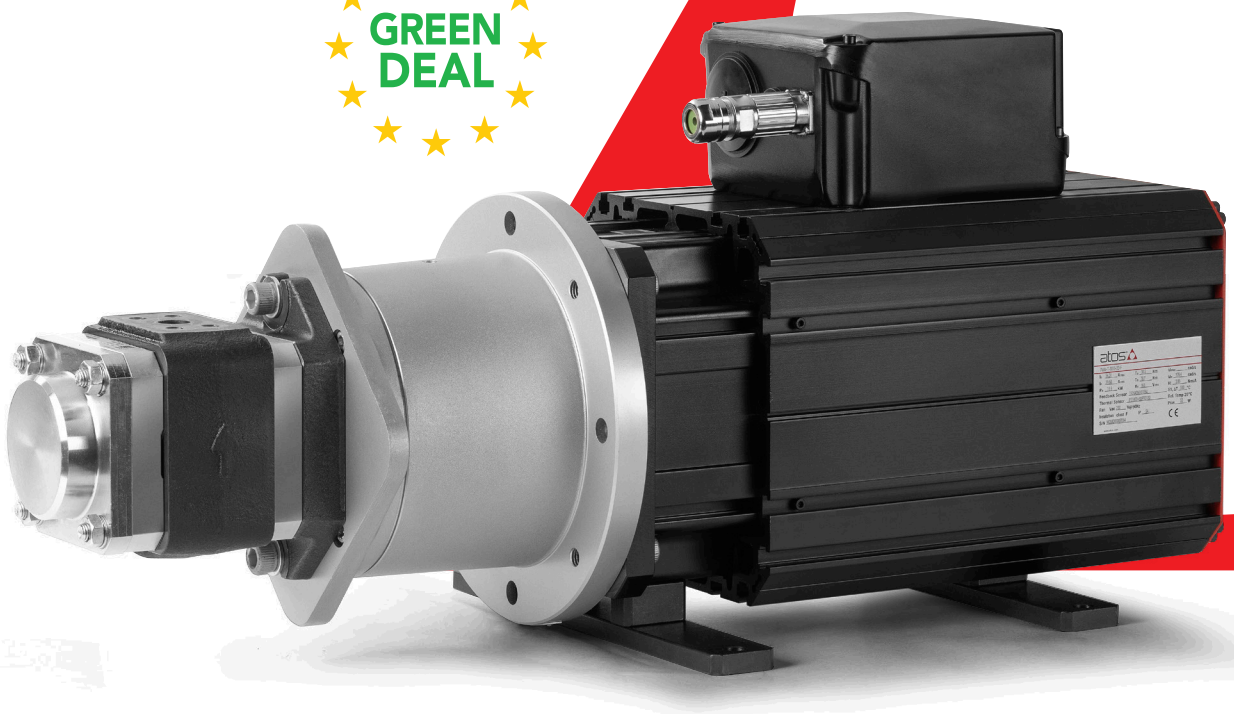
atos
the smart electrohydraulics

SSP SERVOPUMPS

High performance and energy saving
Smart Servopumps with P/Q control

GREEN DEAL




atos
GROUP

ABOUT US

Established in 1957 from the concept of Luciano Crespi, in 60 years of experience we have written the history of electrohydraulics.

Now we are a Group operating in more than 80 countries, with 9 production sites in Italy, China, USA and India with over 750 professionals who share the same passion for innovation, technology and creativity.

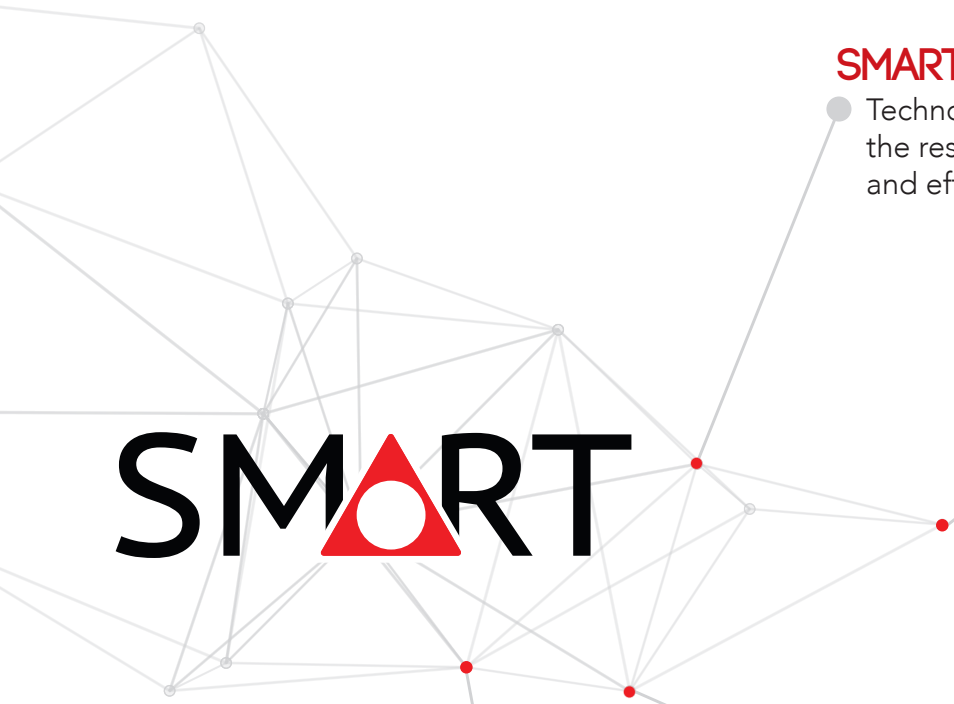
We are specialists, 100% dedicated to electrohydraulics, in a constant search of innovative solutions for any application, from the industrial ones with our high-performance axis controls, to the explosion-proof line for hazardous locations and the stainless steel one for corrosive environments and fluids.

