HS-BR

Q_{max} A-T 60 l/min (16 GPM) • Q_{max} P-A 30 l/min (8 GPM) • p_{max} 50 bar (725 PSI)

Technical Features

- Hydraulic manifold designed to deactivate (release) brake with a spring-loaded control system (The spring loaded control system is a system according to ISO EN 3450 independent of an exhaustible energy source and a system indepedent of continuous activities of the operator)
- Suitable for mobile construction and mobile forestry machinery subject to standards EN ISO 3450, EN 500, ISO 10265, ISO 11169, ISO 11512
- According to EN ISO 3450, brake manifold may control:
  - Service brake (maximum machine speed up to 6 km/h)
  - Secondary brake (maximum machine speed up to 20 km/h)
  - Parking brake (no machine speed limit)
- 3 variants of manifolds according to the required complexity
- Possibility of emergency unbraking (brake release) of the machine via a hand pump
- Automatic valve reset to safe starting position every time the engine starts
- Optional pressure switch for light signalization in the cab
- Wide range of solenoid operated directional control valve connectors
- Manifolds and valves optimised for low pressure drop for rapid response
- Functional surfaces covered by a rubber cuff ensuring a long service life

Examples of Possible Applications with the Related Standards

The mobile machines shown in the figures below have braking systems that are subject to the standards listed below.
The standards define the terms for service braking systems, emergency braking systems, parking braking systems and the requirements for these systems. The brake manifold meets these requirements.

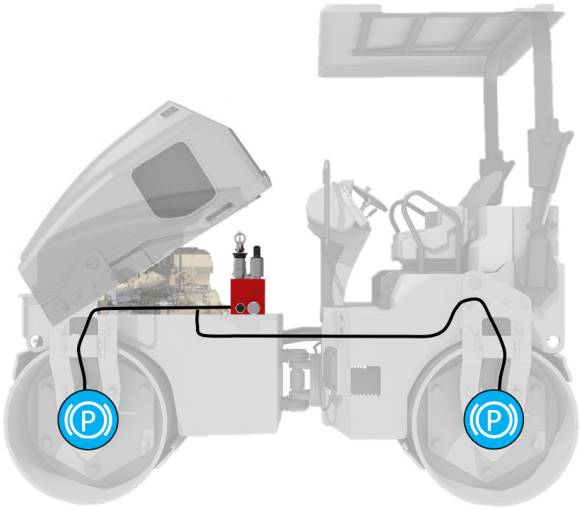
EN ISO 3450
ISO 10265

EN 500-1
EN 500-2
EN 500-3
EN 500-4
EN 500-6

EN 11512
ISO 11169
EN 17344

Subject to change · HS-BR_4300_2en_11/2023

Integration of the System

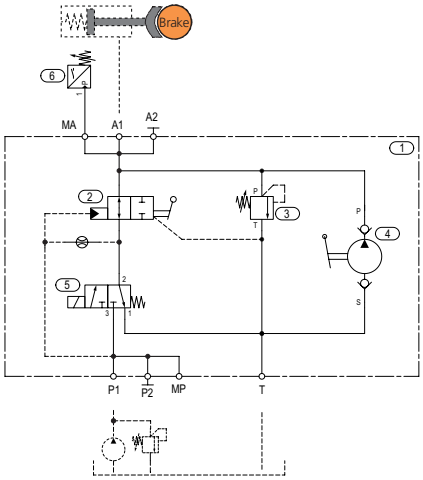


The hydraulic brake manifold is placed in a covered part of the machine where there is no risk of damage to the block from external influences (impact with an obstacle, splashing liquid).

The manifold is oriented so that the manually operated directional control lever is easily accessible and the hand pump can be operated by means of a lever.

The pressurised fluid is routed from the hydraulic manifold to the wheels and treads, which are equipped with a brake.

Functional Description



The brake manifold (1) is connected to the pressure source (port P1), to the single-acting hydraulic cylinder of the spring brake (port A1) and to the pressureless tank (port T).

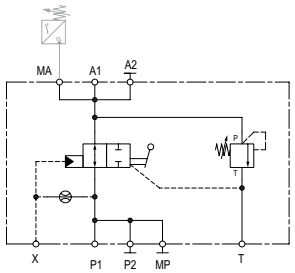
During normal machine operation, the manually operated directional control valve (2) is automatically maintained in the open position.
Switching the solenoid operated directional control valve (5) activates and deactivates the brake. The pressure switch (6) can be used to indicate the status of the brake system.

