

MASTER PRIORITY VALVE®

HYDRAULIC BRAKES AND SERVO-ASSISTED BRAKE SYSTEMS

- 3 Priority Levels
- Steering Protection
- Accumulators' Charge
- In-line Assembly
- Flanged Assembly



SAPIM

010 - INTRODUCTION AND GENERAL FEATURES

020 - MASTER PRIORITY VALVE® 80 L/MIN

030 - MASTER PRIORITY VALVE® 160 L/MIN

040 - FLANGED MASTER PRIORITY VALVE®

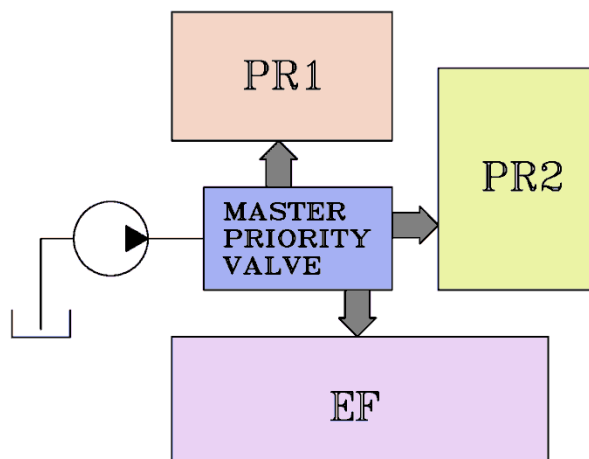
MASTER PRIORITY VALVE® : GENERAL FEATURES

This hydraulic valve 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 don't 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.

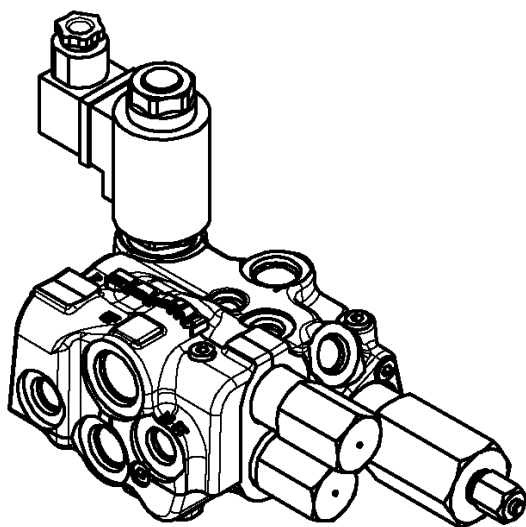
The valve protects applications at a higher priority level from excess requests, failures or breakdowns that may take place on services belonging to a lower priority level.



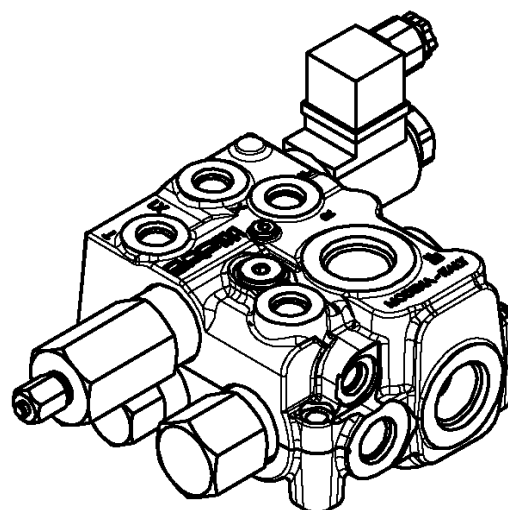
There are two main kinds of Master Priority Valve® : The larger one has the main spool diameter of 22 mm , and allows a maximum flow rate of 160 l/min.

The smaller one has the main spool diameter of 16 mm , and it's designed for a maximum flow rate of 80 l/min.

Hydraulically, the two systems are equivalent.



Master Priority Valve® 80 L/min



Master Priority Valve® 160 L/min

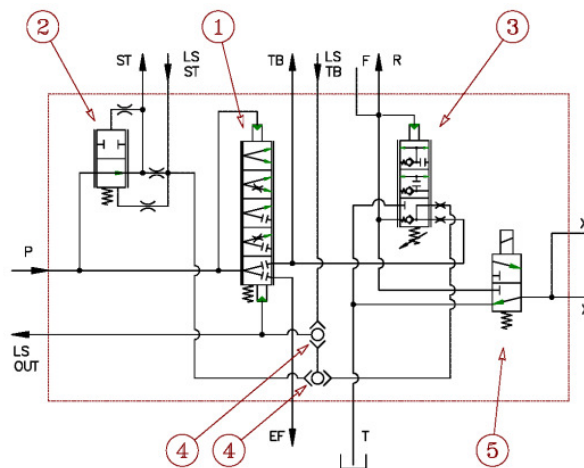
MASTER PRIORITY VALVE OPERATION

The valve has three-levels priority valve (1), controlling the oil flow to the steering, to an accumulators charging valve and the exceeding 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 exceeding flow, but not to the steering.

The group may be connected to a closed centre steering system 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 maximum value, beyond which the valve confines the accumulators, in order to avoid overpressures.



OPTIONAL SERVICES

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.

SOLENOID VALVE FOR PARKING BRAKE

The group has been designed to allow the assembly of a 3-ways solenoid valve for the parking brake (5).

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 minimum requested level.

EMERGENCY STEERING ACCUMULATOR

This function consists in a supplementary accumulator, separated from the main one by a check valve and connected with the steering spool. It permits to have a pressurized oil back up to be used in case of failure of the system, making a fully-functional emergency steering.

TYPICAL HYDRAULIC CIRCUITS

CLOSED CENTRE CIRCUIT (LOAD SENSING)

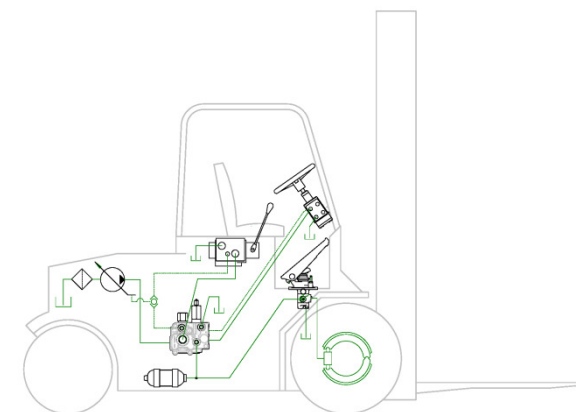
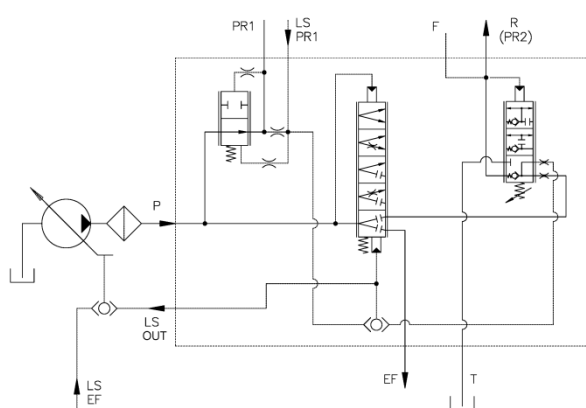
All hydraulic equipment connected to the circuit must be closed centre type with Load Sensing signal output.

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 equipments 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.

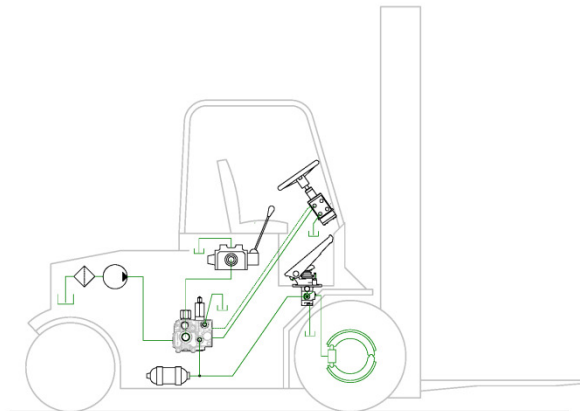
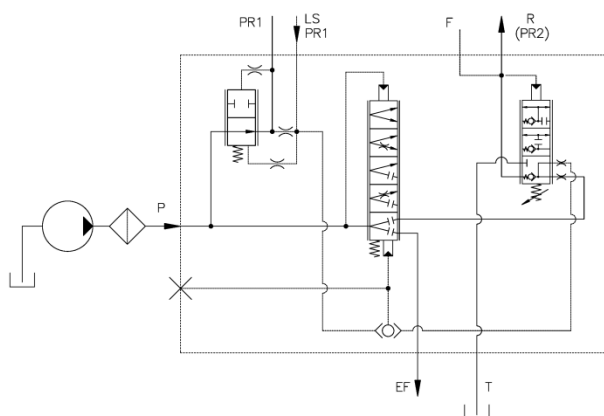
**OPEN CENTRE CIRCUIT**

Hydraulic equipment connected to priority levels PR1 and PR2 must be closed centre 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.



SELECTION POSSIBILITIES

The Master priority valve features are defined by the technical card: **Function code for "MASTER PRIORITY VALVE®"**.

Please find below some guidelines helping you to fill the technical data sheet.

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

16A	Master Priority Valve D.16 (max Flow Rate 80 l/min)
22A	Master Priority Valve D.22 (max Flow Rate 160 l/min)

2) THREADED PORTS

I	Threading type ISO 6149
S	Threading type SAE J475

3) ASSEMBLY TYPE

L	In line assembly (Standard Versions)
F	Flanged assembly on the pump (Connection 1" SAE in bottom face)
B	Flanged on SAFIM S6 Brake System (Only for housing 16A type)

4) SEAL TYPE

	Seal type	Fluid Temperature
S	NBR (Standard)	-20 / +100 °C
V	Viton	Contact SAFIM
C	Low Temperature	Contact SAFIM

5) OPERATING PRESSURE

	Casting Material	Maximum Pressure
S	Hydraulic Cast Iron	250 bar
H	Spheroidal Cast Iron	Contact SAFIM

6) OTHER PORTS

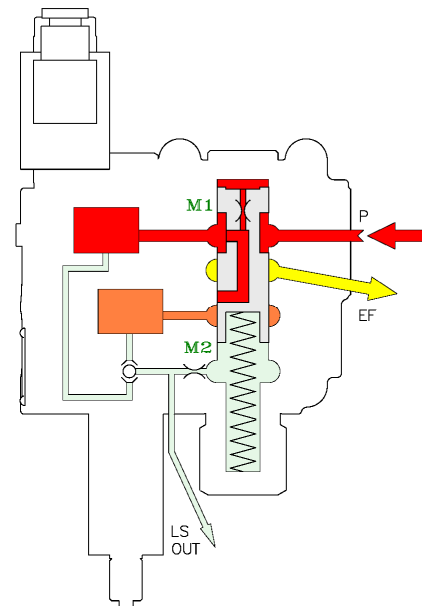
P'	Pressure switch on P
-	Without port (Standard)

SETTING PARAMETERS

MASTER) WAYS OF MANAGING THE PRIORITY LEVELS

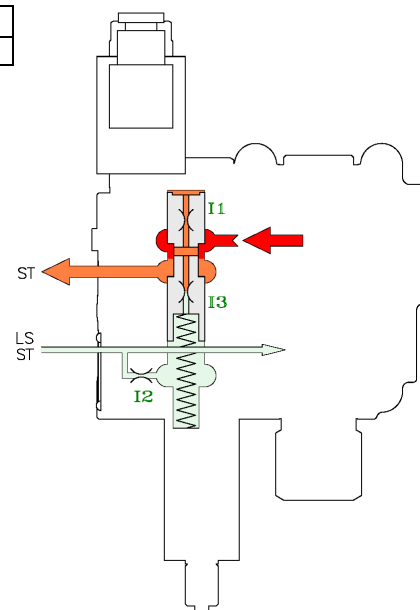
The master spool determines the various priority levels.

	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: " - "					
	M2: 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.

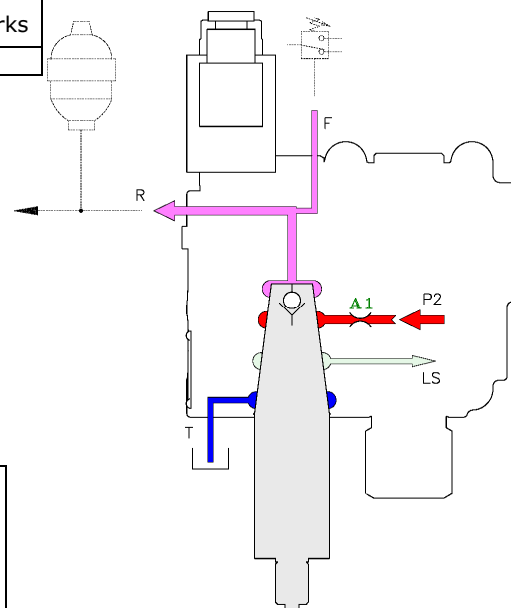
If the feeding is at a higher pressure than the one required by the steering unit, the compensator limits the output pressure to the load sensing signal plus the compensator setting.

