



PERFECT[®]
—MACHINERIES—



PERFECT TOOLS

FOR INDUSTRIAL APPLICATIONS

PRODUCT CATLOGUE

About us

Perfect Machiners is a leading supplier of industrial equipment having the world's most complete line of Products which serve every sector across the globe.

We constantly gear towards engineering the finest & rugged products. specialized in sales of Bolt torquing equipment, bolt tensioning equipment ,pipe cutting & bevelling machine, flange facing machines, non sparking tools, hydro testing equipment & heat exchanger re-tubing tools.

With extensive experience within service companies, our team understands the dynamics of a Wide range of industries and has the capability to deliver tools to turn-key solutions, that both meet special requirements & address complex challenges.

We are a team of experienced technocrats concentrate on technology and research which is The base for our growth. we rely on quality and capacity, as our equipment are best in quality to cater the industries.

Perfect Machiners masters in specialized engineering products to a diverse range of industries including oil And gas, onshore/offshore, construction & maintenance, petrochemical, power generation, Construction, infrastructure and utilities.



CONTENT



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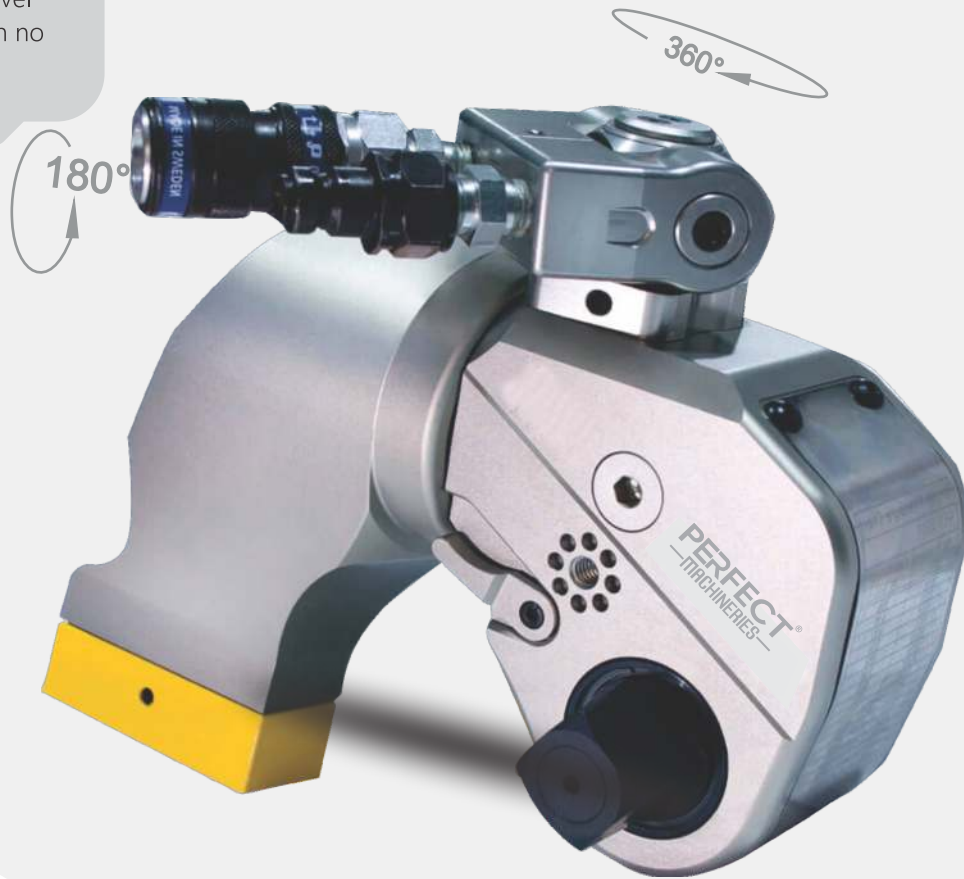
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PSD SERIES SQUARE DRIVE TORQUE WRENCH

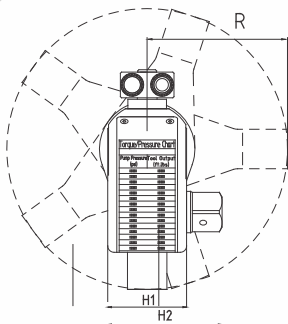
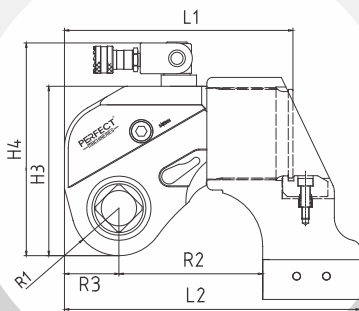


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The 360 180 degree swivel is free to operation with no space limitation



TORQUE WRENCH



FEATURES OF HIT SERIES

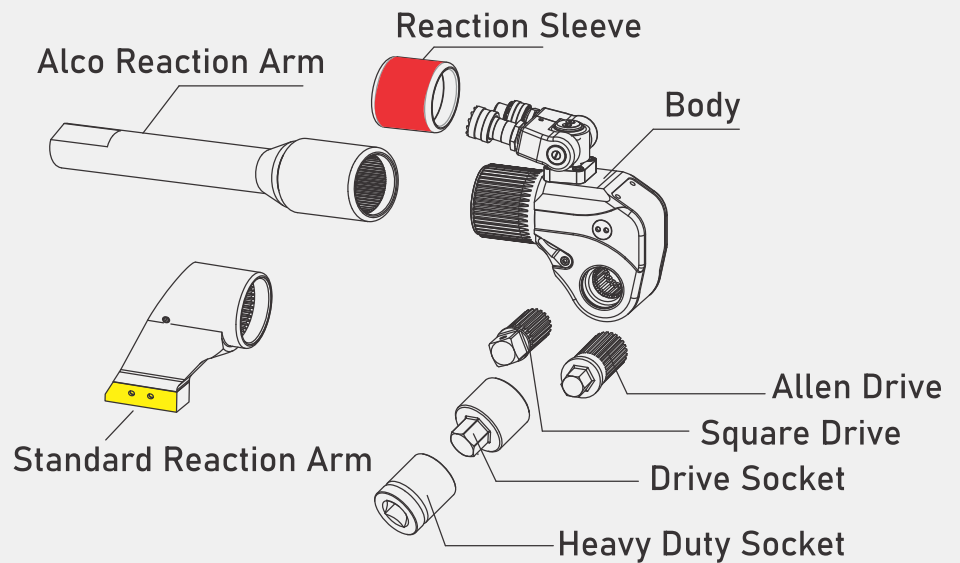
- Compact, uni body designed to give housing maximum strength with minimum weight.
- Light weight Aircraft alloy for high strength and durability
- Output Torque Capacities 108 NM to 72000 NM.
- Choice of square drive sizes from $\frac{3}{4}$ " to $2\frac{1}{2}$ "
- Constant Torque accuracy of $\pm 3\%$
- Working pressure 700Bar.
- Multipurpose reaction arm
- Reversible square drive for tightening & loosening applications
- Fitted with 360 deg X 180 deg uni-swivel quick release couplings for easy positioning of Hoses.
- Internal reaction arm spline.

PSD SERIES SQUARE DRIVE TORQUE WRENCH



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Perfect Machineries manufactures Simple, faster, efficient and reliable Hydraulic Torque Wrenches that are user friendly. the high strength alloy steel and controlled vacuum heat treatment ensures stronger drive components. Improved high pressure seal design is suitable for static & dynamic applications.



TECHNICAL DATA

TECHNICAL DATA	Units	PSD 07	PSD 1	PSD-3	PSD-5	PSD-8	PSD-10	PSD-20	PSD-25	PSD-35	PSD-50
Square Drive	Inch	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
Min. Torque	Nm	110	175	470	750	900	1670	2600	2400	4890	7010
Max. Torque	Nm	1145	1855	4422	7512	10821	15342	26542	34655	48472	66245
Min. Torque	Ft. Lbs.	80	135	331	553	775	1131	1917	2551	3611	5107
Max. Torque	Ft. Lbs.	830	1357	3333	5553	7965	11307	19675	25630	36113	51073
Tool Weight	Kg.	2.5	4	5	9.5	11	14	24	35.5	52	74
Tool Weight	Lbs.	4	6	8.8	22	23	32.7	60.2	74.4	123	137

DIMENSIONAL DATA

DIMENSIONAL DATA	Units	PSD-07	PSD-1	PSD-3	PSD-5	PSD-8	PSD-10	PSD-20	PSD-25	PSD-35	PSD-50
Body Length (L1)	(mm)	110	144.5	178	213	222	246	305	321	371	376
	(Inch)	4.33	5.69	7.0	8.38	8.74	9.69	12	25.68	14.6	14.8
Overall Length (L2)	(mm)	139	173	228	274.5	292	317	383	401	465	528
	(Inch)	5.47	6.81	8.98	10.80	11.49	12.48	30.64	15.78	18.3	30
Tool Width (H1)	(mm)	42	52	69.5	82.5	92	102	121.5	120	137	162
	(Inch)	1.65	2.04	2.74	3.24	3.14	4.01	3.93	4.72	5.39	6.14
Overall Width (H2)	(mm)	65	70	94	128.5	134	142	183	200	216	226
	(Inch)	2.55	2.76	3.7	5.06	5.2	5.59	7.2	7.87	8.5	8.9
Tool Height (H3)	(mm)	77	95.5	115	149	167	182	220	246	282	291
	(Inch)	3.03	3.76	4.53	5.87	6.57	7.16	8.33	9.68	11.1	11.5
Overall Height (H4)	(mm)	108	136	176	199	217	232	270	297	332	326
	(Inch)	4.25	5.35	6.93	7.83	8.54	9.13	10.62	11.69	13.07	12.83
Tool Radius Around Bolt (R1)	(mm)	21	26.3	34.5	39	47	51	59	66	77	78.8
	(Inch)	0.82	1.03	1.36	1.53	1.85	2	2.32	2.59	3.03	3.1
Reaction Reach (R2)	(mm)	68	85	111.5	140	153	154	186	199	241	295
	(Inch)	2.67	3.35	4.39	5.51	6.02	6.06	7.32	7.83	9.48	11.6

Perfect Machineries Recommends Use Of Perfect Machineries Standard Accessories
Ensuring Precise Performance & Best Suitability

PHD-SERIES DIRECT HEX TYPE TORQUE WRENCHES



FEATURES OF PHD SERIES

Compact, lightweight, aluminum drive unit.

Output Torque Capacities 108 NM to 72000 NM.

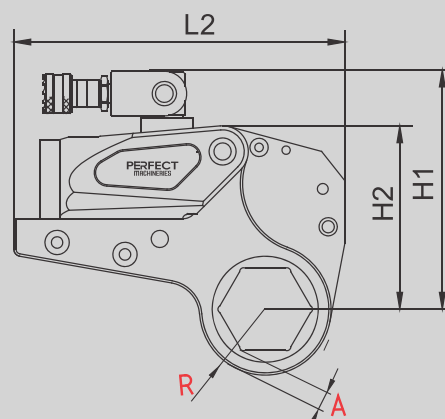
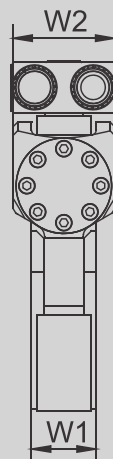
Low profile & Narrow cassette design for direct in line reaction & ideal for limited access applications.

Easy interchangeable ratchet heads

Ratchet heads available from AF 3/4" (19mm) to 6.7/8" (175mm)

Constant Torque accuracy of +/- 3%

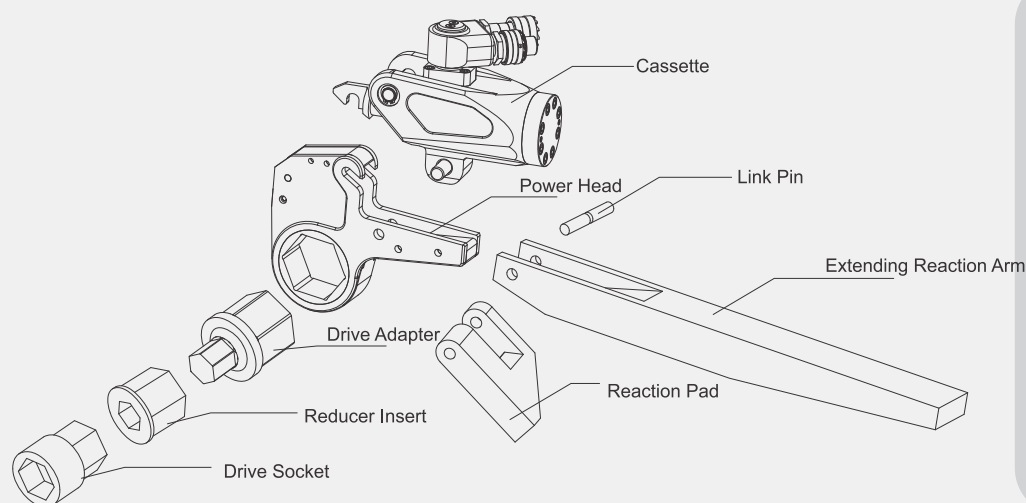
Fitted with 360 deg X 180 deg uni-swivel quick release couplings for easy positioning of Hoses.



PHD-SERIES DIRECT HEX TYPE TORQUE WRENCHES



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PERFECT MACHINERIES PHD-SERIES Direct Hex drive Hydraulic Torque Wrenches are designed for extreme low spaces where normal tools cannot reach. The light weight & compact hydraulic cylinder is made of special Aircraft grade Aluminium Alloy and the internal spares are made of high Nickel Alloy steel. There are 5 models in Fit series ranging from 230-45000 Nm. All models have small nose radius which allows the tool to fit in such areas where space constraint is observed.

