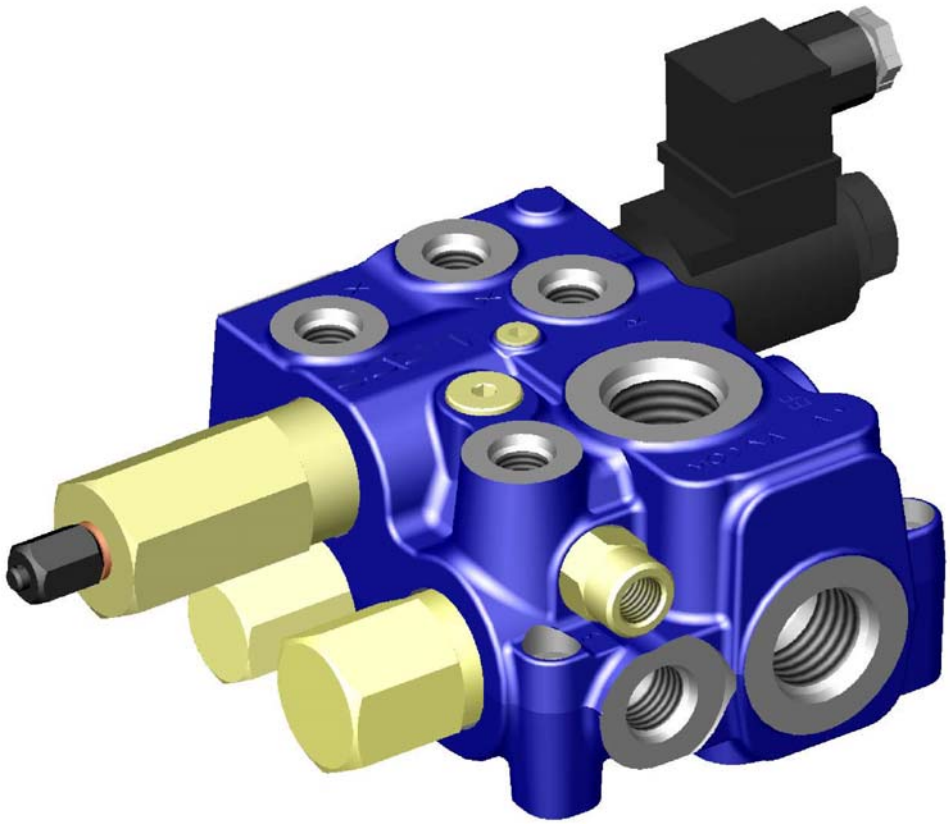
MASTER PRIORITY VALVE®

CONTROLLING STEERING AND ACCUMULATORS CHARGE



SAFIM S.p.A.

SVILUPPO APPLICAZION FRENI INDUSTRIALI

VALVE CONTROLLING STEERING AND ACCUMULATORS CHARGE

MAIN FEATURES:

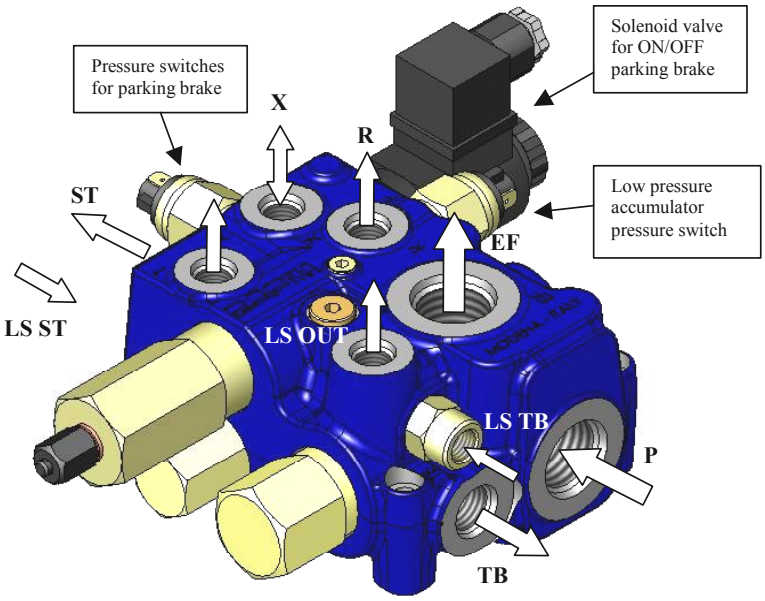
Just one single valve controls the output for steering and accumulators charge.
3 priority levels:

- The flow for the steering is on a priority level in respect to all other services.
- The accumulators charge is on a priority level in respect to the excess flow, but not in respect to the steering.
- The excess flow is not on a priority level.

Valve for protecting the steering from the pressure generated by other services.
Accumulators charging valve built into the braking group with anti-overpressure device.
Versions available for both steady displacement pumps and closed centre ones.
Low crossing pressure drops towards the excess flow.

ACCESSORIES:

Trailer brake valve ports.
Solenoid valve operating the parking brake in the ON/OFF mode.
"Start unloading valve": it disables the accumulators charge when the engine is being started.
Constant pressure valve.



