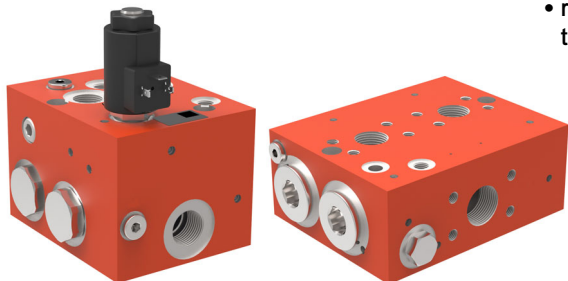


# Differential Lock Valve

Series MT..DV (for 2 motors)

- robust and reliable
- energy-optimised over the whole flow range
- simple control
- compact design offers space-saving installation
- reliable, uniform motion of the wheel-drives being controlled



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"For All Your Hydraulic Needs"

## 1 Description

### 1.1 General

The differential lock valve consists essentially of a bi-directional flow divider (dividing and combining) and a directional valve for optionally bypassing the flow divider.

It is intended for use in either open- or closed-loop hydrostatic drives with parallel-connected hydraulic motors. When the lock valve is switched OFF, the inlet flow can divide itself among the mo-tors in any required manner. When the lock valve is switched ON, however, the inlet flow is divided into two pressure compensated portions in accordance with the division ratio of the lock valve. The motors are

thus driven at fixed speeds, regardless of their respective loads. This arrangement prevents any hydraulic wheel motor from spinning in conditions of poor traction. A balancing orifice can optionally be arranged between the outlets A and B. This allows some redistribution of flow and prevents un-wanted torque build-up between wheels in these circumstances, and when turning.

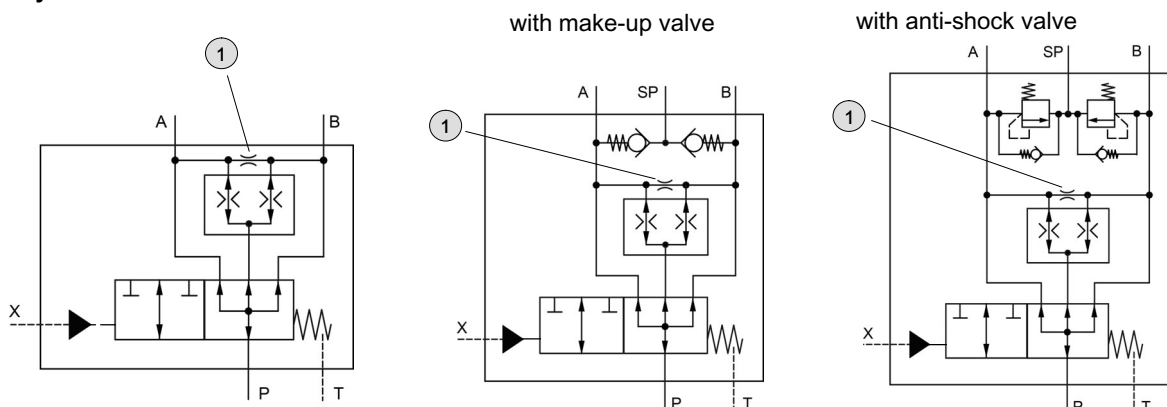
The differential lock valves can be supplied with either hydraulic, or electrohydraulic, actuation.

### 1.2 Application examples

- Harvester
- Highway finisher / pavers
- Forestry machines
- Agriculture machinery
- Ride-on mowers
- Lifting devices

