

MADE IN THE U.S.A.

RAM-PAC

HYDRAULIC TOOLS



**HIGH FORCE HYDRAULIC TOOLS
FOR CONSTRUCTION AND INDUSTRIAL APPLICATIONS**

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

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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.

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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



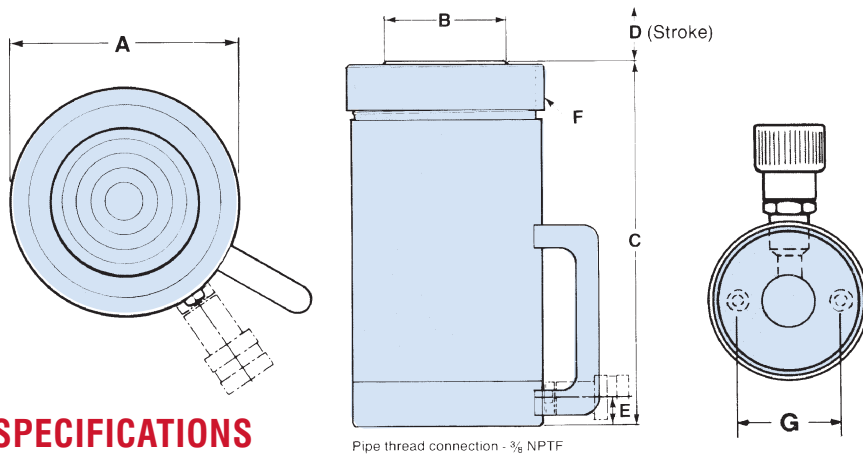
FEATURES

- 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 page 7)
- 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



How to understand cylinder & integral unit model numbers

RC - 10 - SA - 6

Cylinder with half coupling

Load Rating (tons)

SA- Single-Acting

Nominal Stroke (inches)

SPECIFICATIONS

Cyl. Cap. (tons)	Stroke (in) "D"	Model Number	Closed Height "C"	Ext. Height (in)	Eff. Area (in ²)	Oil Capacity (in ³)	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 9/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 19/16" 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 9/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 19/16" 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 9/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 19/16" 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 9/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 19/16" 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 9/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 19/16" 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 9/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 19/16" 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 9/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 19/16" 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 9/16	3/4	1-8 x 1	2 1/4-14 x 1 1/8	(2) 5/16-18 x 11/16" Dp, 19/16" 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, 17/8" 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, 17/8" 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, 17/8" 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, 17/8" 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, 17/8" 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, 17/8" 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, 17/8" 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, 17/8" 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 3/16	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

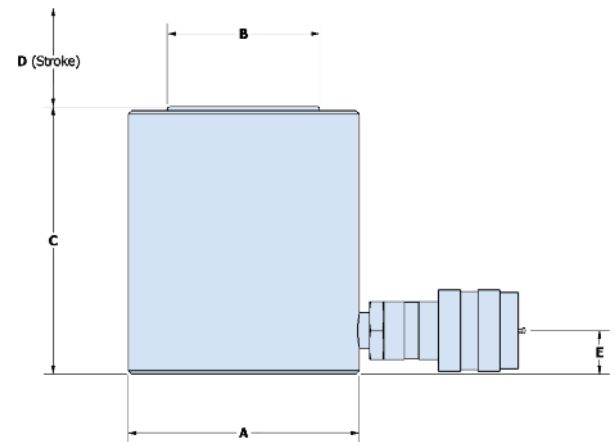
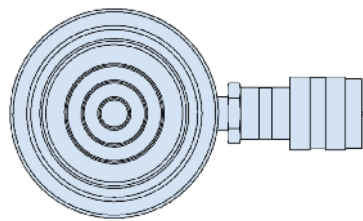


FEATURES

- 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 9/16	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 1/4	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	3/4	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

LOW PROFILE SINGLE-ACTING CYLINDERS

Solid performance in tight work spaces

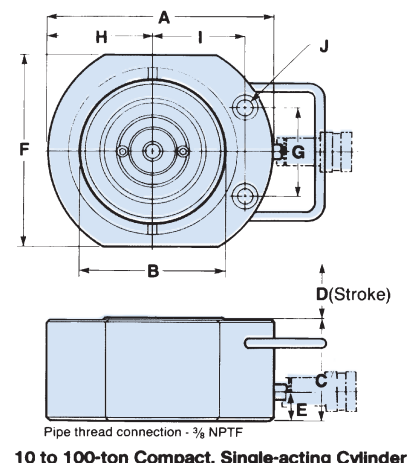
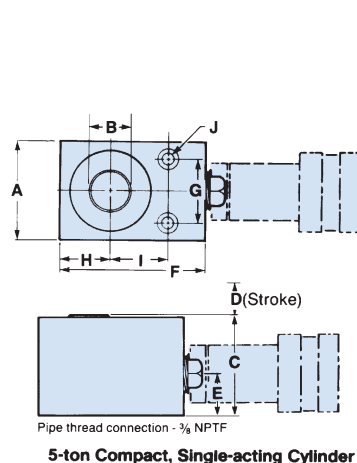


