



Rexroth
Bosch Group

Solenoid Valves CETOP 2

RE 00157/12.07

The Drive & Control Company





Compact Directional Valves

The Drive & Control Company

Product Program ■ Programma Prodotti



- Flow Diverters
- Deviatori di Flusso

RIE 00158



- Modular Directional Valves
- Elettrodistributori Modulari

RIE 00159



- Solenoid Valves CETOP 2
- Elettrovalvole CETOP 2

RE 00157



- Special Directional Valves
- Valvole Direzionali Speciali

RE 00169



Solenoid Valves CETOP 2

Designation	Type	Size	Series	Interface	P max bar [psi]	Q max l/min [gpm]	Page
General							2
4/3, 4/2 directional valves solenoid operated.	LC04Z	04	00	CETOP 2 – P02	310 [4500]	25 [6.6]	5
4/3, 4/2 way directional valves lever operated.	LC04-LV	04	00	CETOP 2 – P02	310 [4500]	25 [6.6]	15
4/3, 4/2 proportional directional valves solenoid operated.	LC04P	04	00	CETOP 2 – P02	310 [4500]	12 [3.2]	23
2 or 3 way pressure compensated flow regulators.	LC04M-CB	04	00	CETOP 2 – P02	310 [4500]	12 [3.2]- 20 [5.3]	31
Technical data							37



INTRODUCTION

Bosch Rexroth Oil Control manufactures a wide range of solenoid and directional valves for different applications grouped by typology in the present catalogue.

For valves not included in this catalogue, please consult Bosch Rexroth Oil Control.

TECHNICAL DATA

The solenoid valves are composed by:

high strength cast iron body, with control spool made of special heat treated steel for long-lasting performance; 1 or 2 oil immersed solenoids and 1 or 2 coils made by copper wire winding, with isolating coating, optimized for high hydraulic performance with limited current absorption.

The directional valves bodies can be manufactured with different materials like high strength cast iron, steel or high strength wrought aluminium; their internal parts are manufactured with top quality steel processed with the most advanced machinery, which combines high production capacity with full and precise control of dimensions.

All external cast iron or steel parts are protected by zinc plating, and aluminium bodies are protected by anodizing.

All solenoid valves are designed according to the highest specifications and are manufactured and tested with the most advanced machinery and equipment which combines high production capacity with full and precise control of dimensions.

Ports, when present, can be drilled according to different specifications like: G sizes (BSPP) according to UNI-ISO 228/1; Metric with O-Ring, or with flat washer, according to UNI-ISO 6149; SAE threaded ports UN-UNF 2B; BSPP thread with O-Ring, according to JIS 2351-90 Type "O".

Seals:

O-Rings: are made with acrylonitrile/butadiene, commonly called BUNA-N (or NBR, according to ASTM and ISO), standard for temperatures between -30°C and +100°C [-22°F and + 212°F]. Special O-Rings for higher temperatures can be supplied upon request.

Back-up Rings and Slide Rings are made of reinforced poly-tetrafluoroethylene (PTFE), or BUNA-N (NBR) as well.

QUALITY SYSTEM APPROVAL ORDERS

BROC distributes its valves through its sales network in compliance with the delivery terms shown in the specific documents. Customer orders must be transmitted to the Vendor in written form (via fax, telecommunication, or electronic means) and must contain the following information:

- a) date and place of issue of the order;
- b) exact name of the Customer company and its complete shipping and billing addresses;
- c) a reference to the offer made by the Vendor company with the relevant agreed prices (if such an offer exists);
- d) valid Vendor's part numbers and description/specification of all the products to which the order refers;
- e) the required quantities;
- f) the quality requirements with which the Vendor must comply;
- g) the signature of an authorized representative;
- h) the required delivery date;
- i) terms of payment;
- j) shipping agent

For Customers supplied by BROC directly, the orders are officially as accepted when the relevant order confirmation, duly signed by BROC, arrives at the Customer; or, if such a document is not forthcoming, orders will be considered confirmed by the Vendor, at the terms requested, if they are not explicitly refused in writing within 10 working days from the order date.

NOTE: except if otherwise agreed with the Customer, BROC can introduce technical modifications to the product specifications without notice; in any event, BROC undertakes to execute customer orders/contracts which are already confirmed without applying any modifications to the product and/or anyway guaranteeing product interchange.



PRODUCT QUALITY AND COMPLIANCE TO THE SPECIFICATIONS

All BROCO valves are subject to the necessary checks/tests in various production phases in order to guarantee compliance with the specifications and settings shown in the catalogues, drawings, and/or technical datasheets. The Customer may make visits to and to carry out Quality AUDITS at the Vendor's plant, provided that a specific appointment is agreed.

Due to the wide range of variants and operating conditions of the equipment manufactured by the Customers, BROCO does not assume any liability for the results of tests performed by third parties. The Customer is therefore responsible for the final choice of the valve and for the adoption of all the measures required to achieve the functional and safety specifications of the system in which the valve is to be installed, in addition to the compliance with any specific regulation or standard applicable to the system in question.

In the event of product non compliance due to Vendor's mistake, in addition to the warranty coverage here described, the Customer can demand the Vendor to perform the necessary corrective actions in order to promptly improve its quality level.

APPLICATION LIMITATIONS

The Customer is expressly prohibited from using the products sold by the Vendor for purposes other than those specified in the offer, catalogues, or technical documentation.

Specifically, BROCO's Dealers or Agents are not authorised to approve the use of BROCO valves for the following applications:

- any passenger or goods carrying road vehicle or equipment subject to Highway Safety Standards and Directives, such as (without limitation) steering, or brake systems;
- aircraft or space vehicles;
- ordnance equipment;
- medical and health products, including life support equipment or vehicles;
- systems to be used under any Nuclear Regulatory Act or Regulation;
- systems for use in explosive or otherwise hazardous environments.

If the Customer intends to use the valves supplied for any applications falling into one or more of the above categories or other similar categories, or for any applications other than those expressly described in the documentation, or in case of doubts concerning the application, he must require prior specific authorisation directly from BROCO and proceed only after such authorisation has been issued in writing.

Any damage suffered by the Customer or third parties arising from failure to comply with the above mentioned terms and limitations, or due to non compliance to BROCO's instructions/specifications shown in the catalogue pages or in the technical drawings, will be borne entirely by the Customer himself.

CUSTOMER'S OBLIGATIONS TO PREVENT DAMAGES WITHIN HIS OWN PRODUCTION PROCESS

If the valves are employed in a production process which could cause substantial damage to the Customer or to third parties in case of assembly line stopping as consequence of defects or lack of availability of valves, the Customer has the responsibility to maintain a safety stock in order to promptly replace the defective or missing parts; the Customer undertakes to engineer the production cycle so that the replacements can be carried out easily.

