

# Tukkimittarin kalibrointirobotti

CD3D3

## Tiivistelmä

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Tiivistelmä <p>Opinnäytetyössä suunniteltiin ja kasattiin asiakkaan vaatimusten mukainen Finnos Oy:n FUSION tukkimittarin 3D-kameroiden kalibroitilaite. Laitteen suunnittelussa käytettiin SolidWorks 3D-mekaniikkasuunnitteluohjelmistoa. Laite suunniteltiin asennettavaksi tukkimittarin 3D-kamera päätyyn kontin ulkopuolelle tukkikuljettimen suojan päälle.</p> <p>Laite laskeutuu kuljettimen suojan päältä 2 osaisella laskumekanismilla tukkimittarin sisään neljän 3D-kameran laserlinjan eteen. Laitteen kalibroitipää kalibroi itsensä neutraaliin keskikohtaan ja suorittaa tietyn ennalta määrätyn sekvenssin kameroiden laserlinjassa.</p> <p>Sekvenssissä kalibroitipään neljästä eri kokoisesta kiekosta koostuva mittakiekko ajetaan haluttuihin kohtiin kolmessa suunnassa (x, y ja z) jolloin kameroiden datasta selviää kunkin kameran tarkkuus ja mahdolliset virheet, kuten kameroiden virheellinen kulma.</p>		
Asiasanat kalibroitirobotti, tukkimittari, 3D-kamerat, mekanismi, mekatroniikka		

## Abstract

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Title of Publication <b>Calibration robot for log scanner</b> CD3D3		
Degree and field of study Bachelor of Engineering, Mechanical Engineering		
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Abstract <p>This thesis is about designing and assembling Finnos Oy's Fusion log scanners calibration robot with customers' requirements. The software used for designing the robot was Dassault system's SolidWorks. The device will be installed on top of log conveyors cover, at Fusion log scanners 3D end.</p> <p>The device will lower itself inside the Fusion log scanner, in front of the 3D cameras with two step lowering mechanism. Device's calibration head calibrates itself to neutral position and will perform a pre-programmed sequence at the laser line of the 3D cameras.</p> <p>The sequence consists of readings from 4 different size and shape disks, which will be driven on 3 different axis's in the scanning area of the cameras. The data informs if there is misalignment or some faults on any of the cameras.</p>		
Keywords calibration, log scanner, 3D-cameras, mechanism, mechatronics		

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## Liitteet

Liite 1. Osa, valmistus- ja kokoonpanopiirustukset

Termit

Laserlinja = 3D-kameroiden mittauslinja.

Tukkimittari = Tukin muodon/koostumuksen mittauslaite.

Kola = Tukkikuljettimen osa minkä päällä tukit makaavat kuljettimessa.

Negatiivinen alue = Alue kuljettimen kolien pohjan alapuolella.

S355 -rakenneteräs = Rakenneteräs, minkä murtolujuus on  $355\text{N/mm}^2$ .

Suojausluokka IP66 = Pölytiivis ja suurella paineella tulevan veden kestävä suojaluokka.

Mittanormaali = Mittanormaanin vertausta kappaleeseen, jonka mitta tiedetään tarkemmaksi kuin mittatulos

## 1 Johdanto

Tämän opinnäytetyön tarkoituksena on kehittää Finnos oy:n FUSION tukkimittarin 3D-kameroiden kalibroitirobotti. Robotilla asiakas halutessaan pystyy varmistamaan, että tukkimittarin kamerat toimivat vaaditulla tasolla ja tukkimittarista saatuun dataa pystytään luottamaan tuotteen loppusijoittelun kannalta. Kalibroitirobotin on tarkoitus olla tulevaisuudessa osa Finnos Oy:n tarjoamia laitteita asiakkaille.

Robottia käytettäessä tukkikuljettimen on oltava tyhjä ja pysäytettynä niin ettei kuljettimen kola ole robotin tiellä. Robotti lasketaan kuljettimen suojan päältä tukkimittarin sisälle 3D-kameroiden laserlinjan eteen laskumekanismilla. Kalibroitipää kalibroi ääriasemat kolmessa suunnassa (x, y ja z) laskemisen jälkeen ja asettautuu neutraaliin asentoon laserlinjan eteen. Kalibroitipää ajaa kalibroitiekot laserlinjassa ennalta määrätyn sekvenssin mukaan, jolloin saadaan tieto 3D-kameroiden tarkkuudesta ja toiminnasta. 3D-kameroiden lukutarkkuus on kymmenosa millin tarkkuudella.

Opinnäytetyössä perehdytään 3D-kameroiden kalibroimiseen ja niiden toimintaan, kalibroitipään- ja kiekkojen rakenteisiin ja laitteen laskumekanismiin. Laitteen vaatimuksina on 4 eri kokoista mittapäätä kameroiden tulosten vertailuun, yksinkertainen ja luotettava toteutus, sekä helppo asennettavuus. Laite ei myöskään saa vuotaa tukkimittarin sisältä säteilevää röntgensäteilyä ympäristöön. Työ ei käsittele ohjelmointia, yrityksen sisäistä datankäsittelyä tai automaatioon liittyviä asioita tarkemmin.

## 2 Finnos Oy

### 2.1 Yritysesittely

Finnos Oy on perustettu vuonna 2016 ja sillä on 2 toimipistettä, päätoimipiste Lappeenrannassa ja sähkö- ja automaatio Mikkelissä. Yritys on pohjoismaiden johtava tukkiröntgenvalmistaja yli 50 toimitetun tukkimittarin ansiosta ja sen korkeasti koulutetun henkilöstön ansiosta. Yrityksen toiminta pohjautuu konenäkö- ja laadunvalvontajärjestelmiin, sahateollisuuden sovellutuksiin, sahateollisuuden mittausteknologioihin ja nykypäivän digitalisaatioon. Yritys tuottaa sahateollisuuteen erilaisia sovellutuksia, ohjelmistoratkaisuja ja järjestelmiä, millä pystytään parantamaan raaka-ainesäästöjä ja tehokkuutta laajalti sahateollisuudessa. Yrityksessä on töissä alle 100 työntekijää ja yritys on vahvasti laajentunut globaaliksi tukkimittarintoimittajaksi muutaman vuoden ajassa. (Finnos Oy, 2021)

### 2.2 Suunnitteluohjelmisto

Suunnittelussa käytettiin Dassault Systemésin valmistamaa SolidWorks 3D CAD-ohjelmistoa. Ohjelmisto on laajaan 3D-mallinukseen tehty sovellus, mihin on saatavilla useita lisäosia. SolidWorksin käytetyt versiot olivat 2019 ja 2020. Kaikki kalibrointirobotin osat ja kokoonpanot suunniteltiin kyseisellä ohjelmistolla ja sen lisäosilla, poissulkien standardien mukaiset kiinnityselimet kuten ruuvit, mutterit ja aluslevyt. Lisäksi suunnittelussa on käytetty lähteissä mainittuja teoksia liittyen suunnitteluun ja mekatroniikkaan. (Robert H. Bishop, Peter RN Childs, G. Pahl, W.Beitz, J.Feldhusen, 2007)

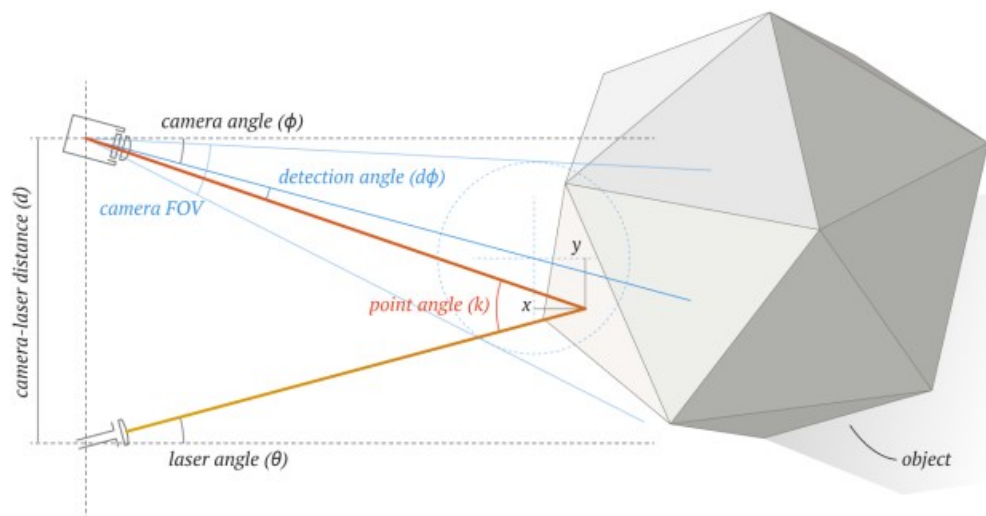
### 3 Kalibrointi teoria

#### 3.1 Kalibrointi yleisesti

Kalibroinnilla tarkoitetaan mittalaitteen näyttämän lukeman vertausta mittanormaalien antamien suureiden arvoihin. Kalibroinnilla siis saadaan tietoon mittalaitteen mahdollinen virhe ja tieto laitteen tilasta sekä toiminnasta. Laitteen suurimman sallitun mittavirheen määrittelee siis laitteen valmistaja, eli tässä tapauksessa Finnos Oy.

Kalibrointia ei pidä sekoittaa varmennukseen. Varmennuksella tarkistetaan mittauslaitteen käyttöönoton jälkeinen toiminta, varmistaen että mittauslaitteeseen ei ole tehty mittauslaitteen toimintaan vaikuttavia muutoksia. Mittauslaitteen mittatulosten on siis pysyttävä sallittujen virherajojen sisäpuolella. Varmennuksessa tarkistetaan siis jäljittävyyttä, mittalaitteen soveltuvuutta käyttökohteeseen ja sitä, että mittalaite on hyväksynnän mukainen.

Virheellinen kamera voidaan havaita tarkistusmittauksilla kulmiin, etäisyyksiin ja mittaustulosvertailussa tuloksiin nähden.



Kuva 1. Havainnollistava kuva mittaustekniikasta (Svetlana Golubeva, 2022)



### 3.2 Kameroiden asetelma ja toiminta

Fusion tukkimittarissa on neljä 3D-kameraa, kaksi mittarin pohjalla ja kaksi ylempänä alumiinirungossa kiinni. Lisäksi 3D-kameroissa on laserit, joilla saadaan ns. laserinja kuvattavan kappaleen pintaan. Kameranat ovat säädetty tiettyihin kulmiin etäisyyksien ja laskennan kannalta, jotta niistä saadaan luotettavaa ja tarkkaa dataa tukkien kulkemalta alueelta. Kun tukkikuljetin vie tukin tukkimittarin 3D-kameroiden läpi, kaikki 4 kameraa kuvaavat tukin muodon eri suunnista. Mittaustekniikka perustuu kameroiden ja laserinjan kolmiomittaukseen. Kun kappale liikkuu laserlinjassa tukkikuljettimen mukana, kamerat havainnollistavat laserin muutoksen kappaleen pinnan muodoissa. Mittaustekniikan on oltava nopea ja todella tarkka, sillä tukit liikkuvat tukkikuljettimilla sahateollisuuden kannattavuuden maksimoinnin takia nopealla vauhdilla. Näin saadaan tarkka malli tukin ulkomuodosta ja mahdollisista epäkohdista kuten pinnalla esiintyvistä montuista, oksista tai muista epämuodoista. Saatu muotodata yhdistetään lopuksi myös tukin läpivalaistuun dataan röntgenlaitteilta, joten lopullisessa mallissa on tukinmuoto sekä koostumus sisältä. Näin osataan päättää tukin kannattavin asento sahaamiseen, minimoiden hukkamateriaalin tukkikohtaisesti.

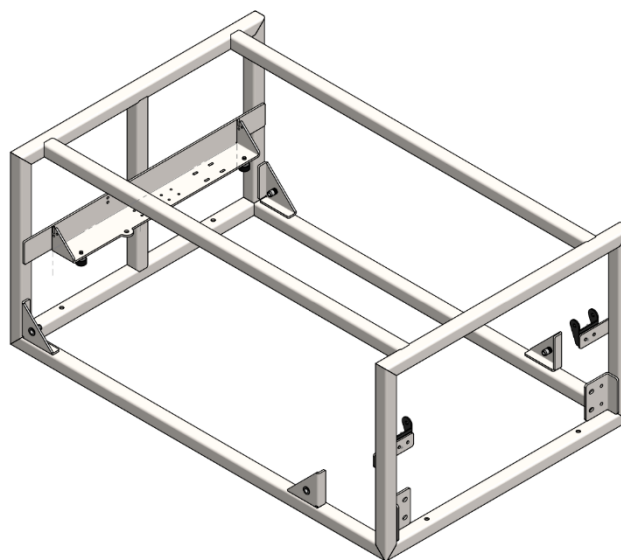
## 4 Kalibrintirobotti

### 4.1 Kalibrintirobotin hyöty

Kalibrintirobotti tekee saman työn itsenäisesti ja huomattavasti nopeammin minkä ihminen joutuisi tekemään manuaalisesti. Ilman robottia jouduttaisiin tukkikuljettimen sisälle asentamaan erinäisiä kappaleita useaan otteeseen eri kohtiin laserlinjaa. Tukkimitari tulisi sammuttaa ja käynnistää useasti operaation aikana. Kalibrintirobotin avulla asiakas pystyy itse varmentamaan kameroiden toimivuuden helposti sahalinjan ollessa tyhjänä ja pois päältä. Laitteen täyden sekvenssin kesto riippuu käyttökohteen määräyksistä, mutta silti sen kesto on alle 10min. Kalibrinti robotilla siis voidaan varmentaa prosessin tarkkuus Finnos FUSION tukkimittarin 3D-kameroiden osalta.

### 4.2 Runko ja asennuskohde

Laitteen rakenne koostuu kiinteästä rungosta, adapterilevystä kuljettimen suojaan, 2 osaisesta laskumekanismista, kalibrintipästä, laitteen suojista ja säteilysuojista. Pääosainen runko on neliöputkesta valmistettu kiinteä kokonaisuus tarvittavilla kiinnikkeillä. Runkoon kiinnitetään kiinteä alumiini profiileista valmistettu tukirakenne, mihin itse laskumekanismi asennetaan. Laitteen suojat on alumiinikomposiittilevystä ja lyijystä muotoon valmistettu laitteen päältä laskettava kokonaisuus irrotettavilla sivupaneeleilla ja yläluukulla.



Kuva 2. Laitteen runko

Robotti asennetaan tukkikuljettimensuojan päälle, tukkimittarin 3D -päädyn puolelle. Mikäli tukkikuljettimensuojaa ei erikseen vaihdeta kalibrintirobotille suunnitelluksi, täytyy siihen

leikata aukko, josta laite mahtuu laskeutumaan tukkimittarin sisälle ja porata kiinnitykselle reiät. Korkeudensäätö tapahtuu adapterilevyn kanssa käyttökohteen mukaan.

### 4.3 Laskumekanismin rakenne

#### 4.3.1 Alumiiniprofiilit

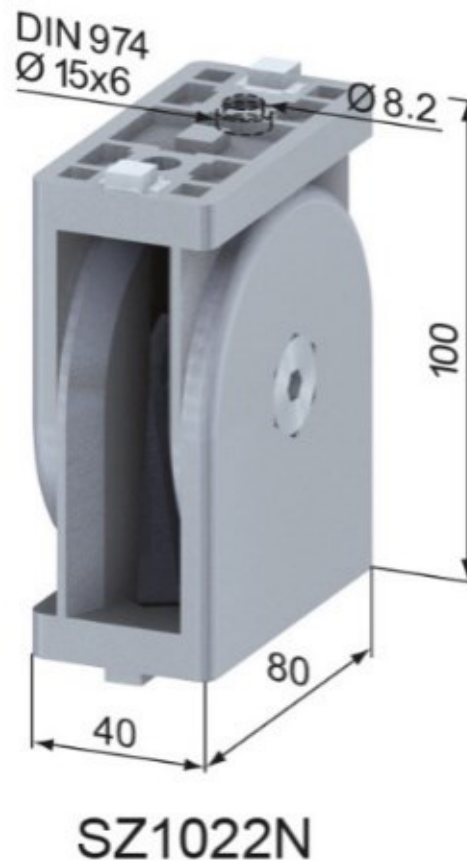
Mekanismin molemmat laskuvarret ja kiinnitys runkoon ovat rakennettu Rollcon alumiiniprofiileista. Profiileilla saavutetaan kestävyys, tarvittavat kiinnikepisteet, pysyvä muoto ja tarpeeksi kevyt lopputulos laskumekanismiin.



Kuva 3. Alumiiniprofiili

#### 4.3.2 Nivelet

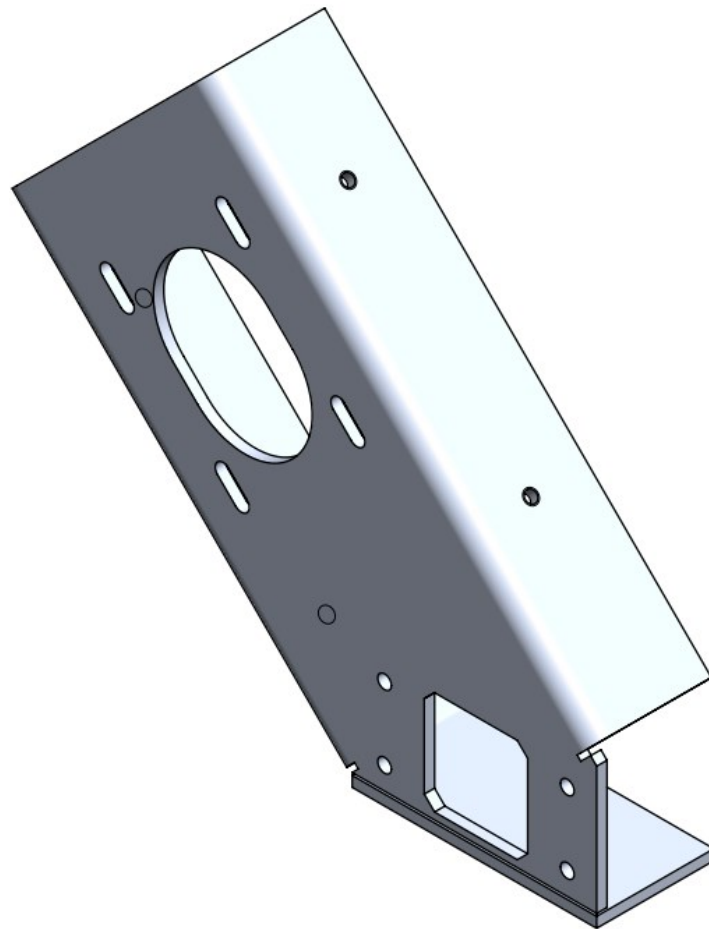
Nivelinä mekaniismissa käytetään  $\pm 90$  astetta kääntyviä Rollco:n raskaskuorma niveliä, jotka ovat valmistettu gadolinium-sinkki seoksesta. Seos takaa nivelille riittävän kestävyden ja hyvän korroosionkeston vaihtelevissa olosuhteissa.



Kuva 4. Raskaskuormanivel. (Rollco, 2022)

### 4.3.3 Särmätyt kiinnikkeet

Kiinnikkeet laskumekanismin varsiin on valmistettu S355 -rakenneteräksestä. Levyjen paksuus vaihtelee 2–4 mm välillä riippuen käyttökohteesta. Kiinnikkeet ovat laserleikattuja ja särmätty muotoonsa. Tarvittaessa särmätyt leikkeet on hitsattu avoimista saumoista kiinni nostaakseen rakenteen lujuutta tai estääkseen lian pääsyn kriittisiin paikkoihin, kuten hihnapyörille. Särmättyjen leikkeiden avulla muille komponenteille ja antureille on saatu tarvittavat kiristys/säätövarat.



Kuva 5. Esimerkkikappale leikatusta ja särmätystä leikkeestä

### 4.3.4 Koneistetut osat

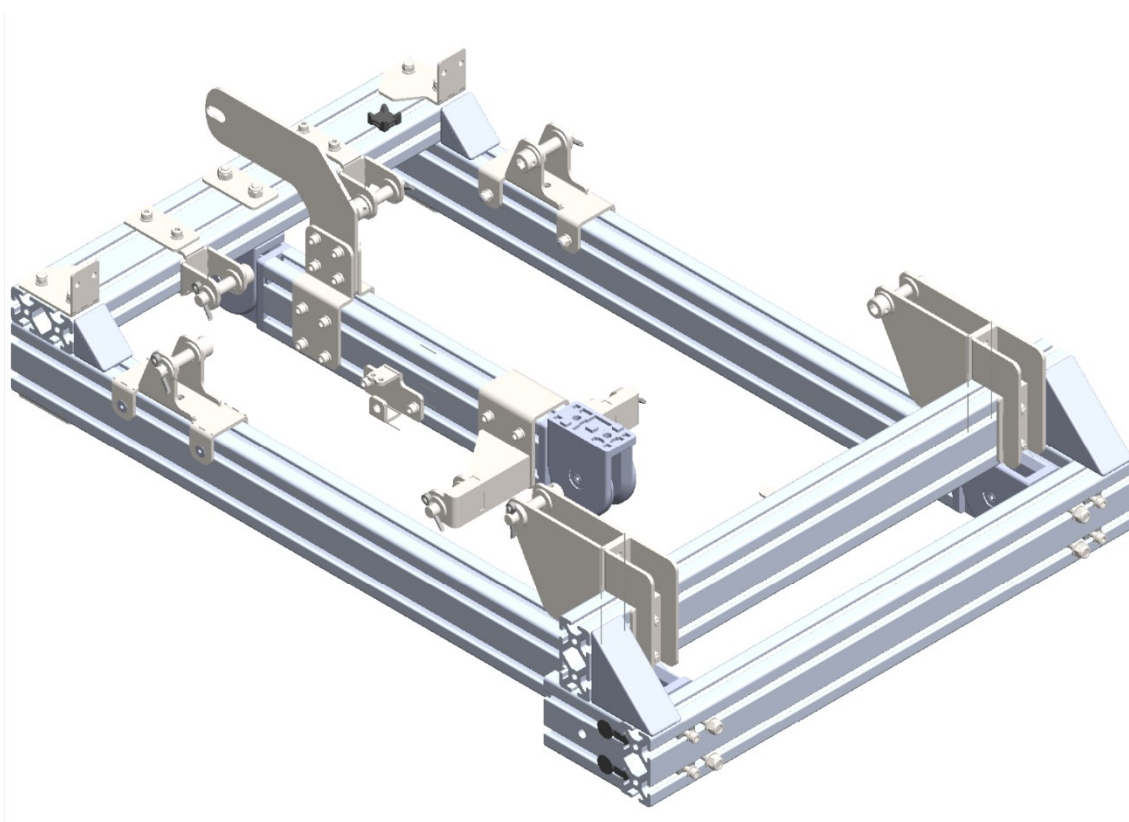
Karamoottorien kiinnityksessä on käytetty koneistettuja 12,1 mm tappeja poistaakseen välyksen mahdollisimman hyvin. Tappien päädyissä on reikä lukituspinnejä varten, joten ne ovat helposti avattavissa/vaihdettavissa mikäli karamoottori tai tappi vioittuu.



Kuva 6. Malli karamoottorin kiinnitys tapista

#### 4.3.5 Mekaaninen varmistus

Laskumekanismissa on myös mekaaninen varmistus laitteen ollessa yläasennossa, ettei laskumekanismi pääse laskeutumaan tukkikuljettimen ollessa päällä.



Kuva 7. Laskumekanismi nivelillä ja kiinnikkeillä

#### 4.4 Laskumekanismin sekvenssi

Kalibrointipään lasku kuljettimensuojan päältä tukkimittarin 3D-päädyn sisään tapahtuu kahdessa osassa. Ensimmäisessä vaiheessa lasketaan pidempi varsi alas kuljettimen sisään ajamalla varsien karamoottorit pulsseilla etäisyyteen, missä varsi saavuttaa kohtisuoran asennon laitteen pohjaa vasten. Toisessa vaiheessa laskumekanismin toinen varsi lasketaan tukkimittarin 3D-kameroiden laserlinjan eteen joko niin että se on kohtisuorassa ensimmäiseen laskettuun varteen tai tiettyyn kulmaan, mikäli kalibrointipää on säädetty kulmaan. Kulmasäädöillä pystytään lisäämään mittausaluetta kolan pohjan ala puolelle, mikä laajentaa kalibroinnista saadun alueen myös ns. negatiiviselle alueelle. Laskusekvenssi pystytään myös suorittamaan samaan aikaan molempien varsien kanssa, mikäli laitteen asennuskohteen kuljettimensuoja on oikean tyyppinen.

#### 4.5 Karamoottorit

Karamoottoreita on 2 eri tyyppiä. Ensimmäinen on pidemmän eli ensimmäisen laskuvaiheen karamoottori, minkä asennuspituus on 410 mm ja iskupituus on 250 mm. Toinen karamoottori on asennuspituudeltaan 310 mm ja sen iskupituus on 150 mm. Molemmissa karamoottoreissa maksimikuorma on 5000 N, vaiheen suhde on 1:67, moottorit sisältävät sisäisen jarrun ja ovat suojausluokalta IP66. Moottorien maksimi nopeus on 7,13 mm/s ja ne toimivat 24 V jännitteellä. Suuremman varmuuden saamiseksi karamoottoreita ei ajeta täydellä nopeudella. Karamoottorien täytyy olla synkronoitu liikkumaan samalla nopeudella ja pienellä erolla toisiinsa nähden, jottei laskumekanismin rakenne väännä kieroon. Karamoottorien enkooderien avulla saamme numeraalisen arvon, joka kertoo varren etäisyyden. Ohjelmassa näitä arvoja verrataan keskenään ja niillä säädetään synkronisoitu liike karamoottorien välillä.

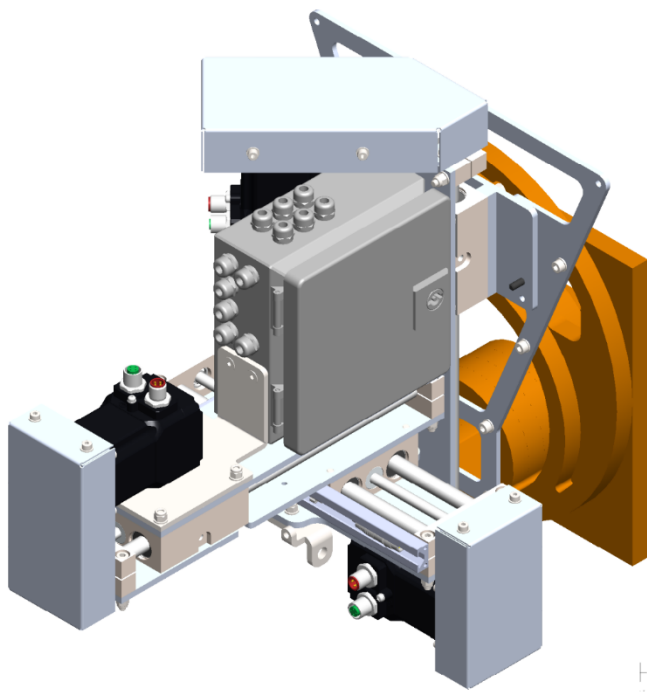


Kuva 8. Linak LA33 Karamoottori (Linak, 2020)

## 4.6 Kalibrintipää

Kalibrintipää koostuu kolmesta lineaariyksiköstä, joilla kalibrintikiekot pystytään ajamaan laserlinjassa erinäisiin sijainteihin. Liikkeitä on kolmeen suuntaa, ylös ja alas (y-liike), vasemmalle ja oikealle (z-liike), sekä eteen ja taakse (x-liike). X-liikkeellä määritetään käytettävä kalibrintikiekko ajamalla kalibrintipää kameroiden laserlinjaan oikealle etäisyydelle. Z- ja y-liikkeillä taas on mahdollista ajaa käytettävä mittakappale laserlinjassa erinäisiin kohtiin 3D-kameroiden lukualueella, jolloin saadaan kameroiden koko lukualueen tarkkuudet selville.

Kalibrintipäässä on käytetty liikkeisiin lineaariyksiköitä. Käytetyt lineaariyksiköt ovat Rollcon QME -lineaariyksiköt mitkä ovat teetätetty tarvittavien liikkeiden mukaan. Lineaariyksiköt ovat ruuvivetoisia ja lineaaripöytä on tuettuna kuulaholkeilla pyöröjohteille. Lineaariyksiköillä tärkeää on vähäinen kitka, ja pehmeä tasainen liike. Yksiköihin on saatavilla kuularuuvi tai trapetsiruuvi. Tässä tapauksessa on käytetty kuularuuvillista mallia. Yksiköt on suojattu tukkikuljettimen liasta ja pölystä palkeilla, jotka rajoittavat lineaariyksikön iskupituutta mutta on välttämätön laitteen sijainnin kannalta. Jokaiseen suuntaan on yksi tarvittavan liikkeen mahdollistava yksikkö. Yksiköissä on asennettuna kiskot, joissa molemmissa päissä on magneettinen asentoanturi. Näillä antureilla tiedetään, milloin kyseinen lineaariyksikkö on saavuttanut maksimiliikkeen ja on ääriasennossa.

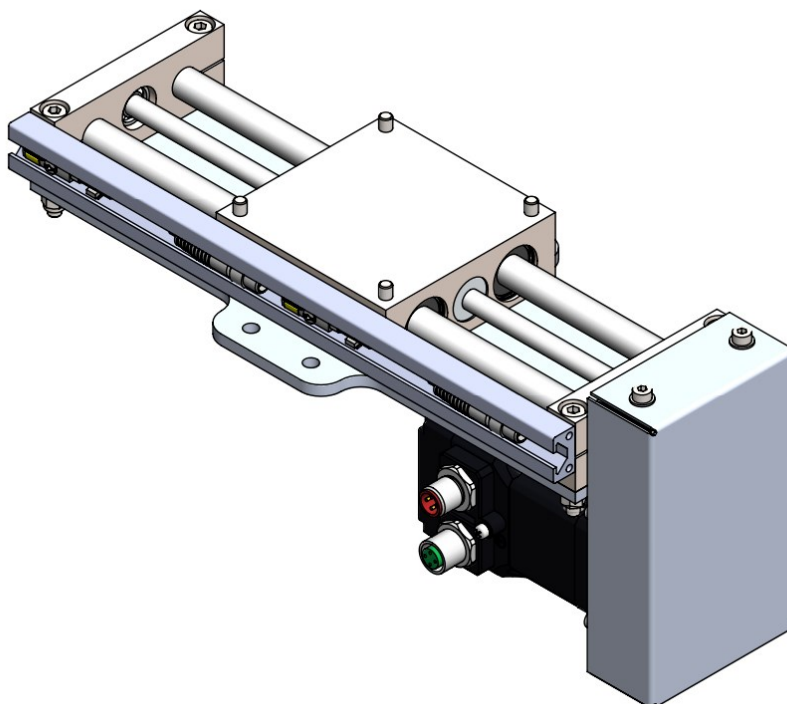


Kuva 9. Kalibrintipää



#### 4.7 Kalibrintipään kalibrointi

Kun kalibrintipää on laskettu tukkimittarin sisälle, ajetaan kalibrintipään y- ja z lineaariyksikkö molempiin äärlaitoihin ja sitten mittausta alustavaan sijaintiin. X-lineaariyksikön liikkeellä valitaan millä kalibrintikappaleella kalibrointi suoritetaan, joten sitä ei tarvitse erikseen kalibroida. Yksiköiden sijaintia mitataan niitä pyörittävien steppimoottoreiden enkooderien avulla. Enkooderit mittaavat kuinka paljon kyseistä akselia on pyöritetty ja ohjelma laskee sijainnin, jossa kyseinen yksikkö on mahdollisella liikealueella.

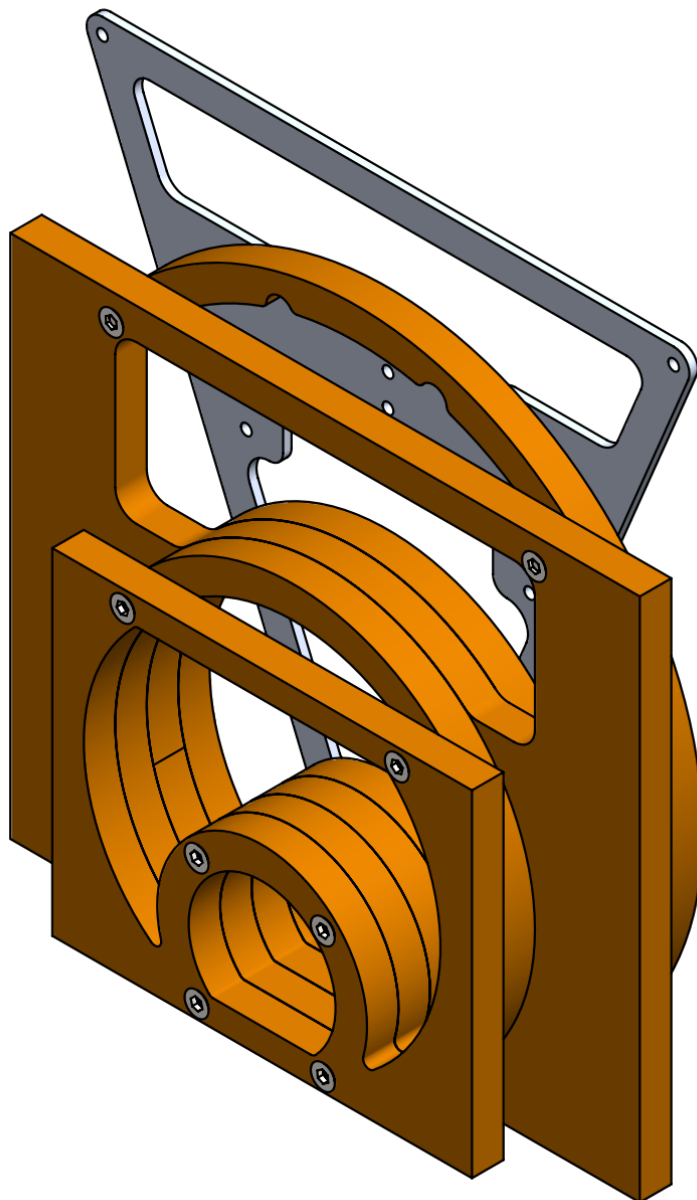


Kuva 10. Lineaariyksikkö, magneettianturit ja steppimoottori

Kalibrintipää on laskumekanismissa kiinni raskaskuorma nivelellä, mitä käytetään laskumekanismin nivelissä (kuva 6). Nivel mahdollistaa pienen kulmasäädön kalibrintipäälle ja on helposti asennettava/vaihdeavissa. Kulmasäädöllä pystytään kasvattamaan negatiivisen alueen suuruutta, mikäli halutaan tietoon 3D-kameroiden tarkkuudet laajemmalla alueella kolan pohjan alapuolelta. Kulmasäätö edellyttää myös laskumekanismin toisen varren ajamisen kohtisuoran asennon yli, mikä helposti johtaa epäluotettaviin tuloksiin mittauksessa.

#### 4.8 Kalibrintikappale

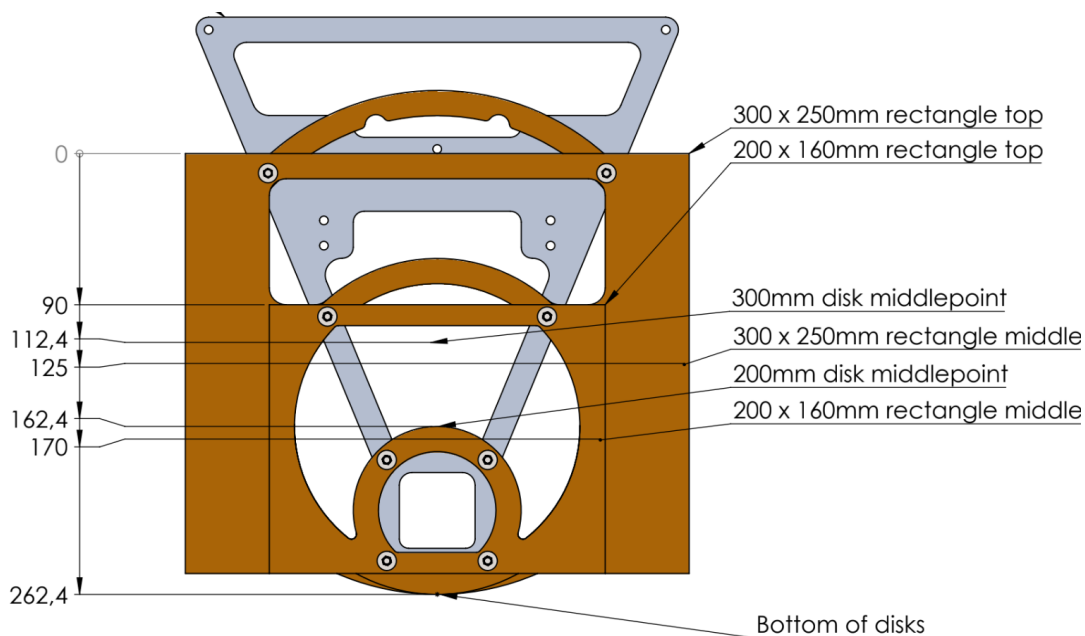
Laitteen vaatimuksena on pystyä todentamaan kaikkien tukkimittarin 3D-kameroiden datan perusteella niiden tarkkuus ja mahdolliset muutokset niiden asennoissa neljän eri kokoisen mittauskappaleen ja niiden liikkeen perusteella.



Kuva 11. Kalibrintikappale

Kalibrintikappale koostuu neljästä erikokoisesta tarkkaan mittaan laserleikatusta vesivanerista kappaleesta. Kappaleilla pystytään havainnollistamaan tukkimittarin läpi meneviä erikokoisia tukkeja ja erinäisiä teräviä kulmia kameroiden laserlinjassa. Kiekkojen halkaisijat ovat 200 ja 300 mm. Suorakaidekappaleet ovat kooltaan 200 x 160 ja 300 x 250 mm. Mittakappaleet ovat paksuudeltaan 15 mm. Kalibrintikappaleeseen on myös

mahdollista kiinnittää 100 ja 400 mm kiekot asiakkaan vaatimuksien mukaan. Ne ovat käsitelty kestämään vaihtelevia olosuhteita, ja lämpötiloja sillä ne eivät ole suljetussa tilassa. Käsitteilyllä on myös vaikutus 3D-kameroiden lukutarkkuuteen. Parhain mahdollinen väri kiekkoille olisi kirkkaan punainen, josta kamerat saisivat tarkimman tuloksen, musta sävy ei heijasta kiekkoista takaisin 3D-kameroille ja valkoinen sävy olisi taas liian heijastava. Tässä tapauksessa on käytetty kirkkaan oranssia sävyä, sillä se edustaa yrityksen väriteemaa ja on erittäin lähellä kirkkaan punaisen värin ominaisuuksia.



Kuva 12. Kalibrintikappaleen geometria

Kalibrintikappale on tehty helposti irrottavaksi ja vaihdettavaksi mikäli sen epäillään kuluneen tai sen muodon vääristyneen. Kalibrintikappale on kiinni kahdella ruuvikiristimellä ja yhdellä keskitystapilla. Ruuvikiristimet puristavat kalibrintikappaleen sen taustalevyyn kiinni tasaisesti.



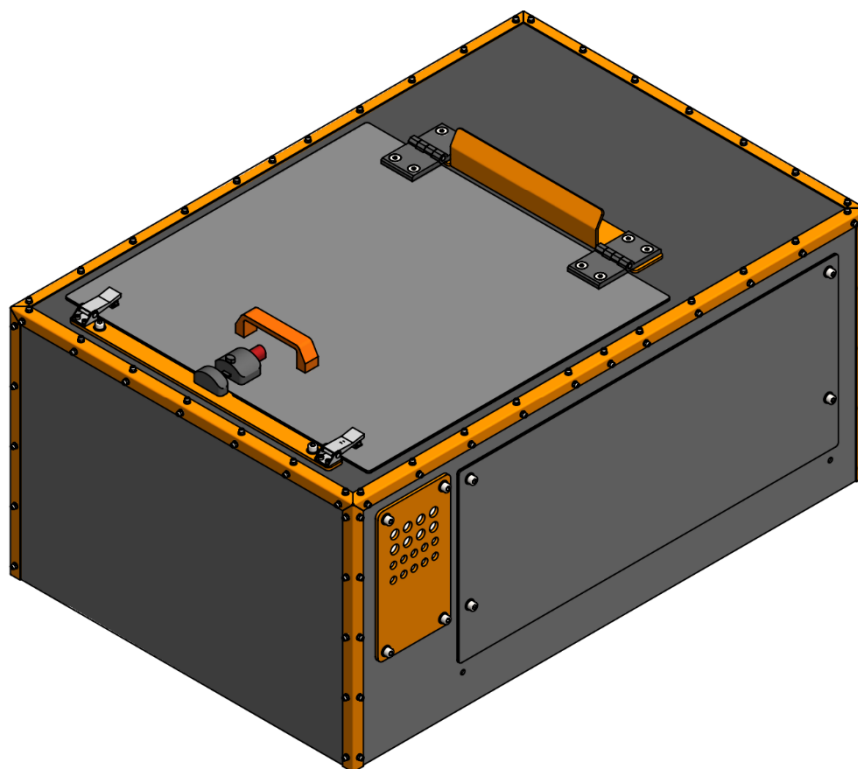
Kuva 13. Ruuvikiristin (Elesa USA, 2020)

## 4.9 Suojat

Tukkimittarin toisessa päässä on röntgenlaitteisto, joten laite täytyy suojata vähintään 2 mm paksulla lyijykerroksella kauttaaltaan tai paksummilla lyijy/metalli yhdisteellä, ettei tukkimittari vuoda säteilyä kalibroitirobotin ja tukkikuljettimen välistä. Lyijylevyjen on myös suotavaa mennä lomittain noin 50 mm matkalta, jotta niiden välistä ei karkaa säteilyä kokonaisuuden ympärille.

Laitteen suojat valmistetaan dibond-alumiinikerroslevyistä kestävä ja kevyen rakenteen vuoksi. Levyt on sisäpuolelta vuorattu 1–2 mm lyijykerroksella. Syynä dibond -levyjen käyttämiseen on laitteen suojeiden paino. Suojat on näin saatu kevyemmiksi ja suojeiden nostaminen laitteen päälle on huomattavasti käytännöllisempää asennuskohteissa.

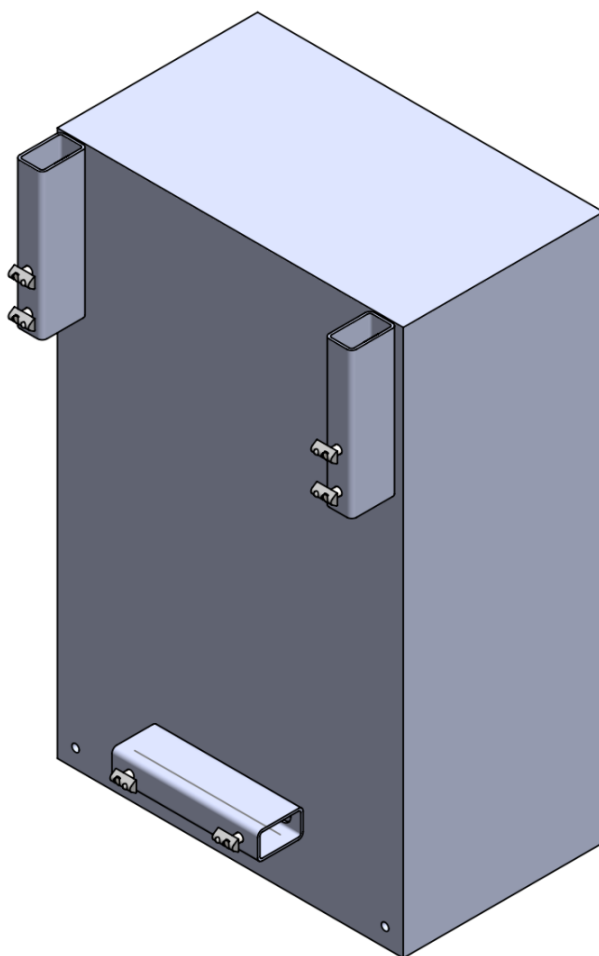
Suojeiden päällä on saranoilla avattava luukku, joka mahdollistaa kalibroitiekikon vaihtamisen suojeiden ollessa paikallaan. Luukku kiristetään edestä kahdella salvalla, jolloin se puristuu tiukasti kiinni suojeeseen. Luukun on oltava lukittuna kiinni tukkimittarin käytön aikana, jotta mittarin sisälle ei pääse käsiksi. Luukun lukossa on erikoisavain, jotta sitä ei saa auki helposti muilla työkaluilla. Myös suojeiden sivuilla on irrotettavat sivupaneelit, jotka on mahdollista poistaa. Näin ollen laitteelle on mahdollista suorittaa puhtaus ja huoltotoimenpiteitä poistamatta koko suojeita laitteen ympäriltä. Myös laitteen suojeiden asennus helpottuu, kun suojeita koostuu osista, eikä ole yksittäinen kappale.



Kuva 14. Dibond- ja lyijysuojakokoonpano

#### 4.10 Ohjausyksikkö

Laitteen automaatio on keskitetty yhteen ohjausyksikköön. Ohjausyksikkönä käytetään Rittal Oy:n suunnittelemaa kytkentäkaappia. Ohjausyksikkö asennetaan tukkimittarin sisälle kiinni alumiinirunkoon. Kaikki kalibroitirobotin johdotukset kyseisessä versiossa joudutaan siis viedä paksuna nippuna tukkimittarin läpivientien kautta. Tulevissa versioissa tämä koitetaan eliminoida muutamaa johtoon erillisillä liittimillä helpottaakseen ja nopeuttaakseen laitteen asennusta. Kalibroitipään ohjauksessa on käytetty Beckhoffin logiikkakortteja steppimootoreille. Karamootoreita ohjataan releillä, mitkä kestävät karamoottorien vaatimat suuret virrat.



Kuva 15. Karkea malli kalibroitirobotin ohjauskaapista

## 5 Pohdinta

Opinnäytetyössä suunniteltiin ja rakennettiin yritykselle asiakkaan tarpeiden mukaan prototyyppi tukkimittarin 3D-kameroiden oikean toiminnan tarkastamiseksi ja varmistamiseksi. Työn ohella pidettiin viikoittain palavereja eri osa-alueiden ihmisten kanssa pitääkseen aikataulun ja toteutuksen parhaana mahdollisena. Opinnäytetyö oli jatkuvasti kehittyvä ja muuttuva prosessi. Laitteen suunnittelussa ja prototyypin kasauksessa meni oma aikansa komponenttipulan/osien saanti vaikeuden takia. Komponenttitoimittajien tehdasseisokit ja maailmantilanne vaikutti useilla kuukausilla tiettyjen komponenttien saatavuuteen.

Kalibrintirobotin prototyyppi oli onnistunut laite. Laitetta stressi testattiin eritavoin useita satoja sekvenssejä ennen itse asennusta paikanpäälle. Sekvenssiin ja laitteeseen tehtiin hienosäätöjä sen luotettavuuden parantamiseksi. Tuotekehityksen kannalta muutamia huomioita otettiin rakenteeseen ja asennukseen liittyen, jotta ne helpottuvat entisestään tulevissa versioissa. Kyseinen laite asennettiin Suomeen. Laitetta on myös toimitettu myöhemmin ulkomaille muille Finnos Oy:n yhteistyökumppaneille.

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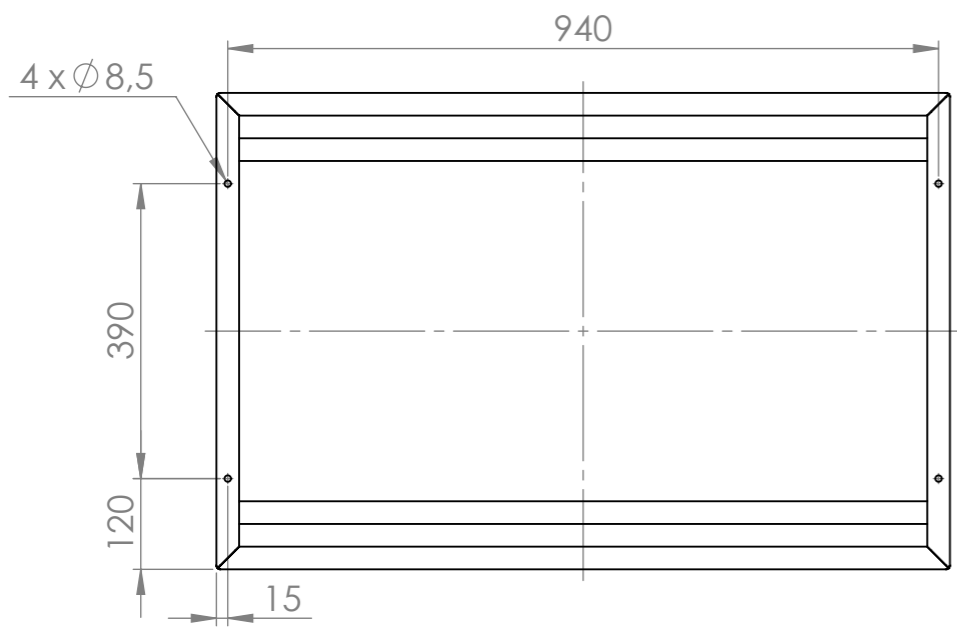
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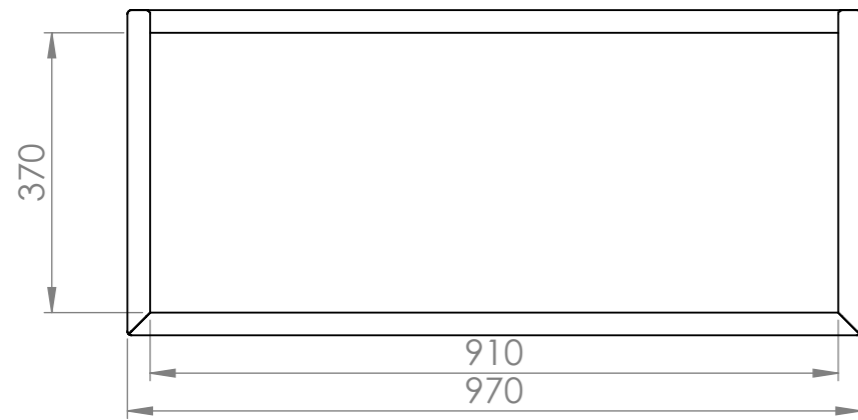
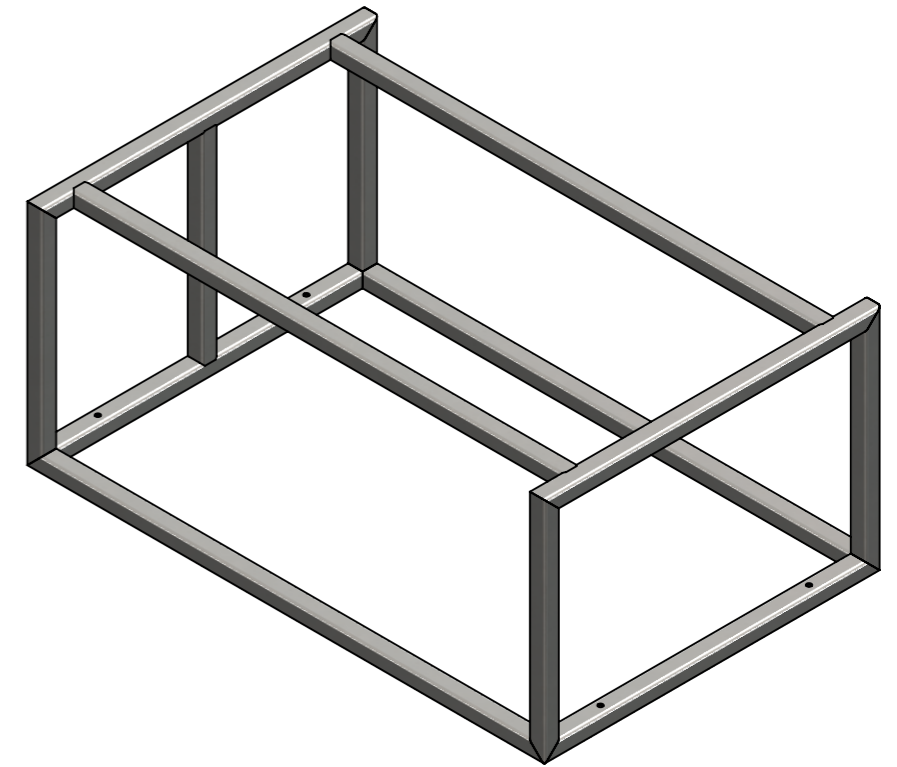
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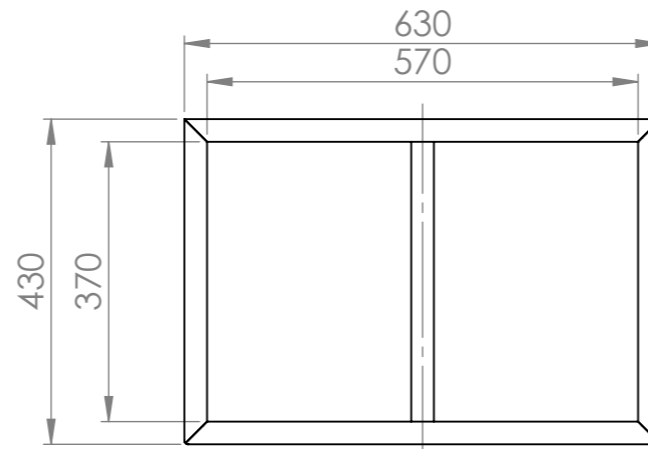
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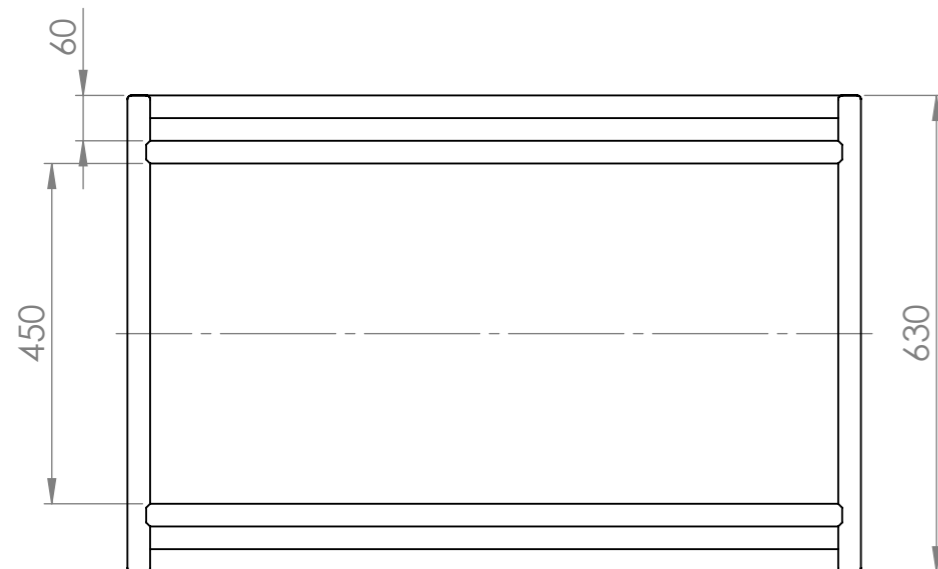
Bottom



Side



Front

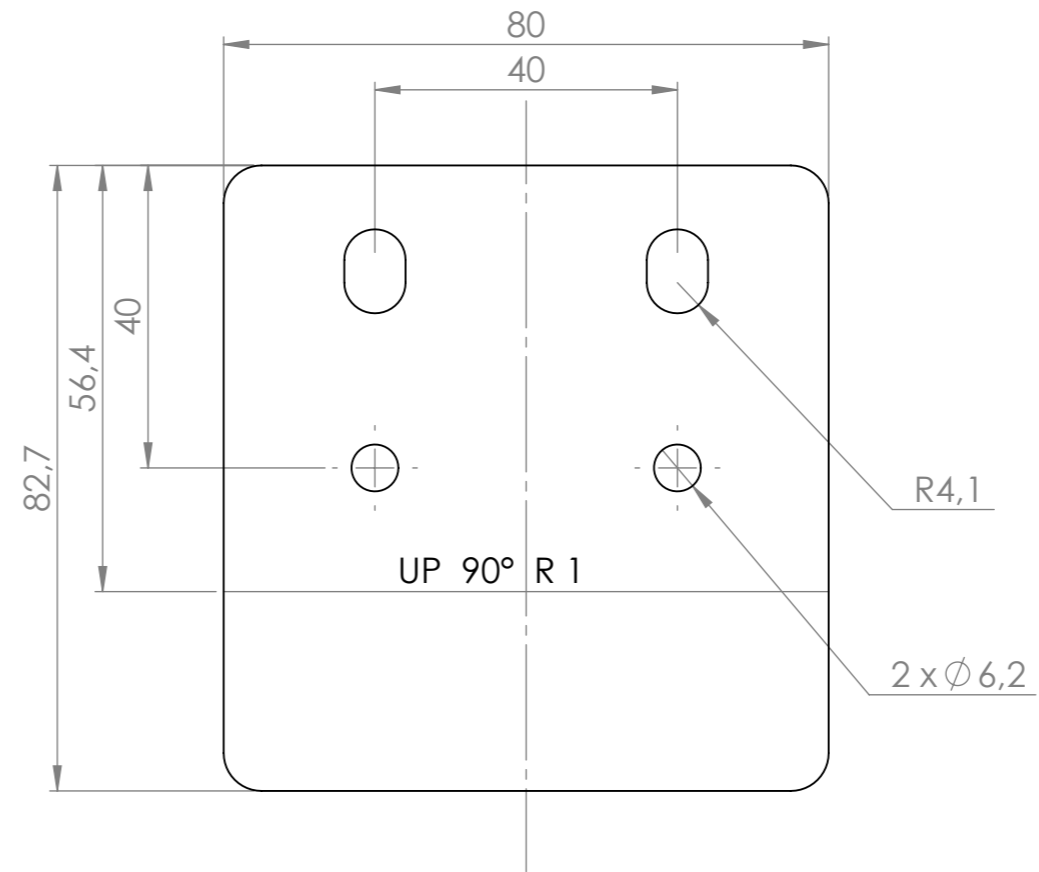
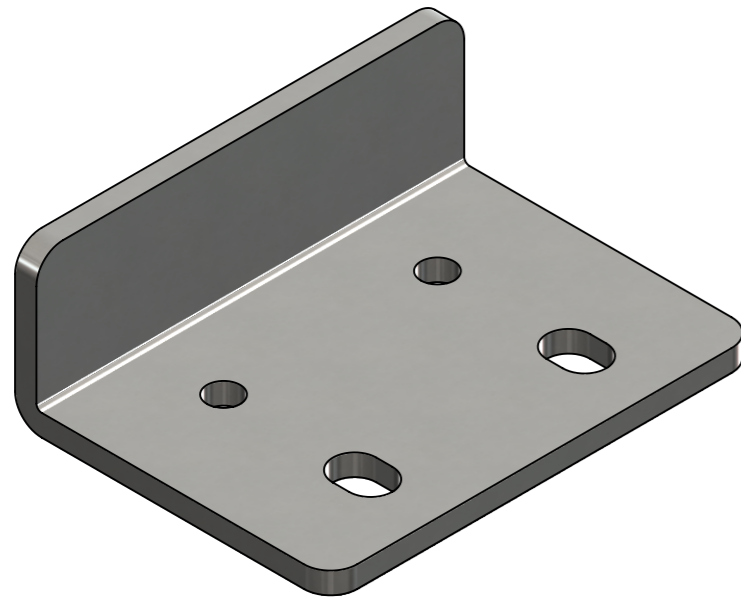


Top

CD3D-00-01-001	Rhs frame		RHS	30 x 30 x 2
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020	
MASS/KG 16.67	PROJECT		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH
FIRST ANGLE	DESCRIPTION <b>Rhs frame</b>		DRAWING NUMBER <b>CD3D-00-01-001</b>	SCALE <b>1:10</b>
			REVISION <b>A</b>	SHEET <b>1 of 1</b>

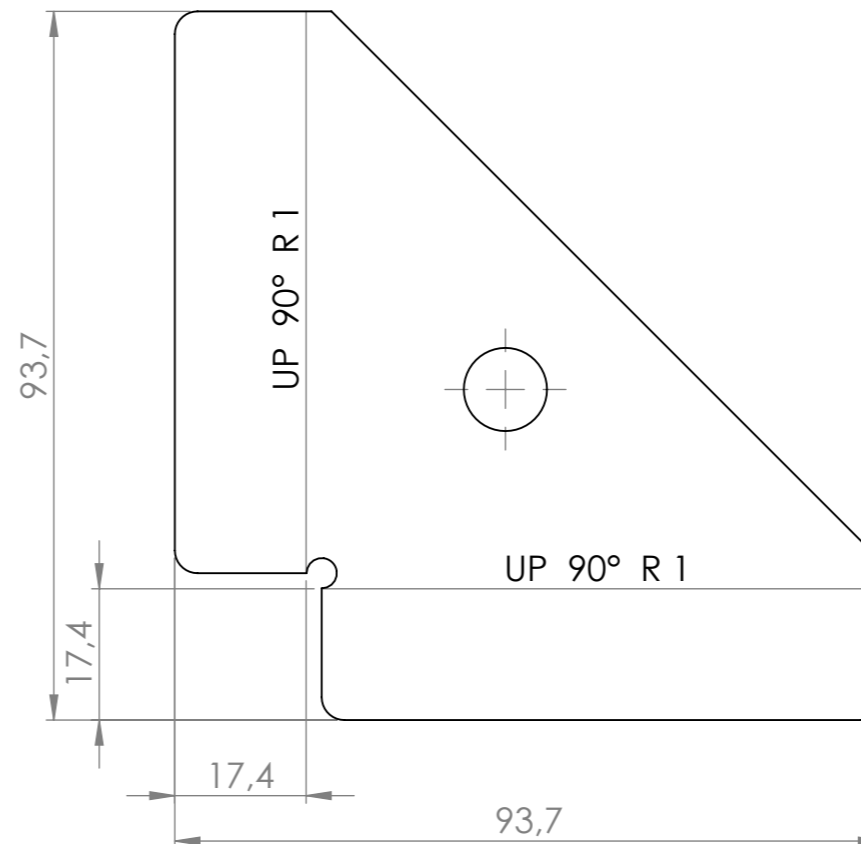
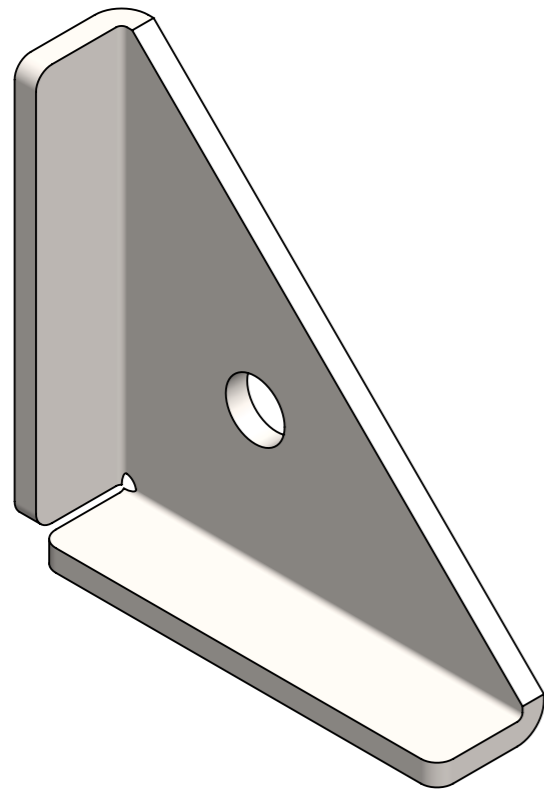
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN





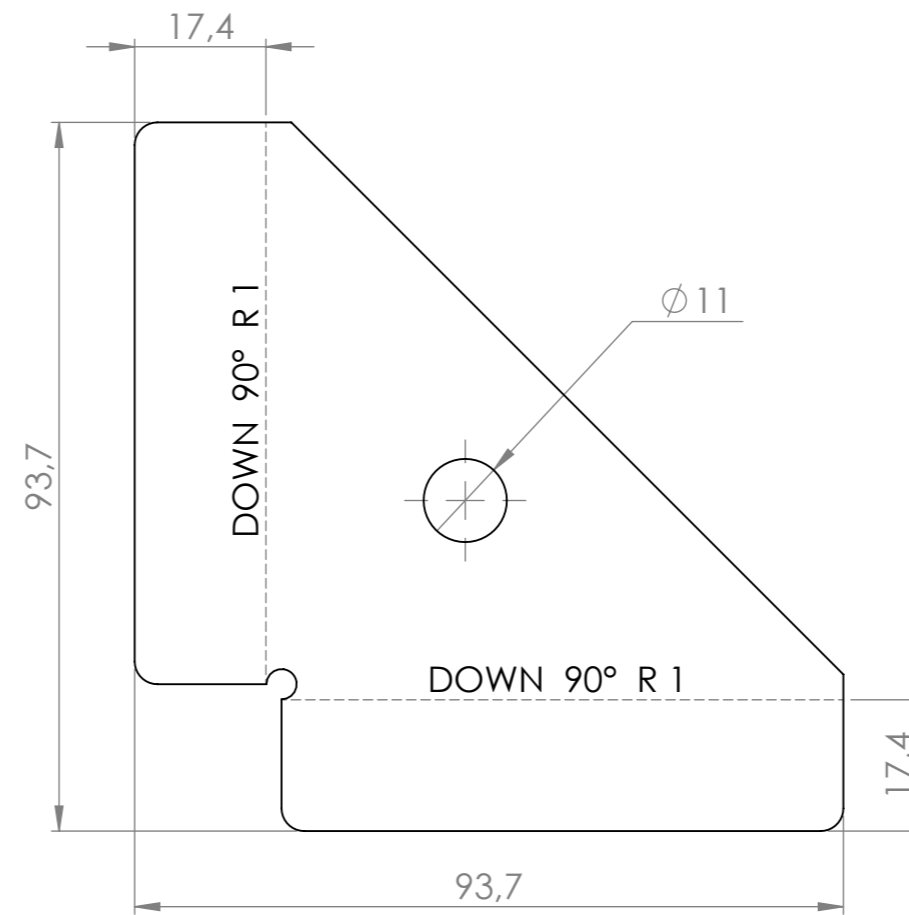
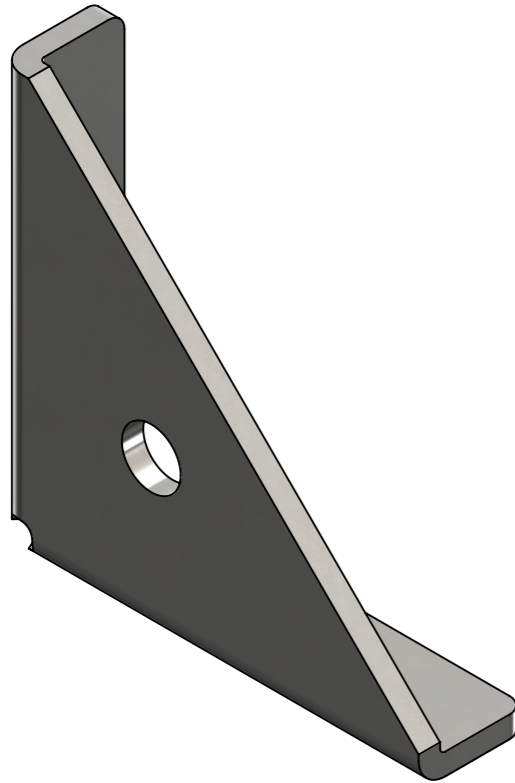
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-01-002	Alu frame mount		Plate	L83 x W80 x Th.4	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 02.07.2020		
MASS/KG 0.20	PROJECT CD		MATERIAL 1.0553 (S355J0)	FINISH	PAPER A3
FIRST ANGLE	DESCRIPTION Alu frame mount		DRAWING NUMBER CD3D-00-01-002	REVISION A	SCALE 1:1
					SHEET 1 of 1



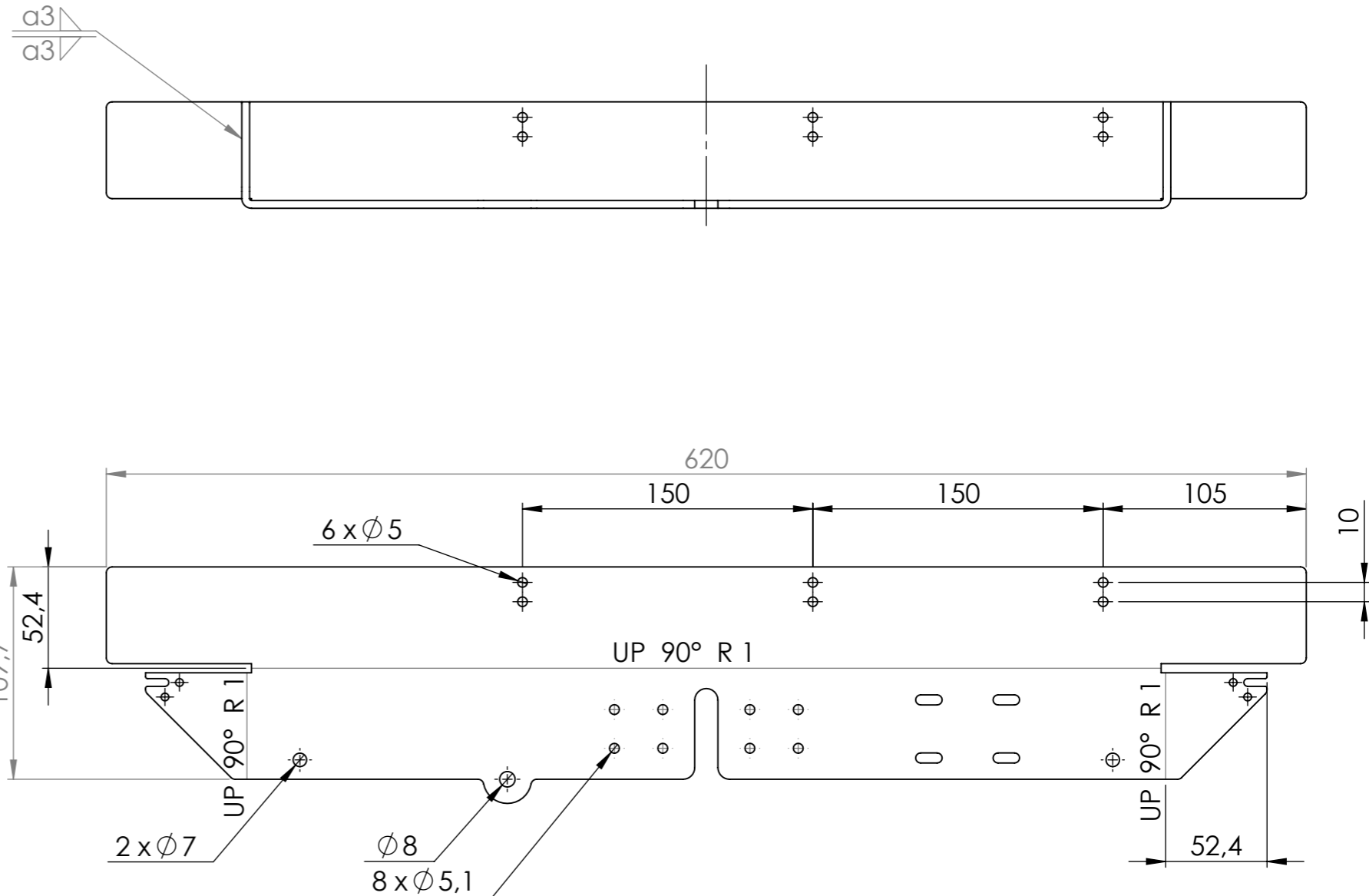
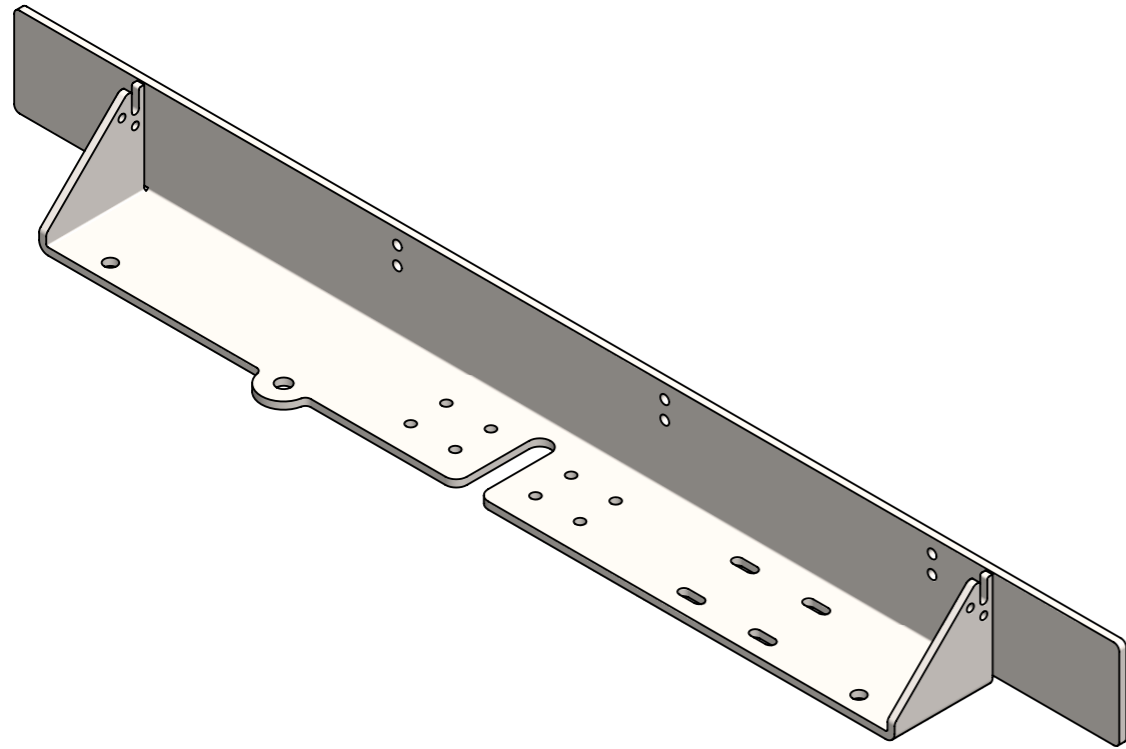
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Drawing fix	06.07.2020	IN

CD3D-00-01-003	Cover mounting plate1		Plate	L94 x W94 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 06.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.18</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Cover mounting plate1</b>	DRAWING NUMBER <b>CD3D-00-01-003</b>	REVISION <b>B</b>	SHEET <b>1 of 1</b>



