

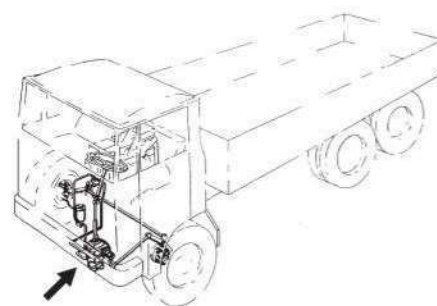


HIDRAULIČKI SERVOUPRAVLJAČI

SA KUGLIČNOM NAVRTKOM U KRATKOM IZVOĐENJU

OPIS

- Primjenjuju se na motornim vozilima (kamioni, autobusi, damperi, mobilne dizalice i sl.)
- Robusna konstrukcija uz male gabarite
- Sigurno i lako upravljanje omogućava velike manevarske sposobnosti vozila uz smanjeni zamor vozača
- Automatsko reagovanje i prelazak na mehaničko upravljanje u slučaju bilo kakvog zastoja u pogonu pumpe ili hidrauličkom sistemu
- Kratko konstrukciono izvođenje omogućava primenu na teretnim vozilima sa oborivom kabinom
- Reaktivni moment sprečava potpuno rasterećenje servoupravljača što pruža vozaču "osećaj puta" pri vožnji
- Granični-prelivni ventili rasterećuju mehanizam za upravljanje kod najvećeg otklona upravljanih točkova
- Izrađeni su od visokokvalitetnih materijala, precizno obrađeni i strogo kontrolisani
- Automatsko reagovanje i održavanje pravca vožnje u slučaju pucanja gume (pneumatika)



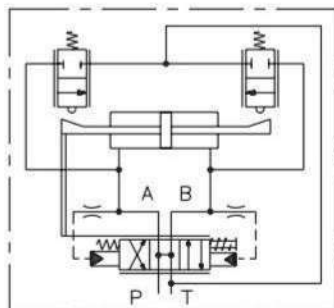
HYDRAULIC SERVO STEERING GEARS

BALL-AND-NUT TYPE, SHORT DESIGN

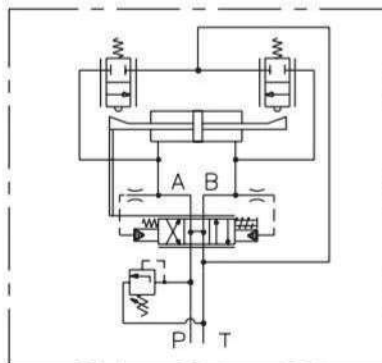
DESCRIPTION

- Applied to motor vehicles (trucks, buses, dumpers, mobile cranes and the alike).
- Robust construction and small overall dimensions.
- Safe and easy steering provides for great manoeuvrability and reduces the driver's fatigue.
- Automatic response and transition to mechanical steering in case of any failure in pump drive or hydraulic system.
- Short design makes it possible to apply this device to goods vehicle with tilting cab.
- Reactive torque prevents complete unloading of servo steering gear, which gives the driver the capability to "feel the road" in travel.
- Limit-overflow valves unload the steering mechanism even at greatest deflection of steered wheels.
- Made of high-quality materials, precision machined and strictly quality controlled.
- Automatic response and maintaining the direction of travel in case a tyre (pneumatics) blows out.

TEHNIČKE KARAKTERISTIKE TECHNICAL DATA



a) bez ventila za ograničenje pritiska
a) without pressure relief valve



b) sa ventilom za ograničenje pritiska
b) with pressure relief valve

Dozvoljeno opterećenje upravljačke osovine Max. allowed load of steered axle		kg	3000	3800	6000	7500
Prenosni odnos servoupravljača Transmission ratio of servo steering gear			18,8:1	20,9:1	20,7:1	22,7:1
Ukupan broj obrtaja točka upravljača Revolutions of steering wheel			4,7	5,2	5,5	6,1
Ugao zaokretanja poluge upravljača Turning angle of steering gear arm		°	90		96	
Obrtni moment na vratilu Shaft torque	za pritisak 100 bar at 100 bar pressure	Nm	1320	2550	3570	4800
	za pritisak 130 bar at 130 bar pressure		1715	3315	4650	6240
	za pritisak 150 bar at 150 bar pressure		1980	—	—	7200
Masa Mass		kg	16	36	43	51
Radna tečnost Working fluid	mineralno ulje mineral oil		GENERAL MOTORS DEXRON II			
	viskozitet viscosity	mm ² /s	27 (pri 50°C)			
	temperatura temperature	°C	od -20 do +100			
	tačka stinjavanja coagulation point		-35			

IZBOR PUMPE PUMP SELECTION

Videti krilne pumpe, konstantnog protoka, za servoupravljanje
See: Vane pumps, fixed displacement, for servo steering

IZBOR REZERVOARA RESERVOIR SELECTION

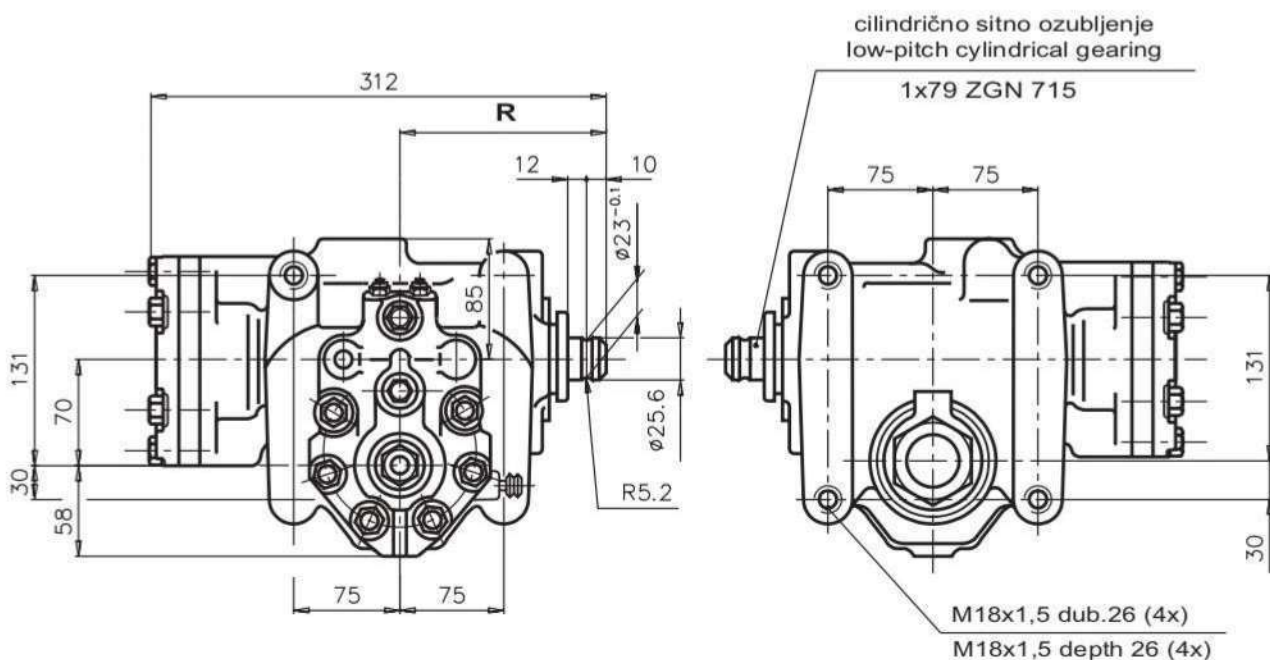
Videti rezervoare za servoupravljanje
See: Reservoirs for servo steering

NARUČIVANJE ORDERING

Quote designation from the following tables
Kod narudžbine navesti oznaku iz dalje navedenih tabela.

