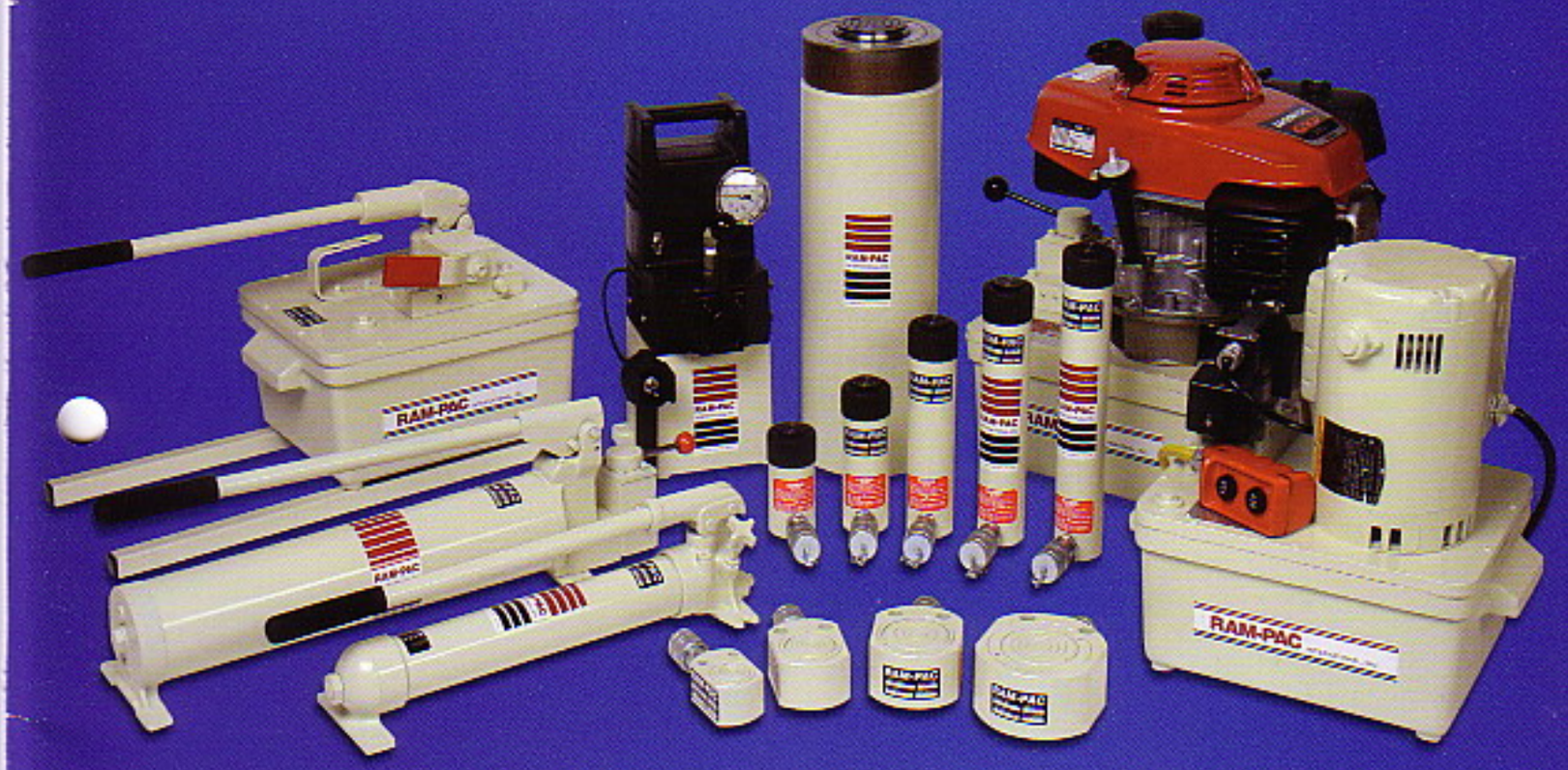
RAM-PAC

HYDRAULIC TOOLS



HIGH FORCE HYDRAULIC TOOLS

FOR CONSTRUCTION AND INDUSTRIAL APPLICATIONS

www.ram-pac.com

RAM-PAC INTERNATIONAL, INC., Subsidiary of HADER INDUSTRIES, INC.

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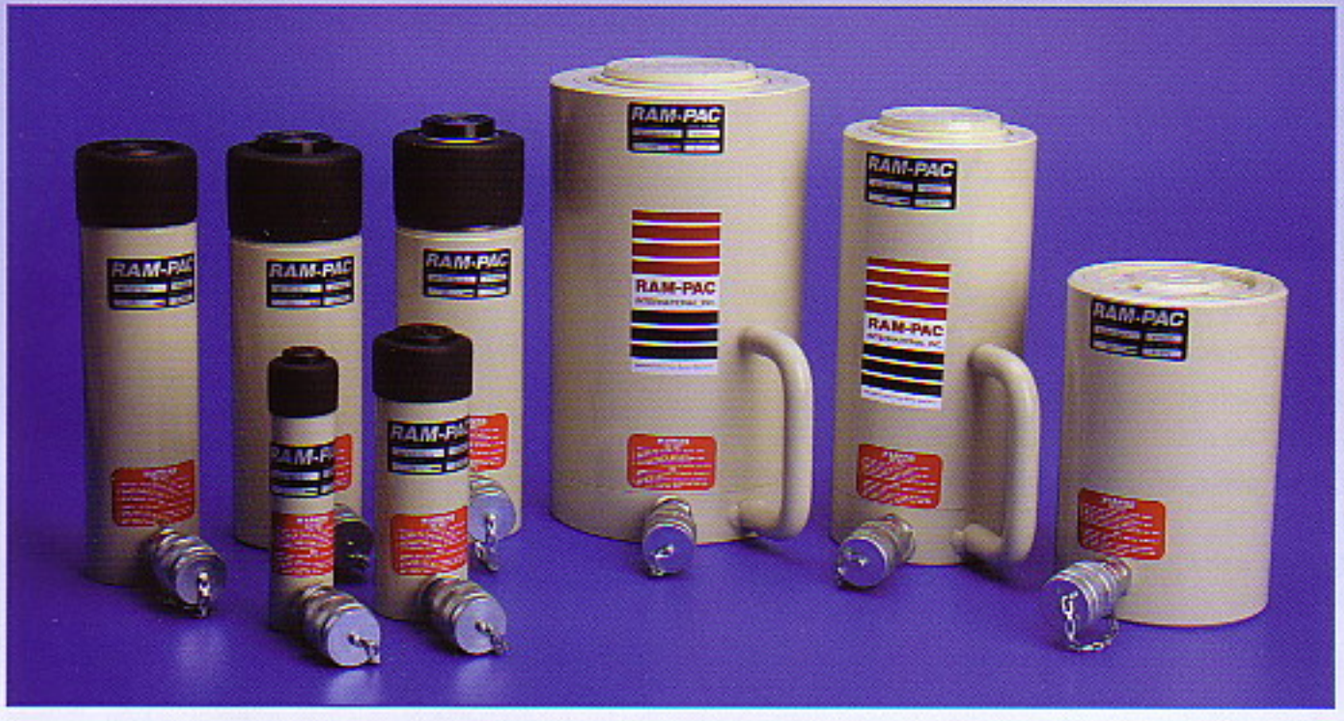
PRODUCT DESIGN AND SPECIFICATIONS

All product dimensions and specifications are catalogued with the intent to provide complete and accurate information for general fixturing requirements and convenient product selection. Product design and specifications changes may occur after printing due to normal product improvements. RAM-PAC International Inc. reserves the right to make changes and improvements without prior notice. Please consult factory if specific dimensions must be met.

RAM-PAC® CYLINDERS

The difference is the STANDARD FEATURES

- High-strength steel construction
- Stop rings to prevent plunger over travel
- Solid bronze gland nuts for smoother operation
- High cycle life Buna-N seals
- High flow couplers
- Collar threads are designed to carry full load
- Burnish rolled cylinder bores
- Precision ground, chrome-plated plungers
- Solid bronze wear rings increase product life
- Heavy-duty return springs provide consistent performance



SINGLE-ACTING CYLINDERS

Tough and reliable for hundreds of applications

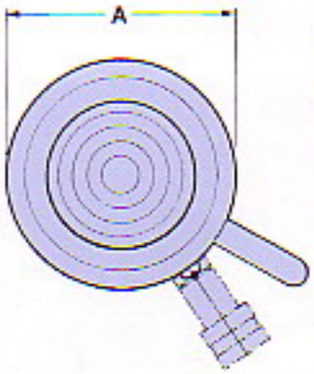
FEATURES

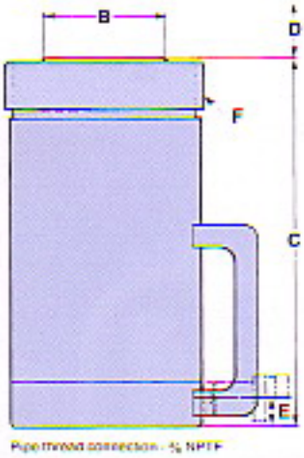
- Solid bronze glands and wear rings for long life
- Grooved pattern on plunger head provides better gripping of load
- Spring return design for faster retraction
- Collar threads, plunger threads and base mounting holes standard on most sizes
- Chrome plated piston rods resist corrosion and wear
- Plunger wiper resists contamination and extends life
- Quick connect coupling for fast setup
- Attachments increase flexibility of 10-ton and 20-ton automotive style cylinders (see pages 7,47 and 48)
- Larger models feature handles for easier carrying and positioning
- Comply with ANSI B30.1

TYPICAL APPLICATIONS

- Highway bridge repair
- Die separation
- Hose crimping
- House moving
- Pressing bearings
- Spread reinforcing bars

SINGLE-ACTING CYLINDERS





Pipe thread connection - ¼ NPTF

How to understand cylinder & integral unit model numbers

RC - 10 - SA - 6

- RC — Cylinder with half coupling
- 10 — Load Rating (tons)
- SA — Single-Acting
- 6 — Nominal Stroke (inches)

SPECIFICATIONS

Cyl. Cap. (tons)	Stroke (in) "D"	Model Number	Closed Height "C"	Ext. Height (in)	Eff. Area (in²)	Oil Capacity (in³)	Outside Dia. "A"	Rod Dia. "B"	Bottom to Port Dim. "E"	Plunger Thread	Collar Thread "F"	Mounting Holes "G"	Wt. (lb)
5	3 1/4	RC-5-SA-3	6 1/2	9 3/4	0.99	3.2	1 1/2	1	3/4	3/4 -16 x 1/2	1 1/2-16 x 1 1/8	(2) 1/4 -20 x 1/2" Dp, 1" Dia. B.C.	3
5	5 1/4	RC-5-SA-5	8 1/2	13 3/4	0.99	5.2	1 1/2	1	3/4	3/4 -16 x 1/2	1 1/2-16 x 1 1/8	(2) 1/4 -20 x 1/2" Dp, 1" Dia. B.C.	4
5	7 1/4	RC-5-SA-7	10 1/2	17 3/4	0.99	7.2	1 1/2	1	3/4	3/4 -16 x 1/2	1 1/2-16 x 1 1/8	(2) 1/4 -20 x 1/2" Dp, 1" Dia. B.C.	6
5	9 1/4	RC-5-SA-9	12 1/2	21 3/4	0.99	9.2	1 1/2	1	3/4	3/4 -16 x 1/2	1 1/2-16 x 1 1/8	(2) 1/4 -20 x 1/2" Dp, 1" Dia. B.C.	7
10	2 1/8	RC-10-SA-2	4 25/32	6 29/32	2.24	4.8	2 1/4	1 5/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 1 5/16" Dia. B.C.	7
10	4 1/8	RC-10-SA-4	6 3/4	10 7/8	2.24	9.2	2 1/4	1 5/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 1 5/16" Dia. B.C.	9
10	6 1/8	RC-10-SA-6	9 3/4	15 7/8	2.24	13.7	2 1/4	1 5/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 1 5/16" Dia. B.C.	11
10	8 1/8	RC-10-SA-8	11 3/4	19 7/8	2.24	18.2	2 1/4	1 5/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 1 5/16" Dia. B.C.	12
10	10 1/8	RC-10-SA-10	13 3/4	23 7/8	2.24	22.6	2 1/4	1 5/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 1 5/16" Dia. B.C.	15
10	12 1/8	RC-10-SA-12	15 3/4	27 7/8	2.07	25.1	2 1/4	1 5/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 1 5/16" Dia. B.C.	18
10	14 1/8	RC-10-SA-14	17 3/4	31 7/8	2.07	29.3	2 1/4	1 5/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 1 5/16" Dia. B.C.	22
10	16 1/8	RC-10-SA-16	19 3/4	35 7/8	2.07	33.4	2 1/4	1 5/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 1 5/16" Dia. B.C.	25
15	2 1/8	RC-15-SA-2	5 7/8	8	3.14	6.7	2 3/4	1 3/4	3/4	1-8 x 1	2 3/4-16 x 1 5/8	(2) 3/8-16 x 9/16" Dp, 1 7/8" Dia. B.C.	10
15	4 1/8	RC-15-SA-4	7 7/8	12	3.14	13.0	2 3/4	1 3/4	3/4	1-8 x 1	2 3/4-16 x 1 5/8	(2) 3/8-16 x 9/16" Dp, 1 7/8" Dia. B.C.	12
15	6 1/8	RC-15-SA-6	10 3/4	16 7/8	3.14	19.2	2 3/4	1 3/4	1	1-8 x 1	2 3/4-16 x 1 5/8	(2) 3/8-16 x 9/16" Dp, 1 7/8" Dia. B.C.	15
15	8 1/8	RC-15-SA-8	12 3/4	20 7/8	3.14	25.5	2 3/4	1 3/4	1	1-8 x 1	2 3/4-16 x 1 5/8	(2) 3/8-16 x 9/16" Dp, 1 7/8" Dia. B.C.	17
15	10 1/8	RC-15-SA-10	14 3/4	24 7/8	3.14	31.8	2 3/4	1 3/4	1	1-8 x 1	2 3/4-16 x 1 5/8	(2) 3/8-16 x 9/16" Dp, 1 7/8" Dia. B.C.	19
15	12 1/8	RC-15-SA-12	17 1/2	29 5/8	3.14	38.1	2 3/4	1 3/4	1	1-8 x 1	2 3/4-16 x 1 5/8	(2) 3/8-16 x 9/16" Dp, 1 7/8" Dia. B.C.	21
15	14 1/8	RC-15-SA-14	19 1/2	33 5/8	3.14	44.4	2 3/4	1 3/4	1	1-8 x 1	2 3/4-16 x 1 5/8	(2) 3/8-16 x 9/16" Dp, 1 7/8" Dia. B.C.	23
15	16 1/8	RC-15-SA-16	21 1/2	37 5/8	3.14	50.6	2 3/4	1 3/4	1	1-8 x 1	2 3/4-16 x 1 5/8	(2) 3/8-16 x 9/16" Dp, 1 7/8" Dia. B.C.	25
20	6 5/8	RC-20-SA-6.5	10 7/8	17 1/2	4.43	29.3	3 3/8	2 5/16	1 5/8	1 1/2-16 x 9/16	3 5/16-12 x 2	(2) 1/2-13, 2 5/16 Dia.B.C.	25
25	2 1/4	RC-25-SA-2	6 3/4	9	4.90	11.0	3 3/8	2 1/4	1	1 1/2-16 x 9/16	3 5/16-12 x 2	(2) 1/2-13, 2 5/16 Dia.B.C.	14
25	4 1/4	RC-25-SA-4	8 3/4	13	4.90	20.8	3 3/8	2 1/4	1	1 1/2-16 x 9/16	3 5/16-12 x 2	(2) 1/2-13, 2 5/16 Dia.B.C.	18
25	6 1/4	RC-25-SA-6	10 3/4	17	4.90	30.6	3 3/8	2 1/4	1	1 1/2-16 x 9/16	3 5/16-12 x 2	(2) 1/2-13, 2 5/16 Dia.B.C.	24
25	8 1/4	RC-25-SA-8	12 3/4	21	4.90	40.4	3 3/8	2 1/4	1	1 1/2-16 x 9/16	3 5/16-12 x 2	(2) 1/2-13, 2 5/16 Dia.B.C.	26
25	10 1/4	RC-25-SA-10	14 3/4	25	4.90	50.2	3 3/8	2 1/4	1	1 1/2-16 x 9/16	3 5/16-12 x 2	(2) 1/2-13, 2 5/16 Dia.B.C.	31
25	12 1/4	RC-25-SA-12	16 3/4	29	4.90	60.0	3 3/8	2 1/4	1	1 1/2-16 x 9/16	3 5/16-12 x 2	(2) 1/2-13, 2 5/16 Dia.B.C.	36
25	14 1/4	RC-25-SA-14	18 3/4	33	4.90	69.8	3 3/8	2 1/4	1	1 1/2-16 x 9/16	3 5/16-12 x 2	(2) 1/2-13, 2 5/16 Dia.B.C.	40
30	6	RC-30-SA-6	10 1/4	16 1/4	6.49	38.9	4	2 5/8	1	–	–	–	31
30	6	RC-30-SA-6T	10 1/4	16 1/4	6.49	38.9	4	2 5/8	1	–	4-12 x 2 5/16	–	31
30	8	RC-30-SA-8	12	20	6.49	51.9	4	2 5/8	1	–	4-12 x 2 5/16	(2) 1/2-13, 2 5/16 Dia.B.C.	40
30	14	RC-30-SA-14	19	33	6.49	90.9	4	2 5/8	1	–	4-12 x 2 5/16	(2) 1/2-13, 2 5/16 Dia.B.C.	57
50	6 1/8	RC-50-SA-6	11 1/4	17 3/8	11.05	67.7	5	3 1/2	3/4	–	–	–	54
50	6 1/8	RC-50-SA-6T	11 1/4	17 3/8	11.05	67.7	5	3 1/2	3/4	–	5-12 x 2 11/16	–	54
50	8 1/8	RC-50-SA-8	13 1/4	21 3/8	11.05	89.7	5	3 1/2	7/8	–	5-12 x 2 11/16	–	62
50	14	RC-50-SA-14	19 3/8	33 3/8	11.05	154.6	5	3 1/2	7/8	–	5-12 x 2 11/16	–	97
60	3	RC-60-SA-3	8	11	12.56	37.7	5 1/4	3 11/16	1 1/4	–	–	(2) 3/8-16, 4 Dia. B.C.	45
60	6	RC-60-SA-6	11	17	12.56	75.4	5 1/4	3 11/16	1 1/4	–	–	–	57
75	5 1/2	RC-75-SA-5.5	11 1/2	17	15.04	82.7	6	3 7/8	7/8	–	–	–	82
100	6	RC-100-SA-6	12 1/4	18 1/4	20.64	123.8	7	4 11/16	7/8	–	–	–	108
100	10	RC-100-SA-10	16 1/4	26 1/4	20.64	206.4	7	4 11/16	7/8	–	–	–	135

** **NOTE:** Cylinders with "T" suffix have male collar threads on rod end of body*

SINGLE-ACTING "COMPACT" CYLINDERS

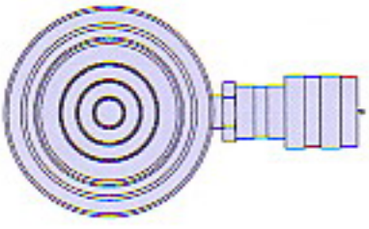
Compact cylinders with the power to get the job done

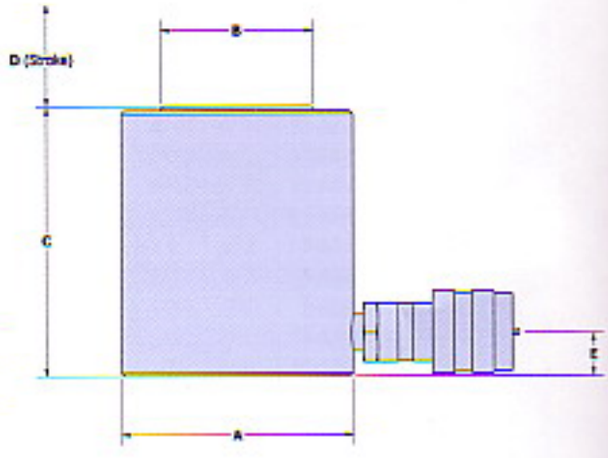
FEATURES

- Compact design fits in tight spots
- Chrome plate plungers resist corrosion and wear
- Spring return design for faster retraction
- Plunger wiper resists contamination and extends life
- Grooved plunger ends provide better gripping of load
- Quick-connect coupling for fast setups
- 100-ton cylinder comes with handle for easier carrying and positioning
- Comply with ANSI B30.1

TYPICAL APPLICATIONS

- Bridge maintenance
- Machine and equipment moving or leveling
- General construction





SPECIFICATIONS

Cyl. Cap. (tons)	Stroke (in) "D"	Model Number	Closed Height "C"	Extended Height (in)	Effective Area (in^2)	Oil Required (in^3)	Outside Dia. "A"	Rod Dia. "B"	Bottom to Port Dim. "E"	Plunger Thread	Collar Thread	Mounting Holes	Wt. (lb)
10	1 1/2	RC-10-SA-1.5	3 15/32	4 31/32	2.24	3.4	2 3/4	1 5/16	3/4	N/A	N/A	N/A	6
20	1 3/4	RC-20-SA-2	3 7/8	5 5/8	4.43	7.8	3 5/8	2	3/4	N/A	N/A	N/A	12
30	2 7/16	RC-30-SA-2-1	4 5/8	7 1/16	6.49	15.8	4	2 5/8	3/4	N/A	N/A	N/A	16
50	2 1/8	RC-50-SA-2	4 27/32	6 31/32	11.05	23.5	5	3 1/2	5/4	N/A	N/A	N/A	26
100	2	RC-100-SA-2	5 3/4	7 3/4	20.64	41.3	7	4 11/16	1	N/A	N/A	N/A	54

RAM-PAC HYDRAULIC TOOLS

LOW PROFILE SINGLE-ACTING CYLINDERS

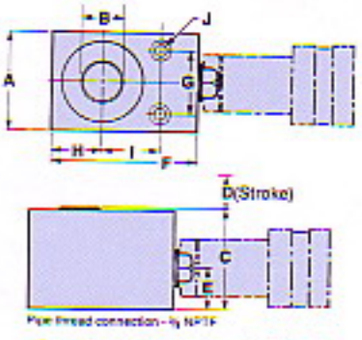
Solid performance in tight work spaces

FEATURES

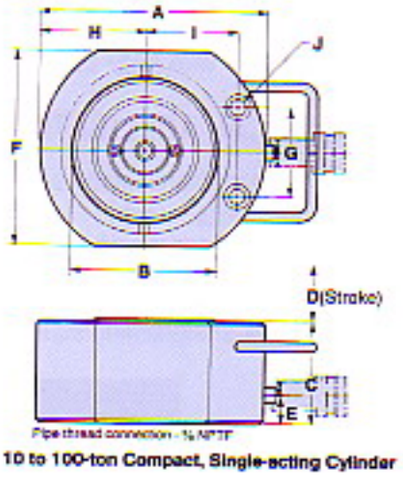
- Spring return design for fast retraction
- Solid, high-strength steel bar stock construction
- Solid bronze gland nuts reduce plunger scoring
- Mounting holes for easy attachment
- Hard Chrome plated plungers resist corrosion and wear
- Plunger wiper resists contamination and extends life. Not available in 5 ton units
- Grooved plunger help prevent load from slipping
- 100-ton model comes with carrying handle
- Quick-connect coupling for fast setup
- Comply with ANSI B30.1

TYPICAL APPLICATIONS

- Align metal plates for welding
- Equipment maintenance
- Level machinery
- General manufacturing and assembly
- Bridge maintenance



5-ton Compact, Single-acting Cylinder



10 to 100-ton Compact, Single-acting Cylinder

SPECIFICATIONS

Cy. Cap. (tons)	Stroke (in) "D"	Model Number	Closed Height "C"	Extended Height (in)	Effective Area (in^2)	Oil Cap. (in^3)	Outside Dia. "A"	Rod Dia. "B"	Dim. "E"	Dim. "F"	Dim. "G"	Dim. "H"	Dim. "I"	Mounting Holes "J"	Wt. (lb)
5	1/4	RC-5-LP-.25	1 13/32	1 21/32	0.995	0.25	1 3/4	11/16	3/4	2 5/16	1 1/8	7/8	1	3/8 x 1/4 Dp, .221 thru	2
5	1/2	RC-5-LP-.5	1 25/32	2 13/32	0.995	0.6	1 3/4	11/16	3/4	2 5/16	1 1/8	7/8	1	3/8 x 1/4 Dp, .221 thru	2
10	7/16	RC-10-LP-.5	1 11/16	2 1/8	2.074	0.9	3 1/4	1 7/16	3/4	2 3/16	1 7/16	1 1/8	1 5/16	27/64 x 5/16 Dp, 9/32 thru	3
20	29/64	RC-20-LP-.5	2 1/32	2 31/64	4.43	2.0	4	2	3/4	3	1 15/16	1 9/16	1 9/16	19/32 x 25/64 Dp, 25/64 thru	6
30	1/2	RC-30-LP-.5	2 5/16	2 13/16	6.492	3.2	4 1/2	2 5/8	3/4	3 3/4	2 1/16	1 7/8	1 3/4	35/64 x 7/16 Dp, 13/32 thru	9
50	5/8	RC-50-LP-.5	2 5/8	3 1/4	11.045	6.9	5 1/2	3 1/2	3/4	5	2 5/8	2 1/2	2 7/32	45/64 x 1/2 Dp, 15/32 thru	16
100	5/8	RC-100-LP-.5	3 3/8	4	20.637	12.9	7 3/8	4 5/8	3/4	7	3	3 3/8	3 3/32	13/16 x 39/64 Dp, 17/32 thru	40

SINGLE-ACTING "AUTOMOTIVE" CYLINDERS

Threaded rod end and base allow for easy attachment of cylinder accessories

FEATURES

- Spring return design for faster retraction
- Solid bronze glands and wear rings for long life
- Male NPT threads on rod end and female NPT in base
- Chrome plated piston rods resist corrosion and wear
- Plunger wiper resists contamination and extends life
- Quick-connect coupling for fast setup
- Attachments increase flexibility of 10-ton and 20-ton cylinders (see pages 7,47, and 48)
- Grooved caps available to protect plunger threads on all sizes
- Comply with ANSI B30.1

TYPICAL APPLICATIONS

- Used in maintenance sets for easy attachment of accessories
- Used in automotive and truck frame straightening equipment

RAM-PAC HYDRAULIC TOOLS

Threaded end automotive cylinders

- Typical attachment setups. Accessories shown on page 48.

