



Government of India
Bhabha Atomic Research Centre
Electromagnetic Applications & Instrumentation Division



Tender No. : EmA&ID/MAH/2019/OPA/ 82779

Date : 03.05.2019

Sub: Manufacturing of jigs for assembly of permanent magnets in focusing lens as per technical specification sheet - TSP-09

Dear Sir/Madam,

1. Quotations are invited for the *execution of subject work*.
2. Taxes and Excise Duties shall be quoted separately. Form AF / H whichever is applicable shall be provided, if required.
3. The suppliers shall submit the cost for Design, fabrication, assembly and testing. All necessary tools, instruments have to be arranged by the supplier.
4. The quotation must reach the undersigned on or before **20th May, 2019** and must be sent in a sealed envelope super-scribed with the **reference number & the due date** given above.
5. The quotations must reach us on or before the aforesaid date by India post (by speed post or ordinary post) only.
6. The address on the envelop should read:

**The Head,
Electromagnetic Applications & Instrumentation
Division,
RCnD Bldg., North Site,
B.A.R.C, Trombay,
Mumbai - 400 085.
(Attn: Kum. Mahima)**

7. The Purchaser representative shall approve the design of the assembly sequence, and fabrication procedure, consequent to which the supplier shall commence the fabrication of the jigs and fixtures.
8. The testing of the magnet shall be conducted in the presence of the Purchaser representatives only, further details are laid down in the enclosed specification sheet.
9. The bidder is expected to deliver the finished components after the approval by our engineer within 02 months from the date of receipt of Free issue material and firm work order.
10. All the raw materials used shall have the manufacturer's QC/QA certificates for ensuring the authenticity of the components. Further details are mentioned in the enclosed specification sheet.
11. The finished components with the test certificates as mentioned in the enclosures shall be delivered by the manufacturer after the award of the contract at Accelerator Control Division(EmA&ID), BARC, Trombay, Mumbai - 400 085.
12. Head, Electromagnetic Applications Section, EmA&ID reserves the right to accept / reject any or all quotations without assigning any reason.
13. Delivery, packing & forwarding charges, if any, must be clearly mentioned in the offer.
14. Drawings / Sketches (if any) must be returned along with the offer.
15. Quotation must indicate the VAT no / PAN no of the vendor & validity of offer. Minimum validity of 60 days is preferred.
16. The quotation has to be duly signed by *authorized person with company seal*. *Unsigned offers shall be treated as invalid*.
17. For any technical clarifications, Please contact us vide email: mahima@barc.gov.in; Tel: +912225596437

Encl.: TSP/09

(SD/-)
Scientific Officer(C), Electromagnetic
Applications & Instrumentation Division
B.A.R.C
For & on Behalf of the President of India
(The Purchaser)

Specification no.	Revision no.	Date of Issue
TSP/09	0	2nd May, 2019

Manufacturing of jigs for assembly of permanent magnets in focusing lens as per technical specification sheet -TSP/09

1.0 Scope:

The tender is invited for the “Manufacturing of jigs for assembly of permanent magnets in focusing lens as per technical specification sheet -TSP/09” as per the following technical specification. This tender specification is arranged as follows:-

- Para 2.0 gives statement of purpose.
- Para 3.0 gives details of Free Issue material offered by the purchaser.
- Para 4.0 mentions the deliverable under this tender.
- Para 5.0 highlights the technical requirement & fabrications techniques for magnet.
- Para 6.0 covers the performance of the contract.
- Para 7.0 describes the general instructions.

2.0 Scope of work:

2.1) Supplier shall procure the raw material mentioned in the enclosed drawings.

2.2) Supplier shall fabricate the requisite jigs and fixtures as per the drawings enclosed herewith and also design and develop additional jigs as deemed necessary to safely insert the magnets in the pockets.

2.3) Supplier shall take adequate safety measures during the assembly of high energy NdFeB magnets.

It should be noted that force between 2 magnets at a separating distance of 2 mm is 1500N.

2.4) Prior to the assembly of magnets, Supplier shall perform CMM measurements on the machined components and submit a geometrical inspection report of the same.

2.5) Supplier shall ensure that all stainless steel components are to be ground finish with a surface roughness better than 0.05 microns.

2.6) Supplier shall demonstrate assembly of permanent magnets onto a stack with the help of manufactured jigs and fixtures at B.A.R.C premises. Supplier shall also substantiate the jig’s separation capability for the permanent magnets. The above process is required to be executed for at least 10 times in the presence of purchaser representative so as to validate the repeatability of the jigs and fixtures. The dimensions of magnets and stack are given in table-1.0.

S.No	Single Magnet	Stack of magnets
1.	High energy NdFeB Bar magnet with dimension 90x90x40 (mm) Direction of magnetization is along 40mm.	Final dimension of stack 90x90x240 (mm) Each stack consists of 6 magnets. Magnets shall be stacked in direction of magnetization of single magnet so that direction of magnetization of the stack is along 240 mm.
2.	High energy NdFeB Bar magnet with dimension 180x180x40 (mm) Direction of magnetization is along 40mm.	Final dimension of stack 180x180x240 (mm) Each stack consists of 6 magnets. Magnets shall be stacked in direction of magnetization of single magnet so that direction of magnetization of the stack is along 240 mm.

