engineering beyond imagination

Single axis pilot control lever

ESJ01A

section with 35 mm pitch

ESJ01B

section with 39 mm pitch

ESJ01C

section with 42 mm pitch

Hydraulic remote control - Single service port

ESJ01V

Rev. 03 • September, 2024

TECHNICAL CATALOGUE

Servocontrols

HISTORY OF REVISIONS

DATE	PAGE	CHANGED	REV.
December, 2018	-	First edition	00
March, 2019	15 - 23	Modified sequence choices	01
May, 2023	13 - 14 - 16 - 19 - 20 - 21 - 22 23 - 24 - 25	Updated controls schema and metering curves. Added EHS8 lever. Added ESJ01B, ESJ01C and ESJ01V versions.	02
September, 2024	26 - 27 - 28 - 29 - 30 - 31	Spare parts list added	03

ABOUT THE MANUAL

This manual contains the technical instructions for the servocontrol ESJ01A, ESJ01B, ESJ01C and ESJ01V.
All information given in this manual is current and valid according to the information available at the time of publication.
The data specified above only serve to describe the product. EBI Motion controls reserves to modify or revise the instructions without prior notice.

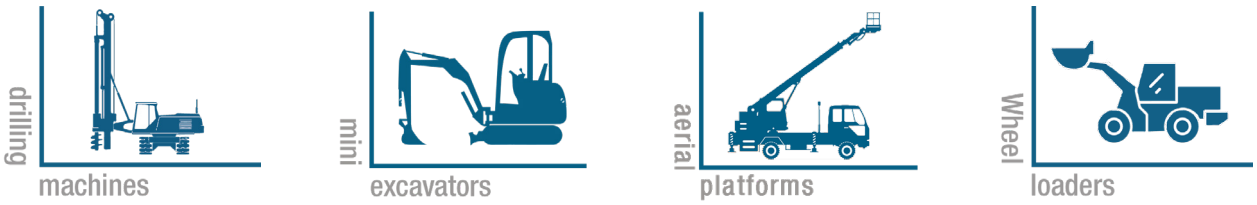
EBI Motion controls is not responsible for any damage caused by an incorrect use of the product.
Please visit www.ebimc.com for the most recent version of this manual.

CONTENTS

INTRODUCTION

SERVOCONTROLS

EBI motion controls servocontrols (joysticks and foot pedals) are used to control the work and drive hydraulics of modern mobile machines with high accuracy, safety and optimal performance. EBI motion controls servocontrols are maintenance free and have a long life cycle, are suited for specialized applications for a variety of mobile equipment such as:

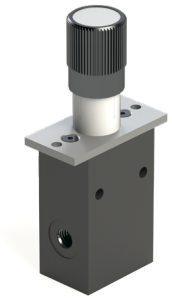


This Image represents a ESJ01A.

ESJ01A - ESJ01B - ESJ01C

SECTIONAL HYDRAULIC CONTROL DEVICE
SINGLE AXIS LEVER

Compact and light weight.
Progressive and sensitive operation.
Precise pressure control.
Low operating effort.
Optimised angular movements of joystick.
Control element protected with rubber bellow.
High durability and Maintenance free.



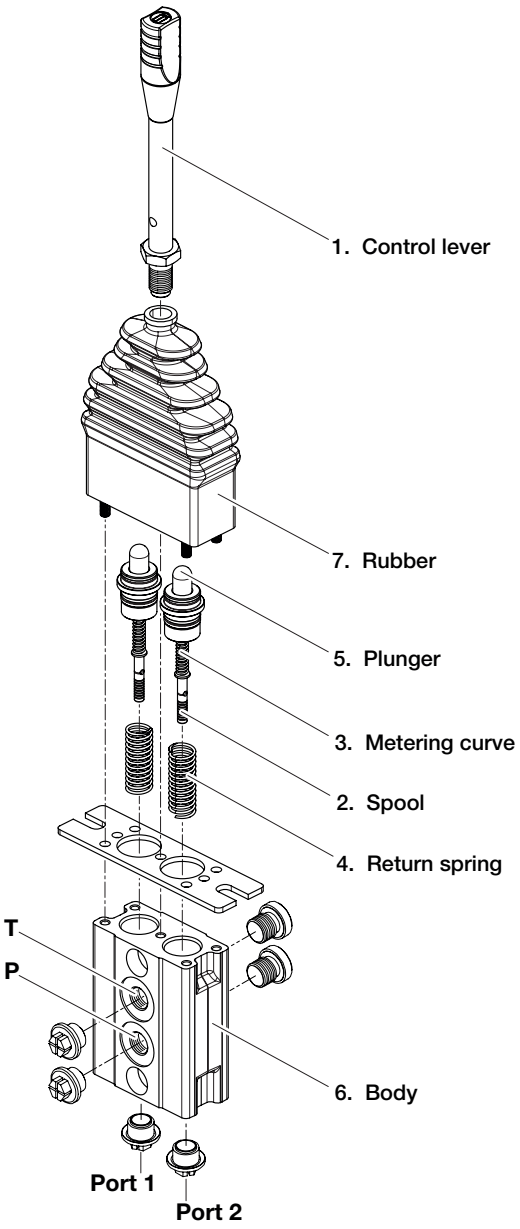
This Image represents a ESJ01V.

ESJ01V

HYDRAULIC REMOTE CONTROL
SINGLE SERVICE PORT

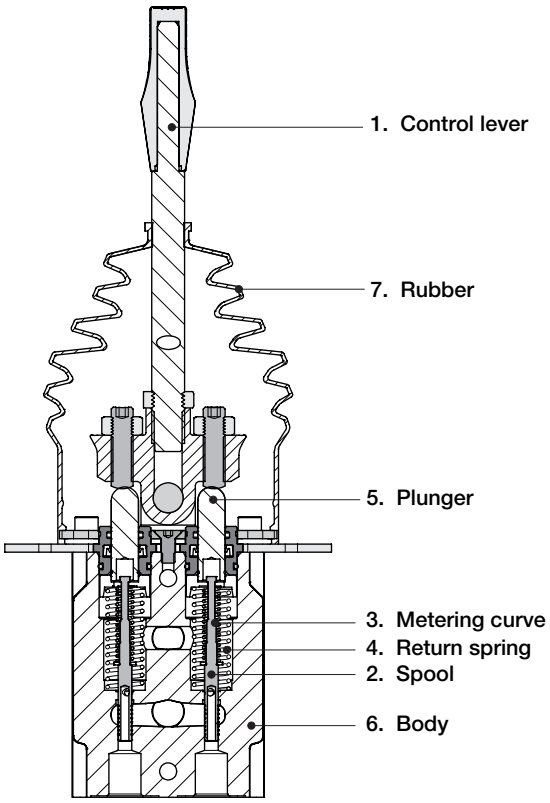
Compact and light weight.
Precise pressure control.
Low operating effort.
High durability and Maintenance free.

GENERAL INFORMATION



HYDRAULIC OPERATING PRINCIPLE

Sectional hydraulic control device operates on the basis of direct operated pressure reducing valves.
The control device basically comprises a control lever **(1)**, two pressure reducing valves and a body **(6)**. Each pressure reducing valve consists of a control spool **(2)**, a metering curve **(3)**, a return spring **(4)** and a plunger **(5)**.
In the non-actuated condition, the control lever is held in the neutral position by the return spring. The control ports (1 and 2) are connected to tank port T via the drilling.



When the control lever is deflected, the plunger is pressed against the return spring and the metering curve. The metering spring initially moves the control spool downwards and closes the connection between the relevant port and tank port T. At the same time, the relevant port is connected to port P via the drilling.

The control phase starts as soon as the control spool finds its balance between the force from the metering curve and the force resulting from the hydraulic pressure in the relevant ports (**ports 1, 2**).
As a result of the interaction of the control spool and the metering curve the pressure in the relevant ports is proportional to the stroke of the plunger and thus to the position of the control lever.

This pressure control as a function of the control lever position and the characteristics of the metering curve enables the proportional hydraulic control of directional valves and high response control valves for hydraulic pumps and motors.
A rubber bellow **(7)** protects the mechanical parts in the housing against contamination and ensures that the control device can also be used for the arduous applications.

GENERAL INSTRUCTIONS

INTENDED USE

Servocontrol ESJ01A, ESJ01B, ESJ01C and ESJ01V are designed for industrial use.

WARRANTY

Check the package and the product for transport damage when receiving goods. The package is not meant for long term storage; protect the product appropriately.
Do not dismantle the product. The warranty is void if the product has been disassembled.
The manufacturer is not responsible for damages resulting from misinterpreted, noncompliance, incorrect, or improper use of the product that goes against the instructions given in this document.

GENERAL SAFETY INSTRUCTIONS

The following instructions apply to all procedures associated with the product. Read these instructions carefully and follow them closely.

- Use necessary personal protective equipment when working with the product.
- Support the product properly; make sure the product cannot fall over or turn around by accident.
- Use only appropriate equipment and attachments for lifting and trasferring the product.
- Always use the lifting equipment properly and check the load-bearing capacity.
- Prevent unintended use of the product during installation and maintenance procedures.

WARNING SYMBOL

The following symbols can be used in this manual:

Note:
Useful information

Danger:
Danger of death or injury

Attention:
May cause damage to the product

PRODUCT IDENTIFICATION

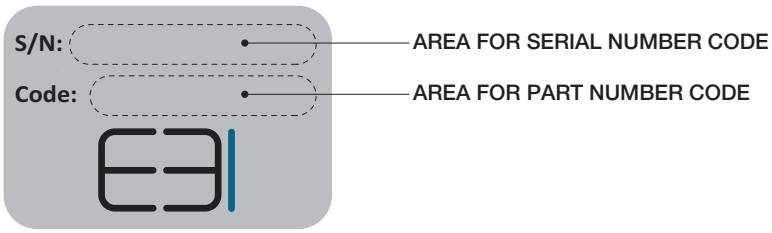
The product identification data can be found on the identification plate attached to the EBI product.

SERIAL NUMBER

all manufacturing data and all sales data can be found with the serial number

PART NUMBER CODE

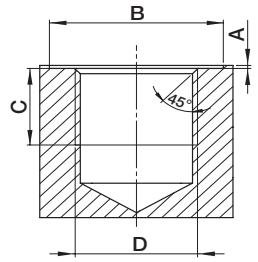
It is a number univocally identifying the configuration and pressure setting of a valve



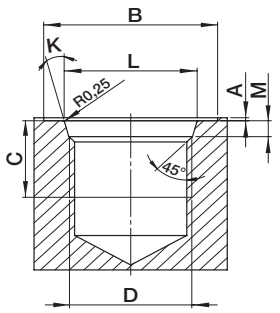
Note:
Serial number and part number code have 9 characters (letters and numbers).