FEATURES

- 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



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 9/16	1 1/8	7/8	1	3/8 x 1/4 Dp, .221 thru	2
5	5/8	RC-5-LP-.5	1 25/32	2 13/32	0.995	0.6	1 3/4	11/16	3/4	2 9/16	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	39/64 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 page 7)
- 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



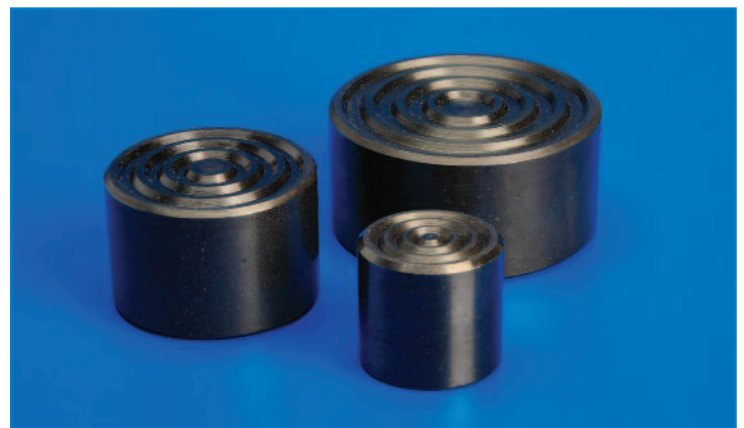
RC-25-SA-14A

RC-20-SA-6A

RC-10-SA-10A

RC-10-SA-6A

RC-4-SA-5A



SINGLE-ACTING "AUTOMOTIVE" CYLINDERS

Threaded end automotive cylinders

- Typical attachment setups. Check with factory for availability.

How to understand cylinder & integral unit model numbers

RC - 4 - SA - 5A

Cylinder with half Coupling

Load Rating (tons)

SA-Single-acting

Nominal Stroke (inches)

CYLINDERS

SPREADERS

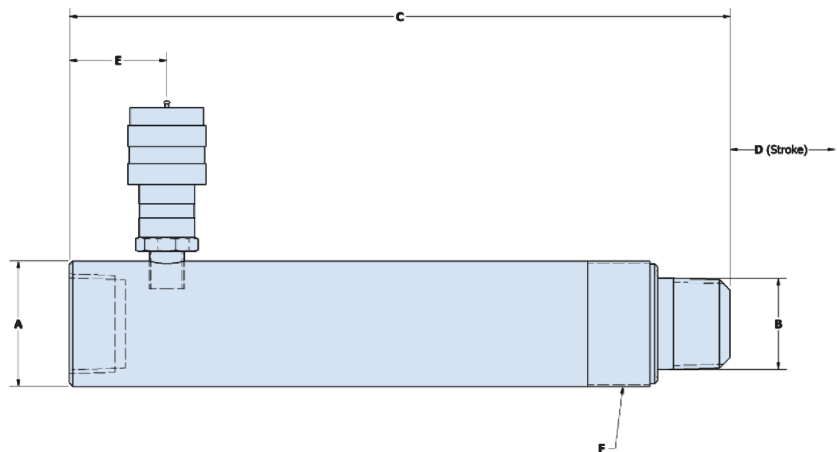
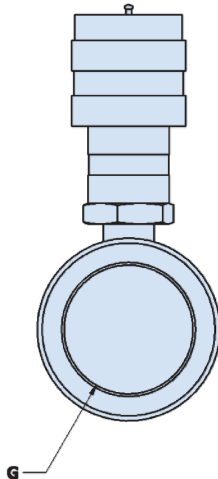
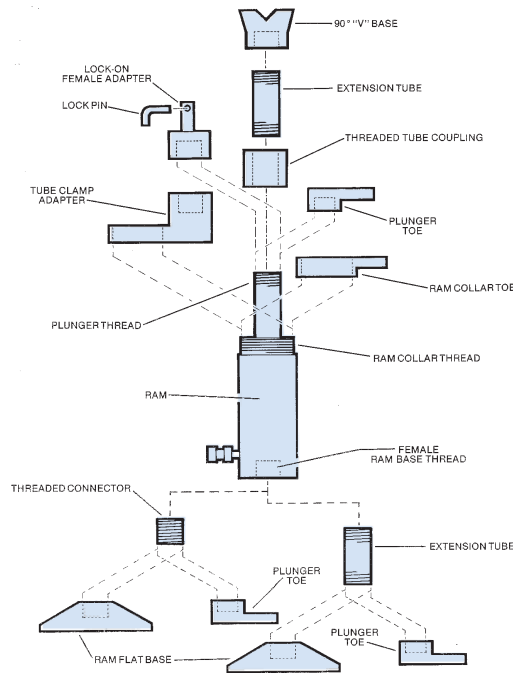
PUMPS

HOSES/GAUGES

JACKS

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 extension 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 (in ²)	Oil Required (in ³)	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 3/4	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	26 9/16	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 9/16	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.



