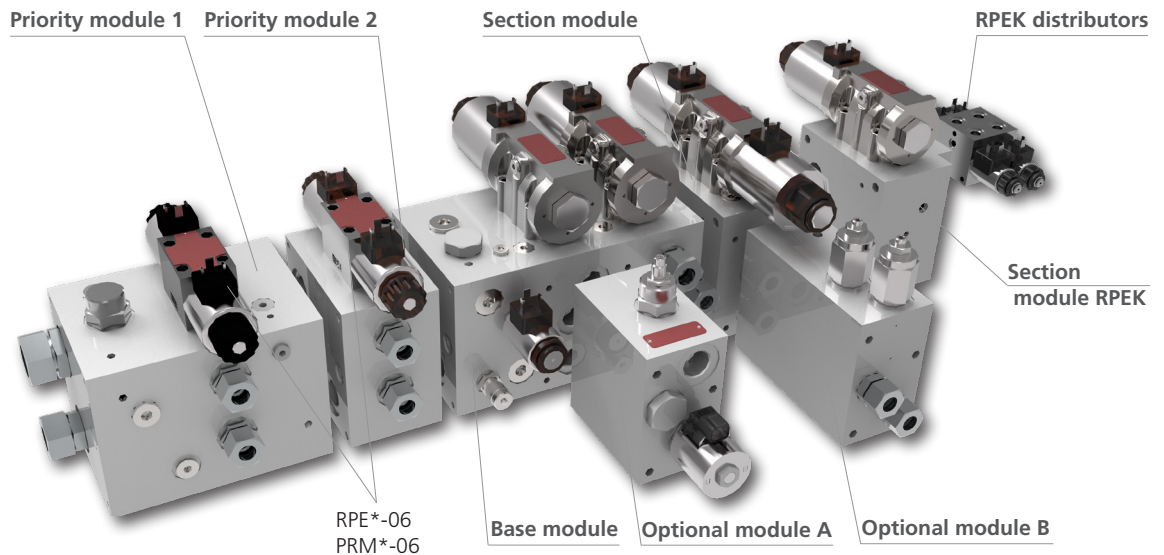


Possible Applications

Technical Features

- › Modular manifold system for the work hydraulics in mobile machines
- › Designed to the complex and variable demands of mobile hydraulics needs
- › Modular concept based on existing modular and screw-in valve technology by ARGO-HYTOS
- › Standard modules easily adaptable for specific applications
- › Various modules allow the integration of various options into the standard modules
- › Modules on manufacturer's stock shorten machine development time at the producers
- › Modularity offers short delivery time and flexibility in the field during validation stage
- › Load sensing control of pressure source from each working section
- › Each working section is pressure compensated for constant performance
- › Flexible modules including inlet block, section blocks, priority function (e.g. steering) or other optional blocks
- › Inlet section suitable for both LS pumps and fixed displacement pumps
- › Basic modular valves interface with sub plate mounting pattern acc. to ISO 4401, DIN 24340 (CETOP 05)

Functional Description

The MLS kit is intended for hydraulic circuits with several hydraulic actuators being used at the same time with different loads. These kit systems provide two basic functions. First, they provide a constant pressure drop on operating valves of each section. A pressure compensator in each section ensures that the flow is independent of the load on the section. The second function is energy saving. The logic valves in the MLS choose the highest pressure needed in the system for a given section. This pressure signal is connected into the LS channel, which is used to control the pressure source. The pressure source can either be a regulated pump with LS control or a fixed displacement pump. If a fixed displacement pump is used, the LS signal controls the pressure compensator (pos 6). The LS signal drives the pressure source to the required value in real-time. Therefore, no energy is wasted on the relief valve, which must be set to the highest expected pressure.

MLS modular kits consist of the following modules
Priority module P1

The module with a priority valve, pressure compensator and one integrated main consumer establishes a supply to consumers in the first priority.

Priority module P2

The module for the second priority consumer function is attached to the „Priority module 1“.

Base module B

The inlet module with pressure compensator realizes a LS pressure depending on the need of the consumers and has 2 consumer sections. The consumer ports are flangeable to optional modules A and B. The LS signal of the base module can be electrically unloaded.

Section module S

The section module is used in cases where additional consumer functions are needed. It is flangeable to the base module as well, the consumer port side is flangeable to optional modules A and B.

Section module SRPEK

The SRPEK module is designed to connect two or more RPEK1-03 valves via two pressure compensators.

Optional modules A and B

These modules enable additional functions at the consumer side, such as load holding, electrical cylinder unload etc.

Projecting recommendations

Relief and unloading of the LS line:

In the MLS system only one relief valve on the main P line is implemented, therefore the used LS pump must have its own relief of the LS line. The LS line pressure in the Base module of the system can be released to the tank by an electrical unloading valve.

Technical specifications of the module:

The specified values for operating pressure, flow rate and temperatures in the technical documentation are consistent with the values for the recommended valves in the ARGO-HYTOS program.

Operation at low temperatures:

Minimum storage temperature: -30 °C (-22 °F)

Minimum operating temperature: -20 °C (-4 °F)

Attention should be paid to the viscosity at cold start, as highly viscous media may cause cavitation. The listed viscosity limits have to be observed. Refer to the datasheet „General Information“ GI_0060 (Products and operating conditions) for basic recommendations.

