

## 2-way cartridge valves with spool position monitoring, passively controlled

**RE 21015**

Edition: 2019-07

Replaces: 2019-04



- ▶ Size 16 ... 160
- ▶ Component series 2X; 6X; 7X
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 25000 l/min

### Features

- ▶ Installation bore and connection dimensions according to ISO 7368
- ▶ Cartridge element with/without shaft sealing and different area ratios
- ▶ Electronic or hydraulic monitoring of the spool position
- ▶ Use in explosive environment (version "Q8G08")
- ▶ Robust design
  - High reliability
  - Long life cycle
- ▶ Inspection certificates (depending on model and application)

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## General Information

### Inductive position switches

The contactless position switch changes its output signals inside the spool overlap depending on its direction of movement. In this way, the hydraulic zero position ("closed" position) can be clearly analyzed.

As a special version, "Position monitoring open" can also be realized.

Advantages of the position switches:

- ▶ Proven technology
- ▶ M12x1 plug-in connection
- ▶ Switching frequency 0.1 ... 1 kHz (versions "QM" and "Q6")
- ▶ Long life cycle
- ▶ High reliability

### Hydraulic position switch

The zero position ("closed" position) can be hydraulically evaluated via the mechanical actuation of a 3/2 directional seat valve. The position switch is suitable for applications where electrical signal evaluation is not permitted.

#### **Notice:**

2-way cartridge valves in safety-relevant controls may only be assembled and commissioned by trained specialists. Service works (e.g. seal replacement) require special tools and devices. This work may only be performed by authorized specialists or in the factory.

Improper work at safety equipment leads to a risk of personal injury and damage to property!

- ▶ The essential valve components are matched, marked and calibrated at the factory. Replacing individual valve components can lead to malfunctions and is therefore not admissible. In case of faults, the complete valve assembly must be replaced.
- ▶ The factory setting of the position switch must not be changed. The position switch may only be set by Bosch Rexroth.
- ▶ The position switch must be automatically monitored by the machine control to prevent initiation of a new machine cycle even in case of a failure or absence of the position signal.
- ▶ Test certificates see page 79.

## Valve assembly components

### Cartridge element

The cartridge elements are hydraulically controlled via the two working ports A and B and via the spring chamber (supply via the control cover). These assemblies are available in NG16 to 160.

Depending on the switching cycle design, versions with shaft seal can be selected to ensure internal freedom from leakage.

### Control cover

The control cover (2) can lead up to 4 pilot oil ports on the block side to internal components or additional externally mounted valve assemblies (3, 4). Via the circuitry of the spring chamber of the cartridge element (1), various circuit variations can be implemented.

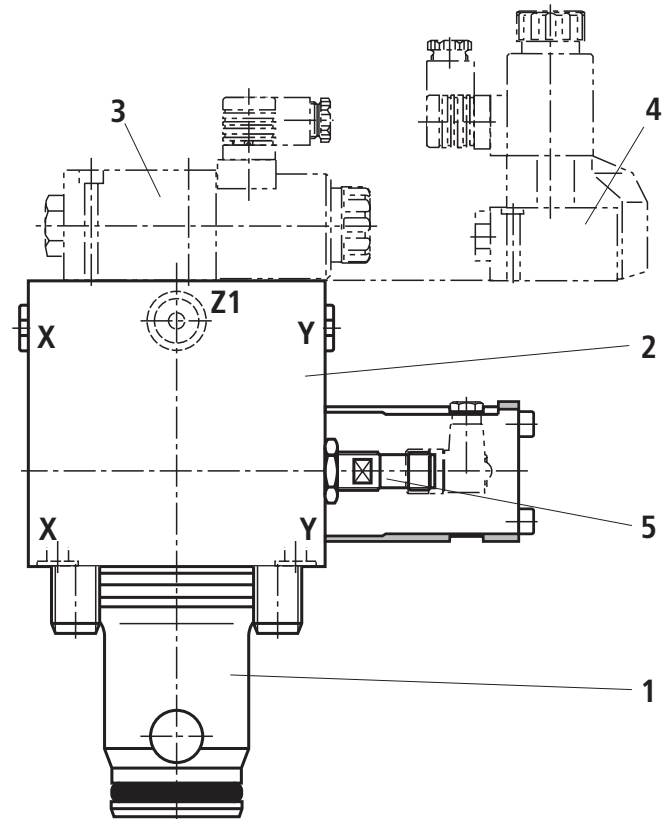
### Pilot control valve (not included in the scope of delivery)

In control covers for set-up of a directional spool valve (3) or seat valve (4), the porting pattern is realized according to ISO 4401.

### Position switch

The cartridge element (1), the control cover (2) and the position switch (5) form a functional unit combined and calibrated at the factory.

In case of faults, this complete functional unit must be replaced. Replacing individual assemblies can lead to malfunctions and is therefore not admissible.



**Example:** Type LFA 40 EWMA-7X/..Q6G24..

## Function, section, symbol

2-way cartridge valves are elements that have been designed for a compact block design. The power section with connections A and B is installed into the control block in a receiving hole standardized according to ISO 7368 and closed with a cover. In most cases, the cover is simultaneously the connection from the control side of the power section to the pilot control valves. By control with respective pilot control valves, the power section can be applied for pressure, directional and throttle functions or a combination of these functions. Particularly efficient solutions are realized by adjustment of the Size to various flows of the individual ways of an actuator. The application of power sections of elements for multiple functions is very cost-effective.

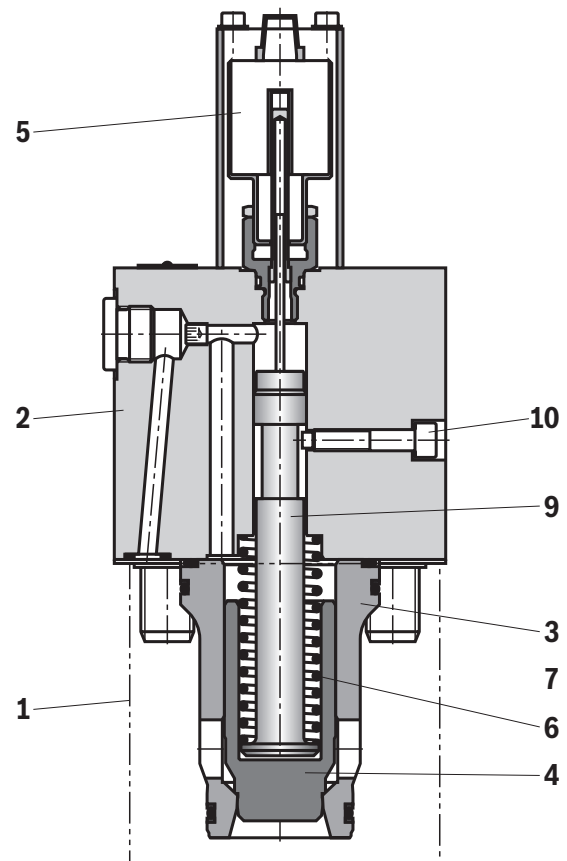
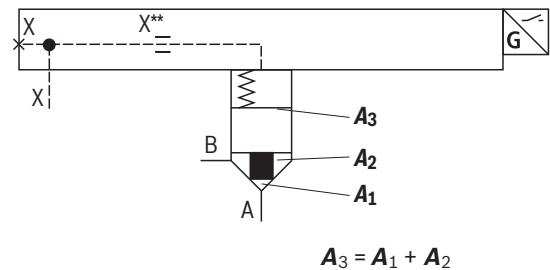
Position-monitored 2-way cartridge valves consist of the main components cartridge element (1), control cover (2) and position switch (5) as well as other model-dependent internal components (e.g. stroke limitation, shuttle valve, check valve). Depending on the type, additional external plate valves can be mounted.

The cartridge element (1) consists of a socket (one or two parts) (3), control spool (here with damping nose) (4) and closing spring (6). The spring-loaded switching piston (9) transmits the movement to the inductively operating contactless evaluation electronics (5). The bolt (10), which is available depending on the model, prevents the switching piston from falling out during assembly/disassembly.

Passively controlled 2-way cartridge valves operate depending on the pressure conditions at working ports A and B. This results in three important pressurized surfaces for the function  $A_1$ ,  $A_2$ ,  $A_3$ . The area at the valve seat  $A_1$  is considered as 100%. Depending on the version, the annulus area  $A_2$  realized by grading is 7% or 50% of area  $A_1$ . The area ratio  $A_1 : A_2$  is respectively either 14.3 : 1 or 2 : 1. The area  $A_3$  is identical to the sum of areas  $A_1 + A_2$ .

### In general, the following applies:

The areas  $A_1$  and  $A_2$  are effective in opening direction. The area  $A_3$  and the spring are effective in closing direction. The direction of action of the resulting force from the opening and closing forces determines the spool position of the 2-way cartridge valve.



Example: Type LFA 40 E-7X/CA...D QMG24 F

**Installation bore and connection dimensions**  
see Data sheet 21010.

**Ordering code:** Control cover type LFA...

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
<b>LFA</b>			-	/	<b>C</b>													

01	Control cover	<b>LFA</b>
02	Size 16	<b>16</b>
	Size 25	<b>25</b>
	Size 32	<b>32</b>
	Size 40	<b>40</b>
	Size 50	<b>50</b>
	Size 63	<b>63</b>
	Size 80	<b>80</b>
	Size 100	<b>100</b>
	Size 125	<b>125</b>
	Size 160	<b>160</b>

**Control cover types**

03	<b>- With electrical control of the closed position</b>	
	Incl. installation kit (NG16 ... 160)	<b>E</b>
	Incl. installation kit with piston sealing (NG16 ... 160)	<b>E15</b>
	Intermediate cover, incl. installation kit, additional end control cover "LFA" required (NG16 ... 32)	<b>EM</b>
	Intermediate cover, incl. installation kit with piston sealing, end control cover "LFA" required (NG16 ... 32)	<b>EM19</b>
	With stroke limitation, incl. installation kit (NG16 ... 160)	<b>EH2</b>
	For set-up of a directional spool valve or seat valve, incl. installation kit (NG16 ... 63)	<b>EWMA</b>
	For set-up of a directional spool valve or seat valve, incl. installation kit (NG16 ... 63)	<b>EWMB</b>
	For set-up of a directional spool valve or seat valve, incl. installation kit (NG16 ... 80)	<b>EWA</b>
	For set-up of a directional spool valve or seat valve, incl. installation kit (NG16 ... 80)	<b>EWB</b>
	With stroke limitation, for set-up of a directional spool valve or seat valve, incl. installation kit (NG16 ... 63)	<b>EHWMA2</b>
	With stroke limitation, for set-up of a directional spool valve or seat valve, incl. installation kit (NG16 ... 63)	<b>EHWMB2</b>
	For set-up of a directional spool valve or seat valve, with built-in shuttle valve, incl. installation kit (NG16 ... 63)	<b>EGWA</b>
	For set-up of a directional spool valve or seat valve, with built-in shuttle valve, incl. installation kit (NG16 ... 63)	<b>EGWB</b>
	For set-up of a directional spool valve or seat valve, with built-in shuttle valve, incl. installation kit (NG16 ... 63)	<b>EKWA</b>
	For set-up of a directional spool valve or seat valve, with built-in shuttle valve, incl. installation kit (NG16 ... 63)	<b>EKWB</b>
	Hydraulic basic position "open"; monitoring of position "open", incl. installation kit (NG25)	<b>E51</b>
	Hydraulic basic position "open"; monitoring of position "closed" and "open", incl. installation kit (NG25)	<b>E76</b>
	Monitoring of position "open", incl. installation kit (NG25)	<b>E52</b>
	<b>- With hydraulic control of the closed position</b>	
Incl. installation kit (NG16 ... 80)	<b>D7</b>	
With stroke limitation (NG16 ... 80), incl. installation kit	<b>H2-7</b>	
04	Component series 70 ... 79 (70 ... 79: unchanged installation and connection dimensions) (NG16 ... 63)	<b>7X</b>
	Component series 60 ... 69 (60 ... 69: unchanged installation and connection dimensions) (NG80 ... 100)	<b>6X</b>
	Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions) (NG125 ... 160)	<b>2X</b>
05	Cartridge installation kit	<b>C</b>

**Spool design** (for area ratio see section on page 4, for symbols see right side)

06	<b>A<sub>1</sub> : A<sub>2</sub> = 2 : 1</b> (annulus area = 50%; directional function; standard)	<b>A</b>
	<b>A<sub>1</sub> : A<sub>2</sub> = 14.3 : 1</b> (annulus area = 7%; directional function)	<b>B</b>
	<b>A<sub>1</sub> : A<sub>2</sub> = 1 : 0</b> (pressure function) (only version "E", "E15", "EM" and "EM19"; others on request)	<b>D</b>

**Ordering code:** Control cover type LFA...

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	/	C													

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 3.0 bar (only NG125)	<b>30</b>
	Cracking pressure 4.0 bar (only NG16 ... 100)	<b>40</b>
08	Valve poppet <b>with</b> damping nose (standard)	<b>D</b>
	Valve poppet <b>without</b> damping nose (only version "Q8G08" or "spool position open")	<b>E</b>

**Spool position monitoring**

09	Hydraulic	<b>no code</b>
	Electrical (dependent on NG; see pages of the individual control cover variations)	<b>QMG24</b>
	Electrical (dependent on NG; see pages of the individual control cover variations)	<b>Q6G24</b>
	Electrical (NAMUR)	<b>Q8G08</b>

**Orifices**

10	For more detailed information, please refer to the pages of the individual control cover variants.	
...		
17		

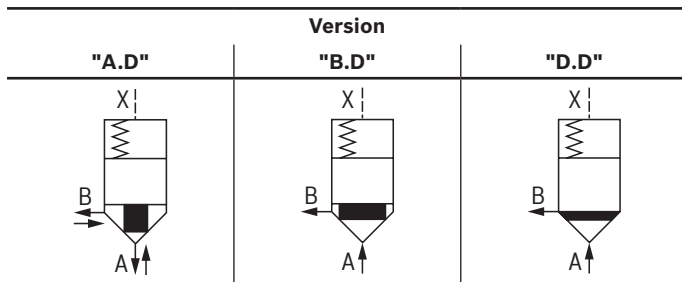
**Seal material** (observe compatibility of seals with hydraulic fluid used, see page 10)

18	NBR seals	<b>no code</b>
	FKM seals	<b>V</b>

**Connections, mounting and plug screws**







19	Mounting screws, metric; connections inch thread (standard)	<b>no code</b>
	Mounting screws UNC; connections UNF (not for version "EM" and "EM19")	<b>/12<sup>1)</sup></b>

- 1) For version "/12" the mounting threads for the logic cover in the block are not designed according to ISO 7368 (special porting pattern, see page 76). The through holes in the cover are adapted to the dimensions of the UNC screws. It is not admissible to combine this version with metric mounting screws. Dimensions for connections UNF (pilot oil ports) on request. Mounting thread UNC for pilot control valves, see page 7.

**Notice:**

The cartridge valve is included in the type designation.

General information on the **ordering code** for control covers type LFA...:  
Nozzle symbols, pilot control valves

Orifice symbol		Symbol in ordering code		
<b>A**</b>		<b>A**</b>		This orifice is designed as screw-type orifice. If an orifice is to be installed, the respective code letter with the orifice $\varnothing$ in 1/10mm has to be entered in the type designation. Example: <b>A12</b> = orifice with $\varnothing$ 1.2 mm in channel A.
<b><math>\varnothing</math>1,2</b>				This orifice is designed as bore. No specifications are made in the type designation. (Orifice $\varnothing$ in mm)
<b>Z12</b>				This orifice is designed as screw-type orifice. This is a standard orifice. No specifications are made in the type designation. (Orifice $\varnothing$ in 1/10mm)

#### Pilot control valve (separate order)

Control cover		Pilot control valve		
Size	Version	Size	Description	Data sheet
16 ... 50	EW., EGW., EHW., EKW.	6	Directional spool valve, direct operated (subplate mounting), type WE	23178
			Directional seat valve, direct operated (subplate mounting), type SEW	22058
			Directional seat valve, direct operated (subplate mounting), type SED	22049
63 ... 80		10	Directional spool valve, direct operated (subplate mounting), type WE	23340
			Directional seat valve, direct operated (subplate mounting), type SEW	22075
			Directional seat valve, direct operated (subplate mounting), type SED	22045
			Directional spool valve, pilot-operated (subplate mounting), type W(E)H	24751

#### Notice:

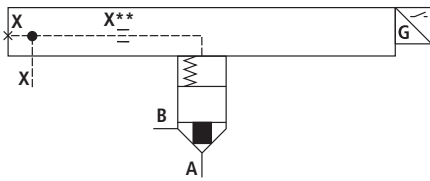
- By combination of a 2-way cartridge valve with a pilot control valve, various valve functions can be realized. Possible pilot control valves according to ISO 4401 see selection table above.
- Mounting screws for pilot control valves are not included in the scope of delivery.
- Mounting thread for pilot control valves in version "/12" deviating from ISO 4401 (see table).

#### Mounting thread "/12"

Size	Thread (Pilot control valve)	Thread depth in mm
16 ... 63	10-24 UNC	11
80 ... 100	1/4"-20 UNC	10

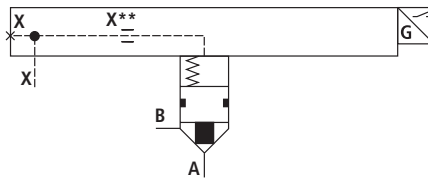
## Symbols

**Version "E"** (NG16 ... 160)  
Incl. installation kit



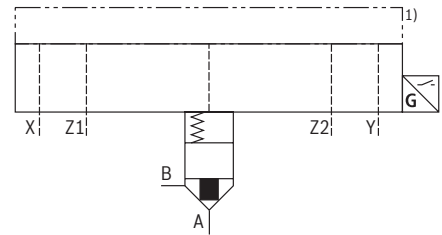
See page 14 ... 19

**Version "E15"** (NG16 ... 160)  
Incl. installation kit with piston sealing



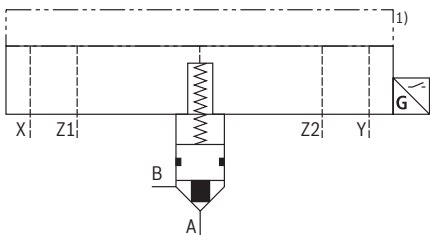
See page 20 ... 25

**Version "EM"** (NG16 ... 32)  
Intermediate cover, incl. installation kit,  
additional end control cover "LFA" required



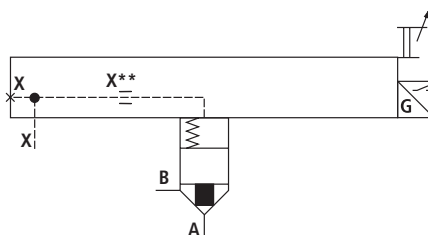
See page 26 ... 27

**Version "EM19"** (NG16 ... 32)  
Intermediate cover, incl. installation kit with  
piston sealing, additional end control cover  
"LFA" required



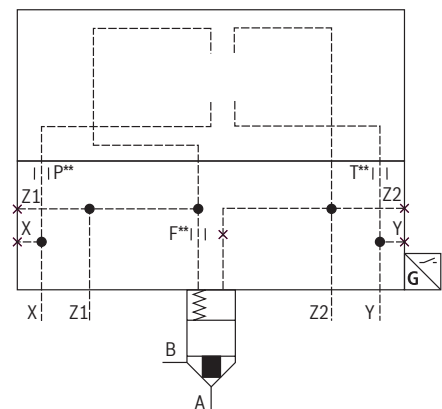
See page 28 ... 29

**Version "EH2"** (NG16 ... 160)  
With stroke limitation, incl. installation kit



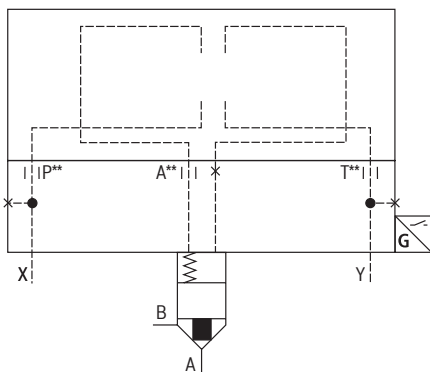
See page 30 ... 37

**Version "EWMA"** (NG16 ... 63)  
For set-up of a directional spool valve or  
seat valve, incl. installation kit



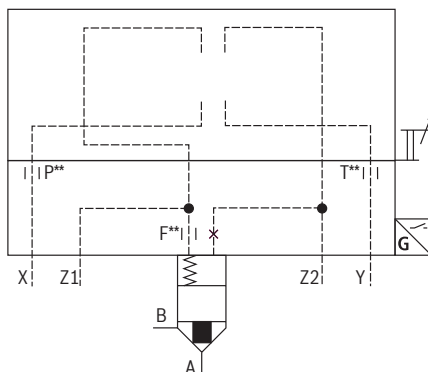
See page 38 ... 41

**Version "EWA"** (NG16 ... 80)  
For set-up of a directional spool valve or  
seat valve, incl. installation kit



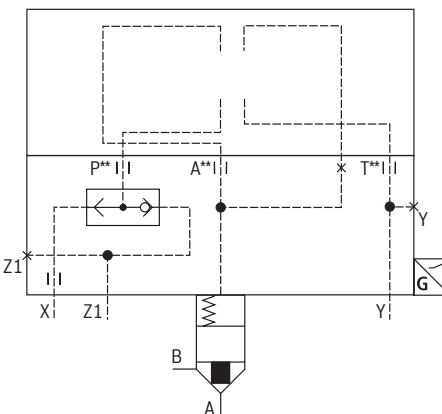
See page 42 ... 49

**Version "EHWMA2"** (NG16 ... 63)  
With stroke limitation, for set-up of a directi-  
onal spool valve or seat valve, incl. installa-  
tion kit



See page 50 ... 53

**Version "EGWA"** (NG16 ... 63)  
For set-up of a directional spool valve or  
seat valve, with built-in shuttle valve,  
incl. installation kit



See page 54 ... 57

<sup>1)</sup> Standard cover required (separate order, see data sheet 21010)



**Notice:**

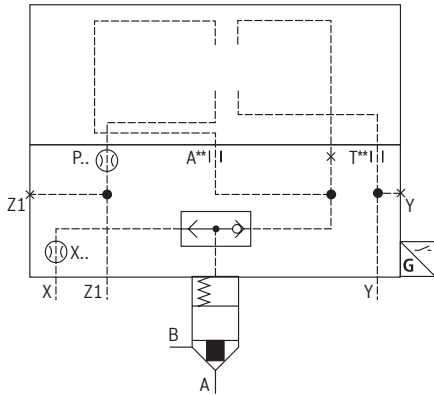
Basic symbols - binding symbols in the following type descrip-  
tions.



## Symbols

### Version "EKWA" (NG16 ... 63)

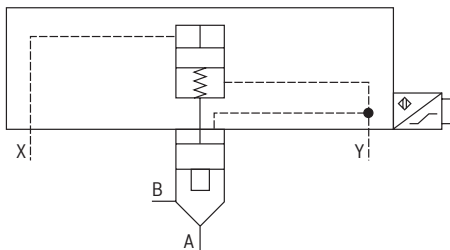
For set-up of a directional spool valve or seat valve, with built-in shuttle valve, incl. installation kit



See page 54 ... 57

### Version "E51" (NG25)

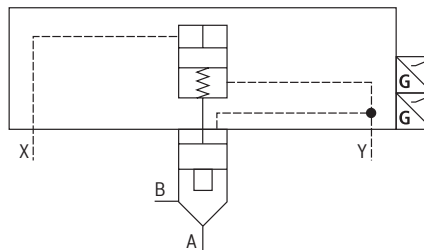
Hydraulic basic position "open"; monitoring of position "open", incl. installation kit



See page 62 ... 63

### Version "E76" (NG25)

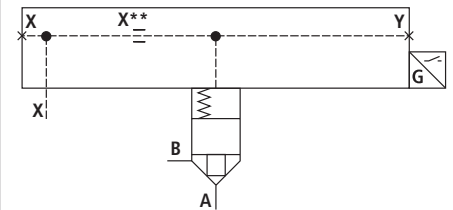
Hydraulic basic position "open"; monitoring of position "closed" and "open", incl. installation kit



See page 64 ... 65

### Version "E52" (NG25)

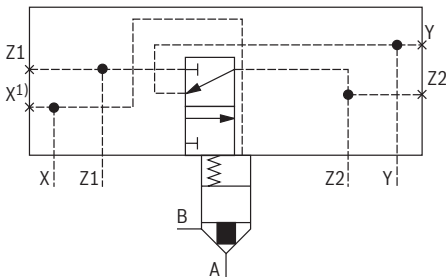
Monitoring of position "open", incl. installation kit



See page 66 ... 67

### Version "D7" (NG16 ... 80)

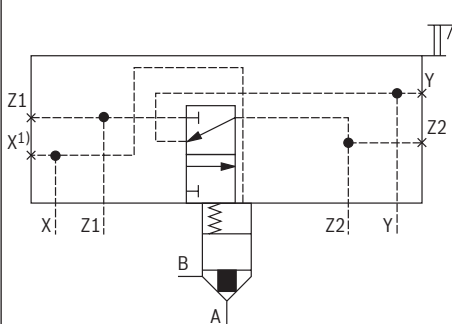
Incl. installation kit



See page 68 ... 69

### Version "H2-7" (NG16 ... 80)

With stroke limitation, incl. installation kit



See page 70 ... 71

#### Notice:

Basic symbols - binding symbols in the following type descriptions.

**Technical data**

(for applications outside these values, please consult us!)

General		
Ambient temperature range	°C	-30 ... +60 (NBR seals) -20 ... +60 (FKM seals)
MTTF <sub>D</sub> values according to EN ISO 13849	Years	150 ... 1200 (version "LFA . E-...QM...", "LFA . EH2...QM...", "LFA . EW...QM...") (for further details see data sheet 08012)

Hydraulic		
Maximum operating pressure	bar	400 (version "QM") 420 (version "Q6", "Q8")
Maximum flow	l/min	25000 (NG-dependent; see characteristic curve data sheet 21010)
Hydraulic fluid		see table below
Hydraulic fluid temperature range	°C	-30 ... +80 (NBR seals) -20 ... +80 (FKM seals)
Viscosity range	mm <sup>2</sup> /s	2.8 ... 500
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)		class 20/18/15 <sup>1)</sup>

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ Insoluble in water	HETG	ISO 15380	90221
		HEES		
	▶ Soluble in water	HEPG	ISO 15380	
Flame-resistant	▶ Water-free	HFDU (glycol base)	ISO 12922	90222
		HFDU (ester base)		
		HFDR		
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	ISO 12922	90223

 **Important information on hydraulic fluids:**

- ▶ For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- ▶ The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.
- ▶ **Bio-degradable and flame-resistant – containing water:** If components with galvanic zinc coating (e.g. version "J3" or "J5") or parts containing zinc are used, small amounts of dissolved zinc may get into the hydraulic system and cause accelerated aging of the hydraulic fluid. Zinc soap may form as a chemical reaction product, which may clog filters, nozzles and solenoid valves - particularly in connection with local heat input.

