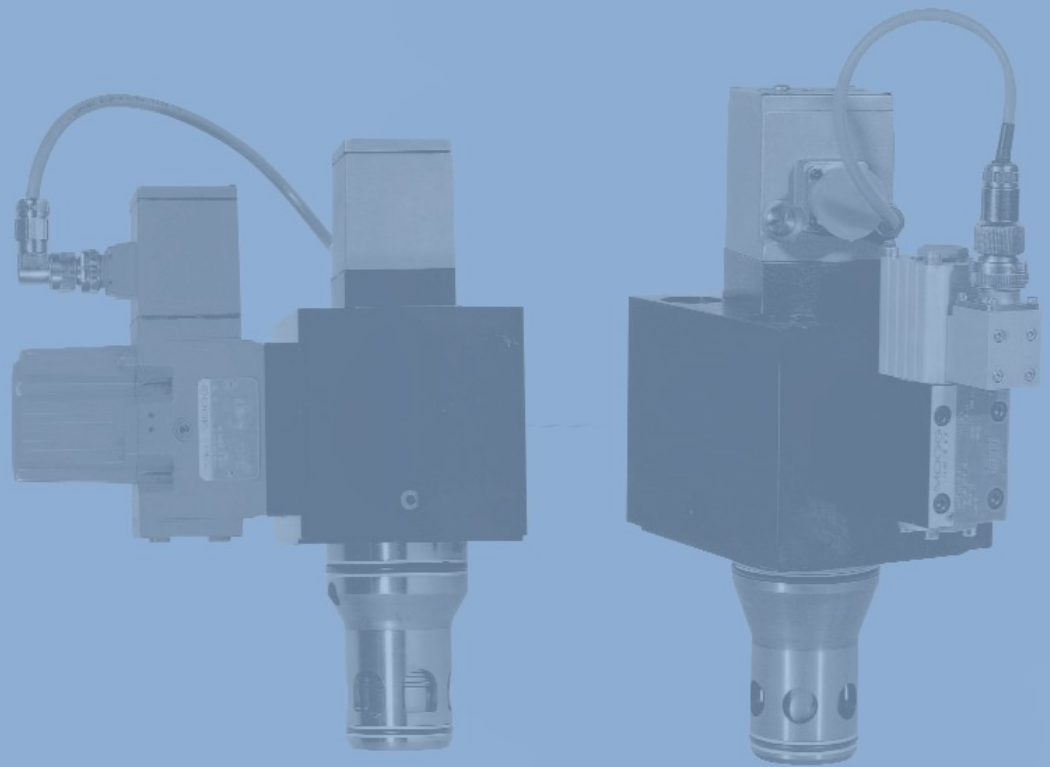


# 2-WAY SERVO CARTRIDGE VALVE

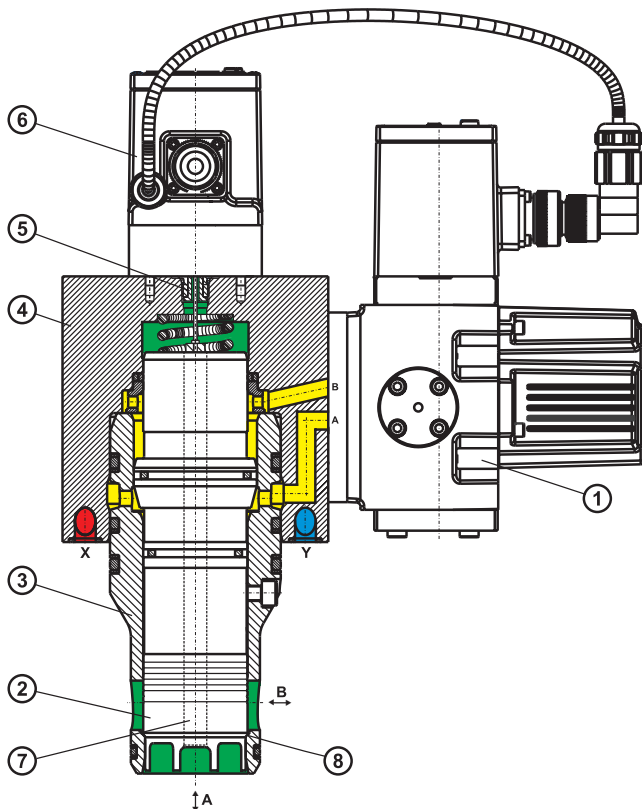
ISO 7369 SIZES 40 TO 100  
SIZES 125 AND 160



REV. B, 03/2015

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This catalogue is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has to check the suitability of the products described herein. In case of doubt please contact Moog Hydrolux.



## Servo valve for manifold mounting

Continuously adjustable from A to B or B to A.  
Pilot valve (1) located directly on the cover.

## Technical design

The valve comprises of 6 main groups.:

- Pilot valve (1)
- Main stage cone (2)
- Sleeve (3)
- Cover (4)
- Position transducer (5)
- Integrated control electronics (6)

## Function description

- Main stage cone (2) with equal pilot-surfaces and metallic seat.
- Controlled by a high-dynamic servo-pilot valve (D661) or a high-dynamic proportional-pilot valve (D633).
- Shut off of the connections A and B by cone-seat (8) of the main stage cone (2).
- => **LEAKAGE FREE**
- Pressure balance through the drilling (7) in the main stage cone (2), resulting in a very low displacement force.
- Control of the main stage cone by a position transducer (5).
- Closed loop by integrated electronics (6).
- Failsafe features: Main stage cone always closed, when pilot pressure available,  
=> biased pilot valve and also with a fail-safe sandwich plate on request.

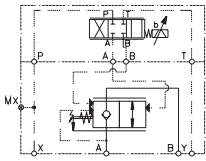
## Recommendation: Valves with NB10 - pilot valve (High response-valve),

- ⇒ Accu in the X - and Y - port of the cover (4), depending on the nominal size.
- ⇒ At low pressure in the Y - port (< 2 bar), it's recommended to use a check valve in the Y- line to ensure a minimal backpressure to protect the diaphragm of the accumulator !

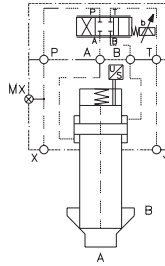
For application where vibrations higher than 30g are expected (i.e Diecasting), the electronics with additional dampening elements are required. (see " ES " in the Ordering Information)

**Attention:** Wrong connecting leads to uncontrolled movements of the main stage cone and may cause damage to person and machine !

D633-Pilot valve (NB06)

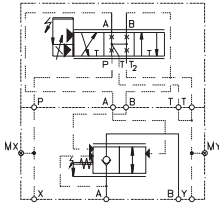


D633-Pilot valve (NB06)

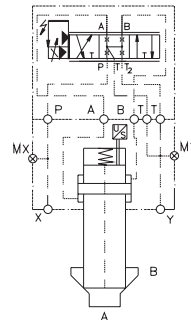


**NB40 + NB50 (D633)**

D661-Pilot valve (NB10)

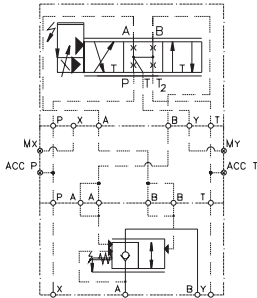


D661-Pilot valve (NB10)

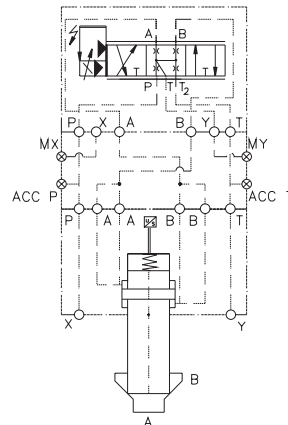


**NB40....NB63 (D661)**

D661-Pilot valve (NB10)

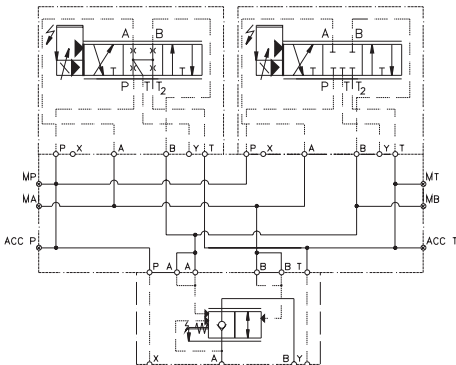


D661-Pilot valve (NB10)

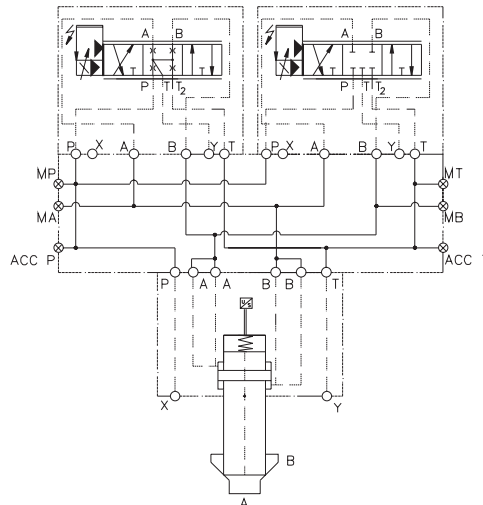


**NB80 + NB100 (1xD661)**

2x D661-Pilot valve (NB10)



2x D661-Pilot valve (NB10)



