

Technical Data

Part-turn gearbox 2SP78



Contents		Page
General data	<ul style="list-style-type: none">• Mounting position, duty classifications, noise level, paint finish and corrosion protection, lubrication, degree of protection, ambient temperature	2
Mechanical data	<ul style="list-style-type: none">• Output torque, valve connection, positioning time	3 - 4
	<ul style="list-style-type: none">• Coupling dimensions - Direct mounting	5
	<ul style="list-style-type: none">• Gear box version, mounting position	- Direct mounting 6
		- Base + lever arm 7
	<ul style="list-style-type: none">• Dimensional drawings	- Direct mounting 8 - 11
	- Base + lever arm 12 - 16	

Technical Data

General data

Part-turn gearboxes 2SP78 are suitable for automatic and safe operation of industrial valves in accordance with EN 15714-2. They have a distinct compact design and are extremely robust due to the braced housing. Sized for numerous cycles with extremely high positioning accuracy with backlash of less than 0.2° ($= 12'$), they are ideally suited for mounting to the HiMod rotary actuator.

Mounting position

The part-turn gearboxes can be mounted in **any position**.

Duty classifications

- Continuous modulating duty, class **D** according to EN 15714-2
- Modulating duty, class **C** according to EN 15714-2

The part-turn gearboxes can be operated for the entire temperature range from -20°C to $+60^\circ\text{C}$ when observing the max. permissible torque.

Noise level

The noise level caused by the part-turn gearbox (sound pressure level at 1 m distance) is **< 70 dB (A)**.

Paint Finish and Corrosion Protection

All outside screws are exclusively made of **stainless steel**. Under normal atmospheric ambient conditions, the housing material consists of a **corrosion-resistant aluminum alloy**. Base and lever arm are made of steel, galvanized and additionally thick-film passivated. Part-turn gearboxes 2SP78 can be used without coating but are painted with a 2K-PUR-single layer coat (two-component polyurethane single layer coating) as standard.

The single layer coating is UV-resistant and decontaminable. It is applied with a minimum coating thickness of $80\ \mu\text{m}$ when dry in color similar to **RAL 7037** (silver-gray). Other RAL colors (add Y35 + number of RAL color to order) are available.

After roughening and cleaning the surfaces, the single layer coating can be painted with all common painting material. This includes epoxid lacquers, nitrocellulose lacquers etc.

Protection against corrosion from outside is stipulated in corrosivity categories in accordance with EN15714-2 (EN ISO 12944-2):

Version	Corrosivity category C5
Installation / Environmental condition	<ul style="list-style-type: none"> - Industrial areas with high humidity and aggressive atmosphere - Areas with almost permanent condensation and with high pollution

Lubrication

Part-turn gearboxes are lubricated for life with gear oil.

Degree of Protection

As standard, the part-turn gearboxes meet the requirements of enclosure protection **IP68** (EN 60529).

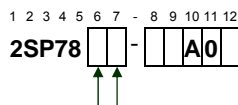
They provide complete protection against touching (rotating parts) and ingress of foreign objects (dust) as well as protection against hazardous water volumes during continuous immersion (max. 6 m head of water for maximum 72 hours).

Ambient Temperature

There are no functional restrictions for the temperature range of **-20°C to $+60^\circ\text{C}$** .

Technical Data

Mechanical data



Output torque

Output torque T_C [Nm]			Valve attachment ISO 5211	Weight \approx [kg]	suitable rotary actuator				
Direct mounting					Type	Tripping torque set to max.			
125 – 250			F07	10	10	2SA7811-	100 % T_C		
	250 – 350		F10		11				
			F12		21				
		300 – 600	F14	25	22	2SA7821-	70 % T_C		
			F12		32				
			F14		33	2SA7833-	100 % T_C		
		600 – 1200	F12		42				
			F14		43				
			F16	120	53	2SA7843-	50 % T_C		
		1305	F14		54				
		1390 – 1950	F14		63			2SA7853-	70 % T_C
		1390 – 2800	F16		64				
		2800 – 3920	F16	74	74	70 % T_C			
Base + lever arm				Weight \approx [kg]	Type	Tripping torque set to max.			
125 – 250				15	18	2SA7811-	100 % T_C		
	250 – 350			40	28	2SA7821-	70 % T_C		
					38				
		300 – 600		136	38	2SA7833-	100 % T_C		
					48				
		600 – 1200			58				
			without base 1)	176	67	2SA7843-	50 % T_C		
		1305			68				
		1390 – 2800	without base 1)	136	77	2SA7853-	100 % T_C		
				176					
		2800 – 3920	without base 1)	136	78	70 % T_C			
				176					

permitted tolerance: $\pm 10\%$ of $T_{C \max}$.

further gearbox data

Type	Reduction ratio	Factor 2)	max. input torque [Nm]
2SP781.- 2SP782.-	$i = 50$	12.5	28
2SP783.- 2SP784.- 2SP785.-	$i = 50$	15	90
2SP786.- 2SP787.-	$i = 52$	16	250

Direction of rotation:

Clockwise rotation at input shaft or hand wheel of the mounted HiMod actuator results in clockwise rotation at gearbox coupling or lever arm.

Self-locking

Part-turn gearboxes 2SP78 are self-locking.

permissible running torque (Duty classification acc. EN 15714-2)

Type	Running torque max. [Nm]	
	Class C (modulating duty)	Class D (continuous modulating)
2SP781.-	250	125
2SP782.-	250	125
2SP783.-	600	450
2SP784.-	900	450
2SP785.-	900	450
2SP786.-	2700	1350
2SP787.-	2700	1350

1) Version without base for direct mounting of gearbox to bottom/rear accessible mounting plate.
2) Conversion factor from output torque to input torque for determining the actuator size

