

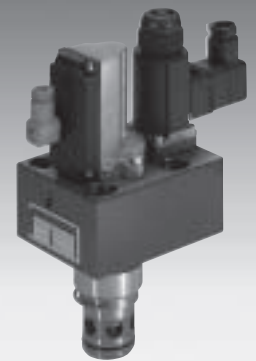
# Proportional cartridge throttle valve, with inductive position transducer, pilot operated

RE 29215/09.05

1/18

## Type FESX

Nominal size 16, 25, 32, 40, 50  
 Unit series 1X  
 Maximum working pressure A, B, X 315 bar, Y 100 bar  
 Nominal flow rate  $Q_{nom}$  980 l/min



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## Features

- Pilot operated throttle valves with inductive position transducer
- Design: cartridge type DIN 24342, ISO/DIS 7368  
Control oil external X and Y
- Adjustable via the position-controlled main stage by means of the position transducer and the external valve electronics
- Hysteresis <math><0.2\%</math>, positioning accuracy >math>>0.5\%</math>, see Technical Data
- Plug-in connector to DIN 43650-AM2 for the solenoid and plug-in connector for the position transducer, included in scope of delivery
- Data for the external trigger electronics
  - $U_B = 24 V_{nom}$  DC
  - Adjustment of valve curve  $N_p$  and gain, with and without ramp generator
  - Europe card format, setpoint 0...+10 V (order separately)

## Ordering data

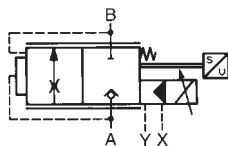
FESX		C	A-1X/	L	Z4	M	*
Proportional throttle valve with inductive position transducer (pilot operated)							Further information in plain text
<b>Nominal size</b>	= 16					<b>M =</b>	NBR seals, suitable for mineral oils (HL, HLP) to DIN 51524
Mounting hole configuration DIN 24342, ISO/DIS 7368	= 25					<b>Z4 =</b>	<b>Electrical connection</b> Unit plug to DIN 43650-AM2 Plug-in connector included in scope of delivery
	= 32					<b>L =</b>	<b>Flow characteristic</b> Linear
	= 40						<b>Nominal flow rate</b> $Q_{nom}$ in l/min $\Delta p = 5$ bar
	= 50						
<b>Connection type</b> (cartridge)		= C					
Direction of flow A → B (customer may implement B → A)			= A				
Unit series 10 to 19 (10 to 19: installation and connection dimensions unchanged)				= 1X			
					125 =		
					210 =		
					320 =		
					500 =		
					980 =		

## Preferred types

Type	Material Number
FESX16CA-1X/125LZ4M	0 811 402 452
FESX25CA-1X/210LZ4M	0 811 402 515
FESX32CA-1X/320LZ4M	0 811 402 614
FESX40CA-1X/500LZ4M	0 811 402 620
FESX50CA-1X/980LZ4M	0 811 402 633

## Symbol

For external trigger electronics



## Function, sectional diagram

### General

Type FESX proportional throttle valves are pilot operated and in "cartridge" design. This results in their compact form despite high flow rates.

The electronics, which take the form of an external valve amplifier in Europe card format, trigger the solenoid of the pilot valve and thus control the position of the main stage.

Hysteresis is <0.2%, and a position accuracy of >0.5% is achieved.

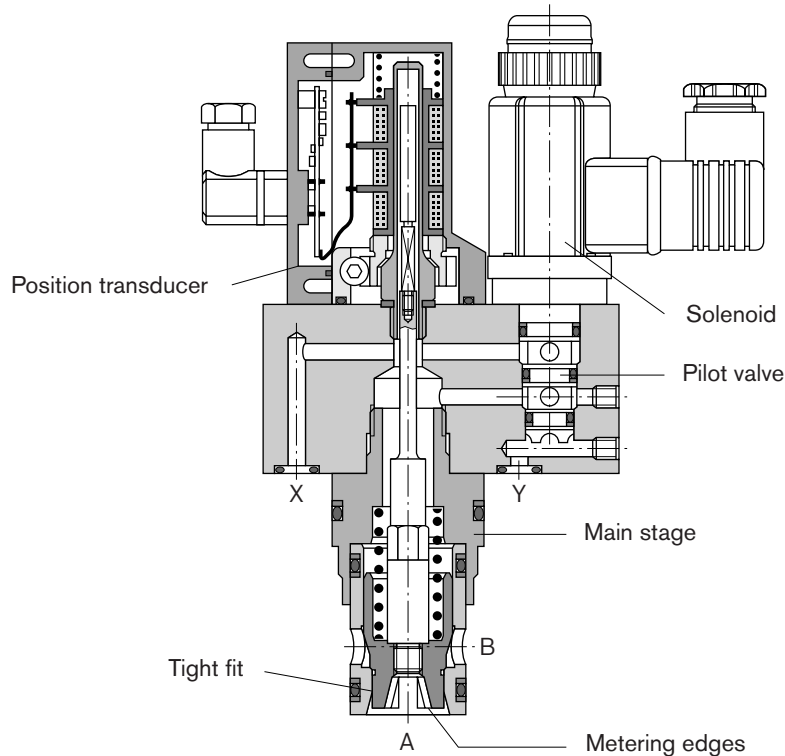
### Basic principle

Pilot operated 2/2-way cartridge valves.

There is a free choice of directions of flow,  $A \rightarrow B$  or  $B \rightarrow A$ , but please note:

- Always route "Y" externally
- Pressure at "X" must always be equal to or greater than at "A" and not below 12 bar when  $A \rightarrow B$ .
- Pressure at "X" must always be equal to or greater than at "B" and not below 20 bar when  $B \rightarrow A$ .

If the valve is shut down electrically and is supplied externally with sufficient pressure at "X", the main stage  $A \rightarrow B$  may be employed as a poppet valve.



### Accessories

Type	Material Number		
(4 x)  ISO 4762	Cheese-head bolts included in scope of delivery		
Europe card 	VT-VRPA1-527-20/V0/2/2V	RE 30055	0 811 405 076
Europe card 	VT-VRPA1-527-20/V0/RTS-2/2V	RE 30053	0 811 405 074
Plug-in connectors 	Plug-in connector 2P+PE (M16x1.5) for the solenoid and plug-in connector 4P (Pg7) for the position transducer. Included in scope of delivery, see also RE 08008.		