PORT DETAILS

The connection port size is indicated by an ordering code common for all EBI products.
Following tables show all available connections.



BSP THREADS ISO 1179-1	D		C		B		A		CODE
	UNI-ISO 228	mm	*in*	mm	*in*	mm	*inc*	
	G 1/4	13	*0.51*	19	*0.75*	1	*0.094*	1B
	G 3/8	13	*0.51*	25	*0.98*	1	*0.04*	2B
	G 1/2	15	*0.59*	29	*1.14*	1.5	*0.06*	3B
	G 3/4	17	*0.67*	36	*1.42*	1.5	*0.06*	4B
	G 1	19	*0.75*	45	*1.77*	2	*0.08*	5B



UN/UNF THREADS ISO 11926-1	D		C		B		L		M		K	A		CODE
	ASA-B1-1	mm	*in*	mm	*in*	mm	*in*	mm	*in*		mm	*in*	
	9/16-18 UNF (SAE6)	13	*0.51*	26	*1.02*	15.6	*0.61*	2.5	*0.098*	12°	1	*0.04*	1S
	3/4-16 UNF (SAE8)	15	*0.59*	30	*1.18*	20.6	*0.81*	2.6	*0.102*	15°	1.5	*0.06*	2S
	7/8-14 UNF (SAE10)	17	*0.67*	34	*1.34*	23.9	*0.94*	2.6	*0.102*	15°	1.5	*0.06*	3S
	1”1/16-12 UNF (SAE12)	20	*0.79*	41	*1.61*	29.2	*1.15*	3.3	*0.13*	15°	1.5	*0.06*	4S
	1”5/16-12 UNF (SAE16)	20	*0.79*	50	*1.97*	35.5	*1.40*	3.3	*0.13*	15°	2	*0.08*	5S

UNITS OF MEASURE - CONVERSION FACTORS

LENGHT	FLOW RATE	MASS	FORCE WEIGHT	PRESSURE
1 mm = 0,0394 in	1 l = 0,2200 gal UK	1 kg = 2,205 lb	1 Nm = 0,1020 Kgf	1 bar = 100000 Pa
1 in = 25,4 mm	1 l = 0,2642 gal US	1 lb = 0,4536 kg	1 Kgf = 9,8067 Nm	1 bar = 14,5 psi
	1 gal UK = 4,546 l			1 Pa = 0,0001 bar
	1 gal UK = 1,2010 gal US			1 Pa = 0,00014 psi
	1 gal US = 3,785 l			1 psi = 0,0689 bar
	1 gal US = 0,8327 gal UK			1 psi = 6890 Pa

TECHNICAL DATA

All performances in this catalogue are obtained using mineral based hydraulic oil 46 cSt viscosity at 40°C (ISO VG 46 viscosity class). All joystyck servocontrols go through functional testing at these conditions before shipment.

HYDRAULIC STANDARD SPECIFICATIONS

Maximum input pressure ..... **100 bar - [1450 psi]**
Maximum back pressure on tank line ..... **3 bar - [43,5 psi]**
Control max flow on ports..... **15 l/min - [4 GPM]**
Hysteresis ..... **< 1 bar - [< 14,5 psi]**
Hydraulic fluid ..... **Mineral Oil HL, HLP (DIN 51524)** phosphate ester (HFD-R)
Fluid temperature range ..... **-20°C +80°C [-4°F +176°F]**
Fluid viscosity range ..... **10 ÷ 380 cSt**
Max contamination level ..... **9 (NAS 1638)** - 20/18/15 (ISO 4406:1999)
Recommended filtration ..... **ß10 > 75** - (ISO 16889:20008)
Leakage (single port) ..... **3 cm^3/min** - (with 100 bar of pressure)

MATERIAL STANDARD SPECIFICATIONS

Body material ..... **Cast iron**
Plunger material ..... **Stainless steel**
Plunger guide material ..... **Brass**

GENERAL STANDARD SPECIFICATIONS

Type of connection ..... **BSP thead (ISO 1179-1) - SAE thead (ISO 11926-1)**

SEALS

O-Rings: **Buna N** (acrylonitrile butadiene), also named **NBR** (according to ASTM), compatible with fluids having mineral oil base, water in oil emulsions, and water glycol fluids.
These seals are standard for temperatures within the range -20°C and +80°C

Back-up rings and Slide rings: **strengthened PTFE** (Politetrafluoroetilene like Teflon®, Lubriflon®, Ecoflon®, or similar).
Special FPM (Viton®) seals are available on request.

Note: the seal materials are compatible with the fluids normally used in hydraulic systems; in case of special fluids, if you suspect incompatibility between the fluid used and the standard seals, contact the EBI motion controls service network.

HYDRAULIC FLUID

Mineral oil based hydraulic fluids suitable for hydraulic systems can be used; they should have physical lubricating and chemical properties as specified by:
MINERAL OIL BASED HYDRAULIC FLUIDS HL (DIN 51524 part 1)
MINERAL OIL BASED HYDRAULIC FLUIDS HLP (DIN 51524 part 2)
For use of environmentally friendly fluids (vegetable or polyglycol base), or other fluids, please contact EBI.

OIL AND SOLUTIONS - ISO 6743/4	(°C) MIN	(°C) MAX	COMPATIBLE SEAL
Mineral Oil HL, HM or HLP	-25	+80	NBR
Oil in water emulsion HFA	+5	+55	NBR
Oil in water emulsion HFB	+5	+55	NBR
Polyglycol-based aqueous solution HFC	-10	+60	NBR

Hydraulic fluids are available in different viscosity classes identified by the ISO VG number, which corresponds to the kinematic viscosity at 40°C. Here is a table showing typical viscosity changes between 0°C and 100°C for mineral oil based fluids having various viscosity classes. The fluid should be selected with the aim to achieve an appropriate operating viscosity at the expected working temperature.

VISCOSITY CLASS AND FILTRATION DATA			
Viscosity class	*kinematic viscosity (cSt)*		
	maximum (0° C)	*medium (40° C)*	*minimum (100° C)*
ISO VG 10	90	10	2.4
ISO VG 22	300	22	4.1
ISO VG 32	420	32	5.0
ISO VG 46	780	46	6.1
ISO VG 68	1400	68	7.8
ISO VG 100	2560	100	9.9

FLUID CLEANLINESS REQUIREMENTS

The cause of malfunctions in hydraulics is often found to be excessive fluid contamination. The hard contaminant particles in the fluid wear the hydraulic components and prevent the poppets from re-seating, with consequent internal leakage and system inefficiency. For the correct operation it is necessary to adopt filtration methods which guarantee for life the specified fluid cleanliness level. It is important to ensure that hydraulic fluids are brought to the appropriate cleanliness level prior filling up the systems, and, when in doubt, also to flush the hydraulic components prior to installation.

FILTRATION RATIO $BETA_x$:

It is the ratio between the number of particles before and after the filter with diameter larger than X micron.

ABSOLUTE FILTRATION RATIO ISO 4572:

It is the diameter X of the largest particle with $BETA_x \geq 75$.

CONTAMINATION CLASS ISO 4406:

It is expressed by 3 scale numbers representing respectively: the number of particles equal to or larger than 4µm, the number of particles equal to or larger than 6µm, the number of particles equal to or larger than 14µm contained in 1 ml of fluid.

CONTAMINATION CLASS NAS 1638:

it's expressed by one scale numbers representing the number of particles of different size ranges contained in 1 ml of fluid.

FILTRATION RECOMMENDATION

Type	Nominal filtration *(micron)*	Absolute filtation rating *ISO 4572 ($BETA_x \geq 75$)*	Contamination class	
			ISO 4406	*NAS 1638*
System/components operating at *HIGH PRESSURE > 250 bar* *HIGH DUTY CYCLE APPLICATIONS* Systems/components with *LOW* dirt tolerance	10	X = 10... 12	19/17/14	8
System/components operating at *MEDIUM HIGH PRESSURE* *HIGH DUTY CYCLE APPLICATIONS* Systems/components with *MODERATELY* dirt tolerance	15	X = 12... 15	20/18/15	9
System/components operating at *LOW PRESSURE < 100 bar* *LOW DUTY CYCLE APPLICATIONS* Systems/components with *GOOD* dirt tolerance	25	X = 15... 25	21/19/16	10

Attention:

If the filtration demands are not met, the valve poppets can jam in the open position, with the result that the valve remains actuated. It is not possible to force back jammed poppets mechanically.

APPLICATION AND SAFETY GUIDELINES

STORAGE OF NEW PRODUCTS

Encapsulated by a protective wrapping, the products shall not be exposed to direct sunlight nor to source of heat or ozone and kept in a dry place at a temperature between -20°C +50°C.

SAFETY GUIDELINES

During any operation on servocontrols, it is recommended to pay attention to components surfaces temperature.

The circuit functions are to be so designed that uncontrolled machine movements, caused by the application, are prevented and that it is possible to switch from one function to another.

Take into account all of the application limits, particularly those application limits stated within this technical catalogue.

It is recommended to follow these steps and only trained and competent personnel may carry out any work on EBI motion controls servocontrols:

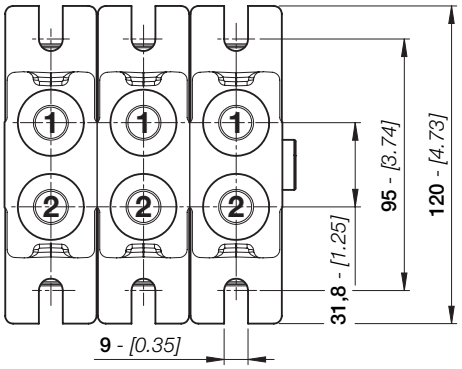
- Do not direct the jet of a pressure washing unit directly to the unit.
- During operation protection via the rubber boot must be ensured.
- Ensure that all matching surfaces are clean, without contamination.
- Ensure that all seals and back-up rings for the matching surfaces are flawless and correctly placed.
- Do not put any sealing material other than the standard seals.
- During the assembly of the complete servocontrol and/or the group of servocontrol, refer to the hydraulic scheme and to the name assigned to each port.
- Do not hang the servocontrol and/or the group of servocontrol to the hydraulics pipes, but always use the specific fixing holes.
- Place in position the servocontrol, then, by hand, insert the fittings and the locating screws.
- Finally tighten with a calibrated torque wrench and torque up to the specifications shown in the catalogue.
- Use gloves in order to avoid accidental injuries during installation or maintenance.
- Do not grab / handle product from moving parts (i.e. cables, levers,...etc.)
- All servocontrols or groups of servocontrols are attributable to pressure vessels. It‘s always recommended to place the components in a closed but ventilated compartment, able to protect the environment and users in case of accidental ejection of material under pressure (fittings, pipes, plugs expander... etc.)
- Do not tamper with the servocontrol.
- Before removing or disassembling the complete servocontrol or allowed parts (as pressure gauge ports, purge plugs, …etc) it is strongly recommended to vent all hydraulic pressure from the system.
- During the first start of the machine, please ensure that the grounding system is connected and stay away from moving parts.
- In case of allowed adjustments on the valve, any maximum value indicated in catalogue must not be exceeded.

