Connection blocks type B for hydraulic power packs

Additional connection block types:

Type A..	acc. to D 6905 A/1	Connection blocks for pipe connection or direct mounting of valve banks with pressure limiting valve
Type AX..	acc. to D 6905 TÜV	Connection blocks with pressure limiting valve with unit approval (TÜV)
Type C	acc. to D 6905 C	Simple connection blocks for pipe connection

1. General information

The connection blocks listed here can be mounted directly onto to the following compact hydraulic power packs:

HC, HCW	acc. to D 7900	Compact hydraulic power packs
MP, MPW	acc. to D 7200 H	
FP, FPX	acc. to D 7310	
HK, HKF, HKL	acc. to D 7600 ++	
LP	acc. to D 7280 H	Airdriven hydraulic pump

There is also a connection block with tapped ports P and R available for applications where connection to the power pack is intended via pipes (see sect. 2.5).

These blocks are intended for intermittent service common with lifting devices and clamping applications where single and double acting cylinders are used and a simple and compact control lay-out is advantageous.
Two basic types are available, which only differ in their max. permissible operating pressure and the max. permissible flow. Only type 2 enables the control of double acting cylinders. Types 1 to 3 feature an idle circulation valve to relieve the hydraulic circuit whereas type 4 features a pressure actuated relieve valve which operates automatically.

2. Available versions

Order examples:

Type 1
MP44-H7,0/B10 - **B1/300-1-31D-G24**
Version for a max. return flow to the tank of 6, 12, or 25 lpm and permissible pressure of 500 or 700 bar intended for single acting consumers, see sect. 2.1

Type 2
HC24/H1,35 - **B4/200-WN1D-13/5-G24**
Version for max. flow of 6 to 8 lpm and permissible pressure of 320 or 450 bar, intended for single or double acting (differential) cylinders, see sect. 2.2

Type 3
HK44/1-H4,2 - **B31T/200-EM11V-12/5-WG230**
Version for max. flow of 20 lpm and permissible pressure of 450 bar, intended for single acting consumers, see sect. 2.3

Type 4 (without photo)
HC12/0,65 - **B1/200-DW-10**
Version for clamping devices with max. flow of 12 lpm and permissible pressure of 300 bar, see sect. 2.4

2.1 Connection blocks type 1

Advantageous for applications with high pressure (> 450 bar) and/or high return flow from the consumer to the tank (Q_{return} > 8 lpm).
For further notes about direct mounting onto other compact hydraulic power packs see restrictions below [1]).
For versions intended for direct pipe connection, see section 2.5

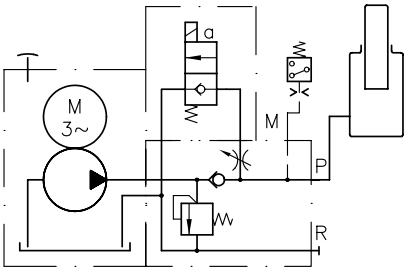
Order examples — Order coding for a compact hydraulic power pack acc. to D 7900 or D 7200 H

Example 1: HC 34/1,5 **- B2/600 - 1 - 33 3 D - G 24**

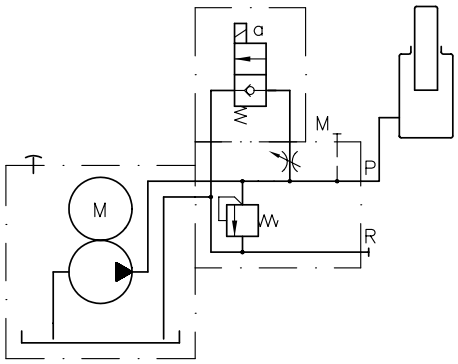
Example 2: MP 44-H9,5/B25 - **B1/180 - 2 - 1 2 D - WG 230**

Symbols to examples above

Example 1:
Version with pressure switch for single acting consumers



Example 2:
Simple version for single acting consumers



[1]) Restrictions to the available versions

Type of pump	Restrictions
HC D 7900 MP D 7200 H HK D 7600-..	None
FP D 7310	Size 1 and 2 (table 2 and 4) are not suited (Q_{max} of the pump type FP approx. 1.1 lpm). Version with pressur switch is not possible due to spatial reasons (see table 3)
LP D 7280 H	Version with pressure switch is not possible due to spatial reasons (see table 3)

[2]) Only for size 1 and 2 (see table 2)
[3]) Including fitting type ERMETO EGE 8 - SR - ED and GE 8 - PSR/A3C, but without plug MSD-T7 (must be ordered separately when required)

Table 5: Directly mounted directional seated valve acc. to D 7300 (size 0, 1, 2)

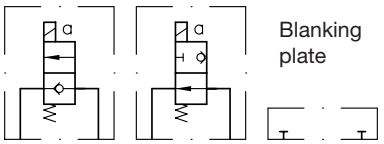
Flow pattern Coding and symbol			Nom. voltage U_N of the actuation solenoid	
D	**F**	**X**	**G 24**	24V DC
		Blanking plate	**WG 230**	230V AC 50/60 Hz
			For further specifications and actuation types, see D 7300	

Table 4: Options (check valve / throttle)

Available for size (table 2)	0	●	●		
	1	●	●	●	●
	2			●	●
Coding	**0**		**1 2**	**3**	
Version with check valve		no	yes	no	yes
with throttle		no	no	yes	yes
Application		---	Mainly for clamping hydraulics	Mainly for lifting devices	

Table 3: Pressure switch [1])
(mainly for hydr. clamping circuits)

Coding	Pressure switch DG acc. to D 5440(E)	Pressure range from ... to (bar)
1	Without DG, tapped plug G 1/4	
5	DG 1 R	20 ... 600
5S	DG 1 RS	20 ... 600
33	DG 33 - Y1	200 ... 700
34	DG 34 - Y1	100 ... 400
35	DG 35 - Y1	20 ... 250
36	DG 36 - Y1	4 ... 12
364	DG 364 - Y1	4 ... 50
365	DG 365 - Y1	12 ... 170
5E2	DG5E-250 [3])	(0) ... 250
5E4	DG5E-400 [3])	(0) ... 400

Note:
p_{min} represents the lower reference value for the pressure setting, where the pressure switches are normally used (the switching hysteresis increases dramatically below this figure).
Doesn't apply to electronic pressure switch type DG 5E-.., where the hysteresis is adjustable.

