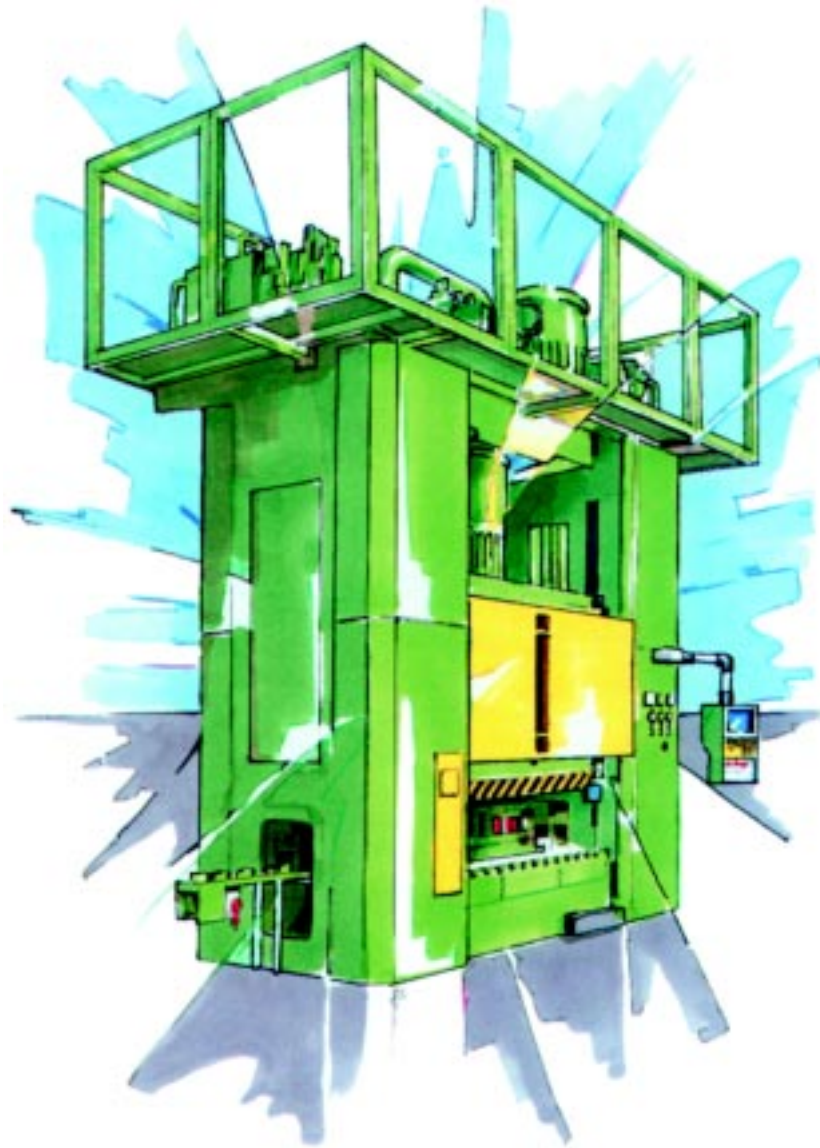




# Hydraulics for Press Controls

*European Standard EN 693*

*Catalogue HY11-3235/UK  
October 2002*



**Note**

This document and other information from Parker Hannifin GmbH, its subsidiaries, sales offices and authorized distributors provide product or system options for further investigation by users having technical expertise. Before you select or use any product or system it is important that you analyse all aspects of your application and review the information concerning the product or system in the current product catalogue. Due to the variety of operating conditions and applications for these products or systems, the user, through his own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance and safety requirements of the application are met. The products are subject to change by Parker Hannifin GmbH at any time without notice.

<b>Contents</b>	<b>Page</b>
General description	4
Safety instructions	5
Modular control design	6
Press controls	
NG 06	7
Characteristic data	
Modular circuit diagram	
Installation drawing	
Parts list	
NG 10	11
Characteristic data	
Modular circuit diagram	
Installation drawing	
Parts list	
NG 16	15
Characteristic data	
Modular circuit diagram	
Installation drawing	
Parts list	
NG 25	19
Characteristic data	
Modular circuit diagram	
Installation drawing	
Parts list	
NG 50	23
Characteristic data	
Modular circuit diagram	
Installation drawing	
Parts list	
Monitoring the safety valves	27
Characteristic data	
Connections	
Switching function	
Position and execution	
Description and function diagrams	30
Operation and installation instructions	32
Initial commissioning, fault analysis, maintenance	33
Order and execution examples	35
Certificates and test reports	36

Hydraulic equipment by Parker Hannifin is available in the rated sizes 6 to 50 for installation in hydraulic presses according to the safety regulations EN 693. The equipment consists of standardised modular blocks which can be selected according to the required press functions, and assembled to form a complete press control. These modular blocks are equipped with valves from the standard valve program, thus guaranteeing long-term spare parts supply.

The clearly organised design gives simple access to all units. The connections of the press blocks are sensibly arranged for an optimum connection between pump and press block, and press block and press cylinder. The connection and valve designations are marked on the control block unit.

Connection unions and flanges are not included in the scope of supply.

The functioning of all press controls has been tested and accepted in the factory. The corresponding test certificate is an integral part of the delivery.

The following basis circuit diagrams include all mandatory items compulsorily prescribed for safety, together with all extended functions required for the various controls:

Press control NG 06	circuit diagram: PADZ 0001A00
Press control NG 10	circuit diagram: PADZ 0002A00
Press control NG 16	circuit diagram: PADZ 0003A00
Press control NG 25	circuit diagram: PADZ 0004A00
Press control NG 50	circuit diagram: PADZ 0005A00



**Characteristic data**

Press control	NG06	NG10	NG16	NG25	NG50
Design "DC Valve"					
Rated volume flow [l/min]	40	70	230	450	1000
Design "Proportional DC valves"					
Rated volume flow [l/min]	—	70	230	450	1000
Operating pressure [bar]	350				

The press controls follow the safety rules stipulated by the „European Committee for Standardisation“ in the following regulations:

EN 292-2 :1991  
EN 693 :1999  
EN 954.1 :1997  
EN 982 :1996  
RL89/336/EEC (electromagnetic compatibility)  
VDE 0580  
VDE 0660

In particular, the safety regulations listed above for hydraulic press controls contain the following:

- These press controls may only be used for their proper purpose.
  - No other use of the press controls is allowed.
  - The press controls may only be used in presses with effective safety devices and electric safety controls.
  - Information on the safety devices is to be found in tables 2...4 of the safety regulation EN 693 for hydraulic presses.
  - The use of “programmable electrical systems” (PES) may not decrease the stipulated safety requirement.
  - In CNC press controls, the safety function must not be based on the PES alone.
  - The safety circuits must be permanently wired.
  - Screw plugs without designations on the press blocks must not be removed.
  - On opening the measuring connection on the annulus side, the falling speed of the press tappet may not exceed the value of 5 mm/s.
  - Ensure that the working pressure is maintained in a tolerable range by means of a pressure limiting valve.
  - It must be guaranteed that when a fault occurs, it is not possible for the press to run through or start up. Accordingly, on switching the presses on or after the stroke of the press cycle has been interrupted, firstly the position of the direction valves must be checked before a closing or return movement is initiated.
- When the press tappet is at a standstill, all DC valves monitored by limit switches must be safely switched off, with electric monitoring of the home positions.
  - The pressure in the annulus of the press cylinder must be safeguarded by a directly controlled, type-tested pressure limiting valve. This pressure limiting valve is adjusted to 10% of the maximum operating pressure and lead sealed.
  - On erecting the press without additional safety measures, the press speed of 10 mm/s may not be exceeded. The press user must initiate suitable measures for safe reduction of the closing speed.
  - When DC valves item 1.2 and item 1.3 are not triggered, the maximum falling speed of the tappet of 1 mm/s may not be exceeded because of leaks.
  - When using a constant DC valve for direction control, the installation of a pressure filter is recommended in the feed pipe to connection “P”.
  - During the opening procedure with safety device switched off, the valve setting of the DC valve for the return motion must be constantly monitored to allow for an immediate switch off in the event of an unexpected change of direction of the press tappet caused by error switching of the press tappet movement.
  - Redundancy for a circuit containing control and safety functions must guarantee that used components act independently of each other to ensure that in the event of failure of one component, the safety is fulfilled by means of another component.

The press control consists of at least one base block and the designated mandatory items. Extended functions are possible as options in the modular design. A press control assembled this way fulfils the requirements for functioning and press safety.

**Base block**

The base block contains the connection bores, the basic control and the possibility of mounting the valves and the various modular segments.

**Mandatory item “pressure valve”**

The task of the various versions of the “pressure valves” is to limit the maximum operating pressure. In the press controls NG 16 – 50, only the required pre-control valves on the lid of valve item 1.1 are selected.

For press controls NG10, the complete pressure valve is stipulated.

The base blocks of press controls NG6 are equipped with a pressure valve as standard feature.

**Mandatory item “DC valve”**

The press controls can be equipped either with DC valves or constant DC valves with integrated electronic component. Both units are equipped with monitoring of the home position.

These monitoring features check how the switching piston leaves the safe home position in each of the two switching directions.

In the event of mains failure, the valves take up the safely monitored home position without any delay.

**Mandatory item “rod side”**

The modular segment “rod side” consists particularly of a directly controlled type-tested pressure limiting valve item R\*5 to safeguard against transmission pressures of the piston rod side on the press tapet.

These safety valves R0.5 are integrated directly in the base block in press controls NG6 and NG10 only.

In addition, this mandatory item includes valves for the various controls of the piston rod side.

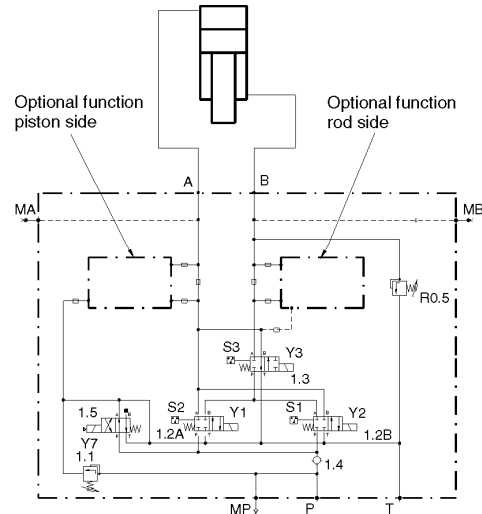
**Optional functions “piston and pressure side”**

These modular segments consist of individual functions which can be mounted additionally on the base block. For example:

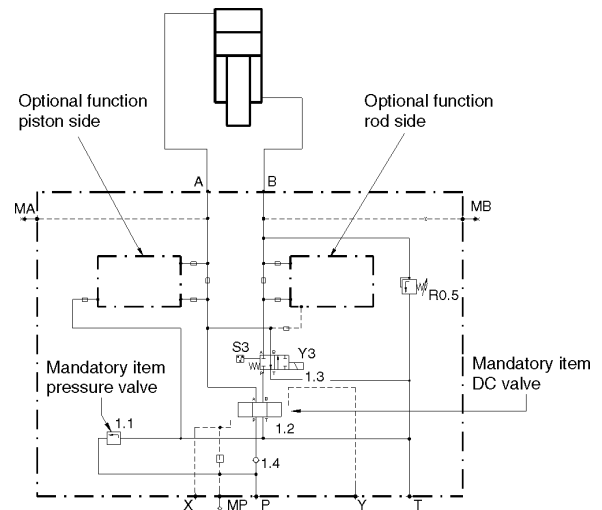
- decompression of the press cylinder
- switching the fast speed to the press cylinder
- maintaining pressure at the press cylinder
- opening the filling valve
- switching a further pump

Other controls can also be mounted on the base block as optional features.

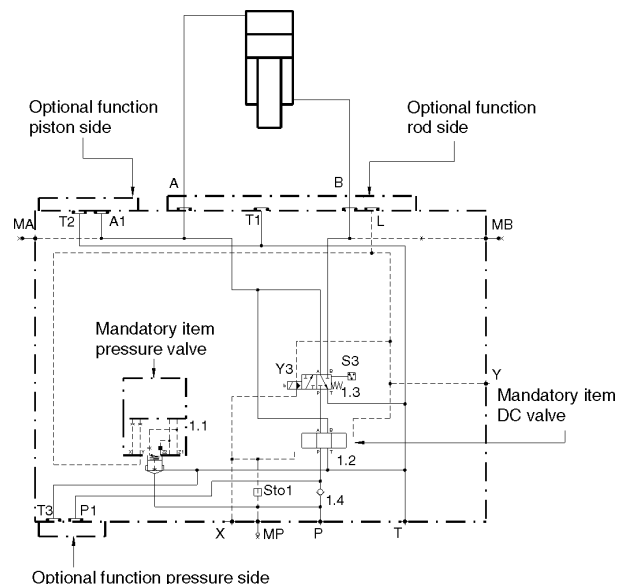
**Press control NG06**



**Press control NG10**

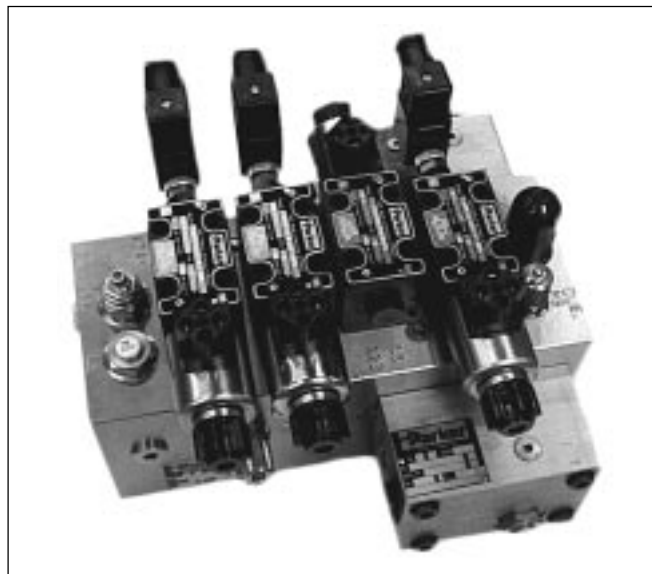


**Press control NG16-50**



**Description**

These press controls consist of a modular block system. Depending on the press function, the modular blocks are mounted together to form complete block units. In addition to the electrically monitored DC valves, they contain all units required for functioning and safe operation, so that the conditions and regulations of EN 693 are fulfilled.