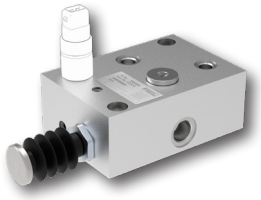
In the event of a drive unit failure, the machine can be emergency unbraked (released) by manually moving the directional control valve (2) to the closed position and manually pressurising the circuit using the hand pump (4). When the drive unit is restarted, the directional control valve (2) is automatically set to the open position allowing the machine to run and stop.

The pressure relief valve (3) protects all circuit components against pressure overload.

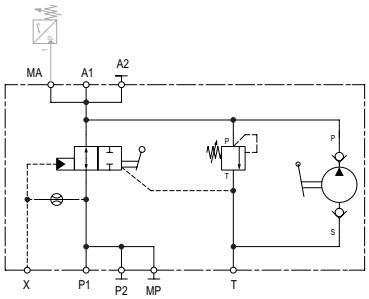
Available Variants

HS-BR-A

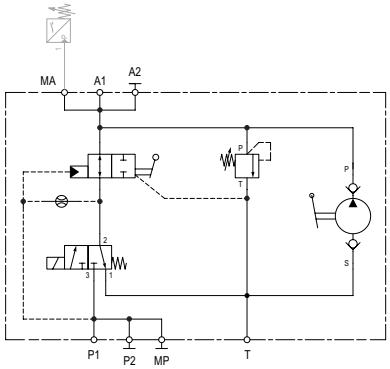




HS-BR-B



HS-BR-C



Technical Data

Max. working pressure of brake circuit	bar (PSI)	45 (650)
Max. cracking pressure of pressure relief valve	bar (PSI)	50 (725)
Max. flow in direction P → A	l/min (GPM)	30 (7.9)
Max. flow in direction A → T without pressure in the tank	l/min (GPM)	60 (15.9)
Fluid temperature range (NBR)	°C (°F)	-30 … +90 (-22 ... +194)
Fluid temperature range (FPM)	°C (°F)	-20 … +90 (-4 ... +194)
Ambient temperature range	°C (°F)	-30 … +80 (-22 ... +176)
Supply voltage of solenoid operated valve	V DC	12 24
Connector type of solenoid operated valve		Deutsch DT04-2P, AMP Junior Timer
Surface treatment of cartridge valves (PD2E1-X3, RCA-A2)		Zinc-coated (ZnNi), ISO 9227 (520 h)
Surface treatment of plugs and pressure relief valve		Zinc-coated (ZnNi), ISO 9227 (240 h)
Material of manifold		Aluminium (EN AW-2007-T4)
Surface treatment of manifold		Elox transparent
Connecting thread acccording to ISO 1179-1		G3/8", G1/4"

Ordering Code

HS - BR - [ ] - [ ] - G - [ ] - 060 - [ ] [ ] - B - AL [ ]

Hydraulic system

Brake release manifold

Block

basic manifold	**A**
manifold with hand pump	**B**
manifold with hand pump and solenoid operated directional control valve	**C**

Pressure switch

without pressure switch	**No designation**
with pressure switch*	
10 - 20 bar (145 - 290 PSI)	**S1**
20 - 50 bar (290 - 728 PSI)	**S4**
Requested pressure setting of pressure switch (example of 16 bar setting of pressure switch S1: **16S1**)	**XXSX**

*S1 and S4 pressure switches are preferred types.
For other possibilities - see table on the next page.

Connection ports (see table connection ports)
G threads acc ISO 1179-1

Cracking pressure of pressure relief valve

15 bar (218 PSI]	**15C**
20 bar (290 PSI)	**20C**
28 bar (406 PSI)	**28C**
37 bar (537 PSI)	**37C**
50 bar (725 PSI)	**50C**
15 - 40 bar (218 - 580 PSI) adjustable	**S**
15 - 40 bar (218 - 580 PSI) adjustable	**XXS**
Requested pressure preset at flow 6 l/min (1.6 GPM) (example of pressure setting 31 bar: **31S**)	

Orifice
orifice diameter 0,6 mm (0.02 in)

Rated supply voltage of solenoid

No designation	without solenoid operated directional control valve
12	12V DC
24	24V DC