Technical Data

1 2 3 4 5 6 7 - 8 9 10 11 12
2SP78 - **A0**

Valve connection

Valve connection (coupling or lever arm)						
Direct mounting ¹⁾ (standard dimensions)						
for output torques [Nm]						
Coupling ISO 5211	125 – 250		250 – 350		300 – 600	
			600 – 1200		1305	
					1390 – 1950	
					1390 – 2800	
					2800 – 3920	
with flange						
	F07	F10	F12	F14	F16	
unbored						0
bore \varnothing [mm]	22	28	36	48	60	with 1 keyway acc. to DIN 6885 Part 1
square bore [mm]	17	22	27	36	46	
bore with two flats [mm]	17	22	27	36	46	3
Base + lever arm						
Lever arm freely adjustable using ring clamping element						
Lever arm lengths [mm]	for output torques [Nm]				Hole Cone 1:10	suitable damper rod
100/125/150/175/200	125 – 250		250 – 350		16 H8	2SX7304-0KG00
100/150/200/250/300	300 – 600		600 – 1200		26 H8	2SX7304-0KG02
	1305		1390 – 2800			
200/250/300/350/400			2800 – 3920			

Dimensions to coupling, see page 5

Positioning time (only valid when using a HiMod rotary actuator)

Positioning range	Positioning time [sec/90°]
	(Positioning time $t_{120^\circ} = 1.33 \times t_{90^\circ}$)
150 – 19	C
75 – 10	D

requires rotary actuator
2SA78...C...
2SA78...D...

Continuous adjustable positioning time within selected positioning range

Rotary actuator	Speed range ($n_{min} - n_{max}$)	adjustable in 2.5% increments between 12.5 - 100% n_{max} [rpm]							
		12.5%	...	35%	...	100%			
2SA78...C	5 – 40	5	6	7	...	14	...	39	40
	10 – 80	10	12	14	...	28	...	78	80
Part-turn gearbox	2SP78...C	Positioning time	150	...	54	...	19		
	2SP78...D	90° [sec]	75	...	27	...	10		
	2SP78...C	Positioning time	200	...	72	...	25		
	2SP78...D	120° [sec]	100	...	36	...	13		

Examples:

Speed of the rotary actuator [rpm]	5	7	10	14	20	28	40	57	80
Positioning time 90° [sec]	150	108	75	54	38	27	19	14	10

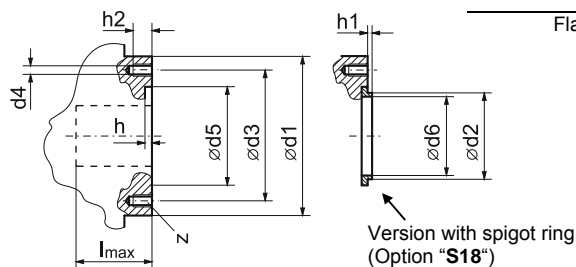
1) without spigot at the connecting flange; with spigot ==> option „S18“

Technical Data

Coupling dimensions – Direct mounting

Flange dimensions

Part-turn gearbox type	2SP78 □□									
	10	11	22	32	33	53	63	54	64	
	21	-	42	43	-	-	-	-	74	
Flange size	ISO 5211	F07	F10	F12	F14			F16		
d1	90	125	150	175			210			
d2 _{f8}	55	70	85	100			130			
d3	70	102	125	140			165			
d4	M8	M10	M12	M16			M20			
d5 ^{H8}	60	85	105	115			140			
d6	49	64	79	92			121			
h	3.5	4	4	5			5			
h1	2.5	2.5	2.5	3.5			4.5			
h2	13	16	19	25			32			
l _{max}	43	48	58	68			88			
z ¹⁾	4	4	4	4			4			

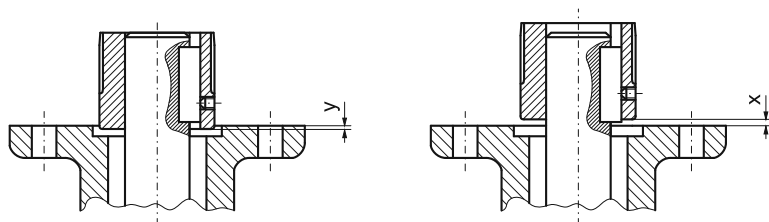


Coupling dimensions

unbored		D	41.8	51.8	67.6	81.6	81.6	105.8
		l4	35	45	55	65	85	80
		M	20	30	40	47	47	50
		Z (No. of teeth)	32	40	32	40	40	52
Bore with keyway acc. to EN ISO 5211 with keyway acc. to DIN 6885 T1		d7 ^{H8}	22	28	36	48	60	60
		b ^{JS9 3)}	6	8	10	14	18	18
		d7 max.	28	38	50	60	60	80
		m	M5	M6	M6	M6	M6	M8
		l	8	10	10	10	10	18
		t ³⁾	24.8	31.3	39.3	51.8	64.4	64.4
Square bore acc. to EN ISO 5211		s ^{H11}	17	22	27	36	46	46
		d8 min.	22.2	28.2	36.2	48.2	60.2	60.2
		s ^{H11} max.	22	30	36	46	46	55
		d8 max.	28.2	40.2	48.2	60.2	60.2	72.2
		m	M5	M6	M6	M6	M6	M8
		l	8	10	10	10	10	18
		l5	30	30	40	50	50	50
Bore with two-flats acc. to EN ISO 5211		s ^{H11}	17	22	27	36	46	46
		d8 min.	22.2	28.2	36.2	48.2	60.2	60.2
		s ^{H11} max.	22	27	36	46	46	55
		d8 max.	28.2	36.2	48.2	60.2	60.2	72.2
		m	M5	M6	M6	M6	M6	M8
		l	8	10	10	10	10	18
		l5	25	30	45	45	45	45

Mounting position of coupling

x max.	6	1	1	1	1	1
y max.	3	3	3	4	4	4



1) number of tapped holes d4

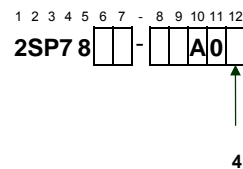
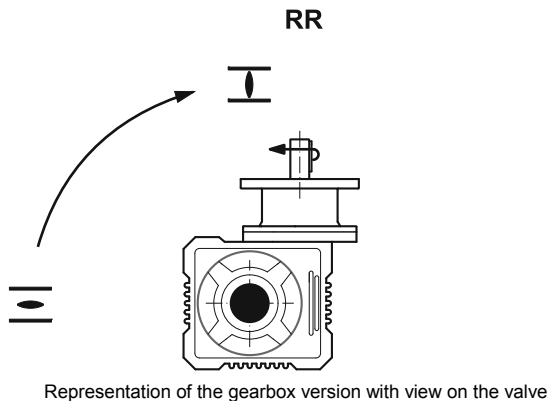
2) thread with grub screw