TECHNICAL DATA

TECHNICAL DATA	Units	PHD - 2		PHD - 4		PHD - 8		PHD - 14	PHD - 32	
Min. Torque	Nm	2430	234	523	642	1054	1134	1823	4154	4344
Max. Torque	Nm	2355	2520	5845	6460	15950	11550	14525	41893	44643
Min. Torque	Ft. Lbs.	180	176	400	474	777	860	1370	3038	3297
Max. Torque	Ft. Lbs.	1850	1784	4500	4800	8111	8726	13722	31030	33038
Across Flat	mm	19 - 55	55 - 60	34 - 65	70 - 80	41 - 95	100 - 105	50 - 117	110 - 155	160 - 175
	Inch	3/4 - 2.3/16	2.3/16 - 2.3/8	1.5/16 - 2.9/16	2.3/4 - 3.1/8	1.5/8 - 3.3/4	3.7/8 - 4.1/8	2 - 4.1/2	4.1/4 - 6.1/8	6.1/8 - 6.7/8
Weight	Kg.	4	4.5	2	2.7	8	5	3	14	16
Drive Unit	Lbs.	4.2	4.3	6.3	4.7	7.4	8.4	13	23	23
Weight	Kg.	2	2.5	5	3.6	8	7	14	29.8	28
Ratchet Unit	Lbs.	3.5	3.7	9.6	10.1	17.6	18.4	25.5	63.8	66

DIMENSIONAL DATA

DIMENSIONAL DETAILS	Units	PHD - 2		PHD - 4		PHD - 8		PHD - 14	PHD - 32	
Overall Length (L)	(mm)	196	196	221	221	274	274	361	430	441
	(Inch)	7.7	7.7	8.7	8.7	10.79	10.79	14.27	16.92	17.36
(H1)	(mm)	125.9	128.5	171.3	171.3	206	206	239	303	315
	(Inch)	4.95	5.05	6.74	6.74	8.11	8.11	9.4	11.9	12.4
(H2)	(mm)	102.3	105	125	125	157	157	204	272	285
	(Inch)	4.02	4.13	4.92	4.92	6.18	6.18	8.03	10.7	11.22
Width at Link (W1)	(mm)	32	32	41.6	41.6	52.2	52.2	64	85	85
	(Inch)	1.25	1.25	1.64	1.64	2.055	2.055	2.55	3.34	3.34
Width at Cylinder (W2)	(mm)	51	51	63.5	63.5	78	78	99	131	131
	(Inch)	2	2	2.49	2.49	3.07	3.07	3.89	5.15	5.15
Nose Radius (R)	(mm)	27 - 43	43 - 46	36 - 53	56 - 61	46 - 71	75 - 78	60 - 87	85 - 155	160 - 175
R min.	(mm)	9.5	10.1	10.7	11.7	14.7	15.9	18.1	25.6	24.8
R max.	(mm)	12.2	10.5	13.8	14.6	15.2	18.7	20.7	31.3	27.3



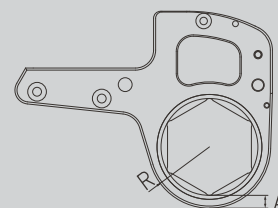
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The reaction pawl officially overcome the possibility of ratchet reversing opposite; enhance the efficiency and torque accuracy

Compact design with longer arm fully advances the reliability

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



LINK SELECTION

wrench to operate freely in confined areas.

Features

- Compact design with longer arm improves the reliability.
- More accurate and easier to use, since the wrench directly operates on the nuts.
- 360x180 degree swivel or 360x360 degree swivel allows the

PHD-2 Link	Hex Size	
	Imperial	Metric
PHD-2-19	3/4"	19mm
PHD-2-20	13/16"	-
PHD-2-21	-	21mm
PHD-2-22	7/8"	22mm
PHD-2-23	15/16"	-
PHD-2-24	-	24mm
PHD-2-25	1"	-
PHD-2-27	1-1/16"	27mm
PHD-2-28	1-1/8"	-
PHD-2-30	1-3/16"	30mm
PHD-2-31	1-1/4"	-
PHD-2-32	-	32mm
PHD-2-33	1-5/16"	-
PHD-2-34	-	34mm
PHD-2-35	1-3/8"	35mm
PHD-2-36	-	36mm
PHD-2-37	1-7/16"	-
PHD-2-38	1-1/2"	38mm
PHD-2-39	1-9/16"	-
PHD-2-41	1-5/8"	41mm
PHD-2-42	1-11/16"	-
PHD-2-44	1-3/4"	-
PHD-2-46	1-13/16"	46mm
PHD-2-47	1-7/8"	-
PHD-2-49	1-15/16"	49mm
PHD-2-50	-	50mm
PHD-2-51	2"	-
PHD-2-52	2-1/16"	-
PHD-2-54	2-1/8"	-
PHD-2-55	2-3/16"	55mm
PHD-2-57	2-1/4"	-
PHD-2-59	2-5/16"	-
PHD-2-60	2-3/8"	60mm

PHD-4 Link	Hex Size	
	Imperial	Metric
PHD-4-33	1-5/16"	-
PHD-4-34	-	34mm
PHD-4-35	1-3/8"	-
PHD-4-36	-	36mm
PHD-4-37	1-7/16"	-
PHD-4-38	1-1/2"	38mm
PHD-4-39	1-9/16"	-
PHD-4-41	1-5/8"	41mm
PHD-4-42	1-11/16"	-
PHD-4-44	1-3/4"	-
PHD-4-46	1-13/16"	46mm
PHD-4-47	1-7/8"	-
PHD-4-49	1-15/16"	49mm
PHD-4-50	-	50mm
PHD-4-51	2"	-
PHD-4-52	2-1/16"	-
PHD-4-53	2-1/8"	-
PHD-4-55	2-3/16"	55mm
PHD-4-57	2-1/4"	-
PHD-4-58	2-5/16"	-
PHD-4-60	2-3/8"	60mm
PHD-4-61	2-7/16"	-
PHD-4-63	2-1/2"	-
PHD-4-65	2-9/16"	65mm
PHD-4-66	2-5/8"	-
PHD-4-68	2-11/16"	-
PHD-4-70	2-3/4"	70mm
PHD-4-71	2-13/16"	-
PHD-4-73	2-7/8"	-
PHD-4-75	2-15/16"	75mm
PHD-4-76	3"	-
PHD-4-77	3-1/16"	-
PHD-4-79	3-1/8"	-
PHD-4-80	-	80mm

PHD-8 Link	Hex Size	
	Imperial	Metric
PHD-8-41	1-5/8"	41mm
PHD-8-42	1-11/16"	-
PHD-8-44	1-3/4"	-
PHD-8-46	1-13/16"	46mm
PHD-8-47	1-7/8"	-
PHD-8-49	1-15/16"	49mm
PHD-8-50	-	50mm
PHD-8-51	2"	-
PHD-8-52	2-1/16"	-
PHD-8-54	2-1/8"	-
PHD-8-55	2-3/16"	55mm
PHD-8-57	2-1/4"	-
PHD-8-58	2-5/16"	-
PHD-8-60	2-3/8"	60mm
PHD-8-61	2-7/16"	-
PHD-8-63	2-1/2"	-
PHD-8-65	2-9/16"	65mm
PHD-8-66	2-5/8"	-
PHD-8-68	2-11/16"	-
PHD-8-70	2-3/4"	70mm
PHD-8-71	2-13/16"	-
PHD-8-73	2-7/8"	-
PHD-8-75	2-15/16"	75mm
PHD-8-76	3"	-
PHD-8-77	3-1/16"	-
PHD-8-79	3-1/8"	-
PHD-8-80	-	80mm
PHD-8-81	3-3/16"	-
PHD-8-82	3-1/4"	-
PHD-8-84	3-5/16"	-
PHD-8-85	-	85mm
PHD-8-86	3-3/8"	-
PHD-8-87	3-7/16"	-
PHD-8-88	3-1/2"	-
PHD-8-90	-	90mm
PHD-8-91	3-9/16"	-
PHD-8-92	3-5/8"	-
PHD-8-93	3-11/16"	-
PHD-8-95	3-3/4"	95mm
PHD-8-96	3-13/16"	-
PHD-8-98	3-7/8"	-
PHD-8-100	3-15/16"	100mm
PHD-8-101	4"	-
PHD-8-103	4-1/16"	-
PHD-8-105	4-1/8"	105mm

PHD-14 Link	Hex Size	
	Imperial	Metric
PHD-14-50	-	50mm
PHD-14-51	2"	-
PHD-14-52	2-1/16"	-
PHD-14-53	2-1/8"	-
PHD-14-55	2-3/16"	55mm
PHD-14-57	2-1/4"	-
PHD-14-58	2-5/16"	-
PHD-14-60	2-3/8"	60mm
PHD-14-62	2-7/16"	-
PHD-14-63	2-1/2"	-
PHD-14-65	2-9/16"	65mm
PHD-14-66	2-5/8"	-
PHD-14-68	2-11/16"	-
PHD-14-70	2-3/4"	70mm
PHD-14-71	2-13/16"	-
PHD-14-73	2-7/8"	-
PHD-14-75	2-15/16"	75mm
PHD-14-76	3"	-
PHD-14-77	3-1/16"	-
PHD-14-79	3-1/8"	-
PHD-14-80	-	80mm
PHD-14-81	3-3/16"	-
PHD-14-82	3-1/4"	-
PHD-14-84	3-5/16"	-
PHD-14-85	-	85mm
PHD-14-86	3-3/8"	-
PHD-14-87	3-7/16"	-
PHD-14-89	3-1/2"	-
PHD-14-90	-	90mm
PHD-14-91	3-9/16"	-
PHD-14-92	3-5/8"	-
PHD-14-93	3-11/16"	-
PHD-14-95	3-3/4"	95mm
PHD-14-96	3-13/16"	-
PHD-14-98	3-7/8"	-
PHD-14-100	3-15/16"	100mm
PHD-14-101	4"	-
PHD-14-104	4-1/6"	-
PHD-14-105	4-1/8"	105mm
PHD-14-106	4-3/16"	-
PHD-14-107	4-1/4"	-
PHD-14-109	4-5/16"	-
PHD-14-110	-	110mm
PHD-14-111	4-3/8"	-
PHD-14-112	4-7/16"	-
PHD-14-114	4-1/2"	-
PHD-14-115	-	115mm
PHD-14-117	-	117mm

PHD-32 Link	Hex Size	
	Imperial	Metric
PHD-32-108	4-1/4"	-
PHD-32-109	4-5/16"	-
PHD-32-110	-	110mm
PHD-32-111	4-3/8"	-
PHD-32-112	4-7/16"	-
PHD-32-114	4-1/2"	-
PHD-32-115	-	115mm
PHD-32-116	4-9/16"	-
PHD-32-117	4-5/8"	117mm
PHD-32-119	4-11/16"	-
PHDT-32-120	-	120mm
PHD-32-121	4-3/4"	-
PHD-32-122	4-13/16"	-
PHD-32-123	4-7/8"	-
PHD-32-125	-	125mm
PHD-32-126	4-15/16"	-
PHD-32-127	5"	127mm
PHD-32-128	5-1/16"	-
PHD-32-130	5-1/8"	-
PHD-32-131	5-3/16"	-
PHD-32-133	5-1/4"	-
PHD-32-134	5-5/16"	135mm
PHD-32-136	5-3/8"	-
PHD-32-138	5-7/16"	-
PHD-32-140	5-1/2"	140mm
PHD-32-141	5-9/16"	-
PHD-32-142	5-5/8"	-
PHD-32-144	5-11/16"	-
PHD-32-145	-	145mm
PHD-32-146	5-3/4"	-
PHD-32-147	5-13/16"	-
PHD-32-149	5-7/8"	-
PHD-32-150	-	150mm
PHD-32-151	5-15/16"	-
PHD-32-152	6"	-
PHD-32-153	6-1/16"	-
PHD-32-155	-	155mm
PHD-32-156	6-1/8"	-
PHD-32-157	6-3/16"	-
PHD-32-158	6-1/4"	-
PHD-32-160	-	160mm
PHD-32-161	6-5/16"	-
PHD-32-162	6-3/8"	-
PHD-32-163	6-7/16"	-
PHD-32-165	6-1/2"	165mm
PHD-32-166	6-9/16"	-
PHD-32-168	6-5/8"	-
PHD-32-170	6-11/16"	170mm
PHD-32-171	6-3/4"	-
FT-32-173	6-13/16"	-
FT-32-174	6-7/8"	-
FT-32-175	-	175mm

HYDRAULIC TORQUE ELECTRICS-PNEUMATIC PUMP



Features:

- Most efficient Compact automatic three stage flow pump
- Aluminum oil tank with oil gauge, thermometer and Protective Frame.
- 700Bar working pressure
- One manifold can be used to operate 2 wrenches simultaneously.
- High Power brushless motor, maintenance free, long service life.

Model	PME-2	PMT-4
Working Pressure	10000 Psi	10000 Psi
Drive	Electric	Electric
Voltage	220V/50Hz	220V/50Hz
Power	1.1 KW	1.1 KW
Tank Capacity	5.5 L	5.5 L
Flow Rate (Low - Mid - High)	7 - 1.6 - 0.8 L/min	7 - 1.6 - 0.8 L/min
Oil Cooler	Yes	Yes
Weight	25 kg	28 kg
Oil Outputs	4x1/4" NPT	8x1/4" NPT
LxWxH	445x304x426mm	461x304x426mm



Features:

- Most efficient Compact automatic three stage flow pump
- Aluminum oil tank with oil gauge thermometer and Protective Frame
- Three Stage with Air Pump
- Oil Cooler for smooth Continuous operation
- 700Bar working pressure
- One manifold can be used to operate 2 wrenches simultaneously.
- High Power brushless motor, maintenance free, long service life.

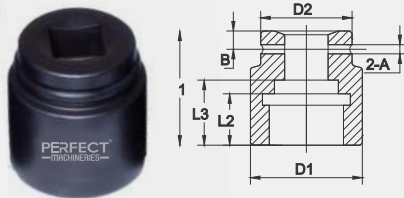
Model	PMP-2	PMP-4
Working Pressure	10000 Psi	10000 Psi
Drive	Air	Air
Air Pressure(Input)	4-8 bar	4-8 bar
Power	4.0 HP	4.0 HP
Tank Capacity	5.5 L	5.5 L
Flow Rate (Low - Mid - High)	8.6 - 2.2 - 1.1 L/min	8.6 - 2.2 - 1.1 L/min
Oil Cooler	N/A	N/A
Weight	22 kg	24 kg
Oil Outputs	4x1/4" NPT	8x1/4" NPT
LxWxH	442x282x337mm	460x282x377mm

ACCESSORIES FOR HYDRAULIC TORQUE WRENCH

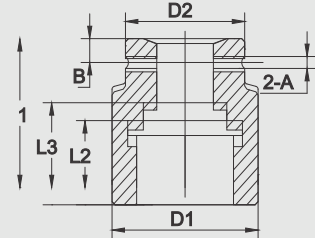


PERFECT[®]
—MACHINERIES—

The range of Imperial Impact Sockets with square drives **is** from 3/4" to 2.1/2" and the across flat sizes go upto 6.7/8 ". The Metric Impact Sockets offer 56 models with square drives ranging from 3/4" to 2.1/2" and across flat sizes up to 145mm.