**Characteristic data**

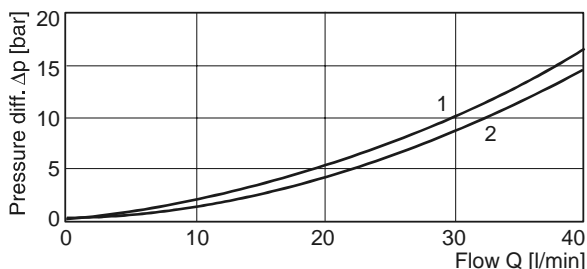
Operating pressure in P,A,B	[bar]	350
Pressure in T	[bar]	10
Solenoid voltage	[V]	24
Monitoring		see page 27-29

**Modular structure**

Base block	Basic structure	PADZ0001.400
Version rod side 1,2,3	Optional function	PADZ0001.410-412
Version piston side 1,2,3	Optional function	PADZ0001.420-422

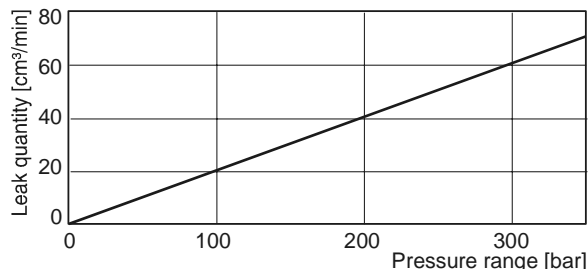
**Flow diagram**

Press control with DC valve



Curve 1: flow direction from connection P to B; from connection B to T; from connection P to T via valve 1.3.  
 Curve 2: flow direction from connection P to A; from connection A to T.

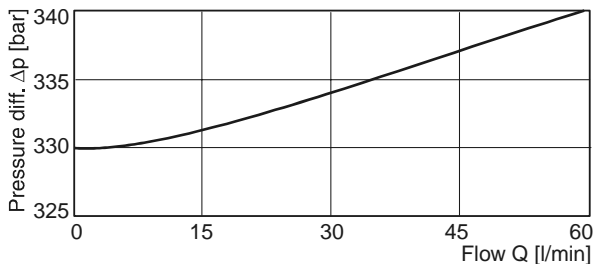
**Drain flow diagram**

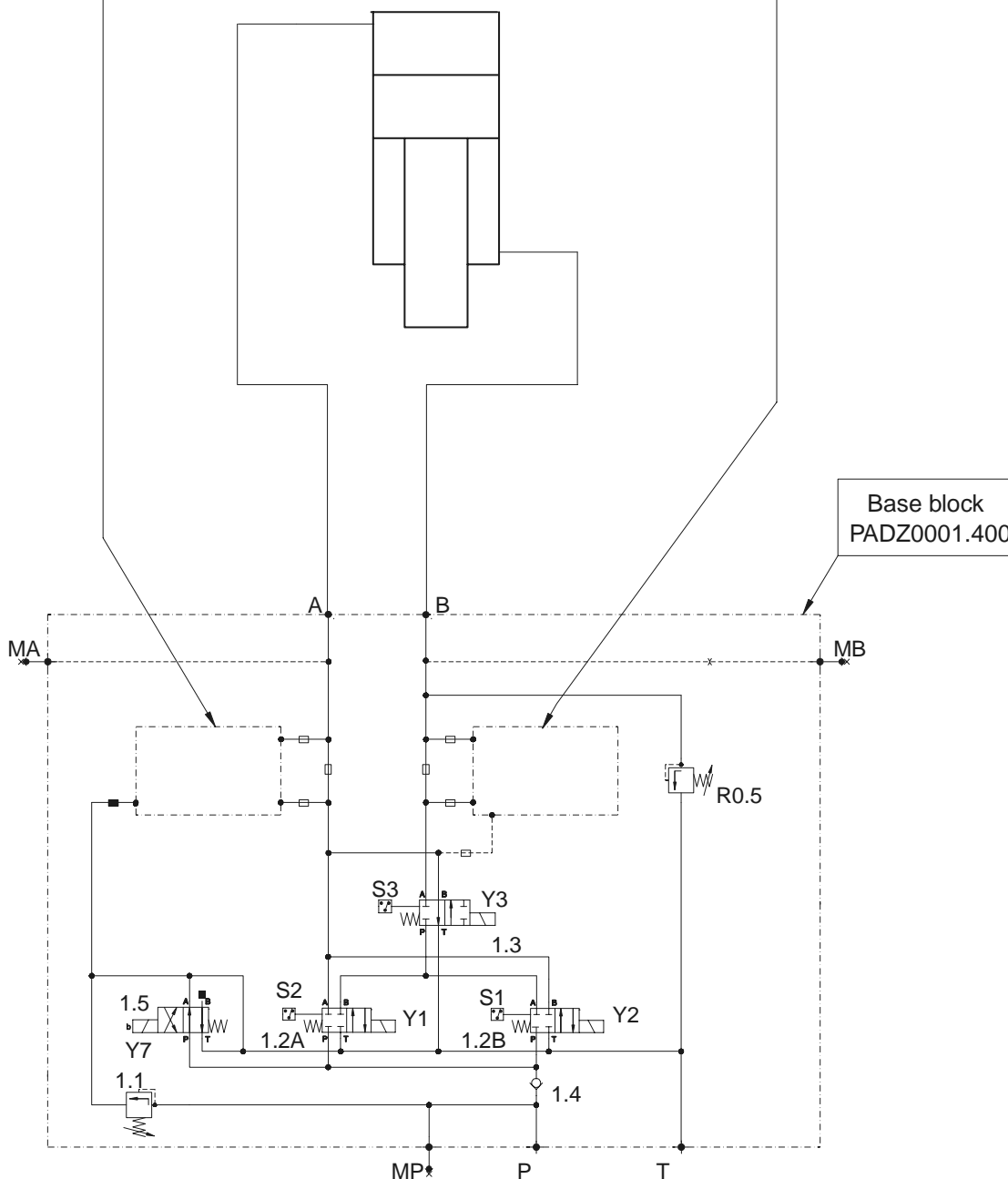
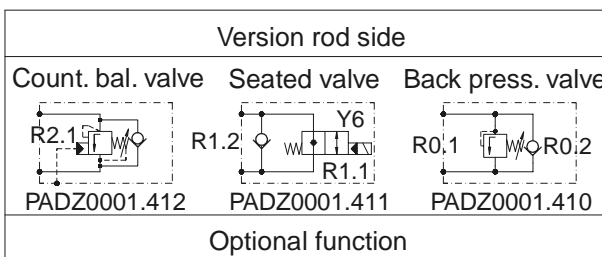
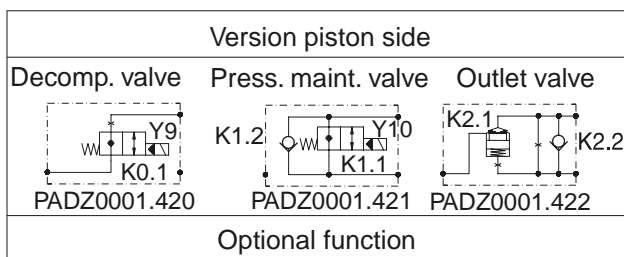


Curve: max. drain quantity.

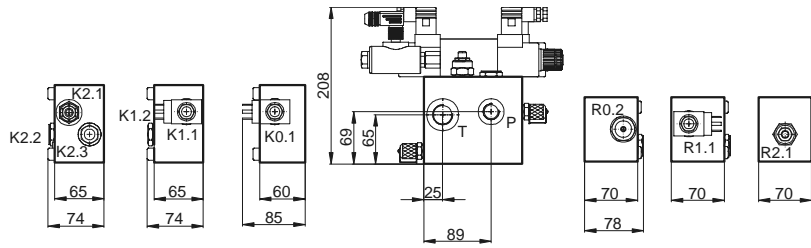
**Flow diagram**

Pressure valve R\*.5



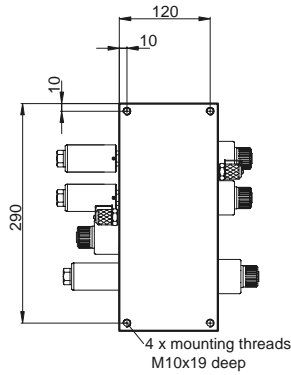
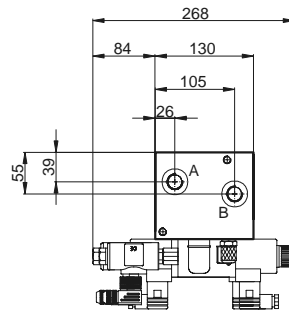
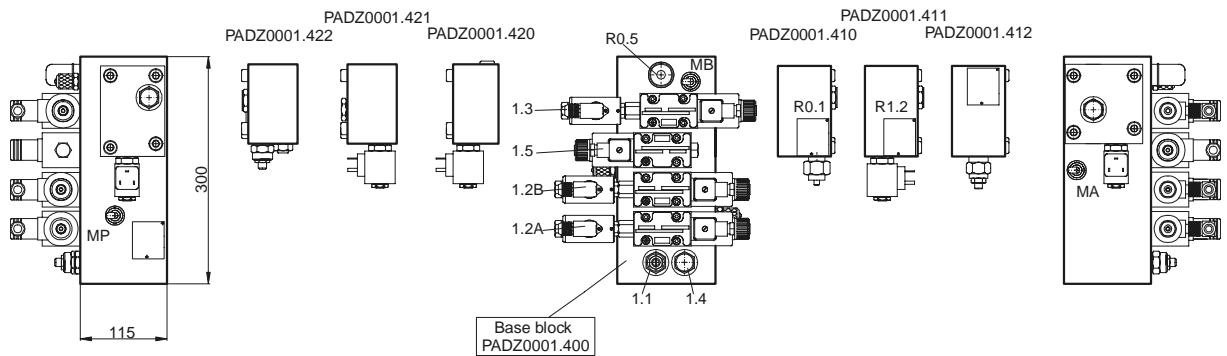






Versions  
 piston side 1-3

Versions  
 rod side 1-3



Connections:  
 P;A;B; = G1/2  
 T = G3/4  
 M... = G1/4

Item No.	Quantity	Designation	Type
		<b>Base block</b>	<b>PADZ0001.400</b>
1.1	1	Pressure valve	RAH101S50
1.2A	1	DC valve	D1VW1KNJWT66
1.2B	1	DC valve	D1VW1KNJWT66
1.3	1	DC valve	D1VW43HNJWT66
1.4	1	Check valve	CVH103P
1.5	1	DC valve	D1VW20BNJPFSXB072
R0.5	1	Pressure valve	0532004108TÜV330bar
		<b>Versions rod side 1-3</b>	
R0.1	1	Block back pressure valve	PADZ0001.410
R0.2	1	Pressure valve	EVSA160A0613
		Check valve	CVH103P
		Block seated valve	PADZ0001.411
R1.1	1	Seated valve	DSH101CRD024LD
R1.2	1	Check valve	CVH103P
		Block counter balance valve	PADZ0001.412
R2.1	1	Counter balance valve	CWCA-LIN
		<b>Versions piston side 1-3</b>	
K0.1	1	Block decompression valve	PADZ0001.420
		Seated valve	DSH101CRD024LD
		Block back pressure valve	PADZ0001.421
K1.1	1	Seated valve	DSH101CRD024LD
K1.2	1	Check valve	CVH103P
		Block outlet valve	PADZ0001.422
K2.1	1	Cartridge valve	CODA-XDN
K2.2	1	Check valve	CVH103P

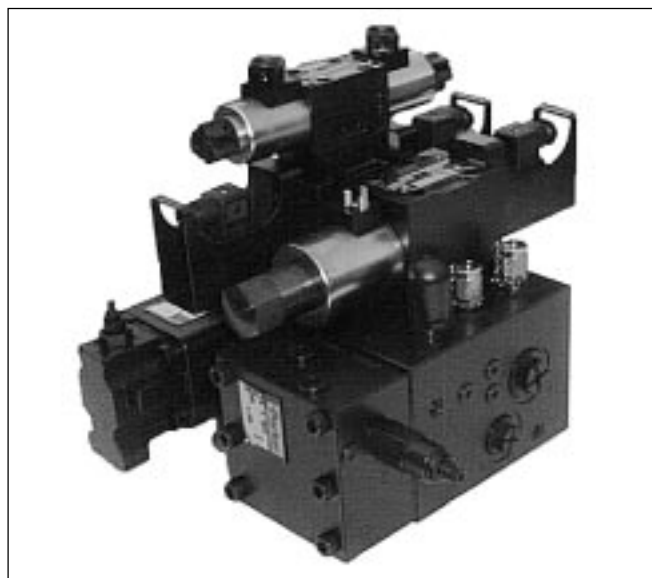
## Description

These press controls consist of a modular block system. Depending on the press function, the modular blocks are mounted together to form complete block units. In addition to the electrically monitored DC valves, they contain all units required for functioning and safe operation, so that the conditions and regulations of EN 693 are fulfilled.

