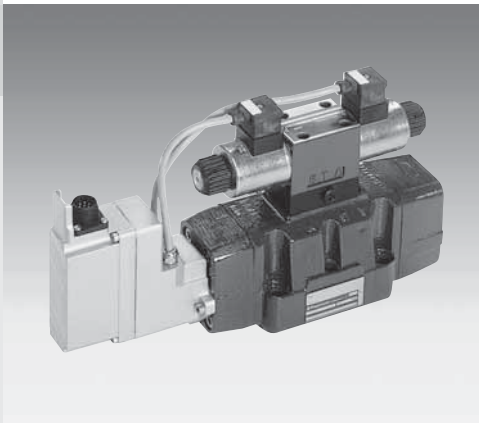
Rexroth
Bosch Group

# Proportional directional control valve, pilot operated with on-board electronics (OBE) and inductive position transducer

RE 29076/12.05 1/24

**Type 4WRBKE**



Nominal size (NG) 10, 16, 27, 35
Unit series 1X
Maximum working pressure NG10, 16, 35 P, A, B 350 bar
NG27 P, A, B 280 bar
Nominal flow rate $Q_{nom}$ 85...1100 l/min

## Overview of Contents



**Different versions on request**
- For standard applications
- Special symbols for plastics machines

## Features

- Pilot operated proportional directional control valves NG10 to NG35 with approx. 20 % positive overlap, see symbols E./W./R5 and characteristic curves
- Adjusted by position-controlled main stage with on-board electronics (OBE) and inductive position transducer, calibrated at the factory
- Electronically compensated and calibrated overlap, see characteristic curve range ±0.5 V
- Spool with linear guidance, with anti-rotation element
- Flow characteristic
  • S = Progressive
- Pilot valve without position control, 4/3-way function, optimized metering edges ensuring the stability of the position-controlled main stage, safe mid position on switch-off
- Suitable for electrohydraulic controllers in production systems with more demanding requirements
- For subplate attachment, mounting hole configuration NG10 to ISO 4401-05-05-0-94, NG16 to ISO 4401-07-06-0-94, NG25 (high flow NG27) to ISO 4401-08-07-0-94 and NG32 (high flow NG35) to ISO 4401-10-08-0-94
- Subplates as per catalog sheet, NG10 RE 45055, NG16 RE 45057, NG25 (27) RE 45059 and NG32 (35) RE 45060 (order separately)
- Plug-in connectors to DIN 43563-AM6, see catalog sheet RE 08008 (order separately).

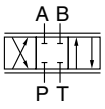
## Ordering data

| 4WRBKE | | | | S | J | −1X | / | 6Z | G24 | | K31 | / | A1 | D3 | M | * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

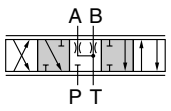
Electrically actuated 2-stage proportional directional control valve in 4-way design with on-board trigger electronics

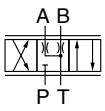
NG10 = **10**
NG16 = **16**
NG27 [1] = **27**
NG35 [1] = **35**

Symbols = **E, E1**

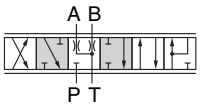


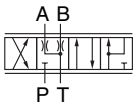

= **W, W1**




= **R5**




Transitional symbols

**With symbol E1, W1, R5**
P→A: $q_v$ B→T: $q_v$/2
P→B: $q_v$/2 A→T: $q_v$

[1] NG27 is a high-flow version of NG25.
NG35 is a high-flow version of NG32.
In the high-flow versions, the ports in the customer's control block may be larger, see unit dimensions on pages 20 and 21.

**NG**
**10** = 85 l/min
**16** = 180 l/min
**27** = 250 l/min or 430 l/min
**35** = 1100 l/min

**Nominal flow rate at 10 bar valve pressure difference**

**S** = **Flow characteristic**
Progressive

**J** = **Overlap compensating signal**
See characteristic curve range: ±0.5 V

**1X** = Unit series 10 to 19
(10 to 19: installation and connection dimensions unchanged)

**6Z** = Proportional solenoid with removable coil

**G24** = **Voltage supply of trigger electronics**
+24 V DC

**Control oil supply "x", control oil outlet "y"**
**No code** = "x" = external, "y" = external
**E** = "x" = internal, "y" = external
**ET** = "x" = internal, "y" = internal
**T** = "x" = external, "y" = internal

**K31** = **Electrical connection**
**without** plug-in connector, with unit plug to EN 175201-804
Order plug-in connector separately

**A1** = **Interface for trigger electronics**
Setpoint input ±10 V

**D3** = With pressure reducing valve (fixed setting)

**M** = NBR seals, suitable for mineral oils (HL, HLP) to DIN 51524

**−903** = [2] Further information in plain text

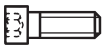
[2] **−903**
Geometry:
Switching point at 55 % stroke,
B–P opens at 50 %,
B–T closes at 65 %.

## Preferred types

| Type 4WRBKE | Material No. |
|---|---|
| **E, E1, W, W1, R5** | **NG10** |
| 4WRBKE10E85SJ–1X/6ZG24K31/A1D3M | 0 811 404 911 |
| 4WRBKE10E85SJ–1X/6ZG24EK31/A1D3M | 0 811 404 913 |
| 4WRBKE10E1-85SJ–1X/6ZG24K31/A1D3M | 0 811 404 912 |
| 4WRBKE10E1-85SJ–1X/6ZG24EK31/A1D3M | 0 811 404 914 |
| 4WRBKE10W85SJ–1X/6ZG24K31/A1D3M | 0 811 404 915 |
| 4WRBKE10W85SJ–1X/6ZG24EK31/A1D3M | 0 811 404 917 |
| 4WRBKE10W1-85SJ–1X/6ZG24K31/A1D3M | 0 811 404 916 |
| 4WRBKE10W1-85SJ–1X/6ZG24EK31/A1D3M | 0 811 404 918 |
| 4WRBKE10R5-85SJ–1X/6ZG24K31/A1D3M–903 | 0 811 404 920 |
| **E, E1, W, W1, R5** | **NG16** |
| 4WRBKE16E180SJ–1X/6ZG24K31/A1D3M | 0 811 404 926 |
| 4WRBKE16E180SJ–1X/6ZG24EK31/A1D3M | 0 811 404 928 |
| 4WRBKE16E1-180SJ–1X/6ZG24K31/A1D3M | 0 811 404 927 |
| 4WRBKE16E1-180SJ–1X/6ZG24EK31/A1D3M | 0 811 404 929 |
| 4WRBKE16W180SJ–1X/6ZG24K31/A1D3M | 0 811 404 930 |
| 4WRBKE16W180SJ–1X/6ZG24EK31/A1D3M | 0 811 404 932 |
| 4WRBKE16W1-180SJ–1X/6ZG24K31/A1D3M | 0 811 404 931 |
| 4WRBKE16W1-180SJ–1X/6ZG24EK31/A1D3M | 0 811 404 933 |
| 4WRBKE16R5-180SJ–1X/6ZG24K31/A1D3M–903 | 0 811 404 937 |
| **E, E1** | **NG27** |
| 4WRBKE27E250SJ–1X/6ZG24K31/A1D3M | 0 811 404 952 |
| 4WRBKE27E250SJ–1X/6ZG24EK31/A1D3M | 0 811 404 956 |
| 4WRBKE27E1-250SJ–1X/6ZG24K31/A1D3M | 0 811 404 953 |
| 4WRBKE27E1-250SJ–1X/6ZG24EK31/A1D3M | 0 811 404 957 |
| 4WRBKE27E430SJ–1X/6ZG24K31/A1D3M | 0 811 404 950 |
| 4WRBKE27E430SJ–1X/6ZG24EK31/A1D3M | 0 811 404 954 |
| 4WRBKE27E1-430SJ–1X/6ZG24K31/A1D3M | 0 811 404 951 |
| 4WRBKE27E1-430SJ–1X/6ZG24EK31/A1D3M | 0 811 404 955 |

| Type 4WRBKE | Material No. |
|---|---|
| **W, W1, R5** | **NG27** |
| 4WRBKE27W250SJ–1X/6ZG24K31/A1D3M | 0 811 404 960 |
| 4WRBKE27W250SJ–1X/6ZG24EK31/A1D3M | 0 811 404 964 |
| 4WRBKE27W1-250SJ–1X/6ZG24K31/A1D3M | 0 811 404 961 |
| 4WRBKE27W1-250SJ–1X/6ZG24EK31/A1D3M | 0 811 404 965 |
| 4WRBKE27W430SJ–1X/6ZG24K31/A1D3M | 0 811 404 958 |
| 4WRBKE27W430SJ–1X/6ZG24EK31/A1D3M | 0 811 404 962 |
| 4WRBKE27W1-430SJ–1X/6ZG24K31/A1D3M | 0 811 404 959 |
| 4WRBKE27W1-430SJ–1X/6ZG24EK31/A1D3M | 0 811 404 963 |
| 4WRBKE27R5-430SJ–1X/6ZG24EK31/A1D3M–903 | 0 811 404 969 |
| **E, E1, W, W1** | **NG35** |
| 4WRBKE35E1100SJ–1X/6ZG24K31/A1D3M | 0 811 404 975 |
| 4WRBKE35E1100SJ–1X/6ZG24EK31/A1D3M | 0 811 404 977 |
| 4WRBKE35E1-1100SJ–1X/6ZG24K31/A1D3M | 0 811 404 976 |
| 4WRBKE35E1-1100SJ–1X/6ZG24EK31/A1D3M | 0 811 404 978 |
| 4WRBKE35W1100SJ–1X/6ZG24K31/A1D3M | 0 811 404 979 |
| 4WRBKE35W1100SJ–1X/6ZG24EK31/A1D3M | 0 811 404 981 |
| 4WRBKE35W1-1100SJ–1X/6ZG24K31/A1D3M | 0 811 404 980 |
| 4WRBKE35W1-1100SJ–1X/6ZG24EK31/A1D3M | 0 811 404 982 |

## **Accessories** (not included in scope of delivery)

| Type | NG | Cheese-head bolts ISO 4762 | | Material No. |
|---|---|---|---|---|
|  | 10 | 4x M6x40 | | 2 910 151 209 |
| | 16 | 2x M6x45 | | 2 910 151 211 |
| | | 4x M10x50 | | 2 910 151 301 |
| | 27 | 6x M12x60 | | 2 910 151 354 |
| | 35 | 6x M20x90 | | 2 910 151 532 |
| * (see page 4)  | Plug-in connectors 2P+PE, see also RE 08008 | | KS | 1 834 482 022 |
| | | | KS | 1 834 482 026 |
| | | | MS | 1 834 482 023 |
| | | | MS | 1 834 482 024 |
| | | | KS 90° | 1 834 484 252 |
|  | ISA adapter for external solenoid switch-off, see page 12 | | | 1 834 484 245 |

## Testing and service equipment

Test box type VT-PE-TB3, see RE 30065
Test adapter 6P+PE type VT-PA-2, see RE 30068