HEAVY DUTY IMPACT SOCKETS:



Model No.	Square Drive	Nut A/F		D1	D2	S	T	L
		inch	mm					
PMT424	3/4"	-	24	40	44	46	21	90
PMT427	3/4"	-	27	41	44	48	23	90
PMT27F	3/4"	1.1/16	-	41	44	48	23	90
PMT430	3/4"	-	30	44	44	52	24	90
PMT431F	3/4"	1.1/4	-	49	44	52	24	90
PMT432	3/4"	-	32	49	44	52	26	90
PMT436	3/4"	-	36	52	44	55	28	90
PMT436F	3/4"	1.7/16	-	52	44	56	28	90
PMT441	3/4"	-	41	57	44	59	36	90
PMT441F	3/4"	1.5/8	-	57	44	59	36	90
PMT446	3/4"	-	46	67	44	64	37	90
PMT446F	3/4"	1.13/16	-	67	44	64	36	90
PMT450	3/4"	-	50	70	54	67	39	90
PMT451F	3/4"	2	-	73	54	67	39	90
PMT455	3/4"	-	55	78	54	71	41	94
PMT455F	3/4"	2.3/16	-	78	54	71	41	94
PMT460	3/4"	-	60	82	52	75	45	98
PMT460F	3/4"	2.3/8	-	82	54	75	45	98
PMT524	1"	-	24	42	54	55	21	100
PMT527	1"	-	27	46	54	55	23	100
PMT527F	1"	1.1/16	-	46	54	55	23	100
PMT530	1"	-	30	50	54	57	24	100
PMT531F	1"	1.1/4	-	51	54	57	24	100
PMT532	1"	-	32	51	54	57	26	100
PMT536	1"	-	36	54	54	60	28	100
PMT536F	1"	1.7/16	-	54	54	60	28	100
PMT541	1"	-	41	63	54	64	36	100
PMT541F	1"	1.5/8	-	63	54	64	36	100
PMT546	1"	-	46	70	54	69	36	100
PMT546F	1"	1.13/16	-	70	54	69	36	100
PMT550	1"	-	50	73	54	72	36	100
PMT551F	1"	2	-	73	54	72	39	100
PMT555	1"	-	55	82	54	76	41	105
PMT555F	1"	2.3/16	-	82	54	80	41	105
PMT560	1"	-	60	86	54	82	45	112
PMT560F	1"	2.3/8	-	88	54	85	45	112
PMT565	1"	-	65	92	54	85	46	118
PMT565F	1"	2.9/16	-	92	54	85	46	118
PMT570	1"	-	70	96	54	88	50	124
PMT570F	1"	2.3/4	-	96	54	88	50	124
PMT575	1"	-	75	100	86	92	57	124
PMT575F	1"	2.15/16	-	100	86	92	57	124
PMT579F	1"	3.1/8"	-	105	86	97	57	132
PMT580	1"	-	80	105	86	97	62	132
PMT585	1"	-	85	115	86	100	62	132
PMT588F	1"	3.1/2"	-	121	86	104	62	140
PMT590	1"	-	90	127	86	104	62	140
PMT595	1"	-	95	135	86	106	62	140
PMT597F	1"	3.7/8"	-	135	86	112	62	143

Model No.	Square Drive	Nut A/F		D1	D2	S	T	L
		inch	mm					
PMT5100	1"	-	100	135	86	112	62	143
PMT636	1.1/2"	-	36	64	86	80	28	130
PMT641	1.1/2"	-	41	69	86	83	32	130
PMT646	1.1/2"	-	46	76	86	86	36	130
PMT646F	1.1/2"	1.13/16	-	76	86	86	36	130
PMT650	1.1/2"	-	50	81	86	90	39	130
PMT651F	1.1/2"	2	-	81	86	90	39	130
PMT655	1.1/2"	-	55	88	86	95	41	140
PMT655F	1.1/2"	2.3/16	-	88	86	95	41	140
PMT660	1.1/2"	-	60	96	86	98	45	140
PMT660F	1.1/2"	2.3/8	-	96	86	98	45	140
PMT665	1.1/2"	-	65	102	86	102	46	140
PMT665F	1.1/2"	2.9/16	-	102	86	102	46	140
PMT670	1.1/2"	-	70	108	86	102	50	150
PMT670F	1.1/2"	2.3/4	-	108	86	102	50	150
PMT675	1.1/2"	-	75	116	86	108	57	150
PMT675F	1.1/2"	2.15/16	-	116	86	108	57	150
PMT680	1.1/2"	-	80	120	86	110	62	150
PMT680F	1.1/2"	3.1/8	-	120	86	110	62	150
PMT685	1.1/2"	-	85	130	86	115	62	170
PMT690	1.1/2"	-	90	135	125	118	65	170
PMT690F	1.1/2"	3.1/2	-	135	125	118	65	170
PMT695	1.1/2"	-	95	140	125	123	70	170
PMT6100	1.1/2"	-	100	148	125	128	75	190
PMT6100F	1.1/2"	3.7/8	-	148	125	128	75	190
PMT6105	1.1/2"	-	105	155	125	133	80	190
PMT6106F	1.1/2"	4.1/4	-	155	125	133	80	190
PMT6110	1.1/2"	-	110	161	150	138	85	200
PMT6115	1.1/2"	-	115	161	150	143	94	200
PMT6120F	1.1/2"	4.5/8	-	175	150	149	94	200
PMT780	2.1/2"	-	80	135	125	140	62	190
PMT780F	2.1/2"	3.1/8	-	135	125	140	62	190
PMT785	2.1/2"	-	85	140	125	140	62	190
PMT790	2.1/2"	-	90	145	125	140	65	190
PMT795	2.1/2"	-	95	155	125	150	70	190
PMT796F	2.1/2"	3.7/8	-	155	125	150	70	190
PMT7100	2.1/2"	-	100	160	125	150	75	200
PMT7105	2.1/2"	-	105	165	125	160	80	200
PMT7110	2.1/2"	-	110	174	150	160	85	210
PMT7115	2.1/2"	-	115	180	150	170	90	210
PMT7115F	2.1/2"	4.1/2	-	180	150	170	90	210
PMT7125F	2.1/2"	5	-	195	150	175	98	220
PMT7130	2.1/2"	-	130	195	150	175	98	220
PMT7135F	2.1/2"	5.3/8	-	205	150	180	102	220
PMT7145	2.1/2"	-	145	220	150	180	105	230
PMT7145F	2.1/2"	5.3/4	-	220	150	180	105	230
PMT7155F	2.1/2"	6.1/8	-	230	180	190	110	250
PMT7165F	2.1/2"	6.1/2	-	240	180	200	120	-
PMT7175F	2.1/2"	6.7/8	-	255	180	200	120	-

NOTE: ALL ABOVE SIZES ARE AVAILABLE IN LONG TYPE WITH PART NO. TIL SERIES

NOTE : ALL SIZES ABOVE 130 mm ARE AVAILABLE ON REQUEST

HEAVY DUTY SLUGGING/ STRIKING WRENCHES



PERFECT
—MACHINERIES—

TYPES OF SLUGGING WRENCHES

- Straight Ring Type
 - Offset Handle Type
 - Open Jaw Type
 - Podger / Tommy Spanners
 - Box Ring Type
 - Square Drive Type
- Slugging Wrenches



WRENCH SIZE (A/F)		STRAIGHT RING TYPE			OFFSET HANDLE TYPE			OPEN JAW TYPE		
Metric mm	SAE inch	Head Diameter mm	Head Depth mm	Length mm	Head Diameter mm	Head Depth mm	Length mm	Head Diameter mm	Head Depth mm	Length mm
	3/16"	68	22	210	56	24	265	-	-	-
32	1.1/4"	68	22	210	58	25	270	80	18	210
33	1.5/16"	68	22	210	59	25	270	80	18	210
35	1.3/8"	68	22	210	62	28	290	80	18	210
36	1.7/6"	68	22	210	64	28	290	80	18	210
38	1.1/2"	68	22	210	66	28	290	80	18	210
41	1.5/8"	80	28	245	68	28	290	110	20	275
43	1.11/16"	80	28	245	68	28	290	110	20	275
44	1.3/4"	80	28	245	68	28	290	110	20	275
46	1.13/16"	80	28	245	76	32	340	110	20	275
47	1.7/8"	80	28	245	76	35	340	110	20	275
50	2"	80	28	245	82	36	340	110	22	275
52	2.1/16"	102	35	285	85	38	360	110	22	275
55	2.3/16"	102	35	285	90	38	360	110	22	275
57	2.1/4"	102	35	285	90	38	360	110	22	275
60	2.3/8"	102	35	285	96	41	380	110	22	275
62	2.7/16"	102	35	285	100	44	380	150	32	362
63	2.1/2"	102	35	285	102	44	380	150	32	362
65	2.9/16"	102	35	285	105	44	380	150	32	362
67	2.5/8"	122	40	322	108	44	380	150	32	362
70	2.3/4"	122	40	322	112	48	400	150	32	362
71	2.13/16"	122	40	322	112	50	400	163	32	400
75	2.15/16"	122	40	322	120	50	400	163	32	400
76	3"	122	40	322	122	50	400	163	32	400
80	3.1/8"	122	40	322	126	60	435	172	36	405
85	3.3/8"	130	40	340	132	60	435	180	38	430
90	3.5/8"	136	45	350	142	60	440	195	40	455
95	3.3/4"	140	45	375	150	60	465	195	40	455
98	3.7/8"	158	50	415	158	60	465	206	40	455
100	4"	158	50	415	164	60	465	210	47	500
105	4.1/8"	164	50	450	172	65	540	220	47	500
110	4.3/8	170	55	450	180	65	540	226	47	500
115	4.1/2"	175	55	465	186	65	540	238	56	550
120	4.3/4"	175	60	490	194	70	540	247	56	550
125	4.7/8"	200	60	510	200	70	540	255	56	550
130	5"	210	65	515	205	70	540	275	60	575

ACCESSORIES FOR HYDRAULIC TORQUE WRENCH



PERFECT
—MACHINERIES—



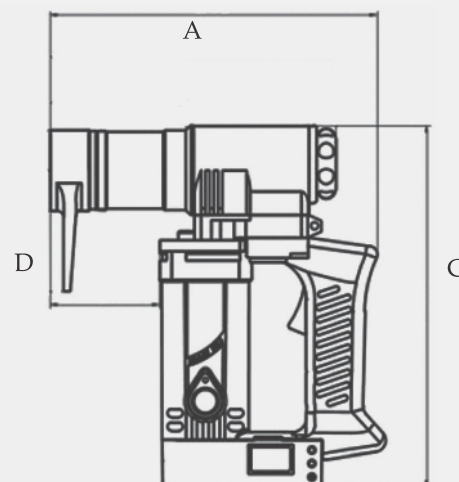
To reduce the female hexagon A/F size of the THL Series these **PERFECT MACHINERIES Hexagon Reducer Bushes** offer an easy and economical solution. Just select your outside A/F size (i.e Ratchet Head A/F size) and the required inside A/F size to determine the Model number.

Outside A/F size	Inside A/F size	PHD-2	PHD-4	PHD-8	PHD-14	PHD-32
		Height-32mm Model number	Height-42mm Model number	Height-53mm Model number	Height-64mm Model number	Height-85mm Model number
30	24	PRD-2-30-24				
32	24	PRD-2-32-24				
32	27	PRD-2-32-27				
36	30	PRD-2-36-30				
41	36	PRD-2-41-36	PRD-4-41-36			
46	36	PRD-2-46-36	PRD-4-46-36			
46	41	PRD-2-46-41		PRD-8-46-41		
50	41	PRD-2-50-41	PRD-4-50-41	PRD-8-50-41		
50	46	PRD-2-50-46	PRD-4-50-46	PRD-8-50-46		
55	41	PRD-2-55-41	PRD-4-55-41	PRD-8-55-41		
55	46	PRD-2-55-46	PRD-4-55-46	PRD-8-55-46		
55	50	PRD-2-55-50	PRD-4-55-50	PRD-8-55-50		
60	46	PRD-2-60-46	PRD-4-60-46	PRD-8-60-46		
60	50		PRD-4-60-50	PRD-8-60-50	PRD-14-60-50	
60	55		PRD-4-60-55	PRD-8-60-55	PRD-14-60-55	
65	50		PRD-4-65-50	PRD-8-65-50	PRD-14-65-50	
65	55		PRD-4-65-55	PRD-8-65-55	PRD-14-65-55	
65	60		PRD-4-65-60	PRD-8-65-60	PRD-14-65-60	
70	55		PRD-4-70-55	PRD-8-70-55	PRD-14-70-55	
70	60		PRD-4-70-60	PRD-8-70-60	PRD-14-70-60	
70	65		PRD-4-70-65	PRD-8-70-65	PRD-14-70-65	
75	60		PRD-4-75-60	PRD-8-75-60	PRD-14-75-60	
75	65		PRD-4-75-65	PRD-8-75-65	PRD-14-75-65	
75	70		PRD-4-75-70	PRD-8-75-70	PRD-14-75-70	
80	65		PRD-4-80-65	PRD-8-80-65	PRD-14-80-65	
80	70		PRD-4-80-70	PRD-8-80-70	PRD-14-80-70	
80	75		PRD-4-80-75	PRD-8-80-75	PRD-14-80-75	
85	70			PRD-8-85-70	PRD-14-85-70	
85	75			PRD-8-85-75	PRD-14-85-75	
85	80			PRD-8-85-80	PRD-14-85-80	
90	75			PRD-8-90-75	PRD-14-90-75	
90	80			PRD-8-90-80	PRD-14-90-80	
90	85			PRD-8-90-85	PRD-14-90-85	
95	80			PRD-8-95-80	PRD-14-95-80	
95	85			PRD8-95-85	PRD-14-95-85	
95	90			PRD-8-95-90	PRD-14-95-90	
100	85			PRD-8-100-85	PRD-14-100-85	
100	90			PRD-8-100-90	PRD-14-100-90	
100	95			PRD-8-100-95	PRD-14-100-95	
105	90			PRD-8-105-90	PRD-14-105-90	
105	95			PRD-8-105-95	PRD-14-105-95	
105	100			PRD-8-105-100	PRD-14-105-100	
110	95				PRD-14-110-95	PRD-32-110-95
110	100				PRD-14-110-100	PRD-32-110-100
110	105				PRD-14-110-105	PRD-32-110-105
115	100				PRD-14-115-100	PRD-32-115-100
115	105				PRD-14-115-105	PRD-32-115-105
115	110				PRD-14-115-110	PRD-32-115-110
135	110					PRD-32-135-110
135	115					PRD-32-135-110
135	120					PRD-32-135-130
145	110					PRD-32-145-110
145	115					PRD-32-145-115
145	130					PRD-32-145-130
160	130					PRD-32-160-130
160	145					PRD-32-160-145
175	145					PRD-32-175-145
175	160					PRD-32-175-160

