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 CATALOGUES

In addition to this English Metric catalogue, other product specific catalogues are available in several languages including Chinese, Dutch, English Imperial, French, German, Italian, Norwegian, Portuguese, Russian, Slovakian and Spanish. To request copies of our catalogue(s) contact your local sales representative, or alternatively you can access our catalogues 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

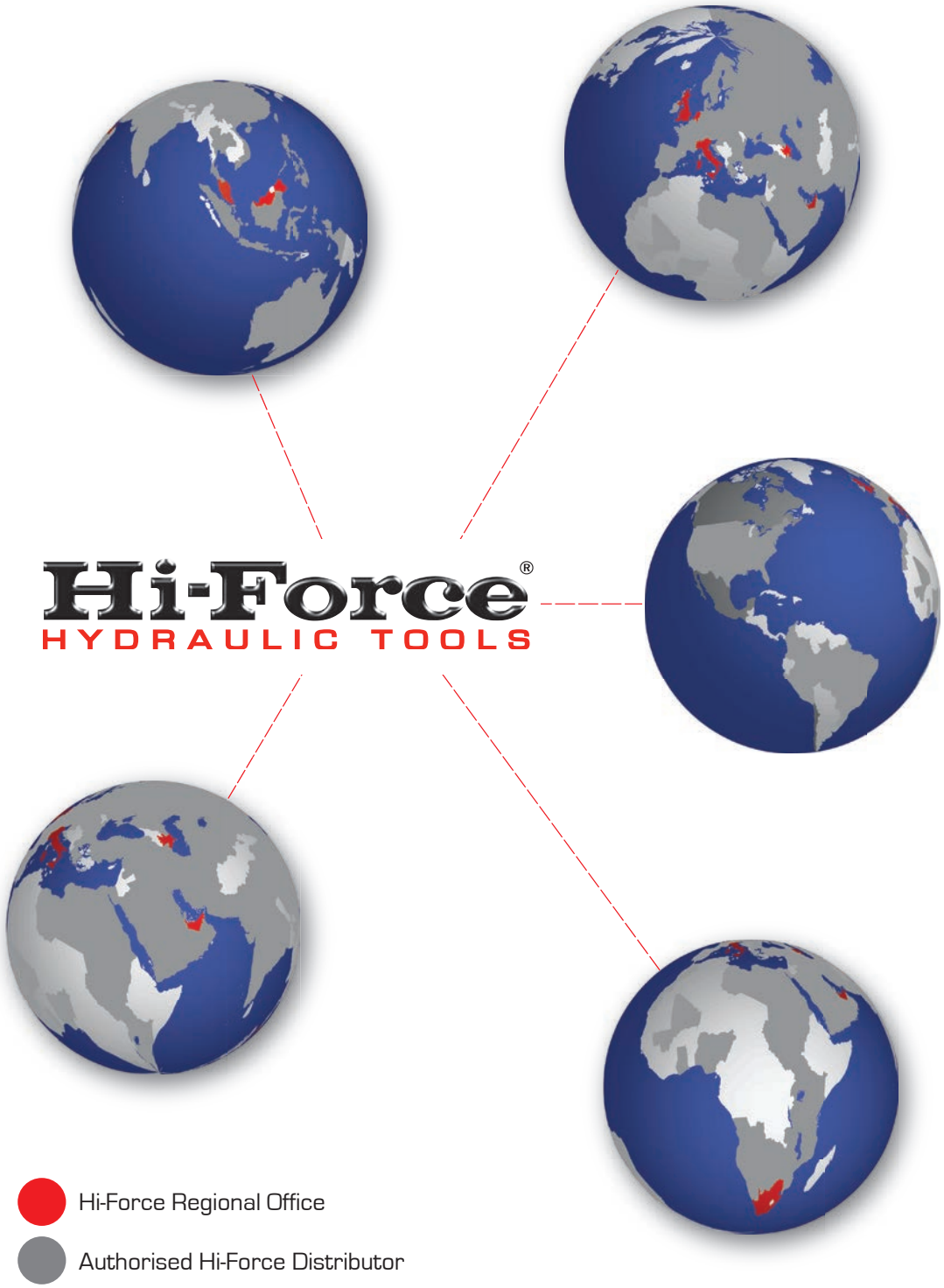
Hi-Force®
HYDRAULIC TOOLS

CONTENTS

ABOUT HI-FORCE, PRODUCTS & MARKETS

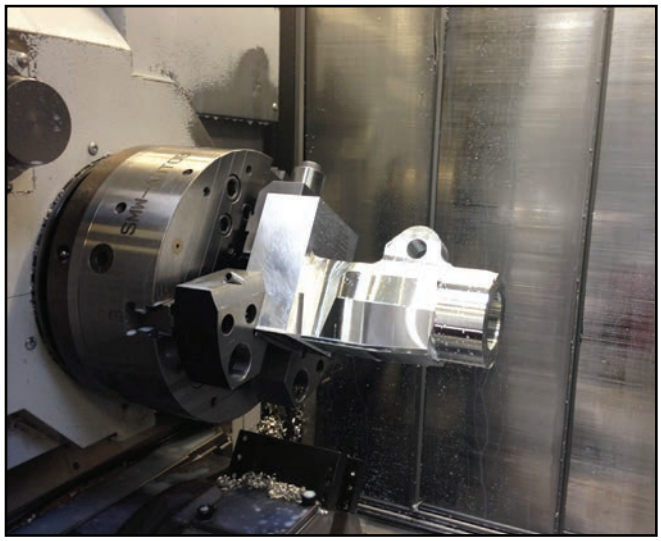
The Hi-Force catalogue comprising of 208 pages, is packed full of product and technical information from the fastest growing hydraulic tools manufacturer in the world today. Our continually expanding Regional Office, Service Centre and Distribution network continue to fuel our desire to ensure that Hi-Force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

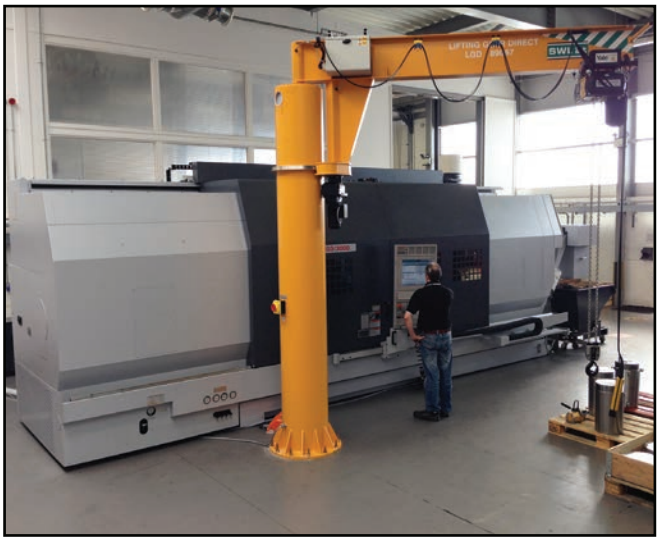
Hi-Force is and will continue to be a fiercely independent Company, managed by hard working Shareholders & Directors, ably supported by a highly motivated and conscientious workforce, all of whom retain the same passion, for success, that helped Hi-Force to produce its first hydraulic tools over 30 years 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 1000 tonnes capacity and 1200mm 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 Centre 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 Centre 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. Till date, our UK Training School has delivered over 80 ECITB approved training courses, with almost 200 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. 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 & Aluminium 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 catalogue which includes over 2000 products. A large number of new products including new design ToughLift jacking systems, 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, aluminium cylinders, increased capacity and range of heavy lift cylinders and remote controlled, high tonnage trolley mounted pullers are mentioned in this catalogue.

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, and plans already in place to set up ECITB approved Training School in South Africa. 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 centres, 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 authorised distributors have established their own accredited Hi-Force Service Centre, further enhancing the Hi-Force "Global Brand, Local Service" philosophy. The appointment of additional strategically placed service centres, authorised 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 catalogue, 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 realised 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

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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 9001:2015 and ISO 14001:2015 as verified by our certificate of registration number A2I INT 212.1, originally issued in October 2015 and valid until November 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.

Hi-Force provides a comprehensive 12 month warranty against material and/or workmanship, valid from the date of purchase. If the product is defective and within this period, a warranty claim must, in the first instance, be registered via our 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. Dependent on whether the approval is to repair or replace, Hi-Force will authorise the warranty through your local authorised Hi-Force Distributor or Service Centre.

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.

afaq

Certificate

Certificat

CERTIFICATE OF REGISTRATION

This is to certify that the Management System of

HI-FORCE LTD

for the following activities:

The Design, Manufacture and supply of a Wide Range of Hydraulic Tools and Equipment

carried out in the following location:

PROSPECT WAY, DAVENTRY, NN11 8PL

Has been assessed by AFNOR UK, part of AFNOR Group,
certifying under AFAQ trademark,
and complies with the Management System requirements of

ISO 9001:2015 & ISO 14001:2015

CERTIFICATE N°	CLIENT SINCE	DATE OF ISSUE	DATE OF EXPIRY
A2I INT 212.1	29/10/2015	13/09/2018	26/11/2018

APPROVED BY
Managing Director of AFNOR UK LTD

Dr Krystyna Stephens

Scan this QR code to check the validity of the certificate

CYLINDERS

SELECTION TABLE FOR HI-FORCE STANDARD RANGE CYLINDERS

Choice of 130 standard cylinder models and unlimited specials made to order, Hi-Force will provide the best cylinder for the job !

Cylinder stroke in mm	Nominal lifting capacity of cylinder in tonnes												
	4.5	10 to 11	14.5 to 20	23 to 32	33 to 37	50 to 52	61 to 73	102 to 110	147 to 152	200 to 260	320 to 398	520 to 800	1012
6	HPS50	HVL10	HVL20	HVL30		HVL50		HVL100					
10		HPS100											
11			HPS200										
12				HPS300									
15						HPS500							
16	HPS51						HPS750	HPS1000	HPS1500				
25	HSS51	HSS101						HLS1001					
25		HHS101		HLS301		HLS501			HLS1501				
40		HLS101											
44			HLS201										
45									HFL1502	HFL2502	HFL4002	HFL5002	
50	HSS52	HHS102	HSS152	HHS202	HHS302			HFL1002	HLS1502	HFG2002			
51					HHR302	HSS502							
51			HHA182	HSS252	HHA372	HFL502							
51						HFG502		HFG1002	HFG1502				
56		HSS102											
60				HLS302		HLS502		HLS1002					
75	HSS53												
76							HHS603	HHS1003					
76							HHR603	HHR1003					
100	HSS54	HSS104	HSS154					HFG1004	HFG1504				
102				HSS254		HSS504							
102						HFG504		HSS1004					
105						HHA504							
125	HSS55												
150		HSS106	HSS156	HHS206	HHR306	HFG506		HFG1006					
150				HSS256			HHS606	HHS1006	HFG1506		HFG3006		
151											HFG4006		
152		HHS106		HDA256		HSS506	HSS756	HDA1006		HDA2006	HDA3006	HDA5006	
152				HAS306	HHS306	HDA506	HHR606	HHR1006	HDA1506	HFG2006	HDA4006	HFG5006	HDA10006
152						HAS506		HAS1006	HSG1506	HSG2006	HSG3006	HDA8006	HFG10006
152										HFG2506		HFG8006	
153								HSS1006					
155									HGG1506	HGG2006	HGG3006		
176	HSS57												
203				HSS258		HSS508			HHR1508	HHR2508			
205				HSS308									
206		HSS108											
227	HSS59												
250		HSS1010	HSS1510	HSS2510									
254							HHR6010	HSS10010					
305		HSS1012			HHR3012				HDA15012	HDA20012			
330						HDA5013							
330						HSS5013		HDA10013					
356				HSS2514									
457				HSS2518									
508						HDA5020							

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 10 to 104 tonnes

Stroke length 6mm

Working pressure 700 Bar

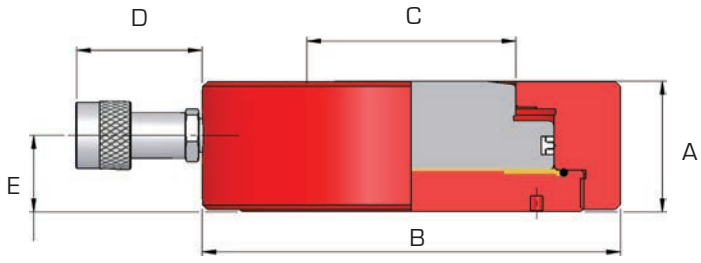
The HVL pancake cylinder range combines a very low closed height with a 6mm stroke, providing a precise adjusting and lifting force in very confined work areas. Ideally suited for applications requiring alignment of machinery, turbines, heavy structures etc. All models are single acting, load return design. The base of all HVL cylinders must be fully supported during use.

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

HVL10 also available with 400mm extension hose and coupling.
Please add suffix 'H' to model number.

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 tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HVL10	10	6	9	14.4	1.6
HVL20	20	6	17	28.6	2.6
HVL30	32	6	27	45.6	3.0
HVL50	50	6	43	71.3	7.2
HVL100	104	6	88	146.5	15.6

Dimensions in mm				
A	B	C	D	E
28	87	38	111	16.0
32	104	52	111	19.0
34	120	60	111	19.5
45	158	75	111	29.0
65	200	100	76	37.0

HPS - SINGLE ACTING LOW HEIGHT PAD CYLINDERS

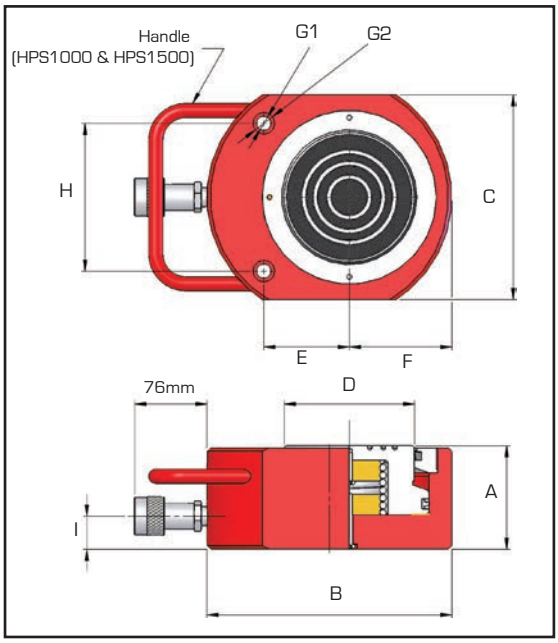
Capacities from 4.5 to 147 tonnes

Stroke lengths from 6 to 16mm

Working pressure 700 Bar

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
- Nitrocarburised piston rod
- Low friction bearing surfaces
- Anti-extrusion seals



Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HPS50	4.5	6	4	6.4	0.8
HPS51	4.5	16	10	6.4	0.9
HPS100	10	10	14	14.4	1.6
HPS200	20	11	31	28.6	2.6
HPS300	32	12	55	45.6	4.2
HPS500	50	15	107	71.3	6.6
HPS750	73	16	164	102.7	10.4
HPS1000	109	16	245	153.4	23.2
HPS1500	147	16	330	206.2	28.5

Dimensions in mm									
A	B	C	D	E	F	G1	G2	H	I
32	60	38	24	20	19	5.6	9.75	26	19
42	60	38	24	20	19	5.6	9.75	26	19
46	81	56	38	34	28	6.8	11.25	37	19
52	100	76	51	40	39	8.8	14.25	50	19
59	115	95	60	46	48	8.8	14.25	52	19
67	140	114	70	54	60	10.8	17.25	67	20
81	165	140	82	67	70	13.0	19.00	76	21
91	215	180	114	75	90	12.8	19.00	130	29
100	215	191	114	83	95	13.0	19.00	117	29

HLS - SINGLE ACTING LOW HEIGHT CYLINDERS

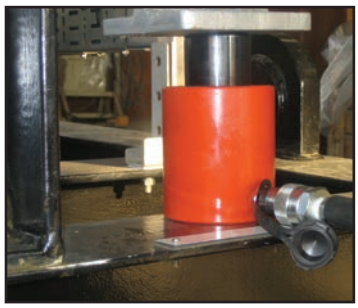
Capacities from 10 to 147 tonnes

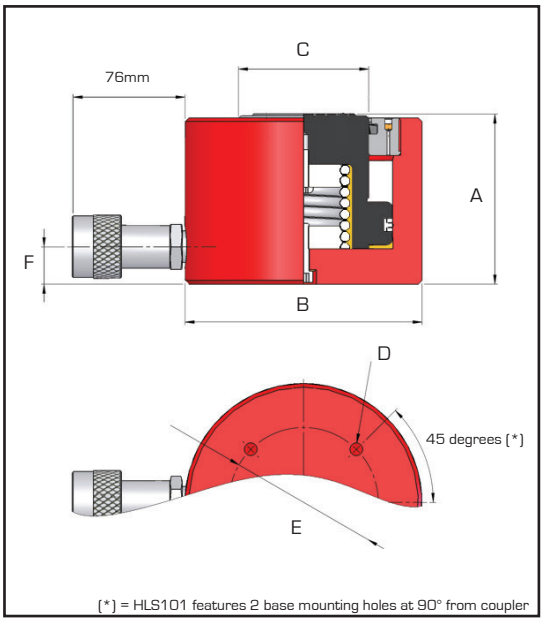
Stroke lengths from 25 to 60mm

Working pressure 700 Bar

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
- Nitrocarburised piston rod
- Low friction bearing surfaces
- Anti-extrusion seals





Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HLS101	10	40	58	14.4	2.4
HLS201	20	44	126	28.6	4.8
HLS301	32	25	114	45.6	5.0
HLS302	32	60	274	45.6	7.0
HLS501	50	25	178	71.3	8.4
HLS502	50	60	428	71.3	10.4
HLS1001	109	25	384	153.4	19.8
HLS1002	109	60	921	153.4	24.0
HLS1501	147	25	516	206.2	37.0
HLS1502	147	50	1031	206.2	42.0

Dimensions in mm					
A	B	C	D	E	F
95	70	38	M8	40	19
102	90	51	M8	60	19
83	102	60	M8	80	19
119	102	60	M8	80	19
91	127	70	M8	80	20
126	127	70	M8	80	20
108	178	114	M12	140	30
143	178	114	M12	140	30
130	216	114	M12	165	41
155	216	114	M12	165	41

HSS - SINGLE ACTING MULTI-PURPOSE CYLINDERS

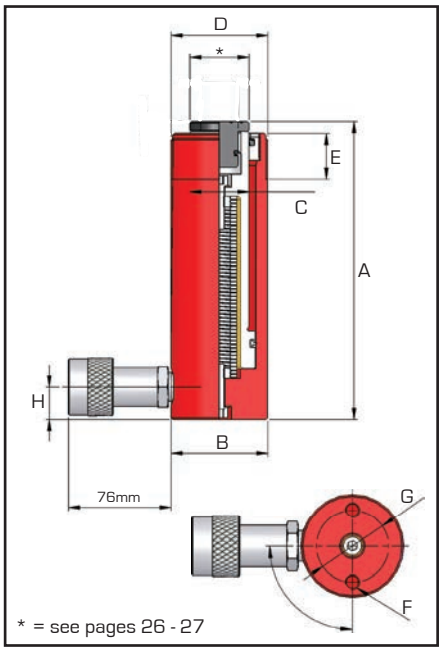
Capacities from 4.5 to 109 tonnes

Stroke lengths from 25 to 457mm

Working pressure 700 Bar

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
- Nitrocarburised piston rod
- Low friction bearing surfaces
- Anti-extrusion seals
- Collar threads withstand full load
- Piston rod thread on all models up to 30t
- Base mounting holes on all models (except HSS308)
- Optional piston rod saddles (see pages 26 - 27)
- Collar thread protector supplied as standard



Lightweight aluminium alternatives available (see page 16)

Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HSS51	4.5	25	16	6.4	1.0
HSS52	4.5	50	32	6.4	1.2
HSS53	4.5	75	48	6.4	1.4
HSS54	4.5	100	64	6.4	1.5
HSS55	4.5	125	80	6.4	1.8
HSS57	4.5	176	113	6.4	2.0
HSS59	4.5	227	146	6.4	2.4
HSS101	10	25	36	14.4	1.8
HSS102	10	56	81	14.4	2.4
HSS104	10	100	144	14.4	3.0
HSS106	10	150	217	14.4	4.2
HSS108	10	206	297	14.4	5.0
HSS1010	10	250	361	14.4	5.4
HSS1012	10	305	440	14.4	6.2

Dimensions in mm (unless otherwise stated)							
A	B	C	D	E	F	G	H
107	38	24	1 ½"-16un	28	M6	25	19
132	38	24	1 ½"-16un	28	M6	25	19
157	38	24	1 ½"-16un	28	M6	25	19
182	38	24	1 ½"-16un	28	M6	25	19
207	38	24	1 ½"-16un	28	M6	25	19
258	38	24	1 ½"-16un	28	M6	25	19
308	38	24	1 ½"-16un	28	M6	25	19
100	57	35	2 ¼"-14un	27	M8	40	19
131	57	35	2 ¼"-14un	27	M8	40	19
175	57	35	2 ¼"-14un	27	M8	40	19
225	57	35	2 ¼"-14un	27	M8	40	19
281	57	35	2 ¼"-14un	27	M8	40	19
325	57	35	2 ¼"-14un	27	M8	40	19
379	57	35	2 ¼"-14un	27	M8	40	19

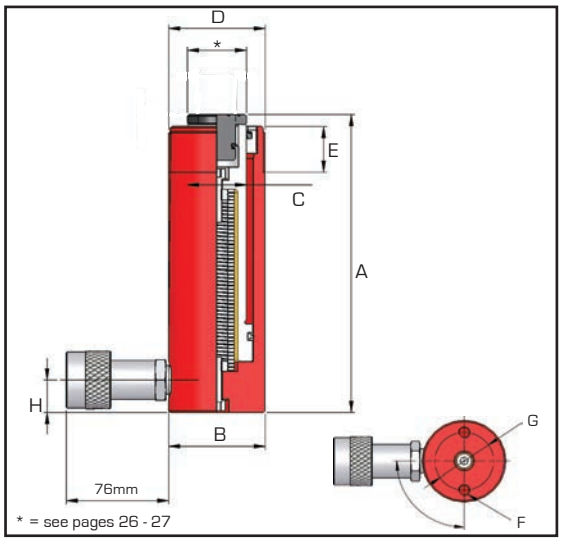
HSS - SINGLE ACTING MULTI-PURPOSE CYLINDERS

Spring assisted return

Nitrocarburised piston rod

Working pressure 700 Bar

- Capacities from 4.5 to 109 tonnes
- Stroke lengths from 25 to 457mm
- Low friction bearing surfaces
- Anti-extrusion seals
- Collar threads withstand full load
- Piston rod thread on all models up to 30t
- 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 tonnes	Stroke mm	Oil cap. cm³	Cyl. eff. area cm²	Weight kg
HSS152	14.5	50	101	20.3	3.4
HSS154	14.5	100	203	20.3	5.0
HSS156	14.5	150	304	20.3	6.6
HSS1510	14.5	250	507	20.3	8.8
HSS252	25	51	178	34.9	6.5
HSS254	25	102	356	34.9	8.0
HSS256	25	150	524	34.9	9.6
HSS258	25	203	709	34.9	11.2
HSS2510	25	250	874	34.9	12.6
HSS2514	25	356	1242	34.9	16.8
HSS2518	25	457	1597	34.9	21.4
HSS308	29	205	860	41.9	18.6
HSS502	50	51	364	71.3	13.0
HSS504	50	102	728	71.3	16.8
HSS506	50	152	1084	71.3	20.0
HSS508	50	203	1448	71.3	23.2
HSS5013	50	330	2354	71.3	33.6
HSS756	73	152	1561	102.7	31.0
HSS1004	109	102	1565	153.4	41.6
HSS1006	109	153	2347	153.4	49.8
HSS10010	109	254	3896	153.4	65.5

Dimensions in mm (unless otherwise stated)							
A	B	C	D	E	F	G	H
154	70	41	2 3/4"-16un	39	M10	48	19.0
204	70	41	2 3/4"-16un	39	M10	48	19.0
254	70	41	2 3/4"-16un	39	M10	48	19.0
354	70	41	2 3/4"-16un	39	M10	48	19.0
174	86	54	3 5/16"-12un	49	M12	60	25.0
225	86	54	3 5/16"-12un	49	M12	60	25.0
273	86	54	3 5/16"-12un	49	M12	60	25.0
324	86	54	3 5/16"-12un	49	M12	60	25.0
374	86	54	3 5/16"-12un	49	M12	60	25.0
480	86	54	3 5/16"-12un	49	M12	60	25.0
611	86	54	3 5/16"-12un	49	M12	60	25.0
374	102	57	3 5/16"-12un	50	-	-	50.0
150	127	79	5"-12un	55	M12	85	20.0
201	127	79	5"-12un	55	M12	85	20.0
251	127	79	5"-12un	55	M12	85	20.0
302	127	79	5"-12un	55	M12	85	20.0
429	127	79	5"-12un	55	M12	85	20.0
272	146	95	5 3/4"-12un	45	M12	115	31.5
223	185	114	6 7/8"-12un	50	M12	146	32.0
274	185	114	6 7/8"-12un	50	M12	146	32.0
375	185	114	6 7/8"-12un	50	M12	146	32.0

HAS - SINGLE ACTING LIGHTWEIGHT ALUMINIUM CYLINDERS

HAS1006

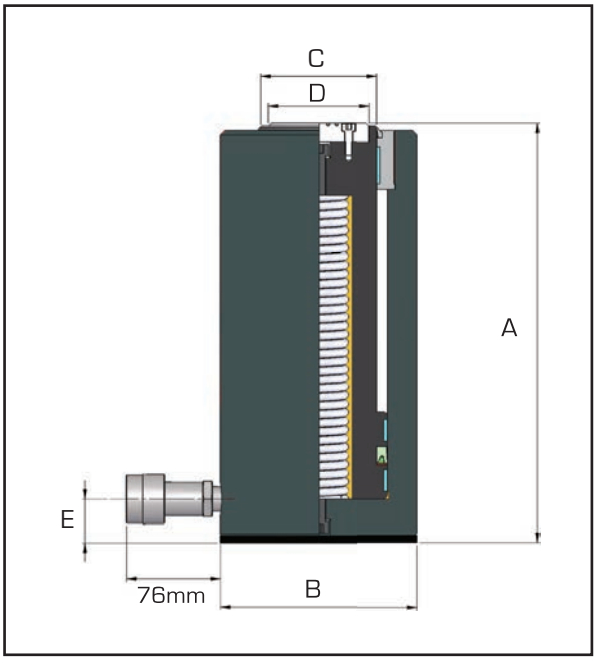
Capacities from 32 to 110 tonnes

Stroke length 152mm

Working pressure 700 Bar

The HAS range of single acting, lightweight, aluminium 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 anodised, wear resistant, piston rod and cylinder body and a steel cylinder base protection plate. Available lifting capacities range from 32 to 110 tonnes capacity, at maximum working pressure of 700 Bar. All models are commonly used in a wide variety of industrial applications in shipyards, steel mills, construction and power plants.

- Spring assisted return
- Hard anodised 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 .....

Aluminium 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 tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HAS306	32	152	672	44.2	6.0
HAS506	51	152	1077	70.9	9.0
HAS1006	110	152	2340	153.9	23.0

Dimensions in mm				
A	B	C	D	E
282	104	60	50	20
287	135	80	70	25
317	195	110	100	35

Note: Other capacities and stroke lengths available on request

HHA - SINGLE ACTING HOLLOW PISTON ALUMINIUM CYLINDERS

HHA504 HHA372

Capacities from 18 to 52 tonnes

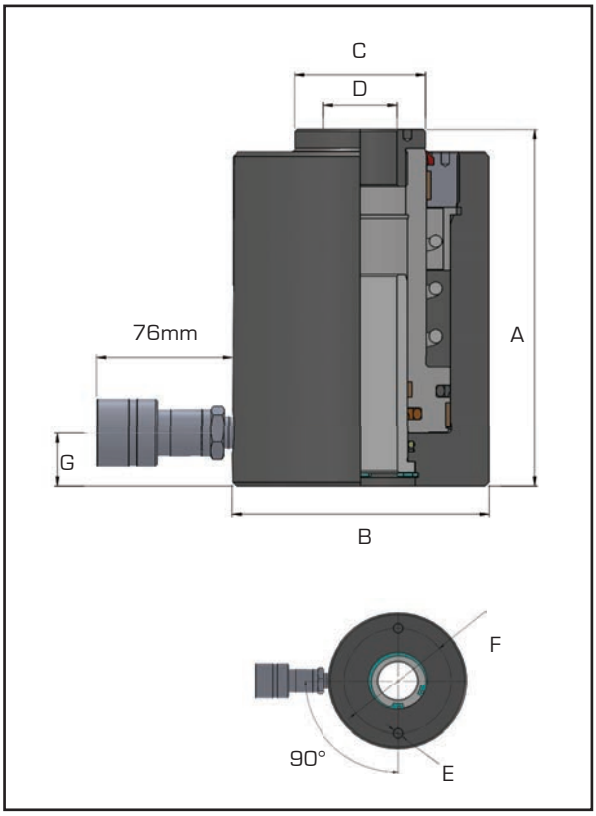
Stroke lengths from 51 to 105mm

Working pressure 700 Bar

B

The HHA range of single acting hollow piston aluminium 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 anodised, wear resistant, piston rod and cylinder body and a steel cylinder base protection plate. Available lifting capacities range from 18 to 52 tonnes, at maximum working pressure of 700 Bar.

- Spring assisted return
- Hard anodised 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.....

Aluminium 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 tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HHA182	18	51	129	25.2	3.6
HHA372	37	51	266	52.1	7.2
HHA504	52	105	765	72.8	13.4

Dimensions in mm (unless otherwise stated)						
A	B	C	D	E	F	G
175	98	45	26	M8x10	66.0	26
193	136	69	39	M10x15	105.0	32
280	160	79	51	M10x15	130.2	39

HHS - SINGLE ACTING HOLLOW PISTON CYLINDERS

HHS302 HHS202

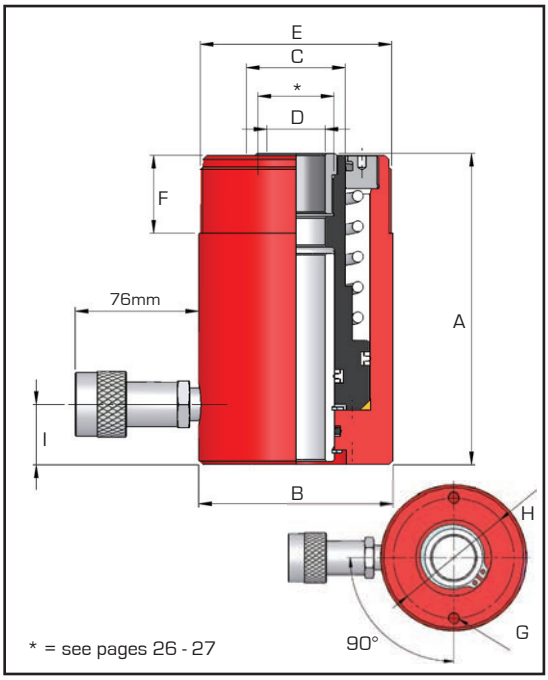
Capacities from 11 to 102 tonnes

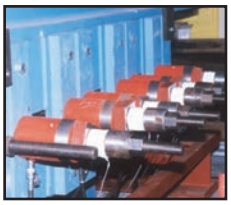
Stroke lengths from 25 to 152mm

Working pressure 700 Bar

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
- Nitrocarburised 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 tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg
HHS101	11	25	39	15.8	2.8
HHS102	11	50	79	15.8	3.0
HHS106	11	152	240	15.8	10.2
HHS202	23	50	167	33.3	7.0
HHS206	23	150	500	33.3	13.8
HHS302	33	50	233	46.7	10.6
HHS306	33	152	710	46.7	19.2
HHS603	61	76	651	85.7	28.0
HHS606	61	150	1285	85.7	40.6
HHS1003	102	76	1088	143.1	64.0
HHS1006	102	150	2147	143.1	75.0

Dimensions in mm (unless otherwise stated)								
A	B	C	D	E	F	G	H	I
110	70	38	20	2 ¾"-16un	30	M8	51	19
140	70	38	20	2 ¾"-16un	30	M8	51	19
297	70	38	20	2 ¾"-16un	30	M8	51	19
160	100	51	30	3 ⅞"-12un	40	M8	82.5	31
306	100	51	30	3 ⅞"-12un	40	M8	82.5	31
165	115	60	35	4 ½"-12un	40	M8	92	31
320	115	60	35	4 ½"-12un	40	M8	92	31
226	160	92	55	6 ¼"-12un	59	M12	130	31
315	160	92	55	6 ¼"-12un	59	M12	130	31
276	213	127	81	8 ⅜"-12un	60	M16	178	45
350	213	127	81	8 ⅜"-12un	60	M16	178	45

HHR - DOUBLE ACTING HOLLOW PISTON CYLINDERS

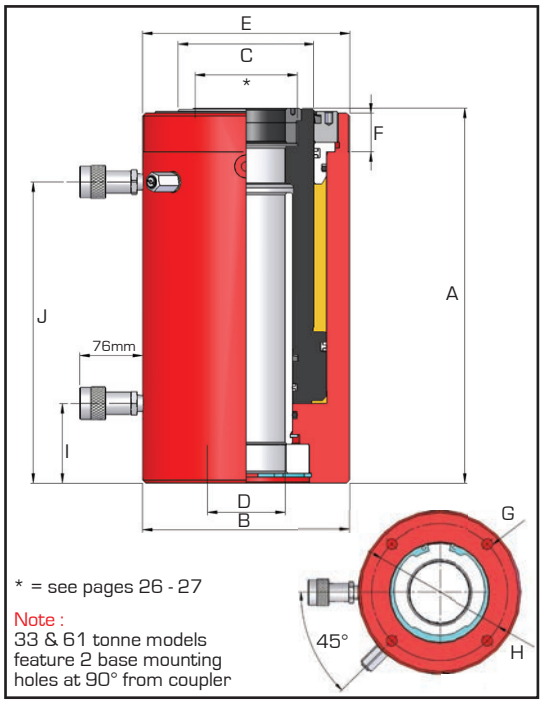
Capacities from 33 to 247 tonnes

Stroke lengths from 51 to 305mm

Working pressure 700 Bar

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 catalogue, however other stroke and tonnage options are available on request.

- Double acting design
- Nitrocarburised 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 :
33 & 61 tonne models feature 2 base mounting holes at 90° from coupler

Model number	Capacity Push tonnes	Pull tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg	Dimensions in mm (unless otherwise stated) A	B	C	D	E	F	G	H	I	J
HHR302	33	24	51	238	46.7	12.2	180	115	60.3	35	4 ½"-12un	40	M8	92	28	119
HHR306	33	24	150	701	46.7	17.6	279	115	60.3	35	4 ½"-12un	40	M8	92	28	218
HHR3012	33	24	305	1424	46.7	25.7	434	115	60.3	35	4 ½"-12un	40	M8	92	28	373
HHR603	61	38	76	652	85.7	30.6	239	160	92	55	6 ¼"-12un	45	M12	130	31	166
HHR606	61	38	152	1304	85.7	41.6	315	160	92	55	6 ¼"-12un	45	M12	130	31	242
HHR6010	61	38	254	2179	85.7	52.5	417	160	92	55	6 ¼"-12un	45	M12	130	31	344
HHR1003	102	43	76	1087	143.1	68.5	310	213	140	80	8 ⅜"-12un	40	M16	178	82	234
HHR1006	102	43	152	2174	143.1	90.0	386	213	140	80	8 ⅜"-12un	40	M16	178	82	310
HHR1508	152	71	203	4320	212.8	170.0	503	270	184	102	n/a	n/a	n/a	n/a	98	389
HHR2508	247	76	203	7039	346.5	269.0	505	350	254	150	n/a	n/a	n/a	n/a	98	389

HDA - DOUBLE ACTING HIGH TONNAGE CYLINDERS

Capacities from 25 to 1012 tonnes

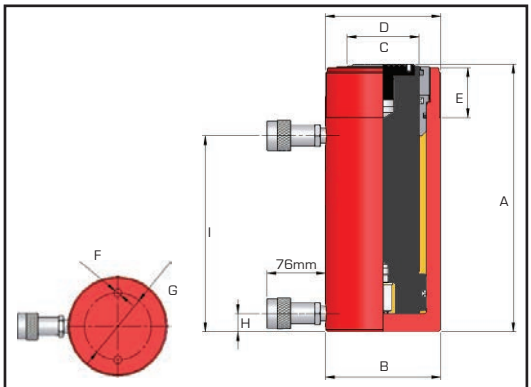
Stroke lengths from 152 to 508mm

Working pressure 700 Bar

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 203 tonnes are supplied with flat saddle, piston rod threads and collar threads as standard. Models from 326 tonnes and upwards are supplied without collar thread and piston rod thread, however include replaceable tilting saddle as standard.

- Internal annular area overload protection valve
- Low friction bearing surfaces
- Nitrocarburised piston rod
- Anti-extrusion seals
- Lifting ring as standard on models from 50 to109 tonnes
- Eyebolts as standard on models from152 to 1012 tonnes
- Base mounting holes*

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



Note: Base mounting holes (F) will not withstand full load. Base mounting holes on model HDA5020 are at a random angular orientation to the cylinder ports.

Optional piston rod saddles on pages 26 - 27

Model number	Capacity Push tonnes	Capacity Pull tonnes	Stroke mm	Oil cap. litres	Cyl. eff. area cm^2	Weight kg
HDA256	25	10	152	0.53	34.9	15.0
HDA506	50	15	152	1.08	71.3	28.4
HDA5013	50	15	330	2.35	71.3	42.6
HDA5020	50	15	508	3.62	71.3	62.8
HDA1006	109	36	152	2.33	153.3	64.5
HDA10013	109	36	330	5.06	153.3	89.0
HDA1506	152	79	152	3.26	214.2	90.0
HDA15012	152	79	305	6.53	214.2	120.5
HDA2006	203	94	152	4.33	285.2	129.8
HDA20012	203	94	305	8.69	285.2	167.4
HDA3006	326	-	152	6.95	457.4	193.0
HDA4006	398	-	152	8.49	558.9	286.0
HDA5006	520	-	152	11.09	729.9	372.0
HDA8006	809	-	152	17.28	1134.1	650.0
HDA10006	1012	-	152	21.62	1419.3	900.0

Dimensions in mm (unless otherwise stated)									
A	B	C	D	E	F*	G	H	I
287	92	50	3 5/16"-12un	53	M10	60	30	212
295	127	79	5"-12un	55	M12	85	20	216
473	127	79	5"-12un	55	M12	85	20	394
730	127	79	5"-12un	55	M12	85	68	636
304	185	114	6 7/8"-12un	51	M12	146	30	226
482	185	114	6 7/8"-12un	51	M12	146	30	404
310	210	114	8"-12un	55	M16	160	35	231
463	210	114	8"-12un	55	M16	160	35	384
327	254	140	9 3/4"-12un	65	M20	185	43	238
480	254	140	9 3/4"-12un	65	M20	185	43	391
409	312	165	Optional	Optional	M20	158	50	262
431	360	216	Optional	Optional	M24	203	55	277
470	397	203	Optional	Optional	M24	203	65	300
535	500	300	Optional	Optional	Optional	Optional	70	318
590	540	320	Optional	Optional	Optional	Optional	99	357

Note: Other capacities and stroke lengths available on request

HFL - SINGLE ACTING LOW HEIGHT FAILSAFE LOCK RING CYLINDERS

Capacities from 50 to 520 tonnes

Stroke lengths from 45 to 51mm

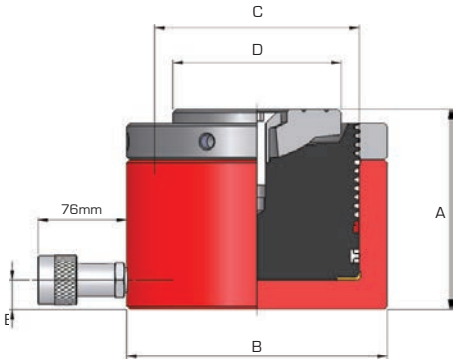
Working pressure 700 Bar

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.

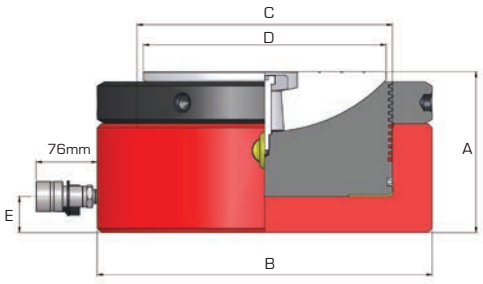
- Single acting load return design
- Nitrocarburised cylinder and piston rod
- Low friction bearing surfaces
- Anti-extrusion seals
- Tilting saddle fitted as standard
- Overstroke restrictor port
- See pages 29 - 50 for pumps suitable for use with all Hi-Force cylinders
- Saddle and piston rod details, see pages 26 - 27

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.

HFL502, HFL1002, HFL1502



HFL2502, HFL4002, HFL5002



Model number	Capacity tonnes	Stroke mm	Oil cap. litres	Cyl. eff. area cm^2	Weight kg	Tommy bar
HFL502	50	51	0.36	71.3	14.2	TTB10
HFL1002	109	50	0.77	153.4	27.9	TTB10
HFL1502	152	45	1.07	214.3	44.0	TTB10
HFL2502	260	45	1.65	366.1	69.4	TTB14
HFL4002	398	45	2.51	559.0	121.0	TTB16
HFL5002	520	45	3.29	729.9	186.0	TTB20

Dimensions in mm				
A	B	C	D	E
125	127	95	70	19
137	185	140	115	20
150	216	165	135	28
159	273	216	200	31
178	360	267	260	36
192	400	305	290	43

HFG - SINGLE ACTING FAILSAFE LOCK RING CYLINDERS

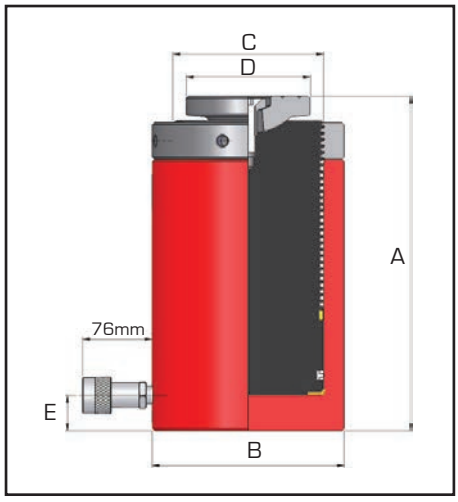
Capacities from 50 to 1012 tonnes

Stroke lengths from 50 to 152mm

Working pressure 700 Bar

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.

- Single acting load return design
- Nitrocarburised cylinder and piston rod for corrosion protection
- Low friction bearing surfaces
- Anti-extrusion seals
- Tilting saddle fitted as standard
- Overstroke restrictor port
- Saddle and piston rod details, see pages 26 - 27



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 tonnes	Stroke mm	Oil cap. litres	Cyl. eff. area cm²	Weight kg	Tommy bar	Dimensions in mm A	B	C	D	E
HFG502	50	51	0.36	71.3	16.2	TTB10	173	127	95	70	25.0
HFG504	50	102	0.73	71.3	20.6	TTB10	224	127	95	70	25.0
HFG506	50	150	1.07	71.3	25.0	TTB10	272	127	95	70	25.0
HFG1002	109	51	0.76	153.4	35.0	TTB10	189	185	140	115	27.5
HFG1004	109	100	1.53	153.4	50.3	TTB10	240	185	140	115	27.5
HFG1006	109	150	2.30	153.4	65.4	TTB10	311	185	140	115	27.5
HFG1502	152	51	1.07	214.3	78.0	TTB10	237	216	165	135	42.0
HFG1504	152	100	2.14	214.3	84.0	TTB10	288	216	165	135	42.0
HFG1506	152	150	3.21	214.3	89.5	TTB10	338	216	165	135	42.0
HFG2002	203	50	1.42	285.1	95.4	TTB14	261	254	190	135	50.0
HFG2006	203	152	4.33	285.1	137.0	TTB14	362	254	190	135	50.0
HFG2506	256	152	5.50	366.5	171.0	TTB14	401	273	216	150	50.0
HFG3006	326	150	6.87	457.7	228.5	TTB14	417	310	241	150	50.0
HFG4006	398	151	8.44	559.0	308.5	TTB14	459	360	267	180	70.0
HFG5006	520	152	11.10	729.9	457.0	TTB16	498	400	305	180	80.0
HFG8006	809	152	17.47	1134.1	735.0	TTB16	565	480	380	340	80.0
HFG10006	1012	152	21.61	1419.3	1016.0	TTB20	620	540	425	380	90.0

Note: Other capacities and stroke lengths available on request

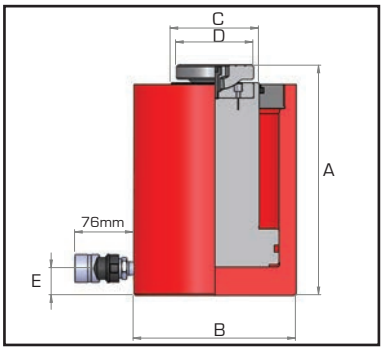
HGG - SINGLE ACTING LOAD RETURN INDUSTRIAL CYLINDERS

HGG2006

Capacities from 152 to 326 tonnes

Stroke length 155mm

Working pressure 700 Bar



The HGG range of load return industrial cylinders is specifically designed for lifting and maintenance applications. All models are supplied with a tilting saddle to reduce the risk 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 catalogue, however additional capacities and stroke options are available on request.

Model number	Capacity tonnes	Stroke mm	Oil cap. litres	Cyl. eff. area cm^2	Weight kg
HGG1506	152	155	3.32	214.3	58.3
HGG2006	203	155	4.63	285.1	95.3
HGG3006	326	155	7.10	457.7	153.5

Dimensions in mm				
A	B	C	D	E
297	210	114	100	37
310	254	140	135	50
343	312	165	150	50

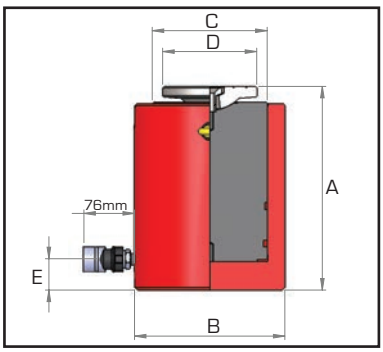
HSG - SINGLE ACTING LOAD RETURN CONSTRUCTION CYLINDERS

HSG2006

Capacities from 152 to 326 tonnes

Stroke length 152mm

Working pressure 700 Bar

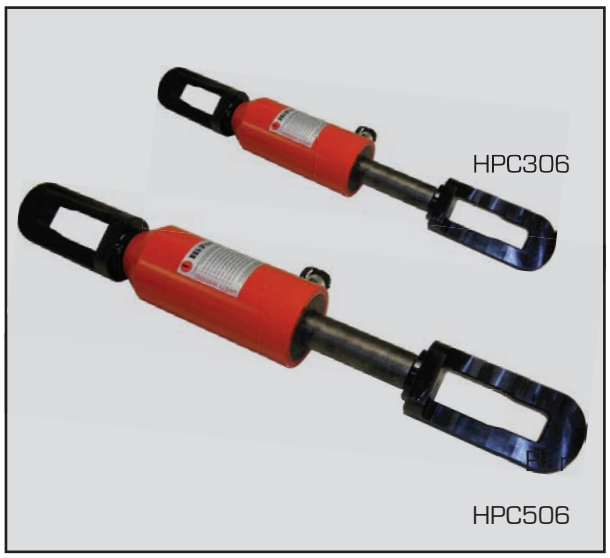


The HSG range of single acting load return construction cylinders is ideally suited for construction, civil engineering, heavy fabrication and maintenance applications. All models are supplied with a tilting saddle fitted as standard and have an overstroke restrictor port to prevent over extension of the piston. Standard range models are featured in this catalogue, however additional capacities and stroke options are available on request.

Model number	Capacity tonnes	Stroke mm	Oil cap. litres	Cyl. eff. area cm^2	Weight kg
HSG1506	152	152	3.21	214.3	77.5
HSG2006	203	152	4.34	285.1	107.7
HSG3006	326	152	6.99	457.7	175.2

Dimensions in mm				
A	B	C	D	E
293	216	165.1	135	45
296	254	190.5	135	45
326	312	241.3	150	50

HPC - SINGLE ACTING PULL CYLINDERS



Capacities from 10 to 50 tonnes

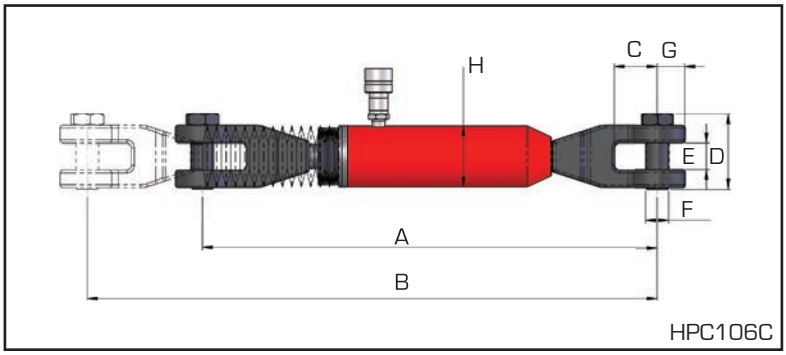
Stroke length 152mm

Working pressure 700 Bar

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 10 tonnes to 50 tonnes of pulling force. All models are 700 Bar maximum working pressure and feature a single acting, spring assisted return piston, with a 152mm stroke length. Fitted with easily replaceable machined pulling eyes on the piston rod and cylinder base, the 10 tonnes 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.