Table 2: Size

Coding	**0**	**1** [1])	**2** [1])
Port ISO 228/1 (BSPP)	G 1/4	G 3/8	G 1/2
Permissible return flow P → R (lpm)	6	12	25
Permissible pressure (bar) with < 10% ED	500	700	700

Table 1: Basic type

Coding	Design	Pressure range (bar)
B1/...	Tool adjustable	(0) ... 80
B2/...	Manually adjust.	(0) ... 160 (0) ... 315 (0) ... 500 (0) ... 700 [2])
	Desired pressure setting (bar)	Take into account the permissible pressure per flow of the respective pump!

2.2 Connection blocks type 2

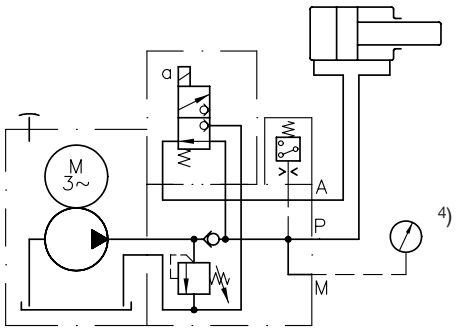
Intended mainly for use in smaller circuits with max. pressure of 450 bar and return flows from the consumer to the tank below 8 lpm, when combined with differential cylinders.
For further notes about direct mounting onto other hydraulic power unit see restrictions below [3]).
For versions intended for direct pipe connection, see section 2.5

Order examples — Order coding for a compact hydraulic power pack acc. to D 7900

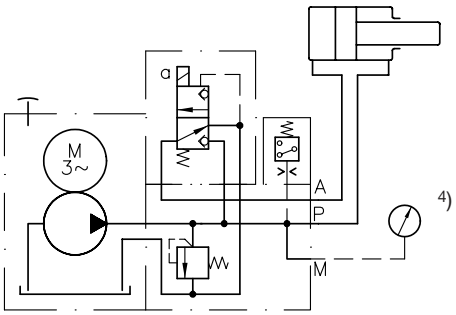
Example 1: HC 24/0,64 **- B4/200 - WN1M- 11/5- G 24**
Example 2: **- B3/400 - WH1H - 10/3 - G 24**

Symbols to examples above

Example 1:
Version with pressure gauge, pressure switch, and check valve for double acting consumers (connection pump / consumer in idle position)



Example 2:
Version with pressure gauge and pressure switch (without check valve) for double acting consumers (with relieve to the tank in idle position)



[1]) Observe the pressure range of the directional seated valve type WN1 (320 bar). For more detailed data, see D 7470A/1)

[2]) Other pressure switches that could be used as well: DG 1.. acc. to D 5440

[3]) Restrictions to the possible combinations:

Type of pump	Restrictions
HC D 7900 MP D 7200 H HK D 7600-.. LP D 7280 H	None
FP D 7310	Version with pressure switch and port for pressure gauge is not available due to spatial reasons

[4]) Pressure gauge (optional), not scope of delivery standard.

Table 9: Pressure switch [2])

Coding	Pressure switch DG acc. to D 5440(E)	Pressure range from ... to (bar)
2	Without DG, prepared for retrofitting	
3	DG 33	200 ... (700)
4	DG 34	100 ... 400
5	DG 35	20 ... 250
6	DG 36	4 ...12
64	DG 364	4 ... 50
65	DG 365	12 ...170
5E2	DG 5E-250-Y1E	(0) ... 250
5E4	DG 5E-400-Y1E	(0) ... 400

Attention: Observe the pressure range of the directly mounted directional seated valve!

	p_{max}
WH 1	450 bar
WN 1	350 bar

Also see note regarding the switching hysteresis in page 2, table 3.

Table 8: Additional elements (check valve)

Coding	**10**	**11**
Check valve	Without	With

Table 7: Directly mounted directional seated valve acc. to D 7470 A/1

Coding Symbol				Nom. voltage U_N of the actuation solenoid	
WN1H	**WN1M**	**WH1H**	**WH1M**	**G 12**	12V DC
				G 24	24V DC
				WG 230	230V AC 50/60 Hz
Max. flow:		WN1.. approx. 5 lpm WH1.. approx. 8 lpm		Special voltage on request; See further data in D 7470 A/1	
Max. pressure:		WN1.. 320 bar [3]) WH1.. 450 bar			

Table 6: Basic type

Kenn-zeichen	Pressure limiting valve	Port M for the connection of a pressure gauge and for DG acc. to D 5440(E)	Pressure range from ... to (bar) [1])	Tapped port size ISO 228/1 (BSPP)
B3/...	Tool adjustable	yes [3])	(0) ... 80 (0) ... 160 (0) ... 315 (0) ... 450	G 1/4
B4/...	Manually adjustable			

Desired pressure setting (bar)

2.3 Connection blocks type 3

Version used preferably for applications with a max. flow of 20 lpm and permissible pressure of 450 bar.
For versions enabling direct pipe connection, see sect. 2.5.