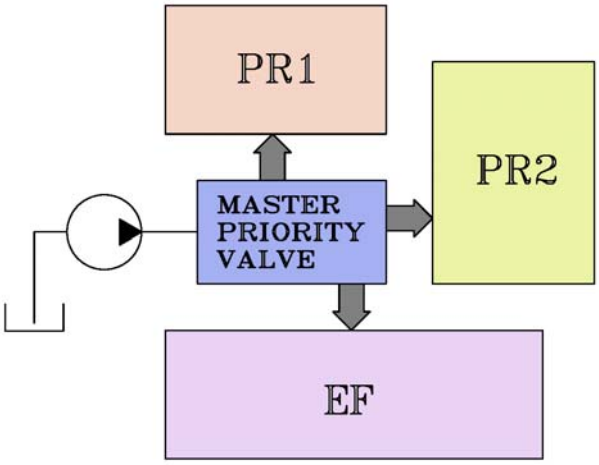
P	Feed from pump
ST	Steering
R	Accumulator
EF	Feed to service
X	Parking brake
LS OUT	L.S. output for pump
LS ST	L.S. inlet from steering

WORKING CONDITIONS:

Inlet flow	160 l/min
Max pressure	280 bar
Acc. charging valve pressure	30-200 bar
Master priority working pressure	7-10 bar
Steering compensator working pressure	14-18 bar
Temperature	-25 to 130 °C
Hydraulic fluid	Mineral oil
Viscosity range	10 to 380 mm^2/s
Filtration degree	10 micron / NAS 1638 class 9

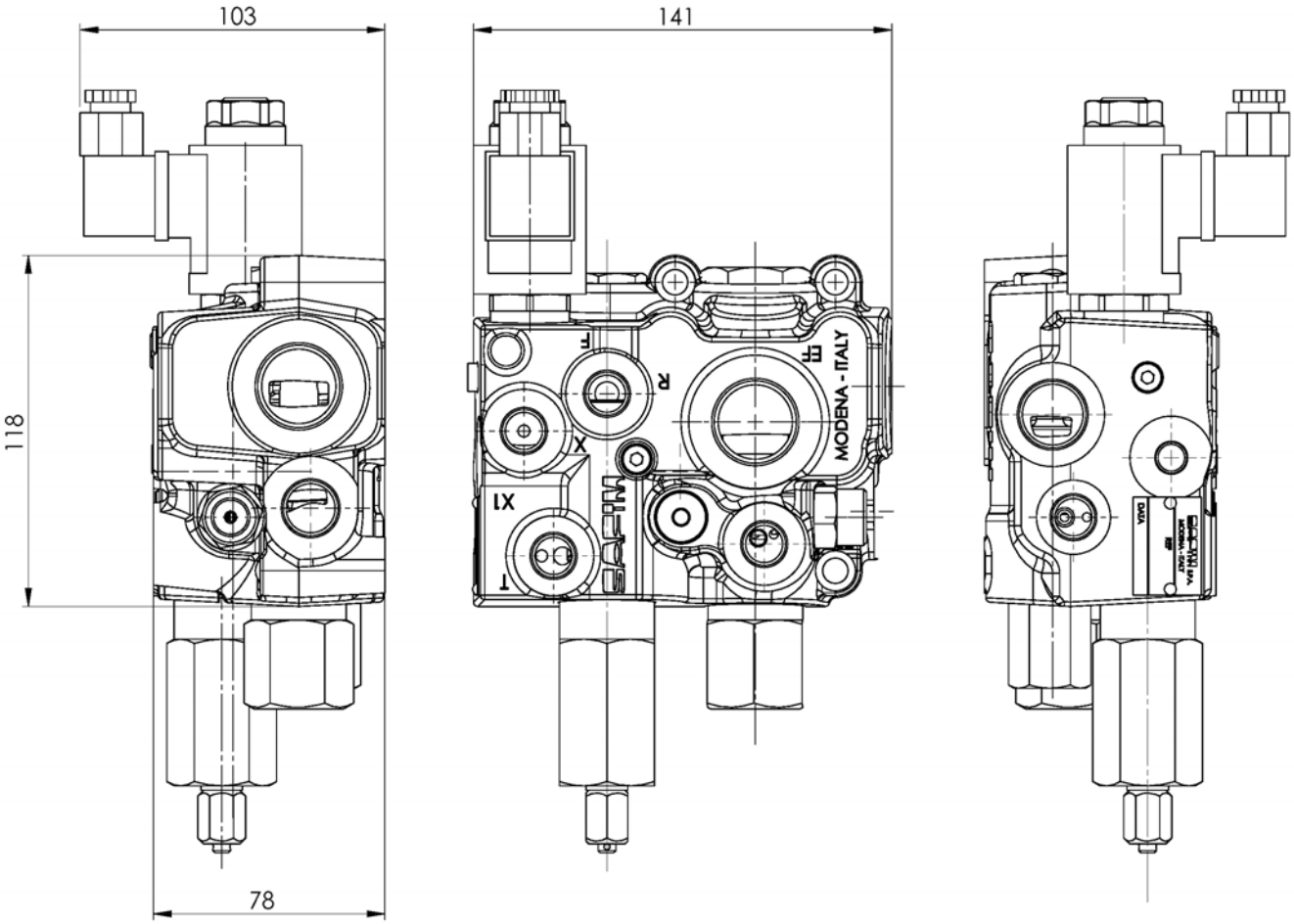
GENERAL

This hydraulic group has been designed in order to convey a pump flow to various services on three priority levels, with low pressure drops on the valve.
On the highest priority level (PR1) you will usually find applications whose failure to function causes problems for both vehicle and operator; on the second priority level (PR2) you will find safety devices that ensure a minimum level of endurance up to a certain extent in the absence of feeding, as well as the services necessary for the vehicle functioning; finally on the third level you will find applications that do not require any priority and whose failure to function doesn't arouse any danger neither to operator nor to the vehicle.



