

Flow Divider

Bi-directional
Series MTD A



- Robust, simple and reliable
- Easy to service
- Flows can be split or merged with accuracy (divide/combine functions).
- The flow division ratio can be altered to suit customer requirements.

1 Description

1.1 General

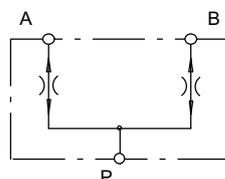
Series MTD A units are flow dividing valves that operate automatically. They are intended for use with hydraulic fluids. They divide a flow, the total rate of which may be varied, into two usually equal parts. When flow passes through a valve in the opposite direction, the two part-flows are combined into one single flow (added). The dividing and combining functions are largely independent of the pressures of the two divided flows and of the fluid viscosity. If the valve has an unequal division ratio, the larger part-flow must always

be through port B. In order for the valve to work properly, a continuous flow is required at all ports. For example, if one actuator is no longer able to move, then the other part-flow will also be restricted. If the two actuators served by the flow divider operate at different pressures, then the pressure of the total flow entering the valve will correspond to the higher of the two actuator pressures. Large pressure differences may give rise to significant heat generation, which must be taken into consideration when designing the system.

1.2 Application examples

- Work access platforms
- Lifting platform
- Harvesters
- Municipal equipment
- Snow/ice clearing equipment
- Wood chippers
- Road rollers
- Tail lifts

2 Symbols



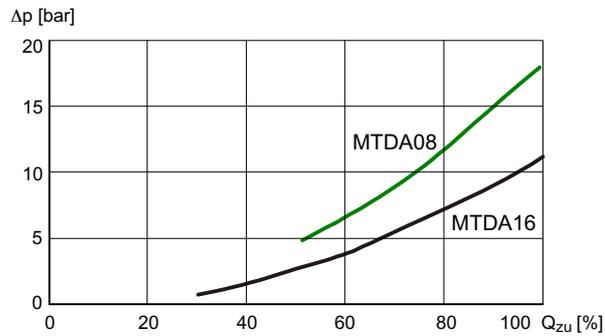
3 Technical data

General characteristics	Description, value, unit
Maximum operating pressure	315 bar
Oil temperature range	-20 °C ... +80 °C
Viscosity range	10 mm ² /s ... 300 mm ² /s
Minimum fluid cleanliness	ISO 4406 class 20/18/15 (NAS 1638 class 9)
Nitrile seals	NBR (Nitril-Butadin-Kautschuk)

4 Characteristic curves

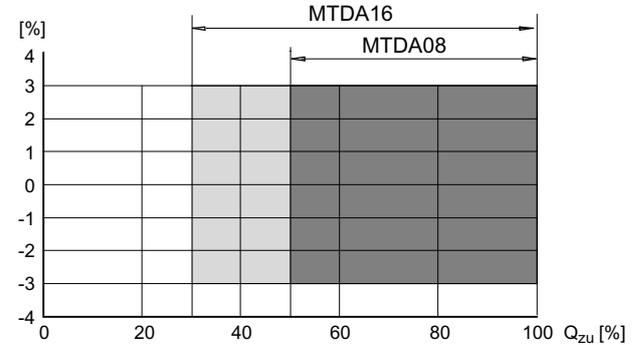
4.1 Pressure drop characteristics (Δp)