- › New components have to be filled at higher temperatures to ensure sufficient lubrication
- › Low temperature measures for pumps, filters, cylinders, gears, etc. have to be coordinated with the manufacturers

Warm-up instructions:

- › Warm up the system to a least -30 °C (-22 °F), start engine
- › Set pumps to neutral position without flow
- › Use pumps for at least 10 min at idle speed
- › Afterward swivel pumps slowly or use them in pressure-reduced mode (max. 50 bar and 50 % flow)
- › Activate all system functions for some time without load
- › Continuously circulate flow through all components to avoid temperature shocks
- › Temperature difference between media and component should not exceed 20 °C (68 °F)
- › On hydraulic motors ensure passage between flush and leakage port (permitted housing pressure)
- › System is ready for use at temperatures over -20 °C (-4 °F)

Inlet modules (Priority 1 and Base module):

Influence of the inlet pressure compensator and the individual pressure compensator on the flow:

The size of the spring used in the inlet pressure compensator determines the flow in the complete system. The spring must always be bigger than the ones in the following individual pressure compensators of the consumer sections. We recommend that the inlet spring shall be set to 10 bar above the maximum required value so that the demanded flow at the biggest consumer is only overridden a little. The spring rate of the individual pressure compensator is selected according to the inlet pressure compensator. The spring pressure should be around 2-3 bar lower than the inlet. If the chosen individual pressure compensator begins throttling the oil flow too early – the installed spring is too weak.

Position of the modules in the complete system:

The module (function module) with the highest flow has to be directly installed at the inlet module. Smaller consumers follow. The smallest consumers (e.g. cylinder functions) have to be mounted at the end as RPEK distributors.

Ordering Code

MLS3-10 - [] - [] [] []

Modular load sensing system

Size / Pattern cetop

Sections

- Base module **B**
- Priority module 1 **P1**
- Priority module 2 **P2**
- Section module **S**
- Section module RPEK **SRPEK**
- Optional module A **OA**
- Optional module B **OB**

Surface Treatment
anodized, transparent

G

Seals

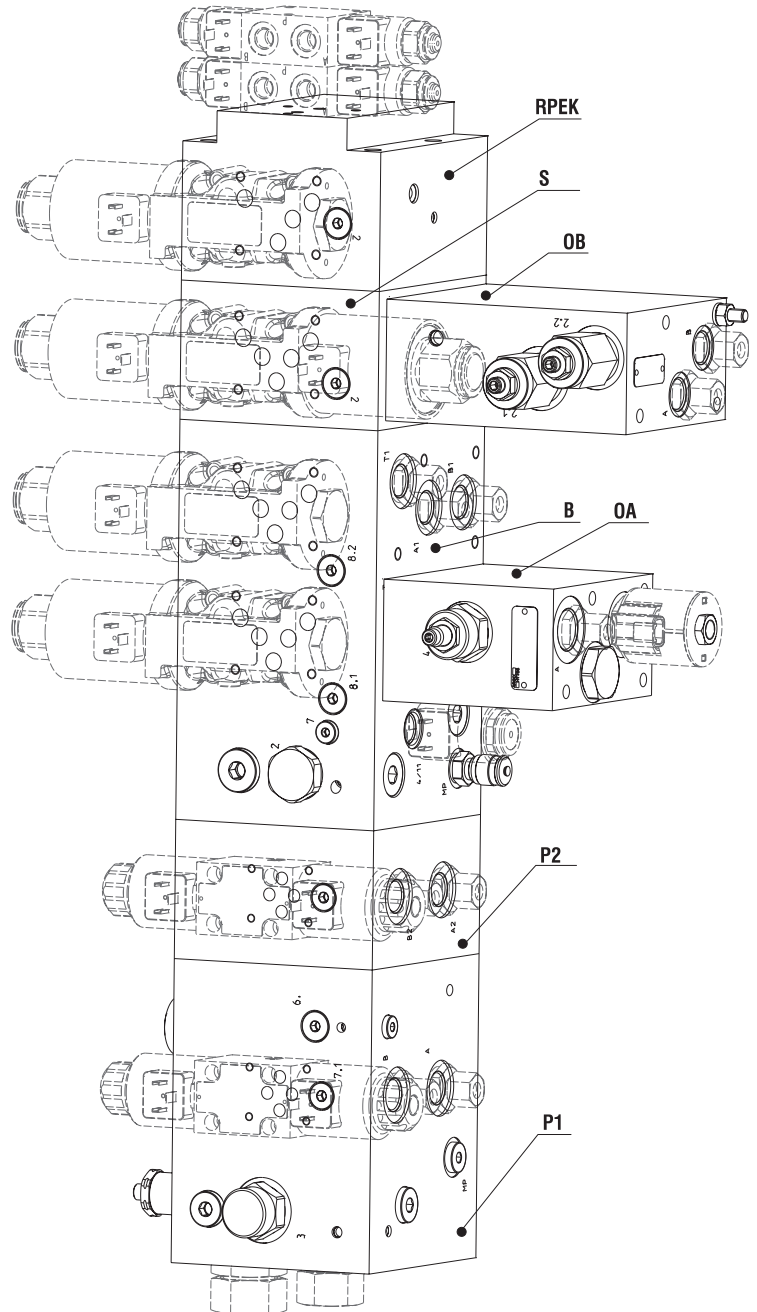
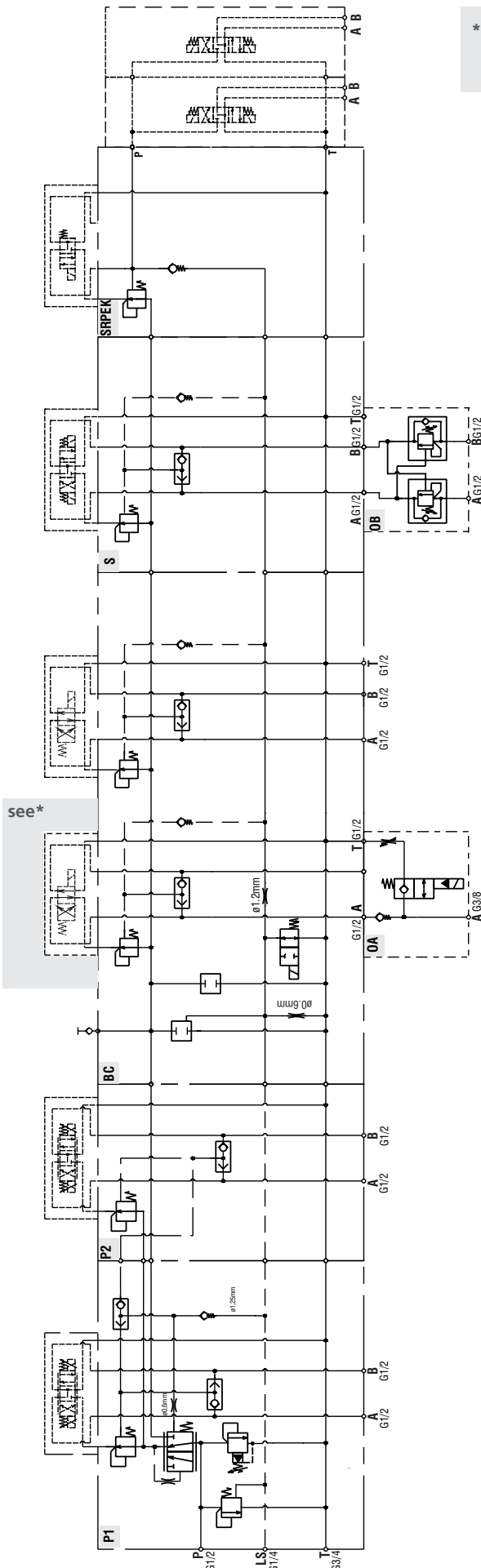
- No designation**
V
- NBR
- FPM (Viton)