Table-1.0

3.0 FREE ISSUE MATERIAL

No Free Issue Material shall be released.

4.0 DELIVERABLES

The deliverables included in this tender are as follows: -

S. No	Description	Quantity	Reference
1.	Jigs and fixtures for separation and assembly of high energy NdFeB magnets	01 assembly	Drawings enclosed

Table-2.0

5.0 LIST OF DOCUMENTS

Following documents (under table 3.0) are to be furnished under this contract

S. No	Description	Quantity
1	Geometrical inspection report from a bench top CMM	01 Set
2	Material test reports	01 Set
3	The Quality Control Records (including mill test certificate of the material to be procured by the vendor)	01 Set

Table-3.0

5.0 RECOMMENDED FABRICATION AND ASSEMBLY TECHNIQUES

5.1) *Supplier shall not damage any of the magnets while assembly and separating them from the stack. The purchaser representative shall witness the complete procedures while doing the same.*

5.3) The supplier to kindly ensure desired flatness and parallelity($\leq 50\mu\text{m}$) is maintained after the assembly of the jigs.

5.4) The grade of aluminium is T6-6061(extruded/rolled), supplier shall produce a mill test certificate from recognised lab(NABL accredited) to ascertain the authenticity of the material.

5.5) The grade of stainless steel shall be of SS316L to eliminate any induced magnetization during the machining process(cold work).

5.6) The lead screw mechanism, fabricated sprockets, machined components indicated in the drawing enclosed shall be strictly inspected on a bench top CMM with accuracy($\pm 2\sigma$) of $1/5^{\text{th}}$ of the desired tolerance.

5.7) Supplier is responsible for the safe custody and handling of the instruments at their premises. It is the responsibility of the supplier to return the instruments safely to the purchaser representative after the satisfactory performance of the contract.

6.0 PERFORMANCE OF THE CONTRACT

6.1 Fabrication and Delivery Schedule

The bidder shall complete the job within preferably *within 02 months starting from the date of Receipt of Work order to the successful bidder*. The supplier is expected to maintain and preserve the integrity of the permanent magnets. This may involve the revision in the practices governing the assembly, testing and requisite jigs fixtures after consulting with the purchaser. All the changes called for, shall be intimated vide Engineering/Design change notice(ECN/DCN) duly approved. A copy of the DCN/ECN may be forwarded to the purchaser for information and records. The purchaser shall incorporate the remarks of the aforesaid notices at applicable test documents and release the revisions of the same to the contractor. This is essential to ensure the quality of the delivered goods.

6.2 Document to be furnished prior to the start of fabrication and assembly

After the successful award of the contract, supplier shall first deliver the manufacturing file(MF) containing the factory drawing of the **jigs**.

The manufacturing file shall contain the following information:

- Engineering Details of jigs and fixtures to be used
- The schematic representation of the assembly procedures

A review meeting will be scheduled within two weeks after its receipt. This document shall be approved by the purchaser, although the review and the approval process shall not relieve the contractor from his responsibility to produce the magnet according to the requirements as set out in this technical specification.

6.2.3 Quality Control Records

The QCR shall contain:

- The material certificates, in particular varnish, epoxy any other material intended to be used.
- All the documentation requested in the para 6.0. All these documents shall be endorsed by the purchaser for approval during successive stages of the production, or for provisional acceptance before authorization for shipment can be granted. The baseline format of the QCR shall be specified in the MF. If any format is changed during the period of this contract, it shall through mutual agreement between purchaser and the contractor, the related templates in the MF shall be revised as well.

6.3) Warranty:

6.3.1) All items covered under this contract shall have a warranty of 12 Months

7.0 GENERAL DESCRIPTION:

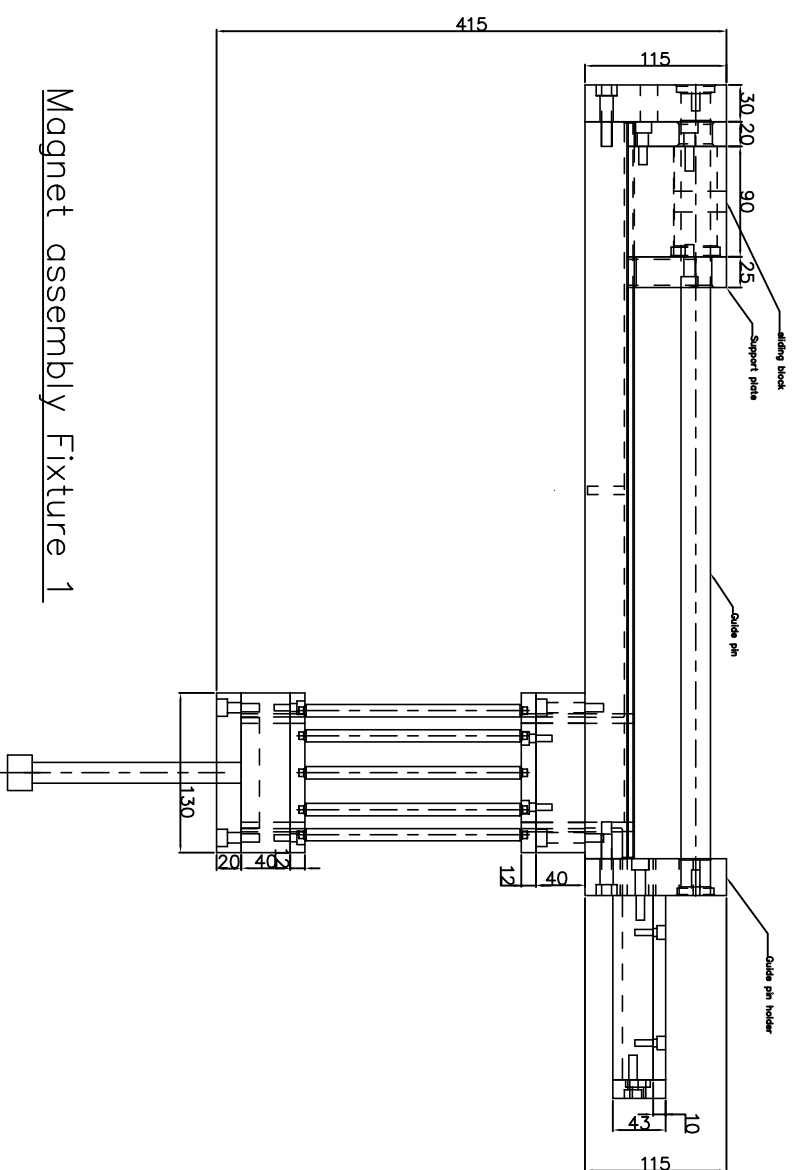
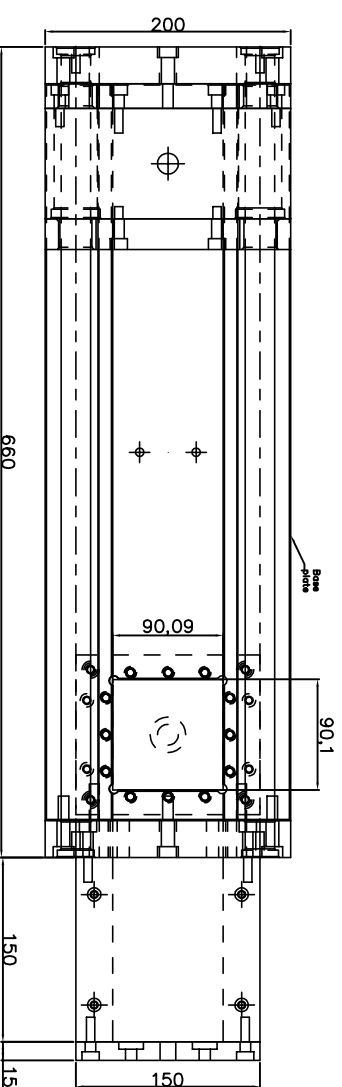
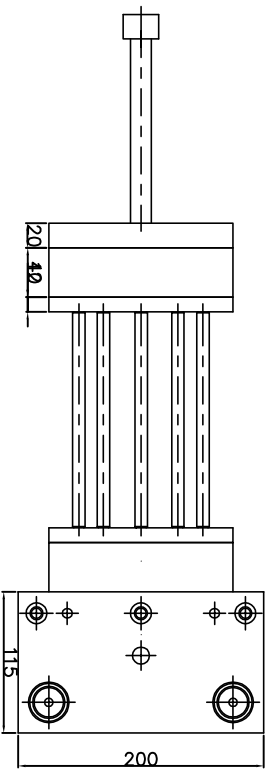
7.1 Supplier shall submit the offer for the jigs and fixtures for the assembly of permanent magnets.