THE SMART ELECTROHYDRAULICS

Smart Electrohydraulics is the vision that sums up the four values leading our actions: **responsibility**, **excellence**, **innovation** and **passion**.

For Atos, being Smart means courage and determination to define new standards of excellence. A new approach in which each process is analysed and optimized: from design to production, from delivery to after-sales service.

Smart Electrohydraulics is our response to market demands for advanced solutions that are easy to install and use.



SMART COMPANY

Technology and innovation drive the research into new sustainable and efficient solutions

SMART PRODUCTS

Atos products are unique in terms ease of use, intelligence and automation, always keeping the highest standards of reliability and safety

SMART PEOPLE

Our people act as a team, motivated to grow and encouraged to propose innovative ideas and improvements in all business fields

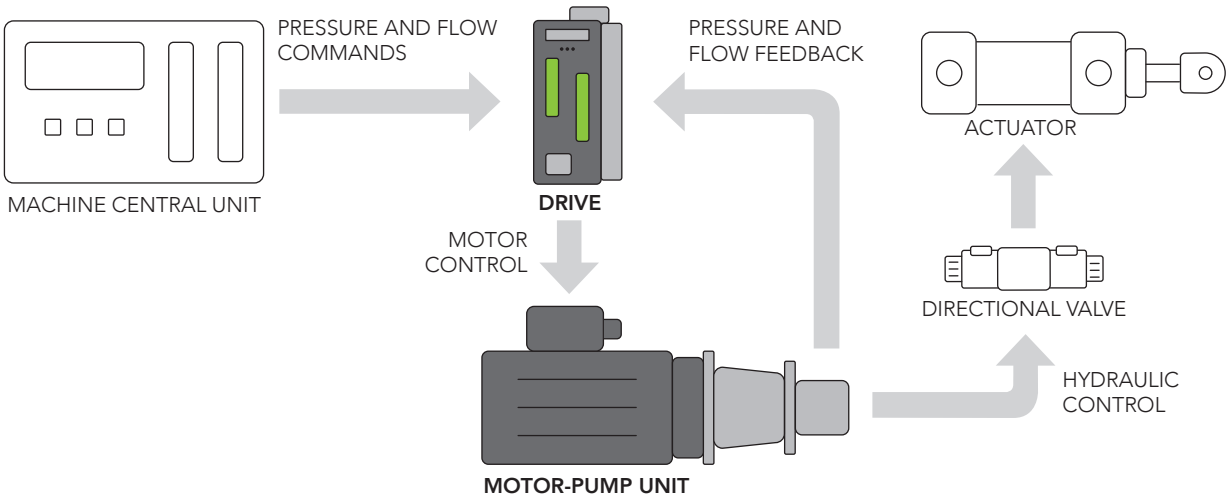
SMART PARTNER

Our relationships are transparent, reactive and proactive, in the spirit of collaboration which only a passioned approach can generate

SSP SERVOPUMPS

The SSP servopumps are designed and engineered to efficiently and accurately deliver the necessary hydraulic power to manage the different phases of the machine cycle, through the modulation of the pump rotation speed.

The **drive** controls the rotation speed of the **motor-pump unit**, to regulate the flow rate and pressure of the system, based on the reference signals received from the machine central unit.



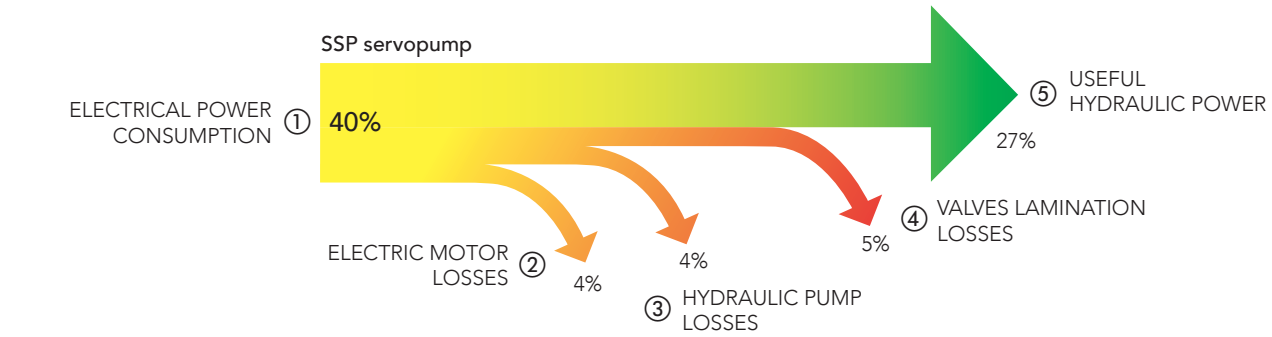
An angular position transducer, integrated in the motor-pump unit, provides the drive with the information on the flow rate generated by the pump. A pressure transducer installed on the pump outlet provides the information on the actual pressure of the hydraulic user line.