Order examples — Bestellbezeichnung des Kompakt-Pumpenaggregates nach D 7600-4

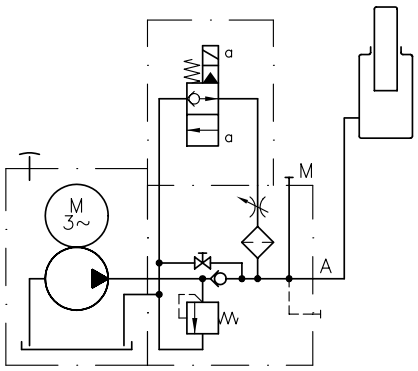
Example 1: HK 44/1-H 4,2 **- B 31/300 - EM 11V - 13/2 - G 24**

Example 2: **C 15 - B 31T/200 - EM 11V - 12/5 - WG 230**

Connection block for direct pipe connection (sect. 2.5)

Symbols to examples above

Example 1:
Version with integrated drain valve



Example 2:
Version with additional return port

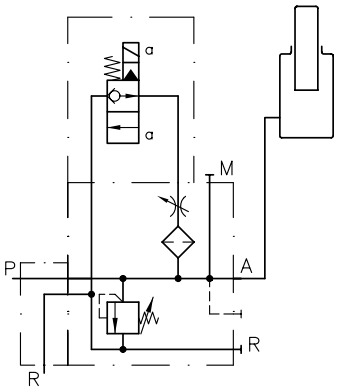


Table 14: Pressure switch

Coding	Pressure switch DG acc. to D 5440(E)	Pressure range from ... to (bar)
2	Without DG, prepared for retrofitting	
3	DG 33	200 ...(700)
4	DG 34	100 ...400
5	DG 35	20 ...250
6	DG 36	4 ...12
64	DG 364	4 ...50
65	DG 365	12 ...170
5E2	DG 5E-200-Y1E	(0) ... 200
5E4	DG 5E-400-Y1E	(0) ... 400

Attention: Observe the pressure range of the directly mounted directional seated valve!
p_{max} = 450 bar

Also see note regarding the switching hysteresis in page 2, table 3.

Table 13: Additional elements (check valve / throttle)

Coding		**10**	**11**	**12**	**13**
Version	Check valve	No	Yes	No	Yes
	Throttle	No	No	Yes	Yes

Table 12: Directly mounted directional seated valve acc. to D 7490/1

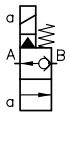
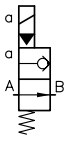
Coding Symbols		Nom. voltage U_N of the actuation solenoid		
EM 11V	**EM 11S**			
		**G 12**	12V DC	For more detailed data, see D 7490/1
		G 24	24V DC	
		WG 230	230V AC 50 and 60 Hz	

Tabelle 11: Grundtyp

Version	Coding	Pressure limiting valve	Pressure range from ... to (bar)	Ports ISO 228/1 (BSPP) A	Ports ISO 228/1 (BSPP) R
With integrated drain valve	**B 31/...**	Tool adjustable	(0) ... 80 (0) ... 160 (0) ... 315 (0) ... 450	G 1/4	---
	B 41/...	Manually adjust.			
	B 32/...	Tool adjustable		G 3/8	---
	B 42/...	Manually adjust.			
With additional return port	**B 31T/...**	Tool adjustable		G 1/4	G 1/4
	B 41T/...	Manually adjust.			

Desired pressure setting bar)

Connection blocks type 3 - Continuation

Version with 2-way flow control valve for load independent dropping of the load

p_{max} = 315 bar
Q_{max} = 40 lpm

Order examples — Order coding for a compact hydraulic power pack acc. to D 7900

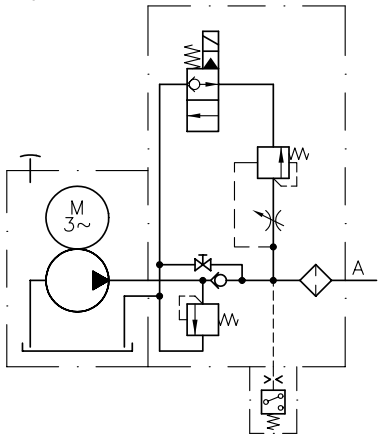
Example 1: HCW 34 **- B 32/250 - EM 21V - R6/10 - 4/220 - WG 230**

Example 2: C 15 **- B 32/300 - EMP 21S - R6/6 - X84V-9/400 - G 24**

Connection block for direct pipe connection (sect. 2.5)

Symbols to examples above

Example 1



Example 2

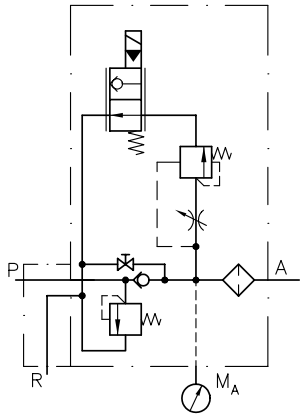


Table 14a: Directly mounted components

Coding	Device	Pressure range from ... to (bar)
Pressure switch type DG acc. to D 5440(E)		
2	Without	---
3	DG 33 - Y1	200 ... (700)
4	DG 34 - Y1	100 ... 400
5	DG 35 - Y1	20 ... 250
6	DG 36 - Y1	4 ... 12
64	DG 364 - Y1	4 ... 50
65	DG 365 - Y1	12 ... 170
Fittings X84 acc. to D 7077		
X84V-9/250	Version with pressure gauge (250 bar)	
X84V-9/400	Version with pressure gauge (400 bar)	
For additional versions, see D 7077		

Attention: Observe the permissible max. pressure of p_{max} = 315 bar

Table 12a: Directly mounted directional seated valve acc. to D 7490/1

Coding Symbols				Nom. voltage U_N of the actuation solenoid		
EM 21V	**EM 21S**	**EMP 21V**	**EMP 21S**	**G 12**	12V DC	For more detailed data, see D 7490/1
				G 24	24V DC	
				WG 230	230V AC 50/60 Hz	

