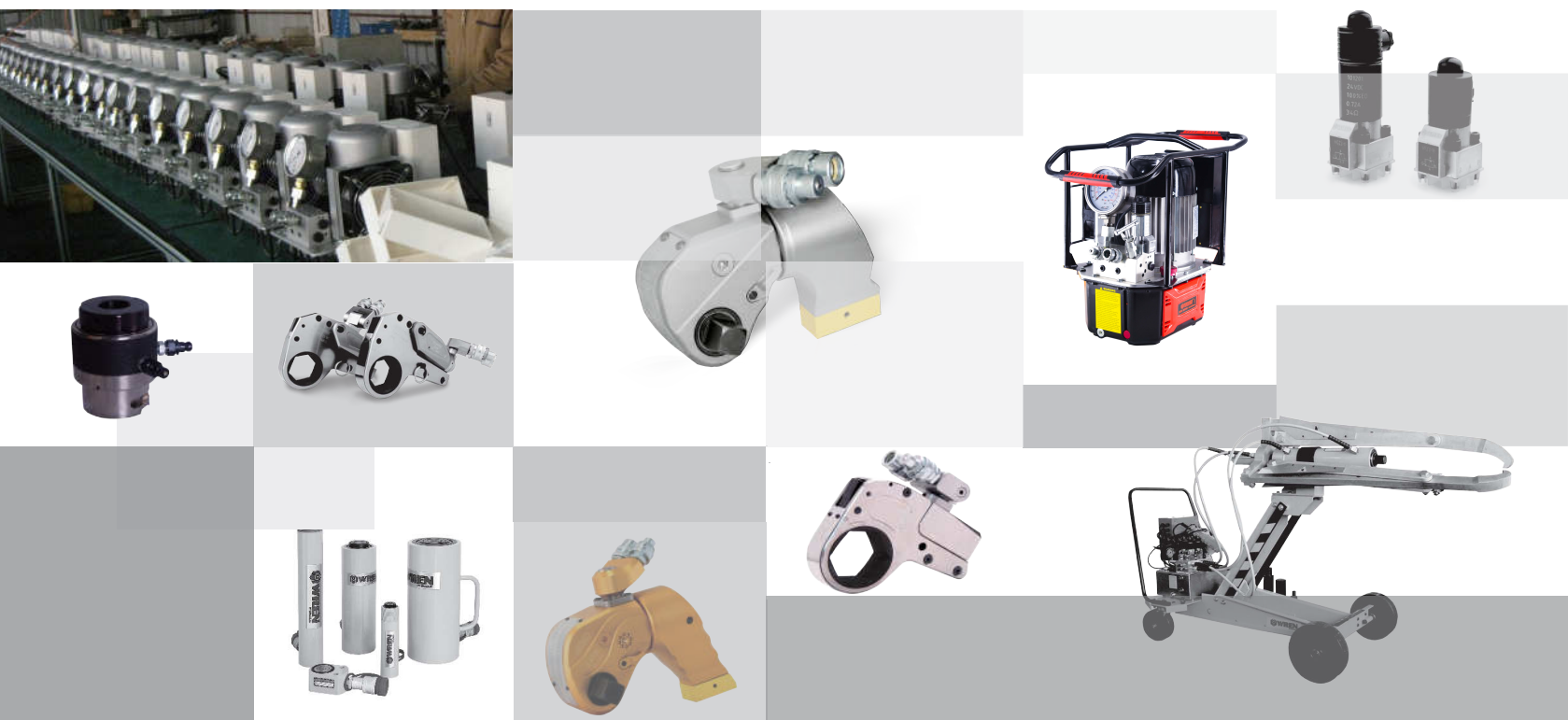


# Hydraulic Tools For Industrial Applications



# Introduction

**WREN was established in 1992 as a professional manufacturer of a complete range hydraulic equipment from 70Mpa to 300Mpa operating pressures. Over the past twenty years we have worked closely with our customers from Europe, United States and around the rest of the world to bring the latest innovations and technology to the global hydraulic equipment market. By investing in the latest technology research we have been able to develop a range of leading specialist hydraulic tools such as our super high pressure pumps and torque wrenches. We focus on providing the highest quality products manufactured with state of the art CNC technology, using international quality standards as our base, adding innovations developed by our high qualified technical team at WREN, to providing world leading products setting new standards for the term 'Made in China' on world markets.**



# Corporation Summarize

## CNC workshop



## 3400M<sup>2</sup> Warehouse



## Worldwide Distributors



## CE certificate / ISO9001:2008 Quality System / Excellent Supplier Qualification



# Catalog

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WREN company has passed the German Rhine (TUV) quality certification



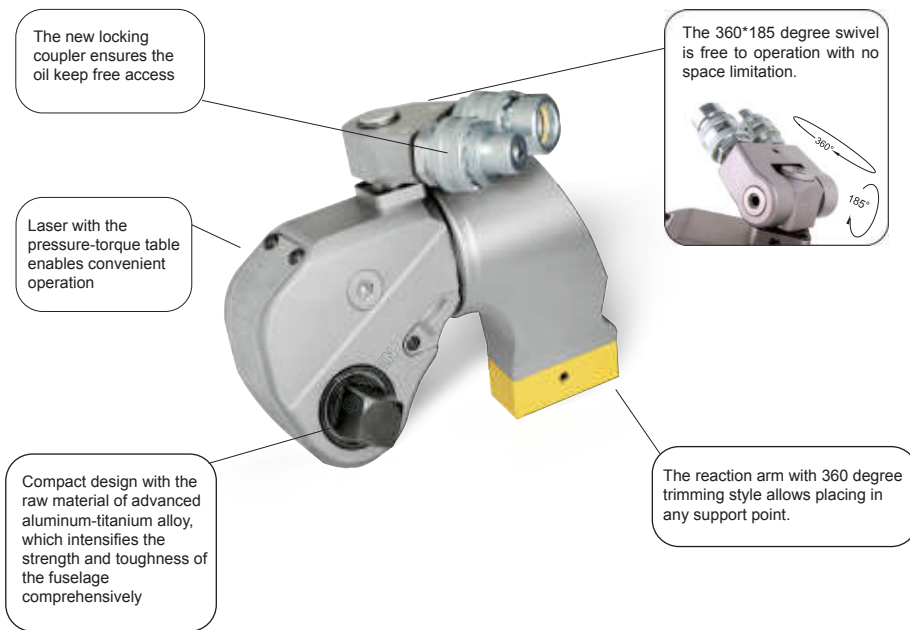
WREN company has passed the Alibaba depth certification in 2010



WREN has got the CE certificate in 2012



# IBT series Square drive hydraulic torque wrench



- 700bar Max working pressure and the accuracy keep within  $\pm 3\%$
- All together 10 models with the range from 112N.m to 72000N.m, which covers the most bolts size, and be the most comprehensive available in the market.
- The 360\*185 degree swivel is free to operation with no space limitation.
- The square drive operate with the high intense socket and suitable with large range of bolts
- 360 degree adjustable reaction arm allows placing in any support point.
- Compact design with the raw material of advanced aluminum-titanium alloy, high intense.

## IBT Series Selection Chart

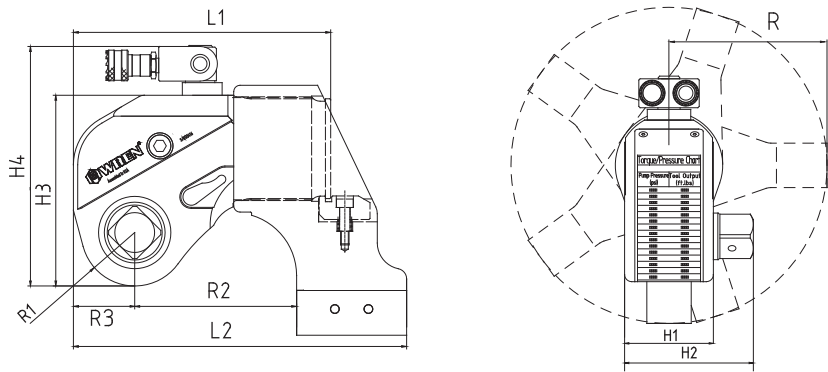
TYPE	07IBT	1IBT	3IBT	5IBT	8IBT	10IBT	20IBT	25IBT	35IBT	50IBT
Torque (N.m)	112~1120	183~1837	451~4512	752~7528	1078~10780	1551~15516	2666~26664	3472~34725	4866~48666	7200~72000
Bolt size (M)	14~30	16~36	22~48	27~56	30~64	36~72	42~90	48~100	64~120	72~125
Weight(Kg)	1.8	2.5	5	8	11	15	26.5	35	50	87
Square Drive	3/4"	3/4"	1"	1-1/2"	1-1/2"	1-1/2"	2-1/2"	2-1/2"	2-1/2"	2-1/2"

## Industrial Applications:



# IBT series Square drive hydraulic torque wrench

IBT series is the professional hydraulic torque wrench which WREN vigorously extends in international market. Its raw material is aluminum-titanium alloy which makes the wrench light and high intense. IBT series has 10 models with the range from 112N.m to 72000N.m; covers the most of bolts size, and be the most comprehensive available in the market. WREN provide after-sales service all over the world, and already got the approved by CE certificate.

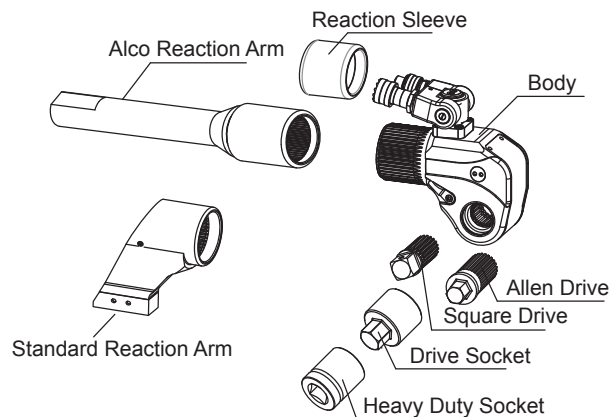


IBT Dimension Chart

TYPE	L1 (mm)	L2 (mm)	H1 (mm)	H2 (mm)	H3 (mm)	H4 (mm)	R (mm)	R1 (mm)	R2 (mm)	R3 (mm)
07IBT	110.8	139.3	42	65.8	76.2	108.1	75	20.5	68.3	25
11IBT	144.5	173.5	50	72	96	131	91.5	26	85	29
31IBT	178	229	68	95	127	176.5	123.5	34	114	40
51IBT	210.5	270.5	80	123	149	199	140	39	137	46.5
81IBT	222	293	90	134	167	217	165	47	153	47
101IBT	245.5	317.5	100	142	182	232	178	51	154	58.5
201IBT	307.5	383.5	120	183	220	270	213	59	186	71
251IBT	323	401	137	200	247	297	228	66	199	66
351IBT	372.5	496.5	153	216	282	332	243.5	77	241	79
501IBT	400	516	160	223	291	341	258	81	259	97.5

## Accessory:

For Special Reaction Arm, consult to WREN !



# LOW series Low Profile Hydraulic Torque Wrench

The reaction pawl officially overcome the possibility of ratchet reversing opposite; enhance the efficiency and precision of torque.



360\*185 degree swivel or 360\*360 degree swivel allow the wrench free to operation with no space limitation.



- 700bar max working pressure; keep the accuracy  $\pm 3\%$ .
- 5 models with the range from 232-44593N.m
- 360\*185 degree swivel & 360\*360 degree swivel allow the wrench free to operation with no space limitation.
- More accuracy and easier when the wrench direct operate on the nuts.
- Compact design with longer arm fully advances the reliability.
- Compact design with the raw material of advanced aluminum-titanium alloy, high intense.

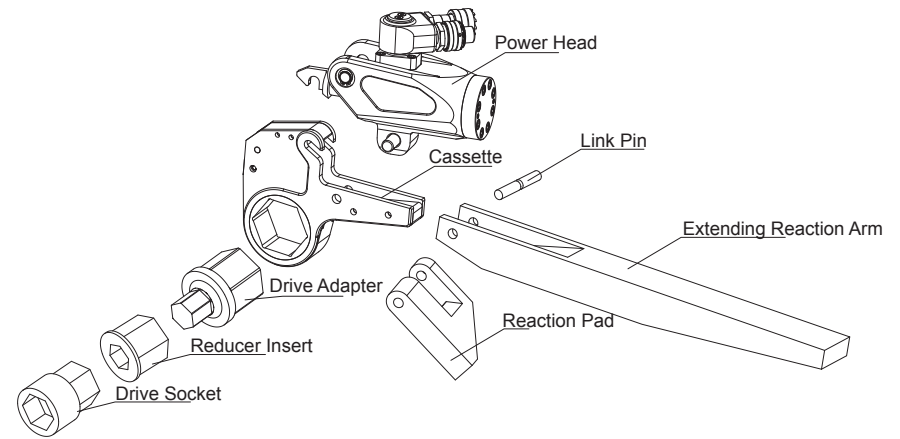
LOW series is the professional Low profile hydraulic torque wrench which WREN vigorously extends in international market. Compare with the square drive hydraulic torque wrench, this series work directly on the nuts, and its body suits well in the narrow space. LOW covers the nuts from S19 to S175. To fulfill all different working situations, the user can just replace the hexagon cassette because the hexagon cassette is changeable, or add the reducer. WREN provide after-sales service all over the world, and already got the approved by CE certificate.

More accuracy and easier when the wrench direct operate on the nuts.

Compact design with longer arm fully advances the reliability.

## Accessory:

Reaction Pad	
Extending Reaction Arm	



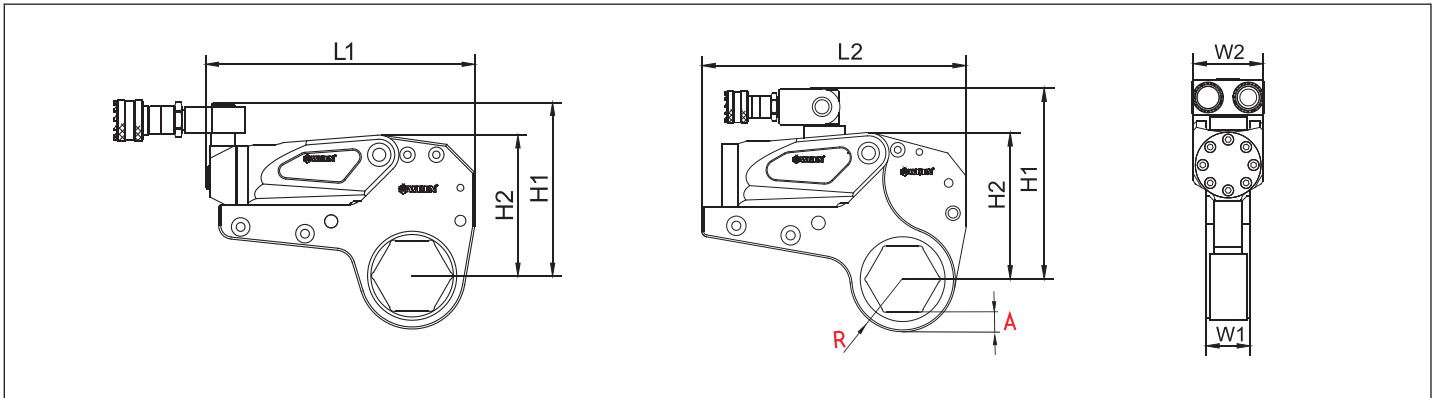
## LOW Paramete Chart

TYPE	Torque (N.m)	Nut Sizes (mm)	Power Head Weight (Kg)	Cassette Weight (Kg)	Sizes (mm)							
					L1	L2	H1	H2	W1	W2		
<b>2LOW</b>	232~2328	19~55	1	1.6	196.4	196.4	125.9	102.3	32	51		
	241~2414	60	1	1.7			128.5	105	32	51		
<b>4LOW</b>	585~2510	34~36	2	4.4	245	246	177	135.7	42	66		
	585~5021	41		4.6			187	145.7	42	66		
	585~5858	46~65	8	8.4			300	301	207	169	53	83
	647~6474	70~80							216	178	53	83
<b>8LOW</b>	1094~10941	41~95	3.3	8	361	361			239	204	64	99
	1177~11774	100~105	3.3	8.4					239	204	64	99
<b>14LOW</b>	1852~18521	50~117	5.5	11.6	430	441	303	272	85	131		
	4459~44593	160~175	11.4	30			315	285	85	131		



# LOW series Low Profile Hydraulic Torque Wrench

## LOW Dimension Drawing



## LOW Series Hexagon Cassette Selection Chart

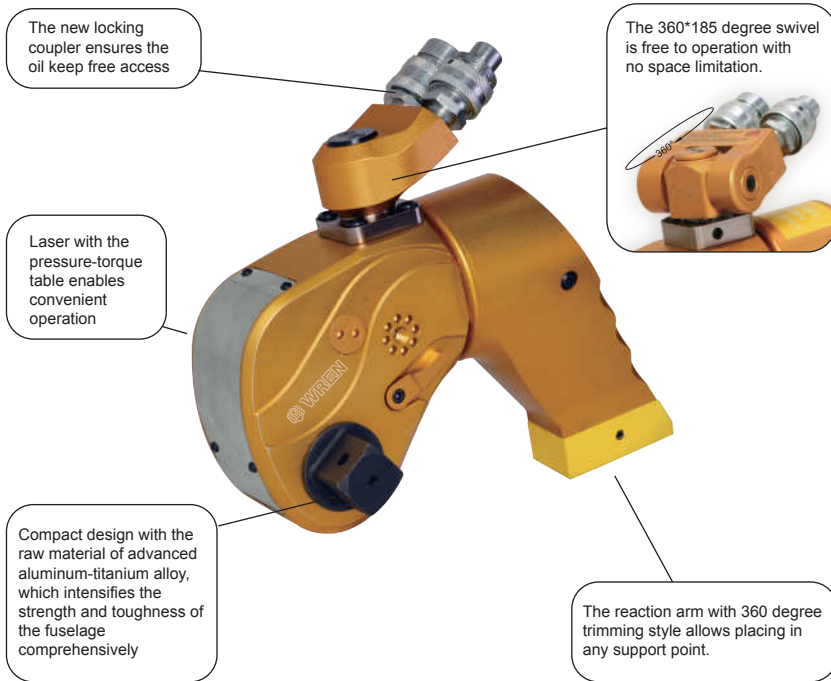
2LOW				4LOW				8LOW				14LOW				30LOW			
Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque
2LOW-19	27	16	2328	4LOW-34	36	16	2510	8LOW-41	46	22	10941	14LOW-50	60	31	18521	30LOW-85	78	28	41882
2LOW-22	27	14	2328	4LOW-36	36	15	2510	8LOW-46	46	19	10941	14LOW-55	60	28	18521	30LOW-90	78	27	41882
2LOW-27	27	11	2328	4LOW-41	39	15	5021	8LOW-50	46	17	10941	14LOW-60	60	25	18521	30LOW-95	83	28	41882
2LOW-30	29	12	2328	4LOW-46	42	15	5858	8LOW-55	50	18	10941	14LOW-65	60	22	18521	30LOW-100	83	25	41882
2LOW-32	29	11	2328	4LOW-50	44	15	5858	8LOW-60	52	17	10941	14LOW-70	60	19	18521	30LOW-105	89	28	41882
2LOW-34	31	11	2328	4LOW-55	46	14	5858	8LOW-65	55	17	10941	14LOW-75	63	19	18521	30LOW-110	89	25	41882
2LOW-36	31	10	2328	4LOW-60	50	15	5858	8LOW-70	58	17	10941	14LOW-80	66	19	18521	30LOW-115	95	28	41882
2LOW-41	34	10	2328	4LOW-65	53	15	5858	8LOW-75	60	17	10941	14LOW-85	69	19	18521	30LOW-117	95	27	41882
2LOW-46	37	10	2328	4LOW-70	56	15	6474	8LOW-80	63	16	10941	14LOW-90	72	20	18521	30LOW-120	95	25	41882
2LOW-50	40	11	2328	4LOW-75	59	15	6474	8LOW-85	66	16	10941	14LOW-95	74	19	18521	30LOW-125	101	29	41882
2LOW-55	43	11	2328	4LOW-80	61	15	6474	8LOW-90	69	17	10941	14LOW-100	77	19	18521	30LOW-130	101	26	41882
2LOW-60	46	11	2414					8LOW-95	71	16	10941	14LOW-105	80	19	18521	30LOW-135	104	26	41882
								8LOW-100	75	17	11774	14LOW-110	83	19	18521	30LOW-140	110	29	41882
								8LOW-105	78	17	11774	14LOW-115	87	20	18521	30LOW-145	110	26	41882
												14LOW-117	87	19	18521	30LOW-150	116	29	41882
																30LOW-155	116	26	41882
																30LOW-160	128	36	44593
																30LOW-165	128	33	44593
																30LOW-170	128	30	44593
																30LOW-175	128	27	44593

WREN can be customized according to customer requirements of special types of cassette.