Karakterist. mera Characteristic dimension R (mm)	Puž Worm	Protok Flow (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ogran. pritiska Pressure relief valve (bar)
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)	
199,5	levi CCW	12	M16x1,5 dub. 12	unutr. 10 spolj. 12	M18x1,5 dub. 12	unutr. 12 spolj. 15	nema none

UGRADNE MERE MOUNTING DIMENSIONS



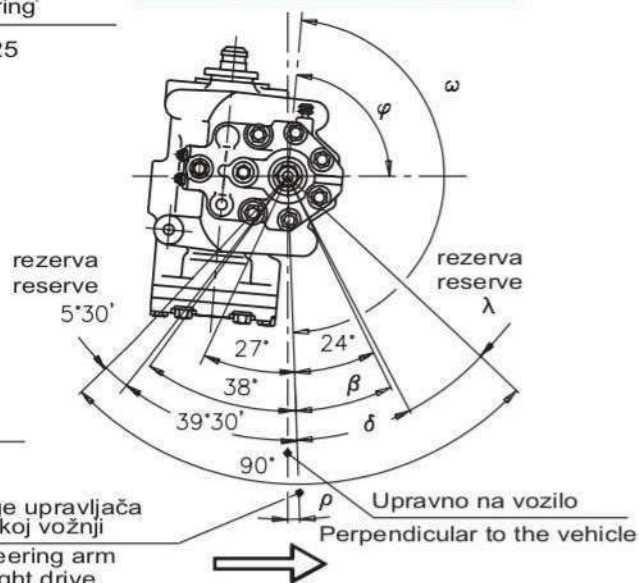
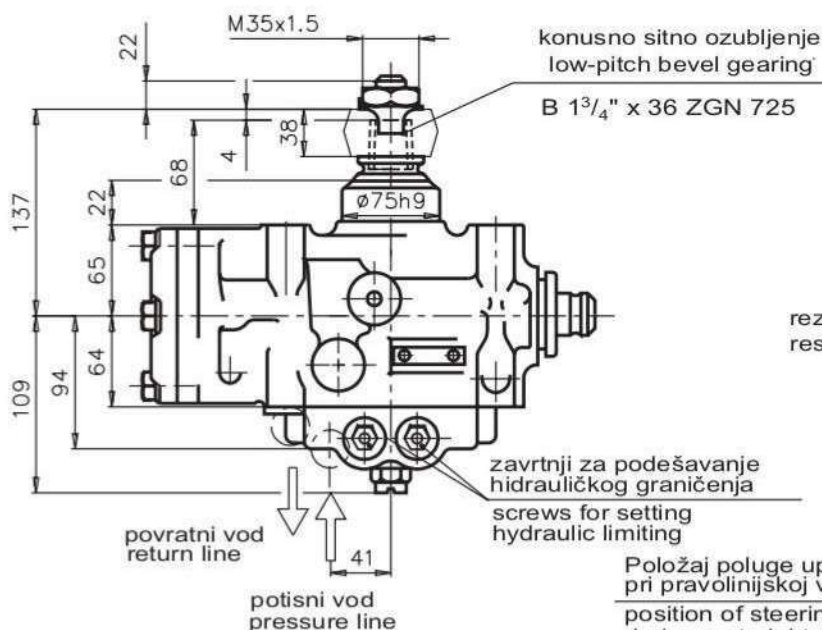
cilindrično sitno ozubljenje
low-pitch cylindrical gearing

1x79 ZGN 715

M18x1,5 dub.26 (4x)

M18x1,5 depth 26 (4x)

POLOŽAJI UGRADNJE MOUNTING POSITIONS



Položaj poluge upravljača
pri pravolinijskoj vožnji
position of steering arm
during a straight drive

Kad se točak upravljača okreće u smeru kazaljke na satu, poluga upravljača se pomera u smeru strelice
When steering wheel turned clockwise, steering arm moves in the direction of the arrow

Karakterist. mera Characteristic dimension R (mm)	Puž Worm	Protok Flow (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ogranič. pritiska Pressure relief valve (bar)	Uglovi ugradnje Mounting angles					
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)		β	δ	λ	ρ	ω	φ
136,5	levi CCW	12	M16x1,5 dub. depth. 12	unutr. int. 10	M18x1,5 dub. depth. 12	unutr. int. 12	nema none	34°	35°30'	9°30'	5°		195°
				spolj. ext. 12				41°	42°30'	2°30'	2°	166°	78°
								24°	25°30'	19°30'	1°	174°	85°
136							100	24°	25°30'	19°30'	1°	174°	85°

