

INSTITUTE FOR PLASMA RESEARCH

An Aided institute of department of Atomic Energy, Govt. of India)
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MINOR FABRICATION WORKS ENQUIRY

Office Copy

ENQUIRY NO :IPR/MFW/20-21/91

Date : 11-01-2021

Due Date : 03-02-2021 13:00 IST

Please send your offer in sealed envelope specifying Inquiry No, Date & Due Date, ALONG WITH your credentials for the following items:

Important Note:

Please note that e-mail quotations are not acceptable however you may send your queries (if any) to **rajendra@ipr.res.in**

Please Ensure that your sealed quotation reaches this office not later than above mentioned due date and time.

Kindly go through the following document properly before Quoting which are available on the IPR web portal i.e., <http://www.ipr.res.in/documents/tenders.html/> attached here with.

1. Technical specification as enclosed.
2. Instruction to the bidders & terms and Condition (refer Form NO:IPR-MFW-01-V1)
3. Bidding format(refer Biddingformat MFW-Bid.pdf)

GST fro Goods and Services (IGST/CGST/SGST TAX BENEFITS): PLEASE REFER clause no:8 of Form No:IPR-MFW-01-V1

QUOTATION SHOULD BE ADDRESSED TO **E. RAJENDRA KUMAR** ONLY.

Sr.No.	Description	Quantity	Rate
1	Fabrication and Supply of Fly wheel system	1	No.

Free Issue Material

Sr.No.	Description	Quantity	Unit	Value
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Note : Please quote with complete technical details (Technical Compliance sheet and product data sheet)

Encl:As per attachment

Sd/-
E. RAJENDRA KUMAR
Scientific Officer-H

Technical Specifications of the Flywheel System

1. Introduction:

Flywheel system consists of shaft, flywheel, bearings and its housing, couplings, brake and base plate and columns. Typical Dimensions and material of construction are given in the enclosed drawings. The shaft has to be provided with the keyways and should be machined to the required surface finish for the mounting of bearings and flywheel. Flywheel should be made from the plate or shaft and machined to the required shape by the machining process with required surface finish for proper mass balance within the flywheel. Flywheel construction by welding or forging is not allowed/permitted. Unbalanced equivalent mass should be less than 50 gm at the rim radius of the flywheel. Working environment of flywheel system would be in closed room and base plate of the flywheel would be grouted to the basement/ground by the Hilti make anchor/grouting bolts at Institute for Plasma Research (IPR) site. The functional requirement of the flywheel system has to run at 3000 rpm for 5 hours daily for 60 days without any abnormal behaviour. Hence, proper bearings and bearing housing should be selected for this application. The bearings and its housing should offer minimum friction to avoid overheating and loss of power from driving motor.

The flywheel would be rotated from zero speed to 3000 rpm by an AC servomotor with the acceleration of 0.16 rad/sec^2 over a time of 2000 seconds. Speeding up slowly to 3000 rpm would be carried out by the Variable frequency Drive (VFD) which would be connected to the AC servo motor. AC servomotor will drive flywheel by increasing the speed of servomotor. This servo motor would be mounted on the shaft and fixed with the support structure as shown in the drawings. (AC Servomotor and its VFD is not in the scope of supply of the flywheel system). However, Vendor has to help in installation, assembly, alignment and commission the AC Servomotor (would be given to vendor) in-line with the flywheel system to meet the functional testing of flywheel which is to be rotated at 3000 rpm.

2. Scope of work at Factory:

1. Preparation of fabrication drawings based on the submitted engineering drawings by IPR. Fabrication of flywheel system should be started only after approval of the fabrication drawings by IPR.
2. Shaft should be machined to ISO tolerance grade IT6 so that the bearings and its sleeve fits properly. Keys and keyways in the shaft and its mating parts should be machined to the standard tolerances. Shaft and keys should be made from high strength material AISI 4140 alloy steel. Shaft should be tested by radiography test for its surface flaws, laminations, rough/jagged, imperfect edges and all other harmful defects.
3. Welding should be carried out on the base plate to the columns and columns to its support plate etc. either by TIG or Arc Welding process. The Fillet size of welding should be at least the thickness of the part being welded. The welding quality should be as per the ASME standards.
4. Vendor may suggest/recommend design improvement/modification in design of the flywheel and/or shaft system if required for the better performance of the flywheel system. The vendor's design suggestions/recommendations would be evaluated by IPR representative and same would be informed to vendor for the changes to incorporate or not to incorporate in the design, if any. Otherwise, Vendor should make the flywheel system as per the engineering drawings provided by IPR.