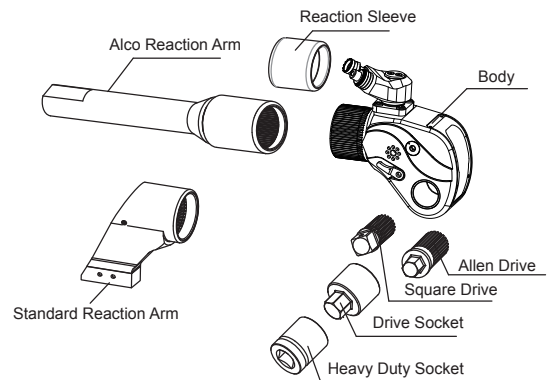
## Industrial Applications:



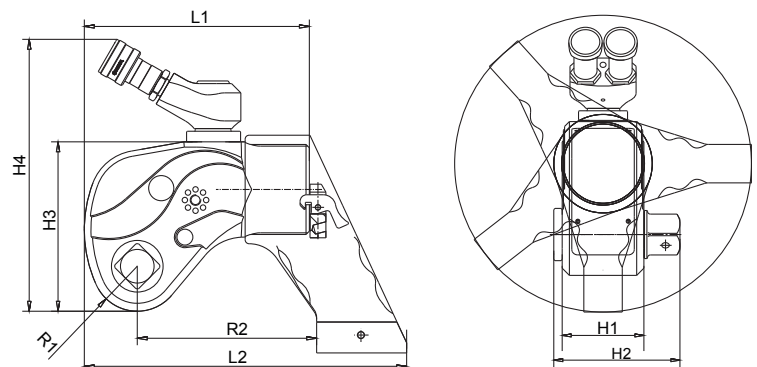
# ATWS series Square drive hydraulic torque wrench



- 700bar Max working pressure and the accuracy keep within  $\pm 3\%$
- All together 6 models with the range from 183N.m to 48666N.m, which covers the most bolts size, and be the most comprehensive available in the market.
- 360 degree or 360 X 185 degree swivel coupling.
- The square drive operate with the high intense socket and suitable with large range of bolts
- 360 degree adjustable reaction arm allows placing in any support point.
- Compact design with the raw material of advanced aluminum-titanium alloy, high intense.



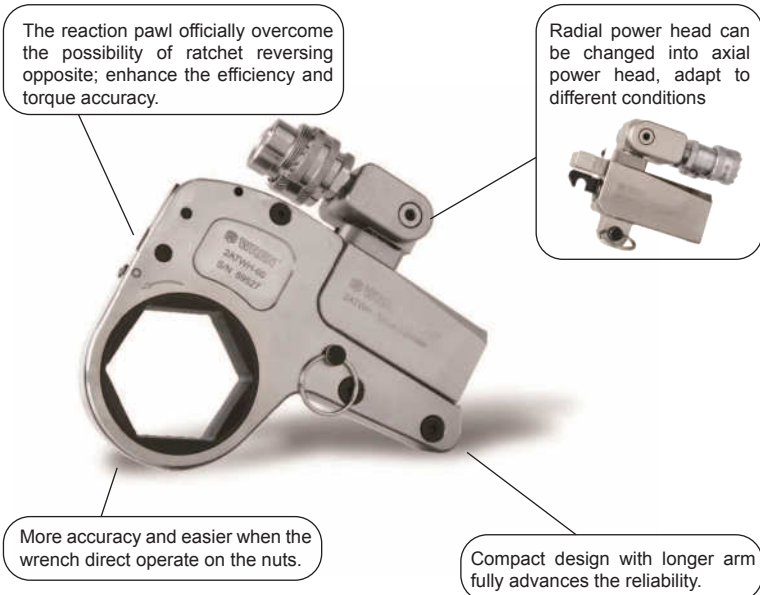
ATWS series is the professional hydraulic torque wrench which WREN vigorously extends in international market. Its raw material is aluminum-titanium alloy which makes the wrench light and high intense. ATWS series has 6 models with the range from 183N.m to 48666N.m; covers the most of bolts size, and be the most comprehensive available in the market. WREN provide after-sales service all over the world, and already got the approved by CE certificate.



## ATWS Series Selection Chart

TYPE	1ATWS	3ATWS	5ATWS	8ATWS	10ATWS	20ATWS	25ATWS	35ATWS
Torque (N.m)	183~1837	455~4553	758~7580	1096~10952	1456~14560	2666~26664	3472~34725	4866~48666
Bolt size (M)	16~36	22~48	27~56	30~64	36~72	42~90	48~100	64~120
Weight Kg	2.5	5	8	11	15	26.5	35Kg	50Kg
L1 (mm)	135	170	204	220	245	303	315	360
L2 (mm)	186	244	285	313	352	451	463	495
H1 (mm)	50	68	80	90	101	120	137	153
H2 (mm)	80	105	132	143	153	189	208	228
H3 (mm)	98	128	152	167	182	223	248	282
H4 (mm)	175	206	230	244	260	300	325	360
R1 (mm)	28	34	41	47	51	62	67	77
R2 (mm)	100	136	150	175	183	255	251	271
Square Drive	3/4"	1"	1-1/2"	1-1/2"	1-1/2"	2-1/2"	2-1/2"	2-1/2"

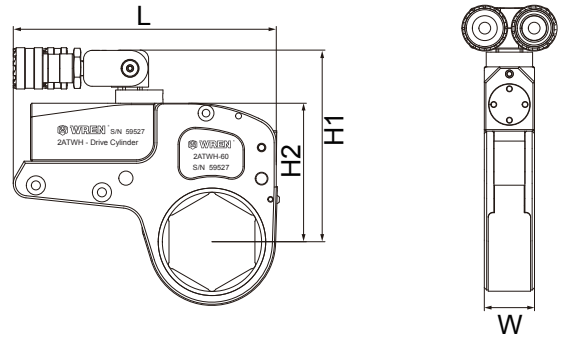
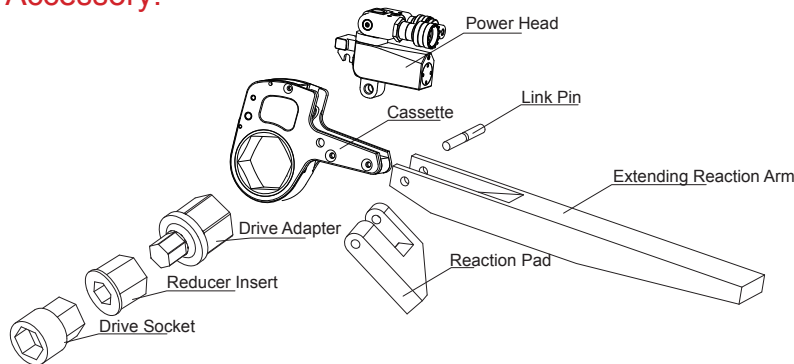
# ATWH series Low Profile Hydraulic Torque Wrench



- 700bar max working pressure; keep the accuracy  $\pm 3\%$ .
- 5 models with the range from 225-44593N.m
- 360°\*185 degree swivel allow the wrench free to operation with no space limitation.
- More accuracy and easier when the wrench direct operate on the nuts.
- Compact design with longer arm fully advances the reliability.
- Compact design with the raw material of advanced aluminum-titanium alloy, high intense.

ATWH series is the professional Low profile hydraulic torque wrench which WREN extends in international market. Compared with the square drive hydraulic torque wrench, this series work directly on the nuts, and its body suits well in the narrow space. ATWH covers the nuts from S19 to S175. To fulfill all different working situations, the user can just replace the hexagon cassette because the hexagon cassette is changeable, or add the reducer. WREN provide after-sales service all over the world, and already got the approved by CE certificate.

## Accessory:



Reaction Pad	
Extending Reaction Arm	

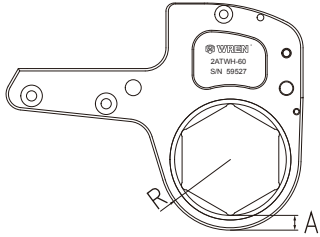
## Parameter Chart

TYPE	Torque (N.m)	Nut Sizes (mm)	Power Head Weight (Kg)	Cassette Weight (Kg)	Sizes (mm)			
					L	H1	H2	W
<b>08ATWH</b>	113~1128	30~36	0.7	0.8	150	115	77	26
<b>2ATWH</b>	225~2255	19~55	0.9	1.5	186	132	95	32
	233~2338	60	0.9	1.5	186	135	98	32
<b>4ATWH</b>	520~5208	34~65	1.6	3.4	251	176	127	42
	575~5755	70~80	1.6	3.4	256	186	137	42
<b>8ATWH</b>	1043~10438	41~95	3.1	6.3	308	211	154	53
	1123~11233	100~105	3.1	6.3	308	220	163	53
<b>14ATWH</b>	1852~18521	50~117	4.8	11.4	378	252	200	64
<b>30ATWH</b>	4188~41882	110~155	10.5	20.5	460	300	253	85
	4459~44593	160~175	10.5	20.5	460	313	266	85


# ATWH series Low Profile Hydraulic Torque Wrench



Every model of ATWH power head covers a complete set of hexagon cassette, combines all the bolt size within its torque range. When choosing the correct hexagon cassette, ensure the distance between bolt and equipment partition must larger than the distance of "A". Pay attention that there is enough space between bolts. The "A" and "R" in below table will be helpful.



**Reducer**  
Reducer work together with the ATWH Ratchet link. One single Ratchet link is suitable for many bolts sizes.(by the reducer, please contact WREN engineer)

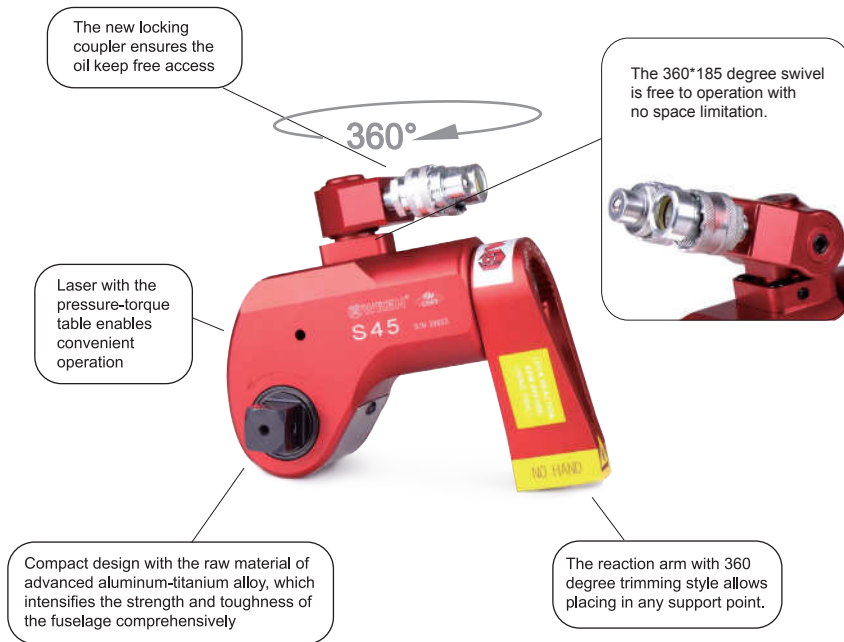


## Series Hexagon Cassette Selection Chart

08ATWH				2ATWH				4ATWH				8ATWH				14ATWH				30ATWH			
Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque
08ATWH-30	26	8	1128	2ATWH-19	27	16	2328	4ATWH-34	36	16	2510	8ATWH-41	46	22	10941	14ATWH-50	60	31	18521	30ATWH-85	78	28	41882
08ATWH-36	29	8	1128	2ATWH-22	27	14	2328	4ATWH-36	36	15	2510	8ATWH-46	46	19	10941	14ATWH-55	60	28	18521	30ATWH-90	78	27	41882
				2ATWH-27	27	11	2328	4ATWH-41	39	15	5021	8ATWH-50	46	17	10941	14ATWH-60	60	25	18521	30ATWH-95	83	28	41882
				2ATWH-30	29	12	2328	4ATWH-46	42	15	5858	8ATWH-55	50	18	10941	14ATWH-65	60	22	18521	30ATWH-100	83	25	41882
				2ATWH-32	29	11	2328	4ATWH-50	44	15	5858	8ATWH-60	52	17	10941	14ATWH-70	60	19	18521	30ATWH-105	89	28	41882
				2ATWH-34	31	11	2328	4ATWH-55	46	14	5858	8ATWH-65	55	17	10941	14ATWH-75	63	19	18521	30ATWH-110	89	25	41882
				2ATWH-36	31	10	2328	4ATWH-60	50	15	5858	8ATWH-70	58	17	10941	14ATWH-80	66	19	18521	30ATWH-115	95	28	41882
				2ATWH-41	34	10	2328	4ATWH-65	53	15	5858	8ATWH-75	60	17	10941	14ATWH-85	69	19	18521	30ATWH-117	95	27	41882
				2ATWH-46	37	10	2328	4ATWH-70	56	15	6474	8ATWH-80	63	16	10941	14ATWH-90	72	20	18521	30ATWH-120	95	25	41882
				2ATWH-50	40	11	2328	4ATWH-75	59	15	6474	8ATWH-85	66	16	10941	14ATWH-95	74	19	18521	30ATWH-125	101	29	41882
				2ATWH-55	43	11	2328	4ATWH-80	61	15	6474	8ATWH-90	69	17	10941	14ATWH-100	77	19	18521	30ATWH-130	101	26	41882
				2ATWH-60	46	11	2414					8ATWH-95	71	16	10941	14ATWH-105	80	19	18521	30ATWH-135	104	26	41882
												8ATWH-100	75	17	11774	14ATWH-110	83	19	18521	30ATWH-140	110	29	41882
												8ATWH-105	78	17	11774	14ATWH-115	87	20	18521	30ATWH-145	110	26	41882
																14ATWH-117	87	19	18521	30ATWH-150	116	29	41882
																				30ATWH-155	116	26	41882
																				30ATWH-160	128	36	44593
																				30ATWH-165	128	33	44593
																				30ATWH-170	128	30	44593
																				30ATWH-175	128	27	44593

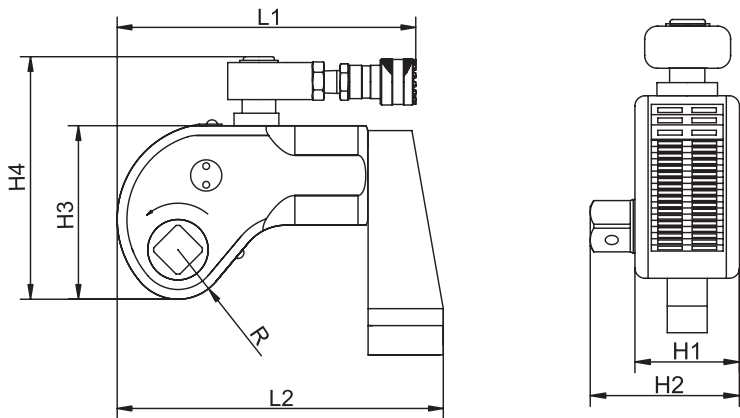
WREN can be customized according to customer requirements of special types of cassette.

# S series Square Drive Torque Wrench



- 700bar maximum working pressure; Repeat accuracy  $\pm 3\%$ .
- 5 different model from 1727-36992N.m
- 360 degree or 360 X 185 degree swivel coupling.
- Working with the high resistance sockets, above more size of screw
- 360° Adjustable reaction arm with safely lock feature, can be used without reaction arm
- High resistance with aluminum-titanium and light body
- Replaceable square drive adapters

S configured with high technology, ideal for long-term usage by means of aluminum-titanium design. Besides having calibration service and support WREN S is one of the important brands that can accomplish big missions even its small body. Almost every tightening & loosening problems can be accomplished with these series that have a torque capacity up to 3.6992 Nm. WREN serves a wide range accessory for S series. These products which are designed for serving true resolutions, entitled with CE seal result of an effort with appropriate directives.



## S Series Technical Data

model	Torque (N.m)	Bolt size (M)	Square drive inches	Weight (Kg)	Sizes (mm)						
					L1	L2	H1	H2	H3	H4	R
<b>S17</b>	172~1727	16~36	3/4 "	2	129	167	51	73	90	131	25
<b>S45</b>	452~4529	22~48	1 "	4.6	167	218	68	98	121	170	34
<b>S100</b>	1006~10064	30~64	1 1/2 "	10	223	293	92	135	163	211	46
<b>S150</b>	1497~14974	36~72	1 1/2 "	14.8	264	323	100	141	177	225	50
<b>S370</b>	3699~36992	48~100	2 1/2 "	32.5	329	432	137	204	240	288	66

# H series Low Profile Torque Wrench

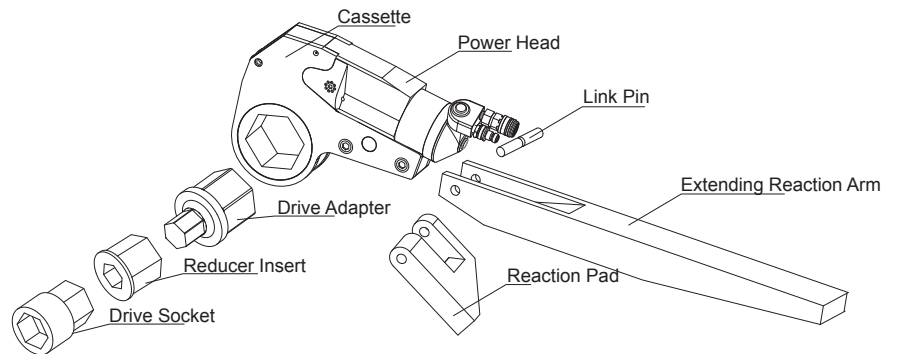
- 700bar maximum working pressure; Repeat accuracy  $\pm 3\%$ .
- 5 different model from 2625-48481N.m
- Fitted with 360°x360° uni-swivel quick release couplings
- Low profile design to accessing limited areas
- Drivers and adaptors can be replaced easily

H low profile torque wrenches designed for accessing limited areas and serves good solutions with numbers of replaceable cassettes and adaptors. Drivers can be replaced easily and fast without using any tools. Saves time by means of easy replacement of attachments. Light weight aluminum design allows easy operations even in robust conditions.