## Hydraulics for Press Controls NG10

### Characteristic data

Design	DC valves	Proportional DC valves
Const. oper. press. in P,A,B [bar]	350	
Pressure in T [bar]	20	
Pressure in X [bar]	15-350	
Pressure in Y [bar]	0	
Solenoid voltage [V]	24	24 / 15...30
Control voltage (target) [V]		0...±10
Enable switching [V]		5...30
Monitoring	see pages 27-29	

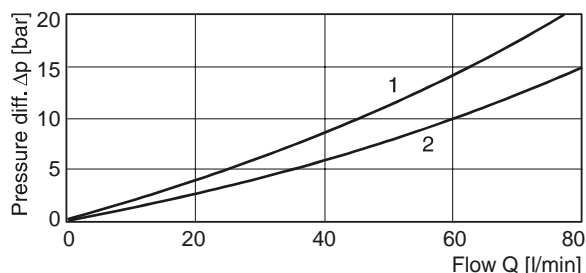


### Modular structure

Base block	Basic structure	PADZ0002.400
Version DC valve 1	Mandatory item	DC valve D31DW..
Version DC valve 2	Mandatory item	Proportional DC valve D31FHE..
Version pressure valve 1,2,3	Mandatory item	P1.1-P1.5
Version rod side 1,2,3	Optional function	PADZ0002.410-412
Version piston side 1,2,3	Optional function	PADZ0002.420-422

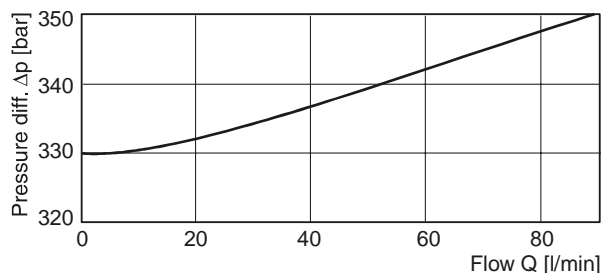
### Flow diagram

Press control with DC valve



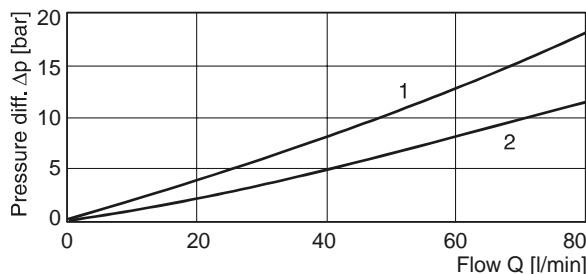
### Flow diagram

Pressure valve R\*.5

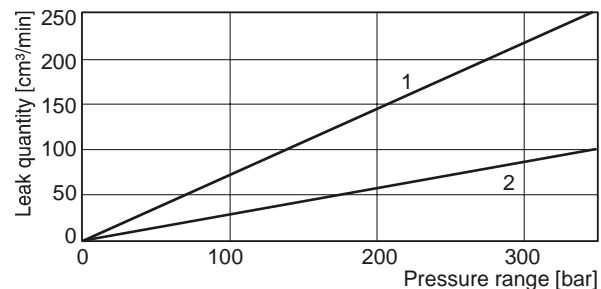


### Flow diagram

Press control with proportional DC valve

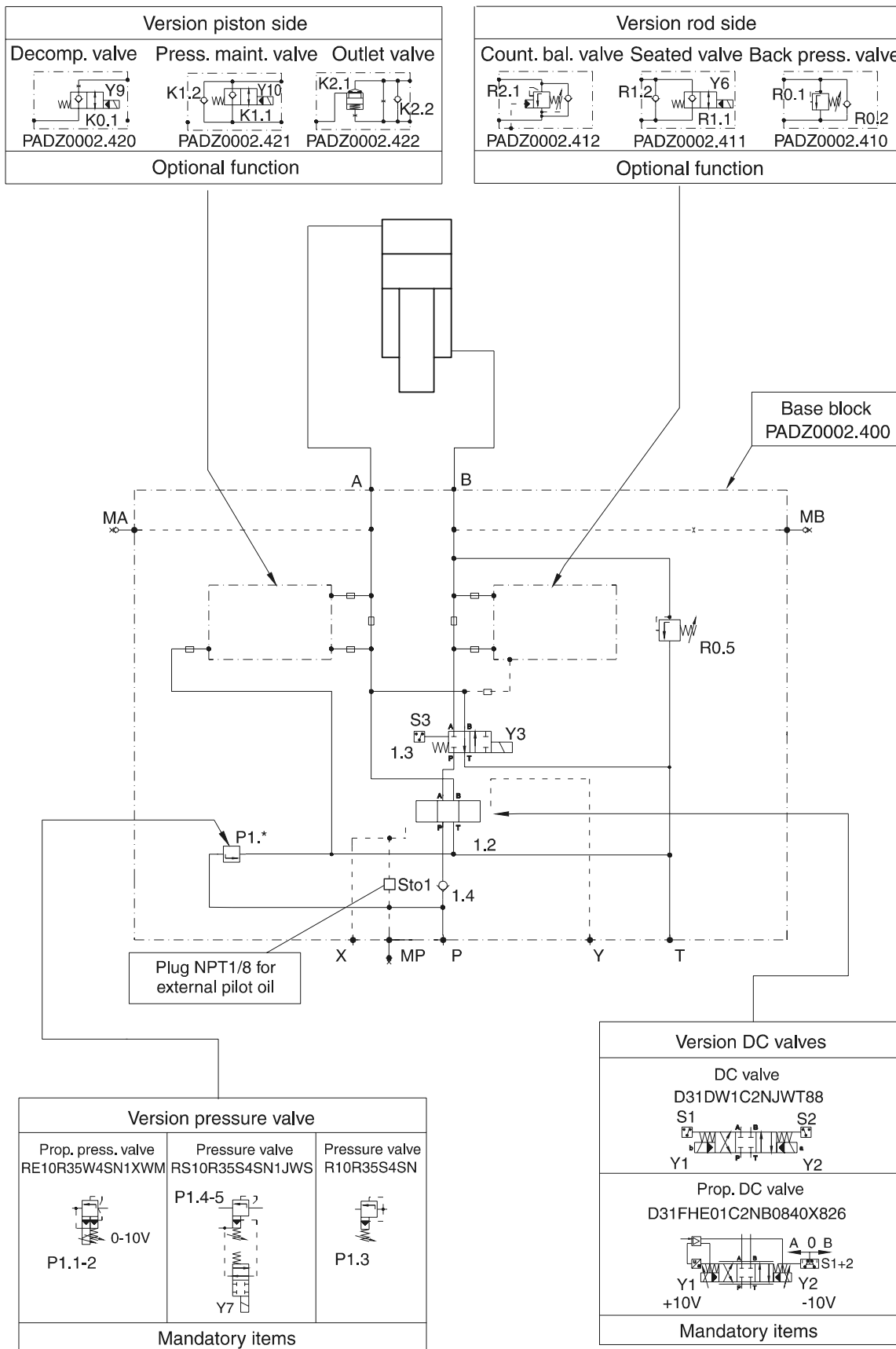


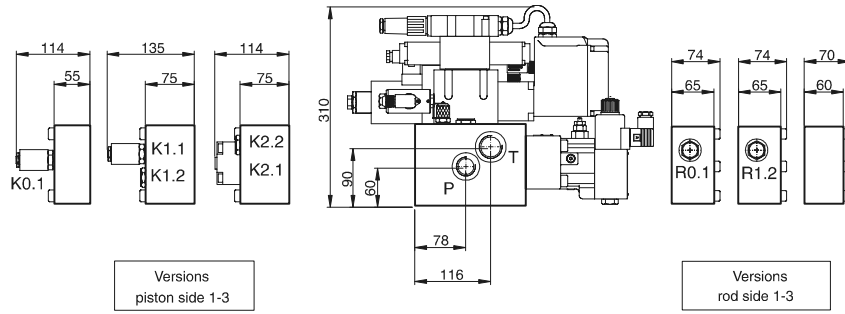
### Drain flow diagram



Curve 1: flow direction from connection P to B; from connection B to T; from connection P to T via valve 1.3.  
 Curve 2: flow direction from connection P to A; from connection A to T.

Curve 1: max. drain quantity for design with proportional DC valve.  
 Curve 2: max. drain quantity for design with DC valve.



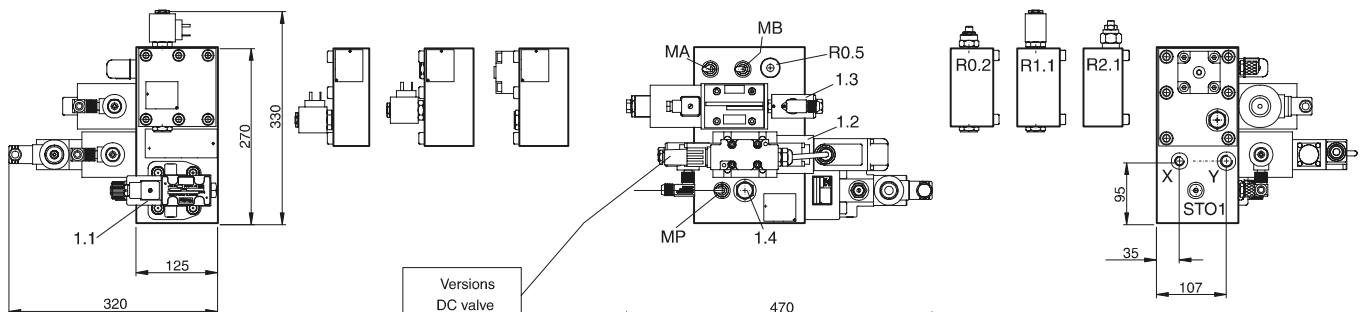


Versions  
piston side 1-3

Versions  
rod side 1-3

PADZ0002.421  
 PADZ0002.420      PADZ0002.422

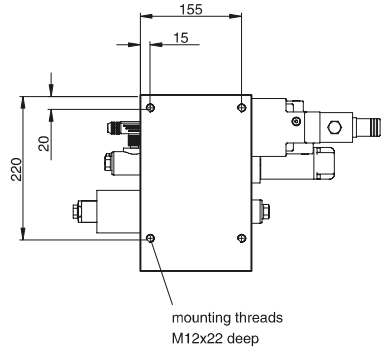
PADZ0002.411  
 PADZ0002.410      PADZ0002.412



Versions  
DC valve

Base block  
PADZ0002.400

- Connections:  
 P;B = G3/4  
 A;T = G1  
 X = G1/4  
 Y = G3/8  
 M... = G1/4



mounting threads  
M12x22 deep

Item No.	Quantity	Designation	Type
R0.5 1.3 1.4	1 1 1	Base block Pressure valve DC valve Check valve	PADZ0002.400 0532004108TÜV330bar D3DW69BNJWTI5N CVH103P
		<b>Versions DC valves</b>	
1.2 1.2	1 1	DC valve Prop. DC valve	D31DW1C2NJWT88 D31FHE01C2NB0840X826
		<b>Versions pressure valves</b>	
1.1 1.1 1.1	1 1 1	Pressure valve Constant pressure valve Pressure valve	R10R35S4SN RE10R35W4SN1XPM RS10R35S4SN1JWS
		<b>Versions rod side 1-3</b>	
R0.1 R0.2 R1.1 R1.2 R2.1	1 1 1 1 1	Block press. maint. valve Pressure valve Check valve Block seated valve Seated valve Check valve Block counterbalance valve Counterbalance valve	PADZ0002.410 EVSA160A1013 CVH103P PADZ0002.411 DSH101CRD024LD CVH103P PADZ0002.412 CWCA-LIN
		<b>Versions piston valve 1-3</b>	
K0.1 K1.1 K1.2 K2.1A K2.1B K2.2	1 1 1 1 1 1	Block decompression valve Seated valve Block press. maint. valve Seated valve Check valve Block outlet valve Cartridge valve Cover unit Check valve	PADZ0002.420 DSH101CRD024LD PADZ0002.421 DSH101CRD024LR CVH103P PADZ0002.422 CE016C08S00N10 C016AA12N10 CVH103P

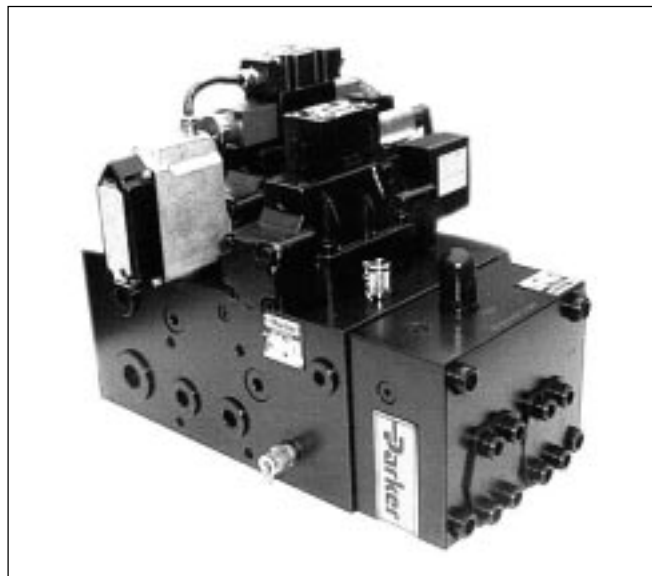
## Description

These press controls consist of a modular block system. Depending on the press function, the modular blocks are mounted together to form complete block units. In addition to the electrically monitored DC valves, they contain all units required for functioning and safe operation, so that the conditions and regulations of EN 693 are fulfilled.