Material of the manifold
aluminium, EN AW-7075 T6

AL

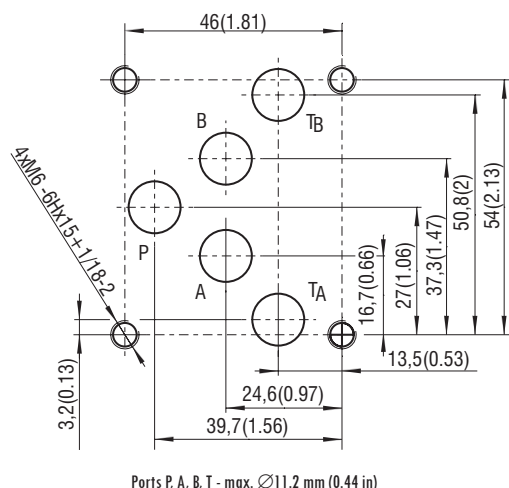
The modules have to be ordered separately.
All modules are supplied only with the valves necessary for the functions.
The valves depending on the circuit variations need to be ordered separately.
Completely assembled MLS modules in one solution are possible.
Contact our technical support for their specification, identification and feasibility.

*Use CETOP valve with just one solenoid on side A where block OA is used



Technical Data

ISO 4401-05-04-0-05



Modular valves mounting surface		10 (D05)
Max. operating pressure (Al)	bar (PSI)	250 (3630)
Max. flow	l/min (GPM)	150 (39.6)
Port dimensions		T ... G1
		P ... G3/4
		A, B, P ... G1/2
		LS ... G1/4
Mass (Al)	B	13.7 (0.54)
	P1	10.4 (0.57)
	P2	4.8 (0.19)
	S	4.8 (0.19)
	SRPEK	5.5 (0.22)
	OA	3.4 (0.13)
	OB	4.7 (0.19)

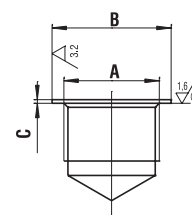
Studrod

Studrods / Bolts MLS3-10

Modular combination	Studrod (Al)	Ordering number	Optional module	Bolts DIN 912-10.9
OA	M8x153	20204700	OA	M8x140 + wascher + spring wascher
OB	M8x197	20205400	OB	M8x190 + wascher + spring wascher
B+P1	M8x227	20205700	Bolts, nuts and washers are not delivered.	
B+P1+P2	M8x304	23378800		
B+S (or B+SRPEK)	M10x125	on request	It is also possible to use purchased threaded rods GRADE 10.9 or 12.9 instead of produced studrods.	
B+2S	M10x215	23707100		
B+3S	M10x300	on request	 Tightening torque: 34 Nm for M8 72 Nm for M10	
B+4S	M10x390	33788400		
B+5S	M10x470	on request		
Studrods are not part of delivery but can be ordered.				

Threaded Chambers for the MLS3-10

Ports	Dimensions in millimeters (inches)									
A	G1/8		G1/4		G1/2		G3/4		G1	
B	15.45	(0.608)	20.7	(0.815)	34.5	(1.358)	39	(1.453)	46	(1.811)
C	1.3	(0.051)	2	(0.079)	2	(0.079)	2	(0.079)	2	(0.079)
O-rings (NBR)	12.42x1.78		15.54x2.62		29.82x2.62		34.59x2.62		40.94x2.62	
Ordering number	20130000		20150600		19906700		20149200		20149700	

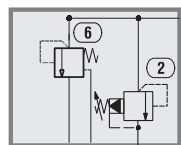
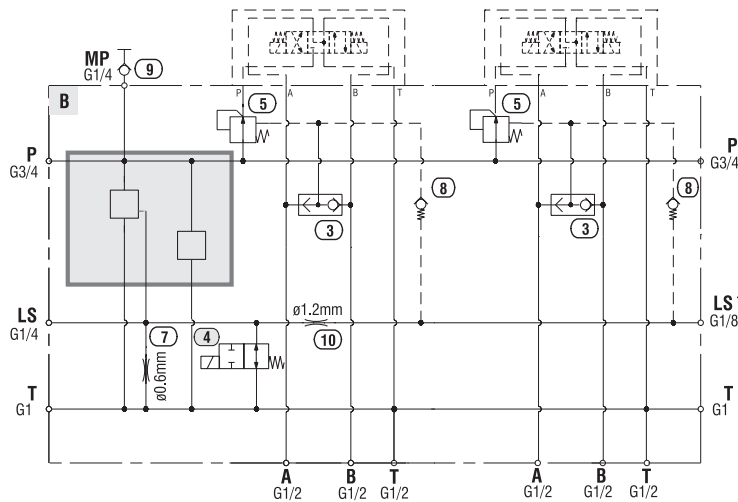