## Function, sectional diagram

### General

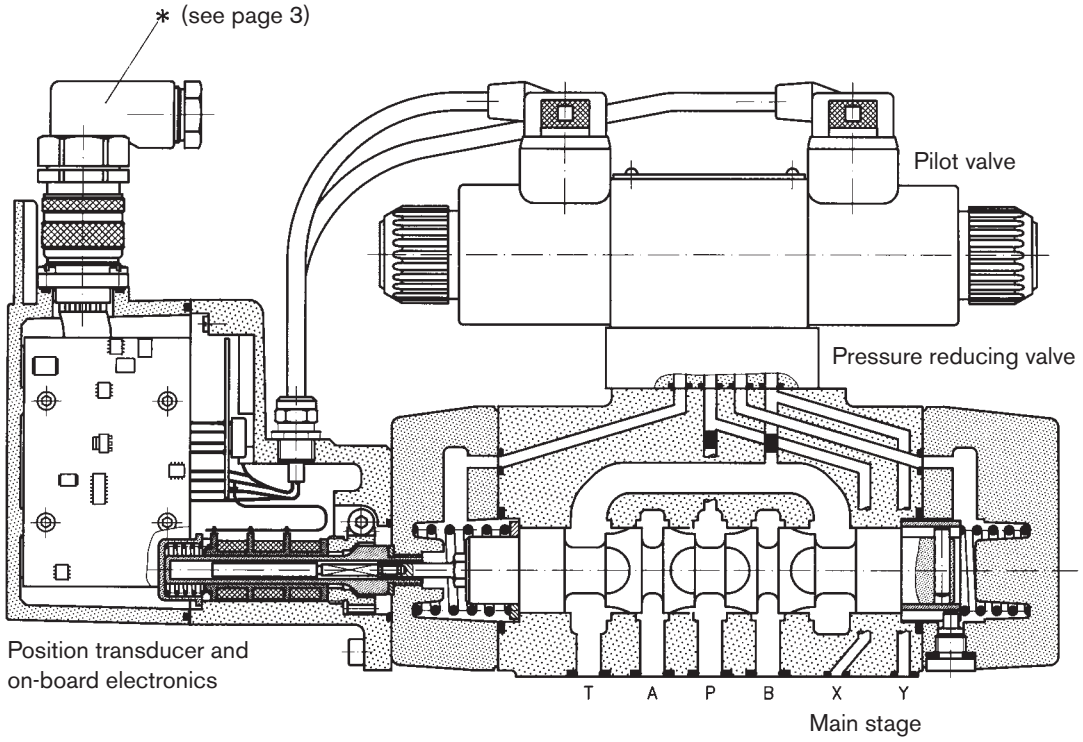
Type 4WRBKE proportional directional control valves are pilot operated with overlap on the main spool,
see symbols E., W. and R5 in mid position (page 6).
The pressure for the pilot valve is supplied via X and Y (external), but may also be delivered internally via the P–T connection (without plug). Here, please note $p_{max}$ in X and Y.
The valve electronics (OBE) are situated on the main stage and also incorporate the inductive position transducer. The main spool is position-controlled and the mechanical overlap is reduced in the electronics to ≦ ±5 % for the valve signal by means of a jump in compensation. The valves are calibrated at the factory (see characteristic curves), so that the manufacturing tolerance is extremely minimal. The main stage is pilot operated by a 4/3-way directional control valve without position control. The solenoid current “a” indirectly causes the deflection of the main spool P–A, while solenoid current “b” deflects the main spool P–B. This “Or function” enables the higher level switch-off of “a desired direction” by means of an ISA adapter (see page 12). With this function, the solenoid and main stage are protected at the same time. This feature can be employed e.g. for the “Emergency Stop function” or for “Setup” mode.

### Basic principle

Proportional directional control valves with symbols E., W. and R5 are available with $Q_A$:$Q_B$ in 1:1 or 2:1 versions. The position of the main spool is determined by the closed-loop controlled flow of control oil on the one hand, and by the return force of the spring on the other hand. During this process, the valve electronics regulate the force compensation for a precise spool position (hysteresis ≦ 0.3 %). Precise details are contained in the Technical Data (see page 8).
Switch-off behavior:
After electrical switch-off, both the pilot valve and the main stage move into the spring-centered mid position. The control oil at the main spool is relieved of pressure to T or Y.
Note:
– NG27 is a high-flow version with mounting hole configuration NG25
– NG35 is a high-flow version with mounting hole configuration NG32.

For high-flow versions, ports P, A, B and T may be larger in the customer’s control block.
The max. hole Ø are described in the dimensions of NG27 on page 20 and NG35 on page 21.

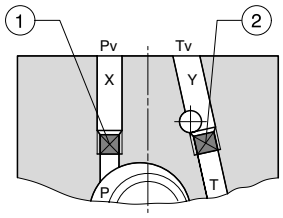
CE EN 61000-6-2: 2002-08
EN 61000-6-3: 2002-08




* 90° plug 1 834 484 252 should preferably be used, not included in scope of delivery.

## Control oil supply

**NG10, 27, 35**

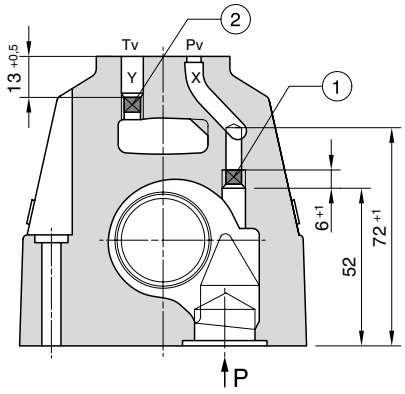



Plug ① ②

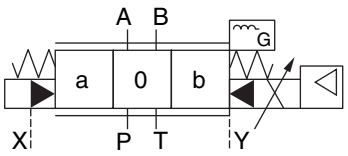
NG10...27 1 813 464 007 SW3

NG35 1 813 464 001 SW4

**NG16**




Type ... no code

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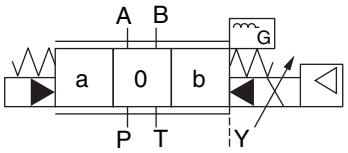


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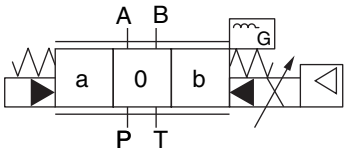
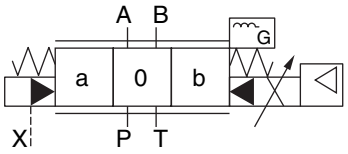
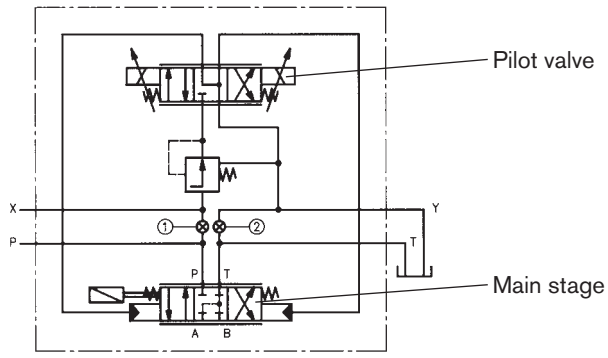



Type ... – ... T ...




| | |
|---|---|
| **No code =** | "x" = external, "y" = external |
| **E =** | "x" = internal, "y" = external |
| **ET =** | "x" = internal, "y" = internal |
| **T =** | "x" = external, "y" = internal |

Symbol in detail

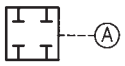



**Conversion**

The pilot valve can be supplied with oil both via ports X and Y (external) and from the main flow ducts P and T.
In the basic version, the valve is equipped with the plugs ① and ②, i.e. X and Y are external.
Valve versions with X and/or Y as internal (see ordering data) may be achieved by means of a conversion (see diagram above).
When the control oil supply or outlet is changed, the part number must also be changed.

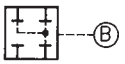
## Symbols in mid position “E”, “W”, “R5”

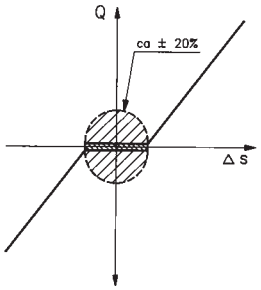
“E”




or

“W”/“R5”




**Spool valves with overlap**

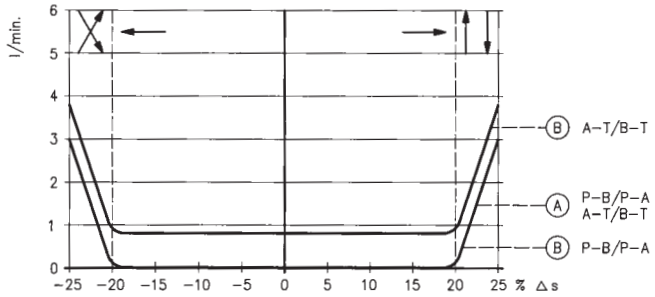
With symbol “E”, leakage oil in the two work chambers A and B of the control piston results in a buildup of pressure in A or B, which then causes a connecting cylinder to drift out of position.
In many cases, the “W” or “R5” symbol is a better solution.
With a setpoint of “0”, the control piston moves into the overlapped mid position.
In this mid position, ports A and B are then relieved of pressure with small openings to T.
This also supports the function of external check valves.

**Flow in mid position**
**“leakage pressure relief”**

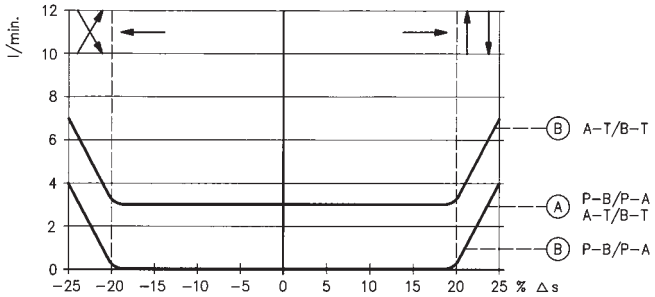
$Q = f(\Delta s)$
0 ... ± 25 %

$$Q_X = Q_{nom} \cdot \sqrt{\frac{\Delta p_X}{5\ bar}}$$

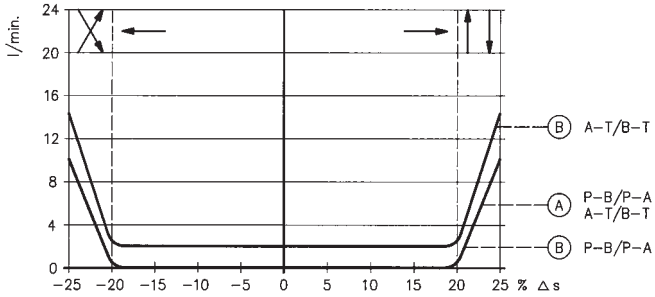
**NG10**



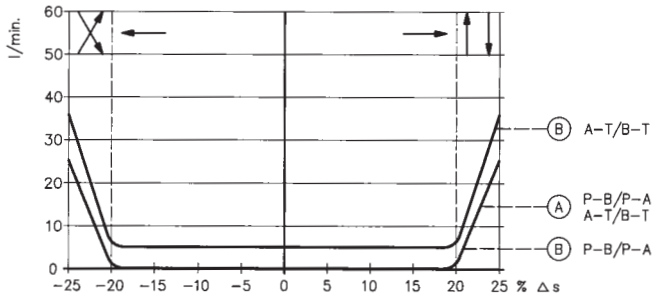

**NG16**




**NG27**




**NG35**

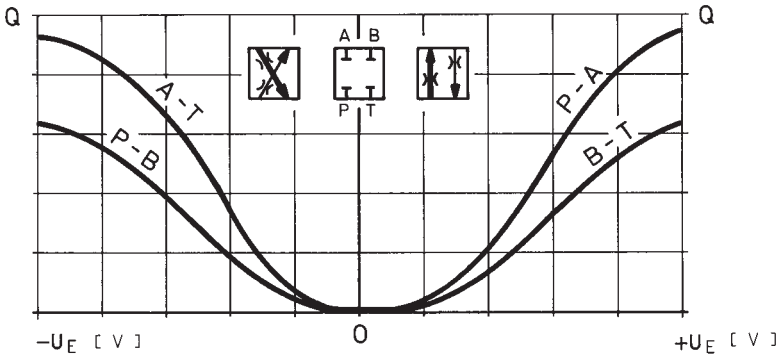


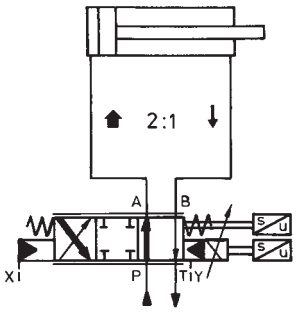
## Valve spools

**Asymmetrical valve spools**

$Q_A : Q_B = 2:1$

The two throttling cross-sections of proportional directional control valves are usually symmetrical.
In order to adapt to differential cylinders with different surface areas, valve spools with asymmetrical metering edges are available.
A comparison of the flow rates can be found in the product range overview “Preferred types, characteristic curves”.