**▶ Flame-resistant – containing water:**

- Due to increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30% as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended - if possible specific to the installation - to back up the return flow pressure in ports T to approx. 20% of the pressure differential at the component.
- Dependent on the hydraulic fluid used, the maximum ambient and hydraulic fluid temperature must not exceed 50 °C. In order to reduce the heat input into the component, a maximum duty cycle of 50% in continuous operation has to be set for on/off valves (measuring period 300 s). If this is not possible due to the function, an energy-reducing control of these components is recommended, e.g. via a PWM plug-in amplifier.

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

For the selection of the filters see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

**Technical data**

(for applications outside these values, please consult us!)

**Piston areas**


Version	Area in cm <sup>2</sup>	Size									
		16	25	32	40	50	63	80	100	125	160
"A"	A <sub>1</sub>	1.89	4.27	6.79	11.1	19.63	30.19	37.9	63.6	95	160.6
"B"		2.66	5.73	9.51	15.55	26.42	41.28	52.8	89.1	133.7	224.8
"D"		2.27	4.9	8.04	–	–	–	–	–	–	–
"A"	A <sub>2</sub>	0.95	1.89	3.39	5.52	8.64	13.99	18.84	31.4	48	79.9
"B"		0.18	0.43	0.67	1.07	1.85	2.90	3.94	5.9	9.3	15.7

**Piston shape** (valve poppet with damping nose)

	Version	Size										
		16	25	32	40	50	63	80	100	125	160	
<b>Stroke</b>	cm	"A", "B"	0.9	1.17	1.4	1.9	2.3	2.8	3.0	3.8	4.8	6.5
	cm	"D"	0.65	0.69	0.96	–	–	–	–	–	–	–
<b>Pilot volume</b>	cm <sup>3</sup>	"A", "B"	2.56	7.21	14.3	31.6	65.0	124	170	361	687	1563
	cm <sup>3</sup>	"D"	1.47	3.4	7.7	–	–	–	–	–	–	–

**Cracking pressure** in bar

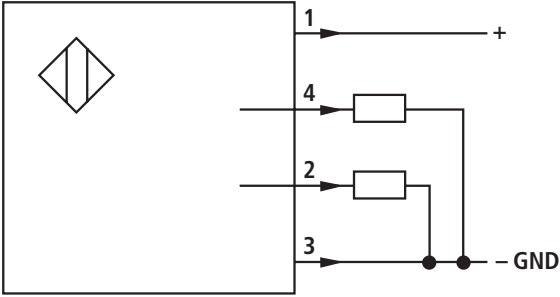
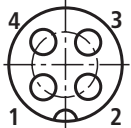
	Version	Size									
		16	25	32	40	50	63	80	100	125	160
<b>Direction of flow A to B</b>	"A20"	2.03	2.18	2.12	2.02	2.01	2.0	1.75	1.75	1.76	1.94
	"A30"	–	–	–	–	–	–	–	–	2.05	–
	"A40"	3.50	3.90	3.80	4.0	4.11	3.8	3.13	3.04	–	–
	"B20"	1.44	1.62	1.52	1.44	1.5	1.5	1.26	1.25	1.25	1.4
	"B30"	–	–	–	–	–	–	–	–	1.45	–
	"B40"	2.48	2.90	2.70	2.86	3.05	2.8	2.25	2.17	–	–
	"D40"	3.8	4.1	4.0	–	–	–	–	–	–	–
<b>Direction of flow B to A</b>	"A20"	4.05	4.91	4.25	4.06	4.57	4.33	3.53	3.54	3.50	3.9
	"A30"	–	–	–	–	–	–	–	–	4.0	–
	"A40"	6.96	8.74	7.6	8.05	9.34	8.15	6.3	6.2	–	–
	"B20" <sup>1)</sup>	21.3	21.5	21.6	20.9	21.4	20.9	16.9	18.7	17.9	20
	"B30" <sup>1)</sup>	–	–	–	–	–	–	–	–	20.7	–
	"B40" <sup>1)</sup>	36.6	38.3	38.6	41.5	43.6	39.4	30.2	32.5	–	–

<sup>1)</sup> Only suitable for direction of flow B to A to a limited extent.**Characteristic curves** **Notice:**

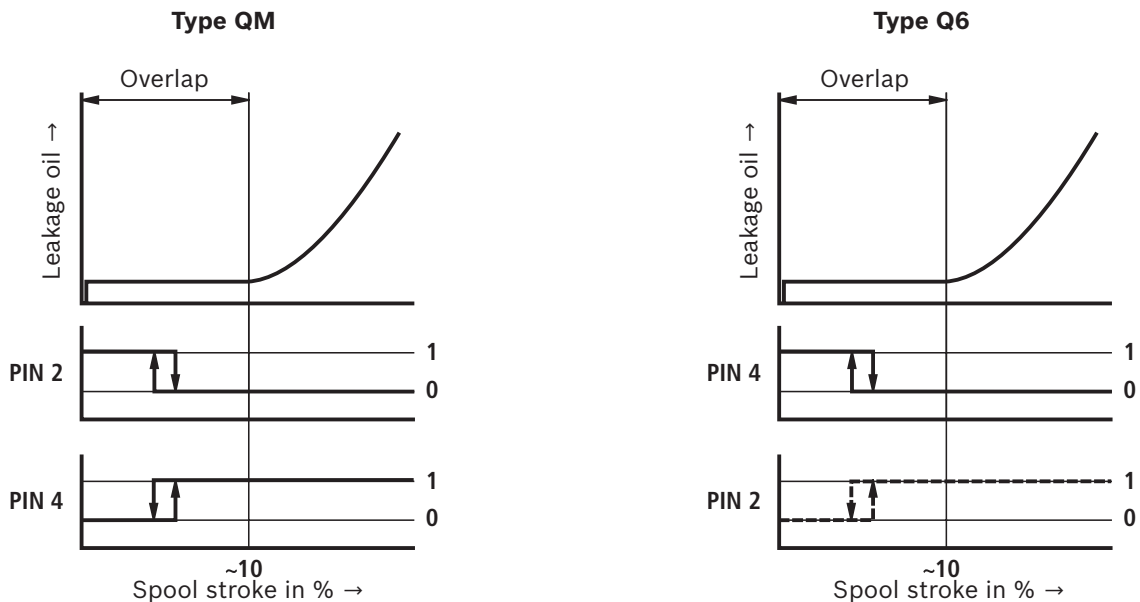
- ▶ Characteristic curves for spool design "A" and "B" (directional function), see data sheet 21010.
- ▶ Characteristic curves for spool design "D" (pressure function), see data sheet 21050.

### Inductive position switch type **QM** and **Q6**: electrical connection

The electrical connection is realized via a 4-pole mating connector (separate order, see page 78) with connection thread M12 x 1.

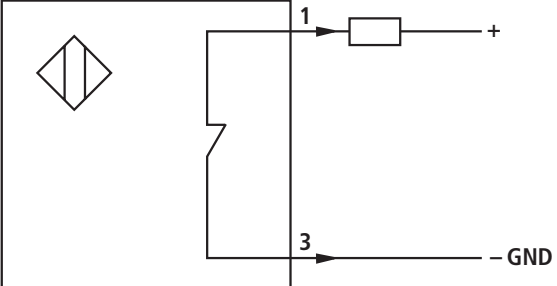
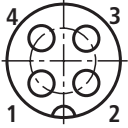
<b>Connection voltage:</b>	24 V +30%/-15%, direct voltage
<b>Admissible residual ripple:</b>	≤ 10%
<b>Load capacity:</b>	<ul style="list-style-type: none"> <li>▶ Version "QM" 400 mA</li> <li>▶ Version "Q6" 200 mA</li> </ul>
<b>Switching outputs:</b>	PNP transistor outputs, load between switching outputs and GND
	
<b>Pinout:</b>	<ul style="list-style-type: none"> <li><b>1</b> +24 V</li> <li><b>2</b> Switching output</li> <li><b>3</b> 0 V, GND</li> <li><b>4</b> Switching output</li> </ul>
	

### Inductive position switch type **QM** and **Q6**: switching logics



### Inductive position switch type Q8: electrical connection

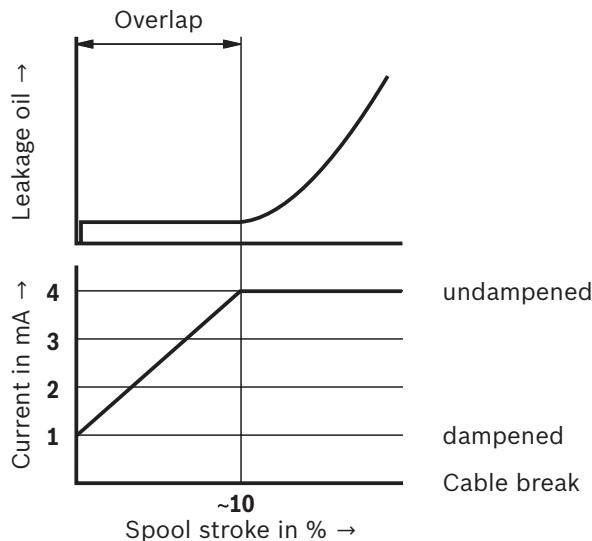
The electrical connection is realized via a 4-pole mating connector (separate order, see page 78) with connection thread M12 x 1.

<b>Connection voltage:</b>	8.2 V +9%/-6%, direct voltage								
<b>Maximum current consumption, damped:</b>	1 mA								
<b>Maximum current consumption, not damped:</b>	4 mA								
<b>Switching outputs:</b>	NAMUR switch								
									
<b>Pinout:</b>									
	<table border="1"> <tr> <td><b>1</b></td> <td>Current source</td> </tr> <tr> <td><b>2</b></td> <td>-</td> </tr> <tr> <td><b>3</b></td> <td>0 V, GND</td> </tr> <tr> <td><b>4</b></td> <td>-</td> </tr> </table>	<b>1</b>	Current source	<b>2</b>	-	<b>3</b>	0 V, GND	<b>4</b>	-
<b>1</b>	Current source								
<b>2</b>	-								
<b>3</b>	0 V, GND								
<b>4</b>	-								

**Notice:**

A special, separate control electronics (NAMUR) is required for the supply and evaluation of the inductive position switch type Q8.

### Inductive position switch type Q8: switching logics



**Control cover "E" incl. installation kit: NG16 ... 63**

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA		E	-	7X	/	C		D	QMG24	F							1)	1)

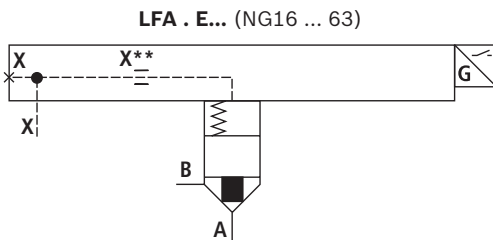
02						15	
Size						Orifice in the channel (Ø in 1/10 mm)	
						X	
16	25	32	40	50	63	X**	

**Spool design** (for area ratio see section on page 4)

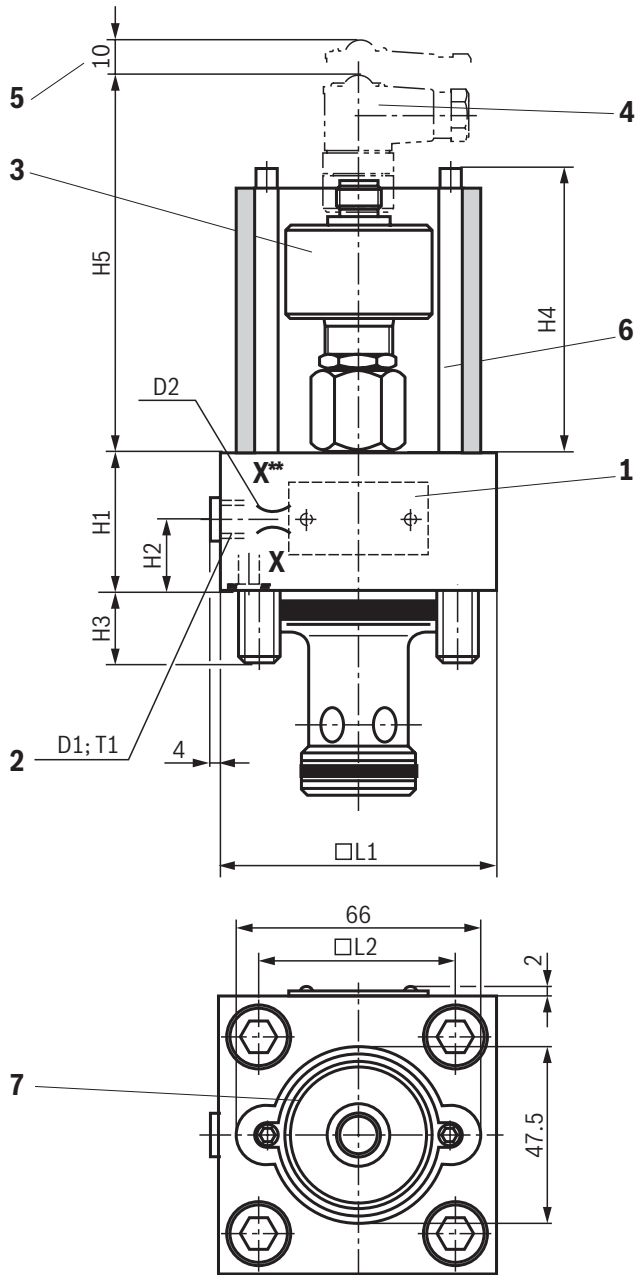
06	$A_1 : A_2 = 2 : 1$ (annulus area = 50%; directional function; standard)	<b>A</b>
	$A_1 : A_2 = 14.3 : 1$ (annulus area = 7%; directional function)	<b>B</b>
	$A_1 : A_2 = 1 : 0$ (pressure function)	<b>D</b>
07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



**Control cover "E"** incl. installation kit: NG16 ... 63  
(dimensions in mm)



NG	16	25	32	40	50	63
<b>D1</b> <sup>1)</sup>	G1/8	G1/4	G1/4	G1/2	G1/2	G3/4
<b>D2</b>	M6	M6	M6	M8 x 1	M8 x 1	M8 x 1
<b>H1</b>	50	50	70	110	120	150
<b>H2</b>	12	16	16	83	93	113
<b>H3</b>	15	24	28	32	34	50
<b>H4</b>	78	78	78	98	98	98
<b>H5</b>	105	105	105	123	123	123
□ <b>L1</b>	65	85	100	125	140	180
□ <b>L2</b>	46±0.1	58±0.15	70±0.15	85±0.2	100±0.2	125±0.2
<b>T1</b>	8	12	12	14	14	16

<sup>1)</sup> Not with version "/12"

- 1 Name plate
- 2 External pilot oil port X
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Representation without position switch

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "E"** incl. installation kit: NG80 ... 100

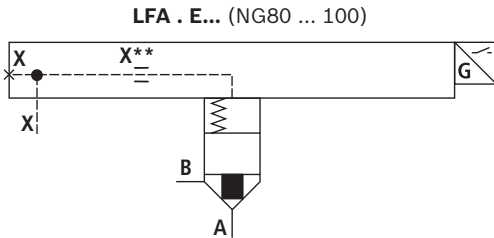
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA		E	-	6X	/	C	A		D	Q6G24	F							1)	1)

02		15	
<b>Size</b>		<b>Orifice in the channel</b> (Ø in 1/10 mm)	
		<b>X</b>	
<b>80</b>	<b>100</b>	X**	

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

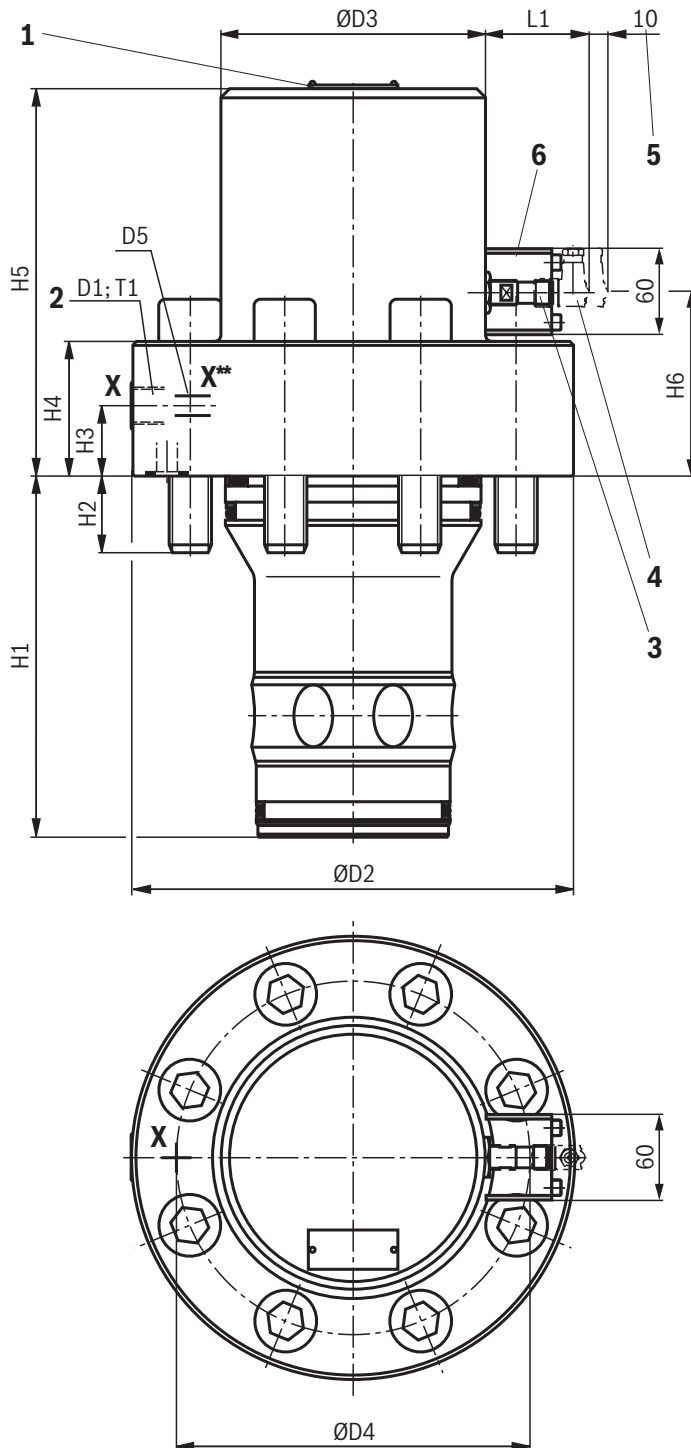
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.





**Control cover "E"** incl. installation kit: NG80 ... 100  
(dimensions in mm)



NG	80	100
D1 <sup>1)</sup>	G1/2	G1
ØD2	250	300
ØD3	150	175
ØD4	200±0.2	245±0.3
D5	G3/8	G1/2
H1	205	245
H2	45	52.5
H3	40	35
H4	76.5	88.5
H5	220	250
H6	105	140.5
L1	62	54
T1	14	18

1) Not with version "/12"

- 1 Name plate
- 2 External pilot oil port X
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood (only NG100)

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "E" incl. installation kit: NG125 ... 160**

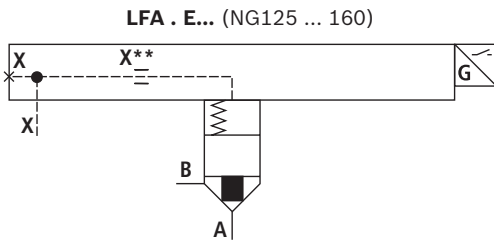
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA		E	-	2X	/	C	A		D	Q6G24	F							1)	1)

02		15	
<b>Size</b>		<b>Orifice in the channel (Ø in 1/10 mm)</b>	
		<b>X</b>	
<b>125</b>	<b>160</b>	X**	

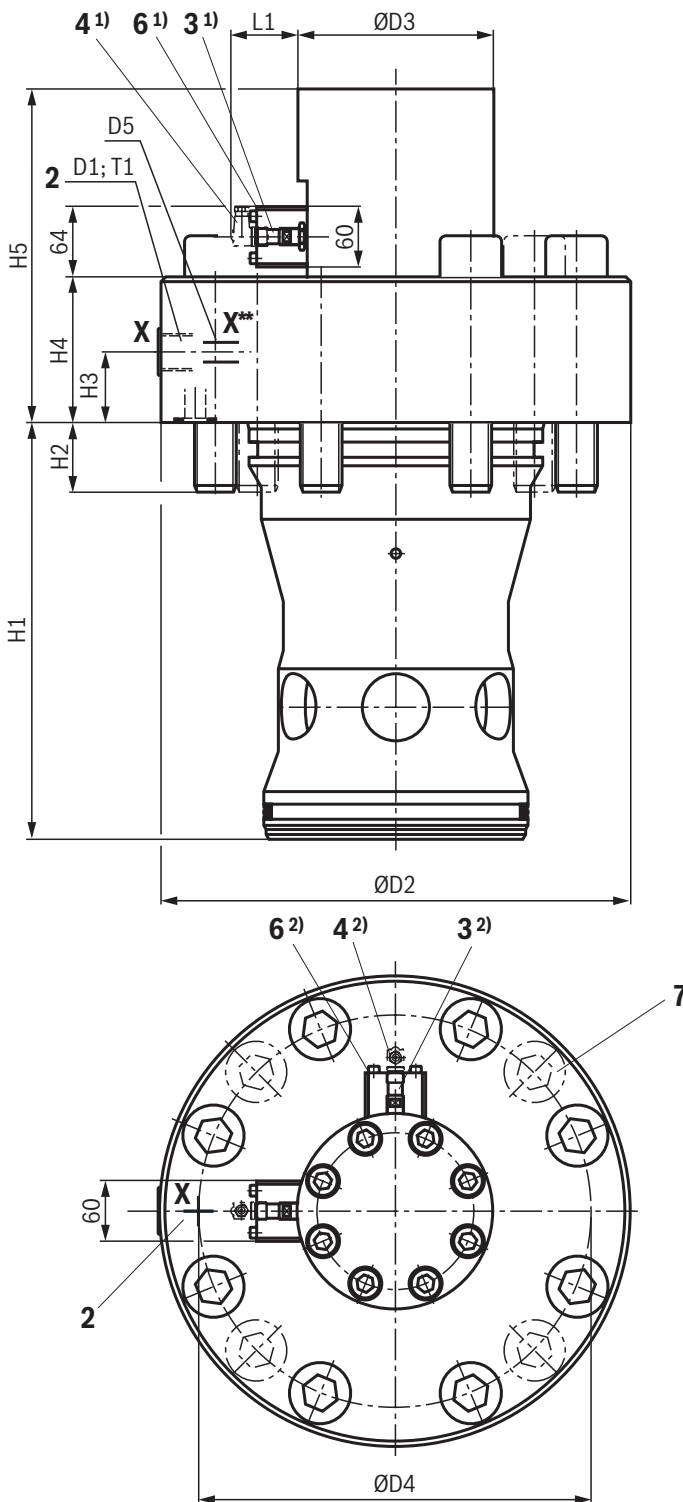
07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 3.0 bar (only NG125)	<b>30</b>

△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



**Control cover "E"** incl. installation kit: NG125 ... 160  
(dimensions in mm)



NG	125	160
D1 <sup>3)</sup>	G1	G3/4
ØD2	380	480
ØD3	230	200
ØD4	300±0.2	400±0.3
D5	G1/2	G1/2
H1	300+0.15	425+0.15
H2	61	74
H3	50	60
H4	100	150
H5	310	344
L1	30	52
T1	18	18

- 2 External pilot oil port X
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 6 Hood
- 7 4 additional valve mounting screws at NG160

- 1) Size 125
- 2) Size 160
- 3) Not with version "/12"

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "E15" incl. installation kit with piston sealing: NG16 ... 63**

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA		E15	-	7X	/	C		40	D	QMG24	F						1)	1)

02						15					
Size						Orifice in the channel (Ø in 1/10 mm)					
						X					
16	25	32	40	50	63	X**					

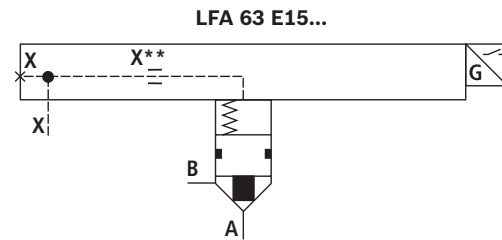
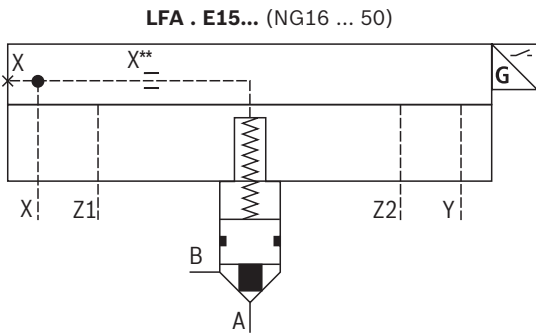
**Spool design** (for area ratio see section on page 4)

06	$A_1 : A_2 = 2 : 1$ (annulus area = 50%; directional function; standard)	<b>A</b>
	$A_1 : A_2 = 1 : 0$ (pressure function)	<b>D</b>

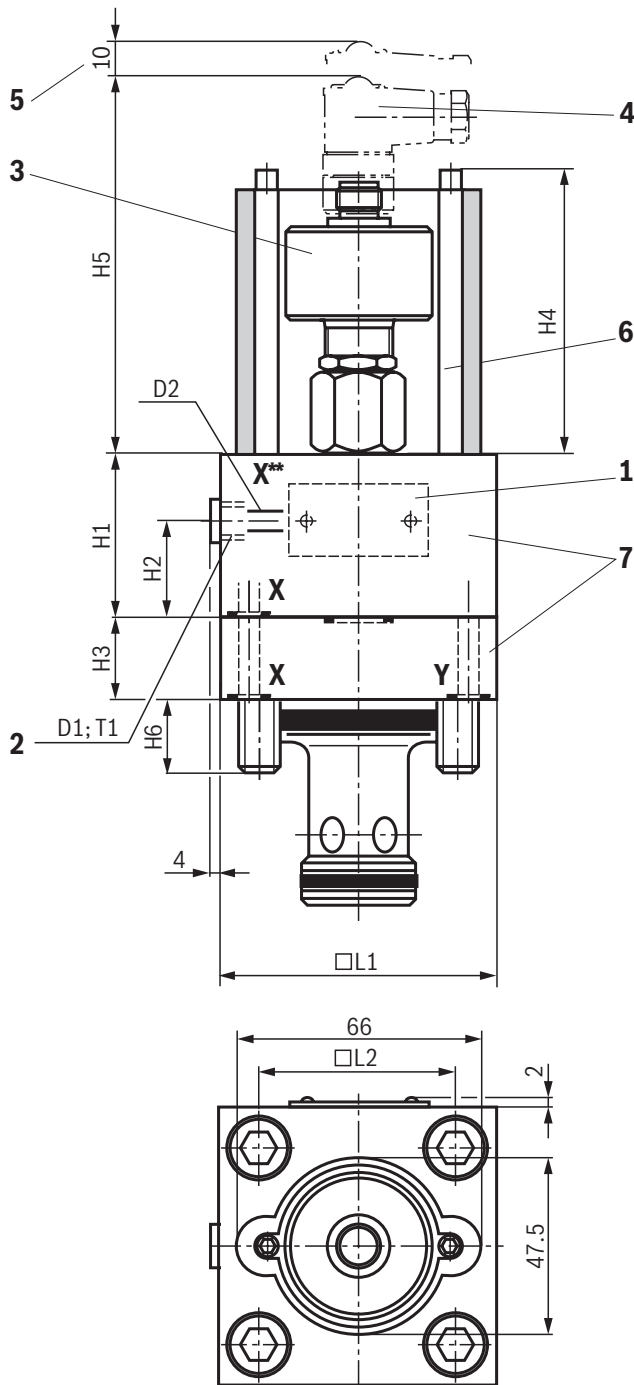
△ Orifice possible, if required, specifications have to be made

Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



**Control cover "E15"** incl. installation kit with piston sealing: NG16 ... 63  
(dimensions in mm)



NG	16	25	32	40	50	63
<b>D1</b> <sup>1)</sup>	G1/8	G1/4	G1/4	G1/2	G1/2	G3/4
<b>D2</b>	M6	M6	M6	M8 x 1	M8 x 1	M8 x 1
<b>H1</b>	50	50	70	110	120	150
<b>H2</b>	29.5	29.5	47.5	83	93	113
<b>H3</b>	25	25	30	30	40	...
<b>H4</b>	78	78	78	98	98	98
<b>H5</b>	105	105	105	123	123	123
<b>H6</b>	15	24	28	32	34	50
$\square$ <b>L1</b>	65	85	100	125	140	180
$\square$ <b>L2</b>	46±0.1	58±0.15	70±0.15	85±0.2	100±0.2	125±0.2
<b>T1</b>	8	12	12	14	14	16

<sup>1)</sup> Not with version "/12"

- 1 Name plate
- 2 External pilot oil port X
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Two-part housing (NG16 ... 50)

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "E15"** incl. installation kit with piston sealing: NG80 ... 100

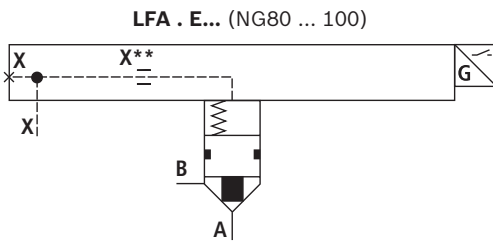
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA		E15	-	6X	/	C	A	40	D	Q6G24	F						1)	1)

02		15	
<b>Size</b>		<b>Orifice in the channel (Ø in 1/10 mm)</b>	
		<b>X</b>	
<b>80</b>	<b>100</b>	X**	

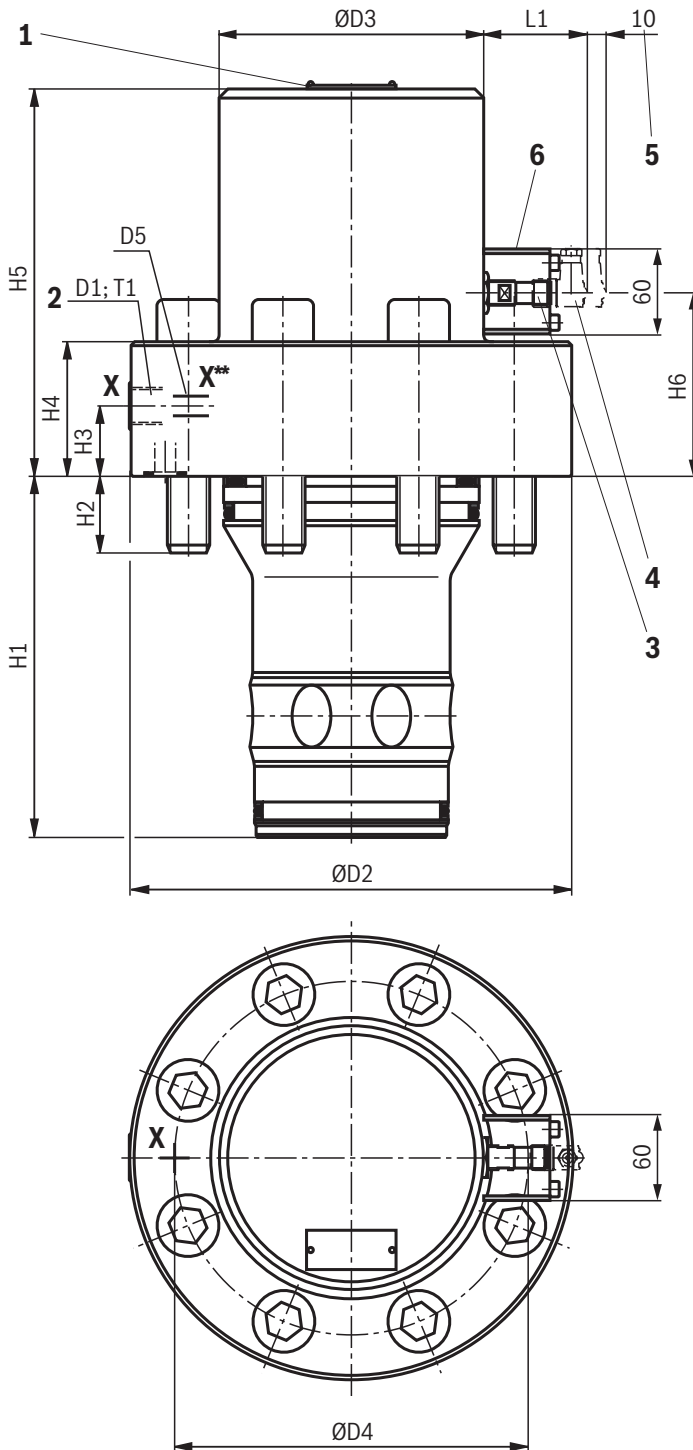
△ Orifice possible, if required, specifications have to be made

Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



**Control cover "E15"** incl. installation kit with piston sealing: NG80 ... 100  
(dimensions in mm)



NG	80	100
D1 <sup>1)</sup>	G1/2	G1
ØD2	250	300
ØD3	150	175
ØD4	200±0.2	245±0.3
D5	G3/8	G1/2
H1	205	245
H2	45	52.5
H3	40	35
H4	76.5	88.5
H5	220	250
H6	105	140.5
L1	62	54
T1	14	18

1) Not with version "/12"

- 1 Name plate
- 2 External pilot oil port X
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood (only NG100)

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "E15"** incl. installation kit with piston sealing: NG125 ... 160

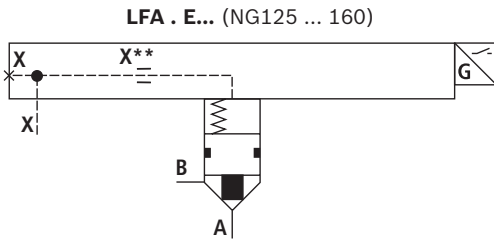
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA		E15	-	2X	/	C	A		D	Q6G24	F						1)	1)

02		15	
<b>Size</b>		<b>Orifice in the channel</b> (Ø in 1/10 mm)	
		<b>X</b>	
<b>125</b>	<b>160</b>	X**	

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 3.0 bar (only NG125)	<b>30</b>

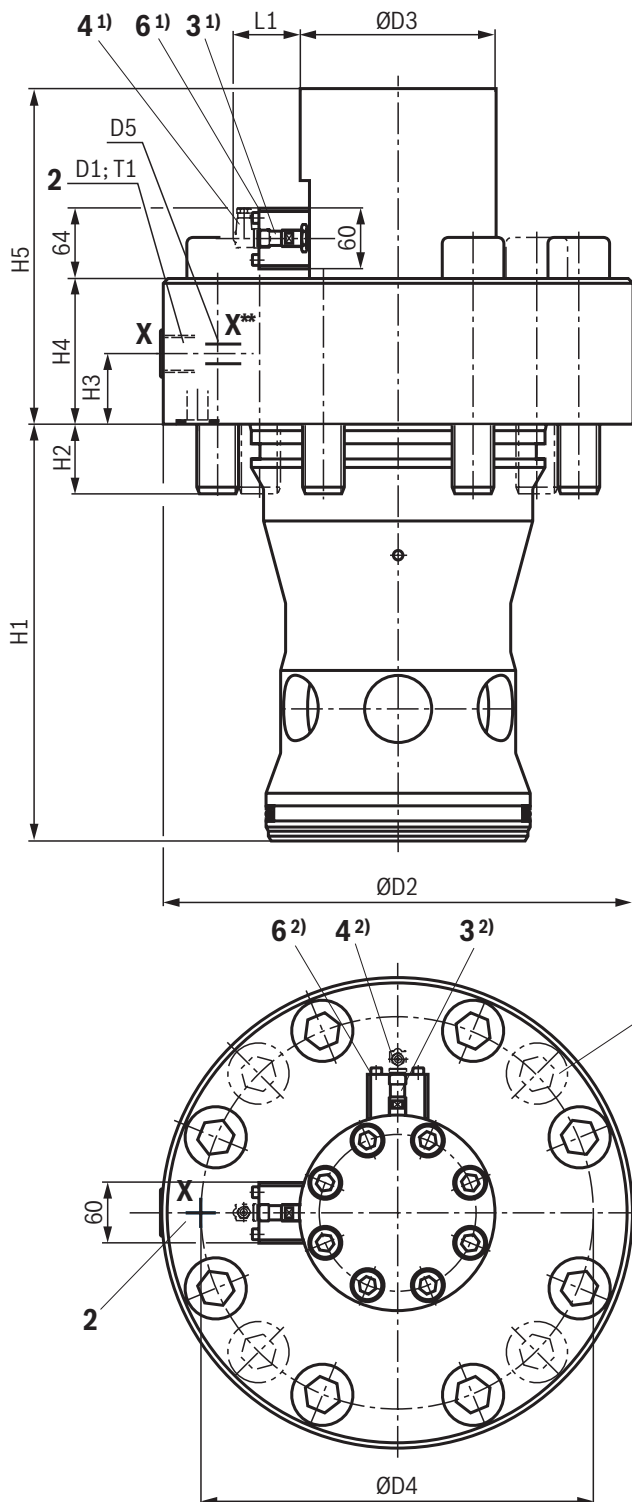
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.





**Control cover "E15"** incl. installation kit with piston sealing: NG125 ... 160  
(dimensions in mm)



NG	125	160
D1 <sup>3)</sup>	G1	G3/4
ØD2	380	480
ØD3	230	200
ØD4	300±0.2	400±0.3
D5	G1/2	G1/2
H1	300+0.15	425+0.15
H2	61	74
H3	50	60
H4	100	150
H5	310	344
L1	30	52
T1	18	18

- 2 External pilot oil port X
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 6 Hood
- 7 4 additional valve mounting screws at NG160

1) Size 125  
2) Size 160  
3) Not with version "/12"

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EM"** Intermediate cover, incl. installation kit: NG16 ... 32

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA		EM	-	7X	/	C		D	QMG24	F								

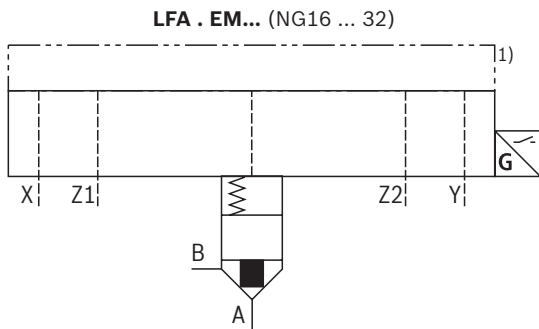
02		
<b>Size</b>		
16	25	32

**Spool design** (for area ratio see section on page 4)

06	$A_1 : A_2 = 2 : 1$ (annulus area = 50%; directional function; standard)	<b>A</b>
	$A_1 : A_2 = 1 : 0$ (pressure function)	<b>D</b>
07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

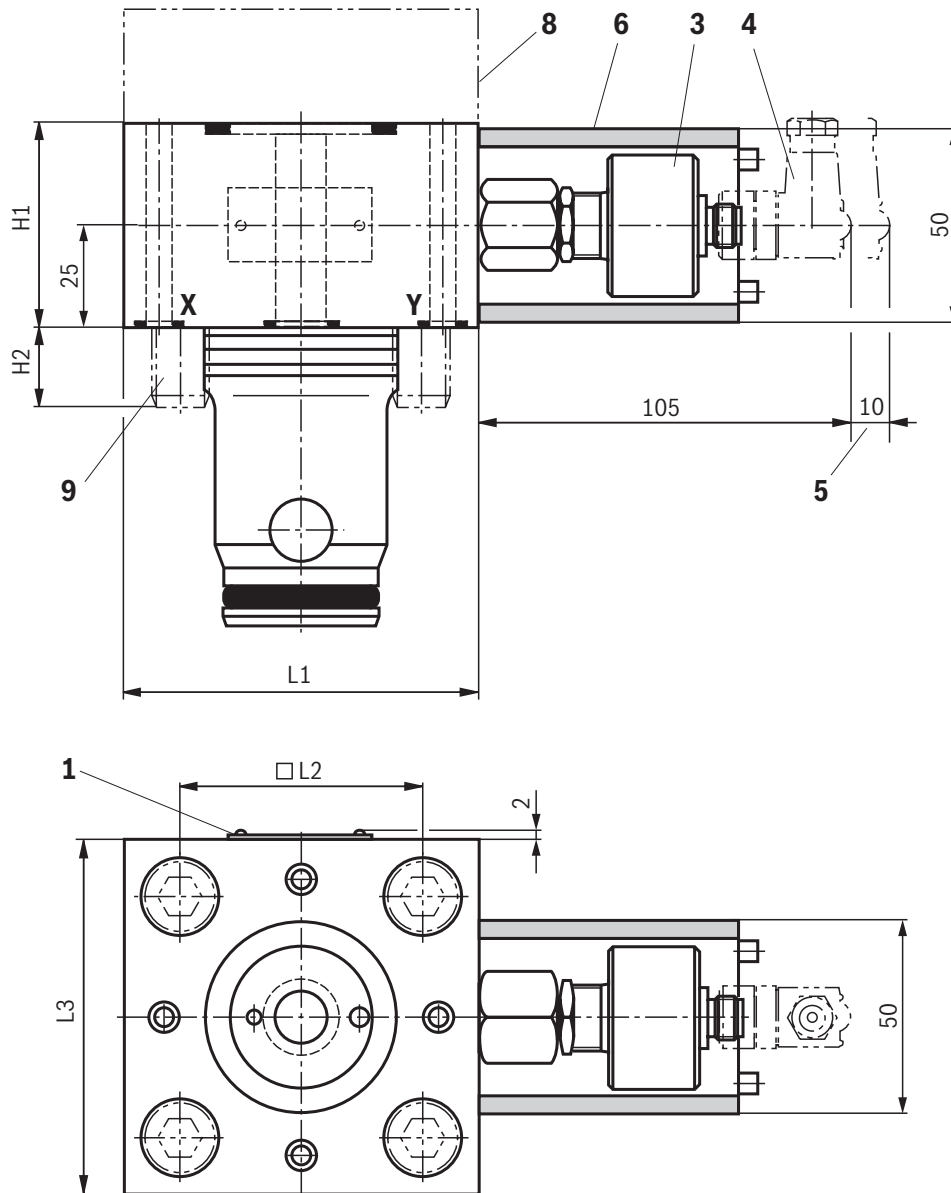
**Seal material** (observe compatibility of seals with hydraulic fluid used, see page 10)

18	NBR seals	<b>no code</b>
	FKM seals	<b>V</b>




<sup>1)</sup> Standard cover required (separate order, see data sheet 21010).

**Control cover "EM"** Intermediate cover, incl. installation kit: NG16 ... 32  
(dimensions in mm)



- 1 Name plate
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 8 Standard cover (separate order, see data sheet 21010 and 21050)
- 9 Valve mounting screws see page 74

NG	16	25	32
H1	50	50	50
H2	15	24	28
L1	80	85	100
□ L2	46	58	70
L3	65	85	100

 **Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EM19"** intermediate cover, incl. installation kit with piston sealing: NG16 ... 32

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA		EM19	-	7X	/	C		40	D	QMG24	F							

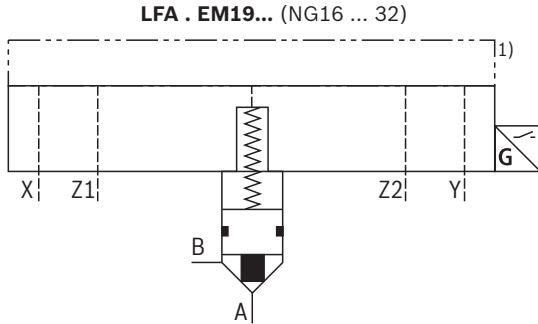
02		
<b>Size</b>		
16	25	32

**Spool design** (for area ratio see section on page 4)

06	$A_1 : A_2 = 2 : 1$ (annulus area = 50%; directional function; standard)	<b>A</b>
	$A_1 : A_2 = 1 : 0$ (pressure function)	<b>D</b>

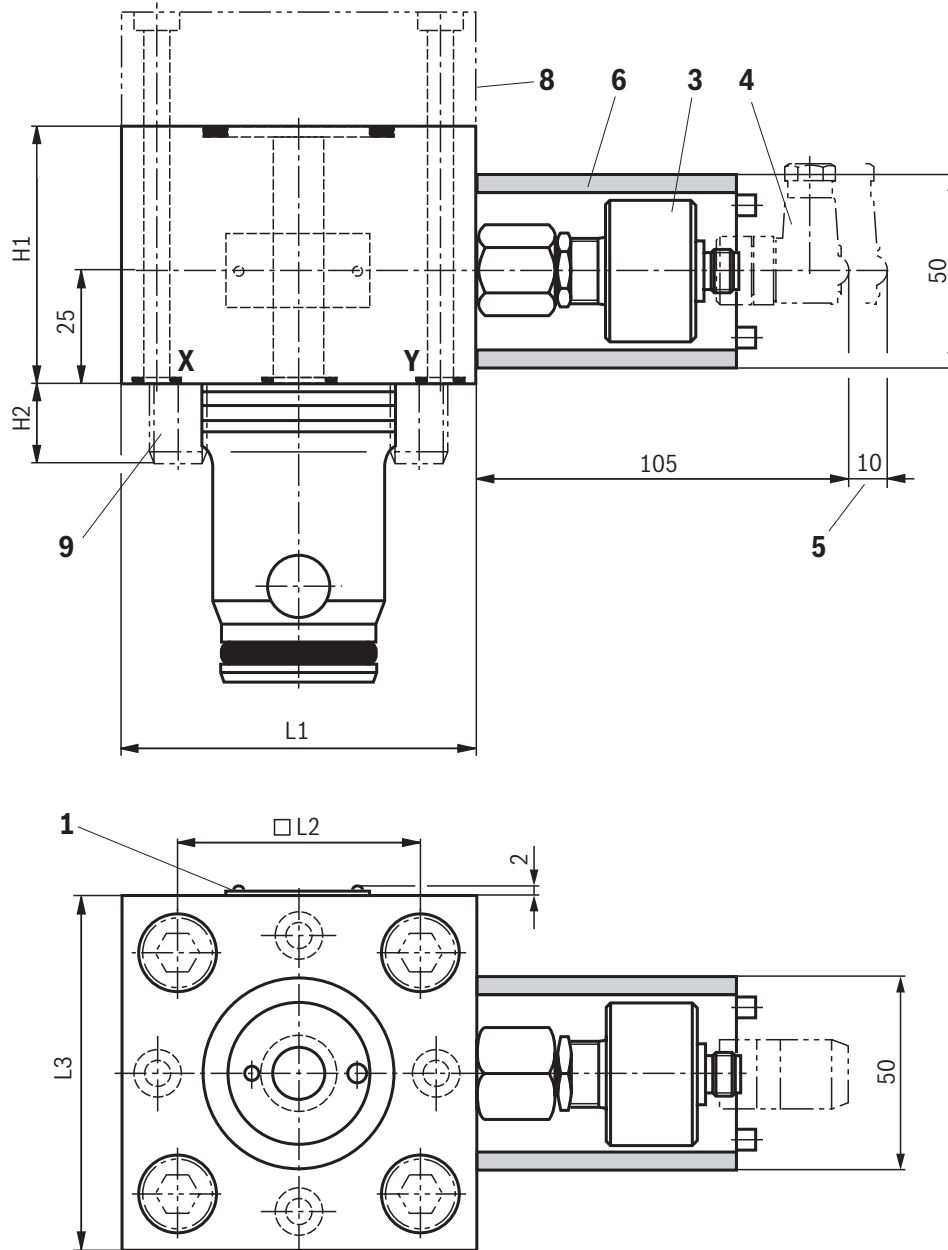
**Seal material** (observe compatibility of seals with hydraulic fluid used, see page 10)

18	NBR seals	<b>no code</b>
	FKM seals	<b>V</b>



<sup>1)</sup> Standard cover required (separate order, see data sheet 21010).

**Control cover "EM19"** intermediate cover, incl. installation kit with piston sealing: NG16 ... 32  
(dimensions in mm)



- 1 Name plate
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 8 Standard cover (separate order, see data sheet 21010 and 21050)
- 9 Valve mounting screws see page 74

NG	16	25	32
H1	60	75	80
H2	15	24	28
L1	80	85	100
□ L2	46	58	70
L3	65	85	100

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EH2"** with stroke limitation, incl. installation kit: NG16 ... 32

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA		EH2	-	7X	/	C	A		D	QMG24	F							1)	1)

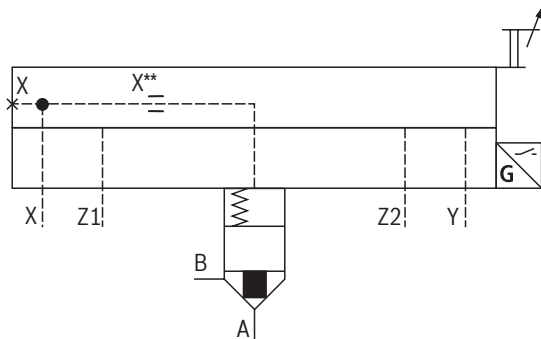
02			15	
<b>Size</b>			<b>Orifice in the channel (Ø in 1/10 mm)</b>	
			<b>X</b>	
<b>16</b>	<b>25</b>	<b>32</b>	X**	

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

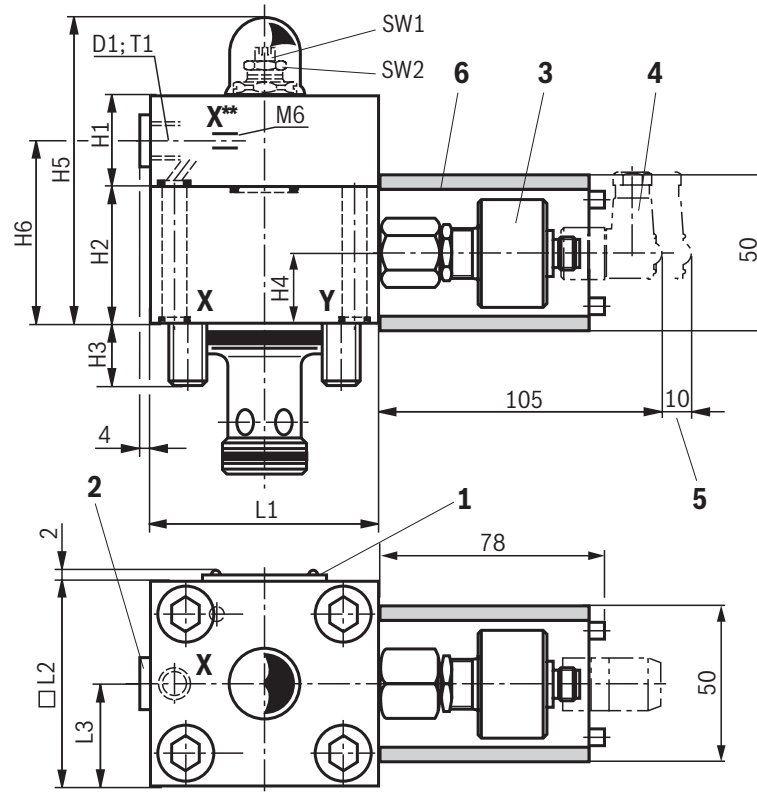
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.

**LFA . EH2...** (NG16 ... 32)



**Control cover "EH2"** with stroke limitation, incl. installation kit: NG16 ... 32  
(dimensions in mm)



- 1 Name plate
- 2 External pilot oil port X
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood

NG	16	25	32
D1 <sup>1)</sup>	G1/8	G1/4	G1/4
H1	35	40	50
H2	50	50	50
H3	15	24	28
H4	25	25	25
H5	126	130	150 <sup>4)</sup>
H6	62	66	66
L1	65	85	100
□ L2	80	85	100
L3	32.5	42.5	50
T1	8	12	12
SW1	6	6	10
SW2	21	21	27

<sup>1)</sup> Not with version "/12"

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EH2"** with stroke limitation, incl. installation kit: NG40 ... 63

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA		EH2	-	7X	/	C	A		D		F							1)	1)

02			15		
<b>Size</b>			<b>Orifice in the channel (Ø in 1/10 mm)</b>		
			<b>X</b>		
<b>40</b>	<b>50</b>	<b>63</b>	X**		

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

**Spool position monitoring**

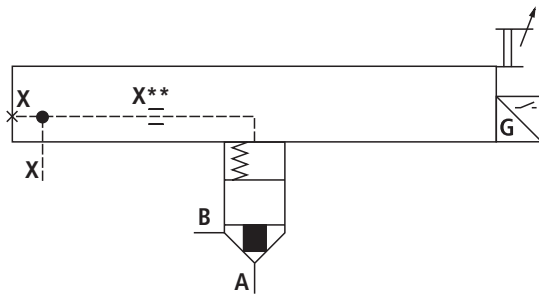
09	Electrical (NG40)	<b>QMG24</b>
	Electrical (NG50 and 63)	<b>Q6G24</b>

△ Orifice possible, if required, specifications have to be made

Characteristic curves for selecting orifices see page 76.