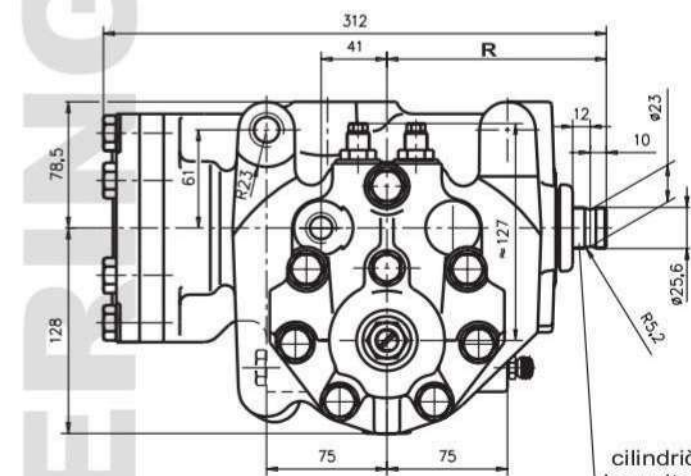
HIDRAULIČKI SERVOPRAVLJAČI

HYDRAULIC SERVO STEERING GEARS

SA KUGLIČNOM NAVRTKOM U KRATKOM IZVOĐENJU

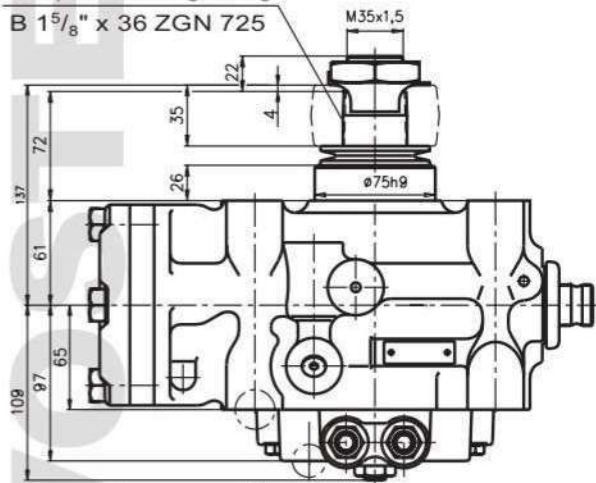
BALL-AND-NUT TYPE, SHORT DESIGN

UGRADNE MERE MOUNTING DIMENSIONS



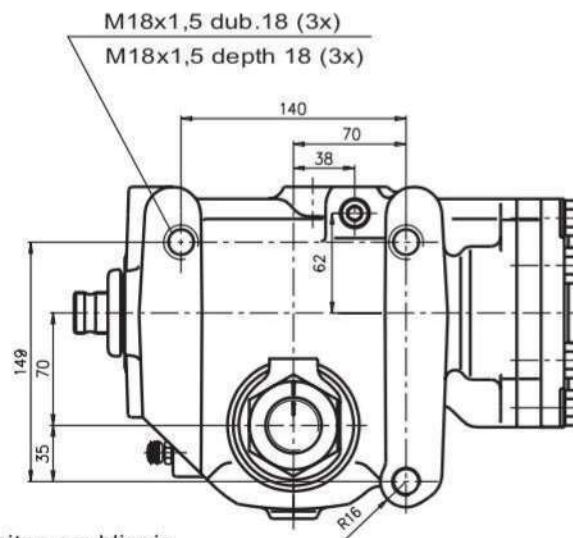
konusno sitno ozubljenje
low-pitch bevel gearing

B 1⁵/₈" x 36 ZGN 725



povratni vod
return line

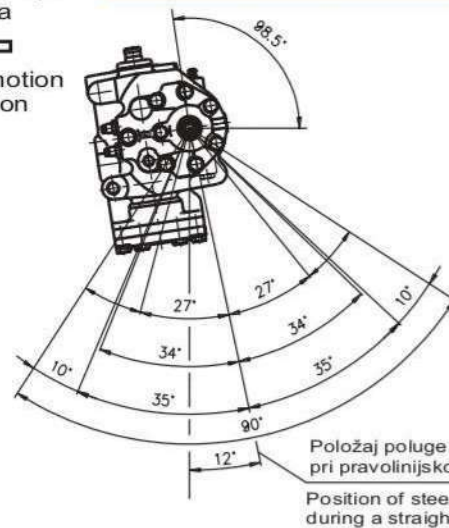
potisni vod
pressure line



cilindrično sitno ozubljenje
low-pitch cylindrical gearing

1x79 ZGN 715

POLOŽAJI UGRADNJE MOUNTING POSITIONS



Položaj poluge upravljača
pri pravolinijskoj vožnji

Position of steering arm during a straight drive

Kada se točak upravljača okreće u smeru kazaljke
na satu, poluga upravljača se pomera u smeru strelice

When steering wheel turned clockwise,
steering arm moves in the direction of the arrow

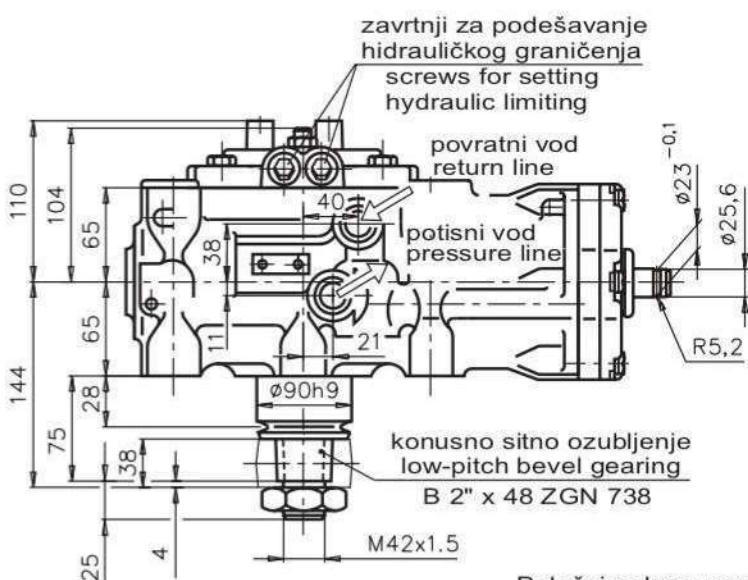
Karakterist. mera Characteristic dimension R (mm)	Puž Worm	Protok Flow (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ogran. pritiska Pressure relief valve (bar)
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)	
136,5	levi CCW	12	M16x1,5 dub. 12 int. 10 spolj. 12	12	M18x1,5 dub. 12 int. 12 spolj. 15	15	100

BALL-AND-NUT TYPE, SHORT DESIGN

SA KUGLIČNOM NAVRTKOM U KRATKOM IZVOĐENJU

B

UGRADNE MERE MOUNTING DIMENSIONS

[illegible]

Kada se točak upravljača okreće u smeru kazaljke
na satu, poluga upravljača se pomera u smeru strelice

When steering wheel turned clockwise, steering
arm moves in the direction of the arrow

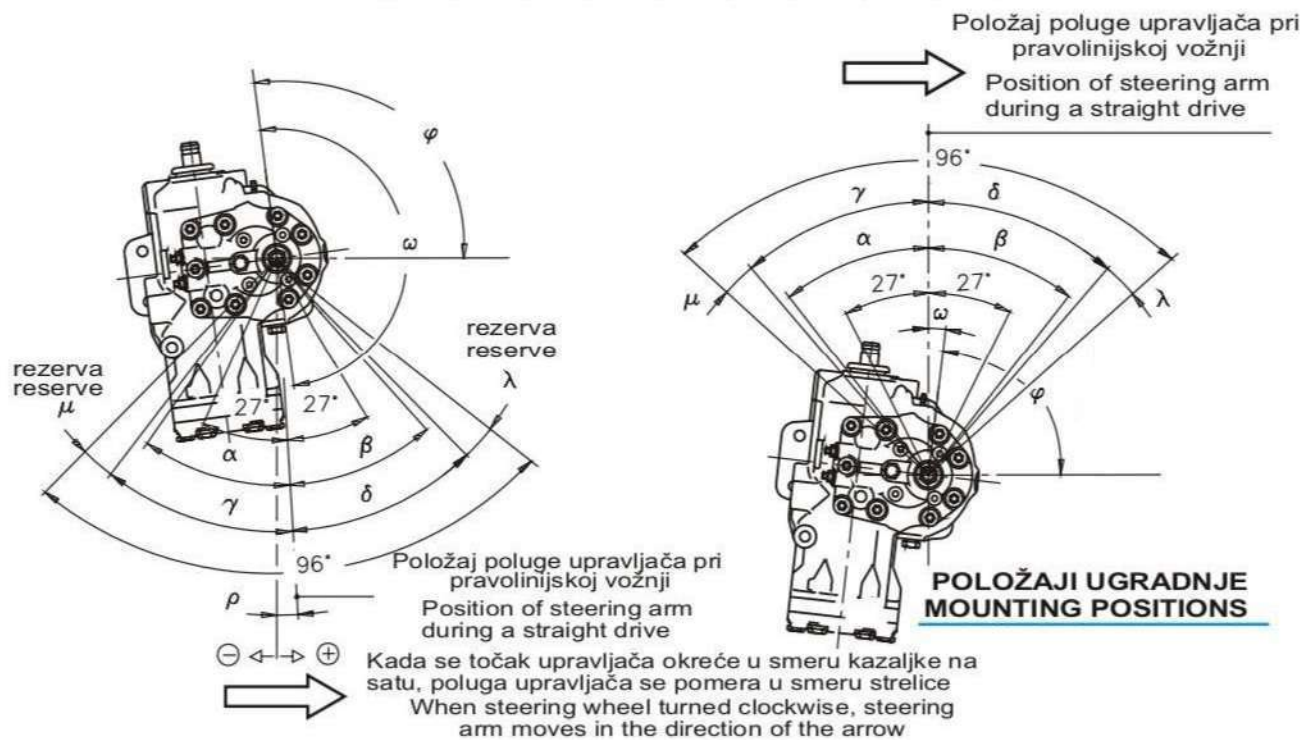
Karakterist. mera Characteristic dimension R (mm)	Puž Worm	Protok Flow (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ograñiç. pritiska Pressure relief valve (bar)	Uglovi ugradnje Mounting angles								
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)		α	β	γ	δ	μ	λ	ρ	φ	ω
245	levi CCW	12	M16x1,5 dub. 14	unutr. 10 spolj. 12	M18x1,5 dub. 15	unutr. 12 spolj. 15	nema none	38°	32°	39°	33°	9°	15°	2°	33°30'	121°30'
		16					130	45°	45°	46°	46°	2°	2°	0°	90°	180°