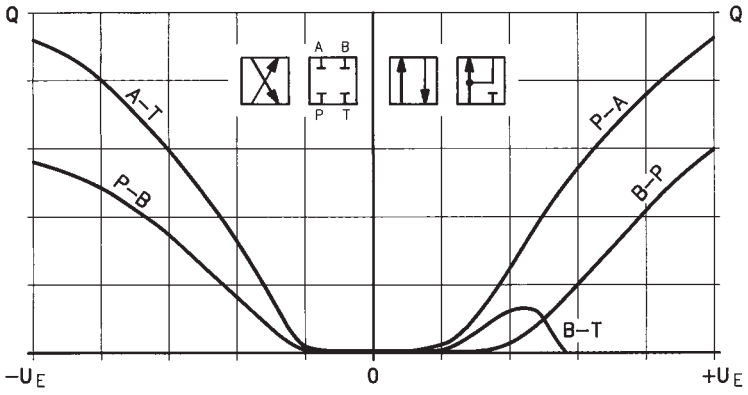



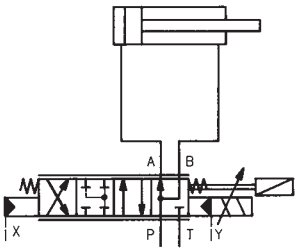

**Valve spools in a differential circuit, symbol “R5”**

$Q_A : Q_B = 2:1$

In order to produce differential circuits, valve spools with an additional “4th position” are available (see diagram).
A check valve must be installed in the consumer lines, but not in the case of symbol B–P with internal connection.

We recommend that you consult the BRH Application Center with regard to using these special symbols for your application. As a rule, a simulation or knowledge of this type of system is required.



## Technical data

### General

| | | |
|---|---|---|
| Construction | | Spool type valve, pilot operated |
| Actuation | | Pilot operated, proportional 4/3 directional control valve NG6 without position control |
| Main stage | | Position-controlled, with OBE on the main stage |
| Type of mounting | | Subplate, mounting hole configuration to ISO 4401 |
| Installation position | | Optional |
| Ambient temperature range | °C | –20...+50 |
| Vibration resistance, test condition | | Max. 25 $g$, shaken in 3 dimensions (24 h) |

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

| | | |
|---|---|---|
| Pressure fluid | | Hydraulic oil to DIN 51524...535, other fluids after prior consultation |
| Viscosity range | recommended mm²/s | 20...100 |
| | max. permitted mm²/s | 10...800 |
| Pressure fluid temperature range | °C | –20...+70 |
| Max. permitted degree of contamination of pressure fluid Purity class to ISO 4406 (c) | | Class 18/16/13 [1] |
| Direction of flow | | See symbol |

| | | NG10 | NG16 | NG27 | NG35 |
|---|---|---|---|---|---|
| Nominal flow rate at $\Delta p = 5$ bar per edge [2] | l/min | 85 | 180 | 430 | 1100 |
| Weight | kg | 9.1 | 11 | 18.8 | 80.8 |
| Max. working pressure in P, A, B | bar | 350 | 350 | 280 | 350 |
| Max. pressure in X (ext.) | bar | 280 | | | |
| Max. pressure in P (X = int.) | bar | 280 | | | |
| Max. pressure in T (Y = ext.) | bar | 250 | | | |
| Max. pressure in T (Y = int.) | bar | 50 | | | |
| Max. pressure in Y (ext.) | bar | 50 | | | |
| Min. control oil pressure of "pilot stage" | bar | 15 | | | |
| $Q_{max}$ | l/min | 170 | 450 | 1200 | 3000 |
| $Q_N$ pilot valve (supply pressure) $\Delta p = 5$ bar | l/min | 5 | 6.5 | 22 | 22 |
| Leakage of pilot valve at 100 bar | cm³/min | <240 | <260 | <300 | <300 |
| Leakage of main stage Sb E at 100 bar $Q_N$: Sb W/R5, see page 6 | l/min | <0.25 | <0.4 | <0.6 | <1.2 |

### Static/Dynamic

| | | | | | |
|---|---|---|---|---|---|
| Overlap in mid position | | ≈ 18...22 % of spool stroke, electrically compensated for $U_{D-E}$ ±0.5 V | | | |
| Spool stroke, main stage | ±mm | 4 | 7 | 10 | 12.5 |
| Control oil volume of main stage 100 % | cm³ | 1.1 | 4.3 | 11.3 | 41.5 |
| Control oil requirement 0...100 %, x = 100 bar | l/min | 2.2 | 4.7 | 11.7 | 15.6 |
| Hysteresis | % | <0.3 | | | |
| Positioning accuracy | % | <0.5 | | | |
| Manufacturing tolerance | % | <±5 | | | |
| Response time for signal change 0...100 % (x = 100 bar) | ms | <35 | <55 | <60 | <140 |
| Switch-off behavior | | After electrical shut-off (pilot valve in mid position), the main stage moves to spring-centered mid position (Sb E., W or R5) | | | |
| Thermal drift | | <1 % at $\Delta T = 40\,°C$ | | | |
| Calibration | | Factory-set ±1 %, see flow curves | | | |

[1] 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.

[2] Flow rate at a different $\Delta p$

$$Q_X = Q_{nom} \cdot \sqrt{\frac{\Delta p_X}{5}}$$

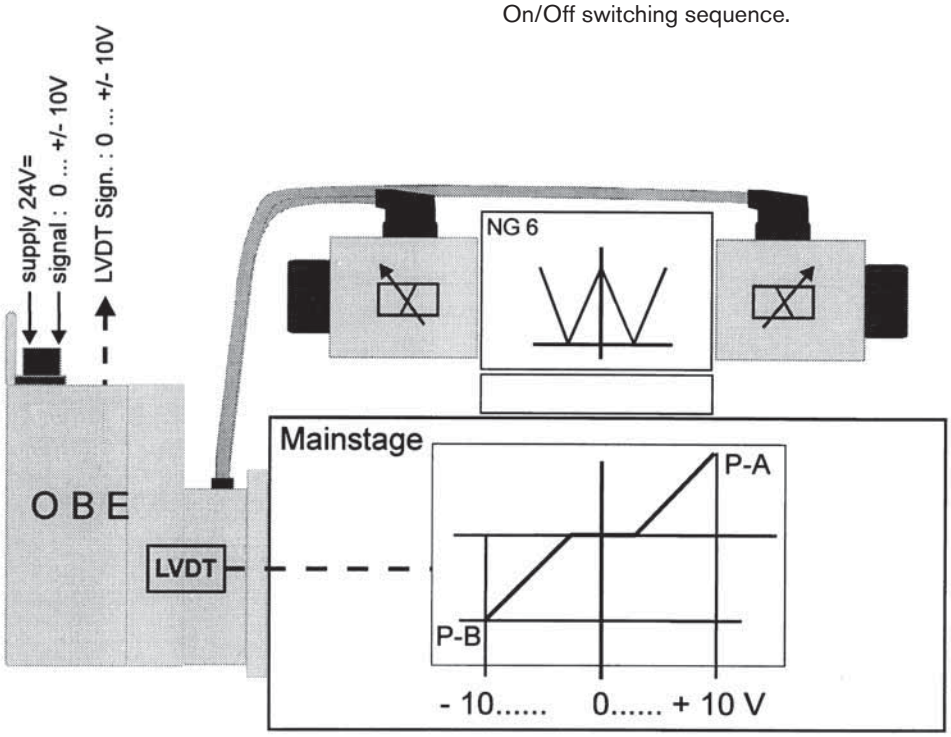
## Technical data

| **Electrical,** valve with on-board electronics | |
|---|---|
| Cyclic duration factor % | 100 |
| Degree of protection | IP 65 to DIN 40050 and IEC 14434/5 |
| Connection | Plug-in connector 6P+PE, DIN 43563 |
| Power supply<br>Terminal A:<br>Terminal B: 0 V | 24 V $DC_{nom}$<br>min. 21 V DC/max. 40 V DC<br>Ripple max. 2 V DC |
| Power consumption | 40 VA max. |
| External fuse | 2.5 $A_F$ |
| Input, “Standard” version<br>Terminal D: $U_{D-E}$<br>Terminal E: | Differential amplifier, $R_i = 100\ k\Omega$<br>0...±10 V<br>0 V |
| Max. differential input voltage at 0 V | D → B<br>E → B } max. 18 V DC |
| Test signal, “Standard” version<br>Terminal F: $U_{Test}$<br>Terminal C: | LVDT<br>0...±10 V<br>Reference 0 V |
| Protective conductor and screen | See pin assignment (installation conforms to CE) |
| Recommended cable | See pin assignment<br>up to 20 m 7 x 0.75 $mm^2$<br>up to 40 m 7 x 1 $mm^2$ |
| Calibration | Overlap and $Q_{P-A}$ at +8 V calibrated at the factory, see valve characteristic curve |
| Conformity | CE EN 61000-6-2: 2002-08<br>EN 61000-6-3: 2002-08 |

**Note**

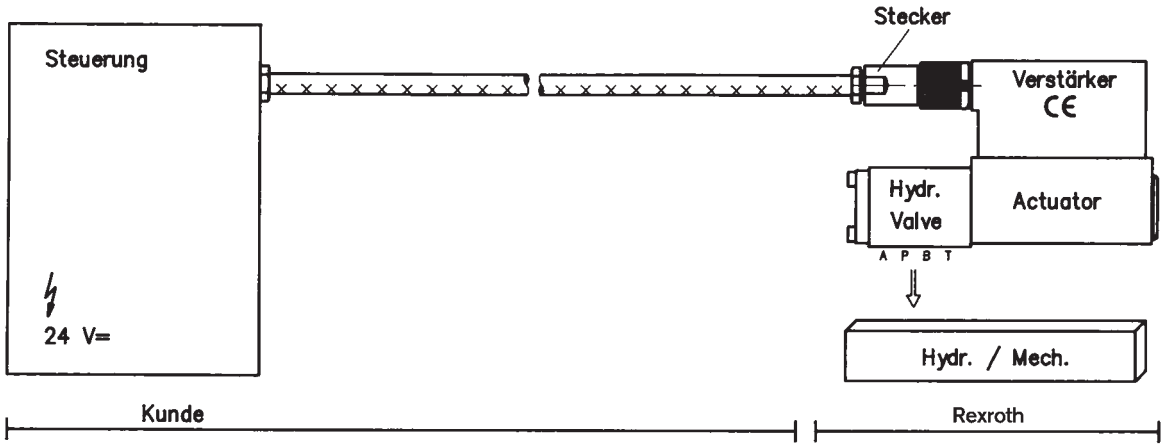
Pilot operated proportional directional control valves with positive overlap perform their function in open or closed-loop-controlled axes and have approx. 20 % overlap when switched off.

This state does not constitute a safe, active basic position. For this reason, many applications require the use of “external check valves” or – in the case of this valve – the ISA adapter on the solenoid, which must be taken into account during the On/Off switching sequence.



## Connection

For electrical data, see page 9 and
Operating Instructions **1 819 929 083**




## Technical notes on the cable

**Version:**
- Multi-wire cable
- Extra-finely stranded wire to VDE 0295, Class 6
- Protective conductor, green/yellow
- Cu braided screen

