

Razvoj transportnog sustava unutar robotske ćelije

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VELEUČILIŠTE U BJELOVARU
PREDDIPLOMSKI STRUČNI STUDIJ MEHATRONIKA

**RAZVOJ TRANSPORTNOG SUSTAVA UNUTAR
ROBOTSKE ČELIJE**

Završni rad br. 16/MEH/2018

Miroslav Modrić

Bjelovar, listopad 2018.

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Veleučilište u Bjelovaru

Trg E. Kvaternika 4, Bjelovar

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Kandidat: **Modrić Miroslav**

Datum: 07.09.2018.

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Mentor: **Tomislav Pavlic, mag.ing.mech.**

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2. Tomislav Pavlic, mag.ing.mech., mentor
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2. ZADATAK ZAVRŠNOG RADA BROJ: 16/MEH/2018

Potrebno je razraditi transportni sustav unutar robotske ćelije prema definiranim uvjetima krajnjega kupca.

- Princip rada prikazati shematski
- Osmisliti i izmodelirati 3D layout u programskom alatu Solidworks
- Razviti, dimenzionirati potrebne mehanizme i tehnička rješenja
- Napraviti svu potrebnu tehničku dokumentaciju
- Napraviti i razraditi pneumatske sheme
- Napraviti i razraditi električne sheme (u obimu transportnog sustava)
- Napraviti dijagram toka i odabir komponenti upravljanja transportnim sustavom

Zadatak uručen: 07.09.2018.

Mentor: **Tomislav Pavlic, mag.ing.mech.**



Zahvala

Zahvaljujem se svome mentoru profesoru Tomislavu Pavlicu, mag.ing.mech. i svim svojim kolegama sa posla na korisnim savjetima, pomoći i trudu pri izradi završnog rada.

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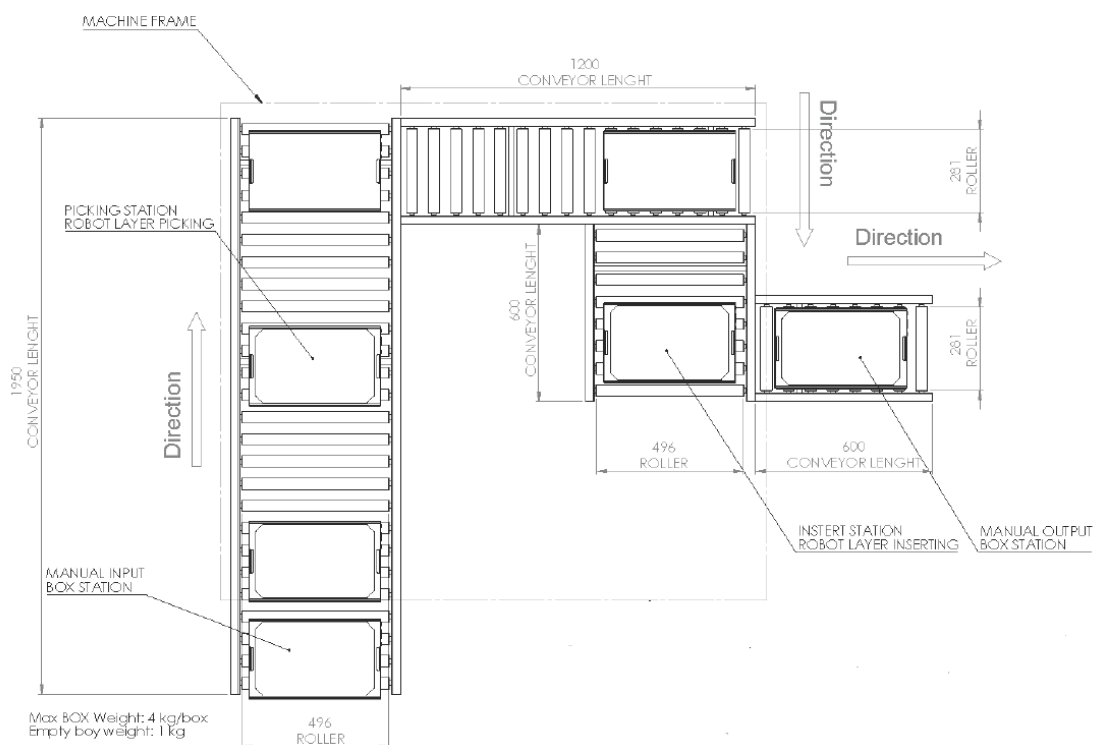
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1. Uvod

Tema ovog rada je razvoj i konstrukcija transportnog sustava za kutije, te njegovo upravljanje unutar robotske ćelije.

Metalne kutije dimenzija 450x275x77 mm sadrže kartonske podloške (SLIP SHEET) na koje su u određenom rasporedu posložene keramičke pločice veličine 14,5 x 14,5 mm. Prije postavljanja prve pune kutije, potrebno je u stroj pustiti dvije potpuno prazne kutije koje se u prvom koraku transportiraju do mjesta punjenja. Potrebna je provjera da li je taj uvjet izvršen, tj. jesu li u sustavu prazne kutije prije početka rada stroja. Nakon umetanja i pozicioniranja prve prazne kutije i slijedeće pune, ROBOT 1 prazni kutiju na okretni stol za ispitivanje, a ROBOT2 prazni sa okretnog stola i puni izlaznu kutiju. Nakon što se izlazna kutija napuni, transportni sustav je izvozi van radnog prostora robota, a nova prazna dolazi na mjesto punjenja, te nakon što se isprazni ulazna kutija, pomiče se prema mjestu punjenja i čeka. (Princip preslagivanja kutija)

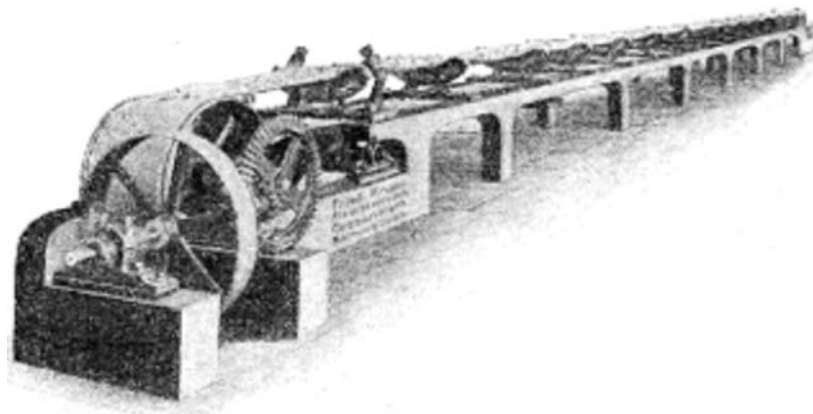
Princip rada dan je shematski:



Slika 1.1 Shema sustava

2. POVIJEST KONVEJERA

Trakasti transporteri bitan su dio u današnjoj industriji. Koriste se za transport različitog materijala iz jednog procesa u drugi, u suradnji s različitim transportnom i strojnom opremom. Važnost trakastih transportera zanemaruje se jer se oni uobičajeno promatraju kao dio opreme koji ne stvara probleme i koji radi dugo vremena bez kvara. Ljudi se koriste načelima trakastih transportera tisućama godina. Drevni narodi poput Egipćana koristili su balvane kao valjke, njima su prevozili teške terete, poput velikih kamenih blokova za gradnju piramida, palača i hramova. Prvi trakasti transporteri bili su jednostavni. Imali su drvene valjke i traku koja je putovala preko njih. Najranije transportne trake bile su izrađene od kože. Takvi trakasti transporteri bili vrlo popularni za prijevoz rasutog tereta, slika 2.1. U dvadesetom stoljeću njihova primjena postaje sve šira. Konstrukcija trakastih transportera stalno se poboljšava pa su postali neizbježan dio suvremene industrije i svakodnevnoga života. Izum poput električnog motora omogućio je izradu trakastih transportera za prijevoz materijala i ljudi u proizvodnim postrojenjima, tvornicama, rudnicima, lukama, skladištima, zračnim lukama, trgovinama, itd.



Slika 2.1 Prvi transporter

Povijest trakastih transportera počinje u 17. stoljeću i otada su oni neizbježni i sastavni dio transporta materijala. Najraniji trakasti transporteri bili su vrlo primitivni i sastojali su se od kožne trake koja se vozila preko ravne drvene platforme ili preko drvenih valjaka. Prva upotreba lijevanih potpornih valjaka zabilježena je 1891. godine u Edisonovim proizvodnim pogonima u New Jerseyju i Pennsylvaniji. U početku trakasti su se transporteri koristili samo za prijevoz vreća žita na kratke udaljenosti, ali njihova se konstrukcija polako poboljšavala jer su zahtjevi za mogućnostima bili sve veći. U 19. stoljeću postajali su sve pouzdaniji pa se i njihova upotreba proširila. Trakasti transporteri počeli su se koristiti i za prenošenje težih tereta. Razvojem tehnologije umjesto drva počeo se koristiti metal, posebice čelik, za upotrebu na višim temperaturama i u svrhu povećanja trajnosti. U tvrtki Sandvik 1901. godine izumljena je i počela se proizvoditi čelična transportna traka. Otada se istražuju novi, lakši i jeftiniji materijali pa su stoga mnogi dijelovi danas izrađeni od plastike. Međutim upotreba plastike nije uvijek moguća, npr. kod visokih temperatura i kod transportera s teškim uvjetima rada, pa se i dalje koristi čelik.



Slika 2.2 Današnji trakasti transporteri

Henry Ford je 1913. godine u vlastitom pogonu Rouge u Dearborneu u Michiganu koristio montažnu liniju baziranu na transportnoj traci za montažu automobila Model-T. To mu je uvelike povećalo proizvodnju i smanjilo troškove na dugogodišnjem planu. Vrijeme potrebno za sklapanje šasijske manjane je ukupno za deset sati od početnog vremena. Nakon njega svi ostali proizvođači su počeli koristiti pokretne montažne trake. Tako su one postale popularan način transporta teške i velike robe unutar tvornica. U prvoj polovici 20. stoljeća trakasti transporteri postali su uobičajena transportna sredstva i njihova je konstrukcija neprestano poboljšavana. Trakasti transporteri velike duljine koriste se danas u rudnicima i u lukama za transport ugljena i raznih ruda. Jedna od prekretnica u povijesti razvoja trakastih transportera bila je uvođenje sintetičkih transportnih traka. To je počelo tijekom Drugoga svjetskog rata, ponajviše zbog nestašice prirodnih materijala poput pamuka, gume i platna. Posljednja novotarija uočena u razvoju transportnih sustava su teleskopske transportne trake. Koriste se za utovare kamiona, aviona, brodova, vlakova. Njihova prednost je ta što oni više nisu ograničeni nagibom, visinom, dužinom i pozicijom.



Slika 2.3 Današnji trakasti transporteri

3. ODABIR MOTORA ZA POGON

Snaga potrebna za pogon opterećenog transportera, bez dodatnih otpora računa se prema izrazu:

$$P_{bo} = C_{bo} \times v [W]$$

- P_{bo} - snaga na osovini pogonskog bubnja [W]

- C_{bo} - vučna sila na obodu pogonskog bubnja [N]

Obodna vučna sila jednaka je algebarskom zbroju sile potrebne za horizontalno kretanje opterećene trake i za rotaciju svih bubnjeva i valjaka i sile potrebne za podizanje, odnosno spuštanje tereta na traci, ako je transporter nagnut. Izračunavanje obodne vučne sile računa se prema slijedećem izrazu:

$$F_{bo} = g \times \left[c \times t \times L \times \left(G_t + \frac{G}{3,6 \times v} \right) \pm \frac{G \times H}{3,6 \times v} \right] [N]$$

U promatranom sustavu nema dodatnih otpora već je težina jedne pune kutije jedini otpor.

Iz toga razloga koristi se prva spomenuta formula za proračun snage motora. Odlučeno je da će brzina trake biti 0,5 m/s. Najveća težina pune kutije iznosi 20 kg.

Prema tome slijedi:

$$P_{bo} = C_{bo} \times v = 200 \times 0,5 = 100 [W]$$

Prema proračunu dobivena je potrebna snaga motora od 100 [W].

Odabiru se SIEMENS motori 1FL6024-2AF21 sa njihovim pripadajućim driverima i reduktorima pod 90°.

SIEMENS

Data sheet for SIMOTICS S-1FL6

MLFB-Ordering data

1FL6024-2AF21-1AA1



Figure similar

Client order no. :
Order no. :
Offer no. :
Remarks :

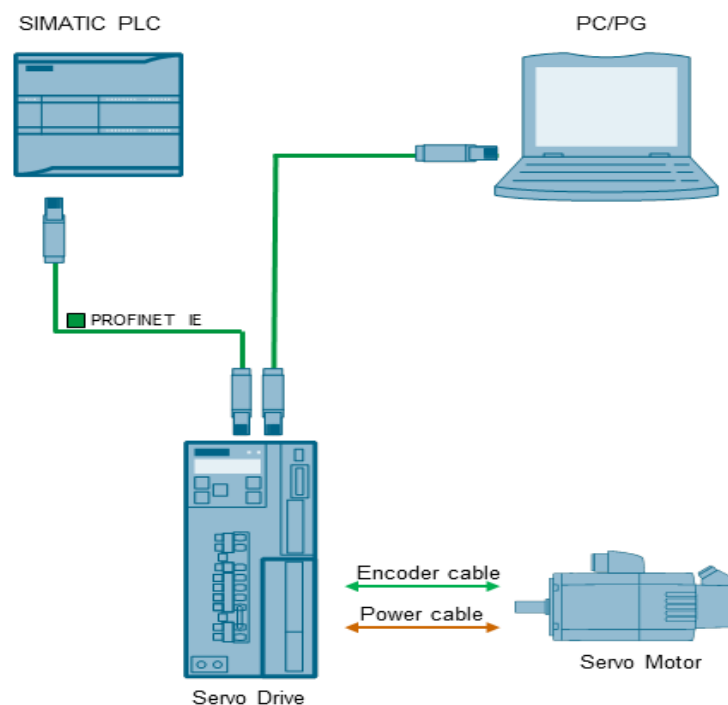
Item no. :
Consignment no. :
Project :

Engineering data		Physical constants	
Rated speed	3000 rpm	Torque constant	0.29 Nm/A
Rated torque (100 K)	0.32 Nm	Thermal class	B (130 °C)
Rated current	1.2 A	Net weight	0.63 kg
Rated power	0.10 kW / 0.14 hp	Ambient conditions	
Max. speed	5000 rpm	Ambient temperature	
Maximum torque	0.96 Nm	Operation	0 ... 40 °C
Max. current	3.6 A	Relative humidity	
Moment of inertia	0.052 kgm ²	Max. operation	90 % RH maximum (no condensation at 30 °C)
Mechanical data		Standards	
Motor type	Low Inertia	Compliance with standards	
Motor type	Permanent-magnet synchronous motor	CE, EAC	
Shaft height	20		
Encoder system	Incremental encoder TTL, 2500 S/R (13 bit)		
Cooling	Natural cooling		
Shaft extension	Feather key		
Radial runout tolerance	Class N		
Vibration severity grade	Grade A		
Degree of protection	IP65		
Design acc. to Code I	IM B5 (IM V1, IM V3)		

Slika 3.1 Data sheet za motor

Servo motor – DC/AC motor koji unutar svog kućišta ima integrirani senzor pozicije osovine motora (enkoder) te najčešće sklop zupčanika na izlazu osovine, radi smanjenja brzine, odnosno povećanja momenta osovine motora. Servo motori imaju odlične karakteristike momenta/brzine i gotovo se najčešće koriste kao pogonski motori. Senzor šalje signal u kontroler (negativna povratna veza), odnosno informaciju na kojoj se točno poziciji nalazi osovina motora i na taj način kontroler može korigirati poziciju osovine, a osim toga i sami moment, odnosno brzinu vrtnje motora.

Kontroler ispravlja ulazni AC napon koji spajamo na njegove stezaljke u istosmjerni DC napon. Tako smo dobili kontinuirani napon kojeg kasnije oblikujemo po našoj želji i potrebi. Pretvarači dobivaju signal od nas, točnije upravljanja kojim režimima želimo da se motor vrti. Oni tada pretvaraju DC napon u izmjenični AC odgovarajuće frekvencije i napona kako bih se postigli ti zadani režimi. Sve to prati senzor na motoru, enkoder koji povratnom vezom govori vrti li se motor dobro u treba li popravljati ulazni signal. Ako motor ne dobije nikakav upravljački signal on se neće niti vrtjeti.



Slika 3.2 Shematski prikaz povezivanja



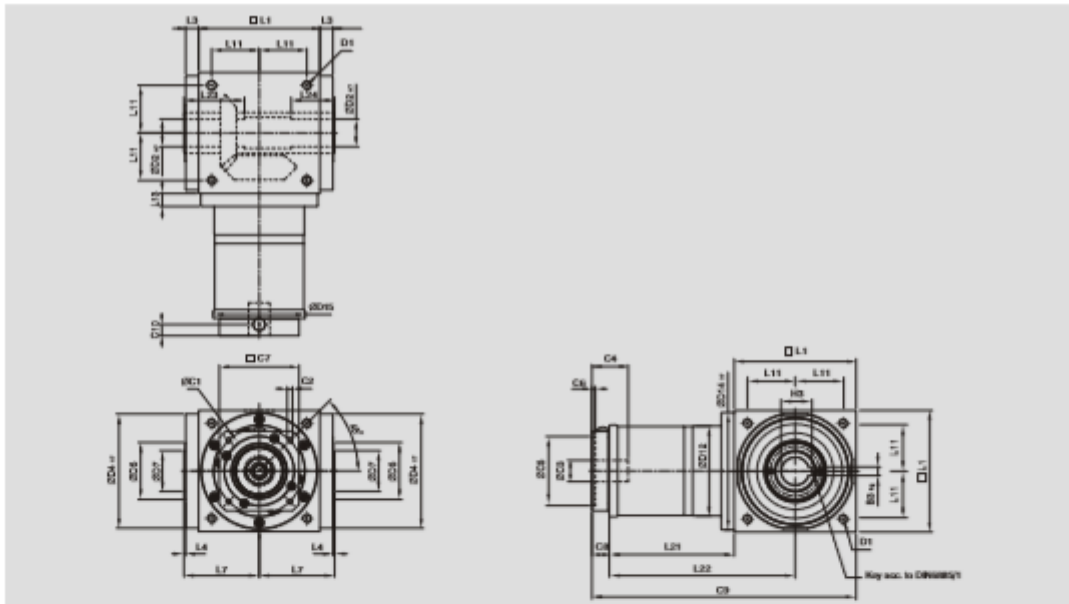
Slika 3.3 Sinamics v90 servo drive

Servo pogonski sustav optimiziran za performanse servo motora SIMOTICS S-1FL6. Različite veličine rotora i statora motora pokrivaju široki raspon primjena za rad na jednofaznu i trofaznu struju.. Postoje upravljanja za raspon motora sa snagama od 0,05 do 7,0 kilovata, kako bi se ostvarila široka primjena. Uz rad u TIA Portalu V14 s novim SIMATIC S7-1500 T-CPU Advanced Controller, sustav servo pogona je također prikladan za uporabu s SIMATIC S7-1500 Advanced Controllerom i SIMATIC S7-1200 Basic Controllerom.

SINAMICS V90 može se integrirati u širok raspon aplikacija, koristeći Modbus ili Profinet vezu. Verzija SINAMICS V90 ima povratni vezu preko Modbasa tako da je odaziv motora još brži. SINAMICS V90 PROFINET verzija opremljen je integriranim PROFINET sučeljem za povezivanje pogona s automatskim sustavom preko PROFIdrive profila. S integriranim automatskim ugađanjem u stvarnom vremenu i automatskim suzbijanjem strojnih rezonancija, sustav se automatski optimizira kako bi postigao visoku dinamičku izvedbu i glatki rad.

Line supply		200 ... 240 V 1AC/3AC							
Article No.	Pulse train: 6SL3210-SF PROFINET: 6SL3210-SF	B10-1UA0 B10-1UF0	B10-2UA0 B10-2UF0	B10-4UA1 B10-4UF1	B10-8UA0 B10-8UF0	B11-0UA1 B11-0UF1	B11-5UA0 B11-5UF0	B12-0UA0 B12-0UF0	
Max. motor power (kW)		0.1	0.2	0.4	0.75	1	1.5	2	
Rated output current (A)		1.2	1.4	2.6	4.7	6.3	10.6	11.6	
Max. output current (A)		3.6	4.2	7.8	14.1	18.9	31.8	34.8	
Line supply	Voltage	1/3AC 200 V ... 240 V (-15%/+10%)				3AC 200 V ... 240 V (-15%/+10%)			
	Frequency	50 Hz / 60 Hz, (-10%/+10%)							
	Capacity (kVA) (1AC) Capacity (kVA) (3AC)	0.5 0.5	0.7 0.7	1.2 1.1	2 1.9	- 2.7	- 4.2	- 4.6	- 4.6
Cooling		Natural cooling				Fan cooling			
Frame size		FSA*		FSB	FSC		FSD		
Dimensions WxHxD (mm)		45x170x170*		55x170x170	80x170x195		95x170x195		
Weight approx. (kg)		1.07		1.20	1.94		2.49		
Line supply		380 ... 480 V 3AC							
Article No.	Pulse train: 6SL3210-SF PROFINET****: 6SL3210-SF	E10-4UA0 E10-4UF0	E10-8UA0 E10-8UF0	E11-0UA0 E11-0UF0	E111-5UA0 E111-5UF0	E12-0UA0 E12-0UF0	E13-5UA0 E13-5UF0	E15-0UA0 E15-0UF0	E17-0UA0 E17-0UF0
Max. motor power (kW)		0.4	0.75	1	1.75	2.5	3.5	5	7
Rated output current (A)		1.2	2.1	3	5.3	7.8	11	12.6	13.2
Max. output current (A)		3.6	6.3	9	15.9	23.4	33	37.8	39.6
Line supply	Voltage	3AC 380 V ... 480 V (-15% / +10%)							
	Frequency	50 Hz / 60 Hz, (-10% / +10%)							
	Capacity (kVA)	1.7	3	4.3	6.6	11.1	15.7	18	18.9
Cooling		Natural cooling				Fan cooling			
Frame size		FSA	FSA	FSB		FSC			
Dimensions WxHxD (mm)		60x180x20		80x180x200		100x180x220		140x260x240	
Weight approx. (kg)		1.45		2.09		2.73		5.95	
Control power supply	Voltage** Current***	24 V DC (-15% / +20%) 1.6 A (without holding brake) 3.6 A (with holding brake)							
Line supply system		TN, TT, IT, TT earthed line							
Overload capacity		300% x rated current for 300 ms every 10 s							
Control system		Servo control							
Braking resistor		Integrated							
Ambient temperature	Operation Storage	0 °C to 45 °C: without power derating, 45 °C to 55 °C: with power derating -40 °C to +70 °C							
Ambient humidity	Operation Storage	< 90% (no condensation) 90% (no condensation)							
Pollution class		2							
Vibration	Operation	Shock	Operational area II Peak acceleration: 5 g, 30 ms, 15 g, 11 ms Quantity of shocks: 3 per direction x 6 direction Duration of shock: 1 s						
		Vibration	Operational area II 10 Hz to 58 Hz: 0.075 mm deflection 58 Hz to 200 Hz: 1 g vibration						
	Product packaging	Vibration	2 Hz to 9 Hz: 3.5 mm deflection 9 Hz to 200 Hz: 1 g vibration Quantity of cycles: 10 per axis Sweep speed: 1 octave/min						
Degree of protection		IP20							
Altitude		≤ 1000 m (without power derating); > 1000 m and up to 5000 m (with power derating)							
Standards		CE, KC, EAC, cULus, C-tick							
Interface		SINAMICS V90 Pulse train version (PT)				SINAMICS V90 PROFINET version (PN)			
USB		Mini USB				Mini USB			
Pulse train input		2 channels, one exclusively for 5 V differential signal, one for 24 V single-end signal				-			
Pulse train encoder output		5 V differential signal, A, B, Z phase				-			
Digital inputs/outputs		10 inputs, NPN/PNP; 6 outputs, NPN				4 inputs, NPN/PNP; 2 outputs, NPN/PNP			
Analog outputs		2 analog outputs, output voltage range ±10 V, 10 bits				-			
Communication		USS/Modbus RTU (RS 485)				PROFINET RT/IRT interface with 2 ports (RJ45 sockets)			
SD card slot		Standard SD card with 400 V version, Micro SD card with 200 V version				Standard SD card with 400 V version, Micro SD card with 200 V version			
Safety functions		Safe Torque Off (STO) via terminal, SIL 2				Safe Torque Off (STO) via terminal, SIL 2			

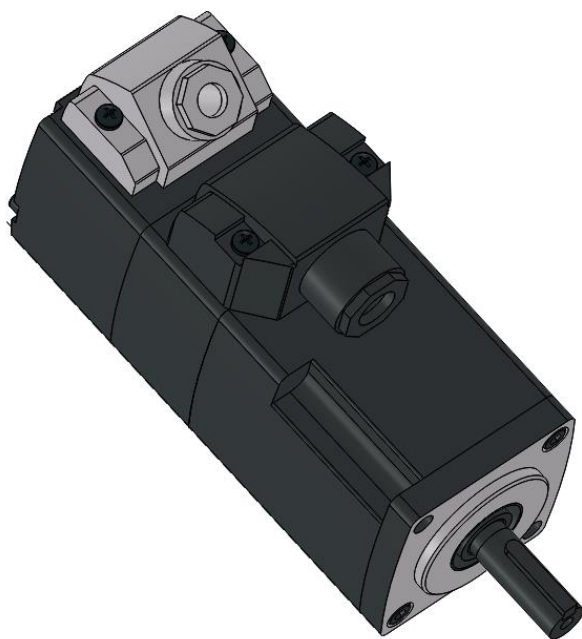
Slika 3.4 Data sheet za Sinamics v90 servo drive



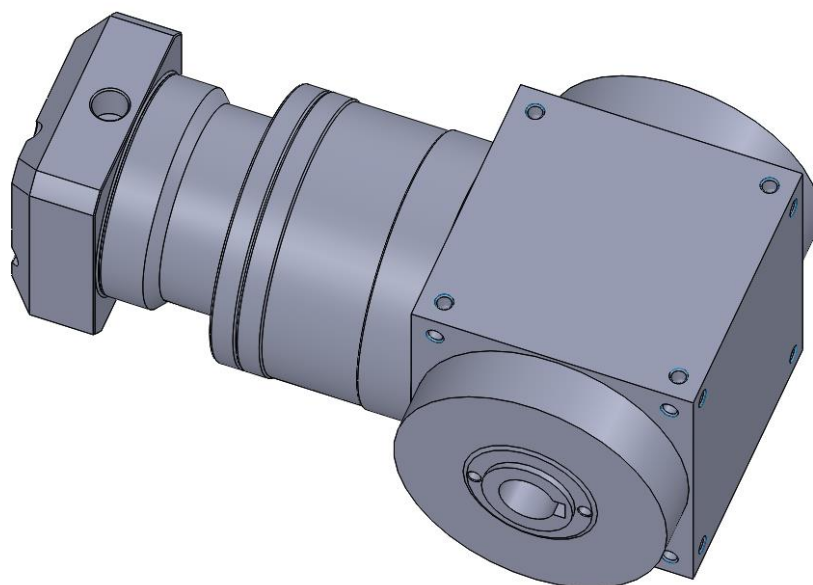
[unit: mm]

Dimension	AT065FH	AT075FH	AT090FH	AT110FH	AT140FH	AT170FH	AT210FH	AT240FH	AT280FH
D1	M4	M6	M6	M8	M10	M12	M16	M16	M16
D2 ^{H7}	13	14	18	22	32	40	50	55	60
D4 ^{h7}	63	73	88	108	135	165	205	235	275
D5	31	35	43	53	68	83	104	124	144
D7	21	22	28	33	47	55	75	85	110
D12	62	72	86	106	104	128	160	180	200
D14 ^{h7}	63	73	88	108	135	165	205	235	275
D15	62.9	72.9	87	107	106	127	158	178	198
L1	65	75	90	110	140	170	210	240	280
L3	13	14.5	15	15	15	15	20	25	25
L4	2	2	2	2	2	2	2	2	2
L7	47.5	54	62	72	87	102	127	147	167
L11	27	30	36	44	55	67	85	95	110
L13	13	15	15	15	15	15	20	25	25
L21	75	84.5	99	122	144.5	157.5	206.5	239	248
L22	107.5	122	144	177	214.5	242.5	311.5	359	388
L23	40	47	52	53	70	80	95	115	115
L24	30	32	35	35	50	55	65	80	80
C1 ^{H0}	46	46	70	100	100	100	130	165	165
C2 ^{H0}	M4	M4	M5	M6	M6	M6	M8	M10	M10
C3 ^{H0}	≤12	≤12	≤16	≤24	≤24	≤24	≤32	≤38	≤38
C4 ^{H0}	30	30	34	40	40	40	50	60	60
C5 ^{H0}	30	30	50	80	80	80	110	130	130
C6 ^{H0}	3.5	3.5	8	4	4	4	5	6	6
C7 ^{H0}	42	42	60	92	92	92	115	142	142
C8 ^{H0}	21.5	21.5	21.5	20	20	20	24	31	31
C9 ^{H0}	161.5	181	210.5	252	304.5	347.5	440.5	510	559
C10 ^{H0}	14.5	14.5	15.5	13	13	13	16	21	21
B3 ^{p9}	5	5	6	6	10	12	14	16	18
H3	15.3	16.3	20.8	24.8	35.3	43.3	53.8	59.3	64.4

Slika 3.5 Data sheet za Gerabox



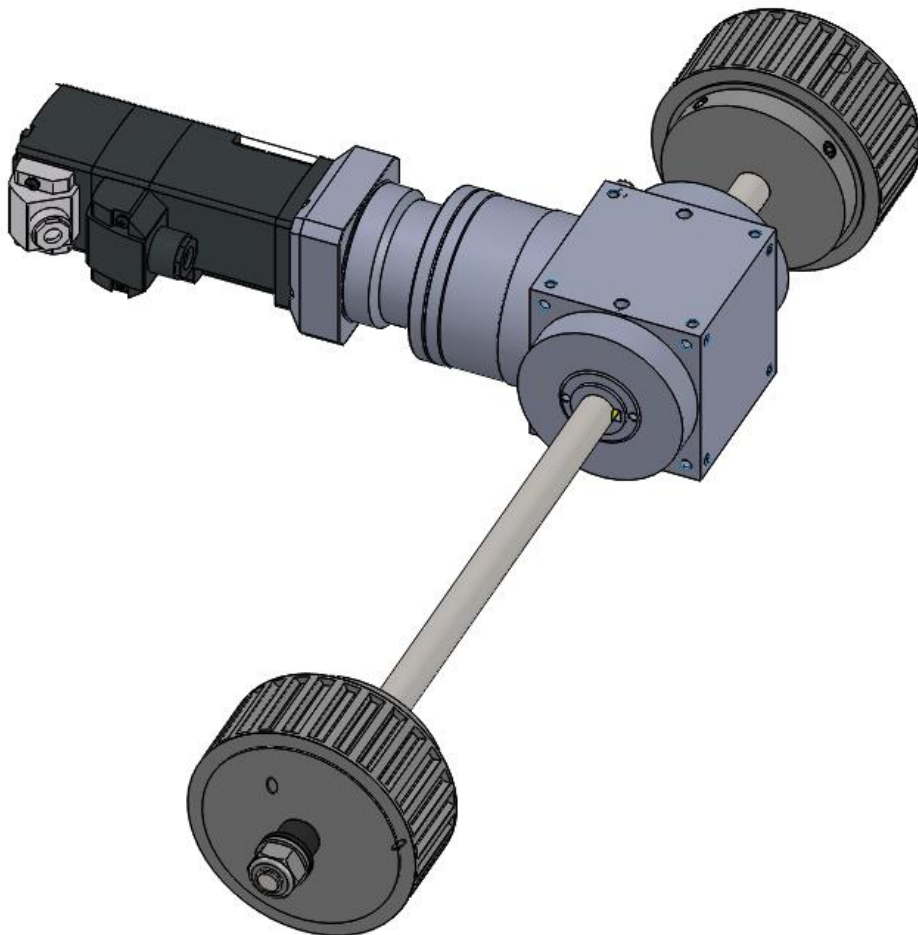
Slika 3.6 3D model motora



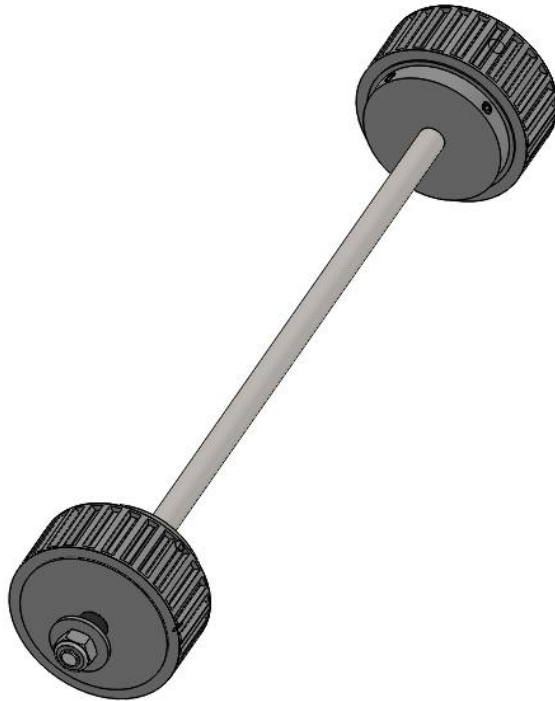
Slika 3.7 3D model reduktora

4. KONSTRUKCIJA KONVEJERA

Sustav koji se konstruira mora se sastojati od četiri zasebna trakasta konvejera. Razlog tome je mogućnost zasebnog upravljanja svakog konvejera te lakši pristup robotima. Konvejeri će na sebi imati dva remena koji će biti pokretani preko istog motora. Biti će vezani preko vratila i reduktora. Time je osigurana konstantna ista brzina remena na istom konvejeru. Osim pogonske zupčaste remenice, na drugoj strani nalaziti će se i zatezna zupčasta remenica koja će služiti za napinjanje remena kada i ako je potrebno.



Slika 4.1 Pogonski dio



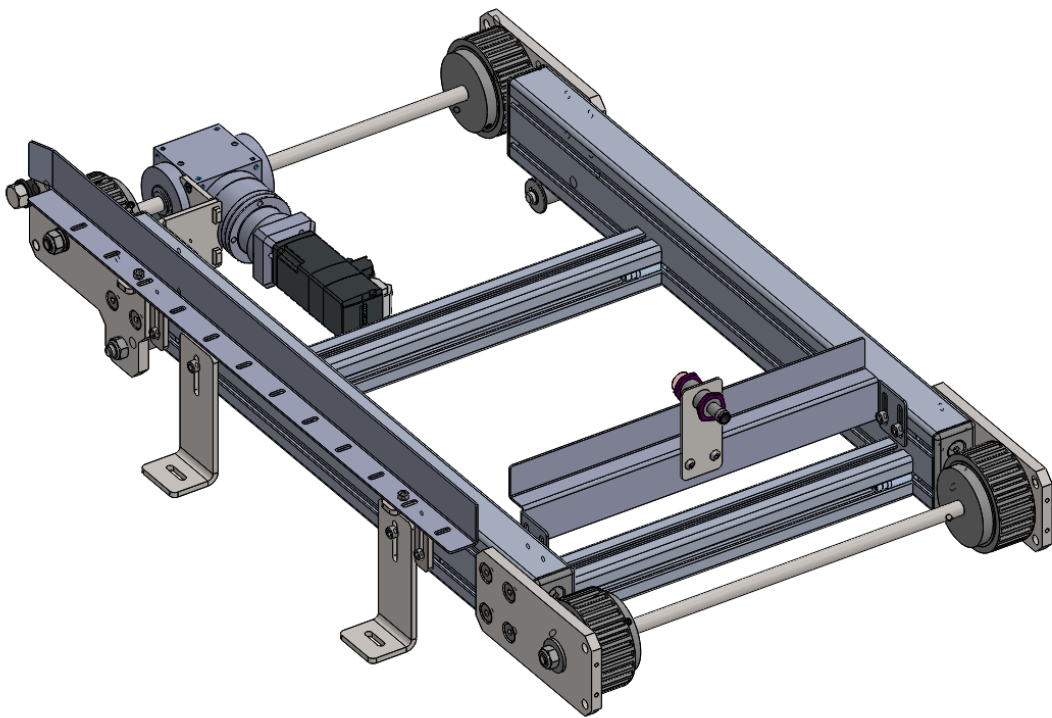
Slika 4.2 Natezni dio

Pogonske zupčaste remenice kupljene su u Setu Bjelovar. Korak remenica je T10, širina remena koja dolazi na nju je 30 mm. Promjer remenice je 87 milimetara. Uz pogonsku i gonjenu remenicu koje su istoga promjera potrebne su nam i male remenice. Male remenice su promjera 47 mm te su također koraka T10. Sveukupno po konvejeru će nam biti potrebno četiri velike remenice i osam malih remenica.



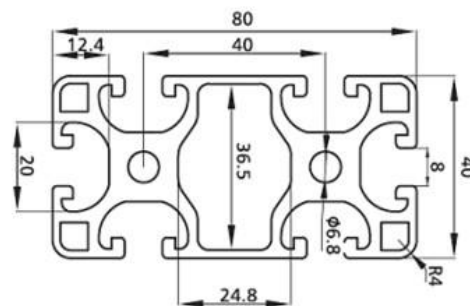
Slika 4.3 Zupčasta remenica

Odlučeno je da će konstrukcija samoga trakastoga transportera biti napravljena od standardiziranih aluminijskih profila, točnije od profila proizvođača Item. Razlog tome je brza izrada kućišta, laka modifikacija, brzo sklapanje, mala masa, imaju površinsku zaštitu eloksiranjem i uz njih se nudi cijela paleta dodatnih proizvoda. Kada se uspoređi cijena spomenutih profila koja i nije baš toliko niska sa izradom konstrukcije na neki drugi način poput varenja profili su jeftiniji. Razlog je izbacivanje jako puno strojne obrade i površinske zaštite konstrukcije što je još dodatno poskupljuje.



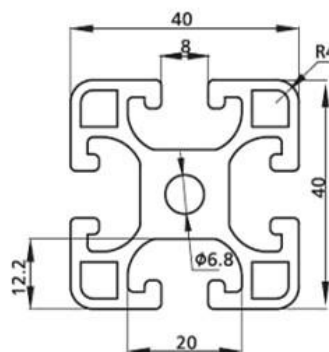
Slika 4.4 Konstrukcija konvejera

Konstrukcija je sastavljena od dva tipa Item profila. Bočni profili koji idu skroz dužinom konvejera su dimenzije 80 x 40 mm. Oni su temelj i na njih se sastavljaju ostali profili i ostale komponente konvejera. Bočne profile 80 x 40 mm skupa drže Item profili 40 x 40 mm. Ovisno o dužini konvejera idu dvije ili tri poprečne pregrade koje drže skupa bočne profile. Item profili se učvršćuju specijalnim takozvanim brzim maticama koje su također proizvod Item firme. One se najprije ušarafljuju u profil i navoj na njima je lijevi. Zatim se kroz njih sa suprotne strane stavlja imbus vijak odgovarajućeg promjera. Postupak se ponavlja sa obadrije strane poprečnih profila 40 x 40 mm. Treba biti oprezan kod montiranja jer ako vijci nisu stavljeni u pravo vrijeme prije brzih matica više ih se ne može staviti. U suprotnom je potrebno izvaditi samourezne matice, staviti vijke unutra te opet vratiti matice.



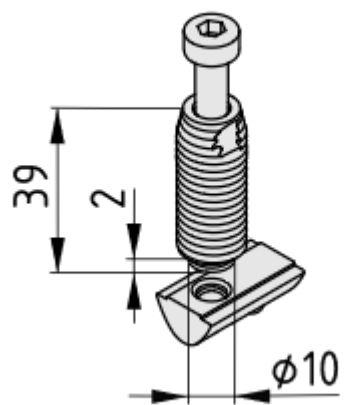
Slot	Item No.	Spec.	Material	Finish	Weight(kg/m)
8	FP-2091	40*80L	Alu. 6063-T5	Blasting	3.10

Slika 4.5 Item profil 80x40mm

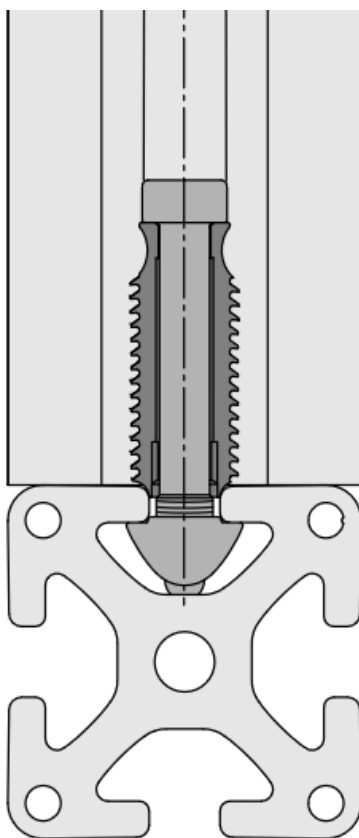


Slot	Item No.	Spec.	Material	Finish	Weight(kg/m)
8	FP-2093	40*40L	Alu. 6063-T5	Blasting	1.80

Slika 4.6 Item profil 40x40mm

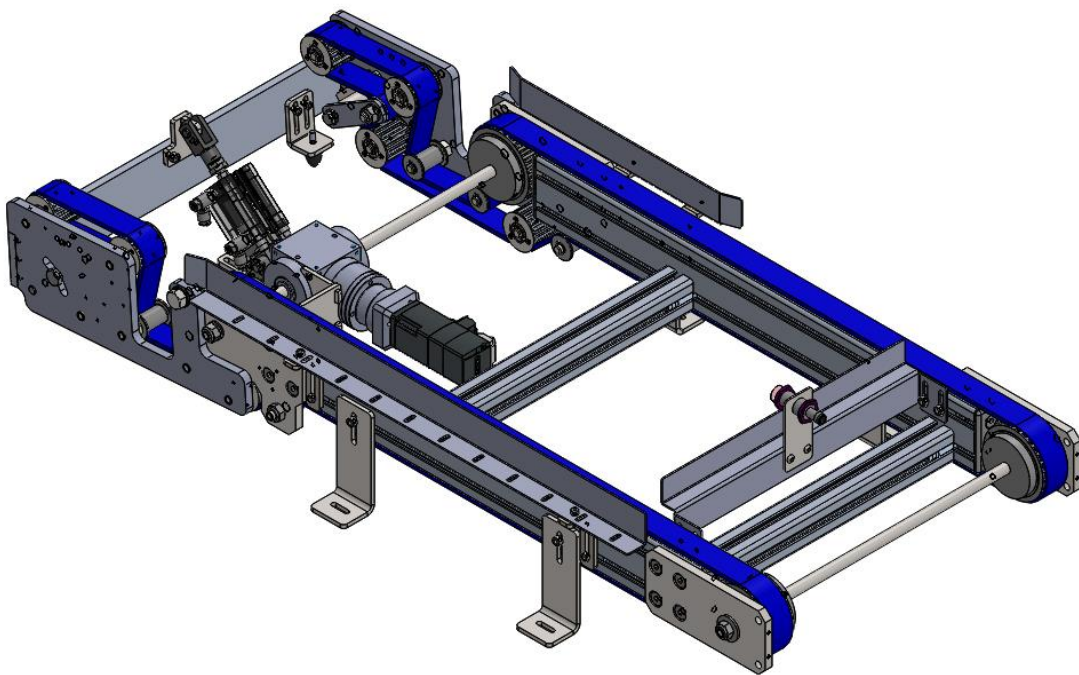


Slika 4.7 Pribor za montiranje profila

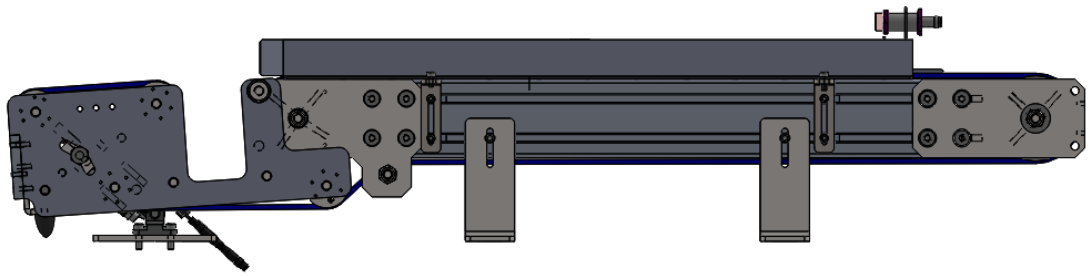


Slika 4.8 Način montaže profila

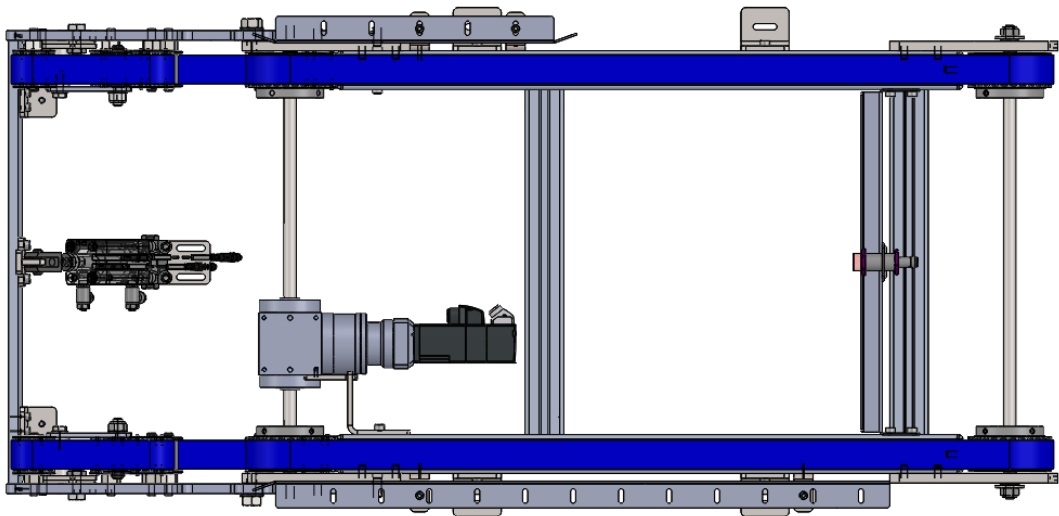
Kutije koje se kreću preko sustava tih konvejera moraju moći prelaziti sa jednog konvejera na drugi. Kada prvi konvejer radi i kada kutija koja je na njemu dotakne krajnji prekidač koji je u ovom slučaju induktivni senzor, prva traka se zaustavlja. Kada se traka zaustavi podiže se pop up preko pneumatskog cilindra koji je aktiviran PLC-om. Dok je u gornjem položaju tada je drugi konvejer viši od prvoga i njegovi remeni povlače kutiju sa prvoga transportera. On također na svome kraju ima induktivni senzor koji se aktivira kada kutija dođe do njega. Postupak se ponavlja sve dok kutija ne prođe sva četiri konvejera na isti način i dođe do kraja četvrtoga. Kada kutija dođe do kraja sustava i dotakne zadnji induktivni senzor šalje se signal i netko mora maknuti kutiju sa izlaza.



Slika 4.9 Konstrukcija konvejera

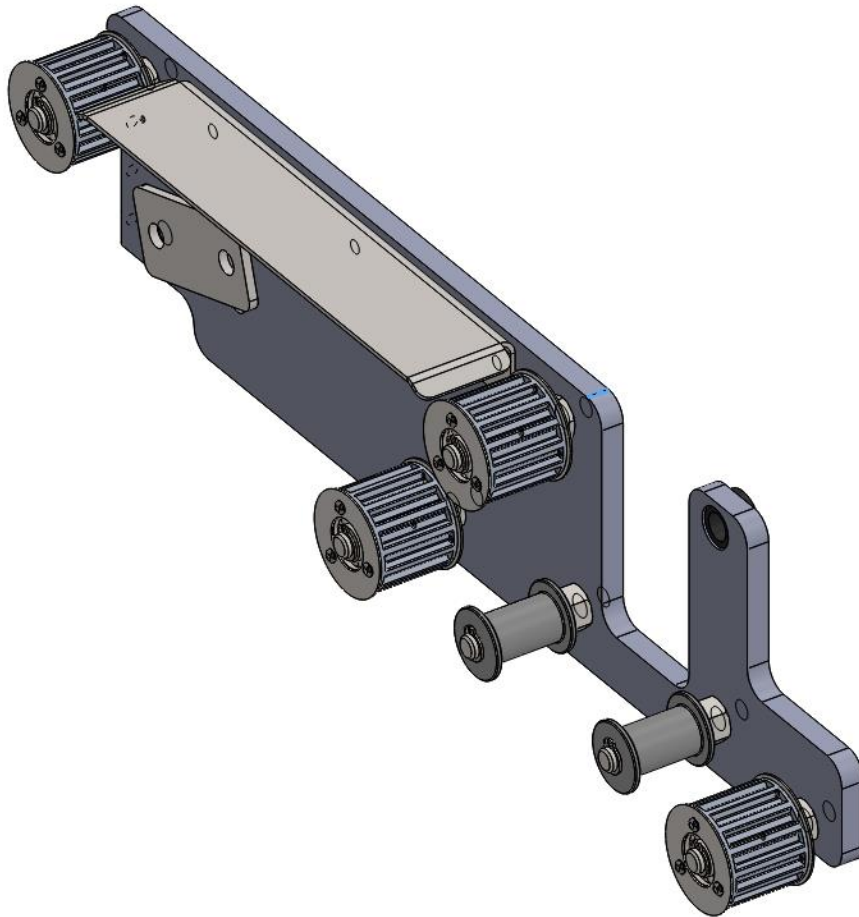


Slika 4.10 Konstrukcija konvejera - pogled sa strane

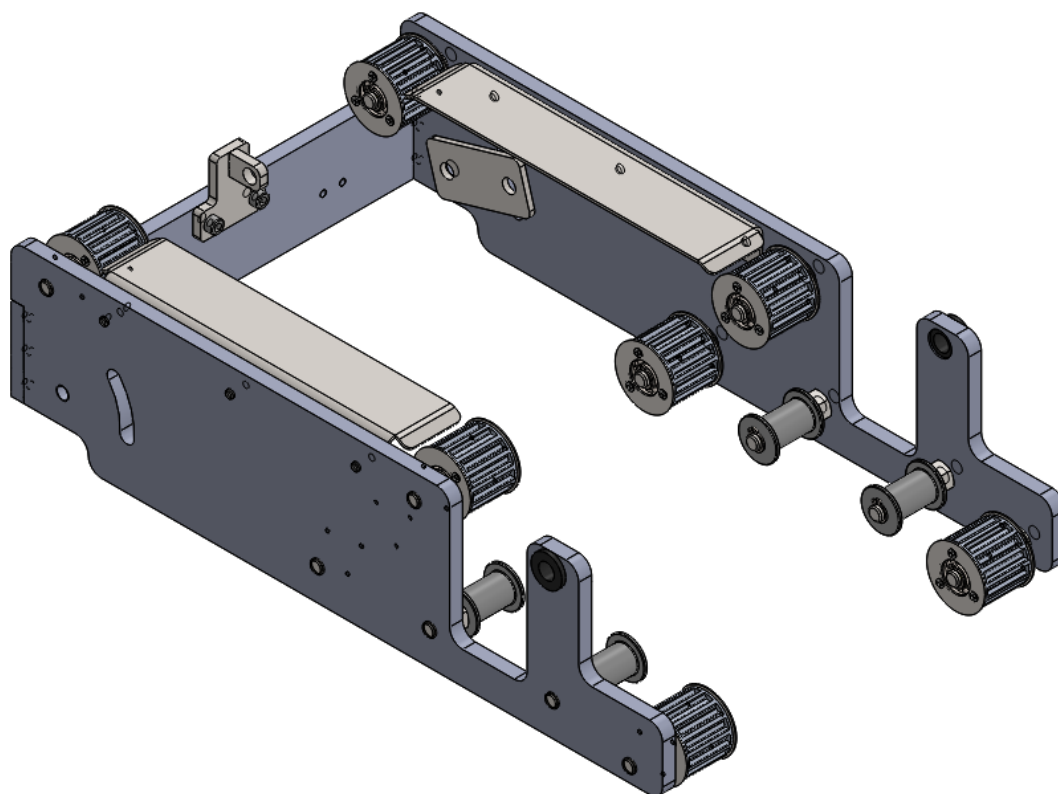


Slika 4.11 Konstrukcija konvejera - pogled odozgora

Sustav je specifičan zato što konvejske linije ulaze jedna u drugu, odnosno jedna pod drugu. To se moglo promatrati kao manu ali upravo to je iskorišteno kao prednost. Konstruirana je platforma, pop-up koji ulazi u prethodni konvejer. Izrađena je od aluminijskog lima debljine 10 mm. Skupa ih drže osovine koje prolaze kroz remenice i čeonim limovi koji zatvaraju kućište. Platforma je ovješena o okretišta koja su ostvarena vijcima promjera 12 mm. Oni su uležišteni u klizne ležajeve firme Iigus. Ležajevi su MFM-1218-12.



Slika 4.12 Pokretna platforma - rastavljena



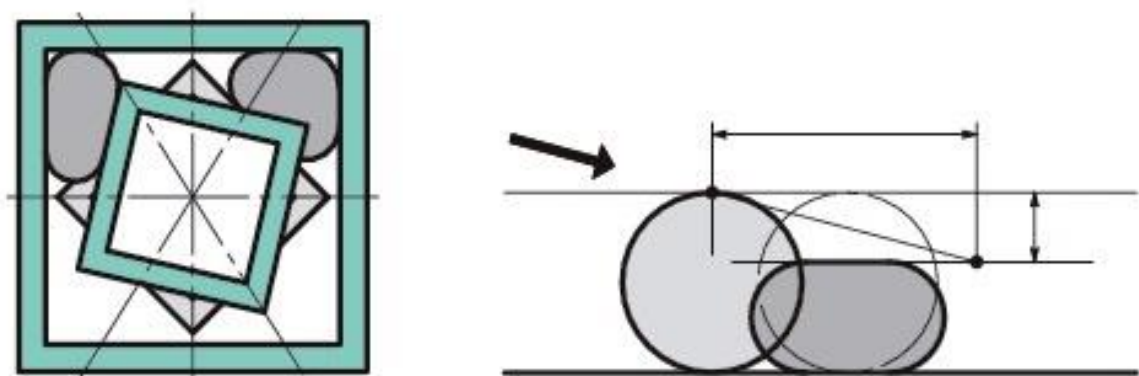
Slika 4.13 Pokretna platforma

Kod spuštanja i podizanje platforme dolazi do promjene napetosti remena. Kada je platforma podignuta remen je potpuno napet i savršeno prelazi preko svih remenica i vozi kutiju na sebi. Kada se platforma spusti u donji položaj remen se raspušta i on je tada predug da bi obavljao svoju funkciju u potpunosti i ispravno. Kako bih se spriječio uočeni problem na vrijeme dodan je napinjač koji amortizira sve devijacije nastale zbog gibanja platforme. On će napeti remen kada platforma bude u donjem položaju i osigurati da remen ostane na poziciji i u mogućnosti kretati se bez poteškoća po konvejeru. Korišten je natezač od firme Misumi USA. Šifra proizvoda je YSA-115.

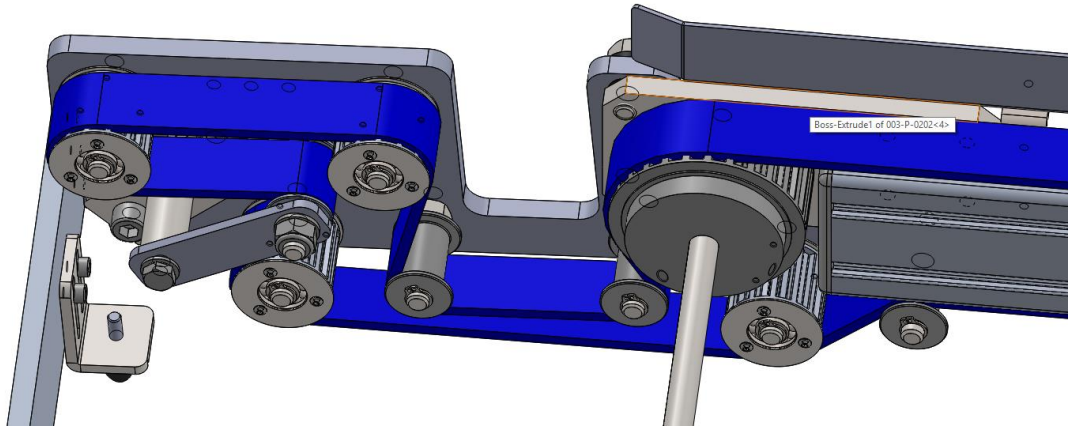


Slika 4.14 Natezač remena

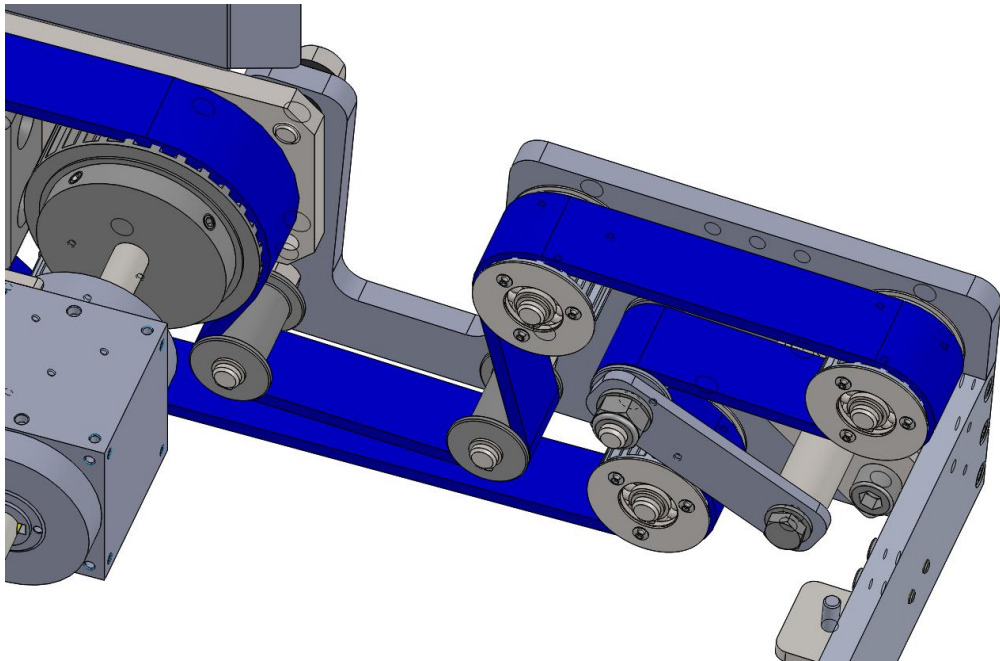
Konstrukcija napinjača je vrlo jednostavna i funkcionalna. Kućište se sastoji od četvrtaste cijevi. U tome kućištu se nalazi druga četvrtasta cijev koja je zakrenuta 45°. U praznine koje su ostale sa strane između kućišta i cijevi ugrurana je guma u okruglim trakama. Ta guma koja se nalazi oko suprotstavlja se pokušaju zakretanja unutarnje osovine. Sila potrebna za zakretanje napinjača proporcionalna je tvrdoći gume u kućištu. Tvrđa guma rezultira potrebom za većom silom zakretanja.



Slika 4.15 Unutrašnjost natezača



Slika 4.16 Natezač u funkciji

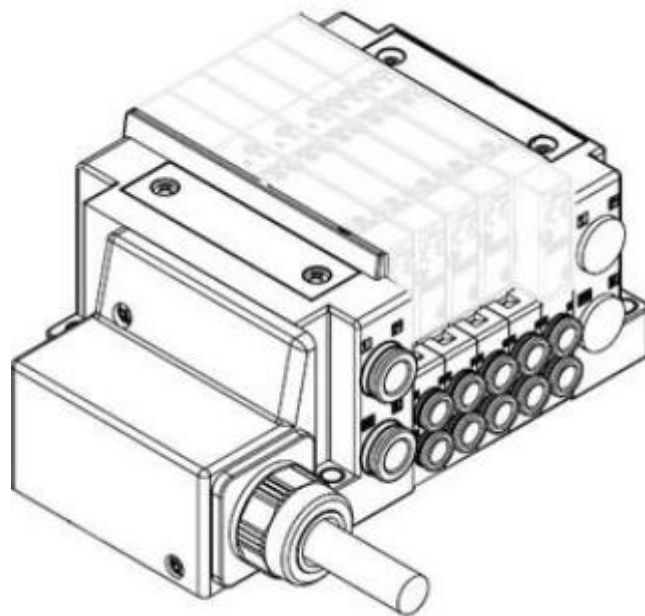


Slika 4.17 Natezač u funkciji 2

Za podizanje platforme odlučeno je da će se koristiti pneumatika kao sredstvo. Odlučeno je iz razloga jer je njena implementacija u sustave jednostavna i brza. Upravljanje je lagano i prilagodljivo ostalim sustavima. Dostupna je široka paleta proizvoda i gotovih brzo dostupnih rješenja koja možemo odmah koristiti.

Pneumatika i hidraulika često se nazivaju zajedničkim imenom fluidika. Fluidika se bavi sustavima za prijenos energije i/ili signala putem radnog fluida. Zadaci pneumatskog ili hidrauličkog sustava mogu uključivati pretvorbu, prijenos i upravljanje energijom. Pneumatika kao radni medij koristi stlačivi fluid – plin, najčešće zrak.

Pneumatika i hidraulika imaju važnu ulogu u automatizaciji, posebno kada su u pitanju izvršni elementi. Pneumatski elementi prisutni su danas u velikom broju pogona, najviše se koriste unutar tzv. male automatizacije. Pneumatika je jednostavnija, a rješenja su u većoj mjeri univerzalna i koriste standardizirane elemente, dok su kod hidraulike rješenja u većoj mjeri specifična, pa zahtijevaju više iskustva i znanja. Upravljanje na ovom sustavu je riješeno ventilskim otokom od tvrtke SMC.



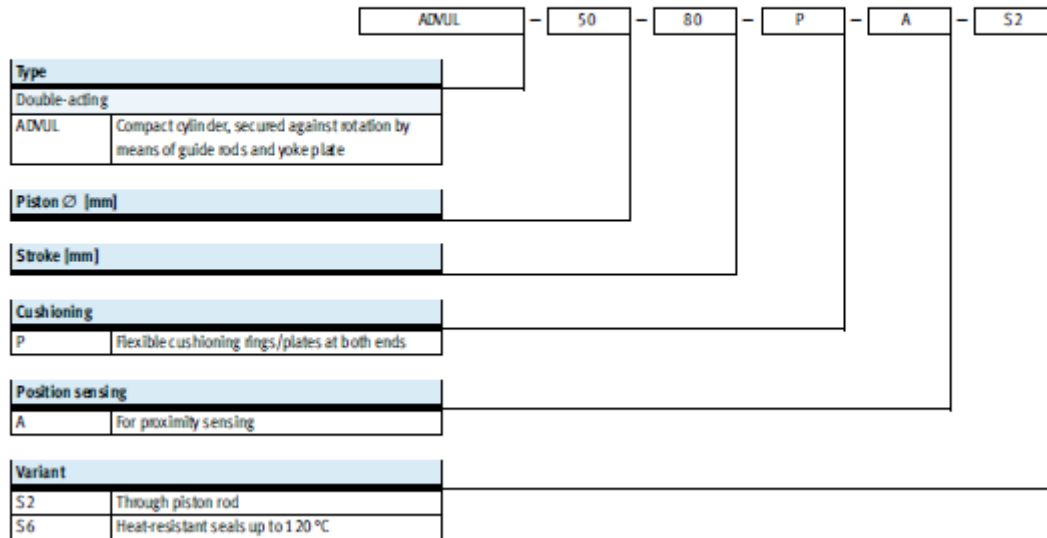
Slika 4.18 SMC ventilski otok

Sukladno masi kutije i masi dijela konvejera koju cilindar mora podignuti odabire se dvoradni cilindar od tvrtke Festo. Oznaka cilindra je ADN-32-30-A-PPS-A. Broj artikla na njihovoj stranici 572659. U sljedećim slikama prikazano je kako se tumače oznake cilindra i data sheet od odabranog cilindra za postojeći sustav.

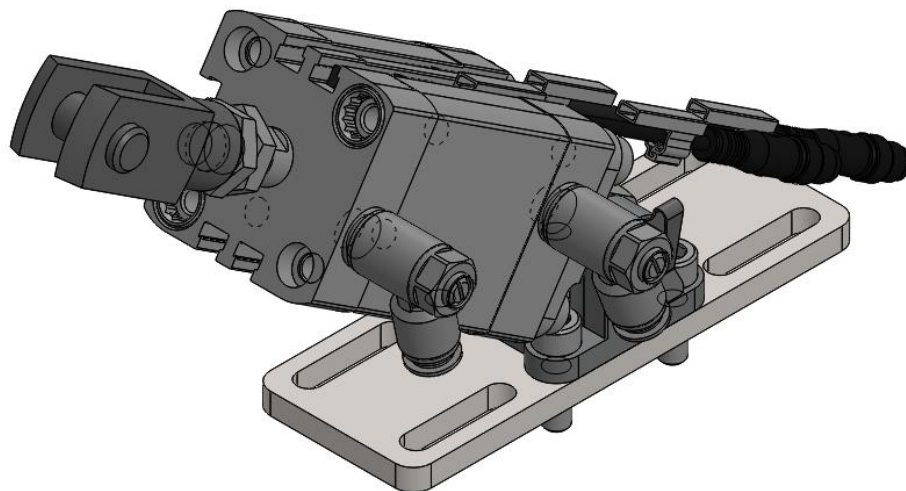
Compact cylinders ADVUL

Type codes

FESTO



Slika 4.19 Tumačenje oznaka na cilindru



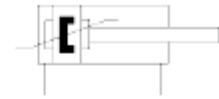
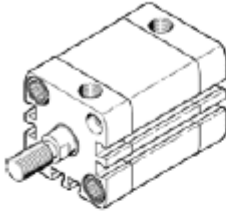
Slika 4.20 3D model pneumatskog cilindra sa priborom i senzorima

Kompaktni cilindar ADN-32-30-A-PPS-A

Broj artikla: 572659

★ Osnovni proizvodni program

FESTO

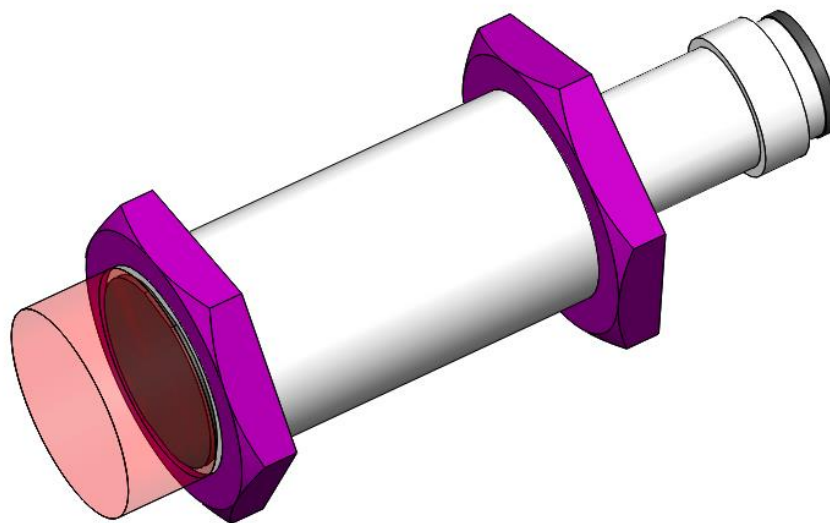


Tehnički podaci

Svojstvo	Vrijednost
Hod	30 mm
Promjer klipa	32 mm
Navoj klipnjače	M10x1,25
Prigušivanje	PPS: samopodesivo pneumatsko prigušivanje krajnjih položaja
Položaj ugradnje	proizvoljno
Odgovara normi	ISO 21287
Kraj klipnjače	Vanjski navoj
Prepoznavanje pozicije	za beskontaktni prekidač
Varijante	jednostrana klipnjača
Pogonski tlak	1,5 ... 10 bar
Način funkcioniranja	dvoradno
Pogonski medij	Komprimirani zrak prema ISO 8573-1:2010 [7:4:4]
Uputa o mediju pogona i upravljanja	Nauljeni pogon moguć (u daljnjem pogonu potreban)
Klasa korozivne otpornosti KBK	2 - umjerena otpornost na koroziju
Temperatura okoline	-20 ... 80 °C
Energija naleta u krajnjim položajima	1 J
Duljina prigušivanja	4 mm
Teoretska sila kod 6 bara, uvlačenje	415 N
Teoretska sila kod 6 bara, izvlačenje	483 N
Pokretna masa kod hoda 0 mm	60 g
Prirast težine po 10 mm hoda	30 g
Osnovna težina kod hoda 0 mm	265 g
Prirast pokretne mase po 10 mm hoda	9 g
Vrsta pričvršćenja	po izboru: s prolaznim provrtom s unutarnjim navojem s priborom
Pneumatski priključak	G1/8
Materijal - napomena	RoHS sukladno
Material cover	Aluminij eloksirano
Material seals	TPE-U(PUR)
Material piston rod	visokolegirani čelik
Material cylinder barrel	Aluminijska legura za gnječenje glatko eloksirano

Slika 4.21 Data sheet za cilindar

Za pozicioniranje i određivanje krajnjeg položaja kutije odabrani su induktivni senzori. Senzori su proizvođača Omron. Šifra proizvoda je OMRON - E2B-M18KS08-M1-B1. Induktivni senzori spadaju u kategoriju pasivnih senzora. Nastali su kao zamjena za Reed senzore koji imaju relativno kratak vijek trajanja. Rad induktivnih senzora se zasniva na zavisnosti induktivne zavojnice od promjene otpora elektromagnetnog kruga ili na elektromagnetnoj indukciji. Induktivni senzori reagiraju uglavnom na metale, a moguće je i na neke druge materijale kao što je grafit. Proizvode se kao bez kontaktni dijelovi opreme što omogućuje niz pogodnosti. Kutije koje se kreću preko konvejserskih traka su od metala tako da je induktivni senzor logičan izbor.



Slika 4.22 3D model induktivnog senzora OMRON - E2B-M18KS08-M1-B1

Size		Sensing distance	Connecting method (See note 1.)	Body length	Output configuration	Operation mode NO	Operation mode NC
M18 (Brass)	Single	Shielded 5 mm	Pre-wired	Short	PNP	E2B-M18K S05-WP-B1 2M	E2B-M18K S05-WP-B2 2M
					NPN	E2B-M18K S05-WP-C1 2M	E2B-M18K S05-WP-C2 2M
				Long	PNP	E2B-M18L S05-WP-B1 2M	E2B-M18L S05-WP-B2 2M
			NPN		E2B-M18L S05-WP-C1 2M	E2B-M18L S05-WP-C2 2M	
			M12 Connector	Short	PNP	E2B-M18K S05-M1-B1	E2B-M18K S05-M1-B2
					NPN	E2B-M18K S05-M1-C1	E2B-M18K S05-M1-C2
		Long		PNP	E2B-M18L S05-M1-B1	E2B-M18L S05-M1-B2	
			NPN	E2B-M18L S05-M1-C1	E2B-M18L S05-M1-C2		
		Unshielded 10 mm	Pre-wired	Short	PNP	E2B-M18KN10-WP-B1 2M	E2B-M18KN10-WP-B2 2M
					NPN	E2B-M18KN10-WP-C1 2M	E2B-M18KN10-WP-C2 2M
				Long	PNP	E2B-M18LN10-WP-B1 2M	E2B-M18LN10-WP-B2 2M
			NPN		E2B-M18LN10-WP-C1 2M	E2B-M18LN10-WP-C2 2M	
	M12 Connector		Short	PNP	E2B-M18KN10-M1-B1	E2B-M18KN10-M1-B2	
				NPN	E2B-M18KN10-M1-C1	E2B-M18KN10-M1-C2	
		Long	PNP	E2B-M18LN10-M1-B1	E2B-M18LN10-M1-B2		
	NPN		E2B-M18LN10-M1-C1	E2B-M18LN10-M1-C2			
	Double	Shielded (See note 2.) 8 mm	Pre-wired	Short	PNP	E2B-M18K S08-WP-B1 2M	E2B-M18K S08-WP-B2 2M
					NPN	E2B-M18K S08-WP-C1 2M	E2B-M18K S08-WP-C2 2M
				Long	PNP	E2B-M18L S08-WP-B1 2M	E2B-M18L S08-WP-B2 2M
			NPN		E2B-M18L S08-WP-C1 2M	E2B-M18L S08-WP-C2 2M	
			M12 Connector	Short	PNP	E2B-M18K S08-M1-B1	E2B-M18K S08-M1-B2
					NPN	E2B-M18K S08-M1-C1	E2B-M18K S08-M1-C2
		Long		PNP	E2B-M18L S08-M1-B1	E2B-M18L S08-M1-B2	
			NPN	E2B-M18L S08-M1-C1	E2B-M18L S08-M1-C2		
Unshielded 16 mm		Pre-wired	Short	PNP	E2B-M18KN16-WP-B1 2M	E2B-M18KN16-WP-B2 2M	
				NPN	E2B-M18KN16-WP-C1 2M	E2B-M18KN16-WP-C2 2M	
			Long	PNP	E2B-M18LN16-WP-B1 2M	E2B-M18LN16-WP-B2 2M	
		NPN		E2B-M18LN16-WP-C1 2M	E2B-M18LN16-WP-C2 2M		
	M12 Connector	Short	PNP	E2B-M18KN16-M1-B1	E2B-M18KN16-M1-B2		
			NPN	E2B-M18KN16-M1-C1	E2B-M18KN16-M1-C2		
Long		PNP	E2B-M18LN16-M1-B1	E2B-M18LN16-M1-B2			
	NPN	E2B-M18LN16-M1-C1	E2B-M18LN16-M1-C2				

Note: 1. Pre-wired Models are available in the cable lengths of 2 m and 5 m.
2. There are restrictions that apply to Shielded sensors.
Please refer to "Effects of Surrounding Metal" on page 20.