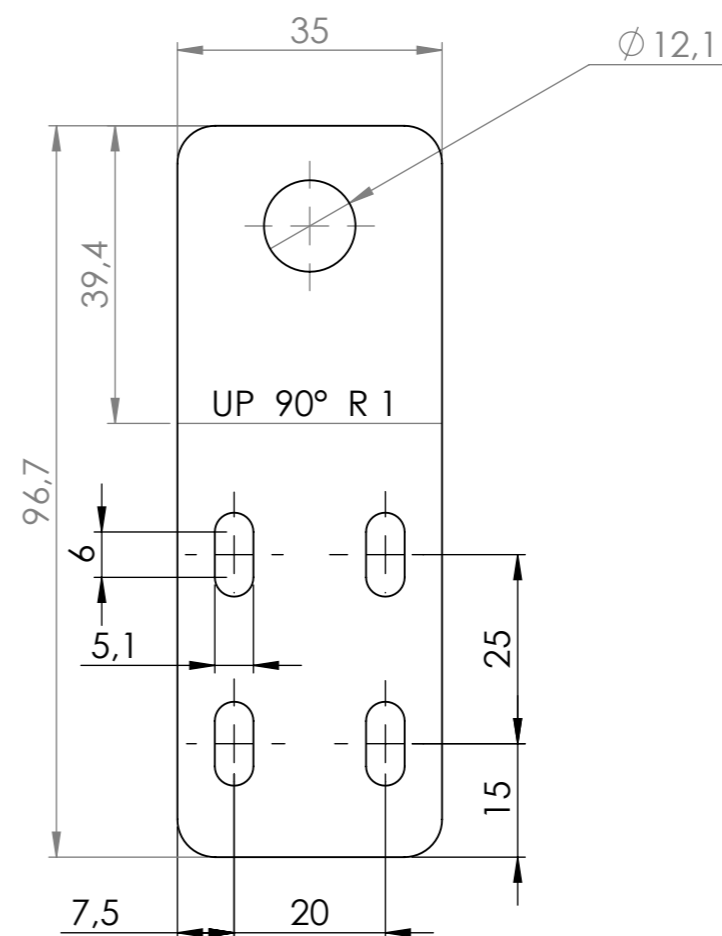
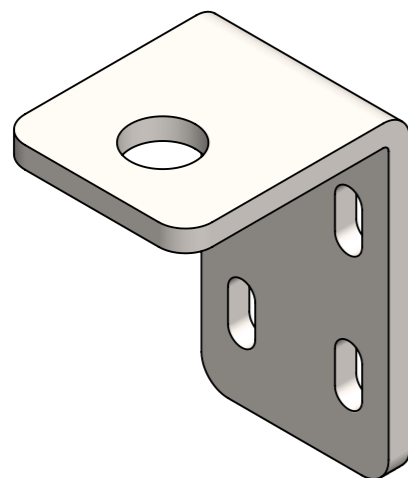
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-01-004	Cover mounting plate2		Plate	L94 x W94 x Th.4	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 02.07.2020 MATERIAL 1.0553 (S355J0)		
MASS/KG 0.18	PROJECT CD		FINISH	PAPER A3	SCALE 1:1
FIRST ANGLE	DESCRIPTION Cover mounting plate2		DRAWING NUMBER CD3D-00-01-004	REVISION A	SHEET 1 of 1



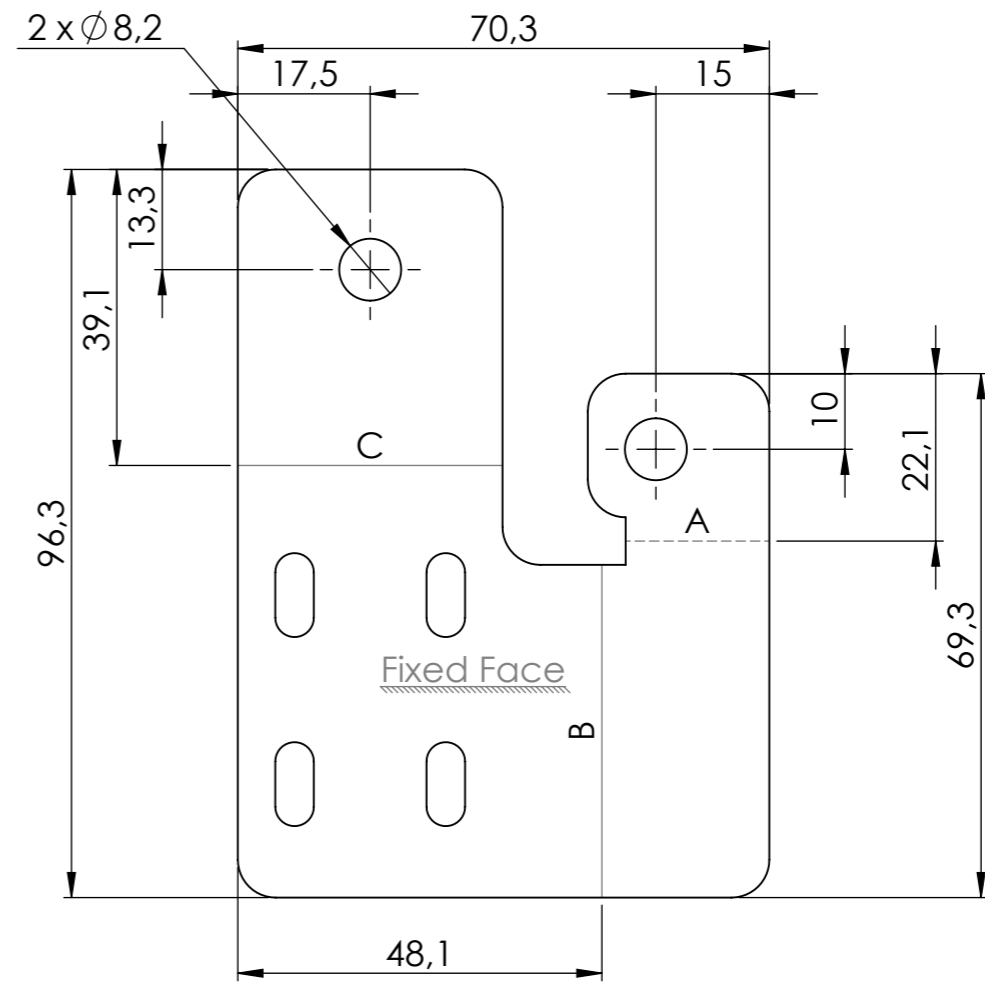
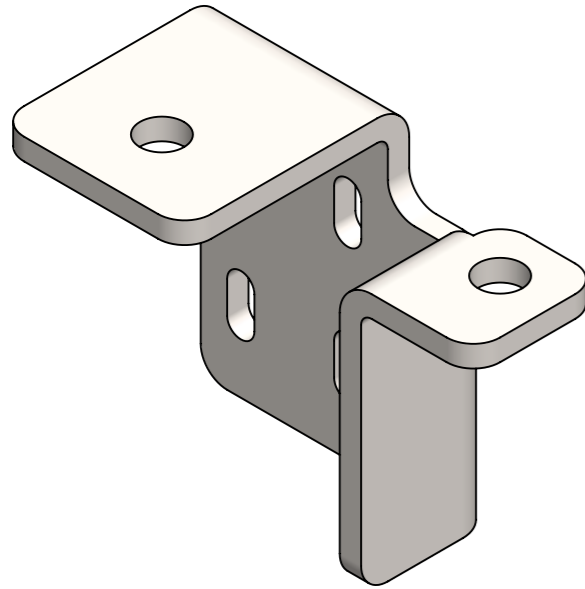
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Dimensions added	05.07.2020	IN
01	Slots 4.2 -> 5.2, holes added	05.10.2020	IN

CD3D-00-01-005	Solenoid mounting plate		Plate	L620 x W110 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 05.10.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>1.93</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Solenoid mounting plate</b>	DRAWING NUMBER <b>CD3D-00-01-005</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	Slot 4,1 -> 5,1 Width 30 -> 35	05.10.2020	IN

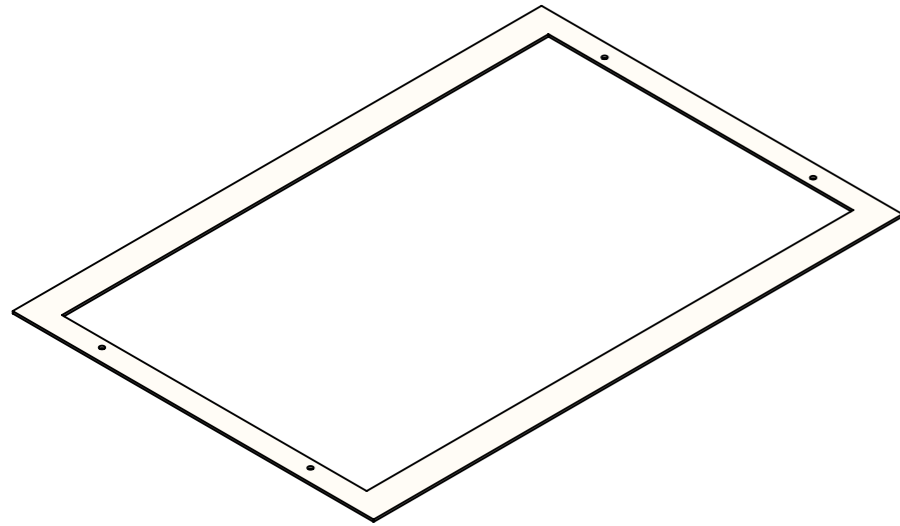
PartNo.	Description	Info	Preform type	Preform Dimension
CD3D-00-01-006	Adjustment plate		Plate	L97 x W35 x Th.4
DEBURR AND BREAK SHARP EDGES GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m		 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> <b>05.10.2020</b> MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.09</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 		DESCRIPTION <b>Adjustment plate</b>		DRAWING NUMBER <b>CD3D-00-01-006</b>
			REVISION <b>01</b>	SHEET <b>1 of 1</b>



Tag	Direction	Angle	Inner Radius
A	DOWN	90°	2
B	UP	90°	2
C	UP	90°	2

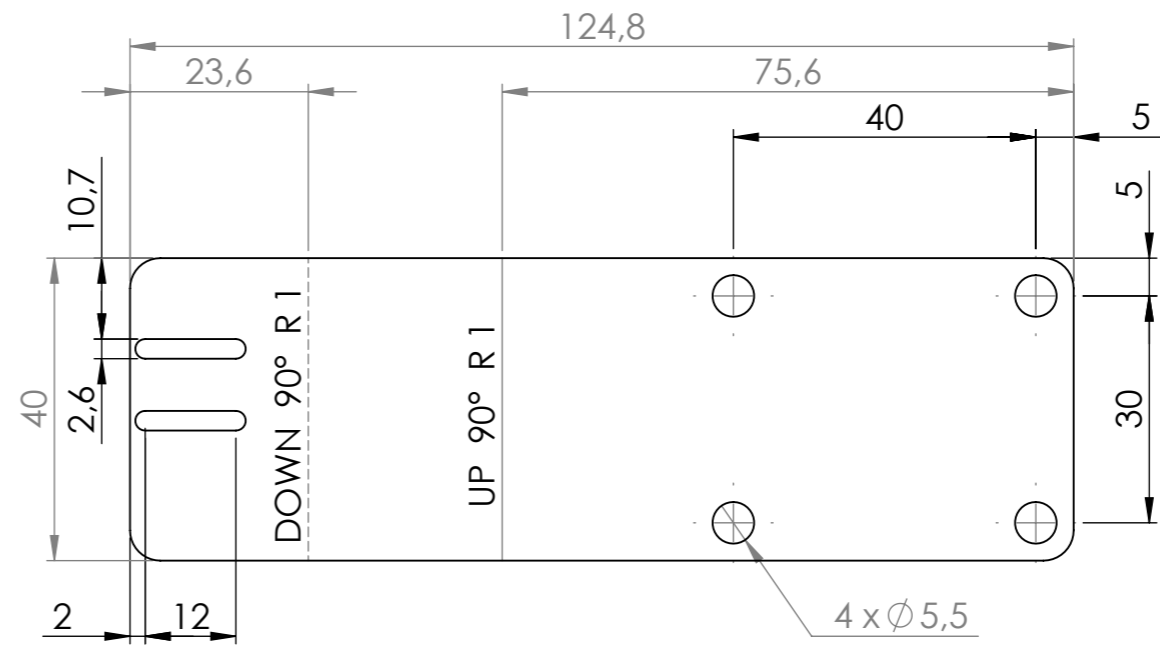
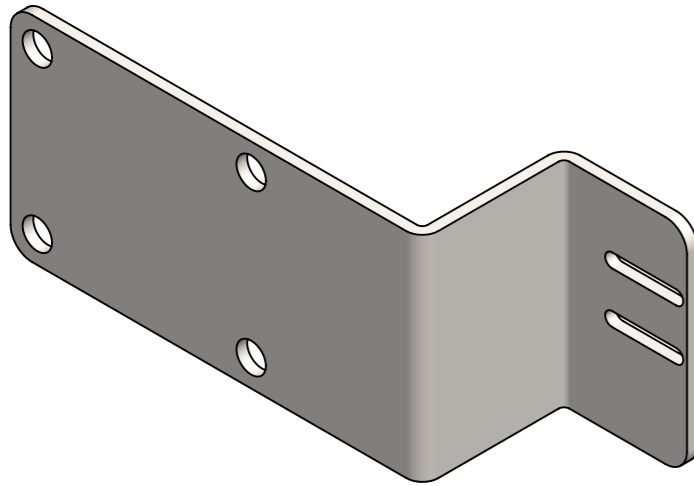
CD3D-00-01-007	Adjustment plate2 mk2		Plate	L97 x W35 x Th.4	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 02.11.2020	APPROVED IN 02.11.2020	
MASS/KG 0.16	PROJECT CD		MATERIAL 1.0553 (\$355J0)	FINISH	PAPER A3
FIRST ANGLE	DESCRIPTION Adjustment plate2 mk2	CONFIGURATION DefaultSM-FLAT-PATTERN	DRAWING NUMBER CD3D-00-01-007	REVISION 01	SHEET 1 of 1

Revision	Description	Date	Approved
01	Sensor pos added	02.11.2020	IN



Revision	Description	Date	Approved
A	Initial design	05.07.2020	IN

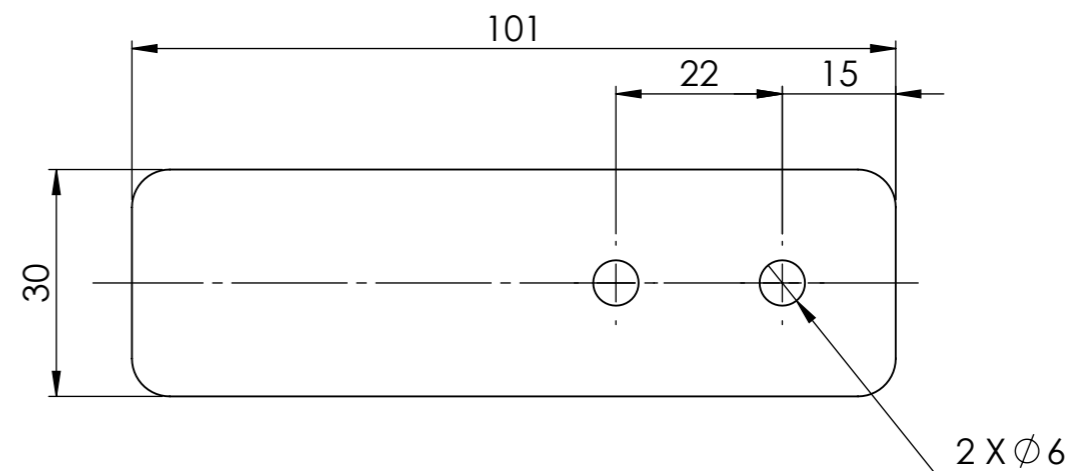
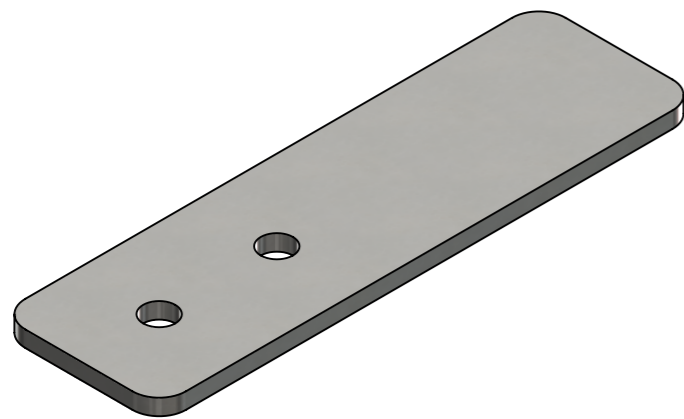
CD3D-00-01-009	Conveyor mount		Plate	L989 x W675 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 05.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>4.64</b>	PROJECT CD		FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>Conveyor mount</b>	DRAWING NUMBER <b>CD3D-00-01-009</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	Slot size to 2,6	19.10.2020	IN

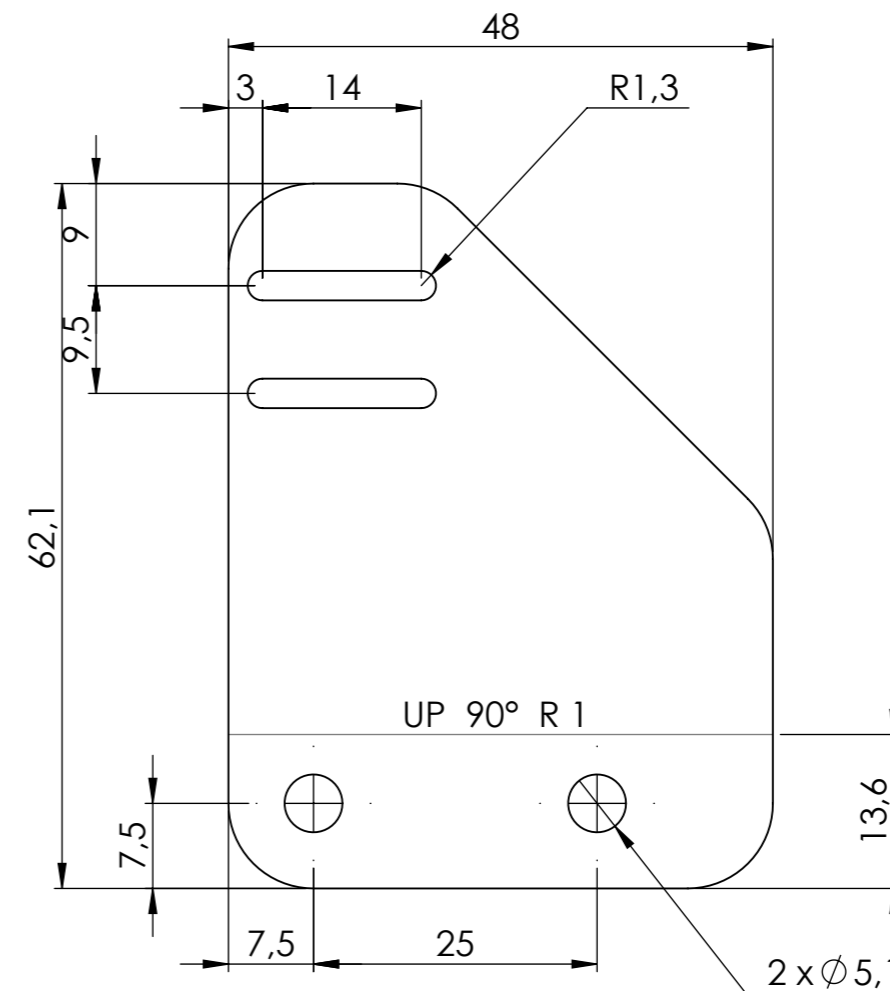
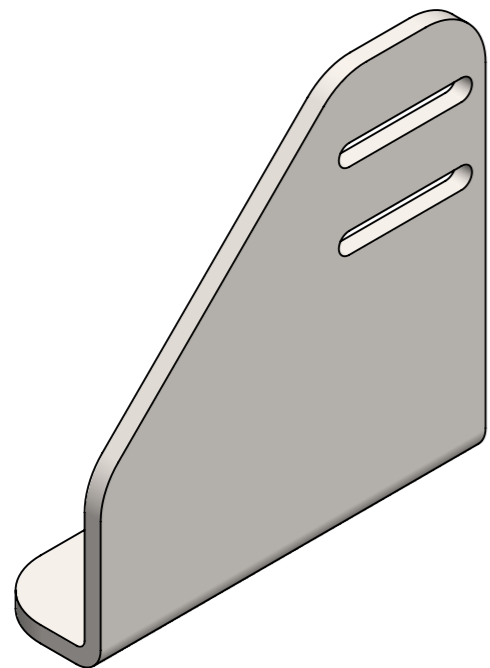
PartNo.	Description	Info	Preform type	Preform Dimension
CD3D-00-01-011	Solenoid microswitch plate		Plate	L125 x W40 Th.2
DEBURR AND BREAK SHARP EDGES GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m		 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 19.10.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.08</b>	PROJECT CD		FINISH	PAPER <b>A3</b>
FIRST ANGLE 		DESCRIPTION <b>Solenoid microswitch plate</b>		DRAWING NUMBER <b>CD3D-00-01-011</b>
			REVISION <b>01</b>	SHEET <b>1 of 1</b>





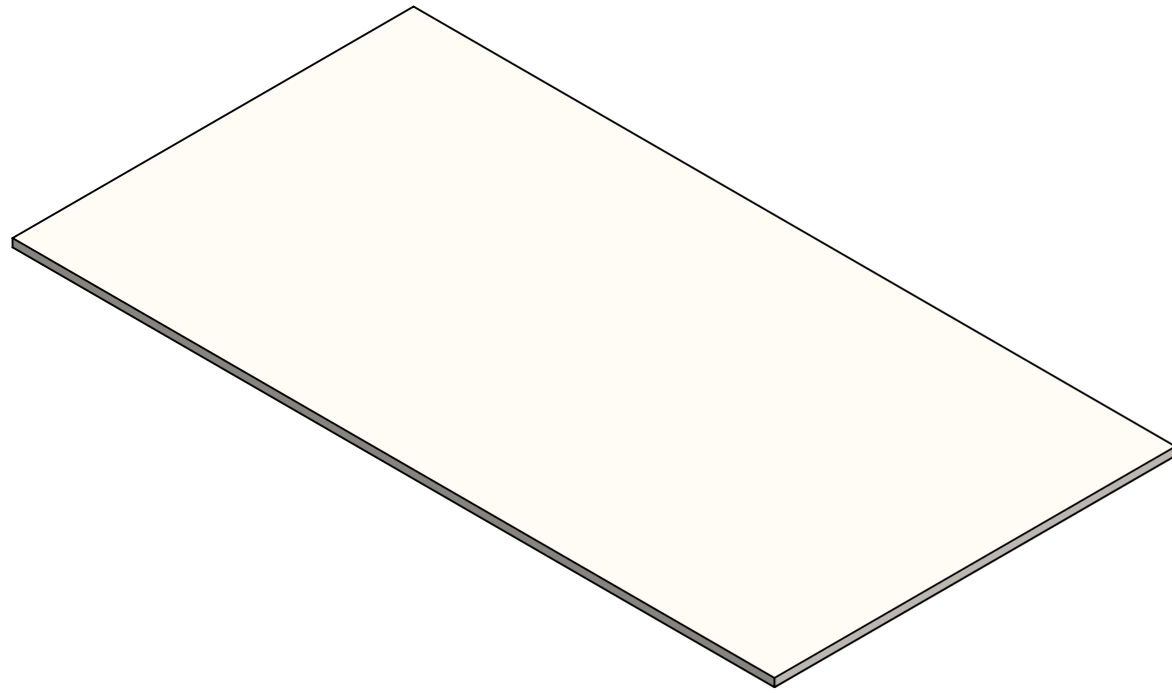
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-01-012	Cable tray mount 2		Plate	L101 x W30 x Th.3
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.07</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>Cable tray mount 2</b>	DRAWING NUMBER <b>CD3D-00-01-012</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>



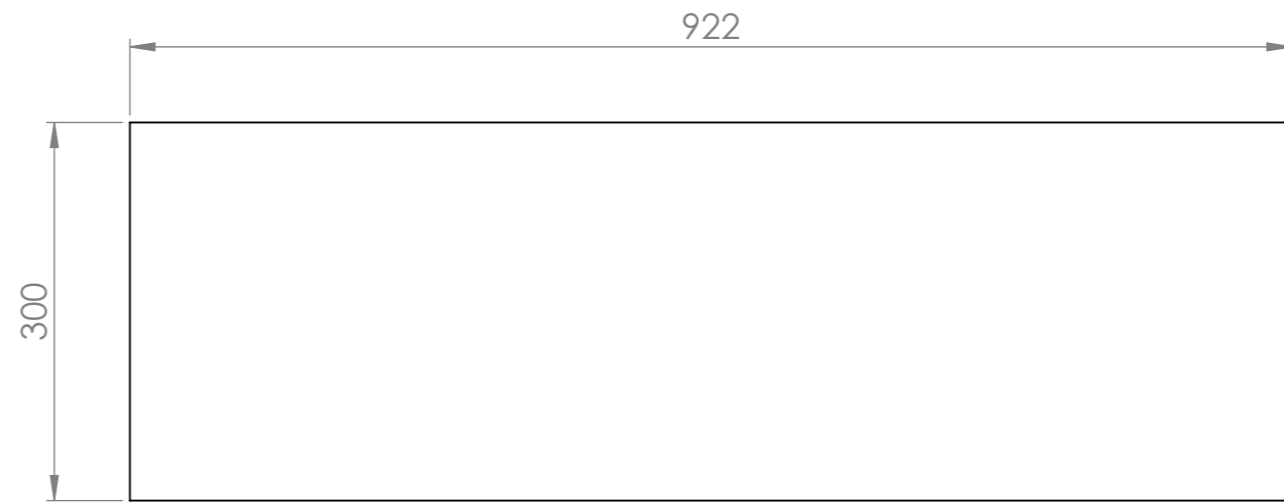
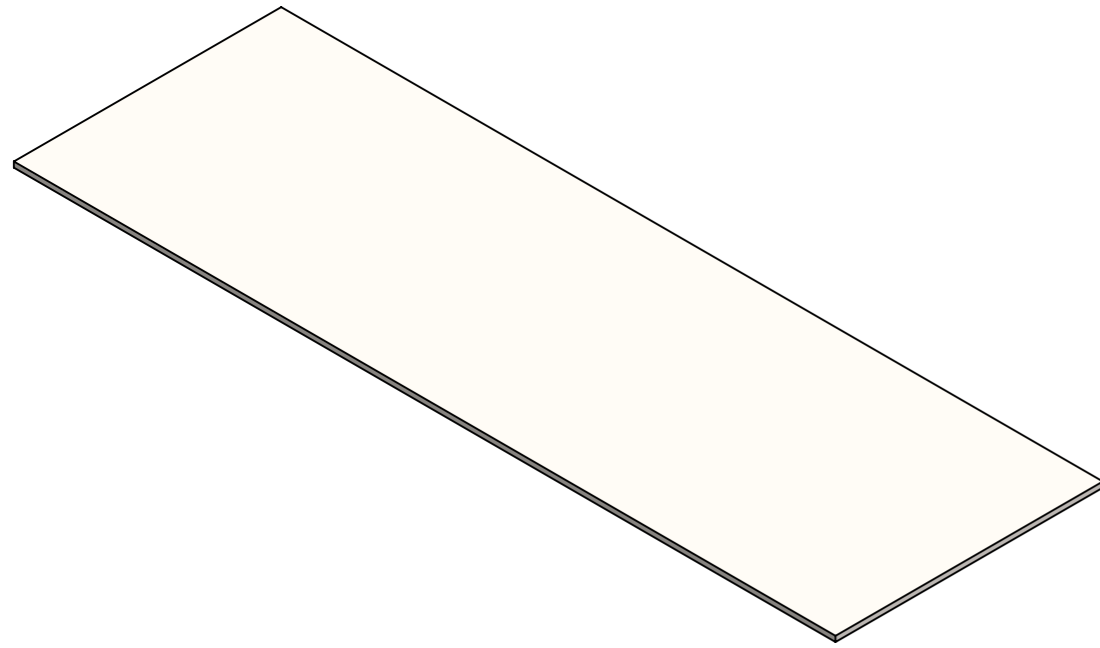
Revision	Description	Date	Approved
01	Initial design	10.11.2020	IN
02	Slot 2mm longer	10.11.2020	IN

CD3D-00-01-015	Second solenoid microswitch plate		Plate	L63 x W48 x Th.2	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 10.11.2020	APPROVED <b>IN</b> 10.11.2020	
MASS/KG <b>0.04</b>	PROJECT <b>CD</b>		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Second solenoid microswitch plate</b>	CONFIGURATION <b>DefaultSM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-01-015</b>	REVISION <b>02</b>	SHEET <b>1 of 1</b>



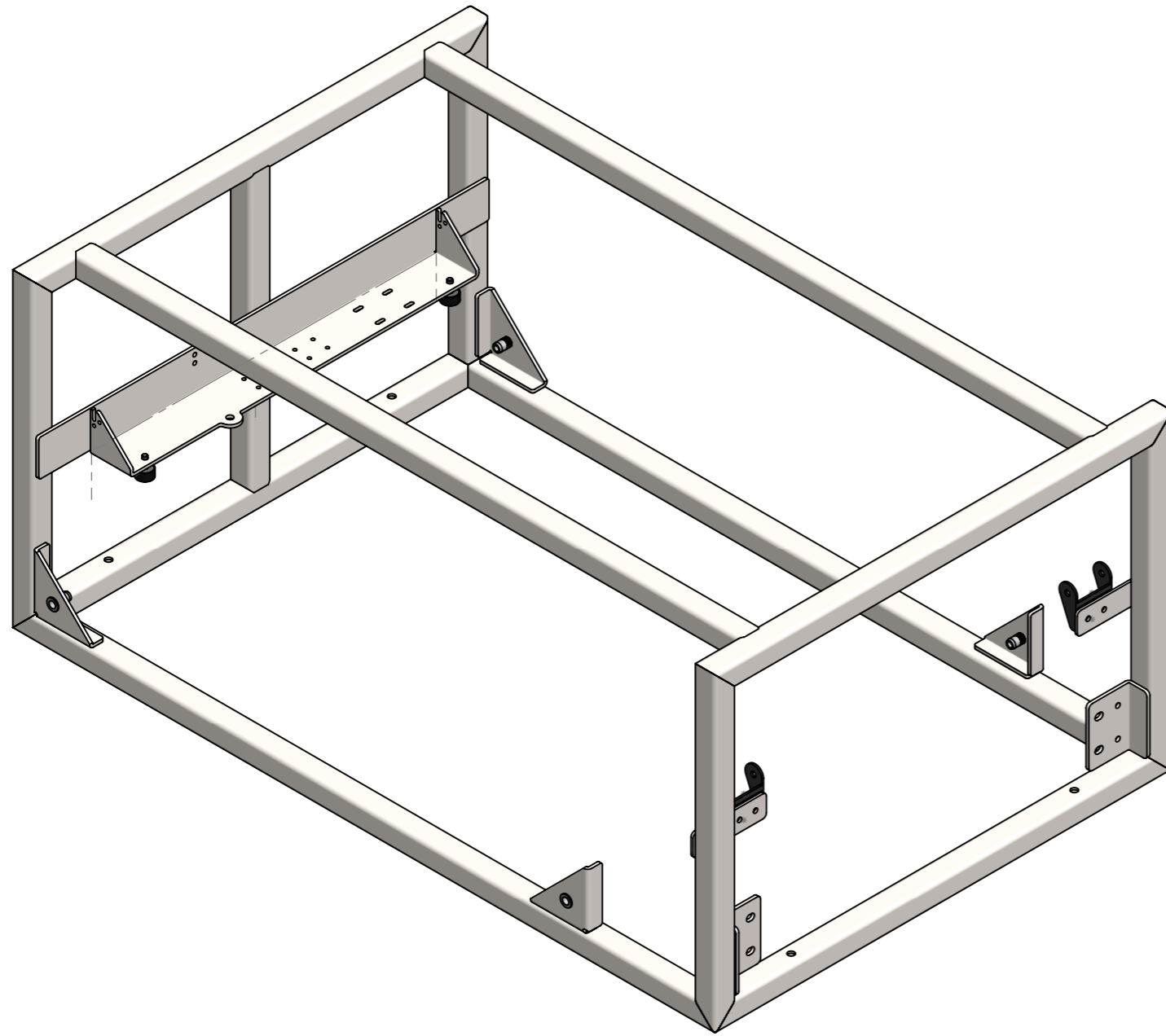
Revision	Description	Date	Approved
01	Initial design	28.12.2020	IN

CD3D-00-01-017	Conveyor mount flange1		Plate	L570 x W300 x Th.6	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 28.12.2020	APPROVED <b>IN</b> 28.12.2020	
MASS/KG <b>8.00</b>	PROJECT <b>CD</b>		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Conveyor mount flange1</b>	CONFIGURATION <b>Default</b>	DRAWING NUMBER <b>CD3D-00-01-017</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
01	Initial design	28.12.2020	IN

CD3D-00-01-019	Conveyor mount flange2		Plate	L922 x W300 x Th.6	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 28.12.2020	APPROVED <b>IN</b> 28.12.2020	
MASS/KG <b>12.94</b>	PROJECT <b>CD</b>		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Conveyor mount flange2</b>	CONFIGURATION <b>Default</b>	DRAWING NUMBER <b>CD3D-00-01-019</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>



9	CD3D-00-01-002	Alu frame mount		Plate	L83 x W80 x Th.4	2
8		Dampener				2
7		cable carrier end piece male				2
6		rivet_nut_M8				4
5	CD3D-00-01-012	Cable tray mount 2		Plate	L101 x W30 x Th.3	2
4	CD3D-00-01-005	Solenoid mounting plate		Plate	L620 x W110 x Th.4	1
3	CD3D-00-01-004	Cover mounting plate2		Plate	L94 x W94 x Th.4	2
2	CD3D-00-01-003	Cover mounting plate1		Plate	L94 x W94 x Th.4	2
1	CD3D-00-01-001	Rhs frame		RHS	30 x 30 x 2	1
No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty

DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES  
 MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

**FINNOS**  
 www.finnos.fi

DRAWN BY: **liron**  
**25.08.2020**  
 APPROVED IN: **01.09.2020**

MASS/KG: **19.91**  
 PROJECT

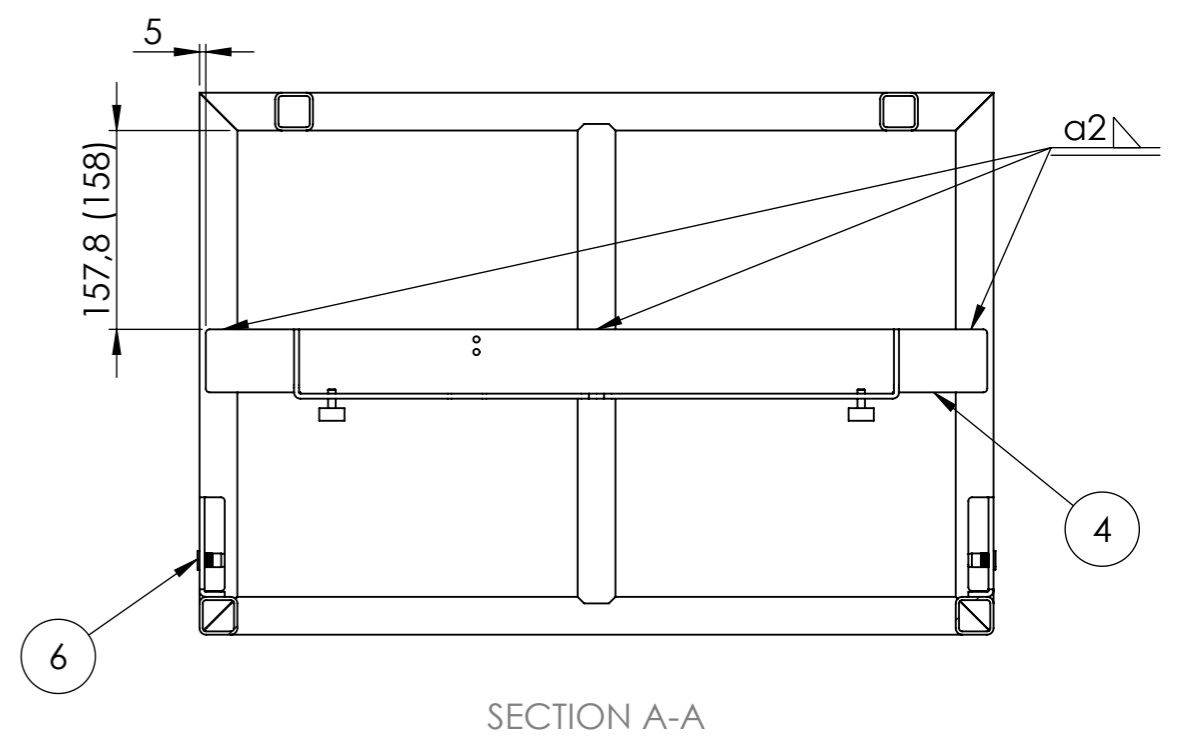
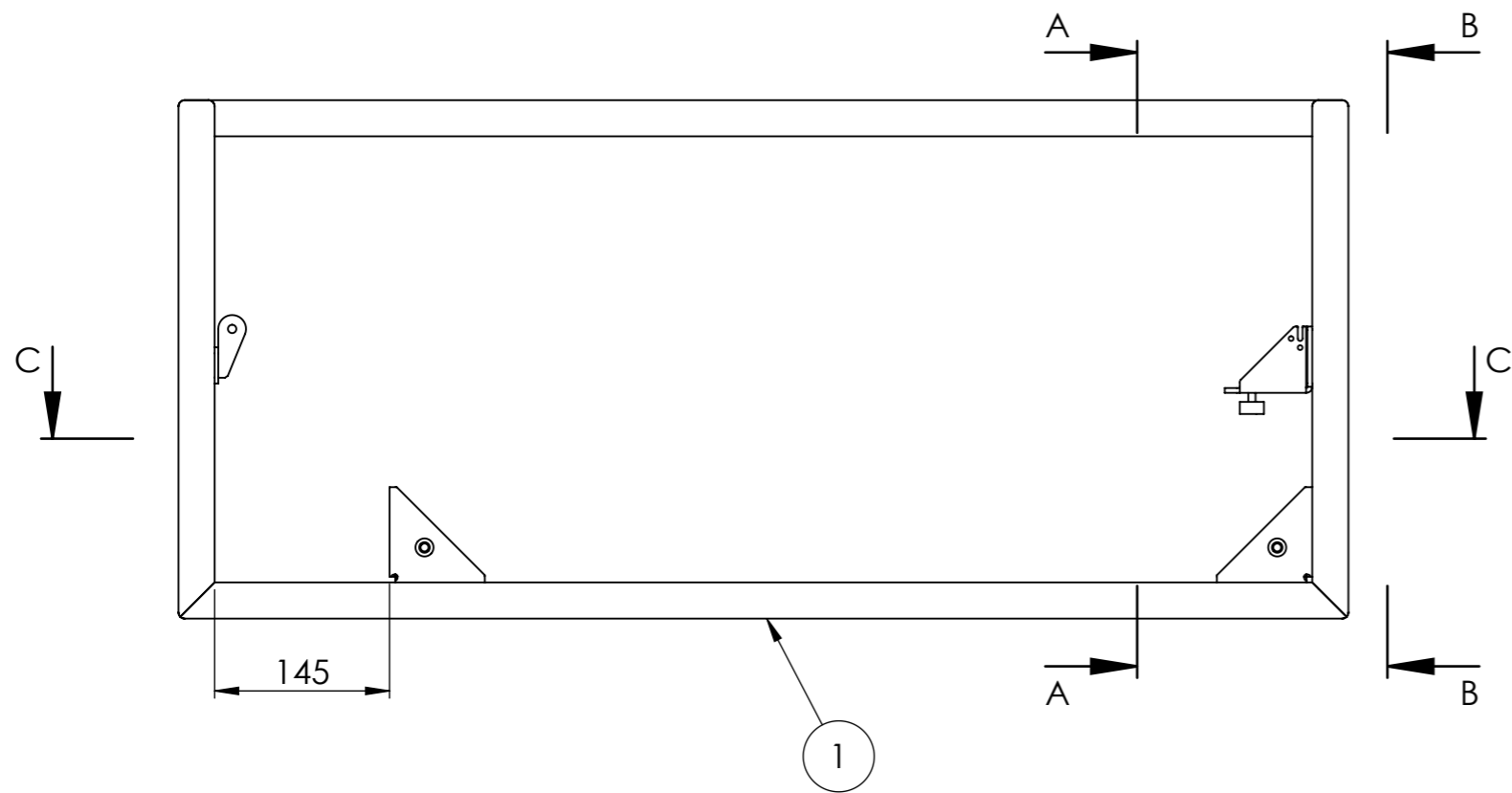
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 PAPER: **A3**  
 SCALE: **1:6**

FIRST ANGLE  
 DESCRIPTION: **Frame assembly**

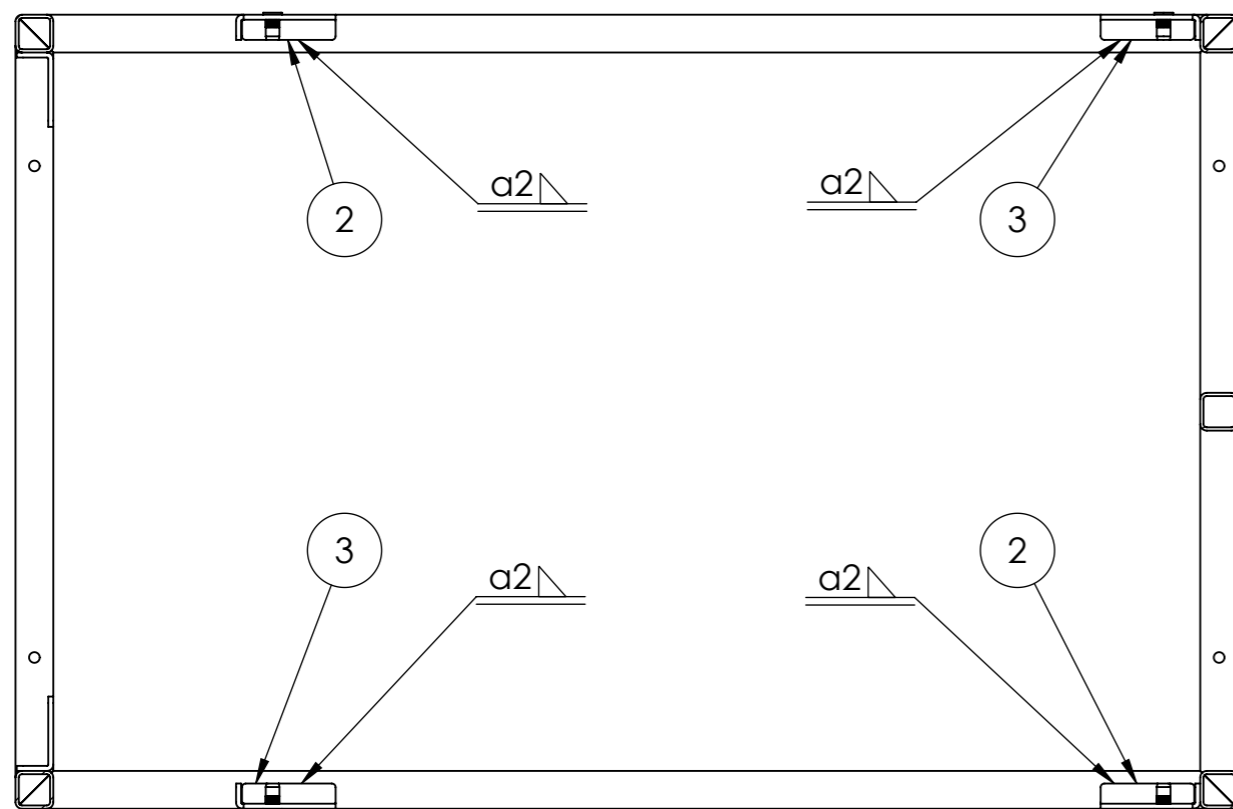
CONFIGURATION: **Default**

DRAWING NUMBER: **CD3D-00-01-801**  
 REVISION: **02**  
 SHEET: **1 of 4**

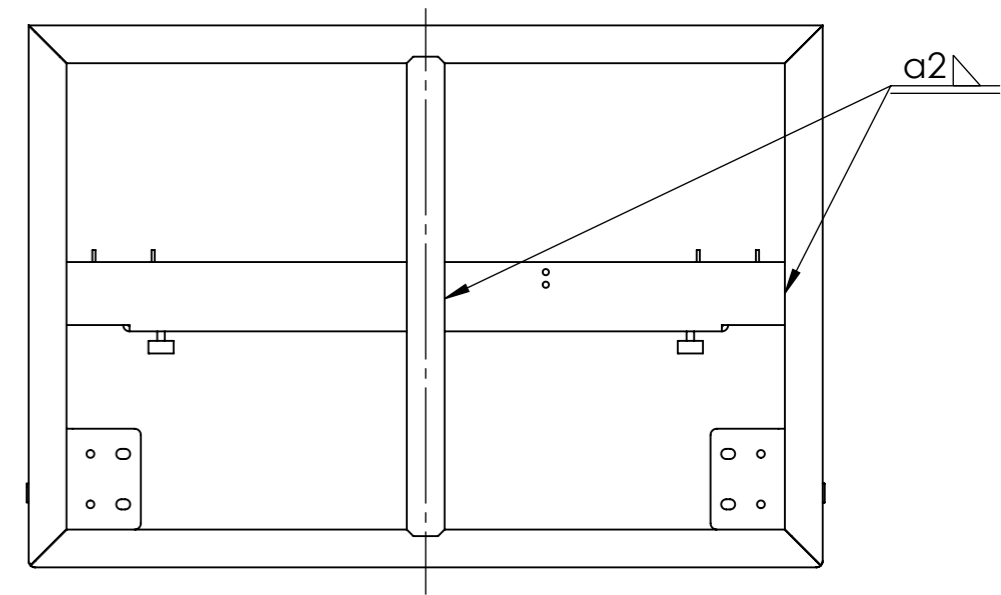
Revision	Description	Date	Approved
01	Initial design	25.08.2020	IN
02	Parts added	01.09.2020	IN



SECTION A-A



SECTION C-C



SECTION B-B

DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

MASS/KG 19.91 PROJECT

FIRST ANGLE DESCRIPTION **Frame assembly**

**FINNOS**  
 www.finnos.fi

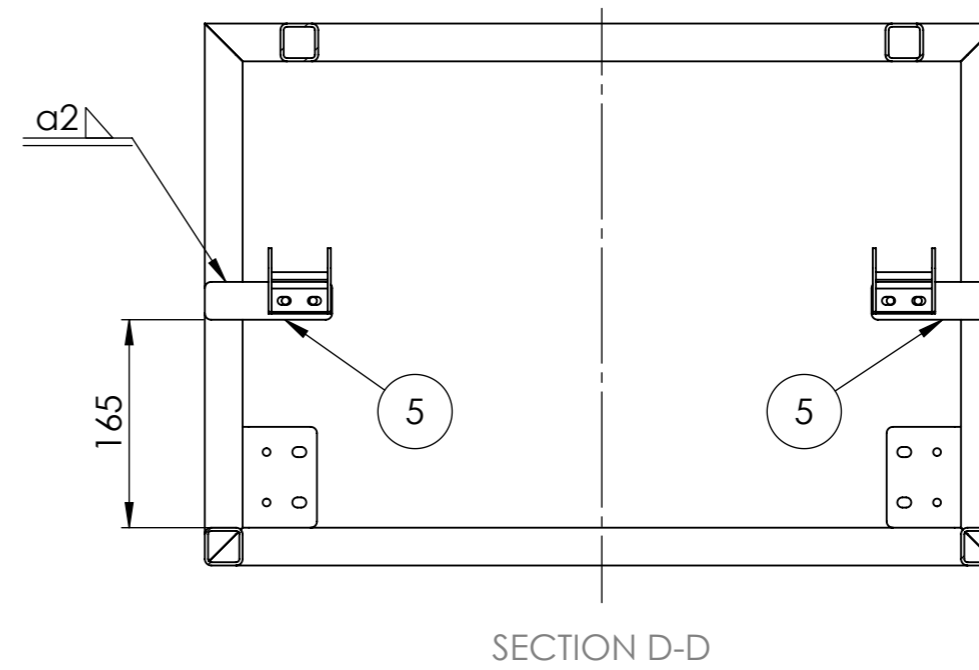
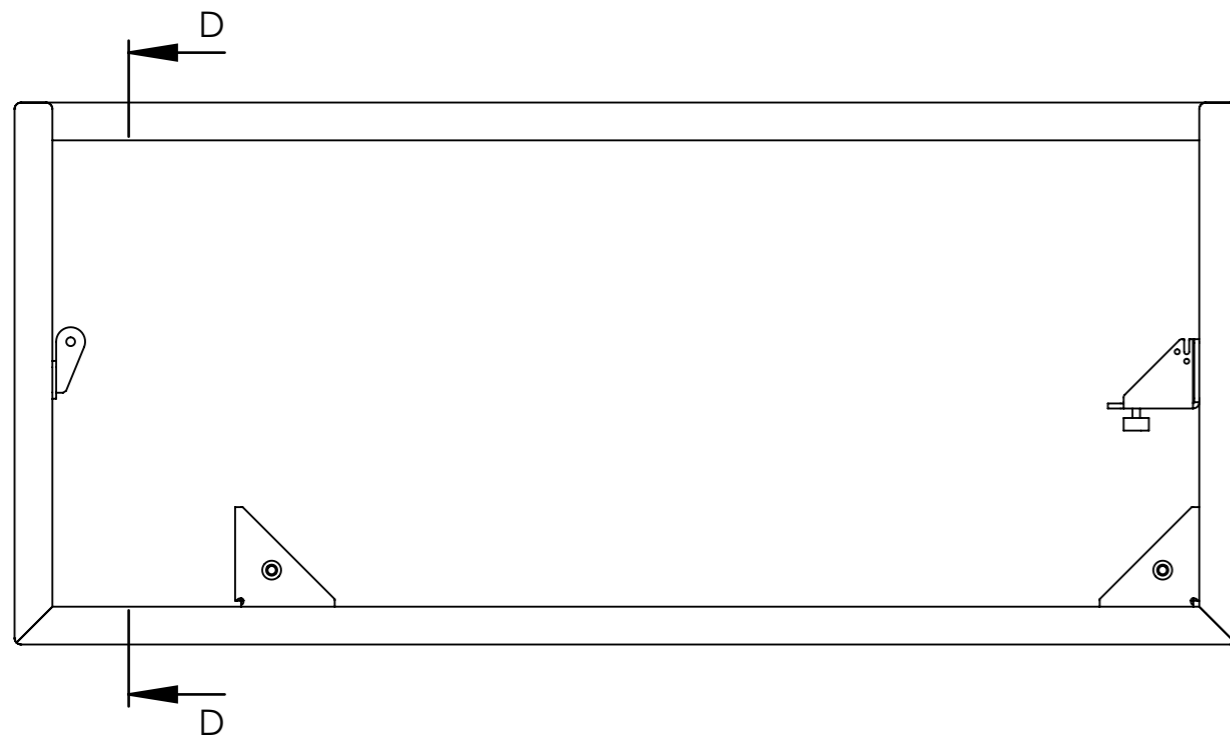
DRAWN BY **liron**  
 25.08.2020 APPROVED IN 01.09.2020

MATERIAL

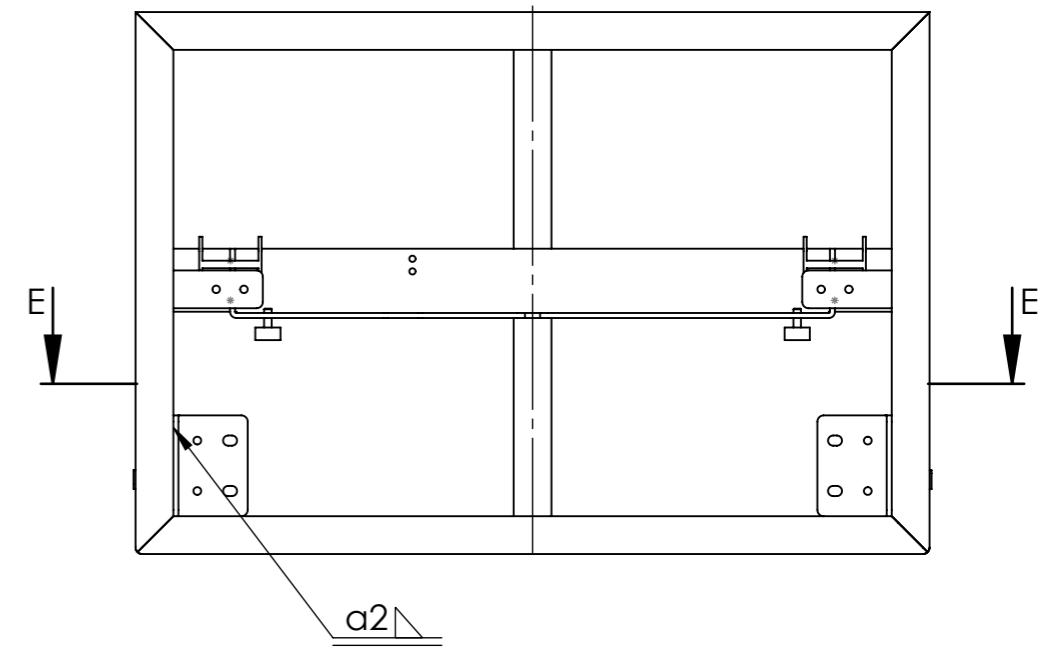
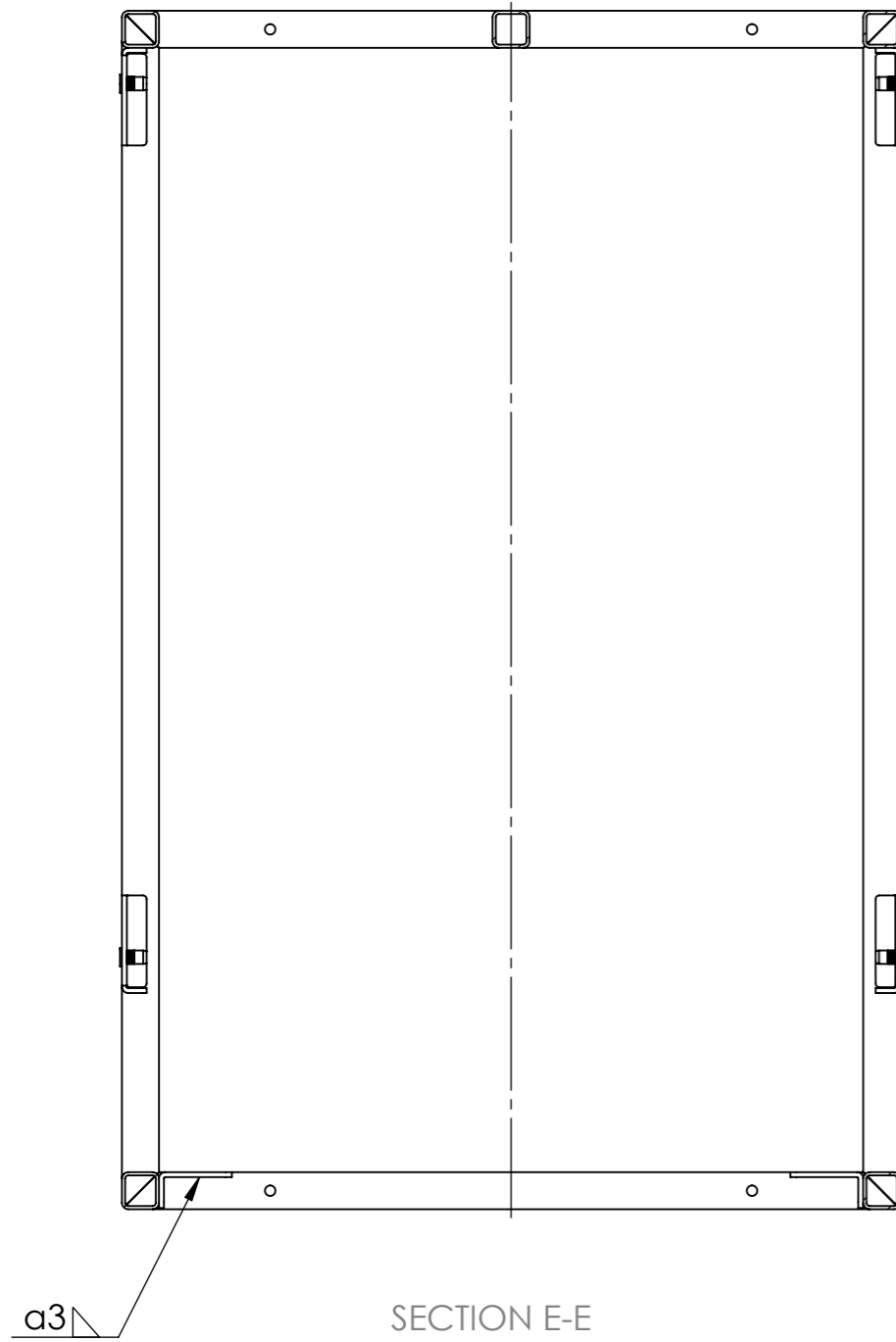
FINISH PAPER A3 SCALE 1:6

DRAWING NUMBER CD3D-00-01-801 REVISION 02 SHEET 2 of 4

CONFIGURATION **Default**

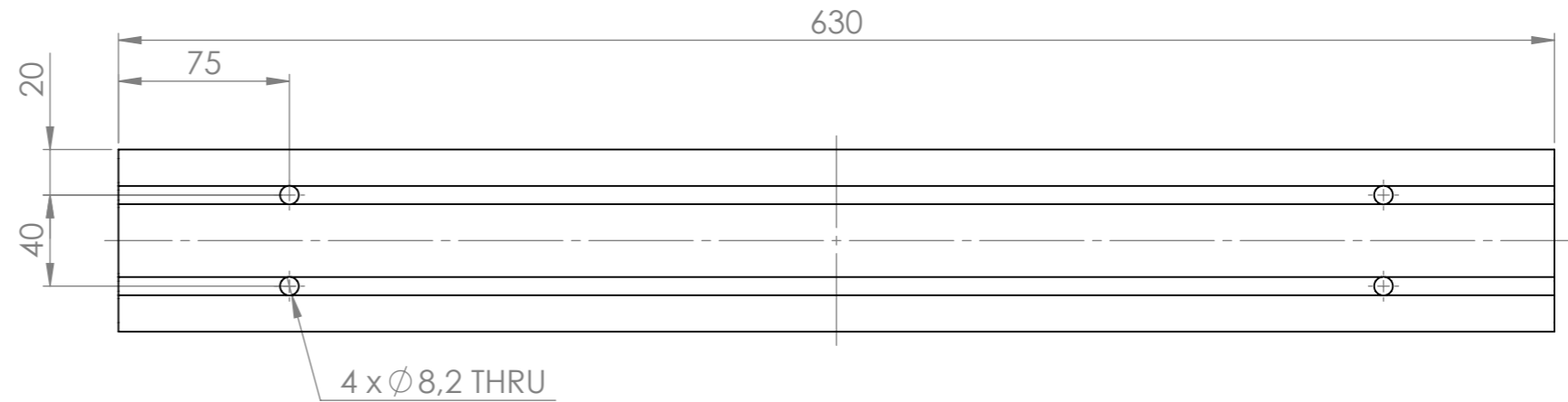
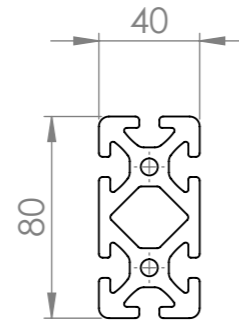
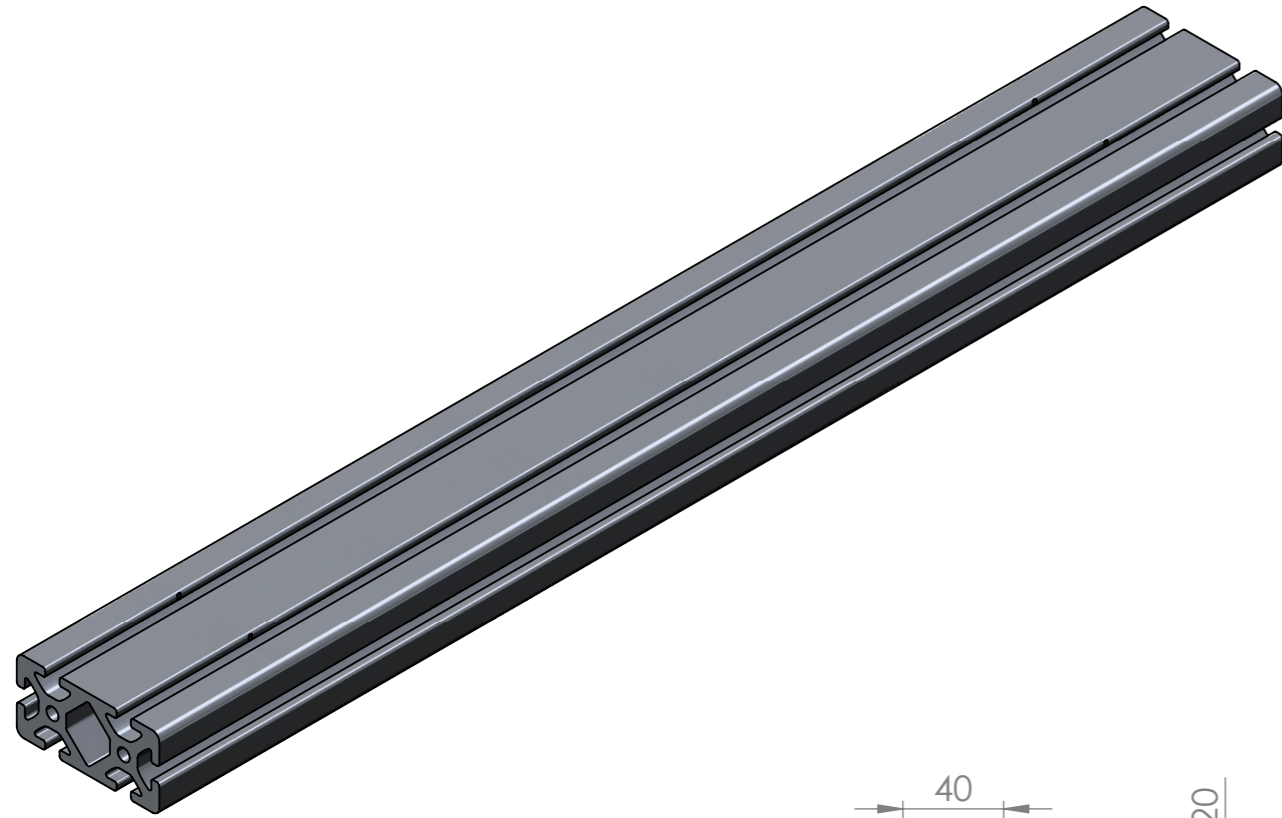


DEBURR AND BREAK SHARP EDGES MASS/KG <b>19.91</b>	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> <b>25.08.2020</b>	APPROVED <b>IN</b> <b>01.09.2020</b>	
	PROJECT		MATERIAL	FINISH <b>A3</b>	SCALE <b>1:6</b>
	DESCRIPTION <b>Frame assembly</b>	CONFIGURATION <b>Default</b>	DRAWING NUMBER <b>CD3D-00-01-801</b>	REVISION <b>02</b>	SHEET <b>3 of 4</b>



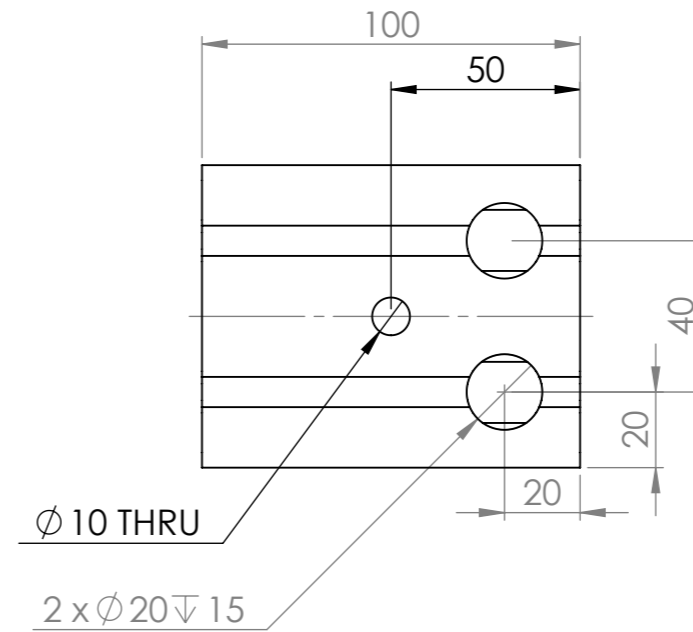
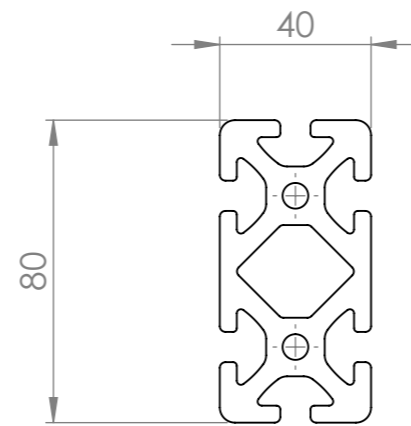
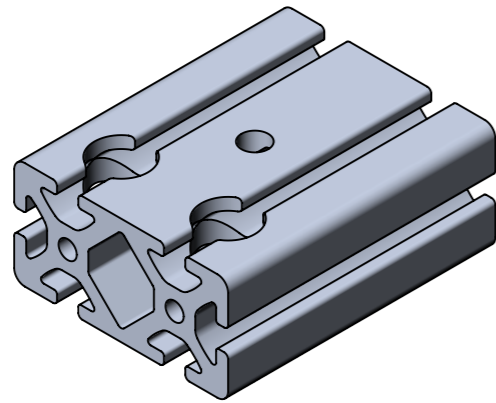
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 25.08.2020	APPROVED <b>IN</b> 01.09.2020	
MASS/KG <b>19.91</b>	PROJECT		MATERIAL	FINISH <b>A3</b>	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Frame assembly</b>	CONFIGURATION <b>Default</b>	DRAWING NUMBER <b>CD3D-00-01-801</b>	REVISION <b>02</b>	SHEET <b>4 of 4</b>





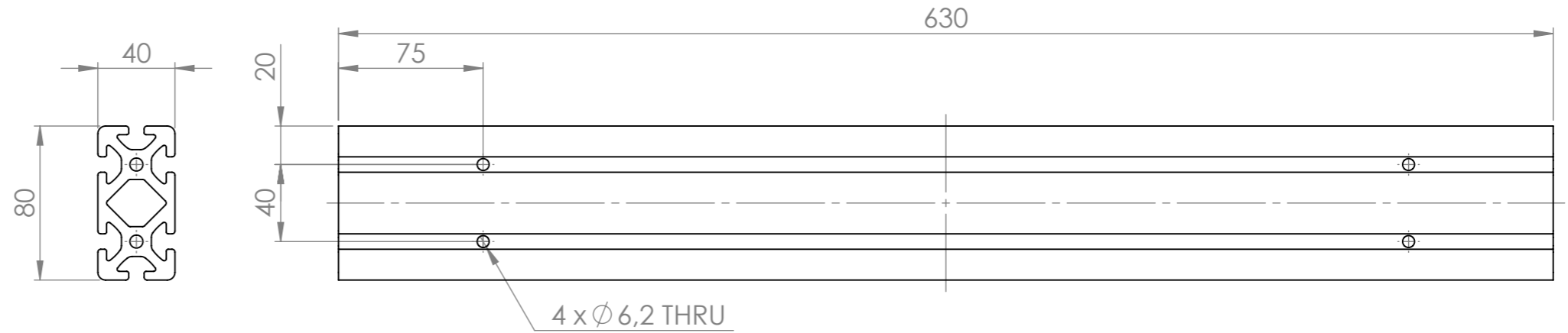
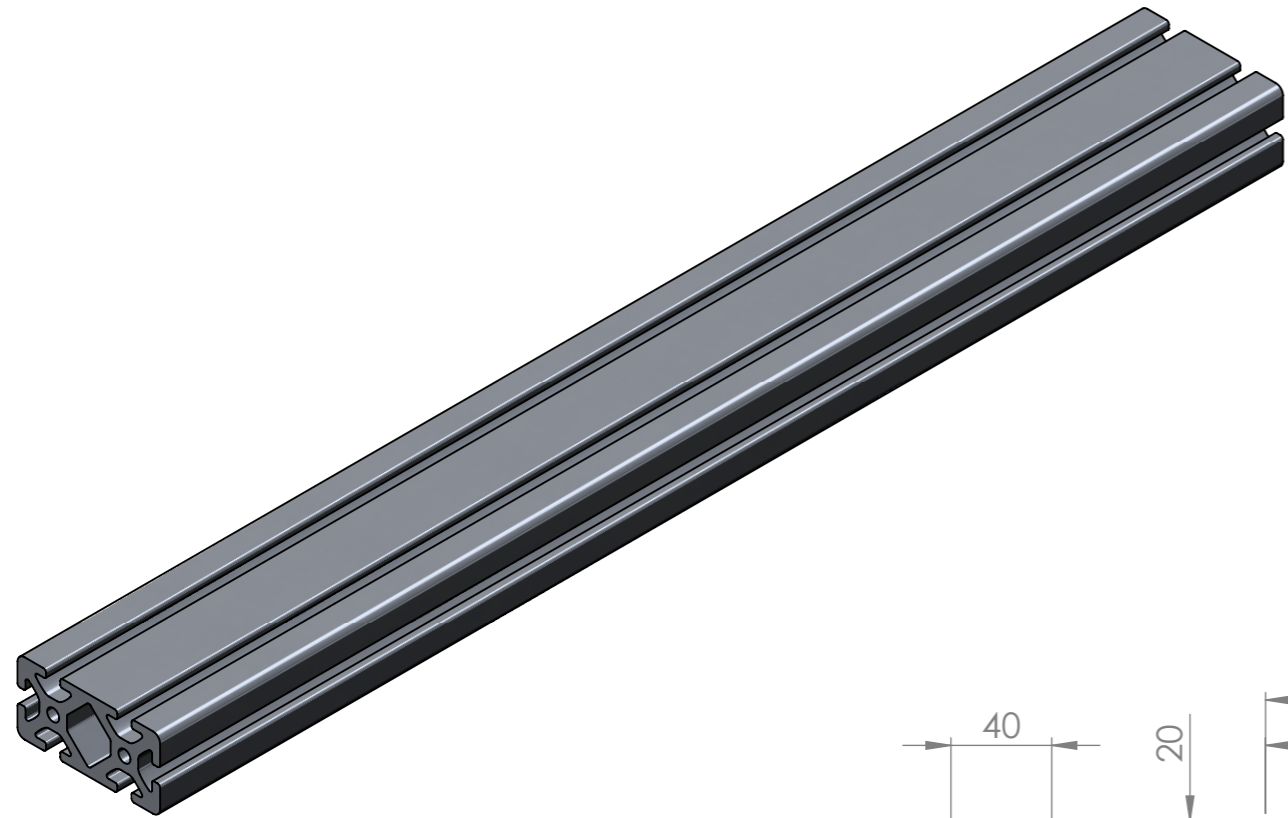
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Details added	02.07.2020	IN

CD3D-00-02-001	Main beam		Rollco PP1040	80 x 40 L630	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020		
MASS/KG <b>2.88</b>	PROJECT <b>CD</b>		MATERIAL <b>1060 Alloy</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>Main beam</b>		DRAWING NUMBER <b>CD3D-00-02-001</b>	REVISION <b>B</b>	SCALE <b>1:3</b>
					SHEET <b>1 of 1</b>



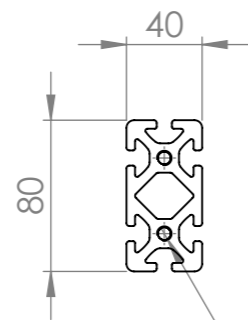
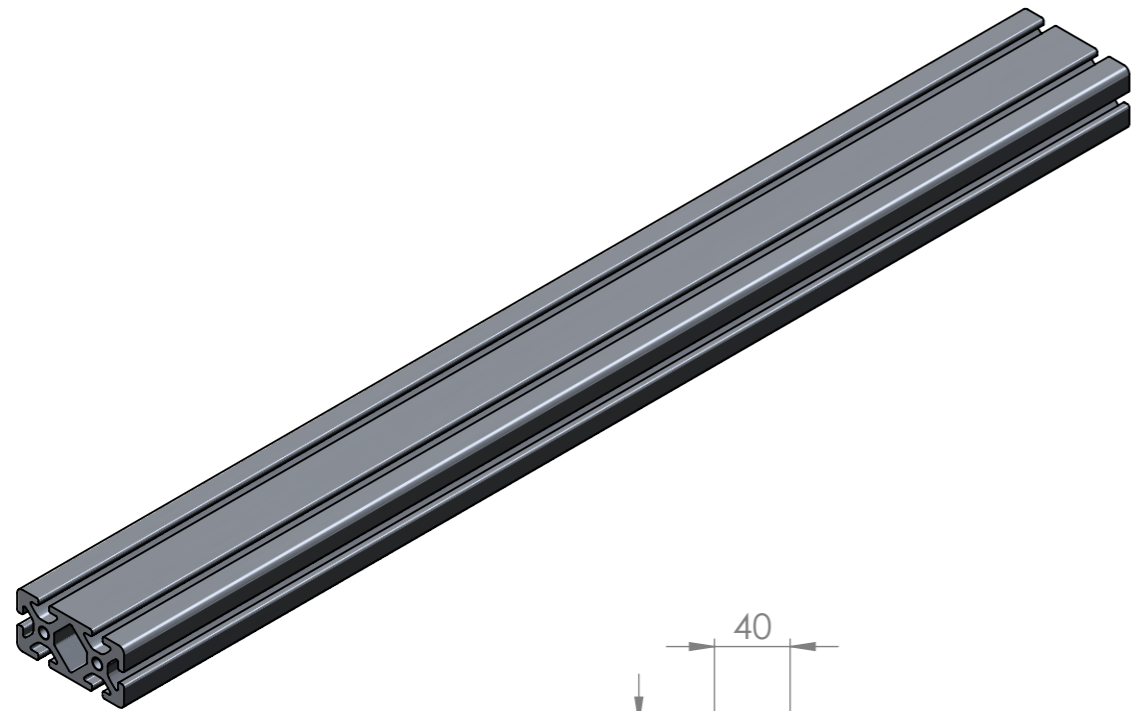
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	Middle holes added	12.10.2020	IN

CD3D-00-02-002	Support beam		Rollco PP1040	80 x 40 L100
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 12.10.2020	
MASS/KG <b>0.44</b>	PROJECT <b>CD</b>		MATERIAL <b>1060 Alloy</b>	
FIRST ANGLE	DESCRIPTION <b>Support beam</b>	FINISH	PAPER <b>A3</b>	SCALE <b>1:2</b>
		DRAWING NUMBER <b>CD3D-00-02-002</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>