**Types:**
- e.g. Ölflex-FD 855 CP (from Lappkabel company)

**No. of wires:**
- Determined by type of valve, plug types and signal assignmen

**Cable Ø:**
- 0.75 $mm^2$ up to 20 m long
- 1.0 $mm^2$ up to 40 m long

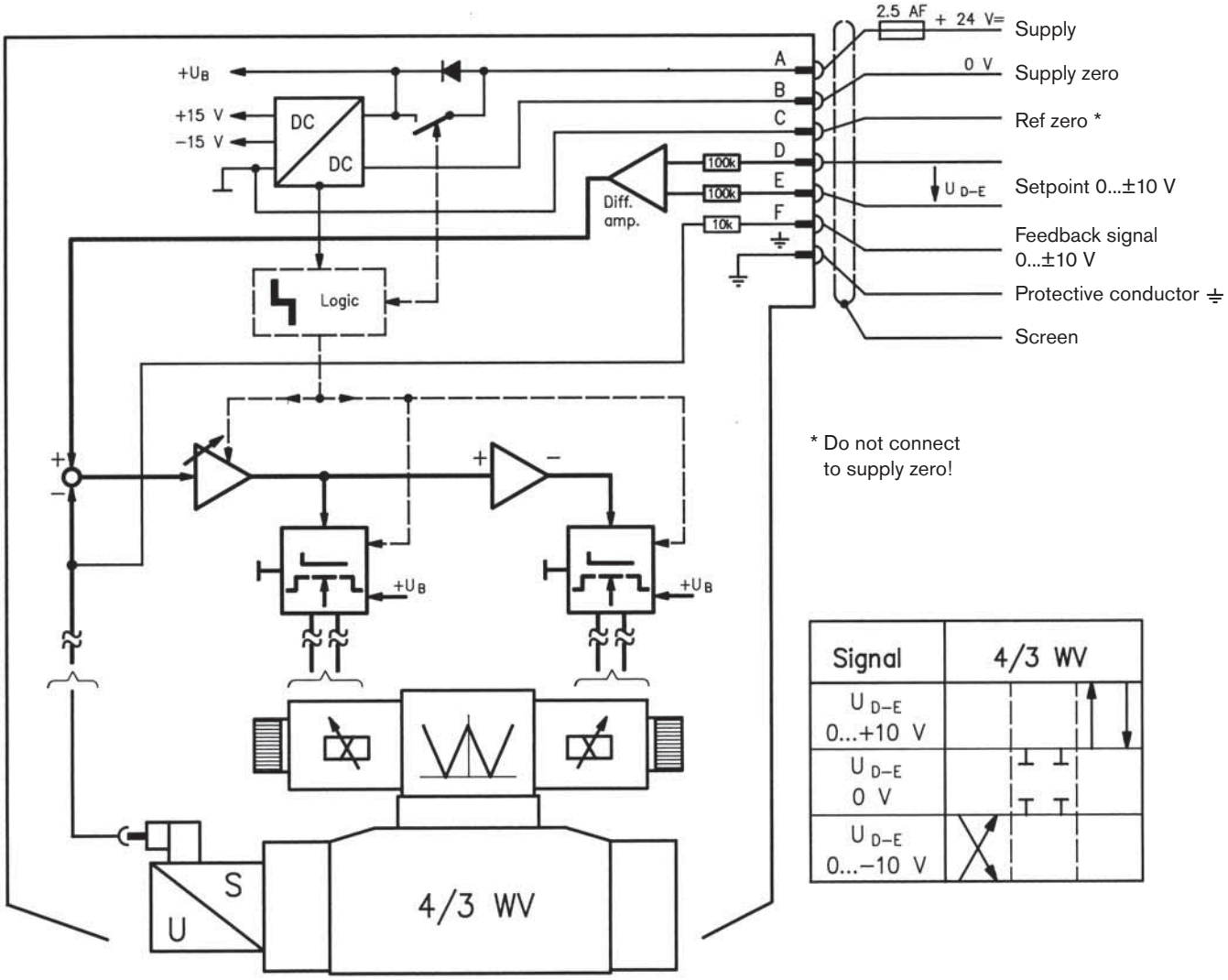
**Outside Ø:**
- 9.4...11.8 mm – Pg11
- 12.7...13.5 mm – Pg16

## Note

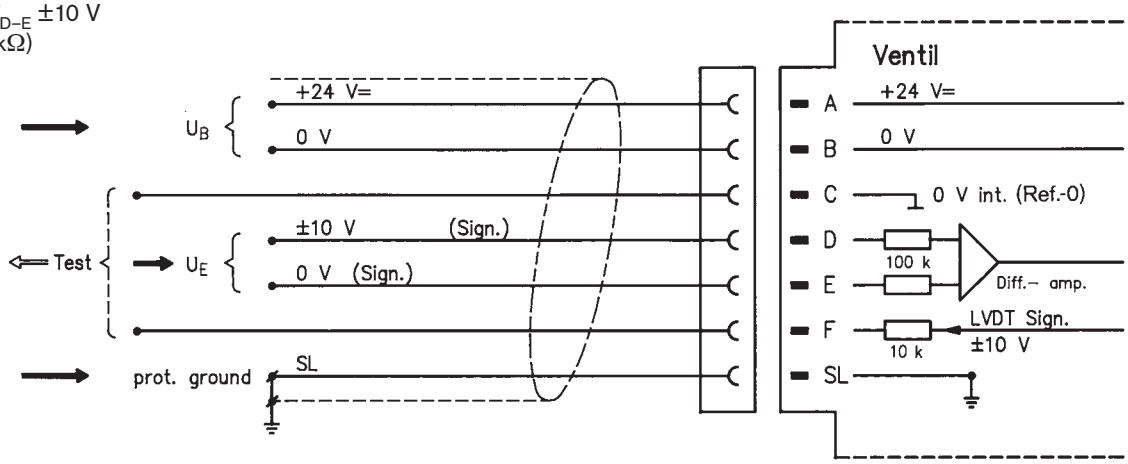
Voltage supply 24 V DC nom.,
if voltage drops below 18 V DC, rapid shutdown resembling "Enable OFF" takes place internally.
In addition, with the "mA signal" version:
$I_{D-E} \geqq 3$ mA – valve is active
$I_{D-E} \leqq 2$ mA – valve is deactivated.
Electrical signals emitted via the trigger electronics (e.g. feedback signal) must not be used to shut down safety-relevant machine functions! (See European Standard, "Technical Safety Requirements for Fluid-Powered Systems and Components – Hydraulics", EN 982).

## On-board trigger electronics

**Block diagram/pin assignment**
Version: $U_{D-E}$ ±10 V

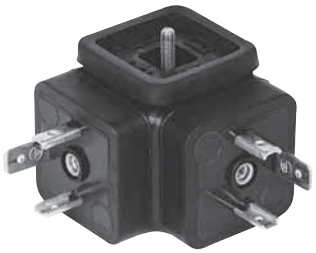



**Pin assignment**
Version: $U_{D-E}$ ±10 V
($R_i$ = 100 kΩ)

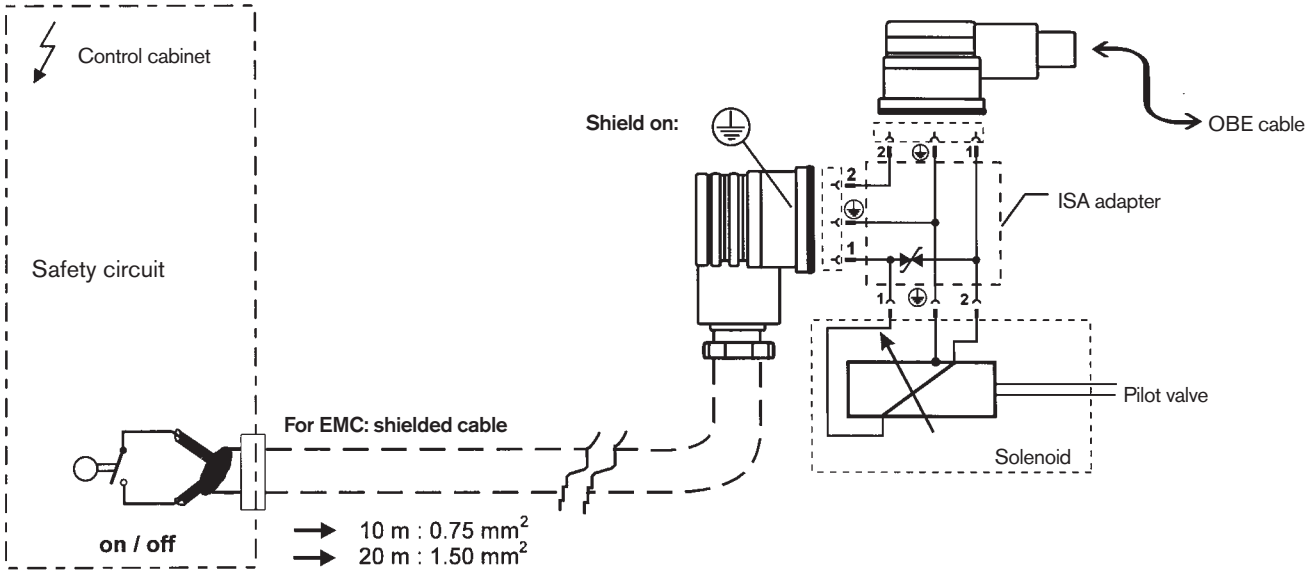


## **Accessories for external switch-off** (ISA adapter)

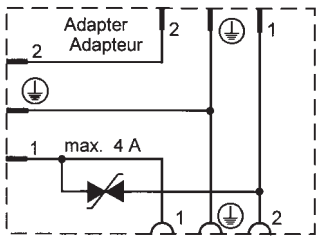
**Function**
**I**nterrupt **S**afety **A**dapter, protective circuit and plug connection for external solenoid switch-off (Emergency Off circuit).



**Circuit with ISA adapter**



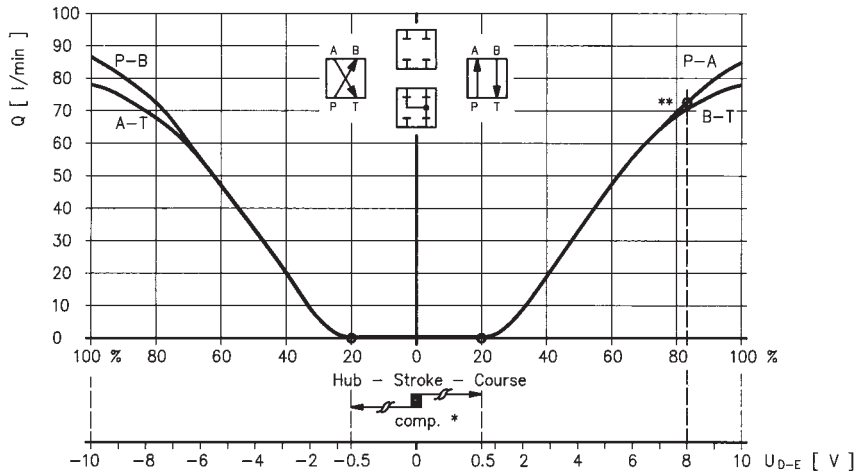

**Note**
The manufacturer of the complete system is responsible for ensuring that installation conforms to EMC guidelines.

| Symbol | Application | kg | Material No. |
|---|---|---|---|
|   | ISA adapter for Rexroth control solenoids up to 50 VA | 0.07 | 1 834 484 245 |

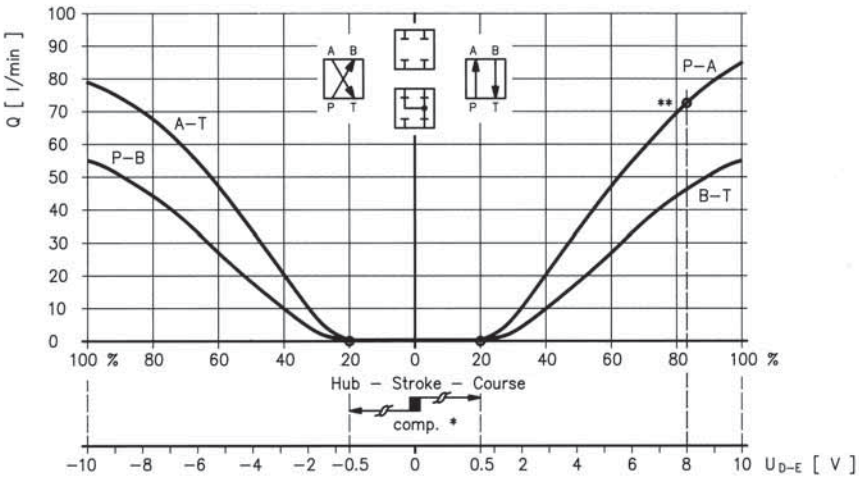
## Characteristic curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