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

VCA) ACCUMULATOR CHARGING VALVE

The accumulator charging valve is a 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 (CUT-IN) charging pressure. — Final (CUT-OFF) 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 difference between initial and final accumulator charge pressure depends on the setting spring. Spring CUT-IN pressure setting (bar) Jump pressure (bar) A 30-160 (step 10 bar) * 30 – 37						



(*) The pressure jump between initial and final charge is being selected among the ones available.

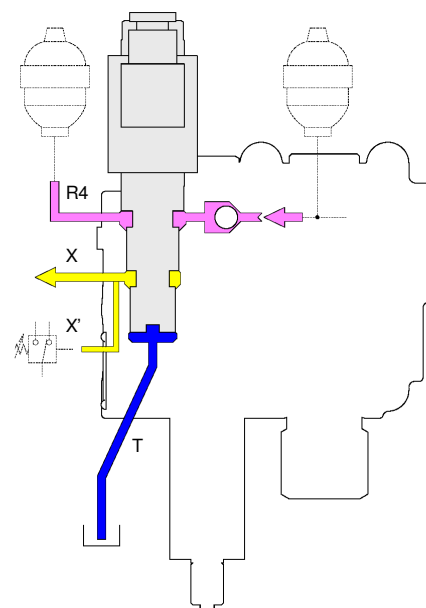
The initial charge pressure is being adjusted by means of AM spring; the pressure jump between initial and final charge it depends not only from AM spring, but also on stroke limiting device (fix setting defined by the SAFIM).

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.

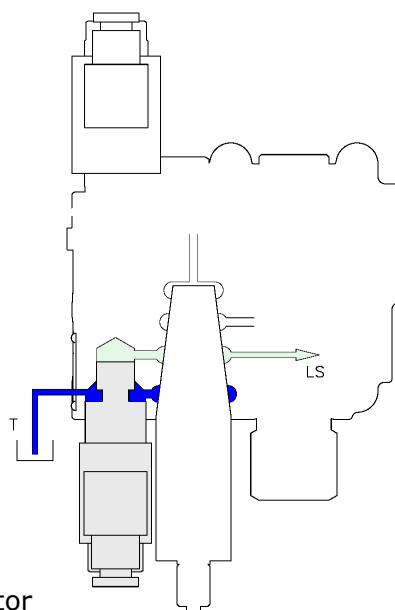
	Type	Setting (Volt)	Connector	Manual	Port R4	Remarks
3 VIE						
Tipo NA0 Standard - Plugged						
Setting (Volt): operating voltage 0 12 Volt 3 27 Volt - Plugged						
Connector: Type of solenoid connector Connector type Description DIN DIN 43650 (Standard)						
Manual override Y With manual override - 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						
Tipo NCO 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)						



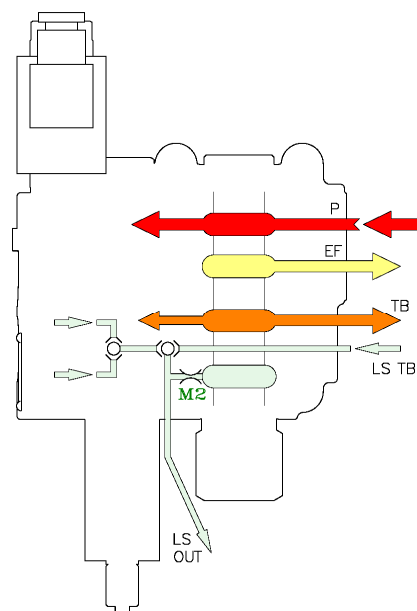
ATTENTION: When the engine is being started, the accumulator charging valve is not active and the service brake is not working. It is therefore necessary that the parking brake is inserted at this stage.

TB) LOAD SENSING OUTPUT WITHOUT COMPENSATOR

	Type					Remarks
TB	-					

The output without compensator is suitable for feeding Load Sensing applications that 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 selecting valve.

This output can be used to feed a closed centre type Trailer Brake Valve.



FUNCTION CODE TECHNICAL CARD



Function code for brake
"MASTER PRIORITY VALVE®"

Mod. SQ 004

Rev. 2
22/05/09

Date

Page N°

Machine to assign the brake system

In charge

Customer

*1

Threads ports

I Metric ISO 6149

S SAE (UNF)

*2

Assembly type

L Assembly in line

F Flanged assembly

Seal type

S NBR (Standard)

V Viton

C Low temperature

Operating pressure

S Standard

H High pressure

Other ports

P' Presa di press. su P

- -

Housing	Threads	Assembly	Seal	Op. Pres.	ST	VCA	3VIE	2VIE	TB	CA	PC	RID	Note	P'
22A														

Priority level

ST Output with compensator
VCA Accumulator charging valve
3VIE 3 Ways solenoid valve
2VIE 2 Ways solenoid valve
TB Output without compensator
CA Constant flow
PC Constant pressure
RID Pressure reducing valve (on 3VIE)

Note: _____

	Type	Setting (bar)	M1	M2	LS OUT	Note
MASTER	22A					

	Type	Setting (bar)	I1	I2	I3 dynamic	Note
ST	LSA					

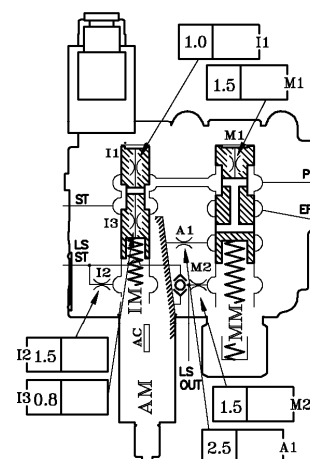
	Type	Setting (bar)	A1(flow)	Molla (AM)	Note
VCA	23A				

	Type	Setting (Volt)	Connector	Manual	Port R4	Note
3VIE	NAA					

	Type	Setting (Volt)	Connector	Manual	Note
2VIE	NCA				

	Type	Note
TB		

	Type	Setting ()	Note

Flow restrictors
positions

SAFIM part number N°:

	*1	*2	/	13
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The CUSTOMER code no. for the group selected is: _____

Compiling signature _____

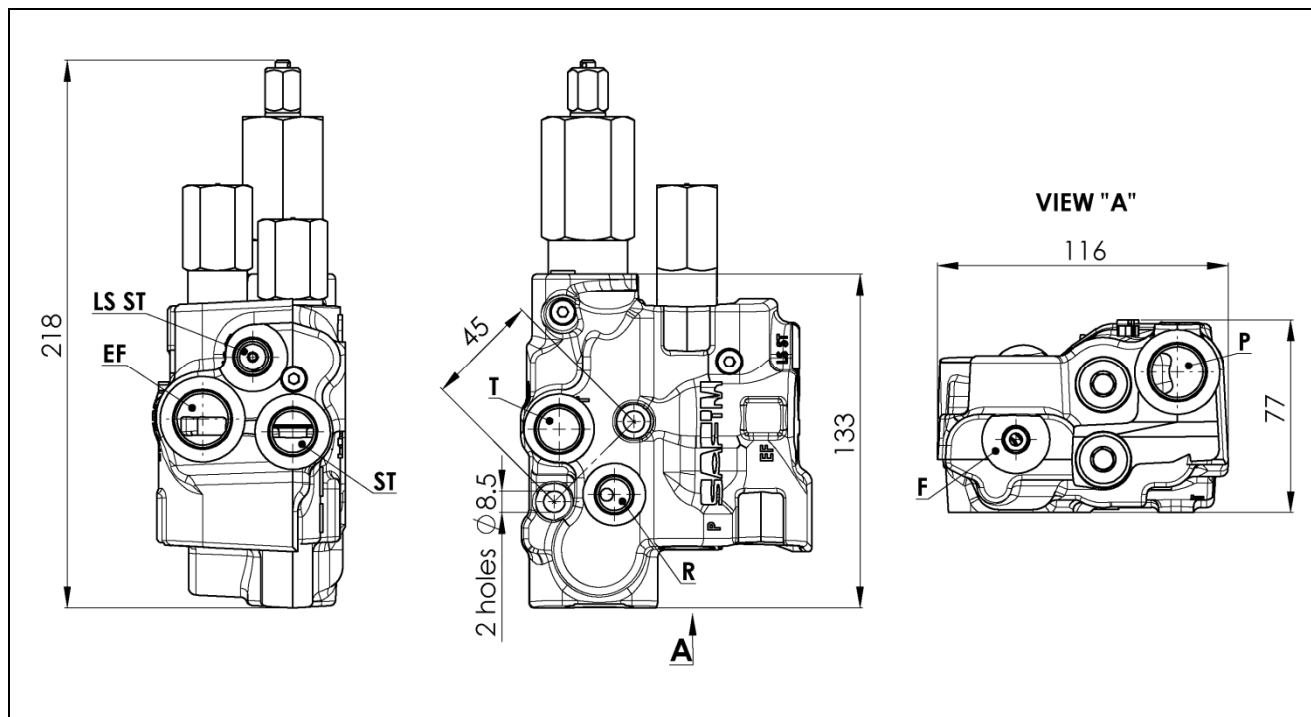
Approval signature (DIR) _____

Examining signature (MON) _____

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cod. 404401

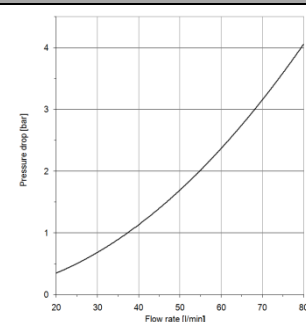
Steering Compensator / Charging Valve / Exceeding Flow



CONNECTIONS

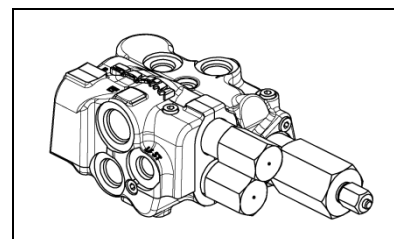
		I	S
P	Feeding from pump	M22x1.5 ISO 6149	7/8-14 SAE#10
ST	Steering	M18x1.5 ISO 6149	3/4-16 SAE#8
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M22x1.5 ISO 6149	7/8-14 SAE#10
T	Tank	M18x1.5 ISO 6149	3/4-16 SAE#8

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	80 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm2/s (cSt)
Filtration degree	NAS 1638 class 9



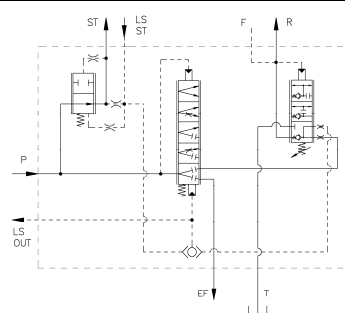
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404401 I L - 120