7.2 Overall cost will be compared and include packaging, forwarding and safe delivery to purchaser site.

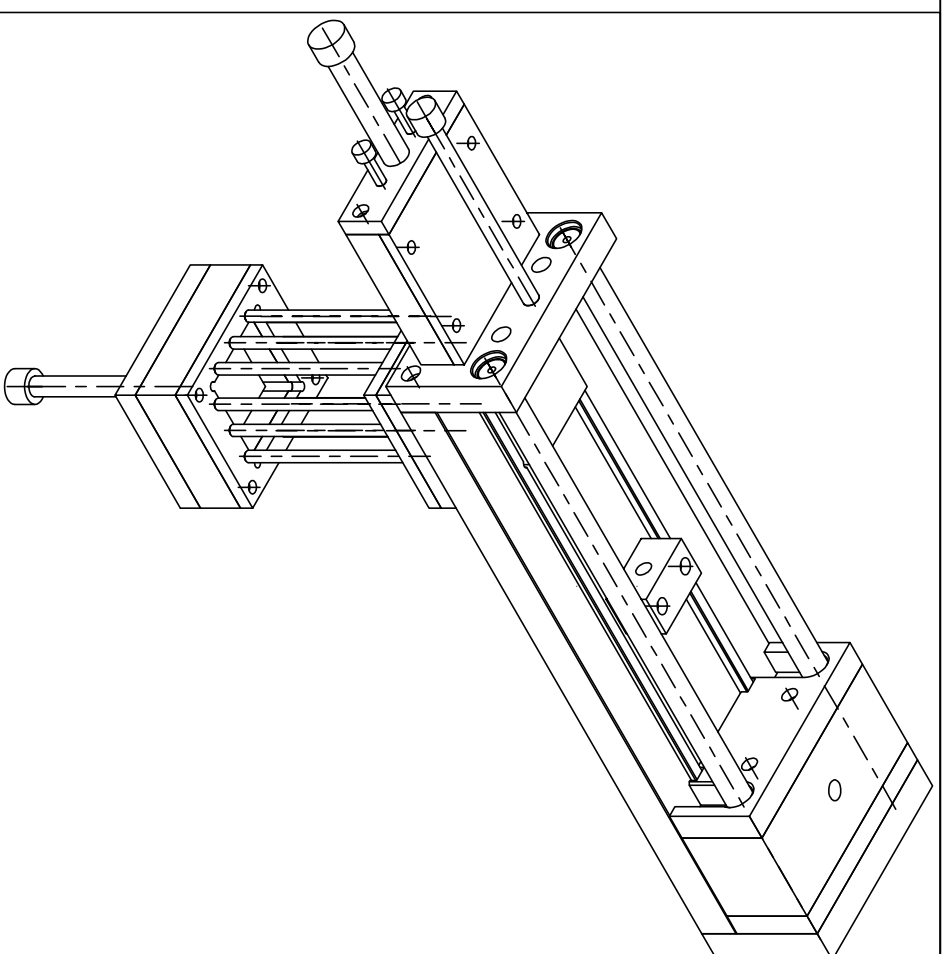
7.3 Suppliers shall give complete details of their product, facilities, list of users and compliance certificates from users for technical evaluation. Quotations submitted with incomplete details are viable for rejection.

7.4 Vendors with test facilities for qualification of geometrical inspection, EDM/spark erosion, CNC machining, and basic metrology equipment's for dimensional checks will be given preference.

In case vendor plans of sub-contracting the job, same shall be clearly brought out in quotations. The sub-contracting can only be carried out only after prior permission of the purchaser. Under any circumstances, the responsibility for the satisfactory completion of job lies solely the supplier. Vendors shall document the details of qualification checks performed on the fabricated parts by self or in collaboration with other laboratories.