Attention:

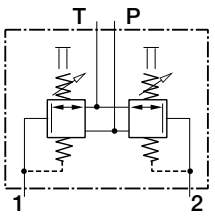
These guidelines are not intended to be considered as complete

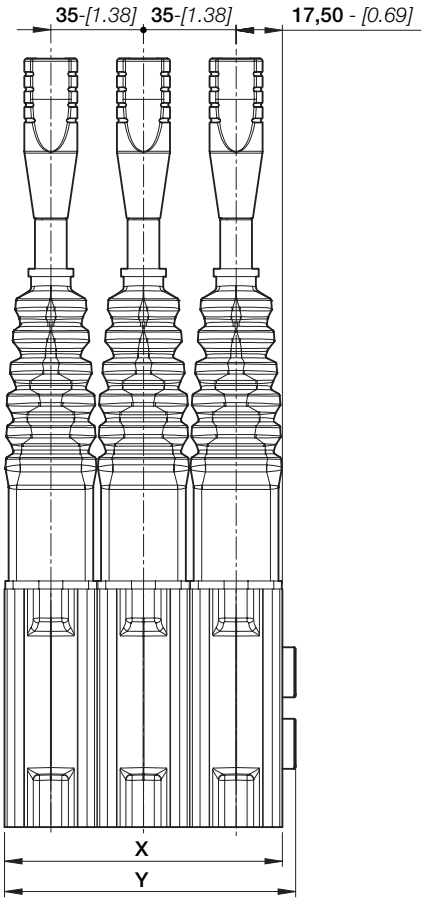
DIMENSIONS - HYDRAULIC SYMBOL

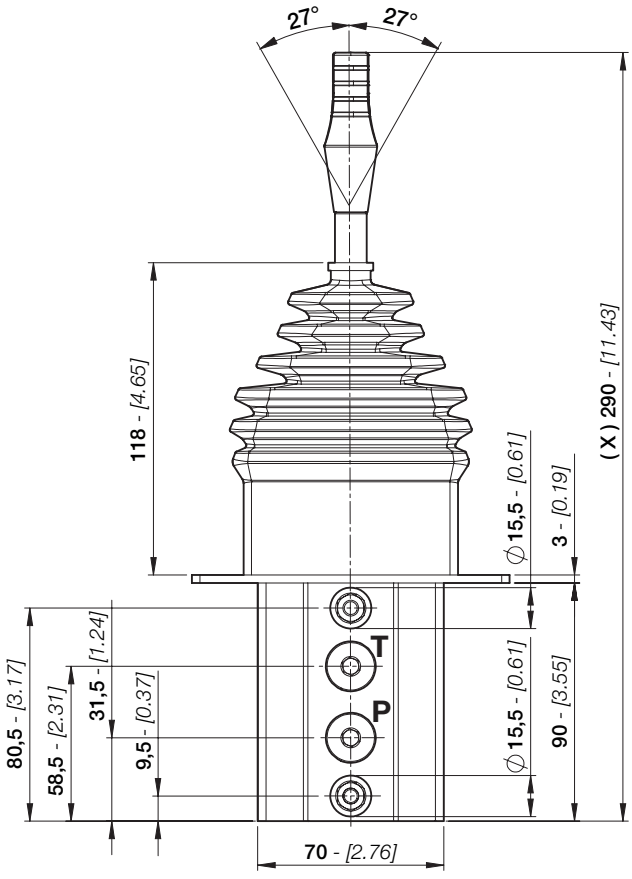
This drawing represents a ESJ01A with 3 sections, standard assembly and BSP configuration.



HYDRAULIC SYMBOL
Single function configuration







STANDARD CONNECTIONS FOR ESJ01A - ESJ01B - ESJ01C

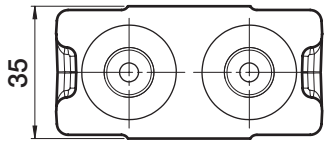
TYPE	BSP ISO 1179-1	UN-UNF ISO 11926-1
INLET - P	G 1/4	9/16-18 UNF
PORTS - 1/2	G 1/4	9/16-18 UNF
OUTLET - T	G 1/4	9/16-18 UNF

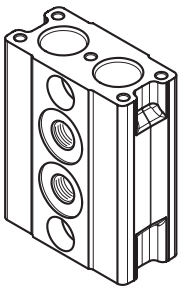
DIMENSIONAL (X)

HANDLE TYPE	X mm - *[in]*
EHS1	290 - *[11.43]*
EHS3	290 - *[11.43]*
EHS5	290 - *[11.43]*
EHS6	281 - *[11.07]*

TECHNICAL SPECIFICATIONS - ESJ01A

TYPE	X mm - [in]	Y mm - [in]	WEIGHT kg - [lb]
ESJ01A/1	35 - [1.38]	40 - [1.58]	1,80 - [3.97]
ESJ01A/2	70 - [2.76]	75 - [2.96]	3,60 - [7.94]
ESJ01A/3	105 - [4.10]	110 - [4.33]	5,40 - [11.25]
ESJ01A/4	140 - [5.50]	145 - [5.71]	7,20 - [15.88]
ESJ01A/5	175 - [6.90]	180 - [7.09]	9,00 - [19.85]
ESJ01A/6	210 - [8.27]	215 - [8.47]	10,80 - [23.81]
ESJ01A/7	245 - [9.65]	250 - [9.85]	12,60 - [27.78]
ESJ01A/8	280 - [11.03]	285 - [11.23]	14,40 - [31.75]
ESJ01A/9	315 - [12.41]	320 - [12.61]	16,20 - [35.72]
ESJ01A/10	350 - [13.79]	355 - [13.99]	18,00 - [39.70]
ESJ01A/11	385 - [15.17]	390 - [15.37]	19,80 - [43.66]
ESJ01A/12	420 - [16.55]	425 - [16.75]	21,60 - [47.63]

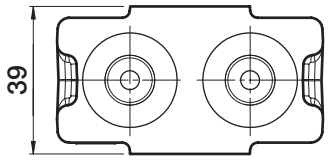


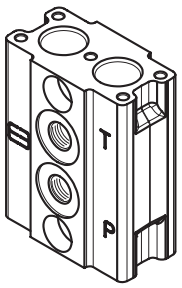


ESJ01A
PITCH = 35 mm

TECHNICAL SPECIFICATIONS - ESJ01B

TYPE	X mm - [in]	Y mm - [in]	WEIGHT kg - [lb]
ESJ01B/1	39 - [1.54]	54 - [1.73]	1,88 - [4.15]
ESJ01B/2	78 - [3.07]	83 - [3.27]	3,76 - [8.30]
ESJ01B/3	117 - [4.61]	122 - [4.81]	5,64 - [12.45]
ESJ01B/4	156 - [6.15]	161 - [6.34]	7,52 - [16.60]
ESJ01B/5	195 - [7.68]	200 - [7.88]	9,40 - [20.75]
ESJ01B/6	234 - [9.22]	239 - [9.42]	11,28 - [24.90]
ESJ01B/7	273 - [10.76]	278 - [10.95]	13,16 - [29.5]
ESJ01B/8	312 - [12.29]	317 - [12.49]	15,04 - [33.20]
ESJ01B/9	351 - [13.83]	356 - [14.03]	16,92 - [37.5]
ESJ01B/10	390 - [15.37]	395 - [15.56]	18,80 - [41.50]
ESJ01B/11	429 - [16.90]	434 - [17.10]	20,68 - [45.65]
ESJ01B/12	468 - [18.44]	473 - [18.64]	22,56 - [49.80]

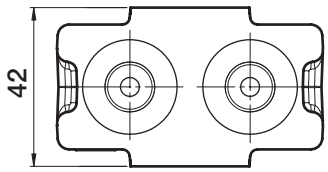


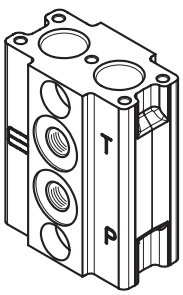


ESJ01B
PITCH = 39 mm

TECHNICAL SPECIFICATIONS - ESJ01C

TYPE	X mm - [in]	Y mm - [in]	WEIGHT kg - [lb]
ESJ01C/1	42 - [1.65]	47 - [1.85]	1,95 - [4.30]
ESJ01C/2	84 - [3.31]	89 - [3.51]	3,90 - [8.60]
ESJ01C/3	126 - [4.96]	131 - [5.16]	5,85 - [12.90]
ESJ01C/4	168 - [6.62]	173 - [6.82]	7,80 - [17.20]
ESJ01C/5	210 - [8.27]	215 - [8.47]	9,75 - [21.50]
ESJ01C/6	252 - [9.93]	257 - [10.13]	11,70 - [27.80]
ESJ01C/7	294 - [11.58]	299 - [11.78]	13,65 - [30.10]
ESJ01C/8	336 - [13.24]	341 - [13.44]	15,60 - [34.40]
ESJ01C/9	378 - [14.89]	383 - [15.09]	17,55 - [38.70]
ESJ01C/10	420 - [16.55]	425 - [16.75]	19,50 - [43.00]
ESJ01C/11	462 - [18.20]	467 - [18.40]	21,45 - [47.30]
ESJ01C/12	504 - [19.85]	509 - [20.05]	23,40 - [51.60]



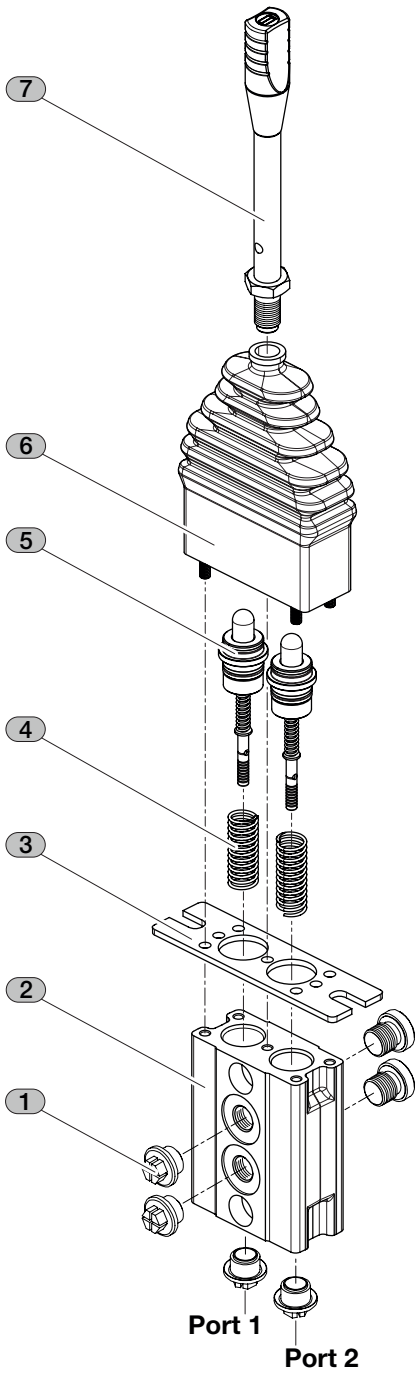


ESJ01C
PITCH = 42 mm

ORDERING CODES

The order code below provides an example of servocontrol ESJ01A with standard configuration.
This example represents a ESJ01A with single section; you can configure a ESJ01A, ESJ01B and ESJ02C up to 12 sections. See pages 15 - 23 for more information about the different options available.