### Testing and service equipment

Test box type VT-PE-TB2, see RE 30064

Test adapter for Europe cards type VT-PA-3, see RE 30070

## Technical data

General	
Construction	Cartridge type throttle valve, spool valve with closed-loop position control via Europe card
Actuation	Pilot operated, proportional 3/2-way directional control valve in valve cover, without position control
Main stage	Position control via external trigger electronics and position transducer LVDT DC/DC
Connection type	Cartridge type, mounting hole configuration to DIN 24342, ISO/DIS 7368
Mounting position	Horizontal if possible, or position transducer at the bottom
Ambient temperature range	°C -20...+50
Vibration resistance, test condition	Max. 25 g, shaken in 3 dimensions (24 h)

### Hydraulic (measured with HLP 46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ )

Pressure fluid	Hydraulic oil to DIN 51524...535, other fluids after prior consultation					
Viscosity range,	recommended	mm <sup>2</sup> /s	20...100			
	max. permitted	mm <sup>2</sup> /s	10...800			
Pressure fluid temperature range	°C	-20...+80				
Maximum permitted degree of contamination of pressure fluid Purity class to ISO 4406 (c)	Class 18/16/13 <sup>1)</sup>					
Direction of flow	A → B or B → A (when X supplied "internally", or "externally" when pressure higher)					
Nominal flow rate at $\Delta p = 5\text{ bar}$ per edge*	l/min	<b>NG16</b>	<b>NG25</b>	<b>NG32</b>	<b>NG40</b>	<b>NG50</b>
		125	210	320	500	980
Weight	kg	2.8	3.9	5.1	7.1	9.7
Max. working pressure in A, B, X	bar	315	315	315	315	315
Max. working pressure in Y	bar	100	100	100	100	100
$Q_{max}$	l/min	350	600	1000	1500	3000
$Q_N$ pilot valve (supply) $\Delta p = 5\text{ bar}$	l/min	5	15	15	28	28
Leakage X → Y Pilot valve at 100 bar	cm <sup>3</sup> /min	<150	<200	<200	<400	<400
Min. flow rate at $U_E = 0\text{ V}$ adjustable Valve active ( $\Delta p = 5\text{ bar}$ )	cm <sup>3</sup> /min	2000	2000	3000	3000	4000
Leakage in main stage at $\Delta p = 100\text{ bar}$ (valve shut down electrically)	A → B = tight (poppet valve) B → A = tight (poppet valve) <b>Note:</b> min. leakage X → B, possible when X = external					
Minimum supply pressure A → B	bar	12	12	12	12	12
Minimum supply pressure B → A	bar	20	20	20	20	20

\* Flow for other values of  $\Delta p$   $Q_X = Q_{nom} \cdot \sqrt{\frac{\Delta p_X}{5}}$

<sup>1)</sup> The purity classes stated for the components must be complied with in hydraulic systems. Effective filtration prevents problems and also extends the service life of components.

For a selection of filters, see catalog sheets RE 50070, RE 50076 and RE 50081.

## Technical data

Static/Dynamic <sup>1)</sup>						
		NG16	NG25	NG32	NG40	NG50
Spool stroke/characteristic curve	+ mm	4	5	7	10	12.5
Overlap on shutdown	- mm	3	3	3	3	3
Control oil volume of main stage 100%	cm <sup>3</sup>	1.02	2.66	6.36	12.57	24.54
Required control oil 0...100%, x = 100 bar	l/min	3	5	7	9	9
Hysteresis	%	<0.2	<0.2	<0.2	<0.2	<0.2
Positioning accuracy	%	<0.5	<0.5	<0.5	<0.5	<0.5
Manufacturing tolerance	See flow curves, adjustable via external trigger electronics					
Response time (x = 100 bar)	ms					
Signal change 0...100%	"open"	<70	<70	<90	<90	<110
Signal change 100... 0%	"close"	<70	<70	<90	<130	<300
Signal change 0... 10%	"open"	<50	<50	<70	<70	<80
Signal change 10... 0%	"close"	<40	<40	<50	<70	<100
Switch-off behavior, enable "OFF"	After electrical shutdown (pilot valve opens "X" to the main stage), main stage moves to closed end position					
Thermal drift	<1 % at $\Delta T = 40^\circ\text{C}$					

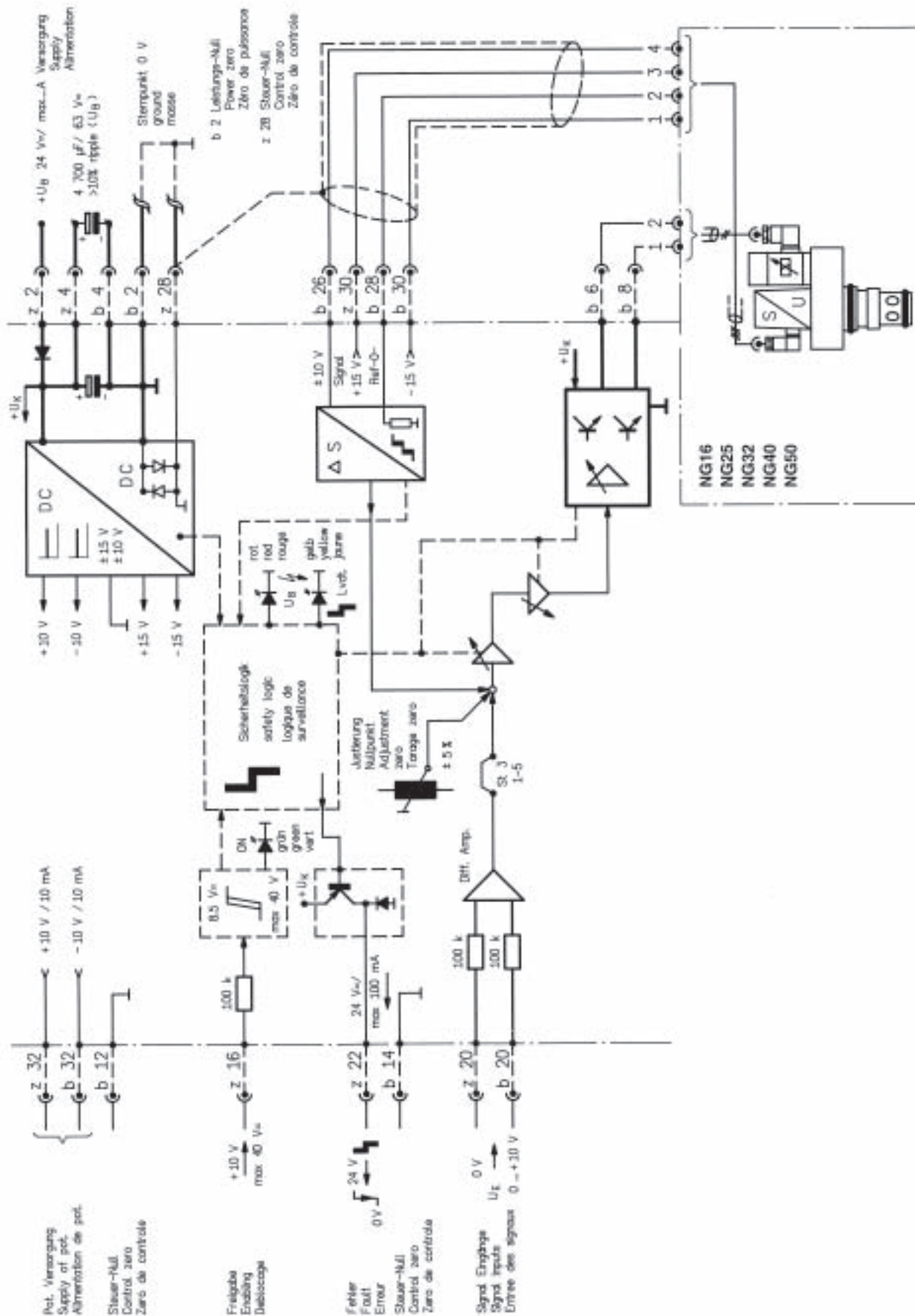
## Electrical

Cyclic duration factor	%	100				
Degree of protection	IP 65 to DIN 40050 and IEC 14434/5					
Solenoid connection	Unit plug DIN 43650/ISO 4400, M16x1.5 (2P+PE)					
Position transducer connection	Special plug (4P/Pg7)					
Max. solenoid current	$I_{\max}$	2.7 A				
Coil resistance $R_{20}$	$\Omega$	2.5				
Max. power consumption at 100% load and operating temperature	VA	40				
Position transducer DC/DC technology	Supply: +15 V/35 mA -15 V/25 mA			Signal: 0...±10 V ( $R_L \geq 10 \text{ k}\Omega$ )		

<sup>1)</sup> All characteristic values ascertained using amplifier 0 811 405 076 (without ramp).