5. Shaft length and Diameter of AC Servomotor, bolt size and position of the bolts on the Motor support would be provided at the time of manufacture of the same. Accordingly position of the bearings and flywheel has to be fixed by the vendor.
6. Procurement of required material as per the approved fabrication drawings.
7. Fabrication/Machining of shaft, flywheel, supports, brake system and base plate etc. Outright procurement of Couplings and Bearing housing and necessary Bolts, washers and Nuts, Hilti chemical anchor/grouting bolts (HAS- E 5.8 grade).Length, diameter and number of bolts of Hilti chemical anchor/grouting as mentioned in the engineering drawings to be used at the time of installation at IPR. Vendor should procure bearings and their housing (Plummer block) and as per the technical specifications only.
8. Flywheel has to be made from the plate and whose material is IS2062 E300A. This plate has to be machined to the required shape to minimise the unbalanced mass in the flywheel. The plate should be free from surface flaws, laminations, rough/jagged, imperfect edges and all other harmful defects. This plate has to be tested and passed by suitable radiography/Ultrasound test before final machining process of the same.
9. Maximum unbalanced mass allowed in the flywheel is less than 50 gm equivalent at the rim radius of the flywheel. However, Vendor should try to reduce this 50 gm equivalent unbalanced mass to 10 or 20 gm, if possible.
10. For estimating unbalanced mass in the machined flywheel, flywheel mounted on the shaft has to be taken to Dynamic testing agency for testing in the presence of IPR personal. Unbalanced equivalent mass testing has to be carried out by 3rd party dynamic balancing testing agency. 3rd party testing agency expenses have to be paid by the vendor. If any unbalanced mass is found above the allowable limit, corrective action need to be taken by vendor either by adding the mass or removing the mass to/from the flywheel.
11. Assembly and alignment of the components to meet the functional requirement of the flywheel which has to be rotated at 3000 rpm. Bearings have to be assembled in the bearing housing with utmost care to avoid over tightening of bolts etc. After assembly of flywheel, shaft with bearings & its bearing housing (Plummer block), flywheel should rotate freely by hand for the intended use.
12. All the tools and measurement equipment (like Vernier callipers, steel ruler, plumbs, water level and measuring tape etc.) should be arranged by the vendor during the pre-despatch inspection.
13. **Two coatings of Red oxide on the flywheel system to prevent from the rusting/corrosion only after pre-despatch inspection.** There is no need of red oxide coating on the outer face (Face that come in contact with the brake) of flywheel and the shaft. The red oxide coating should not be done on the mating faces/surfaces.
14. All the sharp corners/edges should be chamfered/filletted to the appropriate radius/value to prevent injuries to the human beings.
15. Supply of inspected equipment in packed condition to IPR site.

3. Acceptance tests at factory site:

1. Welding size, Surface finish, Flatness, straightness, perpendicular and parallel checking before and after assembly of flywheel system as per the given engineering drawings and/or approved fabrication drawings.
2. Verification of Dynamic Balancing test report (s) of flywheel with shaft. After this test, no machining should be done on the flywheel and shaft.

3. Assembly and Alignment of flywheel system with the base plate. All the dimensional check would be carried out as per the approved fabrication drawings and/or engineering drawings provided by IPR.
4. Vendor should submit manufacturer's test certificates of Mechanical and Chemical properties of materials that are used in the construction of the flywheel system, radiography/ultrasound test reports, manuals, technical specifications of standard parts like bearings and their housing, Jaw couplings etc.to IPR at the time of pre-despatch inspection.
5. Vendor should submit integrated dimensional test report on flywheel system to IPR before calling for pre-despatch inspection that would be conducted by IPR personnel.

4. Scope of work at IPR site:

1. Grouting of the support plate with the Hilti bolts at the designated place in the laboratory at IPR site. Grouting plate has be fixed to the ground/basement after levelling with water level within +/-1mm.
2. Flatness, straightness, perpendicularity and parallarity checking before and after assembly of flywheel system as per the given engineering drawings and/or approved fabrication drawings.
3. Assembly and Alignment of flywheel system. Critical dimensional check would be carried out.
4. Vendor should submit manufacturer's test certificates of Mechanical and Chemical properties of materials that are used in the construction of the flywheel system, manuals, technical specifications of standard parts like bearings and their housing, Jaw couplings etc.to IPR at the time of delivery at IPR.
5. Vendor has to help in installation, assembly, alignment and commission the AC Servomotor (which would be given to vendor at IPR) in-line with the flywheel system to meet the functional testing of flywheel which would be rotated at 3000 rpm.

