

S6 BRAKE SYSTEM

- Power Brake Valves



- Accumulator Charging Valves



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01

CENTRAL DESCRIPTION

01.01

MAIN FEATURES

- A single, compact unit
- Positive, progressive braking
- For any vehicle type or size
- No need for special hydraulic circuit, powered by vehicle's existing circuit
- Pressure differentials between brakes
- For use with both negative and positive brakes
- Available in horizontal or vertical versions
- A minimum of hydraulic connections
- Accumulator charging valve for load sensing circuits
- Modular assembly
- Easy to adjust
- Low in maintenance

01.02

DESCRIPTION

The Safim S6 Brake System is a compact assembly with all brake components grouped together in a single, modular, easy to-adjust unit.

Modular components mean that customers can select the unit configuration that best suits their particular needs.

Safe, dependable braking in all circumstances is thus assured.

The S6 is available in both horizontal and vertical versions. Both versions, whilst the same basic design, offer a choice of different configurations. The S6 is a major innovation in brake systems because it only requires a small number of connections and only uses a small amount of power from the vehicle's existing hydraulic circuit; the remaining power is thus available for other equipment. This innovation is made possible by the charging valve which automatically controls the flow of oil to the hydraulic accumulators.

The S6 system is suitable for mounting on medium and large sized vehicles from 1 to 4 brake circuits. Typical examples are: loaders, dumpers, forklift trucks, mobile cranes, cement mixers, excavators, compressors, etc...

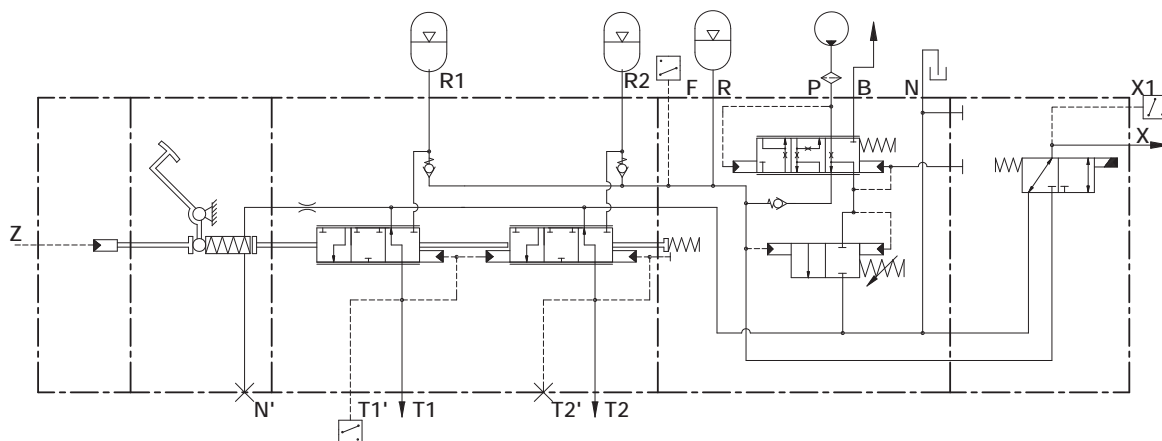
The system is designed for the direct control of mechanical or hydraulic brakes both positive and negative (pressure differentials of 1:2 and 1:4), to provide safe, responsive, and progressive braking at all times.

The technical characteristics of the S6 provide increased braking power with a lower pedal force. Brake pressure is adjusted on the modules connected to the brake circuit. Safim supplies S6 units ready-adjusted to customer specifications. Further adjustment can easily be carried out by the customer if desired.

Fitting the S6 is simple, the unit is virtually maintenance free and Safim customer service will always offer assistance and advice.

01.03

TYPICAL HYDRAULIC SCHEMATIC

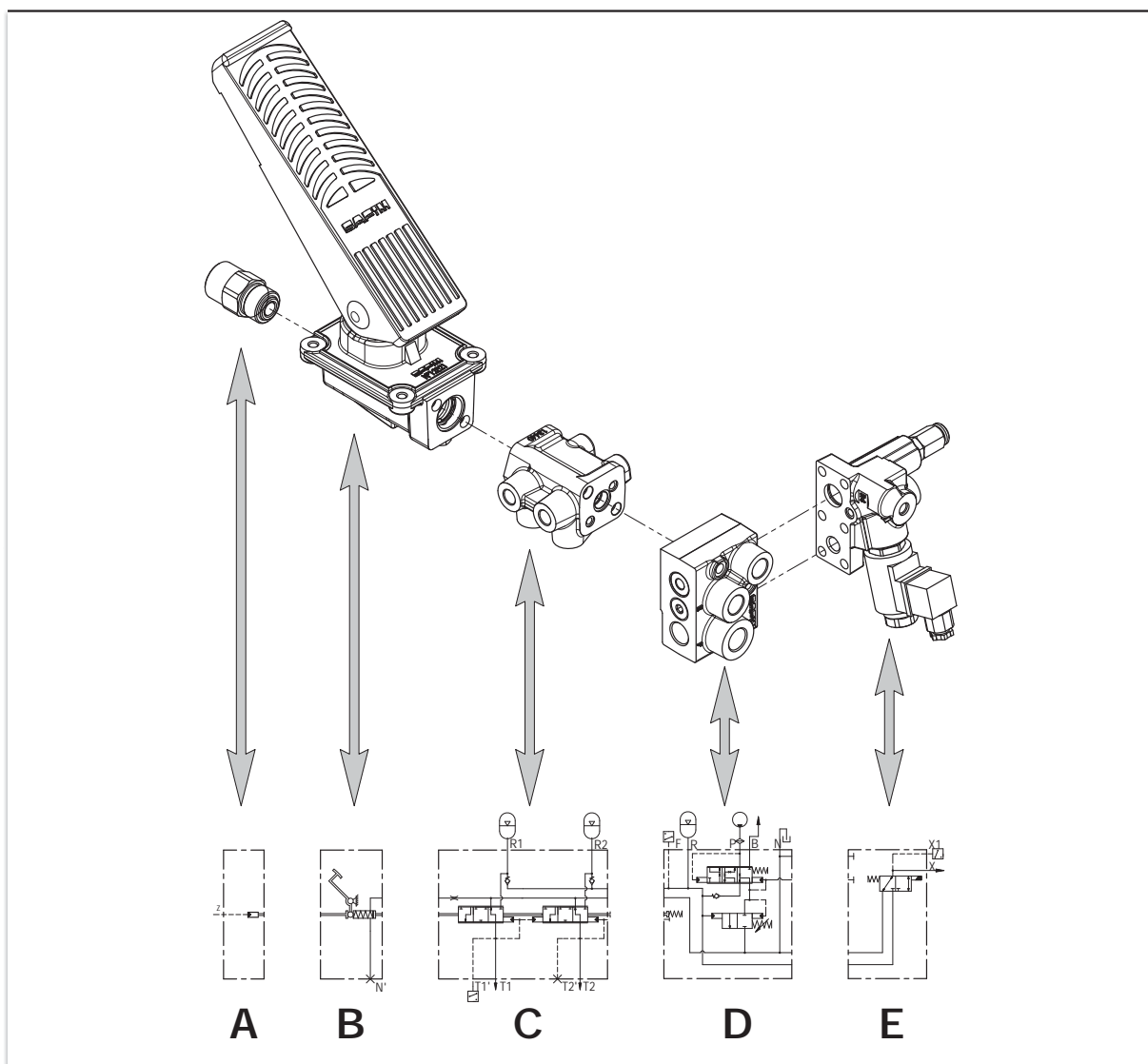


P Feed from pump
 B Feed to service
 X Parking brake
 X1 Pressure switch parking brake
 N Tank
 R Accumulator
 R1 Accumulator
 R2 Accumulator
 T1 Feed to front and rear brakes

T1' Pressure switch stop lights
 T2 Feed to front and rear brakes
 T2' Pressure switch stop lights
 F Pressure switch accumulator
 Z work brake cylinder

01.04

GROUP S6 MODULAR CONSTRUCTION



The Safim S6 brake System is made up of the following modular components:

A: Horizontal brake system front module

B: Pedal-support unit

C: Brake modules

D: Accumulator charging valve

E: Closing flange for valve charge

A: Horizontal brake system front module

The horizontal pedal support enables the connection of some devices in place of the cap which normally close the support:

It is possible to mount an hydraulic actuator capable of operating the group held back by steering pressure.

Alternatively it is possible to mount devices whose operation is linked to the hydraulic brake as commands or electric inching.

B: Pedal-support unit

The pedal/support unit is used to secure the entire brake system to the floor of the cab.

The main function of the support is to convey the actuating force acting on the pedal to brake modules through some springs that make brake pressure proportional to the stroke.

The following parameters in the unit can be regulated:

- the maximum brake pressure is regulated by means of an adjustable push-rod which limits the return lever travel;
- the pedal angle.

C: Brake modules

These modules control the brake pressure.

Each module is connected to an accumulator. The accumulators are high pressure containers fitted with a special membrane which separates the oil from the gas (nitrogen). The brake modules act as hydraulic distributors receiving oil from accumulators and they send to brake a pressure proportional to the force transmitted to them by support springs.

Three threaded connectors link the module to the brakes, accumulator and stop light pressure switch. Longitudinal channelling on the modules provide the hydraulic connection with the tank and the charging unit.

D. Accumulator charging valve

This valve maintains the pressure of the accumulators within the range set by the vehicle manufacturer.

This pressure is regulated by adjusting the screw fitted at the end of the cylinder and protected by a cap nut.

The accumulator charging valve can be connected in series with other appliances. The valve takes up oil fed by the pump and directed at the accumulators connected to the brake system.

The flange is used when there is no need to install an accumulator charging valve (on the vehicle there is a pressure line suitable for power accumulators) or, for reasons of space, it is not possible to assemble a charging valve directly on the group (it's available even the "in line" charging valve that it is connected to the S6 system through circuit hoses).

E: charging valve cover

The charging valve is completed by a cover that may contain several options.

Among these it is possible to insert an electrically driven valve that inhibits the charge to avoid too much absorbed energy during engine ignition and promote the start up.

The flange may contain up to two electro 3-way valves for controlling external hydraulic devices as parking and working brakes (acting on the same s6 hydraulic pilot system). It is also possible to insert a pressure reducing valve integrated into this module to power devices that are unable to withstand direct pressure accumulators.

The modular construction of the S6 brake system allows a very large number of possible combinations to meet the different needs of installation.

The data sheet was designed to define in a more comprehensive and unambiguous way all the features and functionality of the S6 system.

The decoding of a S6 system is a string consists of 21 alphanumeric fields, each of which goes to define a specific characteristic of the group. Individual entries are selected from a list that defines all possible combinations..

A detailed analysis of individual items of data sheet allows to understand the capabilities of the s6 group in all its many versions.

SAFIM SpA.	MODULAR S6 BRAKE SYSTEM TECHNICAL SHEET	SQ002 REV. 3 05/02/2008
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SAFIM CODE	REV.	DATE	DRAWING CODE	CUSTOMER CODE
DEALER	FINAL CUSTOMER	VEHICLE CODE	CUSTOMER S RESPONSIBLE	

FUNCTION CODE																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

1: S6 system type

O : Horizontal mount system
V : Vertical mount system
I : Without pedal (with push-rod)
R : Remote hydraulic piloted valve
D : Double remote hydraulic piloted valve
K : Reverse modulating valve(horizontal type only)
L : In line accumulator charging valve

2: Brake module diameter

8 : Spool D.08mm
9 : Spool D.09mm
1 : Spool D.10mm
4 : Spool D.14mm

3: Number of brake circuits

1,2,3,4 : Number of brake circuit
- : No brake circuit present

4: Type of accumulator charging valve power feeding.

N : S6 brake system without charging valve
F : Open centre charging valve.
V : Load sensing charging valve.

5: Remote hydraulic piloting — Inching

A : Piloting cylinder D.10mm
B : Piloting cylinder D.12mm
C : Piloting cylinder D.20mm
I : Double piloting cylinder D.11/20mm
V : Hydraulic inching valve
S : Linear potentiometer for inching piloting
H : Rotary sensor for inching piloting
P : Personalised

6: Check valve

N : Without check valves
S : With check valves in each brake module
B : With selection of the most fill accumulator
V : Park brake accumulator check valve
T : With check valves in each brake module + park brake accumulator check valve
P : With selection of the most fill accumulator + park brake accumulator check valve
- : Not definable feature

7: Pedal support drain

I : Internal drain without M10x1 port
C : Internal drain with M10x1 port plugged

E : External drain with M10x1 port
- : Not definable feature

8: Pedal Type

N : Pedal with rubber protection (standard)
C : Short pedal with rubber protection
H : Pedal with rubber protection and latch
F : Firewall mounting pedal
S : Without pedal, with lever
I : Without pedal, for push-rod
P : Personalised
- : Not definable feature

9: Solenoid valves — Reducing pressure valve

3 : 3 way solenoid valve
R : 3 way solenoid valve + reducing pressure valve
6 : 2x 3 way solenoid valve
X : 2x 3 way solenoid valve + reducing pressure valve
2 : Start unloading valve
5 : Start unloading valve + 3 way solenoid valve
8 : Start unloading valve + 2x 3 way solenoid valve
Y : Start unloading valve + 2x 3 way solenoid valve + reducing pressure valve
- : No solenoid valve present

10: Thread Type

M : Metric + BPS (sealing with washers)
I : Metric ISO 6149 (sealing with O-ring)
S : UNF-SAE (sealing with O-ring)
I+M : Metric ISO (modules port), Metric + BPS (accumulator charging valve ports)
M+I : Metric ISO (accumulator charging valve ports), Metric + BPS (modules ports)
P : Personalised

11: First circuits braking pressure (Bar)

Max brake pressure of all the circuit before the last

12: Last circuit braking pressure (Bar)

Max brake pressure of the last circuit (This value is different from the previous circuit brake pressure only for differential brake module)

13: Accumulator charging valve cut-in pressure (Bar)**14: Accumulator charging valve cut-off pressure (Bar)****15: Reducing pressure valve setting (Bar)****16: Work brake pressure (Bar)**

Indicate this value only if it is different from the braking pressure

17: Piloting cylinder fluid type

M : Mineral oil
V : Brake fluid (DOT3 – DOT4)

18: Solenoid valve coil voltage

A : 12V
B : 24V

19: Accumulator charging flow rate

2 : 3 l/min
S : 5.5 l/min (standard)
3 : 8.5 l/min
4 : 12 l/min

20: Type of remote hydraulic piloting

S : Work brake piloted by accumulator charging valve 3 way solenoid valve
N : External piloting

21: Pedal support orientation

0 : 0° *
S : 90° (Standard) *
180 : 180° *
270 : 270° *
- : Not definable feature *
(for vertical S6 system type only)

CONTROL PRESSURE SPRING

CHARGING VALVE SPRING

ADJUSTING PEDAL ANGLE

NOTE

FIRMA COMPILAZIONE

FIRMA APPROVAZIONE (RUT, DTS, DAC)

FIRMA MONTAGGIO (MON)

02.03**TECHNICAL SHEET ITEMS****02.03.01****POSITION 1 – S6 SYSTEM TYPE**

The item 1 of the technical file defines the types of securing group S6. This is the media that contains the holes to the structure of the cabin. In most cases, the pedal through which will run the group is integrated into this module. The support also contains the springs kit that defines the pressure curve and the maximum value of brake pressure.

The item 1 can be:

- O – Horizontal support
- V – Vertical support
- I – straight control support
- R – Remote controls support
- K – Negative support
- L – In line accumulator charging valve

02.03.01.01

O – HORIZONTAL MOUNT SYSTEM

This support allows to "assemble" a S6 pedal which develops horizontally towards the rear of the cabin. Designed to be mounted under the cab floor has a low vertical space (particularly suitable for vehicles with rotating cabin as excavators). The adjustment of brake pressure is carried out by recording the pedal stroke through an adjusting screw placed at the bottom (the pressure increase by unscrewing the adjusting screw)

It is also possible to adjust the pedal starting angle acting on the two screws under the pedal. A different regulatory of the standard will be listed under heading NOTES of the technical data sheet.

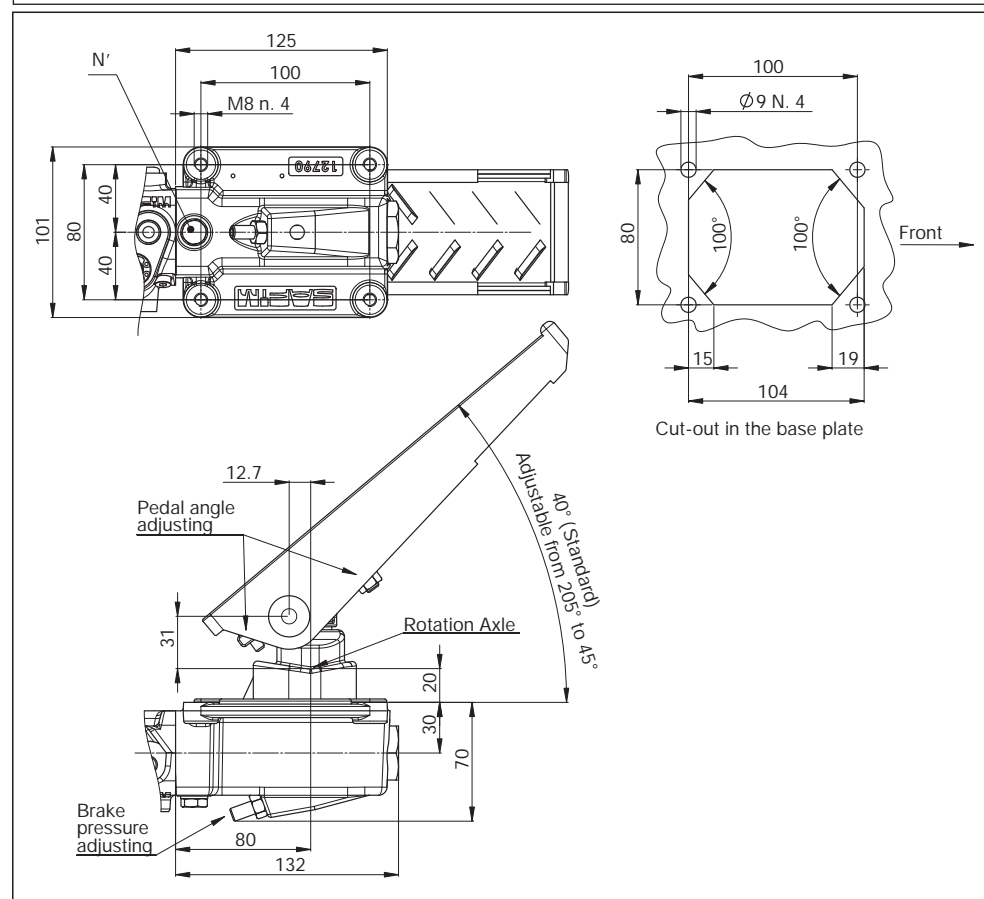
TECHNICAL FEATURES

- Working angle : 13 ° - 18 °
- Standard inclination angle: 40 °
- Tolerance adjustment of the inclination angle $\pm 2^\circ$
- Adjusting angle: 25-45 °

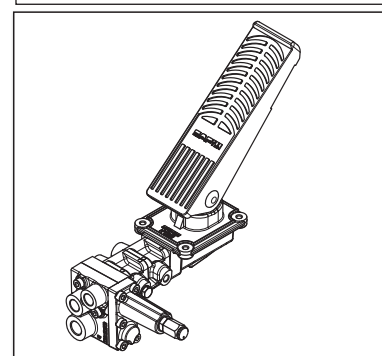
CONNECTIONS

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
N'	External drainage	M10x1 DIN 3852-1X	M10x1 DIN 3852-1X	M10x1 DIN 3852-1X

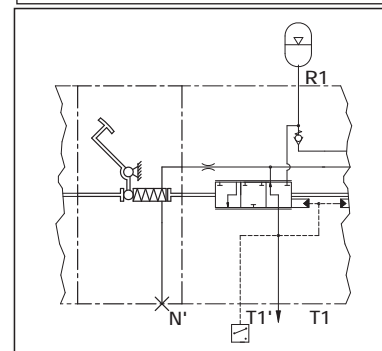
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



02.03.01.02

V – VERTICAL MOUNT SYSTEM

The vertical development support allows to “assemble” a S6 pedal to fit under the cabin floor with a low horizontal foot-print (Particularly suitable for vehicles where space under the cabin abounds in a vertical way as wheel loaders). The adjustment of brake pressure is carried out by recording the pedal stroke through a adjusting screwing the front of the support. It is also possible to adjust starting inclination angle acting on the two screws under the pedal. A different regulatory standard will be listed under heading NOTES of the technical data sheet. The support can be rotated at intervals of 90° in respect to the rest of the valve (see item 21 of the technical file).

- TECHNICAL FEATURES
- Working angle: 13 ° - 18 °

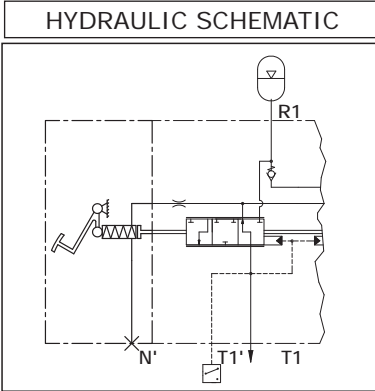
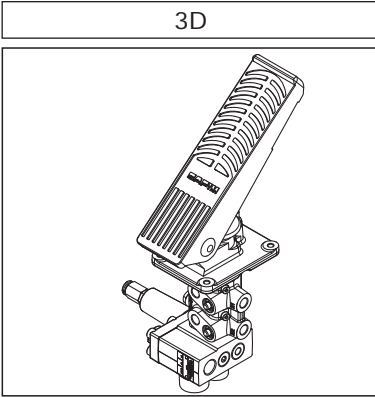
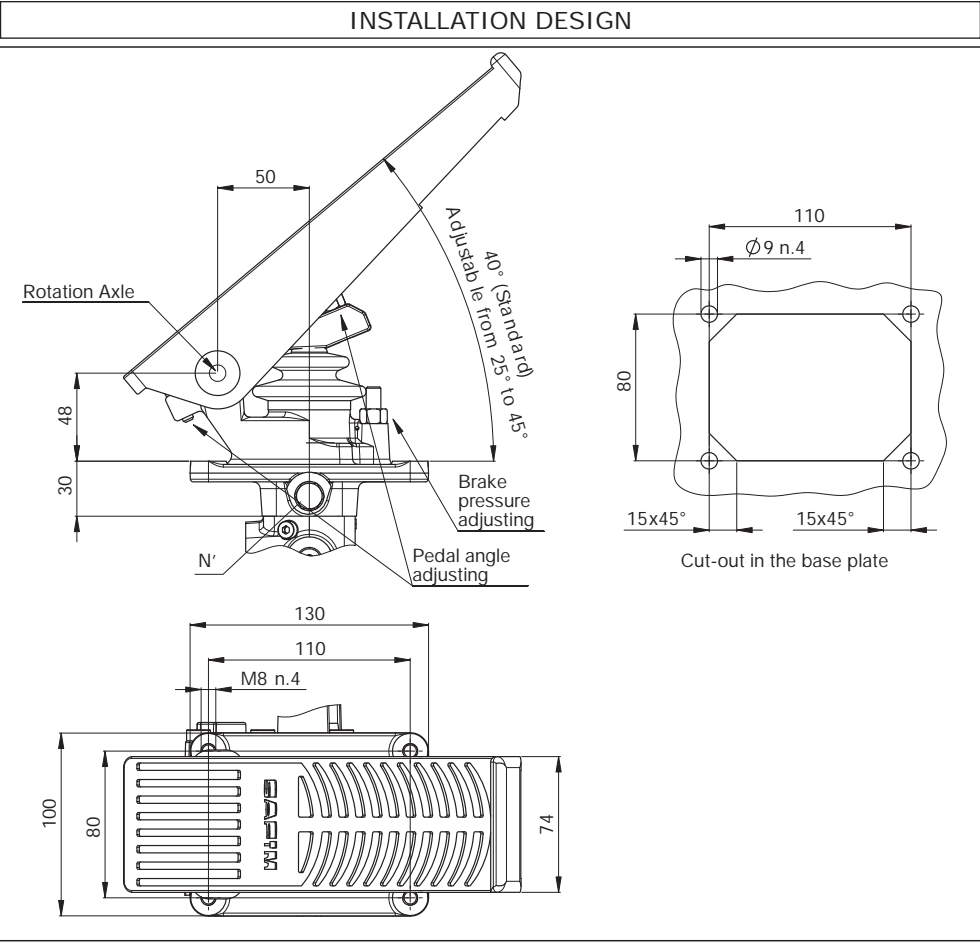
Standard inclination: 40 °

Tolerance adjustment of the inclination angle: ± 2 °

Registration of the slope angle: 25-45 °

CONNECTIONS

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
N'	External drainage	M10x1 DIN 3852-1X	M10x1 DIN 3852-1X	M10x1 DIN 3852-1X



02.03.01.03

I - WITHOUT PEDAL (WITH PUSH-ROD)

The support derived from the aluminium block has no integrated brake pedal, but the actuating force runs through a push rod as the master cylinders. This type of support is particularly suitable for "special" cabins where it is not possible to use a standard pedal with floor support and must be built a special one.