# Valve with external trigger electronics (europe card without ramp, RE 30055)

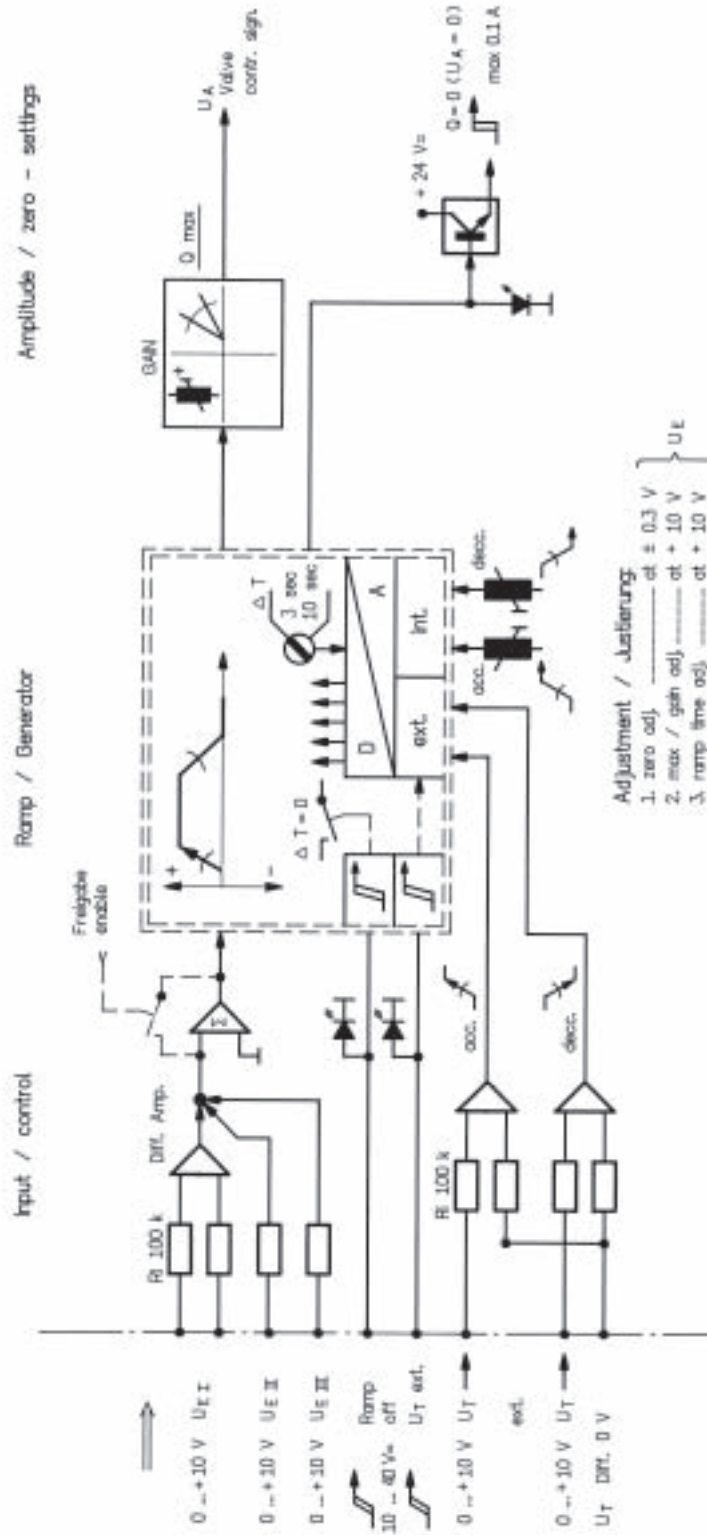
## Circuit diagram/pin assignment





# Valve with external trigger electronics (europe card with ramp, RE 30053)

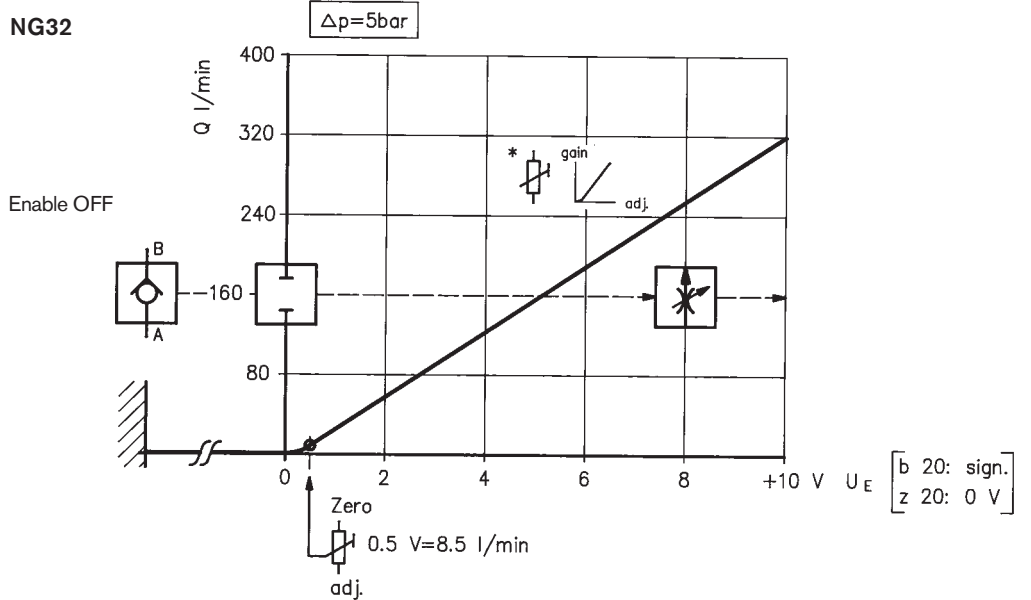
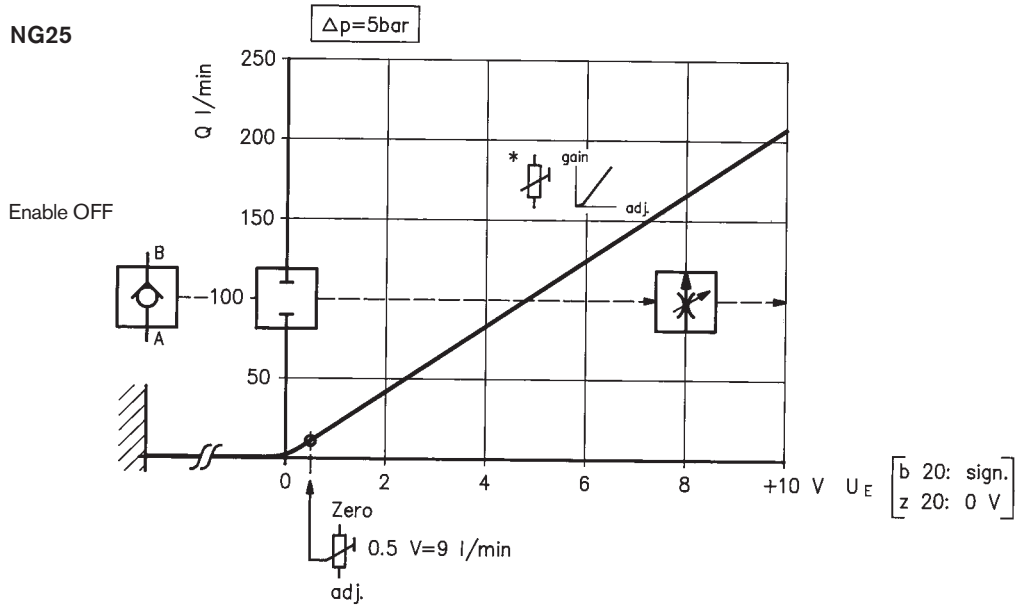
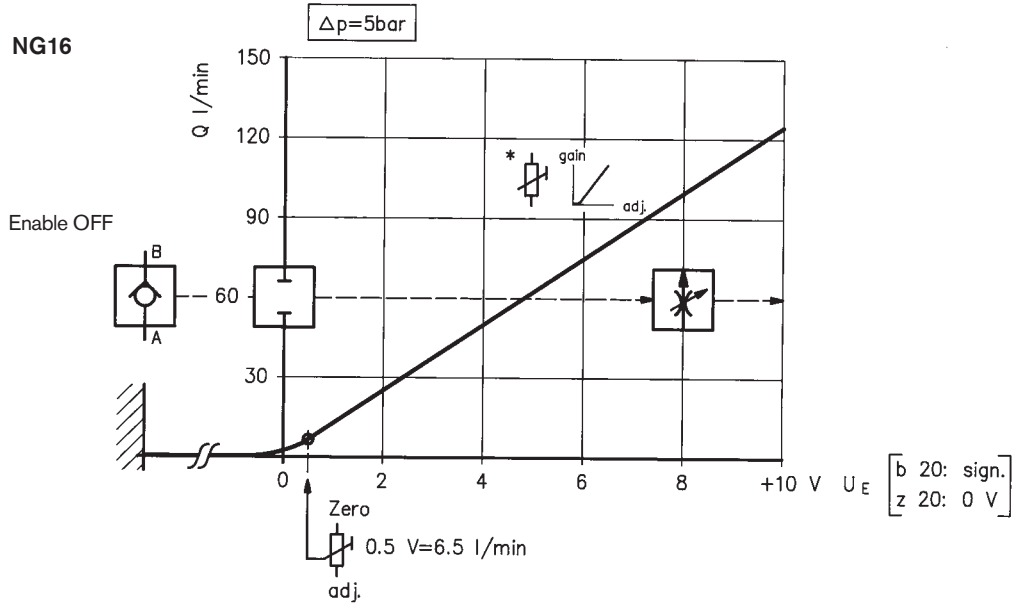
Functional diagram of ramp control