## Accessory:

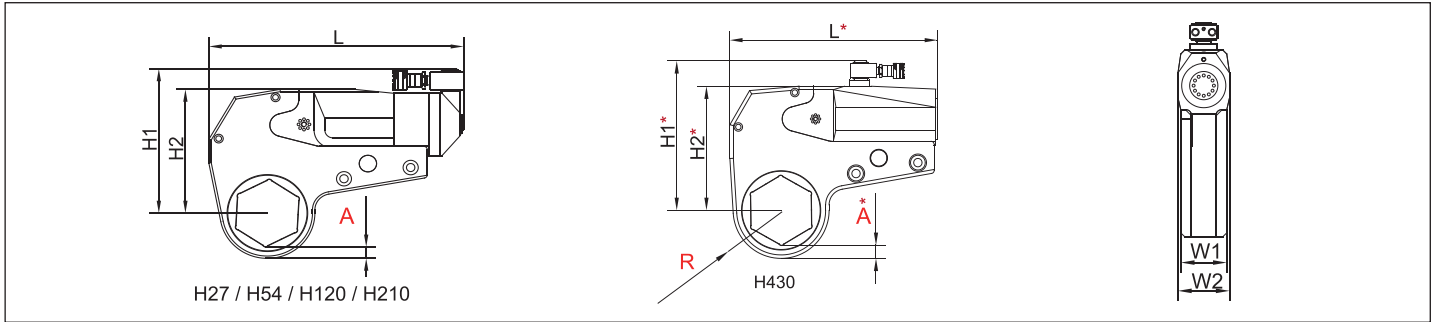
Reaction Pad	
Extending Reaction Arm	



## H Series Technical Data

model	Torque (N.m)	Bolt size (mm)	Weight (Kg)	Cassette Weight (Kg)	Sizes (mm)					
					L	H1	H2	W1	W2	A
<b>H27</b>	262~2625	19~46	0.9		193	125	97	32	51	10~15
	306~3068	50~60			193	136	108	32	51	10~11
<b>H54</b>	537~5372	27~65	1.9		250	158	125	41	64	11~19
	603~6037	70~80			250	169	136	41	64	11.7~12
<b>H120</b>	1173~11737	50~80	3.4		310	189	157	52	78	15~15.2
	1434~14349	85~105			310	214	182	52	78	16~22
<b>H210</b>	2121~21216	70~100	5.9		378	223	191	64	97	8~21
	2312~23124	105~115			378	236	204	64	97	18~24
<b>H430</b>	4379~43792	80~117	16.1		405 *	291 *	242 *	83	93	25~31 *
	4848~48481	120~175			425 *	309 *	260 *	83	93	25~34 *

## H Dimension Drawing



## Choice of Cassettes

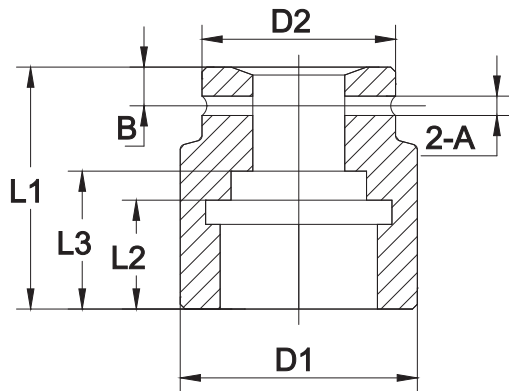
H27				H54				H120				H210				H430			
Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque	Type	R	A	Max Torque
H27-19	26	15	2625	H54-27	36	19	5372	H120-50	44	15	11737	H210-70	59	18	21216	H430-80	72	25	43792
H27-22	26	14	2625	H54-30	35	17	5372	H120-55	47	15	11737	H210-75	62	18	21216	H430-85	78	28	43792
H27-27	26	11	2625	H54-32	35	16	5372	H120-60	50	15	11737	H210-80	65	18	21216	H430-90	78	25	43792
H27-30	28	11	2625	H54-34	35	15	5372	H120-65	53	15	11737	H210-85	68	18	21216	H430-95	84	28	43792
H27-32	28	10	2625	H54-36	35	14	5372	H120-70	56	15	11737	H210-90	71	18	21216	H430-100	84	26	43792
H27-34	31	11	2328	H54-41	35	11	5372	H120-75	58	15	11737	H210-95	74	18	21216	H430-105	90	28	43792
H27-36	31	10	2625	H54-46	37	11	5858	H120-80	61	15	11737	H210-100	77	18	21216	H430-110	90	26	43792
H27-41	34	10	2625	H54-50	41	12	5372	H120-85	66	16	14349	H210-105	79	18	23124	H430-115	94	28	43792
H27-46	37	10	2625	H54-55	44	12	5372	H120-90	69	16	14349	H210-110	82	18	23124	H430-117	94	26	43792
H27-50	40	11	3068	H54-60	47	12	5372	H120-95	71	16	14349	H210-115	87	21	23124	H430-120	101	31	48481
H27-55	42	11	3068	H54-65	50	12	5372	H120-100	77	19	14349					H430-125	101	28	48481
H27-60	45	10	3068	H54-70	52	12	6037	H120-105	77	16	14349					H430-130	101	25	48481
				H54-75	56	12	6037									H430-135	105	26	48481
				H54-80	58	12	6037									H430-140	110	29	48481
																H430-145	110	26	48481
																H430-150	115	29	48481
																H430-155	115	26	48481
																H430-160	121	29	48481
																H430-165	121	26	48481
																H430-170	128	30	48481
																H430-175	128	27	48481

WREN can be customized according to customer requirements of special types of cassette.

## Industrial Applications:



# Sockets



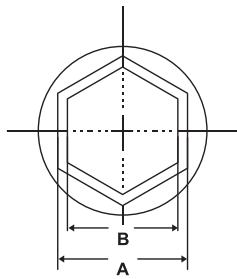
Can order imperial and non-standard socket

Standard sockets selection chart

Bolt Type		3/4" 07IBT/1IBT								1" 3IBT								1-1/2" 5,8,10IBT								2-1/2" 20,25,35,50IBT							
D	N	A	B	L1	L2	L3	D1	D2	A	B	L1	L2	L3	D1	D2	A	B	L1	L2	L3	D1	D2	A	B	L1	L2	L3	D1	D2				
M16	24	6.3	10	54	32	32	40	40																									
M18	27	6.3	10	54	32	32	42	42																									
M20	30	6.3	10	54	33	33	46	44	8	14	59	32	32	54	54																		
M22	34	6.3	10	54	33	33	52	44	8	14	59	32	32	58	58																		
M24	36	6.3	10	57	33	33	54	44	8	14	62	32	32	59	59	8	16	85	44	44	74	74											
M27	41	6.3	10	58	33	33	60	44	8	14	65	38	38	67	54	8	16	85	44	44	74	74											
M30	46	6.3	10	63	38	38	66	44	8	14	65	38	38	74	54	8	16	85	44	44	74	74											
M33	50	6.3	10	65	40	40	71	44	8	14	70	43	43	79	60	8	16	90	45	45	79	79											
M36	55	6.3	10	70	45	45	77	54	8	14	80	42	52	84	60	8	16	90	45	45	84	84	8	18	100	57	57	86	114				
M39	60								8	14	85	45	57	89	60	8	16	100	45	57	94	75	8	18	100	52	52	119	119				
M42	65								8	14	85	45	57	98	70	8	16	100	45	57	98	80	8	18	100	52	52	119	119				
M45	70								8	14	90	50	62	104	70	8	16	105	50	62	104	80	8	18	120	67	67	128	128				
M48	75								8	14	95	50	65	108	70	8	16	110	50	65	118	85	8	18	120	67	67	128	128				
M52	80															8	16	115	55	72	118	90	8	18	130	71	71	128	128				
M56	85															8	16	125	60	77	128	90	8	18	130	71	71	129	129				
M60	90															8	16	125	60	77	139	90	8	18	140	61	73	139	139				
M64	95															8	16	130	65	82	139	90	8	18	140	66	73	139	139				
M68	100															8	16	135	70	87	144	90	8	18	140	71	81	148	130				
M72	105															8	16	135	70	87	149	90	8	18	150	77	89	156	130				
M76	110															8	16	135	70	87	158	90	8	18	150	72	90	158	130				
M80	115															8	16	135	70	87	159	95	8	18	150	82	98	168	130				
M85	120															8	16	135	70	87	168	95	8	18	150	82	98	178	130				
M90	130															8	16	155	93	105	189	95	8	18	170	93	114	189	130				
M95	135																						8	18	170	93	114	198	130				
M100	145																						8	18	170	98	122	210	152				
M105	150																						8	18	190	100	140	216	152				
M110	155																						8	18	190	100	140	229	152				
M115	165																						8	18	190	100	140	241	152				



# Reducer Insert



Standard reducer inserts selection chart

Can order imperial and non-standard Reducer Inserts

Wrench Model	Cassette	Nut Size (S)	Reducer Insert						Locking ring
			Type	A/B (mm)	Type	A/B (mm)	Type	A/B (mm)	
<b>2 LOW</b>	2LOW-50	50	2G5041	50/41	2G5036	50/36	2G5032	50/32	H-50
	2LOW-46	46	2G4636	46/36	2G4632	46/32	2G4630	46/30	H-46
	2LOW-41	41	2G4132	41/32	2G4130	41/30	2G4127	41/27	H-41
	2LOW-36	36	2G3630	36/30	2G3627	36/27			H-36
	2LOW-32	32	2G3227	32/27					H-32
	2LOW-30	30							
	2LOW-27	27							
<b>4 LOW</b>	4LOW-65	65	4G6555	65/55	4G6550	65/50	4G6546	65/46	H-56
	4LOW-60	60	4G6050	60/50	4G6046	60/46	4G6041	60/41	H-60
	4LOW-55	55	4G5546	55/46	4G5541	55/41	4G5536	55/36	H-55
	4LOW-50	50	4G5041	50/41	4G5036	50/36	4G5032	50/32	H-50
	4LOW-46	46	4G4636	46/36	4G4632	46/32	4G4630	46/30	H-46
	4LOW-41	41	4G4132	41/32	4G4130	41/30	4G4127	41/27	H-41
	4LOW-36	36	4G3630	36/30	4G3627	36/27			H-36
	4LOW-32	32	4G3227	32/27					H-32
	4LOW-30	30							
<b>8 LOW</b>	8LOW-90	90	8G9080	90/80	8G9075	90/75	8G9070	90/70	H-90
	8LOW-85	85	8G8575	85/75	8G8570	85/70	8G8565	85/65	H-85
	8LOW-80	80	8G8070	80/70	8G8065	80/65	8G8060	80/60	H-80
	8LOW-75	75	8G7565	75/65	8G7560	75/60	8G7555	75/55	H-75
	8LOW-70	70	8G7060	70/60	8G7055	70/55	8G7050	70/50	H-70
	8LOW-65	65	8G6555	65/55	8G6550	65/50	8G6545	65/45	H-65
	8LOW-60	60	8G6050	60/50	8G6046	60/46			H-60
	8LOW-55	55	8G5546	55/46	8G5541	55/41			H-55
	8LOW-50	50							
<b>14 LOW</b>	14LOW-115	115	14G115105	115/105	14G115100	115/100	14G11595	115/95	H-115
	14LOW-110	110	14G110100	110/100	14G11095	110/95	14G11090	110/90	H-110
	14LOW-105	105	14G10595	105/95	14G10590	105/90	14G10585	105/85	H-105
	14LOW-100	100	14G10090	100/90	14G10085	100/85	14G10080	100/80	H-100
	14LOW-95	95	14G9585	95/85	14G9580	95/80	14G9575	95/75	H-95
	14LOW-90	90	14G9080	90/80	14G9075	90/75	14G9070	90/70	H-90
	14LOW-85	85	14G8575	85/75	14G8570	85/70	14G8565	85/65	H-85
	14LOW-80	80	14G8070	80/70	14G8065	80/65			H-80
	14LOW-75	75	14G7565	75/65					H-75
	14LOW-70	70							
	14LOW-65	65							
<b>30 LOW</b>	30LOW-155	155	30G155145	155/145	30G155130	155/130	30G155120	155/120	H-155
	30LOW-145	145	30G145130	145/130	30G145120	145/120	30G145115	145/115	H-145
	30LOW-130	130	30G130120	130/120	30G130115	130/115	30G130110	130/110	H-130
	30LOW-120	120	30G120110	120/110	30G120105	120/105	30G120100	120/100	H-120
	30LOW-115	115	30G115105	115/105	30G115100	115/100	30G11595	115/95	H-115
	30LOW-110	110	30G110100	110/100	30G11095	110/95	30G11090	110/90	H-110
	30LOW-105	105	30G10595	105/95	30G10590	105/90	30G10590	105/90	H-105
	30LOW-100	100	30G10090	100/90	30G10085	100/85	30G10080	100/80	H-100
	30LOW-95	95	30G9585	95/85	30G9580	95/80			H-95
	30LOW-90	90	30G9080	90/80					H-90
	30LOW-85	85							
	30LOW-80	80							

# The Choosing Of Hydraulic Torque Wrench

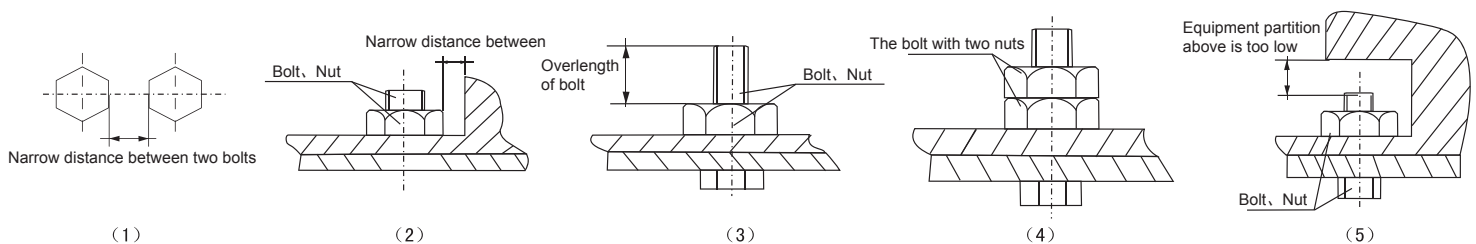
The bolt and nut pretightening force recommended chart.

Strength Grade		4.8		6.8		8.8		10.9		12.9	
Minmum Breaking Strength		392Mpa		588Mpa		784Mpa		941Mpa		1176Mpa	
Material		Q235(SS41)		35(S35C)		35CrMo(SCM3)		42CMo(SCM4)		40GrNiMoA(SNCM)	
Bolt M(mm)	Diameter S(mm)	Torque		Torque		Torque		Torque		Torque	
		KGM	N.m	KGM	N.m	KGM	N.m	KGM	N.m	KGM	N.m
14	22	7	69	10	98	14	137	17	165	23	225
16	24	10	98	14	137	21	206	25	247	36	363
18	27	14	137	21	206	39	284	35	341	49	480
20	30	18	176	28	296	41	402	58	569	69	680
22	32	23	225	34	333	55	539	78	765	93	911
24	36	32	314	48	470	70	686	100	981	120	1176
27	41	45	441	65	637	105	1029	150	1472	180	1764
30	46	60	588	90	882	125	1225	200	1962	240	2352
33	50	75	735	115	1127	150	1470	210	2060	250	2450
36	55	100	980	150	1470	180	1764	250	2453	300	2940
39	60	120	1176	180	1764	220	2156	300	2943	370	3626
42	65	155	1519	240	2352	280	2744	390	3826	470	4606
45	70	180	1764	280	2744	320	3136	450	4415	550	5390
48	75	230	2254	350	3430	400	3920	570	5592	680	6664
52	80	280	2744	420	4116	480	4704	670	6573	850	8330
56	85	360	3528	530	5149	610	5978	860	8437	1050	10290
60	90	410	4018	610	5978	790	7742	1100	10791	1350	13230
64	95	510	4998	760	7448	900	8820				
68	100	580	5684	870	8526	1100	10780				
72	105	660	6468	1000	9800	1290	12642				
76	110	750	7350	1100	10780	1500	14701				
80	115	830	8143	1250	12250	1850	18130				
85	120	900	8820	1400	13720	2250	22050				
90	130	1080	10584	1650	16170	2500	24500				
100	145	1400	13720	2050	20090						
110	155	1670	16366	2550	24990						
120	175	2030	19894	3050	29890						

- ▲This is Germany standard (DIN) above,the figure in the form is the max torque of the bolt,and the recommended torque is 80% of chart figure
- ▲The recommended tightening torque equals the figure in the form\*(80~90%).For instance :M52,strength grade is 8.8,the torque is 4704\*90%=4233.6N.m
- ▲It is recommended that loosening torque equals about 150% of tightening torque.For instance,the tightening torque is 4233.6\*(1.5~2)=6350.4~8467.2N.m

## The Space

Because of the space restriction,please notice the location.For example:



If you meet the above conditions, the square driven Torque Wrench cannot be used,you may use the Low Profile Wrench.

**THE BW-SERIES MAGNETIC BACKUP WRENCHES SIMPLEST WAY TO STOP A NUT ROTATION. EASY TO USE AND VERSATILE**

When torquing or loosening nuts, the thin profile of the MBW Backup wrench prevents the nut on the opposite side of the stud from turning.

No hydraulic, just mechanical & HANDS FREE OPERATION Eliminate injuries on hand and fingers.

Eliminate sparks cause from the use of slugging / striker wrenches.

Reduce time of operation and improve in productivity.



**BOLTING SOLUTIONS**

**MAGNETS EMBEDDED**

creates a magnetic field and force that attracts on other ferromagnetic materials.

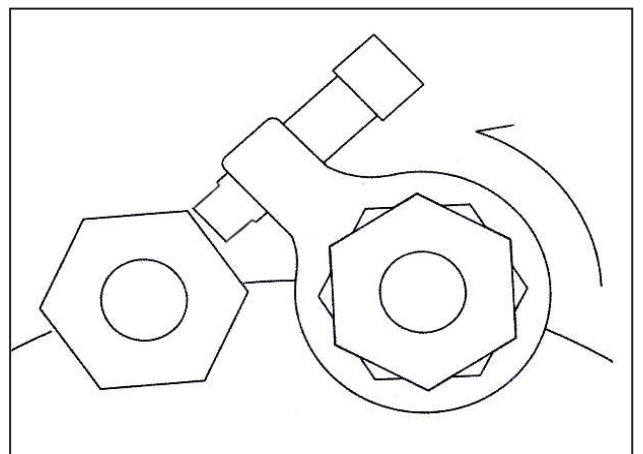
**BI-HEXAGONAL DESIGN**

provides the ultimate mixture of versatility and durability



Usually set release bolt approximate 1/2" length extension, user can be proper to adjust the length extension in case of special space.

Place Backup Wrench on operated Nut, rotates Backup Wrench in counter-clockwise side until release bolt touching reaction points, by this operation, if the release bolt is impossible to close the reaction points after rotation, user also can run release bolt a little out to make it to touch reaction points, after finishing torque operation by hydraulic torque wrench, please loose release bolt with a manual wrench (or other similar wrench), then take backup wrench off and proceed to next operated nut.



# BW series Low Profile Torque Wrench

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WIDE RANGE OF METRIC AND IMPERIAL SIZES AVAILABLE

## Nut Across Flat Range

**30 mm - 145 mm**

**1 1/4" - 5 3/4"**

Model	Across Flat (mm)	Across Flat (in)	Load Limits (Ft.lbs)	Load Limits (Nm)
BW104	30	1-1/4"	2400	3254
BW107	36	1-7/16"	2500	3390
BW110	41	1-5/8"	3500	4745
BW113	46	1-13/16"	3500	4745
BW200	50	2"	4100	5559
BW203	55	2-3/16	4200	5694
BW204	57	2-1/4"	4300	5830
BW206	60	2-3/8"	4300	5830
BW209	65	2-9/16"	4550	6169
BW212	70	2-3/4"	5600	7592
BW215	75	2-15/16"	6300	8542
BW302	80	3-1/8"	7000	9491
BW308	85	3-1/2"	7200	9762
BW311	90	3-11/16"	7300	9897
BW314	95	3-7/8"	9000	12202
BW400	100	4"	24000	32539
BW402	105	4-1/8"	24000	32539
BW404	110	4-1/4"	24000	32539
BW408	115	4-1/2"	25000	33895
BW410	120	4-5/8"	27000	36607
BW500	130	5"	27000	36607
BW506	135	5-3/8"	27000	36607
BW512	145	5-3/4"	28000	37962

# Examples of system connection

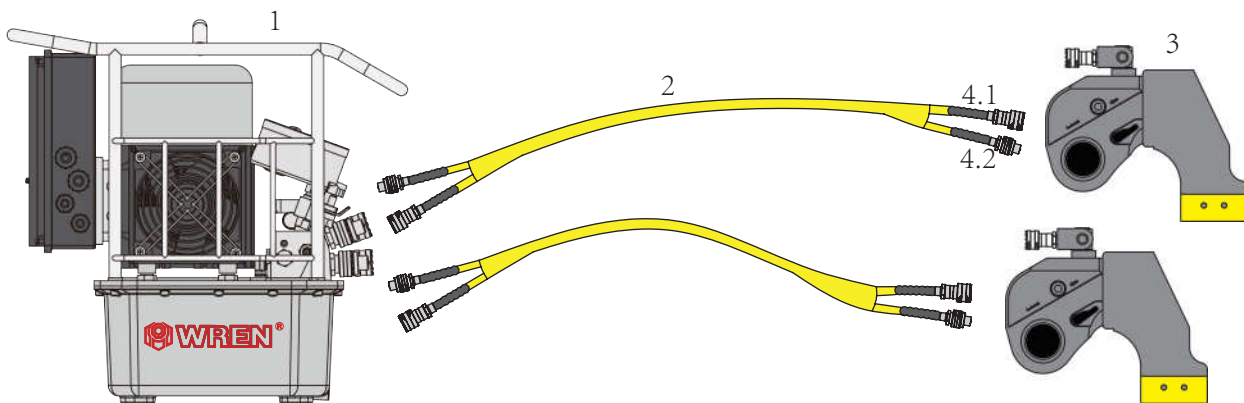
The existing M42 ( S65 ) strength grade level 8.8 flange bolt with a two drive type hydraulic torque wrench.