ELECTRIC TORQUE WRENCH PEW SERIES



PERFECT
—MACHINERIES—



Model	Torque (Nm)	Direct Hex Available	Speed (RPM)	Weight (kg)	Overall Length A (mm)	Overall Width C	Diameter D
PEW-2	100-300	M10, M12, M16	28	4	240	267	80
PEW-5	200-500	M12, M16, M20	20	4.2	271	267	111
PEW-7	300-700	M16, M20, M22	18	4.6	221	269	54
PEW-9	400-900	M20, M22, M24	16	5.1	238	275	71
PEW-12	500-1200	M22, M24, M27	14	6.3	225	287	50
PEW-17	800-1700	M24, M27, M30	12	7	286	287	81
PEW-21	1000-2100	M27, M30, M33	10	7.2	274	286	95
PEW-25	1100-2500	M30, M33, M36	5	9	283	293	107
PEW-35	1700-3500	M33, M36, M42	4.5	15	283	293	107
PEW-50	2000-5000	M42, M45, M48	2.5	17	375	301	273



Model	Torque Range (Nm)	Speed (RPM)	Weight (Kg)	Square Drive
PEWS-3	100-300	28	4	3/4"
PEWS-5	200-500	20	4.2	3/4"
PEWS-7	300-700	18	4.6	1"
PEWS-9	400-900	16	5.1	1"
PEWS-12	500-1200	14	6.3	1"
PEWS-17	800-1700	4.5	7.0	1.1/2"
PEWS-21	1000-2100	5.5	7.2	1.1/2"
PEWS-25	1000-2500	5	9	1.1/2"
PEWS-35	1700-3500	4.5	15	1.1/2"
PEWS-40	2000-4000	3	17	1.1/2"
PEWS-60	3000-6000	2.5	18	1.1/2"
PEWS-100	5000-10000	2.5	21	2.1/2"

PNEUMATIC TORQUE WRENCH -PPSD SERIES



Features: -

- Design for maximize efficiency
- Wide torque range suits different applications
- Reliable, dependable solution for the installation and removal for heavy duty fasteners
- Advanced star-gearbox design basic on reliable quality - Precision $\pm 4\%$, Repeat Precision $\pm 2\%$
- Reduced operator strain and injury
- Collectively it will help into increase productivity

Special reaction arm can be ordered according your operation

PPSD13

Model	Square Drive	Torque	Speed RPM	Weight in kg	Noise Level	Dimension IN MM			
						A	B	C	D
PPSD13	3/4"	275-1350 Nm	15	3.5	80 dBa	207	70	261	31.5
PPSD20	1"	400-2000 Nm	10	3.9	80 dBa	201	70	261	34.5
PPSD34	1"	700-3400 Nm	4.8	7.0	85 dBa	269	89	272	38.5
PPSD80	1-1/2"	2700-8000 Nm	4.2	12.2	85 dBa	317	93	293	51

*Max Air consumption is 10-90 psi / Flow 45-55 CFM

Precision $\pm 4\%$, Repeat Precision $\pm 2\%$

Standard Accessories:

- Reaction Arm
- Lock Circlip
- Air Hose – 8 ft
- Air Gauge, Filter, Regulator
- Carry Case
- Air-Torque Chart

Part No: **PNSD FRL-1** Operating Manual

Note: Standard Air hose comes with 8ft length, over and above requirement will be charged extra

MANUAL TORQUE WRECHES



PERFECT
—MACHINERIES—



TORQUE WRENCH
INDUSTRIAL TORQUE

ITEM NO.	Square Drive	RangeL		
			mm	Kg
PTQ-30N	1/4" or 3/8"	6-30 Nm	350	0.74
PTQ-110N	3/8"	19-110 Nm	385	0.96
PTQ-210N	1/2"	40-210 Nm	535	1.70
PTQ-330N	1/2"	70-350 Nm	645	2.54
PTQ-500N	3/4"	100-500 Nm	865	3.66
PTQ-700N	3/4"	140-700 Nm	1092	5.94
PTQ-980N	3/4" or 1"	140-980 Nm	1230	6.46
PTQ-1500N	1"	300-1500Nm	1700	11.58

ITEM NO.	Square Drive	RangeL		
			mm	Kg
PTQ-250i	1/4" or 3/8"	40-250 in.lb.	350	0.74
PTQ-80F	3/8"	15-80 ft.lb.	385	0.96
PTQ-150F	1/2"	30-150 ft. lb.	535	1.70
PTQ-250F	1/2"	50-250 ft. lb.	645	2.54
PTQ-300F	3/4"	50-300 ft. lb.	865	3.66
PTQ-600F	3/4"	100-600 ft. lb.	1092	5.94
PTQ-700F	3/4" or 1"	100-700 ft. lb.	1230	6.46
PTQ-1000F	1"	200-1000 ft. lb.	1700	11.58



TORQUE WRENCH
PRE SET TORQUE



ITEM NO.	Square Drive	Range		
			L mm	Kg
PT-PRE-12N	1/4"	2.12 Nm	193	0.22
PT-PRE-50N	3/8"	5-50 Nm	298	0.56
PT-PRE-100N	3/8"	15-100 Nm	365	0.76
PT-PRE-200N	1/2"	50-200 Nm	508	1.38

ITEM NO.	Square Drive	Range		
			L mm	Kg
PT-PRE-12i	1/4"	20-120 in.lb	193	0.22
PT-PRE-40F	3/8"	4-40 ft.lb	298	0.56
PT-PRE-80F	3/8"	10-80 ft.lb	365	0.76
PT-PRE-150F	1/2"	40-150 ft.lb	508	1.38



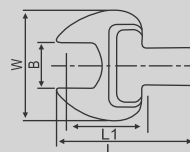
INTERCHANGEABLE FOR
ADJUSTABLE TORQUE

ITEM NO.		Range		
	mm		L mm	Kg
PT ADJ-30N	9x12	6-30 Nm	280	0.75
PT ADJ-80N	9x12	15-80 Nm	355	0.88
PT ADJ-80NS	14x18	15-80 Nm	360	0.90
PT ADJ-80N	9x12	19-110 Nm	368	0.94
PT ADJ-80NS	14x18	19-110 Nm	373	0.96
PT ADJ-210N	14x18	40-210 Nm	509	1.50

ITEM NO.		Range		
	mm		L mm	Kg
PT ADJ-250i	9x12	50-250 in.lb	280	0.75
PT ADJ-60F	9x12	10-60 ft.lb	355	0.88
PT ADJ-60FS	14x18	10-60 ft.lb	360	0.90
PT ADJ-80F	9x12	15-80 ft.lb	368	0.94
PT ADJ-80FS	14x18	15-80 ft.lb	373	0.96
PT ADJ-180FS	14x18	30-150 ft.lb	509	1.50



INTERCHANGEABLE
OPEN ENDED HEADS



ITEM NO.	B		W	H	L	L1	
	mm	mm	mm	mm	mm	mm	Kg
PTOH0912-7m	7	9x12	24.0	5.5	37.0	17.5	38
PTOH0912-8m	8	9x12	24.0	5.5	37.0	17.5	38
PTOH0912-9m	9	9x12	24.0	6.0	37.5	17.5	39
PTOH0912-10m	10	9x12	30.0	6.0	38.5	17.5	42
PTOH0912-11m	11	9x12	30.0	6.0	38.5	17.5	43
PTOH0912-12m	12	9x12	30.0	7.0	39.5	17.5	48
PTOH0912-13m	13	9x12	30.0	7.0	42.0	20.0	52
PTOH0912-14m	14	9x12	30.0	7.0	42.0	20.0	59
PTOH0912-15m	15	9x12	35.0	8.0	43.0	20.0	59
PTOH0912-16m	16	9x12	38.0	8.0	44.5	20.0	67
PTOH0912-17m	17	9x12	38.0	8.5	44.5	20.0	67
PTOH0912-18m	18	9x12	42.0	8.5	44.5	22.0	75
PTOH0912-19m	19	9x12	42.0	8.5	46.0	22.0	75

ITEM NO.	B		W	H	L	L1	
	mm	mm	mm	mm	mm	mm	Kg
PTOH1418-13m	13	14x18	35.0	7.0	62.5	32.0	148
PTOH1418-14m	14	14x18	35.0	8.0	63.0	32.0	154
PTOH1418-15m	15	14x18	35.0	8.5	64.0	32.0	154
PTOH1418-16m	16	14x18	38.0	9.0	64.0	32.0	173
PTOH1418-17m	17	14x18	38.0	9.0	64.0	32.0	173
PTOH1418-18m	18	14x18	42.0	10.0	65.0	32.0	192
PTOH1418-19m	19	14x18	42.0	10.5	65.0	32.0	193
PTOH1418-21m	21	14x18	50.0	11.0	66.0	32.0	217
PTOH1418-22m	22	14x18	52.5	11.0	66.0	32.0	222
PTOH1418-24m	24	14x18	53.0	11.0	67.0	32.0	225
PTOH1418-26m	26	14x18	60.0	12.5	70.0	34.0	273
PTOH1418-27m	27	14x18	60.0	12.5	70.0	34.0	281
PTOH1418-29m	29	14x18	66.0	14.0	74.0	36.0	312
PTOH1418-30m	30	14x18	66.0	14.0	74.0	36.0	312
PTOH1418-32m	32	14x18	66.0	14.5	76.5	37.5	322

PMTL SERIES -MANUAL TORQUE WRENCH



PERFECT
—MACHINERIES—



- All-steel construction.
- The 45-tooth reversible ratchet head for both clockwise and counter clockwise operation.
- $\pm 4\%$ accuracy in clockwise direction exceeds international specifications.
- Unique, stay-in-place, Lock Ring makes adjustments easier and secures selected torque from accidental change.
- Metric scale with fine increments and reference English scales are easy to read and set.
- The identity code marked on each wrench makes it possible to keep accurate records.
- Non slip grooved handle.



Part Code	Drive	Torque Range		Length mm	Width mm	Weight kg
		Nm	Lb ft			
PMTL112	1/4"	2.5-12	20-105*	280	38	0.68
PMTL120	1/4"	4.0-20	30-180*	280	38	0.68
PMTL230	3/8"	6-30	50-250*	315	38	0.82
PMTL330	1/2"	6-30	50-250*	315	38	0.82
PMTL260	3/8"	10-60	9-45	365	38	0.96
PMTL360	1/2"	10-60	9-45	365	38	0.96
PMTL2100	3/8"	20-100	15-75	443	38	1.04
PMTL3100	1/2"	20-100	15-75	443	38	1.04
PMTL2125	3/8"	25-125	20-90	425	38	1.04
PMTL3125	1/2"	25-125	20-90	425	38	1.04
PMTL3200	1/2"	40-200	30-150	465	40	1.16
PMTL3335	1/2"	65-335	50-250	525	40	1.3
PMTL4335	3/4"	65-335	50-250	525	40	1.34
PMTL3335L	1/2"	65-335	50-250	700	40	2.1
PMTL4335L	3/4"	65-335	50-250	700	40	2.15
PMTL4500L	3/4"	100-500	80-400	700	60	2.83
PMTL4500	3/4"	100-500	80-400	840	60	5
PMTL4800	3/4"	160-800	120-600	1040	60	5.9
PMTL5800	1"	160-800	120-600	1040	60	5.9
PMTL41000	3/4"	200-1000	150-750	1040	60	5.9
PMTL51000	1"	200-1000	150-750	1040	60	5.9
PMTL51500	1"	300-1500	200-1100	1260	72	9.2
PMTL52000	1"	400-2000	300-1500	1260	72	9.2
PMTL53000	1"	600-3000	400-2000	1260	72	10.5

EXTENDED LENGTH TORQUE WRENCH

Part Code	Drive	Torque Range		Length mm	Width mm	Weight kg	Extension
		Nm	Lb ft				
PMTL51500E	1"	300-1500	200-1100	2200	72	12.1	1
PMTL52000E	1"	400-2000	300-1500	2200	72	12.1	1
PMTL53000E	1"	600-3000	400-2000	2780	72	15.5	1

3/4" HEAVY DUTY IMPACT WRENCH



Model No.	Torque Max (Nm)	Free Speed (rpm)	Air Inlet (Inch)	Length (mm)	Weight (kg)
PD-34	1493	4000	3/8"	257	5.1
PD-33	1086	4800	1/4"	243	5.1
PD-32	1900	5500	3/8"	229	3.4

1/2" HEAVY DUTY IMPACT WRENCH



Model No.	Torque Max (Nm)	Free Speed (rpm)	Air Inlet (Inch)	Length (mm)	Weight (kg)
PD-12	651	7000	1/4"	185	2.55
PD-11	516	7000	1/4"	190	2.7
PD-10	1357	7500	1/4"	193	1.9

1-1/2" HEAVY DUTY IMPACT WRENCH



Model No.	Torque Max (Nm)	Free Speed (rpm)	Air Inlet (Inch)	Length (mm)	Weight (kg)
PD-112	4,068 N-M	3,000	1/2"	475	15.05

1" HEAVY DUTY IMPACT WRENCH



Model No.	Torque Max (Nm)	Free Speed (rpm)	Air Inlet (Inch)	Length (mm)	Weight (kg)
PD-52	3661	3000	1/2"	628	16.5
PD-52L	2445	3500	1/2"	300	9
PD-52	1627	4000	1/2"	254	6.3

3/8" HEAVY DUTY IMPACT WRENCH



Model No.	Torque Max (Nm)	Free Speed (rpm)	Air Inlet (Inch)	Length (mm)	Weight (kg)
PD-38	325	10,000	1/4"	155	1.5
PD-37	244	10,000	1/4"	162	1.35
PD-36	407	12,000	1/4"	168	1.2

ACCESSORIES FOR PNEUMATIC & HYDRAULIC TOOLS

4-WAY MULTI SPLIT BLOCK



QUICK CONNECT COUPLINGS

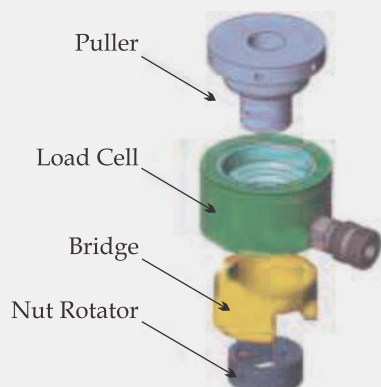


HYDRAULIC HOSES

TOP SIDE BOLT TENSIONER



PERFECT
—MACHINERIES—



Model	Bolt size		Cylinder	Area	Dimension						Weight		
	Metric	Inch			KN	cm²	A	B	C	D		E	F
							mm	mm	mm	mm		mm	mm
PDN 2	M16	-	234.2	15.7	75	32.5	168	90	62	47-51	2		
	M18	3/4"											
	M20	-											
	M22	7/8"											
	M24	1											
PDN 4	M27	1-1/8"	498.2	33	102	47	187	106	60	65-71	4		
	M30	-											
	M33	1-1/4"											
	M36	1-3/8"											
	M39	1-1/2"											
PDN 8	M39	1-1/2"	896.8	59.7	133	61	208	120	60	86-93	6		
	M42	1-5/8"											
	M45	1-3/4"											
	M48	1-7/8"											
PDN 12	M52	2"	1245.5	83	163	73	231	135	62	106-114	10		
	M56	2-1/4"											
	M60	-											
	M64	2-1/2"											
PDN 18	M64	2-1/2"	1843.3	123	193	86.5	254	150	62	129-135	15		
	M68	-											
	M72	2-3/4"											
	M76	3"											
PDN 26	M76	3"	2640.5	176	233	110	286	180	73	155-167	24		
	M80	-											
	M85	3-1/4"											
	M90	3-1/2"											
	M95	3-3/4"											
	M100	4"											
PDN 44	M110	4-1/2"	4384.2	251	280	111-121	304-338	181-197	37-40	210-233	45		
	M120	4-3/4"											
	M125	5"											
PDN 54	M130	5-1/4"	5380.5	317	325	126-141	354-388	202-216	42-47	243-275	73		
	M140	5-1/2"											
	M150	5-3/4"											

Note: Dimensions are subject to change as per customer requirement.