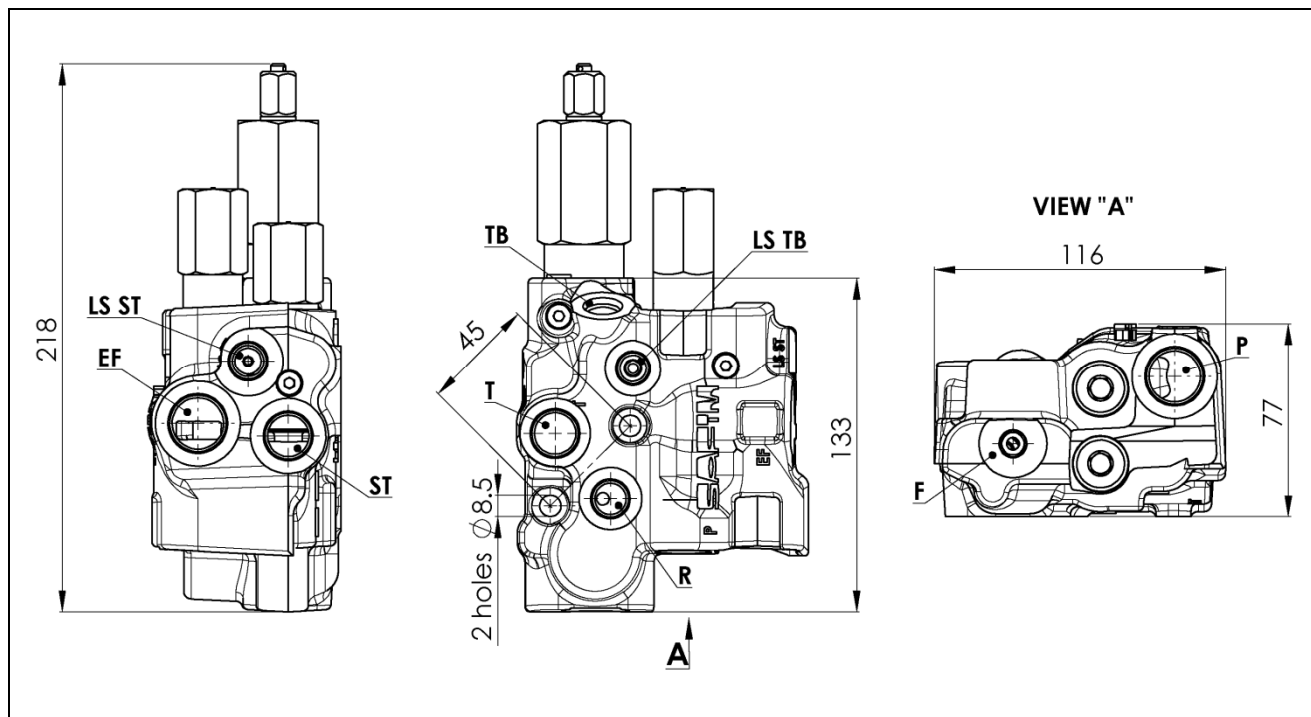
Charging Valve Cut-in pressure (pag.010.060)

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

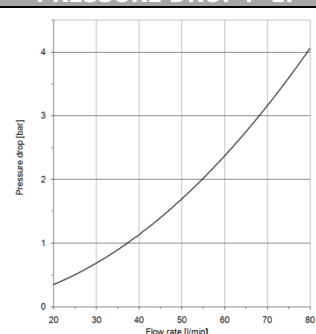
HYDRAULIC SCHEMATIC



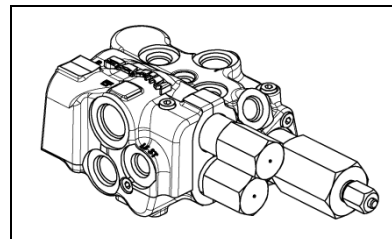
cod. 404402

Steering Compensator / Charging Valve - Trailer Brake / Exceeding Flow**CONNECTIONS**

		I	S
P	Feeding from pump	M22x1.5 ISO 6149	7/8-14 SAE#10
ST	Steering	M18x1.5 ISO 6149	3/4-16 SAE#8
LS ST	Load sensing from steering	M12x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M22x1.5 ISO 6149	7/8-14 SAE#10
T	Tank	M18x1.5 ISO 6149	3/4-16 SAE#8
TB	Trailer Brake feeding	M18x1.5 ISO 6149	3/4-16 SAE#8
LS TB	L.S. from Trailer Brake	M12x1.5 ISO 6149	9/16-18 SAE#6

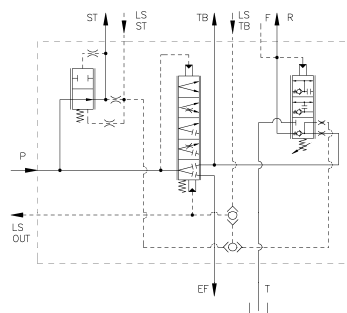
PRESSURE DROP P-EF**TECHNICAL FEATURES**

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	80 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm ² /s (cSt)
Filtration degree	NAS 1638 class 9

**ORDER PART NUMBER****404402 I L - 120**

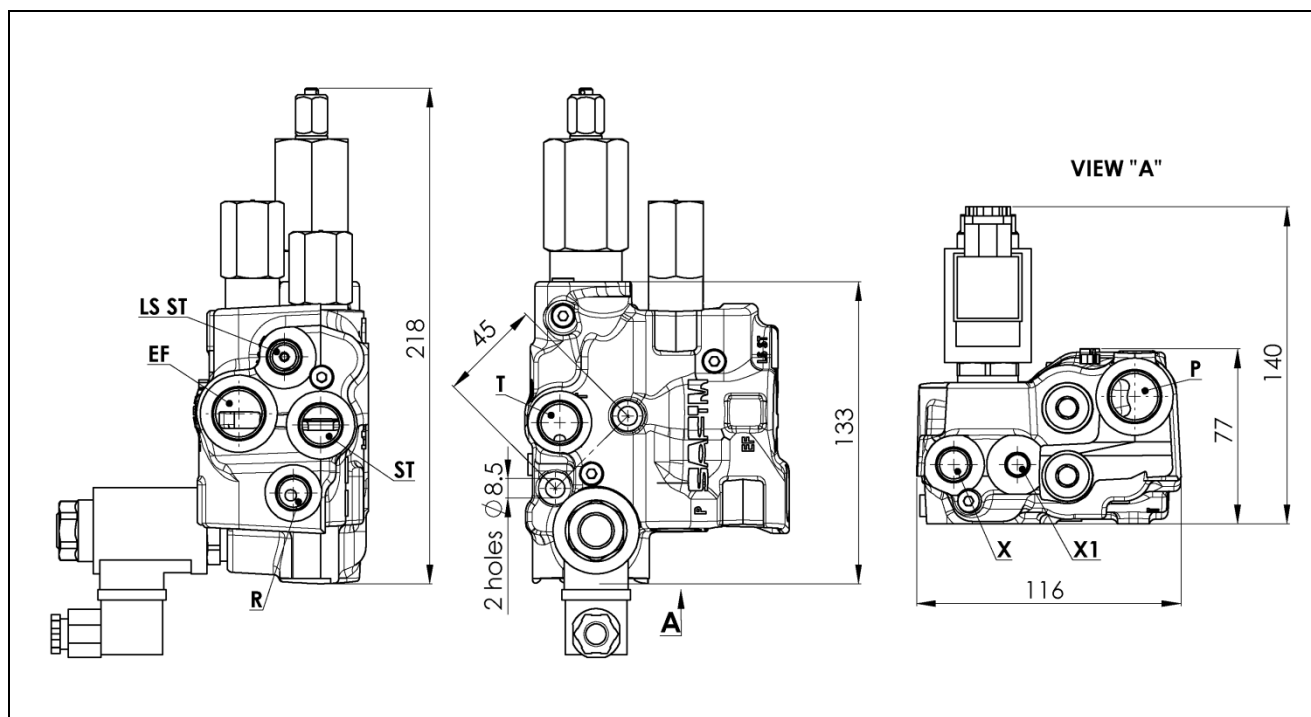
Charging Valve Cut-in pressure (pag.010.060)

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC

cod. 404403

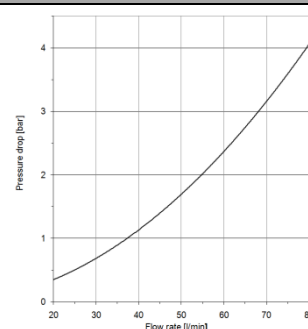
Steering Compensator / Charging Valve - Parking Brake / Exceeding Flow



CONNECTIONS

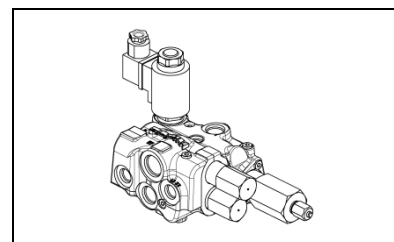
		I	S
P	Feeding from pump	M22x1.5 ISO 6149	7/8-14 SAE#10
ST	Steering	M18x1.5 ISO 6149	3/4-16 SAE#8
LS ST	Load sensing from steering	M12x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M22x1.5 ISO 6149	7/8-14 SAE#10
T	Tank	M18x1.5 ISO 6149	3/4-16 SAE#8
X	Parking Brake	M14x1.5 ISO 6149	9/16-18 SAE#6
X1	Parking brake pressure switch	M10x1 ISO 6149	7/16-20 SAE#4

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	80 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm ² /s (cSt)
Filtration degree	NAS 1638 class 9



ORDER PART NUMBER

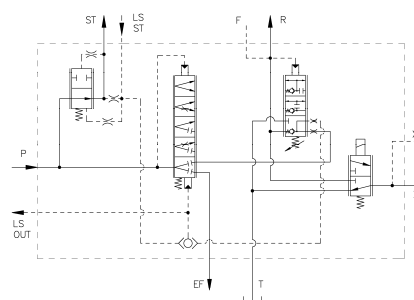
404403 I L / 0 - 60

 Charging valve
Cut-in pressure
(pag. 010.060)

0	Solenoid 12V
3	Solenoid 27V

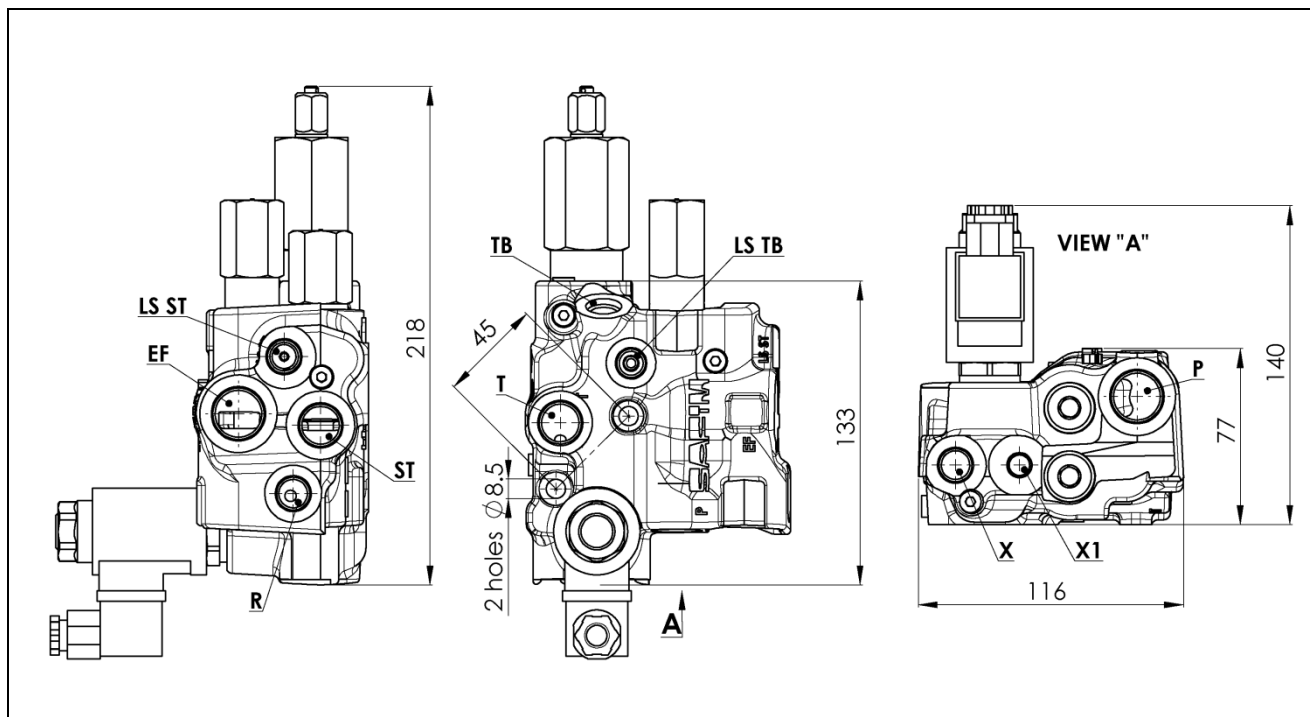
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S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC



cod. 404404

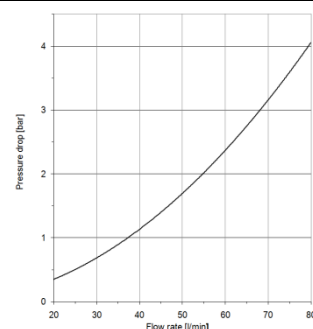
Steering Compensator / Charging Valve - Parking Brake - Trailer Brake / Exceeding Flow