Pressure drop v. flow rate with oil viscosity of 35 mm²/s



4.2 Division accuracy [%]

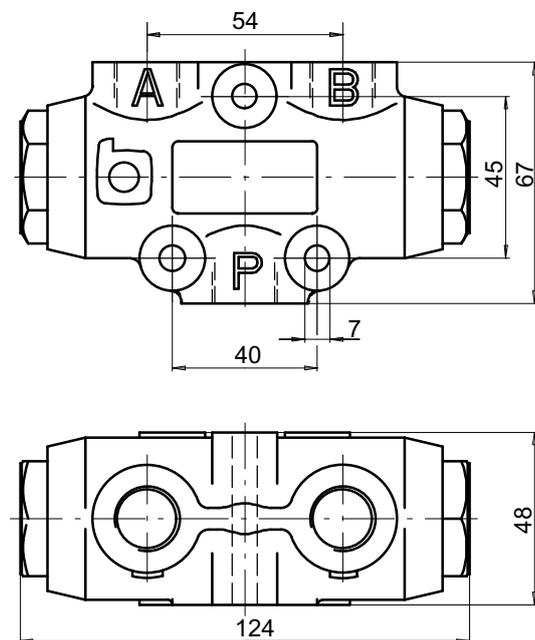
Division accuracy + 3 % of the max. flow rate, based on control flow range of the respective flow divider (see example abs. 6) with oil viscosity of 35 mm²/s



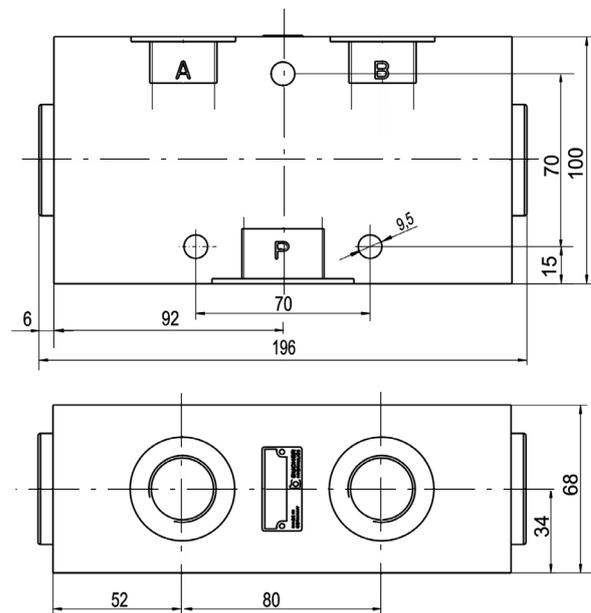
IMPORTANT : - Q_{zu} = really inlet flow (100% = maximum control flow)
 - Higher division accuracy on enquiry

5 Dimensions in mm

5.1 MTDA08



5.2 MTDA16



	MTDA08	MTDA16
Weights	1,5 kg	8 kg
A, B, P	see section 6	

6 Ordering code

		M	T	D	A	0	8	-	0	0	4	M	3	0	/						
Flow divider																					
Bi-directional																					
Threaded ports																					
Nominal size	08																				
	16																				
Control flow range:																					
Nominal Size 08									Nominal Size 16												
004	=	2-4 l/min	025	=	12-25 l/min	100	=	35-100 l/min	120	=	40-120 l/min	160	=	50-160 l/min	200	=	60-200 l/min	250	=	75-250 l/min	
006	=	3-6 l/min	032	=	16-32 l/min	120	=	40-120 l/min	160	=	50-160 l/min	200	=	60-200 l/min	250	=	75-250 l/min				
008	=	4-8 l/min	050	=	25-50 l/min	160	=	50-160 l/min	200	=	60-200 l/min	250	=	75-250 l/min							
012	=	6-12 l/min	075	=	37-75 l/min																
016	=	8-16 l/min	100	=	50-100 l/min																
Port threads																					
M = Metric						R = Inch															
Flow range		P		A + B		P		A + B		P		A + B		P		A + B		P		A + B	
004-025		M18 x 1,5		M18 x 1,5		G 3/8"		G 3/8"		G 3/8"		G 3/8"		G 3/8"		G 3/8"		G 3/8"		G 3/8"	
032-100		M22 x 1,5		M18 x 1,5		G 1/2"		G 3/8"		G 1/2"		G 3/8"		G 1/2"		G 3/8"		G 1/2"		G 3/8"	
100-120		M27 x 2		M22 x 1,5		G 3/4"		G 1/2"		G 3/4"		G 1/2"		G 3/4"		G 1/2"		G 3/4"		G 1/2"	
160-250		M33 x 2		M27 x 2		G 1"		G 3/4"		G 1"		G 3/4"		G 1"		G 3/4"		G 1"		G 3/4"	
Division ratio, see section 6.1																					
Variants / special features (to be inserted by the factory)																					