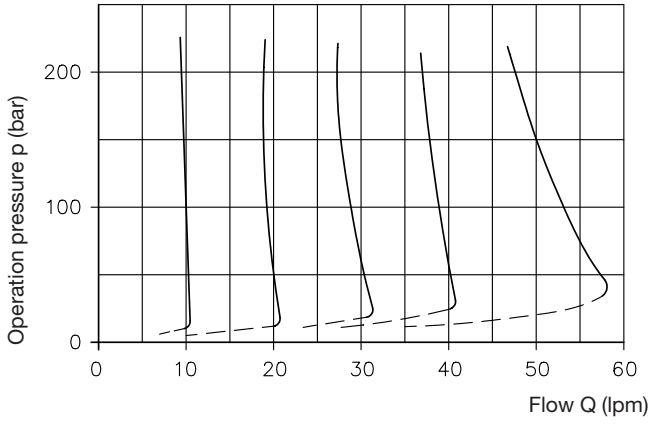
Table 11a: Basic type

Version	Coding	Pressure limiting valve Pressure range see table 11	Ports ISO 228/1 (BSPP) A	Ports ISO 228/1 (BSPP) M_A
with 2-way flow control valve and drain valve	**B 32/.. - .. - R6/..**	Tool adjustable	G 3/8	G 1/4
	B 42/.. - .. - R6/..	Manually adjust.		

Setting of the with 2-way flow control valve
Pressure range: 0.5 ... 40 lpm

Desired pressure setting (bar)
p_{max} = 315 bar

Curve
2-way flow control valve



2.4 Connection block type 4

Intended for use with clamping devices, where seizing and releasing of a function is activated via the pump pressure.
When switching the pump off the system relieves automatically via the pressure actuated valve.
The connection block should be located as close as possible to the pump, to ensure quick switching as soon as the pump is cut-off (i.e. direct mounting onto compact hydraulic power packs, like illustrated)

Order coding for a compact hydraulic power pack acc. to D 7900

Order example: HC12/1,28 **-B1/180-DW-10**

Flow pattern symbol according to the order example

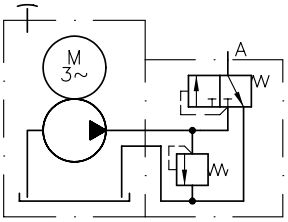


Table 15: Basic type

Coding	Pressure limiting valve	Pressure range from ... to (bar)	Port A ISO 228/1 (BSPP) = G 1/4
B1/...-DW-10	Tool adjustable	20 ... 50 51 ... 100 101 ... 190 191 ... 240 241 ... 300	Flow Q_{max} = 12 lpm Pressure p_{max} = 300 bar
Desired pressure setting (bar			

Note: The pressure rating p_{max} of the compact power pack has to be reduced by 20 bar.

2.5 Version for pipe connection

This connection block with tapped ports at P and R is available for applications where the connection to the power pack is intended via pipes. It may be used also in combination with connection blocks acc. to D 6905 A/1 and D 6905 TÜV.
Therefore not suited for combination with connection block type 4, see also corresponding note in sect. 2.4.

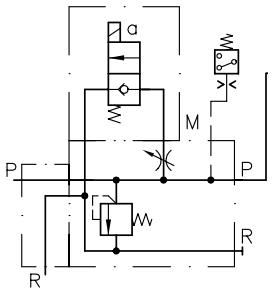
Order examples:

Example 1 (with connection block type 1): **C 15** - B1/600-1-333D-G 24

Example 2 (with connection block type 3): **C 16** - B42/200-EM11V-12/2-WG 230

Symbols to examples above

Example 1:



Example 2:

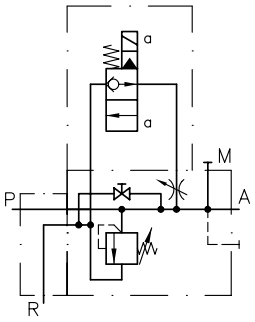


Table 16: Connection block

Coding	Ports P and R ISO 228/1 (BSPP)	Suited for Type 1	Type 2	Type 3
C 15	G 1/4	B 1(2)/..-0	B 3(4)/..	B 31(T)/.. B 41(T)/..
C 16	G 3/8	B 1(2)/..-1	---	B 32(T)/.. B 42(T)/..

3. Further parameters

3.1 General specifications

Nomenclature, design	Connection block with directly mounted directional valve, either 2/2- or 3/2-way depending on type
Ports	Basic valve can be directly mounted onto compact hydraulic power packs type HC (D 7900), MP (D 7200 H), FP (D 7310), HK (D 7600 ++) and LP (D 7280 H); For onleading ports, see specific data in sect. 4 ++. P = Pressurized fluid A = Consumer M = Pressure gauge R = Return
Installed position	in dependance of the hydraulic power pack, otherwise aribitrary
Back pressure	The Δp-Q-curves P(A) $\rightarrow$ R are rather identical to the one given for the corresponding flow plattern coding in the following pamphlets: For type 1 (sect. 2.1) see D 7300 and for type 2 (sect. 2.2) see D 7470A/1) resp. D 7490/1 (type 3, sect. 2.3). Type 4, sect. 2.4: Pressure for opening (P$\rightarrow$A) = 10 bar A$\rightarrow$R = approx. 2 bar; P$\rightarrow$A = 12 bar (all with Q_{max} = 12 lpm)
Pressure fluid	Hydraulic oil conforming DIN 51514 part 1 to 3: ISO VG 10 to 68 conform. DIN 51519. Viscosity range: min. approx. 4; max. approx. 800 mm^2/sec opt. service: approx. 10 ... 200 mm^2/sec The back pressure will strongly rise above viscosities of approx. 300 mm^2/sec. Also suitable are biologically degradable pressure fluids type HEES (Synth. Ester) at service temperatures up to approx. +70°C. Fluid types HEPG and HETG must not be used (due to restrictions caused by oil immersed hydraulic power packs.
Temperature	Ambient: -40 ... +80°C Fluid: -25 ... +80°C, pay attention to the viscosity range! Start temperature down to -40°C are allowable (Pay attention to the viscosity range during start-up!), as long as the operation temperature during consequent running is at least 20K (Kelvin) higher. Biodegradable pressure fluids: Pay attention to manufacturer‘s information. With regard to the compatibility with sealing materials do not exceed +70°C.
Electrical data	Connection block type 1, sect. 2.1 see D 7300 Connection block type 2, sect. 2.2 see D 7470 A/1 Connection block type 3, sect. 2.3 see D 7490/1