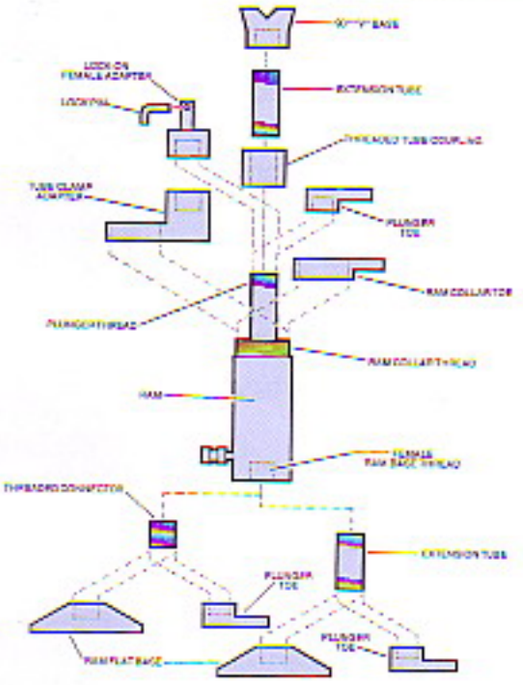
How to understand cylinder & integral unit model numbers

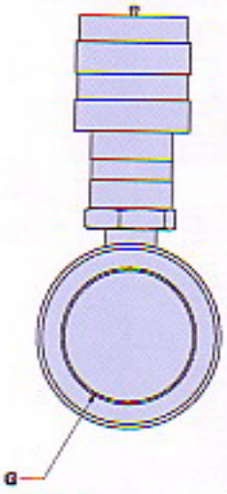
RC - 4 - SA -5A

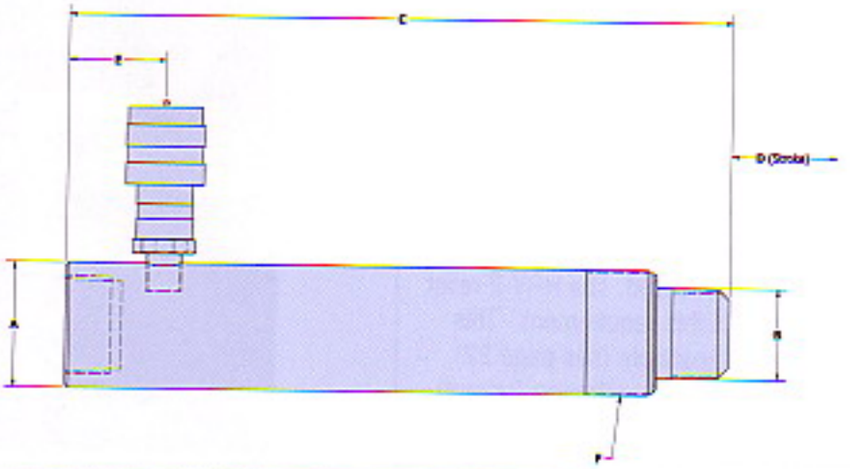
- RC: Cylinder with half Coupling
- 4: Load Rating (tons)
- SA: Single-acting
- 5A: Nominal Stroke (inches)

CAUTION SHOULD BE EXERCISED WHEN ASSEMBLING ATTACHMENT SET-UPS.

1. The use of attachments and/or accessories reduces ram lifting capacity by one-half.
2. All attachments are rated at 50% of ram capacity unless otherwise noted.
3. Off-center loads reduce set-up capacity by an additional 50%.
4. To prevent buckling or sliding out from under the load, only one extention tube per setup is recommended.
5. All attachments must be assembled to the ram or to each other with full thread engagement.







SPECIFICATIONS

Cyl. Cap. (tons)	Stroke (in) "D"	Model Number	Closed Height "C"	Extended Height (in)	Effective Area (in²)	Oil Required (in³)	Outside Dia. "A"	Rod Dia. "B"	Bottom to Port Dim. "E"	Rod End Thread (Male)	Collar Thread "F"	Base Thread (Female) "G"	Wt. (lb)
5	5 1/4	RC-4-SA-5A	9 1/2	14 3/4	0.99	5.2	1 5/8	1	1 3/4	3/4-14 NPT	1 5/8-16 x 1 1/8	3/4-14 NPT	5
10	6 1/8	RC-10-SA-6A	11 5/8	17 7/8	2.24	13.7	2 1/4	1 9/16	1 3/4	1 1/4-11 1/2 NPT	2 1/4-14 x 1 1/8	1 1/4-11 1/2 NPT	12
10	10 1/8	RC-10-SA-10A	15 3/4	25 7/8	2.24	22.6	2 1/4	1 9/16	1 3/4	1 1/4-11 1/2 NPT	2 1/4-14 x 1 1/8	1 1/4-11 1/2 NPT	16
20	5	RC-20-SA-6A	11 1/2	16 1/2	4.45	22.3	3 3/8	2 1/8	1 11/16	2-11 1/2 NPT	3 5/16-12 x 2 1/8	2-11 1/2 NPT	23
20	13	RC-20-SA-13A	19 1/2	32 1/2	4.45	57.9	3 3/8	2 1/8	1 11/16	2-11 1/2 NPT	3 5/16-12 x 2 1/8	2-11 1/2 NPT	42
25	6 1/4	RC-25-SA-6A	12 1/2	18 3/4	4.90	30.6	3 3/8	2 1/4	2	2-11 1/2 NPT	3 5/16-12 x 2 1/8	2-11 1/2 NPT	24
25	10 1/4	RC-25-SA-10A	16 5/16	25 5/16	4.90	50.2	3 3/8	2 1/4	1 7/8	2-11 1/2 NPT	3 5/16-12 x 2 1/8	2-11 1/2 NPT	32
25	14 1/4	RC-25-SA-14A	20 5/16	34 5/16	4.90	69.8	3 3/8	2 1/4	1 7/8	2-11 1/2 NPT	3 5/16-12 x 2 1/8	2-11 1/2 NPT	43

DOUBLE-ACTING CYLINDER

Proven performance for demanding applications

FEATURES

- Retract under hydraulic power for faster operation
- Removable plunger caps
- Solid bronze glands and wear rings
- Chrome plated piston rods resist corrosion and wear
- Plunger wiper resists contamination and extends life
- Wiper ring extends life by reducing contamination
- Quick-connect couplings for fast setup
- Collar threads, plunger threads and base mounting holes for easy fixturing
- To prevent over pressurization, 100-ton models have overload relief valve on retract side
- Comply with ANSI B30.1

TYPICAL APPLICATIONS

- Presses and production fixture operation
- Construction
- Testing

Per ANSI B30.1, every double-acting cylinder shall be fitted with a relief valve on the retract circuit. This will ensure that the retract circuit cannot be over pressurized. The HRV-2 relief valve meets this requirement. This item sold separately (see page 22). Install it directly into the top (retract) port of the cylinder.

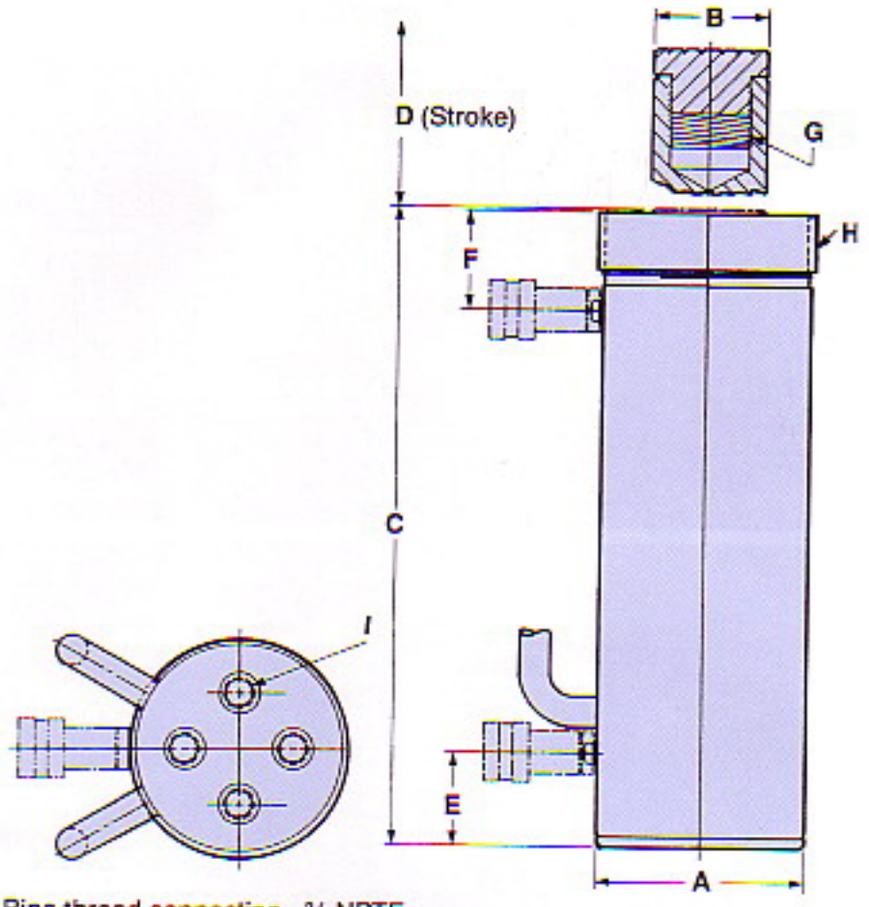
RAM-PAC HYDRAULIC TOOLS

DOUBLE-ACTING CYLINDER

How to understand cylinder & integral unit model numbers

RC - 10 - DA - 6

- **RC** — Cylinder with half Coupling
- **10** — Load Rating (tons)
- **DA** — Double-Acting (plunger can push and pull)
- **6** — Nominal Stroke (inches)



Pipe thread connection - ⅜ NPTF
(Orientation of ports to mounting holes varies)

SPECIFICATIONS

Cyl. Cap. Push/Pull (tons)	Stroke (in) "D"	Model Number	Closed Height "C"	Extended Height (in)	Effective Area Push/Pull (in²)	Oil Reqd. (in³)	Outside Dia. "A"	Rod Dia. "B"	Bottom to Port Dim. "E"	Top to Port Dim. "F"	Plunger Thread "G"	Collar Thread "H"	Mounting Holes "I"	Wt. (lb)
10 / 5	6	RC-10-DA-6	11 3/4	17 3/4	2.07 / 1.08	6.0	2 5/8	1 1/8	1 7/8	2	3/4-16 x 7/8	2 1/4 -14 x 1	(4) 5/16-18 x 11/16 on 1 1/8" Dia. B.C.	20
10 / 5	11 1/2	RC-10-DA-11.5	17 1/4	28 3/4	2.07 / 1.08	11.4	2 5/8	1 1/8	1 7/8	2	3/4-16 x 7/8	2 1/4 -14 x 1	(4) 5/16-18 x 11/16 on 1 1/8" Dia. B.C.	24
20 / 10	9 3/4	RC-20-DA-10	15 1/4	25	4.43 / 2.35	20.2	3 3/8	1 5/16	1 7/8	2 1/8	1-14 x 1 1/4	3 5/16 -12 x 1 3/32	(4) 1/2-13 x 5/8 on 1 3/4" Dia. B.C.	34
20 / 10	16 1/8	RC-20-DA-16	21 5/8	37 3/4	4.43 / 2.35	33.4	3 3/8	1 5/16	1 7/8	2 1/8	1-14 x 1 1/4	3 5/16 -12 x 1 3/32	(4) 1/2-13 x 5/8 on 1 3/4" Dia. B.C.	46
30 / 15	9	RC-30-DA-9	14 15/16	23 15/16	6.49 / 3.35	28.3	4	2	2	2 3/16	1 1/4-12 x 1 1/2	4-12 x 1 1/4	(4) 3/4-10 x 5/8 on 1 7/8" Dia. B.C.	47
30 / 15	16	RC-30-DA-16	22 1/8	38 1/8	6.49 / 3.35	50.2	4	2	2	2 3/16	1 1/4-12 x 1 1/2	4-12 x 1 1/4	(4) 3/4-10 x 5/8 on 1 7/8" Dia. B.C.	66
50 / 25	5 1/4	RC-50-DA-5	11 15/16	17 3/16	11.04 / 5.10	31.2	5	2 3/4	2 1/4	2 3/8	2-16 x 1 3/4	5-12 x 1 1/2	(4) 3/4-10 x 1 on 2 5/8" Dia. B.C.	61
50 / 25	13 1/4	RC-50-DA-13	19 15/16	33 3/16	11.04 / 5.10	78.7	5	2 3/4	2 1/4	2 3/8	2-16 x 1 3/4	5-12 x 1 1/2	(4) 3/4-10 x 1 on 2 5/8" Dia. B.C.	98
100 / 30	6 5/8	RC-100-DA-6.5	13 3/4	20 3/8	20.63 / 10.31	68.4	7	3 5/8	2 9/32	3 5/32	2 5/8-12 x 2	6 7/8-12 x 2	(4) 1-8 x 1 on 3 1/2" Dia. B.C.	130
100 / 30	13 1/8	RC-100-DA-13	20 1/4	33 3/8	20.63 / 10.31	135.5	7	3 5/8	2 9/32	3 5/32	2 5/8-12 x 2	6 7/8-12 x 2	(4) 1-8 x 1 on 3 1/2" Dia. B.C.	182

CENTER-HOLE CYLINDERS

Designed for use with screws, rods, cables and pullers

FEATURES

- Spring return and hydraulic return models
- Solid bronze gland nuts reduce wear in single-acting models
- Center-hole design allows for both push and pull forces
- Chrome plated plunger resists corrosion and wear
- Plunger wiper resists contamination and extends life
- Plain, threaded and grooved saddles available*
- Quick-connect couplings for fast setup
- Comply with ANSI B30.1

**Threaded saddles not available on 100-ton models.*

TYPICAL APPLICATIONS

- Equipment maintenance
- Hose crimping
- Hub, gear and pin removal

CHOICE OF SADDLES

RAM-PAC® center-hole cylinders are equipped with a plain saddle. Threaded and grooved saddles are optional and must be ordered separately.

The plain or smooth saddle permits the insertion of a threaded rod and requires a nut on the threaded shaft to hold the rod in position.

The threaded saddle has internal threads, which mate with a threaded rod.

The grooved saddle converts the center-hole cylinder into a standard unit for conventional jobs, and is designed to prevent slippage at the point of contact.


Plain or Smooth Saddle


Threaded Saddle


Grooved Saddle

OPTIONAL SADDLE ORDERING INFORMATION

For Cylinder Model Number	Type of Saddle	Thread Size	Saddle Model Number
RC-10-CH-2.5	Threaded	¾ -16 UNF-2B	HA-93
	Grooved	N/A	HA-94
RC-20-CH-3	Threaded	1-8 UNC-2B	HA-95
	Grooved	N/A	HA-96
RC-30-CH-2.5	Threaded	1¼ -7 UNC-2B	HA-97
	Grooved	N/A	HA-98
RC-30-CH-3-DA	Threaded	1 ¼-7 UNC-2B	HA-97
	Grooved	N/A	HA-98
RC-60-CH-3	Threaded	1 ⅝-5 ½ UNC-2B	HA-99
	Grooved	N/A	HA-100
RC-60-CH-5-DA	Threaded	1 ⅝-5 ½ UNC-2B	HA-99
	Grooved	N/A	HA-100
RC-100-CH-3-DA	Threaded	N/A	N/A
	Grooved	N/A	HA-101

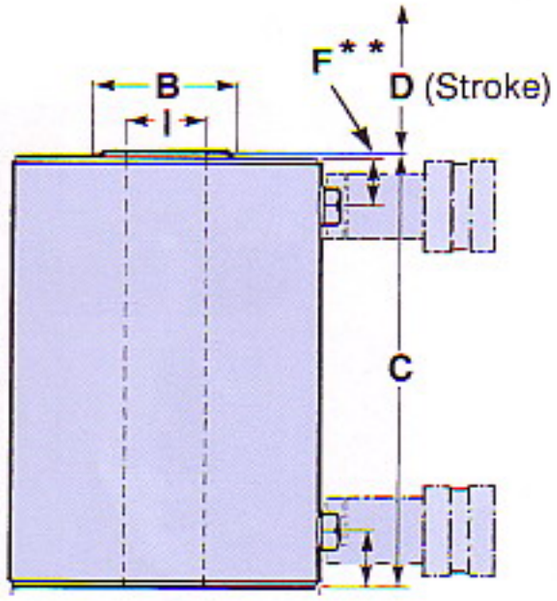
RAM-PAC HYDRAULIC TOOLS

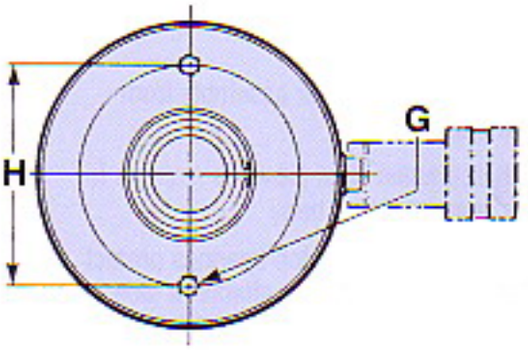
CENTER-HOLE CYLINDERS

How to understand cylinder & integral unit model numbers

RC - 10 - CH - 2.5 DA*

- RC: Cylinder with half Coupling
- 10: Load Rating (tons)
- CH: CH-Center Hole
- 2.5: Nominal Stroke (inches)
- * DA Double Acting





Single-Acting (Spring Return) SPECIFICATIONS

Cylinder Capacity (tons)	Stroke (in) "D"	Model Number	Closed Height "C"	Extended Height (in)	Effective Area Push (in²)	Oil Reqd. (in³)	Outside Dia. "A"	Rod Dia. "B"	Bottom to Port Dim. "E"	Top to Port Dim. "F"**	Mounting Holes "G"	Bolt Circle Dim. "H"	Center Hole Dia. "I"	Wt. (lb)
10	2 1/2	RC-10-CH-2.5	5 5/8	8 1/8	2.22	5.55	3	2 1/16	1 3/32	NA	(2) 1/4-20 x 7/16 Dp.	2 3/8 Dia. B.C.	3/4	10.0
20	3	RC-20-CH-3	6 1/4	9 1/4	3.93	11.79	4	2 3/4	1	NA	(2) 3/8-16 x 7/16 Dp.	3 1/4 Dia. B.C.	1 1/32	19.0
30	2 1/2	RC-30-CH-2.5	7 1/16	9 9/16	7.23	18.06	5	2 3/8	15/16	NA	(2) 3/8-16 x 1/2 Dp.	3 5/8 Dia. B.C.	1 5/16	30.0
30	6	RC-30-CH-6	10 9/16	16 9/16	7.23	43.38	5	2 3/8	15/16	NA	(2) 3/8-16 x 1/2 Dp.	3 5/8 Dia. B.C.	1 5/16	44.0
60	3	RC-60-CH-3	9 11/16	12 11/16	12.73	38.19	6 1/2	3 5/8	1	NA	(2) 1/2-13 x 1/2 Dp.	5 1/8 Dia. B.C.	2 5/32	69.0
60	6	RC-60-CH-6	12 11/16	16 11/16	12.73	76.38	6 1/2	3 5/8	1	NA	(2) 1/2-13 x 1/2 Dp.	5 1/8 Dia. B.C.	2 5/32	82.0

Double-Acting (Hydraulic Return) SPECIFICATIONS

Cylinder Capacity Push/Pull (tons)	Stroke (in) "D"	Model Number	Closed Height "C"	Extended Height (in)	Effective Area Push/Pull (in²)	Oil Cap. (in³)	Outside Dia. "A"	Rod Dia. "B"	Bottom to Port Dim. "E"	Top to Port Dim. "F"**	Mounting Holes "G"	Bolt Circle Dim. "H"	Center Hole Dia. "I"	Wt. (lb)
30/18.4	3	RC-30-CH-3-DA	7 1/16	10 1/16	7.23/3.68	10.70	5 1/4	2 3/4	15/16	1 3/4	(4) 3/4-10 x 1/2 Dp.	3 15/64 Dia. B.C.	1 5/16	38.0
30/18.4	5	RC-30-CH-5-DA	9 1/16	14 1/16	7.23/3.68	17.83	5 1/4	2 3/4	15/16	1 3/4	(4) 3/4-10 x 1/2 Dp.	3 15/64 Dia. B.C.	1 5/16	60.0
30/18.4	10	RC-30-CH-10-DA	14 1/16	24 1/16	7.23/3.68	35.67	5 1/4	2 3/4	15/16	1 3/4	(4) 3/4-10 x 1/2 Dp.	3 15/64 Dia. B.C.	1 5/16	105.0
60/34.3	5	RC-60-CH-5-DA	9 1/2	14 1/2	12.73/6.34	29.30	6 1/2	3 7/8	1	1 3/4	(4) 3/4-10 x 1/2 Dp.	5 1/8 Dia. B.C.	2 5/32	71.0
100/51.3	3	RC-100-CH-3-DA	8	11	20.13/10.27	29.60	8 1/2	5 1/4	5/8	2	(4) 1-8 x 5/8 Dp.	6 13/16 Dia. B.C.	2 13/16	102.0