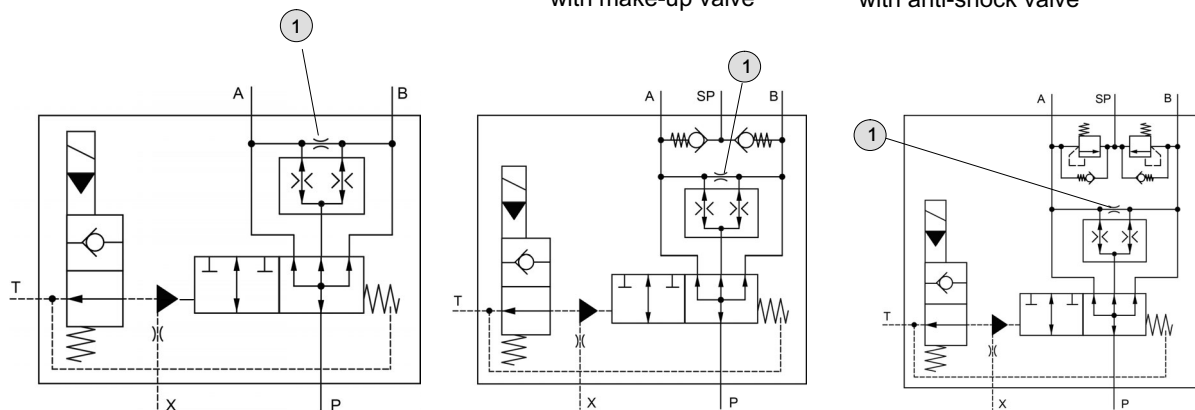
## 2 Symbols

### 2.1 Hydraulic actuation



1 Balancing orifice can be fitted

## 2.2 Electrohydraulic actuation



1 Balancing orifice can be fitted

## 3 Technical data

Hydraulic characteristics	Unit	Description, value	
		Size 08	Size 16
Nominal flow rate $Q_{max}$	l/min	100	250
Flow range <sup>1) 2)</sup>	l/min	25, 50, 75, 100	120, 160, 200, 250
Operating pressure $p_{max}$	bar	420	
Pilot pressure $p_{st min.} - p_{st max.}$	bar	10 ... 30	
Viscosity range	mm <sup>2</sup> /s	10 ... 300	
Maximum admissible level of contamination of the hydraulic fluid		ISO 4406 class 20/18/15 achievable with a filter rating of $\beta_{10} \geq 75$	
Fluid temperature range	°C	-20 ... +80	
Division ratio (for others, contact Bucher Hydraulics)		1:1	
Fluids		HL/HLP mineral oils DIN 51524; other fluids consult Bucher Hydraulics	
Electrical characteristics (type of actuation: EH)	Unit	Description, value	
Voltage	V DC	Direct current voltage 12 or 24	
Power consumption	W	18	
Nitrile seals		NBR	
Duty cycle		100% ED	
Ambient temperature	°C	max. +60	
Coil temperature	°C	max. +180 (insulation class H)	
Enclosure protection (when connector plugs are properly fitted)		Connecting plug to DIN 43650 AMP Junior Timer (2-pole) Deutsch-plug DT04-2P-EP	IP54 IP65 IP67
Electrical connection		Connecting plug to DIN 43650: AMP Junior Timer (2-pole) Deutsch plug DT04-2P-EP	

1) State the application's effective nominal flow when ordering.

2) Note the minimum flow per section 4.2.

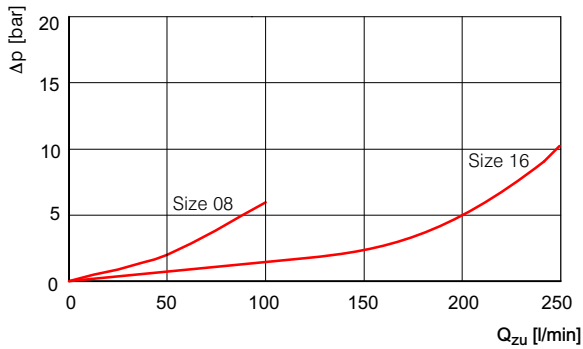
## 4 Performance graphs

Measured with viscosity 35 mm<sup>2</sup>/s.