PNDT SERIES SPRING RETURN HYDRAULIC BOLT TENSIONER



PERFECT
—MACHINERIES—

- Working pressure 1500 bar /21755 psi
- Special seal kit, piston/cylinder mis-alignment compensation
- Piston stroke of RET1=**8mm**, the other model is **10mm**
- Built-in stroke limit valve prevent over stroke
- Fully enclosed load cell to prevent debris into cylinder
- Spring return, fast, safety



Model	Bolt Size		Max. Load (KN)	Hyd. Area (cm ²)	A(mm)	B(mm)	C(mm)	D(mm)	Weight (kg)
	Imperial	Metric							
PD1	3/4" PD1-1	M20 PD1-3	160	10.67	66	93	63	136	1.4
	7/8" PD1-2	M22 PD1-4				93	63	142	
Pd2	1" PD2-1	M24 PD2-3	280	18.67	87	117	68	175	2.7
	1-1/8" PD2-2	M27 PD2-4				117	68	175	
PD3	1" PD3-1	M24 PD3-5	RET#50	30.01	103	117	75	175	4.1
		M27 PD3-6				117	75	175	
	1-1/8" PD3-2	M30 PD3-7				120	80	181	
	1-1/4" PD3-3	M33 PD3-8				123	84	188	
	1-3/8" PD3-4	M36 PD3-9				126	89	195	
PD4	1-1/4" PD4-1	M33 PD4-5	660	44.01	118	123	88	190	5.4
	1-3/8" PD4-2	M36 PD4-6				126	96	197	
	1-1/2" PD4-3	M39 PD4-7				130	96	203	
	1-5/8" PD4-4	M42 PD4-8				133	105	209	
PD5	1-1/2" PD5-1	M39 PD5-6	1000	66.68	140.5	132	112	211	8.4
	1-5/8" PD5-2	M42 PD5-7				135	114	217	
	1-3/4" PD5-3	M45 PD5-8				139	118	223	
	1-7/8" PD5-4	M48 PD5-9				142	114	230	
	2" PD5-5					145	120	236	
PD6	2" PD6-1	M52 PD6-5	1500	100.03	175.5	148	120	246	13.8
	2-1/4" PD6-1	M56 PD6-6				154	138	259	
		M60 PD6-7				161	138	259	
	2-1/2" PD6-3	M64 PD6-8				161	153	272	
	2-3/4" PD6-4	M68 PD6-9				167	156	284	
PD7	2-3/4" PD7-1	M72 PD7-5	2500	166.71	219	167	157	294	23
	3" PD7-2	M76 PD7-6				171	158	307	
		M80 PD7-7				180	190	310	
	3-1/4" PD7-3	M85 PD7-8				180	190	320	
	3-1/2" PD7-4	M90 PD7-9				186	205	332	
Pd8	3-1/2" PD8-1	M90 PD8-4	3200	213.39	252	186	200	339	32
		M95 PD8-5				186	200	346	
	3-3/4" PD8-2	M100 PD8-6				192	200	352	
	4" PD8-3					199	210	364	

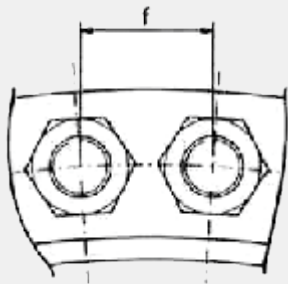
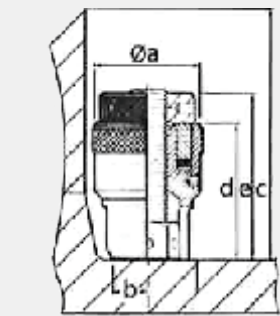
Note: Dimensions are subject to change as per customer requirement.

PD SUB SEA HYDRAULIC BOLT TENSIONER



PERFECT
—MACHINERIES—

Perfect Machineries Subsea Bolt Tensioners are manufactured to suit the demanding requirements of divers working in harsh subsea environments. We provide a complete range of Subsea Tensioners which incorporate the Split Reaction Nut benefitting divers by saving time by saving time and by ensuring the fastest possible reaction nut engagement.



Model		Bolt Dia.		Max Load		Hydraulic Area		Stroke	Tool Weight	Tool Dimensions (mm)					
Imperial	Metric	in	mm	TONF	KN	in ²	mm ²	mm	kg	a	b	c	d	e	f
1SS:1000	1ST:0024	1"	24	24.58	245	2.53	1634	30	3.2	82	25	218	120	144	61
1SS:1125	1ST:0027	1.1/8"	27	24.58	245					82	25	218	120	144	64
2SS:1250	2ST:0033	1.1/4"	33	38	379.2	3.92	2532	30	4.8	100	28	240	131	159	75
2SS:1375	2ST:0036	1.3/8"	36	38	379.2					100	28	240	131	159	78
3SS:1500	3ST:0039	1.1/2"	39	55.4	552	5.71	3688	30	6.2	112	35	249	133	166	84
3SS:1625	3ST:0042	1.5/8"	42	55.4	552					112	35	249	133	166	87
4SS:1750	4ST:0045	1.3/4"	45	75.6	753	7.79	5027	30	8.5	128	41	271	140	178	95.5
4SS:1875	4ST:0048	1.7/8"	48	75.6	753					128	41	271	140	178	98
5SS:2000	5ST:0052	2"	52	108	1076	11.12	7174	30	12.2	148	48	296	152	198	121
5SS:2250	5ST:0056	2.1/4"	56	108	1076					148	48	296	152	198	116
6SS:2500	6ST:0064	2.1/2"	64	165	1644	17	10968	30	19.2	176	58	335	168	224	135
6SS:2750	6ST:0072	2.3/4"	72	165	1644					176	58	335	168	224	141
7SS:3000	7ST:0076	3"	76	253.4	2525	26.1	16870	30	29	216	53	373	192	260	162
7SS:3500	7ST:0090	3.1/2"	90	253.4	2525					216	53	373	192	260	173

Note: Dimensions are subject to change as per customer requirement.

HYDRAULIC BOLT TENSIONER

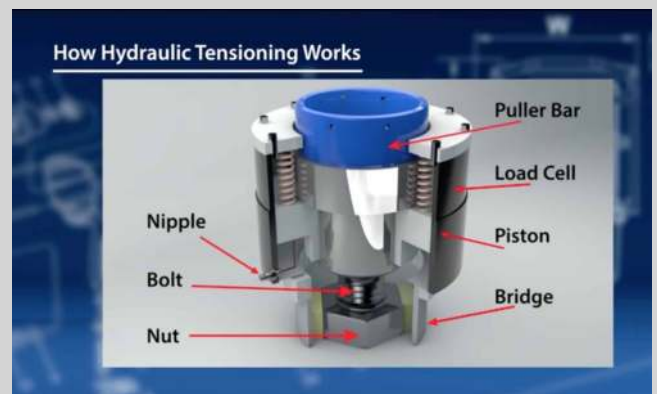


**DST SERIES
MULTI-STAGE HYDRAULIC BOLT TENSIONER**



Model	Bolt Diameter		The Min. Length of Thread (mm)	The Max. Length of Thread (mm)	Working Stroke (mm)	Bolt Distance (mm)	Max. Load (Kn)	Outside Diameter (mm)	Min. Height (mm)
	(mm)	(in)							
PDST-M30	M30	1-1/8	62	69	7	66	464	73	276
PDST-M33	M33	1-1/4	66	73	9	72	583	78	295
PDST-M36	M36	1-3/8	75	82	9	77	677	84	326
PDST-M39	M39	1-1/2	78	88	10	83	805	90	360
PDST-M42	M30	1-5/8	83	91	10	89	926	96	357
PDST-M45	M42	1-3/4	87	96	10	96	1091	105	371
PDST-M48	M48	1-7/8	93	102	10	102	1231	110	387

- Working pressure 1500 bar /21755 psi
- Fast, simple, accuracy, reliable, ideal tightening and bolting tools for wind turbine
- Small, compact, large load
- Durable composite material seal kit
- Clear over stroke alarming mark
- Optional gear drive rotate nut quickly



Note: Dimensions are subject to change as per customer requirement.

AIR OPERATED HYDRAULIC POWER PACK FOR TENSIONERS



- AIR DRIVEN PUMP FOR BOLT TENSIONER
- WORKING PRESSURE UPTO 3200 BAR
- SUPER HIGH PERFORMANCE
- OPERATES FROM STANDARD 6 BAR AIR SUPPLY

The Perfect Machineries BPL 100 range of air driven hydraulic pump is compatible for use with BTN, RET, DST & SS Series of bolt tensioners as well as CTC hydraulic nuts. The pump unit is easy to operate and is supplied complete with a glycerine filled gauge and quick release outlet coupling. The complete system, including an air inlet filter, regulator and lubricator unit is fitted in a robust stainless-steel frame.

SPECIFICATIONS:

Model No.: PDTP 100
Pump Capacity: Up to 3,200 bar
Pressure Gauges: 4" Dial Discharge Pressure Gauge
Air Pressure Gauge: 2.5" Dial range 0-8 Bar / 150 psi
Max Oil Flow**: 0.48 L/min
Air Pressure: 3-8 bar P_L
Air Filter Regulator: 1/2" BSP Air Inlet Port with Chicago Coupling
Out Let Port: NPT -9/16-18 UNF
Oil Tank: 6 to 8Ltr Stainless Steel Tank with oil indicator Scale
Pump Cabinet Material: SS 305
Pump Dimension: L380 x W380 x H450 (mm)
Weight Approx.: 18 Kg.

Note: High Pressure Quick Release Coupler & Air Connection fitting will be charged separately.

HAND PUMPS FOR BOLT TENSIONERS

Model NO. PDHP 15

Maximum Working Pressure :- 1600 Bar
Tanks Size : 1.8 / 2.4 Ltr.

The Perfect machineries 2-Stage hand pumps come with standard pressure gauge; this gives the user precise and safe control over the work carried out. The gauge is directly mounted onto the pump and is well protected by the specially designed pump lever.

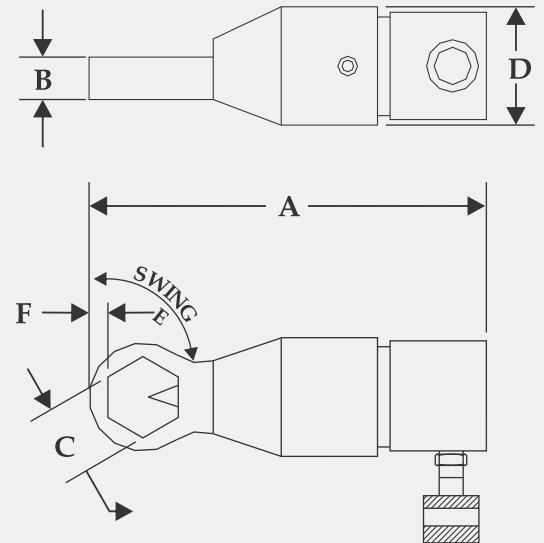
- Return connections on all pumps.
- Robust design
- Aluminium tank.
- Easy and simple maintenance



PERFECT MACHINERIES HEAVY DUTY HYDRAULIC NUT SPLITTERS



PERFECT
—MACHINERIES—



Perfect Machineries Nut Splitter is supplied
Complete with:

- Hydraulic Cylinder
- Housing
- Chisel
- Set of Allen Keys
- Spacer Set
- Packed in a Rugged Steel Tool Box.

