003	20996	42500	0.06	9/16"-18UNF	61.7	20.88	15.37	15.37

Hydraulic pressure PSI	Bar	Approximate rate of discharge (gallons/min) at air input pressure 100 PSI (7 Bar) AHP10-CR	AHP26-CR	AHP36-CR	AHP58-CR	AHP107-CR	AHP187-CR	AHP275-CR	AHP425-CR
0	0	6.10	2.32	1.58	0.94	0.52	0.30	0.19	0.11
500	35	3.17	1.54	1.16	0.81	0.40	0.28	0.18	0.11
1000	69	*	1.25	1.00	0.66	0.34	0.26	0.17	0.10
1500	104	*	1.03	0.88	0.63	0.33	0.24	0.16	0.10
2000	138	*	0.79	0.79	0.59	0.32	0.21	0.15	0.09
2500	173	*	0.32	0.68	0.54	0.31	0.20	0.13	0.09
3000	207	*	*	0.51	0.49	0.31	0.19	0.13	0.08
4000	276	*	*	*	0.41	0.27	0.18	0.12	0.08
5000	345	*	*	*	0.27	0.25	0.18	0.11	0.07
7500	517	*	*	*	*	0.20	0.16	0.11	0.07
10000	690	*	*	*	*	0.12	0.14	0.10	0.06
15000	1034	*	*	*	*	*	0.10	0.09	0.06
20000	1379	*	*	*	*	*	*	0.08	0.05
25000	1724	*	*	*	*	*	*	0.06	0.04
30000	2069	*	*	*	*	*	*	*	0.03
40000	2760	*	*	*	*	*	*	*	0.01

* Pressure exceeds pump capacity

AHP2 - AIR DRIVEN HYDROTEST PUMPS - MEDIUM FLOW


AHP2-036

Output pressures up to 23700 PSI

Suitable for use with various fluids

6" dual scale vibra pressure gauge

- Air consumption 56 scfm
- Infinitely variable output pressure and flow
- 1.85 gallons reservoir capacity

The Hi-Force AHP2 series of air driven hydrostatic pressure testing pumps offers a choice of 5 models with output pressure capacities ranging from 246 PSI (17 Bar) to 23700 PSI (1634 Bar). All models are compact design and suitable for use with various fluids including water and are supplied with a 6" diameter glycerin filled hydraulic pressure gauge (calibrated on request), inlet airline filter, lubricator and pressure regulator unit, lightweight fluid reservoir, pump start/stop valve and a robust stainless steel skid mounted framework. Optional extras include stainless steel reservoir, stroke counter system and pressure isolation valve.

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Model number	Max. output pressure (PSI) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (inch^3)	Outlet port thread	Weight lbs	Dimensions in inches Length	Width	Height
AHP2-036	249	1799	3600	2.49	½" NPT	52.9	17.73	15.37	18.32
AHP2-060	450	2899	6000	1.50	½" NPT	52.9	17.73	15.37	18.32
AHP2-097	750	4749	9700	0.93	½" NPT	52.9	17.73	15.37	18.32
AHP2-144	1099	7098	14400	0.62	½" NPT	52.9	17.73	15.37	18.32
AHP2-237	1900	11597	23700	0.37	9/16"-18UNF	52.9	17.73	15.37	18.32

Hydraulic pressure PSI	Bar	Approximate rate of discharge (gallons/min) at air input pressure 100 PSI (7 Bar) AHP2-036	AHP2-060	AHP2-097	AHP2-144	AHP2-237
0	0	2.69	1.64	1.03	0.71	0.41
500	35	1.27	1.45	0.94	0.66	0.40
1000	69	1.91	1.24	0.84	0.62	0.39
1500	104	1.62	1.19	0.79	0.57	0.37
2000	138	1.43	1.11	0.76	0.57	0.36
3000	207	0.81	0.92	0.67	0.50	0.34
4000	276	*	0.73	0.60	0.46	0.32
5000	345	*	0.57	0.55	0.43	0.32
7500	517	*	*	0.38	0.36	0.29
10000	690	*	*	*	0.30	0.26
15000	1034	*	*	*	*	0.21
20000	1379	*	*	*	*	0.13
23700	1634	*	*	*	*	0.09

* Pressure exceeds pump capacity

AHP2-CR AIR DRIVEN HYDROTEST PUMPS - WITH CHART RECORDER

AHP2-237CR

Output pressures up to 23700 PSI

Suitable for use with various fluids

6" dual scale vibra pressure gauge

- Air consumption 56 scfm
- Infinitely variable output pressure and flow
- 1.85 gallons reservoir capacity
- Supplied with 50 recorder charts and one black chart pen, for additional charts and pens, please see page 128

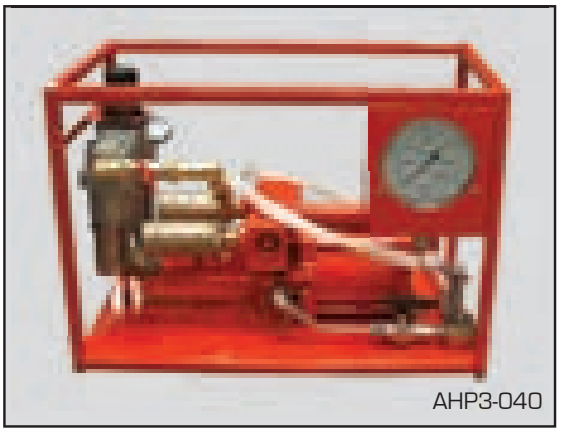
The Hi-Force AHP2-CR series of air driven hydrostatic pressure testing pumps offers a choice of 5 models with output pressure capacities ranging from 246 PSI (17 Bar) to 23700 PSI (1634 Bar) all fitted with on board, 4 hour, single pen chart recorder as standard. All models are compact design and suitable for use with various fluids including water and are supplied with a 6" diameter glycerin filled hydraulic pressure gauge (calibrated on request), inlet airline filter, lubricator and pressure regulator unit, lightweight fluid reservoir, pump start/stop valve and a robust stainless steel skid mounted framework. Recorder isolation valve and pressure release valve are fitted as standard. Optional extras include stainless steel reservoir, pressure isolation valve, stroke counter system, gauge calibration certificate and varying recorder clock speeds.

Model number	Max. output pressure (PSI) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (inch³)	Outlet port thread	Weight lbs	Dimensions in inches Length	Width	Height
AHP2-036CR	246	1799	3600	2.49	½" NPT	70.5	21.87	15.37	18.32
AHP2-060CR	450	2899	6000	1.50	½" NPT	70.5	21.87	15.37	18.32
AHP2-097CR	750	4749	9700	0.93	½" NPT	70.5	21.87	15.37	18.32
AHP2-144CR	1099	7098	14400	0.62	½" NPT	70.5	21.87	15.37	18.32
AHP2-237CR	1900	11597	23700	0.37	9/16"-18UNF	70.5	21.87	15.37	18.32

Hydraulic pressure PSI	Bar	Approximate rate of discharge (gallons/min) at air input pressure 100 PSI (7 Bar) AHP2-036	AHP2-060	AHP2-097	AHP2-144	AHP2-237
0	0	2.69	1.64	1.03	0.71	0.41
500	35	1.27	1.45	0.94	0.66	0.40
1000	69	1.91	1.24	0.84	0.62	0.39
1500	104	1.62	1.19	0.79	0.57	0.37
2000	138	1.43	1.11	0.76	0.57	0.36
3000	207	0.81	0.92	0.67	0.50	0.34
4000	276	*	0.73	0.60	0.46	0.32
5000	345	*	0.57	0.55	0.43	0.32
7500	517	*	*	0.38	0.36	0.29
10000	690	*	*	*	0.30	0.26
15000	1034	*	*	*	*	0.21
20000	1379	*	*	*	*	0.13
23700	1634	*	*	*	*	0.09

* Pressure exceeds pump capacity

AHP3 - AIR DRIVEN HYDROTEST PUMPS - HIGH FLOW


AHP3-040

Output pressures up to 10000 PSI

Suitable for use with various fluids

6" dual scale vibra pressure gauge

- Air consumption 175 scfm
- Infinitely variable output pressure and flow
- Fluid inlet 1.1/4" BSPF

The Hi-Force AHP3 series of air driven hydrostatic pressure testing pumps offers a choice of 3 models with output pressure capacities ranging from 609 PSI (42 Bar) to 10000 PSI (700 Bar). All models are compact design and suitable for use with various fluids including water and are supplied with a 6" diameter glycerin filled hydraulic pressure gauge (calibrated on request), inlet airline filter, lubricator and pressure regulator unit, pressure isolation valve, pressure release valve, fluid inlet via Y-type fluid strainer, pump start/stop valve and a robust stainless steel skid mounted framework. Optional extras include stainless steel reservoir, stroke counter system, distance piece for chemical duty and chart recorder.

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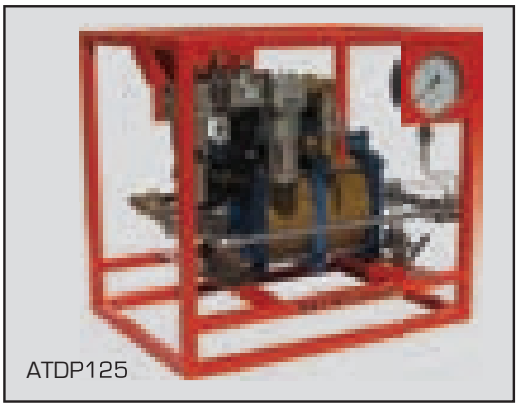
Model number	Max. output pressure (PSI) at airline input pressure 15 PSI 1.04 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (inch³)	Outlet port thread	Weight lbs
AHP3-040	600	2000	4000	6.0	½" NPTF	88.2
AHP3-060	900	3000	6000	3.5	½" NPTF	88.2
AHP3-100	1499	5000	10000	2.1	½" NPTF	88.2

Dimensions in inches Length	Width	Height
28.17	15.37	19.31
28.17	15.37	19.31
28.17	15.37	19.31

Hydraulic pressure PSI	Bar	Approximate rate of discharge (gallons/min) at air input pressure 100 PSI (7 Bar) AHP3-040	AHP3-060	AHP3-100
0	0	4.84	4.13	3.16
500	34.5	3.81	3.39	2.77
1000	68.9	2.85	2.77	2.29
1500	103.4	1.90	2.26	1.86
2000	137.9	1.56	1.84	1.49
2500	172.4	1.12	1.49	1.28
3000	206.8	0.69	1.21	1.10
3500	241.3	0.35	1.00	1.02
4000	275.8	*	0.80	0.93
4500	310.3	*	0.63	0.80
5000	344.8	*	0.49	0.74
5500	379.2	*	0.34	0.69
6000	413.7	*	0.17	0.64
6500	448.2	*	*	0.50
7000	482.6	*	*	0.37
7500	517.1	*	*	0.30
8000	551.6	*	*	0.24
8500	586.1	*	*	0.17
9000	620.5	*	*	0.13
9500	655.0	*	*	0.90
10000	689.5	*	*	0.04

* Pressure exceeds pump capacity

ATDP - AIR DRIVEN TWIN DOUBLE ACTING HYDROTEST PUMPS


ATDP125

Output pressures up to 21600 PSI

Suitable for use with various fluids

Twin double acting design offering high volume flow

The Hi-Force ATDP series of twin double acting air driven hydrostatic pressure testing pumps offers a choice of 3 models with output pressure capacities ranging from 1260 PSI (87 Bar) to 21600 PSI (1489 Bar). The twin double acting design offers a much higher displacement volume per stroke than the smaller AHP & AHP2 series, making it ideal for prefill as well as pressure testing. All models are supplied with a 6" diameter glycerin filled vibra-gauge, inlet airline filter, lubricator and regulator unit, pump start/stop valve and fluid strainer. Viton and ethylene propylene seals for handling special fluids or chemicals can be factory fitted prior to delivery if required. Other seal materials are available on request.

- Air consumption 212 scfm
- Suitable for use with various fluids including water
- 6" dual scale glycerin filled gauge
- Infinitely variable output pressure and flow
- Fitted with inlet air filter, regulator & lubricator
- Optional extras include stainless steel frame work, pneumatic or LCD stroke counter system, onboard chart recorder, pressure isolation valve and wheel mounting.

H

Model number	Max. output pressure (PSI) at airline input pressure 20 PSI 1.38 Bar	60 PSI 4.14 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (inch³)	Outlet port thread	Weight lbs
ATDP63	1260	3770	6300	16.78	½" NPT	211.6
ATDP125	2494	7497	12500	8.54	½" NPT	211.6
ATDP216	4321	12963	21600	4.82	1⅛"-12UNF	211.6

Dimensions in inches Length	Width	Height
30.13	22.46	27.58
30.13	22.46	27.58
30.13	22.46	27.58

Hydraulic pressure PSI	Bar	Approximate rate of discharge (gallons/min) at air input pressure 100 PSI (7 Bar) **ATDP63**	**ATDP125**	**ATDP216**
0	0	8.50	4.46	2.51
1000	69	6.78	3.70	2.32
2000	138	5.41	3.25	2.11
3000	207	4.28	2.80	1.95
4000	276	3.30	2.48	1.82
5000	345	2.11	2.19	1.69
6000	414	0.74	1.93	1.61
8000	552	*	1.27	1.45
10000	690	*	0.79	1.29
12000	828	*	0.11	1.14
16000	1103	*	*	0.84
20000	1379	*	*	0.42

* Pressure exceeds pump capacity

HYDROTEST PUMP ACCESSORIES AND APPLICATIONS

Pack of 100 spare charts, diameter 6.5 inches, 4 hour time scale

Model number	Chart Reading PSI	Suitable for Hydrotest Pump unit
AHP-C01	0 - 1500	AHP10-CR
AHP-C03	0 - 3000	AHP26-CR
AHP-C05	0 - 5000	AHP36-CR - AHP2-036CR
AHP-C10	0 - 10000	AHP58-CR - AHP2-060CR
AHP-C15	0 - 15000	AHP107-CR - AHP2-097CR
AHP-C20	0 - 20000	AHP187-CR - AHP2-144CR
AHP-C30	0 - 30000	AHP275-CR - AHP2-237CR
AHP-C45	0 - 45000	AHP425-CR

Replacement pen for chart recorder

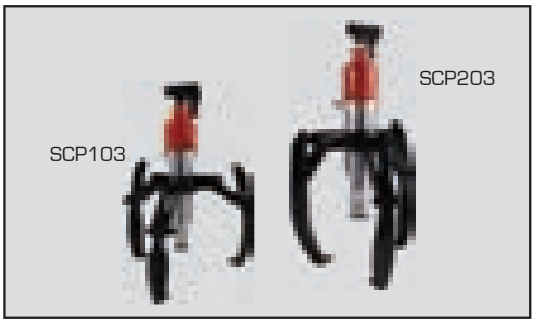
Model number	Colour	Description
AHP-PB	Black	Suitable for pressure reading on all Hi-Force AHP pumps with chart recorder

Did you know .....

Hi-Force can also supply chart recorders with multiple reading functions

PULLER KITS

SCP - SELF-CONTAINED HYDRAULIC PULLERS



Capacities from 11 to 33 tons

Sealed hydraulic system

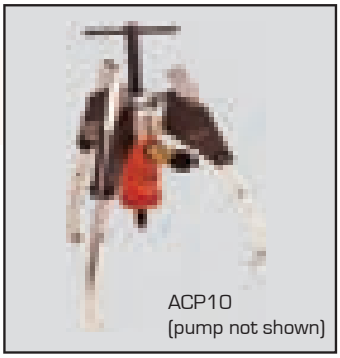
Operates in any position

The SCP range of self-contained hydraulic pullers offers a choice of 3 models, each with integral manually operated hydraulic pump and multi-position operating handle. The completely sealed hydraulic system of the SCP pullers enables use of the tool in any position and all models are easy to operate and provide an efficient solution for many pulling applications.

Model number	Capacity tons	Type of puller	Hydraulic stroke inch	Piston Ext. inch	Weight lbs
SCP103	11	3-way jaw	3.23	1.97	25.6
SCP203	22	3-way jaw	3.23	3.94	52.2
SCP303	33	3-way jaw	4.33	5.91	110.2

Dimensions in inches				
Reach	Dia min.	Dia max.	Tip depth	Tip height
7.68	1.18	12.21	0.87	0.24
10.84	1.97	16.94	1.14	0.39
15.96	3.94	24.03	1.50	1.42

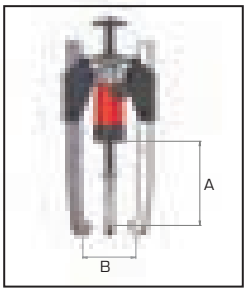
ACP - AUTO-CENTER HYDRAULIC PULLER KITS



Capacities from 11 to 55 tons

Quick set-up time, easy to use

High quality, drop forged steel components

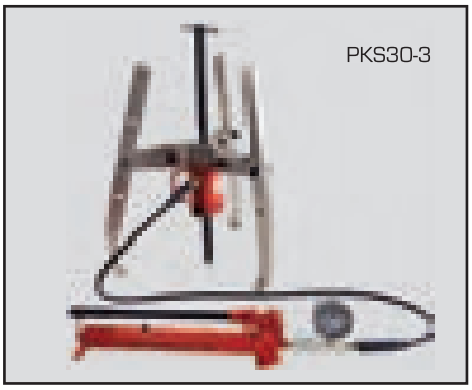


The ACP heavy duty, auto-centering hydraulic puller kit range offers a choice of 4 models, with capacities from 11 to 55 tons. All models are supplied complete with a detachable hollow ram cylinder, manually operated pump, hydraulic hose and a 4 inch diameter pressure gauge. All models are easy to set up and are the ideal tool for all pulling, pushing, installing and removing applications required for press fitted or heat fitted parts, including wheels, sprockets, flywheels, gears and bearings.

Model number	Capacity tons	Type of puller	Cylinder model no.	Pump model no.	Weight lbs
ACP10	11	2 & 3 jaw	HHS102	HP110	54.0
ACP20	22	3 jaw	HHS202	HP110	97.0
ACP30	33	3 jaw	HHS302	HP110	168.7
ACP50	55	3 jaw	HHS603	HP227	399.0

Dimensions in inches		
A	B min	B max
11.66	1.97	13.79
12.61	2.76	18.91
16.04	3.55	22.85
28.64	4.73	36.25

PKS - HYDRAULIC 2 & 3 WAY PULLER KITS



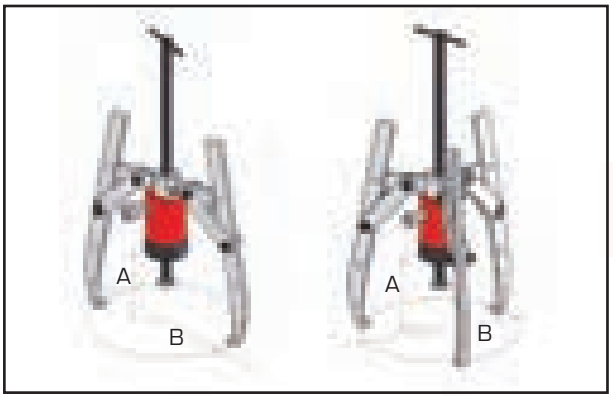
Capacities from 5 to 55 tons

Quick set-up time, easy to use

High quality, drop forged steel components

The PKS heavy duty hydraulic puller range is designed for removing stubborn parts such as wheels, gears, sprockets, sleeves, pulleys and other similar items. The range offers a selection of 8 models with pulling capacities up to 50 tons. All models are supplied complete with a full set of versatile detachable hydraulic components. All models are safe and easy to operate and avoid the need for heating and hammering.

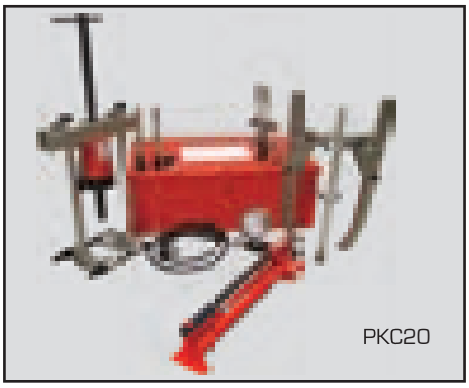
- Working pressure 10000 PSI
- Multi-purpose hollow piston cylinder (excl. PKS5-2-3)
- Complete with all hydraulic components (pump, cylinder, hose, gauge, etc.)
- Supplied complete with storage and transport box



Model number	Capacity tons	Type of puller	Cylinder model no.	Pump model no.	Weight lbs	Dimensions in inches A	B min	B max
PKS5-2-3	5	2 & 3 jaw	HSS53	HP110	52.9	8.87	*	9.46
PKS10-2-3	11	2 & 3 jaw	HHS102	HP110	75.0	11.66	1.97	13.79
PKS20-2	22	2 jaw	HHS202	HP110	63.9	12.61	2.76	18.91
PKS20-3	22	3 jaw	HHS202	HP110	81.6	12.61	2.76	18.91
PKS30-2	33	2 jaw	HHS302	HP110	108.0	16.04	3.55	22.85
PKS30-3	33	3 jaw	HHS302	HP110	127.9	16.04	3.55	22.85
PKS50-2	55	2 jaw	HHS603	HP227	231.5	28.64	4.73	36.25
PKS50-3	55	3 jaw	HHS603	HP227	286.6	28.64	4.73	36.25
PK202	22	2 jaw beam	*	*	6.6	*	*	*
PK302	33	2 jaw beam	*	*	8.8	*	*	*
PK502	55	2 jaw beam	*	*	15.4	*	*	*

Note: PK202, PK302 & PK502 are 2-jaw beam only (not complete kit). Dimensions calculated with 15° outward angled puller legs.

PKC - COMPREHENSIVE HYDRAULIC PULLER KITS


PKC20

Capacities from 11 to 55 tons

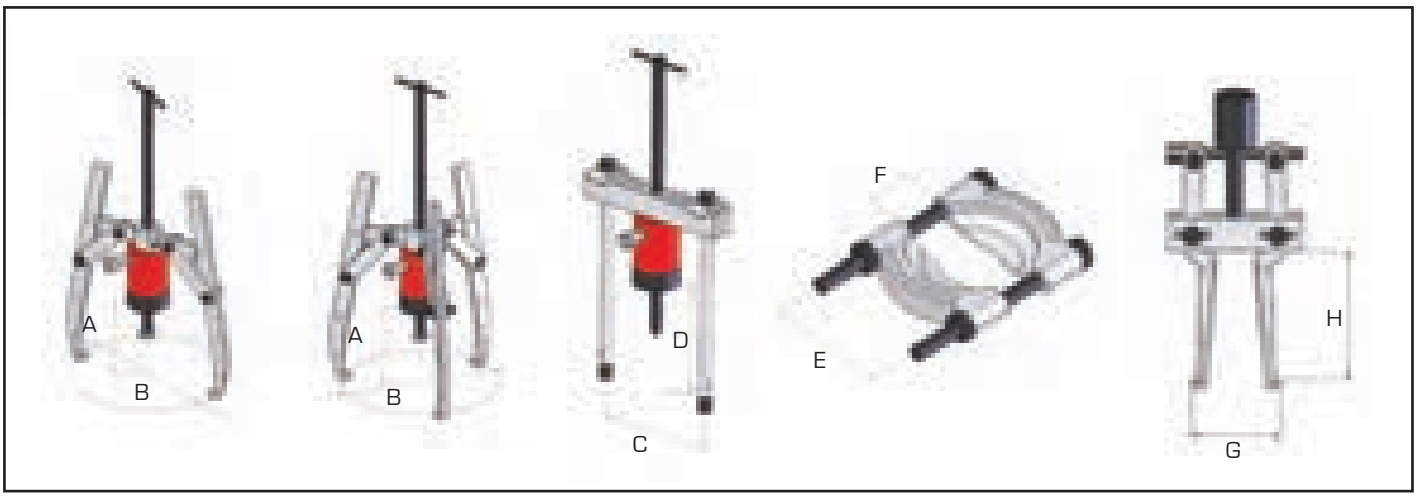
Combination of 4 different pullers in one set

Quick set-up time, easy to use

The PKC heavy duty, multi-purpose hydraulic puller kit range is extremely versatile and includes 2-way and 3-way grip pullers (as detailed on page 131), bearing pullers, bearing cup pullers and cross head pullers. All models are designed for pulling, pushing, installing and removing all press fitted or heat fitted parts such as gears, bearings, sleeves, cogs, internal bearings, wheels, sprockets, flywheels, etc. The range offers a selection of 4 models with pulling capacities up to 55 tons, all supplied complete with a full set of versatile, detachable hydraulic components.

- Working pressure 10000 PSI
- Complete hydraulic system supplied, including gauge
- High quality, drop-forged steel components
- Supplied complete with storage and transport box

I



Model number	Capacity tons	Cylinder model no.	Pump model no.	Weight lbs
PKC10	11	HHS102	HP110	55.1
PKC20	22	HHS202	HP110	132.3
PKC30	33	HHS302	HP110	255.7
PKC50	55	HHS603	HP227	590.8

Dimensions in inches											
A	B min	B max	C min	C max	D	E	F min	F max	G min	G max	H
11.66	1.97	13.79	4.53	10.24	11.82	4.33	0.39	4.33	1.58	5.71	4.53
12.61	2.76	18.91	5.32	13.59	10.44	6.00	0.43	5.28	1.58	5.71	4.53
16.04	3.55	22.85	7.09	17.34	11.19	10.24	0.59	9.85	2.36	9.46	5.91
28.64	4.73	36.25	9.06	22.85	17.61	10.24	0.59	9.85	2.36	9.46	5.91

Dimensions A & B calculated with 15° outward angled puller legs

SPP - HEAVY DUTY HYDRAULIC PULLERS

SPP22045

- Capacities from 83 to 242 tons
- Wireless remote controlled operation
- Powered driven trolley for easy positioning

The SPP range of heavy duty pullers offers a choice of 18 models with capacities ranging from 83 to 242 tons. The functional and ergonomic design of the heavy duty hydraulic pullers features a movable trolley and the two vertical supports provide stability and safety as well as allow the user to adjust the height to the desired position.

All models include self-centering pulling jaws that can rotate 180° and a wireless remote control that allows for an easier and safer operation. Ideal for use in steel plants, mines, shipyards, petrochemical industries for repair and maintenance applications.

Self-centering puller jaws with anti-slip mechanism

Hydraulic system powered by HEP2 series pump

SPP - HEAVY DUTY HYDRAULIC PULLERS


SPP22045

Self-centering jaw design

Spread up to 48.07 inches

Adjustable height

Did you know .....

The SPP pullers incorporate the HEP2 series electric driven pump.
For more information on HEP2 series pumps, see page 41.

- Hydraulically actuated jaws with adjustable jaw tip angle
- Anti-slip mechanism in puller jaws
- Easy to maneuvre with wheel locking feature

Model number	Capacity tons	Type of puller	Motor Voltage	Stroke inch	Weight lbs
Puller with 50Hz motor					
SPP7515	83	2 & 3 jaw	110/115V	6.5	1455
SPP7525	83	2 & 3 jaw	220/240V	6.5	1455
SPP7545	83	2 & 3 jaw	380/440V	6.5	1455
SPP12015	132	2 & 3 jaw	110/115V	6.7	1958
SPP12025	132	2 & 3 jaw	220/240V	6.7	1958
SPP12045	132	2 & 3 jaw	380/440V	6.7	1958
SPP22015	242	2 & 3 jaw	110/115V	6.7	2866
SPP22025	242	2 & 3 jaw	220/240V	6.7	2866
SPP22045	242	2 & 3 jaw	380/440V	6.7	2866
Puller with 60Hz motor					
SPP7516	83	2 & 3 jaw	110/115V	6.5	1455
SPP7526	83	2 & 3 jaw	220/240V	6.5	1455
SPP7546	83	2 & 3 jaw	380/440V	6.5	1455
SPP12016	132	2 & 3 jaw	110/115V	6.7	1958
SPP12026	132	2 & 3 jaw	220/240V	6.7	1958
SPP12046	132	2 & 3 jaw	380/440V	6.7	1958
SPP22016	242	2 & 3 jaw	110/115V	6.7	2866
SPP22026	242	2 & 3 jaw	220/240V	6.7	2866
SPP22046	242	2 & 3 jaw	380/440V	6.7	2866

Model number	Reach in inches		Spread in inches		Dimensions in inches		
	min	max	min	max	Length	Width	Height
SPP75 (all models)	19.31	27.58	4.33	48.07	70.87	47.24	63.00
SPP120 (all models)	35.46	43.34	5.91	48.07	74.80	47.24	63.00
SPP220 (all models)	35.46	43.34	5.91	48.07	86.61	57.09	66.14

HBR-1 - SPRING EYE BUSH REPLACEMENT TOOL KIT

HBR-1

Bushes replaced directly on the vehicle

Safe, simple and easy to operate

Portable and powerful hydraulic operation

The Hi-Force HBR-1 spring eye bush replacement tool kit is offered with a choice of manual or air powered hydraulic pump unit, or it can be supplied without a pump, should the user already have a suitable 10000 PSI pump within his tool store. All models offer a superb 20 tons of hydraulic power, when operated at the maximum working pressure of 10000 PSI. This innovative product from Hi-Force is primarily targeted at commercial vehicle manufacturers and service centers, as well as heavy plant vehicle workshops, where traditional hammer and heat methods of bush replacement activities have proved unsafe, time consuming and costly. All kits incorporate a standard Hi-Force HHA182 lightweight, aluminum hydraulic cylinder making the kit portable and easy to fit to a wide variety of bush replacement applications. Supplied in a smart metal storage case for easy transportation and storage, all kits include a range of standard tooling with non standard and special tooling available on request.