### 4.1 Flow resistance

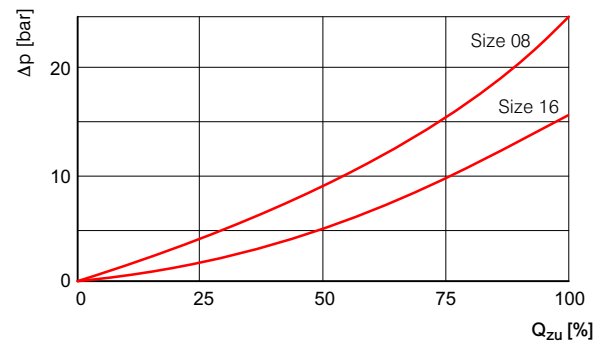
#### 4.1.1 Dividing function switched OFF

In relation to the input  $Q_{zu}$  volume flow rate.



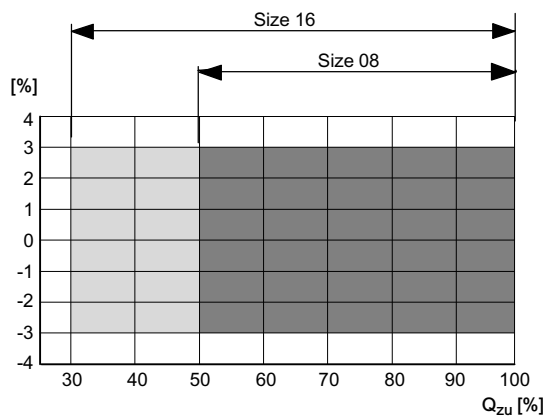
#### 4.1.2 Dividing function switched ON

In relation to the flow range.



### 4.2 Division accuracy

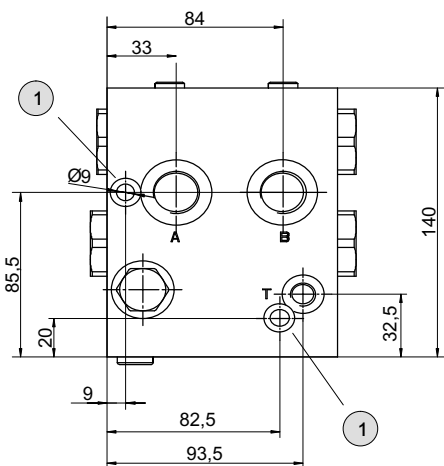
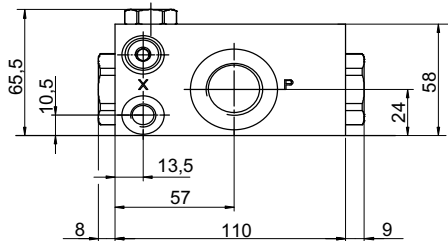
Percentage of the applicable flow range without a balancing orifice between A and B (hole plugged).



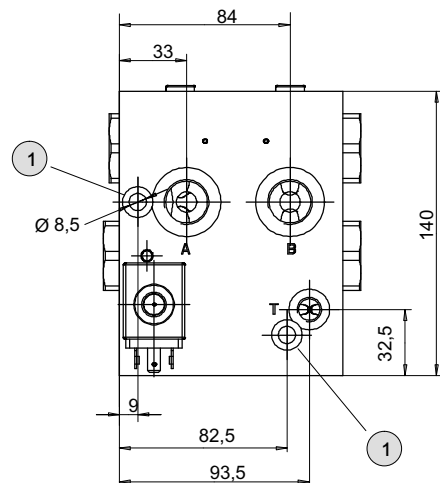
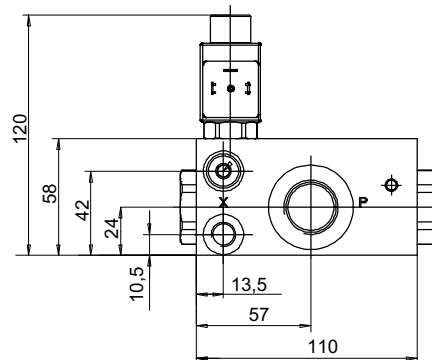
## 5 Dimensions