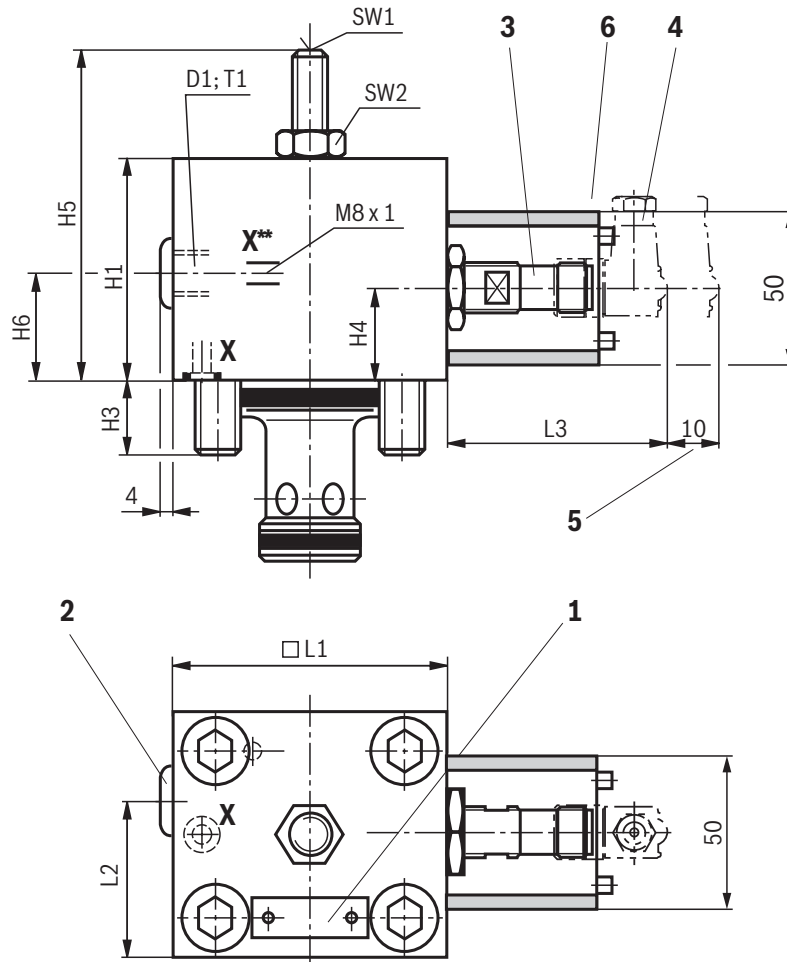
1) See "Ordering code for control cover type LFA..." page 5.

**LFA . EH2...** (NG40 ... 63)





**Control cover "EH2"** with stroke limitation, incl. installation kit: NG40 ... 63  
(dimensions in mm)



- 1 Name plate
- 2 External pilot oil port X
- 3 Position switch type Q6 (QM at NG40)
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood

NG	40	50	63
D1 <sup>3)</sup>	G1/2	G1/2	G3/4
H1	190	210	246
H3	32	34	50
H4	25	59	72.5
H5	233 <sup>2)</sup>	255 <sup>2)</sup>	295 <sup>2)</sup>
H6	84.5	95	120
□ L1	125	140	180
L2	62.5	70	90
L3	86	60	32
T1	14	14	16
SW1	14	17	24
SW2	46	55	65

<sup>2)</sup> Maximum dimension  
<sup>3)</sup> Not with version "/12"

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EH2"** with stroke limitation, incl. installation kit: NG80 ... 100

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA		EH2	-	6X	/	C	A		D	QMG24	F							1)	1)

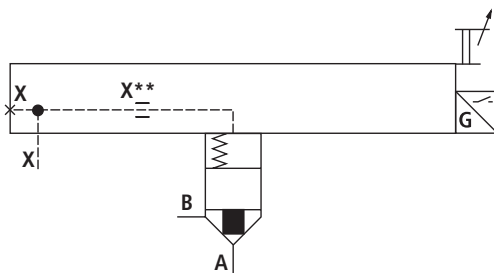
02		15	
<b>Size</b>		<b>Orifice in the channel (Ø in 1/10 mm)</b>	
		<b>X</b>	
<b>80</b>	<b>100</b>	X**	

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

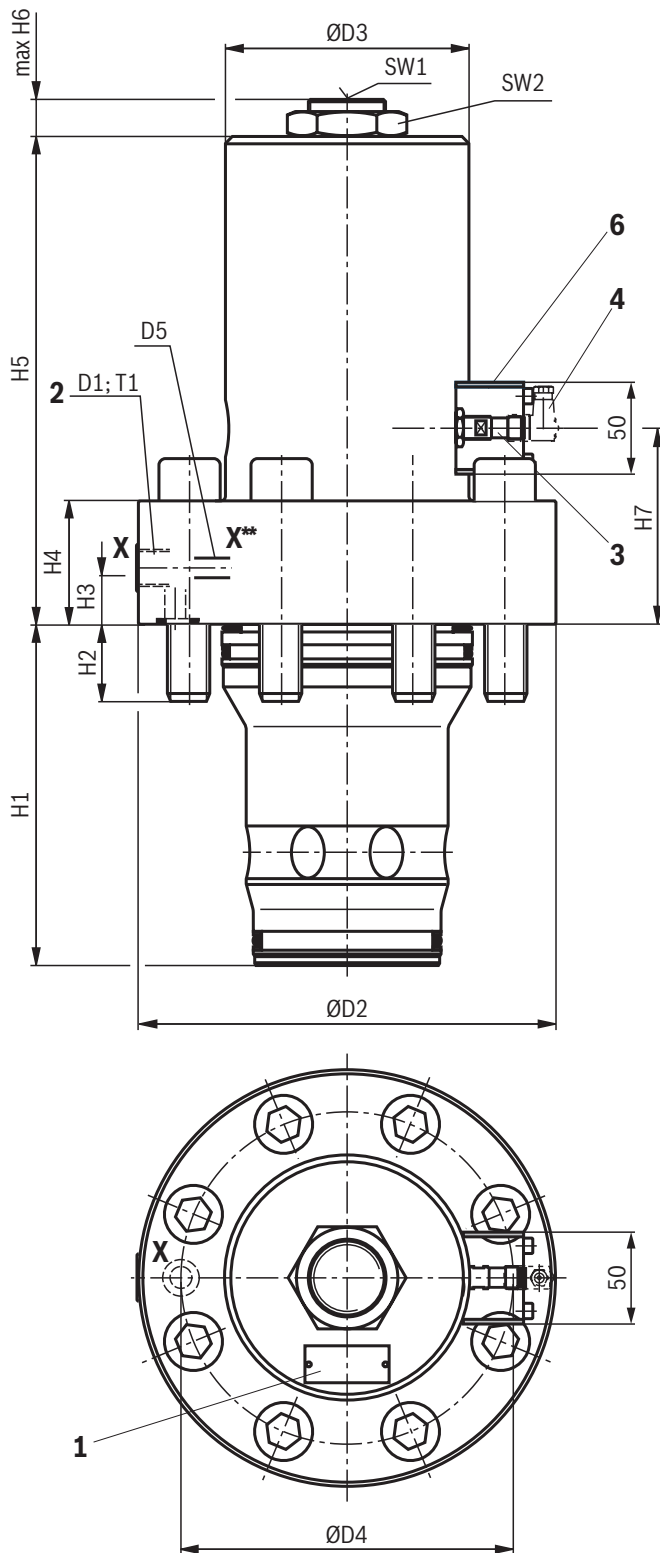
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.

**LFA . EH2...** (NG80 ... 100)



**Control cover "EH2"** with stroke limitation, incl. installation kit: NG80 ... 100  
(dimensions in mm)



NG	80	100
D1 <sup>1)</sup>	G3/4	G1
ØD2	250	300
ØD3	150	175
ØD4	200	245
D5	G3/8	G1/2
H1	205	245
H2	45	52.5
H3	40	35
H4	76.5	88.5
H5	305	350
H6	58	68
H7	105	140.5
L1	62	54
T1	16	18
SW1	75	75
SW2	24	27

<sup>1)</sup> Not with version "/12"

- 1 Name plate
- 2 External pilot oil port X
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 6 Hood (only NG100)

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EH2"** with stroke limitation, incl. installation kit: NG125 ... 160

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA		EH2	-	2X	/	C	A		D	QMG24	F							1)	1)

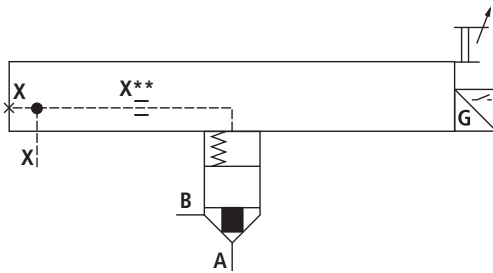
02		15	
<b>Size</b>		<b>Orifice in the channel (Ø in 1/10 mm)</b>	
		<b>X</b>	
<b>125</b>	<b>160</b>	X**	

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 3.0 bar (only NG125)	<b>30</b>

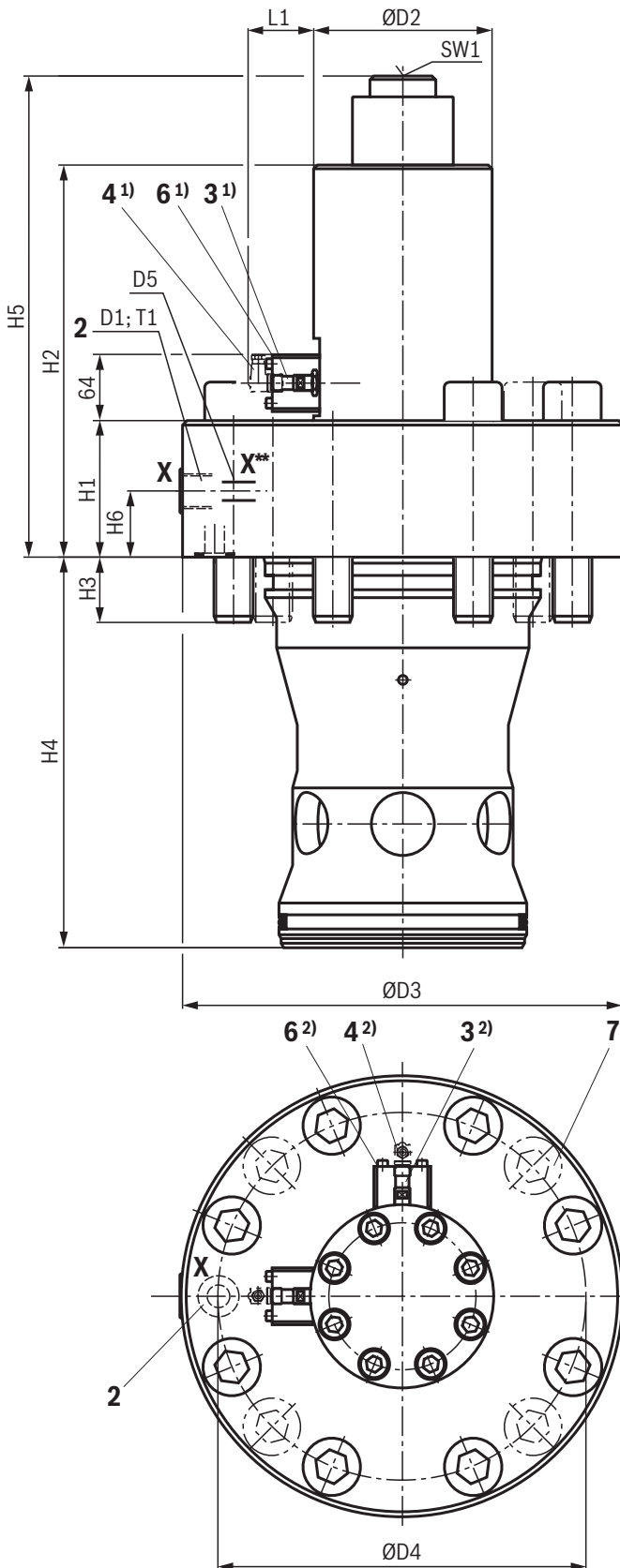
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.

LFA . EH2... (NG125 ... 160)



**Control cover "EH2"** with stroke limitation, incl. installation kit: NG125 ... 160  
(dimensions in mm)



NG	125	160
D1 <sup>3)</sup>	G1	G3/4
ØD2	380	480
ØD3	230	200
ØD4	300±0.2	400±0.3
D5	G1/2	G1/2
H1	100	167
H2	330	383
H3	61	74
H4	300±0.15	425±0.15
H5	445	498
H6	50	70
L1	30	52
T1	18	18

- 2 External pilot oil port X
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 6 Hood
- 7 4 additional valve mounting screws at NG160

- 1) Size 125
- 2) Size 160
- 3) Not with version "/12"

**Electric data, pinout and switching logics see page 12.**



**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Control covers "EWMA" and "EWMB"** for set-up of a directional spool or seat valve, incl. installation kit: NG16 ... 32

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C			D	QMG24							1)	1)

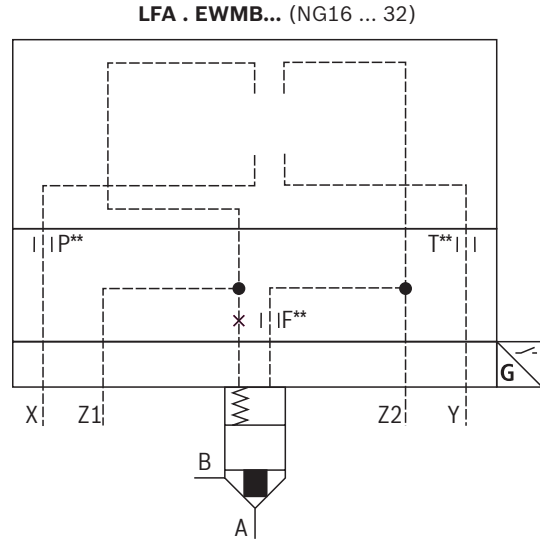
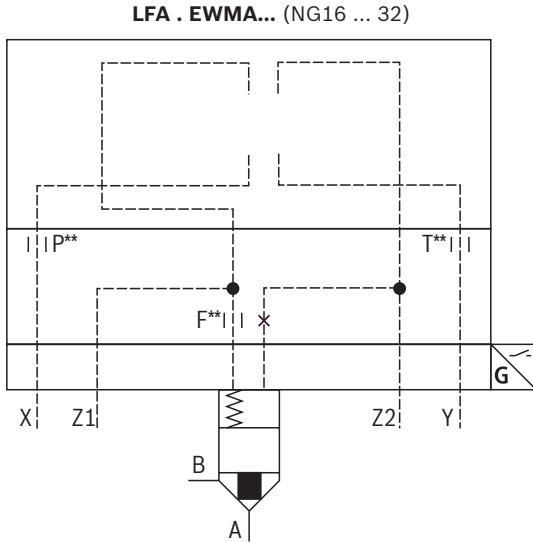
Size			Type	Orifice in the channel (∅ in 1/10 mm)		
				P	T	F
16	25	32	EWMA	P**	T**	F**
			EWMB	P**	T**	F**

**Spool design** (for area ratio see section on page 4)

06	$A_1 : A_2 = 2 : 1$ (annulus area = 50%; directional function; standard)	<b>A</b>
	$A_1 : A_2 = 14.3 : 1$ (annulus area = 7%; directional function)	<b>B</b>
07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

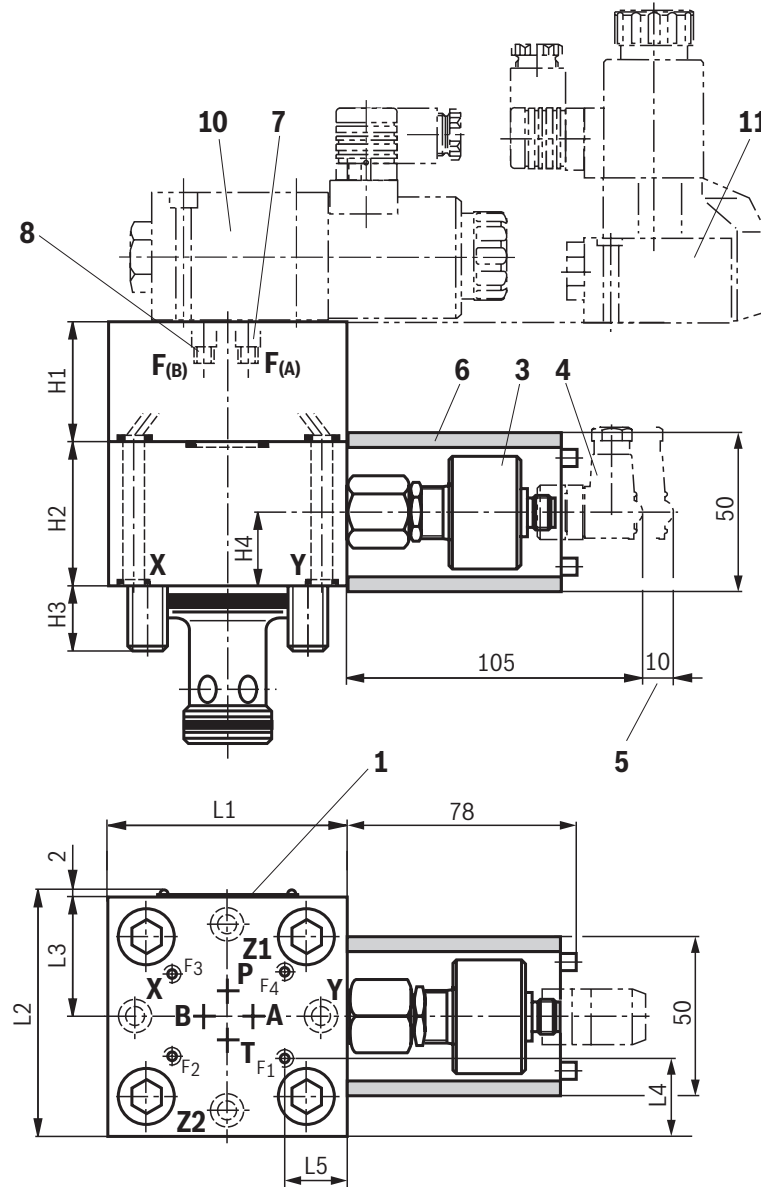
△ Orifice possible, if required, specifications have to be made  
Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



Nozzle thread M6

**Control covers "EWMA" and "EWMB"** for set-up of a directional spool or seat valve, incl. installation kit: NG16 ... 32 (dimensions in mm)



- 1 Name plate
- 2 Cover thickness
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Plug screw in type EWMB
- 8 Plug screw in type EWMA
- 10 Directional spool valve type 4WE 6... (pilot control valve), separate order, see page 7
- 11 Directional seat valve type M-3SEW 6 ... (pilot control valve), separate order, see page 7

NG	16	25	32
H1	65	40	50
H2	50	50	50
H3	15	24	28
H4	25	25	25
L1	80	85	100
L2	65	85	100
L3	40	42.5	50
L4	17	27	34.5
L5	32.5	21	28.5

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control covers "EWMA" and "EWMB"** for set-up of a directional spool or seat valve, incl. installation kit: NG40 ... 63

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C	A		D	Q6G24							1)	1)

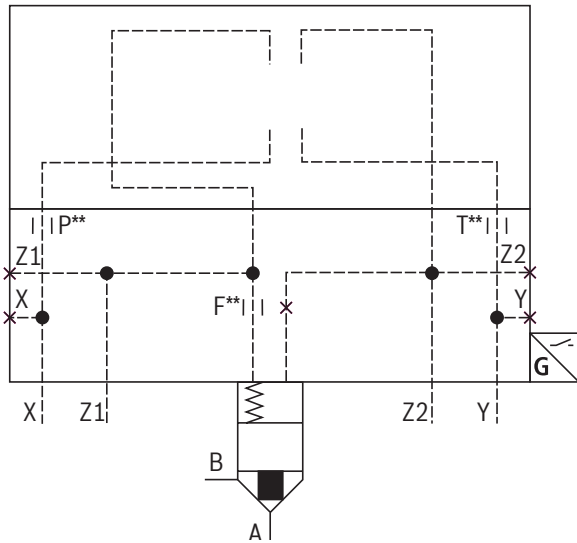
Size			Type	Orifice in the channel (Ø in 1/10 mm)		
02	03			13	14	16
				P	T	F
40	50	63	EWMA	P**	T**	F**
			EWMB	P**	T**	F**

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

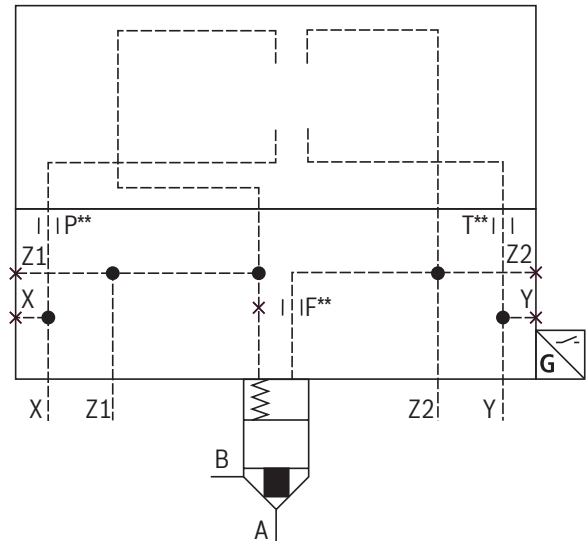
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.

**LFA . EWMA... (NG40 ... 63)**



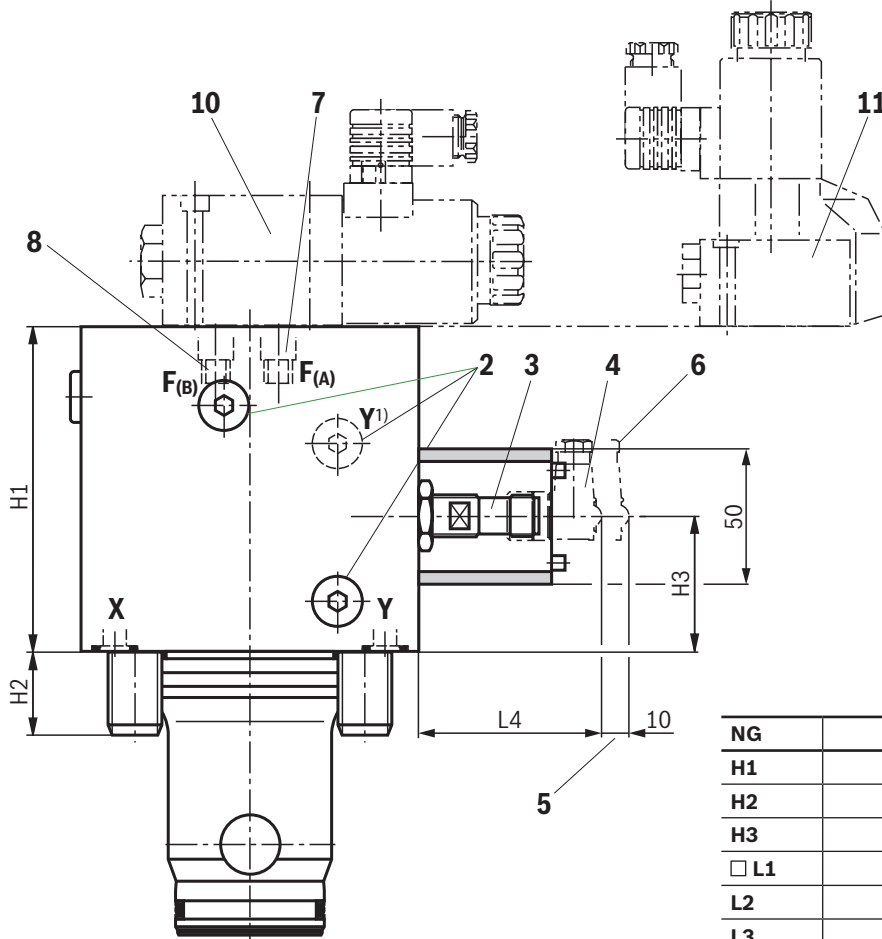
**LFA . EWMB... (NG40 ... 63)**



- ▶ Nozzle thread NG40 and 50: M6
- ▶ Nozzle thread NG63: M8 x 1



**Control covers "EWMA" and "EWMB"** for set-up of a directional spool or seat valve, incl. installation kit: NG40 ... 63 (dimensions in mm)



NG	40	50	63
H1	120	130	170
H2	32	34	50
H3	50	59	73
□ L1	125	140	180
L2	47	54.5	69
L3	41	48.5	63
L4	65	60	32

- 1 Name plate
- 2 External pilot oil ports G1/4 (dimension does not apply to version "/12")
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Plug screw in type EWMB
- 8 Plug screw in type EWMA
- 10 Directional spool valve (pilot control valve), separate order, see page 7
  - ▶ NG40 and 50: Type 4WE 6...
  - ▶ NG63: Type 4WE 10...
- 11 Directional seat valve (pilot control valve), separate order, see page 7
  - ▶ NG40 and 50: Type M-3SEW 6...
  - ▶ NG63: Type M-3SEW 10...

**Electric data, pinout and switching logics see page 12.**

1) NG63

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Control covers "EWA" and "EWB"** for set-up of a directional spool or seat valve, incl. installation kit: NG16 ... 32

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C		D	QMG24								1)	1)

02			03		11		12		13		14	
Size			Type	Orifice in the channel (∅ in 1/10 mm)								
				A	B	P	T					
16	25	32	EWA	A**		P**	T**					
			EWB		B**	P**	T**					

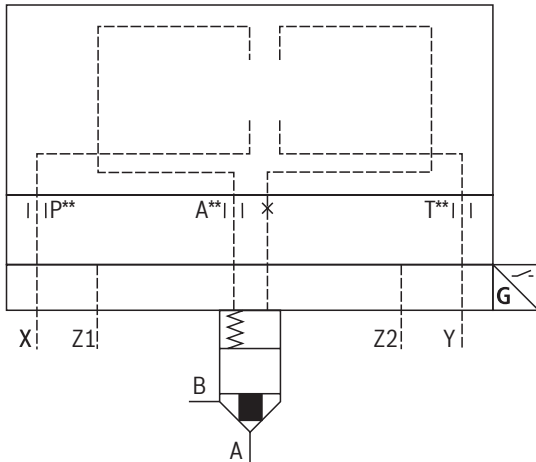
**Spool design** (for area ratio see section on page 4)

06	$A_1 : A_2 = 2 : 1$ (annulus area = 50%; directional function; standard)	<b>A</b>
	$A_1 : A_2 = 14.3 : 1$ (annulus area = 7%; directional function)	<b>B</b>
07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

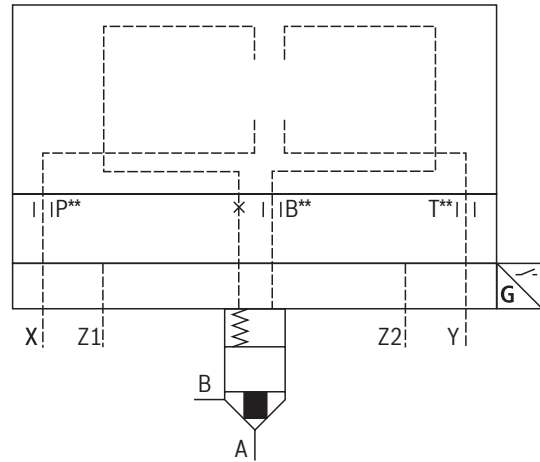
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.