5. Acceptance tests at IPR site:

1. Flatness, straightness, perpendicularity and parallarity checking on flywheel system as per the given engineering drawings and/or approved fabrication drawings.
2. After Assembly and Alignment of total flywheel system, all the dimensional check would be carried out to achieve functional requirement of rotation of flywheel at 3000 rpm.

6. Technical Specifications of Bearings and its Housing (Plummer Block):

(A): Bearings

- | | |
|---------------------------------------|---|
| 1. Outside Diameter of the Bearing | : 110 mm |
| 2. Inside diameter of the Bearing | : 70 mm (shaft Diameter) |
| 3. Width of the Bearing | : 20 mm |
| 4. Type of bearing and Bearing number | : Single row deep groove ball Bearing and Bearing No.6014 |
| 5. Bearings make/brand | : SKF or any Other standard Equivalent make. |

6. Static loading that each bearing should withstand : ~35 kN
7. Maximum Dynamic force that each bearing should withstand: ~30 kN
8. No. of bearings to be installed : 04 (02 No. on each side of Flywheel)
9. Rated rotational Speed (Reference speed) : 3000 revolutions per minute (rpm).
10. No. of cycles : 10^8
11. Working environment : Ambient temperature.
12. Bearings Lubrication facility has to be there.
13. Seals on the both side of the bearings has to be installed in the bearing housing
14. Adaptor sleeve with lock washer and lock nut should be used while mounting on the shaft.

B. Bearing Housing (Plummer Block):

1. Plummer Block model Reference no. : FSNL 517 + 1314 (Similar to this model configuration as shown in the engineering drawings attached with this document. Vendor has to select the proper Plummer block bearing housing from the SKF or equivalent standard make/brand to suit functional requirement of the flywheel system).
2. Overall length of the Housing : ~320 mm
3. Overall width of the housing : ~ 120 mm
4. Overall Height of the housing : As per the Standard available in the market
5. Breaking Loads on Bearing Housing:

Loading Angle	Load value
P_{0°}	~ 370 kN
P_{55°}	~480 kN
P_{90°}	~290 kN
P_{120°}	~ 205 kN
P_{150°}	~190 kN
P_{180°}	~240 kN
P_a	~155 kN

Above breaking loads of the bearing housing is as per the standard nomenclature load angles.

6. Plummer block housing should accommodate two bearing as per the size mentioned in the above section.
7. Seals on the both side of the bearings has to be installed in the bearing housing
8. Adaptor sleeve with lock washer & lock nut should be used while mounting on the shaft.
9. Bolts of bearing Housings should be tightened with standard tightening torques.
10. Lubrication facility should be there in the Plummer block.

11. Bolts of bearing Housings should be tightened with standard tightening torques.

Recommended make/brands: SKF India or any other standard make/brand.

7. Technical specifications of Compression spring:

1. Outside diameter of spring : ~ 80 mm
2. Inside diameter of spring : ~ 60 mm
3. Free length of spring : 127 mm
4. Spring rate/constant or stiffness : 31 N/mm
5. Suggested maximum deflection : 58 mm
6. Suggested maximum load : 1800 N
7. Solid height : ~ 60 mm
8. Wire Diameter : 8.7 mm
9. Spring force required at the brake to be applied : About 240 N force
10. Total coils : 7 Nos.
11. Spring force to be applied on the flywheel : 500 N
12. End type : Closed and Ground

8. Technical specifications of brake pad/shoe:

1. Coefficient of friction between brake Shoe/pad and Fly wheel : 0.2-0.3
2. Brake shoe/pad should be made of : Semi-metallic material
3. Brake Shoe/Pad material pad should have good wear and tear resistance and scoring and galling.
4. Brake Shoe/Pad material should have adequate mechanical strength and high heat resistance
5. Brake pad should be properly bolted to its holder firmly and it should be easily replaced.
6. Braking force on the fly wheel should be about 500 N.
7. Good resiliency