product						1			2						3			4		5				4		5				6			7			
E	S	J	0	1	A	N	1	S	B	J	A	1	1	S	F	P	1	S	1	M	V	0	1	S	1	M	V	0	1	C	0	1	E	H	S	1



PRODUCT	DESCRIPTION
ESJ01A	Single axis lever - Pitch = 35 mm
ESJ01B	Single axis lever - Pitch = 39 mm
ESJ01C	Single axis lever - Pitch = 42 mm

POSITION	CODE	DESCRIPTION	PAGE
1	N1S	Assembly section	15
2	BJA11S	Body classification	16
3	FP1	Fixing plate	17
4	S1	Return spring (port 1)	18
5	MV01	Metering curve (port 1)	19
4	S1	Return spring (port 2)	18
5	MV01	Metering curve (port 2)	19
6	C01	Control actuation	21
7	EHS1	Control lever	23

Note:

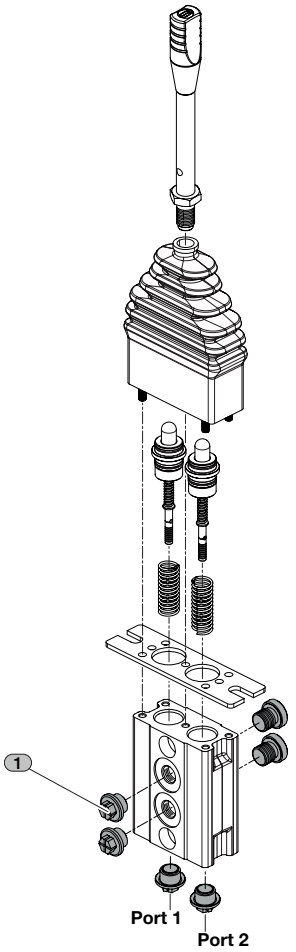
Ordering code from position 2 to 7, must be repeated for each section..

EXAMPLE OF ESJ01A WITH 3 SECTION:

ESJ01A N3S
BJA11S FP1 S1 MV01 S1 MV01 C01 EHS1
BJA11S FP1 S1 MV01 S1 MV01 C01 EHS1
BJA11S FP1 S1 MV01 S1 MV01 C01 EHS1

ASSEMBLY SECTION

product	1	2	3	4	5	4	5	6	7
E S J 0 1 A	N 1 S	B J A 1 1 S	F P 1	S 1	M V 0 1	S 1	M V 0 1	C 0 1	E H S 1



All servocontrols ESJ01A, ESJ01B and ESJ01C include an assembly section kit. Assembly kit for single section is composed by 2 port plugs and 4 plastic plugs. Assembly kits with up to 12 sections also contain tie rods, nuts, growers and o-rings.

CODE	DESCRIPTION
N1B	Assembly for single section
N2B	Assembly for 2 sections
N3B	Assembly for 3 sections
N4B	Assembly for 4 sections
N5B	Assembly for 5 sections
N6B	Assembly for 6 sections
N7B	Assembly for 7 sections
N8B	Assembly for 8 sections
N9B	Assembly for 9 sections
N10B	Assembly for 10 sections
N11B	Assembly for 11 sections
N12B	Assembly for 12 sections

ONLY WITH BSP PORT

CLAMPING TORQUE: 14 Nm

CODE	DESCRIPTION
N1S	Assembly for single section
N2S	Assembly for 2 sections
N3S	Assembly for 3 sections
N4S	Assembly for 4 sections
N5S	Assembly for 5 sections
N6S	Assembly for 6 sections
N7S	Assembly for 7 sections
N8S	Assembly for 8 sections
N9S	Assembly for 9 sections
N10S	Assembly for 10 sections
N11S	Assembly for 11 sections
N12S	Assembly for 12 sections

ONLY WITH SAE PORT

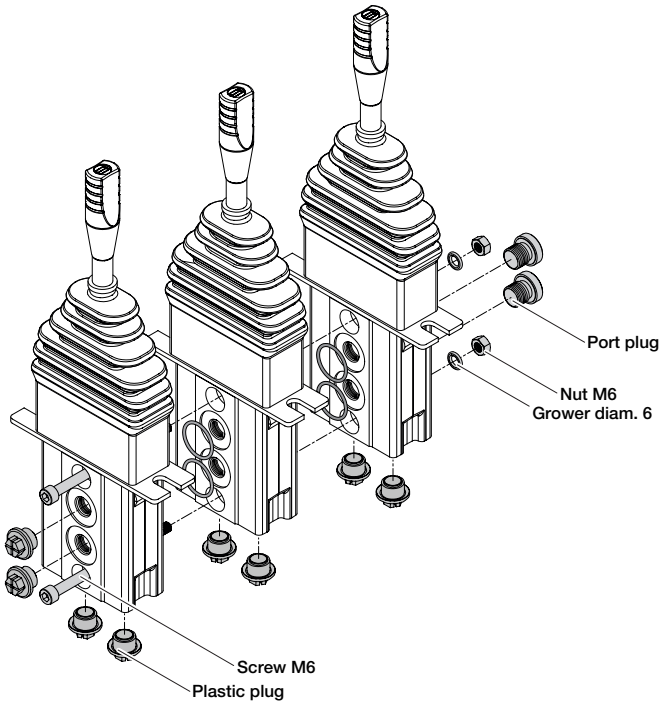
CLAMPING TORQUE: 14 Nm

EXAMPLE OF SERVOCONTROL WITH 3 SECTIONS

These assembly sections including:
- 2 tie rods
- 8 plastic plugs
- 2 port plugs
- 4 O-rings.

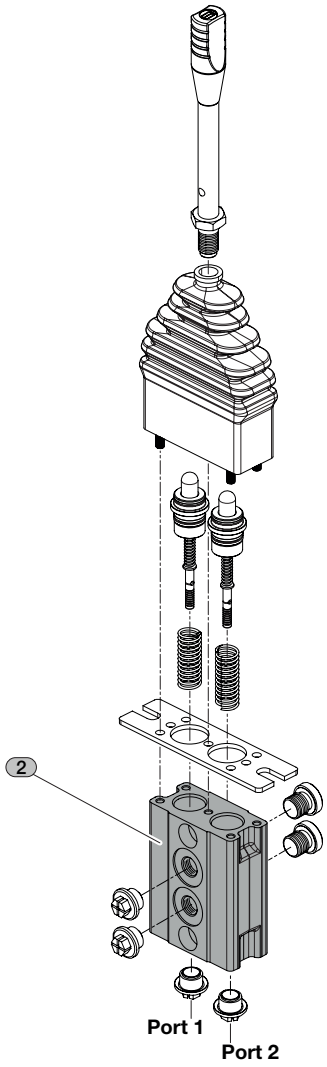
Tie rod's lenght depends on the number of sections.
The quantity of O-ring depends on the number of sections (there are 2 O-rings each 2 sections).
The quantity of plastic plugs depends on the number of sections.

Note:
In some cases the tie rod can be replaced by a commercial screw M6 (see exploded view on the right).



BODY CLASSIFICATION

product	1	2	3	4	5	4	5	6	7
E S J 0 1 A	N 1 S	B J A 1 1 S	F P 1	S 1	M V 0 1	S 1	M V 0 1	C 0 1	E H S 1

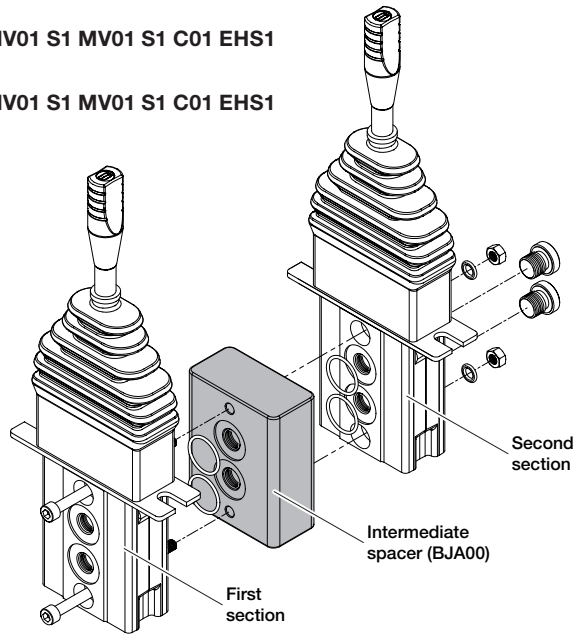


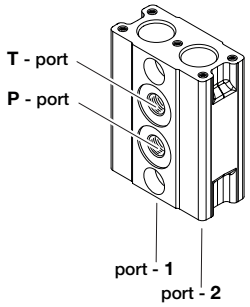
Body arrangement is available in two configurations:
SAE thread or BSP thread.
For different applications, contact our Sales Office.

Note:
To space the sections and allow the correct control of the handles, it is possible to set up the joystick with an intermediate spacer. It is identified by the code BJA0 (see the following example).