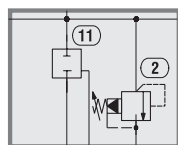
Description

The inlet base module with pressure compensator realizes a LS pressure depending on the consumer demand. This ensures that always the highest pressure required will be provided by the LS pump. If there are no consumers active, there will be an unpressurized flow corresponding to the pressure compensator. It is possible to flange-on priority modules on one side and sectional modules from the other side.

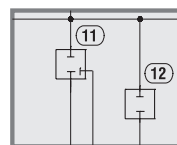
The inlet base module MLS3-10-B* includes two consumer sections for the installation of control valves with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 05).



Fixed displacement pump



Load sensing pump



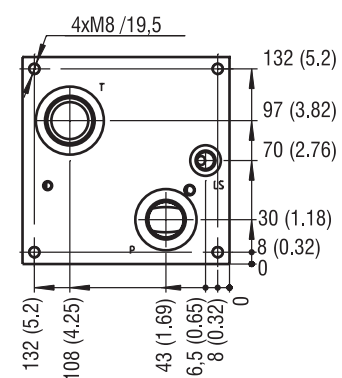
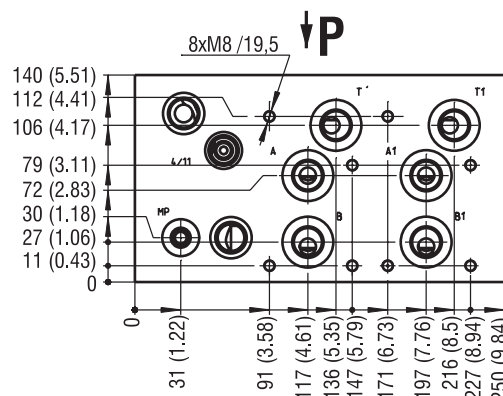
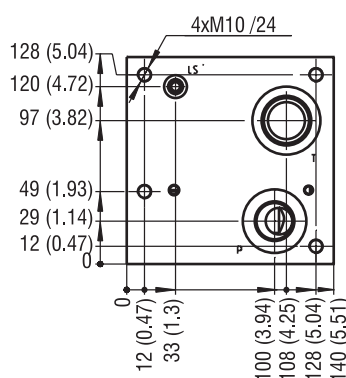
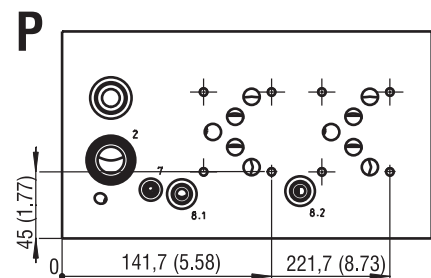
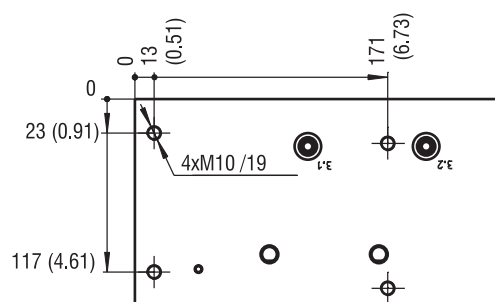
MLS3-10-B combination with MLS3-10-P1 (P2)

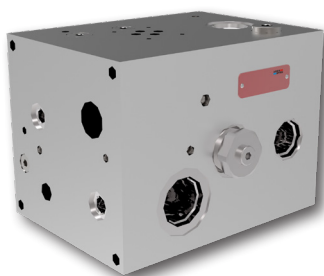
MLS3-10-B includes:		Ordering number ⇒ 33134300		
Pos.	Description	Type	Pcs	Ordering number
1	Manifold block		1	33351500
3	Shuttle valve	LV2-043	2	28944700
5	Pressure compensator	TV2-102/S1C-A	2	15959501
7	Orifice	M6-060	1	27380600
8	Check valve	VJO1-06/SG002-1	2	15949400
9	Minimiss	2103-01-18.00 G1/4	1	20424800
10	Orifice	M6-120	1	18181600



The grey marked valves are not included when MLS3-10-B modules are ordered. The combination of valves is application specific.

Order separately other recommended items:				Data sheet/ Ord. No.
2	Pressure relief valve	VPN2-10/S-32SS	1	HA 5154
4	Direct. control valve	SD2E-A2/H2L11	1	HA 4040
	Coil	C19B*	1	HA 8007
6	Pressure compensator	EP12-S35T-0-P-240	1	29790600
11	Cavity plug	CP12-S30-N	1	32077700
12	Cavity plug	SCP-QK2/XX-A	1	19433600