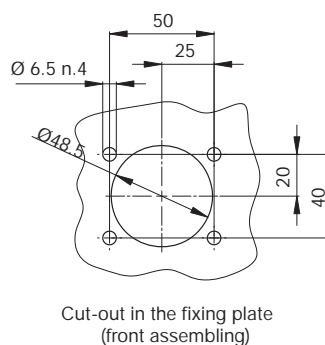
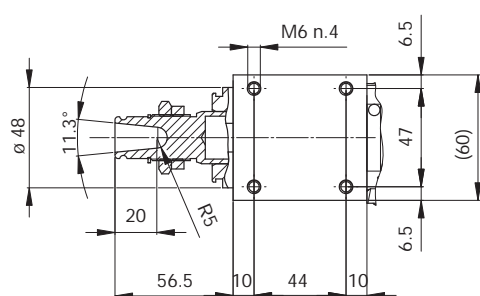
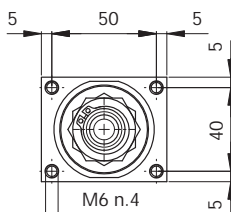
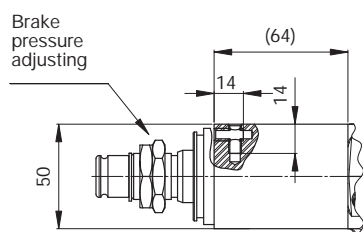
TECHNICAL FEATURES

Working stroke : 13mm – 17mm

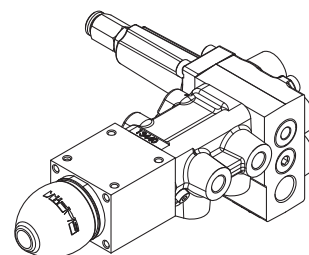
The block presents two sets of holes:

- Front fixing (to be used only for S6 valve without charge).
- Wall fixing.

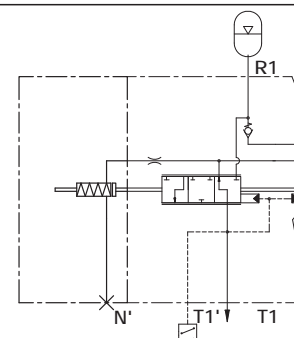
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



02.03.01.04

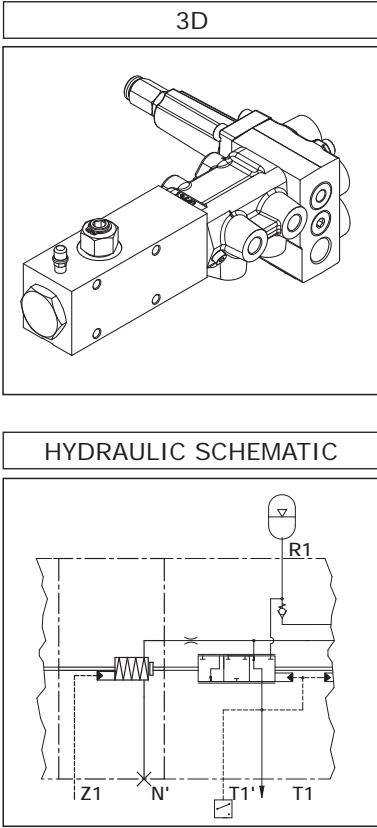
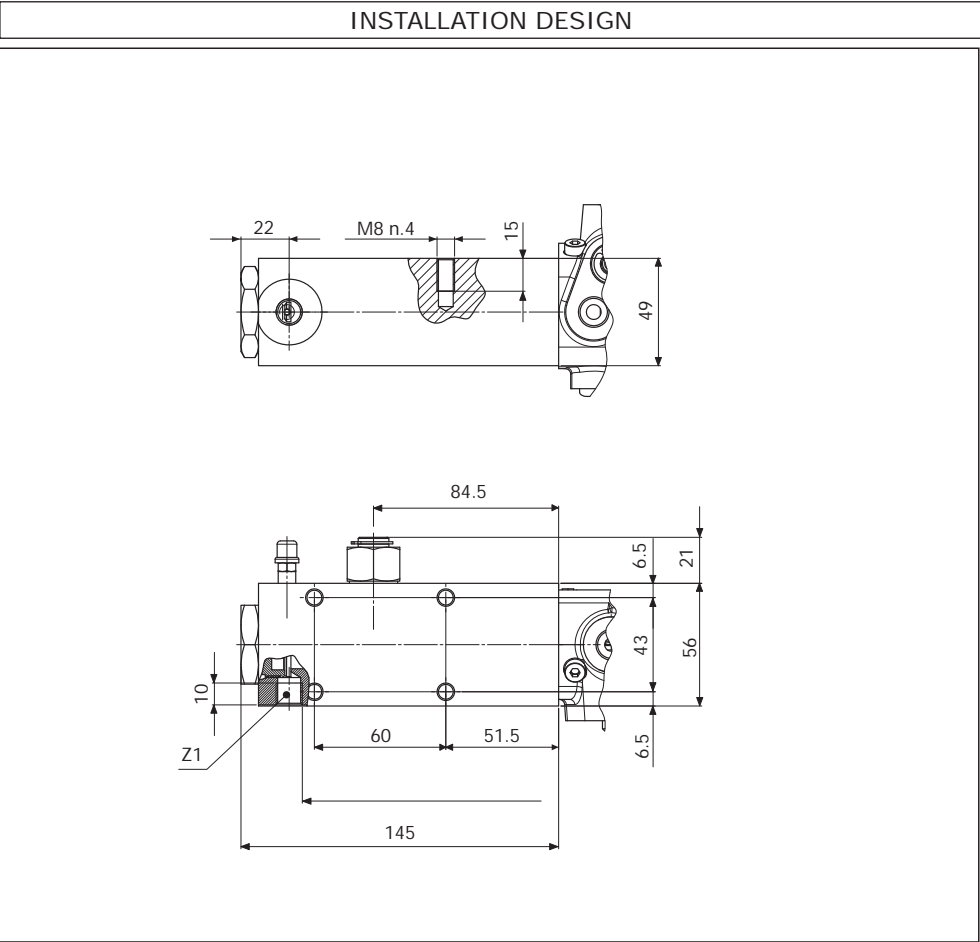
R – REMOTE HYDRAULIC PILOTED VALVE

The support to be used to achieve a S6 remote control system is also achieved by a block as type I, but is prepared to receive a command under pressure from a master cylinders or by another S6 system. This type of S6 system is applicable to multiple driving seat vehicles, or where the cabin is located far from vehicle brakes.

Usually the relay is combined with one or two direct master cylinders \varnothing 22 rif. 022164MN or \varnothing 19 rif. 021279MN.

CONNECTIONS

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
Z1	Pilot signal	M12x1.5 DIN 3852-1X	M12x1.5 DIN 3852-1X	M12x1.5 DIN 3852-1X



02.03.01.05

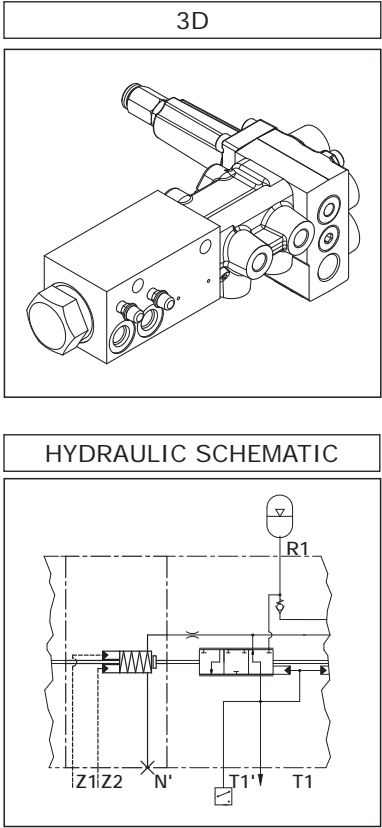
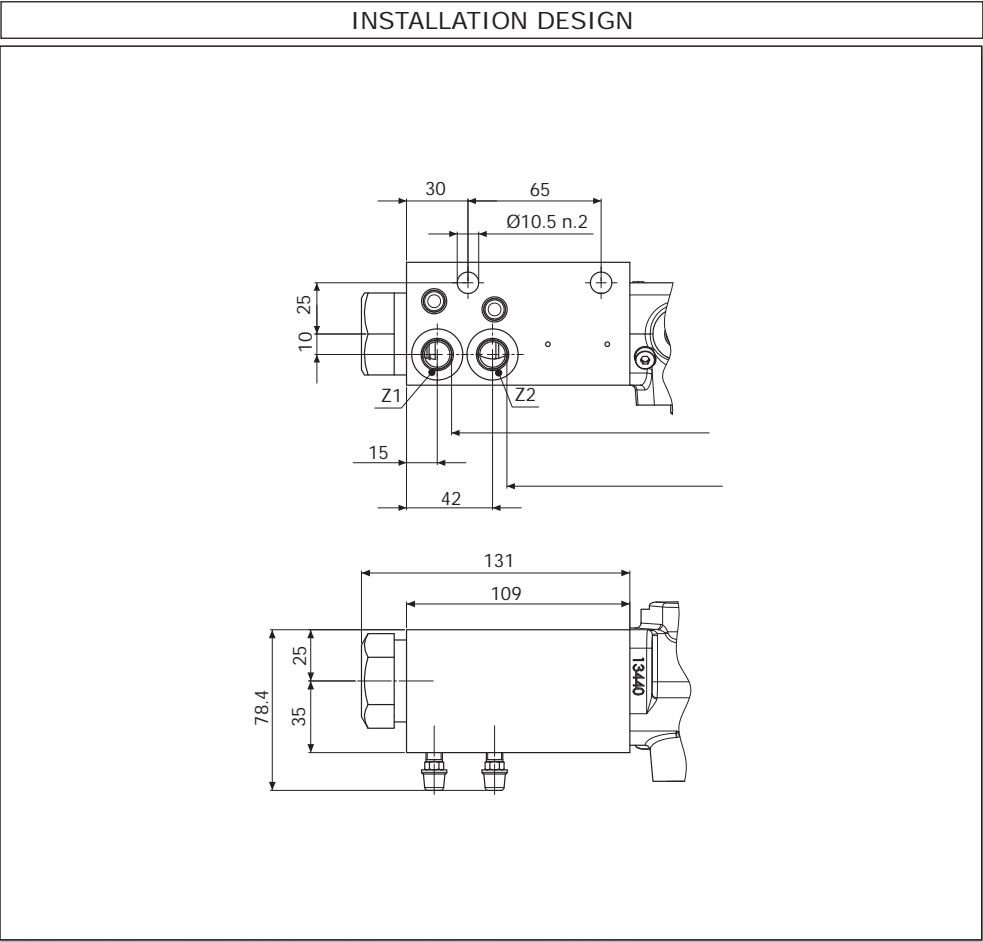
D – DOUBLE REMOTE HYDRAULIC PILOTED VALVE

The dual hydraulic pilot support is used to command a remote S6 system. This type of S6 system is applicable on vehicles that provide the opportunity to drive from two separate loca-

tions, or when you want to have redundancy of the piloting signal through two independent circuits.

CONNECTIONS

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
Z1	pilot signal	M14x1.5 ISO 6149	M14x1.5 ISO 6149	M14x1.5 ISO 6149
Z2	pilot signal	M14x1.5 ISO 6149	M14x1.5 ISO 6149	M14x1.5 ISO 6149



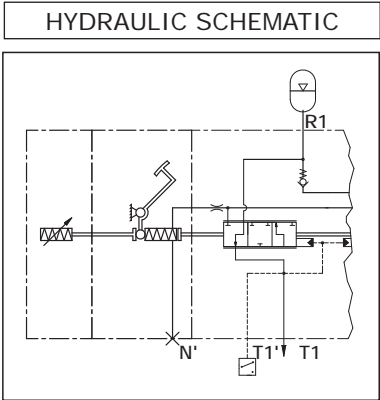
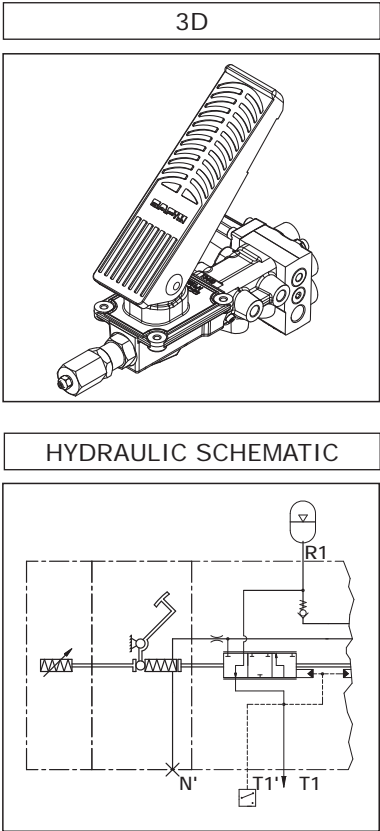
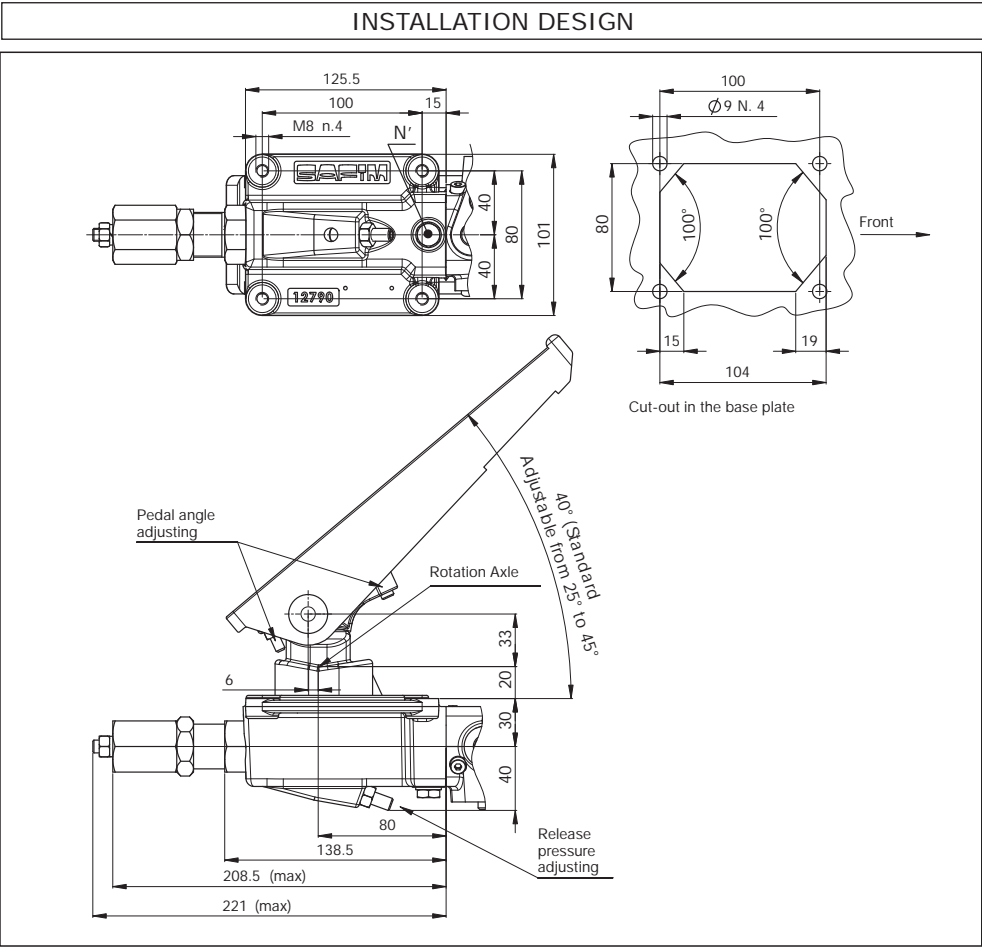
02.03.01.06

K – REVERSE MODULATING VALVE(HORIZONTAL TYPE ONLY)

The negative support is used in specific applications where the S6 system must provide maximum brake pressure when it is not operated. Acting on pedal, the pressure is also progressively reduced to zero.
The negative support can only be achieved in the horizontal footprint version, but unlike the S6 systems that have O under item 1 of the data sheet, in the negative ones the pedal encumbrance spread horizontally forward .

CONNECTIONS

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
N'	External drainage	M10x1 DIN 3852-1X	M10x1 DIN 3852-1X	M10x1 DIN 3852-1X

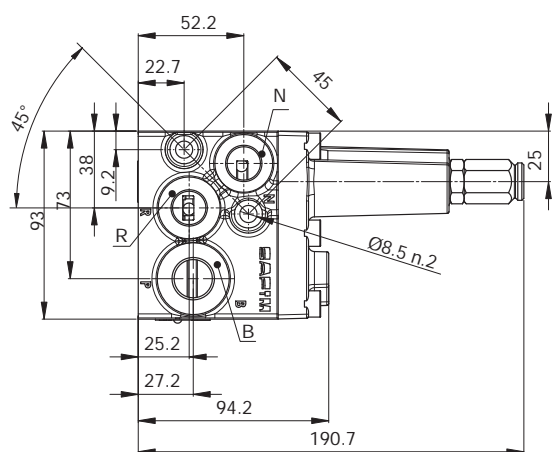


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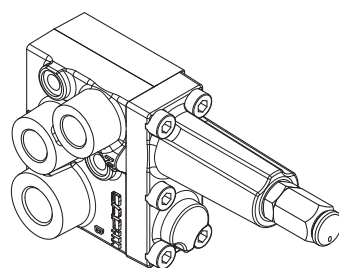
L – IN LINE ACCUMULATOR CHARGING VALVE

The L item identifies a charging valve that has no connection holes with the brake modules to be mounted separately in-line.

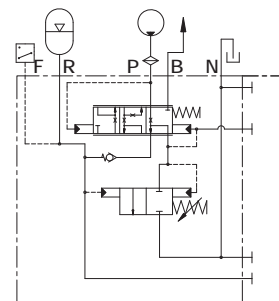
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



02.03.02

POSITION 2 – BRAKE MODULE DIAMETER

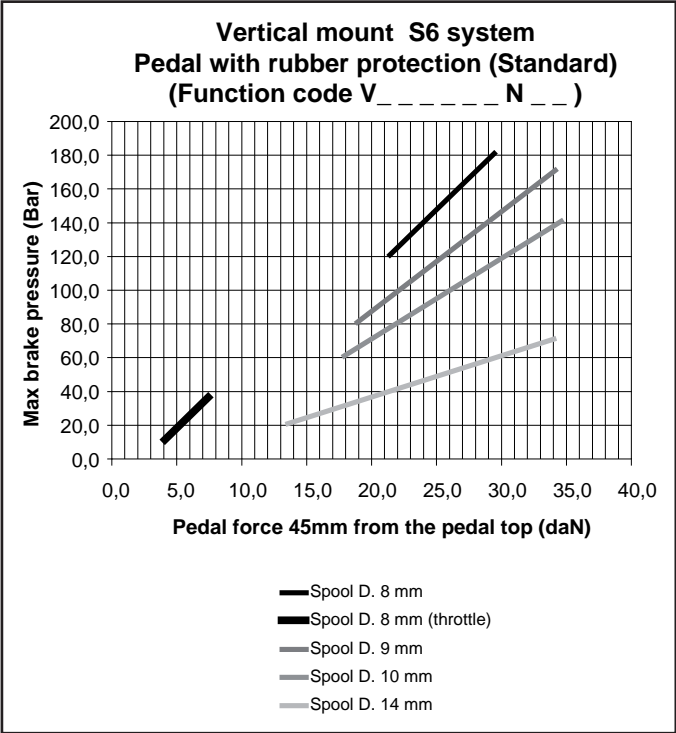
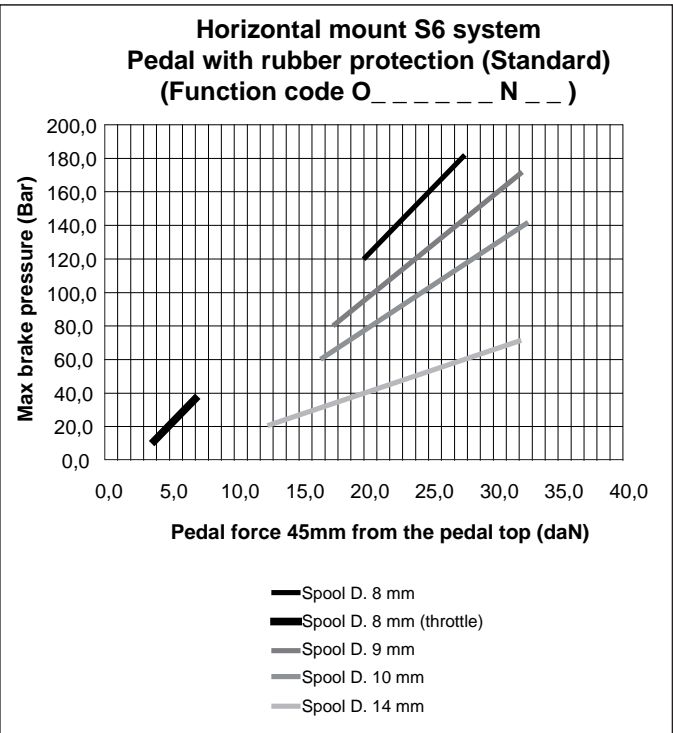
Item n°2 of the technical data sheet defines the diameter of the brake modules spool that is sensitive to brake pressure. Reducing the diameter of the piston distributors it possible to obtaine higher brake pressure. The following table gives

an indication of brake pressure achievable with each spool diameter.

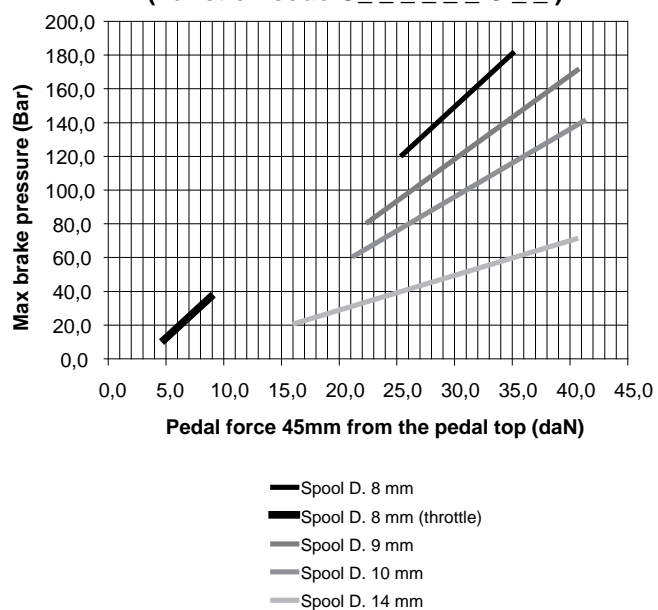
DIAMETER	DESCRIPTION	MAXIMUM PRESSURE OF BRAKES
14	Low – brake pressure	20 Bar – 70 Bar
10	Medium – brake pressure	60 Bar – 140 Bar
9	High – brake pressure	80 Bar – 160 Bar
8	Very high – brake pressure	120 Bar – 180 Bar

In the charts below is shows the needed strength to brake to a given brake pressure with the various types of pedal.
The item n°2 can be:

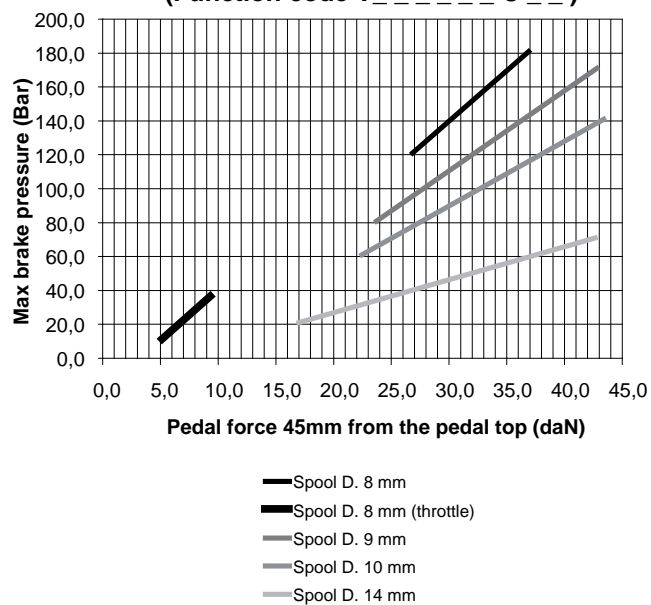
- 8: spool D. 8mm
- 9: spool D. 9mm
- 1: spool D. 10mm
- 4: Spool D. 14mm



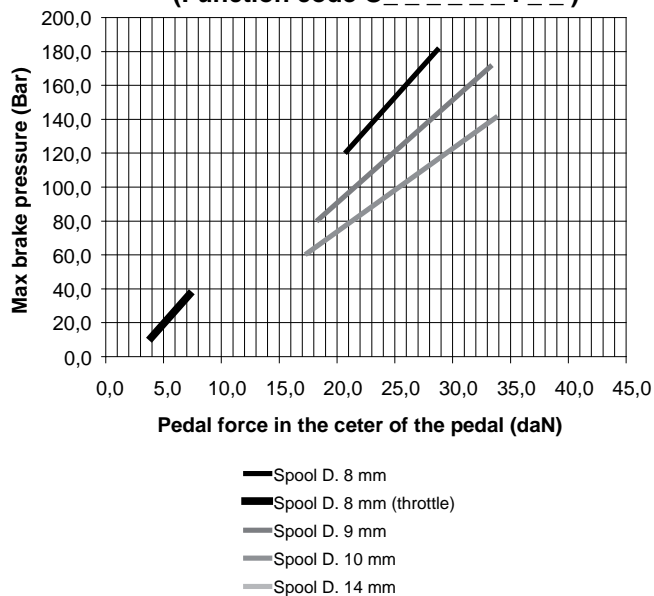
Horizontal mount S6 system
Short pedal with rubber protection
 (Function code O _ _ _ _ C _ _)



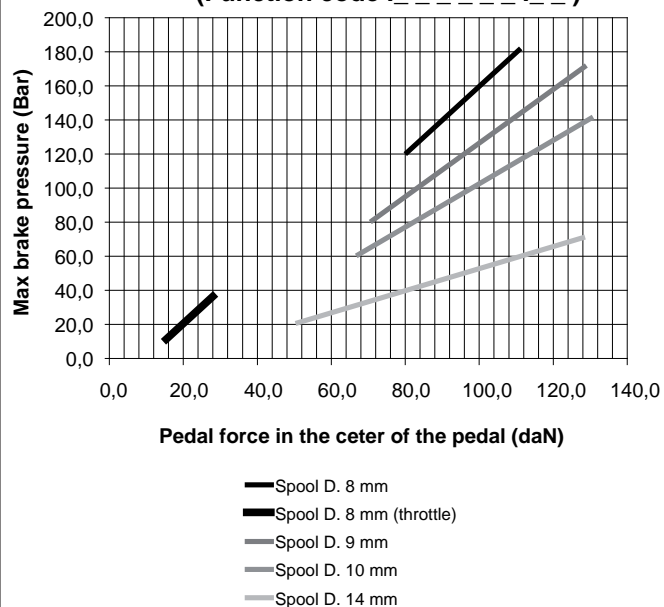
Vertical mount S6 system
Short pedal with rubber protection
 (Function code V _ _ _ _ C _ _)



Horizontal mount S6 system
Firewall mounting pedal
 (Function code O _ _ _ _ F _ _)



S6 system without pedal
with push-rod seal
 (Function code I _ _ _ _ I _ _)



02.03.03

POSITION 3 - NUMBER OF BRAKE CIRCUITS

The modular construction of the S6 brake system allows to assemble groups containing from 1 to 4 brake modules depending on the needs of circuit. The axial footprint of each brake form is 40mm. Every brake module determines an independent brake circuit with its accumulator, protected by uni-directional valve from the other circuits. A brake system with balancing valve in the modules can be assembled with only 2 brake modules (see section 6 LOCATION – CHECK VALVES).