**NB80...NB160 (2xD661)**

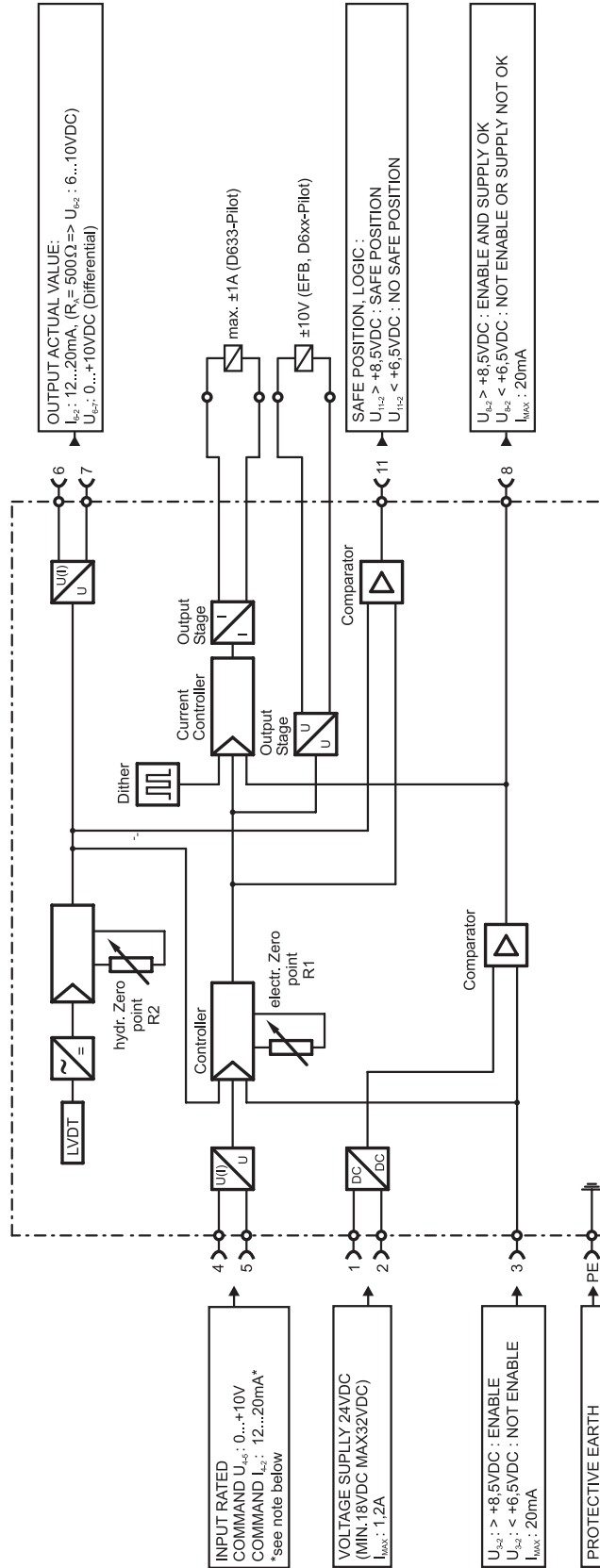
General data	Value	Unit	Specifications						
Mode of construction	-	-	2/2-way-cartridge valve, seat valve with positioning control. Proportional-hydraulically operated with servo pilot valve						
Mounting position	-	-	any						
Vibration	-	-	30 g, 3 axes						
Ambient temperature range	min. max.	°C °C	- 20 + 60						
<b>Hydraulic</b>									
Operating pressure ports A, B A-port B-port	max. max.	bar bar	dynamic 350 for all sizes dynamic 420 for all sizes						
Pilot pressure for	max.	bar	280 => D661-Pilotvalve 350 => D633-Pilotvalve						
Pressure fluid temperature range	min. max.	°C °C	-20 +80						
Flow direction	-	-	A → B B → A (recommended in case of pressure peaks > 350 bar)						
Viscosity	→ recommended → max admissible	mm²/S mm²/S	15.....45 5.....400						
<b>Filtration of the pressure fluid for the pilot circuit</b>			<b>D661-Pilot</b>				<b>D633-Pilot</b>		
Recommended cleanliness class for normal operation			ISO 4406 < 19 / 16 / 13				ISO 4406 < 18 / 15 / 12		
Recommended cleanliness class for longer life			ISO 4406 < 17 / 14 / 11				ISO 4406 < 17 / 14 / 11		
Filter rating recommended for normal operation			β <sub>15</sub> ≥75 (15 μm absolute)				β <sub>10</sub> ≥75 (10 μm absolute)		
Filter rating recommended for longer life			β <sub>10</sub> ≥75 (10 μm absolute)				β <sub>6</sub> ≥75 (6 μm absolute)		
<b>Nominal size</b>	-	-	<b>NB40</b>	<b>NB50</b>	<b>NB63</b>	<b>NB80</b>	<b>NB100</b>	<b>NB125</b>	<b>NB160</b>
Nominal flow at Δp = 5 bar X-cone	Q <sub>N</sub>	L/min	1450	2700	3900	6100	9600	12550	20550
Nominal flow at Δp = 5 bar V-cone	Q <sub>N</sub>	L/min	850	1100	2200	3000	4800	8450	13350
max. permissible flow <sup>3)</sup>	Q <sub>max.</sub>	L/min	2 x Q <sub>N</sub> (X-cone), 3 x Q <sub>N</sub> (V-cone)						
Control stroke of mainstage	-	mm	14	14	24	24	30	40	50
Control oil volume	V <sub>st.</sub>	cm <sup>3</sup>	8,1	13,2	33,5	52,3	108,4	231,7	515,4
Pilot valve: (NB40-NB160) (High Response valve)			Series D661 => NB40 to NB160 (NB80 to NB160 => 2 x D661)						
Pilot valve: (only NB40 + NB50)			Series D633 => NB40 + NB50						
Nominal flow of the pilot valve	Q <sub>N</sub>	L/min	10 / 20 (NB40 / NB50) => D633-Pilotvalve at Δp = 35 bar <sup>1)</sup> 35 => 1x D661-Pilotvalve at Δp = 5 bar <sup>1)</sup> 65 => 2x D661-Pilotvalve at Δp = 5 bar <sup>1)</sup>						
max. null leakage flow at p <sub>x</sub> = 210 bar of the pilot valve	Q <sub>L</sub>	L/min	0,4 => D633-Pilotvalve 4,5 => D661-Pilotvalve <sup>2)</sup>						
<b>Static / dynamic</b>									
Hysteresis	-	%	< 0,3						
Response time for signal change 0...100% at p <sub>x</sub> = 160 bar with accu and D661-pilotvalve	-	ms	12	15	25	32 (1xD661) 18 (2xD661)	55 (1xD661) 32 (2xD661)	55	140
To achieve this response times, membrane accumulators in the P port of the covers are recommended. See on pages 12 until 15 the size of the accumulators. To avoid pressure peaks, for sizes NB63, NB80, NB100, NB125 and NB160 an additional accumulator in the T port is also recommended.									
Response time for signal change 0...100% at p <sub>x</sub> = 160 bar without accu and D633-pilotvalve	-	ms	22	25	-	-	-	-	-
Weight	-	kg	23 (D633) 26 (D661)	36 (D633) 39 (D661)	58	125 (1x D661) 135 (2x D661)	210 (1x D661) 220 (2x D661)	360	733

<sup>1)</sup> Nominal flow per land / Flow rate at a different Δp :  $Q_x = Q_{nom.} \cdot \sqrt{\frac{\Delta p_x}{5}}$

<sup>2)</sup> Leakage for one pilot valve - for two pilot valves the leakage is approximately twice as high.

<sup>3)</sup> For higher flow rates, please contact Moog.

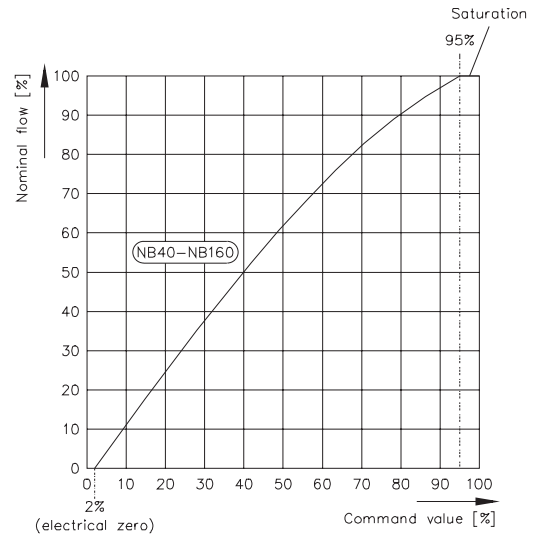
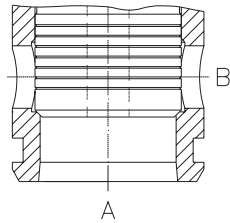
Pole connector to EN 175201 Part 804 (DIN 43 651), and mating connector (type E, metal shell) with leading protective earth connection (⊥)



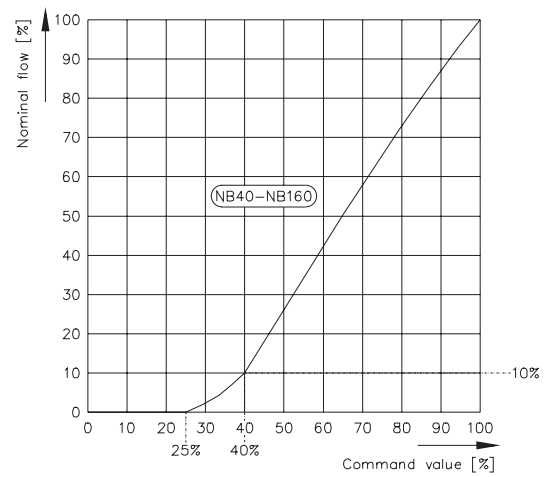
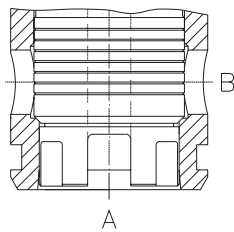
\*INPUT RATED COMMAND 12 to 20 mA.  
 The stroke of the cone is proportional to  $I_c = -I_c$ .  
 100% cone opening A => B or B => A is achieved at  $I_c = 20\text{mA}$ .  
 If pin 4 is used, pin 5 must be connected to pin 2 at cabinet side.  
 At 12 mA command signal the cone is in closed position.

Flow characteristics (measured at  $\nu = 32 \text{ mm}^2/\text{s}$  and  $t = 40^\circ$ )  
 Nominal flow at  $\Delta p = 5 \text{ bar}$

**Cone " X "**

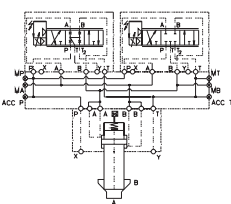
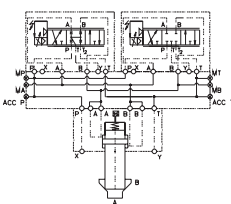
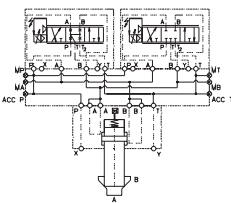
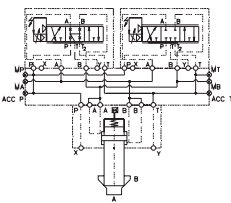


**Cone " V "**



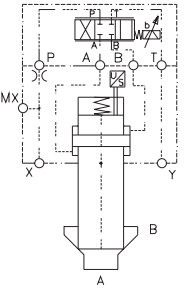
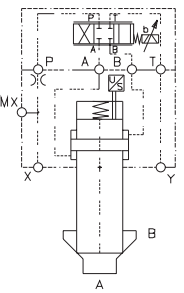




Symbol	Cone	NB	Q <sub>N</sub> (l/min) at Δp= 5 bar	Description	Weight (kg)
	X	80	6100	N-DSHRE80_6XB__1AD_X/AP05	135
	V		3000	N-DSHRE80_6VB__1AD_X/AP05	
	X	100	9600	N-DSHRE100_6XB__1AE_X/AP01	220
	V		4800	N-DSHRE100_6VB__1AE_X/AP01	
	X	125	12550	N-DSHRE125_6XB__1AF_X/AP02	360
	V		8450	N-DSHRE125_6VB__1AF_X/AP02	
	X	160	20550	N-DSHRE160_6XB__1AG_X/AP01	733
	V		13350	N-DSHRE160_6VB__1AG_X/AP01	