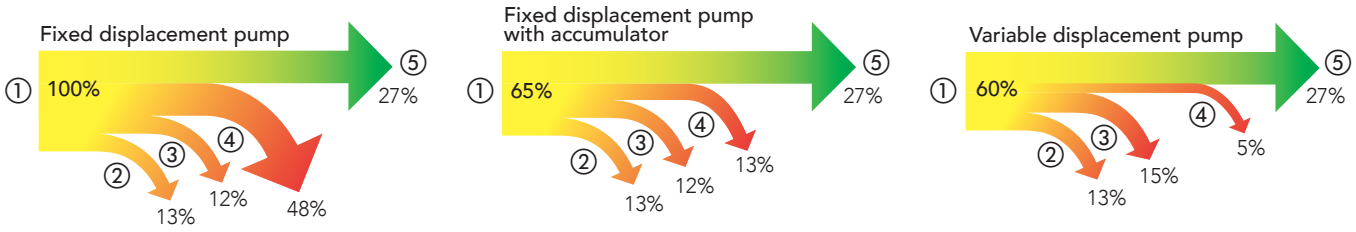
BENEFITS

ENERGY SAVING

SSP servopumps deliver hydraulic power only when required and in the quantity necessary to satisfy the work phase in progress.

Compared to systems that rely on a fixed displacement pump, SSP servopumps reduce the energy consumption by 60 ÷ 80%, depending on the machine cycle.

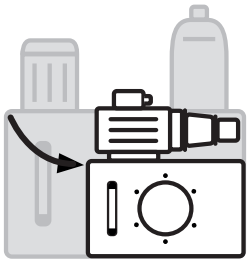




DIMENSIONS REDUCTION

The capability of reaching rotation speeds up to 3000 rpm permits a reduction of the pump displacement, with the same flow rate delivered.

Furthermore, the lower energy dissipation allows a reduction of the tank dimensions and heat exchanger.



NOISE REDUCTION

Due to low noise emissions of the internal gear pump and the capability to modulate the speed of the motor-pump unit, it is possible to reduce the noise emission up to 20 db, compared to traditional systems.

SMART TECHNOLOGY

SMART START-UP

The Smart Start-up feature simplifies the SSP servopump commissioning with a quick and intuitive 3 steps wizard procedure:

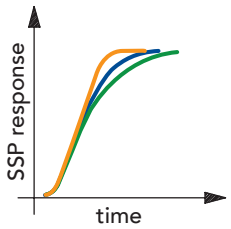
- **General configuration**: allows to select and configure the system communication and set up the protection functions
- **Servomotor test**: verifies the direction of rotation and sends an alarm to the central machine unit, if the direction is not correct
- **Autotuning**: performs the automatic parameterization of the servopump to obtain the best dynamic response, in order to guarantee accuracy and stability during the pressure control phases

SMART TUNING

It allows to refine the pressure control response, by choosing between 3 different levels of performance:

- **Dynamic**: fast response times to achieve maximum dynamic performance
- **Balanced**: intermediate response times suitable for most of applications
- **Smooth**: attenuated response times to improve control stability in critical applications

Each configuration can be further customized with dedicated settings.



P/Q CONTROL

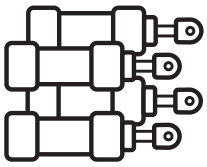
Atos exploited its electrohydraulic know-how to develop a P/Q algorithm dedicated to the control of SSP servopumps and specifically designed for hydraulic axes, in order to satisfy the requirements of any application.

Hydraulic machinery manufacturers will be relieved of the development of their own control algorithm.

P/Q
CONTROL

SMART TECHNOLOGY

MULTIPLE AXIS

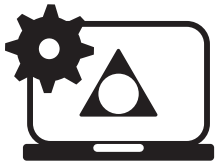


The SSP servopumps allow to manage up to 4 independent parameter sets. This feature allows the real-time selection of optimal configuration of the axis to be controlled, ensuring the maximum performance for each axis of the machine.

Each set of parameters allows the customization of:

- flow and pressure limits
- flow and pressure ramps
- parameters for pressure control and P/Q logics

PROGRAMMING SOFTWARE



SSP servopumps can be configured through the programming software S-SW-SETUP. This can be easily used by connecting the PC to the drive. All the main functionalities can be accessed and modified due to an intuitive and user-friendly graphics.