Connector type of solenoid

No designation	without solenoid operated directional control valve
E3	AMP Junior Timer - radial direction (2 pins)
E4	E3 with quenching diode
E12	Deutsch DT04-2P - radial direction (2 pins)
E13	E12 with quenching diode
E12A	Deutsch DT04-2P - axial direction (2 pins)
E13A	E12A with quenching diode

Surface treatment of cartridge valves
(PD2E1-X3, RCA-A2)
Zinc-coated (ZnNi), ISO 9227 (520 h)

Material of manifold
aluminium alloy with surface treatment

Seals

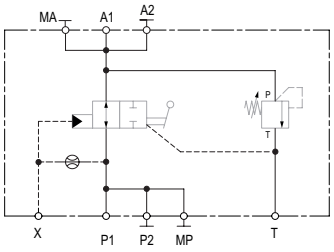
No designation	NBR
V	FPM (Viton)

Configuration of Ordering Code

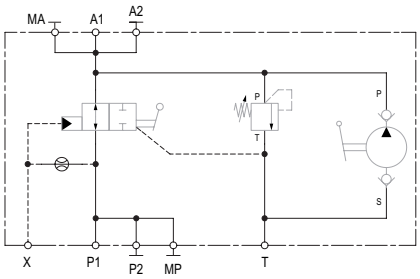
Manifold

Depending on the required complexity of the hydraulic circuit and the requirements for build-in space, there are 3 variants of manifolds available.

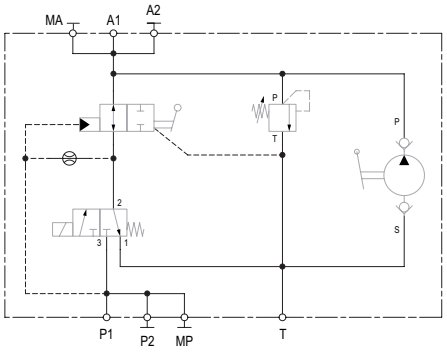
HS-BR-A

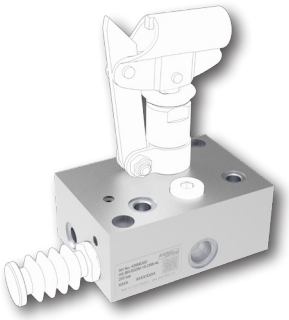


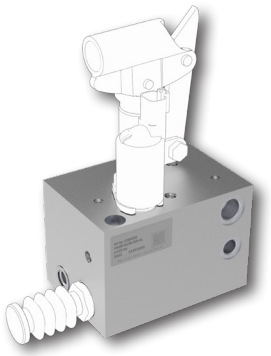
HS-BR-B



HS-BR-C



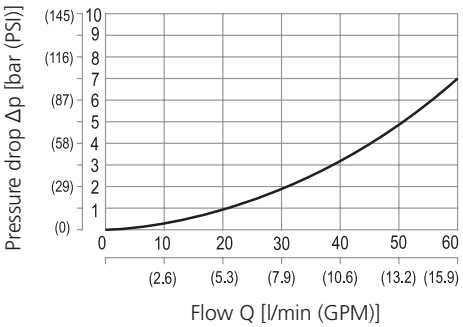




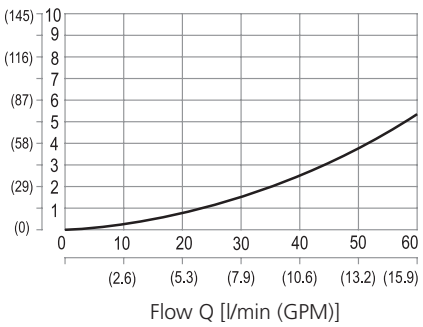
Characteristics measured at ν = 32 mm²/s (156 SUS)

Pressure drop

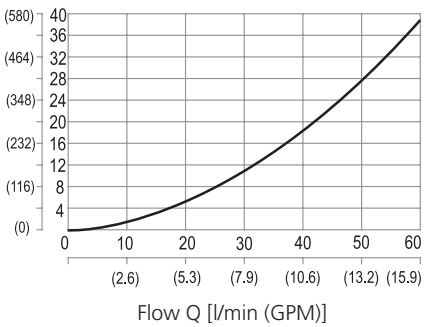
A1→P1



A1→P1



A1→T



Pressure Switch

The pressure switch can serve, for example, as an input to the control unit about the actual status of the brake system or as a light on the dashboard in the driver's cab. The pressure switch is an optional component and is not necessary for the proper function of the brake manifold.