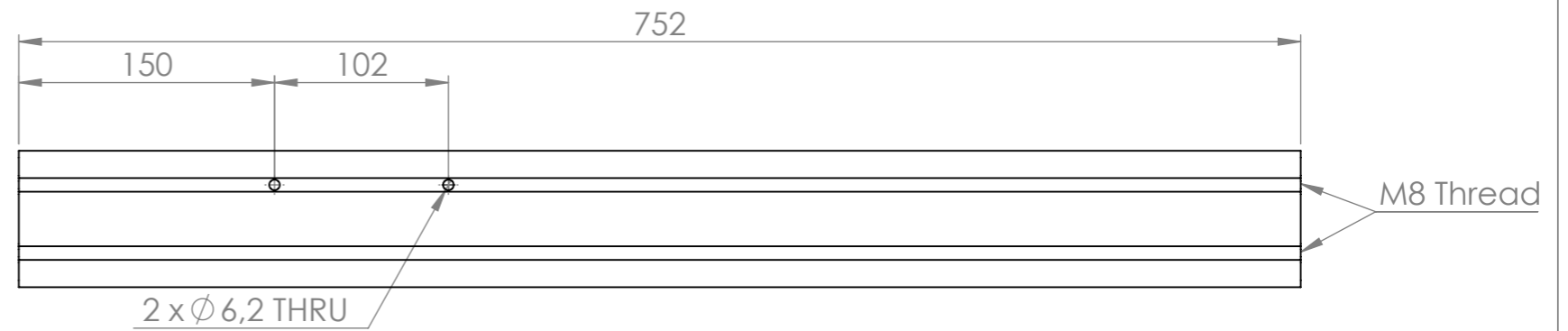


Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Hole size fixed	02.07.2020	IN

CD3D-00-02-003	Mounting beam		Profile	80 x 40 L630
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020	
MASS/KG <b>2.88</b>	PROJECT <b>CD</b>		MATERIAL <b>1060 Alloy</b>	FINISH
FIRST ANGLE 	DESCRIPTION <b>Mounting beam</b>	DRAWING NUMBER <b>CD3D-00-02-003</b>	REVISION <b>B</b>	SCALE <b>1:3</b>
				SHEET <b>1 of 1</b>

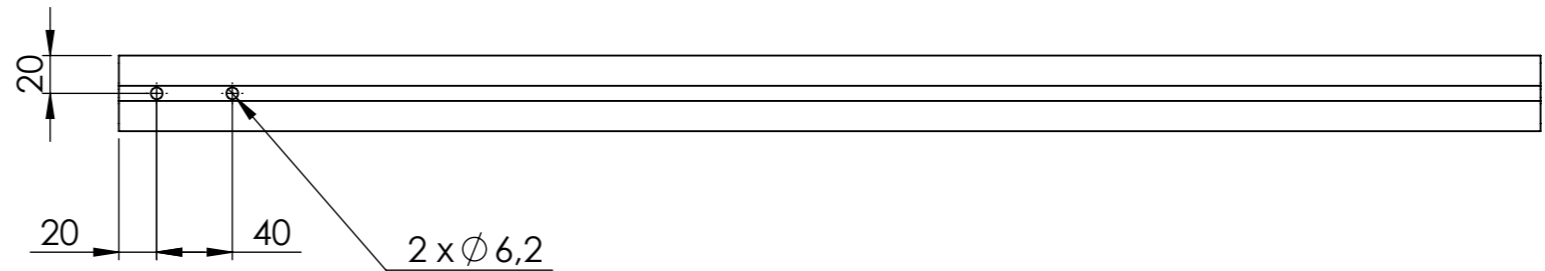


2 x  $\phi$  6,9  $\nabla$  29,8  
M8 - 6H  $\nabla$  26



2 x  $\phi$  6,2 THRU

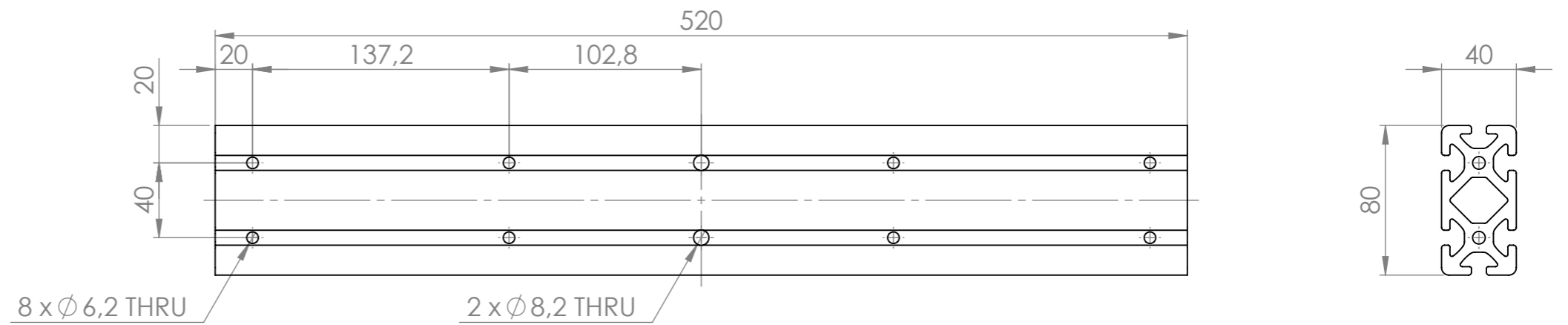
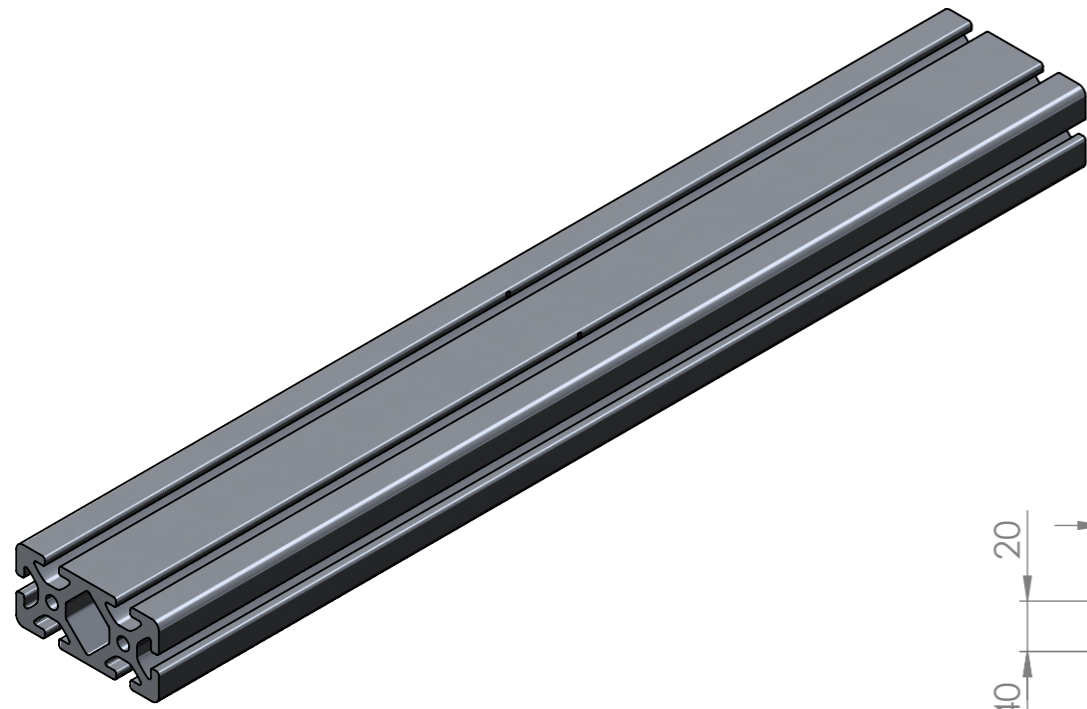
M8 Thread



2 x  $\phi$  6,2

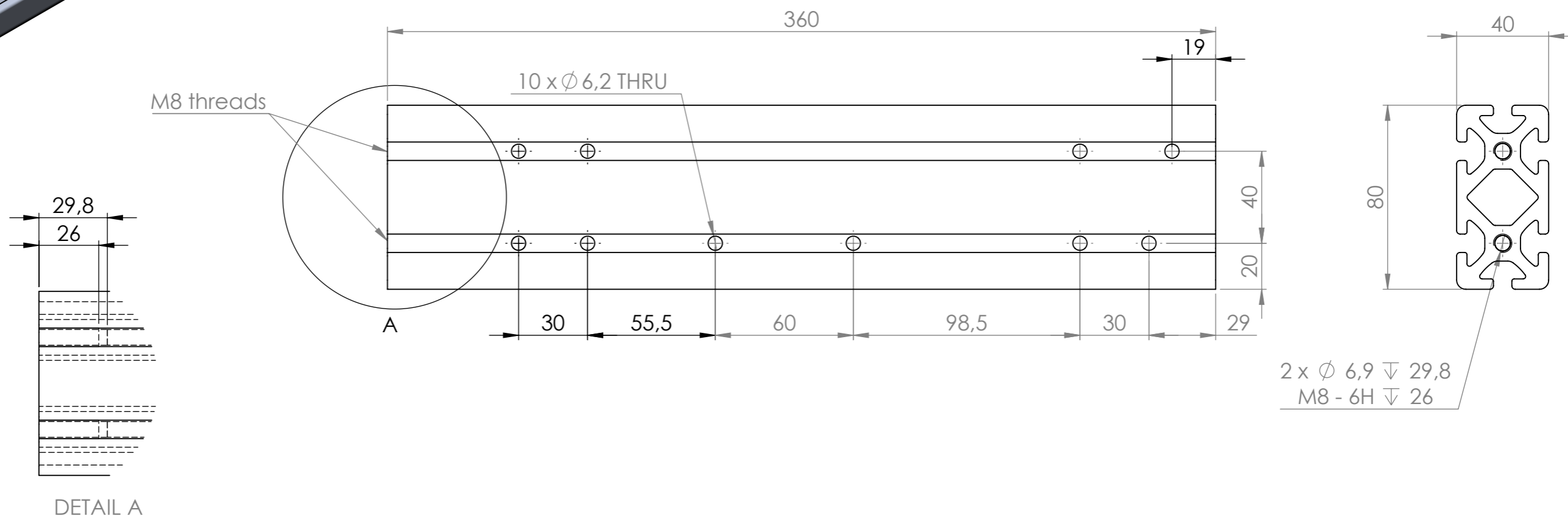
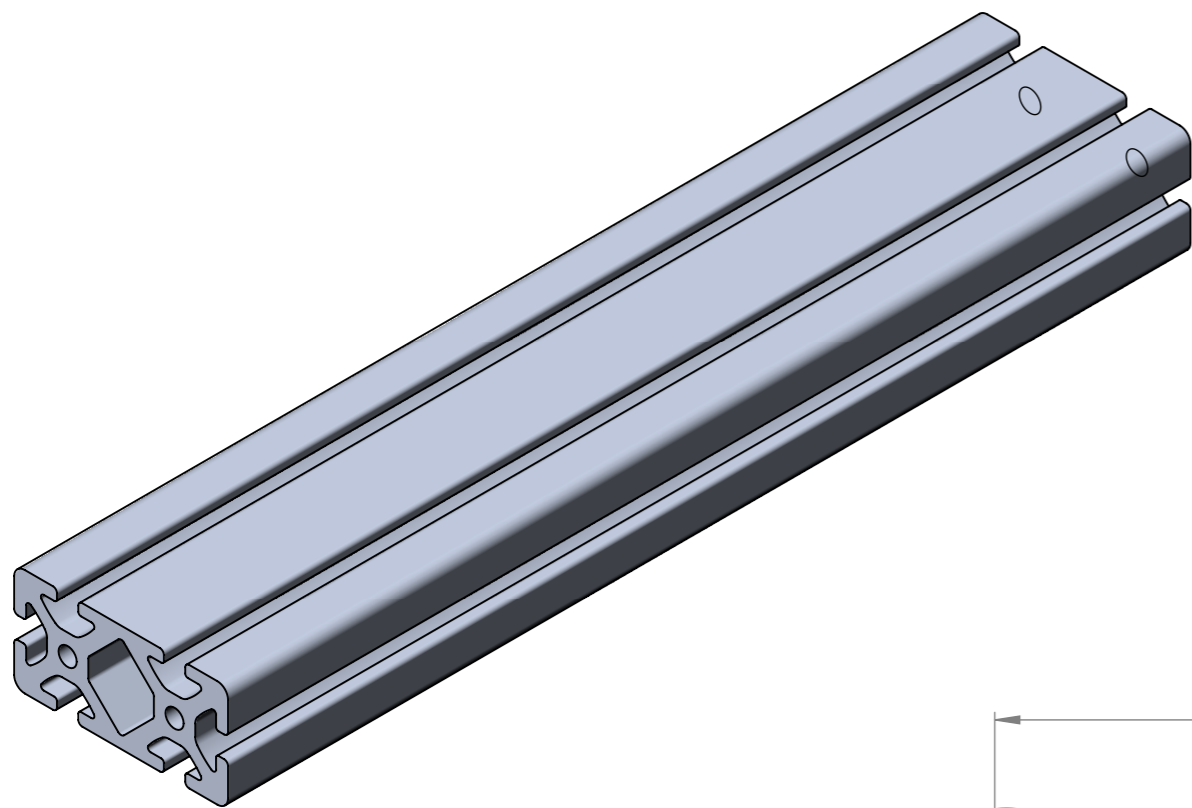
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	Drawing view added	25.08.2020	IN
02	Actuator mount holes moved 50mm	26.10.2020	IN

CD3D-00-02-004	Long arm		Rollco PP1040	80 x 40 L752	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 26.10.2020	MATERIAL 1060 Alloy	
MASS/KG 3.44	PROJECT CD		FINISH	PAPER A3	SCALE 1:4
FIRST ANGLE	DESCRIPTION Long arm		DRAWING NUMBER CD3D-00-02-004	REVISION 02	SHEET 1 of 1



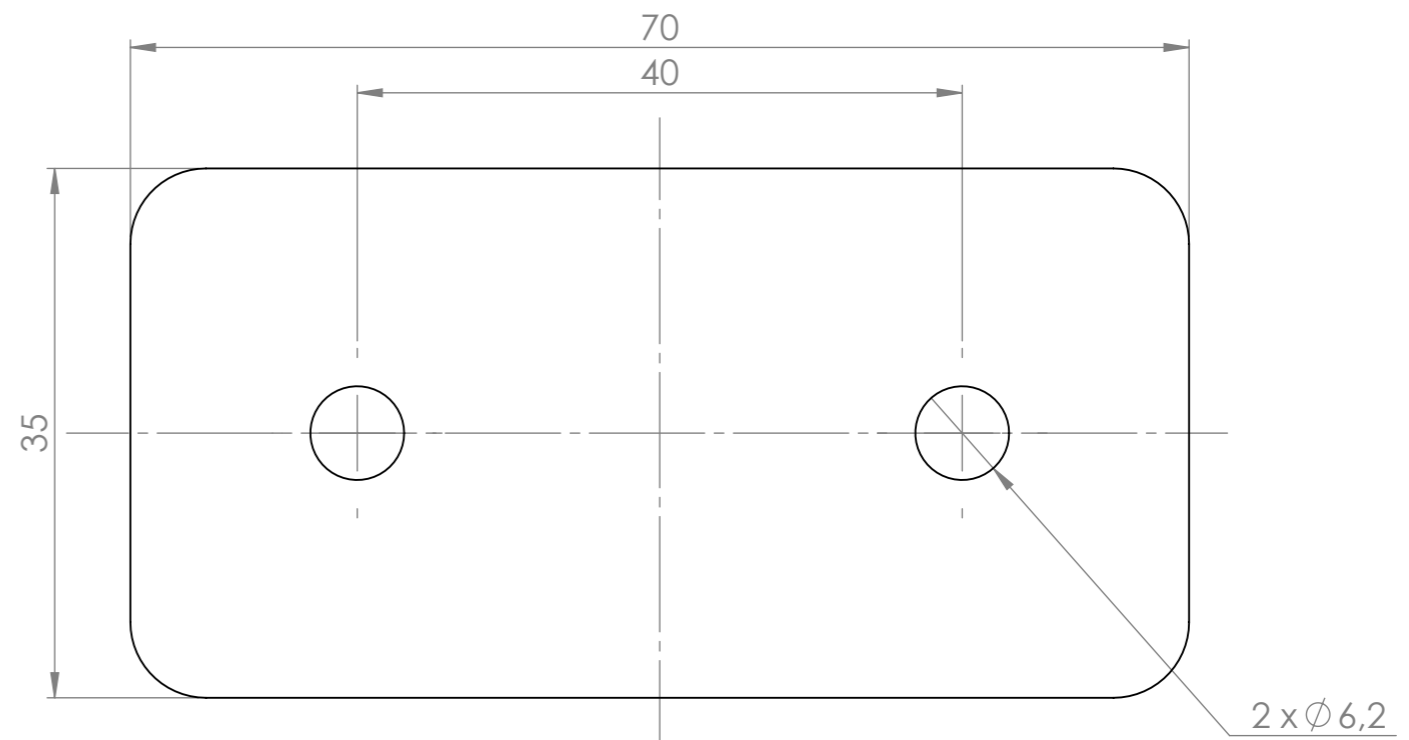
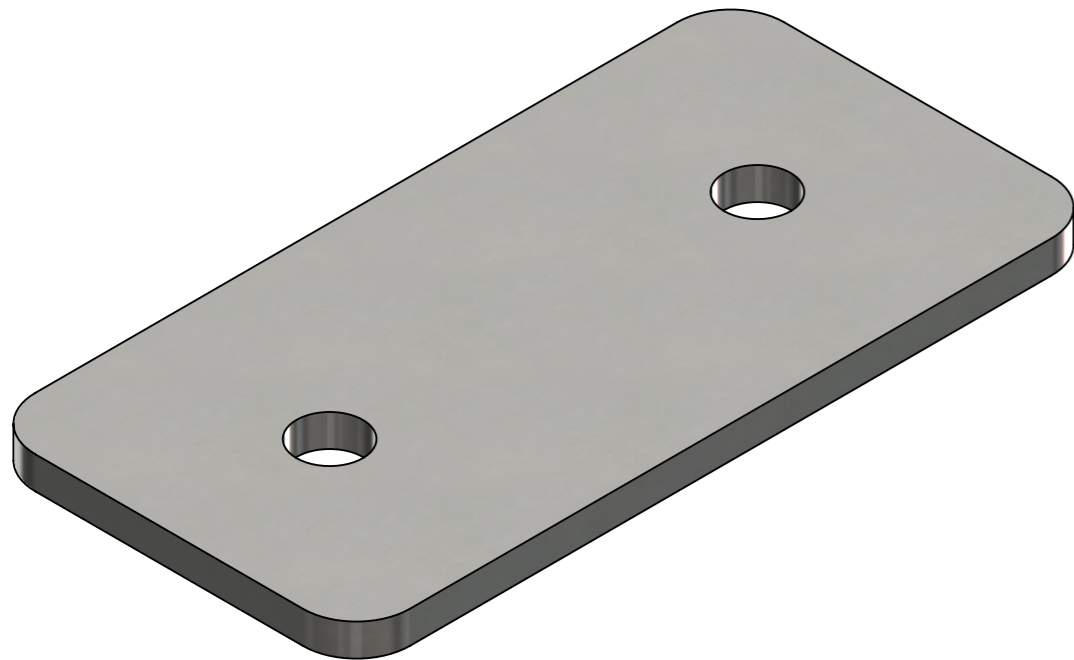
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Details added	02.07.2020	IN

CD3D-00-02-005	Middle arm beam		Rollco PP1040	80 x 40 L520
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1060 Alloy</b>	
MASS/KG <b>2.37</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>Middle arm beam</b>	DRAWING NUMBER <b>CD3D-00-02-005</b>	REVISION <b>B</b>	SHEET <b>1 of 1</b>



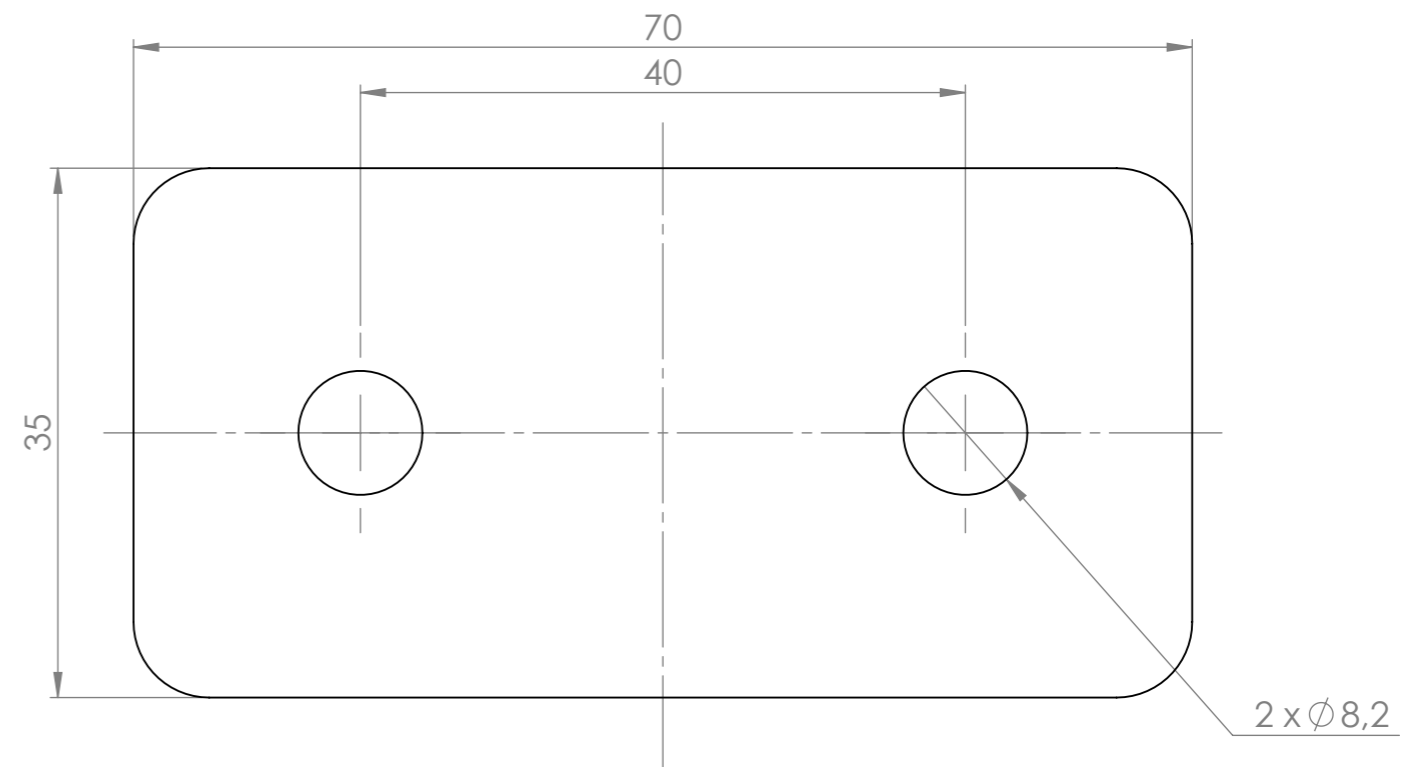
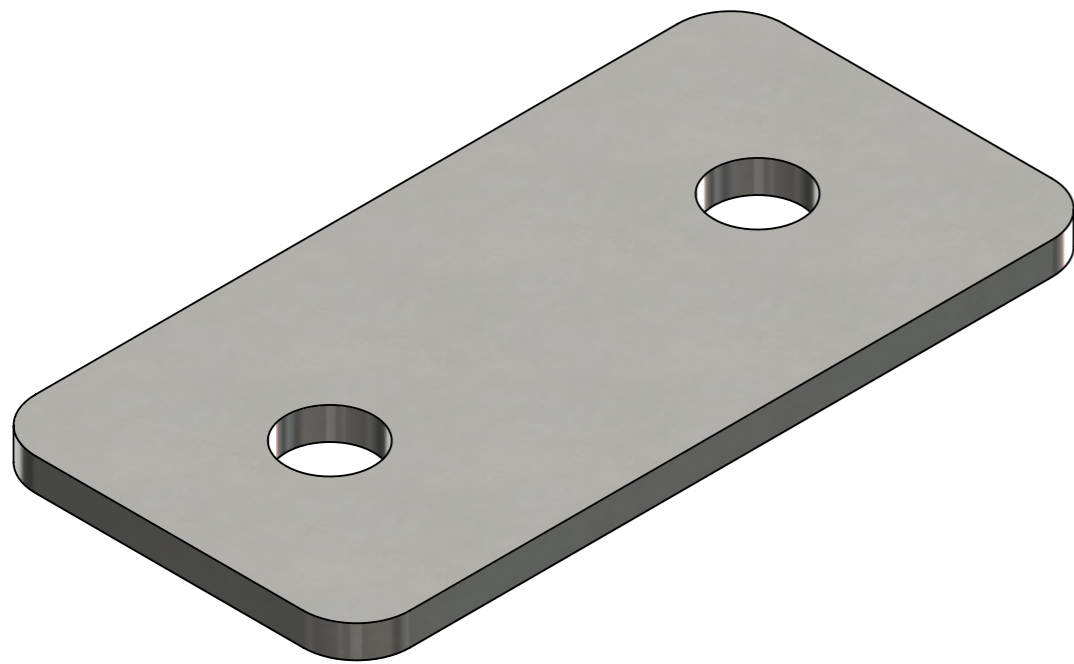
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Dimensions added	06.07.2020	IN
C	Overlap fixed	06.07.2020	IN

CD3D-00-02-006	End arm		Rollco PP1040	80 x 40 L360
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 06.07.2020 MATERIAL <b>1060 Alloy</b>	
MASS/KG <b>1.64</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>End arm</b>	DRAWING NUMBER <b>CD3D-00-02-006</b>	REVISION <b>C</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
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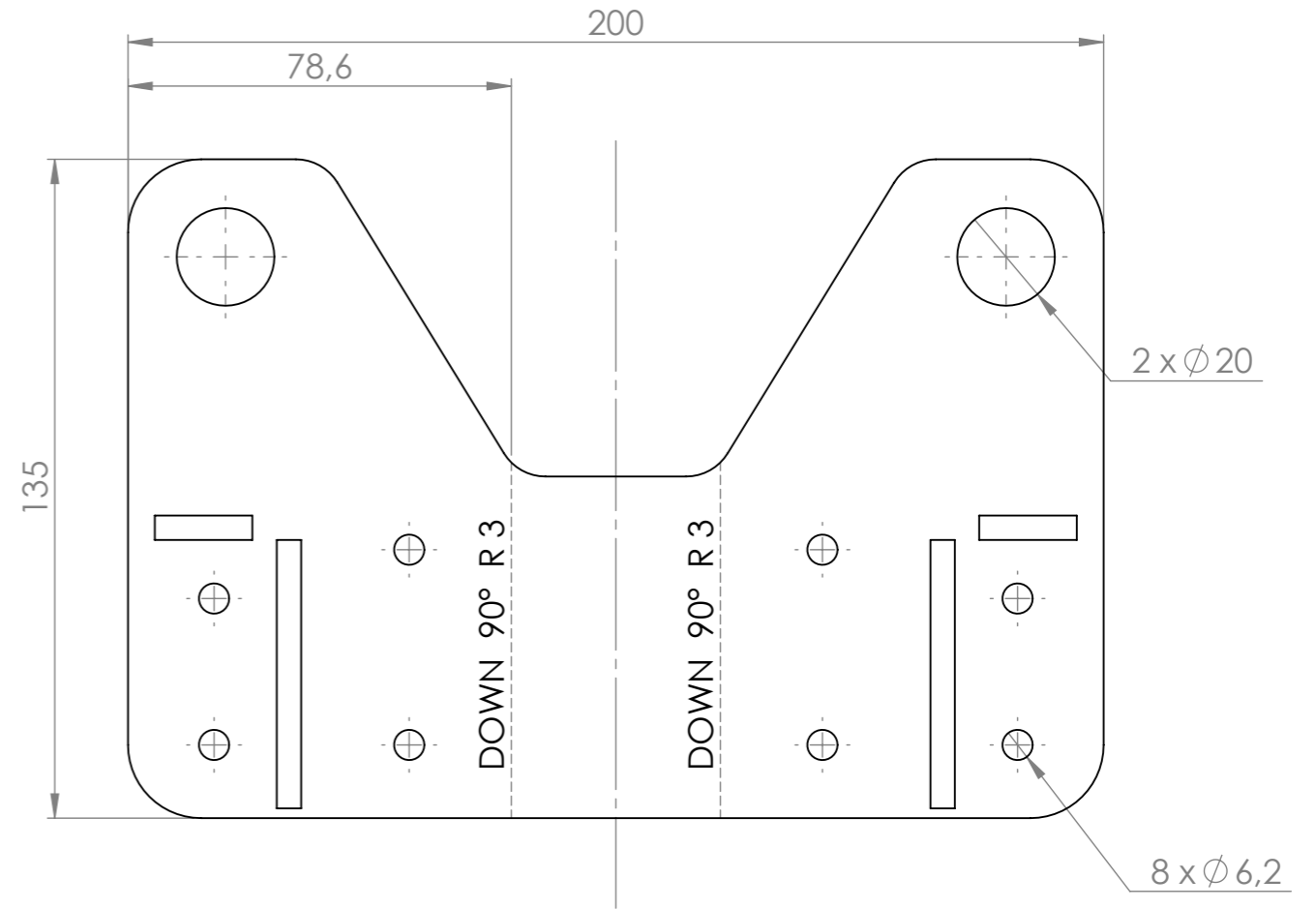
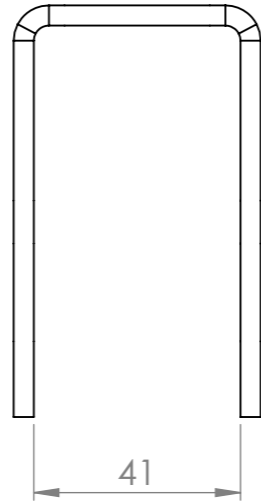
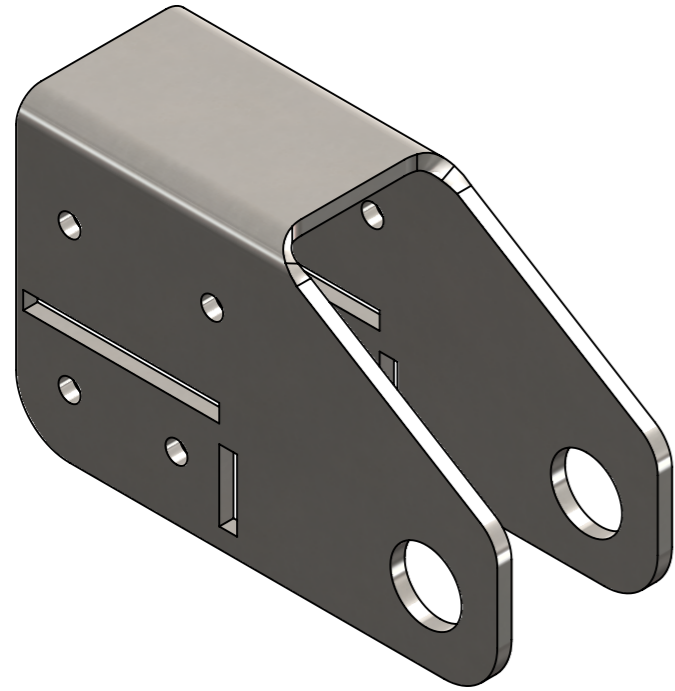
CD3D-00-02-007	Sandwich plate		Plate	L70 x W35 x Th.3
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.06</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Sandwich plate</b>	DRAWING NUMBER <b>CD3D-00-02-007</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

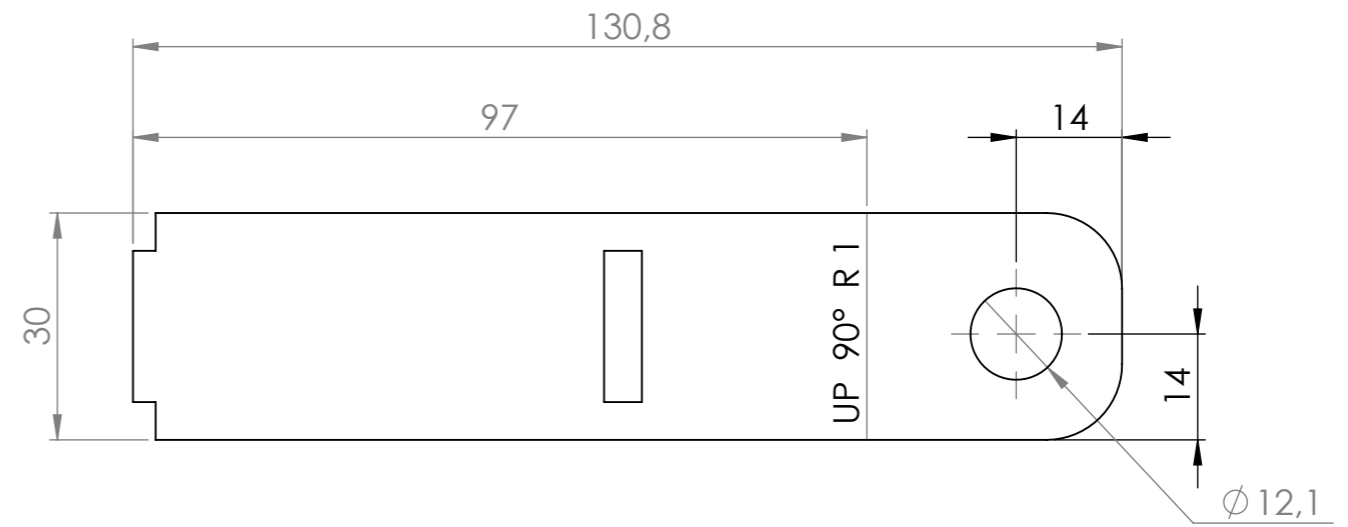
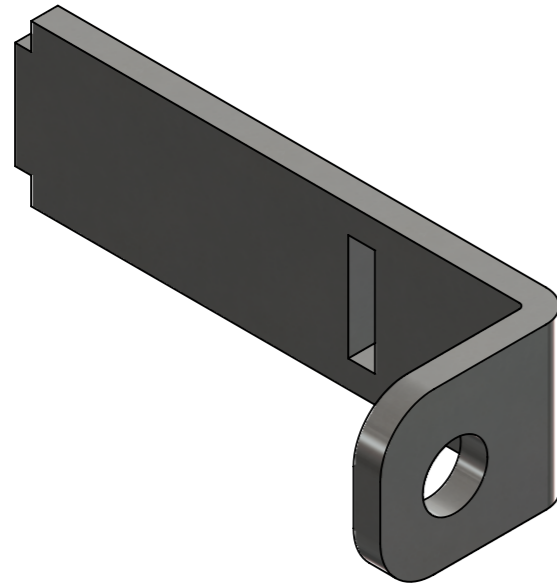
CD3D-00-02-008	Sandwich plate m8		Plate	L70 x W35 x Th.3
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020	
MASS/KG 0.05	PROJECT CD		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH
FIRST ANGLE	DESCRIPTION <b>Sandwich plate m8</b>		DRAWING NUMBER <b>CD3D-00-02-008</b>	SCALE <b>2:1</b>
			REVISION <b>A</b>	SHEET <b>1 of 1</b>





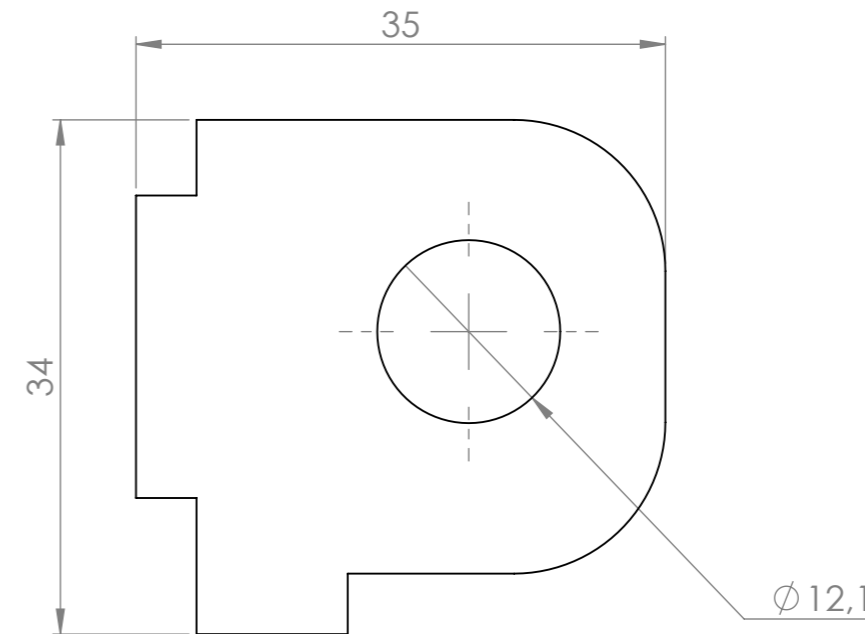
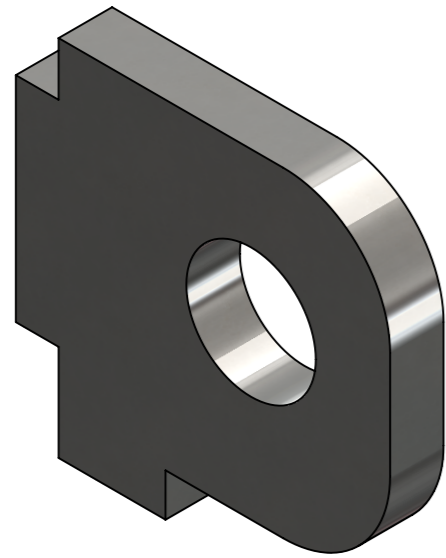
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-02-009	Calibration mount		Plate	L200 x W135 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0545 (\$355N)</b>	
MASS/KG <b>0.62</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Calibration mount</b>	DRAWING NUMBER <b>CD3D-00-02-009</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>



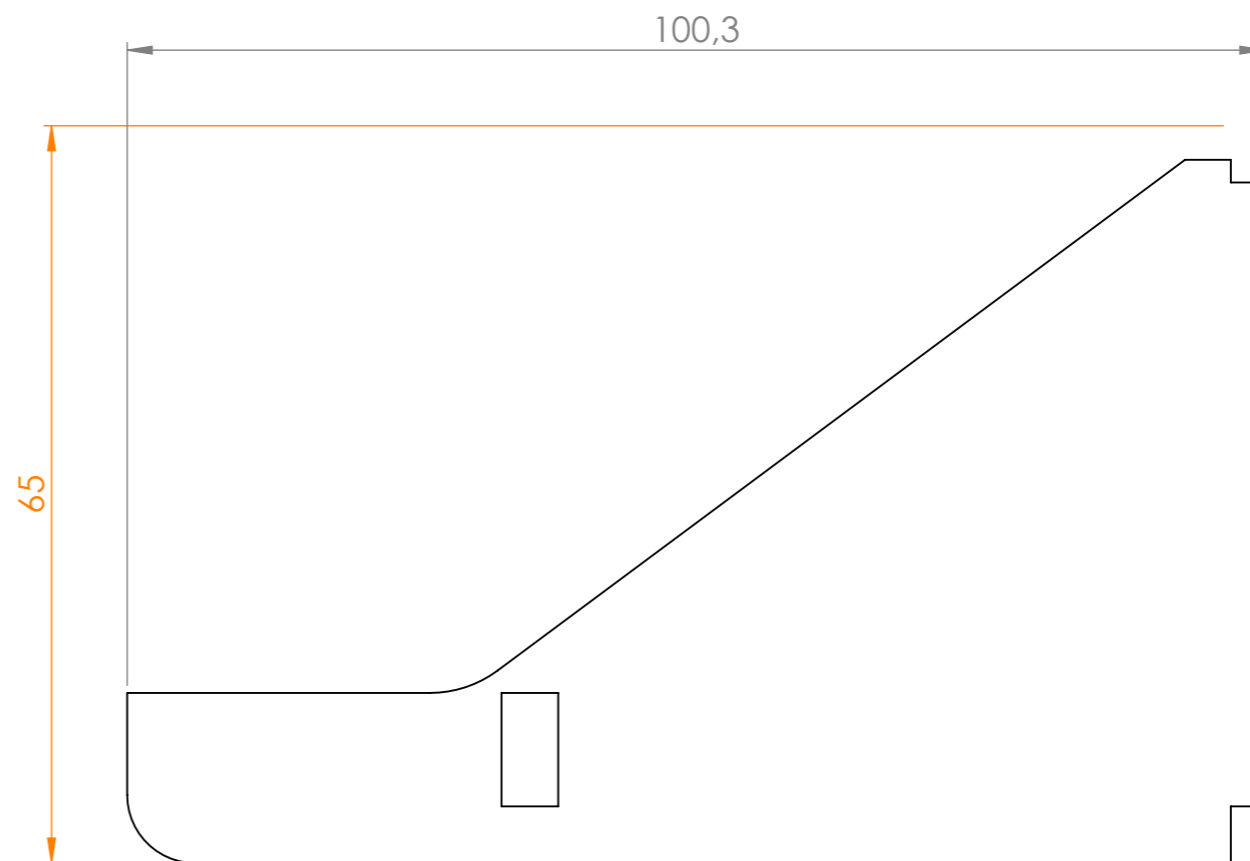
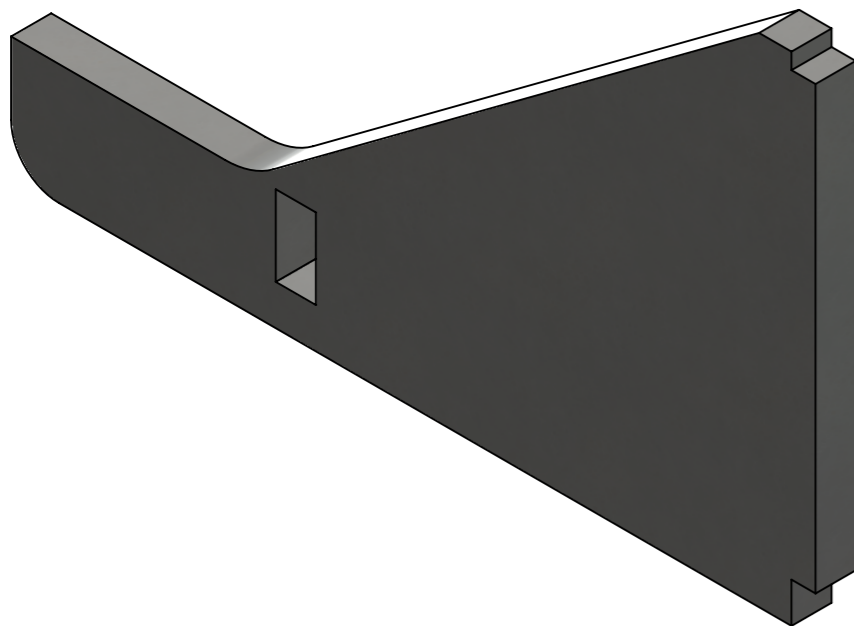
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

PartNo.	Description	Info	Preform type	Preform Dimension
CD3D-00-02-010	Calibration mount2		Plate	L131 x W30 Th.5
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.14</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>Calibration mount2</b>	DRAWING NUMBER <b>CD3D-00-02-010</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>



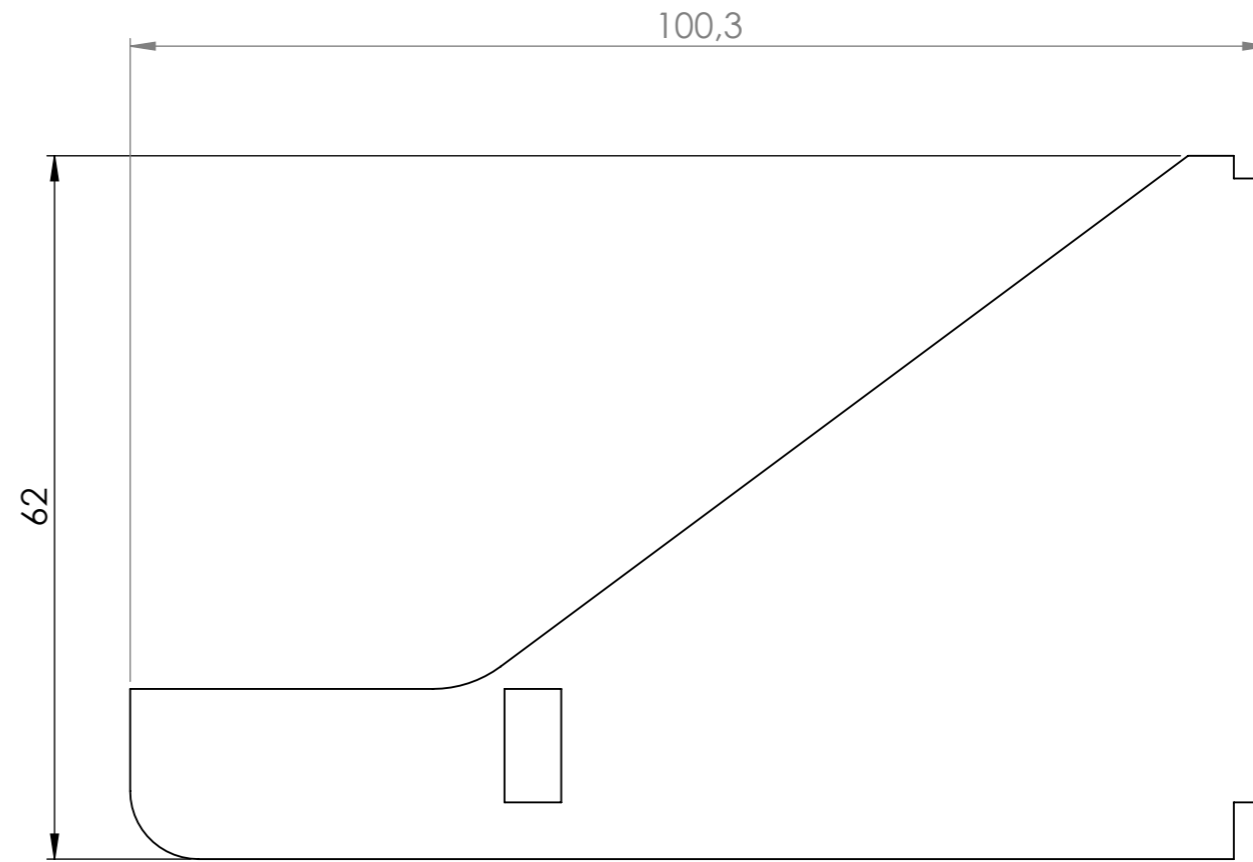
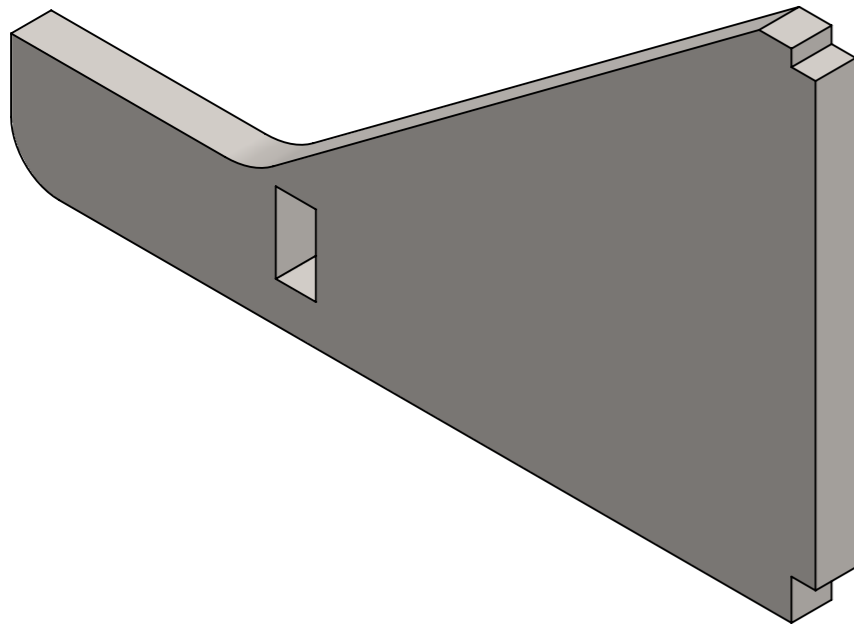
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-02-011	Calibration mount3		Plate	L36 x W35 Th.5
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.03</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>Calibration mount3</b>	DRAWING NUMBER <b>CD3D-00-02-011</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>



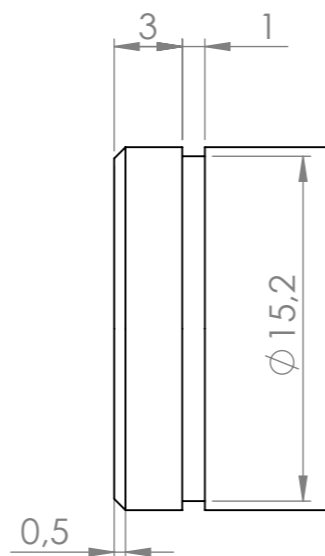
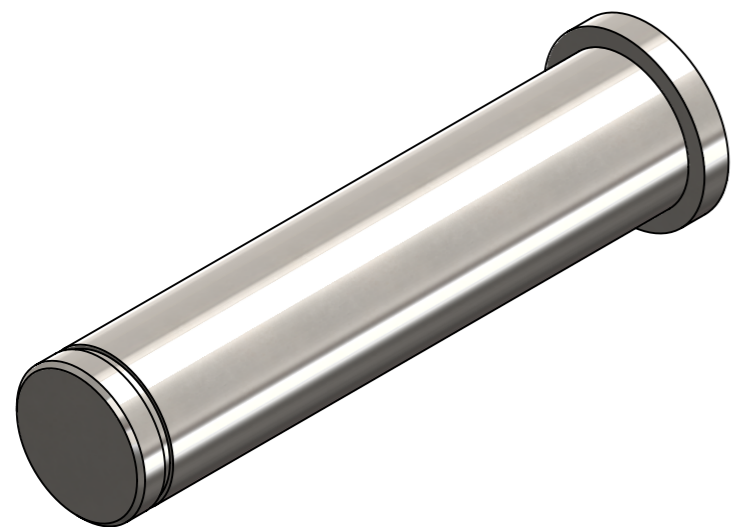
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-02-012	Calibration mount4		Plate	L101 x W62 Th.5
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 02.07.2020	
MASS/KG 0.13	PROJECT CD		MATERIAL 1.0553 (\$355J0)	FINISH
FIRST ANGLE	DESCRIPTION Calibration mount4		DRAWING NUMBER CD3D-00-02-012	SCALE 3:2
			REVISION A	SHEET 1 of 1

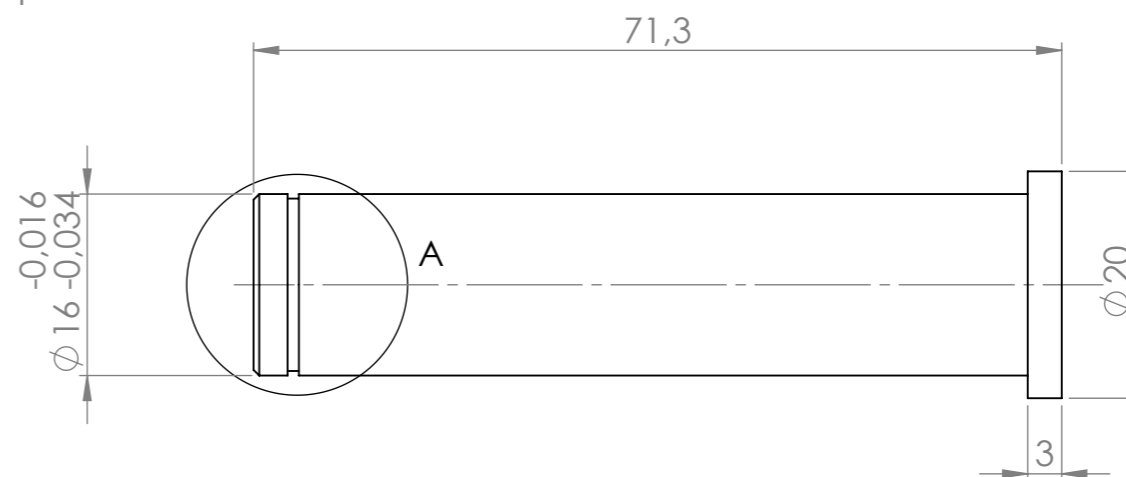


Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Drawing fix	06.07.2020	IN

CD3D-00-02-012	Calibration mount4		Plate	L101 x W62 Th.5
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 06.07.2020	
MASS/KG <b>0.13</b>	PROJECT <b>CD</b>		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH
FIRST ANGLE	DESCRIPTION <b>Calibration mount4</b>		DRAWING NUMBER <b>CD3D-00-02-012</b>	SCALE <b>3:2</b>
			REVISION <b>B</b>	SHEET <b>1 of 1</b>

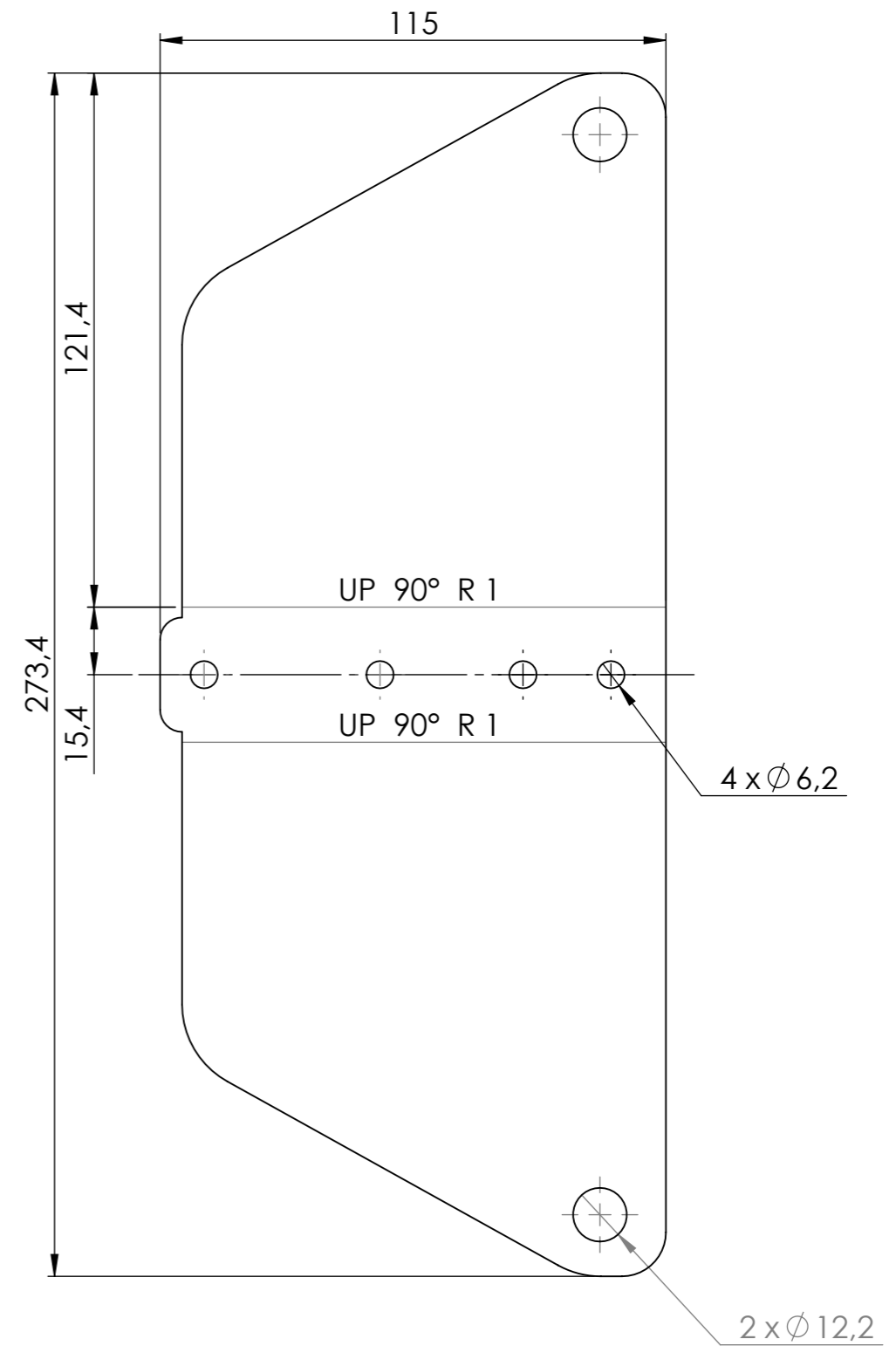
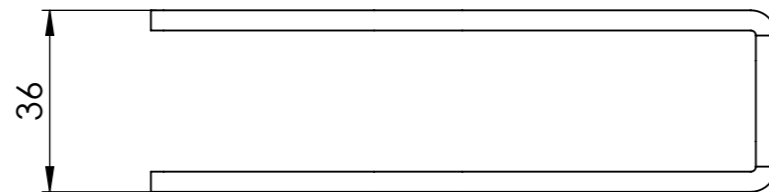
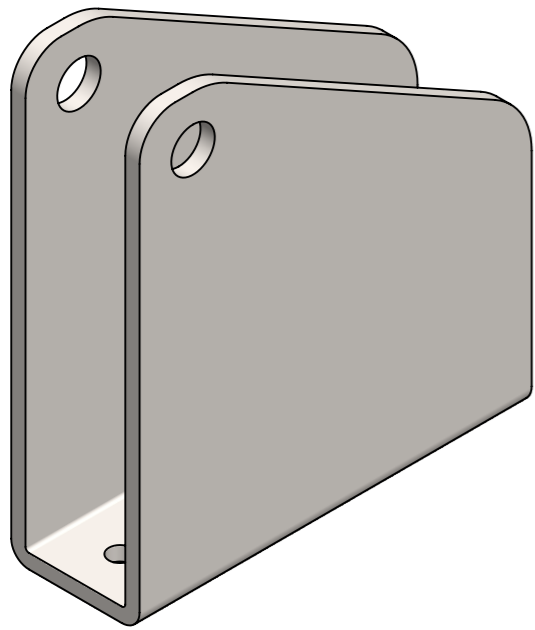


DETAIL A  
SCALE 3 : 1



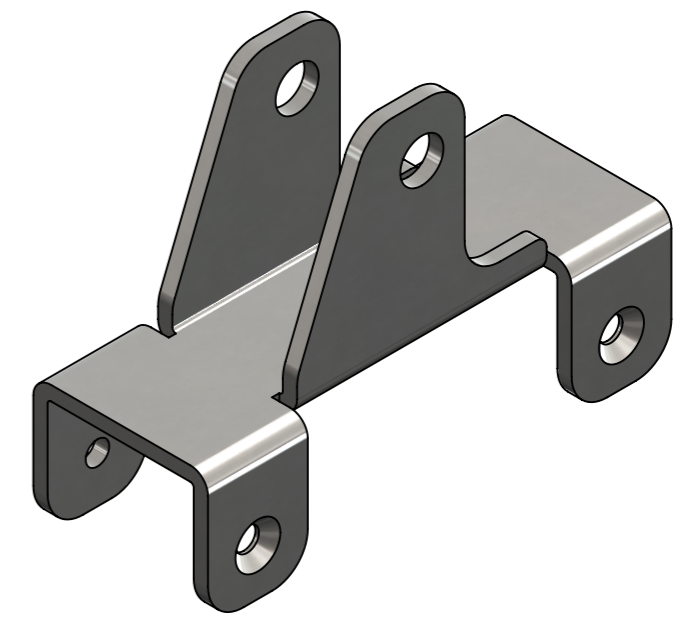
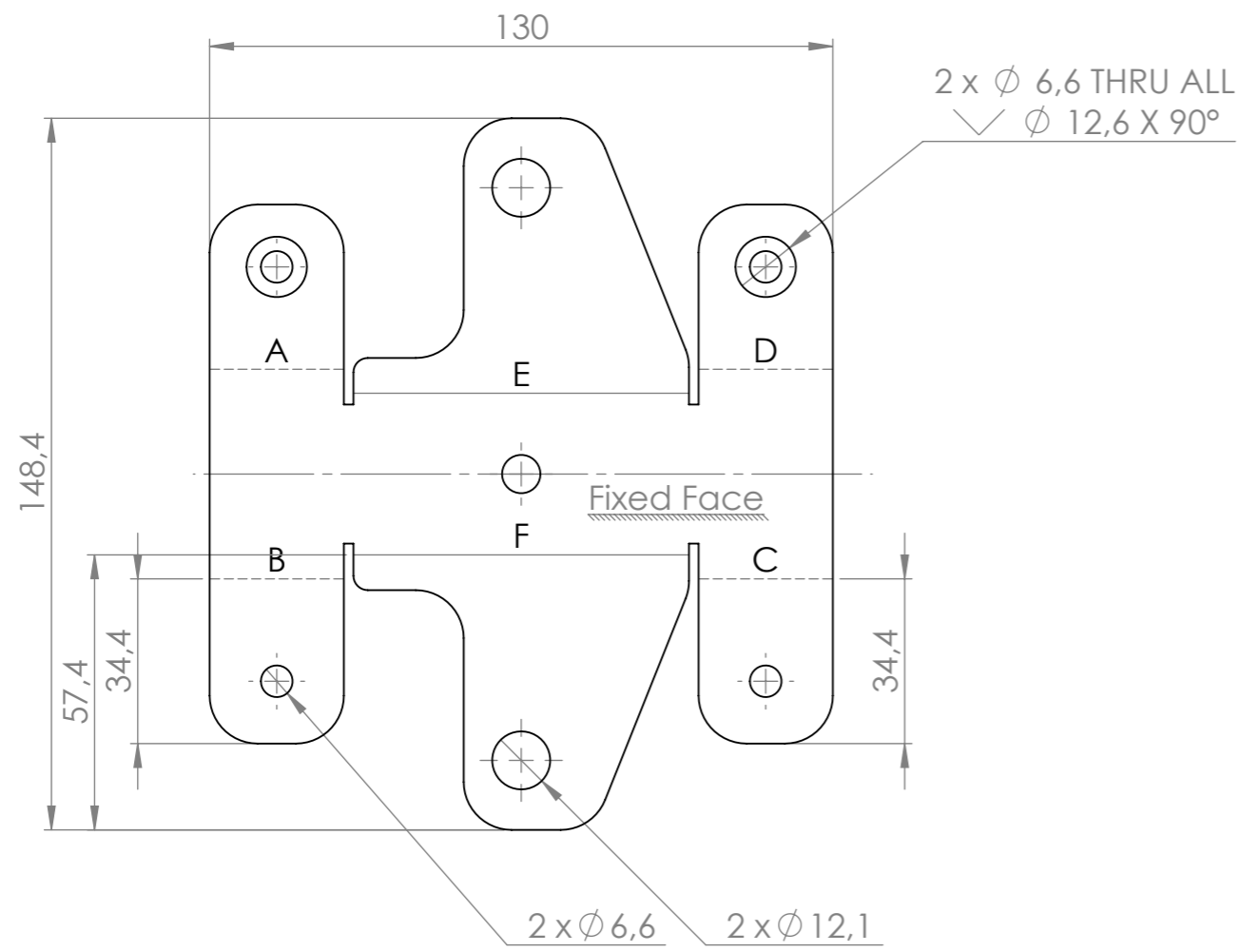
CD3D-00-02-013	3D head hinge bar		Round Bar	D16 L72
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 20.07.2020 MATERIAL <b>1.0490 (S275N)</b>	
MASS/KG <b>0.11</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>3D head hinge bar</b>	DRAWING NUMBER <b>CD3D-00-02-013</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>

Revision	Description	Date	Approved
A	Initial design	20.07.2020	IN



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	Length added	27.10.2020	IN
02	Geometry changed	30.10.2020	IN

CD3D-00-02-015	Top actuator mount		Plate	L274 x W115 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 30.10.2020 MATERIAL 1.0553 (S355J0)	
MASS/KG 0.79	PROJECT CD		FINISH	PAPER A3
FIRST ANGLE	DESCRIPTION Top actuator mount		DRAWING NUMBER CD3D-00-02-015	REVISION 02 SHEET 1 of 1

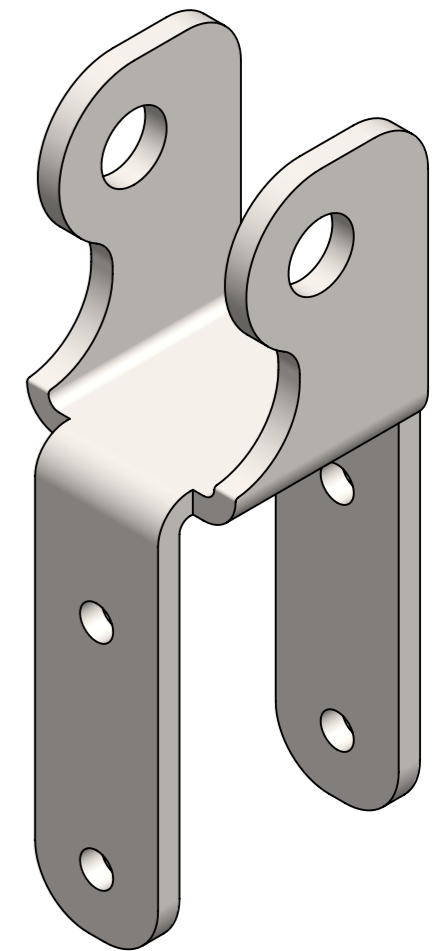
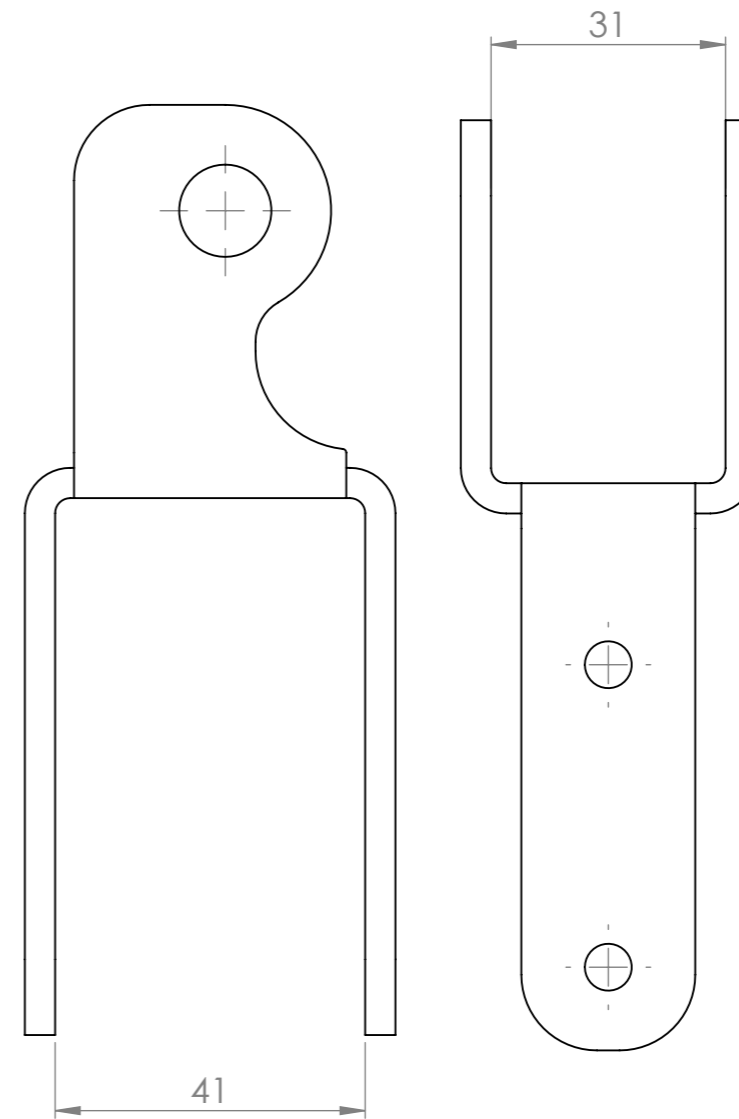
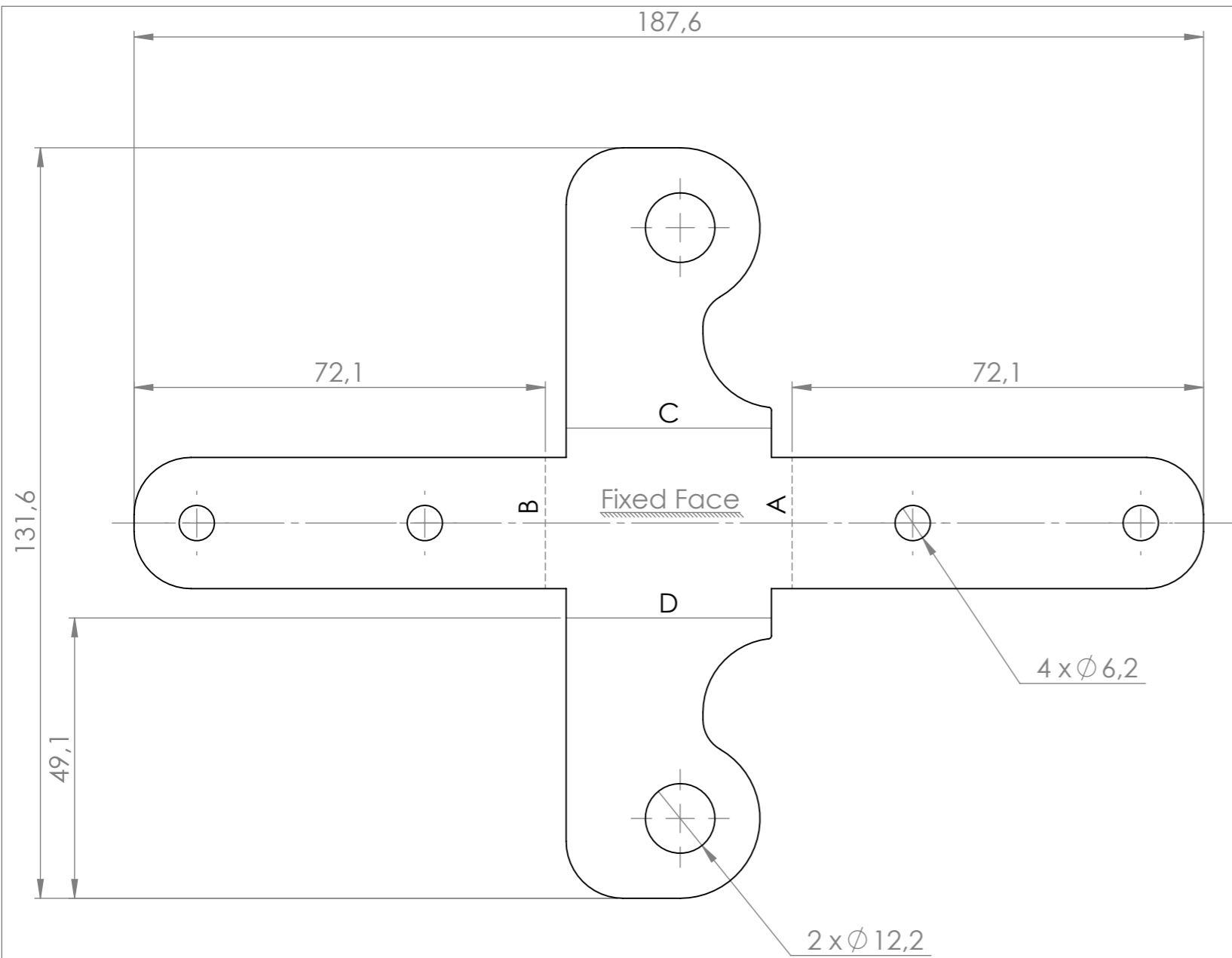


Tag	Direction	Angle	Inner Radius
A	DOWN	90°	1
B	DOWN	90°	1
C	DOWN	90°	1
D	DOWN	90°	1
E	UP	90°	1
F	UP	90°	1

CD3D-00-02-016	Upper Actuator mount 2	Plate	L150 x W130 x Th.4
PartNo.	Description	Info	Preform type
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 www.finnos.fi	DRAWN BY IiroN 02.07.2020 MATERIAL 1.0553 (\$355J0)
MASS/KG 0.40	PROJECT CD		FINISH
FIRST ANGLE	DESCRIPTION Upper Actuator mount 2	DRAWING NUMBER CD3D-00-02-016	SCALE 2:3
		REVISION A	SHEET 1 of 1

Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

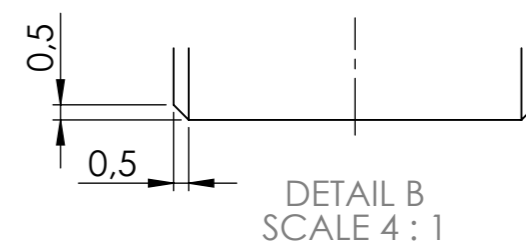
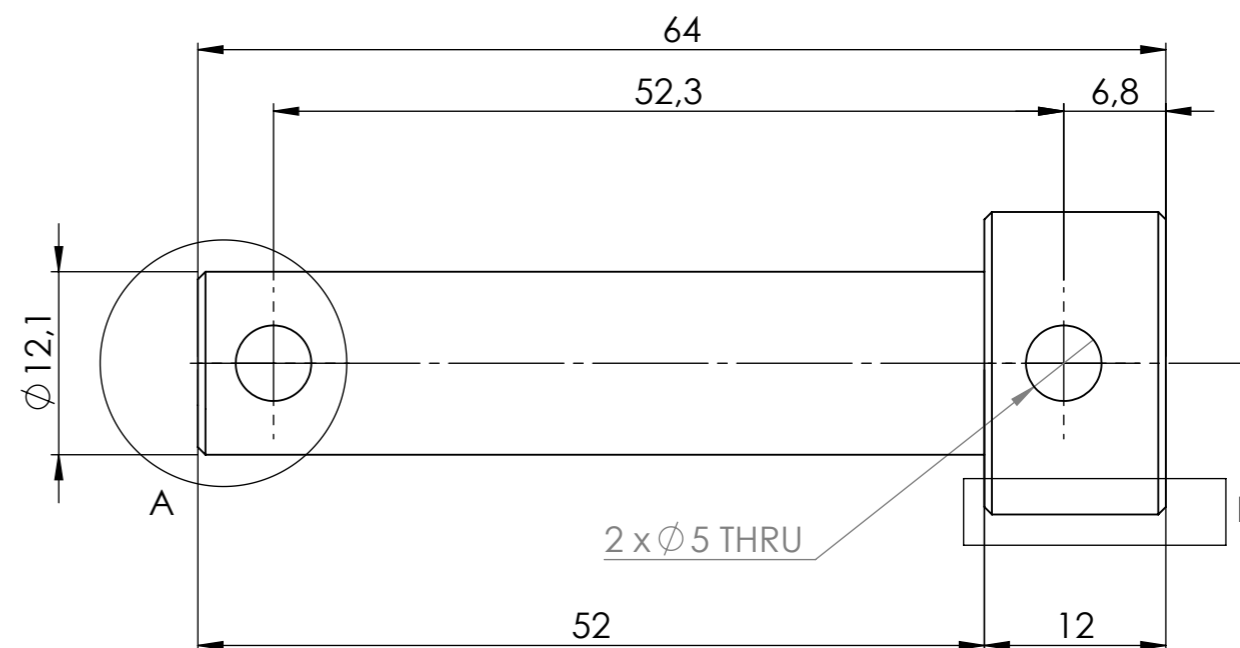
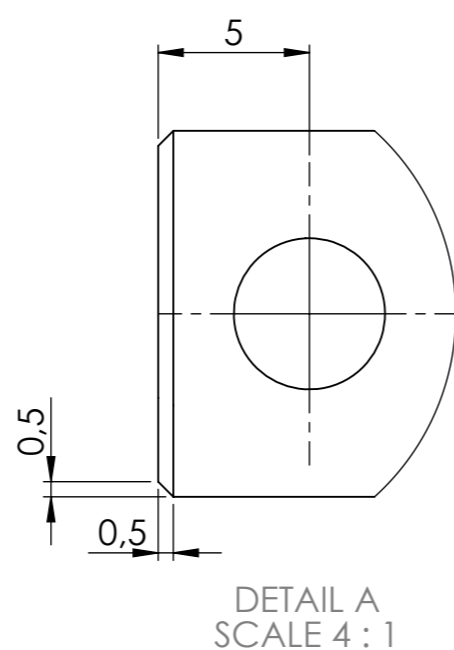
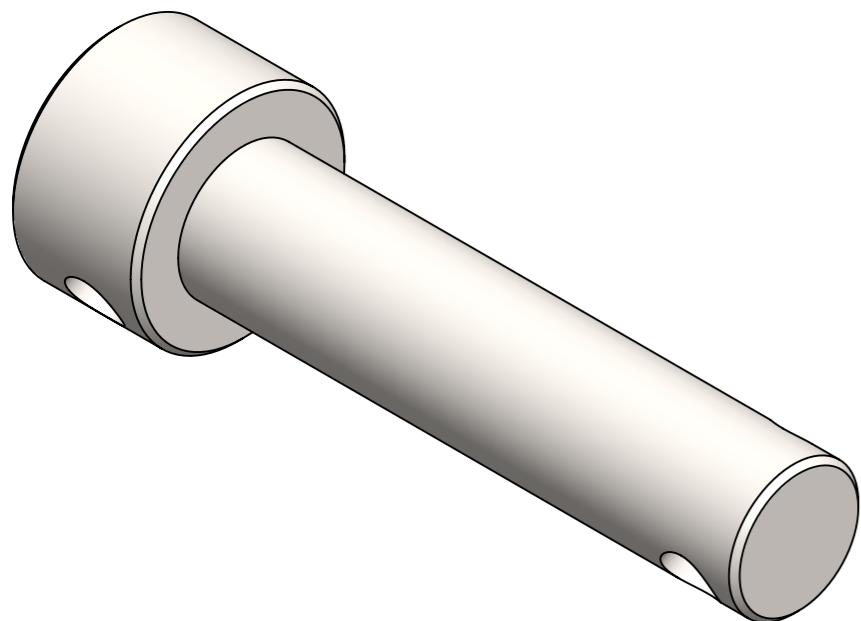