The software allows real-time monitoring of the signals managed by the drive, such as references, feedback and system parameters.

CONNECTIVITY 4.0

The available fieldbuses allow real-time access to functional parameters, diagnostics, transducers and feedback.

CANopen EtherCAT PROFIBUS PROFINET

SIZING SOFTWARE

Developed by Atos, this software leads the users in the selection of the SSP servopump that best fits their needs.

By entering the desired machine cycle, an algorithm calculates the optimal servopump size to satisfy the system requirements, along with an energy saving estimation of this solution compared to traditional systems which use fixed or variable displacement pump.

The S-SW-SIZING software is available for download at www.atos.com

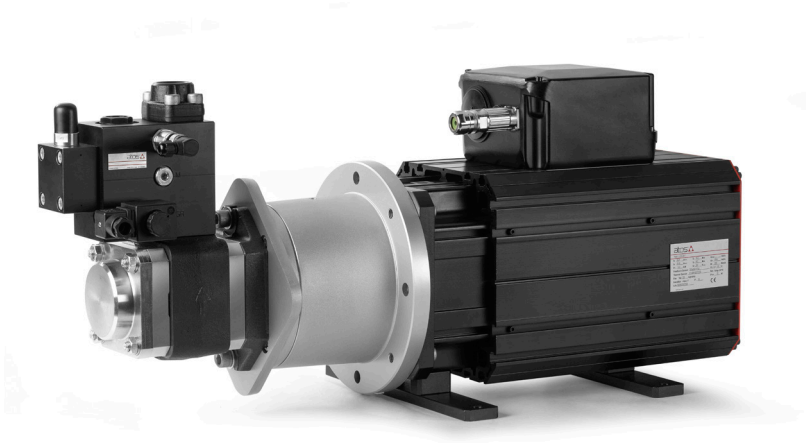
PROTECTION FUNCTIONS

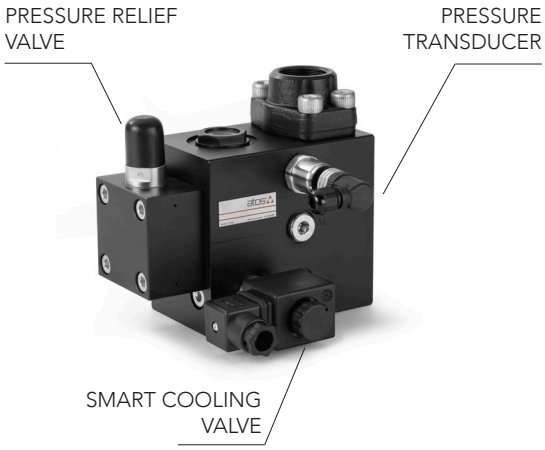
SMART COOLING

During extended phases of static pressure control, the pump tends to overheat due to internal leakage and reduced oil exchange.

The Smart Cooling function prevents the pump overheating due to a dedicated algorithm for temperature management which activates a drain for oil recirculation when necessary.

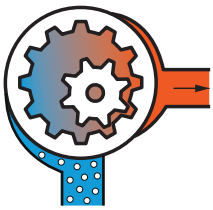
This function, available as an option, is actuated through a flanged block which offers a complete and ready-to-use solution.





CAVITATION PROTECTION

According to the geometry of the system suction line, this function allows to optimize the factory settings of servomotor angular acceleration limits, in order to avoid cavitation phenomena. To activate the function, simply enter the parameters of the suction geometry during the Smart Start-up procedure.



OVERTEMPERATURE PROTECTION

Both the servomotor and the drive are equipped with an internal temperature transducer to avoid an eventual overheating due to incorrect installations or excessively harsh working conditions.

COMPONENTS

INTERNAL GEAR PUMP

Low noise, reduced pressure pulsation and a wide speed range, make it the optimal choice for the servopump application. Available in two versions:

- **PGI** continuous maximum pressure up to 330 bar
- **PGIL** continuous maximum pressure up to 250 bar

Both versions cover a wide range of displacements, from 11 to 125 cm^3/rev with maximum flow rates up to 350 l/min.

PERMANENT MAGNET MOTOR

Synchronous **PMM** servomotors are characterized by high dynamics and rotation precision. They differ from asynchronous motors by:

- high electrical efficiency, up to 94% in nominal conditions
- equal power level with reduced dimensions
- very high control dynamics

Sizes available from 9 kW to 100 kW, with 200% overload capacity.

VECTOR CONTROL DRIVE

The **D-MP** drives represent the "brain" which manages the entire SSP servopump system. The exclusive Smart algorithms simplify commissioning and maximize the P/Q control efficiency.

The drive fully meets Industry 4.0 requirements, as it provides the access to all the hydraulic and electrical parameters of the system, enabling the user to simply monitor the machine status and performance.

Sizes available from 22 A to 210 A, with 200% overload capacity.