Each type of hydraulic torque wrench has its own torque range.

If known to the locking torque value X N.m. As with the torque wrench maximum output torque value should be at least 2X N.m ( bolt torque to remove loose locking torque of 1.5 ~ 2 times ). As is the case with M42 ( S65 ) bolt, if the technical requirements of the locking torque values for 2600N.m, it should in principle for the configuration of the torque wrench torque value should be greater than 5200N.m ( such as field conditions, without removing the loose bolts, can be served with relatively little torque models). Check table selection of most suitable torque wrench torque wrench is 5 IBT type hydraulic torque wrench.

If you are on the site requirements of the locking torque values are unknown, WREN engineer will recommend you use. You can also follow the steps below to his own projections. From the bolt and nut torque value for recommendation, in accordance with the bolt size, strength check table to derive a closer to the real value of torque. As is the case with M42 ( S65 ) look bolt locking torque of  $2744 \times 90\% = 2470\text{N.m}$ , due to remove loose bolt torque for locking of 1.5 ~ 2 times, matching hydraulic wrench torque value should be greater than 4940N.m. Check table selection of most suitable torque wrench torque wrench is 5 IBT type hydraulic torque wrench.

Configure:



- 1 LP3 Electric Pump
- 2 2JH6460Twin Hose
- 3 5IBT square driveTorque Wrench

- 4.1 C9013Quick Coupler (M)
- 4.2 C9014Quick Coupler (F)

### one pump for two torque wrenches

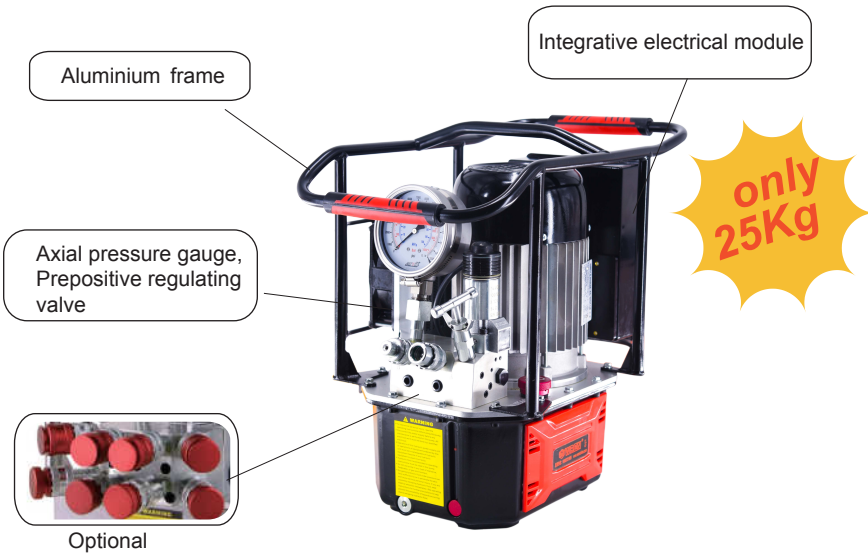
Type	Number	Note
LP3	1	220V/50HZ/700bar
5IBT	2	Torque 752~7528N.m
2JH6460	2	6M
C901Quick coupler	4	C9013 and C9014

### one for one torque wrench

Type	Number	Note
LP3	1	220V/50HZ/700bar
5IBT	1	Torque 752~7528N.m
2JH6460	1	6M
C901Quick coupler	2	C9013 and C9014

# Hydraulic Torque Wrench Pump

## Electric Pump LP3 series



WREN can make the special length of remote control wire according customers' requirement (WREN standard: 6 meters).

### Parameter

Model	LP3-2	LP3-4
Operating wrench	2	4
Tank capacity	5.5L	5.5L
Flow(low-mid-High)	7-1.6-0.8 L/min	7-1.6-0.8 L/min
Output pressure	70~700bar	70~700bar
Source of power	220V/50HZ	220V/50HZ
Power	1.1KW	1.1KW
Weight	25Kg	27Kg
Volume	305x445x426mm	305x465x426mm

- Compact automatic three stage design.
- Applicable on one or two wrenches simultaneously.
- Aluminum oil tank with gauge.
- Have  $\Phi 100$  high pressure gauge.
- Infinitely variable pressure adjustment between 70~700 bar.
- With the high efficiency radiator the pump can work 24 hours continuously.
- Can change the motor to fit the different voltage.
- Optional components(FP4), can operate four wrenches at the same time

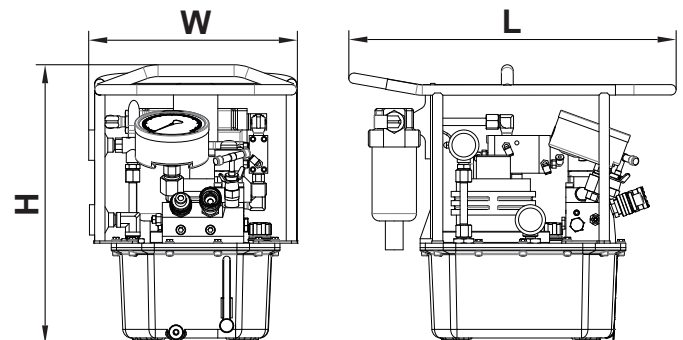
## Air Pump LP3-N series

### Parameter

Model	LP3-N2	LP3-N4
Operating wrench	2	4
Working pressure	700 bar	700 bar
Air pressure(Input)	4-8 bar	4-8 bar
Power	3.0 KW	3.0 KW
Tank capacity	5.5L	5.5L
Flow rate (low-mid-high)	8.6-2.2-1.1 L/min	8.6-2.2-1.1 L/min
Oil cooler	N/A	N/A
Weight	22Kg	24Kg
Oil outputs	4x1/4" NPT	8x1/4" NPT
LxWxH(mm)	442x282x377mm	460x282x377mm

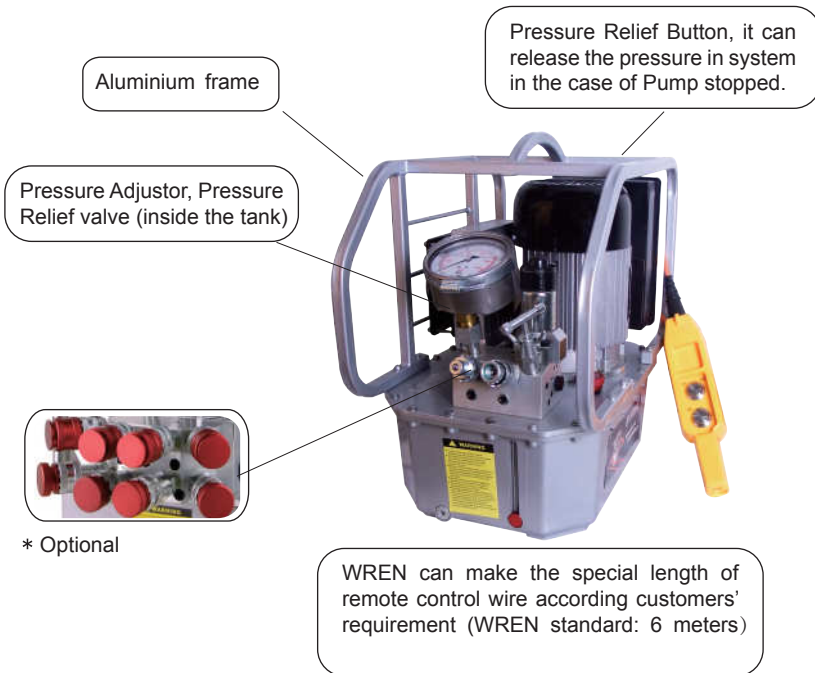


- Compact three-stage pump
- The Single valve block can be replaced by component FP4, there by allowing 2 or 4 Tools to be driven simultaneously.
- Three stage with air drive.
- Supporting continuous operation with steel frame.
- 4" diameter gauge, aluminium oil tank with oil level indicator
- Variable pressure adjustment between 70~700 bar
- Designed for continuous operation



# Hydraulic Torque Wrench Pump

## Electric Pump KLV4010 series



### Parameter

Model	KLV4010-2	KLV4010-4
Operating wrench	2	4
Tank capacity	8L	8L
Flow(low-mid-High)	7-1.6-0.8L/min	7-1.6-0.8L/min
Output pressure	70~700bar	70~700bar
Source of power	220V/50HZ	220V/50HZ
Power	1.1KW	1.1KW
Weight	27.7Kg	29.9Kg
Volume	307x407x450mm	307x407x470mm

- Compact automatic three stage design.
- Applicable on one or two wrenches simultaneously.
- Aluminum oil tank with gauge.
- Have  $\Phi 100$  high pressure gauge.
- Infinitely variable pressure adjustment between 70~700 bar.
- With the high efficiency radiator the pump can work 24 hours continuously.
- Can change the motor to fit the different voltage.
- Optional components, can operate four wrenches at the same time



## Air Pump KLV4010N series

### Parameter

Model	KLV4010N-2	KLV4010N-4
Operating wrench	2	4
Tank capacity	8L	8L
Flow(low-mid-High)	8.6-2.2-1.1 L/min	8.6-2.2-1.1 L/min
Output pressure	70~700 bar	70~700 bar
Air in	4~8 bar	4~8 bar
Power	3 KW	3 KW
Weight	21.5Kg	23.5Kg
Volume	289x407x450mm	289x407x470mm

Pressure Relief Button, it can release the pressure in system in the case of Pump stopped.

Pressure Adjustor, Pressure Relief valve (inside the tank)

**only 21.5kg**



- Input air(4~8 bar).
- Compact automatic three stage flow, can start in high pressure
- Applicable on one or two wrenches simultaneously
- Aluminum oil tank with oil gauge. Total weight only 21.5 kg
- Have  $\Phi 100$  high pressure gauge
- Infinitely variable pressure adjustment between 70~700 bar
- With the high efficiency cooling system makes the pump suitable in extreme environment
- Optional components(FP4), can operate four wrenches at the same time

# Hydraulic Pump

## Semi-automatic Electric Pump

KLW4120 Series Semi-automatic Electrical Pump shared a same design with KLW4010 series standard Electric Pump, it just was added a set of control system on the basic of KLW4010 standard Pump, it inherits all the characteristics of KLW4010, other characteristics are as below.

**-Simple Operation:**

Operate with one Button, the operator just press the button once time to achieve the task of tightening and loosening.

**-High Efficiency:**

Compare with the general Pump, KLW4120 Semi-automatic Pump has compact operation process to reduce some needless action and increase approximate 50% of working efficiency.

**-Manual / Automatic**

Besides of the semi-automatic operation, the Pump also has the function of manual operation.

KLW4120 can work 24 hours continuously. WREN also can make the Pump with other kinds of motors according customers' requirement.



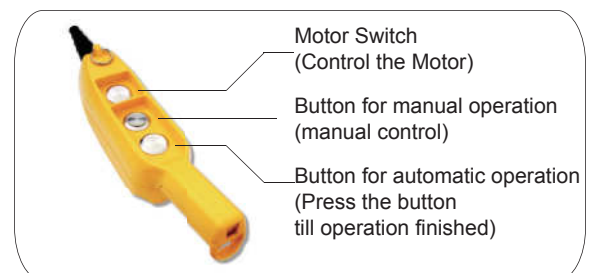
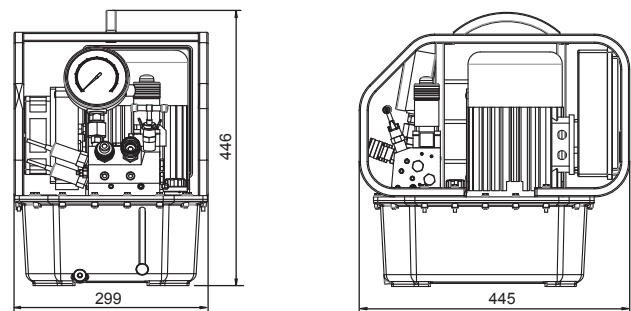
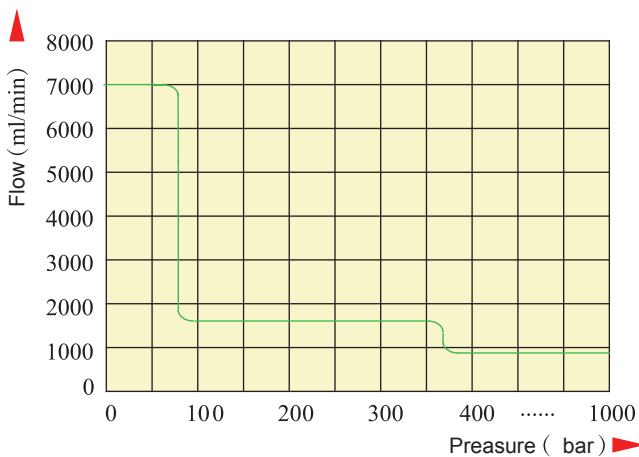
\* Optional

### Model: KLW4120

Parameter

Model	KLW4120-2	KLW4120-4
Operating wrench	2	4
Tank capacity	8L	8L
Flow(low-mid-High)	7-1.6-0.8 L/min	7-1.6-0.8 L/min
Out put pressure	70~700bar	70~700bar
Source of power	220V/50HZ	220V/50HZ
Power	1.1KW	1.1KW
Weight	27.7Kg	29.7Kg
Volume	299×445×446mm	299×465×446mm

Drawing of Flow Description for KLW4120





# Hydraulic Torque Wrench Pump

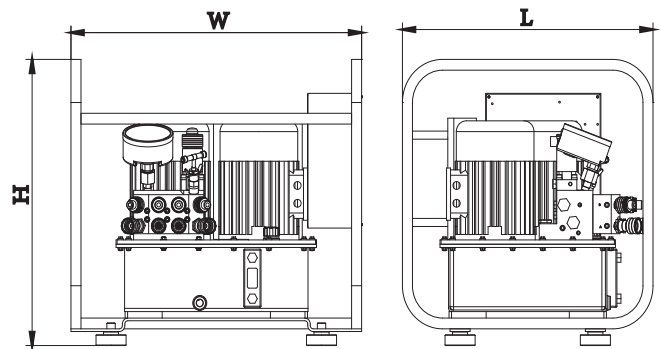
## Double Engine High Speed Hydraulic Pump



- Compact automatic three stage flow, can start in high pressure
- Applicable on one or two wrenches simultaneously
- Aluminum oil tank with gauge
- Have  $\Phi 100$  high pressure gauge
- Infinitely variable pressure adjustment between 70~700 bar
- With the high efficiency cooling system makes the pump suitable in extreme environment
- Optional components(FP4), can operate four wrenches at the same time

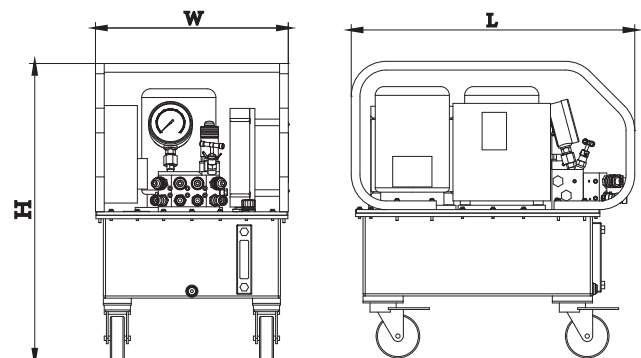
DHP 1.1KW x 2 (220v)

Model	DHP-220x4	DHP-220x8
Operating wrench	4	8
Work Pressure	700 bar	700 bar
Voltage/Frequency	220V / 50Hz	220V / 50Hz
Power	1.1 KW x 2	1.1 KW x 2
Tank capacity	13 L	13 L
Flow(low-mid-High)	14 - 3.2 - 1.6 L/min	14 - 3.2 - 1.6 L/min
Cooler	Yes	Yes
Weight	59.6	63.5
Output Port Size	8 x 1/4" NPT	16 x 1/4" NPT
Volume	500 x 580 x 531mm	500 x 620 x 531mm



DHP 2.2KW x 2 (380v)

Model	DHP-380x4	DHP-380x8
Operating wrench	4	8
Work Pressure	700 bar	700 bar
Voltage/Frequency	380V / 50Hz	380V / 50Hz
Power	2.2 KW x 2	2.2 KW x 2
Tank capacity	40 L	40 L
Flow(low-mid-High)	20 - 8.2 - 2.8 L/min	20 - 8.2 - 2.8 L/min
Cooler	Yes	Yes
Weight	63.5	68.5
Output Port Size	8 x 1/4" NPT	16 x 1/4" NPT
Volume	650 x 442 x 680mm	650 x 442 x 680mm

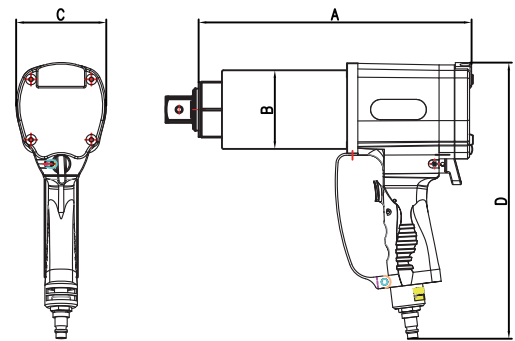


# Pneumatic Torque Wrench-WPD Series

- Design for maximize efficiency
- Wide torque range suits different applications
- Advanced star-gearbox design basic on reliable quality
- Precision+/-4%,Repeat Precision+/-2%



Special reaction arm can be ordered according your operation.



Model	Square Drive	Torque	Speed Rpm	Weight	Noise Level Dba	Dimension			
						A	B	C	D
WPD14	0.75 in.	275-1350 Nm	15	3.5 kg	80 db	207mm	70mm	261mm	31.5mm
WPD20	1.0 in.	400-2000 Nm	10	3.9 kg	80 db	201mm	70mm	261mm	34.5mm
WPD34	1.0 in.	700-3400 Nm	4.8	7.0 kg	85 db	269mm	89mm	272mm	38.5mm
WPD80	1.5 in.	2700-8000 Nm	4.2	12.2 kg	85 db	317mm	93mm	293mm	51mm

Precision+/-4%,Repeat Precision+/-2%

## Standard Accessories :

- Reaction Arm
- Lock Circlip
- Air Hose, G1/2"
- Air Gauge, Filter, Regulator
- Carry Case
- Air-Torque chart
- Operating Manual



# Hydraulic Cylinder series

## Hydraulic cylinder (700bar)

### 1. Force selection:

Considering the impedance loss of the seal ring and the supporting impedance loss of the cylinder with the piston, the force of WREN cylinder is 94%~95% of the set force. When the cylinder needs to work strictly and continuously, it is recommended to choose a cylinder whose tonnage is higher than the load itself, usually calculated by 70%~80% of the cylinder.

### 2. Stroke selection:

If the space permitted, please choose a cylinder whose stroke is longer than the practical need to add the system expandable capacity.

### 3. Type selection:

There are basically two types of cylinders: single-acting cylinder (spring or load returning) and double-acting cylinders. CLS-series and CLL-series single-acting cylinders have no set of spring and can only be returned by load or gravity. What do you need cylinders? To pull or lift or both?

