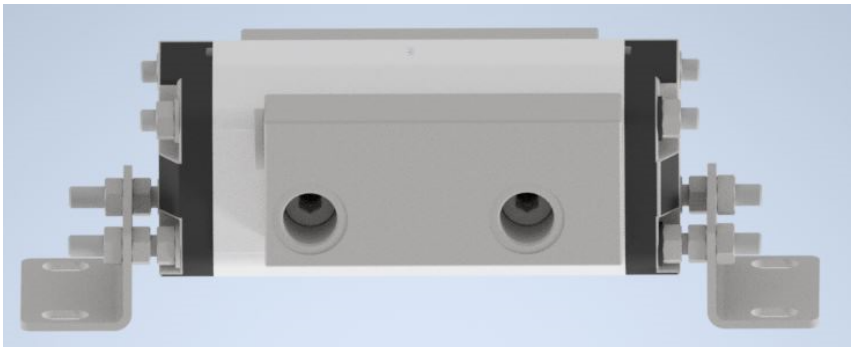
FLOW DIVIDERS/PERSSURE INTENSIFIERS

RHA10/RHA20/RHC30/RHC35/RPC/RPD/RSC



FLOW EQUALIZER*FLOW DIVIDER

This catalog contains the information needed to apply and specify a Rpoint flow divider or intensifier for your hydraulic system. These units were developed by Rpoint to serve the industrial and mobile market. All units are manufactured from aluminium and incorporate crowned sliding bearings and stackable construction.

This catalog is divided into (1) performance and (2) ordering information. Contained within one (1) flow rates, basic equations, overall dimensions etc., can be found. Part two (2) is divided into the individual components which will be combined to suit your particular application. The sections follow in the same sequence as a Rpoint flow divider or intensifier is coded.

This engineering catalog does not include the entire line. Other types as well as porting arrangements are available. Please contact your distributor, factory authorized service center or Rpoint's Customer Service for further information.

RHA10/RHA20

FLOWER DIVIDER AND INTENSIFIERS

The two devices discussed in this brochure are typically constructed of the same components. It is only through their placement in a hydraulic system that one may discern whether the device is a flow divider or an intensifier.

A flow divider accepts flow and then internally divides or combines it. This division may be equal (such as 50 GPM being divided into 25 GPM and 25 GPM) or unequal (such as 50 GPM being divided into 12.5 GPM and 37.5 GPM). In turn, this device may have more than two (2) outlet ports whereby inlet flow may be divided by three (3) (such as 60 GPM being divided into three (3) equal outputs) or more. Almost any type of division of inlet flow can be achieved by selecting the correct number of gears and correct gear width.

Rotary intensifiers on the other hand divide flow to increase pressure. This enables part of the hydraulic system to work at pressure higher than the relief valve setting at the pump. Since the two devices are really one in the same, the flow dividers described above may become intensifiers. Relief valves downstream of the intensifiers are recommended.

By using these devices, you may simplify circuitry, increase the life of components and thereby reduce cost. The following describes the function and application of the RHA10 and RHA20 flow dividers which are assembled using Rpoint service proven gear pump components.

FUNCTION:

Flow dividers are components in a hydraulic circuit which work only when needed and only to the extent required. Their job function is to accept flow and divide it (equally or unequally) or to combine flow in the reverse direction. They function by the principle that input fluid horsepower equals output fluid horsepower, minus the small inefficiency of the flow divider itself.

In rotary intensifiers, one of the output ports operates at a lower pressure than inlet. This gear section of the intensifier (or flow divider) now acts as a motor providing power through the connecting shaft to the other gear sections. To reiterate, with one outlet of a two (2) section device operating at a lower pressure than inlet, the outlet can perform against a pressure higher than inlet, thus providing the intensifier function of the unit.

Both rotary flow dividers and intensifiers divide flow and distribute pressure according to the individual system requirements. The total output flow of the component is equal to its inlet flow. The output of each section is directly proportional to the gear width of the section.

BASIC SIZING REQUIREMENTS:

The most efficient gear widths are one (1") inch or larger. The most efficient speed (RPM) range is from 600 to 2200 RPM. Higher RPM's will increase the sound pressure level of the unit. Units with all gear widths of ½" and ¾" should be avoided.

EXAMPLES: Units with ½" gears would work best with another section of a least 1-1/2".
Units with ¾" gears would work best with another section of a least 1-1/4".

In three (3) section units or larger, it is good practice to position the inlet port nearest the largest gear section. It is also recommended that the largest gear section be placed in the center of the unit.

For applications where speeds are below 600 RPM or above 2200 RPM, and/or where pressure across the unit may exceed 3000 PSI (206 Bar) for RHA10 & RHA20 series and 3500 PSI (240 Bar) for RHC30 and RHC35 please consult the factory.