SMART SSP SERVOPUMPS

FOR HIGH PERFORMANCE AND ENERGY SAVING P/Q CONTROLS

SMART TUNING

P/Q CONTROL

SMART START-UP

MULTIPLE AXIS

SSP-T-SP-NP-2032L-1015-032-*/T **/PE

① Internal gear pump
② Bellhousing with zero backlash coupling
③ Permanent magnets Servomotor
④ Drive

SSP systems combine the typical advantages of hydraulic power transmission with the ease of control and adjustment of an electric drive while also ensuring maximum levels of energy efficiency.
They are used in high performance machines mainly for the plastic, die-casting and deformation sectors.

Maximum flow:	**350 l/min**
Maximum rated power:	**100 kW**
Maximum continuous pressure:	
cast iron pump	**330 bar**
aluminium pump	**250 bar**

They consist of a fixed displacement internal gear pump, driven by a permanent magnet synchronous servomotor controlled by an electronic drive. The latter controls the speed of the servomotor and therefore of the pump, to adjust the flow rate or pressure of the system based on the reference signals received from the PLC of the machine.
A dedicated algorithm optimizes the P/Q function by automatically selecting the activation of the flow or pressure control.
Compared to traditional systems, SSPs offer the following advantages:

- significant reduction in energy consumption, as the pump operates at the speed strictly necessary to generate the required flow rate / pressure
- high dynamics and precision of P/Q control thanks to a dedicated algorithm
- reduction of the noise level, thanks to the design of the pump and the variable speed
- maximum flexibility thanks to dedicated software
- simplified commisioning thanks to the Smart start-up and Smart tuning functions
- possibility of customization up to 4 axes with Multiple axis function

For more details see technical table AS050

1 MODEL CODE

SSP	-	T-SP	-	NP	-	2020L	-	1024	-	046	/	C	/	T	/	*	/	PE

SSP — Smart servopump

T-SP — **Control logic**: **T-SP** = alternated P/Q control with resolver

NP — **Fieldbus interface,** serial port always present:
NP = Not present
BC = CANopen
BP = PROFIBUS DP
EH = EtherCAT
EP = PROFINET RT/IRT

2020L — **Pump**

PGI, cast iron pump, Pmax 330 bar **(1)** - see table AS300:

1011 = 10,9 cm³/rev	**2050** = 50 cm³/rev	**3080** = 80 cm³/rev
2020 = 20 cm³/rev	**4050** = 50 cm³/rev	**4080** = 80 cm³/rev
2032 = 32,1 cm³/rev	**3064** = 64 cm³/rev	**3100** = 100 cm³/rev
2040 = 40,1 cm³/rev	**4064** = 64 cm³/rev	**4100** = 100 cm³/rev

PGIL, aluminium pump, Pmax 250 bar - see table AS350:

2020L = 20 cm³/rev	**2050L** = 50 cm³/rev	**3100L** = 100 cm³/rev
2032L = 32,1 cm³/rev	**3064L** = 64 cm³/rev	**4125L** = 125 cm³/rev
2040L = 40,1 cm³/rev	**3080L** = 80 cm³/rev	

(1) Pmax depends on the pump displacement

1024 — **Motor** PMM - see table AS400:

1009 = 8,7 kW	**1032** = 30 kW	**2080** = 80 kW
1015 = 15 kW	**2042** = 42 kW	**2100** = 100 kW
1024 = 24 kW	**2055** = 55 kW	

046 — **Drive** D-MP - see table AS500:

022 = 22 A	**060** = 57 A	**140** = 140 A
032 = 32 A	**090** = 87 A	**165** = 165 A
046 = 46 A	**100** = 100 A	**210** = 210 A

C — **Hydraulic option** see section 8:
C = integrated block with relief valve and pressure transducer
D = as option C plus Smart Cooling functionality
Electronic option see section 9:
K = Drive with Safe Torque Off

T — **Port orientation** see section 10:
T = standard
U, **V** = optional

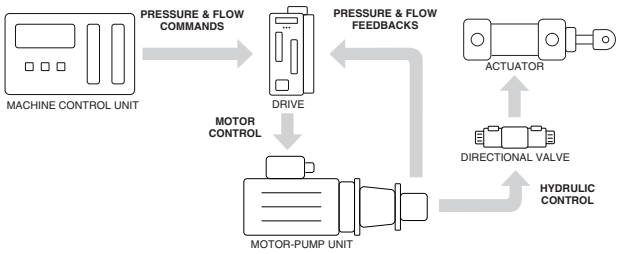
***** — Series number

PE — Seals material
PE = FKM

For optimal sizing, download the sizing software from www.atos.com

2 FUNCTIONING DESCRIPTION

SSP servopumps are designed to efficiently and accurately generate and regulate hydraulic power at every stage of the machine cycle. The ability to modulate the required flow rate or pressure by varying the number of revolutions gives it a substantial advantage in terms of energy savings compared to traditional systems that operate at constant speed. Thanks to the high dynamics and dedicated algorithms, the SSP allow you to directly control the speed of movement and the force of the hydraulic actuators with optimal levels of precision and repeatability.
They consist of an internal gear pump, a permanent magnet servomotor and an electronic drive.
The drive is connected to an angular transducer which measures the rotation speed of the servomotor and to a pressure transducer. It manages the motor power supply, the operating logic and system diagnostics.