(Under the hydraulic reaction, single-acting one can just lift, but double-acting one can both lift and pull).

### 4. Quantity selection:

Weather you need several cylinders to work synchronously or not?

### 5. Warning when install and operate:

Make sure that the load is located in the centre of the cylinder and the load direction is in accordance with the cylinder.

The allowable eccentric loads must be within 2.5% of the technical requirements of cylinders.

By fitting the flange on the neck threads to install the cylinder.

Eliminate the air in the system.

It is forbidden to remove the hydraulic pump connection when the cylinder is under load.

To avoid the cylinder piston over extended.

When there is some omen of oil leaking, please check it immediately.

Keep the hydraulic system clean.

Please keep away from heat, fire, rain, seawater, and moisture and so forth.

Keep the hydraulic system clean.

Please keep away from heat, fire, rain, seawater, and moisture and so forth.

Please maintain and inspect the cylinder on time.

The piston screw and base accessories must be connected to the piston end completely.

Please use standard cylinder oil.

Cylinder fitted with hose quick coupler can't be used for applications of releasing pressure urgently and forming shock pressure. When the quick coupler in the pulling end is blocked completely, it is forbidden to operate double-acting cylinder. Make sure the quick coupler is firmly tightened. If the cylinder fitted with self-conditioned quick coupler stops working suddenly, the most possible case is that the fluid flow is blocked due to the loosening of the quick coupler.

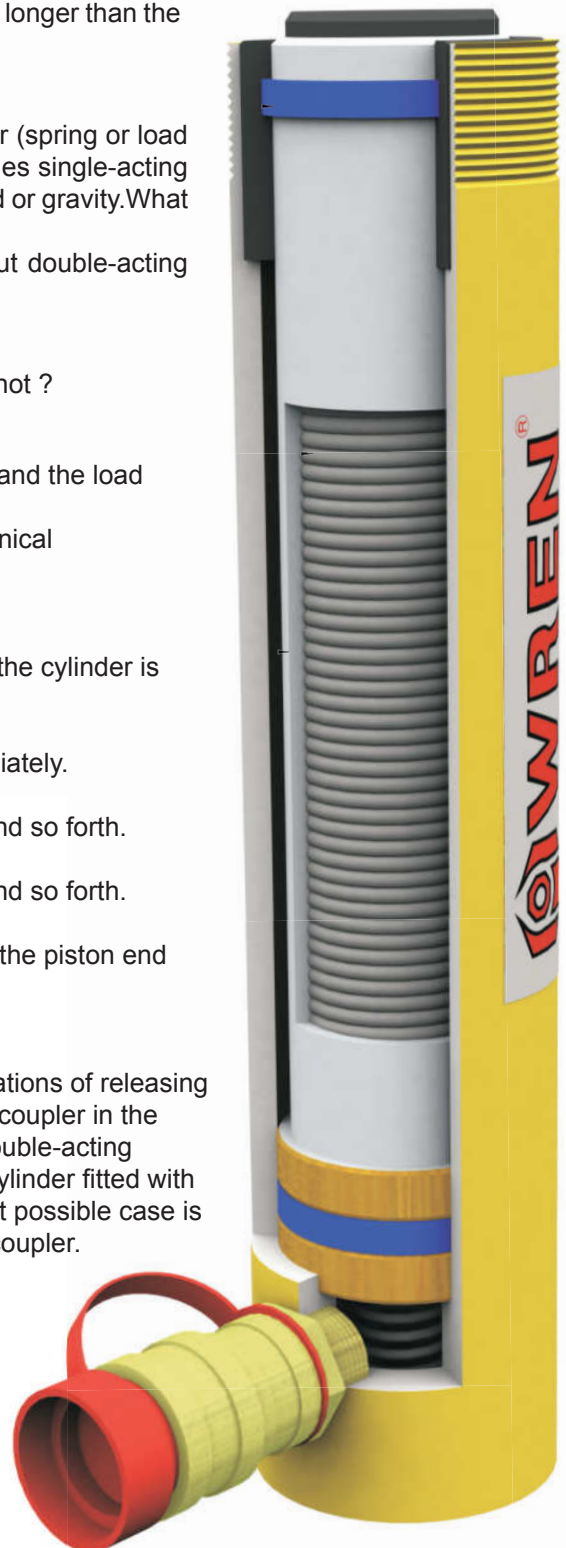
## Nonstandard cylinder and special cylinders

We can customize nonstandard cylinders or ones over 5000KN(500Tons) on your requirements.

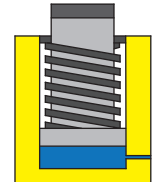
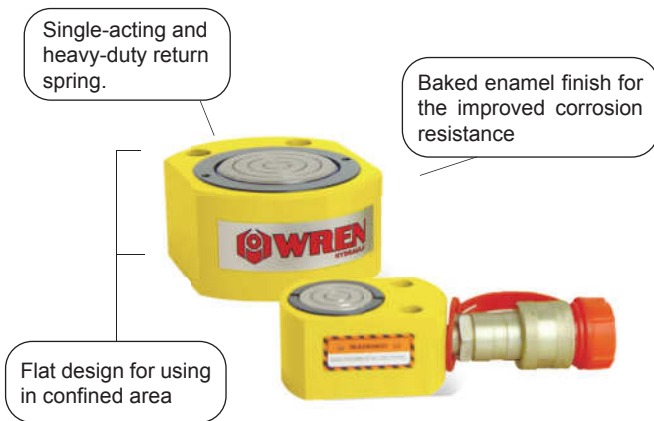
1. How much a tonnage force is needed?

2. You should consider both the stroke and the height after retraction.

3. Whether all the threads are needed on the piston, neck or base or not?



## RSM series Single-Acting Low Weight Cylinder

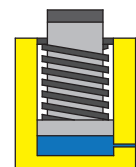


Capacity:5~150Ton  
Stroke:6~16mm  
Maximum Operating Pressure:700bar

RSM Series Selection Chart

Capacity (Ton)	Stroke (mm)	Model	Min Height (mm)	Outside Diameter (mm)	Effective Area (cm <sup>2</sup> )	Oil Capacity (cm <sup>3</sup> )	Saddle Diameter (mm)	Weight (Kg)
5	6	RSM50	32	59 × 42	7	4	26	1.0
10	11	RSM100	42	83 × 56	14.5	16	38	1.4
20	11	RSM200	51	100 × 75	28.2	31	50	3.1
30	13	RSM300	58	118 × 95	41.8	54	63	4.5
50	16	RSM500	66	140 × 115	63.6	101	70	6.8
75	16	RSM750	79	166 × 140	103.8	166	63	11.3
100	16	RSM1000	85	178 × 153	132.7	212	75	14.5
150	16	RSM1500	100	216 × 191	201	321	112	26.3

## RCS series Single-Acting Low Weight Cylinder

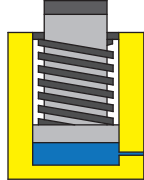
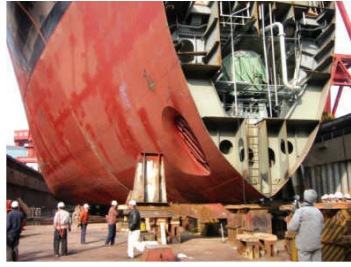


Capacity:10~150Ton  
Stroke:38~62mm  
Maximum Operating Pressure:700bar

RCS Series Selection Chart

Capacity (Ton)	Stroke (mm)	Model	Min Height (mm)	Outside Diameter (mm)	Effective Area (cm <sup>2</sup> )	Oil Capacity (cm <sup>3</sup> )	Saddle Diameter (mm)	Weight (Kg)
10	38	RCS101	88	70	14.5	55	38	4.1
20	45	RCS201	98	92	28.2	127	50	5.0
30	61	RCS302	117	102	41.8	255	65	6.8
50	60	RCS502	122	127	63.6	381	70	10.9
100	57	RCS1002	141	167	132.7	756	90	22.7
150	51	RCS1502	206	205	201.1	1025	138	42.1

# RC series Single-Acting General Purpose Cylinder



Capacity: 5~100Ton  
 Stroke: 16~362mm  
 Maximum Operating Pressure: 700bar

Single-acting and heavy-duty return spring.

High strength alloy steel for durability



Baked enamel finish for the improved corrosion resistance

Easy-carry handle for macimal portability

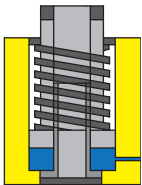
## RC Series Selection Chart

Capacity (Ton)	Stroke (mm)	Model	Min Height (mm)	Outside Diameter (mm)	Effective Area (cm <sup>2</sup> )	Oil Capacity (cm <sup>3</sup> )	Saddle Diameter (mm)	Thread Size	Thread Length (mm)	Weight (Kg)
5	16	RC50	42	42 × 59	7	11	26	1 1/2"-16	28	1.1
5	25	RC51	110	38	6.5	16	25.5	1 1/2"-16	28	1.1
5	76	RC53	165	38	6.5	50	25.5	1 1/2"-16	28	1.5
5	127	RC55	215	38	6.5	83	25.5	1 1/2"-16	28	1.9
5	177	RC57	273	38	6.5	115	25.5	1 1/2"-16	28	2.4
5	232	RC59	323	38	6.5	151	25.5	1 1/2"-16	28	2.8
10	26	RC101	89	57	14.5	38	35	2 1/4"-14	27	1.8
10	54	RC102	121	57	14.5	78	35	2 1/4"-14	27	2.3
10	105	RC104	171	57	14.5	152	35	2 1/4"-14	27	3.3
10	156	RC106	247	57	14.5	226	35	2 1/4"-14	27	4.4
10	203	RC108	298	57	14.5	294	35	2 1/4"-14	27	5.4
10	257	RC1010	349	57	14.5	373	35	2 1/4"-14	27	6.4
10	304	RC1012	400	57	14.5	441	35	2 1/4"-14	27	6.8
10	356	RC1014	450	57	14.5	516	35	2 1/4"-14	27	8.2
15	25	RC151	124	70	19.6	49	38	2 3/4"-16	30	3.3
15	51	RC152	149	70	19.6	100	38	2 3/4"-16	30	4.1
15	101	RC154	200	70	19.6	198	38	2 3/4"-16	30	5.0
15	152	RC156	271	70	19.6	298	38	2 3/4"-16	30	6.8
15	203	RC158	322	70	19.6	398	38	2 3/4"-16	30	8.2
15	254	RC1510A	373	70	19.6	498	38	2 3/4"-16	30	9.5
15	305	RC1512A	423	70	19.6	598	38	2 3/4"-16	30	10.9
15	356	RC1514A	474	70	19.6	697	38	2 3/4"-16	30	11.8
25	26	RC251	139	85	33.2	86	50	3 5/16"-12	49	5.9
25	50	RC252	165	85	33.2	166	50	3 5/16"-12	49	6.4
25	102	RC254	215	85	33.2	339	50	3 5/16"-12	49	8.2
25	158	RC256	273	85	33.2	525	50	3 5/16"-12	49	10.0
25	210	RC258	323	85	33.2	697	50	3 5/16"-12	49	12.2
25	261	RC2510A	374	85	33.2	867	50	3 5/16"-12	49	14.1
25	311	RC2512A	425	85	33.2	1033	50	3 5/16"-12	49	16.3
25	362	RC2514	476	85	33.2	1202	50	3 5/16"-12	49	17.7
30	209	RC308	387	102	44.2	923	50			18.1
50	51	RC502	176	127	70.8	361	71	5"-12	55	15.0
50	101	RC504	227	127	70.8	715	71	5"-12	55	19.1
50	159	RC506	282	127	70.8	1125	71	5"-12	55	23.1
50	337	RC5013	460	127	70.8	2386	71	5"-12	55	37.6
75	156	RC756	285	147	103.8	1619	71	5 3/4"-12	44	29.5
75	333	RC7513A	492	147	103.8	3456	71	5 3/4"-12	44	59.0
100	168	RC1006	357	177	132.7	2229	71	6 7/8"-12	44	59.0
100	260	RC10010	449	177	133.3	3450	71	6 7/8"-12	44	72.6

# RCH series Single-Acting Hollow Plunger Cylinder



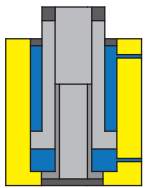
Capacity:12~100Ton  
 Stroke:8~155mm  
 Maximum Operating Pressure:700bar



## RCH Series Selection Chart

Capacity (Ton)	Stroke (mm)	Model	Min Height (mm)	Outside Diameter (mm)	Effective Area (cm <sup>2</sup> )	Oil Capacity (cm <sup>3</sup> )	Plunger Diameter (mm)	Hollow Diameter (mm)	Weight (Kg)
12	8	RCH120	55	69	17.9	14	35	19	1.5
12	42	RCH121	120	69	17.9	75	35	19	2.8
12	76	RCH123	184	69	17.9	136	35	19	4.4
20	50	RCH202	162	99	30.5	152	55	26.9	7.7
20	155	RCH206	306	99	30.5	473	55	28	14.1
30	64	RCH302	179	115	47.7	305	63	34	10.9
30	155	RCH306	331	115	47.7	739	63.5	34	21.8
60	77	RCH603	248	160	84.2	648	92	53	28.1
60	152	RCH606	325	160	84.2	1280	92	53	35.4
100	76	RCH1003	254	212	135.3	1028	127.0	78	63.0

# RRH series Double-Acting Hollow Plunger Cylinder



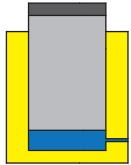
Capacity:30~150Ton  
 Stroke:38~258mm  
 Maximum Operating Pressure:700bar



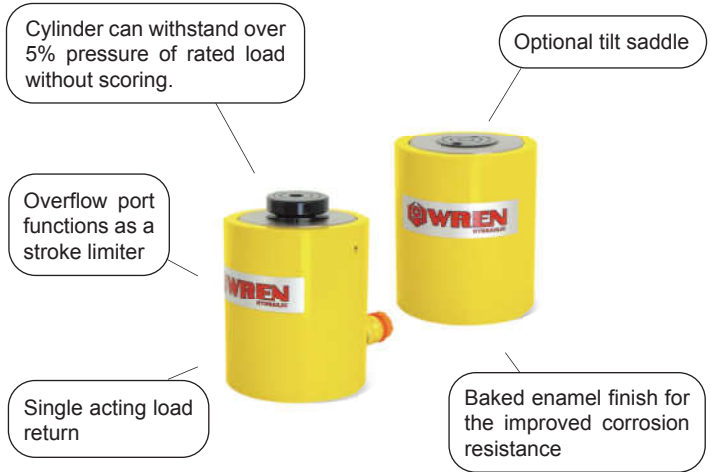
## RRH Series Selection Chart

Capacity (Ton)		Stroke (mm)	Model	Min Height (mm)	Outside Diameter (mm)	Effective Area (cm <sup>2</sup> )		Oil Capacity (cm <sup>3</sup> )		Plunger Diameter (mm)	Hollow Diameter (mm)	Weight (Kg)
Push	Pull					Push	Pull	Push	Pull			
34	23	178	RRH307A	331	115	47.7	32.4	849	576	63	34	21
30	23	258	RRH3010A	431	115	47.7	32.4	1230	836	63	34	27
60	42	89	RRH603A	248	160	84.2	56.2	749	500	95	53	28
60	42	165	RRH606A	324	160	84.2	56.2	1389	927	95	53	35
60	42	257	RRH6010	438	160	84.2	56.2	2164	1444	95	53	45
100	68	38	RRH1001A	166	212	135.2	87.1	513	331	127	79	33
100	68	76	RRH1003A	255	212	135.2	87	1027	661	127	78	61
100	68	153	RRH1006A	343	212	135.2	87	2068	1331	127	78	79
100	68	253	RRH10010A	443	212	135.2	87	3420	2201	127	78	106
150	75	200	RRH1508	349	247	205	106.8	4100	2136	152	78	111

# CLS series Single-Acting High Tonnage Cylinder



Capacity:50~1000Ton  
 Stroke:50~300mm  
 Maximum Operating Pressure:  
 700bar

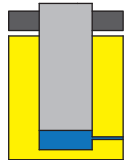


## CLS Series Selection Chart

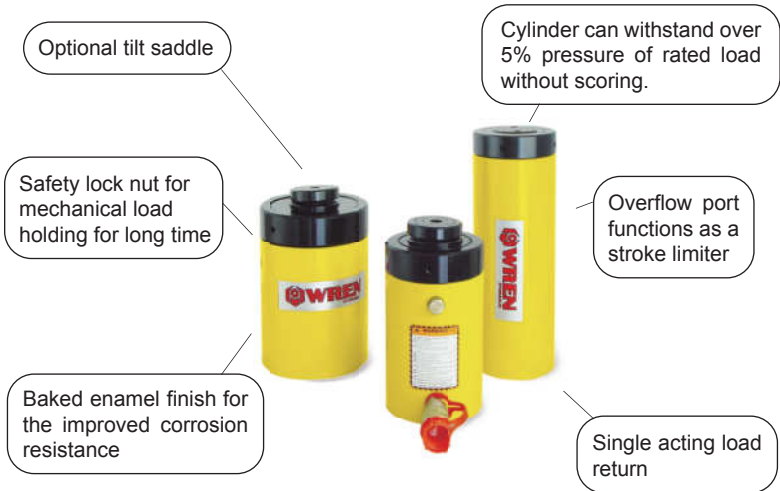
Capacity (Ton)	Stroke (mm)	Model	Min Height (mm)	Outside Diameter (mm)	Effective Area (cm <sup>2</sup> )	Oil Capacity (cm <sup>3</sup> )	Saddle Diameter (mm)	Weight (Kg)
50	50	CLS502A	128	125	70.9	355	71	4
50	100	CLS504A	178	125	70.9	709	71	18
50	150	CLS506	228	125	70.9	1064	71	23
50	200	CLS508A	278	125	70.9	1418	71	28
50	250	CLS5010A	328	125	70.9	1773	71	33
50	300	CLS5012A	378	125	70.9	2127	71	38
100	50	CLS1002A	143	164	132.7	664	71	24
100	100	CLS1004	193	164	132.7	1327	71	32
100	150	CLS1006	243	164	132.7	1991	71	40
100	200	CLS1008A	293	164	132.7	2654	71	49
100	250	CLS10010	343	164	132.7	3318	71	58
100	300	CLS10012	393	164	132.7	3981	71	66
150	50	CLS1502	165	209	201	1005	130	43
150	100	CLS1504	215	209	201	2010	130	55
150	150	CLS1506	265	209	201	3015	130	69
150	200	CLS1508	315	209	201	4020	130	82
150	250	CLS15010	365	209	201	5025	130	95
150	300	CLS15012	415	209	201	6030	130	108
200	50	CLS2002	193	235	265.9	1330	130	66
200	150	CLS2006	293	235	265.9	3989	130	101
200	250	CLS20010A	393	235	265.9	6648	130	136
250	50	CLS2502	193	275	366.4	1832	150	90
250	150	CLS2506	293	275	366.4	5496	150	137
250	250	CLS25010	393	275	366.4	9160	150	184
300	50	CLS3002	235	310	456.2	2281	139	137
300	150	CLS3006	335	310	456.2	6843	139	198
300	250	CLS30010	435	310	456.2	11405	139	258
400	50	CLS4002	265	350	559.9	2800	159	200
400	150	CLS4006	365	350	559.9	8399	159	275
400	250	CLS40010	465	350	559.9	13998	159	352
500	50	CLS5002	295	400	730.6	3656	228	289
500	150	CLS5006	395	400	730.6	10967	228	390
500	250	CLS50010	495	400	730.6	18278	228	489
600	50	CLS6002	310	430	855.3	4277	194	350
600	150	CLS6006	410	430	855.3	12830	194	465
600	250	CLS60010	510	430	855.3	21383	194	582
800	50	CLS8002	355	505	1176.3	5882	224	549
800	150	CLS8006	455	505	1176.3	17645	224	709
800	250	CLS80010	555	505	1176.3	29408	224	870
1000	50	CLS10002	385	560	1465.7	7329	360	729
1000	150	CLS10006	485	560	1465.7	21986	360	921
1000	250	CLS100010	585	560	1465.7	36643	360	1113