Tag	Direction	Angle	Inner Radius
A	DOWN	90°	2
B	DOWN	90°	2
C	UP	90°	2
D	UP	90°	2

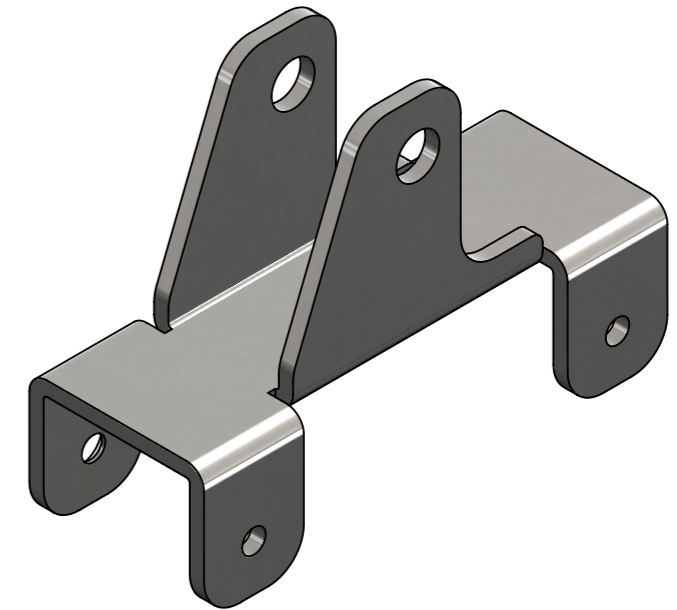
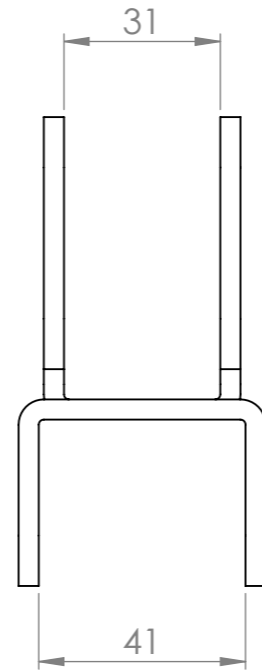
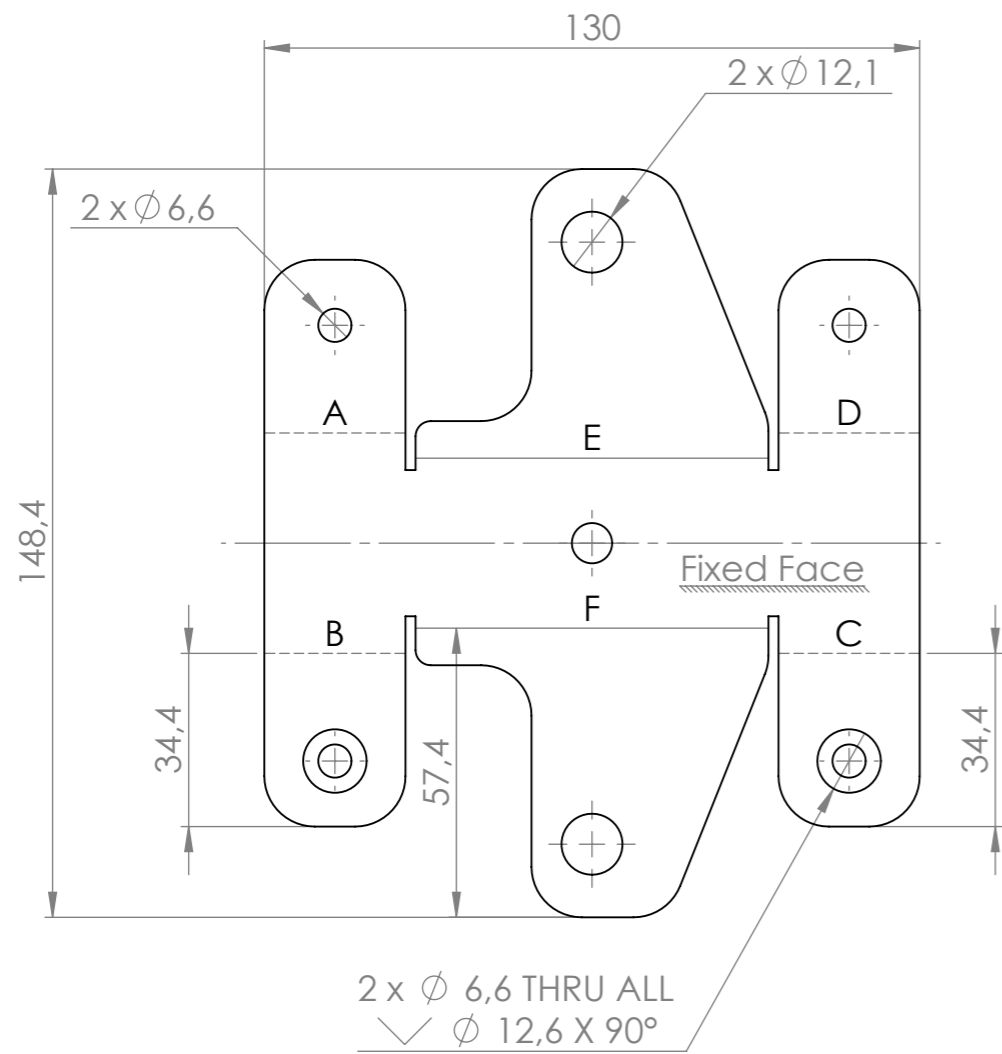
Revision	Description	Date	Approved
A		16.11.2020	Admin
A01	Workflow correction	16.11.2020	Admin
B		16.11.2020	Admin
B01	Workflow correction	16.11.2020	Admin
B02	Hole moved closer to profile	23.11.2020	IN

CD3D-00-02-017	Lower actuator mount	Info	Plate	L189 x W137 x Th.4	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 23.11.2020 MATERIAL 1.0553 (\$355J0)		
MASS/KG 0.22	PROJECT CD		FINISH	PAPER A3	SCALE 1:1
FIRST ANGLE	DESCRIPTION Lower actuator mount	DRAWING NUMBER CD3D-00-02-017		REVISION B02	SHEET 1 of 1



Revision	Description	Date	Approved
A	Initial design	20.07.2020	IN
B	Added missing dimensions	28.07.2020	SN

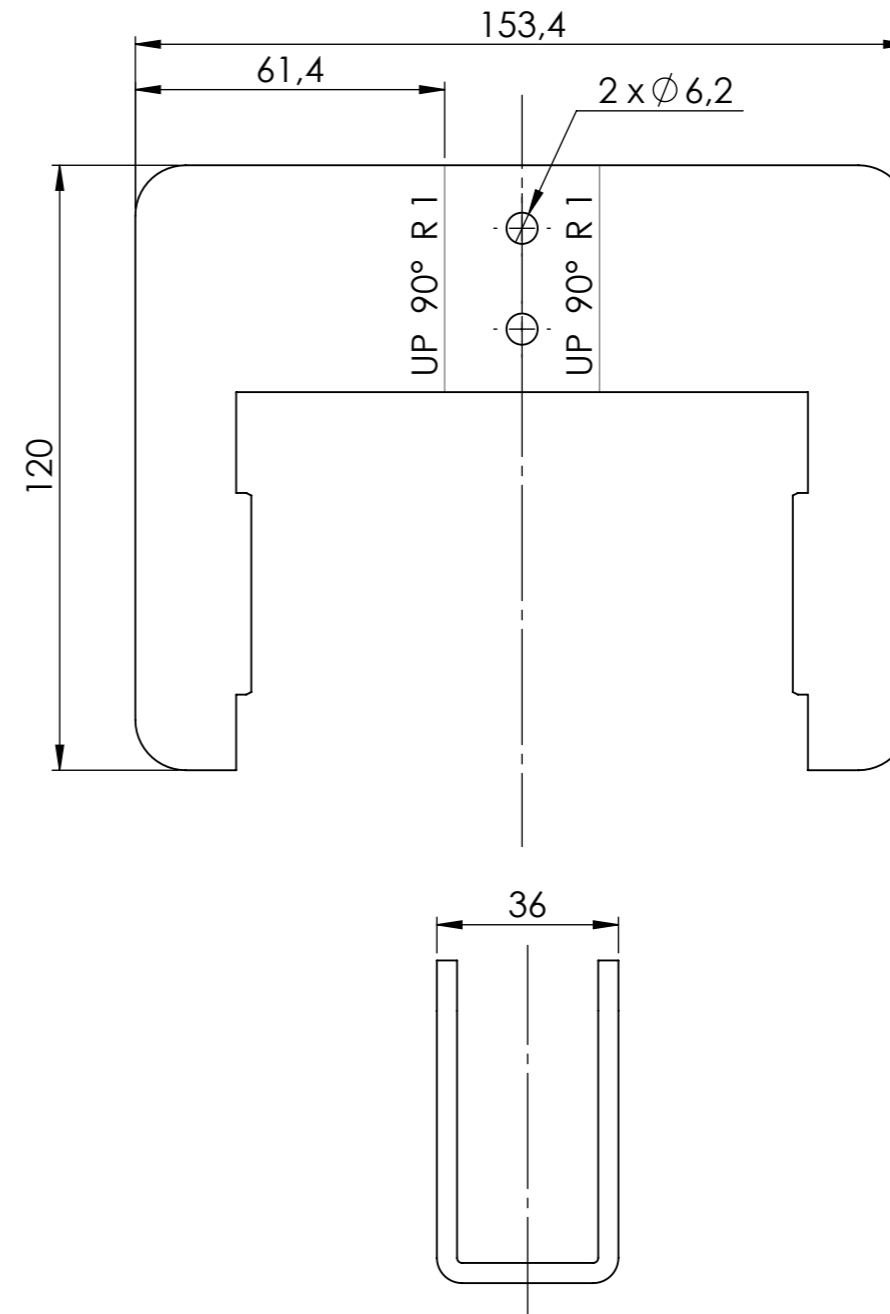
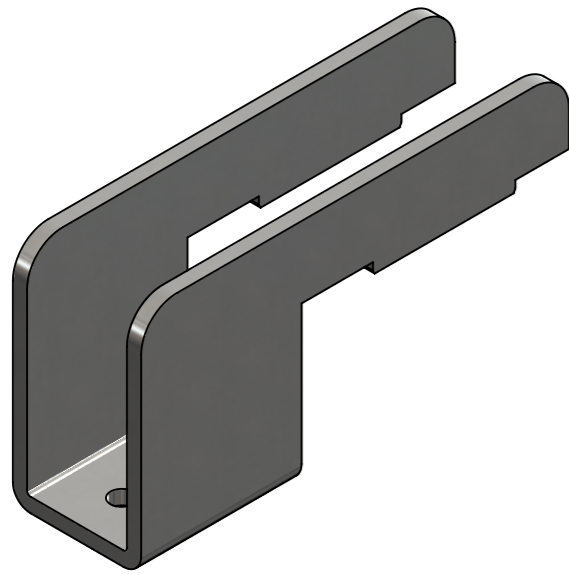
CD3D-00-02-018	Actuator pin		Bolt	D20 x d 12,1 L64
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 28.07.2020 MATERIAL <b>Plain Carbon Steel</b>	
MASS/KG <b>0.07</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Actuator pin</b>	DRAWING NUMBER <b>CD3D-00-02-018</b>	REVISION <b>B</b>	SHEET <b>1 of 1</b>



Tag	Direction	Angle	Inner Radius
A	DOWN	90°	1
B	DOWN	90°	1
C	DOWN	90°	1
D	DOWN	90°	1
E	UP	90°	1
F	UP	90°	1

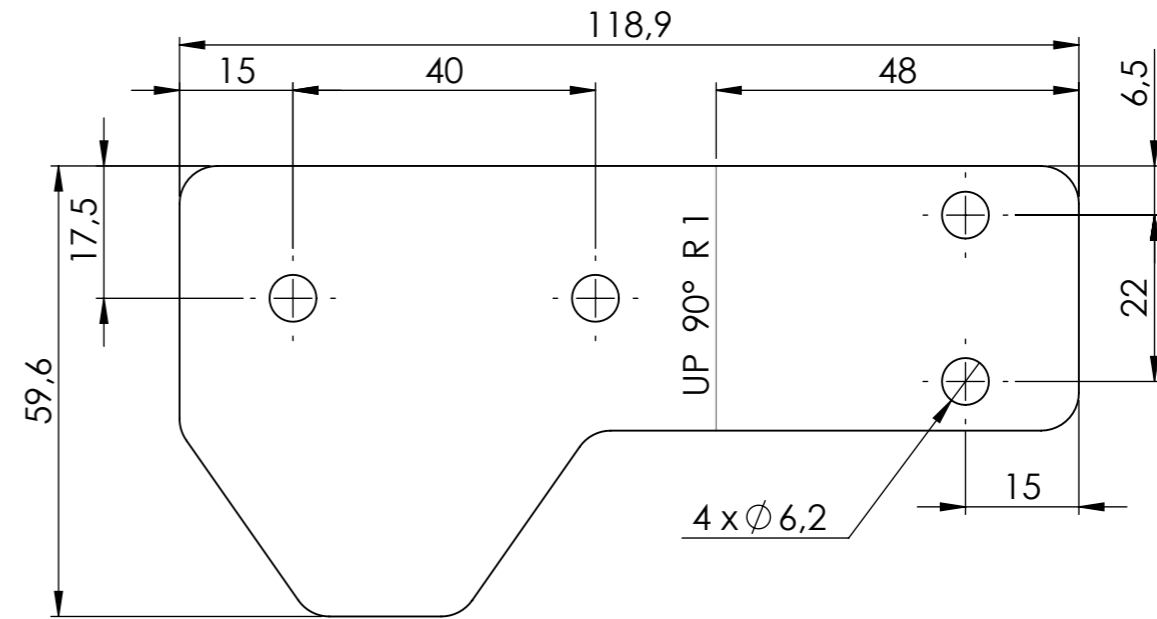
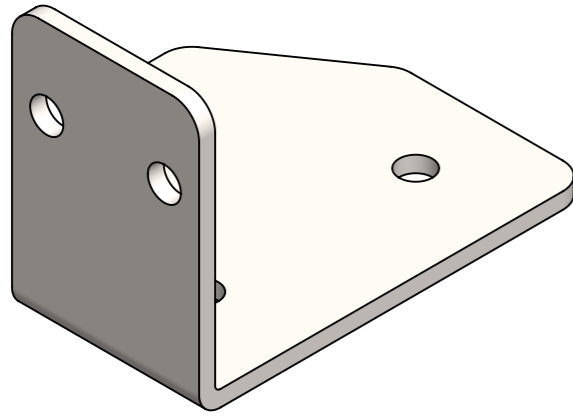
CD3D-00-02-019	Upper Actuator mount 1		Plate	L150 x W130 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.40</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>Upper Actuator mount 1</b>	DRAWING NUMBER <b>CD3D-00-02-019</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>

Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN



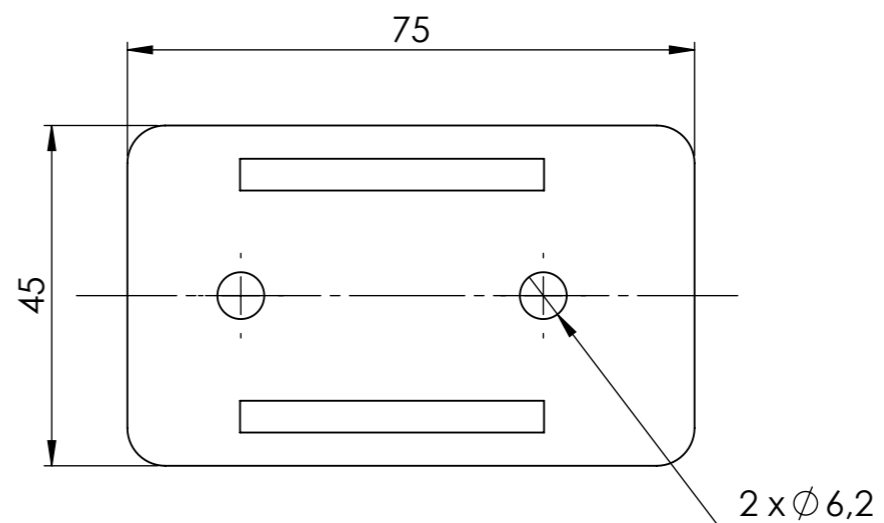
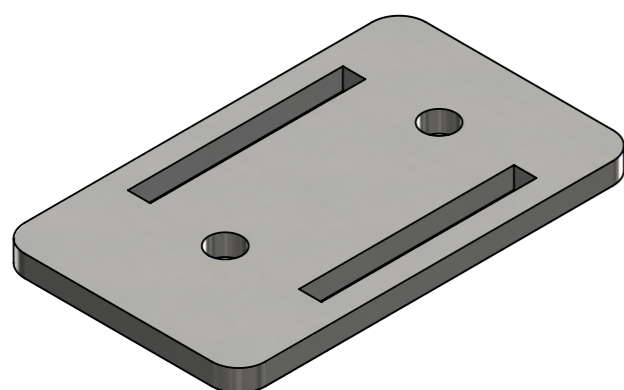
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-02-021	Top actuator mount back piece		Plate	L154 x W120 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG 0.31	PROJECT CD		FINISH	PAPER A3
FIRST ANGLE	DESCRIPTION Top actuator mount back piece	DRAWING NUMBER CD3D-00-02-021	REVISION A	SHEET 1 of 1



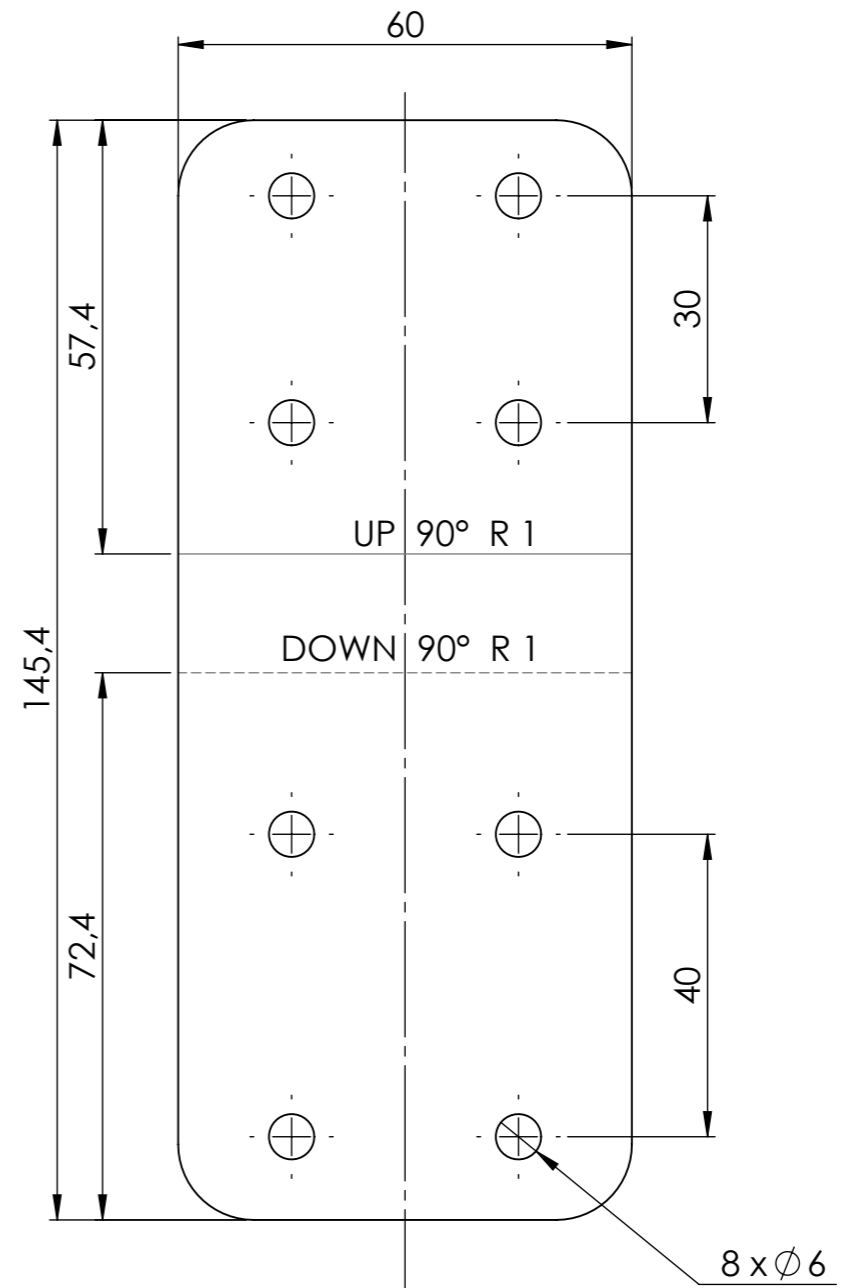
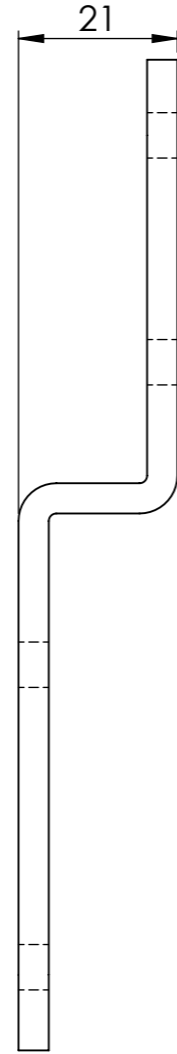
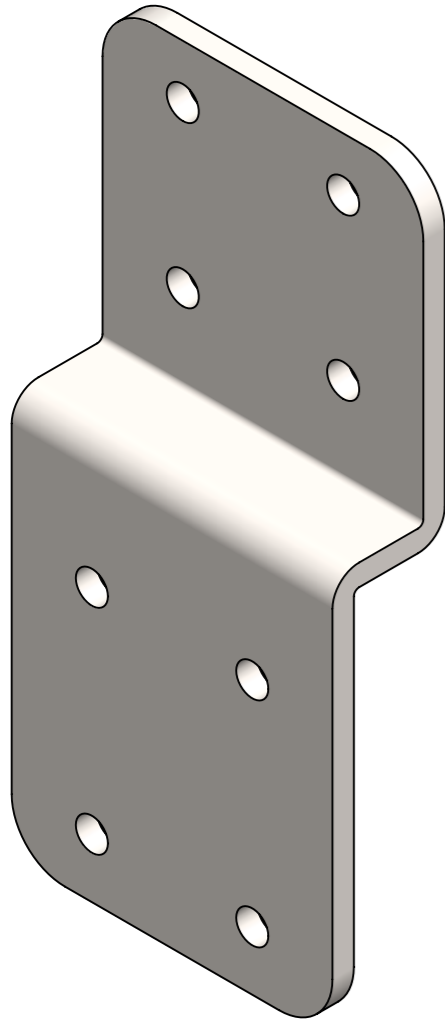
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Dimension fixes	05.07.2020	IN
01	Puskin extensions added	30.10.2020	IN

CD3D-00-02-022	Cable tray mount		Plate	L119 x W60 x Th.3
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 30.10.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.12</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Cable tray mount</b>	DRAWING NUMBER <b>CD3D-00-02-022</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>



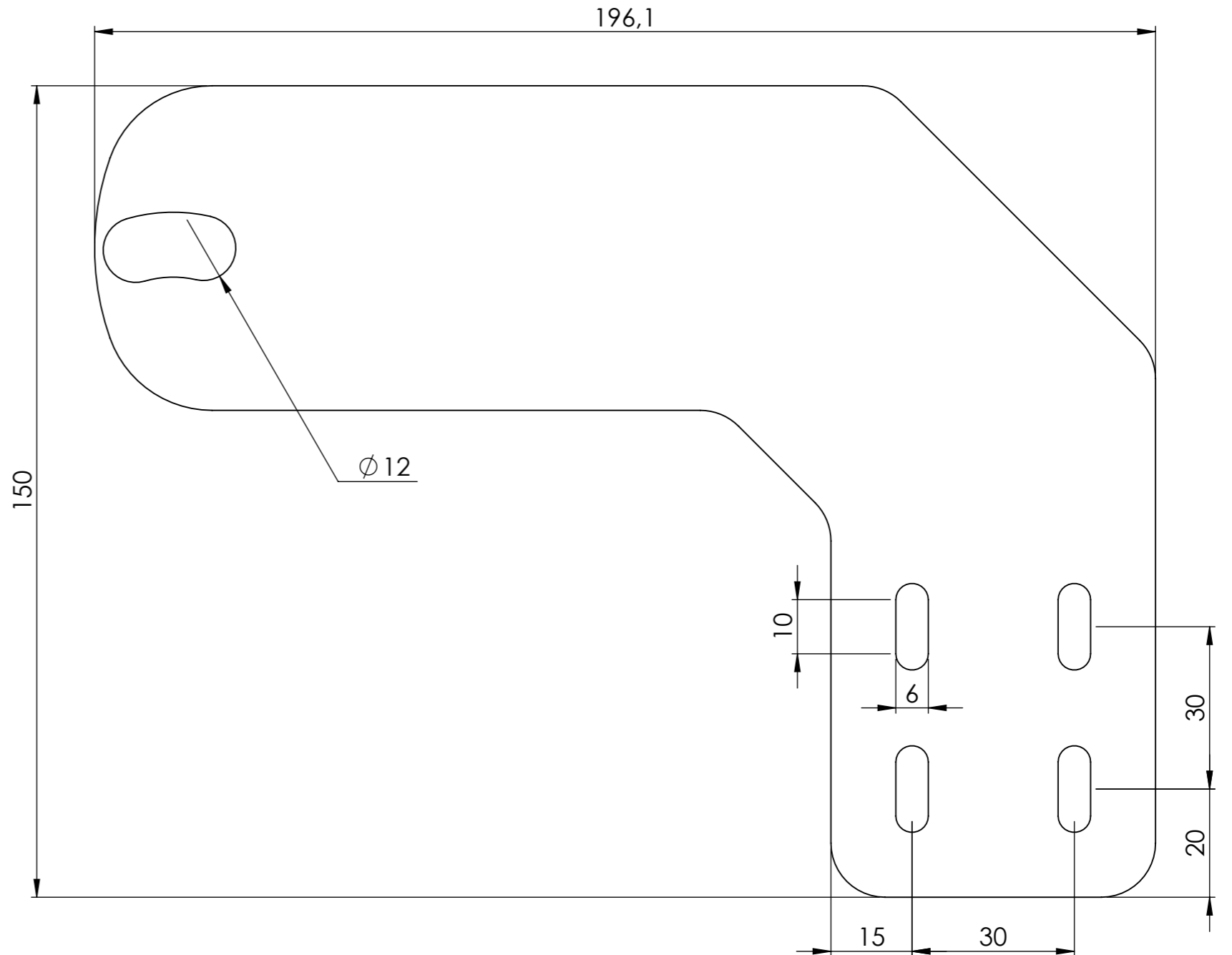
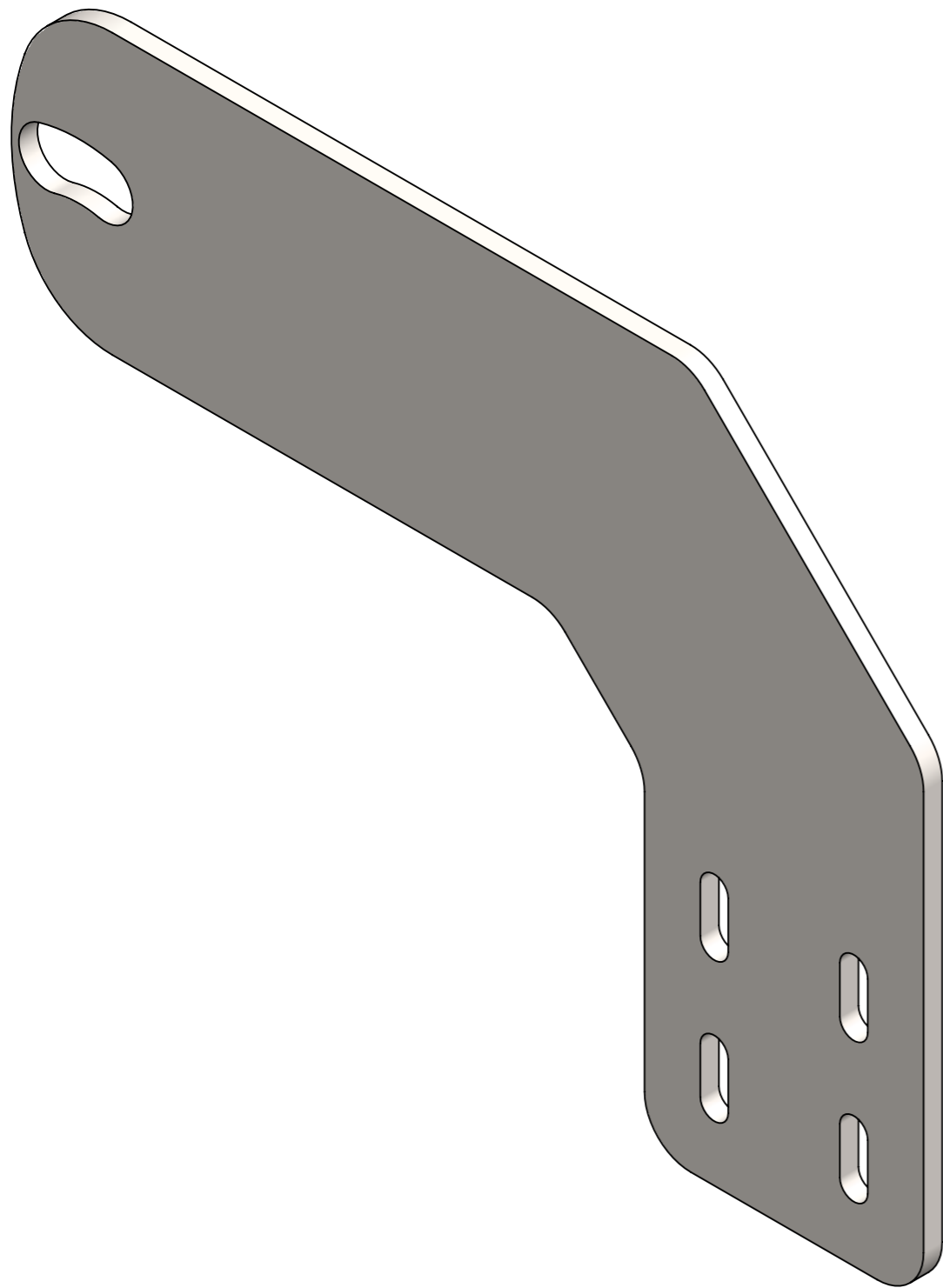
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-02-023	Top actuator mount back plate		Plate	L75 x W45 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.09</b>	PROJECT CD		FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>Top actuator mount back plate</b>	DRAWING NUMBER <b>CD3D-00-02-023</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Dimensions added	05.07.2020	IN

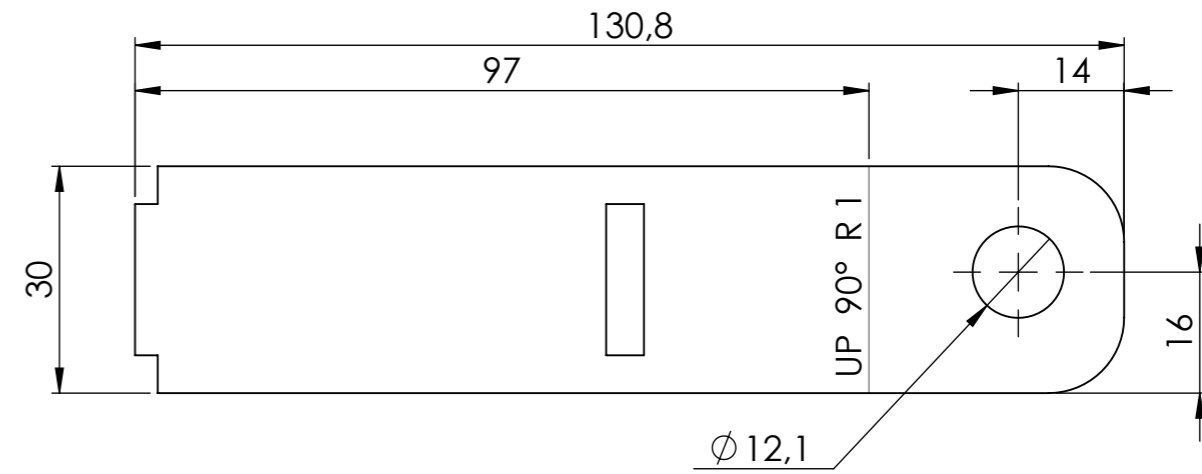
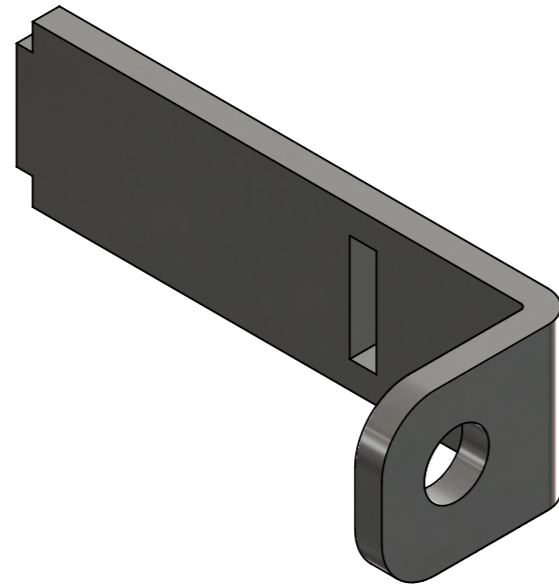
CD3D-00-02-024	Lower arm locking plate 3		Plate	L146 x W60 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 05.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.26</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Lower arm locking plate 3</b>	DRAWING NUMBER <b>CD3D-00-02-024</b>	REVISION <b>B</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	Hole -> Slot	23.11.2020	IN

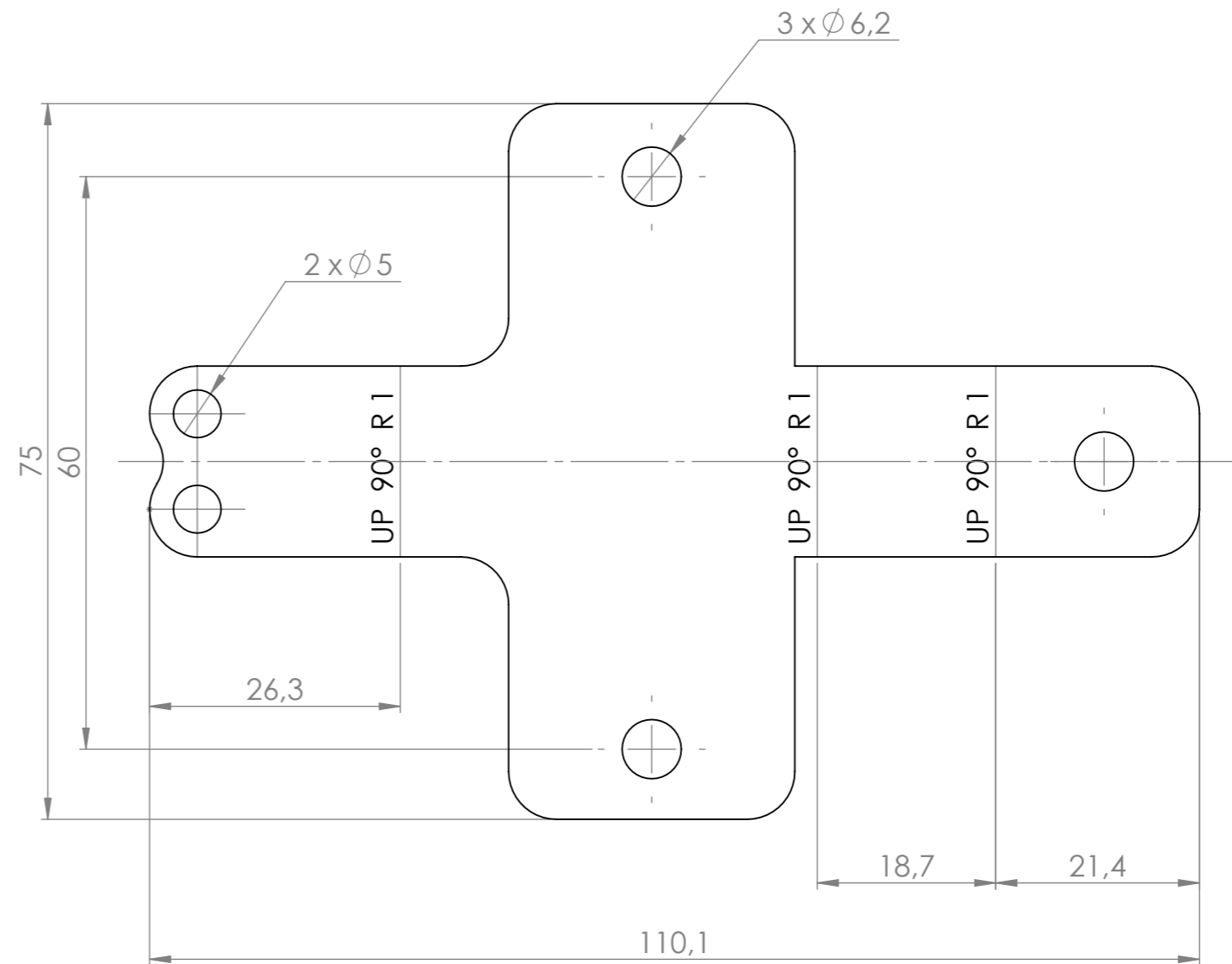
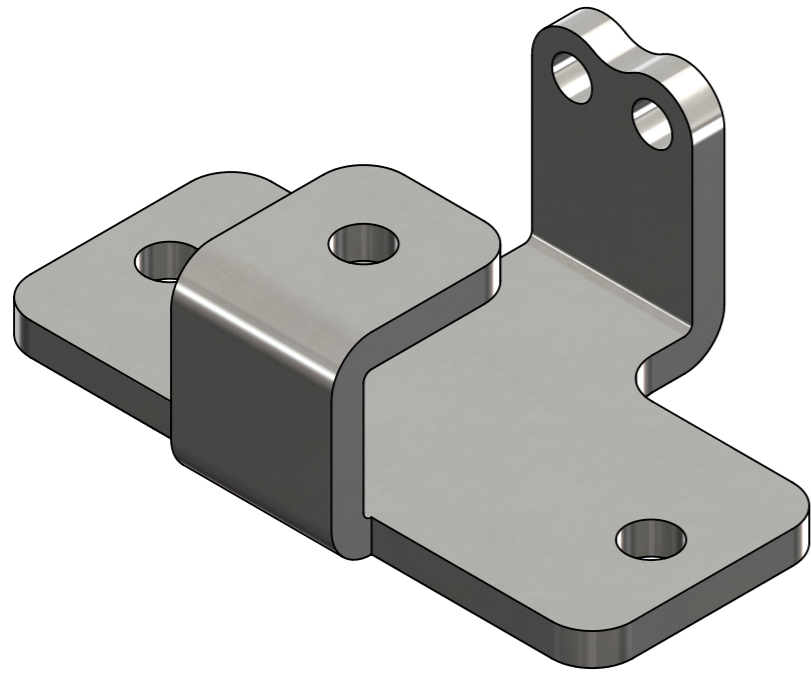
CD3D-00-02-025	Lower arm locking plate 2		Plate	L197 x W150 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 23.11.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.47</b>	PROJECT CD		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Lower arm locking plate 2</b>	DRAWING NUMBER <b>CD3D-00-02-025</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>





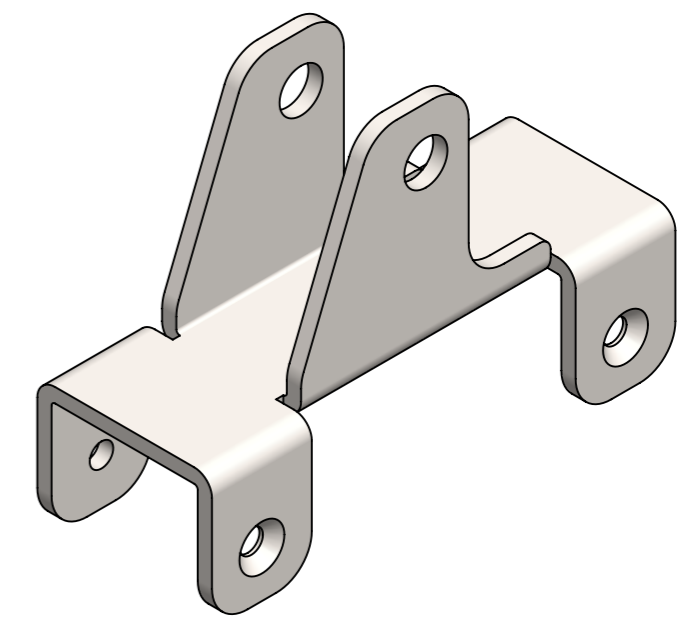
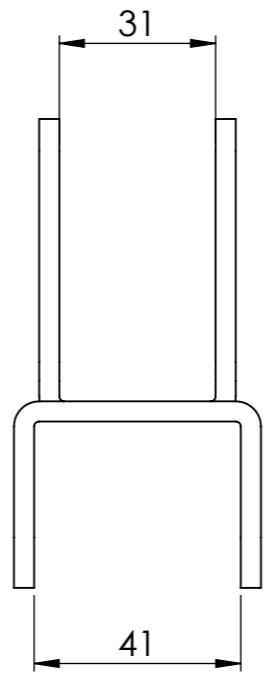
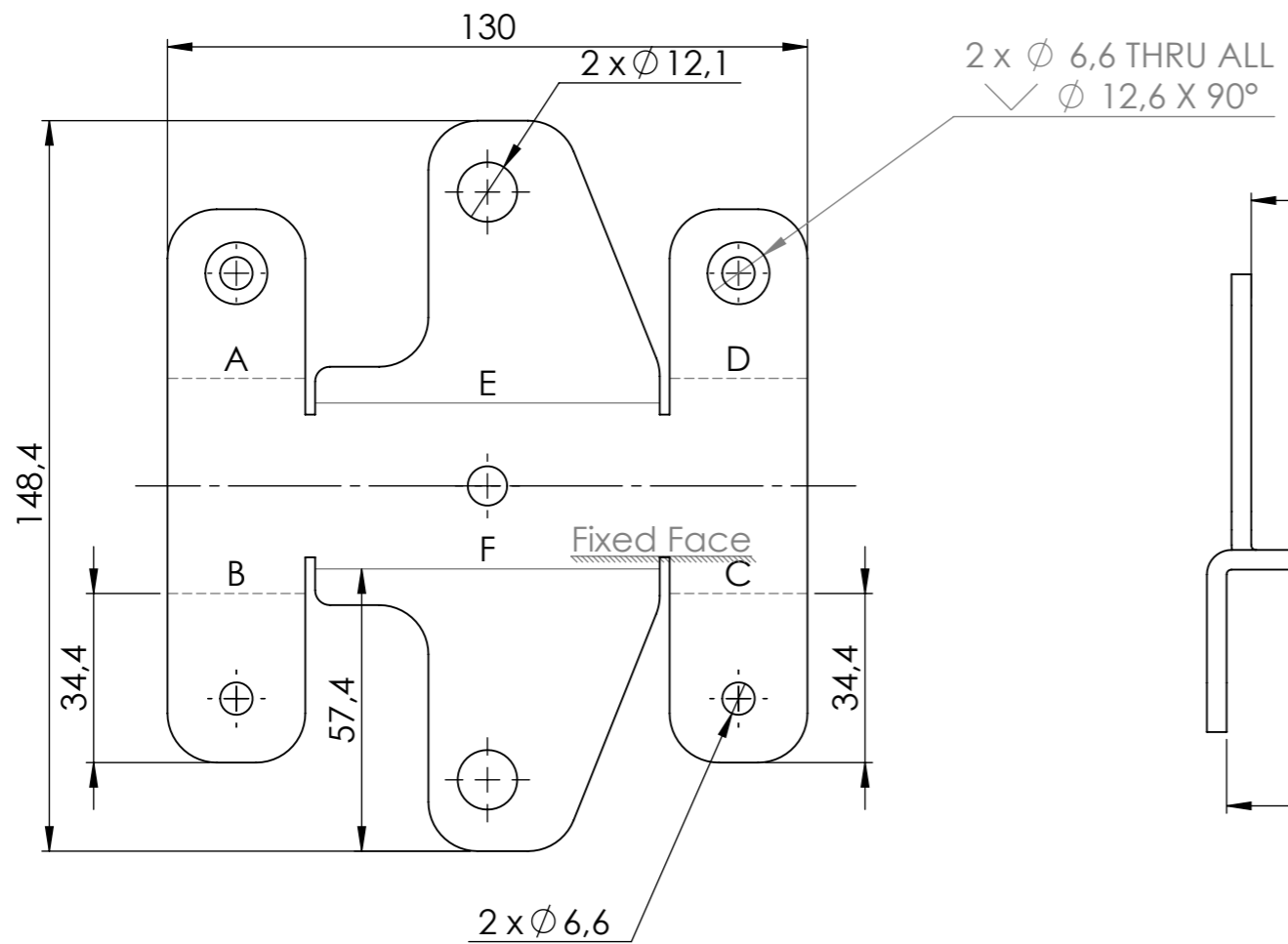
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-02-026	Calibration mount2 mirrored		Plate	L131 x W30 Th.5
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.14</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>Calibration mount2 mirrored</b>	DRAWING NUMBER <b>CD3D-00-02-026</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Drawing number changed	02.07.2020	IN

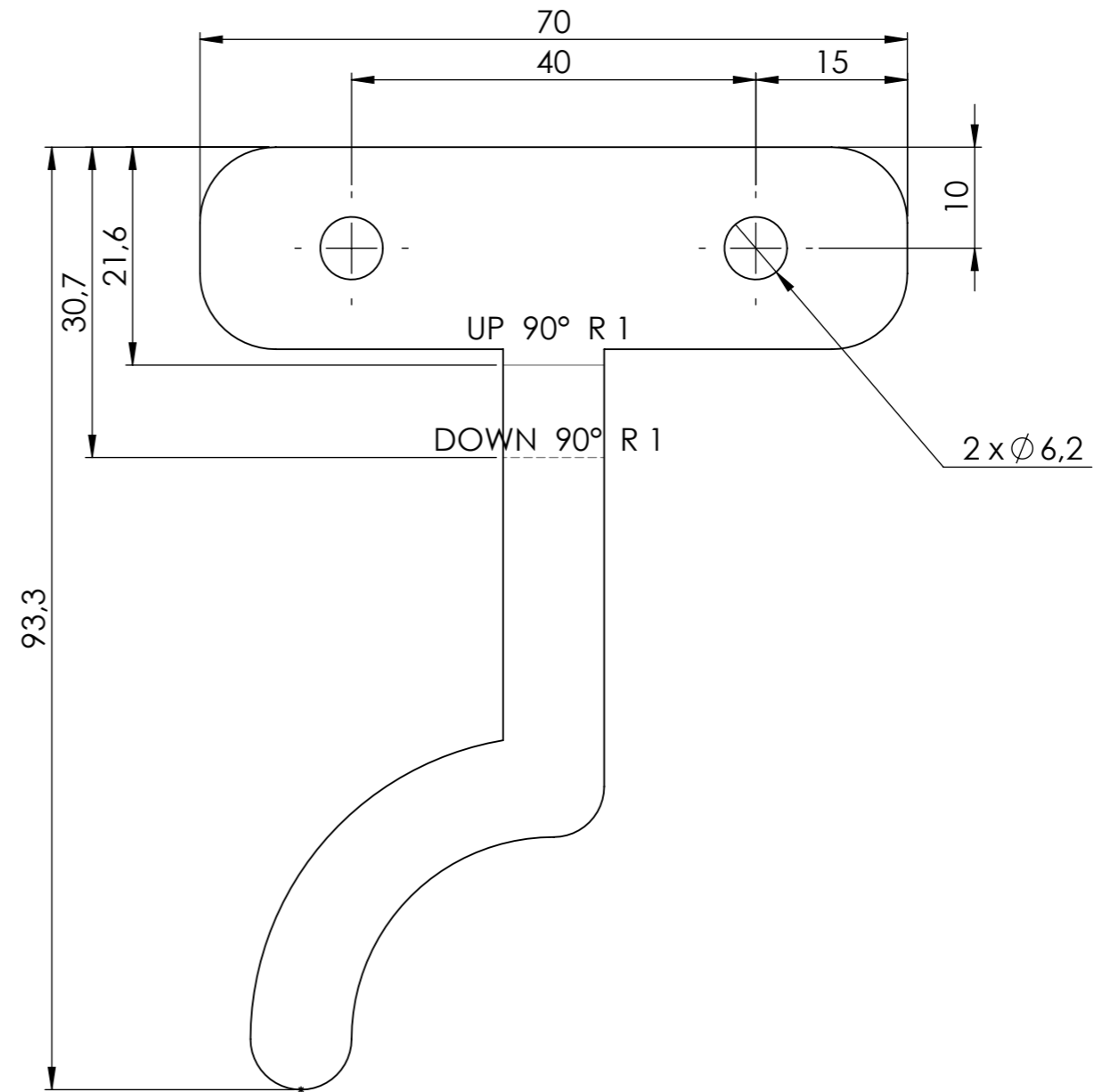
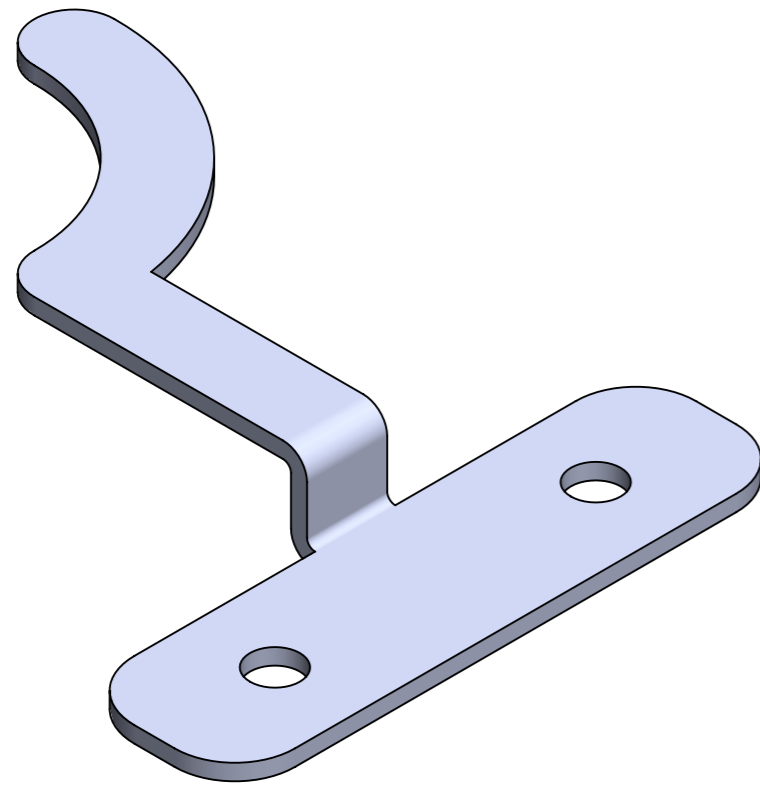
CD3D-00-02-027	Turnbuckle mount		Plate	L112 x W75 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>1.0553 (\$355J0)</b>	
MASS/KG <b>0.11</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Turnbuckle mount</b>	DRAWING NUMBER <b>CD3D-00-02-027</b>	REVISION <b>B</b>	SHEET <b>1 of 1</b>



Tag	Direction	Angle	Inner Radius
A	DOWN	90°	1
B	DOWN	90°	1
C	DOWN	90°	1
D	DOWN	90°	1
E	UP	90°	1
F	UP	90°	1

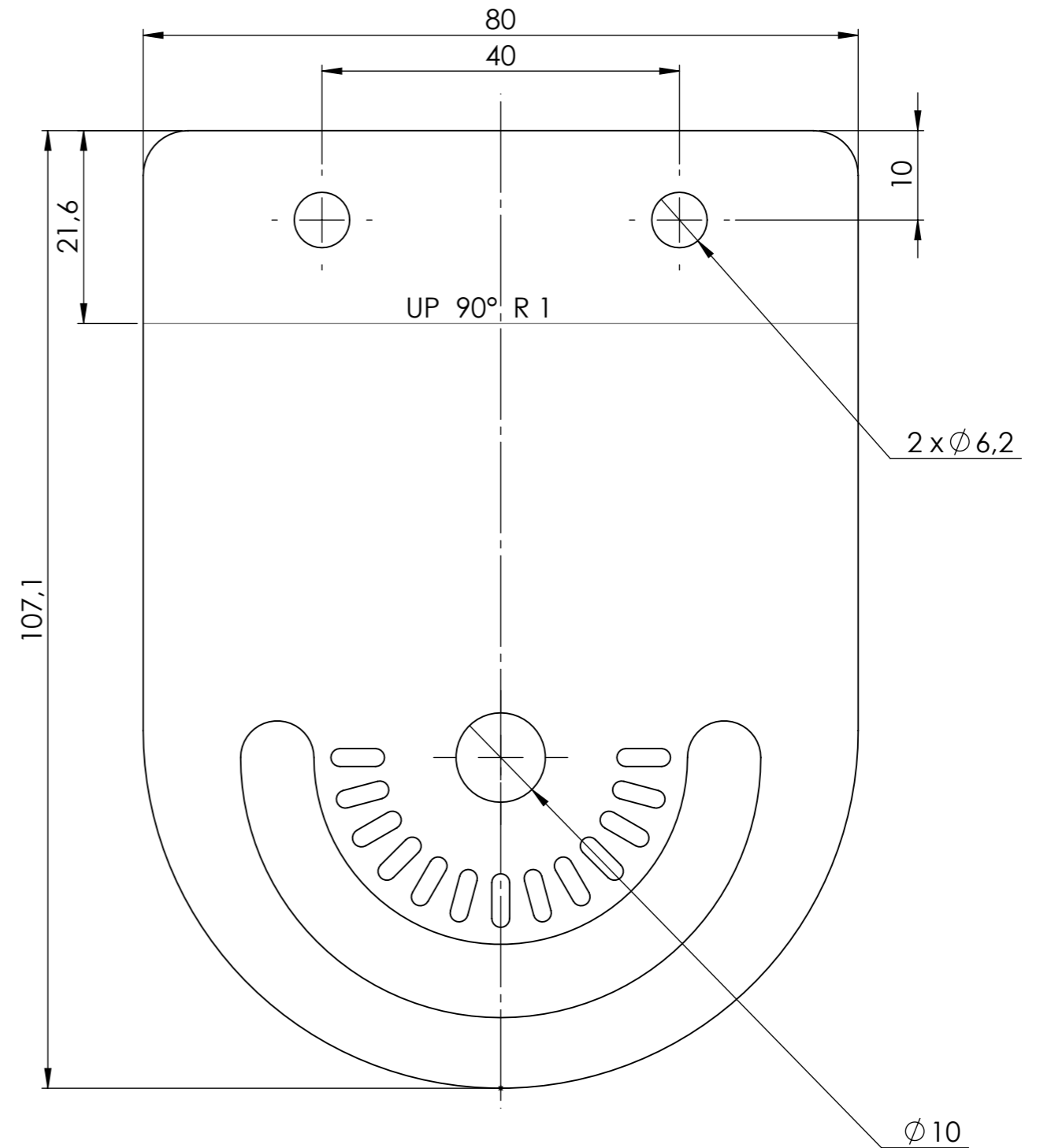
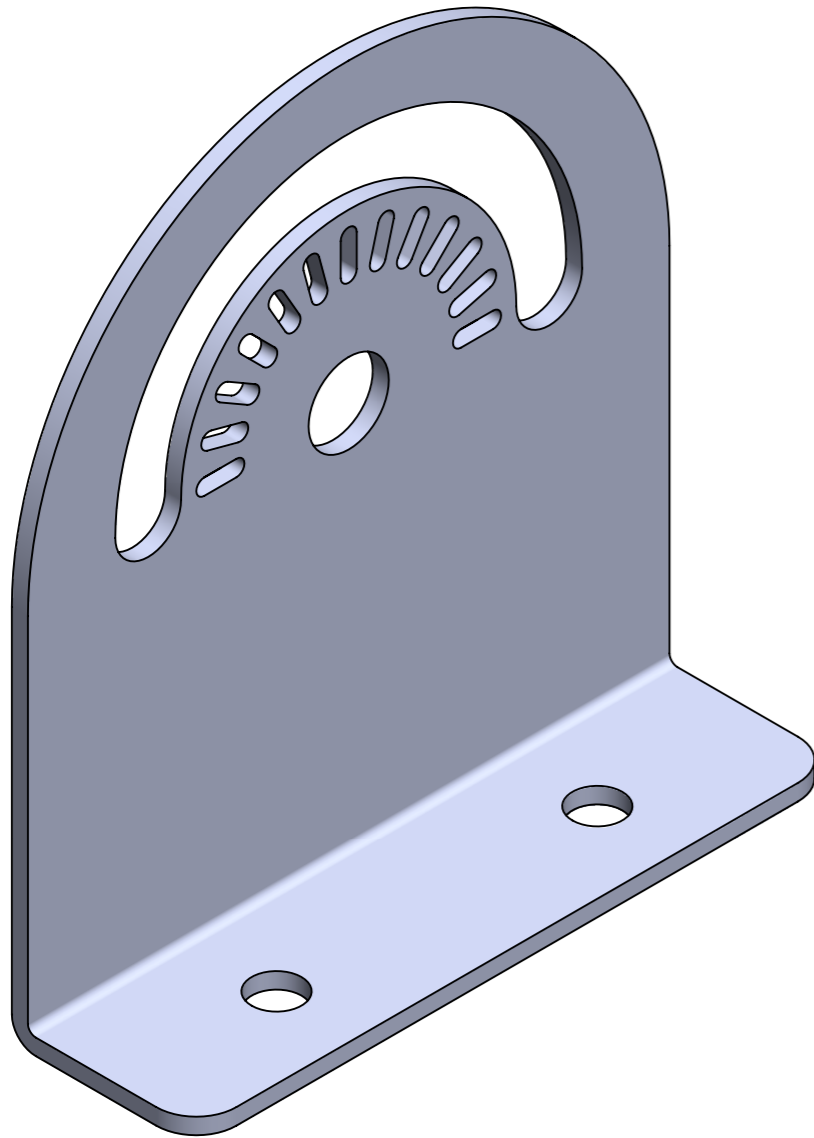
Revision	Description	Date	Approved
A	Initial design	05.07.2020	IN
B	Part number 27 -> 28	05.07.2020	IN
C	Config changed	06.07.2020	IN
D	Moved fixed face	06.07.2020	IN
E	Fixes	06.07.2020	IN

CD3D-00-02-028	Upper Actuator mount 2	Plate	L150 x W130 x Th.4
PartNo.	Description	Info	Preform type
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 06.07.2020 MATERIAL 1.0553 (S355J0)
MASS/KG 0.40	PROJECT CD		FINISH
FIRST ANGLE	DESCRIPTION Upper Actuator mount 2	DRAWING NUMBER CD3D-00-02-028	SCALE 2:3
		REVISION E	SHEET 1 of 1



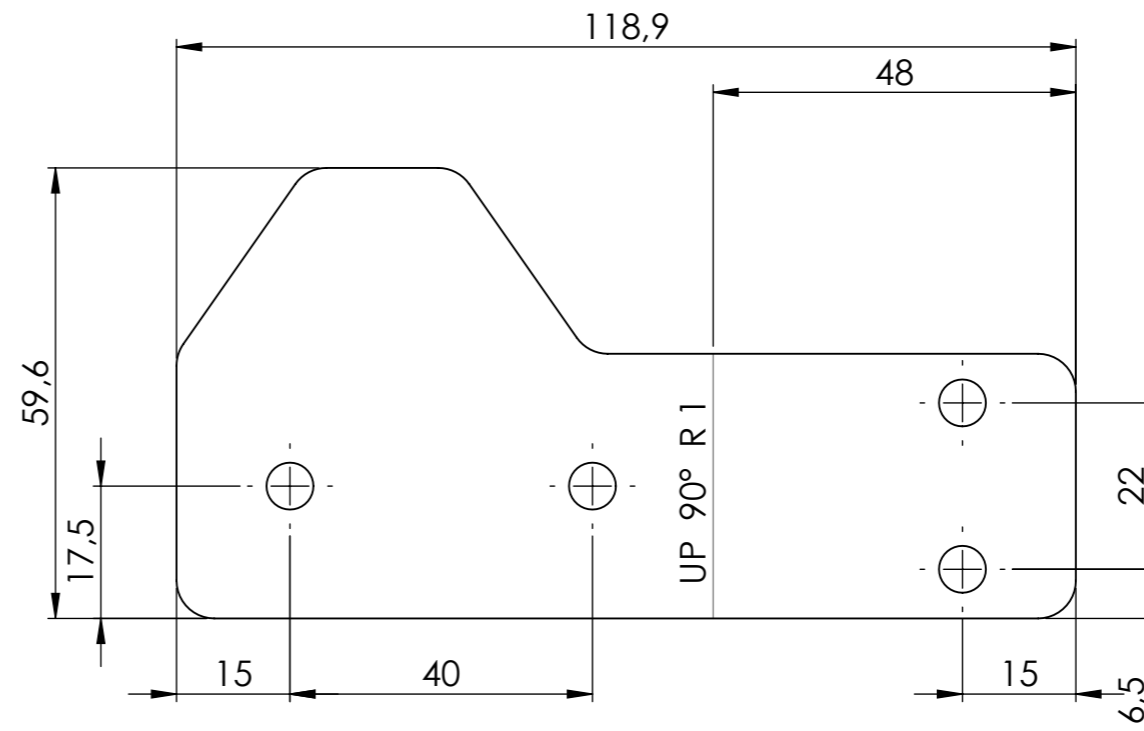
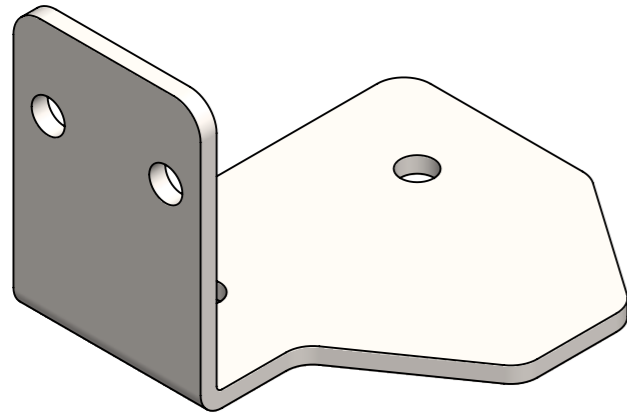
Revision	Description	Date	Approved
01	Initial design	19.10.2020	IN

PartNo.	Description	Info	Preform type	Preform Dimension	
CD3D-00-02-029	Joint angle plate		Plate	L94 x W70 x Th.2	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 19.10.2020	APPROVED <b>IN</b> 19.10.2020	
MASS/KG 0.03	PROJECT CD		MATERIAL <b>AISI 304</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Joint angle plate</b>	CONFIGURATION <b>Default SM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-02-029</b>	REVISION <b>01</b>	SCALE <b>3:2</b>
				SHEET <b>1 of 1</b>	



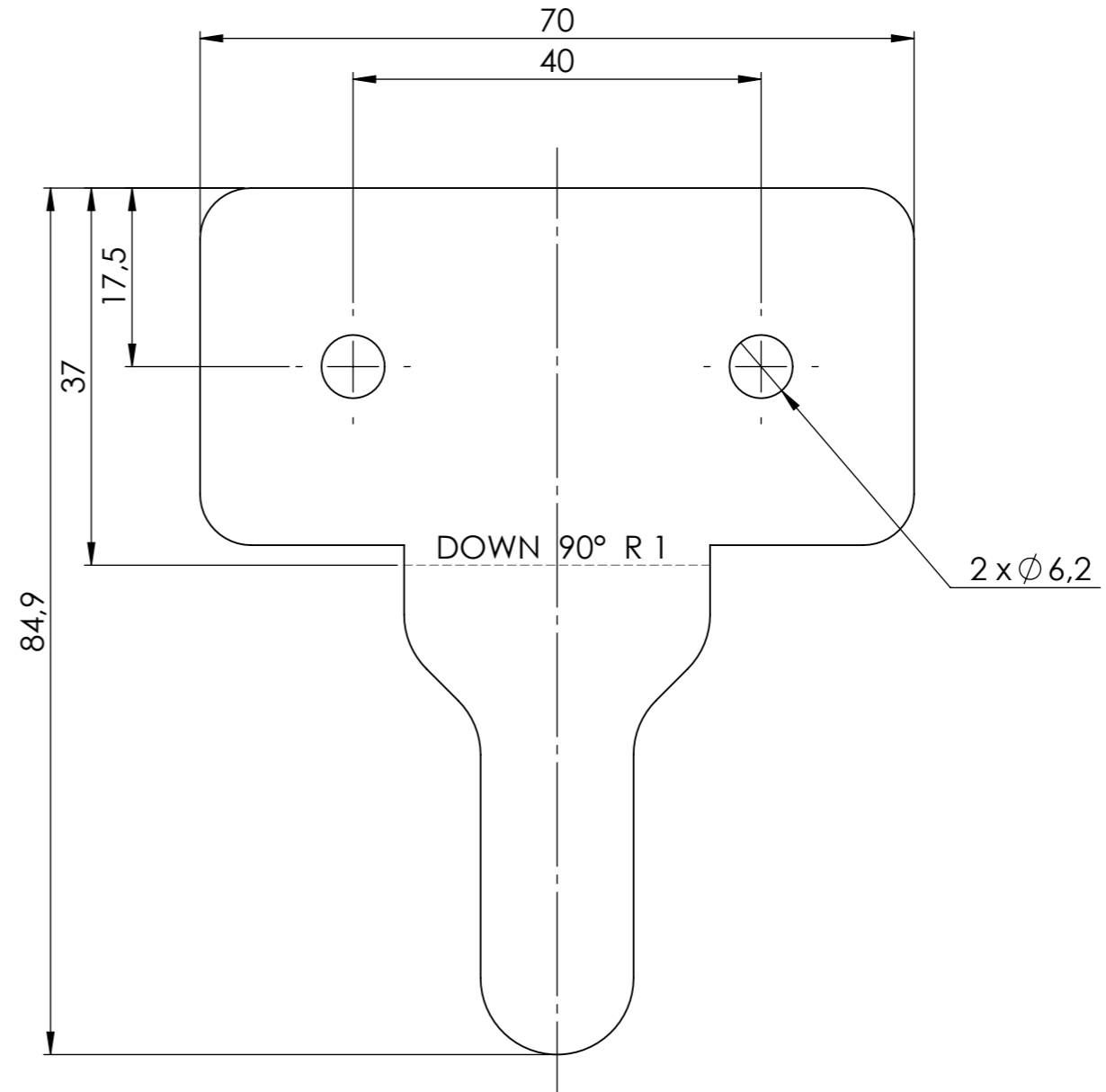
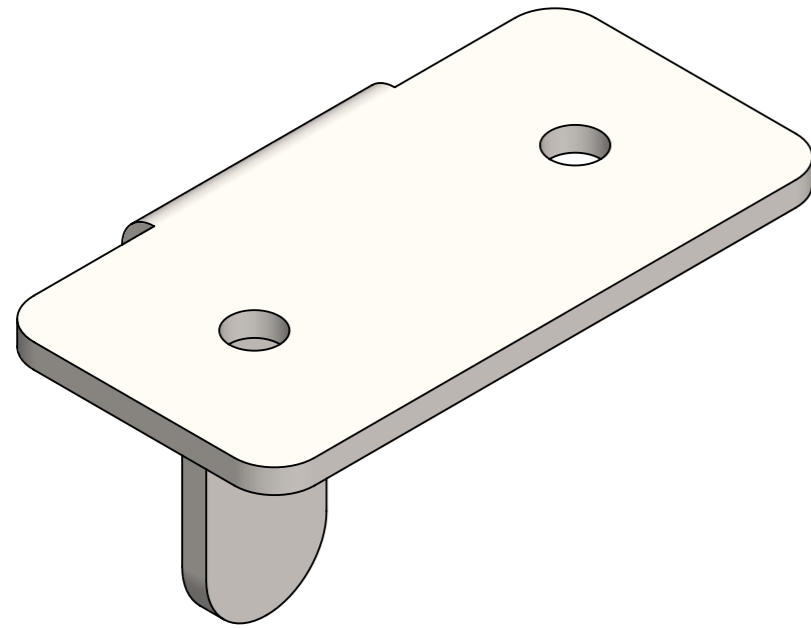
Revision	Description	Date	Approved
01	Initial design	19.10.2020	IN

PartNo.	Description	Info	Preform type	Preform Dimension	
CD3D-00-02-030	Joint angle sensor plate		Plate	L108 x W80 x Th.2	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 19.10.2020	APPROVED IN 19.10.2020	
MASS/KG 0.11	PROJECT CD		MATERIAL AISI 304	FINISH	PAPER A3
FIRST ANGLE	DESCRIPTION Joint angle sensor plate	CONFIGURATION Default SM-FLAT-PATTERN	DRAWING NUMBER CD3D-00-02-030	REVISION 01	SHEET 1 of 1



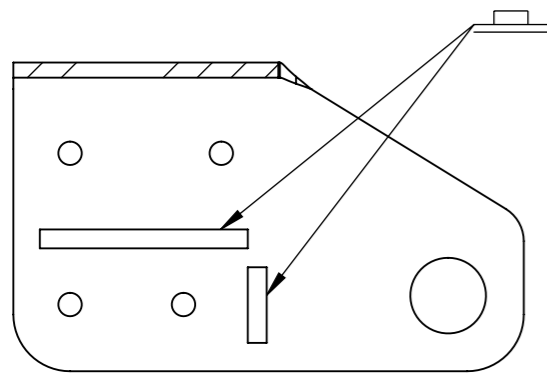
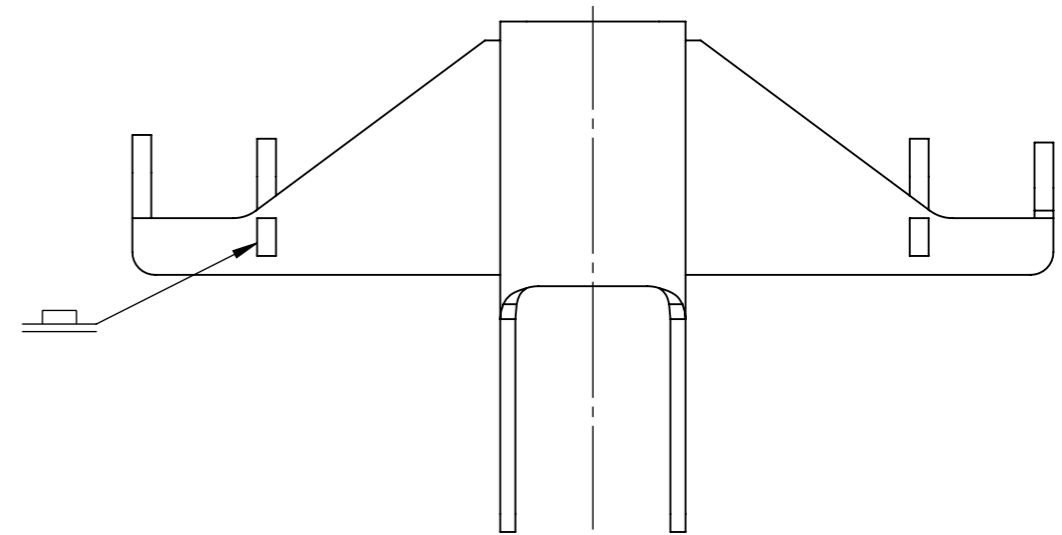
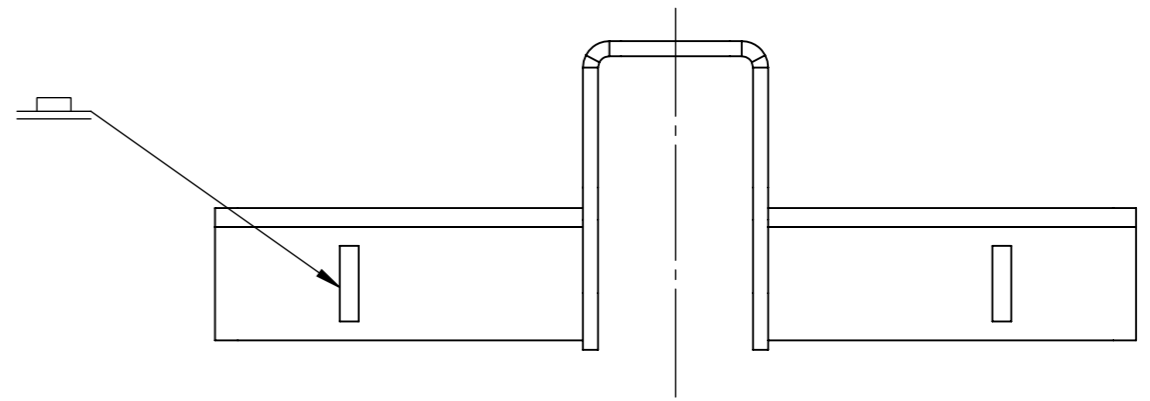
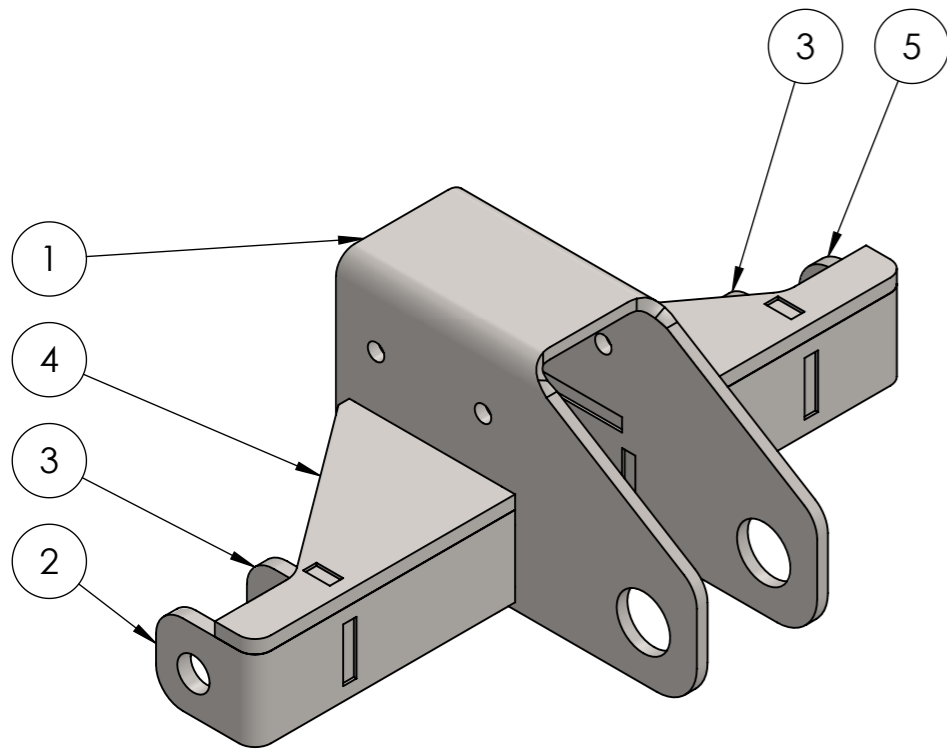
Revision	Description	Date	Approved
01	Initial design	30.10.2020	IN

