

Internal Gear Flow Divider

Series QXT



1 General

1.1 Product description

Series QXT flow dividers are internal gear units that can divide a flow into as many as four portions. The division ratios are constant and are unaffected by the loads at the actuators. They can be used, for example, to provide synchronised movement of unequally loaded cylinders. Several hydraulic motors can be driven at the same speed, irrespective of their external loads.

Since they operate on the principle of the rotating internal gear set, these flow dividers work without any throttling losses, which is in strong contrast to spool-type flow dividers.

The QXT flow divider can also be used to produce pressure intensification i.e. the outlet pressure from the flow divider is higher than its inlet pressure. This

takes place at high efficiency, since the operating principle ensures that the only losses that can possibly occur are proportional to the pressure difference across the unit.

The unit is based on the well-known QX internal gear pump, which is distinguished by its very low noise levels and almost imperceptible pressure pulsations. The large number of closely spaced sizes ensures that the right size is always available for every application.

1.2 Advantages

- flow divider has a wide flow range, thanks to wide speed range of the internal gear sets
- very low noise levels
- negligible pressure pulsations
- 320 bar max. can be attained with single-stage flow dividers

- hydrodynamic bearing support ensures long service life
- optimised flow path cross-sections and special gear profile give low susceptibility to cavitation
- high efficiency, since operating principle ensures there are no throttling losses
- high efficiency, since internal leakage is determined only by the pressure difference across the divider, and not by system pressure
- a very wide range of division ratios is available
- The inlet flow can be divided into as many as four portions
- high division accuracy
- also suitable for special fluids such as HFC, environmentally friendly or low viscosity fluids

2 Technical data

| Type | Outlet displacement cm ³ /rev | Cont./ Intern. pressure ¹⁾ bar | Speed max/min rpm | Maximum inlet flow Q ₀ | | |
|--------|---|--|----------------------|-----------------------------------|-------------------------|-------------------------|
| | | | | 2 outlet flows l/min | 3 outlet flows l/min | 4 outlet flows l/min |
| QXT 22 | 5 | 250/320 | 6300/1250 | 63 | 95 | 125 |
| | 6 | | | 80 | 120 | 160 |
| | 8 | | | 100 | 150 | 200 |
| QXT 32 | 12 | 250/320 | 5000/1000 | 120 | 180 | 240 |
| | 16 | | | 160 | 240 | 320 |
| QXT 42 | 25 | 250/320 | 4000/800 | 200 | 300 | 400 |
| | 32 | | | 250 | 380 | 500 |
| QXT 52 | 50 | 250/320 | 3200/630 | 320 | 480 | 640 |
| | 63 | | | 400 | 600 | 800 |
| QXT 62 | 100 | 250/320 | 2500/500 | 500 | 750 | 1000 |
| | 125 | | | 630 | 950 | 1260 |
| QXT 82 | 200 | 250/320 | 2000/400 | 800 | 1200 | 1600 |
| | 250 | | | 1000 | 1500 | 2000 |

The technical data apply to flow dividers with outlet flows of equal sizes. Please contact Bucher if you require unequal outlet flows.

1) Intermittent for max. 20 sec/min but not than 10% of the duty cycle

For the highest division accuracy as well as the lowest cost, choose the smallest possible flow divider running near its maximum speed. The speed n in rev/min is calculated from:

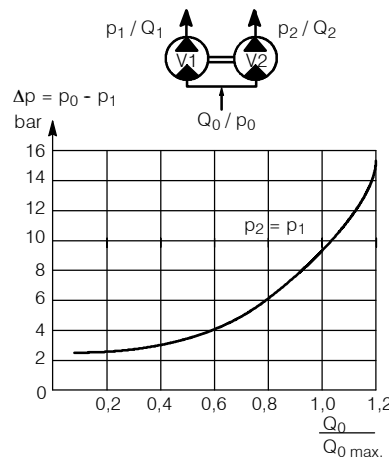
$$n = \frac{Q_0 \times 10^3}{V_1 + V_2 + V_3 + \dots}$$

where Q_0 = inlet flow rate in l/min and V_1 = outlet displacement in cm^3/rev . The minimum permissible inlet flow rate is calculated from:

$$Q_{0 \text{ min.}} = \frac{n_{\text{min.}}}{n_{\text{max.}}} \times Q_{0 \text{ max.}}$$

In the case of the flow dividers with unequal outlet displacements, use the largest displacement for determining $n_{\text{max.}}$, the smallest for $n_{\text{min.}}$. Since rotary flow dividers are also pressure intensifiers, each outlet circuit must be provided with a pressure relief valve. Bucher Hydraulics series VT relief valves mount directly on the flow divider and