HYDRAULIC SERVO STEERING GEARS

BALL-AND-NUT TYPE, SHORT DESIGN

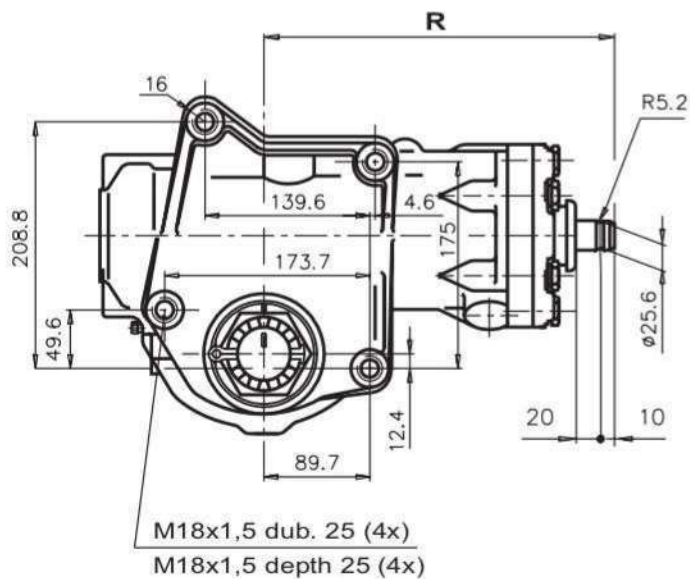
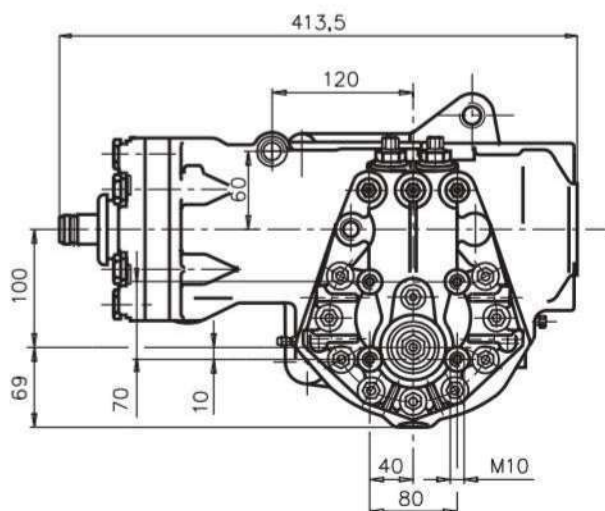
Karakterist. mera Characteristic dimension R (mm)	Puž Worm	Protok Flow (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ogranič. pritisaka Pressure relief valve (bar)		
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)			
150	levi CCW	12	M16x1,5 d.12	unutr. 10 spolj.12 ext.	M18x1,5 d.12	unutr. 12 spolj.15 ext.	nema none		
			M16x1,5 d.14		M18x1,5 d.15		130		
	M16x1,5 dub. depth. 12		M18x1,5 dub. depth. 12		nema none				
desni CW	16	130							
156	levi CCW		12				M16x1,5 dub. depth. 14	M18x1,5 dub. depth. 15	nema none
							16	M16x1,5 dub. depth. 12	M18x1,5 dub. depth. 12
230	desni CW		12	156	levi CCW	12			
156	levi CCW	12					100		
230		16					130		

A	B	C	D	E	F	G	H	L
49	45	94						
50	43	95	120	240	170	5	35	12
49	26	94						
50	43	95	30	150	81	4	34	18
49	45	94						92
	43	94						18
	45	95						92

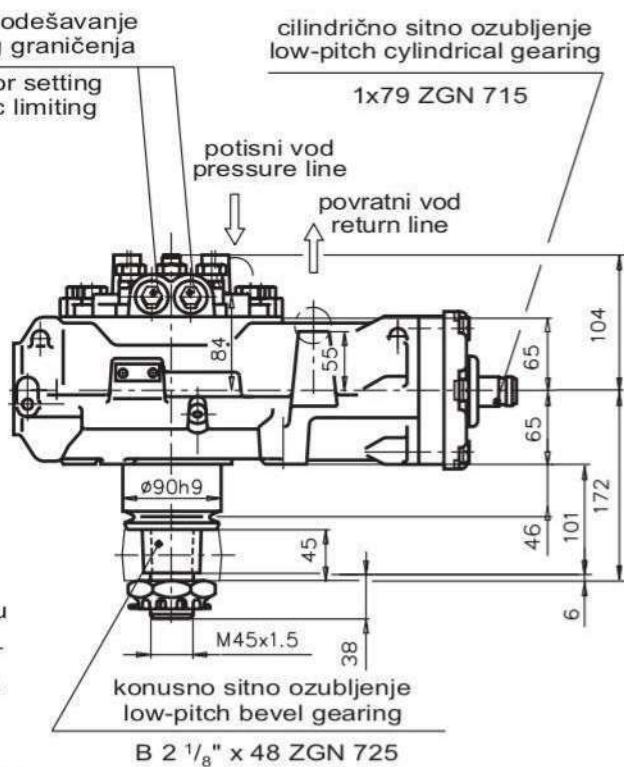
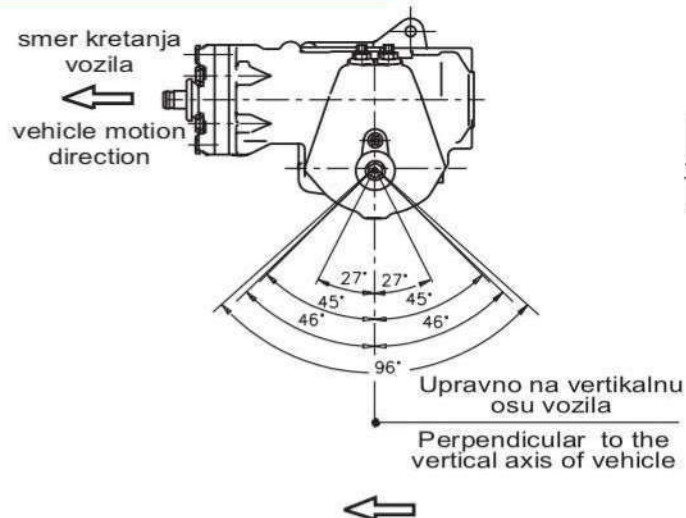