**LFA . EWA... (NG16 ... 32)**

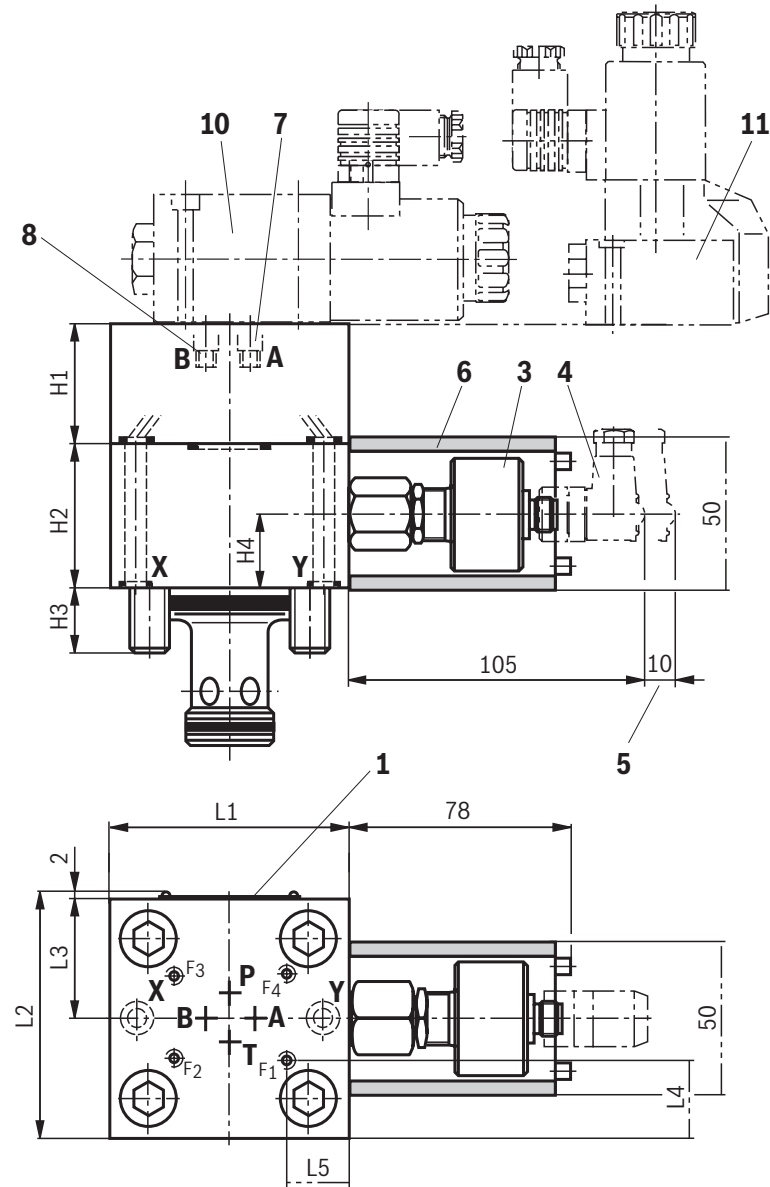


**LFA . EWB... (NG16 ... 32)**



Nozzle thread M6

**Control covers "EWA" and "EWB"** for set-up of a directional spool or seat valve, incl. installation kit: NG16 ... 32 (dimensions in mm)



- 1 Name plate
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Plug screw at type EWB
- 8 Plug screw at type EWA
- 10 Directional spool valve type 4WE 6... (pilot control valve), separate order, see page 7
- 11 Directional seat valve type M-3SEW 6 ... (pilot control valve), separate order, see page 7

NG	16	25	32
H1	65	40	50
H2	50	50	50
H3	15	24	28
H4	25	25	25
L1	80	85	100
L2	65	85	100
L3	40	42.5	50
L4	17	27	34.5
L5	32.5	21	28.5

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control covers "EWA" and "EWB"** for set-up of a directional spool or seat valve, incl. installation kit: NG40 ... 50

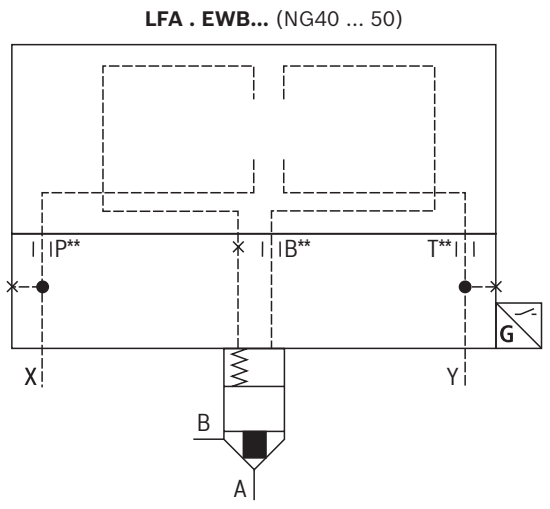
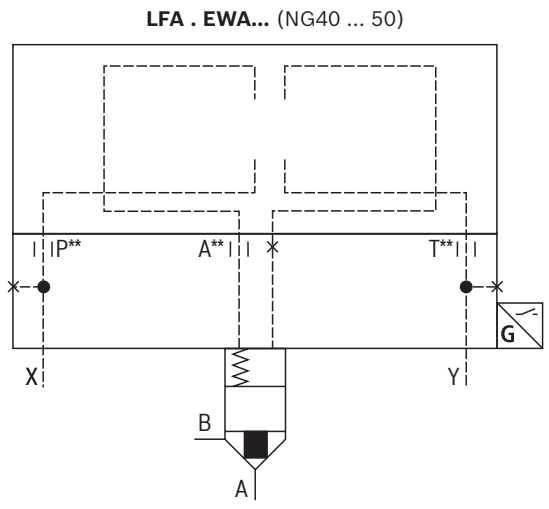
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C	A		D	QMG24							1)	1)

Size		Type	Orifice in the channel (Ø in 1/10 mm)			
			A	B	P	T
40	50	EWA	A**		P**	T**
		EWB		B**	P**	T**

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

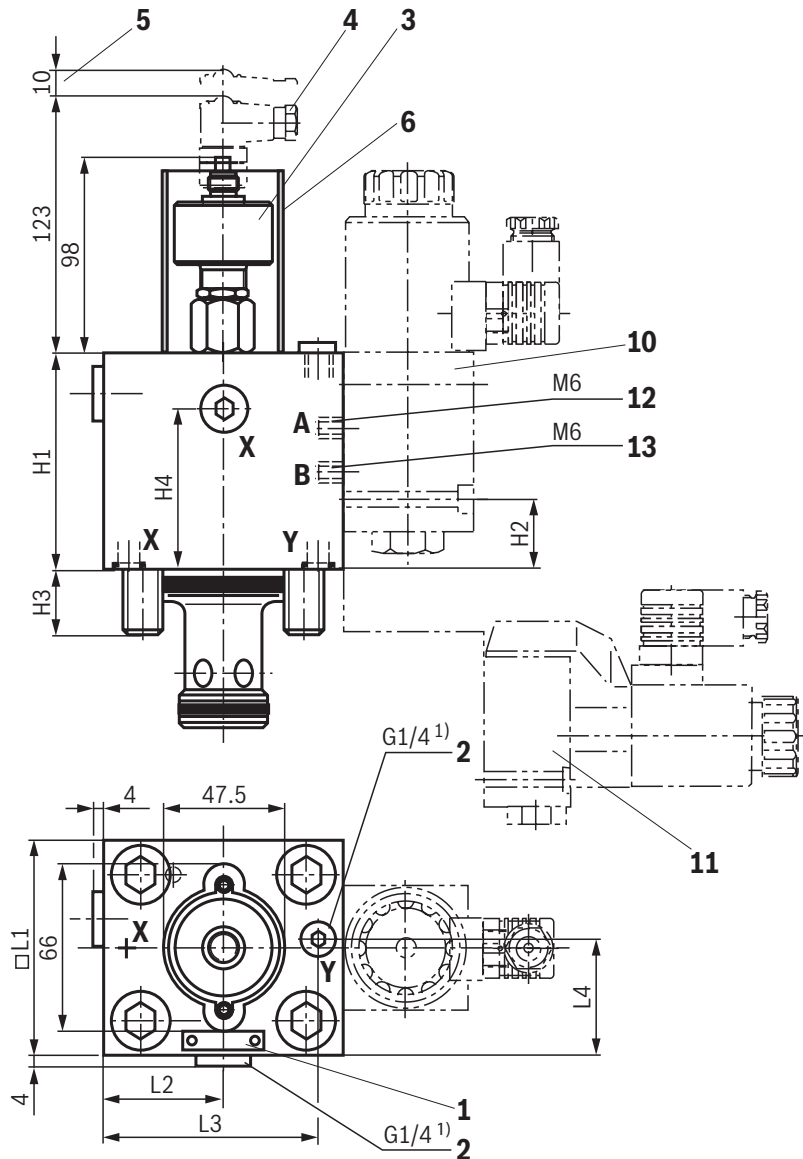
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



Nozzle thread M8 x 1

**Control covers "EWA" and "EWB"** for set-up of a directional spool or seat valve, incl. installation kit: NG40 ... 50 (dimensions in mm)



NG	40	50
H1	110	120
H2	58.5	68
H3	32	34
H4	77.5	87
□ L1	125	140
L2	62.5	70
L3	98.5	113
L4	66.5	70

1) Not with version "/12"

- 1 Name plate
- 2 External pilot oil port X and Y
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 10 Directional spool valve type 4WE 6... (pilot control valve), separate order, see page 7
- 11 Directional seat valve type M-3SEW 6 ... (pilot control valve), separate order, see page 7
- 12 Plug screw for type EWB
- 13 Plug screw for type EWA

**Electric data, pinout and switching logics see page 12.**



**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Control covers "EWA" and "EWB"** for set-up of a directional spool or seat valve, incl. installation kit: NG63

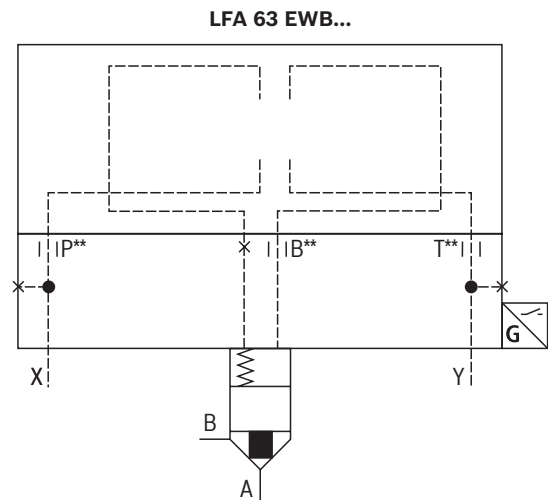
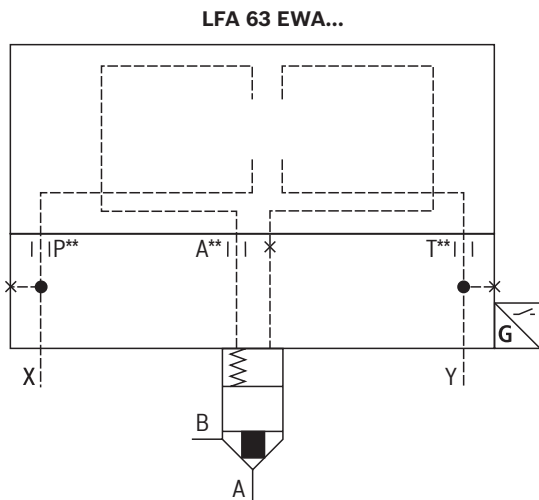
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA	63		-	7X	/	C	A		D	QMG24							1)	1)

Type	Orifice in the channel (Ø in 1/10 mm)			
	A	B	P	T
EWA	A**		P**	T**
EWB		B**	P**	T**

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

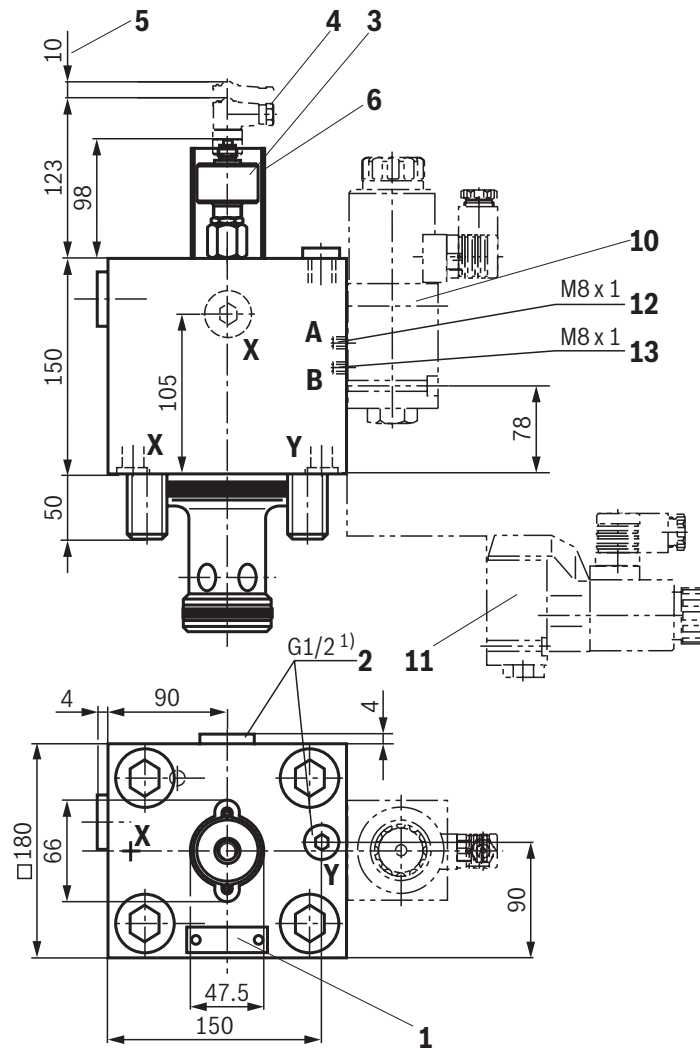
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.




Nozzle thread M8 x 1

**Control covers "EWA" and "EWB"** for set-up of a directional spool or seat valve, incl. installation kit: NG63 (dimensions in mm)



- 1 Name plate
- 2 External pilot oil port X and Y
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 10 Directional spool valve type 4WE 10... (pilot control valve), separate order, see page 7
- 11 Directional seat valve type M-3SEW 10 ... (pilot control valve), separate order, see page 7
- 12 Plug screw for type EWB
- 13 Plug screw for type EWA

<sup>1)</sup> Not with version "/12"

 **Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control covers "EWA" and "EWB"** with electrical control of the closed position, for set-up of a directional spool or seat valve, incl. installation kit: NG80

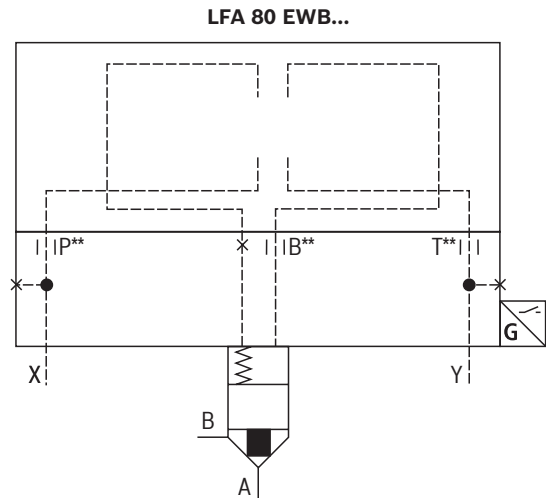
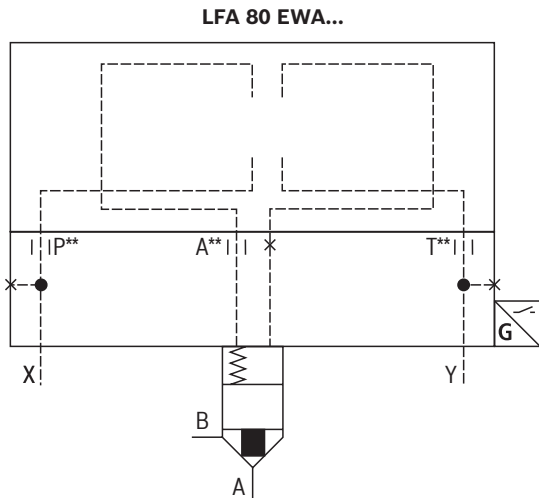
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA	80		-	6X	/	C	A		D	QMG24							1)	1)

03	11	12	13	14
Type	Orifice in the channel (Ø in 1/10 mm)			
	A	B	P	T
EWA	A**		P**	T**
EWB		B**	P**	T**

07	Cracking pressure 2.0 bar	20
	Cracking pressure 4.0 bar	40

△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

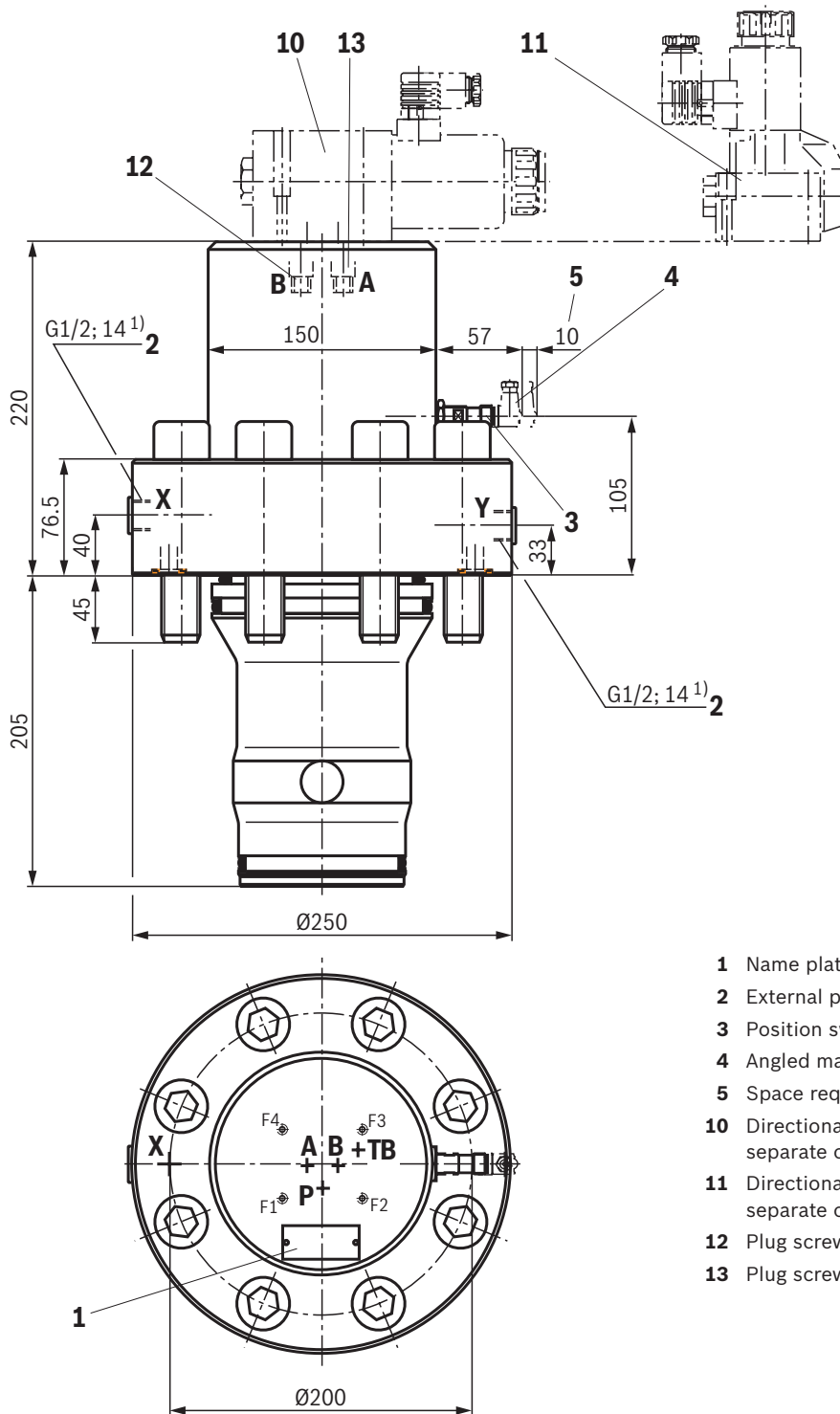
1) See "Ordering code for control cover type LFA..." page 5.



Nozzle thread M8 x 1



**Control covers "EWA" and "EWB"** with electrical control of the closed position, for set-up of a directional spool or seat valve, incl. installation kit: NG80 (dimensions in mm)



- 1 Name plate
- 2 External pilot oil port X and Y
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 10 Directional spool valve type 4WE 10... (pilot control valve), separate order, see page 7
- 11 Directional seat valve type M-3SEW 10... (pilot control valve), separate order, see page 7
- 12 Plug screw for type EWB
- 13 Plug screw for type EWA

<sup>1)</sup> Not with version "/12"

**Electric data, pinout and switching logics see page 12.**



**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Control cover "EHWMA2" and "EHWMB2" with stroke limitation, for set-up of a directional spool or seat valve, incl. installation kit: NG25 ... 32**

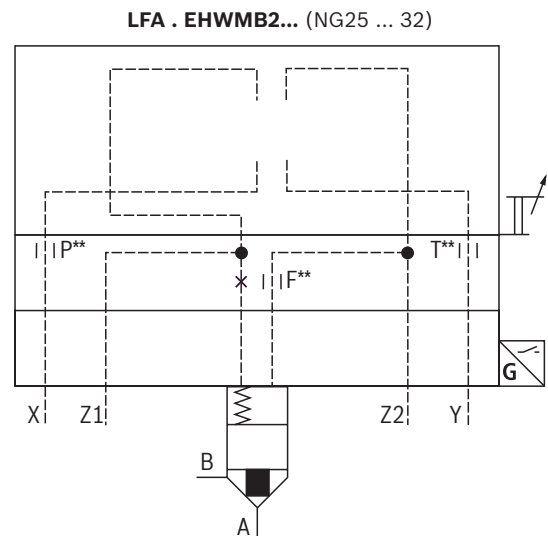
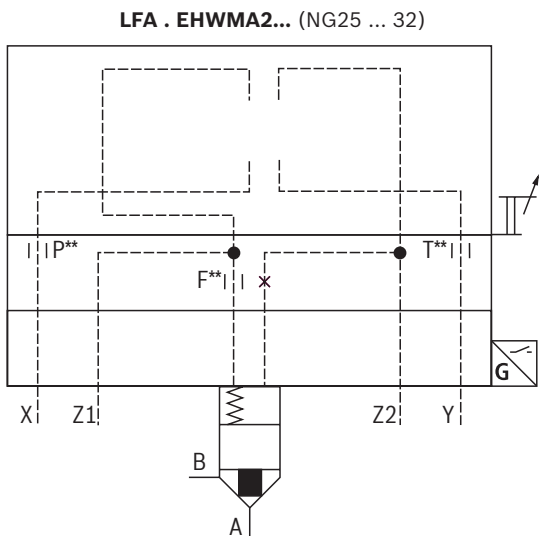
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C	A		D	QMG24							1)	1)

02		03		13		14		16	
Size		Type		P		T		F	
25	32	EHWMA2		P**	T**	F**			
		EHWMB2		P**	T**	F**			

07	Cracking pressure 2.0 bar	20
	Cracking pressure 4.0 bar	40

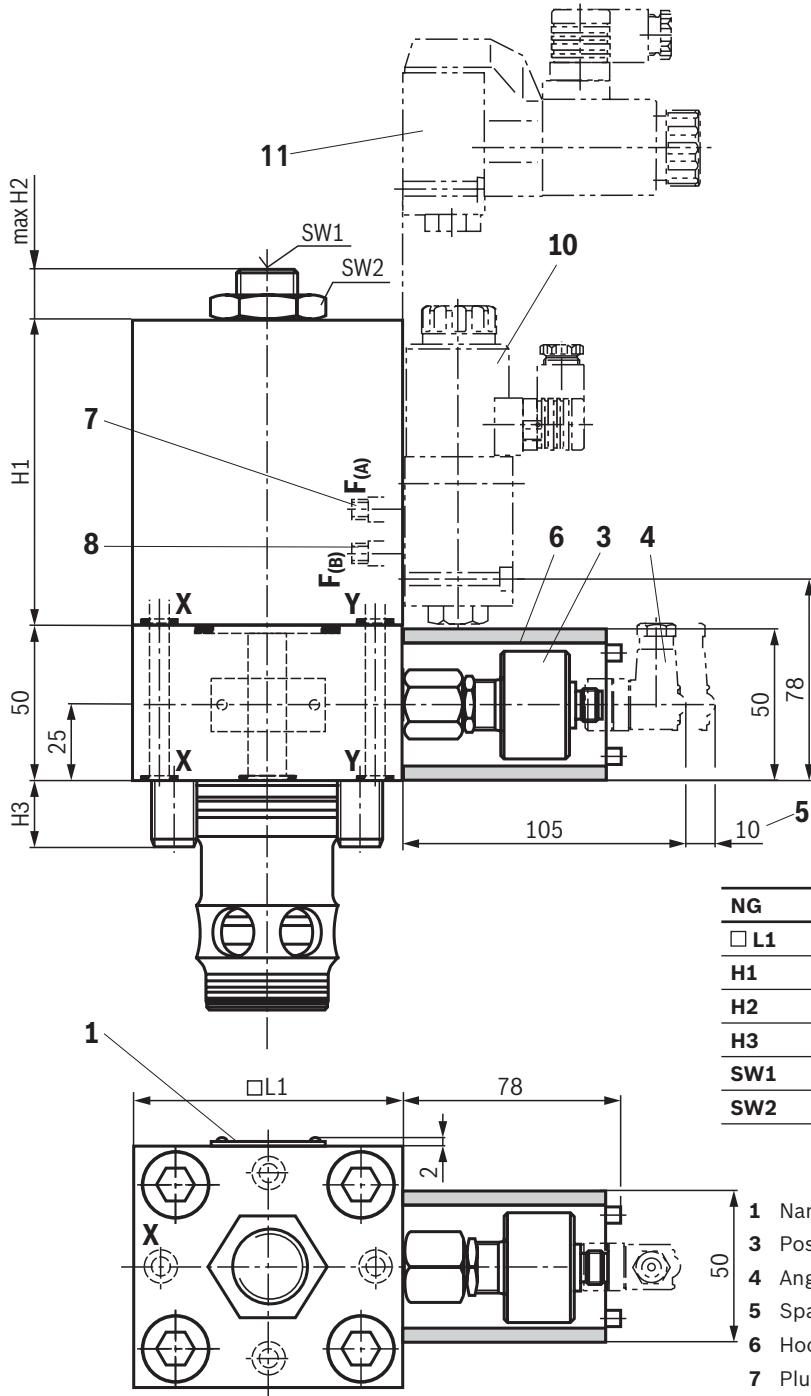
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