## MODELS WITH D633-PILOT VALVE

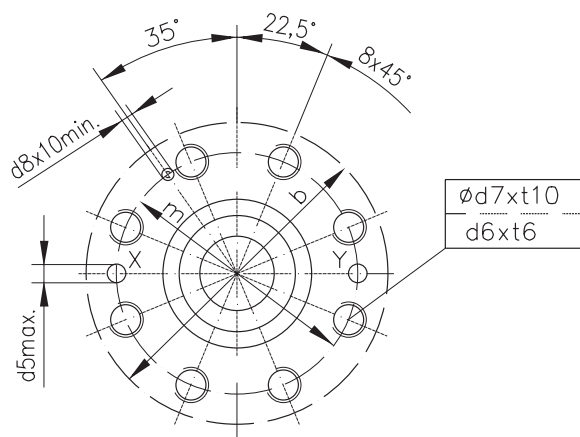
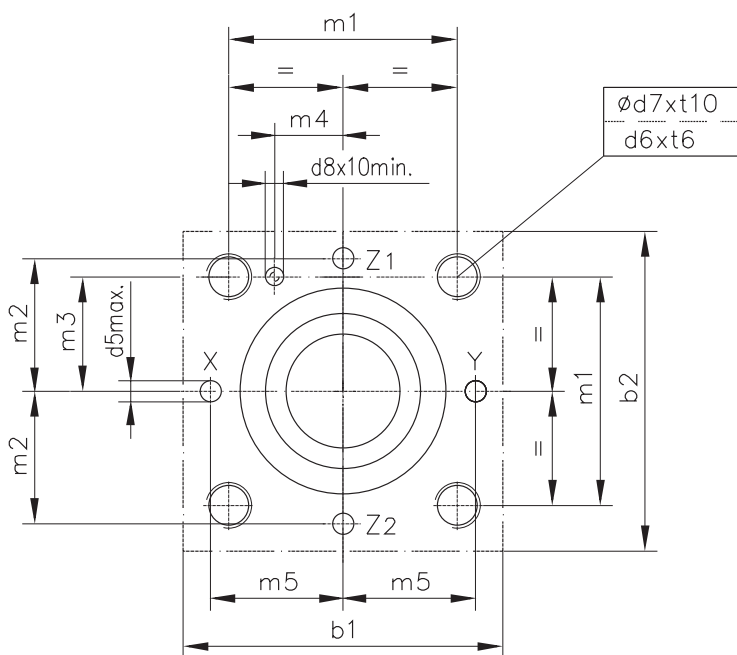
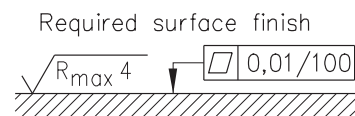
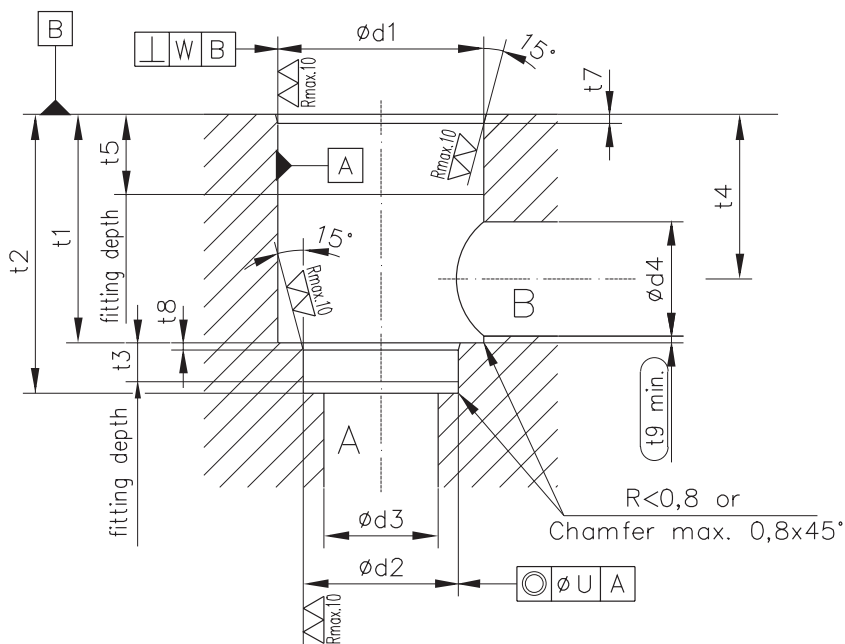
# DSHR

Symbol	Cone	NB	$Q_N$ (l/min) at $\Delta p = 5$ bar	Description	Weight (kg)
	X	40	1450	N-DSHRE40_6XA__1AA_X	23
	V		850	N-DSHRE40_6VA__1AA_X	
	X	50	2700	N-DSHRE50_6XA__1AB_X	36
	V		1100	N-DSHRE50_6VA__1AB_X	

# INSTALLATION DIMENSIONS NB40-NB100

# DSHR

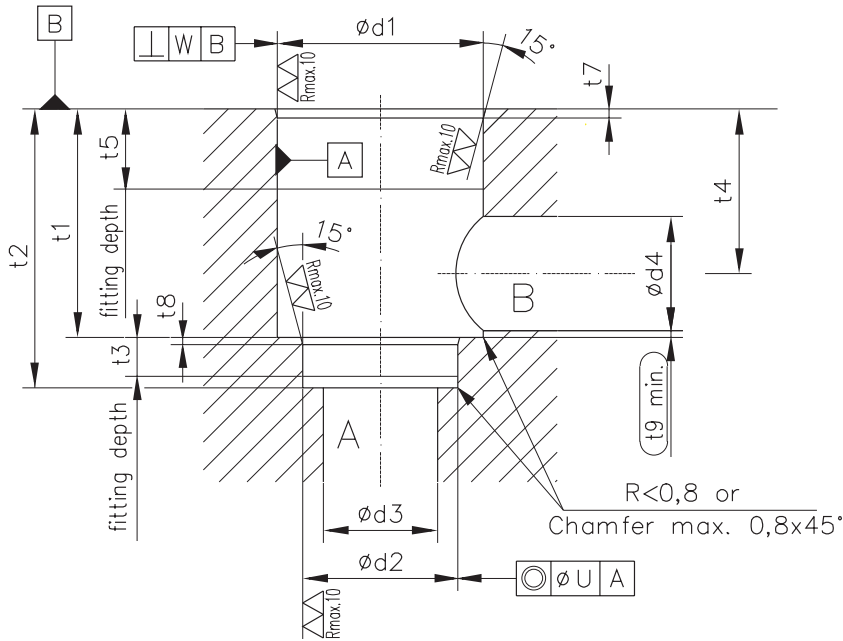
CAVITY AS PER ISO 7368



Dimension	NB40	NB50	NB63
b1	160	140	200
b2	125	140	180
d1 <sup>H7</sup>	75	90	120
d2 <sup>H7</sup>	55	68	90
d3	40	50	63
d4	40	50	63
d4 <sub>max.</sub>	50	63	80
d5 <sub>max.</sub>	10	10	12
d6	M20	M20	M30
d7	17,5	17,5	26,5
d8 <sup>H13</sup>	6	8	8
m1 ±0,2	85	100	125
m2 ±0,2	50	58	75
m3 ±0,2	42,5	50	62,5
m4 ±0,2	23	30	38
m5 ±0,2	50	58	75
t1 +0,1	87	100	130
t2 +0,1	105	122	155
t3	15	17	20
t4	64	72	95
t4 at d4 <sub>max.</sub>	59	65,5	86,5
t5	30	35	40
t6	33	33	50
t7	3	4	4
t8	3	3	4
t9	2,5	2,5	3
t10	38	38	56
U	0,05	0,05	0,05
W	0,1	0,1	0,2

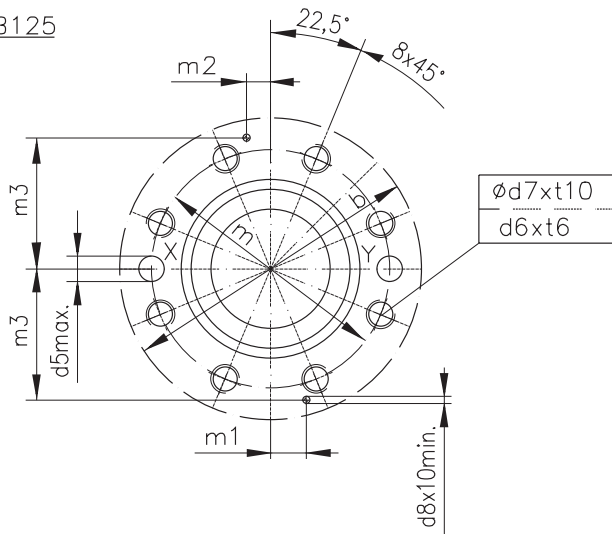
Dimension	NB80	NB100
b <sub>max.</sub>	250	300
d1 <sup>H7</sup>	145	180
d2 <sup>H7</sup>	110	135
d3	80	100
d4	80	100
d4 <sub>max.</sub>	100	125
d5 <sub>max.</sub>	16	20
d6	M24	M30
d7	21	26,5
d8 <sup>H13</sup>	10	10
t1	175	210
t2 +0,2	205	245
t3	25	29
t4	130	155
t4 at d4 <sub>max.</sub>	120	142,5
t5	40	50
t6	39	50
t7	5	5
t8	5	5
t9	3	5
t10	45	56
m ±0,3	200	245
U	0,05	0,05
W	0,2	0,2

CAVITY AS PER MOOG HYDROLUX

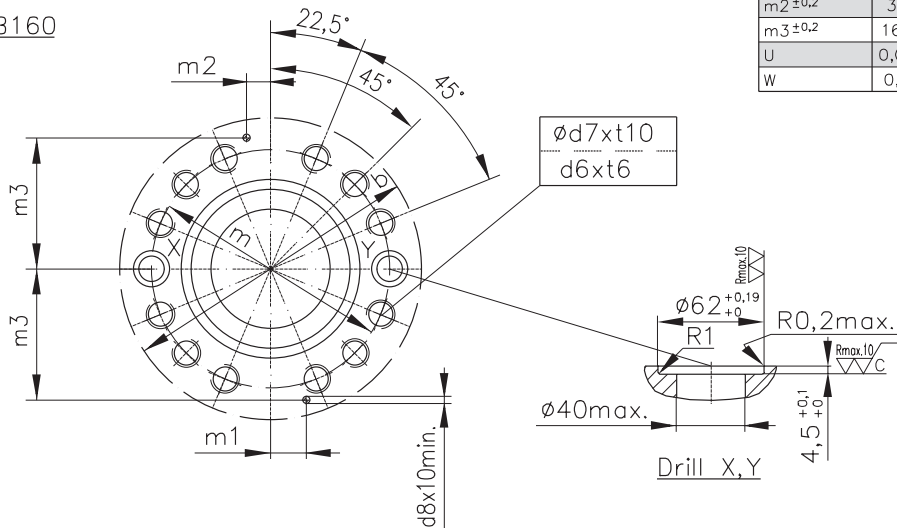


Dimension	NB125	NB160
b $\pm 0,3$	380	480
d1 H7	225	300
d2 H7	200	270
d3	150	200
d4	125	200
d4 max.	150	250
d5 max.	32	40
d6	M36	M42
d7	32	37,5
d8 H13	9.	9.
t1 $\pm 0,5$	257	370
t2 $\pm 0,15$	300	-
t2 $\pm 0,15$	-	425
t3	31	45
t4	192	268
t4 at d4 max.	180	243
t5	40	50
t6	58	70
t7 $\pm 0,2$	5,5	5,5
t8 $\pm 0,2$	7	8
t9 min.	2	2
t10	66	79
m $\pm 0,3$	300	400
m1 $\pm 0,2$	45	60
m2 $\pm 0,2$	30	45
m3 $\pm 0,2$	165	215
U	0,05	0,05
W	0,2	0,2