**NG10**
$\Delta p = 5$ bar
$v = 36$ mm²/s

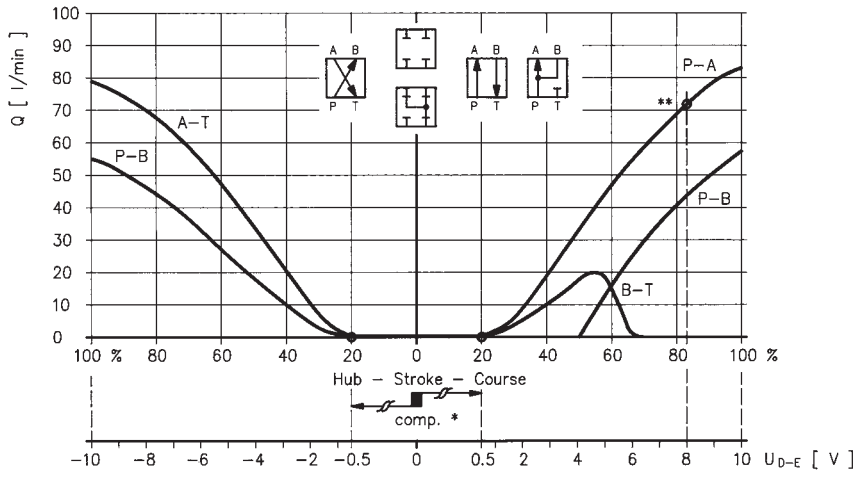
$Q_A : Q_B = 85 : 85$ l/min




$Q_A : Q_B = 85 : 55$ l/min




$Q_A : Q_B = 85 : 55$ l/min



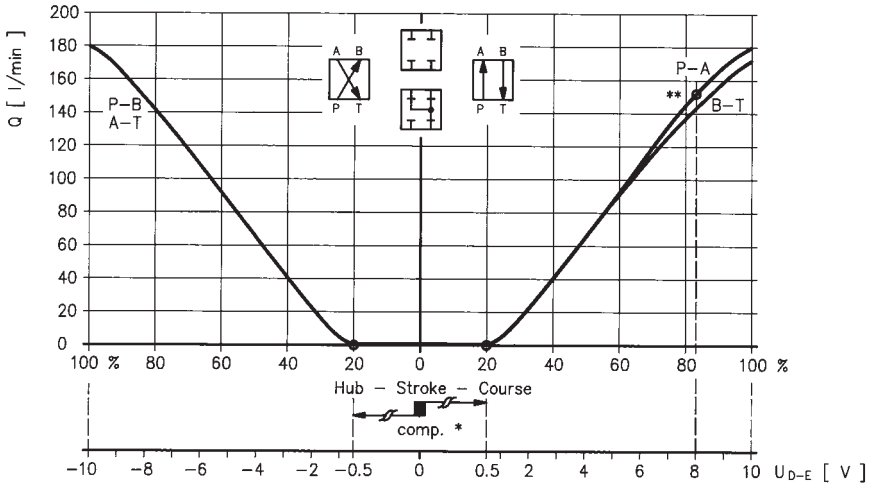

* Comp. $U_{D-E}$ ±0.5 V
Factory setting ±1 %

** $Q_{P-A}$ at + 8 V [$U_{D-E}$]
Manufacturing tolerance $Q_{max} \leqq \pm 5\,\%$

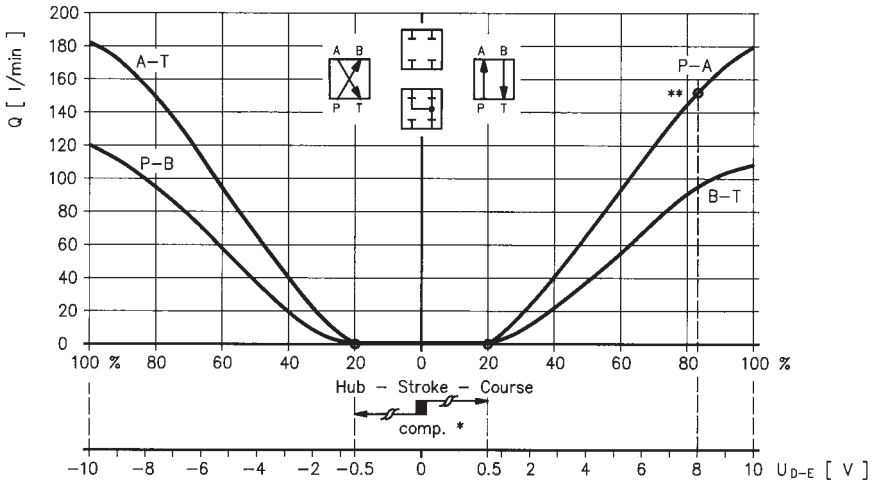
## **Characteristic curves** (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

**NG16**
$\Delta p = 5$ bar
$v = 36$ mm²/s

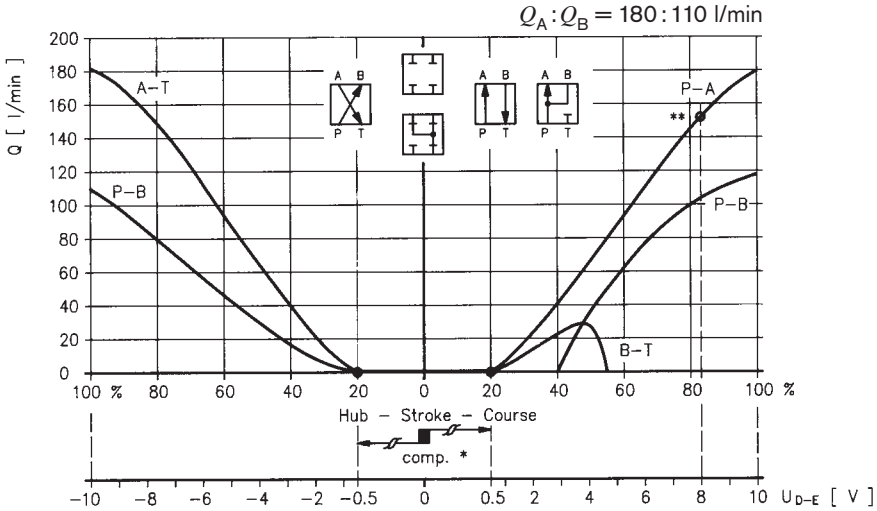
$Q_A : Q_B = 180 : 180$ l/min




$Q_A : Q_B = 180 : 110$ l/min




$Q_A : Q_B = 180 : 110$ l/min



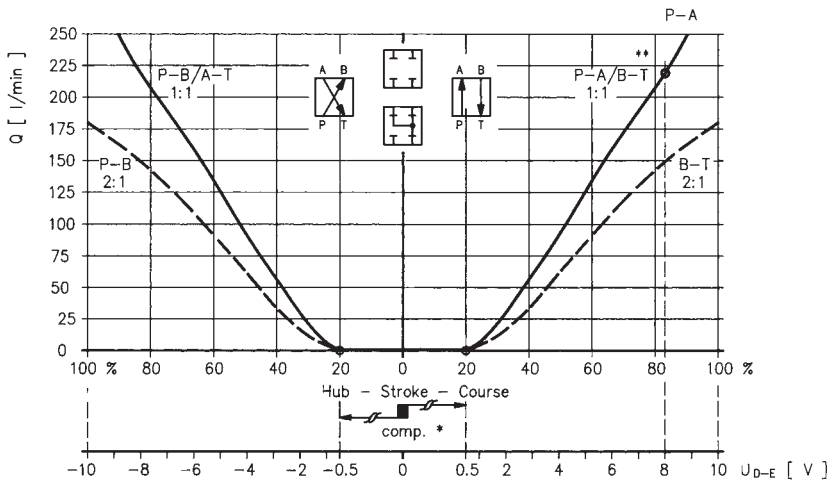

* Comp. $U_{D-E}$ ±0.5 V
Factory setting ±1 %

** $Q_{P-A}$ at + 8 V [$U_{D-E}$]
Manufacturing tolerance $Q_{max} \leqq \pm 5\,\%$

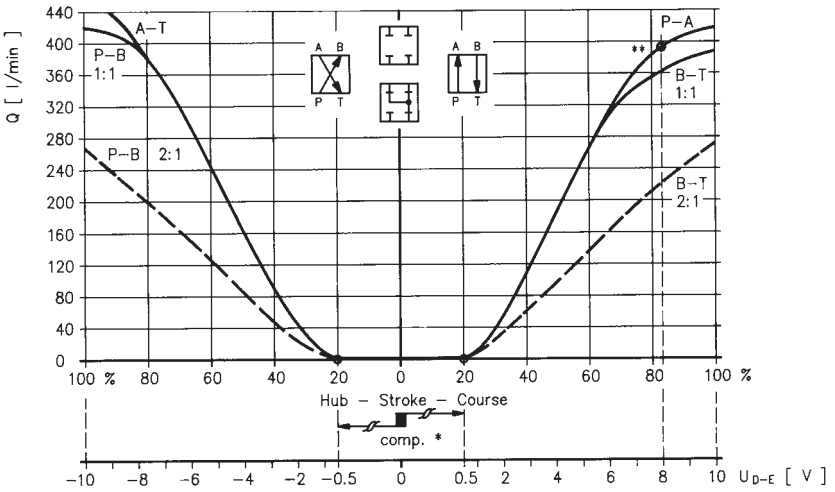
## Characteristic curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

**NG27**
$\Delta p = 5$ bar
$v = 36$ mm²/s

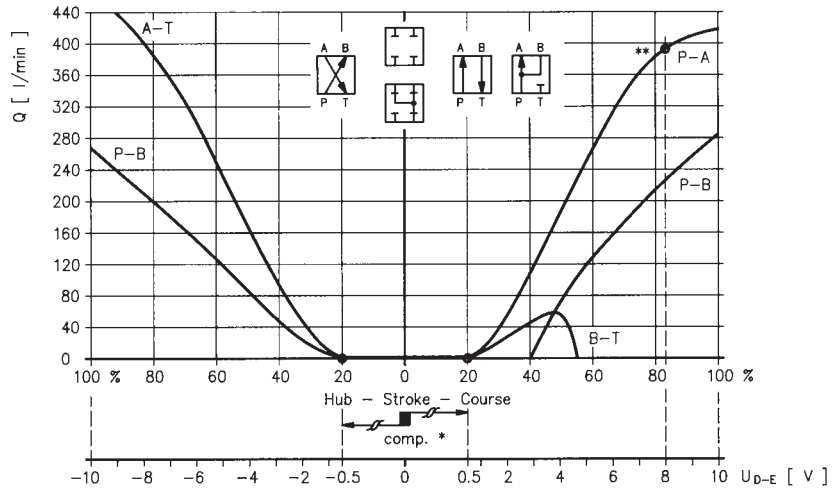
$Q_A : Q_B = 250 : 250$ l/min
$Q_A : Q_B = 250 : 170$ l/min




$Q_A : Q_B = 430 : 430$ l/min
$Q_A : Q_B = 430 : 250$ l/min




$Q_A : Q_B = 430 : 430$ l/min
$Q_A : Q_B = 430 : 250$ l/min



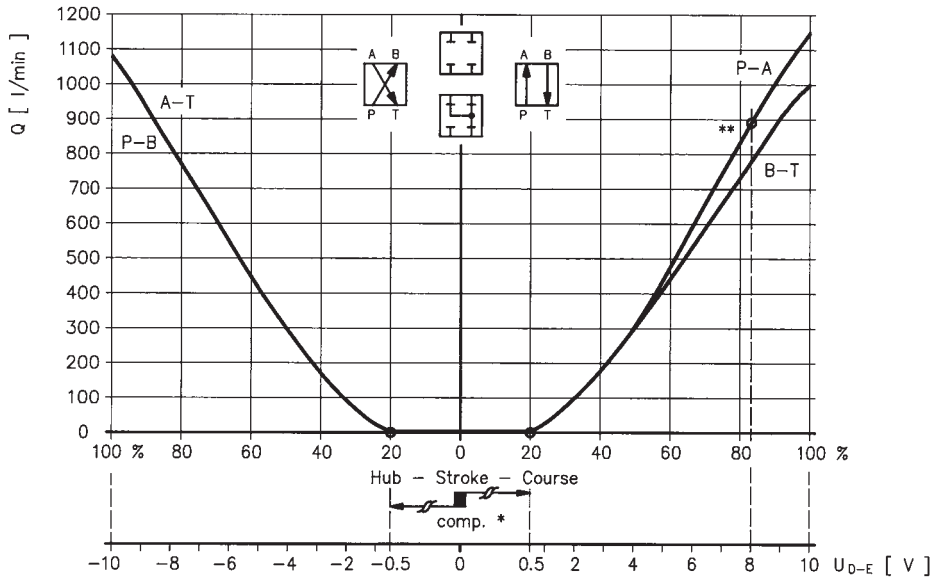

* Comp. $U_{D-E}$ ±0.5 V
Factory setting ±1 %

** $Q_{P-A}$ at + 8 V [$U_{D-E}$]
Manufacturing tolerance $Q_{max} \leqq \pm 5\,\%$

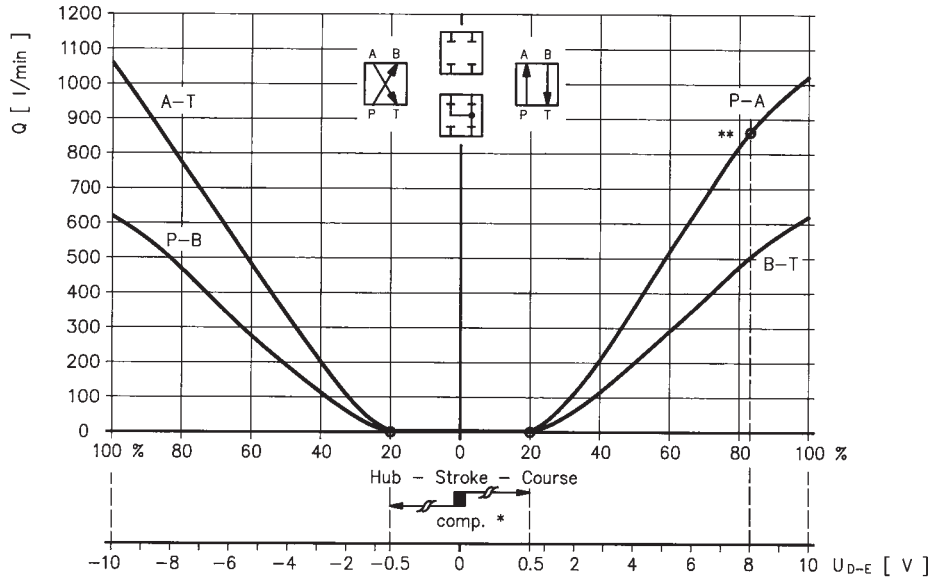
## **Characteristic curves** (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