DOUBLE-ACTING CYLINDER

How to understand cylinder & integral unit model numbers

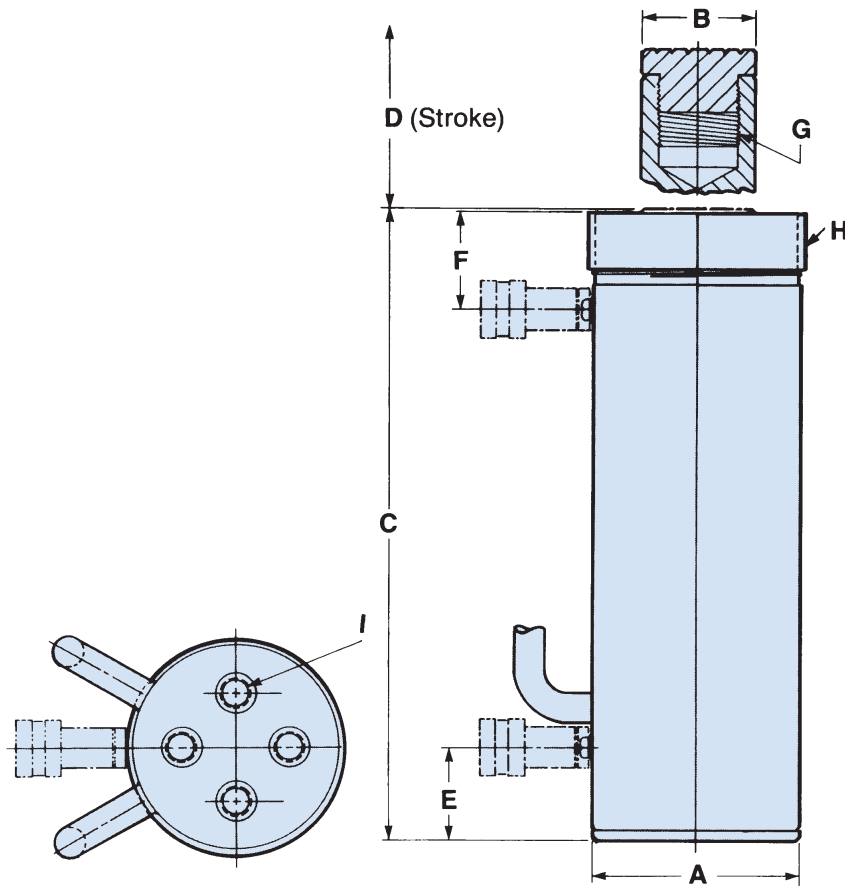
RC - 10 - DA - 6

Cylinder with half Coupling

Load Rating (tons)

DA-Double-Acting (plunger can push and pull)

Nominal Stroke (inches)



Pipe thread connection - 3/8 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 (in ²)	Oil Req'd. (in ³)	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 / 2.36	20.2	3 3/8	1 9/16	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 / 2.36	33.4	3 3/8	1 9/16	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

CYLINDERS

SPREADERS

PUMPS

HOSES/
GAUGES

JACKS

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	3/4 -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	1 1/4 -7 UNC-2B	HA-97
	Grooved	N/A	HA-98
RC-30-CH-3-DA	Threaded	1 1/4-7 UNC-2B	HA-97
	Grooved	N/A	HA-98
RC-60-CH-3	Threaded	1 5/8-5 1/2 UNC-2B	HA-99
	Grooved	N/A	HA-100
RC-60-CH-5-DA	Threaded	1 5/8-5 1/2 UNC-2B	HA-99
	Grooved	N/A	HA-100
RC-100-CH-3-DA	Threaded	N/A	N/A
	Grooved	N/A	HA-101

CENTER-HOLE CYLINDERS

How to understand cylinder & integral unit model numbers

RC - 10 - CH - 2.5 DA*

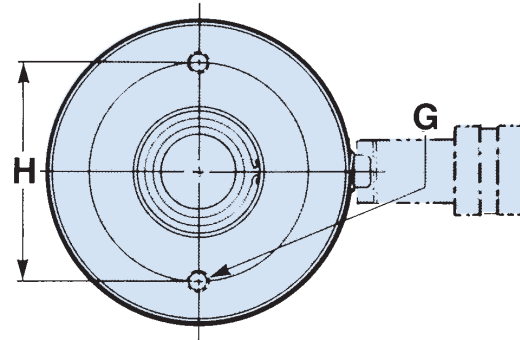
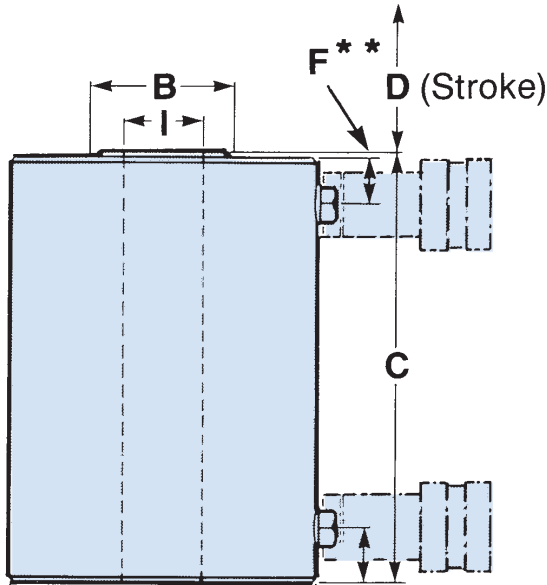
Cylinder with half Coupling