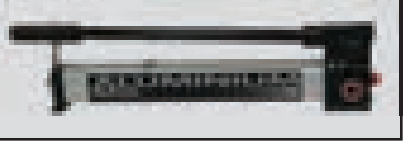
- Offers time & labour savings of up to 60%
- Lightweight & compact design for easy transportation
- Minimal manual effort during operation
- Improved safety over traditional methods

Pump options

The HBR-1 hydraulic spring eye bush replacement tool kit can be operated by either the AHP1120 air driven foot pump or the HP212 lightweight aluminum hand pump.

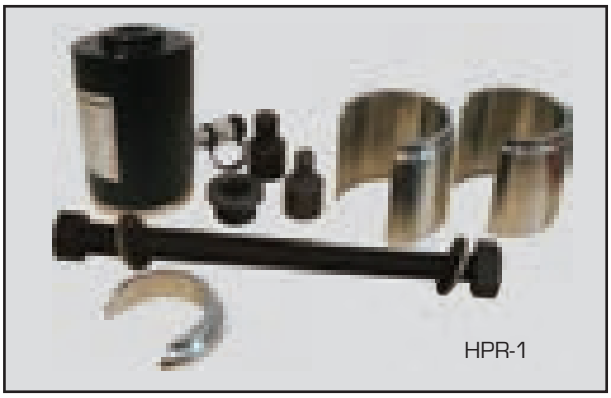
AHP1120

HP212



			Complete set comprising of							
Model number	Capacity tons	Stroke inch	Cylinder	Pump	Hose	Base plate	Threaded rods	Dolleys	Pull sleeves	Weight lbs
HBR-1	20	2.01	HHA182	n/a	n/a	1	3	5	2	59.5
HBR-1H	20	2.01	HHA182	HP212	HC2	1	3	5	2	72.8
HBR-1A	20	2.01	HHA182	AHP1120	HC2	1	3	5	2	77.2

HPR - PIN & BUSH REPLACEMENT TOOL KITS


HPR-1

Safe, simple, hands free operation

Offers time & labour savings of up to 60%

Flexible and adaptable system

The Hi-Force HPR range of pin and bush replacement kits is offered with a choice of 41 or 55 tons capacity, both available with either a manual or air driven hydraulic pump unit. Both the HPR-1 & the HPR-2 can also be supplied without a hydraulic pump for those users that already have a suitable 10000 PSI pump available within their tool store. All models operate at 10000 PSI maximum working pressure and incorporate either a standard HHA372 41 ton capacity or a HHA504 55 ton capacity, lightweight, aluminum hydraulic cylinder. This innovative product from Hi-Force is targeted at manufacturers, service centers and users of heavy plant vehicles, used in the construction and mining industries. Supplied in a smart metal storage case for easy transportation and storage, all kits include a range of standard tooling with non-standard and special tooling available on request.

- Ideal for use on-site and in the workshop
- Improved safety over traditional methods
- Suitable for a wide range of pin & bush applications
- Multi-purpose aluminum hollow piston cylinder

Model number	Capacity tons	Stroke inch	Complete set comprising of								
			Cylinder	Pump	Hose	Base plate	Threaded rods	Pull sleeves	Adaptors	Reducer sleeves	Weight lbs
HPR-1	41	2.01	HHA372	n/a	n/a	1	1	2	2	1	83.8
HPR-1H	41	2.01	HHA372	HP212	HC2	1	1	2	2	1	97.0
HPR-1A	41	2.01	HHA372	AHP1120	HC2	1	1	2	2	1	101.4
HPR-2	55	4.10	HHA504	n/a	n/a	2	1	4	1	1	145.5
HPR-2H	55	4.10	HHA504	HP212	HC2	2	1	4	1	1	158.7
HPR-2A	55	4.10	HHA504	AHP1120	HC2	2	1	4	1	1	163.1

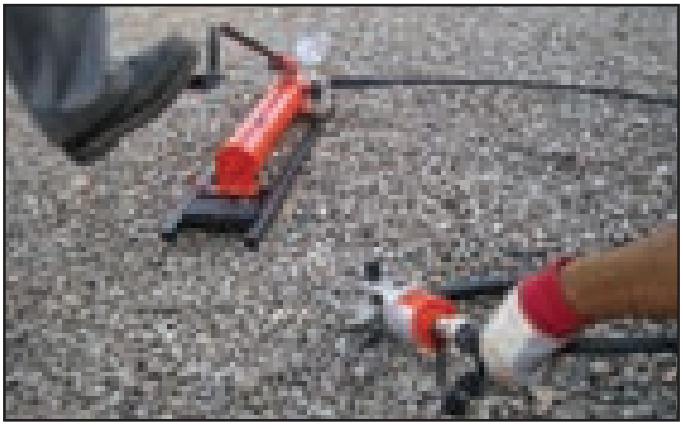
CRIMPERS AND CUTTERS

CRIMPING TOOLS - GENERAL INFORMATION

Hi-Force hydraulic cable crimping tools are designed and manufactured for crimping un-insulated compression and mechanical connectors, in copper and aluminum, to a wide range of electrical power cables including distribution and transmission lines. Offering a choice of self-contained operation, with inbuilt manually operated hydraulic pump mechanism, separate remote operation, crimping head for use with a separate hydraulic pump and hose assembly, or battery operated, which offers all the versatility of our self-contained, manually operated tools but with the added speed and ease of use associated with a battery powered tool.

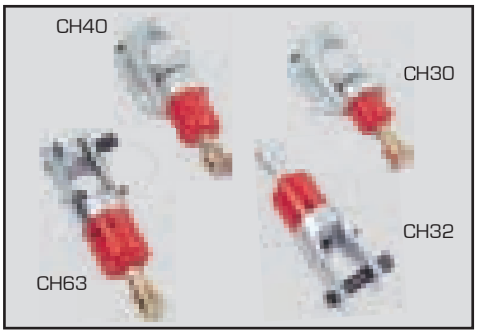
The Hi-Force hydraulic crimping tools range offers the most optimum choice to suit the widest range of electrical cable crimping applications. All models are designed and manufactured for use at 10000 PSI maximum working pressure, supplied complete with all applicable die sets in mm^2, compatible for use with the selected tool and include a handy carrying and storage case. Self-contained manually operated and battery powered crimper tools are fitted with an automatic pump pressure relief valve, which activates and releases the hydraulic pressure immediately once the compression (crimping) process has been successfully achieved. All remote operation crimper heads must be operated with a compatible Hi-Force 10000 PSI hydraulic pump unit, fitted with an inbuilt pump safety overload, pressure relief valve, 10000 PSI pressure gauge and 10000 PSI rated hydraulic hose assembly.

The metric die sets supplied with Hi-Force hydraulic crimpers are suitable for crimping non-insulated connectors and terminals to DIN standards only. The standard metric wire sizes do not correspond exactly to AWG/mcm standards. The illustration on the right provides a cross reference of closest equivalents of metric and AWG/mcm sizes.



mm^2	AWG/mcm
	2000
1000	
	1750
800	
	1500
630	1250
	1000
500	900
	800
400	
	750
	700
	600
300	
	500
240	400
185	350
150	300
	250
120	
	4/0
	3/0
95	
70	
	2/0
	1/0
50	1
35	
	2
25	
	4
16	
	6
10	
	8

CH - CABLE CRIMPING HEADS



Choice of 7 models available

Supplied complete with die sets

Working pressure 10000 PSI

The CH hydraulic cable crimping tool range offers 7 models with a choice of open "C" jaw or parallel guide design. All models are supplied complete with standard die sets and a carrying case. Models with 180° rotating head are designed for easy access into confined spaces. Suitable pump units include HP227FPC foot operated pump set which includes elbow fitting, gauge, gauge block, 10 feet hose and male coupler, as shown below. Standard hand operated pumps suitable for use with CH crimper heads can be found on pages 31-33. All models, excluding CH1000N, are available as a complete kit, comprising of HP227FPC, CSB1 metal storage case and selected crimping tool with die sets.

- Model CH21 is suitable for crimping non-insulated terminals up to 240mm²
- Models CH30, CH32 & CH40 are suitable for crimping connectors up to 400mm²
- Models CH63 & CH80 are suitable for crimping connectors up to 630mm²
- Model CH1000N is suitable for crimping distribution and transmission lines up to 1000mm²

See page 35 for manually operated foot pump unit complete with accessories.

For AWG/mcm sizes, refer to page 138.

Crimping tools complete with die set:

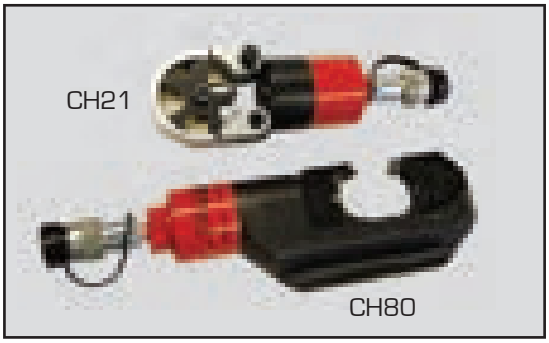
Model number	Output tons	C-Jaw opening	Applicable range DIN mm²		Standard dies mm²	Length inch	Weight lbs
CH21	11	not applicable	16-240	With die Female die	(4pcs) 16-25, 35-70, 70-185, 240 (1pc) 25-35, 50-70, 95-120, 150-185, 240	8.27	6.6
CH30	13	1.18"	35-400	With die	35, 50, 70, 95, 120, 150, 185, 240, 300, 400	8.67	8.8
CH32	20	not applicable	16-400	With die Female die	(4pcs) 16, 25-35, 50-120, 150-400 (8pcs) 16-25, 35-70, 95-120, 150, 185, 240, 300, 400	8.27	7.9
CH40	13	1.5"	35-400	With die	35, 50, 70, 95, 120, 150, 185, 240, 300, 400	9.65	10.6
CH63	20	not applicable	35-630	With die	35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630	9.46	10.6
CH80	16	1.97"	35-630	With die	35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630	11.82	15.4
CH1000N	66	not applicable	500-1000	With die	500, 630, 800, 1000	16.55	67.7

Complete set:

Model number	Description
CHP21	Comprehensive kit, comprising of crimper CH21, manual operated foot pump HP227FPC and steel box CSB1
CHP30	Comprehensive kit, comprising of crimper CH30, manual operated foot pump HP227FPC and steel box CSB1
CHP32	Comprehensive kit, comprising of crimper CH32, manual operated foot pump HP227FPC and steel box CSB1
CHP40	Comprehensive kit, comprising of crimper CH40, manual operated foot pump HP227FPC and steel box CSB1
CHP63	Comprehensive kit, comprising of crimper CH63, manual operated foot pump HP227FPC and steel box CSB1
CHP80	Comprehensive kit, comprising of crimper CH80, manual operated foot pump HP227FPC and steel box CSB1

Note : Models CH21 & CH32 supplied with single indent dies, all other models supplied with hexagon dies.

CH - CABLE CRIMPING HEADS

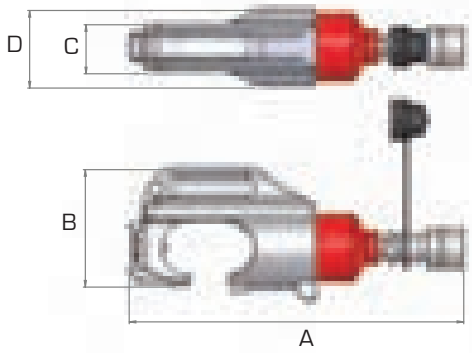


All fitted with standard quick connect coupler

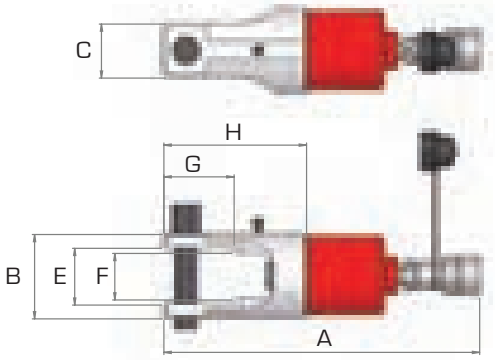
Choice of 'C' jaw or parallel guide design

Designed for easy access in confined spaces

CH30/CH40/CH80



CH32/CH63



Model number	Dimensions in inches							
	A	B	C	D	E	F	G	H
CH21	10.95	3.47	1.10	-	-	-	-	-
CH30	11.58	4.14	1.69	2.68	-	-	-	-
CH32	11.19	3.07	1.97	-	2.09	1.69	2.48	3.78
CH40	12.84	4.45	1.69	2.92	-	-	-	-
CH63	12.57	3.07	1.97	-	1.93	-	6.42	-
CH80	14.58	4.18	2.48	-	-	-	-	-
CH1000N	15.56	8.27	3.55	-	3.23	-	9.26	-

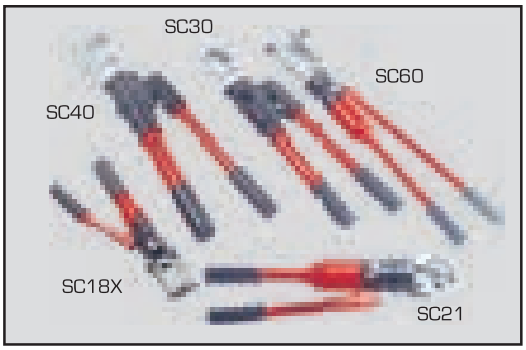
Note : CH21 and CH1000N dimensional drawings are not shown.

OPTIONAL DIE SETS

In addition to the standard die sets, which are supplied with each of the crimping tools as specified on the previous page, optional die sets are available as per the below table.

Model number	Description
CD10	Die set 10mm^2 , suitable for crimping tool CH30, CH40 & CH63
CD16	Die set 16mm^2 , suitable for crimping tool CH30, CH40 & CH63
CD25	Die set 25mm^2 , suitable for crimping tool CH30, CH40 & CH63

SC - SELF-CONTAINED CABLE CRIMPING TOOLS



Choice of 6 models available

Supplied complete with die sets

Automatic pressure release valve

The SC self-contained hydraulic cable crimping tool range offers 6 models with a choice of open "C" jaw or parallel guide design. All models are fitted with an automatic pressure release valve and are supplied complete with standard die sets and a carrying case. Models with 180° rotating head are designed for easy access into confined spaces.

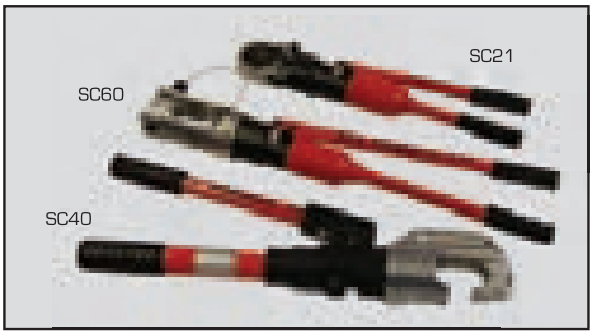
- Model SC21 is suitable for crimping connectors up to 240mm²
- Models SC30, SC32 & SC40 are suitable for crimping connectors up to 400mm²
- Model SC60 is suitable for crimping non-insulated terminals up to 630mm²
- Model SC18X is suitable for crimping non-insulated terminals up to 185mm²

For AWG/mcm sizes, refer to page 138.

Model number	Output tons	C - Jaw opening	Applicable range DIN mm²	Standard dies mm²	Length inch	Weight lbs
SC21	11	not applicable	25-240	With die (4pcs) 16-25, 35-70, 70-185, 240 Female die (1pc) 25-35, 50-70, 95-120, 150-185, 240	20.80	11.5
SC30	13	1.18"	35-400	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400	24.03	13.9
SC32	20	not applicable	16-400	With die (4pcs) 16, 25-35, 50-120, 150-400 Female die (8pcs) 16-25, 35-70, 95-120, 150, 185, 240, 300, 400	25.61	13.7
SC40	13	1.5"	35-400	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400	25.06	17.0
SC60	20	not applicable	35-630	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630	25.61	14.3
SC18X	7	not applicable	10-185	With die 10-16, 25-35, 50-70, 95-120, 150, 185	14.58	4.4

Note : Models SC21 & SC32 are supplied with single indent dies, all other models are supplied with hexagonal dies.

SC - SELF-CONTAINED CABLE CRIMPING TOOLS

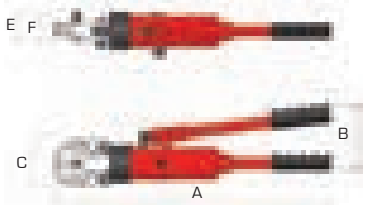


Supplied in handy carrying & storage case

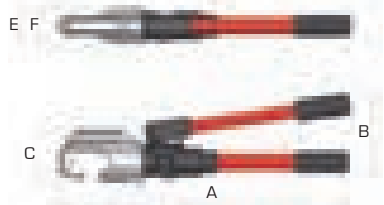
Easy to operate, self-contained design

Choice of open 'C' jaw or parallel guide design

SC21

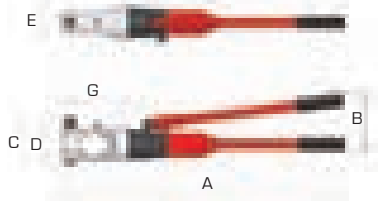


SC40

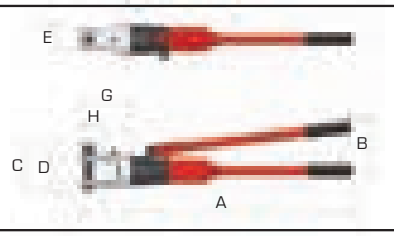


SC30

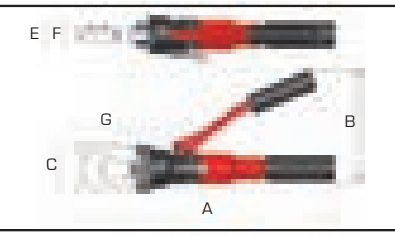
SC60



SC32



SC18X



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Model number	Dimensions in inches A	B	C	D	E	F	G	H
SC21	20.49	4.81	3.39	-	2.25	1.06	-	-
SC30	23.72	6.54	4.57	-	2.68	1.69	-	-
SC32	26.79	5.40	4.57	2.05	1.97	-	5.04	2.48
SC40	24.82	6.54	4.45	-	2.92	1.89	-	-
SC60	27.19	5.52	4.57	2.05	1.97	-	6.42	-
SC18X	14.97	5.59	2.76	-	0.83	0.63	3.39	-

OPTIONAL DIE SETS

In addition to the standard die sets, which are supplied with each of the crimping tools as specified on the previous page, optional die sets are available as per the below table.

Model number	Description
CD10	Die set 10mm^2 , suitable for crimping tool SC30, SC40 & SC60
CD16	Die set 16mm^2 , suitable for crimping tool SC30, SC40 & SC60
CD25	Die set 25mm^2 , suitable for crimping tool SC30, SC40 & SC60

BC - BATTERY OPERATED CABLE CRIMPING TOOLS


BC30-A

Supplied complete with standard set of dies

Battery power warning light

Efficient and quick battery recharger

The BC range of battery powered crimping tools consists of 4 models with a choice of 'C' jaw or parallel guide design that incorporates a 360° swivel head.

The range offers all the versatility of the manually operated CH and SC range but with the added speed and ease of use associated with a battery powered tool. All models are supplied with battery, battery charger, shoulder strap and tool box storage case.

Model number	Output tons	C - Jaw opening	Applicable range DIN mm²	Standard dies mm²	Dimensions in inches A	B	C	Weight lbs
BC18X-A	8	not applicable	10-185	With die 10-16, 25-35, 50-70, 95-120, 150, 185	14.58	11.03	2.76	8.4
BC30-A	13	1.18"	35-400	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400	15.76	11.03	2.76	13.0
BC40-A	13	1.50"	35-400	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400	16.94	10.64	2.76	15.9
BC63-A	20	not applicable	35-630	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630	16.55	12.61	2.96	15.2

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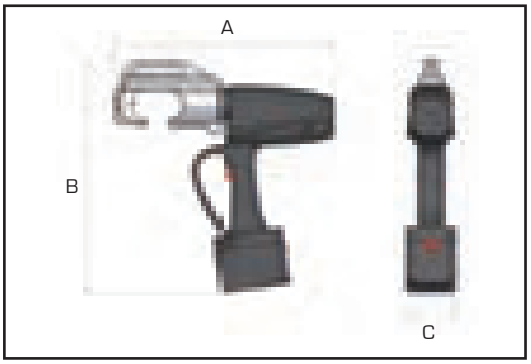
OPTIONAL DIE SETS

In addition to the standard die sets, which are supplied with each of the crimping tools as specified, optional dies sets are available as per the below table.

Model Number	Description
CD10	Die set 10mm² , suitable for crimping tool BC30-A, BC40-A & BC63-A
CD16	Die set 16mm² , suitable for crimping tool BC30-A, BC40-A & BC63-A
CD25	Die set 25mm² , suitable for crimping tool BC30-A, BC40-A & BC63-A

For AWG/mcm sizes, refer to page 138.



BC - ACCESSORIES

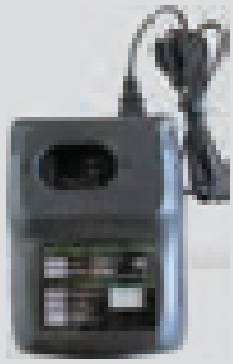
BP12

Model number	Description
BP12	Battery Pack 14.4V
	Note: Charger supplied separately

CCU144

Model number	Description
CCU144	Car cigarette lighter charger unit

CU12



Model number	Description
CU12	Charger 110V - 230V

MP220

Model number	Description
	Power supply to operate unit directly from mains
MP110	110V
MP220	220/230V

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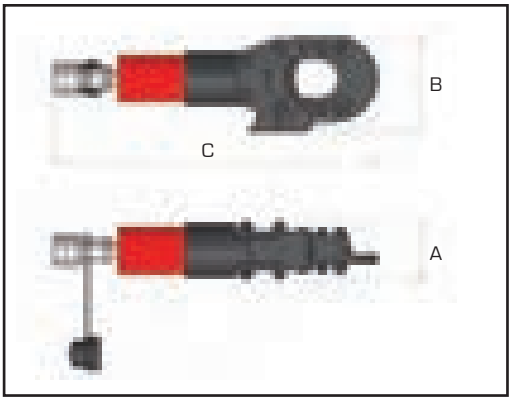
HCH - HYDRAULIC CUTTER HEADS

HCH40

Cutting capacity up to 4.73 inches diameter

Working pressure 10000 PSI

Compact and lightweight



Model number	Cutting force tons	Weight lbs	Dimensions in inches A	B	C
HCH40	8	6.2	2.44	3.98	9.73
HCH120	14	32.0	3.00	9.85	23.64

Material	Description	Maximum diameter cutting capacity in inches HCH40	HCH120
Steel Wire Rope	6x7 Hempcore	0.79	1.18
	6x12 Hempcore	1.00	1.42
	6x19 Hempcore	1.00	1.42
Round Bar	Soft copper bar	1.00	1.58
	Soft aluminum bar	0.87	1.58
	Soft steel bar	0.63	-
Wire Strands	Bare copper strands	1.26	1.97
	Bare aluminum strands	1.26	1.97
Cable	Telephone cable CCP	1.58	4.73
	Lead sheathed telephone cable	1.58	4.73
	Armored underground cable	1.58	4.73

Replacement blades for HCH hydraulic cutter models :

Blade Part number	Blade type	For Cutter
CT40-11	Moving	HCH40
CT40-05	Static	HCH40
HCH120-01	Moving	HCH120
HCH120-02	Static	HCH120

Did you know .....

HCH cutters can be operated with battery powered pumps. For more details, see page 37 of this catalog.

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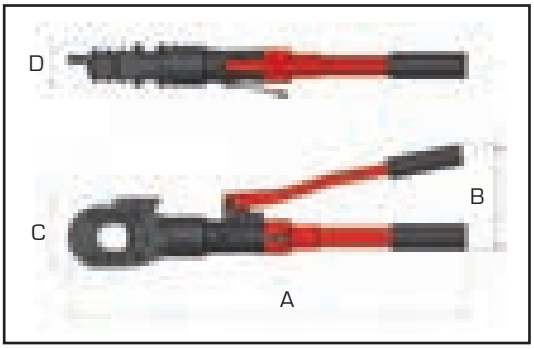
CT - SELF-CONTAINED HYDRAULIC CUTTERS

- Cutting capacity up to 1.58 inches diameter
- Cuts a wide variety of materials
- Self-contained operation

The CT self-contained hydraulic cutter range offers a choice of 2 models with cutting capacities up to 1 inch steel wire rope and 1.58 inches cable. These versatile cutters are suitable for cutting wire rope, round bar, wire strands and electrical cable.



Model number	Cutting force tons	Weight lbs	Dimensions in inches A	B	C	D
CT20	7	2.8	15.37	5.71	3.00	1.58
CT40	8	6.0	22.06	6.11	4.06	2.56

Material	Description	Maximum diameter cutting capacity in inches CT20	CT40
Steel Wire Rope	6x7 Hempcore	0.63	0.79
	6x12 Hempcore	0.79	1.00
	6x19 Hempcore	0.79	1.00
Round Bar	Soft copper bar	0.79	1.00
	Soft aluminum bar	0.79	0.87
	Soft steel bar	0.63	0.63
Wire Strands	Bare copper strands	0.79	1.26
	Bare aluminum strands	0.79	1.26
Cable	Telephone cable CCP	0.79	1.58
	Lead sheathed telephone cable	0.79	1.58
	Armored underground cable	0.79	1.58

Replacement blades for CT self-contained cutter models :

Blade Part number	Blade type	For Cutter
CT20-04	Moving	CT20
CT20-05	Static	CT20
CT40-11	Moving	CT40
CT40-05	Static	CT40

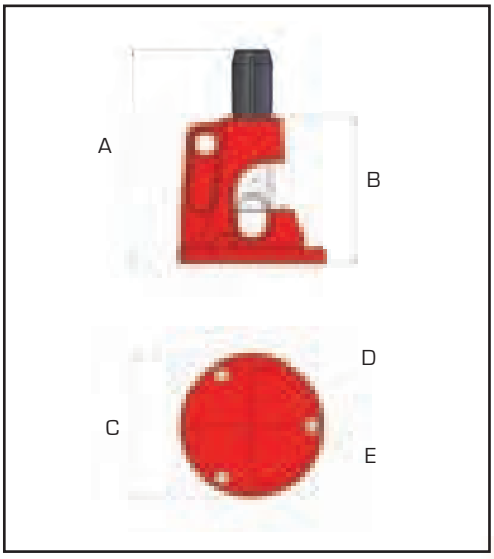
Comprehensive service kits are also available for CT self-contained cutters.

For more information, visit our website www.hi-force.com or contact your regional Hi-Force office.

HWC - HAMMER BLOW WIRE ROPE AND CABLE CUTTERS

- Highly cost efficient impact design
- Cutting capacity up to 1.5 inches diameter wire rope
- Portable and lightweight

The Hi-Force HWC range of highly cost effective hammer blow cutters is manufactured from high quality, shock resistant, ductile iron and is fitted with replaceable cutting blades made from tool steel. The cutting blades are retained in the housing at the moment of impact, ensuring absolute safety. These cutters offer a considerable time saving over conventional axe, chisel and hacksaw methods.