** Hydraulic return models only.

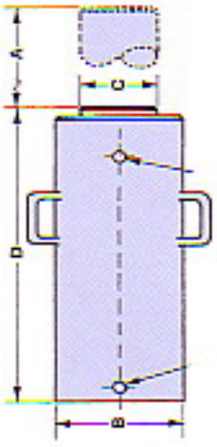
HEAVY DUTY DOUBLE-ACTING CYLINDERS

Designed to handle loads up to 1000 tons with greater reliability

HIGH TONAGE LOCKNUT AND DOUBLE ACTING CYLINDERS MANUFACTURED TO YOUR SPECIFICATIONS. CONSULT FACTORY

FEATURES

- Steel top nut with solid bronze bearing guards against wear
- Wiper ring protects inner assembly from contamination
- Alloy heat-treated steel provides strength for high tonnage cylinder body
- Double solid bronze piston bearings protect against scoring due to the effects of side load
- Chrome plated alloy steel plungers
- Quick-connect couplings for fast setup
- Plunger threads, collar threads and base mounting holes available upon request



SPECIFICATIONS

Model Number	Rated Capacity (Tons)	Pressure @ Capacity (lbs/in²)	Effective Cylinder Area (in²)	A Stroke (in)	B Outside Diameter (in)	C Rod Diameter (in)	D Closed Height (in)	Net Oil Volume (in³)	Estimated Weight (lbs)
RC-150-DA-6	150	9780	30.68	6	8	4 1/2	15 7/8	95	132
RC-150-DA-12	150	9780	30.68	12	8	4 1/2	21 7/8	190	251
RC-150-DA-24	150	9780	30.68	24	8	4 1/2	33 7/8	351	388
RC-150-DA-36	150	9780	30.68	36	8	4 1/2	45 7/8	572	525
RC-250-DA-6	250	9950	50.26	6	10	5	17 7/8	117	317
RC-250-DA-12	250	9950	50.26	12	10	5	23 7/8	235	424
RC-250-DA-24	250	9950	50.26	24	10	5	35 7/8	469	637
RC-250-DA-36	250	9950	50.26	36	10	5	47 7/8	704	851
RC-300-DA-6	300	8460	70.88	6	12	6 1/2	17 1/2	200	544
RC-300-DA-12	300	8460	70.88	12	12	6 1/2	24 1/2	398	768
RC-300-DA-24	300	8460	70.88	24	12	6 1/2	36 1/2	797	1152
RC-300-DA-36	300	8460	70.88	36	12	6 1/2	48 1/2	1195	1376
RC-500-DA-6	500	9630	103.87	6	14 1/2	7 1/2	20 7/8	256	777
RC-500-DA-12	500	9630	103.87	12	14 1/2	7 1/2	26 7/8	530	962
RC-500-DA-24	500	9630	103.87	24	14 1/2	7 1/2	38 7/8	1061	1406
RC-500-DA-36	500	9630	103.87	36	14 1/2	7 1/2	50 7/8	1592	1850
RC-1000-DA-6	1000	9950	201	6	20	12	32	528	2140
RC-1000-DA-12	1000	9950	201	12	20	12	38	1055	3100
RC-1000-DA-24	1000	9950	201	24	20	12	50	2112	3565
RC-1000-DA-36	1000	9950	201	36	20	12	62	3168	4421
RC-1000-DA-48	1000	9950	201	48	20	12	74	4224	5200

RAM-PAC HYDRAULIC TOOLS

Strong arms of HS-1 Spreader deliver one-ton rated load from the beginning of stroke

HS-1 SPREADER FEATURES

- Powerful spreader arms deliver 100% rated load from the start
- Removable positioning handles
- Lightweight and portable
- Spring-loaded arm return
- For use in construction and maintenance applications
- Oil capacity 3.4 in.^{3}
- Quick-connect coupling for fast setup

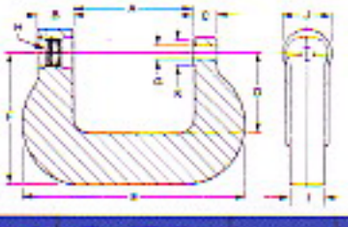
HIGH-PRESSURE HW-1 SMALL PRY™ PROVIDES ONE-TON MUSCLE IN HARD-TO-REACH AREAS.

- Compact design suited for tight spaces
- Ideal for wedging, prying or opening
- Spring-loaded jaws for fast return
- Quick-connect coupling for fast setup

C-CLAMP

Provide portable hydraulic pressing, clamping and crimping.

- Ideal for limited access area or field use to align steel plates for welding, fabricate or assemble bridge griders plus pin removal.
- Increase cylinder versatility for a wide range of industrial, maintenance and construction applications.
- May be used with either single of double- acting cylinders.
- Manual, electric, air or gasoline engine powered pumps may be utilized depending on job requirements. See pages 14-18



DIMENSIONS - 10 AND 20-TON C-CLAMPS

Clamp Part Number	A	B	C	D	E	F	G	H	I	J	K	Weight (lb)
HC-10	9	2 1/4	1 3/16	6	16 5/8	11 1/2	1 1/4	2 1/4-14 UN	2 3/4	3 5/8	1 13/16	38
HC-20	12	2 3/4	1 7/8	5 7/8	21 5/8	13 5/8	1 1/4	3 1/2-12 UN	2 3/4	4 1/4	1 15/16	74

SPECIFICATIONS - HS-1 SPREADER

Rated Load (ton)	Closed Arm Height (in)	Extended Arm Height (in)	Overall Height (in)	Length* (in)	Arm Width (in)	Pipe Thread Connection (NPTF)	Closed Working Pressure (psi)	Weight (Lb)	Model Number
1	1 3/8	11 3/4	6 7/8	21	2 3/8	3/8	10,000	23	HS-1

SPECIFICATIONS - HW-1 SMALL PRY™

Rated Load (ton)	Closed Arm Height (in)	Extended Arm Height (in)	Overall Height (in)	Length* (in)	Arm Width (in)	Pipe Thread Connection (NPTF)	Closed Working Pressure (psi)	Weight (Lb)	Model Number
1	1/2	3 3/4	2	6 1/2	2 1/4	3/8	8,000	4 1/2	HW-1

Selecting the correct RAM-PAC HIGH PRESSURE HYDRAULIC PUMP

RAM-PAC hydraulic pumps are available in several models. Each has individual performance characteristics and is designed to meet specific applications. Selecting the correct pump for your application is easier when you consider the following questions:

HOW IS THE PUMP POWERED?

Power is supplied either manually or by an electric, universal electric, air or gas motor.

HOW BIG A RESERVOIR DO I NEED?

Usable oil is the oil available to the system once it has been bled and the pump reservoir has been filled to its proper lever. You must consider reservoir size and usable oil capacity to be sure the pump you select has sufficient capacity to extend all of the cylinder(s) in your hydraulic system to full stroke.

WHAT PUMP FLOW IS BEST FOR MY APPLICATION?

Pump flow is measured in cubic inches/stroke in manual pumps and cubic inches/minute in power pumps. The greater the flow, the faster the cylinder will extend. Some pumps have two-speeds or stages. In the low-pressure first stage, flow is greater as the plunger approaches the load. When the cylinder reaches the load, the second or high-pressure stage is automatically engaged for uniform operation.

WHICH VALVE DO I NEED?

Different valves are available in both manual and solenoid control to direct oil to and from your single-acting or double-acting cylinder. (For details on hydraulic valves, see pages 20 and 21)

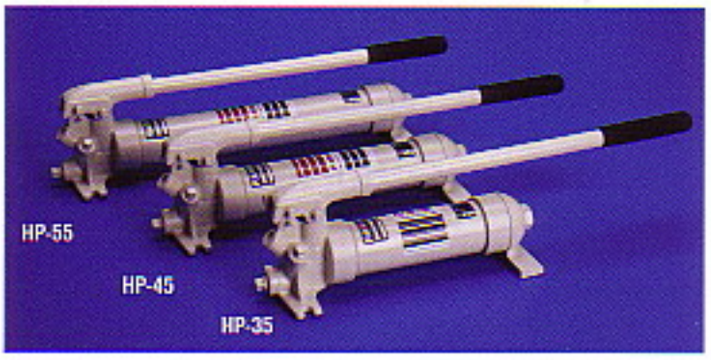
PUMP SELECTION GUIDE

Model Number	Flow at No Load (in³/min. @ 150 psi)	Flow at Full Load (In³/min. @ 10,000psi)	Usable Oil Capacity (in³)	Interchangeable Valving Available
Manual †				
HP-35	3.4	3.4	23	No
HP-45	3.4	3.4	30	No
HP-55	3.4	3.4	37	No
HP-150	14.0	3.4	143	No
HP-150V	14.0	3.4	143	No
HP-520 Series	145	5.0	520	Yes
Universal Electric Motor				
HUP-180	200	18	115 (1/2 gal) 462 (2 gal)	Yes
Electric Motor				
HEP-560	460	56	462 (2 gal) 1155 (5 gal)	Yes
HEP-760	480	105	1155 (5 gal)	Yes
Air Motor				
HAP-050	40	10	80 462 (2 gal)	No
HAP-060	40	10	120	No
HAP-180	260	11	115(1/2 gal) 462 (2gal)	Yes
HAP-560	480	45	462 (2 gal) 1155 (5 gal)	Yes
Gasoline Engine				
HGP-560	400	50	462 (2 gal) 1155 (5 gal)	Yes

*† Based on 20 strokes per minute / **Note:** All pumps are rated at 10,000 psi maximum pressure.*
***Caution:** To prevent hazardous operating conditions, use only recommended cylinder-pump combinations. See page 24*

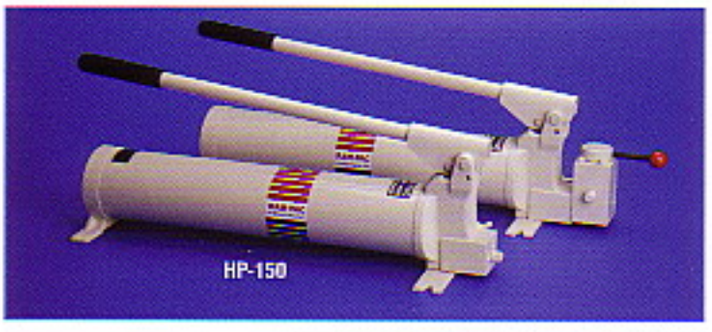
RAM-PAC HYDRAULIC TOOLS

Select pumps for all types of industrial and construction jobs



HP-35, HP-45 AND HP-55 FEATURES

- Lightweight, compact, cost-effective
- Highly portable and simple to operate
- Engineered for durability and ease of repair
- Single-speed flow for use with single-acting cylinders
- Rated at 10,000 psi maximum operating pressure
- Precision-machined malleable casting



HP-150 AND HP-150-V FEATURES

- Rated at 10,000 psi with automatic two-speed flow
- 143 cubic inch usable reservoir
- First stage flow 14.8 in^3/minute*
- Second stage flow: 3.6 in^3/minute at 10,000 psi*
- Durable and easy to repair
- HP-150 for use with single-acting cylinders
- HP-150-V for use with double-acting cylinders
- Precision-machined malleable casting

HP-520 FEATURES

- Fastest Ram-Pac® hand pump
- Rated at 10,000 psi with automatic two-speed flow
- First stage flow: 145 in^3/minute*
- Second stage flow 5.3 in^3/minute at 10,000 psi*
- Equipped with either two, three or four-way manual control valves
- Control valves are field interchangeable and have integral, adjustable relief valves
- 2 1/2 gallon reservoir standard
- 520 cubic inches of usable oil capacity
- Lightweight with built-in handle – easy to carry

** Based on 20 strokes per minute*

HP-520 VALVE SELECTION

Model Number	Valve Type (Built-in)	Cylinder Type
HP-520-2	2-Way, 2-Position	Single-Acting
HP-520-3	3-Way, 3-Position	Single-Acting
HP-520-4	4-Way, 3-Position	Double-Acting

SPECIFICATIONS

Model Number	Usable Oil Capacity (in^3)	Rated Pressure (psi)		Oil Displacement per Stroke (in^3)		Handle Length (in)	Length (in)	Width (in)	Height (in)	Weight (lb)
		1st stage	2nd stage	1st stage	2nd stage					
HP-35*	23	N/A	10,000	N/A	.19	20	13 3/4	5	5 1/2	9
HP-45*	30	N/A	10,000	N/A	.19	20	16 3/4	5	5 1/2	11
HP-55*	37	N/A	10,000	N/A	.19	20	19 3/4	5	5 1/2	16
HP-150*	143	150	10,000	.78	.19	20	23 5/16	7	7 3/8	30
HP-150-V**	143	150	10,000	.78	.19	20	26 1/2	7	7 3/8	32
HP-520-2*	520	150	10,000	8.1	.28	24	25	11	11	70
HP-520-3*	520	150	10,000	8.1	.28	24	25	11	11	71
HP-520-4**	520	150	10,000	8.1	.28	24	25	11	11	71

For Single-Acting Cylinders/ For Double-Acting Cylinders*
All models have 10,000 psi maximum operating pressure, internal relief valves and 3/8 inch NPTF pipe thread connections
For full details on valves designed to operate with the HP-520. See page 20

PORTABLE POWER PUMPS – 180 SERIES

RAM-PAC® portable power pumps allow versatile shop or field use for a variety of high-pressure hydraulic tools

180 SERIES FEATURES

- Universal electric motor or air motor powered models
- Built-in and field adjustable relief valves
- Lightweight, compact design for high portability
- Weighs only 37 pounds with full reservoir (1/2 Gal.)
- Choice of three field interchangeable valves allows use with either single or double-acting cylinders
- Pilot valves with pushbutton controls available factory installed on complete pump units
- Gauge port provided
- Optional pushbutton control with 6-foot control cord (standard on pilot valve models), HAC-17
- May be ordered with either 1/2 or two gallon, field interchangeable reservoirs
- Two-stage – 10,000 psi maximum operating pressure
- Steel construction of high-pressure passages extends pump life and minimizes maintenance


HUP-180-4-2


HUP-180-P-2


HUP-180-4RCG

HUP-180 UNIVERSAL ELECTRIC PUMP

- Heavy-duty universal motor
- 115 VAC, only draws 9 amps
- Equipped with ON/OFF/JOG toggle switch
- Adaptable for press frame operation

HAP-180 AIR MOTOR PUMP

- Powered by 1 1/2 hp air motor
- Requires only 40 cfm of air at 90 psi to operate high pressure hydraulic tools at full load
- Ideal for use within potentially explosive areas

ORDER INFORMATION

Model Number	Description Valve Type	Reservoir Capacity (Gallons)
Universal Electric Pumps		
HUP-180-2	2-Way, 2-Position	1/2
HUP-180-2-2	2-Way, 2-Position	2 1/2
HUP-180-3	3-Way, 3-Position	1/2
HUP-180-3-2	3-Way, 3-Position	2 1/2
HUP-180-4	4-Way, 3-Position	1/2
HUP-180-4-2	4-Way, 3-Position	2 1/2
HUP-180-P	Pilot Dump	1/2
HUP-180-P-2	Pilot Dump	2 1/2
Air Motor Pumps		
HAP-180-3	3-Way, 3-Position	1/2
HAP-180-3-2	3-Way, 3-Position	2 1/2
HAP-180-4	4-Way, 3-Position	1/2
HAP-180-4-2	4-Way, 3-Position	2 1/2
Valves		
HV-12	2-Way, 2-Position	N/A
HV-13	3-Way, 3-Position	N/A
HV-14	4-Way, 3-Position	N/A

SPECIFICATIONS

Model No.	Reservoir Capacity	Usable Oil Capacity (in³)	Operating Pressure (psi)	Flow Capacity (in³/min) 1st Stage @ 150 psi	Flow Capacity (in³/min) 2nd Stage @ 10,000 psi
Universal Electric HUP-180	1/2 Gallon	106	10,000	200	18
	2 1/2 Gallon	482	10,000	200	18
Air Motor HAP-180	1/2 Gallon	106	10,000	260*	12*
	2 1/2 Gallon	482	10,000	260*	12*

* *100 psi static air pressure*

VALVE SELECTION GUIDE

Valve Part No.	Valve Type	Cylinder Type	Control Function	Portable Power Pump Combination
HV-12	2-Way 2-Position	Single-Acting	Advance and Return For Hold: Turn motor off with valve in advance position	HUP-180-2**
HV-13	3-Way 3-Position	Single-Acting	Advance, Hold and Return	HUP-180-3 or HAP-180-3
HV-14	4-Way 3-Position	Double-Acting	Advance, Hold and Return	HUP-180-4 or HAP-180-4
Pilot*	2-Way 2-Position	Single-Acting	Advance and Return With No Hold Position	HUP-180-P**†

* *Available factory installed on HUP-180 pumps only. If field conversion of an HUP-180 series pump to a pilot operated model is necessary, contact the factory for parts and installation information*

***Caution:** Do not use Model HUP-180-P to lift, support or restrain loads*

** *If an air motor pump is required, consult factory*

† *Pilot valves advance the ram plunger when pump is turned on and retract it when the pump is turned off. There is no "Hold" position*

RAM-PAC HYDRAULIC TOOLS

High quality, high-pressure power pumps with reliability you can count on

FEATURES

- Fast acting, two-speed operation
- First stage operates up to 450 psi for fast take-up
- Supercharged second stage operates from 450 to 10,000 psi for sure, uniform lifting
- Pump design virtually eliminates piston inlet cavitation for more consistent operation
- Factory-set overload relief valve protects hydraulic system
- Field adjustable pressure relief valve provides greater operational flexibility
- Field interchangeable directional control valves (see pages 20 and 21)
- Two, five, and ten-gallon reservoir capacities

HAP-560-4

HAP-560 FEATURES

- 4 hp air motor operates on 62 SCFM @ 100 psi.
- For use where electricity is unavailable or electrical equipment may not be used

HEP-560 FEATURES

- 1 1/2 hp, 115/230 VAC, 60 Hz single phase electric motor. Wired 115 VAC. 25 amps at full load
- 230/460 VAC, 50/60 Hz, 3 phase motor available (Consult factory)
- Includes 6-foot power cord
- 115/230 VAC, 50 Hz available. (Consult factory)

HEP-760 FEATURES (Not Shown)

- 3 hp, 230/460 VAC, dual voltage 60 Hz, 3 phase motor
- 11 amps at full load (10,000 psi) at 230 volts
- Starts under full load
- 5-gallon reservoir standard
- External accessible motor leads from factory

HEP-560-P FEATURES

- Equipped with pilot-operated dump valve
- For use where conditions require automatic return of single-acting cylinder when pump is shut off. For single-acting cylinder(s) only*

HGP-560 FEATURES

- 4 hp, four cycle, 3600 rpm, Briggs & Stratton engine
- Ideally suited for remote, outdoor applications
- One-quart gas tank provides 2 1/2 hours of operation
- 5.5 hp, Honda engine is optional (Consult factory)

The RAM-PAC® Heat Exchanger Kit keeps oil temperature below 125° F during extended operation of selected electric motor pumps.

** Electric pumps with pilot-operated valves cannot hold a load when pump is not running. For automatic return, specify a single-acting, spring-return cylinder with this pump.*

POWER PUMPS – 560 SERIES

HEP-560-4S

HGP-560-4
with optional
Honda engine

POWER PUMP SELECTION GUIDE

Reservoir Size (gallons)	Valve	Model Number
Air Motor Pumps		
2	None (HM-1) ‡	HAP-560-1
5	None (HM-1) ‡	HAP-560-1-5
2	2-way (HV-2)	HAP-560-2
5	2-way (HV-2)	HAP-560-2-5
2	3-way (HV-3)	HAP-560-3
5	3-way (HV-3)	HAP-560-3-5
2	4-way (HV-4)	HAP-560-4
5	4-way (HV-4)	HAP-560-4-5
Electric Motor Pumps		
2	None (HM-1) ‡	HEP-560-1
5	None (HM-1) ‡	HEP-560-1-5
2	2-way (HV-2)	HEP-560-2
5	2-way (HV-2)	HEP-560-2-5
2	3-way (HV-3)	HEP-560-3
5	3-way (HV-3)	HEP-560-3-5
2	4-way (HV-4)	HEP-560-4
5	4-way (HV-4)	HEP-560-4-5
2	3-way (HVS-3-1)	HEP-560-3S
2	4-way (HVS-4-1)	HEP-560-4S
5	3-way (HVS-3-1)	HEP-560-3S-5
5	4-way (HVS-4-1)	HEP-560-4S-5
2	Pilot, Dump *	HEP-560-P
5	Pilot, Dump *	HEP-560-P-5
5	3-way (HV-3)	HEP-760-3
5	4-way (HV-4)	HEP-760-4
5	4-way (HVS-4-1)	HEP-760-4S
Gasoline Engine Pumps		
2	None (HM-1) ‡	HGP-560-1
5	None (HM-1) ‡	HGP-560-1-5
2	2-way (HV-2)	HGP-560-2
5	2-way (HV-2)	HGP-560-2-5
2	3-way (HV-3)	HGP-560-3
5	3-way (HV-3)	HGP-560-3-5
2	4-way (HV-4)	HGP-560-4
5	4-way (HV-4)	HGP-560-4-5

** Electric pumps with pilot-operated valves cannot hold a load when pump is not running. For automatic return, specify a single-acting, spring-return cylinder with this pump.*

‡ For use with remote valves

SPECIFICATIONS

Pump Series	Reservoir Capacity † (in³)	Usable Oil Capacity (in³)	Operating Working Pressure (psi)	Flow Capacity (in³/min) @ 150 psi	Flow Capacity (in³/min) @ 10,000 psi	Base Size (in)	Height (in)	Pipe Thread Connection (NPTF)	Net Weight (lb)
HAP-560	520 (2 gal)	462	10,000	480	45	12.8 x 16.5	12.3	3/8	100
	1270 (5 gal)	1155				12.5 x 18	16.4		132
HEP-560	520 (2 gal)	462	10,000	480	56	12.8 x 16.5	16.0	3/8	117
	1270 (5 gal)	1155				12.5 x 18	20.1		148
HEP-760	1270 (5 gal)	1155	10,000	480	105	12.5 x 18	18.9	3/8	150
	2310 (10 gal)	2110				12.5 x 30	22.0		200
HGP-560	520 (2 gal)	462	10,000	400	50	12.8 x 16.5	18.4	3/8	117
	1270 (5 gal)	1155				12.5 x 18	22.6		148

† A 10 gallon reservoir is also available. Contact RAM-PAC® factory for details.