- Item 3 can be:
- 1: N.1 brake circuit
 - 2: N.2 brake circuits
 - 3: N.3 brake circuits
 - 4: N.4 brake circuits
- : No brake circuit.

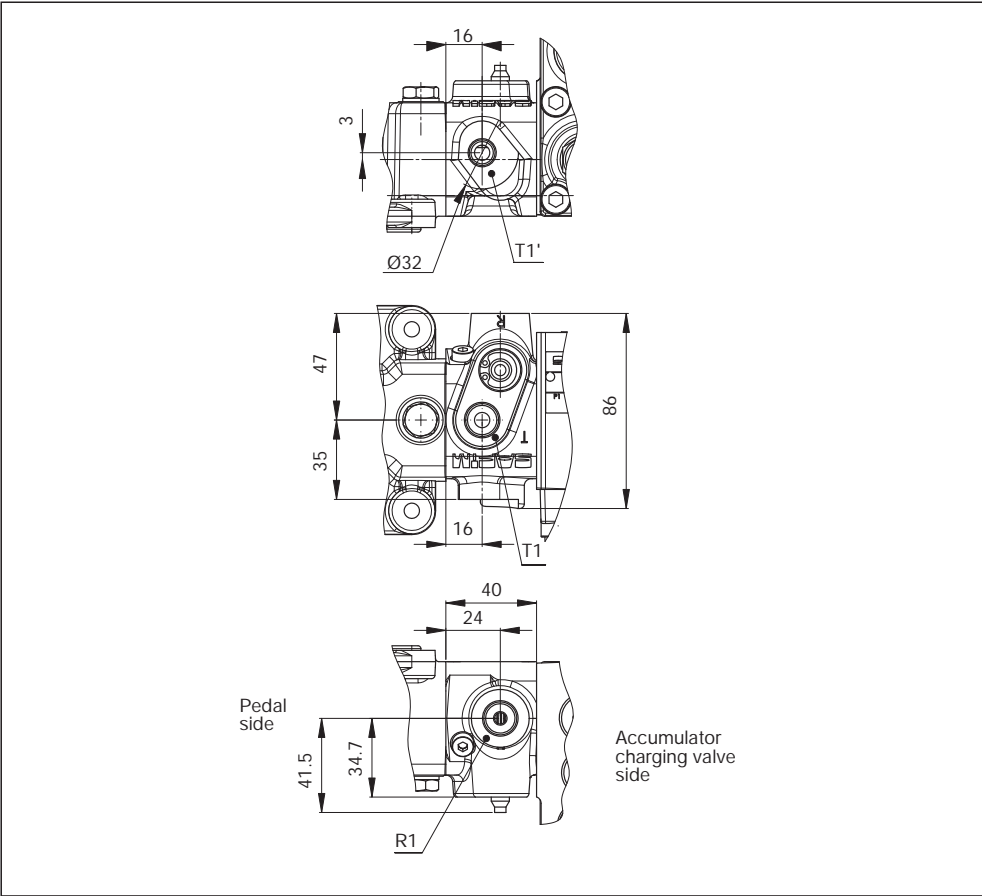
02.03.03.01

1 – N. 1 BRAKE CIRCUIT

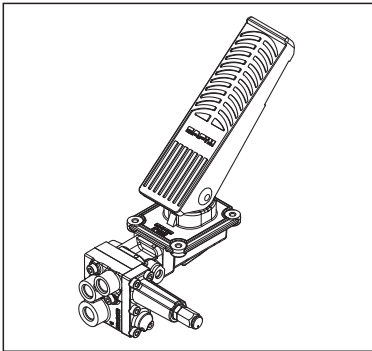
CONNECTION

IDENTIFICATION	DESCRIPTION	THREADS TYPs (ITEM 10 OF THE SHEET)		
		M	I	S
R1	Accumulator	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
T1	Brakes	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
T1'	Pressure switch	M10x1 DIN 3852-1X	M10x1 ISO 6149	7/16-20 UNF SAE J475

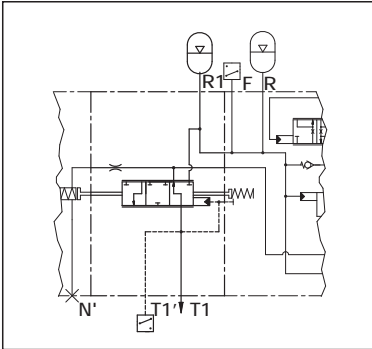
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



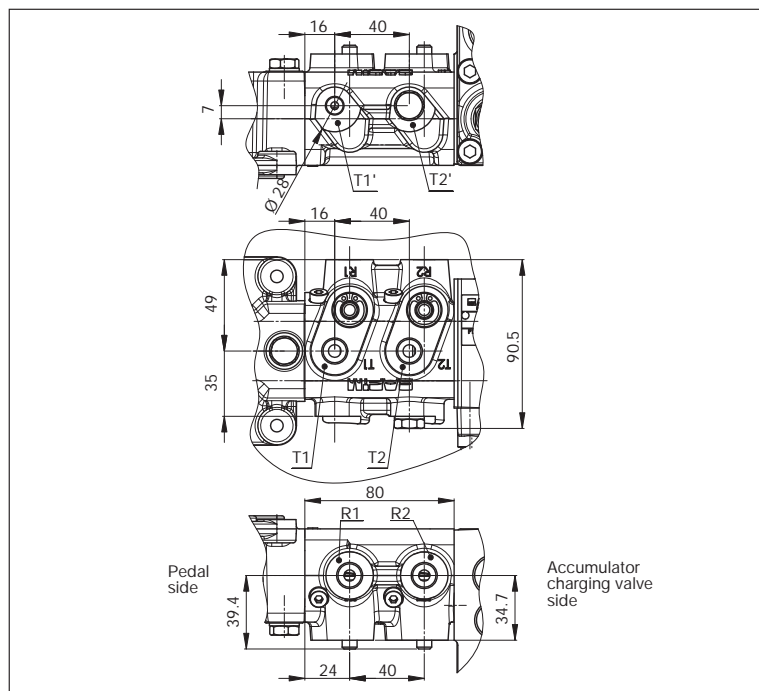
02.03.03.02

2 – N. 2 BRAKE CIRCUIT

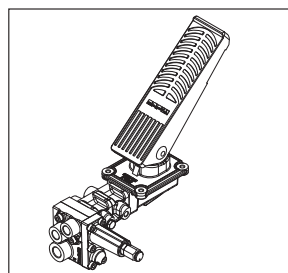
Two modules with check valves (S in item 6 of the function code)

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
R1, R2	Accumulator	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
T1, T2	brakes	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
T1', T2'	Pressure switch	M10x1 DIN 385-1X	M10x1 ISO 6149	7/16-20 UNF SAE J475

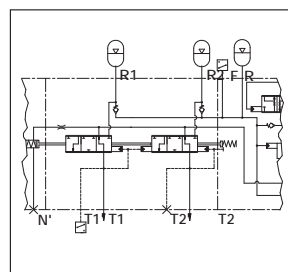
INSTALLATION DESIGN



3D



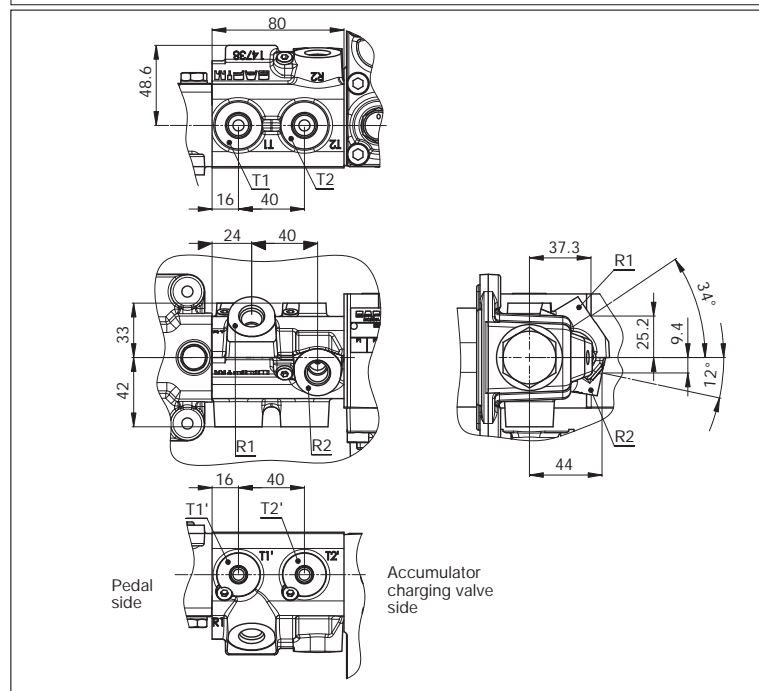
HYDRAULIC SCHEMATIC



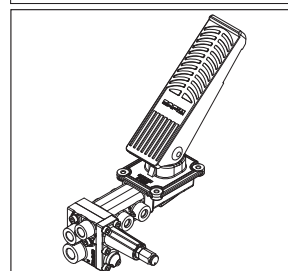
Two modules with the selection of the higher pressure accumulator (B in item 6 of the function code).

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
R1, R2	Accumulator	-	M14x1.5 ISO 6149	-
T1, T2	brakes	-	M14x1.5 ISO 6149	-
T1', T2'	Pressure switch	-	M10x1 ISO 6149	-

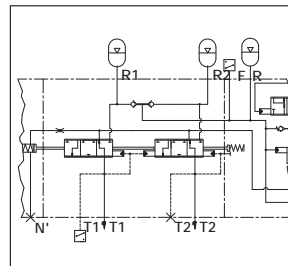
INSTALLATION DESIGN



3D

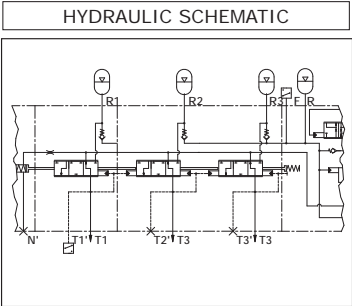
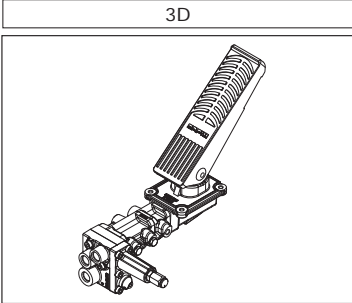
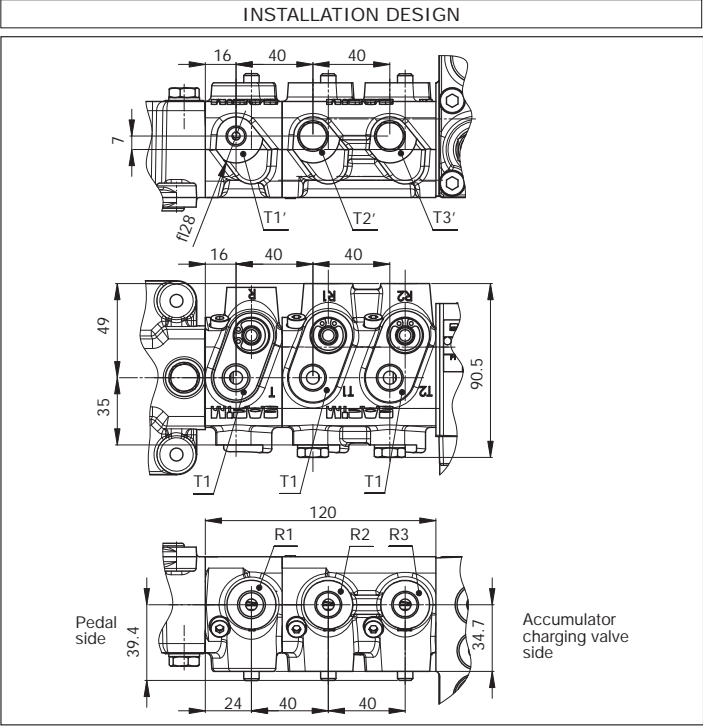


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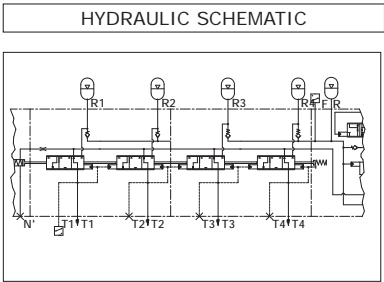
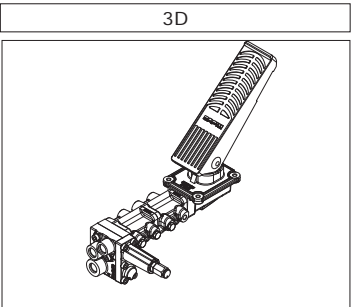
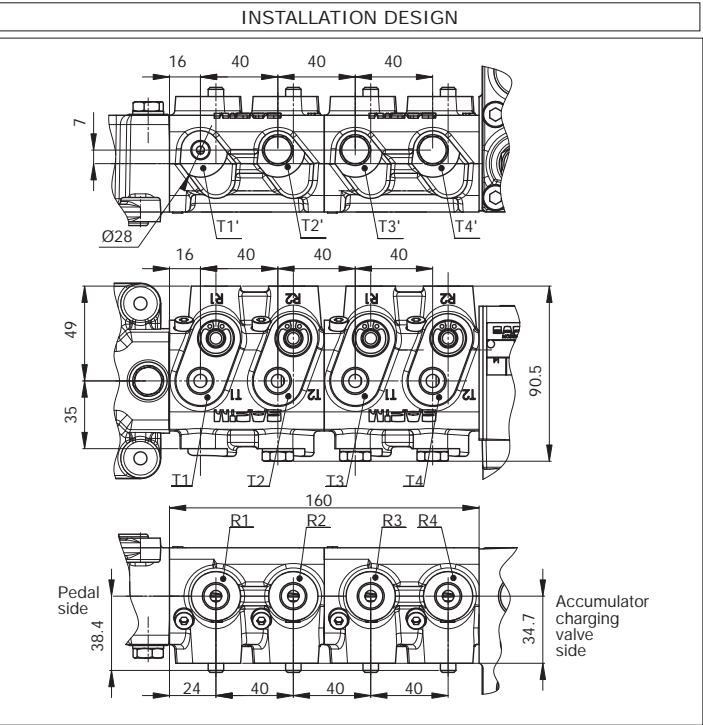
02.03.03.03 TREE – N. 3 BRAKE CIRCUIT

IDENTIFICATION	DESCRIZIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
R1, R2, R3	Accumulator	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
T1, T2, T3	Brake	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
T1', T2', T3'	Pressure switch	M10x1 DIN 3852-1X	M10x1 ISO 6149	7/16-20 UNF SAE J475



02.03.03.04 FOUR – N. 4 BRAKE CIRCUIT

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
R1, R2, R3, R4	Accumulator	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
T1, T2, T3, T4	Brake	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
T1', T2', T3', T4'	Pressure switch	M10x1 DIN 3852-1X	M10x1 ISO 6149	7/16-20 UNF SAE J475



02.03.04

POSITION 4 - TYPE OF ACCUMULATOR CHARGING VALVE POWER FEEDING

The item 4 of the technical data sheet defines whether the system is equipped with an accumulator charging valve and its type of circuits.

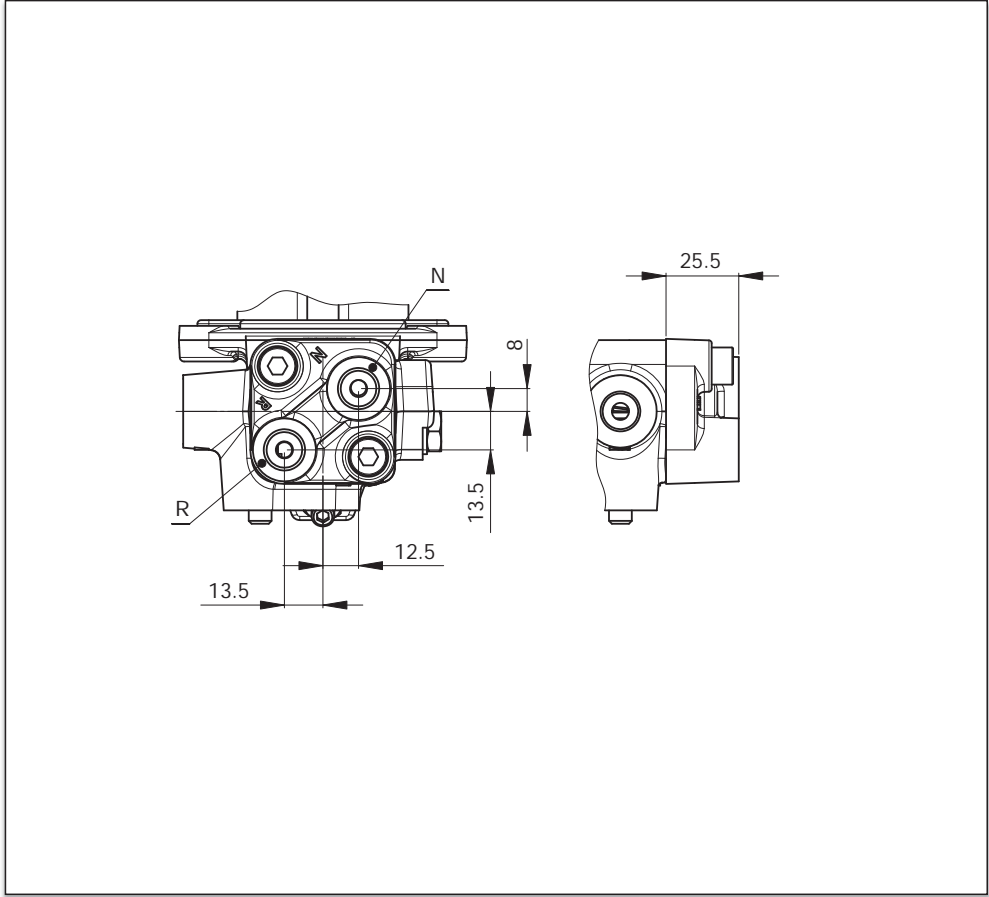
Item 4 can be: .

- N - S6 brake system without charging valve
- F - Open centre charging valve.
- V - Load sensing charging valve.

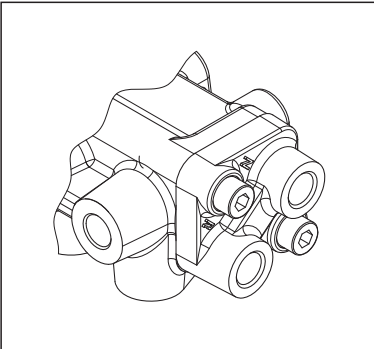
02.03.04.01 N –S6 BRAKE SYSTEM WITHOUT CHARGING VALVE

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
R	Accumulator	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
N	Tank	M14x1.5 DIN 3852-1X	M14x1.5 ISO 6149	9/16-18 UNF SAE J475

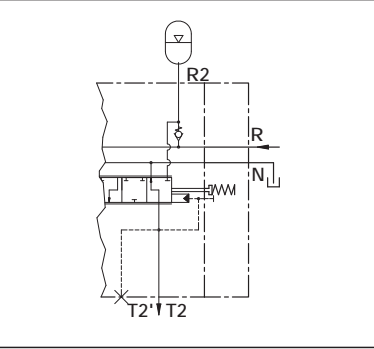
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC

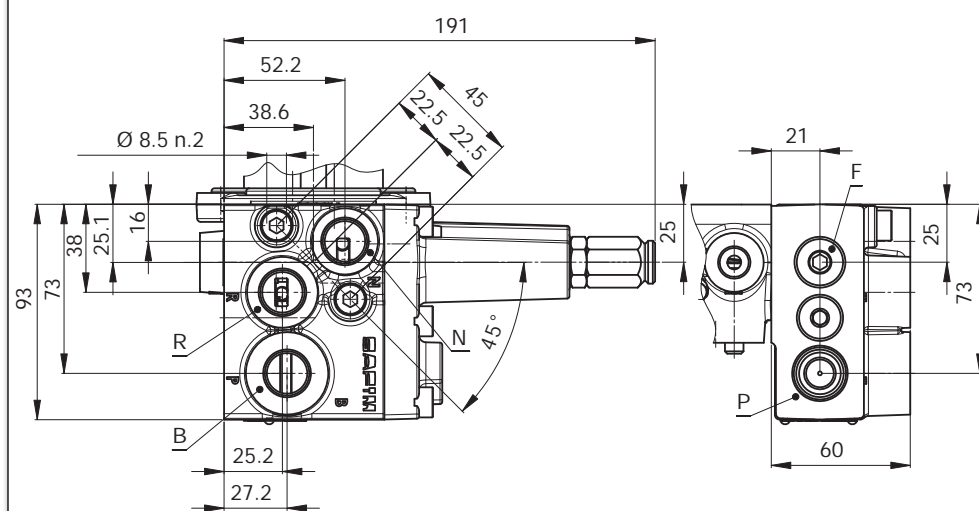


02.03.04.02

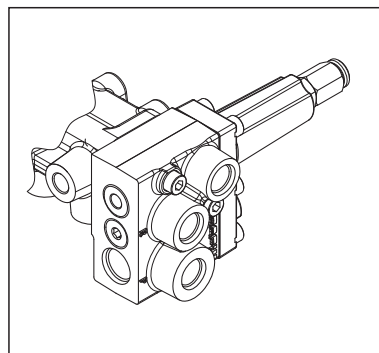
F – OPEN CENTER CHARGING VALVE

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
P	Feeding	G ½ DIN 3852-2X	M22x1.5 ISO 6149	7/8-14 UNF SAE J475
B	Other service or tank	G ½ DIN 3852-2X	M18x1.5 ISO 6149	3/4-16 UNF SAE J475
R	Accumulator	M18x1.5 DIN 3852-1X	M18x1.5 ISO 6149	3/4-16 UNF SAE J475
N	Tank	M18x1.5 DIN 3852-1X	M18x1.5 ISO 6149	3/4-16 UNF SAE J475
F	Low – pressure accumulator pressure switch	M10x1 DIN 3852-1X	M10x1 DIN 3852-1X	7/16-20 UNF SAE J475

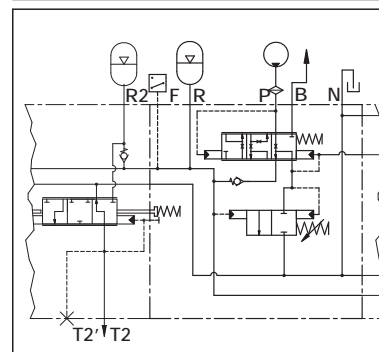
INSTALLATION DESIGN



3D



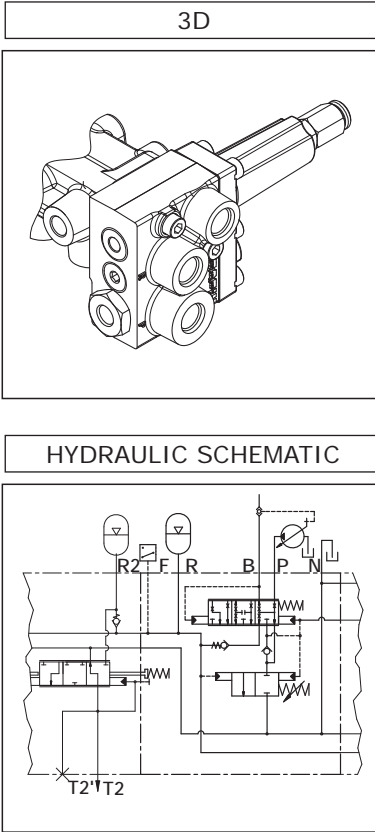
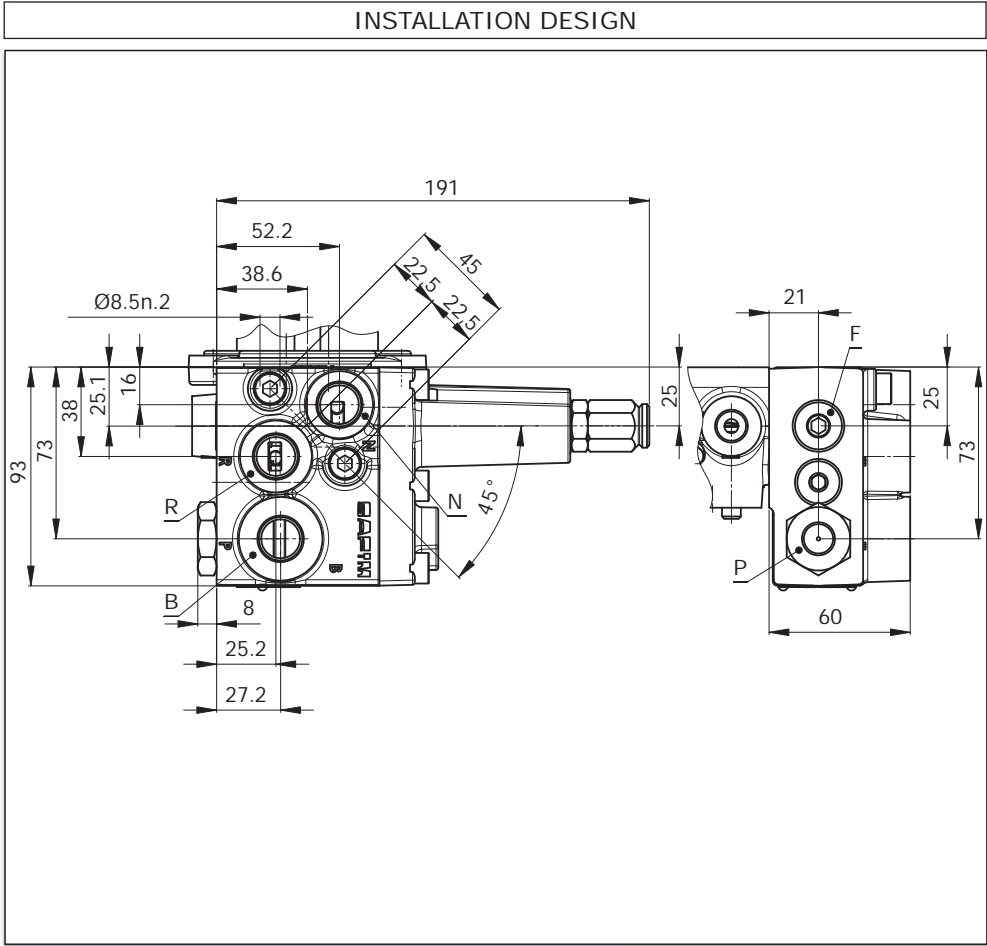
HYDRAULIC SCHEMATIC



02.03.04.03

V - LOAD SENSING CHARGING VALVE

IDENTIFICATION	DESCRIPTION	THREADS TYPE (ITEM 10 OF THE SHEET)		
		M	I	S
P	Feeding	-	M14x1.5 DIN 3852-1X	9/16-18 UNF SAE J475
B	Load sensing	-	M18x1.5 ISO 6149	3/4-16 UNF SAE J475
R	Accumulator	-	M18x1.5 ISO 6149	3/4-16 UNF SAE J475
N	Tank	-	M18x1.5 ISO 6149	3/4-16 UNF SAE J475
F	Low – pressure accumulator pressure switch	-	M10x1 DIN 3852-1X	7/16-20 UNF SAE J475



02.03.05

POSITION 5 - REMOTE HYDRAULIC PILOTING-INCHING

02.03.05.01

INTRODUCTION

Support pedal mounted horizontally enables the connection of some devices in place of the cap which normally closes the support. It is possible to mount an hydraulic actuator that allows to operate the brake valve by an under pressure pilot usually called "Working brake actuator". Alternatively it is possible to assembly devices whose operation is linked to the braking as hydraulic or electrical commands to the deactivation of transmission usually called "Inching".