3.2 Mass (weight) approx. kg

Connection block type 1 acc. to sect. 2.1:

Size	Basic coding B1/.. and B2/..	Pressure switch type DG acc. to D 5440(E)	Directional valve acc. to D 7300 Coding D and F	Coding X
0	0.9	DG1 = 1.3 DG3.. = 0.3 DG5E-.. = 0.3	0.4	0.1
1	1.2		0.7	0.2
2	2.6		1.2	0.2

Connection block type 2 acc. to sect. 2.2:

B3(4)/.. = approx. 2.7 (without DG)
= approx. 3.0 (with DG)

Connection block type 3 acc. to sect. 2.3:

B 3(4) 1/... = approx. 0.9
B 3(4) 2/... = approx. 0.9
B 3(4) 1T/... = approx. 1.2

+ 0.3 for version with pressure switch type DG

Connection block type 4 acc. to sect. 2.4:

B1/..-DW-10 = approx. 0.9

Connection block acc. to sect. 25:

C 15 and C 16 = approx. 0.2

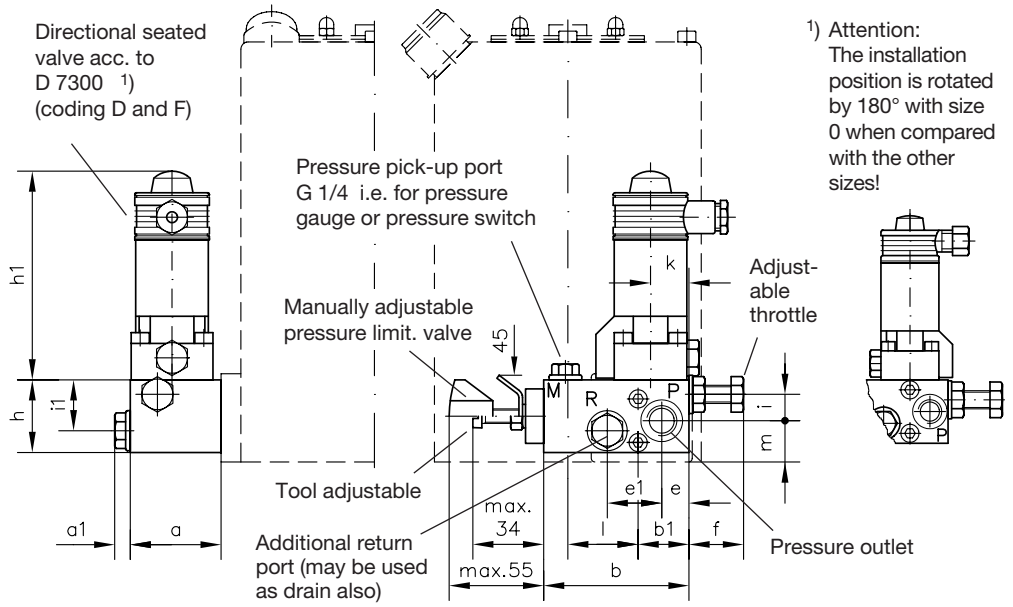
4. Unit dimensions

All dimensions in mm and subject to change without notice!

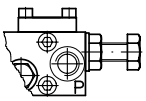
4.1 Connection block type 1 acc. to sect. 2.1

Illustrated here is the installation with compact hydraulic power packs type HC (D 7900)
Example with throttle, without pressure switch

The installation onto hydraulic power packs type HK (D 7600 ++) is similarly. The distance dimensions of the connection pedestal, where the connection blocks type B1/.. and B2/.. are mounted (see sect. 4.2) are substantial.



1) Attention:
The installation position is rotated by 180° with size 0 when compared with the other sizes!



Blanking plate coding **X**:

Size	Z.-No.
0	6540 039
1	5000 099
2	6905 209

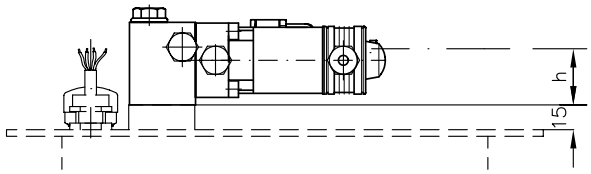
Size	a	a1	b	b1	e	e1	f	h	h1	i	i1	k	P and R
0	50	9	70	19.5	10	30	--	35	90.5	--	25	16	G 1/4
1	50	9	80	28	15	30	30	40	115	22.5	28	21	G 3/8
2	63	12	100	42	24	39	38	50	127	31	20	27.5	G 1/2

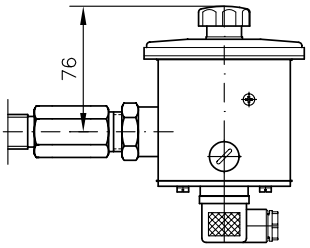
	HC1..	HC2..	HC3..
l	24	39	52
m	23	23	30

Installation at hydraulic power packs type MP

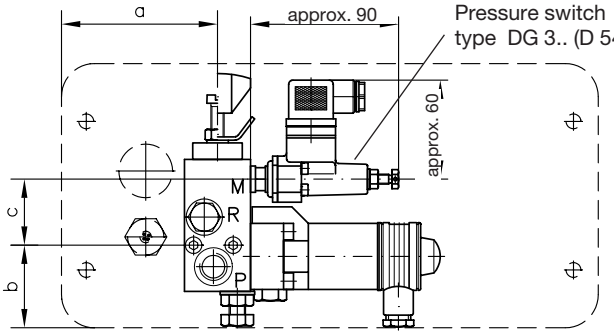
Arrangement with type LP and FP is similar to type MP

Example with pressure switch and throttle
For missing dimensions see above!