**Characteristic curves** (measured with HLP 46,  $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ )

$\Delta p = 5 \text{ bar}$   
 $v = 36 \text{ mm}^2/\text{s}$

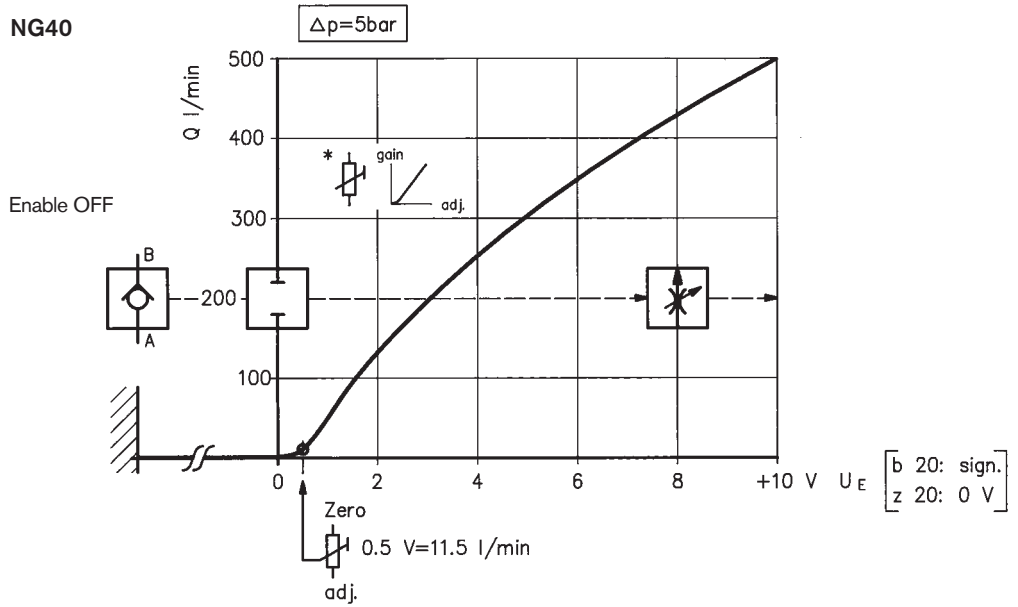


\* Amplifier

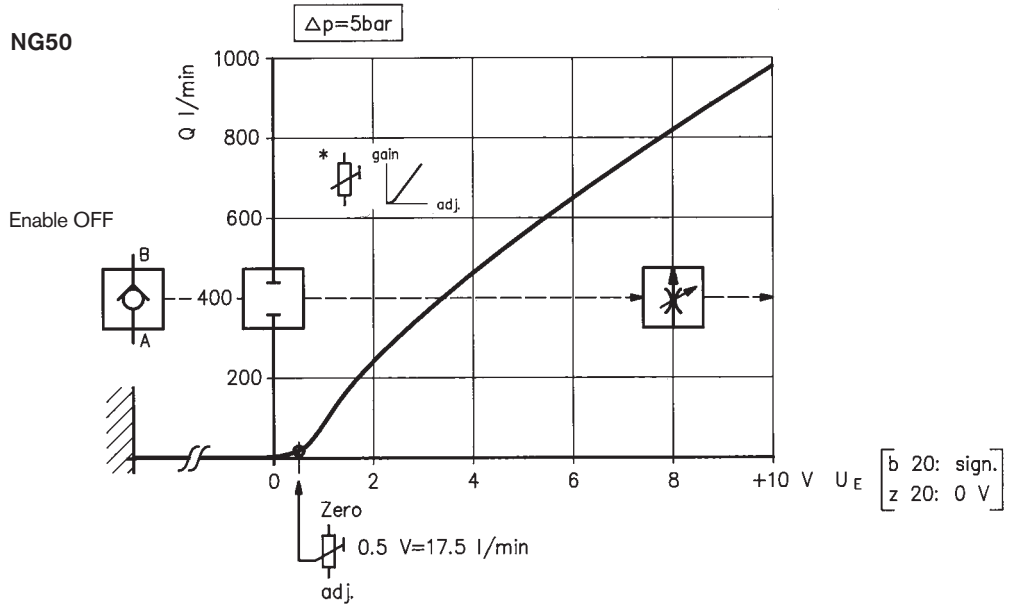
**Characteristic curves** (measured with HLP 46,  $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ )

$\Delta p = 5 \text{ bar}$   
 $v = 36 \text{ mm}^2/\text{s}$

**NG40**

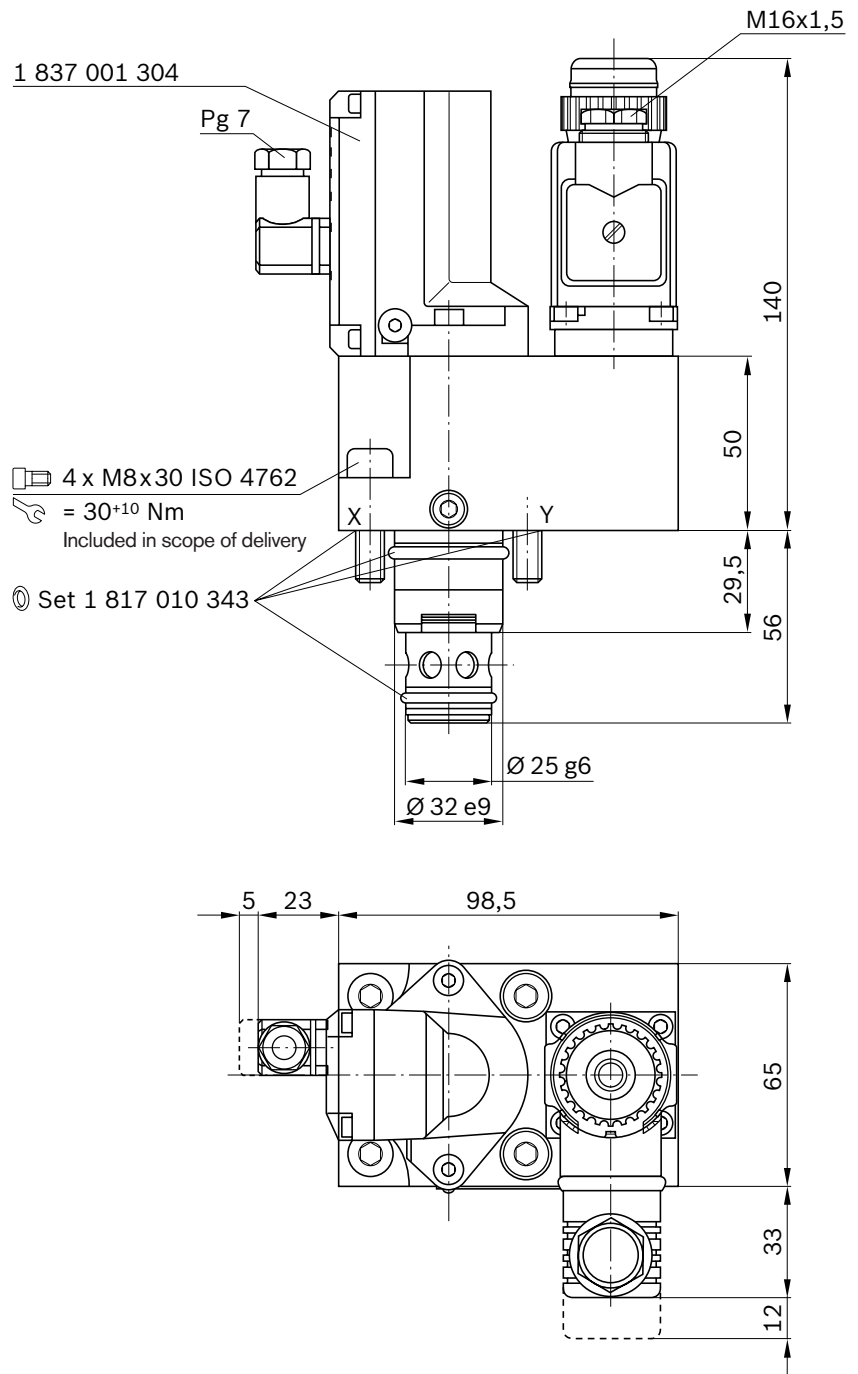


**NG50**



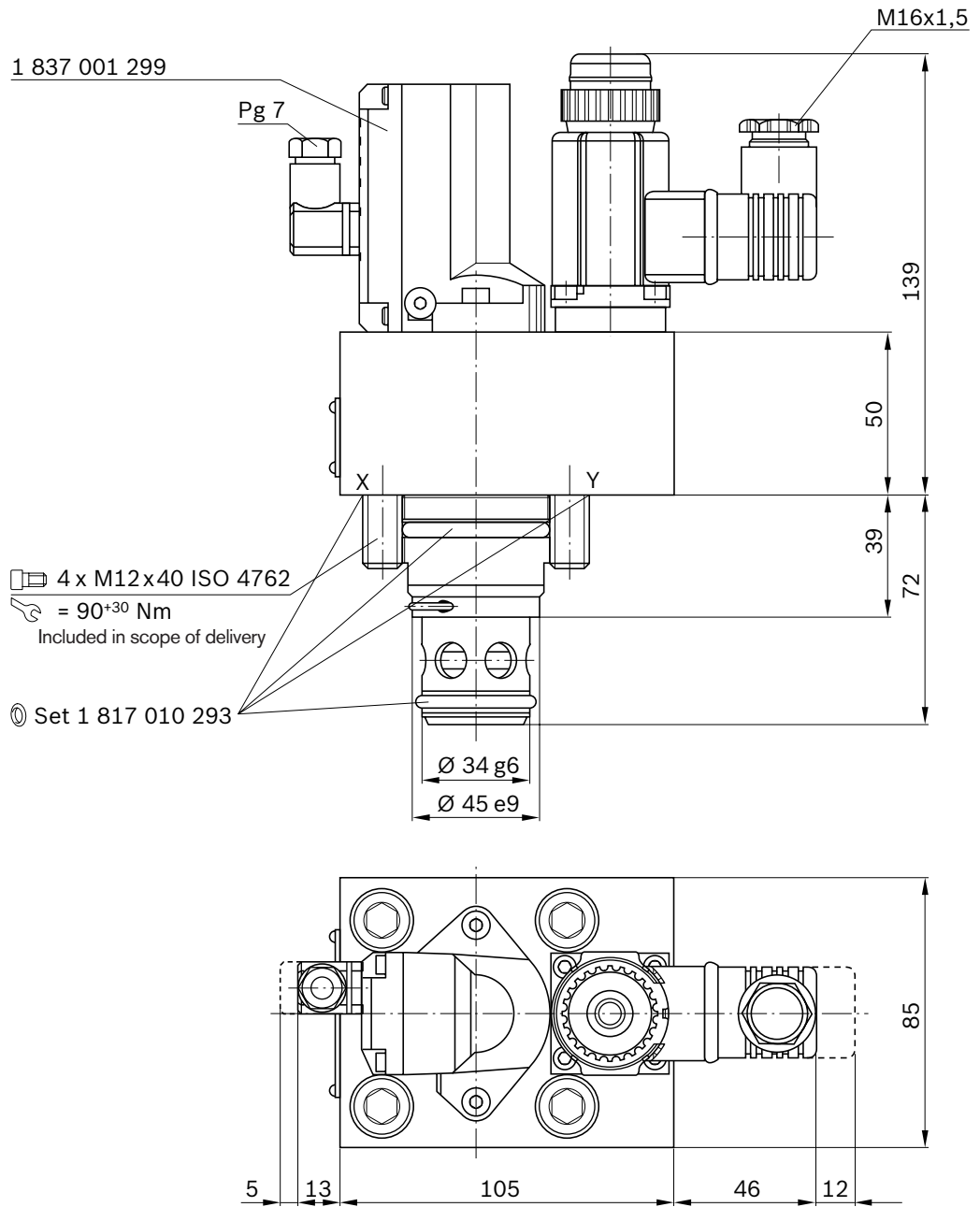
\* Amplifier

## Unit dimensions NG16 (nominal dimensions in mm)



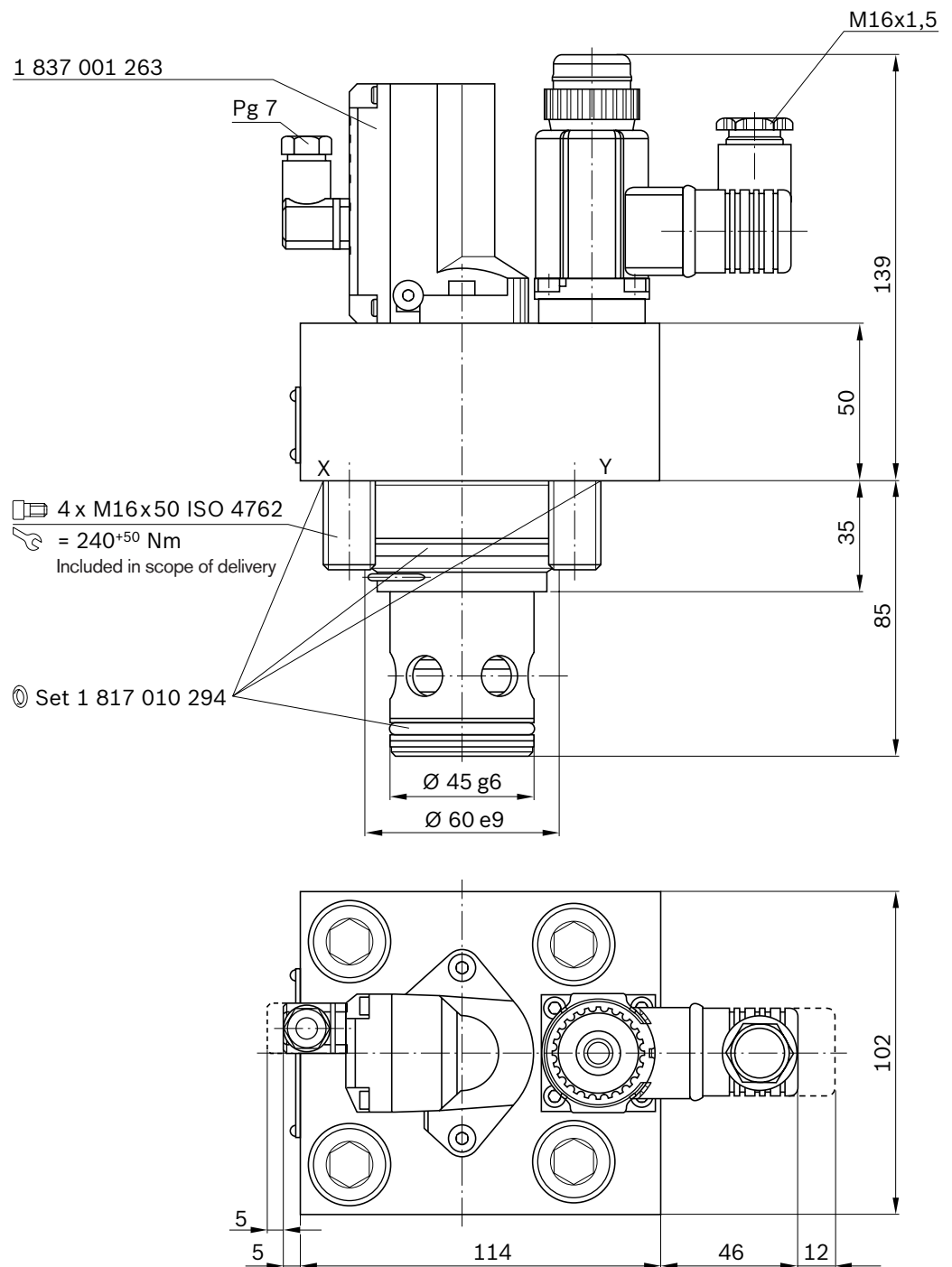
See installation dimensions on page 16