NB125

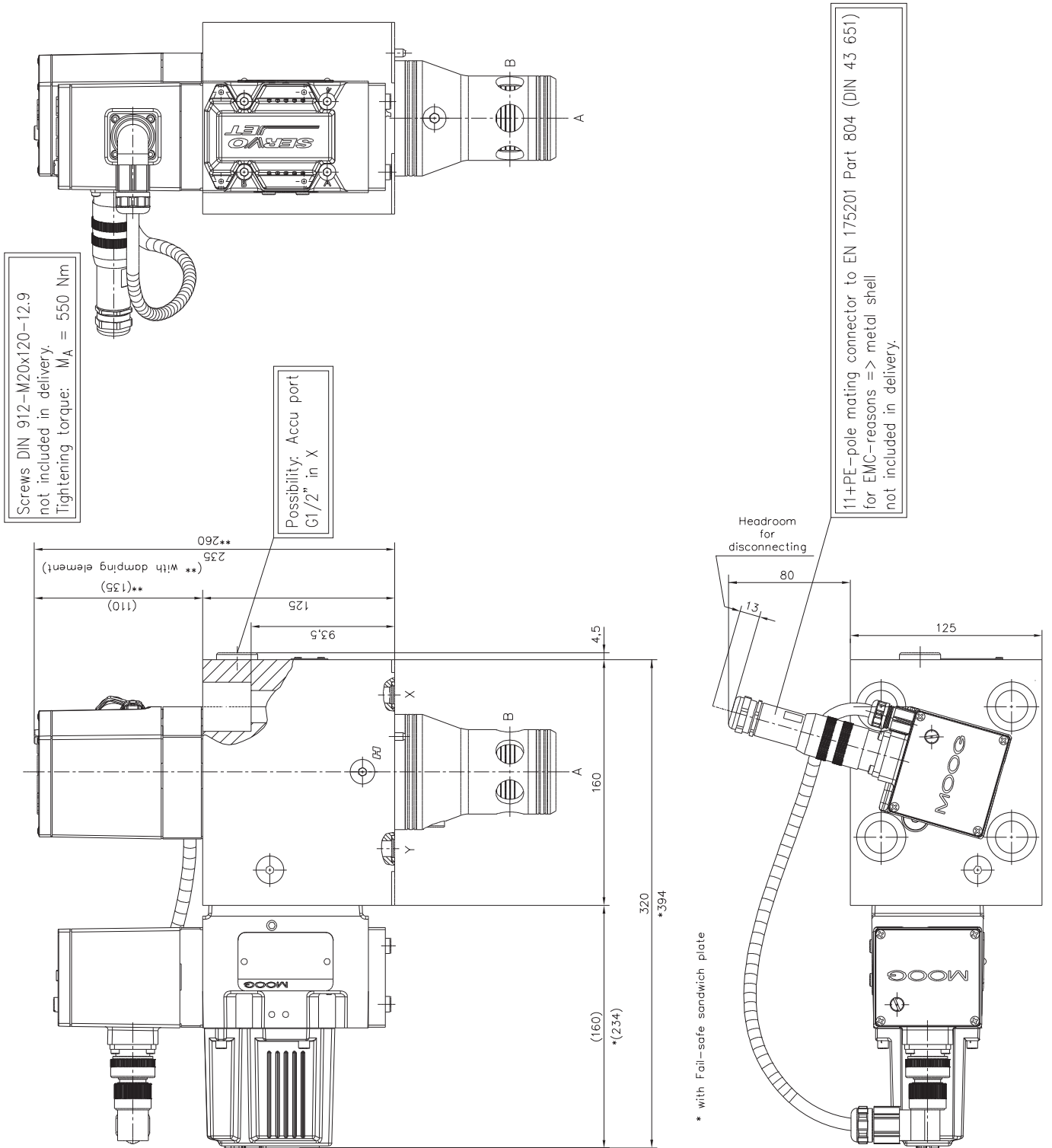


NB160



# DIMENSIONS NB40 WITH D661-PILOT VALVE

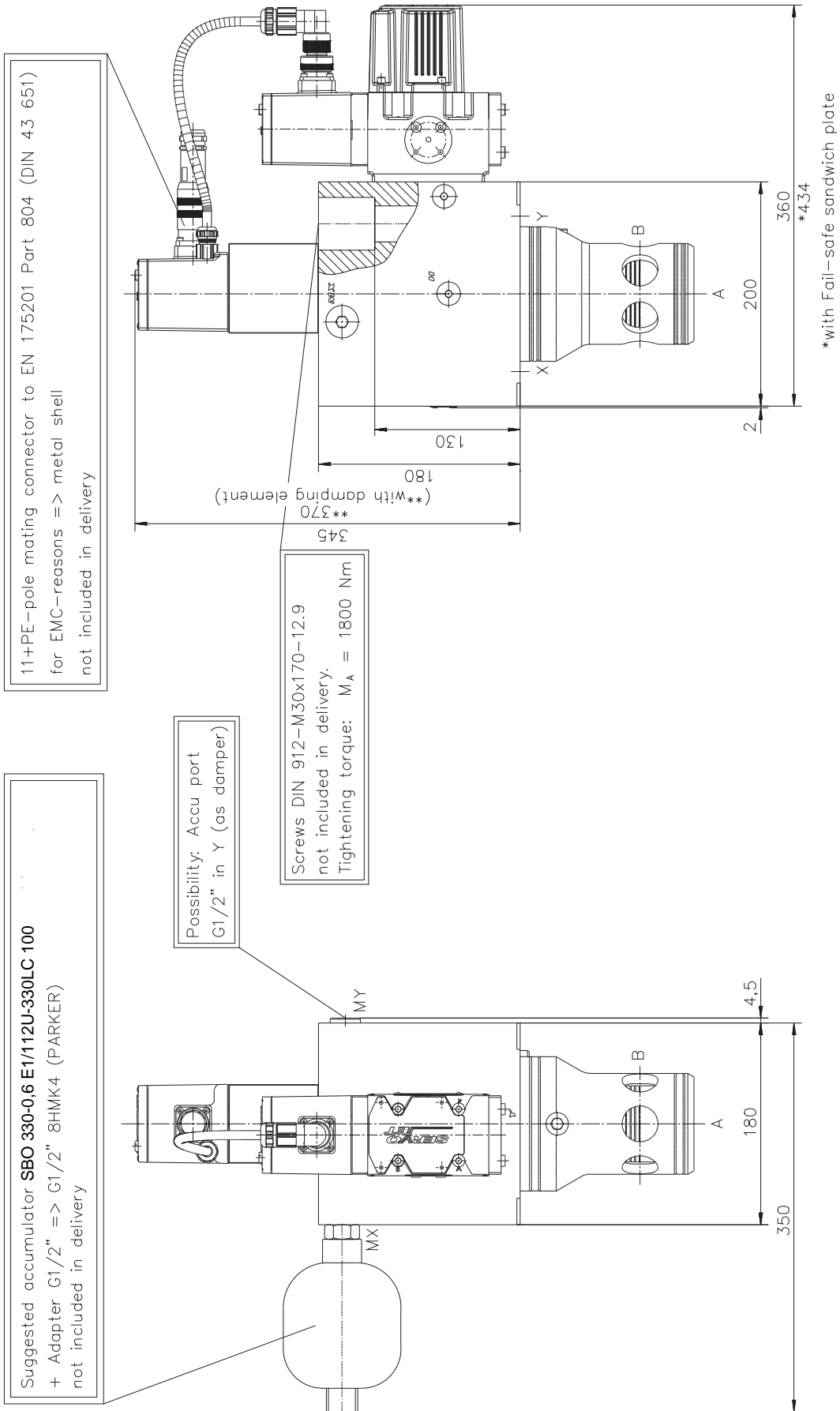
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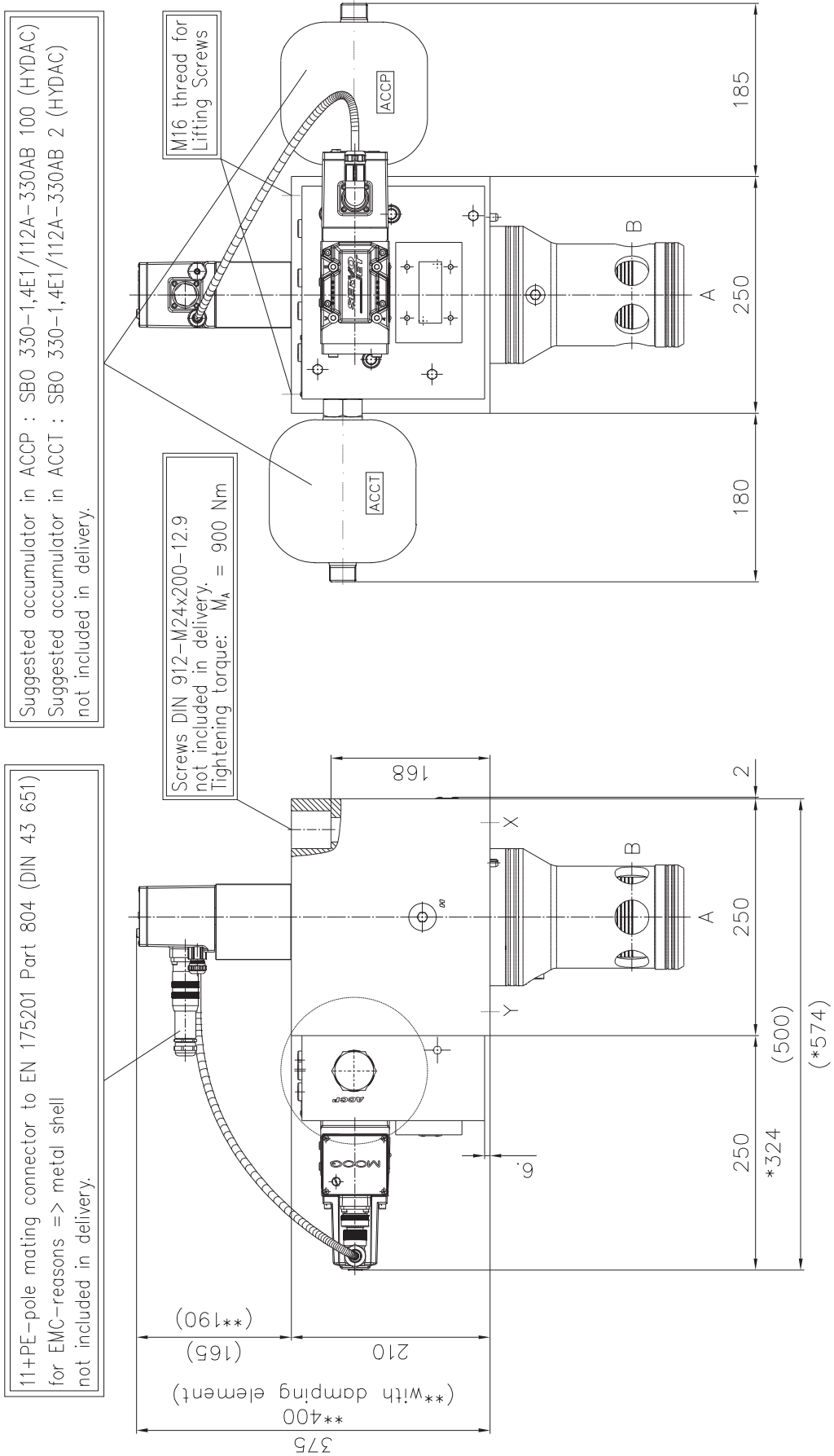
# DIMENSIONS NB63 WITH D661-PILOT VALVE