## Hydraulics for Press Controls NG16

### Characteristic data

Design		DC valves	Prop. DC valves
Operating press. in P,A,B	[bar]	350	
Pressure in T	[bar]	20	
Pressure in X	[bar]	15-350	
Pressure in Y	[bar]	0	
Solenoid voltage	[V]	24	24 / 15...30
Control voltage (target)	[V]		0...±10
Enable switching	[V]		5...30
Monitoring		see pages 27-29	

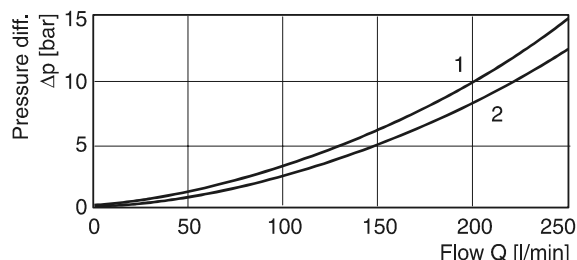


### Modular structure

Base block	Basic structure	PADZ0003.400
Version DC valve 1	Mandatory item	DC valve D41VW..
Version DC valve 2	Mandatory item	Prop. DC valve D41FHE..
Version pressure valve 1,2,3	Mandatory item	P1.1-P1.5
Version rod side 1,2,3,4	Mandatory item	PADZ0003.410-413
Version piston side 1,2,3	Optional function	PADZ0003.420-422
Version pressure side 1,2	Optional function	PADZ0003.430-431

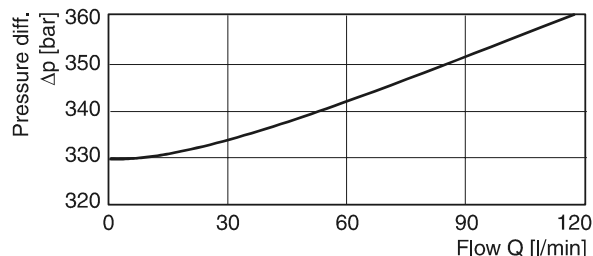
### Flow diagram

Press control with DC valve



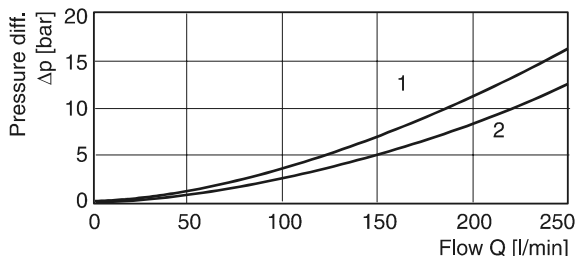
### Flow diagram

Pressure valve R\*.5

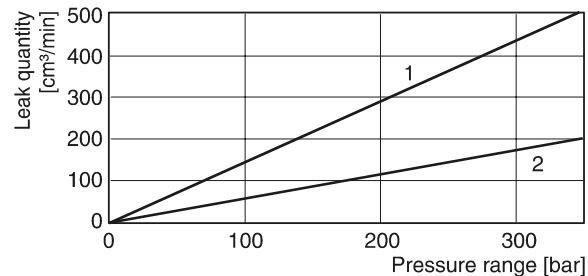


### Flow diagram

Press control with Prop. DC valve

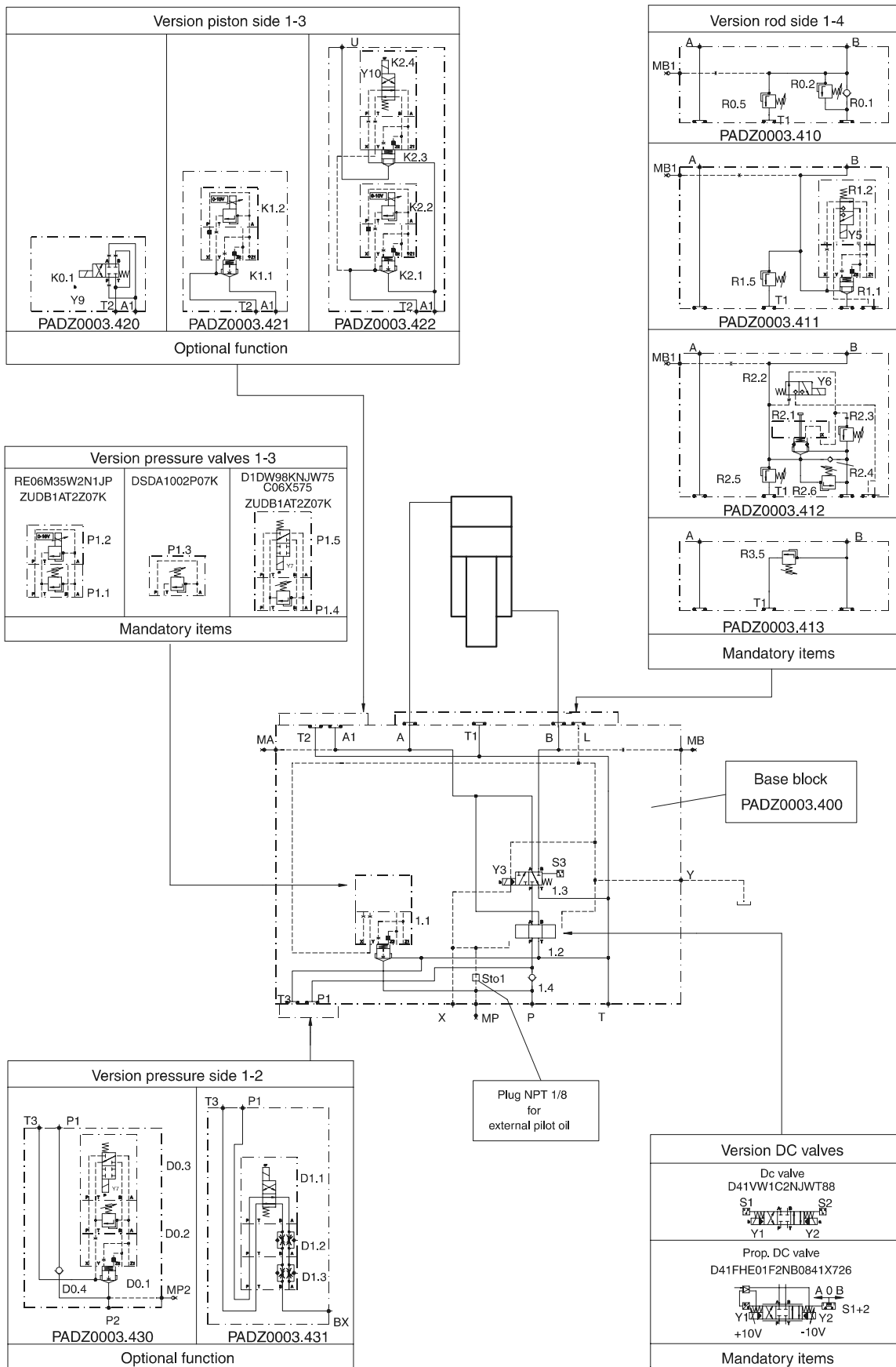


### Drain flow diagram

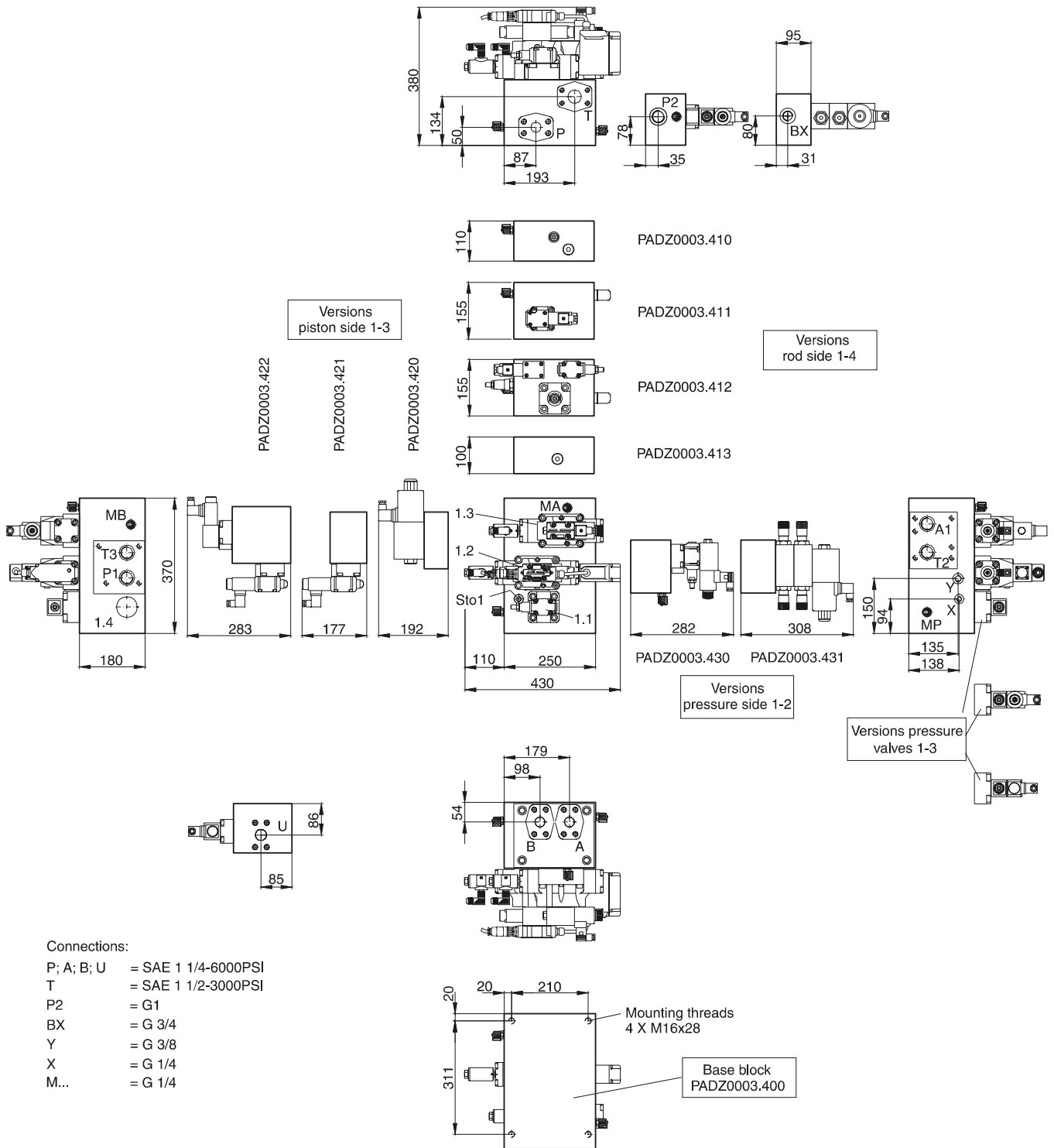


Curve 1: flow direction from connection P to B; from connection B to T; from connection P to T via valve 1.3.  
 Curve 2: flow direction from connection P to A; from connection A to T.

Curve 1: max. drain quantity for design with proportional DC valve.  
 Curve 2: max. drain quantity for design with DC valve.







Item No.	Quantity	Designation	Type
1.1A	1	Base block	PADZ0003.400
1.1B	1	Cartridge valve	CE025C01N11N10
1.3	1	Cover unit	C025CA13009914N10
1.4	1	DC valve	D41VW43B2NJWT80
		Check valve	SPZBE1010E25S
		<b>Versions DC valves</b>	
1.2	1	DC valve	D41VW1C2NJWT88
1.2	1	Prop. DC valve	D41FHE01F2NB0841X726
		<b>Versions pressure valves</b>	
P1.1	1	Pressure valve	ZUDB1AT2Z07K
P1.2	1	Prop. pressure valve	RE06M35W2N1JP
P1.3	1	Pressure valve	DSDA1002P07K
P1.4	1	Pressure valve	ZUDB1AT2Z07K
P1.5	1	DC valve	D1DW98KNJW75C06X575
		<b>Versions rod side 1-4</b>	
R0.1	1	Block rod side 1	PADZ0003.410
R0.2	1	Check valve	SPZBE1010E16S
R0.5	1	Pressure valve	DUDB202E15K
		Block rod side 2	0532004108TÜV330bar
R1.1A	1	Cartridge valve	PADZ0003.411
R1.1B	1	Cover unit	CE025C04S00N10
R1.2	1	Seated valve	C025CA12009915N10
R1.5	1	Pressure valve	D1SE83BNJW
		Block rod side 3	0532004108TÜV330bar
R2.1	1	Cartridge valve	PADZ0003.412
R2.2	1	Seated valve	CE025S07500W + C032BN13N
R2.3	1	Pressure valve	D1SE83BNJW
R2.4	1	Check valve	DSDA1002P07K
R2.5	1	Pressure valve	SPZBE1010E16N
R2.6	1	Pressure valve	0532004108TÜV330bar
		Block rod side 4	DUDB202E15K
R3.5	1	Pressure valve	PADZ0003.413
			0532004108TÜV330bar
		<b>Versions piston side 1-3</b>	
K0.1	1	Block piston side 1	PADZ0003.420
		DC valve	D3DW1ENJW
		Block piston side 2	PADZ0003.421
K1.1-2	1	Prop. pressure valve	RE16E35W1NNXW
		Block piston side 3	PADZ0003.422
K2.1-2.2	1	Prop. pressure valve	RE16E35W1NNXW
K2.3A	1	Cartridge valve	CE016C04S00N10
K2.3B	1	Cover unit	C016CA10000899N10
K2.4	1	Seated valve	D1SE83BNJW
		<b>Versions pressure side 1-2</b>	
D0.1A	1	Block pressure side 1	PADZ0003.430
D0.1B	1	Cartridge valve	CE016C01S09N10
D0.2	1	Cover unit	C016CA11009913N10
D0.3	1	Pressure valve	ZUDB1AT2Z07K
D0.4	1	DC valve	D1DW98KNJW75C06X575
		Check valve	SPZBE1010E16N
		Block pressure side 2	PADZ0003.431
D1.1	1	DC valve	D3DW20BNJW
D1.2	1	Flow control valve	FM3DDDSV
D1.3	1	Flow control valve	FM3DDDSV

## Description

These press controls consist of a modular block system. Depending on the press function, the modular blocks are mounted together to form complete block units. In addition to the electrically monitored DC valves, they contain all units required for functioning and safe operation, so that the conditions and regulations of EN 693 are fulfilled.