CONNECTIONS

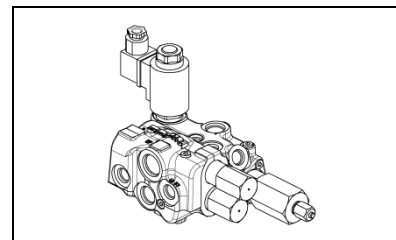
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P	Feeding from pump	M22x1.5 ISO 6149	7/8-14 SAE#10
ST	Steering	M18x1.5 ISO 6149	3/4-16 SAE#8
LS ST	Load sensing from steering	M12x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M22x1.5 ISO 6149	7/8-14 SAE#10
T	Tank	M18x1.5 ISO 6149	3/4-16 SAE#8
X	Parking Brake	M14x1.5 ISO 6149	9/16-18 SAE#6
X1	Parking brake pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
TB	Feeding for Trailer Brake	M18x1.5 ISO 6149	3/4-16 SAE#8
LS TB	L.S. from Trailer Brake	M12x1.5 ISO 6149	9/16-18 SAE#6

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	80 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm2/s (cSt)
Filtration degree	NAS 1638 class 9



ORDER PART NUMBER

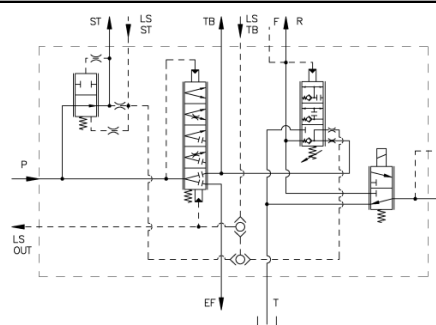
404404 | **I** | **L** / | **0** | **-** | **70**

 Charging valve
Cut-in pressure
(pag. 010.060)

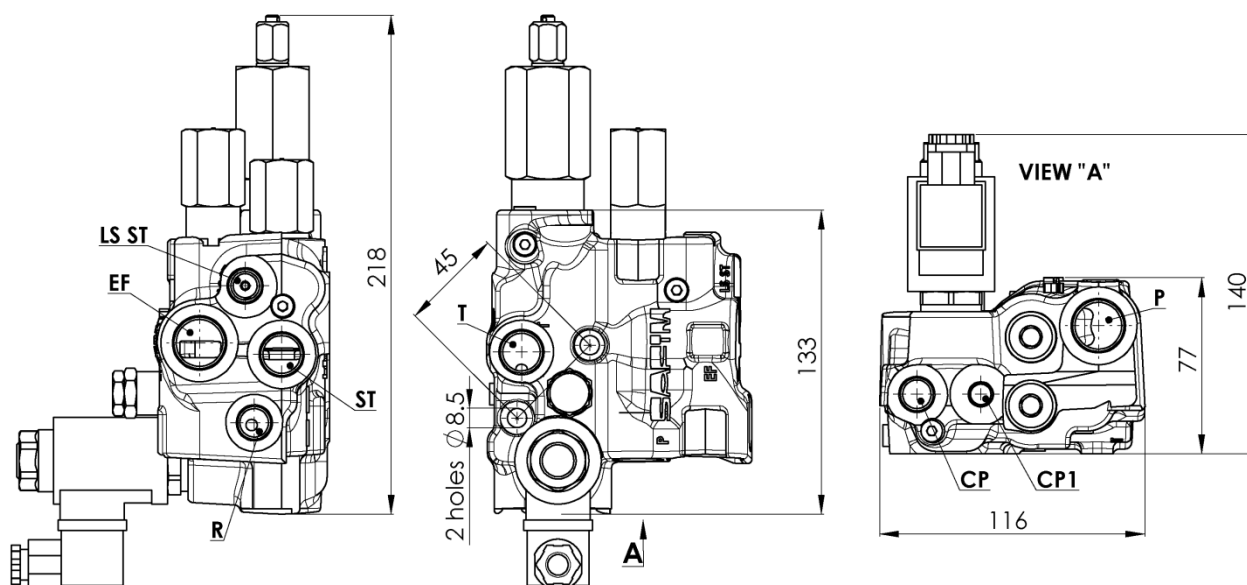
0	Solenoid 12V
3	Solenoid 27V

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC



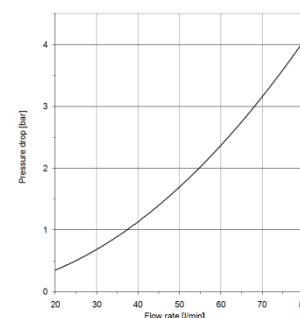
cod. 404405

**Steering Compensator / Charging Valve -
Parking Brake (Reduced Pressure) / Exceeding Flow**


CONNECTIONS

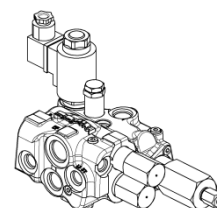
		I	S
P	Feeding from pump	M22x1.5 ISO 6149	7/8-14 SAE#10
ST	Steering	M18x1.5 ISO 6149	3/4-16 SAE#8
LS ST	Load sensing from steering	M12x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M22x1.5 ISO 6149	7/8-14 SAE#10
T	Tank	M18x1.5 ISO 6149	3/4-16 SAE#8
CP	Parking Brake (Reduced)	M14x1.5 ISO 6149	9/16-18 SAE#6
CP1	Parking brake pressure switch	M10x1 ISO 6149	7/16-20 SAE#4

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	80 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm ² /s (cSt)
Filtration degree	NAS 1638 class 9



ORDER PART NUMBER

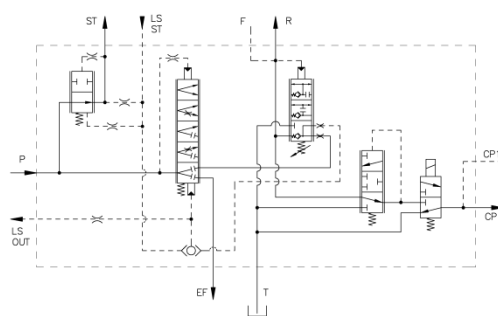
404405 S L / 3 - 120

 Charging valve
Cut-in pressure
(pag. 010.060)

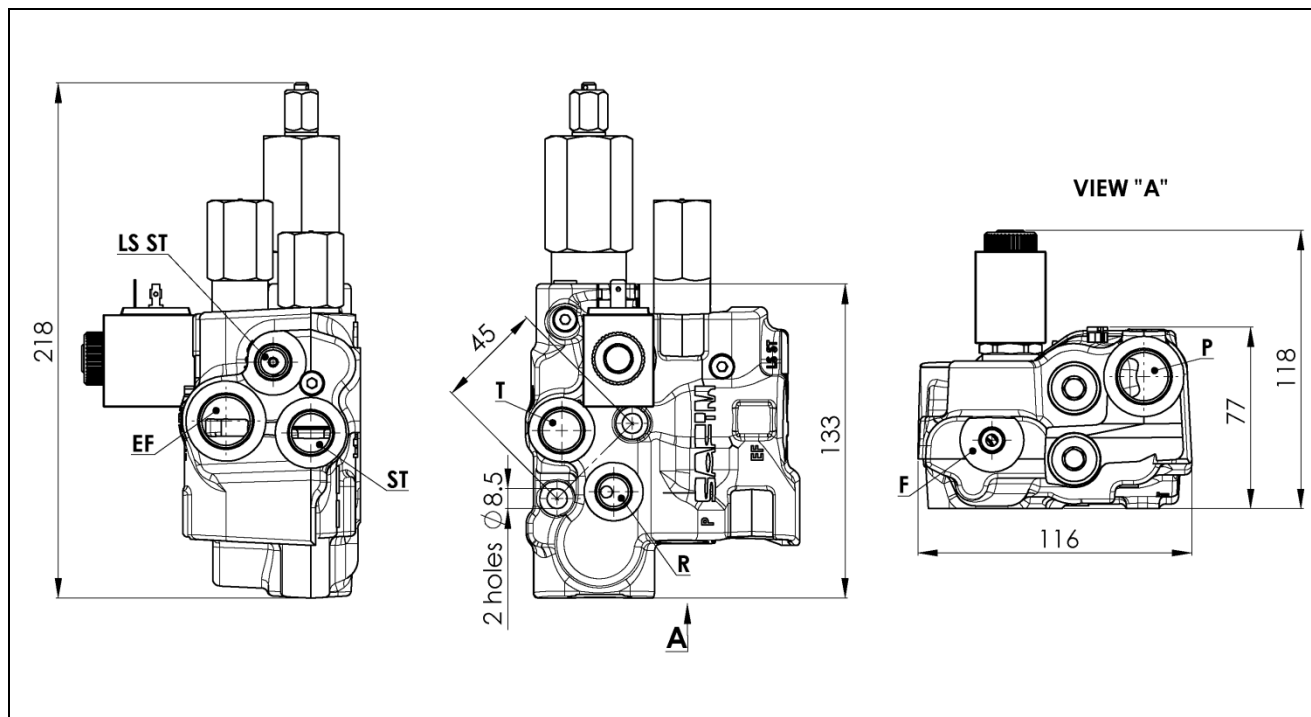
0	Solenoid 12V
3	Solenoid 27V

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

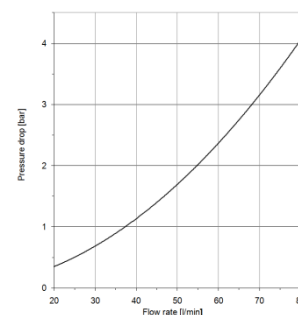
HYDRAULIC SCHEMATIC



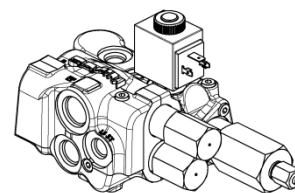
cod. 404406

Steering Compensator / Charging Valve with Start Unloading / Exceeding Flow**CONNECTIONS**

		I	S
P	Feeding from pump	M22x1.5 ISO 6149	7/8-14 SAE#10
ST	Steering	M18x1.5 ISO 6149	3/4-16 SAE#8
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M22x1.5 ISO 6149	7/8-14 SAE#10
T	Tank	M18x1.5 ISO 6149	3/4-16 SAE#8

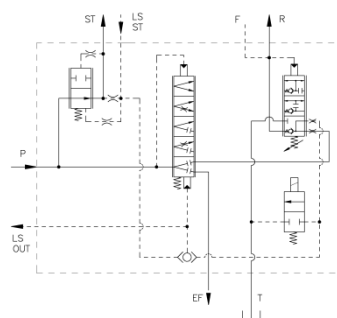
PRESSURE DROP P-EF**TECHNICAL FEATURES**

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	80 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm ² /s (cSt)
Filtration degree	NAS 1638 class 9

**ORDER PART NUMBER****404406 I L / 0 - 100**Charging valve
Cut-in pressure
(pag. 010.060)

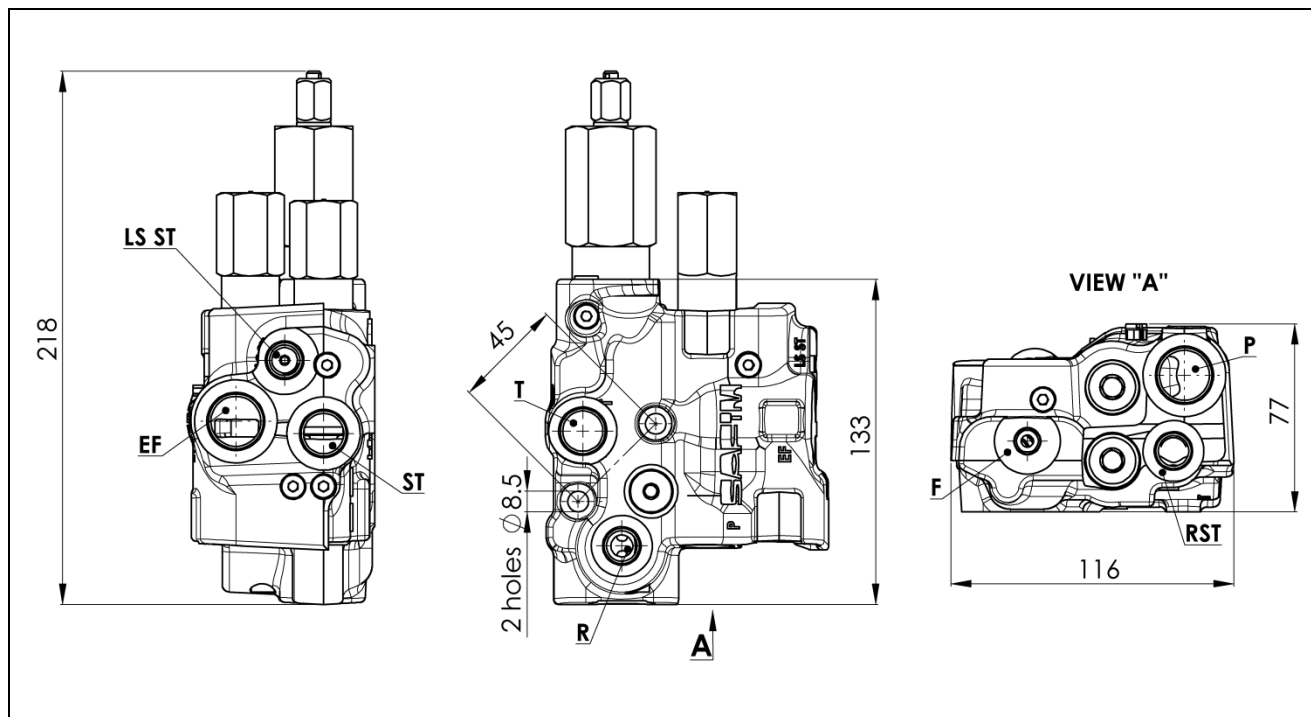
0	Solenoid 12V
3	Solenoid 27V

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC

cod. 404407

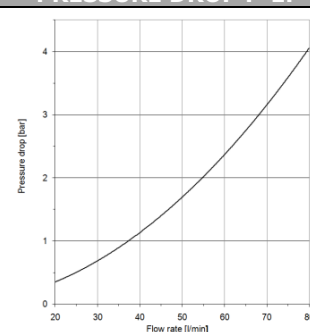
Steering Compensator with Emergency Accumulator / Charging Valve / Exceeding Flow