In case the pump flow is enough to satisfy the whole hydraulic equipment at the same time, the master priority valve® will remain completely open.
The valve group protects applications at a higher priority level from excess requests, failures or breakdowns that may take place on services belonging to a lower priority level.

DIMENSIONAL DATA



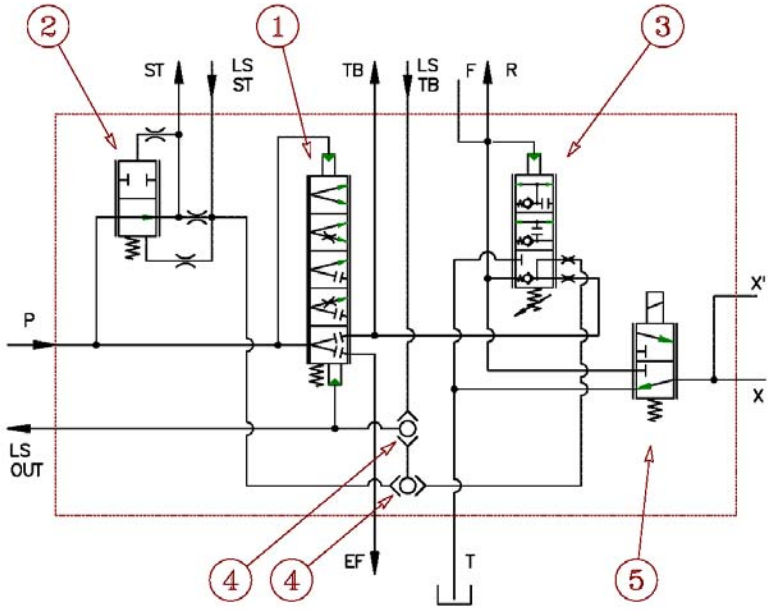
PRIORITY LEVELS:
MASTER PRIORITY VALVE® FOR STEERING, ACCUMULATORS CHARGE AND EXCESS FLOW

The braking group main part is a 3 levels master priority valve® (master priority valve 1), controlling the oil flow to the steering, to an accumulators charging valve and the excess flow, so that the steering is on a priority level in respect to other services and the accumulators charging valve is on a priority level in respect to the excess flow, but not to the steering.

The group may be connected to a steering system of the closed centre kind and contains a valve (2) protecting it from overpressures generated by other services.

The accumulators charging valve (3) keeps the accumulators pressure value within a certain range, that may be set according to the manufacturer's needs.

The accumulators are also charged by means of the pressure coming from other services up to a max. value, beyond which the valve confines the accumulators, in order to avoid overpressures.



ACCESSORIES:

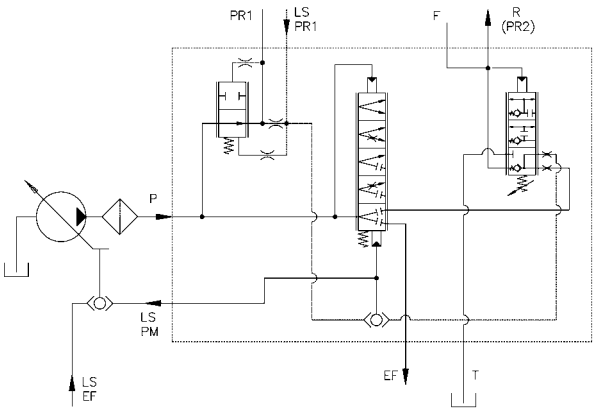
TRAILER BRAKE VALVE PORT
The valve can be equipped with two additional ports TB and LS TB (output and inlet for L.S. signal) to feed a load sensing valve at the same priority level of the accumulator charging valve.
This output is not compensated, therefore it receives also the pressure generated from the other applications.
TB and LS TB are the typical ports for feeding load sensing trailer brake valves applied to agricultural tractors.

SOLENOID VALVE FOR PARKING BRAKE
The group has been designed to allow the assembly of a 3-ways solenoid valve for the parking brake.

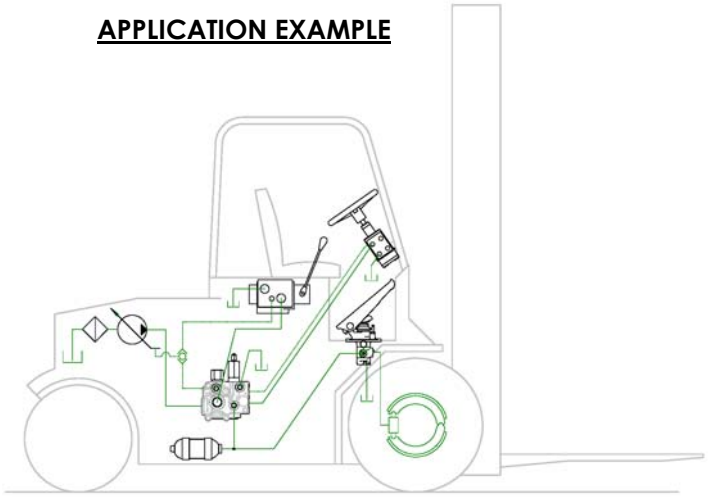
SOLENOID VALVE FOR START UNLOADING
It may be possible to include a 2-ways solenoid valve functioning as a start unloading valve, that may electrically disable the accumulators charge when the engine is being started.