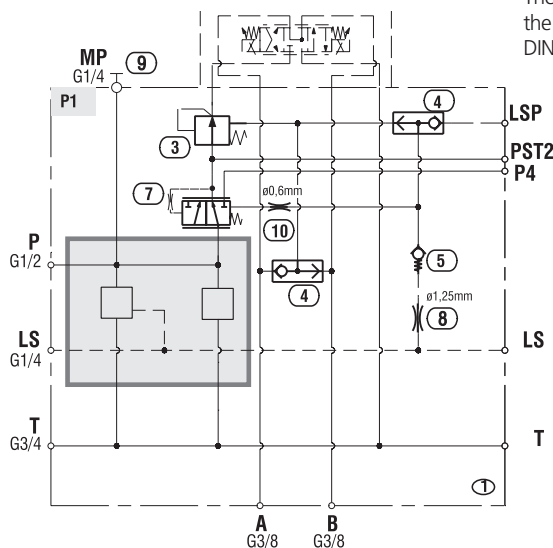




Description

The inlet module with a priority valve and one integrated main consumer implements a supply flow to consumers in the first priority and in the second priority, and from there to the other sections. Typical priority 1 functions are steering (open- or closed-center), priority 2 functions include the work hydraulics. The flow in priority consumers is supplied by a pressure compensator valve. In the third priority it is possible to use the integrated consumer in proportional mode. Supply and overpressure protection is achieved by a pressure compensator with integrated relief function of the main P line. If there are no consumers active there will be an unpressurized flow corresponding to the pressure compensator. It is possible to flange-on modules on one side.

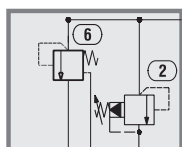
The inlet priority module MLS3-10-P1* includes one consumer section with priority flow for the installation of a control valve with subplate mounting interface acc. to ISO 4401, DIN 24340.



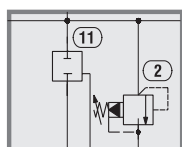
MLS3-10-P1 includes:		Ordering number ⇒ 33139200		
Pos.	Description	Type	Pcs	Ordering number
1	Manifold block		1	33300700
4	Shuttle valve	LV2-043	2	28944700
3	Pressure compensator	TV2-102/S1C-A	1	15959501
8	Orifice	M6-120	1	18181600
5	Check valve	VJO1-06/SG002-1	1	15949400
7	Priority valve	EC-16-42-0-N-150	1	32468600
9	Minimess	2103-01-18.00 G1/4	1	20424800
10	Orifice	M6-060	1	27380600
	O-rings	15.54x2.62	3	20150600
		34.59x2.62	1	20149200
		40.94x2.62	1	20149700



The grey marked valves are not included when MLS3-10-P1 modules are ordered. The combination of valves is application specific.

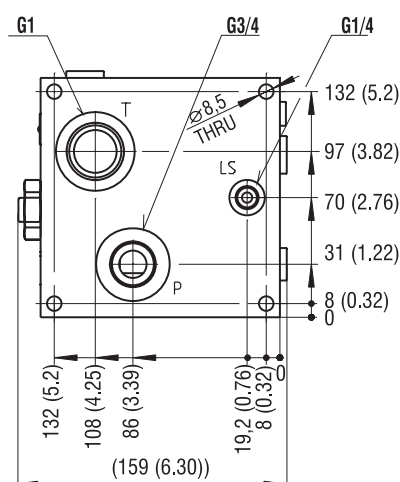
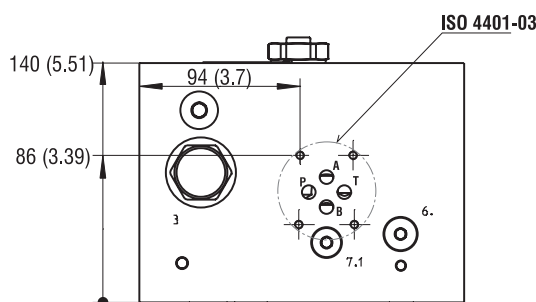
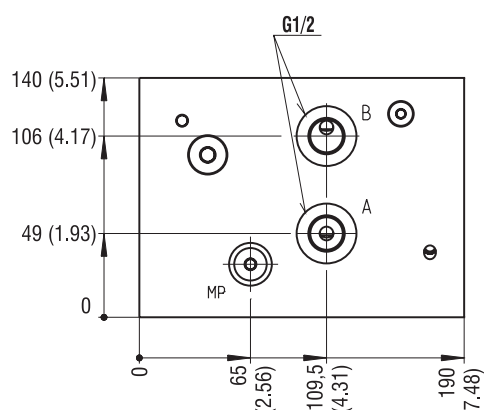


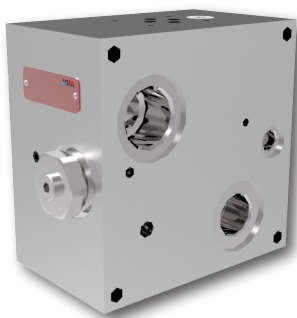
Fixed displacement pump



Load sensing pump

Order separately other recommended items:				Data sheet/ Ord. No.
2	Pressure relief valve	VPN2-10/S-32SS	1	HA 5154
6	Pressure compensator	EP12-S35T-0-P-240	1	29790600
11	Cavity plug	CP12-S30-N	1	32077700