Size		Sensing distance	Connecting method (See note 1.)	Body length	Output configuration	Operation mode NO	Operation mode NC
M30 (Brass)	Single	Shielded 10 mm	Pre-wired	Short	PNP	E2B-M30K S10-WP-B1 2M	E2B-M30K S10-WP-B2 2M
					NPN	E2B-M30K S10-WP-C1 2M	E2B-M30K S10-WP-C2 2M
				Long	PNP	E2B-M30L S10-WP-B1 2M	E2B-M30L S10-WP-B2 2M
			NPN		E2B-M30L S10-WP-C1 2M	E2B-M30L S10-WP-C2 2M	
			M12 Connector	Short	PNP	E2B-M30K S10-M1-B1	E2B-M30K S10-M1-B2
					NPN	E2B-M30K S10-M1-C1	E2B-M30K S10-M1-C2
		Long		PNP	E2B-M30L S10-M1-B1	E2B-M30L S10-M1-B2	
			NPN	E2B-M30L S10-M1-C1	E2B-M30L S10-M1-C2		
		Unshielded 20 mm	Pre-wired	Short	PNP	E2B-M30KN20-WP-B1 2M	E2B-M30KN20-WP-B2 2M
					NPN	E2B-M30KN20-WP-C1 2M	E2B-M30KN20-WP-C2 2M
				Long	PNP	E2B-M30LN20-WP-B1 2M	E2B-M30LN20-WP-B2 2M
			NPN		E2B-M30LN20-WP-C1 2M	E2B-M30LN20-WP-C2 2M	
	M12 Connector		Short	PNP	E2B-M30KN20-M1-B1	E2B-M30KN20-M1-B2	
				NPN	E2B-M30KN20-M1-C1	E2B-M30KN20-M1-C2	
		Long	PNP	E2B-M30LN20-M1-B1	E2B-M30LN20-M1-B2		
	NPN		E2B-M30LN20-M1-C1	E2B-M30LN20-M1-C2			
	Double	Shielded (See note 2.) 15 mm	Pre-wired	Short	PNP	E2B-M30K S15-WP-B1 2M	E2B-M30K S15-WP-B2 2M
					NPN	E2B-M30K S15-WP-C1 2M	E2B-M30K S15-WP-C2 2M
				Long	PNP	E2B-M30L S15-WP-B1 2M	E2B-M30L S15-WP-B2 2M
			NPN		E2B-M30L S15-WP-C1 2M	E2B-M30L S15-WP-C2 2M	
			M12 Connector	Short	PNP	E2B-M30K S15-M1-B1	E2B-M30K S15-M1-B2
					NPN	E2B-M30K S15-M1-C1	E2B-M30K S15-M1-C2
		Long		PNP	E2B-M30L S15-M1-B1	E2B-M30L S15-M1-B2	
			NPN	E2B-M30L S15-M1-C1	E2B-M30L S15-M1-C2		
Unshielded 30 mm		Pre-wired	Long	PNP	E2B-M30LN30-WP-B1 2M	E2B-M30LN30-WP-B2 2M	
				NPN	E2B-M30LN30-WP-C1 2M	E2B-M30LN30-WP-C2 2M	
			M12 Connector	Long	PNP	E2B-M30LN30-M1-B1	E2B-M30LN30-M1-B2
		NPN			E2B-M30LN30-M1-C1	E2B-M30LN30-M1-C2	

Note: 1. Pre-wired Models are available in the cable lengths of 2 m and 5 m.
2. There are restrictions that apply to Shielded sensors.
Please refer to "Effects of Surrounding Metal" on page 20.

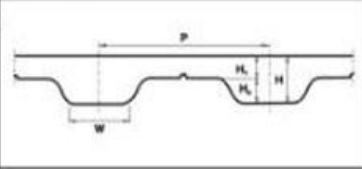
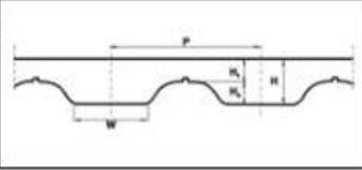
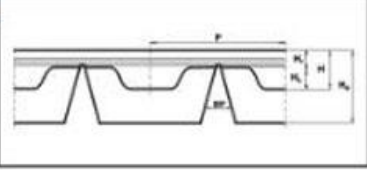
Slika 4.23 Data sheet senzora OMRON - E2B-M18KS08-M1-B1

Za transportne remene odabiru se zupčasti remeni. Zupčasti remeni se koriste za sinkronizirane pogone u svim industrijskim područjima. Definirani su širinom, duljinom i korakom zuba. Klasični ili imperijalni zupčasti remeni su gumeni sa PES ojačanjem...koraci MXL, XL, L, H, XH, XXH. Kod zahtjevnijih prijenosa koriste se HTD (high Torque drive) zupčasti remeni (...koraci HTD3M, HTD5M, HTD8M, HTD14M). Novija generacija zupčastih remena je izrađena od PU sa čeličnim ili kevlar ojačanjem (...koraci T2, T2,5, T5, T10, T20), a dostupni su i u varijanti sa pojačanom izvedbom zuba (...koraci AT3, AT5, AT10, AT20). Većina nabrojanih tipova dostupna je i u varijanti obostrano zupčastog remena.

Zupčasti remeni mogu biti:

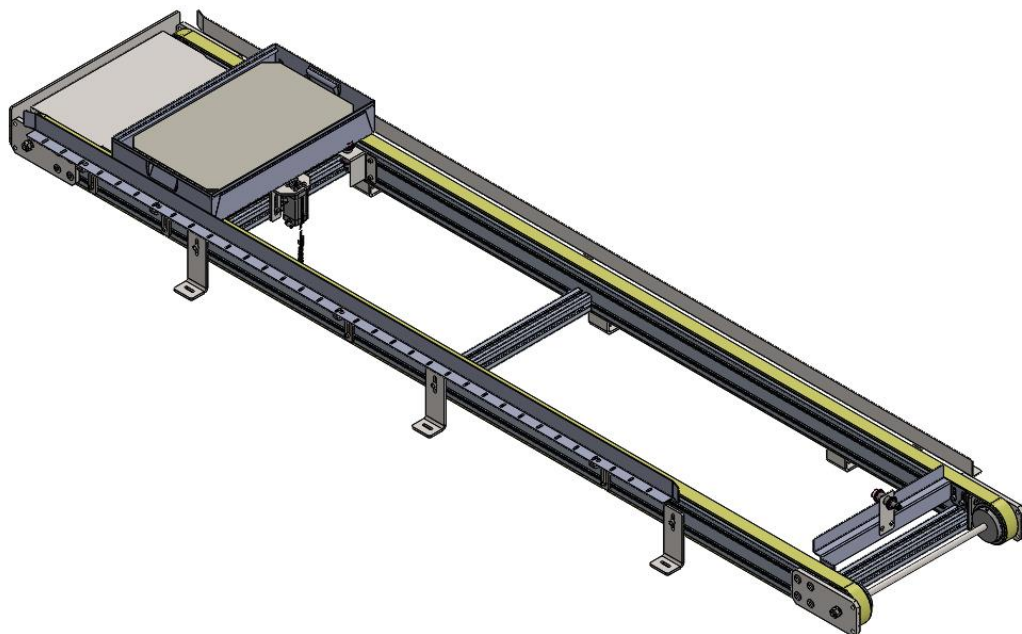
- Stvarno beskonačni (ljeveni bez spojnog mjesta).
- Spojeni (prekidna čvrstoća 30-40% manja nego kod ljevenih zupčastih remena).
- Otvorenih krajeva ili u metraži.

Potrebne duljine traka su 4710 mm, 3860 mm, 2760 mm, 5720 mm. Zupčasti remen će biti koraka T10 sukladno koraku odabranom na zupčastim remenicama koje pogone i zatežu remen. Širina remene biti će 30 mm, te će biti od PU ojačan sa vlaknima tkanine. Potrebne su po dvije trake od svih duljina remena.

Polyurethane(PU) Synchronous Belt/Opening Time Belt												
T5 T10 T20	P	T5	T10	T20	T5	T10	T20					
	H1	5	10	20	6	12	25					
	H2	1.0	2.0	3.0	10	16	32					
	H	1.2	2.5	5.0	25	32	50					
	W	2.2	4.5	8.0	50	75	100					
		1.8	3.5	6.5	75	100	150					
AT5 AT10 AT20	P	AT5	AT10	AT20	AT5	AT10	AT20					
	H1	5	10	20	6	16	25					
	H2	1.5	2.0	3.0	10	25	32					
	H	1.2	2.5	5.0	25	50	75					
	W	2.7	4.5	8.0	32	75	100					
		2.5	5.0	10.0	50	100	200					
TG5 TG10 TG20 ATG10 HG	P	TG5	TG10	TG20	ATG10	HG	TG5	TG10	TG20	ATG10	HG	
	H1	5	10	2.0	10.0	12.7	25	32	50	32	38.1	
	H2	1.0	2.0	3.0	2.0	2.01	32	50	75	50	50.8	
	H	1.2	2.5	5.0	2.5	2.29	50	75	100	75	76.2	
	HG	2.2	4.5	8.0	4.5	4.3		100		100	101.6	
		5.0	8.3	9.5	8.3	8.3						

Slika 4.24 Vrste zupčastih remena

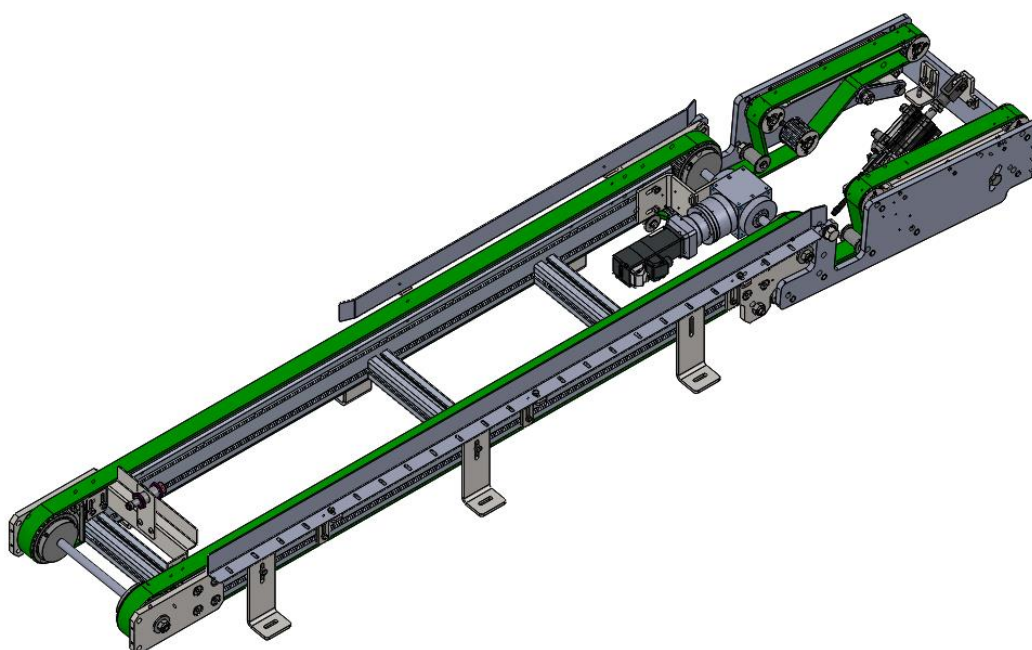
Kroz prijašnji sadržaj razvijeno je i osmišljeno sve potrebno za konstruiranje i dimenzioniranje sustava u potpunosti u zadanim vanjskim dimenzijama i traženim uvjetima. Prema svemu tome konvejske trake i cijeli sustav vidljiv je u sljedećim slikama.



Slika 4.25 Ulazna linija

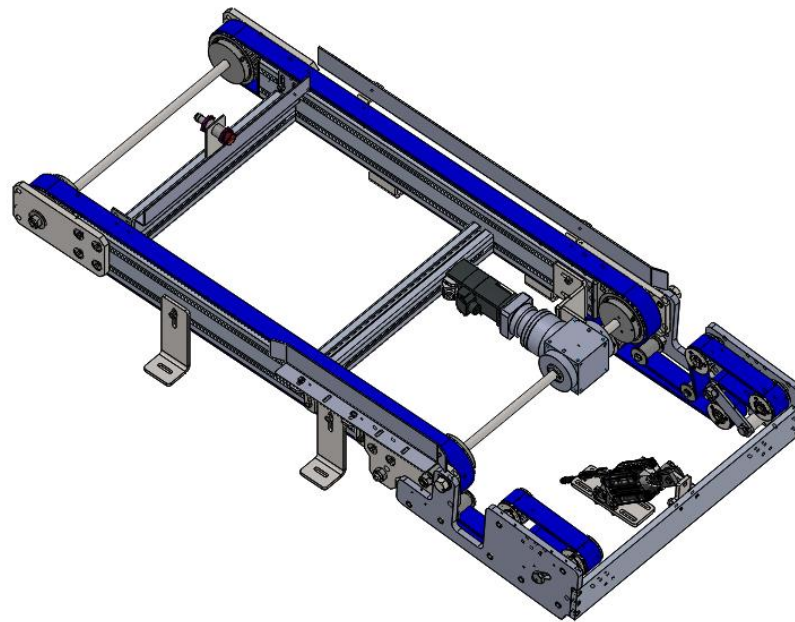
Kod ulazne linije može se primijetiti da nema platforme za podizanje i spuštanje. Na ulaznoj liniji to nije potrebno jer se na nju kutija ručno stavlja na početku. Njezina zadaća je da preveze kutiju do robota i tamo se zaustavi dok je robot ne isprazni. Kada je robot isprazni prazna kutija ide do kraja linije dok ne aktivira induktivni senzor na kraju. U isto vrijeme prije toga sljedeća puna kutija je već čekala na ulazu dok se prazna ne isprazni. Taj ciklus se ponavlja sve dok ima kutija i dok operater to zahtijeva od sustava. To je ujedno i najduža linija u lancu.

Druga linija na sebi ima platformu za podizanje i spuštanje. Može se primijetiti da njezina platforma ulazi u prijašnju liniju. Kada kutija dođe iznad platforme ona se podiže i isto tako podiže i samu kutiju koja je iznad nje. Da bih se to dogodilo, svaka linije nakon mora biti podignuta naspram prethodne 5 mm. Kada je platforma podignuta uključuje se AC servo motor i on preko remena prevozi kutiju dalje. Ova linije služi kao transport do treće ali je ujedno zamišljena da može biti i kao storage. Na njoj se mogu skupiti i dvije do tri prazne kutije ako sustav to zahtijeva zbog nejednolikosti broja elemenata u kutijama.



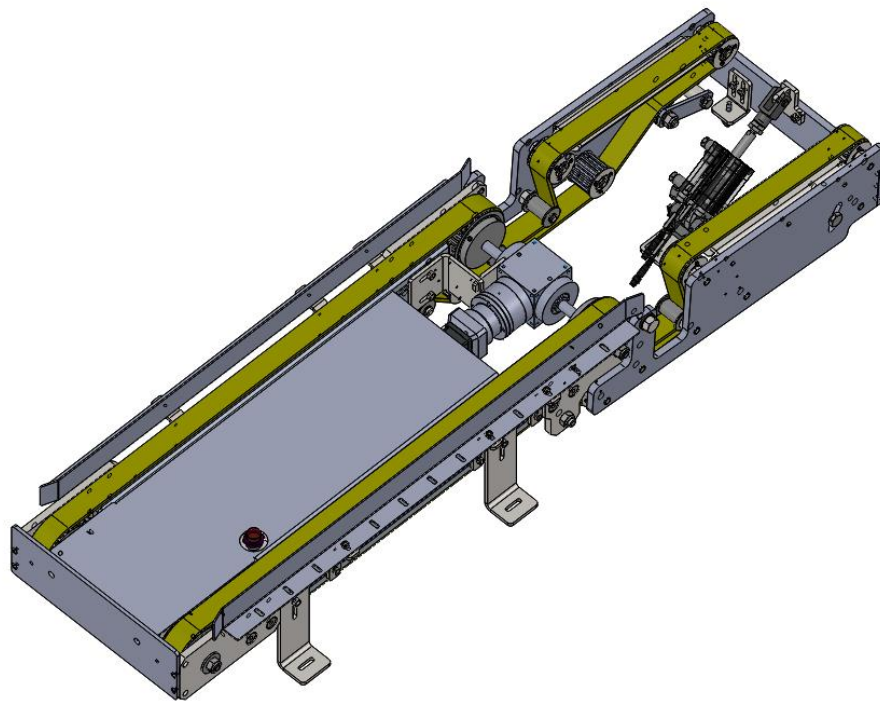
Slika 4.26 Druga traka

Treća linija stoji paralelno nasuprot prve linije. Između njih dvije se nalaze robotske čelije i one su u direktnom kontaktu sa njima. Prvi robot koji vadi elemente sa prve linije slaže ih u drugi odvojeni sustav. Nakon toga drugi robot uzima iz toga drugog odvojenog sustava gdje su elementi bili na mjerenju i dodjeljivanju statusa. Elemente koje je uzeo slaže ponovno u kutiju jednog do drugog. Sustav ne smije početi raditi ako se na početku inicijalizacije nije prazna kutija nalazila na toj liniji. Kada se napuni i ta kutija šalje se informacija u kutija se premiješat dalje a na njezino mjesto dolazi nova prazna kutija. Ova linija nema prostora za storage, kutije se moraju odmah mijenjati jedna za drugom.

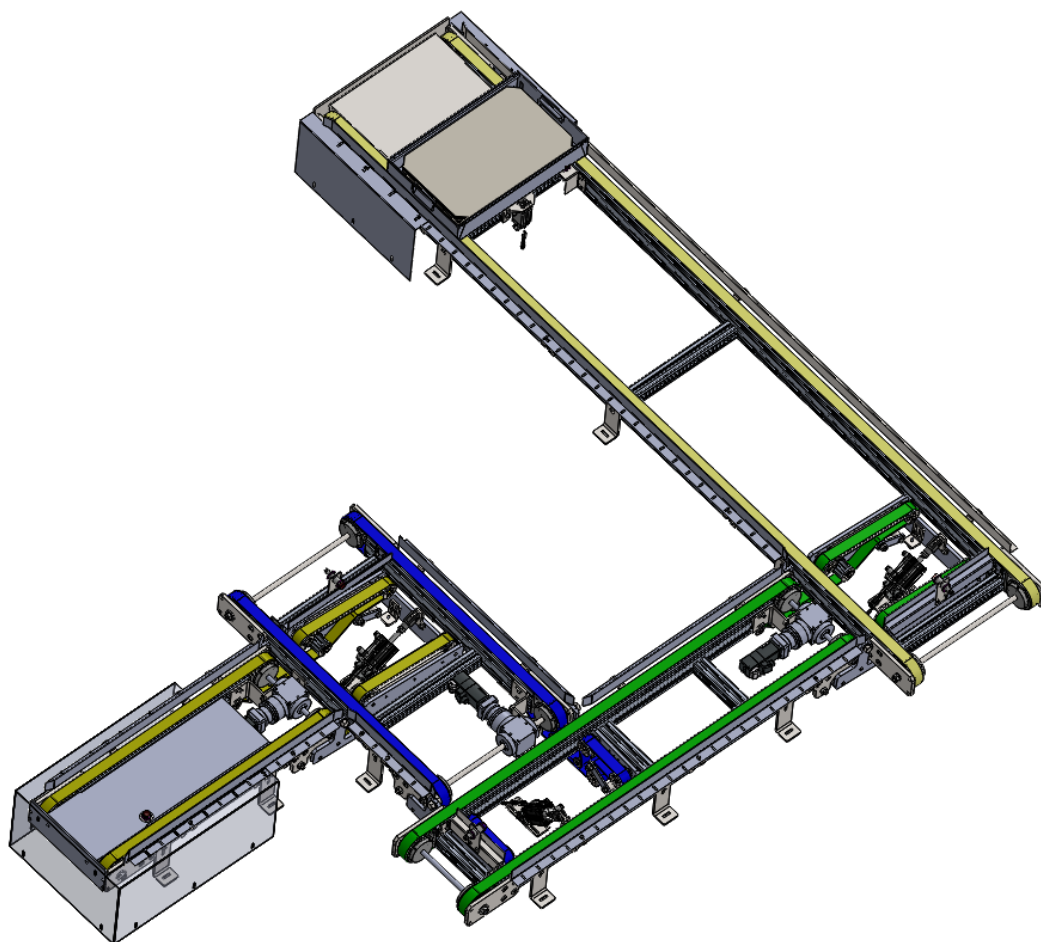


Slika 4.27 Treća traka

Izlazna traka je zadnja linija u sustavu. Njezin zadatak je preuzeti punu kutiju sa prijašnje linije i izbaciti je iz sustava. Kutija putuje sve dok ne dođe do induktivnog senzora i onda javlja operateru da izvadi punu kutiju. Isto tako ako operater ne izvadi na vrijeme kutiju i ako se sljedeće kutija na prethodnoj traci napuni više ne dozvoljava rad. U tom slučaju treba slijediti proceduru i maknuti sve nepotrebne kutije u sustavu.



Slika 4.28 Izlazna traka



Slika 4.29 Konvejski sustav

5. ZAKLJUČAK

U početku prilikom početka razvoja ovog sustava bilo je puno ulica u koje se ulazilo kako bih se pronašao dobar, funkcionalan i elegantan način rješavanja problema. Prve ideje u nekim segmentima proizvoda nisu bili niti približne iste kao na početku. Neki nedostaci su se vidjeli tek nakon što smo krenuli još dublje sa razvijanjem. Nešto se moralo mijenjati ne zato što nije bilo dobro nego nije postojalo načina da se nešto nastavi na to. Zahvaljujući novim proizvodima dostupnim u strojogradnji i konstruiranju problem se lakše i usmjerenije riješi. Firme poput Itepa, Festa, SMC-a nude razne već gotove sustave koje možemo iskoristiti i u štedjeti si vrijeme i novac. Spajanjem svega toga u jednu cjelinu i pronalaženje optimalnog konstrukcijskog rješavanja razvijen je sustav koji kvalitetan, brz za izradu, ekonomičan i elegantan. Njegova primjena također nije samo ograničena na uzak dio neke određene industrije već se njegova primjena može vidjeti svuda. Uz male preinake konstrukcije možemo premještati lakše, manje ili čak teže i veće stvari. Kroz rad su uočene i mane koje su jako brzo i bezbolno uklonjen jer se reagiralo u početku pojavljivanja problema. Nakon uklanjanja takozvanih dječjih bolesti sustav je ispao odličan. On je već implementiran i pošten u pogon te radi besprijekorno. Slijedeći projekti nagovještaju da je uskoro opet otvorena mogućnost za jedan takav sustav. Sada se može ući bez straha u njega i čak možda u budućnosti promijeniti status tog sustava u komercijalni proizvod.

6. LITERATURA

- [1] <http://wolverhamptonhandling.co.uk/history-of-conveyors/>
- [2] <https://www.item24.com/>
- [3] https://www.festo.com/cms/hr_hr/index.htm
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- [8] <http://www.apexdynamicsusa.com/>
- [9] <https://www.omron.com/>
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- [11] <https://www.nbk1560.com/products/pulley/fhp/YSA/YSA-15/>

7. SAŽETAK

Razvoj transportnog sustava unutar robotske ćelije

U ovom završnom radu obrađen je razvoj i konstrukcija transportnog sustava unutar robotske ćelije. U njemu se osvrće na konvejere i njihovu široku primjenu u raznolikim industrijama. Također se objašnjava koji su gotovi i proizvodi korišteni u konstrukciji. Navode se imena proizvođača u svrhu boljeg upoznavanja sa strojogradnjom i raznim dostupnim gotovim proizvodima. Uspoređivanje izrade proizvoda od nule i modernim tehnologijama. U privitcima rada nalazi se i sva potrebna tehnička dokumentacija koja u potpunosti definira sustav.

Ključne riječi:

Konvejer, transportni sustav, konvejer sa pop-upom, tehnička dokumentacija, strojogradnja.

8. ABSTRACT

Development of a transport system within a robotic cell

This final paper deals with the development and construction of the transport system within the robotic cells. It focuses on conveyors and their wide application in a variety of industries. It also explains what are the finished products and products used in the construction. The names of the manufacturers are mentioned in order to get acquainted with machine building and various available finished products. Comparison of non-zero product design and modern technologies. In the attachments of the work there are all the necessary technical documentation that completely defines the system.

Keywords:

Conveyor, transport system, conveyor with pop-up, technical documentation, engineering.

9. PRILOZI

U prilogu u dokumentu se nalaze tehnički nacrti, dijagram toka, te slike razvijanog i opisivanog sustava u završnom radu. Dodatno na CD-u se nalaze 3D modeli, tehnički nacrti, slike i snimke istog sustava.

IZJAVA O AUTORSTVU ZAVRŠNOG RADA

Pod punom odgovornošću izjavljujem da sam ovaj rad izradio/la samostalno, poštujući načela akademske čestitosti, pravila struke te pravila i norme standardnog hrvatskog jezika. Rad je moje autorsko djelo i svi su preuzeti citati i parafraze u njemu primjereno označeni.

Mjesto i datum	Ime i prezime studenta/ice	Potpis studenta/ice
U Bjelovaru, <u>17.10.2018.</u>	MIROSLAV MODRIĆ	Miroslav Modrić

Prema Odluci Veleučilišta u Bjelovaru, a u skladu sa Zakonom o znanstvenoj djelatnosti i visokom obrazovanju, elektroničke inačice završnih radova studenata Veleučilišta u Bjelovaru bit će pohranjene i javno dostupne u internetskoj bazi Nacionalne i sveučilišne knjižnice u Zagrebu. Ukoliko ste suglasni da tekst Vašeg završnog rada u cijelosti bude javno objavljen, molimo Vas da to potvrdite potpisom.

Suglasnost za objavljivanje elektroničke inačice završnog rada u javno dostupnom nacionalnom repozitoriju

Miroslav Modrić

ime i prezime studenta/ice

Dajem suglasnost da se radi promicanja otvorenog i slobodnog pristupa znanju i informacijama cjeloviti tekst mojeg završnog rada pohrani u repozitorij Nacionalne i sveučilišne knjižnice u Zagrebu i time učini javno dostupnim.

Svojim potpisom potvrđujem istovjetnost tiskane i elektroničke inačice završnog rada.

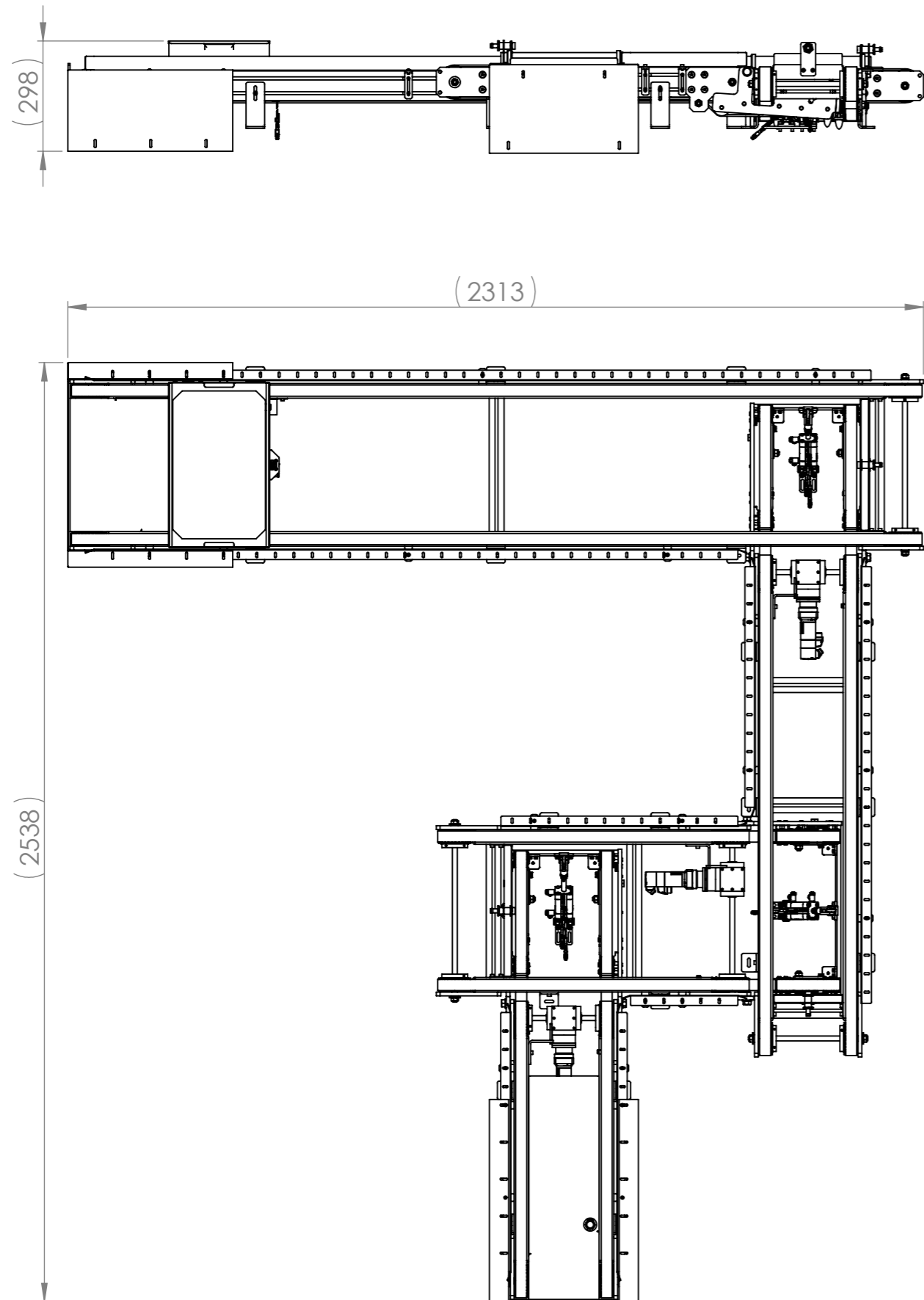
U Bjelovaru, 16.10.2018.

Miroslav Modrić

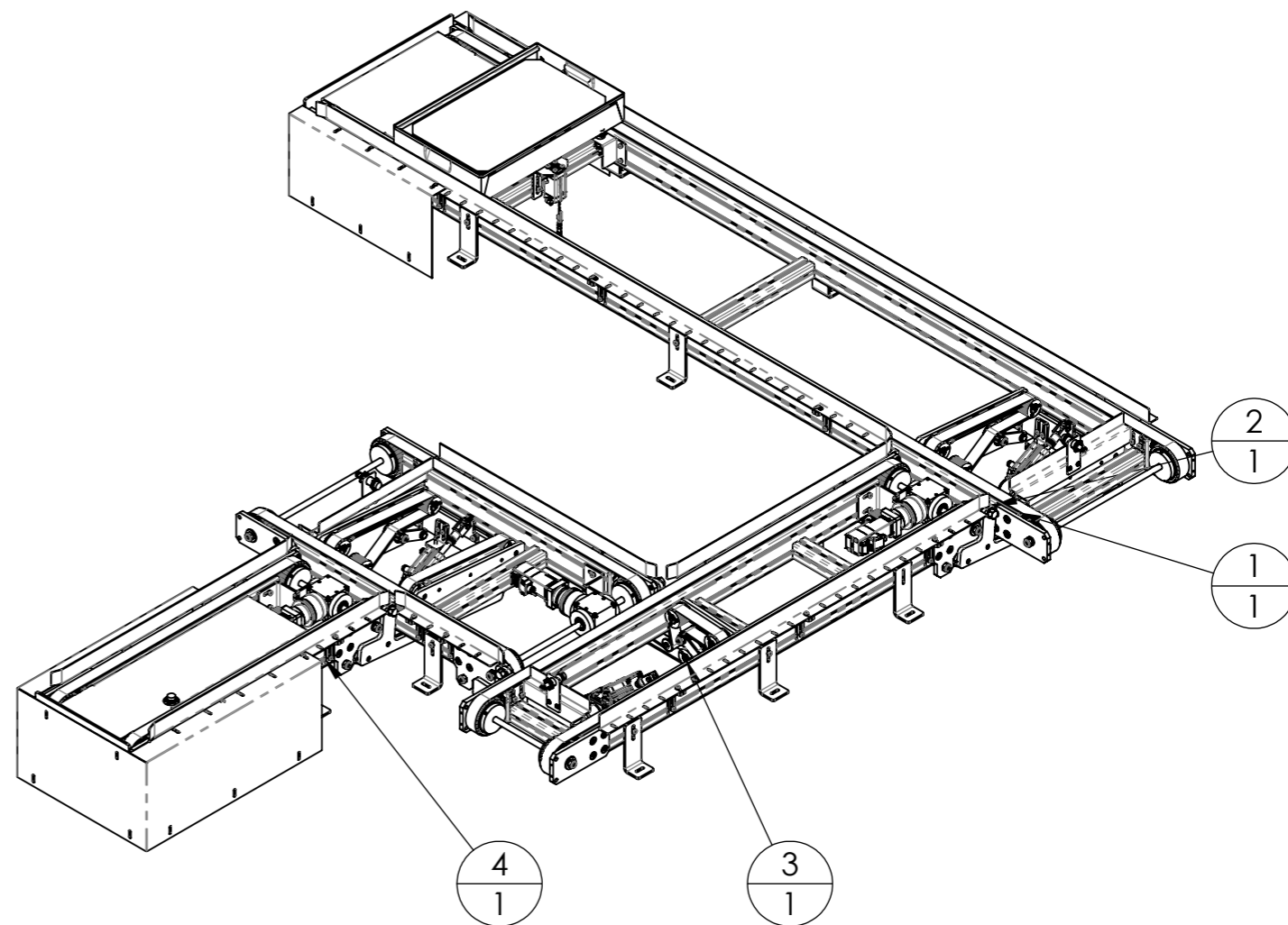
potpis studenta/ice

PRILOG BROJ 1.

Tehnička dokumentacija razvijanog sustava

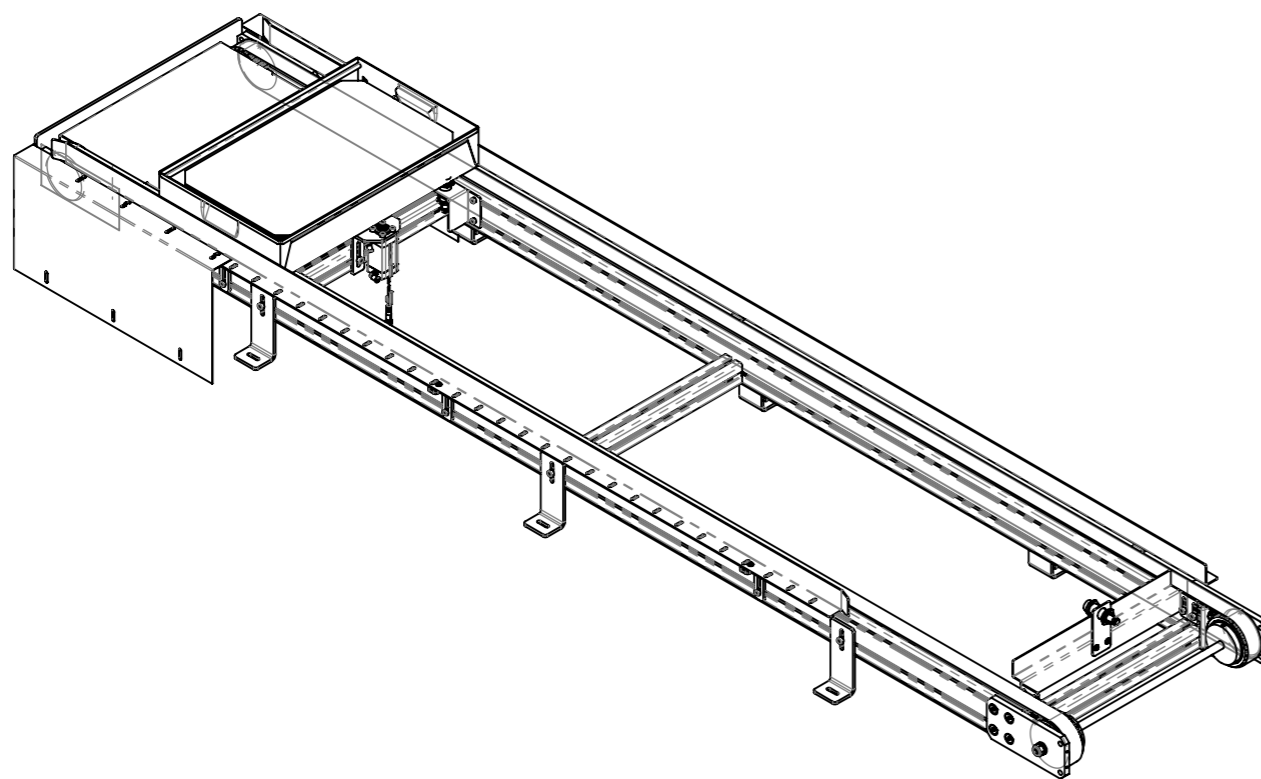
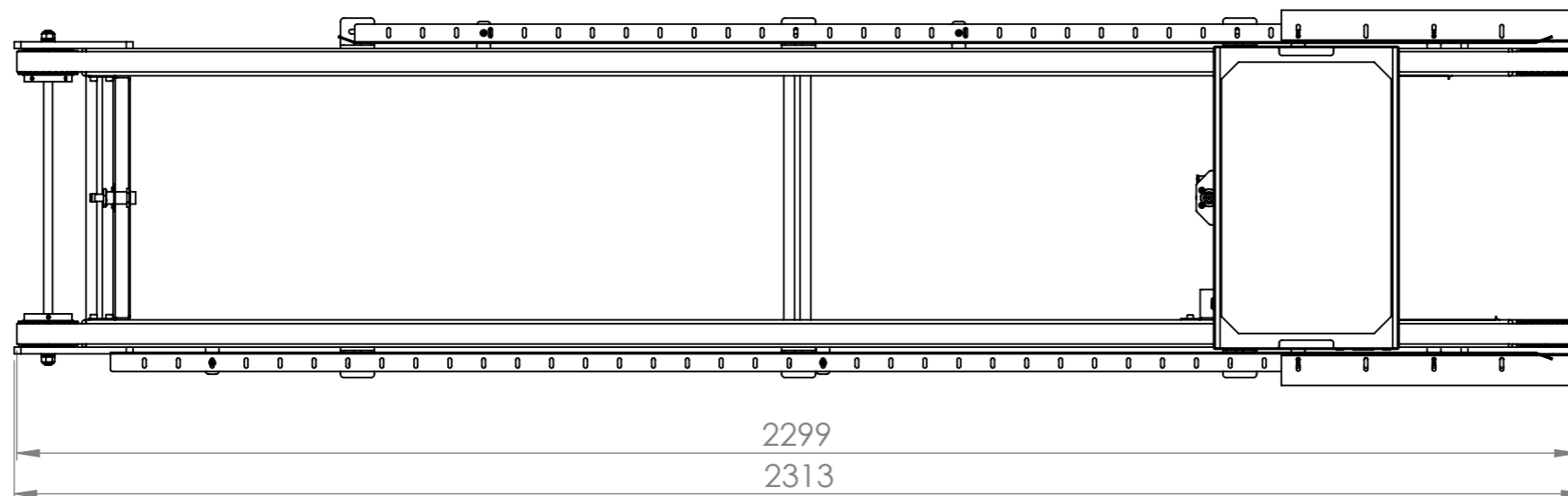
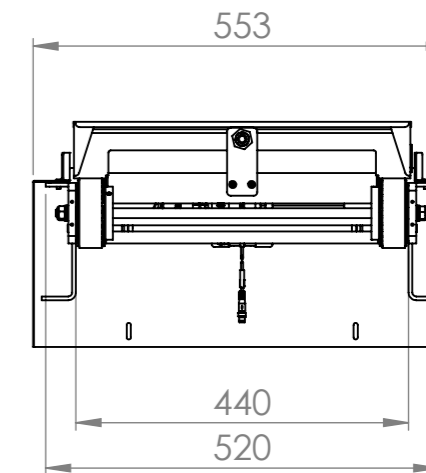
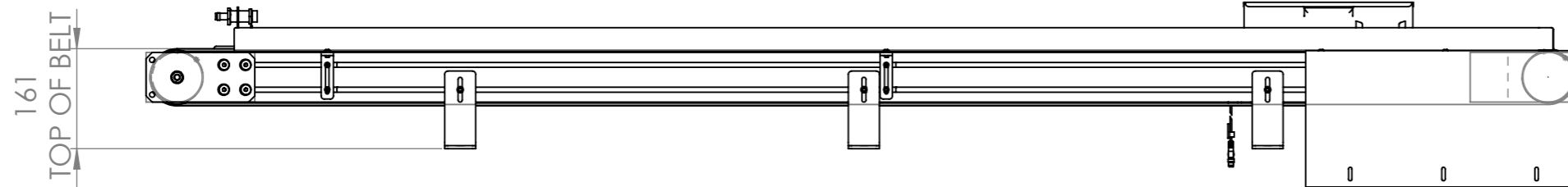


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2	003-A-0203-0002	TRANSFER CONVEYOR 2	1
3	003-A-0203-0003	TRANSFER CONVEYOR 3	1
4	003-A-0203-0004	TRANSFER CONVEYOR 4	1



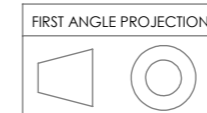
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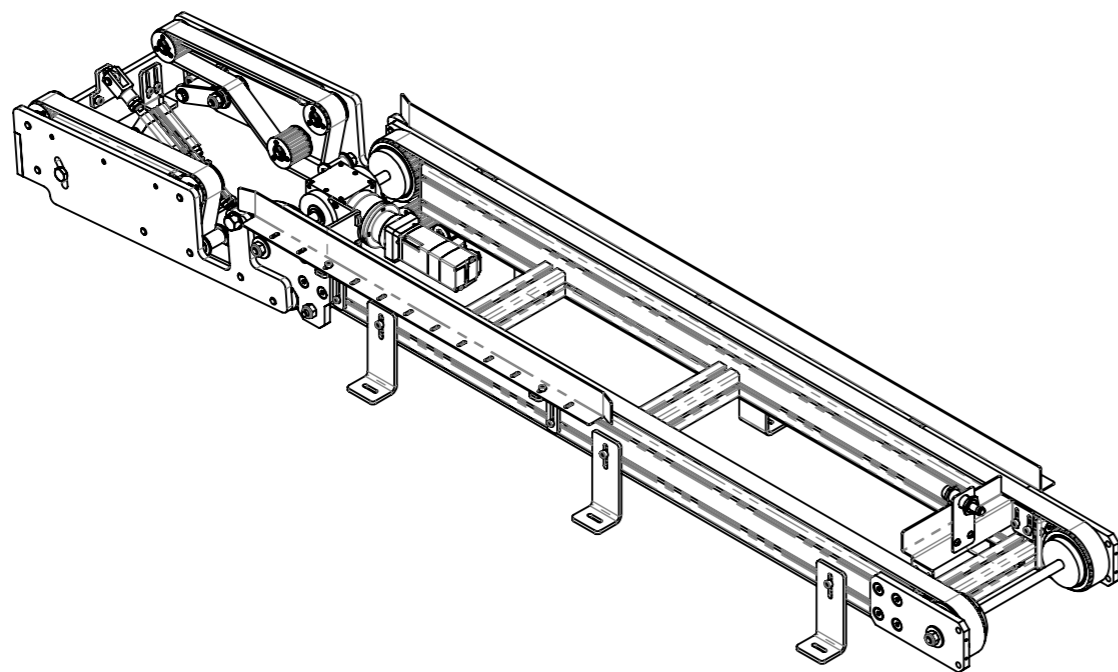
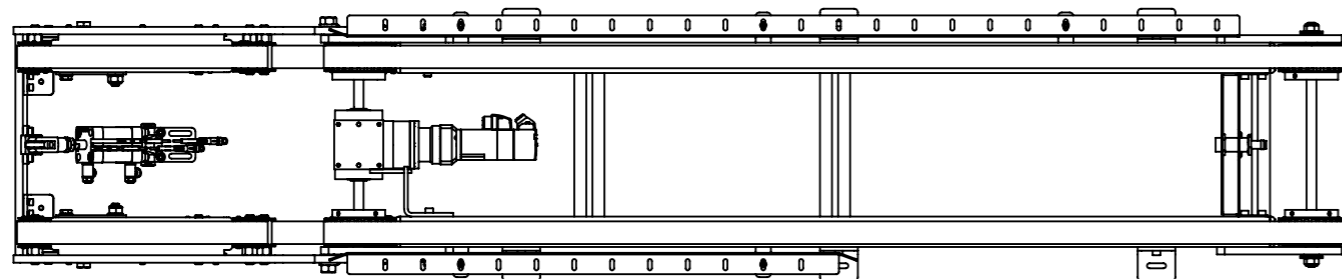
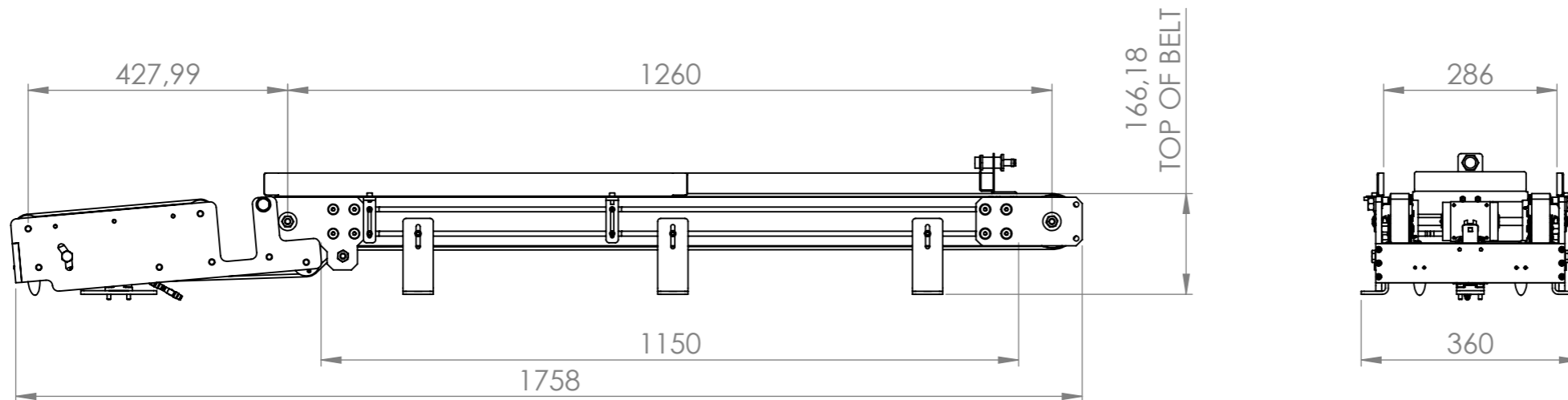
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Crtao: M. Modrić	Potpis:	Datum: 23.9.2018.	FIRST ANGLE PROJECTION	TITLE: 003-A-0200	
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Odobr: D. SKRLEC				Nacrč Br: 003-A-0200	
MFG:			MATERIAL: Material <not specified>	A3	
Q.A:			MATERIAL: VIDI BOM		
			MASA: 116.73 kg	MJERILO: 1:15	LIST 1 OD 1



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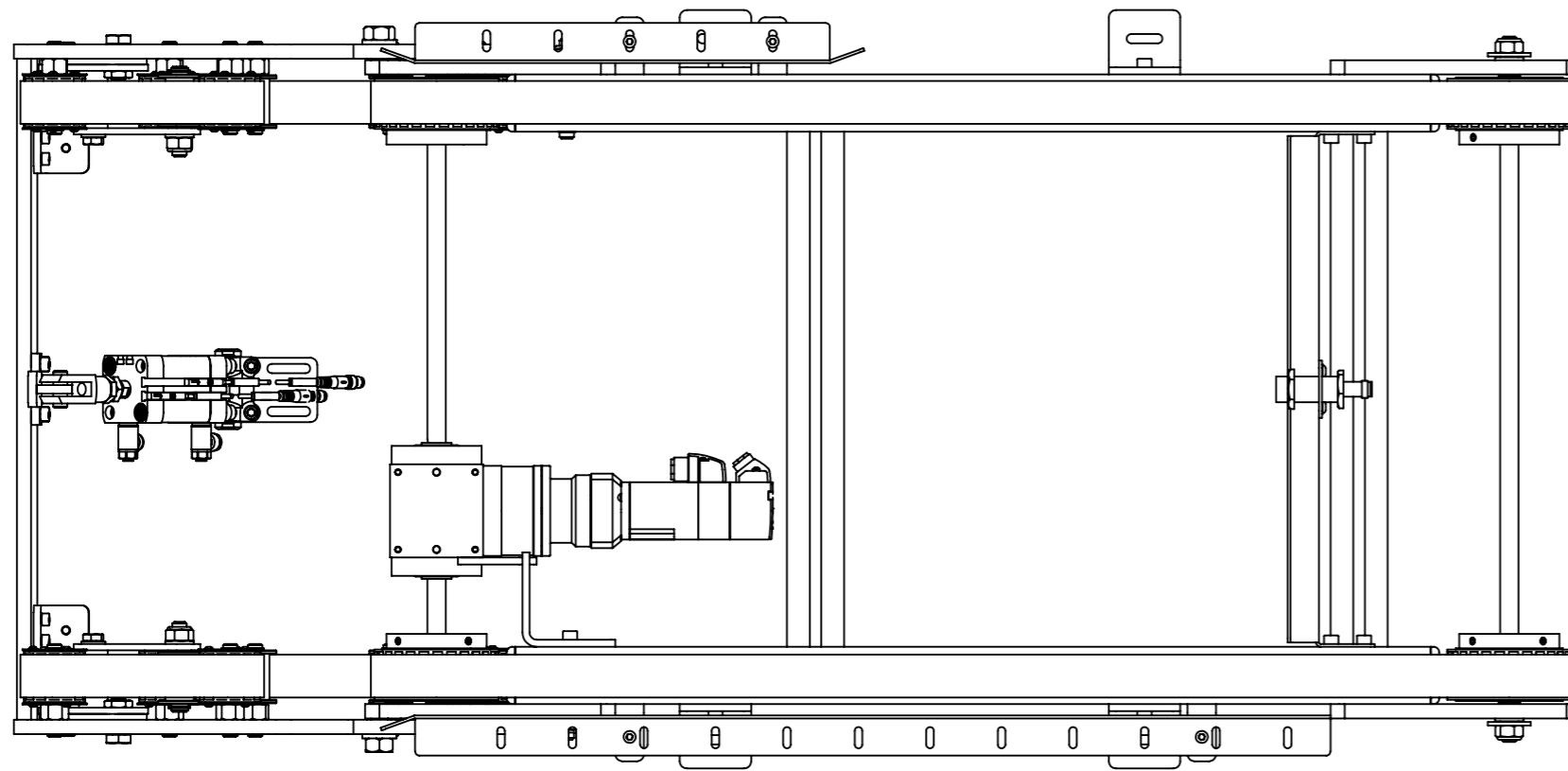
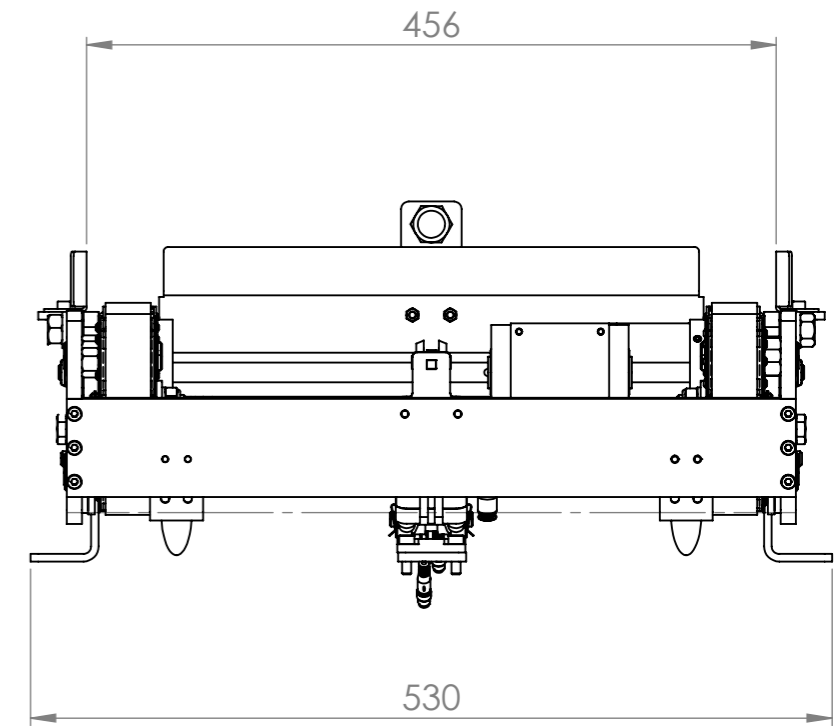
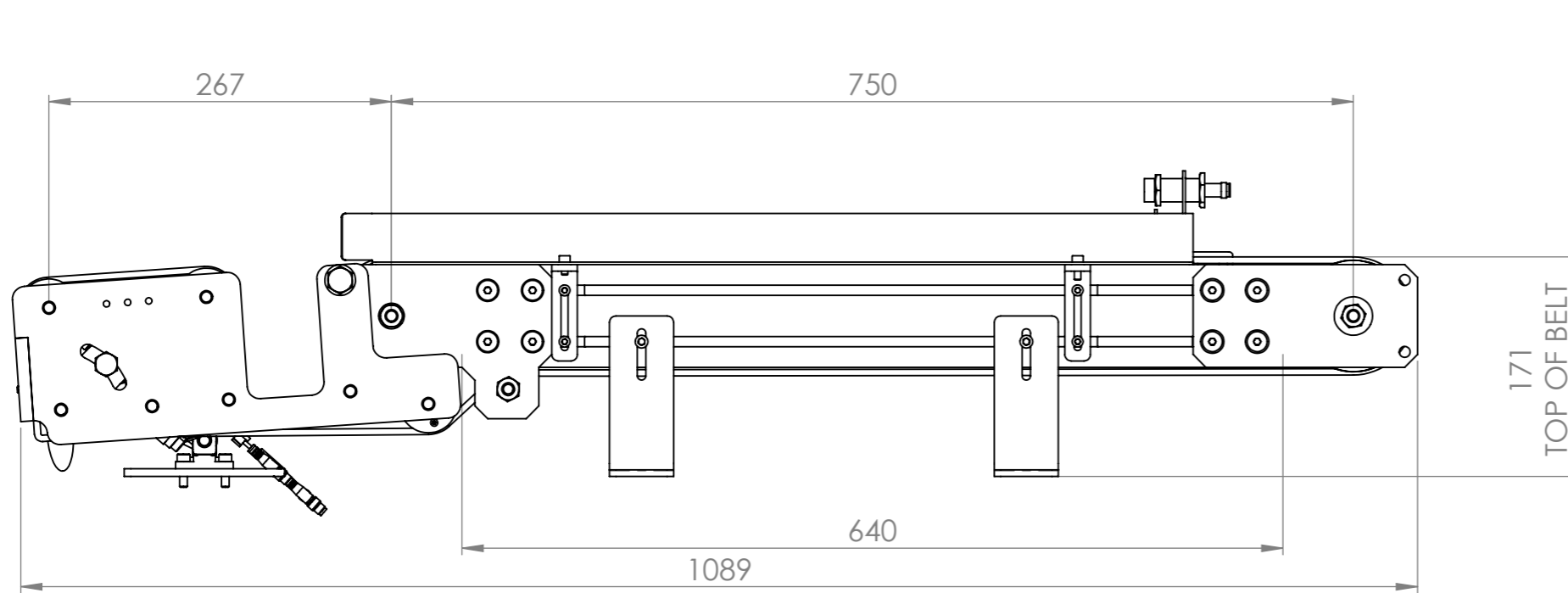
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				CUSTOM: SEE BOM			
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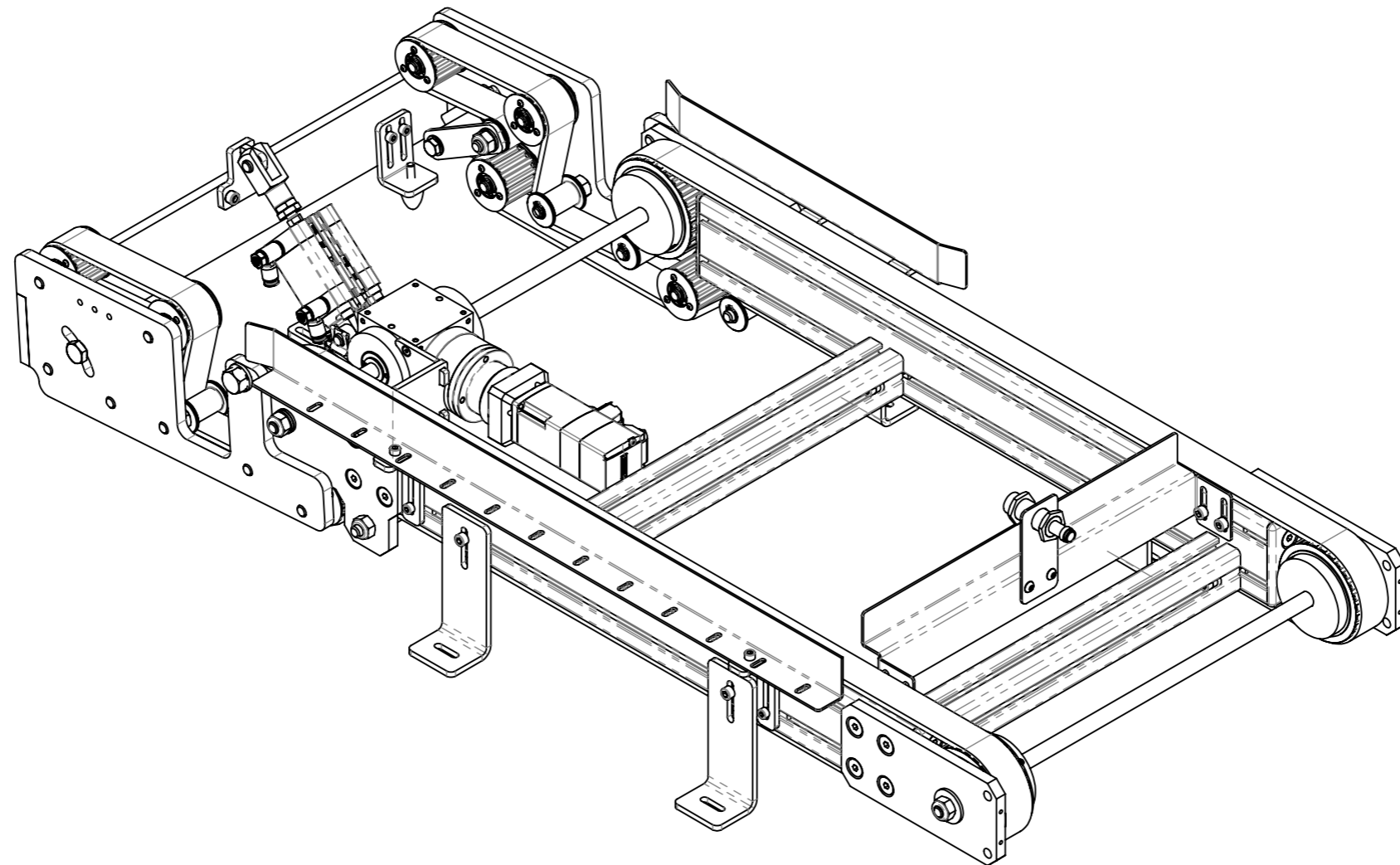
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Q.A				MATERIAL: Material <not specified>			
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				MASA: 26.68 kg			
				Mjerilo: 1:10		LIST 1 OD 1	



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DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

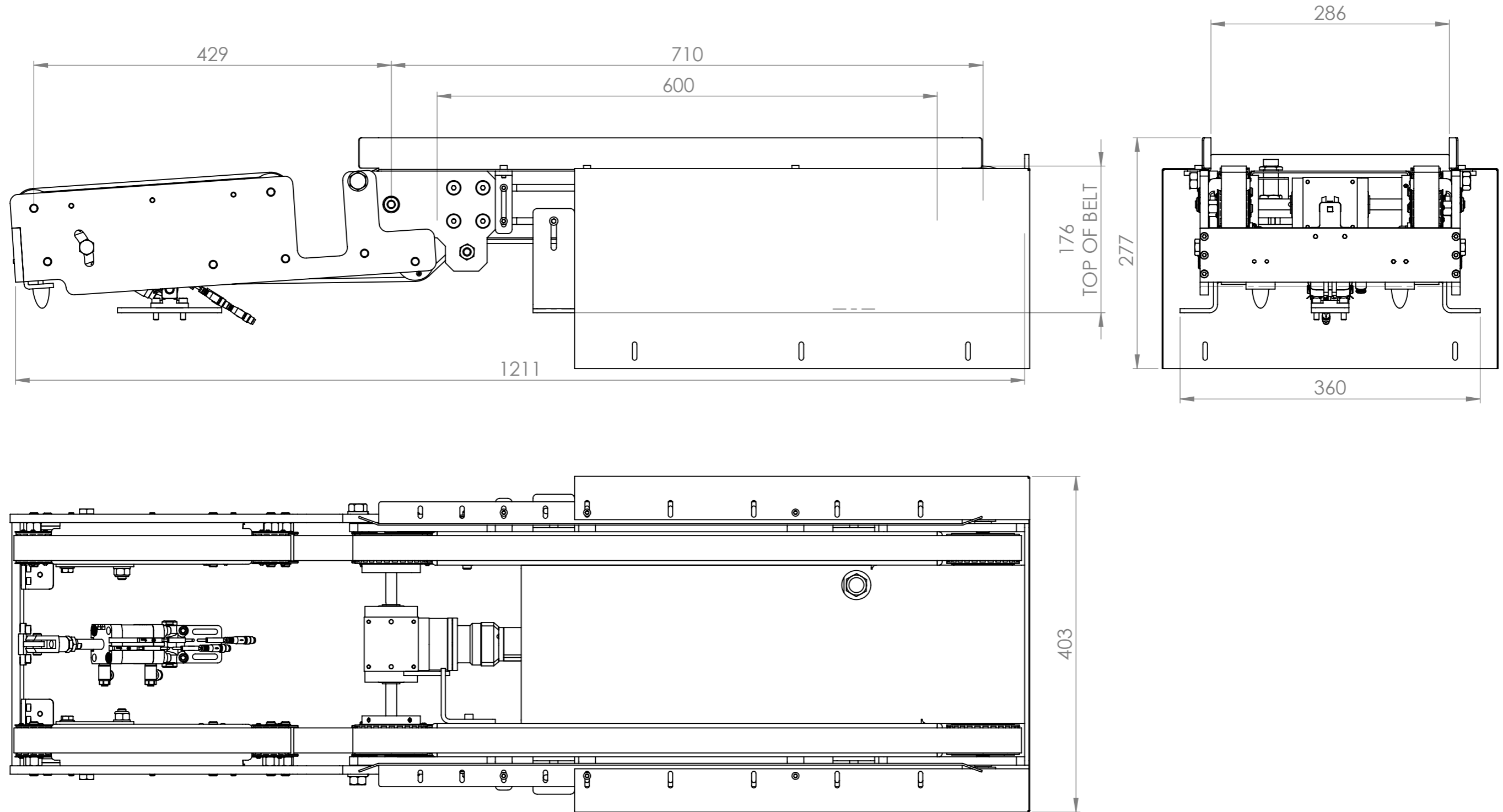
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1	0			Projekt Br:	PR-003-2018	003-A-0001	
Ime i Prezime	Potpis	Datum		TITLE:			
Crtao	M. Modrić	23.9.2018.		003-A-0200			
Kontrol.	D. SKRLEC			TRANSFER CONVEYOR 3			
Odobr.	D. SKRLEC			Nacrč Br.			
MFG				003-A-0203-0003			
Q.A			MATERIAL:	Material <not specified>			
			MATERIAL:	SEE BOM			
			CUSTOM:				
			MASA: 24.37 kg	Mjerilo: 1:5		LIST 1 OD 2	





AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

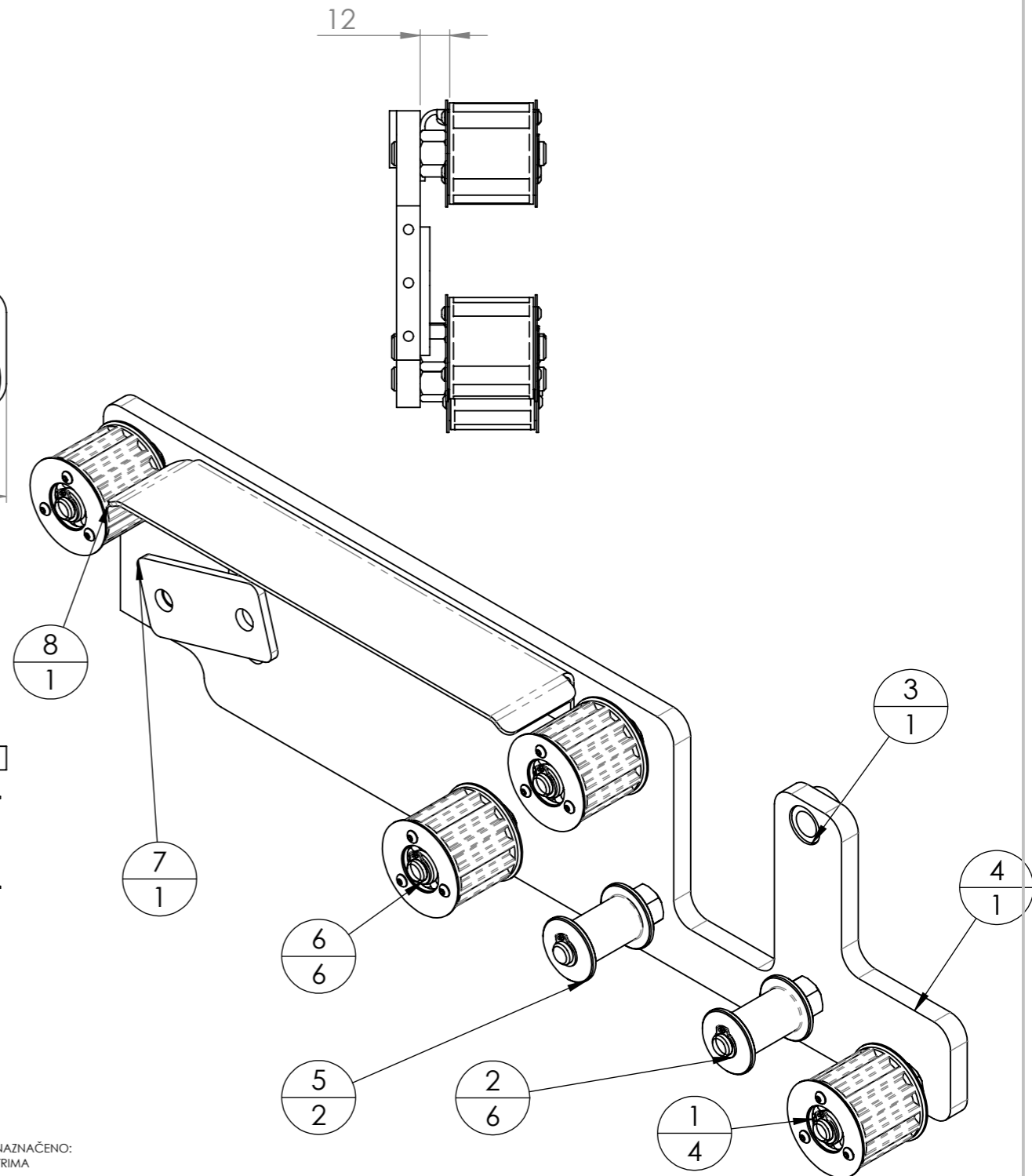
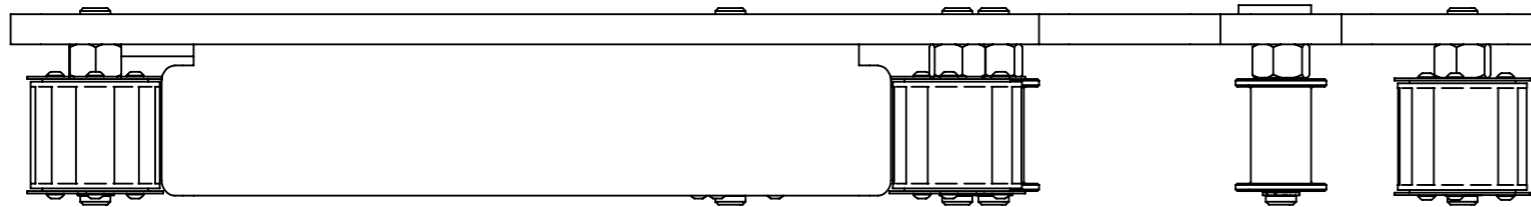
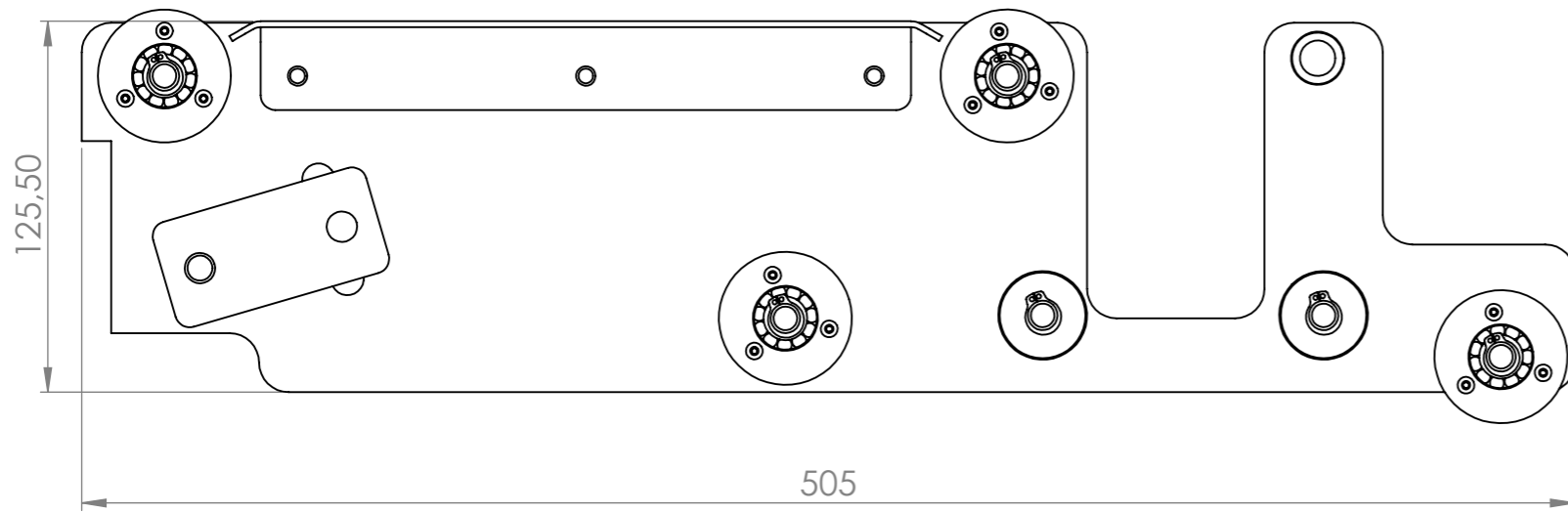
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1	0	-		Projekt Br:	PR-003-2018	003-A-0001		
Ime i Prezime	Potpis	Datum		TITLE:				003-A-0200
Crtao	M. Modrić	23.9.2018.		TRANSFER CONVEYOR 3				
Kontrol.	D. SKRLEC			Nacrč Br.				003-A-0203-0003
Odobr.	D. SKRLEC			MATERIAL: Material <not specified>				A3
MFG				CUSTOM: SEE BOM				
Q.A			MATERIAL: Material <not specified>	MASA: 24.37 kg				MJERILO: 1:10
					LIST 2 OD 2		FILE: 003-A-0203-0003.SLDDRW	



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1	0			Projekt Br:	PR-003-2018	003-A-0001	
Ime i Prezime	Potpis	Datum		TITLE:			
Crtao	M. Modrić	23.9.2018.		003-A-0200			
Kontrol.	D. SKRLEC			TRANSFER CONVEYOR 4			
Odobr.	D. SKRLEC			Nacrč Br.			
MFG				003-A-0203-0004			
Q.A			MATERIAL:	Material <not specified>		A3	
			MATERIAL:	SEE BOM		MJEILO: 1:5	
			CUSTOM:			LIST 1 OD 1	
			MASA: 28.55 kg			FILE: 003-A-0203-0004.SLDDRW	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

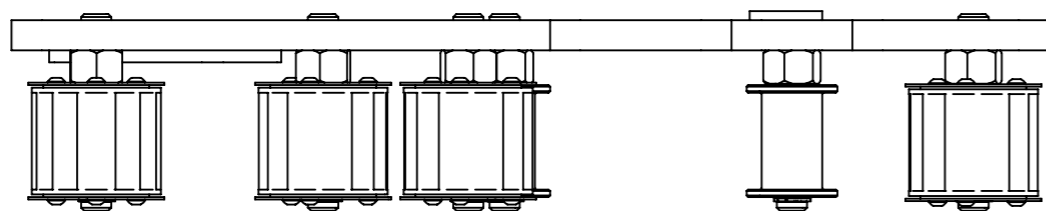
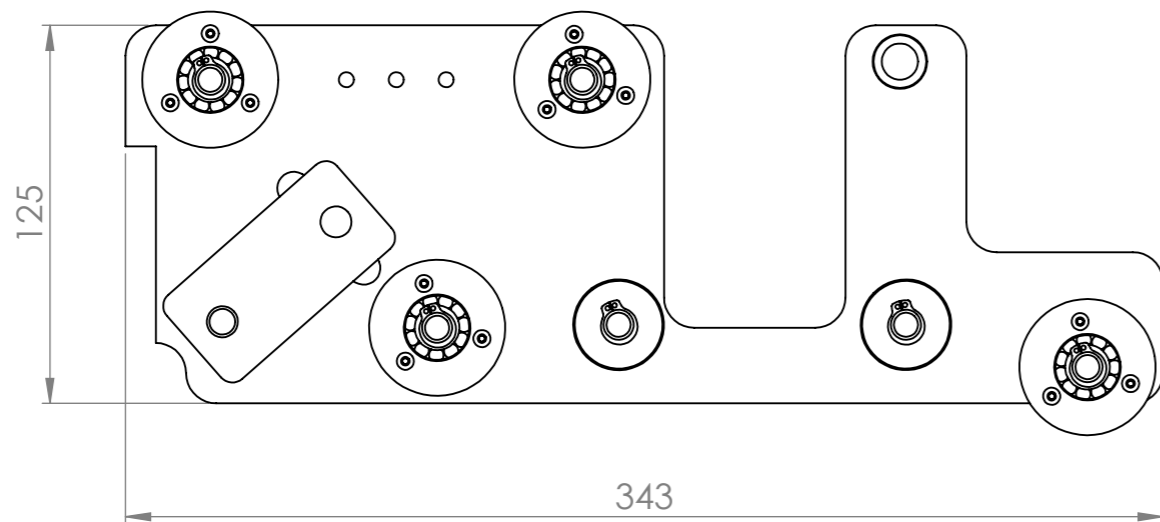