FEEDING VALVE FOR SERVO PILOT PRESSURE AND LOW PRESSURE SERVICES
This device mainly acts as a pressure limiting valve, but it has the possibility to convey a signal to the master priority valve® in order to bring pressure at the min. requested level.

LOAD SENSING CENTRE HYDRAULIC CIRCUIT

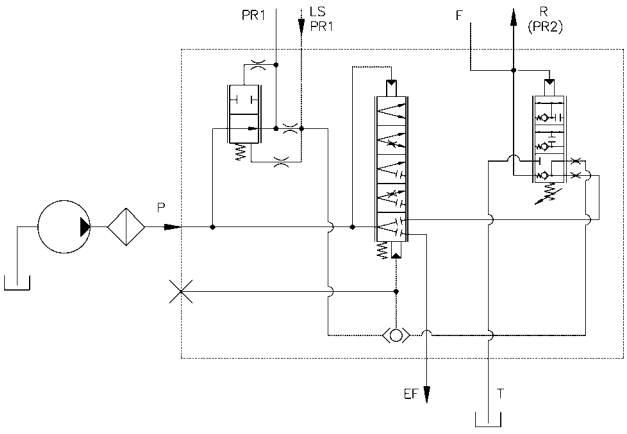


APPLICATION EXAMPLE

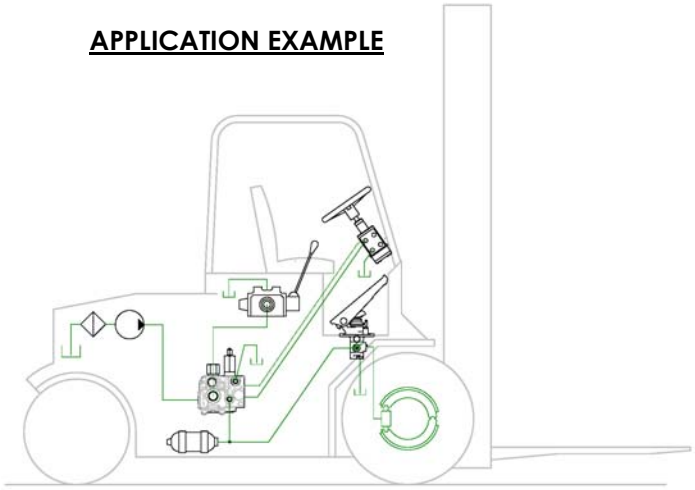


All hydraulic equipment connected to the circuit must be of the closed center type with Load Sensing signal output.
In this system the pump displacement and pressure are dependent on the Load Sensing signals coming from the different services.
The pump feeds all hydraulic equipment until it reaches its max. displacement and the valve is being kept completely open, thus minimizing any pressure drops and without interfering with the circuit.
When the flow demand exceeds the feeding pump flow, the Load Sensing signals coming from priority services can pilot the master priority valve® in order to reduce, bringing to zero, the flow towards auxiliary circuits.
If the LS signal comes from main priority services, the master priority valve® reduces, bringing to zero, the flow for the second level priority.