Load Rating (tons)

CH-Center Hole

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 (in ²)	Oil Req'd. (in ³)	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	18.08	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	18 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 (in ²)	Oil Cap. (in ³)	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 13/64 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 13/64 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 13/64 Dia. B.C.	1 5/16	105.0
60/34.3	5	RC-60-CH-5-DA	9 1/2	14 1/2	12.73/8.34	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.

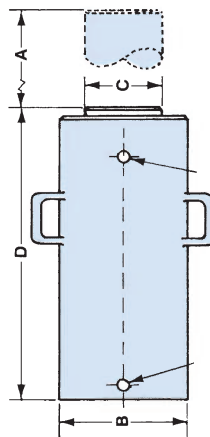
HEAVY DUTY DOUBLE-ACTING CYLINDERS

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/in ²)	Effective Cylinder Area (in ²)	A Stroke (in)	B Outside Diameter (in)	C Rod Diameter (in)	D Closed Height (in)	Net Oil Volume (in ³)	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	1196	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	1056	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

HYDRAULIC SPREADERS

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



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

RAM-PAC® PUMPS

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 level. 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 (in ³ /min. @ 150 psi)	Flow at Full Load (in ³ /min. @ 10,000psi)	Usable Oil Capacity (in ³)	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	480	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

HAND PUMPS

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

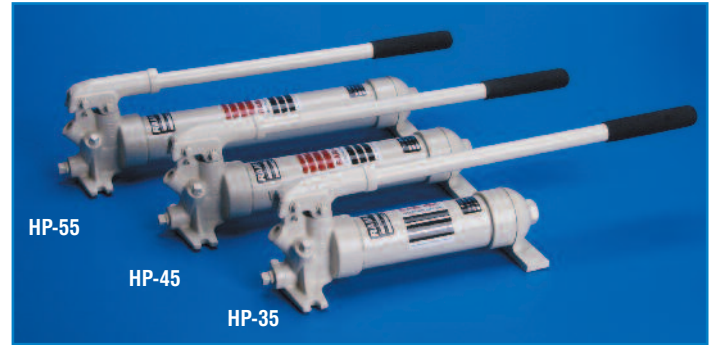
HP-150 AND HP-150-V FEATURES

- Rated at 10,000 psi with automatic two-speed flow
- 143 cubic inch usable reservoir
- First stage flow 14.8 in³/minute*
- Second stage flow: 3.6 in³/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 in³/minute*
- Second stage flow 5.3 in³/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

www.ram-pac.com

MADE IN USA 15

CYLINDERS

SPREADERS

PUMPS

HOSES/
GAUGES

JACKS

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 15-foot control cord (HAC-17 see page 19)
- 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 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

SPECIFICATIONS

Model No.	Reservoir Capacity	Usable Oil Capacity (in ³)	Operating Pressure (psi)	Flow Capacity (in ³ /min)	
				1st Stage @ 150 psi	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

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
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

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

* 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

POWER PUMPS – 560 SERIES

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 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

- 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



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

CYLINDERS

SPREADERS

PUMPS

HOSES/
GAUGES

JACKS

POWER PUMPS – 560 SERIES



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
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 † (in ³)	Usable Oil Capacity (in ³)	Operating Working Pressure (psi)	Flow Capacity (in ³ /min)		Base Size (in)	Height (in)	Pipe Thread Connection (NPTF)	Net Weight (lb)
				@ 150 psi	@ 10,000 psi				
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.