CD3D-00-02-031	Cable tray mount2		Plate	L119 x W60 x Th.3	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 30.10.2020	APPROVED <b>IN</b> 30.10.2020	
MASS/KG <b>0.12</b>	PROJECT <b>CD</b>		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Cable tray mount2</b>	CONFIGURATION <b>DefaultSM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-02-031</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>

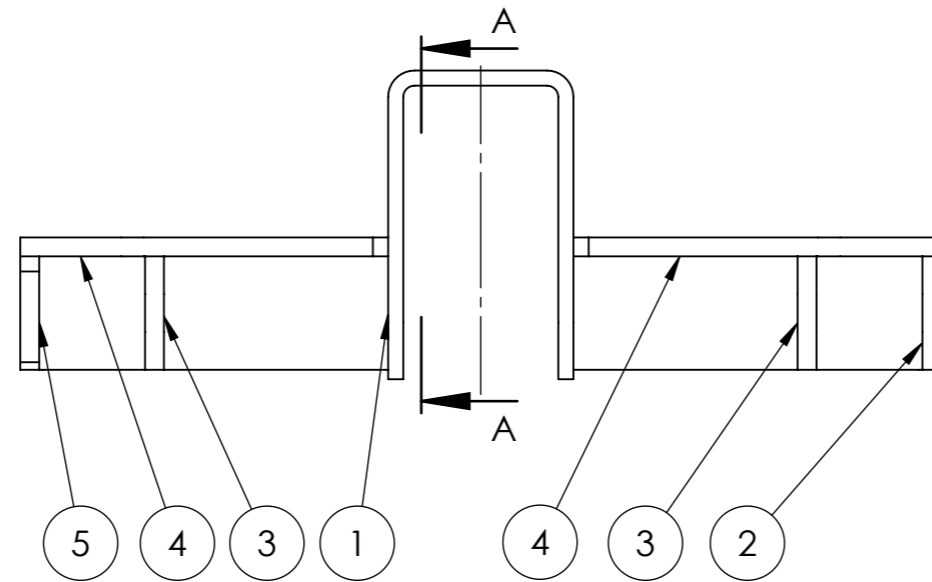


Revision	Description	Date	Approved
01	Initial design	10.11.2020	IN

CD3D-00-02-032	Locking Plate		Plate	L70 x W85 x Th.3	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 10.11.2020	APPROVED <b>IN</b> 10.11.2020	
MASS/KG <b>0.08</b>	PROJECT <b>CD</b>		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Locking Plate</b>	CONFIGURATION <b>Default</b>	DRAWING NUMBER <b>CD3D-00-02-032</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>



SECTION A-A



No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty
5	CD3D-00-02-026	Calibration mount2 mirrored		Plate	L131 x W30 Th.5	1
4	CD3D-00-02-012	Calibration mount4		Plate	L101 x W62 Th.5	2
3	CD3D-00-02-011	Calibration mount3		Plate	L36 x W35 Th.5	2
2	CD3D-00-02-010	Calibration mount2		Plate	L131 x W30 Th.5	1
1	CD3D-00-02-009	Calibration mount		Plate	L200 x W135 x Th.4	1

DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

**FINNOS**  
 www.finnos.fi

DRAWN BY **liron**  
**25.08.2020**  
 MATERIAL

APPROVED IN **IN**  
**25.08.2020**

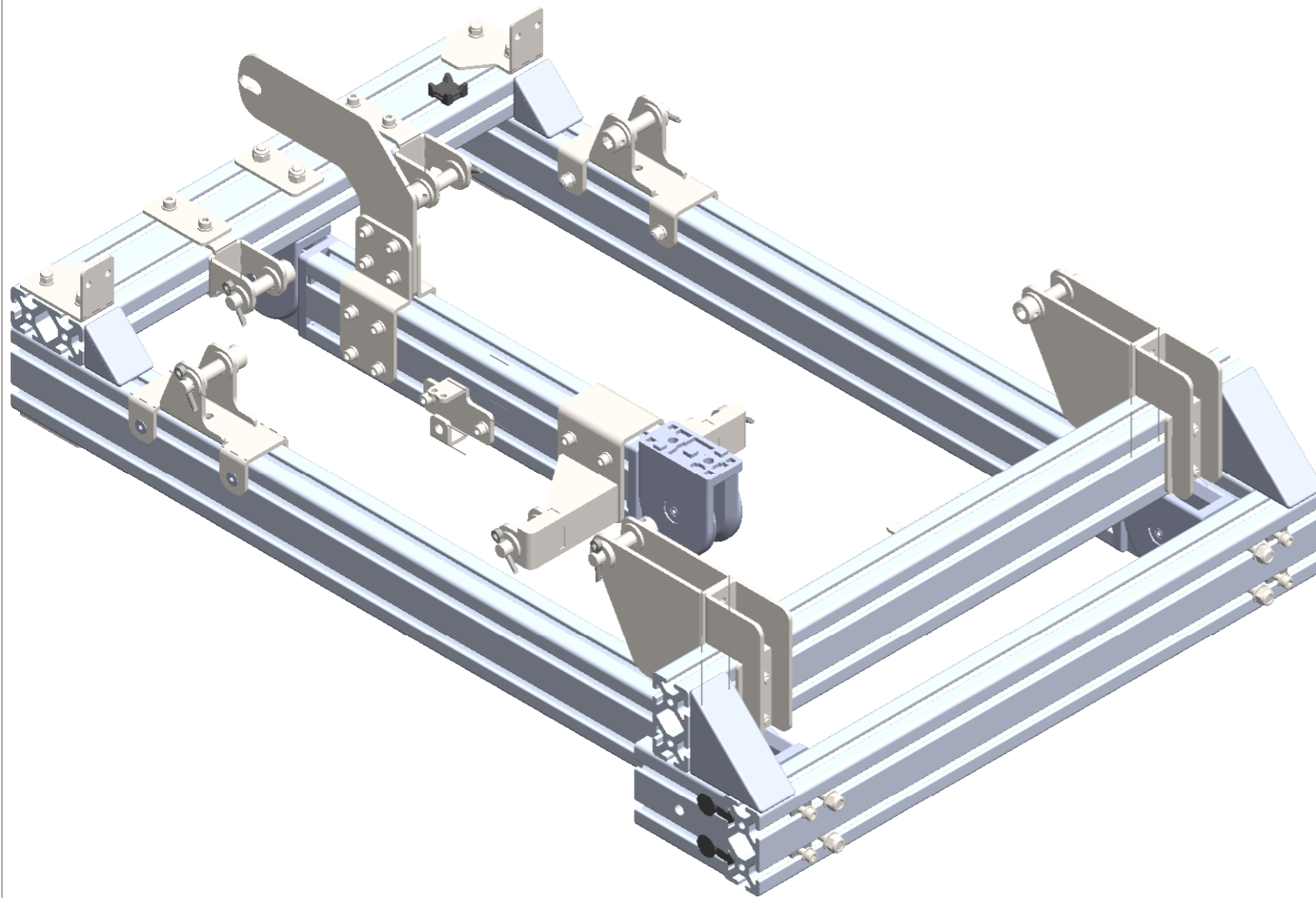
MASS/KG PROJECT CD

DESCRIPTION **Calibration head mount assembly**  
 CONFIGURATION **Default**

FINISH PAPER **A3** SCALE **1:2**  
 DRAWING NUMBER **CD3D-00-02-801** REVISION **01** SHEET **1 of 1**

Revision	Description	Date	Approved
01	Initial design	25.08.2020	IN





41		M6x25 Hexagon socket head cap screw ISO 4762		ISO 4762	M6 x 25	4
40	CD3D-00-02-032	Locking Plate		Plate	L70 x W85 x Th.3	1
39	CD3D-00-02-031	Cable tray mount2		Plate	L119 x W60 x Th.3	1
38	CD3D-00-02-024	Lower arm locking plate 3		Plate	L146 x W60 x Th.4	2
37	CD3D-00-02-025	Lower arm locking plate 2		Plate	L197 x W150 x Th.4	1
36	CD3D-00-02-023	Top actuator mount back plate		Plate	L75 x W45 x Th.4	2
35	CD3D-00-02-021	Top actuator mount back piece		Plate	L154 x W120 x Th.4	2
34		SZ0972N-Rollco				2
33		SZ0970N-Rollco				2
32		SZ1022N-Rollco				4
31		PV1015-Rollco				4
30		M6x60 Hexagon socket countersunk head screw ISO 10642		ISO 10642	M6 x 60	4
29		Washer 8 mm ISO 7089				4
28		M8x60 Hexagon head screw ISO 4017				6
27		M8 Prevailing torque type hexagon nut ISO 7040				6
26		M8x20 Hexagon socket head cap screw ISO 4762				8
25		Cotter pin 4,8 mm				8
24		Washer 12 mm ISO 7089				33
23		M6x60 Hexagon socket head cap screw ISO 4762				18
22		M6 Prevailing torque type hexagon nut ISO 7040				34
21		PZ1210 Strips holder				5
20		M6x16 Hexagon socket head cap screw ISO 4762				6
19		Washer 6 mm ISO 7089				62
18		PN1045-Rollco				6
17	CD3D-00-02-018	Actuator pin		Bolt	D20 x d 12,1 L64	8
16	CD3D-00-02-014	Threaded rod M6		Round Bar	M6 L145	4
15	CD3D-00-02-006	End arm		Rollco PP1040	80 x 40 L360	1
14	CD3D-00-02-003	Mounting beam		Profile	80 x 40 L630	1
13	CD3D-00-02-001	Main beam		Rollco PP1040	80 x 40 L630	1
12	CD3D-00-02-005	Middle arm beam		Rollco PP1040	80 x 40 L520	1
11	CD3D-00-02-002	Support beam		Rollco PP1040	80 x 40 L100	2
10	CD3D-00-02-004	Long arm		Rollco PP1040	80 x 40 L752	2
9	CD3D-00-02-801	Calibration head mount assembly				1
8	CD3D-00-02-019	Upper Actuator mount 1		Plate	L150 x W130 x Th.4	1
7	CD3D-00-02-017	Lower actuator mount		Plate	L189 x W137 x Th.4	2
6	CD3D-00-02-015	Top actuator mount		Plate	L274 x W115 x Th.4	2
5	CD3D-00-02-027	Turnbuckle mount		Plate	L112 x W75 x Th.4	2
4	CD3D-00-02-022	Cable tray mount		Plate	L119 x W60 x Th.3	1
3	CD3D-00-02-008	Sandwich plate m8		Plate	L70 x W35 x Th.3	1
2	CD3D-00-02-028	Upper Actuator mount 2		Plate	L150 x W130 x Th.4	1
1	CD3D-00-02-007	Sandwich plate		Plate	L70 x W35 x Th.3	3
No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty

DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

**FINNOS**  
 www.finnos.fi

DRAWN BY **liron**  
**24.08.2020**  
 MATERIAL  
 APPROVED IN **30.12.2020**

MASS/KG **26.74** PROJECT **CD**

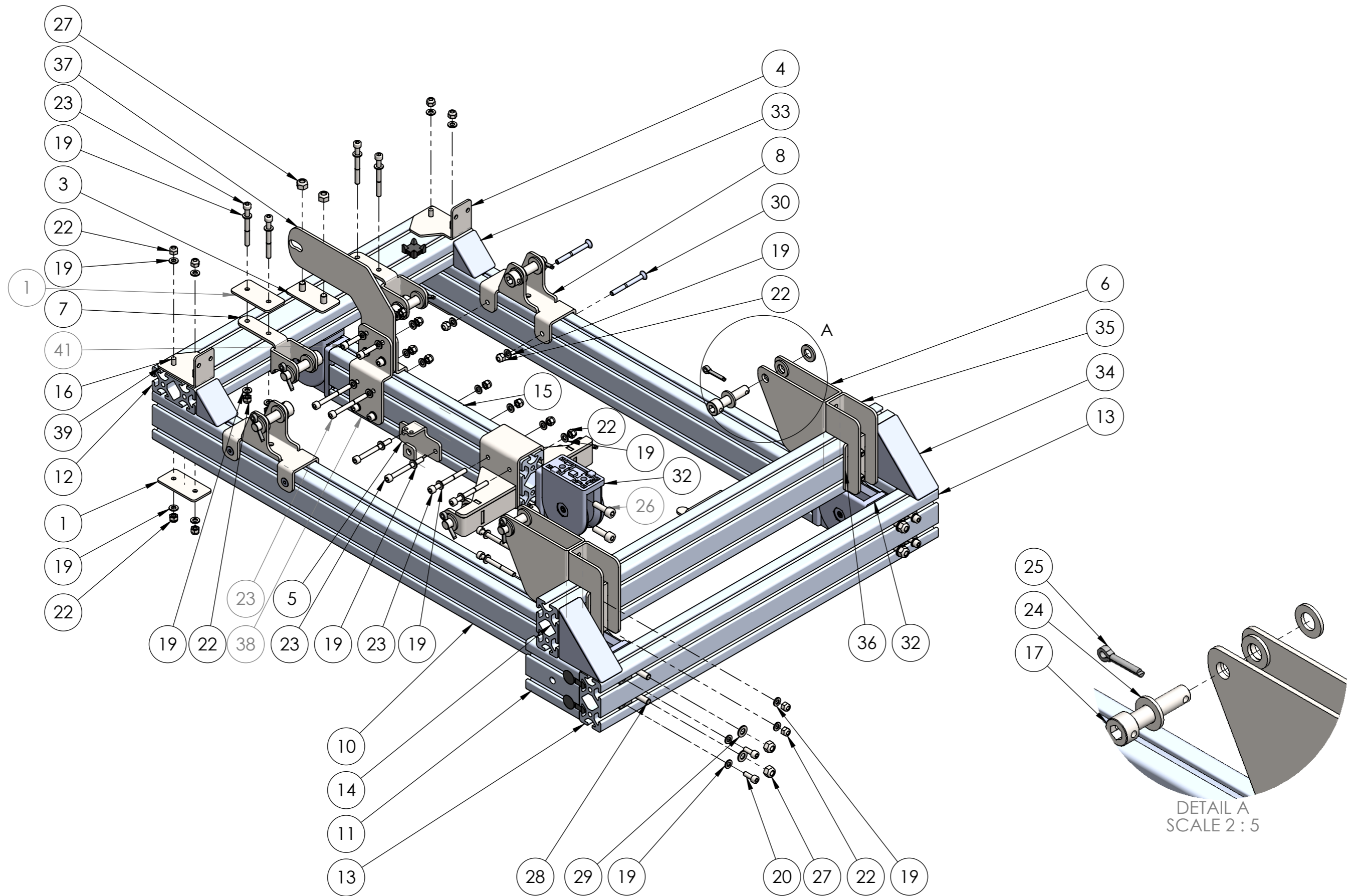
FINISH PAPER **A3** SCALE **1:5**

FIRST ANGLE DESCRIPTION **Lowering arm mechanism**

CONFIGURATION **Default**

DRAWING NUMBER **CD3D-00-02-802** REVISION **01** SHEET **1 of 2**

Revision	Description	Date	Approved
01	Assembly updated	30.12.2020	IN



DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

MASS/KG 26.74  
 PROJECT CD

FIRST ANGLE  
 DESCRIPTION Lowering arm mechanism

**FINNOS**  
 www.finnos.fi

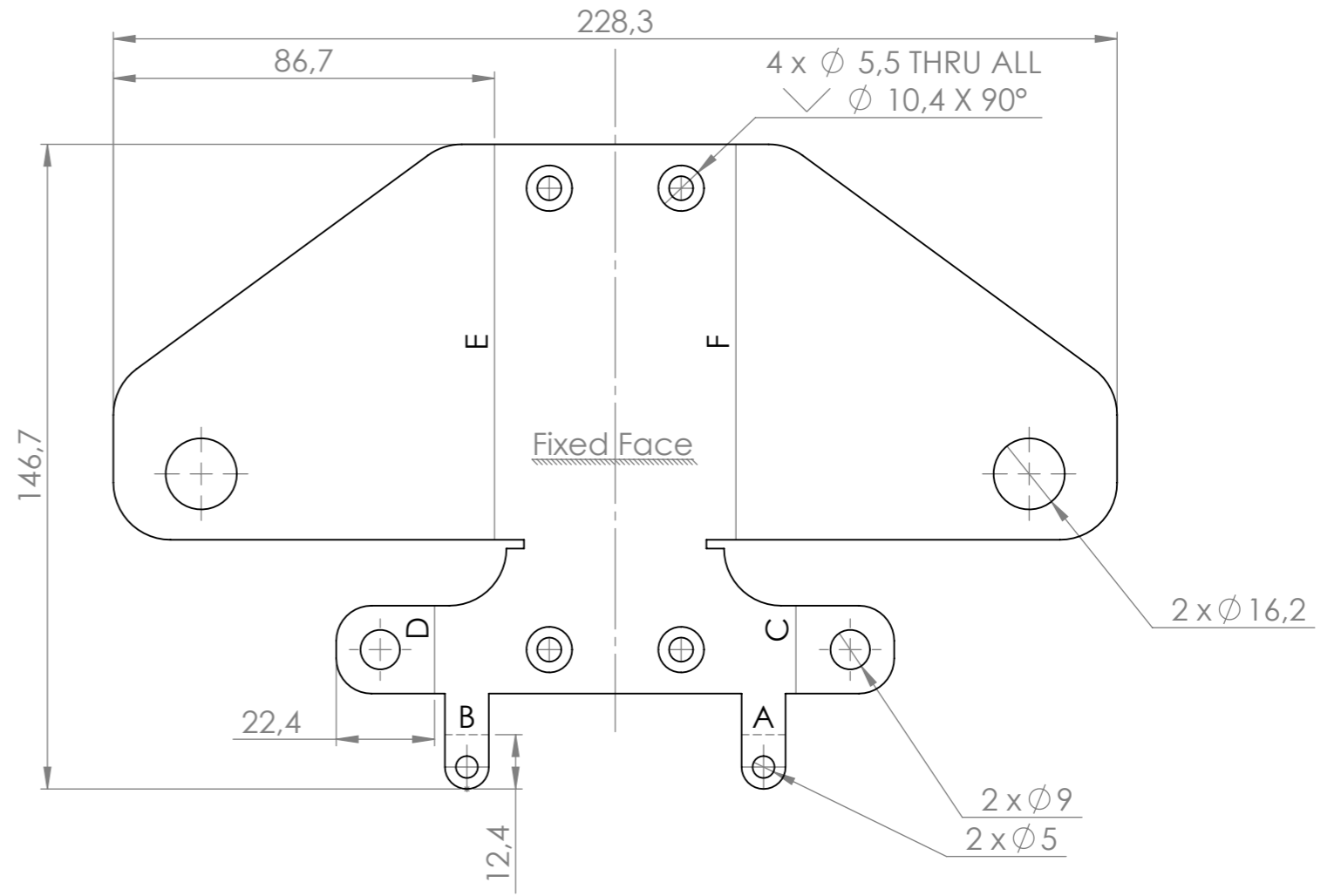
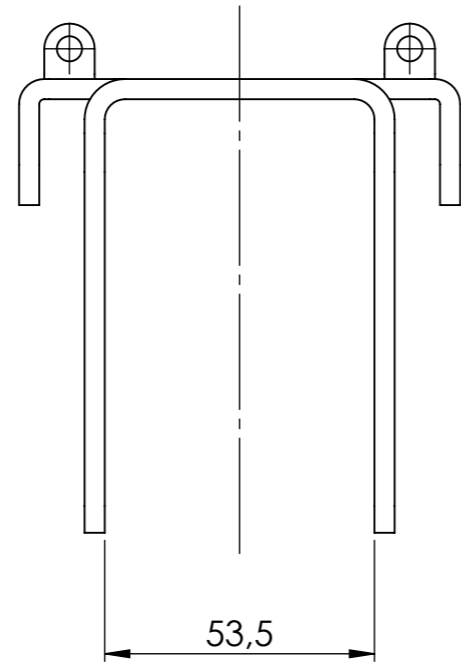
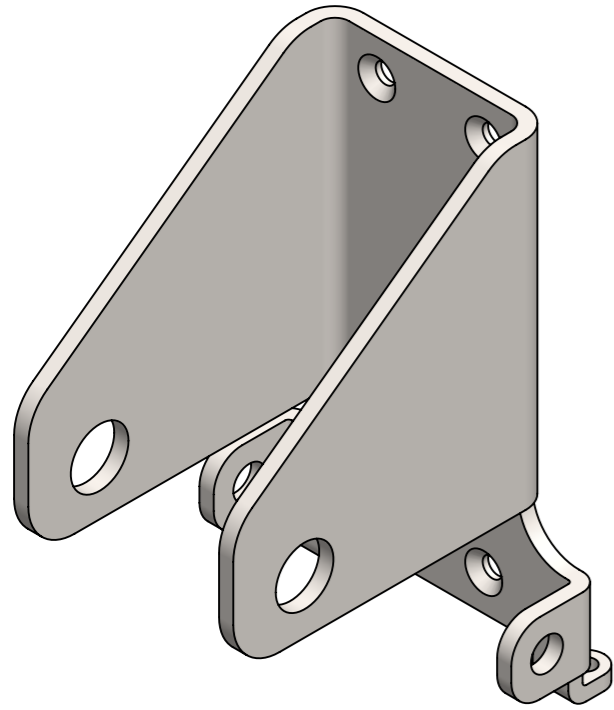
CONFIGURATION Default

DRAWN BY ilroN  
 24.08.2020  
 MATERIAL

APPROVED IN 30.12.2020

FINISH PAPER A3 SCALE 1:5

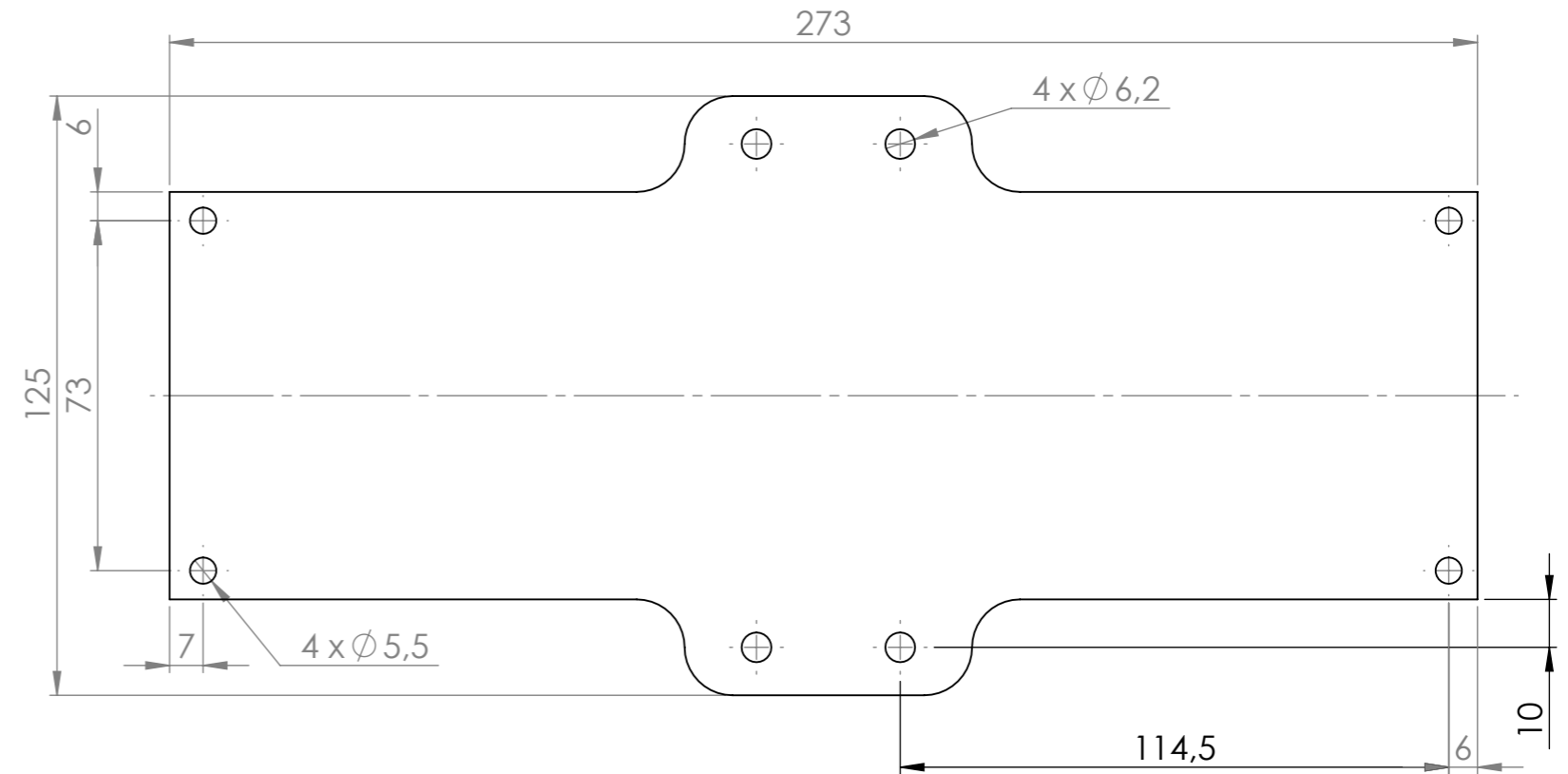
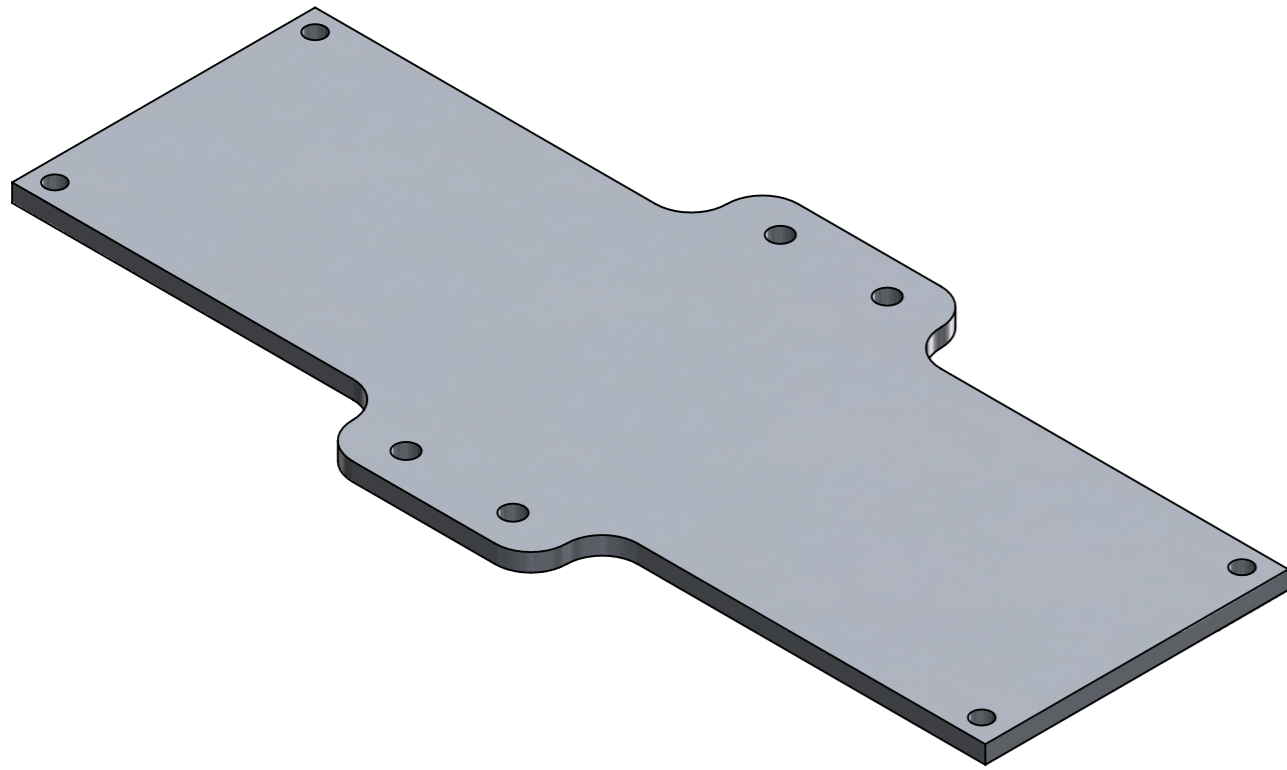
DRAWING NUMBER CD3D-00-02-802  
 REVISION 01 SHEET 2 of 2



Tag	Direction	Angle	Inner Radius
A	DOWN	90°	1
B	DOWN	90°	1
C	UP	90°	1
D	UP	90°	1
E	UP	90°	4
F	UP	90°	4

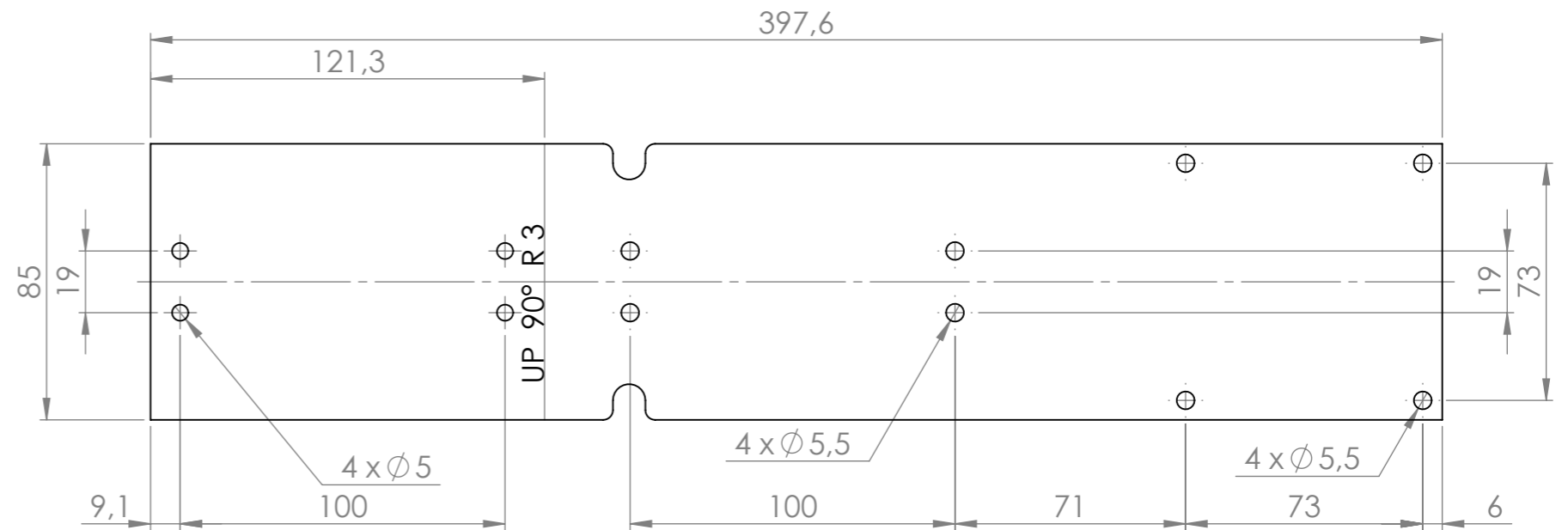
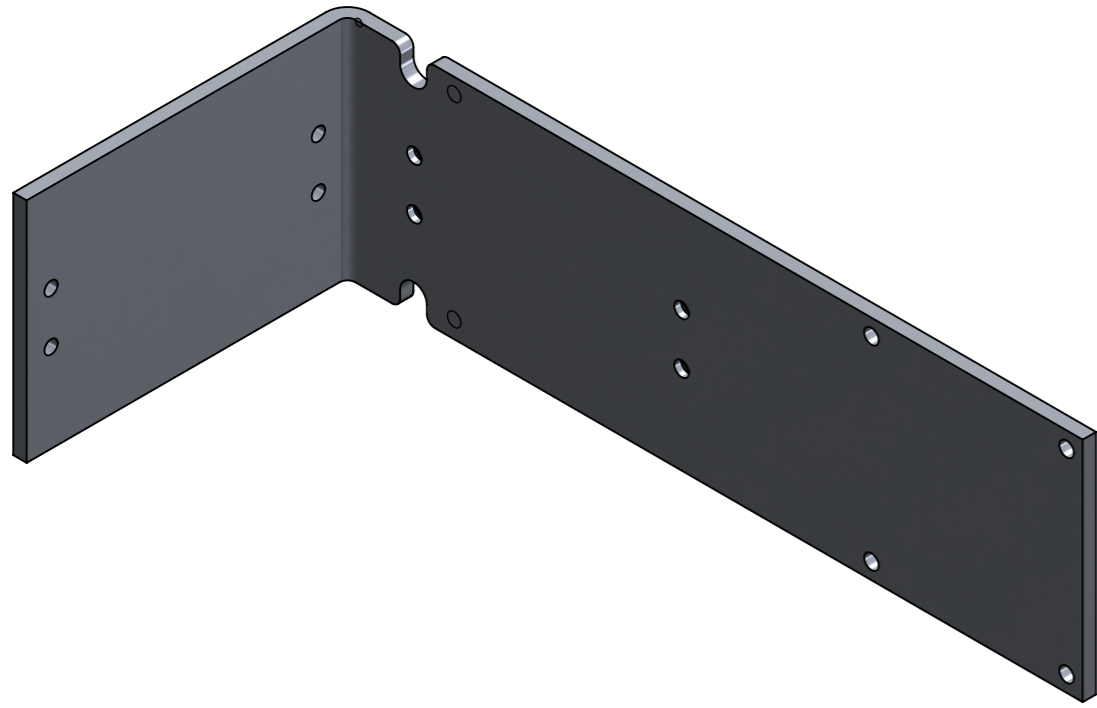
CD3D-00-03-001	Calibration head mounting plate	Plate	L229 x W147 x Th.4
PartNo.	Description	Info	Preform type Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 05.10.2020 MATERIAL 1.0545 (S355N)
MASS/KG 0,60	PROJECT CD		FINISH
FIRST ANGLE 	DESCRIPTION Calibration head mounting plate	DRAWING NUMBER CD3D-00-03-001	REVISION 01 SHEET 1 of 1

Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	Tb hole size 6,2 -> 9	05.10.2020	IN



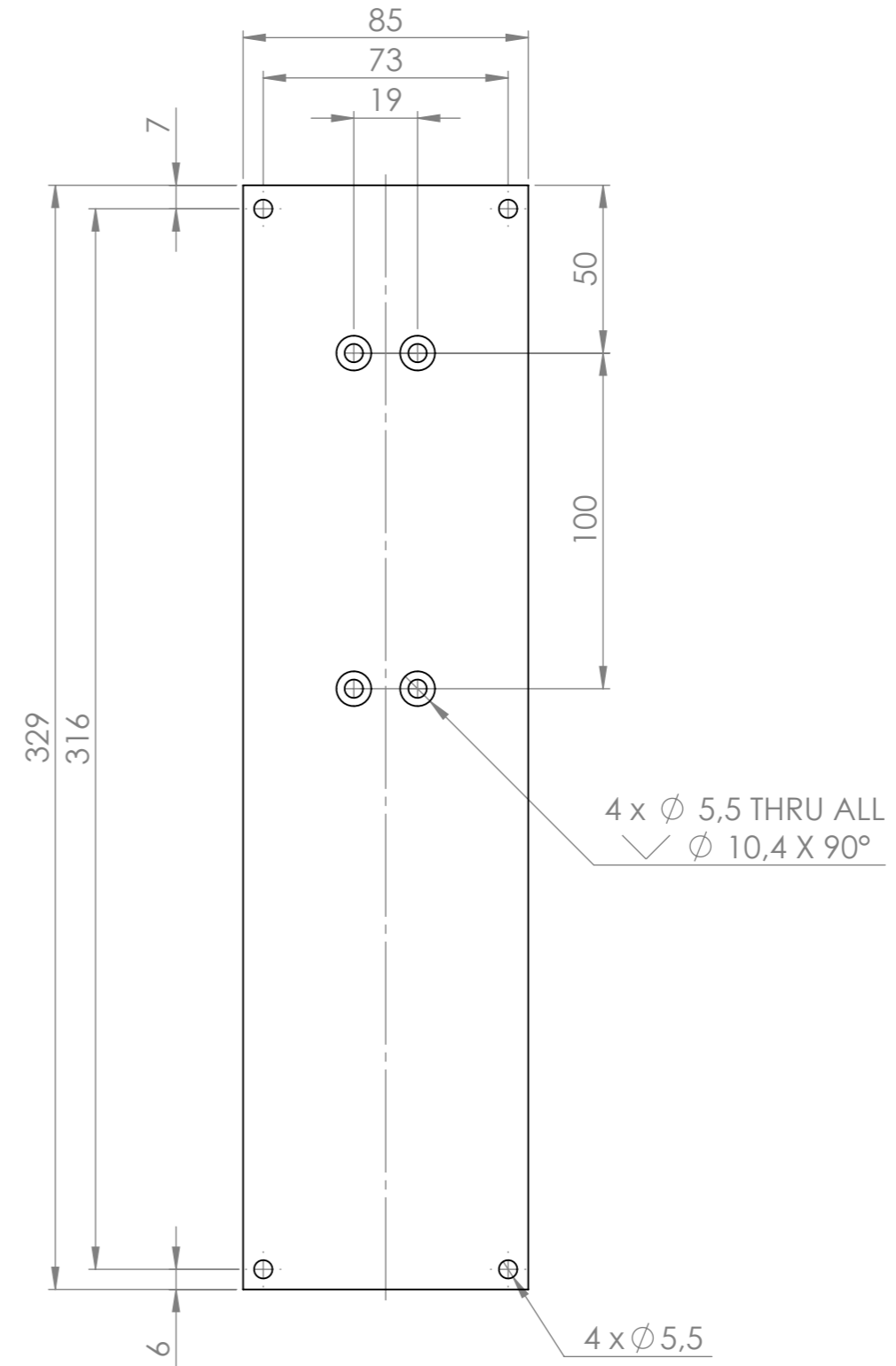
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
B	Material changed	02.07.2020	IN

CD3D-00-03-002	y axis mount plate		Plate	L273 x W125 x Th.5
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>3.3535 (EN-AW 5754)</b>	
MASS/KG <b>0.34</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>y axis mount plate</b>	DRAWING NUMBER <b>CD3D-00-03-002</b>	REVISION <b>B</b>	SHEET <b>1 of 1</b>



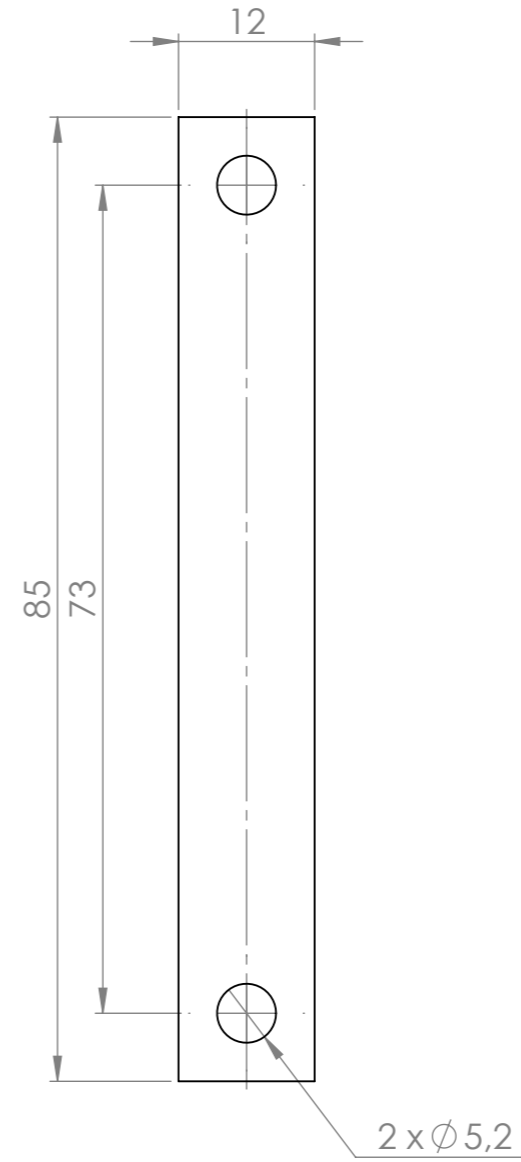
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

CD3D-00-03-005	Rollco to tilt		Plate	L398 x W85 Th.5
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020 MATERIAL <b>3.3535 (EN-AW 5754)</b>	
MASS/KG <b>0.44</b>	PROJECT CD		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Rollco to tilt</b>	DRAWING NUMBER <b>CD3D-00-03-005</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>



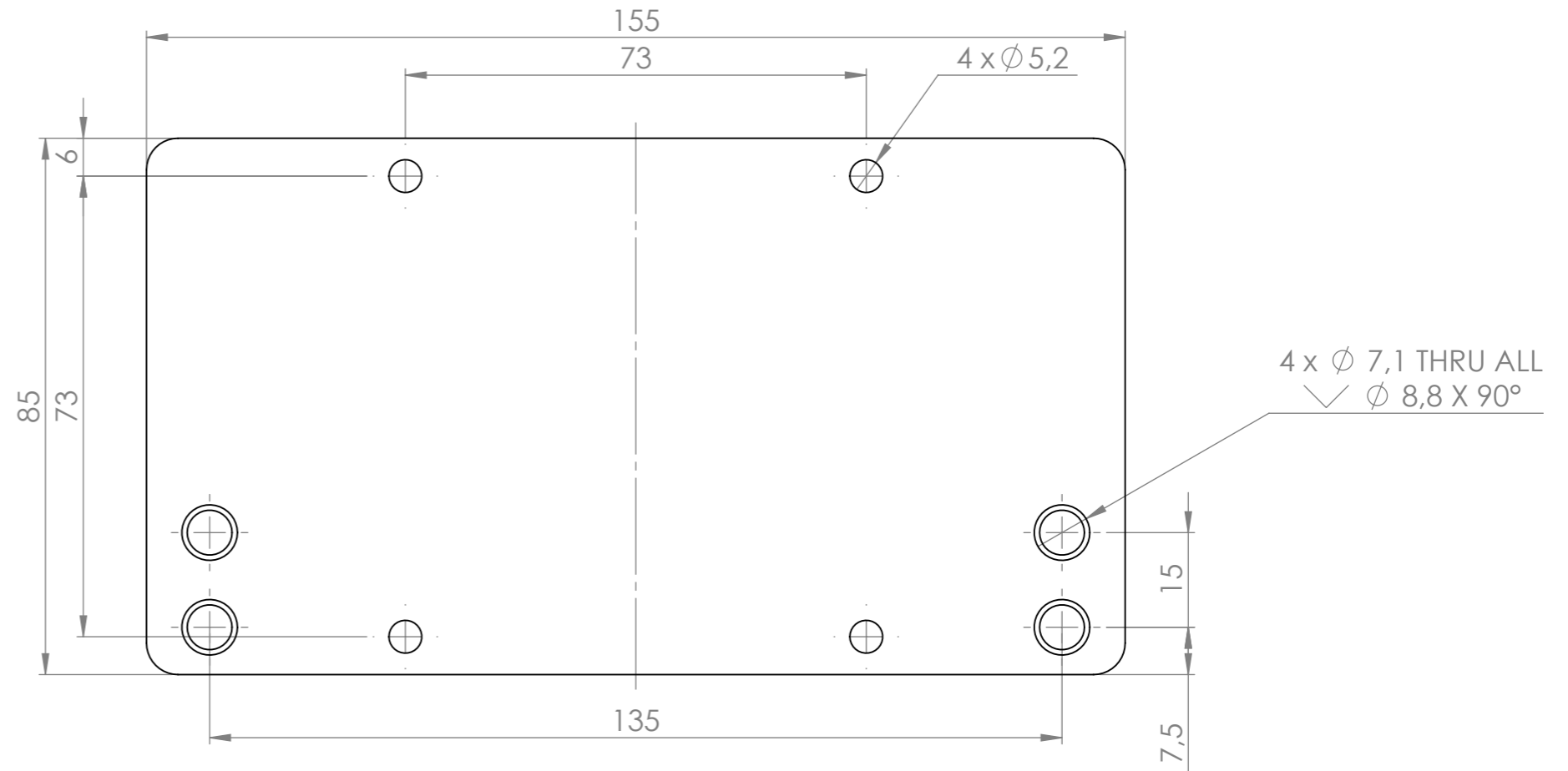
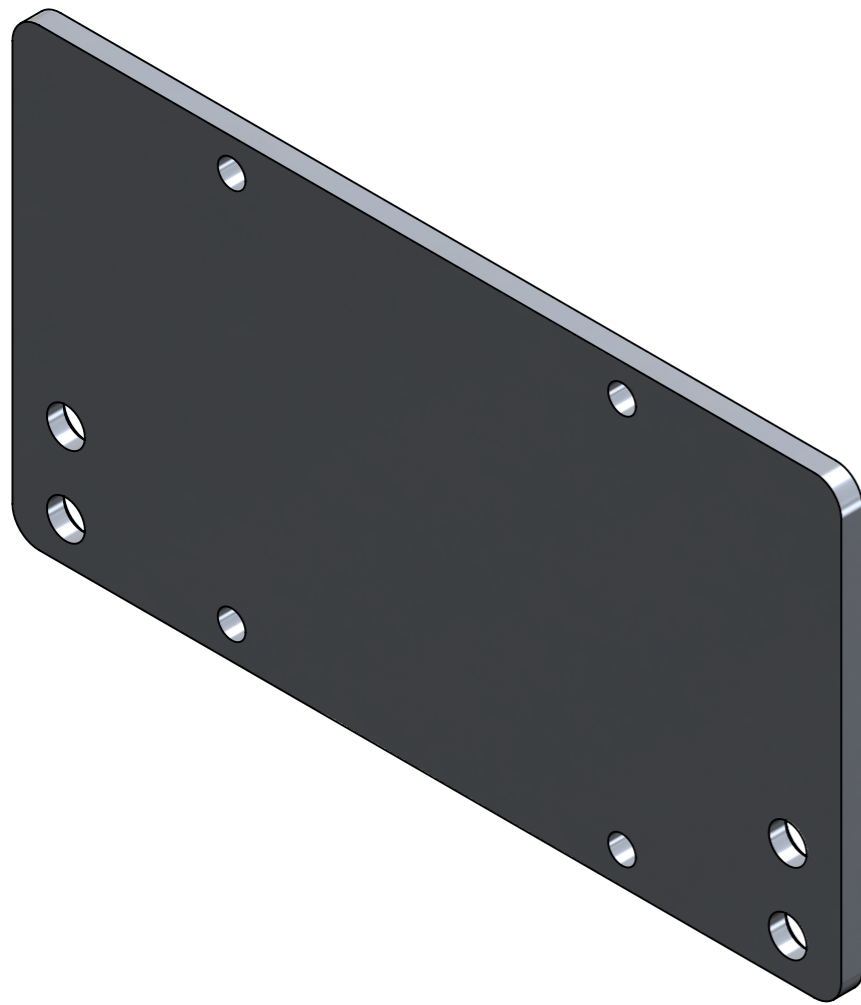
CD3D-00-03-006	Tilt to rollco		Plate	L329 x W85 Th.5	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020		
MASS/KG 0.37	PROJECT CD		MATERIAL <b>3.3535 (EN-AW 5754)</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Tilt to rollco</b>		DRAWING NUMBER <b>CD3D-00-03-006</b>	REVISION <b>A</b>	SHEET <b>1 of 1</b>

Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN

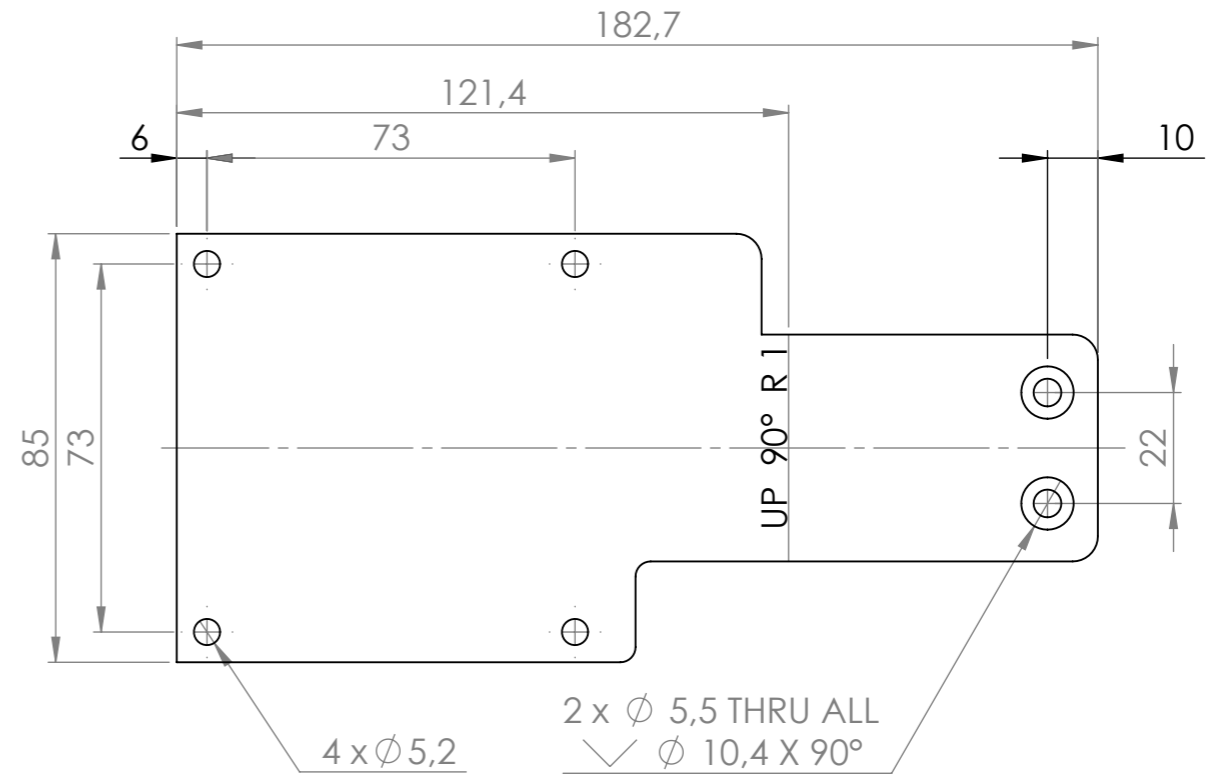
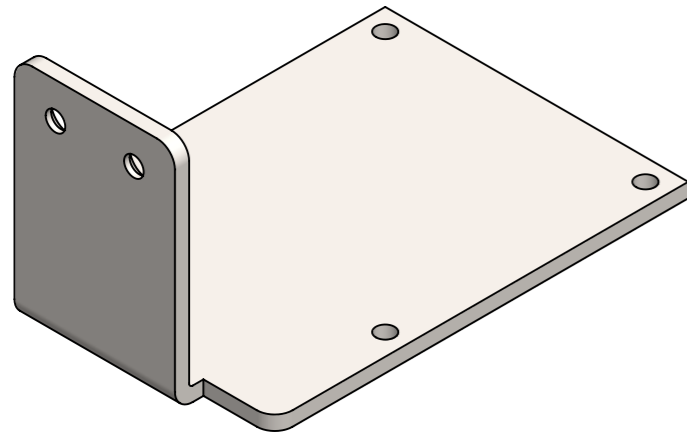
CD3D-00-03-009	Adapter 8mm		Plate	L85 x W12 Th.8
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020	
MASS/KG 0.02	PROJECT CD		MATERIAL <b>3.3535 (EN-AW 5754)</b>	
FIRST ANGLE	DESCRIPTION <b>Adapter 8mm</b>		FINISH	PAPER <b>A3</b>
				SCALE <b>3:2</b>
			DRAWING NUMBER <b>CD3D-00-03-009</b>	REVISION <b>A</b>
				SHEET <b>1 of 1</b>



CD3D-00-03-010	Disk mounting backplate		Plate	L155 x W85 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 02.07.2020	
MASS/KG 0.14	PROJECT CD		MATERIAL <b>3.3535 (EN-AW 5754)</b>	FINISH
FIRST ANGLE	DESCRIPTION <b>Disk mounting backplate</b>		DRAWING NUMBER <b>CD3D-00-03-010</b>	REVISION <b>A</b> SHEET <b>1 of 1</b>

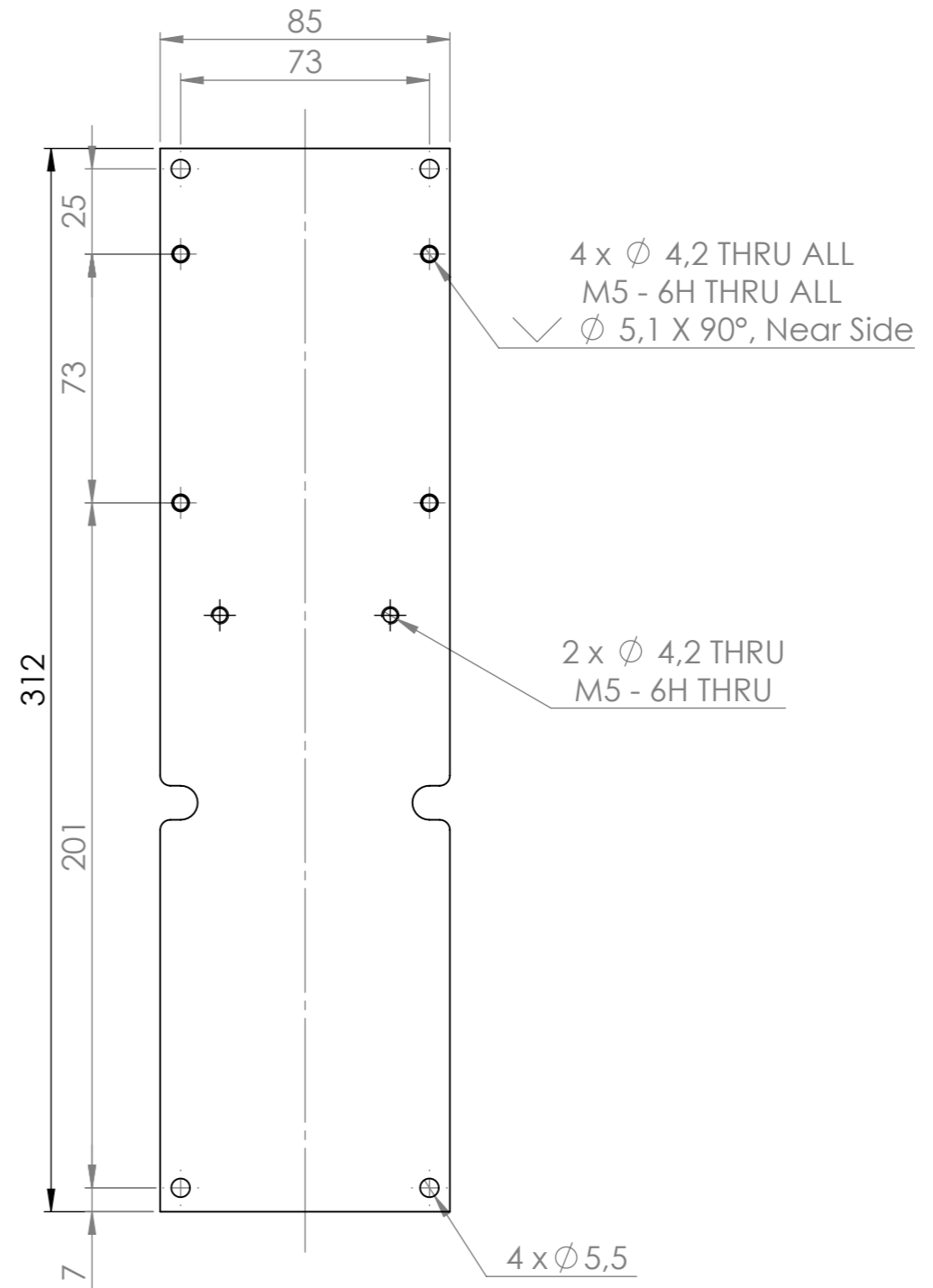
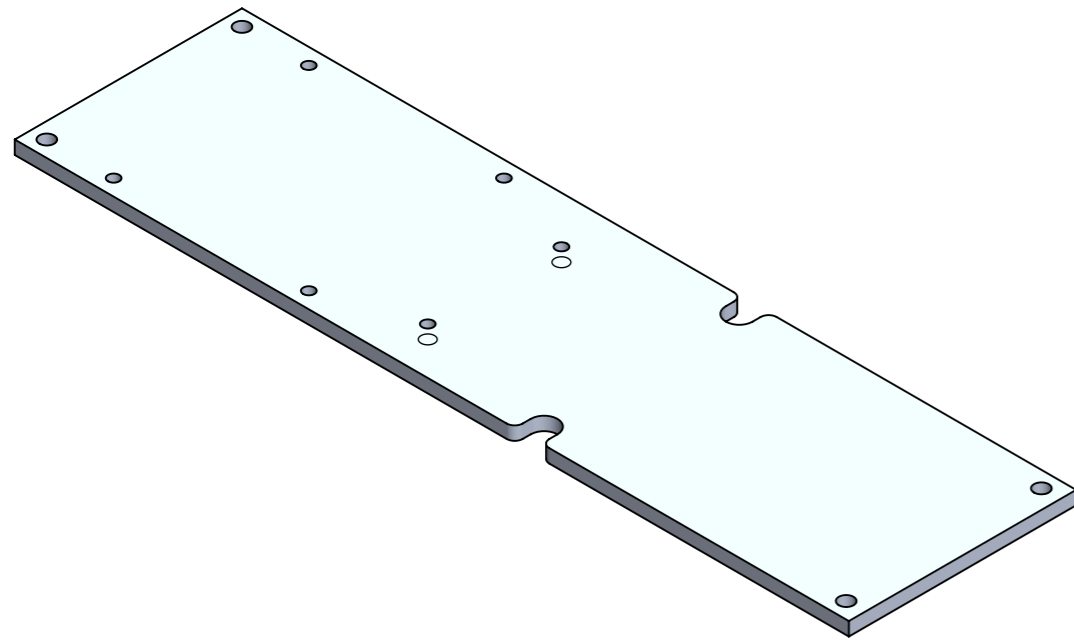
Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN





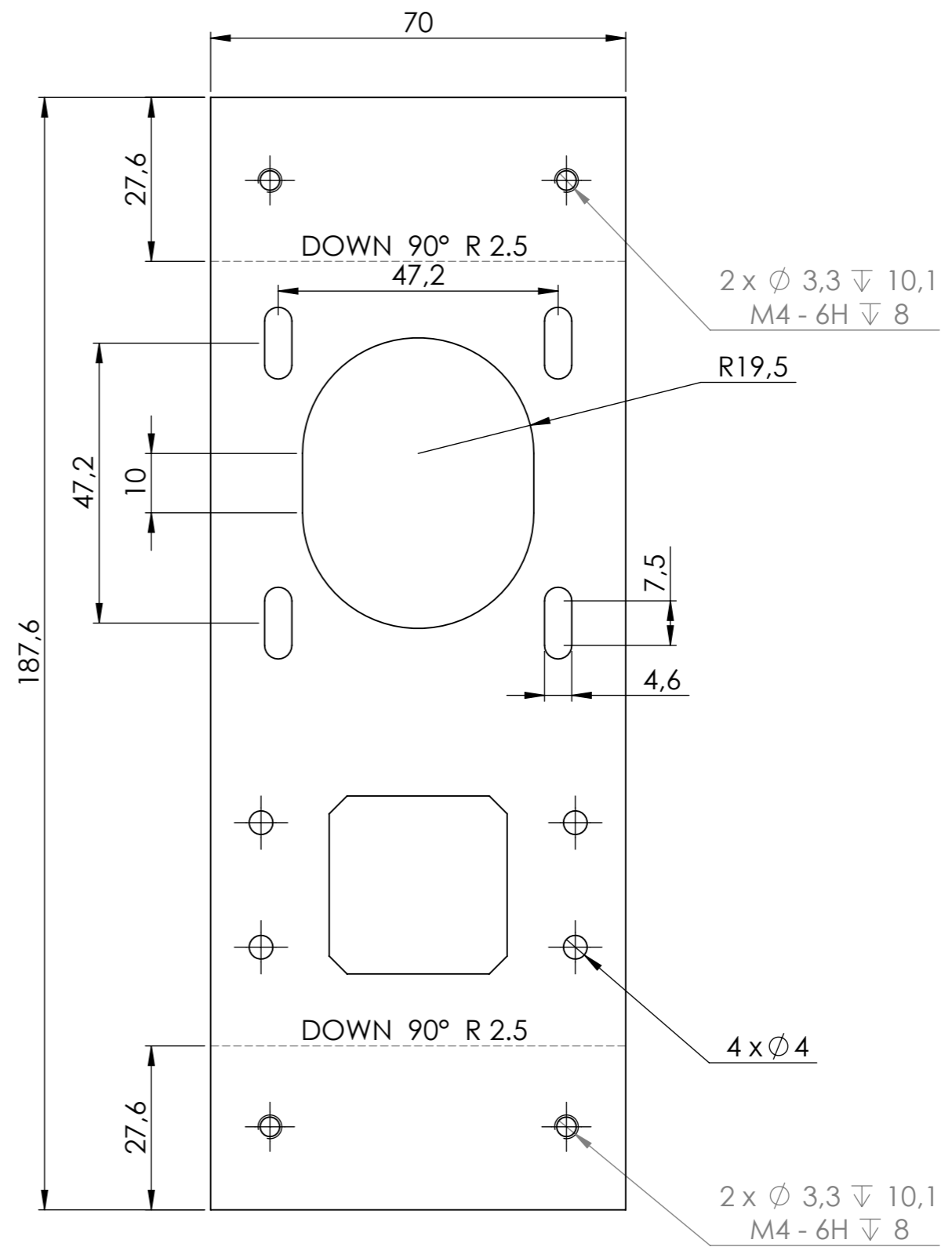
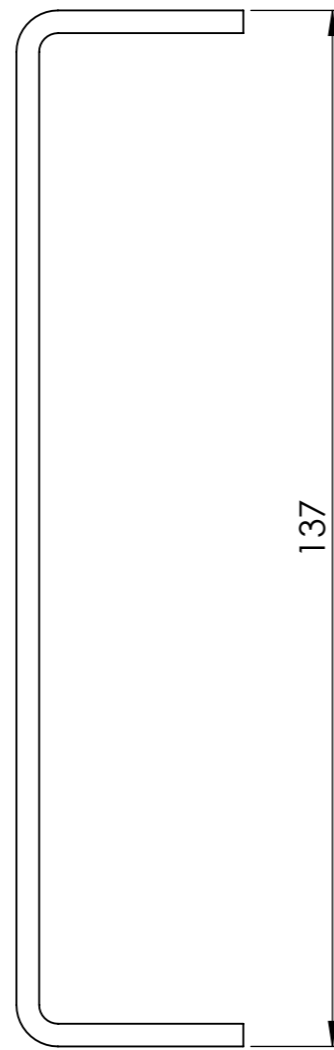
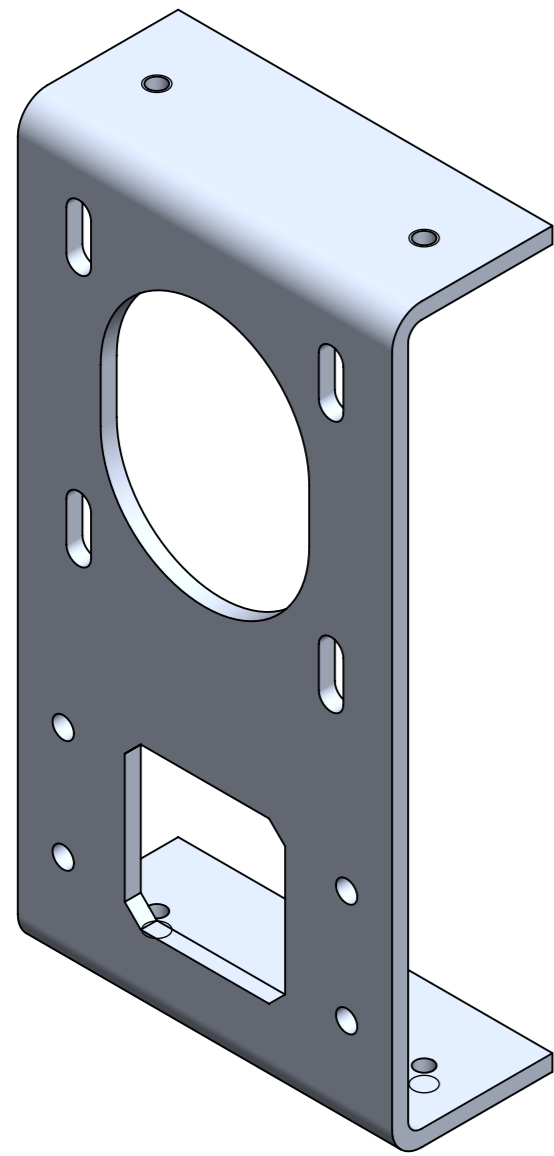
Revision	Description	Date	Approved
A	Initial design	05.07.2020	IN
01	Corner cut so door can open more	05.10.2020	IN

CD3D-00-03-011	Rittal box stiffener		Plate	L83 x W85 x Th.4
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 05.10.2020	
MASS/KG <b>0.38</b>	PROJECT <b>CD</b>		MATERIAL <b>1.0553 (S355J0)</b>	FINISH
FIRST ANGLE	DESCRIPTION <b>Rittal box stiffener</b>		DRAWING NUMBER <b>CD3D-00-03-011</b>	SCALE <b>2:3</b>
			REVISION <b>01</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	Side slots added	05.10.2020	IN

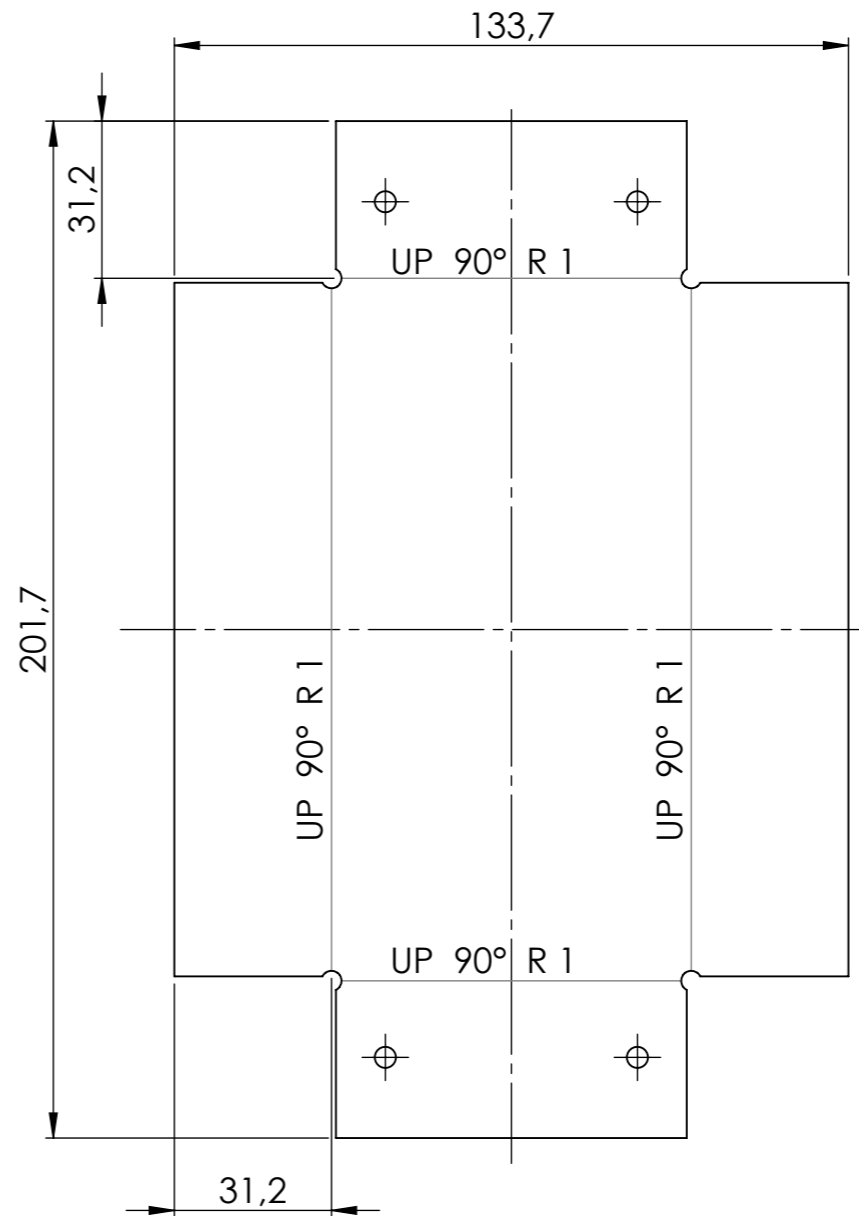
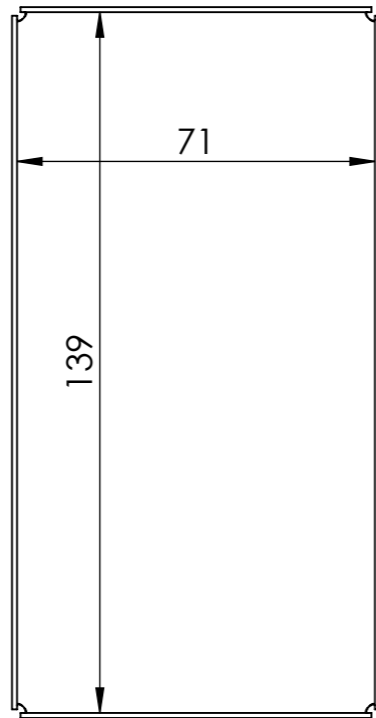
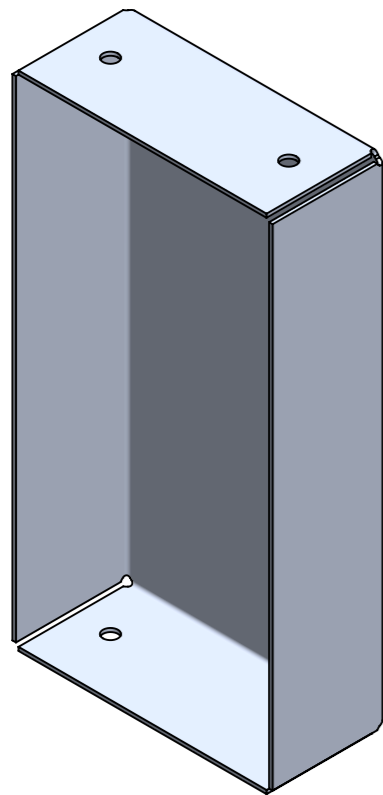
CD3D-00-03-012	Z-axis mount plate		Plate	L312 x W85 x Th.5
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 05.10.2020 MATERIAL <b>3.3535 (EN-AW 5754)</b>	
MASS/KG <b>0.35</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Z-axis mount plate</b>	DRAWING NUMBER <b>CD3D-00-03-012</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
A	Bend line further from squarehole	31.07.2020	IN
01	Slot size to 4,6mm and lenght +10mm	12.10.2020	IN