ITEM NO.	PartNo	DESCRIPTION	Vendor	0001/QTY.
1	003-A-0212-0001	TIMING PULLEY IDLER	VIDACO	4
2	Circlip DIN 471 - 10 x 1	Circlip DIN 471 - 10 x 1	-	6
3	MFM-1218-12	IGUS BEARING	IGUS	1
4	003-P-0204-0001	PLATE	VIDACO	1
5	003-P-0205-0001	PULEY	VIDACO	2
6	003-P-0206-0001	SCREW	VIDACO	6
7	003-P-0208-0001	PLATE	VIDACO	1
8	003-P-0222-0001	STOPER	VIDACO	1

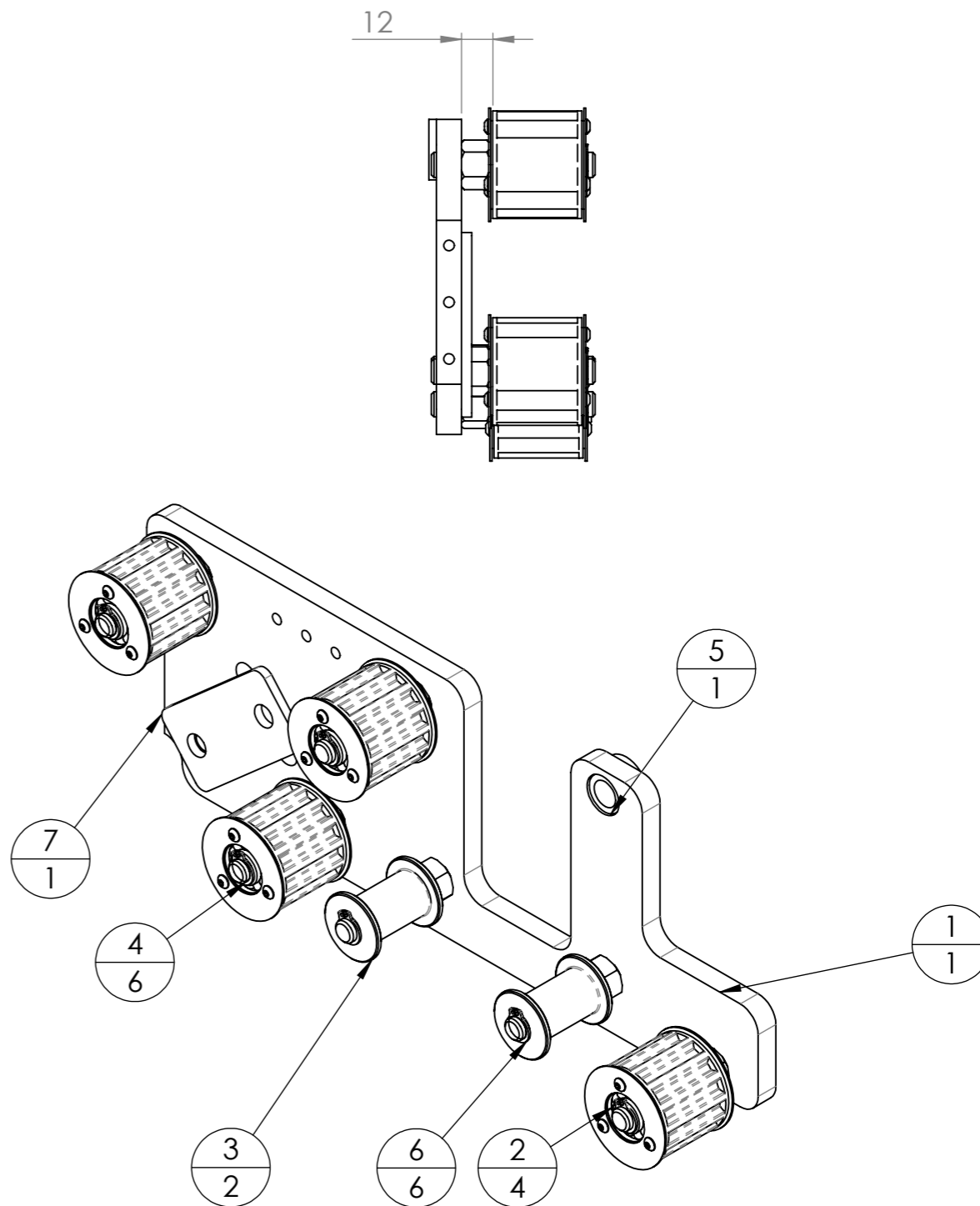
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DIMENZJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1	0			Projekt Br:	PR-003-2018	003-A-0203	
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION	TITLE:	003-A-0206 POPUP SIDE ASSY		
Crtao: M. Modrić		16.9.2018.		Nacrtr Br.	003-A-0205-0001		
Kontrol.: D. SKRLEC				MATERIAL:	Material <not specified>		
Odobr.: D. SKRLEC				CUSTOM:	SEE BOM		
MFG				MATERIAL:	Material <not specified>		
Q.A				MATERIAL:	Material <not specified>		
				MASA: 2.49 kg	MJERILO: 1:2.5	LIST 1 OD 1	
						FILE: 003-A-0205-0001.SLDDRW	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED



ITEM NO.	PartNo	DESCRIPTION	Vendor	0003/QTY.
1	003-P-0204-0003	PLATE	VIDACO	1
2	003-A-0212-0001	TIMING PULLEY IDLER	VIDACO	4
3	003-P-0205-0001	PULEY	VIDACO	2
4	003-P-0206-0001	SCREW	VIDACO	6
5	MFM-1218-12	IGUS BEARING	IGUS	1
6	Circlip DIN 471 - 10 x 1	Circlip DIN 471 - 10 x 1	-	6
7	003-P-0208-0001	PLATE	VIDACO	1

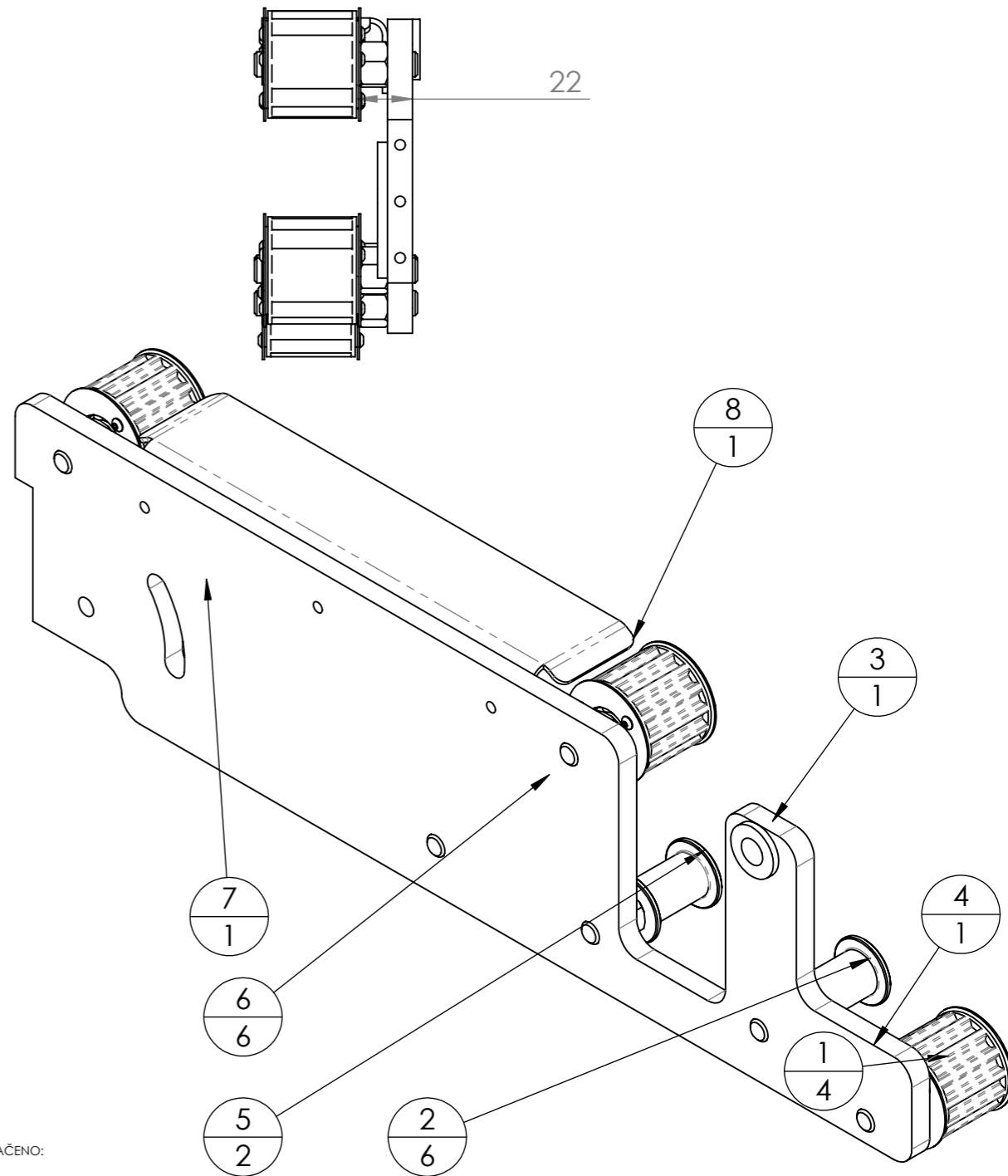
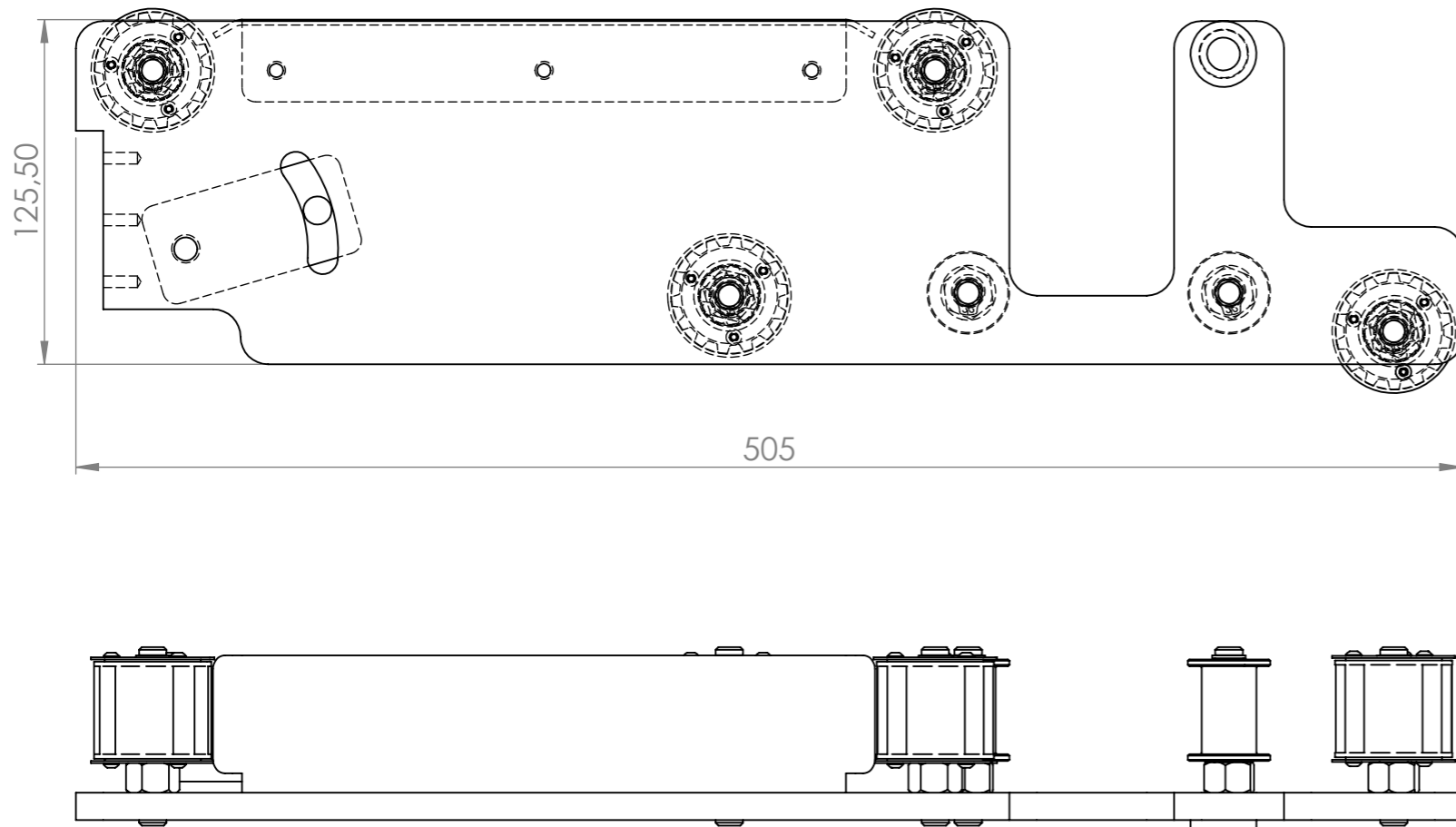


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1	0			Projekt Br:	PR-003-2018	003-A-0203	
Crtao	Ime i Prezime	Potpis	Datum	TITLE: 003-A-0206			
Kontrol.	M. Modrić		16.9.2018.	POPUP SIDE ASSY			
Odobr.	D. SKRLEC			Nacrč Br. 003-A-0205-0003			
MFG				A3			
Q.A				MATERIAL: Material <not specified>			
				MATERIAL: SEE BOM			
				MASA: 1.70 kg			
				MJEILO: 1:2.5			
				LIST 1 OD 1			

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
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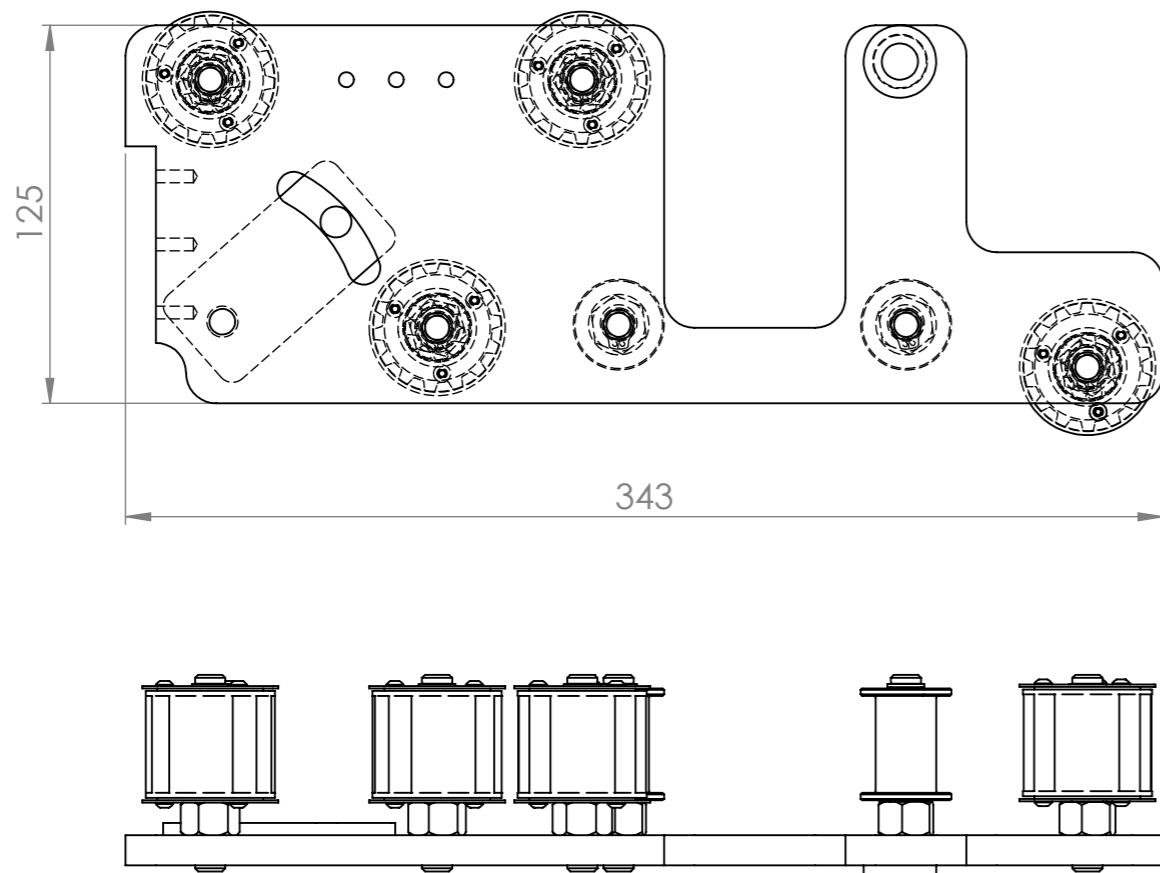


ITEM NO.	PartNo	DESCRIPTION	Vendor	0001/QTY.
1	003-A-0212-0001	TIMING PULLEY IDLER	VIDACO	4
2	Circlip DIN 471 - 10 x 1	Circlip DIN 471 - 10 x 1	-	6
3	MFM-1218-12	IGUS BEARING	IGUS	1
4	003-P-0204-0001	PLATE	VIDACO	1
5	003-P-0205-0001	PULEY	VIDACO	2
6	003-P-0206-0001	SCREW	VIDACO	6
7	003-P-0208-0001	PLATE	VIDACO	1
8	003-P-0222-0001	STOPER	VIDACO	1

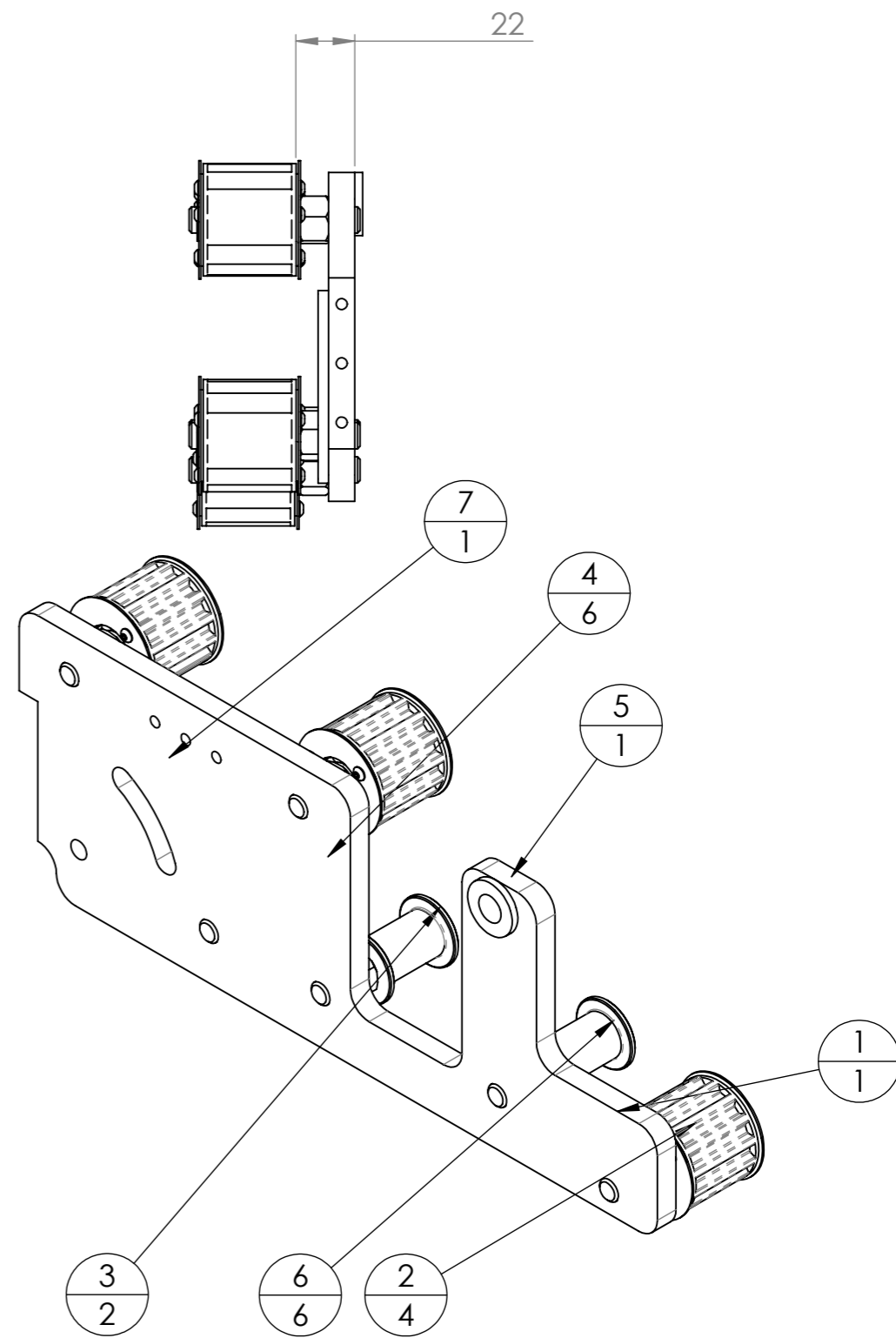
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1	0			Projekt Br:	PR-003-2018	003-A-0206	
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION	TITLE:	003-A-0206		
Crtao	M. Modrić	23.9.2018.		POPUP SIDE ASSY MIRROR			
Kontrol.	D. SKRLEC			Nacrtn Br.	003-A-0205M-0001		
Odobr.	D. SKRLEC			MATERIAL:	Material <not specified>		
MFG				CUSTOM:	SEE BOM		
Q.A				MATERIAL:	Material <not specified>		
				MASA:	2.49 kg		MJERILO: 1:2.5
						LIST 1 OD 1	
						FILE: 003-A-0205M-0001.SLDDRW	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED



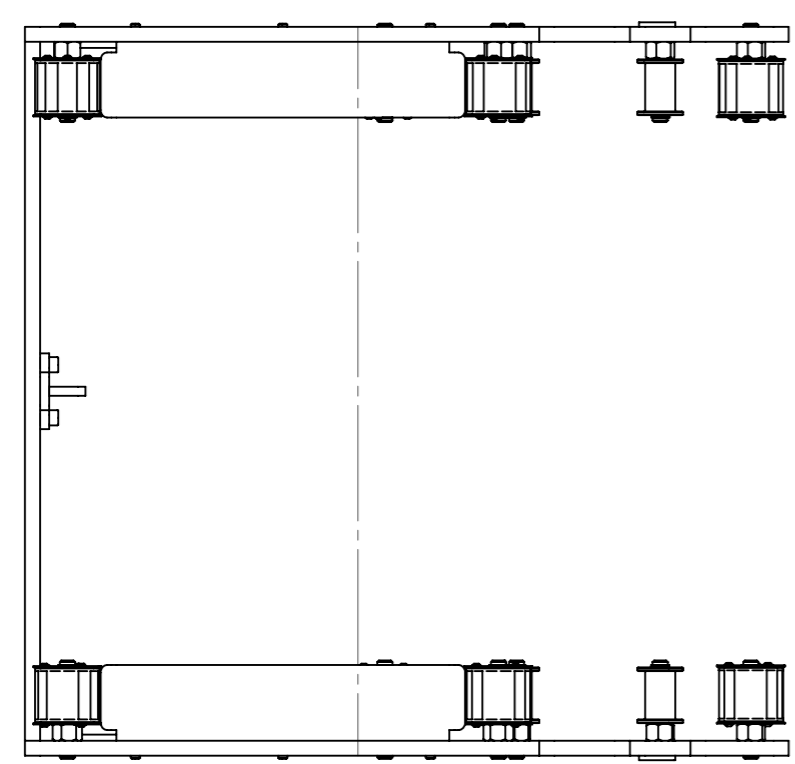
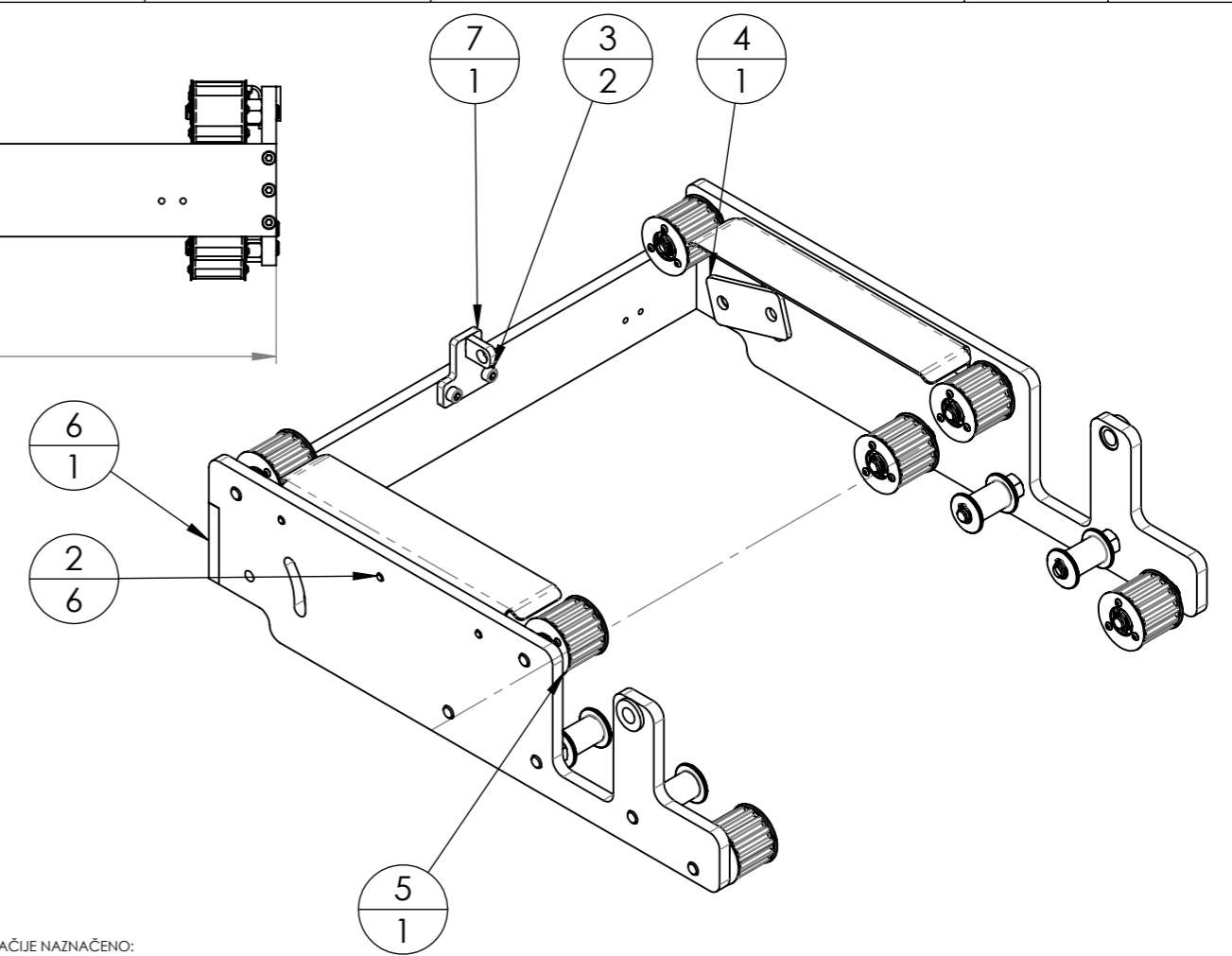
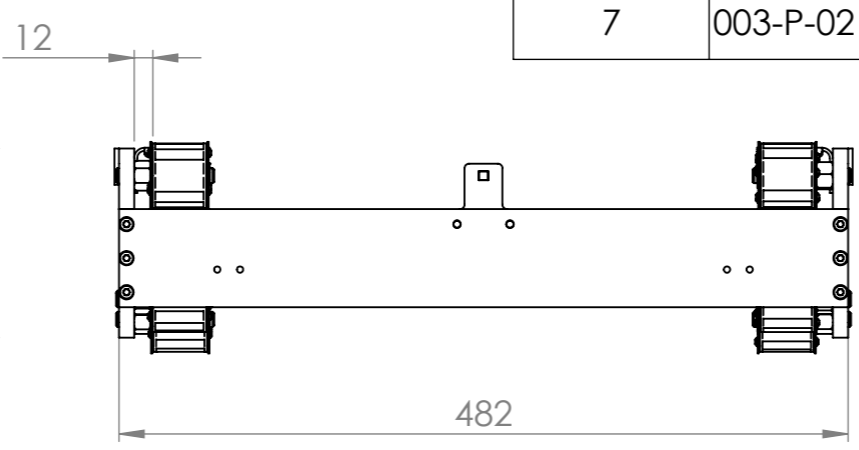
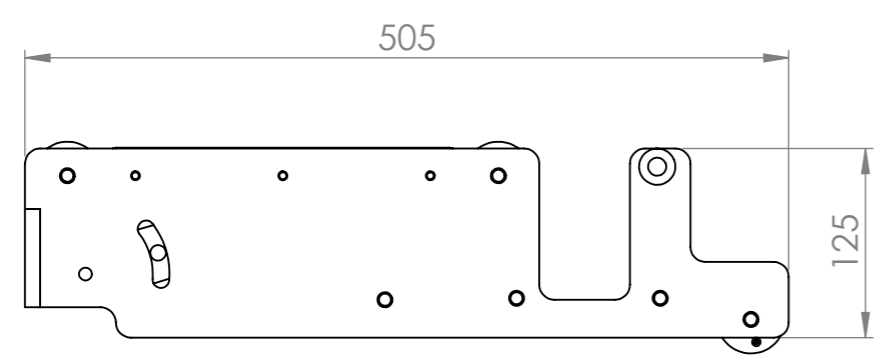
ITEM NO.	PartNo	DESCRIPTION	Vendor	0003/QTY.
1	003-P-0204-0003	PLATE	VIDACO	1
2	003-A-0212-0001	TIMING PULLEY IDLER	VIDACO	4
3	003-P-0205-0001	PULEY	VIDACO	2
4	003-P-0206-0001	SCREW	VIDACO	6
5	MFM-1218-12	IGUS BEARING	IGUS	1
6	Circlip DIN 471 - 10 x 1	Circlip DIN 471 - 10 x 1	-	6
7	003-P-0208-0001	PLATE	VIDACO	1



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1	0			Projekt Br:	PR-003-2018	003-A-0206	
Crtao	Ime i Prezime	Potpis	Datum	TITLE: 003-A-0206			
Kontrol.	M. Modrić		23.9.2018.	POPUP SIDE ASSY MIRROR			
Odobr.	D. SKRLEC			Nacrtn Br. 003-A-0205M-0003			
MFG				A3			
Q.A				MATERIAL: Material <not specified>			
MATERIAL: Material <not specified>				MATERIA: SEE BOM			
CUSTOM: SEE BOM				MASA: 1.70 kg			
				MJEILO: 1:2.5			
				LIST 1 OD 1			

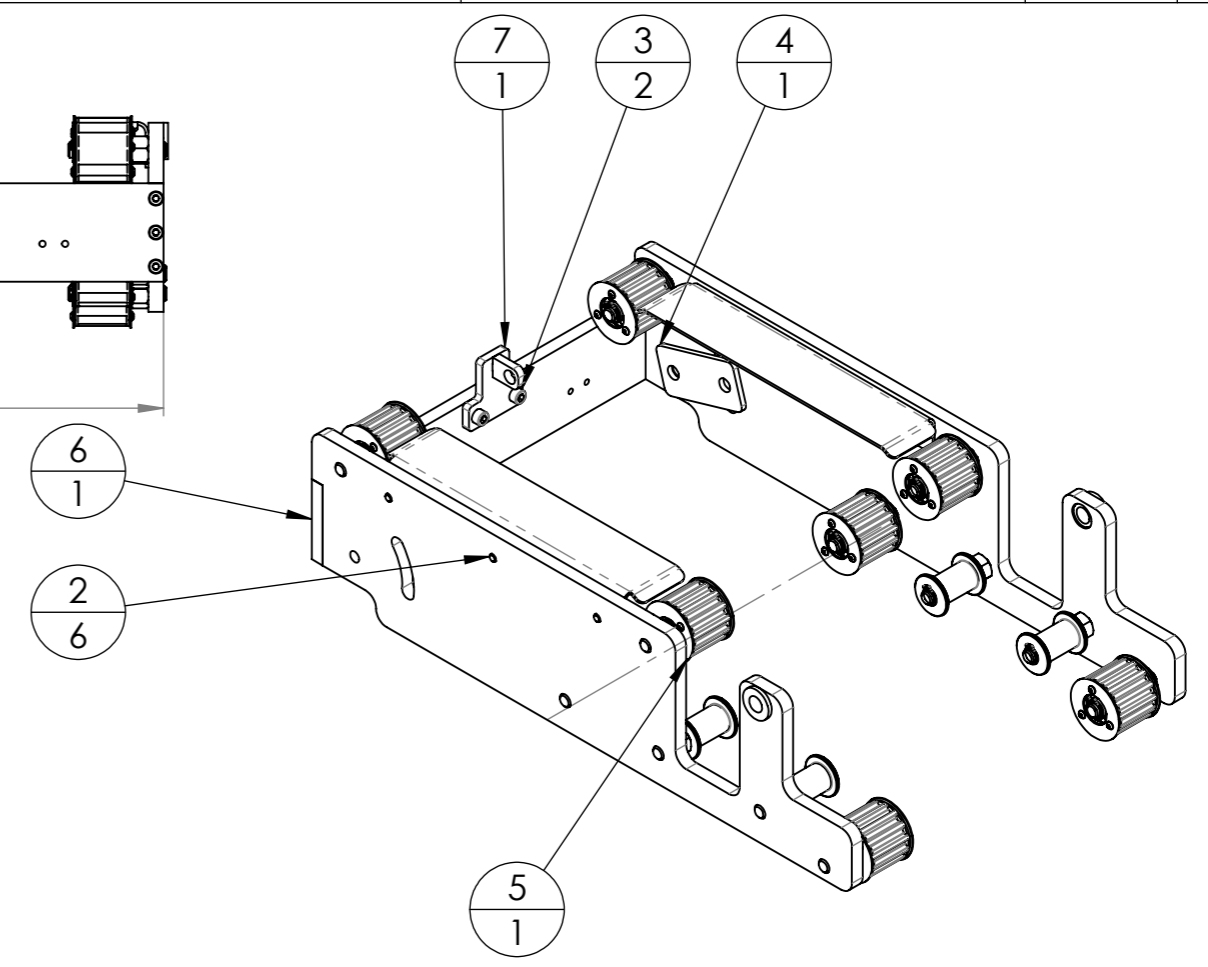
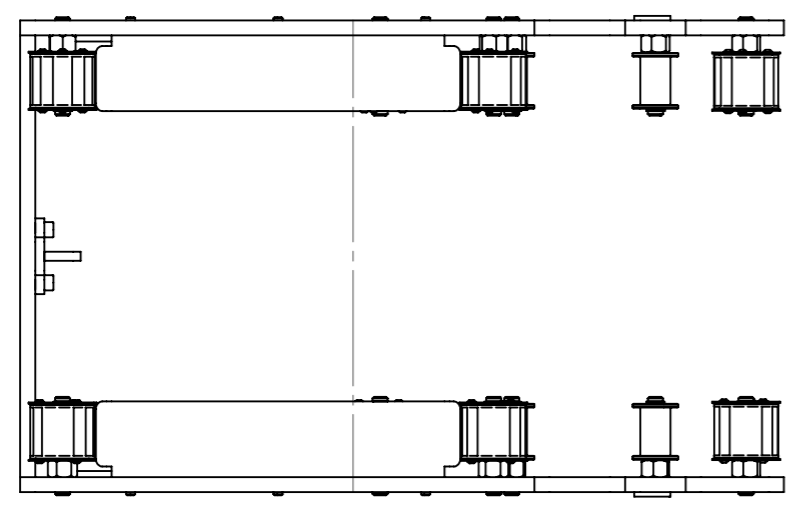
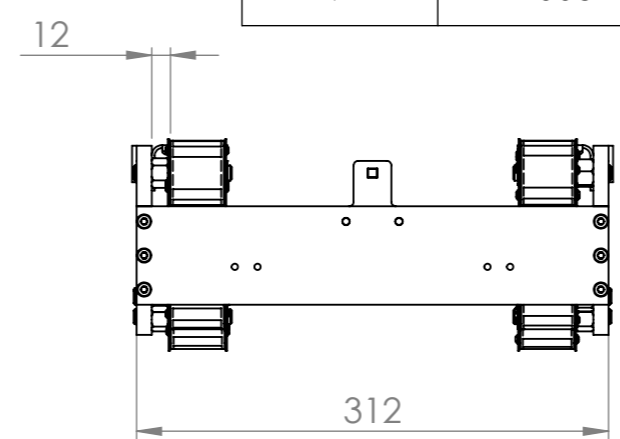
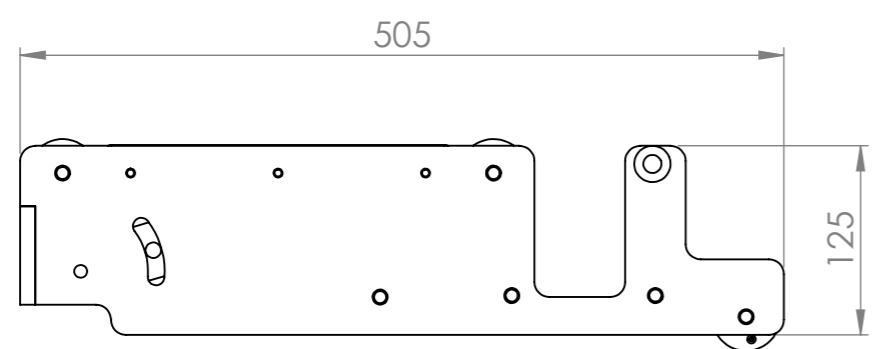
ITEM NO.	PartNo	DESCRIPTION	Vendor	0001/QTY.
1		Bolts & screws - SHCS M5x0.8x016 - STL 12.9 BO*	-	6
2		Bolts & screws - SHCS M6x1.0x014 - STL 12.9 BO	-	6
3	DIN912 12.9 SHCS M6x16	Bolts & screws - SHCS M6x1.0x016 - STL 12.9 BO*	-	2
4	003-A-0205-0001	POPOP SIDE ASSY	VIDACO	1
5	003-A-0205M-0001	POPOP SIDE ASSY MIRROR	VIDACO	1
6	003-P-0207-0001	PLATE	VIDACO	1
7	003-P-0215-0001	CYLINDER FIX	VIDACO	1



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent: ASEMO	REVISION: A
1	0			Projekt Br: PR-003-2018	003-A-0200
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION	TITLE: 003-A-0203	
Crtao: M. Modrić		23.9.2018.		POPOP FRAME	
Kontrol: D. SKRLEC				Nacrč Br: 003-A-0206-0001	A3
Odobr: D. SKRLEC				MATERIAL: Material <not specified>	
MFG				CUSTOM: SEE BOM	
Q.A				MAŠA: 5.99 kg	MJERILO: 1:5
				LIST 1 OD 1	

ITEM NO.	PartNo	DESCRIPTION	Vendor	0002/QTY.
1		Bolts & screws - SHCS M5x0.8x016 - STL 12.9 BO*	-	6
2		Bolts & screws - SHCS M6x1.0x014 - STL 12.9 BO	-	6
3	DIN912 12.9 SHCS M6x16	Bolts & screws - SHCS M6x1.0x016 - STL 12.9 BO*	-	2
4	003-A-0205-0001	POPOP SIDE ASSY	VIDACO	1
5	003-A-0205M-0001	POPOP SIDE ASSY MIRROR	VIDACO	1
6	003-P-0207-0002	PLATE	VIDACO	1
7	003-P-0215-0001	CYLINDER FIX	VIDACO	1



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

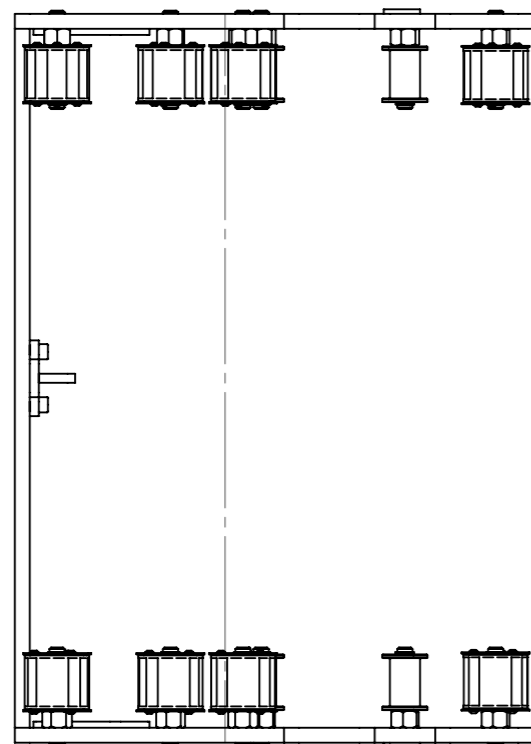
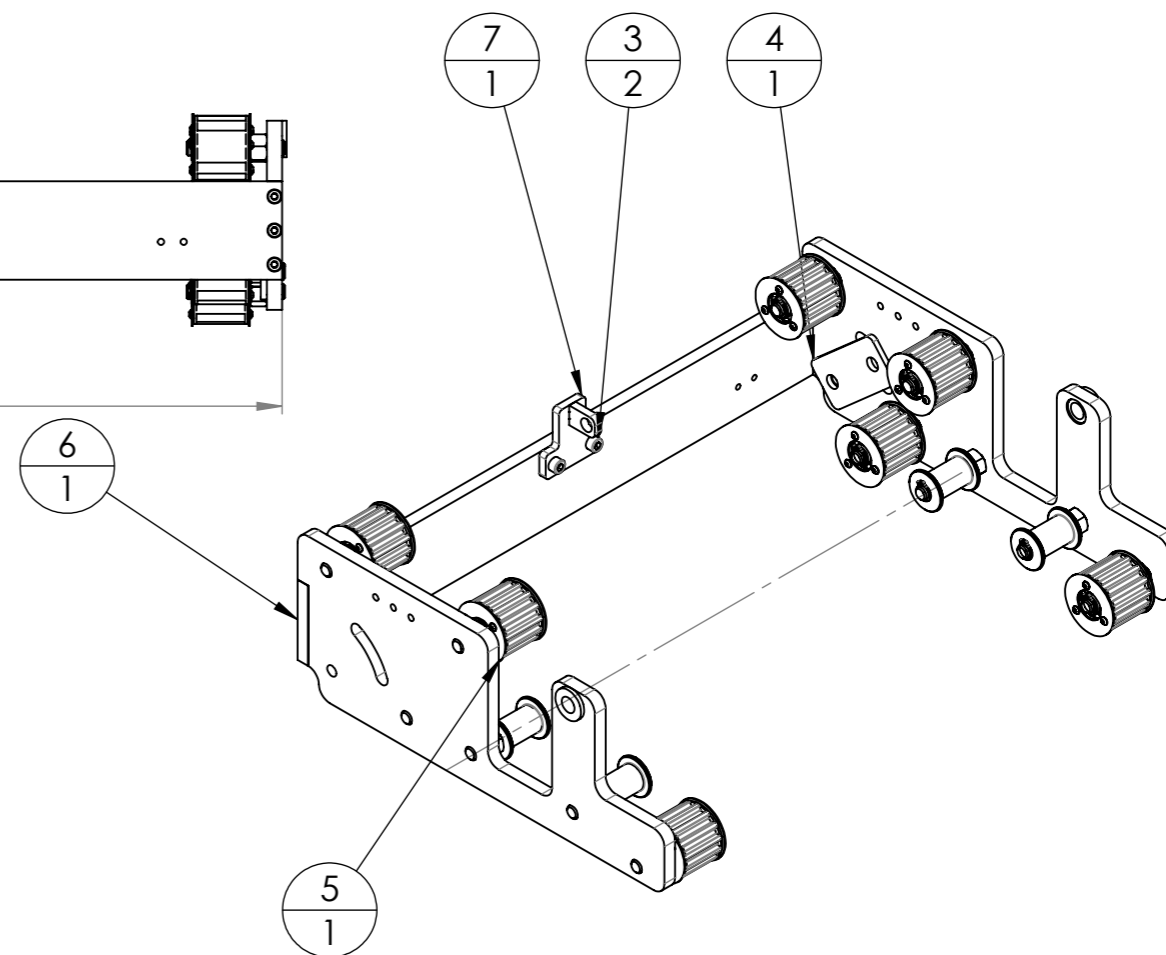
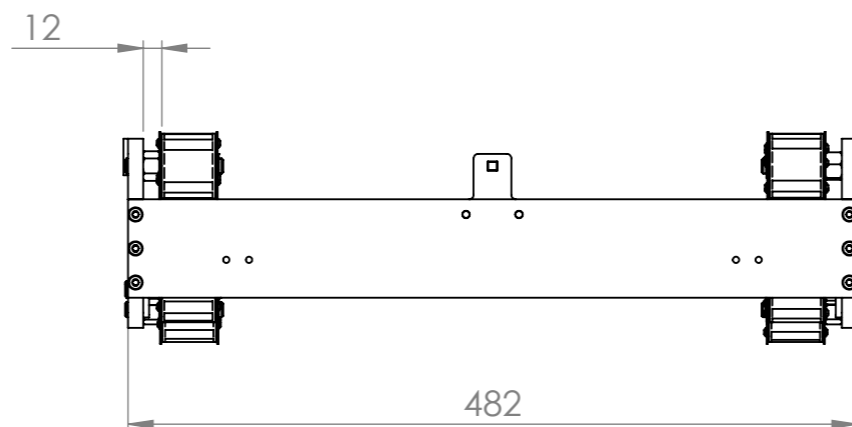
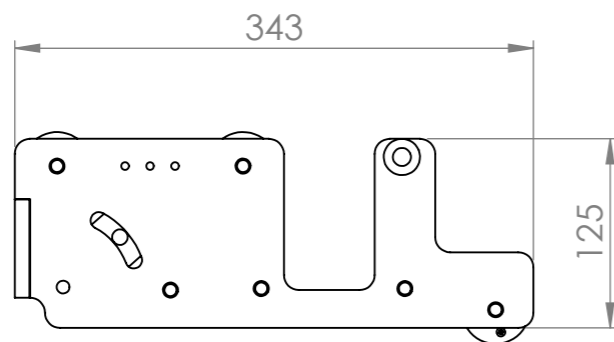
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1	0			Projekt Br:	PR-003-2018	003-A-0200	
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION 	TITLE:			
Crtao	M. Modrić	23.9.2018.		003-A-0203			
Kontrol.	D. SKRLEC			POPUP FRAME			
Odobr.	D. SKRLEC			Nacrč Br.			
MFG			MATERIAL:	003-A-0206-0002			
Q.A			MATERIAL:	Material <not specified>			
			CUSTOM:	SEE BOM			
			MASA: 4.22 kg	Mjerilo: 1:5		LIST 1 OD 1	



003-A-0206-0002

A3

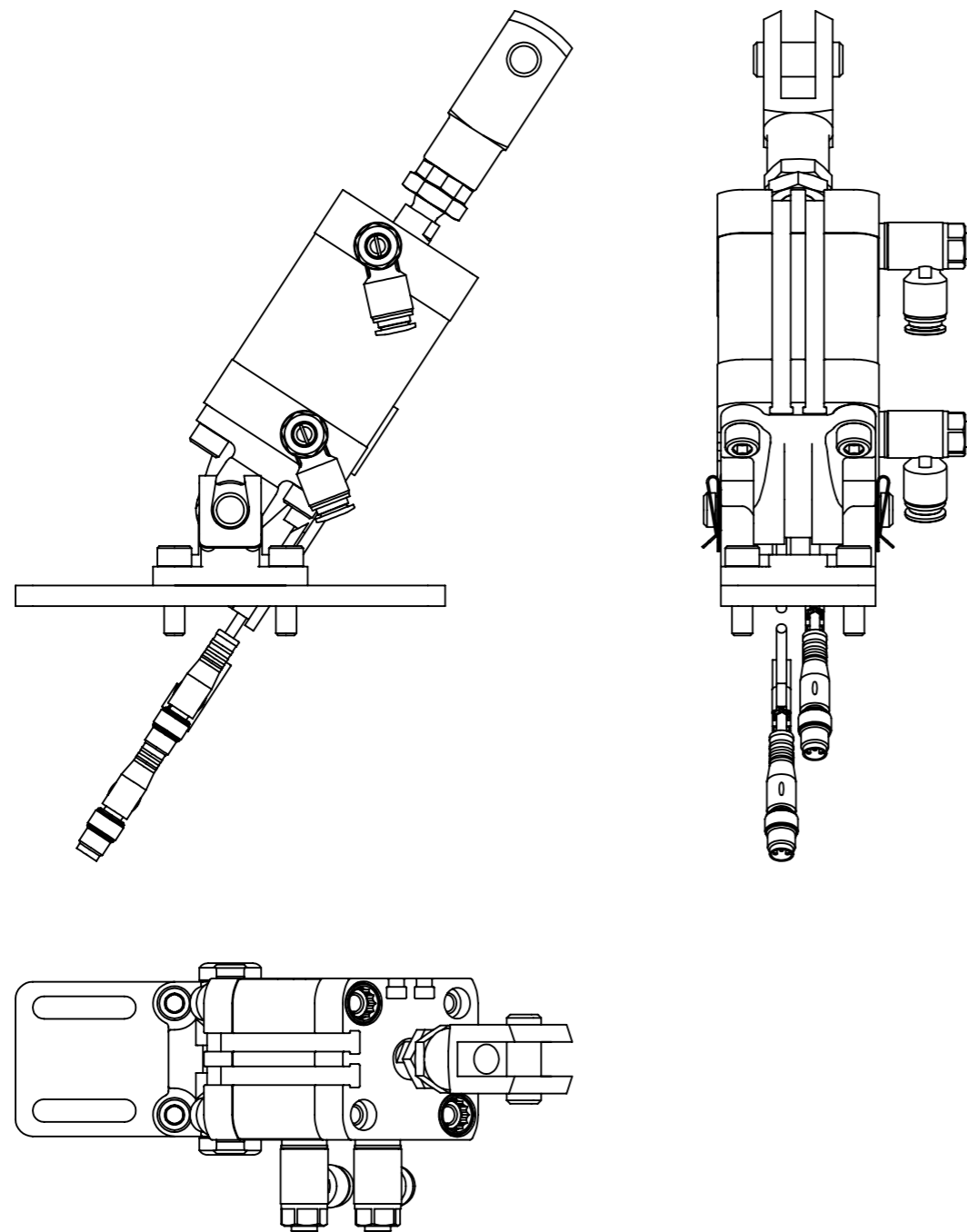
ITEM NO.	PartNo	DESCRIPTION	Vendor	0003/QTY.
1		Bolts & screws - SHCS M5x0.8x016 - STL 12.9 BO*	-	1
2		Bolts & screws - SHCS M5x0.8x014 - STL 12.9 BO	-	5
3	DIN912 12.9 SHCS M6x16	Bolts & screws - SHCS M6x1.0x016 - STL 12.9 BO*	-	2
4	003-A-0205-0003	POPUP SIDE ASSY	VIDACO	1
5	003-A-0205M-0003	POPUP SIDE ASSY MIRROR	VIDACO	1
6	003-P-0207-0001	PLATE	VIDACO	1
7	003-P-0215-0001	CYLINDER FIX	VIDACO	1



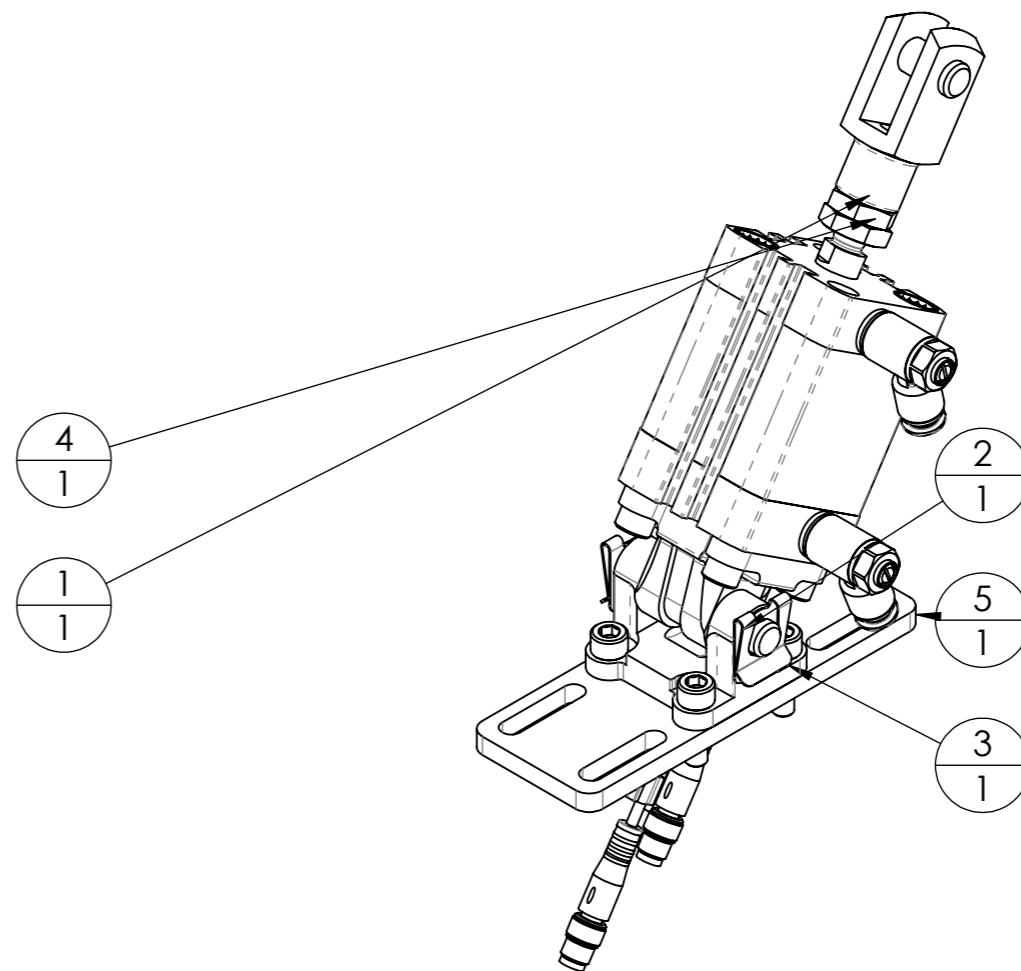
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1	0			Projekt Br:	PR-003-2018	003-A-0200	
Crtao	M. Modrić	Potpis	Datum	TITLE: 003-A-0203 POPUP FRAME			
Kontrol.	D. SKRLEC		23.9.2018.	Nacrč Br. 003-A-0206-0003			
Odobr.	D. SKRLEC			MATERIAL: Material <not specified> CUSTOM: SEE BOM			
MFG				MASA: 4.36 kg			
Q.A				MJEILO: 1:5			
				A3		LIST 1 OD 1	
				FILE: 003-A-0206-0003.SLDDRW		DRWG No.: 003-A-0206-0003	


REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

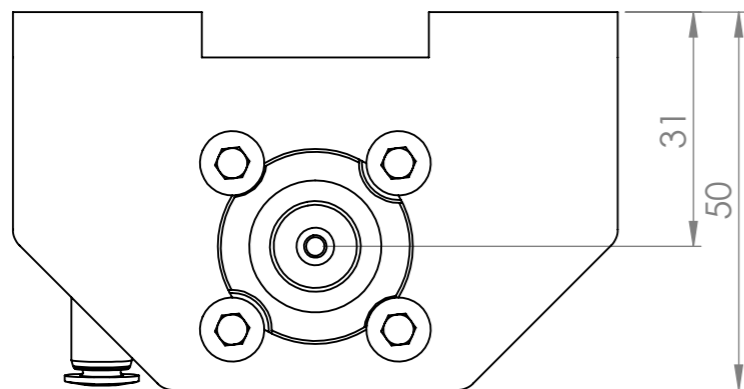
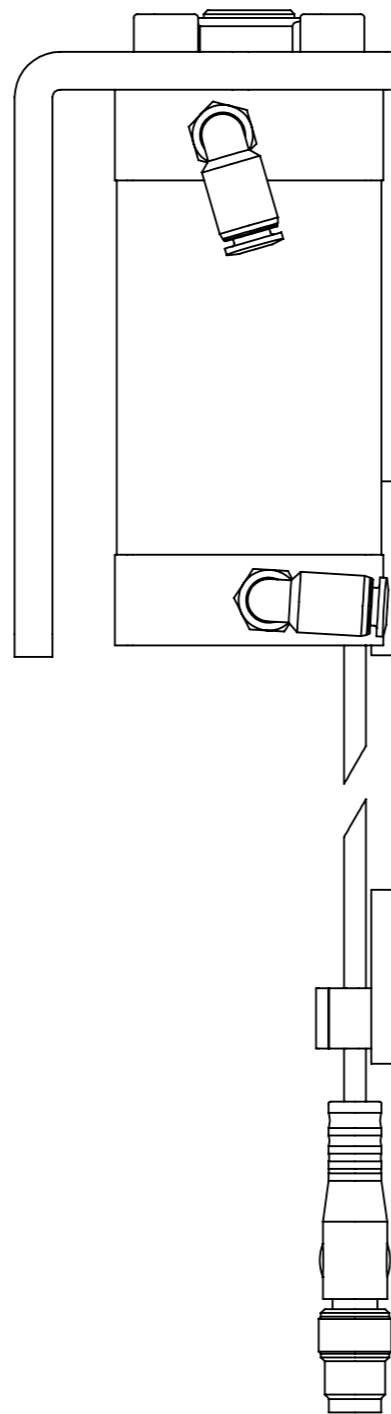
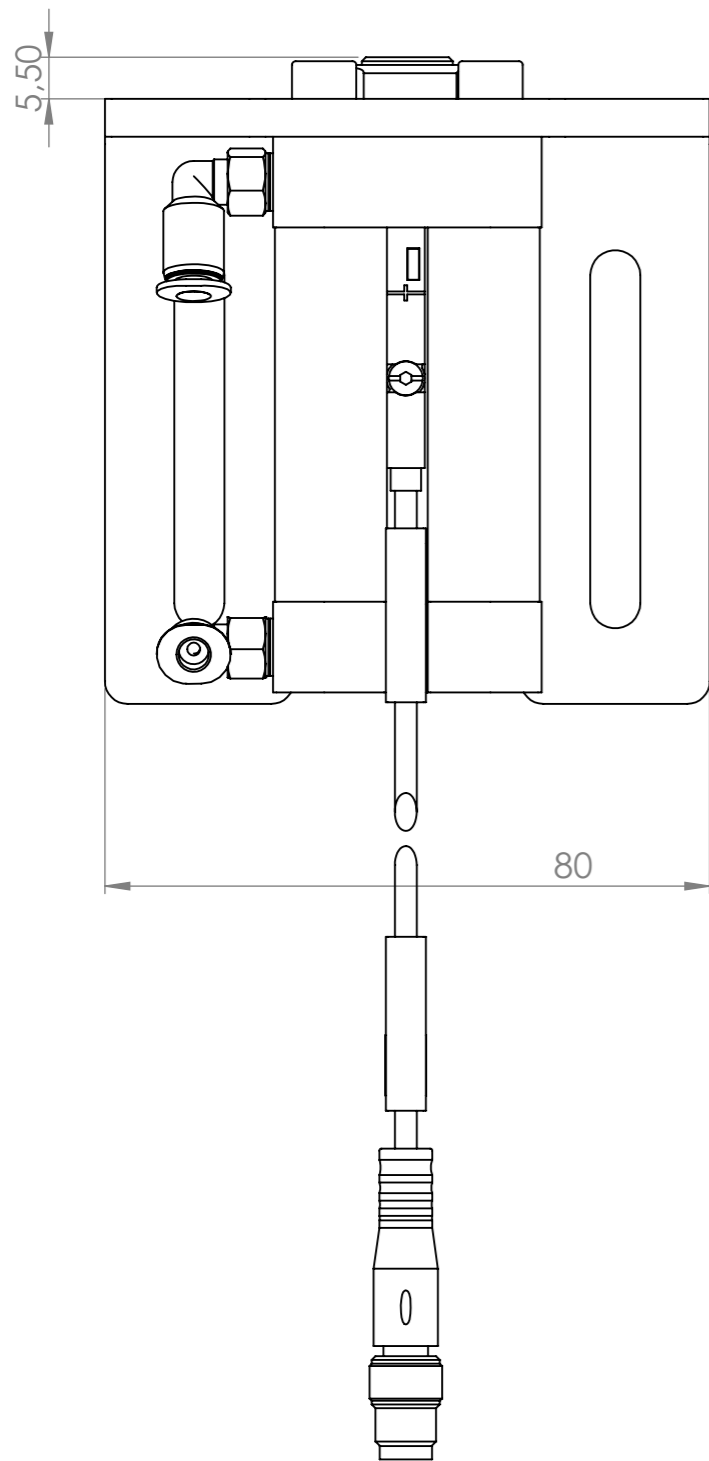


ITEM NO.	PartNo	DESCRIPTION	Vendor	QTY.
1	6144 SG-M10x1,25	ROD CLEVIS	FESTO	1
2	174404 SNCL-32	SWIVEL FLANGE	FESTO	1
3	174390 SNCB-32	SWIVEL FLANGE	FESTO	1
4	572659 ADN-32-30-A-PPS-A	COMPACT CYLINDER	FESTO	1
5	003-P-0217-0001	CYLINDER BOTTOM PLATE	VIDACO	1
6				2
7	543861	Proximity Sensor-SME-8M-DS-24V-K-0.3-M8D	FESTO	2

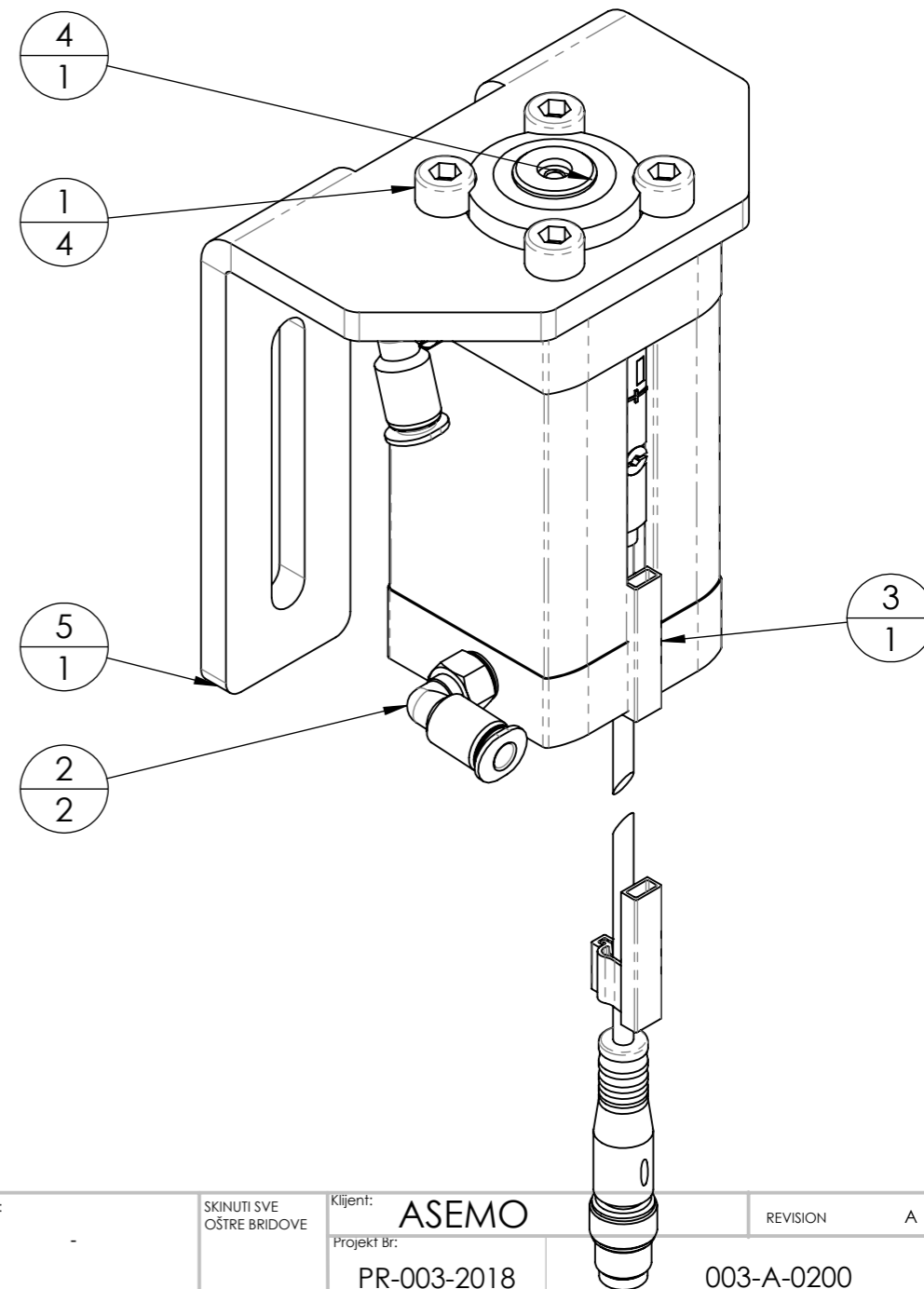


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent: ASEMO	REVISION: A
3	0			Projekt Br: PR-003-2018	
Crtao: M. Modrić	Potpis:	Datum: 23.9.2018.	FIRST ANGLE PROJECTION	TITLE: 003-A-0203 POPUP LIFTER	
Kontrol: D. SKRLEC				Nacrč Br: 003-A-0207-0001	
Odobr: D. SKRLEC				A3	
MFG:				MATERIAL: Material <not specified>	
Q.A:				CUSTOM: SEE BOM	
			MASA: 0.41 kg	MJERILO: 1:2	LIST 1 OD 1



ITEM NO.	PartNo	DESCRIPTION	Vendor	QTY.
1		Bolts & screws - SHCS M5x0.8x015 - STL 12.9 BO	-	4
2	153333 QSML-M5-4	CONNECTION QSML-M5-4	FESTO	2
3	543861	Proximity Sensor-SME-8M-DS-24V-K-0.3-M8D	FESTO	1
4	576086 DFSP-20-20-DF-PA	CYLINDER 576086 DFSP-20-20-DF-PA	FESTO	1
5	003-P-0225-0001	BRACKET	VIDACO	1

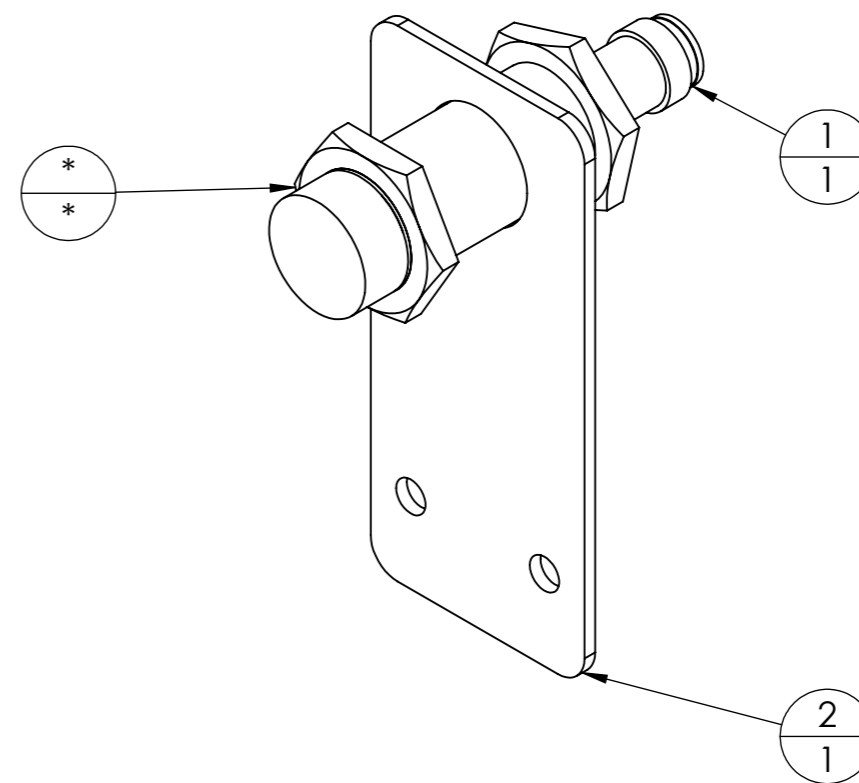
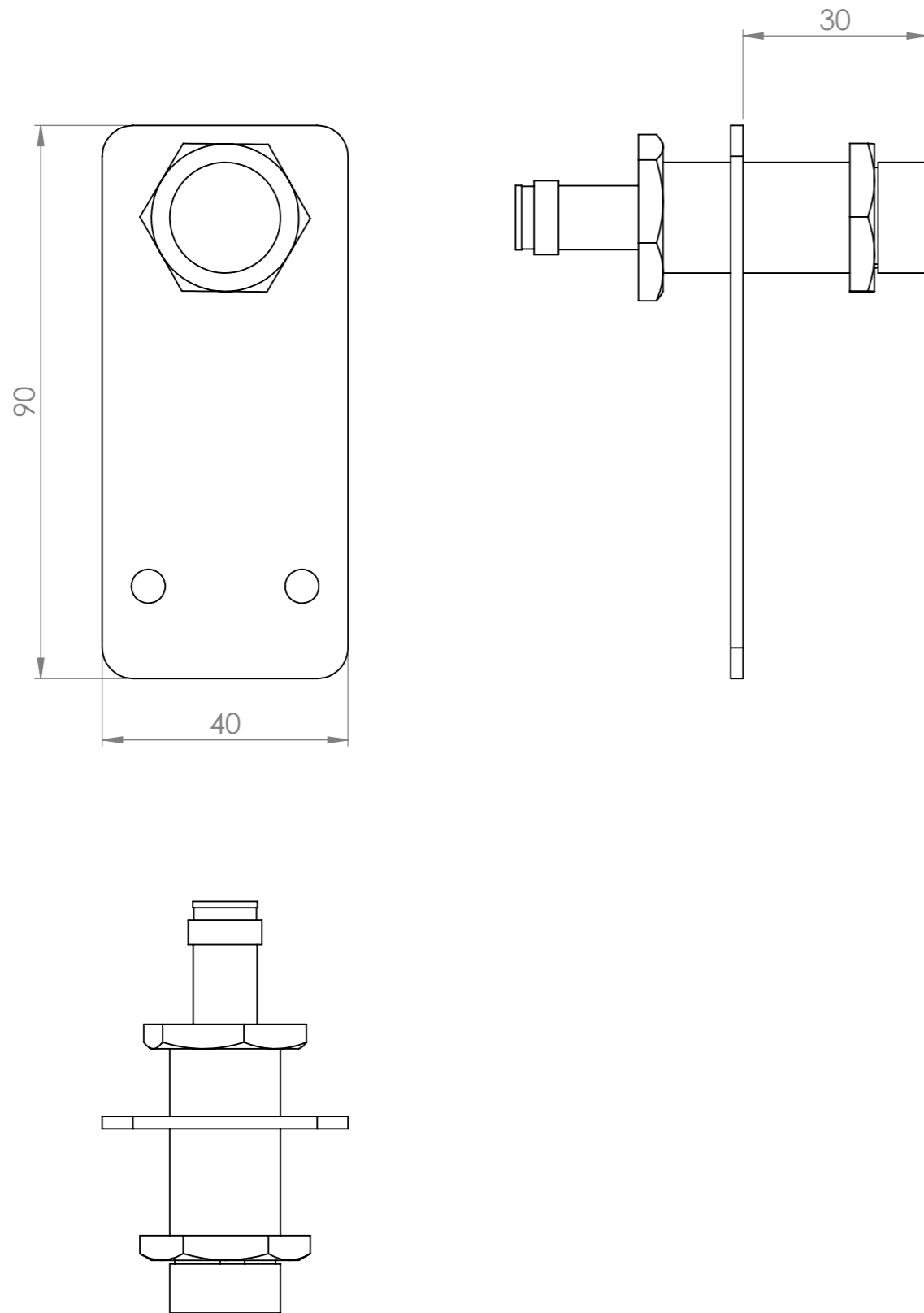


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1	0			Projekt Br:	PR-003-2018		003-A-0200
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION	TITLE:	003-A-0201 STOPER		
Crtao	M. Modrić	23.9.2018.		Nacrč Br.	003-A-0208-0001		
Kontrol.	D. SKRLEC			MATERIAL:	Material <not specified>		
Odobr.	D. SKRLEC			MATERIAL CUSTOM:	SEE BOM		
MFG				MASA:	0.33 kg		
Q.A				MJERILO:	1:1		
					LIST 1 OD 1		A3