## Hydraulics for Press Controls NG25

### Characteristic data

Design	DC valves	Prop. DC valves
Operating pressure in P,A,B [bar]	350	
Pressure in T [bar]	20	
Pressure in X [bar]	15-350	
Pressure in Y [bar]	0	
Solenoid voltage [V]	24	24 / 15...30
Control voltage (target) [V]		0...±10
Enable switching [V]		5...30
Monitoring	see pages 27-29	

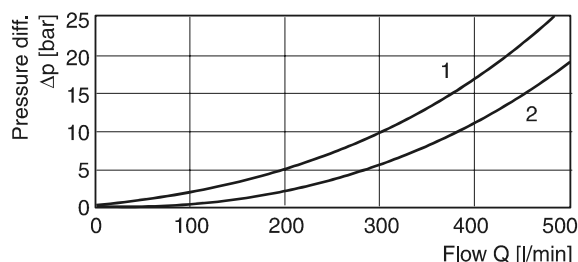


### Modular structure

Base block	Basic structure	PADZ0004.400
Version DC valve 1	Mandatory item	DC valve D91VW..
Version DC valve 2	Mandatory item	Prop. DC valve D91FHE..
Version pressure valve 1,2,3	Mandatory item	P1.1-P1.5
Version rod side 1,2,3,4	Mandatory item	PADZ0004.410-413
Version piston side 1,2,3	Optional function	PADZ0004.420-422
Version pressure side 1,2	Optional function	PADZ0004.430-431

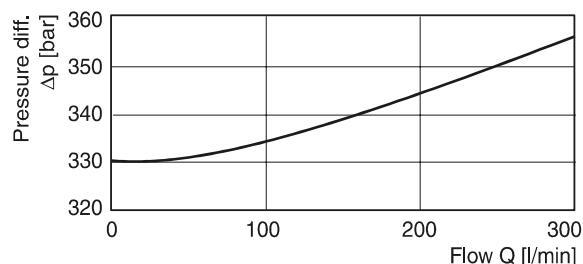
### Flow diagram

Press control with DC valve



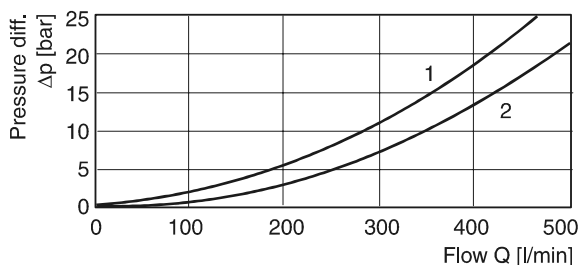
### Flow diagram

Pressure valve R\*.5

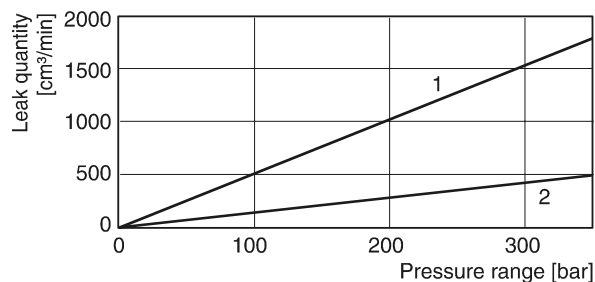


### Flow diagram

Press control with Prop. DC valve

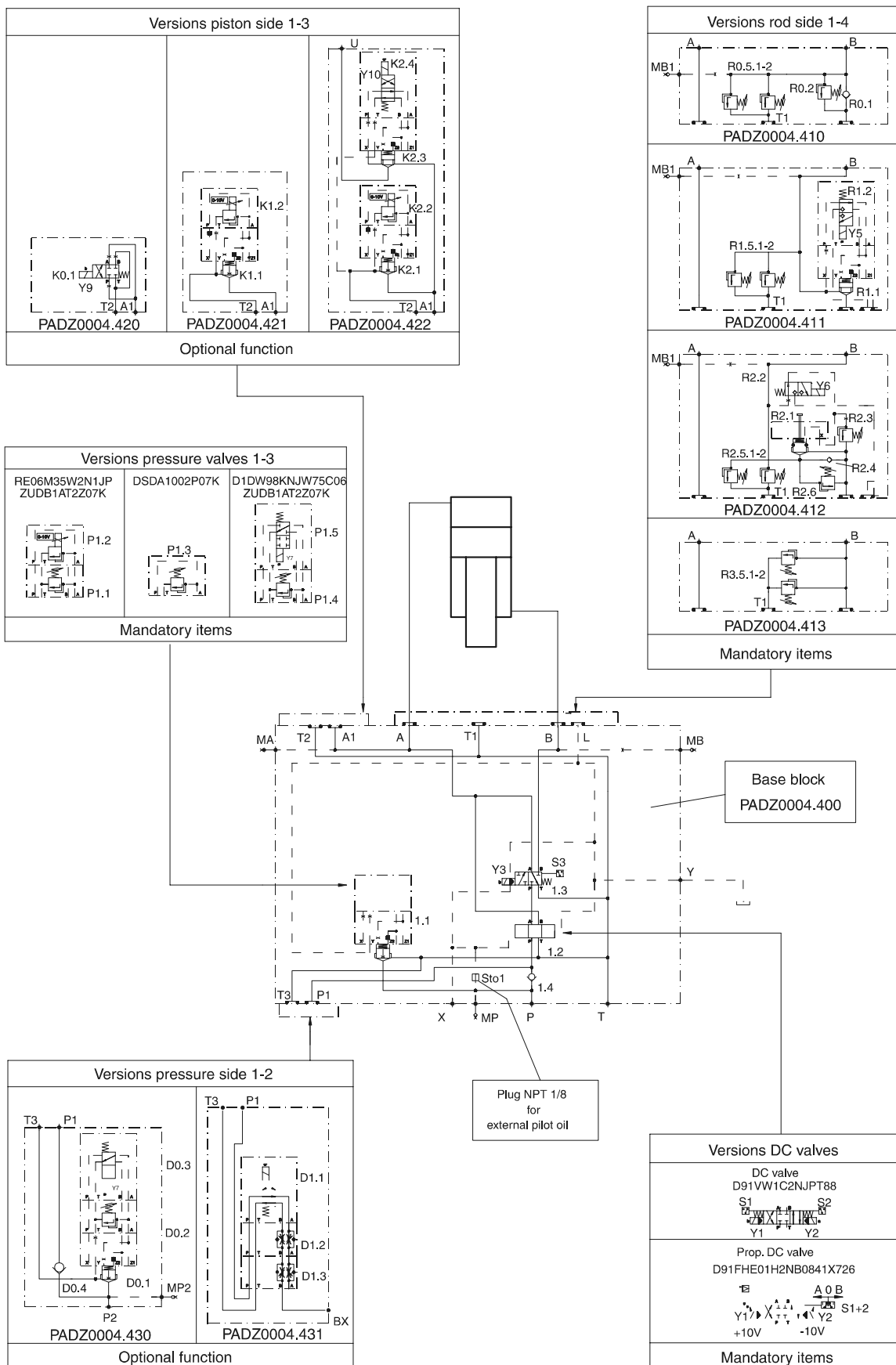


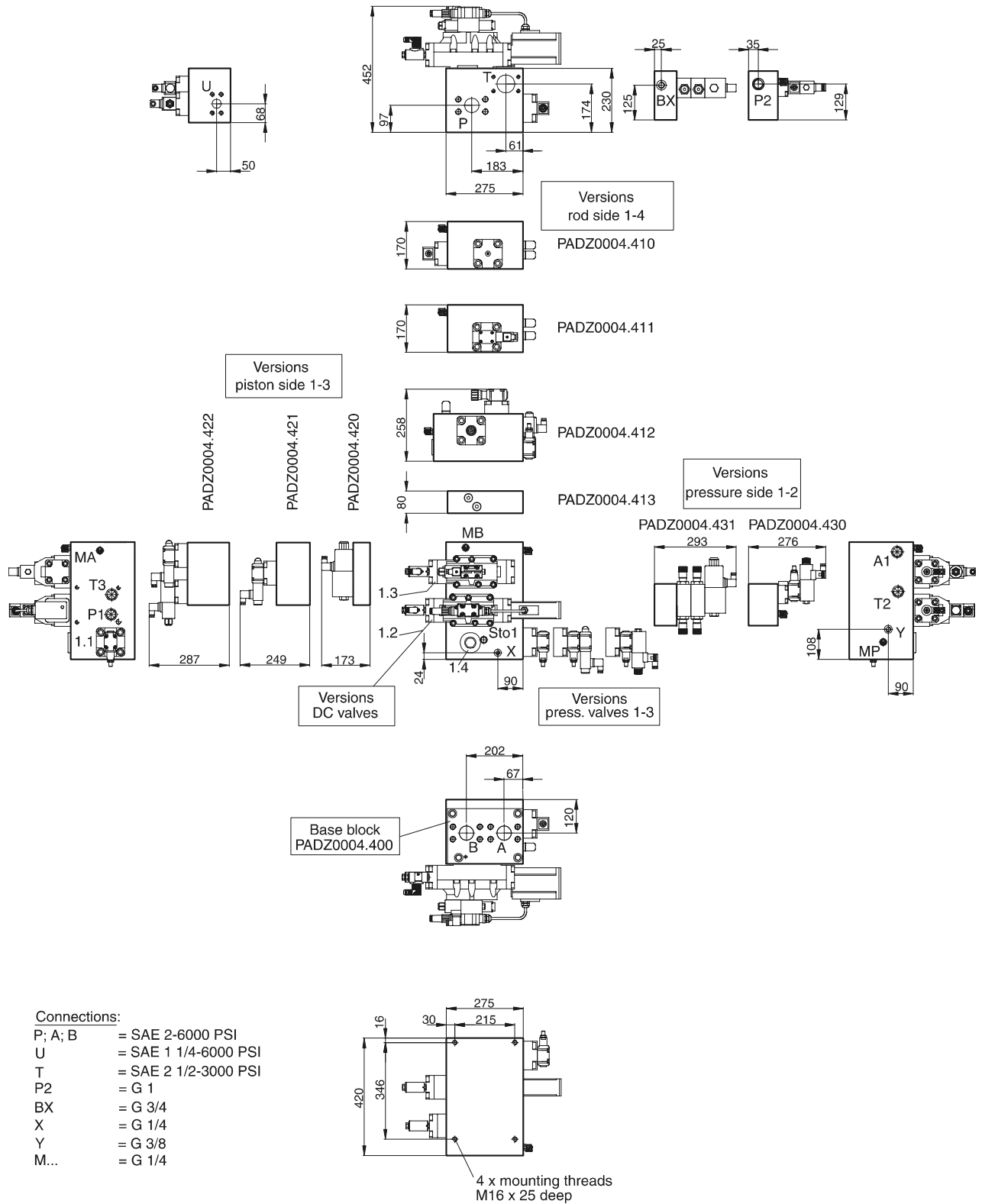
### Drain flow diagram



Curve 1: flow direction from connection P to B; from connection B to T; from connection P to T via valve 1.3.  
 Curve 2: flow direction from connection P to A; from connection A to T.

Curve 1: max. drain quantity for design with proportional DC valve.  
 Curve 2: max. drain quantity for design with DC valve.





Item No.	Quantity	Designation	Type
1.1A	1	Base block	PADZ0004.400
1.1B	1	Cartridge valve	CE032C01N12N10
1.3	1	Cover unit	C032CA13009914N10
1.4	1	DC valve	D91VW43B2NJWT80
		Check valve	SPZBE1010E32S
		<b>Versions DC valves</b>	
1.2	1	DC valves	D91VW1C2NJWT88
1.2	1	Prop. DC valves	D91FHE01H2NB0841X726
		<b>Versions pressure valves</b>	
P1.1	1	Pressure valve	ZUDB1AT2Z07K
P1.2	1	Const. pressure valve	RE06M35W2N1JP
P1.3	1	Pressure valve	DSDA1002P07K
P1.4	1	Pressure valve	ZUDB1AT2Z07K
P1.5	1	DC valve	D1DW98KNJW75C06X575
		<b>Versions rod side 1-4</b>	
R0.1	1	Block rod side 1	PADZ0004.410
R0.2	1	Check valve	SPZBE1010E25S
R0.5	2	Pressure valve	R25EX35S2NXXS07
		Block rod side 2	0532004108TÜV330bar
R1.1A	1	Block rod side 2	PADZ0004.411
R1.1B	1	Cartridge valve	CE032C04S00N10
R1.2	1	Cover unit	C032CA13009914N10
R1.5	2	Seated valve	D1SE83BNJW
		Block rod side 3	0532004108TÜV330bar
R2.1	1	Block rod side 3	PADZ0004.412
R2.2	1	Cartridge valve	CE032S07500N/C032BN13N
R2.3	1	Seated valve	D1SE83BNJW
R2.4	1	Pressure valve	DSDA1002P07K
R2.5	2	Check valve	SPZBE1010E32N
R2.6	1	Pressure valve	0532004108TÜV330bar
		Block rod side 4	R25EX35S2NXXS07
R3.5	2	Block rod side 4	PADZ0004.413
		Pressure valve	0532004108TÜV330bar
		<b>Versions piston side 1-3</b>	
K0.1	1	Block piston side 1	PADZ0004.420
		DC valve	D3DW1ENJW
K1.1-2	1	Block piston side 2	PADZ0004.421
		Const. pressure valve	RE32E35W2SN1XW
K2.1-2.2	1	Block piston side 3	PADZ0004.422
		Const. pressure valve	RE25E35W2SN1XW
K2.3A	1	Cartridge valve	CE025C04S00N10
K2.3B	1	Cover unit	C025CA12001299N10
K2.4	1	Seated valve	D1SE83BNJW
		<b>Versions pressure side 1-2</b>	
D0.1A	1	Block pressure side 1	PADZ0004.430
D0.1B	1	Cartridge valve	CE025C01S11N10
D0.2	1	Cover unit	C025CA13009914N10
D0.3	1	Pressure valve	ZUDB1AT2Z07K
D0.4	1	DC valve	D1DW98KNJW75C06X575
		Check valve	SPZBE1010E25N
		Block pressure side 2	PADZ0004.431
D1.1	1	DC valve	D3DW20BNJW
D1.2	1	Throttle check valve	FM3DDDSV
D1.3	1	Throttle check valve	FM3DDDSV

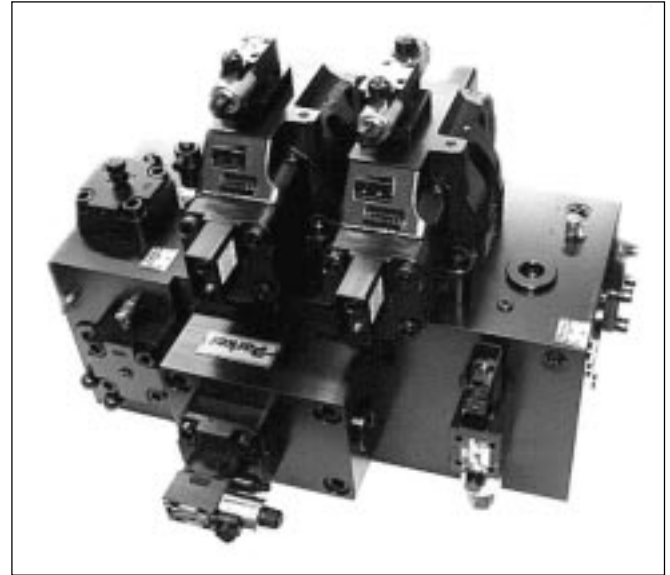
## Description

These press controls consist of a modular block system. Depending on the press function, the modular blocks are mounted together to form complete block units. In addition to the electrically monitored DC valves, they contain all units required for functioning and safe operation, so that the conditions and regulations of EN 693 are fulfilled.