EXAMPLE OF ESJ01A WITH INTERMEDIATE SPACER:

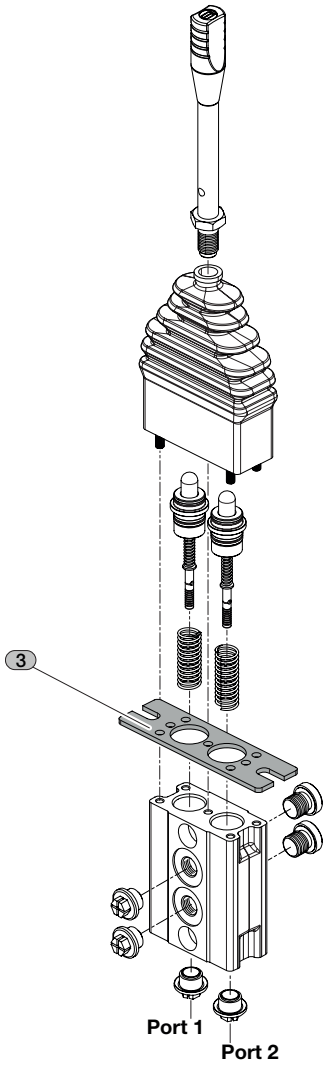
ESJ01A N3S
BJA11S FP1 MV01 S1 MV01 S1 C01 EHS1
BJA0
BJA11S FP1 MV01 S1 MV01 S1 C01 EHS1



PRODUCT	CODE	DESCRIPTION	DRAWING
ESJ01A	BJA11S	Standard body P-T lower with ports 9/16”-18 UNF (SAE6)	
ESJ01B	BJB11S		
ESJ01C	BJC11S		
ESJ01A	BJA11B	Standard body P-T lower with ports G 1/4	
ESJ01B	BJB11B		
ESJ01C	BJC11B		

FIXING PLATE

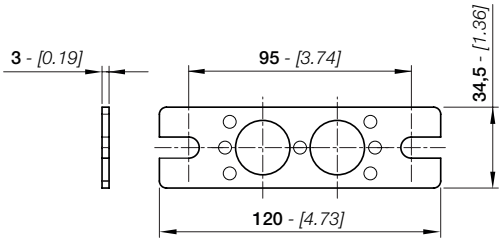
product	1	2	3	4	5	4	5	6	7
E S J 0 1 A	N 1 S	B J A 1 1 S	F P 1	S 1	M V 0 1	S 1	M V 0 1	C 0 1	E H S 1



The fixing plate allows the correct installation of the servocontrol on the customer machine system.

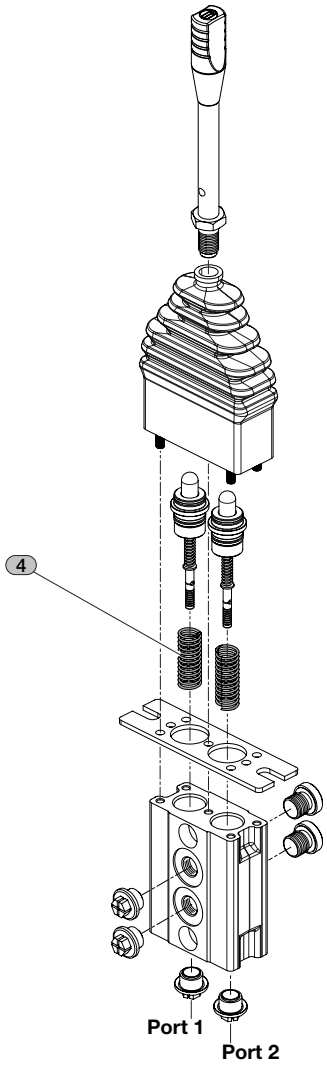
The following is the standard fixing plate (FP1).

For different dimensions or special applications, contact our Sales Office.

CODE	DESCRIPTION	DRAWING
FP1	Standard fixing plate	

RETURN SPRING

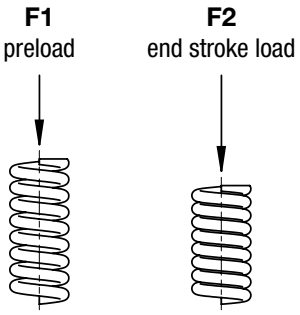
product	1	2	3	4	5	4	5	6	7
E S J 0 1 A	N 1 S	B J A 1 1 S	F P 1	S 1	M V 0 1	S 1	M V 0 1	C 0 1	E H S 1



All servocontrols are equipped with 2 return springs (one spring each service port).

Two types of springs are available; the relative values are shown here below.

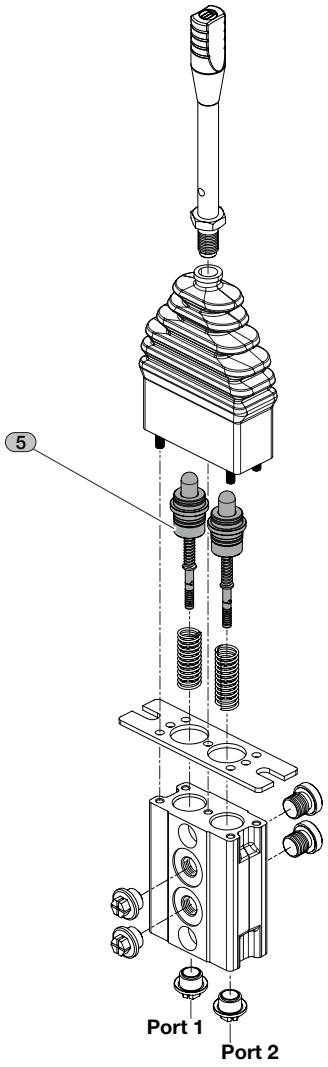
For different values or different applications please contact our Sales Office.



CODE	PRELOAD		END STROKE LOAD	
	Nm	*Kgf*	Nm	*Kgf*
S1	15	*1,53*	28	*2,86*
S2	24	*2,45*	40	*4,08*

METERING CURVE

product	1	2	3	4	5	4	5	6	7
E S J 0 1 A	N 1 S	B J A 1 1 S	F P 1	S 1	M V 0 1	S 1	M V 0 1	C 0 1	E H S 1



All servocontrols are equipped with 2 metering curves (one metering curve each service port).

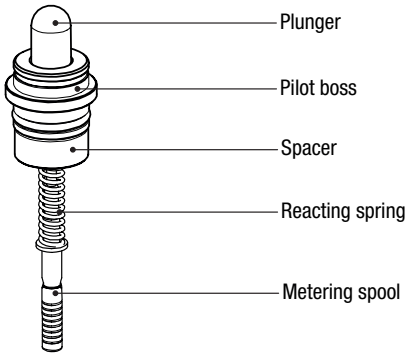
The metering curve classification depends on the working pressure (bar - *psi*) and stroke lenght (mm - *in*).

Currently two types of metering curves are available:

- **Linear curve with step (MV type)**
- **Linear curve without step (MZ type)**

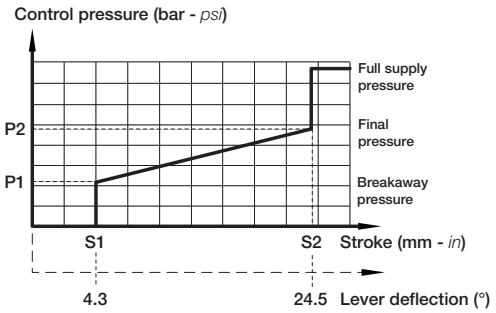
All metering curves are interchangeable.

For different values or different applications please contact our Sales Office.



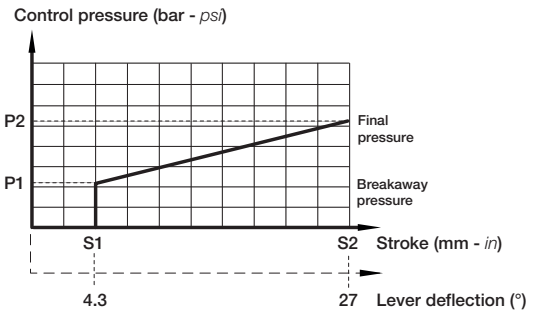
CODE	PRESSURE				STROKE			
	P1		P2		S1		S2	
	bar	*psi*	bar	*psi*	mm	*in*	mm	*in*
MV01	5	*72.5*	25	*362,5*	1.2	*0,05*	7.2	*0,28*
MV02	5.8	*84,1*	19.5	*282,7*	1.2	*0,05*	7.2	*0,28*
MV03	5	*72,5*	22	*319*	1.2	*0,05*	7.2	*0,28*
MV04	5	*72,5*	15	*217.5*	1.2	*0,05*	7.2	*0,28*
MV05	5	*72,5*	20	*290*	1.2	*0,05*	7.2	*0,28*
MV06	7.5	*108,8*	29	*420,5*	1.2	*0,05*	7.2	*0,28*
MV07	8	*116*	28	*406*	1.2	*0,05*	7.2	*0,28*
MV08	2	*29*	18	*261*	1.2	*0,05*	7.2	*0,28*
MV10	7	*101.5*	17	*246.5*	1.2	*0,05*	7.2	*0,28*
MV11	3	*43.5*	22.2	*321.9*	1.2	*0,05*	7.2	*0,28*
MV12	6.8	*98.6*	23.5	*340.8*	1.2	*0,05*	7.2	*0,28*
MV13	3	*43.5*	28	*406*	1.2	*0,05*	7.2	*0,28*
MV14	14.7	*213.2*	28.4	*411.8*	1.2	*0,05*	7.2	*0,28*
MV16	2	*29*	11.5	*166.8*	1.2	*0,05*	7.2	*0,28*
MV21	5.8	*84.1*	18.3	*265.4*	1.2	*0,05*	7.2	*0,28*
MV22	3.5	*50.8*	13.5	*195.8*	1.2	*0,05*	7.2	*0,28*
MV26	2	*29*	26	*377*	1.2	*0,05*	7.2	*0,28*
MV35	5	*72.5*	13.8	*200.1*	1.2	*0,05*	7.2	*0,28*
MV36	5	*72.5*	18.2	*263.9*	1.2	*0,05*	7.2	*0,28*
MV37	10	*145*	20	*290*	1.2	*0,05*	7.2	*0,28*
MV40	6	*87*	40	*580*	1.2	*0,05*	7.2	*0,28*

MV
linear curve with step



CODE	PRESSURE				STROKE			
	P1		P2		S1		S2	
	bar	*psi*	bar	*psi*	mm	*in*	mm	*in*
MZ01	5	*72.5*	25	*362,5*	1.2	*0,05*	8	*0,32*
MZ02	5.8	*84,1*	19.5	*282,7*	1.2	*0,05*	8	*0,32*
MZ03	5	*72,5*	22	*319*	1.2	*0,05*	8	*0,32*
MZ04	5	*72,5*	15	*217.5*	1.2	*0,05*	8	*0,32*
MZ05	5	*72,5*	20	*290*	1.2	*0,05*	8	*0,32*
MZ06	7.5	*108,8*	29	*420,5*	1.2	*0,05*	8	*0,32*
MZ07	8	*116*	28	*406*	1.2	*0,05*	8	*0,32*
MZ08	2	*29*	18	*261*	1.2	*0,05*	8	*0,32*
MZ15	5	*72.5*	16.3	*236.4*	1.2	*0,05*	8	*0,32*
MZ23	1.2	*17.4*	18.9	*274.1*	1.2	*0,05*	8	*0,32*
MZ25	4	*58*	18	*261*	1.2	*0,05*	8	*0,32*
MZ27	5.5	*79.8*	29	*420.5*	1.2	*0,05*	8	*0,32*
MZ28	3	*43.5*	24.8	*359.6*	1.2	*0,05*	8	*0,32*
MZ33	2	*29*	19.3	*279.9*	1.2	*0,05*	8	*0,32*

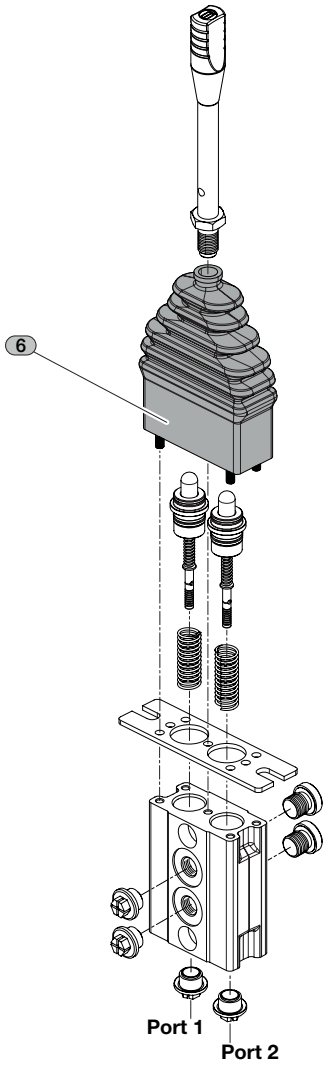
MZ
linear curve without step



On request are available broken line metering curves with step and broken line metering curves without step.
For different values or different applications please contact our Sales Office.