In any event, BROCO will be responsible for the repair or replacement of any part or valve found to be defective due to its own manufacturing causes.

WARRANTY

BROCO warrants the original purchaser of its valves that the products are free from defects in material and workmanship, when handled, installed and operated under normal conditions, in accordance with BROCO and Industry recommended practises, for a period of 12 months from the first installation, provided that the installation date is within 6 months from the manufacturing date marked on the valve itself.

Seals and O-Rings are expressly excluded from the warranty.

This warranty is applicable only to the original purchaser of the valves, and is not transferable.

This warranty will not apply to products that have been subject to conditions of contamination in the customer's hydraulic circuit, or to products which have been incorrectly handled, fitted, used or modified/disassembled without the Vendor's supervision or authorisation.



In the event that the Customer believes that the valves or parts of valves supplied are defective for causes attributable to the Vendor, the Customer shall notify the alleged defects by sending a detailed written report, thereby allowing the Vendor to understand and verify the nature of the claimed defects, also through its authorised technical personnel.

Once the defect has been analysed and after determination that the defect is attributable to the Vendor's fault, BROCC will repair or replace the valve within a reasonable time and/or inform the Customer of the cause of such defect.

The BROCC warranty policy does not provide for refund or credit for the defective material; specifically BROCC shall not be held responsible under any circumstances for loss of profit, costs of disassembly and reassembly of the product, nor for any damages connected with such operation, nor for any cost related to the fitting of the repaired or replaced valves, including losses of earnings related to machine being temporarily out of service.

If the valve supplied is to be fitted in assembly plants potentially capable of causing damages to third parties of magnitude significantly greater than the cost of the valve itself, it is the Customer's responsibility to adopt all the possible safety measures in order to avoid any such damages; in fact, the production of valves at competitive market prices cannot ensure the total absence of defects, in spite of BROCC's continuous concern to provide top quality products. Should the Customer face the need of a Recall Campaign in which an BROCC valve is involved, BROCC's involvement shall be discussed and agreed between BROCC and the Customer prior to the start of any action. Should the Customer face a problem connected with an BROCC valve and potentially capable to raise a "Product Liability" case, the Customer shall immediately notify the Vendor who will participate to the joint analysis of the problem, together with the Customer.

NOTE: any warranty condition or obligation different from this policy can be effective only if specifically agreed and undersigned by both Parties: Customer and Vendor.

TECHNICAL ASSISTANCE

BROCC guarantees to the Customer its availability to perform free of charge a joint analysis of any defect reported by end users, also when such analysis is to be carried out at the Customer's site, provided that the timing is reciprocally agreed.

However, if the malfunction is found to be not due to BROCC's responsibility, the Vendor will issue a debit note to the Customer for the cost of the services rendered. When the Customer requires the assistance of BROCC's engineers on its sites, he shall make a written request to this effect (which can be transmitted also by e-mail or fax).

STATEMENT

The valves described in this catalogue can be employed in systems or machines falling under the specifications of the EEC European Directive 98/37/CE (Machine Directive) and later amendments. The valves shall not be operated, adjusted or disassembled before the complete machines are verified to be in compliance with the requirements of the above mentioned Directive.

APPLICABLE LAW

For all matters that are here omitted, any delivery performed by BROCC directly will be subject to the applicable provisions of the Italian law.

If the Customer's address is in a Foreign Country, any case of dispute, also of "International nature", which should arise from these sales conditions shall be subject to the provisions of the Italian Law, with the sole competence of the Court of Modena – Italy.

ATTENTION

Limited to the valves and related products here included, this catalogue cancels and supersedes any prior issue.

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4/3, 4/2 directional valves solenoid operated

Type L5010... (LC04Z)

Size 4

Series 00

Maximum operating pressure 310 bar [4500 psi]

Maximum flow 25 l/m [6.6 gpm]



DVI0003

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Features

- Direct solenoid operated spool valve, standard version.
- Spool switching is by on off solenoids with a central tube and removable coil
- Spring centered control spool
- For mounting on industry standard surface port pattern to CETOP RP121 H-4.2-P02
- Wet pin DC solenoids with removable coil and manual override
- Special manual override on demand (push or screw-in type)
- Coil can be rotated through 360°
- Available electrical connections: EN 175301-803 (Ex. DIN 43650); AMP JUNIOR; DT04-2P (Deutsch); Free leads.

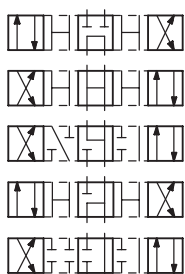
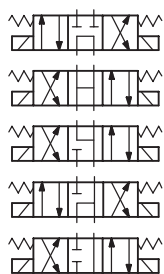
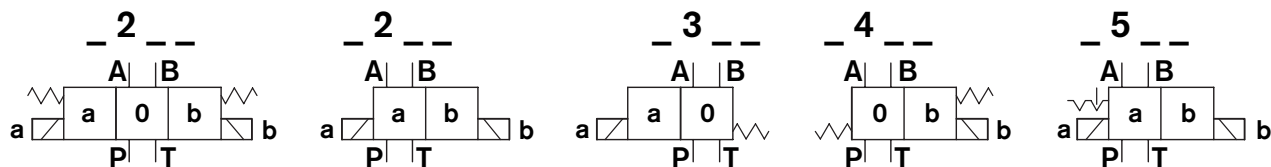


Ordering Code

L		5		0		1		0		---		---		---		---					
Division Directional Valves										Optional 00 = Standard 0V = Other seals EP = External push button manual override EF = Screw-in type manual override											
Type CETOP Valves										Connections 00 = Without coil 01 = With coil without connector 02 = With EN17530-803 connector 03 = AMP Junior connector 07 = DT04-2P Deutsch connector 31 = 350 mm [13.8 In.] free leads											
Size NG 4 (P02)																					
Operation Solenoid operated C36 coil																					
Hydraulic schemes ¹⁾																					
4/3 operated A and B side										=		2		---							
4/2 operated A and B side										=		2		---							
4/2 operated A side										=		3		---							
4/2 operated B side										=		4		---							
4/2 operated A and B side with detent										=		5		---							
¹⁾ Refer it pag. 7 for hydraulic scheme selection.																					
										00 =								Voltage Without coil			
										0B =								12V DC			
										AD =								13V DC			
										OC =								24V DC			
										AC =								27V DC			
										OD =								48V DC			
										OE =								110V DC			
										OV =								(21.5 DC) 24V AC			
										OW =								(98 DC) 110V AC			
										OZ =								(207 DC) 230V AC			
										31		07		03		02		01		00	
										Available connections ²⁾											

²⁾ Refer it pag. 10 for selection of electric connection.