OPEN CENTRE HYDRAULIC CIRCUIT



APPLICATION EXAMPLE

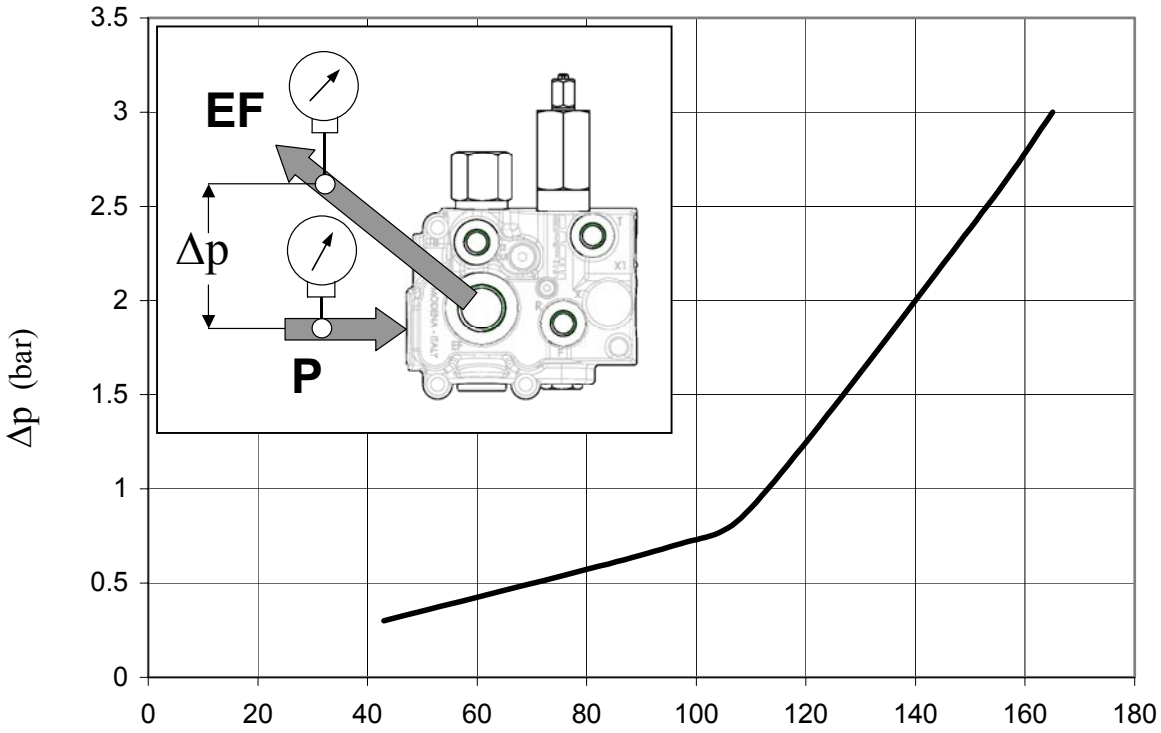


Hydraulic equipment connected to priority levels PR1 and PR2 must be of the closed center type (Load Sensing), whereas the ones that are not connected to priority levels (EF) must be of the open center type (crossing).
In this system with fixed displacement pump, the master priority valve continuously ensures a min. pressure difference between pressure entering the valve and the LS signal from the priority applications.
When a priority application requires oil, it will convey a pressure signal and the master priority valve® will reduce the flow towards EF port, up to reaching the required pressure.
If the application is on the first priority level and the passage closure towards EF port is not enough to generate the pressure necessary for the application, the master priority valve® reduces and if necessary closes the passage towards the second priority level services.

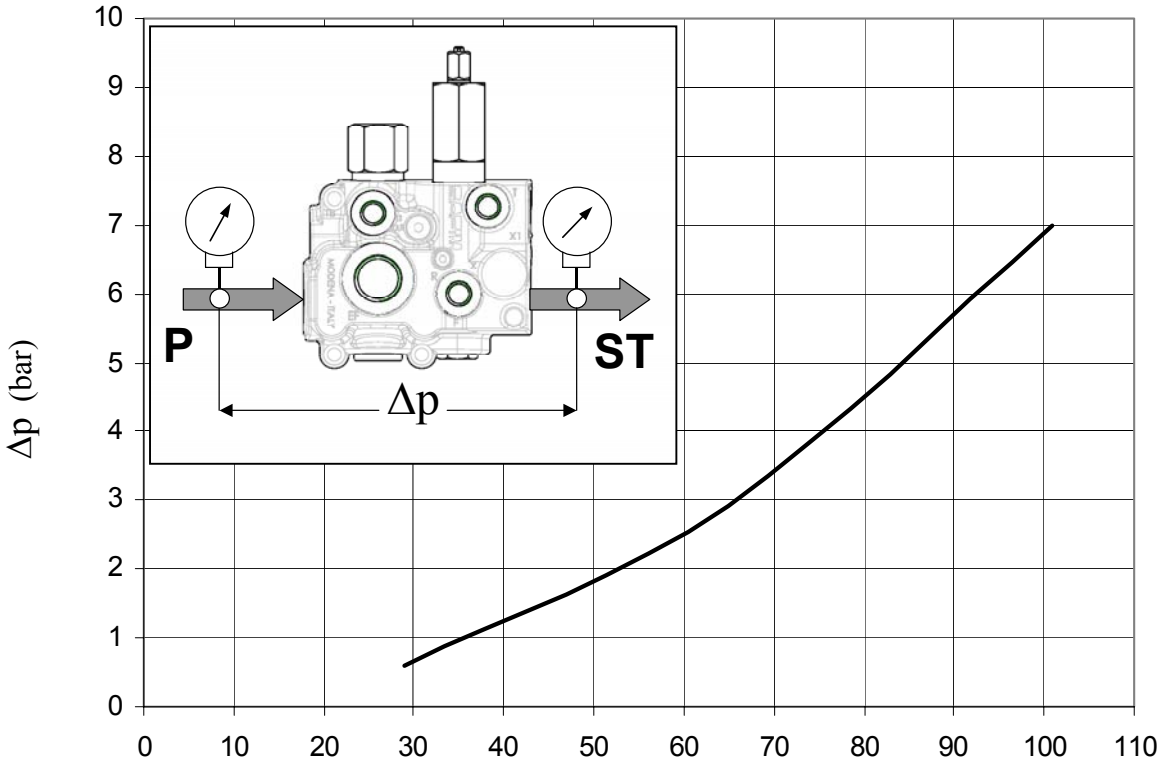
MASTER PRIORITY VALVE® PERFORMANCE DATA

Test procedure: EF must be min. 15 bar.