Item 5 can be:

- A - Piloting cylinder D.10mm
- B - Piloting cylinder D.12mm
- C - Piloting cylinder D.20mm
- I - Double piloting cylinder D.11/20mm
- V - Hydraulic inching valve
- S - Linear potentiometer for inching piloting
- H - Rotary sensor for inching piloting
- P - Personalised

02.03.05.02

REMOTE HYDRAULIC PILOTING

The remote hydraulic piloting is a small cylinder that controls the pedal through a pressure; then the brake valve can be driven directly from the pedal or through pressure from a remote control panel.

The easy way to pilot a S6 brake system is through a simple master cylinder. If the command is ON / OFF is possible to provide valves and pipe connected in the integrated S6 group (See item 20).

In this case, we recommend:

MODULE DIAMETER (ITEM 2 OF THE SHEET)	CYLINDER DIAMETRO	ITEM 5 OF THE SHEET
8	10	A
9	12	B
10	12	B
14	20	C

Warning: the brake work can not be used as a parking brake and should only be used with driver.

The pressure that we must provide to pilot to curb the S6 system at the maximum pressure must meet the following relationship:

- $\text{Driving pressure} > = [(\text{Brake pressure}) \times (\text{spool area}) + 12 \text{ daN}] / (\text{pilot area})$
- If the pressure comes to pilot in an impulsive way it is necessary to enter a restrictor to reduce the impact of pressure that the S6 braking system will suffer.

02.03.05.03

A – PILOTING CYLINDER D.10MM

PILOT FEATURE

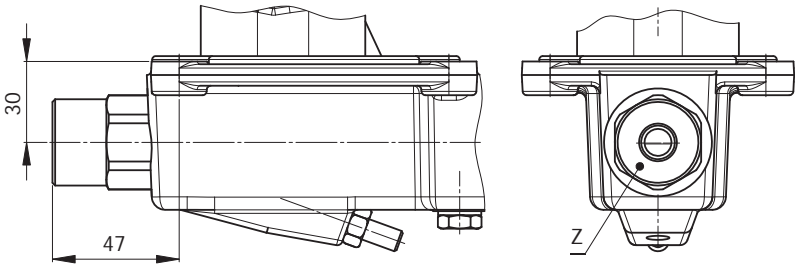
Pilot piston diameter (mm)	10
Maximum pilot displacement (cm³)	1.3

LIMITS OF USE

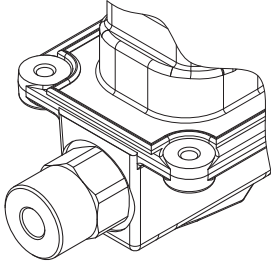
TYPE OF OIL		MINERAL OIL	BRAKE FLUID
Temperature range	°C	-20° / +90°	-30° / +100°
Maximum pilot pressure	bar	150	150

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
Z	Pilot signal	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X

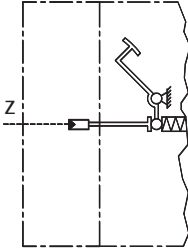
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



02.03.05.04

B – PILOTING CYLINDER D.12MM

PILOT FEATURE

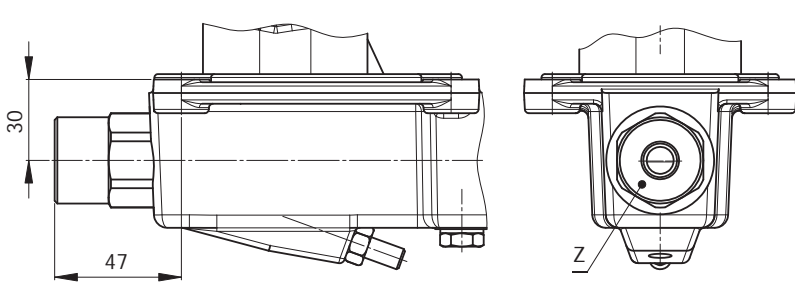
Pilot piston diameter (mm)	12
Maximum pilot displacement (cm³)	1.9

LIMITS OF USE

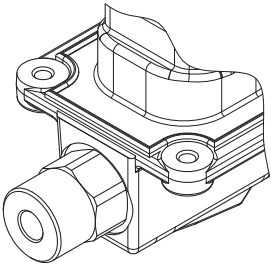
TYPE OF OIL		MINERAL OIL	BRAKE FLUID
Temperature range	°C	-20° / +90°	-30°/+100°
Maximum pilot pressure	bar	150	150

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
Z	Pilot signal	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X

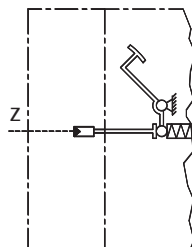
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



02.03.05.05

C – PILOTING CYLINDER D.20MM

PILOT FEATURE

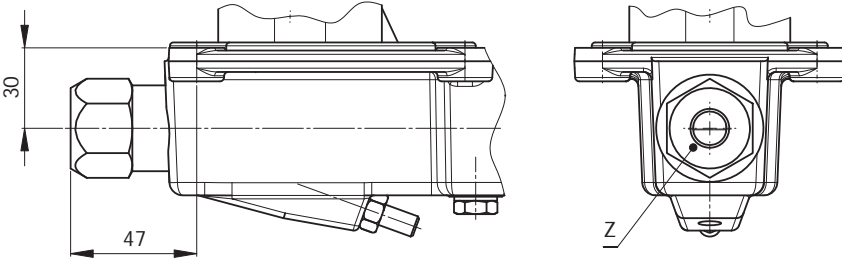
Pilot piston diameter (mm)	20
Maximum pilot displacement (cm³)	5.3

LIMITS OF USE

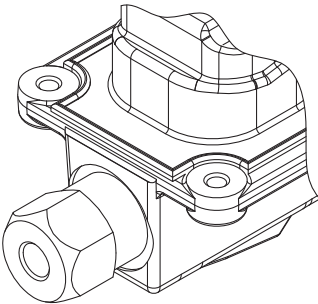
TYPE OF OIL		MINERAL OIL	BRAKE FLUID
Temperature range	°C	-20° / +90°	-30°/+100°
Maximum pilot pressure	bar	150	150

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
Z	Pilot signal	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X

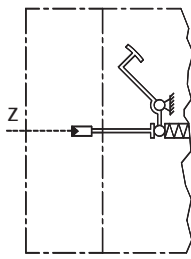
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



02.03.05.06

I - DOUBLE PILOTING CYLINDER D.11/20MM

Z Pilot block (D 11mm) is usually fed by the solenoid valve integrated in the S6 system, while Z1 pilot block (D20mm) can be driven through a brake pump.

PILOT FEATURE

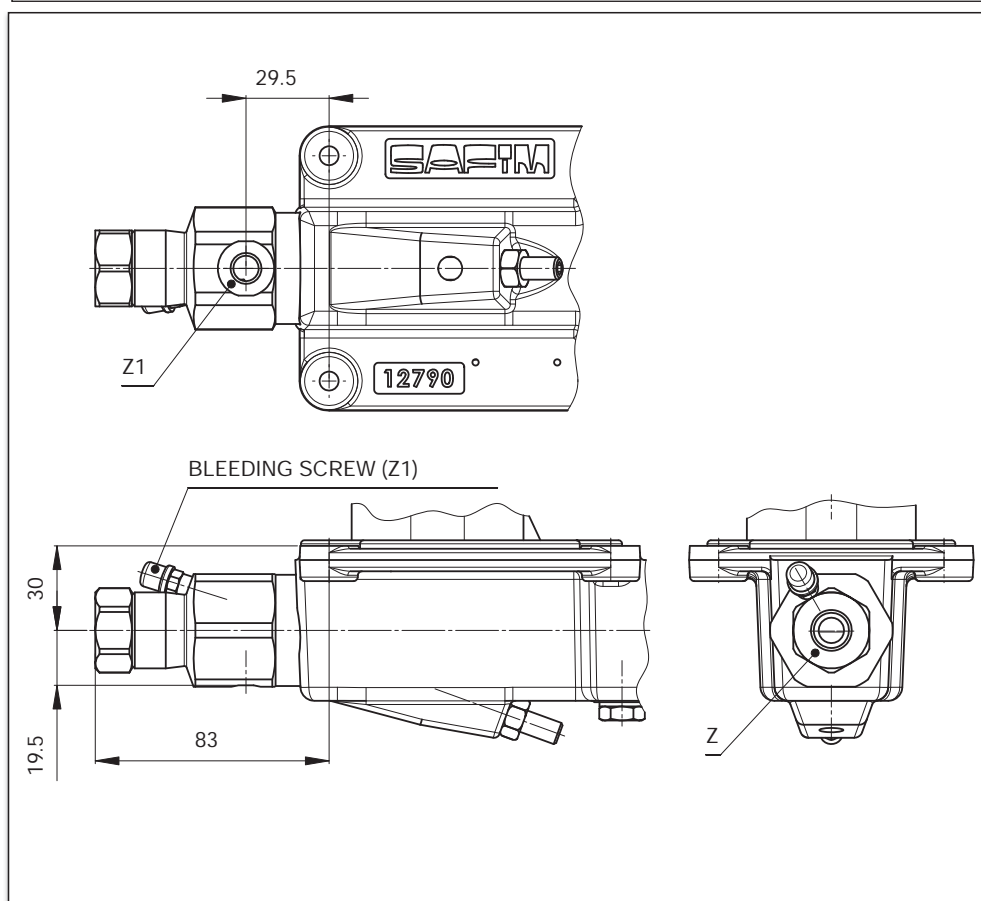
	Z	Z1
Pilot piston diameter (mm)	11	20
Maximum pilot displacement (cm ³)	1.6	5.3

TYPE OF OIL		MINERAL OIL	BRAKE FLUID
Temperature range	°C	-20° / +90°	-30°/+100°
Maximum pilot pressure (Bar)	bar	150	150

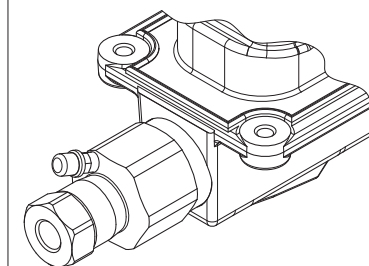
LIMITS OF USE

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
Z	Pilot signal	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X
Z1	Pilot signal	M10X1.0 DIN 3852-1X	M10X1.0 DIN 3852-1X	M10X1.0 DIN 3852-1X

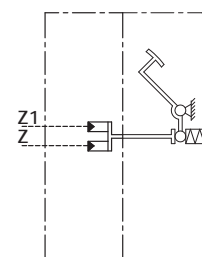
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



02.03.05.07

INCHING

Some categories of vehicles (blades, forklifts...) require a gradual separation of transmission while brake pressure increases. Some hydrostatic transmissions models can be driven through a pressure signal, other models can be driven by an electrical signal. For this purpose valves or sensors connected to the support can be adopted, Safim regulates

according to the braking performance on the basis of values agreed with the customer

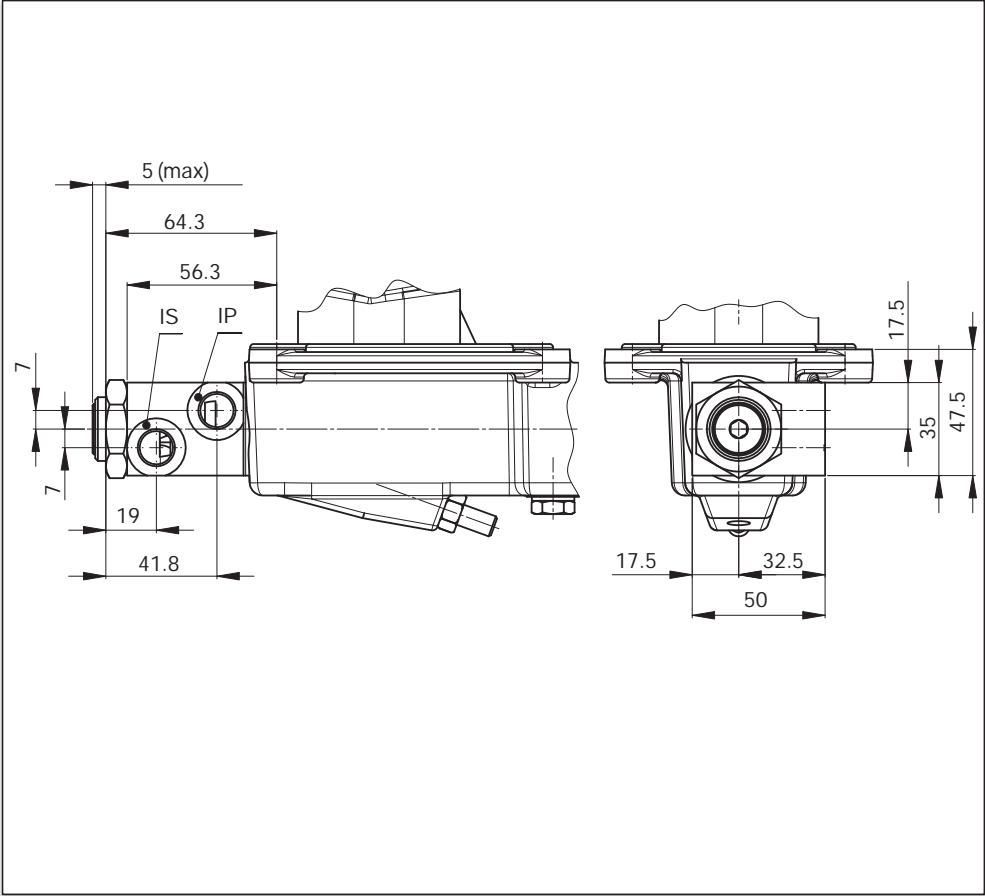
02.03.05.08

V – HYDRAULIC INCHING VALVE

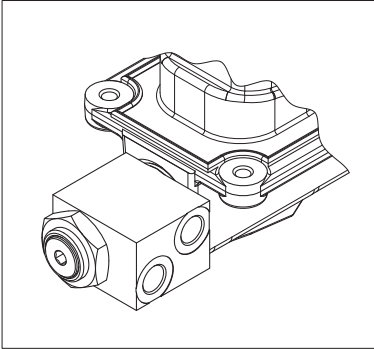
The inching valve can be registered anticipating or delaying action with respect to braking.

IDENTIFICATION	DESCRIPTION	THREADS TYPES (ITEM 10 OF THE SHEET)		
		M	I	S
IP	Inching LINE	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X
IS	Tank	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X	M14x1.5 DIN 3852-1X

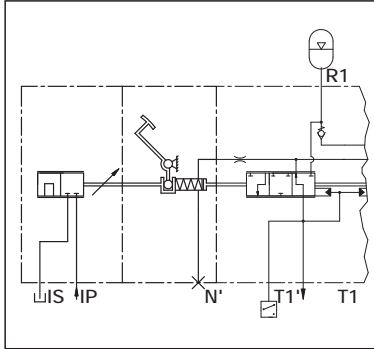
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



02.03.05.09

S – LINEAR POTENTIOMETER FOR INCHING PILOTING

A linear potentiometer notes the stroke pedal and properly fed is able to provide a voltage signal proportional to race drive. The position of the sensor can be adjusted to advance or delay the inching intervention related to the brake.

TECHNICAL FEATURES:

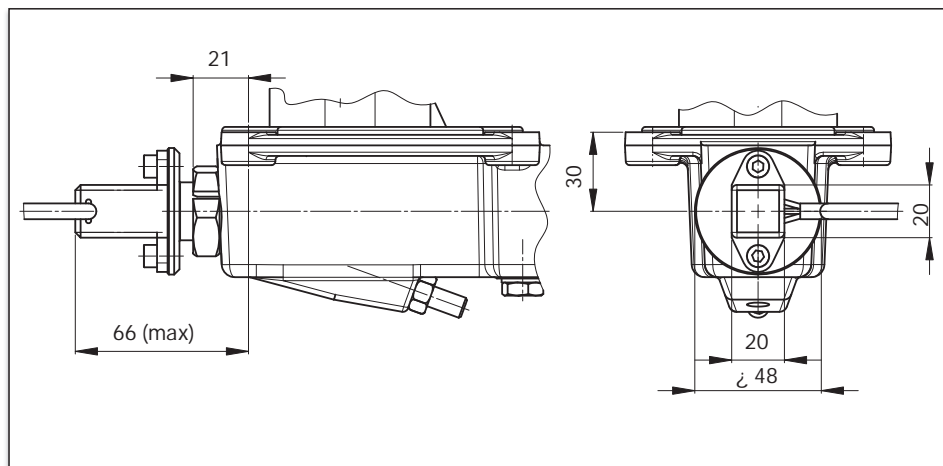
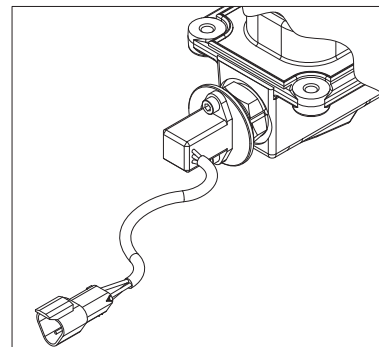
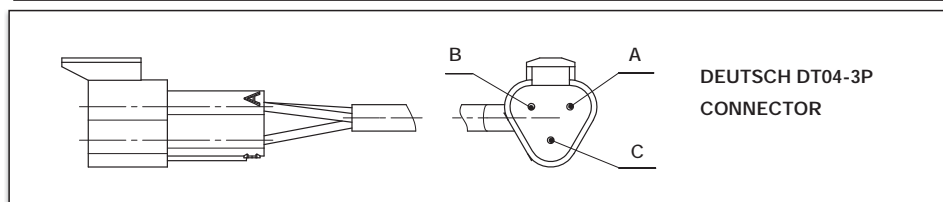
Resistance varies from 0 ohms (with a foot rest) to 5Kohm with pedal operating.

Connector: DEUTSCH DT04-3P

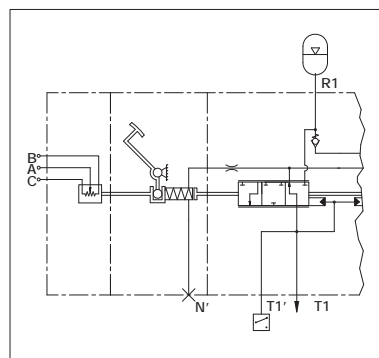
A: Red wire (Wiper)

B: Yellow wire (Full extended)

C: Green wire (Full retracted)

INSTALLATION DESIGN**3D****DISEGNO CONNETTORE**

DEUTSCH DT04-3P
CONNECTOR

HYDRAULIC SCHEMATIC

02.03.05.10

H – ROTARY SENSOR FOR INCHING PILOTING

A rotary Hall effect sensor detects the piston stroke and it is able to provide a voltage signal proportional to the pedal stroke.

The sensor position can be registered to advance or delay the inching intervention compared to the brake action.

There are available a lot of sensors with different angle work more or less wide, single or double track trail for the having the signal redundancy.

It is possible to adjust the sensor output value changing its position by turning it on the plate (+ - 15 °).

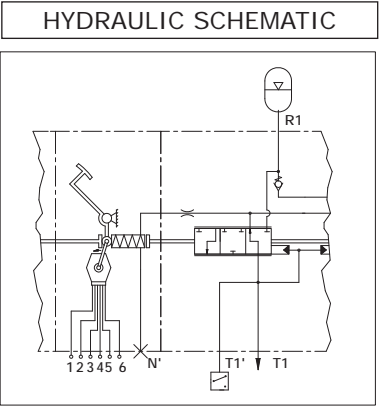
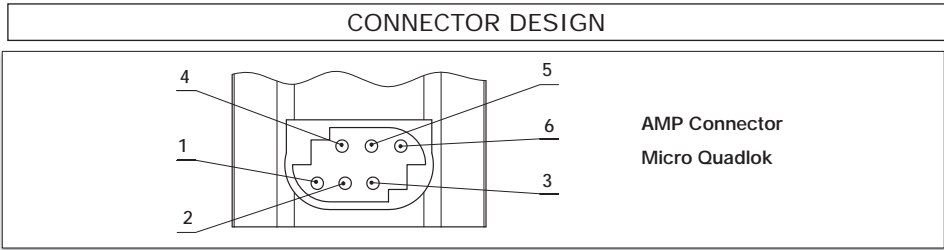
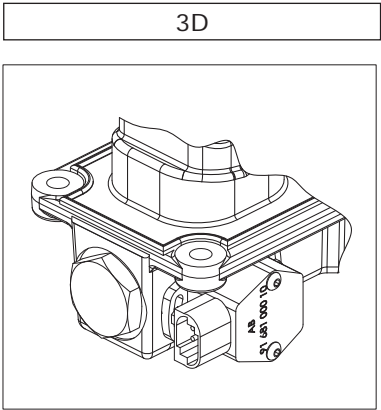
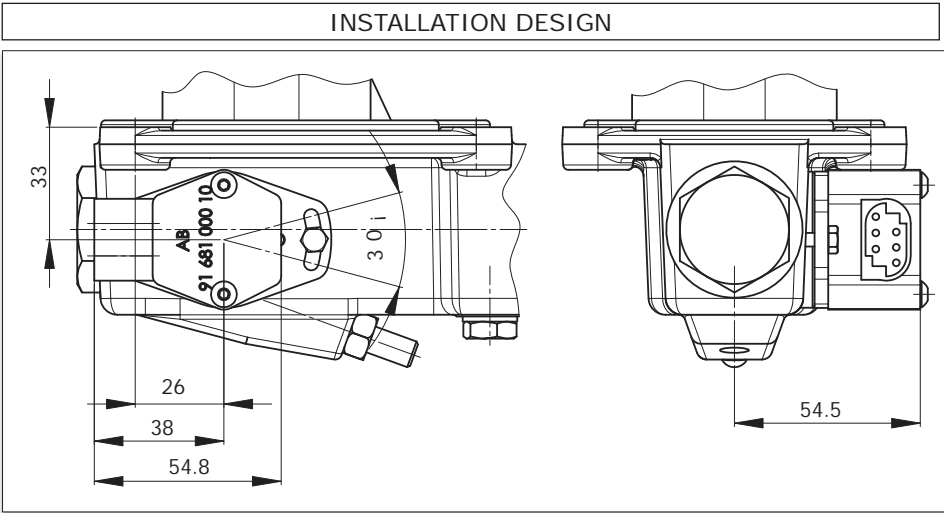
The sensor can be supplied pre-setted, in this case must be listed in the note of the data sheet the output value that we must have with a brake pedal in a released position.