Model number	Cutting capacity Wire rope Ø inch	Electric cable mcm*	Electric cable mm^2	Weight lbs
HWC90	0.75	250	127	7.1
HWC91	1.06	300	152	15.4
HWC92	1.50	750	380	28.7

*mcm = 1,000 circular mils

Dimensions in inches A	B	C	D	E
8.87	5.52	3.47	N/A	N/A
9.65	6.07	6.30	5.83	0.55
11.23	7.68	7.68	6.46	0.71

Replacement blades for HWC hammer blow wire rope and cable cutters :

Blade Part number	For Cutter
HWC90-105	HWC90
HWC91-125	HWC91
HWC92-135	HWC92

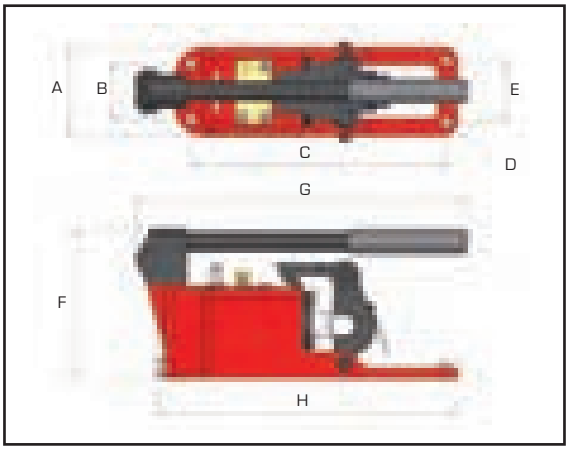
HSWC - SELF-CONTAINED HYDRAULIC WIRE ROPE CUTTERS


HSWC44

- Cutting capacities up to 1.73 inches diameter
- Strong rigid steel construction
- Easy to use with minimum operator effort

The Hi-Force range of self-contained portable hydraulic wire rope and cable cutters comprises of 3 models with cutting capacities up to 1.73 inches diameter. Approved and specified by many major industries throughout the world, these high quality cutters are precision engineered to give a good, clean cut with minimum effort, time after time. The self-contained design of the cutter enables easy transportation to the job site with minimum of fuss.

The shear blades are manufactured using high quality tool steel, which is heat treated and ground to very tight tolerances, ensuring superior performance and long-life. Users include wire rope manufacturers, earthmoving and construction contractors, rigging shops, elevator manufacturers and repairers and many others.



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Model number	Cutting capacity wire rope inch Ø	Weight lbs
HSWC19	0.75	20.9
HSWC28	1.10	34.2
HSWC44	1.73	66.1

Dimensions in inches							
A	B	C	D	E	F	G	H
3.66	2.29	10.44	0.40	2.52	6.07	13.59	12.41
4.14	2.52	11.58	0.40	2.64	6.86	14.74	14.07
4.93	2.76	15.48	0.40	3.31	8.00	19.31	18.12

Replacement blades for HSWC self-contained wire rope cutters :

Blade Part number	For Cutter
HSWC19-4	HSWC19
HSWC28-4	HSWC28
HSWC44-4	HSWC44

HWRC - DOUBLE ACTING WIRE ROPE CUTTERS

- Working pressure 10000 PSI
- Double acting design
- Smooth guillotine cutting action

The HWRC range of hydraulic cutters is specifically designed and manufactured for cutting high tensile locked coil wire rope and solid steel bar. Maximum cutting capacities up to 4.49 inches diameter wire rope and up to 1.58 inches diameter 31 tons tensile solid steel bar. All models incorporate a double acting hydraulic cylinder, suitable for working pressures up to 10000 PSI and an open jaw design cutting head (see pictures below) for easy access to the material to be cut. Cutting blades and jaws are manufactured from specially toughened high tensile steel and the smooth guillotine action of the cutter greatly reduces the risk of blade jamming.

Step 1:

To open the cutter, swivel cutting head forward.

Step 2:

Position material to be cut in the cutting head slot.

Step 3:

Close the cutting head by swivelling it back to its original position and secure behind the latch.

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Model number	Output tons	Cutting capacity in inches: Wire rope inch Ø	Cutting capacity in inches: Cable	Cutting capacity in inches: Reinforcing Bar	Oil capacity inch^3	Weight lbs	Dimensions in inches: Length	Dimensions in inches: Width	Dimensions in inches: Height
HWRC1115	40	1.50	1.50	0.79	21.35	66.1	15.76	6.11	10.64
HWRC1125	88	2.48	2.48	1.26	54.90	132.3	17.73	7.88	15.37
HWRC1136	88	3.55	3.55	1.26	73.23	154.3	20.29	7.88	15.37
HWRC1145	132	4.49	4.49	1.58	146.46	209.4	22.46	11.03	17.53

Replacement blades for HWRC wire rope cutter models :

Blade Part number	For Cutter
HWRC1115-B	HWRC1115
HWRC1125-B	HWRC1125
HWRC1136-B	HWRC1136
HWRC1145-B	HWRC1145

Hand and powered pumps suitable for use with HWRC cutters are detailed on pages 29 to 50.

HCC - CHAIN CUTTERS

HCC34-100

Working pressure 10000 PSI

Single acting design

Fitted with locking guard

The HCC range of hydraulic cutters is specifically designed and manufactured for cutting high tensile chain and reinforcing bar. The easily replaceable cutter blades are manufactured from specially toughened high tensile steel and the choice of models available offer maximum cutting capacities up to 1.97 inches diameter. All models are suitable for working pressures up to 10000 PSI and incorporate a single acting cylinder fitted with a powerful piston retraction spring. The swivel action design of the locking safety guard (see pictures below) allows easy access for the material to be cut.

Model number	Cutting capacity inch Ø	Cutting force tons	Max. allowed chain grade	Max. allowed steel hardness	Oil capacity inch³	Weight lbs	Dimensions in inches Length	Width	Height
HCC26-100	1.02	77	100	47 HRC	16.84	50.7	17.34	7.09	7.09
HCC34-100	1.34	110	100	47 HRC	30.01	88.2	16.15	18.12	9.85
HCC46-100	1.81	154	100	47 HRC	59.78	158.7	22.26	25.02	13.59
HCC50-100	1.97	165	100	47 HRC	67.10	169.8	22.26	25.02	14.18

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Replacement blades for HCC chain cutter models :

Blade Part number	Blade type	For Cutter
HCC26-4M100	Moving	HCC26-100
HCC26-4S100	Static	HCC26-100
HCC34-5M100	Moving	HCC34-100
HCC34-5S100	Static	HCC34-100
HCC46-11M100	Moving	HCC46-100
HCC46-11S100	Static	HCC46-100
HCC50-17M100	Moving	HCC50-100
HCC50-17S100	Static	HCC50-100

Picture 1:

Cutter shown with swivel action safety guard opened.

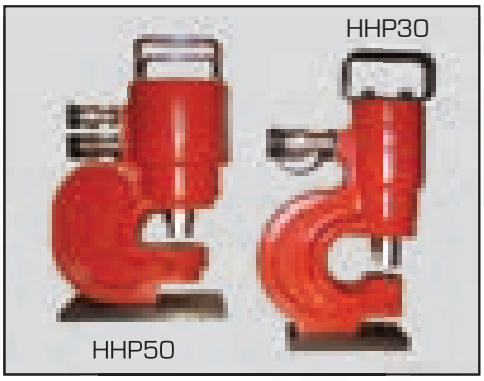
Picture 2:

Cutter shown with swivel action safety guard closed.

Hand and powered pumps suitable for HCC cutters are detailed on pages 29 to 50.

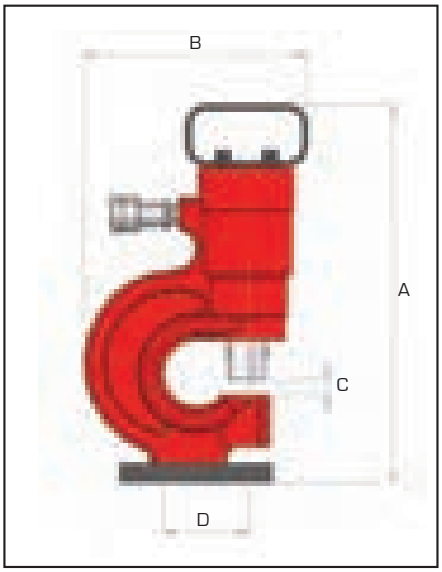
TOOLS

HHP - HOLE PUNCHERS



- Punching force up to 55 tons
- Throat depth 2.76 inches
- Working pressure 10000 PSI

The Hi-Force HHP series hydraulic hole puncher range offers a choice of two models comprising of the HHP30, 33 tons capacity single acting version, and the HHP50, 55 tons capacity double acting version. Both models are suitable for punching holes in steel plate as per the respective capacity of each model and are supplied complete with standard punch and die sets and an integral positioning and carrying handle. See pages 29-50 for detailed information of suitable pumps for use with HHP series punchers.



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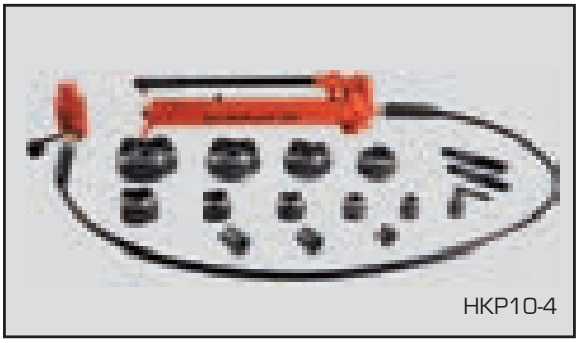
Model number	Maximum force tons	Throat depth inch	Punch capacity (inch) Steel plate	Hole punch diameter	Standard punch/die sets included inch	Recommended pump & hose Manually operated	Pneumatically operated	Weight excl. pump lbs
HHP30	33	2.76	0.39	up to 0.81	7/16", 1/2" 11/16", 13/16"	HP232 complete with HC3 10 feet hose	AHP1120 complete with HC3 10 feet hose	43.7
HHP50	55	2.76	0.59	up to 1.00	7/16", 1/2" 11/16", 13/16", 1"	HP232D c/w 2 x HC3	AHP1141 c/w 2 x HC3	92.6

Note: pump supplied separately

Model number	Dimensions in inches A	B	C	D
HHP30	14.58	8.67	0.51	3.07
HHP50	16.29	11.07	0.59	2.78

The HHP30 is single acting operation, the HHP50 is double acting operation

HKP & SKP - KNOCK OUT PUNCHERS

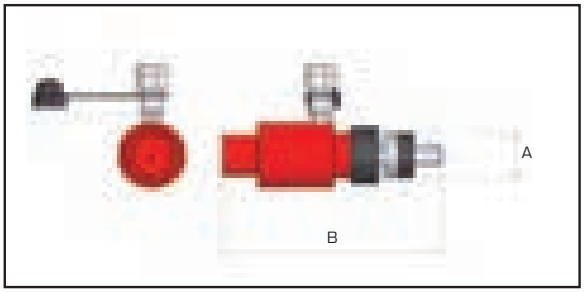


HKP10-4

- Capacity up to 11 tons
- Spring return hydraulic cylinder
- Working pressure 10000 PSI

The Hi–Force HKP and SKP knock out puncher range is supplied as a complete set, including all standard sizes of punches/dies as specified below. Ideal for on-site hole punching in electric control panels and metal plates.

Model number	Maximum force tons	Plate capacity (inch) Stainless steel	Plate capacity (inch) Mild steel	Pump Included	Hose Included	Complete set weight lbs
HKP10-2	11	0.06	0.13	HP110	HC2	32.2
HKP10-4	11	0.06	0.13	HP110	HC2	57.5
HKP10-2H	11	0.06	0.13	Not included	Not included	15.4
HKP10-4H	11	0.06	0.13	Not included	Not included	40.8
SKP7	8	0.06	0.13	Self contained unit with integral pump		22.0



Did you know.....

Hi-Force knock-out punchers are supplied complete with a carrying case.

SKP7

Model number	Description	Punches/dies included									
HKP10-2	Std.punch/die A	0.86	1.09	1.34	1.68	1.92	2.38				
	Conduit Size	½"	¾"	1"	1¼"	1½"	2"				
	Length B	12.06	9.46	9.46	9.46	9.46	9.46				
HKP10-4	Std.punch/die A	0.86	1.09	1.34	1.68	1.92	2.38	3.00	3.50	4.05	4.55
	Conduit Size	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"
	Length B	12.06	9.46	9.46	9.46	9.46	9.46	9.97	9.97	9.97	9.97
SKP7	Std.punch/die A	0.86	1.09	1.34	1.68	1.92	2.38				
	Conduit Size	½"	¾"	1"	1¼"	1½"	2"				
	Length B	12.06	9.46	9.46	9.46	9.46	9.46				

NS - NUT SPLITTERS

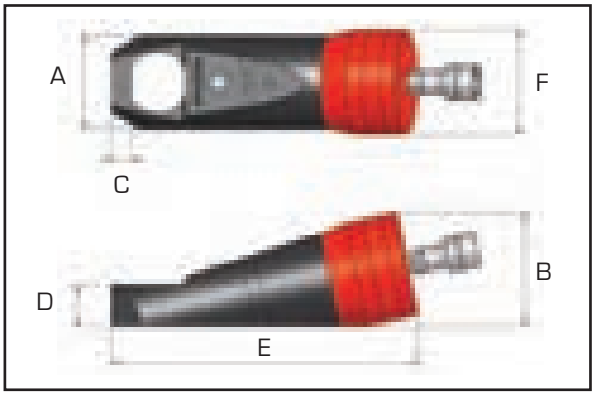
Capacities from 11/16" to 2 15/16" AF

Working pressure 10000 PSI

Compact & easy to use

The improved NS range of hydraulic nut splitters offers a choice of 5 models suitable for hexagon nut AF sizes from 11/16" to 2 15/16" (1/2" to 1 7/8" bolt sizes). The revolutionary design incorporates a hardened steel linkage that ensures the blade cutting edge is kept parallel to the nut throughout the splitting process which improves operational efficiency and more importantly, blade life. Designed to easily split corroded nuts up to RC44 hardness, Hi-Force nut splitters offer the ideal 'cold cut' solution for removing worn or corroded fasteners, especially in applications where 'hot work' permits are not allowed. Optional unique 360° positional swivel coupling for easy adjustment and fitment in confined spaces is available for use with models NS104 and NS110. Suitable pumps are detailed on pages 29 to 50.

- Angled body design on all models
- Provides necessary clearance on flanges and flat surfaces
- Manufactured from high quality steel



Model number	Hexagon AF sizes inch	mm	Stud Bolt thread sizes imperial	metric	Weight lbs
NS104	11/16" - 1 1/4"	17 - 32	1/2" - 3/4"	M10 - M22	8.8
NS110	1 1/4" - 1 5/8"	32 - 41	3/4" - 1"	M22 - M27	16.3
NS200	1 5/8" - 2"	41 - 50	1" - 1 1/4"	M27 - M33	23.4
NS206	2" - 2 3/8"	50 - 60	1 1/4" - 1 1/2"	M33 - M39	34.8
NS215	2 3/8" - 2 15/16"	60 - 75	1 1/2" - 1 7/8"	M39 - M48	86.6

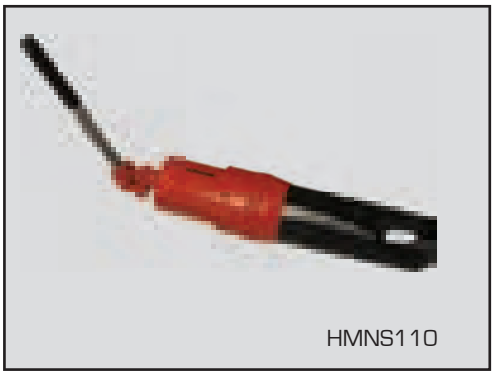
Dimensions in inches					
A	B	C	D	E	F
2.52	3.03	0.49	1.18	8.27	2.64
3.07	3.78	0.79	1.46	11.27	2.68
3.78	4.57	0.83	1.69	12.41	4.26
4.53	5.44	0.95	2.05	13.24	4.96
6.15	6.90	1.06	2.96	16.78	6.38

Note: The NS nut splitters are for use on heavy duty nuts, where the nut height is equal to or greater than two-thirds of the blade length of the tool being used.

Replacement blades for NS nut splitters :

Blade Part number	For Nut splitter
NS104-B	NS104
NS110-B	NS110
NS200-B	NS200
NS206-B	NS206
NS215-B	NS215

HMNS - SELF CONTAINED NUT SPLITTERS


HMNS110

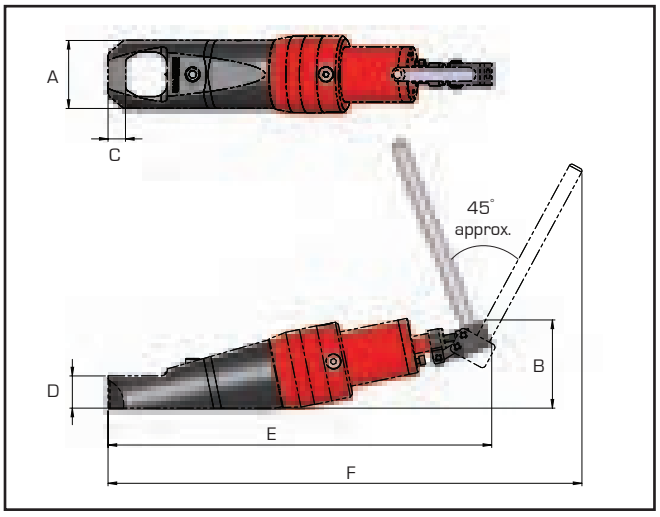
Capacities from 11/16" to 2" AF

Choice of 3 models

Compact & easy to use

The HMNS range of hydraulic nut splitters offers a choice of 3 models suitable for hexagon nut AF sizes from 11/16" to 2" (1/2" to 1 1/4" bolt sizes). All models have an angled body design to provide the necessary clearance on flanges and flat surfaces. The revolutionary design incorporates a hardened steel linkage that ensures the blades cutting edge is kept parallel to the nut throughout the splitting process which improves operational efficiency and more importantly, blade life. Designed to easily split corroded nuts up to RC44 hardness, Hi-Force nut splitters offer the ideal 'cold cut' solution for removing worn or corroded fasteners, especially in applications where 'hot work' permits are not allowed. All models incorporate an integral hydraulic pump with multi-positional lever for even greater versatility.

- Angled body design on all models
- Provides necessary clearance on flanges and flat surfaces
- Manufactured from high quality steel



Model number	Hexagon AF sizes inch	Hexagon AF sizes mm	Stud Bolt thread sizes imperial	Stud Bolt thread sizes metric	Weight lbs
HMNS104	11/16" - 1 1/4"	17 - 32	1/2" - 3/4"	M10 - M22	12.8
HMNS110	1 1/4" - 1 5/8"	32 - 41	3/4" - 1"	M22 - M27	17.4
HMNS200	1 5/8" - 2"	41 - 50	1" - 1 1/4"	M27 - M33	30.0

Dimensions in inches					
A	B	C	D	E	F
2.52	3.47	0.49	1.18	14.97	17.93
3.07	3.98	0.79	1.46	17.34	21.28
3.70	4.41	0.83	1.69	18.56	22.30

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Note: The HMNS nut splitters are for use on heavy duty nuts, where the nut height is equal to or greater than two-thirds of the blade length of the tool being used.

Replacement blades for HMNS nut splitters :

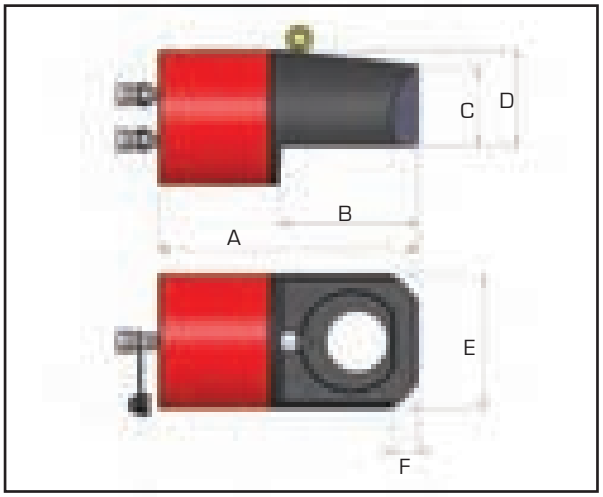
Blade Part number	For Nut splitter
NS104-B	HMNS104
NS110-B	HMNS110
NS200-B	HMNS200

DNS - DOUBLE ACTING NUT SPLITTERS

DNS506

- Choice of 2 models
- Working pressure 10000 PSI
- Double acting design

The Hi-Force DNS range of double acting, hydraulic nut splitters offers a choice of 2 models suitable for splitting nuts of across flats (AF) sizes from 2 15/16" to 5 3/8" (75mm to 136mm). Both models are 10000 PSI maximum working pressure and feature a double acting hydraulic piston for easy extension and retraction of the toughened steel splitting blade. Hi-Force DNS range hydraulic nut splitters are easy to set up and capable of safely splitting nuts quickly without any sparks, flames or flying debris usually associated with cutting torches. The DNS range nut splitter heads are designed to fit on all API and ANSI flanges and capable of splitting the hardest nuts with minimal damage to the stud bolt threads. Splitting blades are easy to remove and re-install after re-sharpening or when a replacement blade is required.



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Model number	Hexagon AF sizes inch	Hexagon AF sizes mm	Stud bolt thread sizes imperial	Stud bolt thread sizes metric	Weight lbs	Dimensions in inches A	B	C	D	E	F
DNS404	2 15/16" - 4 1/4"	75 - 105	1 7/8" - 2 3/4"	M48 - M72	110.2	14.95	7.56	3.92	5.14	7.21	1.34
DNS506	4 1/4" - 5 3/8"	105 - 136	2 3/4" - 3 1/2"	M72 - M95	211.6	17.77	9.46	5.52	6.60	9.26	1.62

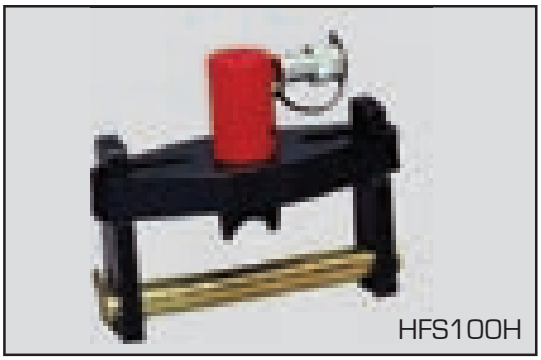
Note: The DNS nut splitters are for use on heavy duty nuts, where the nut height is equal to or greater than two-thirds of the blade length of the tool being used.

Replacement blades for DNS nut splitters :

Blade Part number	For Nut splitter
DNS404-B	DNS404
DNS506-B	DNS506

Hand and powered pumps suitable for use with DNS nut splitters are detailed on pages 29 to 50.

HFS-H - HYDRAULIC FLANGE SPREADERS


HFS100H

Capacities from 5 to 11 tons

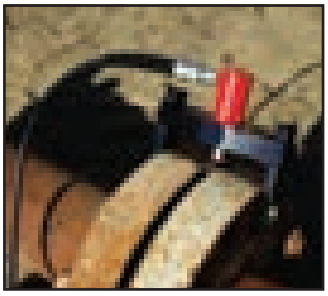
Working pressure 10000 PSI

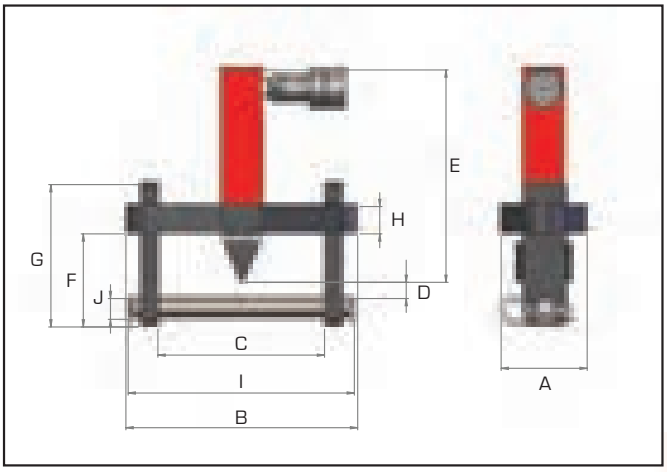
Quick and easy to assemble on flange

HFS-H hydraulic flange spreaders provide the ideal solution for safely opening pipe flanges in the marine and oil & gas industry. Available in capacities from 0 - 5 tons and 0 - 11 tons, these models offer the user the capability of opening flanges up to 2 x 2 1/4" or 2 x 3 5/8" thick respectively. Hi-Force flange spreaders can be operated individually, or as a pair when opening large flanges using a standard pump (see pages 31 to 33) and connecting hose (see page 52). With Hi-Force flange spreaders you are only minutes away from safely opening the toughest flanges without the risk of sparks caused by hammer blows, chisels and flying wedges.

›› Suitable for fitment onto flanges with a maximum stud bolt size of 1 5/8" (41 mm)

Pump and hose not included!
See page 158 for complete kits.





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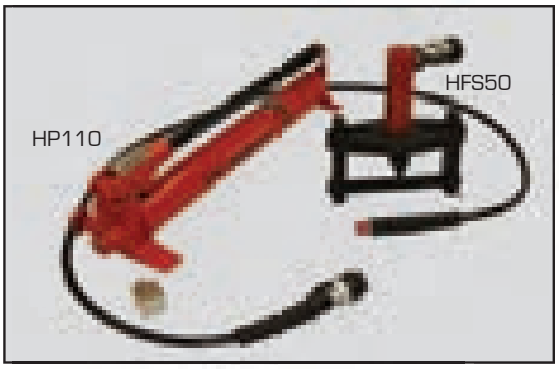
Model number	Capacity tons	Stroke inch	Oil capacity inch³	Max. flange thickness inch	Stud size inch	Standard wedge inch	Weight lbs
HFS50H	5	2.96	2.93	2 x 2 1/4"	3/4" - 1 1/8"	1/8" - 1 1/8"	11.0
HFS100H	11	2.21	4.94	2 x 3 5/8"	1 1/4" - 1 5/8"	1/8" - 1 1/8"	25.6

	Dimensions in inches										
Model number	A	B	C min	C max	D	E	F	G	H	I	J
HFS50H	3.00	8.27	2.40	6.11	0.39	7.56	2.72	5.08	1.00	8.12	0.71
HFS100H	4.26	11.43	2.40	8.83	1.18	6.50	3.51	7.01	1.50	10.76	1.22

HFS & HFS-TK - HYDRAULIC FLANGE SPREADER KITS



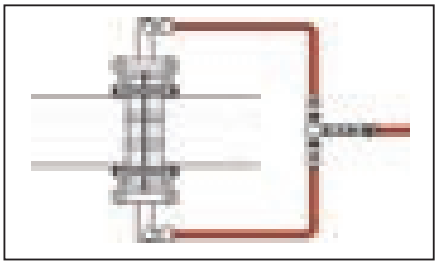
Capacities from 5 to 11 tons

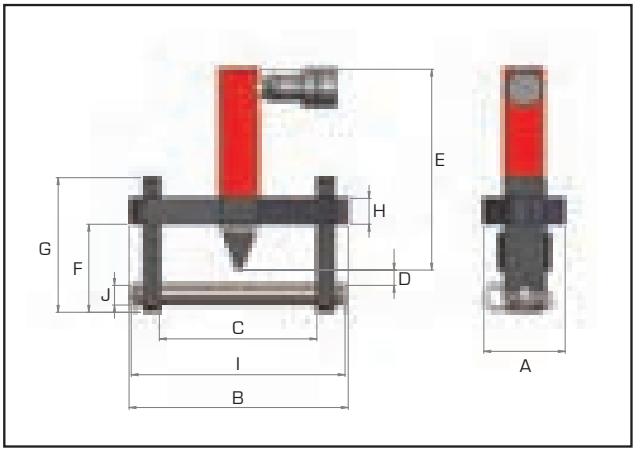
Working pressure 10000 PSI

Complete with manual pump

HFS and HFS-TK hydraulic flange spreader kits offer a choice of either single spreader complete with pump and accessories (HFS) or a twin spreader arrangement incorporating two flange spreaders operated from a single pump with a T-piece and twin hose connection (HFS-TK). For flange separation in applications where long lengths of heavy pipe work are involved, the HFS-TK twin spreader kit enables the operator to achieve parallel flange separation all around the joint. Hi-Force HP110 hand pump is supplied as standard to HFS & HFS-TK flange spreader kits and details can be found on page 31 of this catalog.