Hydraulic schemes



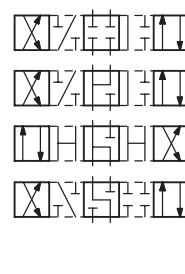
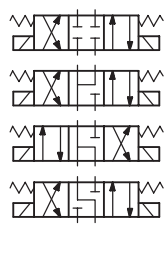
=A201

=C201

=E201

=G209

=K209

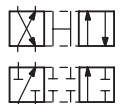
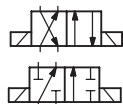


=B201

=D201

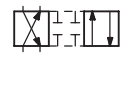
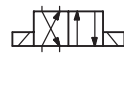
=G201

=K201

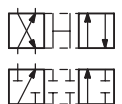
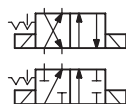


=L201

=N201

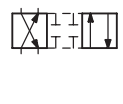
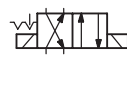


=M201

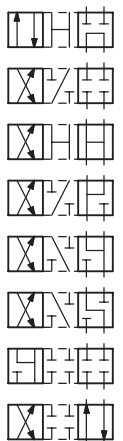
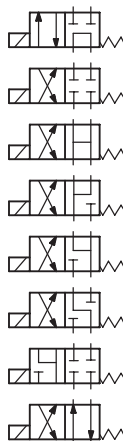


=L501

=N501



=M501



=A301

=B301

=C301

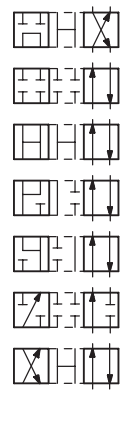
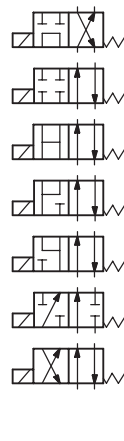
=D301

=E301

=K301

=T301

=Y301



=A361

=B361

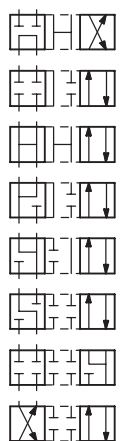
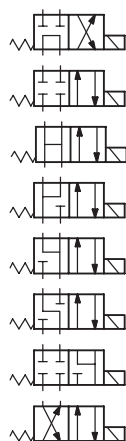
=C361

=D361

=E361

=N301

=X301



=A401

=B401

=C401

=D401

=E401

=K401

=T409

=Y401



=A471

=B471

=C471

=D471

=E471

=N401

=X401

Function, section

Type L5010

The solenoid operated valves type L 5010 provide 3-way or 4-way flow control, usually from port P to either port A or B, and the consequent flow return to T from B or A respectively.

The valves are composed by a central cast iron body (1) which mounts on industry standard surfaces where the flow ports and the fixation holes are located; the central body houses the precisely machined directional control spool (2) which is held in the neutral or initial position by the return springs (4). One or two solenoids, composed by a central tube and a surrounding coil (5), are fitted to the body at the spool's ends: when the coils are energized, their magnetic field develops a force on the oil immersed mobile plunger incorporated in the tube which pushes the control spool from the initial position into a shifted position where oil flow is allowed from P to either A or B.

With coils (5) de-energized, the control spool (2) returns to the central or initial position pushed by the return springs (4).

The coils (5) are locked on the tube by threaded plastic nuts (6); the tube incorporates an externally reachable push rod (7) which can be pushed for emergency spool shifting in case of electric failure.

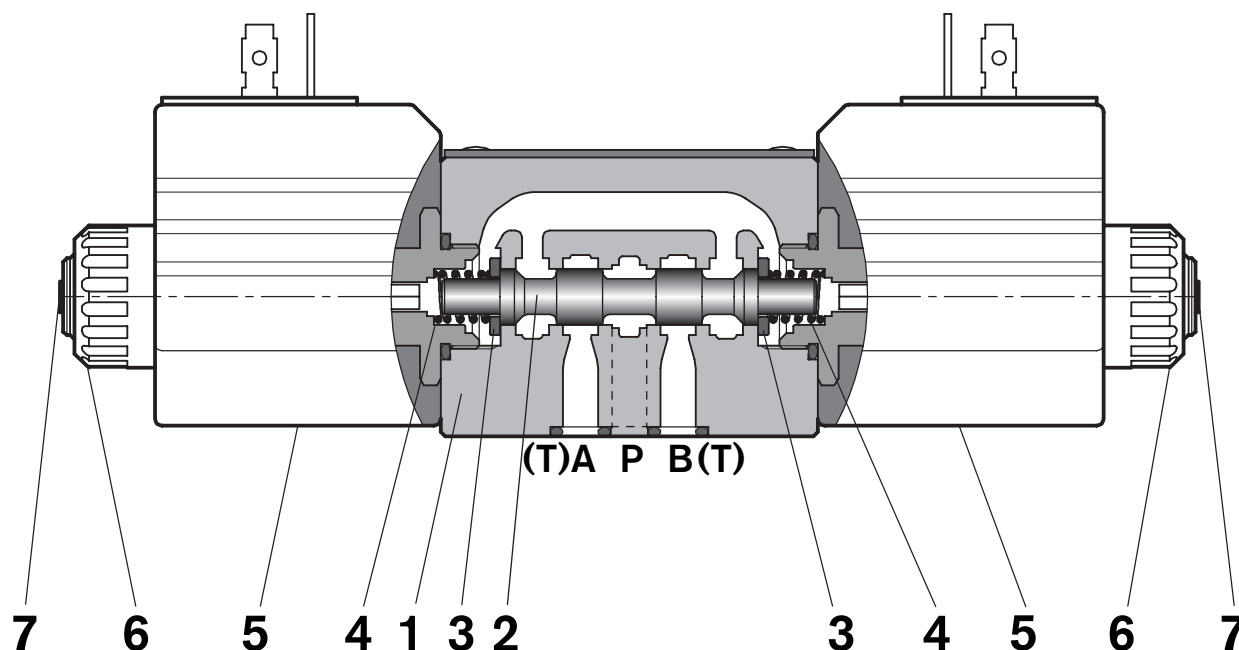
(7) which can be pushed for emergency spool shifting in case of electric failure.

Type L5010L201_, L5010M201_, L5010N201_

These valves do not have return springs (4) for the directional control spool (2): the spool can shift between two positions, driven only by the magnetic force developed by the two solenoids (5), and, when the solenoids are not energized, the neutral position of the spool is not defined. The directional control spool holds a specific position only when one of the solenoids is maintained energized.

Type L5010L501_, L5010M501_, L5010N501_

In these valves the directional control spool has two switched positions, each one with a mechanical detent. Shifting of the spool's position is achieved by energizing one of the solenoids, but it is unnecessary to maintain the coil energized in order to keep the spool shifted.