# CLL series Single-Acting Lock Nut Cylinder



Capacity:50~1000Ton  
 Stroke:50~300mm  
 Maximum Operating Pressure:  
 700bar



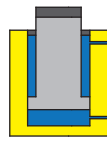
## CLL Series Selection Chart

Capacity (Ton)	Stroke (mm)	Model	Min Height (mm)	Outside Diameter (mm)	Effective Area (cm <sup>2</sup> )	Oil Capacity (cm <sup>3</sup> )	Saddle Diameter (mm)	Weight (Kg)
50	50	CLL502	164	125	70.9	355	71	15
50	100	CLL504	214	125	70.9	709	71	20
50	150	CLL506	264	125	70.9	1064	71	25
50	200	CLL508	314	125	70.9	1418	71	30
50	250	CLL5010	364	125	70.9	1773	71	35
50	300	CLL5012	414	125	70.9	2127	71	40
100	50	CLL1002	187	165	132.7	664	71	30
100	100	CLL1004	237	165	132.7	1327	71	39
100	150	CLL1006	287	165	132.7	1991	71	48
100	200	CLL1008	337	165	132.7	2654	71	56
100	250	CLL10010	387	165	132.7	3318	71	64
100	300	CLL10012	437	165	132.7	3981	71	73
150	50	CLL1502	209	205	201	1005	130	53
150	100	CLL1504	259	205	201	2010	130	66
150	150	CLL1506	309	205	201	3015	130	78
150	200	CLL1508	359	205	201	4020	130	92
150	250	CLL15010	409	205	201	5025	130	104
150	300	CLL15012	459	205	201	6030	130	117
200	50	CLL2002	243	235	265.6	1330	130	83
200	150	CLL2006	343	235	265.6	3989	130	117
200	250	CLL20010	443	235	265.6	6648	130	152
250	50	CLL2502	249	275	366.4	1832	150	116
250	150	CLL2506	349	275	366.4	5496	150	162
250	250	CLL25010	449	275	366.4	9160	150	210
300	50	CLL3002	295	310	456.2	2281	139	173
300	150	CLL3006	395	310	456.2	6843	139	233
300	250	CLL30010	495	310	456.2	11405	139	293
400	50	CLL4002	335	350	559.9	2800	159	250
400	150	CLL4006	435	350	559.9	8399	159	327
400	250	CLL40010	535	350	559.9	13998	159	402
500	50	CLL5002	375	400	730.6	3656	228	367
500	150	CLL5006	475	400	730.6	10967	228	466
500	250	CLL50010	575	400	730.6	18278	228	567
600	50	CLL6002	395	430	855.3	4277	194	446
600	150	CLL6006	495	430	855.3	12830	194	562
600	250	CLL60010	595	430	855.3	21383	194	679
800	50	CLL8002	455	505	1176.9	5882	224	709
800	150	CLL8006	555	505	1176.9	17645	224	870
800	250	CLL80010	655	505	1176.9	29408	224	1029
1000	50	CLL10002	495	560	1466.4	7329	360	949
1000	150	CLL10006	595	560	1466.4	21986	360	1141
1000	250	CLL100010	695	560	1466.4	36643	360	1333

# CLR series Double-Acting High Tonnage Cylinder

## Optional Tilt Saddle

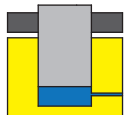
Model	Dimension A/B	Graph	Application
CAT100	71/24		CLL 50T
			CLS 75T
			CLR 100T
CAT200	130/27		CLL 100T
			CLS 200T
			CLR 200T



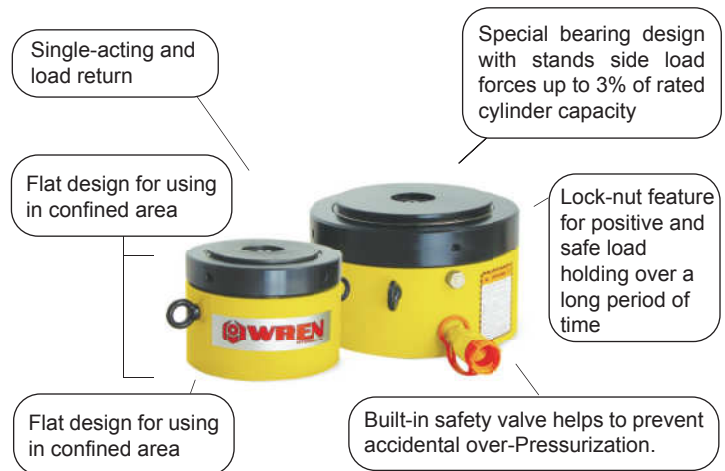
Capacity: 10~1000Ton  
 Stroke: 50~305mm  
 Maximum Operating Pressure: 700bar

## CLR Series Selection Chart

Capacity (Ton)	Stroke (mm)		Model	Min Height (mm)	Outside Diameter (mm)	Effective Area (cm <sup>2</sup> )		Oil Capacity (cm <sup>3</sup> )		Saddle Diameter (mm)	Weight (Kg)
	Push	Pull				Push	Pull	Push	Pull		
10	4.1	254	CLR1010	409	76	14.5	5.9	368	149	33	12
10	4.1	305	CLR1012	457	76	14.5	5.9	442	180	33	14
50	22.6	150	CLR506	325	127	70.8	32.3	1062	484	70	30
50	22.6	300	CLR5012	475	127	70.8	32.3	2124	969	70	52
100	44	50	CLR1002	182	188	132.7	61.9	664	310	95	27
100	44	100	CLR1004	232	188	132.7	61.9	1327	619	95	33
100	44	150	CLR1006	282	188	132.7	61.9	1991	929	95	37
100	44	200	CLR1008	332	188	132.7	61.9	2654	1238	95	44
100	44	250	CLR10010	382	188	132.7	61.9	3318	1548	95	50
100	44	300	CLR10012	432	188	132.7	61.9	3981	1857	95	57
150	67.9	50	CLR1502	196	216	201	97	1005	485	115	47
150	67.9	100	CLR1504	246	216	201	97	2010	970	115	57
150	67.9	150	CLR1506	296	216	201	97	3015	1455	115	67
150	67.9	200	CLR1508	346	216	201	97	4020	1940	115	77
150	67.9	250	CLR15010	396	216	201	97	5025	2425	115	87
150	67.9	300	CLR15012	446	216	201	97	6030	2910	115	97
200	93	50	CLR2002	235	242	265.9	133.1	1329	665	130	67
200	93	150	CLR2006	335	242	265.9	133.1	3988	1996	130	92
200	93	250	CLR20010	435	242	265.9	133.1	6647	3327	130	117
250	107	50	CLR2502	236	288	366.4	152.6	1832	763	165	105
250	107	150	CLR2506	336	288	366.4	152.6	5496	2289	165	141
250	107	250	CLR25010	436	288	366.4	152.6	9160	3815	165	176
300	121	50	CLR3002	350	325	456.2	172.6	2281	863	190	204
300	121	150	CLR3006	412	325	456.2	172.6	6843	2589	190	252
300	121	250	CLR30010	512	325	456.2	172.6	11405	4315	190	299
400	138	50	CLR4002	370	367	559.9	196.8	2799	984	215	281
400	138	150	CLR4006	470	367	559.9	196.8	8399	2952	215	342
400	138	250	CLR40010	570	367	559.9	196.8	13998	4920	215	405
500	168	50	CLR5002	400	405	730.6	239.7	3653	1198	250	411
500	168	150	CLR5006	500	405	730.6	239.7	10959	3595	250	493
500	168	250	CLR50010	600	405	730.6	239.7	18265	5992	250	575
600	207	50	CLR6002	445	450	855.3	295.4	4277	1477	267	494
600	207	150	CLR6006	545	450	855.3	295.4	12830	4431	267	586
600	207	250	CLR60010	645	450	855.3	295.4	21383	7385	267	678
800	252	50	CLR8002	695	515	1164	360	5820	1800	320	759
800	252	150	CLR8006	595	515	1164	360	17460	5400	320	885
800	252	250	CLR80010	695	515	1164	360	29100	9000	320	1019
1000	380	50	CLR10002	535	580	1465.7	541.7	7328	2708	342	1012
1000	380	150	CLR10006	635	580	1465.7	541.7	21985	8125	342	1168
1000	380	250	CLR100010	735	580	1465.7	541.7	36418	13543	342	1325



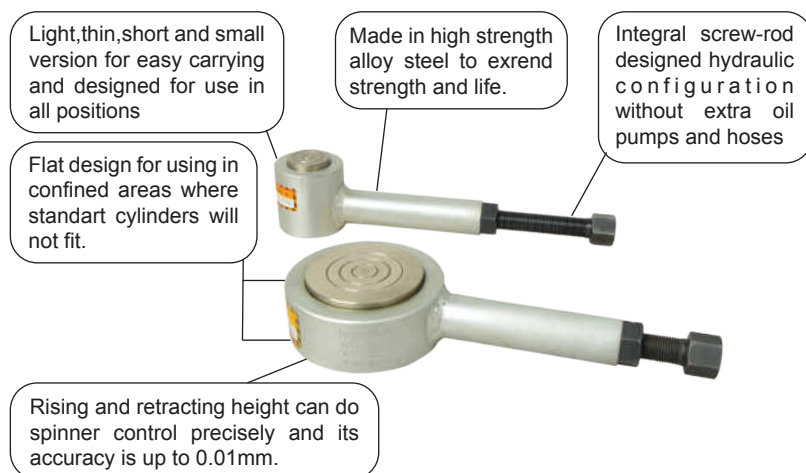
Capacity:60~520Ton  
Stroke:45~50mm  
Maximum Operating Pressure:  
700bar



## CLP Series Selection Chart

Capacity (Ton)	Stroke (mm)	Model	Min Height (mm)	Outside Diameter (mm)	Effective Area (cm <sup>2</sup> )	Oil Capacity (cm <sup>3</sup> )	Saddle Diameter (mm)	Weight (Kg)
60	50	CLP602	125	140	86.6	432	96	15
100	50	CLP1002	137	175	143.1	716	126	26
160	45	CLP1602	148	220	227	1022	160	44
200	45	CLP2002	155	245	283.5	1276	180	57
260	45	CLP2502	159	275	366.4	1649	200	74
400	45	CLP4002	178	350	559.9	2519	250	134
520	45	CLP5002	192	400	730.6	3287	290	189

## SMC series Mechanical Cylinder



Capacity:5~50Ton  
Stroke:5~25mm  
Maximum Operating Pressure:  
700bar

## SMC Series Selection Chart

Capacity (Ton)	Stroke (mm)	Model	Effective Area (mm)	Coll.Height (mm)	Ext.Height (mm)	Outside Diameter (mm)	Max Length (mm)	Min Length (mm)	Weight (Kg)
5	25	SMC0525	8.02	52	77	52	279	199	1.5
10	25	SMC1025	13.85	54	79	62	351	240	2.2
20	5	SMC2005	28.27	35	40	84	295	224	1.9
30	5	SMC3005	38.49	36	41	95	323	243	2.3
50	5	SMC5005	66.48	40	45	120	410	299	3.7

# P series Hydraulic Hand Pump(700~1600Bar)

Equipped with a pressure regulating valve, to adjust the output pressure



The built-in high and low pressure switching valve, low pressure high flow rate output.

Aluminum titanium alloy, corrosion resistance, high strength, light weight, impact resistance, adaptv to a variety of harsh environment.

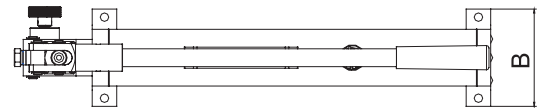
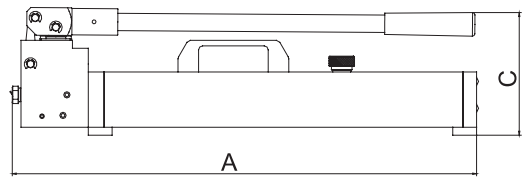
P-series hydraulic hand pumps are designed for Ciinder and hydraulic bolt tensioner. Its pressure anew to two types(700bar & 1600bar), and customers can order every size of oil tank for different equipment WREN serves a wide range accessory for this series, entitled with TUV seal result of an effort with appropriate directives.



## P Series Hand Pump Table Parameters



TYPE	Max Pressure (bar)	Oil interface	Gauge interface
GA-3	700	3/8"NPT	1/4"NPT
GA20	2000	1/4"BSP	1/2"BSP
GA23	2500	M16×1.5	M16×1.5



## P Series Hand Pump Selection Char

Type	Preasure bar		One Stroke Oil mL		Full Tank Oil L	Available Oil L	Handle Force N	SIZE mm			Oil interface	Gauge interface	Weight Kg
	Low	HI	Low	HI				A	B	C			
<b>P392</b>	2.5	700	32	2.5	1.67	1.44	300	590	120	160	3/8" NPT	1/4" NPT	6.3
<b>P80</b>	2.5	700	32	2.5	2.25	1.98	300	590	120	170	3/8" NPT	1/4" NPT	8
<b>P160</b>	2.5	700	32	2.5	3.58	3.24	300	590	140	180	3/8" NPT	1/4" NPT	10
<b>16P392</b>	1.5	1600	32	2.5	1.67	1.44	350	636	120	170	1/4" BSP	1/2" BSP	6.5
<b>16P80</b>	1.5	1600	32	2.5	2.25	1.98	350	636	120	170	1/4" BSP	1/2" BSP	8.5
<b>16P160</b>	1.5	1600	32	2.5	3.58	3.24	350	636	140	190	1/4" BSP	1/2" BSP	10.5

# 28P series High Pressure Hydraulic Hand Pump(2800Bar)

## 28P Series Hand Pump Selection Chart

Type	28P80	28P160
Work Pressure Mpa (Low/Hi)	2.0/280	2.0/280
One Stroke Oil ml (Low/Hi)	32/0.9	32/0.9
Full Tank Oil L	2.26	3.58
Available Oil L	1.98	3.24
Size (A-B-C)	636/120/170	636/140/190
Oil interface	1/4"BSP	1/4"BSP
Gauge interface	1/2"BSP	1/2"BSP
Weight	8.5	10.5



Equipped with a pressure regulating valve, to adjust the output pressure.(Max Pressure 2800bar)

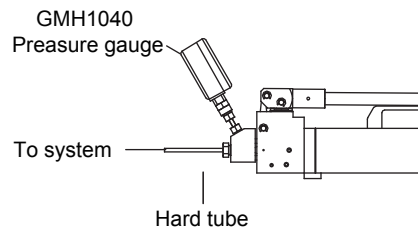
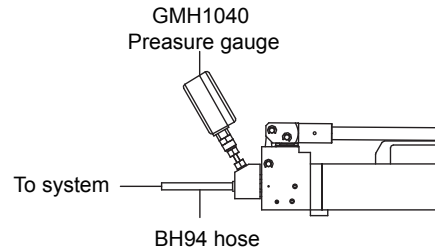
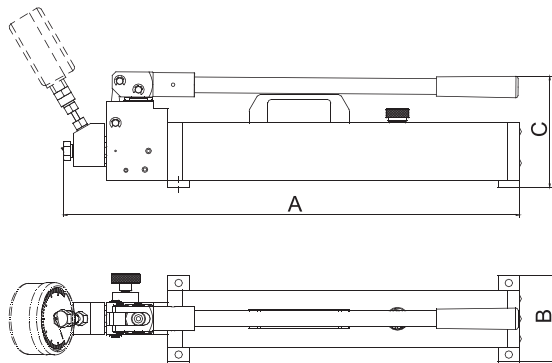
Aluminum titanium alloy corrosion resistance, high strength, light weight, impact resistance, adapt to a variety of harsh environment.

The built-in high and low pressure switching valve, low pressure high flow rate output.

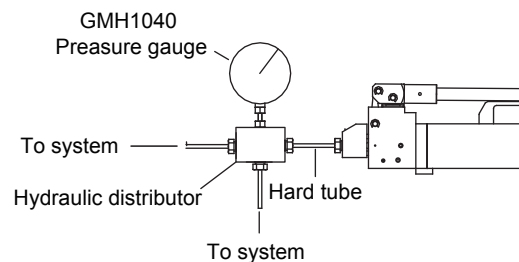
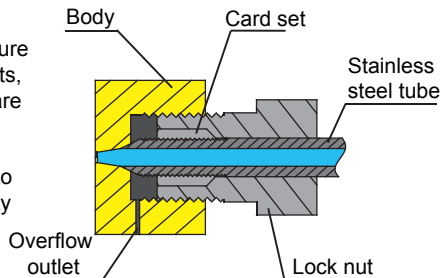


28P-series high hydraulic hand pumps are designed for high hydraulic equipment. Its pressure anew to 2800bar, and customers can order every size of oil tank for different equipment. WREN serves a wide range accessory for this series. These products which are designed for serving true resolutions, entitled with TUV seal result of an effort with appropriate directives.

## Ahead Pump Configure



**Spinal seal**  
Stainless steel high pressure joint seal in the spinal joints, with nut casing and pipe are tightly locked in the spinal canal surface to provide a 2800bar sealed. In order to achieve safety and stability requirements



# MP series Electric Pumps

Please choose the pump according to the below parameters



Pump Oil tank=4L or 8L



Pump Oil tank>8L

▼ Example for the description of pump model:

<b>M</b>	<b>P</b>	<b>04</b>	<b>A</b>	<b>S</b>	<b>220</b>
1	2	3	4	5	6
Drive type	Model	Available oil	Valve type	Motor power	Voltage

**1 Drive Model**

M =Electric drive  
SM =Air drive

**3 Oil Capacity**

04 = 4L  
08 = 8L  
13 = 13L  
18 = 18L  
24 = 24L  
32 = 32L  
56 = 56L

**4 Valve Type**

A =double-acting(pressure hold)  
B =single-acting(pressure hold)  
C =single-acting(pressure hold)  
D =single-acting  
H =double-acting(pressure hold)

**5 Motor Power**

S = 1.0KW  
T = 1.1KW,

**2 Model**

P =Pump

**6 Voltage**

220=220V,  
Single phase, 50Hz  
380=380V,  
Three phase, 50Hz

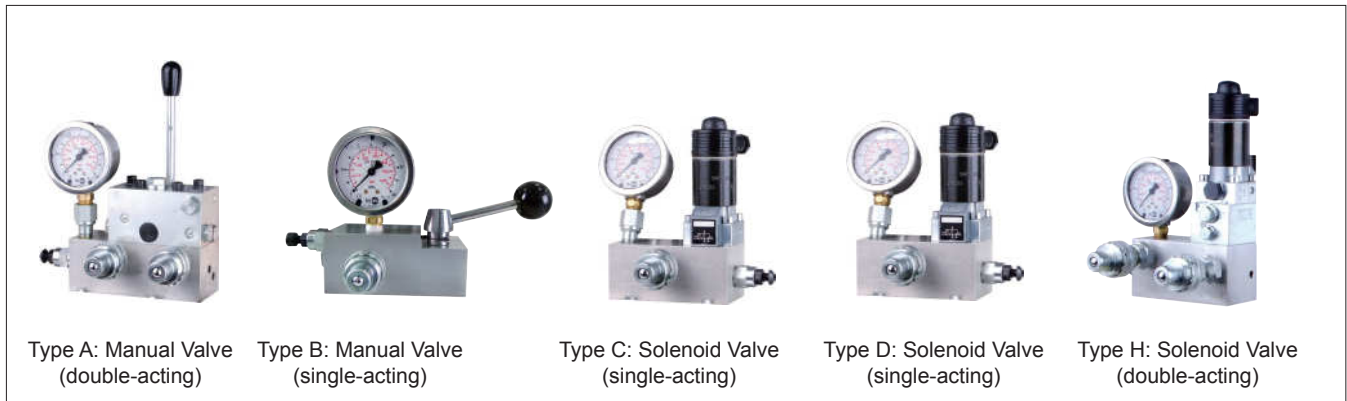
Example :

Model:MP04HS220  
Max Pressure: 700bar  
Power: 1.0KW  
Valve type: Type H,solenoid valve (double acting,pressure hold)  
Oil Available: 4L  
voltage: 220V  
Frequency: 50Hz