SENSOR TECHNICAL SHEET:

CODE	CONSTRUCTOR	WORK ANGLE (°)	OUTPUT		CONNECTOR TYPE	SAFETY TIPE
			Signal 1	Signal 2		
MO16722	ELOBAU	±35° (70°)	Current 4-20mA	-	AMP Micro Quadlok	IP 67
MO16796	ELOBAU	±35° (70°)	Current 4-20mA	Current 4-20mA	AMP Micro Quadlok	IP 67
MO16507	AB Electronic	±45° (90°)	Voltage 0.5-4.5V	Voltage 0.5-4.5V	AMP Micro Quadlok	IP 67
MO15508	AB Electronic	±45° (90°)	Voltage 0.5-4.5V	-	AMP Micro Quadlok	IP 67
MO16834	AB Electronic	±60° (120°)	Voltage 0.5-4.5V	Voltage 0.3-4.3V	AMP Micro Quadlok	IP 67

PIN LAYOUT

- Signal 1
- Signal 2
- 1: +
- 5: +
- 2: -
- 6: -
- 4: OUT
- 3: OUT



02.03.06

POSITION 6 - CHECK VALVE

02.03.06.01

INTRODUCTION

Item 6 of the technical file defines the type of separation between brake circuits and the accumulator dedicated to the solenoid valve for parking brake.

Item n°6 be:

- N : Without check valve
- S : With check valve in each brake module
- B : With selection of the most fill accumulator
- V : Park brake accumulator check valve
- T : With check valve in each brake module + park brake accumulator check valve
- P : With selection of the most fill accumulator + park brake accumulator check valve
- - : Not definable feature

02.03.06.02

N – WITHOUT CHECK VALVE

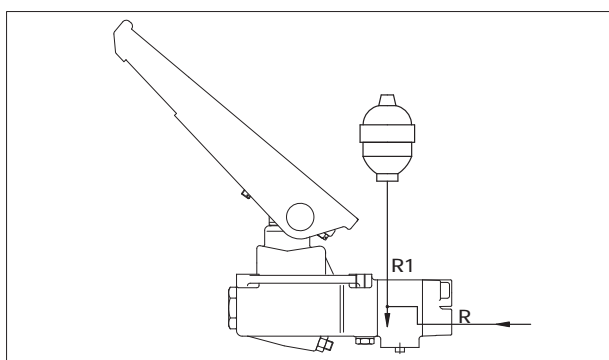
SINGLE CIRCUIT WITHOUT CHARGING VALVE.

Used for one-brake circuits where the accumulator charging valve does not supply other services and does not have a second accumulator.

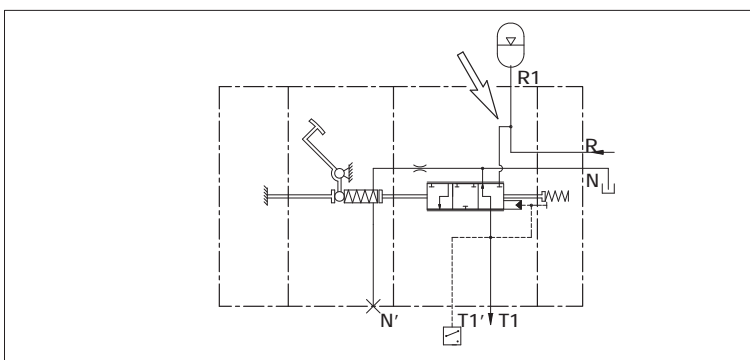
A check valve does not protect the accumulator used to feed the brake; a potential break down on the supply line determines the impossibility to perform any brake function

1	2	3	4	5	6	7	8	9	10
0		1	N		N			-	

SEMPLOY SCHEDULE



HYDRAULIC SCHEMATIC



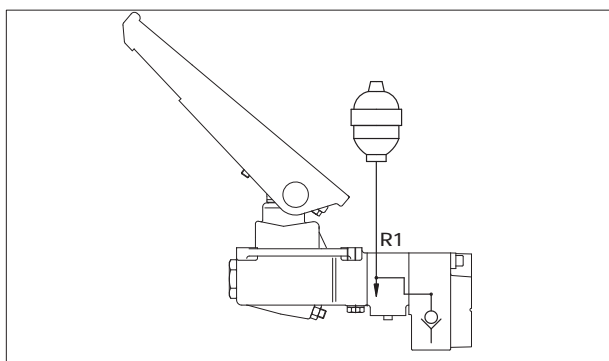
SINGLE CIRCUIT WITH CHARGING VALVE.

Used for one brake circuits where the accumulator charging valve does not supply services outside the brake system. The accumulator used to feed the brake is protected by a

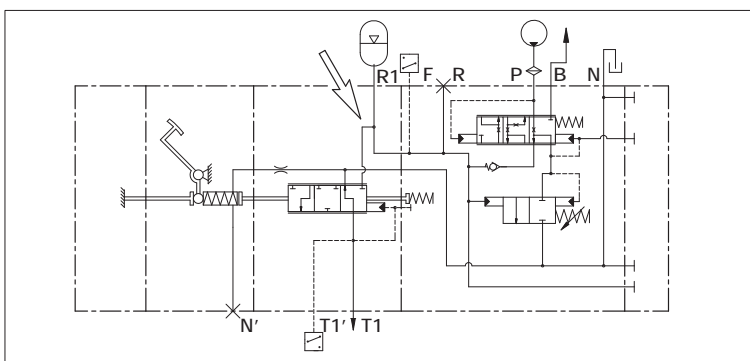
check valve embedded into the charging valve and do not require a specific check valve on the module

1	2	3	4	5	6	7	8	9	10
0		1	F		N			-	

SEMPLOY SCHEDULE

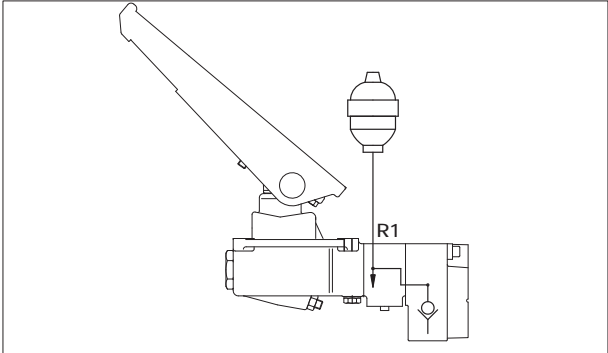


HYDRAULIC SCHEMATIC

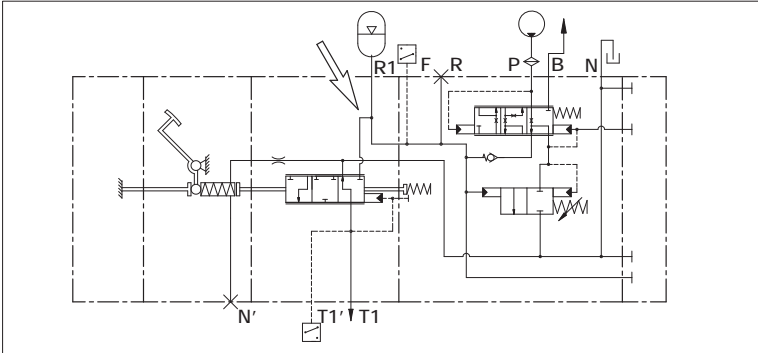


1	2	3	4	5	6	7	8	9	10
0		1	F		N			-	

SEMPLYFY SCHEDULE



HYDRAULIC SCHEMATIC

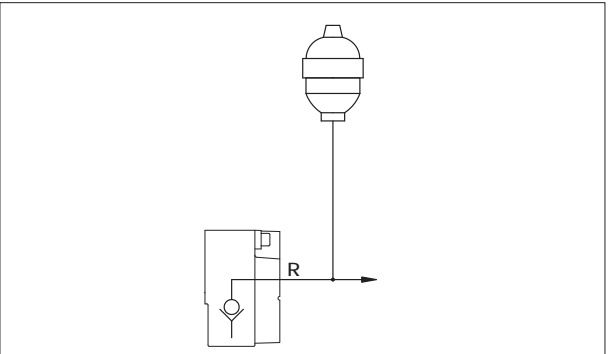


IN LINE ACCUMULTOR CHARGING VALVE
Used to create a reserve of energy in the form of under pressure oil stored in an accumulator to supply closed centre services. Concerning charging valves that are not assembled

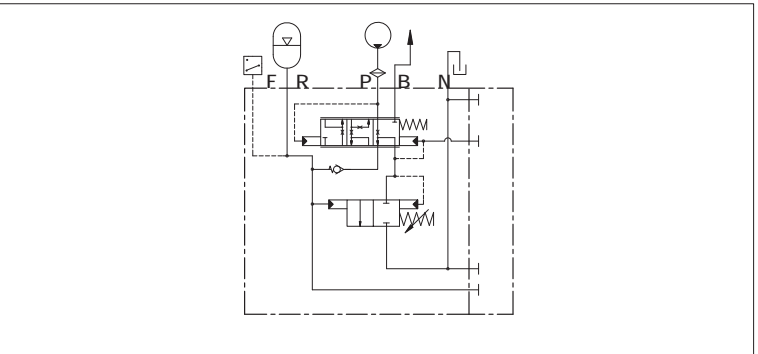
in a S6 brake system, item N is referred to the check valve specifically used to protect the accumulator used to feed the parking brake.

1	2	3	4	5	6	7	8	9	10
L	-	-	F	-	N	-	-	-	

SEMPLYFY SCHEDULE

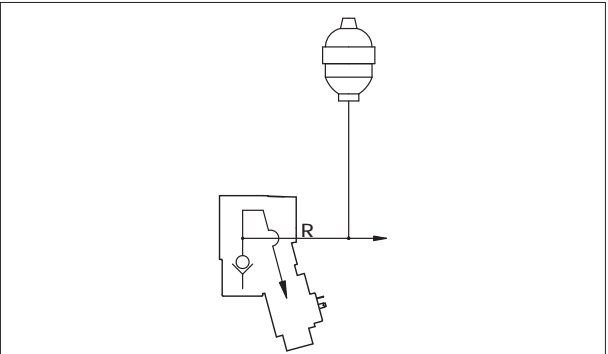


HYDRAULIC SCHEMATIC

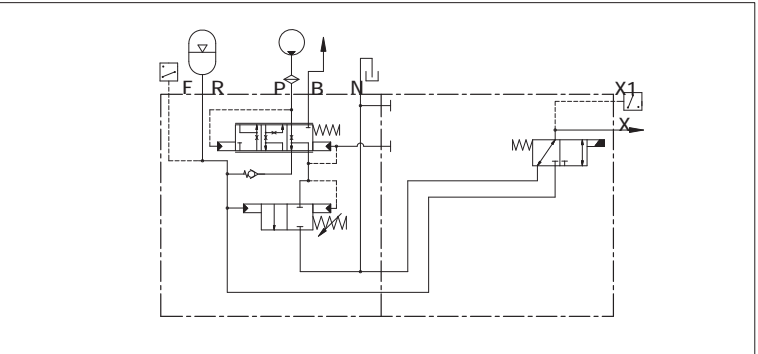


1	2	3	4	5	6	7	8	9	10
L	-	-	F	-	N	-	3	-	

SEMPLYFY SCHEDULE



HYDRAULIC SCHEMATIC



02.03.06.03

S – WITH CHECK VALVE IN EACH BRAKE MODULE

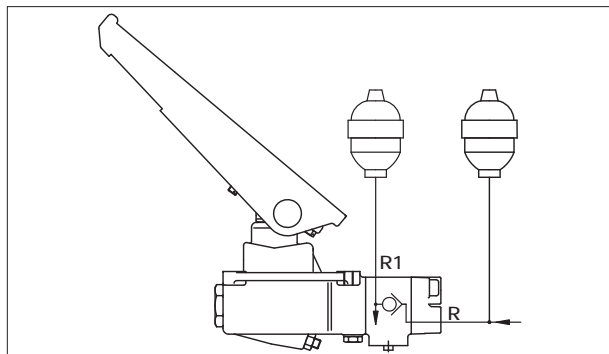
SINGLE CIRCUIT WITHOUT CHARGING VALVE.

Used for single brake circuits where the accumulator charging valve feeds also other services and it is considered necessary to isolate the power brake circuit. The accumulator dedicated to feed the brake is protected by a special check valve; a

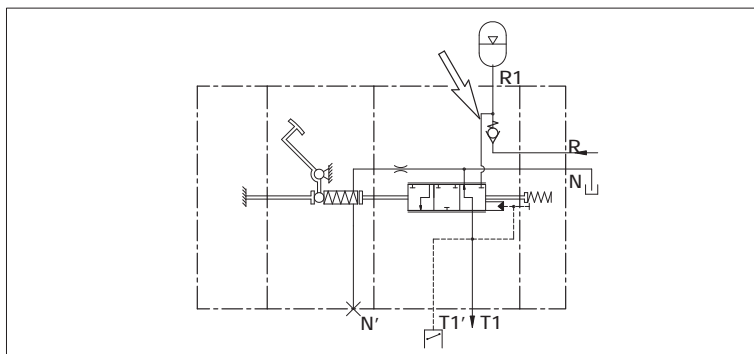
potential break on the line of power does not impact on the accumulator that remains still full, allowing some brakes.

1	2	3	4	5	6	7	8	9	10
0		1	N		S			-	

SEMPLYF SCHEDULE



HYDRAULIC SCHEMATIC



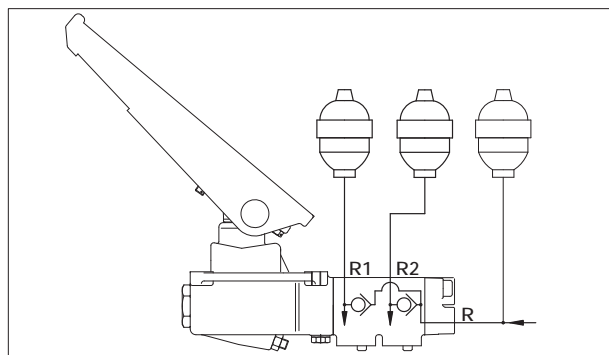
DOUBLE CIRCUIT WITH CHARGING VALVE.

Used for double brake circuits where the brake accumulator charging valve feeds also other services and it is considered necessary to isolate the power brake circuits. The accumulators dedicated to feed the brake are protected

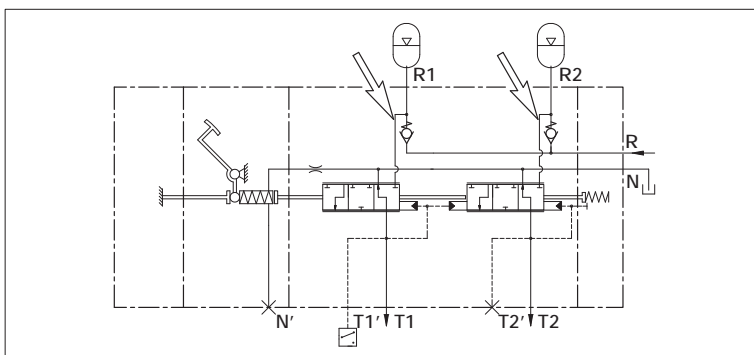
by specific unidirectional valve; a potential break on the line of power does not impact on the accumulator that remains still full, allowing some brakes

1	2	3	4	5	6	7	8	9	10
0		2	N		S			-	

SEMPLYF SCHEDULE



HYDRAULIC SCHEMATIC



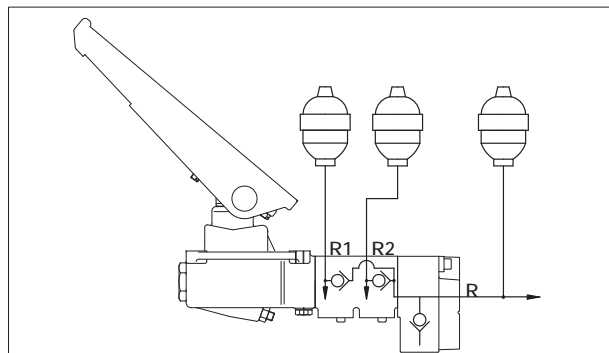
SINGLE CIRCUIT WITH CHARGING VALVE.

Used for single brake circuits where the charging valve accumulator feeds also other services and it is considered necessary to isolate the power supply circuit brake. The accumulator dedicated to feed the brake is protected by

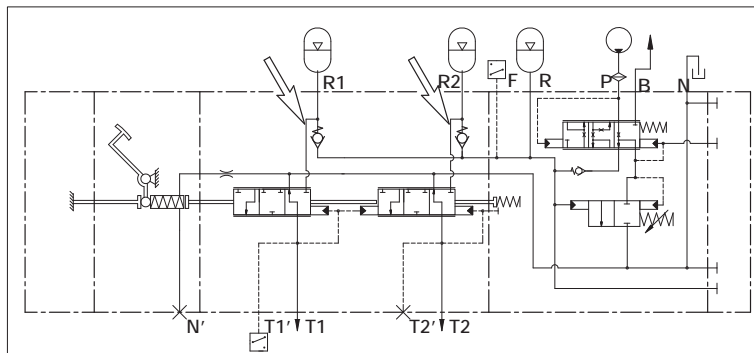
a special check valve; a potential break on the line that feeds the external services do not affect on the accumulator that remains powerful, allowing some brakes.

1	2	3	4	5	6	7	8	9	10
0		2	F		S			-	

SEMPLYF SCHEDULE



HYDRAULIC SCHEMATIC

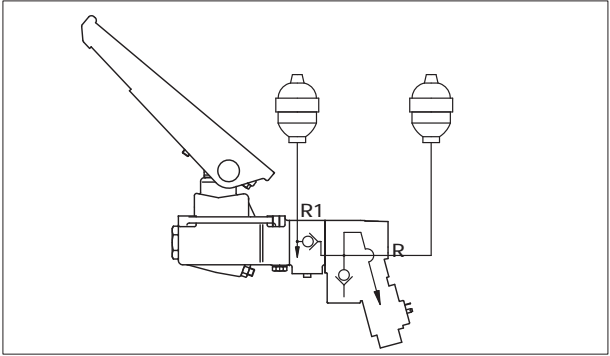


DOUBLE CIRCUIT WITH CHARGING VALVE.
Used for double brake circuits where the charging valve accumulator feeds also other services and it is considered necessary to isolate the power supply circuit brake.
The accumulators dedicated to feed the brake are protected

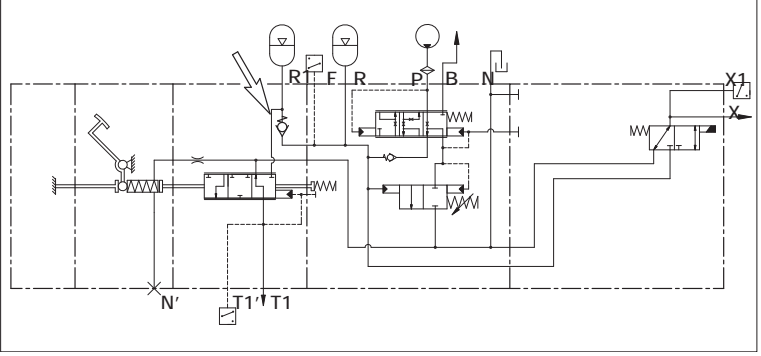
by a special check valve; a potential break on the line that feeds the external services do not affect on accumulators that remain powerful, allowing some brakes.

1	2	3	4	5	6	7	8	9	10
0		1	F		S			3	

SEMPLIFY SCHEDULE



HYDRAULIC SCHEMATIC

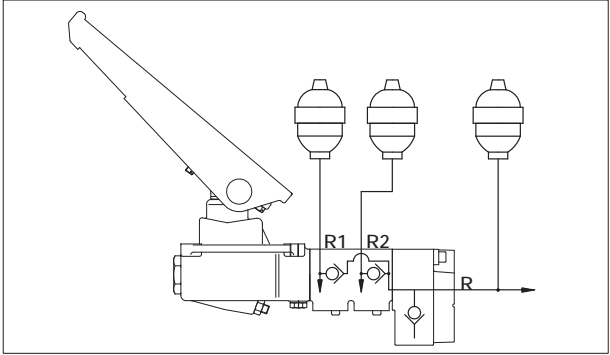


SINGLE CIRCUIT WITH CHARGING VALVE AND SOLENOID VALVE FOR PARKING BRAKE.
Used for single brake circuits where the charging valve accumulator does not feed also other external services but it is provided with a 3-way solenoid valve to release the negative

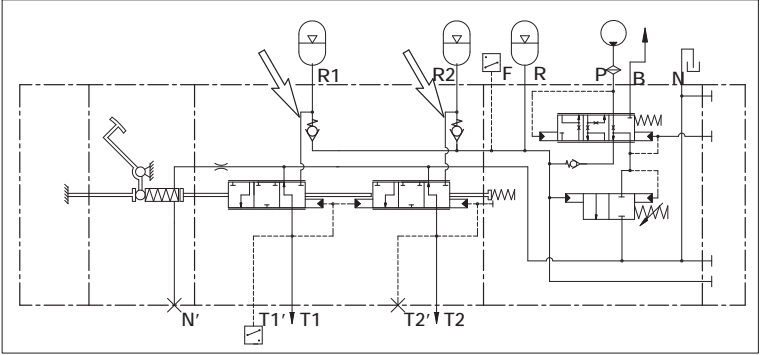
parking brake.
The accumulator dedicated to feed the brake is protected by a special check valve; the main accumulator instead feeds the parking brake without specific protection.

1	2	3	4	5	6	7	8	9	10
0		2	F		S			-	

SEMPLIFY SCHEDULE



HYDRAULIC SCHEMATIC



02.03.06.04

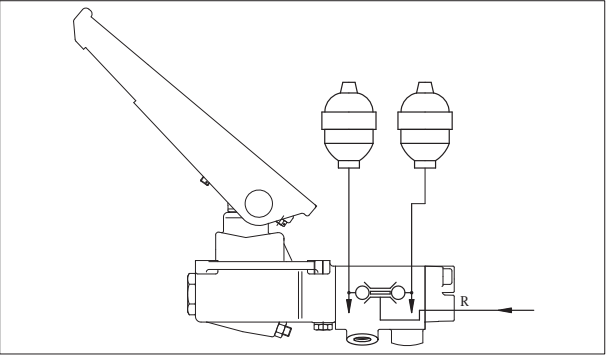
B – WITH SELECTION OF THE MOST FILL ACCUMULATOR

DOUBLE CIRCUIT WITHOUT CHARGING VALVE.
The balancing valve helps to keep the lower pressure accumulator connected with the feed line of the charging valve, while the higher pressure one is protected by a check valve.
Used for double circuits brake systems where the S6 brake system is feed by an external charging valve without need to place a third accumulator.
The accumulators used to feed the brake are protected by a

balancing valve; a potential break on the power line determines the loss of one of the two circuits while the higher pressure accumulator at the time of the collapse remains still in charge allowing some brake operations.

1	2	3	4	5	6	7	8	9	10
0		2	N		B			-	

SEMPLYFY SCHEDULE

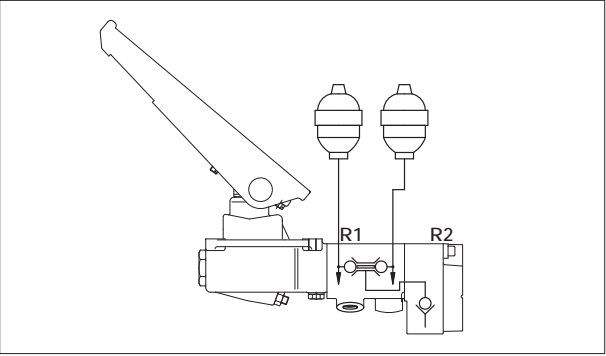


DOUBLE CIRCUIT WITH CHARGING VALVE.
The balancing valve helps to keep the lower pressure accumulator connected with the feed line of the charging valve, while the higher pressure one is protected by a check valve.
Used for double circuits brake systems where there is no need

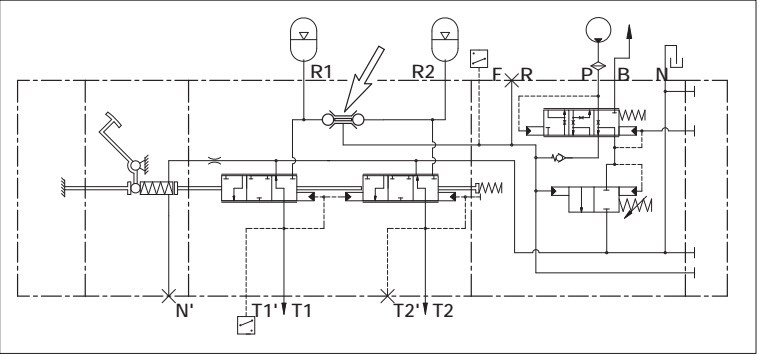
to put a third accumulator.
The accumulators used to feed the brake are protected by a balancing valve and by the internal check valve of the accumulator charging valve.