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
- 15-foot cord included



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

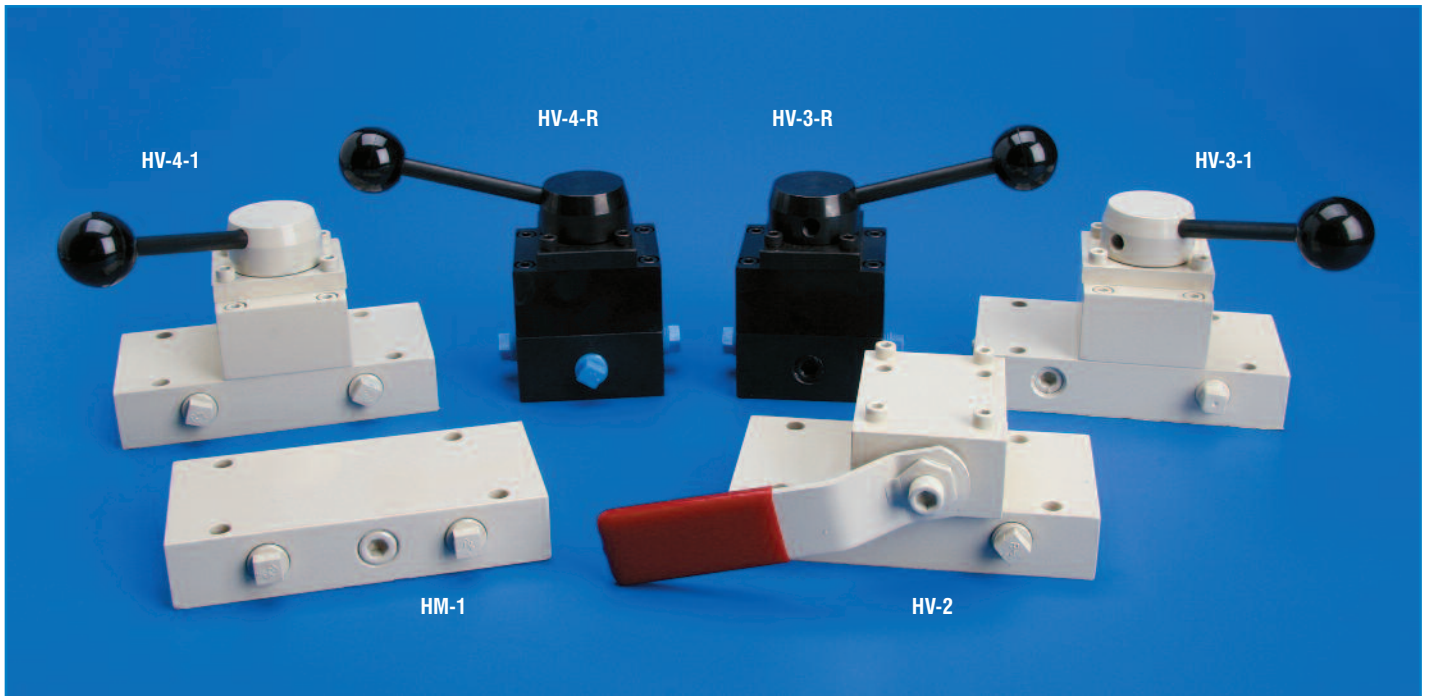
300 SUS. For use in power pumps. High viscosity provides adequate lubrication up to 140°F to protect and extend power pump life



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

ELECTRICALLY-OPERATED VALVES

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	3.98	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	HM-1-1	
Used with Cylinder	single-acting	single-acting	double-acting	single-acting	double-acting	pump-mounted manifold	
Cylinder Operating Function	advance, retract	advance, hold, retract	advance, hold, retract	advance, hold, retract	advance, hold, 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-560-1
HEP-560	5	HEP-560-2-5	HEP-560-3-5	HEP-560-4-5	HEP-560-3S-5	HEP-560-4S-5	HEP-560-1-5
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



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

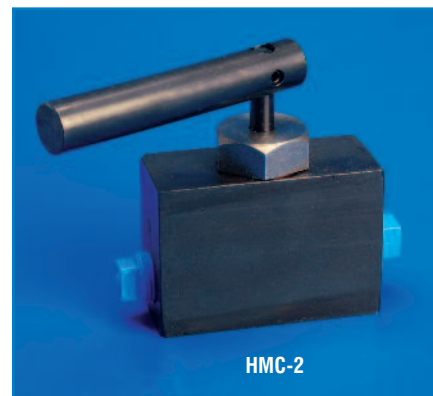
Pressure relief valve designed for use in jacking applications with RAM-PAC® double-acting cylinders. Reduces potential for cylinder overload while a load is being lowered. Should be used in double-acting circuits in conjunction with metering check valve HMC-2. Kit includes all necessary fittings and hose for installation. See double-acting hydraulic system on page 32.

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.



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)		Cylinder Number	Cylinder Closed Height (in)	Stroke (in)	Pump Number	Complete Unit Model Number
Pushing	Pulling					
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 5/8	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

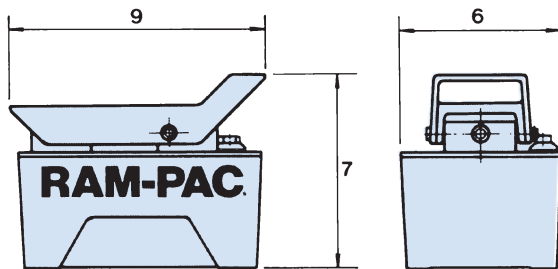
- Advance/hold/retract foot treadle control
- Heavy-duty construction - no plastic parts
- Release detent to facilitate ram return
- Operates on shop air (40 – 125 psi)
- Two-stage release mechanism – reduces shock on system while allowing fast or metered ram return
- Durable aluminum reservoir comes 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 (in ³)	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	18
HAP-050-2	462	9 H x 11½ W x 15½ 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	48
HAP-060	120	8½ H x 6¼ W x 12¼ 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	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)