Parameters

Oil Capacity	Motor Power (KW)	Rated Pressure (bar)		Flow (L/min)		Voltage/Frequency Source of power	Max Pressure (bar)
		Low	High	Low	High		
4L	1.0	650	700	4	0.6	220V, 50Hz 380V, 50Hz;	700
≥8L	1.1			5.5/7.2	0.8		

Valve models



Type A: Manual Valve (double-acting)

Type B: Manual Valve (single-acting)

Type C: Solenoid Valve (single-acting)

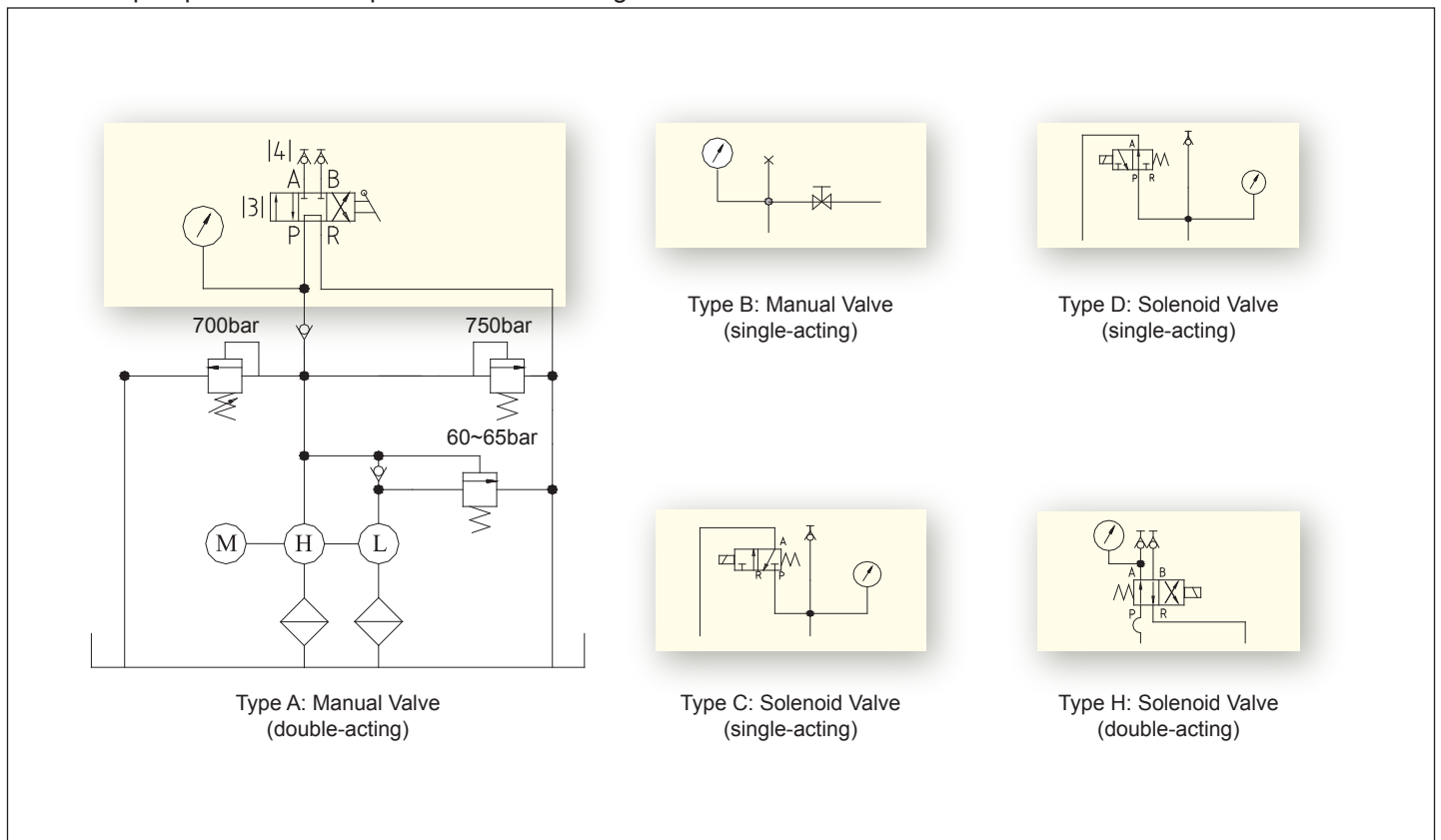
Type D: Solenoid Valve (single-acting)

Type H: Solenoid Valve (double-acting)

## Universal valve block of MP series pump

Valve Block		Introduction To Basic Functions	Circuit Diagram
Type A: Manual Valve (double-acting)		By the manual valve to operate the double acting tank, it responds quickly, and the reservoir piston will stop at once and keep the pressure for long period.	
Type B: Manual Valve (single-acting)		By the manual valve to operate the single acting tank, easy control, responds quickly, and keep the pressure for long period.	
Type C: Solenoid Valve (single-acting)		By the solenoid valve to operate the single acting tank, easy control, responds quickly, and keep the pressure for long period.	
Type D: Solenoid Valve (single-acting)		Press a button on the solenoid valve to control the outputting and inputting oil of the oil pump.	
Type H: Solenoid Valve (double-acting)		By the solenoid valve to operate the double acting tank, it responds quickly, and the reservoir piston will stop at once and keep the pressure for long period.	

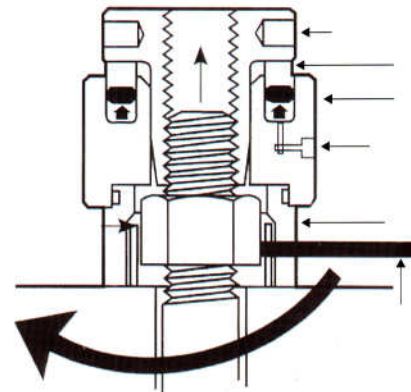
### MP series pump valve block replacement circuit diagram



Above the valve block can be installed in any size of oil tank

# Synchronous Tensioning System

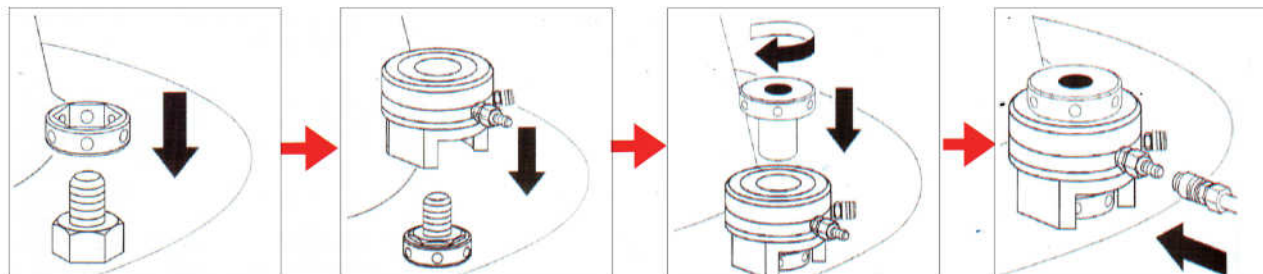
WREN bolt tensioner conforms to the technical standard, has been widely used in chemical industry, Power, steel, mechanics Military industry. WREN also providing customize production to suit all working condition, Any requirement, Please contact WREN Engineer.



Warranty: 12 months

Caution: Warranty is only available for WREN original product.

Assembling Drawing:



## HTE series Multi-stage Cylinder

Aforesaid models are just the samples, WREN can make according to the requirement of customers.



1500bar High Pressure Quick Coupler



Operate the device for swiveling to tighten by Gear just with a pole.

- Multi-stage Cylinder Design, Increase the Tension Length
- Strong capacity with small outside diameter, it is suit for the operation at narrow space.
- Spring return, Protect for the stroke over the maximum value, it is suit for operation frequently.
- 700-1500bar operation pressure
- Operate by Super High Pressure Hand Pumps and Electrical Pump



### Technical Data

Model	HTE30	HTE36	HTE39	HTE42	HTE48
Maximum Operation Pressure	1350bar	1350bar	1350bar	1350bar	1250bar
Maximum Output Capacity	465KN	678KN	915KN	915KN	1202KN
Maximum Stroke	7mm	10mm	10mm	10mm	7mm
Cylinder Effective Area	3448mm <sup>2</sup>	5027mm <sup>2</sup>	6830mm <sup>2</sup>	6830mm <sup>2</sup>	9621mm <sup>2</sup>
Quantity of Cylinder Step	2	2	2	2	2
Outside Diameter	72mm	84.5mm	98.5mm	98.5mm	129mm
Bolt Size	M30X3.5	M36X4	M39X4	M42X4.5	M48X5



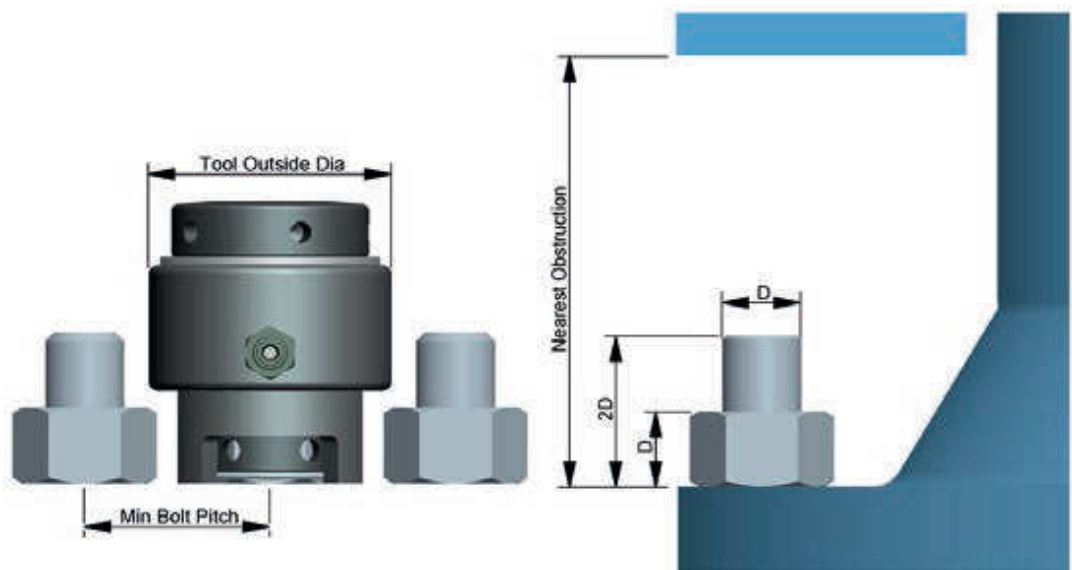


**HSR BOLT TENSIONER  
Spring Return Bolt Tensioner**

- Unique quick release bridge adaptation
- Piston overstroke prevention
- Piston stroke indication
- Piston / cylinder misalignment compensation
- Bolt coverage from 1" to 3 1/2" with just 4 tools
- Designed to fit BS1560 / ANSI B16.5 / API flanges
- Fully enclosed load cell design eliminates entry of debris into piston retraction mechanism

The Spring Return design dramatically increases productivity and safety on the job site when compared to older technology manual return tensioners.

topside.



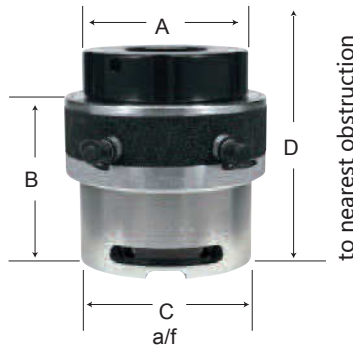
# SPRING RETURN BOLT TENSIONER

Our spring return bolt tensioner reduces operator fatigue, saving time and improving safety and productivity.



Order a load cell and an adaptor kit to make a complete tensioner. each are sold separately.

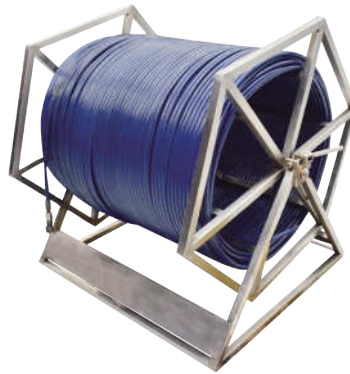
## Specifications and Dimensional Data



- Piston stroke - 10mm except for HS 0-8mm
- Max tool pressure - 21750psi(1500bar)
- Bolt protrusion above nut=1xbolt diameter
- "D" includes an allowance for tool removal after bolt tightening with 10mm tlls stroke
- Weight excludes puller sleeve
- Product development is constantly taking place and dimensions may change without notice

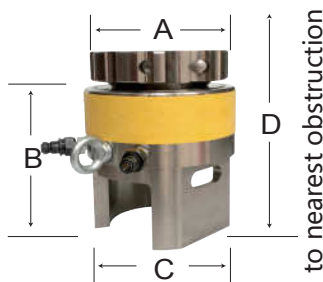
Load Cell	Stud Diameter	Stud	Tool Load		Hydraulic Area		A		B		C		D		Imp	Metric
			Lbs	KN	in <sup>2</sup>	mm <sup>2</sup>	in	mm	in	mm	in	mm	in	mm		
HSR 0	3/4"	M20	35500	160	1.65	1067	2.6	66	3.7	93	2.5	63	5.4	136	5.5	142
	7/8"	M22							3.7	93	2.5	63	5.6	142	5.6	144
		M24							4.6	117	2.7	68	6.9	175	6.9	175
HSR 1	1.1/8"	M27	61950	280	2.89	1867	3.4	87	4.6	117	2.7	68	7.1	181	7.0	178
		M24							4.6	117	3.0	75	6.9	175	6.9	175
HSR 2	1"	M24	99700	450	4.65	3001	4.1	103	4.6	117	3.0	75			7.0	178
		M27							4.6	117	3.0	75			7.0	178
	1.1/8"	M30							4.7	120	3.2	80	7.1	181	7.2	184
		M33							4.8	123	3.3	84	7.4	188	7.5	190
	1.3/8"	M36							5.0	126	3.5	89	7.7	195	7.7	196
HSR 3	1.1/4"	M33	145950	660	6.82	4401	4.7	118	4.8	123	3.5	88	7.5	190	7.6	192
		M36							5.0	126	3.8	96	7.8	197	7.8	198
	1.1/2"	M39							5.1	130	3.8	96	8.0	203	8.0	204
	1.5/8"	M42							5.2	133	4.1	105	8.2	209	8.3	211
HSR 4	1.1/2"	M39	223550	1000	10.34	6668	5.5	140.5	5.2	132	4.4	112	8.3	211	8.4	212
		M42							5.3	135	4.5	114	8.5	217	8.6	218
	1.3/4"	M45							5.5	139	4.7	118	8.8	223	8.9	225
	1.7/8"	M48							5.6	142	4.5	114	9.1	230	9.1	231
	2"								5.7	145	4.7	120	9.3	236		
HSR 5	2"	M52	331400	1500	15.50	10003	6.9	175.5	5.8	148	4.7	120	9.7	246	9.8	248
	2.1/4"	M56							6.1	154	5.4	138	10.2	259	10.2	258
		M60							6.3	161	5.4	138	10.2	259	10.3	262
	2.1/2"	M64							6.3	161	6.0	153	10.7	272	10.8	273
	2.3/4"	M68							6.6	167	6.1	156	11.2	284	11.1	283
HSR 6	2.3/4"	M72	553200	2500	25.84	16671	8.6	219	6.6	167	6.2	157	11.6	294	11.7	297
	3"	M76							6.9	171	7.2	182	12.1	307	12.1	308
		M80							7.1	180	7.5	190			12.3	312
	3.1/4"	M85							7.1	180	7.5	190	12.6	320	12.7	323
	3.1/2"	M90							7.3	186	8.1	205	13.1	332	13.2	334
		M90							7.3	186	7.9	200	13.2	339	13.3	341
HSR 7	3.1/2"	M95	708200	3200	33.06	21339	9.9	252	7.3	186	7.9	200	13.2	339	13.3	341
		M95							7.3	186	7.9	200	13.2	339	13.3	341
	3.3/4"	M100							7.6	192	7.9	200	13.7	352	13.9	356
	4"		7.8	199	8.3	210	14.2	363								

Our Subsea bolt tensioner incorporating the quick resction nut feature reduces diver fatigue,improving diver safety and productivity.



Used to twine super high pressure hose from 5 meter to 210 meter.

## Specifications and Dimensional Data



- Piston stroke - 1.1/18inch(Except WST1 - 0.79inch)
- Max tool pressure - 21,750psi
- "D" includes an allowance for tool removal after bolt tightening with 30mm tool stroke
- Product development is constantly taking place and dimensions may change without notice

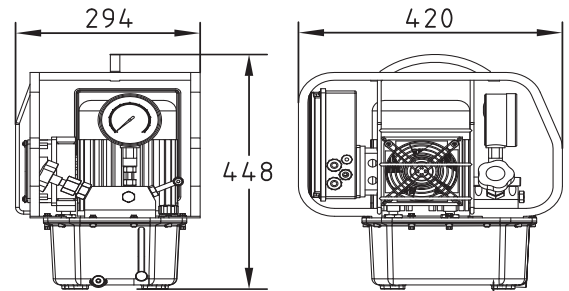
Tool Ref	Bolt Diameter		Tool Load KN	Hydraulic Area		'A' in/mm	'B' in/mm	'C' A/F in/mm	Minmum Bolt Protrusion (Above Nut)		'D' in/mm	Stroke in/mm
	Imperial	Metric		in <sup>2</sup>	mm <sup>2</sup>				in	mm		
<b>WST1</b>	3/4"	M20	141	1.96	943	2.60/66	3.82/97	1.89/48	4.09	107	8.98/228	0.79/20
	7/8"	M22							3.98	105		
<b>WST2</b>	1"	M24	237	2.45	1585	3.23/82	5.02/127.5	2.36/60	5.24	139	11.65/296	1.82/30
	1-1/8"	M27							5.12	136		
		M30								134		
<b>WST3</b>	1-1/4"	M33	379	3.92	2532	3.82/97	5.39/137	3.03/77	5.35	142	12.17/309	1.82/30
	1-3/8"	M36							5.24	139		
<b>WST4</b>	1-1/2"	M39	551	5.69	3676	4.37/111	5.75/146	3.54/90	5.51	147	12.68/322	1.82/30
	1-5/8"	M42							5.35	144		
<b>WST5</b>	1-3/4"	M45	880	9.10	5868	5.35/136	6.22/158	4.49/114	5.94	160	13.46/342	1.82/30
	1-7/8"	M48							5.83	158		
		2"							M52	5.71		
<b>WST6</b>	2-1/4"	M56	1564	16.17	10433	6.97/177	7.11/180.5	5.51/140	6.54	178	14.72/374	1.82/30
	2-1/2"	M60							6.30	172		
	2-3/4"	M64							6.08	169		
		M68								165		
	M70											
<b>WST7</b>	3"	M76	2419	26.63	16128	8.54/217	7.95/202	7.09/180	7.13	195	15.10/409	1.82/30
	3-1/4"	M80							6.89	192		
		M85							6.65	188		
		M90								184		

# HMP series Super High Pressure Electrical Pump

- Single-Acting high performance
- Can be used for bolt tensioning and other HP equipments in shipping vessel & wind power industry
- Convenient adjustable pressure regulator with a high precision pressure gauge
- Easy to adjust the pressure in the range of 700~2000 bar
- Simple and quick operation with the high performance quick connect couplings
- Very user friendly for site work due to its light weight compact design
- Higher operating pressure of pump can be ordered



Parameter	HMP06BWT18-L16	HMP06BWT18-L20
Model	HMP06BWT18-L16	HMP06BWT18-L20
Voltage/Frequency	220V/50HZ	220V/50HZ
Tank capacity	5.5L	5.5L
Flow(low-High)	4.2-0.20 L/min	4.2-0.20 L/min
Max Output Pressure	1600 bar	2000 bar
Output Port Size	1/4"BSP	1/4"BSP
Power	1.1KW	1.1KW
Weight	24KG	24KG



# SHNSP series Super High Pressure Air Pump

Parameter	SHNSP06BZQ5-16	SHNSP06BZQ5-20
Model	SHNSP06BZQ5-16	SHNSP06BZQ5-20
Tank capacity	5.5L	5.5L
Flow(low-High)	5.4-0.15 L/min	5.4-0.15 L/min
Max Output pressure	1600 bar	2000 bar
Air in	4~8 bar	4~8 bar
Power	1.1KW	1.1KW
Weight	20KG	20KG
Volume	272x416x446mm	272x416x446mm

BH series Hydraulic Hose	BH84 series	BH94 series
Maximum Operation Pressure /Safety Parameter	1800bar/2.5	2800bar/2.5
Inside Diameter	5.0X11.2	5.0X13.4
Outside Diameter		
Minimum Bending Radius	150	200
Available Quick Coupler	C116	C125





# HYNC series Hydranlic Nut Splitters

Capacity : 5-90 Ton

Bolt Size : M6 - M48

Max Working Pressure : 700bar

- Compact and ergonomic design, easy to use.
- Unique angled head design.
- Single-acting, spring return cylinder.
- Heavy duty chisels can be reground.
- Applications include service trucks, industry, tank cleaning, petrochemical, piping steel construction, mining...etc.