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

ITEM NO.	PartNo	DESCRIPTION	Vendor	QTY.
1	E2B-M18KS08-M1-B1	SENSOR, PROXIMITY, M18, SHIELDED	OMRON	1
2	003-P-0226-0001	SENSOR BRACKET	VIDACO	1

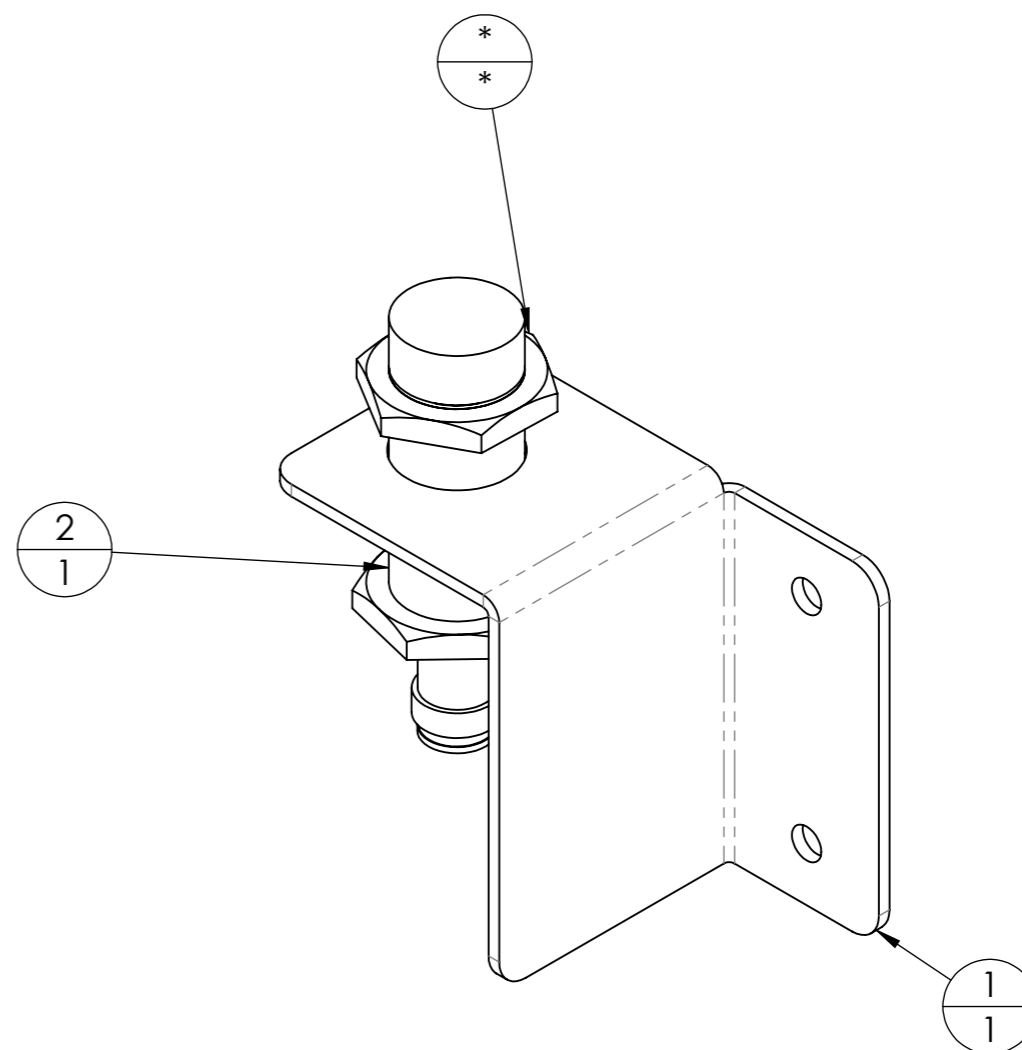
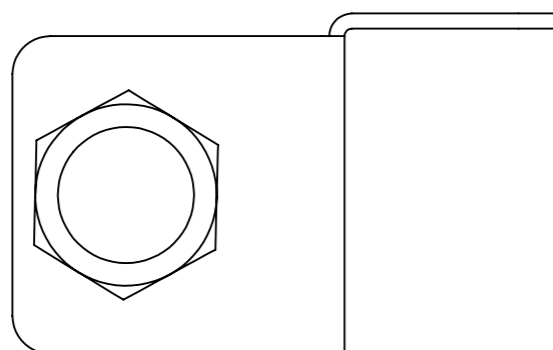
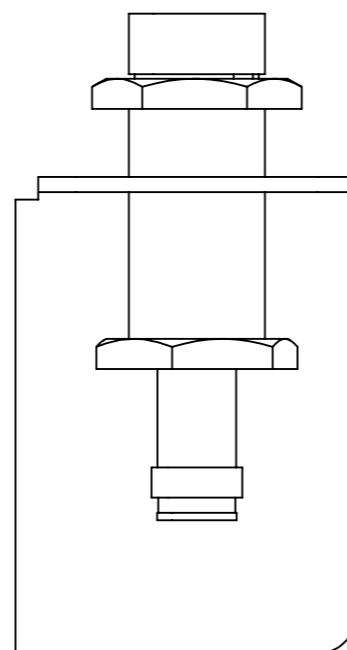
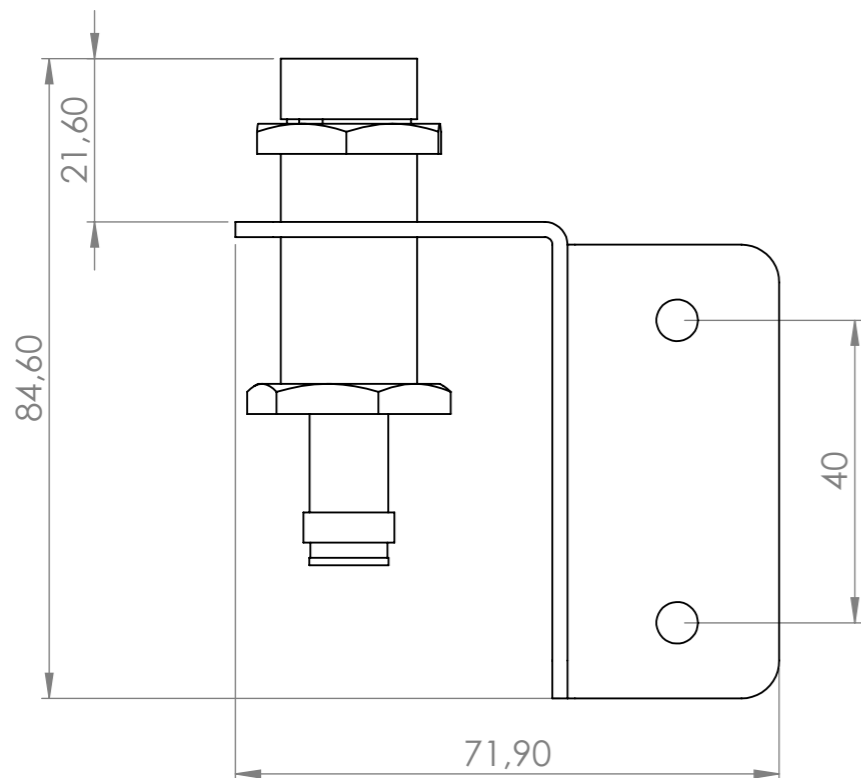


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9


Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1	0	-		Projekt Br:	PR-003-2018	003-A-0200	
Crtao	M. Modrić	Potpis	Datum	TITLE: 003-A-0201			
Kontrol.	D. SKRLEC		23.9.2018.	SENSOR INPUT BOX			
Odobr.	D. SKRLEC			Nacrč Br. 003-A-0209-0001			
MFG				A3			
Q.A				MATERIAL: Material <not specified>			
				MATERIAL: SEE BOM		MjERILO: 1:1	
				CUSTOM: MASA: 0.13 kg		LIST 1 OD 1	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

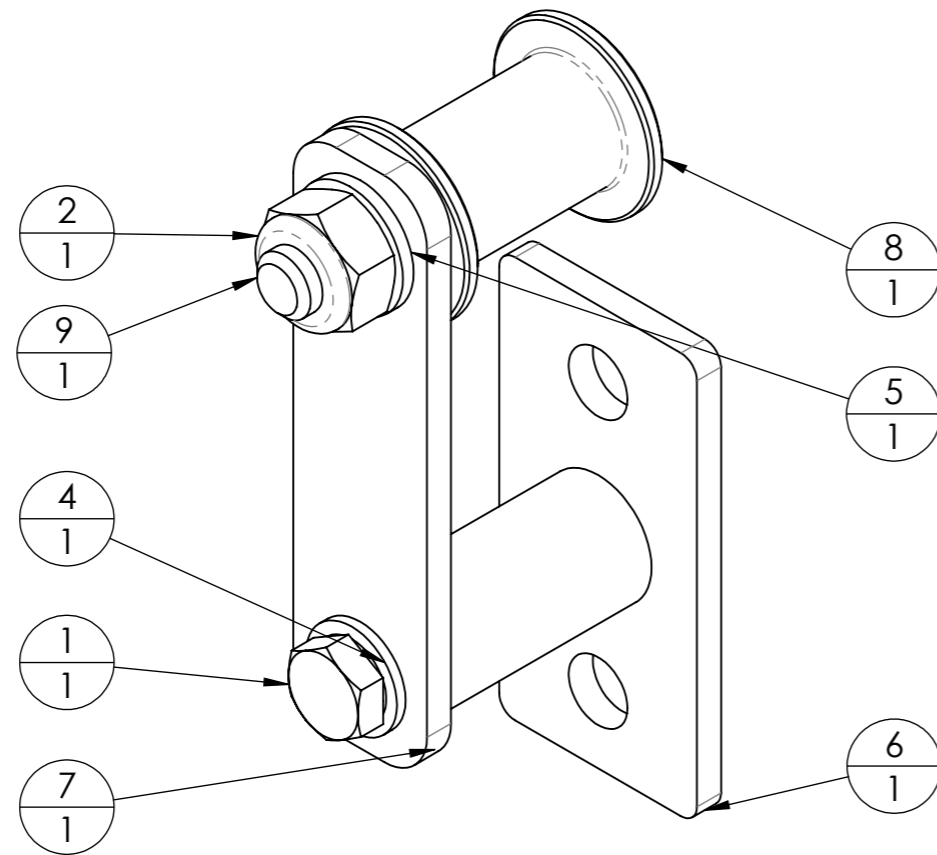
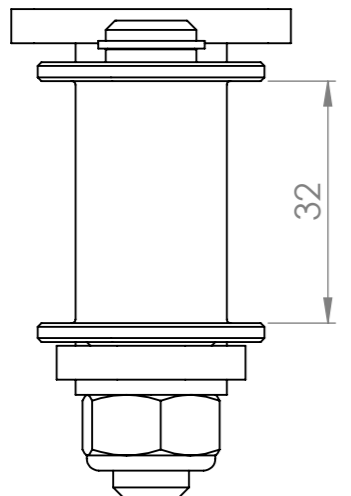
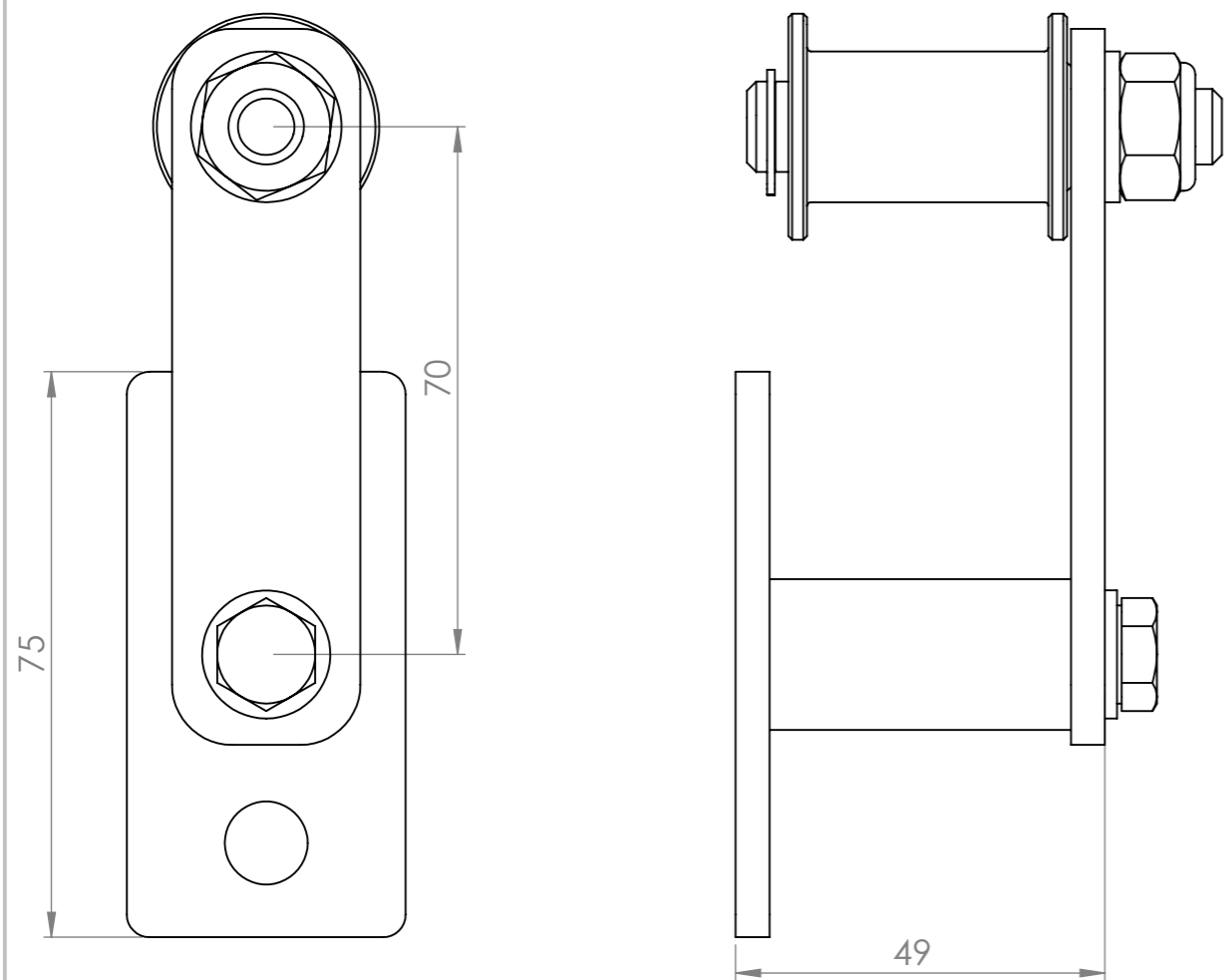
ITEM NO.	PartNo	DESCRIPTION	Vendor	QTY.
1	003-P-0227-0001	SENSOR BRACKET 2	VIDACO	1
2	E2B-M18KS08-M1-B1	SENSOR, PROXIMITY, M18, SHIELDED	OMRON	1



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent: ASEMO	REVISION A
1	0			Projekt Br: PR-003-2018	003-A-0200
Crtao	Ime i Prezime	Potpis	Datum	TITLE: 003-A-0201	
Kontrol.	M. Modrić		23.9.2018.	BOX SENSOR	
Odobr.	D. SKRLEC			Nacrč Br. 003-A-0210-0001	
MFG	D. SKRLEC			A3	
Q.A				MATERIAL: Material <not specified>	MJERILO: 1:1
			MATERIAL: SEE BOM	LIST 1 OD 1	
			MASSA: 0.17 kg	FILE: 003-A-0210-0001.SLDDRW	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

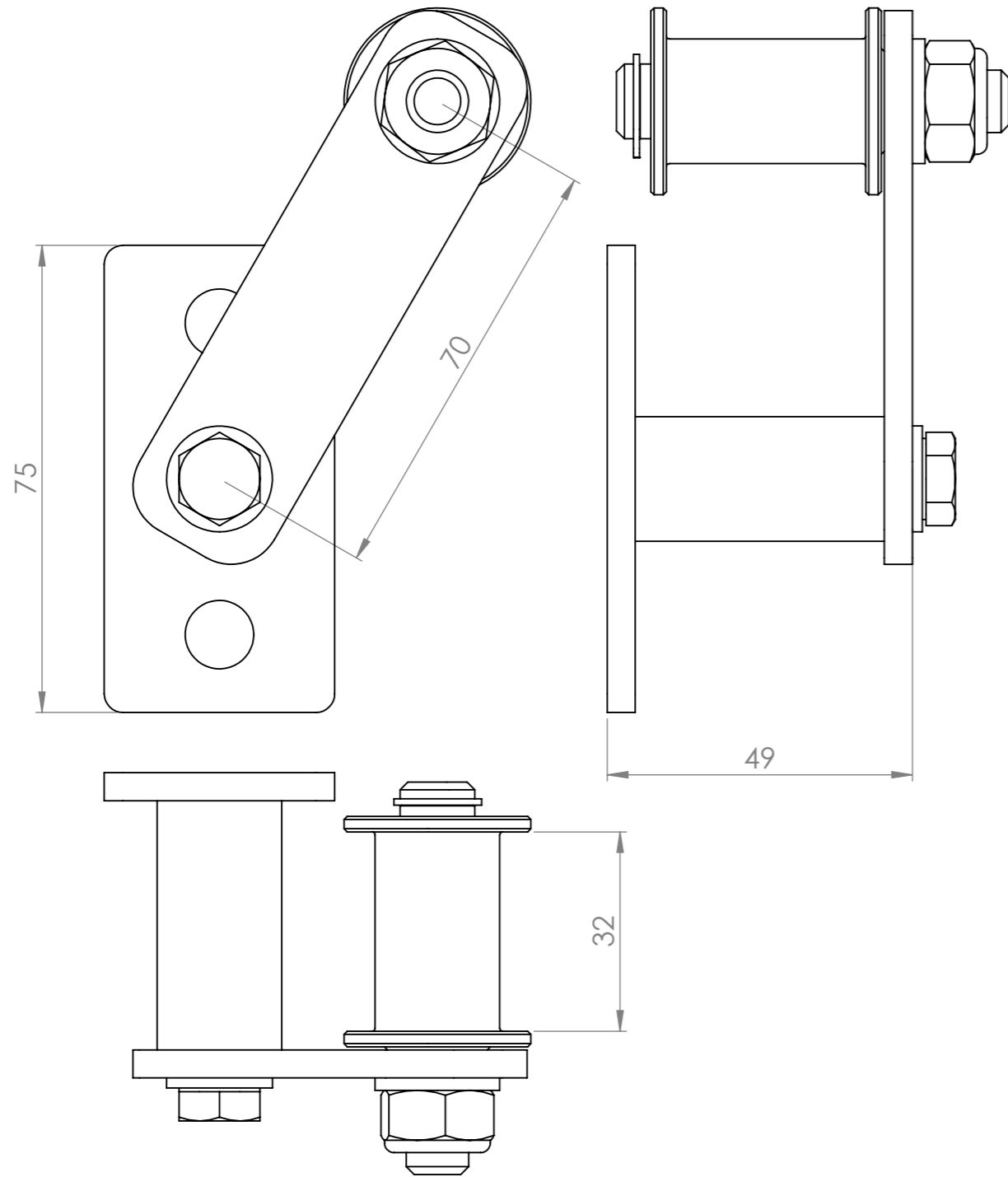


ITEM NO.	PartNo	DESCRIPTION	Vendor	0001/QTY.
1		Bolts & screws - HHCS M8x1.25x020 - STL 8.8 ZN - FULL THREAD*	-	1
2	AX00000 ISO NUT	Nuts - NUT NYLON - M10x1.5 - STL 8 ZN	-	1
3	EXTCIRCLIPS DIN 471	Retaining rings	-	1
4	ISO WASHER_M10_OVER SISED	Washers - FLAT WASHER M08 - STL 8.8 ZN*	FENDER WASHER	1
5	ISO WASHER_M10_OVER SISED	Washers - FLAT WASHER M10 - STL 8.8 ZN*	FENDER WASHER	1
6	YSA-15	BELT TENSIONER	MISUMI	1
7	YSA-15	BELT TENSIONER	MISUMI	1
8	003-P-0205-0002	PULEY	VIDACO	1
9	003-P-0230-0001	SHAFT	VIDACO	1

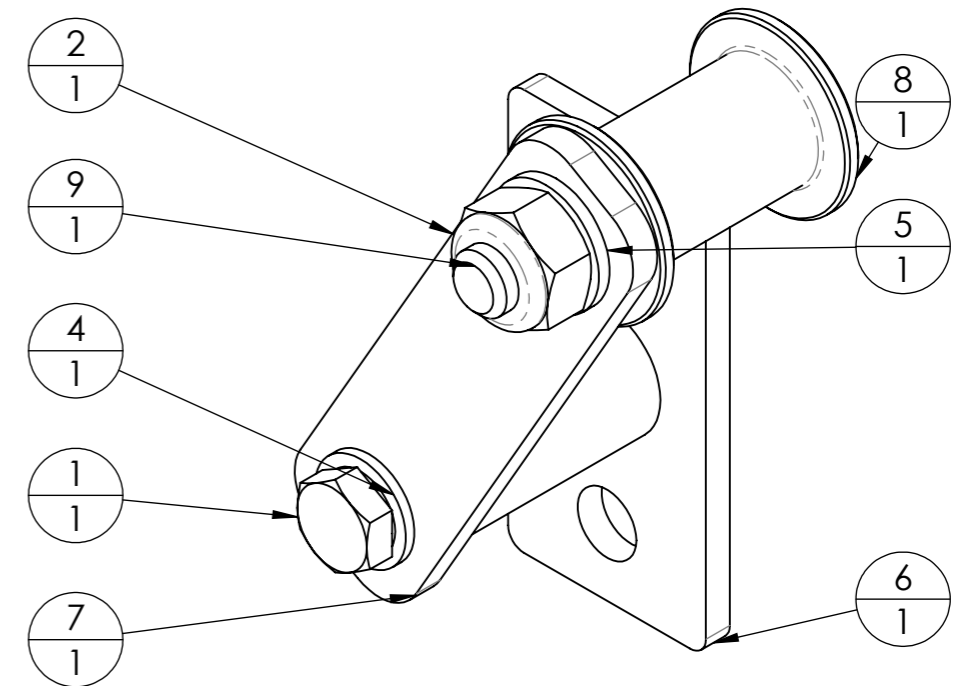
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent: ASEMO	REVISION: A
2	2			Projekt Br: PR-003-2018	003-A-0203
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION	TITLE: 003-A-0203 TENSIONER	
Crtao: M. Modrić		23.9.2018.		Nacrtni Br: 003-A-0211-0001	
Kontrol.: D. SKRLEC				A3	
Odobr.: D. SKRLEC				MATERIAL: Material <not specified>	
MFG:				CUSTOM: SEE BOM	
Q.A:				MASA: 0.28 kg	MJERILO: 1:1
			LIST 1 OD 1		

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED



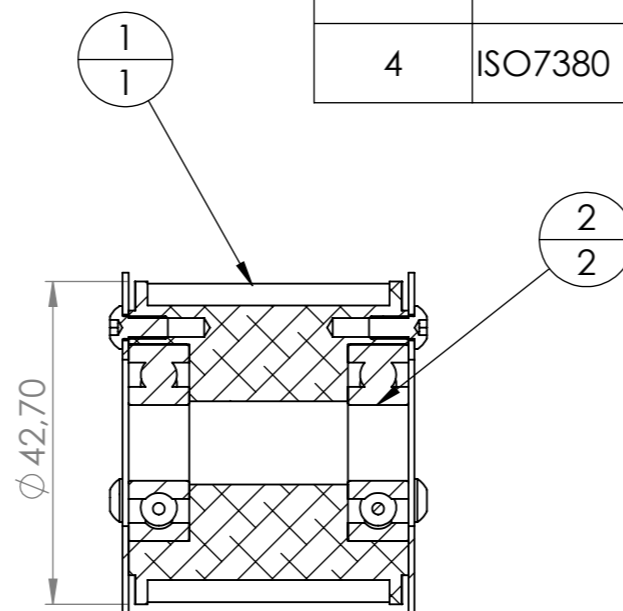
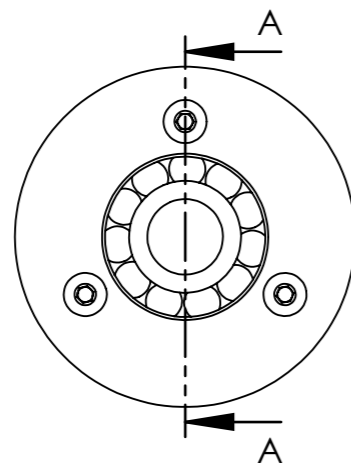
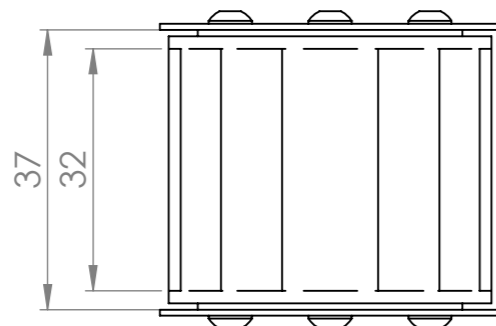
ITEM NO.	PartNo	DESCRIPTION	Vendor	0002/QTY.
1		Bolts & screws - HHCS M8x1.25x020 - STL 8.8 ZN - FULL THREAD*	-	1
2	AX00000 ISO NUT	Nuts - NUT NYLON - M10x1.5 - STL 8 ZN	-	1
3	EXTCIRCLIPS DIN 471	Retaining rings	-	1
4	ISO WASHER_M10_OVERSIZED	Washers - FLAT WASHER M08 - STL 8.8 ZN*	FENDER WASHER	1
5	ISO WASHER_M10_OVERSIZED	Washers - FLAT WASHER M10 - STL 8.8 ZN*	FENDER WASHER	1
6	YSA-15	BELT TENSIONER	MISUMI	1
7	YSA-15	BELT TENSIONER	MISUMI	1
8	003-P-0205-0002	PULEY	VIDACO	1
9	003-P-0230-0001	SHAFT	VIDACO	1



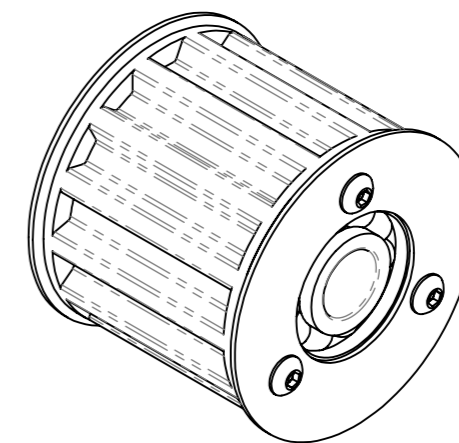
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1	1			Projekt Br:	PR-003-2018	003-A-0203	
Crtao	M. Modrić	Potpis	Datum	TITLE: 003-A-0203 TENSIONER			
Kontrol.	D. SKRLEC		23.9.2018.	MATERIAL: Material <not specified>			
Odobr.	D. SKRLEC			CUSTOM: SEE BOM			
MFG				Nacrč Br. 003-A-0211-0002			
Q.A				MASA: 0.28 kg			
				Mjerilo: 1:1			
				LIST 1 OD 1			

ITEM NO.	PartNo	DESCRIPTION	Vendor	0001/QTY.
1	TPPA14T10300-A-Y10-Q26-R26-S8-T8	IDLER PULEY	SET	1
2	DIN 625 - 6000	BEARING DIN 625 - 6000	SKF	2
3	003-P-0231-0001	SHIM	VIDAC O	2
4	ISO7380 10,9 - BHCS M3x6	Bolts & screws - BHCS M3x0.5x006 - STL 8.8 ZN		6



SECTION A-A



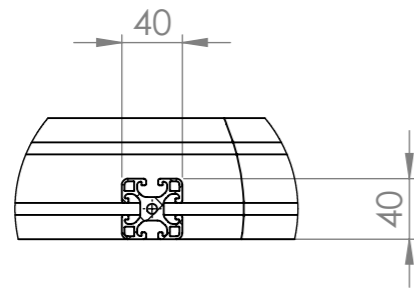
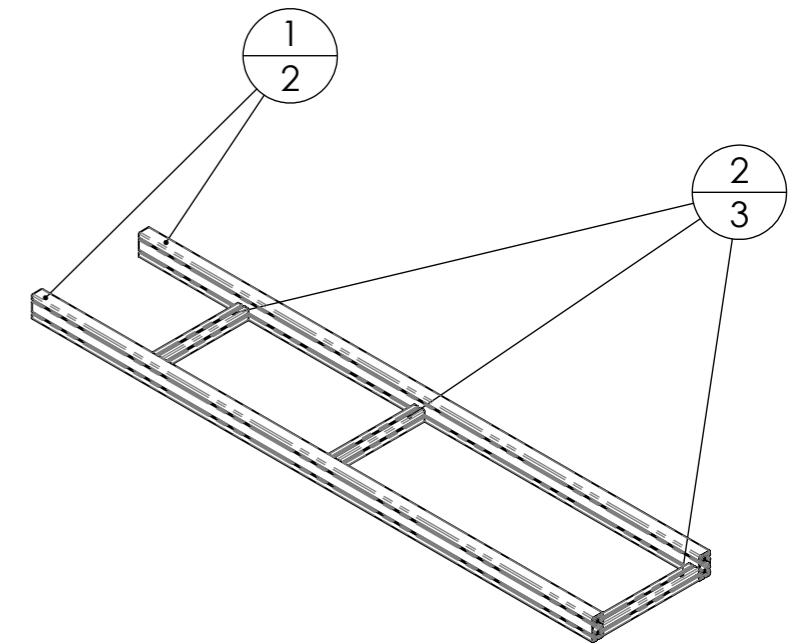
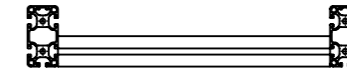
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADJE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent: ASEMO	REVISION: A
24	0			Projekt Br: PR-003-2018	003-A-0200
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION 	TITLE: 003-A-0205	
Crtao: M. Modrić		23.9.2018.		TIMING PULLEY IDLER	
Kontrol.: D. SKRLEC				Nacrtn Br. 003-A-0212-0001	
Odobr.: D. SKRLEC				A3	
MFG			MATERIAL: Material <not specified>		
Q.A			MATERIAL: SEE BOM		
			MASSA: 116.10 kg	MJERILO: 1:1	LIST 1 OD 1

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT+MACHINING

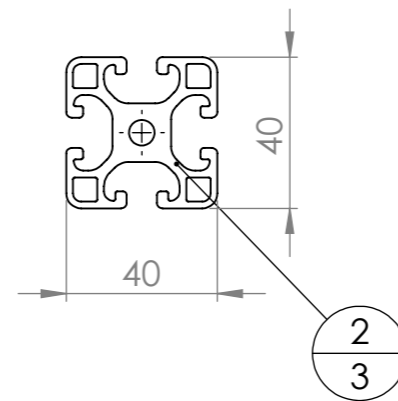
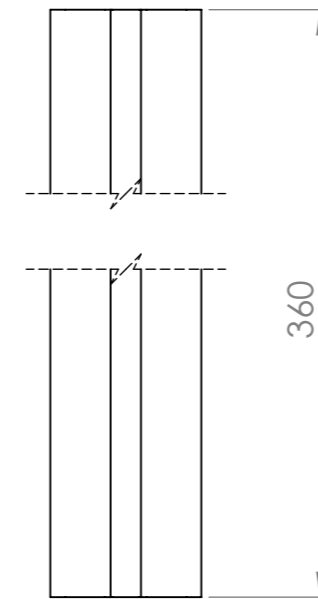
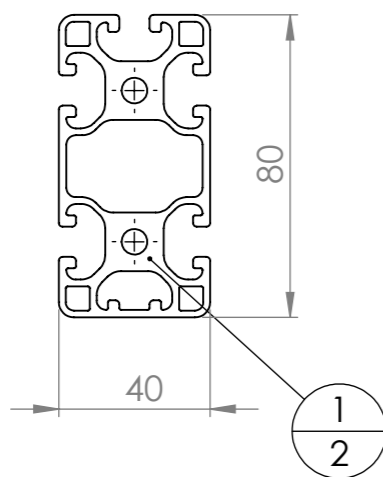
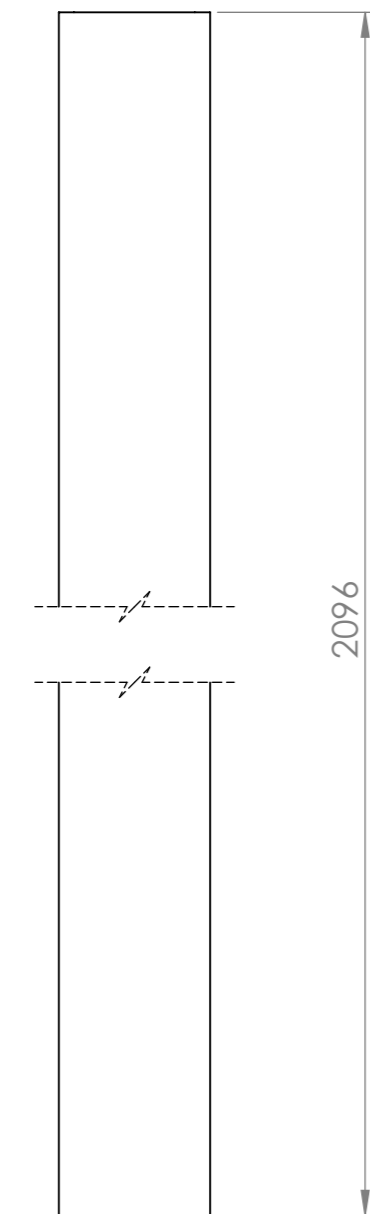
ITEM NO.	QTY.	Description	LENGTH	Material
1	2	Item al profili 0_0_607_75_PROFILE_8_80X40_1N_LIGHT_NATURAL	2096	6061 Alloy
2	3	Item al profili PROFIL 40X40 LEICHT	360	6061 Alloy



DETAIL A
SCALE 1 : 5

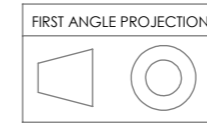
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	Asemo/TDK	REVISION	A
1	0	-	-	Projekt Br:	PR-003-2018	-	-
Crtao	Ime i Prezime	Potpis	Datum	TITLE: 003-A-0201			
Kontrol.	M. Modrić		23.9.2018.	CONVEYOR FRAME 0001			
Odobr.	D. Skrlec			Nacrč Br. 003-P-0201-0001			
MFG	D. Skrlec			A3			
Q.A				MATERIAL:	6061 Alloy	MJEILO: 1:10	
				MATERIAL CUSTOM:	ITEM PROFIL	LIST 1 OD 2	
				MAŠA: 14.72 kg		FILE: 003-P-0201-0001.SLDDRW	



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

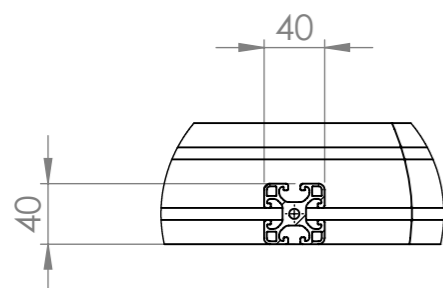
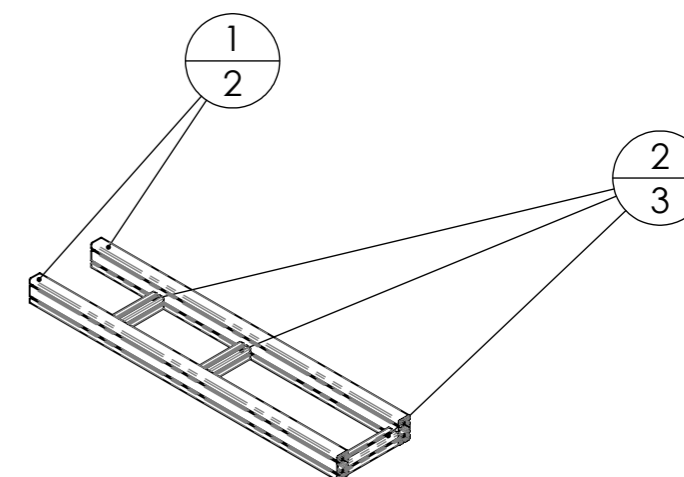
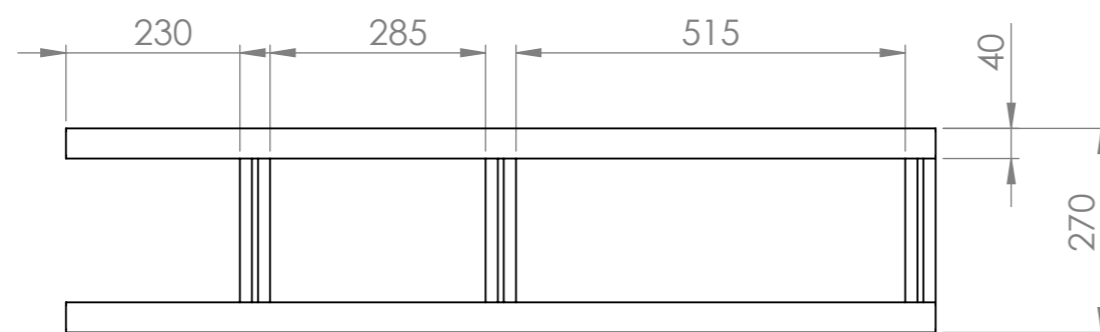
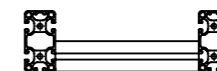
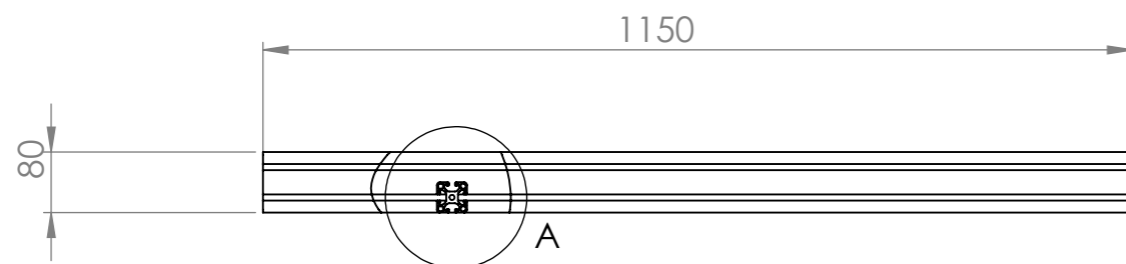
Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	Asemo/TKD	REVISION	A
1	0	-	-	Projekt Br:	PR-003-2018	-	
Crtao	Ime i Prezime	Potpis	Datum	TITLE: 003-A-0201			
Kontrol.	M. Modrić		23.9.2018.	CONVEYOR FRAME 0001			
Odobr.	D. Skrlec			Nacrč Br. 003-P-0201-0001			
MFG	D. Skrlec			A3			
Q.A				MATERIAL:	6061 Alloy	MJEILO: 1:2	
				MATERIAL:	ITEM PROFIL	LIST 2 OD 2	
				MASA:	14.72 kg	FILE: 003-P-0201-0001.SLDDRW	



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

ITEM NO.	DESCRIPTION	LENGTH	QTY.
1	Item al profili 0_0_607_75_PROFILE_8_80X40_1N_LIGHT_NATURAL	1150	2
2	Item al profili PROFIL 40X40 LEICHT	190	3

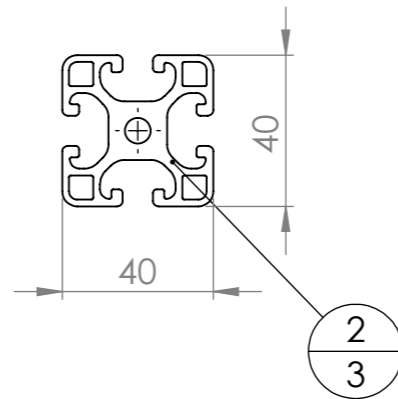
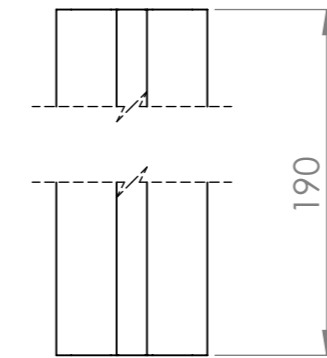
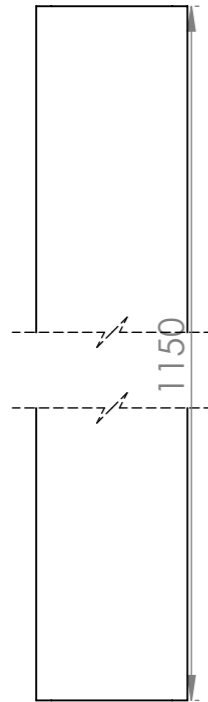
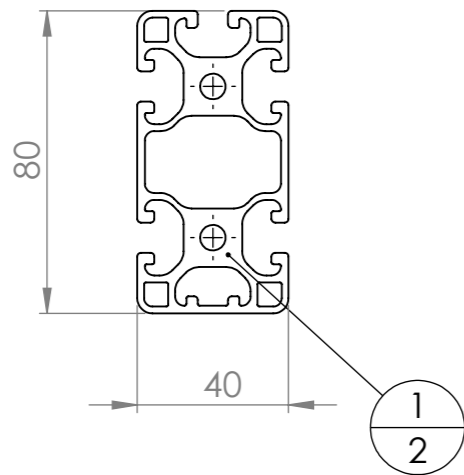
LASER CUT+MACHINING




DETAIL A
SCALE 1 : 5

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1	0	-	-	Asemo/TDK	A
Crtao: M. Modrić Kontrol.: D. Skrlec Odobr.: D. Skrlec MFG: Q.A:				Projekt Br:	TITLE:
Datum: 23.9.2018.				PR-003-2018	003-A-0203-0002
FIRST ANGLE PROJECTION				CONVEYOR FRAME 0002	
MATERIAL: 6061 Alloy MATERIAL CUSTOM: ITEM PROFIL MASA: 8.03 kg				Nacrč Br.	A3
ASEMO AUTOMATIZACIJA / RAČUNALNIŠTVO / ELEKTRONIKA				003-P-0201-0002	
				MJERILO: 1:10	LIST 1 OD 2

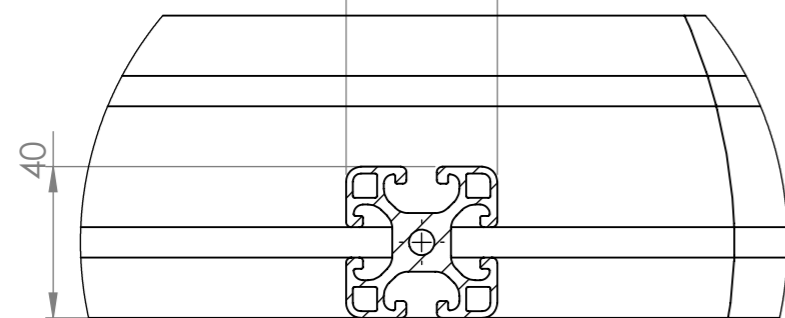
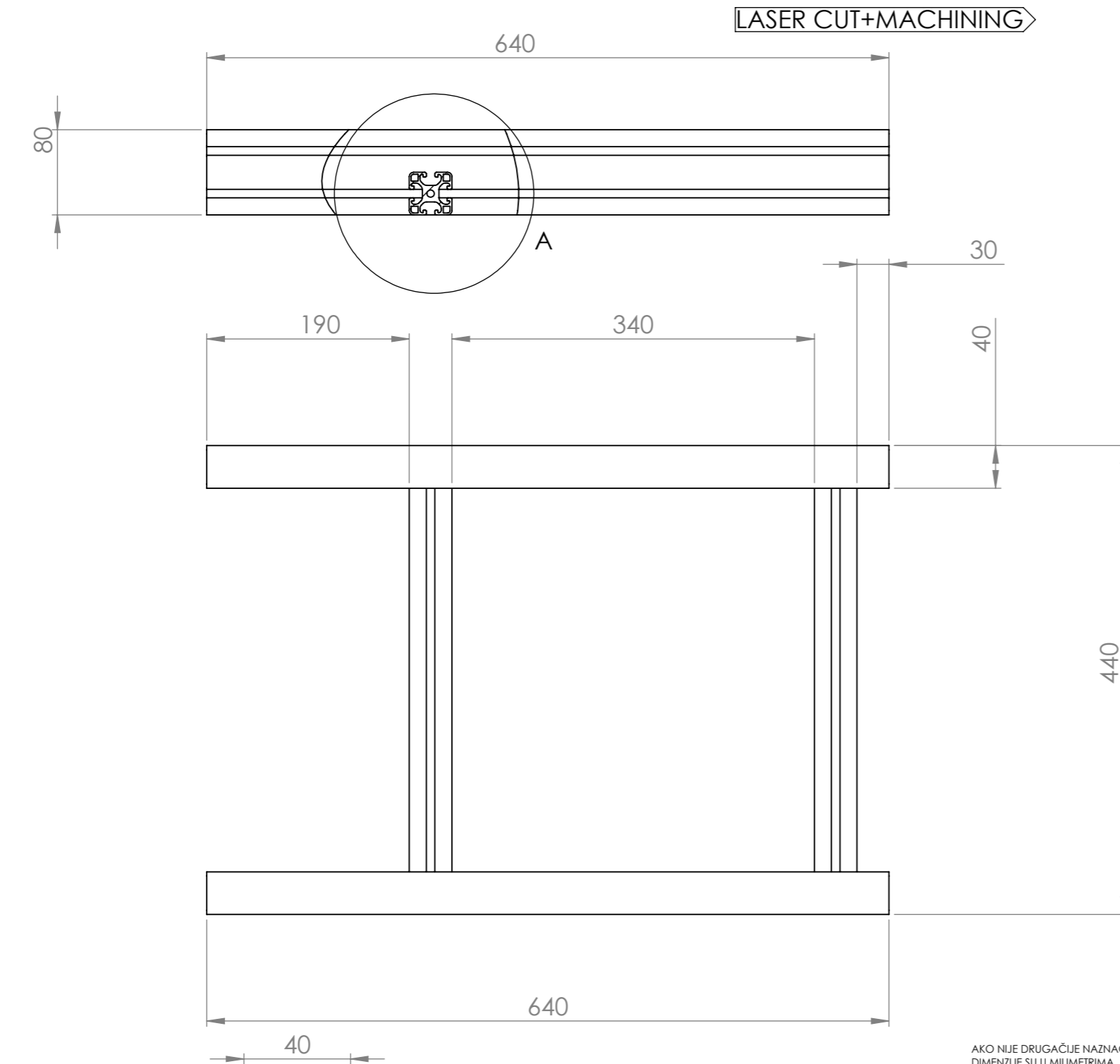


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	Asemo/TDK	REVISION	A
1	0	-	-	Projekt Br:	PR-003-2018	-	
Crtao	M. Modrić	Potpis	Datum	TITLE: 003-A-0203-0002			
Kontrol.	D. Skrllec		23.9.2018.	CONVEYOR FRAME 0002			
Odobr.	D. Skrllec			Nacrč Br. 003-P-0201-0002			
MFG				A3			
Q.A				MATERIAL: 6061 Alloy			
				MATERIAL CUSTOM: ITEM PROFIL			
				MASA: 8.03 kg			
				Mjerilo: 1:2		LIST 2 OD 2	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

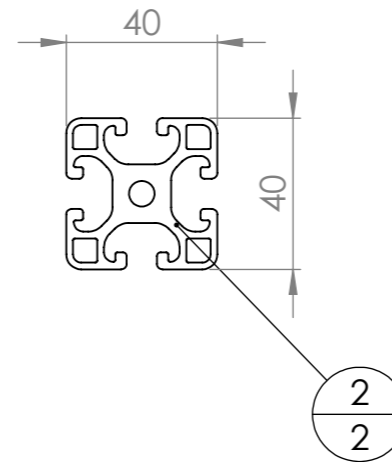
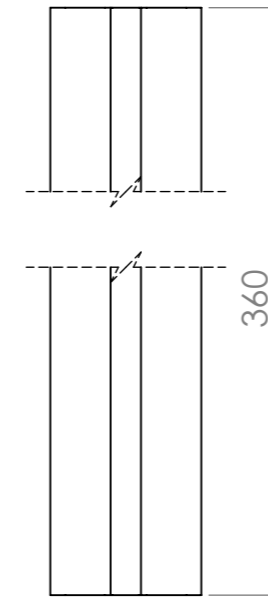
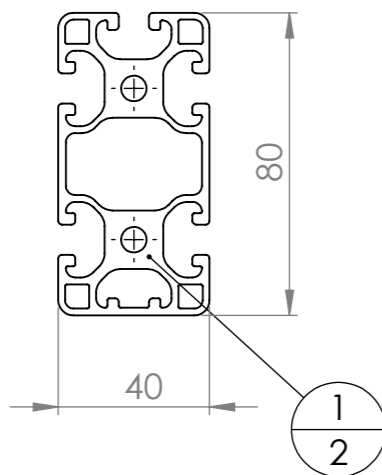
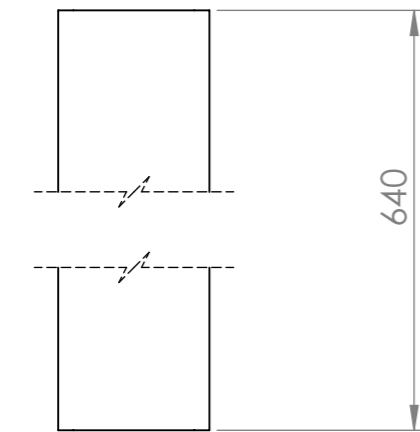
ITEM NO.	DESCRIPTION	LENGTH	QTY.
1	Item al profili 0_0_607_75_PROFILE_8_80X40_1N_LIGHT_NATURAL	640	2
2	Item al profili PROFIL 40X40 LEICHT	360	2



DETAIL A
SCALE 1 : 2

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	Asemo/TDK	REVISION	A
1	0	-	-	Projekt Br:	PR-003-2018	-	-
Crtao	Ime i Prezime	Potpis	Datum	TITLE:			
Kontrol.	M. Modrić		23.9.2018.	003-A-0203-0003			
Odobr.	D. Skrlec			CONVEYOR FRAME 0003			
MFG				Nacrč Br.			
Q.A				003-P-0201-0003			
MATERIAL:			6061 Alloy	A3			
MATERIAL CUSTOM:			ITEM PROFIL	MJEILO: 1:5			
MASA: 5.19 kg				LIST 1 OD 2			

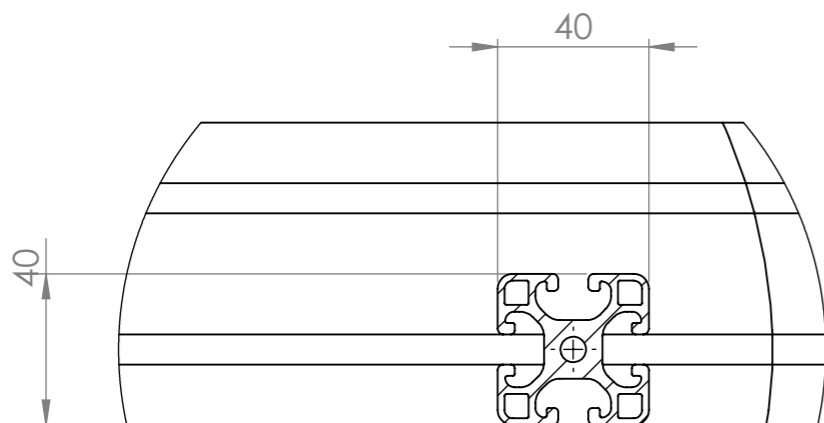
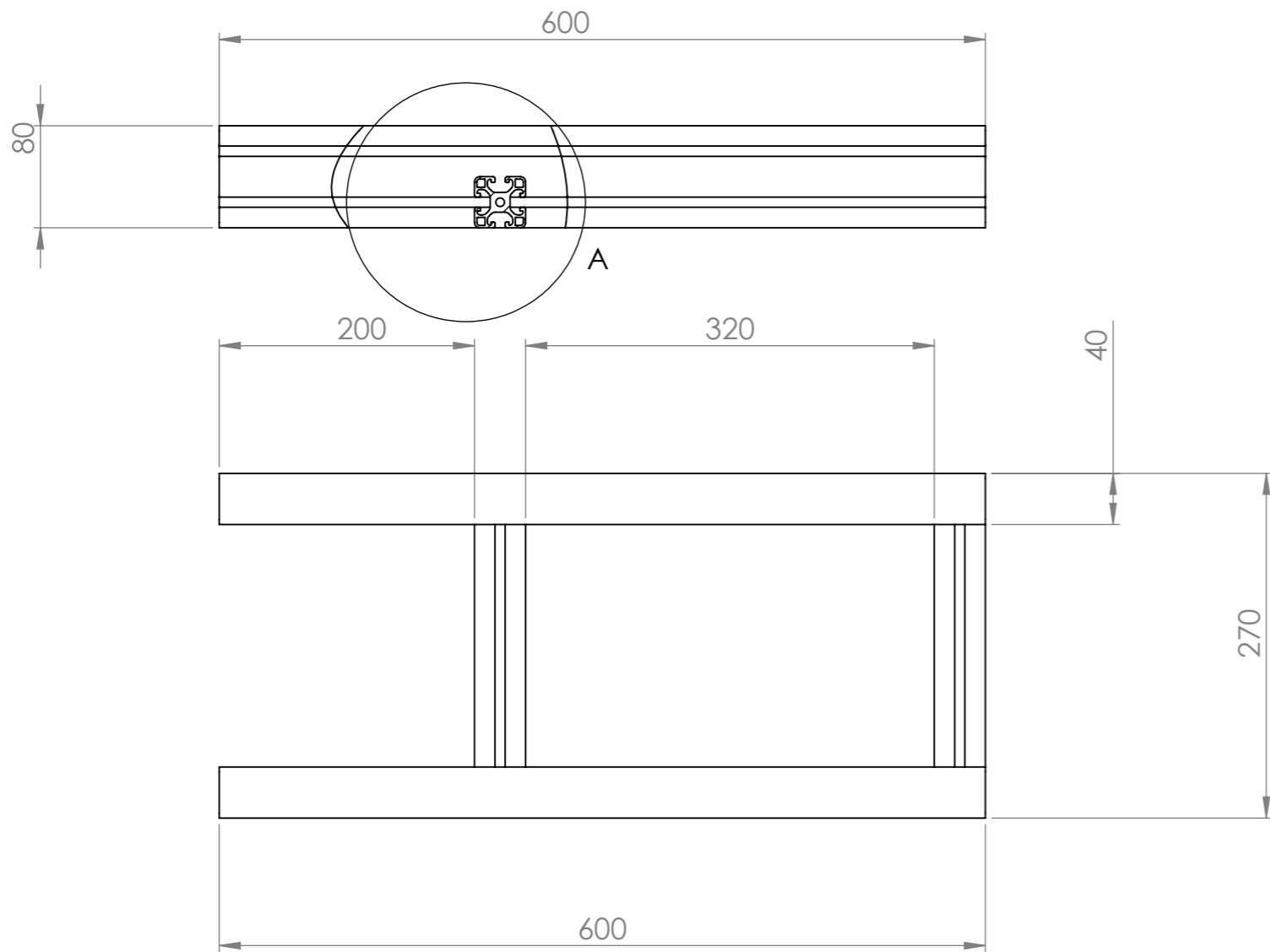


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	Asemo/TDK	REVISION	A
1	0	-	-	Projekt Br:	PR-003-2018	-	
Crtao	M. Modrić	Potpis	Datum	TITLE: 003-A-0203-0003			
Kontrol.	D. Skrlec		23.9.2018.	CONVEYOR FRAME 0003			
Odobr.	D. Skrlec			Nacrč Br. 003-P-0201-0003			
MFG				A3			
Q.A				MATERIAL: 6061 Alloy			
				MATERIAL CUSTOM: ITEM PROFIL			
				MASA: 5.19 kg			
				Mjerilo: 1:2		LIST 2 OD 2	

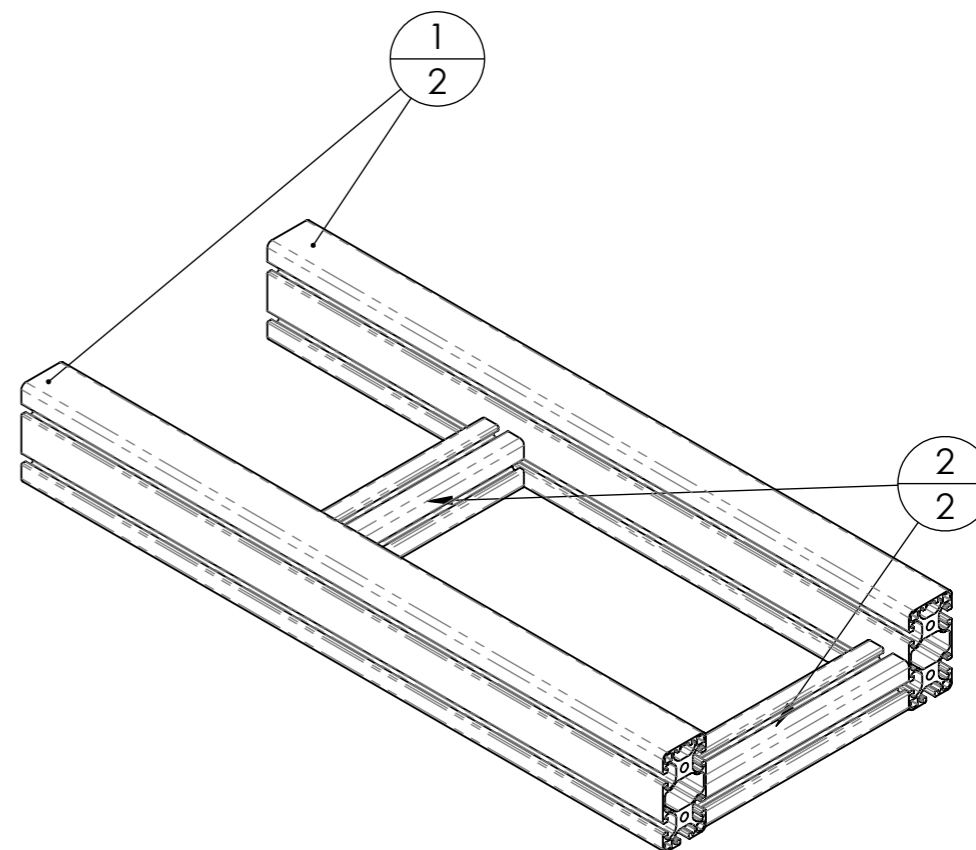
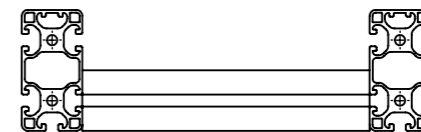
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

ITEM NO.	DESCRIPTION	LENGTH	QTY.
1	Item al profili 0_0_607_75_PROFILE_8_80X40_1N_LIGHT_NATURAL	600	2
2	Item al profili PROFIL 40X40 LEICHT	190	2



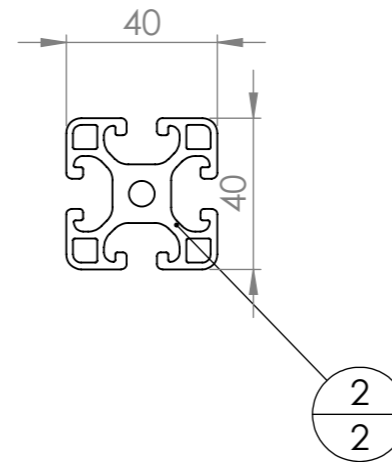
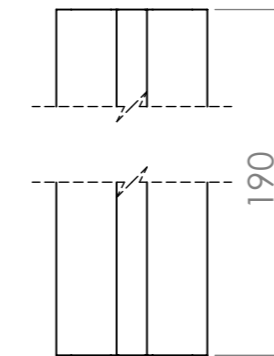
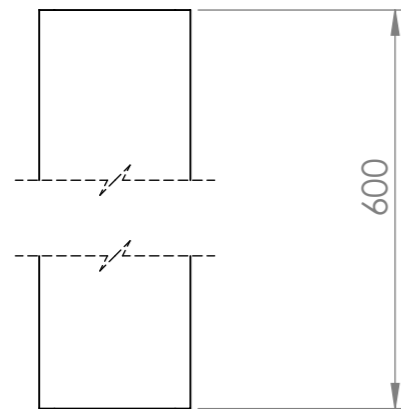
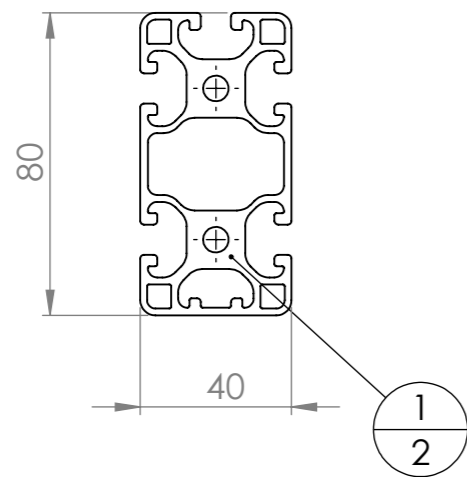
DETAIL A
SCALE 1 : 2

LASER CUT+MACHINING



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	Asemo/TKD	REVISION	A
1	0	-	-	Projekt Br:	PR-003-2018	-	
Crtao	M. Modrić	Potpis	Datum	TITLE: 003-A-0203-0004			
Kontrol.	D. Skrlec		23.9.2018.	CONVEYOR FRAME 0004			
Odobr.	D. Skrlec			MATERIAL: 6061 Alloy			
MFG				MATERIAL CUSTOM: ITEM PROFIL			
Q.A				Nacrč Br. 003-P-0201-0004			
				MASA: 1.11 kg		Mjerilo: 1:5	
				LIST 1 OD 2		A3	

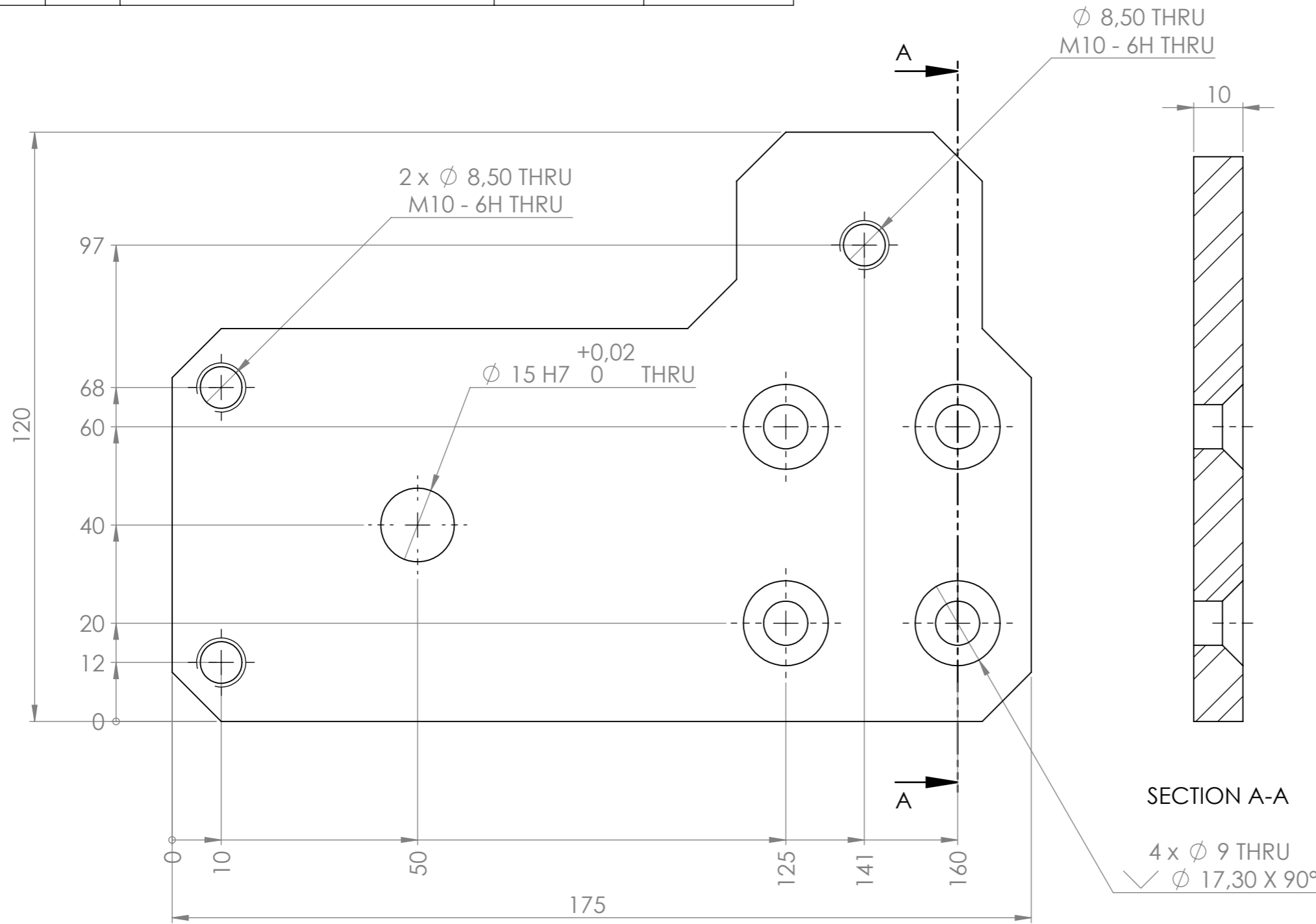


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	Asemo/TDK	REVISION	A
1	0	-	-	Projekt Br:	PR-003-2018	-	
Crtao	M. Modrić	Potpis	Datum	TITLE: 003-A-0203-0004			
Kontrol.	D. Skrlec		23.9.2018.	CONVEYOR FRAME 0004			
Odobr.	D. Skrlec			Nacrt Br. 003-P-0201-0004			
MFG				A3			
Q.A				MATERIAL: 6061 Alloy			
				MATERIAL CUSTOM: ITEM PROFIL			
				MASA: 1.11 kg			
				Mjerilo: 1:2		LIST 2 OD 2	

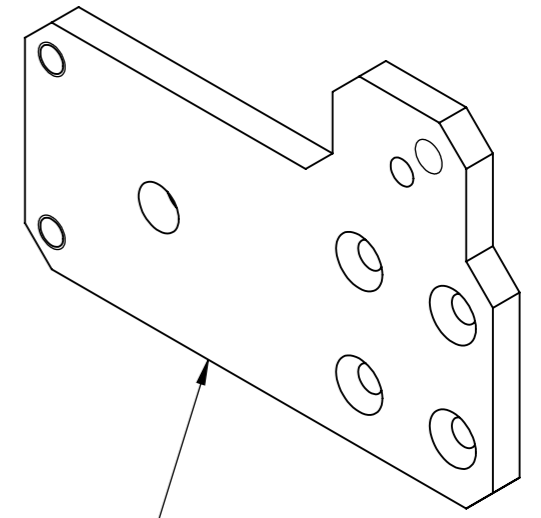
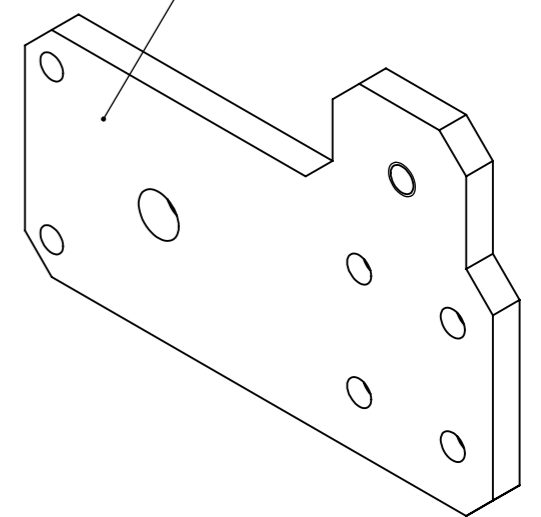
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT+MACHINING



CUT PERIMETER : 862mm

003-P-0202M-0001



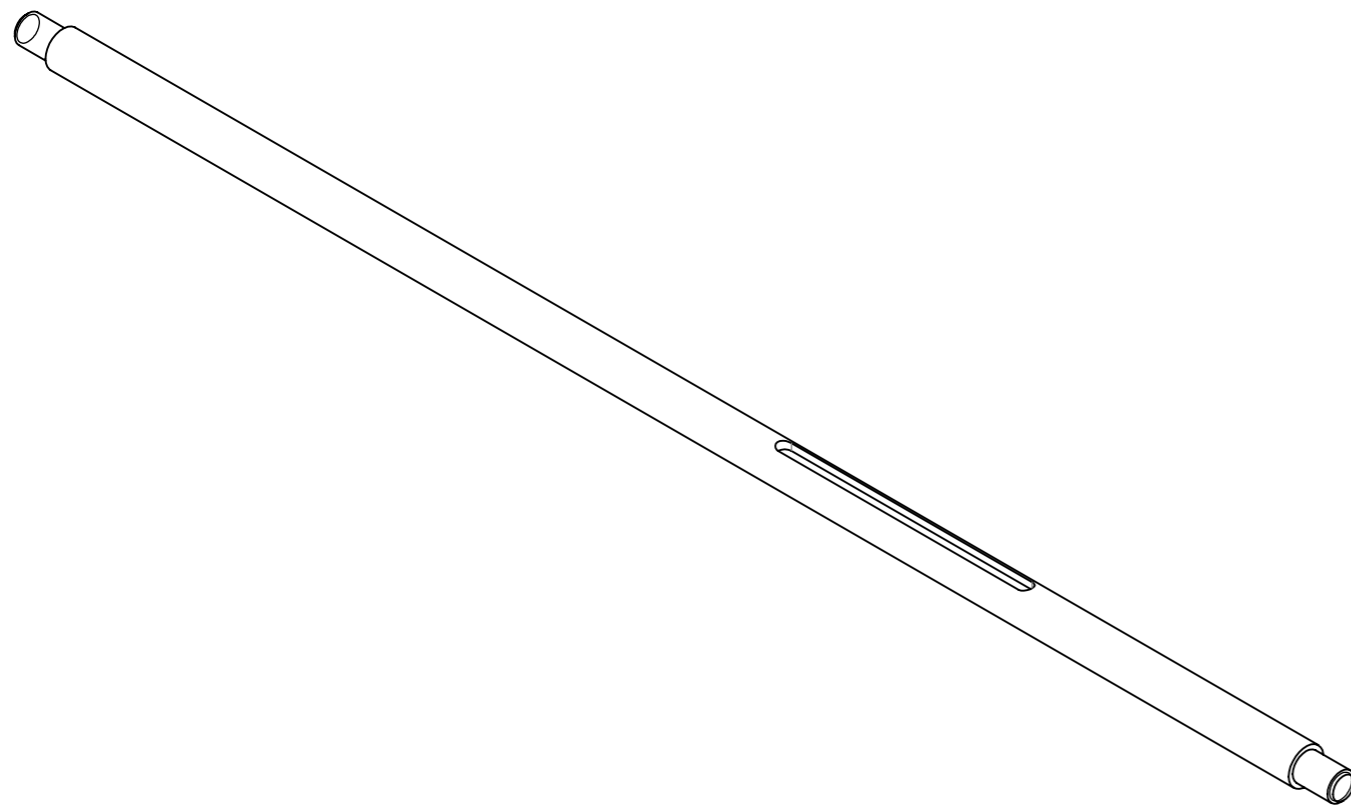
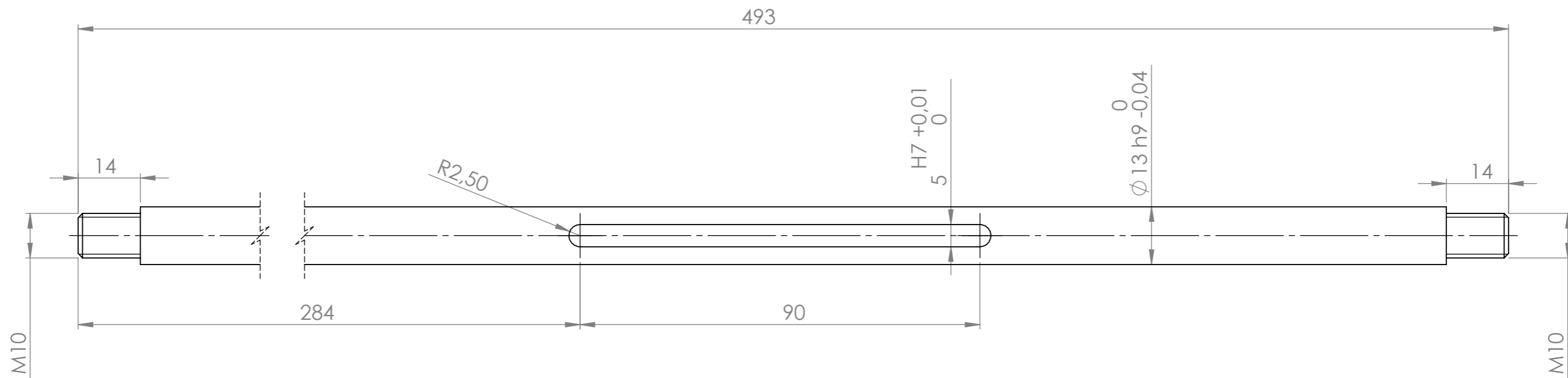
003-P-0202-0001

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
3	3	BOJANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0200
			FIRST ANGLE PROJECTION 	TITLE:	
Crtao	Ime i Prezime	Potpis		003-A-0203-0003	
Kontrol.	M. Modrić	Datum		MOTOR FLANGE	
Odobr.	D.ŠKRLEC	23.9.2018.			
MFG	D.ŠKRLEC			Nacrč Br.	
Q.A				003-P-0202-0001	
			MATERIAL:	A3	
			MATERIAL:	Plain Carbon Steel	
			MATERIAL:	CUSTOM:	
			MATERIAL:	Č 0361	
			MATERIAL:	MASA: 1.17 kg	
			MATERIAL:	MJEŘILO: 1:1	
			MATERIAL:	LIST 1 OD 1	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