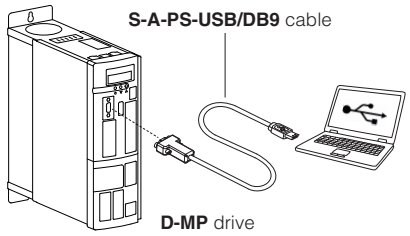
3 PROGRAMMING TOOLS

The functional parameters and configurations of the SSP servopumps can be easily set and optimized using the Atos S-SW-SETUP programming software by connecting the PC to the drive via the RS485 serial port.
The software allows the parameterization of the drive via the RS485 serial port even if the drive is connected to the machine central unit via fieldbus.

S-SW-SETUP support: NP (Serial) BC (CANopen) EH (EtherCAT)
BP (PROFIBUS DP) EP (PROFINET)

Note: For detailed descriptions of settings, wiring and installation procedures, refer to the user manual included in S-SW-SETUP

PC connection



4 FIELDBUS

Fieldbus allows direct communication between the Drive and the machine control unit for digital reference, extended diagnostics and servopump settings. However, the fieldbus versions allow the servopump to be controlled also through analog references.

5 GENERAL CHARACTERISTICS

Installation position	Motor and pump: horizontal position Drive: wall mounting, vertical position
Ambient temperature range	Motor and pump: -20°C ÷ 40°C Drive: 0°C ÷ 40°C motor and drive derate in power for higher temperature
Altitude	up to 1000 m, motor and drive derate in power for higher altitude
Compliance	CE according to EMC directive 2014/30/EU and LVD 2014/35/EU Rohs directive 2011/65/EU as last update by 2015/863/EU

6 HYDRAULIC CHARACTERISTICS

Hydraulic fluid		HL, HLP DIN 51524...535, for other fluids contact Atos technical office	
Fluid temperature range		-20°C ÷ 80°C	
Recommended viscosity		10 ÷ 300 mm²/s - cold start max 2000 mm²/s	
Max fluid contamination level	normal operation	ISO4406 class 20/18/15 NAS1638 class 9	see also fiter section at www.atos.com or KTF catalog
	longer life	ISO4406 class 18/16/13 NAS1638 class 7	
Min/max inlet pressure	(bar abs)	from 0.8 to 2 bar. Recommended ⩾ 1	

7 DRIVE ELECTRICAL CHARACTERISTICS

Rated IN voltage [V]	200 V -10% ÷ 460 V +10% @ 45 ÷ 65 Hz for drive 022 ÷ 060 380 V -15% ÷ 460 V +10% @ 45 ÷ 65 Hz for drive 090 ÷ 210			
DC Bus voltage [V]	280 V -10% ÷ 620 V +10% for drive 022 ÷ 060 530 V -15% ÷ 650 V +10% for drive 090 ÷ 210			
24VDC input power supply	24 VDC ±10% @ max 1,0 A for drives type 022, 032, 090, 100, 140, 165, 210 24 VDC ±10% @ max 1,6 A for drives type 046, 060			
24VDC output power supply	24 VDC ±10% @ max 500 mA - only for drives type 090, 100, 140, 165, 210			
Digital inputs	24 VDC ±10% @ max 10 mA			
Digital outputs	30 VDC @ max 60 mA			
Analog inputs	±10 V @ max 0,5 mA or 4 ÷ 20 mA (Dip-switch selectable - see user manual)			
Analog outputs	±10 V @ max 2 mA			
Protection degree to DIN EN60529	Motor: IP54 (IP65 on request); Drive: IP20 for sizes 022 ÷ 100, IP00 for sizes 140 ÷ 210			
Communication interface	Atos ASCII coding	CANopen EN50325-4 + DS408	PROFIBUS DP EN50170-2/IEC61158	EtherCAT, PROFINET IO RT / IRT EC 61158
Communication physical layer	insulated RS485	optical insulated CAN ISO11898	optical insulated RS485	Fast Ethernet, insuated 100 Base TX

8 HYDRAULIC OPTION

C = This option provides a hydraulic block mounted directly on the pump delivery, which integrates a mechanical pressure relief valve with safety function on the maximum system pressure and a pressure transducer for the feedback of the actual pressure on the delivery line.

① Mechanical pressure relief valve; the valve is supplied with zero adjustment, and must be adjusted by the user at a pressure slightly higher than the maximum pressure required by the system.