α	β	γ	δ	ρ	μ	λ	ω	φ
45°	45°	46°	46°	9°20'	2°	2°	166°40'	86°
39°	40°	40°30'	41°30'	0°	7°30'	6°30'	—	—
44°	44°	45°	45°	3°45'	3°	3°	183°45'	97°30'
41°	35°	42°	36°	—	6°	12°	150°	75°
44°	44°	45°	45°	-2°30'	3°	3°	—	87°30'
43°	43°	46°	46°	0°	—	—	—	105°
				—	2°	2°	—	0°
				0°	—	—	—	105°

Karakterist. mera Characteristic dimension R (mm)	Puž Worm	Protok Flow (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ogranic. pritiska
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)	Pressure relief valve (bar)
156	desni CW	16	M16x1,5 dub. 12	unutr. 10 spolj. 12	M18x1,5 dub. 12	unutr. 12 spolj. 15	nema none
		12					100



POLOŽAJI UGRADNJE MOUNTING POSITIONS



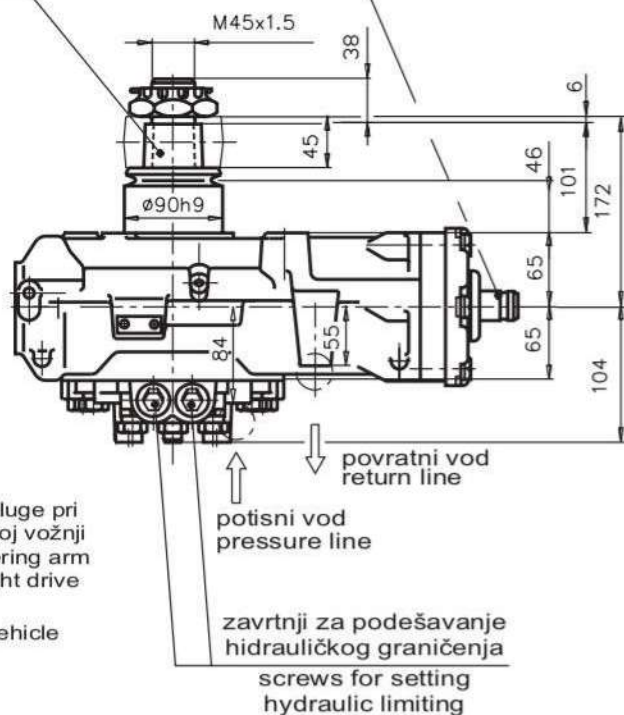
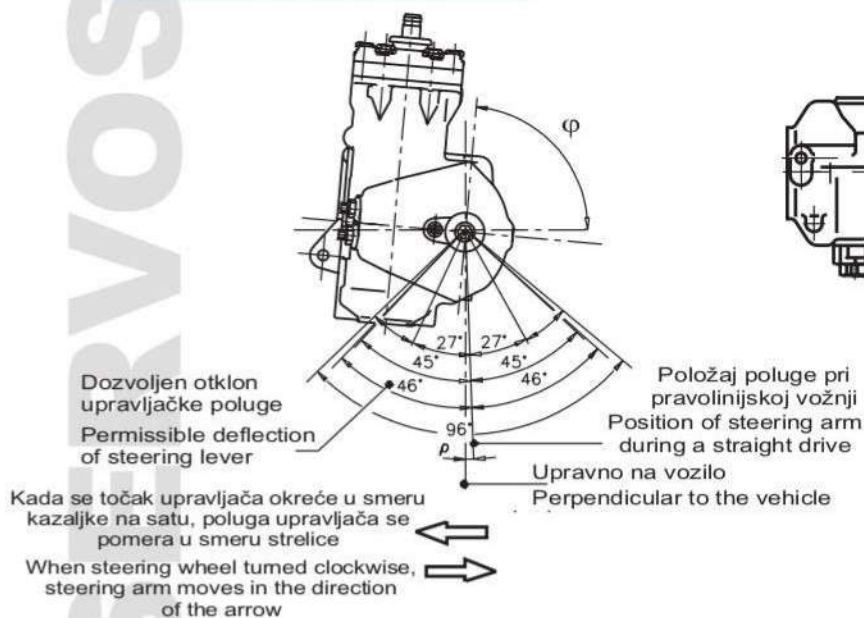
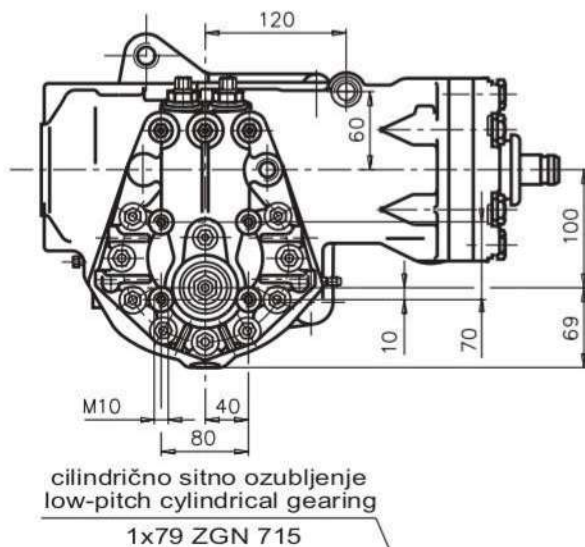
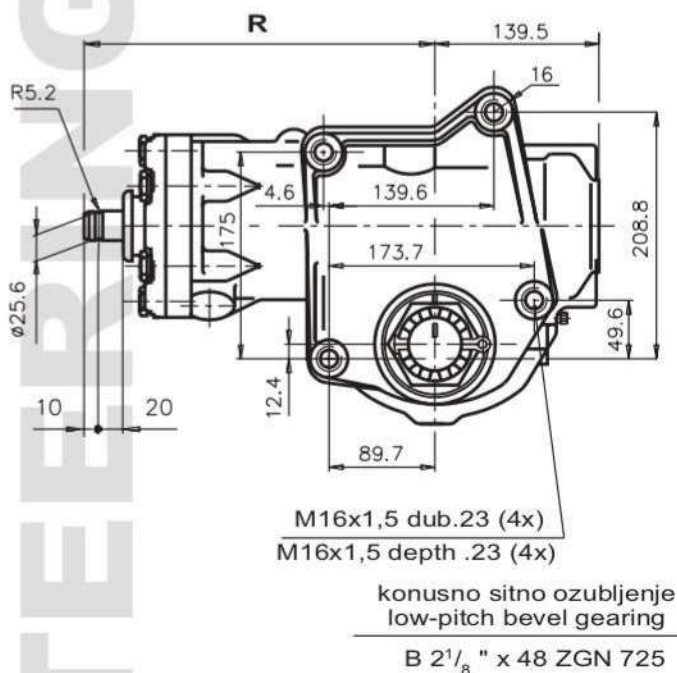
Kada se točak upravljača okreće u smeru kazaljke na satu, poluga upravljača se pomera u smeru strelice