**Unit dimensions NG25 (nominal dimensions in mm)**



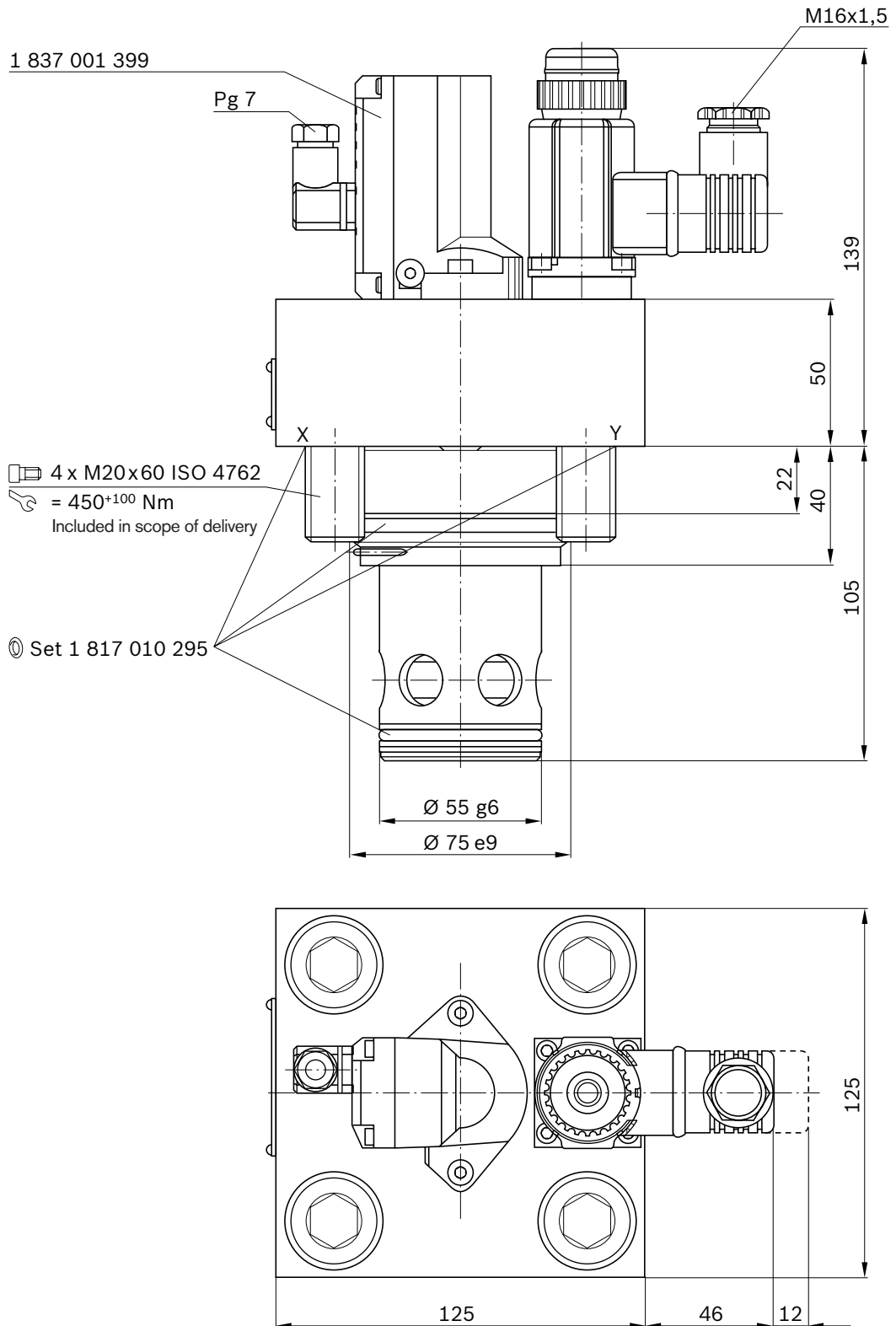
See installation dimensions on page 16

**Unit dimensions NG32 (nominal dimensions in mm)**



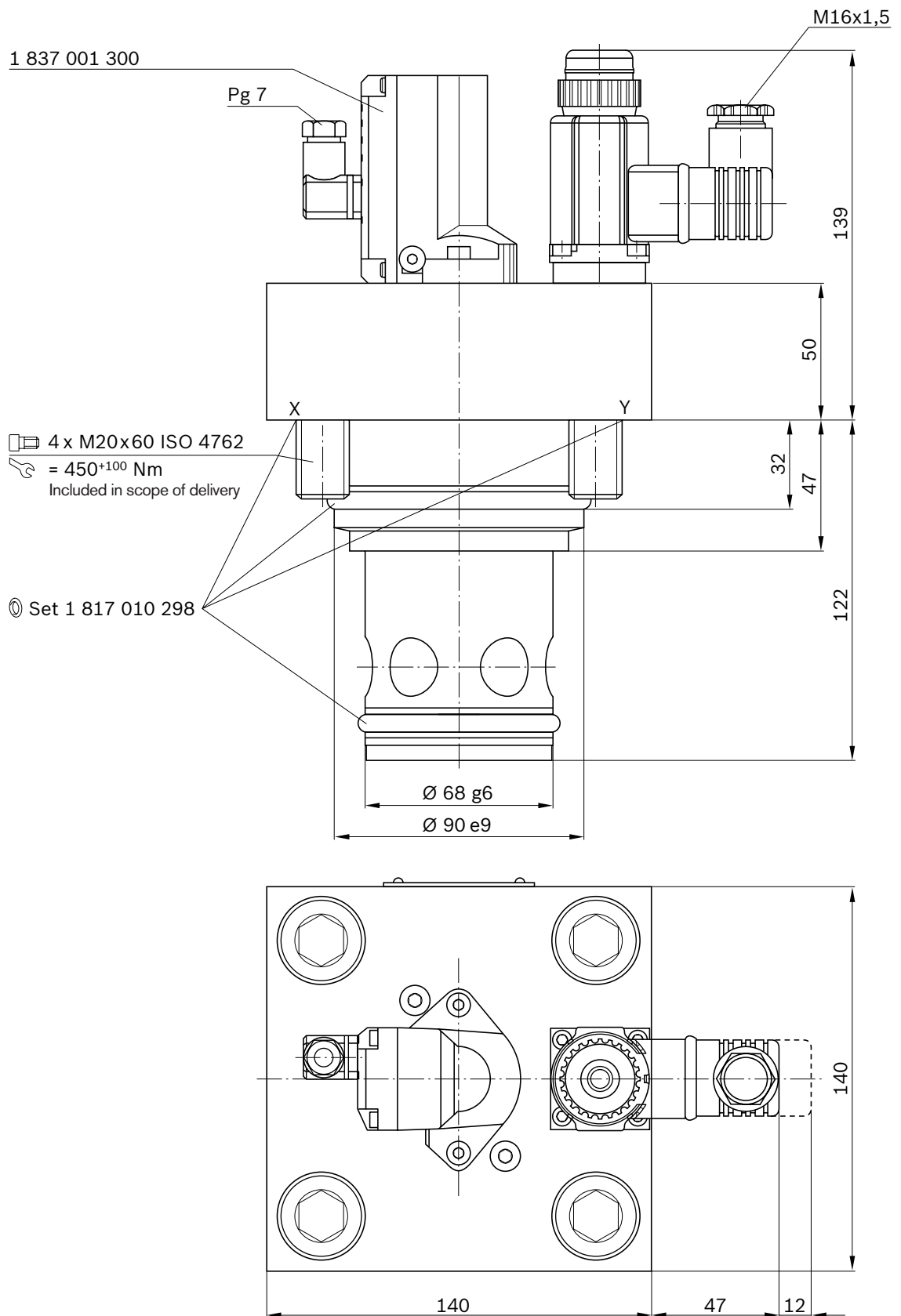
See installation dimensions on page 16