Crossing Pressure drop towards excess flow (P-EF)



Pressure drop towards priority flow for steering (P-PR1)

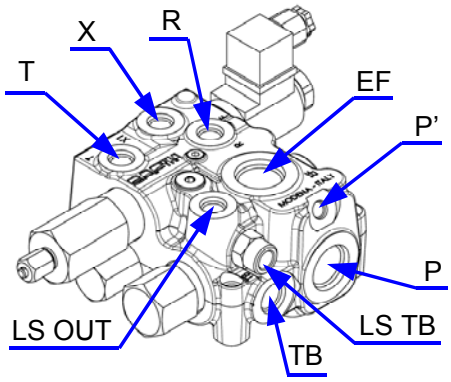


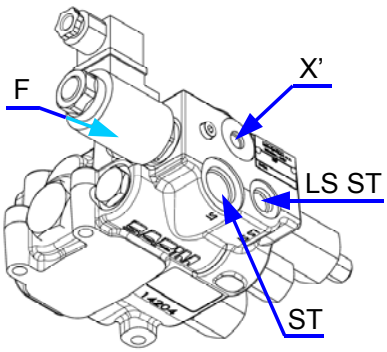
MASTER PRIORITY VALVE® CODE:

The Master priority valve is determined by the technical card: ***Function code for "MASTER PRIORITY VALVE®"***.
Please find below some guidelines helping you to fill the technical card in.
Not all combinations are possible; should you have any questions, please don't hesitate to contact us.
The final order part number will be given by SAFIM.

1) HOUSING TYPE 22A

2) THREADS PORTS

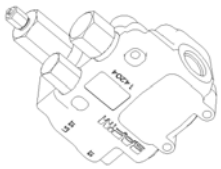
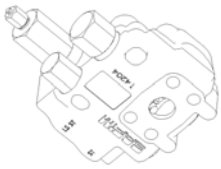




Port	Description	I = Threading type "ISO 6149"	S = Threading type "SAE j475"	
P	Feed from pump (*)	M27x2 ISO 6149	SAE#12	
ST	Steering	M22x1.5 ISO 6149	SAE#10	
LS ST	L.S. inlet from steering	M14x1.5 ISO 6149	SAE#6	
TB	Output for trailer brake valve	M18x1.5 ISO 6149	SAE#8	
LS TB	L.S. inlet from trailer brake valve	M12x1.5 ISO 6149	SAE#4 (SAE#6)	
R	Accumulator	M14x1.5 ISO 6149	SAE#6	
F	Low pressure accumulator pressure switch	M10x1 ISO 6149	SAE#4	
X	Output for parking brake	M14x1.5 ISO 6149	SAE#6	
X'	Pressure switches for parking brake	M10x1 ISO 6149	SAE#4	
R4	Parking brake accumulator	M14x1.5 ISO 6149	SAE#6	
EF	Feed to service	M27x2 ISO 6149	SAE#12	
LS OUT	L.S. output for pump	M14x1.5 ISO 6149	SAE#6	
T	Tank	M14x1.5 ISO 6149	SAE#6	
P'	P pressure port (on request) (**)	M10x1 ISO 6149	SAE#4	

(*) In the flanged version P is always 1" SAE
(**) See "7) Other ports"

3) ASSEMBLY TYPE

Assembly type	Description	External view
L	**"ASSEMBLY IN LINE"** Side feeding port (see "2) THREAD PORTS").	
F	**"FLANGED ASSEMBLY"** on the pump Connection 1" SAE in bottom face.	

4) SEAL TYPE

Seal code	Seal type	Fluid temperature
S	NBR (Standard)	-20 / +80 °C
V	Viton	Contact SAFIM
C	Low Temperature	Contact SAFIM

5) OPERATING PRESSURE

Casting code	Casting material	Maximum pressure (bar)
S	Hydraulic cast iron	250bar
H	Spheroidal cast iron	Contact SAFIM

6) PRIORITY LEVEL

For every type of application, please specify the priority level required:

Priority level	Description (see functioning description)
-	Not present.
1	Applications on first priority level.
2	Applications on second priority level.

7) OTHER PORTS

Other ports	Description
Y	With port
-	Without port (Standard)

MASTER) WAYS OF MANAGING THE PRIORITY LEVELS

The master spool determines the various priority levels.

	Type	Setting (Bar)	M1	M2	LS OUT	Remarks
MASTER	**22A**					

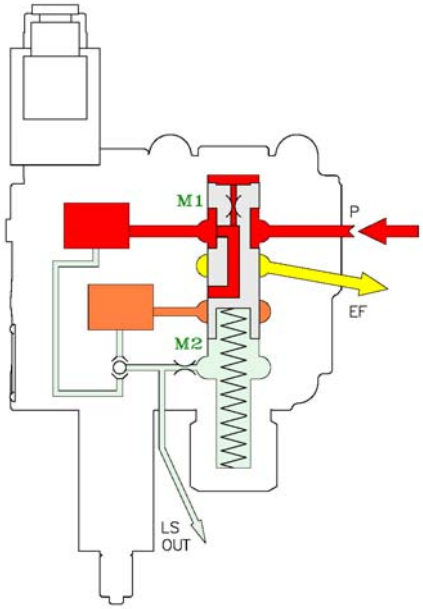
Type
22A Standard

Setting (bar) : Stand by pressure
Standard: **"7-10"**

M1: Flow restrictor diameter M1 (mm)
For standard diameter D=1.5 mm, write: **" - "**

M1: Flow restrictor diameter M2 (mm)
For standard diameter D=1.5 mm, write: **" - "**

LS OUT (L.S. output for pump)
Y With LS OUT (Standard)
N Without LS OUT



ST) COMPENSATOR FOR STEERING

Compensator protecting the steering from overpressures generated by other services.