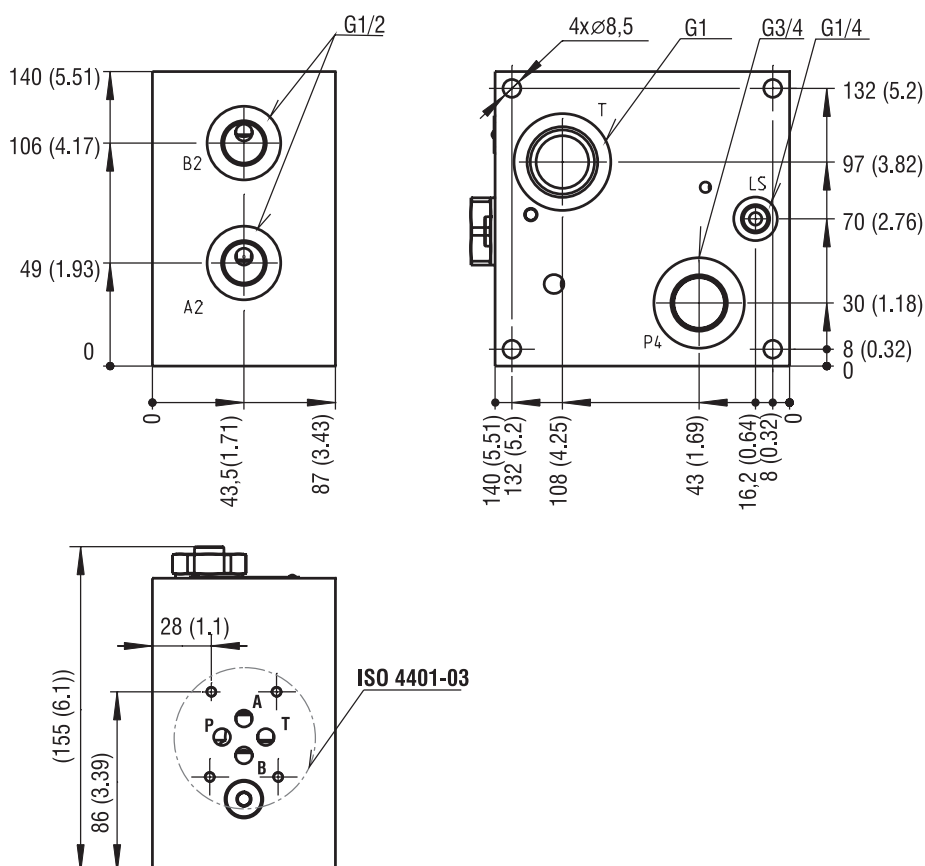
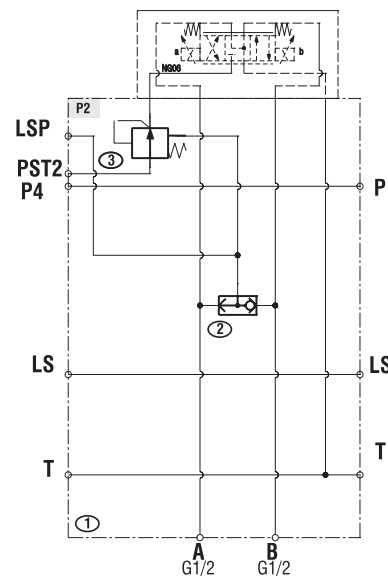


Description

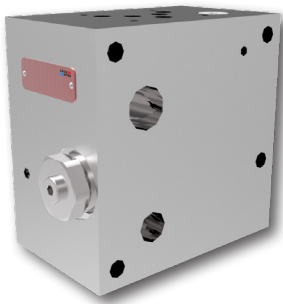
The Priority module 2 and Section block „S“ implement an on/off or proportional consumer supply depending on the valve installation. The Priority module 2 extends the Priority module 1 while the Section block „S“ extends the Base module. They are used in situations when additional consumers need to be operated. Sections are always compensated with 2-way pressure compensators. The LS signal is reported via check valves.

Note: The modules are not interchangeable.

MLS3-10-P2 includes:		Ordering number ⇒ 33806300		
Pos.	Description	Type	Pcs	Ordering number
1	Manifold block		1	34277300
2	Shuttle valve	LV2-043	1	28944700
3	Pressure compensator	TV2-102/S1C-A	1	15959501
	O-rings	15.54x2.62	1	20150600
		34.59x2.62	1	20149200
		40.94x2.62	1	20149700



MLS3-10-S*/* Modular Load Sensing System - Section Block S

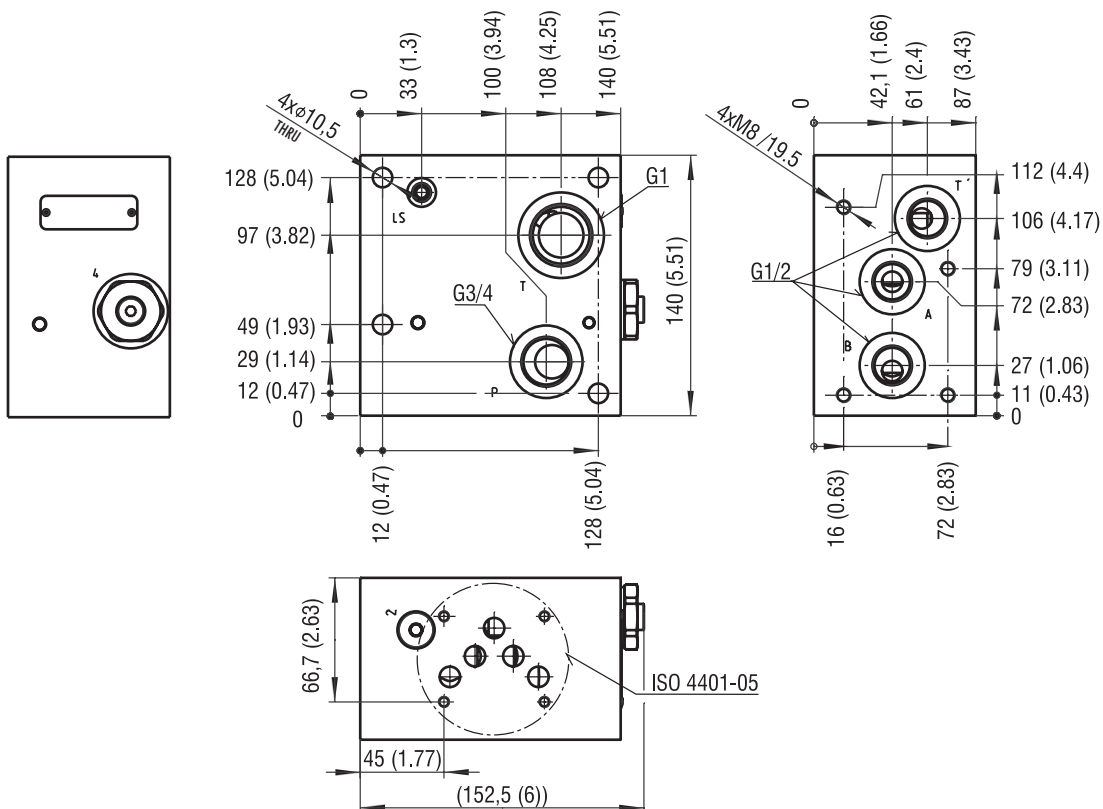
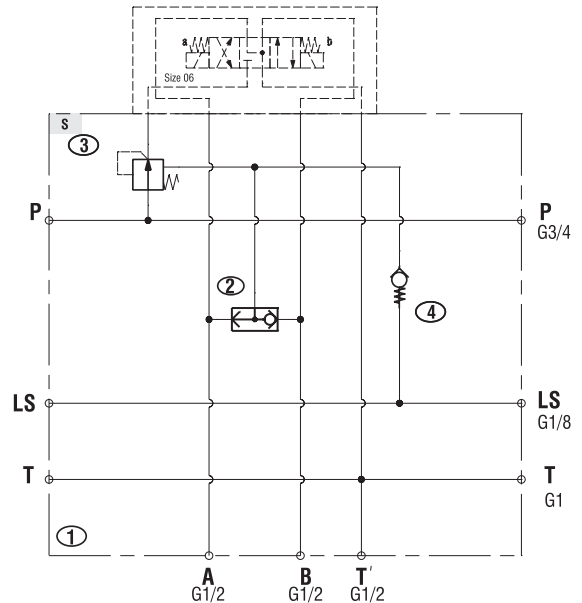