3) dimensions depend on ø d7, refer to DIN 6885 part 1

Technical Data

Gearbox version, mounting position – Direct mounting

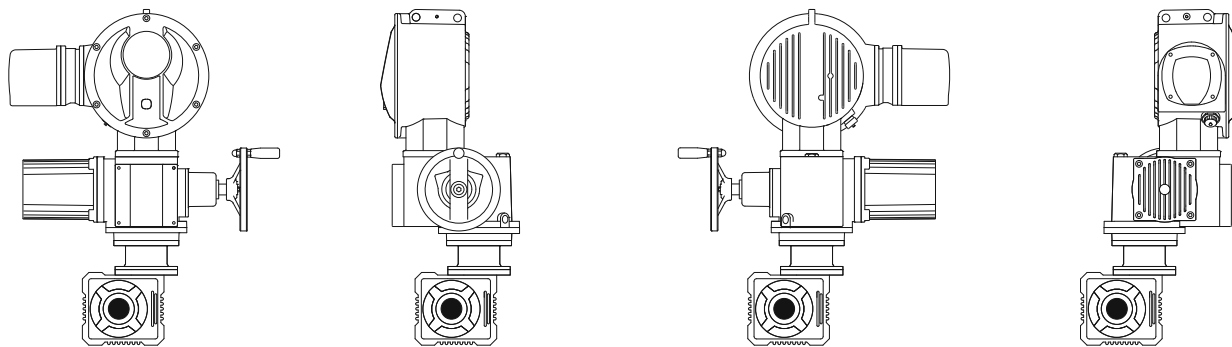
Gearbox version of the part-turn unit



Gearbox-version	Position of the worm shaft	Direction of rotation at output 1)	Swing angle
RR	right side	clockwise closing	360° 2)

possible mounting positions of the rotary actuator

Gearbox version RR

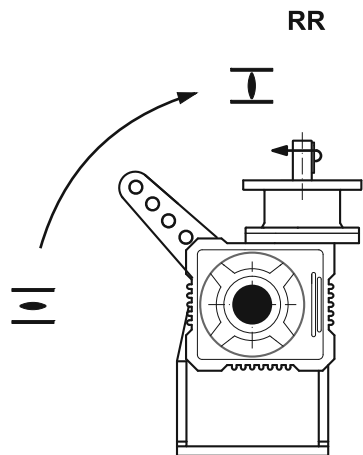


1) clockwise rotation of the input shaft of the part-turn gearbox (change of the sense of rotation in the actuator changes the sense of rotation of the gear box unit's output shaft)
 2) freely rotating gear, i.e. without end stop

Technical Data

Gearbox version, mounting position – Base + lever arm

Gearbox version of the part-turn unit



Representation of the gearbox version with view on the opposite side of the lever arm

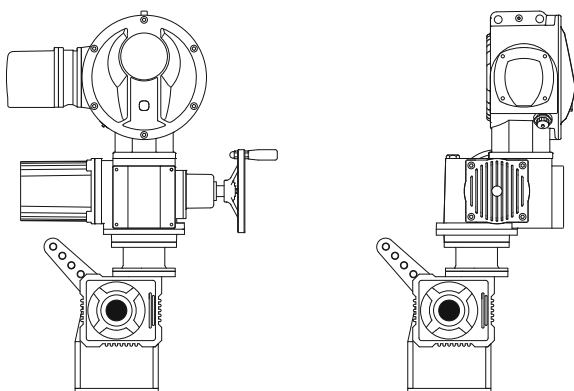
1 2 3 4 5 6 7 - 8 9 10 11 12
 2SP78 - 8 A0

Gearbox-version	Position of the worm shaft	Direction of rotation at lever arm ¹⁾	Swing angle
RR	right side	Clockwise closing	360° ²⁾

4

possible mounting positions of the rotary actuator

Gearbox version RR



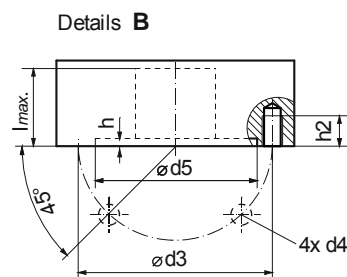
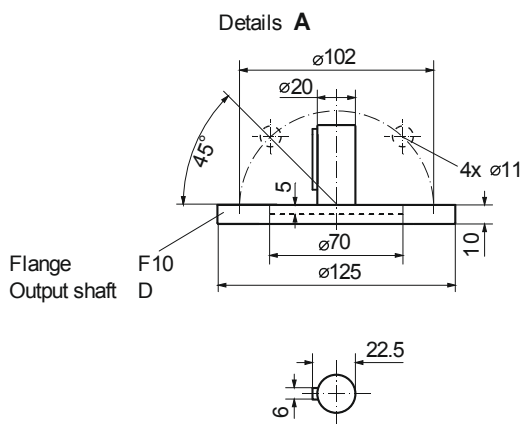
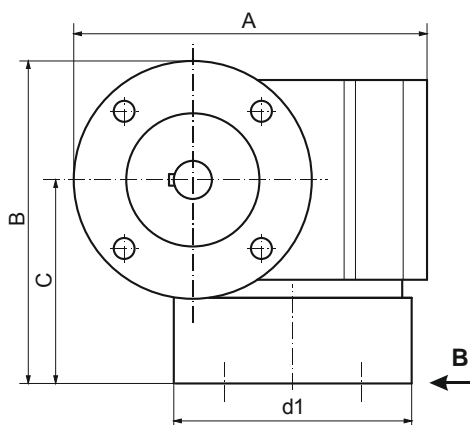
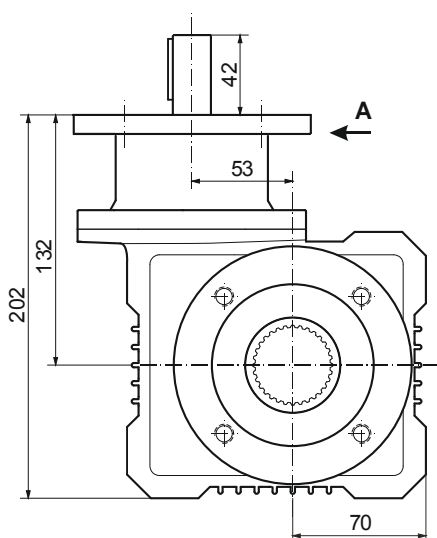
1) for clockwise rotation of this input shaft of the part-turn gearbox (change of the sense of rotation in the actuator changes the sense of rotation of the gearbox unit's lever arm)
 2) freely rotating gear, i.e. without end stop