1	2	3	4	5	6	7	8	9	10
0		2	F		B			-	

SEMPLYFY SCHEDULE



HYDRAULIC SCHEMATIC

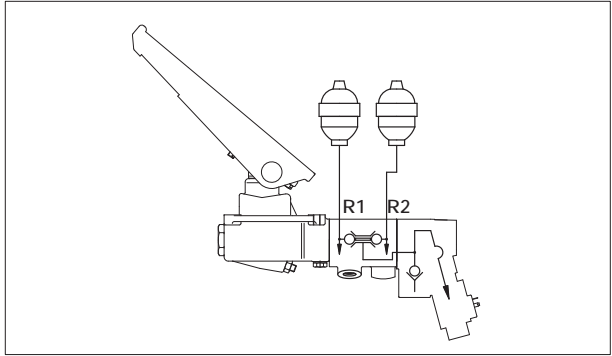


DOUBLE CIRCUIT WITH CHARGING VALVE AND SOLENOID VALVE FOR PARKING BRAKE.
The balancing valve helps to keep the lower pressure accumulator connected with the feed line of the charging valve, while the higher pressure one is protected by a check valve.
Used for double circuits brake systems where there is no need to put a third accumulator.
The accumulators used to feed the brake are protected by a

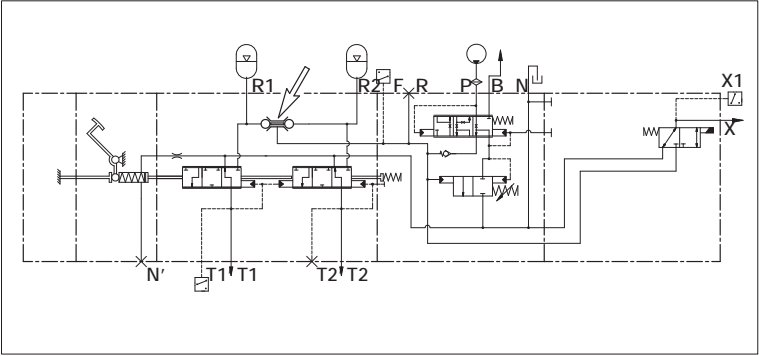
balancing valve, the parking brake is fed by the lowest pressure brake accumulator. In case of supply line failure of the parking brake, the vehicle loose also one of the two braking circuits, but it is still possible to perform some brake operations with the circuit that at the time of failure had the higher pressure accumulator.

1	2	3	4	5	6	7	8	9	10
0		2	F		B			3	

SEMPLYFY SCHEDULE



HYDRAULIC SCHEMATIC



02.03.06.05

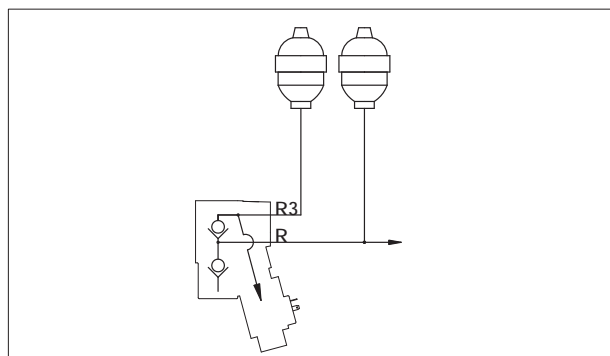
V –PARK BRAKE ACCUMULATOR CHECK VALVE

CHARGING VALVE SEPARATE FROM S6 BRAKE SYSTEM.
Used to create a reserve of energy in the form of under pressure oil stored in an accumulator to feed centre closed seces.
For charging valves that are not assembled in a S6 brake system item V is referred to the one way valve used to protect

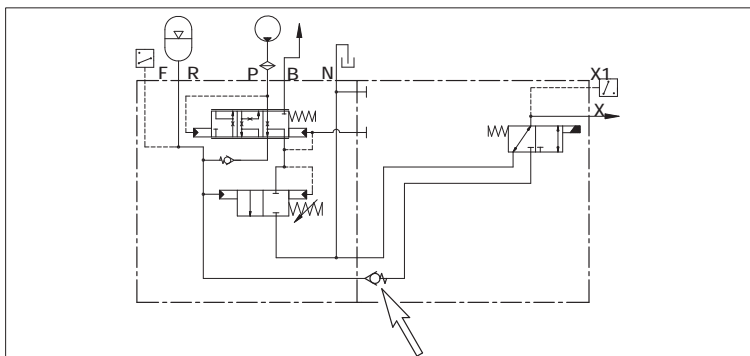
the accumulator in charge to feed the parking brake.

1	2	3	4	5	6	7	8	9	10
L	-	-	F	-	V	-	-	3	-

SEMPLYFIFY SCHEDULE



HYDRAULIC SCHEMATIC



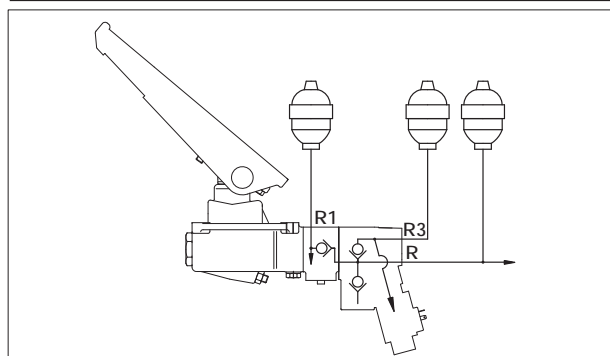
02.03.06.06 T –WHIT CHECK VALVE IN EACH BRAKE MODULE+PARCK BRAKE ACCUMULATOR CHECK VALVE

SINGLE CIRCUIT WITH CHARGING VALVE AND SOLENOID VALVE FOR PARKING BRAKE.
Used for single circuits brake systems where the accumulator charging valve can feed external services and is provided with a 3-way solenoid valve to release the negative parking brake.

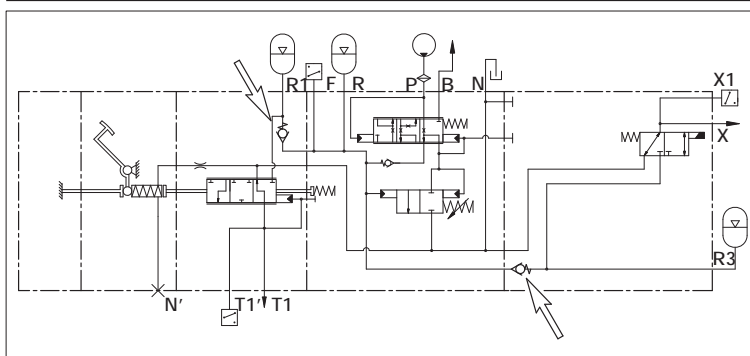
The accumulator used to feed the brake system and the one dedicated to the negative brake are both protected by a specific check valve.

1	2	3	4	5	6	7	8	9	10
L	-	-	F	-	V	-	-	3	-

SEMPLYFIFY SCHEDULE



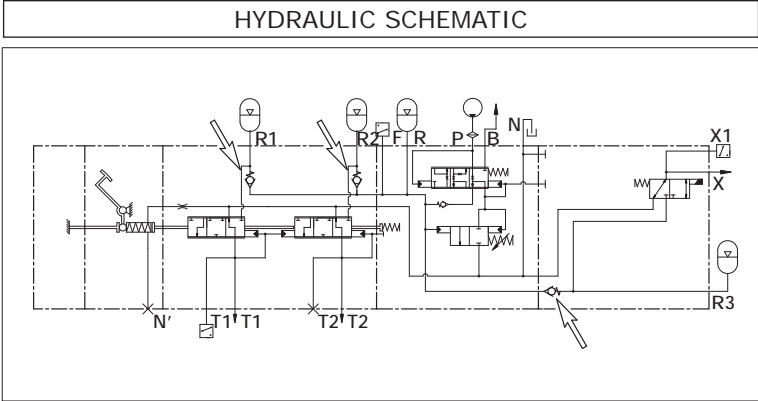
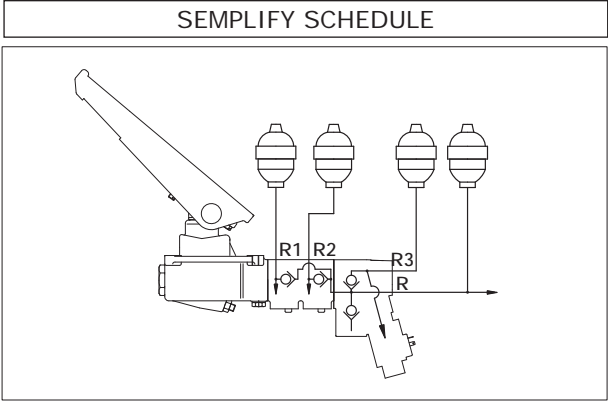
HYDRAULIC SCHEMATIC



DOUBLE CIRCUIT WITH CHARGING VALVE AND SOLENOID VALVE FOR PARKING BRAKE.
Used for double circuits brake systems where the accumulator charging valve can feed external services and is provided with a 3-way solenoid valve to release the negative parking brake.

Accumulators used to feed the brake system and the one dedicated to the negative brake are both protected by a specific check valve.

1	2	3	4	5	6	7	8	9	10
O		2	F		T			3	



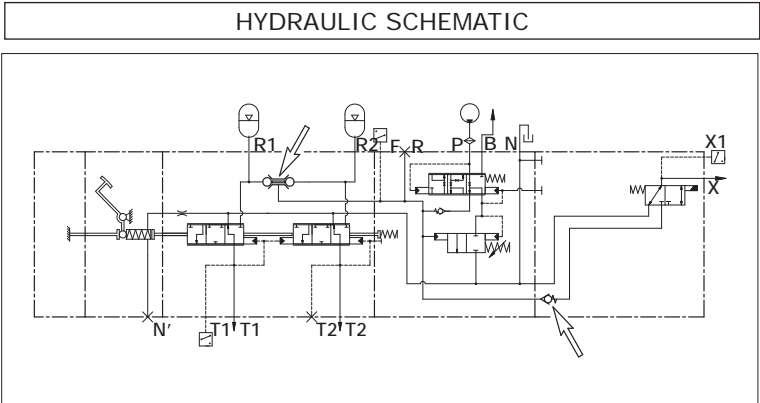
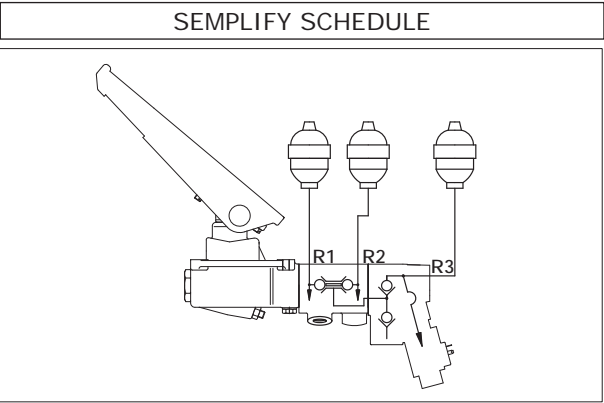
02.03.06.07 P –WHIT SELECTION OF THE MOST FILL ACCUMULATOR
+PARK BRAKE ACCUMULATOR CHECK VALVE

DOUBLE CIRCUIT WITH CHARGING VALVE AND SOLENOID VALVE FOR PARKING BRAKE.
The balancing valve helps to keep the lowest pressure accumulator connected with the feed line of the charging valve, while the higher pressure one is protected by a check valve.
Used for double circuits brake systems where there is no need to put a third accumulator.

balancing valve, the parking brake is fed by a specific accumulator protected by a check valve.
In case of supply line failure of the parking brake, the vehicle loose also one of the two braking circuits, but it is still possible to perform some brake operations with the circuit that at the time of failure had the higher pressure accumulator.

The accumulators used to feed the brake are protected by a

1	2	3	4	5	6	7	8	9	10
O		2	F		P			3	



02.03.07

POSIZIONE 7 - PEDAL SUPPORT DRAIN

The springs package area is in oil bath connected to tank, in order to prevent corrosion and improve his life.

In same support the springs package area can be connected to tank by a separated external drainage

Support type: Horizontal (o) and vertical (V) support

DRAINAGE TYPE	ITEM 7 OF THE SHEET	
Internal (standard)	C	
External	E	Contact Safim for further informations

Other support

DRAINAGE TYPE	ITEM 7 OF THE SHEET	
Internal	I	

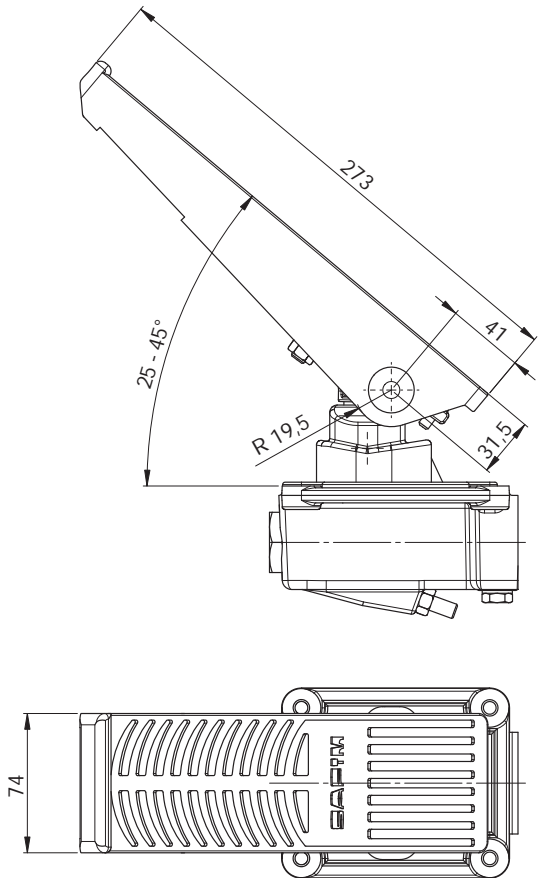
02.03.08

POSITION 8 - PEDAL TYPE

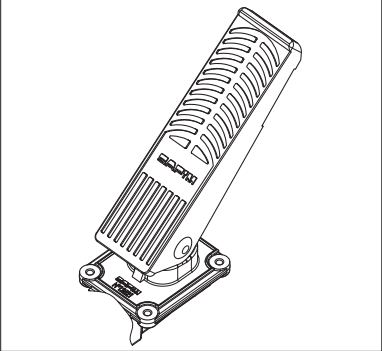
02.03.08.01

N - PEDAL WITH RUBBER PROTECTION (STANDARD)