Nozzle thread M6

**Control cover "EHWMA2" and "EHWMB2" with stroke limitation, for set-up of a directional spool or seat valve, incl. installation kit: NG25 ... 32 (dimensions in mm)**



	25	32
NG	25	32
□ L1	85	100
H1	140	150
H2	40	50
H3	24	28
SW1	6	10
SW2	22	27

- 1 Name plate
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Plug screw for type EHWMA2
- 8 Plug screw for type EHWMA
- 10 Directional spool valve type 4WE 6... (pilot control valve), separate order, see page 7
- 11 Directional seat valve type M-3SEW 10 ... (pilot control valve), separate order, see page 7

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EHWMA2" and "EHWMB2" with stroke limitation, for set-up of a directional spool or seat valve, incl. installation kit: NG40 ... 63**

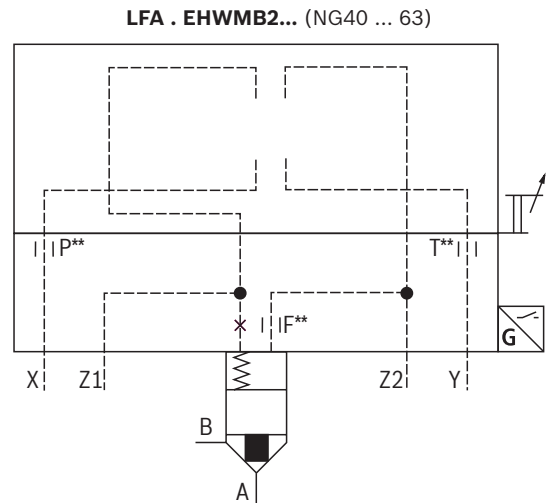
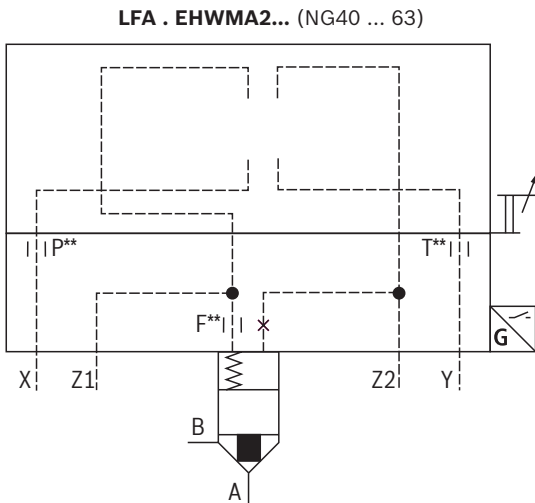
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C	A		D	QMG24							1)	1)

Size			Type	Orifice in the channel (Ø in 1/10 mm)			
				A	B	P	T
40	50	63	EHWMA2	A**		P**	T**
			EHWMB2		B**	P**	T**

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

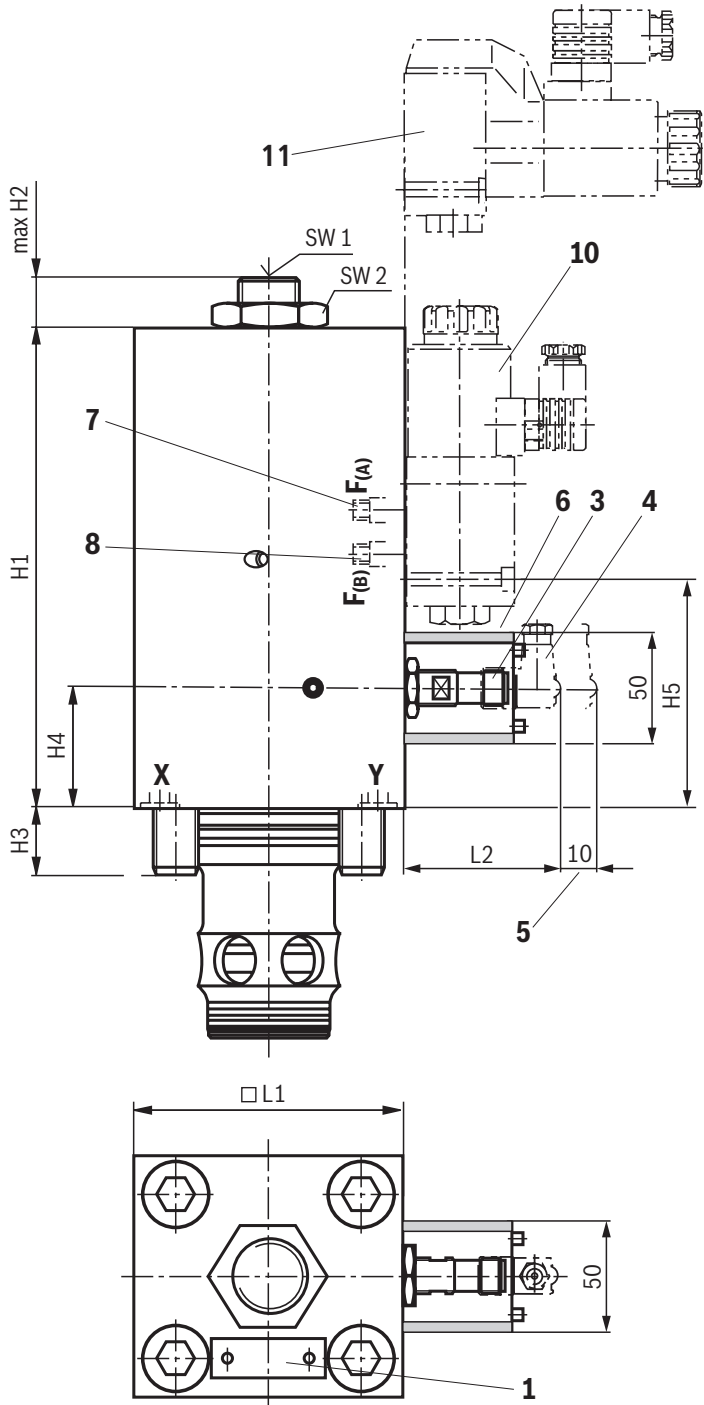
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



- Nozzle thread
- ▶ NG40 and 50: M6
  - ▶ NG63: M8 x 1

**Control cover "EHWMA2" and "EHWMB2" with stroke limitation, for set-up of a directional spool or seat valve, incl. installation kit: NG40 ... 63 (dimensions in mm)**



NG	40	50	63
□ L1	125	140	180
L2	86	60	32
H1	220	210	246
H2	42	23	48
H3	32	71	83
H4	55	59	72.5
H5	104	117	146
SW1	14	17	24
SW2	46	55	65

- 1 Name plate
- 3 Position switch type Q6 (QM at NG40)
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Plug screw for type EHWMB
- 8 Plug screw for type EHWMA
- 10 Directional spool valve (pilot control valve), separate order, see page 7
  - ▶ NG40 and 50: Type 4WE 6...
  - ▶ NG63: Type 4WE 10...
- 11 Directional seat valve (pilot control valve), separate order, see page 7
  - ▶ NG40 and 50: Type M-3SEW 6...
  - ▶ NG63: Type M-3SEW 10...

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EGWA" and "EGWB"** for set-up of a directional spool or seat valve, with built-in shuttle valve, incl. installation kit: NG16 ... 32

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C		D	QMG24								1)	1)

Size	Type	Orifice in the channel (Ø in 1/10 mm)				
		A	B	P	T	X
16	EGWA	A**		P**	T**	-
25		A**		P**	T**	Ø1,5
32		A**		P**	T**	Ø2,0
16	EGWB		B**	P**	T**	-
25			B**	P**	T**	Ø1,5
32			B**	P**	T**	Ø2,0

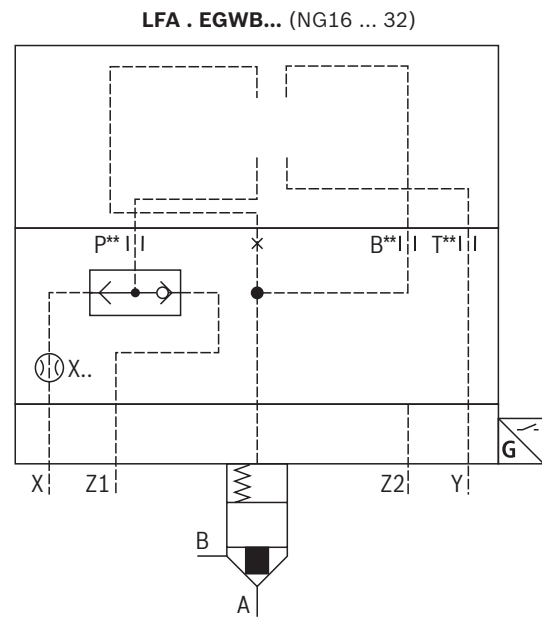
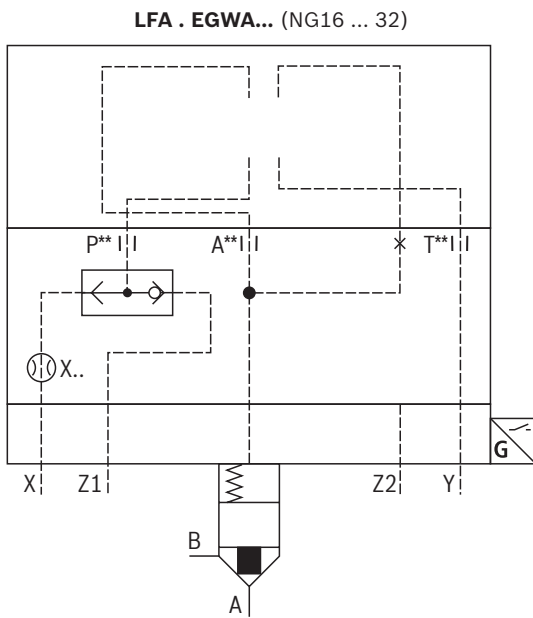
**Spool design** (for area ratio see section on page 4)

06	$A_1 : A_2 = 2 : 1$ (annulus area = 50%; directional function; standard)	<b>A</b>
	$A_1 : A_2 = 14.3 : 1$ (annulus area = 7%; directional function)	<b>B</b>
07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

△ Orifice possible, if required, specifications have to be made

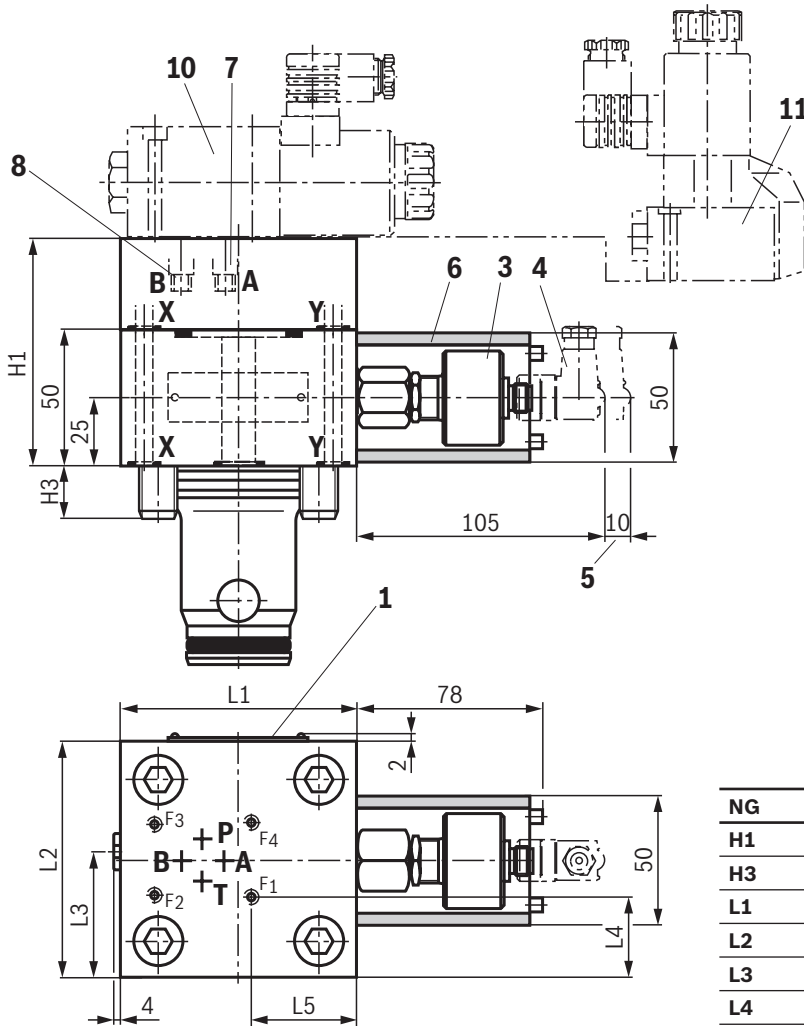
Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



Ports A, B, P, and T: Nozzle thread M6

**Control cover "EGWA" and "EGWB"** for set-up of a directional spool or seat valve, with built-in shuttle valve, incl. installation kit: NG16 ... 32 (dimensions in mm)



NG	16	25	32
H1	90	90	100
H3	15	24	28
L1	80	85	100
L2	65	85	100
L3	39.5	45.5	50
L4	17	27	34.5
L5	32.5	21	28.5

- 1 Name plate
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Plug screw for type EGWB
- 8 Plug screw for type EGWA
- 10 Directional spool valve type 4WE 6... (pilot control valve), separate order, see page 7
- 11 Directional seat valve type M-3SEW 6 ... (pilot control valve), separate order, see page 7

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EGWA" and "EGWB"** for set-up of a directional spool or seat valve, with built-in shuttle valve, incl. installation kit: NG40 ... 63

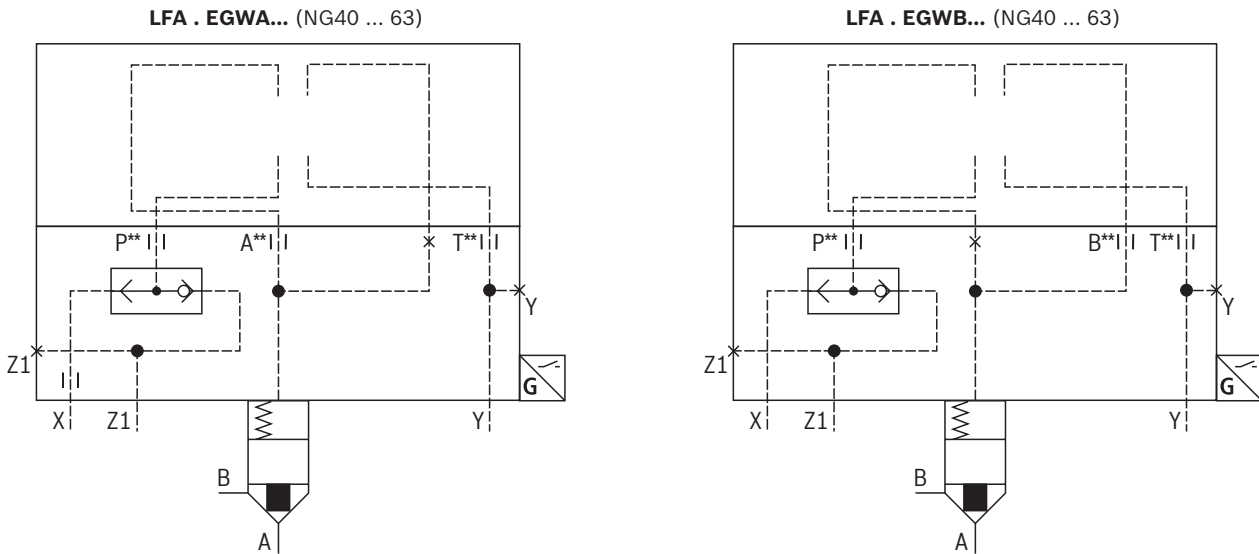
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C	A		D	Q6G24							1)	1)

02			03		11				12		13		14	
Size			Type		Orifice in the channel (Ø in 1/10 mm)									
					A	B	P		T					
40	50	63	EGWA		A**		P**		T**					
			EGWB			B**	P**		T**					

07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

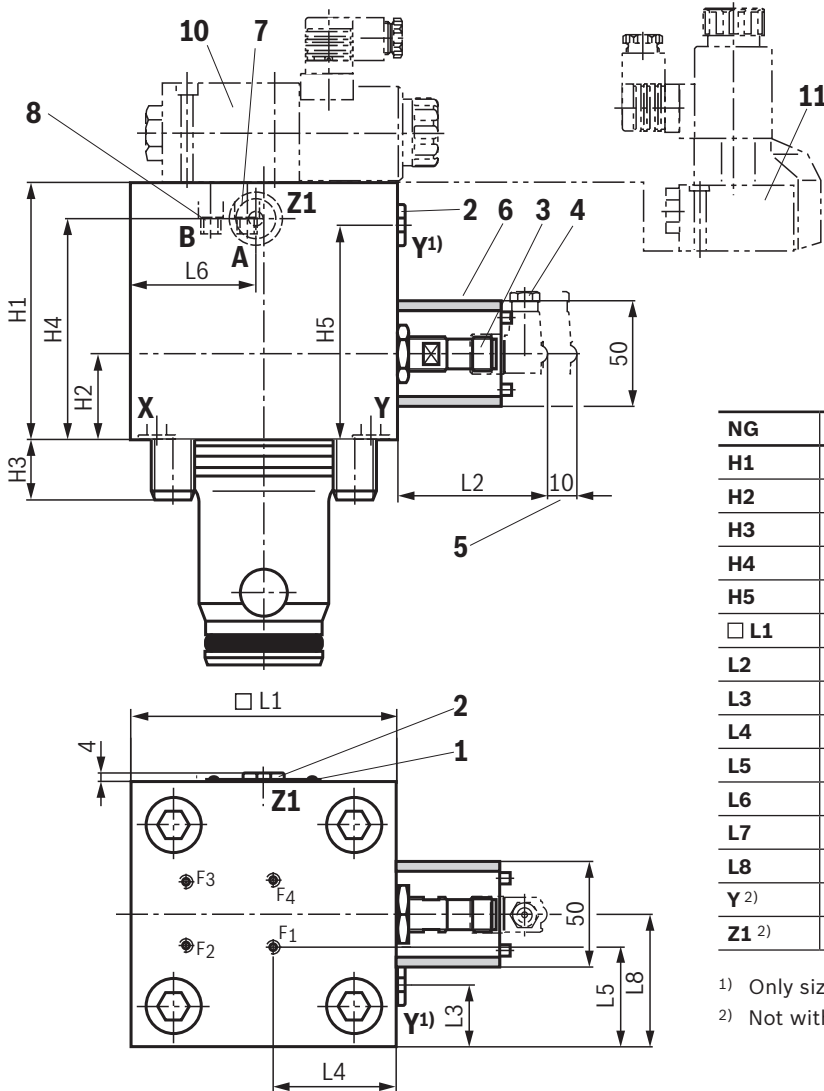
1) See "Ordering code for control cover type LFA..." page 5.



- Nozzle thread
- ▶ NG40 and 50: M6
  - ▶ NG63: M8 x 1



**Control cover "EGWA" and "EGWB"** for set-up of a directional spool or seat valve, with built-in shuttle valve, incl. installation kit: NG40 ... 63 (dimensions in mm)



NG	40	50	63
H1	125	130	160
H2	50	59	73
H3	32	34	50
H4	80	113	107
H5	104	113	-
□ L1	125	140	180
L2	65	60	32
L3	52	69	-
L4	41	71.5	85
L5	47	52.5	68.5
L6	62.5	89	119
L7	62.5	70	90
L8	104	113	-
Y <sup>2)</sup>	G1/4	G1/4	-
Z1 <sup>2)</sup>	G1/4	G1/4	G1/2

<sup>1)</sup> Only sizes 40 and 50

<sup>2)</sup> Not with version "/12"

- 1 Name plate
- 2 External pilot oil port Y (only NG40) and Z1
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Plug screw for type EGWB
- 8 Plug screw for type EGWA
- 10 Directional spool valve (pilot control valve), separate order, see page 7
  - ▶ NG40 and 50: Type 4WE 6...
  - ▶ NG63: Type 4WE 10...
- 11 Directional seat valve (pilot control valve), separate order, see page 7
  - ▶ NG40 and 50: Type M-3SEW 6...
  - ▶ NG63: Type M-3SEW 10...

**Electric data, pinout and switching logics see page 12.**

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Control cover "EKWA" and "EKWB"** for set-up of a directional spool or seat valve, with built-in shuttle valve, incl. installation kit: NG16 ... 32

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C		D	QMG24								1)	1)

Size	Type	Orifice in the channel (Ø in 1/10 mm)				
		A	B	P	T	X
16	EKWA	A**		P15	T**	X15
25		A**		P15	T**	Ø2,0
32		A**		P20	T**	Ø2,5
16	EKWB		B**	P15	T**	X15
25			B**	P15	T**	Ø2,0
32			B**	P20	T**	Ø2,5

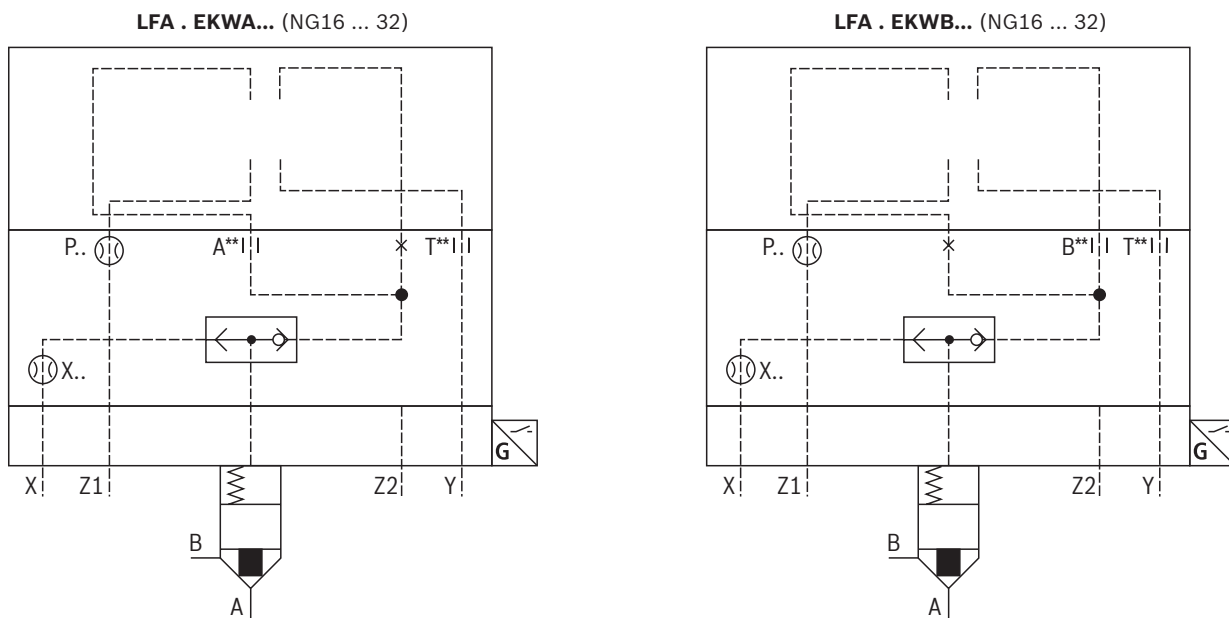
**Spool design** (for area ratio see section on page 4)

06	$A_1 : A_2 = 2 : 1$ (annulus area = 50%; directional function; standard)	<b>A</b>
	$A_1 : A_2 = 14.3 : 1$ (annulus area = 7%; directional function)	<b>B</b>
07	Cracking pressure 2.0 bar	<b>20</b>
	Cracking pressure 4.0 bar	<b>40</b>

△ Orifice possible, if required, specifications have to be made

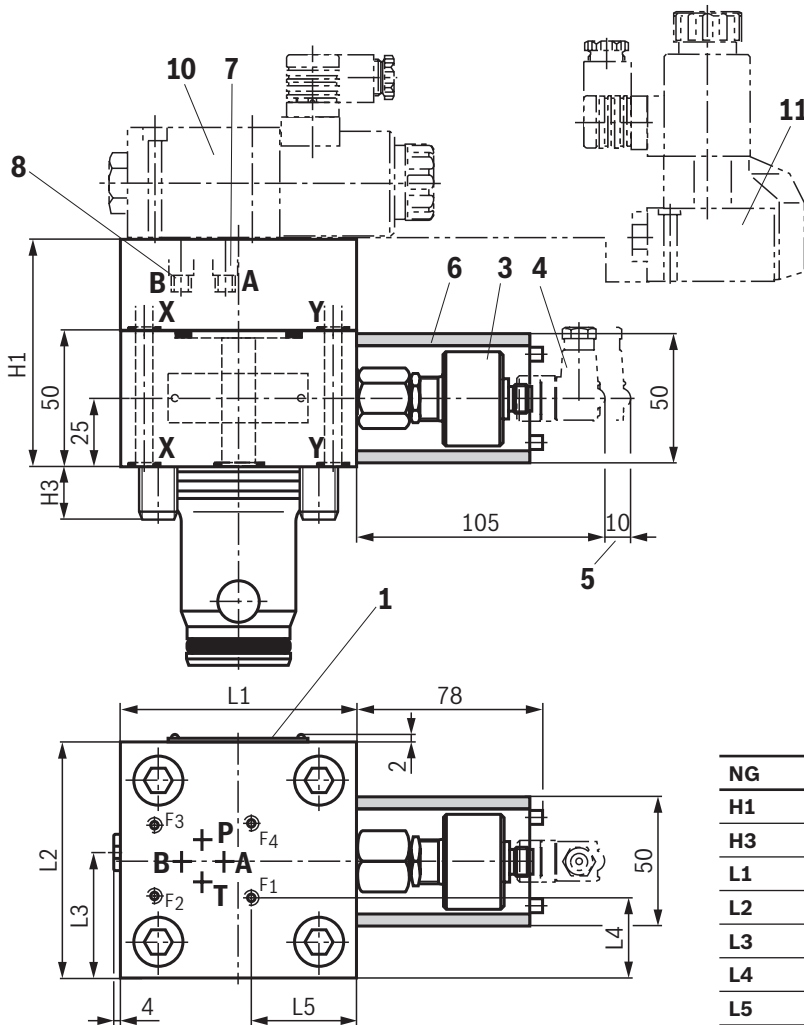
Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



Nozzle thread M6

**Control cover "EKWA" and "EKWB"** for set-up of a directional spool or seat valve, with built-in shuttle valve, incl. installation kit: NG16 ... 32 (dimensions in mm)



NG	16	25	32
H1	90	90	100
H3	15	24	28
L1	65	85	100
L2	65	85	100
L3	36.5	45.5	50
L4	17	27	34.5
L5	32.5	21	28.5

- 1 Name plate
- 3 Position switch type QM
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Plug screw for type EKWB
- 8 Plug screw for type EKWA
- 10 Directional spool valve type 4WE 6... (pilot control valve), separate order, see page 7
- 11 Directional seat valve type M-3SEW 6 ... (pilot control valve), separate order, see page 7