NBR Seals

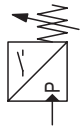
bar (PSI)	Deutsch DT04-2P	AMPJunior Timer	M12x1 DIN EN 61706-2-101-1
10 - 20 (145 - 290)	**S1** (34544100)	S2	S3
20 - 50 (290 - 725)	**S4** (42861700)	S5	S6 (42651600)

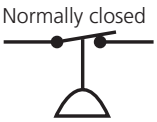
FPM Seals

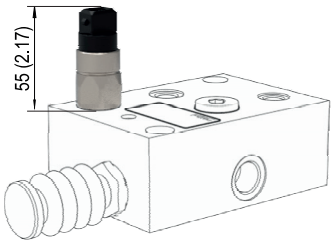
bar (PSI)	Deutsch DT04-2P	AMPJunior Timer	M12x1 DIN EN 61706-2-101-1
10 - 20 (145 - 290)	S7	S8	S9
20 - 50 (290 - 725)	S10	S11	S12

Preferred pressure switches are **S1** and **S4**, for other pressure switches consult the sales department.

All pressure switches are normally closed. If the pressure in the brake circuit is lower than the pressure set on the pressure switch, the contacts will connect the electrical circuit. If the pressure in the brake circuit is higher than the pressure set on the pressure switch, the contacts will disconnect the electrical circuit. It is recommended to set the pressure switch to a pressure 30 % lower than the working pressure in the brake circuit. Tolerance of pressure switch setting is ±1 bar (±14 PSI).







Connection Ports

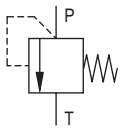
The connection ports of the manifold are designed for fittings according to ISO1179-1.

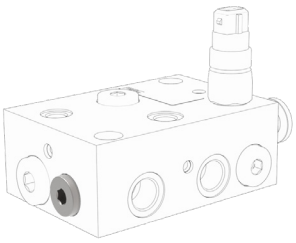
	P	A	T	MP	MA	X
Port size	G3/8"	G3/8"	G3/8"	G1/4"	G1/4"	G1/4"
Tightening torque [Nm (lbf.ft)]	30+2 (22.1+1.5)	30+2 (22.1+1.5)	30+2 (22.1+1.5)	15+1 (11.1+0.7)	15+1 (11.1+0.7)	15+1 (11.1+0.7)

Pressure Relief Valve

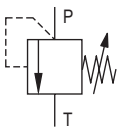
The relief valve provides protection of the hydraulic circuit against pressure overload. There is a non-adjustable relief valve with a cracking pressure that cannot be set on the machine and an adjustable relief valve with a cracking pressure that can be set with a 4 mm Allen key. It is recommended to set the cracking pressure of the relief valve 10-20 % higher than the working pressure in the brake circuit, up to a maximum of 50 bar (725 [PSI]). Tolerance of pressure relief valve setting is ±2 bar (±29 PSI).

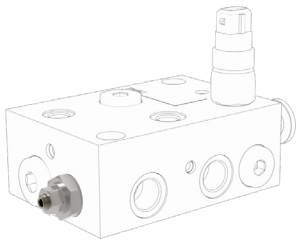
15C, 20C, 28C, 37C, 50C





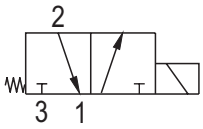
S, XXS

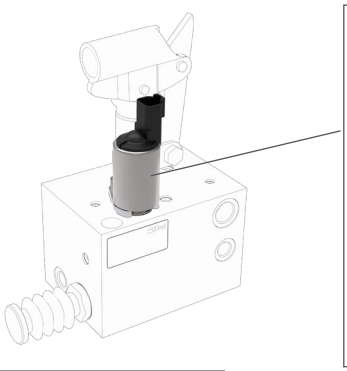




Directional Control Valve

In its basic position, the solenoid operated SLIP-IN PD2E1-X3/2D21-* valve allows to unload the hydraulic circuit and thus activate the brake. The valve can be configured in the rated supply voltage, solenoid connector type and seals (see Datasheet PD2E1_HA 4050).