**NG35**
$\Delta p = 5$ bar
$v = 36$ mm²/s

$Q_A : Q_B = 1100 : 1100$ l/min




$Q_A : Q_B = 1100 : 600$ l/min




* Comp. $U_{D-E}$ ±0.5 V
Factory setting ±1 %

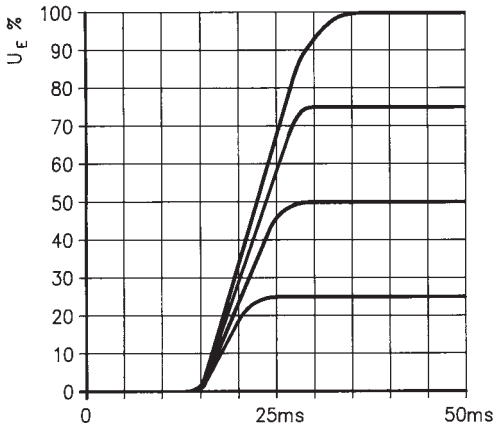
** $Q_{P-A}$ at + 8 V [$U_{D-E}$]
Manufacturing tolerance $Q_{max} \leqq \pm 5\,\%$

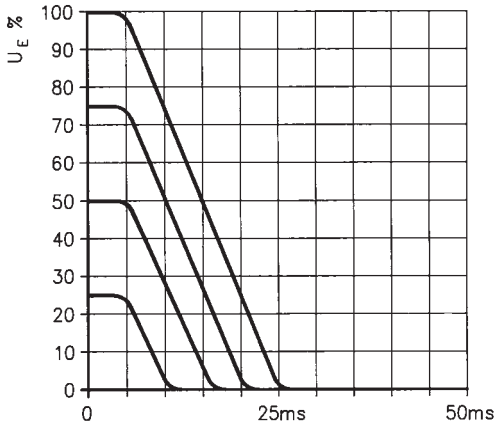
## Characteristic curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