RAM-PAC HYDRAULIC TOOLS

POWER PUMP ACCESSORIES

ELECTRIC HAND SWITCH – HAC-11

- Allows remote "on/off" control for HEP-560 series electric pumps
- Spring-loaded pushbutton mechanism in rugged non-conducting neoprene housing
- Deeply recessed, metallic screw heads reduce operating hazards
- 6-foot cord included

ELECTRIC HAND SWITCH – HAC-17

- Allows remote "on/off" control for HUP-180 series electric pumps
- Spring-loaded toggle switch in rugged non-conducting housing
- 10-foot cord included

FOOT SWITCH – HA-61

- For use with HEP-560 series pumps
- Automatically returns to "off" position when foot is lifted
- 8-foot power cord included
- Controls electric motor only

REMOTE AIR SWITCH – HAC-13

- Permits operation of HAP-560 model air motors from remote location
- 10-foot pilot control line included

FILTER-REGULATOR-LUBRICATOR – HAC-12

- For use with HAP-560 & HAP-050 series pumps
- Filters, regulates and lubricates in one efficient unit
- 1/2 NPT ports
- Air gauge included
- Polycarbonate bowl with steel bowl guard

NON-LOCKING CASTERS – HA-51

- For all RAM-PAC® power pumps
- Provides effortless maneuverability on rugged rubber wheels
- **Locking caster also available – HA-67**

HEAT EXCHANGER KIT – HAC-14

- For use with HEP- 560-1, -3, -4, and –4S models
- Keeps oil temperature below 125°F during extended operation
- Air Cooled
- 110 volt, 50/60 Hz motor

* Not Shown

HYDRAULIC OIL

- Special rust-inhibiting agent stops corrosion
- Protects seals
- Must be used to keep RAM-PAC® warranty valid

HA-41-1 – 1 quart
HA-41-4 – 1 gallon

155 SUS. For use in hand pumps and hand jacks. Low viscosity provides adequate lubrication down to 10°F

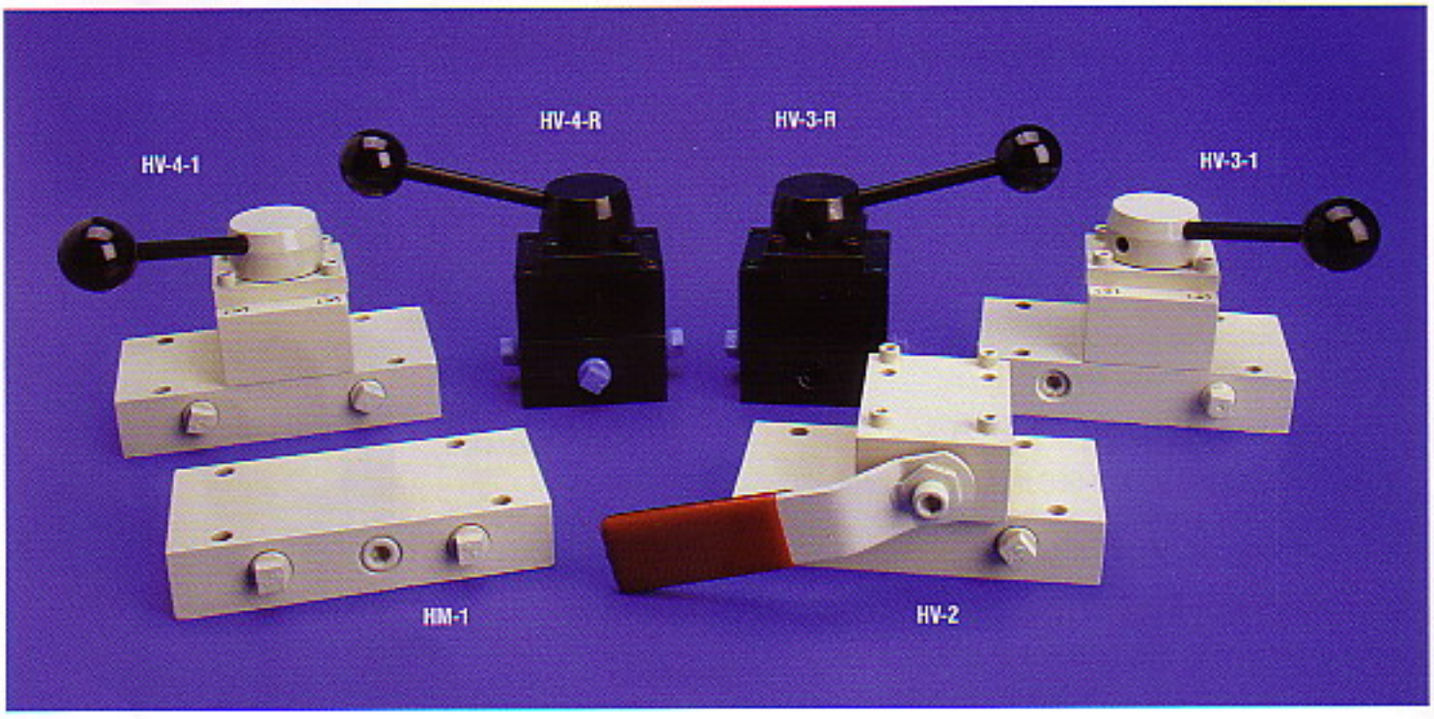
HA-57-1 – quart
HA-57-4 – gallon
HA-57-20 – 5 gallon

300 SUS. For use in power pumps. High viscosity provides adequate lubrication up to 140°F to protect and extend power pump life

MANUALLY-OPERATED VALVES

FEATURES

- Operate efficiently at high and low pressures
- Hand-operated
- Pressure adjustable from 1,000 to 10,000 psi by operator with just an allen wrench and gauge
- Polished steel control rotor and bronze spools for long life and consistent operation
- Models for use with both single-acting and double-acting cylinders
- Field interchangeable on HP-520 (manual) and 560 series power pumps



SPECIFICATIONS

Model Number	Hydraulic Symbol	Valve Location	Valve Description
HV-2		Pump Mounted	Two-way, two-position valve for use with single-acting cylinders where a "hold" position is not required
HV-3-1		Pump Mounted	Three-way, three-position, rotary shear seal, non-interflow valve for single-acting cylinders which must raise and hold a load. Provides load holding between handle shifts. Maintains holding level until handle reaches "return" position. Has additional port for oil cooler option
HV-4-1		Pump Mounted	Four-way, three-position valve for use with double-acting cylinders. Same operation as HV-3-1 except has an extra port for use with double-acting cylinders
HM-1		Pump Mounted	Manifold for use with remote-mounted valves described below.
HV-3-R		Remote Mounted	Remote operation version of HV-3-1
HV-3-CR		Remote Mounted	Closed-center version of HV-3-R
HV-4-R		Remote Mounted	Remote operation version of HV-4-1
HV-4-CR		Remote Mounted	Closed-center version of HV-4-R

RAM-PAC HYDRAULIC TOOLS

Solenoid Control Valves

HVS Series solenoid control valves provide short duration, load holding in single or double-acting cylinder systems.

THREE-WAY SOLENOID VALVE, HVS-3-1

Specifically designed for use with HEP-560 series electric pumps in single-acting cylinder systems to provide short duration load holding.

FEATURES

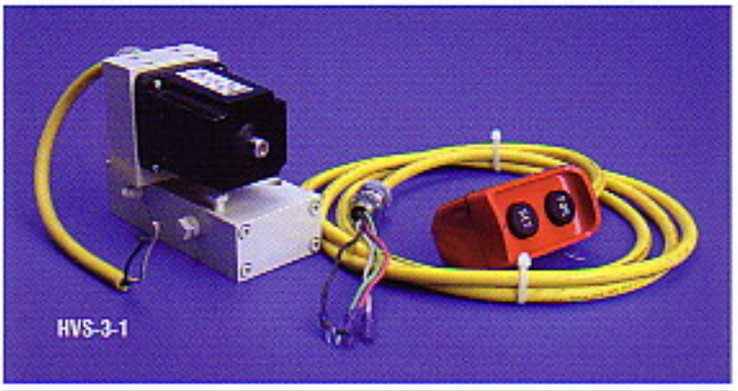
- Separate pushbutton assembly and 10-foot cord for convenient remote operation
- Solenoid rated for 115 VAC, 60 Hz service
- Includes manifold with adjustable pressure relief valve
- Relief valve, factory preset to 10,500 psi, field adjustable between 1,000 and 10,000 psi
- Available factory-mounted on pump models HEP-560-3S and HEP-560-3S-5

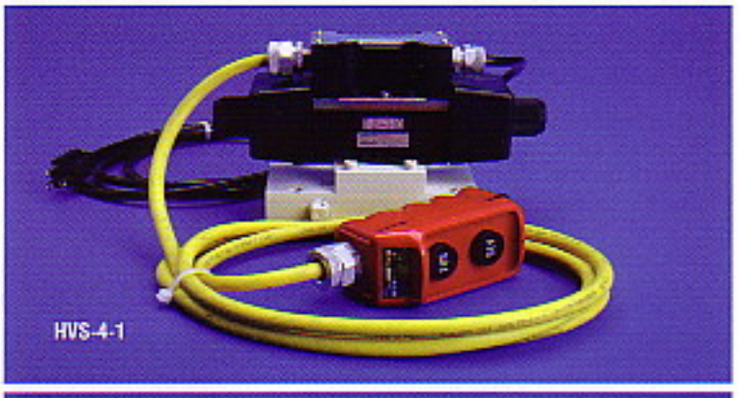
FOUR-WAY SOLENOID VALVE, HVS-4-1, HVS-4-R

Specifically designed for use with HEP-560 series electric pumps in double-acting cylinder systems to provide short duration load holding.

FEATURES

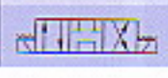
- For use with RAM-PAC® HEP Series electric power pumps
- Choice of two models for use in double-acting cylinder circuits
- All models complete with pushbutton control and 10-foot control cord
- Relief valve, factory preset to 10,500 psi, field adjustable between 1,000 and 10,000 psi
- Requires 115 VAC, 60Hz, electrical service
- 10,000 psi maximum operating pressure
- Available factory-mounted on pump models HEP-560-4S and HEP-560-4S-5.


HVS-3-1


HVS-4-1


HVS-4-R

SPECIFICATIONS

Model Number	Hydraulic Symbol	Valve Location	Valve Description
HVS-3-1		Pump Mounted	115 VAC, 60Hz, 10,000 psi, single solenoid, two-position, three-way valve for single-acting cylinders
HVS-4-1		Pump Mounted	115 VAC, 60Hz, 10,000 psi, double solenoid, three-position, three-way, tandem center valve for double-acting cylinders
HVS-4-R		Remote Mounted	Similar to HVS-4-1 except remote mounted

PUMP AND VALVE SELECTION GUIDES

PUMP SELECTION GUIDE (PUMP SPEED VS. CYLINDER TONNAGE)

Cylinder Capacity	Load[2]	Hand Pumps[1]			Power Pumps					
		HP-35 HP-45 HP-55	HP-150 HP-150V	HP-520 Series	HAP-180 Series[3]	HUP-180 Series	HAP-560 Series[4]	HEP-560 Series	HGP-560 Series	HEP-760 Series
		Cylinder Extension Speed (in/min)								
10	None	1.70	6.98	72.45	125.36	96.43	231.44	231.44	192.86	231.44
10	Full	1.70	1.70	2.50	5.79	8.68	21.70	27.00	24.11	50.63
20	None	.86	3.52	36.60	58.69	45.15	108.35	108.35	90.29	108.35
20	Full	.86	.86	1.26	2.70	4.06	10.16	12.64	11.29	23.70
30	None	.59	2.40	24.96	40.00	30.81	73.94	73.94	61.61	73.94
30	Full	.59	.59	.86	1.85	2.77	6.93	8.63	7.70	16.18
50	None	.34	1.41	14.70	23.53	18.11	43.46	43.46	36.22	43.46
50	Full	.34	.34	.51	1.09	1.63	4.07	5.07	4.53	9.51
60	None	.30	1.24	12.89	20.70	15.92	38.22	38.22	31.45	38.22
60	Full	.30	.30	.45	.96	1.41	3.58	4.46	3.96	8.36
75	None	–	1.04	10.77	17.28	13.30	31.91	31.91	26.60	31.91
75	Full	–	.25	.37	.80	1.20	2.99	3.72	3.32	6.98
100	None	.18	.76	7.85	12.6	9.69	23.26	23.26	19.38	23.26
100	Full	.18	.18	.27	.58	.87	2.18	2.71	2.42	5.08

(1) Speed is based on 20 strokes per minute.
(2) No Load = 150 psi for all pumps except HAP-180 and HUP-180 for which no Load = 200 psi. Full load = 10,000 psi for all pumps
(3) Speed is based on 90 psi static air pressure.
(4) Speed is based on 100 psi static air pressure.

VALVE SELECTION GUIDE (HEP-560 SERIES AND HP-520 PUMPS)

Choice of Valve	HV-2	HV-3-1	HV-4-1	HVS-3-1	HAV-4-1	Pilot Valve Type	HM-1-1
Used with Cylinder	single-acting	single-acting	double-acting	single-acting	double-acting	single-acting	pump-mounted manifold
Cylinder Operating Function	advance, retract	advance, hold, retract	advance, hold, retract	advance, hold, retract	advance, hold, retract	advance, retract	for remote operated valves
Pump Series [1]	**Reservoir Capacity (gal)**	**Pump Model Number**						
HP-520	2 1/4	HP-520-2	HP-520-3	HP-520-4	–	–	–	(2)
HAP-560	2	HAP-560-2	HAP-560-3	HAP-560-4	–	–	–	HAP-560-1
HAP-560	5	HAP-560-2-5	HAP-560-3-5	HAP-560-4-5	–	–	–	HAP-560-1-5
HEP-560	2	HEP-560-2	HEP-560-3	HEP-560-4	HEP-560-3S	HEP-560-4S	HEP-560-P	HEP-560-1
HEP-560	5	HEP-560-2-5	HEP-560-3-5	HEP-560-4-5	HEP-560-3S-5	HEP-560-4S-5	HEP-560-P-5	HEP-560-1-5
HGP-560	2	HGP-560-2	HGP-560-3	HGP-560-4	–	–	–	HGP-560-1
HGP-560	5	HGP-560-2-5	HGP-560-3-5	HGP-560-4-5	–	–	–	HGP-560-1-5
HEP-760	5	–	HEP-760-3	HEP-760-4	–	HEP-760-4S	–	–

(1) 10 gallon reservoir available, consult factory
(2) Consult factory


HA-37


HRV-2


HRV-3 *Comes with HA-86-72 6ft. hose and HAC-2 complete coupler*

RAM-PAC HYDRAULIC TOOLS

SYSTEM VALVES AND SWITCHES

- Permit accurate control of lifting and lowering speeds and direction ("up", "down" and "hold" cycles).
- Choice of shut-off and metered check valves.

HA-37

Shut-off valve, 3/8 inch NPTF female. Permits positive shut-off and throttle control in multiple ram set-ups to 10,000 psi.

HRV-2

In-line pressure relief valve for double acting cylinders. Used on retract circuit to ensure against over pressurization.

HRV-3

Pressure relief valve designed for use in jacking applications with RAM-PAC® double-acting cylinders. Reduces potential for cylinder overload while a load is being lowered. Should be used in double-acting circuits in conjunction with metering check valve HMC-2. Kit includes all necessary fittings and hose for installation. See double-acting hydraulic system on page 51.

HMC-1

Metering check valve. Combination meter and check valve with 3/8 inch NPTF ports. Long handle helps meter load down smoothly. Steel body has heat-treated valve spindle for long life. Includes built in relief valve.

HMC-2

Same as HMC-1 except with out the built in relief valve. Recommended for all jacking applications.

HYDRAULIC PRESSURE SWITCH – HPS-1

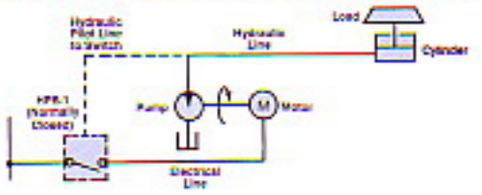
Provides overload warning signal or maintains constant system pressure.

FEATURES

- Monitors system pressure and warns operator if load is in excess of cylinder rated load.
- Operator-adjustable to function between 700 and 10,000 psi (for precise setting, a pressure gauge is required.)
- Maintains constant system pressure. Cuts off pump when pressure reaches pre-set level.
- Micro switch automatically turns pump on again if pressure drops more than 600 psi from shut-off level.
- ¼-inch NPT oil port.

OVERLOAD WARNING APPLICATIONS

CONSTANT SYSTEM PRESSURE APPLICATION



NOTES:

1. When the HPS-1 is wired directly to the pump, system leakage must be minimized. If the 600 psi drop is rapid, fast pump on-off cycle can burn out the pump motor. Meter check valve, HMC-1, should be used to isolate the primary source of leakage (usually the pump).
2. The pressure port on he HPS-1 is 1/4-inch NPT. Adapter HA-21 must be used when a 3/8- inch NPT port is needed. See page 28


HMC-1


HMC-2


HPS-1

PUMP AND CYLINDER SETS

Pre-engineered with cylinders, hose and pump: Just select the tonnage and the stroke you need.

FEATURES

- All engineering and specification have been done for you.
- Rated loads from 5 to 100-ton
- Closed height from 1 11/16 to 22 1/8 inches
- Strokes from 7/16 to 16 1/8 inches
- Each package is complete with the correct cylinder, pump, 6-foot high-pressure hose and necessary couplings.
- Cylinder can be positioned in a restricted space with operator actuating pump from a remote location.

SPECIFICATIONS

Rated Load (tons) Pushing	Rated Load (tons) Pulling	Cylinder Number	Cylinder Closed Height (in)	Stroke (in)	Pump Number	Complete Unit Model Number
With Low Profile Single-Acting Cylinder LP Series						
5	–	RC-5-LP-.5	1 25/32	5/8	HP-55	PR-5-LP-.5
10	–	RC-10-LP-.5	1 11/16	7/16	HP-55	PR-10-LP-.5
20	–	RC-20-LP-.5	2 1/32	29/64	HP-55	PR-20-LP-.5
30	–	RC-30-LP-.5	2 5/16	1/2	HP-55	PR-30-LP-.5
50	–	RC-50-LP-.5	2 5/8	5/8	HP-55	PR-50-LP-.5
100	–	RC-100-LP-.5	3 3/8	5/8	HP-55	PR-100-LP-.5
With Compact Single-Acting SA Series						
20	–	RC-20-SA-2	3 7/8	1 3/4	HP-55	PR-20-SA-2
30	–	RC-30-SA-2-1	4 5/8	2 7/16	HP-55	PR-30-SA-2-1
50	–	RC-50-SA-2	4 27/32	2 1/8	HP-55	PR-50-SA-2
100	–	RC-100-SA-2	5 3/4	2	HP-150	PR-100-SA-2
With Single-Acting Cylinder SA Series						
5	–	RC-5-SA-3	6 1/2	3 1/4	HP-55	PR-5-SA-3
5	–	RC-5-SA-5	8 1/2	5 1/4	HP-55	PR-5-SA-5
10	–	RC-10-SA-2	4 25/32	2 1/8	HP-55	PR-10-SA-2
10	–	RC-10-SA-6	9 3/4	6 1/8	HP-55	PR-10-SA-6
10	–	RC-10-SA-10	13 3/4	10 1/8	HP-55	PR-10-SA-10
20	–	RC-20-SA-6.5	10 3/4	6 5/8	HP-55	PR-20-SA-6.5
25	–	RC-25-SA-6	10 3/4	6 1/4	HP-55	PR-25-SA-6
25	–	RC-25-SA-14	18 3/4	14 1/4	HP-150	PR-25-SA-14
30	–	RC-30-SA-6	10 1/4	6	HP-150	PR-30-SA-6
30	–	RC-30-SA-6T	10 1/4	6	HP-150	PR-30-SA-6T
30	–	RC-30-SA-14	19	14	HP-150	PR-30-SA-14
50	–	RC-50-SA-6	11 1/4	6 1/8	HP-150	PR-50-SA-6
50	–	RC-50-SA-6T	11 1/4	6 1/8	HP-150	PR-50-SA-6T
50	–	RC-50-SA-14	19 3/8	14	HP-520-2	PR-50-SA-14
75	–	RC-75-SA-5.5	11 1/2	5 1/2	HP-150	PR-75-SA-5.5
100	–	RC-100-SA-6	12 1/4	6	HP-150	PR-100-SA-6
With Double-Acting Cylinder DA Series						
10	5	RC-10-DA-11.5	17 1/4	11 1/2	HP-150-V	PR-10-DA-11.5
20	10	RC-20-DA-10	15 1/4	9 3/4	HP-150-V	PR-20-DA-10
20	10	RC-20-DA-16	21 5/8	16 1/8	HP-150-V	PR-20-DA-16
30	15	RC-30-DA-9	14 15/16	9	HP-150-V	PR-30-DA-9
30	15	RC-30-DA-16	22 1/8	16	HP-150-V	PR-30-DA-16
50	25	RC-50-DA-5	11 15/16	5 1/4	HP-150-V	PR-50-DA-5
50	25	RC-50-DA-13	19 15/16	13 1/4	HP-520-4	PR-50-DA-13
100	30	RC-100-DA-6.5	13 3/4	6 3/8	HP-520-4	PR-100-DA-6.5
100	30	RC-100-DA-13	20 1/4	13 1/8	HP-520-4	PR-100-DA-13
With Center-Hole Cylinder CH Series (Single-Acting)						
10	–	RC-10-CH-2.5	5 3/8	2 1/2	HP-55	PR-10-CH-2.5
20	–	RC-20-CH-3	6 1/4	3	HP-55	PR-20-CH-3
30	–	RC-30-CH-2.5	7 1/16	2 1/2	HP-55	PR-30-CH-2.5
60	–	RC-60-CH-3	9 11/16	3	HP-150	PR-60-CH-3
With Center-Hole Cylinder CH Series (Double-Acting)						
30	–	RC-30-CH-3-DA	7 1/16	3	HP-150-V	PR-30-CH-3-DA
60	–	RC-60-CH-5-DA	9 1/2	5	HP-150-V	PR-60-CH-5-DA
100	–	RC-100-CH-3-DA	8	3	HP-150-V	PR-100-CH-3-DA

AIR / HYDRAULIC PUMP HAP-050 SERIES

RAM-PAC® heavy duty air/hydraulic pump saves time & effort in operations requiring plenty of power from a compact, portable package.

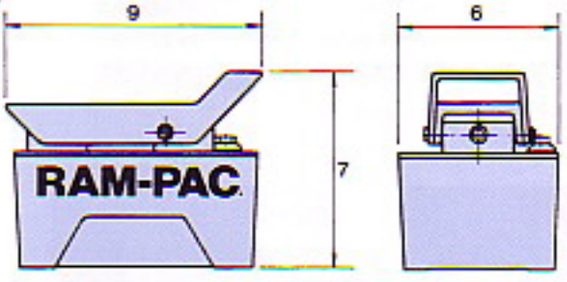
HAP-050/ HAP-060 FEATURES

- Advance/hold/retract foot treadle control
- Heavy-duty construction - no plastic parts
- Release detent to facilitate ram return
- Operates on shop air (40 – 125 psi)
- Two-stage release mechanism – reduces shock on system while allowing fast or metered ram return
- Durable aluminum reservoir comes standard
- Simplicity of design – longer life expectancy
- Convert your press or puller from hand pump operation – saves time and effort

SPECIFICATIONS

Model Number	Usable Reservoir (in³)	Envelope Dimensions (in)	Valve Function	Performance @ 100 psi		Weight (lb)
				Hydraulic Pressure	Oil Delivery*	
HAP-050	80	7 H x 6 W x 9 L	Advance/hold/retract foot treadle for use with single-acting cylinders	0 psi 5000 psi 10,000 psi	40 cu. in/min 25 cu. in/min 10 cu. in/min	16
HAP-050-2	452	9 H x 11½W x 15½L	Advance/hold/retract foot treadle for use with single-acting cylinders	0 psi 5000 psi 10,000 psi	40 cu. in/min 25 cu. in/min 10 cu. in/min	48
HAP-050-V	80	7 H x 6 W x 9 L	4-way, 3 position, manual valve for use with double-acting cylinders	0 psi 5000 psi 10,000 psi	40 cu. in/min 25 cu. in/min 10 cu. in/min	23
HAP-060	120	8½H x 6¼W x12½L	Advance/hold/retract foot treadle for use with single-acting cylinders	0 psi 5000 psi 10,000 psi	40 cu. in/min 25 cu. in/min 10 cu. in/min	21

** Oil delivery based on 10 c.f.m. air supply at the pump.*



RAM-PAC® pump and ram sets for expanding job flexibility in other demanding applications.