MACHINING



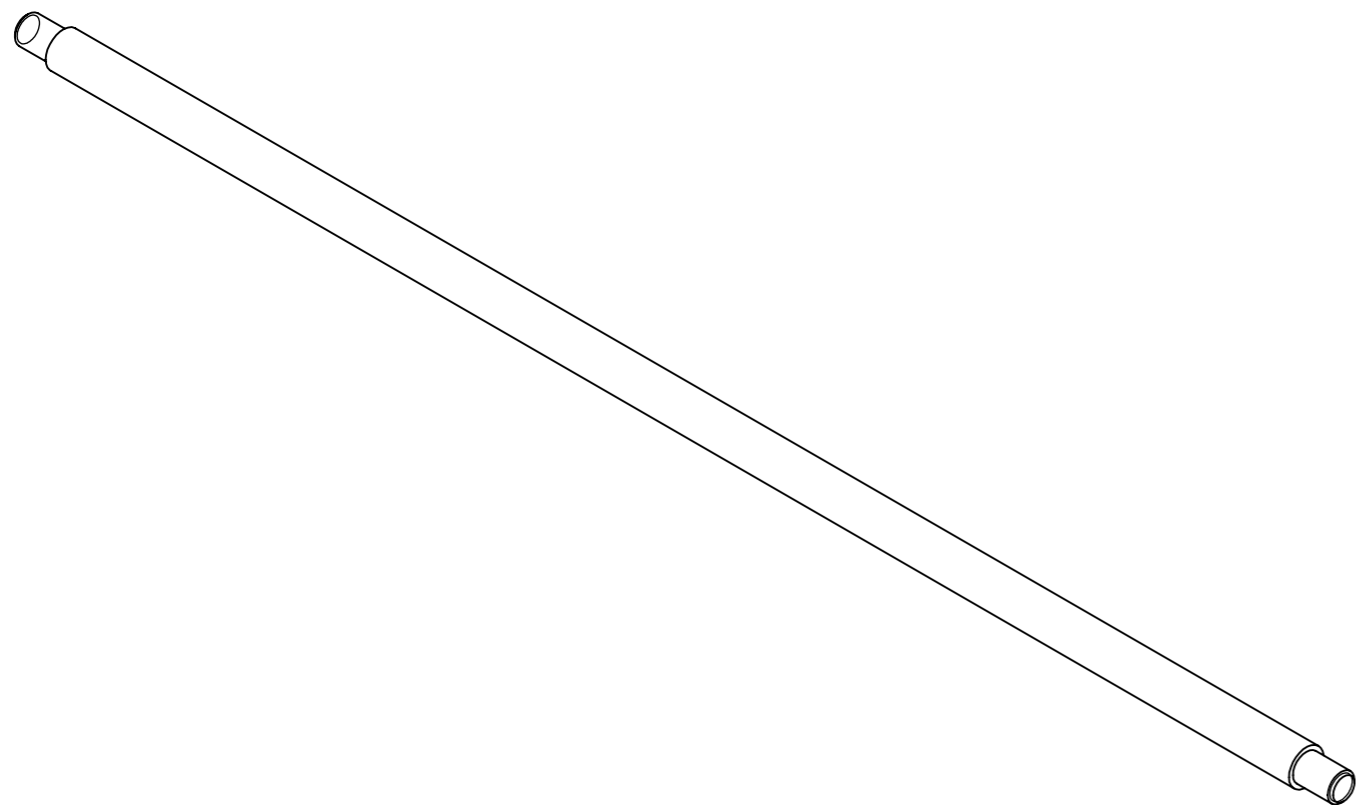
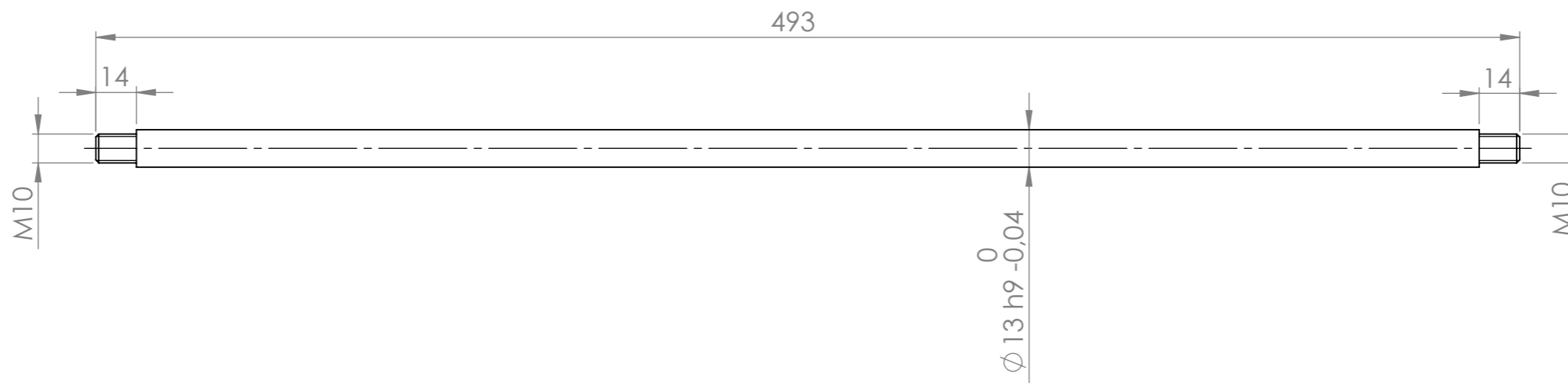
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DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
2	0	BRUNIRANO CRNO		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				003-A-0201_0001/0203_0003	
				SHAFT	
				Nacrč Br.	
				003-P-0203-0001	A3
				MJERILO: 1:1	LIST 1 OD 1
				FILE: 003-P-0203-0001.SLDDRW	

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

MACHINING

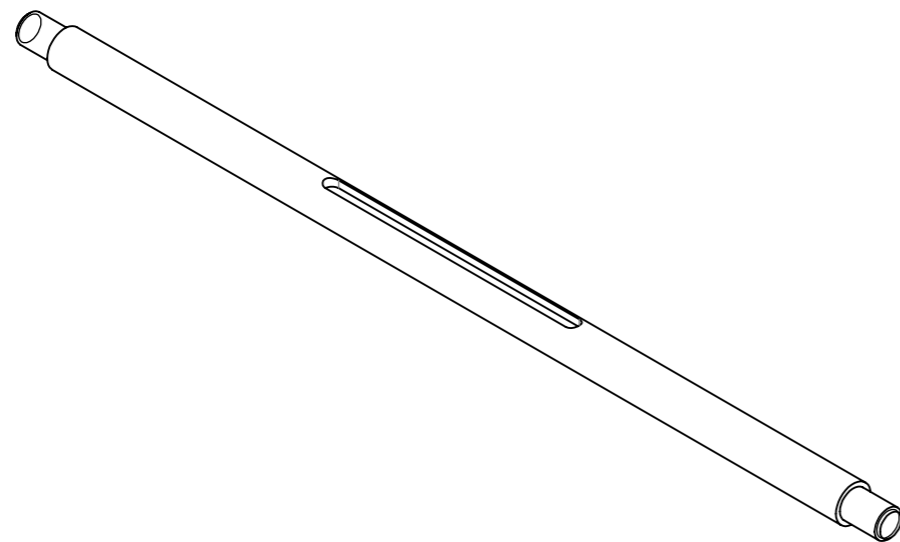
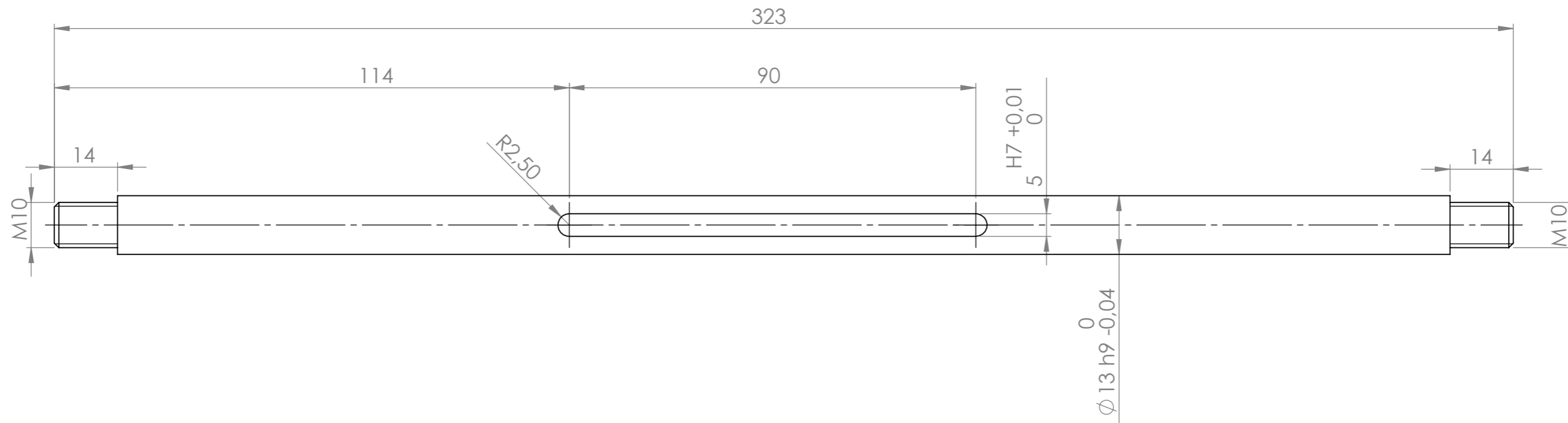


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
2	0	BRUNIRANO CRNO		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				003-A-0201-0001/0203-0003	
				SHAFT	
Ime i Prezime		Potpis	Datum	MATERIJAL:	
M. Modrić			23.9.2018.	Plain Carbon Steel	
Kontrol.				CUSTOM:	
L.RAZUM				Č1530	
Odobr.				MASA: 0.50 kg	
D.ŠKRLEC				Mjere: 1:2	
MFG				Nacrč Br.	
Q.A				003-P-0203-0001A	
				A3	
				LIST 1 OD 1	

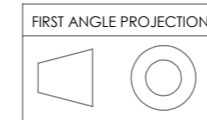
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

MACHINING



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

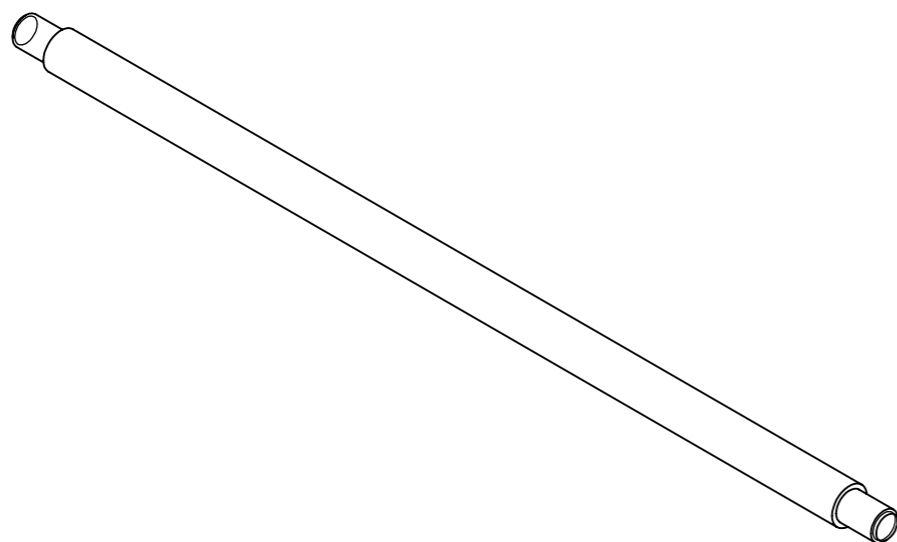
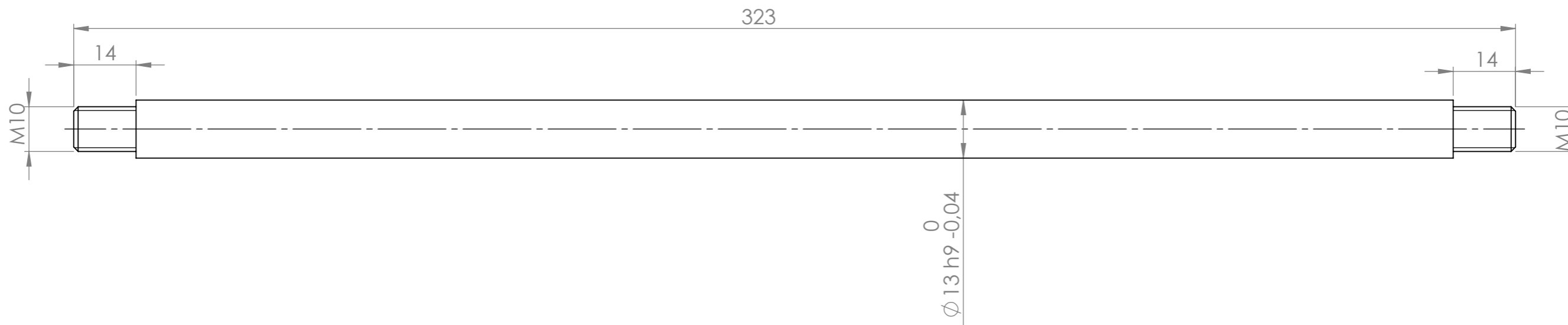
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2	0	BRUNIRANO CRNO		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				003-A-0203-0002/0203-0004	
				SHAFT	
Crtao	Ime i Prezime	Potpis	Datum	MATERIJAL:	
	M. Modrić		23.9.2018.	Plain Carbon Steel	
Kontrol.	L.RAZUM			CUSTOM:	
Odobr.	D.ŠKRLEC			Č1530	
MFG				MASA: 0.31 kg	
Q.A				Nacrč Br.	
				003-P-0203-0002	
				MJERILO: 1:1	LIST 1 OD 1



REVISIONS

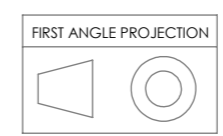
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

MACHINING



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

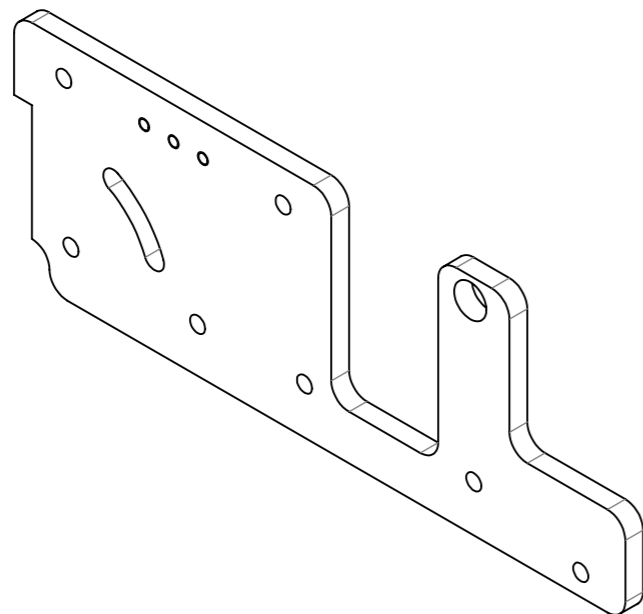
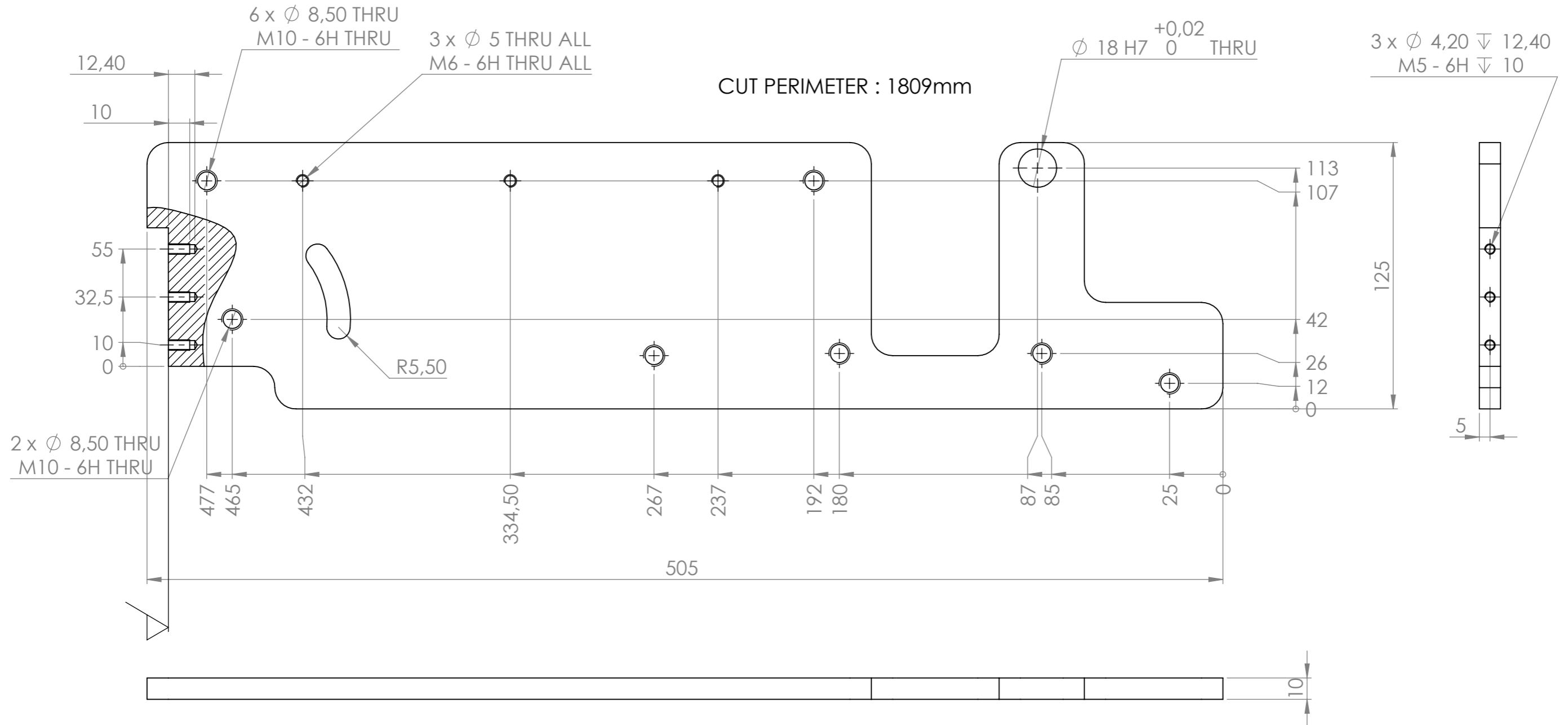
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				Projekt Br:	
				PR-003-2018	003-A-0200
				003-A-0203-0002/0203-0004	
				SHAFT	
Crtao	Ime i Prezime	Potpis	Datum	MATERIJAL:	
	M. Modrić		23.9.2018.	Plain Carbon Steel	
Kontrol.	L.RAZUM			CUSTOM:	
Odobr.	D.ŠKRLEC			Č1530	
MFG				MASA: 0.04 kg	
Q.A				Nacrč Br.	
				003-P-0203-0002A	
				MJEILO: 1:1	
				LIST 1 OD 1	



DRWG No.: 003-P-0203-0002A

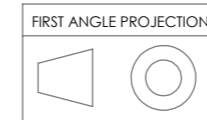
REVISIONS			
ZONE	REV.	DESCRIPTION	APPROVED

LASER CUT+MACHINING



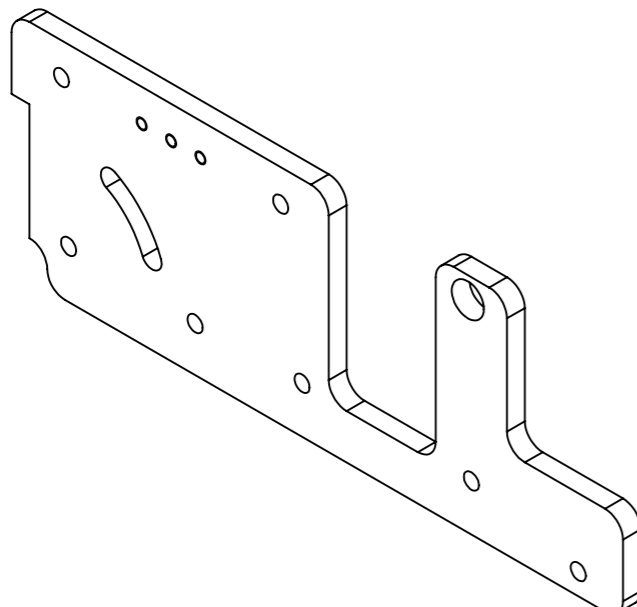
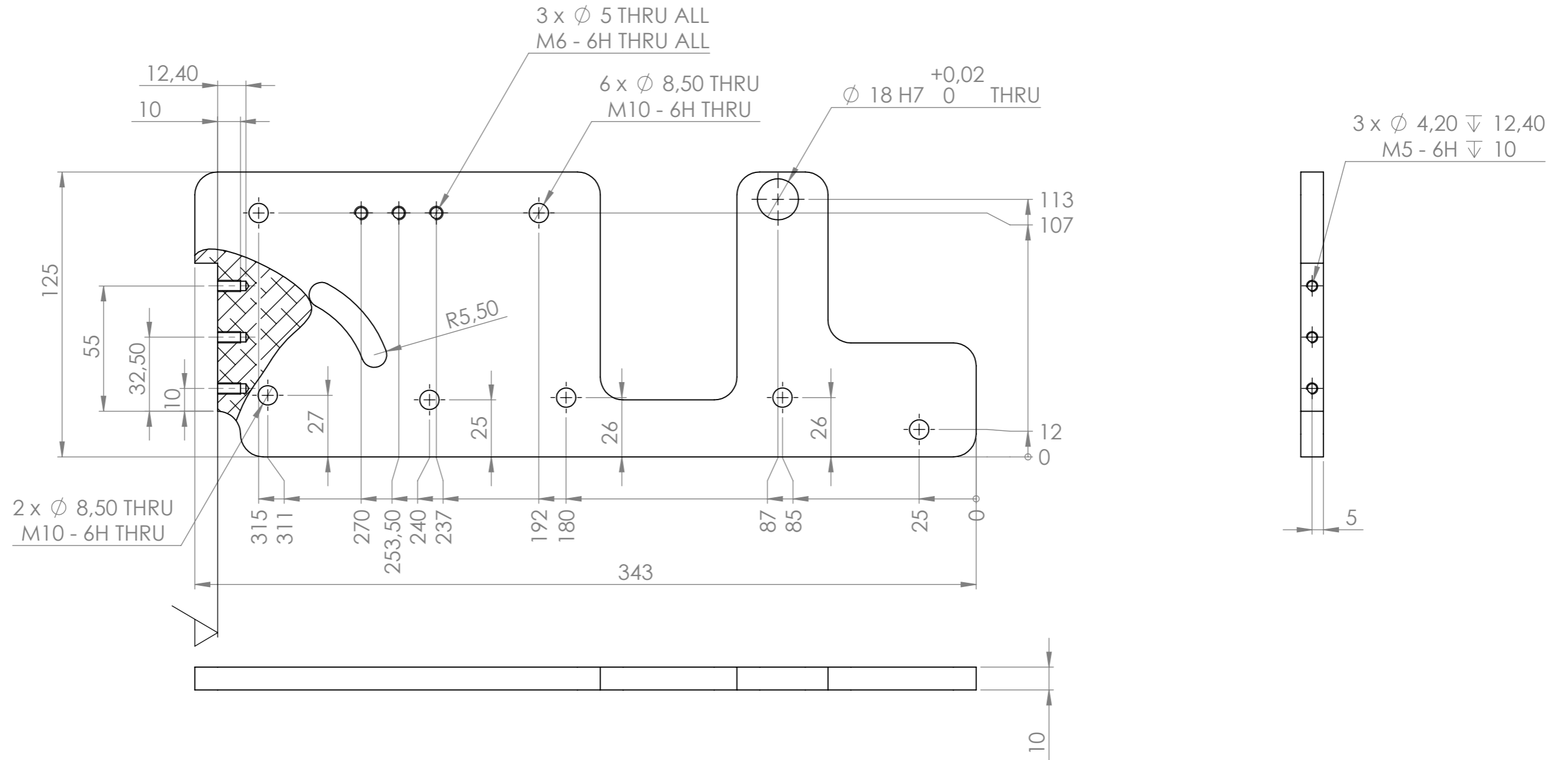
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
4	0	BOJANO RAL 7035		ASEMO/TKD	A
Crtao	Ime i Prezime	Potpis	Datum	Projekt Br:	TITLE:
M. Modrić	M. Modrić		23.9.2018.	PR-003-2018	003-A-0205/0205M
Kontrol.	D.ŠKRLEC				PLATE
Odobr.	D.ŠKRLEC				
MFG					
Q.A					
MATERIAL:			6061 Alloy	Nacrč Br.	A3
MATERIAL CUSTOM:			AlMgSi1	003-P-0204-0001	
MASA: 1,33 kg				MJERILO: 1:2	LIST 1 OD 1



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

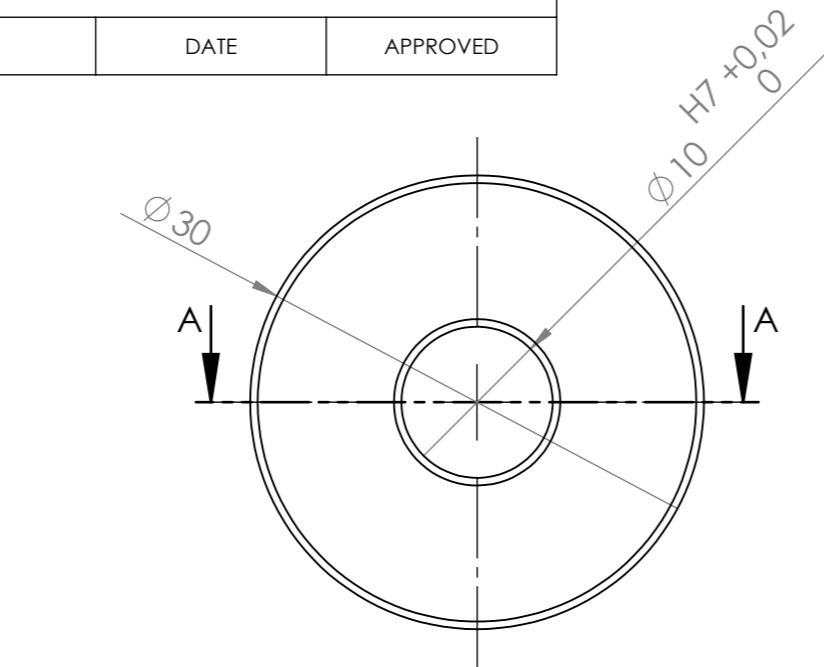
LASER CUT+MACHINING



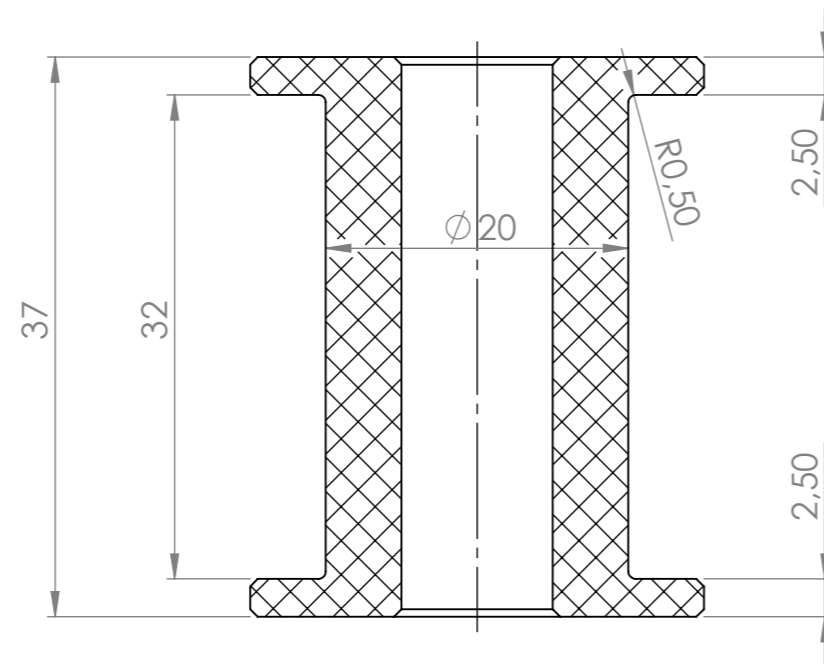
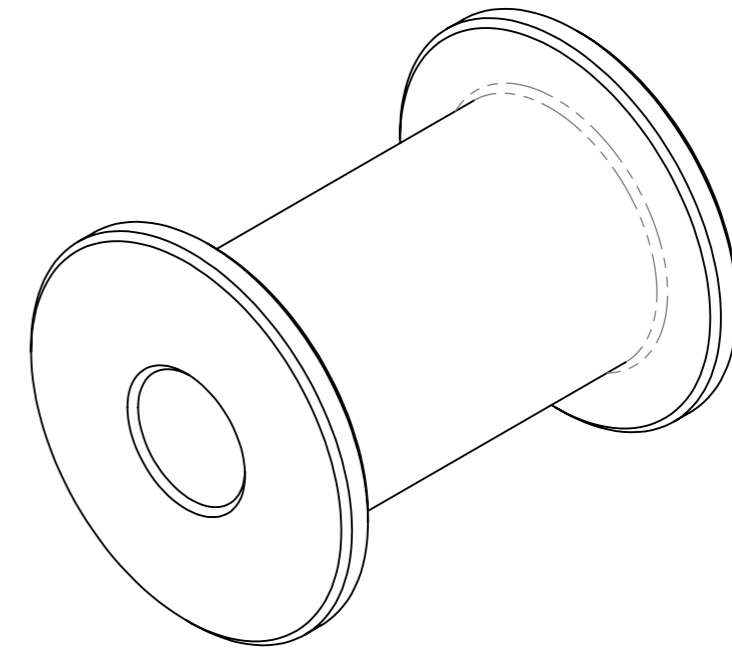
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DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
2	0	BOJANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0205/0205M
				TITLE: 003-A-0205/0205M	
				PLATE	
Ime i Prezime		Potpis	Datum	Nacrtn Br.	
Crtao M. Modrić			23.9.2018.	003-P-0204-0003	
Kontrol. D.ŠKRLEC				A3	
Odobr. D.ŠKRLEC				MATERIJAL: 6061 Alloy	
MFG				MATERIAL CUSTOM: AlMgSi1	
Q.A				MASA: 0.80 kg	
				Mjerilo: 1:2	
				LIST 1 OD 1	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED



MACHINING

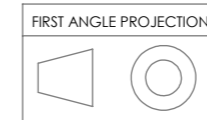


SECTION A-A

Napomena: vanjska i unutarnja skošenja 0,5/45°

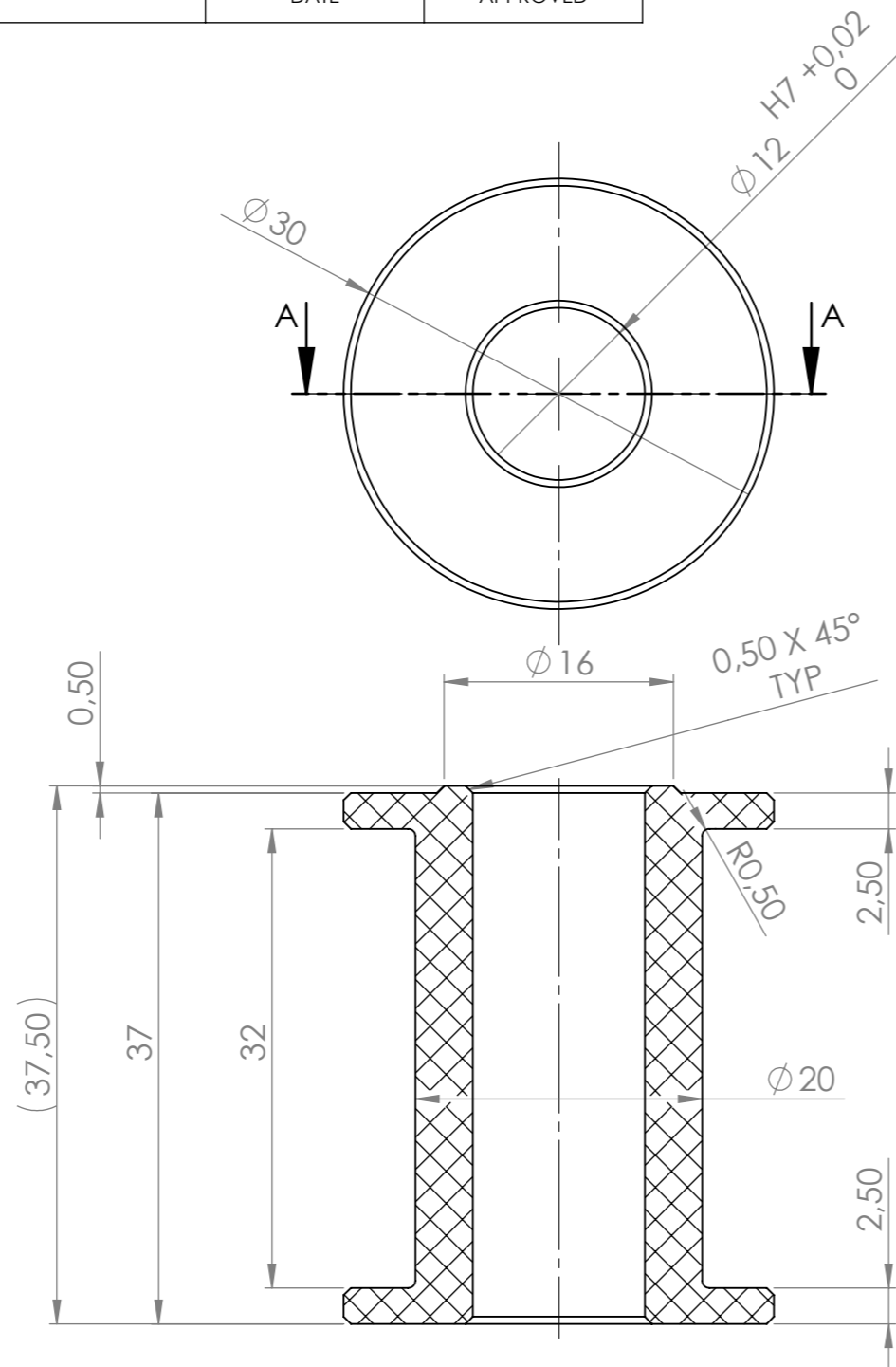
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO/TKD	REVISION	A
18	0	-	-	Projekt Br:	PR-003-2018	003-A-0206-0002	
Crtao	M. Modrić	Potpis	Datum	TITLE: 003-A-0205-0205M			
Kontrol.	D.ŠKRLEC			PULEY			
Odobr.	D.ŠKRLEC			Nacrč Br. 003-P-0205-0001			
MFG				A3			
Q.A				MATERIAL:	PA Type 6	MJERILO: 2:1	
				MATERIAL CUSTOM:	PA6 (SIPAS 6)	LIST 1 OD 1	
				MASA:	0.01 kg	FILE: 003-P-0205-0001.SLDDRW	



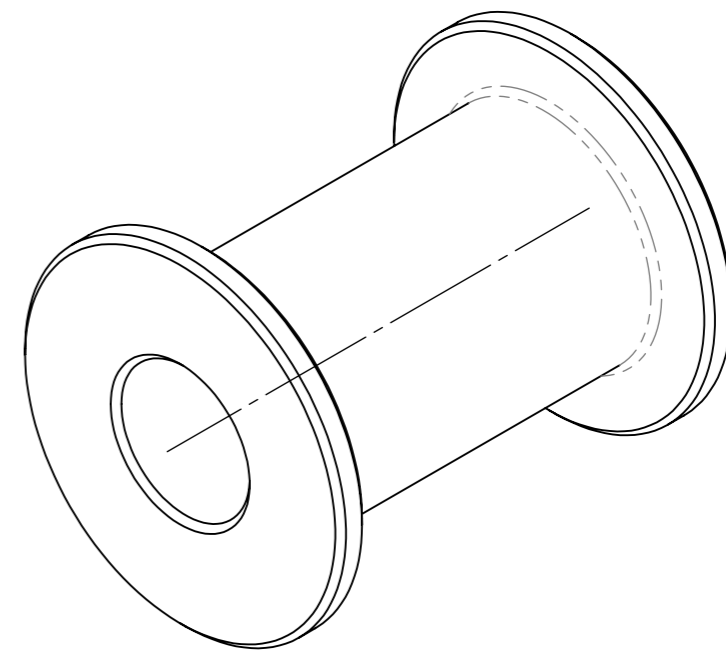
DRWG No.: 003-P-0205-0001

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED



SECTION A-A

MACHINING



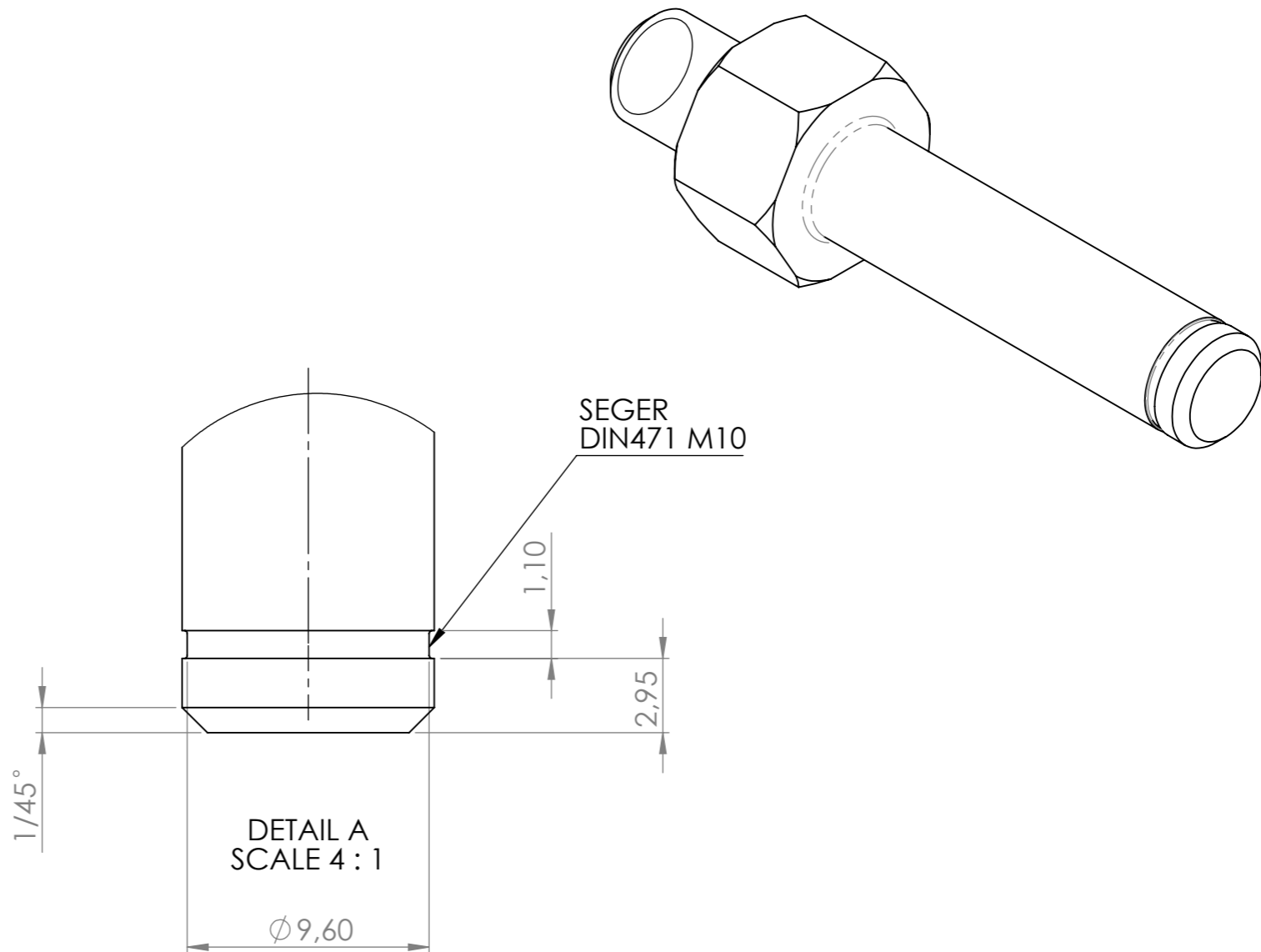
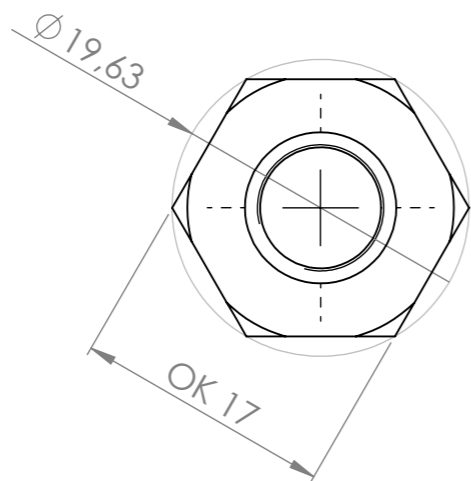
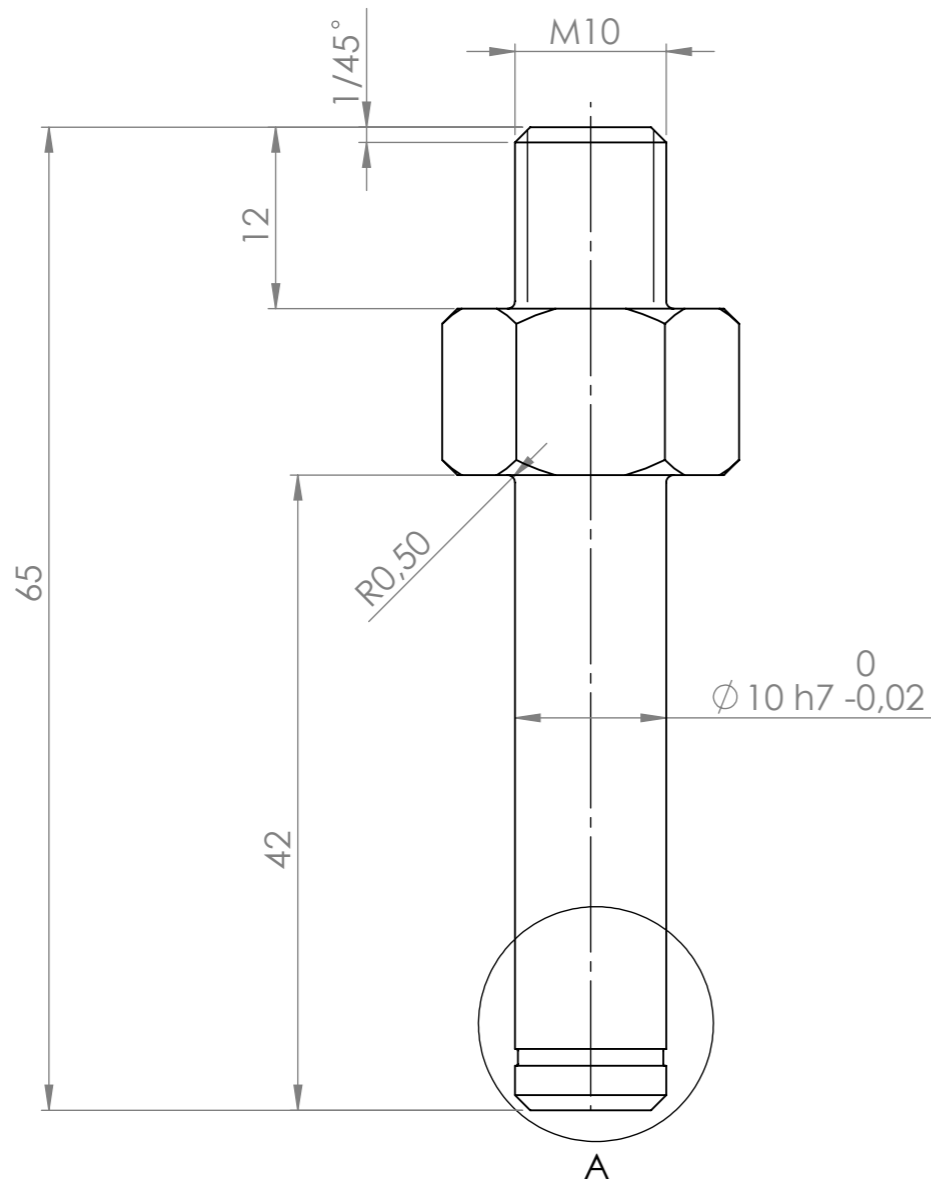
Napomena: vanjska i unutarnja skošenja 0,5/45°

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO/TKD	REVISION	A
6	0	-	-	Projekt Br:	PR-003-2018	003-A-0206-0002	
Crtao	Ime i Prezime	Potpis	Datum	TITLE:		003-A-0205-0205M	
Kontrol.	M. Modrić		23.9.2018.	PULSEY			
Odobr.	D.ŠKRLEC			Nacrč Br.		003-P-0205-0002	
MFG	D.ŠKRLEC			MATERIAL:		A3	
Q.A				MATERIAL CUSTOM:		003-P-0205-0002	
				MASA: 0.01 kg		MJEILO: 2:1	
				PA Type 6		LIST 1 OD 1	
				PA6 (SIPAS 6)		FILE: 003-P-0205-0002.SLDDRW	

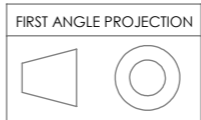
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

MACHINING



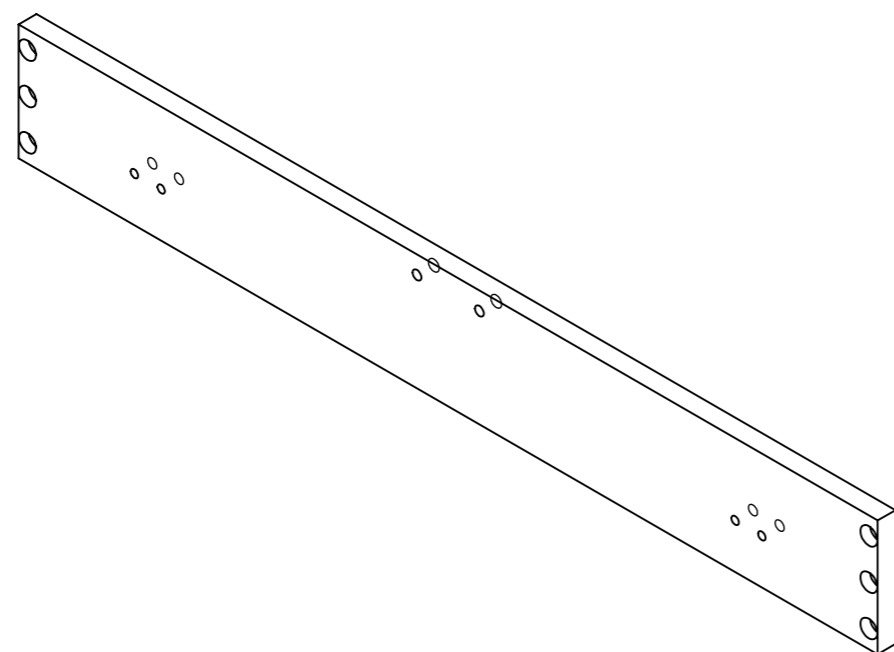
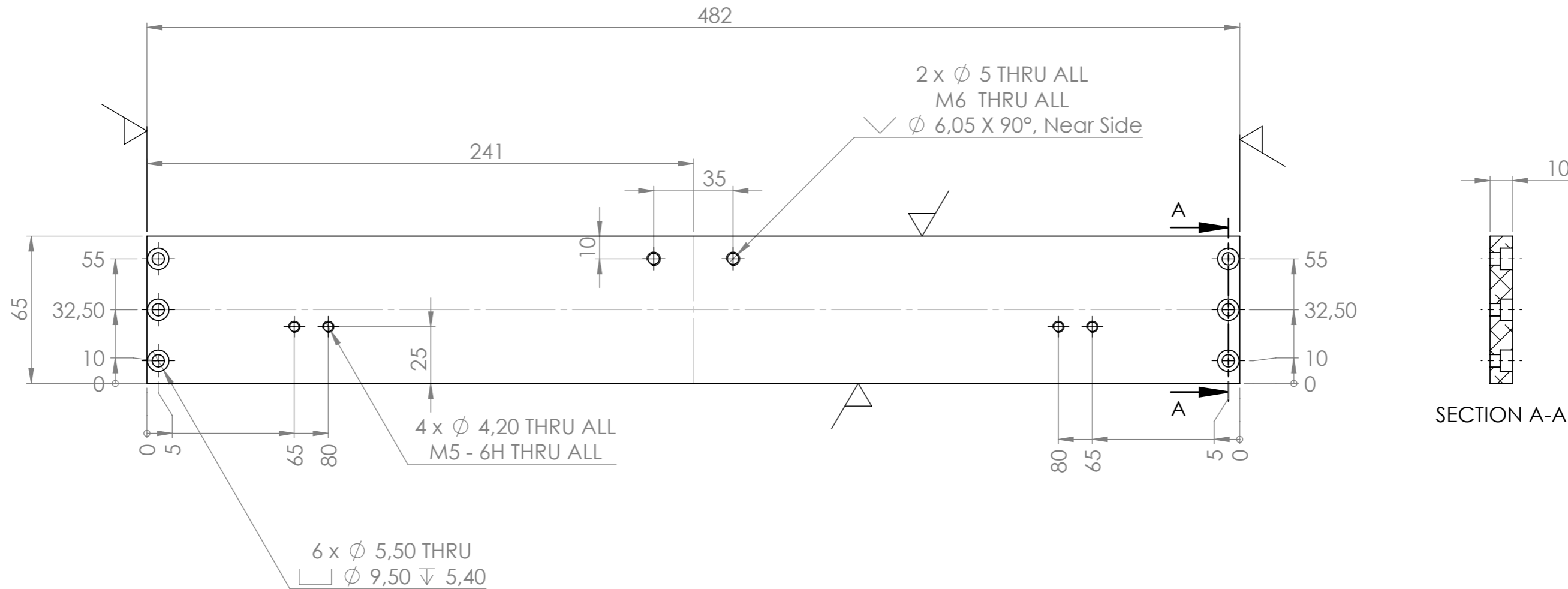
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO/TKD	REVISION	A
36	0	BRUNIRANO CRNO		Projekt Br:	PR-003-2017	003-A-0206-0002	
Crtao	Ime i Prezime	Potpis	Datum	TITLE:		003-A-0205/0205M SCREW	
Kontrol.	M. Modrić		23.9.2018.	MATERIAL:		003-P-0206-0001	
Odobr.	D.ŠKRLEC			MATERIAL CUSTOM:		A3	
MFG	D.ŠKRLEC			Plain Carbon Steel		Nacrč Br.	
Q.A				Č 1220		003-P-0206-0001	
				MASA: 0.05 kg		MJEILO: 2:1	
				LIST 1 OD 1		FILE: 003-P-0206-0001.SLDDRW	



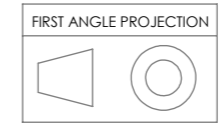
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT+MACHINING



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

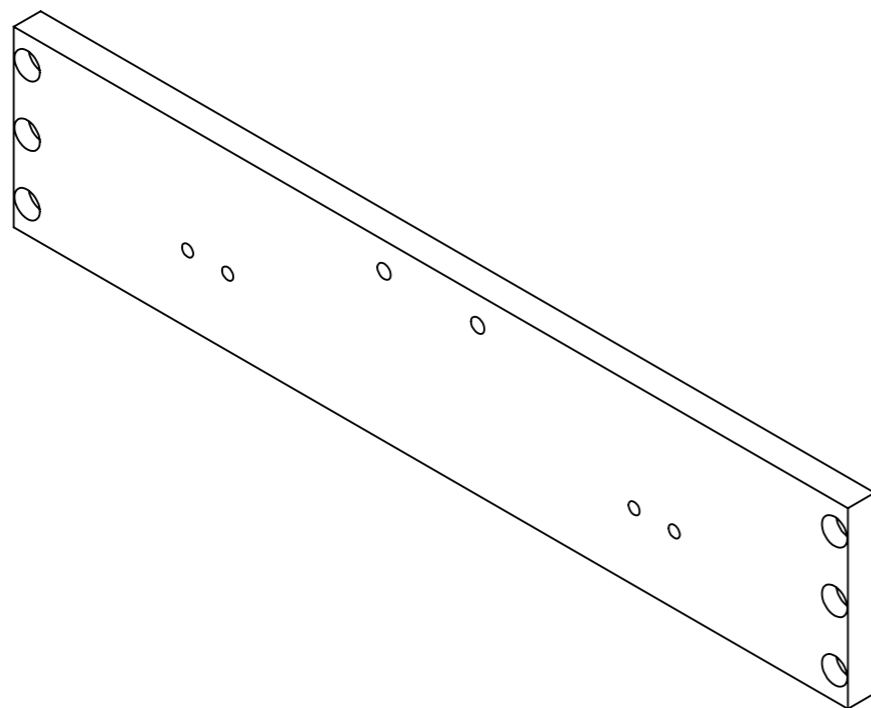
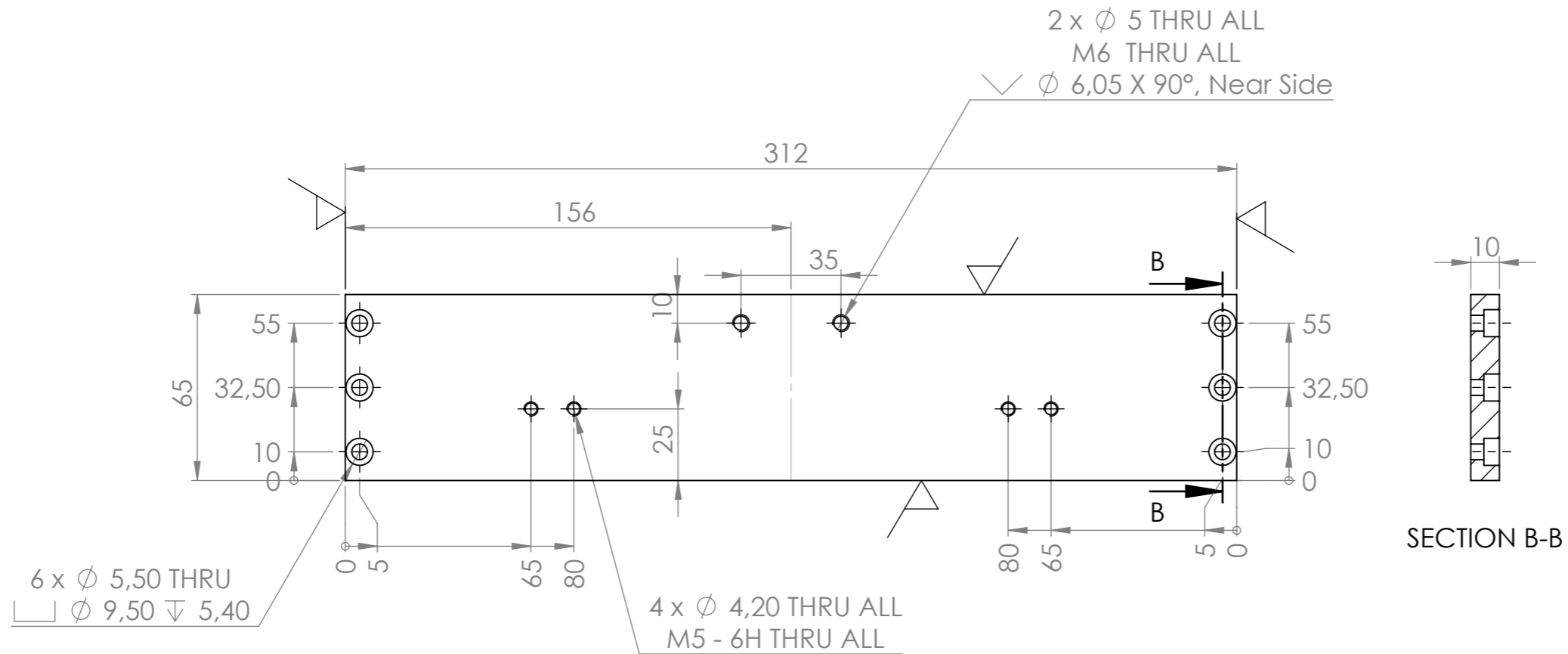
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1	0	BOJANO RAL 7035		ASEMO/TKD	A
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				PR-003-2018	003-A-0203-0003
				TITLE:	
				003-A-0260-0003	
				PLATE	
				Nacrtr Br.	A3
				003-P-0207-0001	
				MJERILO: 1:2	LIST 1 OD 1
				FILE: 003-P-0207-0001.SLDDRW	



DRWG No.: 003-P-0207-0001

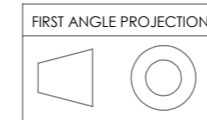
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

LASER CUT+MACHINING



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

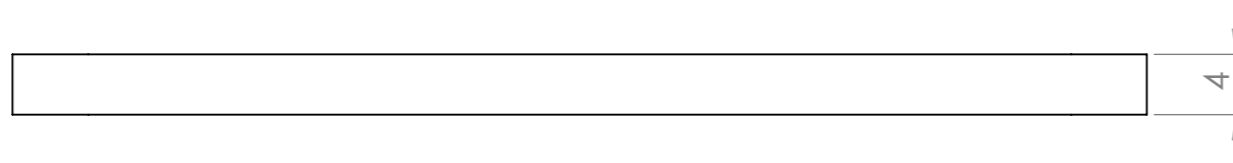
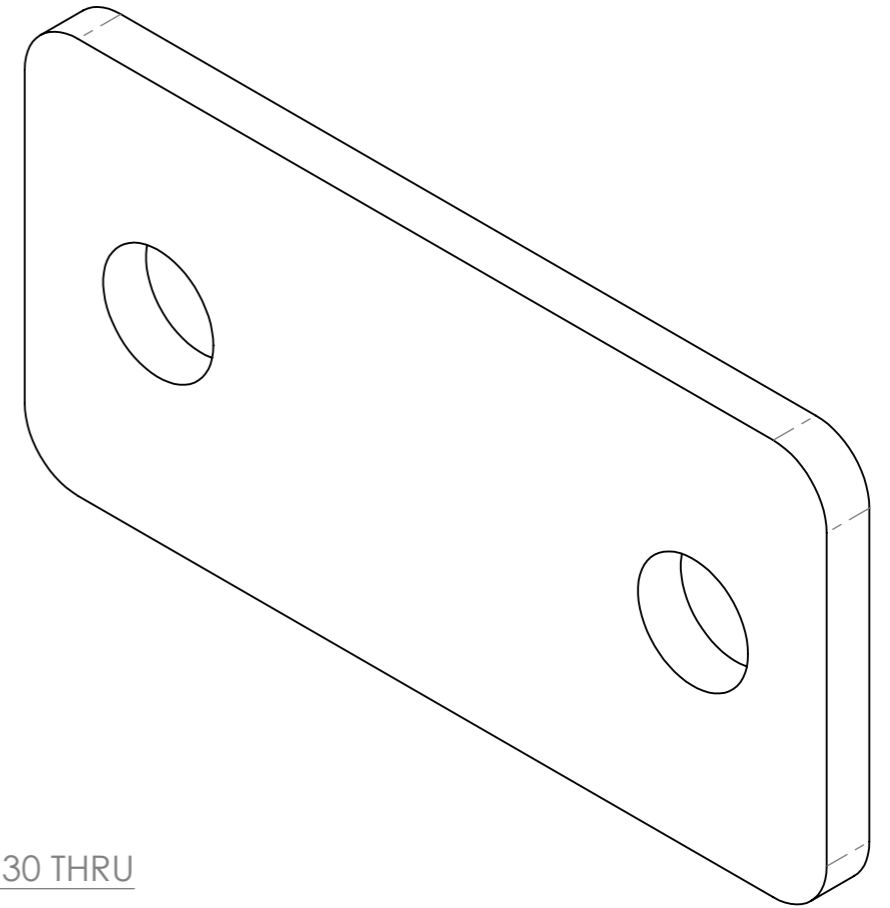
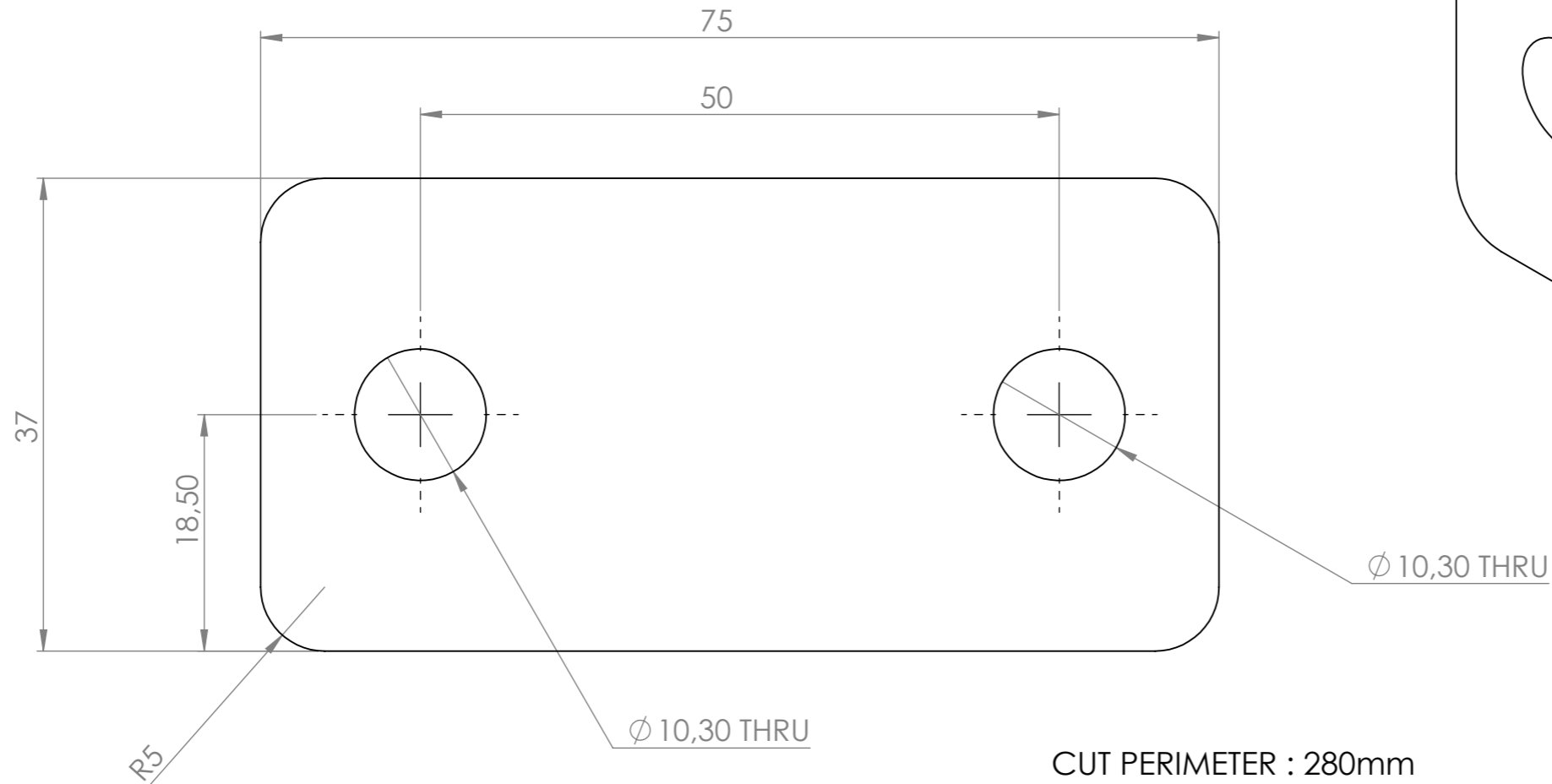
Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
2	0	BOJANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0203-0003
				TITLE:	
				003-A-0206-0002	
				PLATE	
				Nacrč Br.	A3
				003-P-0207-0002	
				MJERILO: 1:2	LIST 1 OD 1
				FILE: 003-P-0207-0002.SLDDRW	




MATERIAL:
6061 Alloy
AIMgSi1
MASA: 0.54 kg

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT

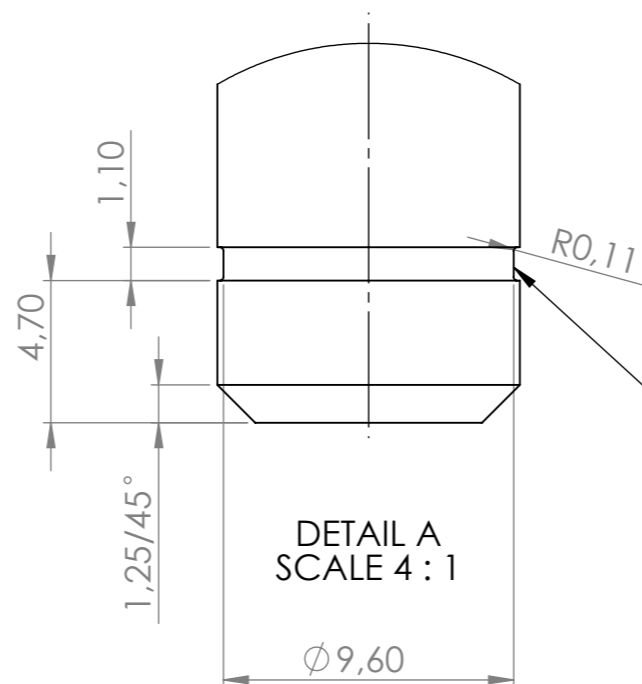
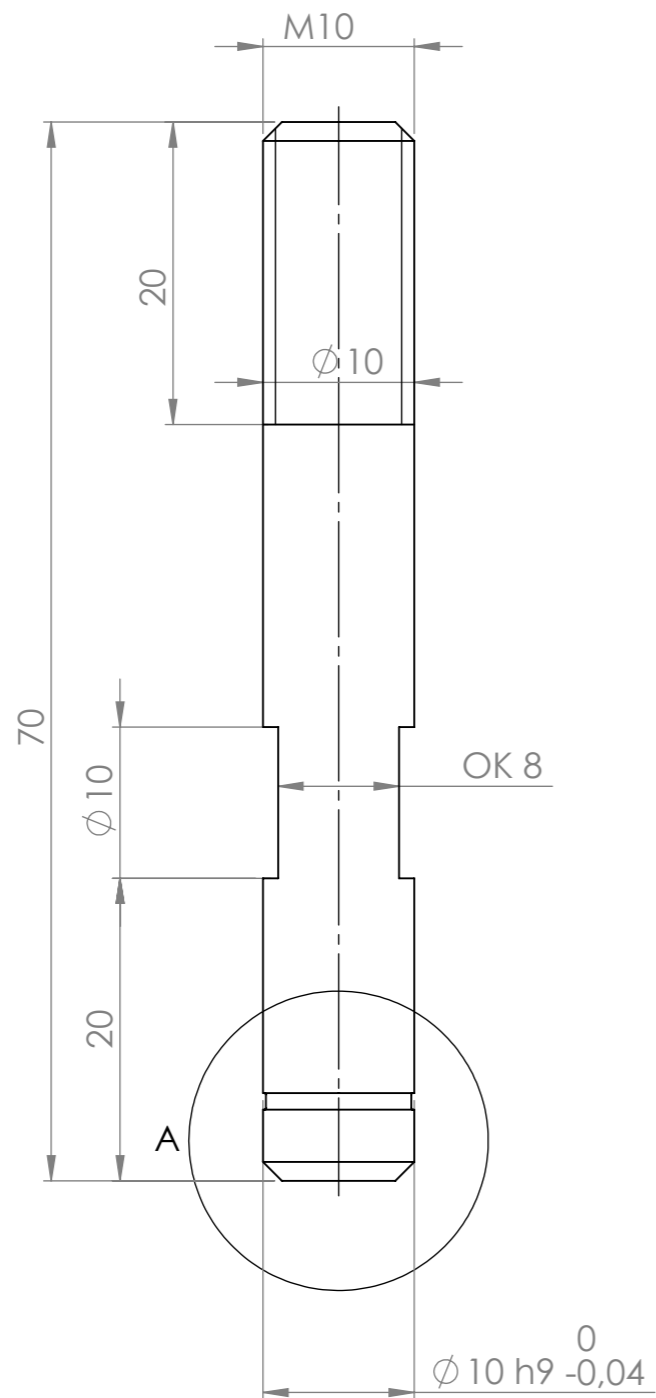


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

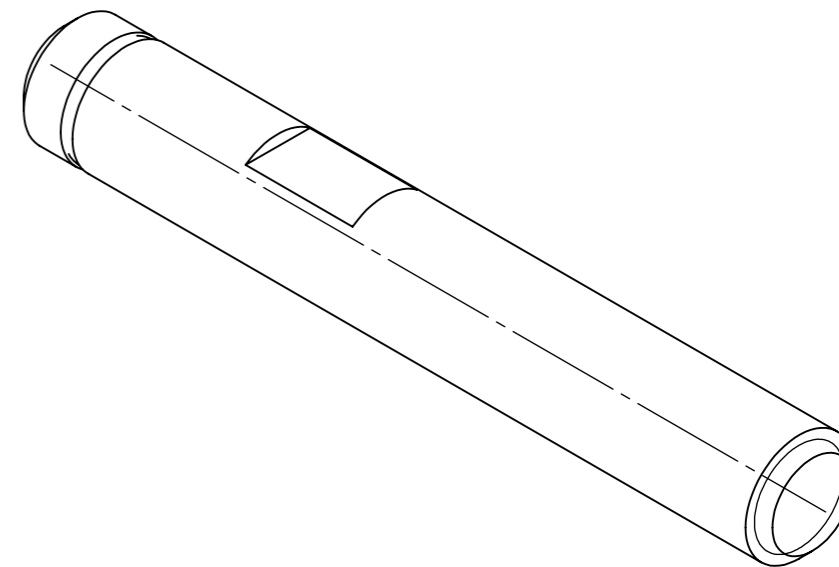
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6	0	BOJANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	-
			FIRST ANGLE PROJECTION 	TITLE:	
Crtao	Ime i Prezime	Potpis		003-A-0205/0205M	
Kontrol.	D.ŠKRLEC			PLATE	
Odobr.	D.ŠKRLEC				
MFG				Nacrč Br.	
Q.A				003-P-0208-0001	
			MATERIAL:	A3	
			MATERIAL:	Plain Carbon Steel	
			CUSTOM:	Č 0361	
			MASSA:	0.08 kg	
				MJERILO:	2:1
				LIST 1 OD 1	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

MACHINING



SEGER
DIN471 M10



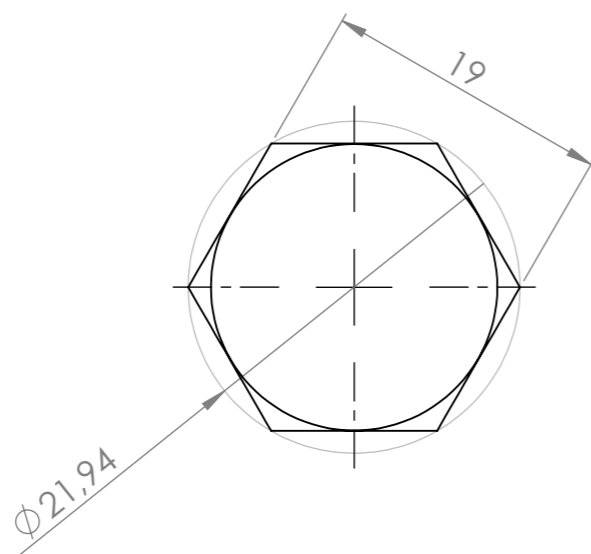
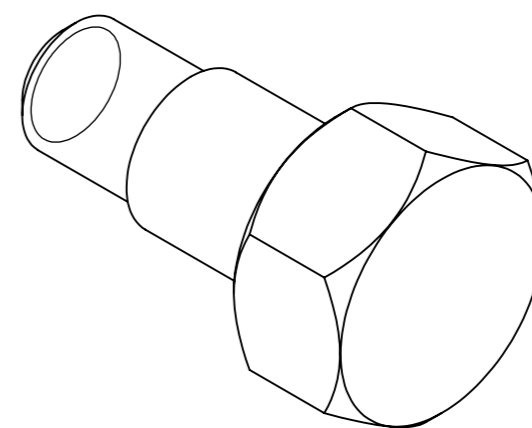
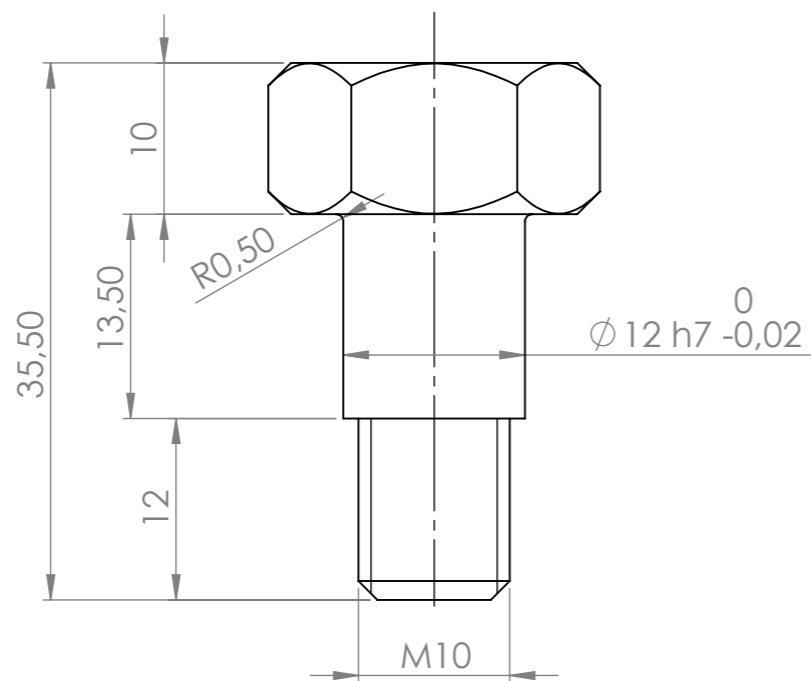
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DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO/TKD	REVISION	B
6	0	BRUNIRANO CRNO		Projekt Br:	PR-003-2018	003-A-0200	
Crtao	Ime i Prezime	Potpis	Datum	TITLE: 003-A-0203-0003 SCREW			
Kontrol.	M. Modrić		23.9.2018.	FIRST ANGLE PROJECTION 			
Odobr.	D.ŠKRLEC						
MFG	D.ŠKRLEC						
Q.A				MATERIAL:	Plain Carbon Steel	Nacrč Br.	003-P-0209-0001
				MATERIAL CUSTOM:	Č1220	A3	
				MASSA:	0.04 kg	MJERILO:	2:1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
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MACHINING