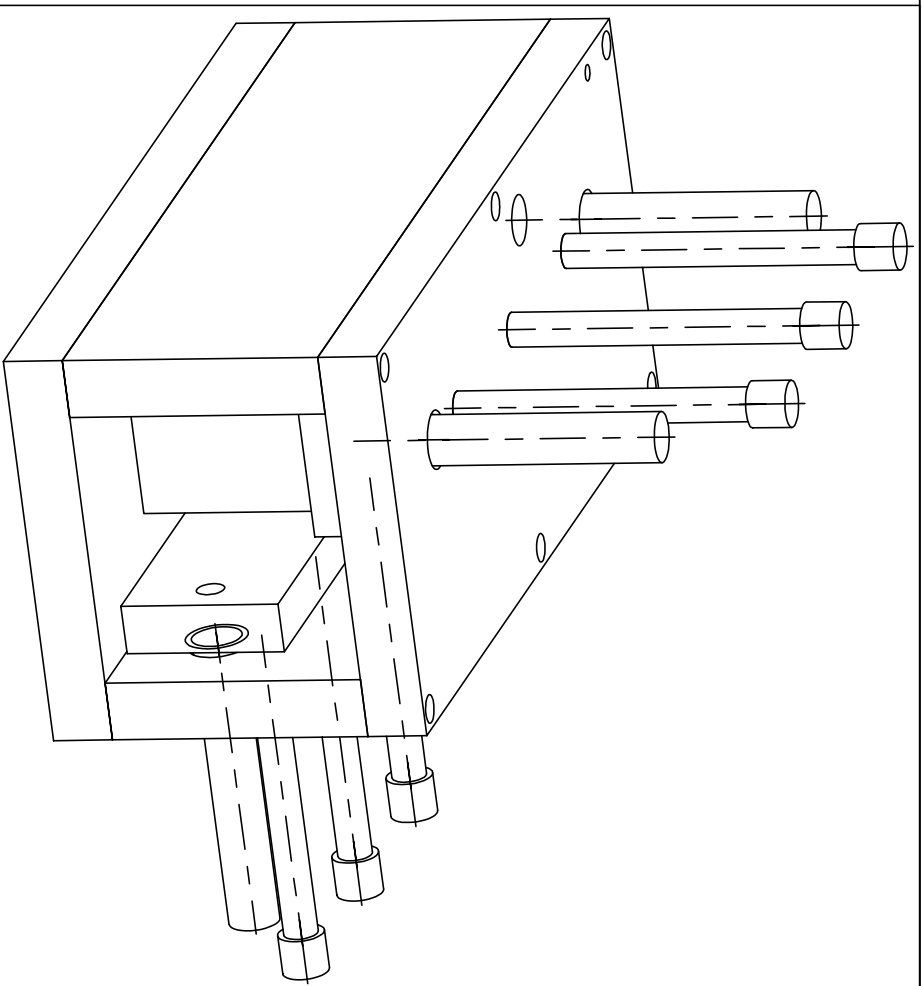
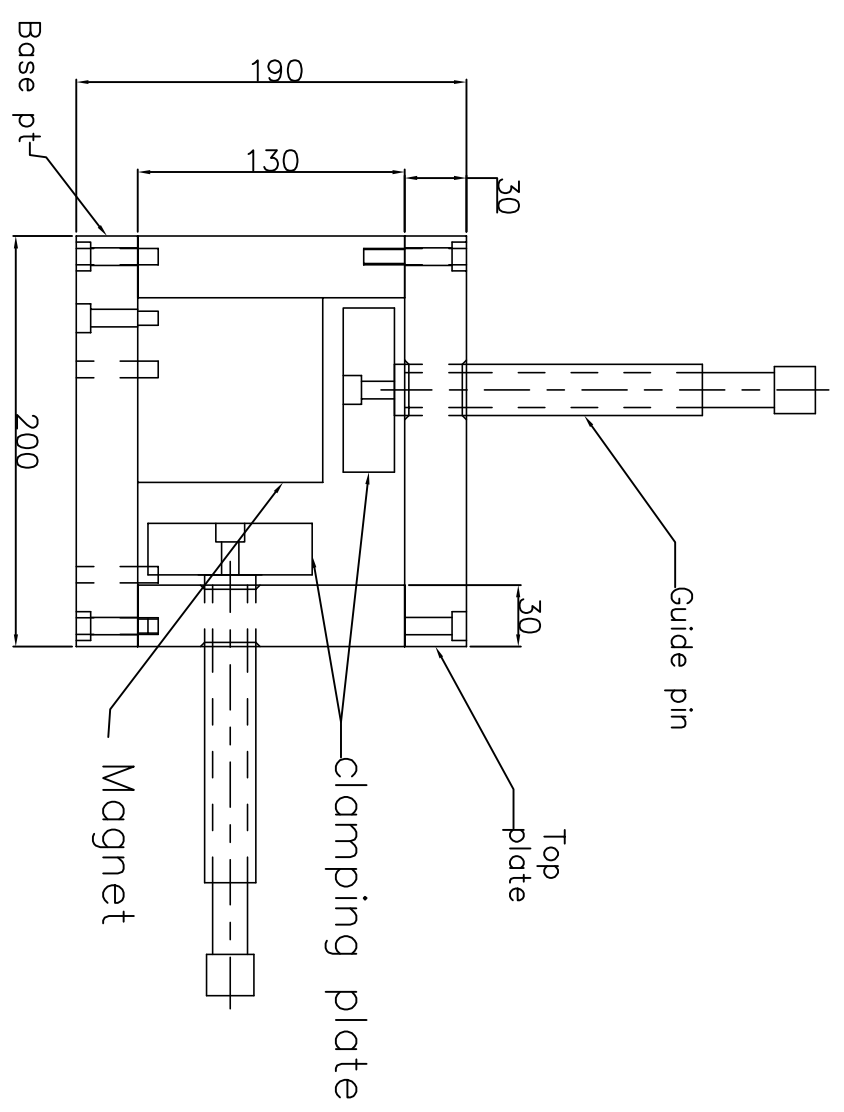
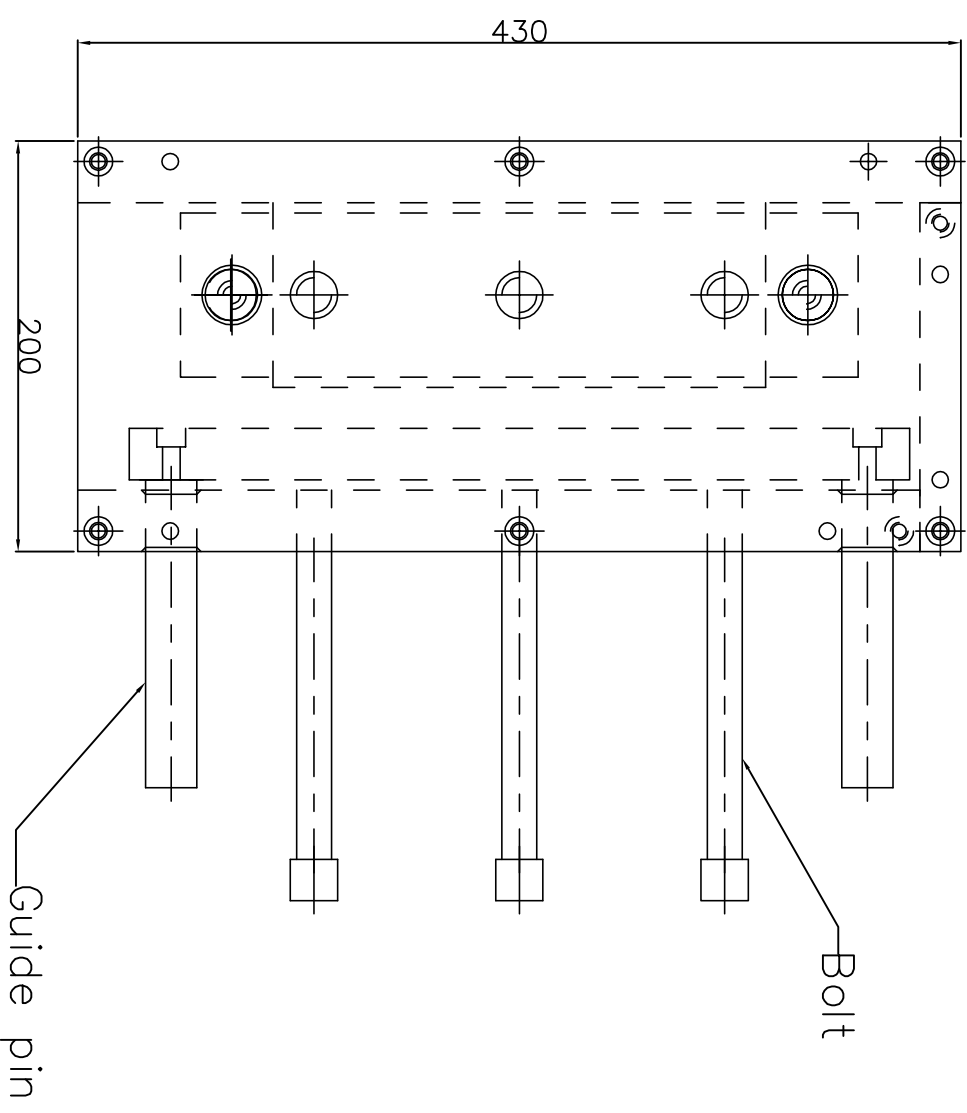