- Supplied complete with manually operated pump and hose assembly
- Suitable for fitment onto flanges with a maximum stud bolt size of 1 5/8" (41 mm)





Specifications :

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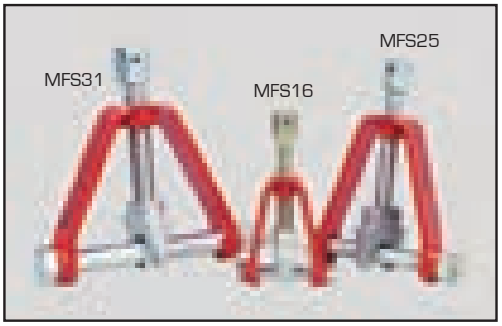
Model number	Capacity tons	Stroke inch	Oil capacity inch³	Max. flange thickness inch	Stud size inch	Standard wedge inch	Weight lbs
HFS50	5	2.96	2.93	2 x 2 1/4"	3/4" - 1 1/8"	1/8" - 1 1/8"	49.6
HFS100	11	2.21	4.94	2 x 3 5/8"	1 1/4" - 1 5/8"	1/8" - 1 1/8"	64.2
HFS50-TK	2 x 5	2.96	2 x 2.93	2 x 2 1/4"	3/4" - 1 1/8"	1/8" - 1 1/8"	60.6
HFS100-TK	2 x 11	2.21	2 x 4.94	2 x 3 5/8"	1 1/4" - 1 5/8"	1/8" - 1 1/8"	78.7

Dimensions in inches :

Model number	A	B	C min	C max	D	E	F	G	H	I	J
HFS-50	3.00	8.27	2.40	6.11	0.39	7.56	2.72	5.08	1.00	8.12	0.71
HFS-100	4.26	11.43	2.40	8.83	1.18	6.50	3.51	7.01	1.50	10.76	1.22
HFS50-TK	3.00	8.27	2.40	6.11	0.39	7.56	2.72	5.08	1.00	8.12	0.71
HFS100-TK	4.26	11.43	2.40	8.83	1.18	6.50	3.51	7.01	1.50	10.76	1.22

MFS - MECHANICAL FLANGE SPREADERS

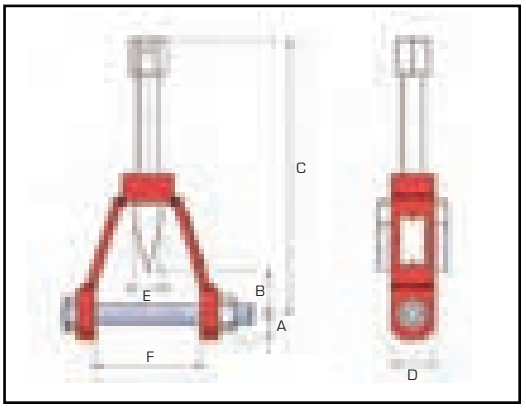


Suitable for bolt diameters up to 1¼"

Maximum spread 9.1 inches

No external power source required

The MFS range of mechanical flange spreaders comprises of 6 models, each offering a safe and economical way to open flanges without the risk of sparks. The threaded spindle can be operated using a standard spanner, allowing the user to apply a controlled force without damaging the flange. Due to the mechanical design of these flange spreaders, no external power source is needed and therefore, they can be used anywhere on-site.



- Choice of six models available
- High grade steel construction with high tensile cross bolt
- Case hardened spreading wedge

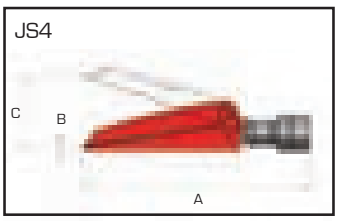
Model number	Pin diameter inch	Pin diameter mm	Min flange bolt hole diameter	Maximum flange thickness inch	Maximum flange thickness mm	Weight lbs	Dimensions in inches A	B max	C min	C max	D	E	F
MFS16	5/8"	16	11/16"	2 x 7/8"	2 x 22	4.9	1.00	1.10	7.29	9.14	1.58	1.00	2.76
MFS19	3/4"	19	13/16"	2 x 1 3/8"	2 x 35	6.0	1.18	1.97	7.29	10.01	1.97	1.00	3.74
MFS22	7/8"	22	15/16"	2 x 1 13/16"	2 x 47	9.0	1.18	1.97	9.73	12.53	1.97	1.18	4.89
MFS25	1"	25	1"	2 x 2 7/16"	2 x 62	14.1	1.18	3.35	9.73	13.91	1.97	1.18	6.11
MFS28	1 1/8"	28	1 1/8"	2 x 2 3/4"	2 x 70	18.1	1.18	3.15	10.84	15.05	2.36	1.58	7.13
MFS31	1 1/4"	31	1 1/4"	2 x 3 3/4"	2 x 95	21.2	1.26	3.31	10.84	15.17	2.36	1.58	9.10

JS - JAW SPREADER

The JS4 hydraulic spreader is the ideal solution for spreading, wedging and prising operations in a wide variety of industrial applications. The compact, low weight, spring assisted return design enables the tool to fit into a gap of 0.47 inches and offers a maximum spread of 3.19 inches. Manufactured from high strength steel, with a maximum pressure of 10000 PSI, the JS4 is supplied fitted with a quick connect female half coupler, and can be used with HP110 manual hand pump and HC hose.

Model number	Capacity tons	Oil capacity inch³	Weight lbs
JS4	1	0.61	4.9

Dimensions in inches A	B	C
9.06	0.47	3.19



SJS - STEPPED JAW SPREADERS

SJS10-TK

Capacity 14 tons per spreader unit

Supplied with safety block & stepped blocks

Maximum spread 2.36 inches

- Single acting, spring assisted return
- Compact & lightweight design

The Hi-Force SJS10 hydraulic spreader offers the ideal solution for spreading, wedging and prising operations in a wide variety of industrial applications. The compact, low weight, spring assisted, piston retract design of the SJS10 offers the user a powerful 14 tons of spreading capacity. Manufactured from high strength steel, the low height jaw tips can easily fit within 0.32 inches gap and can provide a total spreading distance of 2.36 inches in 5 operations, using the step blocks provided with the tool. Suitable for operation up to 10000 PSI maximum working pressure, and supplied complete with a female half quick connect coupler for easy attachment to a Hi-Force manually operated or powered hydraulic pump.

Many applications require two tools, operated simultaneously, to achieve an even spread of a flange joint during gasket replacement. The SJS10-TK comprehensive kit offers the solution for this and comprises of two SJS10 spreaders, manually operated lightweight aluminum pump, controlled manifold, two pressure gauges, gauge blocks and hoses. All connections are fitted with quick release couplers and the set is supplied in a strong metal transport and storage box.

The SJS10-M has all the features of the SJS10, but with the added benefit of an inbuilt manually operated hand pump.

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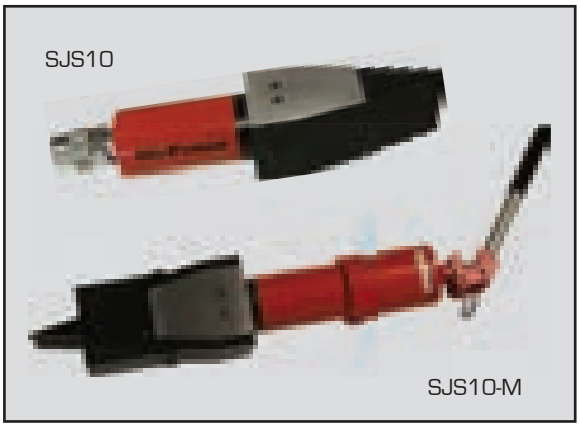
Single spreaders:

Model number	Capacity tons	Stroke inch	Min. height inch	Max. spread inch	Oil capacity inch³	Weight lbs
SJS10	14	1.97	0.32	2.36	4.51	12.1
SJS10-M	14	1.97	0.32	2.36	4.51	16.5

Twin kit comprising of:

Model number	Spreaders 2 x	Pump 1 x	Hoses 2 x	Manifold 1 x	Gauges 2 x	Gauge blocks 2 x	Metal box 1 x	Weight lbs
SJS10-TK	SJS10	HP212	HC3C	HM2C	HG63G	AGA1-25	MSB4	76.1

SJS - STEPPED JAW SPREADERS



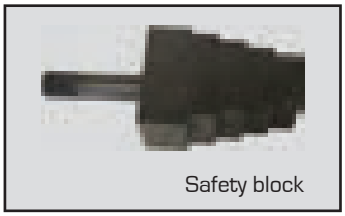
Capacity 14 tons per spreader unit

Supplied with safety block & stepped blocks

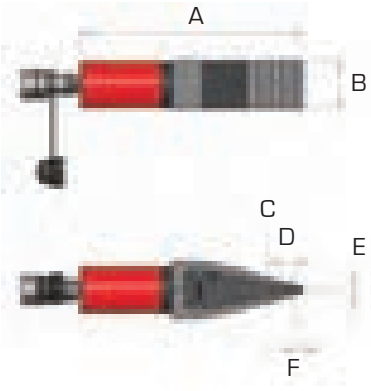
Maximum spread 2.36 inches

- Single acting, spring assisted return
- Compact & lightweight design

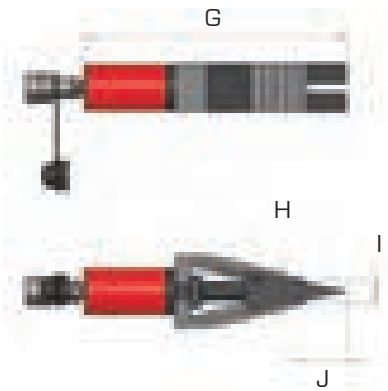
All SJS10 & SJS10-M hydraulic spreaders are supplied complete with two stepped blocks (for increased spreading capacity) and one stepped safety block. The SJS10-TK comes complete with a double set of stepped and safety blocks. Suitable manual pumps and accessories for use with SJS10 can be found on pages 31-32 and 52-53.


Safety block

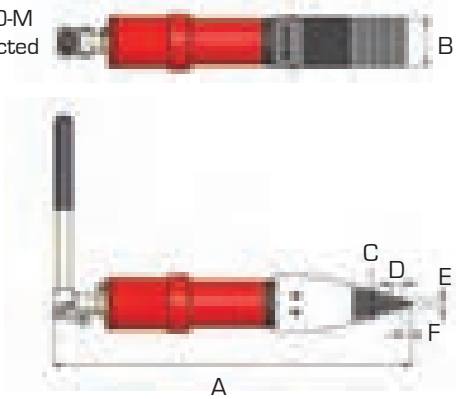
SJS10 Retracted



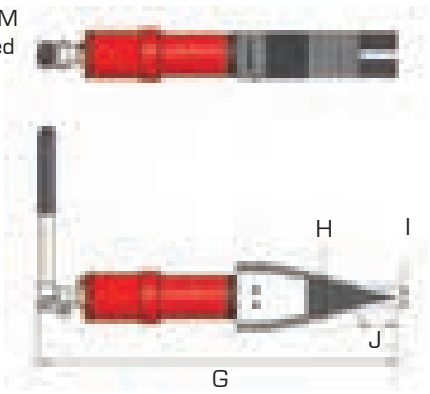
SJS10 Extended



SJS10-M Retracted



SJS10-M Extended



Model number	Capacity tons	Dimensions in mm									
		A	B	C	D	E	F	G	H	I	J
SJS10	14	11.00	2.36	1.58	0.59	0.32	0.39	12.92	2.36	1.10	1.93
SJS10-M	14	17.06	2.36	1.58	0.59	0.32	0.39	19.03	2.36	1.10	1.93

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PB - HYDRAULIC PIPE BENDER


PB10B

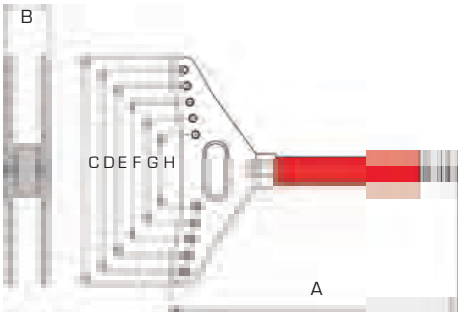
- Working pressure 10000 PSI
- Bends up to 90 degrees
- For use with hydraulic pumps

The Hi-Force PB10 hydraulic pipe bender is designed to bend various sizes and thicknesses of JIS standardized conduit pipes from ½" to 3" (16mm - 82mm). Made of aluminum, the bending frame and pivot shoes are lightweight so that it can be easily carried on and off site, and can be operated by any manual or powered pump up to 10000 PSI. Available as single pipe bender unit (PB10) or as convenient set including all available bending shoes suitable for thick steel conduit (PB10B). For a range of suitable Hi-Force pumps see pages 29-50 of this catalog.

Model number	Max capacity tons	Stroke inch	Oil capacity inch^3	Weight lbs	Applicable range / included bending shoes
PB10	11	9.85	24.41	41.0	PB10 does not include bending shoes
PB10B	11	9.85	24.41	137.8	Thick steel conduit from ½" (16mm) to 3" (82mm)

*Weight for PB10B includes metal storage box

Dimensions in inches							
A	B	C	D	E	F	G	H
28.37	5.79	29.75	27.38	23.44	19.50	15.56	11.62



BENDING SHOES

A range of bending shoes, compatible with the pipe bender PB10, are available as an optional extra to ensure a smooth, wrinkle free bend.

Note: PB10B includes all BS-B bending shoes (8 pcs)

For thick conduit				
Model number	Pipe size (inch)	Pipe outer dia (inch)	Pipe inner dia (inch)	Bending radius (inch)
BS-B16	½"	0.83	0.65	2.95
BS-B22	¾"	1.04	0.86	3.55
BS-B28	1"	1.31	1.11	5.12
BS-B36	1 ¼"	1.65	1.45	7.68
BS-B42	1 ½"	1.88	1.69	9.06
BS-B54	2"	2.35	2.13	10.64
BS-B70	2 ½"	2.96	2.74	17.73
BS-B82	3"	3.46	3.24	19.70

RKT - ROLLER SKATE KITS - TRICYCLE

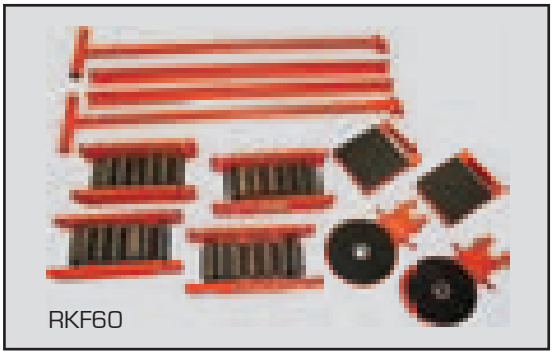

RKT35

- Capacity 39 tons
- Available as a complete kit
- Endless hardened roller chain

The RKT roller skate kit is an easy to assemble unit with a low level construction and offers an easy and safe method of moving heavy loads. This transport kit comprises of a twin skate roller fitted with a turntable, two single roller skates fitted with top plates, a handle and a link bar, all supplied in a metal storage case.

Model number	Cap. per set tons	Twin rollers ø inches	Single rollers ø inches	Height inches	Turntable ø inches	Handle length inches	Metal box (LxWxH inches)	Weight lbs
RKT35	39	1.18	0.95	4.33	9.85	34.67	24.03x12.21x6.50	150

RKF - ROLLER SKATE KITS - QUAD


RKF60

- Capacities from 22 to 66 tons
- Minimum turning circle 10 feet
- Endless hardened roller chain

The RKF roller skate kits are suitable for moving moderately heavy equipment such as transformers, generators, turbines and heavy machinery over short distances. The range comprises of 3 models available with capacities of up to 66 tons per skate and each set is supplied in a metal storage case. Designed with an endless hardened roller chain which revolves around the skate, at least 5 rollers remain in contact with the floor at any one time, ensuring smooth travel even over cracked concrete floors.

Model number	Cap. per set tons	Skates Qty: 4	Turntables Qty: 2	Levelling Plates Qty: 2	Link bars Qty: 2	Handles Qty: 2	Weight lbs
RKF20	22	**RSN10**	**RTT10**	**RLP10**	**RLB00**	**RPH00**	105.8
RKF30	33	**RSN15**	**RTT15**	**RLP15**	**RLB00**	**RPH00**	123.5
RKF60	66	**RSN30**	**RTT30**	**RLP30**	**RLB00**	**RPH00**	198.4

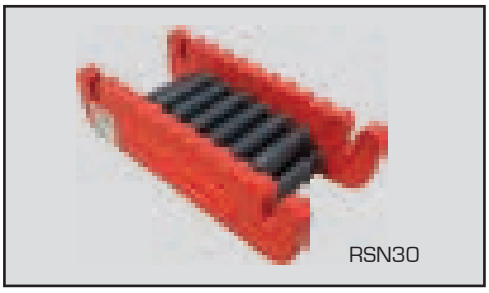
Note: Each set carrying capacity is calculated taking into consideration that two roller skates are sufficient to support the full load.

Dimensions:

Model number	Rollers ø inches	Total height inches	Turntable ø inches	Handle length inches
RKF20	0.71	4.26	5.12	34.67
RKF30	0.95	4.61	5.12	34.67
RKF60	1.18	5.52	5.91	34.67

For detailed information on RSN roller skates, RTT turntables and RLP levelling plates, please refer to page 164 of this catalog.

RSN - MULTI-PURPOSE SKATES


RSN30

- Capacities from 11 to 88 tons
- Low level construction
- Accessories for turning corners

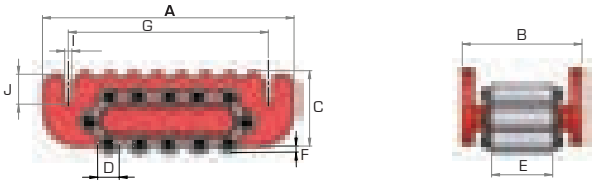
The RSN industrial, low profile skates are ideal for moving moderately heavy loads in the construction, mining and steel industries. Available with capacities of up to 88 tons, these skates can move and position heavy and irregular shaped loads easily and more economically than other lifting devices. Optional accessories such as turntables and levelling plates are available for use with the RSN skates.

Model number	Capacity tons	Rollers in contact	Rollers total	Weight lbs
RSN10	11	5	15	11.5
RSN15	16	4	13	16.1
RSN30	33	4	13	28.7
RSN60	66	4	13	70.5
RSN80	88	6	17	134.5

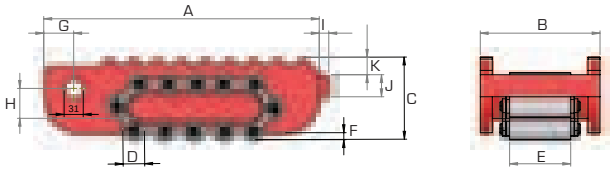
Dimensions in inches										
A	B	C	øD	E	F	G	H	I	J	K
8.27	3.94	2.60	0.71	2.01	0.24	6.58	-	0.24	1.00	-
8.67	4.45	2.96	0.95	2.36	0.39	7.09	-	0.24	1.00	-
10.64	5.12	3.62	1.18	2.68	0.39	8.55	-	0.24	1.00	-
14.97	6.62	5.00	1.65	3.00	0.63	1.42	1.89	0.39	1.58	0.59
20.88	7.17	5.79	1.97	3.39	0.75	1.42	2.36	0.39	1.58	0.59

Model number	Description	Diameter inch	Capacity tons	Weight lbs
RTT10	Turntable	5.12	11	9.9
RTT15	Turntable	5.12	16	9.9
RTT30	Turntable	5.91	33	14.8
RTT60	Turntable	7.49	66	30.2
RTT80	Turntable	8.67	88	41.7
RLP10	Levelling plate	n/a	11	8.2
RLP15	Levelling plate	n/a	16	8.2
RLP30	Levelling plate	n/a	33	11.7
RLP60	Levelling plate	n/a	66	30.4
RLP80	Levelling plate	n/a	88	41.4

Drawings for models RSN10, RSN15 and RSN30



Drawings for models RSN60 and RSN80



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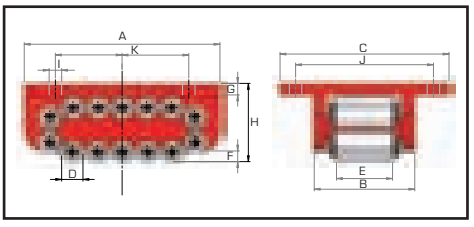
RSA - HEAVY DUTY SKATES

The RSA range of heavy duty moving skates is ideal for movement of heavy loads such as transformers, generators, turbines and machinery. Available with capacities ranging from 16 to 94 tons each skate.




RSA20

Model number	Capacity tons	Rollers in contact	Rollers total	Weight lbs
RSA15	16	5	15	19.6
RSA20	22	4	13	25.8
RSA40	44	4	13	42.5
RSA50	55	6	17	63.9
RSA65	72	4	13	112.4
RSA85	94	6	17	202.8

Dimensions in inches										
A	B	C	øD	E	F	G	H	øI	J	K
8.27	3.94	6.90	0.71	2.01	0.24	0.51	3.00	0.55	5.52	2.96
8.67	4.45	7.49	0.95	2.36	0.39	0.55	3.43	0.55	6.11	2.96
10.64	5.12	8.27	1.18	2.68	0.39	0.55	4.10	0.71	6.90	3.74
12.61	5.52	8.67	1.18	2.68	0.39	0.71	4.53	0.71	7.09	4.73
14.97	6.62	10.64	1.65	3.00	0.75	0.75	5.71	0.87	8.67	5.52
20.88	7.17	11.82	1.97	3.39	0.75	0.75	6.50	0.87	9.46	8.08

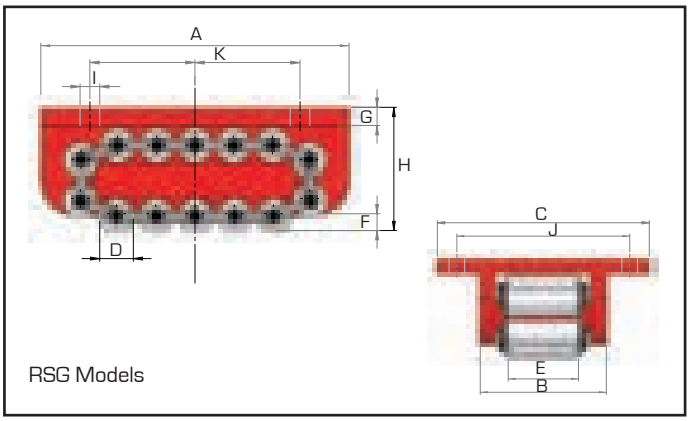
RSG & RSD - HEAVY DUTY SKATES WITH GROOVED GUIDE

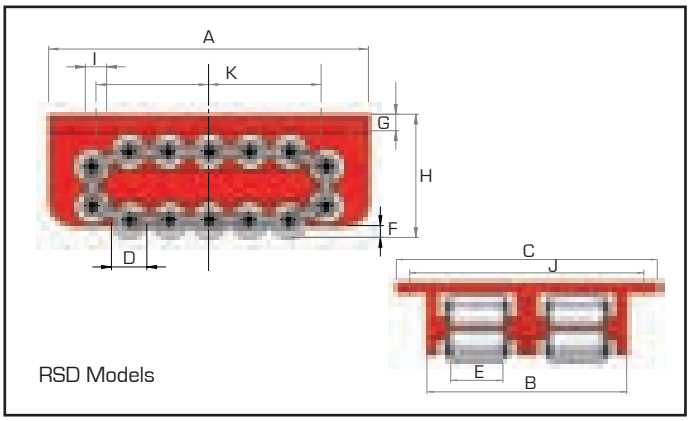
- Capacities from 44 to 441 tons
- Low level, robust construction
- Heat treated, special chrome alloy chains

The RSG heavy duty range of single roller moving skates is available with capacities up to 221 tons each skate and incorporates a chain groove cut into the centre member of the skate, which helps to keep the chain running parallel with the body and is specially suited for moving loads over long distances.

The RSD range offers the same features as the RSG range, however has a double roller design, capable of transporting loads up to 441 tons per skate.

Both the RSG and RSD models feature high quality, heat treated components and are supplied with 4 mounting bolt holes for easy attachment to the load.





Model number	Capacity tons	Rollers in contact	Rollers total	Weight lbs
RSG Range - Single-roller design				
RSG40	44	4	13	43.2
RSG50	55	6	17	65.0
RSG65	72	4	13	114.0
RSG85	94	6	17	205.0
RSG100	110	8	21	240.3
RSG150	165	9	23	357.1
RSG200	221	13	31	586.4
RSD Range - Double-roller design				
RSD80	88	2 x 4	2 x 13	79.8
RSD100	110	2 x 6	2 x 17	126.8
RSD130	143	2 x 4	2 x 13	211.6
RSD170	187	2 x 6	2 x 17	385.8
RSD200	221	2 x 8	2 x 21	456.4
RSD300	331	2 x 9	2 x 23	672.4
RSD400	441	2 x 13	2 x 31	1069.2

Dimensions in inches											
A	B	C	øD	E	F	G	H	øI	J	K
10.64	5.12	8.27	1.18	2.68	0.39	0.55	4.10	0.71	6.90	3.74
12.61	5.52	8.67	1.18	2.68	039	0.71	4.53	0.71	7.09	4.73
14.97	6.62	10.64	1.65	3.00	0.75	0.75	5.71	0.87	8.67	5.52
20.88	7.17	11.82	1.97	3.39	0.75	0.75	6.50	0.87	9.46	8.08
22.85	7.17	11.82	1.97	3.39	0.75	0.91	6.70	1.02	9.85	9.85
25.61	8.08	13.79	1.97	3.94	0.79	1.10	7.49	1.02	11.03	9.46
35.46	8.08	14.97	1.97	3.94	0.79	1.50	7.88	1.30	11.82	14.18
10.64	10.24	13.40	1.18	2.68	0.39	0.55	4.10	0.71	12.02	3.74
12.61	11.03	14.18	1.18	2.68	0.39	0.71	4.53	0.71	12.81	4.73
14.97	13.24	17.34	1.65	3.00	0.75	0.75	5.71	0.87	15.37	5.91
20.88	14.34	18.91	1.97	3.39	0.75	0.75	6.50	0.87	16.94	8.27
22.85	14.34	18.91	1.97	3.39	0.75	0.91	6.70	1.02	16.94	9.85
25.61	16.15	22.06	1.97	3.94	0.79	1.10	7.49	1.02	19.31	9.46
35.46	16.15	23.25	1.97	3.94	0.79	1.50	7.88	1.30	19.70	14.18

HPF - WORKSHOP PRESSES

HPF10042

Capacities from 11 to 220 tons

Stroke lengths from 9.85 to 13 inches

Working pressure 10000 PSI

- Choice of manual, air or electric powered pumps
- Supplied complete with pressure gauge
- Other configurations available on request

The HPF range of workshop presses offers a choice of 25 models with either single acting or double acting cylinders and manually operated, air powered or electric powered pumps. Floor presses incorporate an adjustable work table and dual scale pressure gauge.