CONNECTIONS

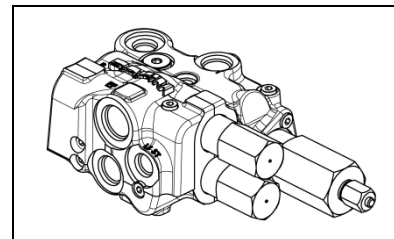
		I	S
P	Feeding from pump	M22x1.5 ISO 6149	7/8-14 SAE#10
ST	Steering	M18x1.5 ISO 6149	3/4-16 SAE#8
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M22x1.5 ISO 6149	7/8-14 SAE#10
T	Tank	M18x1.5 ISO 6149	3/4-16 SAE#8
RST	Steering accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	80 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm ² /s (cSt)
Filtration degree	NAS 1638 class 9



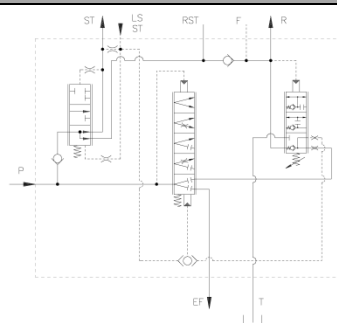
ORDER PART NUMBER

404407 I L - 120

 Charging Valve Cut-in
pressure (pag.010.060)

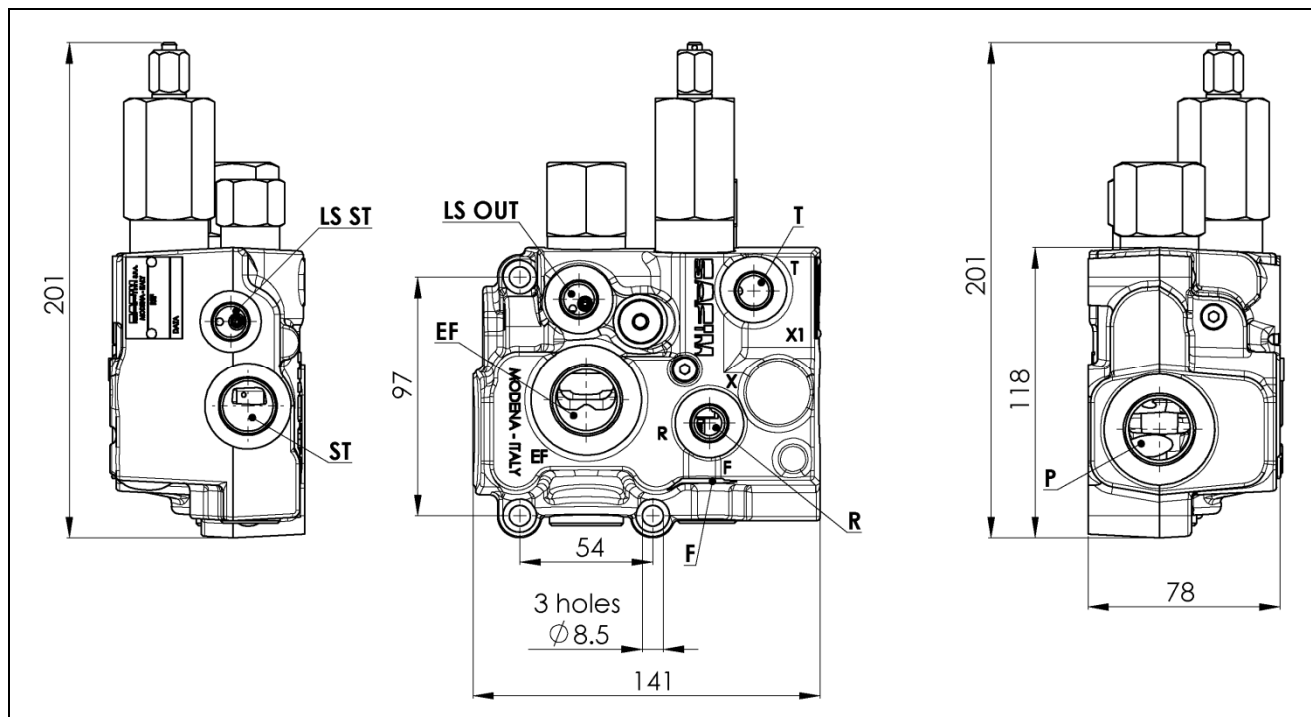
I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC



cod. 403048

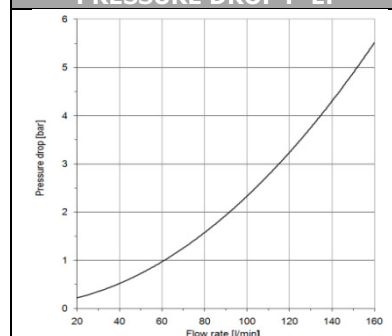
Steering Compensator / Charging Valve / Exceeding Flow



CONNECTIONS

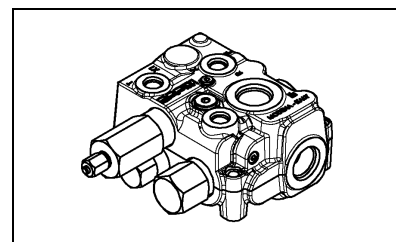
		I	S
P	Feeding from pump	M27x2 ISO 6149	1"1/16-12 SAE#12
LS OUT	Load sensing to pump	M14x1.5 ISO 6149	9/16-18 SAE#6
ST	Steering	M22x1.5 ISO 6149	7/8-14 SAE#10
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M27x2 ISO 6149	1"1/16-12 SAE#12
T	Tank	M14x1.5 ISO 6149	9/16-18 SAE#6

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	160 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm ² /s (cSt)
Filtration degree	NAS 1638 class 9



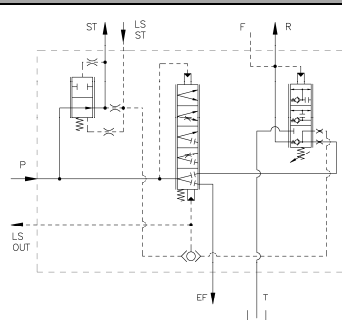
ORDER PART NUMBER

403048 I L - 120

Charging Valve Cut-in pressure (pag.010.060)

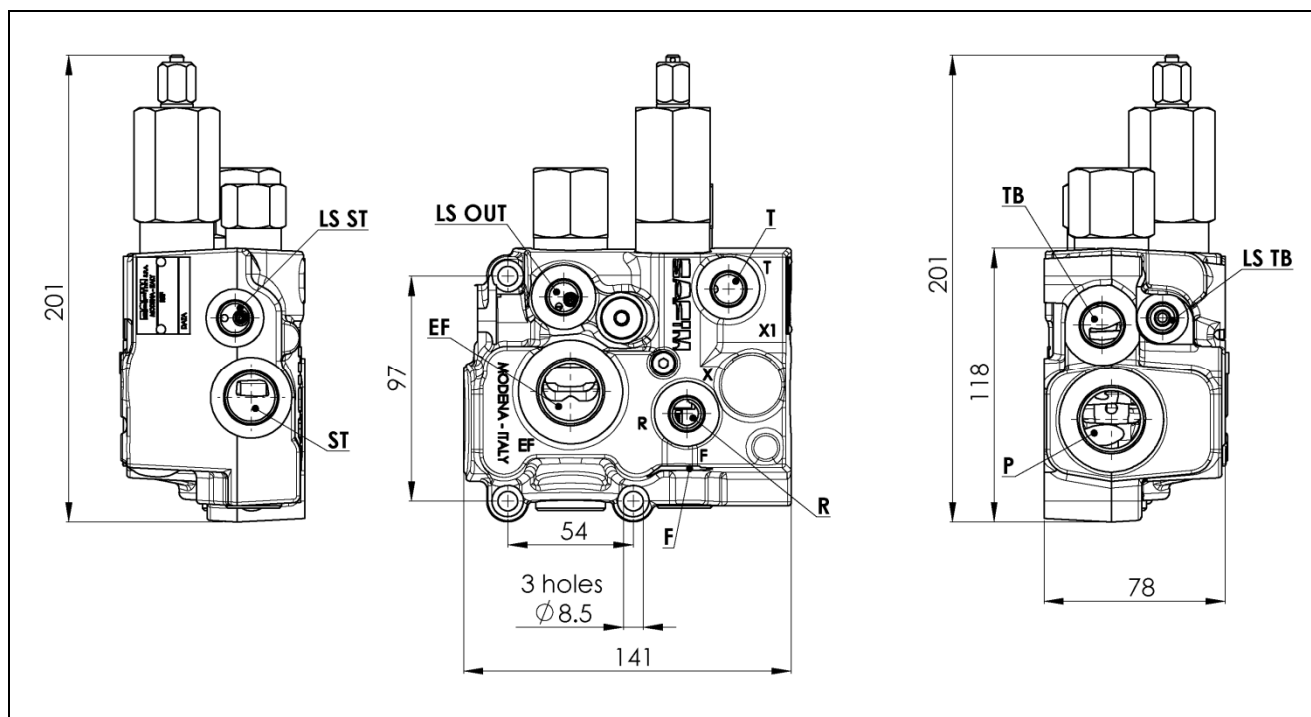
I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC



cod. 403049

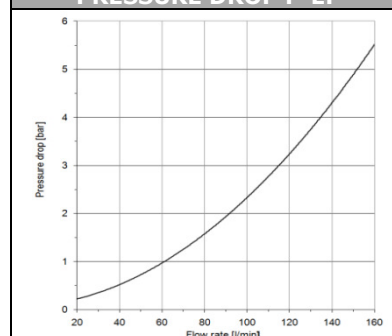
Steering Compensator / Charging Valve - Trailer Brake / Exceeding Flow



CONNECTIONS

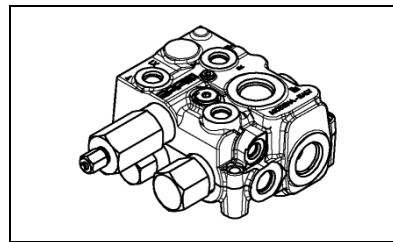
		I	S
P	Feeding from pump	M27x2 ISO 6149	1"1/16-12 SAE#12
LS OUT	Load sensing to pump	M14x1.5 ISO 6149	9/16-18 SAE#6
ST	Steering	M22x1.5 ISO 6149	7/8-14 SAE#10
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M27x2 ISO 6149	1"1/16-12 SAE#12
T	Tank	M14x1.5 ISO 6149	9/16-18 SAE#6
TB	Trailer Brake feeding	M18x1.5 ISO 6149	3/4-16 SAE#8
LS TB	L.S. from Trailer Brake	M12x1.5 ISO 6149	9/16-18 SAE#6

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	160 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm2/s (cSt)
Filtration degree	NAS 1638 class 9