Magnet assembly Fixture 1



Magnet assembly fixture 1 material list

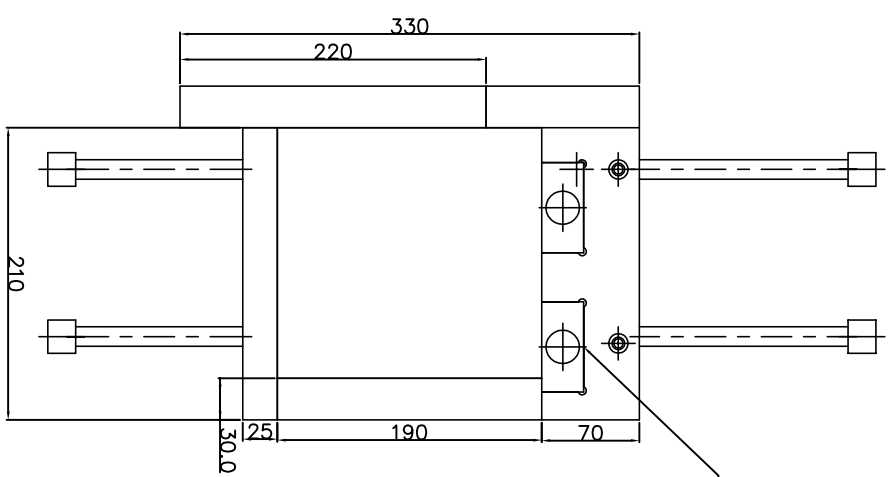
sr.no.	Name	Material	size	Qty
1	Base plate	ss	600*200*40	01.
2	cage plate	Aluminium	150*130*40	02.
3	cage back plate	Aluminium	150*130*20	01.
4	Guide pin holder	ss	200*115*30	02.
5	Magnet holder back plate	ss	200*80*20	01.
6	magnet holder support plate	ss	200*80*25	01.
7	Magnet holder plate	ss	200*80*90	01.
8	push back plate	Aluminium	90*90*15	01.
9	spring holder plate	Aluminium	150*43*15	01.
10	stopper guide plate	ss	150*150*33	01.
11	Stopper holder plate	Aluminium	150*150*10	01.
12	stopper plate	ss	146*90*25	01.
13	magnet pusher	ss	70*40*40	01.
14	Guide pin	ss	Ø24*648	02.
15	washer	ss	Ø31*6	04.
16	Guide bush	pb	Ø40*90	02.
17	support plate	ss	150*130*12	02.