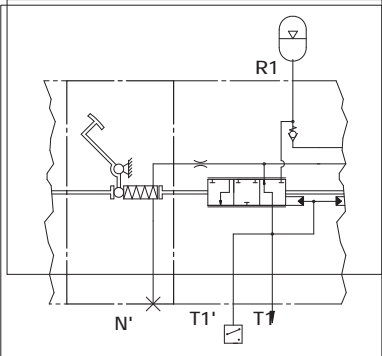
INSTALLATION DESIGN



3D



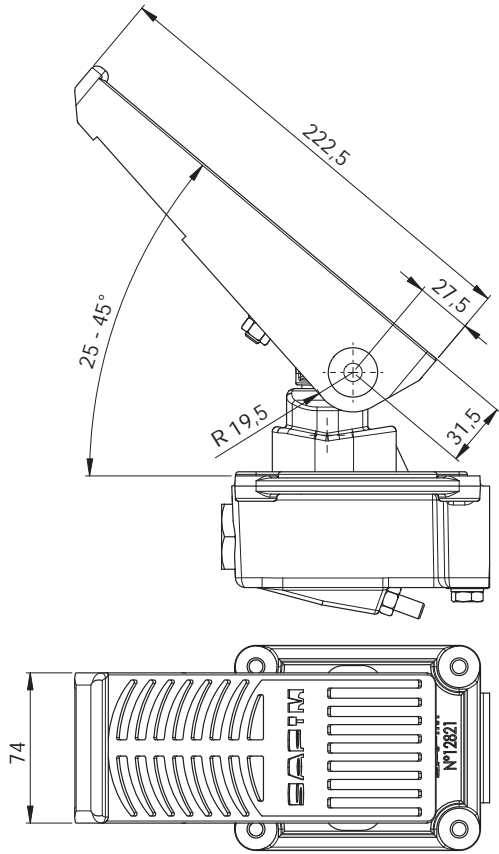
HYDRAULIC SCHEMATIC



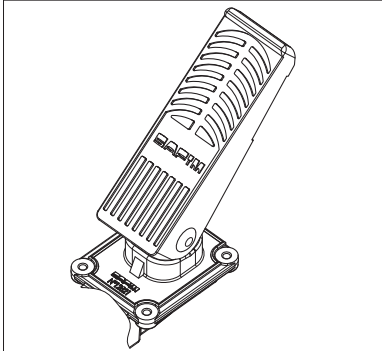
02.03.08.02

C - SHORT PEDAL WITH RUBBER PROTECTION

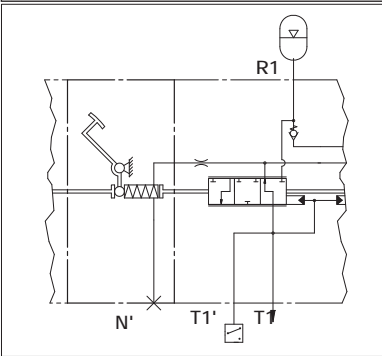
INSTALLATION DESIGN



3D



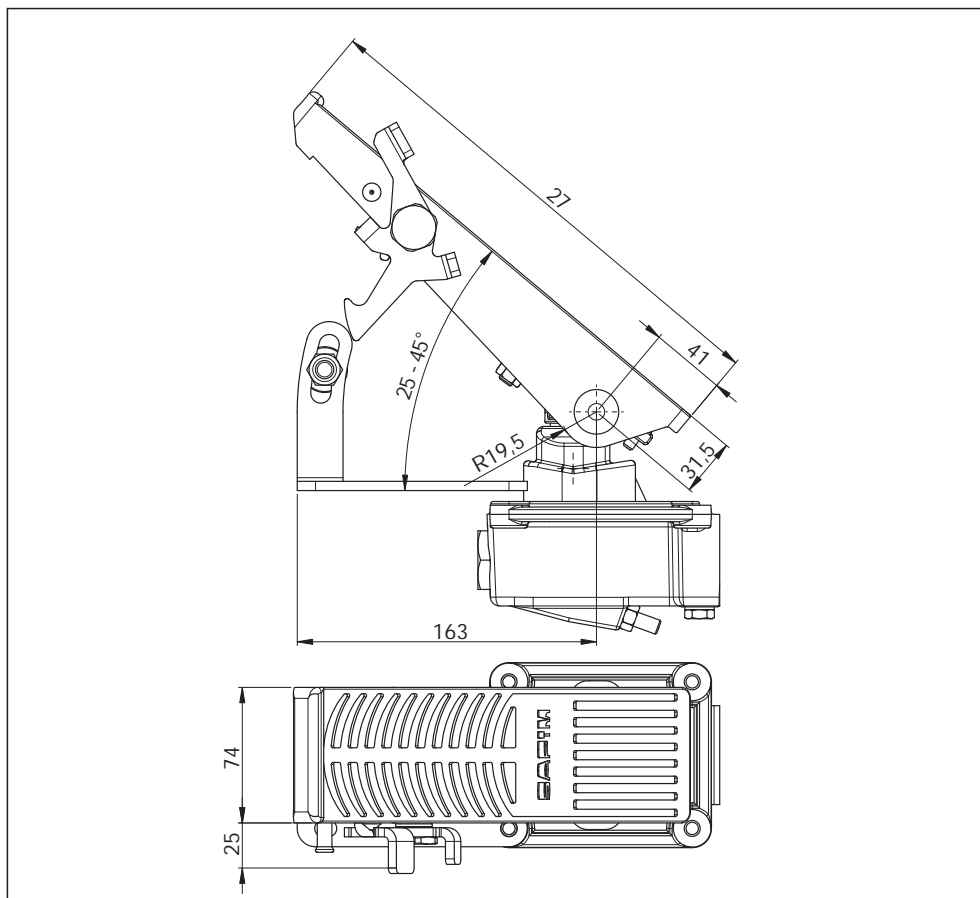
HYDRAULIC SCHEMATIC



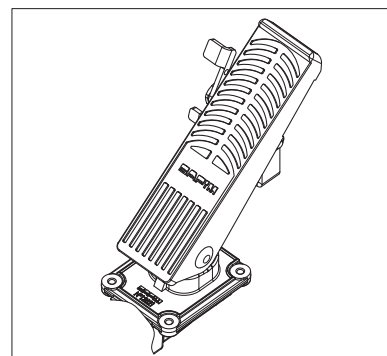
02.03.08.03

H- PEDAL WITH RUBBER PROTECTION AND LATCH

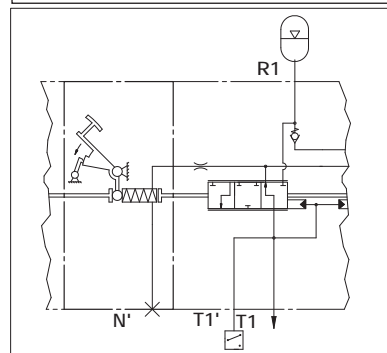
INSTALLATION DESIGN



3D



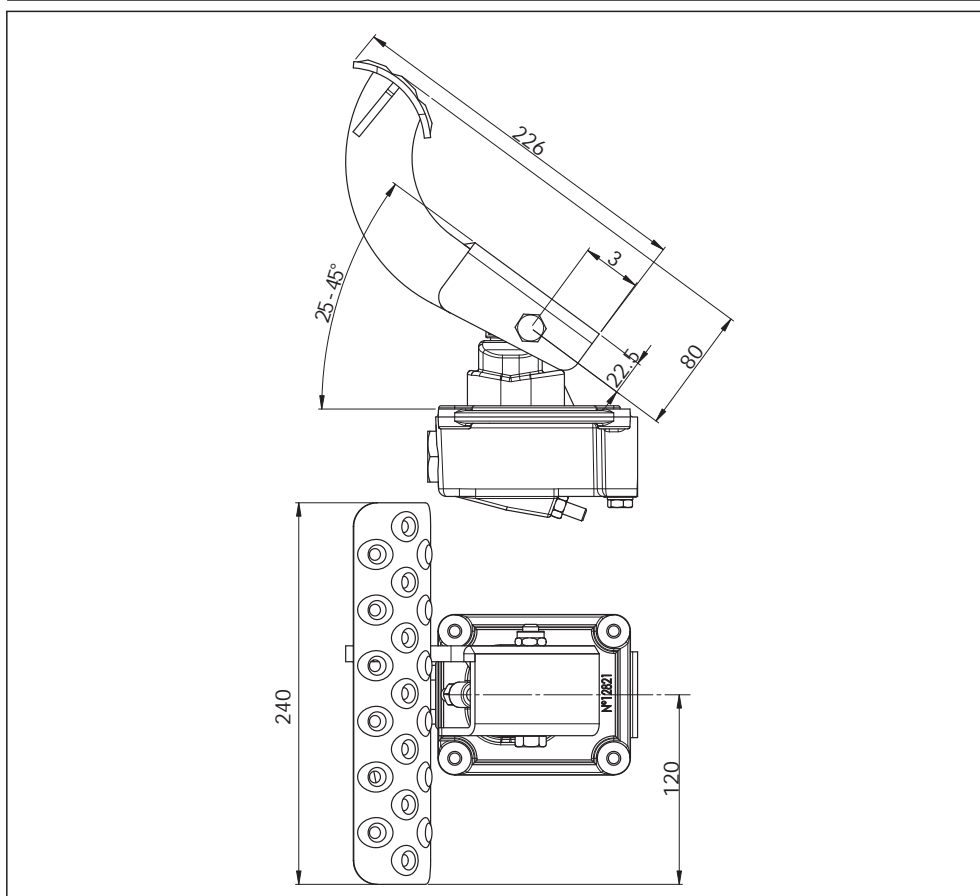
HYDRAULIC SCHEMATIC



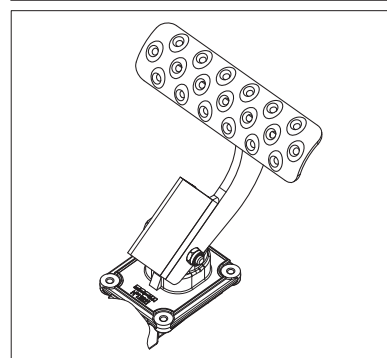
02.03.08.04

F - FIREWALL MOUNTING PEDAL

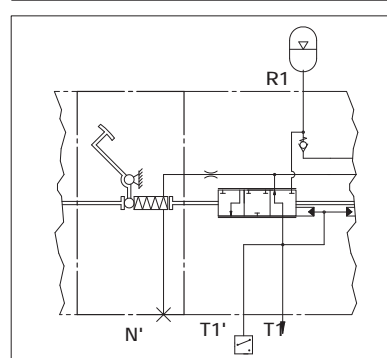
INSTALLATION DESIGN



3D



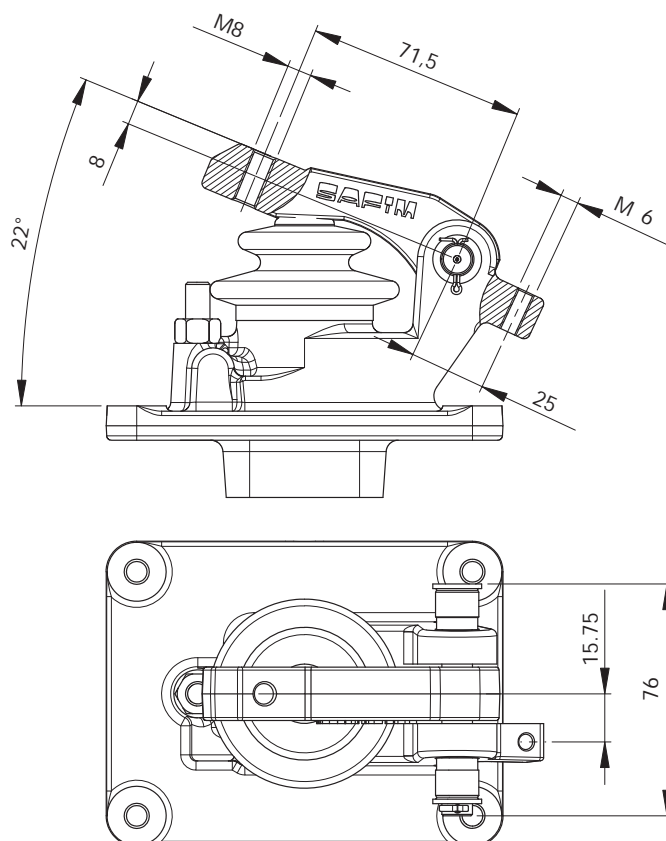
HYDRAULIC SCHEMATIC



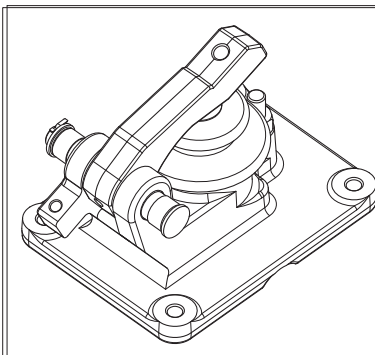
02.03.08.05

S - WITHOUT PEDAL, WITH LEVER

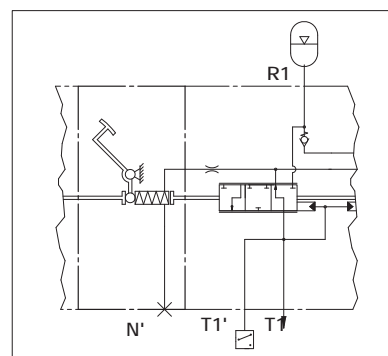
INSTALLATION DESIGN



3D



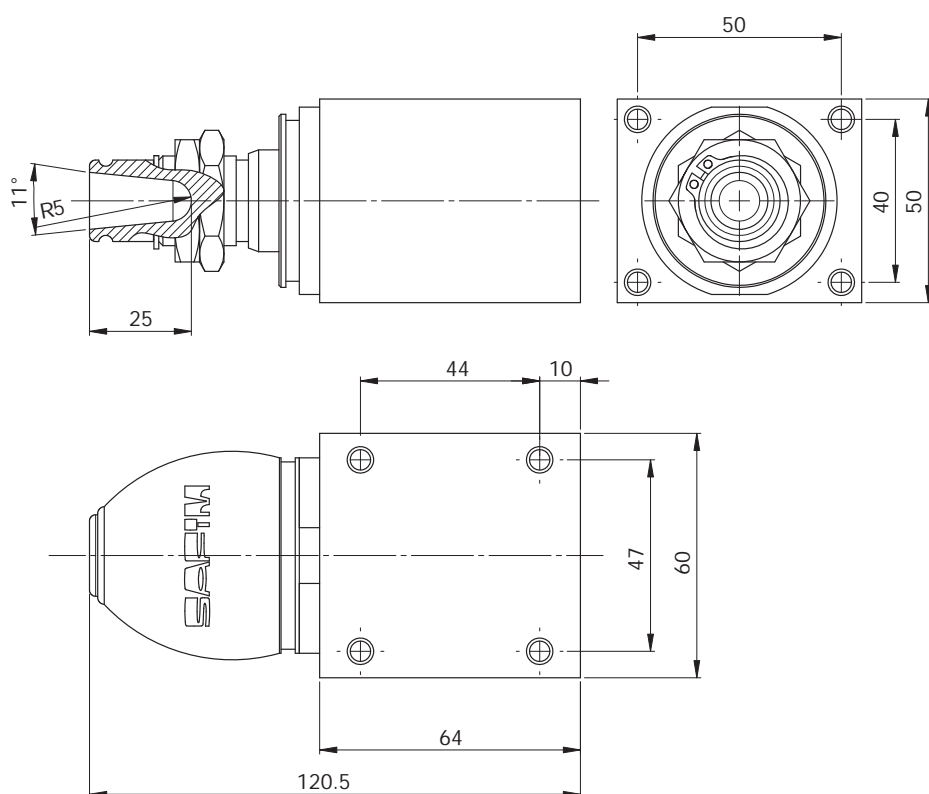
HYDRAULIC SCHEMATIC



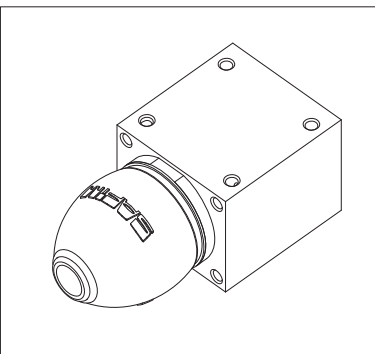
02.03.08.06

I - WITHOUT PEDAL, WITH PUSH-ROD

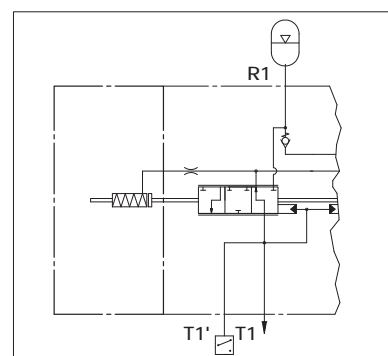
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



02.03.09

POSITION 9 - SOLENOID VALVES-REDUCING PRESSURE VALVE

02.03.09.01

DESCRIPTION

The function code position 9 defines the solenoid valves and the pressure reduction valve integrated on the accumulator charging valve.

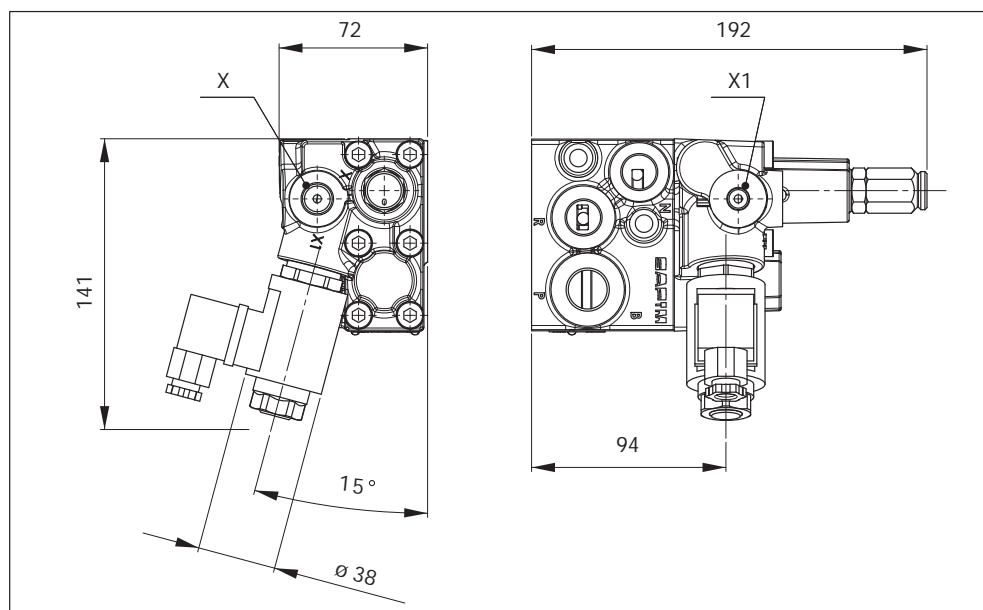
The function code position 9 can be:

- 3 : 3 way solenoid valve
- R : 3 way solenoid valve + reducing pressure valve
- 6 : 2x 3 way solenoid valve
- X : 2x 3 way solenoid valve + reducing pressure valve
- 2 : Start unloading valve
- 5 : Start unloading valve + 3 way solenoid valve
- 8 : Start unloading valve + 2x 3 way solenoid valve
- Y : Start unloading valve + 2x 3 way solenoid valve + reducing pressure valve -
- : No solenoid valve present

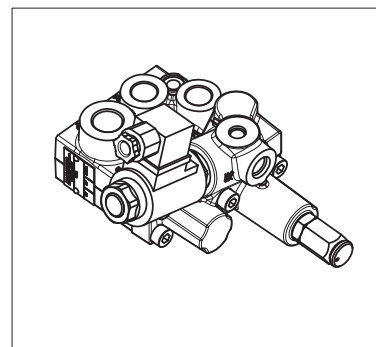
02.03.09.02

3 - 3 WAY SOLENOID VALVE

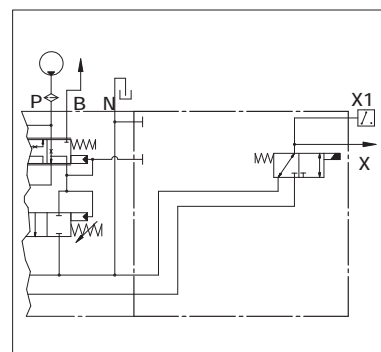
INSTALLATION DESIGN



3D



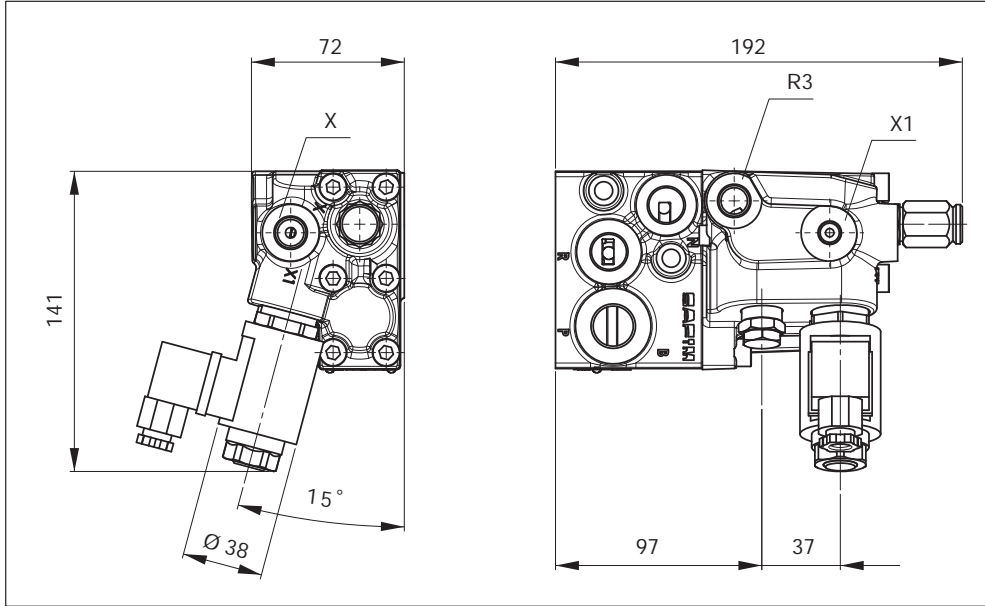
HYDRAULIC SCHEMATIC



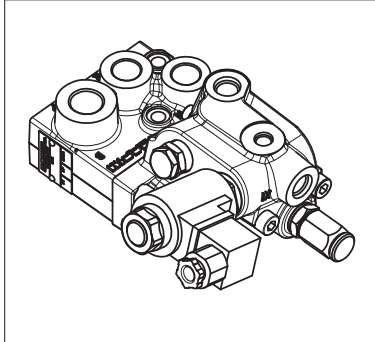
Connection		M	I	S
X	Parking brake	M14x1.5 ISO 6149	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
X1	Pressure switch	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475

02.03.09.03 R - 3 WAY SOLENOID VALVE + REDUCING PRESSURE VALVE

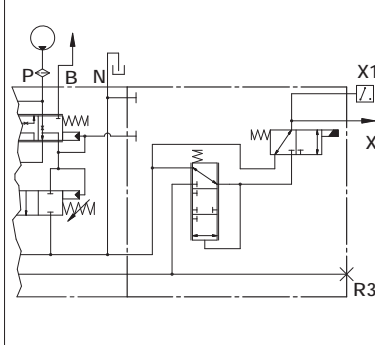
INSTALLATION DESIGN



3D



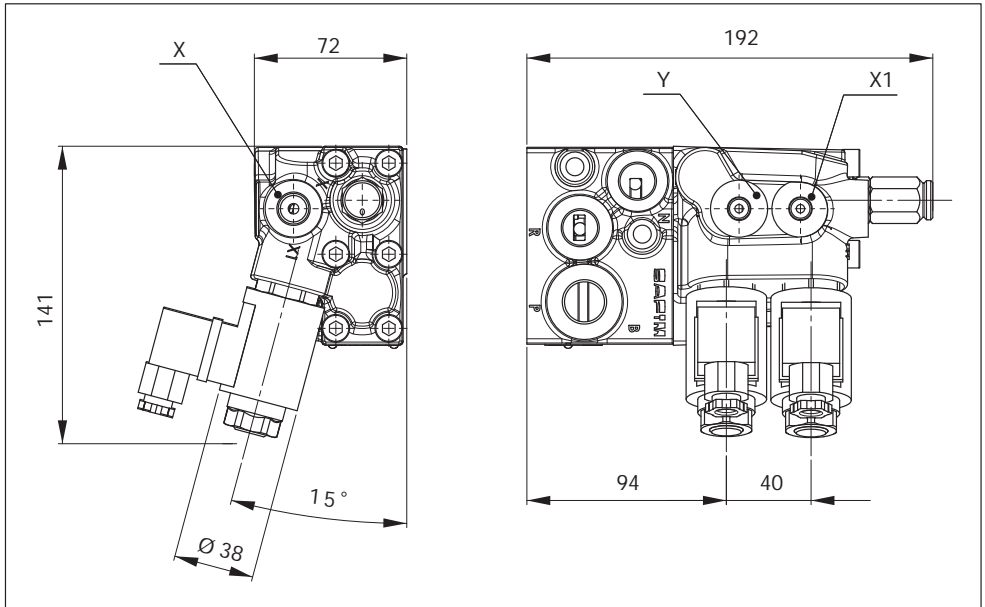
HYDRAULIC SCHEMATIC



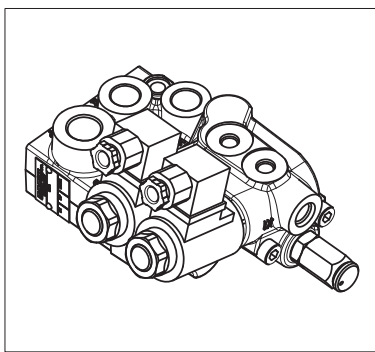
Connection		M	I	S
X	Parking brake	M14x1.5 ISO 6149	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
X1	Pressure switch	M10x1.0 ISO 6149	M10x1.0 ISO 6149	7/16-20 UNF SAE J475
R3	Accumulator	M14x1.5 ISO 6149	M14x1.5 ISO 6149	9/16-18 UNF SAE J475

02.03.09.04 6 - 2X 3 WAY SOLENOID VALVE

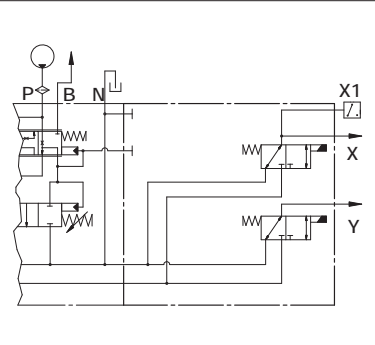
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC

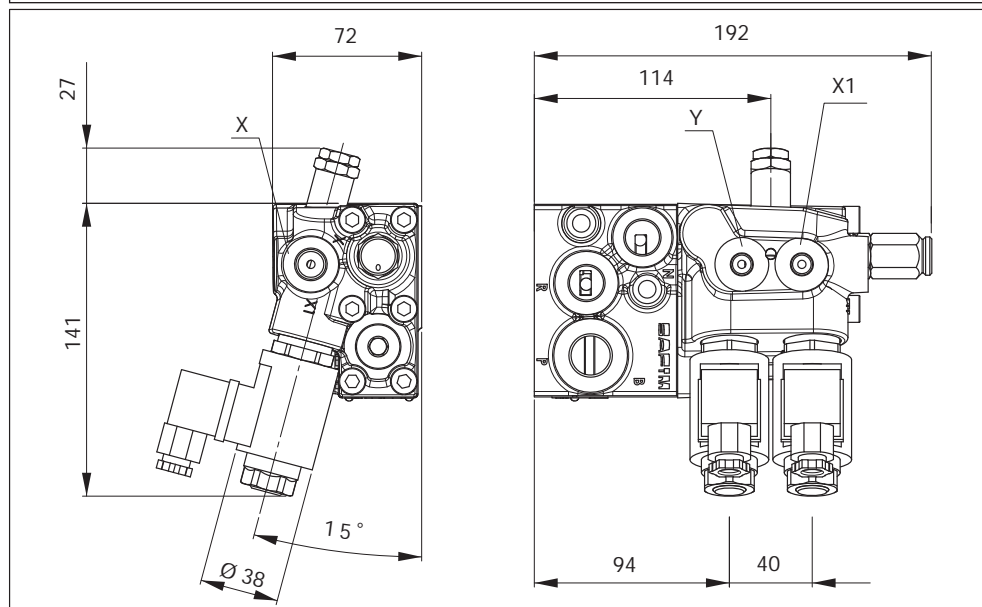


Connection		M	I	S
X	Parking brake	M14x1.5 ISO 6149	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
X1	Pressure switch	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475
Y	Working brake	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475

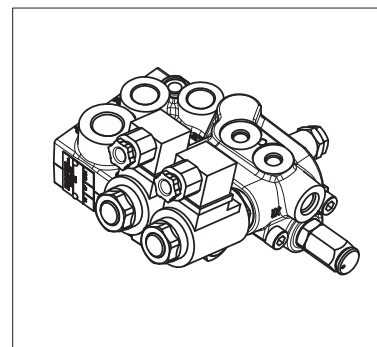
02.03.09.05

X - 2X 3 WAY SOLENOID VALVE + REDUCING PRESSURE VALVE

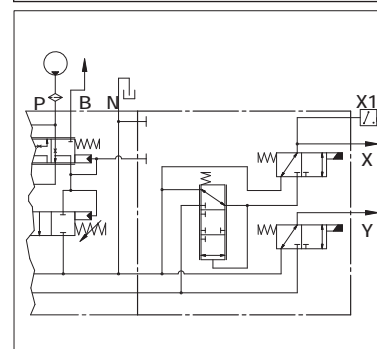
INSTALLATION DESIGN



VISTA



HYDRAULIC SCHEMATIC

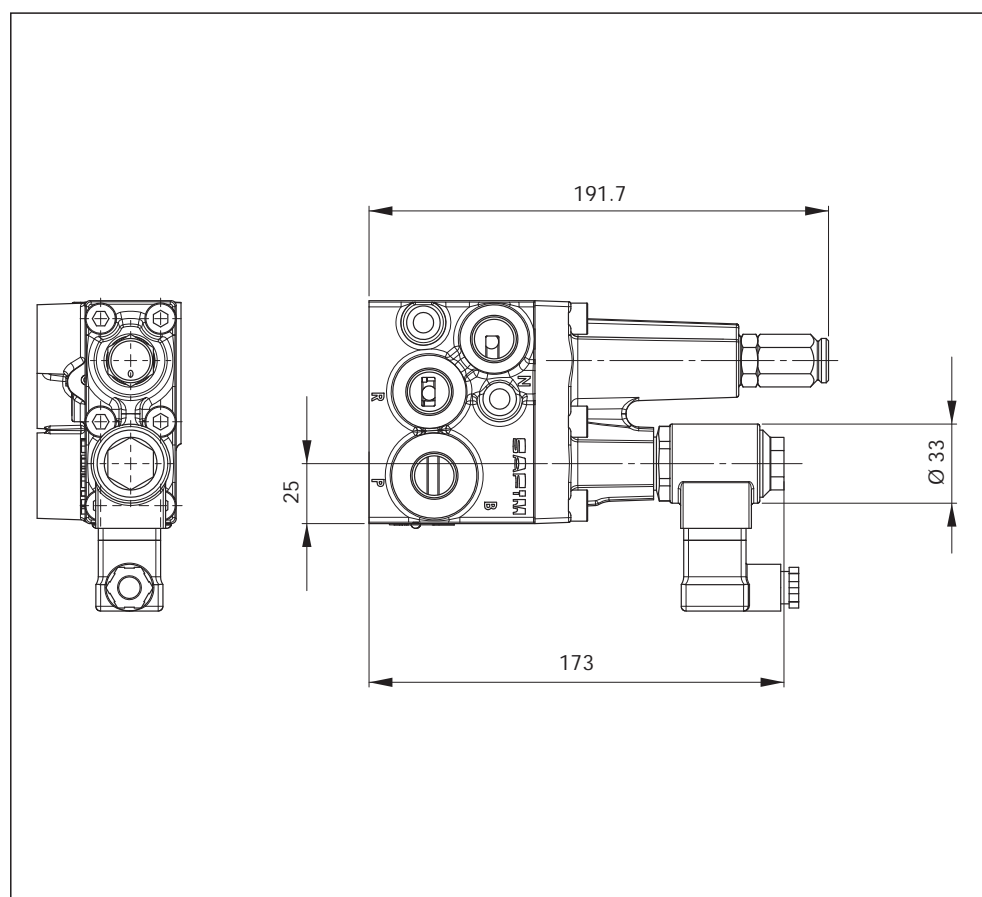


Connection		M	I	S
X	Parking brake	M14x1.5 ISO 6149	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
X1	Pressure switch	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475
Y	Working brake	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475

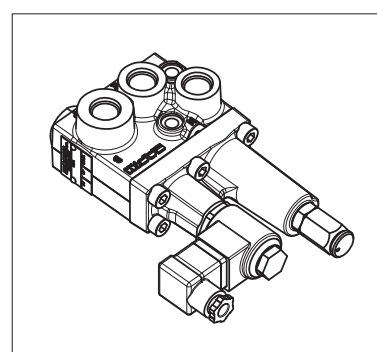
02.03.09.06

2 - START UNLOADING VALVE

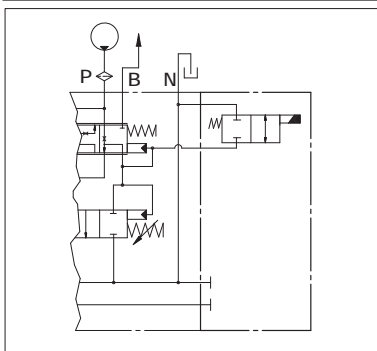
INSTALLATION DESIGN



3D

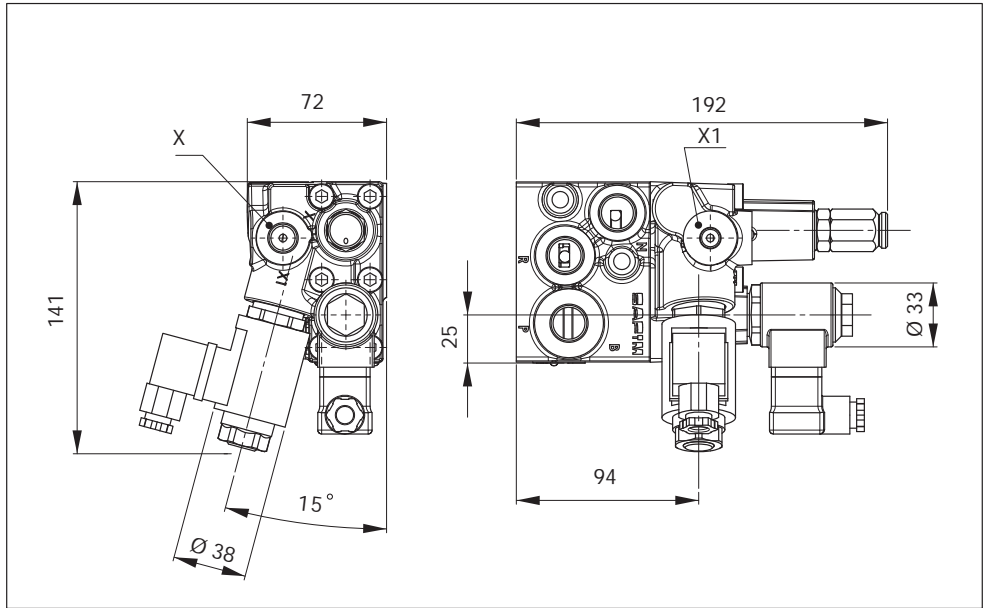


HYDRAULIC SCHEMATIC

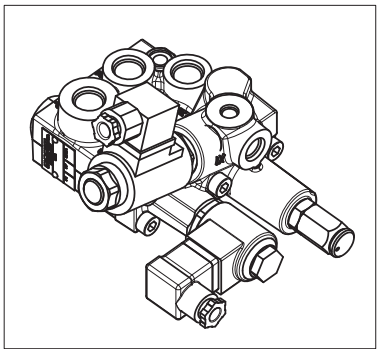


02.03.09.07 5 - START UNLOADING VALVE + 3 WAY SOLENOID VALVE

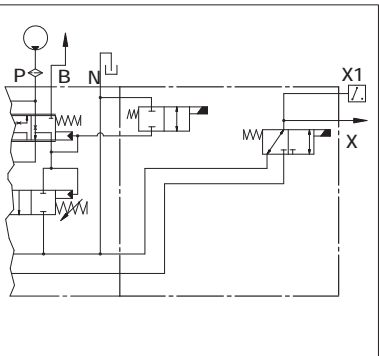
INSTALLATION DESIGN



3D



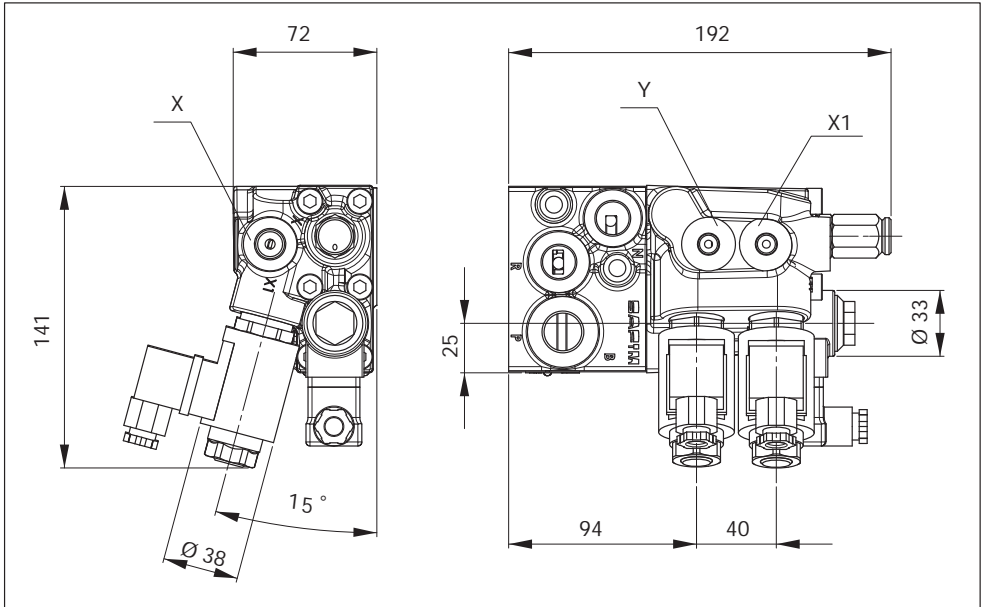
HYDRAULIC SCHEMATIC



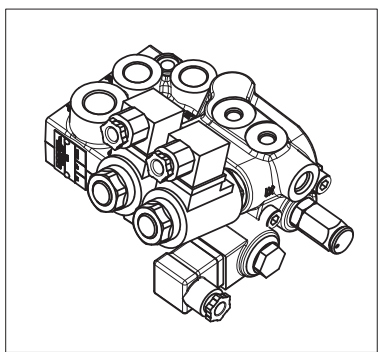
Connection		M	I	S
X	Parking brake	M14x1.5 ISO 6149	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
X1	Pressure switch	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475