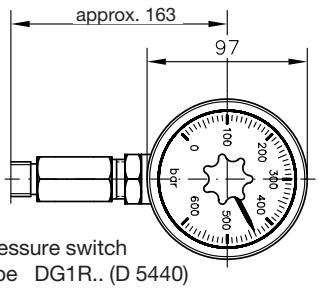




It is necessary to loosen the fittings and turn the pressure switch to ease access to the rear side, while doing the electrical connection. Turn back the pressure switch into the disired position and retighten the fittings after doing the electrical connection.

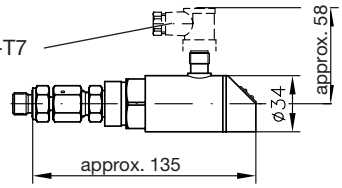


Adjustable throttle



Pressure switch type DG1R.. (D 5440)

Optional plug MSD-T7



Pressure switch type DG5E- .. (D 5440 E) incl. fittings ERMETO EGE8-SR-ED + GE8-PSR/A3C

Connection block B1(2)/..:

Size	h	c
0	35	41
1	34	40
2	47	45

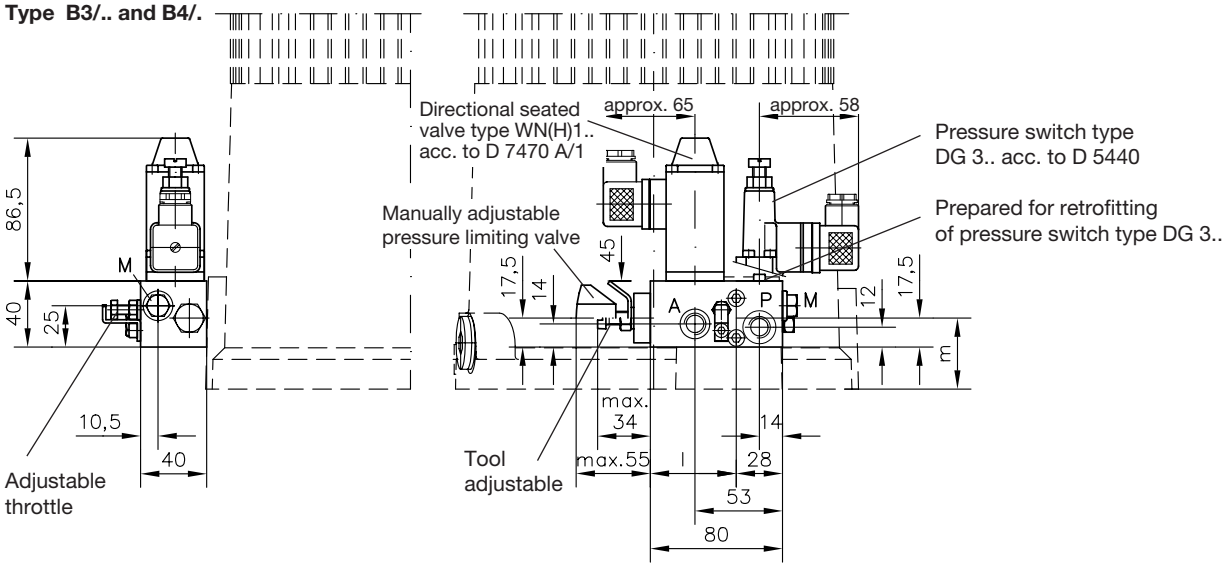
Hydraulic power pack type MP

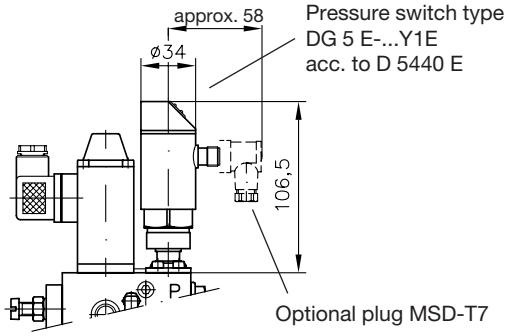
	a	b
B 3	77	50
B 5	93	50
B 10	95	50
B 25	105	50
B 55	135	115

4.2 Connection blocks type 2 acc. to sect. 2.2

Illustrated here is the installation at compact hydraulic power packs type HK (D 7600 ++)
The installation onto hydraulic power packs type HC, MP, and FP is similar to illustration in sect. 4.1

Type B3/.. and B4/.





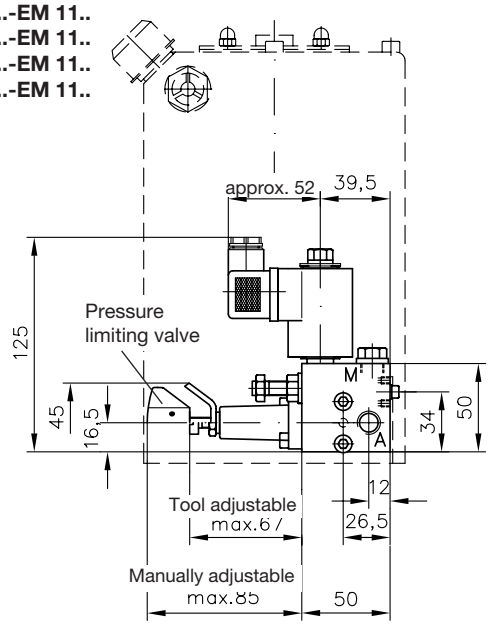
	HK24	HK33(34)	HK44(43)
l	35	45	50
m	37	43	43