# DSHR



# DIMENSIONS NB80 WITH 1 D661-PILOT VALVE

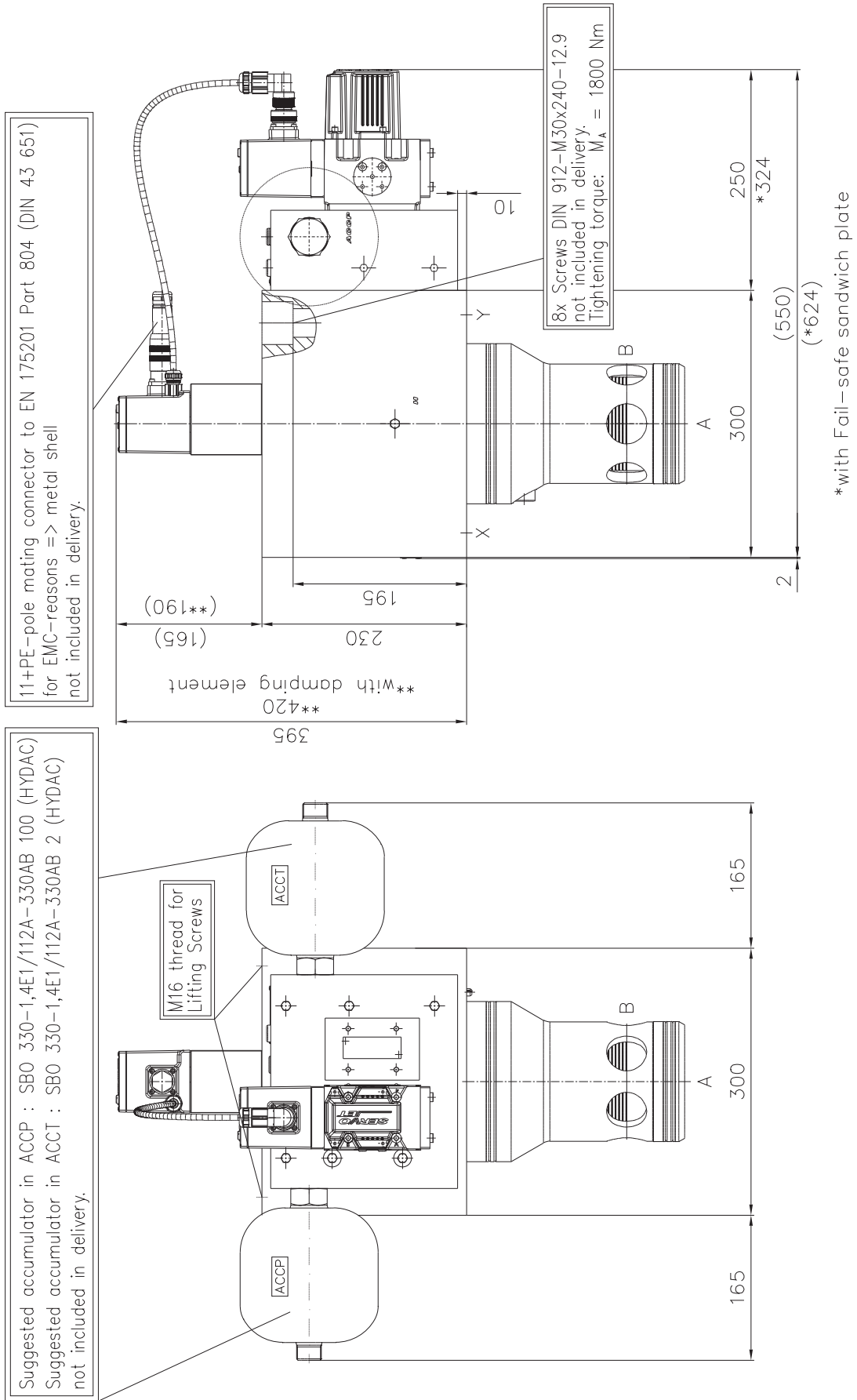
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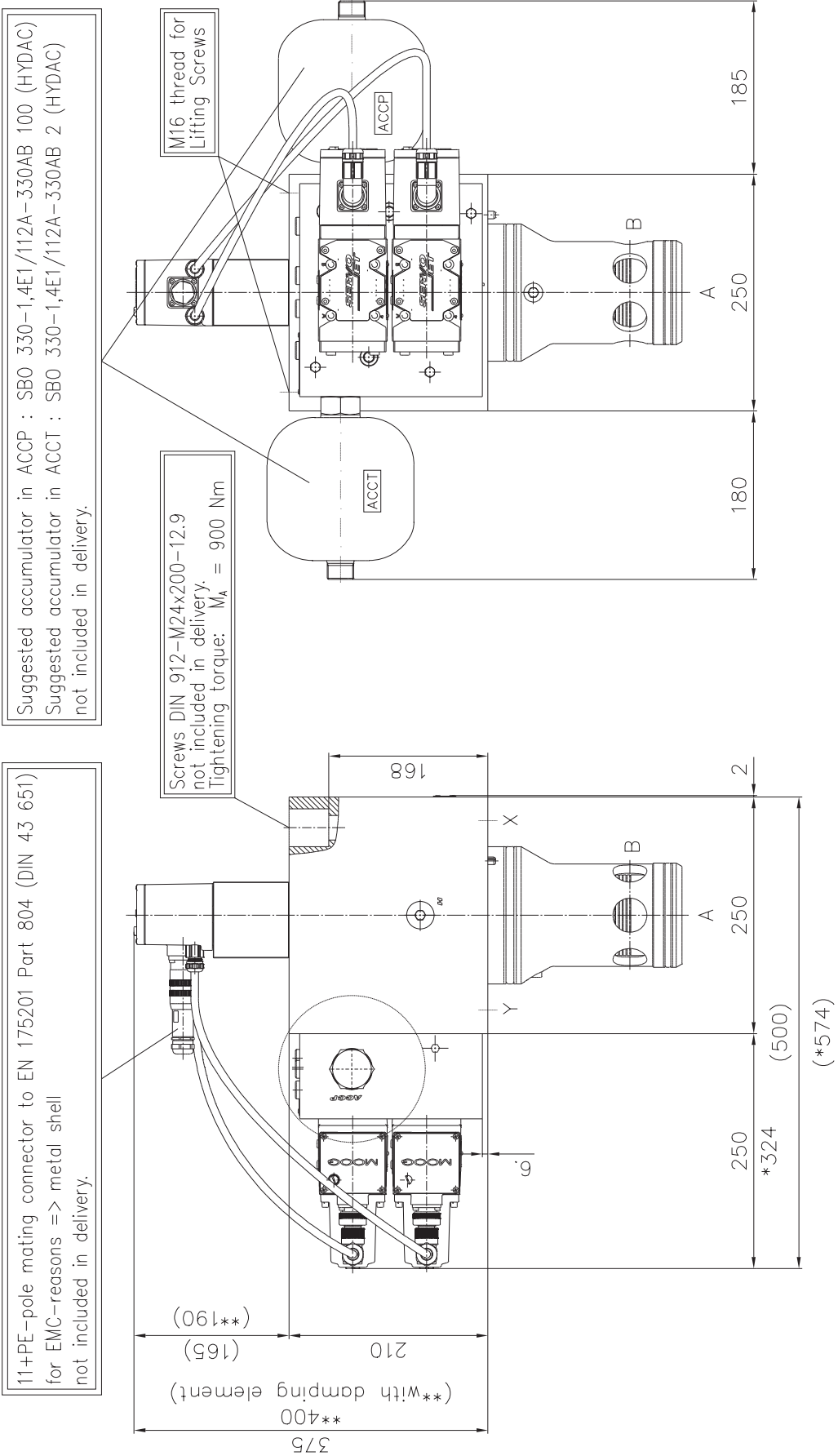
# DIMENSIONS NB100 WITH 1 D661-PILOT VALVE