**Unit dimensions NG40 (nominal dimensions in mm)**



See installation dimensions on page 17

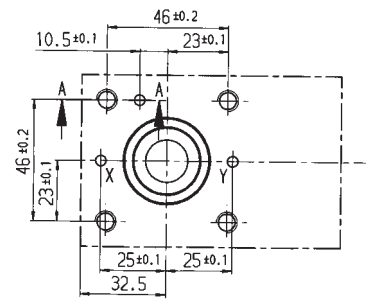
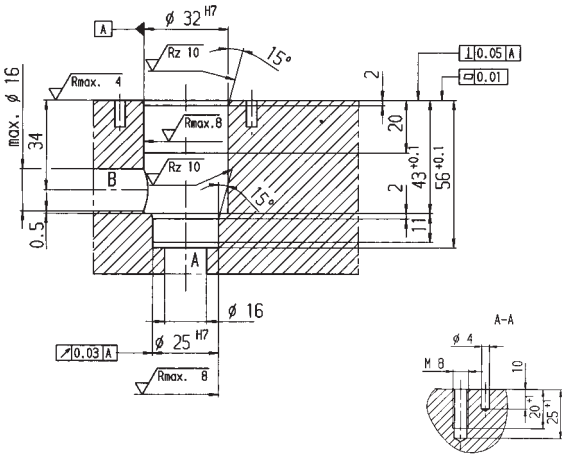
**Unit dimensions NG50 (nominal dimensions in mm)**



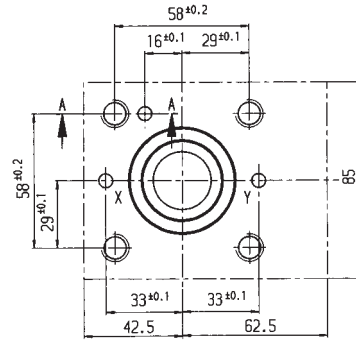
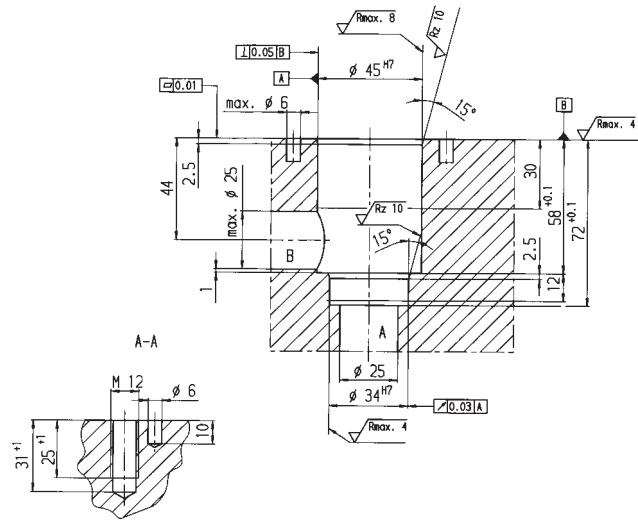
See installation dimensions on page 17