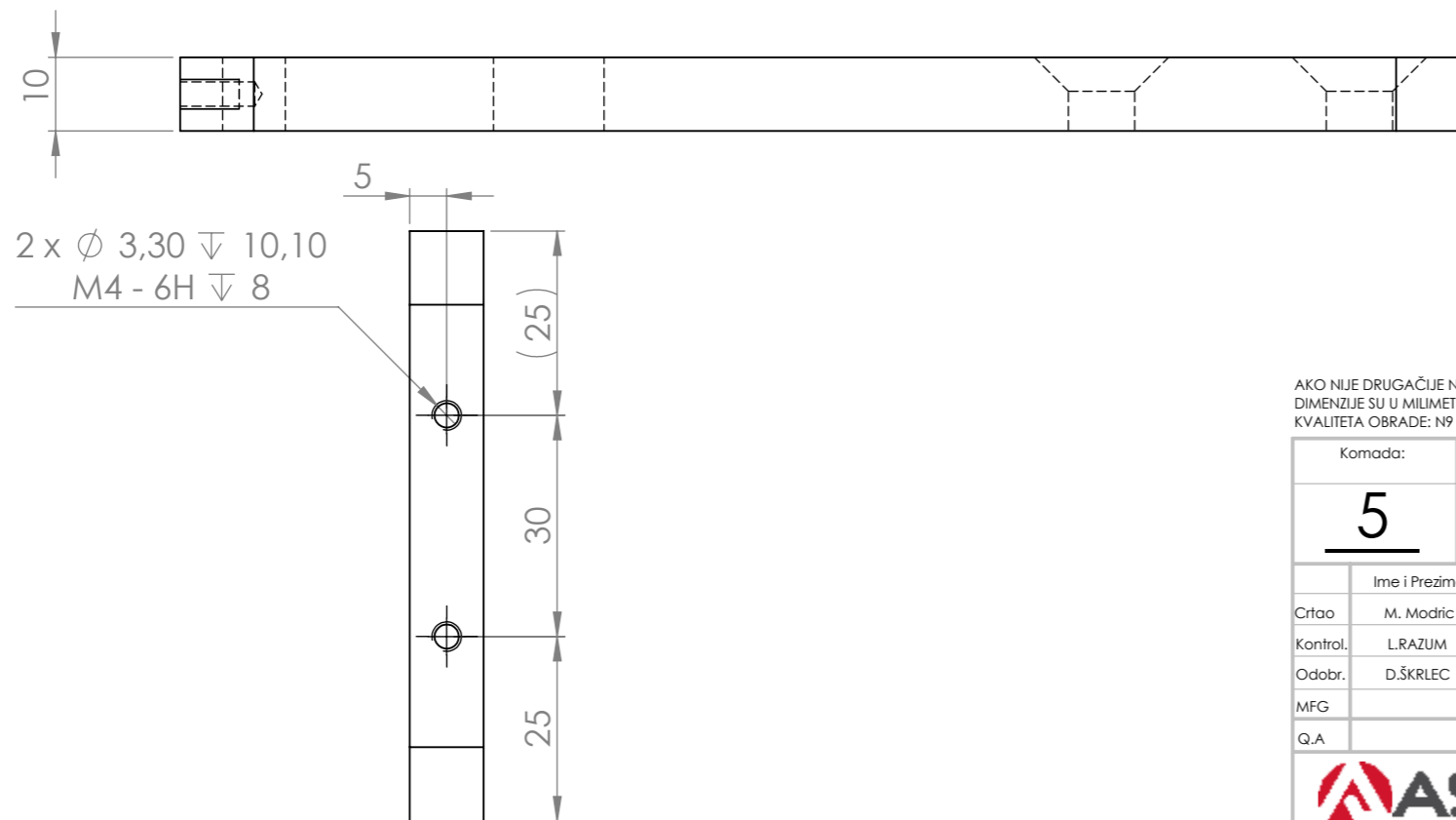
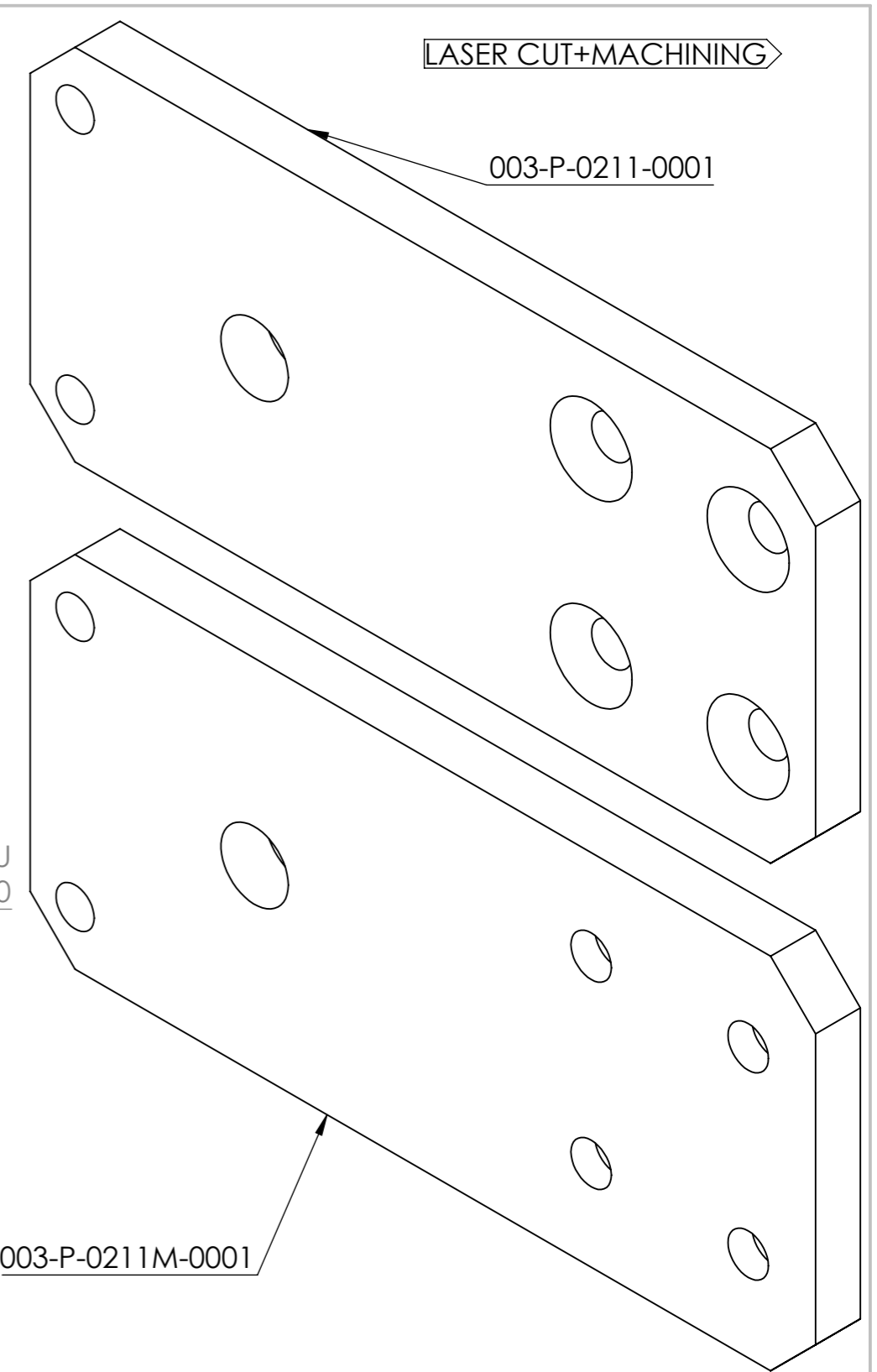
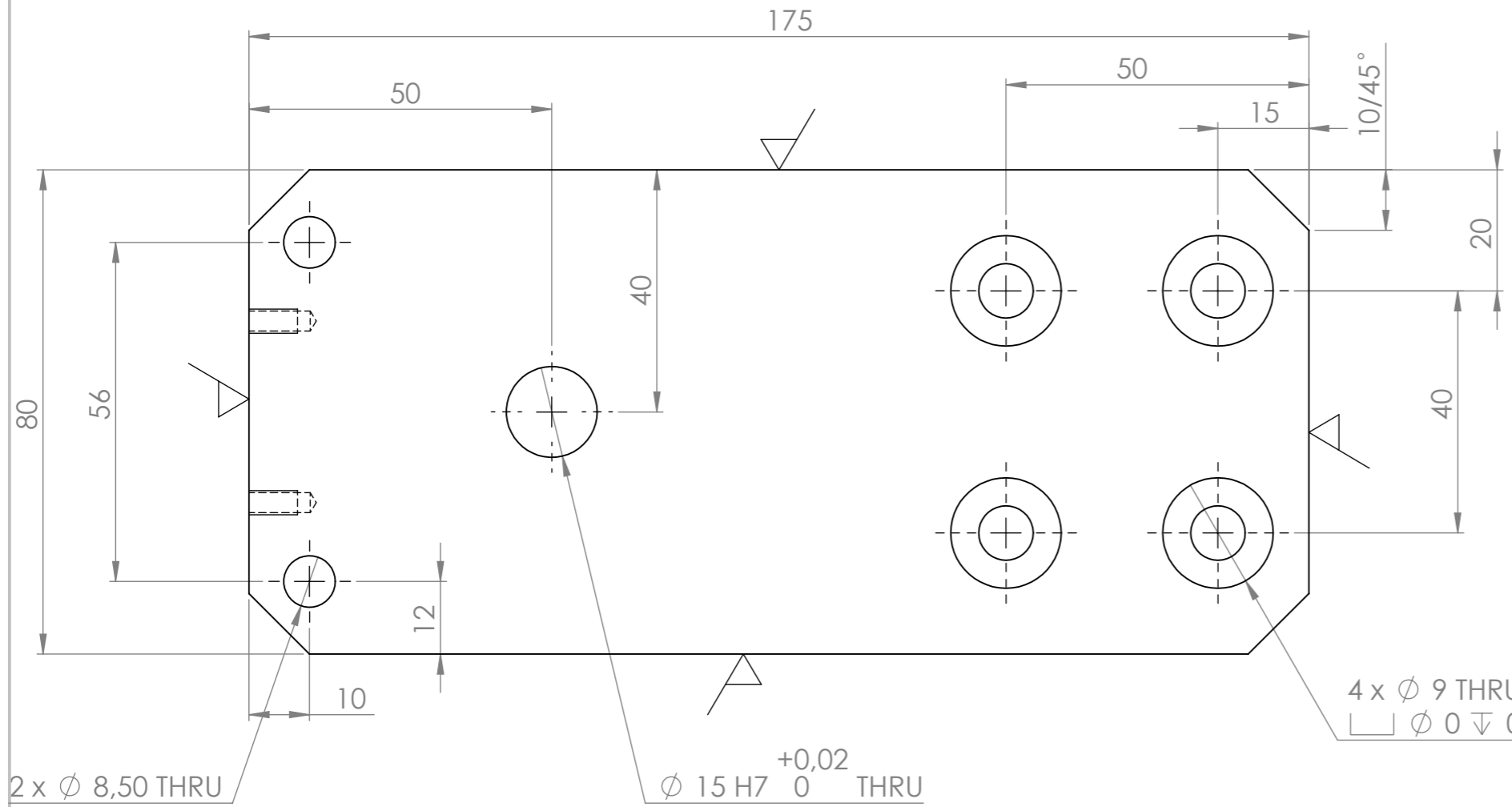
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DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO/TKD	REVISION	A
6	0	BRUNIRANO CRNO		Projekt Br:	PR-003-2018		
Crtao	Ime i Prezime	Potpis	Datum	TITLE:			
	M. Modrić		23.9.2018.	003-A-0203			
Kontrol.	D.ŠKRLEC			SCREW			
Odobr.	D.ŠKRLEC			Nacrt Br.			
MFG				003-P-0210-0001			
Q.A				A3			
		MATERIAL:	Plain Carbon Steel	MJEILO: 2:1		LIST 1 OD 1	
		MATERIAL CUSTOM:		FILE: 003-P-0210-0001.SLDDRW			
		MASSA: 0.04 kg					

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

CUT PERIMETER : 816mm

LASER CUT+MACHINING



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

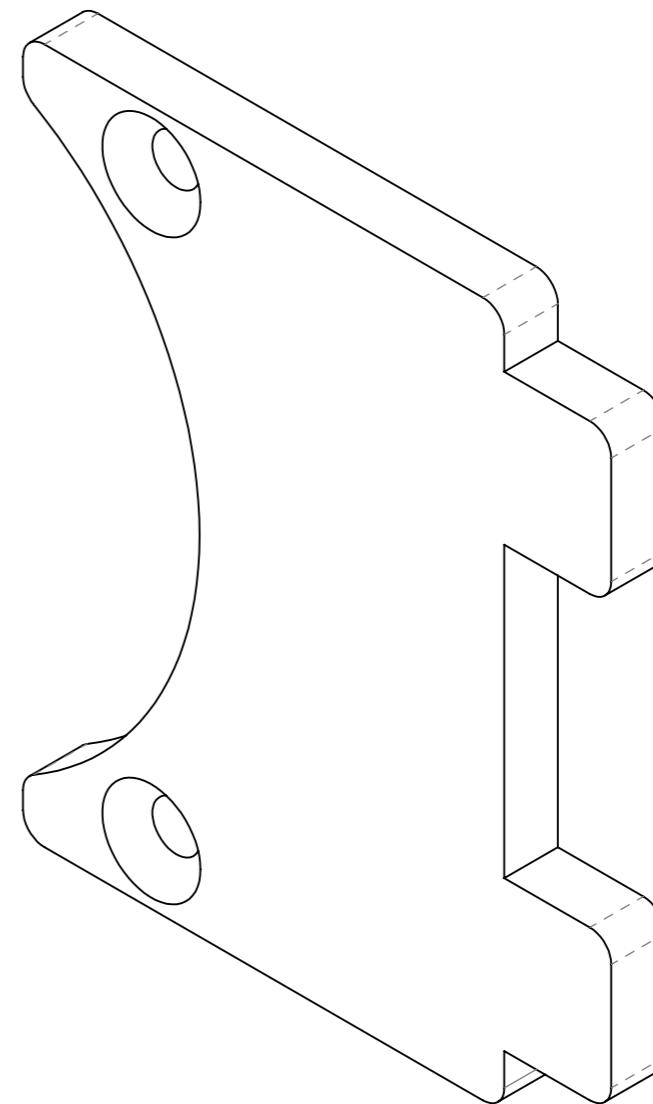
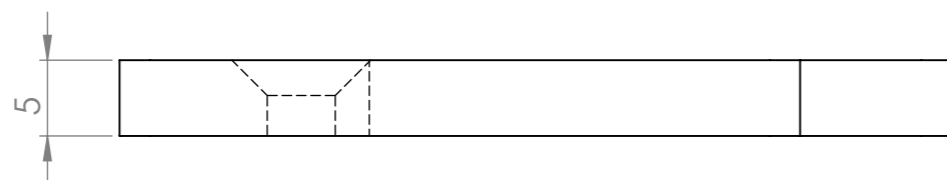
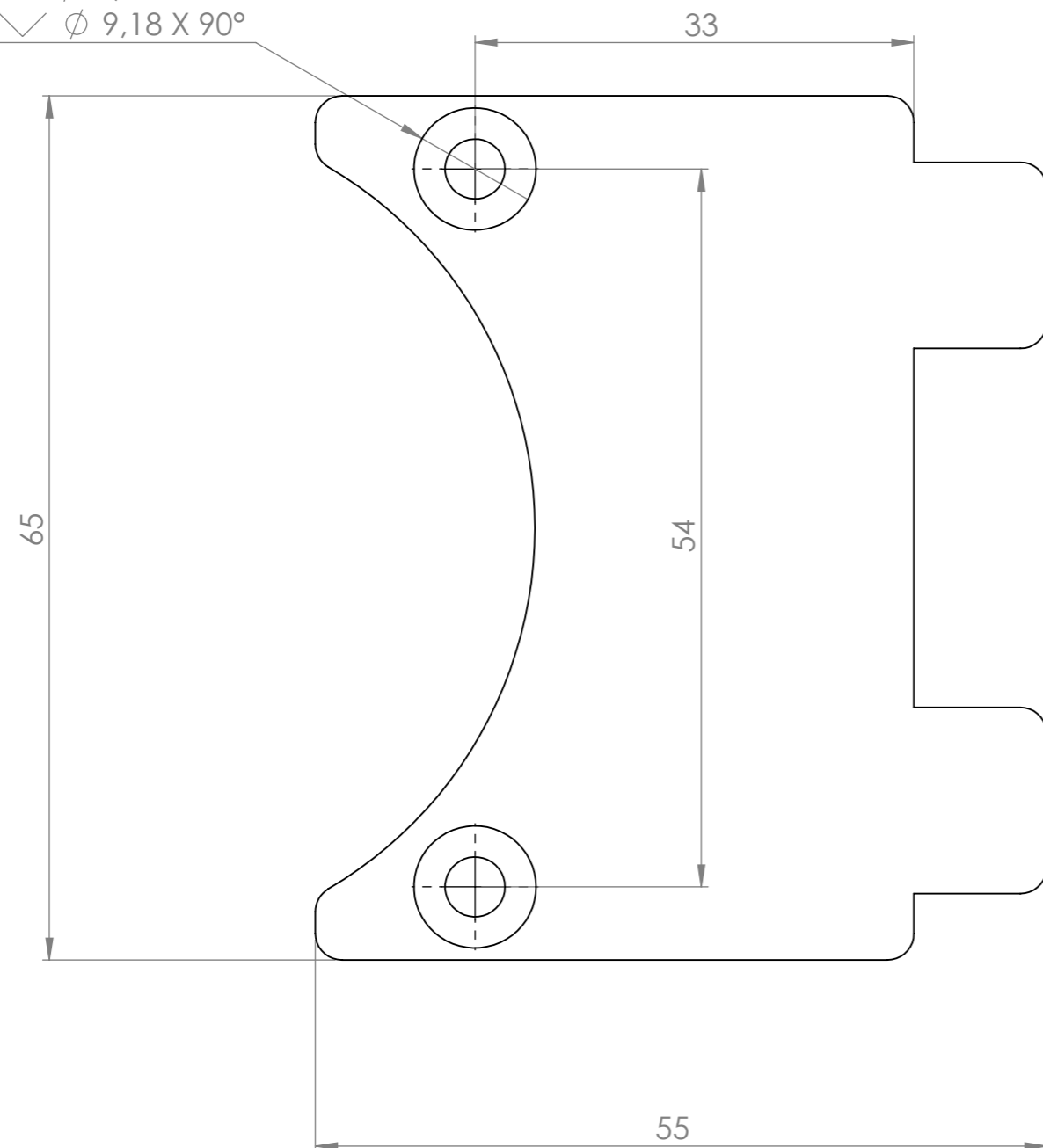
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5	5	BOJANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0200
Crtao	Ime i Prezime	Potpis	Datum	TITLE:	
	M. Modrić		23.9.2018.	003-A-0201	
Kontrol.	L.RAZUM			STEEL PLATE	
Odobr.	D.ŠKRLEC				
MFG					
Q.A					
MATERIAL:			Plain Carbon Steel	Nacrtr Br.	
MATERIAL CUSTOM:			Č 0361	003-P-0211-0001	A3
MASA: 1.02 kg				MJERILO: 1:1	LIST 1 OD 1

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT+MACHINING


CUT PERIMETER : 323mm

2 x \varnothing 4,50 THRU
 \surd \varnothing 9,18 X 90°



CUT PERIMETER : 323mm

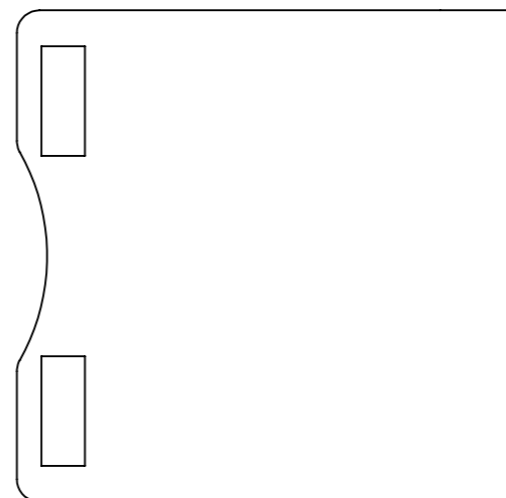
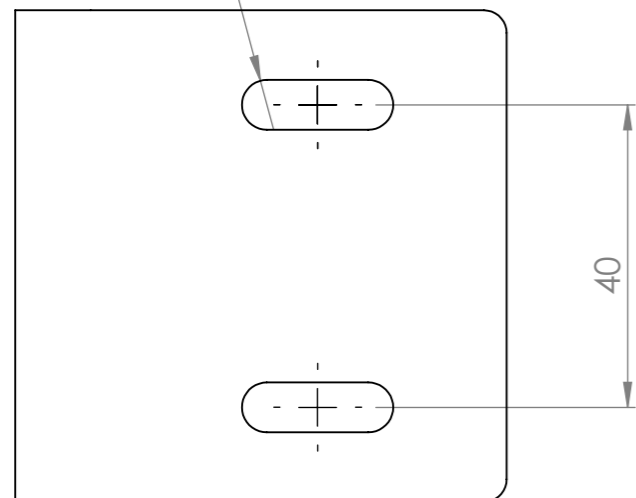
AKO NIJE DRUGAČIJE NAZNAČENO:
 DIMENZIJE SU U MILIMETRIMA
 KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
4	0	BOJANO RAL 7035		ASEMO/TKD	A
Crtao		Ime i Prezime	Potpis	Datum	Projekt Br:
M. Modrić		M. Modrić		23.9.2018.	PR-003-2018
Kontrol.		L.RAZUM			003-A-0200
Dobobr.		D.ŠKRLEC			
MFG					
Q.A					
MATERIAL:		Plain Carbon Steel		Nacrt Br.	
CUSTOM:		Č 0361		003-P-0212-0001	
MASA: 0.10 kg				MJERILO: 2:1	LIST 1 OD 1
				A3	

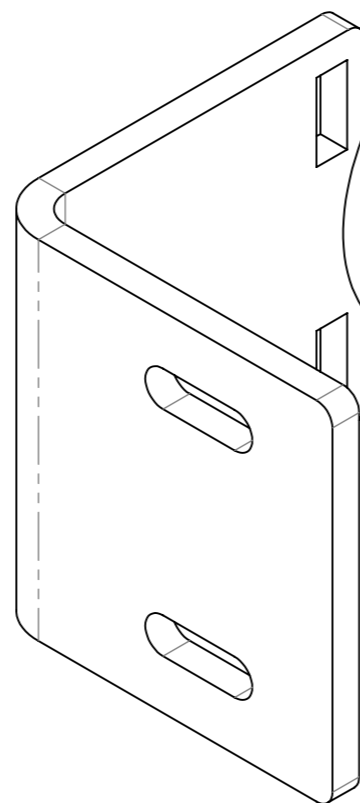
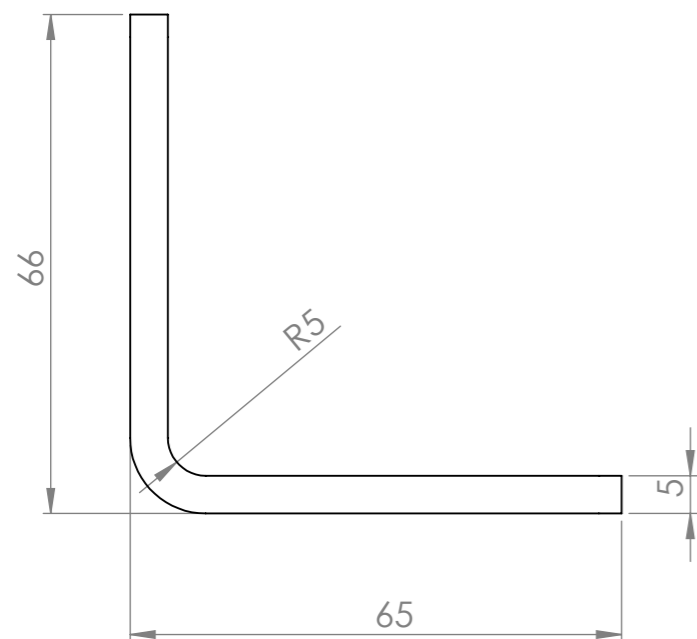
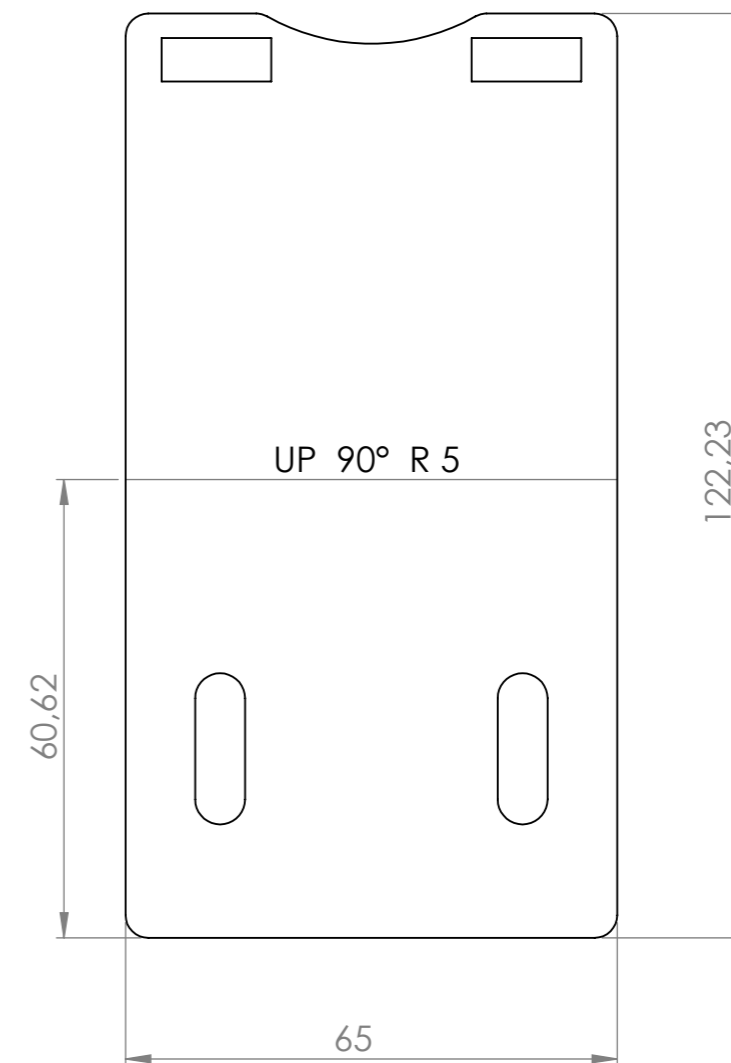
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT

2 x 6,60 X 20 THRU

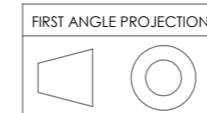


FLAT PATTERN
CUT PERIMETER : 547mm



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

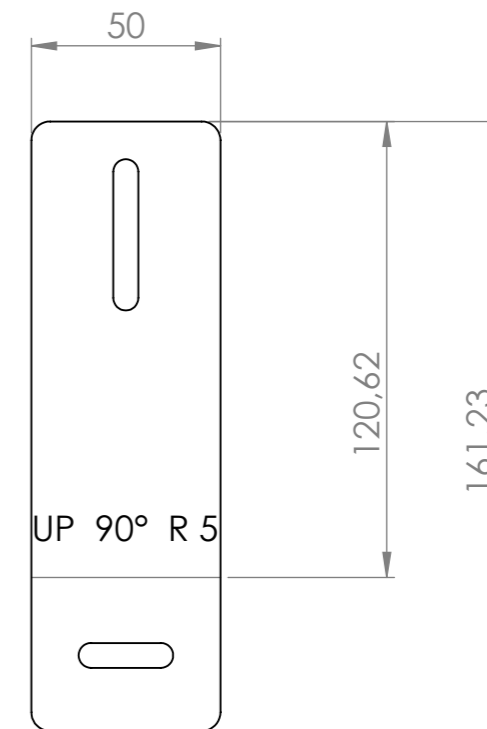
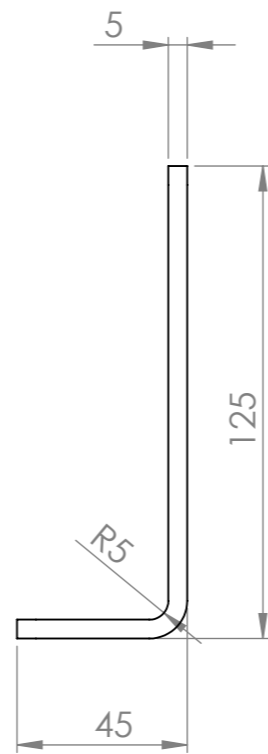
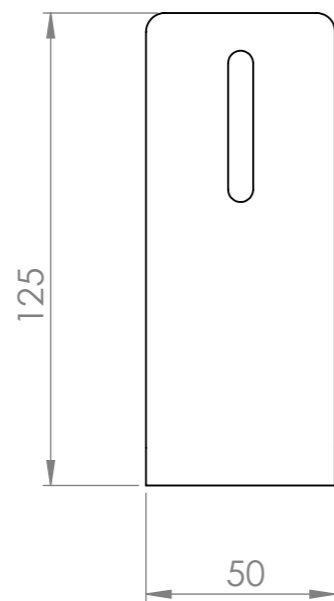
Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
4	0	BOJANO R4LA 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0200
Crtao	Ime i Prezime	Potpis	Datum	TITLE:	
	M. Modrić		23.9.2018.	003-A-0201	
Kontrol.	L.RAZUM			MOTOR PLATE 2	
Odobr.	D.ŠKRLEC				
MFG					
Q.A					
		MATERIAL:	Plain Carbon Steel	Nacrč Br.	
		MATERIAL CUSTOM:	Č 0361	003-P-0213-0001	A3
		MASA: 0.29 kg		MJERILO: 1:1	LIST 1 OD 1



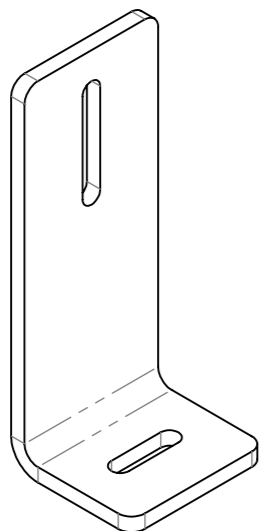
DRWG No.: 003-P-0213-0001

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT



FLAT PATTERN
CUT PERIMETER : 559mm

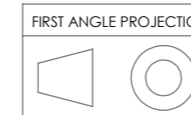


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
20	0	BOJANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0201	
				LEG	
				Nacrč Br.	
				003-P-0214-0001	A3
				MJERILO: 1:2	LIST 1 OD 1

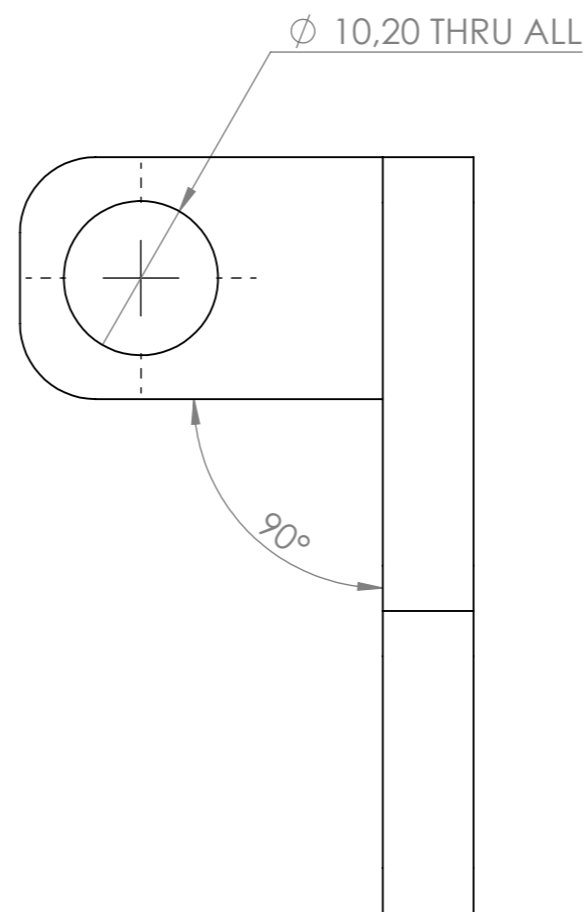
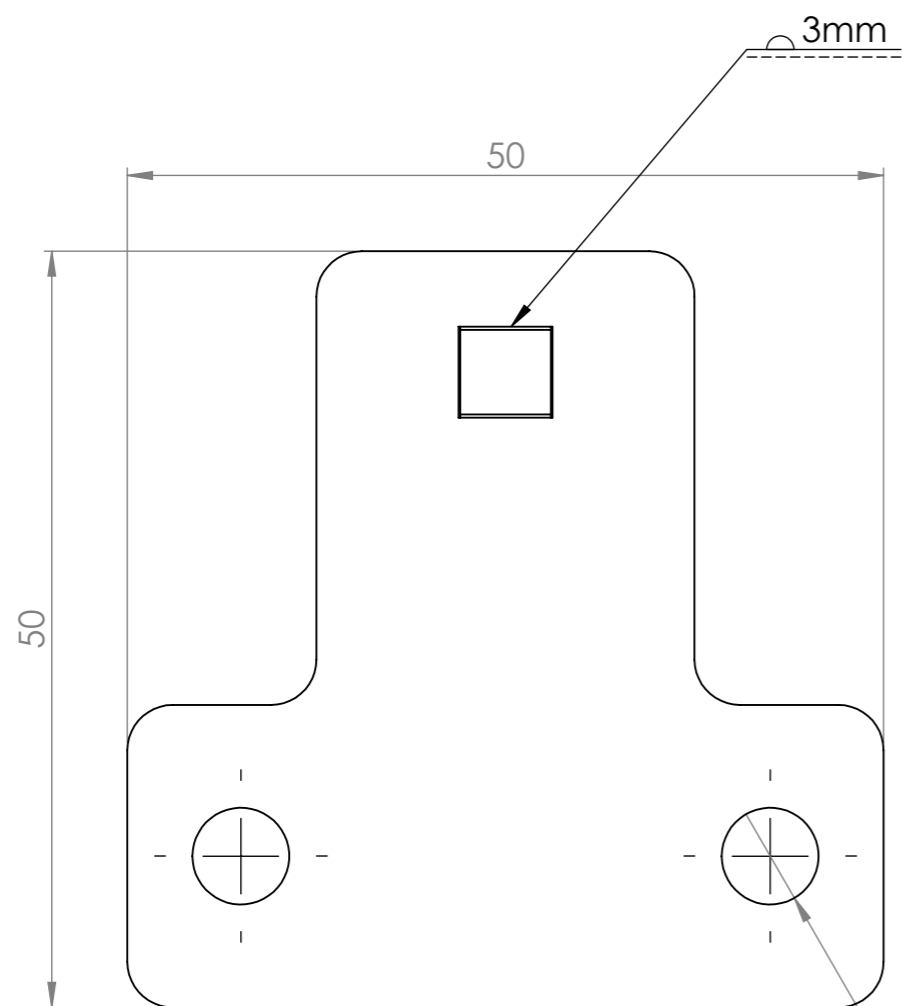


MATERIAL: Plain Carbon Steel
MATERIAL CUSTOM: Č 0361
MASA: 0.30 kg

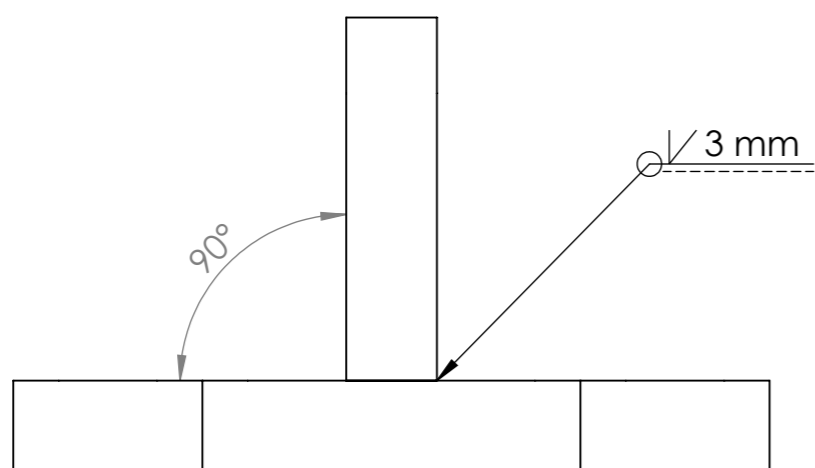
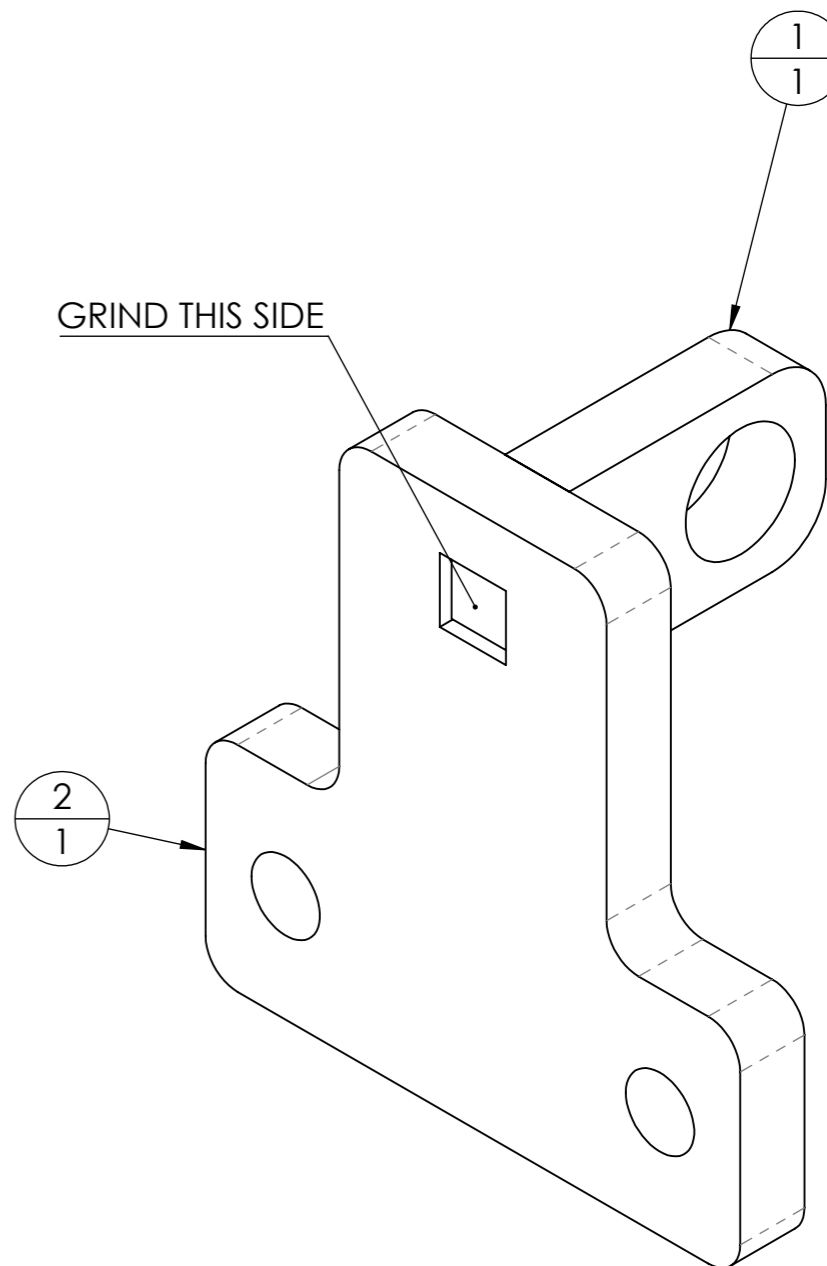


REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	1	USICA	24x16x6
2	1	PLOČICA	50x50x6

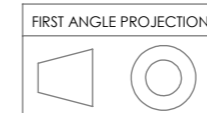


LASER CUT

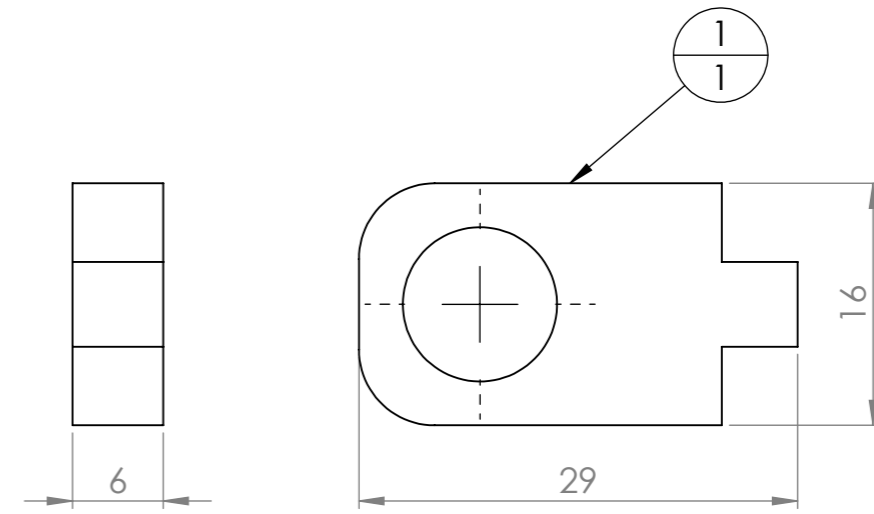
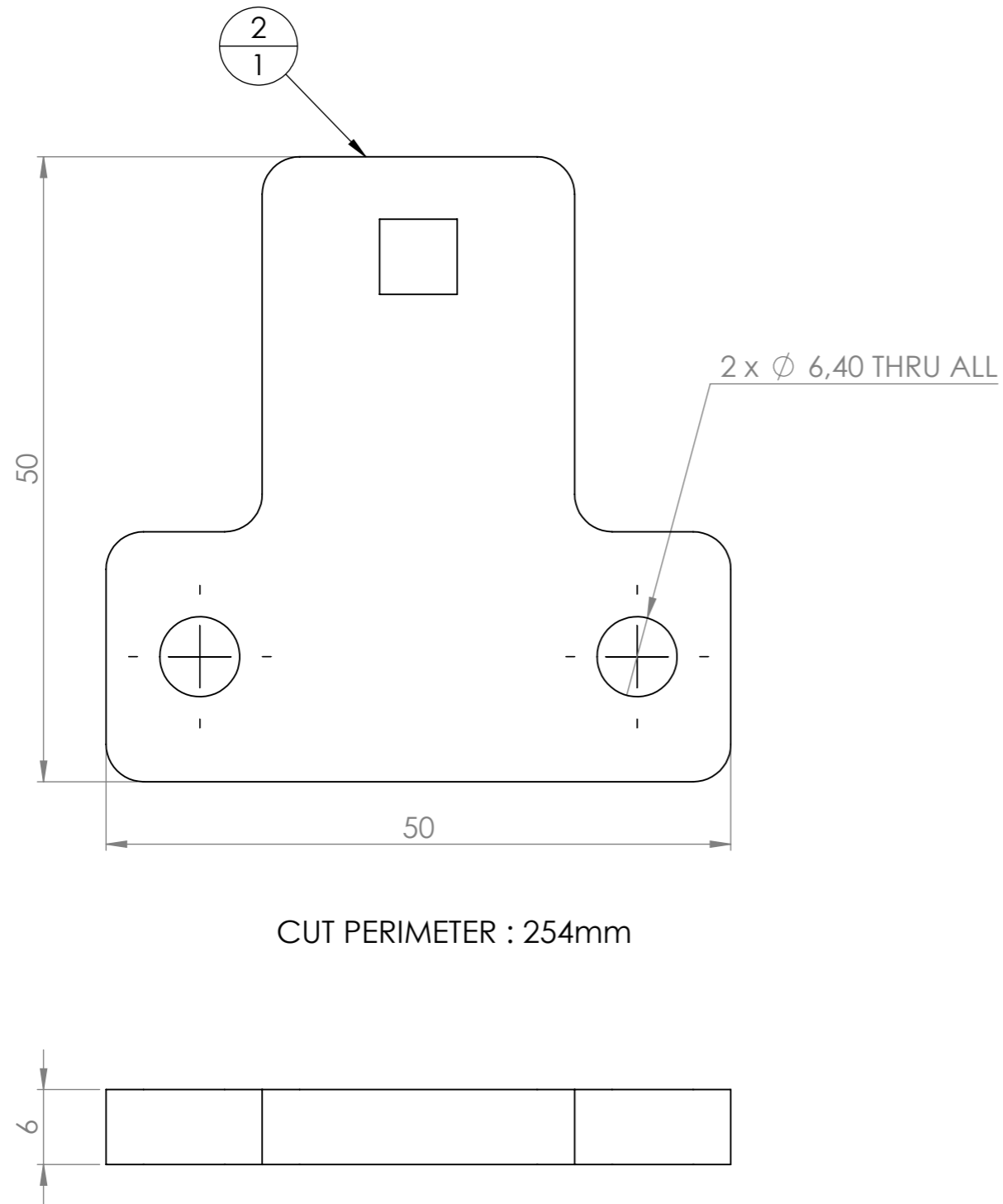


AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
3	0	PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0203 CYLINDER FIX	
				Nacrč Br.	
				003-P-0215-0001	A3
				MJERILO: 2:1	LIST 1 OD 2
				FILE: 003-P-0215-0001.SLDDRW	



MATERIAL: Plain Carbon Steel
MATERIAL CUSTOM: C0361
MASA: 0.09 kg



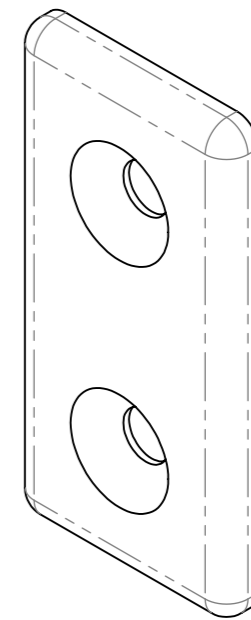
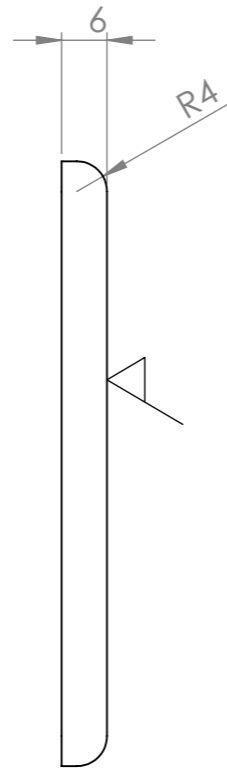
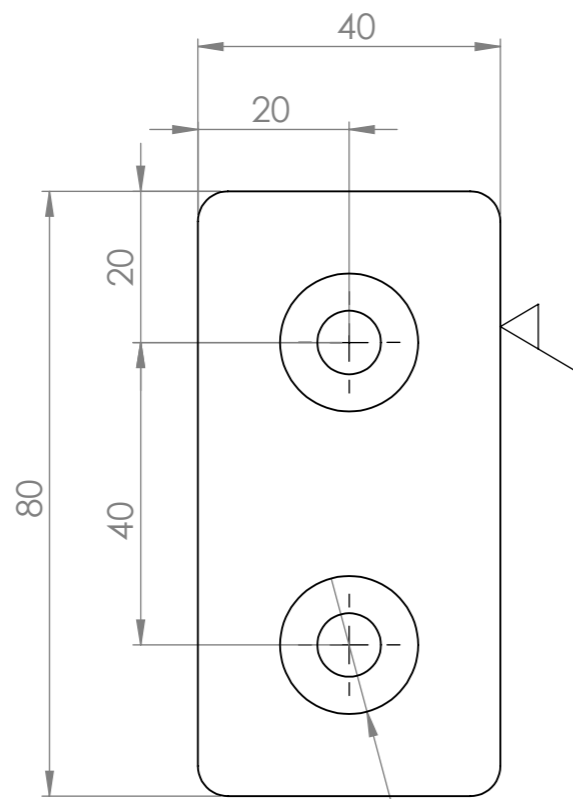
CUT PERIMETER : 119mm

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:		Komada (MI):		FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
3		0		PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:		003-A-0200	
				PR-003-2018		003-A-0203	
Ime i Prezime		Potpis		Datum	TITLE:		
Crtao M. Modrić				23.9.2018.	003-A-0203		
Kontrol. D. SKRLEC					CYLINDER FIX		
Odobr. D. SKRLEC							
MFG							
Q.A							
				MATERIAL:		Nacrč Br.	
				Plain Carbon Steel		003-P-0215-0001	
				MATERIAL CUSTOM:		A3	
				C0361			
				MASA: 0.09 kg		MJEILO: 2:1	
						LIST 2 OD 2	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

MACHINING

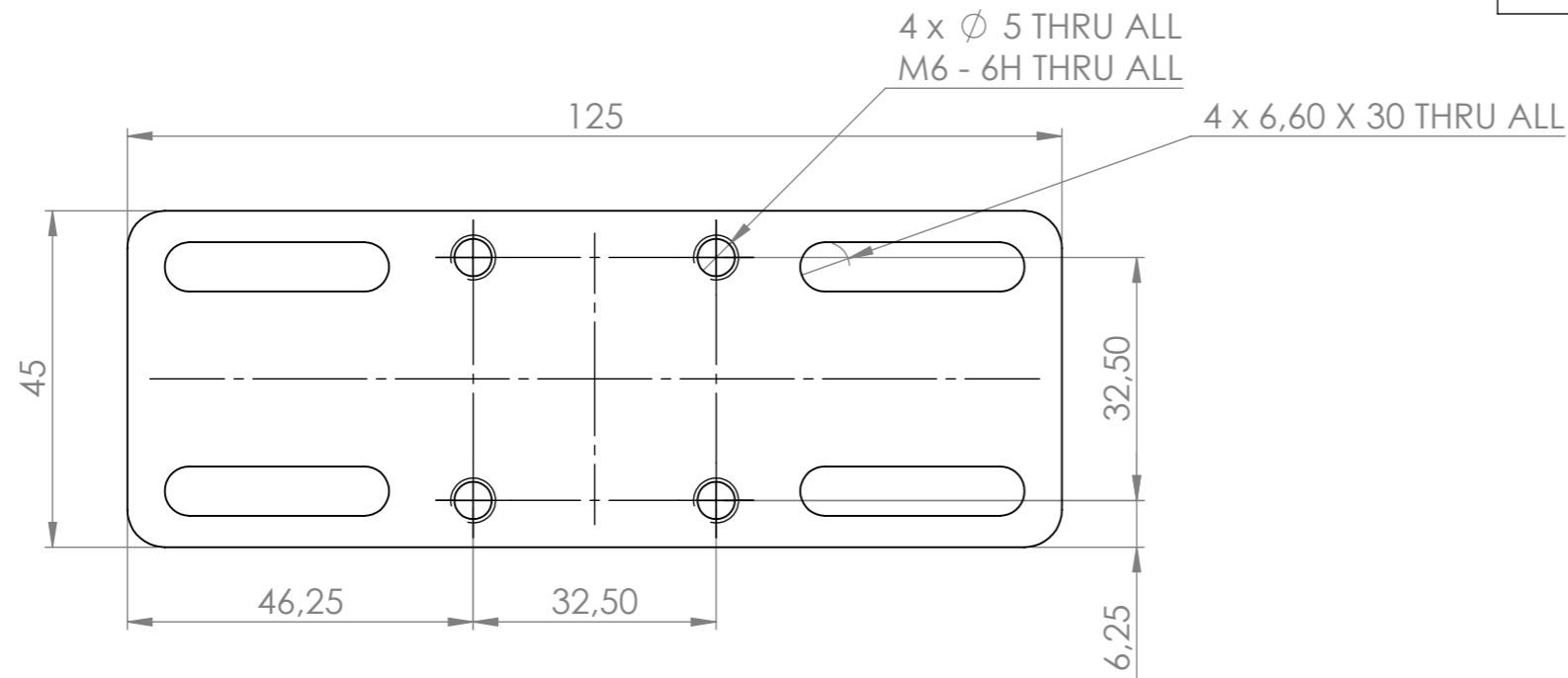


2 x ϕ 8,40 THRU ALL
 \surd ϕ 18,25 X 90°

AKO NIJE DRUGAČIJE NAZNAČENO:
 DIMENZIJE SU U MILIMETRIMA
 KVALITETA OBRADE: N9

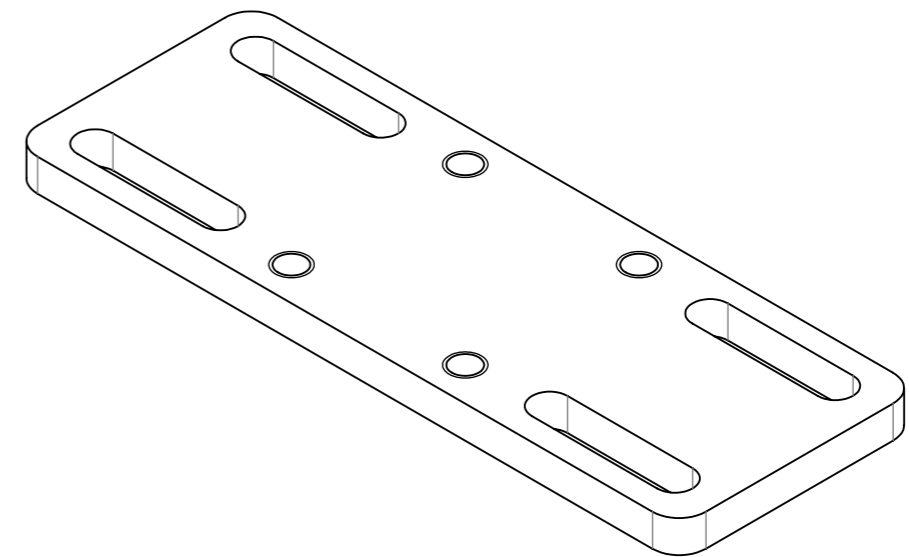
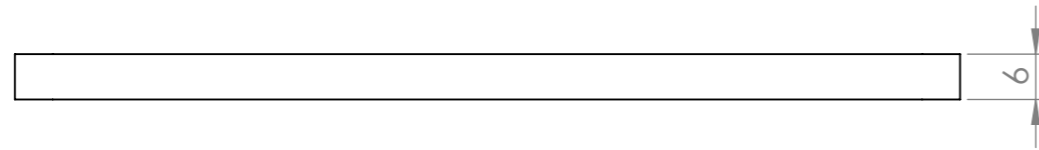
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16	0	-	-	Projekt Br:	PR-003-2018	003-A-0200	
Crtao	Ime i Prezime	Potpis	Datum	TITLE:		003-A-0201	
Kontrol.	M. Modrić		8.4.2018.	Belt Edge Holder			
Odobr.	L.RAZUM			Nacrč Br.		003-P-0216-0001	
MFG	D.ŠKRLEC			MATERIAL:		A3	
Q.A				CUSTOM:			
				MATERIAL:		PA Type 6	
				CUSTOM:		PA6	
MASA: 0.02 kg				MJEILO: 1:1		LIST 1 OD 1	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED



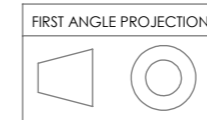
LASER CUT+MACHINING

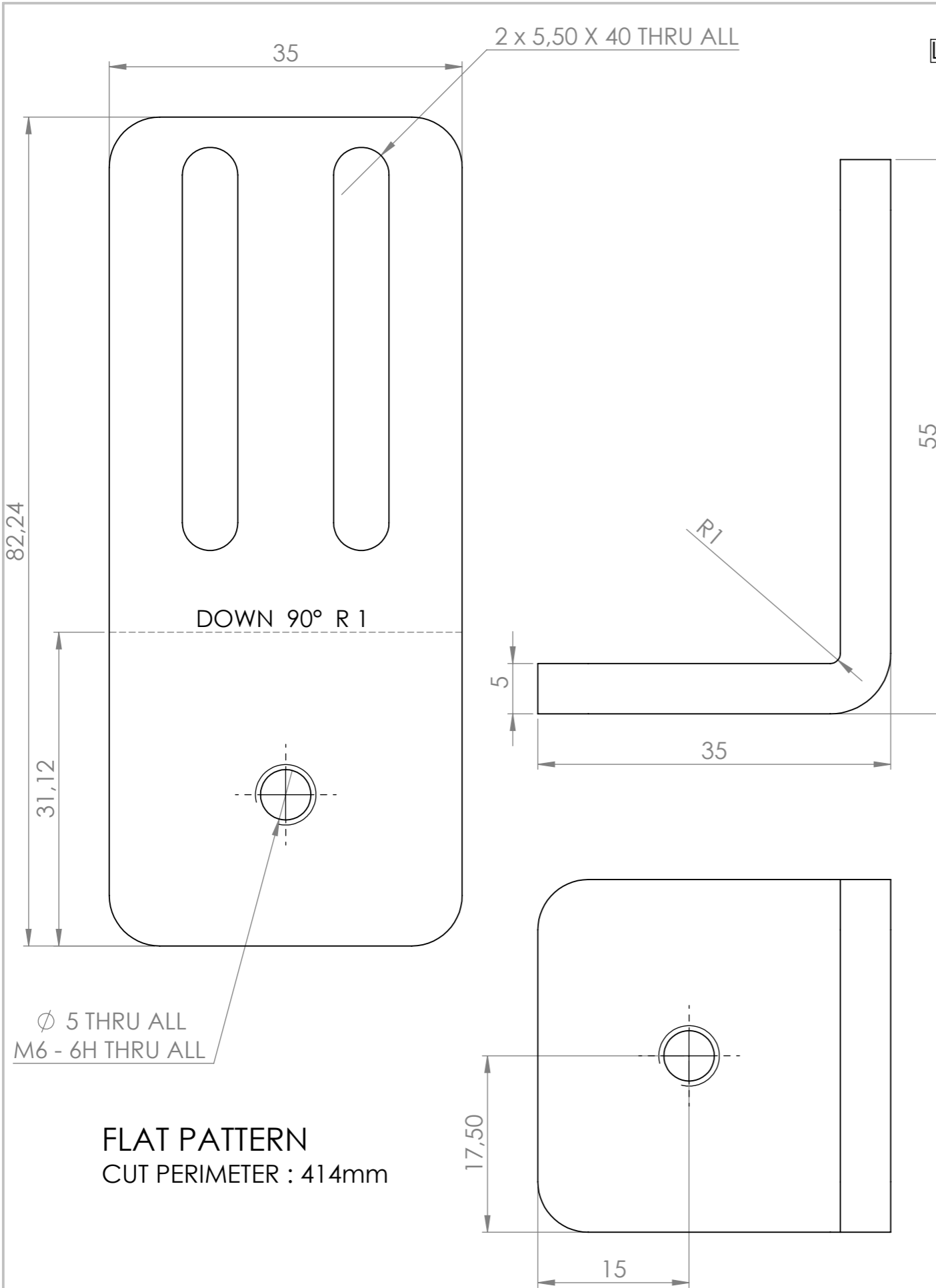
CUT PERIMETER : 664mm



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

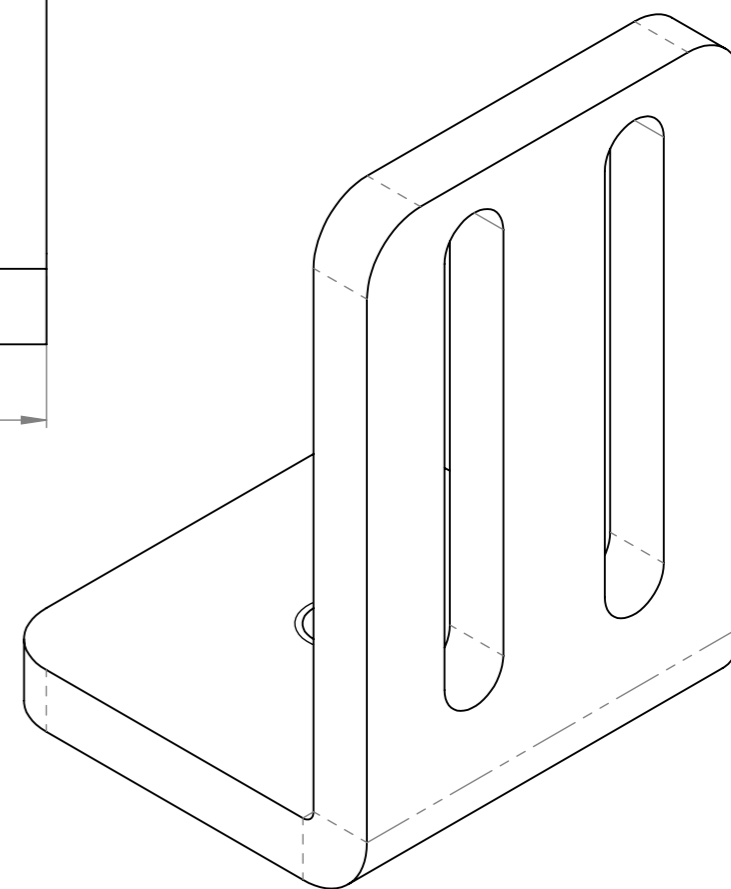
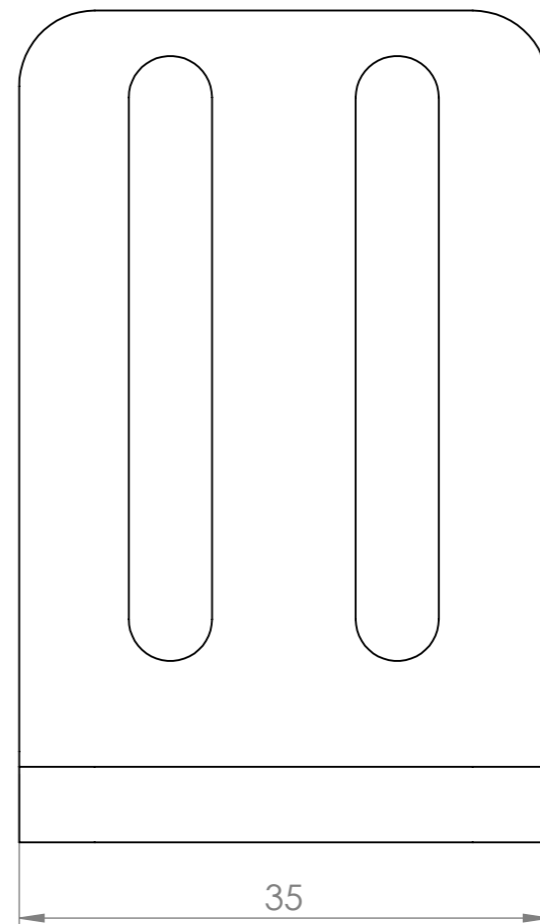
Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
3	0	PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
Crtao	Ime i Prezime	Potpis	Datum	TITLE:	
	M. Modrić		23.9.2018.	003-A-0200	
Kontrol.	D. SKRLEC			CYLINDER BOTTOM PLATE	
Odobr.	D. SKRLEC				
MFG					
Q.A					
		MATERIAL:	Plain Carbon Steel	Nacrč Br.	
		MATERIAL CUSTOM:	C0361	003-P-0217-0001	A3
		MASA: 0.22 kg		MJERILO: 1:1	LIST 1 OD 1





FLAT PATTERN
CUT PERIMETER : 414mm

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

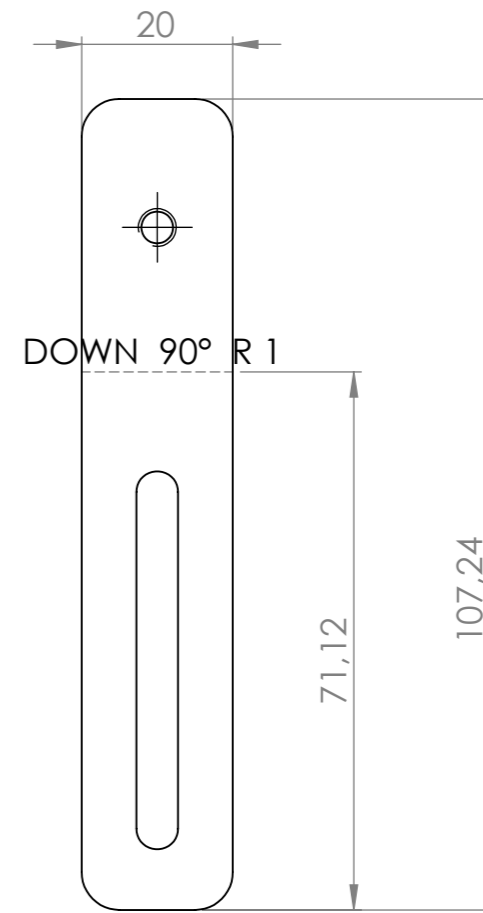
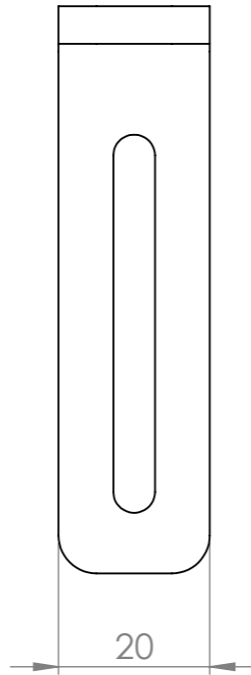
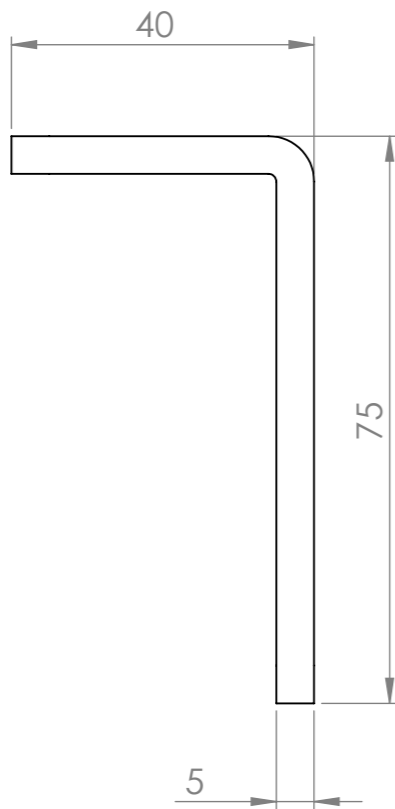
Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
6	0	PLASTIFICIRANO RAL 7035		ASEMO	A
Projekat Br:	003-A-0200				
Crtao			D. SKRLEC		
Kontrol.			D. SKRLEC		
Odobr.			D. SKRLEC		
MFG					
Q.A					
MATERIAL:			Plain Carbon Steel		
MATERIAL CUSTOM:			C0361		
MASA: 0.10 kg			Nacrč Br.		
ASEMO AUTOMATIZACIJA / RAČUNALNIŠTVO / ELEKTRONIKA			003-P-0218-0001		
MATERIJAL: 0361			A3		
MJEŠTO: 2:1			LIST 1 OD 1		

003-A-0200
BRACKET

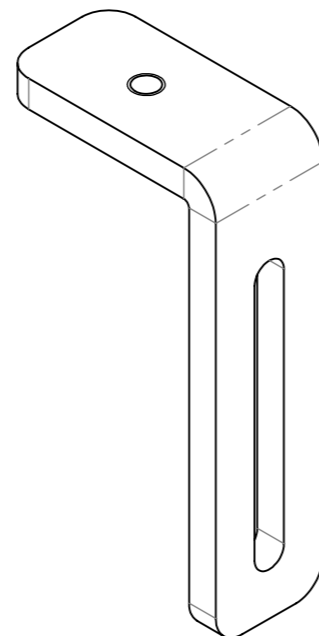
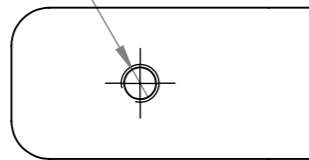
003-P-0218-0001

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT



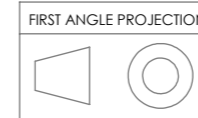
Ø 4,20 THRU ALL
M5 - 6H THRU ALL



FLAT PATTERN
CUT PERIMETER : 402mm

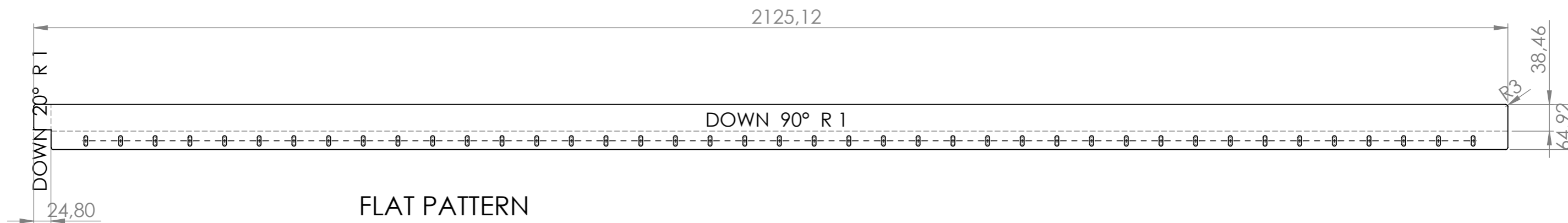
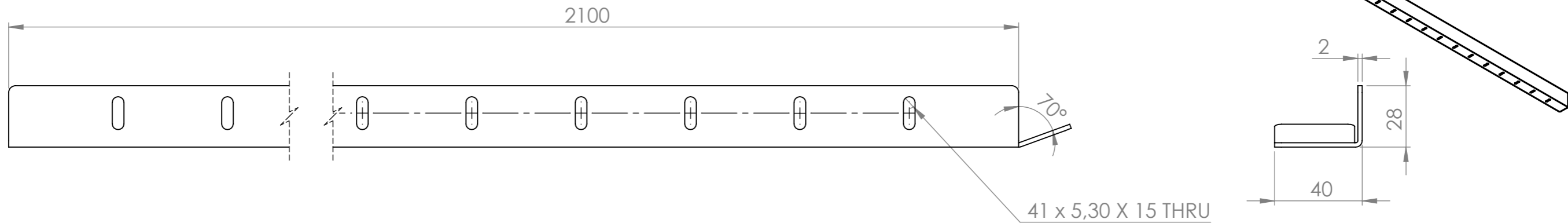
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
23	0	PLASTIFICIRANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0200
Crtao	Ime i Prezime	Potpis	Datum	TITLE:	
	M.ŽEGREC		8.4.2018.	003-A-0201	
Kontrol.	L.RAZUM			L BRACKET	
Odobr.	D.ŠKRLEC				
MFG					
Q.A					
			MATERIAL:	Nacrč Br.	
			MATERIAL:	003-P-0219-0001	A3
			Alloy Steel		
			Č 0361		
			MAŠA: 71.846 kg	MJERILO: 1:1	LIST 1 OD 1



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT



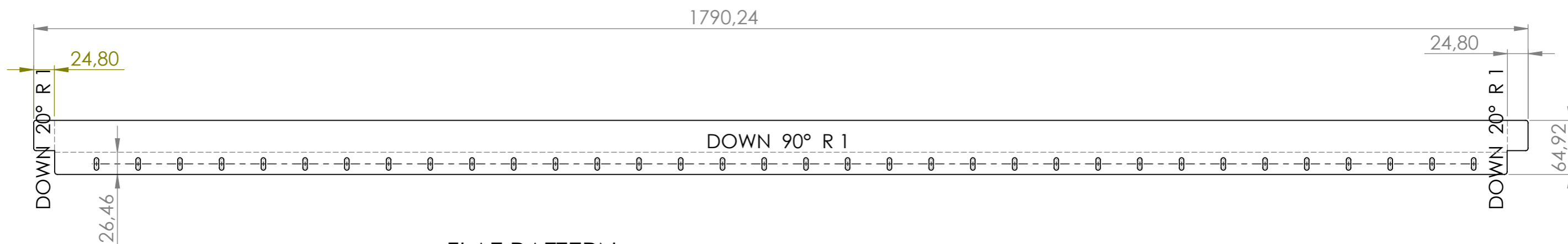
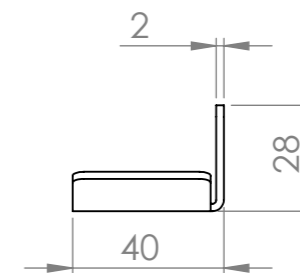
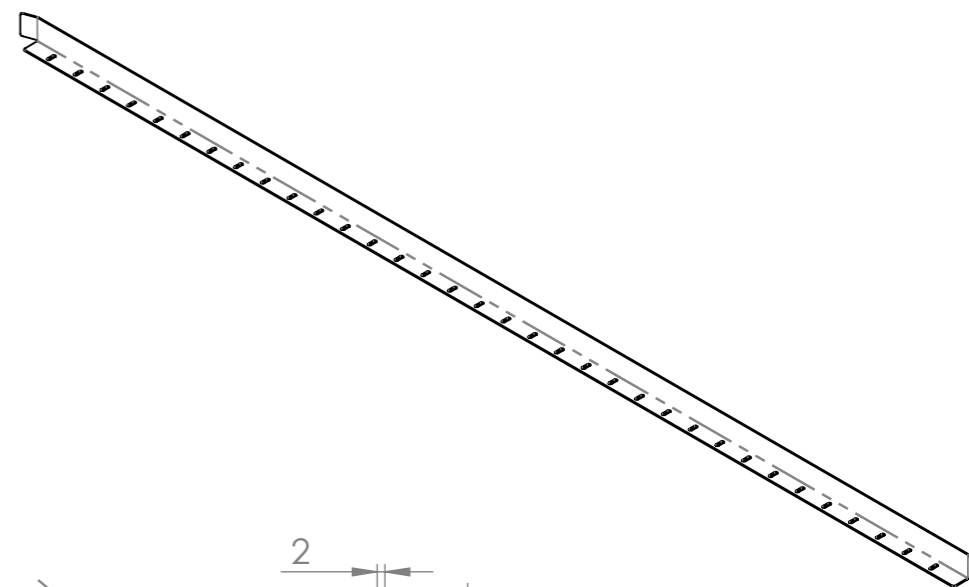
FLAT PATTERN
 CUT PERIMETER : 5852mm
 SCALE: 1:6