	Type	Setting (Bar)	I1	I2	I3	Remarks
ST	**LSA**					

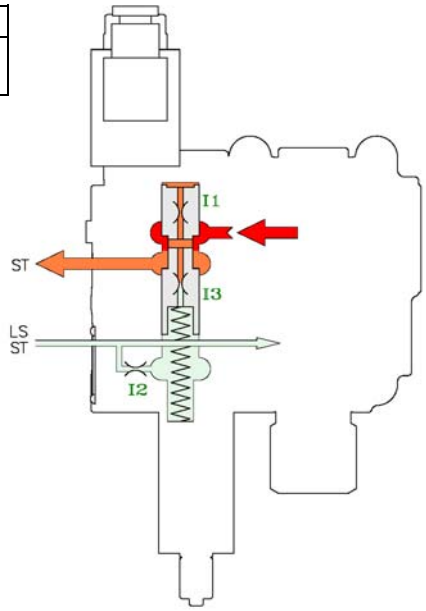
Type
LSA Standard

Setting (bar) : Compensator setting pressure
Standard: **"14-18"**

I1: Flow restrictor diameter I1 (mm)
For standard diameter D=1.0 mm, write: **" - "**

I2: Flow restrictor diameter I2 (mm)
For standard diameter D=1.5 mm, write: **" - "**

I3: Restrictor diameter for dynamic flow I3 (mm)
For standard diameter D=0.8 mm, write: **" - "**
For non dynamic flow write**" N "**



When pressure is controlled by the steering, the compensator doesn't work.

If the feeding is at a pressure higher than the one required by the steering unit, the compensator limits output pressure to the load sensing signal plus the compensator setting.

Attention: The steering unit must be of the Load Sensing type with built-in pressure limiting valve

VCA) ACCUMULATOR CHARGING VALVE

The accumulator charging valve is of the load sensing type and is usually connected on a second priority level.

	Type	Setting (bar)	A1 (flow)	Spring (AM		Remarks
VCA						

Type
23A Standard

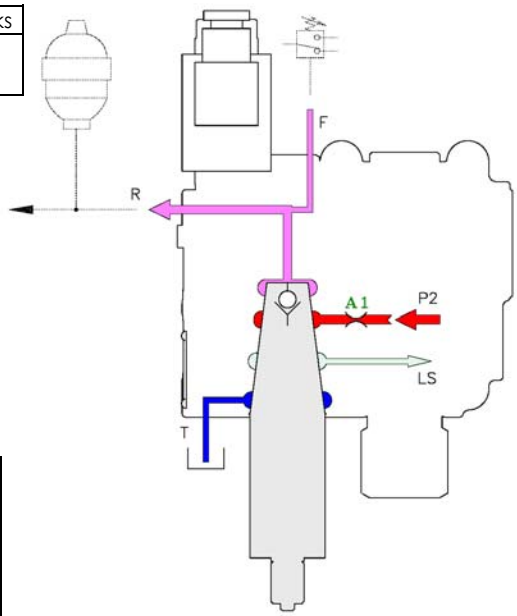
Setting (bar): (*)
Initial charging pressure. – **Final charging pressure.**

Diameter restrictor A1 (mm):
Set the flow to accumulators.

Diameter	Flow (l/min)
2.5 Standard **"-"**	

Setting spring of accumulator charging valve:
The setting pressure range and the pressure defference between initial and final accumulator charge pressure depends on the setting spring.

Spring	Setting pressure range (bar)	Jump pressure available (bar)
A	30-200	20 – 30



(*) The pressure jump between initial and final charge is being selected among the ones available and listed in the "Spring" table.
The initial charge pressure is being adjusted by means of AM spring; the pressure jump between initial and final charge not only depends on AM spring, but also on AC stroke limiting device.
The accumulators are being charged by the pressure generated by other services as well; the valve closes to protect the accumulators from overcharging at about 15-20 bar higher than the final charge pressure.

3VIE) SOLENOID VALVE FOR PARKING BRAKE

Normally open solenoid valve for parking brake.

	Type	Setting (Volt)	Connector	Manual	Port R4	Remarks
3 VIE						

Tipo

NA0	Standard
-	Plugged

Setting (Volt): operating voltage

0	12 Volt
3	27 Volt
-	Plugged

Connector: Type of solenoid connector

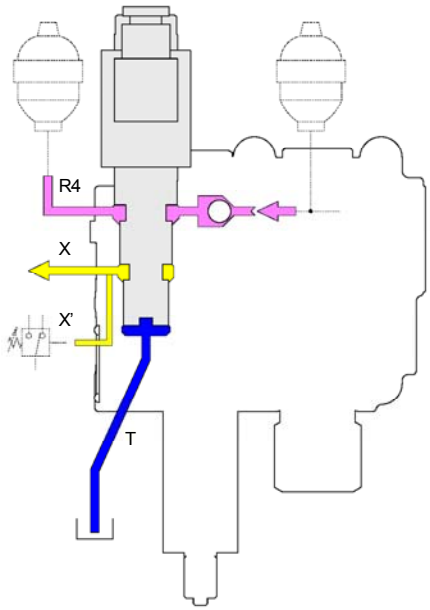
Connector type	Description
DIN	DIN 43650 (Standard)

Manual override

Y	With manual override
-	Without manual override (Standard)

Port R4: Check valve and port for parking brake accumulator.

R4	With port R4
-	Without port R4



2VIE) START UNLOADING VALVE

The start unloading valve disables the accumulators charge when the engine is being started.