Technical Data

Dimensional drawing **2SP7810, 2SP7811,**
2SP7821, 2SP7822



2SA7811-5 Flange F10
2SA7821-5 Output shaft B3



Dimensions	2SP781.		2SP782.	
	F07	F10	F10	F12
A	186	186	186	191
B	165	170	170	180
C	102	107	107	117
ø d1	90	125	125	150
ø d3	70	102	102	125
d4	M8	M10	M10	M12
ø d5	60	85	85	105
h	3,5	4	4	4
h2	13	16	16	19
l _{max.}	43	48	48	58

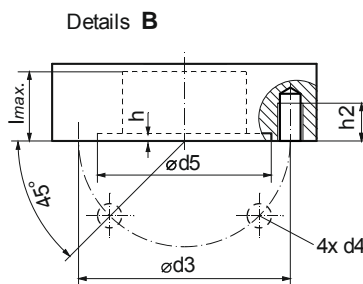
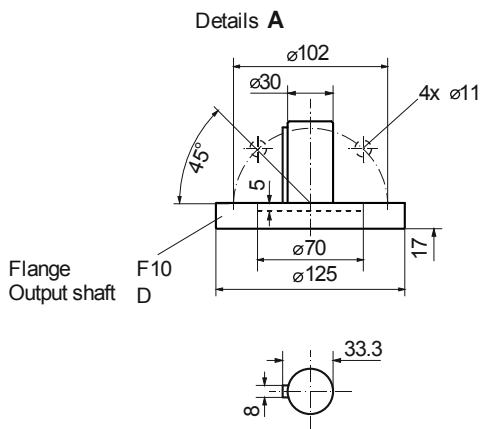
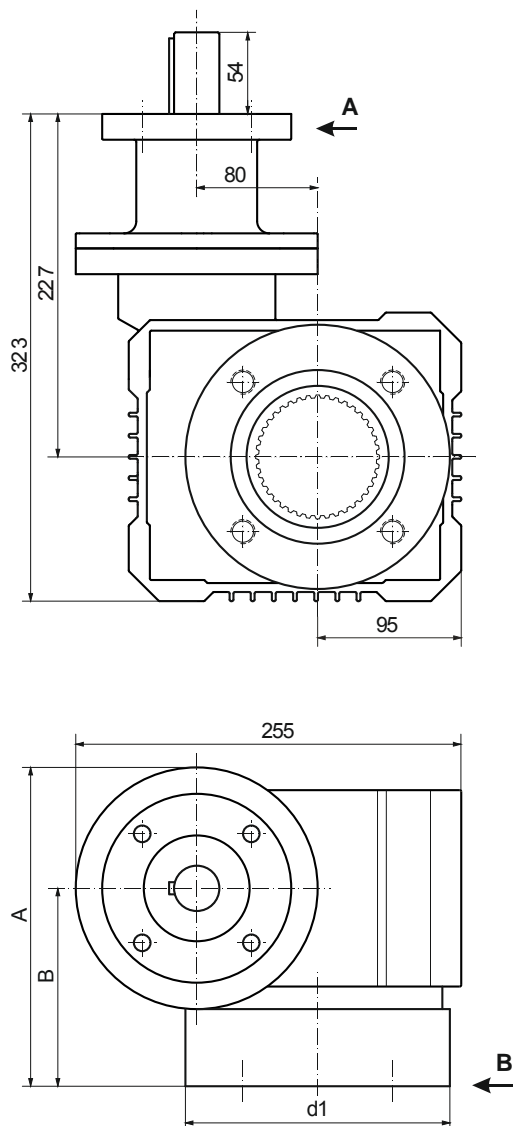
Technical Data

Dimensional drawing 2SP7832, 2SP7833



2SA7821-9 # H2Y

Flange F10
Output shaft B2/B4



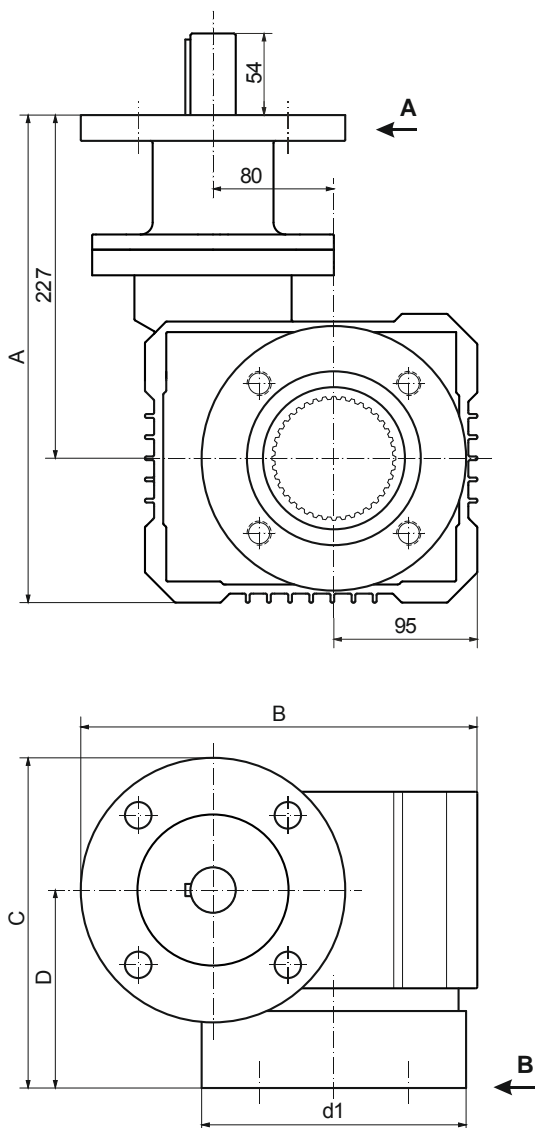
Dimensions	2SP783.	
ISO 5211	F12	F14
A	200	211
B	120	131
$\phi d1$	150	175
$\phi d3$	125	140
d4	M12	M16
$\phi d5$	105	115
h	4	5
h2	19	25
l_{max}	58	68