Set comes complete with HAP-050 air/hydraulic pump, 6-foot hose and selected cylinder to suit your exact requirements. RAM-PAC® cylinders have field proven performance and include chrome plated plungers; heavy duty return springs; and bronze bearings for longer life. Replace your current hydraulic components with the complete set for maximum efficiency and performance.

SPECIFICATIONS

Set Number	Capacity (Tons)	Cylinder Stroke (in.)	Closed Height (in.)	Weight (lbs.)
APR-5-SA-5	5	5	8 1/2	20
APR-10-SA-2	10	2 1/8	4 3/4	30
APR-10-SA-6	10	6 1/8	9 3/4	34
APR-10-SA-10	10	10 1/8	13 3/4	38
APR-25-SA-6	25	6 1/4	10 3/4	45
APR-50-SA-6	50	6 1/8	11 1/4	75

Note: *For automotive style rams (threaded base & threaded plunger See page 6 and 7 add suffix A (example APR-10-SA-10A)*

Hoses and Couplers


HAC Style


HA Style

HOSE ASSEMBLIES

- For trouble-free operation and ease of set-up
- Rated to 10,000 psi working pressure
- Meet Material Handling Institute IJ-100 specifications
- Constructed of synthetic rubber core tube with two-wire braid reinforcement and synthetic rubber cover
- Consult factory for longer lengths

HOSE ASSEMBLY SELECTION GUIDE

Hose Length (ft)	Type Connection	Model Number
	1/4" ID (Rubber)*	
3	3/8-inch NPTF male both ends	HA-86-36
6	3/8-inch NPTF male both ends	HA-86-72
10	3/8-inch NPTF male both ends	HA-86-120
20	3/8-inch NPTF male both ends	HA-86-240
3	HA-17 half coupling, 3/8-inch NPTF male	HAC-86-36
6	HA-17 half coupling, 3/8-inch NPTF male	HAC-86-72
10	HA-17 half coupling, 3/8-inch NPTF male	HAC-86-120
20	HA-17 half coupling, 3/8-inch NPTF male	HAC-86-240
	3/8" ID (Rubber)*	
6	3/8-inch NPTF male both ends	HA-375-72
10	3/8-inch NPTF male both ends	HA-375-120
20	3/8-inch NPTF male both ends	HA-375-240

** Other lengths available upon request.*

QUICK CONNECT COUPLINGS

- Allow fast set-up of hydraulic systems
- Provide maximum field convenience

Description	Weight (lb)	Model Number
Hose half coupling	1/2	HA-17
Cylinder half coupling w/metal dust cap.	1/2	HA-18
Metal dust cover only for HA-18 (cyl. half)	1/8	HA-79
Metal dust cover only for HA-17 (hose half)	1/8	HA-85
Complete set. Includes cylinder and hose half coupler with dust cap	1	HAC-2


HA-17


HA-18

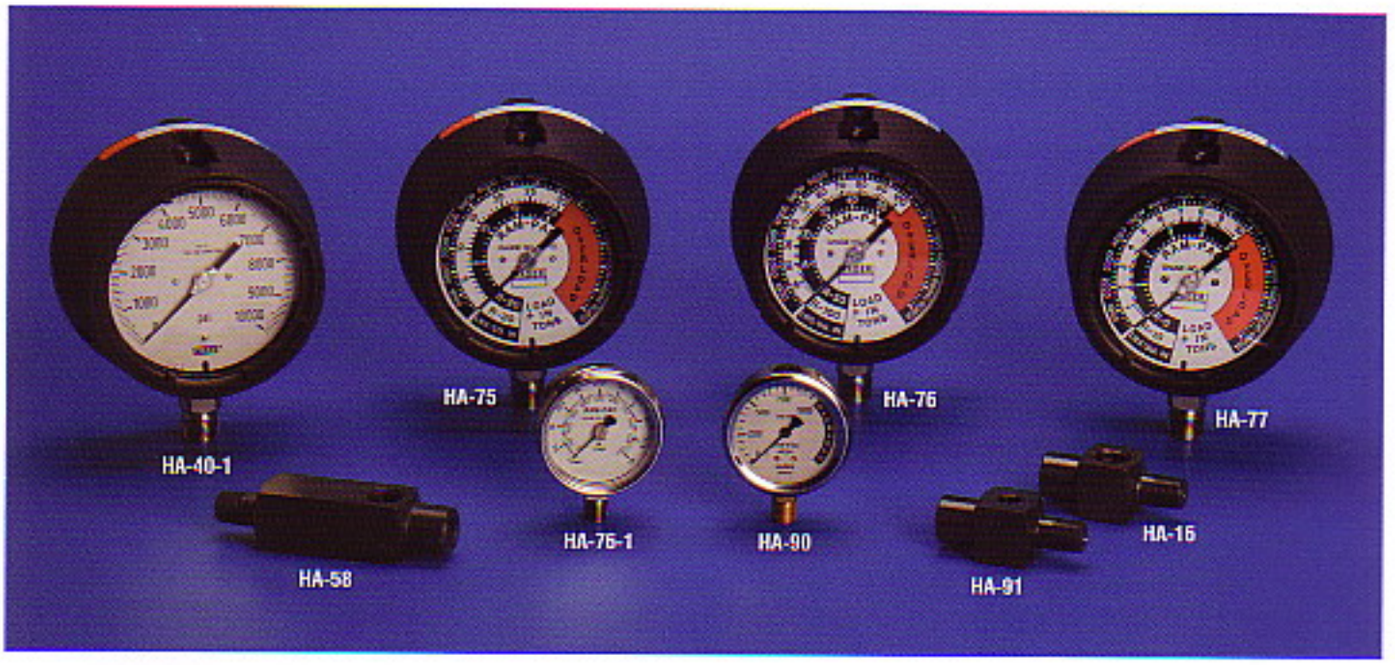

HAC-2


HA-85

RAM-PAC HYDRAULIC TOOLS

GAUGE AND GAUGE ADAPTERS

1/4 and 1/2 inch NPTF pipe threads (lower mount)



NOTE: *RAM-PAC® recommends the use of gauges in all hydraulic systems connected with power pumps. Gauges permit the user to monitor the load or pressure on cylinders. This is especially important where loads are not precisely known in advance.*

IMPORTANT: *All gauges require a gauge adapter.*

GAUGE/CYLINDER COMBINATION GUIDE
(Force/Pressure Reading)

Rated Load (ton/psi)	Cylinder Model Number	Gauge Number	Gauge Dia. (in)	Thread Lower	Number Intervals	Major Grad.	Minor Grad.	Accuracy	Gauge Type	Gauge Adapter
5 & 10 Ton 0-10,000 psi	RC-5-LP & RC-10-LP Family	HA-77	4 1/2	1/2" NPTF	1 Ton 1000 psi	1 Ton 1000 psi	200 lbs 200 psi	+/- .5%	Dry	HA-58 or HA-16
	RC-5-SA & RC-10-SA Family									
	RC-4-SA-5A									
	RC-10-DA Family (Push Only)									
20 & 30 Ton 0-10,000 psi	RC-20-LP-.5 & RC-30-LP-.5	HA-75	4 1/2	1/2" NPTF	5 Ton 1000 psi	5 Ton 1000 psi	1 Ton 200 psi	+/- .5%	Dry	HA-58 or HA-16
	RC-20-SA & RC-30-SA Family									
	RC-20-DA Family (Push Only)*									
	RC-30-DA Family (Push Only)*									
50 & 100 Ton 10,000 psi	RC-50-LP-.5 & RC-100-LP-.5	HA-76	4 1/2	1/2" NPTF	10 Ton 1000 psi	10 Ton 1000 psi	2 Ton 200 psi	+/- .5%	Dry	HA-58 or HA-16
	RC-50-SA & RC-100-SA Family									
	RC-50-DA Family (Push Only)*									
	RC-100-LP-.5									
	RC-100-SA Family									
	RD-100-DA Family (Push Only)*									
75 Ton	RC-75-SA-5.5	HA-76-1	2 1/2	1/4" NPTF	7.5 Ton	7.5 Ton	1.5 Tons	+/- .5%	Dry	HA-91
0-10,000 psi	All Cylinders	HA-40-1	4 1/2	1/2" NPTF	1000 psi	500 psi	100 psi	+/- .5%	Dry	HA-58 or HA-16
		HA-90	2 1/2	1/4" NPTF	2500 psi	2500 psi	500 psi	+/- 2%	Liquid	HA-91

HA-14 Maximum reading indicators are available for all 4 1/2" diameter gauges.
Note: *Pressure reading only gauges work with any cylinder.*
* *Measures load and pressure when pushing and pressure only when pulling*

Fittings, Adapters, and Manifolds (10,000 psi)

FEATURES

- For convenience and flexibility in making tight-fitting system connections

NIPPLES

Part No.	Description
HA-2	Close Nipple, ⅜ NPTF Male
HA-92	3" Pipe Nipple, ⅜ NPTF Male

TEE

Part No.	Description
HA-3	⅜ NPTF Female All Ports

COUPLING

Part No.	Description
HA-20	⅜ NPTF Female Both Ends

REDUCER ADAPTERS

Part No.	Description
HA-120	¼ NPTF Female to ⅛ NPTF Male
HA-21	⅜ NPTF Female to ¼ NPTF Male
HA-39	½ NPTF Female to ¼NPTF Male
HA-47	½ NPTF Female to ⅜ NPTF Male

ELBOWS

Part No.	Description
HA-30	90° Street, ⅜ NPTF Male & Female
HA-88	90°, ⅜ NPTF Female Both Ends
HA-55	45° Street, ½ NPTF Male & Female
HA-119	45° Street, ¼ NPTF Male & Female

CROSS

Part No.	Description
HA-31	⅜ NPTF Female All Ports

REDUCER BUSHING

Part No.	Description
HA-48	½ NPTF Male to ⅜ NPTF Female
HA-50	⅜ NPTF Male to ¼ NPTF Female

MANIFOLD PLUGS

Part No.	Description
HA-59	⅜ NPTF (10 Per Package)

MANIFOLDS

Part No.	Description
HA-27	1 ½" Sq. x 5"L, 5-Port ⅜ NPTF
HA-29	1 ½" Sq. x 10 ½"L, 9-Port ⅜ NPTF
HA-54	1 ¼" Thick x 5 ¾" Dia., 6-Port ⅜ NPTF

HYDRAULIC HAND JACKS

High-quality, industrial hydraulic jacks handle a wide range of construction, rigging and other applications

How to understand jack & integral unit model numbers

8 - H - 6A

- **8** — Load Rating (tons)
- **H** — Hydraulic
- **6A** — Nominal Stroke (inches)

FEATURES

- Made in U.S.A.
- Lifting starts with first stroke of handle
- Extension screws in all 3 to 12-ton models
- Cast head nut is made of durable grey iron
- Plunger plated with electroless nickel
- Cast ductile iron base on 3 thru 20-ton jacks
- 30-ton jack has a machined steel base
- All units feature a fluid by-pass and a stop ring to prevent over-travel
- All units include 2-piece pumping handle

SPECIFICATIONS

Rated Load (tons)	Closed Height (in)	Stroke (in)	Extension Screw	Extended Ht. Less Ext. Screw (in)	Extended Ht. Plus Ext. Screw (in)	Plunger Diameter (in)	Base Size Length x Width (in)	Handle Length (in)	Weight (lb)	Model Number
3	8 7/16	6 1/2	2	15	17	7/8	4 7/16 x 5 7/8	21	11	3-H-6A
5	8 5/8	6	3	14 5/8	17 5/8	1 3/16	6 1/4 x 4 11/16	21	14	5-H-6A
8	9 1/8	5 7/8	4 1/4	15	19 1/4	1 3/8	6 1/2 x 5 1/4	21	17	8-H-6A
12	9 1/8	6 1/8	3	15 1/4	18 1/4	1 3/8	6 3/4 x 5 3/4	21	21	12-H-5.5A
20	10 7/8	6 3/4	–	17 5/8	17 5/8	1 7/8	6 3/4 x 6 7/8	21	38	20-H-8SA
30	11 1/8	7	–	18 1/8	18 1/8	2 1/8	5 1/2 x 7	21	45	30-H-7A

RAM-PAC® HYDRAULIC PULLERS

How to choose a puller

When buying a puller it is important to consider 3 basic specifications: Reach, Spread and Capacity.

"A" Reach
Reach is the distance from the base of the hub to the flats of the jaws. This must be greater than the distance from the end of the shaft to behind the item being pulled. The maximum reach of each puller is always given.

"B" Spread
Spread is the distance between the jaws. This must be greater than the diameter of the item being pulled.

"C" Capacity
Capacity is the amount of force each puller is capable of safely exerting.

For Hydraulic Pullers: 8-12 tons of pressure are required for each inch of shaft diameter.

CAUTION NOTICE

The operation of a puller represents the application of considerable amounts of power, often measured in TONS. For this reason it is necessary to take certain precautions.

Always wear Safety Glasses.

Keep forcing screw and hub threads, clean and oiled.

Do not heat or grind puller parts. This will cause loss of strength and void the warranty.

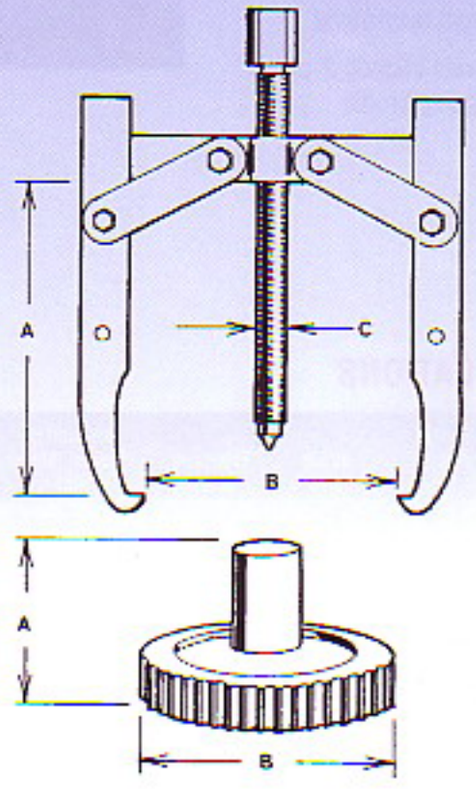
Be sure puller is aligned and kept from cocking.

Do not use cheaters or extend wrenches.

Cover or shield work area to prevent parts from flying.

When possible, use the next larger size puller to prevent overloading.

Adapter and attachments are rated at various capacities. When used with a puller of larger capacity, never exceed the capacity of the smallest adapter.

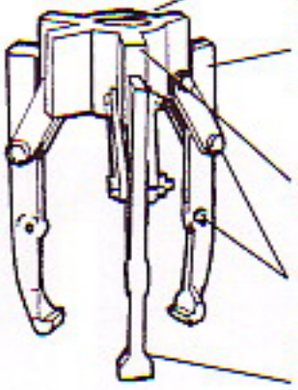


RAM-PAC HYDRAULIC TOOLS

10 TON 2/3-JAW CONVERTIBLE PULLER

Made in USA

Combine the ease and speed of hydraulic power with the versatility of these 10-TON HYDRAGRIP PULLERS. Jaw pullers feature a convertible hub for 2 or 3 jaw pulling. All are quality made to give dependable trouble-free service. Save time and money with these lightweight easy to handle hydraulic pullers.



Single Piston for direct in-line thrust

Dropped Forged, Heat Treated Alloy Steel for maximum strength

Convertible Hub for 2 or 3 arm pulling

Adjustment Holes for long or short reach

Lock on Jaws the harder the pull the tighter they grip

10 TON 2/3 JAW CONVERTIBLE PULLER SPECIFICATIONS

Rated Load (ton)	Number of Jaws	Spread (in)	Maximum Reach Under Cylinder (in)	Type of Hand Pump*	Type of Cylinder †	Weight (lb)	Model Number
10	2-3 Convertible	0 to 12	Short 6 15/16 Long 9	—	—	27	P-10-01-23
10	2-3 Convertible	0 to 12	Short 6 15/16 Long 9	—	RC-10-SA-6	53	PH-10-01-23
10	2-3 Convertible	0 to 12	Short 6 15/16 Long 9	HP-55	RC-10-SA-6	69	PHS-10-01-23

* *See page 15 for pump description. Set also includes six-foot hydraulic hose.*
** *Includes adapter head H4-106 (page 36).*
† *See page 2 and 3 for cylinder description.*

HAND PUMP SPECIFICATIONS

Rated Load Puller/ Press Puller (ton)	Hand Pump Model Number	Pump Plunger Dia. (in)	Pump Plunger Stroke (in)	Pump Plunger Displacement (in3)	Usable Oil Capacity (in3)	Handle Length (in)	Pump Length (in)	Pump Width (in)	Pump Height (in)	Pump Weight (lb)
10/20/30	HP-55	½	1	0.19	37	20	24½	5½	6¼	16
60	HP-150	½	1	0.19	143	20	26½	7	7⅜	29
		1		0.78						
60†	HP-520	½	1⅛	0.28	24	24	25**	11	11	57
		2⅝		8.1						
10/20/30/60‡	HUP-180	—	—	—	106	—	6½	6½	16¼	41

†*Optional hand-powered unit. Available on request.*
‡*Optional electric-powered unit. Available on request.*
* *Without handle*

HYDRAULIC PULLERS 2-JAW

Flexibility for a wide spectrum of light to heavy-duty pulling tasks.

FEATURES

- Choice of two or three-jaw models
- Adjustable puller jaws for maximum flexibility
- Forged, heat-treated alloy steel jaws provide maximum strength
- Unique jaw design strengthens grip as pulling force increases, minimizing slippage
- May be ordered as individual components, puller/cylinder units, or complete operating sets consisting of puller, cylinder, coupling, six foot hose and RAM-PAC® hydraulic hand pump or portable power pump

All pullers come standard with adjusting screw and crank.

SPECIFICATIONS

Rated Load (ton)	Number of Arms	Spread (in)	Maximum Reach Under Cylinder (in)	Type of Hand Pump*	Type of Cylinder †	Weight (lb)	Model Number
20	2	16	11½	–	–	27	P-20-01-02
20	2	16	11½	–	RC-20-CH-3ST	53	PH-20-01-02
20	2	16	11½	HP-55	RC-20-CH-3ST	69	PHS-20-01-02
30	2	26	19 7/16	–	–	45	P-30-01-02
30	2	26	19 7/16	–	RC-30-CH-2.5ST	81	PH-30-01-02
30	2	26	19 7/16	HP-55	RC-30-CH-2.5ST	96	PHS-30-01-02
60	2	36	28¼	–	–	164	P-60-01-02
60	2	36	28¼	–	RC-60-CH-3 ST	226	PH-60-01-02
60	2	36	28¼	HP-150	RC-60-CH-3 ST	256	PHS-60-01-02

2-Jaw pullers are available as puller only with no hydraulics, puller with hydraulic cylinder or as puller with cylinder, hand pump and 6-foot hose. See chart on the left.

** See page 15 for pump description. Set also includes HAC-66-72 six-foot hydraulic hose.*
† See page 10 for cylinder description.

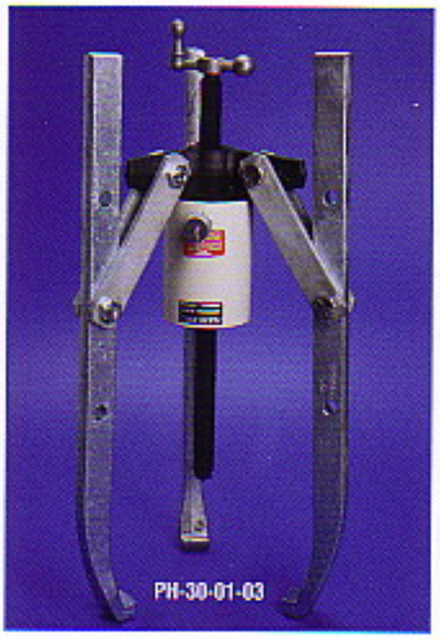
RAM-PAC HYDRAULIC TOOLS

HYDRAULIC PULLERS 3-JAW

CAUTION

For better leverage and even distribution of force,use a three-jaw puller whenever clearance permits. Always use safety glasses when operating hydraulic equipment. Make sure load is aligned to keep pull in a straight line.


PH-20-01-03


PH-30-01-03


PH-60-01-03

3-Jaw pullers are available as puller only with no hydraulics, puller with hydraulic cylinder or as puller with cylinder, hand pump and 6-foot hose. See chart below.

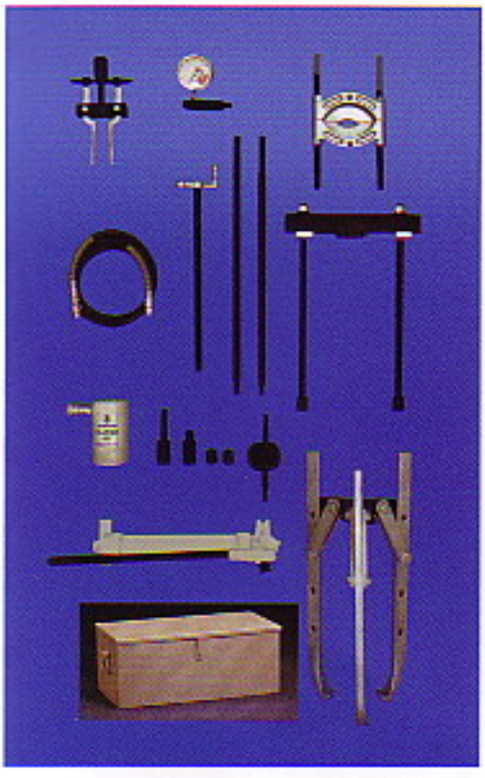
SPECIFICATIONS

Rated Load (ton)	Number of Arms	Spread (in)	Maximum Reach Under Cylinder (in)	Type of Hand Pump*	Type of Cylinder †	Weight (lb)	Model Number
20	3	20	11½	—	—	39	P-20-01-03
20	3	20	11½	—	RC-20-CH-3ST	65	PH-20-01-03
20	3	20	11½	HP-55	RC-20-CH-3ST	81	PHS-20-01-03
30	3	35	19 7/16	—	—	66	P-30-01-03
30	3	35	19 7/16	—	RC-30-CH-2.5ST	102	PH-30-01-03
30	3	35	19 7/16	HP-55	RC-30-CH-2.5ST	117	PHS-30-01-03
60	3	44	28¼	—	—	213	P-60-01-03
60	3	44	28¼	—	RC-60-CH-3ST	275	PH-60-01-03
60	3	44	28¼	HP-150	RC-60-CH-3ST	305	PHS-60-01-03

** See page 15 for pump description. Set also includes HMC-66-72 six-foot hydraulic hose.*
† See page 10 for cylinder description.