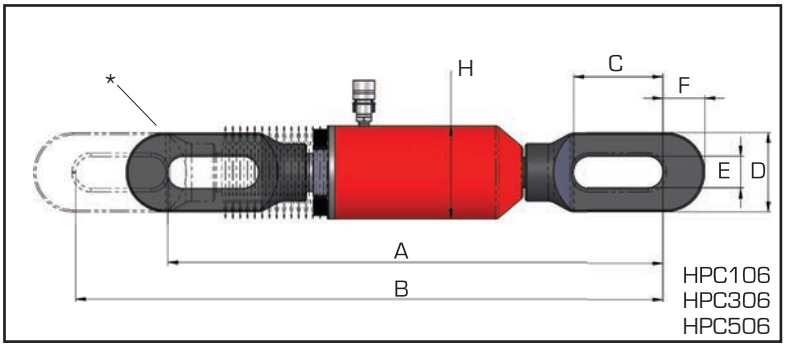
- Spring assisted return
- Surface treated piston rod
- Replaceable pulling and clevis eyes
- Piston wiper prevents contamination



HPC106C

Protective bellows are fitted as standard

HPC106 c/w bellows



HPC106
HPC306
HPC506

* Eye bolt thickness: HPC106 = 22mm, HPC306 = 35mm, HPC506 = 40mm

Model number	Capacity tonnes	Stroke mm	Oil cap. cm^3	Cyl. eff. area cm^2	Weight kg	Dimensions in mm A	B	C	D	E	F	G	H
HPC106	10	152	228	15.0	12.0	600	752	114	67	32	33	-	80
HPC106C	10	152	228	15.0	15.5	602	754	58	99	35	30	36	80
HPC306	30	152	636	41.8	31.0	695	847	145	105	42	50	-	122
HPC506	50	152	1078	71.0	54.0	819	971	149	130	52	69	-	153

PCS - PUMP AND CYLINDER SETS

PCS200

Capacities from 4.5 to 109 tonnes

Stroke lengths from 10 to 153mm

Working pressure 700 Bar

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 two metre 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 tonnes	Model number	Capacity litres	Model number	Stroke mm	Closed height mm	Model number	Length metres	Weight kg
PCS50	4.5	HP110	1.0	HPS51	16	42	HC2	2.0	7.4
PCS53	4.5	HP110	1.0	HSS53	75	157	HC2	2.0	8.0
PCS100	10	HP110	1.0	HPS100	10	46	HC2	2.0	8.2
PCS101	10	HP110	1.0	HLS101	40	95	HC2	2.0	9.0
PCS102	10	HP110	1.0	HSS102	56	131	HC2	2.0	9.0
PCS106	10	HP110	1.0	HSS106	150	225	HC2	2.0	10.8
PCS200	20	HP110	1.0	HPS200	11	52	HC2	2.0	9.4
PCS201	20	HP110	1.0	HLS201	44	102	HC2	2.0	11.3
PCS256	25	HP110	1.0	HSS256	150	273	HC2	2.0	16.0
PCS300	32	HP110	1.0	HPS300	12	59	HC2	2.0	10.8
PCS302	32	HP110	1.0	HLS302	60	119	HC2	2.0	13.6
PCS502	50	HP110	1.0	HLS502	60	126	HC2	2.0	17.0
PCS506	50	HP232	2.0	HSS506	152	251	HC2	2.0	31.0
PCS1002	109	HP232	2.0	HLS1002	60	143	HC2	2.0	35.5
PCS1006	109	HP252	5.0	HSS1006	153	274	HC2	2.0	66.0
PCS202H	23	HP110	1.0	HHS202	50	160	HC2	2.0	13.9
PCS302H	33	HP110	1.0	HHS302	50	165	HC2	2.0	17.2
PCS603H	61	HP232	2.0	HHS603	76	226	HC2	2.0	34.6

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.	Saddles: Standard Saddle Figure	Saddles: Optional Saddle Model No.	Saddles: Optional Saddle Figure	Piston rod thread: Dimensions in mm A	B	C	Thread Size D	Figure
HSS Cylinder Range									
HSS5	HA5	1	-	-	-	-	20	¾"-16UNF	12
HSS10	HA10	1	HAT10	9	-	-	14	1"-8UNC	12
HSS15	HA15	1	HAT10	9	-	-	14	1"-8UNC	12
HSS25	HA25	1	HAT25	9	-	-	30	1½"-16UN	12
HSS30	HA25	1	HAT25	9	-	-	30	1½"-16UN	12
HSS50	HA50	2	HAT50	7	70	11	-	-	10
HSS75	HA75	2	HAT75	7	80	12	-	-	10
HSS100	HA100	2	HAT100	7	100	12	-	-	10
HAS Cylinder Range									
HAS30	HA30	2	HAT30	7	50	10	-	-	10
HAS50	HA50	2	HAT50	7	70	11	-	-	10
HAS100	HA100	2	HAT100	7	100	12	-	-	10
HHS Cylinder Range									
HHS11	HA102	4	HA102T, HA102G	5,6	32	7	21	M28x1.5	13
HHS23	HA202	4	HA202T, HA202G	5,6	43	10	31	M39x1.5	13
HHS33	HA302	4	HA302T, HA302G	5,6	52	10	31	M48x1.5	13
HHS61	HA603	4	HA603T, HA603G	5,6	80	10	31	M70x1.5	13
HHS102	HA1003	4	HA1003T, HA1003G	5,6	114	12	38	M105x2	13
HHA Cylinder Range									
HHA18	HA18	4	HA18T	5	-	-	28	M35x1.5	12
HHA37	HA37	4	HA37T	5	-	-	35	M50x1.5	12
HHA50	HA50	4	HA50T	5	-	-	37	M60x1.5	12
HHR Cylinder Range									
HHR33	HA302	4	HA302T, HA302G	5,6	52	10.0	32	M48x1.5	13
HHR61	HA603	4	HA603T, HA603G	5,6	80	10.0	32	M70x1.5	13
HHR102	HA1003	4	HA1003T, HA1003G	5,6	114	12.0	38	M105x2	13
HHR150	HA1508	4	HA1508G	6	170	13.5	50	M150x3	13
HHR250	HA2508	4	HA2508G	6	242	13.5	74	M220x3	13
HDA Cylinder Range									
HDA25	HD25	3	HD25T	9	45	9	35	1"-12UNF	11
HDA50	HD50	3	HD50T	9	70	11	45	1"-12UNF	11
HDA100	HD100	3	HD100T	9	100	12	55	1¾"-12UNF	11
HDA150	HD200	3	HD200T	9	100	12	52	2½"-12UNF	11
HDA200	HD200	3	HD200T	9	110	12	70	2½"-12UNF	11
HDA300	HD300T	7	HD300	2	150	25	-	-	-
HDA400	HD400T	7	HD400	2	180	25	-	-	-
HDA500	HD500T	7	HD500	2	180	25	-	-	-
HDA800	TS800	8	-	-	180	-	51	M24x3	14
HDA1000	TS1000	8	-	-	180	-	51	M24x3	14
HFG Cylinder Range									
HFG50	TS50	8	-	-	15	-	30	M8x1.25	14
HFG100	TS100	8	-	-	18	-	60	M12x1.75	14
HFG150	TS150	8	-	-	18	-	60	M12x1.75	14
HFG200	TS200	8	-	-	18	-	60	M12x1.75	14
HFG300	TS300	8	-	-	16	-	70	M10x1.5	14
HFG400	TS400	8	-	-	17	-	125	M12x1.75	14
HFG500	TS500	8	-	-	17	-	125	M12x1.75	14
HFG800	TS800	8	-	-	50	-	175	M24x3	14
HFG1000	TS1000	8	-	-	51	-	175	M24x3	14
HFL Cylinder Range									
HFL50	TS50	8	-	-	15	-	31	M8x1.25	14
HFL100	TS100	8	-	-	18	-	60	M12x1.75	14
HFL150	TS150	8	-	-	18	-	120	M12x1.75	14
HFL250	TS250	8	-	-	40	-	140	M10x1.5	14
HFL400	TS400	8	-	-	40	-	180	M12x1.75	14
HFL500	TS500	8	-	-	40	-	200	M12x1.75	14
HGG Cylinder Range									
HGG150	TS150	8	-	-	18	-	60.0	M12x1.75	14
HGG200	TS201	8	-	-	18	-	124.5	M12x1.75	14
HGG300	TS301	8	-	-	21	-	95.0	M12x1.75	14
HSG Cylinder Range									
HSG150	TS150	8	-	-	18	-	60.0	M12x1.75	14
HSG200	TS201	8	-	-	18	-	124.5	M12x1.75	14
HSG300	TS302	8	-	-	28	-	160.0	M22x2.5	14

CYLINDER SADDLES & PISTON ROD THREAD SPECIFICATIONS

SADDLE DRAWINGS (for specifications, see facing page)

Fig. 1

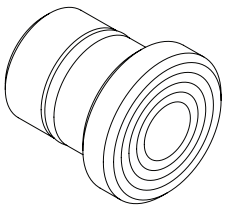


Fig. 2

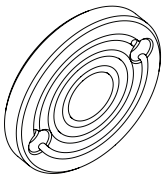


Fig. 3

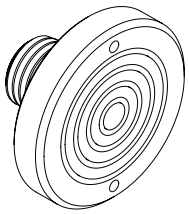


Fig. 4

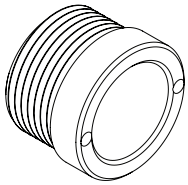
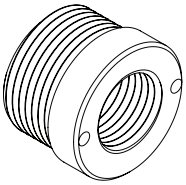


Fig. 5



Note: See below table for details on internal saddle thread

Fig. 6

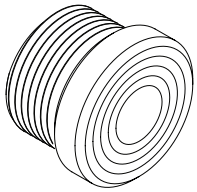


Fig. 7

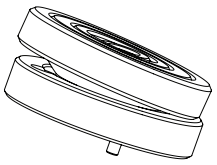
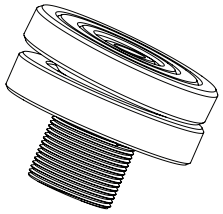


Fig. 8

Fig. 9



PISTON ROD DRAWINGS (for specifications, see facing page)

Fig. 10

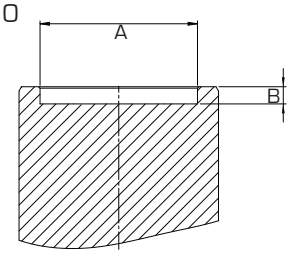


Fig. 11

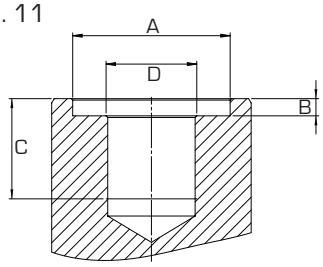


Fig. 12

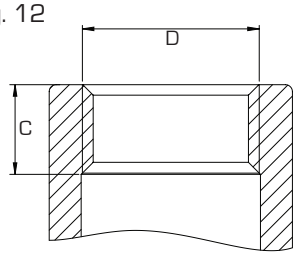


Fig. 13

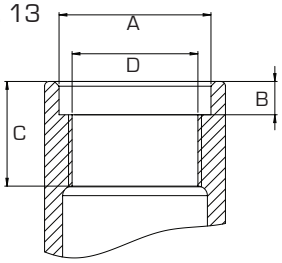
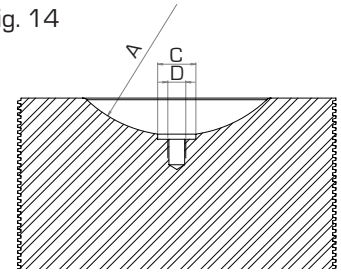
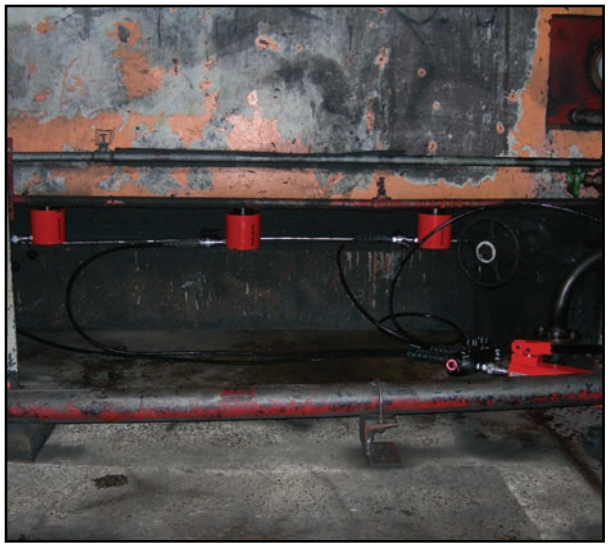


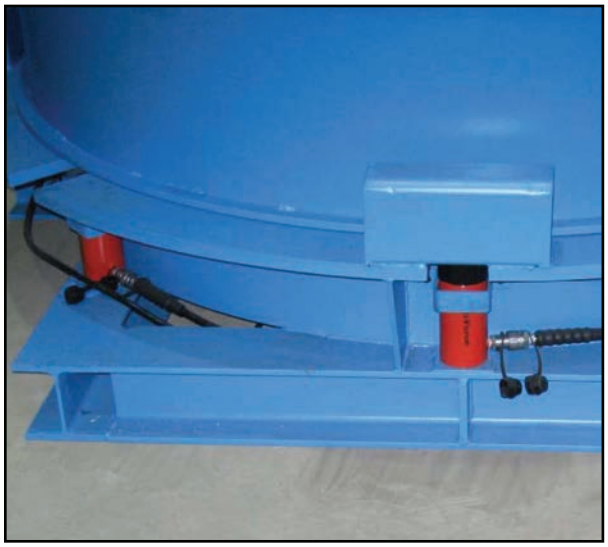
Fig. 14



Saddle Model	Internal saddle thread specification
HA18T	M24
HA37T	M36
HA50T	M48
HA102T	¾" - 16 UNF
HA202T	1" x 8 UNC
HA302T	1 ¼" x 7 UNC
HA603T	1 ⅝" x 5 ½" UNS
HA1003T	2 ½" x 8 UN

HYDRAULIC CYLINDER APPLICATIONS



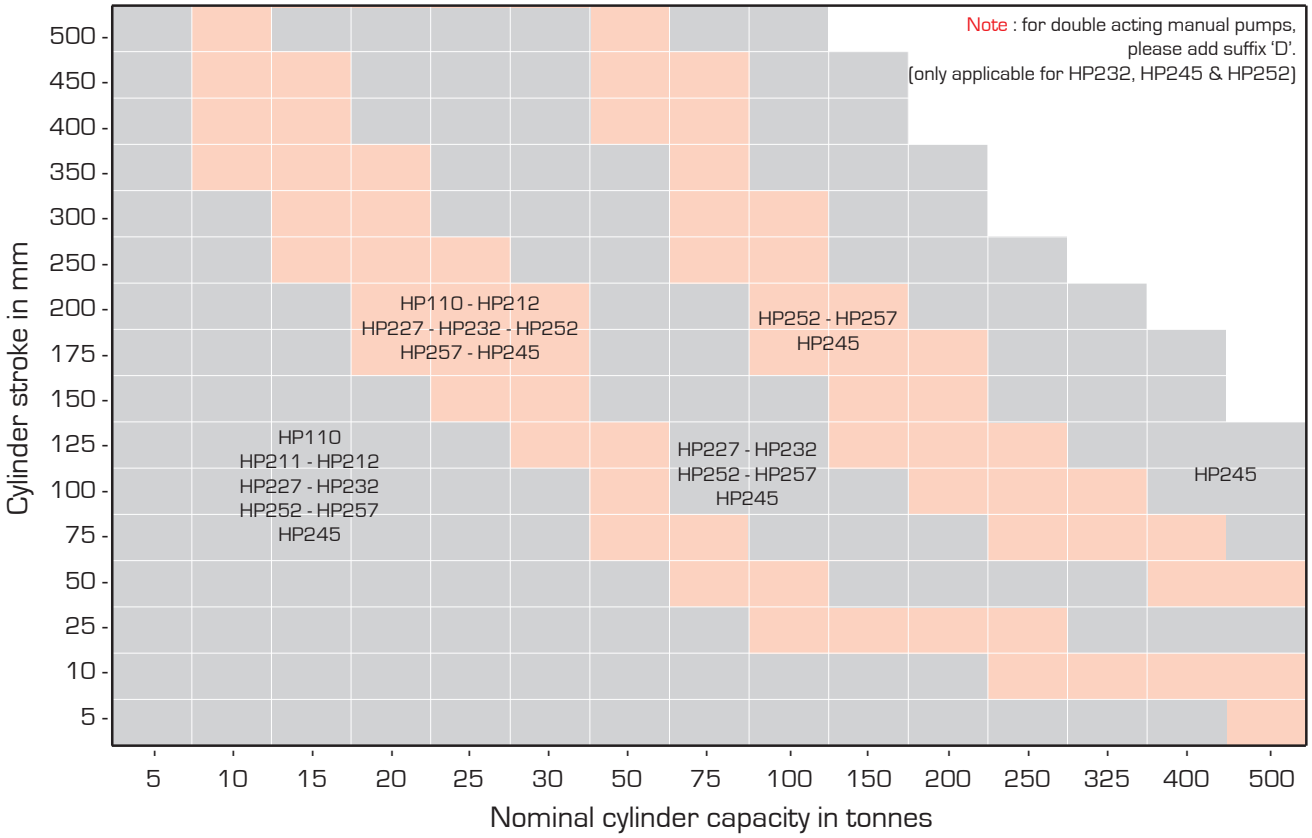


PUMPS

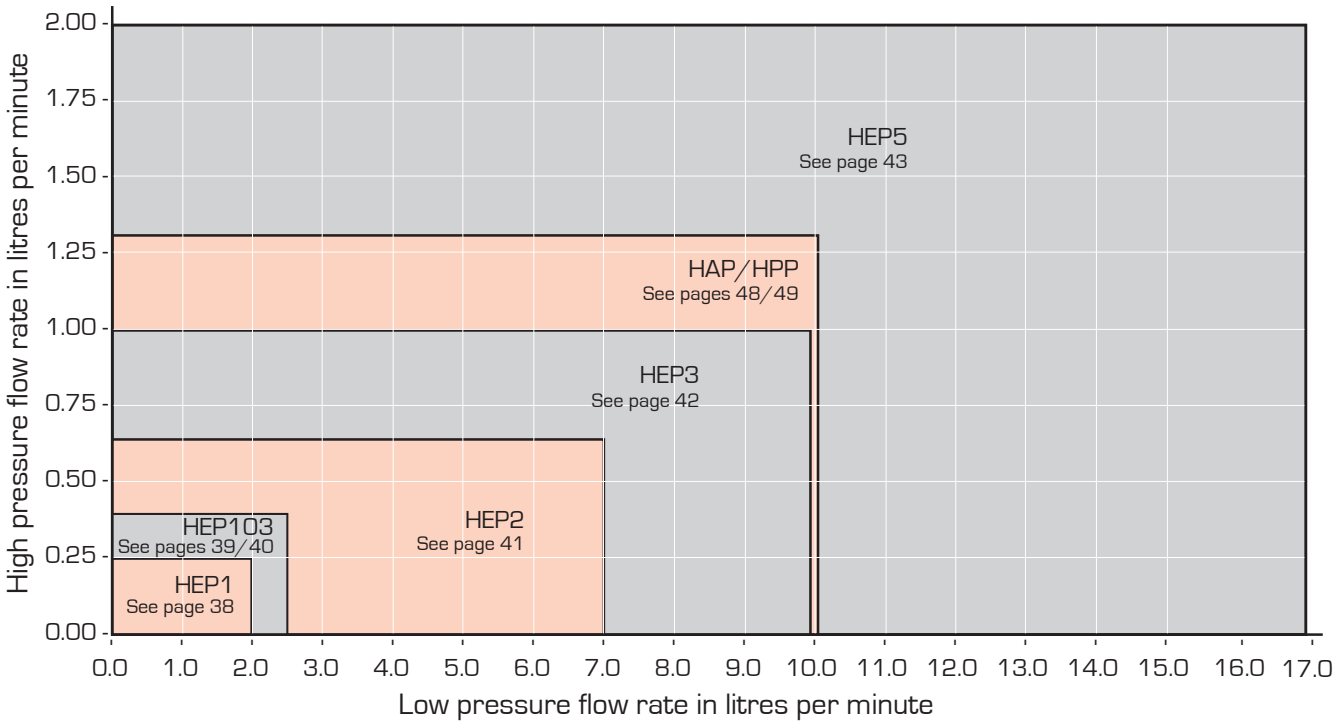
C

SELECTION TABLE FOR HI-FORCE HYDRAULIC PUMPS

MANUAL PUMPS



POWERED PUMPS



HP - MANUALLY OPERATED PUMPS - STEEL

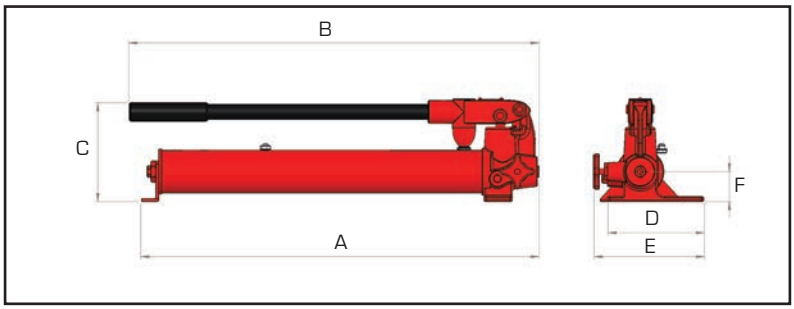
Single or two speed operation

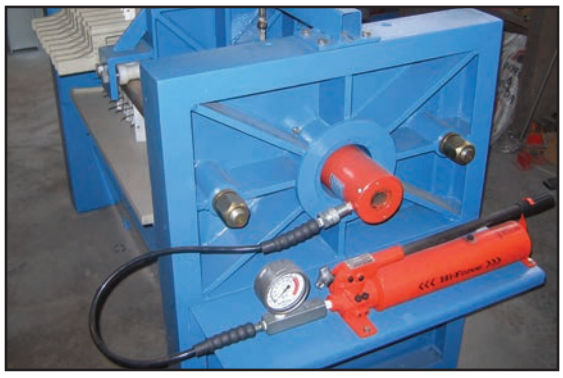
Choice of control valves

Working pressure 700 Bar

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 700 Bar 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 4.1 litres
- Durable steel construction
- External pressure release valve
- Factory set safety relief valve
- Changeover pressure for two speed models is 14 Bar





Model number	Valve type	Displacement per stroke cm³ 1st stage	2nd stage	Usable oil cap. litres	Handle effort kg	Weight kg
Single speed hand operated pumps for single acting cylinders and tools						
HP110	2-way	2.9	-	1.0	45	5.6
Two speed hand operated pumps for single acting cylinders and tools						
HP227	2-way	12.9	2.3	2.3	38	10.5
HP257	2-way	12.9	2.3	4.1	38	15.2

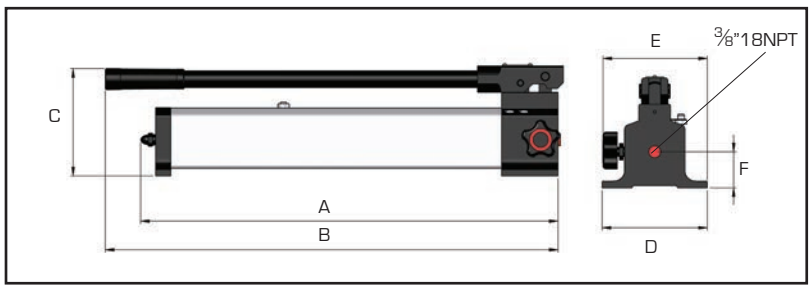
Dimensions in mm					
A	B	C	D	E	F
558	566	128	134	145	40
544	597	168	135	145	53
545	597	168	135	150	53

HP - MANUALLY OPERATED PUMPS - ALUMINIUM

- Two speed operation
- Working pressure 700 Bar
- Six models with choice of control valve

The HP manually operated aluminium 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 700 Bar 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 5 litres
- Lightweight aluminium construction
- External pressure release valve
- Factory set safety relief valve
- Changeover pressure 14 Bar



Model number	Valve type	Displacement per stroke cm³ 1st stage	2nd stage	Usable oil cap. litres	Handle effort kg	Weight kg	Dimensions in mm A	B	C	D	E	F
Two speed hand operated pumps for single acting cylinders and tools												
HP211	2-way	12.9	1.0	0.5	27	2.0	335	388	135	100	125	40
HP212	2-way	12.9	2.3	1.0	40	4.0	560	610	140	100	125	40
HP232	2-way	12.9	2.3	2.0	40	6.9	560	610	160	140	155	50
HP252	2-way	12.9	2.3	5.0	40	9.6	585	610	160	168	145	50
Two speed hand operated pumps for double acting cylinders and tools												
HP232D	4-way	12.9	2.3	2.0	40	8.7	580	625	160	140	175	30
HP252D	4-way	12.9	2.3	5.0	40	13.6	605	625	160	168	175	30

HP - MANUALLY OPERATED PUMPS - HIGH FLOW

High flow manual pump

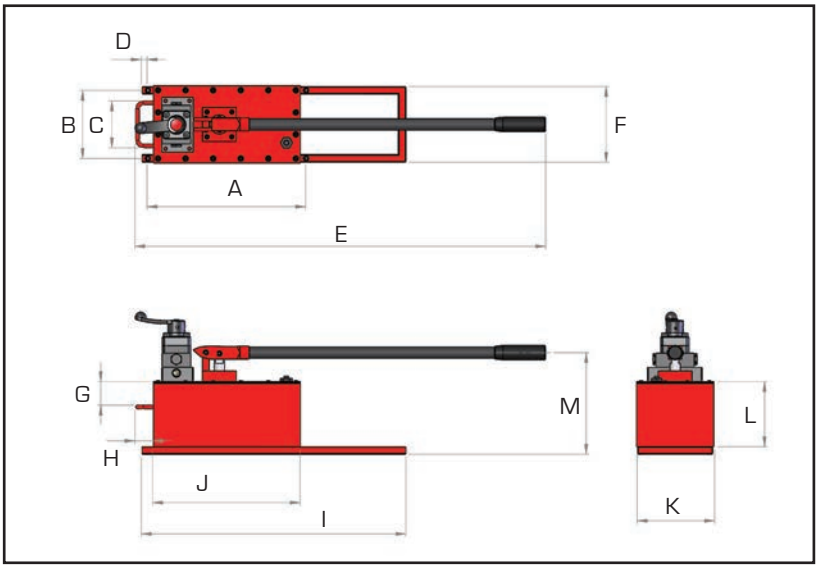
Working pressure 700 Bar

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 700 Bar and the very high, low pressure displacement (113 cm^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 10 litre oil reservoir and are ready for immediate use.

- Durable steel construction
- Factory set safety relief valve
- Changeover pressure 28 Bar
- Low handle effort characteristics
- 10 litres of usable oil capacity



Model number	Valve type	Displacement per stroke cm^3 1st stage	Displacement per stroke cm^3 2nd stage	Usable oil cap. litres	Handle effort kg	Material	Weight kg
Two speed hand operated pump for single acting cylinders and tools							
HP245	2-Way	113	4	10	40	Steel	29.5
Two speed hand operated pump for double acting cylinders and tools							
HP245D	4-Way	113	4	10	40	Steel	31.0

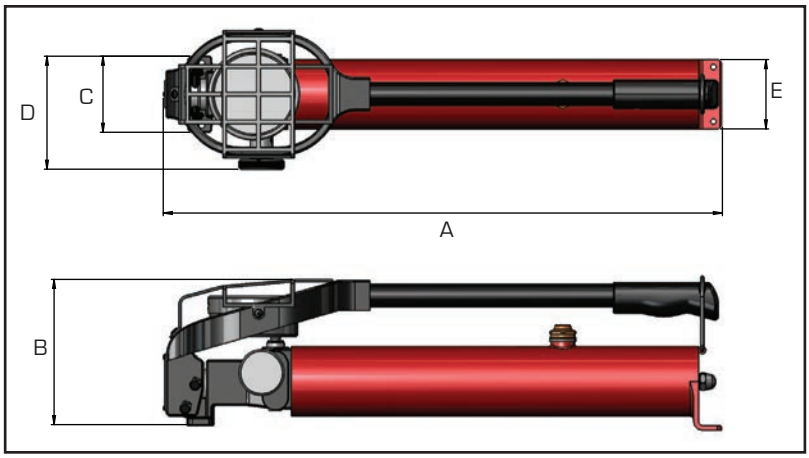
Model number	Dimensions in mm A	B	C	D	E	F	G	H	I	J	K	L	M
HP245	420	180	124	15	1050	200	63	47	700	390	205	173	270
HP245D	420	180	124	15	1050	200	63	47	700	390	205	173	270

HPX - MANUALLY OPERATED ULTRA HIGH PRESSURE PUMP

- Compact design
- Two speed operation
- Working pressure up to 2800 Bar

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 incorporates automatic changeover from low to high pressure at 20 Bar, enabling smooth and low operator handle effort. Both models are fitted with a dual scale gauge reading Bar and PSI contained within a bespoke loop handle and feature a mesh casing to protect the gauge from accidental damage.

- Lightweight aluminium construction
- Factory set safety relief valve
- External pressure release valve
- Low handle effort
- Oil reservoir capacity of 1.2 litres



Model number	Working pressure Bar	Usable oil capacity litres	Displacement per stroke (cm^3) 1st stage	2nd stage	Outlet port	Weight kg	Dimensions in mm A	B	C	D	E
HPX1500	1500	1.2	20.0	1.0	1/4" BSP	6.5	615	161	84	125	76.5
HPX2800	2800	1.2	20.0	0.8	9/16"-18 UNF	6.5	615	161	84	125	76.5

Optional hoses :

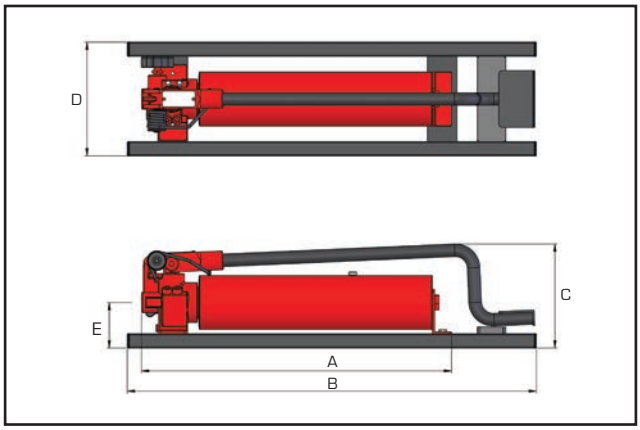
Model number	Working pressure Bar	Description
XHH3-15	1500	3 metres hose with 1/4" BSP male thread each end
XHH5-15	1500	5 metres hose with 1/4" BSP male thread each end
XHH3-30	3000	3 metres hose with 9/16" UNF male coned thread each end
XHH5-30	3000	5 metres hose with 9/16" UNF male coned thread each end

HP227FPC & HP227FP - MANUALLY OPERATED FOOT PUMPS

- Working pressure 700 Bar
- Two stage operation
- Complete with accessories

The HP227FPC manually operated foot pump is supplied complete with 100mm diameter pressure gauge, gauge mounting block and 3 metre length hydraulic hose with CM1 quick connect male coupler. Ideally suited for use with Hi-Force CH series crimper heads (see pages 139 & 140) and all other Hi-Force 700 Bar maximum working pressure, hydraulic tools that require a remote pump operation, the HP227FPC has a superb two speed low pressure displacement (12.9 cm^3 per stroke) with automatic changeover to high pressure displacement (2.3 cm^3 per stroke) up to 700 Bar. Supplied with a pre-filled oil reservoir offering a usable oil capacity of 2.3 litres, 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 3 metre hose assembly.



Model number	Valve type	Displacement per stroke cm^3 1st stage	2nd stage	Usable oil cap. litres	Handle effort kg	Material	Weight kg
HP227FPC	2-way	12.9	2.3	2.3	39	Steel	14.5
HP227FP	2-way	12.9	2.3	2.3	39	Steel	12.5

Dimensions in mm A	B	C	D	E
544	763	227	200	78
544	715	185	200	78

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 8.0 kg) 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 700 Bar, 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 700 Bar maximum working pressure. The two stage design offers a low pressure flow rate up to 2 litres/min with automatic changeover to high pressure, with a flow rate up to 0.2 litres/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 700 Bar maximum working pressure. The two stage design offers a low pressure flow rate up to 2.5 litres/min with automatic changeover to high pressure, with a flow rate up to 0.35 litres/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 7 litres/min with automatic changeover to high pressure flow rate of 0.65 litres/min up to 700 Bar 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 700 Bar.
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 10 litres/min at low pressure and 1 litre/min at high pressure (up to 700 Bar) 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 17 litres/min with automatic changeover to a superb high pressure flow rate of 2 litres/min. The HEP5 offers all the features of the HEP2 and HEP3 series with the addition of a 2.2 kW 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 10 litres/min, with automatic changeover to high pressure flow rate, of 1.3 litres/min up to the 700 Bar 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 petrol 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 petrol 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 700 Bar
- 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 (8.0 kg) 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 700 Bar, 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	Oil Cap litres	Oil Flow litres/min		Weight kg	Dimensions in mm		
			1st stage	2nd stage		Length	Width	Height
BPP107	700 Bar	0.7	0.5	0.15	8.0	355	160	260

ACCESSORIES

BP12

Model No	Description
BP12	Battery Pack 14.4V

Note: Charger supplied separately

CCU144

Model No	Description
CCU144	Car cigarette lighter charger unit

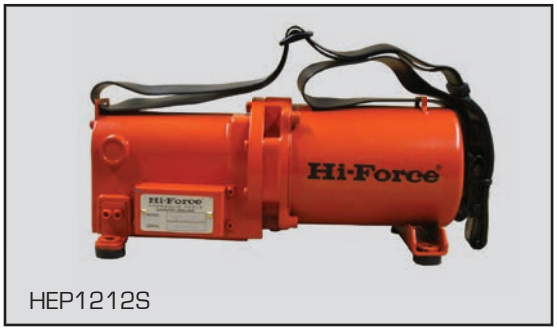
CU12

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

C

Working pressure 700 Bar

Two-stage design, changeover pressure 10 Bar

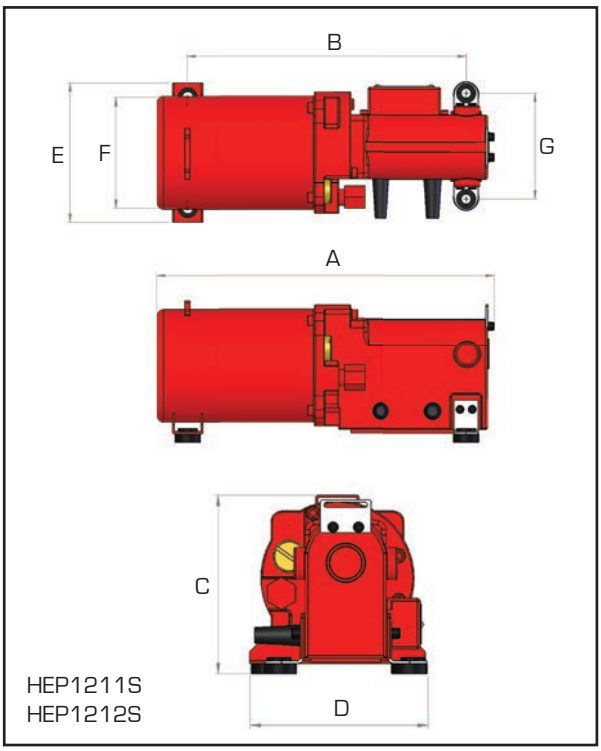
Extremely compact, lightweight & powerful

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 3 metre 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 bar	Maximum flow rate l/min 1st stage	2nd stage	Valve type	Usable oil cap. litres	Weight kg
HEP1211S	110 V - 1 Ph	700	2.00	0.2	2-way	0.8	7.5
HEP1212S	240 V - 1Ph	700	2.00	0.2	2-way	0.8	7.5

Model number	Dimensions in mm A	B	C	D	E	F	G
HEP1211S	333	269	140	139	138	110	105
HEP1212S	333	269	140	139	138	110	105



HEP1211S
HEP1212S

HEP103 - ELECTRIC DRIVEN TWO STAGE COMPACT PUMPS


HEP103442

- Working pressure 700 Bar
- Choice of valve options
- Compact, lightweight & powerful

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 centre, closed centre and locking valve designs available. Maximum working pressure is 700 Bar with automatic low to high pressure changeover fitted as standard. All models are supplied complete with a glycerine filled hydraulic pressure gauge, pre-filled 4 litre 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 Bar	Maximum flow rate l/min 1st stage	2nd stage	Changeover pressure Bar	Remote pendant functions	Usable oil capacity litres	Weight kg
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	700	2.50	0.35	150	advance/retract	4	19.2
HEP103242LS	240 V - 1 Ph	700	2.50	0.35	150	advance/retract	4	19.2
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	700	2.50	0.35	150	advance/retract	4	20.5
HEP103242S	240 V - 1 Ph	700	2.50	0.35	150	advance/retract	4	20.5
Models featuring 3-way manually operated valve, suitable for use with single acting cylinders and tools.								
HEP103341	110 V - 1Ph	700	2.50	0.35	150	motor on/off	4	18.1
HEP103342	240 V - 1 Ph	700	2.50	0.35	150	motor on/off	4	18.1
Models featuring 4-way manually operated valve, suitable for use with double acting cylinders and tools.								
HEP103441	110 V - 1Ph	700	2.50	0.35	150	motor on/off	4	18.1
HEP103442	240 V - 1 Ph	700	2.50	0.35	150	motor on/off	4	18.1
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	700	2.50	0.35	150	advance/retract	4	20.5
HEP103442LS	240 V - 1 Ph	700	2.50	0.35	150	advance/retract	4	20.5

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

HEP103 - ELECTRIC DRIVEN TWO STAGE COMPACT PUMPS

HEP103442LS

Working pressure 700 Bar

Choice of valve options

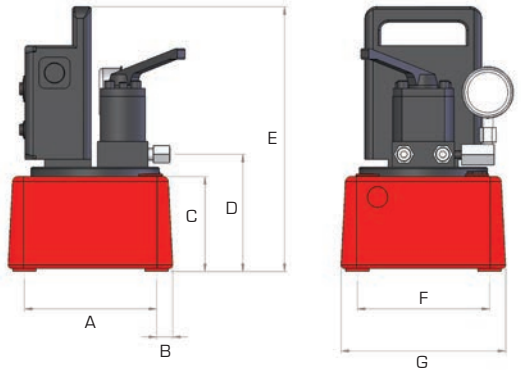
Compact, lightweight & powerful

- 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 17 litres per minute in low pressure and 2 litres per minute up to 700 Bar.

See pages 41 to 43 for more details



HEP103 Range

All models	Dimensions in mm
A	195.0
B	25.0
C	117.5
D	141.5
E	342.0
F	210.0
G	260.0

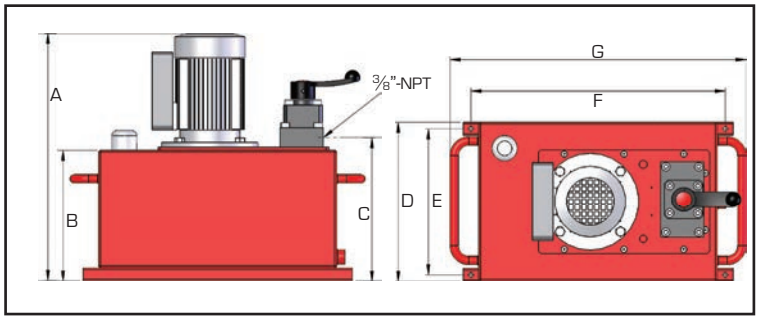
HEP2 - ELECTRIC DRIVEN PUMPS - GENERAL DUTY MEDIUM FLOW

Low pressure flow rate 7 ltr/min. up to 70 Bar

High pressure flow rate 0.65 ltr/min. up to 700 Bar

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. litres	Motor kW	Motor voltage	Weight kg	Dimensions in mm A	B	C	D	E	F	G
HEP207111	P-T Plate	10	1.5	110 / 115 V - 1Ph	47.0	498	198	230	246	221	368	438
HEP207112	P-T Plate	10	1.5	220 / 240 V - 1Ph	47.0	498	198	230	246	221	368	438
HEP207114	P-T Plate	10	1.5	380 / 440 V - 3Ph	47.0	498	198	230	246	221	368	438
HEP207121	P-T Plate	25	1.5	110 / 115 V - 1Ph	63.0	527	227	259	306	281	490	570
HEP207122	P-T Plate	25	1.5	220 / 240 V - 1Ph	63.0	527	227	259	306	281	490	570
HEP207124	P-T Plate	25	1.5	380 / 440 V - 3Ph	63.0	527	227	259	306	281	490	570
HEP207211	2-way	10	1.5	110 / 115 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207212	2-way	10	1.5	220 / 240 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207214	2-way	10	1.5	380 / 440 V - 3Ph	47.5	498	198	230	246	221	368	438
HEP207221	2-way	25	1.5	110 / 115 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207222	2-way	25	1.5	220 / 240 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207224	2-way	25	1.5	380 / 440 V - 3Ph	63.5	527	227	259	306	281	490	570
HEP207311	3-way	10	1.5	110 / 115 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207312	3-way	10	1.5	220 / 240 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207314	3-way	10	1.5	380 / 440 V - 3Ph	47.5	498	198	230	246	221	368	438
HEP207321	3-way	25	1.5	110 / 115 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207322	3-way	25	1.5	220 / 240 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207324	3-way	25	1.5	380 / 440 V - 3Ph	63.5	527	227	259	306	281	490	570
HEP207411	4-way	10	1.5	110 / 115 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207412	4-way	10	1.5	220 / 240 V - 1Ph	47.5	498	198	230	246	221	368	438
HEP207414	4-way	10	1.5	380 / 440 V - 3Ph	47.5	498	198	230	246	221	368	438
HEP207421	4-way	25	1.5	110 / 115 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207422	4-way	25	1.5	220 / 240 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP207424	4-way	25	1.5	380 / 440 V - 3Ph	63.5	527	227	259	306	281	490	570

Note: All 380/440V models are suitable for operation at 50Hz and 60Hz.
All 110/115 and 220/240 volt models are supplied to run at 50Hz as standard. For 60Hz requirements please suffix "H" to the model number.
For optional extras please see page 50.

HEP3 - ELECTRIC DRIVEN PUMPS - GENERAL DUTY HIGH FLOW

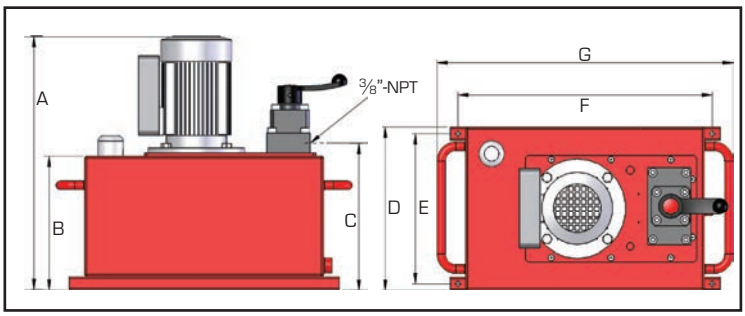

HEP310322S

Low pressure flow rate 10 ltr/min. up to 70 Bar

High pressure flow rate 1 ltr/min. up to 700 Bar

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. litres	Motor kW	Motor voltage	Weight kg	Dimensions in mm A	B	C	D	E	F	G
HEP310121	P-T Plate	25	2.2	110 / 115 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP310122	P-T Plate	25	2.2	220 / 240 V - 1Ph	63.5	527	227	259	306	281	490	570
HEP310124	P-T Plate	25	2.2	380 / 440 V - 3Ph	63.5	527	227	259	306	281	490	570
HEP310141	P-T Plate	40	2.2	110 / 115 V - 1Ph	88.5	636	336	368	306	281	490	560
HEP310142	P-T Plate	40	2.2	220 / 240 V - 1Ph	88.5	636	336	368	306	281	490	560
HEP310144	P-T Plate	40	2.2	380 / 440 V - 3Ph	88.5	636	336	368	306	281	490	560
HEP310221	2-way	25	2.2	110 / 115 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310222	2-way	25	2.2	220 / 240 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310224	2-way	25	2.2	380 / 440 V - 3Ph	64.0	527	227	259	306	281	490	570
HEP310241	2-way	40	2.2	110 / 115 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310242	2-way	40	2.2	220 / 240 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310244	2-way	40	2.2	380 / 440 V - 3Ph	89.0	636	336	368	306	281	490	560
HEP310321	3-way	25	2.2	110 / 115 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310322	3-way	25	2.2	220 / 240 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310324	3-way	25	2.2	380 / 440 V - 3Ph	64.0	527	227	259	306	281	490	570
HEP310341	3-way	40	2.2	110 / 115 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310342	3-way	40	2.2	220 / 240 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310344	3-way	40	2.2	380 / 440 V - 3Ph	89.0	636	336	368	306	281	490	560
HEP310421	4-way	25	2.2	110 / 115 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310422	4-way	25	2.2	220 / 240 V - 1Ph	64.0	527	227	259	306	281	490	570
HEP310424	4-way	25	2.2	380 / 440 V - 3Ph	64.0	527	227	259	306	281	490	570
HEP310441	4-way	40	2.2	110 / 115 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310442	4-way	40	2.2	220 / 240 V - 1Ph	89.0	636	336	368	306	281	490	560
HEP310444	4-way	40	2.2	380 / 440 V - 3Ph	89.0	636	336	368	306	281	490	560

Note: All 380/440V models are suitable for operation at 50Hz and 60Hz.
All 110/115 and 220/240 volt models are supplied to run at 50Hz as standard. For 60Hz requirements please suffix "H" to the model number.
For optional extras please see page 50.

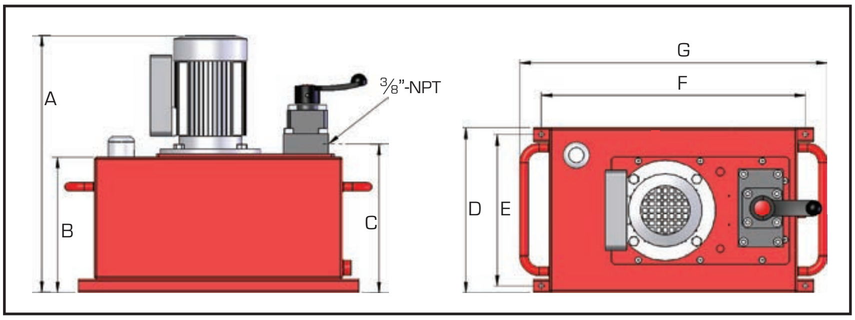
HEP5 - ELECTRIC DRIVEN PUMPS - HEAVY DUTY HIGH FLOW

Low pressure flow rate 17 ltr/min up to 70 Bar

High pressure flow rate 2 ltr/min up to 700 Bar

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. litres	Motor kW	Motor voltage	Weight kg	Dimensions in mm A	B	C	D	E	F	G
HEP517142	P-T Plate	40	2.2	220 / 240	88.5	636	336	368	306	281	490	560
HEP517144	P-T Plate	40	2.2	380 / 440	88.5	636	336	368	306	281	490	560
HEP517162	P-T Plate	60	2.2	220 / 240	120.0	657	357	389	406	381	513	583
HEP517164	P-T Plate	60	2.2	380 / 440	120.0	657	357	389	406	381	513	583
HEP517242	2-way	40	2.2	220 / 240	89.0	636	336	368	306	281	490	560
HEP517244	2-way	40	2.2	380 / 440	89.0	636	336	368	306	281	490	560
HEP517262	2-way	60	2.2	220 / 240	120.0	657	357	389	406	381	513	583
HEP517264	2-way	60	2.2	380 / 440	120.0	657	357	389	406	381	513	583
HEP517342	3-way	40	2.2	220 / 240	89.0	636	336	368	306	281	490	560
HEP517344	3-way	40	2.2	380 / 440	89.0	636	336	368	306	281	490	560
HEP517362	3-way	60	2.2	220 / 240	120.0	657	357	389	406	381	513	583
HEP517364	3-way	60	2.2	380 / 440	120.0	657	357	389	406	381	513	583
HEP517442	4-way	40	2.2	220 / 240	89.0	636	336	368	306	281	490	560
HEP517444	4-way	40	2.2	380 / 440	89.0	636	336	368	306	281	490	560
HEP517462	4-way	60	2.2	220 / 240	120.0	657	357	389	406	381	513	583
HEP517464	4-way	60	2.2	380 / 440	120.0	657	357	389	406	381	513	583

Note: All 380/440V models are suitable for operation at 50Hz and 60Hz.
All 220/240 volt models are supplied to run at 50Hz as standard. For 60Hz requirements please suffix "H" to the model number.
For optional extras please see page 50.

HSP - ELECTRIC DRIVEN SPLIT FLOW MULTI-OUTLET PUMPS

HSP44E104

- Working pressure 700 Bar
- Multiple outlet valve options
- Precise control to achieve synchronised 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 synchronised, 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 synchronised lift control button for all of the selected control valves. Maximum working pressure of all HSP pumps is 700 Bar with an externally adjustable pressure relief valve on each outlet for easy pressure adjustment between 70 and 700 Bar. A full range of system components is available and detailed on pages 51 to 60.

Optional extra's include a fully automatic PLC controlled synchronised 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 centralised touch screen computer.

Model number	Valve configuration	Valve type	Oil Capacity litres	Oil flow per outlet l/min	Motor voltage	Weight kg
HSP23M54	2 x 3-way	manual	50	0.9	380 / 440	178
HSP24M54	2 x 4-way	manual	50	0.9	380 / 440	178
HSP33M104	3 x 3-way	manual	100	1.8	380 / 440	333
HSP34M104	3 x 4-way	manual	100	1.8	380 / 440	333
HSP43M104	4 x 3-way	manual	100	1.1	380 / 440	272
HSP44M104	4 x 4-way	manual	100	1.1	380 / 440	272
HSP23E54	2 x 3-way	electric	50	0.9	380 / 440	180
HSP24E54	2 x 4-way	electric	50	0.9	380 / 440	180
HSP33E104	3 x 3-way	electric	100	1.8	380 / 440	335
HSP34E104	3 x 4-way	electric	100	1.8	380 / 440	335
HSP43E104	4 x 3-way	electric	100	1.1	380 / 440	274
HSP44E104	4 x 4-way	electric	100	1.1	380 / 440	274
HSP63E104	6 x 3-way	electric	100	0.9	380 / 440	335
HSP64E104	6 x 4-way	electric	100	0.9	380 / 440	335
HSP83E104	8 x 3-way	electric	150	0.7	380 / 440	370
HSP84E104	8 x 4-way	electric	150	0.7	380 / 440	370

HSP - ELECTRIC DRIVEN SPLIT FLOW MULTI-OUTLET PUMPS

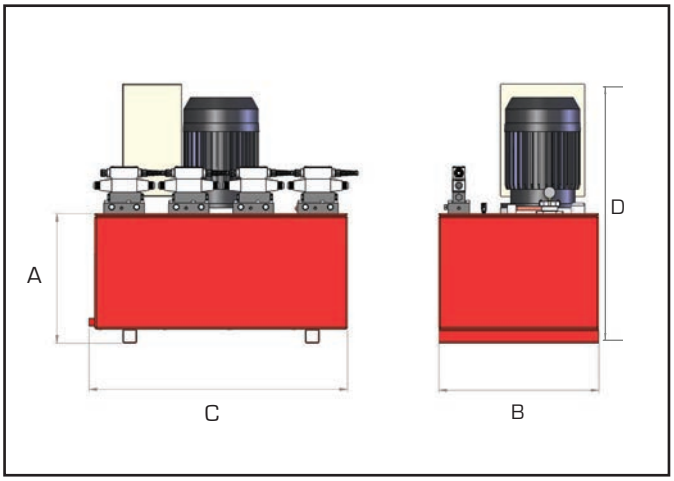
Choice of manual or electric valve options

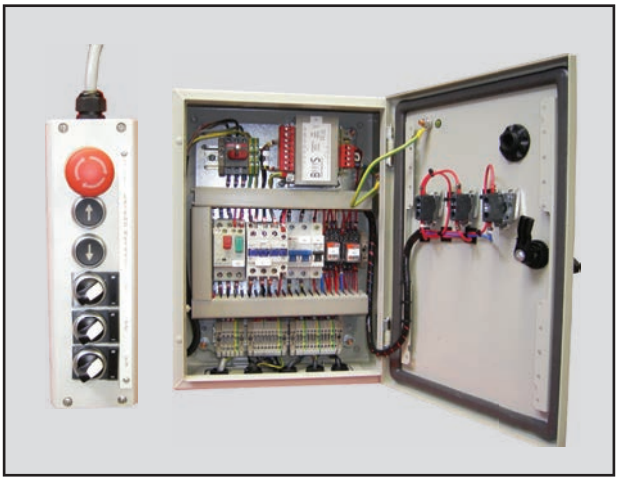
Reservoir capacity 50 to 150 litres

Consistent single speed flow rate

- Working pressure 700 Bar
- Equal output flow regardless of pressure
- Control panel with selector switches for each individual outlet, allowing for single or multiple (synchronised) 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 synchronised 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 litres	Dimensions in mm A	B	C	D
HSP2 (all models)	50	460	570	500	817
HSP3 (all models)	100	460	570	920	920
HSP4 (all models)	100	460	570	920	920
HSP6 (all models)	100	470	800	750	920
HSP8 (all models)	150	470	800	1010	1085

AHP11 - AIR DRIVEN SINGLE STAGE HAND OR FOOT OPERATED PUMPS

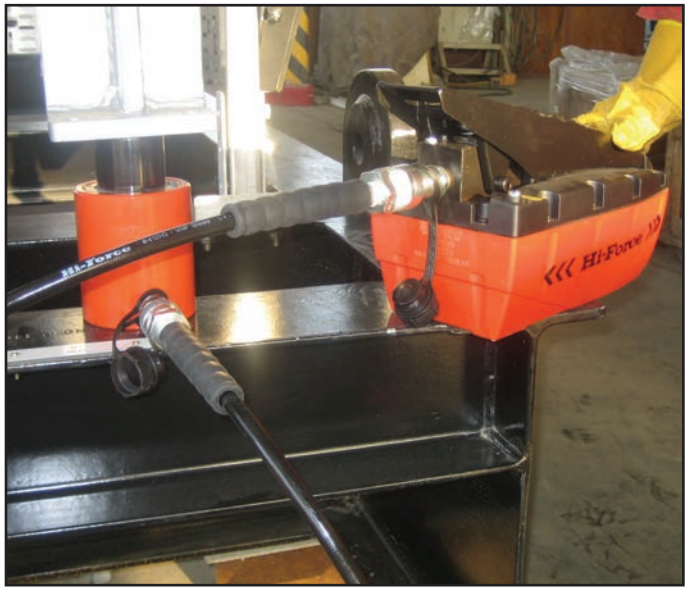
- Working pressure 700 Bar
- Operates from standard 7 Bar air supply
- Compact, lightweight & powerful

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 7 Bar 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 10 litres

OPTIONAL REMOTE PENDANT:

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



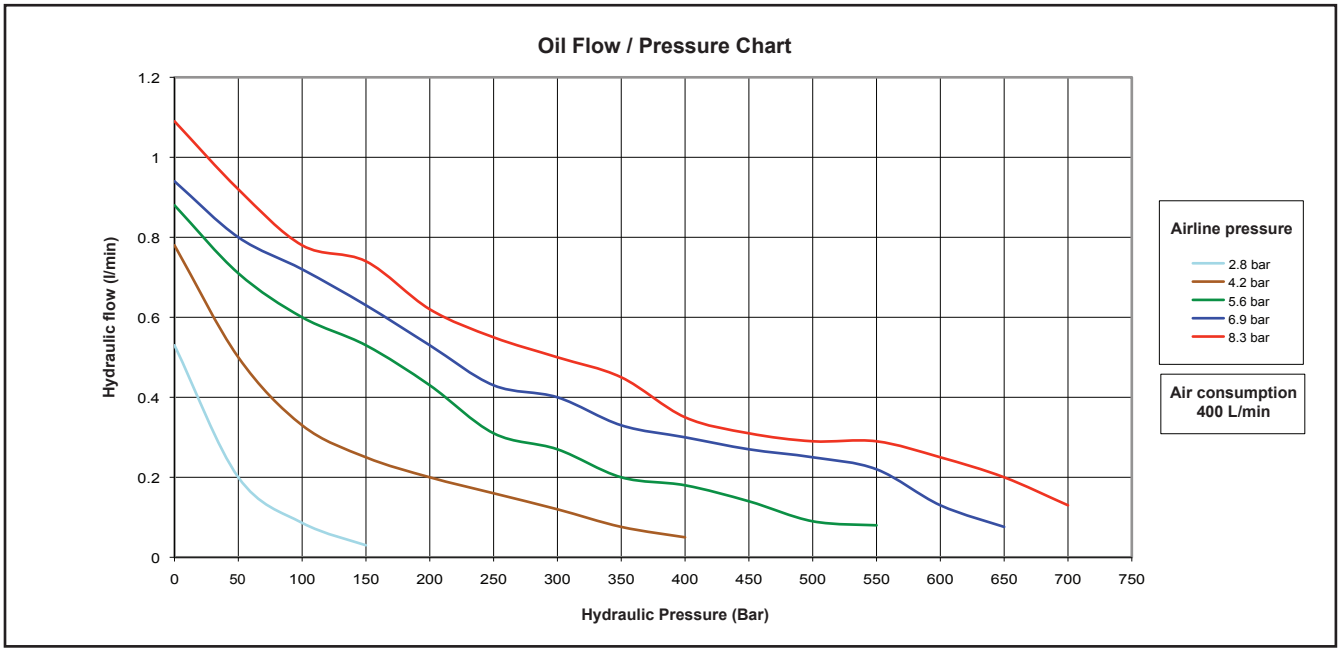
Filter, regulator & lubricator units for use in combination with air driven pump units are also available.
Please see page 91 for more details.