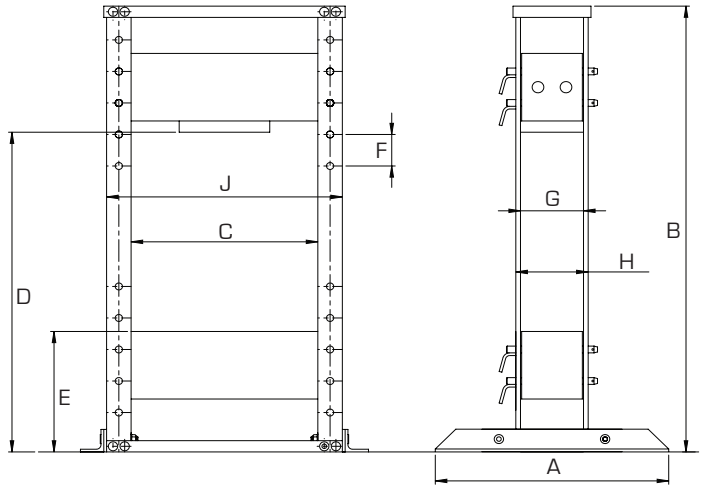
Model number	Capacity tons	Stroke inch	Cylinder model no. [1]	Cylinder principle	Pump model no. [2]	Pump operation	Weight lbs
HPF1020	11	9.85	HSS1010	single acting	HP110	hand operated	209.4
HPF1030	11	9.85	HSS1010	single acting	AHP1120	air powered	187.4
HPF2520	28	9.85	HSS2510	single acting	HP227	hand operated	319.7
HPF2530	28	9.85	HSS2510	single acting	AHP1120	air powered	304.2
HPF2541	28	9.85	HSS2510	single acting	HEP103341	electric driven 110 V	352.7
HPF2542	28	9.85	HSS2510	single acting	HEP103342	electric driven 240 V	352.7
HPF2544	28	9.85	HSS2510	single acting	HEP207314H	electric driven 415 V	352.7
HPF5020S	55	13.00	HSS5013	single acting	HP257	hand operated	1036.2
HPF5020D	55	13.00	HDA5013	double acting	HP252D	hand operated	1102.3
HPF5030S	55	13.00	HSS5013	single acting	AHP1121	air powered	1113.3
HPF5030D	55	13.00	HDA5013	double acting	AHP1141	air powered	1113.3
HPF5041S	55	13.00	HSS5013	single acting	HEP207311H	electric driven 110 V	1113.3
HPF5041D	55	13.00	HDA5013	double acting	HEP207411H	electric driven 110 V	1060.4
HPF5042S	55	13.00	HSS5013	single acting	HEP207312H	electric driven 240 V	1128.8
HPF5042D	55	13.00	HDA5013	double acting	HEP207412H	electric driven 240 V	1142.0
HPF5044S	55	13.00	HSS5013	single acting	HEP207314H	electric driven 415 V	1142.0
HPF5044D	55	13.00	HDA5013	double acting	HEP207414H	electric driven 415 V	1142.0
HPF10020	110	13.00	HDA10013	double acting	HP245D	hand operated	2228.9
HPF10030	110	13.00	HDA10013	double acting	HAP21042	air powered	2268.5
HPF10041	110	13.00	HDA10013	double acting	HEP207421H	electric driven 110 V	2299.4
HPF10042	110	13.00	HDA10013	double acting	HEP207422H	electric driven 240 V	2299.4
HPF10044	110	13.00	HDA10013	double acting	HEP207424H	electric driven 415 V	2299.4
HPF20041	220	12.02	HDA20012	double acting	HEP310421H	electric driven 110 V	7165.0
HPF20042	220	12.02	HDA20012	double acting	HEP310422H	electric driven 240 V	7165.0
HPF20044	220	12.02	HDA20012	double acting	HEP310424H	electric driven 415 V	7165.0

Notes: [1]) For detailed specification on applicable cylinders, see pages 14 - 15 for HSS range and page 20 for HDA range. [2]) For detailed specification on applicable pumps, see pages 31 - 33 for HP range, page 39 - 43 for HEP range, page 46 - 47 for AHP range and page 48 for HAP range.

HPF - WORKSHOP PRESSES

Factory mounted optional accessories include a mechanical bed winch for easy adjustment of the work table, rolling head kit and multi-position V-blocks. All presses are supplied completely assembled, ready for use. Hi-Force workshop presses are manufactured to the highest quality standards, and are suitable for the most demanding jobs.

In order to fully comply with CE regulations, some presses must be equipped with specific safety components, such as spring centered valves, two- hand control devices or others.

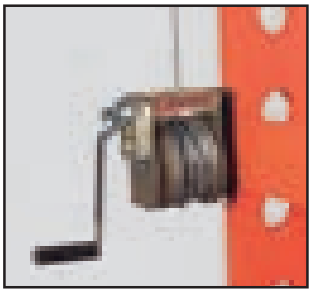


Note: Press bed and press head are adjustable in steps of 'F',
55 ton has 4 positions, 110 ton has 3 positions, 220 ton has 7 positions.
11 and 28 tonne press frame has fixed press head and adjustable press bed.

Press Range	Capacity tons
HPF1000	11
HPF2500	28
HPF5000	55
HPF10000	110
HPF20000	220

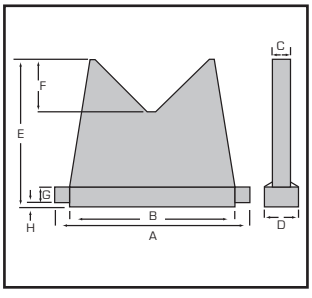
Frame dimensions in inches										
A	B	C	D min	D max	E min	E max	F	G	H	J
29.23	57.05	20.02	49.57		10.24	39.79	5.91	-	6.00	26.00
29.23	57.05	20.02	49.57		10.24	39.79	5.91	-	6.00	26.00
39.40	80.97	31.52	44.92	61.46	15.56	32.11	5.52	10.17	11.74	39.40
39.40	78.01	39.40	42.95	53.98	21.67	32.70	5.52	13.32	15.29	48.86
47.28	98.50	49.25	71.51	83.33	24.03	59.49	5.91	13.00	16.15	68.95

OPTIONAL EXTRAS



- Only available factory fitted option
- Lifts and lowers work table
- Available for 55 and 110 ton presses

Suffix	Description
BW	Bed winch, suitable for 55 and 110 ton models



- Multi-position V-blocks with flat bed and V-shape press surfaces
- Available for 11, 28, 55 and 110 ton presses

Model number	Cap. per set tons	Dimensions in inches A	B	C	D	E	F	G	H
HVB2500	11 - 28	8.04	6.07	0.79	1.77	6.11	1.77	0.79	0.32
HVB5000	55	14.38	10.44	1.00	1.97	7.49	2.36	1.00	0.39
HVB10000	110	16.75	12.81	1.38	2.36	10.44	3.35	1.38	0.39

K

TOOL BOXES


MSB6

- Metal storage and transport box
- Width up to 19.7 inches
- Durable steel body

Hi-Force offers users a choice of four tool box models that can be used for storing and transporting Hi-Force products and accessories. These tool boxes are of strong durable steel construction and have an anti-corrosion coating making them resistant to rust and abrasion and hence suitable for long term use at on-site locations, workshops and service centers.

Available in lengths of 24.43 to 43.34 inches, these lockable tool boxes help reduce loss of tools as well as protect the equipment from dirt, dust and water.

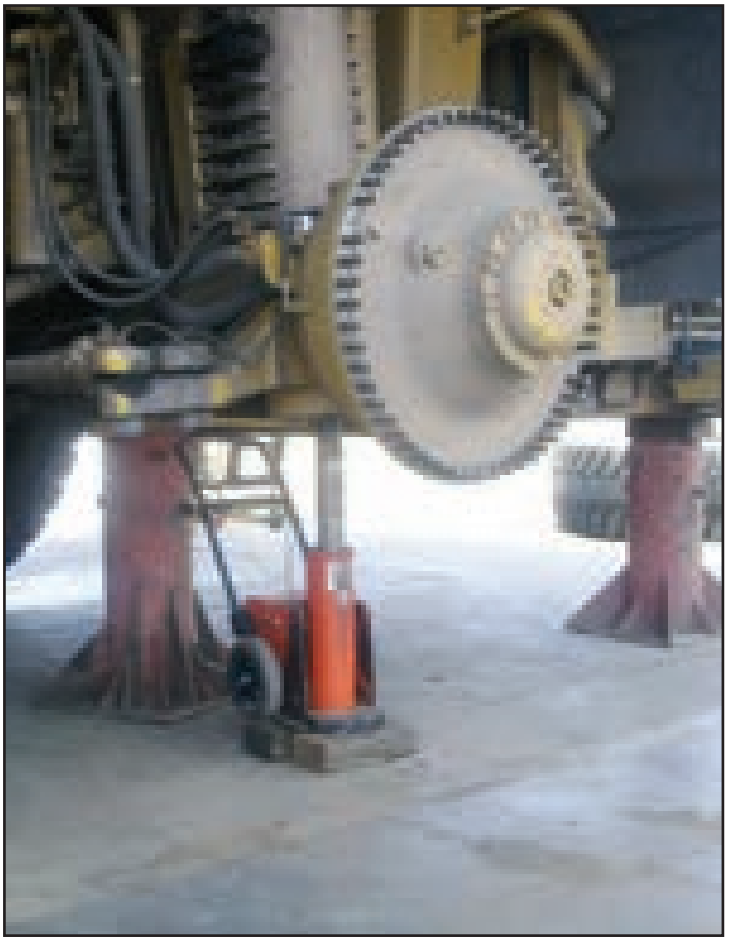
Model number	Weight lbs	Length inch	Width inch	Depth inch
MSB2	21.4	24.43	13.40	5.79
MSB4	30.4	34.48	11.03	9.85
MSB6	35.9	28.37	19.70	9.85
MSB8	67.2	43.34	19.70	9.85

K

A tool box used for storing and transporting PCS cylinder & pump sets. For details on PCS sets, see Page 25 of this catalog.

Need help deciding which tool box will best suit your requirement?

Contact your local Hi-Force office or authorized Hi-Force Distributor for assistance.



TL - TOUGHLIFT JACKING SYSTEMS

The Hi-Force ToughLift jacking system offers users the easiest and safest method of lifting material haulers in the mining and construction industry and locomotives in the railway industry, when critical maintenance and breakdown repair work requires completion.

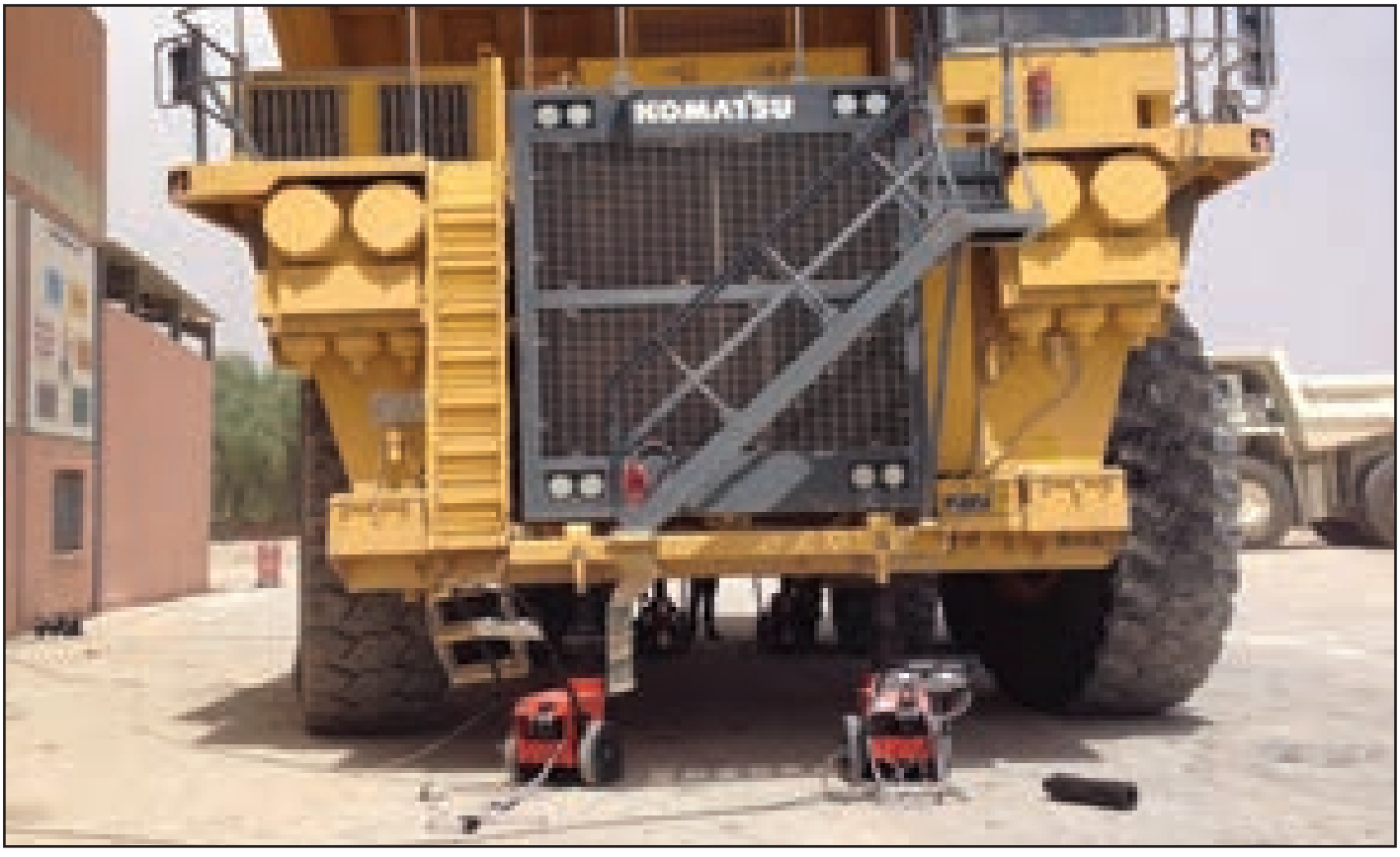
Suitable for lifting even the largest earth haulers in the world, the Hi-Force ToughLift is available in 55, 110, 165 and 220 tons lifting capacities. All models are available with either a 110 volt or 240 volt single phase electric driven pump unit or a 90 PSI compressed air driven pump version. All models are operated via a remote, push button hand pendant controller with a 20 foot length control cable to ensure the operator has precise control over the lifting operation from a safe distance away from the load.

Hi-Force ToughLift jacking systems are supplied fitted as standard with a hardened steel lifting saddle, patented "snap latch" handle assembly for easy positioning and transportation and a patented jacking system design for increased safety, enabling them to be easily positioned, in the tightest of spaces, to ensure location into the correct and exact lifting and jacking position.

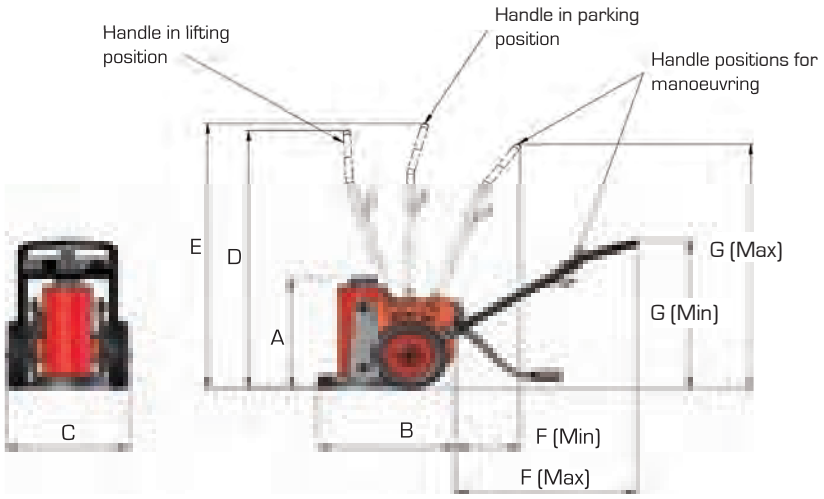
Fitted with large diameter wheels and heavy duty tyres as standard, all ToughLift models are narrow in width and have the smallest footprint area in the industry.

A wide variety of optional extras are also available which include load holding blocks, swivel load caps, locking, load block extensions, slip lock extensions and accessory tool boxes. Further details can be found on pages 172 to 174.

With the Hi-Force ToughLift, plant operators in mining, construction and railway industries are assured of minimal maintenance and repair downtime, of their capital intensive equipment, from the strongest and most versatile lifting jack in the world!



TL - TOUGHLIFT JACKING SYSTEMS



Note: The 55 ton models have a combined lifting and parking position.

Model number	Dimensions in inches A	B	C	D	E	F MIN - MAX	G MIN - MAX
TL050A255	17.93	26.00	22.06	56.74		14.97 - 39.40	27.58 - 51.22
TL050E255-A	17.93	26.00	22.06	56.74		14.97 - 39.40	27.58 - 51.22
TL100A405	26.20	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74
TL100E405-A	26.20	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74
TL100E530	33.21	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74
TL100E530-A	33.21	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74
TL150A390	26.20	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74
TL150E390-A	26.20	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74
TL150E520	33.21	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74
TL150E520-A	33.21	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74
TL200A380	26.00	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74
TL200E380-A	26.00	28.76	26.00	59.89	61.46	14.18 - 37.82	33.88 - 56.74

SADDLES

Tilting saddles are fitted as standard to all ToughLift jacks, however flat saddles can also be supplied as an optional extra. Both types of saddle (flat or tilting swivel) can be easily fitted to all slip lock and load lock extensions.

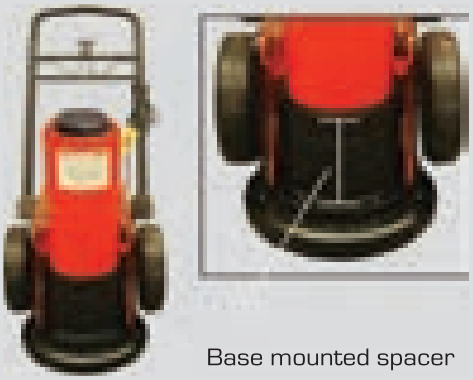
EXTENSIONS

Hi-Force also offers a range of extensions for use with ToughLift jacking systems. Slip lock extensions can be used in multiples up to the maximum height specified on page 173. Load lock extensions can only be used one at a time, however, they can be used in conjunction with slip lock extensions.

Both extension options must terminate with a flat or swivel tilting saddle on the top of the extension stack.

SPACERS

Base mounted spacers increase the closed height by 11.8 inches. This optional extra is available for 220 ton models only and weighs 173.1 lbs. Please suffix model number with “E” when ordering.



Base mounted spacer

TL - TOUGHLIFT JACKING SYSTEMS


TL150A520 TL200A380

Working pressure 10000 PSI

Choice of 12 models with a range of accessories

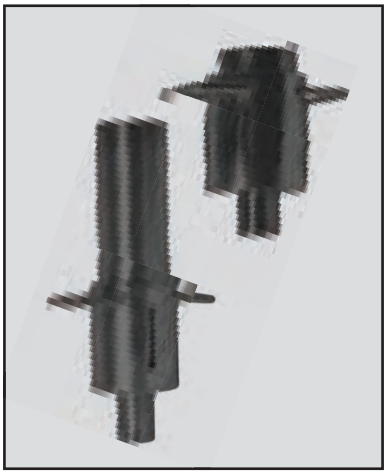
Used in mining, construction & railway industries

- Choice of 55, 110, 165 or 220 ton lifting capacities
- Patented multi-positional lifting handle for easy transportation and positioning
- Available with choice of electric or air driven hydraulic pump unit
- Push button remote hand pendant controller with 20 feet control cable
- Patented jacking system for safe and correct positioning prior to load lift
- Wide range of accessories available for even greater versatility (see pages 172 to 174)
- Narrow width, with small footprint for easy access into confined spaces
- Integral airline filter, lubricator and pressure regulator unit (air driven models only)
- User friendly design with easily accessible maintenance features
- Large diameter, heavy duty wheels for easy positioning underneath the load

Model number	Capacity tons	Power Supply	Stroke inch	Weight lbs	Max additional stack in inches
TL050A255	55	90 PSI air driven	10.00	352.7	26.79
TL050E255-A	55	110V, 60 Hz	10.00	370.4	26.79
TL100A405	110	90 PSI air driven	15.96	634.9	18.91
TL100E405-A	110	110V, 60 Hz	15.96	652.6	18.91
TL100A530	110	90 PSI air driven	20.88	701.1	7.09
TL100E530-A	110	110V, 60 Hz	20.88	718.7	7.09
TL150A390	165	90 PSI air driven	15.37	687.8	19.11
TL150E390-A	165	110V, 60 Hz	15.37	705.5	19.11
TL150A520	165	90 PSI air driven	20.49	767.2	7.09
TL150E520-A	165	110V, 60 Hz	20.49	784.8	7.09
TL200A380	220	90 PSI air driven	15.00	820.1	19.70
TL200E380-A	220	110V, 60 Hz	15.00	837.7	19.70

TL - TOUGHLIFT JACKING SYSTEMS

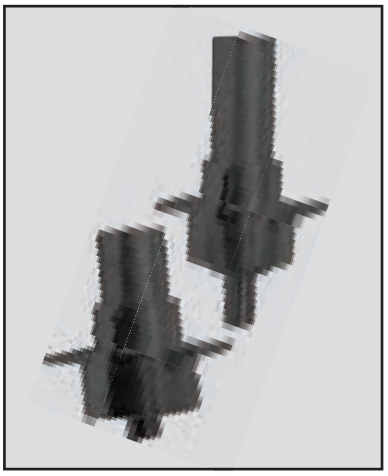
SLIP LOCK EXTENSIONS



Length 7.1"	Length 11.8"	Length 15.8"	Length 19.1"	Length 19.7"	To suit jack model	Recom. max. extension height in inch
SLE180-50	SLE300-50	SLE400-50	*	SLE500-50	TL050A255	26.79
SLE180-50	SLE300-50	SLE400-50	*	SLE500-50	TL050E255-A	26.79
SLE180-100	SLE300-100	*	SLE485-100	*	TL100A405	19.11
SLE180-100	SLE300-100	*	SLE485-100	*	TL100E405-A	19.11
SLE180-100	*	*	*	*	TL100A530	7.09
SLE180-100	*	*	*	*	TL100E530-A	7.09
SLE180-150	SLE300-150	*	SLE485-150	*	TL150A390	19.11
SLE180-150	SLE300-150	*	SLE485-150	*	TL150E390-A	19.11
SLE180-150	*	*	*	*	TL150A520	7.09
SLE180-150	*	*	*	*	TL150E520-A	7.09
SLE180-200	SLE300-200	SLE400-200	*	SLE500-200	TL200A380	19.70
SLE180-200	SLE300-200	SLE400-200	*	SLE500-200	TL200E380-A	19.70

* = Exceeds recommended maximum extension height

LOAD LOCK EXTENSIONS



Length 7.1"	Length 11.8"	Length 15.8"	Length 19.1"	Length 19.7"	To suit jack model	Recom. max. extension height in inch
LLE180-50	LLE300-50	LLE400-50	*	LLE500-50	TL050A255	26.79
LLE180-50	LLE300-50	LLE400-50	*	LLE500-50	TL050E255-A	26.79
LLE180-100	LLE300-100	*	LLE485-100	*	TL100A405	19.11
LLE180-100	LLE300-100	*	LLE485-100	*	TL100E405-A	19.11
LLE180-100	*	*	*	*	TL100A530	7.09
LLE180-100	*	*	*	*	TL100E530-A	7.09
LLE180-150	LLE300-150	*	LLE485-150	*	TL150A390	19.11
LLE180-150	LLE300-150	*	LLE485-150	*	TL150E390-A	19.11
LLE180-150	*	*	*	*	TL150A520	7.09
LLE180-150	*	*	*	*	TL150E520-A	7.09
LLE180-200	LLE300-200	LLE400-200	*	LLE500-200	TL200A380	19.70
LLE180-200	LLE300-200	LLE400-200	*	LLE500-200	TL200E380-A	19.70

* = Exceeds recommended maximum extension height

LOAD BLOCK SETS

Load block sets Model number	Capacity tons	Lock out Height inch	Load Blocks	Adaptor	To suit jack model
TLB50-250	55	9.85	3	1	TL050A255
TLB50-250	55	9.85	3	1	TL050E255-A
TLB100-405	110	15.76	5	1	TL100A405
TLB100-405	110	15.76	5	1	TL100E405-A
TLB100-530	110	20.69	7	1	TL100A530
TLB100-530	110	20.69	7	1	TL100E530-A
TLB150-390	165	15.17	5	1	TL150A390
TLB150-390	165	15.17	5	1	TL150E390-A
TLB150-520	165	20.29	7	1	TL150A520
TLB150-520	165	20.29	7	1	TL150E520-A
TLB200-380	220	14.78	5	1	TL200A380
TLB200-380	220	14.78	5	1	TL200E380-A

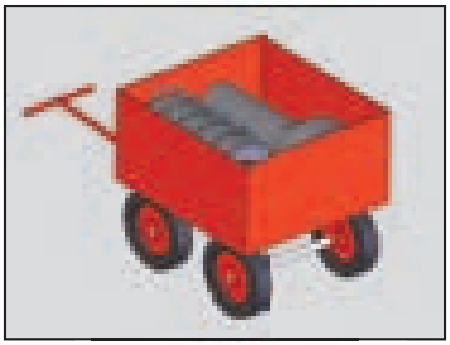
TL - TOUGHLIFT JACKING SYSTEMS

FLAT SADDLES

TLF150

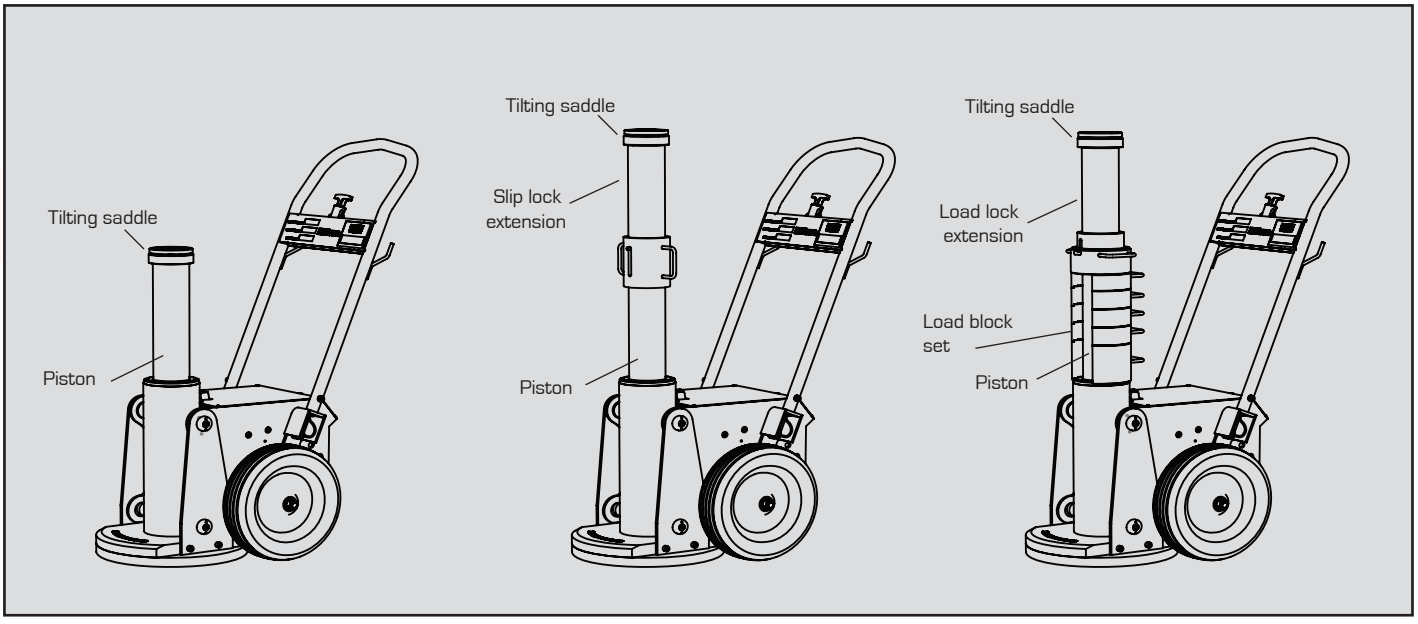
Flat saddle Model number	Capacity tons	To Suit Jack Model
TLF50	55	TL050A255
TLF50	55	TL050E255-A
TLF150	110	TL100A405
TLF150	110	TL100E405-A
TLF150	110	TL100A530
TLF150	110	TL100E530-A
TLF150	165	TL150A390
TLF150	165	TL150E390-A
TLF150	165	TL150A520
TLF150	165	TL150E520-A
TLF200	220	TL200A380
TLF200	220	TL200E380-A

TOOL BOXES



To store your ToughLift accessories safely why not consider ordering a tool box made specifically to suit your accessory set. Hi-Force offers ToughLift accessory tool boxes made to special order with a fast delivery time to help maintain the working condition and integrity of your ToughLift system.

TOUGHLIFT CONFIGURATION EXAMPLES



L

SERVICES

RENTAL SERVICES

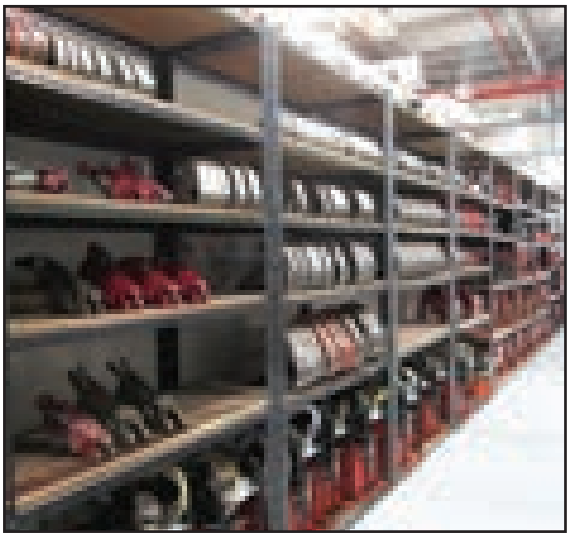
The Hi-Force philosophy of offering a complete service package to support our valued customers needs and requirements also extends to tool rental services. With an extensive array of products available within the Hi-Force range, it is sometimes difficult for our customers to decide on the most suitable tool in which to invest their money. Additionally, with our higher value products like high tonnage cylinders, powered pumps, hydraulic wrenches, stud bolt tensioners and hydrotest pumps, many clients simply cannot justify the high capital outlay to purchase, especially in cases where their needs for the product are relatively short term or even simply for a one off job. In some cases annual budget restraints also make it difficult to get purchase expenditure approval even though there is a definite requirement for the tools.