Technical data (for different parameters or special applications, please contact BROC Service Network)

General

Valve weight with 2 solenoids	kg [lbs]	1.08 [2.2]
Valve weight with 1 solenoid	kg [lbs]	0.82 [1.7]
Valve installation positions		Unrestricted
Ambient temperature	°C [°F]	-20....+50 [-4....+122] (with NBR seals)

Hydraulic

Maximum pressure on P, A and B	bar [psi]	310 [4500]
Maximum dynamic pressure on T	bar [psi]	180 [2610]
Maximum static pressure on T	bar [psi]	210 [3045]
Maximum flow	l/min [gpm]	25 [6.6]
Maximum flow when using spool type A201, A301, A401, A361, A471, G201, G209	l/min [gpm]	18 [4.7]
Hydraulic fluid		Mineral based oil type HL (DIN 51524 part 1), or Mineral based oil type HLP (DIN 51524 part 2). For use of environmentally acceptable fluids (vegetable or polyglycol base) please consult BROC
Oil temperature	°C [°F]	-20....+80 [-4....+176]
Fluid cleanliness		ISO 4572: $\beta_x \geq 75$ X=12...15 ISO 4406: class 20/18/15 NAS 1638: class 9
Viscosity class		ISO-VG 32 (5 ... 420) cSt

Electrical

Voltage		DC (AC possible by using rectifiers connectors)								
Voltage tolerance	V	Nominal (- 10 ... + 10)%								
Duty cycle	ED	100% with maximum ambient temperature at 50°C [122°F]								
Switching time	ms	ON 50 90; OFF 40 80								
Maximum shift frequency	Hz	3								
Isolation class of coil		H								
Maximum Coil temperature	°C [°F]	150 [302]								
Compliance to EU specs		Low voltage Directives EEC 73/23 and 2004/108/CE								
Coil weight	kg [lbs]	0.215 [0.44]								
Voltage type	V	12	13	24	27	48	110	24 +RAC (21,5)	110 +RAC (98)	230 +RAC (207)
DC = Direct Current; AC = Alternate Current		DC	DC	DC	DC	DC	DC	AC	AC	AC
Frequency	Hz	-	-	-	-	-	-	50/60	50/60	50/60
Power absorption	W	26	26	26	26	26	26	29	29	29
Current ⁽¹⁾	A	2.15	2.00	1.10	1.00	0.54	0.27	1.20	0.29	0.14
Resistance ⁽²⁾	Ω	5.5	6.5	22	28	89	413	18	338	1430

¹⁾ Nominal

²⁾ ± 7% at ambient temperature of 20°C



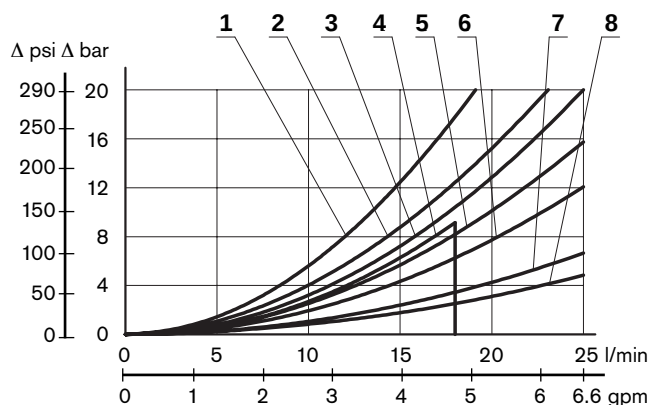
Electrical

	Volts	Connections	Model	Marking on coil	Coil code
=OB 01 =OB 02	12 DC	EN 175301-803 (Ex. DIN 43650)	C3601 12DC	12 DC	R933000044
=OB 03	12 DC	AMP JUNIOR	C3603 12DC	12 DC	R933000047
=OB 07	12 DC	DEUTSCH DT 04-2P	C3607 12DC	12 DC	R933000048
=OB 31	12 DC	Cable 350 mm	C3631 12DC	12 DC	R933000045
=AD 01 =AD 02	13 DC	EN 175301-803 (Ex. DIN 43650)	C3601 13DC	13 DC	R933000051
=AD 07	13 DC	DEUTSCH DT 04-2P	C3607 13DC	13 DC	R933000049
=OC 01 =OC 02	24 DC	EN 175301-803 (Ex. DIN 43650)	C3601 24DC	24 DC	R933000053
=OC 03	24 DC	AMP JUNIOR	C3603 24DC	24 DC	R933000057
=OC 07	24 DC	DEUTSCH DT 04-2P	C3607 24DC	24 DC	R933000058
=OC 31	24 DC	Cable 350 mm	C3631 24DC	24 DC	R933000055
=AC 01 =AC 02	27 DC	EN 175301-803 (Ex. DIN 43650)	C3601 27DC	27 DC	R933000056
=AC 07	27 DC	DEUTSCH DT 04-2P	C3607 27DC	27 DC	R933000050
=OD 01 =OD 02	48 DC	EN 175301-803 (Ex. DIN 43650)	C3601 48DC	48 DC	R933000059
=OE 01 =OE 02	110 DC	EN 175301-803 (Ex. DIN 43650)	C3601 110DC	110 DC	R933000061
=OV 01 =OV 02	24 RAC (1)	EN 175301-803 (Ex. DIN 43650)	C3601 21.5DC	21.5 DC	R933000054
=OW 01 =OW 02	110 RAC (1)	EN 175301-803 (Ex. DIN 43650)	C3601 98DC	98 DC	R933000060
=OZ 01 =OZ 02	230 RAC (1)	EN 175301-803 (Ex. DIN 43650)	C3601 207DC	207 DC	R933000062

¹⁾ Use connectors with rectifiers.

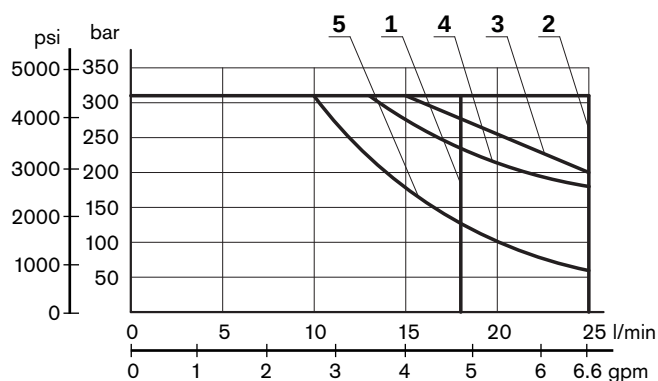
Performance curves

Test conditions: the performance curves and the specifications shown in this catalogue are obtained by using mineral based oil ISO-VG 32, at $45 \pm 5^\circ\text{C}$ [$113 \pm 9^\circ\text{F}$]. The test is carried out with 20°C [68°F] ambient temperature.