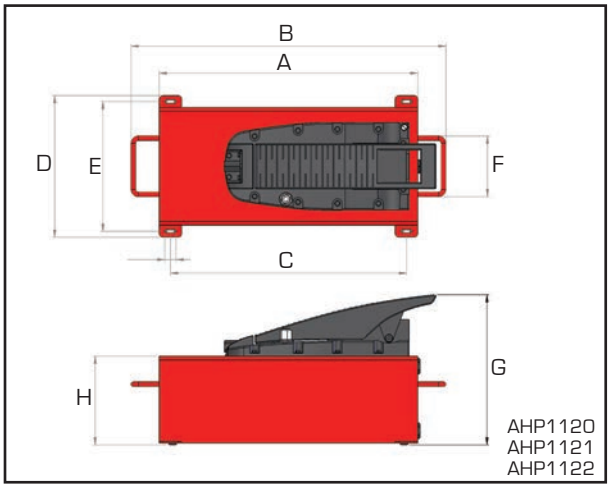
Model number	Maximum pressure bar	Maximum flow rate l/min	Valve type	Usable oil capacity litres	Air inlet connection G	Oil outlet connection NPTF	Weight kg
AHP1120	700	0.8	2-way	2.4	1/4"	3/8"	4.7
AHP1121	700	0.8	2-way	5.0	1/4"	3/8"	9.0
AHP1122	700	0.8	2-way	10.0	1/4"	3/8"	17.8
AHP1141	700	0.8	4-way	5.0	1/4"	3/8"	9.5
AHP1142	700	0.8	4-way	10.0	1/4"	3/8"	18.3

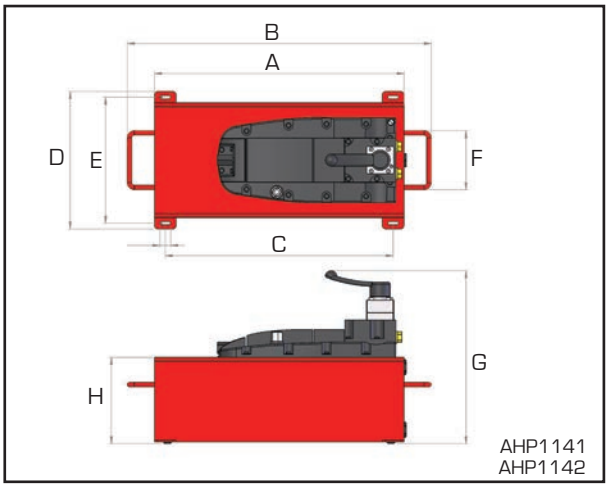
AHP11 - AIR DRIVEN SINGLE STAGE HAND OR FOOT OPERATED PUMPS

- Working pressure 700 Bar
- Operates from standard 7 Bar air supply
- Compact, lightweight & powerful

C







Model number	Dimensions in mm							
	A	B	C	D	E	F	G	H
AHP1120	365	*	237	157	66-90	*	210	125
AHP1121	420	*	380	240	220	*	223	114
AHP1122	464	560	*	210	*	108	274	158
AHP1141	420	*	380	240	220	*	265	114
AHP1142	464	560	*	210	*	*	315	158

*Not applicable

HAP - AIR DRIVEN PUMPS - GENERAL DUTY HIGH FLOW


HAP21026

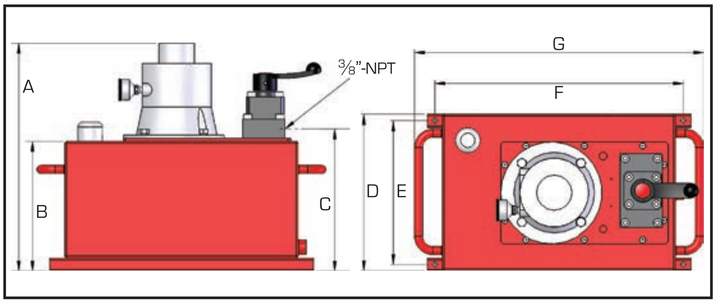
Low pressure flow rate 10 litres/min up to 70 Bar

High pressure flow rate 1.3 litres/min up to 700 Bar

Working pressure 700 Bar

The HAP two stage air powered hydraulic pump range offers a low pressure flow of 10 litres/min with automatic changeover to 700 Bar high pressure flow rate of 1.3 litres/min. Driven by a powerful 3 kW rotary air motor with a maximum air consumption of 2.4m^3 per minute at 7 Bar 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. litres	Motor kW	Weight kg	Dimensions in mm A	B	C	D	E	F	G
HAP21011	P-T Plate	10	3.0	41.5	393	198	230	246	221	368	438
HAP21012	P-T Plate	25	3.0	57.5	422	227	259	306	281	490	570
HAP21014	P-T Plate	40	3.0	71.5	531	336	368	306	281	490	560
HAP21016	P-T Plate	60	3.0	96.5	552	357	389	406	381	513	583
HAP21021	2-way	10	3.0	42.0	393	198	230	246	221	368	438
HAP21022	2-way	25	3.0	58.0	422	227	259	306	281	490	570
HAP21024	2-way	40	3.0	72.0	531	336	368	306	281	490	560
HAP21026	2-way	60	3.0	97.0	552	357	389	406	381	513	583
HAP21031	3-way	10	3.0	42.0	393	198	230	246	221	368	438
HAP21032	3-way	25	3.0	58.0	422	227	259	306	281	490	570
HAP21034	3-way	40	3.0	72.0	531	336	368	306	281	490	560
HAP21036	3-way	60	3.0	97.0	552	357	389	406	381	513	583
HAP21041	4-way	10	3.0	42.0	393	198	230	246	221	368	438
HAP21042	4-way	25	3.0	58.0	422	227	259	306	281	490	570
HAP21044	4-way	40	3.0	72.0	531	336	368	306	281	490	560
HAP21046	4-way	60	3.0	97.0	552	357	389	406	381	513	583

Note: For optional extras, please see page 50

HPP - PETROL ENGINE DRIVEN PUMPS - GENERAL DUTY HIGH FLOW

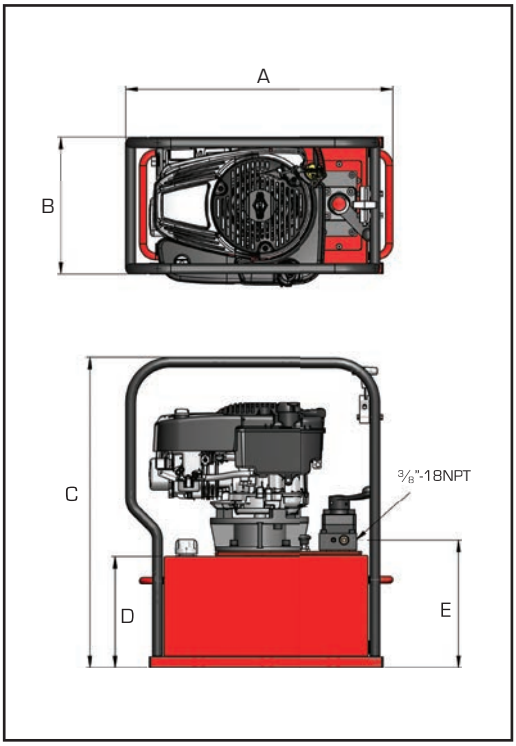

HPP21044

Low pressure flow rate 10 litres/min up to 70 Bar

High pressure flow rate 1.3 litres/min up to 700 Bar

Working pressure 700 Bar

The HPP range of two stage petrol 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 700 Bar maximum working pressure and offer a low pressure flow rate of 10 litres/min with automatic changeover to a high pressure flow rate of 1.3 litres/min. Powered by a 3.35 kW 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 3.35 kW four stroke petrol 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. litres	Motor kW	Weight kg	Dimensions in mm A	B	C	D	E
HPP21012	P-T Plate	25	3.35	70.5	570	306	686	227	259
HPP21014	P-T Plate	40	3.35	85.5	570	306	795	336	368
HPP21016	P-T Plate	60	3.35	113.5	583	406	816	357	389
HPP21022	2-way	25	3.35	71.0	570	306	686	227	259
HPP21024	2-way	40	3.35	86.0	570	306	795	336	368
HPP21026	2-way	60	3.35	114.0	583	406	816	357	389
HPP21032	3-way	25	3.35	71.0	570	306	686	227	259
HPP21034	3-way	40	3.35	86.0	570	306	795	336	368
HPP21036	3-way	60	3.35	114.0	583	406	816	357	389
HPP21042	4-way	25	3.35	71.0	570	306	686	227	259
HPP21044	4-way	40	3.35	86.0	570	306	795	336	368
HPP21046	4-way	60	3.35	114.0	583	406	816	357	389

ACCESSORIES FOR POWERED PUMPS

Protective roll frame

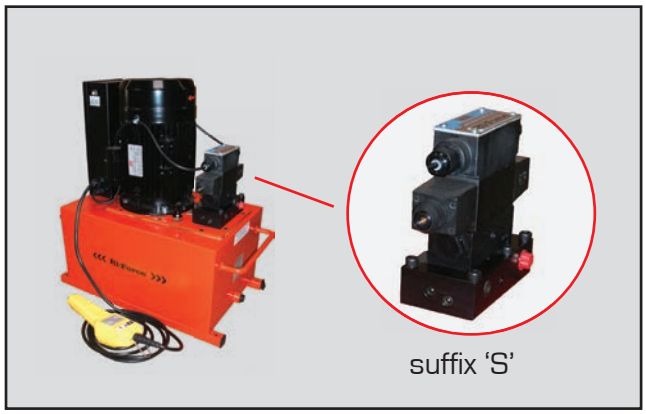
Model number	For all HEP and HAP models
PPA10RF	All pumps with 10L tank
PPA25RF	All pumps with 25L tank
PPA40RF	All pumps with 40L tank
PPA60RF	All pumps with 60L tank

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 25 and 40 litre model pumps.
PPA60WT	Wheel trolley for all 60 litre model pumps.

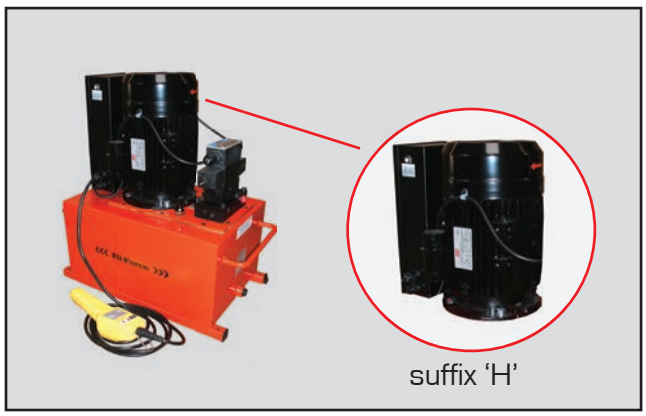
All pumps can be supplied with wheel trolley factory fitted.
Just suffix pump model number with 'WT'.



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'.



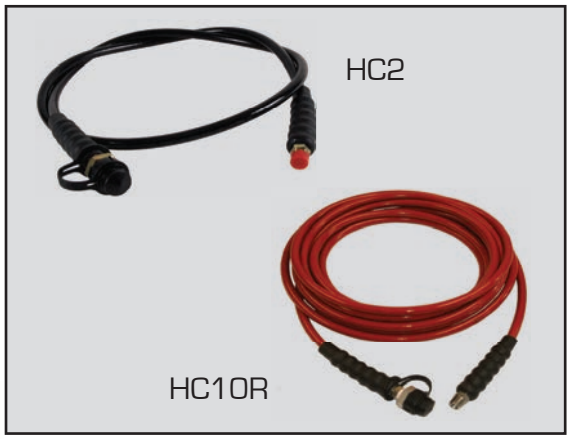
60Hz Electric Motor

Suffix	Description
H	All 380/440V models are suitable for operation at 50Hz and 60Hz. All 110/115 and 220/240 volt models are supplied to run at 50Hz as standard. For 60Hz requirements, please suffix "H" to the model number.

SYSTEM COMPONENTS

D

HIGH PRESSURE HYDRAULIC HOSES - BLACK & RED



- Working pressure 700 Bar
- 4:1 Factor of safety
- Hand grip protective strain relievers

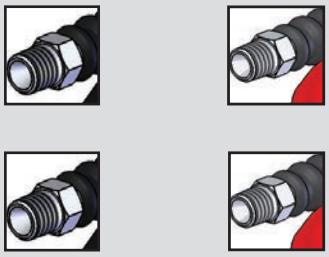
D

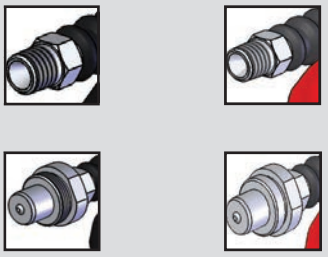
Hi-Force high pressure hydraulic hoses provide the vital, high quality, safe connection for your hydraulic equipment. Available in black and red and supplied complete with an ergonomically designed protective strain reliever at both ends, Hi-Force high pressure hoses are suitable for working pressures up to 700 Bar with a 4 : 1 factor of safety.

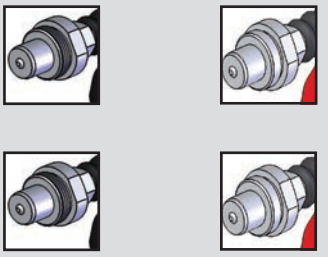
Tip for double acting systems ...

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 6.6mm and outside diameter is 12.7mm







Length Metres	No couplers 3/8"- 18 NPT male fittings both ends Model number		3/8"- 18 NPT male fitting one end with CM1 coupler fitted one end Model number		CM1 male couplers fitted both ends Model number	
0.5	HH0.5	HH0.5R	HC0.5	HC0.5R	HC0.5C	HC0.5CR
1.0	HH1	HH1R	HC1	HC1R	HC1C	HC1CR
2.0	HH2	HH2R	HC2	HC2R	HC2C	HC2CR
3.0	HH3	HH3R	HC3	HC3R	HC3C	HC3CR
4.0	HH4	HH4R	HC4	HC4R	HC4C	HC4CR
5.0	HH5	HH5R	HC5	HC5R	HC5C	HC5CR
6.0	HH6	HH6R	HC6	HC6R	HC6C	HC6CR
10.0	HH10	HH10R	HC10	HC10R	HC10C	HC10CR
12.0	HH12	HH12R	HC12	HC12R	HC12C	HC12CR
15.0	HH15	HH15R	HC15	HC15R	HC15C	HC15CR
20.0	HH20	HH20R	HC20	HC20R	HC20C	HC20CR
25.0	HH25	HH25R	HC25	HC25R	HC25C	HC25CR
30.0	HH30	HH30R	HC30	HC30R	HC30C	HC30CR

PRESSURE GAUGES & GAUGE MOUNTING BLOCKS

Clear precise dual scale readings

Manufactured to EN837-1

Calibration certificates on request

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 up to 109 tonnes are featured in this catalogue, 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 mm	Gauge type	Reading Inner scale	Reading Outer scale	Inlet thread	Compatible Hi-Force cylinders	Weight kg
HG63G	63	glycerine	0-700 Bar	0-10000 Psi	¼"-18NPT	All models	0.2
HG1	100	dry	0-700 Bar	0-10000 Psi	½"-14NPT	All models	0.9
HG1G	100	glycerine	0-700 Bar	0-10000 Psi	½"-14NPT	All models	1.0
HG5	100	dry	0-700 Bar	0-4.5 tonnes	½"-14NPT	All 4.5 tonnes models	0.9
HG10	100	dry	0-700 Bar	0-10 tonnes	½"-14NPT	All 10 tonnes models	0.9
HG11	100	dry	0-700 Bar	0-11 tonnes	½"-14NPT	All 11 tonnes models	0.9
HG20	100	dry	0-700 Bar	0-20 tonnes	½"-14NPT	All 20 tonnes models	0.9
HG23	100	dry	0-700 Bar	0-23 tonnes	½"-14NPT	All 23 tonnes models	0.9
HG25	100	dry	0-700 Bar	0-25 tonnes	½"-14NPT	All 25 tonnes models	0.9
HG32	100	dry	0-700 Bar	0-32 tonnes	½"-14NPT	All 32 tonnes models	0.9
HG33	100	dry	0-700 Bar	0-33 tonnes	½"-14NPT	All 33 tonnes models	0.9
HG50	100	dry	0-700 Bar	0-50 tonnes	½"-14NPT	All 50 tonnes models	0.9
HG61	100	dry	0-700 Bar	0-61 tonnes	½"-14NPT	All 61 tonnes models	0.9
HG102	100	dry	0-700 Bar	0-102 tonnes	½"-14NPT	All 102 tonnes models	0.9
HG109	100	dry	0-700 Bar	0-109 tonnes	½"-14NPT	All 109 tonnes models	0.9
HG2	150	dry	0-700 Bar	0-10000 Psi	½"-14NPT	All models	1.6
HG2G	150	glycerine	0-700 Bar	0-10000 Psi	½"-14NPT	All models	1.7

Gauge mounting blocks :

Model number	Dimensions Length mm	Width mm	Height mm	Gauge thread	Inlet thread	Outlet thread	Weight kg
HGA1	75	32	32	½"-14NPT	⅜"-18NPT male	⅜"-18NPT female	0.25
HGA2	170	32	32	½"-14NPT	⅜"-18NPT male	⅜"-18NPT female	0.85
HGA1-25	75	32	32	¼"-18NPT	⅜"-18NPT male	⅜"-18NPT female	0.30
HGA2-25	170	32	32	¼"-18NPT	⅜"-18NPT male	⅜"-18NPT female	0.90
AGA1-25	75	32	50	¼"-18NPT	⅜"-18NPT male	⅜"-18NPT female	0.55

DIGITAL GAUGE

HDG1

5 digit LCD display

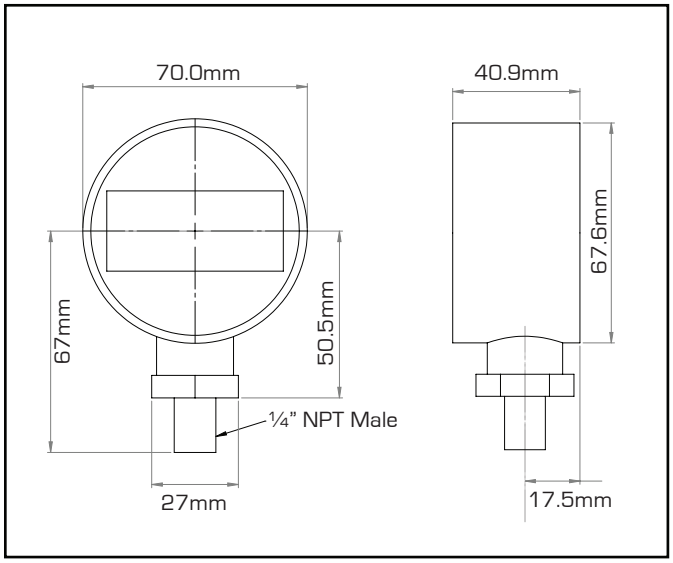
Choice of pressure readings

0.5% full scale accuracy

The Hi-Force HDG1 digital general purpose gauge is capable of measuring hydraulic pressure up to 1000 Bar (14,503 PSI) 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 12mm, 5 digit upper line pressure reading and 6mm, 5 digit lower line unit reading.
- Blue backlight allows reading in low visibility 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 mm	Pressure reading Bar	Pressure reading PSI	Pressure reading mPa	Pressure reading kg/cm^2	Inlet thread	Weight kg
HDG1	70	0-1000	0-14503	0-100	0-1019.7	¼"-18NPT	0.2

PRESSURE TRANSDUCER & DIGITAL DISPLAY

Maximum working pressure 700 Bar

Pressure readings in Bar and PSI

0.5% full scale accuracy

The Hi-Force HPT1 pressure transducer offers an economical solution for precise pressure measurement in many different applications. Offering an accuracy of 0.5%, this universal pressure transducer is capable of measuring hydraulic pressure up to 700 bar (10,000 psi).

The Hi-Force HDD1 digital display complements the HPT1 pressure transducer for applications where remote pressure reading is preferred. A cable permanently attached to HDD1 terminates with an M12 receptacle which connects to the HPT1 pressure transducer. 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 Bar or PSI
- Display voltage 18-32 VDC, supplied including power supply unit
- Suitable gauge mounting blocks can be found on Page 53

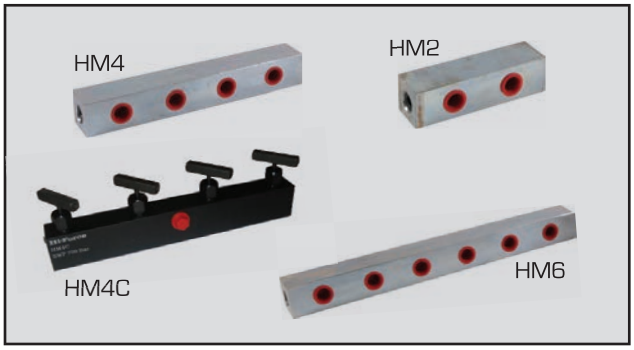
Pressure transducer:

Model number	Pressure range Bar	Pressure range PSI	Connection thread	Accuracy percentage full scale	Cable length m	Weight kg
HPT1	0-700	0-10000	¼"-18NPT	0.5	2	0.1

Digital diplay unit:

Model number	Pressure reading Bar	Pressure reading PSI	Display size L x H mm	Overall size L x W x H mm	Voltage VDC	Weight kg
HDD1	0-700	0-10000	76 x 25	120 x 110 x 40	18 - 32	0.3

MANIFOLDS



Working pressure 700 Bar

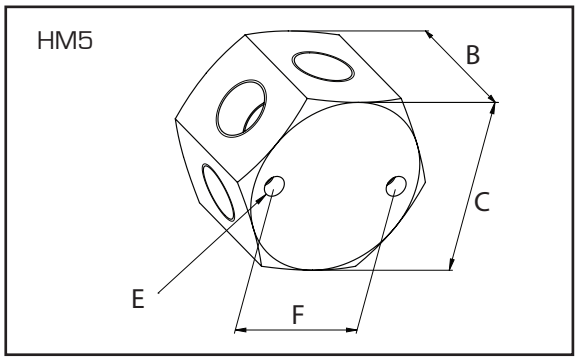
Choice of open or controlled manifolds

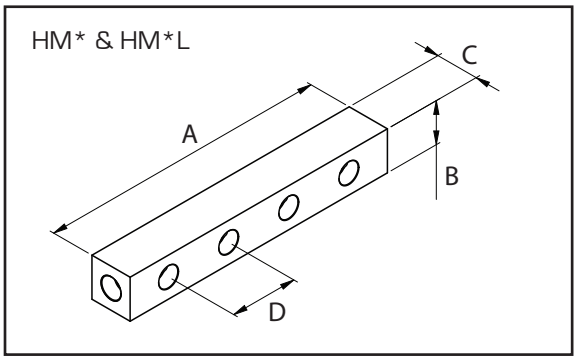
2, 4, 5, 6 or 8 outlet port models available

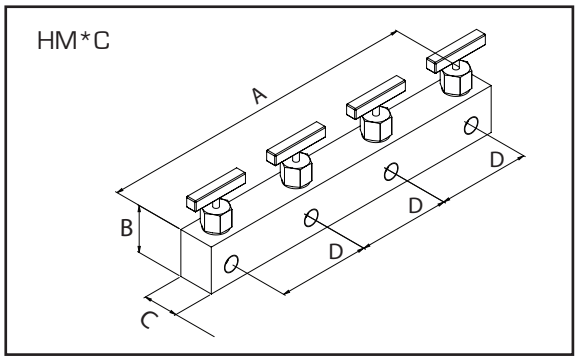
D

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 700 Bar maximum working pressure.

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







Model number	Type	Design	Number of outlets	Female Threads Inlet	Female Threads Outlet	Weight kg	Dimensions in mm A	B	C	D	E	F
HM2	manifold	parallel	2	3/8"-18NPT	2 x 3/8"-18NPT	1.0	114	32	32	50	-	-
HM4	manifold	parallel	4	3/8"-18NPT	4 x 3/8"-18NPT	1.5	214	32	32	50	-	-
HM5	manifold	hexagon	5	3/8"-18NPT	5 x 3/8"-18NPT	0.7	-	41	51	-	M6	38
HM6	manifold	parallel	6	3/8"-18NPT	6 x 3/8"-18NPT	2.0	314	32	32	50	-	-
HM8	manifold	parallel	8	3/8"-18NPT	8 x 3/8"-18NPT	2.5	414	32	32	50	-	-
HM4L	manifold	extended parallel	4	3/8"-18NPT	4 x 3/8"-18NPT	2.4	394	32	32	110	-	-
HM6L	manifold	extended parallel	6	3/8"-18NPT	6 x 3/8"-18NPT	3.7	614	32	32	110	-	-
HM2C	controlled manifold	parallel	2	3/8"-18NPT	2 x 3/8"-18NPT	2.0	150	51	38	100	-	-
HM4C	controlled manifold	parallel	4	3/8"-18NPT	4 x 3/8"-18NPT	3.5	350	51	38	100	-	-

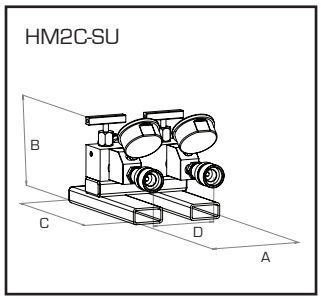
MANIFOLDS

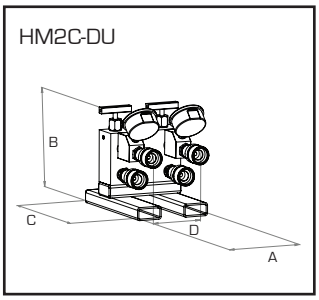
Working pressure 700 Bar

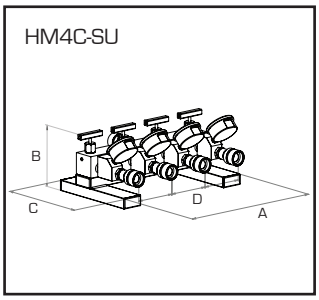
Designed for single or double acting systems

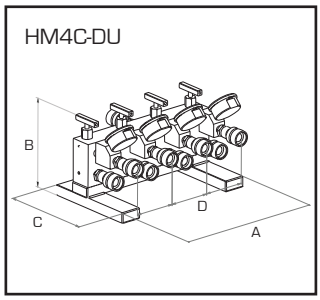
2 or 4 outlet port models available

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, 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.









Model number	Type	Weight kg	Dimensions in mm A	B	C	D
HM2C-SU	2-Way controlled manifold unit, suitable for single acting systems	2.0	150	51	51	100
HM2C-DU	2-Way controlled manifold unit, suitable for double acting systems	3.0	150	102	51	100
HM4C-SU	4-Way controlled manifold unit, suitable for single acting systems	3.5	350	51	51	100
HM4C-DU	4-Way controlled manifold unit, suitable for double acting systems	6.0	350	102	51	100

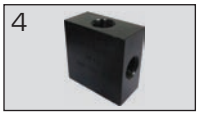
HYDRAULIC OIL

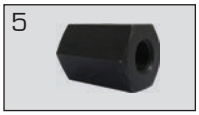
Hi-Force premium grade hydraulic oil is specially formulated for use with Hi-Force hydraulic tools, providing optimum performance throughout all working conditions.

Model number	Capacity litres	For use with
HF032-1	1	Manually operated pumps
HF032-5	5	Manually operated pumps
HF032-25	25	Manually operated pumps
HF046-1	1	Powered pumps
HF046-5	5	Powered pumps
HF046-25	25	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 700 Bar 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 700 Bar working pressure.

Large selection of standard adaptors

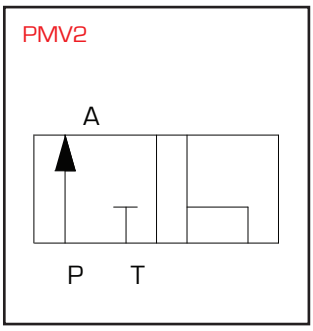
Working pressure 700 Bar

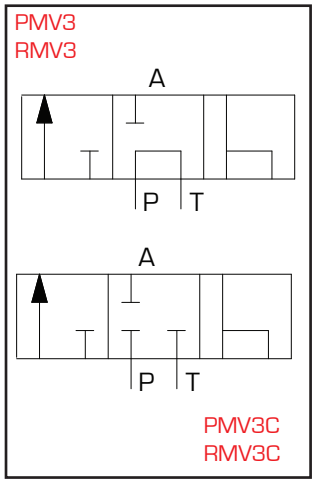
Model number	See picture	Description	Thread specification
HF7	1	Nipple	¼" NPT male to ¼" NPT male
HF8	5	Adaptor	¼" NPT female to ¼" NPT female
HF10	2	Elbow	⅜" NPT female to ⅜" NPT female
HF12	3	Equal tee	⅜" NPT female
HF13	4	Cross	⅜" NPT female
HF14	5	Adaptor	⅜" NPT female to ⅜" NPT female
HF15	5	Reducer	⅜" NPT female to ¼" NPT female
HF16	6	Elbow	⅜" NPT female to ⅜" NPT male
HF17	1	Nipple	⅜" NPT male to ⅜" NPT male
HF19	1	Long nipple	⅜" NPT male to ⅜" NPT male
HF24	7	Adaptor	⅜" NPT male to ⅜" BSP female
HF27	1	Nipple	¼" NPT male to ⅜" NPT male
HF30	7	Reducer	⅜" NPT male to ¼" NPT female
HF31	8	Tee	⅜" NPT female to ⅜" NPT male
HF33	7	Reducer	⅜" NPT male to ¼" BSP female
HF55	7	Reducer	⅜" NPT female to ¼" NPT male
HF69	7	Adaptor	½" BSP male to ⅜" NPT female
CF1	9	Female coupler	⅜" NPT male
CM1	10	Male coupler	⅜" NPT female
CMF1	9 + 10	Complete coupler	⅜" NPT
CF2	9	Female coupler	¼" NPT male
CM2	10	Male coupler	¼" NPT female
CMF2	9 + 10	Complete coupler	¼" 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	

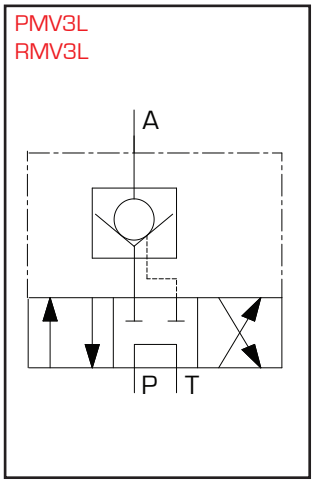
DIRECTIONAL CONTROL VALVES

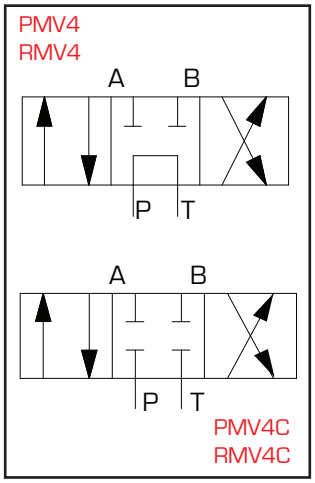
- Working pressure 700 Bar
- Pump or remote mounted design
- Manual or solenoid options available

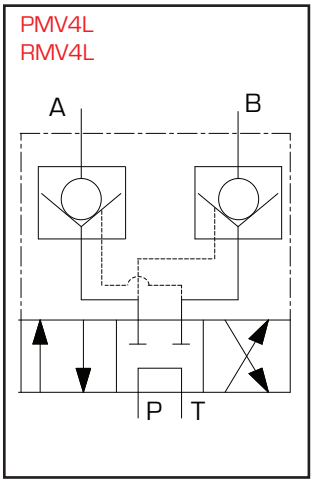
Hi-Force control valves are designed to provide precise control of the hydraulic system either by accurate pressure or directional flow control. The PMV range of pump mounted valves is identical to the valves fitted to the Hi-Force powered pumps featured on pages 41-43, 44-45, 48, 49 and can be easily 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.







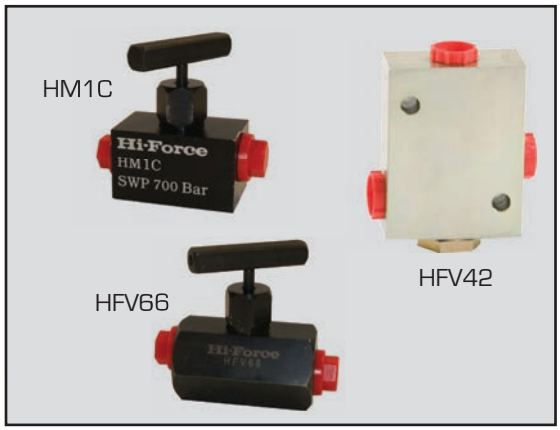




Directional control valves :

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 700 Bar
- 3/8"-18 NPT connections
- Ensures system safety and control

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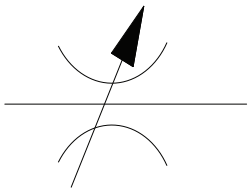
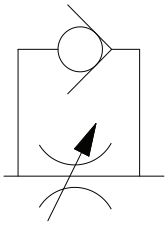


HM1C

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

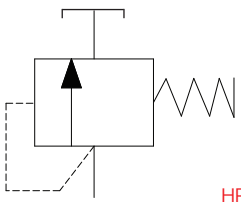
Model Number	Dimensions in mm Height	Length	Width
HM1C	82	64	38



HFV66

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

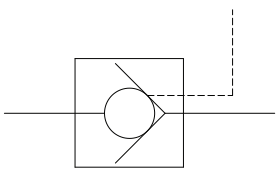
Model Number	Dimensions in mm Height	Length	Width
HFV66	86	75	47



HPV152

Adjustable pressure relief valve, for pressure setting from 55 to 700 Bar. Supplied complete with return line hose.

Model Number	Dimensions in mm Height	Length	Width
HPV152	102	64	32



HFV42

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

Model Number	Dimensions in mm Height	Length	Width
HFV42	84	64	32

JACKS

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JAH & JAS - ALUMINIUM JACKS

Capacities from 10 to 60 tonnes

Stroke lengths from 75 to 305mm

Internal safety overload device

The JAH and JAS ranges of lightweight aluminium 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 aluminium 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.

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

Model number	Jack capacity tonnes	Claw capacity tonnes	Stroke mm	Weight kg	Dimensions in mm Closed height	Toe height	Base length	Base width
Multi purpose superjack								
JAS103	10	-	75	4.3	131	-	162	75
JAS105	10	-	125	5.7	181	-	162	75
Jack with plain piston								
JAH620	20	-	152	11	263	-	178	121
JAH1220	20	-	305	17	438	-	246	121
JAH630	30	-	152	16	263	-	203	140
JAH1230	30	-	305	24	451	-	273	140
JAH660	60	-	152	28	293	-	251	190
JAH1260	60	-	305	44	500	-	342	190
Jack with plain piston & lifting claw & with extended base								
JAH620C	20	8	152	15	280	67	246	121
JAH1220C	20	8	305	23	456	67	246	121
JAH630C	30	12	152	21	281	73	273	140
JAH1230C	30	12	305	32	472	73	273	140
JAH660C	60	24	152	44	327	73	342	190
JAH1260C	60	24	305	65	540	73	342	190
Jack with "failsafe" locking ring								
JAH620SR	20	-	152	13	289	-	178	121
JAH1220SR	20	-	305	19	464	-	246	121
JAH630SR	30	-	152	17	292	-	203	140
JAH1230SR	30	-	305	25	479	-	273	140
JAH660SR	60	-	152	30	330	-	251	190
JAH1260SR	60	-	305	46	536	-	342	190

Note: JAS103 and JAS105 feature spring assisted piston retraction

JCS - COMPACT JACKS - SOLID PISTON

Capacities from 10 to 30 tonnes

Operates 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 aluminium (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 240mm in length, these compact lifting jacks will fit in any toolbox.

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

Model number	Capacity tonnes	Material	Stroke mm	Weight kg	Dimensions in mm Length	Closed Height	Piston Dia.	Max handle height	Width
JCS10	10	Steel	35	4.5	240	76	38	266	70
JCS20	20	Aluminium	41	5.5	257	102	51	281	102
JCS30	30	Aluminium	45	8.0	281	112	60	285	125

JCH - COMPACT JACKS - HOLLOW PISTON

Capacity of 13 and 21 tonnes

Operates 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 tonnes	Material	Stroke mm	Weight kg	Dimensions in mm Length	Closed Height	Piston Dia.	Max handle height	Centre Hole	Width
JCH13	13	Aluminium	41	5.5	257	95	51	281	25	102
JCH21	21	Aluminium	45	8.0	281	114	60	285	35	125

JSS - STEEL BOTTLE JACKS

- Capacities from 3 to 100 tonnes
- Strong rigid steel construction
- Working pressure 700 Bar

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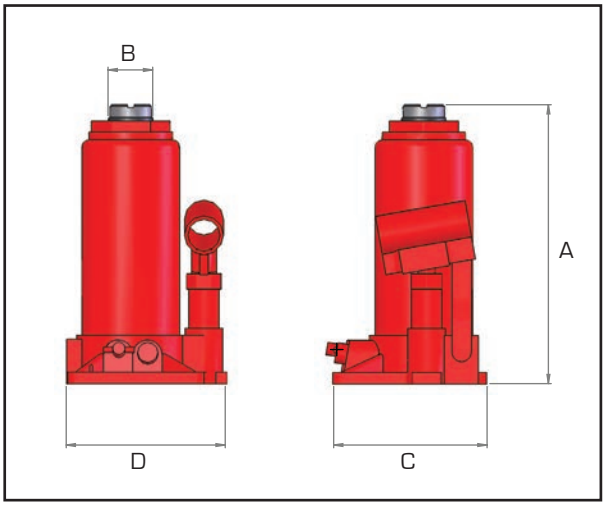
The Hi-Force JSS range of steel bottle jacks offers capacities from 3 to 100 tonnes, with stroke lengths from 135 to 195mm. Models up to 16 tonnes capacity feature heat-treated piston rod extension with saddle, that allows for low pick-up height adjustment and maximum lift height. All models are supplied 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 195mm
- Internal safety overload valve
- Screw extension spans the gap between piston ram cap and load
- Suitable for industrial and automotive use



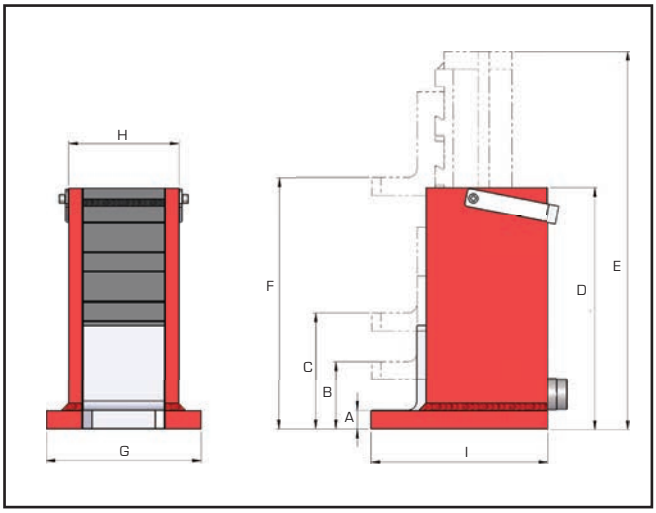
Model number	Capacity tonnes	Stroke mm	Screw extension mm	Weight kg	Dimensions in mm A	B	C	D
JSS35	3	135	70	3.0	195	28	100	100
JSS55	5	135	90	4.0	200	32	120	110
JSS106	10	174	90	7.0	243	43	110	125
JSS166	16	178	95	10.0	255	53	150	160
JSS207	20	190	-	15.0	280	56	128	167
JSS327	32	190	-	20.0	285	71	150	187
JSS507	50	195	-	29.0	300	85	180	215
JSS1007	100	195	-	65.0	340	117	265	240

HMJ - STEEL MACHINE LIFT JACKS

- Capacities of 10 and 25 tonnes
- Working pressure 700 Bar
- Minimum toe height as low as 21mm

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 700 Bar maximum working pressure and incorporate a 150mm 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 catalogue.

- Multi-position lifting toe
- Remote operation gives improved operator safety
- Stroke length 150mm
- 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 tonnes	Capacity Head tonnes	Stroke mm	Weight kg	Dimensions in mm A	B	C	D	E	F	G	H	I
HMJ10	8.5	10	150	29.2	25	79	133	272	422	283	202	122	187
HMJ25	20	25	150	55.1	35	117	199	330	480	349	292	152	211

HYDRAULIC JACK APPLICATIONS

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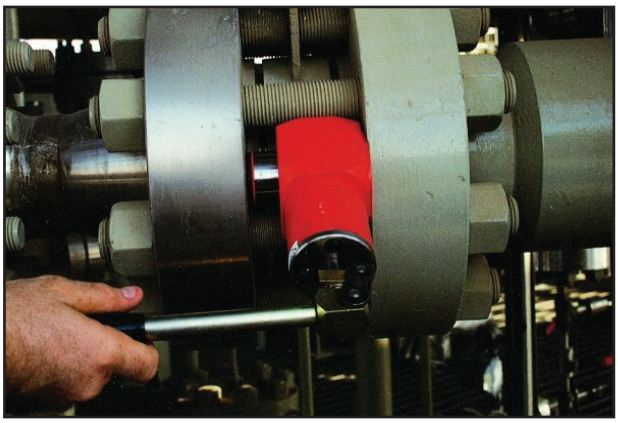

TORQUE TOOLS

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TWM - MANUAL TORQUE WRENCHES - CLICK TYPE

Torque capacities from 5 to 850 Nm

Repeatable accuracy +/- 3%

Dual scale Nm & lbf.ft.

The TWM range of industrial manual torque wrenches offers 7 models with torque capacities from 5 to 850 Nm (3.5 to 630 lbf.ft) with square drive sizes from ⅜" to ¾". 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 TWM manual torque wrenches have a dual scale reading of Nm and lbf.ft and are ideally suited for applications requiring repeatable, accurate torqueing of bolts and nuts. The reversible square drive and integrated ratchet head allows the wrench to be used for torque control in both clockwise and anti-clockwise directions. All models incorporate an ergonomic handgrip and integrated locking mechanism to prevent accidental alteration of the torque setting during operation. The ratchet head gives a audible click immediately the required preset torque is achieved.

- Heavy duty ratchet head
- Accuracy +/- 3%
- Reversible 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 Nm	Torque range lbf.ft	Main scale grad. Nm	Micro scale grad. Nm	Overall length mm	Ratchet head dia mm	Weight kg
TWM50	⅜"	10 - 50	3.5 - 37	2.50	0.25	334	35	0.5
TWM100	½"	20 - 100	15 - 75	5.00	0.50	394	44	0.9
TWM200	½"	40 - 200	30 - 150	10.00	1.00	485	44	1.1
TWM300	½"	60 - 300	45 - 220	10.00	1.00	577	46	1.4
TWM400	¾"	80 - 400	60 - 300	10.00	1.00	686	67	2.0
TWM550	¾"	110 - 550	80 - 405	10.00	1.00	956	69	3.8
TWM850	¾"	250 - 850	185 - 630	10.00	1.00	1379	69	4.7

HTW - MANUAL TORQUE WRENCHES - BREAK BACK TYPE

Torque capacities from 300 to 2000 Nm

Repeatable accuracy +/- 4%

Dual scale Nm & lbf.ft.

Hi-Force HTW industrial manual torque wrenches offer output torque capacities ranging from 300 to 2000 Nm (220 to 1500 lbf.ft) 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.

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- 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 Nm	Torque range lbf.ft	Overall length mm	Ratchet head dia mm	Weight kg
HTW1000B	¾"	300 - 1000	220 - 750	1475	70	7.3
HTW1500B	¾"	700 - 1500	500 - 1000	1475	70	10.4
HTW1800B	1"	700 - 1500	500 - 1000	1475	70	10.4
HTW2000B	1"	900 - 2000	600 - 1500	1920	70	13.0

TWM - HIGH CAPACITY ALUMINIUM MANUAL TORQUE WRENCHES

TWM1000 and TWM2000 with extension handle

- Torque capacities from 520 to 2000 Nm
- Repeatable accuracy +/- 3%
- Lightweight design

Hi-Force TWM high capacity, aluminium manual torque wrenches offer comparable output torque capacities to the HTW range of manual torque wrenches, featured on page 69, but have the added benefit of a lightweight aluminium body. The range offers a choice of 3 models with torque capacities from 520 to 2000 Nm and square drive sizes of ¾" and 1".

All models are supplied with extension handles to minimise operator effort when high torque values need to be achieved. Optional ratchet heads available for use with the TWM aluminium manual torque wrenches are detailed below under accessories.

Model number	Square drive	Torque range Nm	Torque range lbf. ft	Scale grad. Nm	Nr. of ext. rods	Overall length mm	Recom. ratchet head	Weight kg
TWM1000	¾"	520 - 1000	380 - 730	10	1	1413	TWM075R	5.6
TWM1500	1"	600 - 1500	-	25	1	1608	TWM100R	10.8
TWM2000	1"	750 - 2000	-	50	2	2353	TWM100R	11.6

ACCESSORIES

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

TWM100R

Model number	Square drive input	Square drive output	Max. torque capacity Nm	Height mm	Diameter mm	Weight kg
TWM075R	¾"	¾"	1000	53	65	1.0
TWM100R	1"	1"	2000	63	73	1.8

TWG - MECHANICAL TORQUE MULTIPLIERS

Torque capacities up to 10000 Nm

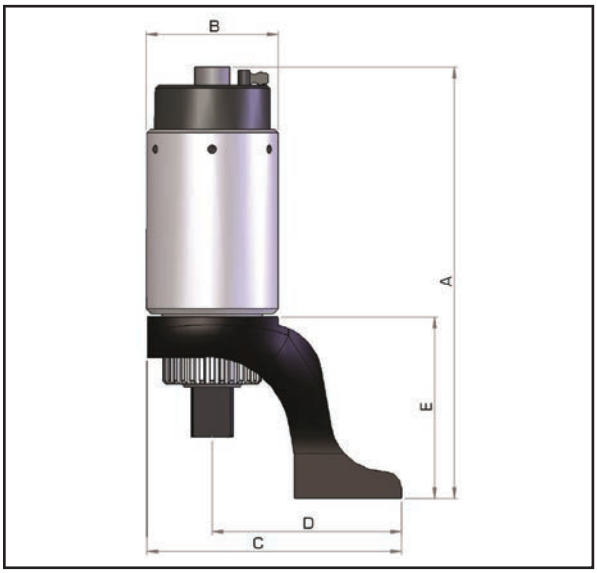
Lightweight aluminium housing

Supplied complete with reaction arm

The Hi-Force TWG range of mechanical torque multipliers offers output torque capacities from 1300 to 10000 Nm with gearbox multiplication ratios from 1:4 to 1:28.5. Available in a choice of 6 models, each fitted with a high performance aluminium 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.

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 catalogue.

- Single stage planetary gear in models up to 2800 Nm
- Compact two stage planetary gear in models up to 10000 Nm
- Output square drives of ¾", 1" and 1½"



Model number	Torque capacity Nm	Torque capacity lbf.ft	Gearbox ratio	Input square drive	Output square drive	Recom. torque wrench	Weight kg	Dimensions in mm A	B	C	D	E
TWG13	1300	950	1:5	½"	¾"	**TWM300**	1.3	133	80	124	96	98
TWG20	2000	1500	1:4	¾"	1"	**TWM550**	1.8	131	88	190	150	80
TWG28	2800	2050	1:5.5	¾"	1"	**TWM550**	2.4	146	106	221	159	83
TWG40	4000	2930	1:16	½"	1"	**TWM300**	4.2	227	88	175	135	110
TWG60	6000	4400	1:18	¾"	1½"	**TWM400**	6.6	256	102	240	190	145
TWG100	10000	7330	1:28.5	¾"	1½"	**TWM400**	10.9	292	142	267	215	163

TWP - PISTOL GRIP PNEUMATIC TORQUE MULTIPLIERS

TWP15S

Torque capacities up to 6000 Nm

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, 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 with an airline pressure and lubrication control unit, in a handy carrying frame with a 3 metre 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 23 litres per second, from a standard airline pressure of 8 Bar (49.5 cubic feet per minute at 116 PSI).

- Slimline gearbox allows excellent access
- Sensitive trigger control allows for easy reaction arm positioning
- Smooth, quiet, non-impacting design with reversible air motor
- 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 details on page 91

Model number	Torque capacity * Nm	lbf.ft	Square drive size	R.P.M. at max pressure	Overall length mm	Gearbox diameter mm	Weight kg
TWP09S	200-900	150-670	¾"	24	328	80	3.2
TWP15S	300-1500	220-1110	1"	12	343	88	4.7
TWP22S	500-2200	370-1620	1"	7	360	88	5.1
TWP32S	800-3200	590-2360	1"	4	383	88	5.8
TWP40S	850-4200	620-3100	1"	4	383	88	5.8
TWP60S	1200-6000	880-4400	1½"	4	400	102	7.7

(*) Minimum torque value at 1.5 Bar, maximum torque value at 8 Bar airline pressure. Weight is without reaction arm.

TWP-OG - PISTOL GRIP PNEUMATIC TORQUE MULTIPLIERS

TWP30S-OG1

Torque capacities up to 4800 Nm

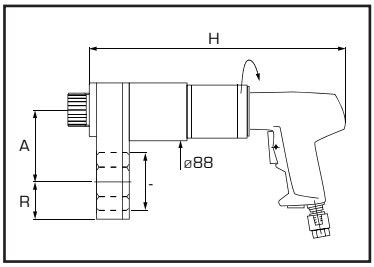
Repeatable accuracy of +/- 5%

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 3 metre 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 23 litres per second from a standard airline pressure of 8 Bar (49.5 cubic feet per minute at 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
- 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 details on page 91



Model number	Torque capacity * Nm	lbf.ft	R.P.M. at max pressure	Weight kg	Female Hexagon	Dimensions in mm A	H	R
TWP30S-OG1	3000	2200	7	10	60 mm AF	112	396	61
TWP30S-OG2	3600	2650	5	12	80 mm AF	118	396	75
TWP30S-OG3	4800	3500	4	13	95 mm AF	135	396	95

(*) Maximum torque value at 8 Bar airline pressure

TWS-N - HYDRAULIC TORQUE WRENCHES - SQUARE DRIVE

Working pressure 700 Bar

Compact, lightweight, aluminium construction

Fitted with 360° Uni-Swivel quick release couplings

Hi-Force TWS-N series lightweight aluminium 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).

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- 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)

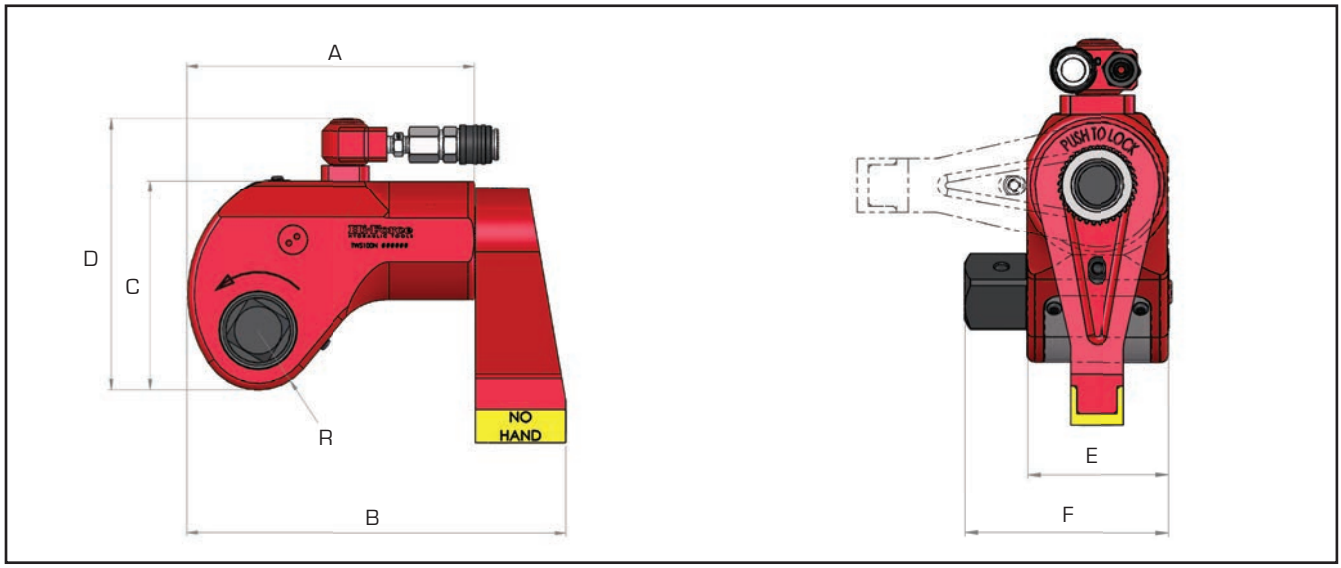
Did you know.....

Hi-Force hydraulic torque tools are manufactured on the latest "State of the art" CNC machining centres, 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 Nm at 700 Bar	Torque Capacity lbf.ft at 10,000 PSI	Square drive size	Weight incl. reaction foot kg
TWS17N	1727	1254	¾"	1.9
TWS45N	4529	3289	1"	4.8
TWS100N	10064	7308	1 ½"	9.0
TWS150N	14974	10873	1 ½"	15.0
TWS370N	36992	26860	2 ½"	32.5

Dimensions in mm						
A	B	C	D	E	F	R
129	167	90	131	51	73	25
167	218	121	170	68	98	34
223	293	163	211	92	135	46
247	323	192	236	100	141	54
329	432	240	288	137	204	66

TWS-N - ACCESSORIES

Hexagon drive adaptor

TWS17N with hexagon drive fitted

Sizes available for all TWS-N wrenches

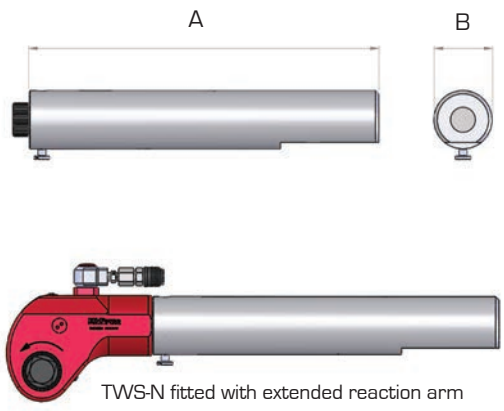
Limitations on applied torque (check before use)

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 Nm	Model Number	Hexagon Size	Maximum Torque load Nm
TWS17N	IH17N-008	½"	470	MH17N-14	14mm	740
	IH17N-010	⅝"	930	MH17N-17	17mm	1350
	IH17N-012	¾"	1600	MH17N-19	19mm	1612
	IH17N-014	⅞"	1700	MH17N-22	22mm	1700
	IH17N-100	1"	1700	MH17N-24	24mm	1700
TWS45N	IH45N-010	⅝"	930	MH45N-17	17mm	1100
	IH45N-012	¾"	1600	MH45N-19	19mm	1600
	IH45N-014	⅞"	2550	MH45N-22	22mm	2550
	IH45N-100	1"	3800	MH45N-24	24mm	3700
	IH45N-102	1⅛"	4500	MH45N-27	27mm	3900
	IH45N-104	1¼"	4500	MH45N-32	32mm	4500
TWS100N	IH100N-014	⅞"	1890	MH100N-22	22mm	2480
	IH100N-100	1"	3800	MH100N-24	24mm	3700
	IH100N-102	1⅛"	5440	MH100N-27	27mm	4650
	IH100N-104	1¼"	7400	MH100N-30	30mm	6380
	IH100N-106	1⅜"	9920	MH100N-32	32mm	7625
	IH100N-108	1½"	10000	MH100N-36	36mm	10000
TWS150N	IH150N-104	1¼"	7400	MH150N-30	30mm	7000
	IH150N-106	1⅜"	9900	MH150N-32	32mm	7500
	IH150N-108	1½"	15000	MH150N-36	36mm	10900
	IH150N-110	1⅝"	15000	MH150N-41	41mm	15000
	IH150N-112	1¾"	15000	MH150N-46	46mm	15000
TWS370N	IH370N-108	1½"	12900	MH370N-36	36mm	10000
	IH370N-110	1⅝"	16300	MH370N-41	41mm	16300
	IH370N-112	1¾"	20400	MH370N-46	46mm	22500
	IH370N-114	1⅞"	25100	MH370N-50	50mm	30600
	IH370N-200	2"	30600	MH370N-55	55mm	37000
	IH370N-204	2¼"	37000	MH370N-60	60mm	37000

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

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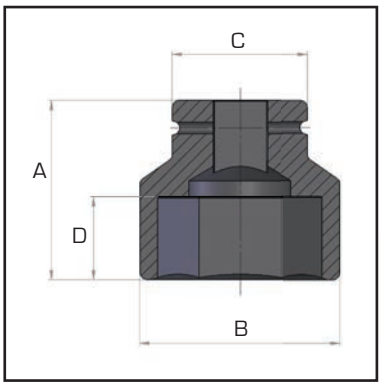
IS - IMPERIAL HEXAGON AF SIZE HEAVY DUTY SOCKETS

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.