AKO NIJE DRUGAČIJE NAZNAČENO:
 DIMENZIJE SU U MILIMETRIMA
 KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1	0	PLASTIFICIRANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0200
Crtao	Ime i Prezime	Potpis	Datum	TITLE:	
Kontrol.	M. Modrić		8.4.2018.	003-A-0201	
Odobr.	L.RAZUM			BOX GUIDE	
MFG	D.ŠKRLEC			Nacrč Br.	
Q.A				003-P-0220-0001	A3
MATERIAL:			Plain Carbon Steel	MJEILO: 1:2	
MATERIAL CUSTOM:			Č 0361	LIST 1 OD 1	
MASA: 2.10 kg				FILE: 003-P-0220-0001.SLDDRW	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

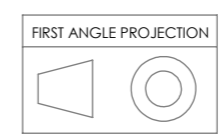
LASER CUT



FLAT PATTERN
 CUT PERIMETER : 4928mm
 SCALE: 1:5

AKO NIJE DRUGAČIJE NAZNAČENO:
 DIMENZIJE SU U MILIMETRIMA
 KVALITETA OBRADE: N9

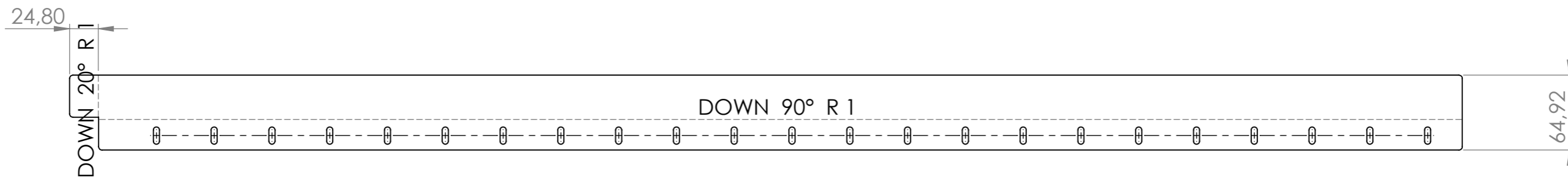
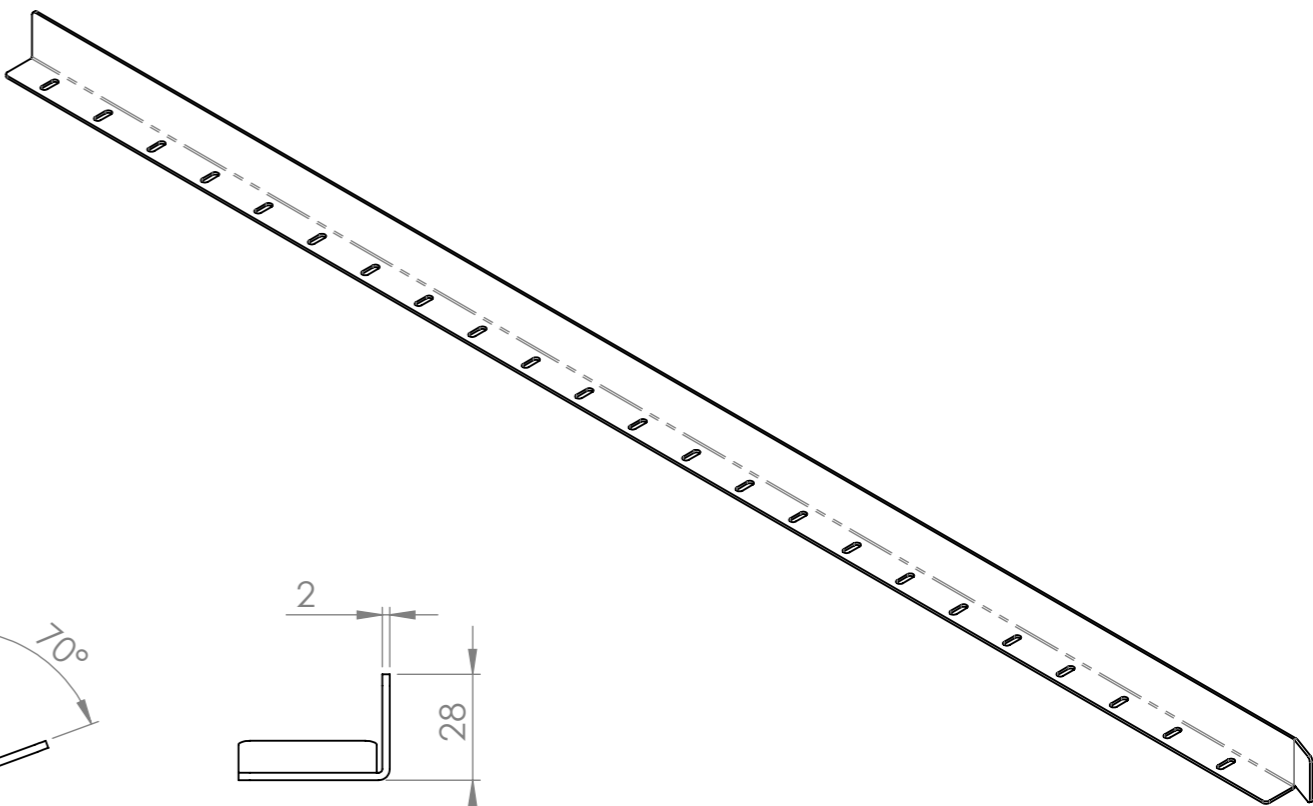
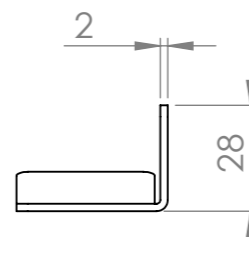
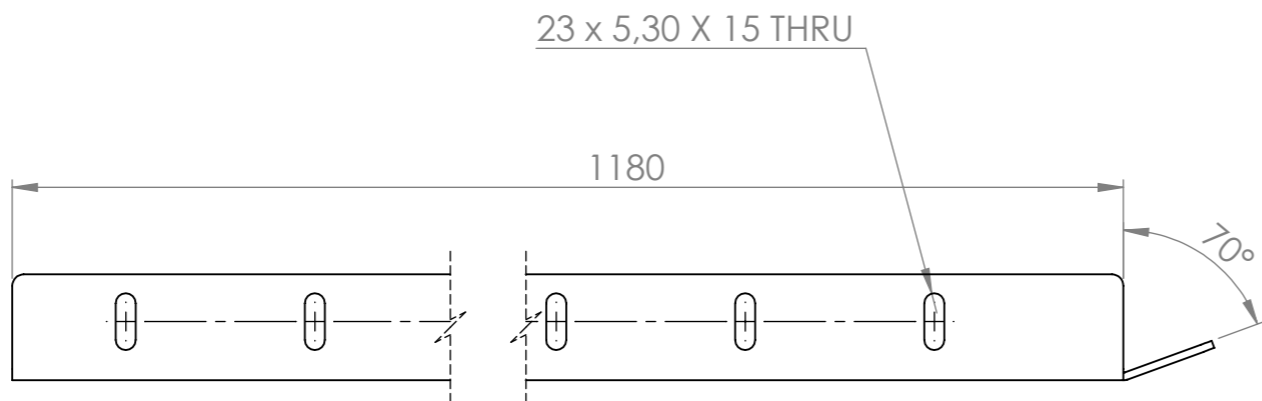
Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1	0	PLASTIFICIRANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0201 BOX GUIDE	
				Nacrč Br.	
				003-P-0220-0002	A3
				MJERILO: 1:2	LIST 1 OD 1
				FILE: 003-P-0220-0002.SLDDRW	



MATERIAL: Plain Carbon Steel
 MATERIAL CUSTOM: Č 0361
 MASA: 0.23 kg

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

LASER CUT



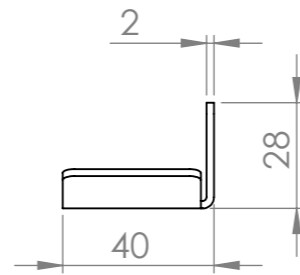
FLAT PATTERN
 CUT PERIMETER : 3363mm
 SCALE: 1:4

AKO NIJE DRUGAČIJE NAZNAČENO:
 DIMENZIJE SU U MILIMETRIMA
 KVALITETA OBRADE: N9

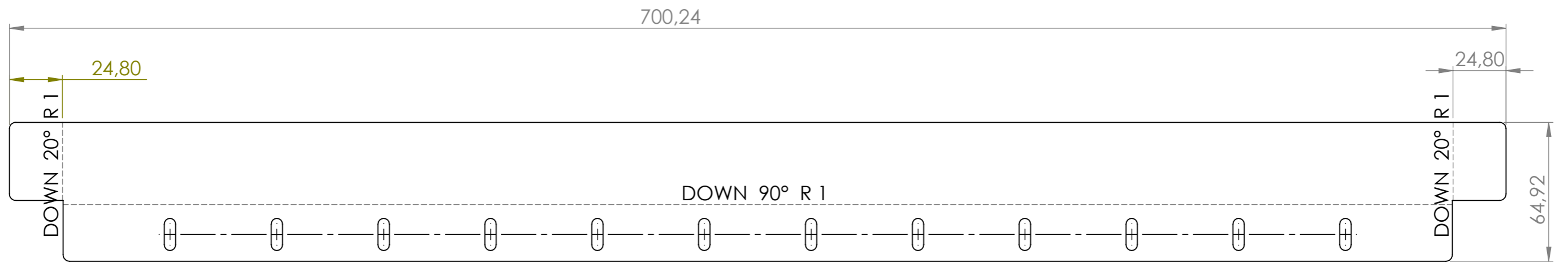
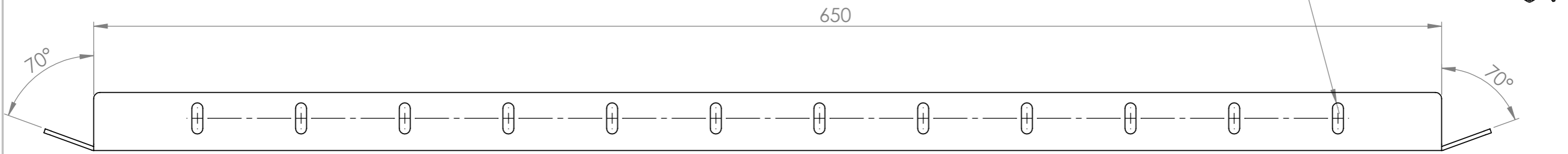
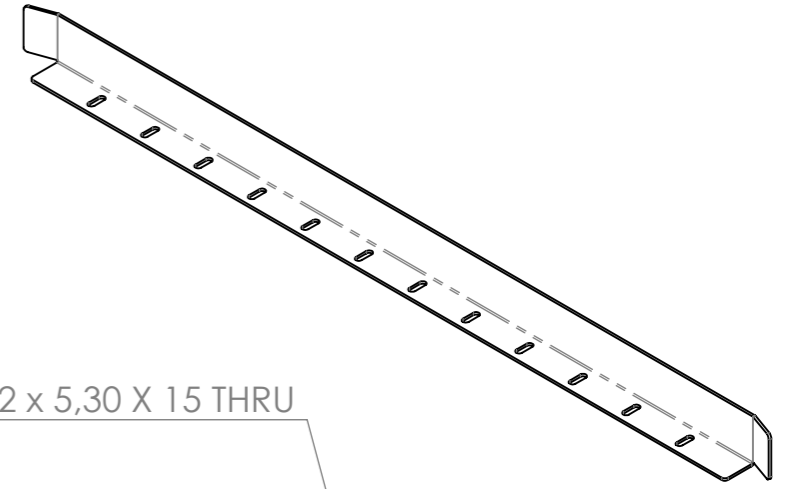
Komada: 1		Komada (MI):	FINISH: PLASTIFICIRANO RAL 7035	SKINUTI SVE OŠTRE BRIDOVE	Klijent: ASEMO/TKD	REVISION: A	
Crtao: M. Modrić		Potpis:	Datum: 8.4.2018.	FIRST ANGLE PROJECTION 	Projekt Br: PR-003-2018	003-A-0200	
Kontrol: L.RAZUM					TITLE: 003-A-0201	BOX GUIDE	
Odobr: D.ŠKRLEC					MATERIAL: Plain Carbon Steel	Nacrč Br: 003-P-0220-0003	A3
MFG:					MATERIAL CUSTOM: Č 0361	MJERILO: 1:2	LIST 1 OD 1
Q.A:				MASA: kg	FILE: 003-P-0220-0003.SLDDRW		

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

LASER CUT



12 x 5,30 X 15 THRU



FLAT PATTERN
CUT PERIMETER : 1955mm

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

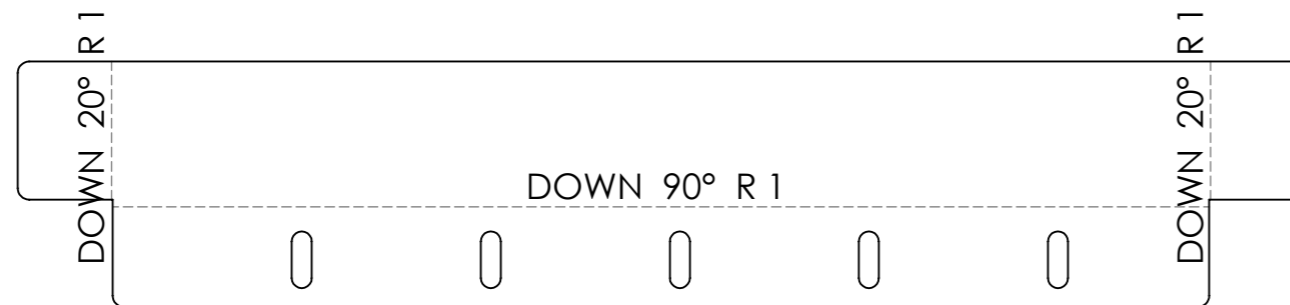
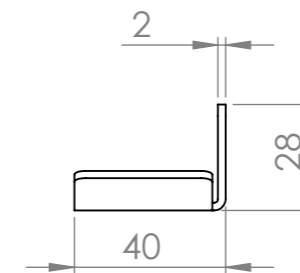
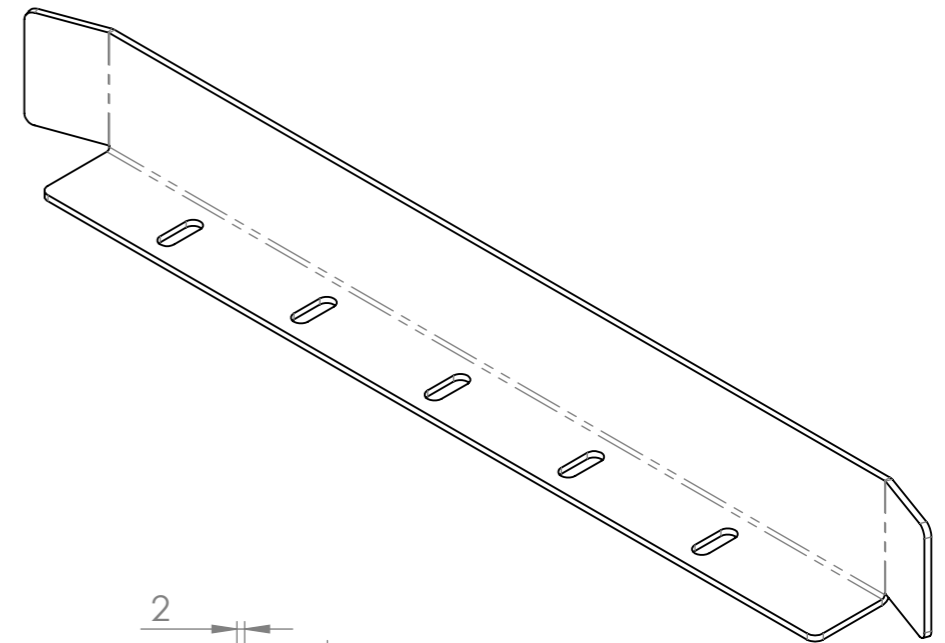
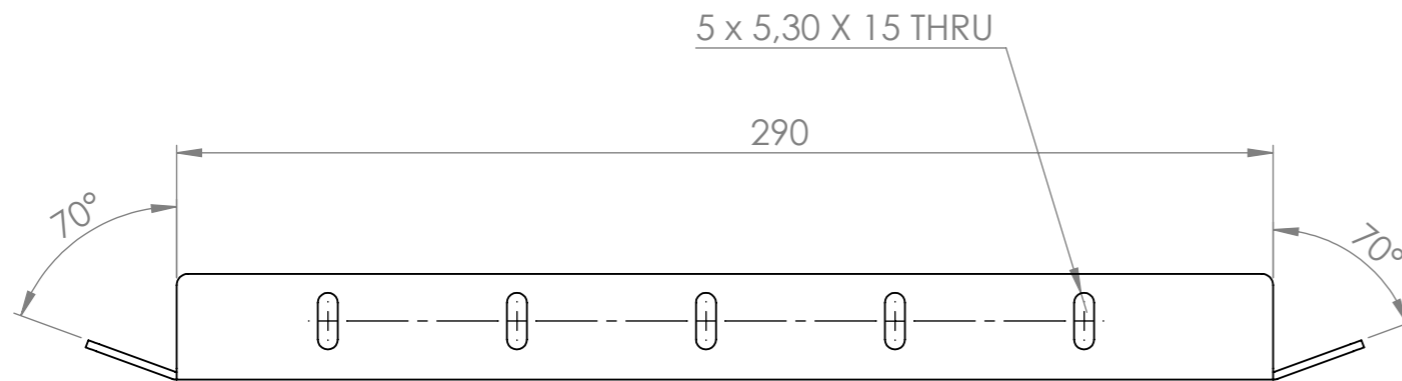
Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1		PLASTIFICIRANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0201 BOX GUIDE	
				Nacrč Br.	
				003-P-0220-0004	A3
				MJERILO: 1:2	LIST 1 OD 1



MATERIAL: Plain Carbon Steel
MATERIAL CUSTOM: Č 0361
MASA: kg

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

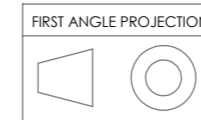
LASER CUT



FLAT PATTERN
CUT PERIMETER : 1955mm

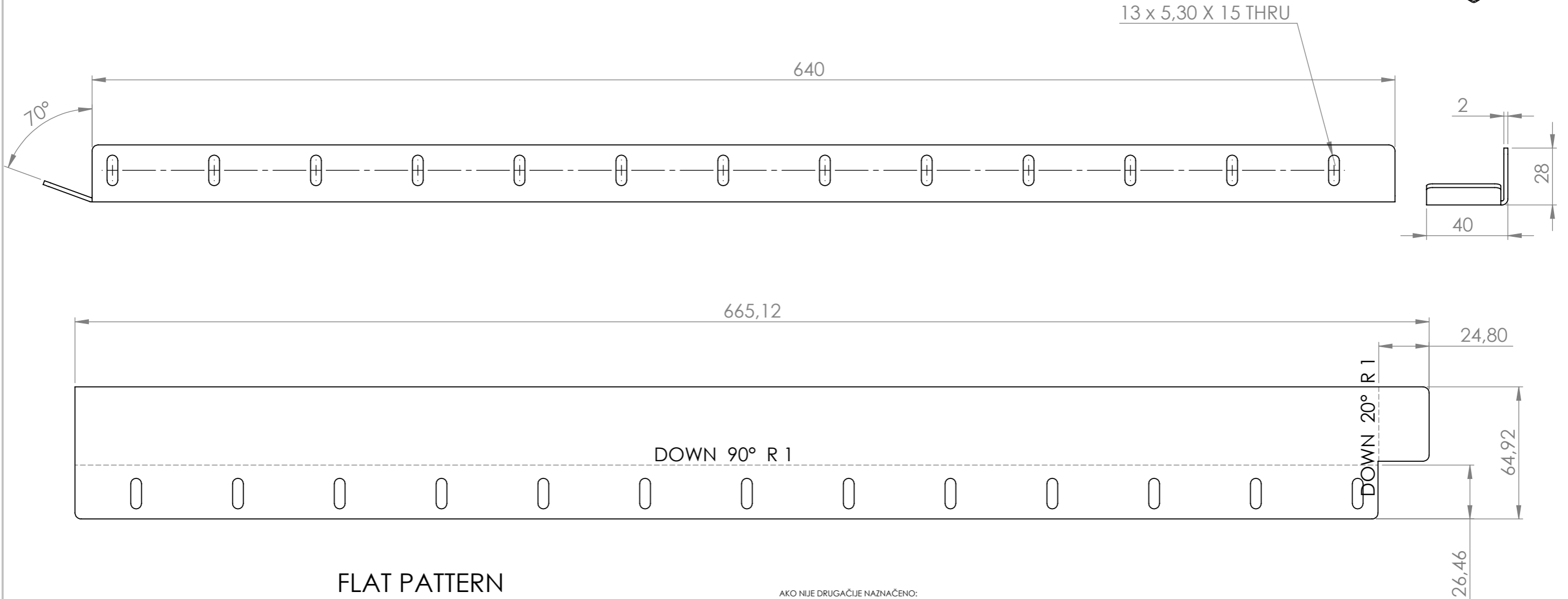
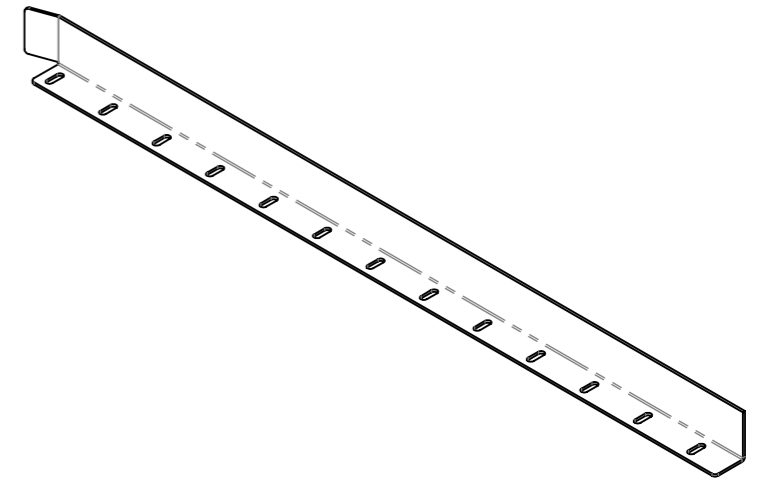
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADJE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO/TDK	REVISION	A
1		PLASTIFICIRANO RAL 7035		Projekt Br:	PR-003-2018	003-A-0200	
Crtao	Ime i Prezime	Potpis	Datum	TITLE:			
	M. Modrić		8.4.2018.	003-A-0201			
Kontrol.	L.RAZUM			BOX GUIDE			
Odobr.	D.ŠKRLEC			Nacrč Br.			
MFG				003-P-0220-0005			
Q.A				A3			
MATERIAL:		Plain Carbon Steel		MJEILO: 1:2			
MATERIAL CUSTOM:		Č 0361		LIST 1 OD 1			
MASA: kg				FILE: 003-P-0220-0005.SLDDRW			



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

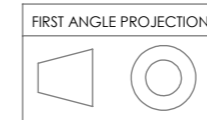
LASER CUT



FLAT PATTERN
 CUT PERIMETER : 1924mm
 SCALE: 1:2

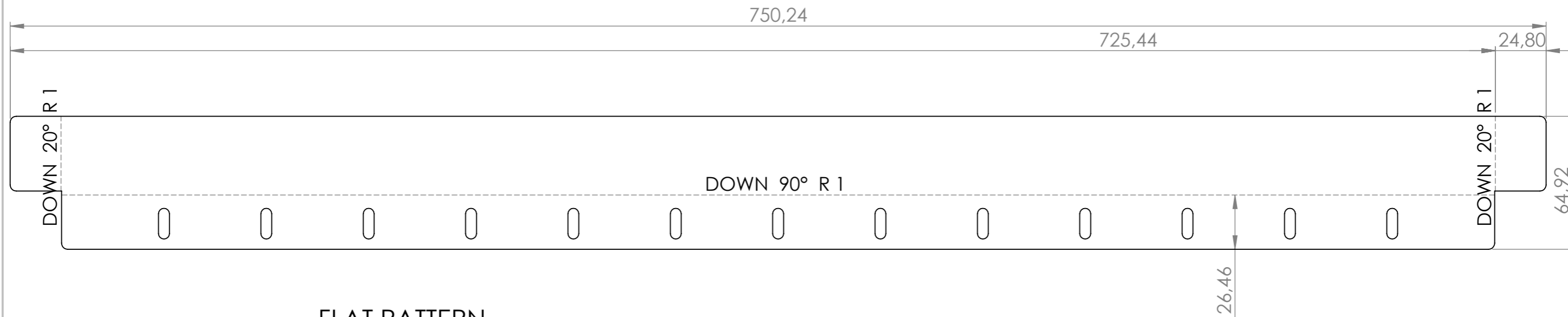
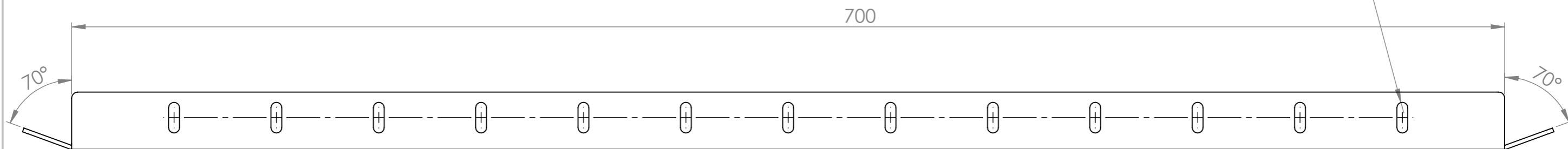
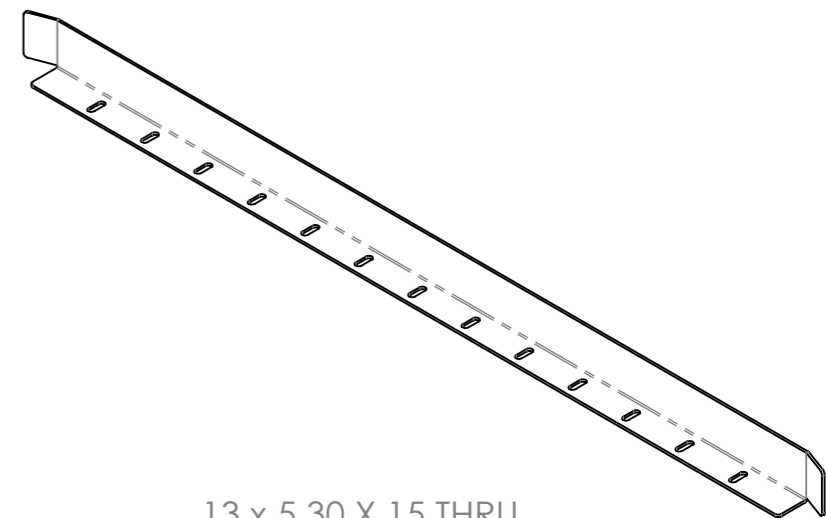
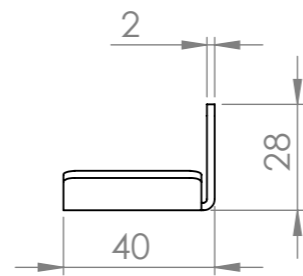
AKO NIJE DRUGAČIJE NAZNAČENO:
 DIMENZIJE SU U MILIMETRIMA
 KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1		PLASTIFICIRANO RAL 7035		ASEMO/TKD	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0201	
				BOX GUIDE	
				Nacrtn Br.	
				003-P-0220-0006	A3
				MJERILO: 1:2	LIST 1 OD 1
				FILE: 003-P-0220-0006.SLDDRW	



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
-	-	See 0001	-	-

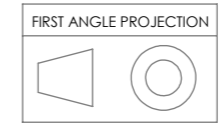
LASER CUT



FLAT PATTERN
 CUT PERIMETER : 2091mm
 SCALE: 1:2

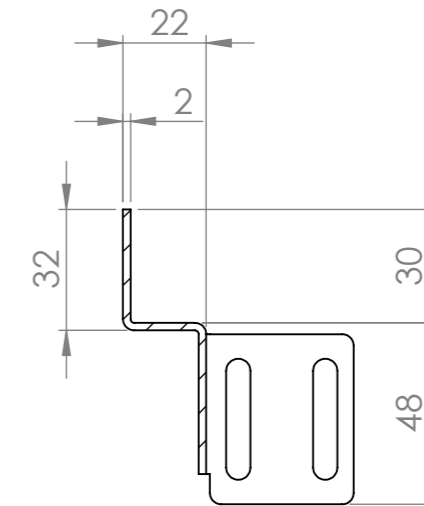
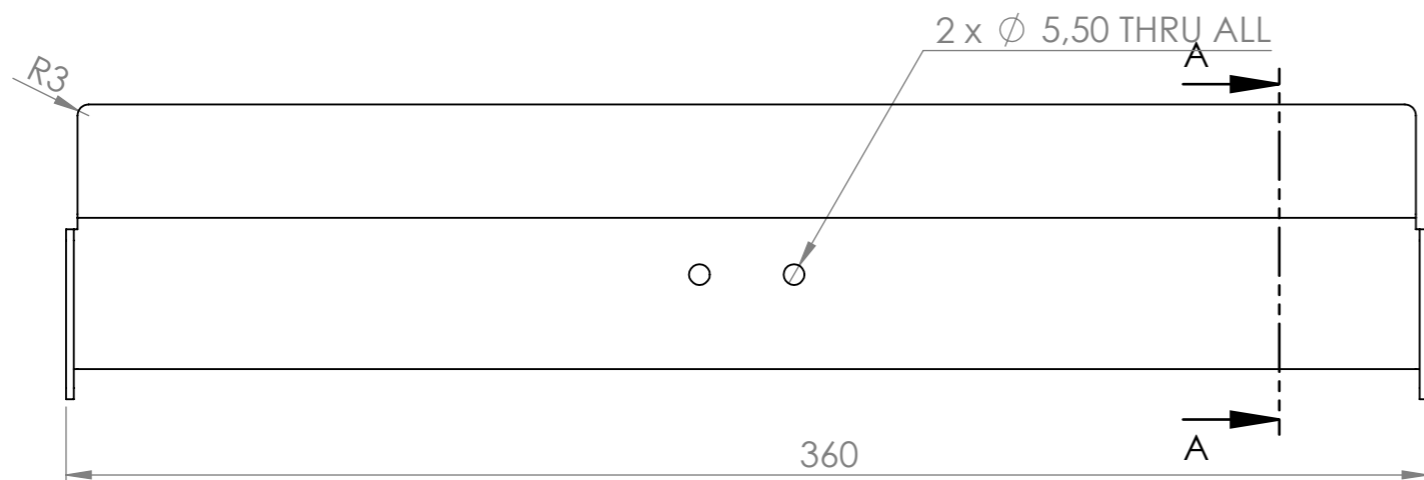
AKO NIJE DRUGAČIJE NAZNAČENO:
 DIMENZIJE SU U MILIMETRIMA
 KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
2		PLASTIFICIRANO RAL 7035		ASEMO/TKD	A
Crtao		Potpis	Datum	Projekt Br:	
M. Modrić			8.4.2018.	PR-003-2018	003-A-0200
Kontrol.				TITLE:	
L.RAZUM				003-A-0201	
Odobr.				BOX GUIDE	
D.ŠKRLEC				Nacrč Br.	
MFG				003-P-0220-0007	
Q.A				MATERIJAL:	A3
				MATERIAL:	
				Plain Carbon Steel	
				MATERIAL CUSTOM:	
				Č 0361	
				MASA: kg	
				MJERILO: 1:2	LIST 1 OD 1

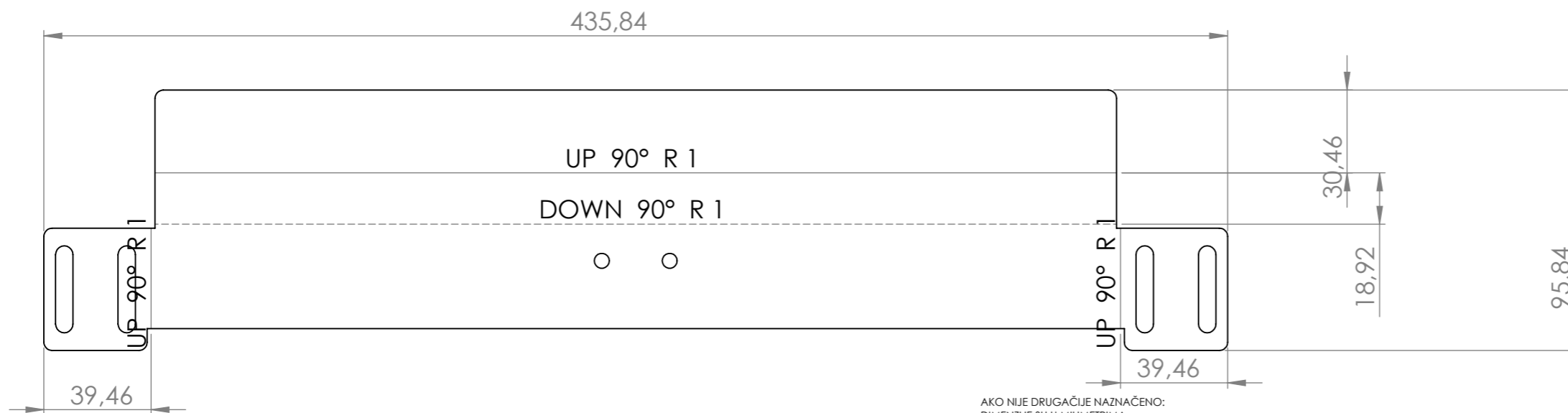
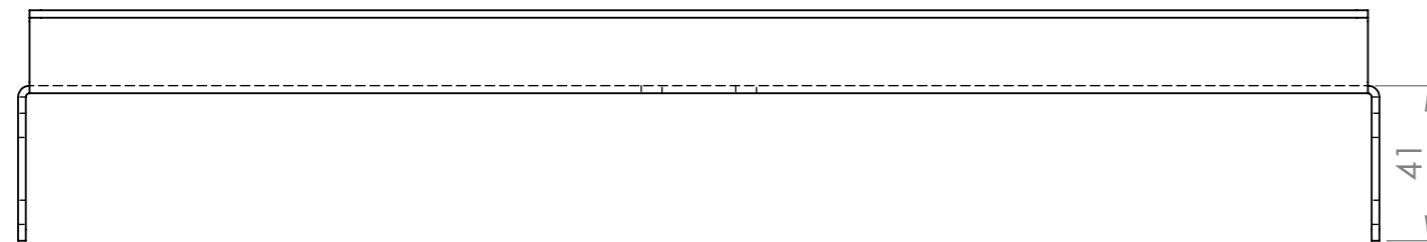


REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT



SECTION A-A



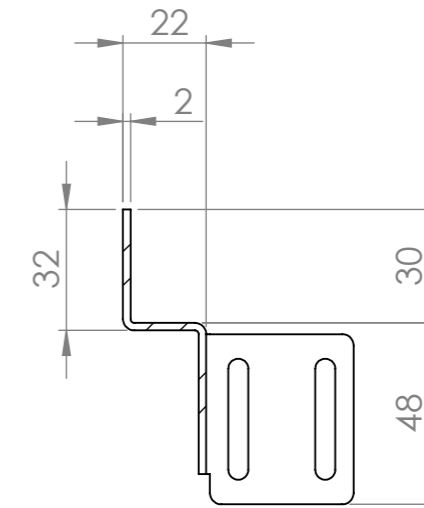
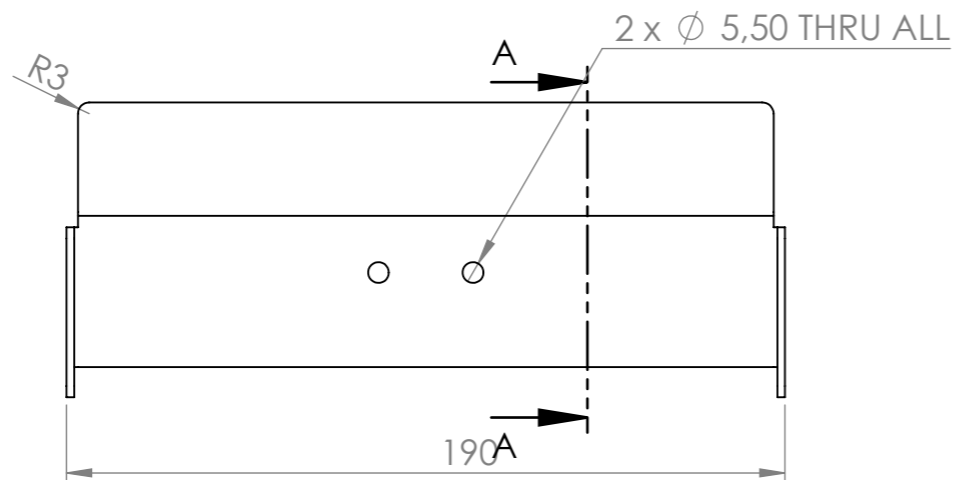
FLAT PATTERN
CUT PERIMETER : 1389mm

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

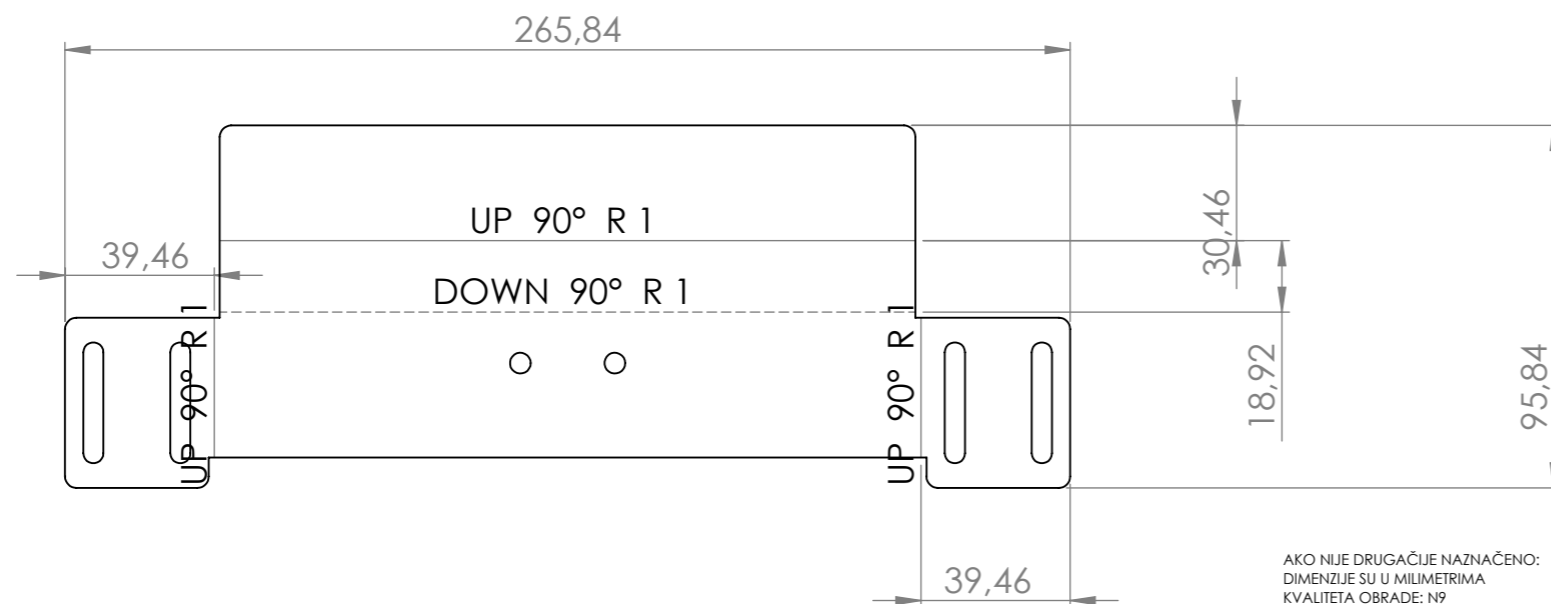
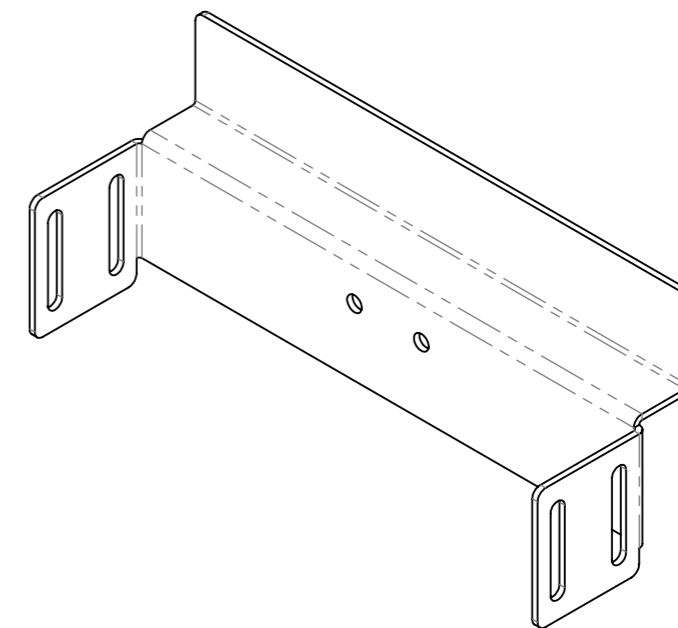
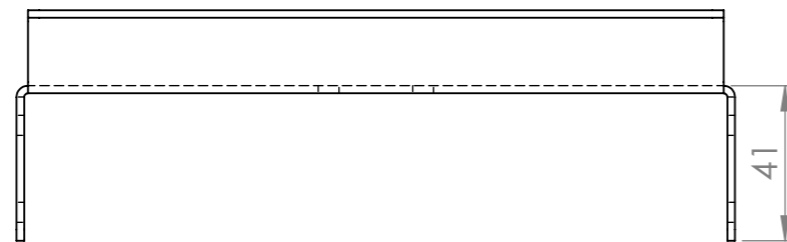
Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
2	0	PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0201 END PLATE	
				Nacrč Br.	A3
				003-P-0221-0001	
				MATERIJAL:	
				Material <not specified>	
				CUSTOM:	
				C0361	
				MASA: 0.53 kg	
				MJERILO: 1:2	
				LIST 1 OD 1	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT



SECTION A-A

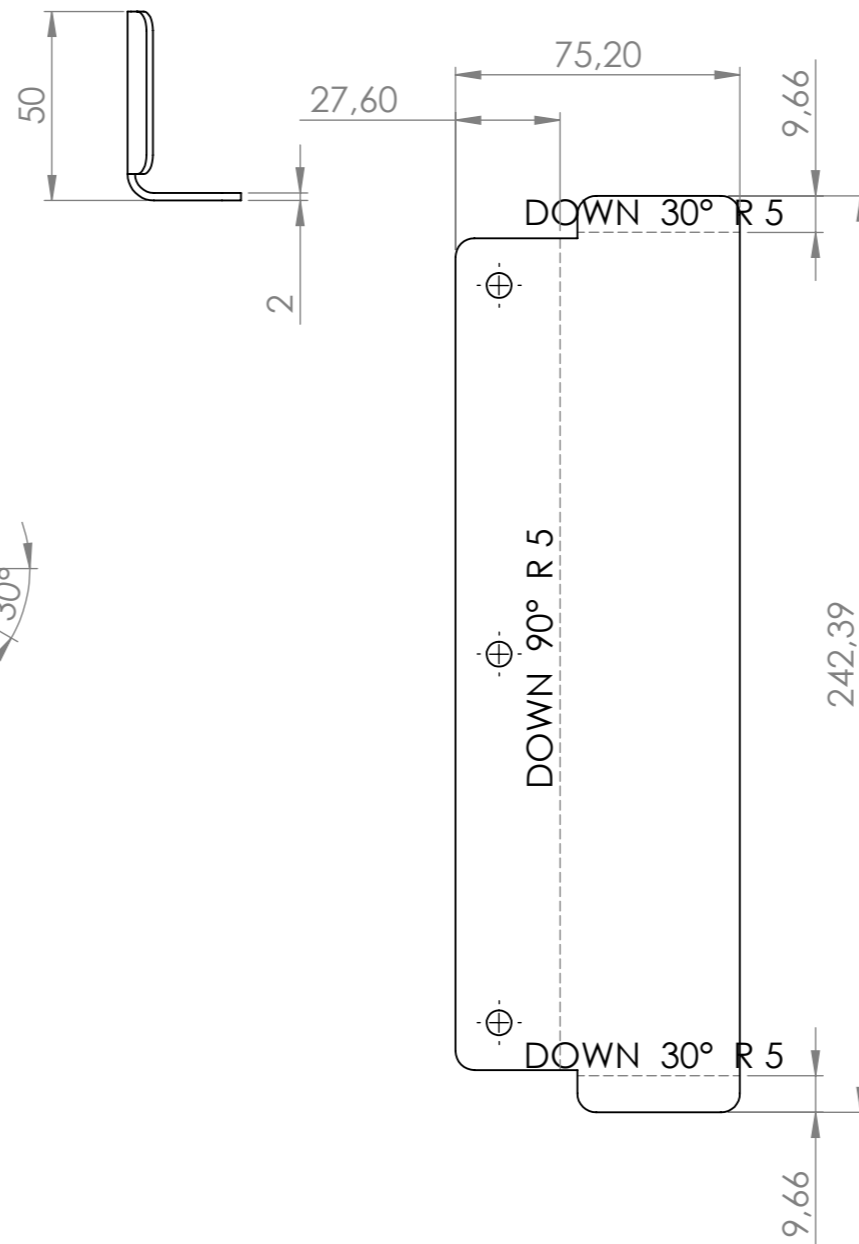
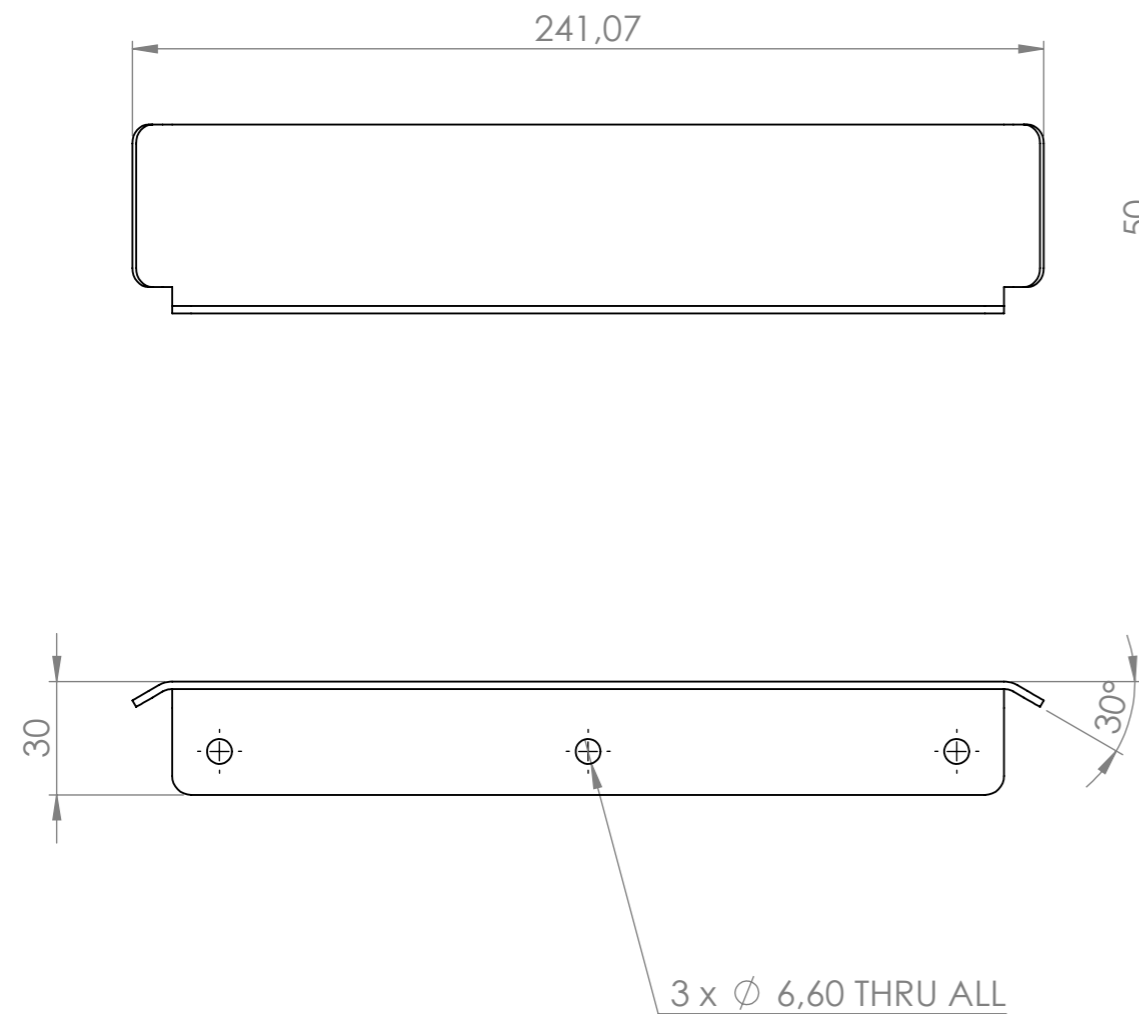


FLAT PATTERN
CUT PERIMETER : 1044mm

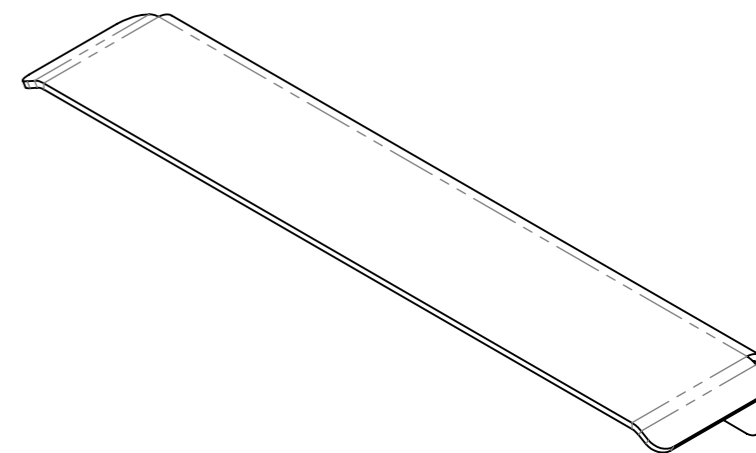
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1	0	PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
Crtao	Ime i Prezime	Potpis	Datum	TITLE:	
	M. Modrić		8.4.2018.	003-A-0201	
Kontrol.	L.RAZUM			END PLATE	
Odobr.	D.ŠKRLEC				
MFG				Nacrč Br.	
Q.A				003-P-0221-0002	A3
MATERIAL: Material <not specified>					
MATERIA: C0361					
CUSTOM: MASA: 0.30 kg					
				MJERILO: 1:2	LIST 1 OD 1

LASER CUT



FLAT PATTERN
CUT PERIMETER : 685mm



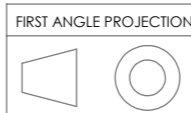
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
4	0	PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0200	
				STOPER	
				Nacrč Br.	
				003-P-0222-0001	A3
				MJERILO: 1:2	LIST 1 OD 1



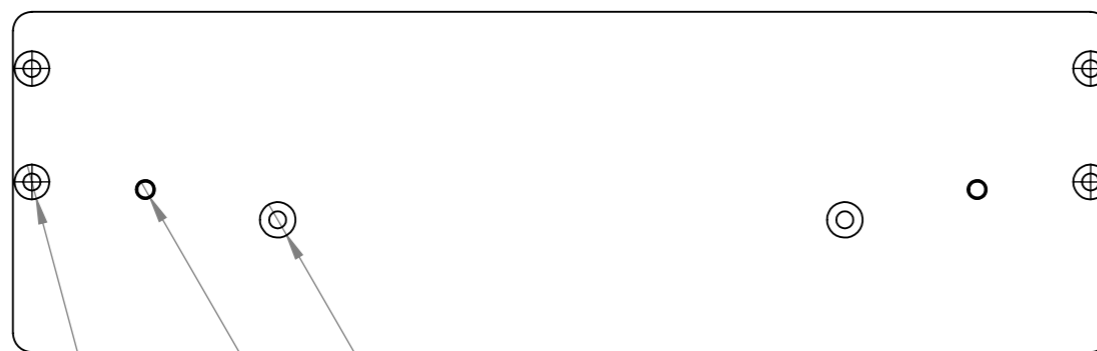
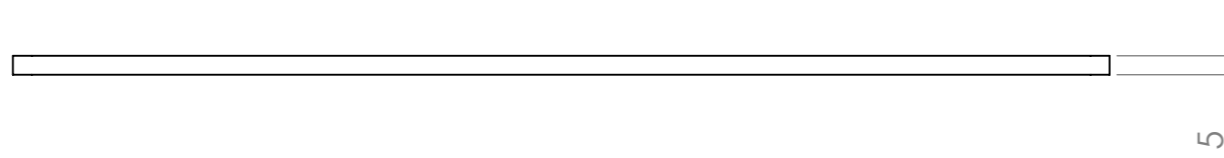
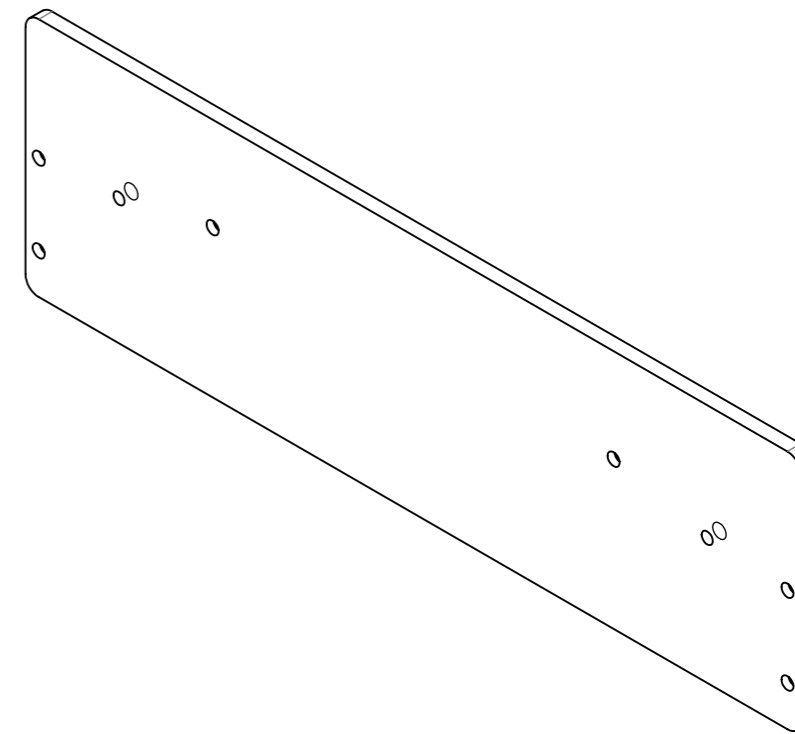
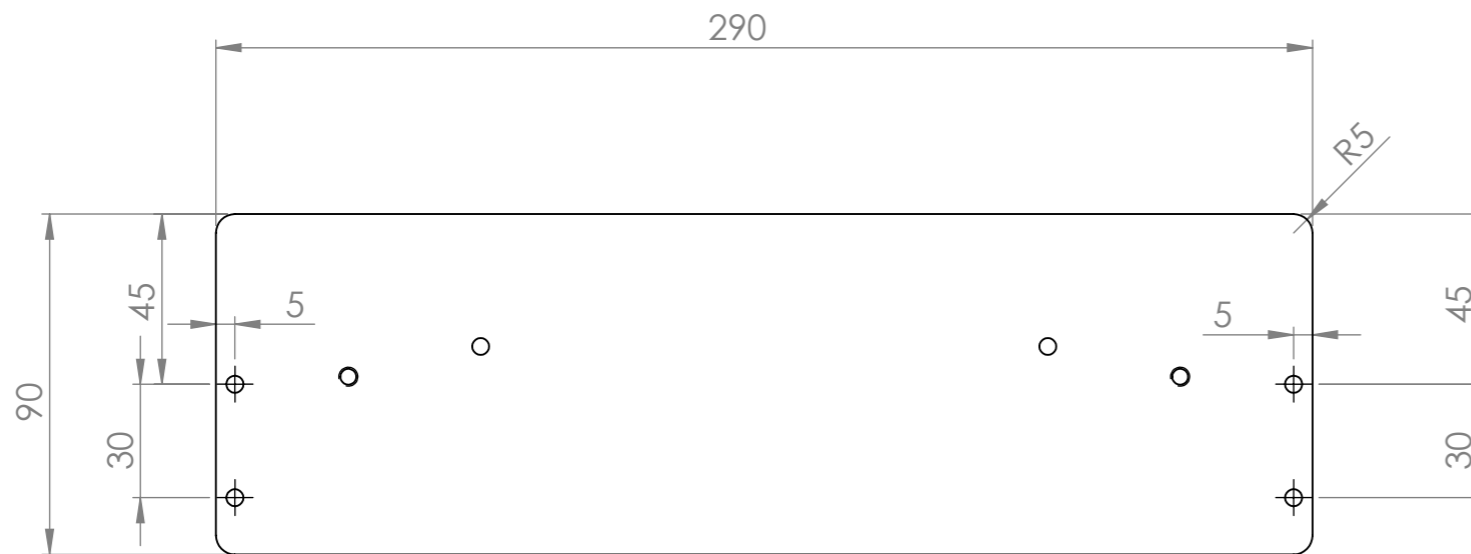
MATERIAL: Plain Carbon Steel
MATERIAL CUSTOM: C0361
MASA: 0.27 kg



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT+MACHINING

CUT PERIMETER : 863mm



2 x 4,50 X 1 ∇ 10,10
 ∇ 9,40 X 90°

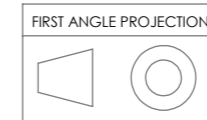
2 x ϕ 4,20 THRU ALL
M5 - 6H ∇ 16

∇ ϕ 5,05 X 90°, Near Side

4 x ϕ 4,50 THRU
 ∇ ϕ 9,18 X 90°

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1	0	PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0201 END PLATE	
				Nacrč Br.	A3
				003-P-0223-0001	
				MJERILO: 1:2	LIST 1 OD 1
				FILE: 003-P-0223-0001.SLDDRW	

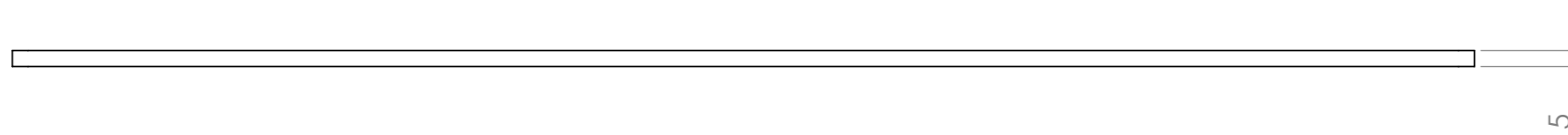
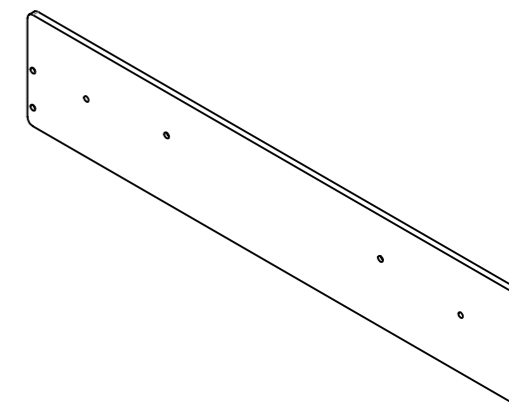


MATERIAL: Material <not specified>
MATERIAL: C0361
CUSTOM: MASA: 1.01 kg

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

LASER CUT+MACHINING

CUT PERIMETER : 1203mm



2 x 4,50 X 1 ∇ 10,10
∇ 9,40 X 90°

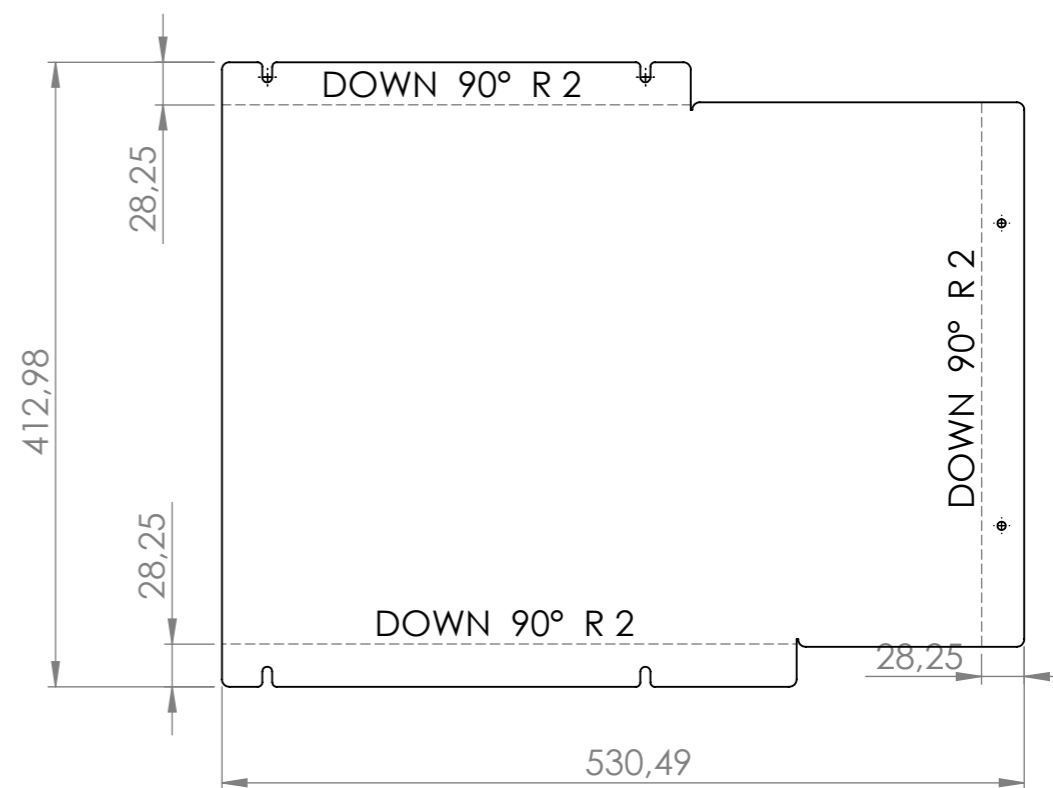
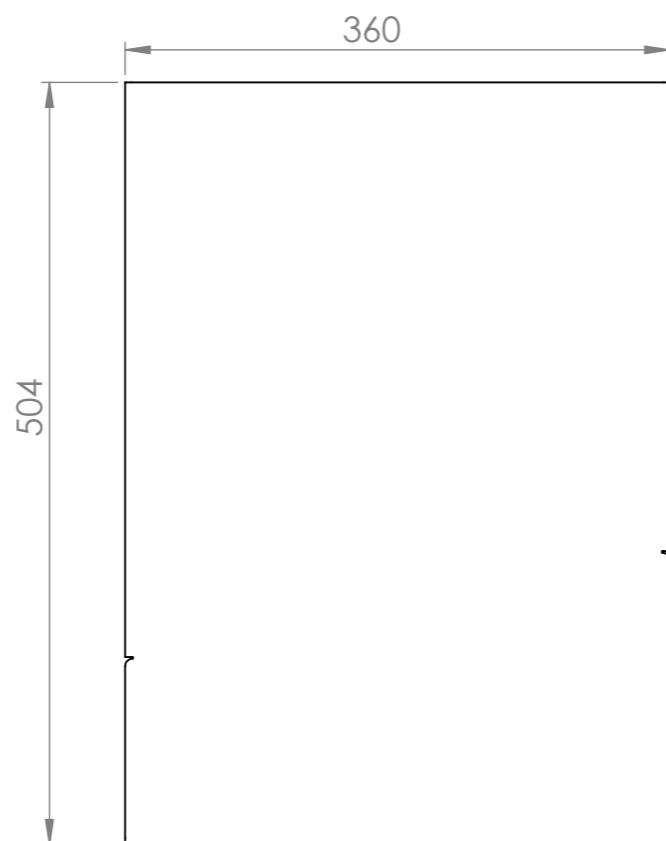
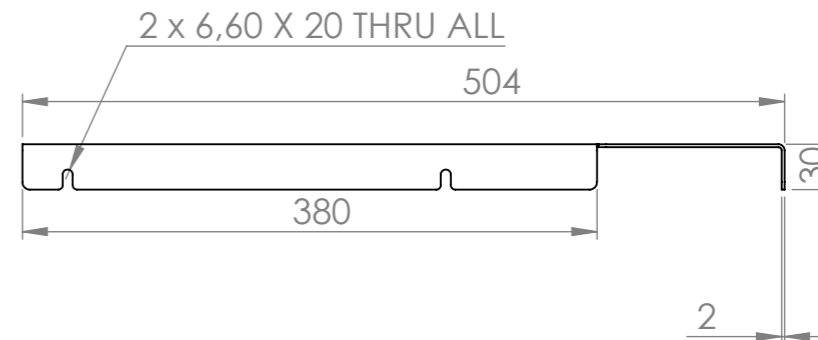
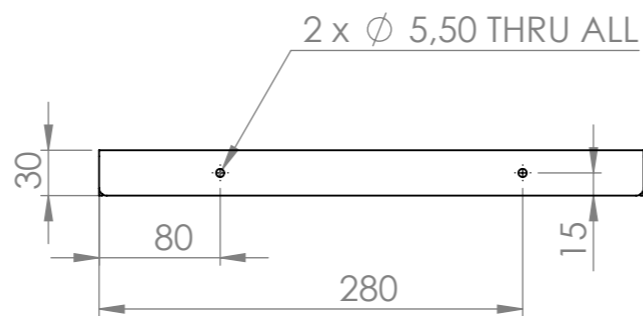
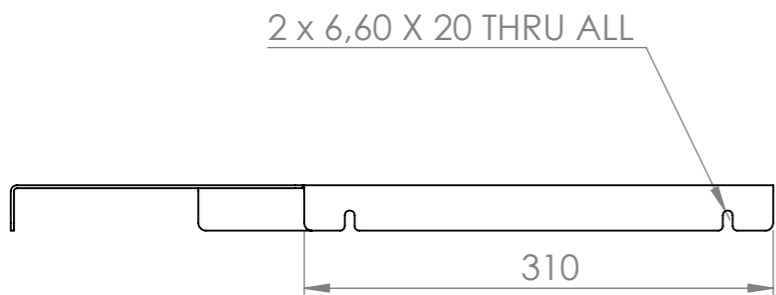
2 x ∅ 4,20 THRU ALL
M5 - 6H ∇ 16
∇ ∅ 5,05 X 90°, Near Side

4 x ∅ 4,50 THRU
∇ ∅ 9,18 X 90°

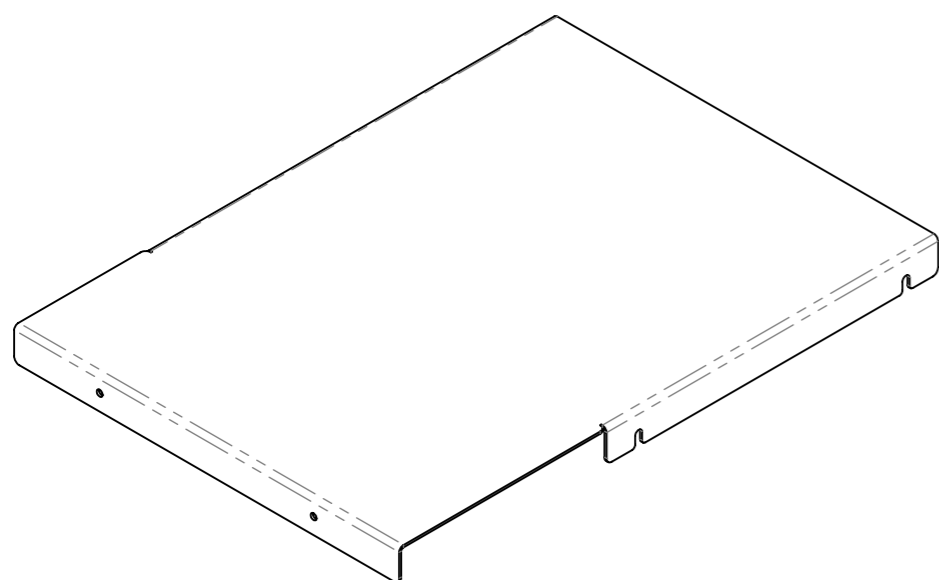
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRÉ BRIDOVE	Klijent:	REVISION
1	0	PLASTIFICIRANO RAL 7035		ASEMO	A
Crtao			Projekt Br:		
M. Modrić			PR-003-2018		
Kontrol.			003-A-0200		
L.RAZUM			TITLE:		
Dobobr.			003-A-0201		
D.ŠKRLEC			END PLATE		
MFG			MATERIAL:		
Q.A.			CUSTOMER:		
			Material <not specified>		
			C0361		
			Nacrč Br.		
			003-P-0223-0002		
			A3		
			MASA: 1.61 kg		
			MJEILO: 1:2		
			LIST 1 OD 1		

LASER CUT

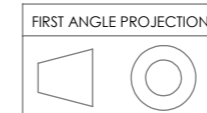


FLAT PATTERN
CUT PERIMETER : 2024mm



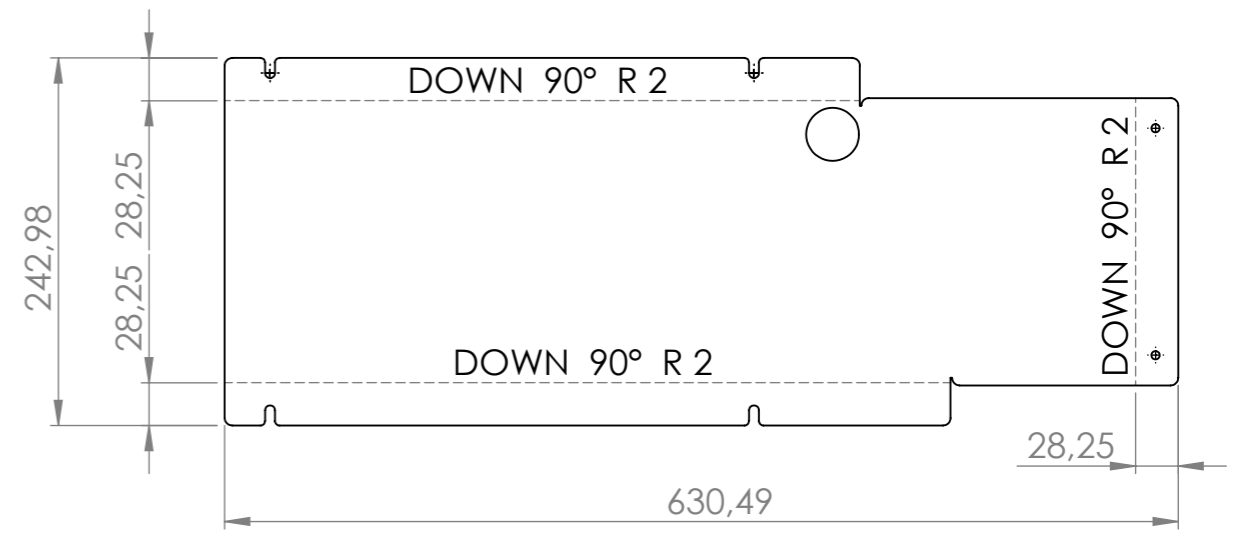
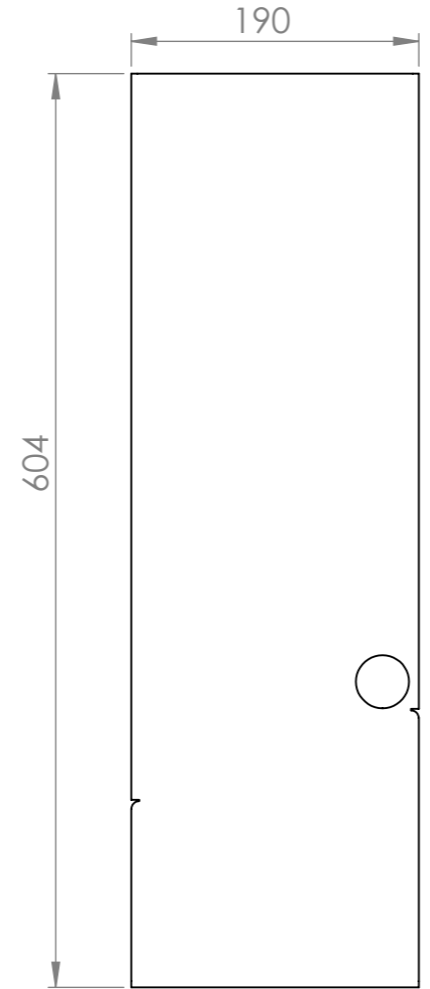
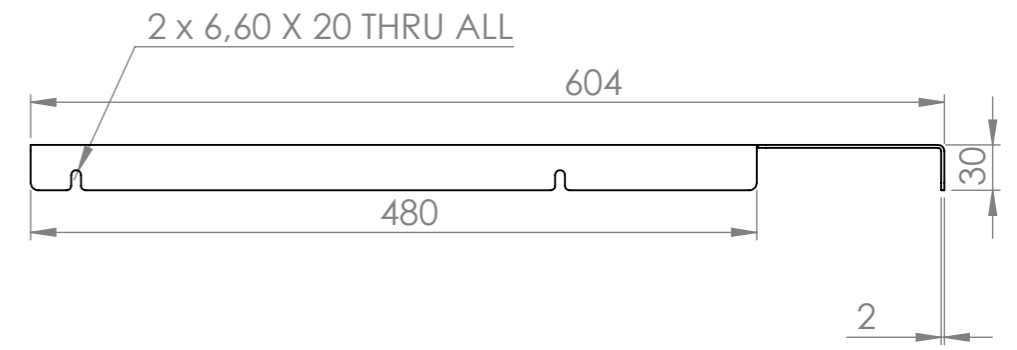
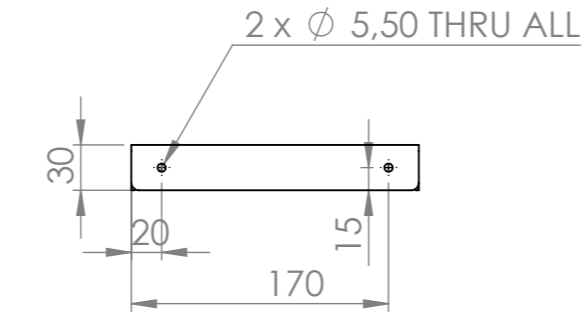
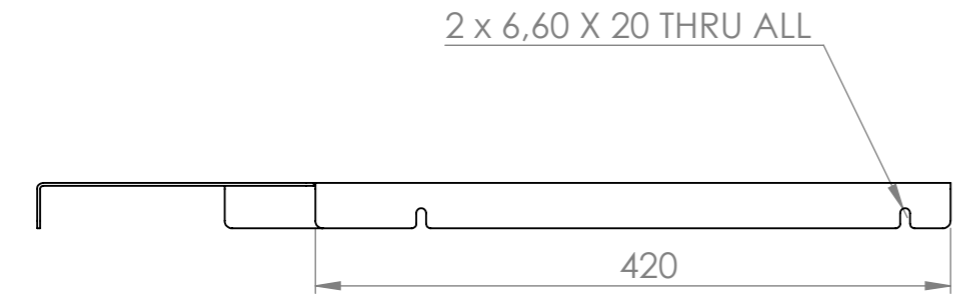
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1	0	PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0201 COVER	
				Nacrč Br.	A3
				003-P-0224-0001	
				MJERILO: 1:5	LIST 1 OD 1
				FILE: 003-P-0224-0001.SLDDRW	