Spool	Curve n°				
	P>T	P>A	P>B	A>T	B>T
A201, A301, A401, A361, A471, G201, G209	4	1	1	2	2
B201, B301, B401		5	5	7	7
B361, B471		5	5	8	8
C201, C301, C401, C361, C471, D201, D301, D401; D361, D471	6	6	6	8	8
E201, E301, E401, E361, E471, K201, K209, K301, K401		5	5	8	8
L201		5	5	8	7
L501		3	5	7	7
M201		3	3	7	6
M501		2	3	6	5
N201		3	3		
N301		2	5		
N401		5	2		
N501		2	3		
T301, T409				5	5
X301, Y301		3	5	8	6
X401, Y401		5	3	6	8

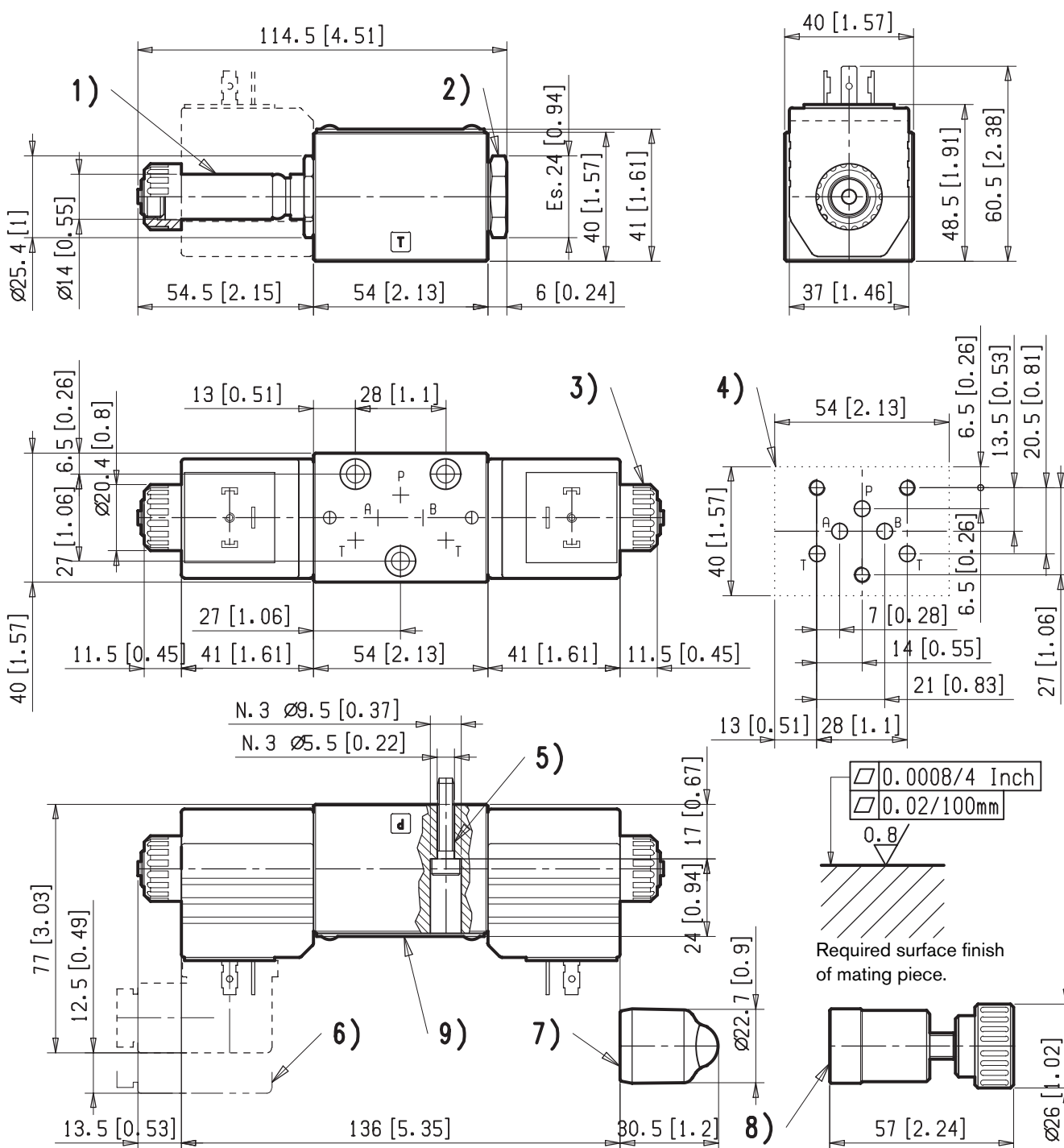
Performance ranges



Spool	Curve n°
A201; A301; A401; A361; A471; G201; G209	1
B201; B301; B401; B361; B471; C201; C301; C401; C361; C471; L201; L501; M201; M501	2
E201, E301, E401; E361; E471; D201, D301, D401; D361; D471; K201, K209; K301; K401; T301; T409	3
X301; X401; Y301; Y401	4
N201; N301; N401; N501	5

The performance curves here shown are applicable when oil flow is travelling in both directions, example P>A and B>T. In special circuit schemes the performance limits can be lower.

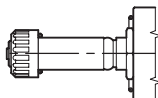
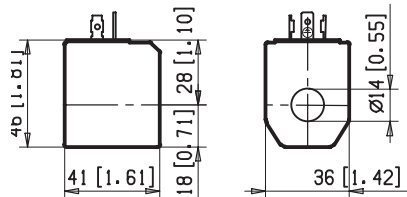
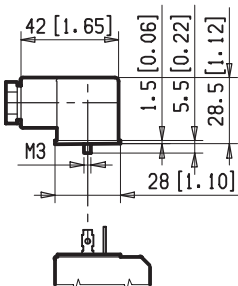
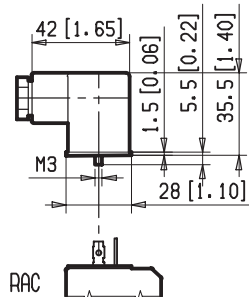
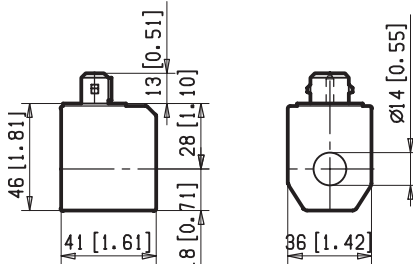
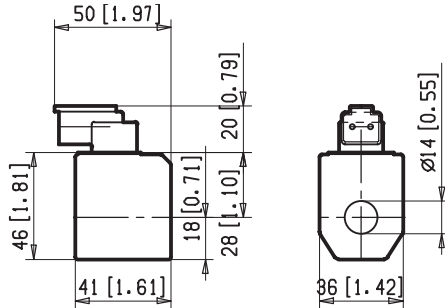
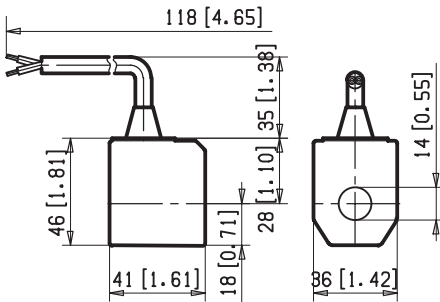
Overall dimensions