Supply voltage (V DC)
12, 24

Connector type
E3, E4, E12, E13, E12A, E13A

AMP Junior timer

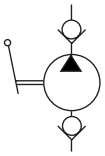
Deutsch DT04-2P

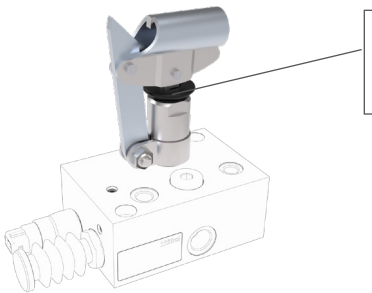
Seals
NBR, FPM

Surface treatment
B

Hand Pump

To ensure a long service life and trouble-free servicing of the machine, the RCA-A2-1L* hand pump is designed for brake manifolds, with its functional surfaces covered by a rubber cuff. The manual control lever must be ordered separately, ordering code according to hand pump datasheet (see Datasheet RCA_HA 2020).

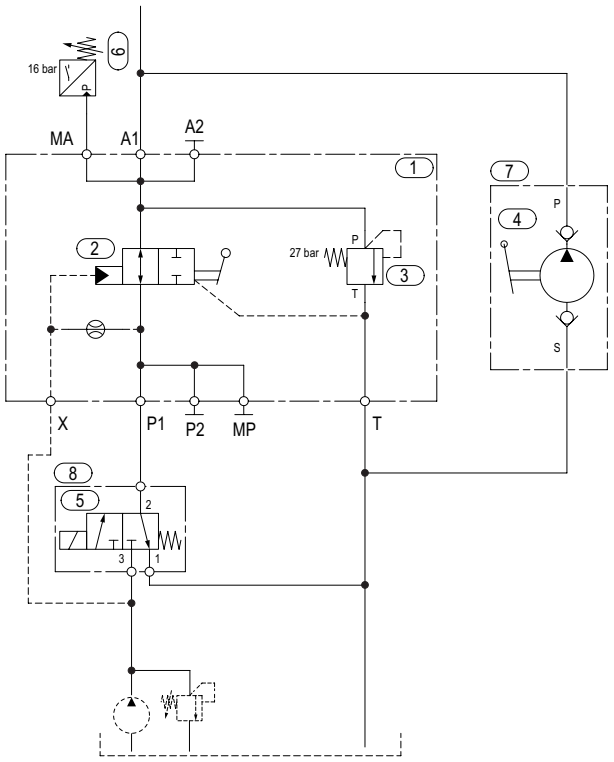




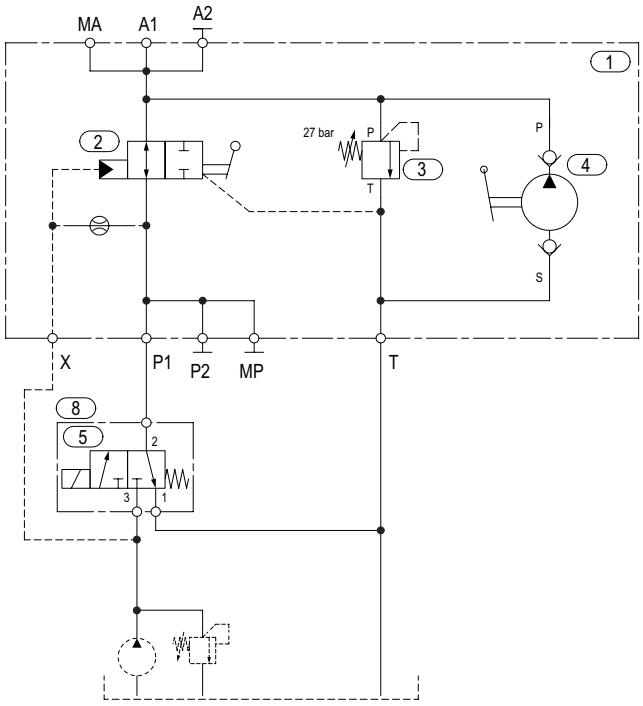
Recommended
RCA-A2-1L-B
RCA-A2-1LV-B

Examples of Complete Hydraulic Circuits

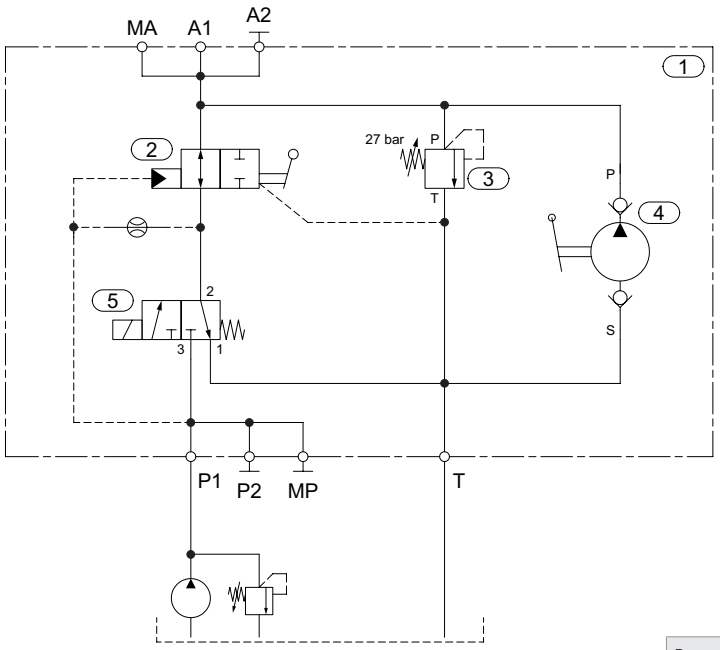
HS-BR-A



HS-BR-B



HS-BR-C



Pos.	Description	Type
1	Manifold HS-BR*	without AH designation