CYLINDER AND PUMP ACCESSORIES

Hoses and Couplers



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



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									
20 & 30 Ton 0-10,000 psi	RC-10-DA Family (Push Only)	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-LP-.5 & RC-30-LP-.5									
	RC-20-SA & RC-30-SA Family									
	RC-20-DA Family (Push Only)*									
50 & 100 Ton 10,000 psi	RC-30-DA Family (Push Only)*	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-LP-.5 & RC-100-LP-.5									
	RC-50-SA & RC-100-SA Family									
	RC-50-DA Family (Push Only)*									
	RC-100-LP-.5									
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

CYLINDER AND PUMP ACCESSORIES

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, 3/8 NPTF Male
HA-92	3" Pipe Nipple, 3/8 NPTF Male

TEE



Part No.	Description
HA-3	3/8 NPTF Female All Ports

COUPLING



Part No.	Description
HA-20	3/8 NPTF Female Both Ends

REDUCER ADAPTERS



Part No.	Description
HA-120	1/2 NPTF Female to 1/4 NPTF Male
HA-21	3/8 NPTF Female to 1/4 NPTF Male
HA-39	1/2 NPTF Female to 1/4 NPTF Male
HA-47	1/2 NPTF Female to 3/8 NPTF Male

ELBOWS



Part No.	Description
HA-30	90° Street, 3/8 NPTF Male & Female
HA-88	90°, 3/8 NPTF Female Both Ends
HA-55	45° Street, 1/2 NPTF Male & Female
HA-119	45° Street, 1/4 NPTF Male & Female

CROSS



Part No.	Description
HA-31	3/8 NPTF Female All Ports

REDUCER BUSHING



Part No.	Description
HA-48	1/2 NPTF Male to 3/8 NPTF Female
HA-50	3/8 NPTF Male to 1/4 NPTF Female

MANIFOLD PLUGS



Part No.	Description
HA-59	3/8 NPTF (10 Per Package)

MANIFOLDS

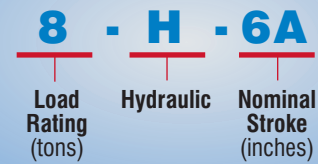


Part No.	Description
HA-27	1 1/2" Sq. x 5"L, 5-Port 3/8 NPTF
HA-29	1 1/2" Sq. x 10 1/2"L, 9-Port 3/8 NPTF
HA-54	1 1/4" Thick x 5 3/4" Dia., 6-Port 3/8 NPTF

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



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 ⁵ / 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

CYLINDERS

SPREADERS

PUMPS

HOSES/ GAUGES

JACKS

GUIDELINES FOR SAFE OPERATION

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.

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

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.

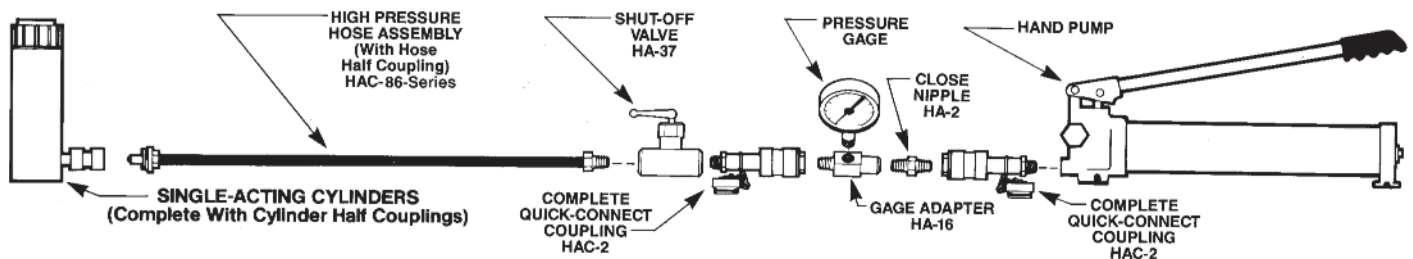
This warranty is in lieu of all other warranties expressed or implied, and no other person is authorized to assume for RAM-PAC® any other liability in connection with the sale of this product.

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.