Description

The Priority module 2 and Section block „S“ implement an on/off or proportional consumer supply depending on the valve installation. The Priority module 2 extends the Priority module 1 while the Section block „S“ extends the Base module. They are used in situations when additional consumers need to be operated. Sections are always compensated with 2-way pressure compensators. The LS signal is reported via check valves.

Note: The modules are not interchangeable.

MLS3-10-S includes:		Ordering number ⇒ 33127800		
Pos.	Description	Type	Pcs	Ordering number
1	Manifold block		1	33284200
2	Shuttle valve	LV2-043	1	28944700
3	Pressure compensator	TV2-102/S1C-A	1	15959501
4	Check valve	VJO1-06/SG002-1	1	15949400
	O-rings	12.42x1.78	1	20130000
		34.59x2.62	1	20149200
		40.94x2.62	1	20149700



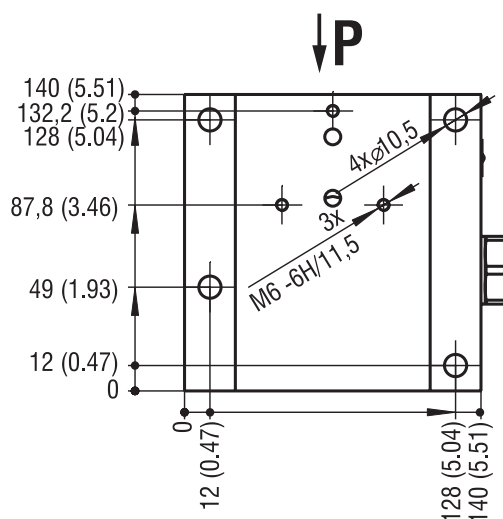
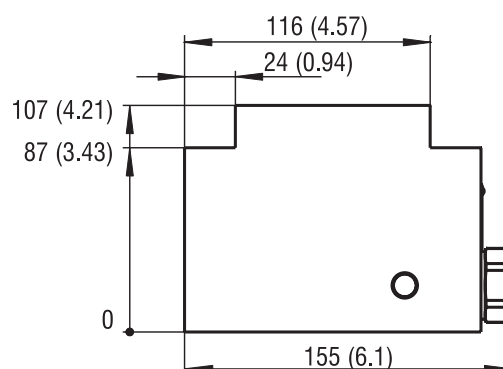
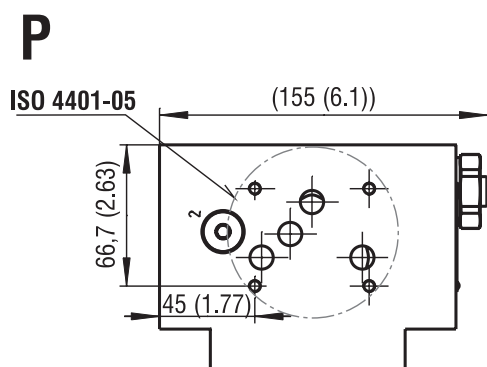
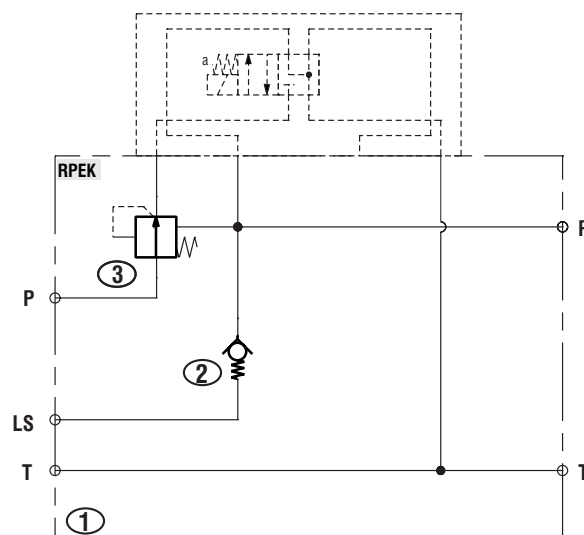


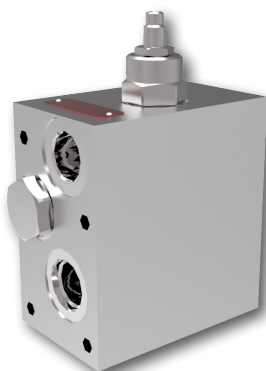
Description

Section module SRPEK

The SRPEK module is designed to connect two or more RPEK1-03 valves via two pressure compensators.