CONTROL ACTUATION

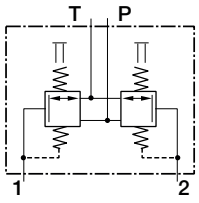
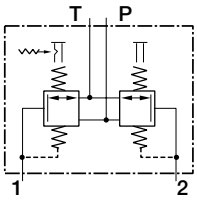
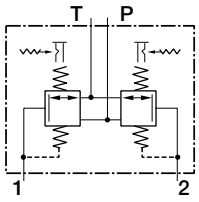
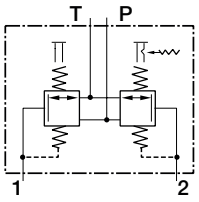
product	1	2	3	4	5	4	5	6	7
E S J 0 1 A	N 1 S	B J A 1 1 S	F P 1	S 1	M V 0 1	S 1	M V 0 1	C 0 1	E H S 1

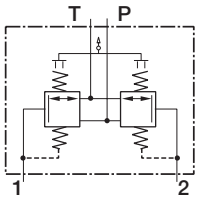
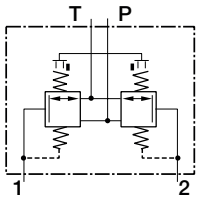
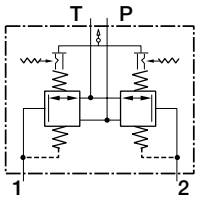
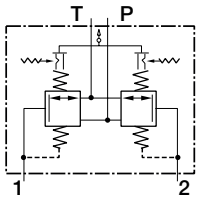
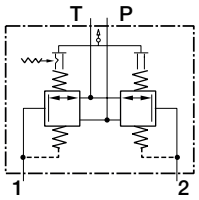
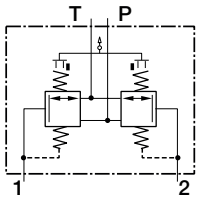
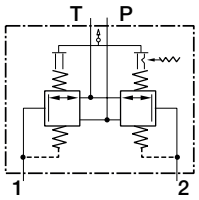
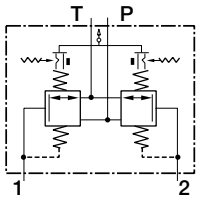


Several different types of controls actuation are available; the controls shown correspond to standard arrangement, for different applications please contact our Sales Office.

Linear levers can be equipped with a detent that locks the lever in the fully actuated position (for one or both control-pressure ports)

All controls actuation type are interchangeable.

CODE	DESCRIPTION	HYDRAULIC SYMBOL	CODE	DESCRIPTION	HYDRAULIC SYMBOL
C01	Return spring in neutral		C03	Mechanical detent in 1	
C02	Mechanical detent in 1-2		C04	Mechanical detent in 2	

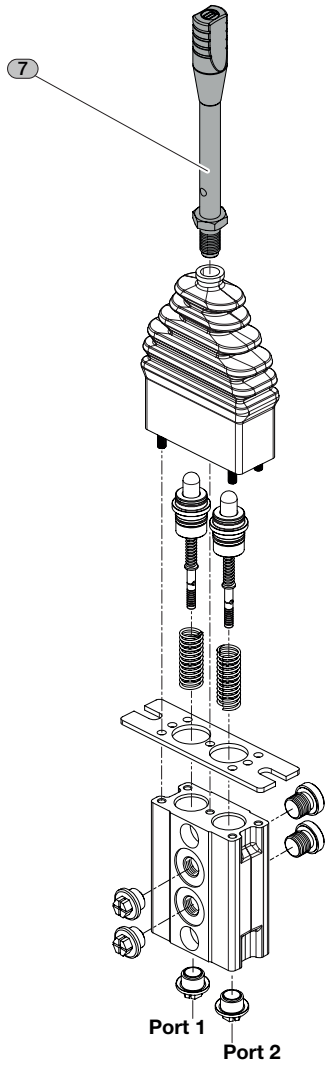
CODE	DESCRIPTION	HYDRAULIC SYMBOL	CODE	DESCRIPTION	HYDRAULIC SYMBOL
C11	Mechanical detent in N (arch version)		C15	Friction (arch version)	
C12	Mechanical detent in 1-2 (arch version)		C16	Mechanical detent in 1-N-2 (arch version)	
C13	Mechanical detent in 1 (arch version)		C17	Friction and security function in neutral (arch version)	
C14	Mechanical detent in 2 (arch version)		C18	Friction and Mechanical detent in 1-N-2 (arch version)	

CONTROL ACTUATION AND CONTROL LEVER COMPATIBILITY

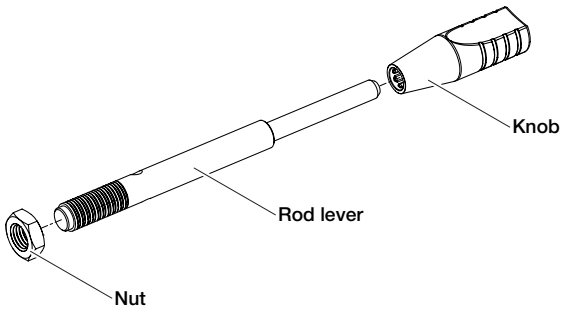
code	EHS1	EHS3	EHS5	EHS6	EHS8
C01	•		•		•
C02	•		•		•
C03	•		•		•
C04	•		•		•
C11		•			
C12		•			
C13		•			
C14		•			
C15				•	
C16		•			
C17		•			
C18		•			

CONTROL LEVER

product	1	2	3	4	5	4	5	6	7
E S J 0 1 A	N 1 S	B J A 1 1 S	F P 1	S 1	M V 0 1	S 1	M V 0 1	C 0 1	E H S 1



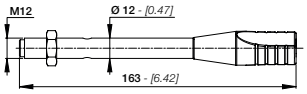
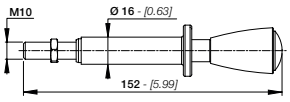
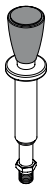
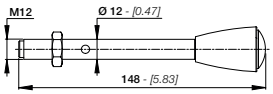
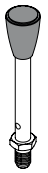
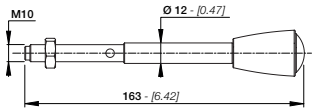
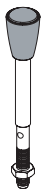
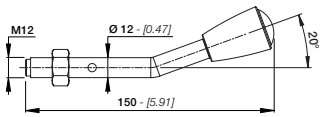
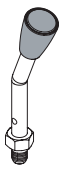
Each rod lever kit includes a rod lever, a nut and a knob. This example shows a rod lever kit EHS1.



Note:

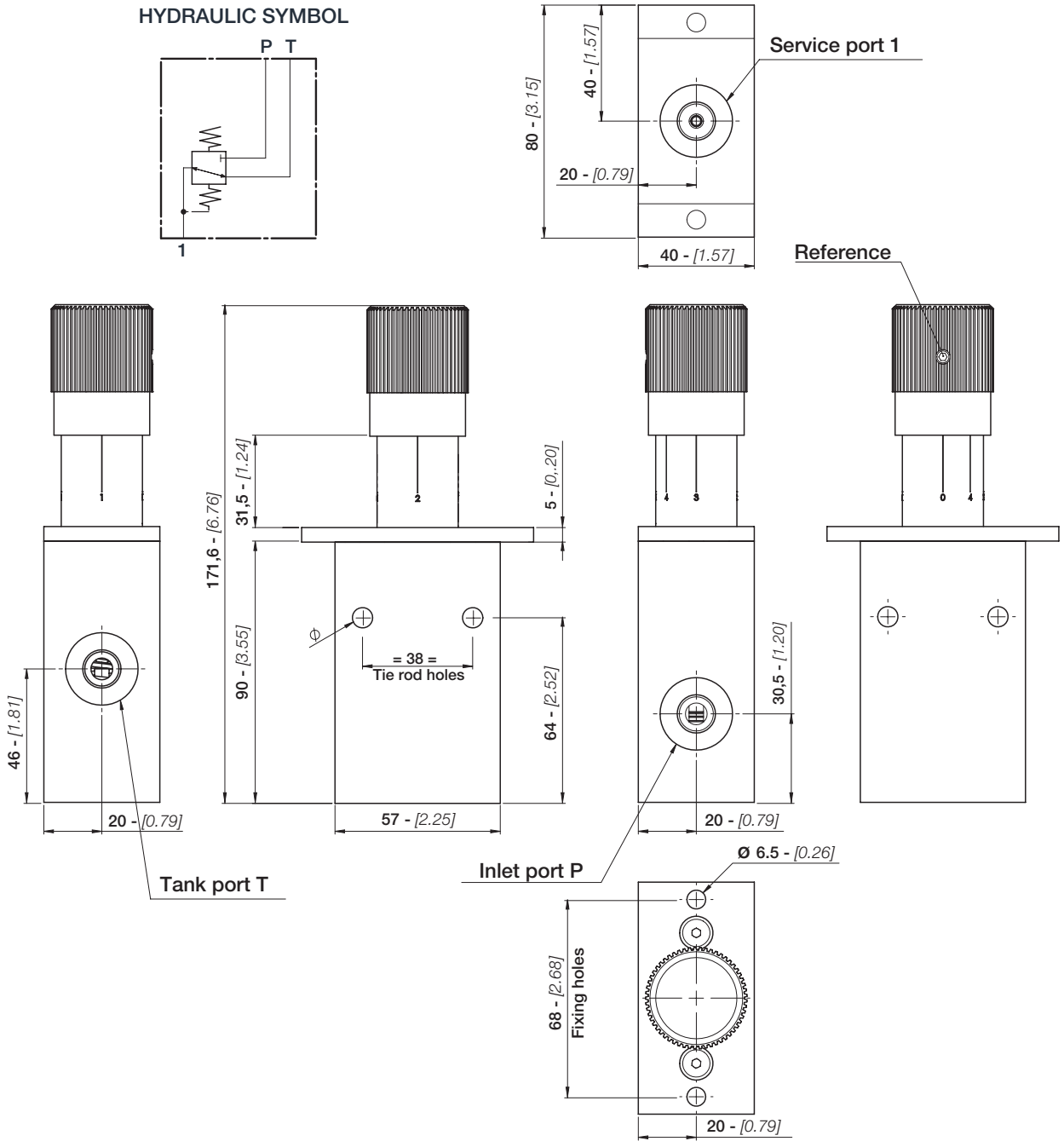
Actuation control kits with arch version are set up with rod lever EHS3 or EHS6.