## Hydraulics for Press Controls NG50

### Characteristic data

Design	DC valve	Prop. DC valve
Operating pressure in P,A,B [bar]	350	
Pressure in T [bar]	20	
Pressure in X [bar]	15...350	
Pressure in Y [bar]	0	
Solenoid voltage [V]	24	24 / 15...30
Control voltage (target) [V]		0...±10
Enable switching [V]		5...30
Monitoring	see pages 27-29	

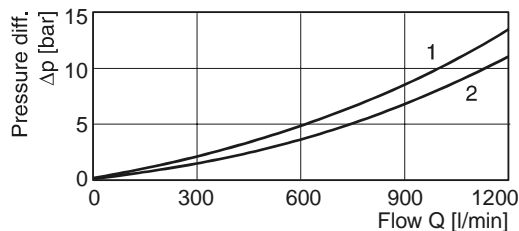


### Modular structure

Base block Version DC valve 1 Version DC valve 1 Version pressure valve 1,2,3 Version rod side 1,2,3,4 Version piston side 1,2,3 Version pressure side 1,2	Basic structure Mandatory item Mandatory item Mandatory item Optional function Optional function	PADZ0005.400 DC valve D111VW.. Prop. DC valve D111FHE.. P1.1-P1.5 PADZ0005.410-413 PADZ0005.420-422 PADZ0005.430-431
--	---	--

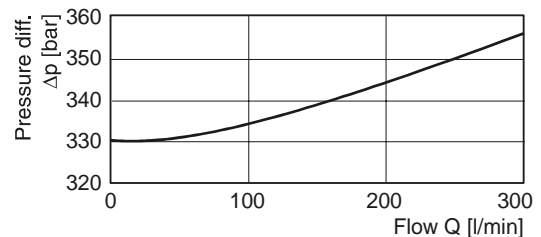
### Flow diagram

Press control with DC valve



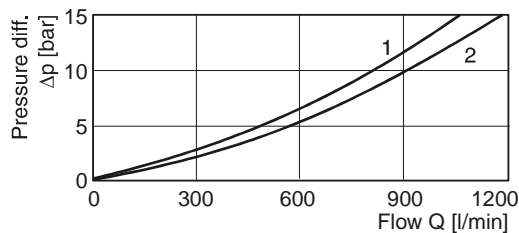
### Flow diagram

Pressure valve R\*.5

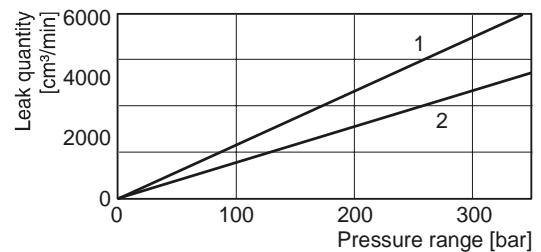


### Flow diagram

Press control with Prop. DC valve

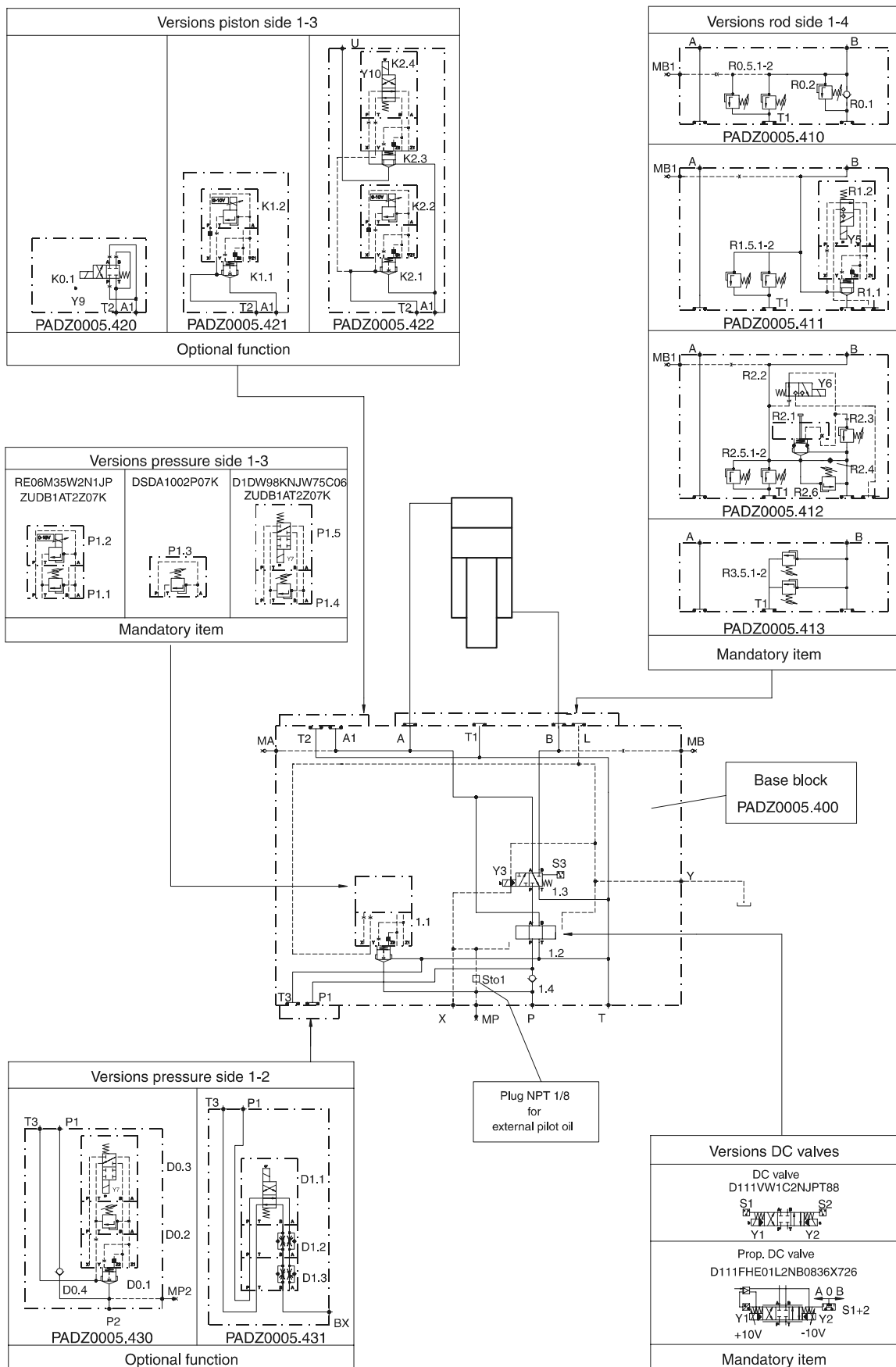


### Drain flow diagram

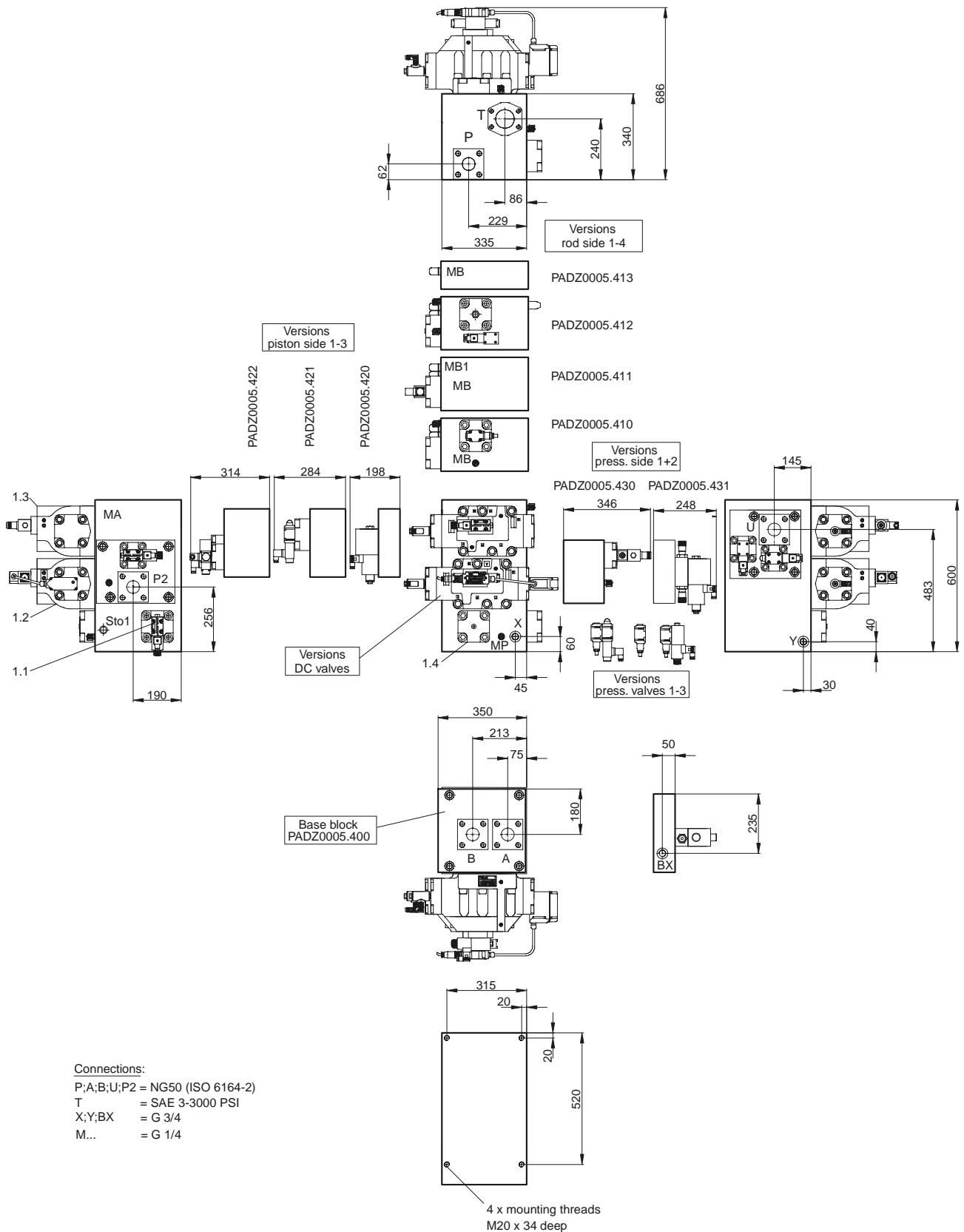


Curve 1: flow direction from connection P to B; from connection B to T; from connection P to T via valve 1.3.  
Curve 2: flow direction from connection P to A; from connection A to T.

Curve 1: max. drain quantity for design with proportional DC valve.  
Curve 2: max. drain quantity for design with DC valve.



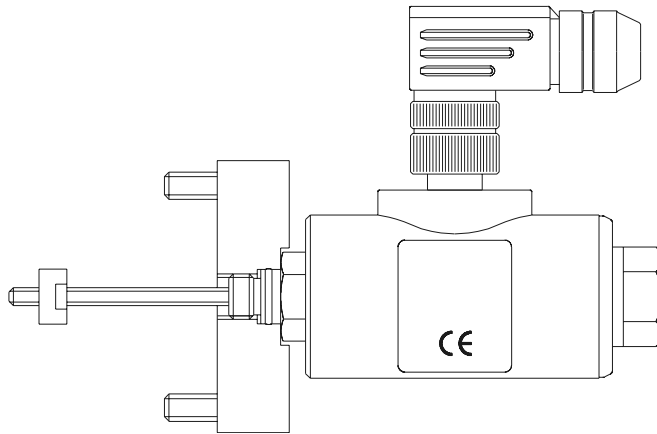




Item No.	Quantity	Designation	Type
1.1A	1	Base block	PADZ0005.400
1.1B	1	Cartridge valve	CE040C01N13N10
1.3	1	Cover unit	C040CA14009915N10
1.4	1	DC valve	D111VW43B2NJPT80
		Check valve	SPRB1010E40S
<b>Versions DC valves</b>			
1.2	1	DC valve	D111VW1C2NJPT88
1.2	1	Prop. DC valve	D111FHE01L2NB0836X726
<b>Versions pressure valves</b>			
P1.1	1	Pressure valves	ZUDB1AT2Z07K
P1.2	1	Const. pressure valve	RE06M35W2N1JP
P1.3	1	Pressure valve	DSDA1002P07K
P1.4	1	Pressure valve	ZUDB1AT2Z07K
P1.5	1	DC valve	D1DW98KNJW75C06X575
<b>Versions rod side 1-4</b>			
R0.1	1	Block rod side 1	PADZ0005.410
R0.2	1	Check valve	SPRB1010E40N
R0.5	2	Pressure valve	R40EX35S2NXXS07
		Block rod side 2	0532004108TÜV330bar
R1.1A	1	Pressure valve	PADZ0005.411
R1.1B	1	Cartridge valve	CE040C04S00N10
R1.2	1	Cover unit	C040CA14009915N10
R1.5	2	Seated valve	D1SE83BNJW
		Pressure valve	0532004108TÜV330bar
R2.1A	1	Block rod side 3	PADZ0005.412
R2.1B	1	Cartridge valve	CE040S07S00N10
R2.2	1	Cover unit	C040BN15N10
R2.3	1	Seated valve	D1SE83BNJW
R2.4	1	Pressure valve	0532002015
R2.5	2	Check valve	SPRB1010E40S
R2.6	1	Pressure valve	0532004108TÜV330bar
R3.5	2	Pressure valve	R25EX35S2NXXS07
		Block rod side 4	PADZ0005.413
		Pressure valve	0532004108TÜV330bar
<b>Versions piston side 1-3</b>			
K0.1	1	Block piston side 1	PADZ0005.420
		DC valve	D3DW1ENJW
K1.1-2	1	Block piston side 2	PADZ0005.421
		Const. pressure valve	RE40E35W2SN1XW
K2.1-2.2	1	Block piston side 3	PADZ0005.422
		Const. pressure valve	RE32E35W2SN1XW
K2.3A	1	Cartridge valve	CE032C04S00N10
K2.3B	1	Cover unit	C032CA13001399N10
K2.4	1	Seated valve	D1SE83BNJW
<b>Versions pressure side 1-2</b>			
D0.1A	1	Block pressure side 1	PADZ0005.430
D0.1B	1	Cartridge valve	CE032C01S12N10
D0.2	1	Cover unit	C032CA14009917N10
D0.3	1	Pressure valve	ZUDB1AT2Z07K
D0.4	1	DC valve	D1DW98KNJW75C06X575
		Check valve	SPZBE1010E32N
D1.1	1	Block pressure side 2	PADZ0005.431
D1.2	1	DC valve	D3DW20BNJW
D1.3	1	Throttle check valve	FM3DDDSV
		Throttle check valve	FM3DDDSV

**Description**

The positioning of the direction valves is monitored by inductive limit switches type ASEW001D08 or type ASEW001D09 with integrated switch amplifier, which switch before the control piston has left the home position. The positive connection of the limit switch to the control piston forms a direct monitoring.