When steering wheel turned clockwise, steering arm moves in the direction of the arrow

Karakterist. mera Characteristic dimension R (mm)	Puž Worm	Protok Flow (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ogran. pritiska
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)	Pressure relief valve (bar)
274	levi CCW	16	M18x1,5 dub. 12	unutr. 10 spolj. 12	M18x1,5 dub. 12	unutr. 12 spolj. 15	130

SA KUGLIČNOM NAVRTKOM U KRATKOM IZVOĐENJU

BALL-AND-NUT TYPE, SHORT DESIGN



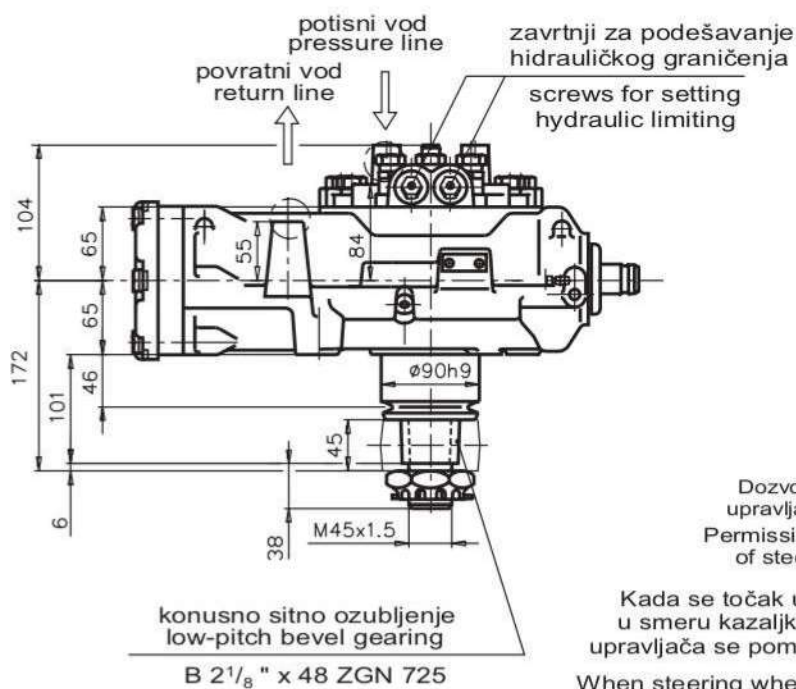
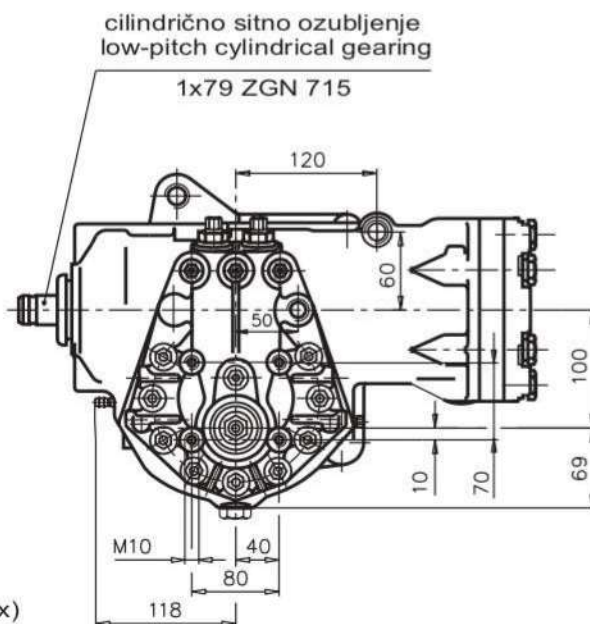
Karakterist. mera Characterist. dimension R (mm)	Puž Worm	Protok Flow (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ogranič. pritiska Pressure relief valve (bar)	ρ	φ
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)			
287,5	desni CW	16	M16x1,5	unutr. 10 int. 10	M18x1,5	unutr. 12 int. 12	100	0°	82°30'
	levi CCW		dub. 12 depth. 12	spolj. 12 ext. 12	dub. 12 depth 12	spolj. 15 ext. 15		1°30'	76°

BALL-AND-NUT TYPE, SHORT DESIGN

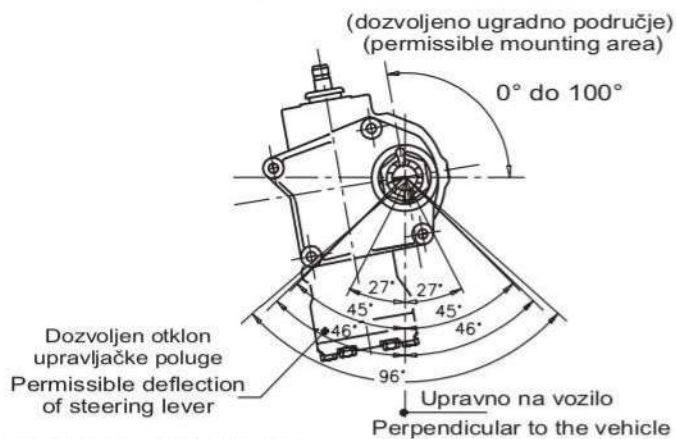
SA KUGLIČNOM NAVRTKOM U KRATKOM IZVOĐENJU

UGRADNE MERE MOUNTING DIMENSIONS

B



POLOŽAJI UGRADNJE MOUNTING POSITIONS



Kada se točak upravljača okreće u smeru kazaljke na satu, poluga upravljača se pomera u smeru strelice

When steering wheel turned clockwise, steering arm moves in the direction of the arrow

Karakterist. mera Characterist. dimension R (mm)	Puž Worm	Flow Protok (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ogranič. pritiska Pressure relief valve (bar)
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)	
179	desni CW	16	M16x1,5	unutr. 10 int. 10	M18x1,5	unutr. 12 int. 12	nema none
	levi CCW	20	dub. 12 depth 12	spolj. 12 ext. 12	dub. 12 depth 12	spolj. 15 ext. 15	