02.03.09.08 8 – START UNLOADING VALVE + 2X 3 WAY SOLENOID VALVE

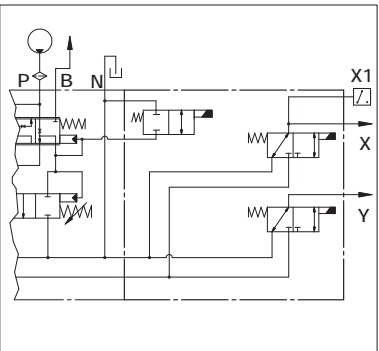
INSTALLATION DESIGN



3D



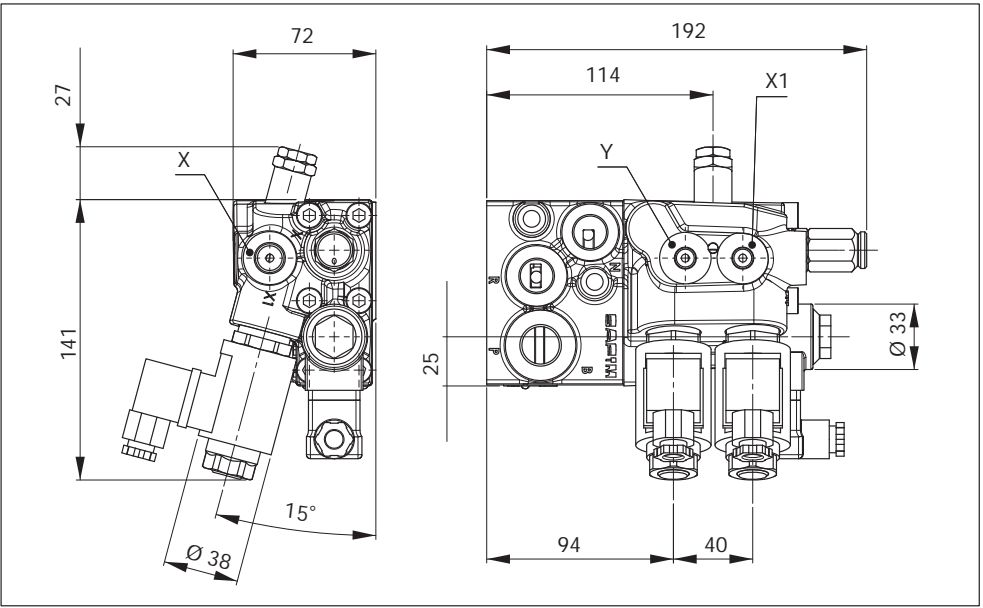
HYDRAULIC SCHEMATIC



Connection		M	I	S
X	Parking brake	M14x1.5 ISO 6149	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
X1	Pressure switch	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475
Y	Working brake	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475

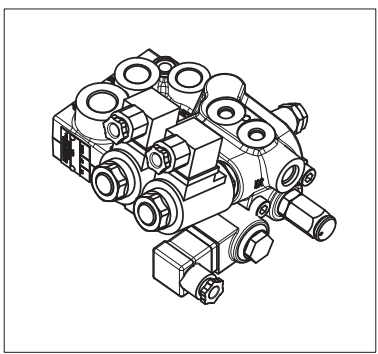
02.03.09.09 Y – WITH “START UNLOADING VALVE” AND 2X3 WAY SOLENOID VALVE
+ REDUCING PRESSURE VALVE

INSTALLATION DESIGN

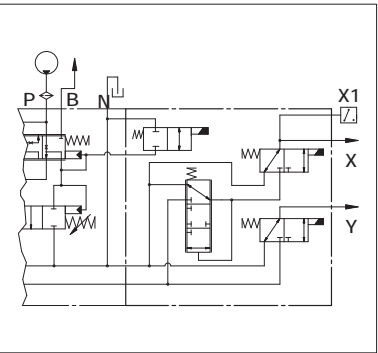


Conessioni		M	I	S
X	Parking brake	M14x1.5 ISO 6149	M14x1.5 ISO 6149	9/16-18 UNF SAE J475
X1	Pressure switch	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475
Y	Working brake	M10x1 ISO 6149	M10x1 ISO 6149	7/16-20 UNF SAE J475

3D



HYDRAULIC SCHEMATIC



02.03.10

POSIZIONE 10 - THREAD TYPE

The item 10 can be:

- M – Metric Thread DIN 3852-1X and BSPP Thread DIN 3852-2X
- I – Metric Thread ISO 6149
- S – UNF Thread SAE J475
- I+M – Metric thread ISO 6149 (brake modules ports), metric thread DIN 3852-1X and BSPP thread DIN 3852-2X (accumulator charging valve ports).
- M+I – Metric thread DIN 3852-1X (brake modules ports), metric thread ISO 6149 (accumulator charging valve ports).
- P : Personalised

02.03.11

POSITION 11 - FIRST CIRCUITS BRAKING PRESSURE (BAR)

The function code position 11 defines the brake pressure of the circuits from the first to the one before the last.

02.03.12

POSITION 12 - LAST CIRCUIT BRAKING PRESSURE (BAR)

The function code position 12 defines the brake pressure of the last circuit. For S6 single circuit the value is not required " – ". Usually the brake pressure is the same in all the brake circuit. Some vehicles needs different pressure in the systems, is possible to use a different reaction area in the last

circuit. This circuit is called "differential module". A differential module multiplies the pressure of the first module to a ratio obtained by the two areas.

Differential modules available:

MODULE DIAMETER mm	LAST MODULE RACTION DIAMETER mm	AREA RATIO
10	6	2.8
10	7	2.0
10	8	1.6
14	7	4.0
14	8	3.1
14	9	2.4
14	10	2.0

Es: module diameter 14 mm, last module reaction diameter 9 mm, first circuit setting pressure at 50 bar.

Last circuit setting pressure: $50 * 2.4 = 120$ bar

The first circuit pressure and the differential module are in a fixed relation, the operator cannot adjust separately the two settings.

The differential module has to be confirmed by Safim.

02.03.13

POSITION 13 - ACCUMULATOR CHARGING VALVE CUT-IN PRESSURE (BAR)

For S6 provided with accumulator charging valve (pos. 4 "F" or "V"), it defines the cut-in pressure. For S6 without charging valve is not required " - ".

The cut-in pressure should be chosen, together with accumulators volume, accumulator nitrogen pre-charge pressure, and pressure-switch setting, to guarantee an adequate supply of oil in case of lack of oil feeding.

Cut-in must be higher than the max brake pressures, the higher between pos. 11 and 12.

Cut-in must be chosen in a way that cut-out pressure doesn't overtake the maximum system pressure, see position 14 for cut-in / cut-out difference value. If the accumulator pressure is used to operate a spring brake, consider the possibility to don't overtake the max pressure allowed by the spring brake to avoid the use of a pressure-reducing valve.

Choose the pressure at 5bar steps.

02.03.14

POSITION 14 - ACCUMULATOR CHARGING VALVE CUT-OFF PRESSURE (BAR)

It defines the cut-off pressure of the charging valve.

For S6 without charging valve is not required " - ".

Standard Cut-off pressure can be chosen from the following table

CUT-IN PRESSURE (bar)	CUT-IN/CUT-OFF DIFFERENCE (bar)
Up to 65	25
Over 65 to 105	30
Over 105 to 150	35
Over 150 to 210	45

For special request cut-in / cut-off pressure could be increased or reduced, contact Safim for more information.

02.03.15

POSITION 15 - REDUCING PRESSURE VALVE SETTING (BAR)

The function code position 15 defines the setting of the pressure-reducing valve if installed; see pos. 9 ("R", "X", "Y"). If not installed " - ".

The pressure could be chosen from 25 to 70bar at 5bar steps. For different setting contact Safim.

02.03.16

POSITION 16 - WORK BRAKE PRESSURE (BAR)

If on the valve is installed a work brake cylinder, it's possible to choose a maximum brake pressure controlled by the work brake cylinder lower than that the maximum controlled by the pedal.

If the maximum pressures are equal, it is not required " - ". If it is lower write the pressure

02.03.17

POSITION 17 - PILOTING CYLINDER FLUID TYPE

If on the valve is installed a work brake or a pilot cylinder, position 17 defines the type of fluid that could be used.

"M" for mineral oil.
"V" for Brake fluid (DOT3 – DOT4)
"–" if not installed

02.03.18

POSITION 18 - SOLENOID VALVE COIL VOLTAGE

If on the valve are installed one or more solenoid valve it defines the tension setting.

"A" for system at 12 volts.
"B" for systems at 24 volts.
"–" Without solenoid valve.

02.03.19

POSITION 19 - ACCUMULATOR CHARGING FLOW RATE

It defines the charging flow rate of the charging valve.

"S" is the standard flow rate 5.5 l/min
"2" low flow rate 3 l/min.
"3" high flow rate 8.5 l/min.
"4" high flow rate 12 l/min.
"–" without charging valve

Usually standard flow rate of 5.5 l/min is the preferred, as it is a good compromise from charging time and flow used.

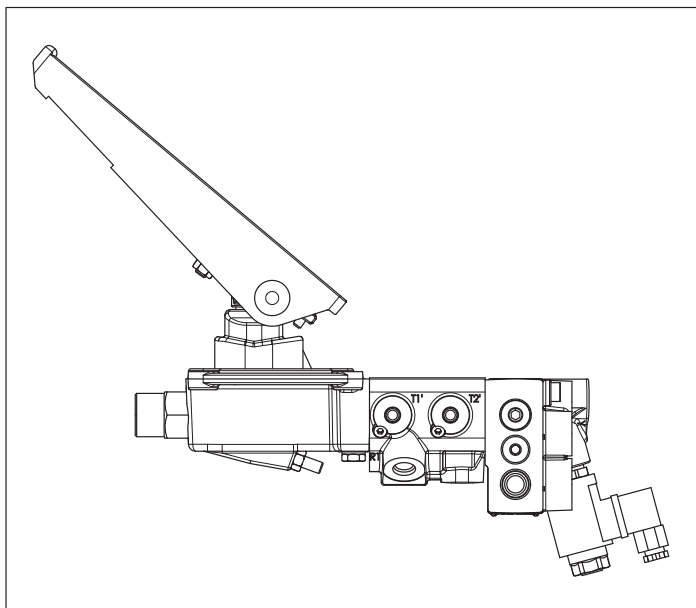
02.03.20

POSITION 20 - TYPE OF REMOTE HYDRAULIC PILOTING

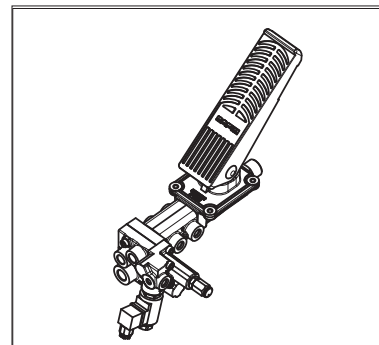
02.03.20.01

N - EXTERNAL PILOTING (NO TUBE CONNECTION)

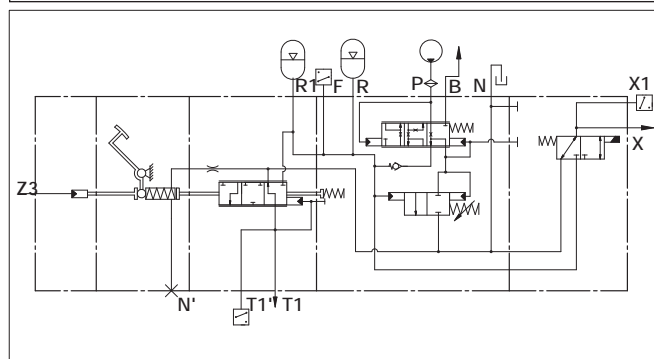
INSTALLATION DESIGN



3D

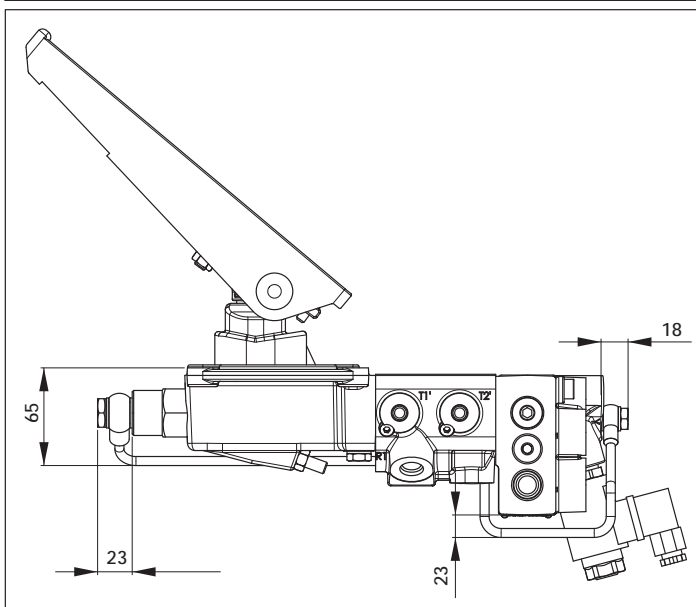


HYDRAULIC SCHEMATIC

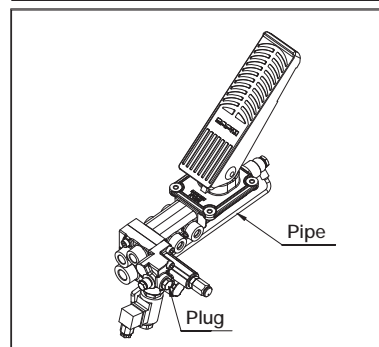


02.03.20.02 S - WORK BRAKE PILOTED BY ACCUMULATOR CHARGING VALVE 3 WAY SOLENOID VALVE

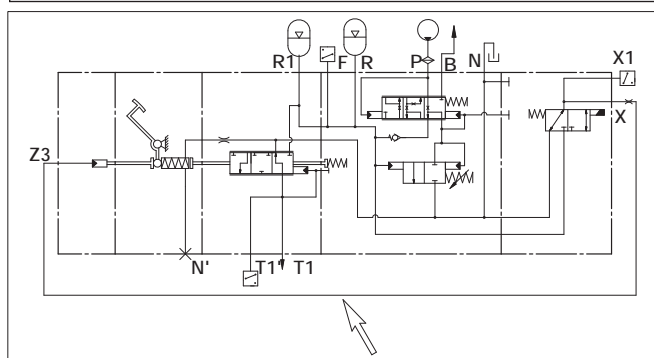
INSTALLATION DESIGN



3D



HYDRAULIC SCHEMATIC



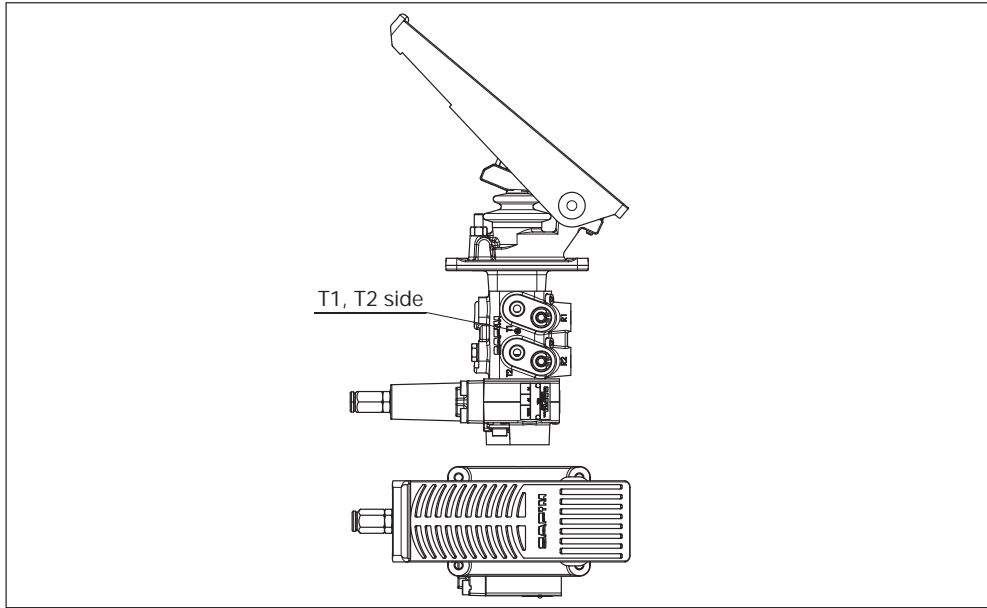
02.03.21

POSITION 21 - PEDAL SUPPORT ORIENTATION

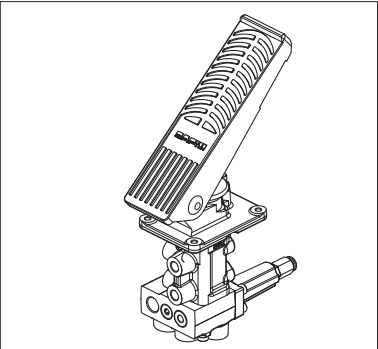
02.03.21.01

0 - 0°

INSTALLATION DESIGN



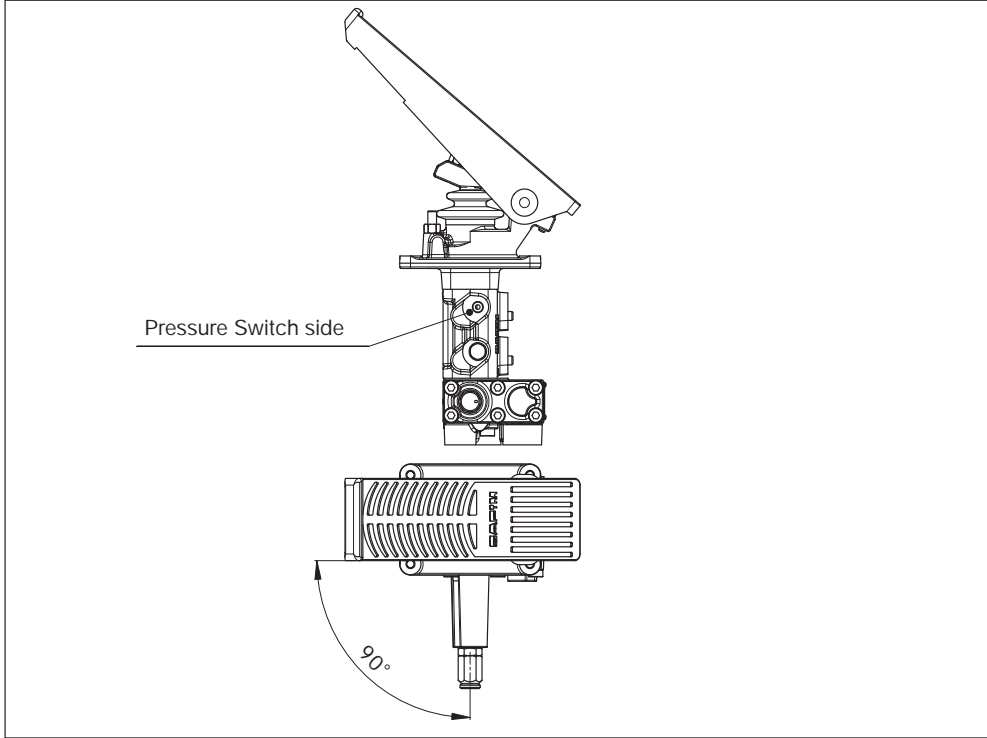
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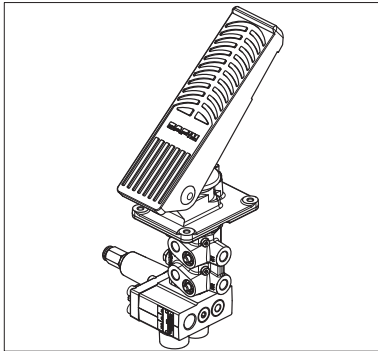
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S - 90° (STANDARD)

INSTALLATION DESIGN



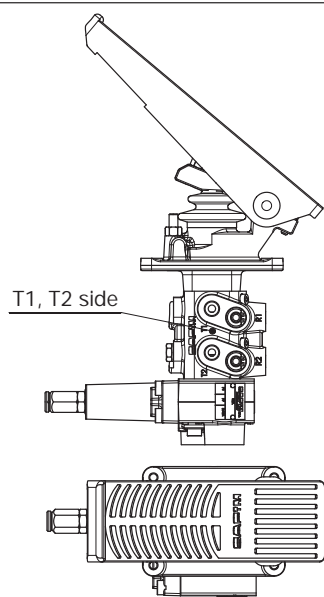
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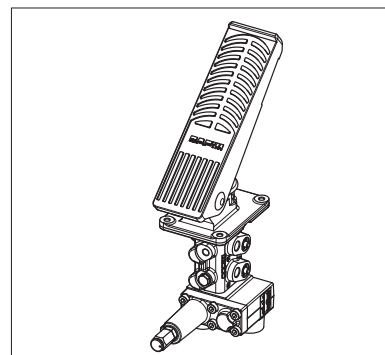
02.03.21.03

180 - 180°

INSTALLATION DESIGN



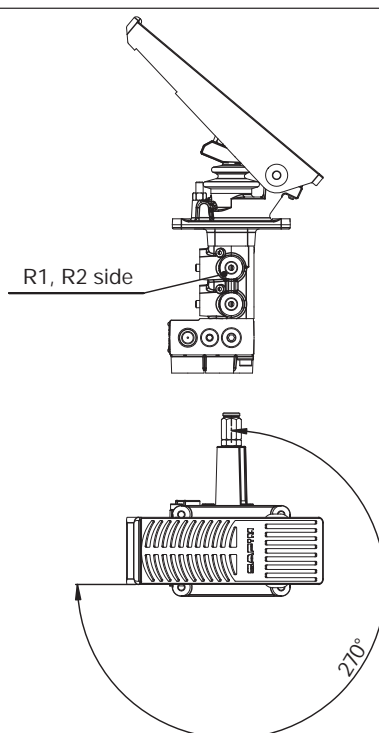
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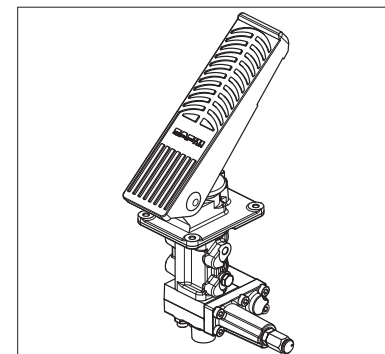
02.03.21.02

270 - 270°

INSTALLATION DESIGN



3D



PRODUCTS



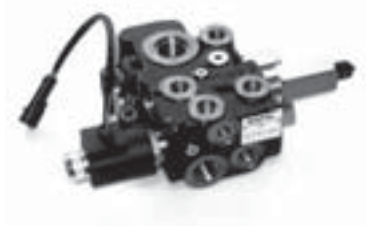
Master cylinders

Master cylinders Master cylinders with or without hydraulic booster, single or double circuit, single or step-bore piston



SAFIM S6 brake valves

SAFIM S6 brake valves Completely powered brake valves



Master priority valve

Master priority valve Valve controlling steering and accumulators charge.



Wheel cylinders

Brake wheel cylinders Multi-function, negative and positive brake cylinders.



Farm tractors hydraulic braking

Hydraulic trailer brake braking system Trailer brake valves for European and Italian market, quick- release couplings, service and parking brake cylinders.



Accessories

Accessories to complete the hydraulic brakes system.



SAFIM was awarded the following quality certificates: ISO 9001 in the year 1999, VISION 2000 in the year 2002.

The quality system is completely supported by paperwork and it has 3 procedure levels:

- a) "Quality manual" explaining SAFIM internal management and company policy.
- b) "Operating procedures" regulating the main company processes and appointing tasks to our staff.
- c) "Technical procedures" giving the necessary instructions to carry out the different jobs appointed to our staff.

All the procedures results related to our products are being recorded and listed so that any quality indicator can be accessed at any time.



SAFIM SAFIM was awarded the quality certificate ISO 14001:2004 in the year 2006.

Since 2006 we attended the environmental certification ISO 14001:2004



SAFIM S.p.A.

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