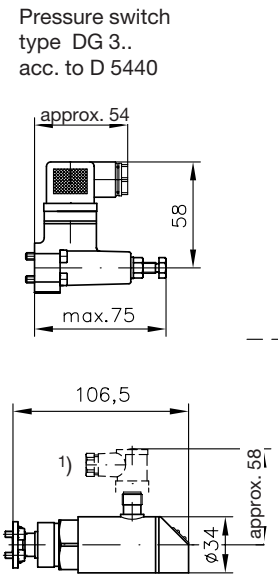
Ports ISO 228/1 (BSPP):
A, P, R, and M = G 1/4

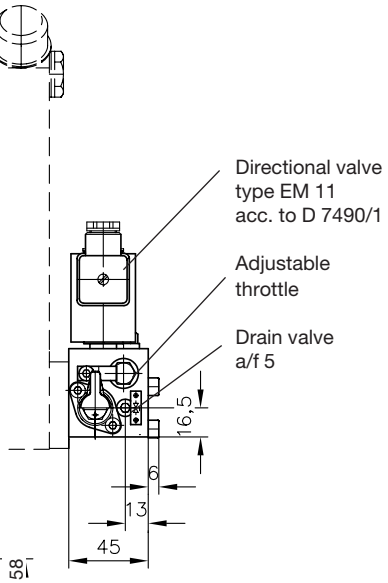
4.3 Connection blocks type 3 acc. to sect. 2.3

Illustrated here is the installation at compact hydraulic power packs type HC (D 7900)
The installation onto hydraulic power packs type MP, HK, and FP is similar to illustration in sect. 4.1

Type B 31/..-EM 11..
B 41/..-EM 11..
B 32/..-EM 11..
B 42/..-EM 11..