Technical Data

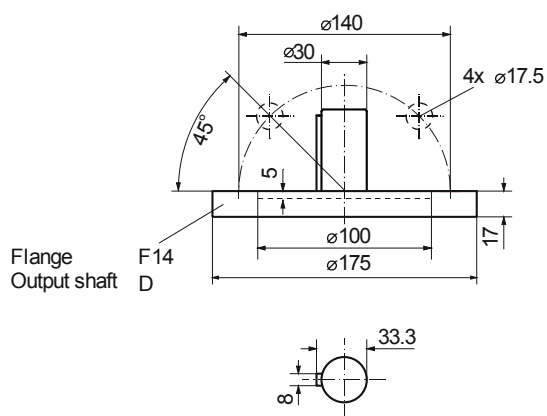
Dimensional drawing **2SP7842, 2SP7843,**
2SP7853, 2SP7854



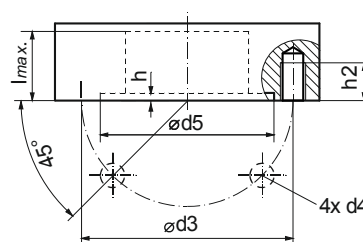
2SA7833-5 Flange F14
2SA7843-5 Output shaft B3



Details A



Details B



Dimensions	2SP784.		2SP785.	
	F12	F14	F14	F16
ISO 5211	F12	F14	F14	F16
A	323	323	323	332
B	263	263	263	273
C	208	219	219	239
D	120	131	131	151
$\phi d1$	150	175	175	210
$\phi d3$	125	140	140	165
d4	M12	M16	M16	M20
$\phi d5$	105	115	115	140
h	4	5	5	5
h2	19	25	25	32
l_{max}	58	68	68	88

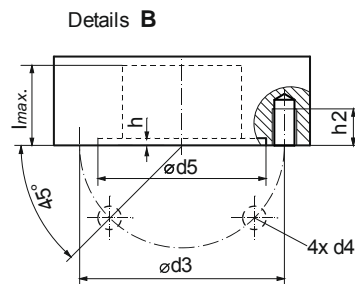
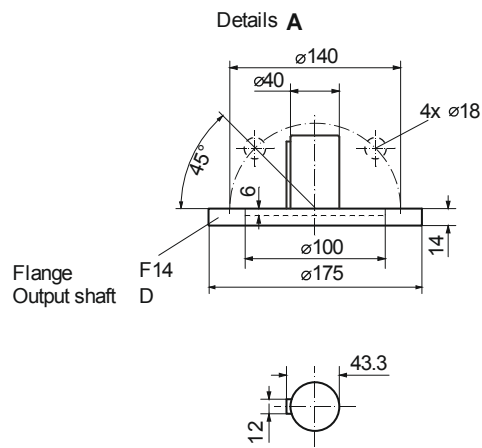
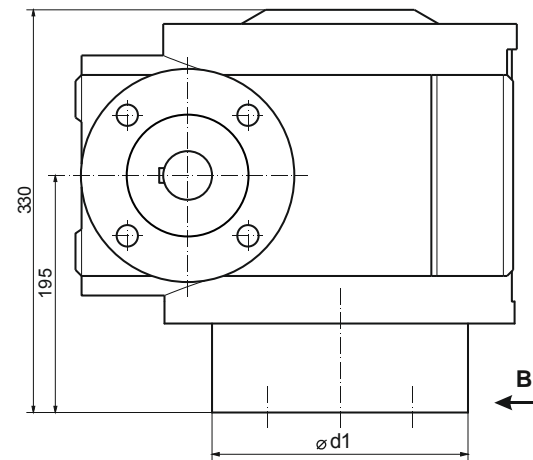
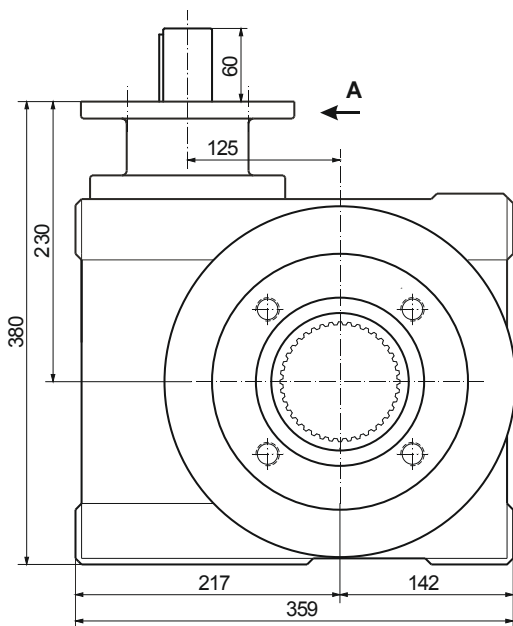
Technical Data