Installation dimensions DIN 24342, ISO/DIS 7368 (nominal dimensions in mm)

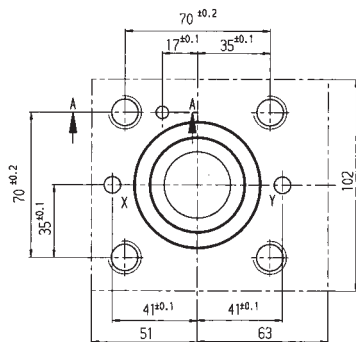
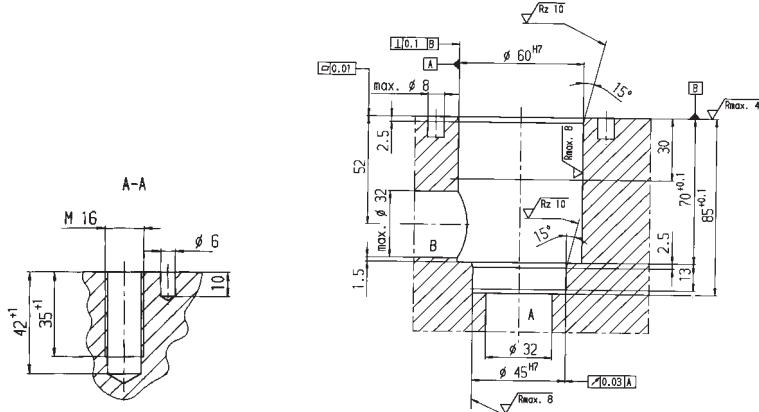
NG16



NG25



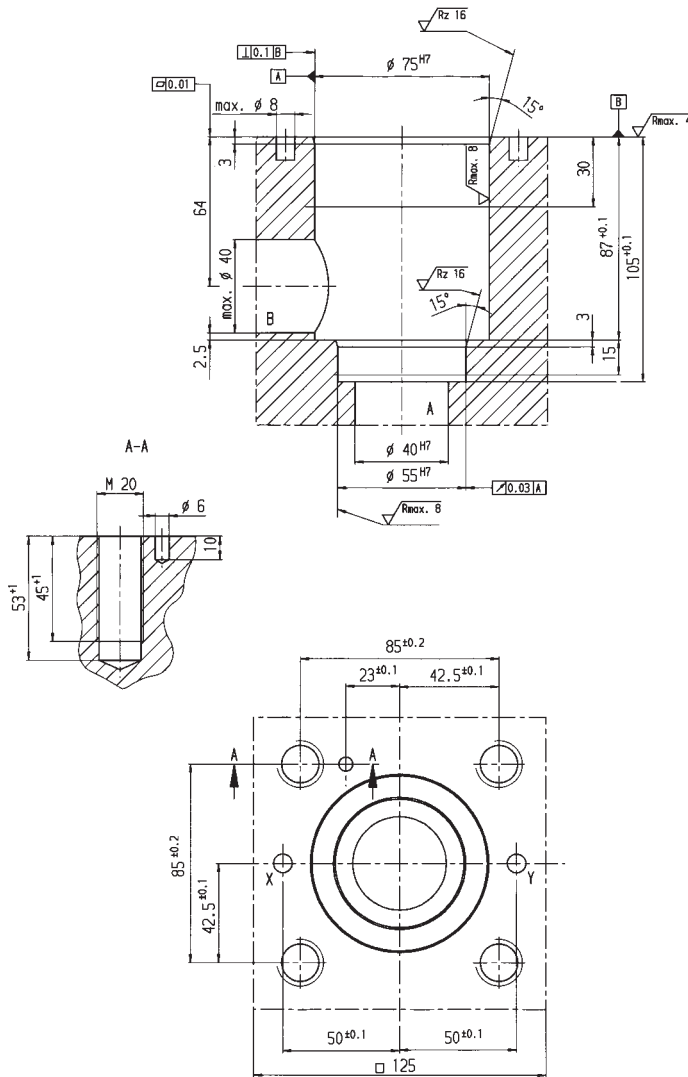
NG32



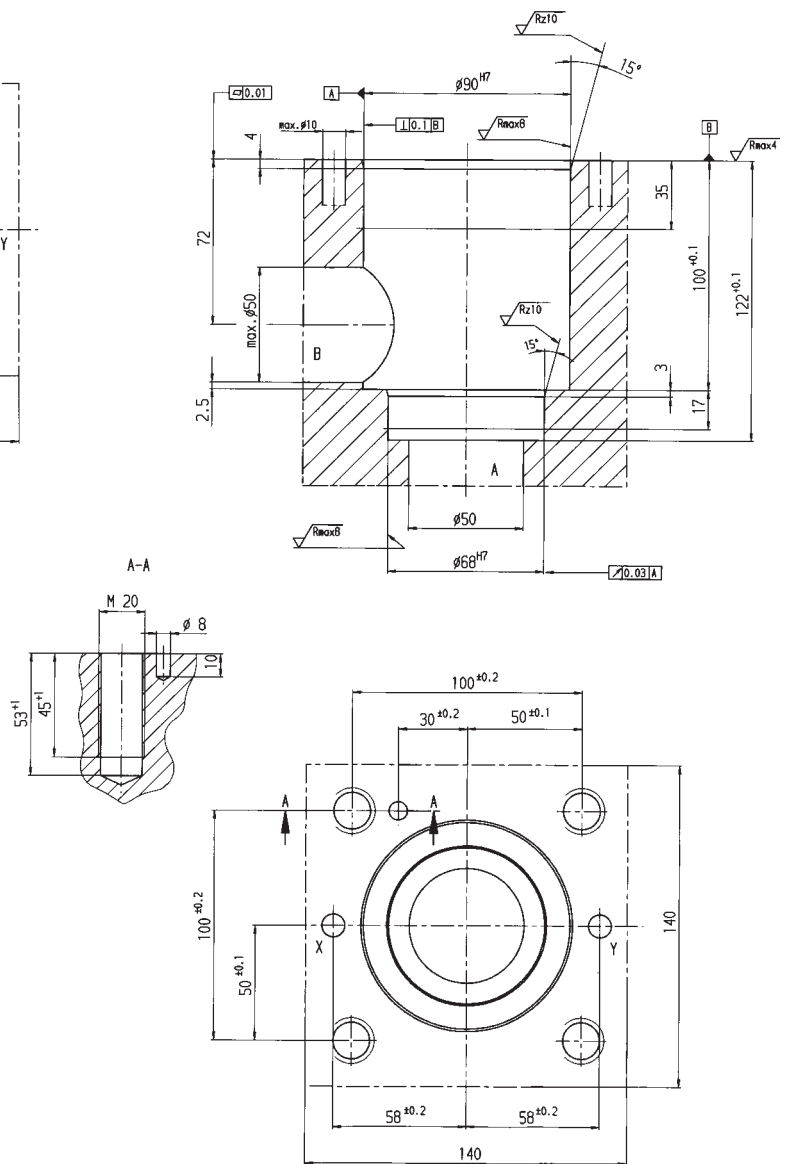


Installation dimensions DIN 24342, ISO/DIS 7368 (nominal dimensions in mm)

NG40



NG50



## Notes

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## Notes

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## Notes

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