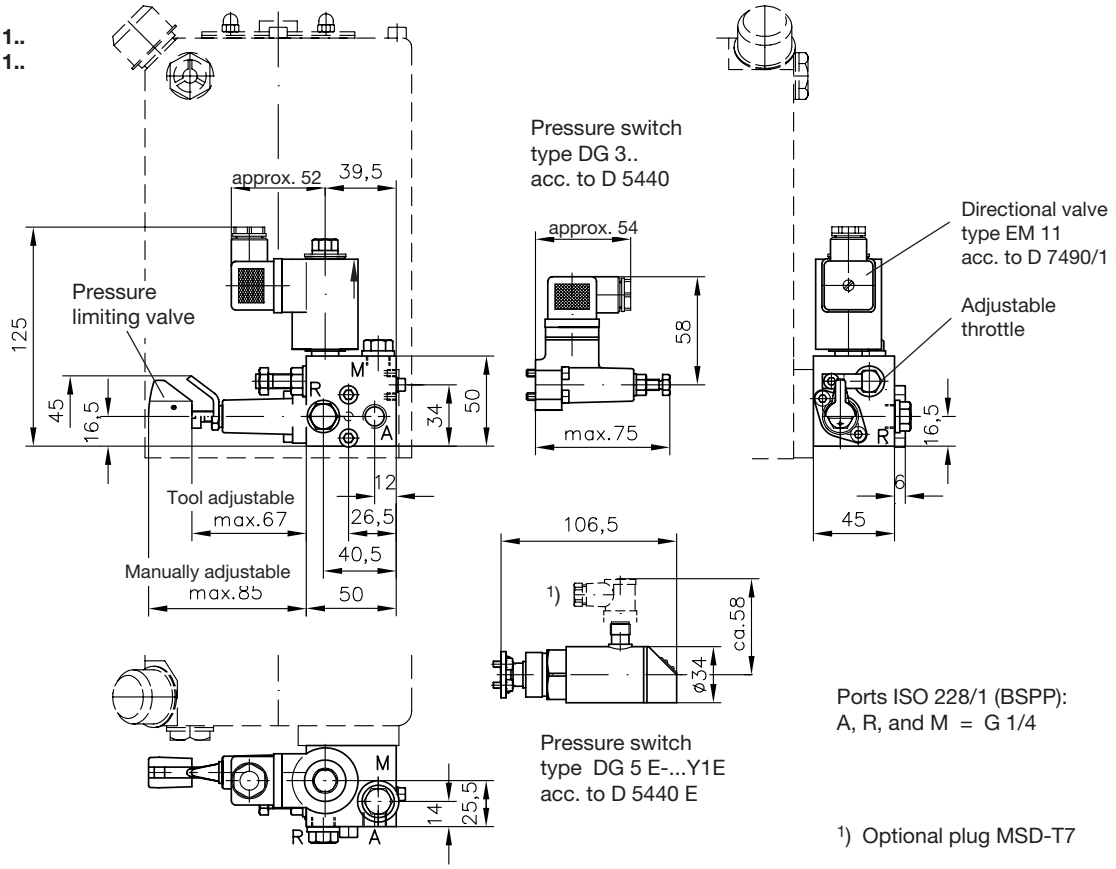


1) Optional plug MSD-T7

Ports ISO 228/1 (BSPP):
A = G 1/4 (B...1../...)
= G 3/8 (B...2../...)
M = G 1/4

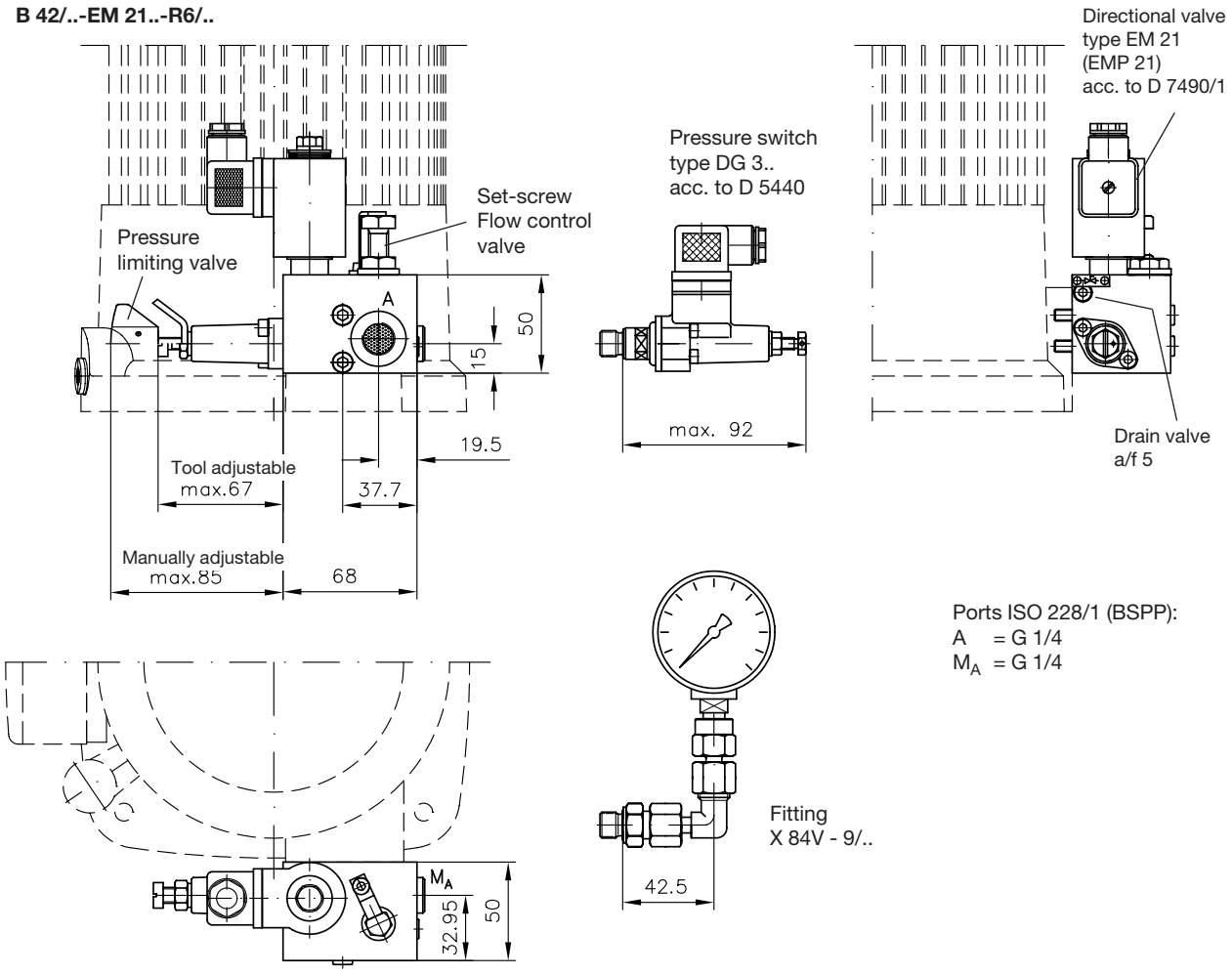
Continuation sect. 4.3

Type B 31T/..-EM 11..
B 41T/..-EM 11..



Illustrated here is the installation at compact hydraulic power packs type HK (D 7600 ff)
The installation onto hydraulic power packs type HC, MP and FP is similar to illustration in sect. 4.1

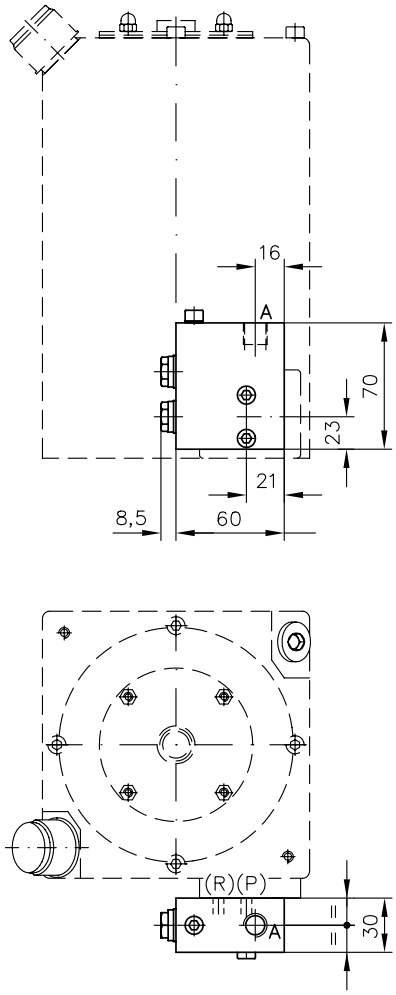
Type B 32/..-EM 21..-R6/..
B 42/..-EM 21..-R6/..



4.4 Connection block type 4 acc. to sect. 2.4

Illustrated here is the installation at compact hydraulic power packs type HC (D 7900)
The installation onto hydraulic power packs type MP, HK, and FP is similar to illustration in sect. 4.1

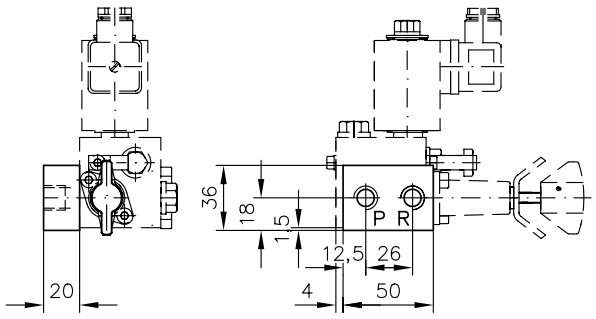
Type 1/...-DW-10



Port A
ISO 228/1 (BSPP)
= G 1/4

4.5 Version for pipe connection acc. to sect. 2.5

Type C 15(16)-B.../...



Ports P and R
ISO 228/1 (BSPP):

C 15 - B.../... = G 1/4
C 16 - B.../... = G 3/8