HYNC Series Hydranlic Nut Splitter Selection Chart

Model	Capacity (Tons)	Nut Size (mm)	Bolt Size (mm)	Oil Capacity (cm <sup>3</sup> )	Length (mm)	Width (mm)	Height (mm)	Weight Kg
HYNC-1319	5	10-19	M6-M12	15	170	40	48	1.2
HYNC-1924	10	19-24	M12-M16	20	191	54	62	2.0
HYNC-2432	15	24-32	M16-M22	60	222	64	72	3.0
HYNC-3241	20	32-41	M22-M27	80	224	75	88	4.4
HYNC-4150	35	41-50	M27-M33	155	288	94	105	8.2
HYNC-5060	50	50-60	M33-M39	240	318	106	128	11.8
HYNC-6075	90	60-75	M39-M48	492	393	156	181	34.1

\* The hardness of the nut should not exceed HRC-44.

## LA Automatic Series Selection Table

Model	LA50L337
Capacity (T)	50
Min open (mm)	64
Pulling depth of Min.open	651
Max.open (mm)	1150
Depth of max. open	559
Overall length (mm)	2590
Regulation of puller center height (mm)	450~1120
Cylinder stroke (mm)	337
Source of power (single phase)	220V/380V

Fully automatic hydraulic design-automatically up and down, grip and pull.

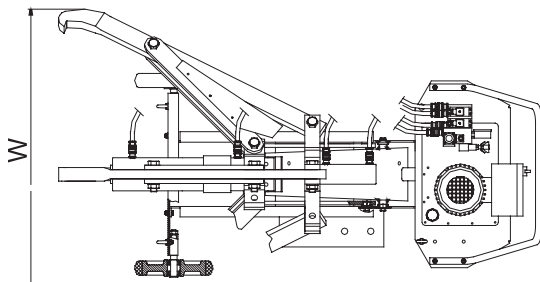
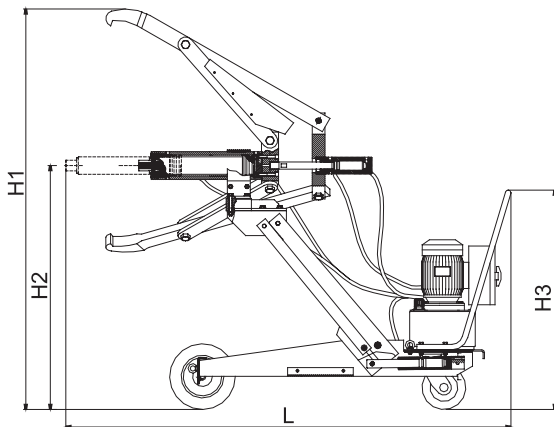
Made of alloy steel with super-high strength; double-acting hydraulic design. Used for dismantling large shafts and performing work pieces.



Available in 2 and 3 jaws design allows adding a pulling disc to pull bearings.

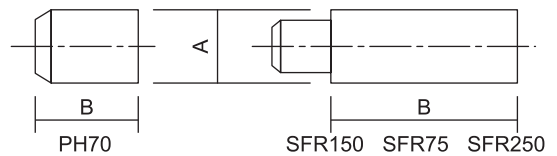
Roller cart makes it available to change workplace.

## LA Automatic Series Dimension



Model	LA50L337
L (mm)	2590
W (mm)	1264
H1 (mm)	1829
H2 (mm)	1114
H3 (mm)	1002

## LA Automatic Series Affix



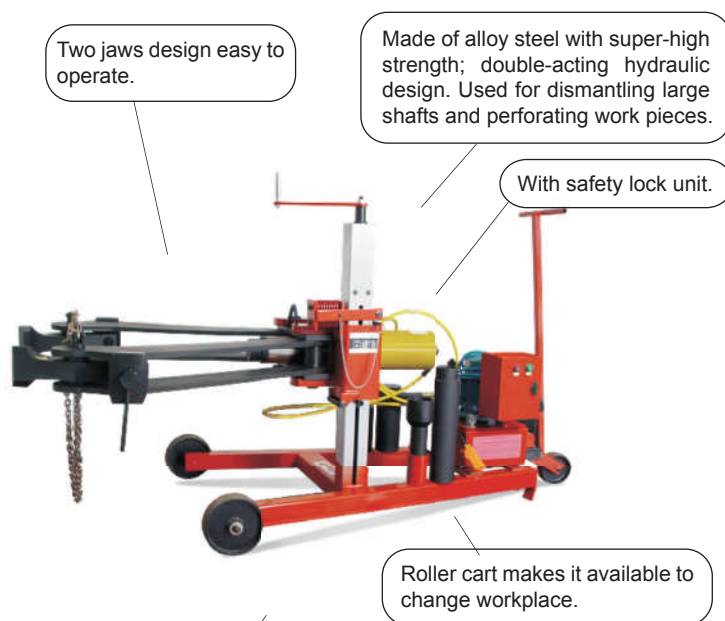
Model	A (mm)	B (mm)	Quantity
PH70	70	70	1
SFR150	70	150	1
SFR75	70	75	1
SFR250	70	250	1



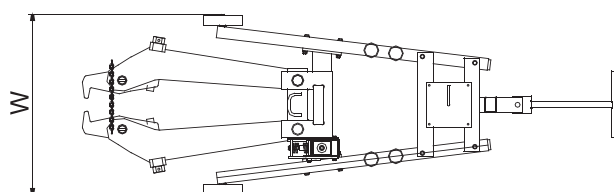
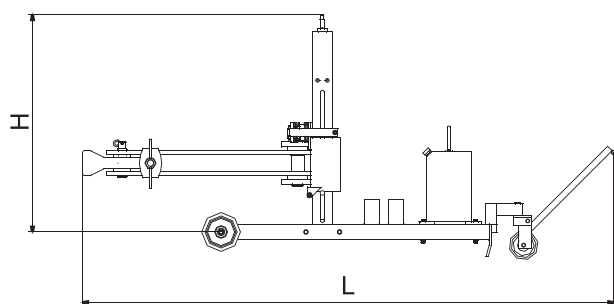
# LA series Vehicle Hydraulic Puller

## LA Series Selection Table

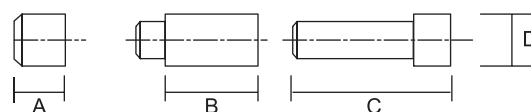
Model	LA25100	LA2560
Capacity (T)	100	60
Min open (mm)	381	140
Pulling depth of Min.open (mm)	1066	790
Max.open (mm)	1219	1000
Depth of max. open (mm)	863	650
Overall length (mm)	3015	2885
Regulation of puller center height (mm)	305~915	305~915
Cylinder stroke (mm)	250	250
Source of power (single phase)	220V/380V	220V/380V



## LA Series Dimension



### LA Series Affix



PHA105

SFR105

PHD105




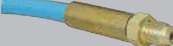

Model	A (mm)	B (mm)	C (mm)	D (mm)
PHA105	80			105
SFR105		205		105
PHD105			245	105

Model	LA25100	LA2560
L (mm)	3015	2885
H (mm)	1276	1276
W (mm)	930	930





- ▲ Four layers nylon design. Two layers of high strength steel wire braids and plastic coating.
- ▲ Twins hoses supplied for Hydraulic Torque Wrench.
- ▲ Used in strict occasion, 4:1 design factor.
- ▲ Light weight, small size and high bending radius.
- ▲ Exhibits low volumetric expansion under pressure.

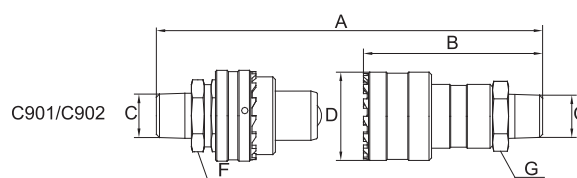
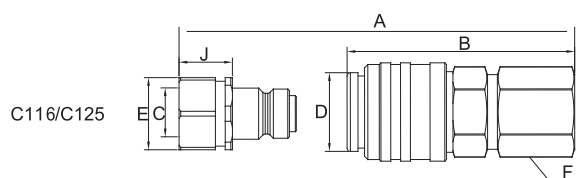
Model & photograph		max operating pressure ( bar )	hose end		Type	hose length ( M )
			end one	end two		
2JH64Series twin hydraulic hose		720	1/4"NPT	1/4"NPT	2JH6445-1	4.5
					2JH6460-1	6
					2JH6490-1	9
					2JH64100-1	10
JH74 Series hydraulic hose		720	1/4"NPT	1/4"NPT	JH7445	4.5
					JH7460	6
					JH7490	9
					JH74100	10
JH78 Series hydraulic hose		1000	3/8"NPT	3/8"NPT	JH7818	1.8
					JH7845	4.5
					JH7890	9
					JH78120	12
BH84 Series superhigh pressure hydraulic hose		1800	1/4"BSP	1/4"BSP	BH8420	2
					BH8460	6
					BH8490	9
					BH84120	12
BH94 Series superhigh pressure hydraulic hose		2500	1/4"BSP	1/4"BSP	BH9430	3
					BH9460	6
					BH9490	9

Above are the standard length, can be customized according to customer requirements of various length

## C series Quick Coupler

Model & photograph	Max Operating Pressure	Male half	Femal half	connecting	Dimensions							
					A	B	C	D	E	F	G	J
C901	700bar	C9014	C9013	Spiral lock	97	61	1/4"NPT	29		22	22	
					97	61	1/4"NPT	29		22	22	
C902	700bar	C9022	C9021	Spiral lock	108	71	3/8"NPT	35		24	24	
					108	71	3/8"NPT	35		24	24	
C116	1500bar	C1162	C1161	Card set	81		1/4"BSP		27.5			18.5
					81	61.5	1/4"BSP	28		24		
C125	2000bar	C1252	C1251	Card set	82		1/4"BSP		27.5			17.7
					82	64.5	1/4"BSP	30		24		




C Series Quick Coupler Dimension



- ▲ 3/8"NPT high flow couplers,.
- ▲ It is standard component on most WREN cylinders.
- ▲ featuring 'push-to-connect' operation.
- ▲ 1/4" regular coupler.




## G series Glycerin Filled Hydraulic Pressure Gauge

- ▲ Standard calibration with dual scale reading for psi and bar.
- ▲ All the pressure sensing components are sealed with glycerin and dampened proof to guarantee durability.
- ▲ Including a safety seal ring and pressure equalling membrane.

Model & photograph	Port	Face Diameter (mm) and pressure range(Mpa)	Gauge adaptor
GN0610 	1/4" NPT External screw thread	Psi/Bar Double scale 0-700bar	 GA-3
		Psi/Bar Double scale 0-1000bar	
GG1010	1/2" BSP External screw thread	Psi/Bar Double scale 0-1000bar	 GA20
GG1010-B		Psi/Bar Single scale 0-1000bar	
GG1020-G		Psi/Bar Double scale 0-2000bar	
GG1025-G		Psi/Bar Double scale 0-2500bar	
GG1030-G		Psi/Bar Double scale 0-3000bar	

## J series Connecting Accessory


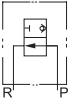

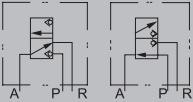

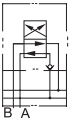

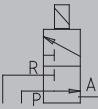

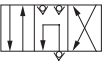
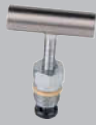
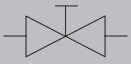

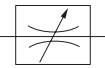



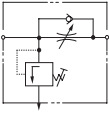

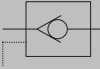

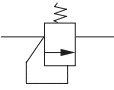
- ▲ Hundreds of connection
- ▲ Kinds of screw thread, apply for any systems
- ▲ All bear superhigh pressure working condition













J01 Series	J02 Series	J03 Series
		
J01-01 NPT1/4" (F)-NPT1/4"(F)	J02-06 NPT1/4" (M)-NPT1/4"(M)	J03-01 NPT1/4" (M)-G1/4"(F)
J01-02 NPT3/8" (F)-NPT1/4"(F)	J02-07 NPT1/4" (M)-NPT3/8"(M)	J03-06 NPT1/4" (F)-G1/4"(M)
J01-03 NPT3/8" (F)-NPT3/8"(F)	J02-10 NPT3/8" (M)-NPT3/8"(M)	J03-07 NPT1/4" (F)-NPT3/8"(M)
J01-04 NPT1/4" (F)-M10X1.5 (F)	J02-23 G1/4" (M)-G1/4"(M)	J03-11 NPT3/8" (F)-G3/8"(M)
J01-05 NPT3/8" (F)-M16X1.5(F)	J02-25 G1/4" (M)-NPT3/8"(M)	J03-14 NPT3/8" (F)-NPT1/4"(M)

Above as the standard model, other 300 kinds of models, please contact WREN Engineer.

# Superhigh pressure series (made by WREN)

## Hydraulic Component(in common use)

Photograph and Model		Description	Application	Hydraulic Symbol
	solenoid (operated)valve VGS2	These valve maybe directly installed in pipe systems, when equipped with sub plates enabling pipe connection. Many optional functions can be incorporated in these sub-plates.	single-acting hydraulic pump	
	solenoid (operated)valve VGZ3		double-acting hydraulic pump	
	solenoid (operated)valve VGZ4		double-acting hydraulic pump	
	air (operated)valve VPZ3-1B		double-acting hydraulic pump	
	Directional control valve VH1	The directional-seated valesl types operate leakage free. They are operated via a hand lever on an eccentric shaft transferring the switching moment to an actuation pin acting on the valve elements(balls), for oil outlet, shut-off, retraction.	Double-acting hydraulic pump	
	Shut-off Valve IV4	Operated in the pump with model to use for shut-off, reaction	single-acting hydraulic pump & Double-acting hydraulic pump	
	needle valve V-82	The control cylinder speed,can also be used as shut-off valve for temporary load holding. 3/8NPT Female ports.	single-acting hydraulic pump & Double-acting hydraulic pump	
	limited valve TYC01	Safeguarding the system against excessive pressure or for the limitation of working pressure.	electric pump(limite the pressure and adjust the pressure)	
	Manually operated check valve V-66	Used for load holding applications with single and double acting cylinders. Valve is manually opened to allow oil to flow back to tank when cylinder retracts.	single-acting hydraulic pump & Double-acting hydraulic pump	
	Pilot operated check valve V-42	To hold the load in case of system pressure loss	Double-acting hydraulic pump	
	safe valve BF2	For the limitation of working pressure	single-acting hydraulic pump & Double-acting hydraulic pump	

Photograph and Model		Description	Application	Hydraulic Symbol
	Piston	Basic hydraulic unit	Piston pump	
	Adjust Valve TYC02	Apply to adjust the work pressure of the hydraulic system.	adjust pressure for hydraulic pump or hydraulic system	
	Directional Valve HXC02	Do reverse of direction by a little oil discharge	single-acting hydraulic pump & Double-acting hydraulic pump	
	Directional control Valve DXC01	Ensure the liquid do single-flow, opposite direction holding the pressure.	single-flow , holding the pressure	
	Directional control Valve DXC02	Ensure the liquid do single-flow, opposite direction holding the pressure.	single-flow , holding the pressure	
	Relief Valve XHC02 XHC03	Control the oil loading to release the pump's loading.	hydraulic pump	

# SI\* CONVERSION FORMULAS

## APPROXIMATE CONVERSION

MULTIPLY	BY	TO GET OR MULTIPLY	TO GET
SI* UNIT	CONY FACTOR	NON-SI UNIT	CONY FACTOR
<b>LENGTH</b>			
millimeter (mm) (1 inch = 25.4 mm exactly)	X 0.03937	= inch	X 25.4 = mm
centimeter (cm) 10 mm	X 0.3937	= inch	X 2.54 = cm
meter (m) 1000 mm	X 3.28	= foot	X 0.305 = m
meter (m)	X 1.09	= yard	X 0.914 = m
kilometer (km) 1000 m	X 0.62	= mile	X 1.61 = km
<b>AREA</b>			
millimeter <sup>2</sup> (mm <sup>2</sup> )	X 0.00155	= inch <sup>2</sup>	X 645 = mm <sup>2</sup>
centimeter (cm <sup>2</sup> )	X 0.155	= inch <sup>2</sup>	X 6.45 = cm <sup>2</sup>
meter (m <sup>2</sup> )	X 10.8	= foot <sup>2</sup>	X 0.0929 = m <sup>2</sup>
meter (m <sup>2</sup> )	X 1.2	= yard <sup>2</sup>	X 0.836 = m <sup>2</sup>
hectare (ha) 10,000 m <sup>2</sup>	X 2.47	= acre	X 0.405 = ha
kilometer (km <sup>2</sup> )	X 0.39	= mile <sup>2</sup>	X 2.59 = km <sup>2</sup>
<b>VOLUME</b>			
centimeter <sup>3</sup> (cm <sup>3</sup> )	X 0.061	= inch <sup>3</sup>	X 16.4 = cm <sup>3</sup>
liter (l)	X 61	= inch <sup>3</sup>	X 0.016 = l
milliliter (ml) (1 ml= 1 cm <sup>3</sup> )	X 0.034	= oz-liq	X 29.6 = ml
liter (l) 1000 ml	X 1.06	= quart	X 0.946 = l
liter (l)	X 0.26	= gallon	X 3.79 = l
meter <sup>3</sup> (m <sup>3</sup> ) 1000 l	X 1.3	= yard <sup>3</sup>	X 0.76 = m <sup>3</sup>
<b>MASS</b>			
gram (g)	X 0.035	= ounce	X 28.3 = g
kilogram (kg) 1000 g	X 2.2	= pound	X 0.454 = kg
metric ton (t) 1000 kg	X 1.1	= ton (short)	X 0.907 = t

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<b>FORCE (N = kg · m/s<sup>2</sup>)</b>			
newton (N)	X 0.225	= pound	X 4.45 = N
kilonewton (kN)	X 225	= pound	X 0.00445 = kN
<b>TORQUE</b>			
newton meter (N·m)	X 8.9	= lb. in.	X 0.113 = N·m
newton meter (N·m)	X 0.74	= lb. ft.	X 1.36 = N·m
<b>PRESSURE (Pa = N/m<sup>2</sup>)</b>			
kilopascal (kPa)	X 4.0	= in. H <sub>2</sub> O	X 0.249 = kPa
kilopascal (kPa)	X 0.30	= in. Hg	X 3.38 = kPa
kilopascal (kPa)	X 0.145	= p.s.i.	X 6.89 = kPa
megapascal (MPa)	X 145	= p.s.i.	X 0.00689 = MPa
Bar	X 14.5	= p.s.i.	X 0.0689 = Bar
<b>POWER (W = J/s)</b>			
kilowatt (kw)	X 1.34	= hp	X 0.746 = kw
kilowatt (kw)	X 0.948	= Btu/s	X 1.055 = kw
watt (w)	X 0.74	= ft. lb/s	X 1.36 = w
<b>TEMPERATURE</b>			
°C = (°F - 32) ÷ 1.8		°F = (°C X 1.8) + 32	
<b>FLOW</b>			
cu. cm./min.	X 0.061	= cu. in./min.	X 16.4 = cu. cm./min.
liters/min.	X 0.2642	= GPM	X 3.785 = liters/min.

\*System international (Modern Metric System)



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without prior notice to power, these changes will list in future publications