Hi-Force actively encourages and promotes its tool rental services package, both at Regional Offices and at participating distributors worldwide. Unlike our competitors who believe that tool rental business reduces product sales, we at Hi-Force believe it actually increases them!

Many of our customers worldwide who have purchased Hi-Force products, initially took the opportunity to "try out" both our product quality and our level of service support via tool rental. Once satisfied, these same customers became, brand loyal purchasers of Hi-Force products on a regular basis.

An additional benefit of maintaining a comprehensive fleet of rental tools at our Regional Offices and participating distributors is that users can easily request on-site demonstrations, using rental tools at short notice, or even utilize our rental services whilst having their own equipment serviced or repaired. In most industries the biggest drain on profits is the cost to the company of maintenance and shutdown activities. Hi-Force tool rental is available at very short notice and helps ensure that production recommences as quickly as possible without any unnecessary delays.

Hi-Force tool rental is available on both short and long term basis and all equipment provided is guaranteed, tested and certified prior to mobilization to site.



All Hi-Force rental equipment is proof-tested prior to release for rental. All tests are documented and all equipment is supplied with a test certificate.

Additionally, torque equipment is calibrated, using the latest technology. Test & calibration results are automatically transferred to purpose-written software for producing unique and traceable certificates.

Hi-Force tool rental offers an economical alternative to purchasing capital intensive specialized equipment at short notice. Give it a try, you will be pleasantly surprised!

ON-SITE SERVICES

In addition to the tool rental services offered by Hi-Force and detailed on page 176, we also offer a first class on-site services package. Utilizing Hi-Force tools drawn from our extensive global rental tool inventory, Hi-Force is also able to offer a first class on-site bolting and jacking service. Available globally via Hi-Force Regional Offices and participating distributors, the Hi-Force on-site services package combines the expertise of our highly trained and experienced crews with the high quality reputation of Hi-Force products.

For on-site bolting services we are able to carry out jobs ranging from a simple bolt up of a single flange joint to major construction and maintenance shut down projects. Our record and past experience of working with many major multi-national companies is second to none and our crews have established an excellent reputation for meeting and beating critical time deadlines, even in the most demanding conditions. Major customer industries include oil & gas, power generation, cement plants, civil and mechanical construction and maintenance.

We also offer on-site lifting and jacking services usually related to heavy lift applications involving multiple numbers of Hi-Force high tonnage cylinders, pumps, hoses and accessories. Past jobs undertaken and successfully completed include bridge lifting, cantilever and steel structure weighing and a variety of lift and shift applications.

Our crews have received many verbal and written testimonials for their excellent performance and copies of these are available on request.

Hi-Force is very proud of its excellent reputation for carrying out efficient, safe, competitively priced on-site jobs, within client specified time periods. Please do not hesitate to contact us if you have a requirement for Hi-Force on-site services.

REPAIR SERVICES

Every year huge amounts of money are lost to industries worldwide due to the breakdown of capital intensive hydraulic and pneumatic tools. This extensive loss of revenue could be drastically reduced if users and owners were always in a position to call upon specialist repairers, at short notice, to identify the faults and carry out fast, reliable, guaranteed repairs.

Hi-Force is at your service!! We have built our success on our "service first philosophy" and a long history of providing customers with a comprehensive repair service for a wide range of hydraulic and pneumatic tools.

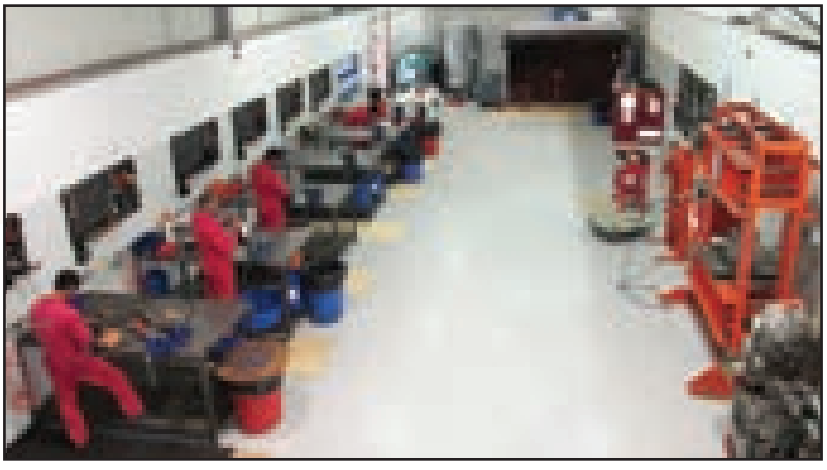
All Hi-Force offices worldwide, along with participating Hi-Force Distributors operate a fully equipped workshop repair facility, using the latest "state of the art" repair and testing equipment and techniques, carried out by trained and qualified workshop technicians. Our global network of Hi-Force service centers is modelled on our highly successful and wholly owned UK Distributor company, H.E.S. Sales Limited, who have been offering repair services, along with the other services detailed in this section of the catalog, from two strategically placed locations in England, since the early 1970's.

All Hi-Force service centers carry good stocks of commonly used spare parts and are able to offer a first class guaranteed repair service for all Hi-Force products as well as most international competitor brands. All items repaired carry a 90 day warranty against faulty materials or workmanship and each item is returned to the customer with an individual test/calibration certificate.

Make the most of your investment in tools through regular servicing and repair, at an economical cost, through the Hi-Force service network.

Test and Repair facilities at Hi-Force Offices

Hi-Force Dubai workshop



H.E.S. Sales Ltd. UK workshop

CALIBRATION SERVICES

As part of our ever improving after sales and service support facilities, Hi-Force offers a comprehensive calibration service for all makes of manual, pneumatic and hydraulic torque tools to our services portfolio. Available from selected Hi-Force Regional Offices and distributors worldwide, this fast expanding activity is currently receiving considerable attention from our customer base.

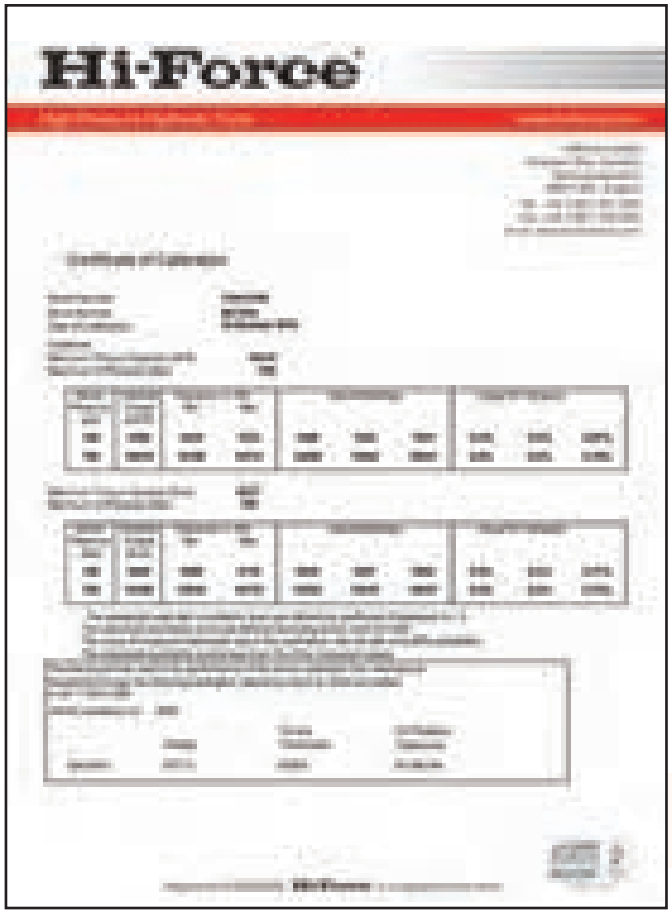
All of our in-house calibration equipment has valid, independently approved "UKAS" calibration certificates which are renewed annually. All items calibrated are returned with an individual test and calibration certificate traceable to our "UKAS" certification.

This service is particularly focused on tools used for accurate bolt tightening, which according to industry standards, recommends that they are calibrated, at least once per year and in some cases more often if used extensively. When did you last have your critical bolt tightening tools calibrated? Check and contact Hi-Force for a first class calibration service at a competitive price.

Hi-Force is also able to offer a limited calibration service for other hydraulic and pneumatic tools. Contact your local Hi-Force Regional Office or distributor for more information.

Calibration of a hand torque wrench

Hydraulic torque wrench calibration



Sample calibration certificate

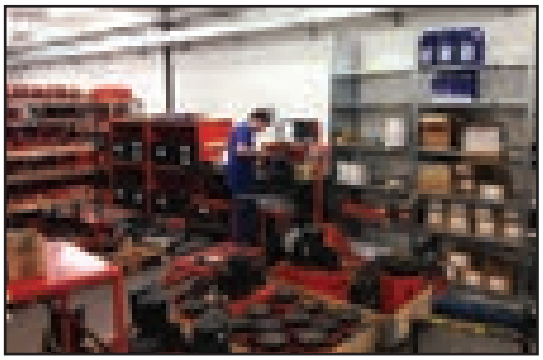
TESTING & SERVICE CONTRACTS

Targeted at companies with a wide variety or a considerable number of hydraulic and pneumatic tools, Hi-Force is able to negotiate and offer a regular on-site testing and service facility to customers, which ensures that their tool inventory is kept in first class working condition, fully tested and certified. This is particularly beneficial to tool users that are required to carry out planned plant maintenance shutdowns at their facilities, as this unique service, from Hi-Force, can be planned to coincide within a reasonable time period, prior to an upcoming shutdown.

Within the UK, Hi-Force testing and service contracts are managed by our wholly owned distributor, H.E.S Sales Limited, who operate a fleet of dedicated, fully equipped, on-site mobile test vehicles ably supported by two strategically placed workshop service centers. All test vehicles are managed by a trained and qualified test engineer, who is fully conversant with all of the latest safety regulations related to hydraulic and pneumatic tools. Site visits are planned and pre-booked for mutually agreed date(s) so that clients can arrange to gather all of their tools, requiring test and inspection, to a central point, at their facilities, for our test inspector to carry out the testing.

A comprehensive test report is prepared by our test engineer, detailing all of the tools examined and tested, along with a report on all tools that fail the test. A copy of the report is handed over by our test engineer, prior to leaving site, for the client to assess and give any necessary authorization for the tools to be removed from site for detailed examination and estimate for repair. Subject to client approval, our test engineer will deliver the tools to the nearest H.E.S. Sales Limited service center, from where a comprehensive strip down, inspection, report and repair quotation will be promptly prepared and sent to the client in writing. Subject to approval of the repair costs, the client's tools will then receive the "first class" repair service, as detailed on page 178.

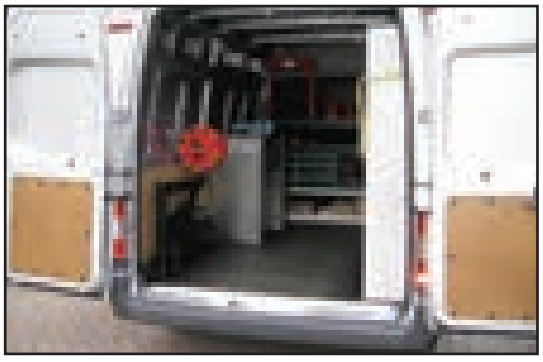
Alongside the testing service, many of our clients also negotiate a period contract covering both the on-site testing and repair service which usually results in more advantageous and competitive rates. For further information on our global testing and service capabilities please contact Hi-Force UK or one of our Regional Offices and Service Centers.



H.E.S Sales UK workshop

Hi-Force test facilities

Hi-Force service vehicle



Interior of Hi-Force test & service vehicle

TRAINING

INTRODUCTION

Hi-Force has been providing training courses in the safe and proper application, use, operation, service, maintenance and repair of hydraulic tools for several years, however in 2013 Hi-Force took its Training Package to a whole new level, with the addition of ECITB (Engineering Construction Industry Training Board) approved Training Courses. Formal approval was in fact granted by the ECITB towards the end of 2012, however with the opening of our brand new expanded Training School in mid-2013, demand for training from Hi-Force has grown significantly. The new Training School, occupying an area of over 1500 square feet, is located within a brand new, 20000 square feet Logistics Center, built as part of our on-going expansion. This "state of the art" Training Facility comprises of a fully equipped classroom, product practical training area and a tool repair and service training workshop.

Hi-Force training courses combine first-class education with the most advanced practical training facilities available, within the hydraulic tool industry. Designed for a wide variety of delegates, Hi-Force training courses are suitable for Field Sales Engineers, Sales Office Supervisors, Service, Repair and Maintenance Engineers and Technicians, On-Site Engineers and Technicians and everyone else involved in the high pressure hydraulic tools industry.

With everything located under one roof, the Hi-Force Training School is fully equipped for putting the theory into practice, all in one course, within one designated area. Delegates are able to listen and learn theory and then proceed to practical in an interactive manner, both with the Trainer and other delegates. Our classroom training material includes high quality graphic images and animations of exactly how hydraulic tools operate. Our practical training area contains a complete range of Hi-Force products enabling delegates to operate "off the shelf" products and achieve a high level of confidence in the safe and proper use of hydraulic tools. Our Service and Repair Training facility is fully equipped with all the standard and special tools and test equipment for the service, maintenance and repair of the complete range of Hi-Force hydraulic tools.

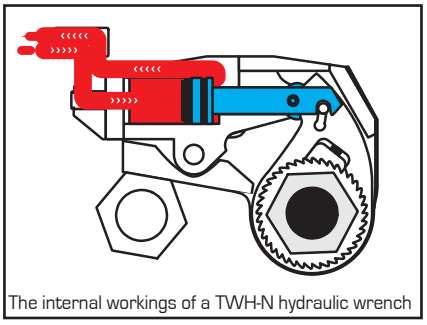
Hi-Force is totally committed to improving the technical knowledge of our own employees, those of our Distributors and of the many users of Hi-Force hydraulic tools, throughout the world. Hi-Force investment in this new Training School, is testament to our commitment to not only offer world class products, but to also ensure that our network of Regional Offices and Distributors are offering users the correct and proper technical advice whilst discussing individual customer specific requirements for hydraulic tools.

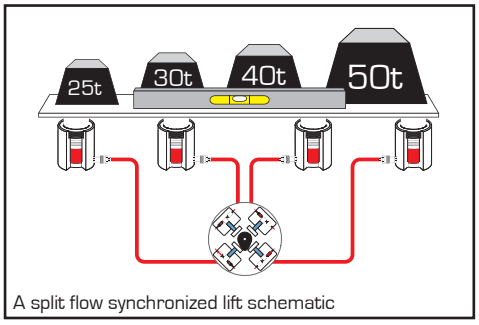
PRODUCT TRAINING COURSES

With our ever expanding network of Hi-Force regional offices and authorized distributors worldwide, Hi-Force has identified technical product and application training, as an essential core competency, for us to maintain our continued growth in the global market, for hydraulic tools.

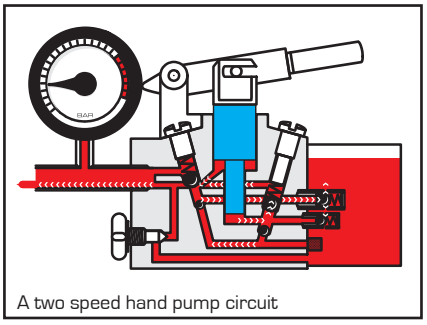
The latest, updated version of our Product Training Course, is divided into various product groups, each of which cover all aspects of technical sales, industry specific application selling, special product design, practical and theoretical operation, health & safety and general maintenance. Hi-Force believes that our Product Training courses are at the leading edge of the high pressure hydraulic tools industry worldwide.

To cater for the large number of different countries in which our products are now distributed and sold, we have designed our Product Training Courses in such a way that moving graphics and pictorial examples, are used wherever possible, to minimize the need for sometimes, difficult to understand written words. This enables us to easily translate the text, of the various training modules, into different languages, to suit local market requirements. The moving graphics used within the Hi-Force Product Training Courses vary from a simple hand pump and cylinder, through to complex multiple lifting applications, using split flow pumps, hydraulic torque wrenches and stud bolt tensioners, all of which clearly demonstrate how our products operate, in a simple and straightforward way. When delegates experience the visual learning provided by these graphics and then move to the practical training area to put theory into practice by operating our tools in real and simulated situations, the retention of knowledge is far greater, than learning from presentation slides, or books, containing only text and pictures.

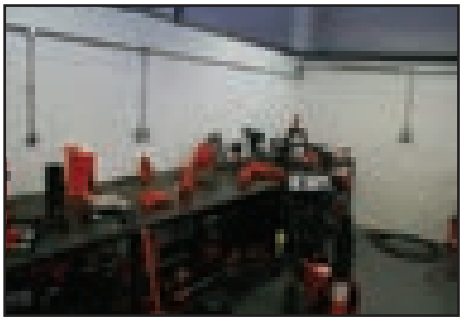

The internal workings of a TWH-N hydraulic wrench



A split flow synchronized lift schematic


A two speed hand pump circuit

Hi-Force Product Training courses can be delivered from within our UK Training School, from any of our Regional Offices and even from a Hi-Force Distributor or End User premises, provided of course a suitable classroom and practical training area is available. It is also important to have a wide selection of Hi-Force products, readily available at the location of the training, for the practical use element of the course.



Hi-Force Product Training Courses can be tailored to suit individual needs and can be held for any number of days from one up to a full working week of five days. All Training Courses will incorporate a written and verbal exam, for all participating delegates, to ensure that the required level of learning is achieved. Delegates achieving the required minimum pass level will receive a Certificate, in recognition of their achievement.

Whilst primarily focused on our Distributor sales personnel and of course any new or existing members, of our own global sales team, we are also more than happy to offer Hi-Force Product Training to end users of our products.

ECITB MECHANICAL JOINT INTEGRITY TRAINING COURSES

Hi-Force is approved by ECITB (Engineering Construction Industry Training Board) for the provision of Mechanical Joint Integrity (MJI) training courses in line with industry standards and practices.

Hi-Force's ECITB approved Trainers have the technical and practical knowledge, and understanding to deliver these training courses. These in-house trainers have many years of "hands on" experience in the Oil, Gas and Petrochemical industries (onshore & offshore), as well as Power Generation and a wide variety of construction industry applications, requiring bolted joint technology. They are, of course, also fully trained and competent in the use of the various mechanical and high pressure, hydraulic tools used to deliver the training courses, in terms of theoretical, practical and the required Technical Testing (TMJI) as specified and required by the ECITB, prior to the issue of a certificate of successful completion to the delegate.

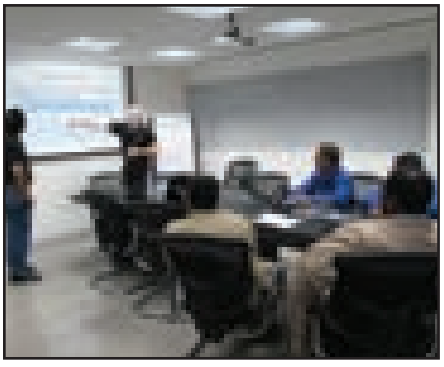
The technical content of the MJI training modules will include:

- Mechanical Joint integrity (Flange and Bolt Materials, Components, Lubricants, Dis-assembly, Inspection, Assembly)
- Safe use of high pressure hydraulic equipment
- General Tooling Maintenance
- Correct Tool selection

Hi-Force, as an approved ECITB Training Provider, will competently train all delegates that attend the training courses. All of these courses are most suited for delegates employed to carry out Mechanical Joint Integrity and Flange Management activities, that are or could be associated with potential work scopes to industry standards, or client specific requirements that follow industry guidelines.

Hi-Force can develop and provide training courses that will suit client specifications, if required and we will be happy to provide advice on any applicable industry standards. For further details please contact Hi-Force UK or the Regional Hi-Force Office or local Distributor.

Health and Safety is of paramount importance to Hi-Force, as we continuously strive to not only maintain the levels of competence of personnel in the bolting industry, but to further develop and improve these levels in order to reduce the potential risk of accidents or incidents wherever possible.



ECITB MECHANICAL JOINT INTEGRITY TRAINING COURSES

Hi-Force is a member of the ECITB and our Training School and Trainers are approved to deliver the following Training Courses and Technical Test Units.

Part 1 – Training - "Theoretical and Practical"

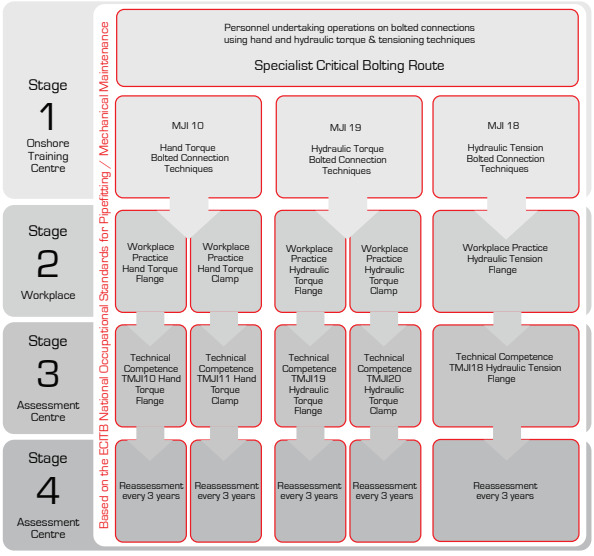
- MJI10 Hand Torque Bolted Connection Techniques
- MJI18 Hydraulically Tensioned Bolted Connection Techniques
- MJI19 Hydraulically Torqued Bolted Connection Techniques

Part 2 - Technical Tests - "Theoretical and Practical"

- TMJI10 Dismantle, Assemble and Hand Torque Flanged Joints
- TMJI11 Dismantle, Assemble and Hand Torque Clamp Connectors
- TMJI18 Dismantle, Assemble and Tension Bolted Connections (Hydraulic Tensioning)
- TMJI19 Dismantle, Assemble and Hydraulically Torque Flanged Joints
- TMJI20 Dismantle, Assemble and Hydraulically Torque Clamp Connector Joints

The Training and Technical Tests are provided as two separate elements of the overall course. The Technical Tests can be taken by the delegate, usually within 3 to 12 months, only after completion of workplace specific practical applications related to the new skills and knowledge obtained from the Training Course.

The ECITB training courses are fully documented and the details of the course content can be made available upon request.



The Future

Hi-Force continually monitors ASME and European standards and any changes that are introduced and implemented, will under guidance of the ECITB, be incorporated into our training modules and applied as required.

Industry Compliance

Hi-Force training modules comply with the following training standards and guidelines:

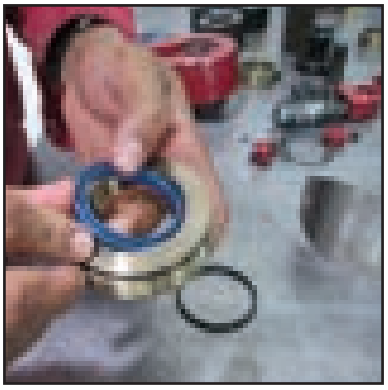
- ECITB MJI & TMJI Training & Testing Units (UK & International)
- Step Change in Safety Mechanical Joint Integrity Route to Competence Guidance
- BS EN 1591-4-2013: Flanges and their joints – Part 4 Qualification of personnel competency in the assembly of bolted connections of critical service pressurized systems
- ASME PCC -1-2013: Guidelines for pressure boundary bolted flange joint assembly
- Energy Institute Guidelines for the management of the integrity of bolted flange joints for pressurized systems
- BS EN 1591-1-2013: Flanges and their joints – Design rules for gasketed circular flange connections – Part 1 Calculations
- BS EN 1591-2-2008: Flanges and their joints – Design rules for gasketed circular flange connections – Part 2 Gasket parameters
- BS EN ISO 27509: 2012 Petroleum & Natural Gas Industries – Compact flange connections with IX seal ring
- BS EN 1515-2:2001: Flanges and their joints. Bolting. Classification of bolt materials for steel flanges, PN designated

SERVICE & REPAIR TRAINING COURSES

As a rapidly expanding manufacturer and supplier of high pressure hydraulic tools, Hi-Force recognises the very important role that after sales service and repair plays in achieving future sales growth. Ultimately the entire success of the Hi-Force brand is dependent on, not only manufacturing and supplying tools of the highest quality and performance, but also ensuring that users of our products are able to access a high quality after sales service, with readily available spare parts, wherever they are in the world. To help Hi-Force achieve this high standard of expectation, from our customers, we are placing the establishment of fully equipped Hi-Force Service Centers, manned by fully trained service and repair technicians as a top priority. To ensure this is achieved, Hi-Force has invested in and is proud to offer, modular training courses, in the correct service and repair of our complete range of products.

Hi-Force Service and Repair Training Courses are primarily available to our Global Distributor Network and are designed, to enable our Distributors, to gain the highly prestigious, Hi-Force Authorized Service Center accreditation. To achieve this, our Distributors need to send personnel for training and establish a fully equipped Service Center facility, within their own premises. To help with this, the Hi-Force UK Service and Repair Training facility, is modelled on exactly how, an Authorized Hi-Force Service Center should be set up, within the Distributors own facility. All Hi-Force offices globally, operate a fully equipped Service Center facility and in the future certain elements of our Service and Repair Training Courses will be made available within our Regional Office network.

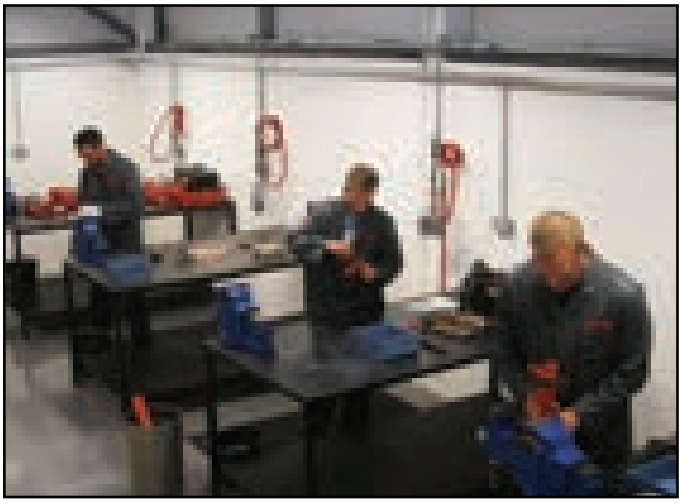
Establishing a Hi-Force Authorized Service Center offers many advantages, to our Distributors, including an increased revenue stream, through chargeable service and repair work, greater customer loyalty, gained from the benefits of offering full after sales support, authorization to carry out warranty work, on behalf of Hi-Force and of course the added opportunity to invest in Tool Rental services, given that a service center is vital for supporting this additional activity. To help Hi-Force achieve our goals, of establishing a professional, worldwide network of Authorized Service Centers, we offer several financial incentives, to our Distributors, to assist them, with becoming an Authorized Hi-Force Service Center.



We are also able to offer Service and Repair Training to end users, of our products, that prefer to have their own, in-house tool repair facilities. One of the major advantages of the modular design, of our Service and Repair Training courses, is that we can tailor courses to suit specific, individual requirements, of our end user customers. So if an end user customer is a major user of our bolting tools we can concentrate on the Service and Repair Training of hydraulic torque wrenches and stud bolt tensioners. Similarly if the customer is a user of our jacking systems we can focus the training on cylinders, pumps and accessories.

As with all of our Hi-Force training packages, we offer a mixture of theoretical classroom training with full hands on practical training, within the one designated Training School. Our Trainers are vastly experienced in all aspects of the courses we provide. Contact your local Hi-Force office for further details on all of our first class, training packages.

TRAINING



THE INFORMATION PAGES

BASIC PRINCIPLES OF HYDRAULICS

INTRODUCTION

The basic principles of hydraulics are not difficult to understand, knowing how and why hydraulic tools work will help the user to select the most suitable Hi-Force tools for the job, ensuring maximum performance at the most economical cost.