# DSHR



# DIMENSIONS NB80 WITH 2 D661-PILOT VALVE

# DSHR

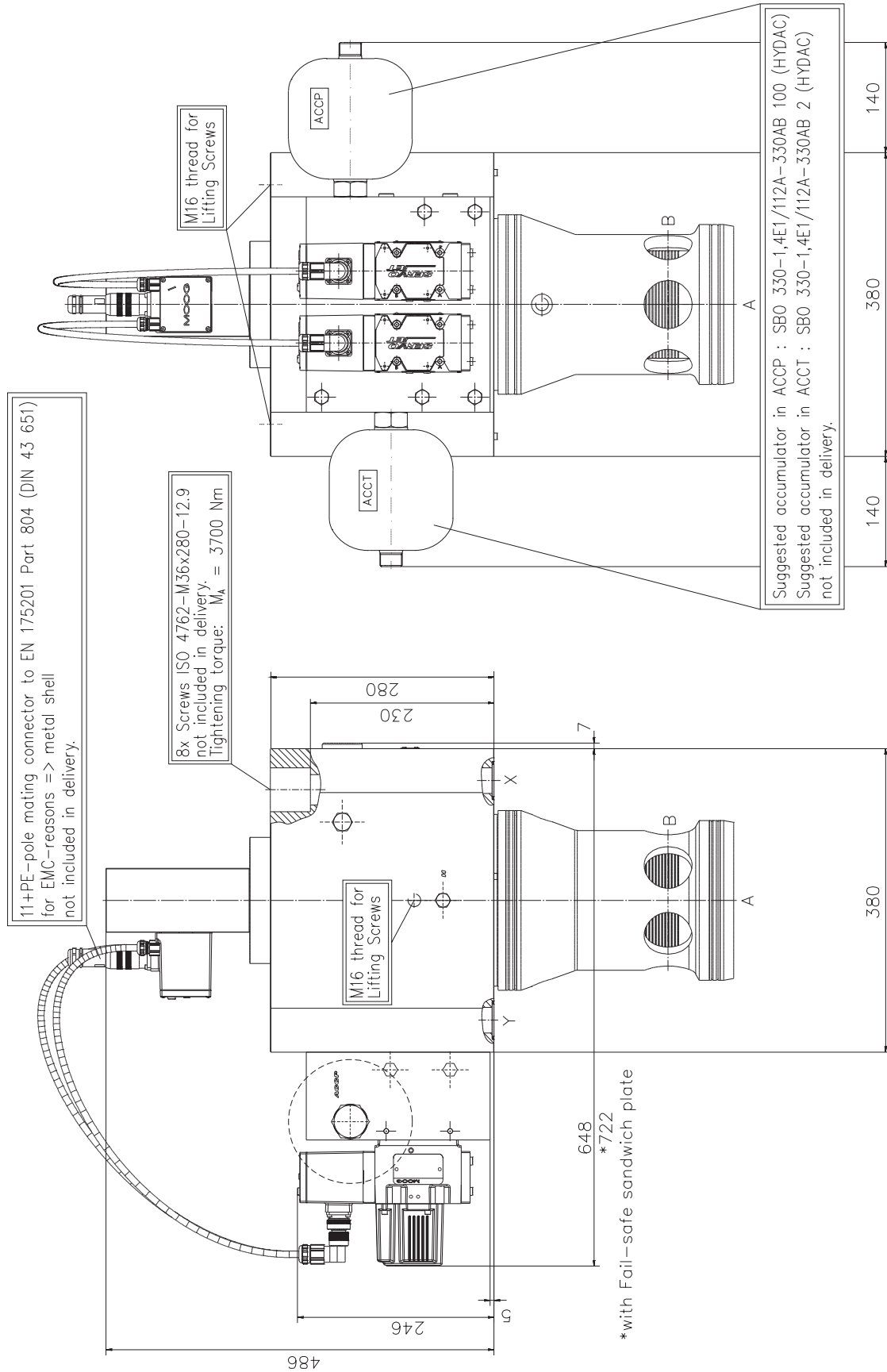


\*with Fail-safe sandwich plate



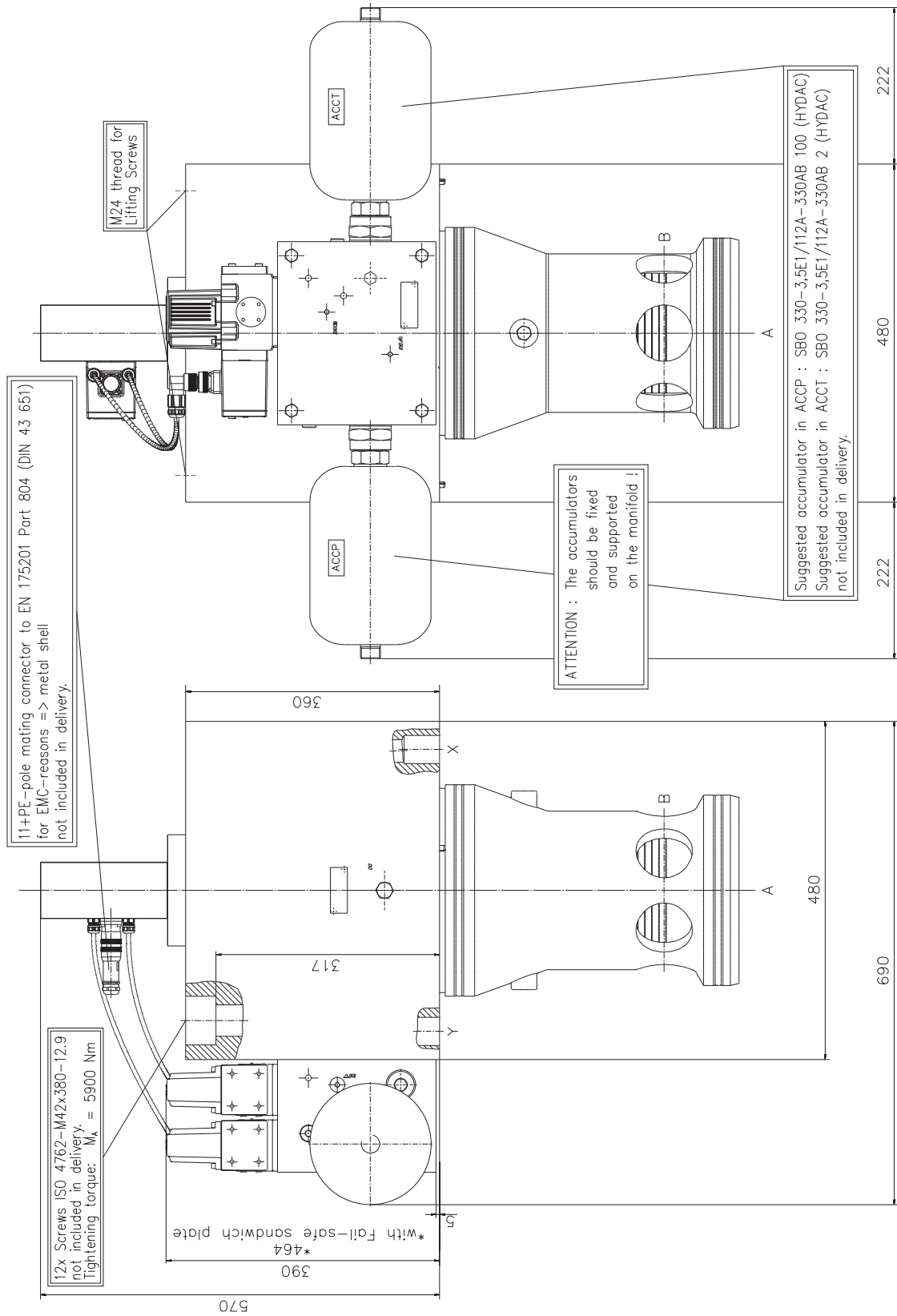
# DIMENSIONS NB125 WITH 2 D661-PILOT VALVE