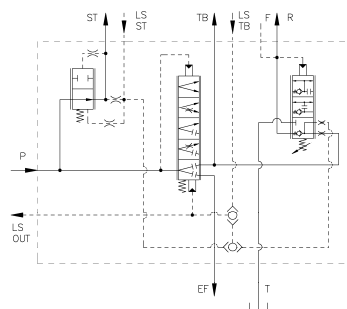
ORDER PART NUMBER

403049 I L - 60

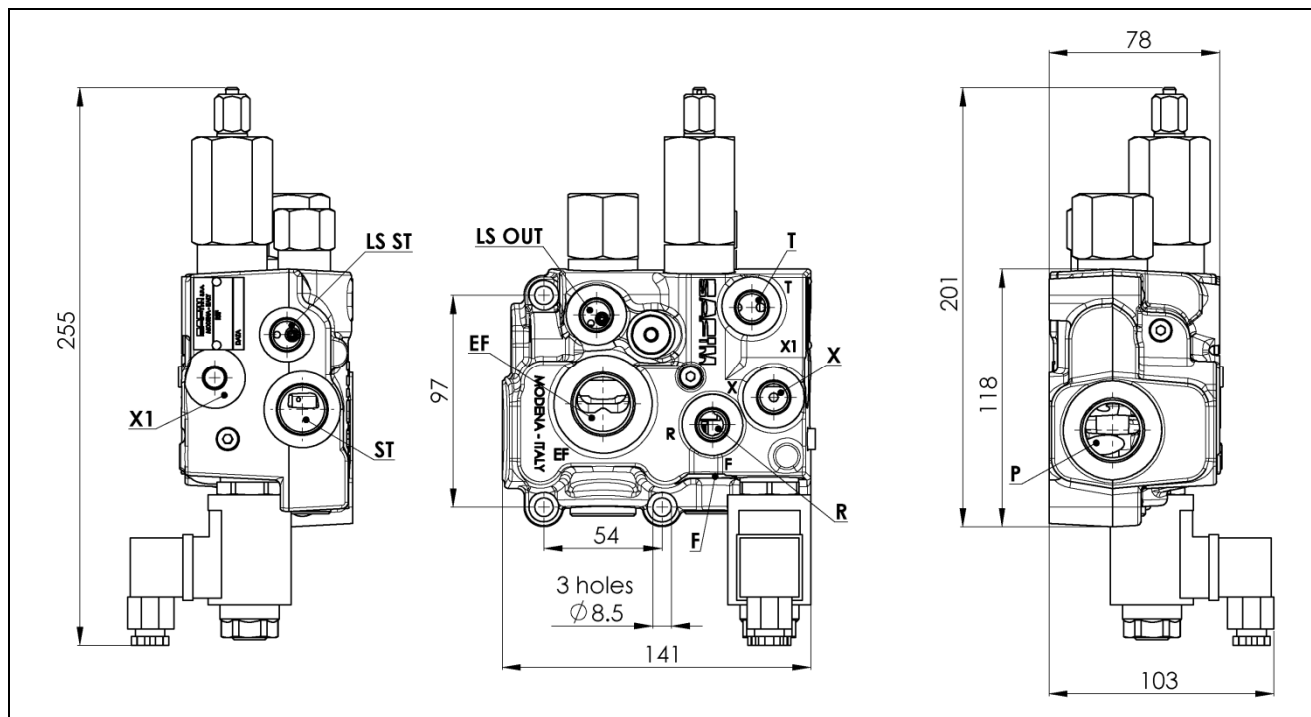
Charging Valve Cut-in pressure (pag.010.060)

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

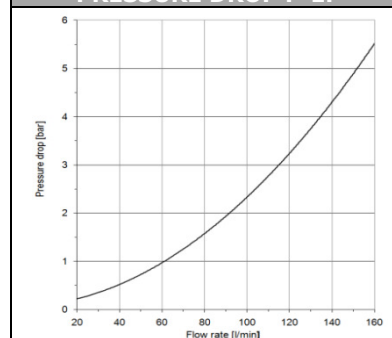
HYDRAULIC SCHEMATIC



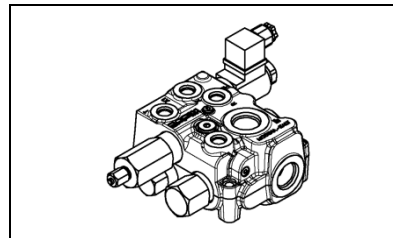
cod. 402843

Steering Compensator / Charging Valve - Parking Brake / Exceeding Flow**CONNECTIONS**

		I	S
P	Feeding from pump	M27x2 ISO 6149	1"1/16-12 SAE#12
LS OUT	Load sensing to pump	M14x1.5 ISO 6149	9/16-18 SAE#6
ST	Steering	M22x1.5 ISO 6149	7/8-14 SAE#10
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M27x2 ISO 6149	1"1/16-12 SAE#12
T	Tank	M14x1.5 ISO 6149	9/16-18 SAE#6
X	Parking Brake	M14x1.5 ISO 6149	9/16-18 SAE#6
X1	Parking brake pressure switch	M10x1 ISO 6149	7/16-20 SAE#4

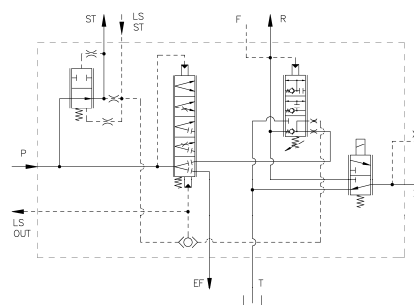
PRESSURE DROP P-EF**TECHNICAL FEATURES**

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	160 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm2/s (cSt)
Filtration degree	NAS 1638 class 9

**ORDER PART NUMBER****402843 I L / 0 - 90**Charging valve
Cut-in pressure
(pag. 010.060)

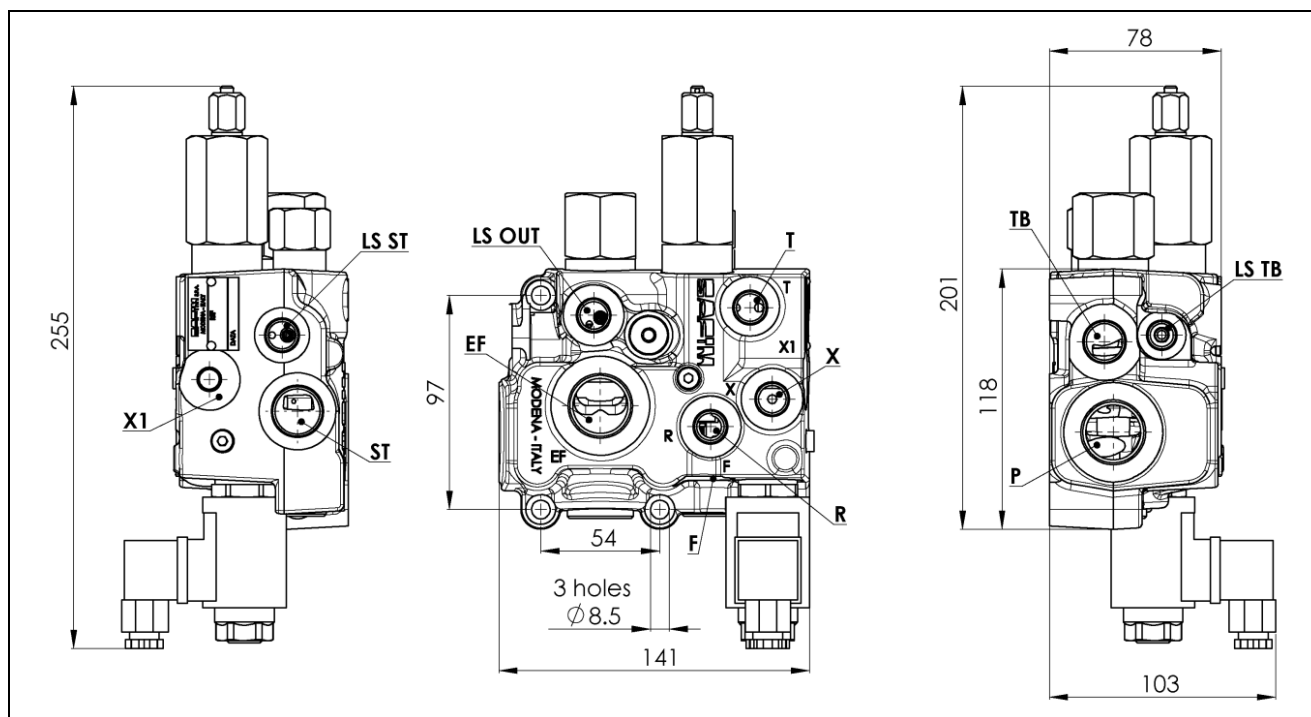
0	Solenoid 12V
3	Solenoid 27V

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC

cod. 403050

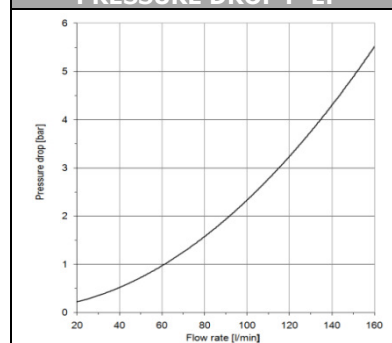
Steering Compensator / Charging Valve - Parking Brake - Trailer Brake / Exceeding Flow



CONNECTIONS

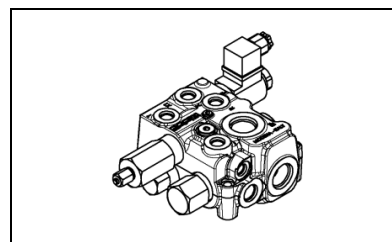
		I	S
P	Feeding from pump	M27x2 ISO 6149	1"1/16-12 SAE#12
LS OUT	Load sensing to pump	M14x1.5 ISO 6149	9/16-18 SAE#6
ST	Steering	M22x1.5 ISO 6149	7/8-14 SAE#10
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M27x2 ISO 6149	1"1/16-12 SAE#12
T	Tank	M14x1.5 ISO 6149	9/16-18 SAE#6
X	Parking Brake	M14x1.5 ISO 6149	9/16-18 SAE#6
X1	Parking brake pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
TB	Feeding for Trailer Brake	M18x1.5 ISO 6149	3/4-16 SAE#8
LS TB	L.S. from Trailer Brake	M12x1.5 ISO 6149	9/16-18 SAE#6

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	160 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm2/s (cSt)
Filtration degree	NAS 1638 class 9



ORDER PART NUMBER

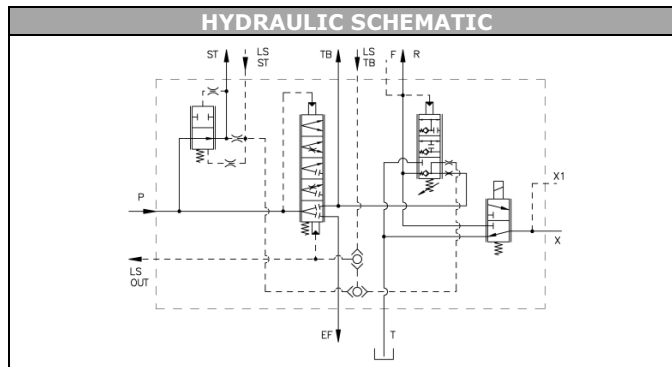
403050 | **I** | **L** | **/** | **0** | **-** | **80**

 Charging valve
Cut-in pressure
(pag. 010.060)