**Characteristic data**

**Limit switch type ASEW001D08**

Feed voltage range	18 ... 42VDC
Waviness of the feed voltage range	≤10%
Current consumption without load	≤30mA
Max. output current per channel, ohmic	400mA
Min. output load per channel, ohmic	100kOhm
Max. output drop at 0.2A load	≤1.1V
Max. output drop at 0.4A load	≤1.6V
Switching hysteresis	≤0.1mm
Ambient temperature range	0...70°C
Max. tol. ambient field strength at 50 Hz	1200A/m
Protection	IP 65
Socket	M12 to DIN 40050

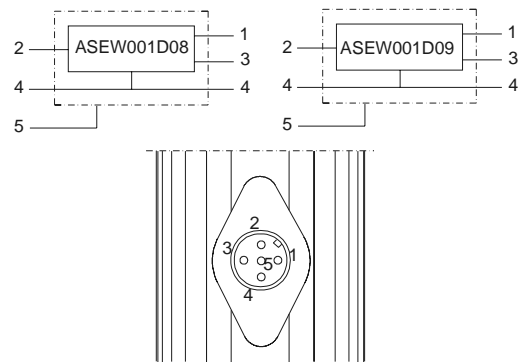
**Limit switch type ASEW001D09**

Feed voltage range	18...42 VDC
Waviness of the feed voltage range	≤10%
Current consumption without load	≤60mA
Max. output current per channel, ohmic	400mA
Min. output load per channel, ohmic	100kOhm
Max. output drop at 0.2A load	≤1.1V
Max. output drop at 0.4A load	≤1.6V
Switching hysteresis	≤0.1mm
Ambient temperature range	0...70°C
Max. tol. ambient field strength at 50 Hz	1200A/m
Protection	IP 65
Socket	M12 to DIN 40050

**EMV-compatibility as per EN50081-1/EN50082-2**

PI PRESSEN UK.PM6.5 RH

**Connections**



- Connection 1 : output 1
- Connection 2 : power supply  $U_b = 18...42V$
- Connection 3 : output 3
- Connection 4 : 0V
- Connection 5 : PE

**Plug connection**

Lead socket: 5004109

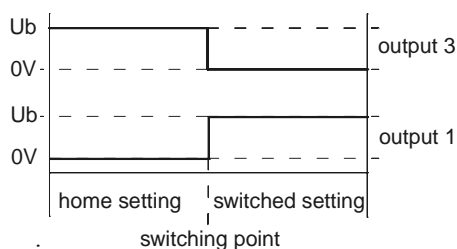
**Instructions for use**

- Connection leads to the limit switch are to be routed separately from the main current cables, e.g. cables to the electric motors or solenoids, as otherwise inductive voltage peaks can reach the limit switch via the power supply network, and damage them in spite of the integrated safety circuit.
- Suitable DC supply is necessary as power supply to the limit switch. The residual waviness of the feed voltage must not exceed max. 10%.
- Switch-off voltage peaks when switching inductive loads are to be decreased using corresponding safety circuits, e.g. recovery diodes.
- An integrated overload safety circuit interrupts the switching function of the limit switch in the case of overload. The limit switch is then automatically ready again after the duration of the overload state.
- The limit switch may not be installed in the vicinity of AC-operated consumers, e.g. AC solenoids, as otherwise malfunctions can occur. In any case, a minimum clearance of 0.1 m must be observed.
- Only operation within the stated technical data is allowed.
- Connections must be made according to the connections diagram.
- The setting of the position control switch adjusted in the factory may not be changed.

**Switching function**

**Limit switch type ASEW001D08**

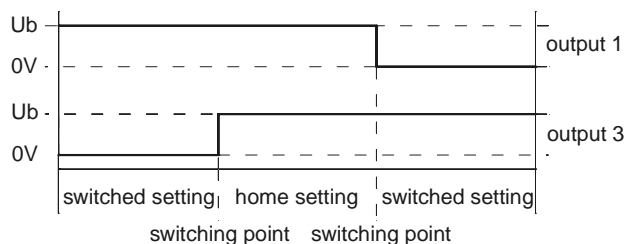
Inductive limit switches type ASEW001D08, integrated in the following DC valves D1VW..., D3DW..., D31DW..., D41VW..., D91VE... and D111VW... serve to monitor one switching point.



In the home setting, the output 1 is switched to 0V and output 3 to operating voltage Ub. On reaching the switching point, output 3 is switched to 0V and output 1 to operating voltage Ub.

**Limit switch type ASEW001D09**

Inductive limit switches type ASEW001D09, integrated in the following constant DC valves D31FHE..., D41FHE..., 91FHE..., and D111FHE...serve to monitor the middle setting with two switching points.



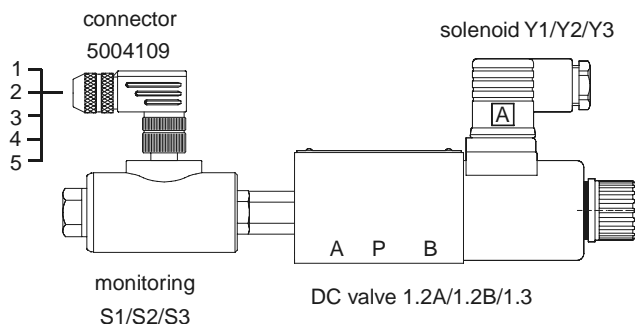
On reaching the middle setting, outputs 1 and 3 are switched to operating voltage Ub.

In the “pressing” function, output 1 is switched to 0V and output 3 is still switched to operating voltage Ub.

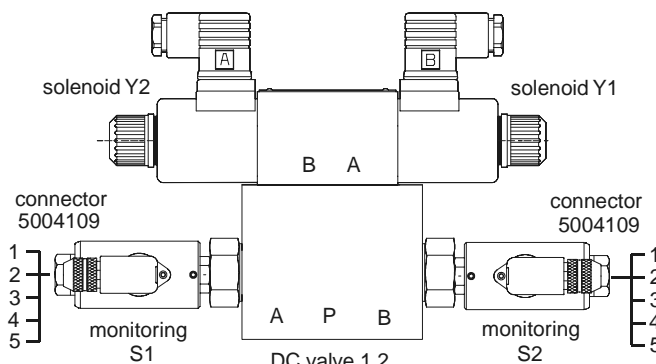
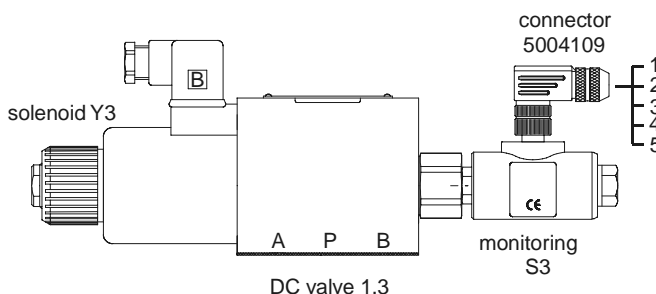
In the function “retract”, output 3 is switched to 0V and output 1 is still switched to operating voltage Ub.

**Position and execution of position controls for direction and safety DC valves**

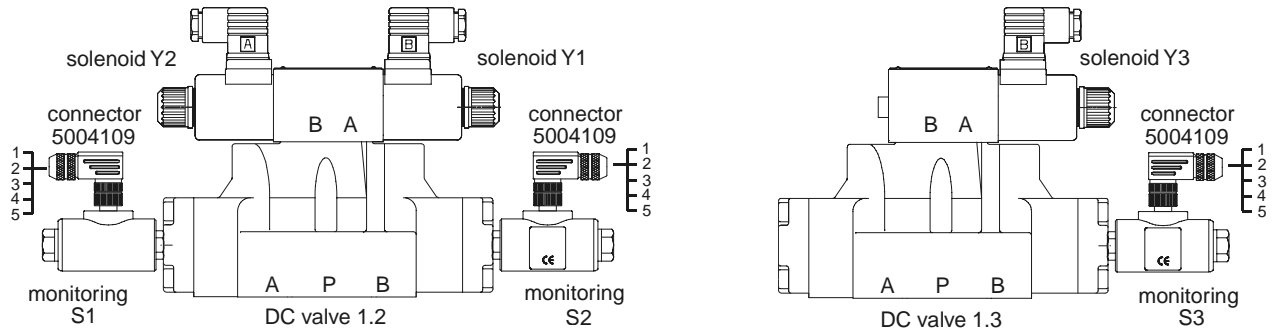
**Press control NG06**



**Press control NG10**

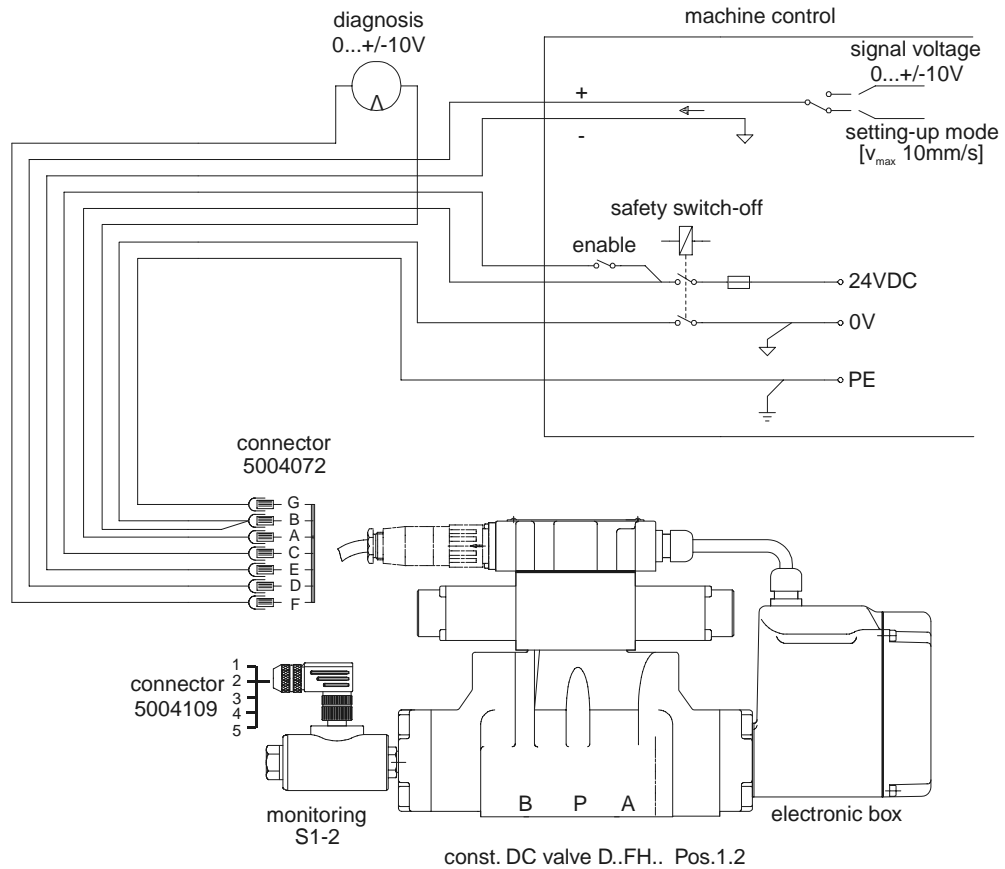


**Press control NG16-50**

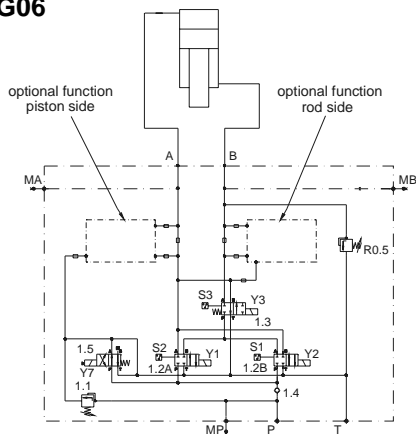


**Control and electrical connections**

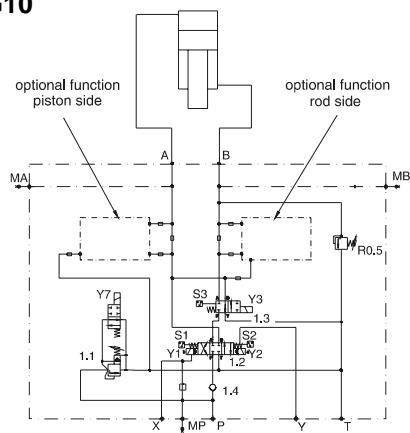
**Press control NG10-50 with proportional DC valve**



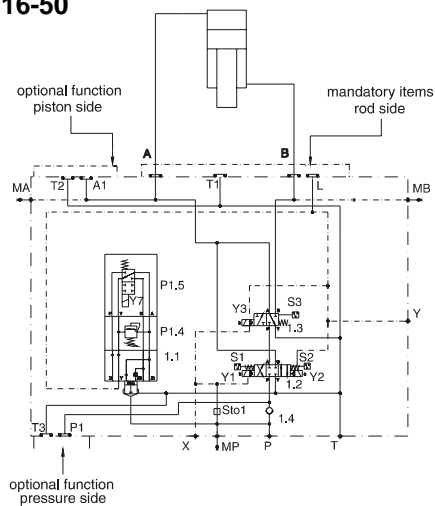
**Press control NG06**



**Press control NG10**



**Press control NG16-50**



**Stop and start position (pressure free circulation)**

The DC valves are in the home setting. All solenoids are idle. DC valves 1.2 and 1.3 prevent the press tappet from falling and prevent any pressure build-up on the piston side of the press cylinder. The safe home position of the DC valves is monitored by the electrical position switches S1, S2 and S3. Pressure-free circulation is via valve 1.1.