F

Model number	Square drive	Nut AF inches	Dimensions in mm A	B	C	D
IS2-101	¾"	1 1/16"	52	40	38	16
IS2-104	¾"	1 1/4"	52	44	44	20
IS2-107	¾"	1 7/16"	56	51	44	23
IS2-110	¾"	1 5/8"	62	58	44	27
IS2-113	¾"	1 13/16"	68	67	44	32
IS2-200	¾"	2"	72	71	54	35
IS2-203	¾"	2 3/16"	74	77	54	35
IS2-206	¾"	2 3/8"	75	84	54	35
IS9-101	1"	1 1/16"	58	44	51	17
IS9-104	1"	1 1/4"	60	51	51	21
IS9-107	1"	1 7/16"	62	56	52	26
IS9-110	1"	1 5/8"	62	62	52	26
IS9-113	1"	1 13/16"	64	68	58	27
IS9-200	1"	2"	70	74	58	31
IS9-203	1"	2 3/16"	72	80	62	32
IS9-206	1"	2 3/8"	78	87	62	35
IS9-209	1"	2 9/16"	80	93	62	36
IS9-212	1"	2 3/4"	85	98	62	40
IS9-215	1"	2 15/16"	95	104	86	48
IS9-302	1"	3 1/8"	100	109	86	52
IS9-308	1"	3 1/2"	105	125	86	52
IS9-314	1"	3 7/8"	105	136	95	52
IS5-113	1 1/2"	1 13/16"	84	76	86	27
IS5-200	1 1/2"	2"	87	82	86	29

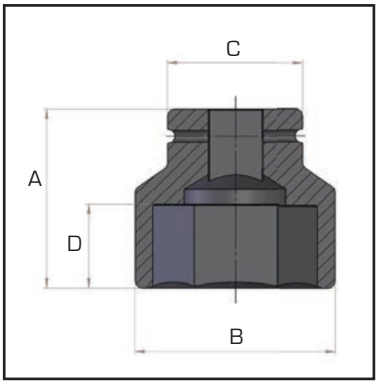
Model number	Square drive	Nut AF inches	Dimensions in mm A	B	C	D
IS5-203	1 1/2"	2 3/16"	90	86	86	36
IS5-206	1 1/2"	2 3/8"	92	93	86	38
IS5-209	1 1/2"	2 9/16"	95	97	86	40
IS5-212	1 1/2"	2 3/4"	100	105	86	43
IS5-215	1 1/2"	2 15/16"	103	110	86	45
IS5-302	1 1/2"	3 1/8"	110	116	86	50
IS5-308	1 1/2"	3 1/2"	118	130	86	55
IS5-314	1 1/2"	3 7/8"	125	140	95	58
IS5-404	1 1/2"	4 1/4"	125	150	95	58
IS5-410	1 1/2"	4 5/8"	135	165	95	65
IS5-500	1 1/2"	5"	140	179	127	70
IS5-506	1 1/2"	5 3/8"	150	195	127	75
IS6-302	2 1/2"	3 1/8"	140	124	127	51
IS6-308	2 1/2"	3 1/2"	140	135	127	51
IS6-314	2 1/2"	3 7/8"	150	147	127	57
IS6-404	2 1/2"	4 1/4"	160	159	127	64
IS6-410	2 1/2"	4 5/8"	170	172	127	71
IS6-500	2 1/2"	5"	175	185	127	75
IS6-506	2 1/2"	5 3/8"	180	197	127	79
IS6-512	2 1/2"	5 3/4"	185	210	127	83
IS6-602	2 1/2"	6 1/8"	190	223	127	91
IS6-608	2 1/2"	6 1/2"	195	235	127	95
IS6-614	2 1/2"	6 7/8"	200	248	127	105

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.

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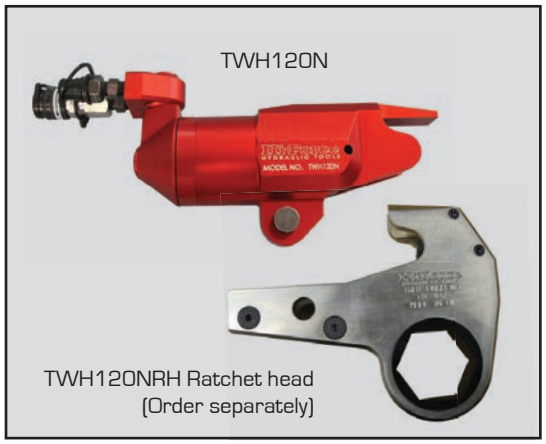
Model number	Square drive	Nut AF mm	Dimensions in mm A	B	C	D
MS2-24	¾"	24	50	39	44	16
MS2-27	¾"	27	54	43	44	16
MS2-30	¾"	30	54	47	44	23
MS2-32	¾"	32	56	49	44	23
MS2-36	¾"	36	56	54	44	23
MS2-41	¾"	41	58	60	44	24
MS2-46	¾"	46	63	67	44	30
MS2-50	¾"	50	72	71	54	32
MS2-55	¾"	55	74	78	54	35
MS2-60	¾"	60	75	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 700 Bar

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 2625 Nm to 48181 Nm (1906 to 34985 lbf.ft). Manufactured from high grade aluminium (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 24 to 175mm (1 1/16" to 6 7/8") 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.

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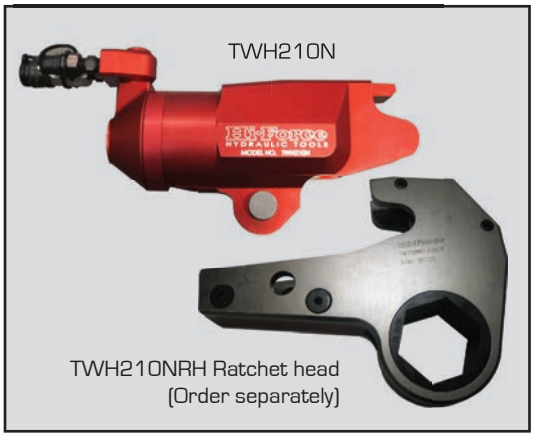
- Compact, lightweight, aluminium drive unit (except TWH430N)
- Accurate to +/- 3% with standard torque chart supplied
- Low profile design for limited access applications
- Minimum radius cassette head for fitment in confined spaces
- Suitable for continuous operation at maximum pressure

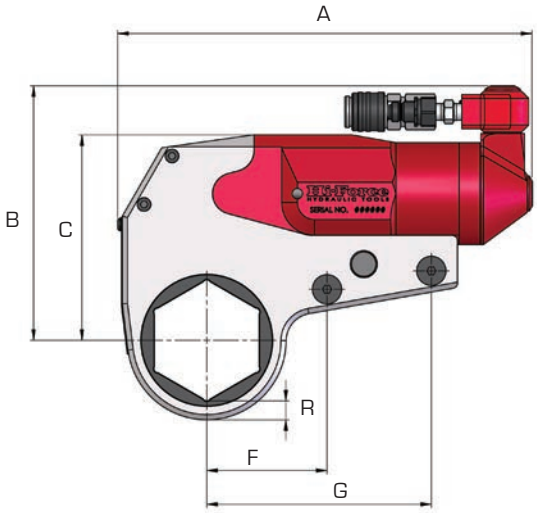
Note: Model TWH430N manufactured from high grade alloy steel

TWH-N - HYDRAULIC TORQUE WRENCH - DRIVE CYLINDERS



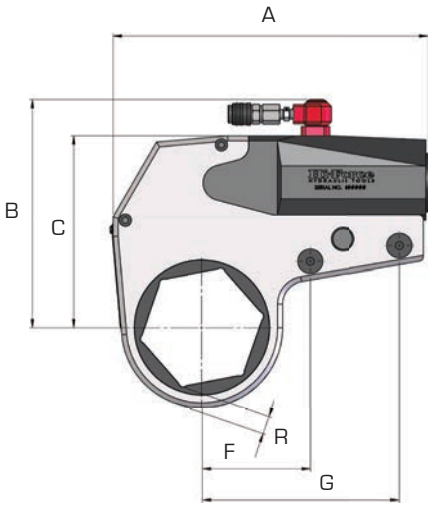
- Designed for tightening and loosening applications
- Easily assembled to selected ratchet head
- Minimal nose radius for fitment in confined spaces

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 Nm at 700 Bar	Torque capacity lbf. ft at 10,000PSI	Hexagon AF size Metric min	Metric max	Imperial min	Imperial max	Weight kg
TWH27N	2625	1906	24	46	1 1/16"	1 13/16"	1.4
	3068	2228	50	60	2"	2 3/8"	1.4
TWH54N	5372	3901	36	65	1 7/16"	2 9/16"	2.3
	6037	4384	70	80	2 3/4"	3 1/8"	2.3
TWH120N	11737	8522	50	80	2 3/16"	3 1/8"	3.8
	14349	10419	85	100	3 1/2"	3 7/8"	3.8
TWH210N	21216	15405	70	100	2 3/4"	3 7/8"	6.4
	23124	16791	105	115	4 1/4"	4 5/8"	6.4
TWH430N	43792	31798	80	115	3 1/8"	4 5/8"	16.1
	48181	34985	130	175	5"	6 7/8"	16.1

Dimensions in mm A max	B max	C max	D	E	F	G	R min - max
193	125	97	32	51	54	109	9.5 - 12.2
193	136	108	32	51	54	109	10 .1 - 10.5
250	158	125	41	64	73	137	10.7 - 13.8
250	169	136	41	64	73	137	11.7 - 14.6
310	189	157	52	78	92	172	14.7 - 15.2
310	214	182	52	78	92	172	15.9 - 18.7
378	223	191	64	97	114	213	18.1 - 18.6
378	236	204	64	97	114	213	18.3 - 20.7
405	291	242	83	93	146	267	25.6 - 31.3
425	309	260	83	93	146	267	24.8 - 27.3

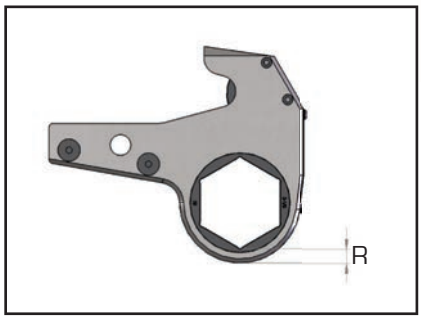
Note: Above selection table is for drive unit only. Ratchet head(s) to be ordered separately - see pages 81 - 82.
Weight as stated is drive cylinder only, exact radius size (R) varies according to ratchet AF size selected.

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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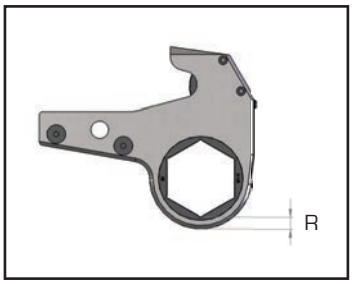
IMPERIAL RATCHET HEAD SELECTION TABLE:

Bolt size	Nut AF size	For TWH27N			For TWH54N			For TWH120N			For TWH210N			For TWH430N		
		Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg
5/8"	1 1/16"	TWH27NRH1.1/16	10.4	1.5												
3/4"	1 1/4"	TWH27NRH1.1/4	9.7	1.6												
7/8"	1 7/16"	TWH27NRH1.7/16	9.8	1.6	TWH54NRH1.7/16	13.5	2.9									
1"	1 5/8"	TWH27NRH1.5/8	10.0	1.6	TWH54NRH1.5/8	10.8	2.8									
1 1/8"	1 13/16"	TWH27NRH1.13/16	10.5	1.7	TWH54NRH1.13/16	10.7	2.9									
1 1/4"	2"	TWH27NRH2	10.5	1.7	TWH54NRH2	11.7	3.0									
1 3/8"	2 3/16"	TWH27NRH2.3/16	10.3	1.8	TWH54NRH2.3/16	11.8	3.1	TWH120NRH2.3/16	14.7	6.1						
1 1/2"	2 3/8"	TWH27NRH2.3/8	10.5	1.8	TWH54NRH2.3/8	11.8	3.2	TWH120NRH2.3/8	14.8	6.4						
1 5/8"	2 9/16"				TWH54NRH2.9/16	11.6	3.3	TWH120NRH2.9/16	14.8	6.4						
1 3/4"	2 3/4"				TWH54NRH2.3/4	11.8	3.4	TWH120NRH2.3/4	14.9	6.5	TWH210NRH2.3/4	18.3	12.1			
1 7/8"	2 15/16"				TWH54NRH2.15/16	14.8	3.5	TWH120NRH2.15/16	14.9	6.5	TWH210NRH2.15/16	18.3	12.2			
2"	3 1/8"				TWH54NRH3.1/8	12.1	3.5	TWH120NRH3.1/8	15.1	6.5	TWH210NRH3.1/8	18.5	12.3	TWH430NRH3.1/8	26.0	23.2
2 1/4"	3 1/2"							TWH120NRH3.1/2	16.9	7.9	TWH210NRH3.1/2	19.3	12.4	TWH430NRH3.1/2	26.8	23.9
2 1/2"	3 7/8"							TWH120NRH3.7/8	19.6	8.5	TWH210NRH3.7/8	19.5	12.5	TWH430NRH3.7/8	26.5	25.7
2 3/4"	4 1/4"										TWH210NRH4.1/4	19.5	13.3	TWH430NRH4.1/4	26.9	26.1
3"	4 5/8"										TWH210NRH4.5/8	19.3	13.8	TWH430NRH4.5/8	25.9	26.3
3 1/4"	5"													TWH430NRH5	27.4	27.9
3 1/2"	5 3/8"													TWH430NRH5.3/8	25.8	28.3
3 3/4"	5 3/4"													TWH430NRH5.3/4	24.8	29.3
4"	6 1/8"													TWH430NRH6.1/8	25.0	30.1
4 1/4"	6 1/2"													TWH430NRH6.1/2	25.0	31.0
4 1/2"	6 7/8"													TWH430NRH6.7/8	27.3	31.8

TWH-NRH - METRIC SIZE RATCHET HEADS

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

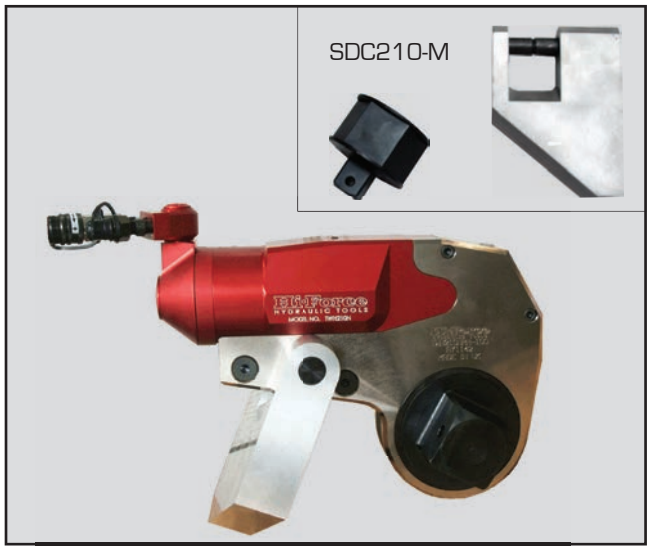
The TWH-NRH range of metric hexagon ratchet heads, suitable for use with TWH-N series low profile hydraulic torque wrenches (see pages 79-80), provide exceptional flexibility with across flats (AF) sizes from 24mm to 175mm available as standard. All models feature extremely low profile design combined 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.



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 kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg	Model number	R mm	Wt kg
16	24	TWH27NRH-24	12.1	1.5												
18	27	TWH27NRH-27	10.4	1.5												
20	30	TWH27NRH-30	10.7	1.6												
22	32	TWH27NRH-32	9.5	1.6												
24	36	TWH27NRH-36	10.1	1.6	TWH54NRH-36	13.8	2.9									
-	38				TWH54NRH-38	12.6	2.8									
27	41	TWH27NRH-41	10.1	1.6	TWH54NRH-41	10.9	2.8									
30	46	TWH27NRH-46	10.5	1.7	TWH54NRH-46	10.7	2.9									
33	50	TWH27NRH-50	10.4	1.7	TWH54NRH-50	12.1	3.0	TWH120NRH-50	15.2	5.8						
36	55	TWH27NRH-55	10.1	1.8	TWH54NRH-55	12.1	3.1	TWH120NRH-55	15.0	6.1						
39	60	TWH27NRH-60	10.5	1.8	TWH54NRH-60	12.0	3.2	TWH120NRH-60	15.0	6.4						
42	65				TWH54NRH-65	11.7	3.3	TWH120NRH-65	14.9	6.4						
45	70				TWH54NRH-70	11.7	3.4	TWH120NRH-70	14.8	6.5	TWH210NRH-70	18.2	12.1			
48	75				TWH54NRH-75	14.6	3.5	TWH120NRH-75	14.7	6.5	TWH210NRH-75	18.1	12.2			
52	80				TWH54NRH-80	11.7	3.5	TWH120NRH-80	14.7	6.5	TWH210NRH-80	18.1	12.3	TWH430NRH-80	25.6	23.2
56	85							TWH120NRH-85	16.4	7.8	TWH210NRH-85	18.2	12.4	TWH430NRH-85	29.0	24.0
60	90							TWH120NRH-90	16.2	7.9	TWH210NRH-90	18.6	12.4	TWH430NRH-90	31.3	26.0
64	95							TWH120NRH-95	15.9	7.9	TWH210NRH-95	18.6	12.5	TWH430NRH-95	28.5	25.8
68	100							TWH120NRH-100	18.7	8.5	TWH210NRH-100	18.6	12.5	TWH430NRH-100	25.6	25.6
72	105										TWH210NRH-105	18.4	12.9	TWH430NRH-105	28.6	26.5
76	110										TWH210NRH-110	18.3	13.3	TWH430NRH-110	25.7	26.2
80	115										TWH210NRH-115	20.7	13.8	TWH430NRH-115	27.3	26.4
90	130													TWH430NRH-130	25.6	27.3
-	135													TWH430NRH-135	26.6	28.3
100	145													TWH430NRH-145	25.4	29.4
110	155													TWH430NRH-155	25.0	30.1
115	165													TWH430NRH-165	25.0	31.0
-	175													TWH430NRH-175	27.3	31.8

TWH-N ACCESSORIES



Suitable for TWH-N range up to 23124 Nm

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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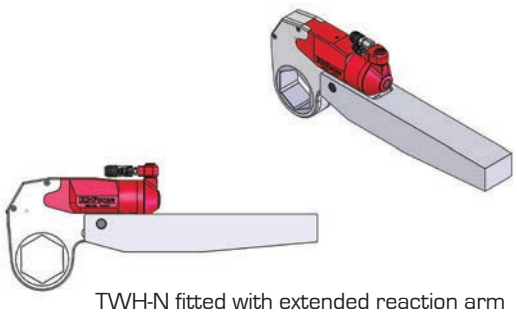
Model number	Square drive	Hexagon AF Size	Maximum torque Nm	Maximum torque lbf.ft	Suitable for drive cylinder incl. ratchet head		Weight kg
SDC27-I	1"	1 13/16"	3068	2263	TWH27N	TWH27NRH1.13/16	1.1
SDC27-M	1"	46mm	3068	2263	TWH27N	TWH27NRH-46	1.1
SDC54-I	1½"	2 9/16"	6037	4453	TWH54N	TWH54NRH2.9/16	3.0
SDC54-M	1½"	65mm	6037	4453	TWH54N	TWH54NRH-65	3.0
SDC120-I	1½"	3⅛"	14349	10583	TWH120N	TWH120NRH3.1/8	4.4
SDC120-M	1½"	80mm	14349	10583	TWH120N	TWH120NRH-80	4.4
SDC210-I	2½"	3⅞"	23124	17055	TWH210N	TWH210NRH3.7/8	9.1
SDC210-M	2½"	100mm	23124	17055	TWH210N	TWH210NRH-100	9.1

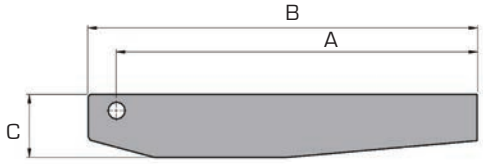
Extended Reaction Arms

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 mm	Model number	W mm	Model number	W mm	Model number	W mm	Model number	W mm
1 1/4"	1 1/16"	IB27-104-101	2.4								
1 7/16"	1 1/16"	IB27-107-101	4.8								
1 7/16"	1 1/4"	IB27-107-104	2.4								
1 5/8"	1 1/4"	IB27-110-104	4.8	IB54-110-104	4.8						
1 5/8"	1 7/16"	IB27-110-107	2.4	IB54-110-107	2.4						
1 13/16"	1 7/16"	IB27-113-107	4.8	IB54-113-107	4.8						
1 13/16"	1 5/8"	IB27-113-110	2.4	IB54-113-110	2.4						
2"	1 5/8"	IB27-200-110	4.8	IB54-200-110	4.8						
2"	1 13/16"	IB27-200-113	2.4	IB54-200-113	2.4						
2 3/16"	1 5/8"	IB27-203-110	7.2	IB54-203-110	7.2						
2 3/16"	1 13/16"	IB27-203-113	4.8	IB54-203-113	4.8						
2 3/16"	2"	IB27-203-200	2.4	IB54-203-200	2.4						
2 3/8"	1 13/16"	IB27-206-113	7.2	IB54-206-113	7.2						
2 3/8"	2"	IB27-206-200	4.8	IB54-206-200	4.8						
2 3/8"	2 3/16"	IB27-206-203	2.4	IB54-206-203	2.4	IB120-206-203	2.4				
2 9/16"	2"			IB54-209-200	7.2	not available	-				
2 9/16"	2 3/16"			IB54-209-203	4.8	IB120-209-203	4.8				
2 9/16"	2 3/8"			IB54-209-206	2.4	IB120-209-206	2.4				
2 3/4"	2 3/16"			IB54-212-203	7.2	IB120-212-203	7.2				
2 3/4"	2 3/8"			IB54-212-206	4.8	IB120-212-206	4.8				
2 3/4"	2 9/16"			IB54-212-209	2.4	IB120-212-209	2.4				
2 15/16"	2 3/8"			IB54-215-206	7.2	IB120-215-206	7.2				
2 15/16"	2 9/16"			IB54-215-209	4.8	IB120-215-209	4.8				
2 15/16"	2 3/4"			IB54-215-212	2.4	IB120-215-212	2.4	IB210-215-212	2.4		
3 1/8"	2 9/16"			IB54-302-209	7.2	IB120-302-209	7.2	not available	-		
3 1/8"	2 3/4"			IB54-302-212	4.8	IB120-302-212	4.8	IB210-302-212	4.8		
3 1/8"	2 15/16"			IB54-302-215	2.4	IB120-302-215	2.4	IB210-302-215	2.4		
3 1/2"	2 15/16"					IB120-308-215	7.2	IB210-308-215	7.2		
3 1/2"	3 1/8"					IB120-308-302	4.8	IB210-308-302	4.8	IB430-308-302	4.8
3 7/8"	3 1/8"					IB120-314-302	9.5	IB210-314-302	9.5	IB430-314-302	9.5
3 7/8"	3 1/2"					IB120-314-308	4.8	IB210-314-308	4.8	IB430-314-308	4.8
4 1/4"	3 1/2"							IB210-404-308	9.5	IB430-404-308	9.5
4 1/4"	3 7/8"							IB210-404-314	4.8	IB430-404-314	4.8
4 5/8"	3 7/8"							IB210-410-314	9.5	IB430-410-314	9.5
4 5/8"	4 1/4"							IB210-410-404	4.8	IB430-410-404	4.8
5"	4 1/4"									IB430-500-404	9.5
5"	4 5/8"									IB430-500-410	4.8
5 3/8"	4 5/8"									IB430-506-410	9.5
5 3/8"	5"									IB430-506-500	4.8
5 3/4"	5"									IB430-512-500	9.5
5 3/4"	5 3/8"									IB430-512-506	4.8
6 1/8"	5 3/8"									IB430-602-506	9.5
6 1/8"	5 3/4"									IB430-602-512	4.8
6 1/2"	5 3/4"									IB430-608-512	9.5
6 1/2"	6 1/8"									IB430-608-602	4.8
6 7/8"	6 1/8"									IB430-614-602	9.5
6 7/8"	6 1/2"									IB430-614-608	4.8

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	Inside AF size	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 backup 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

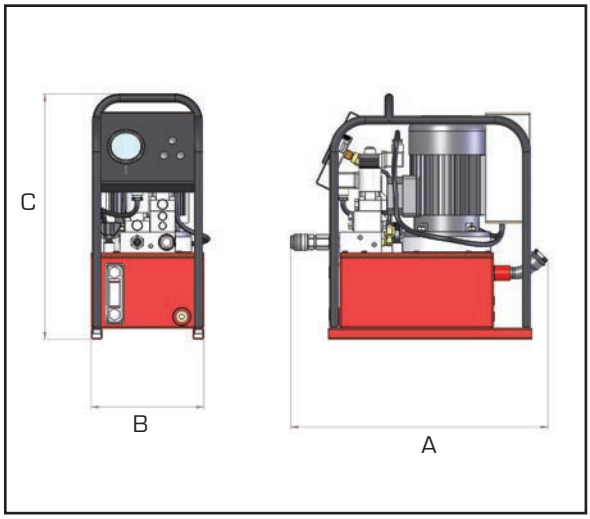
HTWP - TORQUE WRENCH PUMPS

HTWP2142AR HTWP2140P

- Working pressure 700 Bar
- 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 700 Bar 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 three metres of control line cable. Glycerine filled, easy to read, dual scale (0-700 Bar/0-10,000 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.

- Dual scale glycerine 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 Bar	Power supply	Motor rating kW	Displacement l/min low pressure	high pressure	Changeover pressure Bar	Weight kg	Dimensions in mm A	B	C
HTWP2140P	700	7 Bar	1.50	6.1	0.51	60	28.0	468	205	445
HTWP2141AR	700	110 volt	0.75	3.9	0.36	60	34.0	468	205	445
HTWP2141ARH	700	110 volt	0.75	3.9	0.36	60	34.0	468	205	445
HTWP2142AR	700	240 volt	0.75	3.9	0.36	60	34.0	468	205	445
HTWP2142ARH	700	240 volt	0.75	3.9	0.36	60	34.0	468	205	445

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

TPA / TPE - TORQUE WRENCH PUMPS - PREMIUM LINE

High flow 3-stage pump unit

Choice of air or electric power options

Rigid, compact & lightweight

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

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- 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 analogue 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 5 metre cable

Model number	Max. pressure Bar	Power supply	Pressure gauge	Gauge reading (*)	Displacements l/m 1st stage 0-65 bar	2nd stage 65-325 bar	3rd stage 325-700 bar
Air driven pump units							
TPA07A	700	7.0 Bar air	analogue	Bar/PSI	7.0	1.6	0.80
TPA07D	700	7.0 Bar air	digital	Bar/PSI/Nm/Lbf.Ft	7.0	1.6	0.80
Electric driven pump units							
TPE15A	700	110V-1Ph-50Hz	analogue	Bar/PSI	6.5	1.5	0.75
TPE15D	700	110V-1Ph-50Hz	digital	Bar/PSI/Nm/Lbf.Ft	6.5	1.5	0.75
TPE16A	700	120V-1Ph-60Hz	analogue	Bar/PSI	7.8	1.8	0.90
TPE16D	700	120V-1Ph-60Hz	digital	Bar/PSI/Nm/Lbf.Ft	7.8	1.8	0.90
TPE25A	700	230V-1Ph-50Hz	analogue	Bar/PSI	6.5	1.5	0.75
TPE25D	700	230V-1Ph-50Hz	digital	Bar/PSI/Nm/Lbf.Ft	6.5	1.5	0.75
TPE26A	700	230V-1Ph-60Hz	analogue	Bar/PSI	7.8	1.8	0.90
TPE26D	700	230V-1Ph-60Hz	digital	Bar/PSI/Nm/Lbf.Ft	7.8	1.8	0.90
TPE45A	700	400V-3Ph-50Hz	analogue	Bar/PSI	6.5	1.5	0.75
TPE45D	700	400V-3Ph-50Hz	digital	Bar/PSI/Nm/Lbf.Ft	6.5	1.5	0.75
TPE46A	700	480V-3Ph-60Hz	analogue	Bar/PSI	7.8	1.8	0.90
TPE46D	700	480V-3Ph-60Hz	digital	Bar/PSI/Nm/Lbf.Ft	7.8	1.8	0.90

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

TPA / TPE - TORQUE WRENCH PUMPS - PREMIUM LINE


TPA07A

- Maximum working pressure 700 Bar
- Inbuilt oil cooling system
- 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.

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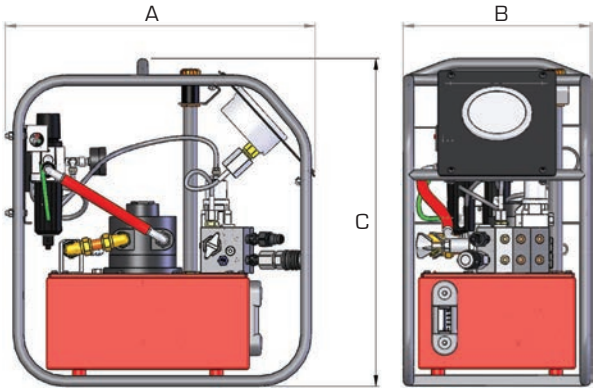
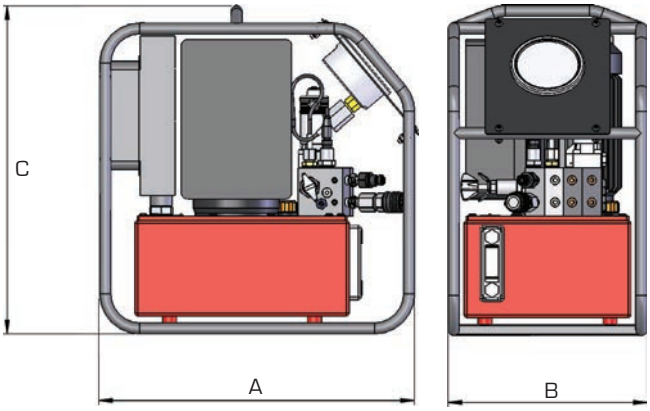
TPA air driven models



TPE electric driven models

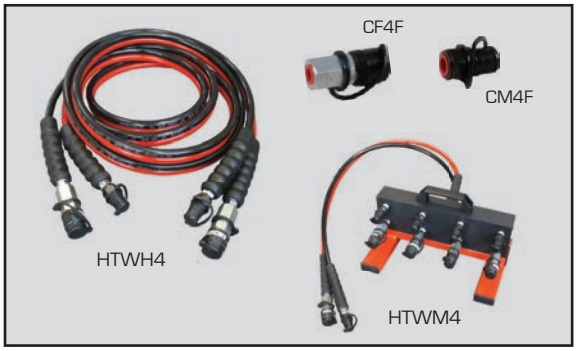


Pump model	Oil capacity	Max. noise level	Max. oil temp	Weight incl. oil	Dimensions in mm Length (A)	Width (B)	Height (C)
All TPA air driven models	7 litres	90 db (A)	80 °C	30 kg	474	286	501
All TPE electric driven models	7 litres	88 db (A)	80 °C	39 kg	456	286	476

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 flat face couplers, for simultaneous operation of two hydraulic wrenches
TP-CS2	Double set of male / female flat face couplers, for simultaneous operation of three hydraulic wrenches
TP-CS3	Triple set of male / female flat face couplers, for simultaneous operation of four hydraulic wrenches

TORQUE WRENCH PUMP ACCESSORIES



- Hose lengths up to 100 metres
- Supplied with quick connect couplings
- Working pressure 700 Bar

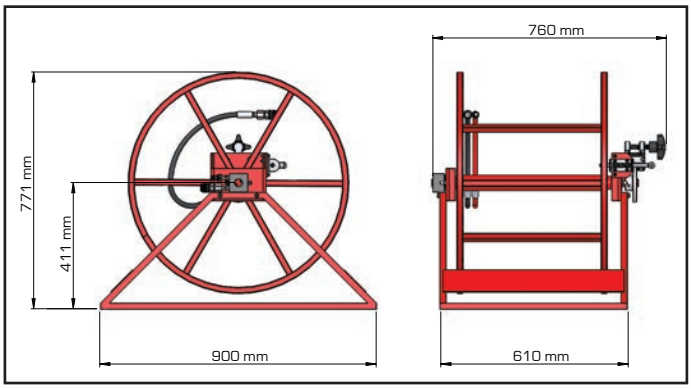
Hi-Force torque wrench hydraulic hoses are compatible for use with all Hi-Force hydraulic torque wrenches and torque pumps up to a maximum of 700 Bar working pressure. The torque wrench hoses are available as bonded twin hoses with quick connect couplings on both ends. Standard hose lengths from 4 to 100 metres and alternative lengths are available on request.

Model number	Maximum pressure Bar	Description
HTWH4	700	Bonded twin hoses with quick connect couplers, length 4 metres
HTWH5	700	Bonded twin hoses with quick connect couplers, length 5 metres
HTWH6	700	Bonded twin hoses with quick connect couplers, length 6 metres
HTWH8	700	Bonded twin hoses with quick connect couplers, length 8 metres
HTWH10	700	Bonded twin hoses with quick connect couplers, length 10 metres
HTWH50	700	Bonded twin hoses with quick connect couplers, length 50 metres
HTWH75	700	Bonded twin hoses with quick connect couplers, length 75 metres
HTWH100	700	Bonded twin hoses with quick connect couplers, length 100 metres
CF4F	700	Female half coupler, ¼" NPT Female
CM4F	700	Male half coupler, ¼" NPT Female
HTWM4	700	Multi-split block complete with quick connect couplers for use with 4 hydraulic wrenches

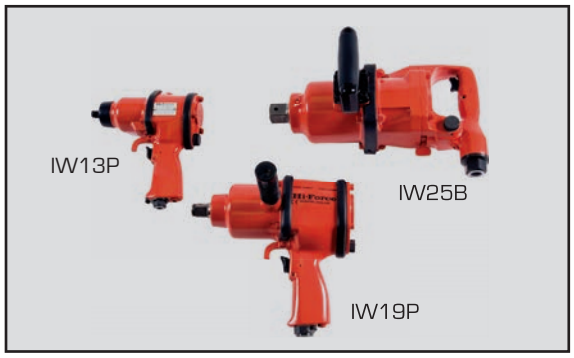
Note: We recommend the use of HTWR1 hose reel with hose lengths of 50 metres or more.

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 100 metres. The reel is supplied with twin 0.5 metres 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



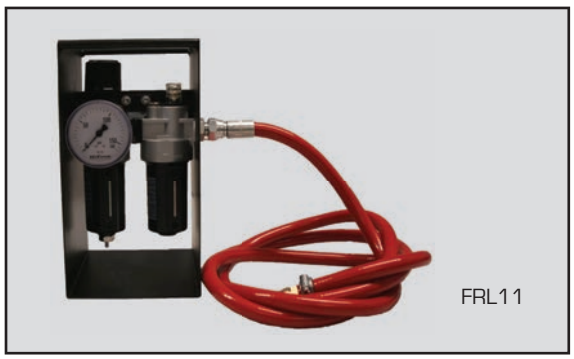
- Industrial heavy duty design
- Square drive sizes from ½" to 1½"
- Operates from standard 6 Bar air pressure

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 both imperial and metric sizes, for use with the IW impact wrenches is detailed on pages 77 and 78.

Model number	Square drive size	Bolt capacity mm	Bolt capacity inch	Free speed R.P.M.	Free speed I.P.M.	Max. torque Nm	Max. torque lbf.ft	Recommended torque Nm	Recommended torque lbf.ft	Air Consumption m^3/min	Air Consumption cfm	Weight kg
Pistol grip versions												
IW13P	½"	16	⅝"	6300	1200	450	300	90-350	65-260	0.35	12.5	2.8
IW19P	¾"	22	⅞"	3800	1100	870	640	250-800	185-590	0.60	21.4	6.2
Back handle grip versions												
IW25B	1"	45	1¾"	3700	700	2700	1980	1000-2450	740-1772	0.75	26.7	10.7
IW38B	1½"	50	2"	3000	600	3500	2600	1000-3200	740-2370	0.82	29.2	16.0

Note: Performance figures are at 0.62 MPa (Pe) (90 PSI) air pressure

FRL11 - FILTER REGULATOR LUBRICATOR UNIT

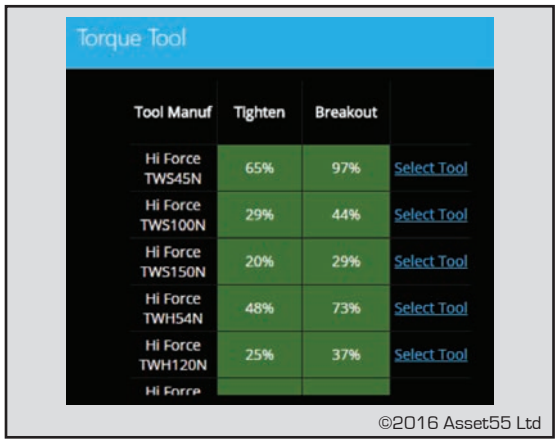


- Protective carrying frame
- Complete with air inlet hose
- Air pressure gauge fitted as standard

The Hi-Force FRL11 filter regulator lubricator unit is designed to be used in conjunction with air operated tools such 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 3 meter air hose with end fittings.

Model number	Air inlet connection	Air outlet connection	Weight kg	Dimensions in mm Length	Width	Height
FRL11	½" NPT	½" NPT	3.0	200	200	310

BOLTRIGHT PRO SOFTWARE - POWERED BY ASSET55



Online access compatible with all operating systems

Offline version available

Covers bolt torqueing requirements

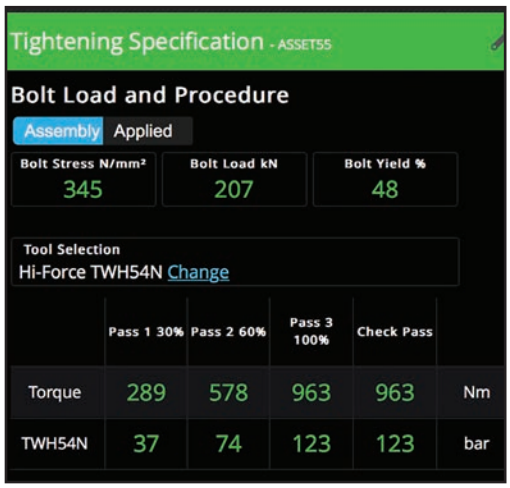
BOLTRIGHTPRO

Hi-Force's answer to joint integrity

BOLTRIGHT PRO is an innovative, bolted joint integrity software programme, 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 analyse 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.



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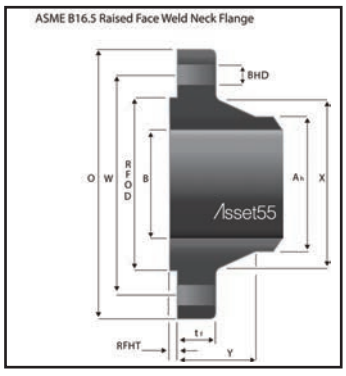

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BOLT TENSIONERS

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SBT - SPRING RETURN BOLT TENSIONERS - IMPERIAL

SBT3-187B1

Capacities from 457 to 2649 kN

Maximum working pressure 1500 Bar

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 pistons will automatically start to retract, after the hydraulic pressure is released. The range currently comprises of 22 models, suitable for standard size bolts from 1¼" to 4" diameter.

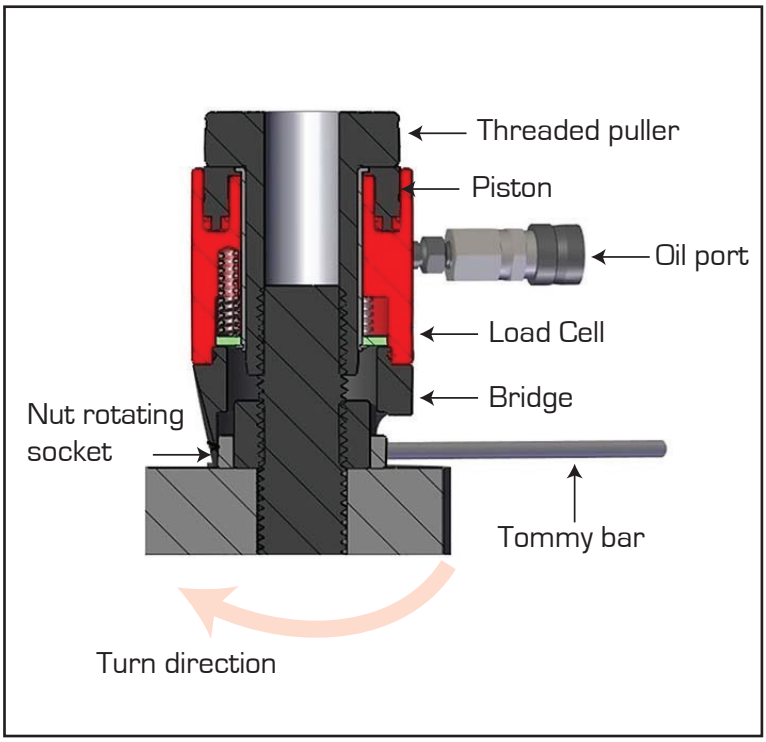
The versatility of the SBT bolt tensioner range, is identical to our standard STS range, with a variety of interchangeable threaded pullers and nut rotating sockets available, either as bolt size conversion kits or individual parts. Further details on SBT imperial conversion kits are detailed on pages 96 & 97. All SBT bolt tensioners are designed and manufactured with a wear coated piston, maximum stroke indicator, self energising high pressure seals, dual quick connect couplers, for easy multiple tensioner hook up and operate at pressures up to 1500 Bar maximum.

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

- Nitrocarburised 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

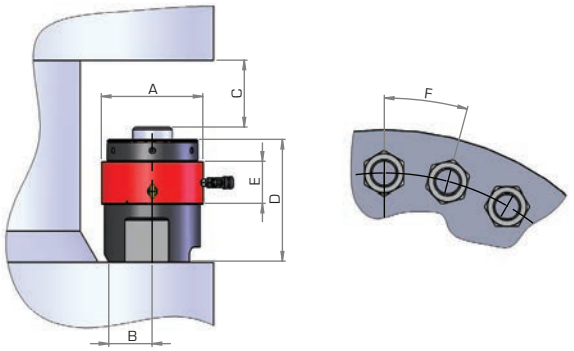


SBT - SPRING RETURN BOLT TENSIONERS - IMPERIAL

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 catalogue.

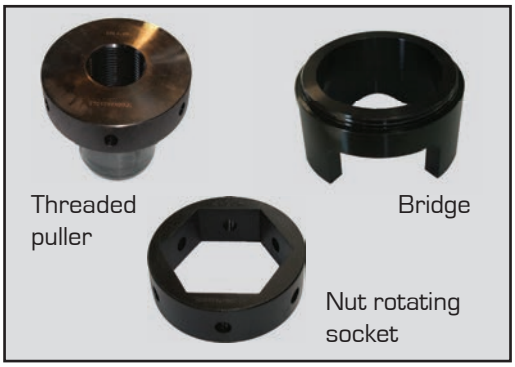


Note: F is guidance for only ANSI flange application

Model number	Bolt thread size	Threads per inch	Capacity kN	Capacity tonnes	Effective area cm²	Stroke mm	Weight kg	Dimensions in mm A	B	C min	D	E	F
SBT2-125B1	1 1/4"	8	457	46.6	30.5	15	4.0	102	39	127	164	91	74
SBT2-137B1	1 3/8"	8	457	46.6	30.5	15	4.0	102	39	127	164	91	77
SBT2-150B1	1 1/2"	8	457	46.6	30.5	15	4.0	102	39	123	164	91	80
SBT3-162B1	1 5/8"	8	822	83.8	54.8	15	6.7	137	47	146	188	94	92
SBT3-175B1	1 3/4"	8	822	83.8	54.8	15	6.7	137	47	143	188	94	93
SBT3-175B2	1 3/4"	8	822	83.8	54.8	15	6.7	137	50	148	193	94	94
SBT3-187B1	1 7/8"	8	822	83.8	54.8	15	6.7	137	47	139	188	94	97
SBT3-187B2	1 7/8"	8	822	83.8	54.8	15	6.7	137	50	144	193	94	104
SBT3-200B2	2"	8	822	83.8	54.8	15	6.7	137	50	141	193	94	104
SBT4-187B1	1 7/8"	8	1264	128.9	84.3	15	11.0	167	50	147	197	97	104
SBT4-200B1	2"	8	1264	128.9	84.3	15	11.0	167	50	143	197	97	104
SBT4-200B2	2"	8	1264	128.9	84.3	15	11.0	167	62	155	213	97	106
SBT4-225B2	2 1/4"	8	1264	128.9	84.3	15	11.0	167	62	150	213	97	121
SBT4-250B2	2 1/2"	8	1264	128.9	84.3	15	11.0	167	62	145	213	97	127
SBT5-250B1	2 1/2"	8	1833	186.9	122.2	15	16.5	209	73	162	229	102	134
SBT5-275B1	2 3/4"	8	1833	186.9	122.2	15	16.5	209	73	156	229	102	140
SBT5-300B1	3"	8	1833	186.9	122.2	15	16.5	209	73	149	229	102	147
SBT6-300B1	3"	8	2649	270.0	176.6	15	24.0	246	84	174	254	103	161
SBT6-325B1	3 1/4"	8	2649	270.0	176.6	15	24.0	246	84	169	254	103	167
SBT6-350B1	3 1/2"	8	2649	270.0	176.6	15	24.0	246	84	162	254	103	172
SBT6-375B3	3 3/4"	8	2649	270.0	176.6	15	24.0	246	105	194	295	103	191
SBT6-400B3	4"	8	2649	270.0	176.6	15	24.0	246	105	189	295	103	196

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.

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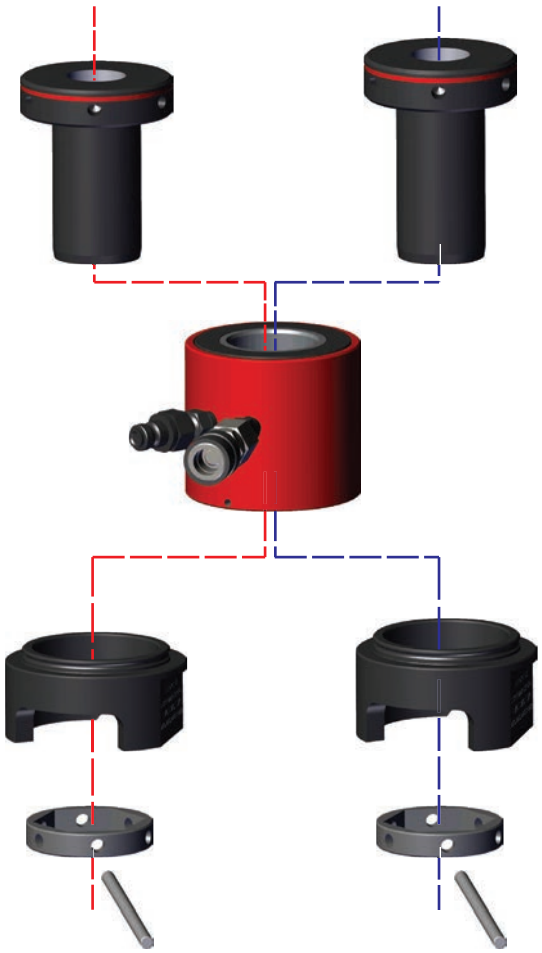
Changes within the same colour code DO NOT require a bridge change however, changes from the red to blue line (or vice versa) MUST include a relative bridge also.

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.

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.

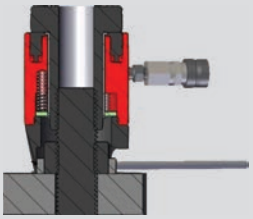


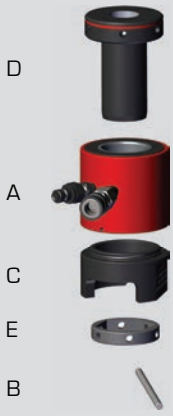
Note: SBT2 & SBT5 models both have only one tensioner bridge available.

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					
		A	B	C	Available as conversion kit		D & E
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	TPS4-200B2	RS4-80B2	CKS4-200B2
SBT4-225B2	2 1/4"				TPS4-225B2	RS4-90B2	CKS4-225B2
SBT4-250B2	2 1/2"				TPS4-250B2	RS4-98B2	CKS4-250B2
For tensioner range SBT5:							
SBT5-250B1	2 1/2"	SBT5-LC	TTB14	STS5-B1	TPS5-250B1	RS5-100B1	CKS5-250B1
SBT5-275B1	2 3/4"				TPS5-275B1	RS5-108B1	CKS5-275B1
SBT5-300B1	3"				TPS5-300B1	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 457 to 2649 kN

Maximum working pressure 1500 Bar

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.

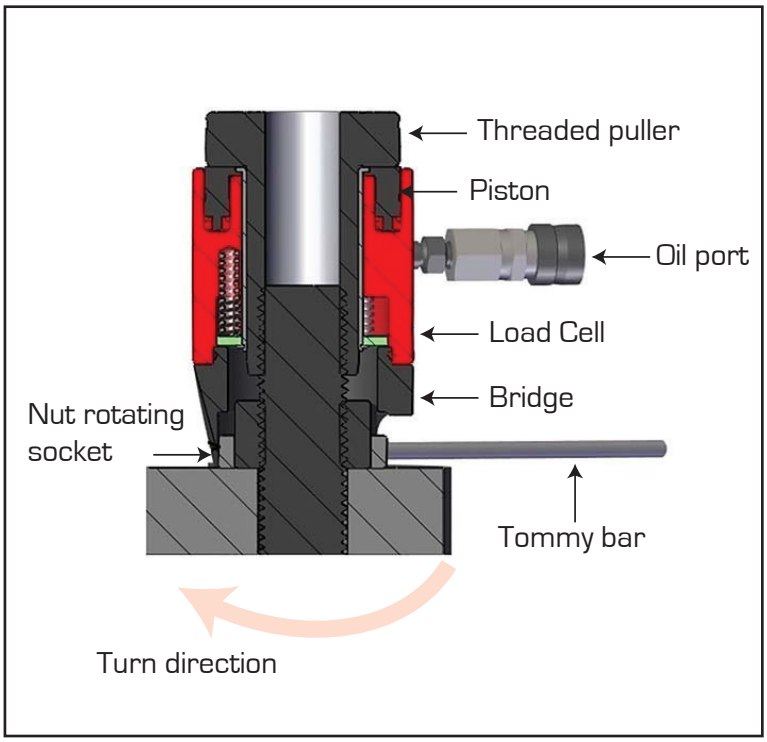
The versatility of the SBT bolt tensioner range, is identical to our standard STS range, with a variety of inter-changeable threaded pullers and nut rotating sockets available, either as bolt size conversion kits or individual parts. Further details on SBT metric conversion kits are detailed on pages 100 & 101. All SBT bolt tensioners are designed and manufactured with a wear coated piston, maximum stroke indicator, self energising high pressure seals, dual quick connect couplers, for easy multiple tensioner hook up and operate at pressures up to 1500 Bar maximum.

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

- Nitrocarburised 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.

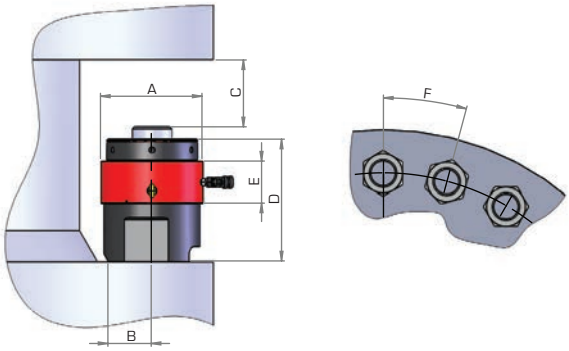
Tensioner range	Tommy bar
SBT2	TTB08
SBT3	TTB10
SBT4	TTB10
SBT5	TTB14
SBT6	TTB14



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



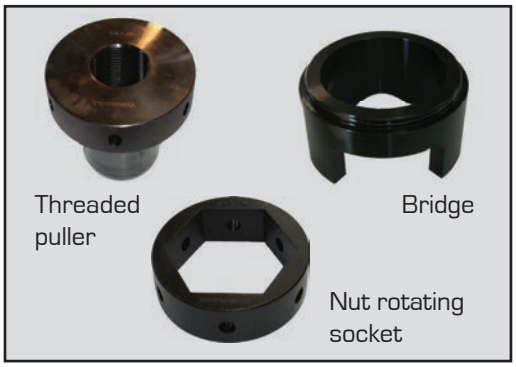
Note: F is guidance for only ANSI flange application

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

Model number	Bolt thread size	Thread pitch	Capacity kN	Capacity tonnes	Effective area cm²	Stroke mm	Weight kg	Dimensions in mm A	B	C min	D	E	F
SBT2-M30B1	M30	3.5	457	46.6	30.5	15	4.0	102	39	132	164	91	71
SBT2-M33B1	M33	3.5	457	46.6	30.5	15	4.0	102	39	127	164	91	74
SBT2-M36B1	M36	4	457	46.6	30.5	15	4.0	102	39	123	164	91	77
SBT2-M39B1	M39	4	457	46.6	30.5	15	4.0	102	39	123	164	91	80
SBT3-M42B1	M42	4.5	822	83.8	54.8	15	6.7	137	47	145	188	94	91
SBT3-M45B1	M45	4.5	822	83.8	54.8	15	6.7	137	47	142	188	94	105
SBT3-M45B2	M45	4.5	822	83.8	54.8	15	6.7	137	47	147	193	94	97
SBT3-M48B1	M48	5	822	83.8	54.8	15	6.7	137	47	139	188	94	105
SBT3-M48B2	M48	5	822	83.8	54.8	15	6.7	137	47	144	193	94	105
SBT3-M52B2	M52	5	822	83.8	54.8	15	6.7	137	47	140	193	94	97
SBT4-M48B1	M48	5	1264	128.9	84.3	15	11.0	167	50	150	197	97	105
SBT4-M52B1	M52	5	1264	128.9	84.3	15	11.0	167	50	145	197	97	108
SBT4-M52B2	M52	5	1264	128.9	84.3	15	11.0	167	62	160	213	97	120
SBT4-M56B2	M56	5.5	1264	128.9	84.3	15	11.0	167	62	155	213	97	120
SBT4-M60B2	M60	5.5	1264	128.9	84.3	15	11.0	167	62	150	213	97	124
SBT4-M64B2	M64	6	1264	128.9	84.3	15	11.0	167	62	145	213	97	126
SBT5-M64B1	M64	6	1833	186.9	122.2	15	16.5	209	73	164	229	102	134
SBT5-M68B1	M68	6	1833	186.9	122.2	15	16.5	209	73	159	229	102	136
SBT5-M72B1	M72	6	1833	186.9	122.2	15	16.5	209	73	156	229	102	139
SBT5-M76B1	M76	6	1833	186.9	122.2	15	16.5	209	73	149	229	102	142
SBT6-M76B1	M76	6	2649	270.0	176.6	15	24.0	246	84	176	254	103	158
SBT6-M80B1	M80	6	2649	270.0	176.6	15	24.0	246	84	172	254	103	160
SBT6-M85B1	M85	6	2649	270.0	176.6	15	24.0	246	84	169	254	103	162
SBT6-M90B1	M90	6	2649	270.0	176.6	15	24.0	246	84	162	254	103	170
SBT6-M95B3	M95	6	2649	270.0	176.6	15	24.0	246	96	194	295	103	184
SBT6-M100B3	M100	6	2649	270.0	176.6	15	24.0	246	96	189	295	103	190

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

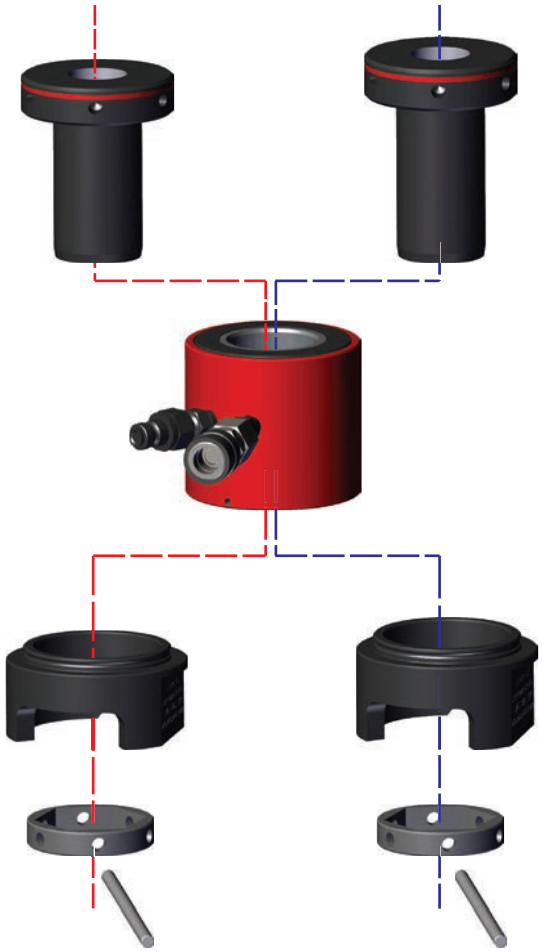
Similar to the imperial tensioner components (pages 96 & 97), the Hi-Force metric spring return hydraulic bolt tensioners are also modular in design and can be adapted to another thread size, within the tensioner range, by purchasing individual components or a simple conversion kit. By changing the required 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.