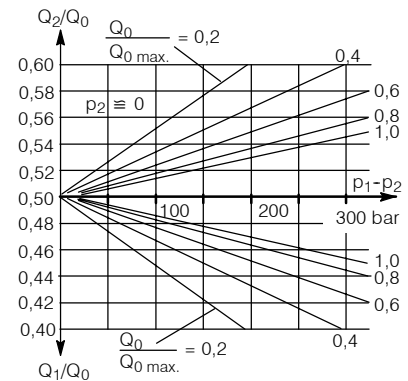
are therefore particularly suitable (please request the VT catalogue).



3 Performance curves

Tests carried out on a QXT flow divider, type 32-016/32-016, produced the results shown below. For the same speed, larger flow dividers have a better accuracy while smaller ones display

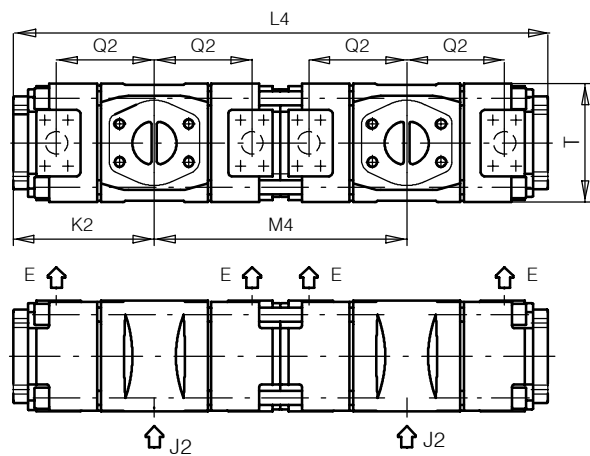
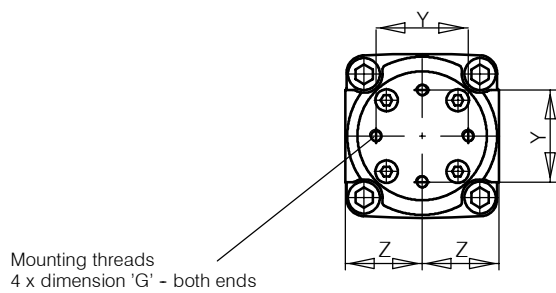
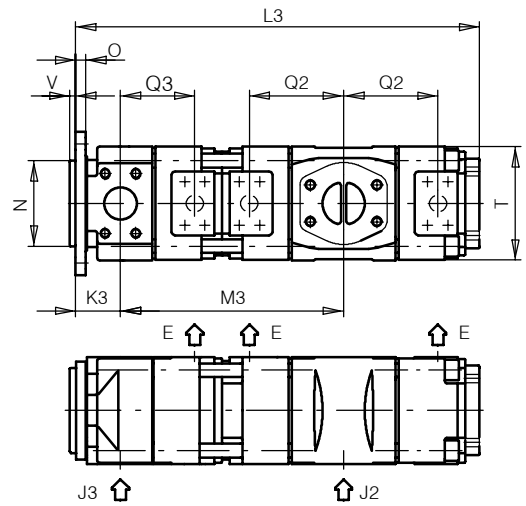
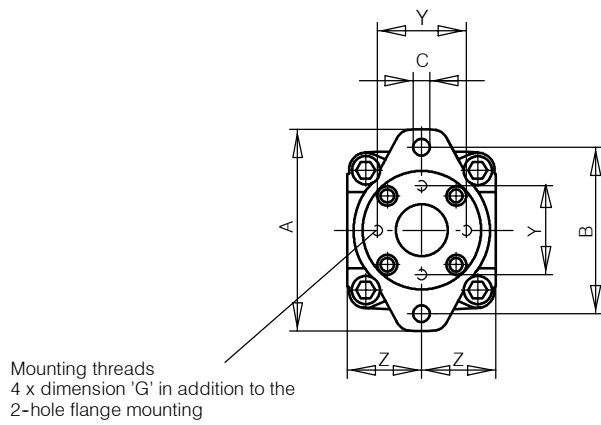
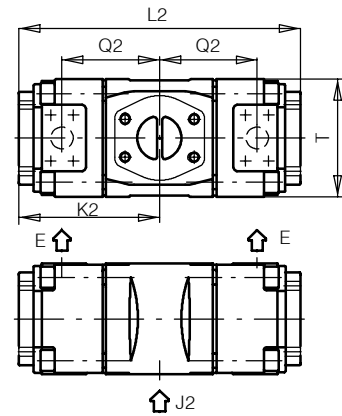
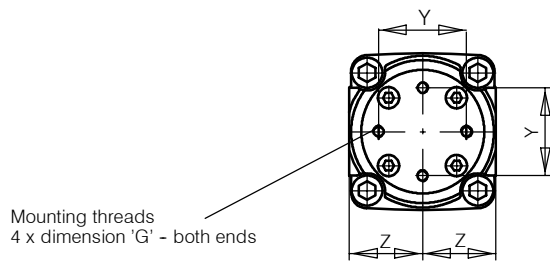
a bigger difference between the two outlet flows.