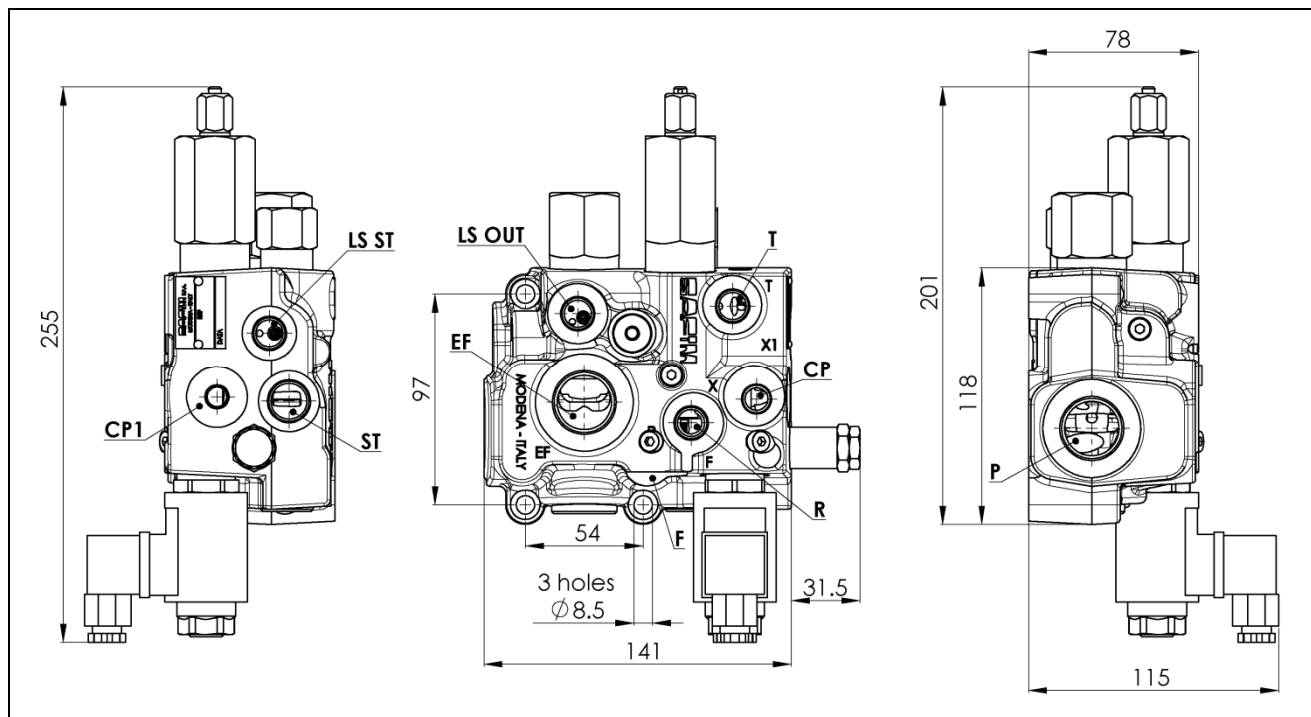
0	Solenoid 12V
3	Solenoid 27V

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC



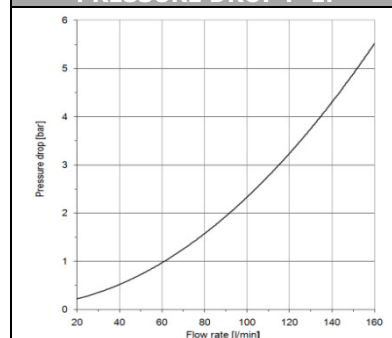
cod. 404214

**Steering Compensator / Charging Valve -
Parking Brake (Reduced Pressure) / Exceeding Flow**


CONNECTIONS

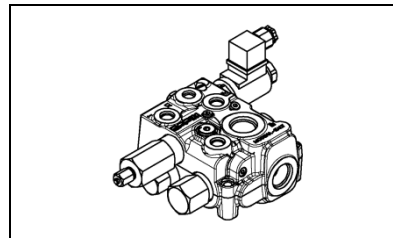
		I	S
P	Feeding from pump	M27x2 ISO 6149	1"1/16-12 SAE#12
LS OUT	Load sensing to pump	M14x1.5 ISO 6149	9/16-18 SAE#6
ST	Steering	M22x1.5 ISO 6149	7/8-14 SAE#10
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M27x2 ISO 6149	1"1/16-12 SAE#12
T	Tank	M14x1.5 ISO 6149	9/16-18 SAE#6
CP	Parking Brake (Reduced)	M14x1.5 ISO 6149	9/16-18 SAE#6
CP1	Parking brake pressure switch	M10x1 ISO 6149	7/16-20 SAE#4

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	160 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm ² /s (cSt)
Filtration degree	NAS 1638 class 9



ORDER PART NUMBER

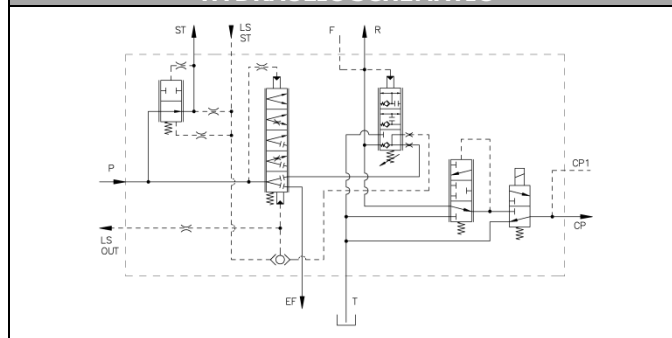
404214 S L / 3 - 120

Charging valve
Cut-in pressure
(pag. 010.060)

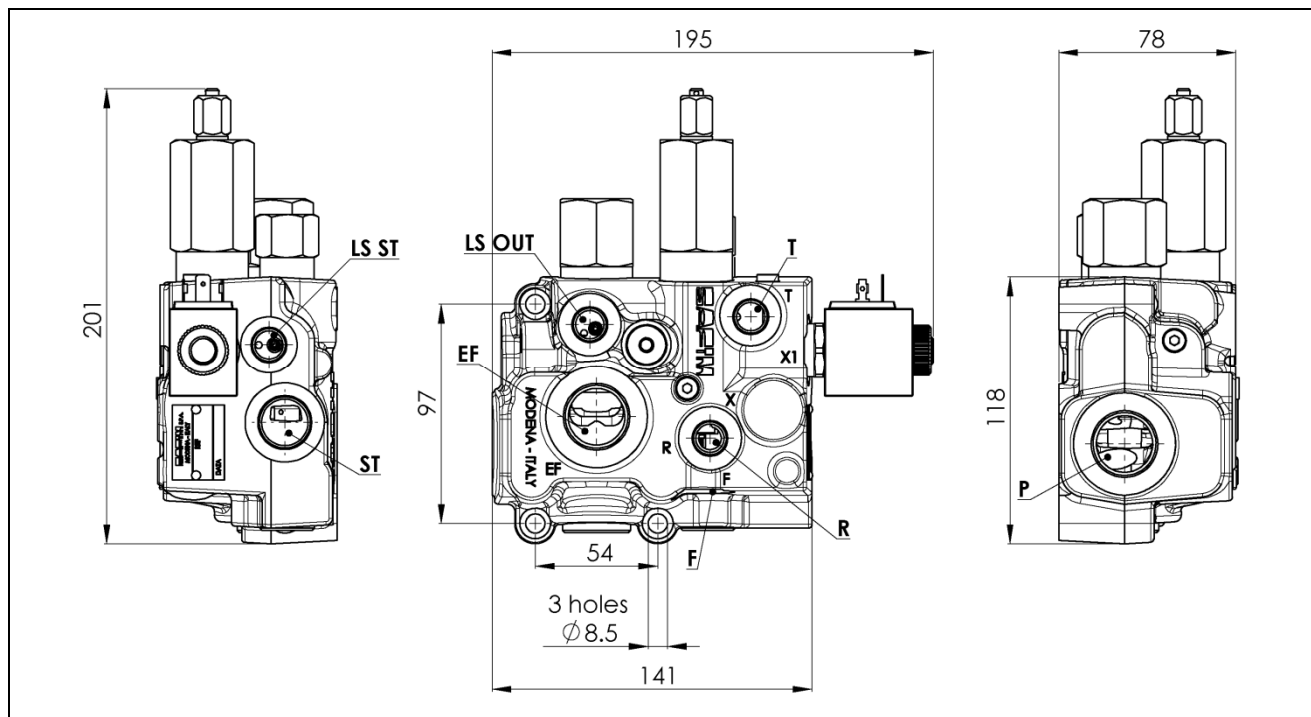
0	Solenoid 12V
3	Solenoid 27V

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

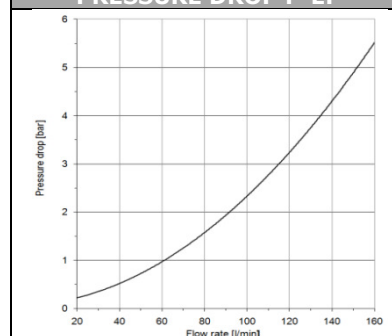
HYDRAULIC SCHEMATIC



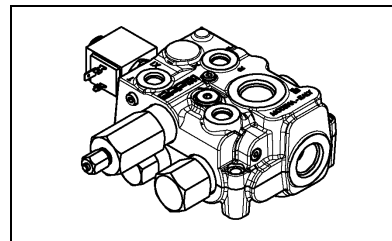
cod. 404020

Steering Compensator / Charging Valve with Start Unloading / Exceeding Flow**CONNECTIONS**

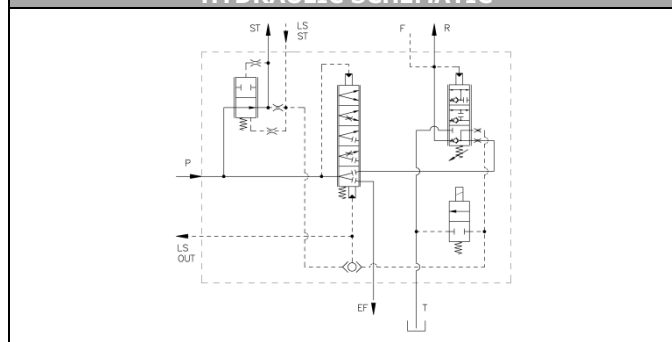
		I	S
P	Feeding from pump	M27x2 ISO 6149	1"1/16-12 SAE#12
LS OUT	Load sensing to pump	M14x1.5 ISO 6149	9/16-18 SAE#6
ST	Steering	M22x1.5 ISO 6149	7/8-14 SAE#10
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M27x2 ISO 6149	1"1/16-12 SAE#12
T	Tank	M14x1.5 ISO 6149	9/16-18 SAE#6

PRESSURE DROP P-EF**TECHNICAL FEATURES**

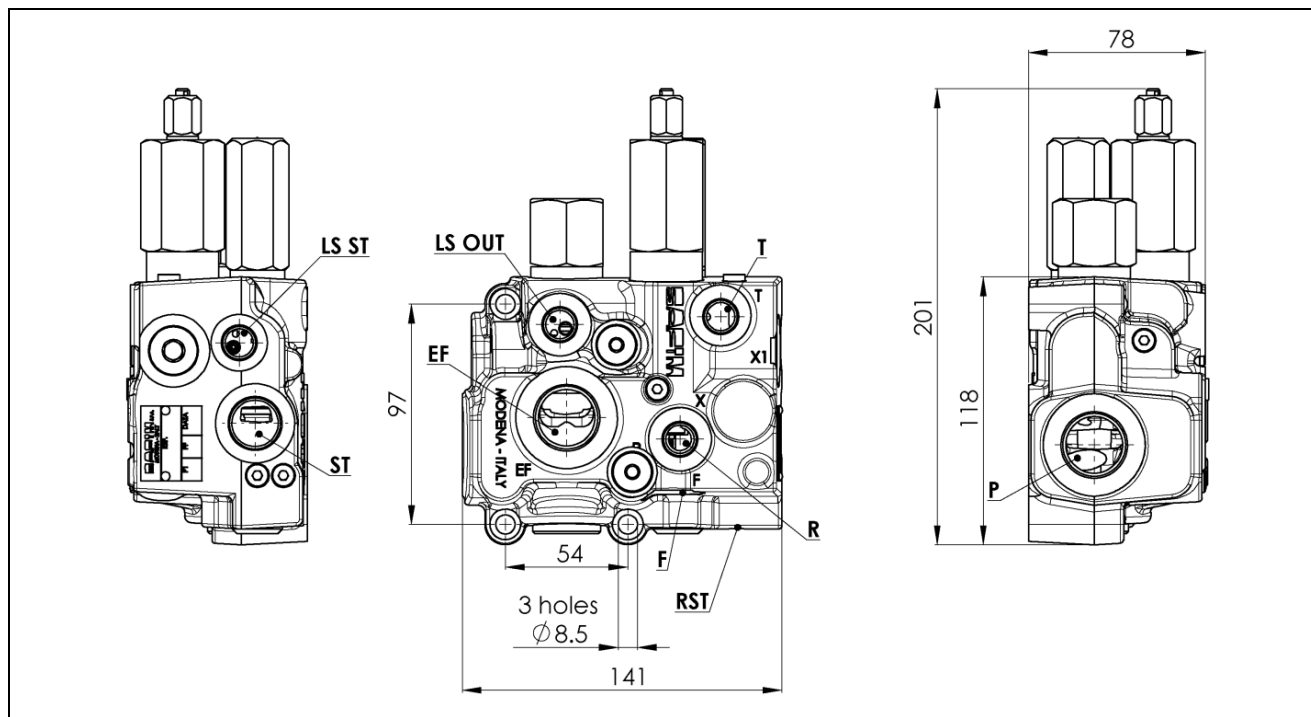
Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	160 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm2/s (cSt)
Filtration degree	NAS 1638 class 9