2	2/2 Directional Control Valve	without AH designation
3	Pressure Relief Valve	without AH designation
4	Hand Pump	RCA-A2-1L-B
5	3/2 Directional Control Valve	PD2E1-X3/2D21-24E12AV-A
6	Pressure Switch	without AH designation
7	Manifold	SB-A2-0103AL
8	Manifold	SB-X3-0104

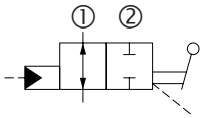
Technical Recommendations and Dimensions

Bleeding the Hydraulic Circuit

WARNING For the system to work properly, the entire brake circuit must be bled.

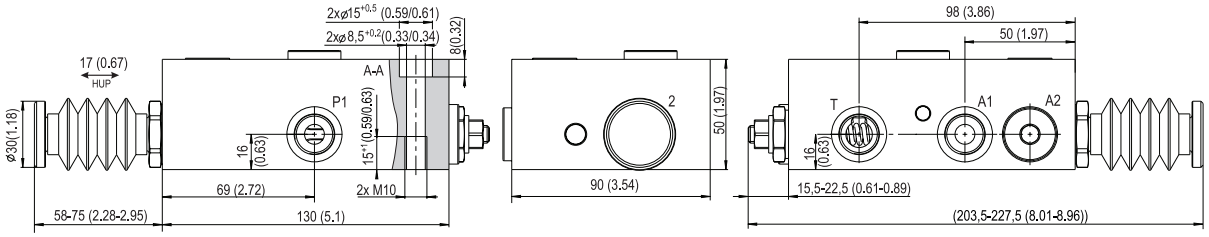
Manually Operated Directional Control Valve

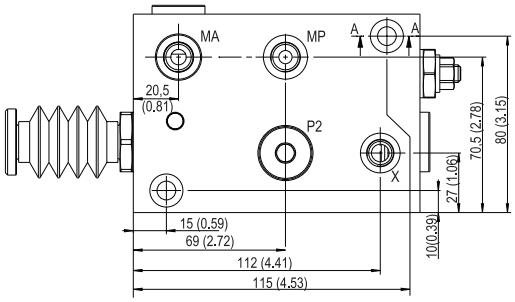
When the control lever of a manually operated directional control valve is in position 1, the directional control valve is open and fluid flows with minimal pressure drop through the directional control valve. When the control lever is in position 2, the directional control valve blocks the flow of fluid.