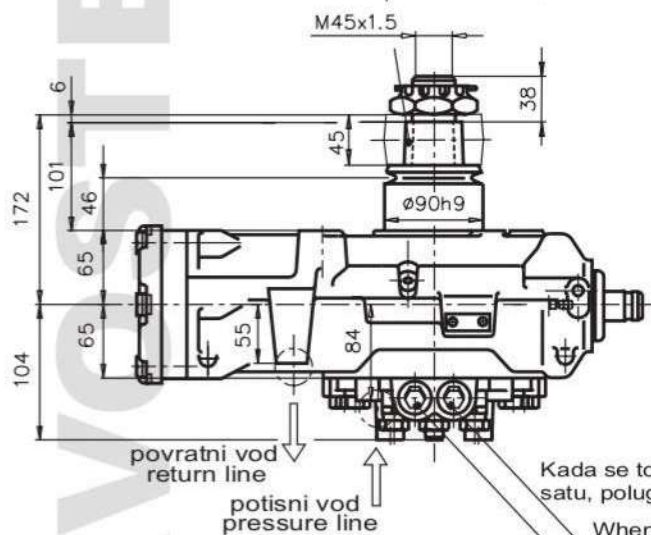
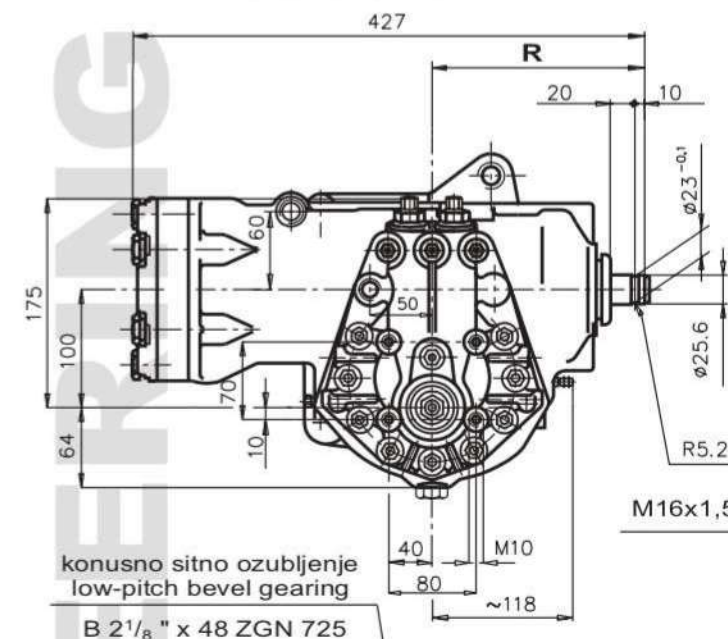
HIDRAULIČKI SERVOPRAVLJAJI HYDRAULIC SERVO STEERING GEARS

HIDRAULIČKI SERVOPRAVLJAJI HYDRAULIC SERVO STEERING GEARS

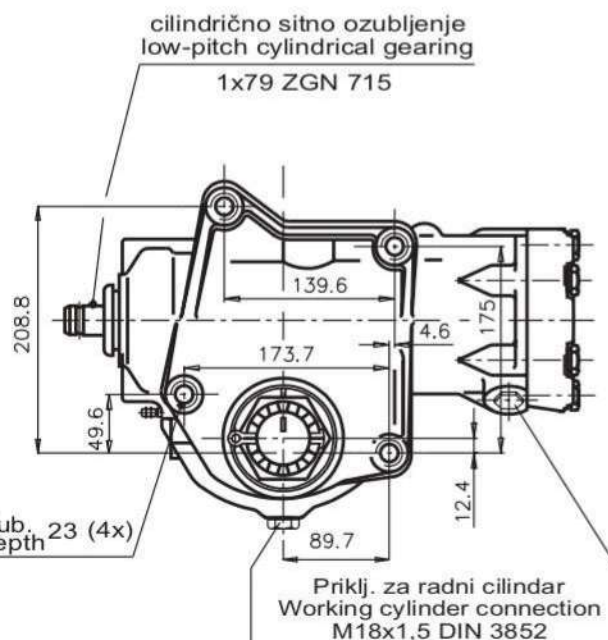
SA KUGLIČNOM NAVRTKOM U KRATKOM IZVOĐENJU BALL-AND-NUT TYPE, SHORT DESIGN

SA KUGLIČNOM NAVRTKOM U KRATKOM IZVOĐENJU BALL-AND-NUT TYPE, SHORT DESIGN

UGRADNE MERE MOUNTING DIMENSIONS

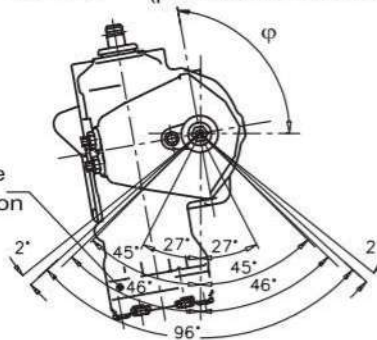
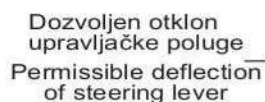


zavrtnji za podešavanje hidrauličkog graničenja
screws for setting hydraulic limiting