	Type	Setting (Volt)	Connector	Manual		Remarks
2 VIE						

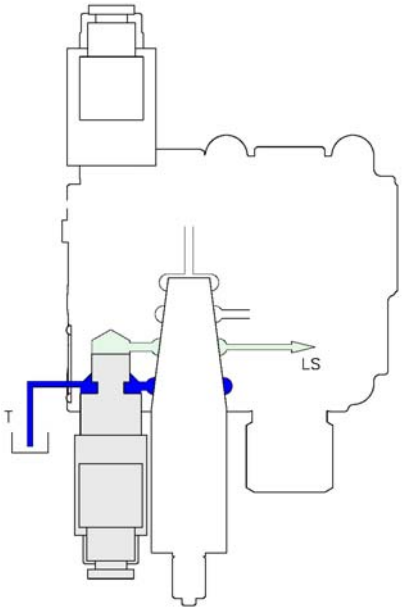
Typo
NC0 Standard
- Plugged

Setting (Volt): operationg voltage
0 12 Volt
3 27 Volt
- Plugged

Connector: Type of solenoid connector

Connector type	Description
DIN	DIN 43650 (Standard)

Manual override:
Y With manual override
- Without manual override (Standard)



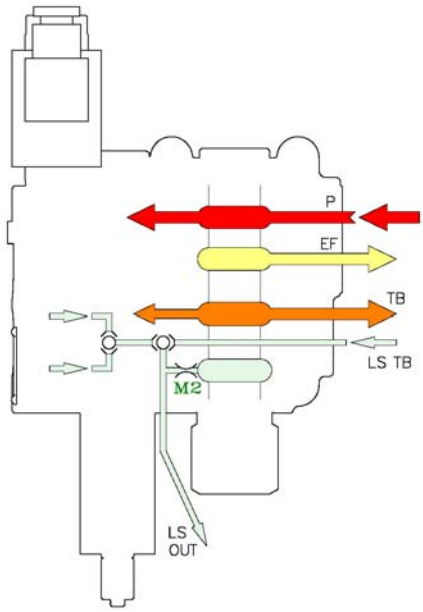
ATTENTION: When the engine is being started, the accumulator charging valve is not active and the service brake is not working correctly. It is necessary therefore that the parking brake is inserted at this stage.

TB) LOAD SENSING OUTPUT WITHOUT COMPENSATOR

	Type					Remarks
TB	**-**					

The output without compensator is suitable for feeding Load Sensing applications that can work with the pressure generated from other services. This output is on a second priority level in parallel with the accumulator charging valve and is accompanied by a second selector valve.

This output can be used for feeding a Trailer Brake Valve of the closed center type.



SAFIM

Codifica del sistema "MASTER"

Data	Foglio N°
XX.XX.XX	

Macchina destinataria della fornitura	Responsabile	Cliente

***1** Tipo di connessioni:
- I Fil. Metr. ISO 6149
- M Fil. Metr. DIN 3852
- S Fil. SAE (UNF)

***2** Tipo di montaggio:
- L Montaggio in linea
- F Flangiata 1" SAE

Tipo di guarnizioni:
- S NBR (Standard)
- V Viton
- C Bassa temperatura

Classe di resistenza
- S Standard
- H Alte pressioni

Porte aggiuntive
- P' Presa di press. su P
- – –

CORPO

	Corpo	Connessioni	Montaggio	Guarnizioni	Resistenza	Porte aggiuntive / Varianti	Note
CORPO	01		L	S	S		

Tipo di utilizzi:

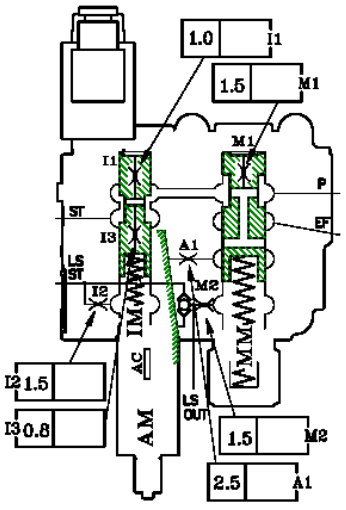
Cod.	Descrizione	Valv. Stand.	Pag. Cat.
MSTR	Master priority valve	ST22	6
STLS	Uscita con compensatore	LS01	6
TB	Uscita senza compensatore	–	8
VCA	Valvola carica accumulatori	23ST	7
3VIE	Elettrovalvola a 3 vie	NAST	7
2VIE	Elettrovalvola a 2 vie	NCST	8
STAT	Portata costante	*Sentire SAFIM*	
PC	Uscita a pressione costante	*Sentire SAFIM*	
RID	Riduttrice di pressione	*Sentire SAFIM*	

Note: _____

MASTER

	Valvola	Taratura (bar)	M1	M2	Tarabile	Note
Master						

Posizine dei fori calibrati



PRIOR.1

	Valvola	Taratura (bar)	I1	I2	I3 dinamico	Note
X **ST**						

PRIOR.2

	Valvola	Taratura (bar)	A1(portata)	Molla (AM)	Tarabile	Note
X **VCA**						

	Valvola	Tensione (Volt)	Connettore	Em. Manuale	Porta R4	Note
3VIE						

	Valvola	Taratura ( )				Note

	Valvola					Note
TB						

Codice SAFIM N°:

	*1	*2	/	13

Il gruppo scelto corrisponde al codice CLIENTE N°: _____

Firma per approv. (DTS/DAC) _____

Firma per compilazione _____

Ultimo aggiornamento 17/07/03