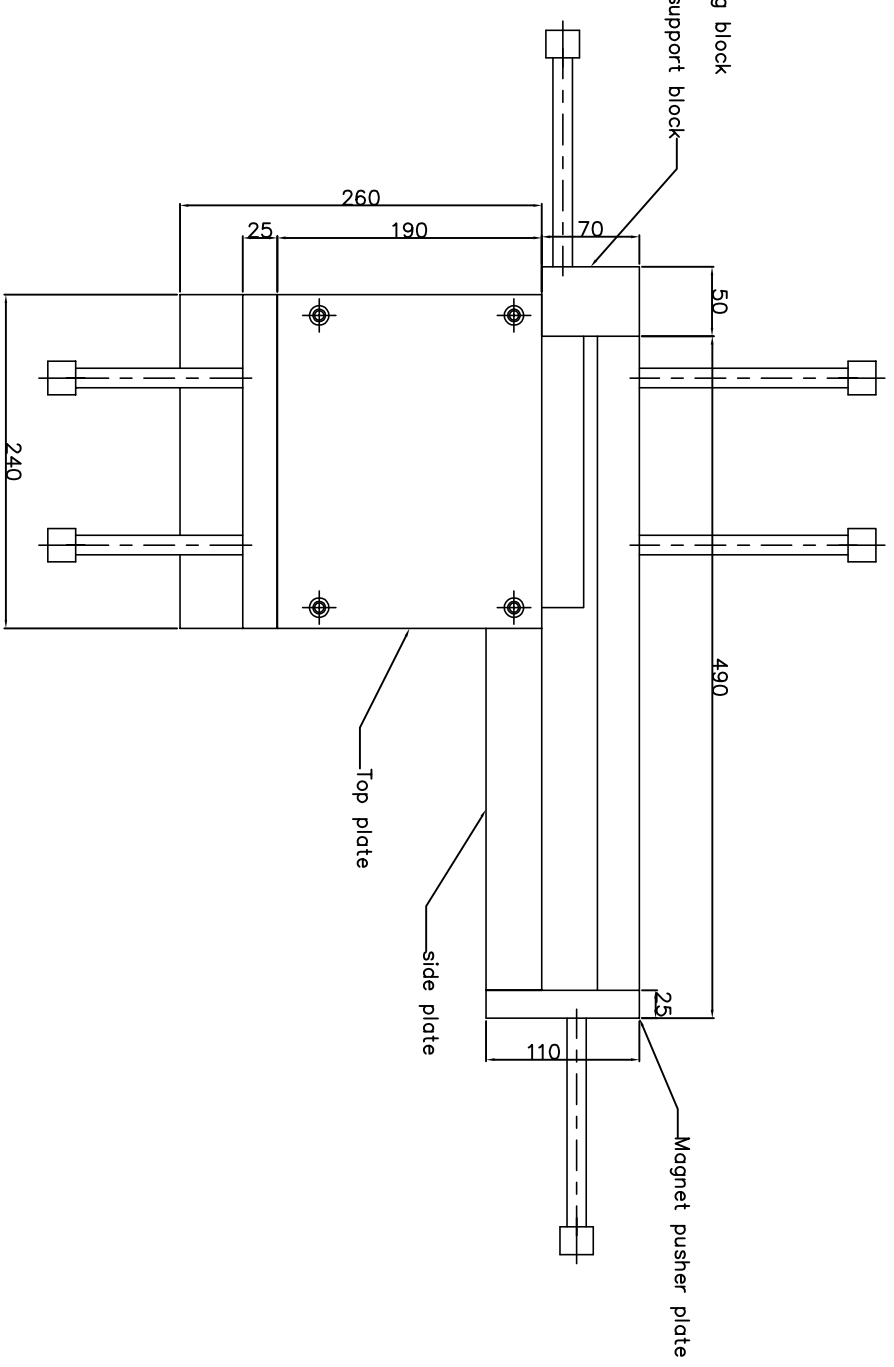
Magnet assembly Fixture 2 (Material list)

NO.	Name	Size	Material	Qty
1	Base plate	430*200*30	ss	01.
2	Angle plate 1	430*130*30	ss	01.
3	Angle plate 2	410*130*30	ss	01.
4	Magnet pusher pt	330*80*25	ss	02.
5	Side plate	170*130*20	Alluminium	01.
6	Top plate	430*200*30	Alluminium	01.
7	Guide pin	Ø25*100	ss	04.
8	Guide bush	Ø37*30	ss	04.