**Pressing**

The function “pressing” consists of the lowering and pressure build-up of the press tappet. It can only be initiated when the DC valves 1.2 and 1.3 are in the home position.

Firstly, solenoids Y1 and Y7 of valves 1.2 and 1.5 are activated. The control piston of DC valve 1.2 leaves the closed home position and releases the through flow from the pump in the direction of the press cylinder.

The DC valve leaving the home setting and moving into the switching setting is monitored by switch S2, which confirms the switching position “pressing” and the direction of the function, and then initiates the actuation of solenoid Y3 of valve 1.3.

The oil current flows from the pump via valve 1.2 to the piston side of the press cylinder. The return oil flows from the annulus of the press cylinder via valves 1.2 and 1.3 back to the oil tank. The press tappet moves downward.

On reaching the pressing stroke or pressing pressure, the function “pressing” switches off.

**Decompression**

After the end of the pressing stage, solenoid Y9 of valve K1.1 is excited, or the pressure release is initiated by the piston setting “B to T” of the constant DC valve 1.2 opening, thus reducing the operating pressure.

**Retract**

After decompression, the retract phase is initiated by exciting solenoids Y2, Y3 and Y7 of valves 1.2, 1.3 and 1.5. The oil current flows via valves 1.2 and 1.3 in the annulus of the press tappet. On reaching the retract stroke, the retract phase is switched off.

During retract phase with the safety device switched off, the direction switching of the valves must be permanently monitored.

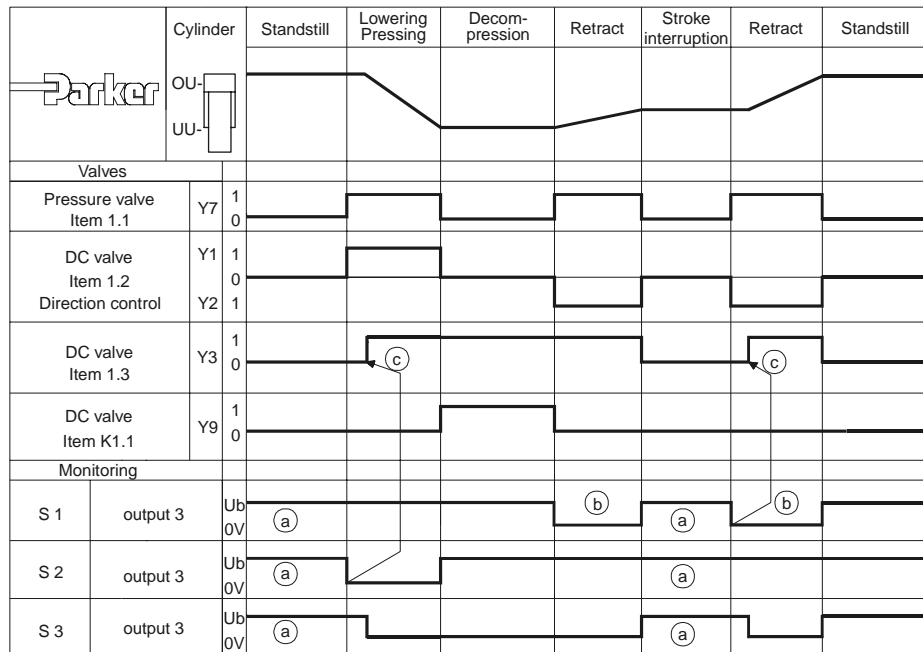
**Stroke interruption**

During a stroke interruption and before initiating another closing or retract movement, the DC valves 1.2 and 1.3 must be in the safe home setting. The electric home setting monitoring of switches S1, S2 and S3 enable another movement.

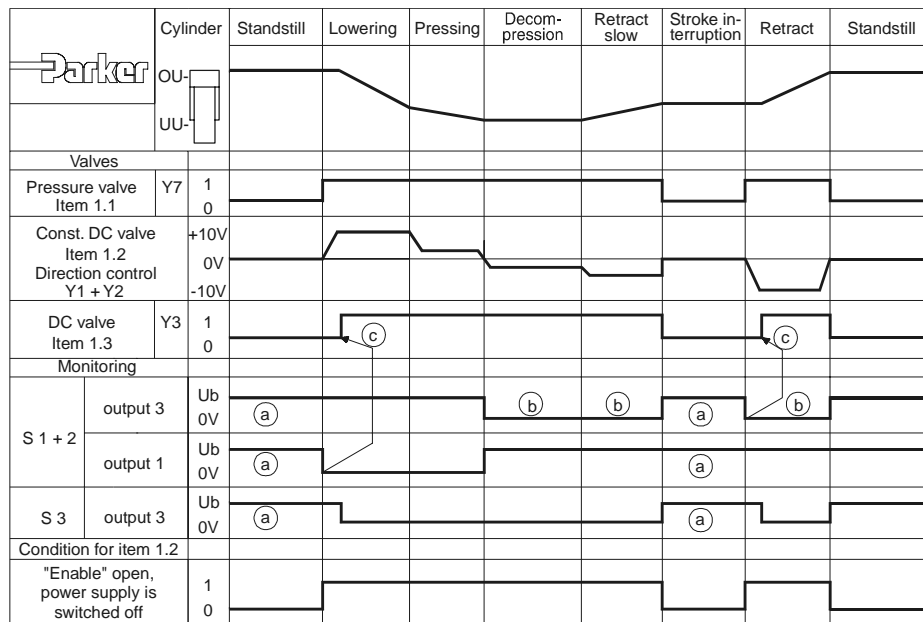
The direction detection feature of the electric control compares the initiated function with the switched solenoids.

DC valve 1.3 does not switch until the direction detection is OK.

**Function diagram (DC valve control)**



**Function diagram (proportional DC valve control)**



- “a” At standstill or stroke interruption in the closing and retract movement, the safe position of valves item 1.2 and item 1.3 must be monitored and controlled.
- “b” When pressing with safety device switched off in the retract phase, the switching position of the DC valve 1.2 for function “retract” must be permanently monitored.
- “c” After a standstill or stroke interruption, before initiating a closing or retract movement, the switching setting of DC valve item 1.2 must be controlled with the initiated function. DC valve item 1.3 is not switched until after direction detection.

**Installation**

When installing the press control, the press safety regulation EN693 must be observed.

The control block can be installed in any required position, but should be located as close as possible to the pressing cylinder.

The precise alignment and functioning of the control is indicated in the supplied parts lists, installation drawings and hydraulic diagrams.

Precise knowledge of the functions and connections is required for correct installation of the press control.

**Pressure fluid**

Mineral-based pressure fluids are recommended, such as H-L oils DIN 51524 or H-LP oils DIN 51525.

Viscosity should be 30-50 mm<sup>2</sup>/s [CSt.] at 40°C.

The temperature range of the pressure fluid from -25°C to +70°C may not be exceeded.

**Seals**

For operation with mineral-oil-based pressure fluids, standard seals are used made of nitrile.

**Filtration**

Functional reliability and service life of the control valves and other components can be decisively improved by effective filtration.

Full flow filtering in the feed pipe is recommended for systems with increased function safety, as is the case with press controls.

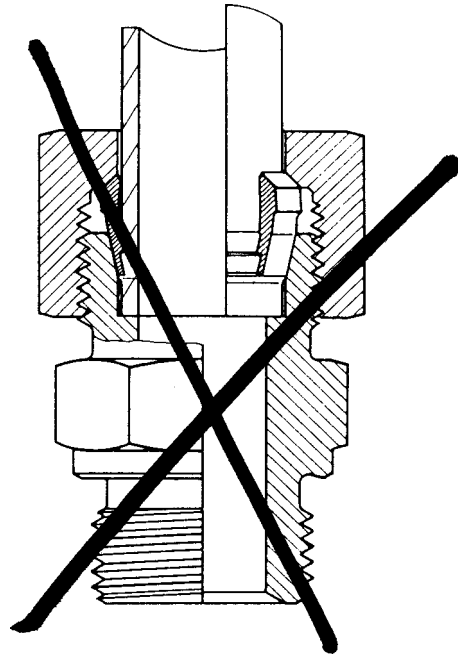
The fineness of the filter should be rated so that the pressure fluid achieves a purity class of 16/13 as per ISO4006.

**Connection pipes**

The pipes between press control and press cylinder are to be rated for the maximum pressure, adjusted at the pressure limiting valves 1.1 and R\*.5.

The pipe connection between press control and annulus connection of the press cylinder may not consist of cutting ring fittings.

Hose connections may not be used at this point.



Possible connections are flanges, peened ring fittings and fittings with welding nipples.

In the event of a malfunction, the build-up in pressure on the rod side of the press cylinder can increase up to the maximum set pressure of the pressure limiting valve R\*.5, which must be taken into account when rating the connection pipes.

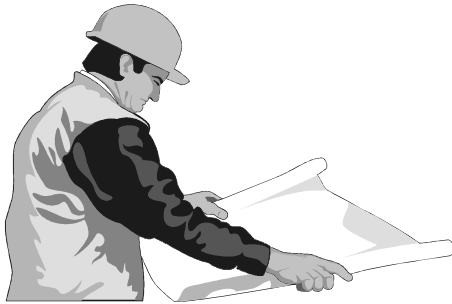
The pipes located in the vicinity of the operator workstation must be protected by an additional covering.

Leakage pipes and tank pipes must be routed to the tank without any pressure.



**Initial commissioning**

The hydraulic press control is not a machine which is ready for use, but is a component in the whole press equipment. Before initial commissioning, check that the mechanical, hydraulic and electrical/electronic components comply with the safety requirements. Only then should you start with initial commissioning.

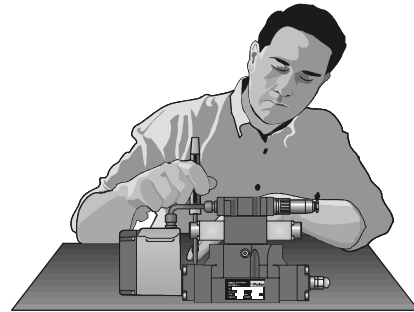


- Check that the technical data of the press agree with the data on the press control nameplate.
- Check the safe home setting of DC valves or constant DC valves 1.2 and 1.3, which are monitored by inductive switches. Also check that the signals of limit switches S1, S2 and S3 are registered in the electric control of the plant in compliance with the safety regulations (see function diagram).
- Check that the pipelines between press block and cylinder comply with the prescribed safety regulations.
- Check that the safety-relevant parts of the whole control comply completely with all requirements.
- Theoretical check and behaviour analysis based on the hydraulic and electric circuit diagrams.
- Adjust the pressures at pressure control valve 1.1.
- Check and adjust the pressure at the load holding valve so that the load weight is carried.
- Check that valves 1.2 and 1.3 loop in safely into the safe electric control.
- Practical test with the original switching of the hydraulic and electric/electronic components.
- Fault simulation of the individual relevant hydraulic and electric/electronic components.

After the tests have been concluded, the results must be documented and kept in a traceable form.

**Fault and fault analysis of the hydraulic system**

Press control blocks normally work fault-free when correctly rated and regularly maintained. If however a fault does occur, it is important to find the cause and eliminate the fault as quickly as possible. The following remarks should help to find and eliminate the fault.

**Fault 1:**

Insufficient or no pressure build-up in connection "P".

**Causes:**

- Pump wear or pump failure.
- Incorrect pressure setting at the pump.
- Incorrect pressure setting at pressure limiting valve 1.1.
- Piston jams at DC valve P1.5.

**Fault 2:**

No closing movement of the press tappet.

**Causes:**

- Pre-control piston at DC valve 1.2 jams because of dirt.
- Pre-control piston at DC valve 1.3 jams because of dirt.
- Piston of DC valve 1.2 is not in the safe, monitored middle setting.
- Piston of DC valve 1.3 is not in the safe, monitored middle setting.
- No control oil pressure.
- Fault in the electric/electronic control.
- Safety grid is not closed.

**Fault 3:**

No opening movement of the press tappet.

**Causes:**

- Pre-control piston at DC valve 1.2 jams because of dirt.
- Pre-control piston at DC valve 1.3 jams because of dirt.
- Piston of DC valve 1.2 is not in the safe, monitored middle setting.
- Piston of DC valve 1.3 is not in the safe, monitored middle setting.
- No control oil pressure.
- The filling valve is not opened with too slow movement.

**Maintenance**

Maintenance is preventive servicing. The following routine checks and maintenance work should be carried out at regular intervals on the hydraulic control and the whole system:

- Check the degree of contamination of the hydraulic fluid.
- Check the degree of contamination of the filter.
- Check the operating temperature.
- Check the pressure levels.
- Leak check of the hydraulic system.
- Leak check of the pipelines.
- Check the electric connections.
- Check for verification of the proper use and function of the system and all safety devices.

Maintenance and repair work may only be carried out by qualified, trained staff, using original tools and spare parts.

Inspections are to be carried out at certain time intervals to check and certify that the plant and all components and safety settings correspond with the safety requirements. The result of the final test is documented in a test report.