Application

- Designed for Operator Comfort
- Removes Corroded Nuts Faster
- Removes Frozen Nuts Safely
- Fits Tight Spaces
- Cuts through the Hardest Nuts

Model	Stud Diameter in (mm)	Nut A/F in(mm)	A in(mm)	B in(mm)	C in(mm)	D in(mm)	E	F in(mm)	Weight lbs(kg)
STANDARD									
PNS 105	7/16"-7/8" (11-22)	5/8"-1 7/16" (16-36)	11" (271)	1.05 (38)	1.49" (38)	4.13" (105)	60°	0.39" (10)	20 (9)
PNS 200	7/8"-1 1/4" (22 - 31)	1 5/16" - 2" (33-50)	11.29" (287)	1.05" (38)	2.12" (54)	4.25" (108)	45°	0.51" (13)	21 (10)
PNS 204	1 1/4"-1 1/2" (32-38)	1 7/8"-2 3/8" (47-60)	15.16" (385)	2 1/4" (57)	2.52" (64)	6.45" (164)	30°	0.55" (14)	71 (32)
PNS 210	1 3/8"-1 3/4" (39-44)	2 1/16"-2 3/4" (52-70)	16.10" (398)	2 1/4" (57)	2.87" (73)	6.45" (164)	30°	0.70" (18)	72 (33)
PNS 308	1.3/4"-2.1/4" (45-57)	2.5/8"-3.1/2" (70-89)	17.75" (460)	3" (77.8)	3.89" (99)	8.42" (214)	30°	0.75" (19)	158 (72)
PNS 314	2"-2.1/2" (50-64)	3.1/8"-3.7/8" (79-98)	18" (488)	3.12" (79.4)	4.25" (108)	8.42" (214)	30°	0.86" (22.2)	163 (74)
PNS 404	2.1/2"-2.3/4" (64-70)	3.3/4"-4.1/4" (95-108)	22.75" (579)	3.75" (95.3)	4.64" (118)	9.88" (251)	60°	1.14" (28.6)	251 (114)
PNS 500	3"-3.1/4" (76-83)	4.1/2"-5" (114-127)	23" (590)	4.12" (104.8)	5.39" (137)	9.88" (251)	60°	1.14" (28.6)	256 (116)
PNS 506	3.1/4"-3.1/2" (83-89)	4.7/8"-5.3/8" (124-136)	23.5" (598)	4.12" (104.8)	5.86" (149)	9.88" (251)	60°	1.14" (28.6)	262 (119)

PERFECT MACHINERIES LIGHT NUT SPLITTER



Perfect machineries Light Weight Hydraulic Nut Splitters are used in applications that involve corrosion; it can be used to remove corroded frozen nuts fast and safely. The light weight option helps the user to apply the product to lower sized bolts.

Perfect machineries offers Light Weight Nut splitters for a range of Hex size 0.37" to 2.95". Our product is designed for operator comfort that fits tight spaces and it cuts through the hardest of nuts.

- Higher capacity and customized solutions on request.
- Specifications are subject to change due to continual improvement.

Application

- The fast, sure and safe method to cut and remove seized nuts.
- Compact and ergonomic angled head design.
- Heavy duty cutting tool, can be re-ground.



Model STANDARD	Hex Size in (mm)	Thread Size in(mm)	A in(mm)	B in(mm)	C in(mm)	D in(mm)	E in(mm)	F in(mm)	Weight lbs(kg)	Replacement Chisel Model Nos.
PD-5	0.37"-0.75" (10-19)	M6-M12	1.57" (40)	2.04" (52)	0.31" (8)	0.79" (20)	5.11" (130)	1.18" (30)	2 (1)	NBC - 5
PD-10	0.75"-0.94" (19-24)	M12-M16	2.12" (54)	2.64" (67)	0.47" (12)	0.94" (24)	6.41" (163)	1.41" (41)	4 (2)	NBC - 10
PD-15	0.94"-1.26" (24-32)	M16-M22	2.52" (64)	3.11" (79)	0.51" (13)	1.18" (30)	7.36" (187)	2.04" (52)	6 (3)	NBC - 15
PD-20	1.26"-1.61" (32-41)	M22-M27	3.07" (78)	3.70" (94)	0.78" (20)	1.46" (37)	8.62" (219)	2.72" (69)	10 (4.5)	NBC - 20
PD-35	1.61"-1.97" (41-50)	M27-M33	3.74" (95)	4.45" (113)	0.83" (21)	1.77" (45)	10.43" (265)	3.07" (78)	21 (9.6)	NBC - 35
PD-50	1.97"-2.36" (50-60)	M33-M39	4.17" (106)	5.04" (128)	0.98" (25)	2.12" (54)	11.69" (297)	3.58" (91)	29 (13)	NBC - 50
PD-90	2.36"-2.95" (60-75)	M39-M48	6.14" (156)	7.28" (185)	1.06" (27)	2.95" (75)	14.05" (357)	4.33" (110)	75 (34)	NBC - 90

MECHANICAL FLANGE SPREADER PDFS 100 MANUAL



PERFECT
—MACHINERIES—

Friction-free, smooth and parallel wedge movement with unique interlock wedge design. Eliminates flange damage and risk of spreading arm failure.

USED IN: Mini Kit are used for shutdown, testing, pipe line maintenance, commissioning etc...

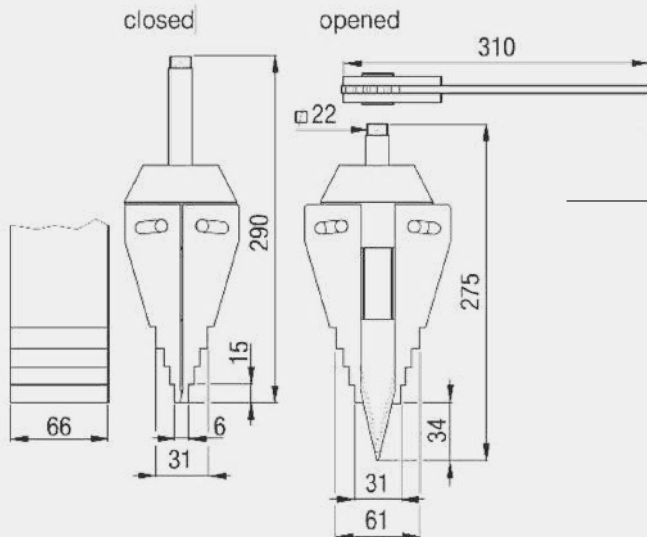
FEATURES:

Manual Operation

Required very small access gap of only 6mm

Safety blocks and stepped blocks provide for more spreading distance

Safe and reliable system



STANDARD KIT COMPONENTS

1 x MFS Wedge heads

1 x Safety Blocks

2 x Pair of Stepped Blocks

1 x Hex Key

1 x Ratchet Spanner

1 x Instruction Manual 1 x Carry Case

Maximum Spread Force	Tip Clearance	Maximum wt. Spread blocks	Tool Weight
10 (100 KN)	6mm	80mm	6.0 kg (15.4 lb)

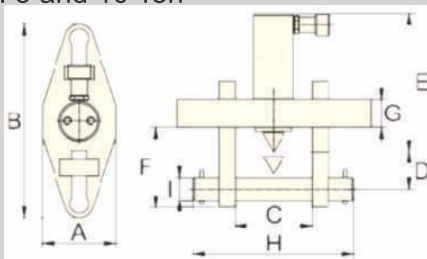
LOW CLEARANCE HYDRAULIC FLANGE SPREADER

Features:

- 1) Secure Hold
- 2) No pinch points
- 3) Strength & Reliability of product
- 4) Max Working Pressure: 700Bar
- 5) Capacity: 5 and 10 Ton

Includes in Carry Case:

- 1 x Wedge head with threaded coupler
- 1 x 2m Hydraulic hose with threaded couplers on both ends
- 1 x 10000 PSI hand pump, gauge, gauge adaptor & coupler
- 1 x Instruction manual
- 1 x Carry case



Model	Capacity	Bolt Size	Flange	Stroke	Standard	Weight	Dimensions (mm)						
	(T)	(mm)	Thickness	(mm)	Wedge	(kg)	A	B	C MIN-MAX	D	E	F	G
PD50STD	5	19-28	57(mm)	38	3-28(mm)	11.5	76	209	70 155	32	196	88	25
PD100STD	10	31-41	92(mm)	54	3-28(mm)	18	108	290	90 205	45	155	109	38

Model	Capacity(T)	Inserting Clearance (m)	Weight (kg)
PDF7STD	6.8	2	5

HYDRAULIC FLANGE-SPREADER STANDARD FULL KIT-PDSPR-150



Separation of stubborn joints for inspection and maintenance particularly those fitted with ring grooves or those with external forces acting on them are often difficult to separate. The use of hammers and wedges, chain blocks and lever bars can damage joint components and present a potential safety risk.

TWT Wedge Spreaders and Flange Spreader are the ideal solutions.

USED IN: Standard Kit / Full Kit are used for shutdown, testing, pipe line maintenance, commissioning etc...

FEATURES:

Operated by hydraulic pump with rated pressure of 700 bar (10 000 psi) hydraulic pressure applied

Required very small access gap of only 6mm

Each step spreading distance is 20mm

Maximum spreading distance is 61mm

Use stepped blocks to increase wedge opening up to 81 mm

Includes Safety blocks

Supplied with 3/8 male coupler and dust cap

Safe and reliable hydraulic system

SPREADING FORCE:

with 700 bar (10 000 psi) hydraulic pressure applied: 14 ton (140 KN) per tool

Maximum Spread	Tip Clearance	Maximum Spread	Maximum wt. Spread blocks	Tool Weight
14 (140 KN)	6mm	61mm	80mm	9.0 kg (15.4 lb)



STANDARD KIT COMPONENTS:

- 1 x HSWL 10 Wedge heads
- 1 x 700 bar (10 000 psi) Hydraulic Hose, 2m length
- 1 x 700 bar (10 000 psi) Hand Pump with Gauge
- 1 x Safety Blocks
- 1 x Pair of Stepped Blocks 1 x Hex Key
- 1 x Instruction Manual
- 1 x Carry Case

FULL KIT COMPONENTS:

- 2 x HSWL Wedge heads
- 3 x 700 bar (10 000 psi) Hydraulic Hose, 2m length
- 1 x 700 bar (10 000 psi) Hand Pump with Gauge
- 2 x Safety Blocks
- 2 x Pair of Stepped Blocks
- 1 x Mani fold with 3 outlets 2 x Hex Keys
- 1 x Instruction Manual
- 1 x Carry Case



NON SPARKING SPANNERS

PERFECT
—MACHINERIES—

Non-Sparking Hand / Impact Sockets



	Socket A/F sizes (mm/inch)
1/4"	4, 4.5, 5.5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 5 / 32, 3 / 16, 7 / 32, 1 / 4, 9 / 32, 5 / 16, 11 / 32, 3 / 8, 7 / 16, 1 / 2
3/8"	5 / 16, 3 / 8, 7 / 16, 1 / 2, 9 / 16, 5 / 8, 11 / 16, 3 / 4, 13 / 16, 7 / 8, 15 / 16 5 / 16, 3 / 8, 7 / 16, 1 / 2, 9 / 16, 5 / 8, 11 / 16, 3 / 4, 13 / 16, 7 / 8, 15 / 16
1 / 2"	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32 5 / 16, 3 / 8, 7 / 16, 1 / 2, 9 / 16, 5 / 8, 11 / 16, 3 / 4, 13 / 16, 7 / 8, 15 / 16, 1, 1-1 / 16, 1-1 / 4, 1-7 / 16
3/4"	17, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 34, 36, 38, 41, 46, 50 3 / 16, 13 / 16, 7 / 8, 15 / 16, 1, 1-1 / 16, 1-1 / 8, 1-3 / 16, 1-1 / 4, 1-5 / 16, 1-3 / 8, 1-7 / 16, 1-1 / 2, 1-5 / 8, 1-3 / 4, 1-13 / 16, 1-7 / 8, 2
1"	22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 36, 38, 41, 46, 50, 55, 60, 65, 70, 75, 80 1-1 / 16, 1-1 / 16, 1-1 / 8, 1-3 / 16, 1-1 / 4, 1-5 / 16, 1-3 / 8, 1-7 / 16, 1-1 / 2, 1-5 / 8, 1-7 / 8, 2, 2-1 / 4, 2-1 / 2, 2-3 / 4, 3

Non-sparking Slugging Wrenches Box Type



A / F Sizes (mm / inch)
17, 19, 20, 22, 24, 27, 30, 31, 32, 36, 38, 41, 46, 50, 52, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 110, 120, 130, 140, 150
11 / 16, 11 / 16, 3 / 4, 7 / 8, 1, 1-1 / 16, 1-1 / 8, 1-3 / 16, 1-1 / 4, 1-3 / 8, 1-13 / 32, 1-1 / 2, 1-5 / 8, 1-3 / 4, 1-13 / 16, 2, 2-1 / 16, 2-3 / 16, 2-13 / 64, 2-5 / 16, 2-3 / 8, 2-1 / 2, 2-9 / 16, 2-5 / 8, 2-3 / 4, 2-15 / 16, 3, 3-1 / 16, 3-1 / 8, 3-3 / 8, 3-9 / 16, 3-3 / 4, 3-15 / 16, 4-1 / 8

Non-sparking Slugging Wrenches Open Type



Sizes (inches)
6, 8, 10, 12, 14, 16

Non-Sparking Flat / Half Round Files



A / F Sizes (mm / inch)
17, 19, 20, 22, 24, 27, 30, 31, 32, 36, 38, 41, 46, 50, 52, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 110, 120, 130, 140, 150
11 / 16, 3 / 4, 7 / 8, 1, 1-1 / 16, 1-1 / 8, 1-3 / 16, 1-1 / 4, 1-3 / 8, 1-13 / 32, 1-1 / 2, 1-5 / 8, 1-3 / 4, 1-13 / 16, 2, 2-1 / 16, 2-3 / 16, 2-13 / 64, 2-5 / 16, 2-3 / 8, 2-1 / 2, 2-9 / 16, 2-5 / 8, 2-3 / 4, 2-15 / 16, 3, 3-1 / 16, 3-1 / 8, 3-3 / 8, 3-9 / 16, 3-3 / 4, 3-15 / 16, 4-1 / 8

Non-sparking Combination Spanners



A / F Sizes (mm / inch)
6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90
1 / 4, 5 / 16, 3 / 8, 7 / 16, 1 / 2, 9 / 16, 19 / 32, 5 / 8, 11 / 16, 3 / 4, 13 / 16, 7 / 8, 15 / 16, 1, 1-1 / 16, 1-1 / 8, 1-3 / 16, 1-1 / 4, 1-5 / 16, 1-3 / 8

Non-Sparking Adjustable Wrenches & Pipe Wrenches



L (mm)	L (inch)
150, 200, 250, 300, 350, 375, 450, 600	6, 8, 10, 12, 14, 15, 18, 24



NON SPARKING TOOLS

PERFECT
—MACHINERIES—

Non-sparking Ball Pen Hammers



Weight (gms)

230, 340, 450, 680, 910, 1130

Non-Sparking Sledge Hammers



Weight (gms)

450, 1000, 1400, 1500, 1800, 2000, 2200,
2500, 2700, 3000, 3600, 4000, 4500, 5000, 5400,
6400, 7200, 8000, 8200, 9100, 9900

Non-Sparking Double Ended Open Type Spanners



A / F Sizes (mm / inch)