HYDRAULIC PULLER SETS

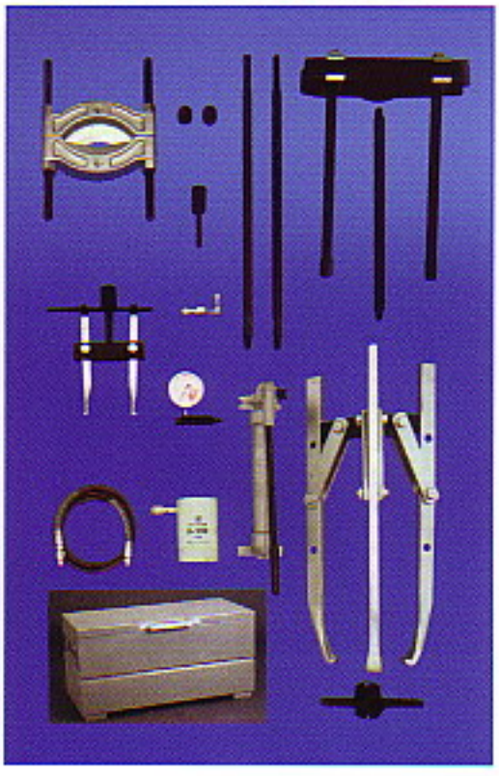
20 TON INDUSTRIAL SET



07-523	20 Ton Industrial Set
HP-55	Hand Pump
RC-20-CH-3ST	20 Ton Cylinder
HA-86-72	High Pressure Hose
HA-17	Hose Coupler
P-20-01-03	20-Ton, 3-Jaw Puller
93-372	20-Ton, 2-Jaw, Hub
P-20-02	20-Ton Press Puller
07-448	20" x 1-8 Adjusting Screw
07-449	Crank Handle
07-441	½" Pushing Adapter
HA-91	Gauge Tee
HA-90	Gauge
IP-20-02	1 ½-6" Spread Internal Puller
BS-20-02	½ -6" Bearing Separator
LS-20-02	22 ½" Legs for Press-Puller (PR)
08-730	1-8F x ¾-18M Adapter
08-752	¾-16 F x ¾-16F Adapter (2)

Wt. 126 lbs.

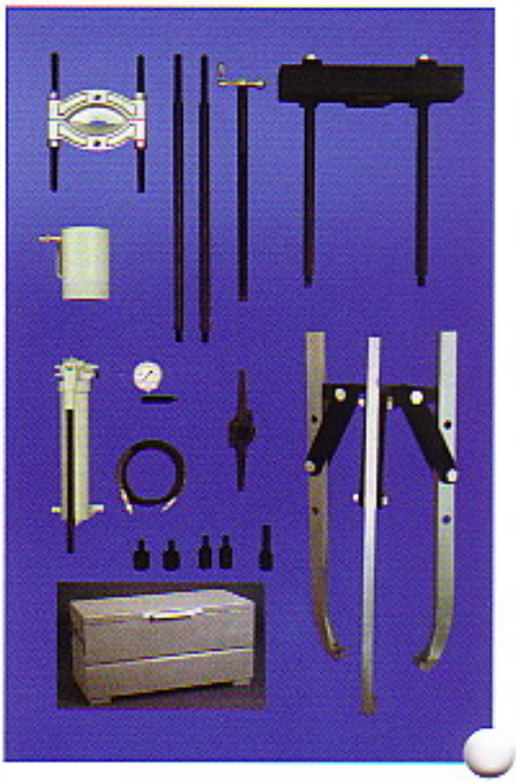
30 TON HEAVY DUTY SET



07-535	30 Ton Heavy Duty Set
HP-55	Hand Pump
RC-30-CH-2.5ST	30 Ton Cylinder
HA-86-72	High Pressure Hose
HA-17	Hose Coupler
P-30-01-03	30-Ton, 3-Jaw Puller
93-382	30-Ton, 2-Jaw, Hub
P-30-02	30-Ton Press Puller
07-468	24" x 1 ¼-7 Adjusting Screw
07-449	Crank Handle
07-462	¾" Pushing Adapter
HA-91	Gauge Tee
HA-90	Gauge
IP-30-02	3-9" Spread Internal Puller
BS-30-02	¾ - 7 ½" Bearing Separator
LS-30-02	28" Legs for Press-Puller (PR)
08-758	1 -14F x 1 -14F Adapter (2)

Wt. 238 lbs.

60 TON EXTRA HEAVY DUTY SET



07-565	60 Ton Extra Heavy Duty Set
HP-150	Hand Pump
RC-60-CH-3ST	60 Ton Cylinder
HA-86-72	High Pressure Hose
HA-17	Hose Coupler
P-60-01-03	60-Ton, 3-Jaw Puller
93-392	60-Ton, 2-Jaw, Hub
P-60-02	60-Ton Press Puller
07-488	30" x 1 ⅜-5 ½ Adjusting Screw
07-489	Crank Handle
07-483	1" Pushing Adapter
HA-91	Gauge Tee
HA-90	Gauge
BS-60-02	1 1/4 - 10" Bearing Separator
LS-60-02	Legs for Press-Puller (PR)
08-740	1 ¼-12F x 1-14M Adapter (2)
08-742	1 ⅜-5 ¼F x 1-8M Adapter
08-743	1 ⅜-5 ¼F x 1-14M Adapter

Wt. 576 lbs.

RAM-PAC HYDRAULIC TOOLS

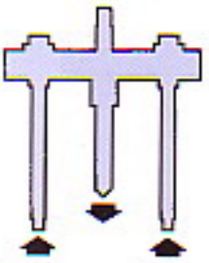
HYDRAULIC PRESS PULLERS

For superior leverage and even distribution of force.

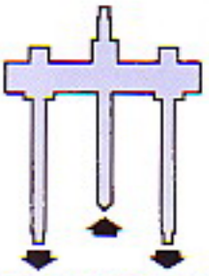
Reduce down time by having the best tool available for removing and installing gears, bearing, pulleys, shafts, and other press fitted parts. Bearing Puller Attachments, Internal Pullers, Adapters, and a variety of leg lengths make **HYDRAGRIP PRESS-PULLERS** the ideal tool for pushing or pulling.

FEATURES

- Ideal for the removal and installation of a wide variety of press-fit parts
- Select from 20, 30, and 60-ton units
- Same quality construction as RAM-PAC® hydraulic pullers
- Complete selection of accessories extends flexibility
- May be ordered as individual components, press puller/cylinder units, or complete operating sets consisting of press puller, cylinder, coupling, six-foot hydraulic hose and RAM-PAC® hydraulic hand pump or portable power pump



Ram below cross block causes adjusting screw to push.



Ram above cross block causes adjusting screw to pull.

PHS-20-02 – *20 Ton Hydraulic Press-Puller*
Complete with pump, hose, ram, adjusting screw, crank handle, and 08-587 16 1/2" legs. Leg ends have 5/8"-18 threads.

PHS-30-02 – *30 Ton Hydraulic Press-Puller*
Complete with pump, hose, ram, adjusting screw, crank handle, and 08-592 18" legs. Leg ends have 1"-14 threads.

PHS-60-02 – *60 Ton Hydraulic Press-Puller*
Complete with pump, hose, ram, adjusting screw, crank handle, and 07-368 24" legs. Leg ends have 1 1/4"-12 threads.

SPECIFICATIONS

Rated Load (ton)	Spread (in)	Maximum Reach Under Cylinder (in)	Type of Hand Pump*	Type of Cylinder	Weight (lb)	Model Number
20	4¾ to 12¾	9 1⅛	–	‡	25	P-20-02
20	4¾ to 12¾	9 1⅛	–	RC-20-CH-3ST	49	PH-20-02
20	4¾ to 12¾	9 1⅛	HP-55	RC-20-CH-3ST	66	PHS-20-02
30	8½ to 16¾	10⅞	–	‡	41	P-30-02
30	8½ to 16¾	10⅞	–	RC-30-CH-2.5ST	65	PH-30-02
30	8½ to 16¾	10⅞	HP-55	RC-30-CH-2.5ST	82	PHS-30-02
60	8½ to 20½	14½	–	‡	122	P-60-02
60	8½ to 20½	14½	–	RC-60-CH-3ST	184	PH-60-02
60	8½ to 20½	14½	HP-150	RC-60-CH-3ST	214	PHS-60-02

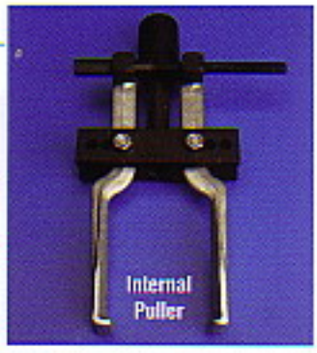
‡ Use cylinder with following specifications:

Rated Load (ton)	Model Number	Cylinder Mounting Thread	Internal Saddle Thread
20	RC-20-CH-3ST	(2) ⅜-16 on 3 ¼" centers	1"-8
30	RC-30-CH-2.5ST	(2) ⅜-16 on 3 ¼" centers	1 ¼"-7
60	RC-60-CH-3ST	(2) ½-13 on 5 ½" centers	1 ½"-5 ½

HYDRAULIC PULLER ACCESSORIES

INTERNAL PULLERS

- Can be used with 20 and 30-ton press pullers
- Removes bearing cups, sleeves, bushings and other objects from blind holes
- Prevents damage to internal parts
- Three-hole hub adjustment provides wide spread range


Internal Puller

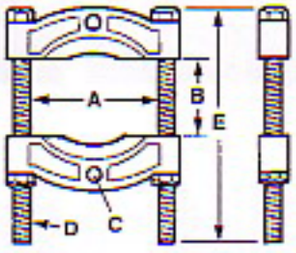
SPECIFICATIONS

For Rated Load Puller/Press Puller (ton)	Spread (in)		Reach (in)	Weight (lb)	Model Number
	Min.	Max.			
20 Ton	1½	6	4	4	IP-20-02
30 Ton	3	9	5¼	14	IP-30-02

BEARING SEPARATORS

- Used with two-arm puller and press pullers
- Easily removes bearing, pulleys, cone-shaped gears and other hard-to-grip parts
- Thin, beveled jaw edges can wedge behind hard-to-reach areas


Bearing Separator



SPECIFICATIONS

For use with the puller capacities listed below	Dimentions (in)						Weight (lb)	Model Number
	A	B		C	D	E		
		Min.	Max.					
20 Ton	6	½	5 ¾	⅝-18	¾	10 ¾	12	BS-20-02
30 Ton	7 ⅜	⅝	8	1-14	⅞	14 ⅜	20	BS-30-02
60 Ton	13	1 ¼	10	1¾-12	1 ½	18	120	BS-60-02

PUSHING ADAPTERS

- Easily converts hydraulic pullers for pushing applications

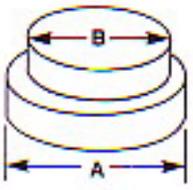

Pushing Adapters

SPECIFICATIONS

For Rated Load Press Puller (ton)	Diameter (in)	Weight (lb)	Model Number
20	½	1	HA-113
20	¾	1	HA-114
30	¾	1	HA-115
30	1	1	HA-116
60	1	1	HA-117
60	1¼	1	HA-118

STEP PLATE SETS

- For use on press puller forcing screw when shaft has hollow end
- Both sets fit all models




Step Plate

SPECIFICATIONS

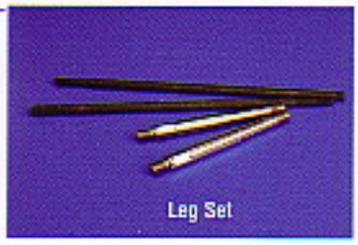
Number Included in Set	Diameter "A" (in)	Diameter "B" (in)	Weight (lb)	Model Number
1	1	¾	3	HA-110
1	1 ⅛	⅞		
1	1 ¼	1		
1	1 ⅜	1 ⅛		
1	1 ⅜	1 ¼		
1	1 ½	1 ⅜		
1	1 ⅝	1 ½		
1	2	1 ⅝		
1	2 ⅛	1 ¾		
1	2 ⅜	1 ⅞		
1	2 ½	2		
1	2 ⅝	2 ⅛	3	HA-111
1	2 ¾	2 ¼		
1	2 ⅞	2 ⅜		
1	3	2 ½		
1	3 ⅛	2 ¾		
1	3 ½	3		

RAM-PAC HYDRAULIC TOOLS

HYDRAULIC PULLER ACCESSORIES

LEG SETS

- Permit adaptability to a greater range of tasks


Leg Set

SPECIFICATIONS

For Rated Load Press Puller (ton)	Set Includes	Weight (lb)	Model Number
20	Two female adapters ⅝"- 18 x ¾"-16, Leg lengths of 4½, 9½, and 22½ inches	17	LS-20-02
30	Two female adapters 1"-14 x 1"-14, Leg lengths of 8 and 28 inches	32	LS-30-02
60	Two leg , 34 inches long	47	LS-60-02

MALE ADAPTER SETS

- For use on press puller legs or forcing screw when parts have tapped holes


Male Adapter Set

SPECIFICATIONS

For Rated Load Press-Puller (ton)	Number Included in Set	Male End (in)	Female End (in)	Length (in)	Weight (oz)	Weight (lb)	Model Number
20	2	⅝-13	⅝-18	2½	5	5	HA-102
	2	¾-11	⅝-18	2¼	5		
	2	⅞-16	⅝-18	2¼	5		
	2	⅞-10	⅝-18	2¼	5		
	2	⅞-9	⅝-18	2¼	6		
	2	1-14	⅝-18	2¼	6		
	1	⅝-18	1-8	3½	16		
	1	1-14	1-8	3½	18		
30	2	¾-11	1-14	2½	9	3	HA-103
	2	¾-18	1-14	2½	7		
	2	⅞-16	1-14	2½	10		
	2	⅞-10	1-14	2½	10		
	1	⅝-18	1 ⅛-7	4	20		
	1	1-14	1 ⅛-7	4	24		
60	2	1-14	1 ⅛-12	4½	28	3	HA-104
	2	1⅛-12	1 ⅛-12	4½	40		
	1	1-14	1 ⅛-5 ½	4	25		
	1	1-8	1 ⅛-5 ½	4	26		

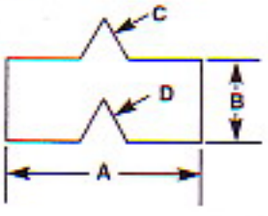
FEMALE ADAPTER SET

- For use on press puller legs or forcing screw when parts are threaded or have threaded studs
- When used for legs, two sets are required
- Fits all models


Female Adapter

SPECIFICATIONS

Number Included in Set	Size (in)	Weight (oz)	Model Number
1	⅝-18 x ⅝-18	2	HA-112
1	⅝-18 x ¾-16	3	
1	⅝-18 x ¾-14	4	
1	⅝-18 x 1-14	5	
1	⅝-18 x 1 ⅛-12	7	
1	⅝-18 x 1 ¼-12	7	
1	⅝-18 x 1 ½-12	13	



SHAFT PROTECTOR SET

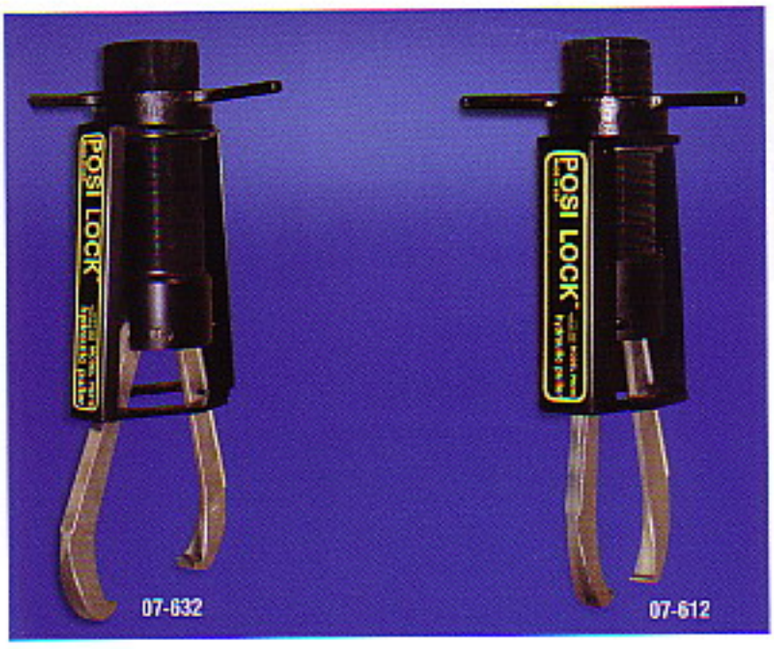
- For use between forcing screw and shaft end to protect shaft
- Fits all models


Shaft Protector

SPECIFICATIONS

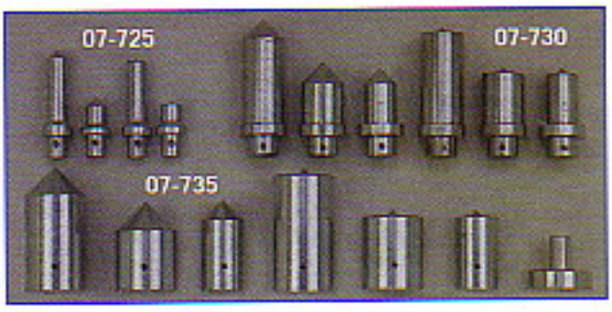
Number Included in Set	"A" (in)	"B" (in)	"C" 60° M (in)	"D" 60° F (in)	Weight (lb)	Model Number
1	1½	¾	⅛	7/16	3	HA-105
1	1¼	⅝	⅛	⅜		
1	1	¾	⅛	5/16		
1	¾	¾	¼	¼		
1	⅝	⅝	¼	¼		
1	½	½	3/16	3/16		

POSILOCK HYDRAULIC 2-JAW PULLERS



Posilock Hydraulic pullers combine all the advantages of a Posilock puller with hydraulic pulling power. The cage keeps the jaws under control at all times. Jaws are opened, closed and locked-on, all by simply turning the T-handle. One man can quickly and easily align and lock the puller in place, and once it is on, it cannot slip off. Pulling is safer for both the operator and the parts being removed.

Posilock Hydraulic pullers are available in 15 Ton, 25 Ton and 50 Ton capacities in both 2-Jaw and 3-Jaw models.



TWO JAW PULLERS (10,000 PSI CAPACITY)

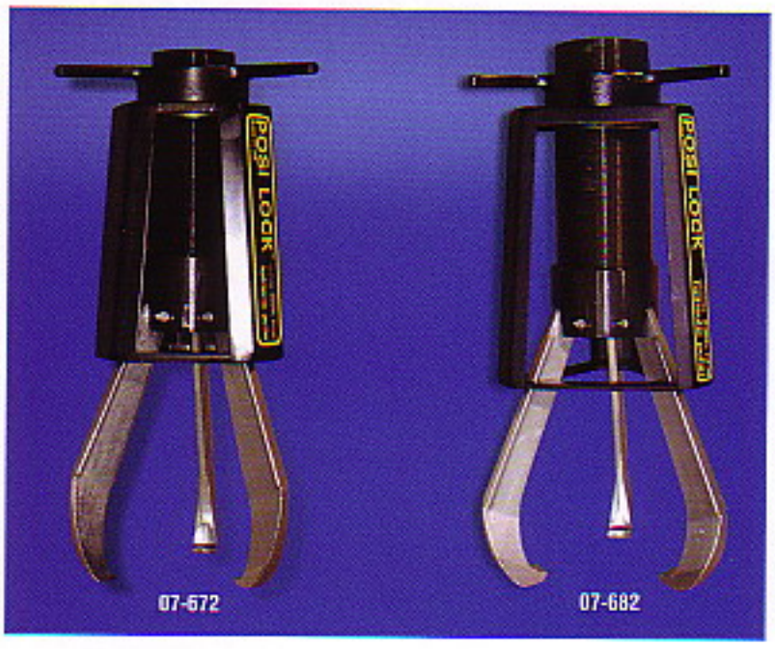
Model Number	Rated Capacity	Spread (in)	Ram Stroke	Description	Weight (lb)
07-610	15 Ton	1-15	10	Complete with cylinder, point set and lift plate	49
07-612	15 Ton	1-15	10	Puller only	22
07-620	25 Ton	2⅛-18	14¼	Complete with cylinder, point set and lift plate	96
07-622	25 Ton	2⅛-18	14¼	Puller only	47
07-630	50 Ton	3-25	14	Complete with cylinder, point set and lift plate	192
07-632	50 Ton	3-25	14	Puller only	90

INTERCHANGABLE RAM POINTS FOR HYDRAUILIC CYLINDERS

Model Number	Puller Capacity	Fits Model	Ram Point Style	Size	Weight (lb.)
07-725	15	07-610 07-660	Flat	1"x1" 1x3"	½ 1
			Tapered	1" x 1 ½" 1" x 3 ½"	½ 1
07-730	25	07-620 07-670	Flat	1 ½" x 2 ½" 2" x 2 ½" 2"x 4"	1 1/2 2 1/2 3 1/2
			Tapered	1 ½" x 2 ½" 2" x 2 ½" 2"x 4 ½"	1 1/2 2 1 1/2
07-735	50	07-630 07-680	Flat	2" x 3" 2 ½" x 3" 2 ½"x 5"	2 5 7 1/2
			Tapered	2" x 3 ½" 2½" x 5 ½" 2½" x 5 ½"	2 5 6 1/2
			Ram Point Adapter	2 ½" x 2 ½"	2

RAM-PAC HYDRAULIC TOOLS

POSILOCK HYDRAULIC 3-JAW PULLERS



Pump, Hose and Hose Coupler must be ordered separately.

THREE JAW PULLERS (10,000 PSI CAPACITY)

Model Number	Rated Capacity	Spread (in)	Ram Stroke	Description	Weight (lb)
07-660	15 Ton	1-15	10	Complete with cylinder, point set and lift plate	52
07-662	15 Ton	1-15	10	Puller only	25
07-670	25 Ton	2½-18	14¼	Complete with cylinder, point set and lift plate	106
07-672	25 Ton	2½-18	14¼	Puller only	55
07-680	50 Ton	3-25	14	Complete with cylinder, point set and lift plate	202
07-682	50 Ton	3-25	14	Puller only	100

OPTIONAL LONG JAWS

Model Number	Fits Models	No. Jaws Required	Spread	Reach
07-710	07-612	2	1.5"-22"	16"
	07-662	3		
07-715	07-662	2	1.5"-30"	20"
	07-672	3		
07-720	07-632	2	2"-36"	28"
	07-682	3		

07-745 Puller Cart

Heavy-duty cart holds puller, pump, hose and points. Wheels right to the job: a safe, easy way to put everything in easy reach. Weighs 78 lbs.

RAM-PAC® HYDRAULIC PRESSES

Versatile presses to perform a variety of production and maintenance jobs – bending, straightening, holding and pressing. Install and remove gears, pulleys, pins, bushings and more.

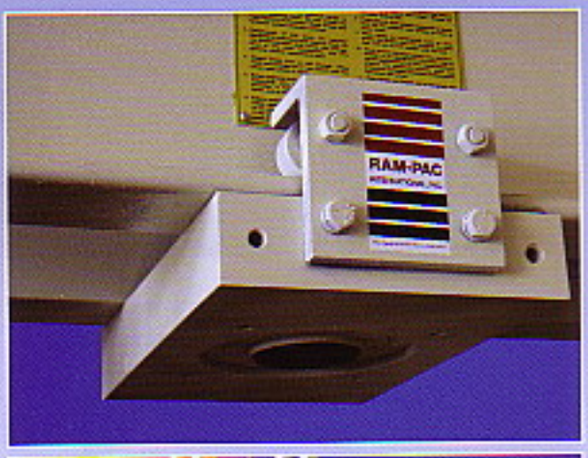
RAM-PAC HYDRAULIC PRESSES

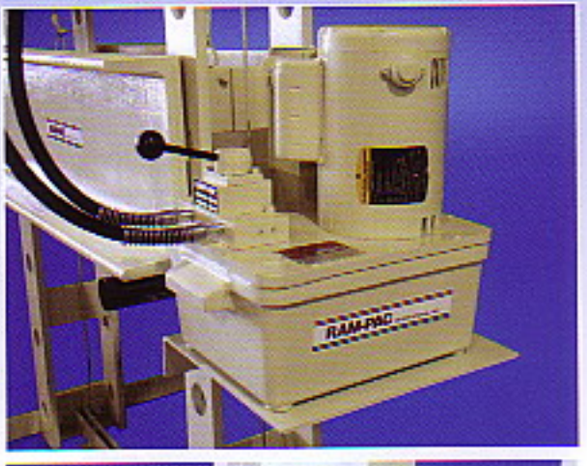
Ram-Pac offers both 10-ton capacity bench presses as well as 10, 30, 50, and 100-ton floor standing H-Frame presses.