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

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 adaptor, 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.

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.

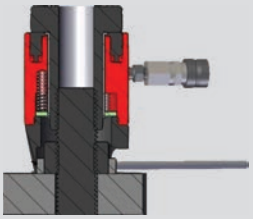


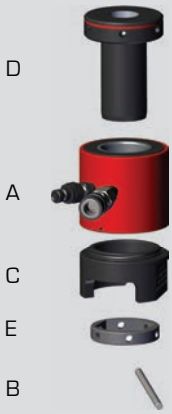
Note: SBT2 & SBT5 models both have only one tensioner bridge available.

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
		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-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	TPS5-M64B1	RS5-95B1	CKS5-M64B1
SBT5-M68B1	M68				TPS5-M68B1	RS5-100B1	CKS5-M68B1
SBT5-M72B1	M72				TPS5-M72B1	RS5-105B1	CKS5-M72B1
SBT5-M76B1	M76				TPS5-M76B1	RS5-110B1	CKS5-M76B1
For tensioner range SBT6:							
SBT6-M76B1	M76	SBT6-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 234 to 2649 kN

Working pressure 1500 Bar

Single acting design

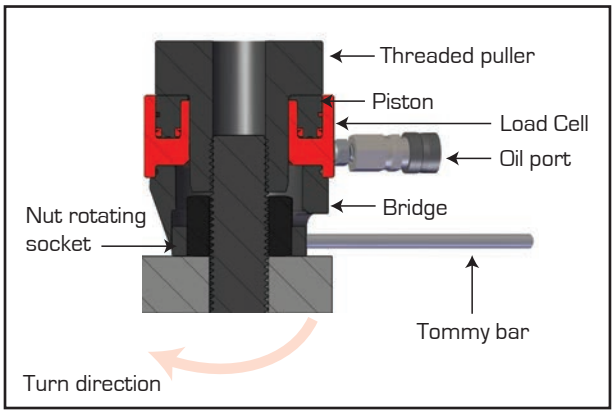
- Nitrocarburised piston
- Maximum piston stroke indicator
- Suitable for single or multi-tensioning applications
- Specially designed tensioners available on request (see page 110)
- User friendly operating and maintenance procedure
- Choice of manually operated or air powered pumps available (see page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

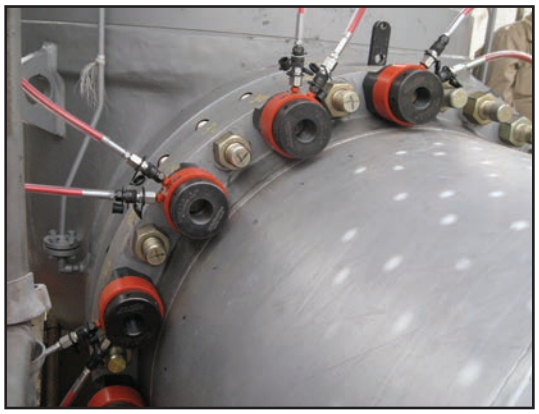
G

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 1500 Bar. 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-energising 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.

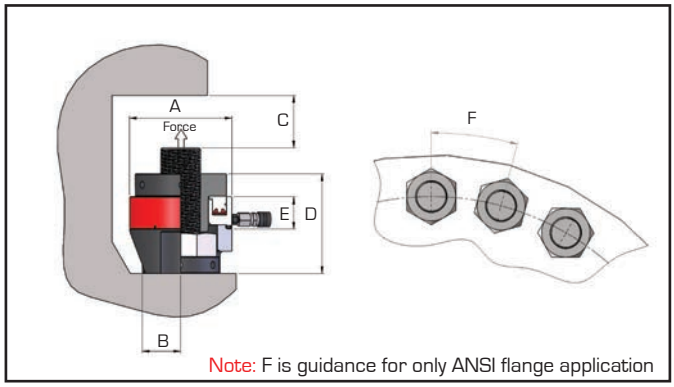
The STS range of tensioners are push back type tensioners.
For spring return tensioners, see pages 94-97 of this catalogue.





STS - TOPSIDE BOLT TENSIONERS - IMPERIAL RANGE

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

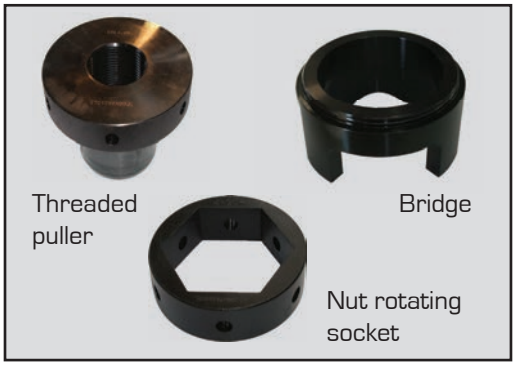


Note: F is guidance for only ANSI flange application

Model number	Bolt thread size	Threads per inch	Capacity kN	Capacity tonnes	Effective area cm²	Stroke mm	Weight kg	Dimensions in mm A	B	C min	D	E	F
STS1-075B1	¾"	10	234	23.9	15.6	10	1.7	74	28	74	90	45	51
STS1-087B1	⅞"	9	234	23.9	15.6	10	1.7	74	28	74	90	45	54
STS1-100B2	1"	8	234	23.9	15.6	10	1.7	74	30	80	98	45	61
STS1-112B2	1 ⅛"	8	234	23.9	15.6	10	1.7	74	30	80	98	45	64
STS2-125B1	1 ¼"	8	457	46.6	30.5	15	3.5	102	39	103	128	54	74
STS2-137B1	1 ⅜"	8	457	46.6	30.5	15	3.5	102	39	103	128	54	77
STS2-150B1	1 ½"	8	457	46.6	30.5	15	3.5	102	39	103	128	54	80
STS3-162B1	1 ⅝"	8	822	83.8	54.8	15	6.1	133	47	115	150	56	92
STS3-175B1	1 ¾"	8	822	83.8	54.8	15	6.1	133	47	115	150	56	93
STS3-175B2	1 ¾"	8	822	83.8	54.8	15	6.1	133	50	117	155	56	104
STS3-187B1	1 ⅞"	8	822	83.8	54.8	15	6.1	133	47	115	150	56	97
STS3-187B2	1 ⅞"	8	822	83.8	54.8	15	6.1	133	50	117	155	56	104
STS3-200B2	2"	8	822	83.8	54.8	15	6.1	133	50	117	155	56	104
STS4-187B1	1 ⅞"	8	1264	128.9	84.3	15	10.6	163	50	119	149	57	104
STS4-200B1	2"	8	1264	128.9	84.3	15	10.6	163	50	119	149	57	104
STS4-200B2	2"	8	1264	128.9	84.3	15	10.6	163	62	119	149	57	106
STS4-225B2	2 ¼"	8	1264	128.9	84.3	15	10.6	163	62	135	165	57	121
STS4-250B2	2 ½"	8	1264	128.9	84.3	15	10.6	163	62	135	165	57	127
STS5-250B1	2 ½"	8	1833	186.9	122.2	15	16.0	193	73	145	187	60	134
STS5-275B1	2 ¾"	8	1833	186.9	122.2	15	16.0	193	73	145	187	60	140
STS5-300B1	3"	8	1833	186.9	122.2	15	16.0	193	73	145	187	60	147
STS6-300B1	3"	8	2649	270.0	176.6	15	23.5	233	84	178	216	64	161
STS6-325B1	3 ¼"	8	2649	270.0	176.6	15	23.5	233	84	178	216	64	167
STS6-350B1	3 ½"	8	2649	270.0	176.6	15	23.5	233	84	178	216	64	172
STS6-375B3	3 ¾"	8	2649	270.0	176.6	15	23.5	233	105	205	257	64	191
STS6-400B3	4"	8	2649	270.0	176.6	15	23.5	233	105	205	257	64	196

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



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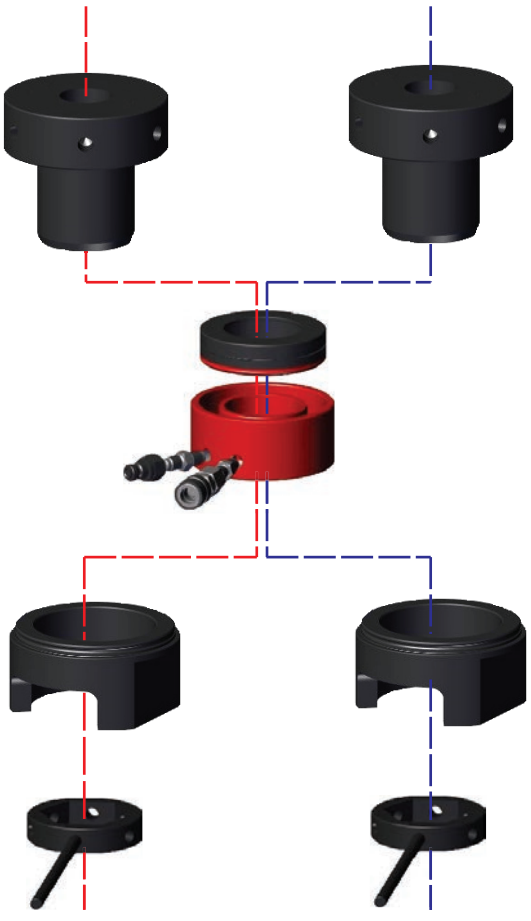
Changes within the same colour code DO NOT require a bridge change however, changes from the red to blue line (or vice versa) MUST include a relative bridge also.

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.

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.

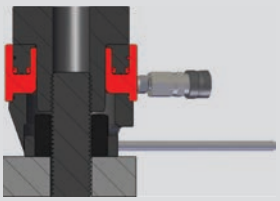


Note: STS2 & STS5 models both have only one tensioner bridge available.

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
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 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

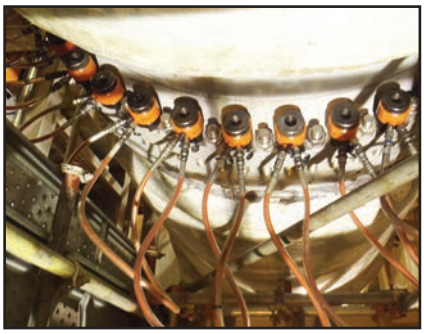
STS3-M52

Capacities from 234 to 2649 kN

Working pressure 1500 Bar

Single acting design

- Nitrocarburised 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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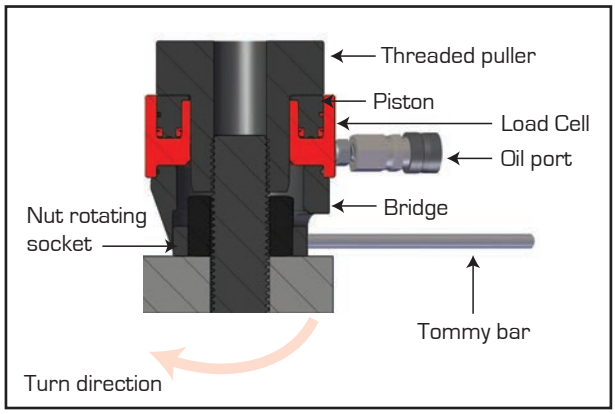
The STS metric bolt tensioner range is designed for topside operation in a wide variety of applications including pipeline flanges, heat exchangers, pressure vessels, compressor covers, boiler feed pumps, anchor bolts and many others. The range comprises of 32 metric size options ranging from M16 to M100 thread size and all models are suitable for working pressures up to 1500 Bar. 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-energising 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.

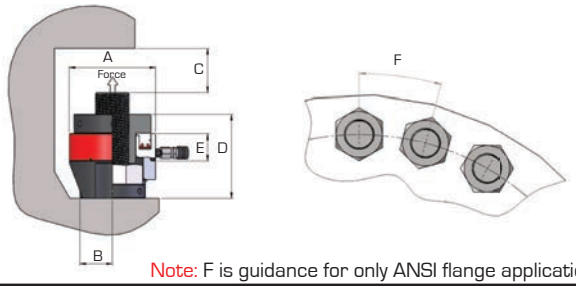
The STS range of tensioners are push back type tensioners.
For spring return tensioners, see pages 98-101 of this catalogue.



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

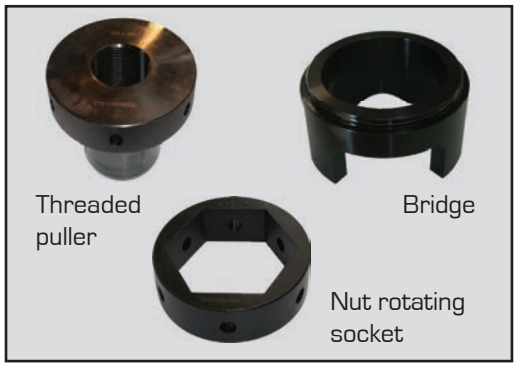


Note: F is guidance for only ANSI flange application

Model number	Bolt thread size	Thread pitch	Capacity kN	Capacity tonnes	Effective area cm²	Stroke mm	Weight kg	Dimensions in mm A	B	C	D	E	F
STS1-M16B1	M16	2	234	23.9	15.6	10	1.7	74	28	74	90	45	47
STS1-M18B1	M18	2.5	234	23.9	15.6	10	1.7	74	28	74	90	45	49
STS1-M20B1	M20	2.5	234	23.9	15.6	10	1.7	74	28	74	90	45	51
STS1-M22B2	M22	2.5	234	23.9	15.6	10	1.7	74	30	80	98	45	56
STS1-M24B2	M24	3	234	23.9	15.6	10	1.7	74	30	80	98	45	59
STS1-M27B2	M27	3	234	23.9	15.6	10	1.7	74	30	80	98	45	61
STS2-M30B1	M30	3.5	457	46.6	30.5	15	3.5	102	39	103	128	54	71
STS2-M33B1	M33	3.5	457	46.6	30.5	15	3.5	102	39	103	128	54	74
STS2-M36B1	M36	4	457	46.6	30.5	15	3.5	102	39	103	128	54	77
STS2-M39B1	M39	4	457	46.6	30.5	15	3.5	102	39	103	128	54	80
STS3-M42B1	M42	4.5	822	83.8	54.8	15	6.1	133	47	115	150	56	91
STS3-M45B1	M45	4.5	822	83.8	54.8	15	6.1	133	47	115	150	56	94
STS3-M45B2	M45	4.5	822	83.8	54.8	15	6.1	133	50	117	155	56	105
STS3-M48B1	M48	5	822	83.8	54.8	15	6.1	133	47	115	150	56	97
STS3-M48B2	M48	5	822	83.8	54.8	15	6.1	133	50	117	155	56	105
STS3-M52B2	M52	5	822	83.8	54.8	15	6.1	133	50	117	155	56	105
STS4-M48B1	M48	5	1264	128.9	84.3	15	10.6	163	50	119	149	57	105
STS4-M52B1	M52	5	1264	128.9	84.3	15	10.6	163	50	119	149	57	108
STS4-M52B2	M52	5	1264	128.9	84.3	15	10.6	163	62	135	165	57	120
STS4-M56B2	M56	5.5	1264	128.9	84.3	15	10.6	163	62	135	165	57	120
STS4-M60B2	M60	5.5	1264	128.9	84.3	15	10.6	163	62	135	165	57	124
STS4-M64B2	M64	6	1264	128.9	84.3	15	10.6	163	62	135	165	57	126
STS5-M64B1	M64	6	1833	186.9	122.2	15	16.0	193	73	145	187	60	134
STS5-M68B1	M68	6	1833	186.9	122.2	15	16.0	193	73	145	187	60	136
STS5-M72B1	M72	6	1833	186.9	122.2	15	16.0	193	73	145	187	60	139
STS5-M76B1	M76	6	1833	186.9	122.2	15	16.0	193	73	145	187	60	142
STS6-M76B1	M76	6	2649	270.0	176.6	15	23.5	233	84	178	216	64	158
STS6-M80B1	M80	6	2649	270.0	176.6	15	23.5	233	84	178	216	64	160
STS6-M85B1	M85	6	2649	270.0	176.6	15	23.5	233	84	178	216	64	162
STS6-M90B1	M90	6	2649	270.0	176.6	15	23.5	233	84	178	216	64	170
STS6-M95B3	M95	6	2649	270.0	176.6	15	23.5	233	105	205	257	64	184
STS6-M100B3	M100	6	2649	270.0	176.6	15	23.5	233	105	205	257	64	190

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.

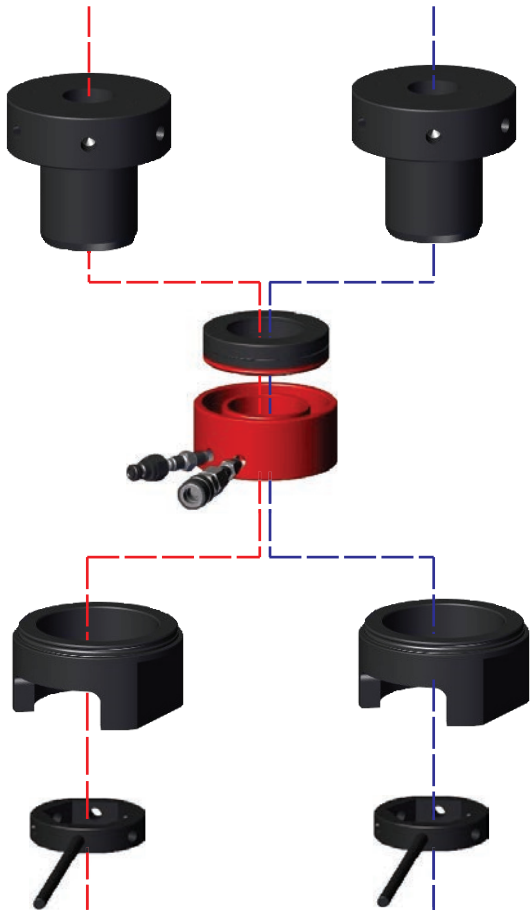
Tensioner models STS1, STS3, STS4 & STS6 are available with two different bridge sizes, hence always check whether or not the required thread change is possible within the bridge size (please follow coloured lines in below drawing). Make sure that all components match up. DO NOT mix components from different 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.

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.

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.

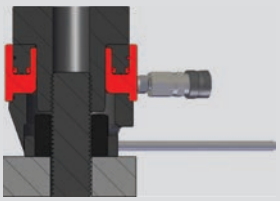


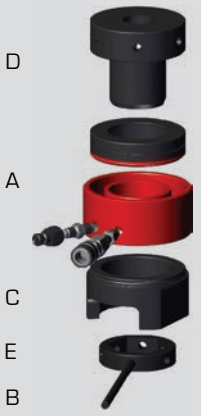
Note: STS2 & STS5 models both have only one tensioner bridge available.

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).

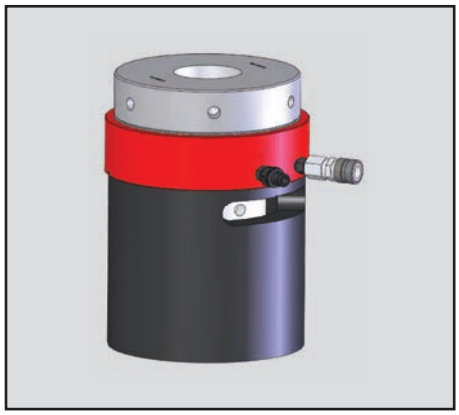
Examples:
To change from STS3-M42B1 to STS3-M48B1 would require conversion kit CK3-M48B1 only.
To change from STS3-M48B1 to STS3-M52B2 would require conversion kit CK3-M52B2 and bridge STS3-B2.

- 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					
		A	B	C	Available as conversion kit		D & E
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 - CUSTOMISED & SPECIAL DESIGN BOLT TENSIONERS



Custom design & built to your requirements

Working pressure up to 2275 Bar

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

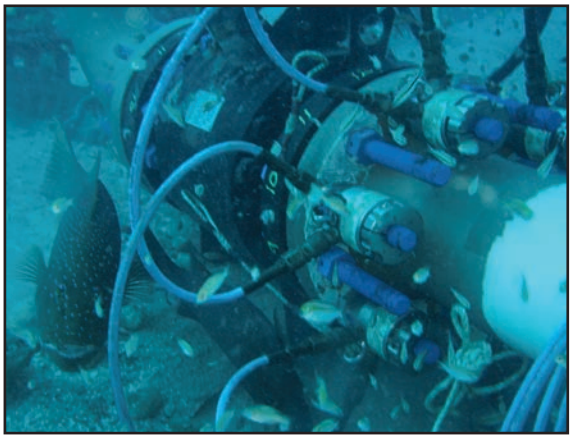
STU - SUB SEA BOLT TENSIONERS - IMPERIAL

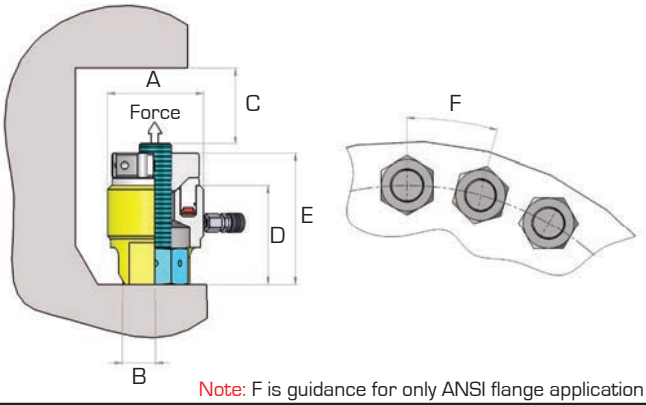
STU3-162

Top view Hi-Force quick fit threaded puller

- Working pressure 1500 Bar
- 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 30mm 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

G

Model number	Bolt thread size	Capacity kN	Capacity Tonnes	Effective area cm²	Stroke mm	Weight kg	Tommy bar
STU1-100	1" - 8UN	256.04	26.10	17.07	20	3.4	TTB06
STU1-112	1 1/8"- 8UN	256.04	26.10	17.07	20	3.4	TTB06
STU2-125	1 1/4"- 8UN	430.36	43.87	28.69	30	6.0	TTB08
STU2-137	1 3/8"- 8UN	430.36	43.87	28.69	30	6.0	TTB08
STU3-150	1 1/2"- 8UN	553.35	56.41	36.89	30	7.5	TTB10
STU3-162	1 5/8"- 8UN	553.35	56.41	36.89	30	7.5	TTB10
STU4-175	1 3/4"- 8UN	756.30	77.09	50.42	30	9.8	TTB10
STU4-187	1 7/8"- 8UN	756.30	77.09	50.42	30	9.8	TTB10
STU5-200	2" - 8UN	1168.19	119.08	77.88	30	14.5	TTB12
STU5-225	2 1/4"- 8UN	1168.19	119.08	77.88	30	14.5	TTB12
STU6-250	2 1/2"- 8UN	1649.12	168.11	109.94	30	22.8	TTB14
STU6-275	2 3/4"- 8UN	1649.12	168.11	109.94	30	22.8	TTB14
STU7-300	3" - 8UN	2483.44	253.15	165.56	30	35.6	TTB16
STU7-325	3 1/4"- 8UN	2483.44	253.15	165.56	30	35.6	TTB16
STU7-350	3 1/2"- 8UN	2483.44	253.15	165.56	30	35.6	TTB16

Dimensions in mm					
A	B	C	D	E	F
82	22	119	119	140	61
82	22	119	119	140	64
102	30	140	140	164	73
102	30	140	140	164	75
114	35	142	142	169	82
114	35	142	142	169	85
128	41	151	151	181	94
128	41	151	151	181	98
150	48	164	164	202	112
150	48	164	164	202	116
176	60	183	183	231	136
176	60	183	183	231	141
215	89	215	215	260	162
215	89	215	215	260	173
215	89	215	215	260	175

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

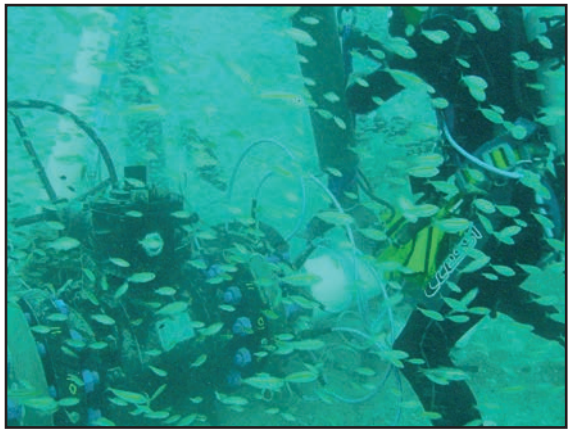
Topview Hi-Force quick fit threaded puller

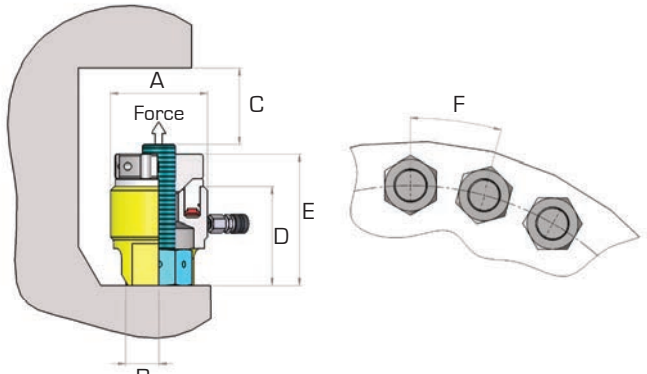
Working pressure 1500 Bar

Interchangeable quickfit/release pullers

Load cell with integral bridge

- Dual hose connection for easy hook up
- Extra long 30mm 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

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Model number	Bolt thread size	Capacity kN	Capacity Tonnes	Effective area cm²	Stroke mm	Weight kg	Tommy bar
STU1-24	M24 x 3	256.04	26.10	17.07	20	3.4	TTB06
STU1-27	M27 x 3	256.04	26.10	17.07	20	3.4	TTB06
STU2-30	M30 x 3.5	430.36	43.87	28.69	30	6.0	TTB08
STU2-33	M33 x 3.5	430.36	43.87	28.69	30	6.0	TTB08
STU2-36	M36 x 4	430.36	43.87	28.69	30	6.0	TTB10
STU3-39	M39 x 4	553.35	56.41	36.89	30	7.5	TTB10
STU3-42	M42 x 4.5	553.35	56.41	36.89	30	7.5	TTB10
STU4-45	M45 x 4.5	756.30	77.09	50.42	30	9.8	TTB10
STU4-48	M48 x 5	756.30	77.09	50.42	30	9.8	TTB12
STU5-52	M52 x 5	1168.19	119.08	77.88	30	14.5	TTB12
STU5-56	M56 x 5.5	1168.19	119.08	77.88	30	14.5	TTB14
STU6-60	M60 x 5.5	1649.12	168.11	109.94	30	22.8	TTB14
STU6-64	M64 x 6	1649.12	168.11	109.94	30	22.8	TTB16
STU6-68	M68 x 6	1649.12	168.11	109.94	30	22.8	TTB16
STU6-72	M72 x 6	1649.12	168.11	109.94	30	22.8	TTB16
STU7-76	M76 x 6	2483.44	253.15	165.56	30	35.6	TTB16
STU7-80	M80 x 6	2483.44	253.15	165.56	30	35.6	TTB16
STU7-85	M85 x 6	2483.44	253.15	165.56	30	35.6	TTB16
STU7-90	M90 x 6	2483.44	253.15	165.56	30	35.6	TTB16

Dimensions in mm					
A	B	C	D	E	F
82	22	119	119	140	61
82	22	119	119	140	64
102	30	140	140	164	73
102	30	140	140	164	75
102	30	140	140	164	78
114	35	142	142	169	82
114	35	142	142	169	85
128	41	151	151	181	94
128	41	151	151	181	98
150	48	164	164	202	112
150	48	164	164	202	116
176	60	183	183	231	136
176	60	183	183	231	136
176	60	183	183	231	136
176	60	183	183	231	141
215	89	215	215	260	164
215	89	215	215	260	164
215	89	215	215	260	175
215	89	215	215	260	175

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

HTN9-200 HTN7-175 HTN10-225

- Integral mechanical load retaining collar
- Working pressure 1500 Bar
- 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 or 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 1500 Bar 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 pages 115 & 116).

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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 kN	Capacity tonnes	Effective area cm^2	Stroke mm	Diameter mm	Height mm	Weight kg	Tommy bar
HTN1-100	1" - 8 UN	198.27	20.21	13.22	5	72	55	1.9	TTB06
HTN2-112	1 1/8" - 8 UN	216.30	22.05	14.42	5	75	55	2.0	TTB06
HTN3-125	1 1/4" - 8 UN	252.94	25.78	16.86	5	82	57	2.4	TTB06
HTN4-137	1 3/8" - 8 UN	305.83	31.18	20.39	5	88	57	2.7	TTB06
HTN5-150	1 1/2" - 8 UN	344.12	35.08	22.94	6	93	58	2.9	TTB06
HTN6-162	1 5/8" - 8 UN	397.61	40.53	26.51	6	100	62	3.5	TTB06
HTN7-175	1 3/4" - 8 UN	475.01	48.42	31.67	6	106	64	4.0	TTB06
HTN8-187	1 7/8" - 8 UN	501.40	51.11	33.43	6	110	64	4.2	TTB06
HTN9-200	2" - 8 UN	563.72	57.46	37.58	6	117	67	4.9	TTB06
HTN10-225	2 1/4" - 8 UN	746.44	76.09	49.76	8	128	74	6.4	TTB06
HTN11-250	2 1/2" - 8 UN	905.13	92.27	60.34	8	141	77	8.0	TTB06
HTN12-275	2 3/4" - 8 UN	999.85	101.92	66.66	8	150	78	8.8	TTB08
HTN13-300	3" - 8 UN	1203.43	122.67	80.23	8	162	81	10.6	TTB08
HTN14-325	3 1/4" - 8 UN	1413.72	144.11	94.25	10	174	87	12.9	TTB08
HTN15-350	3 1/2" - 8 UN	1605.04	163.61	107.00	10	187	95	16.2	TTB10
HTN16-375	3 3/4" - 8 UN	1704.59	173.76	113.64	10	194	102	18.3	TTB10
HTN17-400	4" - 8 UN	1911.46	194.85	127.43	10	205	110	21.9	TTB10

HTN - HYDRAULIC TENSIONER NUTS - METRIC

HTN8-M48

Integral mechanical load retaining collar

Working pressure 1500 Bar

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 or 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. All models are 1500 Bar 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).

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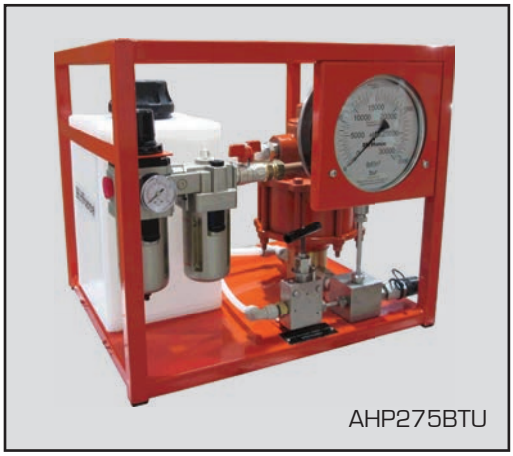
Don't forget to order your tommy bars when purchasing Hi-Force hydraulic tensioner nuts. We recommend the purchase of one tommy bar for every four tensioners nuts.

Model number	Bolt size	Capacity kN	Capacity tonnes	Effective area cm²	Stroke mm	Diameter mm	Height mm	Weight kg	Tommy bar
HTN1-M24	M24 x 3	198.27	20.21	13.22	5	72	55	1.9	TTB06
HTN2-M27	M27 x 3	216.30	22.05	14.42	5	75	55	2.0	TTB06
HTN3-M30	M30 x 3.5	252.94	25.78	16.86	5	82	57	2.4	TTB06
HTN3-M33	M33 x 3.5	252.94	25.78	16.86	5	82	57	2.4	TTB06
HTN4-M36	M36 x 4	305.83	31.18	20.39	5	88	57	2.7	TTB06
HTN5-M39	M39 x 4	344.12	35.08	22.94	6	93	58	2.9	TTB06
HTN6-M42	M42 x 4.5	397.61	40.53	26.51	6	100	62	3.5	TTB06
HTN7-M45	M45 x 4.5	475.01	48.42	31.67	6	106	64	4.0	TTB06
HTN8-M48	M48 x 5	501.40	51.11	33.43	6	110	64	4.2	TTB06
HTN9-M52	M52 x 5	563.72	57.46	37.58	6	117	67	4.9	TTB06
HTN10-M56	M56 x 5.5	746.44	76.09	49.76	8	128	74	6.4	TTB06
HTN11-M60	M60 x 5.5	905.13	92.27	60.34	8	141	77	8.0	TTB06
HTN11-M64	M64 x 6	905.13	92.27	60.34	8	141	77	8.0	TTB06
HTN12-M68	M68 x 6	999.85	101.92	66.66	8	150	78	8.8	TTB08
HTN13-M72	M72 x 6	1203.43	122.67	80.23	8	162	81	10.6	TTB08
HTN13-M76	M76 x 6	1203.43	122.67	80.23	8	162	81	10.6	TTB08
HTN14-M80	M80 x 6	1413.72	144.11	94.25	10	174	87	12.9	TTB08
HTN15-M85	M85 x 6	1605.04	163.61	107.00	10	187	95	16.2	TTB10
HTN15-M90	M90 x 6	1605.04	163.61	107.00	10	187	95	16.2	TTB10
HTN16-M95	M95 x 6	1704.59	173.76	113.64	10	194	102	18.3	TTB10
HTN17-M100	M100 x 6	1911.46	194.85	127.43	10	205	110	21.9	TTB10

AHP-BTU - AIR DRIVEN PUMP FOR BOLT TENSIONERS



AHP275BTU

- Operates from standard 7 Bar air supply
- Air consumption 28 scfm (0.79 m^3/minute)
- Working pressure 1500 Bar

The Hi-Force AHP-BTU range of air driven hydraulic pumps is 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 glycerine 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 Bar	Usable oil capacity litres	Oil flow per stroke cm^3	Outlet coupler	Weight kg	Dimensions in mm Length	Width	Height
AHP275BTU	1500	7	1.6	STFC4	20	450	395	395
AHP2-237BTU	1500	7	6.1	STFC4	24	450	390	465

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HPX-BTU - MANUALLY OPERATED PUMP FOR BOLT TENSIONERS

HPX1500BTU

- Compact & lightweight design
- Complete with pressure gauge
- Working pressure 1500 Bar

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 Bar	Usable oil capacity litres	Displacement per stroke (cm^3) 1st stage	2nd stage	Outlet coupler	Weight kg	Dimensions in mm Length	Width	Height
HPX1500BTU	1500	1.2	20.0	1.0	STFC4	6.5	617	125	161

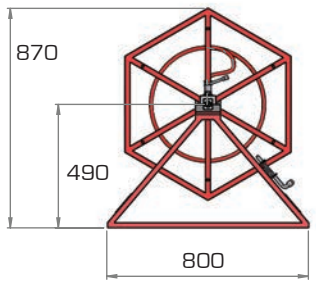
BOLT TENSIONER HOSES, COUPLERS & HOSE REELS

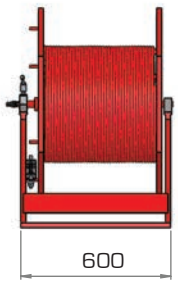
Safety factor 3 : 1

Working pressure up to 1500 Bar

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 1500 Bar 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.

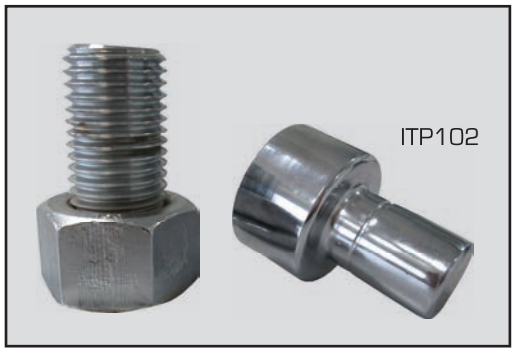




Designed for sub-sea main line hose connection between the pump and the first tensioner, the reel above is suitable for off-shore use and can accommodate up to 300 meters of Hi-Force XHC hydraulic hose. The reel comes complete with quick connect couplings, integrated brake and a spring loaded locking bolt.

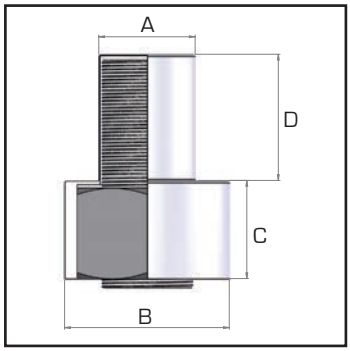
Model number	Maximum pressure Bar	Description
XHC1.5B	1500	Link hose complete with quick connect couplings, length 1.5 metres
XHC3B	1500	Link hose complete with quick connect couplings, length 3.0 metres
XHC5B	1500	Mainline hose complete with quick connect couplings, length 5.0 metres
XHC10B	1500	Mainline hose complete with quick connect couplings, length 10.0 metres
XHC25B	1500	Mainline hose complete with quick connect couplings, length 25.0 metres
XHC50B	1500	Mainline hose complete with quick connect couplings, length 50.0 metres
XHC100B	1500	Mainline hose complete with quick connect couplings, length 100.0 metres
XHC150B	1500	Mainline hose complete with quick connect couplings, length 150.0 metres
XHC200B	1500	Mainline hose complete with quick connect couplings, length 200.0 metres
XHC250B	1500	Mainline hose complete with quick connect couplings, length 250.0 metres
XHC300B	1500	Mainline hose complete with quick connect couplings, length 300.0 metres
XHR1	1500	Hose reel, suitable for up to 300 meters of XHC high pressure hose
STFC4	1500	Female coupling
STMC4	1500	Male coupling
STN1P2	1500	⅛" x ¼" BSP nipple for current model STS1 only
STN1P4	1500	¼" BSP nipple c/w bonded sealing washer (old design - not for STS1)
STN1P4-C	1500	¼" BSP nipple with cone seat seal (current design - not for STS1)

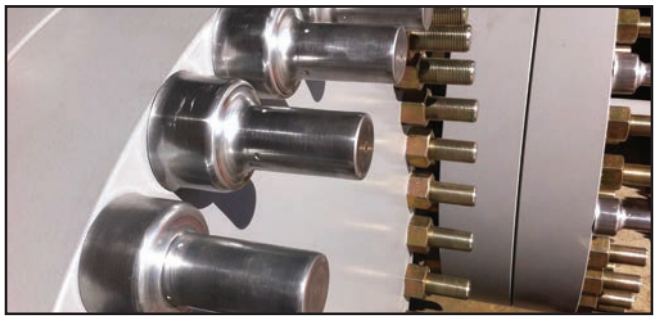
ITP & MTP - BOLT & NUT PROTECTION CAPS

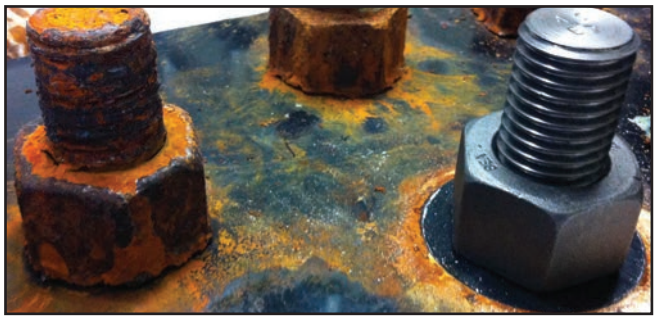


- Protects exposed bolt threads and nuts
- Sizes from ¾" to 4" (M16 to M100)
- Strong and secure fixing

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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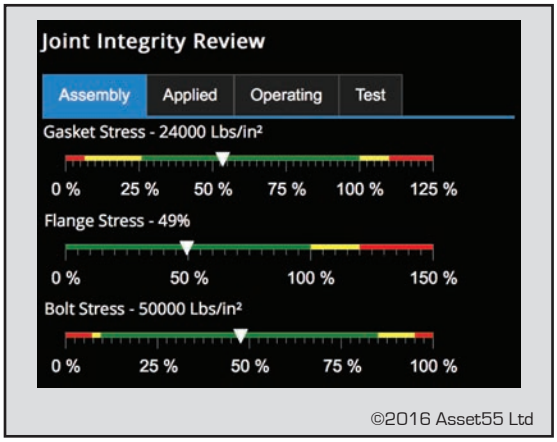
Imperial Sizes					
Model number	Bolt size	Dimensions in mm A	B	C	D
ITP012	¾"	19.0	39	22	23
ITP014	⅞"	22.3	44	26	33
ITP100	1"	25.5	48	29	37
ITP102	1⅛"	28.6	55	33	40
ITP104	1¼"	31.8	60	36	44
ITP106	1⅜"	35.0	65	39	48
ITP108	1½"	38.2	70	42	53
ITP110	1⅝"	41.3	77	46	59
ITP112	1¾"	44.5	83	49	64
ITP114	1⅞"	47.7	88	53	67
ITP200	2"	51.0	94	56	72
ITP204	2¼"	57.2	105	62	80
ITP208	2½"	63.5	114	69	91
ITP212	2¾"	70.0	125	75	99
ITP300	3"	76.3	136	81	107
ITP304	3¼"	82.7	152	87	116
ITP308	3½"	89.0	160	94	126
ITP312	3¾"	95.4	172	100	135
ITP400	4"	102.0	183	107	152

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

Metric Sizes					
Model number	Bolt size	Dimensions in mm A	B	C	D
MTP16	M16	16	31	18	22
MTP18	M18	18	34	21	23
MTP20	M20	20	39	23	25
MTP22	M22	22	40	25	32
MTP24	M24	24	45	29	34
MTP27	M27	27	51	30	37
MTP30	M30	30	55	33	40
MTP33	M33	33	61	36	46
MTP36	M36	36	65	39	48
MTP39	M39	39	70	42	52
MTP42	M42	42	77	46	59
MTP45	M45	45	83	49	64
MTP48	M48	48	88	53	67
MTP52	M52	52	94	56	72
MTP56	M56	56	102	60	84
MTP64	M64	64	113	69	91
MTP68	M68	68	119	73	98
MTP72	M72	72	125	77	100
MTP76	M76	76	131	81	105
MTP80	M80	80	136	85	107
MTP90	M90	90	159	95	126
MTP100	M100	100	183	105	144

BOLTRIGHT PRO SOFTWARE - POWERED BY ASSET55



Online access compatible with all operating systems

Offline version available

Covers bolt tensioning requirements

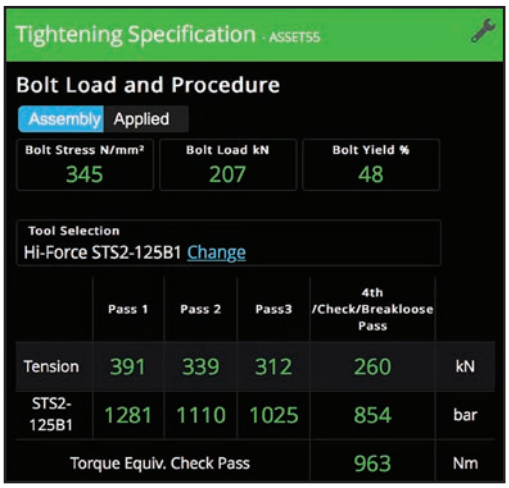
BOLTRIGHTPRO

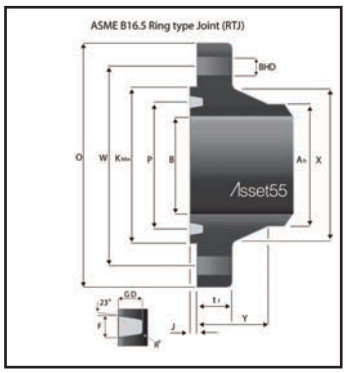
Hi-Force's answer to joint integrity

BOLTRIGHT PRO is an innovative, bolted joint integrity software programme, 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 analyse 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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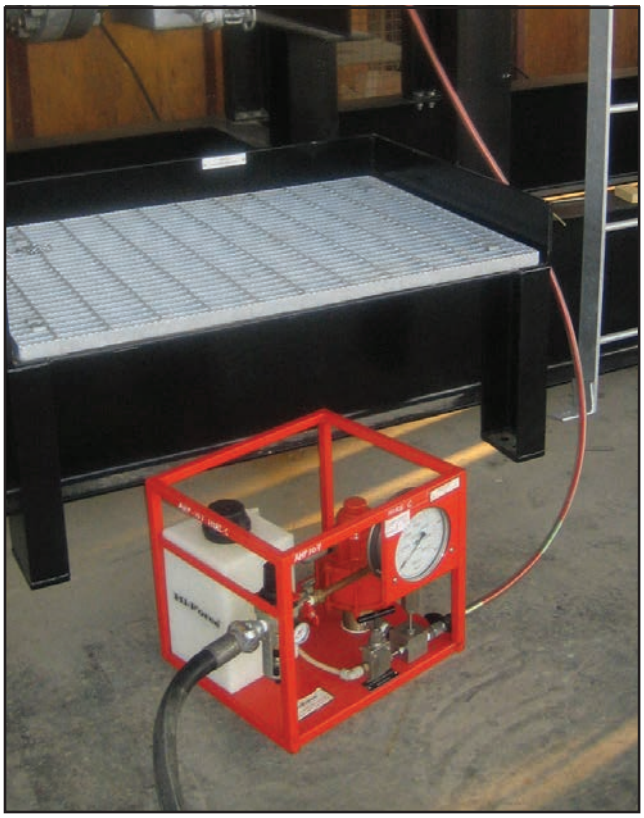
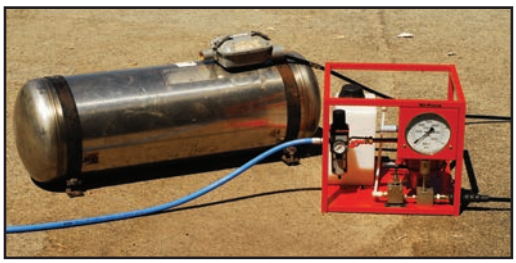
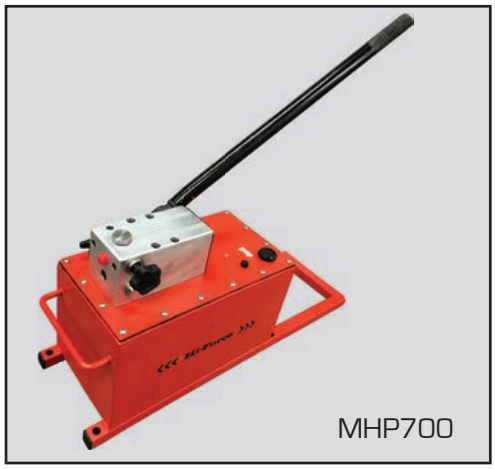




MHP - MANUALLY OPERATED HYDROTEST PUMPS


MHP700

Up to 1000 Bar 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 aluminium 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 50cm^3 up to 50 Bar 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 100 to 1000 Bar 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 610mm 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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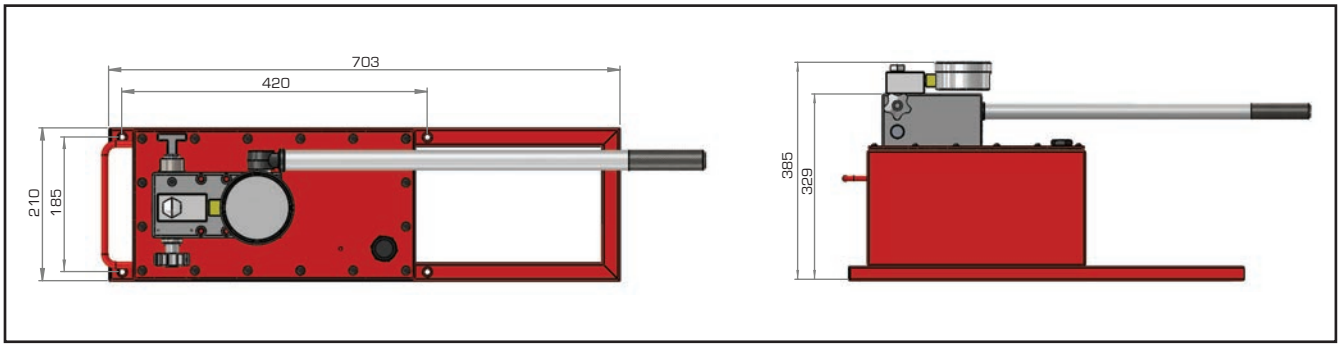
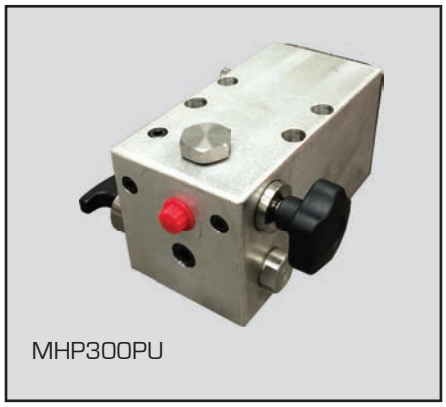
- Lightweight aluminium design with stainless steel pistons
- Relief valve incorporated as standard
- Standard 15 litre capacity stainless steel powder coated fluid reservoir
- Optional pressure gauges available (see page 121)



Model number (with tank)	Model number (pump only)	Working pressure Bar	Valve type	Displacement per stroke cm^3 1st stage	Displacement per stroke cm^3 2nd stage	Changeover pressure Bar	Outlet port	Suction port	Weight with tank kg
MHP100	MHP100PU	100	2-way	50	22	50	3/8" NPT	3/8" NPT	20
MHP300	MHP300PU	300	2-way	50	8	50	3/8" NPT	3/8" NPT	20
MHP500	MHP500PU	500	2-way	50	4	50	3/8" NPT	3/8" NPT	20
MHP700	MHP700PU	700	2-way	50	3	50	3/8" NPT	3/8" NPT	20
MHP1000	MHP1000PU	1000	2-way	50	2	50	3/8" BSP	3/8" NPT	20

MHP-PU - MANUALLY OPERATED HYDROTEST PUMPS

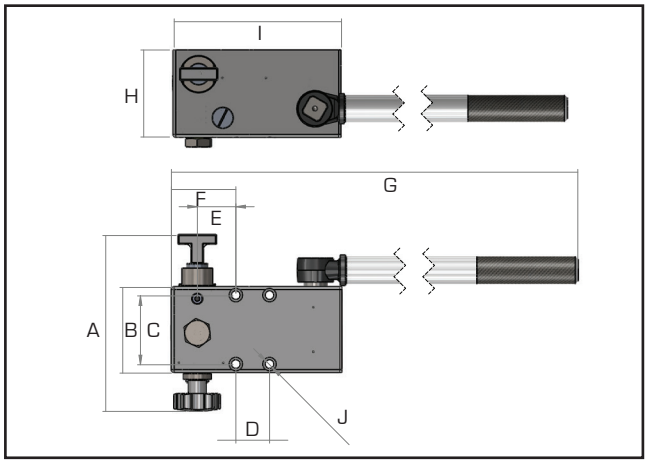


MHP300PU

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	Dimensions in mm (all models)									
kg	A	B	C	D	E	F	G	H	I	J
5.0	183.0	89.0	71.5	35.0	40.0	67.0	760.0	92.0	177.0	4 X M8

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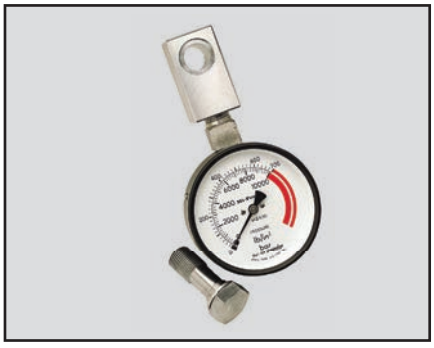
RESERVOIR

Model number	Description
MHR15	15 litre standard reservoir

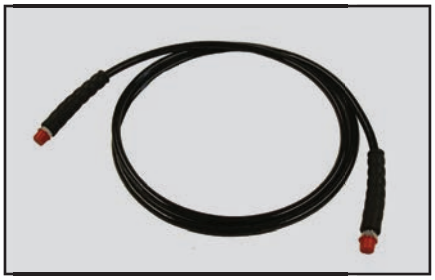
PRESSURE GAUGES

Model number	Pressure range Bar
MHP100GK	110
MHP300GK	310
MHP500GK	552
MHP700GK	700
MHP1000GK	1000



HOSES

Model Number	Max W.P Bar	Length (metres)	End Fitting	For model number
HH3-6NMS-1	up to 300	3	3/8" NPT Male Swivel	MHP100 & MHP300
HH3-6NMS-2	up to 700	3	3/8" NPT Male Swivel	MHP500 & MHP700
HH3-6NMS-3	1000	3	3/8" BSP Male Swivel	MHP1000



AHP - AIR DRIVEN HYDROTEST PUMPS - STANDARD FLOW


AHP58

Output pressures up to 2931 Bar

Suitable for use with various fluids

150mm dual scale vibra pressure gauge

- Air consumption 28 scfm (0.79m³/minute)
- Infinitely variable output pressure and flow
- 7 litre reservoir capacity

The Hi-Force AHP series of air driven hydrostatic pressure testing pumps offer a choice of eight models with output pressure capacities ranging from 6 Bar (87 PSI) to 2931 Bar (42500 PSI). All models are suitable for use with various fluids, including water and are supplied with a 150mm diameter glycerine 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 23 kg.