POLOŽAJI UGRADNJE MOUNTING POSITIONS

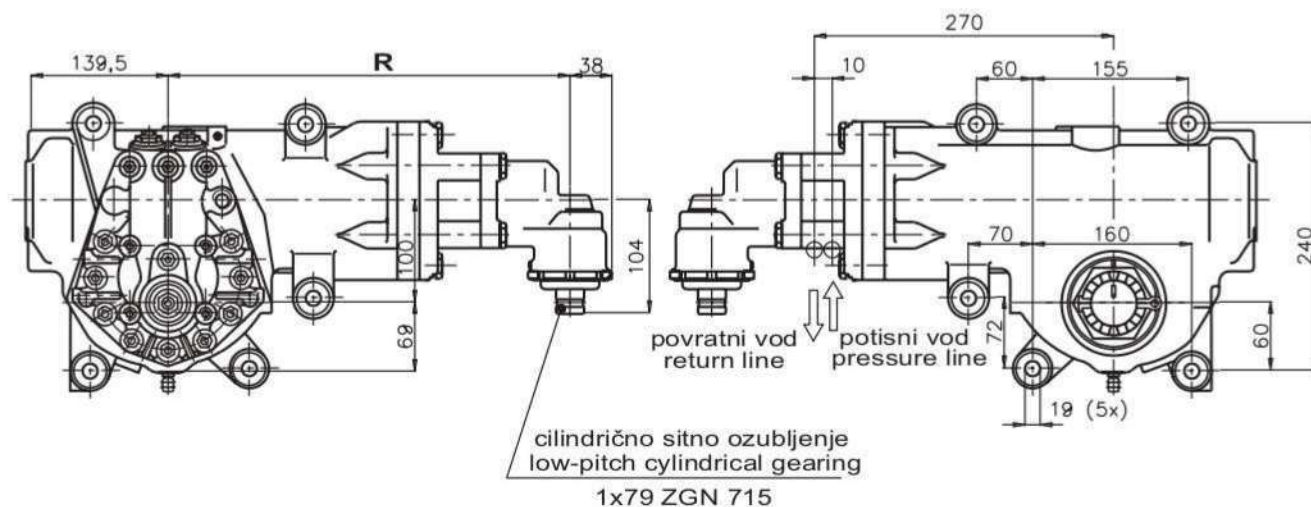
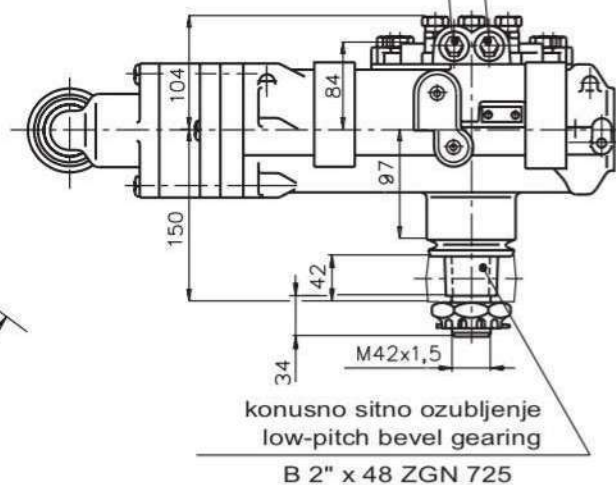
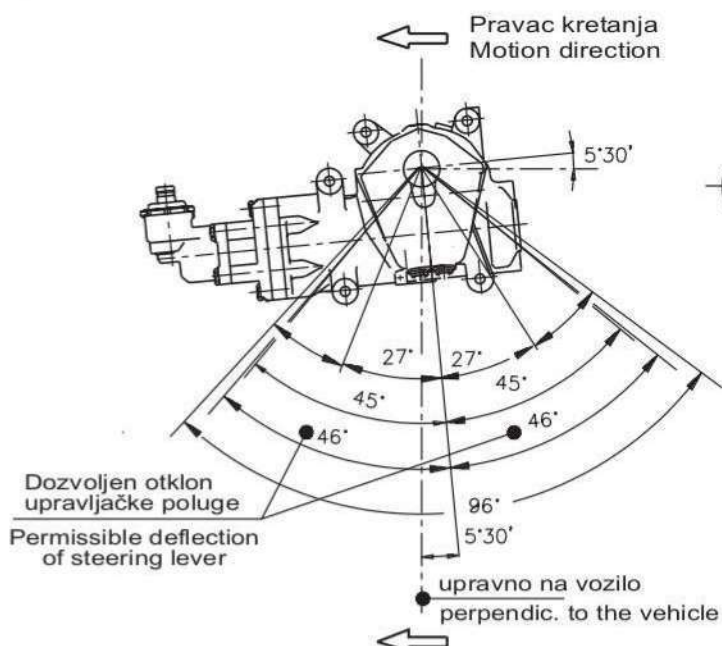
(dozvoljeno ugradno područje)
(permissible mounting area)



upravno na vozilo
perpendic. to the vehicle

When steering wheel turned clockwise, steering arm moves in the direction of the arrow

[illegible]

POLOŽAJI UGRADNJE
MOUNTING POSITIONSzavrtnji za podešavanje hidrauličkog graničenja
screws for setting hydraulic limiting

Kada se točak upravljača okreće u smeru kazaljke na satu, poluga upravljača se pomera u smeru strelice

When steering wheel turned clockwise, steering arm moves in the direction of the arrow

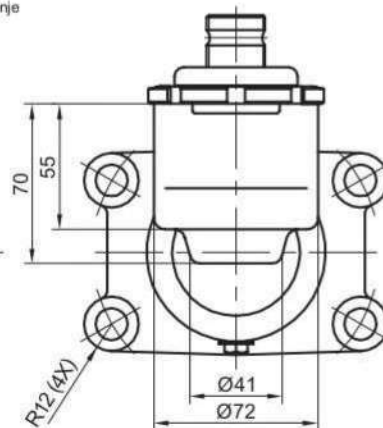
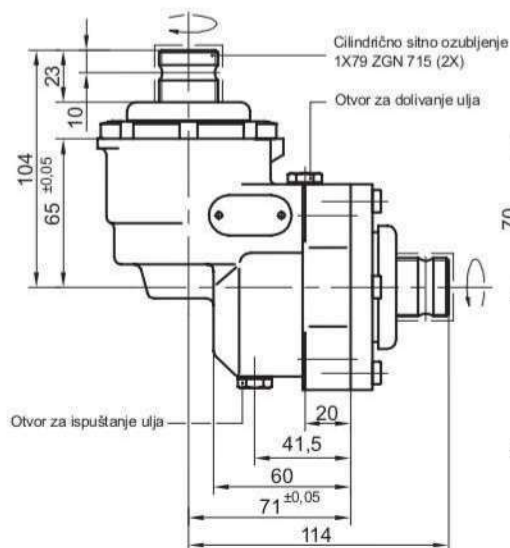
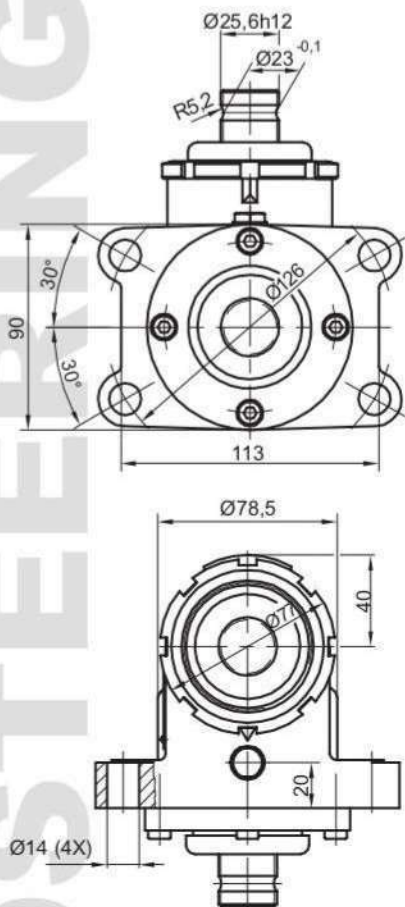
Karakterist. mera Characteristic dimension R (mm)	Puž Worm	Protok Flow (l/min)	Potisni vod Pressure line		Povratni vod Return line		Vent. za ogranič. pritiska Pressure relief valve (bar)
			Navoj Thread	D cevi Tube dia. (mm)	Navoj Thread	D cevi Tube dia. (mm)	
360	desni CW	16	M16x1,5 dub. 12 depth.	unutr. 10 spolj. 12 ext.	M26x1,5 dub. 16 depth.	unutr. 19 spolj. 22 ext.	nema none

HIDRAULIČKI SERVOPRAVLJAJI

SA KUGLIČNOM NAVRTKOM U KRATKOM IZVOĐENJU

HYDRAULIC SERVO STEERING GEARS

BALL-AND-NUT TYPE, SHORT DESIGN



Max. obrtni moment $M = 200 \text{ Nm}$.
 Max. moment trenja $M_t = 90 \text{ Ncm}$.
 Prenosni odnos $i = 1:1$