The 10-ton bench presses come with either a 6" or 10" stroke single acting cylinder and are powered by either a hand pump or universal electric motor driven pump.

You can chose H-Frame presses with either single or double acting cylinders that are powered by hand pumps, electric motor or air motor driven pumps.

If you do not find a model with the pump and cylinder combination that you need, contact us about changing the components to meet your requirements.



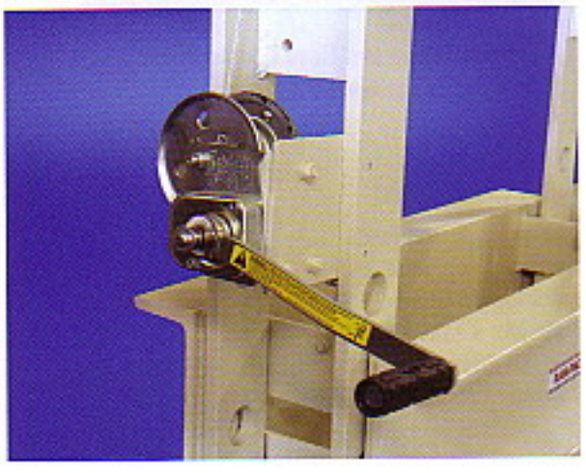


Standard features on 30, 50, and 100-ton H-frame press models make for easy of operation and increased productivity.

The unique bed lifting mechanism shifts from maximum to minimum opening in one smooth operation- without moving chains or incremental lowering and lifting.

Cylinder rolls smoothly on 4 rollers to provide easy movement when the cylinder position needs to be changed for specific applications.


HPH-101



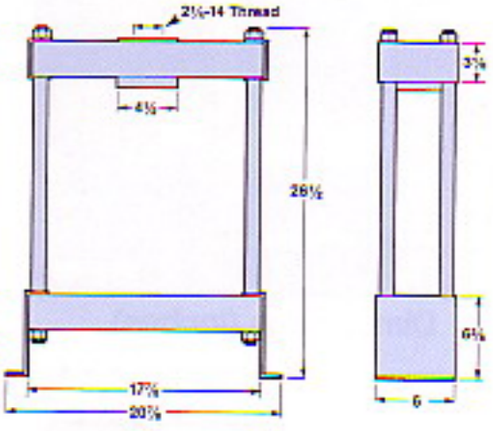
RAM-PAC HYDRAULIC TOOLS

BENCH PRESSES

- Select from six models for 10-ton rated loads
- Hand or universal motor electric pump
- Bench mounted
- Open design permits loading from either side
- Rugged steel construction throughout
- Ram cylinder easily adjustable side to side
- Complete with frame, cylinder, pump, and hose

** Bench Press shipped unassembled*

Dimensions (Inches)



HYDRAULIC BENCH PRESSES
Specifications

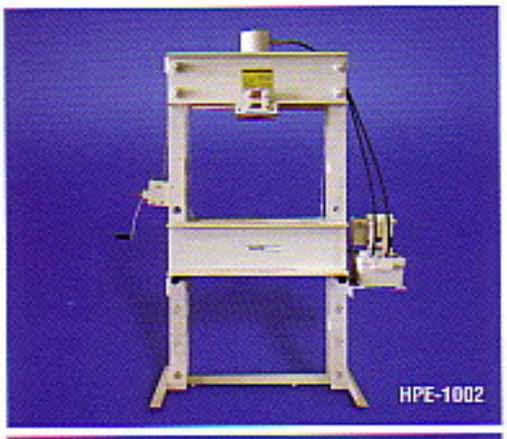
Press Rated Load (ton)	Model Number	Pump Model Number	Type Pump	Cylinder Model Number*	Type Cylinder	Cylinder Stroke(in)	Cylinder Speed Advance/ Pressing
10	**BPH-101**	HP-55	Manual	RC-10-SA-6	Single-acting Spring-return	6⅛	.08/.09 (in/stroke)
10	**BPH-102**	HP-55	Manual	RC-10-SA-10	Single-acting Spring-return	10⅛	.08/.08 (in/stroke)
10	**BPH-103**	HP-150	Manual	RC-10-SA-6	Single-acting Spring-return	6⅛	.34/.08 (in/stroke)
10	**BPH-104**	HP-150	Manual	RC-10-SA-10	Single-acting Spring-return	10⅛	.34/.08 (in/stroke)
10	**BPU-101**	HUP-180-2	Universal Electric	RC-10-SA-6	Single-acting Spring-return	6⅛	89.45/8.05 (in min)
10	**BPU-102**	HUP-180-2	Universal Electric	RC-10-SA-10	Single-acting Spring-return	10⅛	89.45/8.05 (in min)

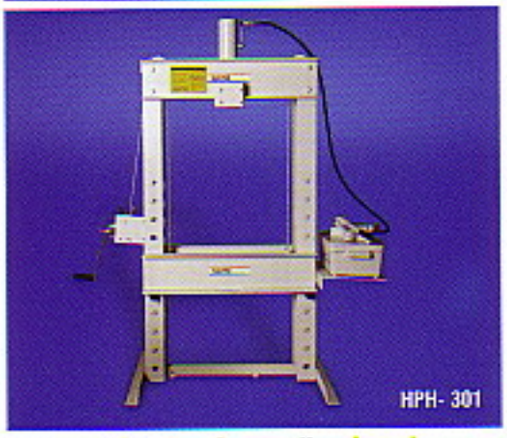
** HA-106 threaded adapter head can be used.* *See page 46.*

H-FRAME PRESSES

FEATURES

- Rated loads of 10, 30, 50 and 100-tons.
- Select from hand, electric, or air-powered pumps.
- Open design permits loading from either side.
- Unique bed lifting mechanism shifts from maximum to minimum opening in one smooth operation without re-chaining or incremental lowering and lifting. Standard on all 30, 50 and 100-ton presses.
- Built-in relief valves on pumps protect equipment.
- Hose(s) included.

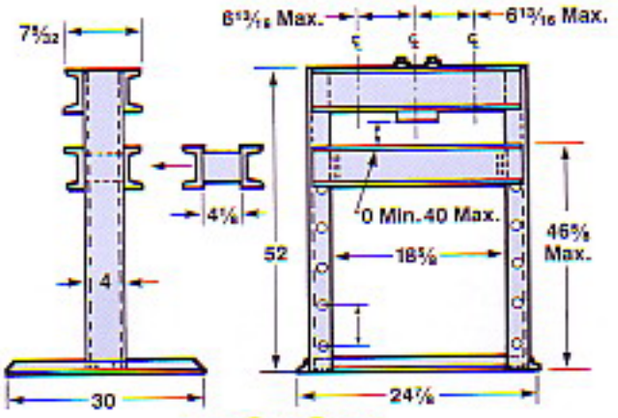




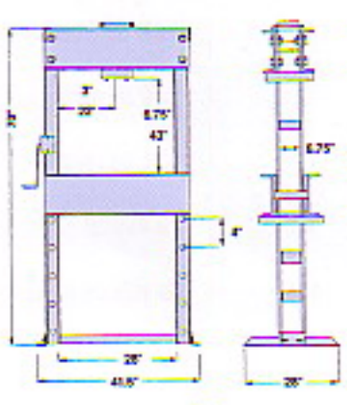
A RAM-PAC® H-FRAME PRESS AND PUMP FOR EVERY APPLICATION.

- **Hand Pump Model HP-55** – Medium size pump for applications where pressures up to 10,000 psi are required. Easy to operate. Available in single-acting cylinder presses only.
- **Power Pump Model HEP-560** – Fast-acting, precision two-stage pump powered by 1 1/2 hp, 115 VAC, 60 Hz single-phase motor. Available in both single and double-acting cylinder presses.
- **Hand Pump Model HP-150 and HP-150-V** – Automatic, two-speed pump. Available in both single and double-acting cylinder presses
- **Hand Pump Model HP-520** – Automatic, two-speed pump with 2 1/4-gallon reservoir. Designed for applications where fast, low-cost cycle time is required. Available in both single and double-acting cylinder presses.
- **Power pump Model HAP-560** – Fast-acting, two stage pump powered by 4 hp air motor. Available in both single and double-acting cylinder presses.
- **Power Pump Model HUP-180** – Heavy-duty 1/2 hp universal motor, See page 16.

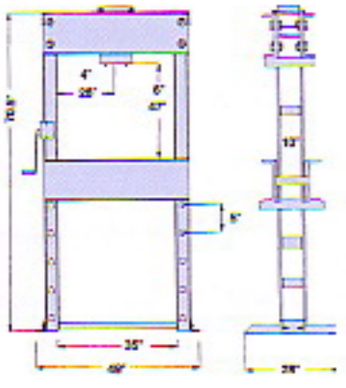
Dimensions (Inches)



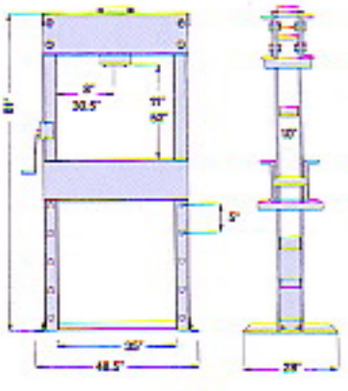
10-ton Press Frame



30 Ton



50 Ton



100 Ton

RAM-PAC HYDRAULIC TOOLS

H-FRAME PRESSES
Press Selection Guide

Press Rated Load (ton)	Model Number	Pump Model Number	Type Pump	Cylinder Model Number	Type Cylinder	Cylinder Stroke (in)	Cylinder Speed Advance/Pressing	Height* (in)
10	HPH-101	HP-55	Manual	RC-10-SA-6	Single-acting Spring-return	6 1/8	.08/.05 (in/stroke)	57 3/4
	HPH-102	HP-55	Manual	RC-10-SA-10	Single-acting Spring-return	10 1/8	.08/.05 (in/stroke)	61 3/4
	HPU-101	HUP-180-2	Universal Electric	RC-10-SA-6	Single-acting Spring-return	6 1/8	96.93/8.05 (in/min)	57 3/4
	HPU-102	HUP-180-2	Universal Electric	RC-10-SA-10	Single-acting Spring-return	10 1/8	96.93/8.05 (in/min)	61 3/4
30	HPE-301	HEP-560-2	Electric	RC-30-SA-14	Single-acting Spring-return	14	73.93/8.62 (in/min)	78 3/4
	HPE-302	HEP-560-3S	Electric	RC-30-SA-14	Single-acting Spring-return	14	73.93/8.62 (in/min)	78 3/4
	HPE-303	HEP-560-4S	Electric	RC-30-DA-16	Double-acting Hydraulic-return	16	73.93/8.62 (in/min)	82 3/4
	HPE-304	HEP-560-2	Electric	RC-30-SA-14	Single-acting Spring-return	14	73.93/8.62 (in/min)	78 3/4
	HPH-301	HP-520-2	Manual	RC-30-SA-14	Single-acting Spring-return	14	1.24/.04 (in/stroke)	78 3/4
	HPH-302	HP-150	Manual	RC-30-SA-14	Single-acting Spring-return	14	.11/.03 (in/stroke)	78 3/4
	HPH-303	HP-150-V	Manual	RC-30-DA-16	Double-acting Hydraulic-return	16	.11/.03 (in/stroke)	82 3/4
	HPH-304	HP-150	Manual	RC-30-SA-6T	Single-acting Spring-return	6 1/8	.11/.03 (in/stroke)	75 3/4
	HPA-301	HAP-560-2	Air	RC-30-SA-14	Single-acting Spring-return	14	73.93/6.93 (in/min)	78 3/4
	HPA-302	HAP-560-4	Air	RC-30-DA-16	Double-acting Hydraulic-return	16	73.93/6.93 (in/min)	82 3/4
	HPU-301	HUP-180-2	Universal Electric	RC-30-SA-6T	Single-acting Spring-return	6 1/8	30.8/2.77 (in/min)	75 3/4
	HPU-302	HUP-180-2	Universal Electric	RC-30-SA-14	Single-acting Spring-return	14	30.8/2.77 (in/min)	78 3/4
50	HPH-501	HP-520-2	Manual	RC-50-SA-14	Single-acting Spring-return	14	.73/.025 (in/stroke)	75
	HPH-502	HP-520-2	Manual	RC-50-SA-6T	Single-acting Spring-return	6 1/8	.73/.025 (in/stroke)	72 1/2
	HPH-503	HP-150	Manual	RC-50-SA-6T	Single-acting Spring-return	6 1/8	.07/.02 (in/stroke)	72 1/2
	HPH-504	HP-520-4	Manual	RC-50-DA-13	Double-acting Hydraulic-return	13	.73/.025 (in/stroke)	72 1/2
	HPH-501	HAP-560-2	Air	RC-50-SA-6T	Single-acting Spring-return	6 1/8	43.60/4.10 (in/min)	72 1/2
	HPA-502	HAP-560-4	Air	RC-50-DA-13	Double-acting Hydraulic-return	13 1/8	43.60/4.10 (in/min)	72 1/2
	HPE-501	HEP-560-3S	Electric	RC-50-SA-14	Single-acting Spring-return	14	43.60/5.10 (in/min)	75
	HPE-502	HEP-560-4S	Electric	RC-50-DA-13	Double-acting Hydraulic-return	13 1/8	43.60/5.10 (in/min)	72 1/2
	HPE-503	HEP-560-4	Electric	RC-50-DA-13	Double-acting Hydraulic-return	13 1/8	43.60/5.10 (in/min)	72 1/2
	HPE-504	HEP-560-2	Electric	RC-50-SA-14	Single-acting Spring-return	14	43.60/5.10 (in/min)	75
	HPE-505	HEP-560-5	Electric	RC-50-SA-14	Single-acting Spring-return	14	43.60/5.10 (in/min)	75
100	HPH-1001	HP-520-2	Manual	RC-100-SA-10	Single-acting Spring-return	10	.39/.02(in/stroke)	83.5
	HPE-1002	HEP-560-4	Electric	RC-100-DA-13	Double-acting Hydraulic-return	13 1/8	23.26/2.71(in/min)	87

* *Including Cylinder*

NOTE: Presses other than those shown above can be specially ordered. For a quotation please contact the factory with the specifications you need.

RAM-PAC® HYDRAULIC BENDERS

These versatile tools make 90° bends in mild steel pipe in sizes ranging from 3/8 to 4 inch

All models have a minimum capacity to bend up to schedule 80 pipe

- **Select from three bending ranges.**
- **Make 90° one shot bends.**
- **Eliminate set-up and re-positioning time with One-shot bends.**
- **Precision fabricated hi-strength structural aluminum frames on 2" and 3" benders. Steel frame on 4" bender.**
- **Wood storage chest for shoes.**
- **Benders come with hand or motor driven pumps.**

(Model A-102 shown)

RAM-PAC HYDRAULIC TOOLS

90° One Shot Benders

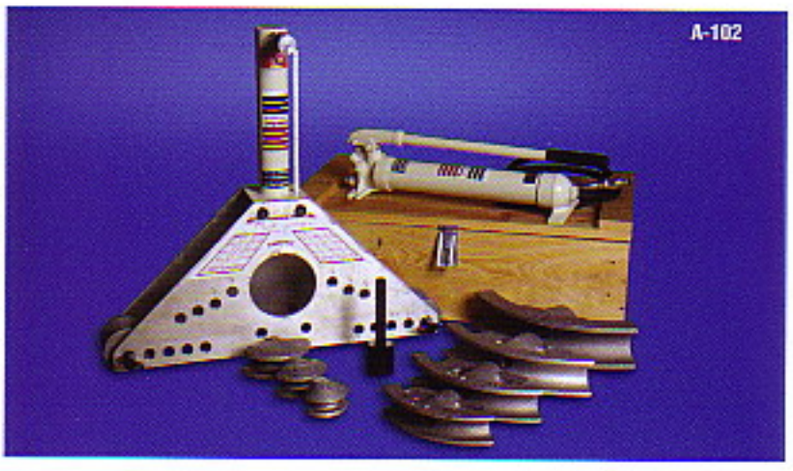
MODEL A-102 FEATURES

3/8 thru 2" Bender Set

- Makes 90° one shot bends in standard pipe from 3/8 thru 2 in. diameters.
- Will handle schedule 80 pipe to 2 in., double extra heavy to 1-1/2 in.
- Set includes:
  - (1) Hand Pump (Model HP-55)
  - (1) Frame Assembly w/10 Ton Cylinder
  - (1) Complete Set of Shoes 3/8 thru 2"
  - (1) Wood Storage Chest

To order this one shot bender with 1/2 H.P. motor Pump (HUP-180-2)

ORDER MODEL NUMBER A-102M



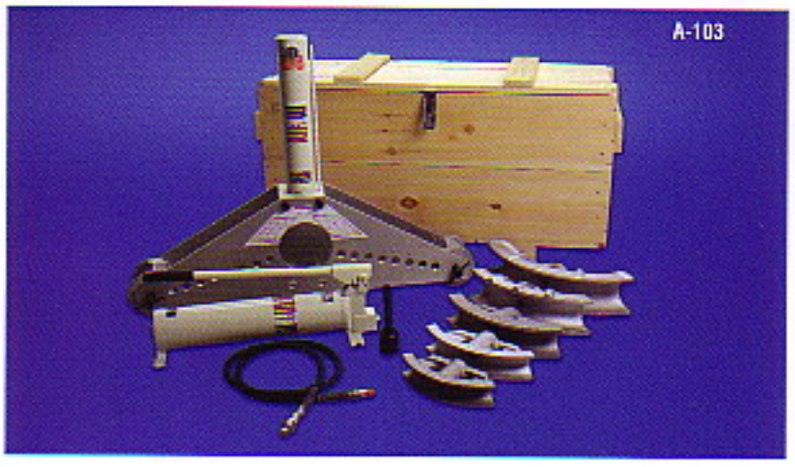
MODEL A-103 FEATURES

1 1/4 thru 3" Bender Set

- Makes 90° bends in 2 1/2 to 3 in. schedule 80 pipe, and 90° bends in 2 in. double extra heavy pipe
- Handle all forming shoes of 3 in. or smaller.
- Set includes:
  - (1) Hand Pump (Model HP-150)
  - (1) Frame Assembly w/20 Ton Cylinder
  - (1) Complete Set of Shoes 1-1/4 thru 3"
  - (1) Wood Storage Chest

To order this one shot bender with 1/2 H.P. motor Pump (HUP-180-2)

ORDER MODEL NUMBER A-103M



MODEL A-104 FEATURES

1 1/4 thru 4" Bender Set

- Makes 90° bends in 3-1/2 to 4 in. schedule 80 pipe. Will handle 3 in. pipe up to double extra heavy. Handles all forming shoes of 4 in. or smaller.
- Set includes:
  - (1) Hand Pump (Model HP-150)
  - (1) Frame Assembly w/30 Ton Cylinder
  - (1) Complete Set of Shoes 1-1/4 thru 4"
  - (1) Wood Storage Chest

To order this one shot bender with 1 1/2 H.P. motor Pump (HEP-560-3)

ORDER MODEL NUMBER A-104M

All benders come with a 6-foot hose and hose half coupling.

HYDRAULIC BENDERS

STANDARD SHOE SPECIFICATIONS

Nominal Pipe Size (in)	Actual Pipe O.D.	Centerline Bend Radius (in)	Shipping Weight (lb)	Works With Bender Size	Model Number
⅜	.675	1.5	1	2" 3" 4"	PB-48
½	.840	2	1	2" 3" 4"	PB-47
¾	1.050	2.5	1	2" 3" 4"	PB-46
1	1.315	5.75	3	2" 3" 4"	PB-90
1-¼	1.660	7.25	4	2" 3" 4"	PB-91
1-½	1.900	8.25	5	2" 3" 4"	PB-92
2	2.375	9.25	7	2" 3" 4"	PB-93
2-½	2.875	10	11	3" 4"	PB-82-1
3	3.500	12	15	3" 4"	PB-83
3-½	4.000	18	71	4"	484
4	4.500	23	88	4"	485

OPTIONAL SHOE SPECIFICATIONS

Nominal Pipe Nominal Pipe Size (in)	Actual Pipe O.D.	Centerline Bend Radius (in)	Shipping Weight (lb)	Works With Bender Size	Model Number
1	1.315	3.5	2	2" 3" 4"	PB-45
1-¼	1.660	4.5	4	2" 3" 4"	PB-44
1-½	1.900	6	5	2" 3" 4"	PB-43
2	2.375	8	7	2" 3" 4"	PB-42

ONE- SHOT BENDER CYLINDERS

FEATURES

- RAM-PAC® Bender Cylinders mount directly to bender frame.
- Specially designed heads allow for fast replacement of bending shoes.