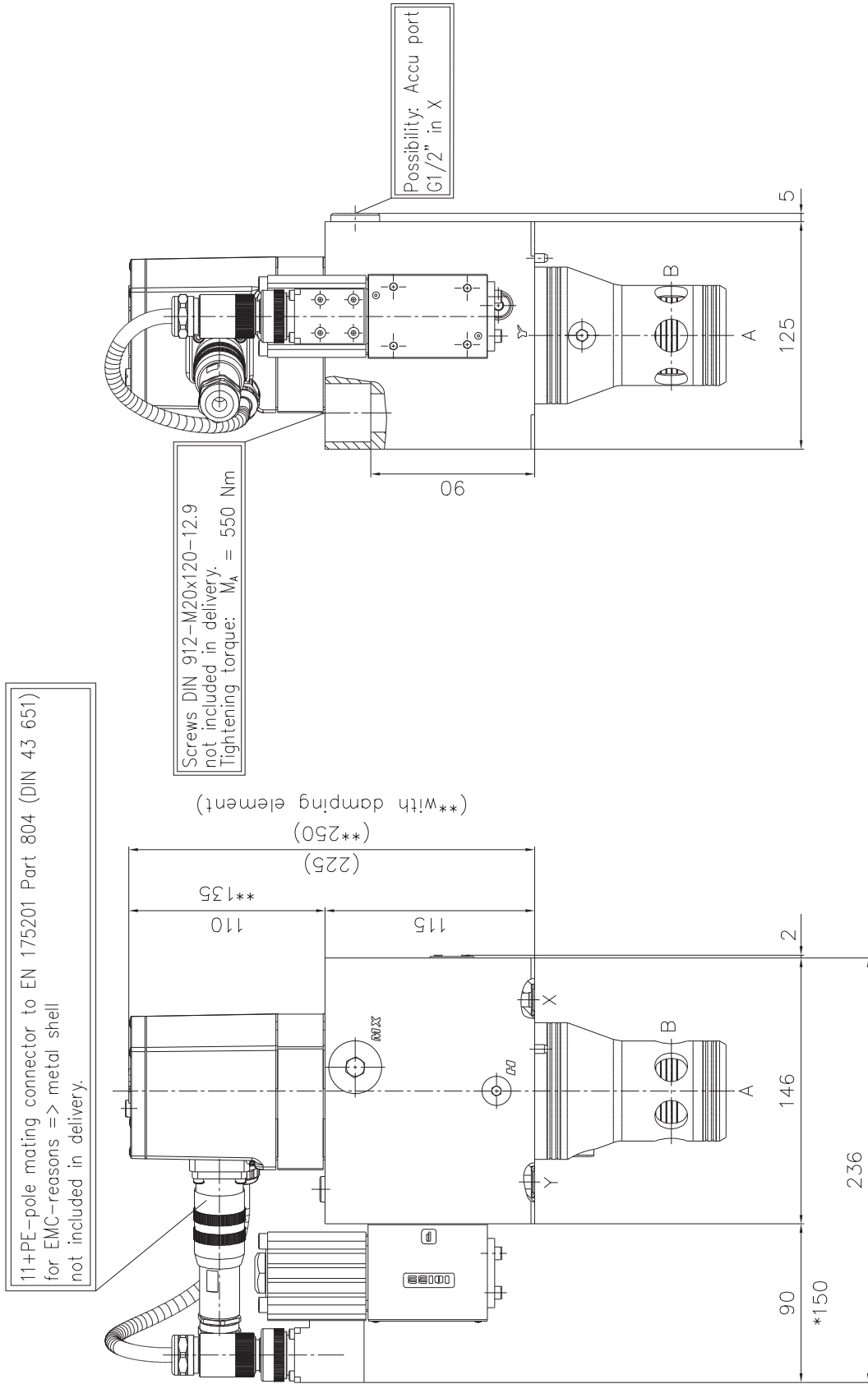
# DSHR



# DIMENSIONS NB160 WITH 2 D661-PILOT VALVE

# DSHR

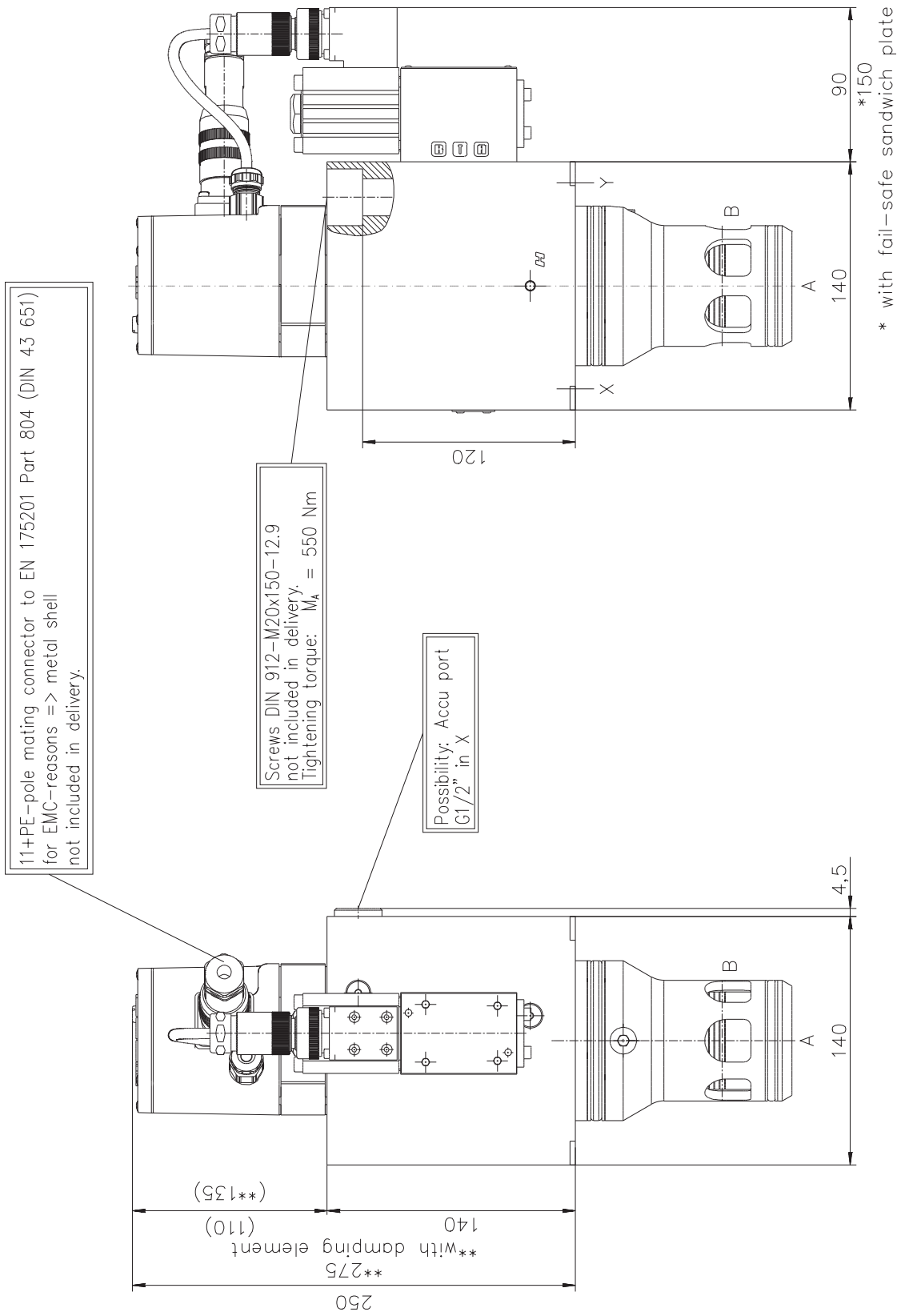


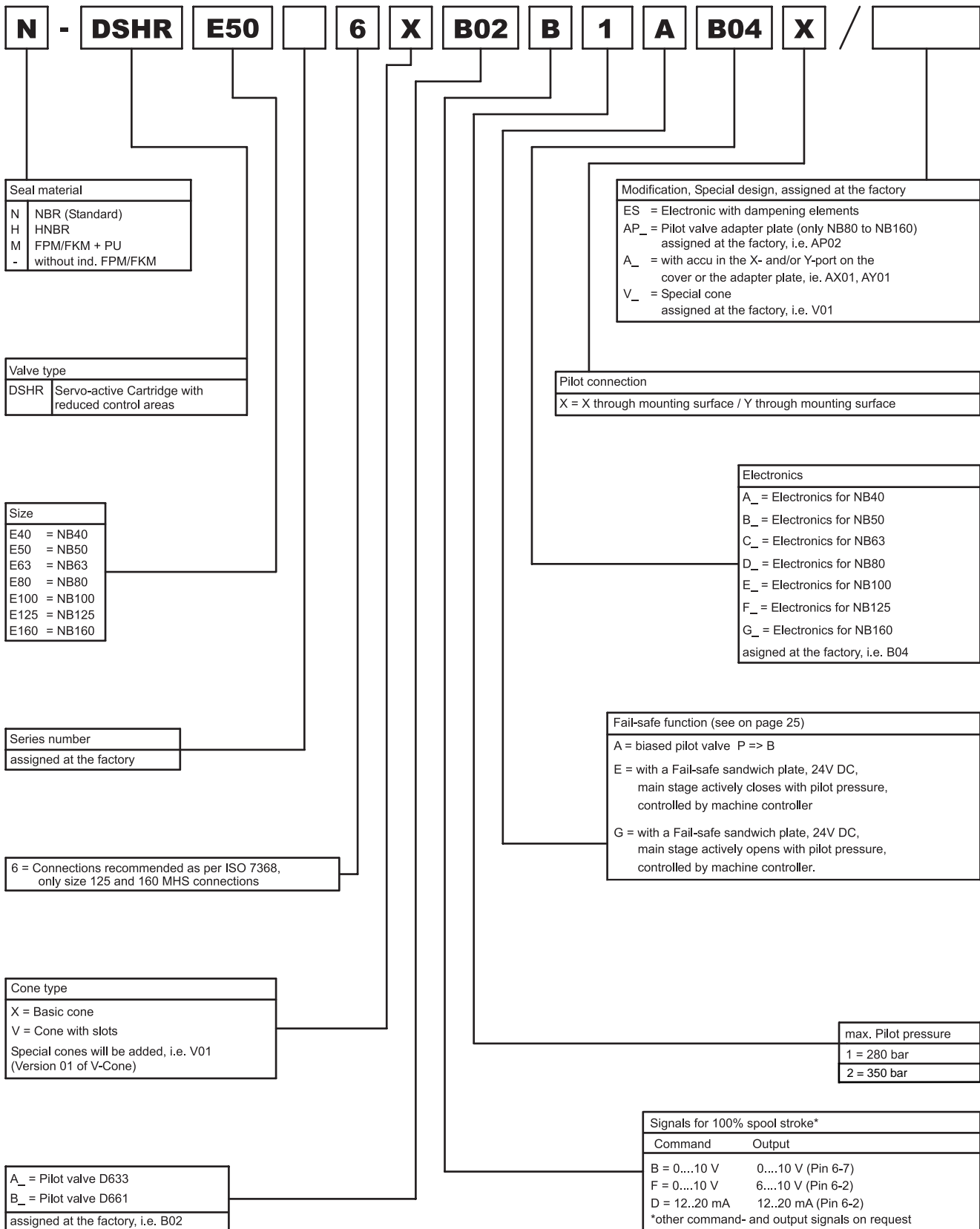


\* with fail-safe sandwich plate

# DIMENSIONS NB50 WITH D633-PILOT VALVE

# DSHR





Subject to technical changes



# CONFIGURATION CHECKLIST

# DSHR

6100 – 002e – 017 (old: 7-3-FE03)

Issue: 1.0

Customer			
Fill out date (Customer)		Prepared by	
Application			
<b>!! Please fill out the form as accurately as possible !!</b> <b>Mark selection fields with " X "</b>			

<b>Basic data</b>			
Nominal valve size		Cone type (X, V) <sup>1)</sup>	
Fluid		Seal material (Standard = NBR)	
Fluid temperature		°C	Ambient temperature °C

<sup>1)</sup> Please specify non-standard cones !!

<b>Hydraulic Data</b>								
Pilot pressure [bar]				Main stage pressure [bar]				
Pilot valve (DDV only for size 40 and 50)	DDV		D661	Filtersubplate for pilot valve DDV [Y/N]			N	X
Other pilotvalve				Flow direction	A→B		B→A	
Qmax [L/min]				Δp [bar]				
Qmin [L/min]				Δp [bar]				
Max. response time [ms]				Response time FS [ms]				
Failsafe cone position (Main stage)	closed		open	Failsafe function <sup>2)</sup> (Biased pilot, FS-valve..)	Biased Pilot		FS- Valve	

<sup>2)</sup> FS-Function: Check FS-time for biased DDV, For FS-valve and flow B to A pilotpressure must be > than 0,5 x system pressure

<b>Electrical Data</b>					
Command signal		0....10 Volt → Feedback 0.... 10 Volt (Type B)			
(Standard = 0...10 Volt)		12.. 20 mA → Feedback 12.... 20 mA (Type D)			
Electrical connector (Standard = 11 + Pe)	<b>11 + Pe</b>		Control failsafe valve	external	

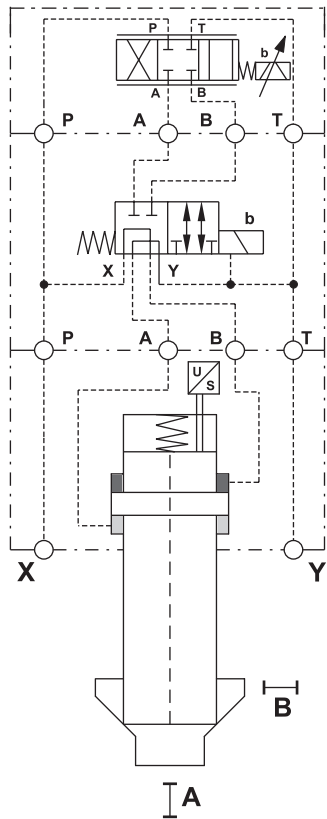
<b>Miscellaneous</b>							
Fastening screws included in delivery [Y/N]	Y		N	Electrical connector included in delivery [Y/N]	Y		N
Electronic with rubber dampening element [Y/N]	Y	X	N	LVDT pressure peak protection (size 100 - 160)	Y		N
Accumulator in X-port of cover [Y/N]	Y		N	Accumulator in Y-port of cover [Y/N]	Y		N

Accumulators only available with certificate according 97/23/EG - No country specific certificates available !

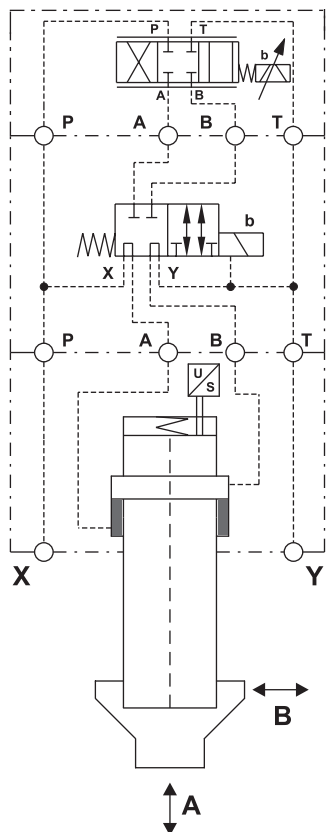
Remarks			

Remark: High flows and fast valve response times could cause high pressure peaks (water hammer) in the hydraulic system.  
This effect has to be avoided by suitable precautions.

Allocated part number	<b>XLB</b>	Closing date (Moog)	
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Main stage actively closes :  
" E "



Main stage actively opens :  
" G "

## Solutions

### Hydraulic solutions

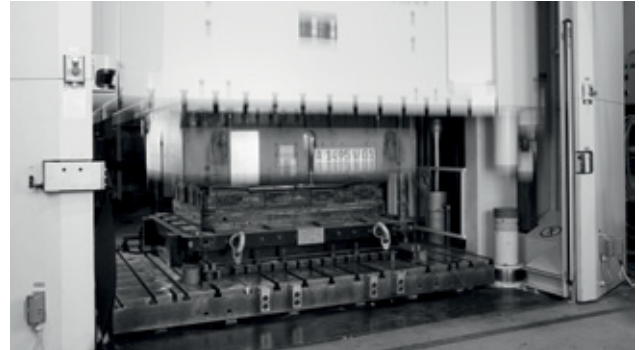
Since Bill Moog invented the first commercially viable servo valve in 1951, Moog has set the standard for world-class hydraulic technology. Today, Moog products are used in a variety of applications - providing high power, enhanced productivity and ever better performance for some of the worlds most demanding applications.