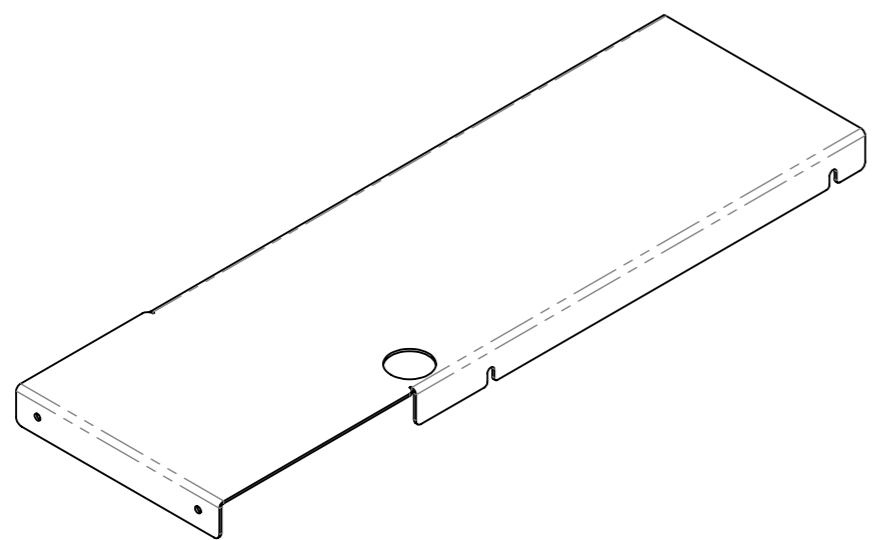


DRWG No.: 003-P-0224-0001

LASER CUT



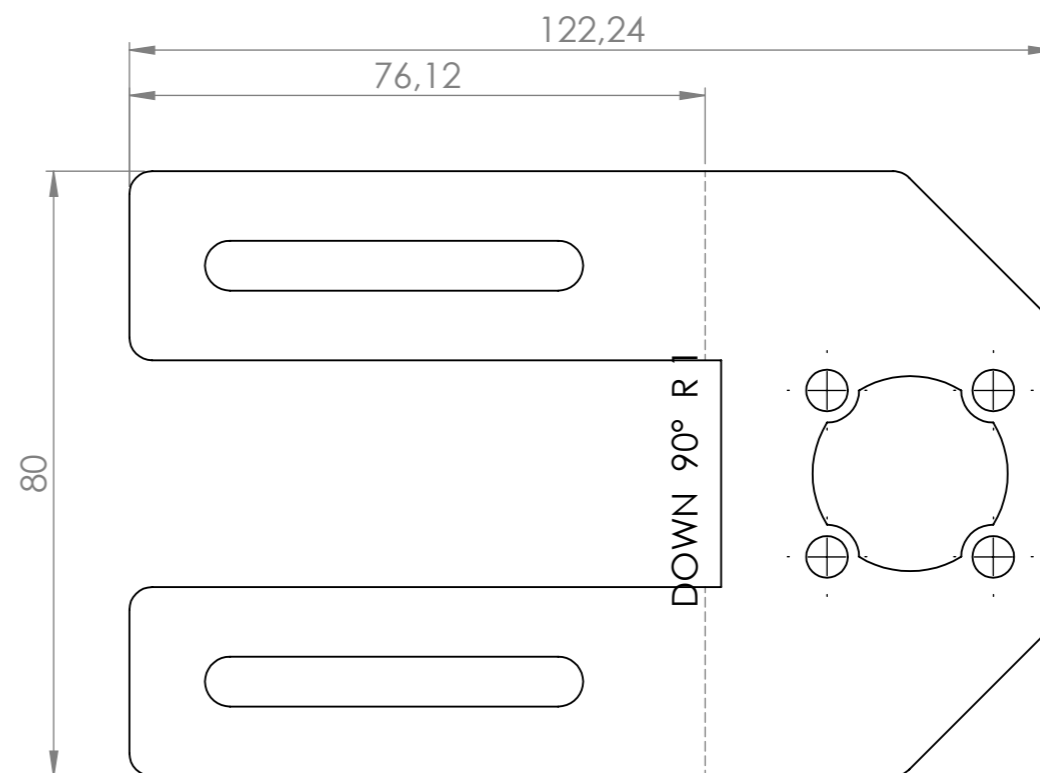
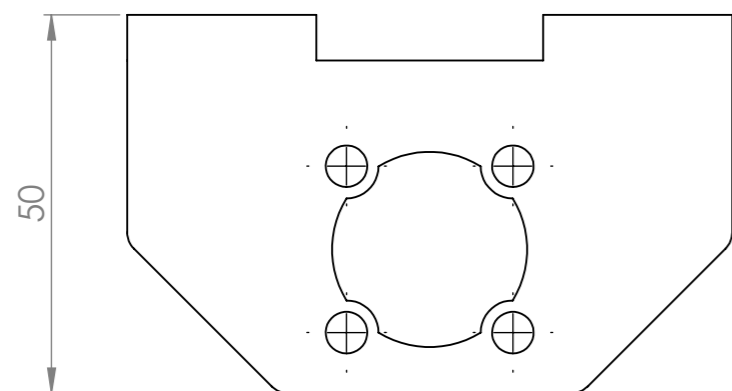
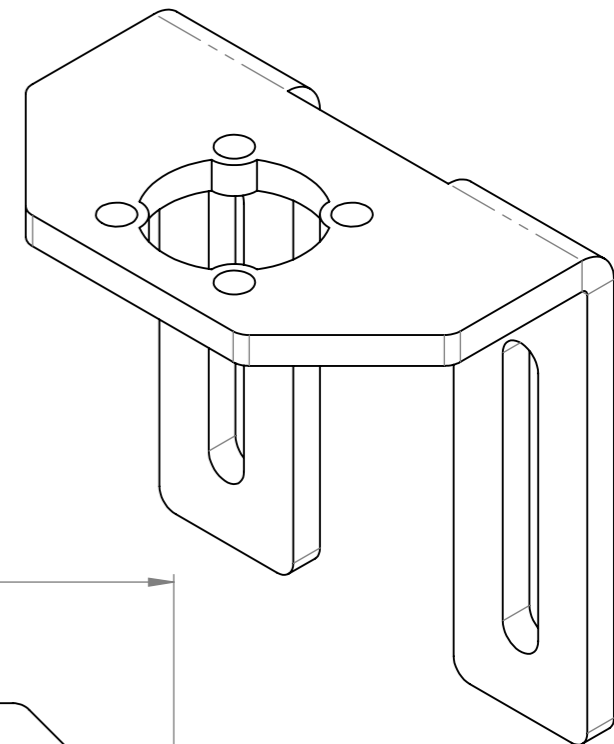
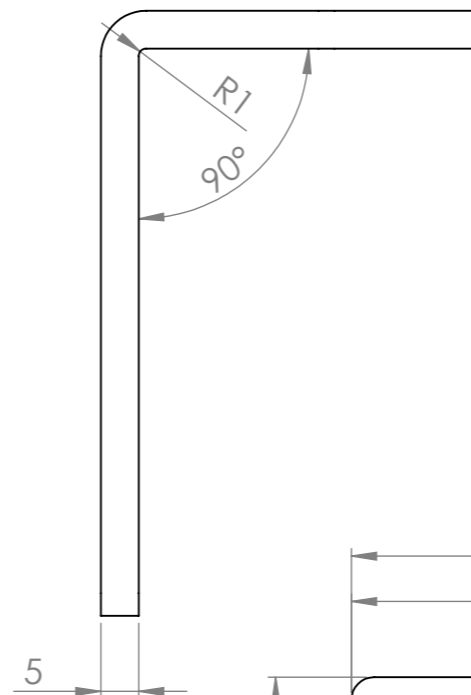
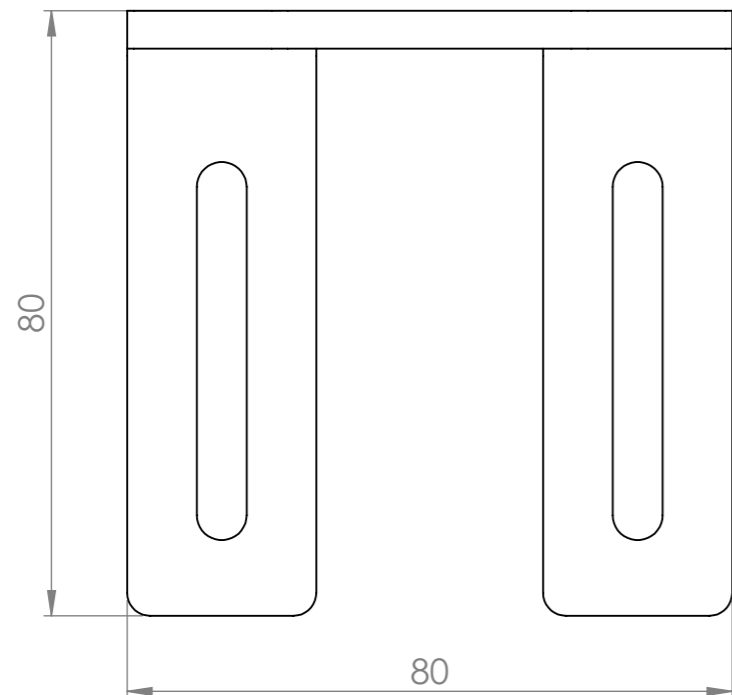
FLAT PATTERN
CUT PERIMETER : 1979mm



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1	0	PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0201 COVER	
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION	Nacrč Br.	
Crtao M. Modrić		8.4.2018.		003-P-0224-0002	A3
Kontrol. L.RAZUM				MATERIAL:	
Odobr. D.ŠKRLEC				MATERIAL CUSTOM:	
MFG				Plain Carbon Steel	
Q.A				C0361	
MATERIAL: Plain Carbon Steel			MASA: 0.28 kg	MJERILO: 1:5	LIST 1 OD 1
MATERIAL CUSTOM: C0361					

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

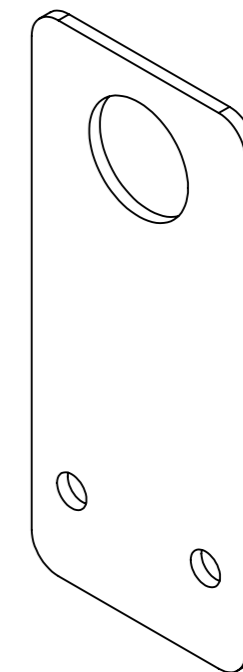
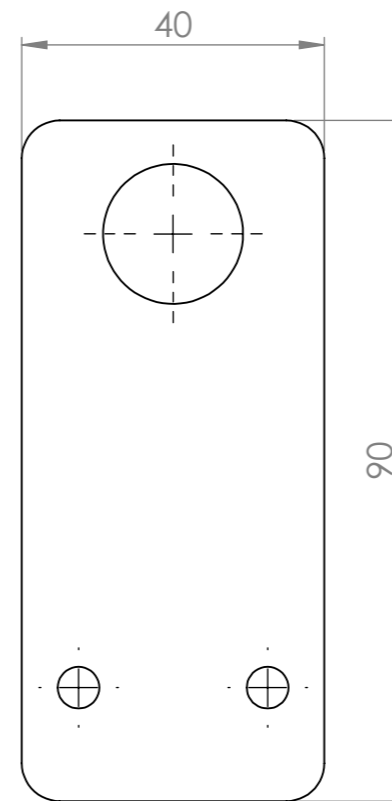
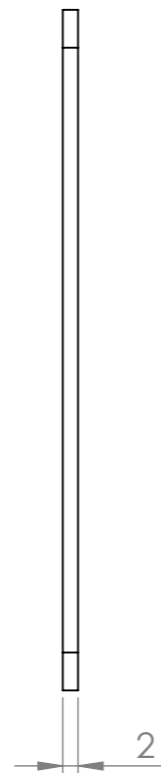
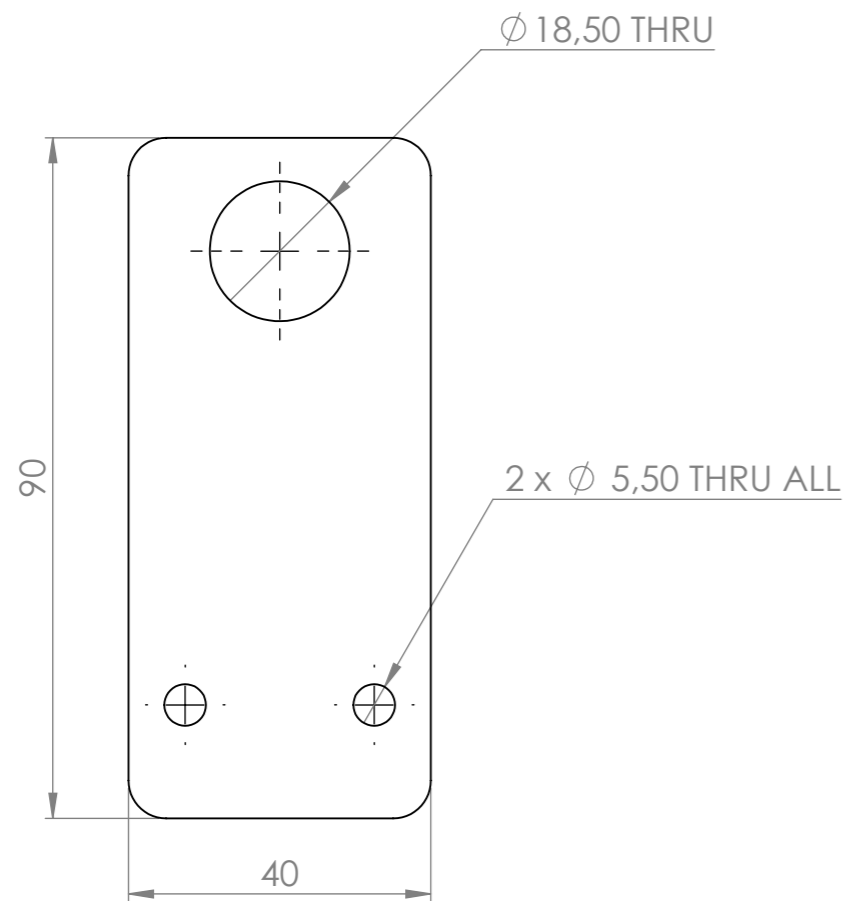


FLAT PATTERN
CUT PERIMETER : 900mm

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
1	0	BRUNIRANO CRNO		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
Ime i Prezime		Potpis		003-A-0200	
Datum				BRACKET	
MATERIAL:				Nacrč Br.	
Plain Carbon Steel				003-P-0225-0001	
MATERIAL CUSTOM:			A3		
C361			MJEJLO: 1:1		
MASA: 0.23 kg			LIST 1 OD 1		

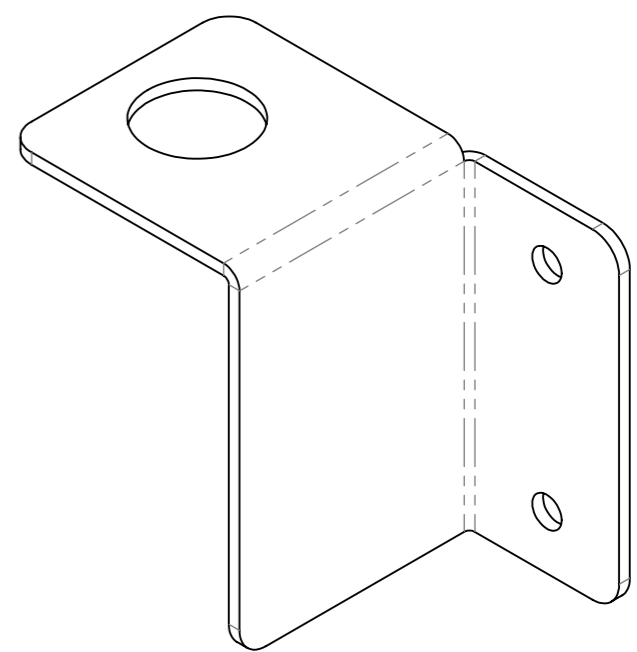
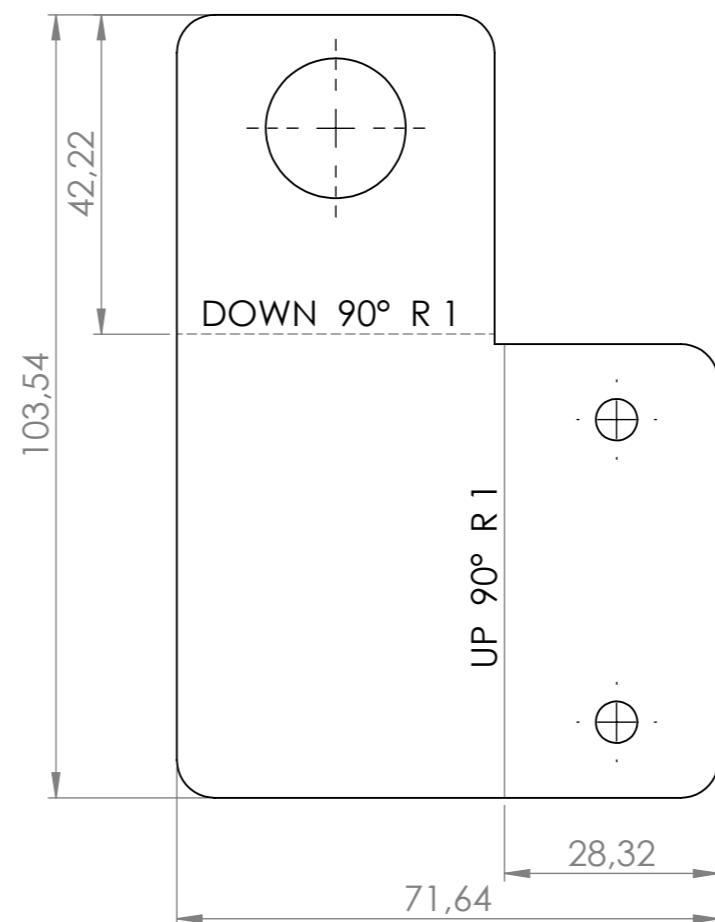
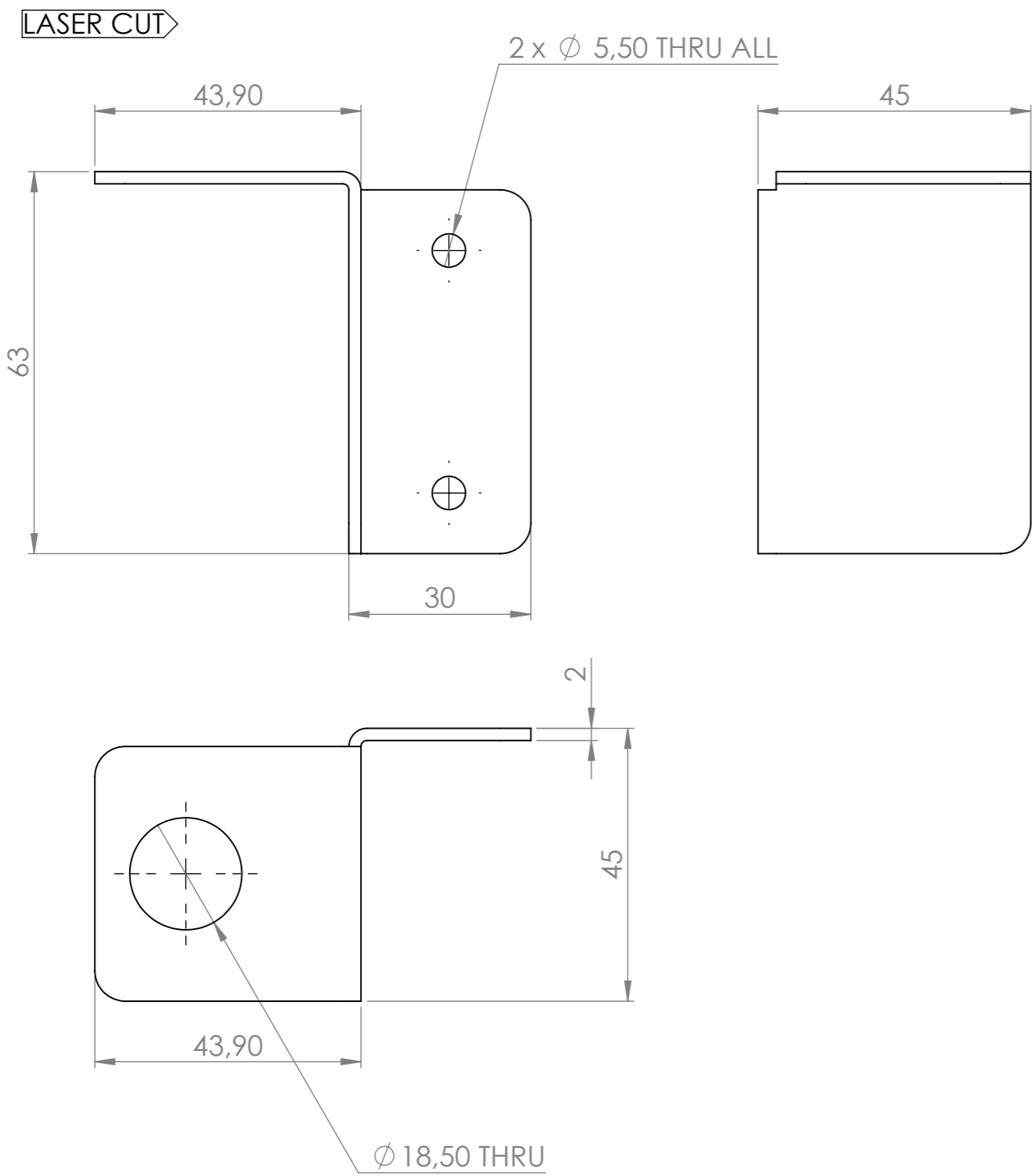
LASER CUT



FLAT PATTERN
CUT PERIMETER : 344mm

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:		Komada (MI):		FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
3		0		PLASTIFICIRANO		ASEMO	A
				RAL 7035		Projekt Br:	
						PR-003-2018	003-A-0200
	Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION 		TITLE:	
Crtao	M. Modrić		23.9.2018.			003-A-0200	
Kontrol.	D. SKRLEC					SENSOR BRACKET	
Odobr.	D. SKRLEC						
MFG							
Q.A				MATERIAL:	Plain Carbon Steel	Nacrč Br.	
				MATERIAL:	C0361	003-P-0226-0001	
				MASA: 0.05 kg		MJERILO: 1:1	LIST 1 OD 1
						A3	



FLAT PATTERN
CUT PERIMETER : 432mm

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

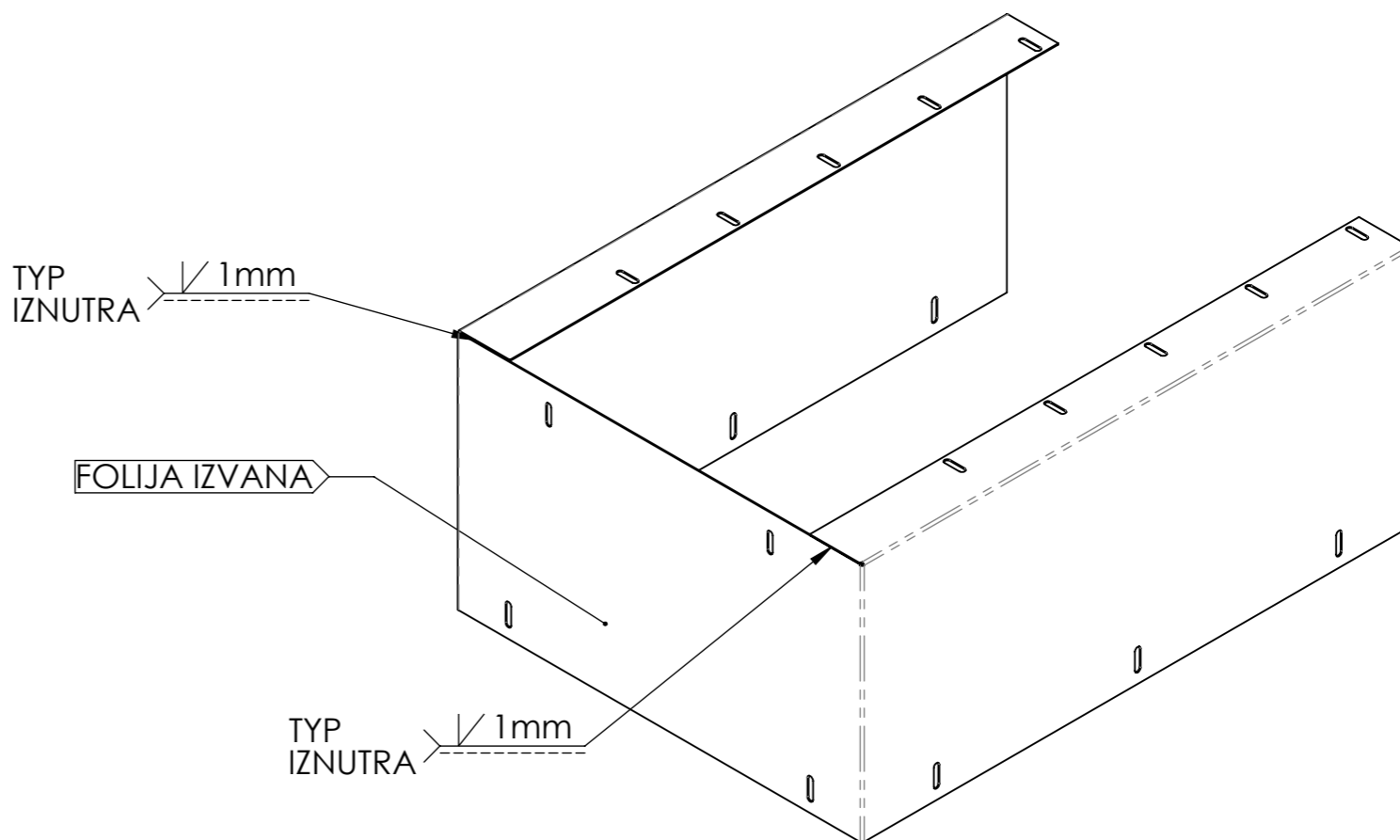
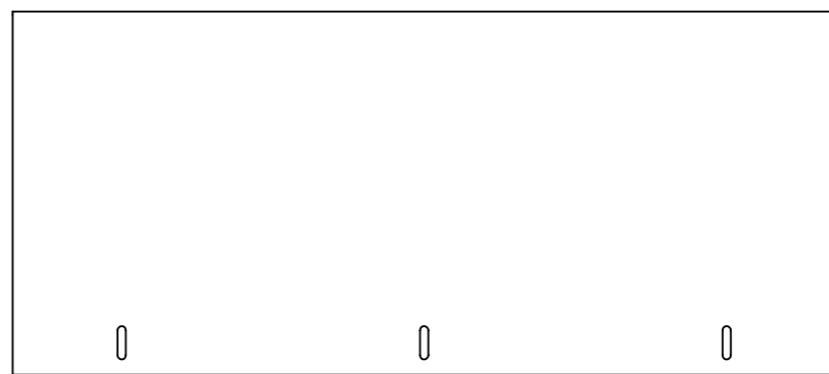
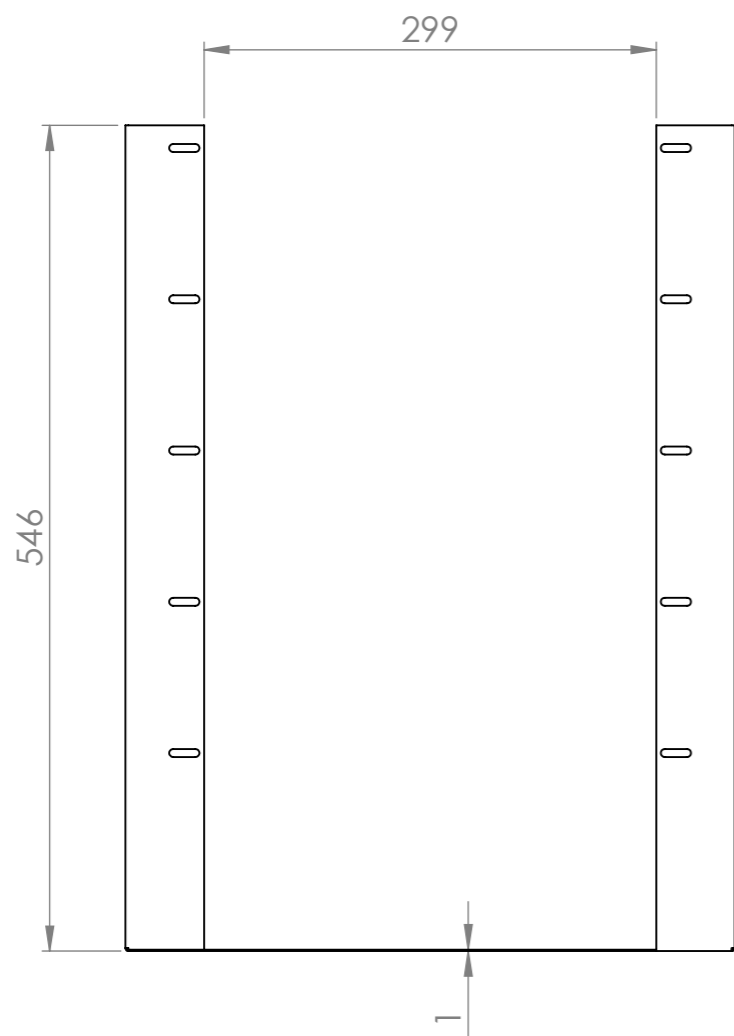
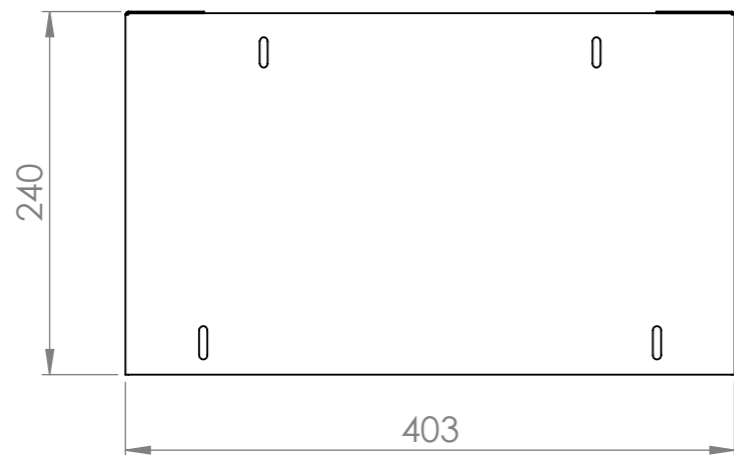
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	REVISION
2	0	PLASTIFICIRANO RAL 7035		ASEMO	A
				Projekt Br:	
				PR-003-2018	003-A-0200
				TITLE:	
				003-A-0200	
				SENSOR BRACKET 2	
				Nacrč Br.	
				003-P-0227-0001	A3
				MJERILO: 1:1	LIST 1 OD 1



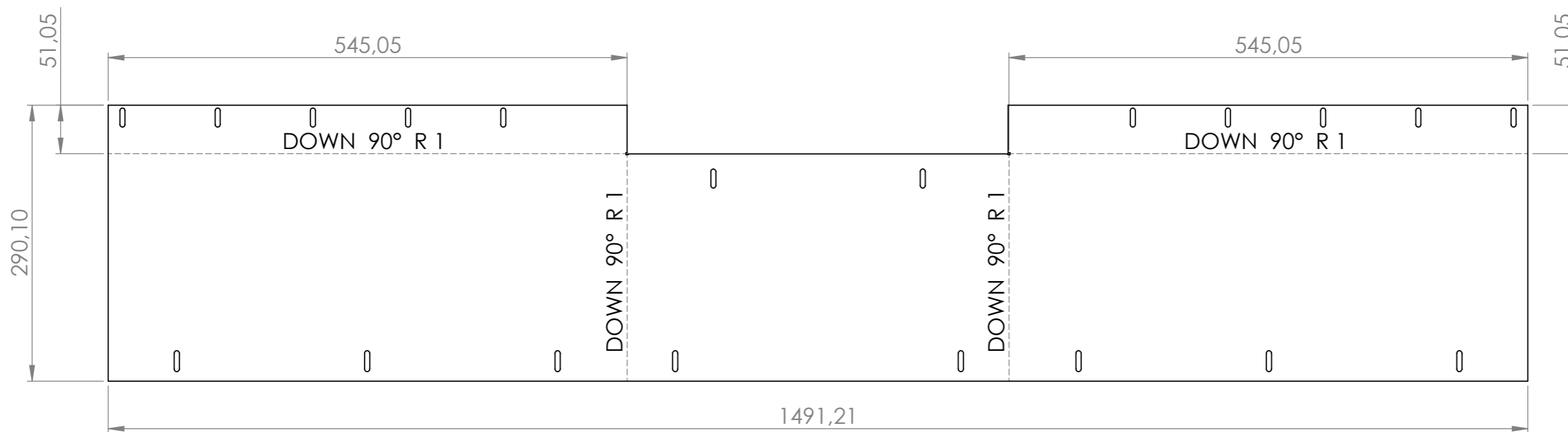
MATERIAL: Plain Carbon Steel
MATERIAL CUSTOM: C0361
MASA: 0.09 kg

LASER CUT



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

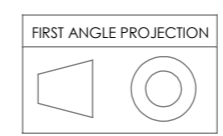
Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A	
1	0	-	-	Projekt Br:	PR-003-2018	003-A-0200		
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION 	TITLE: 003-A-0200 INPUT COVER				
Crtao	M. Modrić	23.9.2018.		MATERIAL: AISI 304 MATERIAL CUSTOM: INOX S FOLIJOM MASA: 3.28 kg	Nacrt Br. 003-P-0228-0001			A3
Kontrol.	D. SKRLEC				MJEJLO: 1:5			LIST 1 OD 2
Odobr.	D. SKRLEC				FILE: 003-P-0228-0001.SLDDRW			
MFG								
Q.A								



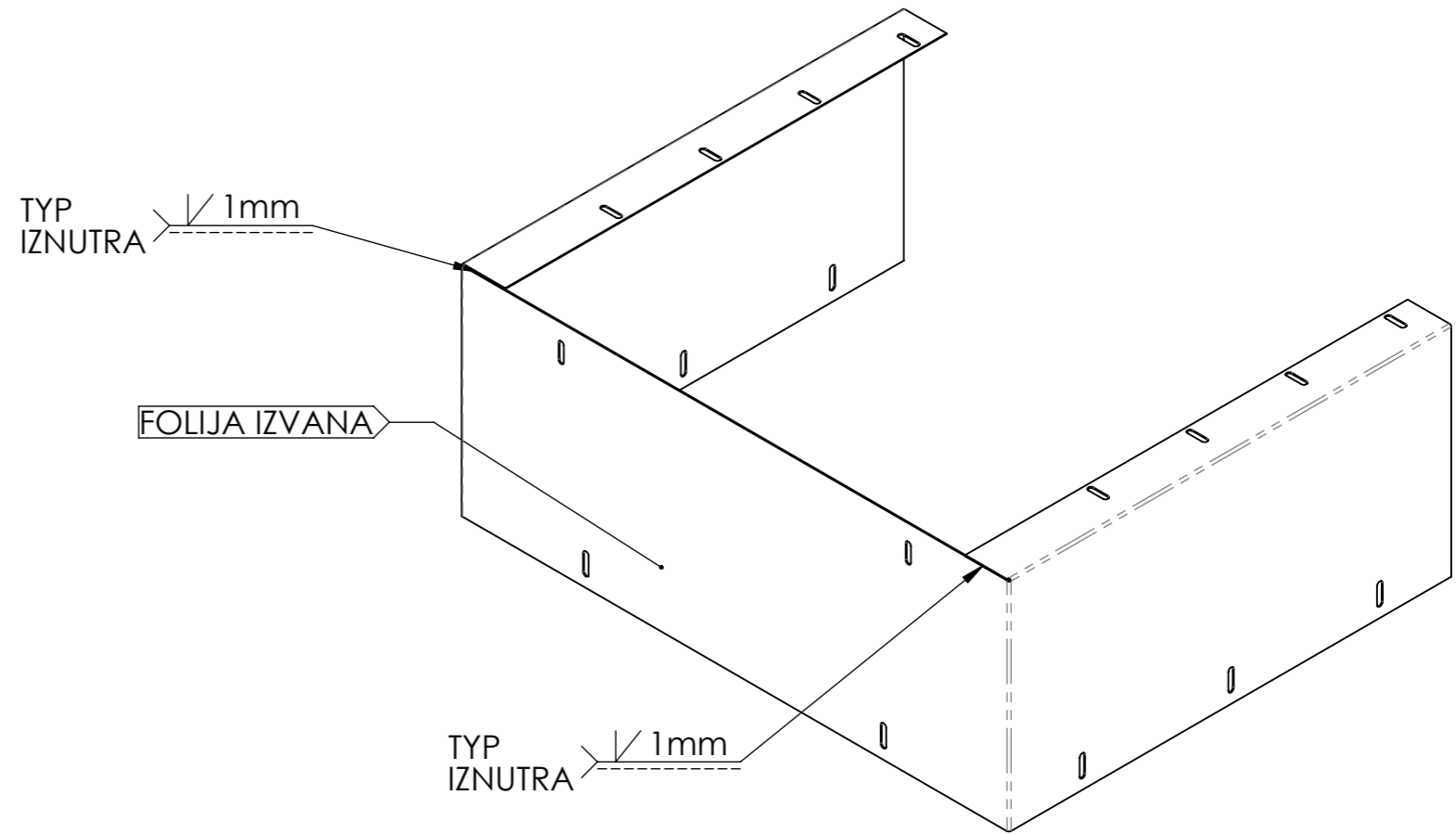
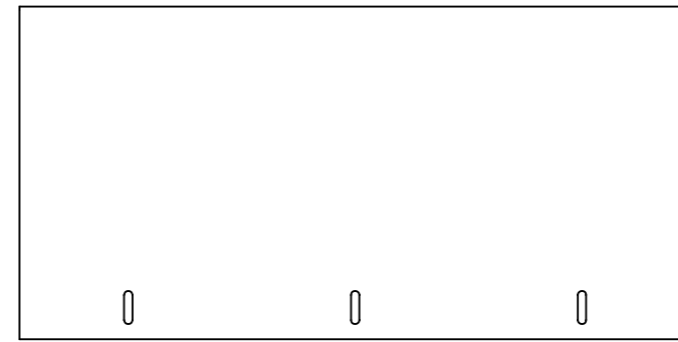
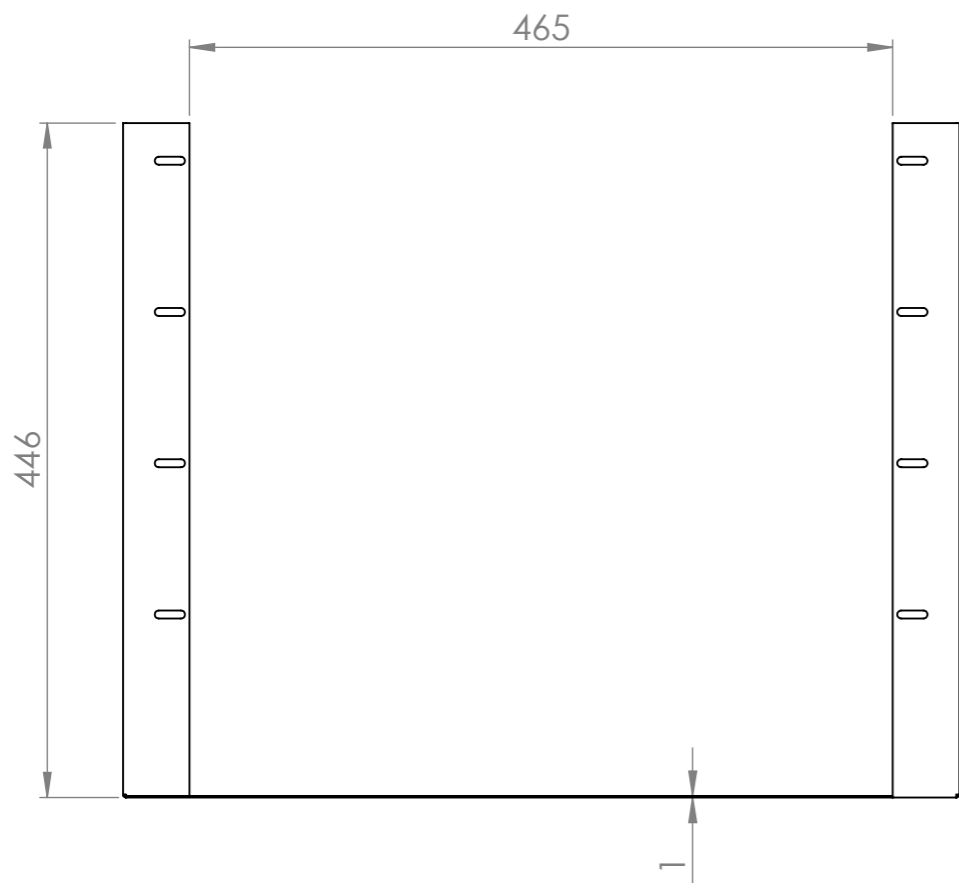
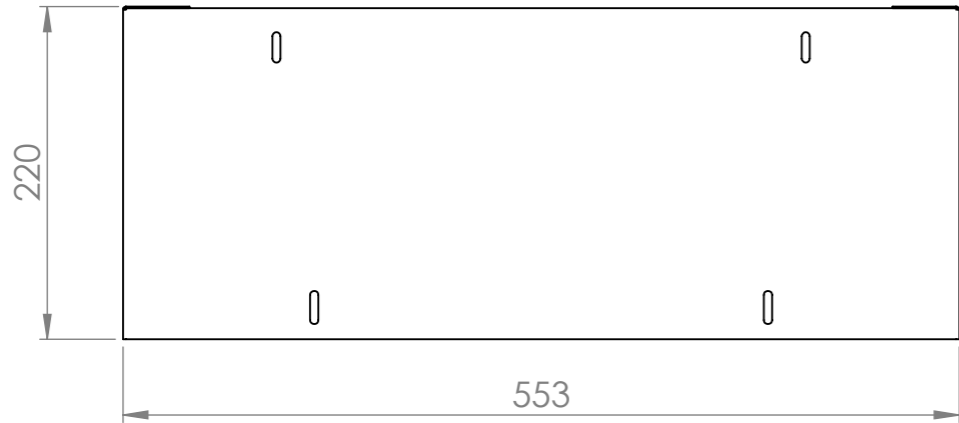
FLAT PATTERN
CUT PERIMETER : 4629mm

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:		Komada (MI):		FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	A
1		0		-	-	Projekt Br:	PR-003-2018	003-A-0200	
Crtao	M. Modrić	Potpis		Datum	23.9.2018.	TITLE: 003-A-0200 INPUT COVER			
Kontrol.	D. SKRLEC					Nacrč Br. 003-P-0228-0001			
Odobr.	D. SKRLEC					A3			
MFG						MATERIAL: AISI 304			
Q.A						MATERIAL: INOX S FOLIJOM			
ASEMO				MASA: 3.28 kg		Mjerilo: 1:5		LIST 2 OD 2	
						FILE: 003-P-0228-0001.SLDDRW			

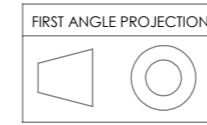


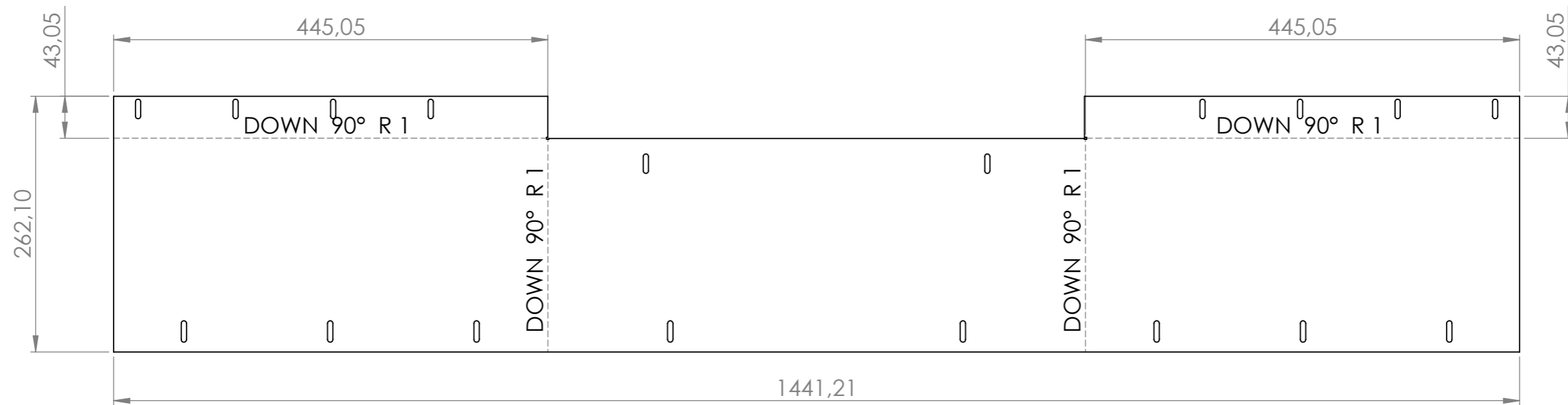
LASER CUT



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	B
1		-	-	Projekt Br:	PR-003-2018	003-A-0200	
Crtao	Ime i Prezime	Potpis	Datum	TITLE:			
Kontrol.	M. Modrić		23.9.2018.	003-A-0200			
Odobr.	D. SKRLEC			INPUT COVER			
MFG	D. SKRLEC			Nacrč Br.			
Q.A				003-P-0228-0002			
MATERIAL:			AISI 304	Mjerilo: 1:5			
MATERIAL CUSTOM:			INOX S FOLIJOM	LIST 1 OD 2			
MASA: kg				FILE: 003-P-0228-0002.SLDDRW			



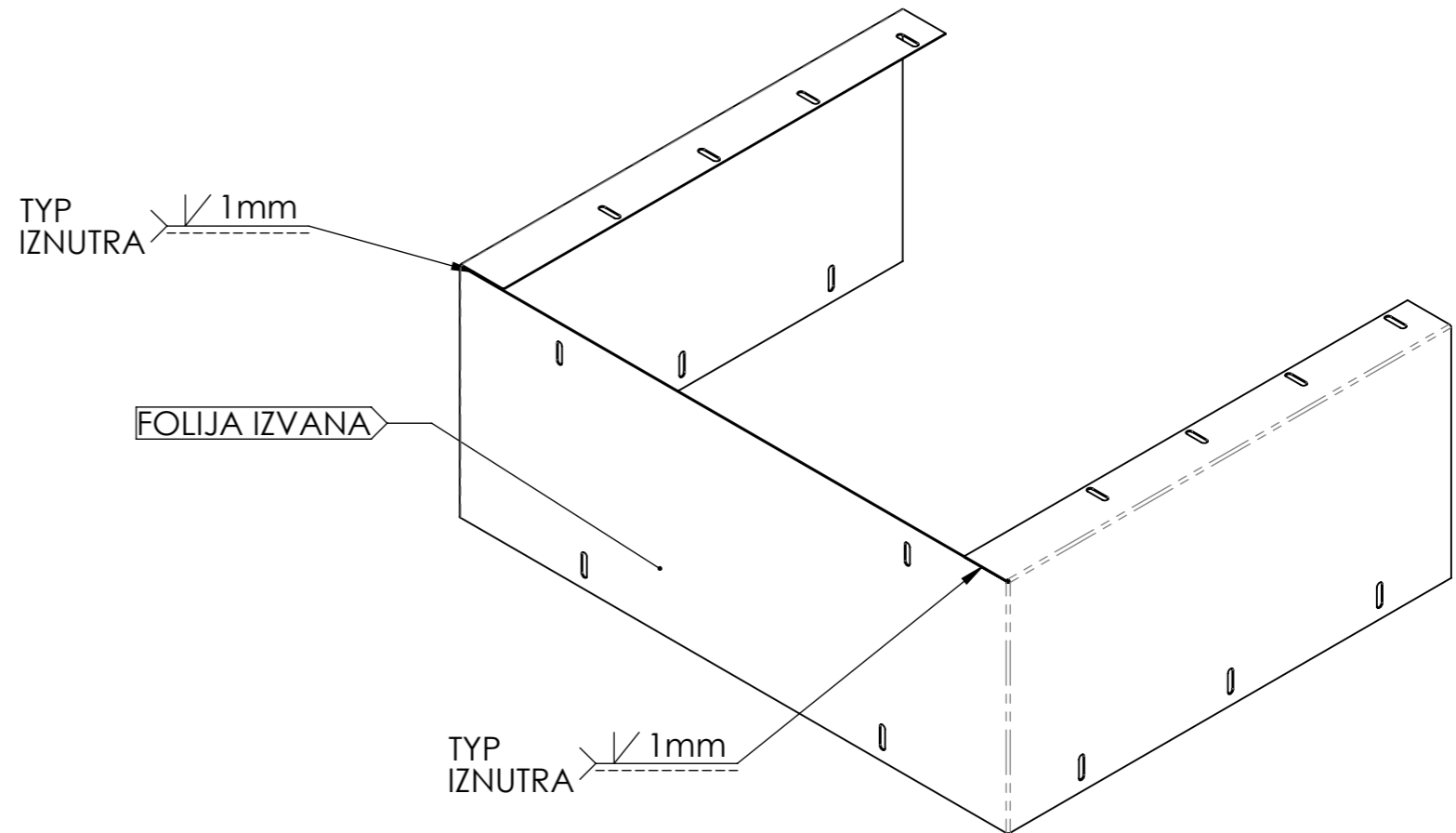
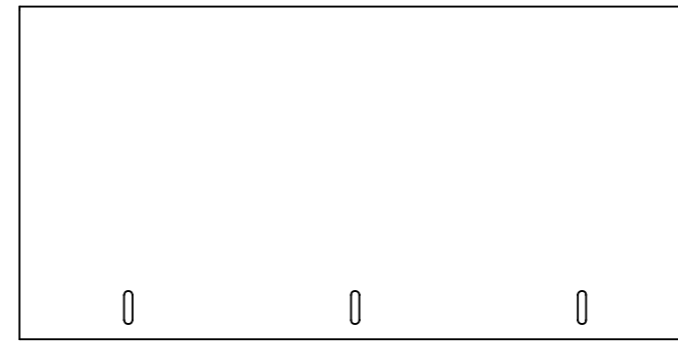
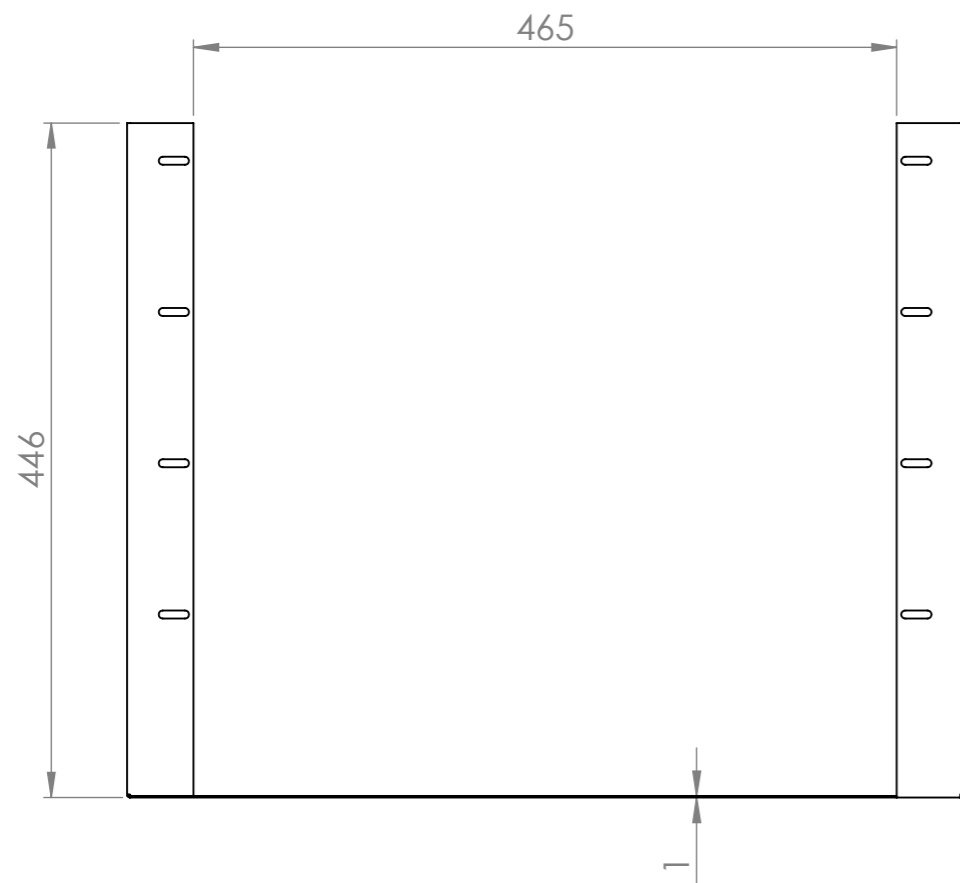
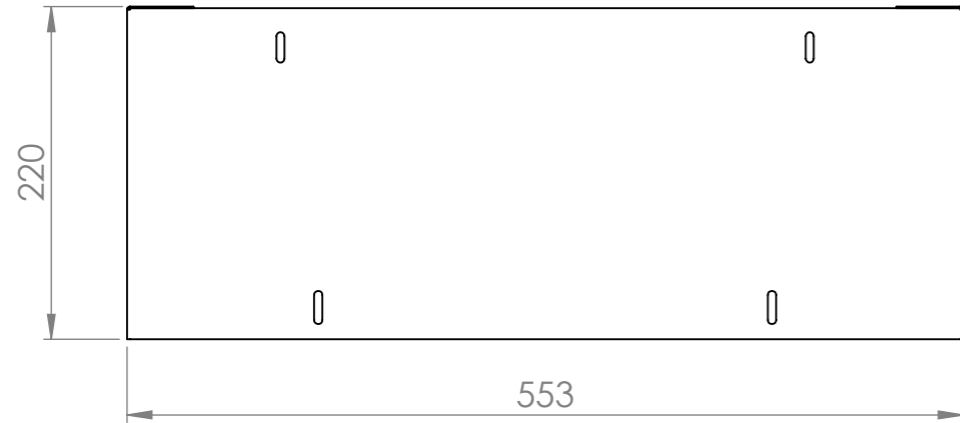


FLAT PATTERN
CUT PERIMETER : 4365mm

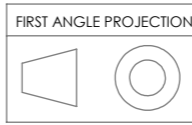

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

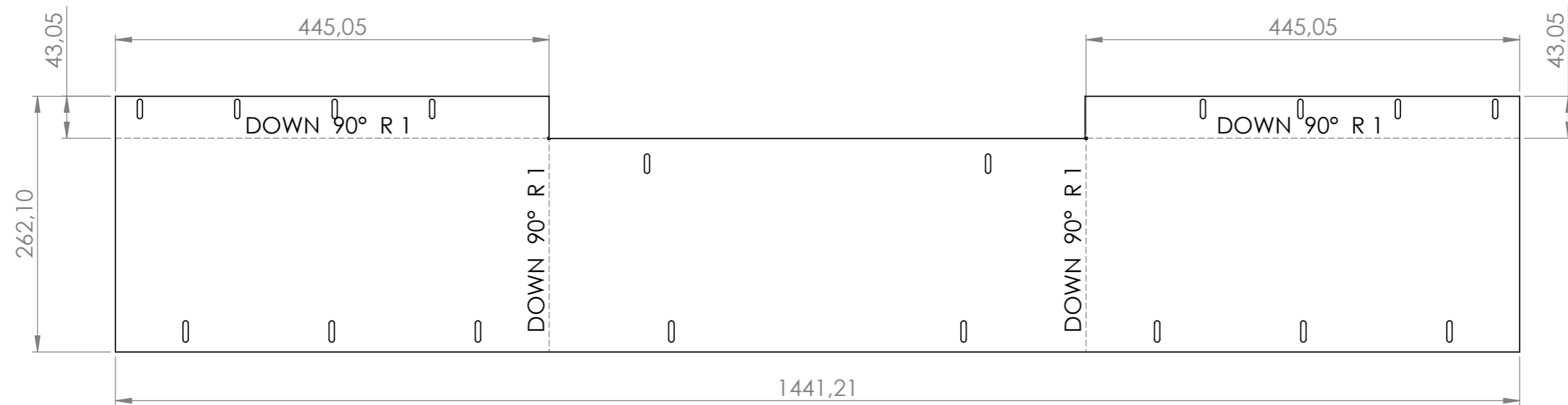
Komada:		Komada (MI):		FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO		REVISION	A
1				-	-	Projekt Br:	PR-003-2018	003-A-0200		
Crtao	M. Modrić	Potpis	Datum			TITLE: 003-A-0200 INPUT COVER				
Kontrol.	D. SKRLEC									
Odobr.	D. SKRLEC									
MFG										
Q.A										
		MATERIAL:		AISI 304		Nacrč Br.	003-P-0228-0002			
		MATERIAL:		INOX S FOLIJOM				A3		
		MASA:		kg		MJEILO: 1:5		LIST 2 OD 2		

LASER CUT



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	B
1		-	-	Projekt Br:	PR-003-2018	003-A-0200	
Ime i Prezime	Potpis	Datum		TITLE: 003-A-0200 INPUT COVER			
Crtao	D. SKRLEC	17.4.2018.					
Kontrol.	D. SKRLEC						
Odobr.	D. SKRLEC						
MFG				MATERIAL: Material <not specified>		Nacrč Br.	
Q.A				CUSTOM: INOX S FOLIJOM		003-P-0228-0002	
			MASA: kg	MJERILO: 1:5	LIST 1 OD 2		A3



FLAT PATTERN
CUT PERIMETER : 4365mm

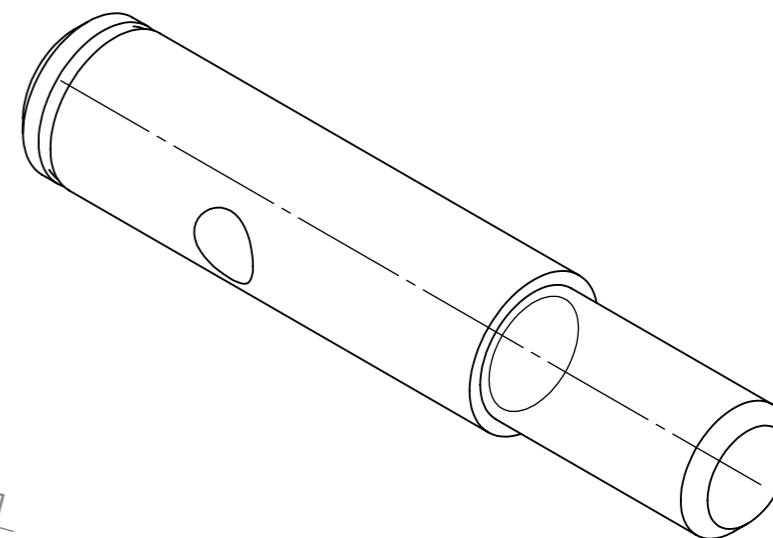
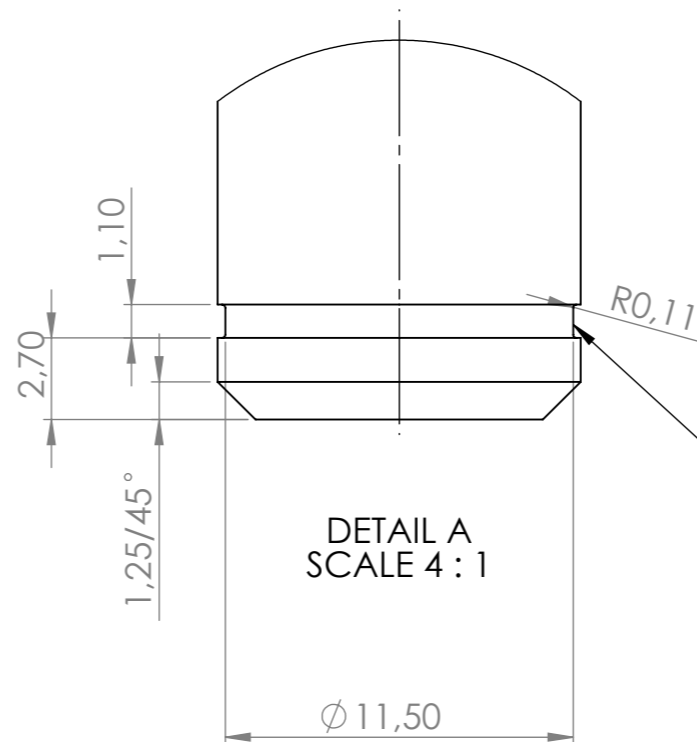
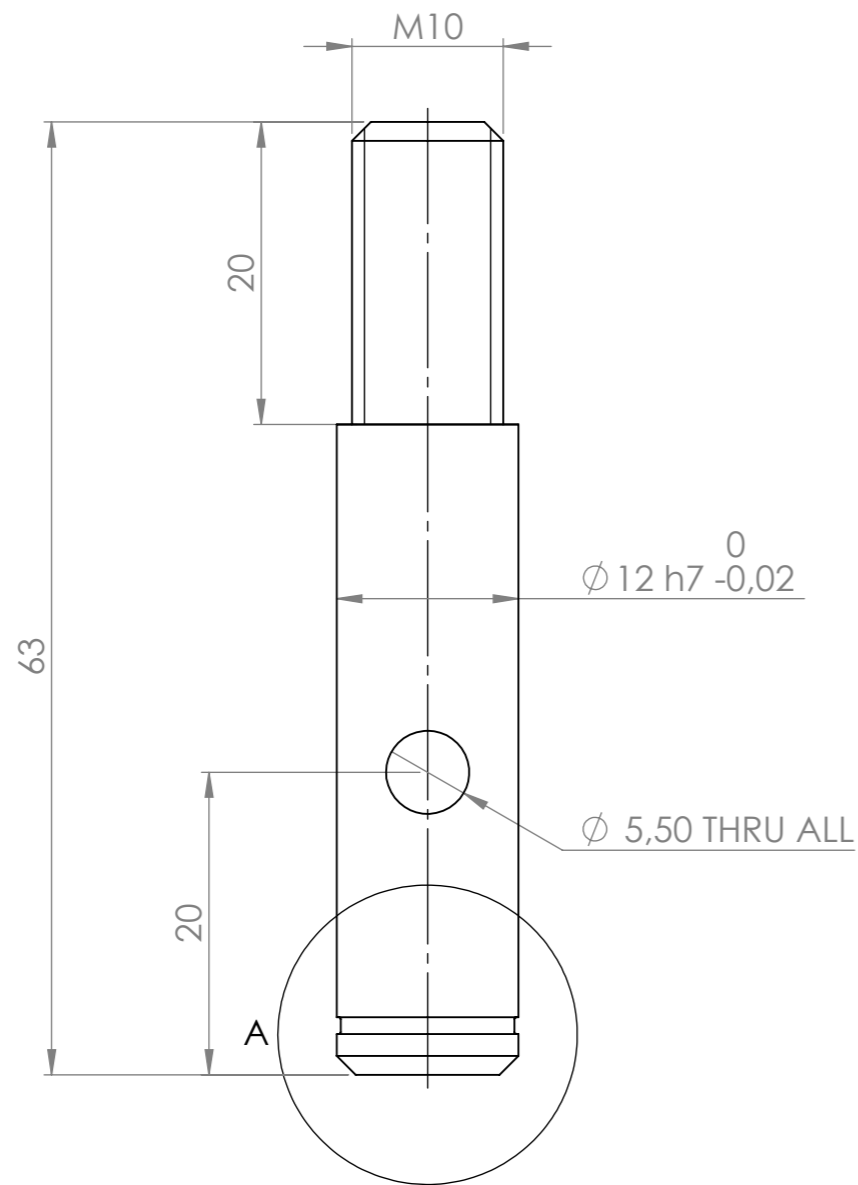
AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADE: N9

Komada:		Komada (MI):		FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent: ASEMO	REVISION A
1				-		Projekt Br: PR-003-2018	003-A-0200
Crtao	Ime i Prezime	Potpis	Datum			TITLE: 003-A-0200 INPUT COVER	
Kontrol.	D. SKRLEC		17.4.2018.				
Odobr.	D. SKRLEC						
MFG							
Q.A				MATERIAL: Material <not specified> CUSTOM: INOX S FOLIJOM MASA: kg		Nacrtni Br. 003-P-0228-0002 MJEILO: 1:5	A3 LIST 2 OD 2



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

MACHINING

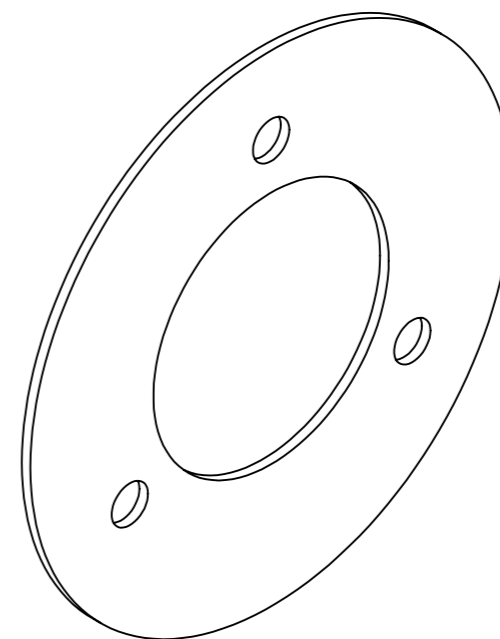
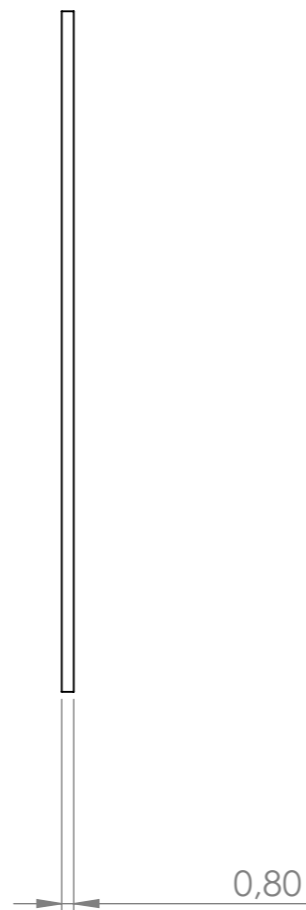
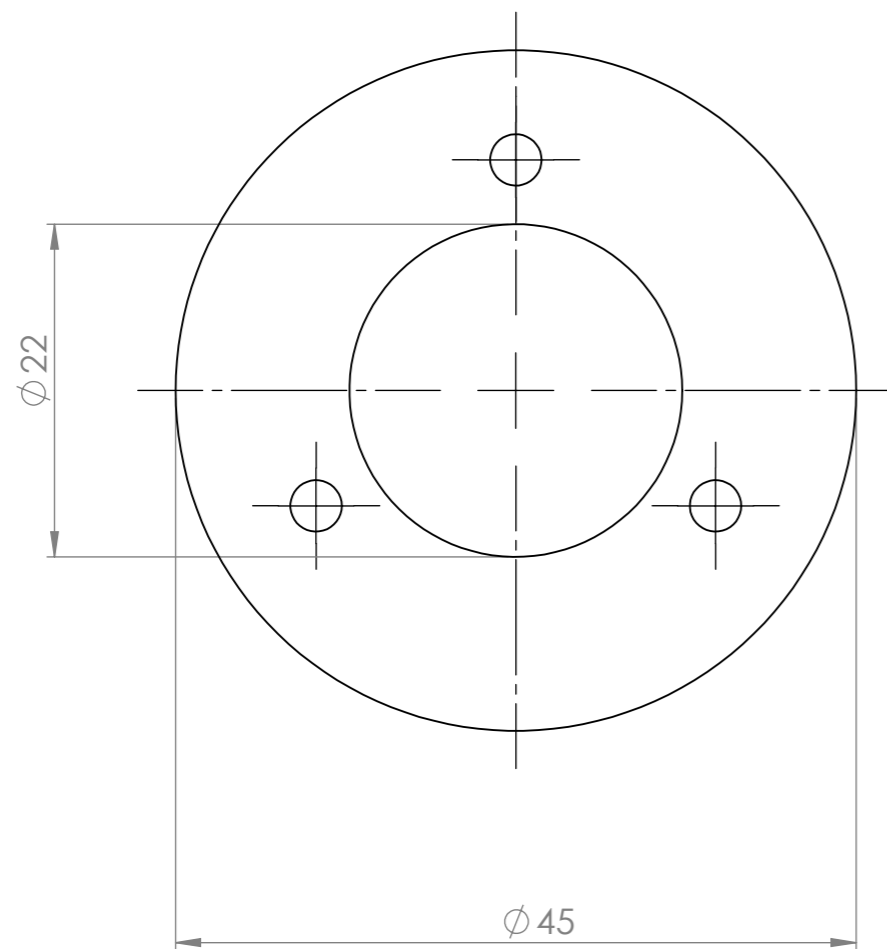


SEGER
DIN471 M10

AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADJE: N9

Komada:	Komada (MI):	FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO/TKD	REVISION	A
6	0	BRUNIRANO CRNO		Projekt Br:	PR-003-2018	003-A-0200	
Ime i Prezime	Potpis	Datum	FIRST ANGLE PROJECTION 	TITLE: 003-A-0203-0003 SHAFT			
Crtao	M. Modrić	23.9.2018.		Nacrč Br. 003-P-0230-0001			
Kontrol.	D.ŠKRLEC			A3			
Odobr.	D.ŠKRLEC			MATERIAL: Plain Carbon Steel CUSTOM: Č1220			
MFG				MASA: 0.05 kg			
Q.A			MATERIJAL: Plain Carbon Steel CUSTOM: Č1220				
				MJERILO: 2:1	LIST 1 OD 1		

CUT PERIMETER : 243mm



AKO NIJE DRUGAČIJE NAZNAČENO:
DIMENZIJE SU U MILIMETRIMA
KVALITETA OBRADJE: N9

Komada:		Komada (MI):		FINISH:	SKINUTI SVE OŠTRE BRIDOVE	Klijent:	ASEMO	REVISION	B
50		0		POCINČANO		Projekt Br:	PR-003-2018	003-A-0200	
Crtao	M. Modrić	Potpis		Datum	23.9.2018.	TITLE: 003-A-0200 SHIM			
Kontrol.	D. SKRLEC					FIRST ANGLE PROJECTION 			
Odobr.	D. SKRLEC								
MFG									
Q.A						MATERIAL:	Plain Carbon Steel	Nacrč Br.	003-P-0231-0001
				MATERIAL CUSTOM:	C0361			A3	
				MASA: 0.01 kg		MJERILO: 2:1	LIST 1 OD 1		

PRILOG BROJ 2.

Dijagram toga promatranog sustava