6.1 Unequal division on enquiry

In the case of unequal division, the division ratio is shown in the flow divider model code

e. g. 13 = 1 : 1,3
20 = 1 : 2
30 = 1 : 3

Ordering example:

Flow range: Q_{zu} 60 l/min with unequal division of 1 : 3

Flow divider: **MTDA08-075M30**

At an inlet flow rate of 60 l/min the unequal division prod. : 15 l/min at port A and 45 l/min at port B

6.2 Example for division accuracy

Flow range: Q_{zu} 60 l/min, required division of $Q_A/Q_B = 30$ l/min (division 1 : 1)

Flow divider: **MTDA08-075M**

flow range 37...75 l/min
max. flow rate 75 l/min

max. allowable deviation = 75 l/min x $\pm 3\%$ = $\pm 2,25$ l/min

resulting part- flow rate at Q_{zu} 60 l/min:

Port A - $Q_{min} = 27,75$ l/min / $Q_{max} = 32,25$ l/min

Port B - $Q_{min} = 27,75$ l/min / $Q_{max} = 32,25$ l/min

7 End-stop synchronisation of parallel-connected cylinders

When one of the two cylinders reaches its end-stop, the flow to the other cylinder drops to approx. 5-10% of its nominal rate. This leakage flow enables the second cylinder, which has not yet reached its final position, to slowly resynchronise itself. To enable full-speed resynchronisation of the lagging cylinder, each actuator line from the flow divider must be equipped with a pressure relief valve.

8 Installation attitude and mounting

To prevent the weight of the spool causing division inaccuracies, the valve must be installed so that the spool axis is horizontal. When mounting the valve, make sure that the body is not subjected to any distorting forces. Do not use tapered-thread pipe fittings.

9 Fluid cleanliness

MTDA flow divider require fluid with a minimum cleanliness level of NAS 1638, Class 9 or ISO 4406, code 20/18/15.

HLP hydraulic oils to DIN 51524, Part 2, can be used without any special restriction as long as they remain within the specified temperature and viscosity ranges. HFC fire-resistant fluids to DIN 51502 can be used. Note that all fire-resistant fluids require special versions of the valves and must be approved by Bucher Hydraulics. We recommend the use of fluids that contain anti-wear additives for mixed-friction operating conditions. Fluids without appropriate additives can reduce the service life of pumps and motors. The user is responsible for maintaining, and regularly checking, the fluid quality. Bucher Hydraulics recommends a load capacity of $\geq 30 \text{ N/mm}^2$ to Brugger DIN 51347-2.

10 Fluid cleanliness

Cleanliness class (RK) onto ISO 4406 and NAS 1638

Code ISO 4406	Number of particles / 100 ml			
	$\leq 4 \mu\text{m}$	$\leq 6 \mu\text{m}$	$\leq 14 \mu\text{m}$	NAS 1638
23/21/18	8000000	2000000	250000	12
22/20/18	4000000	1000000	250000	-
22/20/17	4000000	1000000	130000	11
22/20/16	4000000	1000000	64000	-
21/19/16	2000000	500000	64000	10
20/18/15	1000000	250000	32000	9
19/17/14	500000	130000	16000	8
18/16/13	250000	64000	8000	7
17/15/12	130000	32000	4000	6
16/14/12	64000	16000	4000	-
16/14/11	64000	16000	2000	5
15/13/10	32000	8000	1000	4
14/12/9	16000	4000	500	3
13/11/8	8000	2000	250	2