FLOW DIVIDER SELECTION:

To select a flow divider, this procedure should be followed:

For equal flow division, select a gear width greater than one (1") inch from the charts keeping the speed between about 600 RPM and 2200 RPM.

For unequal flow division use the following procedure:

1) Determine the outlet flow required for each leg of the hydraulic circuit.
2) Use charts below to select a series and gear width for the leg with the greatest flow (keeping gear widths greater than one (1") inch).
3) Move straight up the chart to select the other gear widths by choosing gear widths with the closest flow at the same RPM.
4) Check the actual flow for each section to determine if acceptable using the following formula.

GEAR WIDTH / (TOTAL GEAR WIDTH) X TOTAL FLOW = FLOW FOR SECTION

5) If the flows are not acceptable, repeat from step (2) by choosing a different gear width or moving to a chart in another series.

EXAMPLE:

1) System requires flows of 35 GPM and 20 GPM for a total of 55 GPM.
2) Select a 2-1/2" gear in the RHC30 series in 1300 RPM column.
3) Note: 1-1/2" gear and 1-1/4" gear both are about the same difference from 20 GPM therefore we will consider both.
4) Using 2-1/2" and 1-1/4" gears the output would be:

TOTAL GEAR WIDTH IS 1.25 + 2.50 = 3.75
(1.25/3.75) * 55 = 18.3 GPM
(2.50/3.75) * 55 = 36.6 GPM

TOTAL GEAR WIDTH IS 1.50 + 2.50 = 4.00
(1.50/4.00) * 55 = 20.6 GPM
(2.50/4.00) * 55 = 34.3 GPM

5) Check to determine which combination of flows is best for the application.

SERIES FLOW CHART

RHA10

GEAR WIDTH	RPM	RPM	RPM	RPM	RPM	RPM	RPM	RPM
	600	800	900	1000	1300	1600	1900	2200
0.50	3.0	3.4	3.8	4.3	4.7	5.1	5.5	6.0
0.75	4.5	5.1	5.8	6.4	7.0	7.7	8.3	9.0
1.00	6.0	6.8	7.7	8.5	9.4	10.2	11.1	11.9
1.25	7.5	8.5	9.6	10.7	11.7	12.8	13.9	14.9
1.50	9.0	10.2	11.5	12.8	14.1	15.4	16.6	17.9
1.75	10.4	11.9	13.4	14.9	16.4	17.9	19.4	20.9
2.00	11.9	13.6	15.4	17.1	18.8	20.5	22.2	23.9

RHA20

GEAR WIDTH	RPM	RPM	RPM	RPM	RPM	RPM	RPM	RPM
	600	800	900	1000	1200	1400	1500	1600
0.50	3.9	4.5	5.0	5.6	6.1	6.7	7.2	7.8
0.75	5.8	6.7	7.5	8.4	9.2	10.0	10.9	11.7
1.00	7.8	8.9	10.0	11.1	12.3	13.4	14.5	15.6
1.25	9.7	11.1	12.5	13.9	15.3	16.7	18.1	19.5
1.50	11.7	13.4	15.0	16.7	18.4	20.0	21.7	23.4
1.75	13.6	15.6	17.5	19.5	21.4	23.4	25.3	27.3
2.00	15.6	17.8	20.0	22.3	24.5	26.7	29.0	31.2
2.25	17.5	20.0	22.6	25.1	27.6	30.0	32.6	35.1
2.50	19.5	22.3	25.1	27.8	30.6	33.4	36.2	39.0

INTENSIFIER SELECTION:

An intensifier is constructed in the same manner as a flow divider. However, in an intensification circuit one section of the intensifier has an operating pressure at its outlet port below the pressure at the inlet port. This section then functions as a motor, supplying the necessary torque to the second section which based on downstream pressure higher than that of the inlet port.

EXAMPLE:

Given available flow of 50 GPM at 1500 PSI, determine gears for a unit to intensify 35 GPM to 2500 PSI.

1) First determine if output is possible by calculating input and output horsepower.
   HP = [GPM X PSI] / [1714]
   HP IN = [50 X 1500] / [1714] = 43.7 HP HP OUT = [35 X 2500] / [1714] = 51.1 HP

2) Determine gear ratio for intensifier.
   Since chart shows theoretical ratios we will add inefficiency in here.
   REQUIRED PSI = [ACTUAL PSI / .9]
   [2500 PSI / .9] = 2777 PSI

3) Find ratio for intensifier chart.
   [REQUIRED PSI/ACTUAL PSI] = RATIO
   [2777 / 1500 = 1.85

4) Find closest ratio from RATIO CHART.
   Chart shows the closest match to be a 1.75" gear loaded and a 1.5" gear unloaded to tank.