5.5x7, 6x7, 6x8, 7x9, 8x9, 8x10, 9x10, 9x11, 10x11, 10x12, 10x14, 11x13, 12x13,
12x14, 13x17, 14x15, 14x17, 16x17, 16x18, 17x19, 17x21, 17x22, 18x19, 19x21,
19x22, 19x24, 20x22, 21x23, 21x26, 22x24, 22x27, 23x26, 24x26, 24x27, 24x30,
25x28, 26x29, 26x32, 27x29, 27x30, 27x32, 29x32, 30x32, 30x36, 32x34, 32x36,
34x36, 36x38, 36x41, 38x40, 41x46, 46x50, 50x55, 50x60, 55x60, 60x65, 65x70

1/4x5/16, 5/16x3/8, 3/8x7/16, 3/8x1/2, 7/16x1/2, 1/2x9/16, 9/16x5/8,
5/8x11/16, 5/8x3/4, 11/16x3/4, 3/4x13/16, 3/4x7/8, 13/16x7/8, 7/8x15/16,
15/16x1, 1x1-1/16, 1-1/16x1-1/8, 1-1/8x1-3/16, 1-3/16x1-1/4, 1-1/4x1-5/16,
1-5/16x1-3/8, 1-3/8x1-7/16, 1-7/16x1-5/8, 1-1/2x1-9/16, 1-5/8x1-13/16,
1-13/16x2, 2x2-3/16, 2x2-3/8, 2-3/16x2-3/8, 2-3/8x2-9/16

Non-Sparking Double Ended Ring Type Spanners



A / F Sizes (mm / inch)

5.5x7, 6x7, 6x8, 7x9, 8x9, 8x10, 9x10, 9x11, 10x11, 10x12, 10x14, 11x13, 12x13,
12x14, 13x17, 14x15, 14x17, 16x17, 16x18, 17x19, 17x21, 17x22, 18x19, 19x21,
19x22, 19x24, 20x22, 21x23, 21x26, 22x24, 22x27, 23x26, 24x26, 24x27, 24x30,
25x28, 26x29, 26x32, 27x29, 27x30, 27x32, 29x32, 30x32, 30x36, 32x34, 32x36,
34x36, 36x38, 36x41, 38x40, 41x46, 46x50, 50x55, 50x60, 55x60, 60x65, 65x70

1 / 4x5 / 16, 5 / 16x3 / 8, 3 / 8x7 / 16, 3 / 8x1 / 2, 7 / 16x1 / 2, 1 / 2x9 / 16, 9 / 16x5 / 8,
5 / 8x11 / 16, 5 / 8x3 / 4, 11 / 16x3 / 4, 3 / 4x13 / 16, 3 / 4x7 / 8, 13 / 16x7 / 8, 7 / 8x15 / 16,
15 / 16x1, 1x1 -1 / 16, 1-1 / 16x1-1/8, 1-1 / 8x1-3/16, 1-3 / 16x1-1 / 4, 1-1 / 4x-5 / 16,
1-5 / 16x1-3 / 8, 1-3 / 8x1-7 / 16, 1-7 / 16x1-5 / 8, 1-1 / 2x1-9 / 16, 1-5 / 8x1-13 / 16,
1-13 / 16x2, 2x2-3 / 16, 2x2 3 / 8, 2-3 / 16x2-3 / 8, 2-3 / 8x2-9 / 16

Non-Sparking Chisels



Sizes (OAL mm)

160, 200, 250, 300, 400, 500

Non-Sparking Pliers



L (inch)	L (mm)	K (mm)
6	152	8
8	203	13

Non-Sparking Slotted Screwdrivers



L1(inch)

2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18

Note:

- We have also developed the ACETILEX Alloy tools (Less than 70% copper),
- 100% safe to be used in Acetylene environments

Material	Aluminium - Bronze					Copper-beryllium			
Analysis	Cu	Al	Ni	Fe	Mn	Be	Ni	Co	Cu
%	Rest	9-12	2-6	1-4	0-1.8	1.5-2	0.1-0.6	0.1-0.6	Rest

HYDRAULIC LIGHT WEIGHT HAND PUMP



PERFECT
—MACHINERIES—

Light weight hand pump is a kind of small high-pressure hydraulic pump that can transfer the Mechanical power to hydraulic power, matched with hydraulic cylinder for lifting the heavy equipment, and also can be matched with other hydraulic tools like pipe bending, flange spreader etc. The pump unit is easy to operate and is supplied complete with a glycerin filled gauge, gauge adapter, Hydraulic Hose and Threaded outlet coupling.

USED IN:

Shutdown, Line Testing, Pipe line maintenance, Commissioning etc...

FEATURES:

- High Pressure, Manual Type, light weight, portable and easy to operate
- Two Speed operation, automatic switching, high performance, small oil tank
- High temperature and corrosion resistant hand pump
- Lower handle effort to minimize operator fatigue
- Built in safety valve to avoid damage caused by high pressure.
- Optional directional valve to make it more convenient to operate the single acting cylinder



PDNP 07



PDNP 01

Model	Maximum Operating Pressure (bar)	Pressure Rating 1st Stage (bar)	Pressure Rating 2nd Stage (bar)	Cylinder Compatibility	Reservoir Capacity (cm ³)	Usable Oil Capacity (cm ³)	Maximum Flow at Rated Pressure (cm ³ /stroke)	Oil Displacement Per Stroke 1st Stage (cm ³)	Oil Displacement Per Stroke 2nd Stage (cm ³)	Maximum Handle Effort (kg)	Piston Stroke (mm)	Valve Operate	Power Source	Weight (Kg)
PDNP-0.7	700	13	700	Single Acting	327	327	0, 90 cm ³ /stroke	3, 62	0, 90	35, 4	12, 7	Manual	Manual	2.2
PDNP-1	700	13	700	Single Acting	901	901	2, 47 cm ³ /stroke	11, 26	2, 47	42, 2	25, 4	Manual	Manual	4.0

HYDRAULIC STEEL HAND PUMP

Heavy duty hand pump for high pressure operations, designed for single acting & double acting Cylinders with 2-way & 4-way control valve matched with hydraulic cylinder for lifting the heavy equipment and also can be matched with other hydraulic tools like pipe bending, flange spreader etc.

USED IN: HH 7-3 & HH7-8 is 4 way valving for operation of double acting cylinders. Heavy tonnage lifting cylinders Shutdown, Commissioning etc...



FEATURES:

- Compact all steel design oil capacity tank
- Usually equipped with the high tonnage cylinders.
- High flow output at per stroke, 11ar
- Double speed, effortless-handle to reduce operator intensity
- Integrated control valve with high performance
- Large oil capacity tank two to operate a wide range of cylinder and tools.
- Chrome plated plunger and wiper system for durable, long lasting performance.



Model	Maximum Operating Pressure (bar)	Pressure Rating 1st Stage (bar)	Pressure Rating 2nd Stage (bar)	Cylinder Compatibility	Reservoir Capacity (cm ³)	Usable Oil Capacity (cm ³)	Maximum Flow at Rated Pressure (cm ³ /stroke)	Oil Displacement Per Stroke 1st Stage (cm ³)	Oil Displacement Per Stroke 2nd Stage (cm ³)	Maximum Handle Effort (kg)	Piston Stroke (mm)	Valve Operate	Power Source	Weight (Kg)
PD7-2	700	25	700	Double Acting	2200	2200	2, 46 cm ³ /stroke	16, 39	2, 46	35	25, 4	Manual	Manual	10.9
PD7-3	700	25	700	Double Acting	2200	2200	2, 46 cm ³ /stroke	16, 39	2, 46	35	25, 4	Manual	Manual	11.8
PD7-4	700	14	700	Double Acting	7423	7423	4, 75 cm ³ /stroke	126, 20	4, 75	49	38, 1	Manual	Manual	27.9
PD7-8	700	14	700	Double Acting	7423	7423	4, 75 cm ³ /stroke	126, 20	4, 75	49	38, 1	Manual	Manual	27.9



Perfect Machineries cylinders operate with a maximum pressure of 700Bar. With single and Double acting ranges Perfect machineries cylinders show Versatility in operational requirements and fulfill the needs of the user.



PERFECT MACHINERIES **SINGLE-ACTING** **HOLLOW HYDRAULIC CYLINDER**

Capacity: 13-95 ton
Stroke: 42-155 mm
Max. Pressure: 700 bar

Cylinder Capacity	Stroke	Model Number	Oil Capacity	Collapsed Height	Extend Height	Outside Dia.	Cylinder Bore Dia.	Plunger Dia. (Thread)	Weight
				A	B	C	D	E	
ton (kN)	(mm)		(cm)	(mm)	(mm)	(mm)	(mm)	(mm)	(Kg)
13 (125)	42	PDCL 130-42	76	130	172	76	55	35.5	3.4
	76	PDCL 130-76	138	184	260	76	55	35.5	5.2
20 (215)	49	PDCL 200-49	174	162	211	101	77	54.5	8.2
	155	PDCL 200-155	550	306	461	101	77	54.5	15
30 (326)	64	PDCL 300-64	307	180	244	115	90	64.5	11.5
	155	PDCL 300-155	744	330	485	115	90	64.5	21.5
60 (576)	76	PDCL 600-76	640	247	323	159	125	94.5	28.2
	153	PDCL 600-153	1278	323	476	159	125	94.5	35.5
95 (931)	76	PDCL 1000-76	1028	254	330	212	165	125	63.5

SINGLE ACTING HYDRAULIC CYLINDER

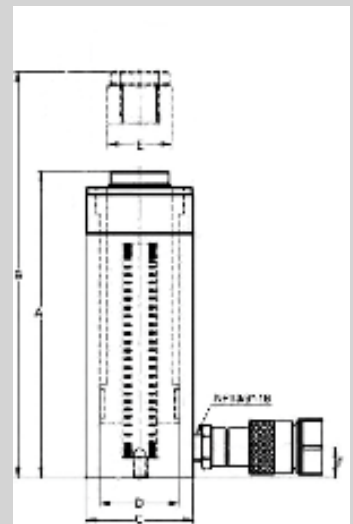
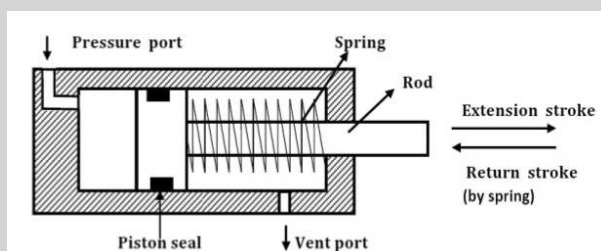


PERFECT
—MACHINERIES—

Capacity: 5-95 ton
Stroke: 25-362 mm
Max. Pressure: 700 bar



Cylinder Capacity	Stroke	Model Number	Oil Capacity	Collapsed Height	Extended Height	Outside Dia.	Cylinder Bore Dia.	Plunger Dia.	Weight
ton	(mm)		(cm ³)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	(Kg)
5 (45)	25	PSCL 5-25	18	110	135	40	30	25	1
	76	PSCL 5-76	54	165	241	40	30	25	1.6
	127	PSCL 5-127	90	215	342	40	30	25	2
	177	PSCL 5-177	125	273	450	40	30	25	2.6
	232	PSCL 5-232	164	323	555	40	30	25	3.1
10 (101)	54	PSCL 10-54	86	121	175	59	45	35	2.3
	105	PSCL 10-105	167	171	276	59	45	35	3
	156	PSCL 10-156	248	247	403	59	45	35	4.1
	203	PSCL 10-203	323	298	501	59	45	35	5.8
	257	PSCL 10-257	409	349	606	59	45	35	6.6
	304	PSCL 10-304	483	400	707	59	45	35	7.5
	356	PSCL 10-356	566	450	806	59	45	35	8.3
15 (142)	25	PSCL 15-25	53	124	149	70	52	42	3.5
	51	PSCL 15-51	108	149	200	70	52	42	4
	101	PSCL 15-101	214	200	301	70	52	42	5
	152	PSCL 15-152	323	271	423	70	52	42	7
	203	PSCL 15-203	431	322	525	70	52	42	8
	254	PSCL 15-254	539	373	627	70	52	42	9
	305	PSCL 15-305	647	423	728	70	52	42	10
	356	PSCL 15-356	756	474	830	70	52	42	11
25 (232)	26	PSCL 25-26	86	139	165	85	65	56	6
	50	PSCL 25-50	166	165	215	85	65	56	7
	102	PSCL 25-102	338	215	317	85	65	56	8
	158	PSCL 25-158	524	273	431	85	65	56	10
	210	PSCL 25-210	696	323	533	85	65	56	12
	261	PSCL 25-261	866	374	635	85	65	56	14
	311	PSCL 25-311	1031	425	736	85	65	56	15
	362	PSCL 25-362	1201	476	838	85	65	56	17
30 (295)	50	PSCL 30-50	209	228	278	101	73	60	13
	100	PSCL 30-100	418	278	378	101	73	60	16
	209	PSCL 30-209	874	387	596	101	73	60	19
	300	PSCL 30-300	1255	478	778	101	73	60	27
50 (498)	51	PSCL 50-51	361	176	206	127	95	80	19
	101	PSCL 50-101	716	227	307	127	95	80	19
	159	PSCL 50-159	1126	282	422	127	95	80	23
	337	PSCL 50-337	2388	460	797	127	95	80	37
75 (718)	156	PSCL 75-156	1620	285	441	150	115	100	33
	333	PSCL 75-333	3457	492	825	150	115	100	54
95 (933)	168	PSCL 100-168	2229	357	525	177	130	112	59
	260	PSCL 100-260	3449	449	709	177	130	112	72