All servocontrols are equipped with a customized control lever.

CODE	DESCRIPTION	DRAWING
EHS1	Handle with slim knob 	
EHS3	Handle with lens (arch version WITH friction) 	
EHS5	Handle with lens 	
EHS6	Handle with lens (arch version for C15 friction) 	
EHS8	Bent lever with lens 	

DIMENSIONS - HYDRAULIC SYMBOL - ESJ01V

This drawing represents a ESJ01V with standard assembly and BSP configuration.



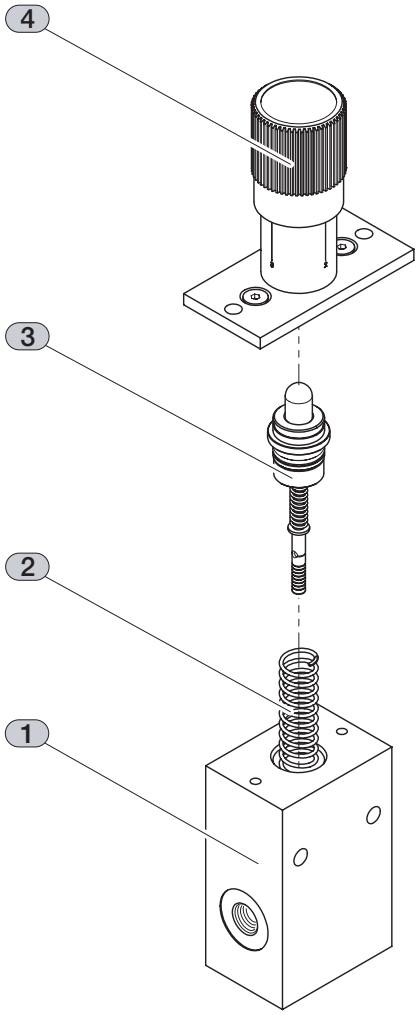
STANDARD CONNECTIONS ESJ01V

TYPE	BSP ISO 1179-1	UN-UNF ISO 11926-1
INLET - P	G 1/4	9/16-18 UNF
SERVICE PORT - 1	G 1/4	9/16-18 UNF
OUTLET - T	G 1/4	9/16-18 UNF

ORDERING CODES - ESJ01V

The order code below provides an example of servocontrol ESJ01V with standard configuration.
ESJ01V is a general purpose single user remote control. It can be delivered with wheel operated hydraulic remote control. See pages 18 - 19 for more information about the different options available.

product						1						2		3				4		
E	S	J	0	1	V	B	J	V	1	1	B	S	1	M	V	0	1	C	2	4

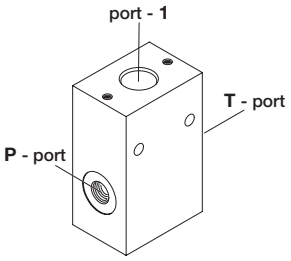


POSITION	CODE	DESCRIPTION	PAGE
	ESJ01V	product	
1	**BJV11B**	Body classification	25
2	**S1**	Return spring (port 1)	18
3	**MV01**	Metering curve (port 1)	19
4	**C24**	Control actuation	25

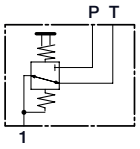
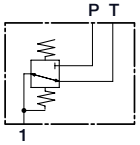
Note:

All servocontrols ESJ01V are equipped with 1 return spring and 1 metering curve.

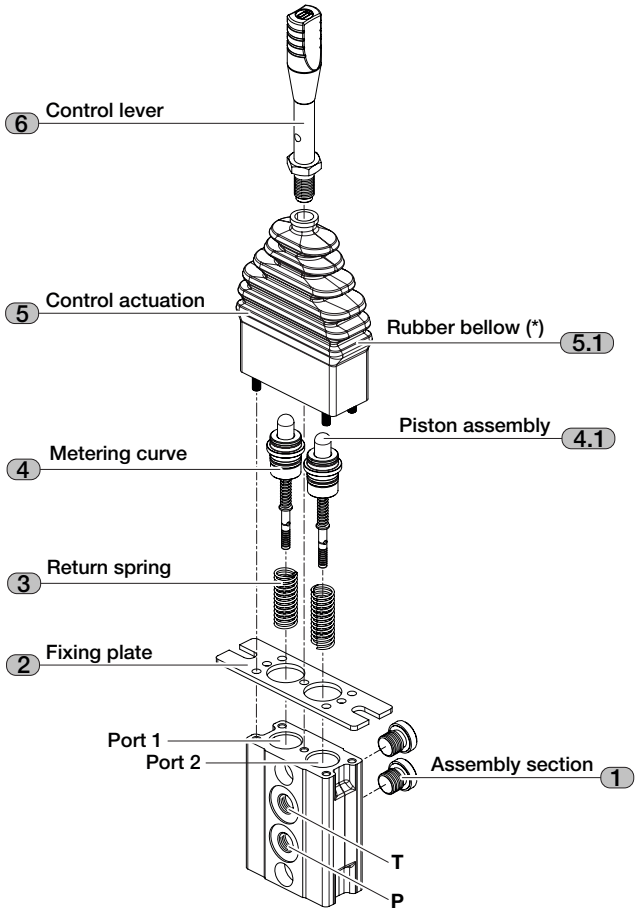
BODY CLASSIFICATION

CODE	DESCRIPTION	DRAWING
BJV11S	Standard body P-T with ports 9/16”-18 UNF (SAE6)	
BJV11B	Standard body P-T with ports G 1/4	

CONTROL ACTUATION

CODE	DESCRIPTION	HYDRAULIC SYMBOL
C24	Wheel operated hydraulic remote control	
C26	Without control	

SPARE PARTS LIST - ESJ01 (A-B-C)



Note:

This example represents a ESJ01 with single sections and standard configuration.

All ESJ01 (A-B-C) section joysticks are set up with 2 metering curves and 2 return springs.

All servocontrols ESJ01 (A-B-C) include an assembly section kit.

Assembly kit for single section is composed by 2 port plugs and 4 plastic plugs. Assembly kits with up to 12 sections also contain tie rods, nuts, growers and o-rings. In some cases the tie rod can be replaced by a commercial screw M6.

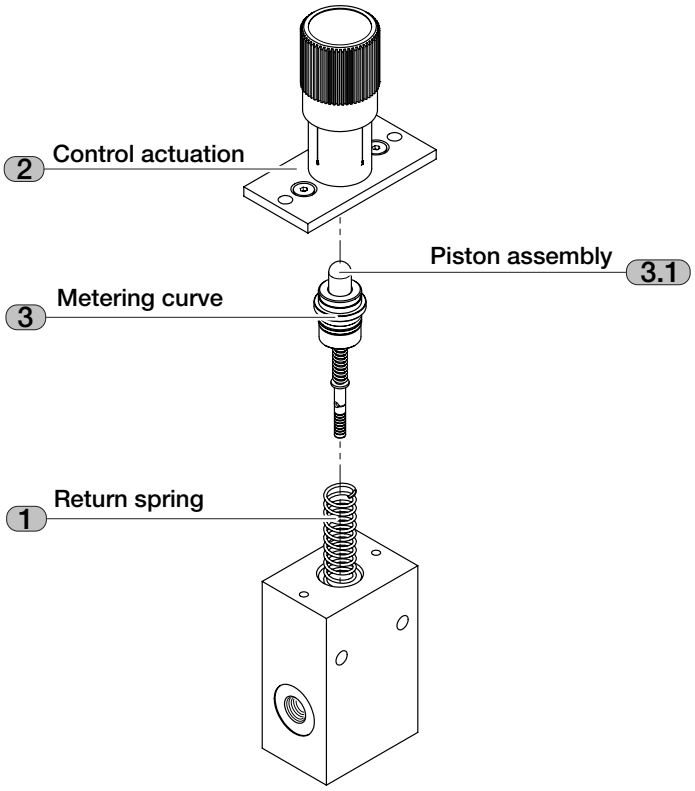
REFERENCE	CATALOGUE CODE	ORDER CODE	DESCRIPTION	NOTE
1	N1S	A01010004	Assembly for single section	only for ESJ01A with SAE port
	N2S	A01010005	Assembly for 2 sections	
	N3S	A01010006	Assembly for 3 sections	
	N4S	A01010007	Assembly for 4 sections	
	N5S	A01010008	Assembly for 5 sections	
	N6S	A01010009	Assembly for 6 sections	
	N7S	A01010010	Assembly for 7 sections	
	N8S	A01010011	Assembly for 8 sections	
	N9S	A01010012	Assembly for 9 sections	
	N10S	A01010013	Assembly for 10 sections	
	N11S	A01010014	Assembly for 11 sections	
	N12S	A01010015	Assembly for 12 sections	
	N1B	A01010016	Assembly for single section	only for ESJ01A with BSP port
	N2B	A01010017	Assembly for 2 sections	
	N3B	A01010018	Assembly for 3 sections	
	N4B	A01010019	Assembly for 4 sections	
	N5B	A01010020	Assembly for 5 sections	
	N6B	A01010021	Assembly for 6 sections	
	N7B	A01010022	Assembly for 7 sections	
	N8B	A01010023	Assembly for 8 sections	
	N9B	A01010024	Assembly for 9 sections	
	N10B	A01010025	Assembly for 10 sections	
	N11B	A01010026	Assembly for 11 sections	
	N12B	A01010027	Assembly for 12 sections	