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Model number	Max. output pressure (Bar) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm³)	Outlet port thread	Weight kg	Dimensions in mm Length	Width	Height
AHP10	6	34	69	42.3	½" NPT	23	450	395	395
AHP26	14	90	181	16.0	½" NPT	21	450	395	395
AHP36	17	122	250	12.3	½" NPT	20	450	395	395
AHP58	28	200	400	7.6	½" NPT	20	450	395	395
AHP107	62	373	738	4.0	½" NPT	20	450	395	395
AHP187	97	638	1293	2.2	9/16"-18UNF	20	450	395	395
AHP275	155	931	1897	1.6	9/16"-18UNF	20	450	395	395
AHP425	345	1448	2931	1.0	9/16"-18UNF	20	450	395	395

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) AHP10	AHP26	AHP36	AHP58	AHP107	AHP187	AHP275	AHP425
0	0	23.10	8.80	6.00	3.56	1.97	1.15	0.72	0.43
500	35	12.00	5.85	4.39	3.05	1.50	1.05	0.68	0.40
1000	69	*	4.72	3.80	2.51	1.28	1.00	0.65	0.38
1500	104	*	3.90	3.34	2.38	1.25	0.90	0.60	0.36
2000	138	*	3.00	3.00	2.25	1.21	0.78	0.55	0.34
2500	173	*	1.21	2.56	2.05	1.18	0.75	0.50	0.33
3000	207	*	*	1.95	1.85	1.16	0.73	0.48	0.31
4000	276	*	*	*	1.56	1.02	0.70	0.45	0.29
5000	345	*	*	*	1.02	0.95	0.67	0.42	0.26
7500	517	*	*	*	*	0.76	0.60	0.40	0.25
10000	690	*	*	*	*	0.44	0.52	0.37	0.24
15000	1034	*	*	*	*	*	0.39	0.33	0.21
20000	1379	*	*	*	*	*	*	0.30	0.20
25000	1724	*	*	*	*	*	*	0.21	0.16
30000	2069	*	*	*	*	*	*	*	0.13
40000	2760								0.05

* Pressure exceeds pump capacity

AHP-CR AIR DRIVEN HYDROTEST PUMPS - WITH CHART RECORDER

AHP187-CR

Output pressures up to 2931 Bar

Suitable for use with various fluids

150mm dual scale vibra pressure gauge

- Air consumption 28 scfm (0.79m³/minute)
- Infinitely variable output pressure and flow
- 7 litre 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 offer a choice of 8 models with output pressure capacities ranging from 6 Bar (87 PSI) to 2931 Bar (42500 PSI) 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 150mm diameter glycerine 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 31 kg.

Model number	Max. output pressure (Bar) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm³)	Outlet port thread	Weight kg	Dimensions in mm Length	Width	Height
AHP10-CR	6	34	69	42.3	½" NPT	31	530	390	390
AHP26-CR	14	90	181	16.0	½" NPT	29	530	390	390
AHP36-CR	17	122	250	12.3	½" NPT	28	530	390	390
AHP58-CR	28	200	400	7.6	½" NPT	28	530	390	390
AHP107-CR	62	373	738	4.0	½" NPT	28	530	390	390
AHP187-CR	97	638	1293	2.2	9/16"-18UNF	28	530	390	390
AHP275-CR	155	931	1897	1.6	9/16"-18UNF	28	530	390	390
AHP425-CR	345	1448	2931	1.0	9/16"-18UNF	28	530	390	390

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/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	23.10	8.80	6.00	3.56	1.97	1.15	0.72	0.43
500	35	12.00	5.85	4.39	3.05	1.50	1.05	0.68	0.40
1000	69	*	4.72	3.80	2.51	1.28	1.00	0.65	0.38
1500	104	*	3.90	3.34	2.38	1.25	0.90	0.60	0.36
2000	138	*	3.00	3.00	2.25	1.21	0.78	0.55	0.34
2500	173	*	1.21	2.56	2.05	1.18	0.75	0.50	0.33
3000	207	*	*	1.95	1.85	1.16	0.73	0.48	0.31
4000	276	*	*	*	1.56	1.02	0.70	0.45	0.29
5000	345	*	*	*	1.02	0.95	0.67	0.42	0.26
7500	517	*	*	*	*	0.76	0.60	0.40	0.25
10000	690	*	*	*	*	0.44	0.52	0.37	0.24
15000	1034	*	*	*	*	*	0.39	0.33	0.21
20000	1379	*	*	*	*	*	*	0.30	0.20
25000	1724	*	*	*	*	*	*	0.21	0.16
30000	2069	*	*	*	*	*	*	*	0.13
40000	2760	*	*	*	*	*	*	*	0.05

* Pressure exceeds pump capacity

AHP2 - AIR DRIVEN HYDROTEST PUMPS - MEDIUM FLOW


AHP2-036

Output pressures up to 1634 Bar

Suitable for use with various fluids

150mm dual scale vibra pressure gauge

- Air consumption 56 scfm (1.59m³/minute)
- Infinitely variable output pressure and flow
- 7 litre reservoir capacity

The Hi-Force AHP2 series of air driven hydrostatic pressure testing pumps offer a choice of 5 models with output pressure capacities ranging from 17 Bar (246 PSI) to 1634 Bar (23700 PSI). All models are compact design and suitable for use with various fluids including water and are supplied with a 150mm diameter glycerine 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 (Bar) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm^3)	Outlet port thread	Weight kg	Dimensions in mm Length	Width	Height
AHP2-036	17.2	124.1	248.2	40.8	½" NPT	24	450	390	465
AHP2-060	31.0	199.9	413.7	24.6	½" NPT	24	450	390	465
AHP2-097	51.7	327.5	668.8	15.2	½" NPT	24	450	390	465
AHP2-144	75.8	489.5	992.8	10.2	½" NPT	24	450	390	465
AHP2-237	131.0	799.8	1634.1	6.1	9/16"-18UNF	24	450	390	465

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) AHP2-036	AHP2-060	AHP2-097	AHP2-144	AHP2-237
0	0	10.20	6.20	3.90	2.70	1.57
500	35	8.60	5.50	3.55	2.50	1.52
1000	69	7.25	4.80	3.19	2.35	1.47
1500	104	6.15	4.50	3.00	2.16	1.42
2000	138	5.40	4.20	2.87	2.15	1.38
3000	207	3.05	3.50	2.55	1.88	1.29
4000	276	*	2.75	2.28	1.75	1.22
5000	345	*	2.16	2.10	1.64	1.20
7500	517	*	*	1.45	1.35	1.10
10000	690	*	*	*	1.15	0.98
15000	1034	*	*	*	*	0.78
20000	1379	*	*	*	*	0.51
23700	1634	*	*	*	*	0.34

* Pressure exceeds pump capacity

AHP2-CR AIR DRIVEN HYDROTEST PUMPS - WITH CHART RECORDER

AHP2-237CR

Output pressures up to 1634 Bar

Suitable for use with various fluids

150mm dual scale vibra pressure gauge

- Air consumption 56 scfm (1.59m³/minute)
- Infinitely variable output pressure and flow
- 7 litre 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 offer a choice of 5 models with output pressure capacities ranging from 17 Bar (246 PSI) to 1634 Bar (23700 PSI) 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 150mm diameter glycerine 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.

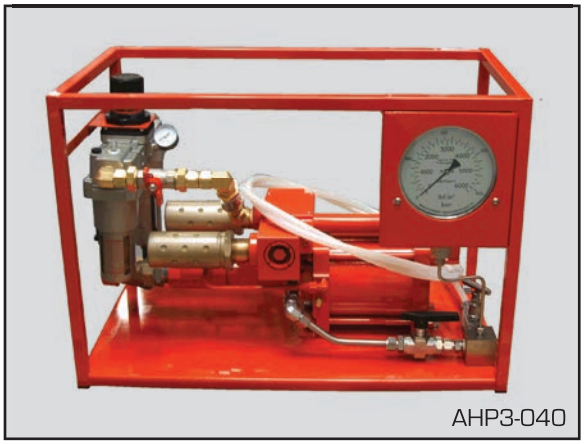
Model number	Max. output pressure (Bar) at airline input pressure 10 PSI 0.69 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm³)	Outlet port thread	Weight kg
AHP2-036CR	17.2	124.1	248.2	40.8	½" NPT	32
AHP2-060CR	31.0	199.9	413.7	24.6	½" NPT	32
AHP2-097CR	51.7	327.5	668.8	15.2	½" NPT	32
AHP2-144CR	75.8	489.5	992.8	10.2	½" NPT	32
AHP2-237CR	131.0	799.8	1634.1	6.1	9/16"-18UNF	32

Dimensions in mm Length	Width	Height
555	390	465
555	390	465
555	390	465
555	390	465
555	390	465

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) AHP2-036CR	AHP2-060CR	AHP2-097CR	AHP2-144CR	AHP2-237CR
0	0	10.20	6.20	3.90	2.70	1.57
500	35	8.60	5.50	3.55	2.50	1.52
1000	69	7.25	4.80	3.19	2.35	1.47
1500	104	6.15	4.50	3.00	2.16	1.42
2000	138	5.40	4.20	2.87	2.15	1.38
3000	207	3.05	3.50	2.55	1.88	1.29
4000	276	*	2.75	2.28	1.75	1.22
5000	345	*	2.16	2.10	1.64	1.20
7500	517	*	*	1.45	1.35	1.10
10000	690	*	*	*	1.15	0.98
15000	1034	*	*	*	*	0.78
20000	1379	*	*	*	*	0.51
23700	1634	*	*	*	*	0.34

* Pressure exceeds pump capacity

AHP3 - AIR DRIVEN HYDROTEST PUMPS - HIGH FLOW


AHP3-040

Output pressures up to 700 Bar

Suitable for use with various fluids

150mm dual scale vibra pressure gauge

- Air consumption 175 scfm (4.96 m^3/minute)
- Infinitely variable output pressure and flow
- Fluid inlet 1.1/4" BSPF

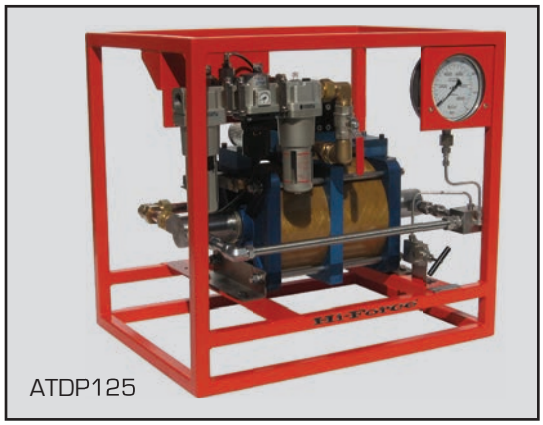
The Hi-Force AHP3 series of air driven hydrostatic pressure testing pumps offer a choice of 3 models with output pressure capacities ranging from 42 Bar (609 PSI) to 700 Bar (10000 PSI). All models are compact design and suitable for use with various fluids including water and are supplied with a 150mm diameter glycerine 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.

Model number	Max. output pressure (Bar) at airline input pressure 15 PSI 1.04 Bar	50 PSI 3.45 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm^3)	Outlet port thread	Weight kg	Dimensions in mm Length	Width	Height
AHP3-040	41.4	137.9	275.8	98.3	½" NPTF	40	715	390	490
AHP3-060	62.1	206.9	413.7	57.4	½" NPTF	40	715	390	490
AHP3-100	103.4	344.8	689.5	34.4	½" NPTF	40	715	390	490

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) AHP3-040	AHP3-060	AHP3-100
0	0	18.35	15.63	11.96
500	34.5	14.42	12.85	10.49
1000	68.9	10.81	10.51	8.69
1500	103.4	7.21	8.57	7.05
2000	137.9	5.90	6.97	5.65
2500	172.4	4.26	5.66	4.83
3000	206.8	2.62	4.60	4.18
3500	241.3	1.31	3.74	3.85
4000	275.8	0	3.02	3.52
4500	310.3	*	2.40	3.03
5000	344.8	*	1.84	2.79
5500	379.2	*	1.27	2.62
6000	413.7	*	0.65	2.46
6500	448.2	*	*	1.88
7000	482.6	*	*	1.39
7500	517.1	*	*	1.15
8000	551.6	*	*	0.90
8500	586.1	*	*	0.66
9000	620.5	*	*	0.49
9500	655.0	*	*	0.33
10000	689.5	*	*	0.16

* Pressure exceeds pump capacity

ATDP - AIR DRIVEN TWIN DOUBLE ACTING HYDROTEST PUMPS


ATDP125

Output pressures up to 1489 Bar

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 offer a choice of 3 models with output pressure capacities ranging from 87 Bar (1260 PSI) to 1489 Bar (21600 PSI). 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 150mm diameter glycerine filled vibra-gauge (calibrated on request), 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 (6m^3 /minute)
- Suitable for use with various fluids including water
- 150mm dual scale glycerine 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

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Model number	Max. output pressure (Bar) at airline input pressure 20 PSI 1.38 Bar	60 PSI 4.14 Bar	100 PSI 6.9 Bar	Fluid volume displacement per stroke (cm^3)	Outlet port thread	Weight kg
ATDP63	87	260	434	275	½" NPT	96
ATDP125	172	517	862	140	½" NPT	96
ATDP216	298	894	1489	79	1⅛"-12UNF	96

Dimensions in mm Length	Width	Height
765	570	700
765	570	700
765	570	700

Hydraulic pressure PSI	Bar	Approximate rate of discharge (litres/min) at air input pressure 100 PSI (7 Bar) ATDP63	ATDP125	ATDP216
0	0	32.2	16.9	9.5
1000	69	25.7	14.0	8.8
2000	138	20.5	12.3	8.0
3000	207	16.2	10.6	7.4
4000	276	12.5	9.4	6.9
5000	345	8.0	8.3	6.4
6000	414	2.8	7.3	6.1
8000	552	*	4.8	5.5
10000	690	*	3.0	4.9
12000	828	*	0.4	4.3
16000	1103	*	*	3.2
20000	1379	*	*	1.6

* Pressure exceeds pump capacity

HYDROTEST PUMP ACCESSORIES AND APPLICATIONS

Pack of 100 spare charts, diameter 163mm, 4 hour time scale

Model No	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

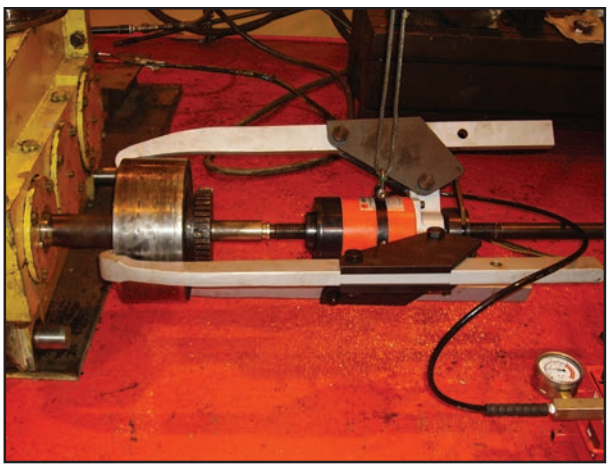
Model No	Colour	Description
AHP-PB	Black	Suitable for pressure reading on all Hi-Force AHP pumps with chart recorder

Did you know .....

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

H

PULLER KITS



SCP - SELF-CONTAINED HYDRAULIC PULLERS

- Capacities from 10 to 30 tonnes
- Sealed hydraulic system
- Operates in any position

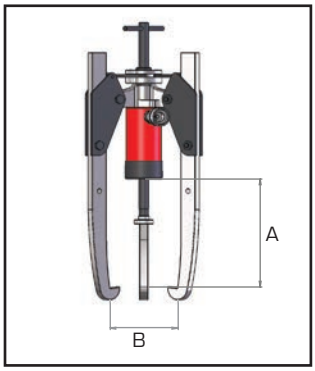
The SCP range of self-contained hydraulic pullers offers a choice of 3 models, each with integral manually operated hydraulic pump and multi-position operating handle. The completely sealed hydraulic system of the SCP pullers enables use of the tool in any position and all models are easy to operate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

Model number	Capacity tonnes	Type of puller	Hydraulic stroke mm	Piston Ext. mm	Weight kg
SCP103	10	3-way jaw	82	50	11.6
SCP203	20	3-way jaw	82	100	23.7
SCP303	30	3-way jaw	110	150	50.0

Dimensions in mm				
Reach	Dia min.	Dia max.	Tip depth	Tip height
195	30	310	22	6
275	50	430	29	10
405	100	610	38	36

ACP - AUTO-CENTRE HYDRAULIC PULLER KITS

- Capacities from 10 to 50 tonnes
- 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 10 to 50 tonnes. All models are supplied complete with a detachable hollow ram cylinder, manually operated pump, hydraulic hose and a 100mm 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 tonnes	Type of puller	Cylinder model no.	Pump model no.	Weight kg
ACP10	10	2 & 3 jaw	HHS102	HP110	24.5
ACP20	20	3 jaw	HHS202	HP110	44.0
ACP30	30	3 jaw	HHS302	HP110	76.5
ACP50	50	3 jaw	HHS603	HP227	181.0

Dimensions in mm		
A	B (min)	B (max)
296	50	350
320	70	480
407	90	580
727	120	920

PKS - HYDRAULIC 2 & 3 WAY PULLER KITS

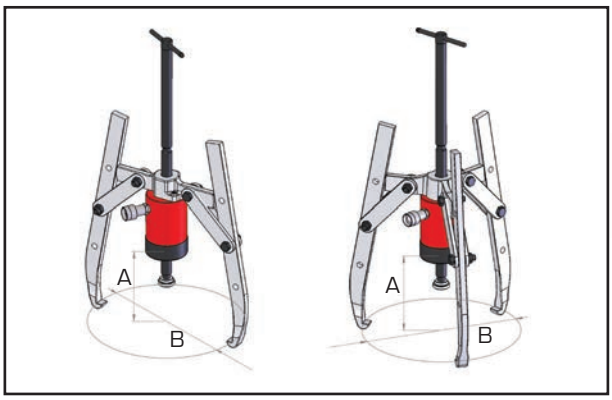
Capacities from 4.5 to 50 tonnes

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 tonnes. 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 700 Bar
- 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 tonnes	Type of puller	Cylinder model no.	Pump model no.	Weight kg	Dimensions in mm A	B (min)	B (max)
PKS5-2-3	4.5	2 & 3 jaw	HSS53	HP110	13.4	225	*	240
PKS10-2-3	10	2 & 3 jaw	HHS102	HP110	20.8	296	50	350
PKS20-2	20	2 jaw	HHS202	HP110	30.8	320	70	480
PKS20-3	20	3 jaw	HHS202	HP110	35.7	320	70	480
PKS30-2	30	2 jaw	HHS302	HP110	44.8	407	90	580
PKS30-3	30	3 jaw	HHS302	HP110	54.4	407	90	580
PKS50-2	50	2 jaw	HHS603	HP227	99.0	727	120	920
PKS50-3	50	3 jaw	HHS603	HP227	121.7	727	120	920
PK202	20	2 jaw beam	*	*	3.0	*	*	*
PK302	30	2 jaw beam	*	*	4.0	*	*	*
PK502	50	2 jaw beam	*	*	7.0	*	*	*

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

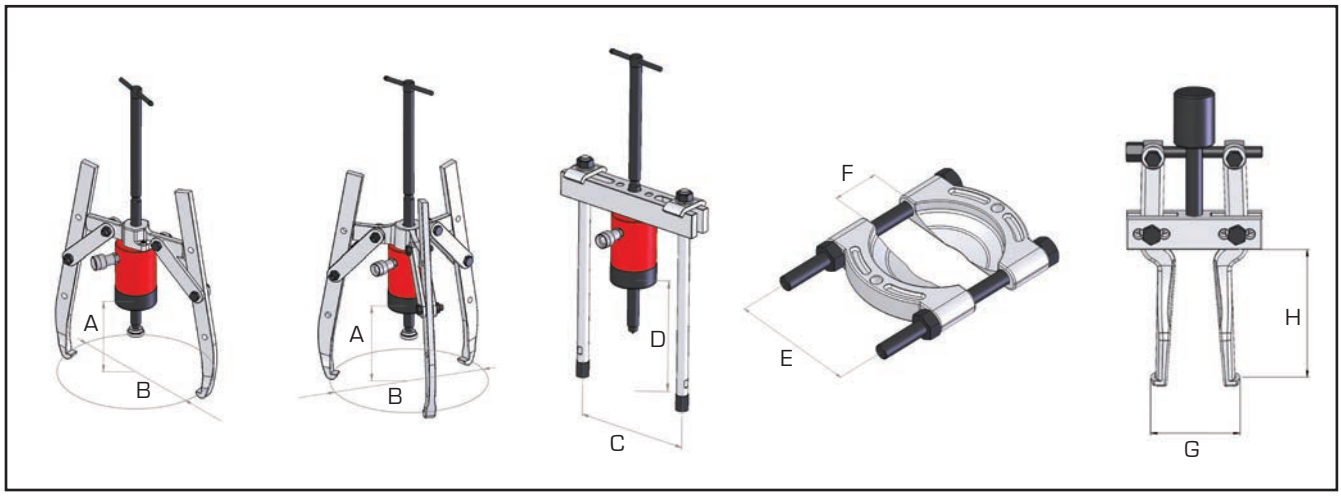
Capacities from 10 to 50 tonnes

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 50 tonnes, all supplied complete with a full set of versatile, detachable hydraulic components.

- Working pressure 700 Bar
- Complete hydraulic system supplied, including gauge
- High quality, drop-forged steel components
- Supplied complete with storage and transport box



Model number	Capacity tonnes	Cylinder model no.	Pump model no.	Weight kg
PKC10	10	HHS102	HP110	32.8
PKC20	20	HHS202	HP110	59.3
PKC30	30	HHS302	HP110	117.0
PKC50	50	HHS603	HP227	235.0

Dimensions in mm											
A	B min	B max	C min	C max	D	E	F min	F max	G min	G max	H
296	50	350	115	260	300	110	10	110	40	145	115
320	70	480	135	345	265	152	11	134	40	145	115
407	90	580	180	440	284	260	15	250	60	240	150
727	120	920	230	580	447	260	15	250	60	240	150

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

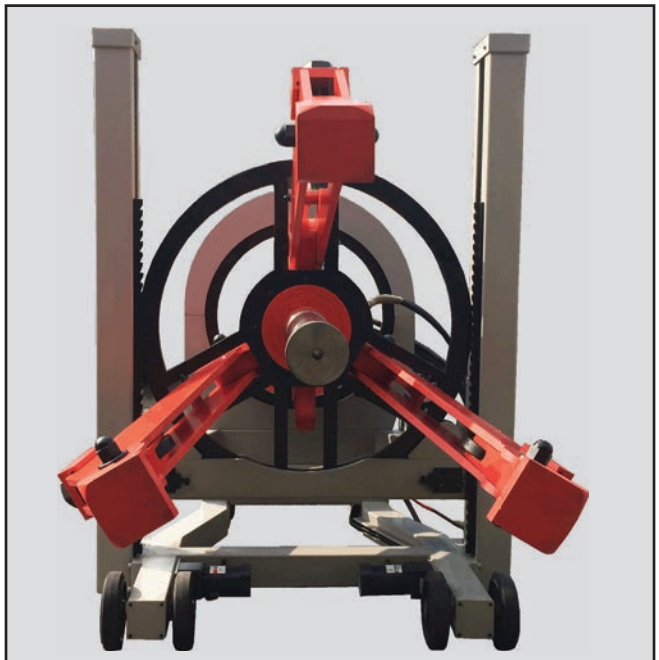
SPP - HEAVY DUTY HYDRAULIC PULLERS

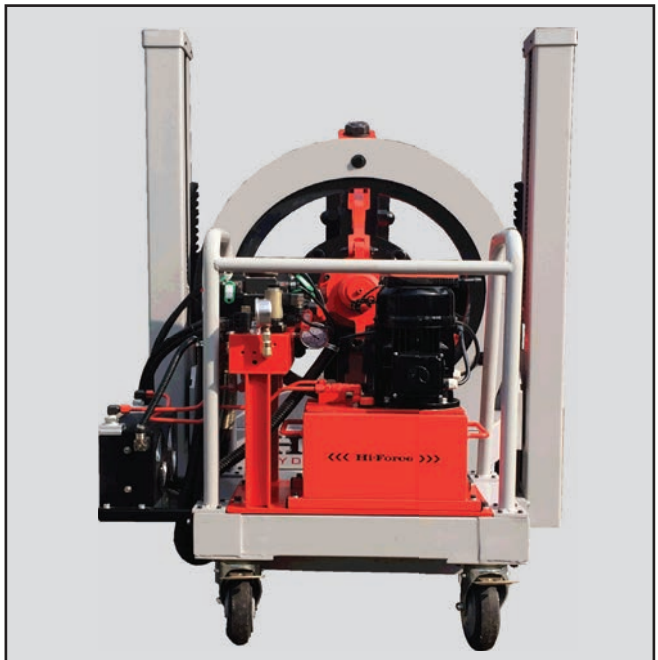
SPP22045

- Capacities from 75 to 220 tonnes
- 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 75 to 220 tonnes. 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

Self-centering jaw design

Spread up to 1220mm

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 tip angle
- Anti-slip mechanism in puller jaws
- Easy to manoeuvre with wheel locking feature

Model number	Capacity tonnes	Type of puller	Motor Voltage	Stroke mm	Weight kg
Puller with 50Hz motor					
SPP7515	75	2 & 3 jaw	110/115V	165	660
SPP7525	75	2 & 3 jaw	220/240V	165	660
SPP7545	75	2 & 3 jaw	380/440V	165	660
SPP12015	120	2 & 3 jaw	110/115V	170	888
SPP12025	120	2 & 3 jaw	220/240V	170	888
SPP12045	120	2 & 3 jaw	380/440V	170	888
SPP22015	220	2 & 3 jaw	110/115V	170	1300
SPP22025	220	2 & 3 jaw	220/240V	170	1300
SPP22045	220	2 & 3 jaw	380/440V	170	1300
Puller with 60Hz motor					
SPP7516	75	2 & 3 jaw	110/115V	165	660
SPP7526	75	2 & 3 jaw	220/240V	165	660
SPP7546	75	2 & 3 jaw	380/440V	165	660
SPP12016	120	2 & 3 jaw	110/115V	170	888
SPP12026	120	2 & 3 jaw	220/240V	170	888
SPP12046	120	2 & 3 jaw	380/440V	170	888
SPP22016	220	2 & 3 jaw	110/115V	170	1300
SPP22026	220	2 & 3 jaw	220/240V	170	1300
SPP22046	220	2 & 3 jaw	380/440V	170	1300

Model number	Reach in mm		Spread in mm		Dimensions in mm		
	min	max	min	max	Length	Width	Height
SPP75 (all models)	490	700	110	1220	2200	1200	1615
SPP120 (all models)	900	1100	150	1220	1900	1200	1600
SPP220 (all models)	900	1100	150	1220	2200	1450	1680

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 700 Bar pump within his tool store. All models offer a superb 18 tonnes of hydraulic power, when operated at the maximum working pressure of 700 Bar. This innovative product from Hi-Force is primarily targeted at commercial vehicle manufacturers and service centres, 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, aluminium 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 aluminium hand pump.

AHP1120

HP212

			Complete set comprising of							
Model number	Capacity tonnes	Stroke mm	Cylinder	Pump	Hose	Base plate	Threaded rods	Dolleys	Pull sleeves	Weight kg
HBR-1	18	51	HHA182	n/a	n/a	1	3	5	2	27
HBR-1H	18	51	HHA182	HP212	HC2	1	3	5	2	33
HBR-1A	18	51	HHA182	AHP1120	HC2	1	3	5	2	35

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 37 or 50 tonnes 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 700 Bar pump available within their tool store. All models operate at 700 Bar maximum working pressure and incorporate either a standard HHA372 37 tonne capacity or a HHA504 50 tonne capacity, lightweight, aluminium hydraulic cylinder. This innovative product from Hi-Force is targeted at manufacturers, service centres 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 aluminium hollow piston cylinder

Model number	Capacity tonnes	Stroke mm	Complete set comprising of Cylinder	Pump	Hose	Base plate	Threaded rods	Pull sleeves	Adaptors	Reducer sleeves	Weight kg
HPR-1	37	51	HHA372	n/a	n/a	1	1	2	2	1	38
HPR-1H	37	51	HHA372	HP212	HC2	1	1	2	2	1	44
HPR-1A	37	51	HHA372	AHP1120	HC2	1	1	2	2	1	46
HPR-2	50	104	HHA504	n/a	n/a	2	1	4	1	1	66
HPR-2H	50	104	HHA504	HP212	HC2	2	1	4	1	1	72
HPR-2A	50	104	HHA504	AHP1120	HC2	2	1	4	1	1	74

CRIMPERS AND CUTTERS

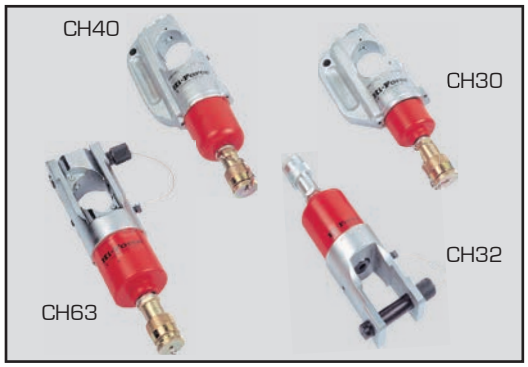
J

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 aluminium, 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 and 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 700 Bar maximum working pressure, supplied complete with all applicable die sets, compatible for use with the selected tool and include a convenient 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 700 Bar hydraulic pump unit, fitted with an inbuilt pump safety overload, pressure relief valve, 700 Bar pressure gauge and 700 Bar rated hydraulic hose assembly.

CH - CABLE CRIMPING HEADS



Choice of 7 models available

Supplied complete with die sets

Working pressure 700 Bar

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, 3 metre 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

HP227FPC manually operated foot pump unit complete with accessories, see page 35

Crimping tools complete with die set:

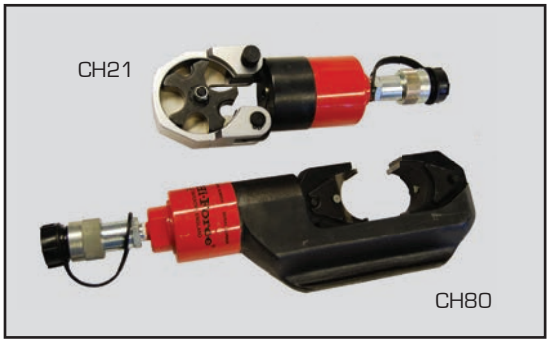
Model number	Output tonnes	C-Jaw opening	Applicable range DIN mm²	Standard dies mm²		Length mm	Weight kg
CH21	10	not applicable	16-240	With die Female die	(4pcs) 16-25, 35-70, 70-185, 240 (1pc) 25-35, 50-70, 95-120, 150-185, 240	210	3.0
CH30	12	30 mm	35-400	With die	35, 50, 70, 95, 120, 150, 185, 240, 300, 400	220	4.0
CH32	18	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	210	3.6
CH40	12	38 mm	35-400	With die	35, 50, 70, 95, 120, 150, 185, 240, 300, 400	245	4.8
CH63	18	not applicable	35-630	With die	35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630	240	4.8
CH80	15	50 mm	35-630	With die	35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630	300	7.0
CH1000N	60	not applicable	500-1000	With die	500, 630, 800, 1000	450	30.7

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

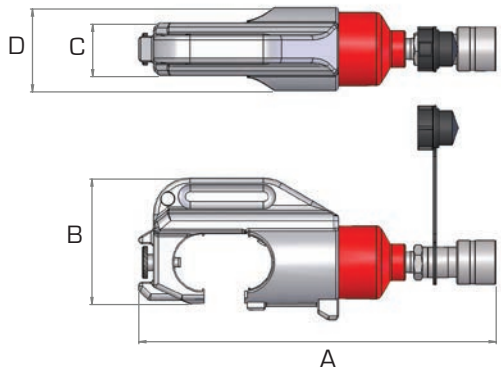


All fitted with standard quick connect coupler

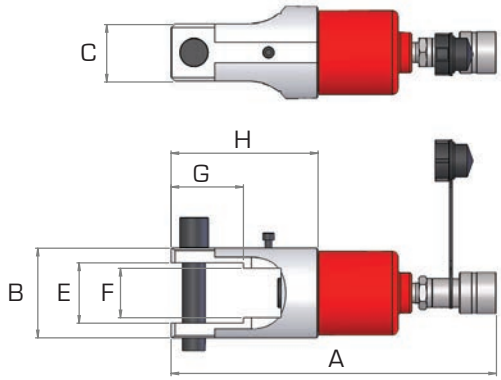
Choice of 'C' jaw or parallel guide design

Designed for easy access in confined spaces

CH30/CH40/CH80



CH32/CH63



Model Number	Dimensions in mm							
	A	B	C	D	E	F	G	H
CH21	278	88	28	-	-	-	-	-
CH30	294	105	43	68	-	-	-	-
CH32	284	78	50	-	53	43	63	96
CH40	326	113	43	74	-	-	-	-
CH63	319	78	50	-	49	-	163	-
CH80	370	106	63	-	-	-	-	-
CH1000N	395	210	90	-	82	-	235	-

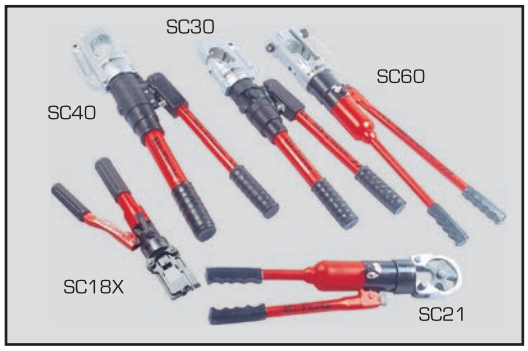
Note : CH21 and CH1000N dimensional drawings are not shown.

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.

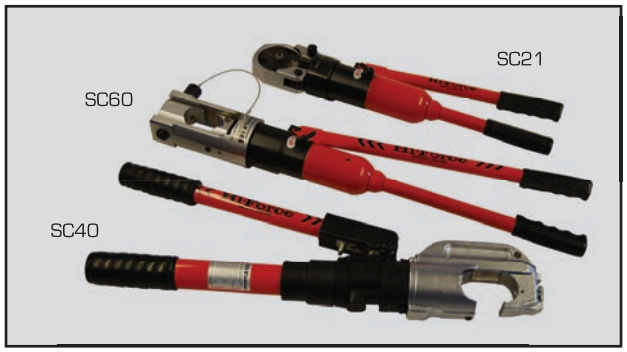
- Model SC21 is suitable for crimping connectors up to 240mm²
- Models SC30, SC32 & SC40 are suitable for crimping connectors up to 400mm²
- Model SC60 is suitable for crimping non-insulated terminals up to 630mm²
- Model SC18X is suitable for crimping non-insulated terminals up to 185mm²

J

Model number	Output tonnes	C - Jaw opening	Applicable range DIN mm²	Standard dies mm²	Length mm	Weight kg
SC21	10	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	528	5.2
SC30	12	30 mm	35-400	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400	610	6.3
SC32	18	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	650	6.2
SC40	12	38 mm	35-400	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400	636	7.7
SC60	18	not applicable	35-630	With die 35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630	650	6.5
SC18X	6	not applicable	10-185	With die 10-16, 25-35, 50-70, 95-120, 150, 185	370	2.0

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

SC - SELF-CONTAINED CABLE CRIMPING TOOLS

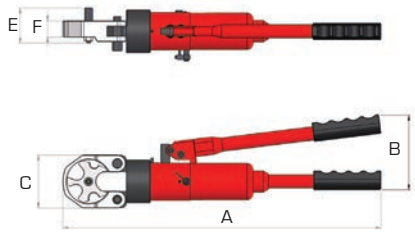


Supplied in convenient carrying & storage case

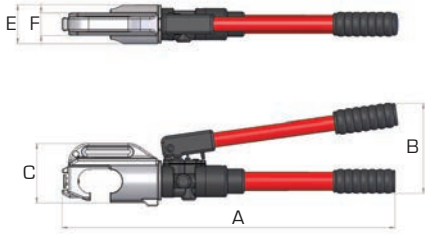
Easy to operate, self-contained design

Choice of open 'C' jaw or parallel guide design

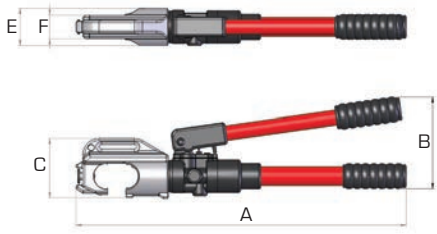
SC21



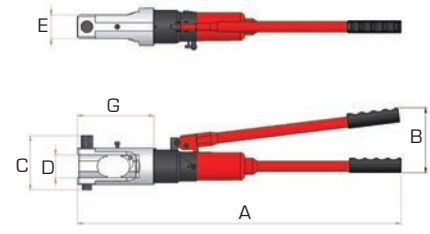
SC40



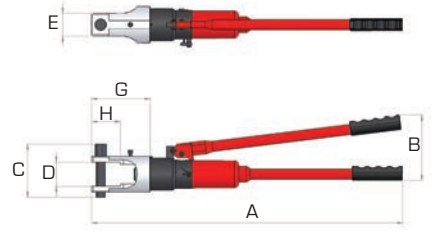
SC30



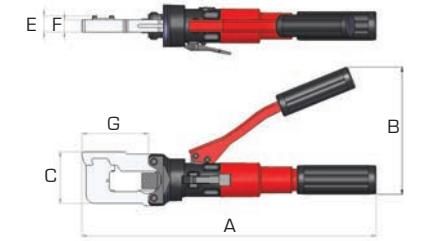
SC60



SC32



SC18X



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Model Number	Dimensions in mm A	B	C	D	E	F	G	H
SC21	520	122	86	-	57	27	-	-
SC30	602	166	116	-	68	43	-	-
SC32	680	137	116	52	50	-	128	63
SC40	630	166	113	-	74	48	-	-
SC60	690	140	116	52	50	-	163	-
SC18X	380	142	70	-	21	16	86	-

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

- 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 tonnes	C - Jaw opening	Applicable range DIN mm²	Standard dies mm²		Dimensions in mm A	B	C	Weight kg
BC18X	7	not applicable	10-185	With die	10-16, 25-35, 50-70, 95-120, 150, 185	370	280	70	3.8
BC30	12	30 mm	35-400	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400	400	280	70	5.9
BC40	12	38 mm	35-400	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400	430	270	70	7.2
BC63	18	not applicable	35-630	With die	35, 50, 70, 95, 120, 150, 185 240, 300, 400, 500, 630	420	320	75	6.9

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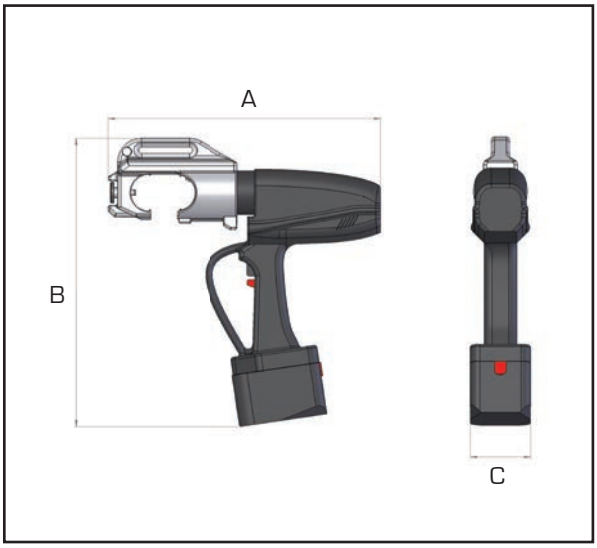
OPTIONAL DIE SETS

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, BC40 & BC63
CD16	Die set 16mm², suitable for crimping tool BC30, BC40 & BC63
CD25	Die set 25mm², suitable for crimping tool BC30, BC40 & BC63



BC - ACCESSORIES

BP12

Model Number	Description
BP12	Battery Pack 14.4V

Note: Charger supplied separately

CCU144

Model Number	Description
CCU144	14.4V Car cigarette lighter charger unit

CU12

Model Number	Description
CU12	Charger 110V - 230V

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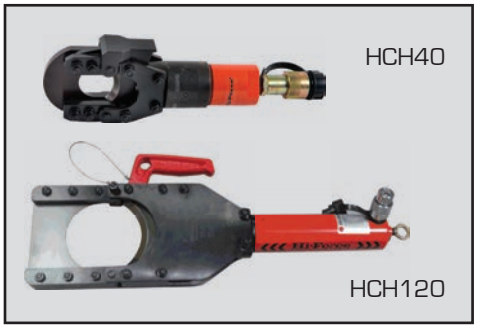
MP220

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

HCH - HYDRAULIC CUTTER HEADS

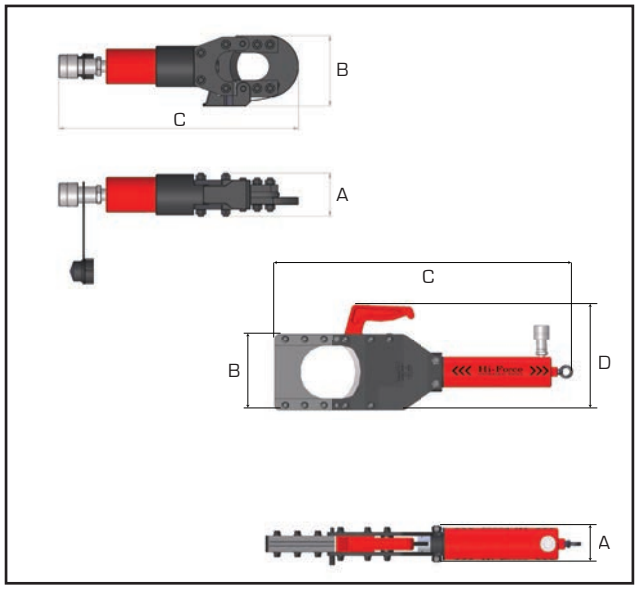


Cutting capacity up to 120mm diameter

Working pressure 700 Bar

Compact and lightweight

The HCH cutter head range cuts a wide range of materials and offers 2 models with similar features to the CT range of self-contained cutters. A comprehensive range of suitable manually operated and powered hydraulic pumps suitable for use with Hi-Force HCH cutters is detailed on pages 29 to 50.



Model number	Cutting force tonnes	Weight kg	Dimensions in mm A	B	C	D
HCH40	7	2.8	60	101	330	-
HCH120	13	15.0	80	178	702	248

Material	Description	Maximum diameter cutting capacity in mm HCH40	HCH120
Steel Wire Rope	6x7 Hempcore	20	30
	6x12 Hempcore	25	36
	6x19 Hempcore	25	36
Round Bar	Soft copper bar	25	40
	Soft aluminium bar	22	40
	Soft steel bar	16	-
Wire Strands	Bare copper strands	32	50
	Bare aluminium strands	32	50
Cable	Telephone cable CCP	40	120
	Lead sheathed telephone cable	40	120
	Armoured underground cable	40	120

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 catalogue.

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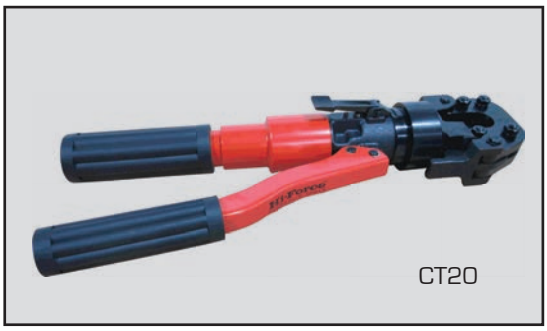
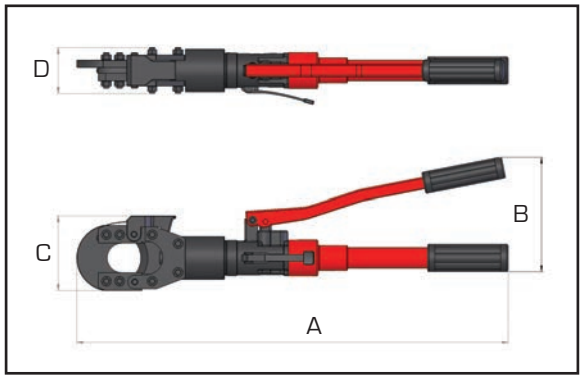
CT - SELF-CONTAINED HYDRAULIC CUTTERS



- Cutting capacity up to 40mm 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 25mm steel wire rope and 40mm cable. These versatile cutters are suitable for cutting wire rope, round bar, wire strands and electrical cable.



Model number	Cutting force tonnes	Weight kg	Dimensions in mm A	B	C	D
CT20	6	2.8	390	145	76	40
CT40	7	6.0	560	155	103	65

Material	Description	Maximum diameter cutting capacity in mm CT20	CT40
Steel Wire Rope	6x7 Hempcore	16	20
	6x12 Hempcore	20	25
	6x19 Hempcore	20	25
Round Bar	Soft copper bar	20	25
	Soft aluminium bar	20	22
	Soft steel bar	16	16
Wire Strands	Bare copper strands	20	32
	Bare aluminium strands	20	32
Cable	Telephone cable CCP	20	40
	Lead sheathed telephone cable	20	40
	Armoured underground cable	20	40

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.

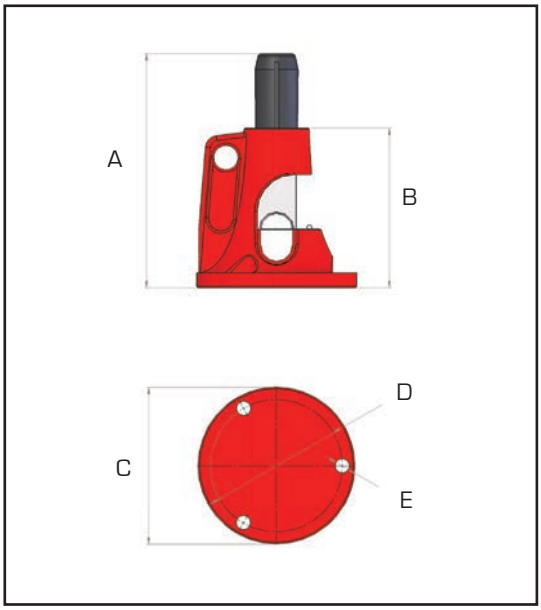
For more information, visit our website www.hi-force.com or contact your regional Hi-Force office.

HWC - HAMMER BLOW WIRE ROPE AND CABLE CUTTERS

HWC92 HWC91 HWC90

- Highly cost efficient impact design
- Cutting capacity up to 38mm 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 mm	Electric cable mcm*	mm²	Weight kg
HWC90	19	250	127	3.2
HWC91	27	300	152	7.0
HWC92	38	750	380	13.0

*mcm = 1,000 circular mils

Dimensions in mm A	B	C	D	E
225	140	88	N/A	N/A
245	154	160	148	14
285	195	195	164	18

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

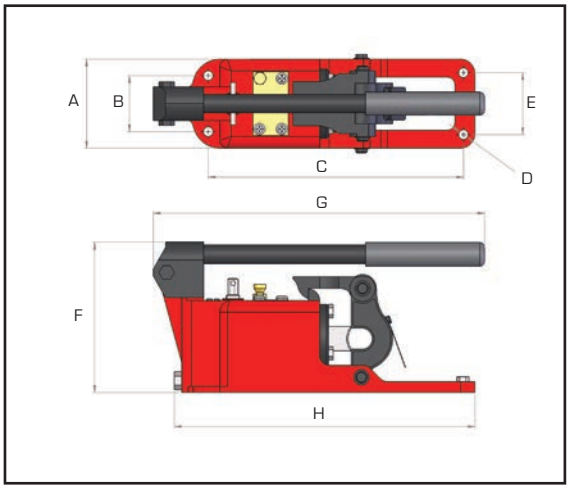
HSWC - SELF-CONTAINED HYDRAULIC WIRE ROPE CUTTERS

HSWC44

- Cutting capacities up to 44mm 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 44mm 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 mm Ø	Weight kg
HSWC19	19	9.5
HSWC28	28	15.5
HSWC44	44	30.0

Dimensions in mm							
A	B	C	D	E	F	G	H
93	58	265	10.2	64	154	345	315
105	64	294	10.2	67	174	374	357
125	70	393	10.2	84	203	490	460

Replacement blades for HSWC self-contained wire rope cutters :

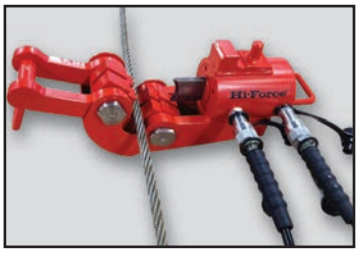
Blade Part number	For Cutter
HSWC19-4	HSWC19
HSWC28-4	HSWC28
HSWC44-4	HSWC44

HWRC - DOUBLE ACTING WIRE ROPE CUTTERS

- Working pressure 700 Bar
- 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 114mm diameter wire rope and up to 40mm diameter 28 tonnes tensile solid steel bar. All models incorporate a double acting hydraulic cylinder, suitable for working pressures up to 700 Bar 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 tonnes	Cutting capacity in mm: Wire rope mm Ø	Cutting capacity in mm: Cable	Cutting capacity in mm: Reinforcing Bar	Oil capacity cm^3	Weight kg	Dimensions in mm: Length	Dimensions in mm: Width	Dimensions in mm: Height
HWRC1115	36	38	38	20	350	30	400	155	270
HWRC1125	80	63	63	32	900	60	450	200	390
HWRC1136	80	90	90	32	1200	70	515	200	390
HWRC1145	120	114	114	40	2400	95	570	280	445

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 700 Bar
- 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 50mm diameter. All models are suitable for working pressures up to 700 Bar 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 mm Ø	Cutting force tonnes	Max. allowed chain grade	steel hardness	Oil capacity cm^3	Weight kg	Dimensions in mm Length	Width	Height
HCC26-100	26	70	100	47 HRC	276	23	440	180	180
HCC34-100	34	100	100	47 HRC	492	40	410	460	250
HCC46-100	46	140	100	47 HRC	980	72	565	635	345
HCC50-100	50	145	100	47 HRC	1100	77	565	635	360

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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.