The division accuracy of the outlet flows Q_1 and Q_2 depends mainly on the pressure difference between the two outlet lines and the ratio $Q_0/Q_{0 \text{ max.}}$. The pressure drop across the flow divider is dependent on $Q_0/Q_{0 \text{ max.}}$. Using the curves, the accuracy of flow division and the pressure drop can be optimised.

4 Dimensions

| Frame size | 2 | 3 | 4 | 5 | 6 | 8 |
|------------|--------|----------|--------|--------|--------|--------|
| J2 (SAE) | G 1/4" | G 1 1/2" | 2" | 3" | 3 1/2" | 4" |
| J3 (SAE) | G 1" | G 1 1/4" | 1 1/2" | 2" | 2 1/2" | 3" |
| E (SAE) | G 1/2" | G 3/4" | 1" | 1 1/4" | 1 1/2" | 2" |
| A | 118 | 132 | 170 | 212 | 267 | 330 |
| B | 100 | 106 | 146 | 181 | 229 | 280 |
| C | 9 | 11 | 14 | 18 | 22 | 26 |
| N | 63 | 82,55 | 101,6 | 127 | 152,4 | 200 |
| O | 8,5 | 8,5 | 10,5 | 12,5 | 16,5 | 20 |
| V | 6 | 6 | 7 | 7 | 7 | 9 |
| G | M8x12 | M8x12 | M10x16 | M10x20 | M16x28 | M20x30 |
| K2 | 102 | 129 | 159,5 | 190 | 230,5 | 282,5 |
| K3 | 37,5 | 44 | 52,5 | 60,5 | 74 | 130,5 |
| L2 | 204 | 258 | 319 | 380 | 461 | 565 |
| L3 | 313,5 | 393,5 | 480,5 | 572,5 | 685,5 | 851 |
| L4 | 384 | 490 | 604 | 720 | 865 | 1062 |
| Z | 50 | 60 | 62,5 | 78 | 97,5 | 125 |
| Q3 | 55 | 69,5 | 87 | 102 | 119 | 151 |
| Q2 | 67 | 87 | 110,5 | 127 | 149 | 178,5 |
| M3 | 168 | 301,5 | 261,5 | 315 | 374 | 469,5 |
| M4 | 180 | 232 | 285 | 340 | 404 | 497 |
| y | 55 | 60 | 75 | 90 | 112 | 140 |
| T | 85 | 107 | 133 | 177 | 220 | 275 |



5 Ordering code

| | | Q | X | T | 3 | 2 | - | 0 | 1 | 2 | / | 3 | 2 | - | 0 | 1 | 2 | / | |
|---------------------|-------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Series | QXT | | | | | | | | | | | | | | | | | | |
| Frame size | 2 / 3 / 4 / 5 / 6 / 8 | | | | | | | | | | | | | | | | | | |
| Pressure range 2 | 2 | | | | | | | | | | | | | | | | | | |
| Outlet displacement | 005 - 250 | | | | | | | | | | | | | | | | | | |
| Frame size | 2 / 3 / 4 / 5 / 6 / 8 | | | | | | | | | | | | | | | | | | |
| Pressure range 2 | 2 | | | | | | | | | | | | | | | | | | |
| Outlet displacement | 005 - 250 | | | | | | | | | | | | | | | | | | |
| Special features | (to be inserted by the plant) | | | | | | | | | | | | | | | | | | |

5.1 Ordering example

For dividers with 3 outlet flows:
QXT22-005 / 22-005 / 22-005

For dividers with 4 outlet flows:
QXT62-100 / 62-100 / 62-100 / 62-100

Flow divider combinations must contain the same frame sizes, pressure ranges and outlet flows.

If unequal flows are required, please contact BUCHER HYDRAULICS

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We reserve the right to introduce technical modifications