5) Find flows for each section as follows:
   Flow for section =
   [GEARWIDTH / TOTAL GEARWIDTH] X TOTAL FLOW
   [1.5 / (1.5 + 1.75)] X 50 = 23.1 GPM UNLOADED
   [1.75 / (1.5 + 1.75)] X 50 = 26.9 GPM LOADED

6) Now use the flow divider chart and size a flow divider for the calculated flows. From the chart we find that a RHC30 with 1.75" and 1.50" gear will spin at about 1400 RPM and a RHC35 with the same size gears will operate at about 900 RPM.

RATIO CHART FOR INTENSIFICATION (THEORETICAL)

GEAR ACROSS THE TOP SHOWS SECTION GOING BACK TO TANK @ 0 PSI

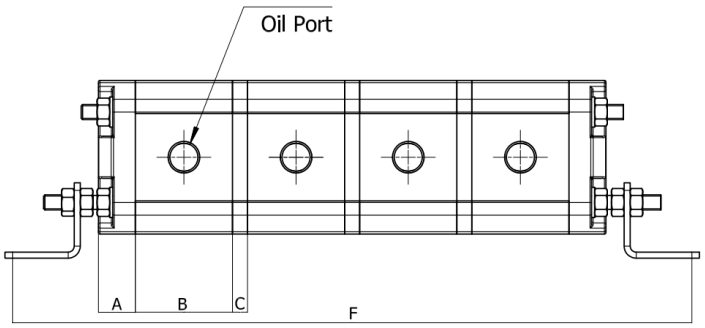
	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
LOAD GEAR											
0.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00
0.75	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00
1.00	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00
1.25	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00	3.20	3.40
1.50	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50	2.67	2.83	3.00
1.75	1.29	1.43	1.57	1.71	1.86	2.00	2.14	2.29	2.43	2.57	2.71
2.00	1.25	1.38	1.50	1.63	1.75	1.88	2.00	2.13	2.25	2.38	2.50
2.25	1.22	1.33	1.44	1.56	1.67	1.78	1.89	2.00	2.11	2.22	2.33
2.50	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20
2.75	1.18	1.27	1.36	1.45	1.55	1.64	1.73	1.82	1.91	2.00	2.09
3.00	1.17	1.25	1.33	1.42	1.50	1.58	1.67	1.75	1.83	1.92	2.00

ORDERING INFORMATION

The assembly code of the flow divider is similiar to the pump code in that individual code, for gear housings, port end covers, and bearing carriers combine in sequence to make up the complete assembly code of the unit.

EXAMPLE:

A flow divider assembly code: **RH**C30BAXAC12-1EAC12AX

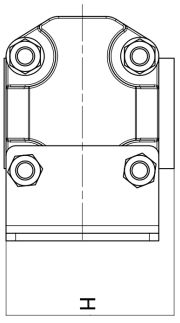


CODE EXAMPLE: RHA SERIES

FLOW DIVIDER	RHA
SERIES	10/20
MULTIPLE	B
PORT END COVER	AX
GEAR HOUSING	AC12
CONNECTING SHAFT	1
BEARING CARRIER	E
GEAR HOUSING	AC12
PORT END COVER	AX

					TWO SECTION	THREE SECTION	FOUR SECTION	FIVE SECTION
SERIES	"A" DIM	"B" DIM	"C" DIM	"H" DIM	"F" DIM	"F" DIM	"F" DIM	"F" DIM
RHA10	9.84 24,5	16.5+GW 42,0+GW	3.94 10,0	35.04 89,0	79.7+TOTGW 202,5+TOTGW	83.7+TOTGW 212,5+TOTGW	87.6+TOTGW 222,5+TOTGW	91.5+TOTGW 232,5+TOTGW
RHA20	9.84 24,5	16.5+GW 42,0+GW	3.94 10,0	35.04 89,0	79.7+TOTGW 202,5+TOTGW	83.7+TOTGW 212,5+TOTGW	87.6+TOTGW 222,5+TOTGW	91.5+TOTGW 232,5+TOTGW
RHA30	9.84 24,5	16.5+GW 42,0+GW	3.94 10,0	35.04 89,0	79.7+TOTGW 202,5+TOTGW	83.7+TOTGW 212,5+TOTGW	87.6+TOTGW 222,5+TOTGW	91.5+TOTGW 232,5+TOTGW

Dimensions are in inches
MM



SERIES	"G1" DIM	"G2" DIM	"G3" DIM	"G4" DIM	"G5" DIM
RHA10	5.18 131,6	5.75 146,0	5.75 146,0	5.75 146,0	5.62 142,7
RHA20	5.18 131,6	5.75 146,0	5.75 146,0	5.75 146,0	5.62 142,7
RHA30	7.37 187,2	7.37 187,2	7.37 187,2	7.37 187,2	7.25 184,1

Dimensions are in inches
MM

G1= Narrow Bearing Carrier with no ports
G2= Wide Bearing Carrier with no ports
G3= Wide Bearing Carrier with Straight Thread Ports
G4= Wide Bearing Carrier with NPT Ports
G5= Wide Bearing Carrier with Split Flange Ports