**Response time x = 100 bar**

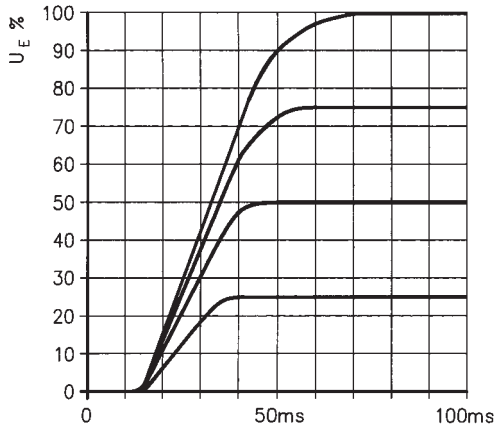
**Open** **Close**

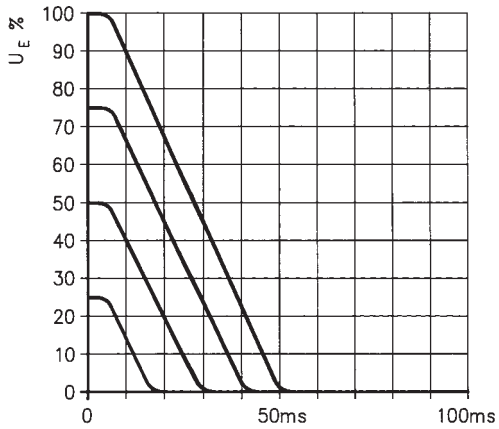
**NG10**



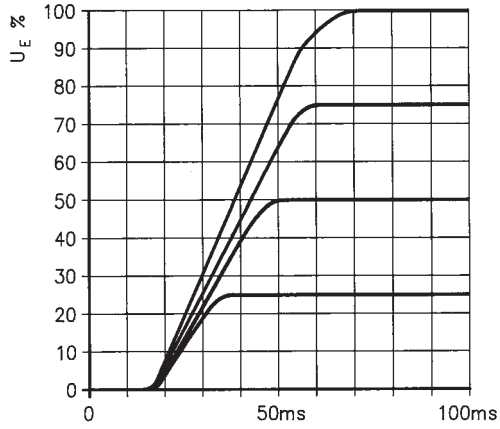



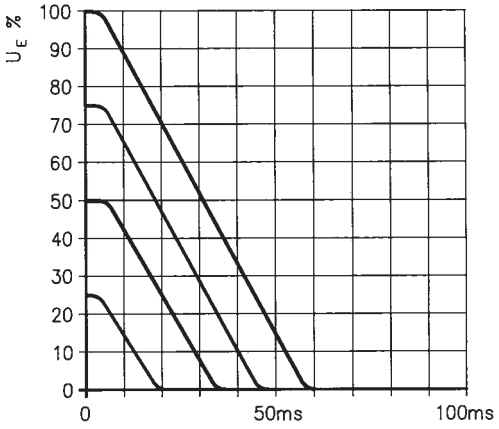

**NG16**



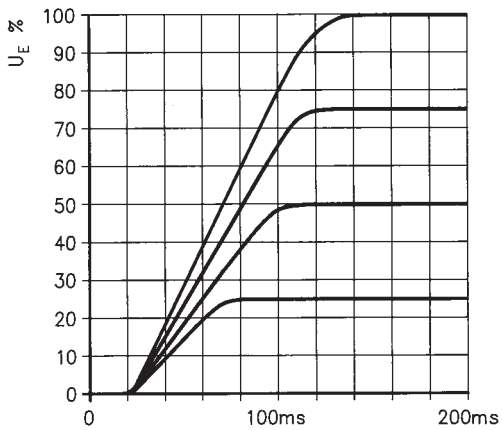



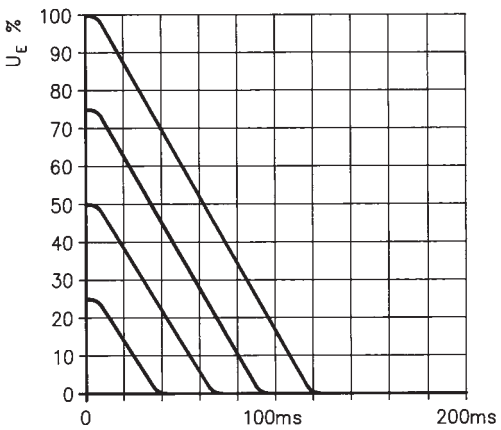

**NG27**



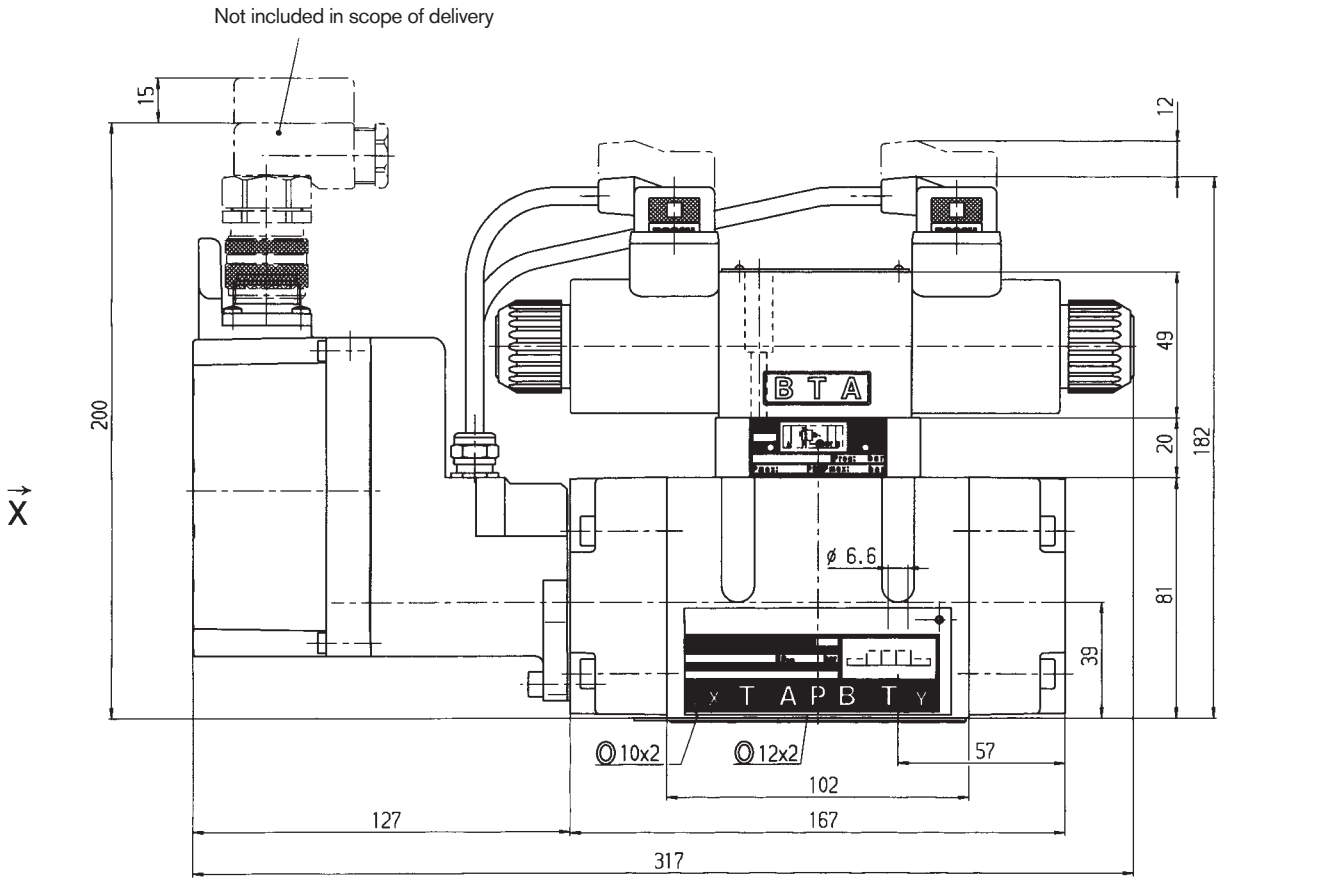




**NG35**

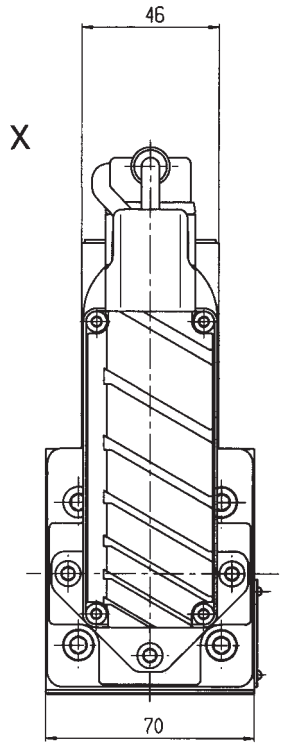


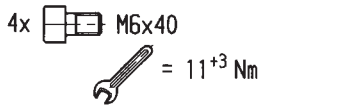



## **Unit dimensions NG10** (nominal dimensions in mm)




O Set **1817010280**

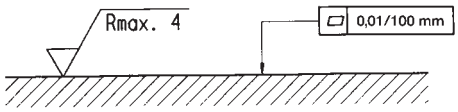


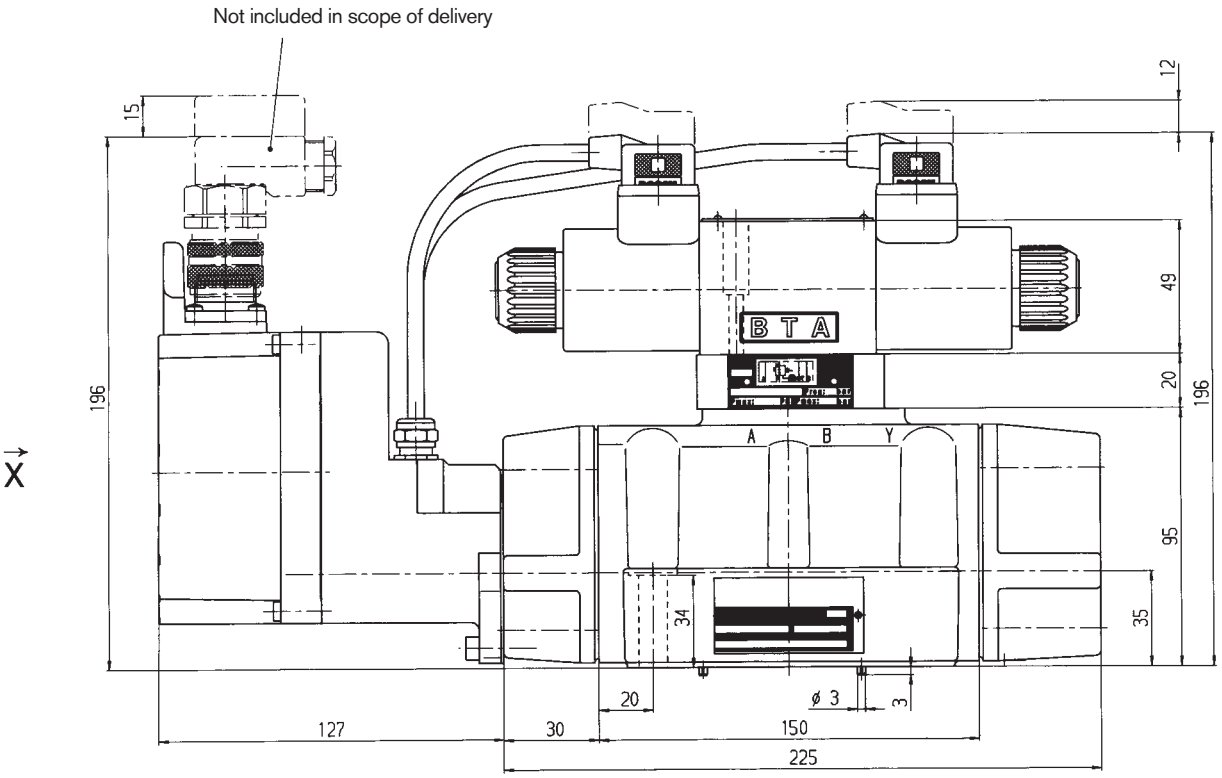

**2910151209**

**Mounting hole configuration:**
**NG10** (ISO 4401-05-05-0-94),
see page 22
For subplates, see catalog sheet RE 45055

Required surface quality
of mating component



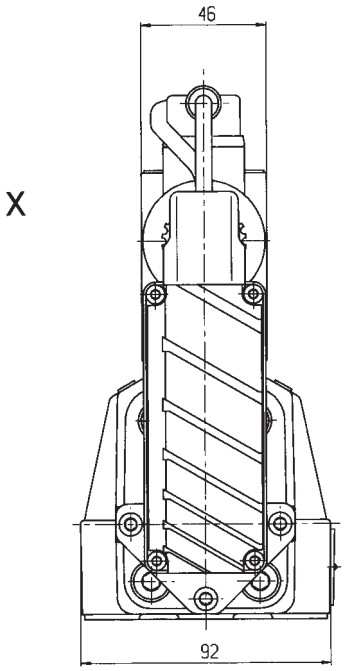
## **Unit dimensions NG16** (nominal dimensions in mm)




- X, Y Ø 9 x 2
- P, A, B, T Ø 23 x 2.5
- Set **1817010275**

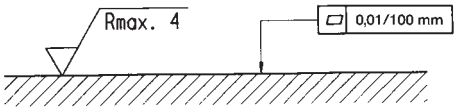
2 x M 6 x 45 — 11 Nm
4 x M 10 x 50 — 40 Nm

M 6 x 45 **2910151211**
M 10 x 50 **2910151301**

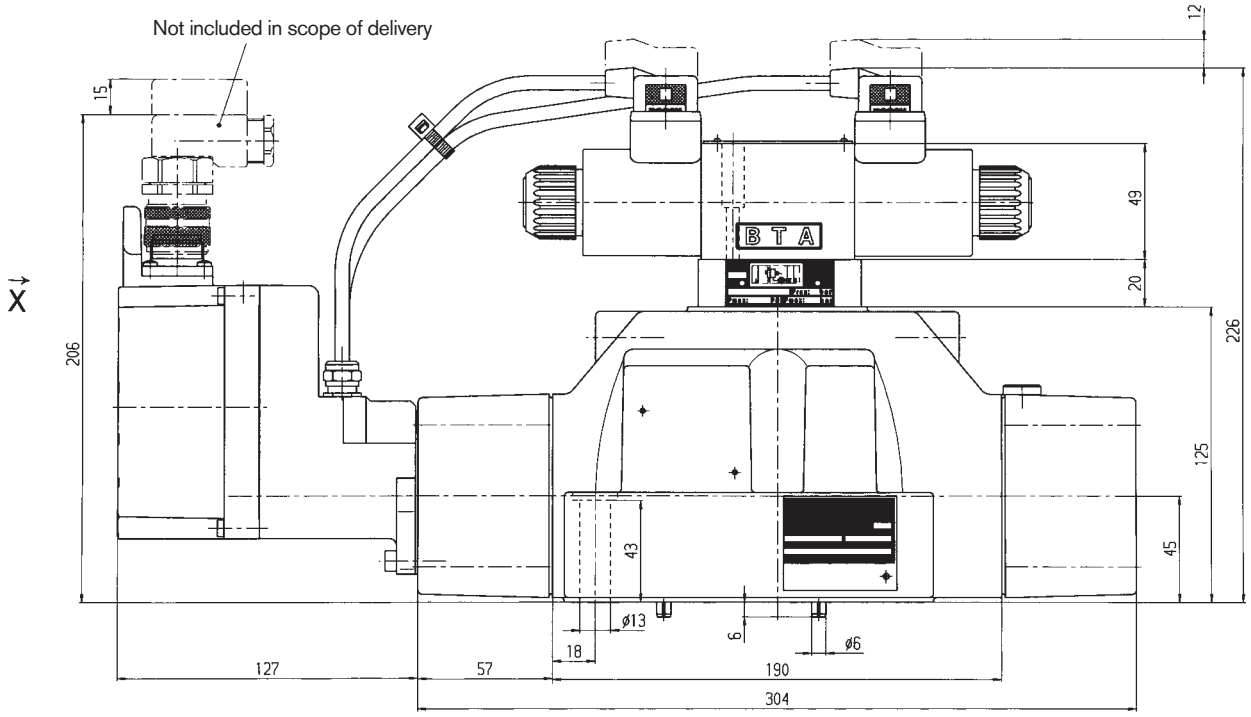



**Mounting hole configuration:**
**NG16** (ISO 4401-07-06-0-94),
see page 22
For subplates, see catalog sheet RE 45057

Required surface quality of mating component

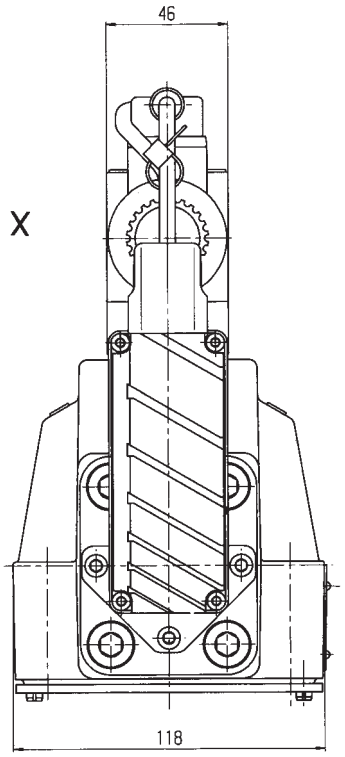


## **Unit dimensions NG27** (nominal dimensions in mm)




- X, Y Ø 15 x 2,5
- P, A, B, T Ø 34.6 x 2.62
- Set **1 817 010 344**

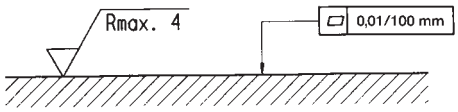
6 x M 12 x 60
= 90$^{+30}$ Nm
**2910151354**



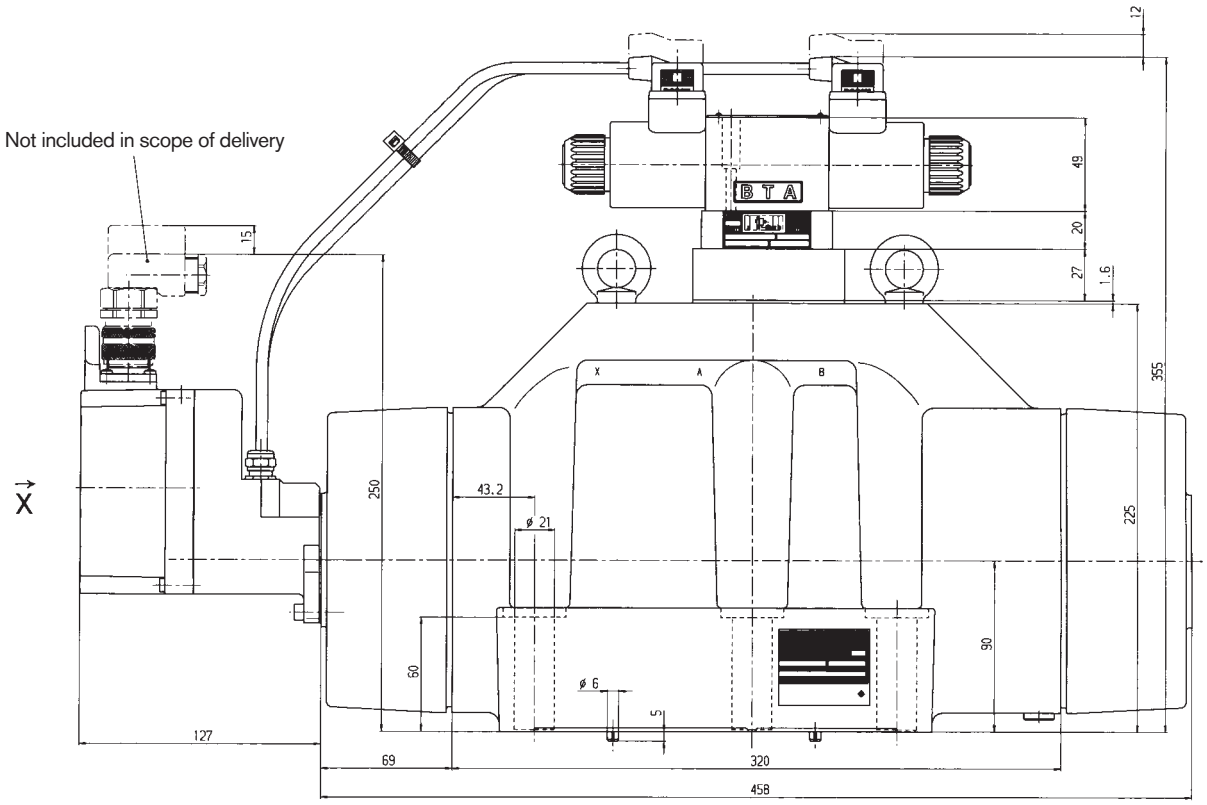

**Note**
NG27 is a high-flow version of NG25, holes P, A, B and T have a diameter of 32 mm in the main stage. Contrary to the standard, ports P, A, B and T may have a max. diameter of 32 mm in the control block. The control block with Ø 32 mm holes and the NG27 valve together achieve higher flow rates at a low $\Delta p$.