② Pressure transducer E-ATR-8/400/I - see technical table GS465

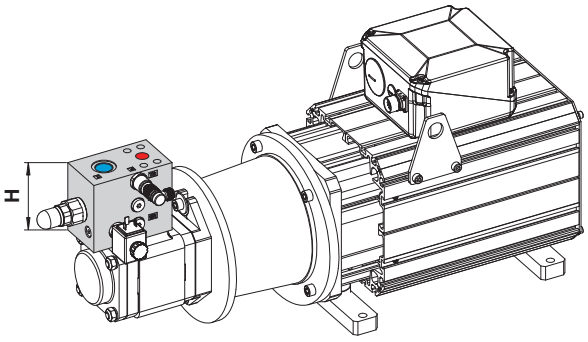
D = This option allows to protect the pump from overheating when it is subjected to particularly heavy duty cycles, in particular in the prolonged phases of static pressure control.
This option includes a hydraulic block with relief valve and pressure transducer, as for the /C option, with also integrated:

③ Smart Cooling cartridge valve JO-DL-4-2/NC-X 24DC - see technical table E105

When a temperature considered critical is reached, the Smart Cooling valve opens ③ as to cause a small recirculation of oil through the pump which protects it from dangerous overheating.

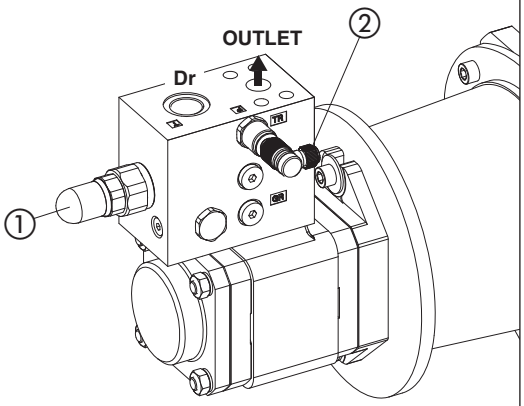
The sizing software for SSP suggests the need for the /D option based on the machine cycle.

Options **C** and **D** dimensions

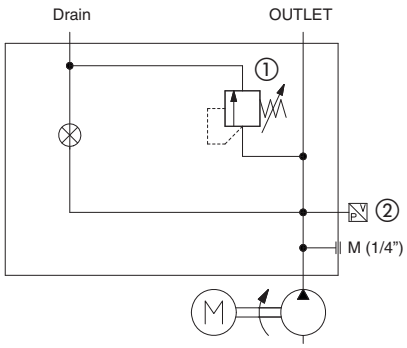


SSP CODE	OUTLET	**Dr** (drain)	**H** (mm)
SSP-T-SP-1011***	1/2" SAE3000	G1/2"	105
SSP-T-SP-2020***	3/4" SAE3000	G3/4"	110
SSP-T-SP-2032***			
SSP-T-SP-2040***	1" SAE3000	G1"	115
SSP-T-SP-2050***			
SSP-T-SP-4050**	1" SAE6000	G1"	115
SSP-T-SP-3064***	1" SAE6000	G1 1/4"	125
SSP-T-SP-4064**			
SSP-T-SP-3080***	1 1/4" SAE6000	G1 1/2"	140
SSP-T-SP-4080***			
SSP-T-SP-3100***			
SSP-T-SP-4100**			
SSP-T-SP-4125***	1 1/2" SAE6000	G 2"	140

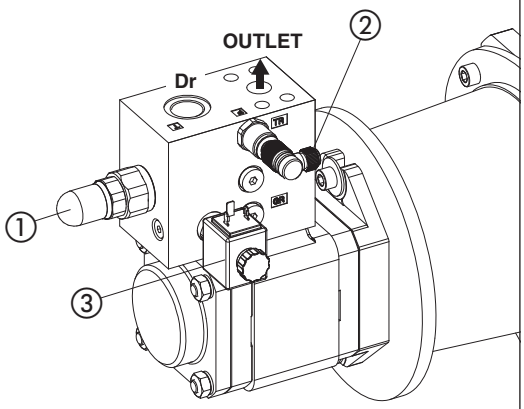
Detail option **C**



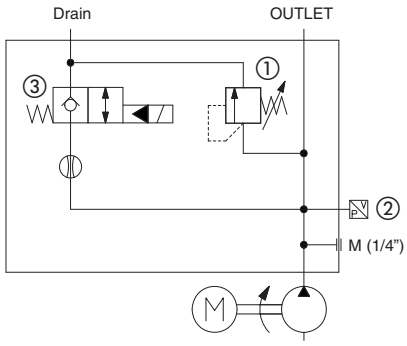
Hydraulic scheme option C



Detail option **D**



Hydraulic scheme option D



9 ELECTRONIC OPTION

K = Safe Torque Off (STO) safety function to prevent accidental starting of the servo pump, in accordance with the Machinery Directive 2006/42/EC (MD) - standard EN 61800-5-2

The STO function is implemented in the D-MP Drive and is activated by two digital signals sent by the control unit of the machine that allow to remove the power supply to the servomotor in order to prevent unwanted start-up.