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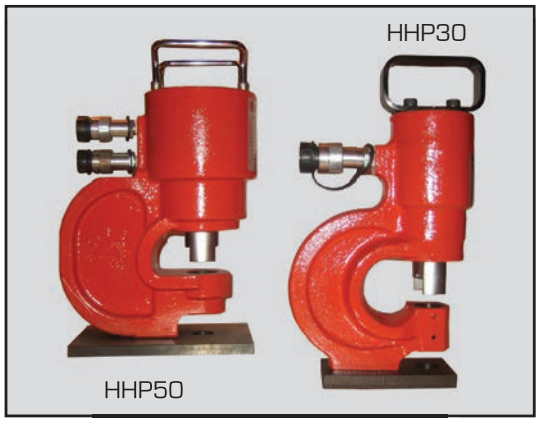
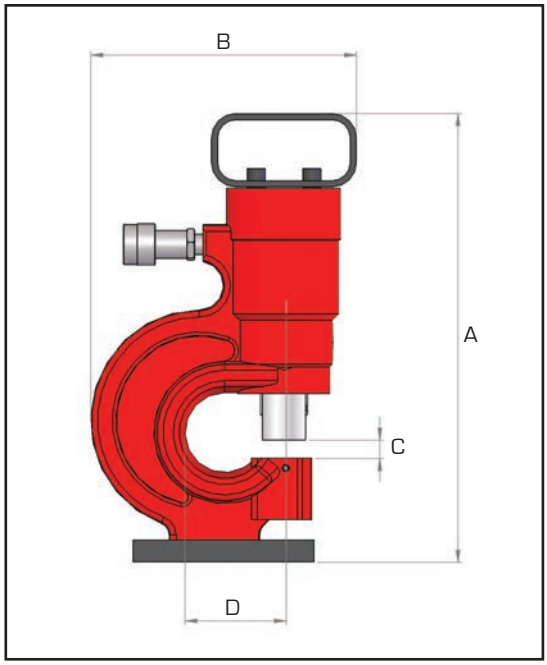
HHP - HOLE PUNCHERS



- Punching force up to 50 tonnes
- Throat depth 70mm
- Working pressure 700 Bar

The Hi-Force HHP series hydraulic hole puncher range offers a choice of two models comprising of the HHP30, 30 tonnes capacity single acting version, and the HHP50, 50 tonnes 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 tonnes	Throat depth mm	Punch capacity (mm) Steel plate	Punch capacity (mm) Hole punch diameter	Standard punch/die sets included mm	Recommended pump & hose Manually operated	Recommended pump & hose Pneumatically operated	Weight excl. pump kg
HHP30	30	70	10.0	up to 20.5	10.5, 13.5 17.5, 20.5	HP232 complete with HC3 3m hose	AHP1120 complete with HC3 3m hose	13
HHP50	50	70	15.0	up to 25.5	10.5, 13.5 17.5, 20.5, 25.5	HP232D c/w 2 x HC3	AHP1141 c/w 2 x HC3	42

Note: pump supplied separately

Model number	Dimensions in mm A	B	C	D
HHP30	370.0	220	13	78.0
HHP50	413.5	281	15	70.6

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

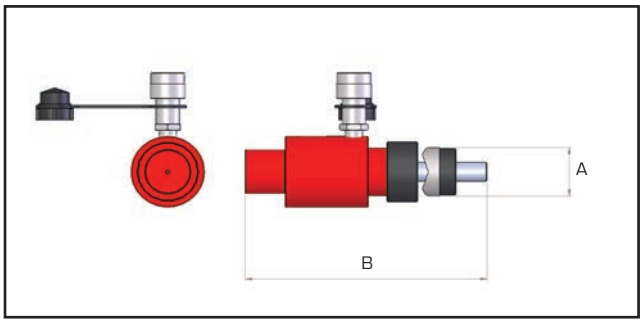
HKP & SKP - KNOCK OUT PUNCHERS


HKP10-4

- Capacity up to 10 tonnes
- Spring return hydraulic cylinder
- Working pressure 700 Bar

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 tonnes	Plate capacity (mm) Stainless steel	Mild steel	Pump Included	Hose Included	Complete set weight kg
HKP10-2	10	1.6	3.2	HP110	HC2	14.6
HKP10-4	10	1.6	3.2	HP110	HC2	26.1
HKP10-2H	10	1.6	3.2	Not included	Not included	7.0
HKP10-4H	10	1.6	3.2	Not included	Not included	18.5
SKP7	7	1.6	3.2	Self contained unit with integral pump		10.0



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	21.8	27.6	34.1	42.7	48.7	60.5				
	Conduit Size	½"	¾"	1"	1¼"	1½"	2"				
	Length B	306	240	240	240	240	240				
HKP10-4	Std.punch/die A	21.8	27.6	34.1	42.7	48.7	60.5	76.1	88.9	102.8	115.5
	Conduit Size	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"
	Length B	306	240	240	240	240	240	253	253	253	253
SKP7	Std.punch/die A	21.8	27.6	34.1	42.7	48.7	60.5				
	Conduit Size	½"	¾"	1"	1¼"	1½"	2"				
	Length B	306	240	240	240	240	240				

NS - NUT SPLITTERS


NS104

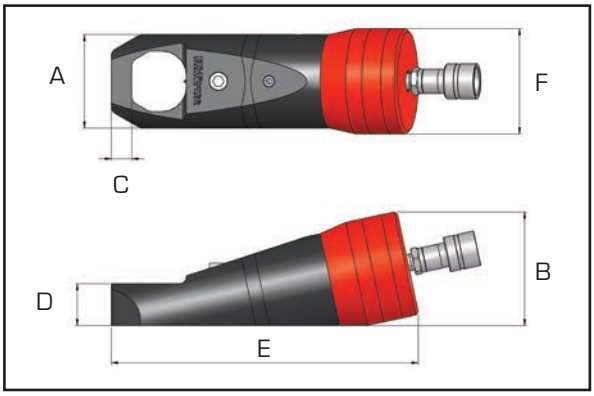
Capacities from 17 to 75mm AF

Working pressure 700 Bar

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 17 to 75mm (M10 to M48 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 mm	Hexagon AF sizes inch	Bolt sizes metric	Bolt sizes imperial	Weight kg
NS104	17 - 32	11/16" - 1 1/4"	M10 - M22	1/2" - 3/4"	4.0
NS110	32 - 41	1 1/4" - 1 5/8"	M22 - M27	3/4" - 1"	7.4
NS200	41 - 50	1 5/8" - 2"	M27 - M33	1" - 1 1/4"	10.6
NS206	50 - 60	2" - 2 3/8"	M33 - M39	1 1/4" - 1 1/2"	15.8
NS215	60 - 75	2 3/8" - 2 15/16"	M39 - M48	1 1/2" - 1 7/8"	39.3

Dimensions in mm					
A	B	C	D	E	F
64	77	12.5	30.0	210	67
78	96	20.0	37.0	268	88
96	116	21.0	43.0	315	108
115	138	24.0	52.0	336	126
156	175	27.0	75.0	426	162

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

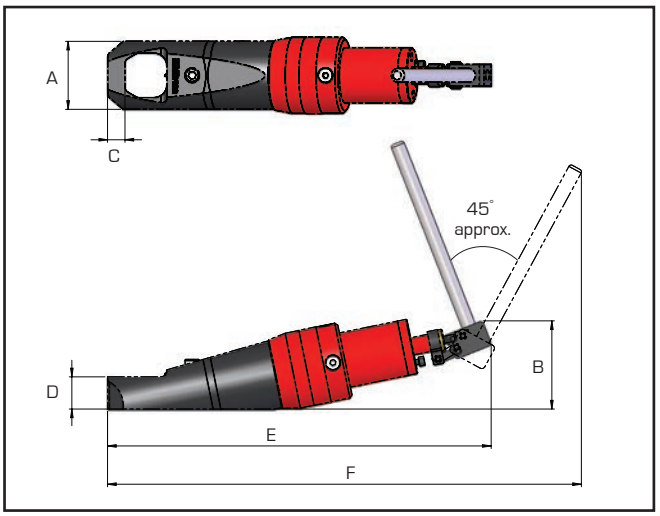
Capacities from 17 to 50mm AF

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 17 to 50mm (M10 to M33 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 mm	Hexagon AF sizes inch	Bolt sizes metric	Bolt sizes imperial	Weight kg
HMNS104	17 - 32	11/16" - 1 1/4"	M10 - M22	1/2" - 3/4"	5.8
HMNS110	32 - 41	1 1/4" - 1 5/8"	M22 - M27	3/4" - 1"	7.9
HMNS200	41 - 50	1 5/8" - 2"	M27 - M33	1" - 1 1/4"	13.6

Dimensions in mm					
A	B	C	D	E	F
64	88	12.5	30.0	380	455
78	101	20.0	37.0	440	540
94	112	21.0	43.0	471	566

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 :

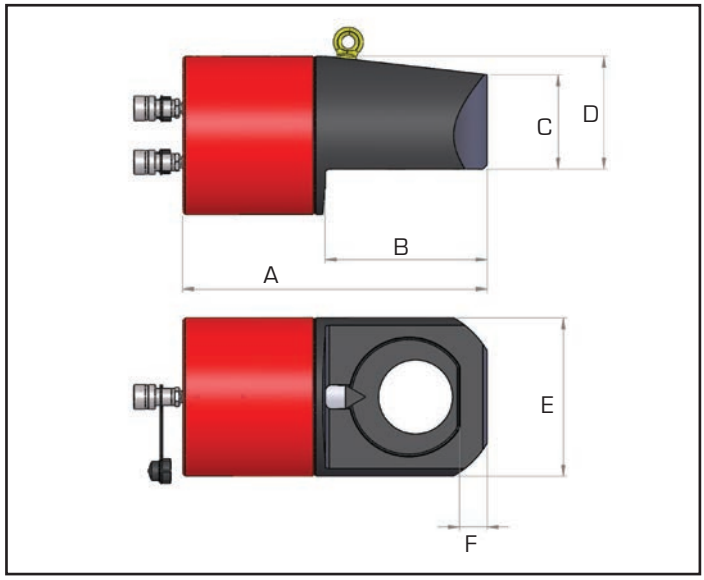
Blade Part number	For Nut splitter
NS104-B	HMNS104
NS110-B	HMNS110
NS200-B	HMNS200

DNS - DOUBLE ACTING NUT SPLITTERS

DNS506

- Choice of 2 models
- Working pressure 700 Bar
- 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 700 Bar 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.



Model number	Hexagon AF sizes mm	Hexagon AF sizes inch	Stud bolt thread sizes metric	Stud bolt thread sizes imperial	Weight kg	Dimensions in mm A	B	C	D	E	F
DNS404	75 - 105	2 15/16" - 4 1/4"	M48 - M72	1 7/8" - 2 3/4"	50	379.5	192	99.5	130.5	183	34
DNS506	105 - 136	4 1/4" - 5 3/8"	M72 - M95	2 3/4" - 3 1/2"	96	451.0	240	140.0	167.5	235	41

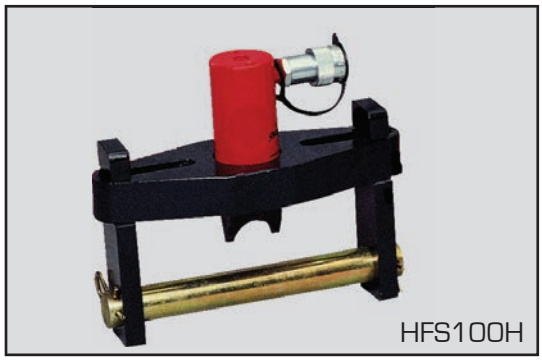
Note : The DNS nut splitters are for use on heavy duty nuts, where the nut height is equal to or greater than two-thirds of the blade length of the tool being used.

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 4.5 to 10 tonnes

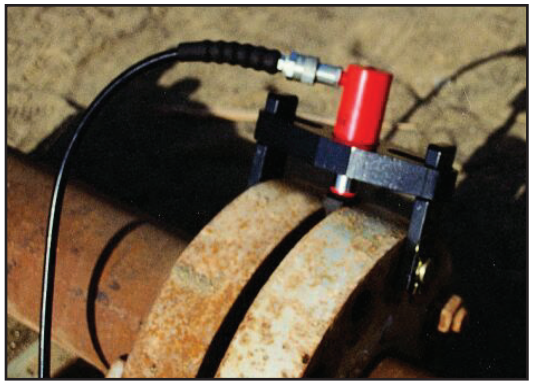
Working pressure 700 Bar

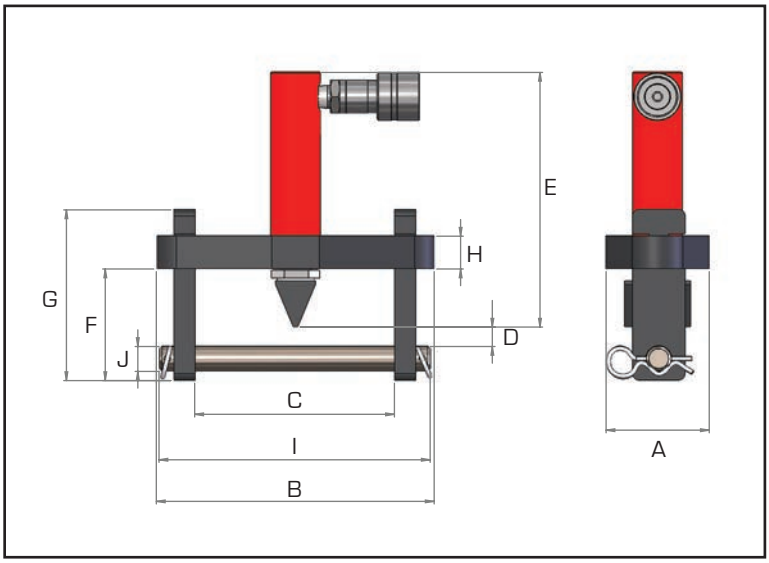
Quick and easy to assemble on flange

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 - 4.5 tonnes and 0 - 10 tonnes, these models offer the user the capability of opening flanges up to 2 x 57mm or 2 x 92mm 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 1⅝" (41 mm)

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

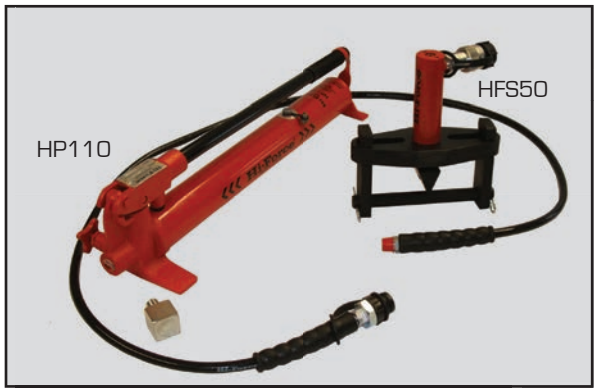




Model number	Capacity tonnes	Stroke mm	Oil capacity cm^3	Max. flange thickness mm	Stud size mm	Standard wedge mm	Weight kg
HFS50H	4.5	75	48	2 x 57	19 - 29	3 - 29	5.0
HFS100H	10	56	81	2 x 92	32 - 41	3 - 29	11.6

	Dimensions in mm										
Model number	A	B	C min	C max	D	E	F	G	H	I	J
HFS50H	76	210	61	155	10	192	69	129	25	206	18
HFS100H	108	290	61	224	30	165	89	178	38	273	31

HFS & HFS-TK - HYDRAULIC FLANGE SPREADER KITS



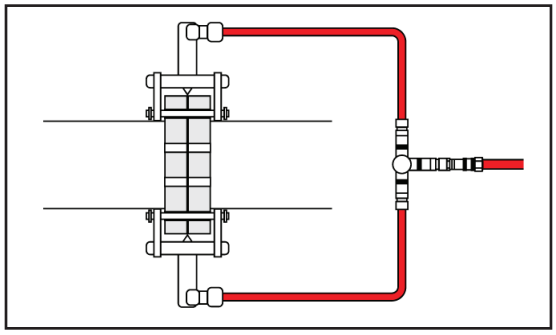
Capacities from 4.5 to 10 tonnes per spreader

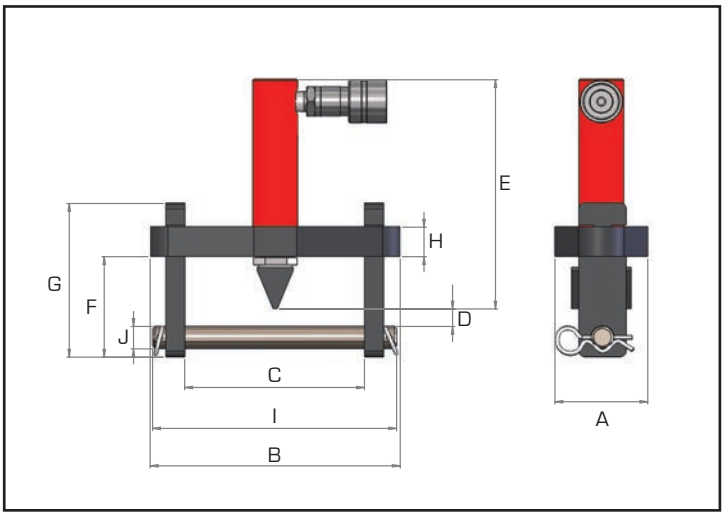
Working pressure 700 Bar

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 catalogue.

- Supplied complete with manually operated pump and hose assembly
- Suitable for fitment onto flanges with a maximum stud bolt size of 1⅝" (41 mm)





K

Specifications :

Model number	Capacity tonnes	Stroke mm	Oil capacity cm^3	Max. flange thickness mm	Stud size mm	Standard wedge mm	Weight kg
HFS50	4.5	75	48	2 x 57	19 - 29	3 - 29	22.5
HFS100	10	56	81	2 x 92	32 - 41	3 - 29	29.1
HFS50-TK	2 x 4.5	75	2 x 48	2 x 57	19 - 29	3 - 29	27.5
HFS100-TK	2 x 10	56	2 x 81	2 x 92	32 - 41	3 - 29	35.7

Dimensions in mm :

Model number	A	B	C min	C max	D	E	F	G	H	I	J
HFS-50	76	210	61	155	10	192	69	129	25	206	18
HFS-100	108	290	61	224	30	165	89	178	38	273	31
HFS50-TK	76	210	61	155	10	192	69	129	25	206	18
HFS100-TK	108	290	61	224	30	165	89	178	38	273	31

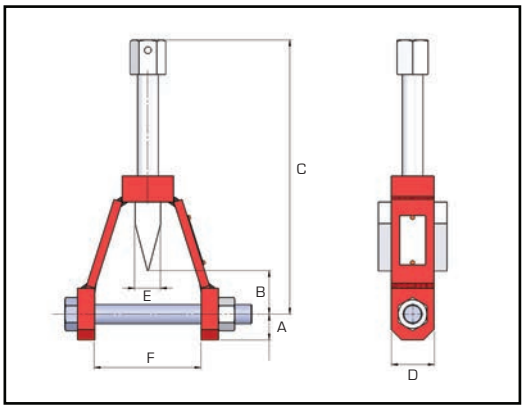
MFS - MECHANICAL FLANGE SPREADERS

Suitable for bolt diameters up to 31mm

Maximum spread 231mm

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

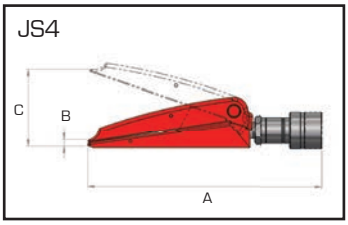
Model number	Pin diameter mm	Pin diameter inch	Min flange bolt hole diameter	Maximum flange thickness mm	Maximum flange thickness inch	Weight kg	Dimensions in mm A	B max.	C min.	C max.	D	E	F
MFS16	16	5/8"	17	2 x 22	2 x 7/8"	2.2	25	28	185	232	40	25	70
MFS19	19	3/4"	20	2 x 35	2 x 1 3/8"	2.7	30	50	185	254	50	25	95
MFS22	22	7/8"	23	2 x 47	2 x 1 13/16"	4.1	30	50	247	318	50	30	124
MFS25	25	1"	26	2 x 62	2 x 2 7/16"	6.4	30	85	247	353	50	30	155
MFS28	28	1 1/8"	29	2 x 70	2 x 2 3/4"	8.2	30	80	275	382	60	40	181
MFS31	31	1 1/4"	32	2 x 95	2 x 3 3/4"	9.6	32	84	275	385	60	40	231

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 13mm and offers a maximum spread of 84mm. Manufactured from high strength steel, with a maximum pressure of 700 Bar, 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 tonnes	Oil capacity cm^3	Weight kg
JS4	0.9	10.0	2.2

Dimensions in mm A	B	C
234	13	84



SJS - STEPPED JAW SPREADERS

SJS10-TK

Capacity 13 tonnes per spreader unit

Supplied with safety block & stepped blocks

Maximum spread 60mm

- 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 13 tonnes of spreading capacity. Manufactured from high strength steel, the low height jaw tips can easily fit within an 8mm gap and can provide a total spreading distance of 60mm in 5 operations, using the step blocks provided with the tool. Suitable for operation up to 700 Bar 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 aluminium 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.

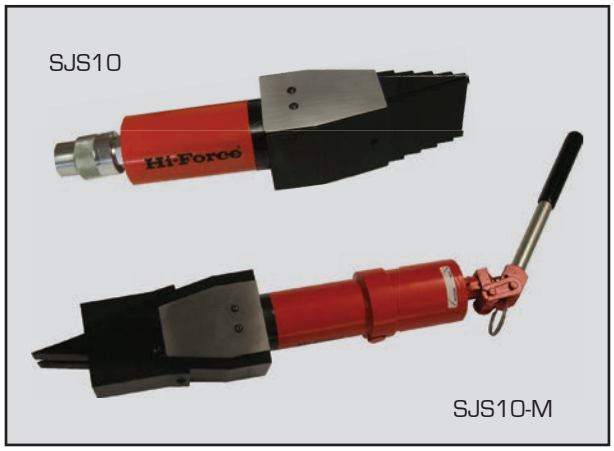
Single spreaders:

Model number	Capacity tonnes	Stroke mm	Min. height mm	Max. spread mm	Oil capacity cm^3	Weight kg
SJS10	13	50	8	60	74	5.5
SJS10-M	13	50	8	60	74	7.5

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 kg
SJS10-TK	SJS10	HP212	HC3C	HM2C	HG63G	AGA1-25	MSB4	34.5

SJS - STEPPED JAW SPREADERS



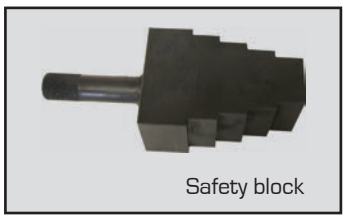
Capacity 13 tonnes per spreader unit

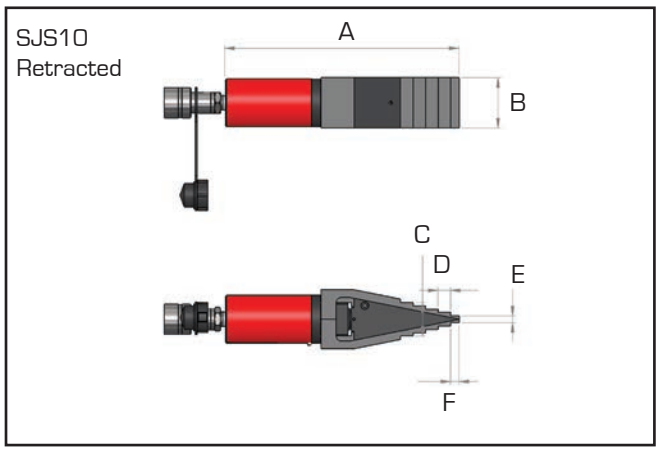
Supplied with safety block & stepped blocks

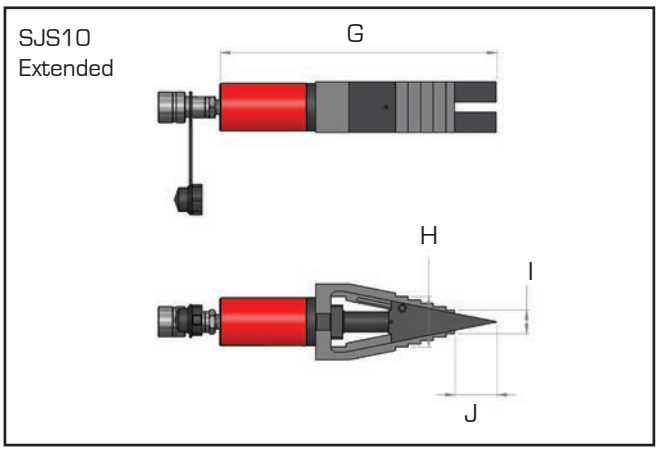
Maximum spread 60mm

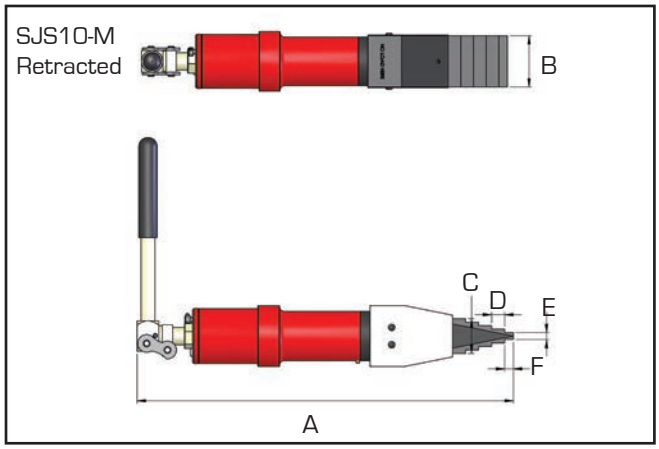
- Single acting, spring assisted return
- Compact & lightweight design

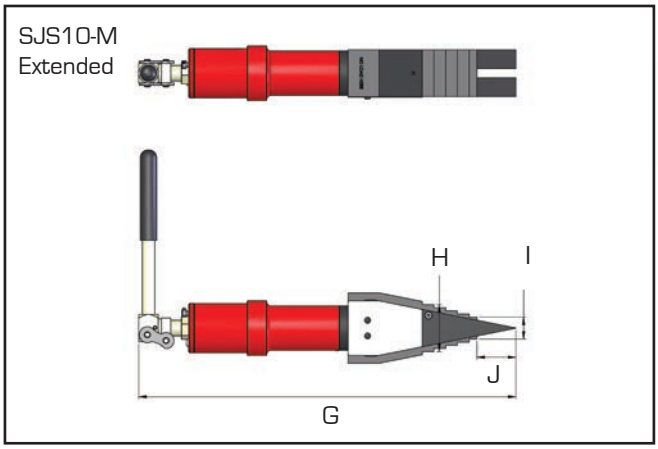
All SJS10 & SJS10-M hydraulic spreaders are supplied complete with two stepped blocks (for increased spreading capacity) and one stepped safety block. The SJS10-TK comes complete with a double set of stepped and safety blocks. Suitable manual pumps and accessories for use with SJS10 can be found on pages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











Model number	Capacity tonnes	Dimensions in mm									
		A	B	C	D	E	F	G	H	I	J
SJS10	13	279	60	40	15	8	10	328	60	28	49
SJS10-M	13	433	60	40	15	8	10	483	60	28	49

K

PB - HYDRAULIC PIPE BENDER

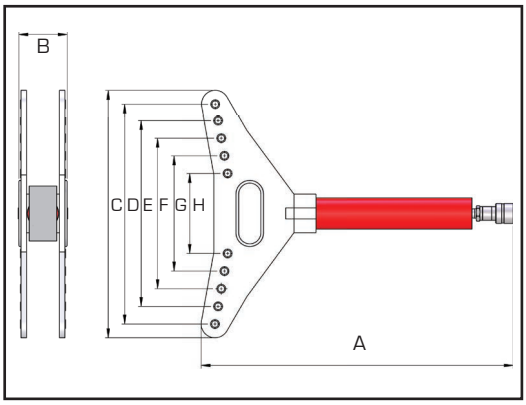
- Working pressure 700 Bar
- Bends up to 90 degrees
- For use with hydraulic pumps

The Hi-Force PB10B hydraulic pipe bender is designed to bend various sizes and thicknesses of JIS standardised conduit pipes ranging from 16mm to 82mm (½" to 3"). Made of aluminium, 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 700 Bar. For a range of suitable Hi-Force pumps see pages 29-50 of this catalogue.

Model number	Max capacity tonnes	Stroke mm	Oil capacity litres	Weight kg	Applicable range / included bending shoes
PB10B	10	250	0.4	62.5	Thick steel conduit from 16mm (½") to 82mm (3")

Note: Weight for PB10B includes metal storage box

Dimensions in mm							
A	B	C	D	E	F	G	H
720	147	755	695	595	495	395	295

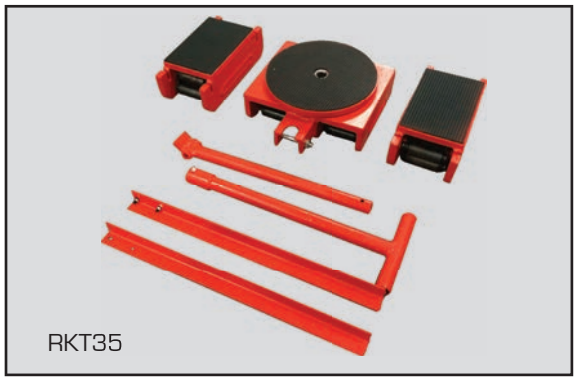


BENDING SHOES

A range of bending shoes, compatible with the pipe bender PB10B are available as an optional extra to ensure a smooth, wrinkle free bend.

	For thick conduit from 16mm (½") to 82mm (3")			
Model number	Pipe size (inch)	Pipe outer dia (mm)	Pipe inner dia (mm)	Bending radius (mm)
BS-B16	½"	21.0	16.4	75
BS-B22	¾"	26.5	21.9	90
BS-B28	1"	33.3	28.3	130
BS-B36	1 ¼"	41.9	36.9	195
BS-B42	1 ½"	47.8	42.8	230
BS-B54	2"	59.6	54.0	270
BS-B70	2 ½"	75.2	69.6	450
BS-B82	3"	87.9	82.3	500

RKT - ROLLER SKATE KIT - TRICYCLE

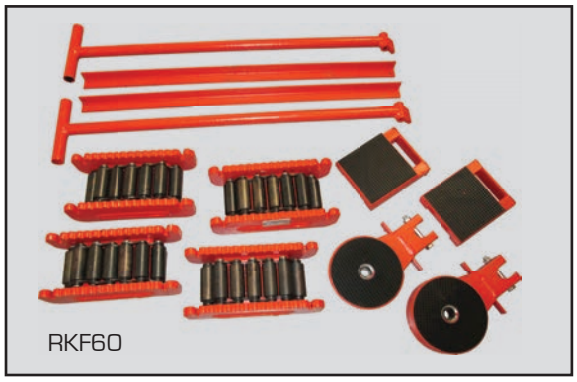

RKT35

- Capacity 35 tonnes
- 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 tonnes	Twin rollers ø mm	Single rollers ø mm	Height mm	Turntable ø mm	Handle length mm	Metal box (LxWxH mm)	Weight kg
RKT35	35	30	24	110	250	880	610x310x165	68

RKF - ROLLER SKATE KITS - QUAD


RKF60

- Capacities from 20 to 60 tonnes
- Minimum turning circle 3 metres
- 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 60 tonnes 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 tonnes	Skates Qty: 4	Turntables Qty: 2	Levelling Plates Qty: 2	Link bars Qty: 2	Handles Qty: 2	Weight kg
RKF20	20	**RSN10**	**RTT10**	**RLP10**	**RLB00**	**RPH00**	48
RKF30	30	**RSN15**	**RTT15**	**RLP15**	**RLB00**	**RPH00**	56
RKF60	60	**RSN30**	**RTT30**	**RLP30**	**RLB00**	**RPH00**	90

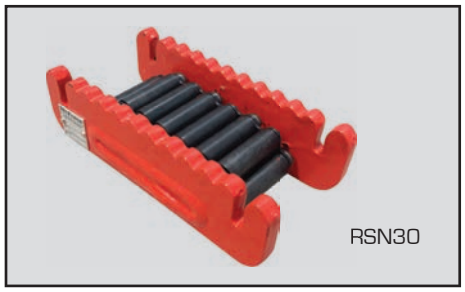
Note: Each set carrying capacity is calculated taking into consideration that two roller skates are sufficient to support the full load.

Dimensions:

Model number	Rollers ø mm	Total height mm	Turntable ø mm	Handle length mm
RKF20	18	108	130	880
RKF30	24	117	130	880
RKF60	30	140	150	880

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

RSN - MULTI-PURPOSE SKATES



- Capacities from 10 to 80 tonnes
- Low level construction
- Accessories for turning corners

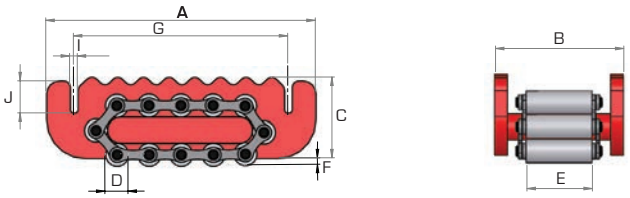
The RSN industrial, low profile skates are ideal for moving moderately heavy loads in the construction, mining and steel industries. Available with capacities of up to 80 tonnes, these skates can move and position heavy and irregular shaped loads easily and more economically than other lifting devices. Optional accessories such as turntables and levelling plates are available for use with the RSN skates.

Model number	Capacity tonnes	Rollers in contact	Rollers total	Weight kg
RSN10	10	5	15	5.2
RSN15	15	4	13	7.3
RSN30	30	4	13	13.0
RSN60	60	4	13	32.0
RSN80	80	6	17	61.0

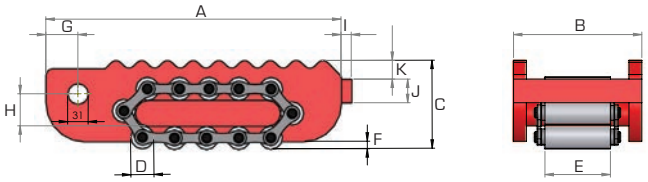
Dimensions in mm										
A	B	C	øD	E	F	G	H	I	J	K
210	100	66	18	51	6	167	-	6	25	-
220	113	75	24	60	10	180	-	6	25	-
270	130	92	30	68	10	217	-	6	25	-
380	168	127	42	76	16	36	48	10	40	15
530	182	147	50	86	19	36	60	10	40	15

Model number	Description	Diameter mm	Capacity tonnes	Weight kg
RTT10	Turntable	130	10	4.5
RTT15	Turntable	130	15	4.5
RTT30	Turntable	150	30	6.7
RTT60	Turntable	190	60	13.7
RTT80	Turntable	220	80	18.9
RLP10	Levelling plate	n/a	10	3.7
RLP15	Levelling plate	n/a	15	3.7
RLP30	Levelling plate	n/a	30	5.3
RLP60	Levelling plate	n/a	60	13.8
RLP80	Levelling plate	n/a	80	18.8

Drawings for models RSN10, RSN15 and RSN30



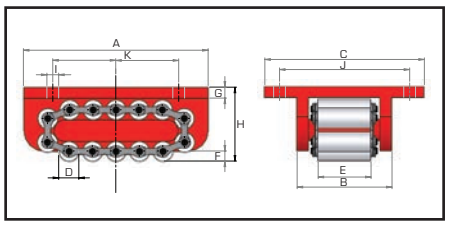
Drawings for models RSN60 and RSN80



K

RSA - HEAVY DUTY SKATES

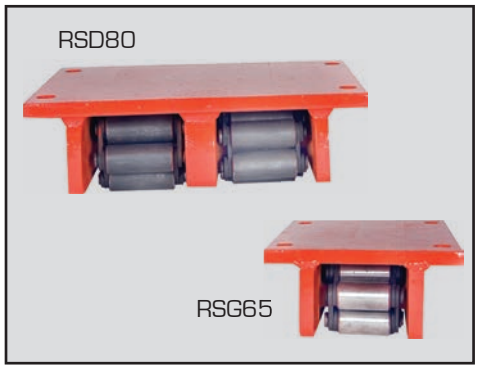
The RSA range of heavy duty moving skates is ideal for movement of heavy loads such as transformers, generators, turbines and machinery. Available with capacities ranging from 15 to 85 tonnes each skate.



Model number	Capacity tonnes	Rollers in contact	Rollers total	Weight kg
RSA15	15	5	15	8.9
RSA20	20	4	13	11.7
RSA40	40	4	13	19.3
RSA50	50	6	17	29.0
RSA65	65	4	13	51.0
RSA85	85	6	17	92.0

Dimensions in mm										
A	B	C	øD	E	F	G	H	øI	J	K
210	100	175	18	51	6	13	76	14	140	75
220	113	190	24	60	10	14	87	14	155	75
270	130	210	30	68	10	14	104	18	175	95
320	140	220	30	68	10	18	115	18	180	120
380	168	270	42	76	19	19	145	22	220	140
530	182	300	50	86	19	19	165	22	240	205

RSG & RSD - HEAVY DUTY SKATES WITH GROOVED GUIDE

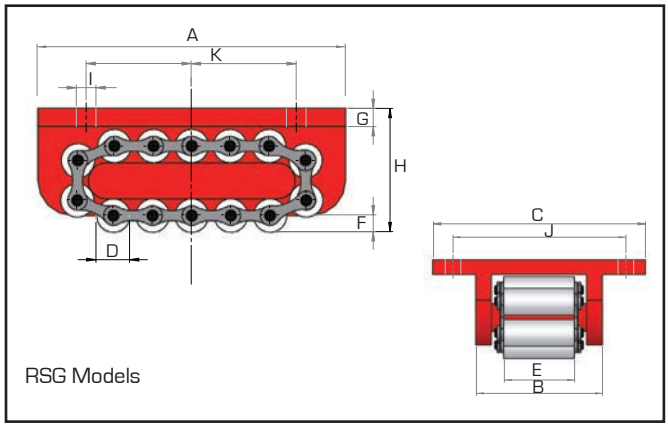


- Capacities from 40 to 400 tonnes
- Low level, robust construction
- Heat treated, special chrome alloy chains

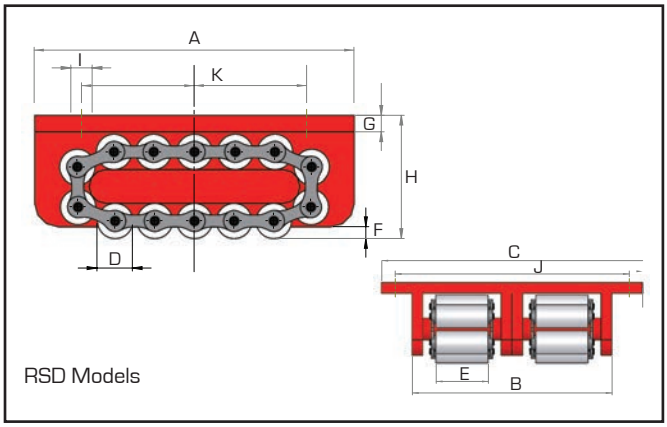
The RSG heavy duty range of single roller moving skates is available with capacities up to 200 tonnes each skate and incorporates a chain groove cut into the centre member of the skate, which helps to keep the chain running parallel with the body and is specially suited for moving loads over long distances.

The RSD range offers the same features as the RSG range, however has a double roller design, capable of transporting loads up to 400 tonnes 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.



RSG Models



RSD Models

Model number	Capacity tonnes	Rollers in contact	Rollers total	Weight kg	Dimensions in mm A	B	C	øD	E	F	G	H	øI	J	K
RSG Range - Single-roller design															
RSG40	40	4	13	19.6	270	130	210	30	68	10	14	104	18	175	95
RSG50	50	6	17	29.5	320	140	220	30	68	10	18	115	18	180	120
RSG65	65	4	13	51.7	380	168	270	42	76	19	19	145	22	220	140
RSG85	85	6	17	93.0	530	182	300	50	86	19	19	165	22	240	205
RSG100	100	8	21	109.0	580	182	300	50	86	19	23	170	26	250	250
RSG150	150	9	23	162.0	650	205	350	50	100	20	28	190	26	280	240
RSG200	200	13	31	266.0	900	205	380	50	100	20	38	200	33	300	360
RSD Range - Double-roller design															
RSD80	80	2 x 4	2 x 13	36.2	270	260	340	30	68	10	14	104	18	305	95
RSD100	100	2 x 6	2 x 17	57.5	320	280	360	30	68	10	18	115	18	325	120
RSD130	130	2 x 4	2 x 13	96.0	380	336	440	42	76	19	19	145	22	390	150
RSD170	170	2 x 6	2 x 17	175.0	530	364	480	50	86	19	19	165	22	430	210
RSD200	200	2 x 8	2 x 21	207.0	580	364	480	50	86	19	23	170	26	430	250
RSD300	300	2 x 9	2 x 23	305.0	650	410	560	50	100	20	28	190	26	490	240
RSD400	400	2 x 13	2 x 31	485.0	900	410	590	50	100	20	38	200	33	500	360

HPF - WORKSHOP PRESSES


HPF10042

Capacities from 10 to 200 tonnes

Stroke lengths from 250 to 330mm

Working pressure 700 Bar

- 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.

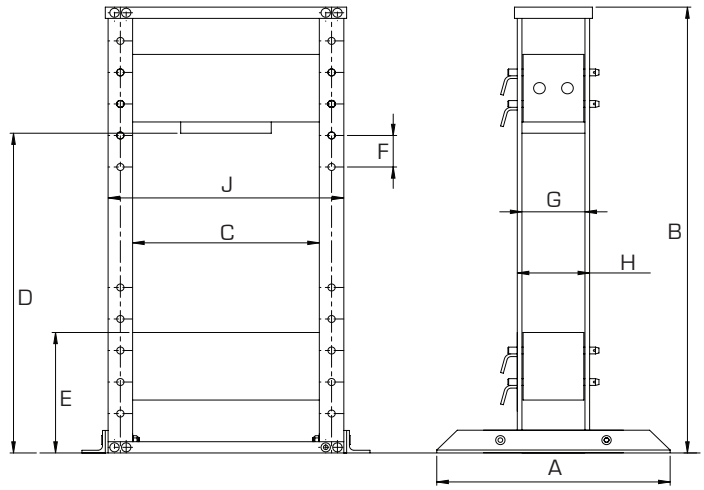
Model number	Capacity tonnes	Stroke mm	Cylinder model no. [1]	Cylinder principle	Pump model no. [2]	Pump operation	Weight kg
HPF1020	10	250	HSS1010	single acting	HP110	hand operated	95
HPF1030	10	250	HSS1010	single acting	AHP1120	air powered	85
HPF2520	25	250	HSS2510	single acting	HP227	hand operated	145
HPF2530	25	250	HSS2510	single acting	AHP1120	air powered	138
HPF2541	25	250	HSS2510	single acting	HEP103341	electric driven 110 V	160
HPF2542	25	250	HSS2510	single acting	HEP103342	electric driven 240 V	160
HPF2544	25	250	HSS2510	single acting	HEP207314	electric driven 415 V	160
HPF5020S	50	330	HSS5013	single acting	HP257	hand operated	470
HPF5020D	50	330	HDA5013	double acting	HP252D	hand operated	500
HPF5030S	50	330	HSS5013	single acting	AHP1121	air powered	505
HPF5030D	50	330	HDA5013	double acting	AHP1141	air powered	505
HPF5041S	50	330	HSS5013	single acting	HEP207311	electric driven 110 V	505
HPF5041D	50	330	HDA5013	double acting	HEP207411	electric driven 110 V	481
HPF5042S	50	330	HSS5013	single acting	HEP207312	electric driven 240 V	512
HPF5042D	50	330	HDA5013	double acting	HEP207412	electric driven 240 V	518
HPF5044S	50	330	HSS5013	single acting	HEP207314	electric driven 415 V	518
HPF5044D	50	330	HDA5013	double acting	HEP207414	electric driven 415 V	518
HPF10020	100	330	HDA10013	double acting	HP245D	hand operated	1011
HPF10030	100	330	HDA10013	double acting	HAP21042	air powered	1029
HPF10041	100	330	HDA10013	double acting	HEP207421	electric driven 110 V	1043
HPF10042	100	330	HDA10013	double acting	HEP207422	electric driven 240 V	1043
HPF10044	100	330	HDA10013	double acting	HEP207424	electric driven 415 V	1043
HPF20041	200	305	HDA20012	double acting	HEP310421	electric driven 110 V	3250
HPF20042	200	305	HDA20012	double acting	HEP310422	electric driven 240 V	3250
HPF20044	200	305	HDA20012	double acting	HEP310424	electric driven 415 V	3250

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, pages 39 - 43 for HEP range, pages 46 - 47 for AHP11 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.

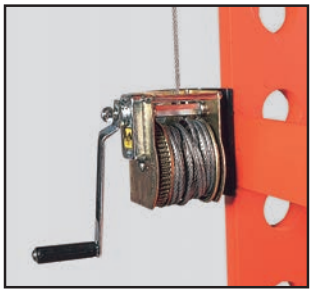


Note: Press bed and press head are adjustable in steps of 'F',
50 tonne has 4 positions, 100 tonne has 3 positions, 200 tonne has 7 positions.
10 and 25 tonne press frame has fixed press head and adjustable press bed.

Press Range	Capacity tonnes
HPF1000	10
HPF2500	25
HPF5000	50
HPF10000	100
HPF20000	200

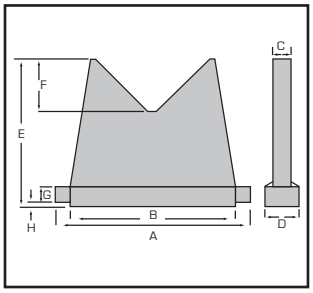
Frame dimensions in mm										
A	B	C	D (min)	D (max)	E (min)	E (max)	F	G	H	J
742	1448	508	1258		260	1010	150	-	152	660
760	1448	508	1258		260	1010	150	-	152	660
1000	2055	800	1140	1560	395	815	140	258	298	1000
1000	1980	1000	1090	1370	550	830	140	338	388	1240
1200	2800	1250	1815	2135	610	1510	150	330	410	1750

OPTIONAL EXTRAS



- Only available factory fitted option
- Lifts and lowers work table
- Available for 50 and 100 tonne presses

Suffix	Description
BW	Bed winch, suitable for 50 and 100 tonne models



- Multi-position V-blocks with flat bed and V-shape press surfaces
- Available for 10, 25, 50 and 100 tonne presses

Model number	Cap. per set tonnes	Dimensions in mm							
		A	B	C	D	E	F	G	H
HVB2500	10 - 25	204	154	20	45	155	45	20	8
HVB5000	50	365	265	25	50	190	60	25	10
HVB10000	100	425	325	35	60	265	85	35	10

TOOL BOXES

Metal storage and transport box

Width up to 500mm

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 powder coating making them resistant to rust and abrasion and hence suitable for long term use at on-site locations, workshops and service centres.

Available in lengths of 620 to 1100mm, these lockable tool boxes help control authorised tool usage, maintain tool integrity and protect them in harsh environments.

Model number	Weight kg	Length mm	Width mm	Height mm
MSB2	9.7	620	340	147
MSB4	13.8	875	280	250
MSB6	16.3	720	500	250
MSB8	30.5	1100	500	250

K

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

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

Contact your local Hi-Force office or authorised 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 is required. Suitable for lifting even the largest earth haulers in the world, the Hi-Force ToughLift is available in 50, 100, 150 and 200 tonne lifting capacities.

With the introduction of the TLA20027 to the range, lifting heights have been increased to 685mm without the need for extensions and all air driven models are operated by a 6 bar air driven motor.

The Hi-Force ToughLift models incorporate a 3-speed pump unit, giving faster advance and retract times, both under load and no load conditions. All models are fitted with a load tonnage gauge as standard and new low maintenance 3-piece handle design to increase manoeuvrability. To aid with lifting, the models come with dedicated lifting points to keep the unit balanced and secure while lifting. A newly designed manifold and muffler allows for easier maintenance and better flow, improving the performance on all air driven ToughLift models.

The redesigned wheel position on the frame and wear-resistant steel base plate offer better ground clearance, making the Hi-Force ToughLift suitable for use on varied terrains. Pivot plates fitted on all models allow the cylinder and tank unit to articulate separately, thus retaining the load on the base plate and preventing the force from being transferred to the wheels. New optional accessory options include load block tool box and pneumatic tyres available on 100, 150 and 200 tonne models.

All Hi-Force ToughLift jacking systems are supplied fitted as standard with a hardened steel lifting saddle. 50 tonne models come with a patented “snap latch” handle assembly for easy positioning and transportation and a patented jacking system designed 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.

For ease of use and safety, all Hi-Force ToughLift models are operated via a 5 metre remote, push button hand pendant controller to ensure the operator has precise control over the lifting operation from a safe distance. All Hi-Force units come with pneumatic pilot valves with pendant control and 50 tonne models also come with solenoids as a standard option. The 100, 150 and 200 tonne models can have solenoids and electric driven pump as options available upon request.

The Hi-Force ToughLift is built with the cylinder as a one-piece design making it effective against side loading and allowing for quicker turnaround times, should the unit require servicing. Fitted with large diameter wheels and heavy duty solid tyres as standard, all ToughLift models are narrow in width and have the smallest footprint area in the industry.

TL - TOUGHLIFT JACKING SYSTEMS

Working pressure 700 Bar

Choice of 8 models with a range of accessories

Used in mining, construction & railway industries

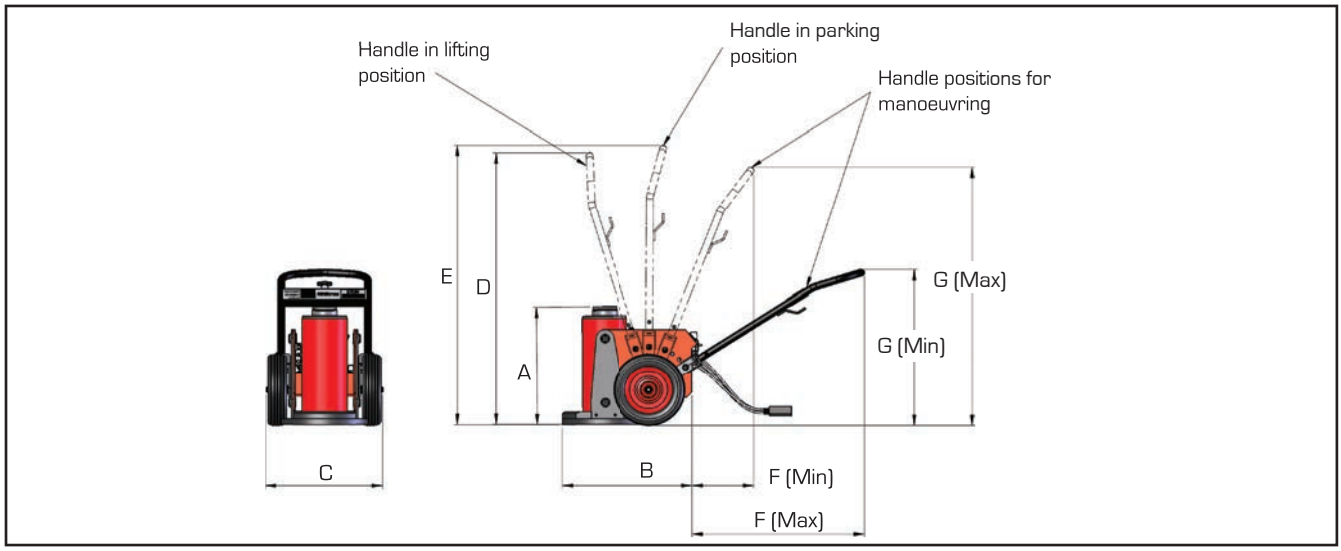
- Choice of 50, 100, 150 or 200 tonne lifting capacities
- High speed 3-stage pump unit offers faster advance and retract times, both under load and no load
- Solid tyres fitted as standard with option of pneumatic tyres
- Narrow width wheels and redesigned wheel position for better ground clearance and balance when manoeuvring
- Longer, robust 4-position lifting handle design for increased leverage and manoeuvrability on 100, 150 and 200 tonne models
- Integral airline filter, lubricator and pressure regulator unit on air driven models. Option of auto-drain unit available on request.
- Push button remote hand pendant controller with 5 metre control cable
- Load tonnage gauge fitted as standard on 100, 150 and 200 tonne models
- User friendly design with easily accessible maintenance features
- Wide range of accessories available for even greater versatility (see pages 173 and 174)

Model number	Capacity tonnes	Power Supply	Stroke mm	Weight kg	Max additional stack in mm
TL050A255	50	6-Bar air driven	254	160	680
TL050E255	50	240V electric	254	168	680
TLA10016	100	6-Bar air driven	405	289	480
TLA10021	100	6-Bar air driven	530	319	180
TLA15015	150	6-Bar air driven	390	313	485
TLA15020	150	6-Bar air driven	520	349	180
TLA20015	200	6-Bar air driven	381	373	500
TLA20027	200	6-Bar air driven	685	453	180

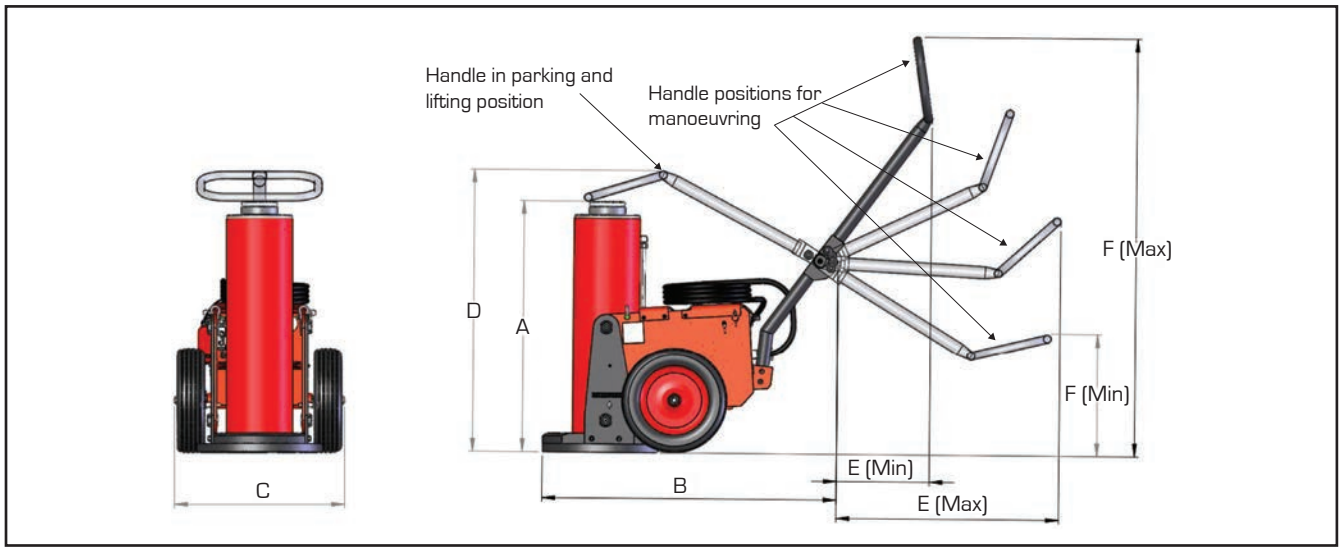
Note: 100, 150 and 200 tonne electric driven Hi-Force ToughLift jacking systems available on request

TL - TOUGHLIFT JACKING SYSTEMS

Drawings for 50 tonne models:



Drawings for 100, 150 and 200 tonne models:



L

Model number	Dimensions in mm A	B	C	D	E MIN - MAX	F MIN - MAX	G MIN - MAX
TL050A255	455	660	560	1440	1440	380-1000	700-1300
TL050E255	455	660	560	1440	1440	380-1000	700-1300
TLA10016	665	1130	652	831	356-854	465-1605	-
TLA10021	843	1130	652	946	356-854	465-1605	-
TLA15015	665	1130	652	835	356-854	465-1605	-
TLA15020	843	1130	652	963	356-854	465-1605	-
TLA20015	660	1130	652	830	356-854	465-1605	-
TLA20027	964	1130	652	1085	356-854	465-1605	-

TL - ACCESSORIES

Hi-Force offers a range of extensions for use with ToughLift jacking systems. Slip lock extensions can be used in multiples up to the maximum height as specified in the table below. 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.

SLIP LOCK EXTENSIONS

Length 180mm	Length 300mm	Length 400mm	Length 485mm	Length 500mm	To suit jack model	Recom. max. extension height in mm
SLE180-50	SLE300-50	SLE400-50	*	SLE500-50	TL050A255	680
SLE180-50	SLE300-50	SLE400-50	*	SLE500-50	TL050E255	680
SLE180-100	SLE300-100	*	SLE485-100	*	TLA10016	485
SLE180-100	*	*	*	*	TLA10021	180
SLE180-150	SLE300-150	*	SLE485-150	*	TLA15015	485
SLE180-150	*	*	*	*	TLA15020	180
SLE180-200	SLE300-200	SLE400-200	*	SLE500-200	TLA20015	500
SLE180-200	*	*	*	*	TLA20027	180

* = Exceeds recommended maximum extension height

LOAD LOCK EXTENSIONS

Length 180mm	Length 300mm	Length 400mm	Length 485mm	Length 500mm	To suit jack model	Recom. max. extension height in mm
LLE180-50	LLE300-50	LLE400-50	*	LLE500-50	TL050A255	680
LLE180-50	LLE300-50	LLE400-50	*	LLE500-50	TL050E255	680
LLE180-100	LLE300-100	*	LLE485-100	*	TLA10016	485
LLE180-100	*	*	*	*	TLA10021	180
LLE180-150	LLE300-150	*	LLE485-150	*	TLA15015	485
LLE180-150	*	*	*	*	TLA15020	180
LLE180-200	LLE300-200	LLE400-200	*	LLE500-200	TLA20015	500
LLE180-200	*	*	*	*	TLA20027	180

* = Exceeds recommended maximum extension height

LOAD BLOCK SETS

Load block sets Model number	Capacity tonnes	Lock out Height (mm)	Load Blocks	Adaptor	To suit jack model
TLB50-250	50	250	3	1	TL050A255
TLB50-250	50	250	3	1	TL050E255
TLB100-405	100	400	5	1	TLA10016
TLB100-530	100	525	7	1	TLA10021
TLB150-390	150	385	5	1	TLA15015
TLB150-520	150	515	7	1	TLA15020
TLB200-380	200	375	5	1	TLA20015
TLB200-685	200	675	9	1	TLA20027

SPACERS

Base mounted spacers increase the closed height by 300mm. This optional extra is available for Hi-Force ToughLift model TLA20015 only and weighs 78.5 kg. Please suffix model number with "E" when ordering.