SPECIFICATIONS

Capacity	Closed Height (in)	Stroke (in)	Used with Bender	Model Number
10 Ton Single-Acting	16	10	A-102 & A-102M	RCB-10-SA-10
20 Ton Single-Acting	20	13	A-103 & A-103M	RCB-20-SA-13
30 Ton Single-Acting	30	14	A-104 & A-104M	RCB-30-SA-14 +

+ Not Shown

RAM-PAC HYDRAULIC TOOLS

MAINTENANCE KITS

Complete kits especially designed to handle demanding maintenance tasks – lifting, pushing, clamping, bending and straightening

FEATURES

- Select from three sizes determined by capacity of cylinder, 4, 10, and 20-ton
- Each kit contains a single-acting cylinder, hand pump, 6-feet of high-pressure hose, couplings and accessories
- Includes heavy-duty, easy-to-carry storage box

NOTE: *The use of plunger toe, collar toe or other accessories reduces lifting capacity by one-half.*

WARNING: *To avoid buckling and sliding out from under load, use only one extension tube per set-up.*

4-TON
M-4-K-1 SET CONSISTING OF:

Description	Model Number
4-Ton, SA Cylinder	RC-4-SA-5A
Grooved Saddle	HA-22-4
Hand Pump	HP-45
6-Ft. Hose w/Half Coupling	HAC-86-72
3-Inch Extension Tube	C-403
6-Inch Extension Tube	C-406
10-Inch Extension Tube	C-4010
(2) 18-Inch Ext. Tubes	C-418
Male Thread Connector	C-496
(2) Male Quick Connector	C-472
(2) Lock-On Male Adapt.	C-474
(2) Lock-On Female Adapt.	C-473
(4) Lock Pins	C-475
3" Rubber Flex Head	C-463
Plunger Toe	C-464
Collar Toe	C-465
Combination Head	C-436
Cyl. Flat Base	C-458
Chain Pull Plate	C-409
(2) 5-Ft. Sling Chains w/Hook	C-408
Wedge Head	C-471
Metal Storage Case	CC-4B

10-TON
M-10-K-2 SET CONSISTING OF:

Description	Model Number
10-Ton, SA Cylinder	RC-10-SA-6A
Grooved Saddle	HA-22
Threaded Tube Coupling	HA-9
Hand Pump	HP-55
6-Ft. Hose w/Half Coupling	HAC-86-72
6-Inch Extension Tube	HA-8-6
12-Inch Extension Tube	HA-8-12
Male Thread Connector	C-1096
5" Rubber Flex Head	C-1067
Hydraulic Spreader Unit	HM-1
Plunger Toe	HA-6
Collar Toe	HA-5
Cylinder Flat Base	HA-7
Combination Head	C-1036
Metal Storage Case	CC-10C

20-TON
M-20-K-2 SET CONSISTING OF:

Description	Model Number
20-Ton, SA Cylinder	RC-20-SA-6A
Hand Pump	HP-55
6-Ft. Hose w/Half Coupling	HAC-86-72
12-Inch Extension Tube	C-2012
18-Inch Extension Tube	C-2018
24-Inch Extension Tube	C-2024
(2) Threaded Tube Couplings	HA-2009
Collar Toe	HA-2041
Grooved Saddle	HA-36
Chain Pull Plate	C-2009
(2) 8-Ft. Sling Chains w/Hook	C-2008
Metal Storage Case	X-7101

ACCESSORIES FOR 5,10 & 20 TON CYLINDERS

Individual components expand unit flexibility

(For Single-Acting, Spring Return Cylinder)

COLLAR TOE

Used On	Model No.
5 Ton	C-465
10 Ton	HA-5
20 Ton	HA-2041

PLUNGER TOE

Capacity	Model No.
5 Ton	C-464
10 Ton	HA-6

CYLINDER BASE

Capacity	Model No.
5 Ton	C-458
10 Ton	HA-7

THREADED CONNECTOR

Capacity	Model No.
5 Ton	C-496
10 Ton	C-1096
20 Ton	C-2003

CHAIN W/HOOK

Capacity	Model No.
5 Ton	C-408 (5-Ft.)
10 Ton	HA-10 (6-FL)
20 Ton	C-2008 (8-FL)

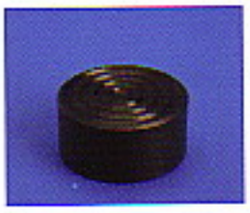
CHAIN PULL PLATE

Capacity	Model No.
5 Ton	C-409
10 Ton	HA-11
20 Ton	C-2009

THRD. ADAPTER HEAD

Capacity	Model No.
5 Ton	HA-105-4
10 Ton	HA-106
20 Ton	HA-108

GROOVED SADDLE



Capacity	Model No.
5 Ton	HA-22-4
10 Ton	HA-22
20 Ton	HA-36

WEDGE HEAD

Capacity	Model No.
5 Ton	C-471

COMINATION HEAD

Capacity	Model No.
5 Ton	C-436
10 Ton	C-1036

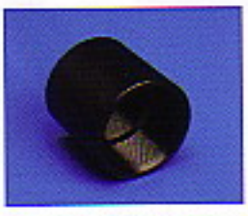
SPREADER HEAD

Capacity	Model No.
10 Ton	C-1071

RUBBER FLEX HEAD

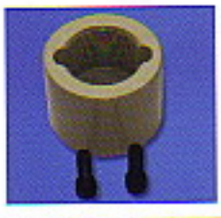
Capacity	Model No.
5 Ton	C-463
10 Ton	C-1067

PIPE COUPLING



Capacity	Model No.
5 Ton	C-428
10 Ton	HA-9
20 Ton	HA-2009

CYL. BASE ATTACHMENT



Capacity	Model No.
5 Ton	HA-107-4
10 Ton	HA-107

EXTENTION TUBES

Capacity	3"	6"	10"	12"	18"	24"
5 Ton	C-403	C-406	C-4010	-	C-418	-
10 Ton	HA-8-3	HA-8-6	-	HA-8-12	HA-8-18	HA-8-24
20 Ton	C-2003	C-2006	-	C-2012	C-2018	C-2024

IMPORTANT: Caution should be exercised when using accessories. All accessories are rated at 50% of cylinder rated load unless otherwise noted. Off-center loads reduce rated loads setups by an additional 50%. Use of only one extension tube per setup is recommended to prevent buckling or sliding out from under load. All accessories must have full thread engagement.

RAM-PAC HYDRAULIC TOOLS

GUIDLINES FOR SAFE OPPERATION

Choose the proper size cylinder or hand jack so that it is not lifting more than its rated load. If the weight of the lifted load is unknown use a pressure gauge, and do not exceed the rated working pressure.

Choose the proper size pump, either hand or power, so that the pump reservoir contains enough oil to lift the plunger through its full stroke.

Choose the proper volume pump, either hand or power, to provide satisfactory cylinder speed. If the pump is equipped with an externally adjustable relief valve the pressure should be adjusted using a pressure gauge, and by following the manufacturers recommended procedure.

Do not change the setting of any internal relief valve unless authorized by the manufacturer.

If an air driven pump is being used make sure it is connected to the proper pressure and volume of air and that proper lubrication is provided in the air line.

Make sure that the lifting unit (cylinder or hand jack) is firmly supported at the base, the load is properly supported at the lifting point, and that the lifting unit will not slip or the load shift and overturn the lifting unit.

Never stand in a direct line with the application of force or crawl under a load that is not blocked to prevent the load from falling.

After each use the equipment should be inspected and tested to 100% of rated load, and any necessary repairs should be made by qualified personnel or a factory authorized service center.

For further information on safe operating procedure and maintenance requirements consult the ANSI B30.1.

WARRANTY

RAM-PAC® warrants to the purchaser of its products that if the product or any part thereof in the judgement of RAM-PAC® is proven to be defective in material or workmanship within one year from the date of original purchase, such defects will be repaired or replaced at RAM-PAC's® option.

This warranty does not apply to any product which has been damaged by accident or which has been misused, abused, altered, or repaired by others.

This warranty is in lieu of all other warranties expressed or implied, and no other person is authorized to assume for RAM-PAC® any other liability in connection with the sale of this product.

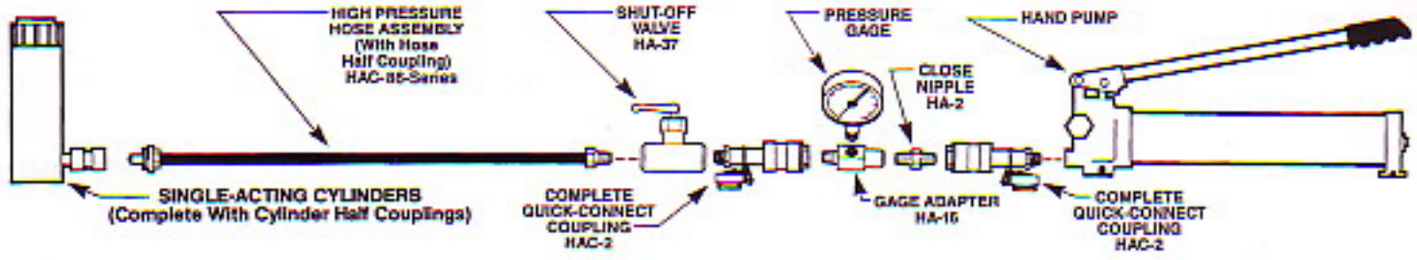
RAM-PAC® shall not be liable for any consequential, incidental or special damages including but not limited to loss or damage resulting from use or loss of use of RAM-PAC® products whatsoever, whether based on breach of contract, breach of warranty, negligence or other tort, or any strict liability theory.

All products listed in this catalog are manufactured in the United States of America.

BASIC HIGH PRESSURE HYDRAULIC SYSTEMS

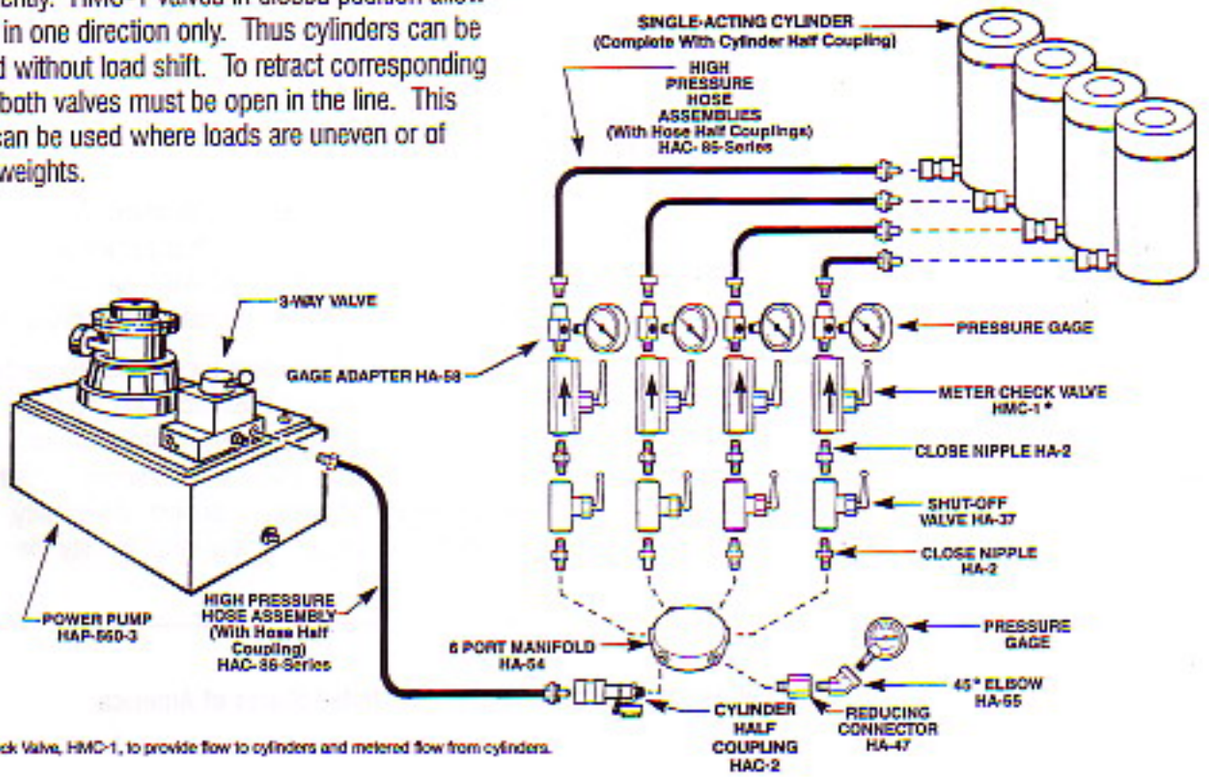
Single-acting system with one cylinder and a hand pump.

A typical simple circuit. Illustration shows correct sequence for needed components. Closing the shut-off valve keeps the cylinder extended. Gauge can be positioned at any angle for easy reading. Circuit can be simply expanded by duplicating components plus adding "T" connection.



Single-acting system with multiple cylinders and a power pump.

By using HA-37 shut-off valves, it is possible to isolate individual cylinders – raising or lowering them independently. HMC-1 valves in closed position allow free flow in one direction only. Thus cylinders can be advanced without load shift. To retract corresponding cylinder, both valves must be open in the line. This system can be used where loads are uneven or of unequal weights.

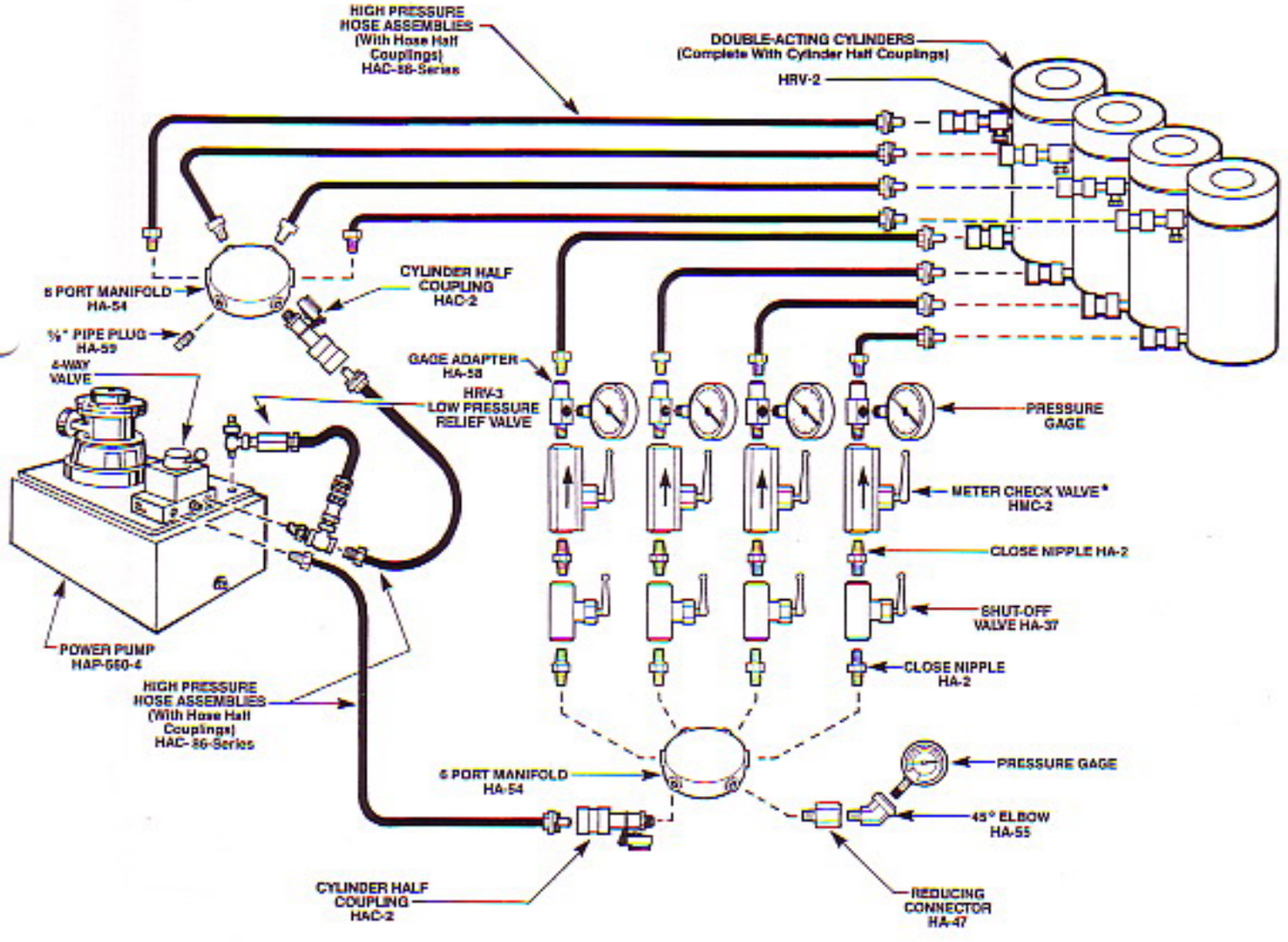


*Position Meter Check Valve, HMC-1, to provide flow to cylinders and metered flow from cylinders.

RAM-PAC HYDRAULIC TOOLS

Double-acting system with multiple cylinders and a power pump.

The two HA-54 manifolds enable a number of hoses to be connected in a convenient, orderly arrangement. Double-acting cylinders provide a fast, positive return. This is important where return time/cycle is of the essence, as in production work. The joint return of four large single-acting cylinders would be very slow if the flow had to be directed through one quick-connect coupling.



* Position Meter Check Valve, HMC-2, to provide free flow to cylinders, and metered flow from cylinders.

MODEL NUMBER INDEX

MODEL NUMBER INDEX

MODEL NUMBER INDEX

RAM-PAC HYDRAULIC TOOLS

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CONVERSION CHART

Pump Formulas

Formula For:	Word Formula:	Letter Formula
PUMP OUTLET FLOW In Gallons/Minute	$\text{Flow} = \frac{\text{rpm} \times \text{Pump Displacement (Cu. In./Rev.)}}{231}$	$Q = nd/231$
PUMP INPUT POWER In Horsepower Required	$\text{Horsepower Input} = \frac{\text{Flow Rate Output (GPM)} \times \text{Pressure (psi)}}{1714 \text{ Efficiency (Overall)}}$	$Hp_{in} = QP/1714Eff.$ or $(GPM \times psi)/1714Eff.$
PUMP EFFICIENCY Overall in Percent	$\text{Overall Efficiency} = \left(\frac{\text{Output Horsepower}}{\text{Input Horsepower}}\right) \times 100$	$Eff_{ov} = (HP_{out}/HP_{in}) \times 100$
	Overall Efficiency = Volumetric Eff. x Mechanical Eff.	$Eff_{ov} = Eff_{vol} \times Eff_{mech}$
PUMP EFFICIENCY Volumetric in Percent	$\text{Volumetric Efficiency} = \frac{\text{Actual Flow Rate Output (GPM)}}{\text{Theoretical Flow Rate Output (GPM)}} \times 100$	$Eff_{vol} = (Q_{act}/Q_{theo}) \times 100$
PUMP EFFICIENCY Mechanical in Percent	$\text{Mechanical Efficiency} = \frac{\text{Theoretical Torque to Drive}}{\text{Actual Torque to Drive}} \times 100$	$Eff_{mech} = (T_{theo}/T_{act}) \times 100$
PUMP LIFE B_{10} Bearing Life	B_{10} Hrs. Bearing Life = Rated Life Hrs. $\times \frac{\text{Rated Speed (rpm)}}{\text{New Speed (rpm)}} \times \frac{\text{Rated Pressure (psi)}}{\text{New Pressure (psi)}}$	$B_{10} = \text{Rated Hrs} \times (RPM_r/RPM_n) \times (P_r/P_n)^3$

Cylinder Formulas

Formula For:	Word Formula:	Letter Formula:
CYLINDER AREA In Square Inches	Area = Π x Radius^2 (Inches)	$A = \Pi r^2$
	Area = $(\Pi/4)$ x Diameter^2 (Inches)	$A = (3D^2)/4$ or $A = .785D^2$
CYLINDER FORCE In Pounds, Push or Pull	Area = Pressure (psi) x Net Area (sq in.)	$F = psi \times A$ or $F = PA$
CYLINDER VELOCITY or SPEED In Feet/Second	$\text{Velocity} = \frac{231 \times \text{Flow Rate (GPM)}}{12 \times 60 \times \text{Net Area (sq in.)}}$	$v = 231Q/720A$ or $v = .3208Q/A$
CYLINDER VOLUME CAPACITY In Gallons of Fluid	$\text{Volume} = \frac{\Pi \times \text{Radius}^2 \text{ (In.)} \times \text{Stroke (In.)}}{231}$	$V = \Pi r^2 LI/231$
	$\text{Volume} = \frac{\text{Net Area (sq. in.)} \times \text{Stroke (In.)}}{231}$	$V = IA\,LI/231$
CYLINDER FLOW RATE In Gallons/Minute	$\text{Flow Rate} = \frac{12 \times 60 \times \text{Velocity (Ft/Sec)} \times \text{Net Area (sq. in.)}}{231}$	$Q = (720vA)/231$ or $Q = 3.117vA$
FLUID MOTOR TORQUE In Inch Pounds	$\text{Torque} = \frac{\text{Pressure (psi)} \times \text{F.M. Displacement (Cu. In./Rev.)}}{2\Pi}$	$T = psi\ d/2\Pi$ or $T = Pd/2\Pi$
	$\text{Torque} = \frac{\text{Horsepower} \times 63025}{\text{rpm}}$	$T = 63025\ hp/n$
	$\text{Torque} = \frac{\text{Flow Rate (GPM)} \times \text{Pressure (psi)} \times 36.77}{\text{rpm}}$	$T = 36.77QP/n$ or $T = 36.77Qpsi/n$
FLUID MOTOR TORQUE/100 psi In Inch Pounds	$\frac{\text{Torque}}{100} = \frac{\text{F.M. Displacement (Cu. In./Rev.)}}{.0628}$	$T_{100psi} = d/.0628$
FLUID MOTOR SPEED In Revolutions/Minute	$\text{Speed} = \frac{231 \text{ Flow Rate (GPM)}}{\text{F.M. Displacement (Cu. In./Rev.)}}$	$n = 231\,Q/d$
FLUID MOTOR POWER In Horsepower Output	$\text{Horsepower} = \frac{\text{Torque Output (Inch Pounds)} \times \text{rpm}}{63025}$	$hp = Tn/63025$

RAM-PAC HYDRAULIC TOOLS

CONVERSION CHART

Volume and Capacity Equivalents

	Cubic Inches	Cubic Feet	Cubic Centimeters	Liters	U.S. Gallons	Imperial Gallons	Water at Max Density	
							Pounds of Water	Kilograms of Water
Cubic Inches	1	0.0005787	16.384	0.016384	0.004329	0.0036065	0.361275	0.0163872
Cubic Feet	1728	1	0.037037	28.317	7.48052	6.23210	62.4283	28.3170
Cubic Centimeters	0.0610	0.0000353	1	0.001	0.000264	0.000220	0.002205	0.0001
Liters	61.0234	0.0353145	0.001308	1	0.264170	0.220083	2.20462	1
U.S. Gallons	231	0.133681	0.004951	3.78543	1	0.833111	8.34545	3.78543
Imperial Gallons	277.274	0.160459	0.0059429	4.54374	1.20032	1	10.0172	4.54373
Pounds of Water	27.6798	0.0160184	0.0005929	0.453592	0.119825	0.0998281	1	0.453593

Basic Formulas

Formula For:	Word Formula:	Letter Formula:
FLUID PRESSURE In Pounds/Square Inch	$\text{Pressure} = \frac{\text{Force (Pounds)}}{\text{Unit Area (Square Inches)}}$	P = F/A or psi = F/A
FLUID FLOW RATE In Gallons/Minute	$\text{Flow Rate} = \frac{\text{Volume (Gallons)}}{\text{Unit Time (Minute)}}$	Q = V/T
FLUID POWER In Horsepower	$\text{Horsepower} = \frac{\text{Pressure (psi) x Flow (GPM)}}{1714}$	hp = PQ/1714

Fluid Formulas

Formula For:	Word Formula:	Letter Formula:
VELOCITY THROUGH PIPING In Feet/Second Velocity	$\text{Velocity} = \frac{.3208 \times \text{Flow Rate through I.D. (GPM)}}{\text{Internal Area (Square Inches)}}$	V = .3208Q/A
COMPRESSIBILITY OF OIL In Additional Required Oil to Reach Pressure	$\text{Additional Volume} = \frac{\text{Pressure (psi) x Volume of Oil under Pressure}}{\text{250,000 (approx.)}}$	V_a = PV/250,000 (approx.)
COMPRESSIBILITY OF A FLUID	$\text{Compressibility} = \frac{1}{\text{Bulk Modulus of the Fluid}}$	C(R) = 1/BM
SPECIFIC GRAVITY OF A FLUID	$\text{Specific Gravity} = \frac{\text{Weight of One Cubic Foot of Fluid}}{\text{Weight of One Cubic Foot of Water}}$	SG = W/62.4283
VALVE (Cv) FLOW FACTOR	$\text{Valve Factor} = \frac{\text{Flow Rate (GPM)}\sqrt{\text{Specific Gravity}}}{\sqrt{\text{Pressure Drop (psi)}}}$	$Cv = (Q\sqrt{SG})/(\sqrt{\Delta p})$
VISCOSITY IN CENTISTOKES	For Viscosities of 32 to 100 Saybolt Universal Seconds: Centistokes = .2253 x SUS - $\left(\frac{194.4}{SUS}\right)$	CS = .2253 SUS - (194.4/SUS)
	For Viscosities of 100 to 240 Saybolt Universal Seconds: Centistokes = .2193 x SUS - $\left(\frac{134.6}{SUS}\right)$	CS = .2193 SUS - (134.6/SUS)
	For Viscosities greater than 240 Saybolt Universal Seconds: Centistokes = $\left(\frac{SUS}{4.635}\right)$	CS = SUS/4.635

Note: Saybolt Universal Seconds can also be abbreviated as SSU.

CORPORATE HEADQUARTERS

Ram-Pac products are manufactured in a modern facility in the United States and are made available through distributors worldwide. Call or write for the distributor nearest you. Refer to our General Line Catalog for all your cylinder, pump or high force hydraulic requirements.

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