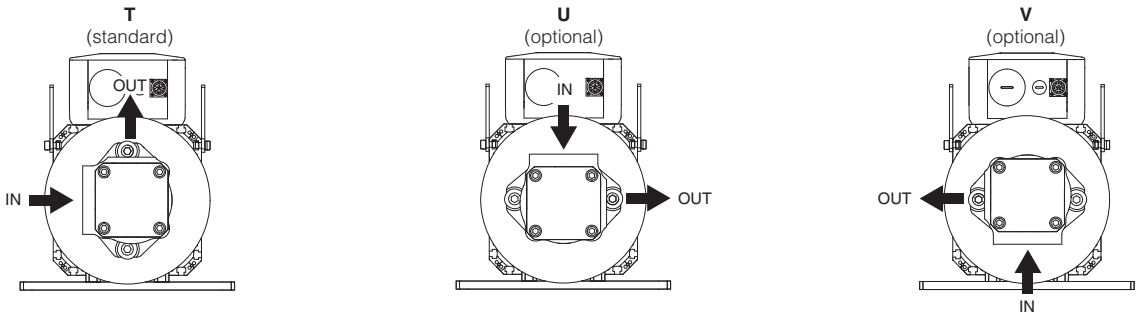
At the same time, two digital signals are generated by the Drive to confirm that the power supply to the motor has been removed and the absence of other anomalies. These signals are read by the machine control unit for safety management.

For more information see the S-MAN-STO manual.

Possible combined option:
/CK, /DK

10 PORTS ORIENTATION

The pump can be supplied with inlet and outlet ports oriented in different configurations, as shown in the figure (seen from the bottom of the pump)



TECHNICAL TABLES

THE COMPLETE DOCUMENTATION IS AVAILABLE AT WWW.ATOS.COM

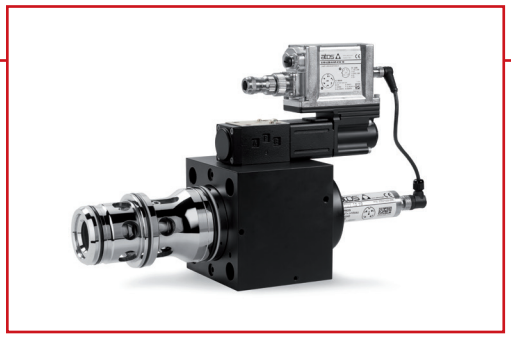
THE ATOS RANGE

PRODUCT LINES

The Atos range is represented by 3 product lines and 7 categories
to provide easy access to the wide and ever-evolving product portfolio

INDUSTRIAL

High performance
hydraulics meet
advanced digital
technology

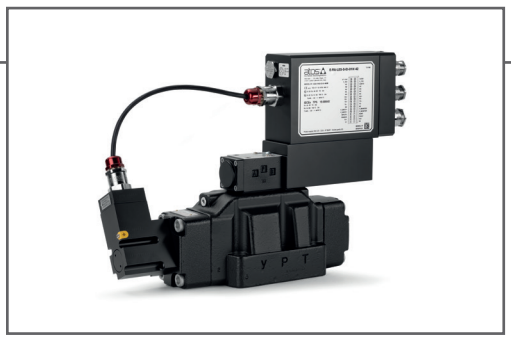


SECTORS:

- Manufacturing
- Defense
- Wind
- Construction
- Agriculture
- Transportation

EX-PROOF

Engineered for
safe operation
in hazardous
environments

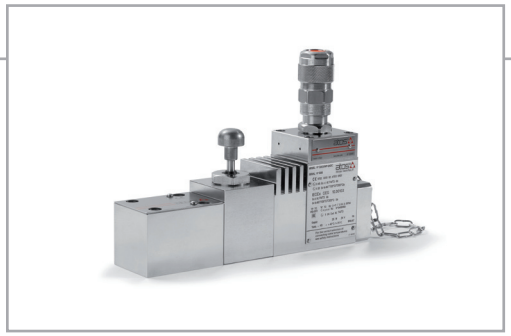


SECTORS:

- Oil & gas
- Mining
- Energy

STAINLESS STEEL

The highest resistance
to corrosive environments
and fluids

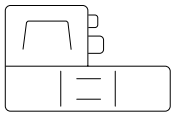


SECTORS:

- Marine
- Chemical
- Food

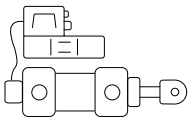
THE ATOS RANGE

PRODUCT CATEGORIES



PROPORTIONAL VALVES

A unique range, from simple valves without transducers to servoproportionals

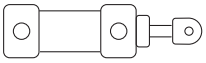


AXIS & P/Q CONTROLS

Servosystems for position, speed and force control of any hydraulic actuator

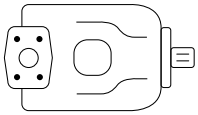
ON-OFF VALVES

A full range of reliable components to satisfy the most demanding applications



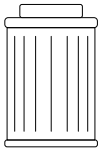
CYLINDERS

ISO executions with rugged design, engineered for high speeds, low friction and extended operative life



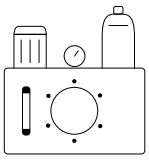
PUMPS & SERVOPUMPS

Fixed or variable displacement, for high pressure applications with low noise and long service life



FILTERS

Equipped with high efficiency microfiber elements for optimal fluid cleanliness



SYSTEMS

Power units and hydraulic blocks tailored for any hydraulic application, environment and working condition

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WE ARE SMART"

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