If the "Basic Principles of Hydraulics" detailed in this section of the catalog are of assistance to the reader, then its purpose of helping with the selection of the correct Hi-Force tool for the job has been achieved.

USING HYDRAULIC FLUID PRESSURE TO GENERATE A FORCE

a) Hydraulic Pressure

Hydraulic power provides one of the simplest and most powerful forms of producing considerable amounts of force within a confined space using hydraulic fluid pressure to generate a force. Since the early inventions of low pressure, heavy hydraulic lifting jacks through to the latest state of the art high pressure hydraulic systems of today, hydraulic power remains an extensively used and widely respected assistant to mankind's drive for even greater power and knowledge.

Pascal's law states that pressure applied at any point upon a confined fluid (liquid) is transmitted undiminished in all directions within the fluid (see figure 1 & 2). This means that by using hydraulic pressure as a medium a small force can be converted into an appreciable multiple of itself.

The actual fluid pressure involved plays a very important role in this "Multiplication of Force" and in this context there are two features of hydraulic pressure which are important to remember.

1. Hydraulic pressure is measured as a force per unit of area e.g. Bar (kg/cm²) or PSI (Pounds per Square Inch).

2. The hydraulic pressure at any point within the fluid is the same in all directions provided of course that the fluid is static (non moving) - see figure 1 & 2.

Figure 1

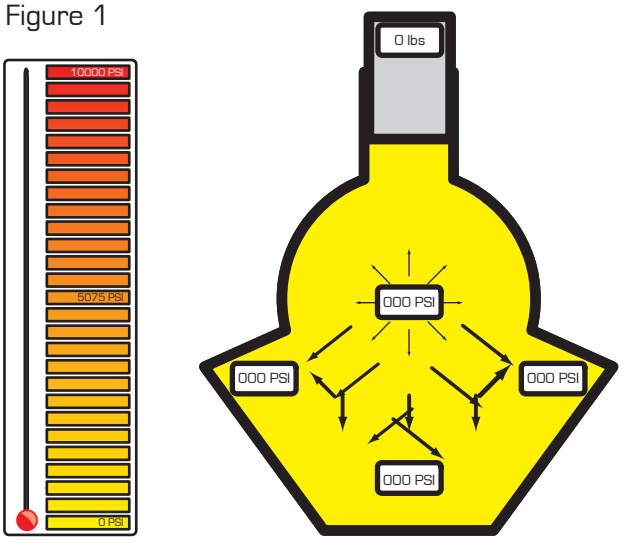
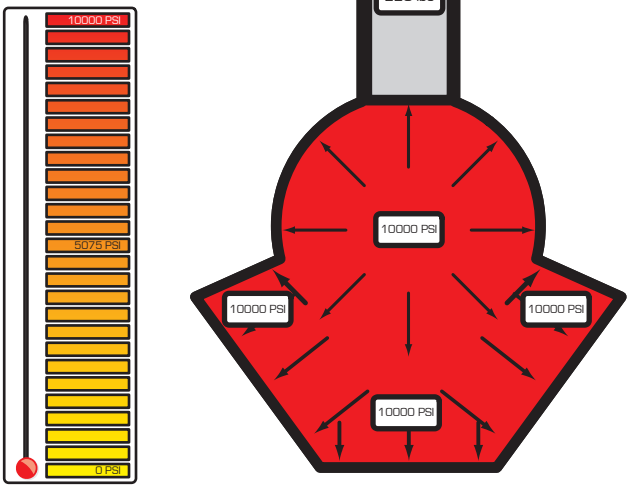


Figure 2



b) The Industry Standard

The accepted International Standard for maximum working pressure in the high pressure hydraulic tools industry is 10000 PSI (700 Bar) and the majority of the products detailed in this catalog have a maximum working pressure of 10000 PSI (700 Bar). Therefore where a particular cylinder is specified in this catalog as having a 11 tons maximum capacity, it must be noted that the maximum capacity is calculated at the maximum working pressure.

c) Pressure and Force

The criteria for establishing the maximum output force of a hydraulic cylinder at 10000 PSI pressure is the size of the effective area of the cylinder bore, i.e. the area to which the hydraulic fluid at a pressure of 10000 PSI is being applied. Because of this simple criteria it is possible to manufacture cylinders in the Hi-Force range from 5 tons up to in excess of 1115 tons capacity.

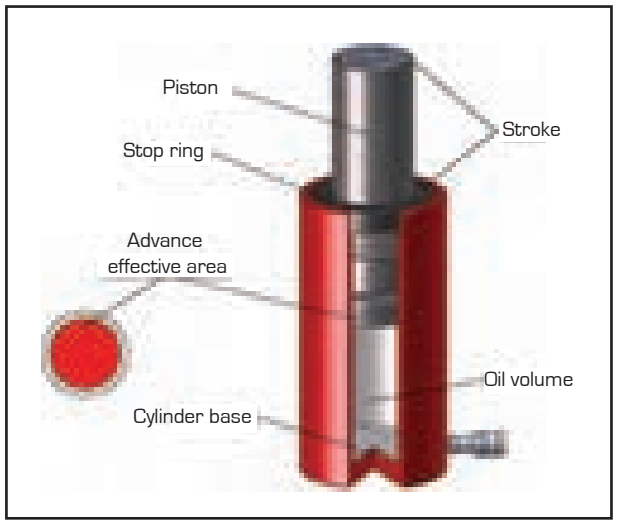
The equation for calculating the output force of a hydraulic cylinder, given that the effective area and design maximum working pressure are known, is simply : -

$$\frac{\text{Effective area (inch}^2\text{)} \times \text{Pressure (PSI)}}{2000} = \text{Output Force (Tons)}$$

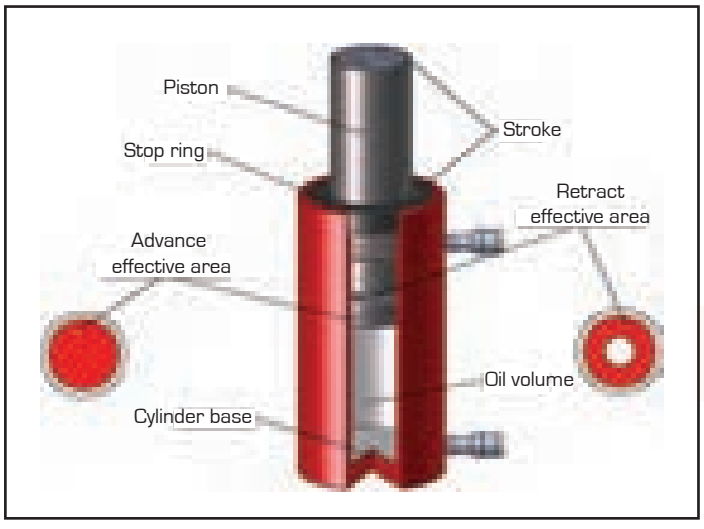
For example Hi-Force model reference HLS502 (page 13) has an effective area of 11.05 inch^2 and therefore a maximum working pressure of 10000 PSI : -

$$\frac{11.05\ (\text{inch}^2) \times 10000\ (\text{PSI})}{2000} = 55\ \text{Tons}$$

Single acting cylinder



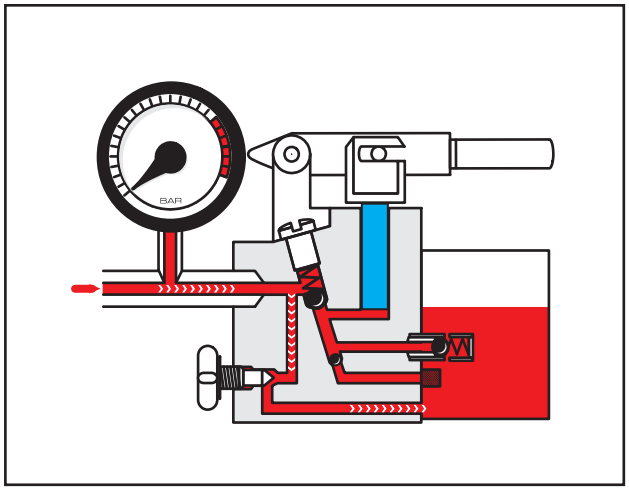
Double acting cylinder



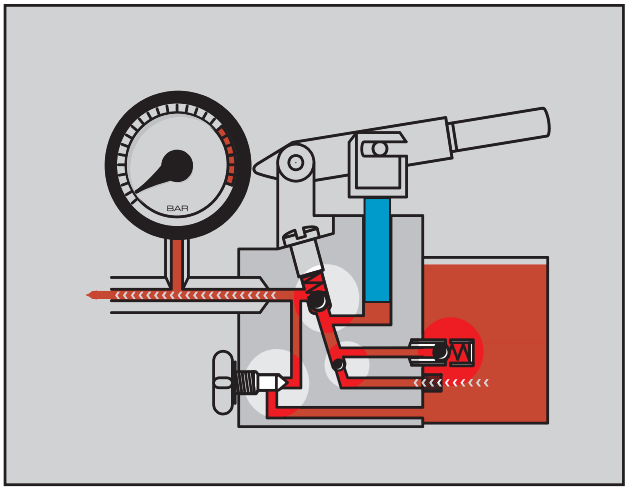
d) The Pump

Hydraulic pressure is provided by a hydraulic pump (manual or powered operation) that pumps the hydraulic fluid into the cylinder bore via a flexible hydraulic hose connected to the cylinder quick connect inlet coupling.

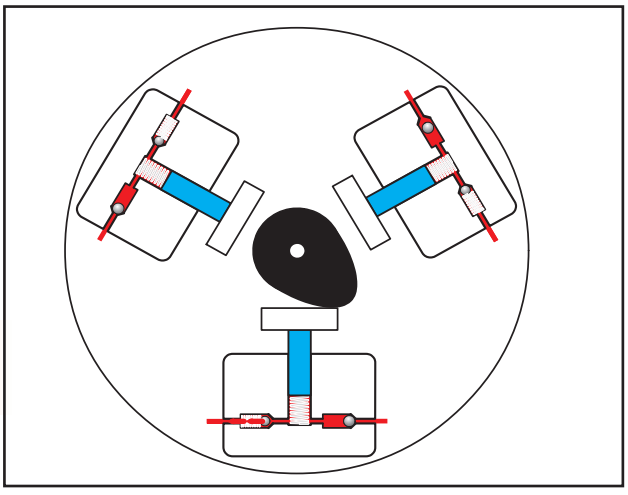
Hand operated pumps are the simplest form of pump and consist of a pumping piston, release valve, and suction and delivery check valves. The pump is operated by closing the valve and then raising and lowering the handle to pump fluid from the reservoir to the pump outlet connection. This action produces a steadily increasing fluid pressure generated by the downward leverage of the pump handle in conjunction with the opening and closing of the suction and delivery check valves. Power pumps replace hand leverage with a motive driven rotational force, i.e., electric, air or gasoline engine driven motor.



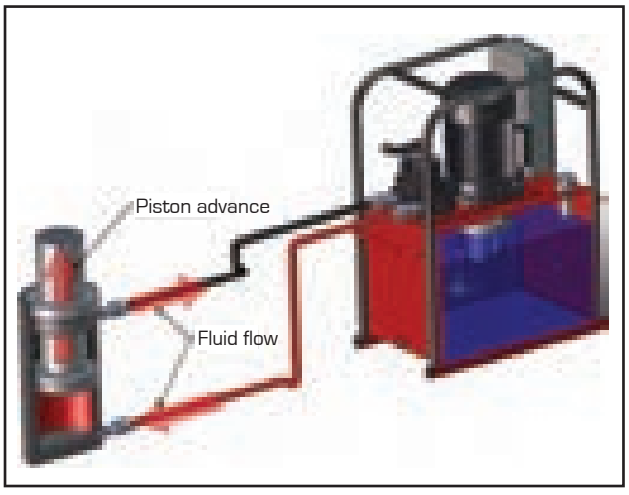
Single speed hand pump



Suction, delivery & release valve highlighted



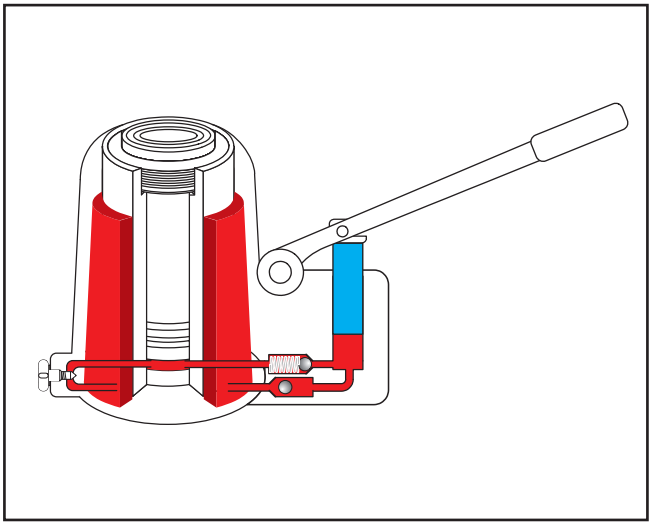
Multiple piston block powered pump



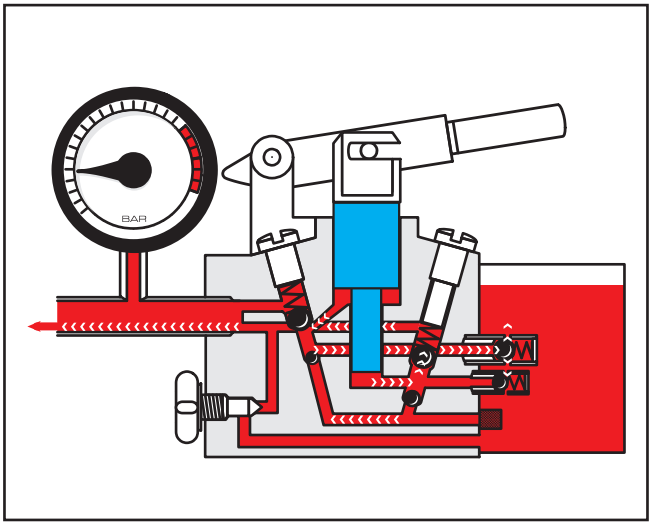
Double acting cylinder & powered pump set

BASIC PRINCIPLES OF HYDRAULICS

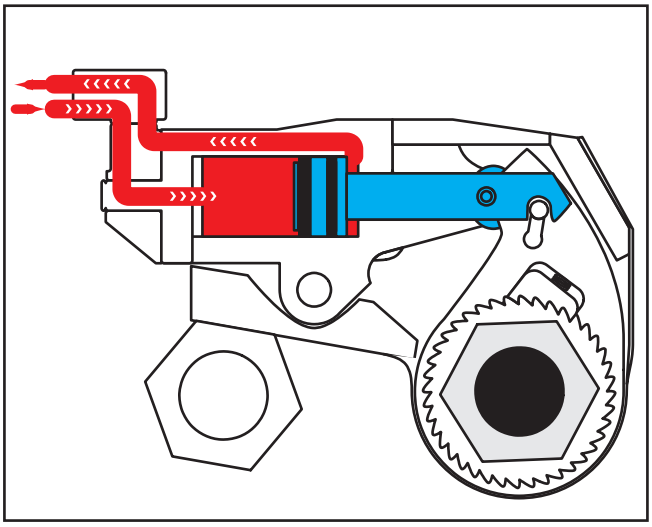
As the hydraulic fluid enters into the bore of the cylinder it forces the cylinder piston to move upwards. Any resistance to the upward movement of the piston, e.g. a load, will result in the fluid pressure increasing as the operator continues to actuate the pump lever up and down. The fluid pressure will continue to increase either until the piston overcomes the resistance (load) and moves upwards until it reaches the end of its designed stroke length or the fluid pressure reaches the maximum permissible pressure of 10000 PSI and the pump safety pressure relief valve is activated preventing over pressurization above 10000 PSI.



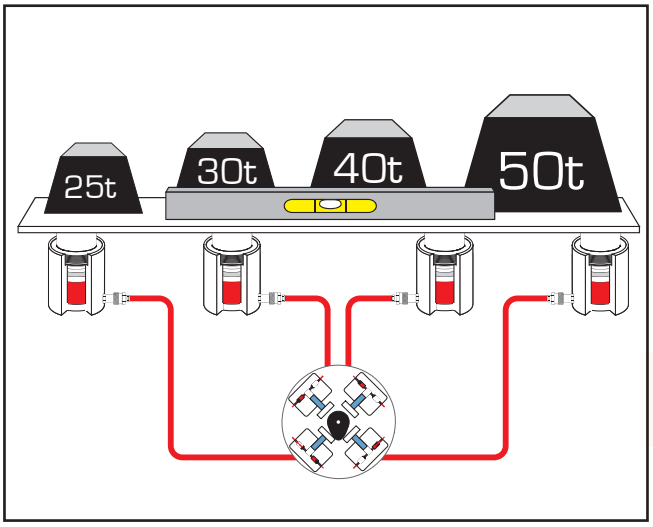
The internal workings of a hydraulic jack



A two speed hand pump circuit



The internal workings of a TWH-N hydraulic wrench



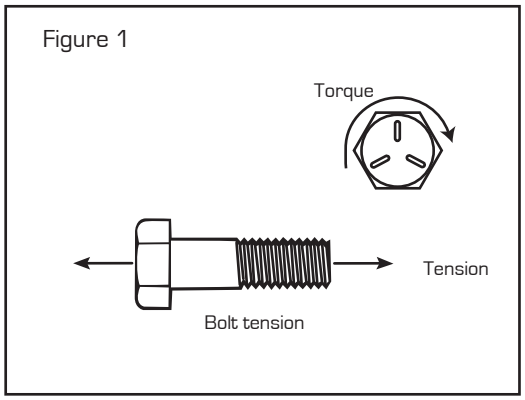
A split flow synchronized lift schematic

BASIC PRINCIPLES OF BOLTING TOOLS AND EQUIPMENT

Since the invention of using threaded bolts and nuts to join various components together was introduced centuries ago, the methods of bolt tensioning and the tool design technology have improved tremendously to the extent that Hi-Force offers the most comprehensive range of bolting products available from a single source anywhere in the world!

From basic high quality, calibrated hand torque wrenches to the latest "State of the Art" hydraulic torque wrenches and bolt tensioners, Hi-Force can deliver the right tool for the job on time, every time!

Figure 1



This section of the catalog provides basic information about the methods of applying tension to a bolted connection. There are three possible methods to tighten threaded fasteners, by torque which is rotation of the nut or bolt head, by direct tension to stretch the fastener, or by heat to expand the fastener.

Torque and tensioning (see figure 1) probably covers 99% of bolting applications, and it is these two methods that are detailed in this catalog.

What is tension and how does it affect a bolted fastener ?

As with most materials, steel which is predominantly used in the manufacture of bolts and nuts, has an inherent "elasticity" i.e. it can be stretched between two points. The tension that is imparted into the bolt acts as a clamping force to hold the bolted components together. Care must always be taken when stretching the bolt to ensure that its "yield point" is not exceeded which will cause the bolt to lose its physical properties of elasticity.

Hooke's law states that the amount of distortion (lengthening, shortening, bending or twisting) applied will be directly proportional to the applied force, provided the applied force is kept within the material's elastic limits. For most industrial applications, a fastener should be tightened until it has a retained tension of 40 to 60 percent of its elastic limit.

For a threaded fastener to correctly hold (clamp) components together it must be "stretched" (tensioned) to a known accurate amount. A threaded fastener that is under-tightened could work loose and come apart, resulting in a "shearing force" developing between the mating parts which could cut the bolt in two. A loose fastener may also lead to further mechanical looseness of surrounding machinery parts causing unnecessary vibration and wear. Fluid and gas leaks could also occur due to incorrect sealing in pressure joints, which could be extremely dangerous if any of the materials to be sealed are toxic, flammable or explosive.

An over-tightened fastener could cause damage to the bolted components, excessive over-tightening will cause the bolt and/or nut to deform causing loss of tension in the fastener as it exceeds its elastic limit (yield point).

For most industrial applications, the equipment manufacturers, as well as structural and piping component designers, will provide the torque or tension specifications for the relevant fastener(s) to be used to connect the component parts. It is vitally important to adhere to these specifications to ensure a correctly tensioned joint is achieved.

BASIC PRINCIPLES OF BOLTING TOOLS AND EQUIPMENT

How do we generate tension in the bolt ?

As mentioned earlier the two most common methods to impart tension into a threaded fastener are by torque (see figure 2) or by direct tension (see figure 3).

Torque is defined as the turning or twisting force exerted on a nut or bolt head and it is the product of two measurements i.e. force and distance (see figure 4). Force is measured in units of Pounds or Newtons and is quite simply the amount of force applied at a given distance from the centre of the item being turned or twisted. Distance is measured in units of length i.e. inches, feet, centimetres or metres. Torque is expressed as a combination of the relevant units of force and distance i.e. pounds feet (lbf.ft) in the imperial system or Newton metres (Nm) in the metric system. Torque is applied to a threaded fastener by a variety of manual and power driven types of torque wrenches.

Newton's law states that for every applied force there is an equal and opposite reactive force. Therefore as the torque is applied to the nut, by turning it increases, it will create a tension in the bolt which will act as a "clamping force" within the effective thread length. Initially this clamping force will pull the two bolted components together and subsequently it will build up and retain a known tension (load) within the fastener to maintain the joint integrity.

The amount of torque to be applied to a threaded fastener will depend on several factors including the design application, type of joint, size, length and quantity of fasteners to be used and the type of thread lubricant. Ordinarily the torque applied should not be outside of the 40-60% of minimum yield range. Hi-Force BOLTRIGHT PRO software program (see pages 92 and 118) assists the user to accurately calculate the required torque/ tension to achieve a successful joint bolt up.

Figure 2

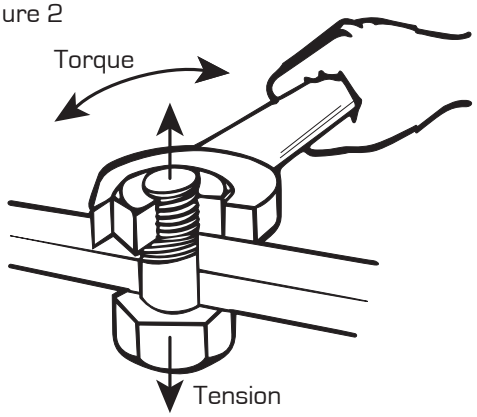


Figure 3

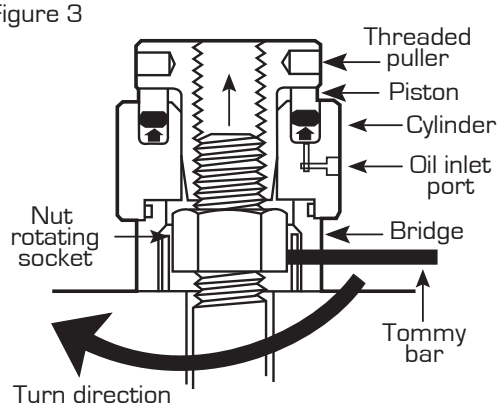
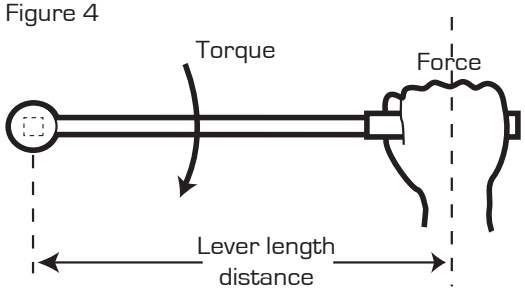


Figure 4



Direct tension is applied to the fastener using a hydraulic tensioning device commonly known as a hydraulic bolt tensioner (see figure 3). This is a high pressure hydraulic cylinder, with accessories, designed to seat against the joint, grip the fastener thread using a compatible threaded puller, and via applied hydraulic pressure extend the cylinder piston against the puller, to pull (stretch) the bolt or stud to a known tension in tonnes or kN. When the pull force equals the desired bolt preload, plus an additional amount to compensate for bolt relaxation, the nut is run down the thread using a short tommy bar until it is tight against the joint face. The hydraulic pressure is then released and the threaded fastener is prevented from returning to its original length, by the tightened nut, subsequently leaving the required tension retained in the fastener.

BASIC PRINCIPLES OF BOLTING TOOLS AND EQUIPMENT

Hydraulic bolt tensioners are commonly used in multiples linked to a single hydraulic pump unit particularly in applications where reliable leak free joints are required. By using a number of tensioners simultaneously the operator is able to ensure an even pull down of the joint components, resulting in uniformity of gasket compression and consistent leak free joints. As with torque, the actual amount of tension to be directly applied to the threaded fastener by the hydraulic bolt tensioner, should be confirmed by the equipment manufacturer or designer. The majority of hydraulic bolt tensioners operate at a maximum hydraulic pressure of 21750 PSI and certainly this maximum pressure/tension load should never be exceeded.

Correct Tool Selection

Having now understood the two most common methods of applying tension to the fastener (torque or direct tension) let us now look at the various types of tools available to accurately and successfully complete the given task, along with other bolting products available from Hi-Force.

Hand Torque Wrenches

Probably the most commonly used tool, for accurately tightening threaded fasteners in the world !! Hand torque wrenches are designed and manufactured on the basis of Hooke's Law i.e. force x distance.

Hi-Force hand torque wrenches incorporate a reversible ratchet design drive head and a clear, easily adjustable torque setting scale. All Hi-Force hand torque wrenches are designed and manufactured to International Standard ISO 6789:2003. Each model is supplied marked with a unique serial number, traceable to an individual test and calibration certificate, and provides a repeatable accuracy of +/- 3% for TWM models and +/- 4% for the HTW-B models.

Hi-Force hand torque wrench models incorporate a clear, easily adjustable torque setting dual scale that gives accurate reading in Nm and PSI. Full technical specification on the Hi-Force range of hand torque wrenches can be found on pages 68 - 70 of this catalog.

Mechanical Torque Multipliers

A mechanical torque multiplier is a mechanical device that multiplies the preset amount of input torque applied by the operator using a calibrated hand torque wrench. Hi-Force mechanical torque multipliers incorporate a single stage planetary gear in models up to 2050 lbf.ft and a two stage planetary gear in models up to 7330 lbf.ft. The greater the number of stages within the planetary gear train, the higher the output torque achieved, relative to the input torque applied. Due to the greater output torque produced using mechanical torque multipliers, it is necessary to incorporate an integral reaction arm to absorb the opposing reactive force generated (Hooke's Law). Great care must be taken to ensure that the reaction arm is correctly located against a suitably strong reaction point prior to operating the tool. Because the power output cannot exceed the power input, the number of output rotations will be lower than the number of input rotations. Hi-Force mechanical torque multipliers are available with multiplication ratios of 1:4, 1:5, 1:5.5, 1:16, 1:18 and 1:28.5 and full technical details can be found on page 71 of this catalog.

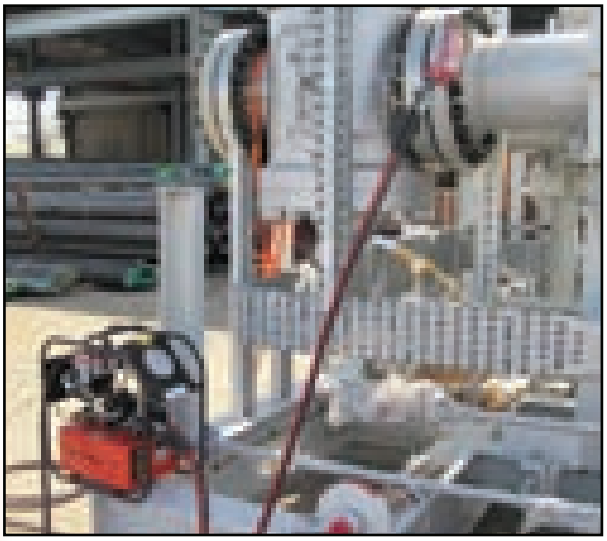
Pneumatic Torque Multipliers

A pneumatic torque multiplier operates in the same way as a mechanical torque multiplier except that the input motive force is provided by a pneumatically driven air motor instead of a manually operated manual torque wrench, making the tool both faster and easier to operate. Torque output is preset and adjusted by regulating the input air pressure, supplied to the pneumatic motor, which will control the amount of input torque applied to the planetary gear train. As the torque output increases the air motor will gradually slow down, until it eventually stalls i.e. the opposite reactive force generated becomes equivalent to the input torque of the air motor. Each tool is supplied with an airline filter, regulator, lubricator unit in a handy carrying frame with integral air line pressure gauge and 10 feet connecting hose. Repeatable accuracy of +/- 5% can easily be achieved in conjunction with the individual torque calibration chart supplied with each tool. Full technical details can be found on pages 72 - 73 of this catalog.