TL - ACCESSORIES

SADDLES

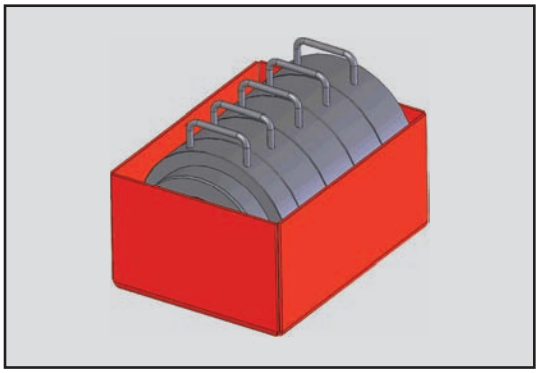
Hi-Force ToughLift jacks are fitted with tilting saddles as standard. Flat saddles are also available and can be supplied as optional extra. Both types of saddle (flat or tilting swivel) can be easily fitted to all slip lock and load lock extensions. See below table for flat saddle model numbers.

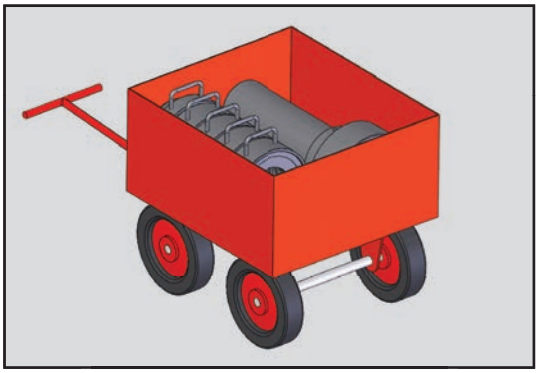

TLF150

Flat saddle Model number	Capacity tonnes	To suit Jack Model
TLF50	50	TL050A255
TLF50	50	TL050E255
TLF150	100	TLA10016
TLF150	100	TLA10021
TLF150	150	TLA15015
TLF150	150	TLA15020
TLF200	200	TLA20015
TLF200	200	TLA20027

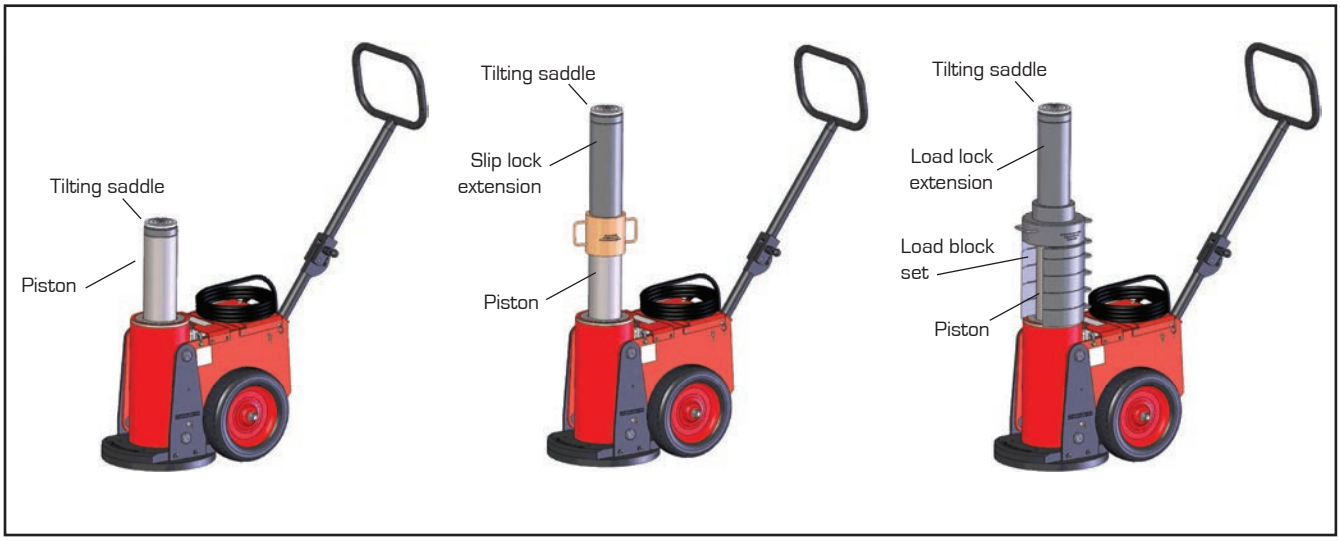
TOOL BOXES

To store your ToughLift accessories safely why not consider ordering a load block box or 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



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SERVICES

RENTAL SERVICES

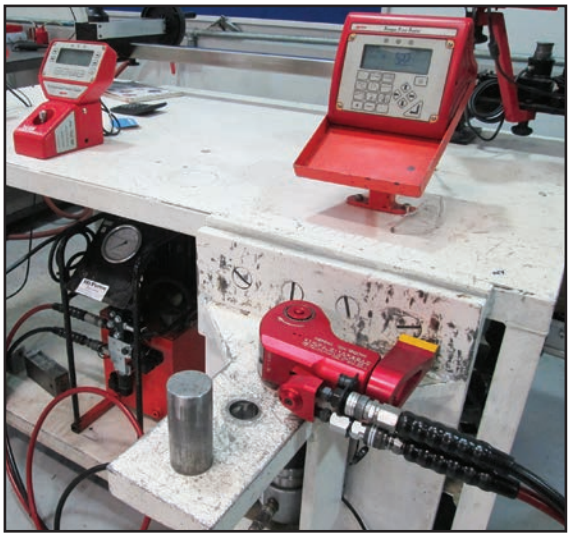
The Hi-Force philosophy of offering a complete service package to support our valued customers needs and requirements also extends to tool rental services. With an extensive array of products available within the Hi-Force range, it is sometimes difficult for our customers to decide on the most suitable 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 utilise 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.

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.

M

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

Hi-Force tool rental offers an economical alternative to purchasing capital intensive specialised 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. Utilising 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.

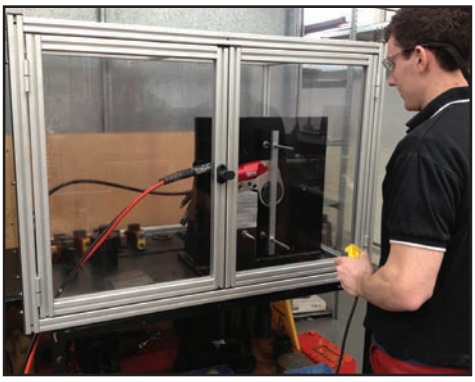
Hi-Force is at your service!! We have built our success on our "service first philosophy" and a long history of providing customers with a comprehensive repair service for a wide range of hydraulic and pneumatic tools.

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 centres 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 catalogue, from two strategically placed locations in England, since the early 1970's.

All Hi-Force service centres 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.

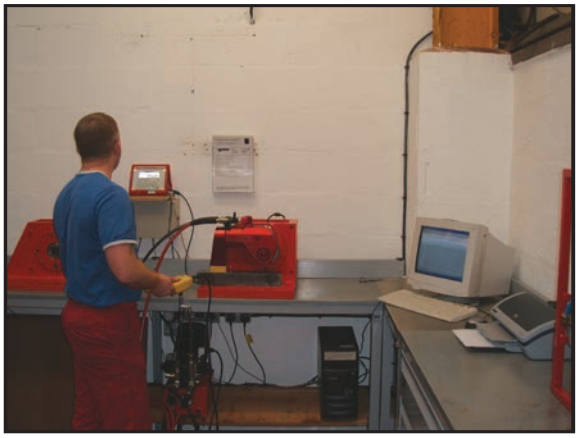
All of our in-house calibration equipment has valid, independently approved "UKAS" calibration certificates which are renewed annually. All items calibrated are returned with an individual test and calibration certificate traceable to our "UKAS" certification.

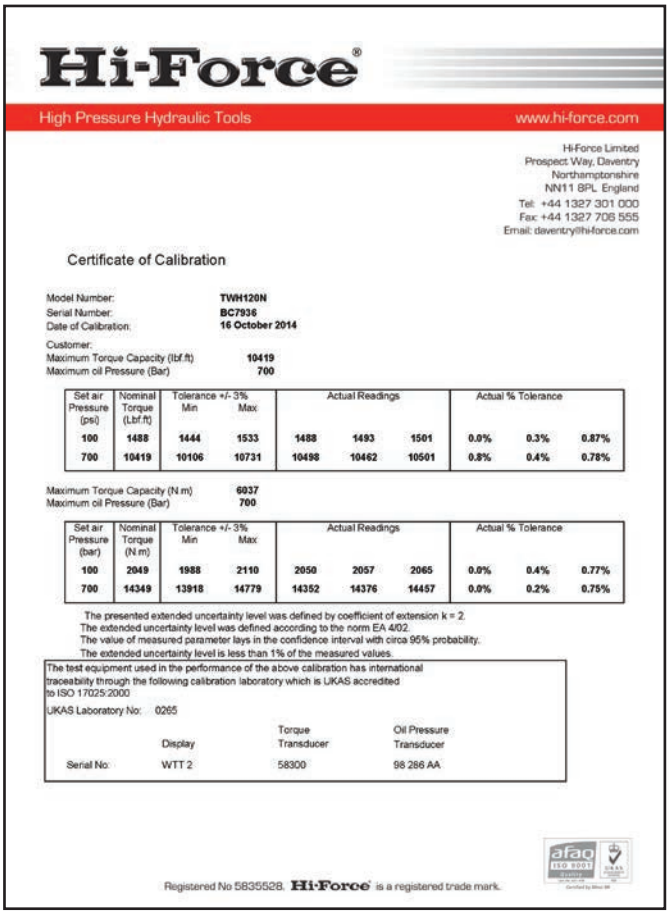
This service is particularly focused on tools used for accurate bolt tightening, which according to industry standards, recommends that they are calibrated, at least once per year and in some cases more often if used extensively. When did you last have your critical bolt tightening tools calibrated?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





Hi-Force®

High Pressure Hydraulic Tools www.hi-force.com

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Northamptonshire
NN11 8PL England
Tel: +44 1327 301 000
Fax: +44 1327 706 555
Email: daventry@hi-force.com

Certificate of Calibration

Model Number: TWH120N
Serial Number: BC7936
Date of Calibration: 16 October 2014

Customer:
Maximum Torque Capacity (lbf.ft) 10419
Maximum oil Pressure (Bar) 700

Set air Pressure (psi)	Nominal Torque (Lbf.ft)	Tolerance +/- 3% Min	Tolerance +/- 3% Max	Actual Readings			Actual % Tolerance		
100	1488	1444	1533	1488	1493	1501	0.0%	0.3%	0.87%
700	10419	10106	10731	10498	10462	10501	0.8%	0.4%	0.78%

Maximum Torque Capacity (N.m) 6037
Maximum oil Pressure (Bar) 700

Set air Pressure (bar)	Nominal Torque (N.m)	Tolerance +/- 3% Min	Tolerance +/- 3% Max	Actual Readings			Actual % Tolerance		
100	2049	1988	2110	2050	2057	2065	0.0%	0.4%	0.77%
700	14349	13918	14779	14352	14376	14457	0.0%	0.2%	0.75%

The presented extended uncertainty level was defined by coefficient of extension k = 2.
The extended uncertainty level was defined according to the norm EA 4/02.
The value of measured parameter lays in the confidence interval with circa 95% probability.
The extended uncertainty level is less than 1% of the measured values.

The test equipment used in the performance of the above calibration has international traceability through the following calibration laboratory which is UKAS accredited to ISO 17025:2000

UKAS Laboratory No: 0265

	Display	Torque Transducer	Oil Pressure Transducer
Serial No:	WTT 2	58300	98 286 AA

Registered No 5835528. Hi-Force is a registered trade mark.

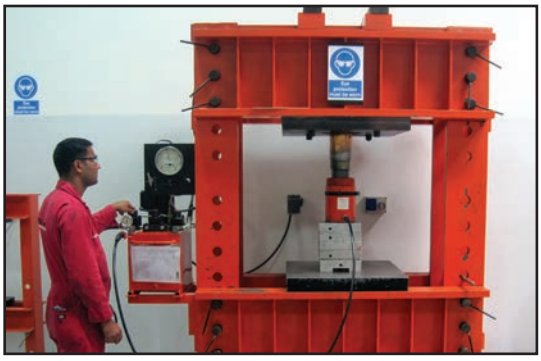
Sample calibration certificate

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.

H.E.S Sales UK workshop

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 centres. 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.



Hi-Force test facilities

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 authorisation 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 centre, 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.

Hi-Force service vehicle

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 Centres.

Interior of Hi-Force test & service vehicle

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 150 square metres, is located within a brand new, 2000 square metre Logistics Centre, 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.

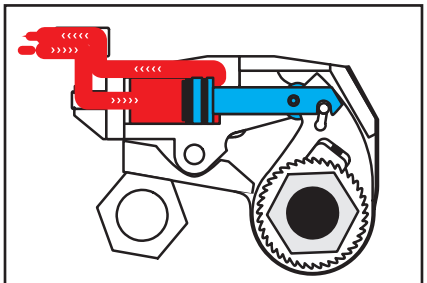
Hi-Force is totally committed to improving the technical knowledge of our own employees, those of our Distributors and of the many users of Hi-Force hydraulic tools, throughout the world. Hi-Force investment in this new Training School, is testament to our commitment to not only offer world class products, 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

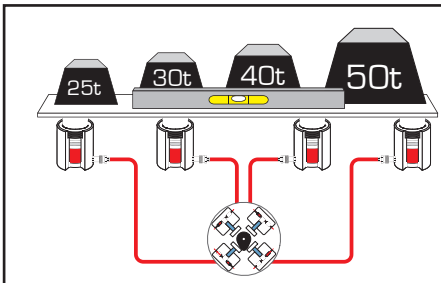
With our ever expanding network of Hi-Force regional offices and authorised distributors worldwide, Hi-Force has identified technical product and application training, as an essential core competency, for us to maintain our continued growth in the global market, for hydraulic tools.

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.

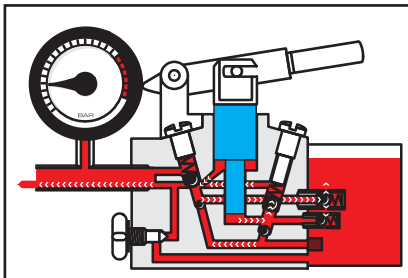
To cater for the large number of different countries in which our products are now distributed and sold, we have designed our Product Training Courses in such a way that moving graphics and pictorial examples, are used wherever possible, to minimise the need for sometimes, difficult to understand written 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

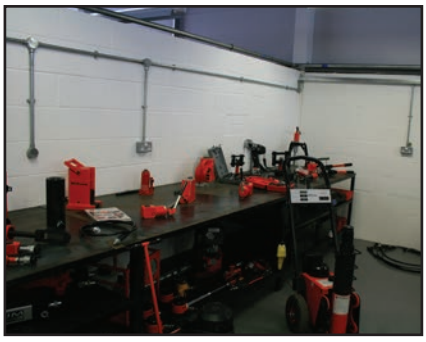


A split flow synchronised lift schematic

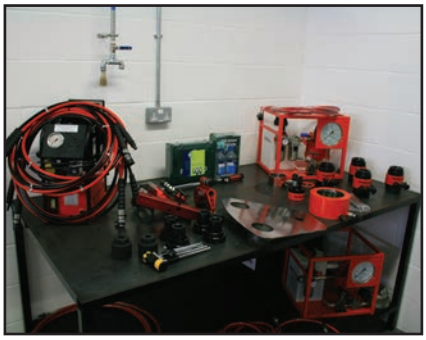


A two speed hand pump circuit

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.

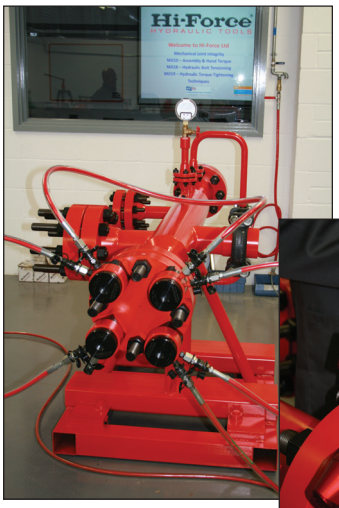


Hi-Force Product Training Courses can be tailored to suit individual needs and can be held for any number of days from one up to a full working week of five days. All Training Courses will incorporate a written and verbal exam, for all participating delegates, to ensure that the required level of learning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



Whilst primarily focussed 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



ecITB
Engineering Construction Industry Training Board
APPROVED PROVIDER

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.

ecITB Engineering Construction Industry Training Board APPROVED PROVIDER

Part 1 – Training - "Theoretical and Practical"

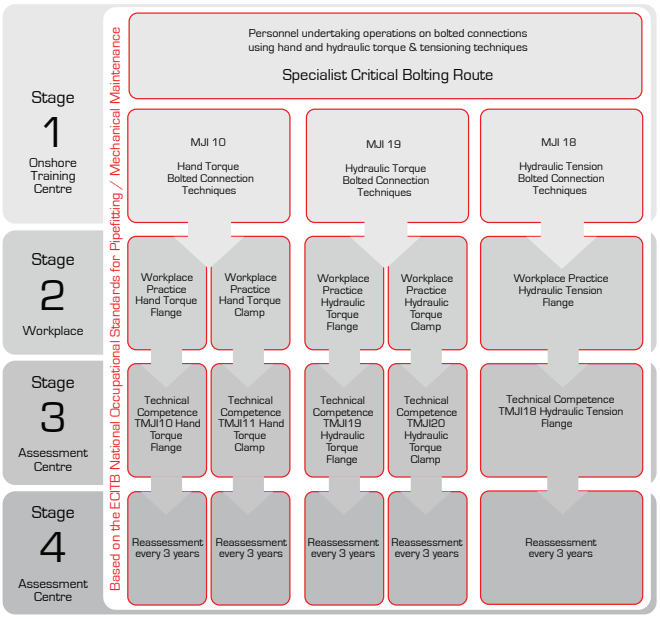
- MJI10 Hand Torque Bolted Connection Techniques
- MJI18 Hydraulically Tensioned Bolted Connection Techniques
- MJI19 Hydraulically Torqued Bolted Connection Techniques

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 pressurised 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 pressurised 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 Centres, 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.

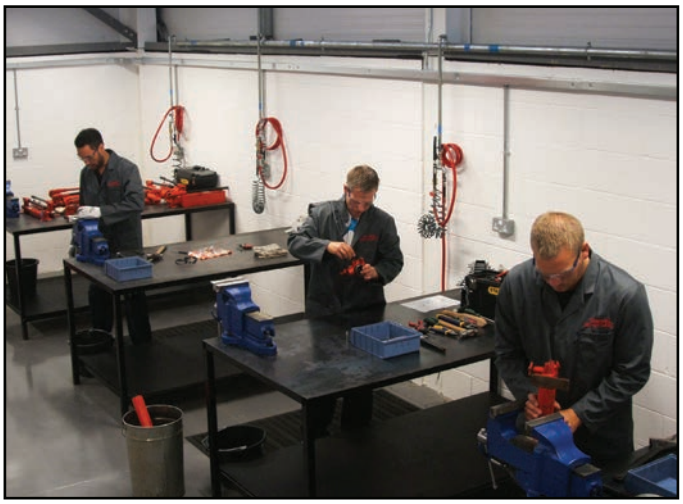
Hi-Force Service and Repair Training Courses are primarily available to our Global Distributor Network and are designed, to enable our Distributors, to gain the highly prestigious, Hi-Force Authorised Service Centre accreditation. To achieve this, our Distributors need to send personnel for training and establish a fully equipped Service Centre facility, within their own premises. To help with this, the Hi-Force UK Service and Repair Training facility, is modelled on exactly how, an Authorised Hi-Force Service Centre should be set up, within the Distributors own facility. All Hi-Force offices globally, operate a fully equipped Service Centre 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 Authorised Service Centre 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, authorisation 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 centre is vital for supporting this additional activity. To help Hi-Force achieve our goals, of establishing a professional, worldwide network of Authorised Service Centres, we offer several financial incentives, to our Distributors, to assist them, with becoming an Authorised Hi-Force Service Centre.

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 catalogue 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/cm^2) 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

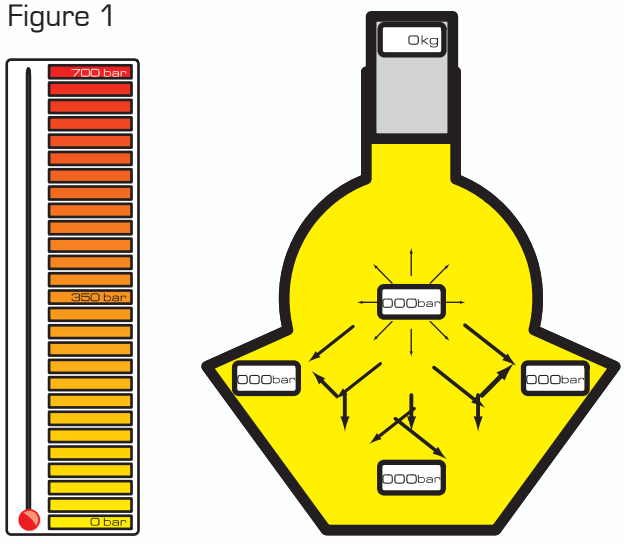
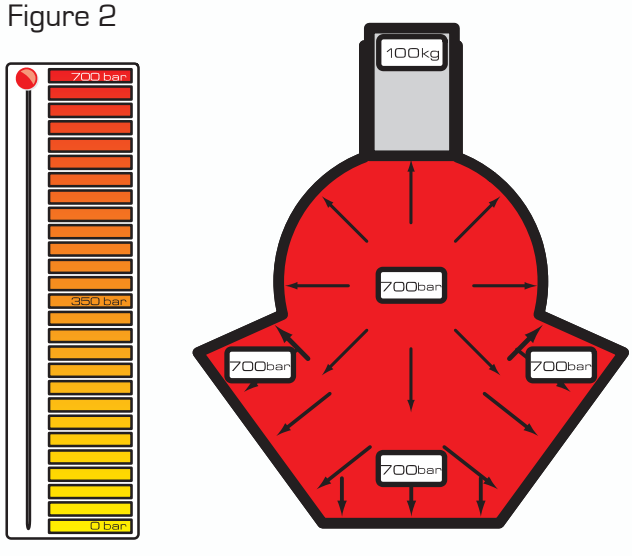


Figure 2



b) The Industry Standard

The accepted International Standard for maximum working pressure in the high pressure hydraulic tools industry is 700 Bar (10,000 PSI) and the majority of the products detailed in this catalogue have a maximum working pressure of 700 Bar (10,000 PSI). Therefore where a particular cylinder is specified in this catalogue as having a 10 tonnes 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 700 Bar 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 700 Bar is being applied. Because of this simple criteria it is possible to manufacture cylinders in the Hi-Force range from 4.5 tonnes up to in excess of 500 tonnes capacity.

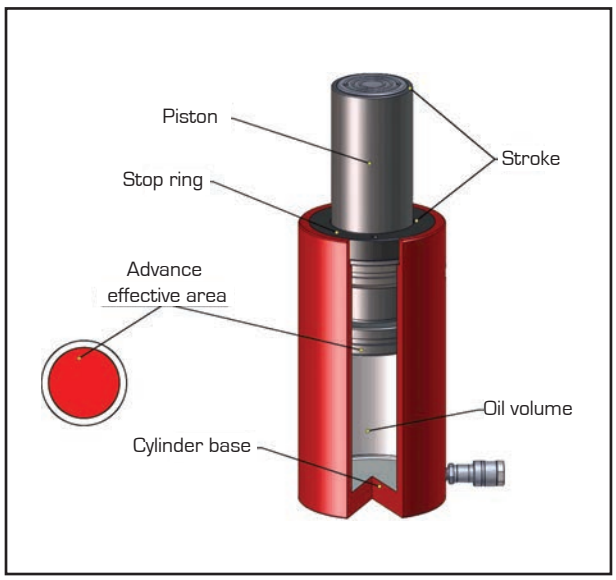
The equation for calculating the output force of a hydraulic cylinder, given that the effective area and design maximum working pressure are known, is simply : -

$$\frac{\text{Effective area (cm}^2\text{) x Pressure (Bar)}}{981} = \text{Output Force (Tonnes)}$$

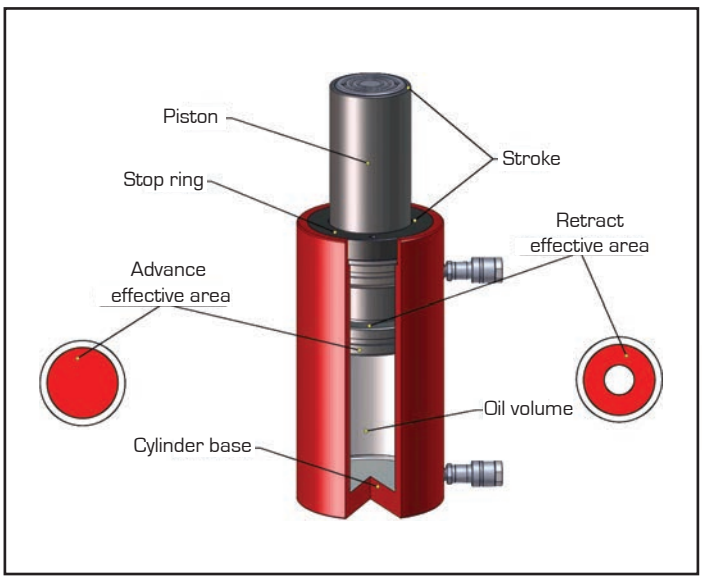
For example Hi-Force model reference HLS502 (page 13) has an effective area of 71.3 cm² and therefore a maximum working pressure of 700 Bar : -

$$\frac{71.3\ (\text{cm}^2) \times 700\ (\text{Bar})}{981} = 50.88\ \text{Tonnes}$$

Single acting cylinder



Double acting cylinder

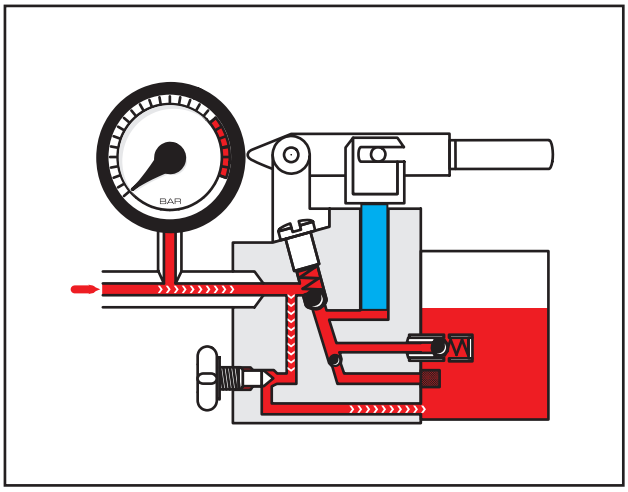


N

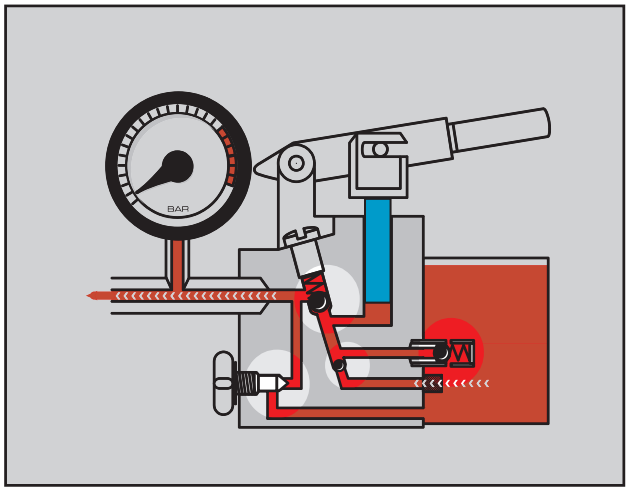
d) The Pump

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.

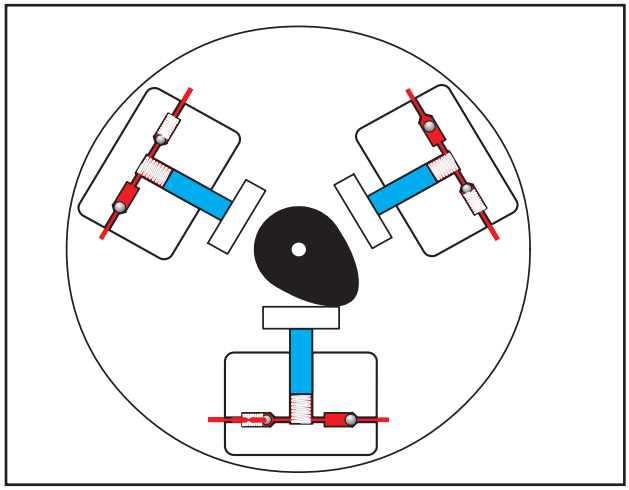
Hand operated pumps are the simplest form of pump and consist of a pumping piston, release valve, and suction and delivery check valves. The pump is operated by closing the valve and then raising and lowering the handle to pump fluid from the reservoir to the pump outlet connection. This action produces 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 petrol engine driven motor.



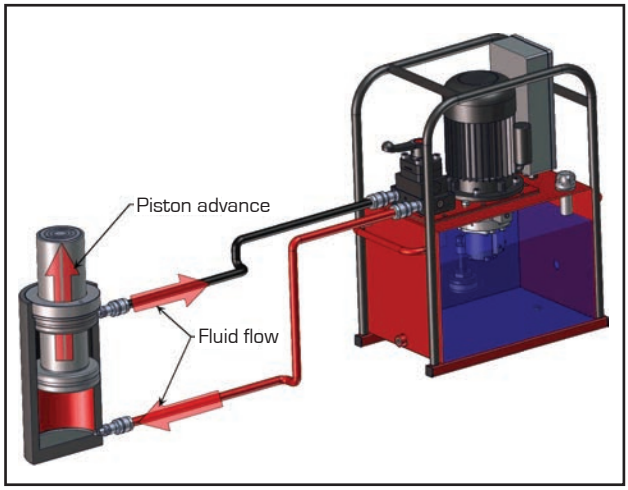
Single speed hand pump



Suction, delivery & release valve highlighted



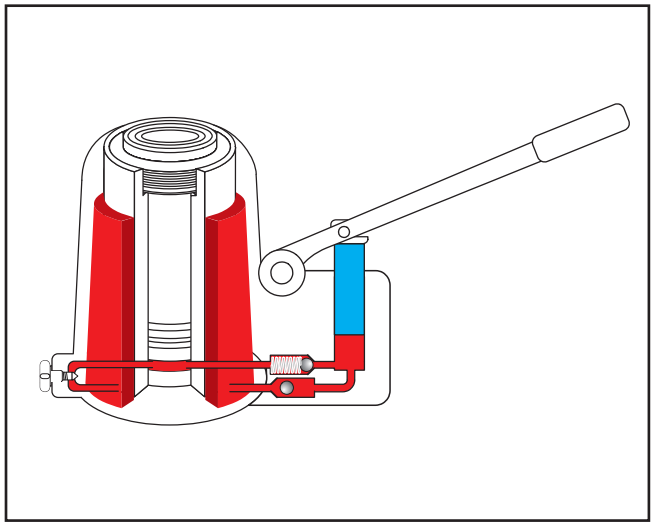
Multiple piston block powered pump



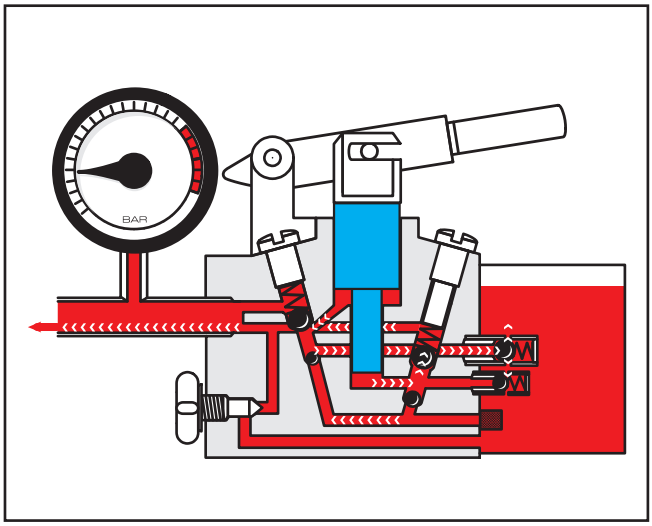
Double acting cylinder & powered pump set

BASIC PRINCIPLES OF HYDRAULICS

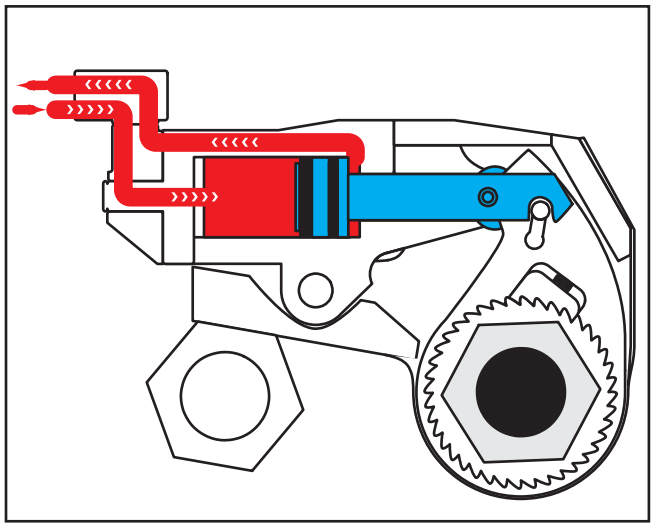
As the hydraulic fluid enters into the bore of the cylinder it forces the cylinder piston to move upwards. Any resistance to the upward movement of the piston, e.g. a load, will result in the fluid pressure increasing as the operator continues to actuate the pump lever up and down. The fluid pressure 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 700 Bar and the pump safety pressure relief valve is activated preventing over pressurisation above 700 Bar.



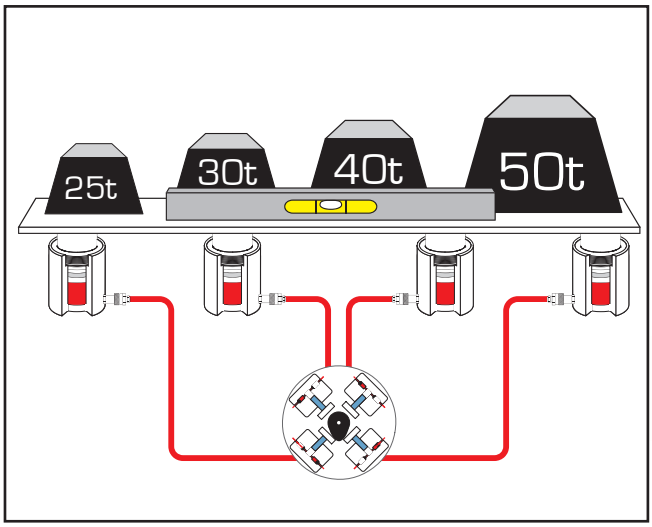
The internal workings of a hydraulic jack



A two speed hand pump circuit



The internal workings of a TWH-N hydraulic wrench



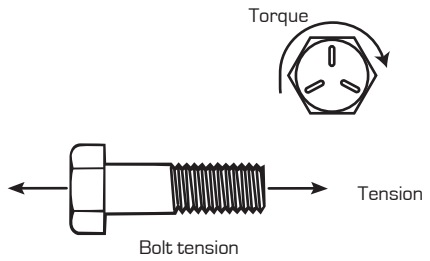
A split flow synchronised lift schematic

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 catalogue 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 catalogue.

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).

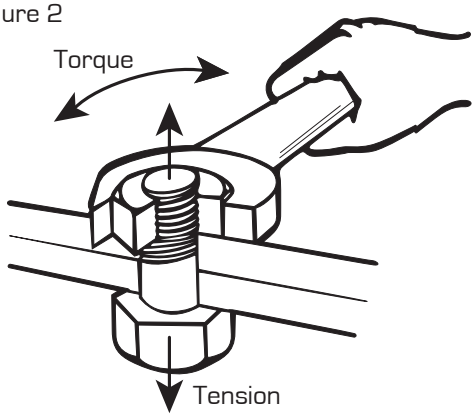
For most industrial applications, the equipment manufacturers, as well as structural and piping component designers, will provide the torque or tension specifications for the relevant fastener(s) to be used to connect the component parts. It is vitally important to adhere to these specifications to ensure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

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).

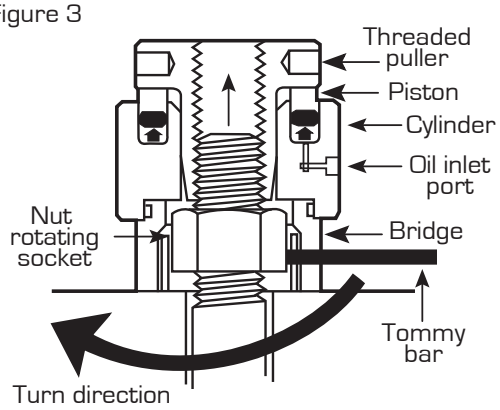
Torque is defined as the turning or twisting force exerted on a nut or bolt head and it is the product of two measurements i.e. force and distance (see figure 4). Force is measured in units of Pounds or Newtons and is quite simply the amount of force applied at a given distance from the centre of the 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.

Figure 2



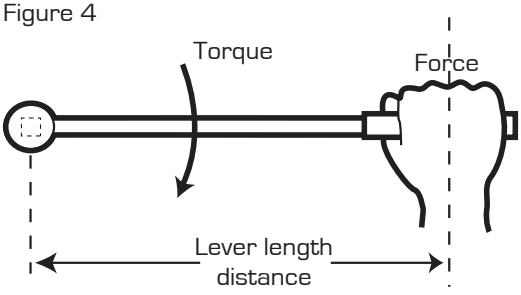
Newton's law states that for every applied force there is an equal and opposite reactive force. Therefore as the torque is applied to the nut, by turning it increases, it will create a tension in the bolt which will act as a "clamping force" within the effective thread length. Initially this clamping 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.

Figure 3



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 (see page 91) assists the user to accurately calculate the required torque/ tension to achieve a successful joint bolt up.

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 1500 Bar 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 catalogue.

Mechanical Torque Multipliers

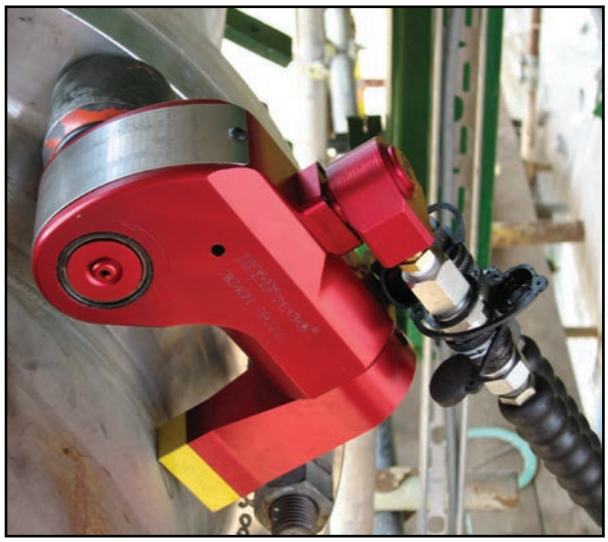
A mechanical torque multiplier is a mechanical device that multiplies the preset amount of input torque applied by the operator using a calibrated hand torque wrench. Hi-Force mechanical torque multipliers incorporate a single stage planetary gear in models up to 2800 Nm and a two stage planetary gear in models up to 10000 Nm. 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 catalogue.

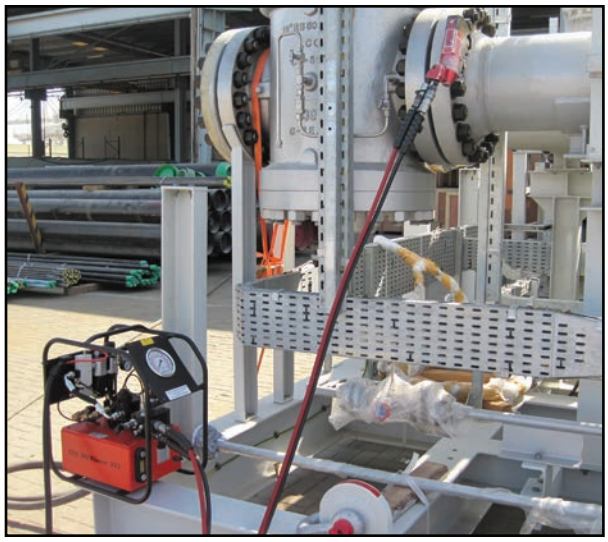
Pneumatic Torque Multipliers

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 3 metre 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 catalogue.

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 utilises 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 700 Bar 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 catalogue.





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 catalogue.

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 catalogue.

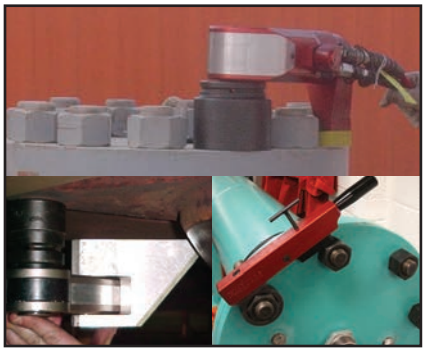
Impact Wrenches

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 6 Bar 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 catalogue.

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 catalogue.

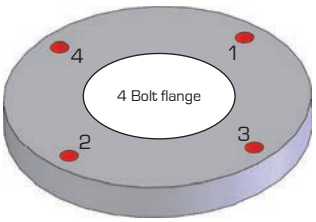
Sockets and Accessories

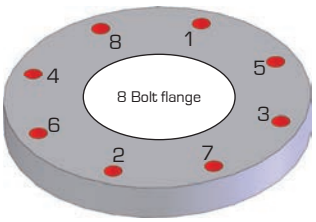


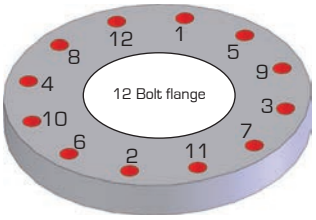
Most of the bolting products detailed in this catalogue will also require a selection of accessories to assist with the relevant bolting application. Hi-Force offers an extensive range of sockets, hexagon drives, hexagon reducer bushes and backup wrenches suitable for use with Hi-Force bolting tools. 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 catalogue.

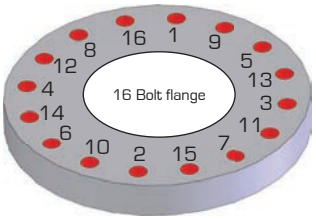
TIGHTENING SEQUENCE & BOLTING PROCEDURE FOR FLANGE BOLTS

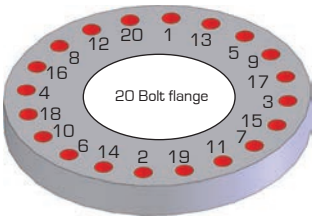
As explained on page 193, the two most common methods for tightening of bolted flange joints are either by torque using torque wrenches or by direct tension using hydraulic bolt tensioners. Regardless of the method selected a pre-bolting inspection is essential if an accurate and leak free joint is to 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.

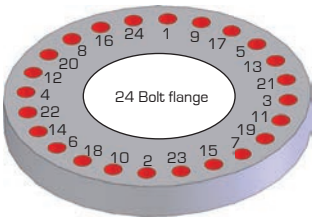


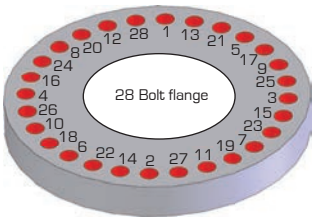


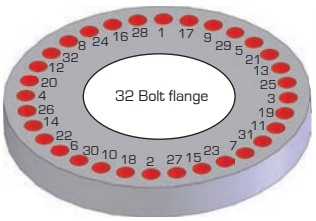












Tightening using torque wrenches

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 30% of the final specified and required torque figure, a second pass at 60% 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 optimise 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).

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Please refer to page 118 for further details on the Hi-Force BOLTRIGHT PRO software.

(*) 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.

Figure 1

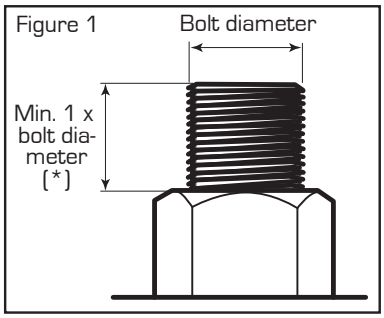


Figure 2

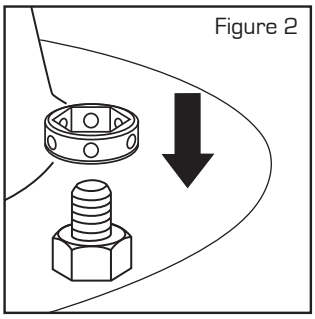


Figure 3

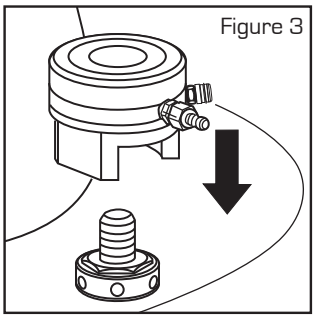


Figure 4

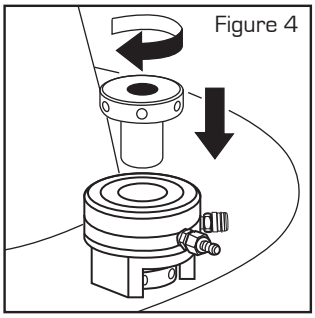


Figure 5

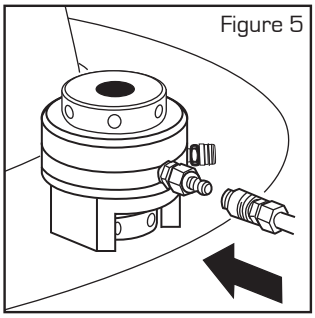


Figure 6

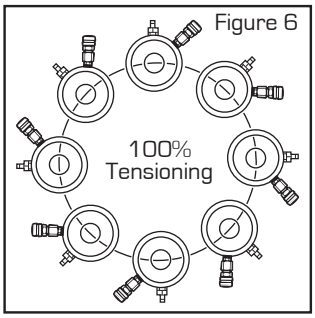


Figure 7

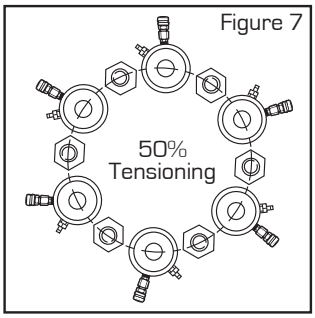


Figure 8

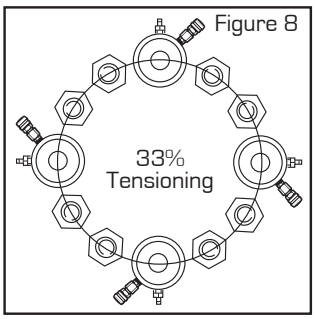
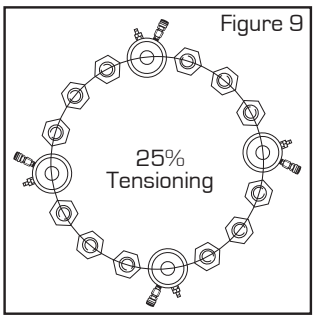


Figure 9



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.

METRIC TO IMPERIAL CONVERSION CHART

SI Unit System International	Conversion Factor	Imperial Equivalent	Conversion Factor	SI Unit System International
Pressure				
Bar	x 14.5	PSI	x 0.069	Bar
Bar	x 14.5	lbf.in^2	x 0.069	Bar
kPA	x 0.145	PSI	x 6.89	kPa
mPA	x 145	PSI	x .00689	mPa
Volume				
cm^3	x 0.061	inch^3	x 16.4	cm^3
litre	x 61	inch^3	x 0.016	litre
litre	x 0.22	gallon	x 4.54	litre
m^3	x 1.3	yard^3	x 0.76	m^3
Area				
mm^2	x 0.00155	inch^2	x 645	mm^2
cm^2	x 0.155	inch^2	x 6.45	cm^2
m^2	x 10.8	foot^2	x 0.0929	m^2
Length				
mm	x 0.03937	inch	x 25.4	mm
cm	x 0.3937	inch	x 2.54	cm
m	x 3.28	foot	x 0.305	m
Force				
N	x 0.225	pound	x 4.45	N
kN	x 225	pound	x 0.00445	kN
Torque				
Nm	x 0.738	lbf.ft	x 1.356	Nm
Nm	x 8.9	lbf.in	x 0.113	Nm
kgf.m	x 7.2345	lbf.ft	x 0.1382	kgf.m
Mass				
g	x 0.035	ounce	x 28.3	g
kg	x 2.2046	pound	x 0.4536	kg
t	x 1.1	ton (short)	x 0.907	t
Flow				
cm^3/min	x 0.61	inch^3/min	x 16.4	cm^3/min
litres/min	x .2642	gallon/min	x 3.785	litres/min
Power				
kw	x 1.34	hp	x 0.746	kw
kw	x 0.948	Btu/s	x 1.055	kw
w	x 0.74	ft lb/s	x 1.36	w

Temperature

To calculate Celsius to Fahrenheit :	(°C x 1.8) + 32 = °F
To calculate Fahrenheit to Celsius :	(°F - 32) / 1.8 = °C

RECOMMENDED TORQUE VALUE CHART

The below table should be used as a guideline for the correct torque to be applied to standard size metric and imperial bolts in grade 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. The coefficient of friction applicable for the chosen bolt lubricant, using the 'k' value or the 'μ' (mu) value should always be considered. The below torque values are for guidance's purposes only. Always check with the equipment / bolt manufacturer for the actual torque required for the specific bolted components. Alternatively visit www.hi-force.com to learn more about BOLTRIGHT PRO joint integrity software.

ALL VALUES ARE BASED ON 50% OF THE BOLT YIELD STRESS									
Bolt diameter (see note1)	Nut AF Size (see note 2)	Bolt preload value (for grade ASTM A193 B7) (see note 3)		Torque value (for grade ASTM A193 B7) for specified lubricant(s) Moly: f = 0.06 (see note 4)		Copper: f = 0.10 (see note 4)		Machine Oil: f = 0.15 (see note 4)	
inches	inches	kN	lbs.force	Nm	lbf.ft	Nm	lbf.ft	Nm	lbf.ft
5/8	1.1/16	52	11866	82	61	124	91	176	130
3/4	1.1/4	78	17560	142	105	315	159	307	227
7/8	1.7/16	107	24243	225	166	342	252	489	361
1	1.5/8	141	31804	334	246	509	376	728	537
1.1/8	1.13/16	184	41502	478	353	735	542	1056	779
1.1/4	2	233	52488	658	486	1019	751	1469	1083
1.3/8	2.3/16	288	64763	878	648	1367	1008	1977	1458
1.1/2	2.3/8	348	78327	1142	842	1786	1317	2591	1911
1.5/8	2.9/16	414	93179	1453	1072	2283	1684	3320	2448
1.3/4	2.3/4	486	109320	1817	1340	2864	2112	4173	3078
1.7/8	2.15/16	563	126750	2235	1649	3536	2608	5161	3807
2	3.1/8	647	145468	2714	2002	4305	3175	6294	4642
2.1/4	3.1/2	830	186771	3865	2851	6162	4545	9032	6662
2.1/2	3.7/8	938	211001	4796	3538	7678	5663	11279	8319
2.3/4	4.1/4	1146	257693	6383	4708	10252	7561	15088	11128
3	4.5/8	1374	309049	8284	6110	13344	9842	19669	14507
3.1/4	5	1623	365069	10530	7767	17003	12541	25094	18508
3.1/2	5.3/8	1893	425751	13148	9697	21275	15692	31434	23185
3.3/4	5.3/4	2184	491097	16167	11924	26208	19330	38761	28588
4	6.1/8	2495	561107	19615	14467	31850	23492	47145	34772

ALL VALUES ARE BASED ON 50% OF THE BOLT YIELD STRESS									
Bolt diameter (see note1)	Nut AF Size (see note 2)	Bolt preload value (for grade 8.8)		Torque value (for grade 8.8) for specified lubricant(s) Moly: f = 0.06 (see note 4)		Copper: f = 0.10 (see note 4)		Machine Oil: f = 0.15 (see note 4)	
mm	mm	kN	lbs.force	Nm	lbf.ft	Nm	lbf.ft	Nm	lbf.ft
M16	24	51	11623	75	55	114	84	163	120
M20	30	80	18161	147	108	223	164	318	235
M24	36	116	26151	253	186	384	283	548	404
M27	41	151	34082	365	270	561	414	805	594
M30	46	185	41588	500	369	765	564	1095	808
M33	50	228	51453	666	491	1026	756	1475	1088
M36	55	269	60590	863	637	1325	977	1901	1402
M39	60	322	72388	1104	814	1703	1256	2452	1808
M42	65	369	83157	1376	1015	2117	1561	3043	2244
M45	70	431	96888	1700	1254	2627	1938	3786	2793
M48	75	486	109288	2067	1524	3186	2350	4586	3383
M52	80	580	130408	2625	1936	4067	2999	5869	4329
M56	85	669	150601	3280	2419	5076	3744	7321	5400
M60	90	779	175231	4030	2972	6262	4618	9051	6676
M64	95	883	198522	4867	3590	7550	5569	10904	8042
M68	100	1008	226663	5833	4302	9080	6697	13139	9691
M72	105	1141	256668	6918	5102	10803	7968	15689	11549
M76	110	1283	288538	8128	5995	12729	9389	18481	13631
M80	115	1433	322272	9470	6985	14871	10968	21622	15948
M90	130	1845	414765	13519	9971	21357	15752	31155	22979
M100	145	2308	518911	18614	13729	29553	21797	43228	31883

Note: The above figures do not take into account either gasket stress or flange stress load loss that occur. To consider these load loss probability will require a full 'Bolt load / Stress calculation'. This can be provided using the Hi-Force BOLTRIGHT PRO software program.

1 = Bolt material grade ASTM A193 B7 (Imperial) or grade 8.8 (Metric)
2 = Nut AF size is based on heavy series nuts
3 = Bolt Preload equates to a bolt yield stress of 50% of the minimum yield strength
4 = Torque figure values are based on 50% of the minimum bolt yield stress

NEW PRODUCTS

HHA - Hollow Piston Aluminium 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

See page 22

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 pages 68 & 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

BOLTRIGHT PRO - Bolted joint integrity software

See pages 92 & 118

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

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MHP - Manually Operated Hydrotest Pumps

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SPP - Heavy Duty Hydraulic Pullers

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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

TL - ToughLift Jacking Systems

See pages 170-174

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