- 1) Tube Hex. 24 mm. Torque 20÷22 Nm [14.8 ÷ 16.2 ft-lbs].
- 2) Blinding plug for 2 positions version: Hex. 24 mm. Torque 20 ÷ 22 Nm [14.8 ÷ 16.2 ft-lbs].
- 3) Ring nut (O.D. 20.4 mm) for coil locking. Torque 5 ÷ 6 Nm [3.7÷4.4 ft-lbs].
- 4) Drilling specifications of standard mounting surface according to CETOP RP 121 H-4.2 4-P02.
- 5) Locking screws 3 pieces: UNI 5931 (ISO 4762) hexagon socket head cap screw M 5x25, recommended specific strength 8.8 class. Torque 5 ÷ 6 Nm [3.7÷4.4 ft-lbs].

- 6) Gap needed for connector removal.
- 7) EP type optional override push-knob: it is pressure fitted, with adhesive, on the coil locking ring nut. Code: R933000042.
- 8) EF type accessory emergency threaded knob, fitted on the solenoid tube, and replacing the locking ring nut. Torque 6 ÷ 7 Nm [4.4÷5.2 ft-lbs]. Code: R933000021.
- 9) Identification label.

Electric connections

=00 No coil fitted; tube with locking nut and seals. Basic recommended version, suitable for any coil type. 	=01 With coil, connection type EN 175301-803, without connectors. 																										
With coils and with EN 175301-803 connectors, non assembled. Protection class: IP 65 (if connector is assembled with seal, tightened down with the locking screw and the cable clamp is properly tightened.) 182-09: Standard 182-LED-T-A1: With LED pilot light. 182-09-G-DO-2-1: With transient voltage suppressor bi-directional diode. <table><tr><th>Code</th><th>Type</th></tr><tr><td>R933002885</td><td>182-09 GREY</td></tr><tr><td>R933002889</td><td>182-09 BLACK</td></tr><tr><td>R933002893</td><td>182-LED-T-A1 12 DC/AC</td></tr><tr><td>R933002894</td><td>182-LED-T-A1 24 DC/AC</td></tr><tr><td>R933002896</td><td>182-LED-T-A1 48 DC/AC</td></tr><tr><td>R933002897</td><td>182-LED-T-A1 110 DC/AC</td></tr><tr><td>R933002898</td><td>182-LED-T-A1 230 DC/AC</td></tr><tr><td>R933002886</td><td>182-09-G-DO-2-1 12DC with VDR</td></tr><tr><td>R933002887</td><td>182-09-G-DO-2-1 24DC with VDR</td></tr></table> 532-09 RAC: With built-in rectifier for AC applications. <table><tr><th>Code</th><th>Type</th></tr><tr><td>R933002892</td><td>532-09 RAC GREY</td></tr><tr><td>R933002891</td><td>532-09 RAC BLACK</td></tr></table>		Code	Type	R933002885	182-09 GREY	R933002889	182-09 BLACK	R933002893	182-LED-T-A1 12 DC/AC	R933002894	182-LED-T-A1 24 DC/AC	R933002896	182-LED-T-A1 48 DC/AC	R933002897	182-LED-T-A1 110 DC/AC	R933002898	182-LED-T-A1 230 DC/AC	R933002886	182-09-G-DO-2-1 12DC with VDR	R933002887	182-09-G-DO-2-1 24DC with VDR	Code	Type	R933002892	532-09 RAC GREY	R933002891	532-09 RAC BLACK
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Code	Type																										
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R933002891	532-09 RAC BLACK																										
=03 Coil(s) with integrated AMP junior connection and built in bidirectional diode protection class: IP 65 with connector properly fixed. 	=07 Coil(s) with integrated DEUTSCH DT 04-2P connection and built in bidirectional diode protection class: IP 69K with connector properly fixed. 																										
=31 Coil(s) with 350 mm cable with extra protective sheath and built in bidirectional diode. 																											





4/3, 4/2 way directional valves lever operated

Type L50L0... (LC04-LV)

Size 4
Series 00
Maximum operating pressure 310 bar [4500 psi]
Maximum flow 25 l/min [6.6 gpm]