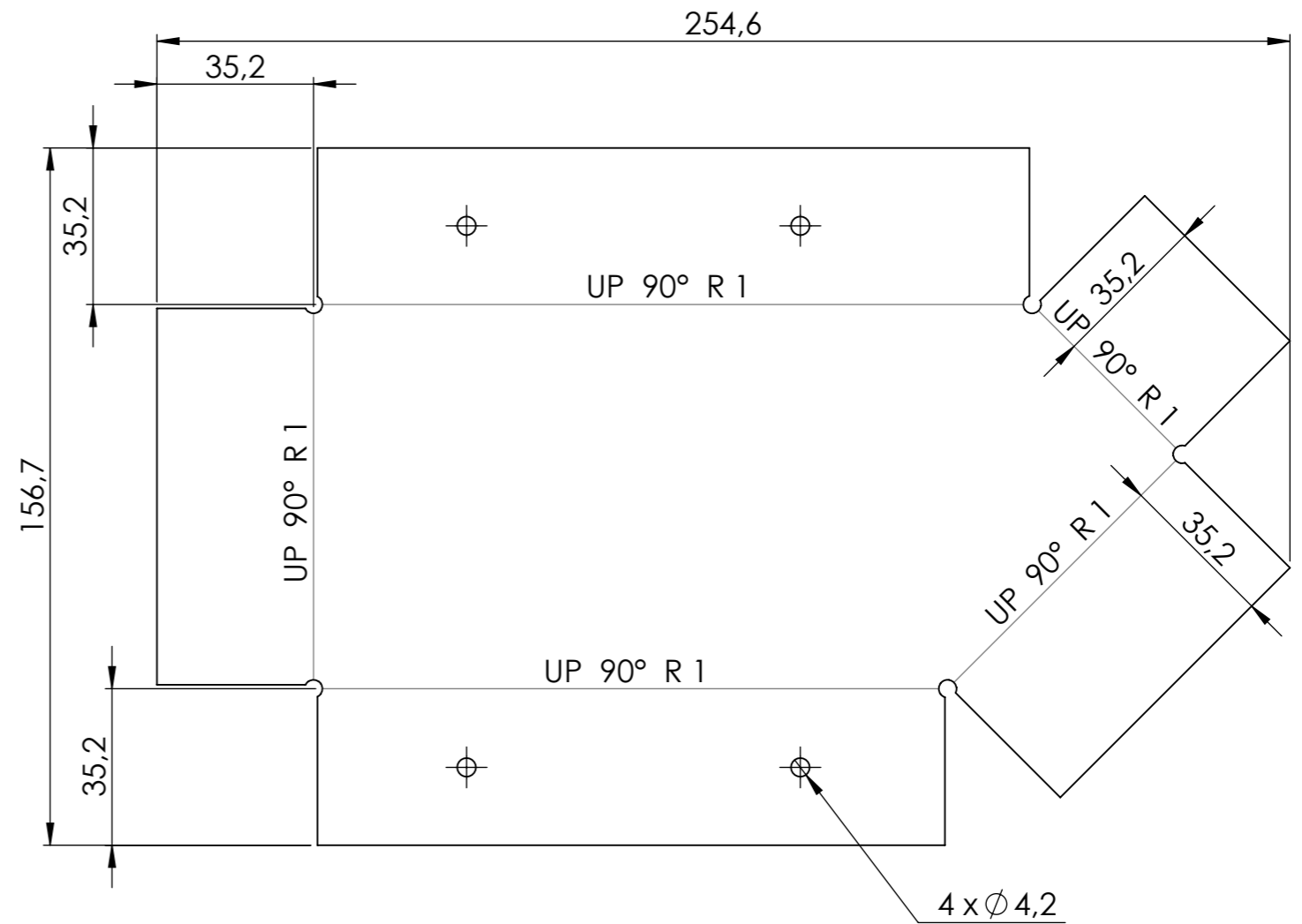
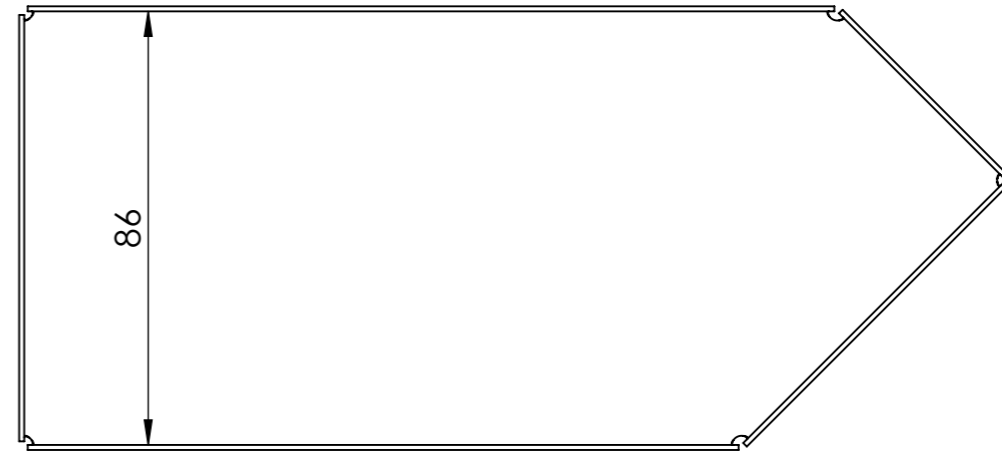
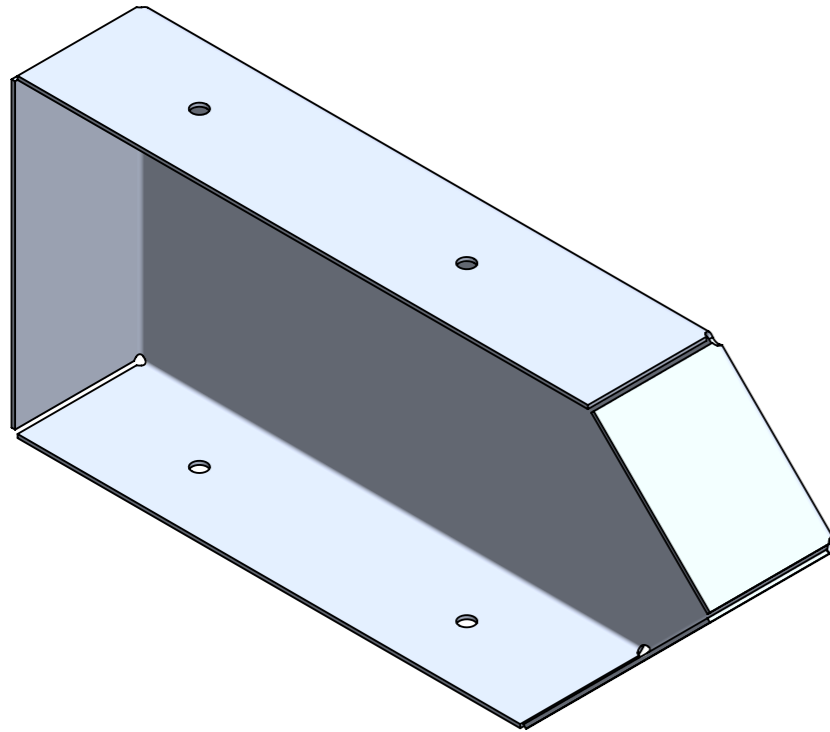
CD3D-00-03-015 mk2	Motor mounting plate NEMA23		Plate	L188 x W70 x Th.3	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 31.07.2020	APPROVED <b>IN</b> 12.10.2020	
MASS/KG <b>0.08</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>	SCALE <b>1:1</b>
FIRST ANGLE 	DESCRIPTION <b>Motor mounting plate NEMA23</b>	CONFIGURATION <b>DefaultSM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-03-015 mk2</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>

MATERIAL  
**3.3535 (EN-AW 5754)**

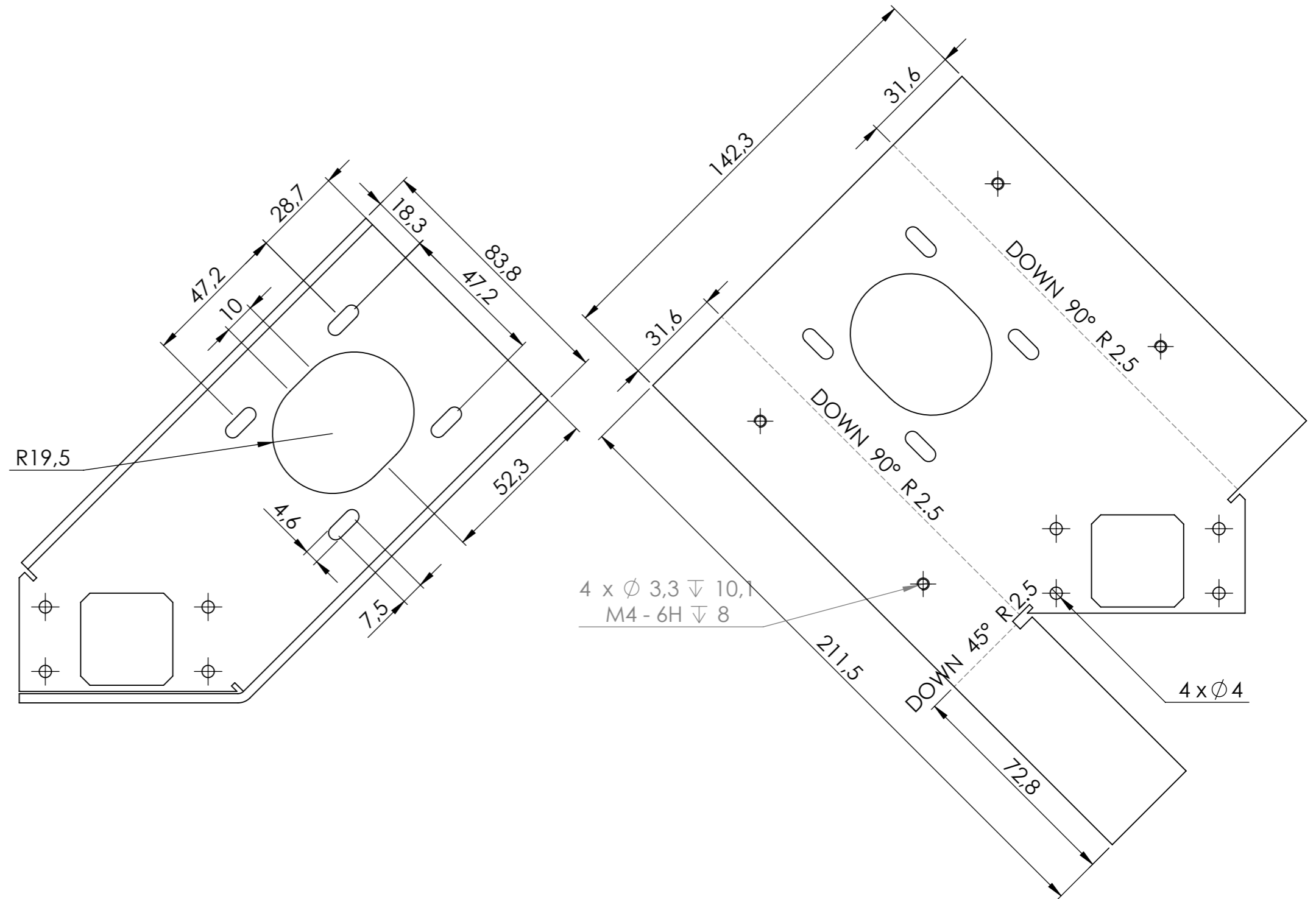
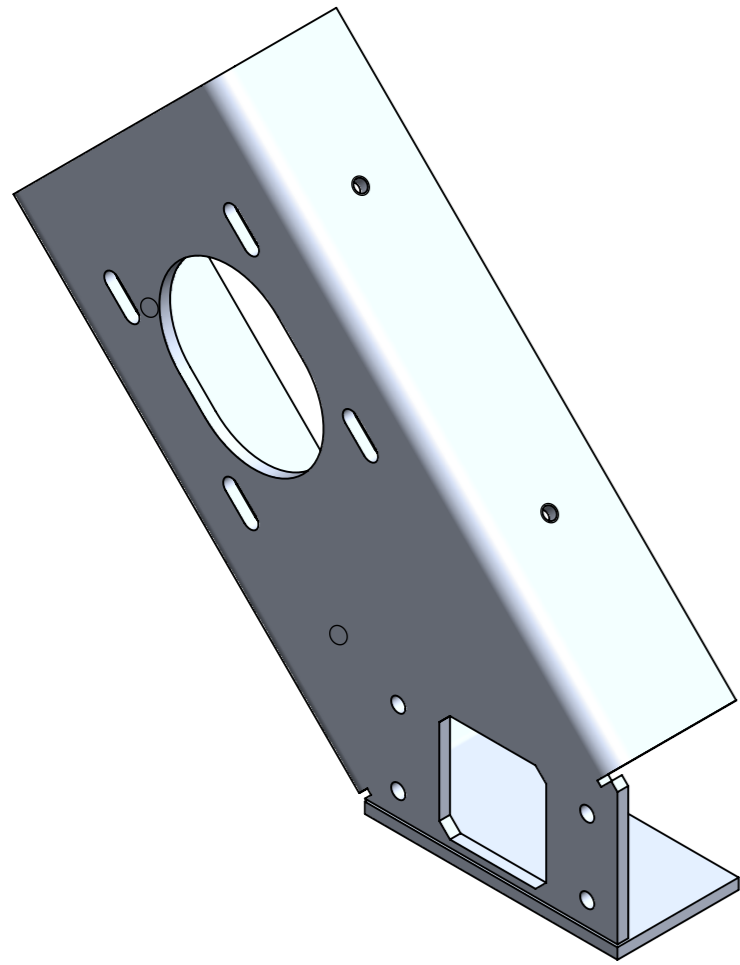


Revision	Description	Date	Approved
A	Length modified for mount mk2	31.07.2020	IN
01	Length +10mm	12.10.2020	IN

CD3D-00-03-016 mk2	Motor mounting plate cover NEMA23		Plate	L202 x W134 x Th.1	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 31.07.2020	APPROVED IN 12.10.2020	
MASS/KG 0.06	PROJECT CD		MATERIAL 3.3535 (EN-AW 5754)	FINISH	PAPER A3
FIRST ANGLE 	DESCRIPTION Motor mounting plate cover NEMA23	CONFIGURATION Default<As Machined>SM- FLAT-PATTERN	DRAWING NUMBER CD3D-00-03-016 mk2	REVISION 01	SHEET 1 of 1

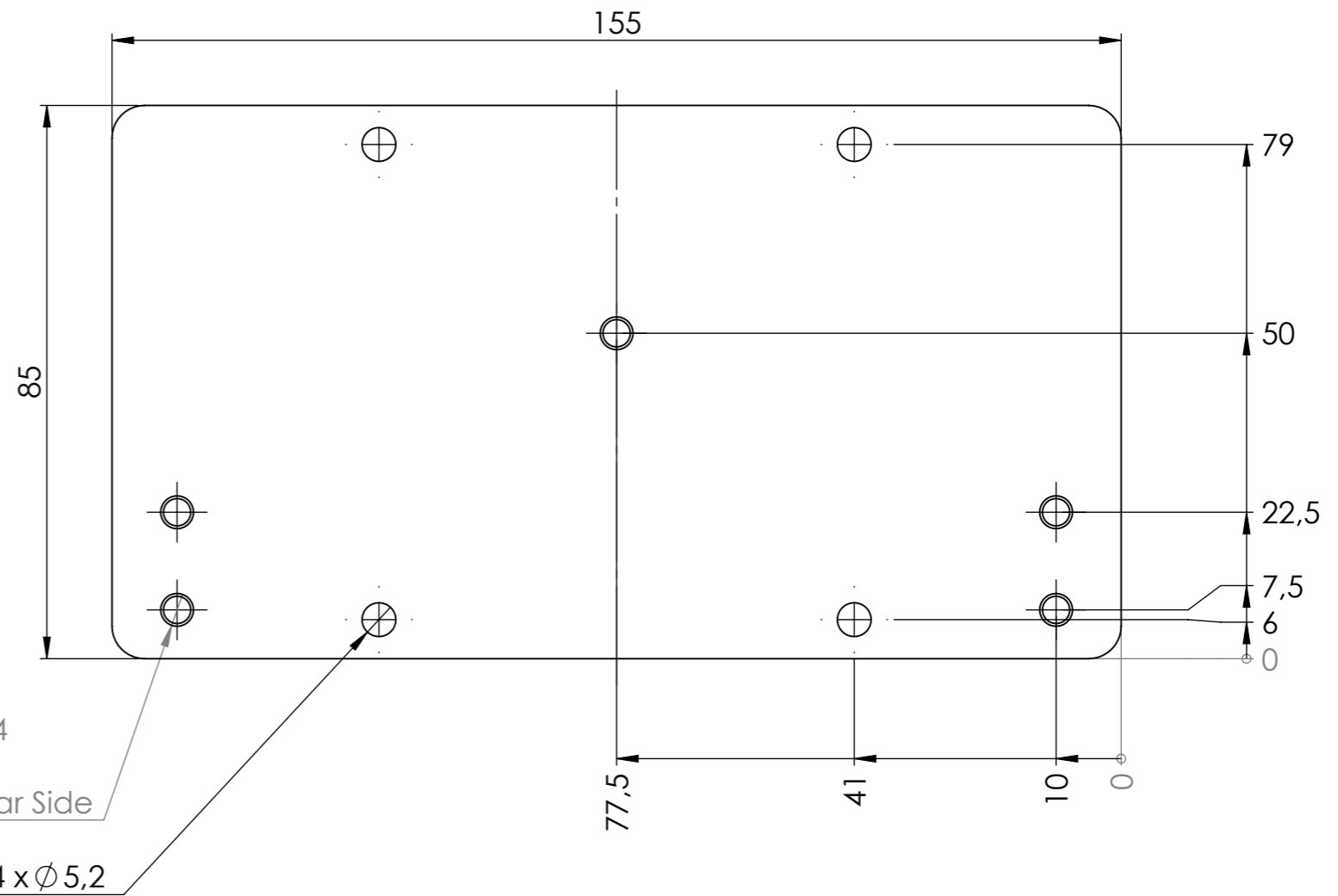
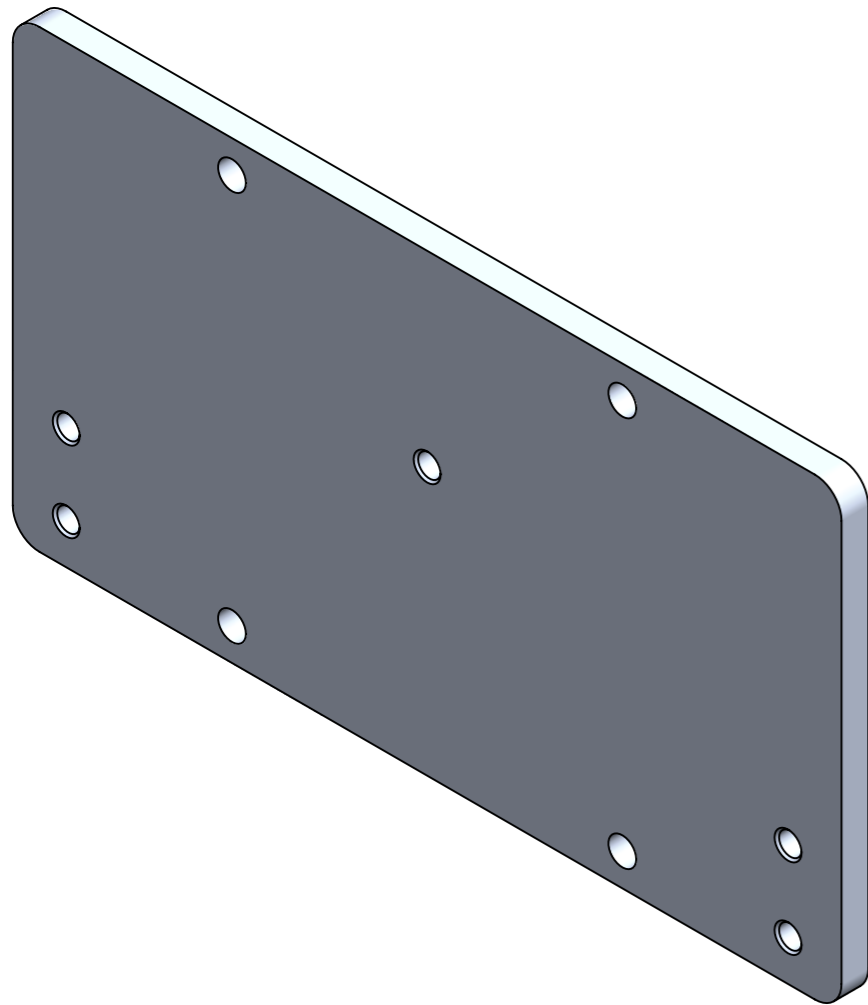


CD3D-00-03-017	Motor mount y-axis cover NEMA23 angled		Plate	L254 x W157 x Th.1
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 12.10.2020	
MASS/KG 0.09	PROJECT CD		MATERIAL 3.3535 (EN-AW 5754)	FINISH
Revision	Description	Date	Approved	SCALE 2:3
A	Initial design	02.07.2020	IN	
01	Corner reliefs bigger	12.10.2020	IN	
	FIRST ANGLE	DESCRIPTION Motor mount y-axis cover NEMA23 angled	DRAWING NUMBER CD3D-00-03-017	REVISION 01
				SHEET 1 of 1



Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	Motor slot sizes changed to 4,6mm	12.10.2020	IN
02	R to 2,5	12.10.2020	IN

CD3D-00-03-018	Motor mount y-axis NEMA23	Plate	L212 x W143 x Th.3
PartNo.	Description	Info	Preform type
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 12.10.2020 MATERIAL 3.3535 (EN-AW 5754)
MASS/KG 0.18	PROJECT CD		FINISH
FIRST ANGLE	DESCRIPTION Motor mount y-axis NEMA23	DRAWING NUMBER CD3D-00-03-018	SCALE 2:3
		REVISION 02	SHEET 1 of 1

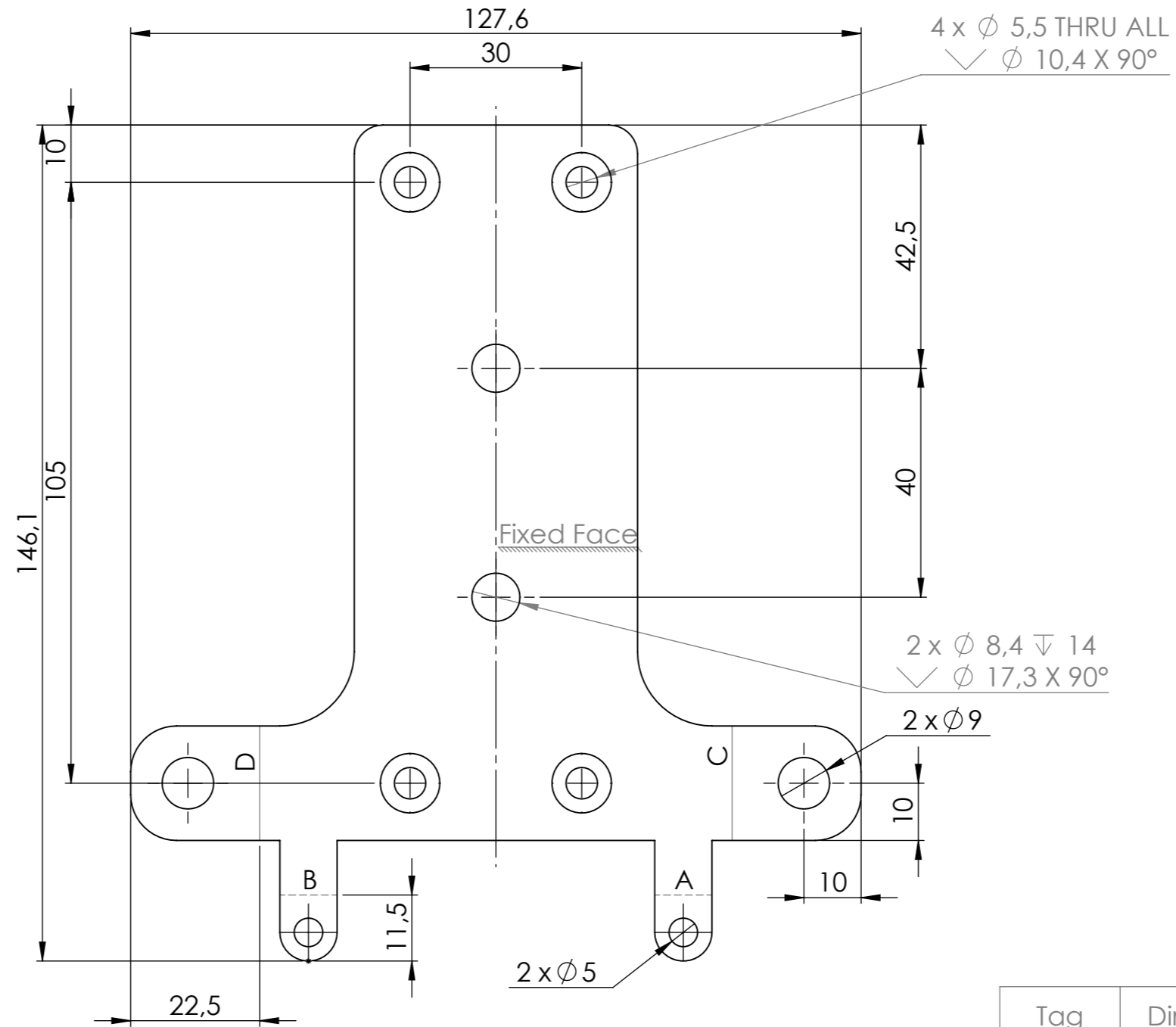
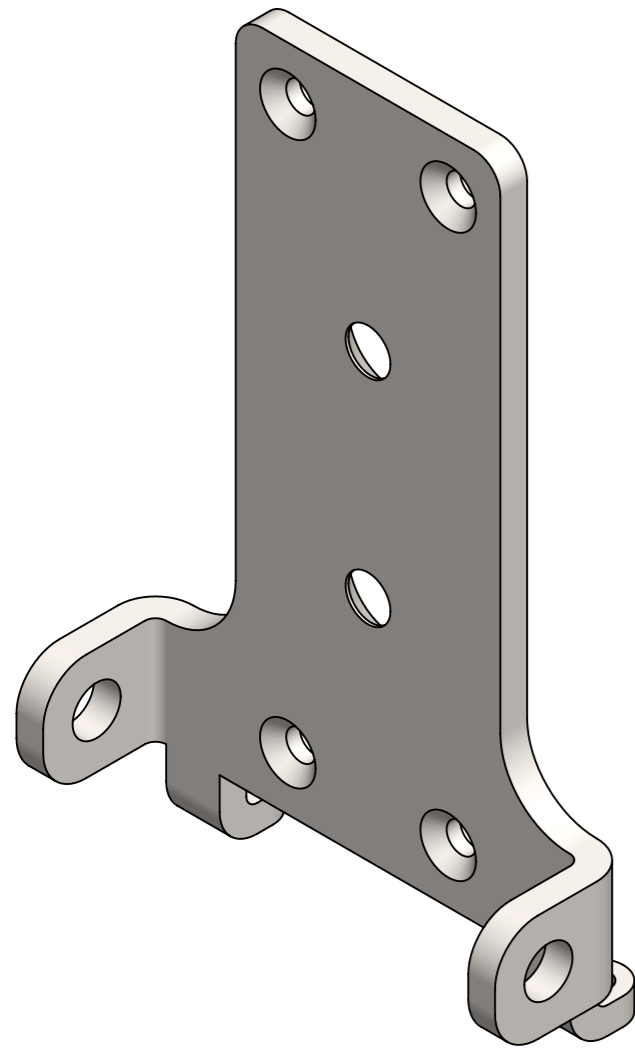


5 x  $\varnothing$  4,2  $\nabla$  14  
M5 - 6H  $\nabla$  10  
 $\surd$   $\varnothing$  5,1 X 90°, Near Side

4 x  $\varnothing$  5,2

Revision	Description	Date	Approved
01	Initial design	31.08.2020	IN

CD3D-00-03-019	Disk mounting backplate steel		Plate	L155 x W85 x Th.5	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 31.08.2020	APPROVED <b>IN</b> 31.08.2020	
MASS/KG 0.51	PROJECT CD		FINISH	PAPER A3	SCALE 1:1
FIRST ANGLE	DESCRIPTION Disk mounting backplate steel	CONFIGURATION Default	DRAWING NUMBER CD3D-00-03-019	REVISION 01	SHEET 1 of 1

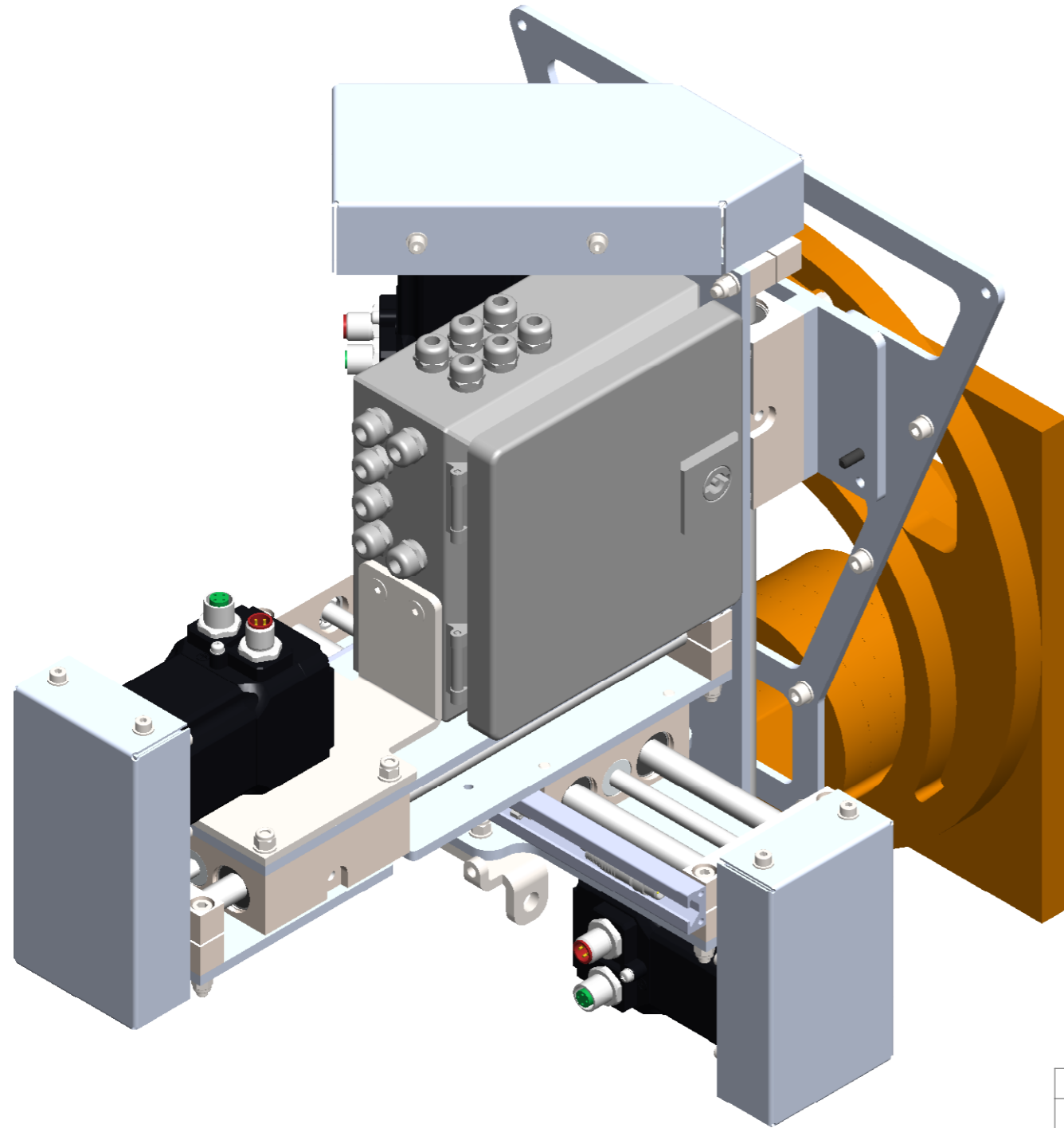


Tag	Direction	Angle	Inner Radius
A	DOWN	90°	2
B	DOWN	90°	2
C	UP	90°	2
D	UP	90°	2

CD3D-00-03-020	Calibration head mounting plate		Plate	L147 x W130 x Th.5	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 30.10.2020	APPROVED IN 30.10.2020	
MASS/KG 0.30	PROJECT CD		FINISH	PAPER A3	SCALE 1:1
FIRST ANGLE	DESCRIPTION Calibration head mounting plate	CONFIGURATION Default-FLAT-PATTERN	DRAWING NUMBER CD3D-00-03-020	REVISION 02	SHEET 1 of 1

Revision	Description	Date	Approved
01	Initial design	30.10.2020	IN
02	Thickness to 5mm	30.10.2020	IN





9	CD3D-00-03-020	Calibration head mounting plate		Plate	L147 x W130 x Th.5	1
8		Cam clamping levers GN 927				2
7		M5 Prevailing torque type hexagon nut ISO 7040				8
6		M5x16 Hexagon socket countersunk head screw ISO 10642				4
5		Washer 5 mm ISO 7089				8
4	CD3D-00-04-801	Calibration disk assembly				1
3	CD3D-00-03-804	Z-axis assembly				1
2	CD3D-00-03-803	Y-axis assembly				1
1	CD3D-00-03-802	X axis assembly				1
No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty

DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES  
 MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m



DRAWN BY: **liron**  
**24.08.2020**  
 MATERIAL  
 APPROVED BY: **IN**  
**30.12.2020**

MASS/KG: **0.00**  
 PROJECT: **CD**

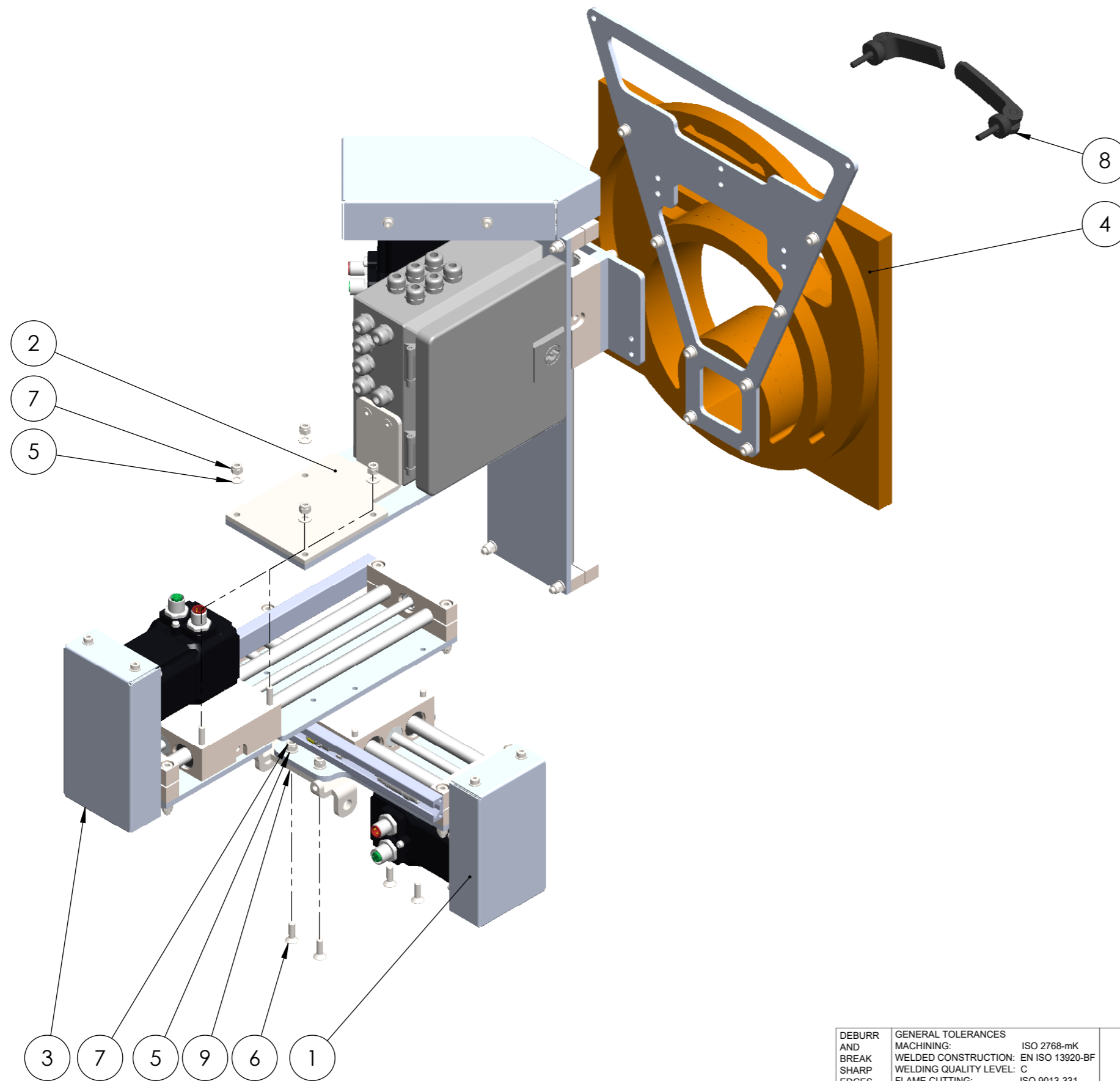
FINISH  
 PAPER: **A3**  
 SCALE: **2:5**

FIRST ANGLE  
 DESCRIPTION: **Calibration head**

CONFIGURATION: **Default**

DRAWING NUMBER: **CD3D-00-03-801**  
 REVISION: **01**  
 SHEET: **1 of 2**

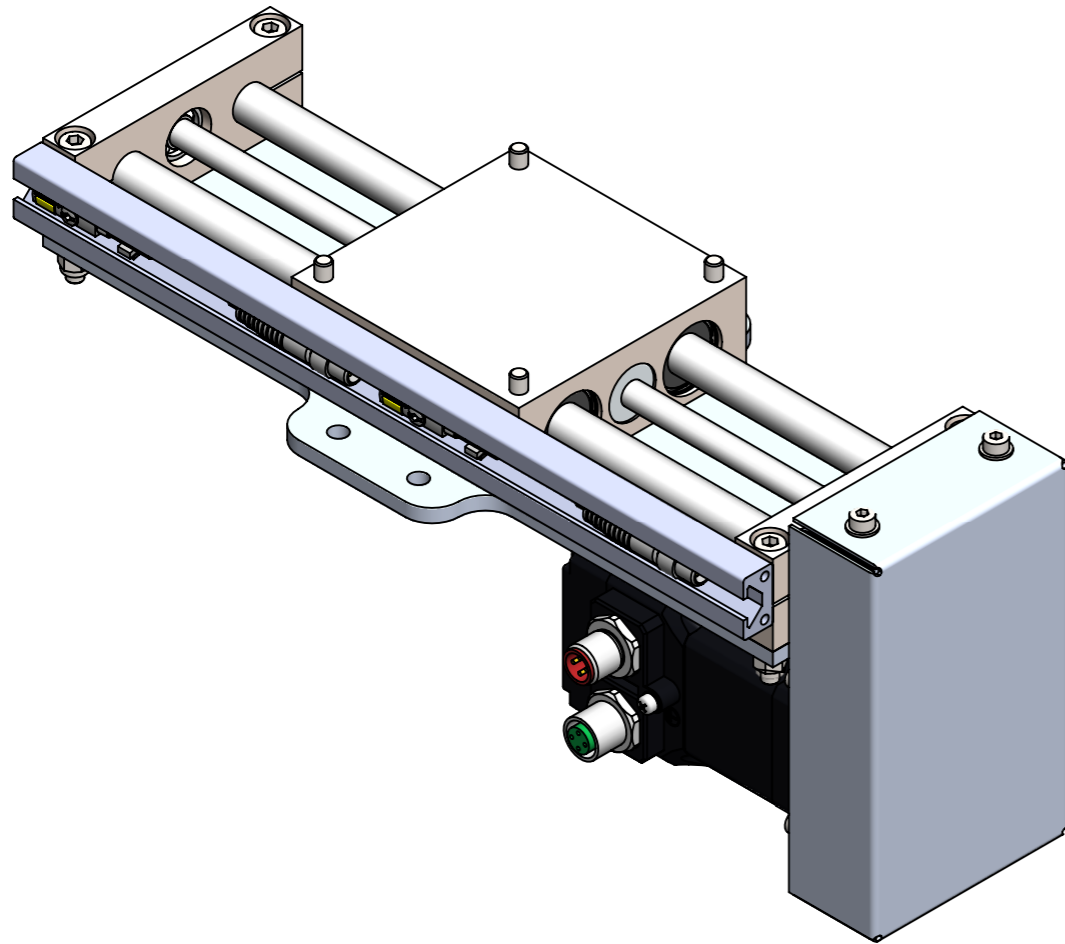
Revision	Description	Date	Approved
01	Assembly updated	30.12.2020	IN



DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES	ISO 2768-mK
	MACHINING:	ISO 13920-BF
MASS/KG	WELDED CONSTRUCTION:	EN ISO 13920-BF
	WELDING QUALITY LEVEL:	C
0.00	FLAME CUTTING:	ISO 9013-331
	CASTING:	ISO 8062-CT 11
	STAMPING:	SFS 5803-m
	PROJECT	CD
	FIRST ANGLE	DESCRIPTION
		Calibration head

**FINNOS**  
www.finnos.fi

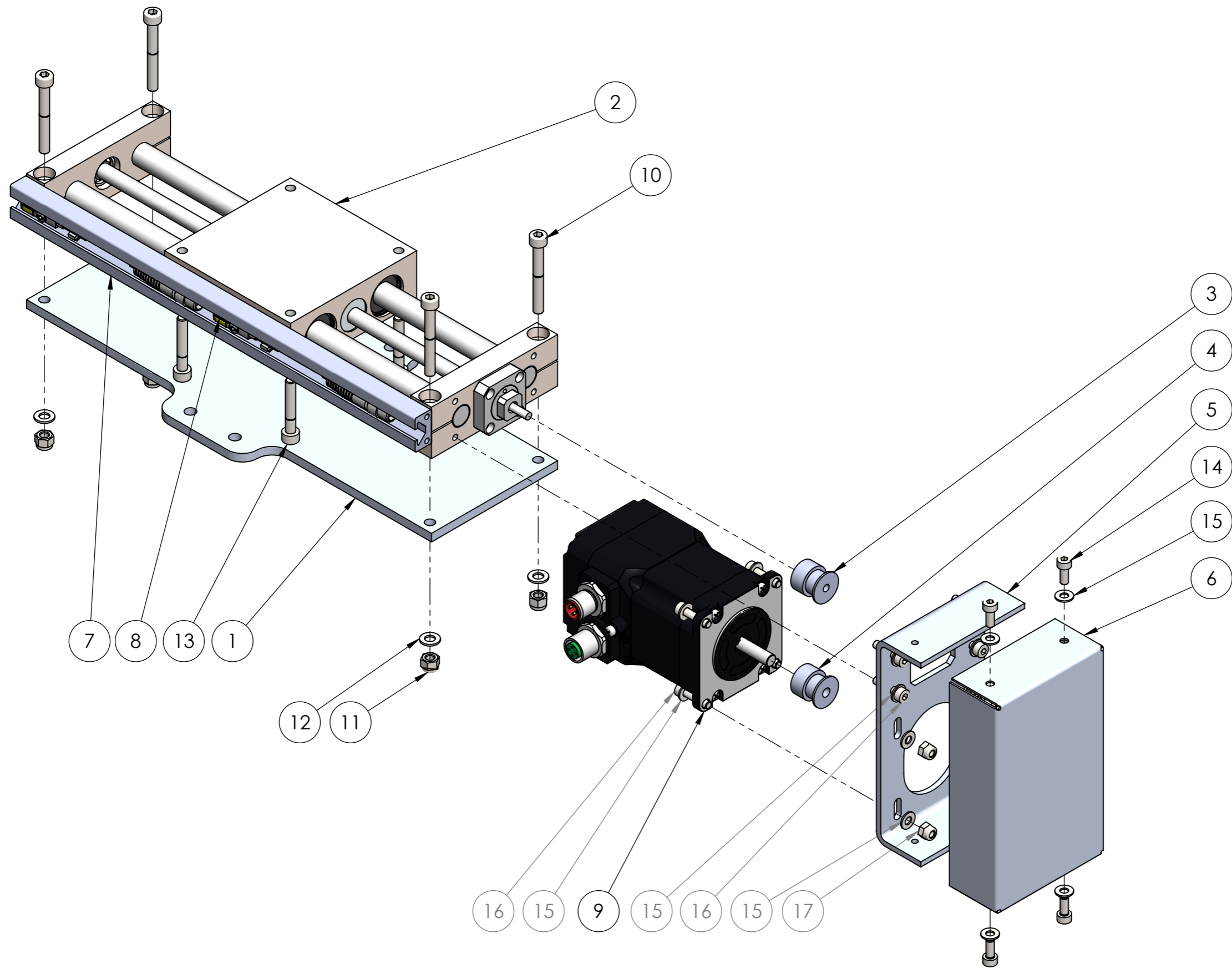
DRAWN BY	APPROVED	
liron	IN	
24.08.2020	30.12.2020	
MATERIAL		
FINISH	PAPER	SCALE
	A3	2:5
DRAWING NUMBER	REVISION	SHEET
CD3D-00-03-801	01	2 of 2



17		M4 Prevailing torque type hexagon nut ISO 7040				4
16		M4x16 Hexagon socket head cap screw ISO 4762				8
15		Washer 4 mm ISO 7089				16
14		M4x10 Hexagon socket head cap screw ISO 4762				4
13		M5x30 Hexagon socket head cap screw ISO 4762				4
12		Washer 5 mm ISO 7089				4
11		M5 Prevailing torque type hexagon nut ISO 7040				4
10		M5x40 Hexagon socket head cap screw ISO 4762				4
9		as2021-0x10				1
8						2
7		Magnetic rail 273mm				1
6	CD3D-00-03-016	Motor mounting plate cover NEMA23		Plate	L183 x W134 x Th.1	1
5	CD3D-00-03-015	Motor mounting plate NEMA23		Plate	L171 x W70 x Th.3	1
4		2GT pulley wheel 5mm				1
3		2GT pulley wheel 4mm				1
2		QME-12-117-260-B-SR0825-Rollco				1
1	CD3D-00-03-002	y axis mount plate		Plate	L273 x W125 x Th.5	1
No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty

DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES	 www.finnos.fi	DRAWN BY		APPROVED
	MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m		liron	IN	30.12.2020
MASS/KG	PROJECT	FINISH		PAPER	SCALE
0.00	CD			A3	1:2
FIRST ANGLE		DESCRIPTION		CONFIGURATION	DRAWING NUMBER
		X axis assembly		Default	CD3D-00-03-802
			REVISION	SHEET	
			01	1 of 2	

Revision	Description	Date	Approved
01	Assembly updated	30.12.2020	IN



DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

MASS/KG 0.00  
 PROJECT CD

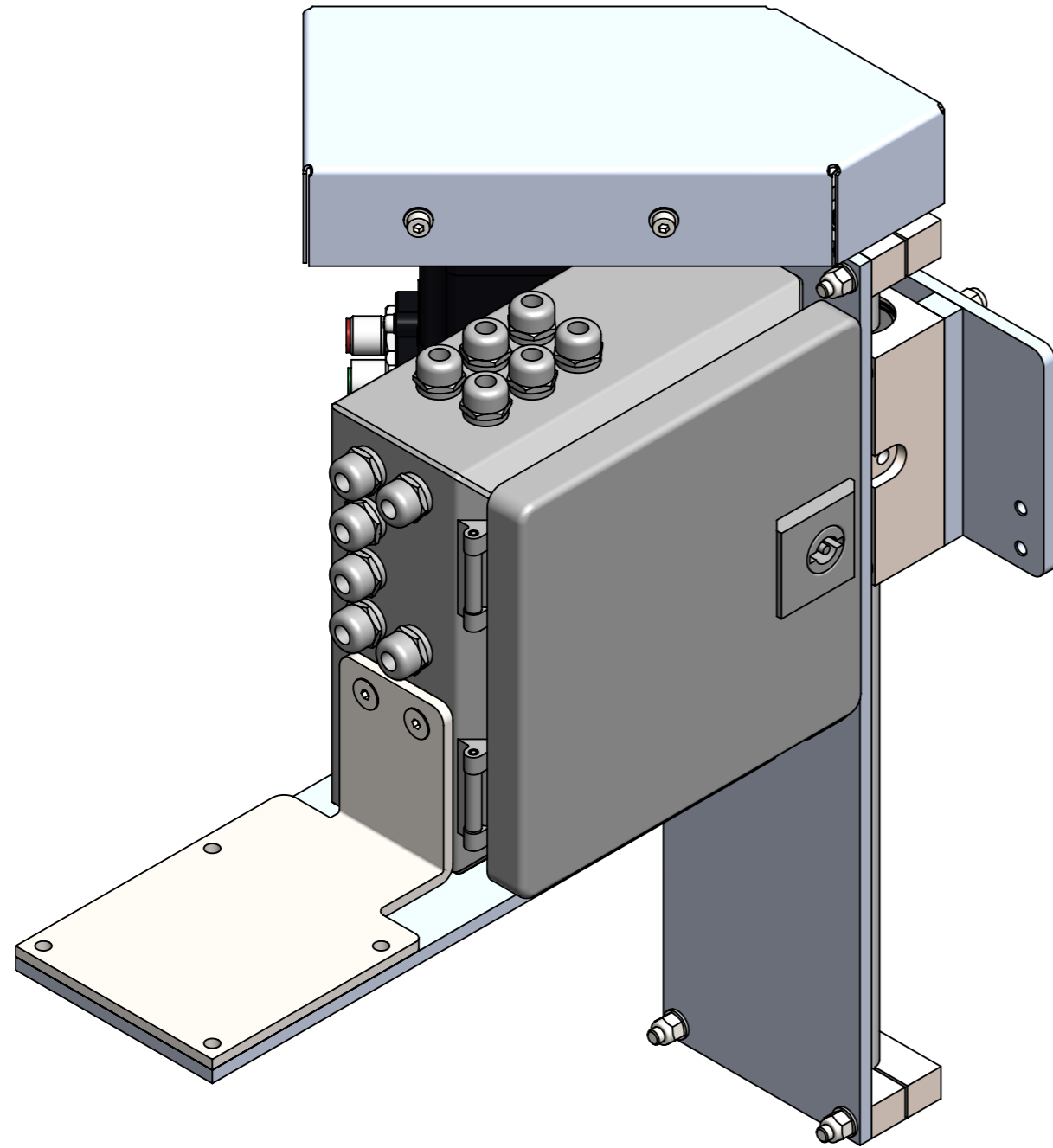
FIRST ANGLE

DESCRIPTION  
**X axis assembly**

**FINNOS**  
 www.finnos.fi

CONFIGURATION  
 Default

DRAWN BY <b>liron</b> 24.08.2020		APPROVED <b>IN</b> 30.12.2020	
FINISH		PAPER <b>A3</b>	SCALE <b>1:2</b>
DRAWING NUMBER <b>CD3D-00-03-802</b>		REVISION <b>01</b>	SHEET <b>2 of 2</b>



23		M4x16 Hexagon socket head cap screw ISO 4762				8
22		M4 Prevailing torque type hexagon nut ISO 7040				4
21	CD3D-00-03-019	Disk mounting backplate steel	Plate	L155 x W85 x Th.5		1
20		Washer 4 mm ISO 7089				16
19		M4x10 Hexagon socket head cap screw ISO 4762				4
18		as2021-0x10				1
17	CD3D-00-03-017	Motor mount y-axis cover NEMA23 angled	Plate	L254 x W157 x Th.1		1
16						2
15		2GT pulley wheel 4mm				2
14	CD3D-00-03-018	Motor mount y-axis NEMA23	Plate	L212 x W143 x Th.3		1
13		M5x45 Hexagon socket head cap screw ISO 4762				4
12		M5x20 Hexagon socket countersunk head screw ISO 10642				4
11		M5 Prevailing torque type hexagon nut ISO 7040				16
10		Washer 5 mm ISO 7089				16
9		M5x40 Hexagon socket head cap screw ISO 4762				4
8		M5x16 Hexagon socket countersunk head screw ISO 10642				6
7		Rittal 1551_500				1
6	CD3D-00-03-011	Rittal box stiffener	Plate	L83 x W85 x Th.4		1
5	CD3D-00-03-009	Adapter 8mm	Plate	L85 x W12 Th.8		2
4	CD3D-00-03-006	Tilt to rollco	Plate	L329 x W85 Th.5		1
3		Magnetic rail 328mm				1
2						1
1	CD3D-00-03-005	Rollco to tilt	Plate	L398 x W85 Th.5		1
No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty

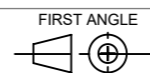
DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES  
 MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

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 IN  
 30.12.2020

MASS/KG  
 0.00

PROJECT  
 CD



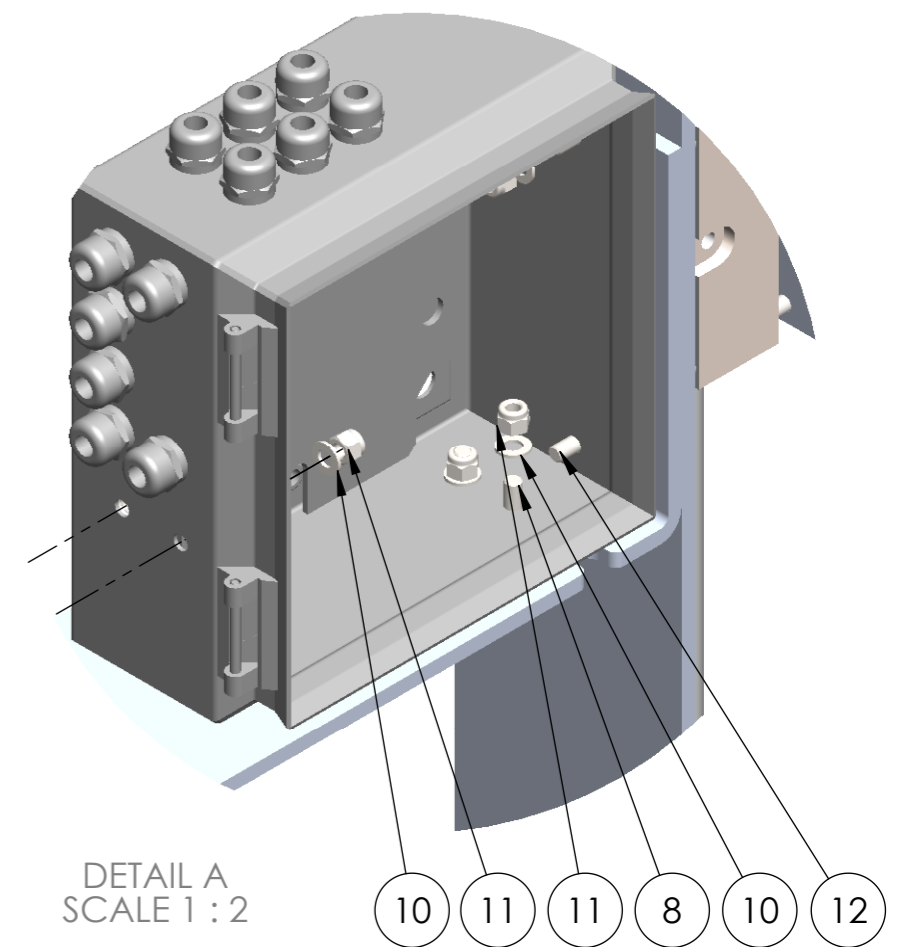
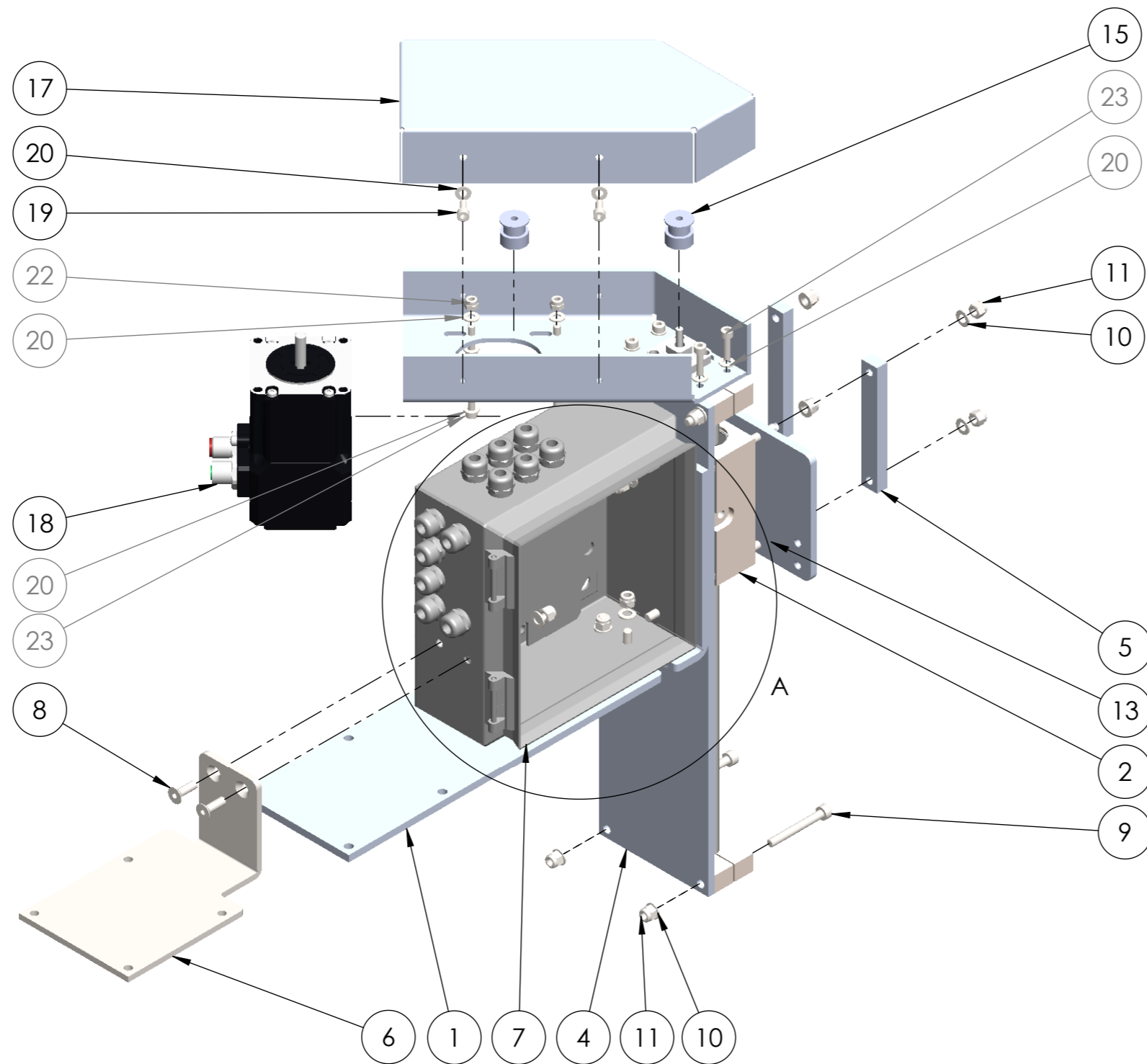
DESCRIPTION  
 Y-axis assembly

CONFIGURATION  
 Motor mount straight

FINISH  
 A3  
 PAPER  
 SCALE  
 1:5

DRAWING NUMBER  
 CD3D-00-03-803  
 REVISION  
 02  
 SHEET  
 1 of 2

Revision	Description	Date	Approved
01	BOM	24.08.2020	IN
02	Assembly updated	30.12.2020	IN

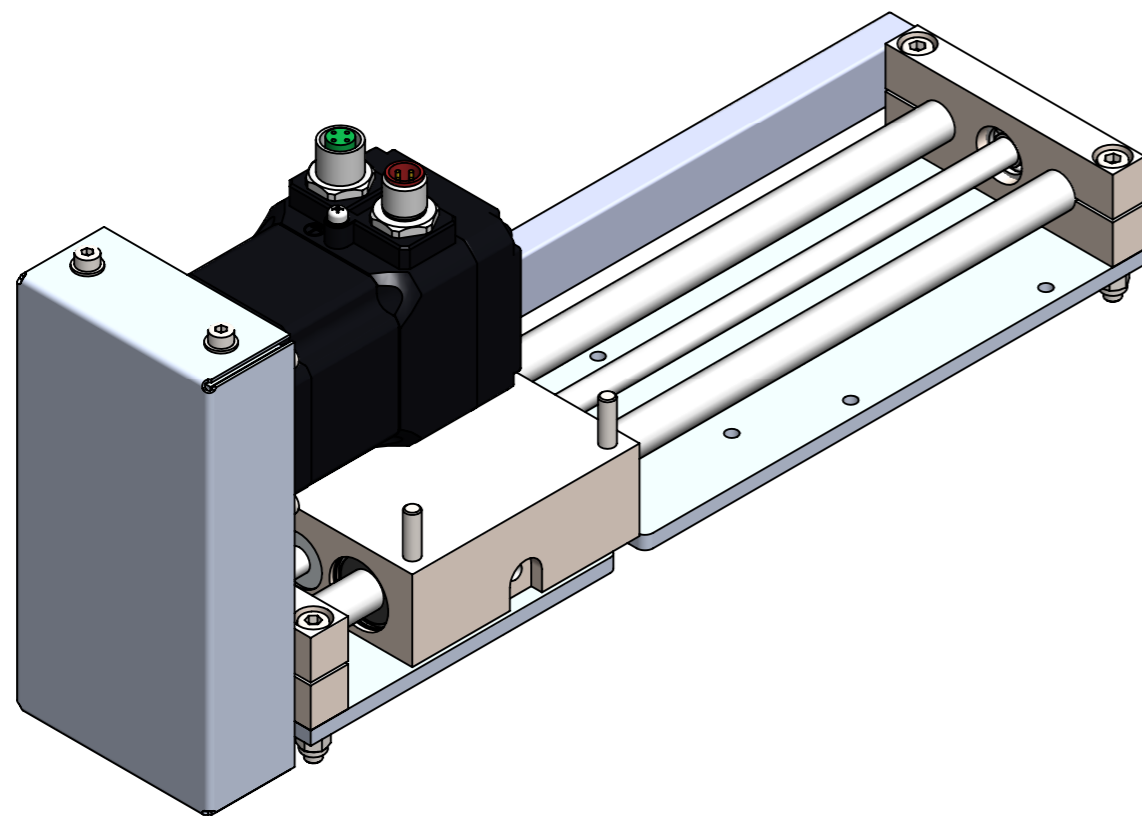


DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES	ISO 2768-mK
	MACHINING:	EN ISO 13920-BF
MASS/KG	WELDED CONSTRUCTION:	EN ISO 13920-BF
	WELDING QUALITY LEVEL:	C
0.00	FLAME CUTTING:	ISO 9013-331
	CASTING:	ISO 8062-CT 11
	STAMPING:	SFS 5803-m
	PROJECT	CD
	FIRST ANGLE	
	DESCRIPTION	Y-axis assembly

**FINNOS**  
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DRAWN BY	APPROVED	
liron	IN	
24.08.2020	30.12.2020	
MATERIAL		
FINISH	PAPER	SCALE
	A3	1:5
DRAWING NUMBER	REVISION	SHEET
CD3D-00-03-803	02	2 of 2

CONFIGURATION  
Motor mount straight



15		M4 Prevailing torque type hexagon nut ISO 7040			4	
14		M4x16 Hexagon socket head cap screw ISO 4762			8	
13		M4x10 Hexagon socket head cap screw ISO 4762			4	
12		Washer 4 mm ISO 7089			16	
11		as2021-0x10			1	
10		BALLUFF_BMF_235K_PS_C_2A_SA2_S49_00_3			2	
9		2GT pulley wheel 5mm			2	
8		QME-12-147-299-B-SR0825-Rollco			1	
7		M5 Prevailing torque type hexagon nut ISO 7040			4	
6		Washer 5 mm ISO 7089			4	
5		M5x40 Hexagon socket head cap screw ISO 4762			8	
4	CD3D-00-03-016 mk2	Motor mounting plate cover NEMA23	Plate	L202 x W134 x Th.1	1	
3	CD3D-00-03-015 mk2	Motor mounting plate NEMA23	Plate	L188 x W70 x Th.3	1	
2		Magnetic rail 312mm			1	
1	CD3D-00-03-012	Z-axis mount plate	Plate	L312 x W85 x Th.5	1	
No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty

DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES  
 MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

**FINNOS**  
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 24.08.2020  
 APPROVED  
 IN  
 30.12.2020

MATERIAL

FINISH  
 A3  
 PAPER  
 A3  
 SCALE  
 1:5

DRAWING NUMBER  
 CD3D-00-03-804  
 REVISION  
 02  
 SHEET  
 1 of 2

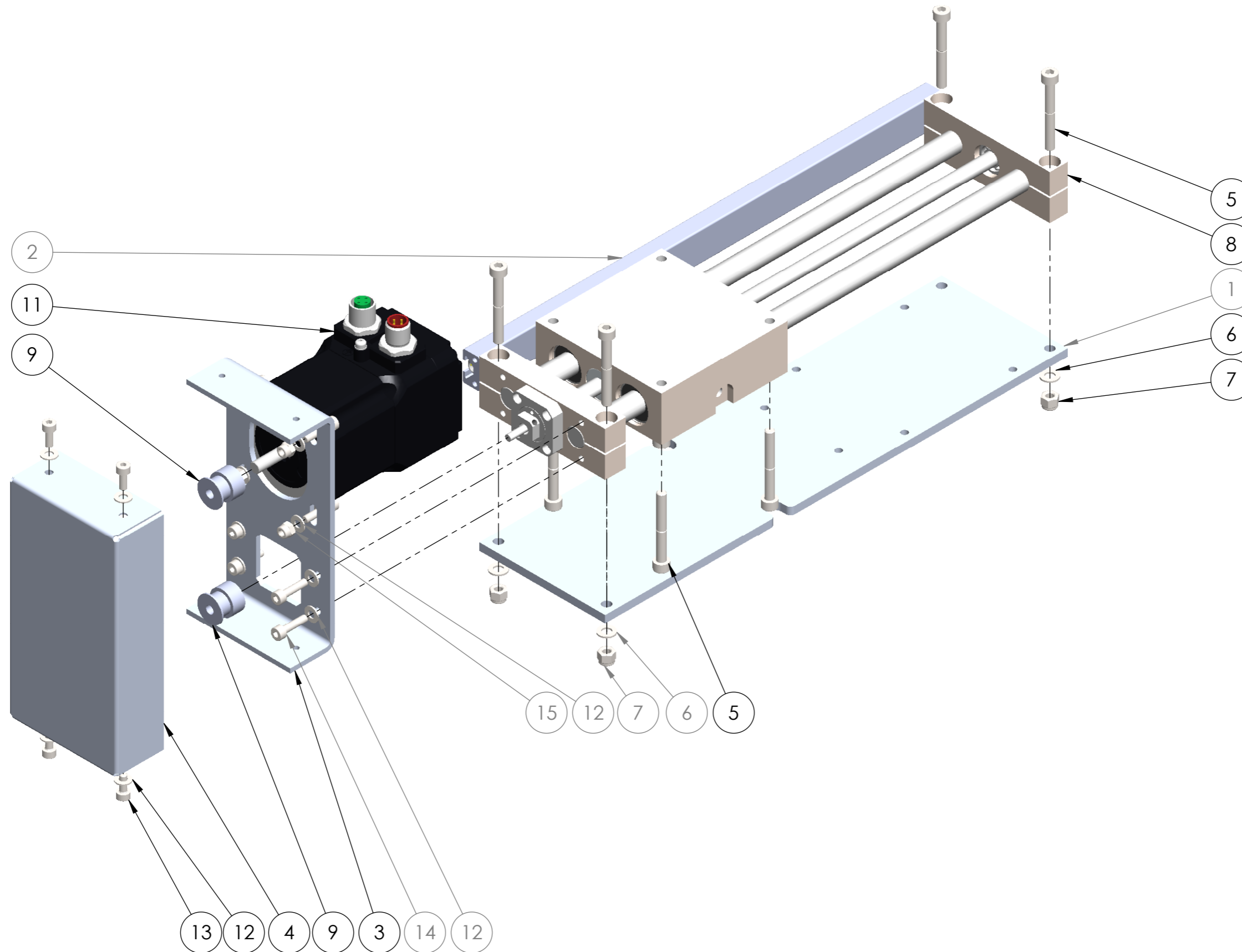
Revision	Description	Date	Approved
01	BOM	24.08.2020	IN
02	Assembly updated	30.12.2020	IN

MASS/KG  
 0.00  
 PROJECT  
 CD

FIRST ANGLE

DESCRIPTION  
 Z-axis assembly

CONFIGURATION  
 Longer unit

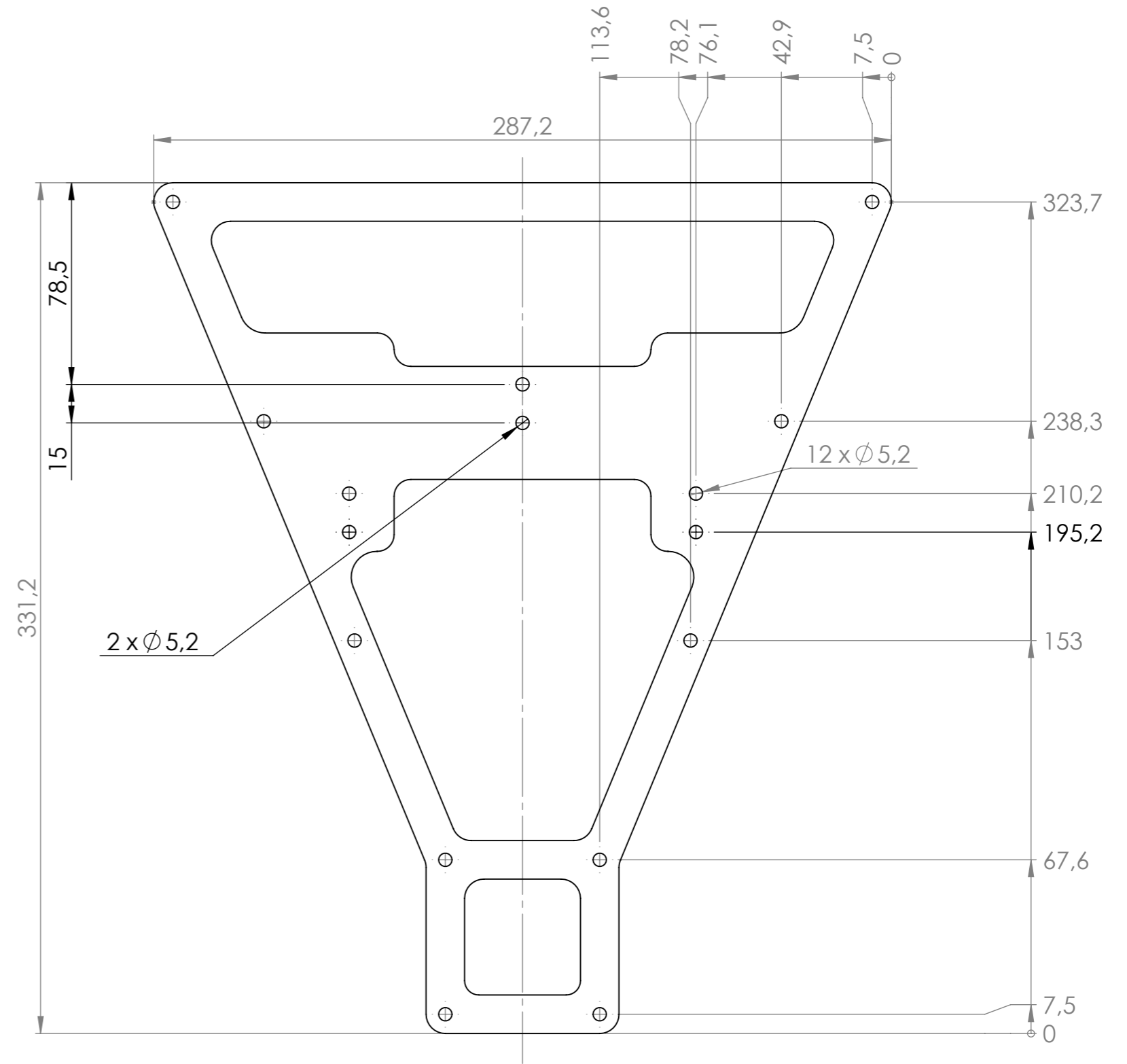
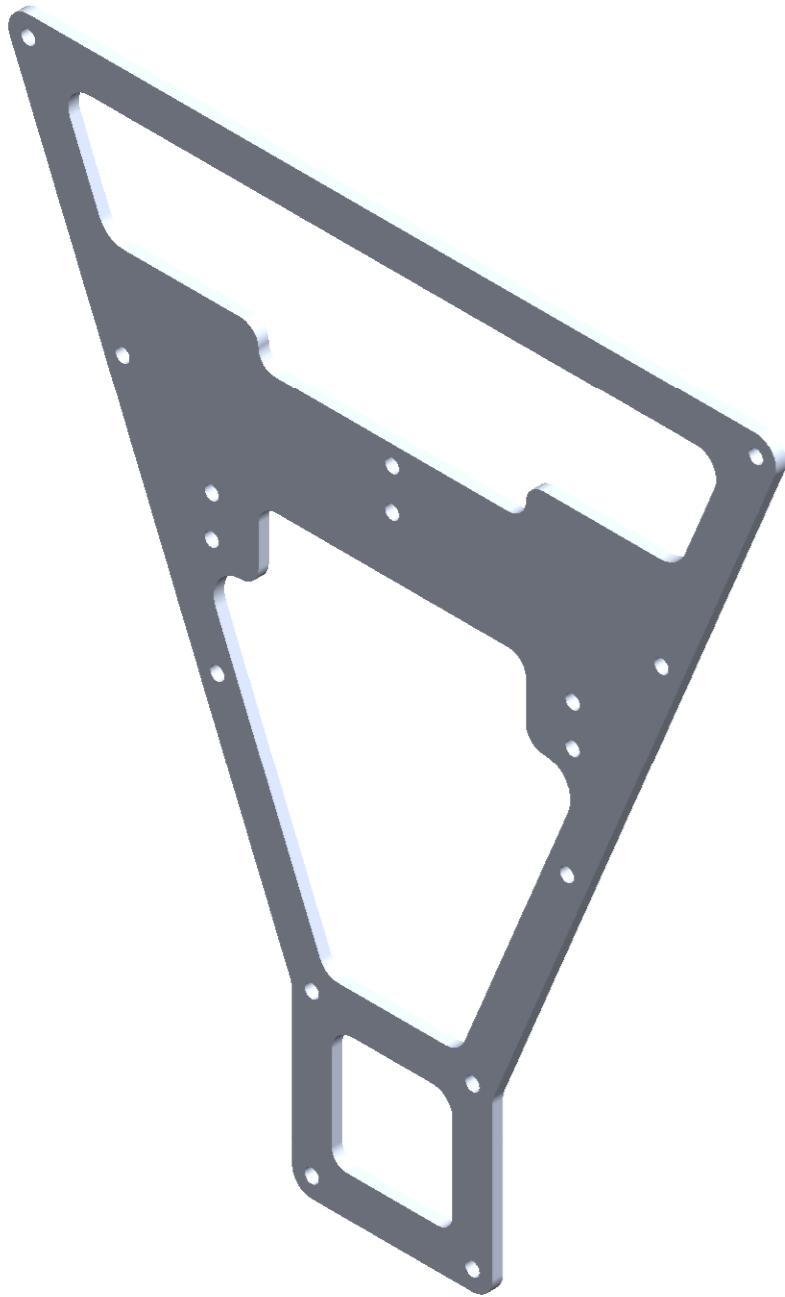


DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES	ISO 2768-mK
	MACHINING:	ISO 13920-BF
MASS/KG	WELDED CONSTRUCTION:	EN ISO 13920-BF
	WELDING QUALITY LEVEL:	C
0.00	FLAME CUTTING:	ISO 9013-331
	CASTING:	ISO 8062-CT 11
	PROJECT	CD
	DESCRIPTION	Z-axis assembly
	FIRST ANGLE	
	CONFIGURATION	Longer unit