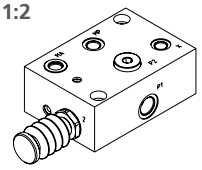
Dimensions in millimeters (in)

HS-BR-A

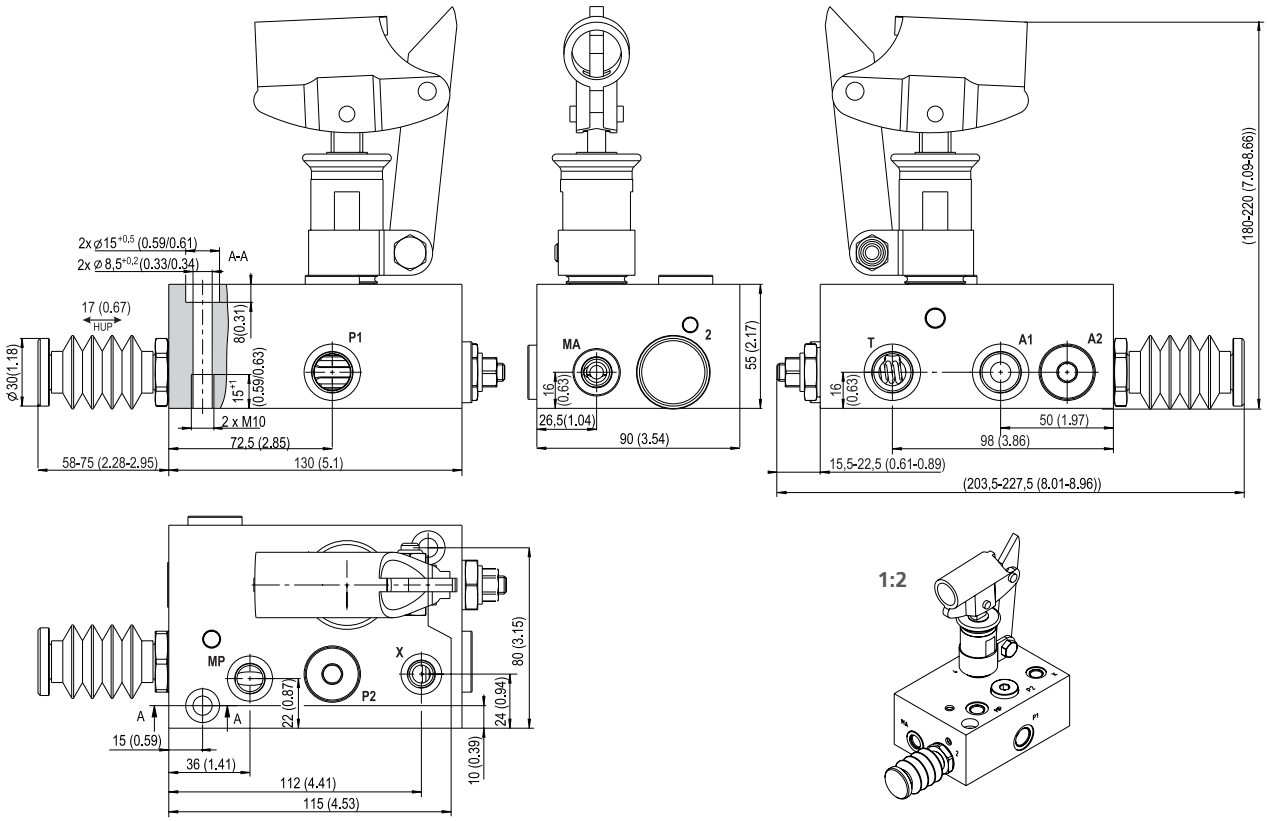




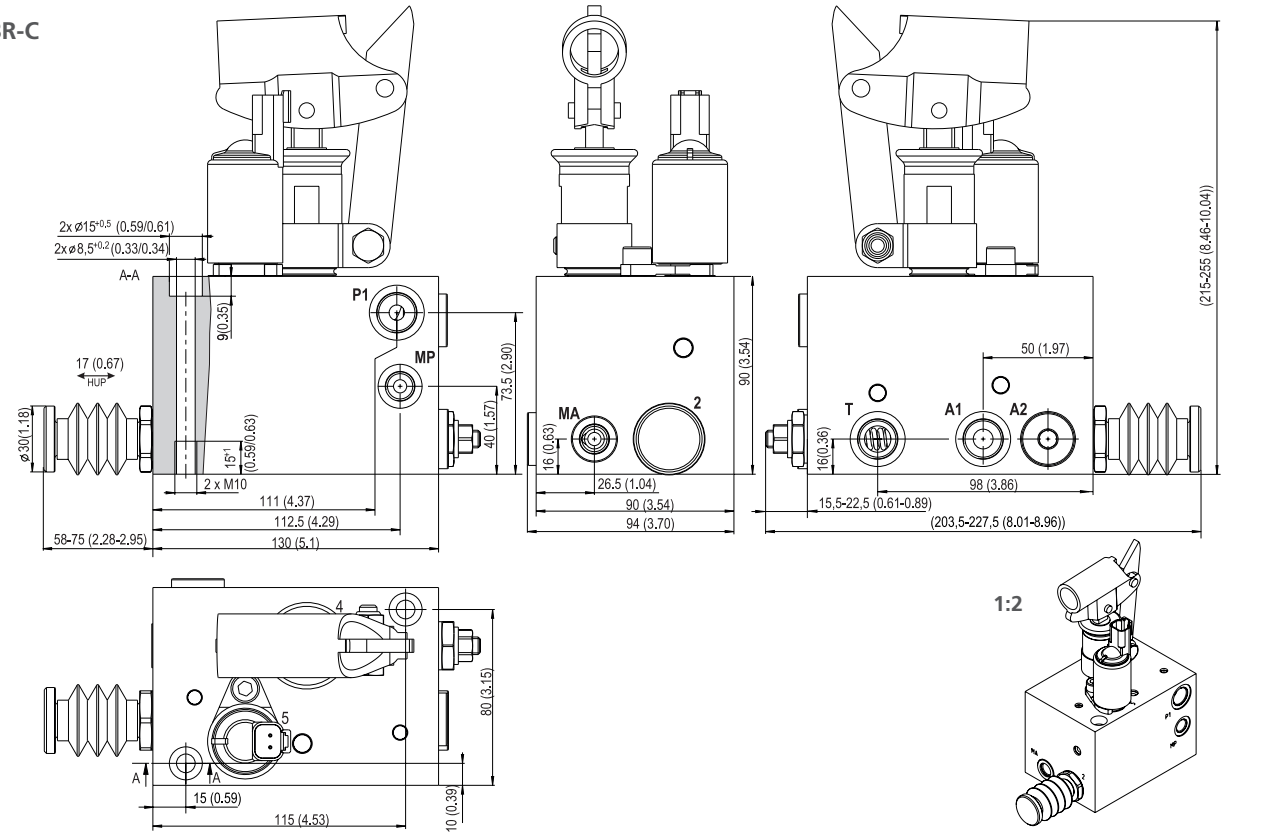
1:2



HS-BR-B


2x ⌀15+0,5 (0.59/0.61)
2x ⌀8,5+0,2 (0.33/0.34)
A-A
17 (0.67)
HUP
8(0.31)
⌀30(1.18)
15+1 (0.59/0.63)
2 x M10
72,5 (2.85)
58-75 (2.28-2.95)
130 (5.1)
P1
MA
2
55 (2.17)
16 (0.63)
26,5(1.04)
90 (3.54)
T
A1
A2
16 (0.63)
50 (1.97)
98 (3.86)
15,5-22,5 (0.61-0.89)
(203,5-227,5 (8.01-8.96))
(180-220 (7.09-8.66))
MP
X
P2
A
A
22 (0.87)
24 (0.94)
80 (3.15)
15 (0.59)
36 (1.41)
112 (4.41)
115 (4.53)
10 (0.39)
1:2

HS-BR-C


2x ⌀15+0,5 (0.59/0.61)
2x⌀8,5+0,2 (0.33/0.34)
A-A
P1
9(0.35)
MP
17 (0.67)
HUP
73,5 (2.90)
40 (1.57)
⌀30(1.18)
15+1 (0.59/0.63)
2 x M10
111 (4.37)
112,5 (4.29)
58-75 (2.28-2.95)
130 (5.1)
MA
2
90 (3.54)
16 (0.63)
26.5 (1.04)
90 (3.54)
94 (3.70)
T
A1
A2
16(0.36)
50 (1.97)
98 (3.86)
15,5-22,5 (0.61-0.89)
(203,5-227,5 (8.01-8.96))
(215-255 (8.46-10.04))
4
5
A
A
80 (3.15)
15 (0.59)
115 (4.53)
10 (0.39)
1:2