### Electric solutions

Clean operation, low noise generation, less maintenance and reduced power consumption make Moog electric solutions ideal for applications worldwide. Moog is the ideal partner for applications where transitioning technologies requires special expertise.

### Hybrid solutions

By incorporating the advantages of existing hydraulic and electric technologies - including modular flexibility, increased efficiency and cleanliness - into innovative hybrid solutions, Moog offers new performance potential in specialized applications.



Press



Injection Molding Machine

## Moog Global Support

Moog Global Support is our promise to offer world-class Repair and Maintenance Services delivered expertly by our trained technicians. With the reliability only available from a leading manufacturer with facilities around the world, Moog offers you service and expertise you can count on to keep your equipment operating as it should.

This promise offers many benefits to our customers including:

- Reduce your downtime by keeping critical machines running in peak performance
- Protect your investment by ensuring reliability, versatility and long-life of products
- Better plan your maintenance activities and make systematic upgrades
- Leverage our flexible programs to meet the unique service requirements of your facility

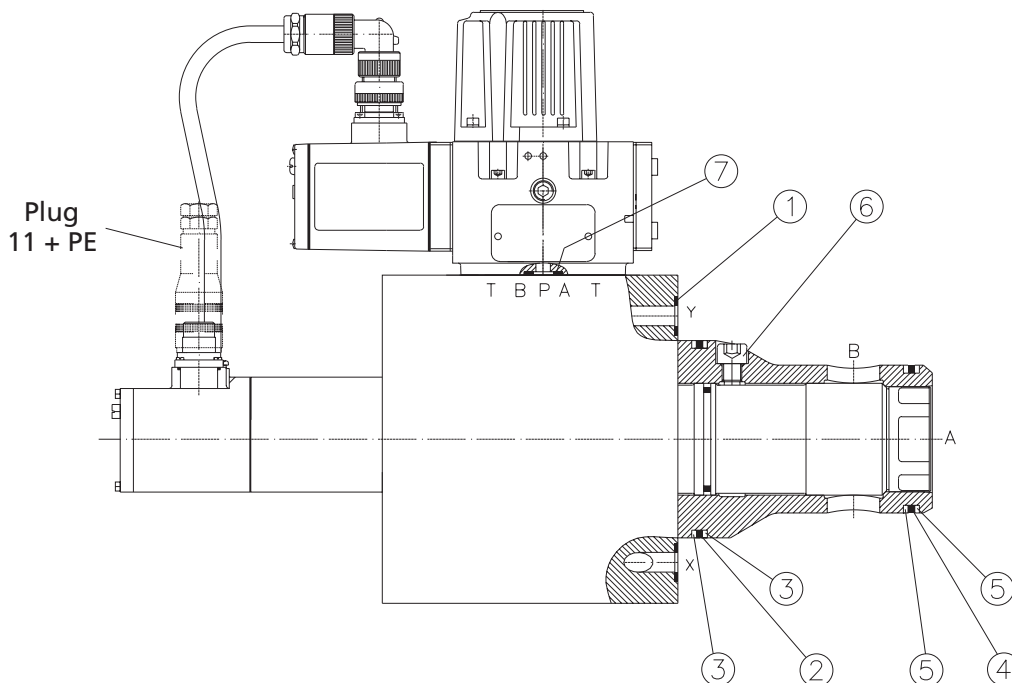
Look to Moog for global support including:

- Repair services using OEM parts are performed by trained technicians to the latest specifications
- Stock management of spare parts and products to prevent unplanned downtime

- Flexible programs, tailored to your needs such as upgrades, preventative maintenance and annual/multi-year contracts
- On-site services bring the expertise to you, providing quicker commissioning, set-up and diagnostics
- Access to reliable services that are guaranteed to offer consistent quality anywhere in the world

For more information on Moog Global Support visit [www.moog.com/industrial/service](http://www.moog.com/industrial/service).





Seal-Kits & Accessories for Sleeve and Cover									
Pos.	Description	Ordering number							
		NB40	NB50	NB63	NB80	NB100	NB125	NB160	
	Seal - Kit	XEB	17680-000N00	17681-000N00	17682-000N00	17683-000N00	17924-000N00	18045-000N00	18147-000N00
1	O-Ring	X783-	00207	00207	00293	00281	01296	01304	-
2	O-Ring	X783-	00204	00270	00297	00283	01298	01301	01303
3	Backup-Ring	X780-	18231	18338	08348	08431	18439	18445	18452
4	O-Ring	X783-	00205	00268	00270	00282	01297	01300	01302
5	Backup-Ring	X780-	18225	18229	18338	18344	18427	18442	18450
6	Locking Screws, not for X-cone	C97	247-001	247-001	122-001	122-001	005-001	005-001	151-001
Accessories (not in valve delivery included !)									
	Socket screws DIN EN ISO 4762-12.9	X784-	12008 (4x)	12010 (4x)	13004 (4x)	12409 (8x)	13014 (8x)	13602 (8x)	14202 (12x)
	Torques (Nm)		550	550	1800	900	1800	3700	5900
	Plug 11+PE-pole (Metal)	XEB	17725						
	* Cable 12 x 1 mm <sup>2</sup> for plug 11+PE-pole	X798-	00117						

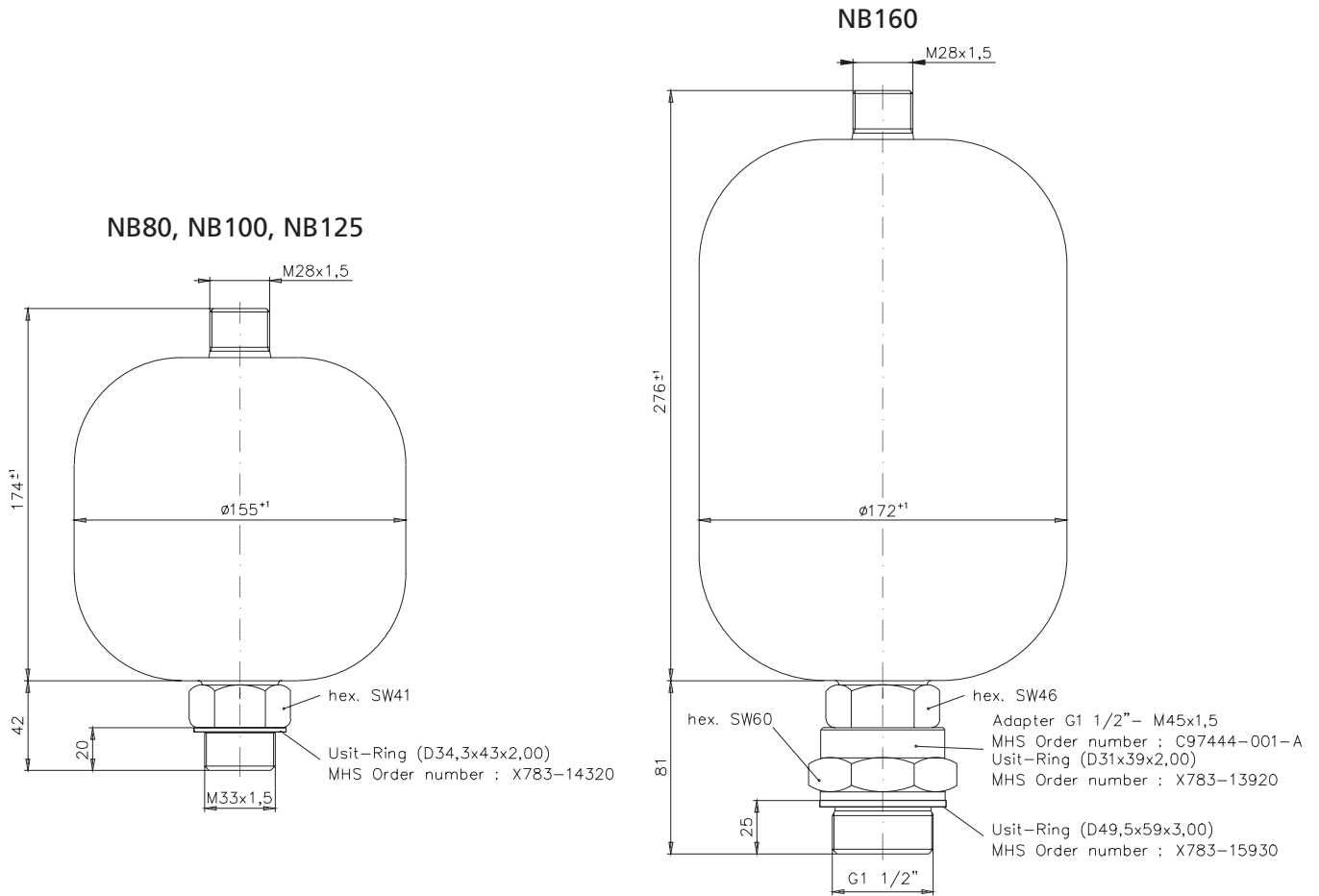
\*This part number have a unit of measure (length), for example : 1 x X789-00117 => 1 metre / 10 x X798-00117 => 10 metre

Order example : O-Ring NBR Pos.4 NB50 => Part number : X783-00268

Seal-Kits & Accessories for Pilot valves					
Pos.	Description	Ordering number			
			NBR 85 Shore	HNBR 85 Shore	FPM (Viton) 85 Shore
7	Seal - Kit D663	XEB-	17866	17867	17868
7	Seal - Kit D661	XEB-	17869	17870	17871
Seal - Kits only available completely					
Description		Accessories			
			D633	D661	-
	Socket screws DIN EN ISO 4762-12.9	X784-	10522 (4x)	10631 (4x)	-
	Torques (Nm)		8	13	-

# SPECIFICATIONS ACCUMULATOR FOR SIZES NB80....NB160

# DSHR



Accumulator SBO 300-1,4E1/112A-330AB (HYDAC) for NB80,NB100,NB125,not included in delivery				
Nominal volume (l)	Permissible pressure ratio (p <sub>2</sub> : p <sub>0</sub> )	Perm. working pressure (bar)	Q <sub>max.</sub> (l/min)	Weight (kg)
1,4	8 : 1	330	95	7,6
Accumulator SBO 300-3,5E1/112A-330AB (HYDAC) for NB160, not included in delivery				
Nominal volume (l)	Permissible pressure ratio (p <sub>2</sub> : p <sub>0</sub> )	Perm. working pressure (bar)	Q <sub>max.</sub> (/min)	Weight (kg)
3,5	4 : 1	330	150	13,8





# TAKE A CLOSER LOOK.

Moog designs a range of motion control products that complement the performance of those featured in this catalog. Visit our website for more information and contact the Moog facility nearest you.

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2-way Servo Cartridge Valves  
02/2015, DSHR-1-EN-Servo cartridge