Table of contents

Contents	Page
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Features

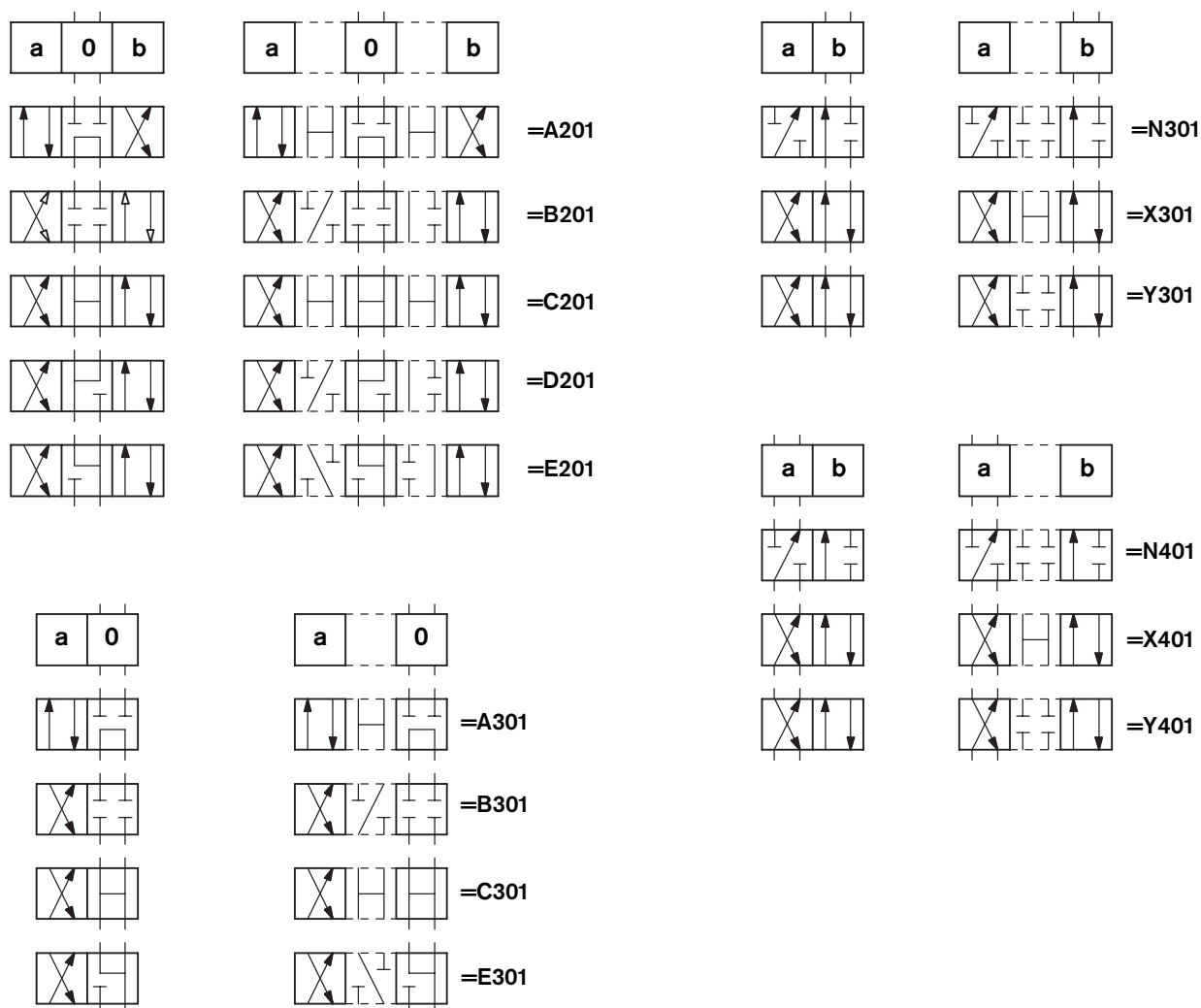
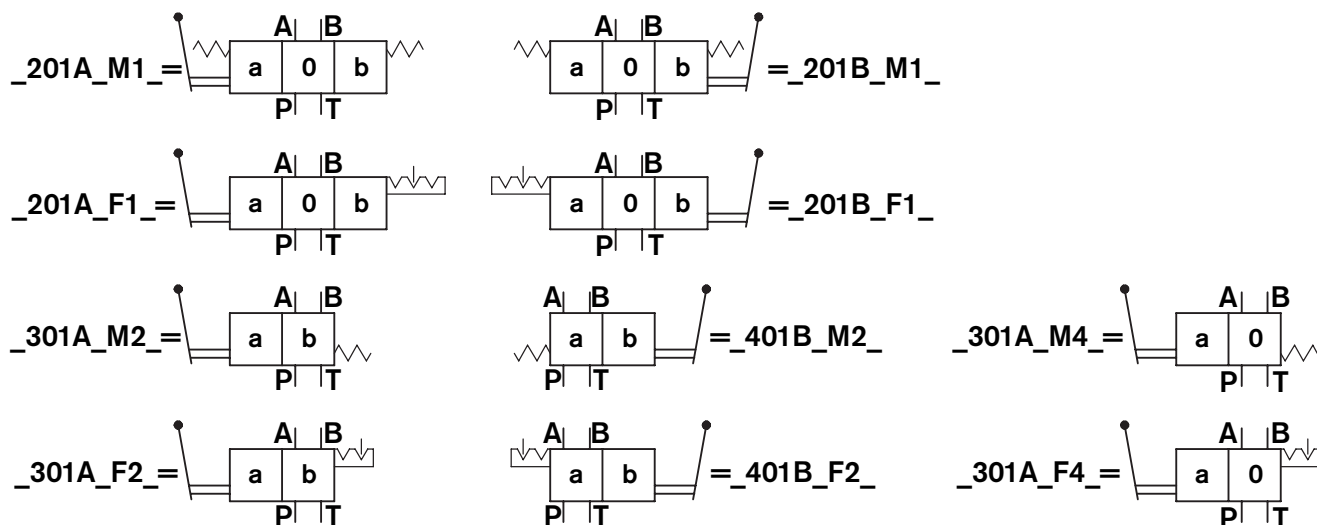
- Direct operated directional spool valve
- Hand lever actuator
- Flange mounting on industry standard surfaces according to CETOP RP121 H-4.2-4-P02

[illegible]

2) The spool positions' options depend on the chosen hydraulic scheme.

3) See overall drawing.

Hydraulic schemes



Function, section

Type L50L0

The hand lever operated valves type L 50L0 provide 3 or 4 way flow control, usually from port P to either port A or B, and the consequent flow return to T from B or A respectively.

The valves are composed by a central cast iron body (1) which mounts on industry standard surfaces where the flow ports and the fixation holes are located; the central body houses the precisely machined directional control spool (2) can travel between 2 or 3 position, and which is held in the neutral or initial position by the return spring (5), or can be maintained in the shifted position by a mechanical detent.

Through the hand operated lever (3), the control spool can be pushed from the initial position into a shifted position where oil flow is allowed from P to either A or B.

The control spool assembly (4) is available also with mechanical detent which holds the spool in the shifted position: in this case the spool can be brought back into the central or initial position only by actuating the hand operated lever (3).