**Mounting hole configuration:**
**NG25** (ISO 4401-08-07-0-94),
see page 23
For subplates, see catalog sheet RE 45059

Required surface quality of mating component

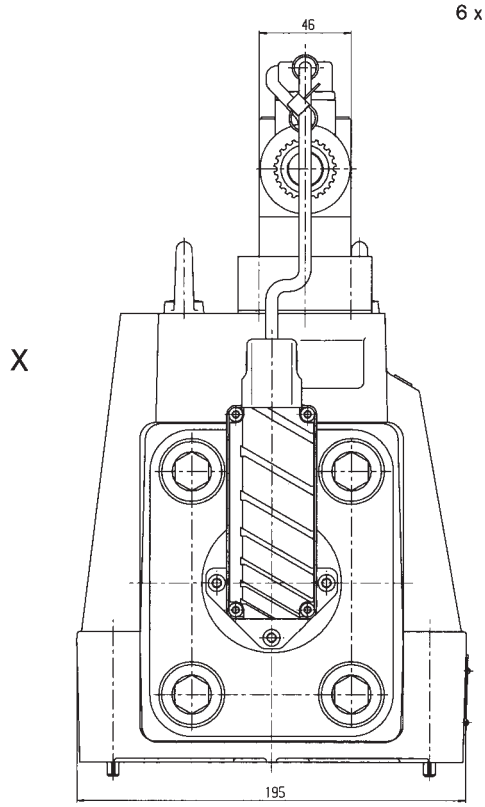


## Unit dimensions NG35 (nominal dimensions in mm)




- X, Y Ø 14 x 2,5
- P, A, B, T Ø 53.57 x 3.53
- Set **1817 010 297**

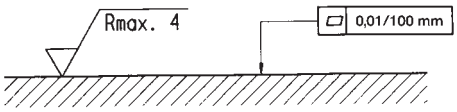
6 x M 20 x 90
= 450$^{+110}$ Nm
**2910 151 532**




**Note**
NG35 is a high-flow version of NG32, holes P, A, B and T have a diameter of 50 mm in the main stage. Contrary to the standard, ports P, A, B and T may have a max. diameter of 48 mm in the control block. The control block with Ø 48 mm holes and the NG35 valve together achieve higher flow rates at a low $\Delta p$.

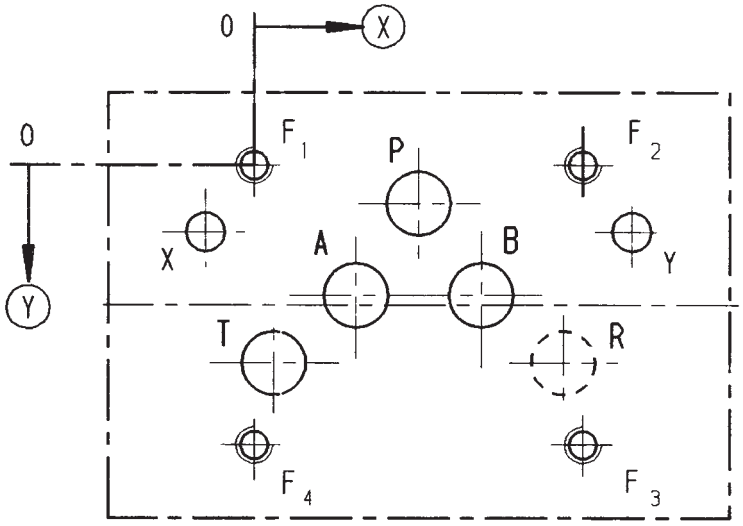
**Mounting hole configuration: NG32**
(ISO 4401-10-08-0-94),
see page 23
For subplates, see catalog sheet RE 45060

Required surface quality of mating component



## **Mounting hole configurations** (nominal dimensions in mm)

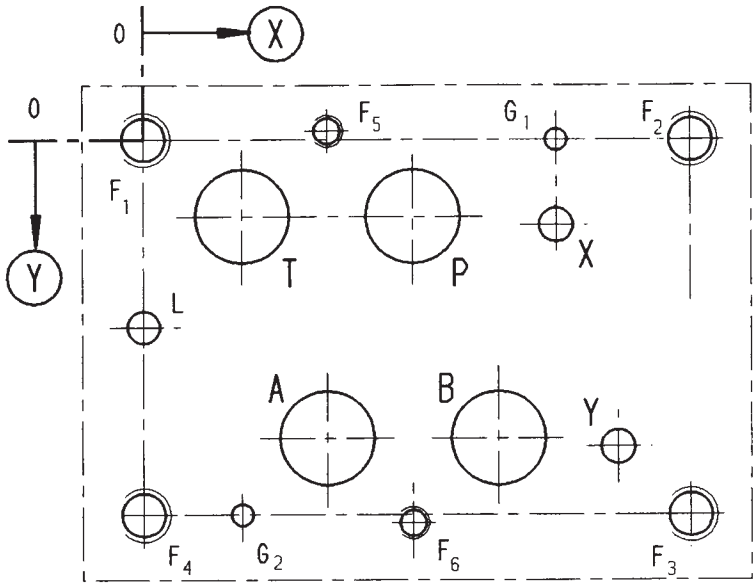
**NG10 – ISO 4401-05-05-0-94**




1) Deviates from standard
2) Thread depth:
Ferrous metal 1.5 x Ø*
Non-ferrous 2 x Ø
* (NG10 min. 10.5 mm)

| | P | A | T | B | $F_1$ | $F_2$ | $F_3$ | $F_4$ | X | Y | R |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ⓧ | 27 | 16.7 | 3.2 | 37.3 | 0 | 54 | 54 | 0 | –8 | 62 | 50.8 |
| Ⓨ | 6.3 | 21.4 | 32.5 | 21.4 | 0 | 0 | 46 | 46 | 11 | 11 | 32.5 |
| ∅ | 10.5[1)] | 10.5[1)] | 10.5[1)] | 10.5[1)] | M6[2)] | M6[2)] | M6[2)] | M6[2)] | 6.3 | 6.3 | 10.5[1)] |

**NG16 – ISO 4401-07-06-0-94**

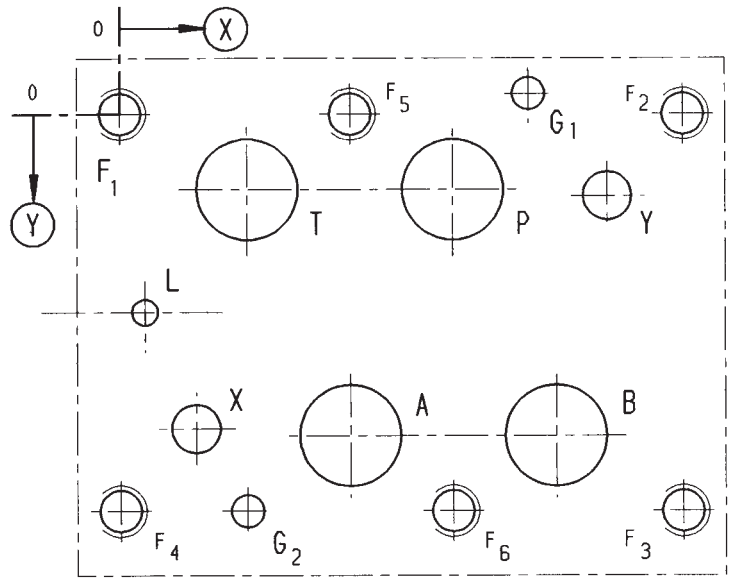



1) Deviates from standard
2) Thread depth:
Ferrous metal 1.5 x Ø
Non-ferrous 2 x Ø

| | P | A | T | B | L | X | Y | $G_1$ | $G_2$ | $F_1$ | $F_2$ | $F_3$ | $F_4$ | $F_5$ | $F_6$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ⓧ | 50 | 34.1 | 18.3 | 65.9 | 0 | 76.6 | 88.1 | 76.6 | 18.3 | 0 | 101.6 | 101.6 | 0 | 34.1 | 50 |
| Ⓨ | 14.3 | 55.6 | 14.3 | 55.6 | 34.9 | 15.9 | 57.2 | 0 | 69.9 | 0 | 0 | 69.9 | 69.9 | –1.6 | 71.5 |
| ∅ | 20[1)] | 20[1)] | 20[1)] | 20[1)] | 6.3 | 6.3 | 6.3 | 4 | 4 | M10[2)] | M10[2)] | M10[2)] | M10[2)] | M6[2)] | M6[2)] |

## Mounting hole configurations (nominal dimensions in mm)

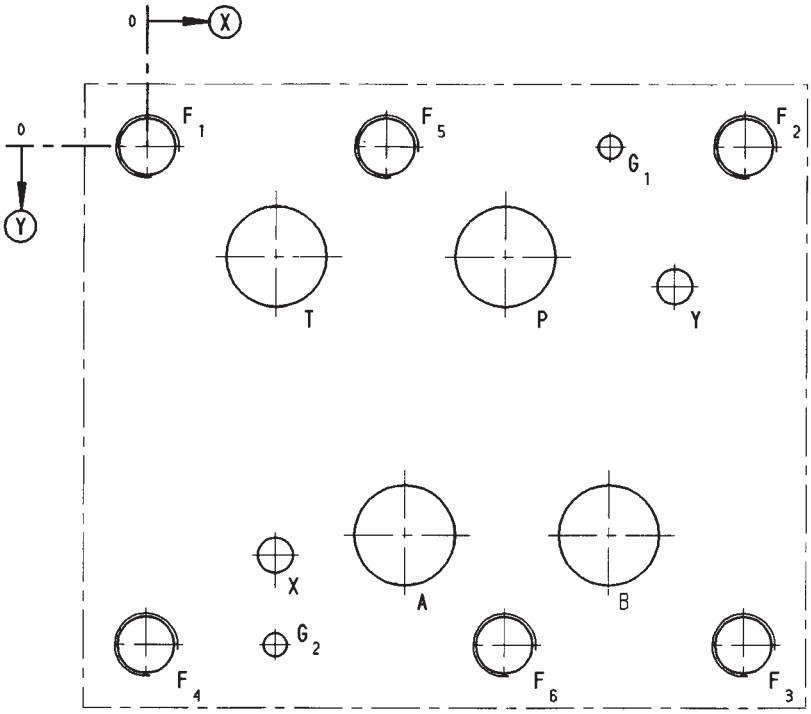
**NG25 – ISO 4401-08-07-0-94**




1) Deviates from standard
2) Thread depth:
Ferrous metal 1.5 x Ø
Non-ferrous 2 x Ø

| | P | A | T | B | L | X | Y | $G_1$ | $G_2$ | $F_1$ | $F_2$ | $F_3$ | $F_4$ | $F_5$ | $F_6$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ⓧ | 77 | 53.2 | 29.4 | 100.8 | 5.6 | 17.5 | 112.7 | 94.5 | 29.4 | 0 | 130.2 | 130.2 | 0 | 53.2 | 77 |
| Ⓨ | 17.5 | 74.6 | 17.5 | 74.6 | 46 | 73 | 19 | –4.8 | 92.1 | 0 | 0 | 92.1 | 92.1 | 0 | 92.1 |
| ∅ | 32[1)] | 32[1)] | 32[1)] | 32[1)] | 11.2 | 11.2 | 11.2 | 7.5 | 7.5 | M12[2)] | M12[2)] | M12[2)] | M12[2)] | M12[2)] | M12[2)] |

**NG32 – ISO 4401-10-08-0-94**




1) Deviates from standard
2) Thread depth:
Ferrous metal 1.5 x Ø
Non-ferrous 2 x Ø

| | P | A | T | B | X | Y | $G_1$ | $G_2$ | $F_1$ | $F_2$ | $F_3$ | $F_4$ | $F_5$ | $F_6$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ⓧ | 114.3 | 82.5 | 41.3 | 147.6 | 41.3 | 168.3 | 147.6 | 41.3 | 0 | 190.5 | 190.5 | 0 | 76.2 | 114.3 |
| Ⓨ | 35 | 123.8 | 35 | 123.8 | 130.2 | 44.5 | 0 | 158.8 | 0 | 0 | 158.8 | 158.8 | 0 | 158.8 |
| ∅ | 48[1)] | 48[1)] | 48[1)] | 48[1)] | 11.2 | 11.2 | 7.5 | 7.5 | M20[2)] | M20[2)] | M20[2)] | M20[2)] | M20[2)] | M20[2)] |

## Notes

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