### 5.1 MT08DV (Serie index 3)

#### 5.1.1 Hydraulic actuation MT08DV...-H-3\*\*\*



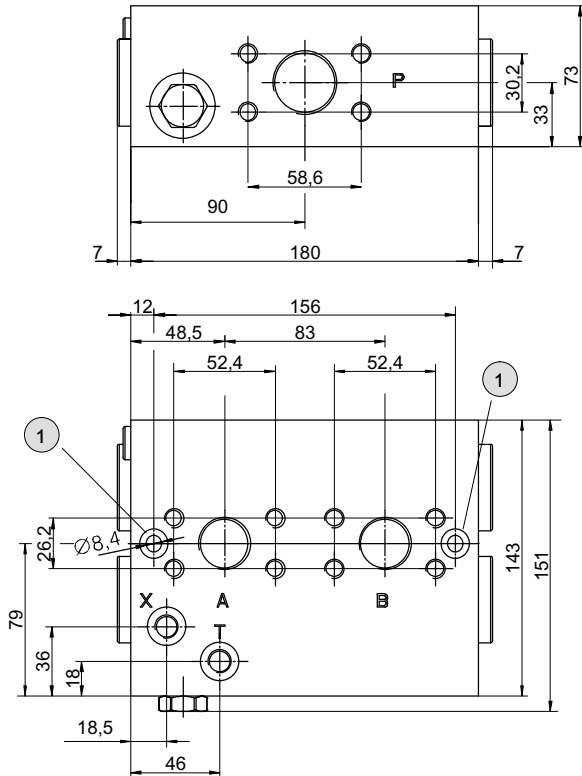
#### 5.1.2 Electrohydraulic actuation MT08DV...-EH-3G...



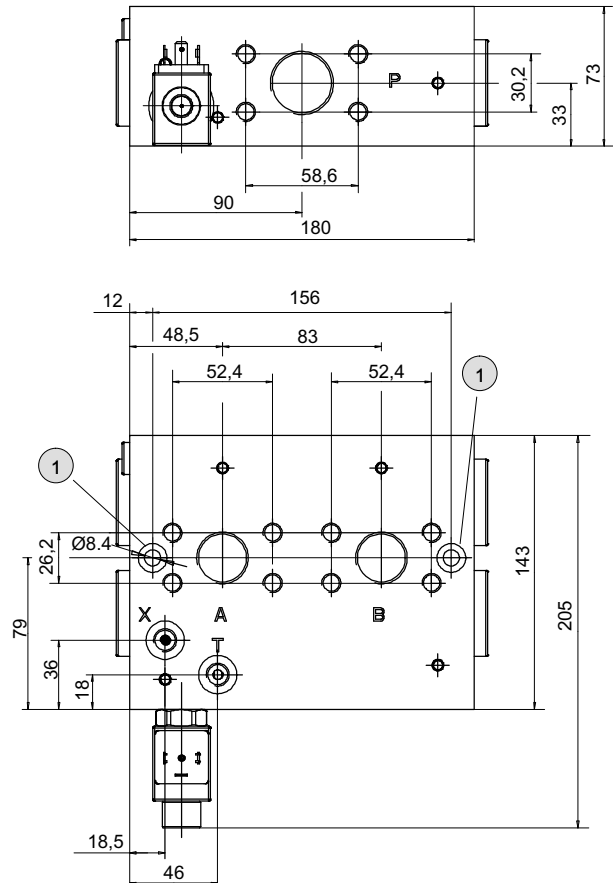
1 Clearance holes for M8 mounting cap screws to DIN 912

## 5.2 MT16DV (Serie index 2)

### 5.2.1 Hydraulic actuation MT16DV...-H-2\*\*\*



### 5.2.2 Electrohydraulic actuation MT16DV...-EH-2G...



1 Clearance holes for M8 mounting cap screws to DIN 912

## 5.3 Connection size

MT08DV		MT16DV	
Port	Port threads	Port	Port threads
P	M27 x 2	P	M33 x 2 and SAE 1 1/4" (3000 PSI) <sup>1)</sup>
A, B, C	M22 x 1,5	A, B	M27 x 2 and SAE 1" (3000 PSI) <sup>1)</sup>
T, X	M12 x 1,5	T, X	M12 x 1,5

1) SAE-flange see datasheet 100-P-000049.