Dimensional drawing **2SP7863, 2SP7864, 2SP7874**



2SA7843-9 # H2Y
2SA7853-9 # H2Y

Flange F14
Output shaft B2/B4



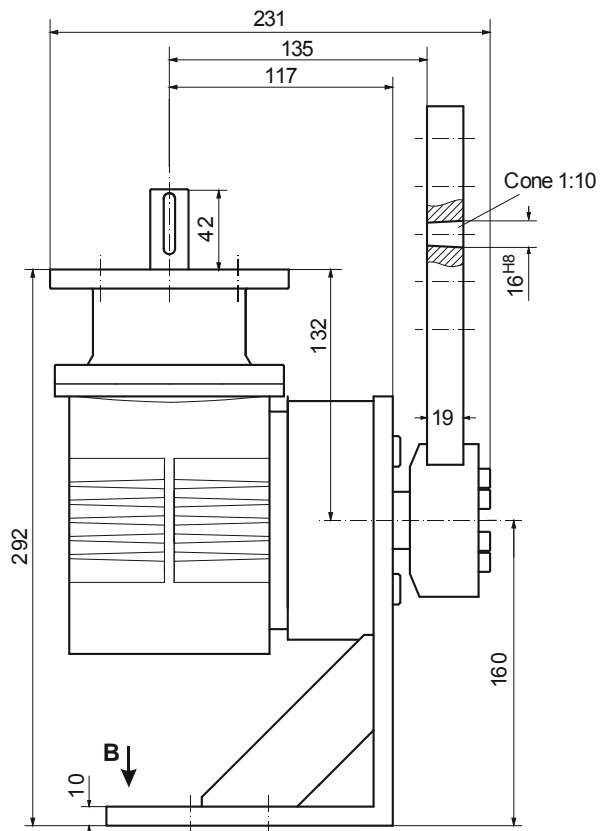
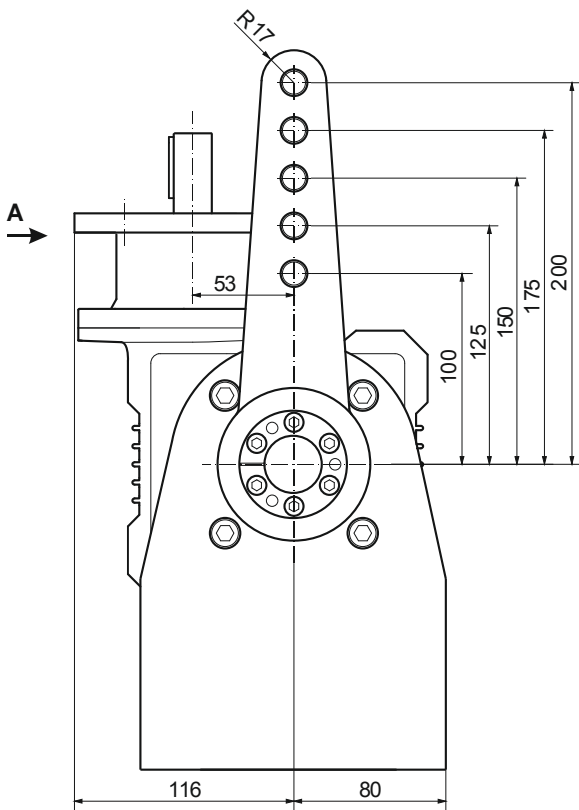
Dimensions	2SP786.		2SP787.
	F14	F16	F16
$\varnothing d1$	175	210	210
$\varnothing d3$	140	165	165
d4	M16	M20	M20
$\varnothing d5$	115	140	140
h	5	5	5
h2	25	32	32
$l_{max.}$	68	88	88

Technical Data

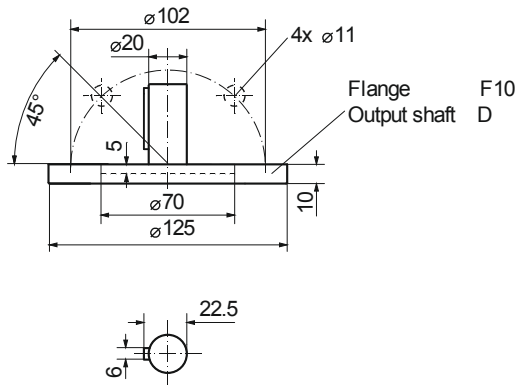
Dimensional drawing 2SP7818, 2SP7828



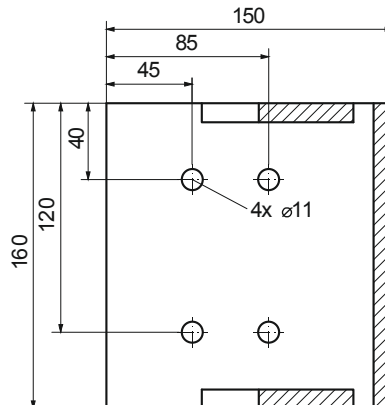
2SA7811-5 Flange F10
2SA7821-5 Output shaft B3



Details A



Details B

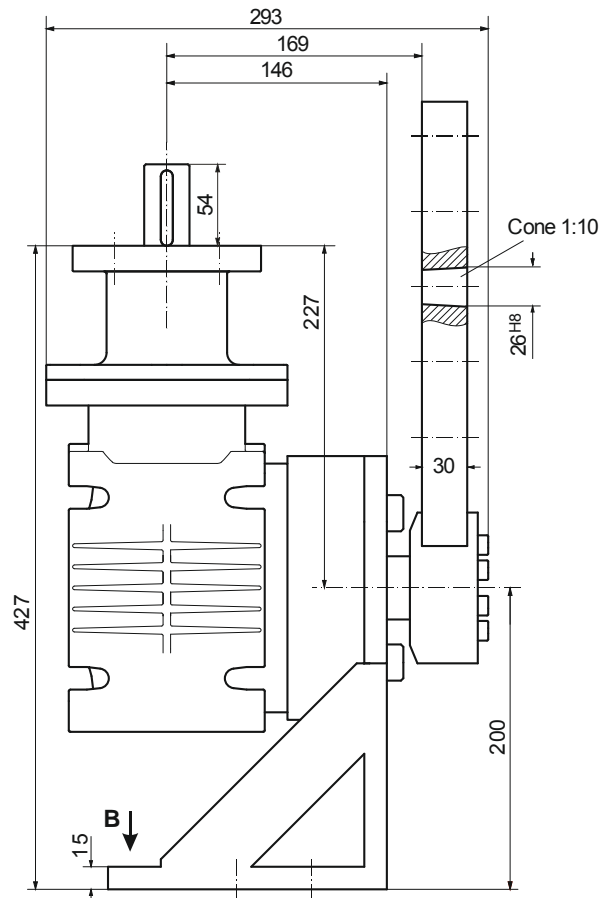
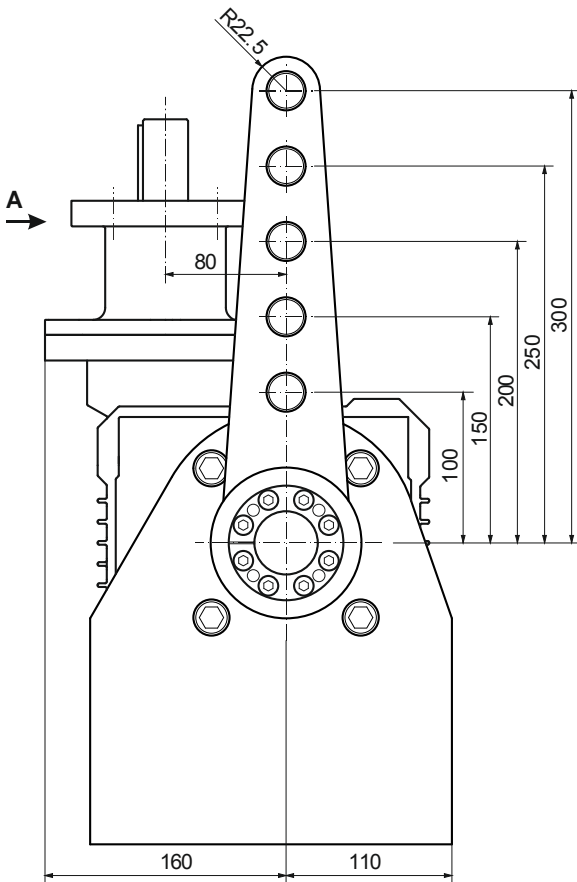