BASIC HIGH PRESSURE HYDRAULIC SYSTEMS

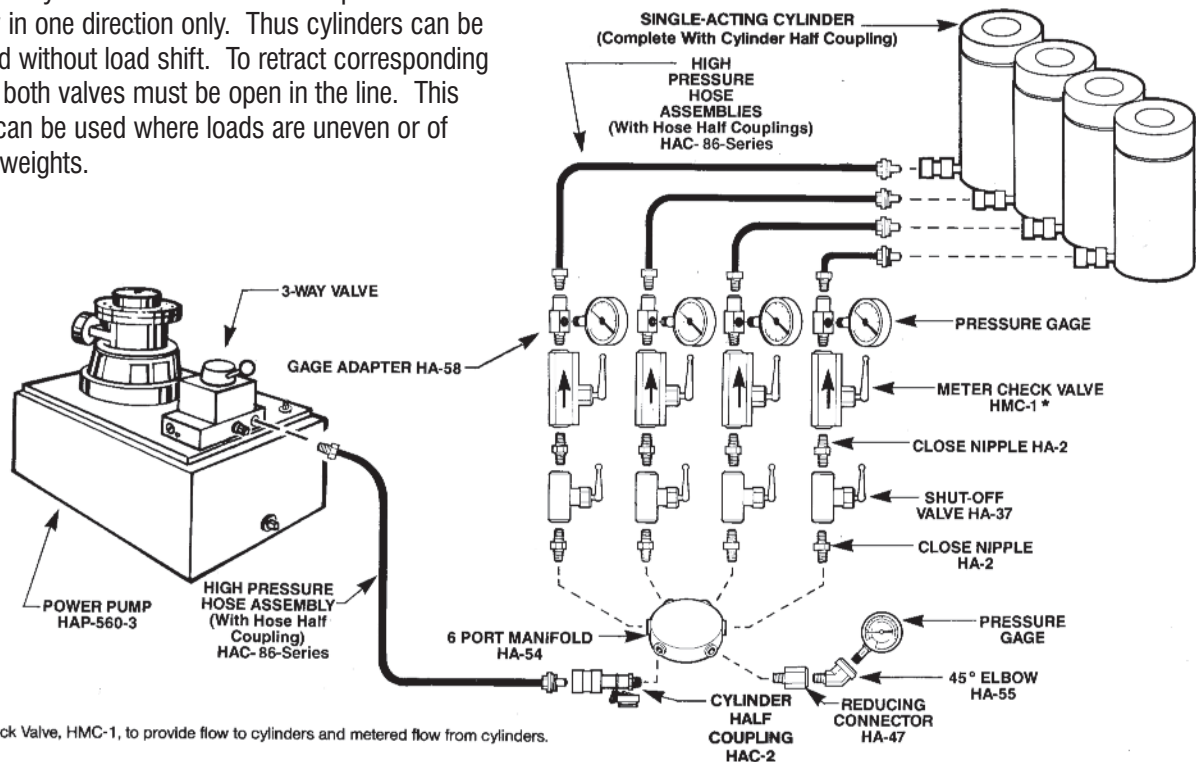
Single-acting system with one cylinder and a hand pump.

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.