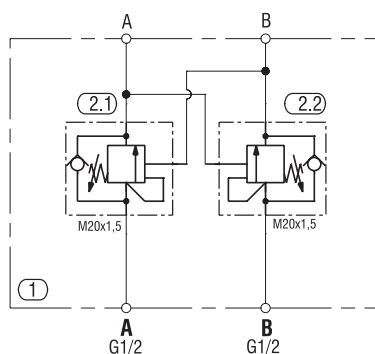
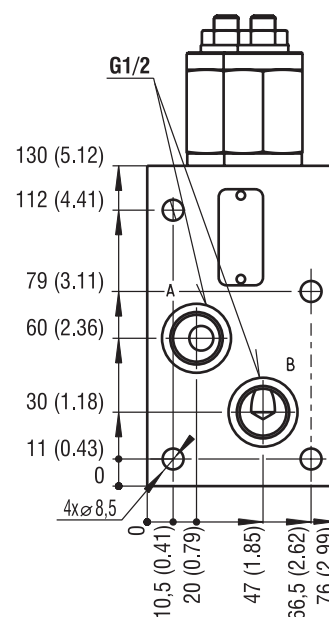
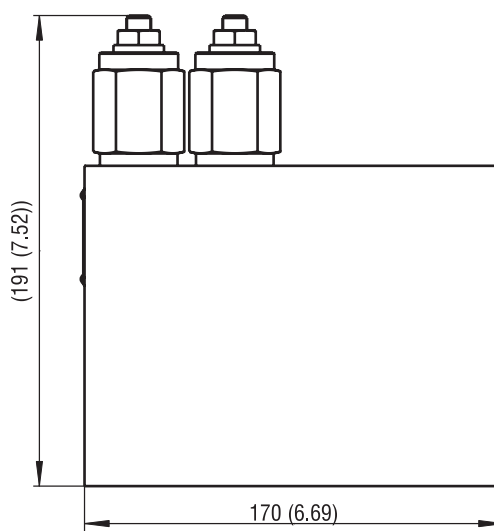
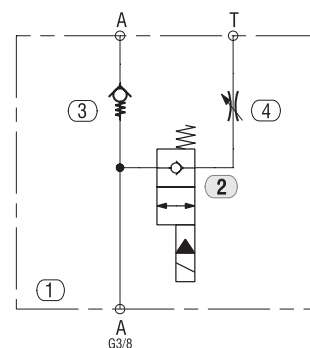
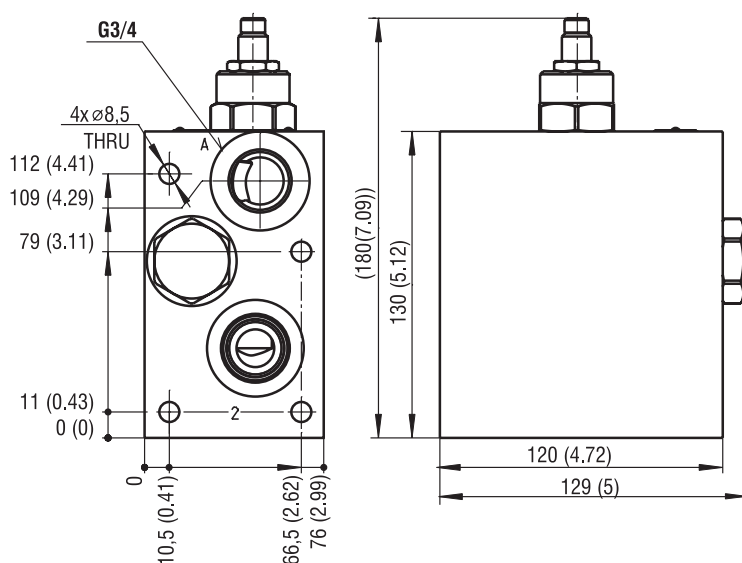
MLS3-10-SRPEK includes:		Ordering number ⇒ 33125200		
Pos.	Description	Type	Pcs	Ordering number
1	Manifold block		1	33274000
2	Check valve	VJO1-06/SG002-1	1	15949400
3	Pressure compensator	TV2-102/S1C-A	1	15959501
	O-rings	12.42x1.78	1	20130000
		34.59x2.62	1	20149200
		40.94x2.62	1	20149700



MLS3-10
MLS3-10-OA(OB)*/* Modular Load Sensing System - Optional Block

Description

OA (OB) is an optional block that may be connected to output ports of the sections.
 Use a CETOP valve with just one solenoid on side A where block OA is used - see page 3.

MLS3-10-OA includes:		Ordering number ⇒ 33137900		
Pos.	Description	Type	Pcs	Ordering number
1	Manifold block		1	33300900
3	Check valve	CV12-20-0-N-25	1	31944900
4	Needle valve	NV12-20-A-0-N	1	31945000
	O-rings	29.82x2.62	3	19906700
Order separately the other recommended items:				
2	Load control valve	HSV12-20-0-U-0	1	31944700
	Coil 12 VDC			34721000
	Coil 24 VDC			34721100



MLS3-10-OB includes:		Ordering number ⇒ 33803900		
Pos.	Description	Type	Pcs	Ordering number
1	Manifold block		1	34279800
2	Over center valve	SO5A-R3/4	2	20421500
	O-rings	29.82x2.62	3	19906700