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12.**

**Control cover "EKWA" and "EKWB"** for set-up of a directional spool or seat valve, with built-in shuttle valve, incl. installation kit: NG40 ... 63

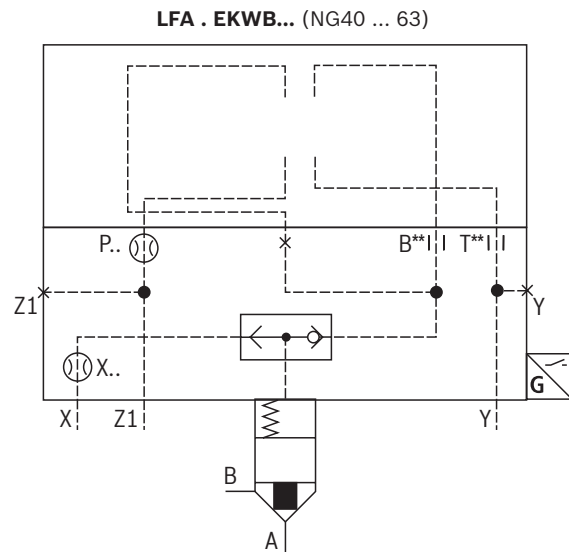
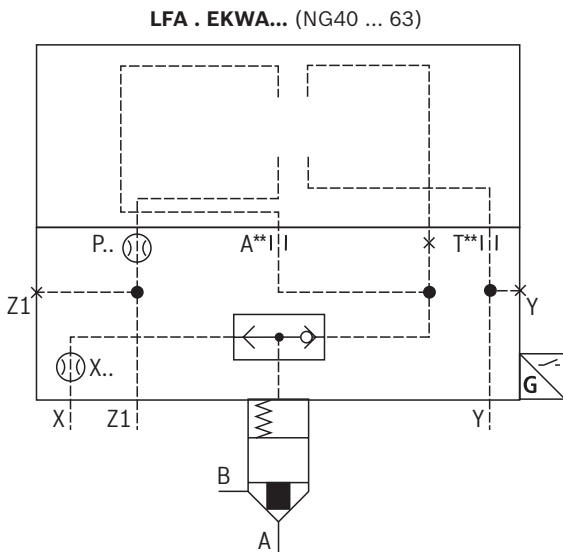
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	7X	/	C	A		D	Q6G24							1)	1)

Size	Type	Orifice in the channel (Ø in 1/10 mm)				
		A	B	P	T	X
40	EKWA	A**		P20	T**	X30
50		A**		P20	T**	X30
63		A**		P25	T**	X**
40	EKWB		B**	P20	T**	X30
50			B**	P20	T**	X30
63			B**	P25	T**	X**

07	Cracking pressure 2.0 bar	20
	Cracking pressure 4.0 bar	40

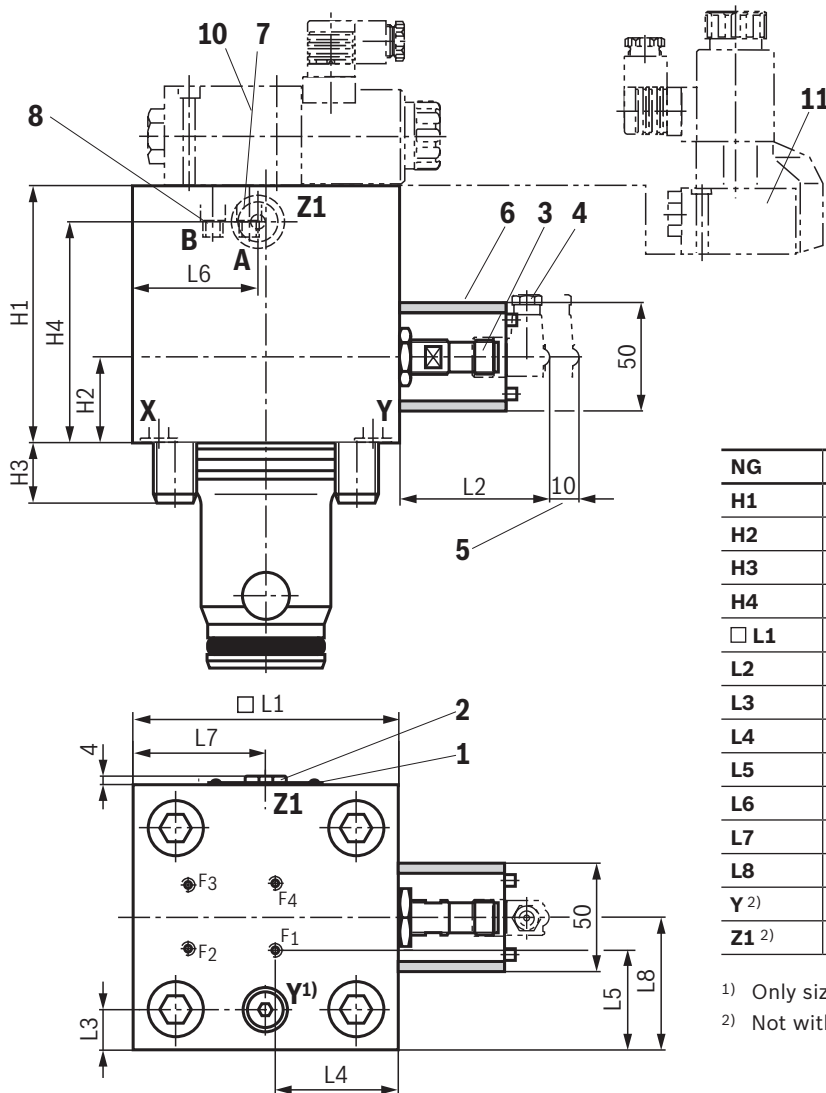
△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.



- Nozzle thread
- ▶ NG40 and 50: M6
  - ▶ NG63: M8 x 1

**Control cover "EKWA" and "EKWB"** for set-up of a directional spool or seat valve, with built-in shuttle valve, incl. installation kit: NG40 ... 63 (dimensions in mm)



NG	40	50	63
H1	125	130	190
H2	50	59	73
H3	32	34	50
H4	104	112	150
□ L1	125	140	180
L2	65	60	32
L3	20	-	-
L4	41	46.5	62
L5	43.5	35.5	45
L6	62.5	70	90
L7	62.5	89	-
L8	62.5	70	90
Y <sup>2)</sup>	G1/4	-	-
Z1 <sup>2)</sup>	G1/4	G1/2	G1/2

<sup>1)</sup> Only sizes 40 and 50

<sup>2)</sup> Not with version "/12"

- 1 Name plate
- 2 External pilot oil port Y (only NG40) and Z1
- 3 Position switch type Q6
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Hood
- 7 Plug screw for type EKWB
- 8 Plug screw for type EKWA
- 10 Directional spool valve (pilot control valve), separate order, see page 7
  - ▶ NG40 and 50: Type 4WE 6...
  - ▶ NG63: Type 4WE 10...
- 11 Directional seat valve (pilot control valve), separate order, see page 7
  - ▶ NG40 and 50: Type M-3SEW 6...
  - ▶ NG63: Type M-3SEW 10...

**Electric data, pinout and switching logics see page 12.**

**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Control cover "E51"** with hydraulic basic position "open"; monitoring of the position "open", incl. installation kit: NG25

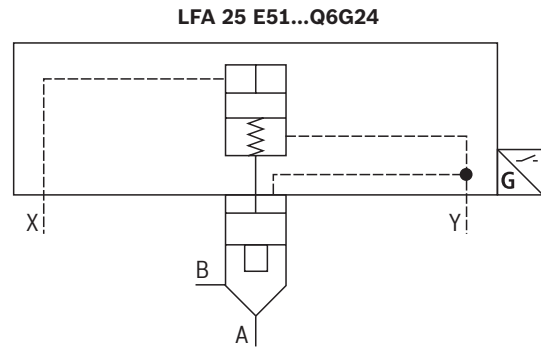
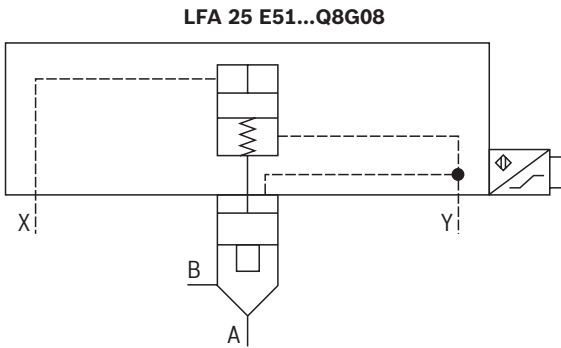
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA	25	E51	-	6X	/	C	A	20	E									1)	

**Spool position monitoring**

09	Electrical	<b>Q6G24</b>
	Electrical (NAMUR)	<b>Q8G08</b>

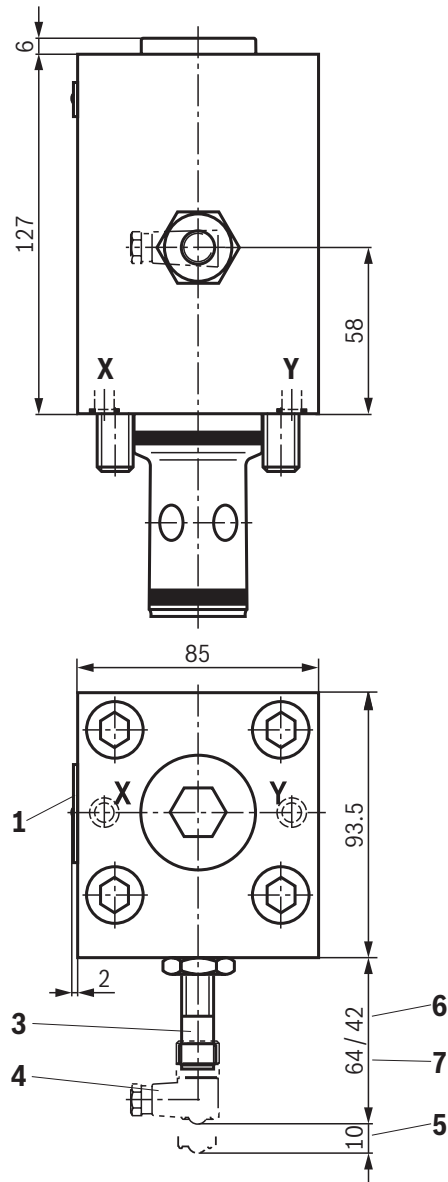
Characteristic curves for selecting orifices see page 76.

1) See "Ordering code for control cover type LFA..." page 5.




**Characteristic curve upon request.**

**Control cover "E51"** with hydraulic basic position "open"; monitoring of the position "open", incl. installation kit: NG25 (dimensions in mm)



- 1 Name plate
- 3 Position switch type Q6 or Q8
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Position switch type Q8
- 7 Position switch type Q6

 **Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 13.**

**Control cover "E76"** with hydraulic basic position "open"; monitoring of position "closed" and "open", incl. installation kit: NG25

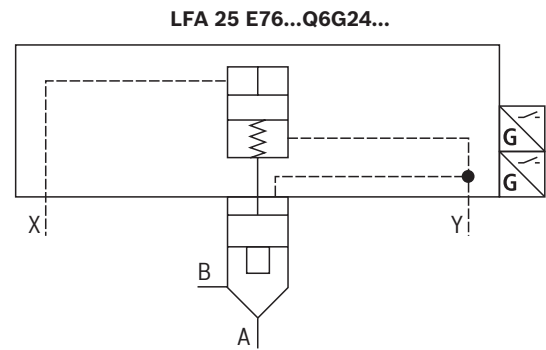
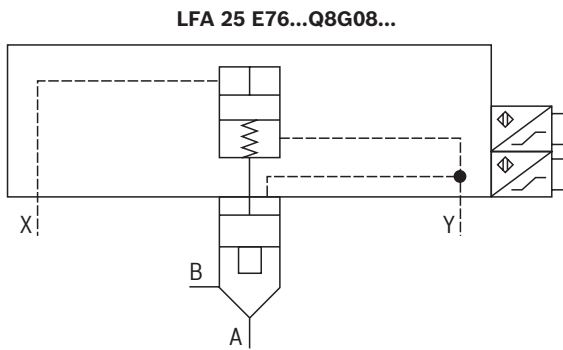
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA	25	E76	-	6X	/	C	A	20	E									1)	

**Spool position monitoring**

09	Electrical	<b>Q6G24</b>
	Electrical (NAMUR)	<b>Q8G08</b>

△ Orifice possible, if required, specifications have to be made  
 Characteristic curves for selecting orifices see page 76.

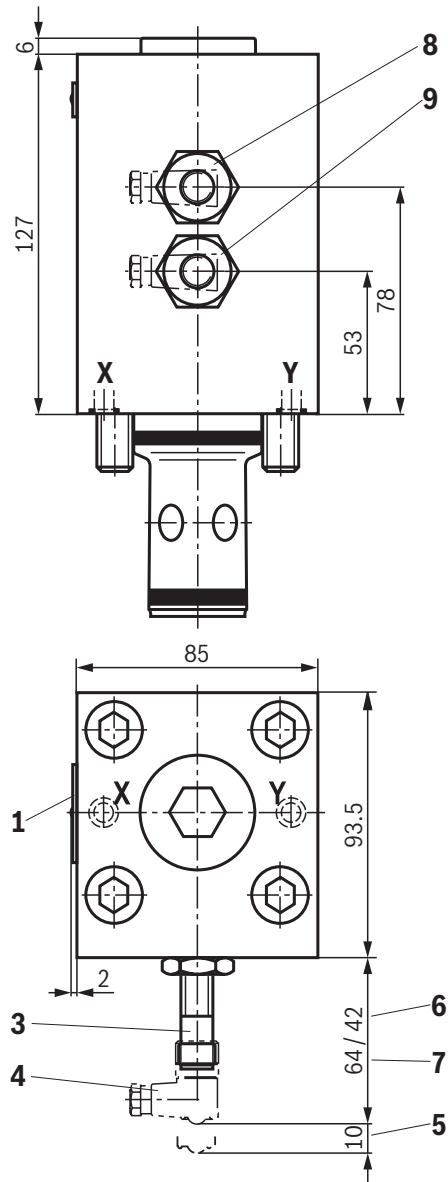
1) See "Ordering code for control cover type LFA..." page 5.




**Characteristic curve upon request.**



**Control cover "E76"** with hydraulic basic position "open"; monitoring of position "closed" and "open", incl. installation kit: NG25 (dimensions in mm)



- 1 Name plate
- 3 Position switch type Q6 or Q8
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Position switch type Q8
- 7 Position switch type Q6
- 8 Position switch "closed" position
- 9 Position switch "open" position

 **Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

**Electric data, pinout and switching logics see page 12 and 13.**

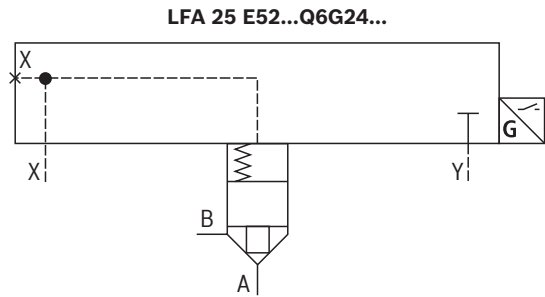
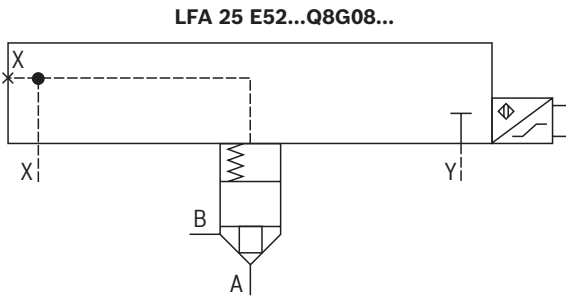
**Control cover "E52" with monitoring of the position "open", incl. installation kit: NG25**

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA	25	E52	-	7X	/	C	A	20	E									F	1)

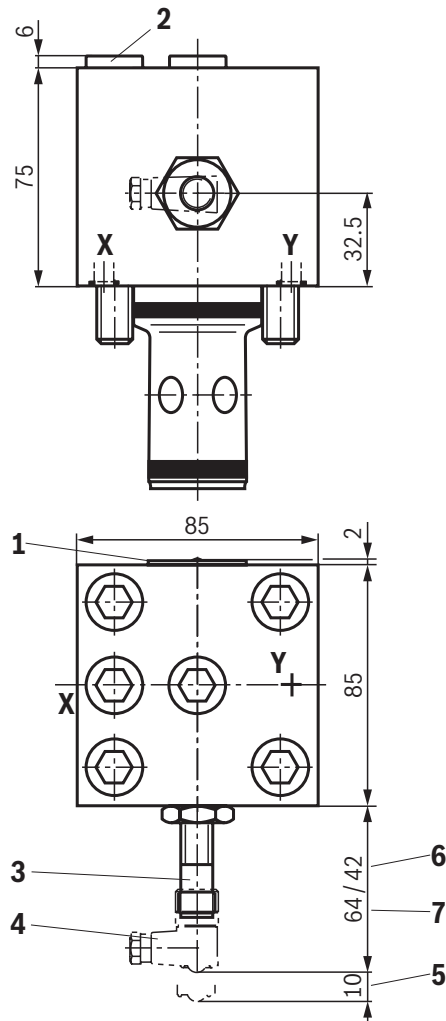
**Spool position monitoring**

09	Electrical	<b>Q6G24</b>
	Electrical (NAMUR)	<b>Q8G08</b>


1) See "Ordering code for control cover type LFA..." page 5.



**Control cover "E52"** with monitoring of the position "open", incl. installation kit: NG25  
(dimensions in mm)



- 1 Name plate
- 2 External pilot oil port X (G1/4)
- 3 Position switch type Q6 or Q8
- 4 Angled mating connector (separate order, see page 78)
- 5 Space required to remove the mating connector
- 6 Position switch type Q8
- 7 Position switch type Q6

 **Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

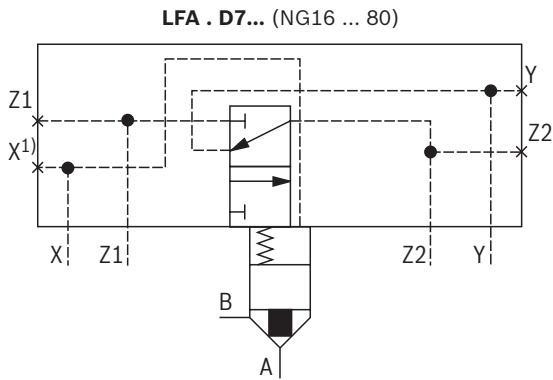
**Electric data, pinout and switching logics see page 12 and 13.**

**Control cover "D7"** incl. installation kit: NG16 ... 80

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
LFA			-	6X	/	C	A	40	D	Q6G24							1)	

02						
Size						
16	25	32	40	50	63	80

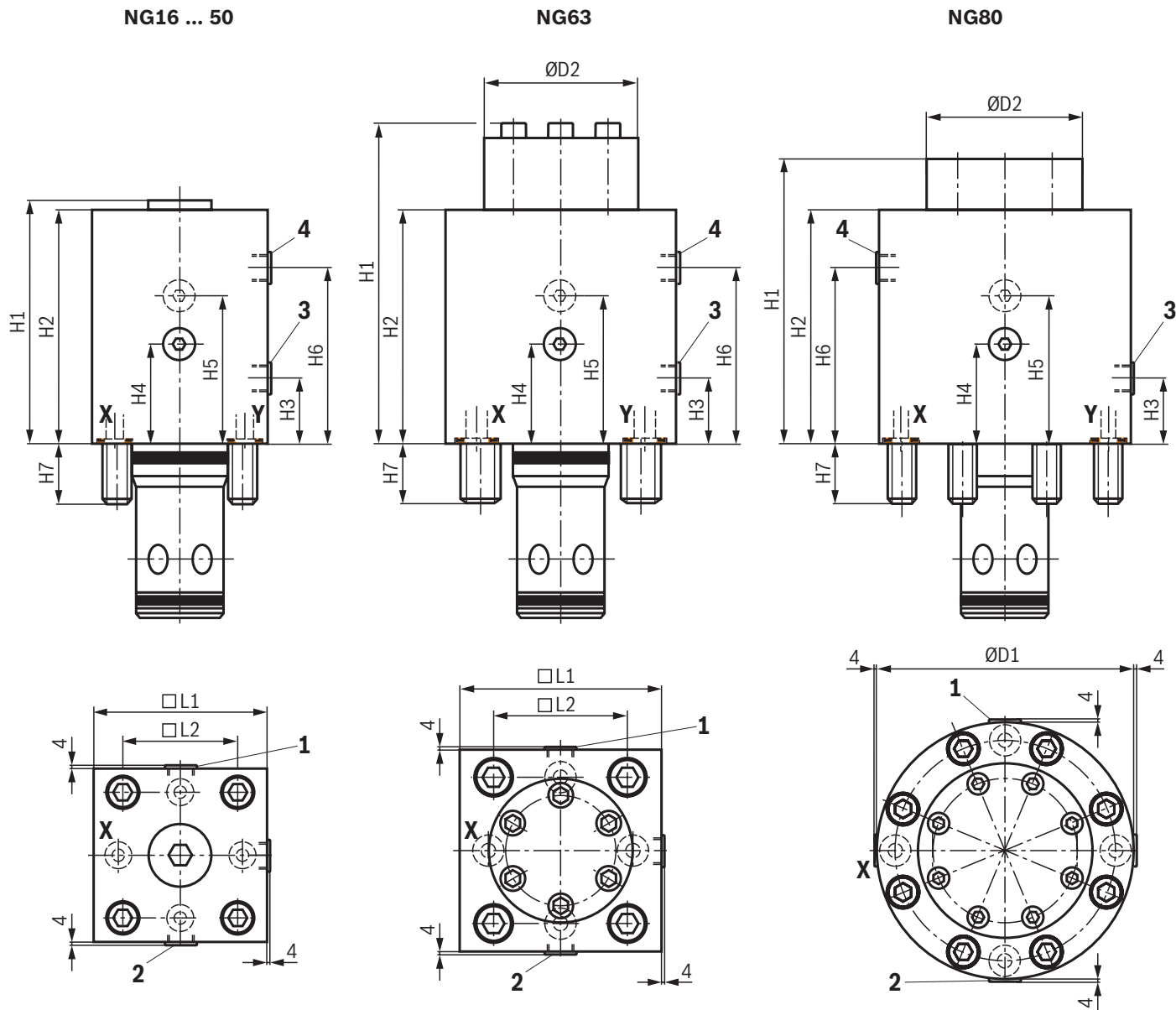
1) See "Ordering code for control cover type LFA..." page 5.



1) Not Size 16

**Characteristic curve upon request.**

**Control cover "D7"** incl. installation kit: NG16 ... 80  
(dimensions in mm)



NG	16	25	32	40	50	63	80
H1	95	109	118	161	175	264	213
H2	92	105	114	158	172	172	163
H3	26	26	30	27	29	28	35
H4	39	42	47	50	57	62	75
H5	50	58	63	68	72	77	95
H6	-	79	85	104	115	120	136
H7	15	24	28	32	34	50	45
□ L1	65	85	100	125	140	180	-
□ L2	46	58	70	85	100	125	200
ØD1	-	-	-	-	-	-	250
ØD2	-	-	-	-	-	115	155
X	-	G1/4	G1/4	G1/4	G1/4	G1/4	G1/2
Y, Z1, Z2	G1/4	G1/4	G1/4	G1/4	G1/4	G1/4	G1/2

- 1 External pilot oil port Z1
- 2 External pilot oil port Z2
- 3 External pilot oil port Y
- 4 External pilot oil port X (not NG16)



**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

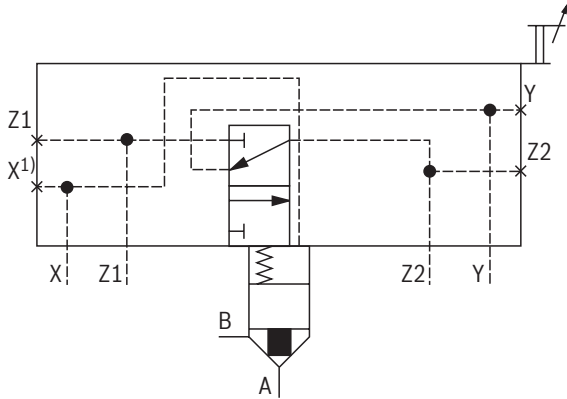
**Control cover "H2-7"** with stroke limitation: NG16 ... 50

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA			-	6X	/	C	A	40	D									1)	

02				
<b>Size</b>				
16	25	32	40	50

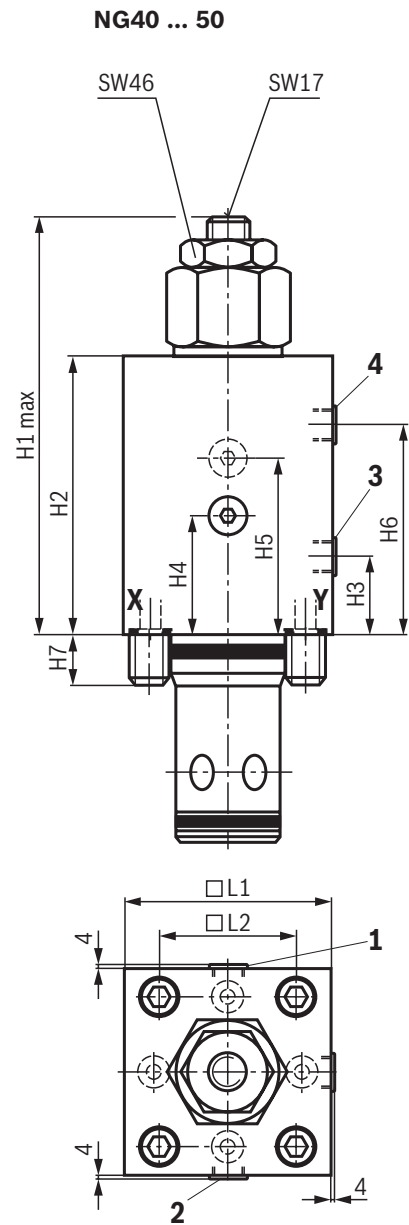
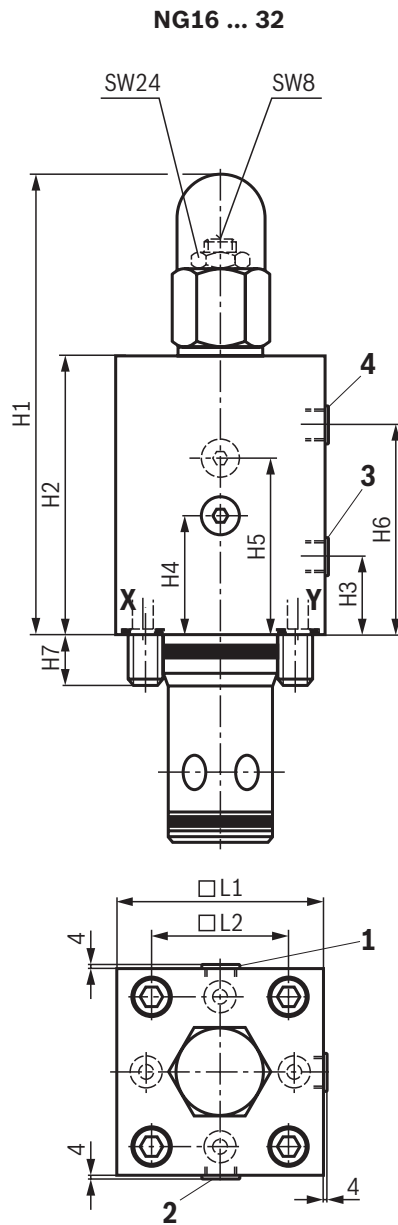
1) See "Ordering code for control cover type LFA..." page 5.