BASIC PRINCIPLES OF BOLTING TOOLS AND EQUIPMENT

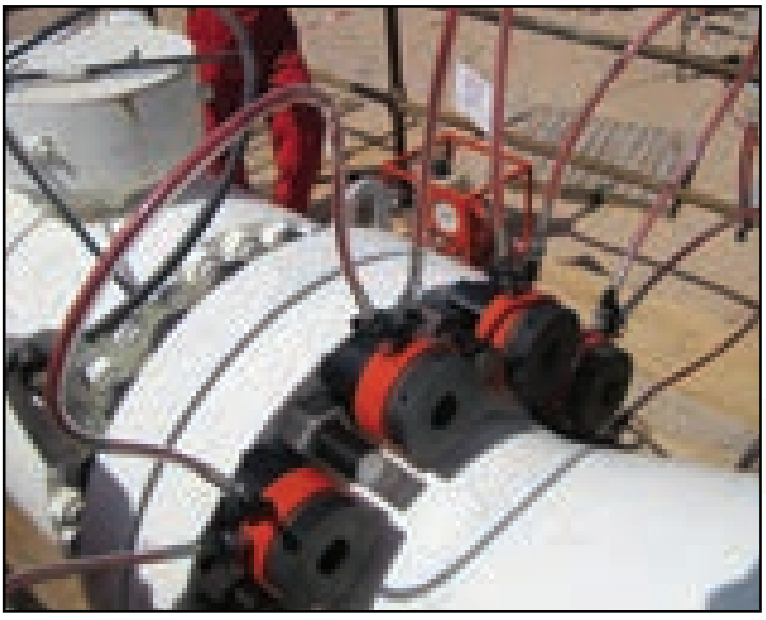
Hydraulic Torque Wrenches

Hydraulic torque wrenches are specifically designed for applications where limitation of space and/or particularly high output torque is required. The design of a hydraulic torque wrench utilizes the far higher leverage forces generated from a hydraulic piston, using high pressure hydraulic power supplied from an air or electric driven pump. The hydraulic piston is connected to a ratchet via a reaction pawl assembly which allows it to engage the ratchet teeth in the advance mode to rotate the nut or bolt head, and subsequently release during piston retraction to re-engage in the next forward push position. All Hi-Force hydraulic torque wrenches operate at 10000 PSI maximum hydraulic pressure, incorporate a double acting heavy duty hydraulic piston for fast and easy operation, and can be used for accurately tightening or loosening nuts/bolts. A choice of standard square drive tools, suitable for use with a variety of sizes of torque wrench sockets, or hexagon drive cassette head tools that locate directly on to the nut/bolt are available. Full technical specifications can be found on pages 74 to 83 of this catalog.



Hydraulic Bolt Tensioners

Hydraulic bolt tensioners provide the most consistent and accurate method of applying tension to bolted connections. Comprising of four component parts, i.e. bridge, nut rotating socket, threaded puller and load cell, hydraulic bolt tensioners offer a safe, accurate method of ensuring consistent joint integrity. Sub-sea tensioners consists of only two parts, i.e a bridge mounted load cell and a quick fit threaded puller. Designed to directly stretch the bolt by applying a known load to the fastener using a hydraulic load cell and threaded puller, the securing nut is rotated using a short tommy bar, whilst the thread is being stretched, until it is firmly tightened against the joint face. Immediately after the hydraulic pressure (load) is released, the bolt tension is retained because the threaded fastener is prevented from returning to its original length by the tightened nut. Hydraulic bolt tensioners can be linked together in multiples to ensure an even “pull down” or tension is applied to all bolts simultaneously. This is particularly critical in applications where a sealing gasket is used and consistent leak free connections are required. Full technical specification can be found on pages 93 to 114 of this catalog.



BASIC PRINCIPLES OF BOLTING TOOLS AND EQUIPMENT

Nut splitters

Hydraulic nut splitters provide the perfect answer for removal of worn, damaged or corroded fasteners that cannot be opened using torque or tensioning tools. The nut splitter design incorporates a powerful hydraulic piston to drive a precision engineered, angled splitting wedge into the flat face of the nut. The splitting wedge is manufactured from high grade tool steel for maximum life and can be easily removed for re-sharpening or replacement. The angled design of the splitting wedge allows the nut to be split with minimal damage to the threads on the bolt or stud. Full details can be found on pages 154 to 156 of this catalog.

Impact Wrenches

Air driven (pneumatic) impact wrenches are probably one of the most commonly used tools in the bolting industry today. Ideally suited for run down or fast removal of bolted connections, all models operate using a standard 90 PSI air line pressure. Hi-Force industrial quality impact wrenches have a 4 position adjustable power output device, however torque accuracy cannot be measured or guaranteed due to the impact design of these tools. Full technical details can be found on page 91 of this catalog.

Flange Spreaders

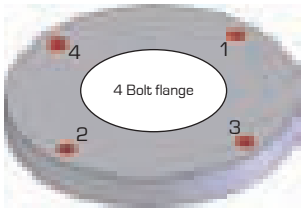
Flange spreaders provide the perfect answer for separating flange joints for maintenance etc..... after bolt removal. Hi-Force flange spreaders are available in both mechanical and hydraulic options. Full technical details can be found on pages 157 to 161 of this catalog.

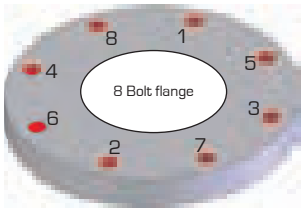
Sockets and Accessories

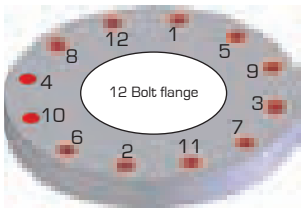
Most of the bolting products detailed in this catalog will also require a selection of accessories to assist with the relevant bolting application. Hi-Force offers an extensive range of sockets, hexagon drives, hexagon reducer bushes and backup wrenches suitable for use with Hi-Force bolting tools. Full specifications and available options in both imperial and metric standard sizes are detailed on pages 76, 77, 78, 83, 84, 85 and 86 of this catalog.

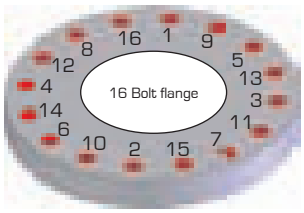
TIGHTENING SEQUENCE & BOLTING PROCEDURE FOR FLANGE BOLTS

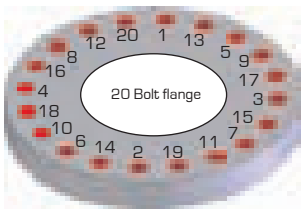
As explained on page 193, the two most common methods for tightening of bolted flange joints are either by torque using torque wrenches or by direct tension using hydraulic bolt tensioners. Regardless of the method selected a pre-bolting inspection is essential if an accurate and leak free joint is to be achieved first time, every time. The inspection must include checking for any damage to the gasket and sealing surfaces, ensuring that the bolts and nuts are the correct size and material, are not damaged in any way and that the correct lubricant is to be used. In addition, it is vital that the two flanges are correctly aligned to each other and that the bolts can be easily fitted through the bolt holes. If any of the above checks are not satisfactory immediate remedial action must take place before starting to bolt up the joint.

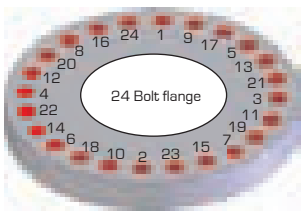


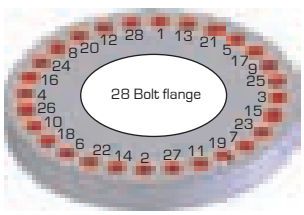


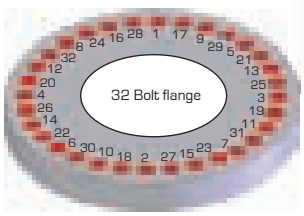












Tightening using torque wrenches

Insert the bolts through both flanges and hand tighten the nuts on both sides ensuring that there is full thread engagement on both nuts of every bolt. Square up the joint and ensure that all bolts are freely moving through the bolt holes and that the nuts are hand tightened against the outer flange faces. Number all bolts sequentially in a diametrically opposed fashion as shown in the illustrations on the right. Commence tightening of the bolts sequentially starting with a first pass at 25% of the final specified and required torque figure, a second pass at 50% and then a third pass at 100%. Finally a check pass should be carried out in either a clockwise or anti-clockwise direction at 100% of the required torque to ensure all bolts are uniformly tightened.

Tensioning procedure using hydraulic bolt tensioners

Insert the bolts through both flanges and hand tighten the nuts on both sides ensuring that there is full thread engagement on both sides. Take care to ensure that on the selected flange face, to which the tensioners are to be affixed, that there is at least 1 x diameter (*) of the bolt thread protruding above the nut face. This is required for the tensioner puller to attach correctly and if insufficient thread is exposed then the tensioning procedure must not proceed. The exact number and positioning of the hydraulic bolt tensioners must then be ascertained i.e. 25%, 33%, 50% or 100% simultaneous tensioning of all the bolts in the respective joint. After deciding the number of bolt tensioners to be used simultaneously, affix them to the exposed thread end of the bolts, equally spaced around the flange for 25%, 33% or 50% simultaneous tensioning, or on every bolt in the case of 100% simultaneous tensioning. Please refer to page 200 and to the Hi-Force operating manual for bolt tensioners for detailed instructions. After correctly assembling all of the bolt tensioners on to the flange, hook up the interconnecting hydraulic hoses and the mainline hose to the air driven pump unit and apply the applicable hydraulic pressure, as specified by either the joint equipment manufacturer or the BOLTRIGHT PRO software (see page 118). In cases other than 100% simultaneous tensioning there will be two different hydraulic pump pressures to be applied to the bolt tensioners and these should be strictly adhered to. Once all of the bolts have been tensioned using the Hi-Force bolt tensioners the joint is ready for testing. Take note that it is normal to have to make 2 or 3 passes around the bolts when tensioning at 50% or less and usually the lower the number of tensioners being used simultaneously, the more passes that will need to be done and hence it will take more time to complete the joint tightening.

Whether tightening the bolts using a torque wrench or bolt tensioners it is a good idea to carry out a final check for tightness of all the bolts by simply tapping each nut with a hammer and listen to see if a high pitched ringing sound is achieved. A dull sound indicates that the respective bolt is still loose.

(*) For sub-sea tensioners, please see note on page 200.

TIGHTENING SEQUENCE & BOLTING PROCEDURE FOR FLANGE BOLTS

Hi-Force hydraulic bolt tensioners offer the quickest, safest and most accurate means of applying a specific residual load to bolts. Bolt tensioners can be used to easily achieve an accurate and pre-determined bolt loading in a single, simultaneous operation, providing the uniform gasket compression, essential for the integrity of critical bolted connections. Ideally all bolts in the joint should be tensioned simultaneously i.e. 100%, however 50%, 33% or even 25% simultaneous tensioning can be carried out, which then requires the operator to make two, three or four tensioning operations by moving around the bolts in diametrically opposed fashion. Whilst partial tensioning will take longer to complete the task, it enables the user to optimize between the cost of the equipment and the available time.

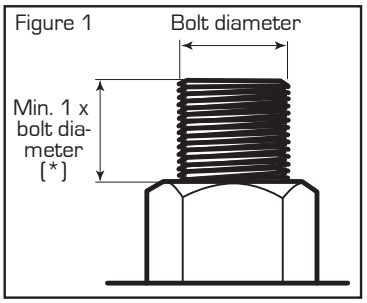
Hi-Force hydraulic bolt tensioners are designed to directly stretch the bolt by applying a known load to the fastener using a hydraulic cylinder and threaded puller. The securing nut is then rotated using a short tommy bar, whilst the thread is being stretched, until it is firmly tightened against the joint face. Immediately the hydraulic pressure (load) is released the bolt tension (residual load) is retained, within the clamp length of the bolt, because it is prevented from returning to its original length by the tightened nut.

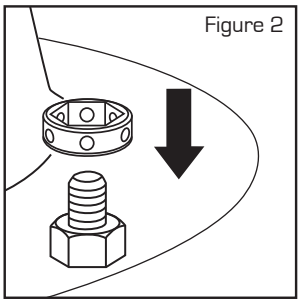
To operate hydraulic bolt tensioners on bolted connections safely, an extra length of threaded stud above the nut, of at least 1x bolt diameter (*), is required to facilitate easy fitment of the equipment (see figure 1). Assembly of the tensioners to the bolt is quick and easy, provided of course that the bolts and nuts are clean, lubricated and in good condition (see figures 2-5).

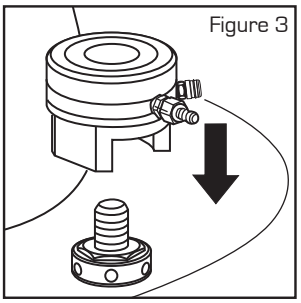
Hi-Force has considerable experience in providing precise calculations of the correct bolt load to be applied to ensure an accurate residual load is imparted into the bolts, whether they be tightened using a 100%, 50%, 33% or 25% simultaneous tensioning procedure (see figures 6-9).

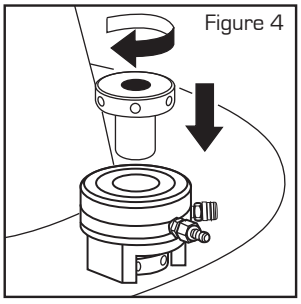
Please refer to page 118 for further details on the Hi-Force BOLTRIGHT PRO software program.

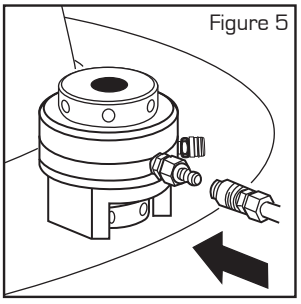
(*) Depending on the bolt size, sub-sea tensioners (STU Range) may require an extra length of threaded stud above the nut, up to 4.8 x the diameter.

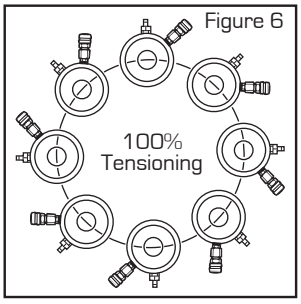


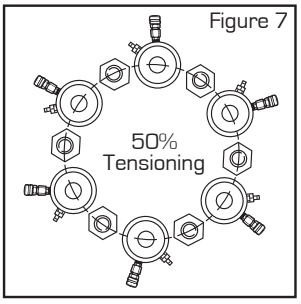


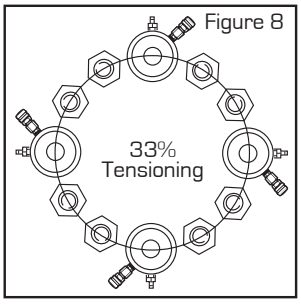


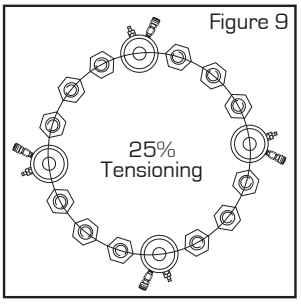












Note: If 100% tensioning cannot be achieved by attaching all bolt tensioners to one side of the flange, due to a lack of space, then alternate the tensioners on opposite sides of the flange.

IMPERIAL TO METRIC CONVERSION CHART

Imperial Unit	Conversion Factor	SI Unit Metric Equivalent	Conversion Factor	Imperial Unit
Pressure				
PSI	x 0.069	Bar	x 14.5	PSI
lbf.inch^2	x 0.069	Bar	x 14.5	lbf.inch^2
PSI	x 6.89	kPa	x 0.145	PSI
PSI	x 0.00689	MPa	x 145	PSI
Volume				
inch^3	x 16.4	cm^3	x 0.061	inch^3
inch^3	x 0.016	litre	x 61	inch^3
gallon	x 4.54	litre	x 0.22	gallon
yard^3	x 0.76	m^3	x 1.3	yard^3
Area				
inch^2	x 645	mm^2	x 0.00155	inch^2
inch^2	x 6.45	cm^2	x 0.155	inch^2
foot^2	x 0.0929	m^2	x 10.8	foot^2
Length				
inch	x 25.4	mm	x 0.03937	inch
inch	x 2.54	cm	x 0.3937	inch
foot	x 0.305	m	x 3.28	foot
Force				
pound	x 4.45	N	x 0.225	pound
pound	x 0.00445	kN	x 225	pound
Torque				
lbf.ft	x 1.356	Nm	x 0.738	lbf.ft
lbf.inch	x 0.113	Nm	x 8.9	lbf.inch
lbf.ft	x 0.1382	kgf.m	x 7.2345	lbf.ft
Mass				
ounce	x 28.3	g	x 0.035	ounce
pound	x 0.4536	kg	x 2.2046	pound
ton (short)	x 0.907	t	x 1.1023	ton (short)
Flow				
inch^3/min	x 16.4	cm^3/min	x 0.61	inch^3/min
gallons/min	x 3.785	litres/min	x 0.2642	gallons/min
Power				
hp	x 0.746	kw	x 1.34	hp
Btu/s	x 1.055	kw	x 0.948	Btu/s
ft lb/s	x 1.36	w	x 0.74	ft lb/s

Temperature

To calculate Fahrenheit to Celsius :	(°F - 32) / 1.8 = °C
To calculate Celsius to Fahrenheit :	(°C x 1.8) + 32 = °F

RECOMMENDED TORQUE VALUE CHART

Use this chart as a guideline for the correct torque to be applied to standard size metric and imperial bolts in grades 8.8 (metric) and ASTM A193 grade B7 (imperial) or similar. The torque figures are calculated in both metric (Nm) and imperial (lbf.ft) values using a choice of three commonly used bolt thread lubricants. Always consider the coefficient of friction applicable for the chosen bolt lubricant. For grade 10.9 bolts add 47% and grade 12.9 bolts add 72% to the figure detailed against the relevant 8.8 grade metric bolt size.

Remember these torque values are for guidance purposes only! Always check with the equipment/bolt manufacturer for the actual torque required and specified for bolted components within the particular equipment design.

ALL VALUES ARE BASED ON 60% OF THE BOLT YIELD STRESS

Bolt diameter (see note1)	Nut AF Size (see note 2)	Bolt tension (for grade ASTM A193 B7) (see note 3)		Torque value (for grade B7 bolt) for specified lubricant Moly: f = 0.06 see note 4		Copper: f = 0.10 see note 4		Machine Oil: f = 0.15 see note 4	
		(lbs.force)	kN	lbf.ft	Nm	lbf.ft	Nm	lbf.ft	Nm
5/8"	1 1/16"	13044	57	73	99	110	149	156	211
3/4"	1 1/4"	18559	82	126	170	191	259	272	369
7/8"	1 7/16"	25830	115	199	270	303	411	433	587
1"	1 5/8"	38555	171	296	401	451	611	644	874
1 1/8"	1 13/16"	50247	224	423	574	650	882	934	1267
1 1/4"	2"	63487	282	583	790	901	1222	1300	1762
1 3/8"	2 3/16"	78271	349	777	1054	1210	1640	1750	2373
1 1/2"	2 3/8"	94602	422	1011	1370	1581	2143	2293	3109
1 5/8"	2 9/16"	112479	501	1286	1744	2020	2739	2938	3983
1 3/4"	2 3/4"	131904	586	1608	2180	2535	3436	3693	5007
1 7/8"	2 15/16"	152874	680	1978	2682	3129	4243	4568	6193
2"	3 1/8"	175389	780	2402	3256	3810	5166	5570	7552
2 1/4"	3 1/2"	225061	1001	3420	4638	5453	7393	7994	10838
2 1/2"	3 7/8"	280917	1250	4692	6361	7510	10183	11034	14960
2 3/4"	4 1/4"	310296	1381	6244	8465	10029	13597	14760	20011
3"	4 5/8"	372024	1655	8104	10988	13054	17699	19241	26088
3 1/4"	5"	439349	1954	10301	13966	16633	22551	24548	33283
3 1/2"	5 3/8"	512269	2279	12862	17438	20812	28218	30750	41692
3 3/4"	5 3/4"	590785	2628	15815	21442	25638	34761	37917	51409
4"	6 1/8"	674898	3003	19188	26015	31157	42244	46119	62529

ALL VALUES ARE BASED ON 60% OF THE BOLT YIELD STRESS

Bolt diameter (see note1)	Nut AF Size (see note 2)	Bolt tension (for grade 8.8) (see note 3)		Torque value (for grade 8.8 bolt) for specified lubricant Moly: f = 0.06 see note 4		Copper: f = 0.10 see note 4		Machine Oil: f = 0.15 see note 4	
		(lbs.force)	kN	lbf.ft	Nm	lbf.ft	Nm	lbf.ft	Nm
M16	24	13509	51	64	87	98	133	140	189
M20	30	21197	85	126	171	191	259	273	370
M24	36	30543	136	217	294	330	447	470	638
M27	41	40417	180	314	425	481	653	691	937
M30	46	49116	219	429	582	656	890	940	1275
M33	50	61453	273	572	775	880	1193	1266	1716
M36	55	72075	321	741	1005	1137	1541	1632	2212
M39	60	86874	387	947	1284	1461	1981	2104	2853
M42	65	99617	443	1181	1601	1817	2463	2611	3540
M45	70	116703	519	1459	1978	2255	3057	3250	4406
M48	75	131157	583	1774	2405	2735	3708	3936	5337
M52	80	157758	702	2253	3054	3490	4732	5037	6830
M56	85	181917	809	2815	3817	4357	5907	6283	8519
M60	90	221649	947	3459	4689	5374	7286	7768	10532
M64	95	240948	1071	4178	5664	6480	8786	9358	12688
M68	100	276631	1230	5006	6788	7793	10566	11276	15289
M72	105	314641	1400	5937	8050	9271	12570	13439	18221
M76	110	337437	1502	6976	9458	10925	14812	15861	21505
M80	115	360234	1603	8128	11020	12763	17305	18557	25160
M90	130	467173	2078	11603	15731	18330	24852	26739	36253
M100	145	587739	2614	15975	21660	25364	34389	37100	50301

Notes: 1 = Bolt Material Grades 8.8 (Metric) and ASTM A193/BS4882 Grade B7 (Imperial) or similar
2 = AF size based on heavy series nuts
3 = Bolt tension equates to a bolt stress of 60% of the minimum yield strength
4 = Torque figures detailed are based on 60% of the minimum bolt yield stress

NEW PRODUCTS

HHA - Hollow Piston Aluminum Cylinders

See page 17

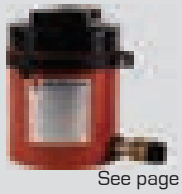
HDA8006 & HDA10006 - High Tonnage Cylinders

See page 20

HFL4002 - Low Height Failsafe Lock Ring Cylinder

See page 21

HFG8006 & HFG10006 - Failsafe Lock Ring Cylinders



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HGG/HSG - Single Acting Load Return High Tonnage Cylinders

See page 23

HPX - Manually Operated Ultra High Pressure Pump

See page 34

HDG/HDD/HPT - Digital gauge, Display unit & Pressure transducer

See pages 54-55

HM-C-SU / HM-C-DU - Controlled Manifold Units

See page 57

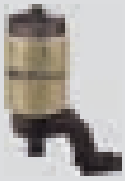
TWM - Manual Torque Wrenches

See page 68

TWM - Manual Torque Wrenches Aluminum

See page 70

TWG - Mechanical Torque Multipliers



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TWP / TWP-OG - Pneumatic Torque Multipliers

See pages 72-73

TPA / TPE - Torque Wrench Pumps Premium Line

See pages 88-89

HTWR1 - Torque Wrench Hose Reel

See page 90

SBT - Spring Return Topside Bolt Tensioners

See pages 94-101

HPX1500BTU - Manual Pump for Bolt Tensioners

See page 115

ITP / MTP - Bolt and Nut Protection Caps

See page 117

MHP - Manually Operated Hydrotest Pumps

See pages 120-121

SPP - Heavy Duty Hydraulic Pullers

See pages 133-134

HBR / HPR - Pin & Bush Replacement Tool Kits

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RKT / RKF - Roller Skate Kits

See page 163

RSN - Multi-purpose Skates

See page 164

RSA - Heavy Duty Skates

See page 164

RSG / RSD - Heavy Duty Skates with Grooved Guide

See page 165

CONTACT DETAILS HI-FORCE OFFICES

U.K. - Head Office :

Hi-Force Limited
Prospect Way
Daventry
Northants, NN11 8PL
United Kingdom

Tel: +44 1327 301 000

Email: daventry@hi-force.com

U.K. - Regional Office :

Hi-Force Aberdeen
Unit 8, Ashley Group Base
Pitmedden Road
Aberdeen, AB21 0DP
United Kingdom

Tel: +44 1224 973 512

Email: aberdeen@hi-force.com

U.A.E. - Regional Office :

Hi-Force FZCO
Plot MO 0555
P.O. Box 17012
Jebel Ali, Dubai
United Arab Emirates

Tel: +971 4 8150 600

Email: dubai@hi-force.com

U.A.E. - Regional Office :

Hi-Force Hydraulics
Unit 24 / M-43
Mussaffah Industrial Area
P.O. Box 9722, Abu Dhabi
United Arab Emirates

Tel: +971 2 551 3100

Email: abu.dhabi@hi-force.com

Azerbaijan - Regional Office :

Hi-Force Caspian
14 Salyan Highway
Lokbatan District
Baku
Azerbaijan

Tel: +994 12 447 4100

Email: baku@hi-force.com

Notes:

CONTACT DETAILS HI-FORCE OFFICES

Italy - Regional Office :

Hi-Force S.r.l.
Via Serio
I - 20090 Opera
Milan
Italy

Tel: +39 0253 031 088

Email: italy@hi-force.com

Malaysia - Regional Office :

Hi-Force Hydraulics (Asia) S.B.
No. 2A Jalan Sg Jeluh 32/192
Bukit Kemuning, Nouvelle Industrial Park
40460 Shah Alam, Selangor
Malaysia

Tel: +603 5525 4203

Email: malaysia@hi-force.com

Netherlands - Regional Office :

Hi-Force Nederland BV
Oud Bonaventura Industrial Estate
Industriestraat 17
3291 CC Strijen
Netherlands

Tel: +31 78 674 5488

Email: holland@hi-force.com

South Africa - Regional Office :

Hi-Force Hydraulics (Pty) Ltd
16 Gazelle Place (off Suni Avenue)
Corporate Park South
Gauteng, Midrand
South Africa

Tel: +27 11 314 0555

Email: south.africa@hi-force.com

Practical Tools Inc.
P.O. Box 233 Aurora, Ontario L4G3H3
905-727-0014 / 888-847-8880 fax 905-727-0014
email: practicaltools@bellnet.ca

Notes:

MODEL NUMBER INDEX

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Hi-Force®

HYDRAULIC TOOLS

UK Head Office:

Hi-Force Limited
Prospect Way, Daventry, Northants, NN11 8PL, United Kingdom
Tel: +44 1327 301 000 - Fax: +44 1327 706 555
daventry@hi-force.com

Hi-Force Regional Offices:

Hi-Force Caspian
Baku
Azerbaijan
Tel: +994 12 447 4100
Email: baku@hi-force.com

Hi-Force S.r.l.
Milan
Italy
Tel: +39 0253 031 088
Email: italy@hi-force.com

Hi-Force Hydraulics (Asia) S.B.
Selangor
Malaysia
Tel: +603 5525 4203
Email: malaysia@hi-force.com

Hi-Force Nederland BV
Strijen
Netherlands
Tel: +31 78 674 5488
Email: holland@hi-force.com

Hi-Force Hydraulics (Pty) Ltd
Midrand
South Africa
Tel: +27 11 314 0555
Email: south.africa@hi-force.com

Hi-Force Aberdeen
Aberdeen
United Kingdom
Tel: +44 1224 973 512
Email: aberdeen@hi-force.com

Hi-Force Hydraulics
Abu Dhabi
United Arab Emirates
Tel: +971 2 551 3100
Email: abu.dhabi@hi-force.com

Hi-Force FZCO
Dubai
United Arab Emirates
Tel: +971 4 815 0600
Email: dubai@hi-force.com

Your authorized distributor:

Practical Tools Inc
Aurora, Ontario L4G 3H3
905-727-0004 / 888-847-8880
email: practicaltools@bellnet.ca

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