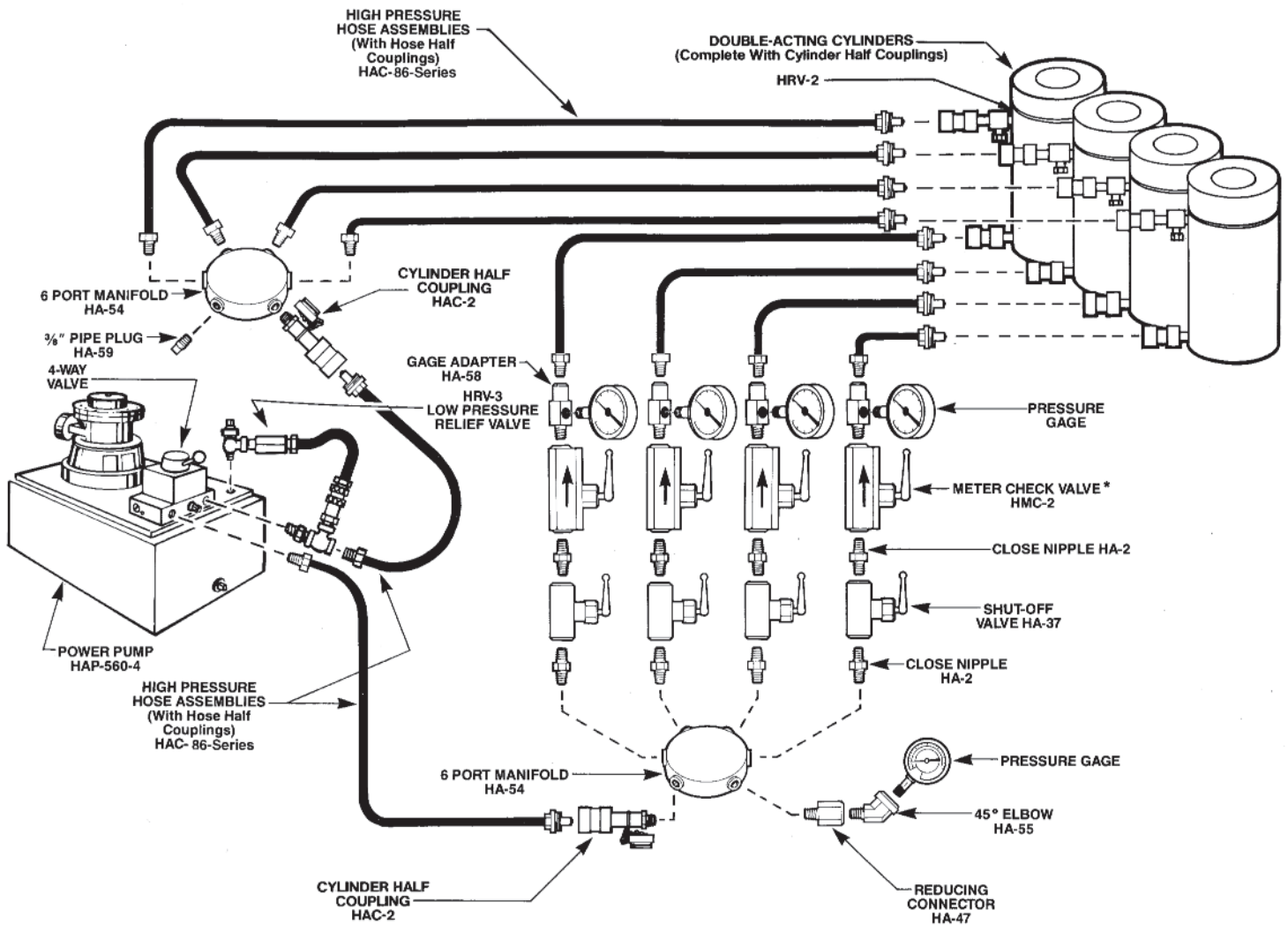


*Position Meter Check Valve, HMC-1, to provide flow to cylinders and metered flow from cylinders.

BASIC HIGH PRESSURE HYDRAULIC SYSTEMS

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.

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CONVERSION CHART

Pump Formulas

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

Cylinder Formulas

Formula For:	Word Formula:	Letter Formula:
CYLINDER AREA In Square Inches	Area = $\pi \times \text{Radius}^2$ (Inches)	$A = \pi r^2$
	Area = $(P/4) \times \text{Diameter}$ (Inches)	$A = (\pi D^2)/4$ or $A = .785D^2$
CYLINDER FORCE In Pounds, Push or Pull	Area = Pressure (psi) x Net Area (sq in.)	$F = \text{psi} \times A$ or $F = PA$
CYLINDER VELOCITY or SPEED In Feet/Second	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	Volume = $\frac{\pi \times \text{Radius}^2 \text{ (in.)} \times \text{Stroke (in.)}}{231}$	$V = (\pi r^2 L)/231$
	Volume = $\frac{\text{Net Area (sq. in.)} \times \text{Stroke (in.)}}{231}$	$V = (A L)/231$
CYLINDER FLOW RATE In Gallons/Minute	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	Torque = $\frac{\text{Pressure (psi)} \times \text{F.M. Displacement (Cu. In./Rev.)}}{2\pi}$	$T = \text{psi} d/2\pi$ or $T = Pd/2\pi$
	Torque = $\frac{\text{Horsepower} \times 63025}{\text{rpm}}$	$T = 63025 \text{ hp/n}$
	Torque = $\frac{\text{Flow Rate (GPM)} \times \text{Pressure (psi)} \times 36.77}{\text{rpm}}$	$T = 36.77QP/n$ or $T = 36.77Q\text{psi}/n$
FLUID MOTOR TORQUE/100 psi In Inch Pounds	$\frac{\text{Torque}}{100} = \frac{\text{F.M. Displacement (Cu. In./Rev.)}}{.0628}$	$T_{100\text{psi}} = d/.0628$
FLUID MOTOR SPEED In Revolutions/Minute	Speed = $\frac{231 \text{ Flow Rate (GPM)}}{\text{F.M. Displacement (Cu. In./Rev.)}}$	$n = 231 Q/d$
FLUID MOTOR POWER In Horsepower Output	Horsepower = $\frac{\text{Torque Output (Inch Pounds)} \times \text{rpm}}{63025}$	$\text{hp} = Tn/63025$

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

Fluid Formulas

Formula For:	Word Formula:	Letter Formula:
VELOCITY THROUGH PIPING In Feet/Second Velocity	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	Additional Volume = $\frac{\text{Pressure (psi)} \times \text{Volume of Oil under Pressure}}{250,000 \text{ (approx.)}}$	V _A = PV/250,000 (approx.)
COMPRESSIBILITY OF A FLUID	Compressibility = $\frac{1}{\text{Bulk Modulus of the Fluid}}$	C(B) = 1/BM
SPECIFIC GRAVITY OF A FLUID	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	Valve Factor = $\frac{\text{Flow Rate (GPM)} \sqrt{\text{Specific Gravity}}}{\sqrt{\text{Pressure Drop (psi)}}$	Cv = (Q√SG)/(√Δp)
VISCOSITY IN CENTISTOKES	For Viscosities of 32 to 100 Saybolt Universal Seconds: Centistokes = .2253 x SUS - $\left(\frac{194.4}{\text{SUS}}\right)$	CS = .2253 SUS - (194.4/SUS)
	For Viscosities of 100 to 240 Saybolt Universal Seconds: Centistokes = .2193 x SUS - $\left(\frac{134.6}{\text{SUS}}\right)$	CS = .2193 SUS - (134.6/SUS)
	For Viscosities greater than 240 Saybolt Universal Seconds: Centistokes = $\left(\frac{\text{SUS}}{4.635}\right)$	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 the distributor nearest you. Refer to our General Line Catalog for all your cylinder, pump or high force hydraulic requirements.

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RAM-PAC

HYDRAULIC TOOLS

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