## 6 Models

### 6.1 Sockets

GDM plug to DIN 43650 G	AMP Junior Timer J	Deutsch plug DT04-2P-EP04 T

### 7 Ordering code

M T 0 8 DV 1 0 0 2 5 - E H - . G 1 2 / \* \* D ... 4)

Differential lock valve	= MT..DV
Nominal size	= 08 or 16
Division:	
1 : 1	= 10
1:1,5 etc. )	= 15 1)
Control flow range:	
per. sect. 3. e. g. 25 l/min	= 025
Type of actuation: _	
hydraulic	= *H
electro-hydraulic	= EH
Design no.	
Plug connector:	
GDM plug DIN 43650	= G
AMP Junior Timre	= J
Deutsch plug DT04-2P-EP04	= T
Coil voltage:	
DC 12Volt	= 12
DC 24Volt	= 24
with actuation type *H	= ***
Options (see chapter 7.1):	
with make-up valve	= 01
with anti-shock valve and make up valve	= 02
with make-up valve and inch-size port threads	= 07

1) With unequal division, the larger flow goes to port B

2) Size of balancing orifices must be plainly stated (see also sect. 2) e.g. 0.6 / 0.8 / 1.0 : if balancing orifice D is to be 0.8 mm, then D = 08

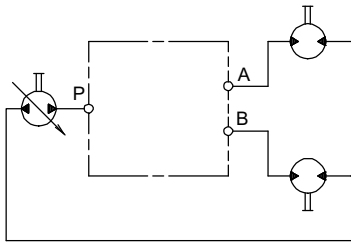
### 7.1 Options

In addition to the standard versions, differential-lock valves can also be equipped with numerous auxiliary functions and combined in customer-specific manifold blocks. In these cases, technical datas and performance graphs may differ from standard.

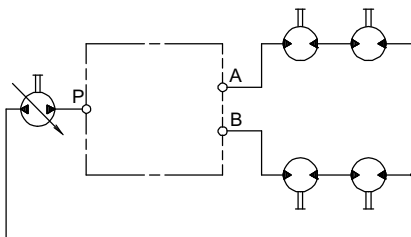
- /01 = with make-up valve
- /02 = with anti-shock valve  
(pressure-relief + make-up valve)
- /07 = with make-up valve and inch-size port threads

## 8 Application example

### 8.1 2-wheel drive



### 8.2 4-wheel drive



## 9 Installation

Horizontal mounting is recommended. Do not bolt the valve body onto an uneven mounting surface.

## 10 Fluid

Differential lock valves require fluid with a minimum cleanliness level of ISO 4406 code 20/18/15.

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.

## 11 Fluid cleanliness class

Cleanliness class (RK) onto ISO 4406.

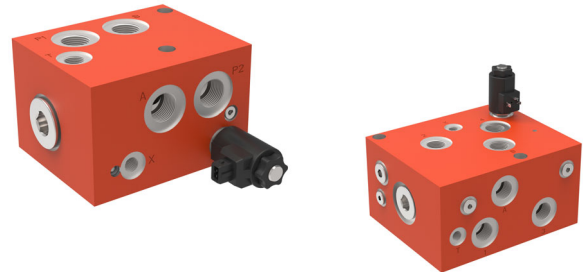
Code ISO 4406	Number of particles / 100 ml		
	≥ 4 μm	≥ 6 μm	≥ 14 μm
23/21/18	8000000	2000000	250000
22/20/18	4000000	1000000	250000
22/20/17	4000000	1000000	130000
22/20/16	4000000	1000000	64000
21/19/16	2000000	500000	64000
20/18/15	1000000	250000	32000
19/17/14	500000	130000	16000
18/16/13	250000	64000	8000
17/15/12	130000	32000	4000
16/14/12	64000	16000	4000
16/14/11	64000	16000	2000
15/13/10	32000	8000	1000
14/12/9	16000	4000	500
13/11/8	8000	2000	250