Type L50L0_201_0M100

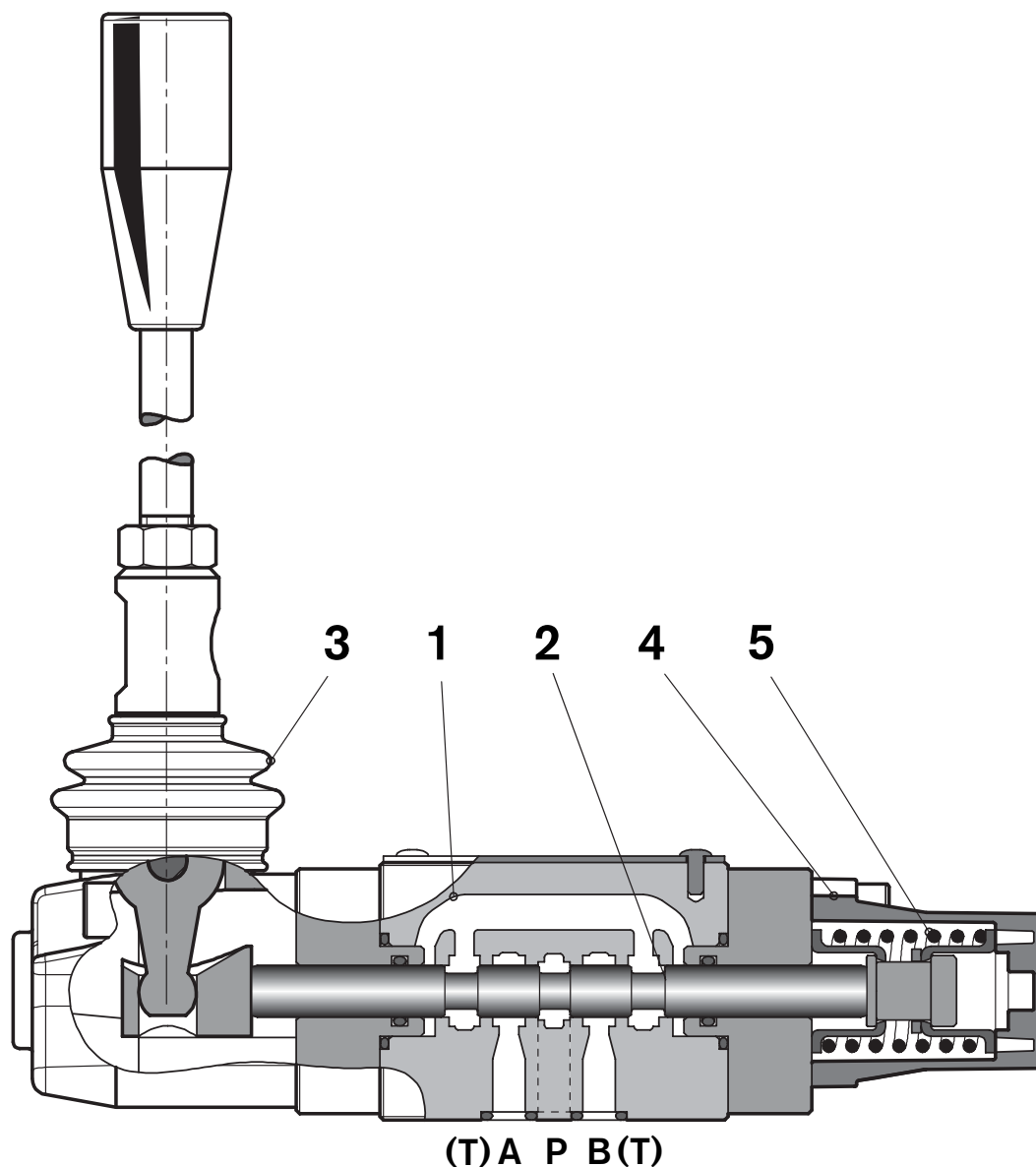
(available with hydraulic schemes =_M_ see page 17)

These are 2 or 3 positions hand lever operated valves with control spool (2) normally kept in the neutral or initial position by the return spring (5): when the control lever (3) is released, the spool (2) returns to the central or initial position pushed by the spring force.

Type L50L0_201_0F100

(available with hydraulic schemes =_F_ see page 17)

In these valves the directional control spool (2) can travel between 2 or 3 positions, each one with mechanical detent: the spool (2) stays in any reached position also if the hand control lever (3) is released. The hand operated lever needs to be actuated only in order to shift the spool from one position to another one.



**Technical data** (for different parameters or special applications, please contact BROC Service Network)**General**

Valve weight	kg [lbs]	1.10 [2.25]
Valve installation position		Unrestricted
Ambient temperature	°C [°F]	-20....+50 [-4....+122] (with NBR seals)

Hydraulic

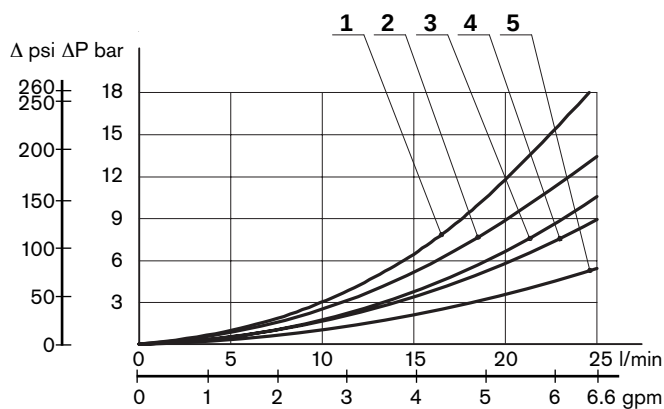
Maximum operating pressure on ports P, A and B	bar [psi]	310 [4500]
Maximum dynamic pressure on T	bar [psi]	160 [2320]
Maximum flow	l/min [gpm]	25 [6.6]
Hydraulic fluid		Mineral based oil type HL (DIN 51524 part 1), or Mineral based oil type HLP (DIN 51524 part 2). For use of environmentally acceptable fluids (vegetable or polyglycol base) please consult BROC
Oil temperature	°C [°F]	-20....+80 [-4....+176]
Fluid cleanliness		ISO 4572: $\beta_x \geq 75$ X=12...15 ISO 4406: class 20/18/15 NAS 1638: class 9
Viscosity class		ISO-VG 32 (5 ... 420) cSt

Operating force

Operating force with return-spring	N [lbs]	50 [11.24]
Operating force with mechanical detent	N [lbs]	25 [5.62]

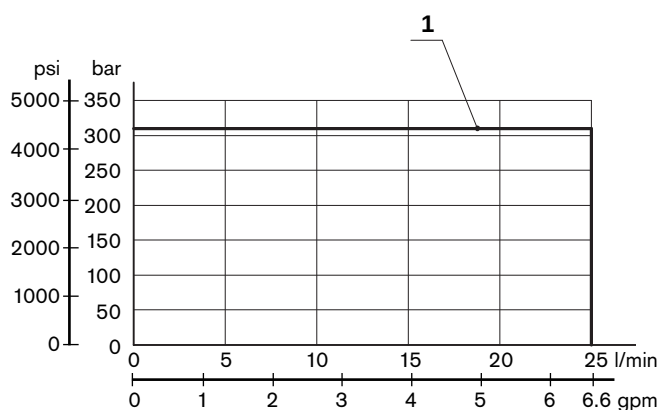
Performance curves

Test conditions: the performance curves and the specifications shown in this catalogue are obtained by using mineral based oil ISO-VG 32, at $45 \pm 5^\circ\text{C}$ [$113 \pm 9^\circ\text{F}$]. The test is carried out with 20°C [68°F] ambient temperature.



Spool	Curve number				
	P>T	P>A	P>B	A>T	B>T
A201, A301	1	2	2	3	3
B201, B301, E201, E301, Y301, Y401		3	3	5	5
C201, C301, X301, X401	3	3	3	5	5
D201, N301		4	4		

Performance ranges



Spool	Curve number
A201, A301, B201, B301, C201, C301, D201, E201, E301, N301, X301, X401, Y301, Y401	1