Technical Data

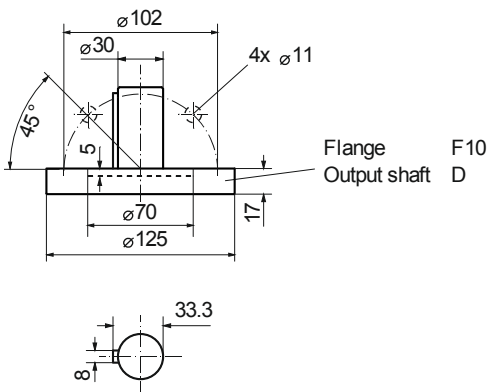
Dimensional drawing **2SP7838**



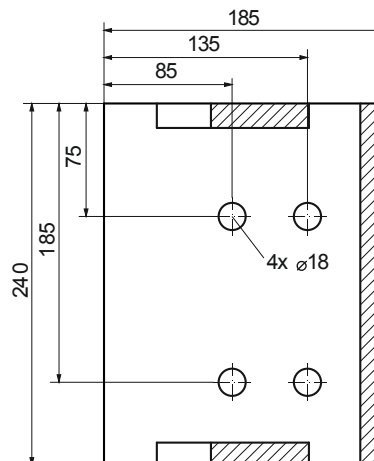
2SA7821-9 # H2Y Flange F10
Output shaft B2/B4



Details A



Details B

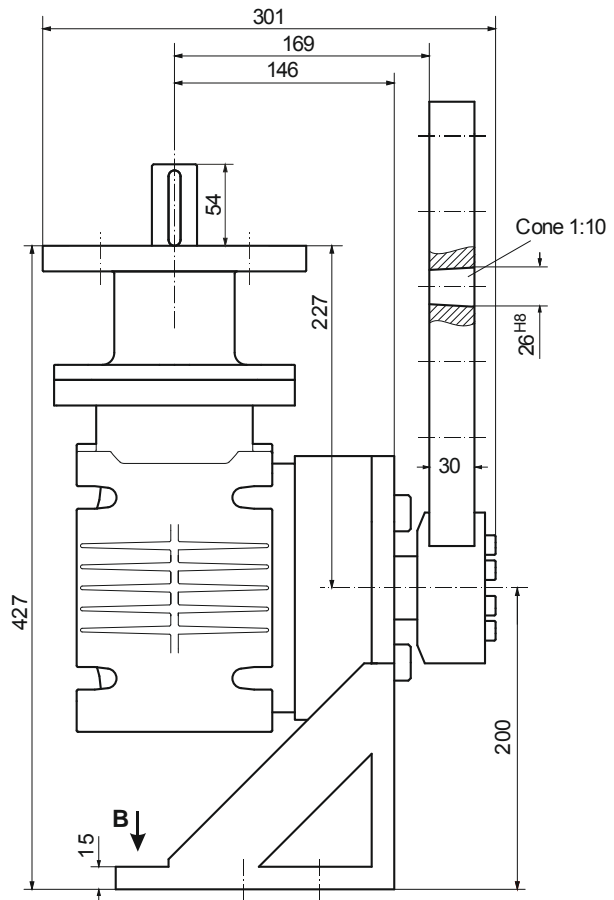
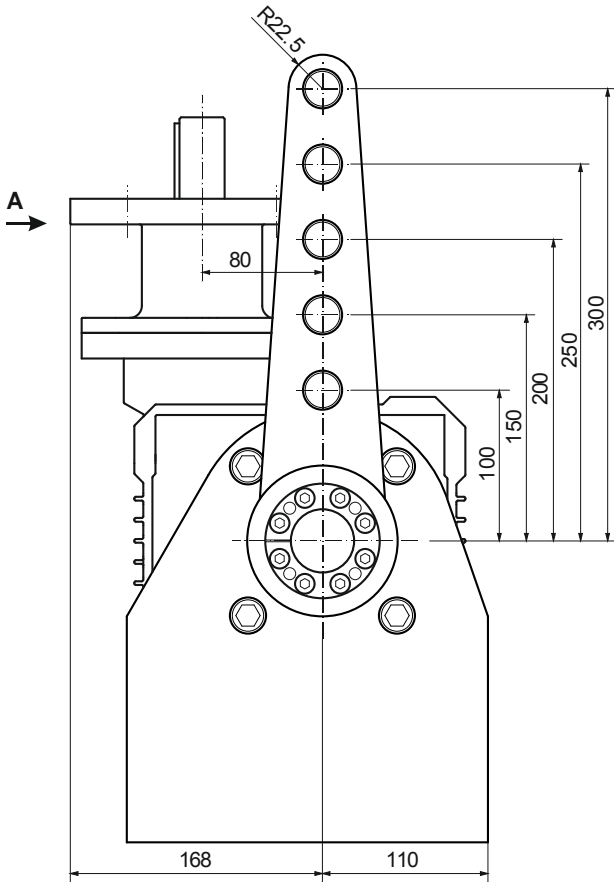