**LFA . H2-7...** (NG16 ... 50)



1) Not Size 16

**Characteristic curve upon request.**

**Control cover "H2-7"** with stroke limitation: NG16 ... 50  
 (dimensions in mm)


NG	16	25	32	40	50
<b>H1 max</b>	182	195	203	279	293
<b>H2</b>	92	105	114	158	172
<b>H3</b>	26	26	30	27	29
<b>H4</b>	39	42	47	50	57
<b>H5</b>	50	58	63	68	72
<b>H6</b>	-	79	85	104	115
<b>H7</b>	90	90	90	125	125
□ <b>L1</b>	65	85	100	125	140
□ <b>L2</b>	46	58	70	85	100
<b>ØD1</b>	-	-	-	-	-
<b>ØD2</b>	-	-	-	-	-
<b>X</b>	-	G1/4	G1/4	G1/4	G1/4
<b>Y, Z1, Z2</b>	G1/4	G1/4	G1/4	G1/4	G1/4

- 1** External pilot oil port Z1
- 2** External pilot oil port Z2
- 3** External pilot oil port Y
- 4** External pilot oil port X (not NG16)


**Notice:**

The dimensions are nominal dimensions which are subject to tolerances.

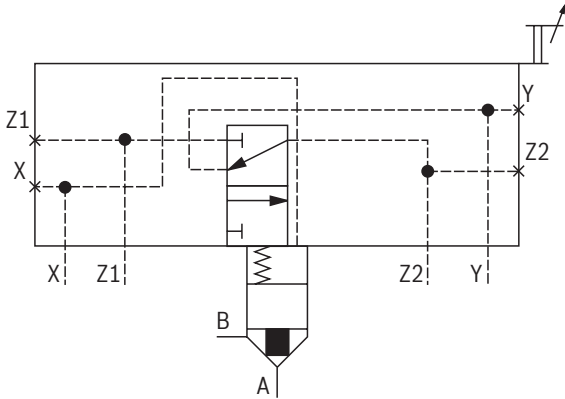
**Control cover "H2-7"** with stroke limitation: NG63 ... 80

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
LFA			-	6X	/	C	A	40	D									1)	

02	
<b>Size</b>	
<b>63</b>	<b>80</b>

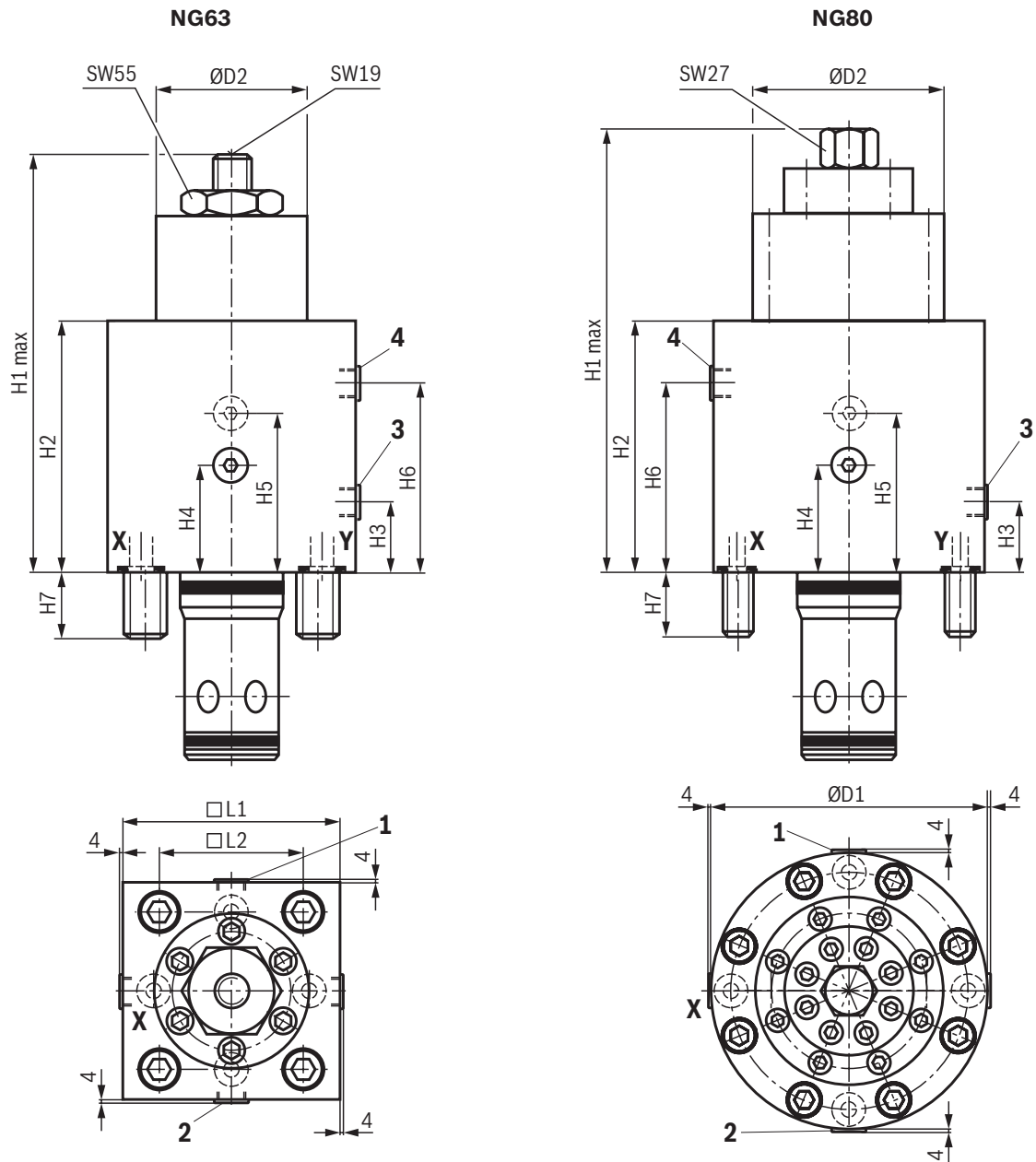
1) See "Ordering code for control cover type LFA..." page 5.

**LFA . H2-7...** (NG63 ... 80)



**Characteristic curve upon request.**



**Control cover "H2-7" with stroke limitation: NG63 ... 80 (dimensions in mm)**


NG	63	80
H1 max	312	354
H2	172	163
H3	28	35
H4	62	75
H5	77	95
H6	120	136
H7	140	190
□ L1	180	-
□ L2	125	200
ØD1	-	250
ØD2	115	155
X, Y	G1/4	G1/2
Z1, Z2	G1/4	G1/2

- 1 External pilot oil port Z1
- 2 External pilot oil port Z2
- 3 External pilot oil port Y
- 4 External pilot oil port X


**Notice:**


The dimensions are nominal dimensions which are subject to tolerances.

**Mounting screws:** metric**Scope of delivery:**► **Control cover "LFA"** (except version "EM" and "EM19") - included in scope of delivery**Hexagon socket head cap screws ISO 4762 - 10.9-f1Zn/nc/480h/C**

Size	Quantity	Tightening torque $M_A$ in Nm $\pm 10\%$
16	4	30
25	4	100
32	4	240
40	4	480
50	4	480
63	4	1600
80	8	800
100	8	1600
125	8	3100
160	12	5000

► **Control cover combinations** with intermediate covers "EM" and "EM19":**Hexagon socket head cap screws ISO 4762 - 10.9-f1Zn/nc/480h/C**

Size	Control cover type LFA	Intermediate cover type	Quantity	Dimension	Material number	Tightening torque $M_A$ in Nm $\pm 10\%$	Delivery
16	WEM., GWM., KWM.	EM	4	M8 x 130	R913049958	30	separate order
		EM19	4	M8 x 140	R913018191		
	H., HWM.	EM	4	M8 x 90	R913015805		
		EM19	4	M8 x 100	R913014764		
	other standard covers	EM	4	M8 x 95	R913015806		included in the scope of delivery
		EM19	4	M8 x 105	R913068456		
25	HWM.	EM	4	M12 x 150	R913015596	100	separate order
		EM19	4	M12 x 175	R913015599		
	other standard covers	EM	4	M12 x 100	R913014792		included in the scope of delivery
		EM19	4	M12 x 125	R913015590		
32	HWM.1, HWM.2	EM	4	M16 x 160	R913015647	240	separate order
		EM19	4	M16 x 190	R913015651		
	H.1, H.2	EM	4	M16 x 130	R913094713		
		EM19	4	M16 x 160	R913015647		
	other standard covers	EM	4	M16 x 110	R913015642		included in the scope of delivery
		EM19	4	M16 x 140	R913014755		

 **Notice:**

- The tightening torques stated are guidelines when using screws with the specified friction coefficients and when using a manual torque wrench (tolerance  $\pm 10\%$ ).
- The specified tightening torques were calculated with the total friction coefficient  $\mu = 0.09 \dots 0.14$ ; adapt to modified surfaces.
- The hexagon socket head cap screws indicated refer to the standard version with metric threads.
- The through holes in the control cover are adapted to the dimensions of the metric mounting screws. A combination with UNC mounting screws is not admissible.


**Mounting screws:** UNC (version "/12")**Scope of delivery:**

- **Control cover "LFA.../12"** (except version "EM" and "EM19") - included in scope of delivery

Hexagon socket head cap screws ASME B18.3 (CM-Fe-Zn-6)			
Size	Quantity	Dimension	Tightening torque $M_A$ in Nm $\pm 10\%$
16	4	5/16-18 UNC	26
25	4	1/2-13 UNC	110
32	4	5/8-11 UNC	220
40	4	3/4-10 UNC	385
50	4	7/8-9 UNC	590
63	4	1 1/4-7 UNC	1700
80	8	1-8 UNC	880
100	8	1 1/4-7 UNC	1700
125	8	1 1/2-6 UNC	2650
160	12	1 3/4-5 UNC	3700

- **Control cover combinations** with intermediate covers "EM" and "EM19" (separate order):

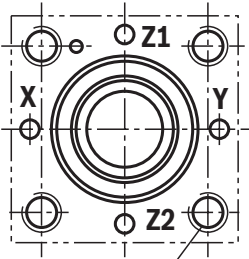
Hexagon socket head cap screws ISO 4762 - 10.9-f1Zn/nc/480h/C								
Size	Control cover type LFA	Intermediate cover type	Quantity	Dimension	Material Number	Tightening torque $M_A$ in lbf-lbs $\pm 10\%$		
16	WEM., GWM., KWM.	EM	4	5/16-18 UNC x 5 1/4"	upon request	26		
		EM19	4	5/16-18 UNC x 5 1/2"	upon request			
	H., HWM.	EM	4	5/16-18 UNC x 3 1/2"	upon request		26	
		EM19	4	5/16-18 UNC x 4"	R913023762			
	other standard covers	EM	4	5/16-18 UNC x 3 3/4"	upon request			26
		EM19	4	5/16-18 UNC x 4 1/4"	R913023760			
25	HWM.	EM	4	1/2-13 UNC x 6"	R913030339	110		
		EM19	4	1/2-13 UNC x 7"	upon request			
	other standard covers	EM	4	1/2-13 UNC x 4"	R913030335		110	
		EM19	4	1/2-13 UNC x 5"	R913023778			
32	HWM.1, HWM.2	EM	4	5/8-11 UNC x 6 1/4"	upon request	220		
		EM19	4	5/8-11 UNC x 7 1/2"	upon request			
	H.1, H.2	EM	4	5/8-11 UNC x 5 1/4"	R913023685		220	
		EM19	4	5/8-11 UNC x 6 1/2"	upon request			
	other standard covers	EM	4	5/8-11 UNC x 4 1/4"	R913023682			220
		EM19	4	5/8-11 UNC x 5 1/2"	upon request			

 **Notice:**

- The tightening torques stated are guidelines when using screws with the specified friction coefficients and when using a manual torque wrench (tolerance  $\pm 10\%$ ).
- The specified tightening torques were calculated with the total friction coefficient  $\mu = 0.09 \dots 0.14$ ; adapt to modified surfaces.
- For version "/12" the mounting threads for the logic cover in the block are not designed according to ISO 7368 (special porting pattern, see page 76). The through holes in the cover are adapted to the dimensions of the UNC screws. A combination with metric mounting screws is not admissible.

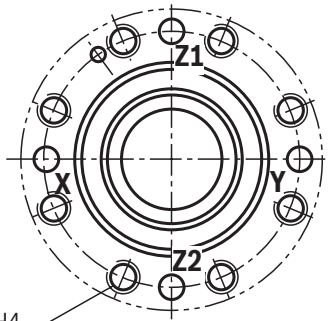
**Special porting pattern:** Version "/12" (deviating from ISO 7368 (dimensions in mm))

NG16 ... 63



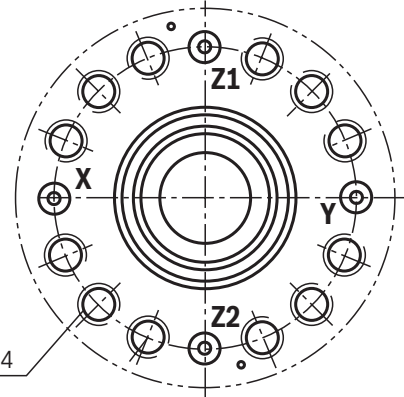
4 x D5; H4

NG80 ... 125



8 x D5; H4

NG160



12 x D5; H4

Size	D5	H4
16	5/16-18	20
25	1/2-13	25
32	5/8-11	35
40	3/4-10	45
50	7/8-9	50
63	1 1/4-7	65
80	1-8	50
100	1 1/4-7	63
125	1 1/2-6	62
160	1 3/4-5	74

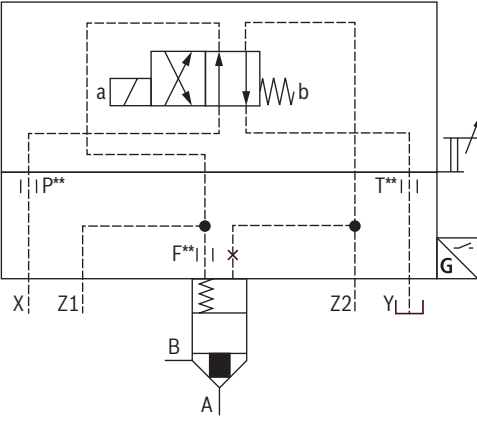
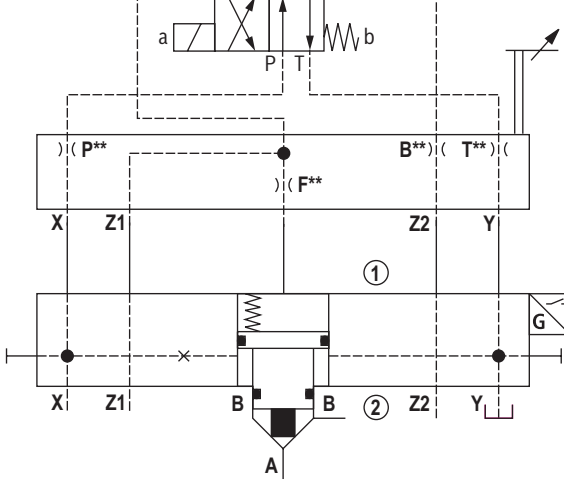
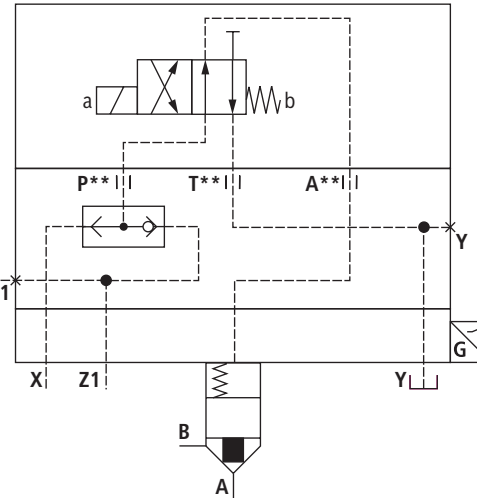
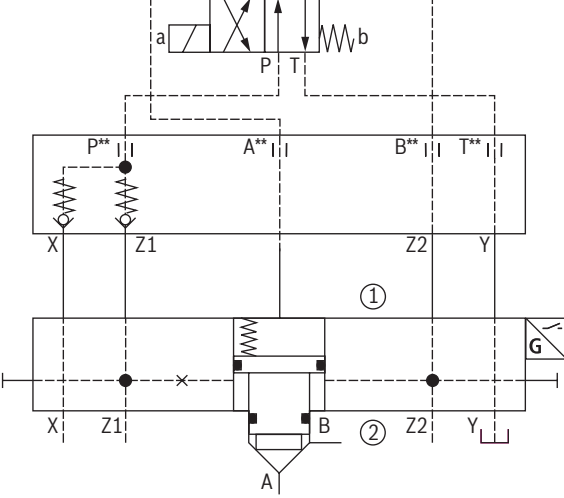
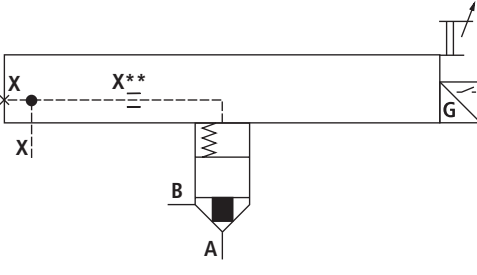
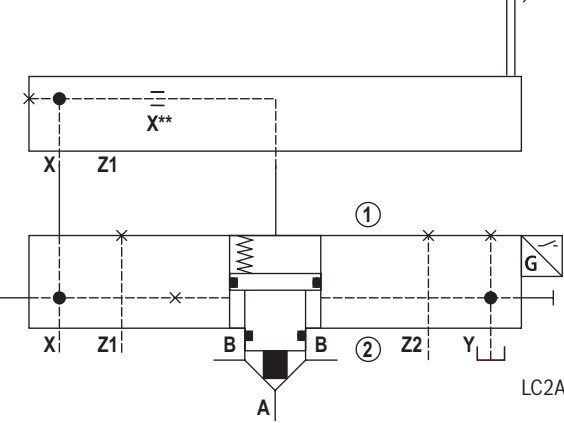
For more dimension refer to data sheet 21010

**Characteristic curves for selecting orifices; plug screws**

**Notice:**

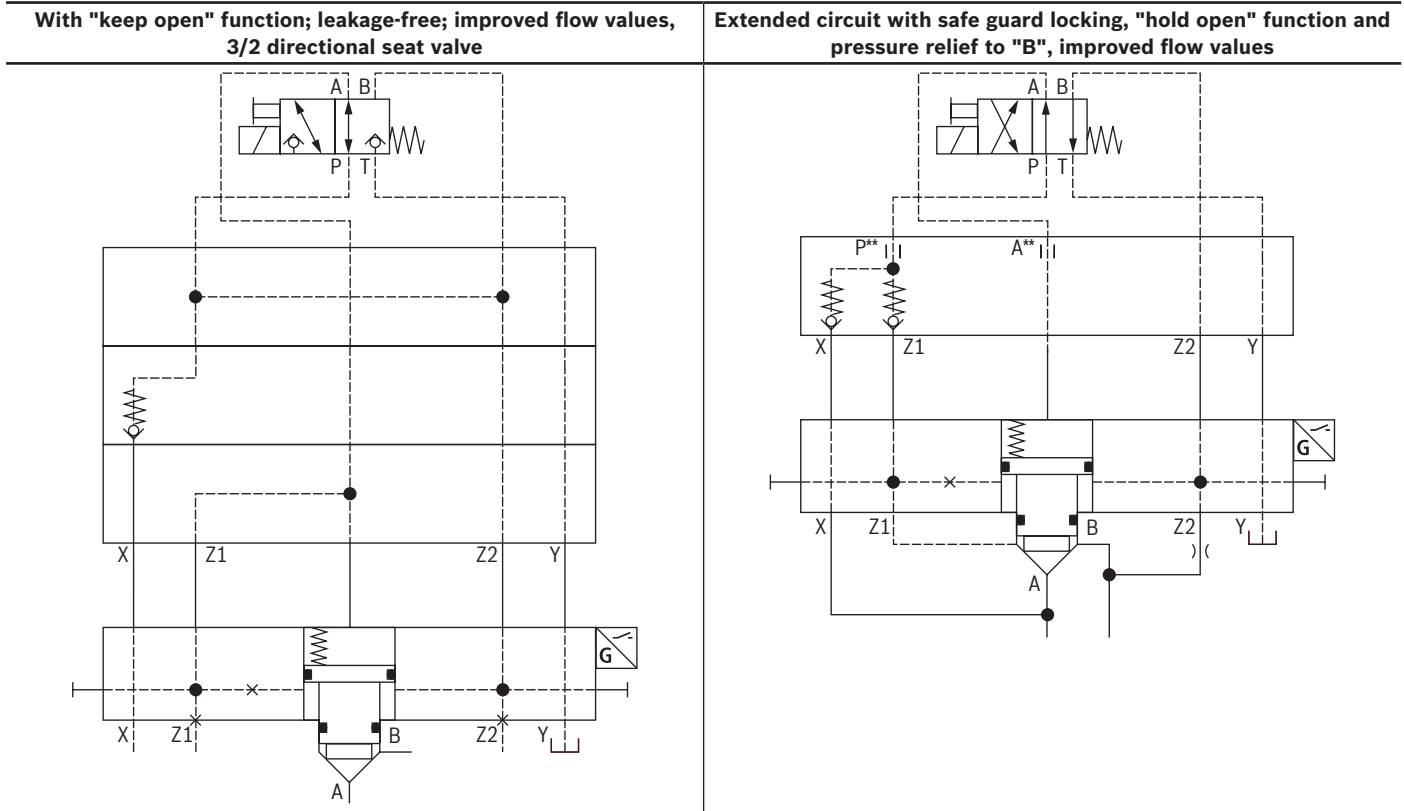
For information on nozzle selection, nozzles and plug screws see data sheet 21010.

**Circuit examples** (schematic diagram, function must be checked with the application)

Passive cartridge valve	Active cartridge valve (data sheet 21040)
<p>LFA . EHWMA2...</p> 	<p>Active cartridge valve (data sheet 21040)</p>  <p>LFA . HWMA...</p> <p>LC2A . A40D-1X/YQ7...</p> <p>Without changing the control: shorter closing time</p>
<p>LFA . EGWA...</p> 	 <p>LFA . GWMA20...</p> <p>LC2A . B40F-1X/Z2Q7...</p> <p>Logic operated actively; "open" position remains activated; higher closing forces</p>
<p>LFA . EH2...</p> 	 <p>LFA . H...</p> <p>LC2A . A40D-1X/YQ7..Y99Z99S99</p> <p>Shorter closing time; an existing standard cover can still be used</p>

**Circuit examples** (schematic diagram, function must be checked with the application)

**Connection-compatible functional examples for circuits with active logics "LC2A", especially for increased requirements for retrofitting and new installations**



**Accessories** (separate order)

**Mating connectors and cable sets**

Designation	Version	Short designation	Material number	Data sheet
Mating connectors; for sensors and valves with "K24", "K35" and "K72" connectors, 4-pole	M12 x 1, straight, PG 7, with potted-in PVC cable, 3 m	4PZ24	<b>R900064381</b>	08006
	M12 x 1, straight, PG 9		<b>R900031155</b>	
	M12 x 1, angled, PG 7		<b>R900082899</b>	

## Test certificates

- ▶ Type examination certificate (only version "LFA . E..." and "LFA . E15..."):
 

The respectively valid "HSM 01028" certificate for using the QMG24 type position switch in hydraulic security locks in injection molding machines according to the manufacturer's installation instructions is available upon request.
- ▶ Test certificate (concept test) for versions with electrical position monitoring (restrictions in piston and spring selection as well as function).
 

Certificate "HSM 17023" for installation as intended in

  - molding and injection machines according to DIN EN 289
  - mechanical presses according to DIN EN 692
  - hydraulic presses according to DIN EN 693
  - hydraulic press brakes according to DIN EN 12622 is available upon request.

## Further information

- |   |  |
|---|--|
| ▶ 2-way cartridge valve directional functions                                       | Data sheet 21010   |
| ▶ 2-way cartridge valve pressure functions  | Data sheet 21050   |
| ▶ 2-way cartridge valves, pressure and directional functions - high pressure series | Data sheet 21030   |
| ▶ 2-way cartridge valve, actively controllable, type LC2A                           | Data sheet 21040   |
| ▶ 2-way cartridge valves, pressure limiting function, type-examination tested       | Data sheet 21055   |
| ▶ Directional spool valve type WE 6   | Data sheet 23178   |
| ▶ Directional spool valve type WE 10  | Data sheet 23340   |
| ▶ Directional seat valve type SEW 6   | Data sheet 22058   |
| ▶ Directional seat valve type SEW 10  | Data sheet 22075   |
| ▶ Directional seat valve type SED 6   | Data sheet 22049   |
| ▶ Directional seat valve type SED 10  | Data sheet 22045   |
| ▶ Directional spool valve type WEH  | Data sheet 24751   |
| ▶ Cover plates type HSA   | Data sheet 48042   |
| ▶ Sandwich plates type HSZ  | Data sheet 48050   |
| ▶ Hydraulic fluids on mineral oil basis   | Data sheet 90220   |
| ▶ Environmentally compatible hydraulic fluids                                       | Data sheet 90221   |
| ▶ Flame-resistant, water-free hydraulic fluids                                      | Data sheet 90222   |
| ▶ Reliability characteristics according to EN ISO 13849                             | Data sheet 08012   |
| ▶ General product information on hydraulic products                                 | Data sheet 07008   |
| ▶ Assembly, commissioning and maintenance of industrial valves                      | Data sheet 07300   |
| ▶ Hydraulic valves for industrial applications                                      | Data sheet 07600-B   |
| ▶ Selection of the filters  | <a href="http://www.boschrexroth.com/filter">www.boschrexroth.com/filter</a> |

## Notes

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