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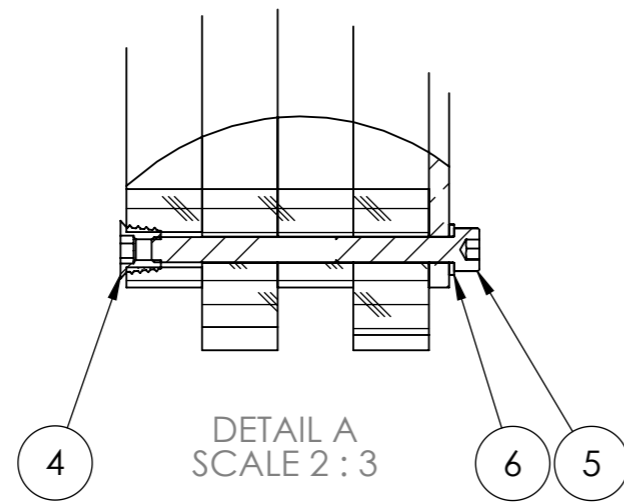
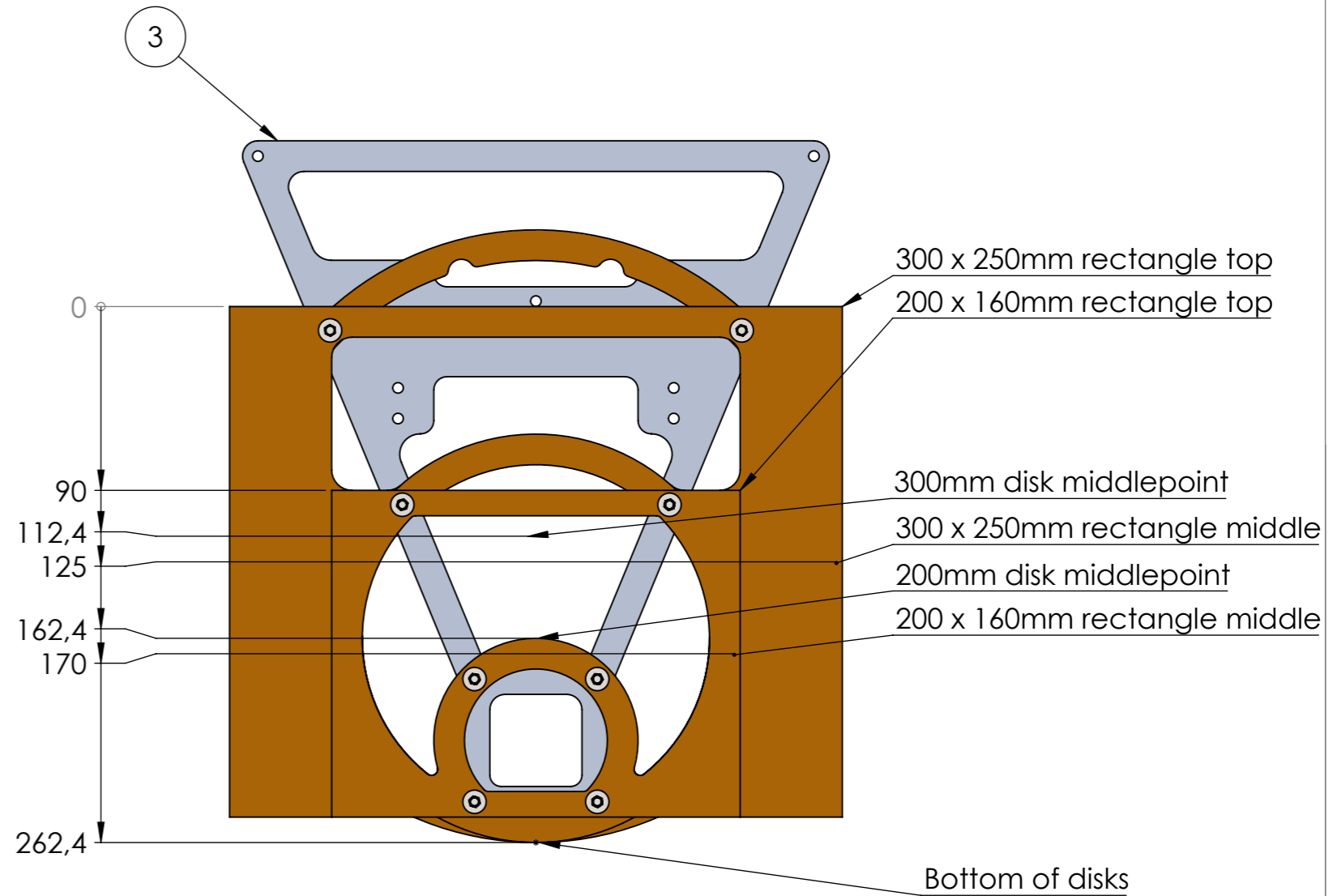
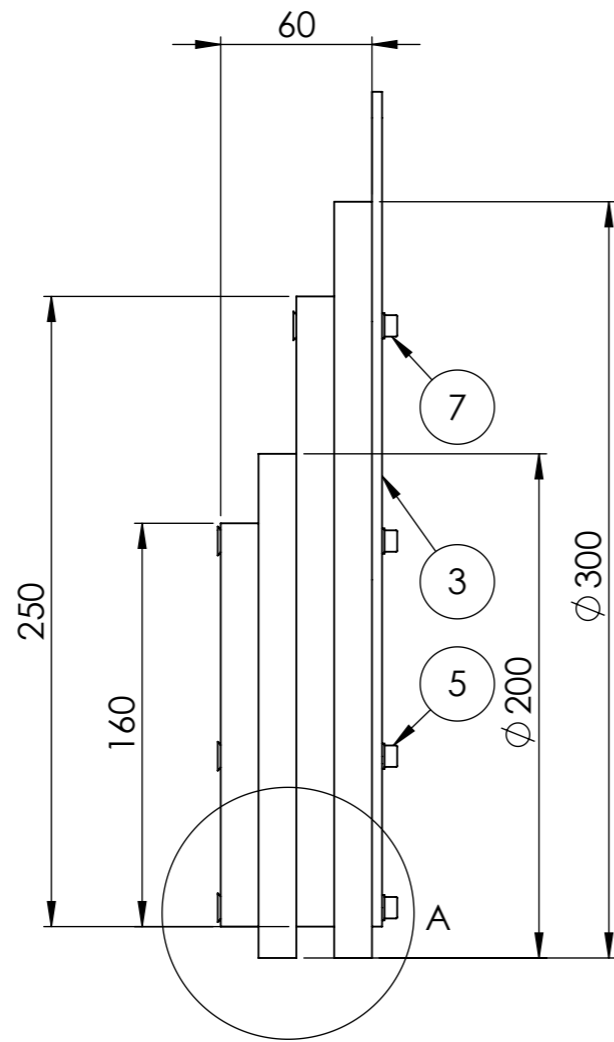
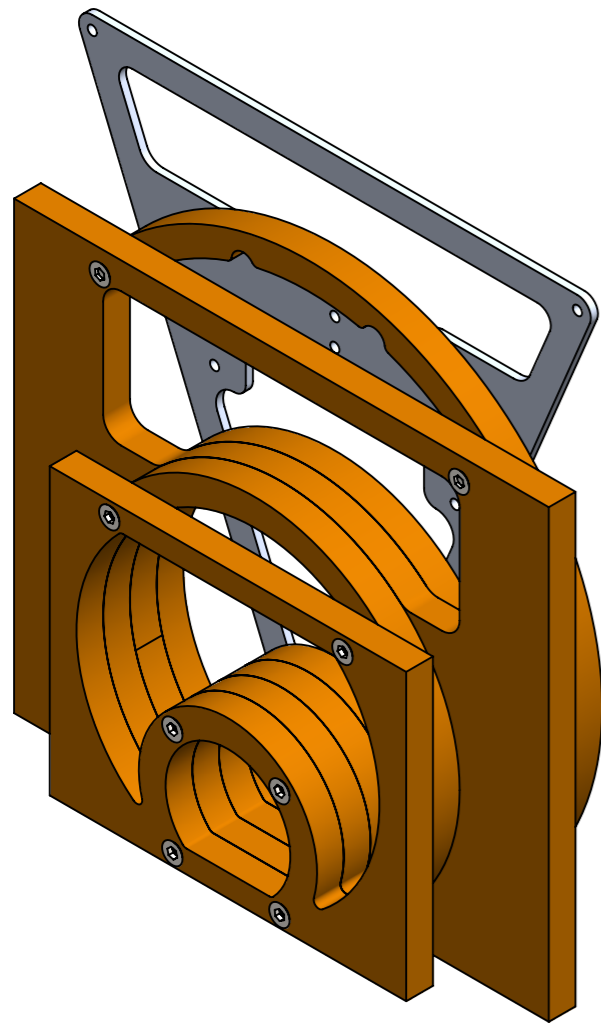
DRAWN BY	APPROVED	
liron	IN	
24.08.2020	30.12.2020	
MATERIAL		
FINISH	PAPER	SCALE
	A3	1:5
DRAWING NUMBER	REVISION	SHEET
CD3D-00-03-804	02	2 of 2





Revision	Description	Date	Approved
A	Initial design	02.07.2020	IN
01	2 Middle holes added	31.08.2020	IN
02	Middle holes from 4,2 to 5,2 mm	31.08.2020	IN

PartNo.	Description	Info	Preform type	Preform Dimension	
CD3D-00-04-005	Disk back bracket		Plate	L332 x W288 x Th.4	
DEBURR AND BREAK SHARP EDGES GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m		 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY: <b>liron</b> 31.08.2020 MATERIAL: <b>3.3535 (EN-AW 5754)</b>		
MASS/KG <b>0.28</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>	SCALE <b>1:2</b>
FIRST ANGLE 		DESCRIPTION <b>Disk back bracket</b>	DRAWING NUMBER <b>CD3D-00-04-005</b>	REVISION <b>02</b>	SHEET <b>1 of 1</b>



No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty
9	CD3D-00-04-006	Rectangle big		Plywood	L250 x W300 x Th.15	1
8	CD3D-00-04-007	Rectangle 200 x 150		Plywood	L160 x W200 x Th.15	1
7		M5x35 Hexagon socket head cap screw ISO 4762				2
6		Washer 5 mm ISO 7089				8
5		M5x60 Hexagon socket head cap screw ISO 4762				6
4		M5x8 wood insert				8
3	CD3D-00-04-005	Disk back bracket		Plate	L332 x W288 x Th.4	1
2	CD3D-00-04-003	Disk 300mm		Plywood	D300 x Th.15	1
1	CD3D-00-04-002	Disk 200mm		Plywood	D200 x Th.15	1

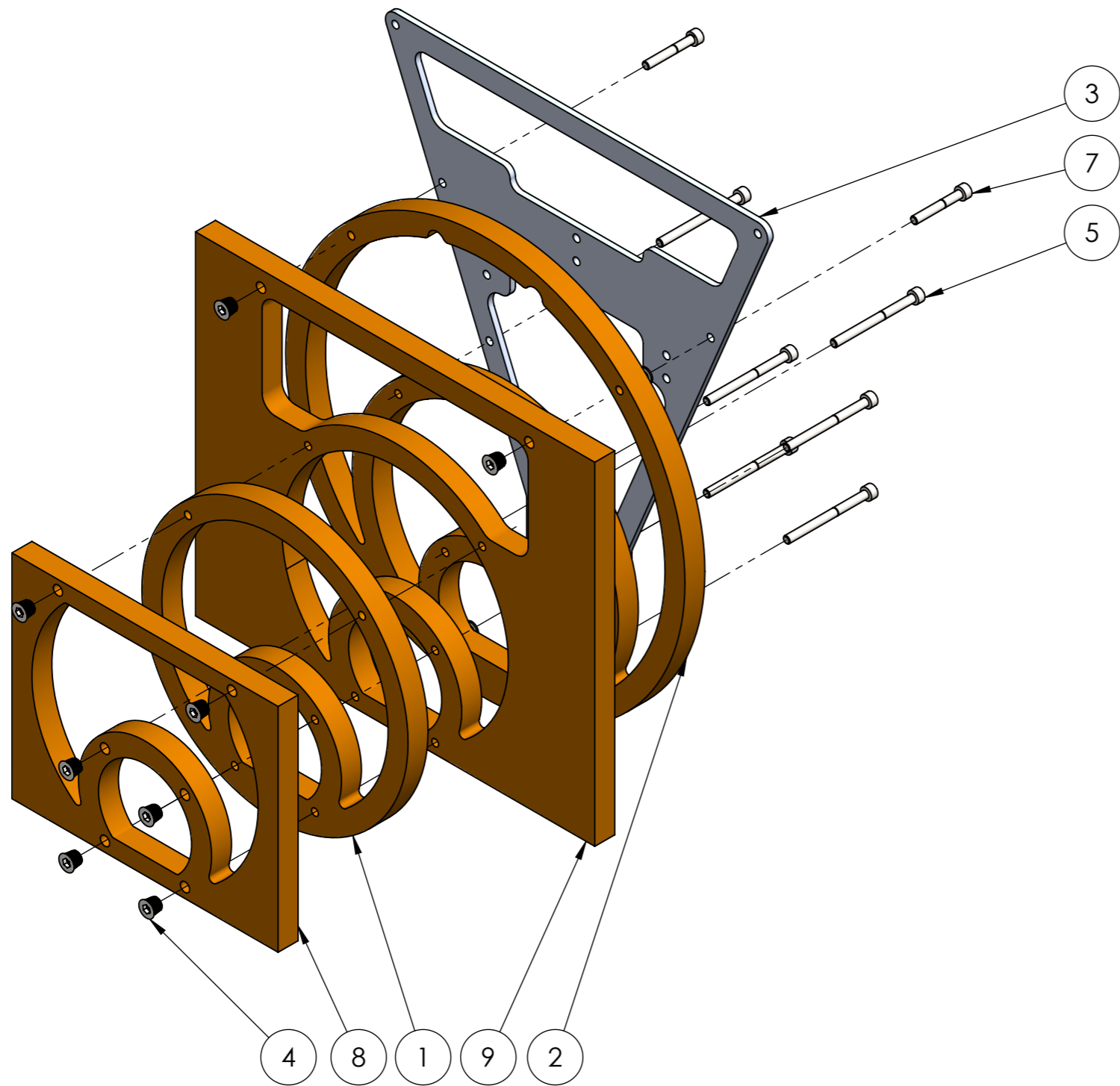
DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m



DRAWN BY **liron**  
**31.08.2020**  
 MATERIAL  
 APPROVED IN **IN**  
**15.09.2020**

Revision	Description	Date	Approved
01	Initial design	31.08.2020	IN
02	Explo view added	15.09.2020	IN

MASS/KG <b>0.86</b>	PROJECT <b>CD</b>		DESCRIPTION <b>Calibration disk assembly</b>	CONFIGURATION <b>Default</b>	DRAWING NUMBER <b>CD3D-00-04-801</b>	REVISION <b>02</b>	SHEET <b>1 of 2</b>
FINISH <b>A3</b>			SCALE <b>1:3</b>				



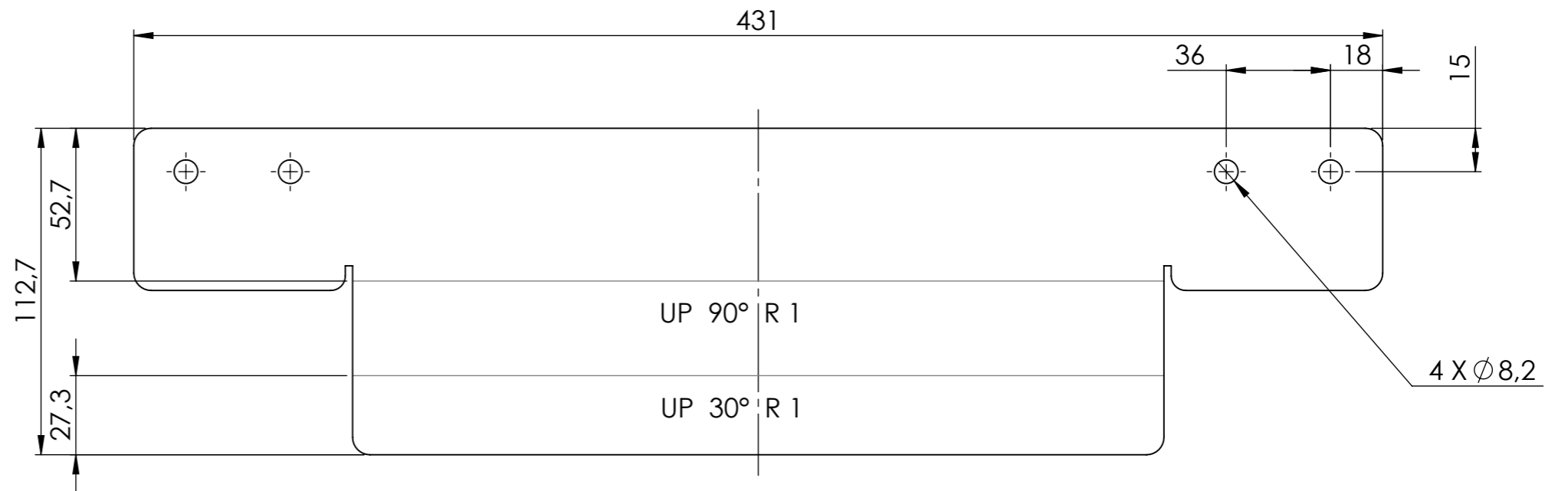
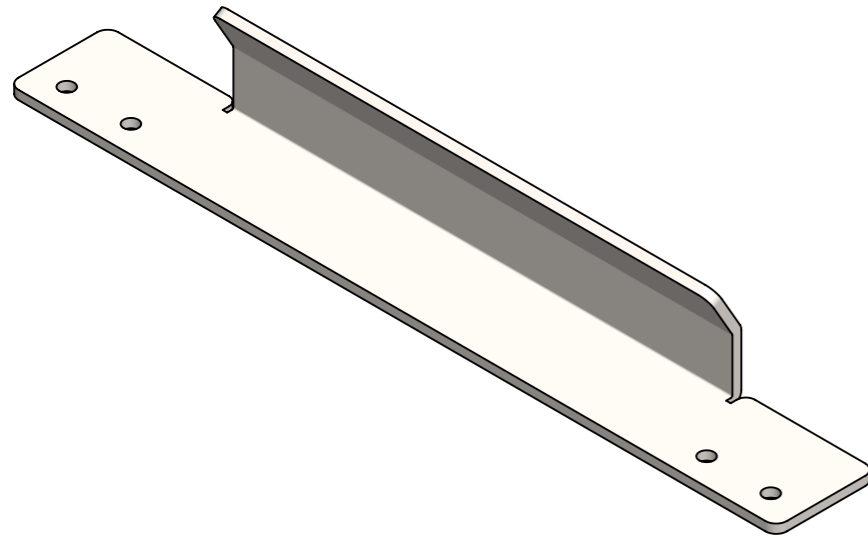
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES	ISO 2768-mK
	MACHINING:	ISO 2768-mK
MASS/KG	WELDED CONSTRUCTION:	EN ISO 13920-BF
	WELDING QUALITY LEVEL:	C
0.86	FLAME CUTTING:	ISO 9013-331
	CASTING:	ISO 8062-CT 11
	STAMPING:	SFS 5803-m
	PROJECT	CD
	DESCRIPTION	Calibration disk assembly


  
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DRAWN BY <b>liron</b> 31.08.2020		APPROVED <b>IN</b> 15.09.2020
MATERIAL		
FINISH	PAPER <b>A3</b>	SCALE <b>1:3</b>
DRAWING NUMBER <b>CD3D-00-04-801</b>	REVISION <b>02</b>	SHEET <b>2 of 2</b>

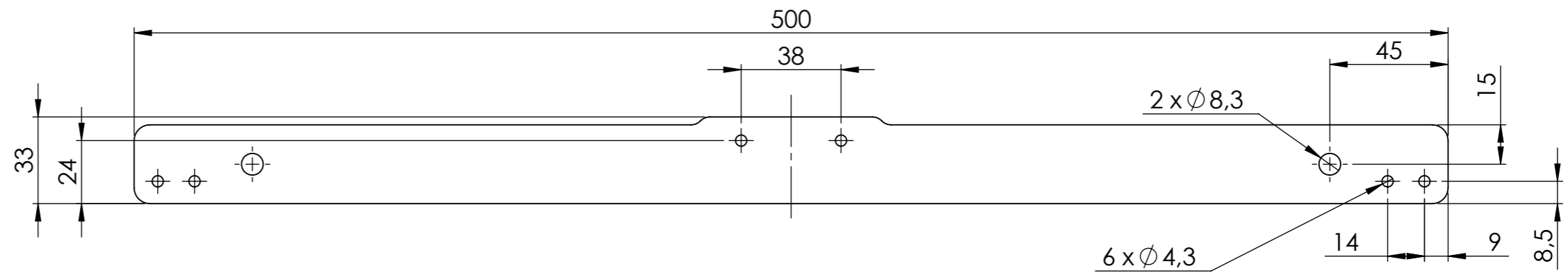
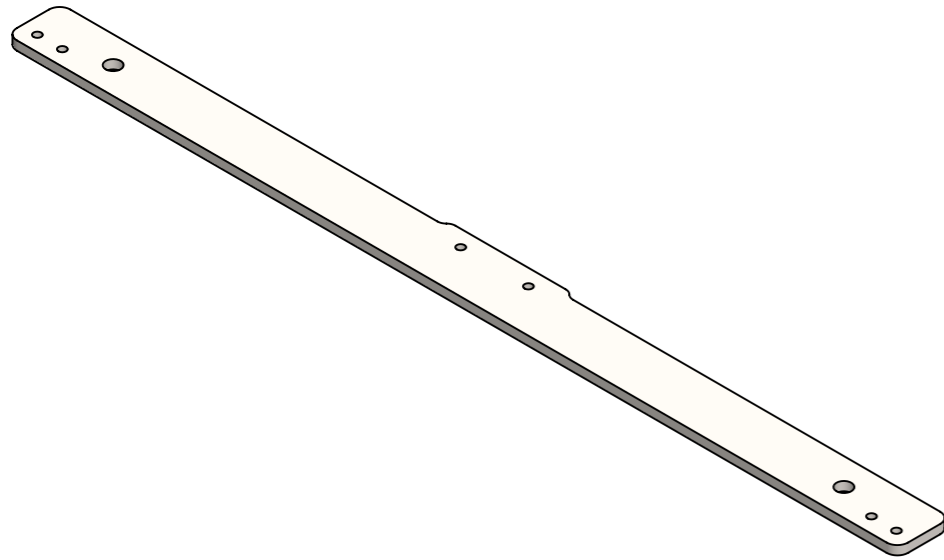


CONFIGURATION  
**Default**



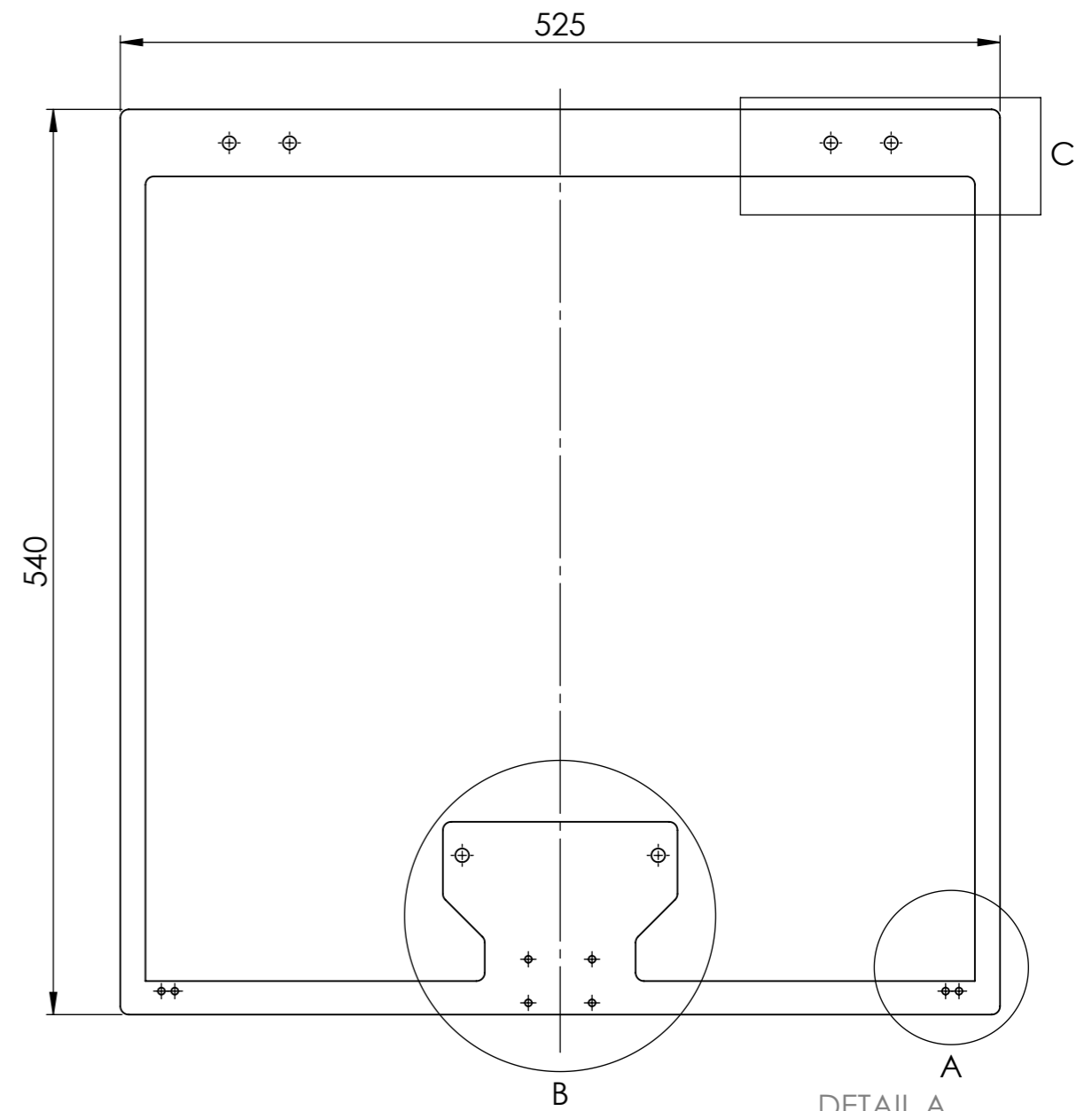
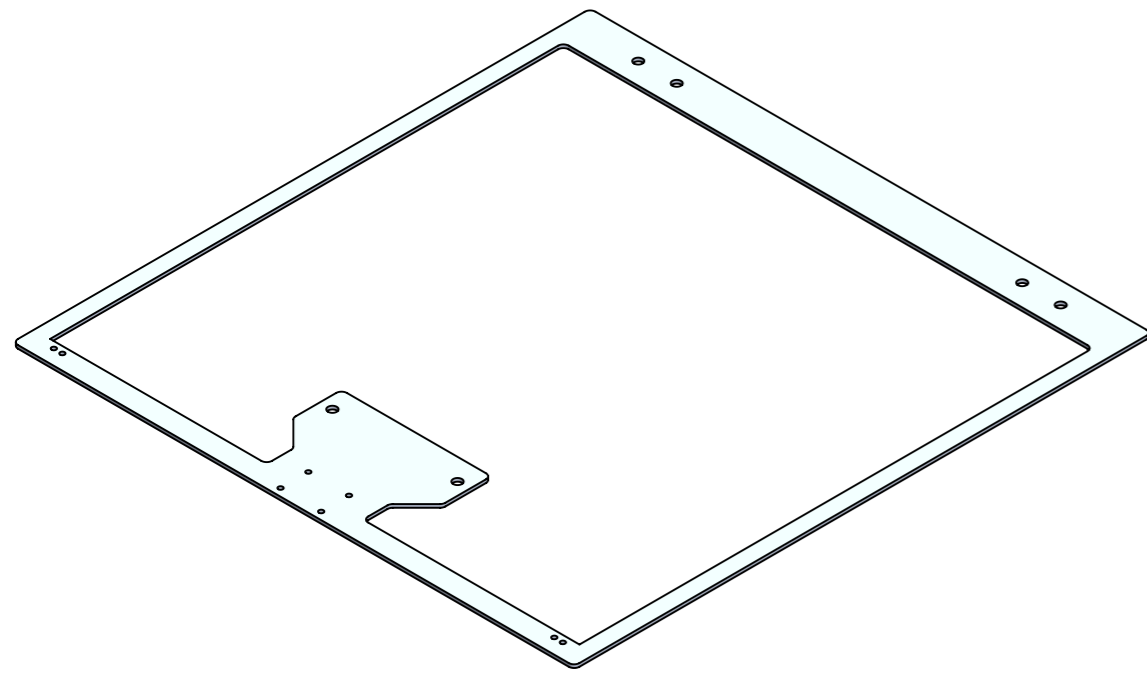
CD3D-00-05-001	CD3D3 Fiberglass hatch mount plate		Plate	L431 x W113 x Th.5	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 27.10.2020	APPROVED <b>IN</b> 27.10.2020	
MASS/KG 1.55	PROJECT		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>CD3D3 Fiberglass hatch mount plate</b>	CONFIGURATION <b>DefaultSM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-001</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>

Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN

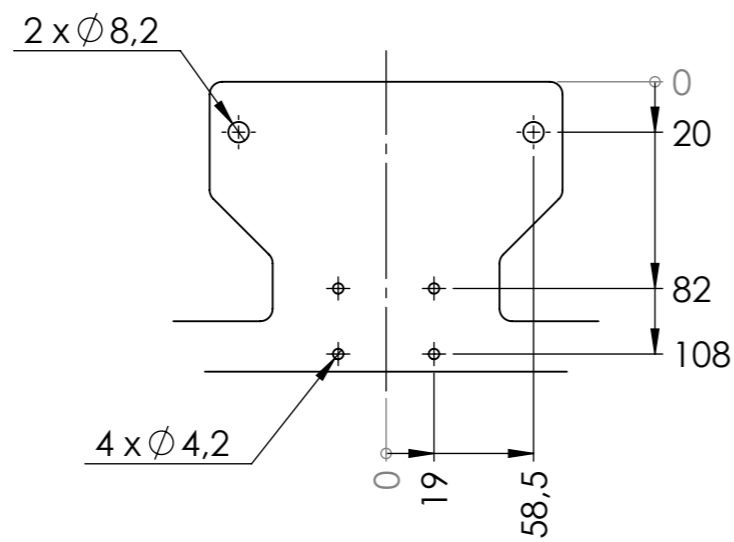


Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN

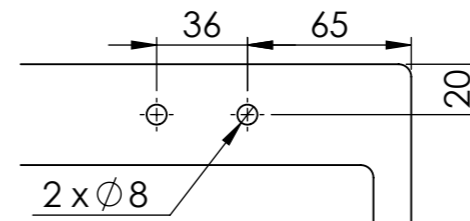
CD3D-00-05-002	CD3D3 Fiberglass lock and latch plate		Plate	L500 x W33 x Th.5	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 27.10.2020	APPROVED <b>IN</b> 27.10.2020	
MASS/KG <b>0.58</b>	PROJECT		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>CD3D3 Fiberglass lock and latch plate</b>	CONFIGURATION <b>Default SM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-002</b>	REVISION <b>01</b>	SCALE <b>1:2</b>
				SHEET <b>1 of 1</b>	



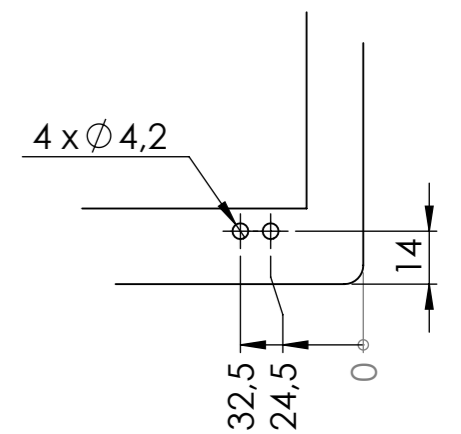
DETAIL B  
SCALE 1 : 3



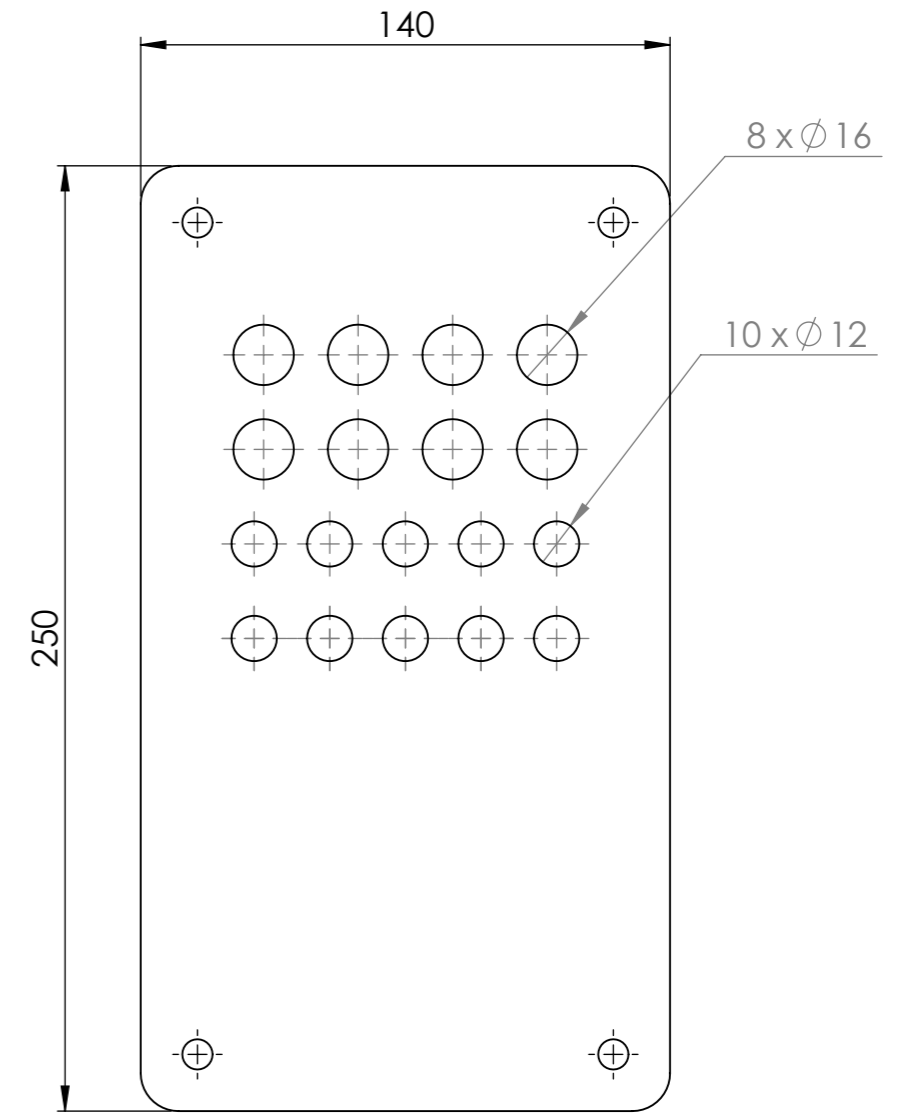
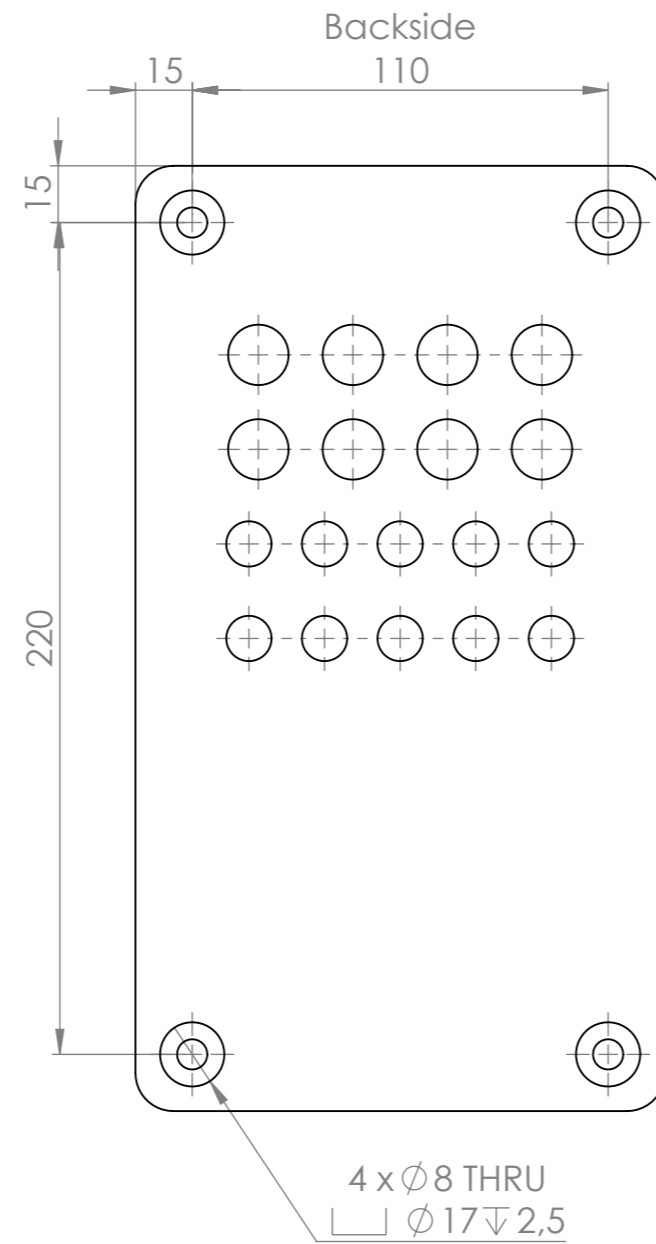
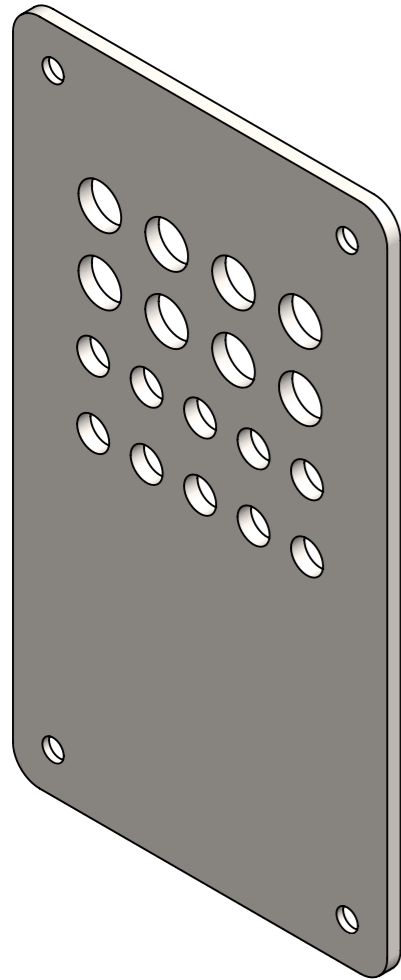
DETAIL C  
SCALE 1 : 3



DETAIL A  
SCALE 1 : 2

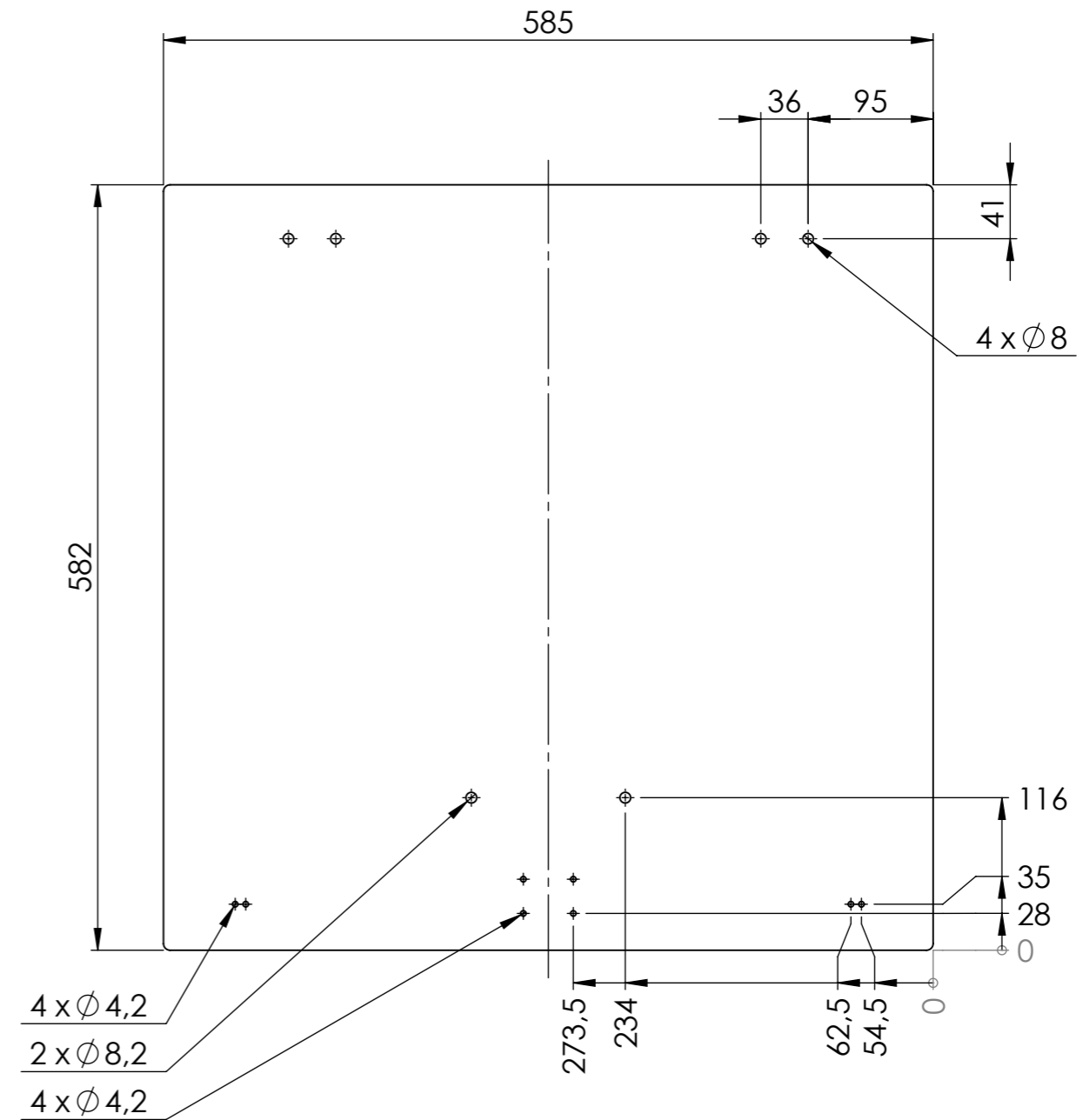
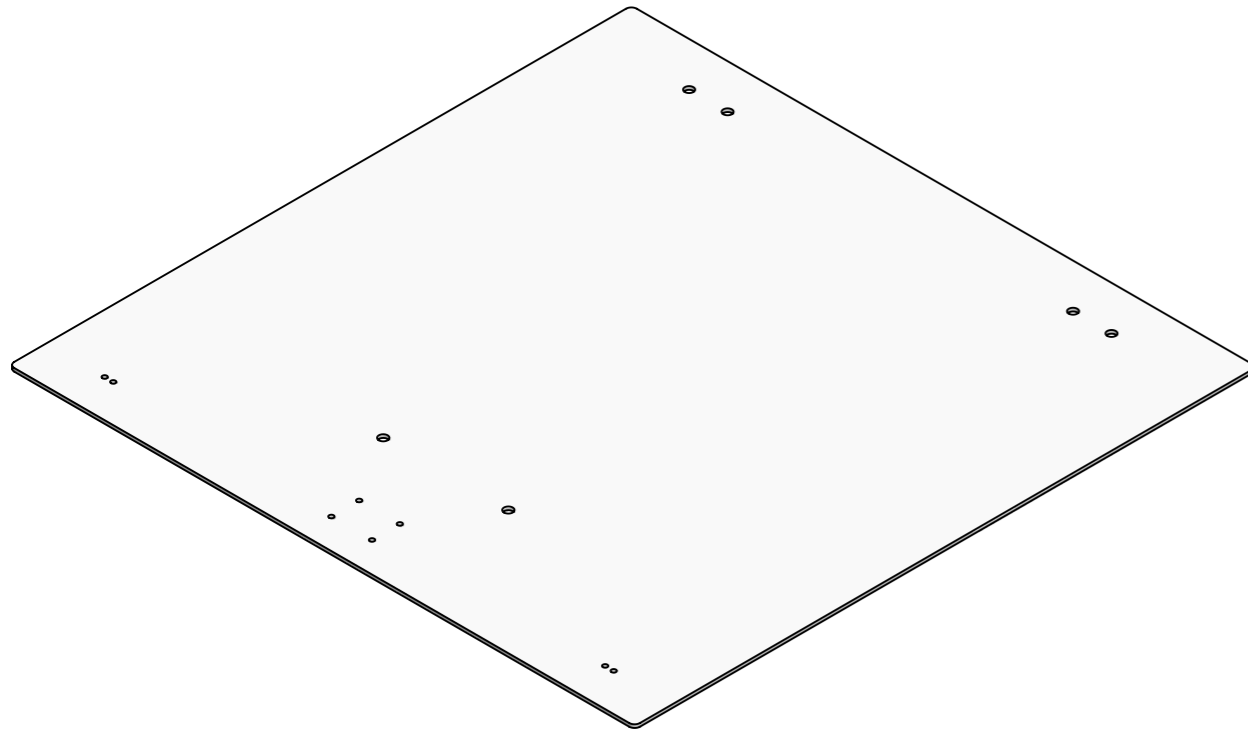


CD3D-00-05-003	CD3D3 Fiberglass hatch reinforcement		Plate	L540 x W525 x Th.3	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 27.10.2020	APPROVED <b>IN</b> 28.10.2020	
MASS/KG <b>0.46</b>	PROJECT		MATERIAL <b>6063-T5</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>CD3D3 Fiberglass hatch reinforcement</b>	CONFIGURATION <b>DefaultSM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-003</b>	REVISION <b>02</b>	SCALE <b>1:4</b>
Revision	Description	Date	Approved		SHEET <b>1 of 1</b>
01	Initial design	27.10.2020	IN		
02	Material changed	28.10.2020	IN		



Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN
02	Thickness to 2mm	28.10.2020	IN
03	Mounting holes edited	15.12.2020	IN

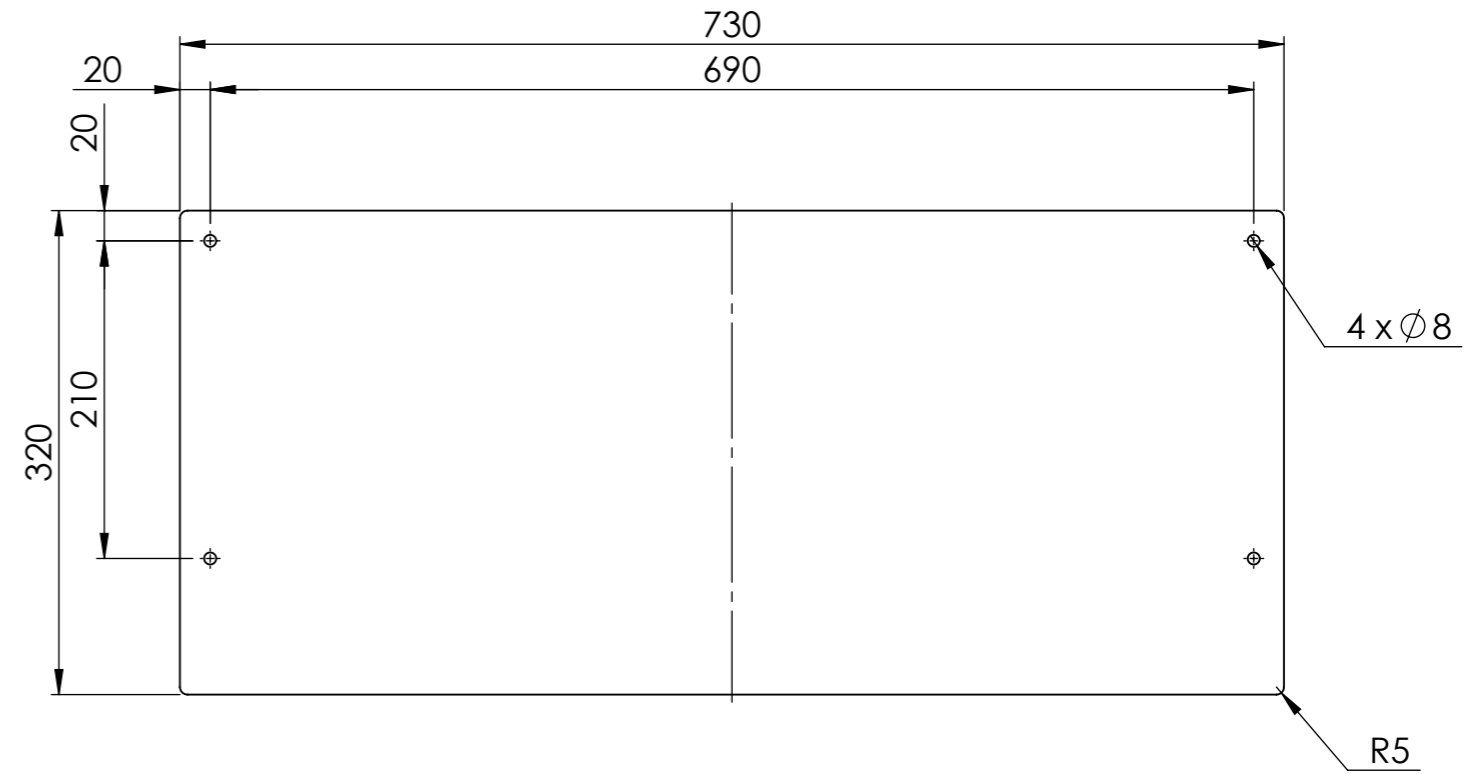
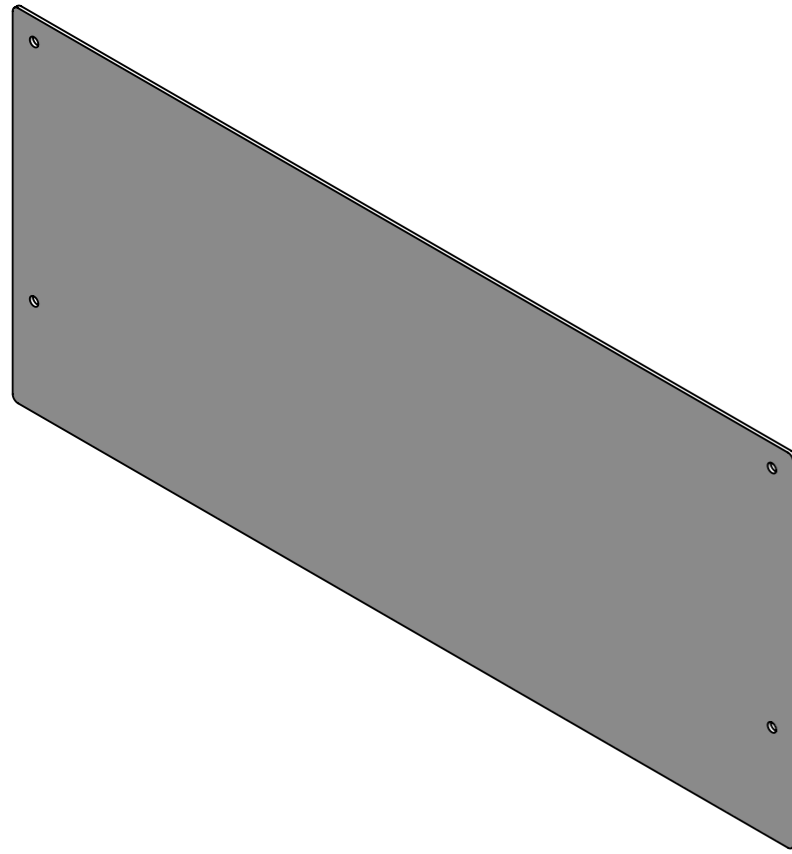
CD3D-00-05-004	CD3D3 Fiberglass Cable panel		Plate	L250 x W140 x Th.5
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 27.10.2020	APPROVED <b>IN</b> 15.12.2020
MASS/KG 1.23	PROJECT		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH
FIRST ANGLE 	DESCRIPTION <b>CD3D3 Fiberglass Cable panel</b>	CONFIGURATION <b>Default</b>	DRAWING NUMBER <b>CD3D-00-05-004</b>	SCALE <b>1:2</b>
			REVISION <b>03</b>	SHEET <b>1 of 1</b>




Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN

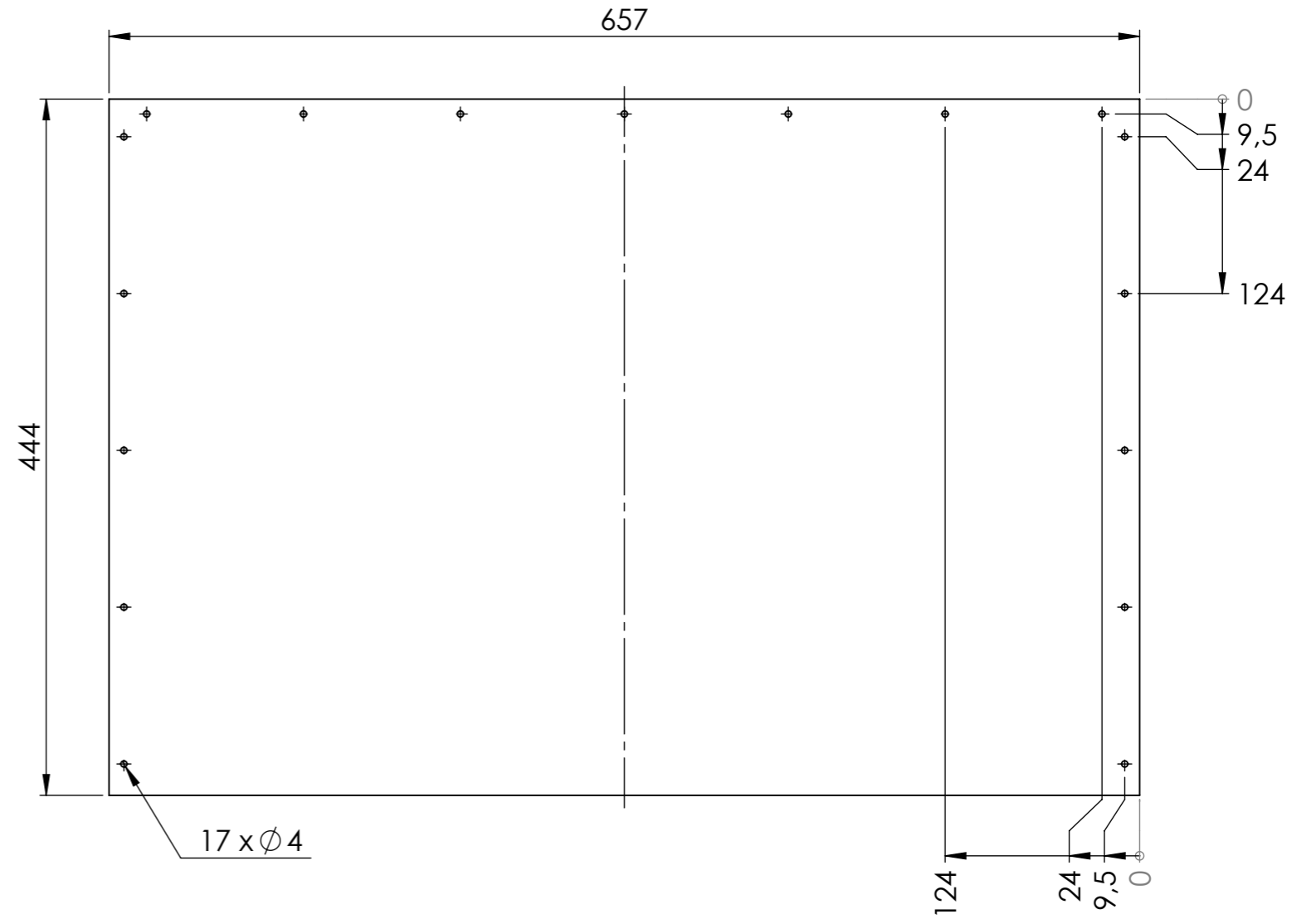
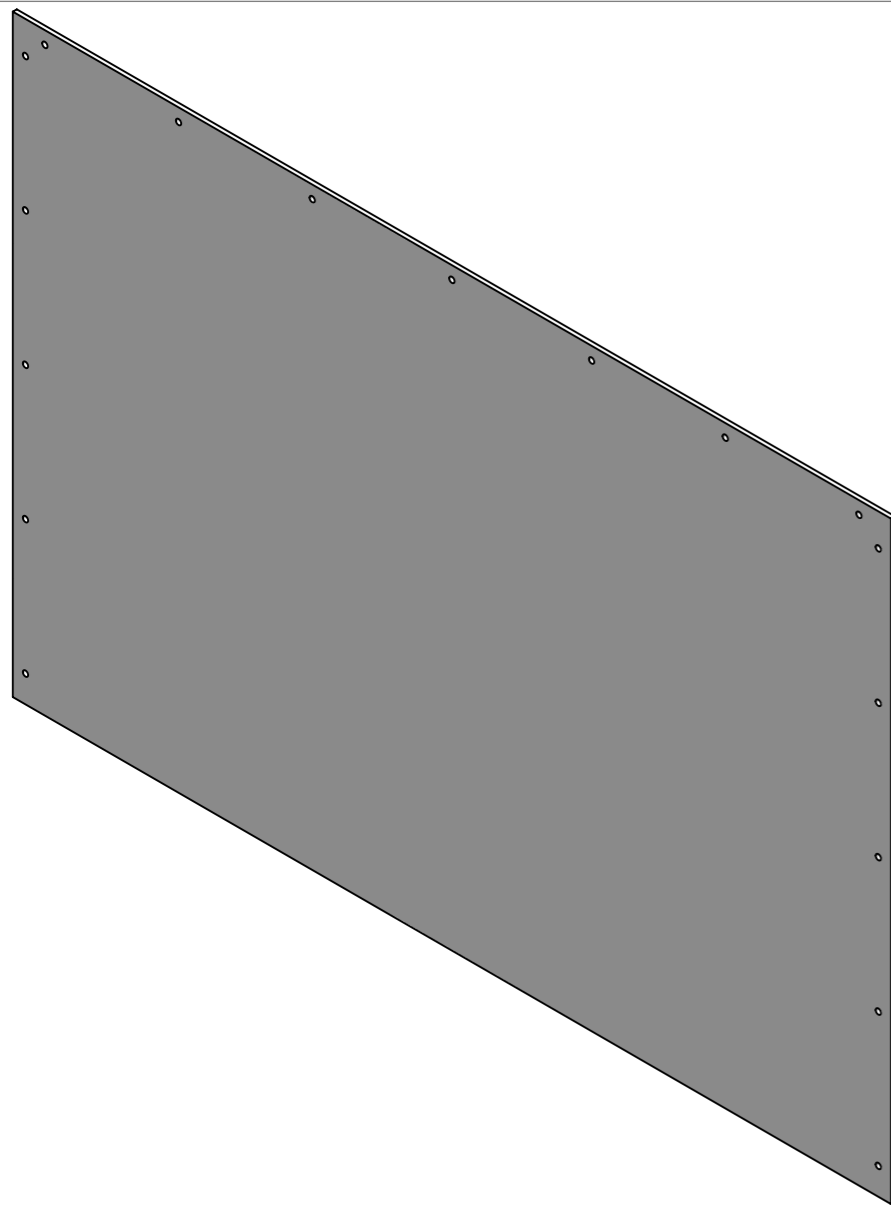
CD3D-00-05-005	CD3D3 Fiberglass hatch		Plate	L585 x W582 x Th.3
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 27.10.2020	APPROVED IN 27.10.2020
MASS/KG 1.04	PROJECT		MATERIAL Dibond	FINISH
FIRST ANGLE 	DESCRIPTION CD3D3 Fiberglass hatch	CONFIGURATION DefaultSM-FLAT-PATTERN	DRAWING NUMBER CD3D-00-05-005	SCALE 1:5
			REVISION 01	SHEET 1 of 1





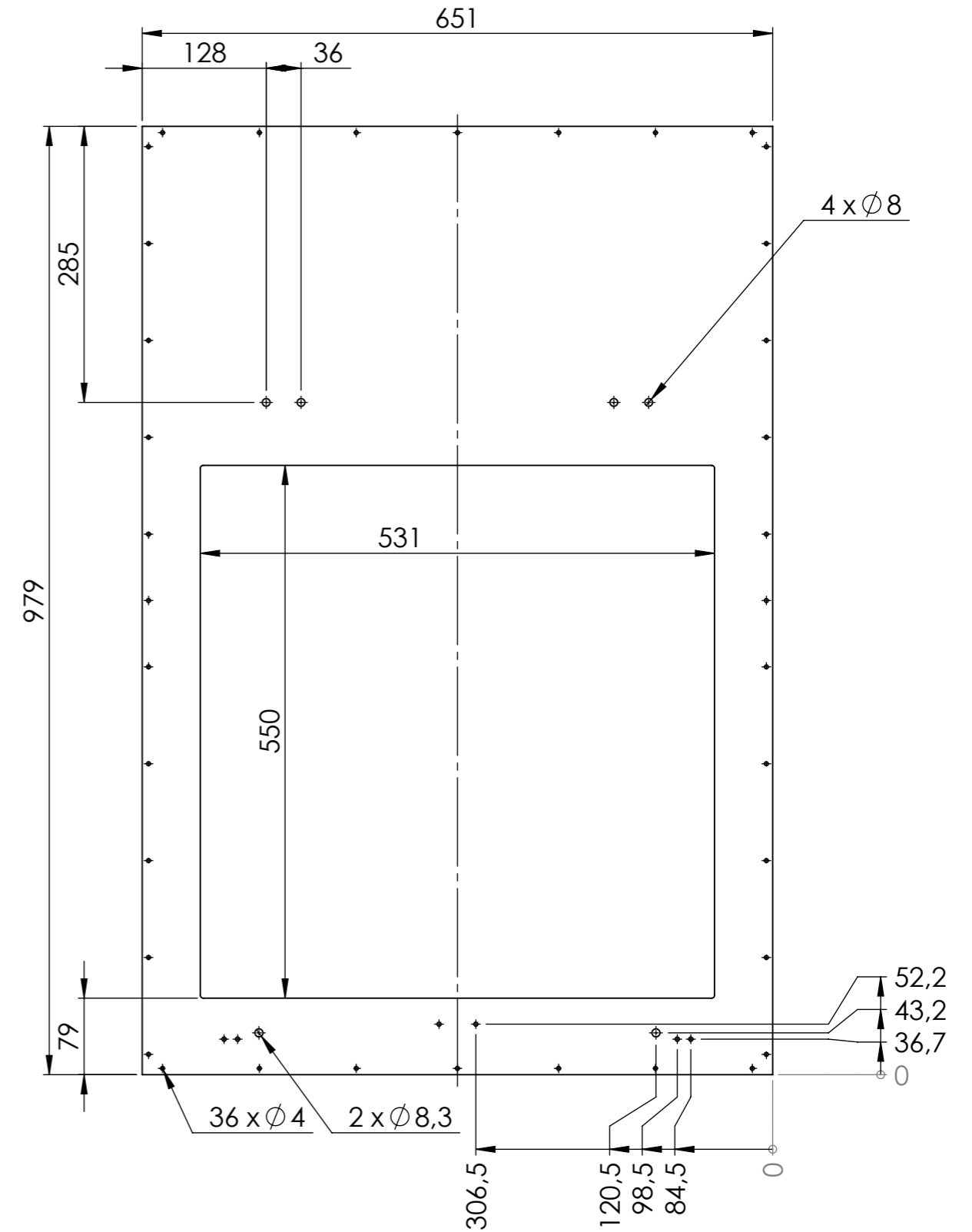
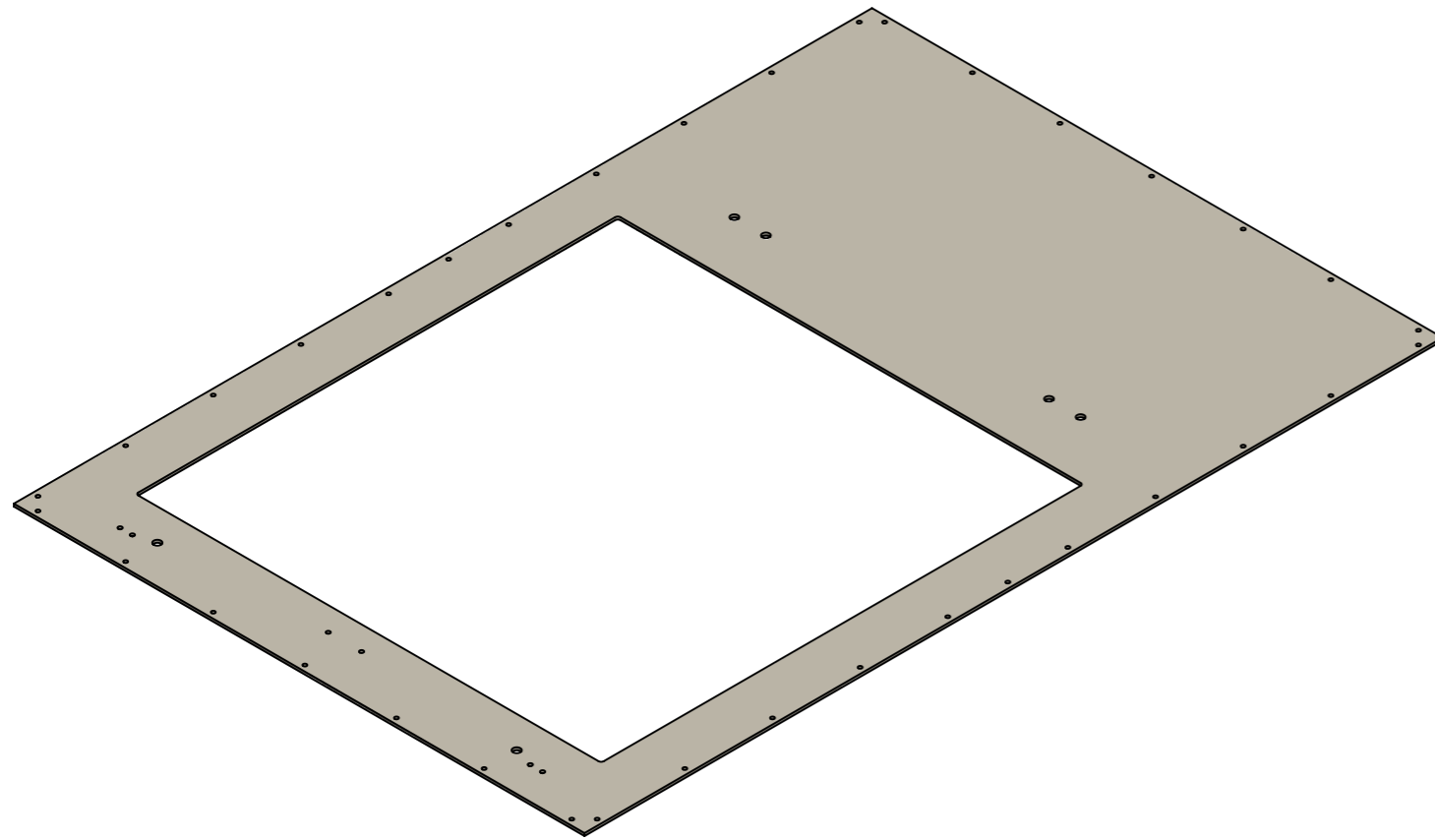
Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN
02	Details added	27.10.2020	IN

CD3D-00-05-006	CD3D3 Dibond Side panel		Plate	L730 x W320 x Th.3	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 27.10.2020	APPROVED <b>IN</b> 27.10.2020	
MASS/KG <b>0.71</b>	PROJECT		MATERIAL <b>Dibond</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>CD3D3 Dibond Side panel</b>	CONFIGURATION <b>Default SM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-006</b>	REVISION <b>02</b>	SCALE <b>1:5</b>
				SHEET <b>1 of 1</b>	



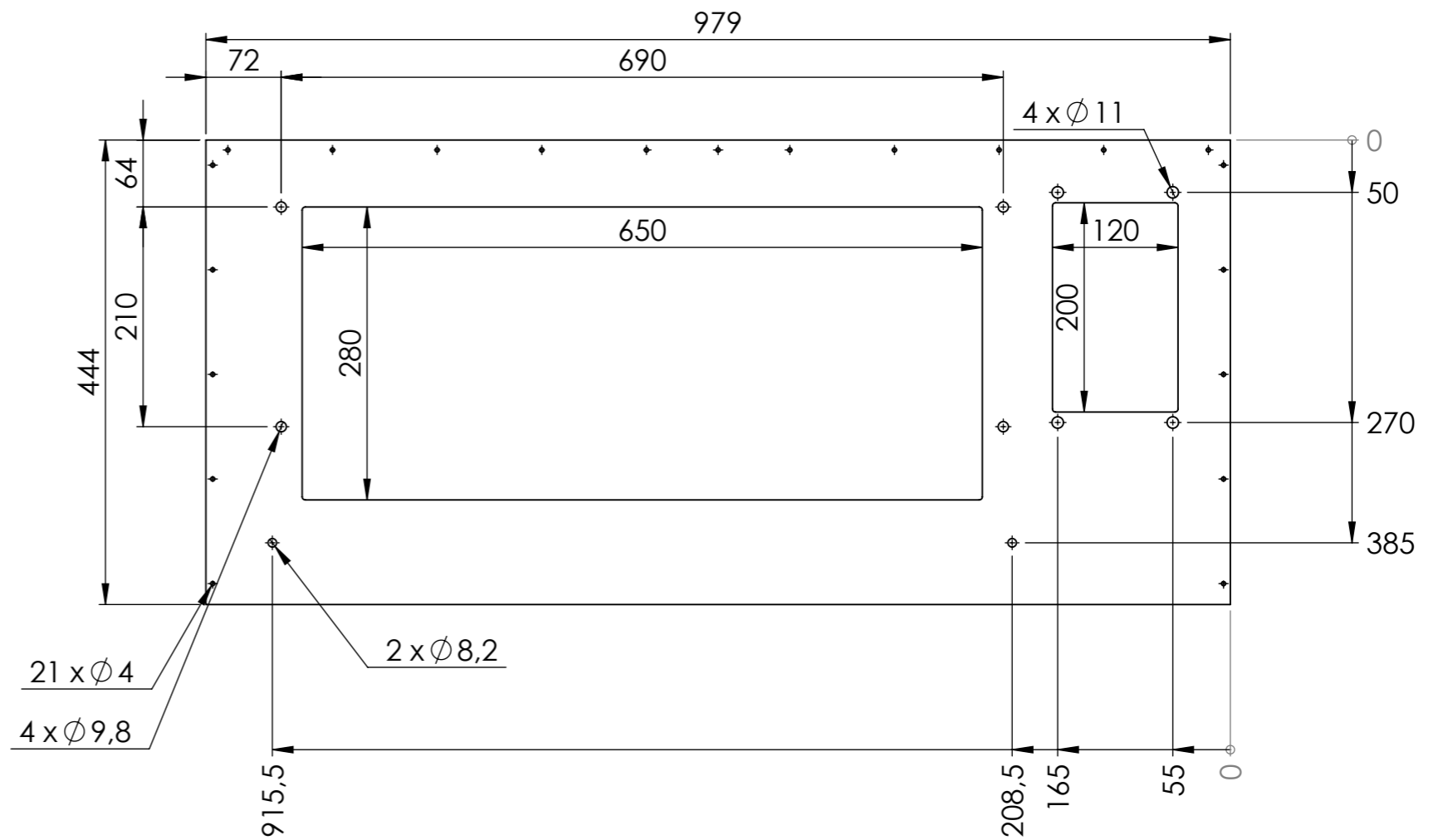
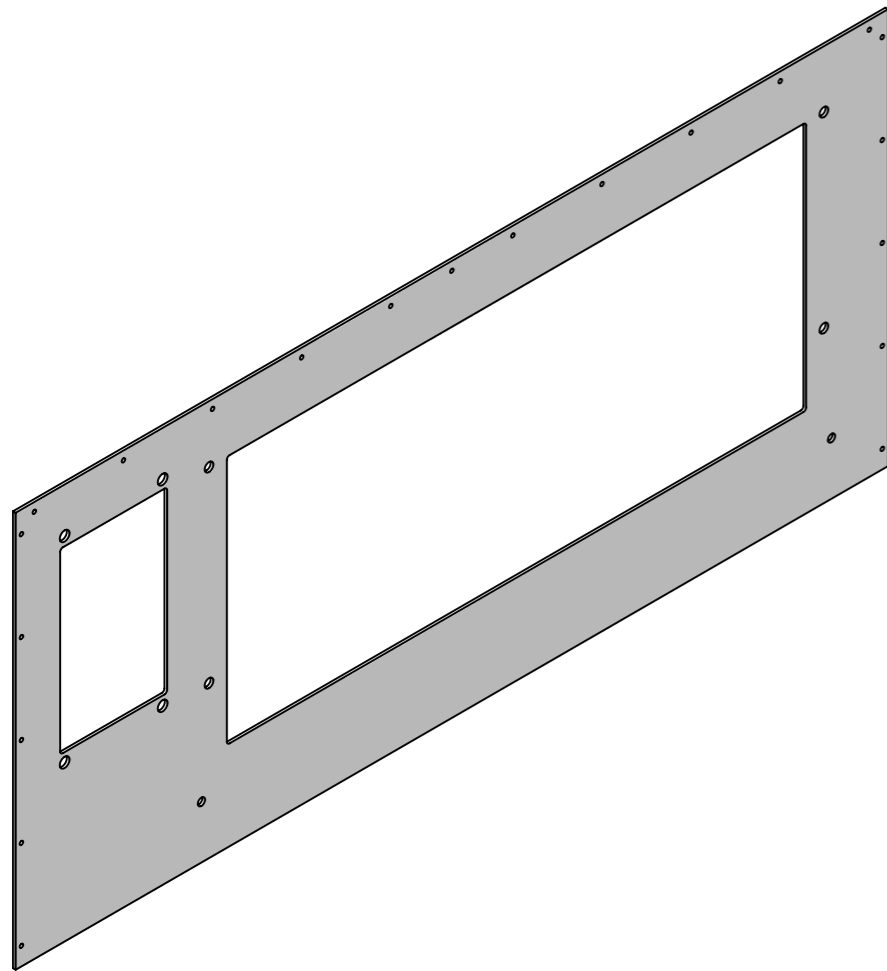
CD3D-00-05-007	CD3D3 Dibond Cover ends		Plate	L657 x W444 x Th.3	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>IlroN</b> 27.10.2020	APPROVED <b>IN</b> 27.10.2020	
MASS/KG <b>0.89</b>	PROJECT <b>CD</b>		MATERIAL <b>Dibond</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>CD3D3 Dibond Cover ends</b>	CONFIGURATION <b>DefaultSM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-007</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>

Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN



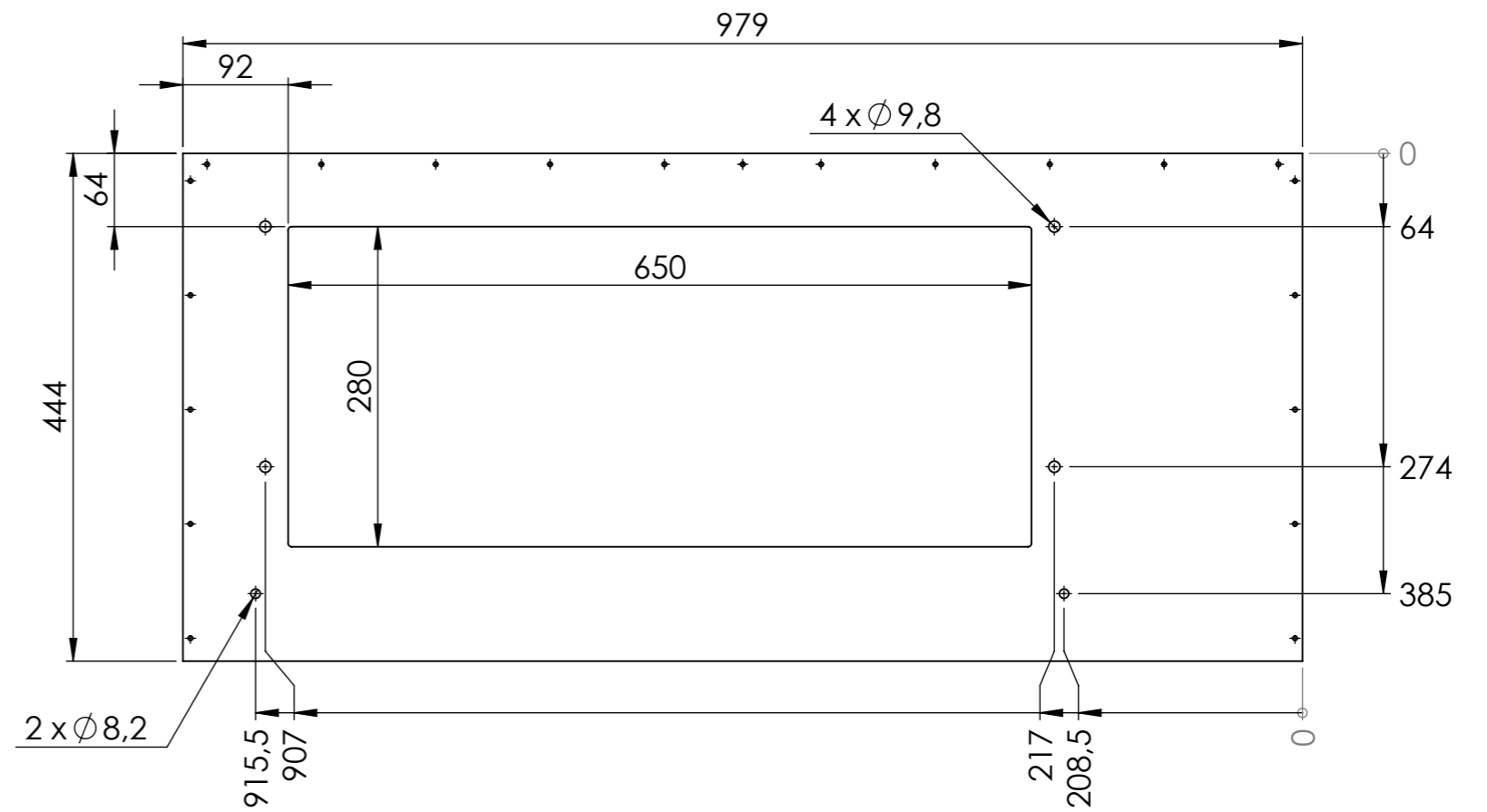
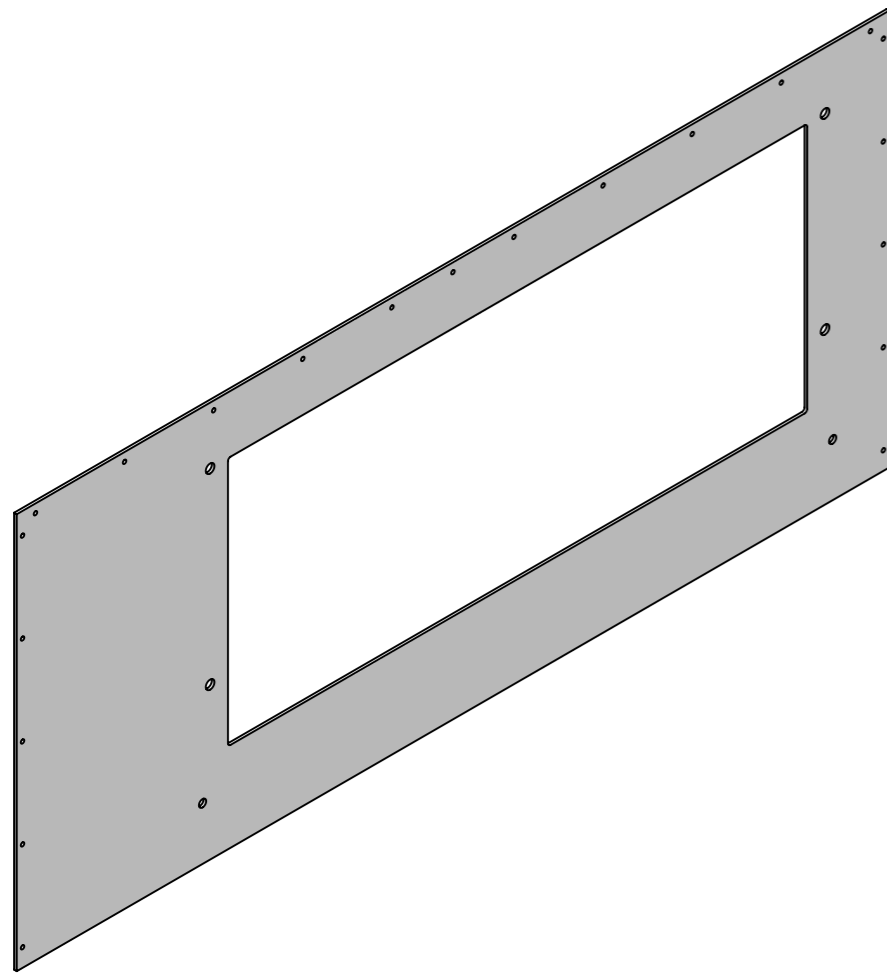
Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN
02	Holesizes added to drawing	10.11.2020	IN



CD3D-00-05-008	CD3D3 Dibond cover top		Plate	L979 x W651 x Th.3
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 27.10.2020	APPROVED IN 10.11.2020
MASS/KG 1.05	PROJECT CD		MATERIAL Dibond	FINISH
FIRST ANGLE 	DESCRIPTION CD3D3 Dibond cover top	CONFIGURATION DefaultSM-FLAT-PATTERN	DRAWING NUMBER CD3D-00-05-008	SCALE 1:6
			REVISION 02	SHEET 1 of 1

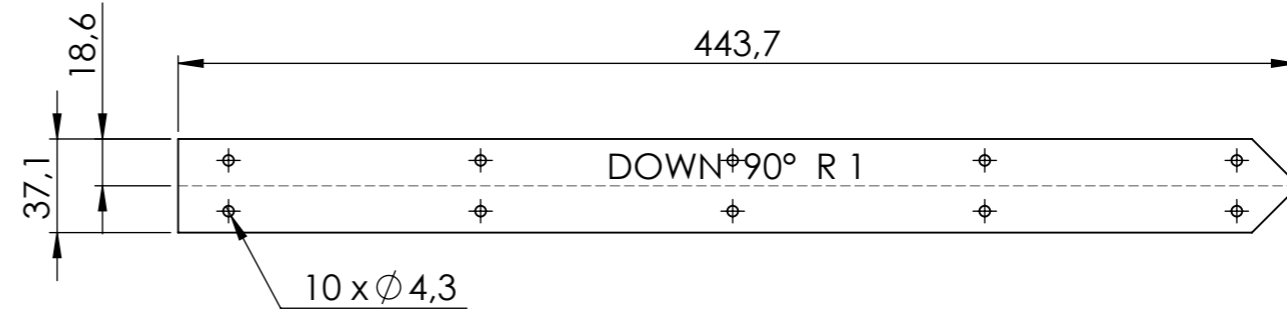
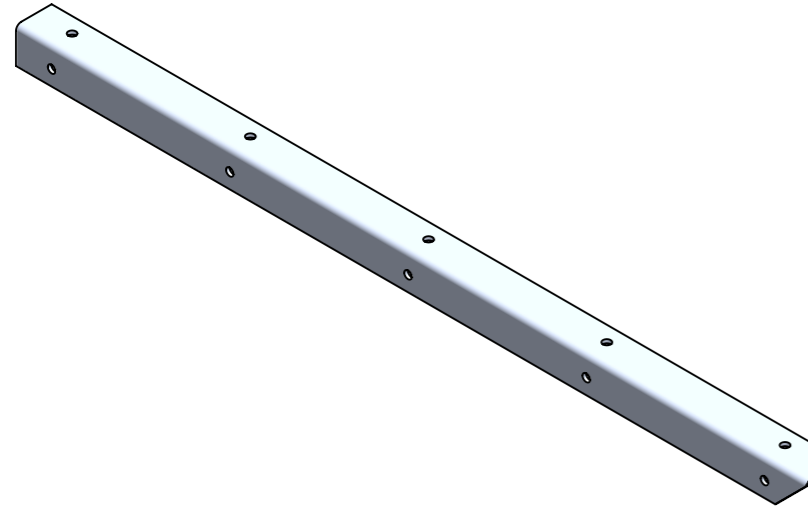


Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN
02	Mounting holes moved	28.10.2020	IN


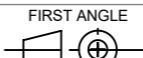
PartNo.	Description	Info	Preform type	Preform Dimension	
CD3D-00-05-009	CD3D3 Dibond cover side 2		Plate	L979 x W444 x Th.3	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 27.10.2020	APPROVED IN 28.10.2020	
MASS/KG 0.70	PROJECT CD		MATERIAL Dibond	FINISH	PAPER A3
FIRST ANGLE	DESCRIPTION CD3D3 Dibond cover side 2	CONFIGURATION DefaultSM-FLAT-PATTERN	DRAWING NUMBER CD3D-00-05-009	REVISION 02	SHEET 1 of 1

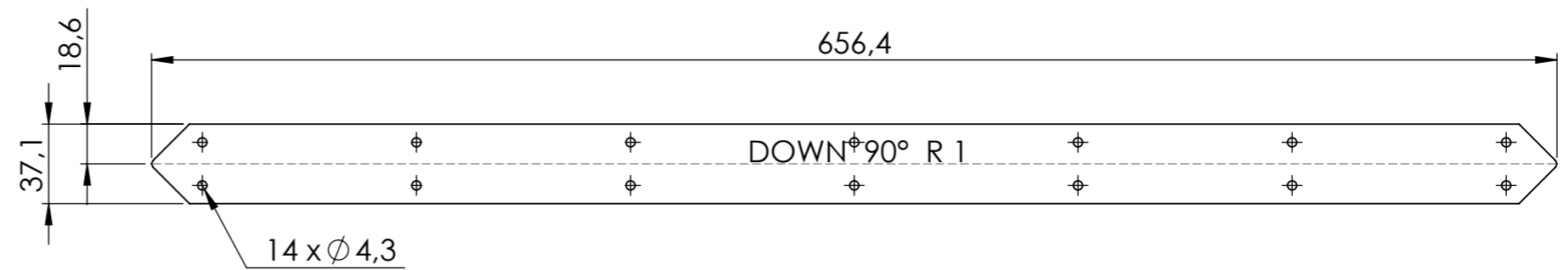
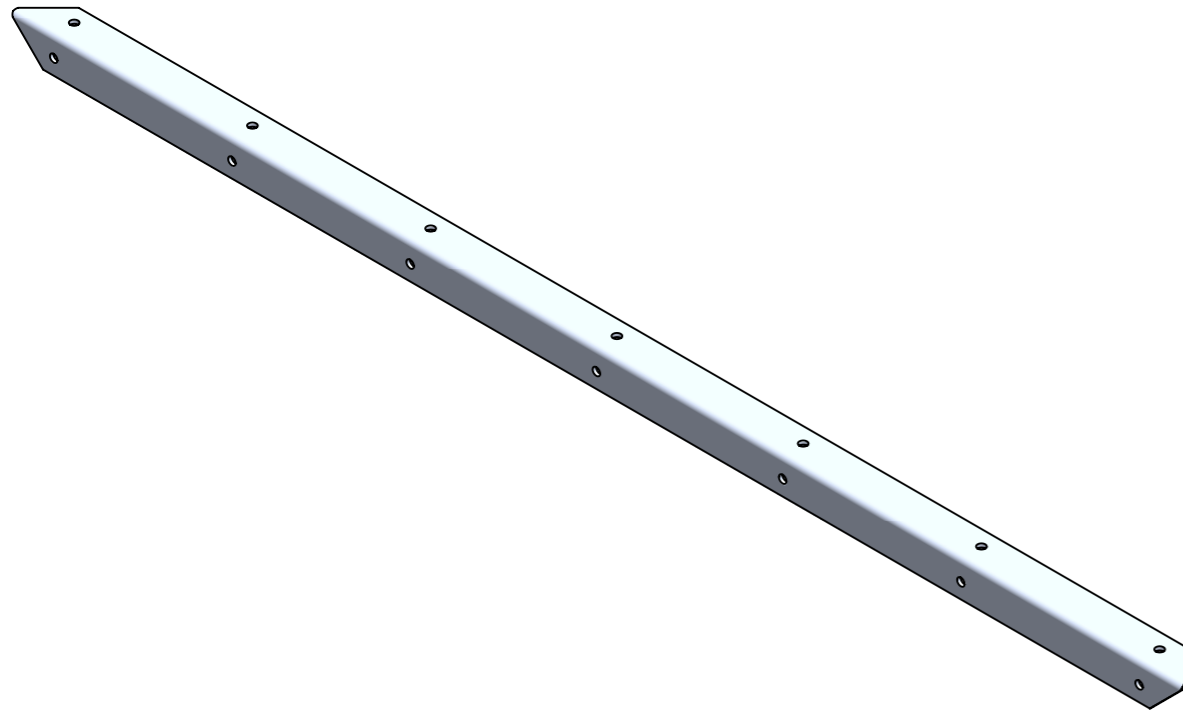


CD3D-00-05-010	CD3D3 Dibond cover side 1		Plate	L979 x W444 x Th.3
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 27.10.2020	APPROVED IN 27.10.2020
MASS/KG 0.77	PROJECT CD		MATERIAL Dibond	FINISH
FIRST ANGLE 	DESCRIPTION CD3D3 Dibond cover side 1	CONFIGURATION DefaultSM-FLAT-PATTERN	DRAWING NUMBER CD3D-00-05-010	SCALE 1:6
Revision	Description	Date	Approved	
01	Initial design	27.10.2020	IN	
				REVISION 01
				SHEET 1 of 1



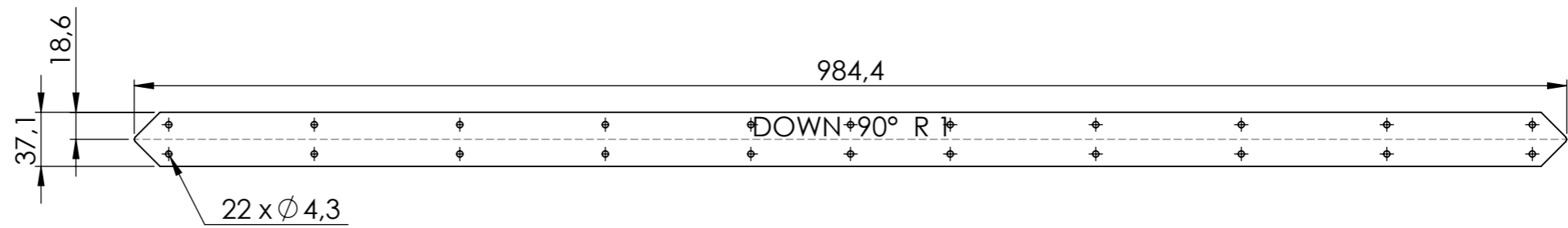
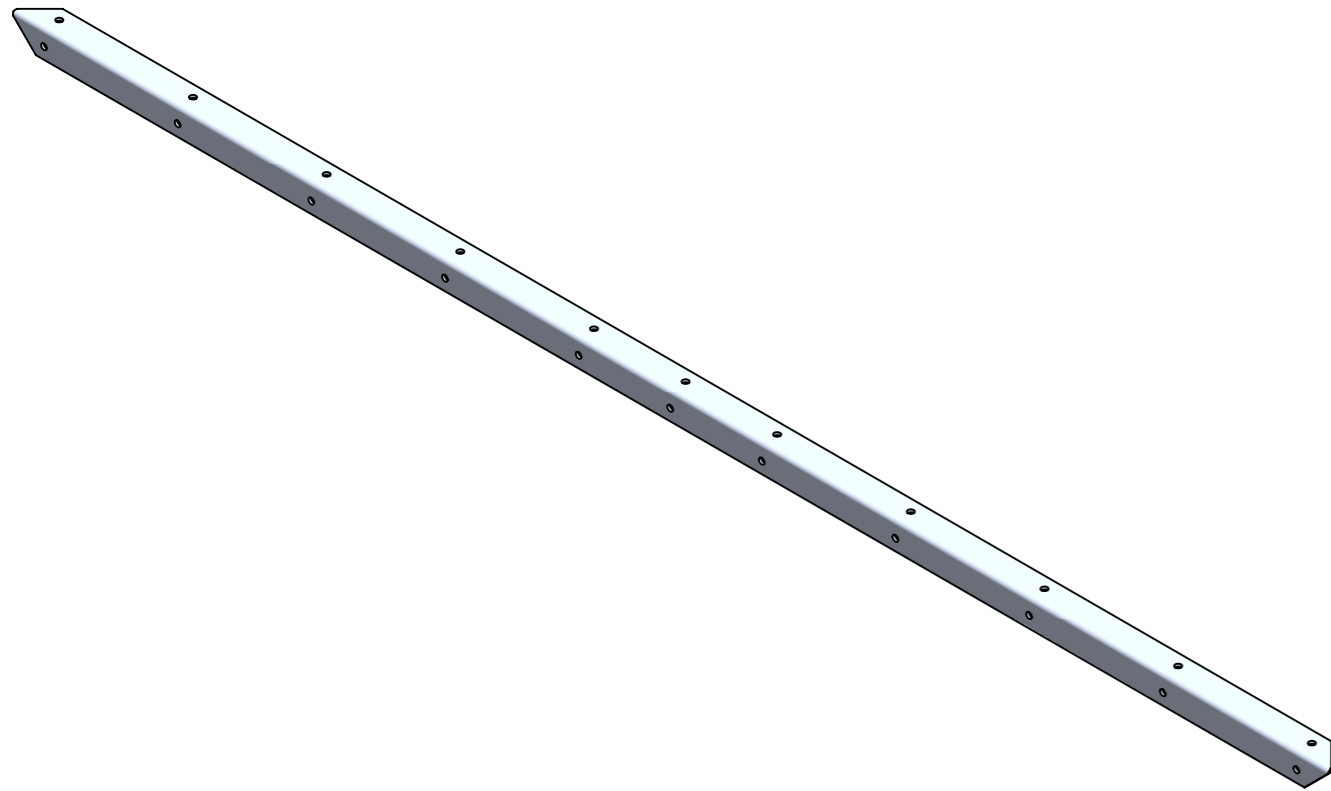
Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN
02	Holes added	27.10.2020	IN
03	Material changed	28.10.2020	IN

CD3D-00-05-011	Shell alu corner1		Plate	L444 x W38 x Th.2	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 27.10.2020	APPROVED <b>IN</b> 28.10.2020	
MASS/KG <b>0.09</b>	PROJECT		MATERIAL <b>6063-T5</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Shell alu corner1</b>	CONFIGURATION <b>MainSM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-011</b>	REVISION <b>03</b>	SCALE <b>1:3</b>
					SHEET <b>1 of 1</b>



Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN
02	Material changed	28.10.2020	IN

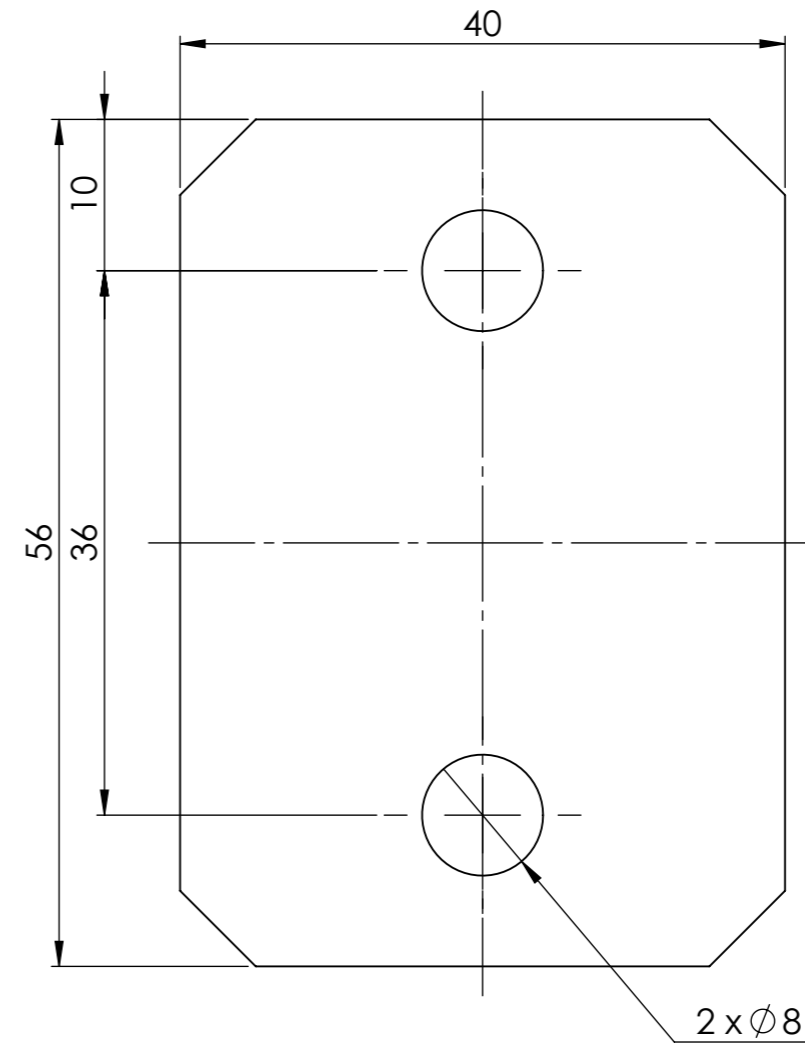
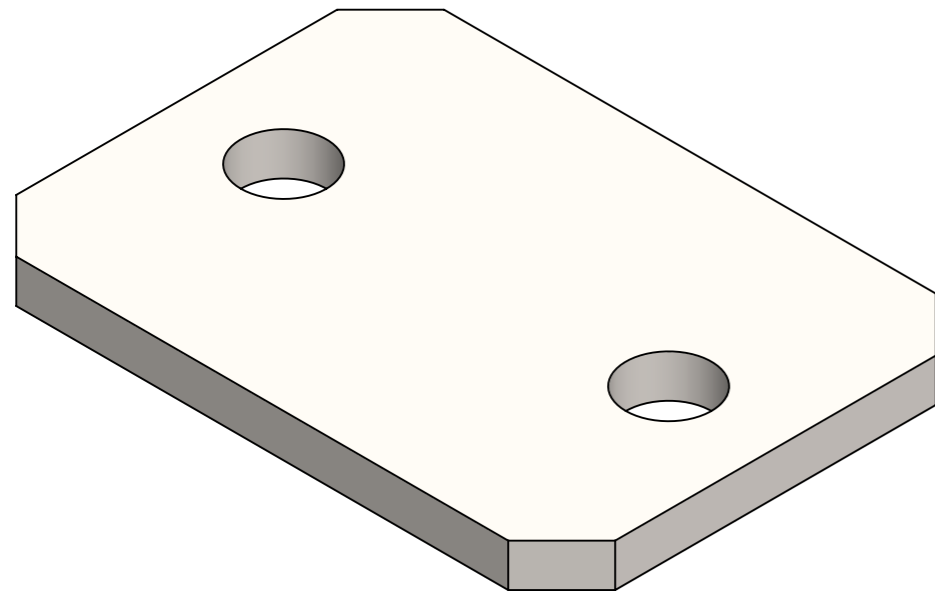
CD3D-00-05-012	Shell alu corner2		Plate	L657 x W38 x Th.2	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY IiroN 27.10.2020	APPROVED IN 28.10.2020	
MASS/KG 0.13	PROJECT CD		FINISH	PAPER A3	SCALE 1:3
FIRST ANGLE	DESCRIPTION Shell alu corner2	CONFIGURATION MainSM-FLAT-PATTERN	DRAWING NUMBER CD3D-00-05-012	REVISION 02	SHEET 1 of 1



Revision	Description	Date	Approved
01	Initial design	27.10.2020	IN
02	Material changed	28.10.2020	IN

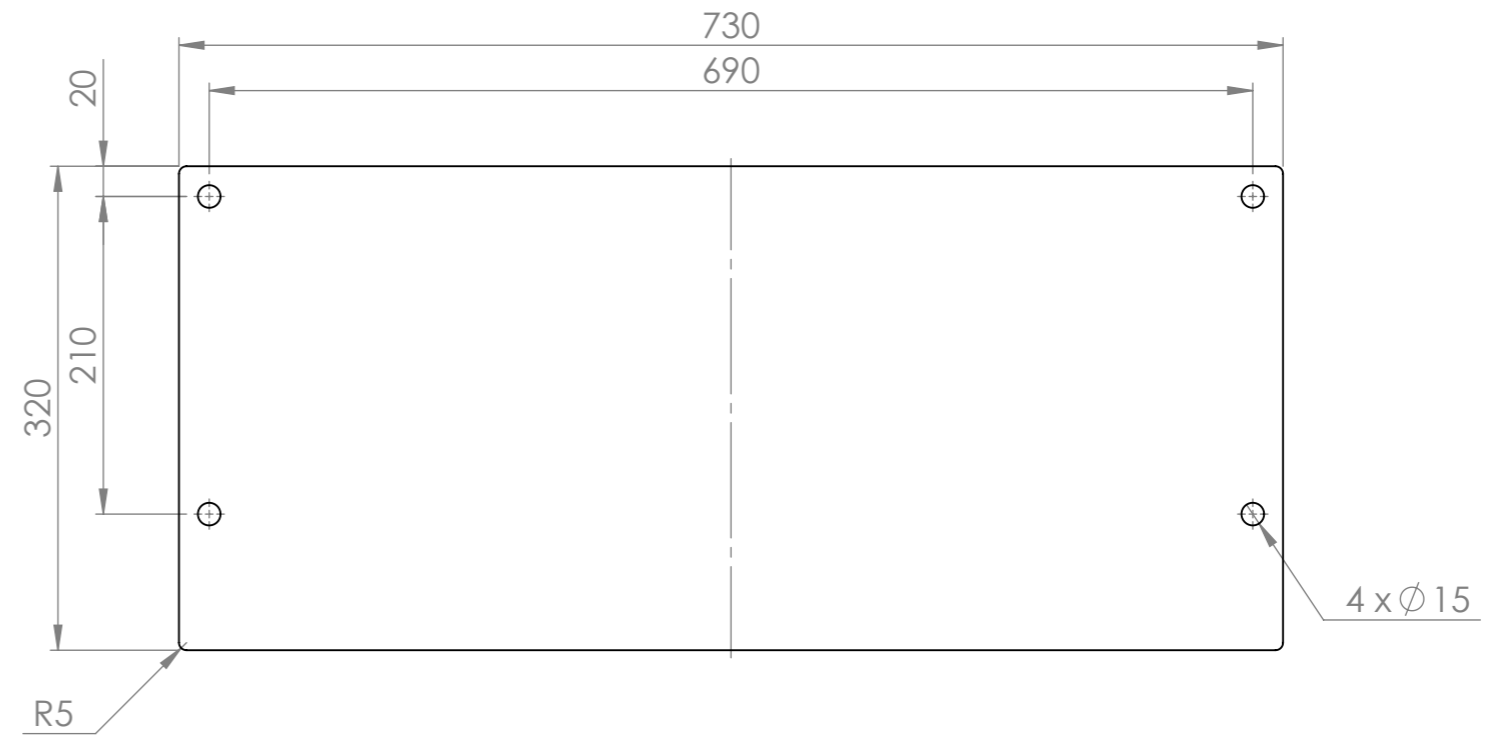
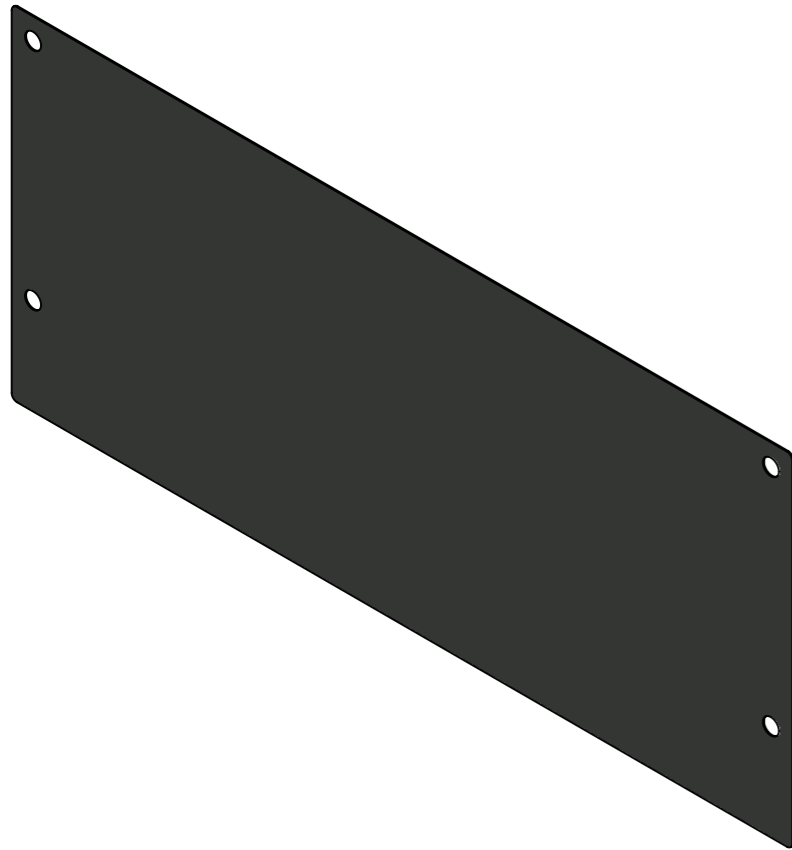
CD3D-00-05-013	Shell alu corner3		Plate	L985 x W38 x Th.2	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY liron	APPROVED IN	
MASS/KG 0.19	PROJECT CD		MATERIAL 6063-T5	27.10.2020	28.10.2020
FIRST ANGLE	DESCRIPTION Shell alu corner3	CONFIGURATION MainSM-FLAT-PATTERN	FINISH	PAPER A3	SCALE 1:4
			DRAWING NUMBER CD3D-00-05-013	REVISION 02	SHEET 1 of 1





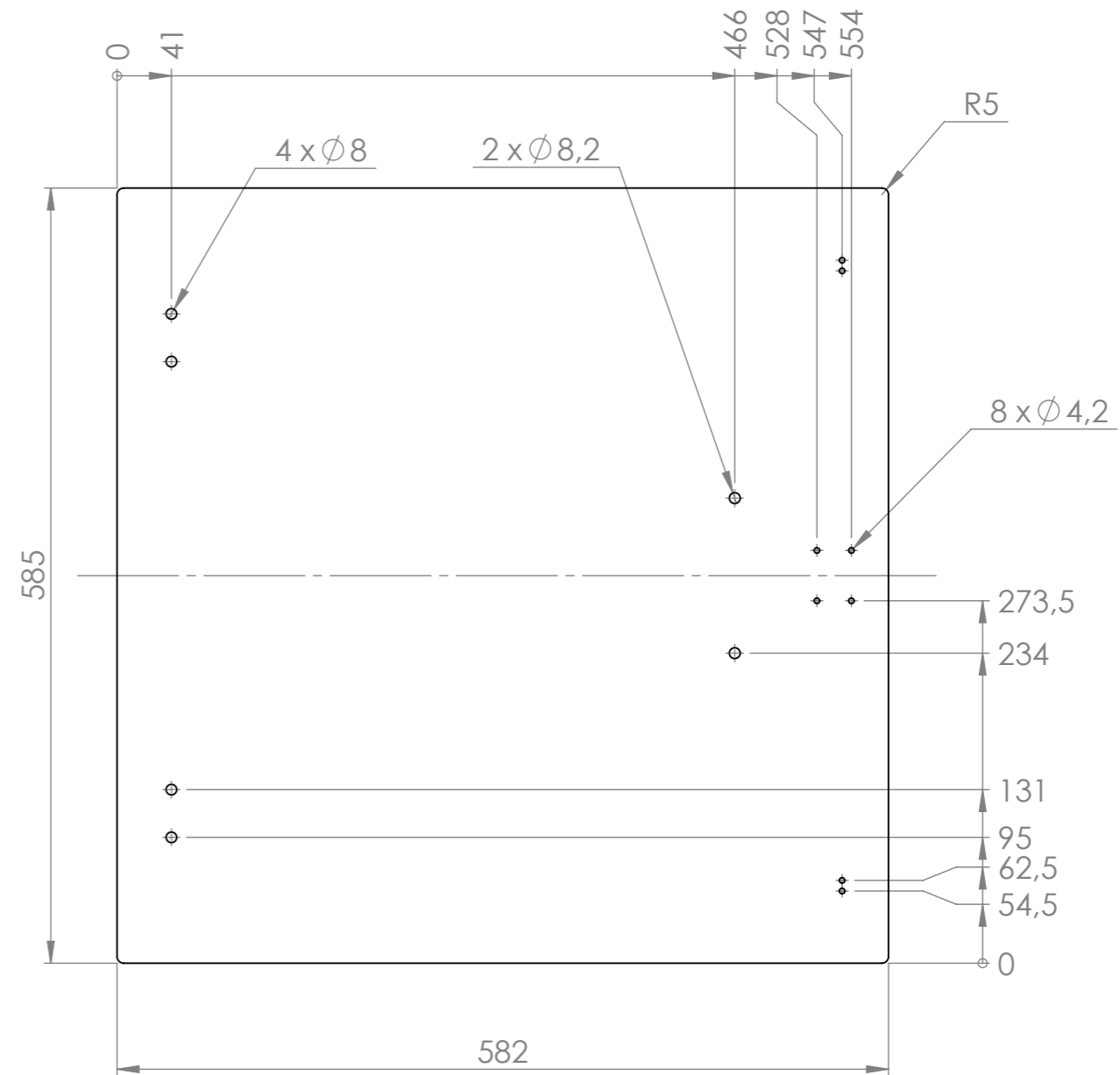
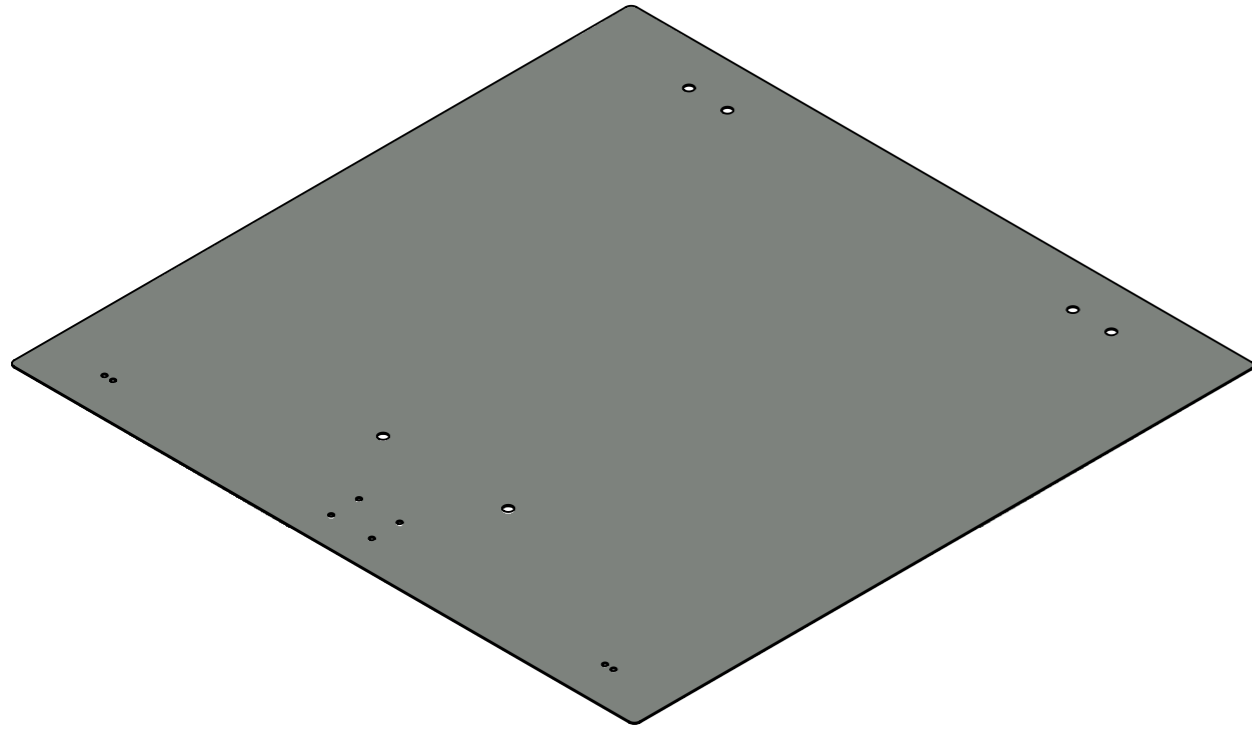
Revision	Description	Date	Approved
01	Initial design	09.11.2020	IN

CD3D-00-05-014	Cover hatch undermount plates		Plate	L56 x W40 x Th.4	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 09.11.2020	APPROVED <b>IN</b> 09.11.2020	
MASS/KG <b>0.07</b>	PROJECT <b>CD</b>		FINISH	PAPER <b>A3</b>	SCALE <b>2:1</b>
FIRST ANGLE 	DESCRIPTION <b>Cover hatch undermount plates</b>	CONFIGURATION <b>MainSM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-014</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>
			MATERIAL <b>1.0553 (\$355J0)</b>		

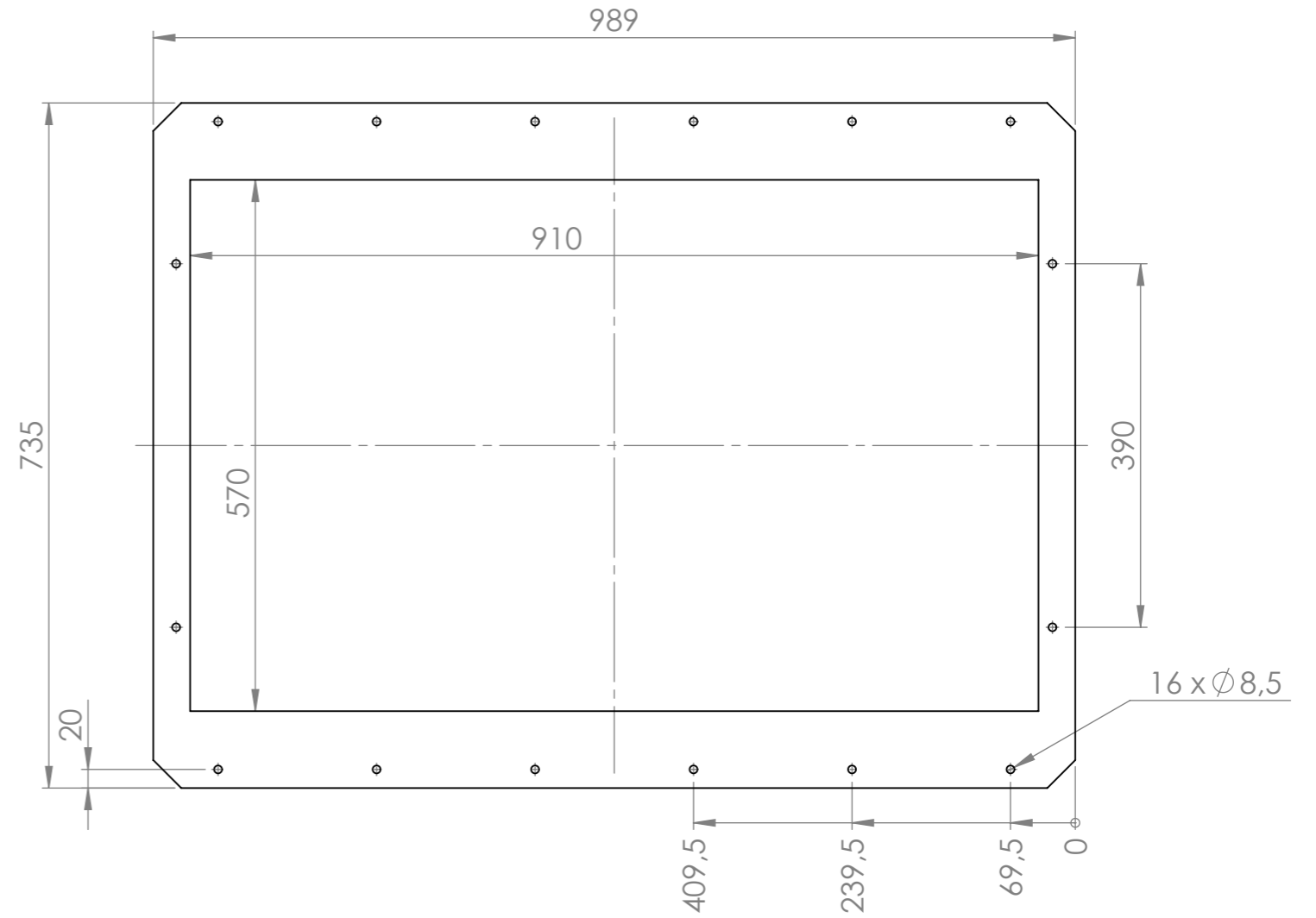
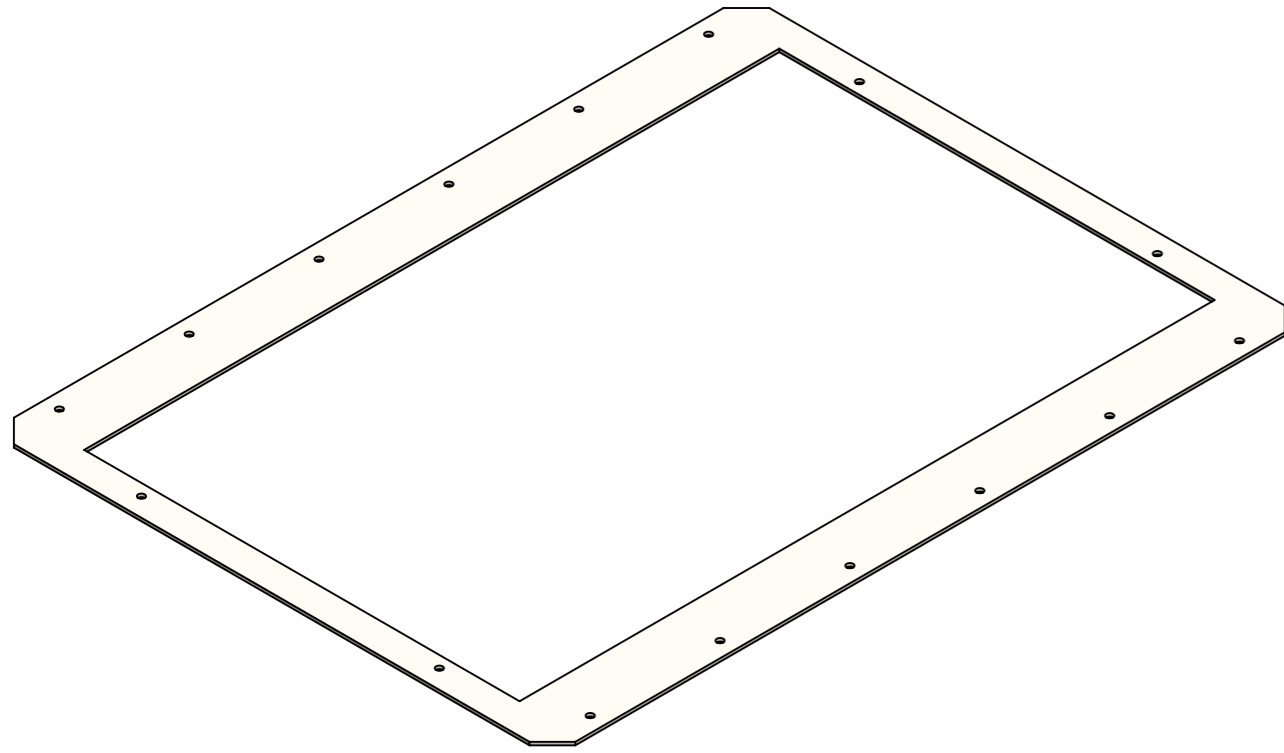


Revision	Description	Date	Approved
01	Initial design	14.12.2020	IN

CD3D-00-05-015	CD3D3 Cover side panel lead		Plate	L730 x W320 x Th.1	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 14.12.2020	APPROVED <b>IN</b> 14.12.2020	
MASS/KG <b>2.56</b>	PROJECT <b>CD</b>		MATERIAL <b>Pure Lead</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE	DESCRIPTION <b>CD3D3 Cover side panel lead</b>	CONFIGURATION <b>Default SM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-015</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>

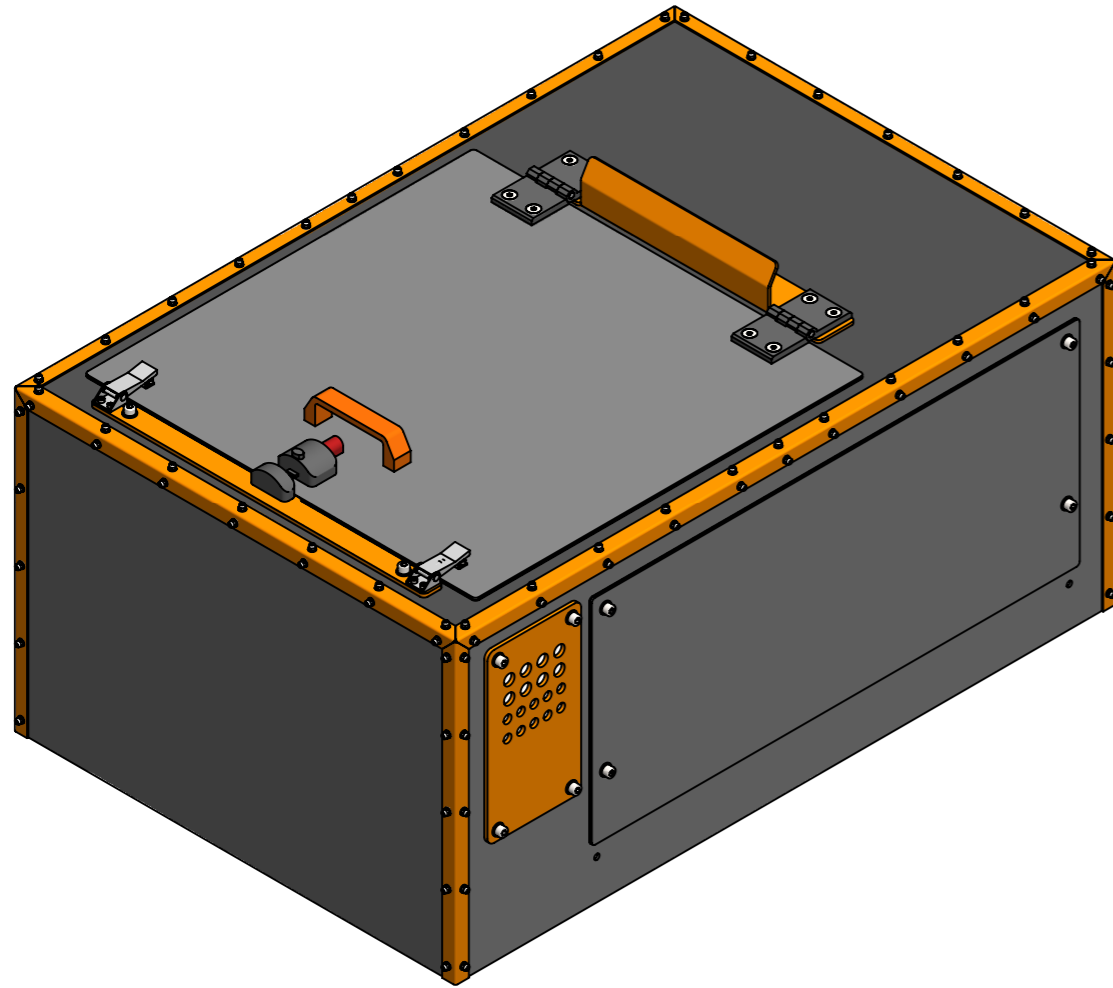


CD3D-00-05-016	CD3D3 Cover hatch lead		Plate	L585 x W582 x Th.1
PartNo.	Description	Info	Preform type	Preform Dimension
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 14.12.2020	APPROVED <b>IN</b> 14.12.2020
MASS/KG 3.74	PROJECT CD		MATERIAL <b>Pure Lead</b>	FINISH
FIRST ANGLE	DESCRIPTION <b>CD3D3 Cover hatch lead</b>	CONFIGURATION <b>Default SM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-016</b>	SCALE <b>1:5</b>
Revision	Description	Date	Approved	SHEET <b>1 of 1</b>
01	Initial design	14.12.2020	IN	



Revision	Description	Date	Approved
01	Initial design	28.12.2020	IN

CD3D-00-05-018	Conveyor flange mount		Plate	L989 x W735 x Th.4	
PartNo.	Description	Info	Preform type	Preform Dimension	
DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 28.12.2020	APPROVED <b>IN</b> 28.12.2020	
MASS/KG <b>6.41</b>	PROJECT <b>CD</b>		MATERIAL <b>1.0553 (\$355J0)</b>	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>Conveyor flange mount</b>	CONFIGURATION <b>DefaultSM-FLAT-PATTERN</b>	DRAWING NUMBER <b>CD3D-00-05-018</b>	REVISION <b>01</b>	SHEET <b>1 of 1</b>

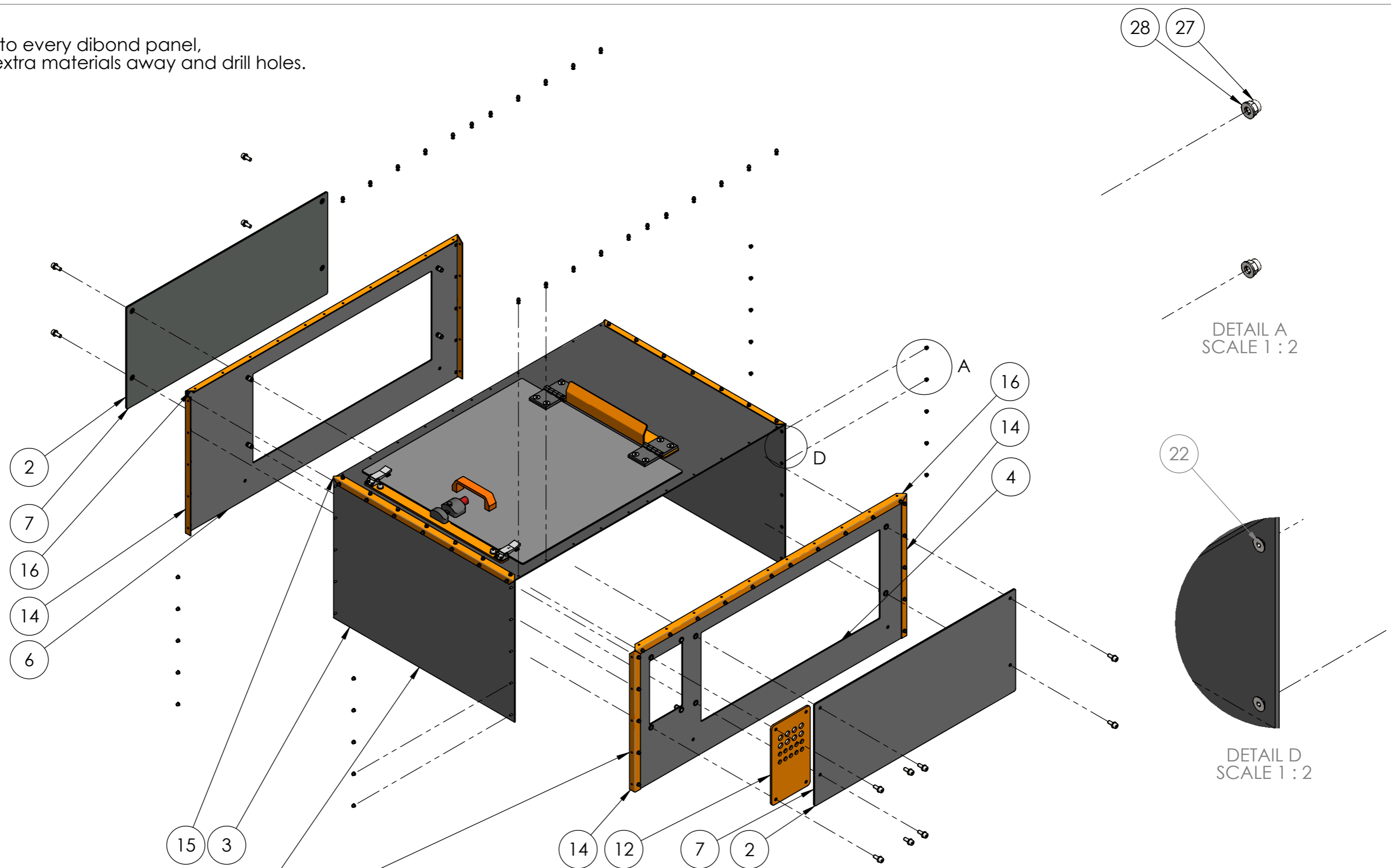


30		M4x10 Hexagon socket head cap screw ISO 4762				2
29		M4x16 Hexagon socket head cap screw ISO 4762				12
28		Washer 4 mm ISO 7089				122
27		M4 Prevailing torque type hexagon nut ISO 7040				120
26		M8x20 Hexagon socket head cap screw ISO 4762				16
25		M8 Prevailing torque type hexagon nut ISO 7040				10
24		Washer 8 mm ISO 7089				26
23		M8x30 Hexagon socket countersunk head screw ISO 10642				8
22		M4x12 Hexagon socket countersunk head screw ISO 10642				111
21		Bridge handlesM.543_140 B-M8-C2				1
20		Hook clamps TLT.SST-22_60-70+R(2)				2
19		CKE.40 B-M5(0) Locking bolt				1
18		Hinges CMM.60-120-SH-8(0)				2
17		rivet_nut_M8				12
16	CD3D-00-05-013	Shell alu corner3		Plate	L985 x W38 x Th.2	2
15	CD3D-00-05-012	Shell alu corner2		Plate	L657 x W38 x Th.2	2
14	CD3D-00-05-011	Shell alu corner1		Plate	L444 x W38 x Th.2	4
13	CD3D-00-05-014	Cover hatch undermount plates		Plate	L56 x W40 x Th.4	2
12	CD3D-00-05-004	CD3D3 Fiberglass Cable panel		Plate	L250 x W140 x Th.5	1
11	CD3D-00-05-001	CD3D3 Fiberglass hatch mount plate		Plate	L431 x W113 x Th.4	1
10	CD3D-00-05-003	CD3D3 Fiberglass hatch reinforcement		Plate	L540 x W525 x Th.3	1
9	CD3D-00-05-002	CD3D3 Fiberglass lock and latch plate		Plate	L500 x W33 x Th.5	1
8	CD3D-00-05-016	CD3D3 Cover hatch lead		Plate	L585 x W582 x Th.1	1
7	CD3D-00-05-015	CD3D3 Cover side panel lead		Plate	L730 x W320 x Th.1	2
6	CD3D-00-05-010	CD3D3 Dibond cover side 1		Plate	L979 x W444 x Th.3	1
5	CD3D-00-05-008	CD3D3 Dibond cover top		Plate	L979 x W651 x Th.3	1
4	CD3D-00-05-009	CD3D3 Dibond cover side 2		Plate	L979 x W444 x Th.3	1
3	CD3D-00-05-007	CD3D3 Dibond Cover ends		Plate	L657 x W444 x Th.3	2
2	CD3D-00-05-006	CD3D3 Dibond Side panel		Plate	L730 x W320 x Th.3	2
1	CD3D-00-05-005	CD3D3 Fiberglass hatch		Plate	L585 x W582 x Th.3	1
No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty

DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> 09.11.2020	APPROVED <b>IN</b> 30.12.2020	
MASS/KG <b>21.51</b>	PROJECT <b>CD</b>		MATERIAL	FINISH <b>A3</b>	SCALE <b>1:10</b>
FIRST ANGLE 	DESCRIPTION <b>CD3D3 Cover assy</b>	CONFIGURATION <b>Default</b>	DRAWING NUMBER <b>CD3D-00-05-801</b>	REVISION <b>01</b>	SHEET <b>1 of 3</b>

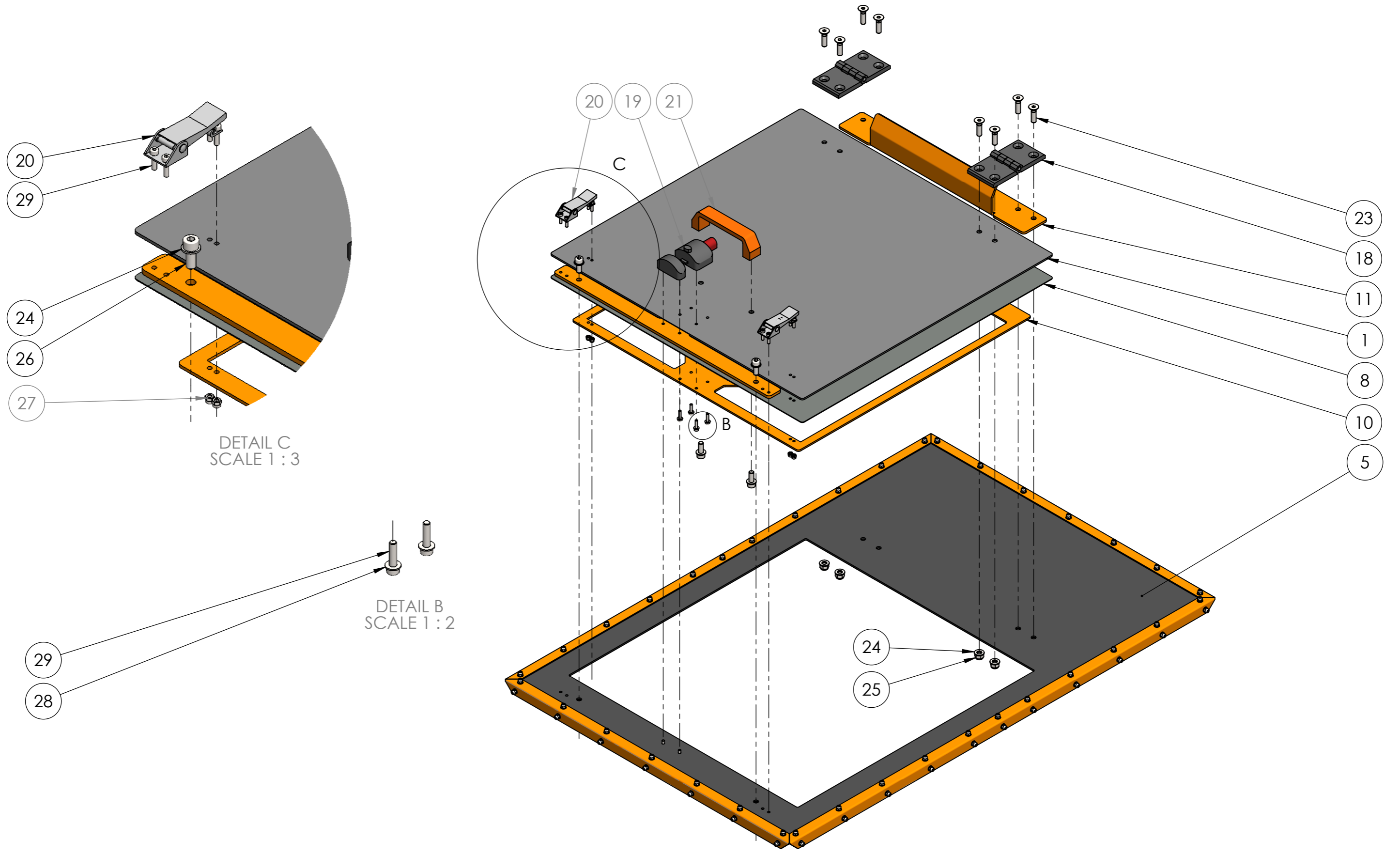
Revision	Description	Date	Approved
01	Updated cover	30.12.2020	IN

Glue 1mm lead to every dibond panel, let dry and cut extra materials away and drill holes.



- 1) Assemble these 3 dibonds with lead together
- 2) Assemble and mount sidepanels.
- 3) Assemble top latch and mount it on(see page 3).

DEBURR AND BREAK SHARP EDGES MASS/KG <b>21.51</b>	GENERAL TOLERANCES MACHINING: ISO 2768-mK WELDED CONSTRUCTION: EN ISO 13920-BF WELDING QUALITY LEVEL: C FLAME CUTTING: ISO 9013-331 CASTING: ISO 8062-CT 11 STAMPING: SFS 5803-m	 <a href="http://www.finnos.fi">www.finnos.fi</a>	DRAWN BY <b>liron</b> <b>09.11.2020</b>	APPROVED <b>IN</b> <b>30.12.2020</b>	
	PROJECT <b>CD</b>		MATERIAL	FINISH	PAPER <b>A3</b>
FIRST ANGLE 	DESCRIPTION <b>CD3D3 Cover assy</b>	CONFIGURATION <b>Default</b>	DRAWING NUMBER <b>CD3D-00-05-801</b>	REVISION <b>01</b>	SHEET <b>2 of 3</b>



DETAIL C  
SCALE 1 : 3

DETAIL B  
SCALE 1 : 2

DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

MASS/KG 21.51  
 PROJECT CD

FIRST ANGLE  
 DESCRIPTION CD3D3 Cover assy



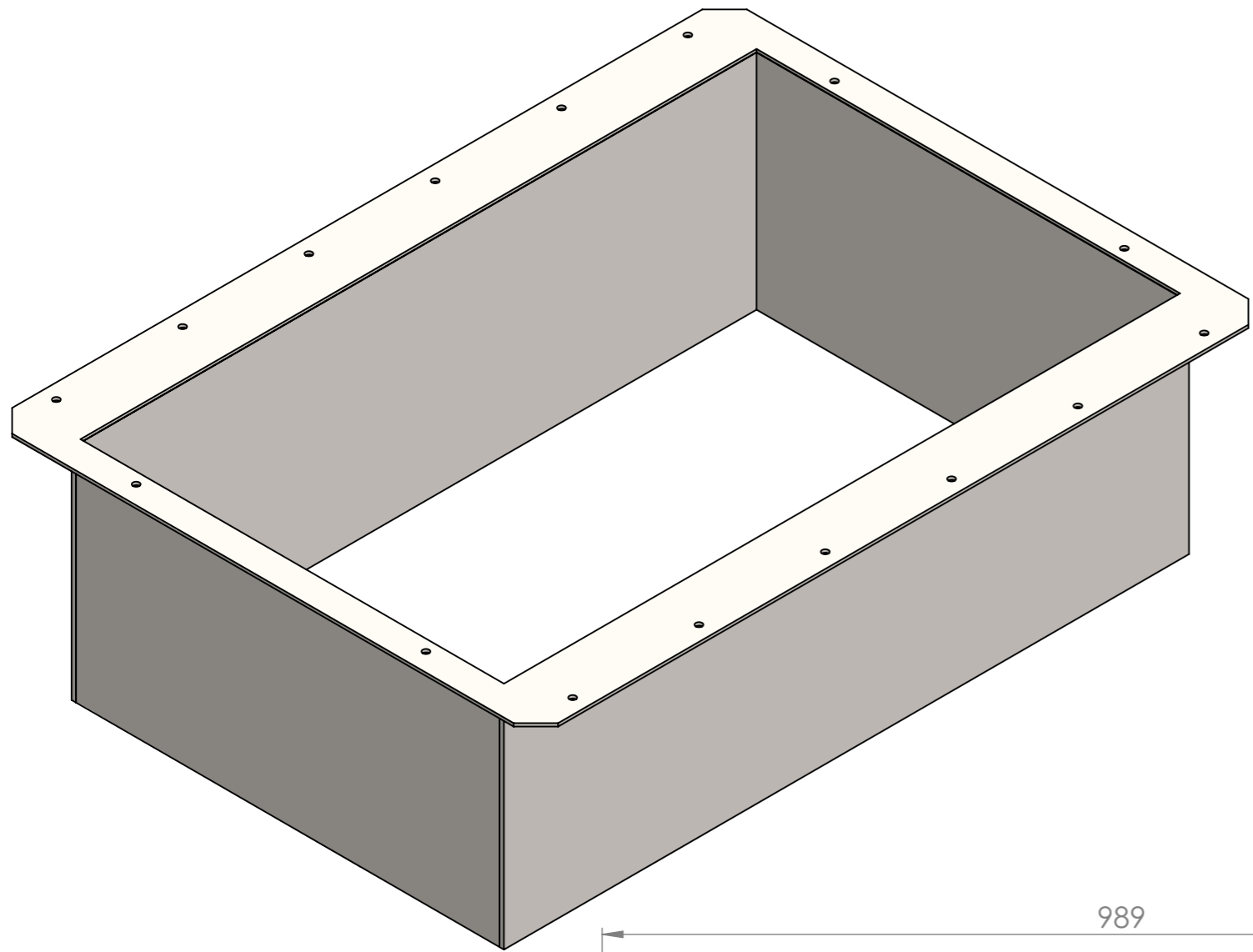
CONFIGURATION Default

DRAWN BY ilroN  
 09.11.2020  
 APPROVED IN 30.12.2020

MATERIAL

FINISH PAPER A3 SCALE 1:10

DRAWING NUMBER CD3D-00-05-801 REVISION 01 SHEET 3 of 3



No.	PartNo.	Description	Info	Preform type	Preform Dimension	Qty
3	CD3D-00-01-019	Conveyor mount flange2		Plate	L922 x W300 x Th.6	2
2	CD3D-00-01-017	Conveyor mount flange1		Plate	L570 x W300 x Th.6	2
1	CD3D-00-05-018	Conveyor flange mount		Plate	L989 x W735 x Th.4	1

DEBURR AND BREAK SHARP EDGES  
 GENERAL TOLERANCES  
 MACHINING: ISO 2768-mK  
 WELDED CONSTRUCTION: EN ISO 13920-BF  
 WELDING QUALITY LEVEL: C  
 FLAME CUTTING: ISO 9013-331  
 CASTING: ISO 8062-CT 11  
 STAMPING: SFS 5803-m

**FINNOS**  
 www.finnos.fi

DRAWN BY  
 ilroN  
 28.12.2020  
 MATERIAL  
 APPROVED  
 IN  
 28.12.2020

MASS/KG  
 48.31  
 PROJECT  
 CD

FINISH  
 PAPER  
 A3  
 SCALE  
 1:6

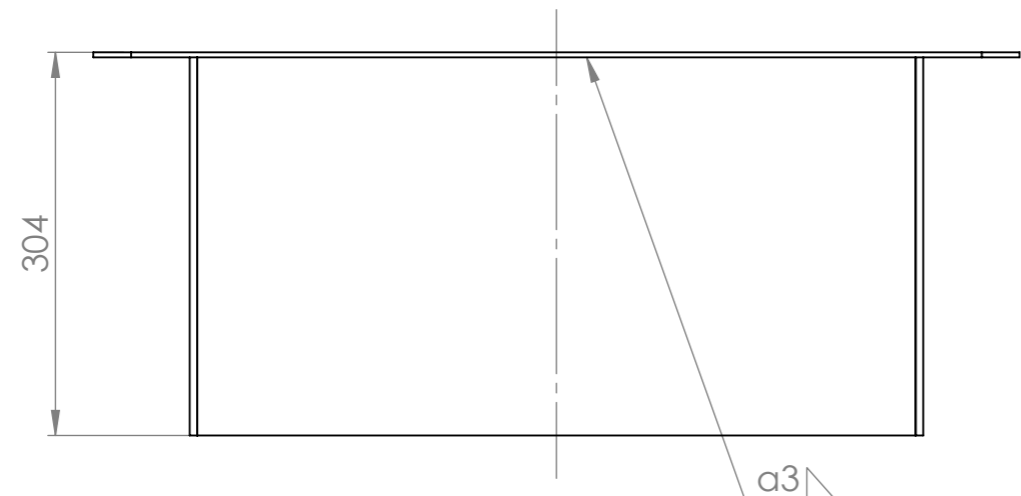
FIRST ANGLE  
 DESCRIPTION  
 Conveyor adjustable mount

CONFIGURATION  
 Main Assembly

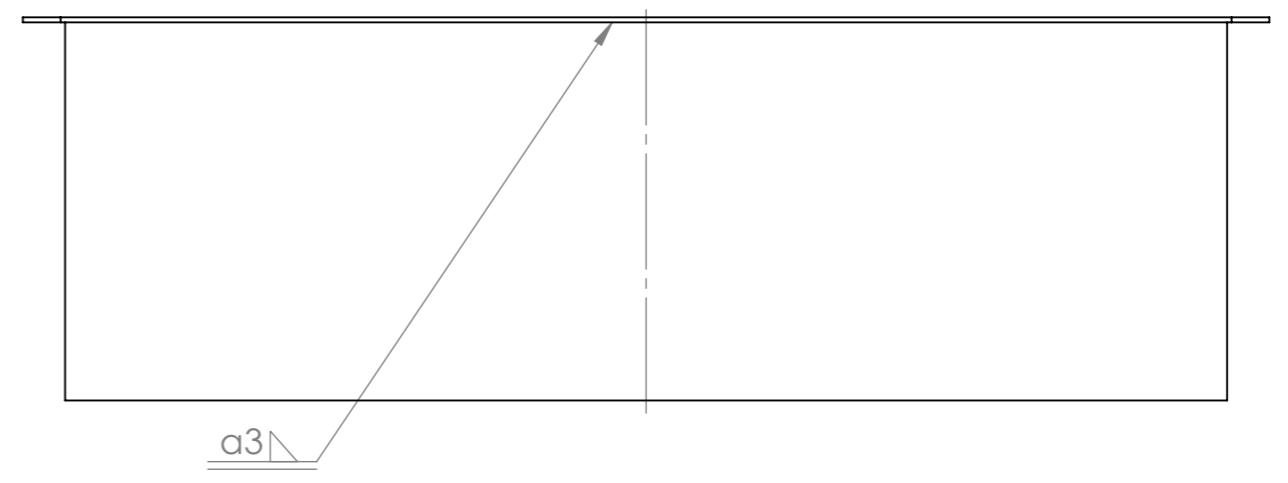
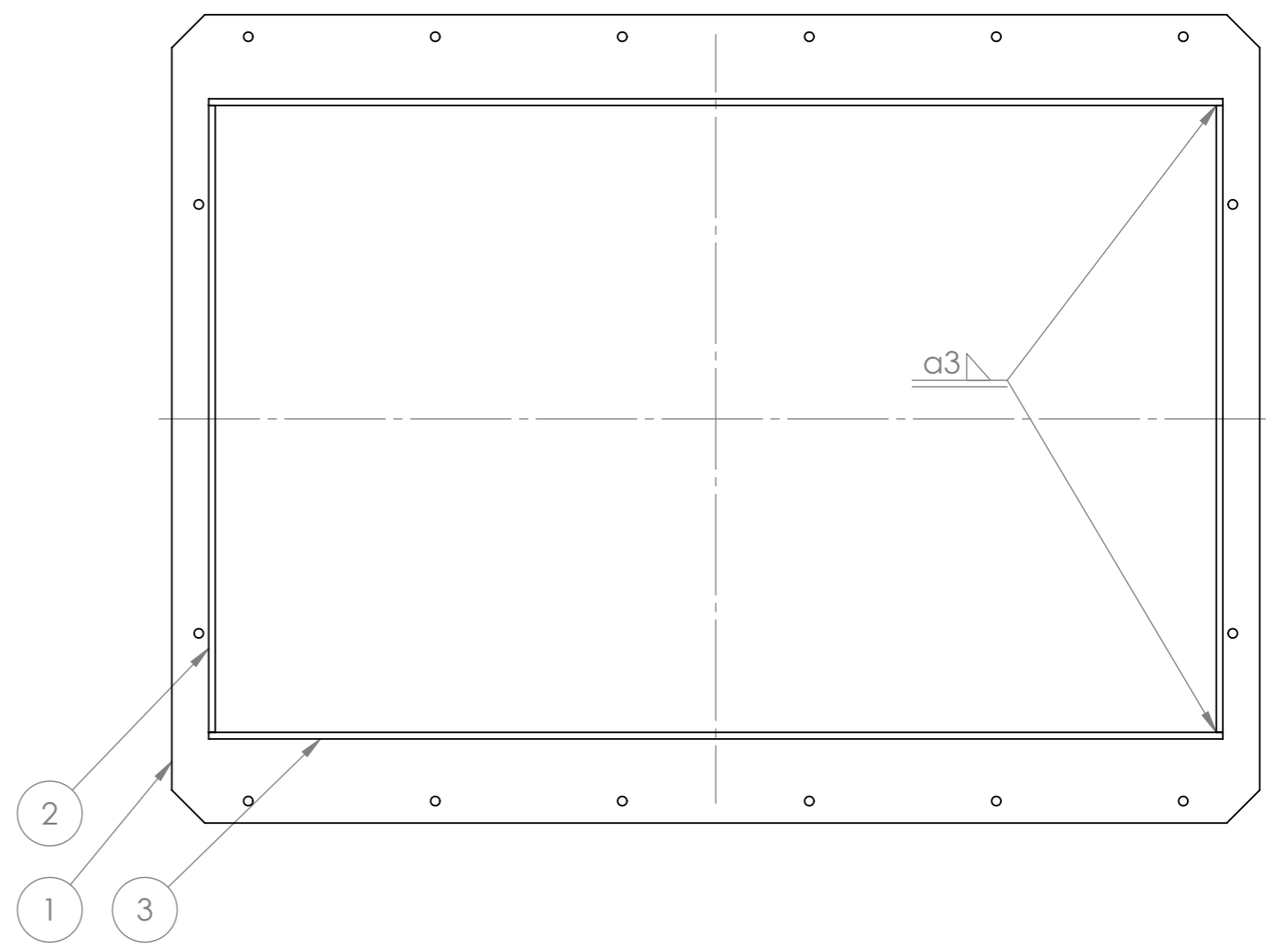
DRAWING NUMBER  
 CD3D-00-05-802  
 REVISION  
 01  
 SHEET  
 1 of 2

Revision	Description	Date	Approved
01	Initial design	28.12.2020	IN





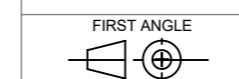
Leave 30mm gaps  
on hole positions



DEBURR AND BREAK SHARP EDGES	GENERAL TOLERANCES	ISO 2768-mK
	MACHINING:	ISO 13920-BF
MASS/KG 48.31	PROJECT	CD
	DESCRIPTION	Conveyor adjustable mount

**FINNOS**  
www.finnos.fi

DRAWN BY IiroN 28.12.2020	APPROVED IN 28.12.2020
MATERIAL	
FINISH	PAPER A3
DRAWING NUMBER CD3D-00-05-802	SCALE 1:6
REVISION 01	SHEET 2 of 2



CONFIGURATION  
Main Assembly