Technical Data

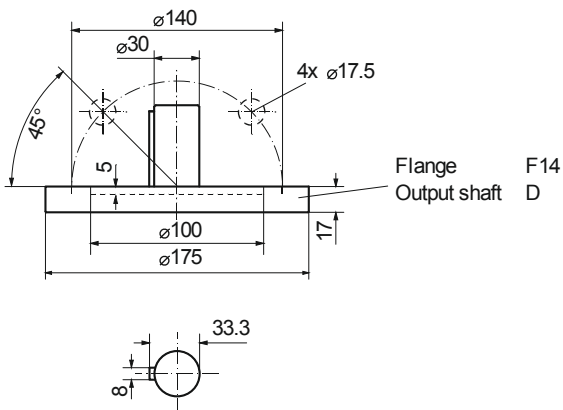
Dimensional drawing 2SP7848, 2SP7858



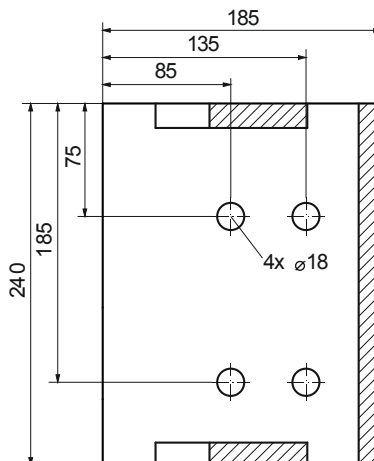
2SA7833-5 Flange F14
2SA7843-5 Output shaft B3



Details A



Details B



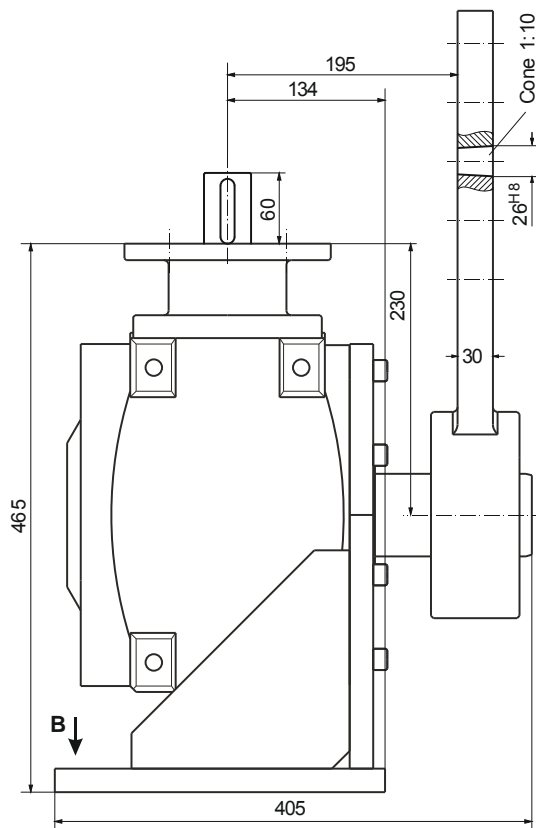
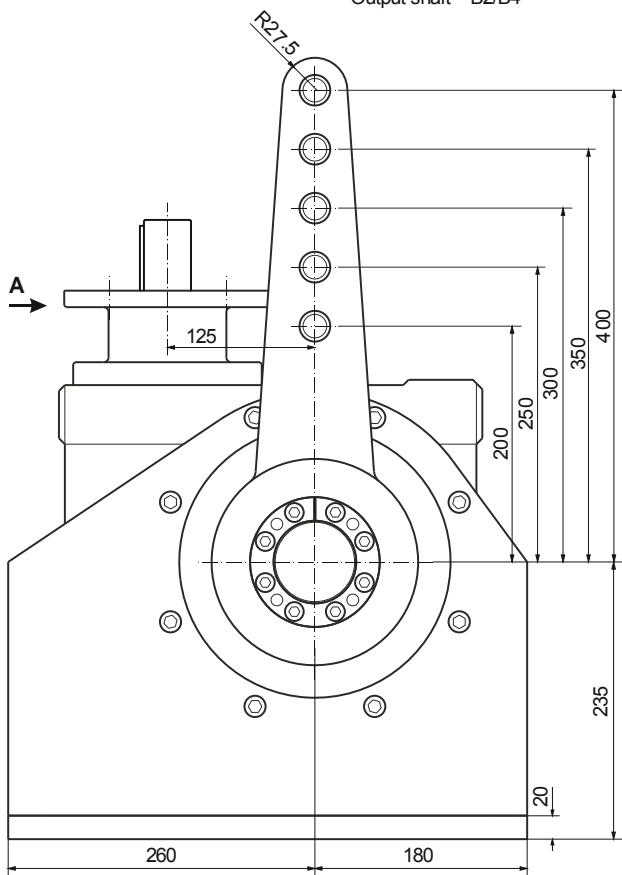
Technical Data

Dimensional drawing 2SP7868, 2SP7878

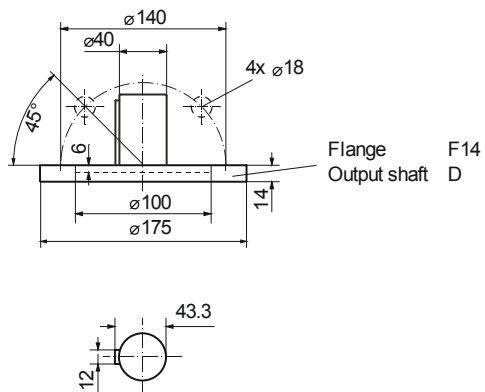


2SA7843-9 # H2Y
2SA7853-9 # H2Y

Flange F14
Output shaft B2/B4



Details A



Details B