## 12 System augmentation

### 12.1 Switch valve for traction drives

#### 12.1.1 USV08 und USV16 series

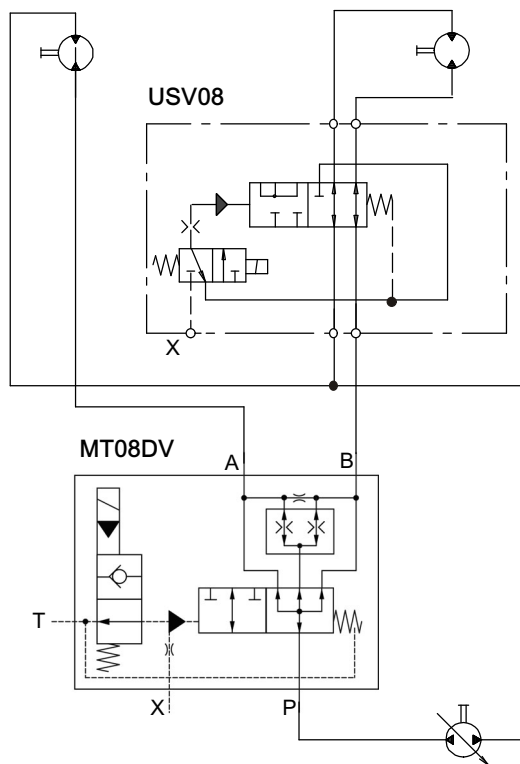
These valves enable switching from a serial connection, for example "drive mode," into a parallel connection using a differential lock valve. For the user, such solutions mean reliable output and fast operating speeds.



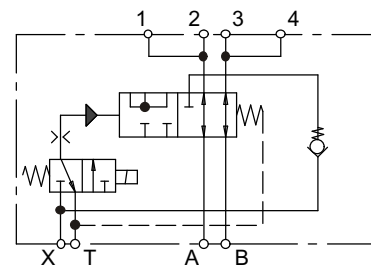
#### 12.1.2 Application examples

- Sweepers
- Black-top pavers
- Cold milling machines
- Trench rollers
- Farm sprayers

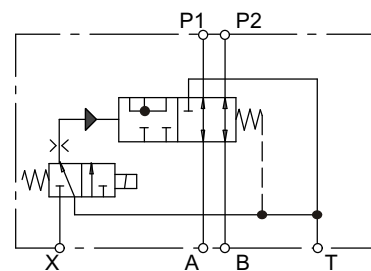
#### 12.1.3 Circuit diagram



USV16



USV08



## 12.1.4 Technical data

Hydraulic characteristics	Unit	Description, value	
		Size 08	Size 08
Operating pressure $p_{max}$	bar	420	420
Nominal flow rate	l/min	120	160
Dimensions (valve body without solenoid)	mm	160x105x130	220x118x185
Ordering information and order number		USV08-1J12 = 100032930	USV16-0G12 = 100028253
Fluid temperature range	°C	-20 ... +80	
Viscosity range	mm <sup>2</sup> /s	10 ... 300	
Maximum fluid cleanliness		ISO 4406 class 20/18/15 achievable with a filter rating of $\beta_{10} \geq 75$	
Nitrile seals		NBR (Nitril-Butadien-Kautschuk)	
Port threads:: USV08		P1, P2, A, B = M27x2 T, C = M18x1,5 X = M14x1,5 according to DIN EN ISO 9974-1	
USV16		1 - 4, A, B = M27x2 T = M14x1,5 X = M14x1,5 according to DIN EN ISO 9974-1	
Electrical characteristics	Unit	Description, Value	
Supply voltage	VDC	12 or 24	
Supply voltage tolerance		± 10%	
Nominal power consumption	W	27	
Relative duty cycle		100%	
Enclosure protection (when connector plugs are properly fitted)		Connecting plug to DIN 43650	IP54
		AMP Junior Timer (2-pole)	IP65
		Deutsch plug DT04-2P-EP	IP67
Electrical connection		Connecting plug to DIN 43650 AMP Junior Timer (2-pole) Deutsch plug DT04-2P-EP	

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