Magnet assembly fixture 2



Sliding block

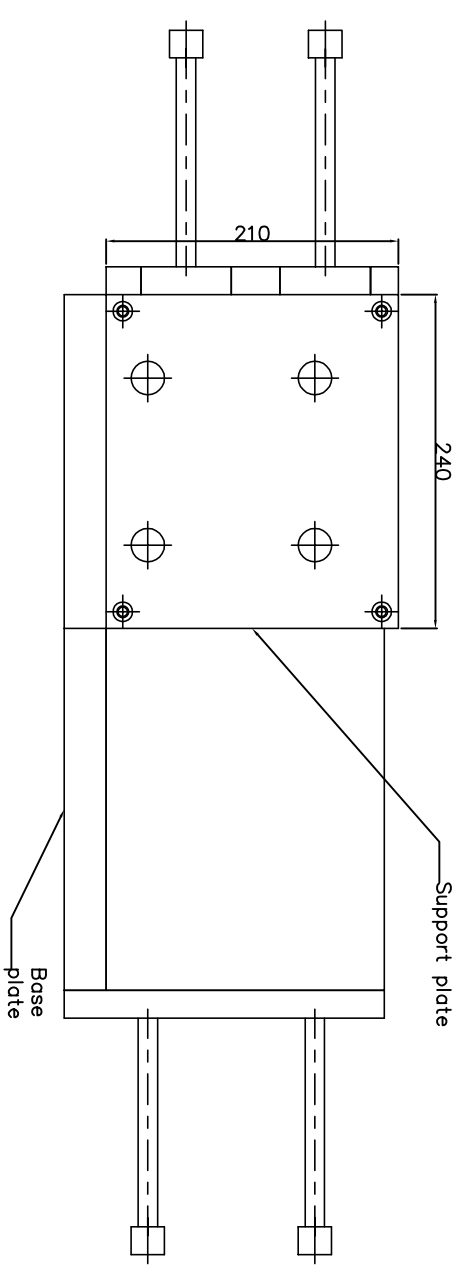


Slide support block

Top plate

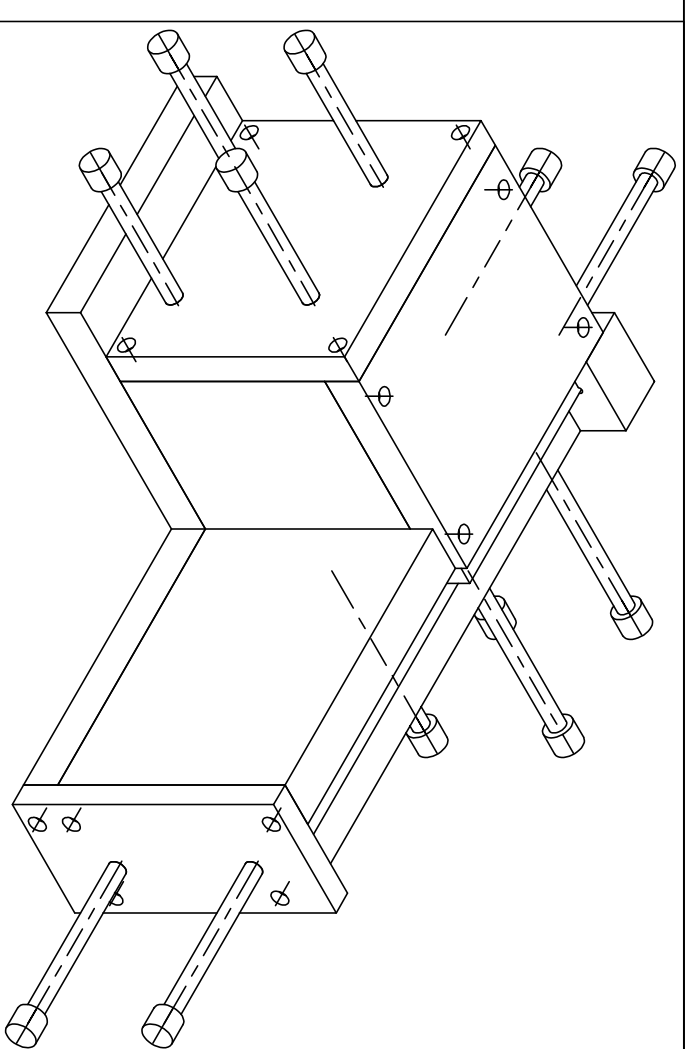
side plate

Magnet pusher plate



Support plate

Base plate



Magnet assembly Fixture 3 (Material list)

NO.	Name	Size	Material	Qty
1	Top plate	240*190*30	Aluminium	01.
2	Support plate	240*210*25	Aluminium	01.
3	Sliding block	245*65*30	ss	02.
4	Slide support block	210*70*50	ss	01.
5	Bottom plate	240*220*30	Aluminium	01.
6	Base plate	500*110*30	Aluminium	01.
7	Magnet holder back plate	470*170*30	Aluminium	01.
8	Angle plate	190*181*30	ss	02.
9	Magnet pusher plate	230*110*25	Aluminium	01.
10	side plate	260*200*40	Aluminium	01.