**ORDER PART NUMBER**

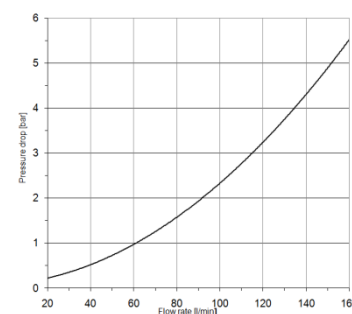
404020	I	L	/	0	-	100
						Charging valve Cut-in pressure (pag. 010.060)
				0		Solenoid 12V
				3		Solenoid 27V
I	ISO ports (see connections' table)					
S	SAE ports (see connections' table)					

HYDRAULIC SCHEMATIC

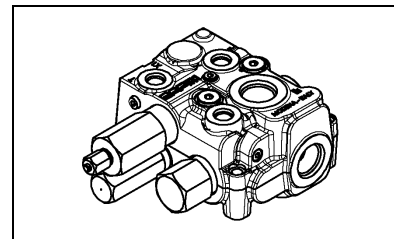
cod. 404021

**Steering Compensator with Emergency Accumulator /
Charging Valve / Exceeding Flow****CONNECTIONS**

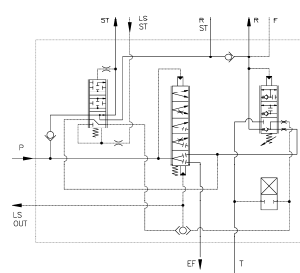
		I	S
P	Feeding from pump	M27x2 ISO 6149	1"1/16-12 SAE#12
LS OUT	Load sensing to pump	M14x1.5 ISO 6149	9/16-18 SAE#6
ST	Steering	M22x1.5 ISO 6149	7/8-14 SAE#10
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
F	Accumulator pressure switch	M10x1 ISO 6149	7/16-20 SAE#4
EF	Exceeding Flow	M27x2 ISO 6149	1"1/16-12 SAE#12
T	Tank	M14x1.5 ISO 6149	9/16-18 SAE#6
RST	Steering accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6

PRESSURE DROP P-EF**TECHNICAL FEATURES**

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	160 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm2/s (cSt)
Filtration degree	NAS 1638 class 9

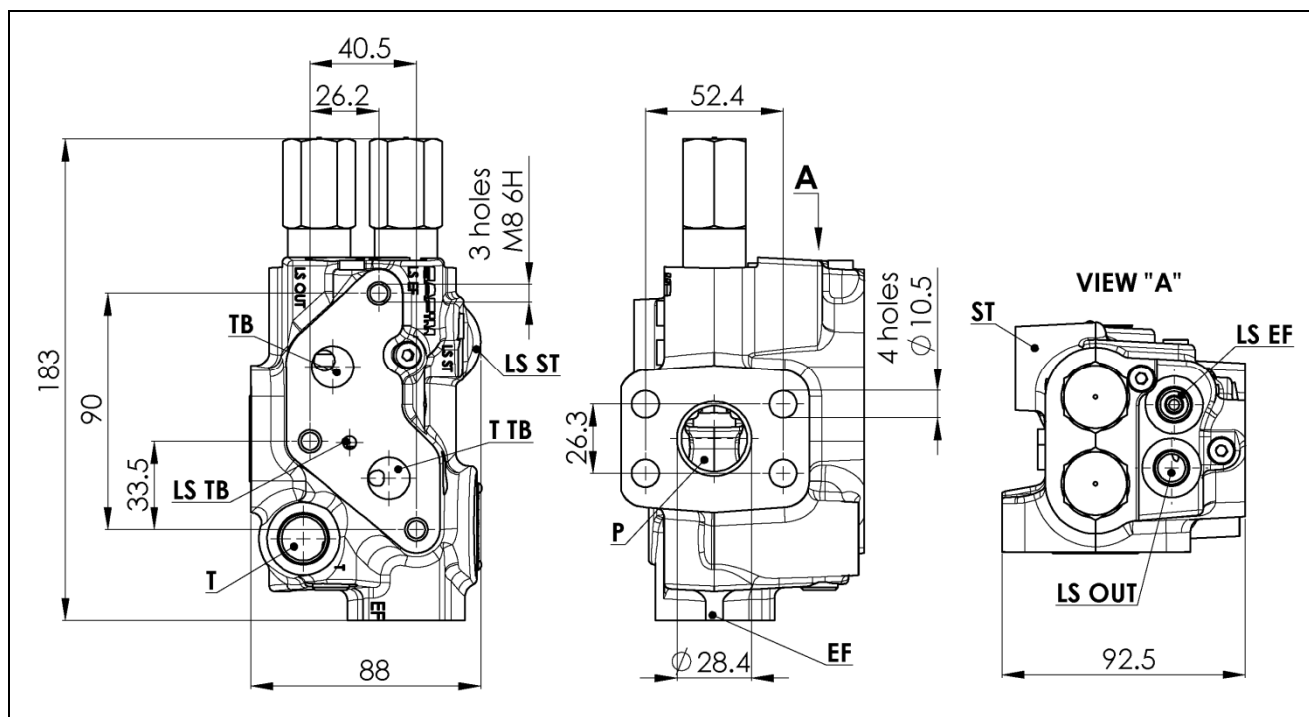
**ORDER PART NUMBER****404021 I L - 120**Charging Valve Cut-in
pressure (pag.010.060)

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC

cod. 404806

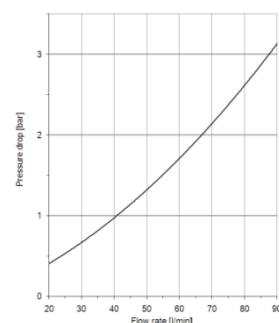
Steering Compensator / Trailer Brake / Exceeding Flow



CONNECTIONS

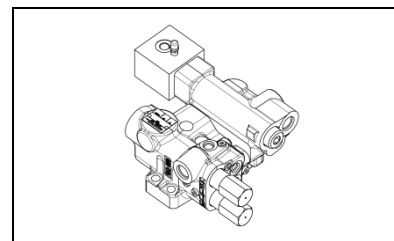
		I	S
P	Feeding from pump	Flanged SAE 1"	Flanged SAE 1"
LS OUT	Load sensing to pump	M12x1.5 ISO 6149	9/16-18 SAE#6
ST	Steering	M18x1.5 ISO 6149	3/4-16 SAE#8
LS ST	Load sensing from steering	M12x1.5 ISO 6149	9/16-18 SAE#6
TB	Trailer Brake feeding	Flanged	Flanged
LS TB	L.S. from Trailer Brake	Flanged	Flanged
EF	Exceeding Flow	M27x2 ISO 6149	1"1/16-12 SAE#12
LS EF	L.S. from exceeding flow	M12x1.5 ISO 6149	9/16-18 SAE#6
T TB	Trailer Brake Tank	Flanged	Flanged
T	Tank	M14x1.5 ISO 6149	9/16-18 SAE#6

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	140 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm2/s (cSt)
Filtration degree	NAS 1638 class 9

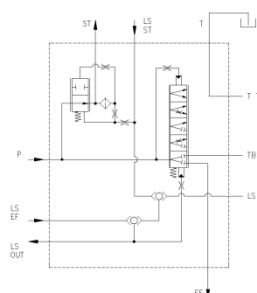


ORDER PART NUMBER

404806 I F

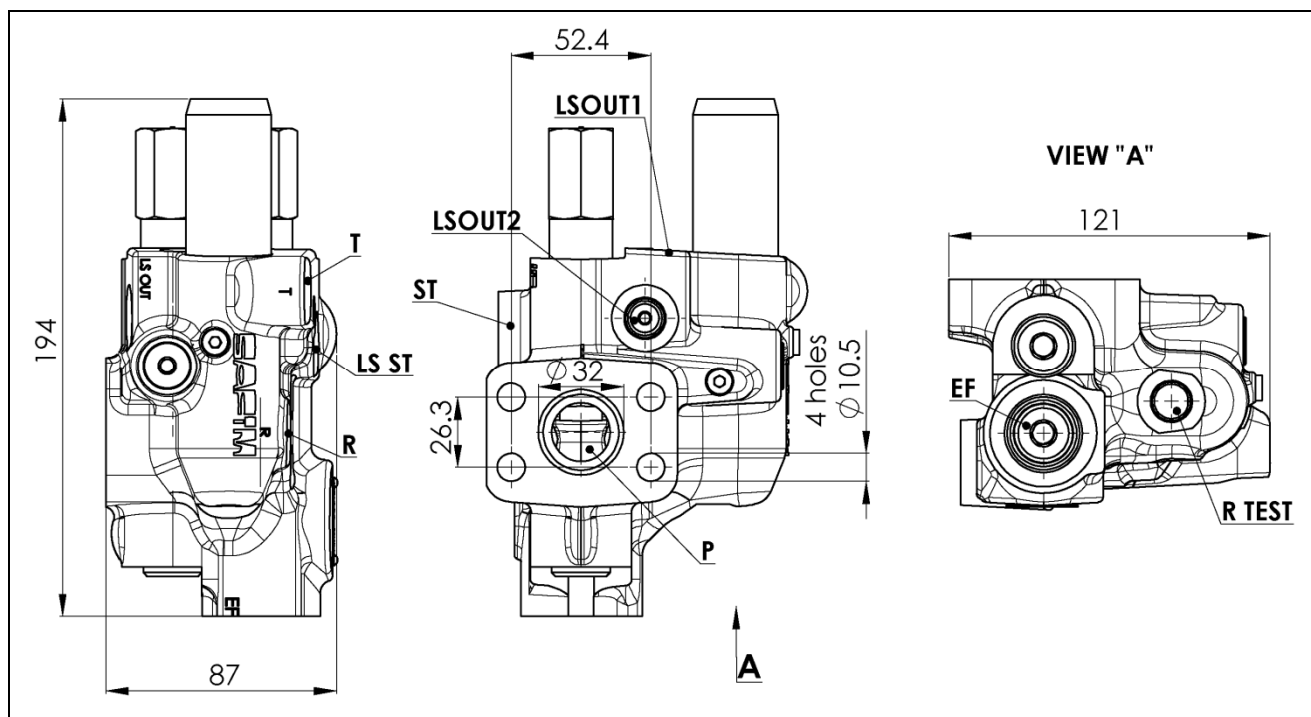
I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

HYDRAULIC SCHEMATIC



cod. 404809

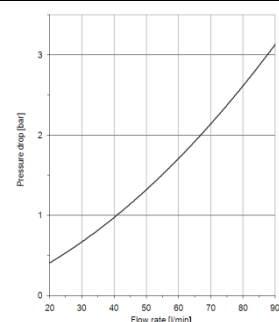
Steering Compensator / Charging Valve / Exceeding Flow



CONNECTIONS

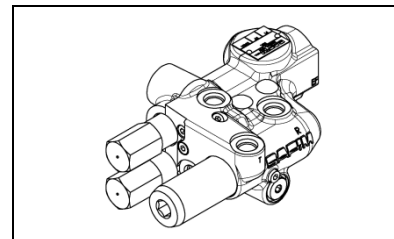
		I	S
P	Feeding from pump	Flanged SAE 1"	Flanged SAE 1"
LSOUT1	Load sensing to pump	M12x1.5 ISO 6149	9/16-18 SAE#6
LSOUT2	Load sensing to pump	M12x1.5 ISO 6149	9/16-18 SAE#6
ST	Steering	M18x1.5 ISO 6149	3/4-16 SAE#8
LS ST	Load sensing from steering	M14x1.5 ISO 6149	9/16-18 SAE#6
R	Accumulator	M14x1.5 ISO 6149	9/16-18 SAE#6
R-TEST	Accumulator diagnostic	M14x1.5 ISO 6149	9/16-18 SAE#6
EF	Exceeding Flow	M27x2 ISO 6149	1"1/16-12 SAE#12
T	Tank	M14x1.5 ISO 6149	9/16-18 SAE#6

PRESSURE DROP P-EF



TECHNICAL FEATURES

Max operating pressure in P port	250 bar
Working Temperature	-20 / +100 °C
Max feed flow	140 l/min
Accumulator charging valve cut-in range setting	30 - 160 bar
Hydraulic Fluid	Mineral Oil
Viscosity range	From 10 to 380 mm ² /s (cSt)
Filtration degree	NAS 1638 class 9



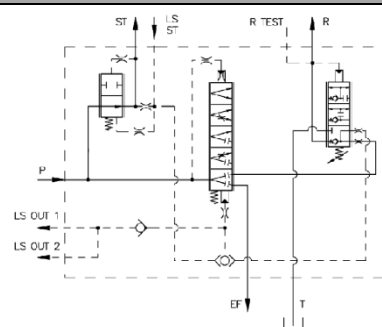
ORDER PART NUMBER

404809 I F - 120

Charging Valve Cut-in pressure (pag.010.060)

I	ISO ports (see connections' table)
S	SAE ports (see connections' table)

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