REFERENCE	CATALOGUE CODE	ORDER CODE	DESCRIPTION	NOTE
1	N1S	A01010114	Assembly for single section	only for ESJ01B with SAE port
	N2S	A01010115	Assembly for 2 sections	
	N3S	A01010116	Assembly for 3 sections	
	N4S	A01010117	Assembly for 4 sections	
	N5S	A01010118	Assembly for 5 sections	
	N6S	A01010119	Assembly for 6 sections	
	N7S	A01010120	Assembly for 7 sections	
	N8S	A01010121	Assembly for 8 sections	
	N9S	A01010122	Assembly for 9 sections	
	N10S	A01010123	Assembly for 10 sections	
	N11S	A01010124	Assembly for 11 sections	
	N12S	A01010125	Assembly for 12 sections	
	N1B	A01010126	Assembly for single section	only for ESJ01B with BSP port
	N2B	A01010127	Assembly for 2 sections	
	N3B	A01010128	Assembly for 3 sections	
	N4B	A01010129	Assembly for 4 sections	
	N5B	A01010130	Assembly for 5 sections	
	N6B	A01010131	Assembly for 6 sections	
	N7B	A01010132	Assembly for 7 sections	
	N8B	A01010133	Assembly for 8 sections	
	N9B	A01010134	Assembly for 9 sections	
	N10B	A01010135	Assembly for 10 sections	
	N11B	A01010136	Assembly for 11 sections	
	N12B	A01010137	Assembly for 12 sections	
	N1S	A01010138	Assembly for single section	only for ESJ01C with SAE port
	N2S	A01010139	Assembly for 2 sections	
	N3S	A01010140	Assembly for 3 sections	
	N4S	A01010141	Assembly for 4 sections	
	N5S	A01010142	Assembly for 5 sections	
	N6S	A01010143	Assembly for 6 sections	
	N7S	A01010144	Assembly for 7 sections	
	N8S	A01010145	Assembly for 8 sections	
	N9S	A01010146	Assembly for 9 sections	
	N10S	A01010147	Assembly for 10 sections	
	N11S	A01010148	Assembly for 11 sections	
	N12S	A01010149	Assembly for 12 sections	
	N1B	A01010150	Assembly for single section	only for ESJ01C with BSP port
	N2B	A01010151	Assembly for 2 sections	
	N3B	A01010152	Assembly for 3 sections	
	N4B	A01010153	Assembly for 4 sections	
	N5B	A01010154	Assembly for 5 sections	
	N6B	A01010155	Assembly for 6 sections	
	N7B	A01010156	Assembly for 7 sections	
	N8B	A01010157	Assembly for 8 sections	
	N9B	A01010158	Assembly for 9 sections	
	N10B	A01010159	Assembly for 10 sections	
	N11B	A01010160	Assembly for 11 sections	
	N12B	A01010161	Assembly for 12 sections	
2	FP1	**A01210001**	Standard fixing plate	
3	S1	**A01220001**	Return spring (15 / 28 N) - *[1.53 / 2.45 kgf]*	Each ESJ01 section contains 2 return springs
	S2	A01220002	Return spring (24 / 40 N) - *[2.86 / 4.08 kgf]*	

REFERENCE	CATALOGUE CODE	ORDER CODE	DESCRIPTION				NOTE
			P1 (bar-psi)	P2 (bar-psi)	S1 (mm-in)	S2 (mm-in)	
4	MV01	A01160002	5 - *72.5*	25 - *362.5*	1.2 - *0.05*	7.2 - *0.28*	METERING CURVE WITH STEP Each ESJ01 section contains 2 metering curves
	MV02	A01160003	5.8 - *84.1*	19.5 - *282.8*			
	MV03	A01160020	5 - *72.5*	22 - *319*			
	MV04	A01160006	5 - *72.5*	15 - *217.5*			
	MV05	A01160022	5 - *72.5*	20 - *290*			
	MV06	A01160014	7.5 - *108.8*	29 - *420.5*			
	MV07	A01160021	8 - *116*	28 - *406*			
	MV08	A01160023	2 - *29*	18 - *261*			
	MV10	A01160011	7 - *101.5*	17 - *246.5*			
	MV11	A01160012	3 - *43.5*	22.2 - *321.9*			
	MV12	A01160010	6.8 - *98.6*	23.5 - *340.8*			
	MV13	A01160015	3 - *43.5*	28 - *406*			
	MV14	A01160016	14.7 - *213.2*	28.4 - *411.8*			
	MV16	A01160019	2 - *29*	11.5 - *166.8*			
	MV21	A01160034	5.8 - *84.1*	18.3 - *265.4*			
	MV22	A01160035	3.5 - *50.68*	13.5 - *195.8*			
	MV26	A01160048	2 - *29*	26 - *377*			
	MV35	A01160062	5 - *72.5*	13.8 - *200.1*			
	MV36	A01160063	5 - *72.5*	18.2 - *263.9*			
	MV37	A01160065	10 - *145*	20 - *290*			
	MV40	A01160067	6 - *87*	40 - *580*			
	MZ01	A01160024	5 - *72.5*	25 - *362.5*	1.2 - *0.05*	8 - *0.32*	METERING CURVE WITHOUT STEP Each ESJ01 section contains 2 metering curves
	MZ02	A01160025	5.8 - *84.1*	19.5 - *282.8*			
	MZ03	A01160004	5 - *72.5*	22 - *319*			
	MZ04	A01160026	5 - *72.5*	15 - *217.5*			
	MZ05	A01160027	5 - *72.5*	20 - *290*			
	MZ06	A01160028	7.5 - *108.8*	29 - *420.5*			
	MZ07	A01160029	8 - *116*	28 - *406*			
	MZ08	A01160030	2 - *29*	18 - *261*			
	MZ15	A01160017	5 - *72.5*	16.3 - *236.4*			
	MZ23	A01160037	1.2 - *17.4*	18.9 - *274.1*			
	MZ25	A01160049	4 - *58*	18 - *261*			
	MZ27	A01160050	5.5 - *79.8*	29 - *420.5*			
	MZ28	A01160051	3 - *43.5*	24.8 - *359.6*			
	MZ33	A01160057	2 - *29*	19.3 - *279.9*			
4.1	A02050003		Piston assembly for metering curve With STEP				
	A02050009		Piston assembly for metering curve Without STEP				

REFERENCE	CATALOGUE CODE	ORDER CODE	DESCRIPTION	NOTE
5	C01	A01250001	Return spring in neutral	
	C02	A01250002	Mechanical detent in 1-2	
	C03	A01250003	Mechanical detent in 1	
	C04	A01250004	Mechanical detent in 2	
	C11	A01250005	Mechanical detent in N	Arch version only
	C12	A01250012	Mechanical detent in 1-2	
	C13	A01250018	Mechanical detent in 1	
	C14	A01250013	Mechanical detent in 2	
	C15	A01250006	Friction	
	C16	A01250014	Mechanical detent in 1-N-2	
	C17	A01250007	Friction and security function in neutral	
	C18	A01250032	Friction and mechanical detent 1-N-2	
5.1	EIM120058		Single axis joystick rubber bellow	(*) rubber bellow code only
6	EHS1	A01170016	Handle with slim knob	
	EHS3	A01170017	Handle with lens (arch version)	
	EHS5	A01170002	Handle with lens	
	EHS6	A01170029	Handle with lens	for C15 friction only
	EHS8	A01170048	Bent lever with lens	

SPARE PARTS LIST - ESJ01V



Note:

This example represents a ESJ01V with standard configuration.
All ESJ01V servocontrols are set up with 1 metering curve and 1 return spring.

REFERENCE	CATALOGUE CODE	ORDER CODE	DESCRIPTION	NOTE
1	S1	**A01220001**	Return spring (15 / 28 N) - *[1.53 / 2.45 kgf]*	Each ESJ0V contains 1 return spring
	S2	A01220002	Return spring (24 / 40 N) - *[2.86 / 4.08 kgf]*	
2	C24	A01250033	Wheel operated hydraulic remote control	
	C26	A01250063	Without control	

REFERENCE	CATALOGUE CODE	ORDER CODE	DESCRIPTION				NOTE
			P1 (bar-psi)	P2 (bar-psi)	S1 (mm-in)	S2 (mm-in)	
3	MV01	A01160002	5 - *72.5*	25 - *362.5*	1.2 - *0.05*	7.2 - *0.28*	METERING CURVE WITH STEP Each ESJ01V contains 1 metering curve
	MV02	A01160003	5.8 - *84.1*	19.5 - *282.8*			
	MV03	A01160020	5 - *72.5*	22 - *319*			
	MV04	A01160006	5 - *72.5*	15 - *217.5*			
	MV05	A01160022	5 - *72.5*	20 - *290*			
	MV06	A01160014	7.5 - *108.8*	29 - *420.5*			
	MV07	A01160021	8 - *116*	28 - *406*			
	MV08	A01160023	2 - *29*	18 - *261*			
	MV10	A01160011	7 - *101.5*	17 - *246.5*			
	MV11	A01160012	3 - *43.5*	22.2 - *321.9*			
	MV12	A01160010	6.8 - *98.6*	23.5 - *340.8*			
	MV13	A01160015	3 - *43.5*	28 - *406*			
	MV14	A01160016	14.7 - *213.2*	28.4 - *411.8*			
	MV16	A01160019	2 - *29*	11.5 - *166.8*			
	MV21	A01160034	5.8 - *84.1*	18.3 - *265.4*			
	MV22	A01160035	3.5 - *50.68*	13.5 - *195.8*			
	MV26	A01160048	2 - *29*	26 - *377*			
	MV35	A01160062	5 - *72.5*	13.8 - *200.1*			
	MV36	A01160063	5 - *72.5*	18.2 - *263.9*			
	MV37	A01160065	10 - *145*	20 - *290*			
	MV40	A01160067	6 - *87*	40 - *580*			
	MZ01	A01160024	5 - *72.5*	25 - *362.5*	1.2 - *0.05*	8 - *0.32*	METERING CURVE WITHOUT STEP Each ESJ01V contains 1 metering curve
	MZ02	A01160025	5.8 - *84.1*	19.5 - *282.8*			
	MZ03	A01160004	5 - *72.5*	22 - *319*			
	MZ04	A01160026	5 - *72.5*	15 - *217.5*			
	MZ05	A01160027	5 - *72.5*	20 - *290*			
	MZ06	A01160028	7.5 - *108.8*	29 - *420.5*			
	MZ07	A01160029	8 - *116*	28 - *406*			
	MZ08	A01160030	2 - *29*	18 - *261*			
	MZ15	A01160017	5 - *72.5*	16.3 - *236.4*			
	MZ23	A01160037	1.2 - *17.4*	18.9 - *274.1*			
	MZ25	A01160049	4 - *58*	18 - *261*			
	MZ27	A01160050	5.5 - *79.8*	29 - *420.5*			
	MZ28	A01160051	3 - *43.5*	24.8 - *359.6*			
	MZ33	A01160057	2 - *29*	19.3 - *279.9*			
3.1	A02050003		Piston assembly for metering curve With STEP				
	A02050009		Piston assembly for metering curve Without STEP				

engineering beyond imagination

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