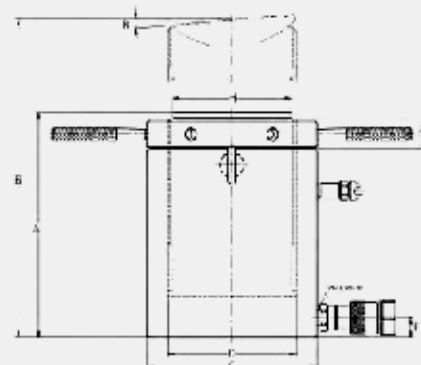
SINGLE ACTING LOW PROFILE LOCK-NUT HYDRAULIC CYLINDER



PERFECT
MACHINERIES

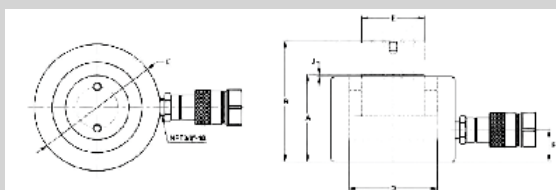


Capacity: 60-520 ton
Stroke: 45-50 mm
Max. Pressure: 700 bar

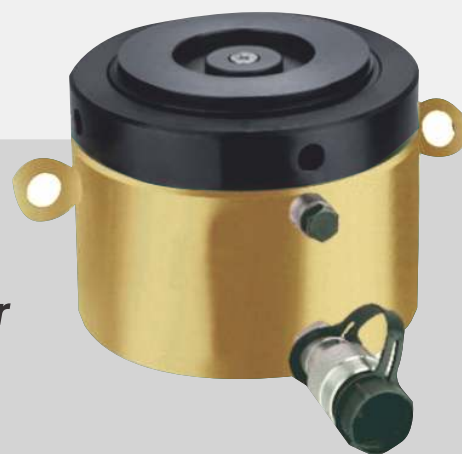


Cylinder Capacity	Stroke	Model Number	Oil Capacity	Collapsed Height	Extended Height	Outside Dia.	Cylinder Bore Dia.	Plunger Dia. (Thread)	Base to Advance port	Saddle Dia.	Saddle Protrusion from Plgr.	Saddle Max. Tilt Angle	Plunger Dia.	Weight
ton	(mm)			A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	H (mm)	J (mm)	R (mm)	S (mm)	(Kg)
60 (606)	50	PLCL 60-50	432	125	175	140	106	Tr104x4	19	96	6	5	28	15
100 (1027)	50	PLCL 100-50	734	137	187	180	137	Tr136x6	21	126	8	5	31	27
160 (1619)	45	PLCL 160-45	1040	148	193	224	172	Tr171x6	27	160	9	5	40	45.5
200 (1999)	45	PLCL 200-45	1285	155	200	245	190.7	Tr190x6	30	180	10	5	43	57
260 (2567)	45	PLCL 250-45	1650	159	204	275	216	Tr215x6	32	200	11	5	44	74
400 (3916)	45	PLCL 400-45	2517	178	223	350	270	Tr266x6	41	251	11	4	55	134
520 (5114)	45	PLCL 500-45	3287	192	237	400	305	Tr304x6	48	289	10	3	62	188

SINGLE ACTING LOW PROFILE HYDRAULIC CYLINDER



Capacity: 10-150 ton
Stroke: 11-80 mm
Max. Pressure: 700 bar

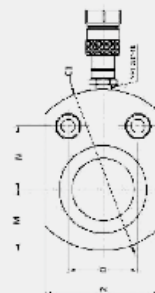
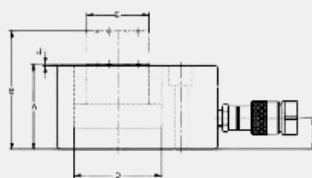


Cylinder Capacity	Stroke	Model Number	Oil Capacity	Collapsed Height	Extend Height	Outside Dia.	Cylinder Bore Dia.	Plunger Dia. (Thread)	Base to Advance port	Saddle Protrusion from Plgr.	Saddle Max. Tilt Angle	Plunger to Mounting Hole	Weight
ton (kN)	(mm)		(cm) ³	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	J (mm)	M (mm)	N (°)	(Kg)
10 (101)	38	PDH 10-38	60	88	126	78	45	35	23	2	-	-	4
20 (201)	45	PDH 20-45	140	97	142	96	63	50	23	2	-	-	6.9
30 (295)	64	PDH 30-64	290	117	181	109	76	60	23	2	-	-	9.8
50 (435)	60	PDH 50-60	471	120	180	233	200	80	24	2	-	-	13.3
75 (718)	50	PDH 75-50	584	116	166	157	122	100	21	2	-	-	19
100 (887)	57	PDH 100-57	877	141	198	176	140	112	31	2	-	-	24.5
150 (1386)	51	PDH 150-51	1184	141	192	215	172	145	28	2	-	-	42
150 (1386)	80	PDH 150-80	1860	170	250	215	172	145	28	2	-	-	50

SINGLE ACTING LOW FLAT HYDRAULIC CYLINDER



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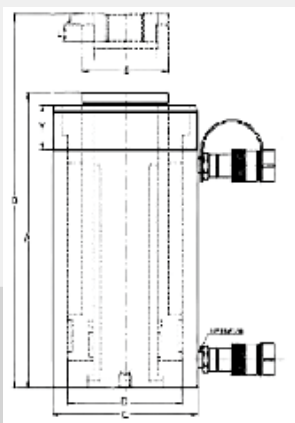


Capacity: 10-150 ton

Stroke: 11-80 mm

Max. Pressure: 700 bar

Cylinder Capacity	Stroke	Model Number	Oil Capacity	Collapsed Height	Extend Height	Outside Dia.	Cylinder Bore Dia.	Plunger Dia. (Thread)	Base to Advance port	Saddle Protrusion from Plgr.	Saddle Max. Tilt Angle	Plunger to Mounting Hole	Weight
ton (kN)	(mm)		(cm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	J (mm)	M (mm)	N (*)	(Kg)
10 (101)	11	PLFH 10-11	18	44	55	83x60	45	35	23	1	31.5	34	1.4
20 (201)	12	PLFH 20-12	37	52	64	102x80	63	50	23	1	41	39	2.2
30 (295)	13	PLFH 30-13	59	58	71	117x97	76	60	23	1	48.5	47	4.2
50 (435)	16	PLFH 50-16	125	67	83	150x125	100	80	23	1	63	60	7.4
75 (718)	16	PLFH 75-16	187	79	96	177x152	122	100	23	1	76.5	73	12.7
100 (887)	16	PLFH 100-16	246	87	103	203x179	140	112	23	1	89.5	84	15.5
150 (1386)	16	PLFH 150-16	371	95	111	236x212	172	145	23	1	106	92	28.7



DOUBLE ACTING HOLLOW HYDRAULIC CYLINDER

Capacity: 30-145 ton

Stroke: 38-258 mm

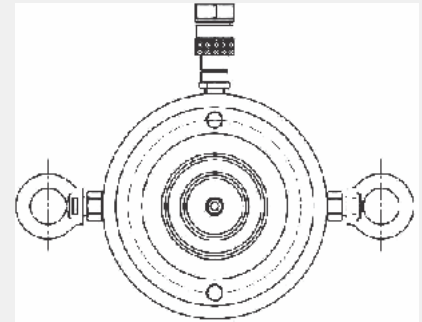
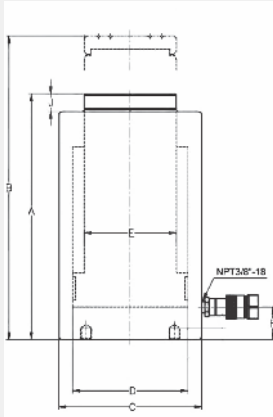
Max. Pressure: 700 bar

Cylinder Capacity	Stroke	Model Number	Max. Cylinder Capacity		Oil Capacity		Collapsed Height	Extend Height	Outside Dia.	Cylinder Bore Dia.	Plunger Dia. (Thread)	Weight
ton (kN)	(mm)		Advance (kN)	Retract (kN)	Advance (cm)	Retract (cm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	(Kg)
30	178	PHH 300-178	326	210	855	550	330	508	115	90	64.5	21
	258	PHH 300-258	326	210	1240	798	431	689	115	90	64.5	27
60	89	PHH 600-89	576	360	749	468	247	336	159	125	94.5	28
	166	PHH 600-166	576	360	1398	873	323	489	159	125	94.5	35
	257	PHH 600-257	576	360	2146	1352	438	695	159	125	94.5	45
95	38	PHH 1000-38	931	627	517	345	165	203	212	165	125	33
	76	PHH 1000-76	931	627	1028	692	254	330	212	165	125	61
	153	PHH 1000-153	931	627	2070	1394	342	495	212	165	125	79
	257	PHH 1000-257	931	627	3477	2341	460	717	212	165	125	106
145	203	PHH 1500-203	1429	749	4191	2198	359	562	247	190.5	150	111

DOUBLE ACTING HIGH TONNAGE HYDRAULIC CYLINDER



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Cylinder Capacity	Stroke	Model Number	Cylinder Effective Area	Oil Capacity	Collapsed Height	Extend Height	Outside Dia.	Cylinder Bore Dia.	Plunger Dia.	Base to Advance Port	Weight
					A	B	C	D	E	F	
ton	(mm)		(cm ²)	(cm ³)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(Kg)
50	50	PTH 50-50	78.5	392	188	238	140	100	70	41	21.5
	100	PTH50-100	78.5	784	238	338	140	100	70	41	26
	150	PTH50-150	78.5	1176	288	438	140	100	70	41	31
	200	PTH50-200	78.5	1568	338	538	140	100	70	41	35
	300	PTH50-300	78.5	2352	438	738	140	100	70	41	44
100	50	PTH100-50	153.9	770	216	266	180	140	100	54	42
	100	PTH100-100	153.9	1540	266	366	180	140	100	54	49
	150	PTH 100-150	153.9	2310	316	466	180	140	100	54	56
	200	PTH100-200	153.9	3080	366	566	180	140	100	54	63
	300	PTH100-300	153.9	4620	466	766	180	140	100	54	70
150	50	PTH 150-50	201	1005	224	274	210	160	112	58	44
	100	PTH150-100	201	2010	274	374	210	160	112	58	57
	150	PTH150-150	201	3015	324	474	210	160	112	58	70
	200	PTH150-200	201	4020	374	574	210	160	112	58	83
	300	PTH 150-300	201	6030	474	774	210	160	112	58	109
200	50	PTH200-50	314	1570	246	296	250	200	150	64	84
	150	PTH 200-150	314	4712	346	496	250	200	150	64	118
	300	PTH 200-300	314	9423	496	796	250	200	150	64	152
320	50	PTH 300-50	490.6	2453	277	327	315	250	180	74	155
	150	PTH 300-150	490.6	7359	377	527	315	250	180	74	195
	300	PTH 300-300	490.6	14718	527	827	315	250	180	74	255
400	50	PTH400-50	572.3	2861	305	355	355	270	220	83	240
	150	PTH400-150	572.3	8583	405	555	355	270	220	83	310
	300	PTH400-300	572.3	17169	555	855	355	270	220	83	415
500	50	PTH500-50	803.8	4019	325	375	395	320	250	93	285
	150	PTH 500-150	803.8	12057	425	575	395	320	250	93	353
	300	PTH500-300	803.8	24114	575	875	395	320	250	93	455
630	50	PTH 600-50	1017.4	5087	386	436	450	360	280	115	487
	150	PTH 600-150	1017.4	15261	486	636	450	360	280	115	579
	300	PTH600-300	1017.4	30522	636	936	450	360	280	115	717
800	50	PTH 800-50	1256	6280	427	477	550	400	320	113	712
	150	PTH 800-150	1256	18840	527	677	550	400	320	113	860
	300	PTH800-300	1256	37698	677	977	550	400	320	113	1082

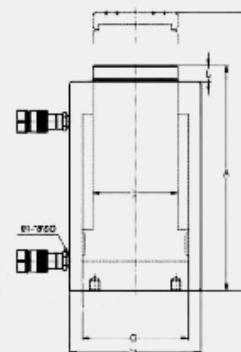
DOUBLE ACTING HIGH TONNAGE HYDRAULIC CYLINDER



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Capacity: 50-800 ton
Stroke: 50-300 mm
Max. Pressure: 700 bar



Cylinder Capacity	Stroke	Model Number	Max. Cylinder Capacity		Oil Capacity		Collapsed Height	Extended Height	Outside Dia.	Cylinder Bore Dia.	Plunger Dia.	Weight
			Advance	Retract	Advance	Retract	A	B	C	D	E	
ton	(mm)		(KN)		(cm^3)		(mm)	(mm)	(mm)	(mm)	(mm)	(Kg)
50	50	PHT50-50	500	255	392	200	188	238	140	100	70	21.5
	100	PHT50-100	500	255	784	400	238	338	140	100	70	26
	150	PHT50-150	500	255	1176	600	288	438	140	100	70	31
	200	PHT50-200	500	255	1563	800	338	538	140	100	70	35
	300	PHT50-300	500	255	2352	1200	438	738	140	100	70	44
100	50	PHT100-50	1000	490	770	377	216	266	180	140	100	42
	100	PHT100-100	1000	490	1540	754	266	366	180	140	100	49
	150	PHT100-150	1000	490	2310	1131	316	466	180	140	100	56
	200	PHT100-200	1000	490	3080	1508	366	566	180	140	100	63
	300	PHT100-300	1000	490	4620	2262	466	766	180	140	100	70
150	50	PHT150-50	1390	709	1005	512	224	274	210	160	112	44
	100	PHT150-100	1390	709	2010	1025	274	374	210	160	112	57
	150	PHT150-150	1390	709	3015	1537	324	474	210	160	112	70
	200	PHT150-200	1390	709	4020	2050	374	574	210	160	112	83
	300	PHT150-300	1390	709	6030	3075	474	774	210	160	112	109
200	100	PHT200-100	2000	875	3141	1374	296	396	250	200	150	109
	150	PHT200-150	2000	875	4712	2061	346	496	250	200	150	121
	200	PHT200-200	2000	875	6282	2748	396	596	250	200	150	132
	300	PHT200-300	2000	875	9423	4122	496	796	250	200	150	155
300	100	PHT300-100	3193	1537	4906	2363	327	427	315	250	180	180
	200	PHT300-200	3193	1537	9812	4726	427	627	315	250	180	220
	300	PHT300-300	3193	1537	14718	7089	527	827	315	250	180	260
400	100	PHT400-100	3919	1317	5723	1924	355	455	355	270	220	255
	200	PHT400-200	3919	1317	11446	3848	455	655	355	270	220	310
	300	PHT400-300	3919	1317	17169	5772	555	855	355	270	220	375
500	100	PHT500-100	5000	1948	8038	3133	375	475	395	320	250	326
	200	PHT500-200	5000	1948	16076	6266	475	675	395	320	250	394
	300	PHT500-300	5000	1948	24114	9399	575	875	395	320	250	462
600	100	PHT600-100	6300	2488	10174	4019	436	536	450	360	280	542
	200	PHT600-200	6300	2488	20348	8038	536	736	450	360	280	634
	300	PHTT600-300	6300	2488	30522	12057	636	936	450	360	280	726
800	100	PHT800-100	8000	2880	12566	4522	477	577	550	400	320	796
	200	PHT800-200	8000	2880	25132	9044	577	777	550	400	320	944
	300	PHT800-300	8000	2880	37698	13566	677	977	550	400	320	1092



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