9. Technical specifications of the Coupling-1:

1. Nominal Torque to be transmitted through the coupling : 20 N m
2. Maximum Torque to be transmitted : 60 N m
3. Diameter of the shaft on input drive motor : IPR would provide at the time of machining of the same
4. Diameter of the shaft on the other side : 70mm
5. Keys material : AISI4140 Material or better strength
6. Allowable misalignment for Jaw type couplings to connect shafts
Axial=+/-0.9, Radial= 0.4mm and Angular=1°
7. Material of construction of coupling : Cast Iron or any material
8. Vendor should supply manufacturer's test certificates about technical specifications and typical dimensions of Jaw coupling.
9. Total length of the coupling on both the shafts : ~120 mm
10. Outer diameter of the coupling : ~ 120 mm

10. Technical specifications of the Coupling-2:

1. Nominal Torque to be transmitted through the coupling : 600 N m
2. Maximum Torque to be transmitted : 1400 N m
3. Diameter of the shaft on both sides of coupling : 70 mm
4. Keys material : AISI 4140 alloy steel or better strength
5. Allowable misalignment for Jaw type couplings to connect shafts
Axial= ± 0.9 , Radial= 0.4mm and Angular= 1°
6. Material of construction of coupling : Cast Iron or any material with High strength to withstand about torque.
7. Vendor should supply manufacturer's test certificates about technical specifications and typical dimensions
8. Total length of the coupling : ~120 mm
9. Outer diameter of the coupling : ~ 120 mm

11. Delivery time: Vendor should submit fabrication drawings in 2 weeks from the date of Purchase Order. After approval of fabrication drawings, vendor should complete fabrication, testing, pre-despatch inspection by IPR and delivery in IPR in 2 months from the date of approval of fabrication drawings by IPR. In totality, the delivery time is 2 and ½ months to complete this work as per the purchase order from the date of Purchase Order.

P.S:

With this document, one set of engineering drawings (DRG No.: IPR-20-A3-F_S_A-8921 REV 03 sheet 1/2 and sheet 2/2) which are part of this technical specifications of the Flywheel System 6 pages.

Compliance Sheet for the Flywheel system:

NOTE:

1. Vendor should fill these below mentioned tables with appropriate words (Agree)/values.
2. Vendor should send a copy of Technical Specifications of the Flywheel System with their stamp to IPR for confirmation.

Sr. No	IPR's Technical Specification/ Description	Technical Parameter/ Value required by IPR	Vendor has to write Agree/not agree or Parameter value	Remarks, if any deviations/suggestions by the vendor
1	Flywheel has to be made from the plate and whose material	IS2062 E300A.		
2	Shaft and keys should be made from high strength material	AISI 4140 alloy steel		
3	Maximum unbalanced mass allowed in the flywheel equivalent at the rim radius of the flywheel	<50 gm		
4	Static loading that each bearing should withstand	~35 kN		
5	Maximum Dynamic force that each bearing should withstand	~30 kN		
6	Rated rotational Speed (Reference speed)	3000 rpm		
7	Bearing Housing load, P _{0°}	~ 370 kN		
8	Bearing Housing load, P _{55°}	~480 kN		
9	Spring rate/constant or stiffness of compression spring	~31 N/mm		
10	Spring force to be applied on the flywheel	~500 N		
11	Coefficient of friction between brake Shoe/pad and flywheel.	0.2-0.3		
12	Vendor may offer his observations and/or any deviations (if any) in the submitted engineering drawings that would occur at the time of machining/fabrication and or assembly of the flywheel system to meet the functional requirement of rotation of flywheel at 3000 rpm.			

(This need to be printed in Bidders letter head)

1. Please quote with complete technical details along with technical compliance sheet.
2. Quotation should be submitted in the format given below, else IPR shall not consider the offer by the vendor.

NAME OF PARTY : _____

ENQUIRY NO: _____

QUOTATION No. & DATE : _____

Currency of Quotation: **Indian Rupees**

Sr. No.	Item Description	HSN/SAC Code	Quantity	Unit Rate (Basic)	Packaging & forwarding (P&F)	Applicable GST	Rate (incl P&F and GST)	Total Value
			a	b	c	d	e = b + c + d	f = a * e
1								
2								
3								
4								
5								
6								

Sr. No.	Particular	Remarks
I.	Ex-works / FOR Destination	
II.	Freight	
III.	Insurance	
IV.	Delivery Period	
V.	Payment (IPR terms will apply)	
VI.	Guarantee / Warrantee	
VII.	Validity Period	
VIII.	Discount (if any)	
IX.	Remarks	

Place: Authority Signatory

Date: Company Seal

Note:

1. Bidder should submit the copy of GSTIN / ARN Certificate along with the offer
2. Bidder should specify the SUPPLY and SERVICE rates/ charges separately wherever applicable



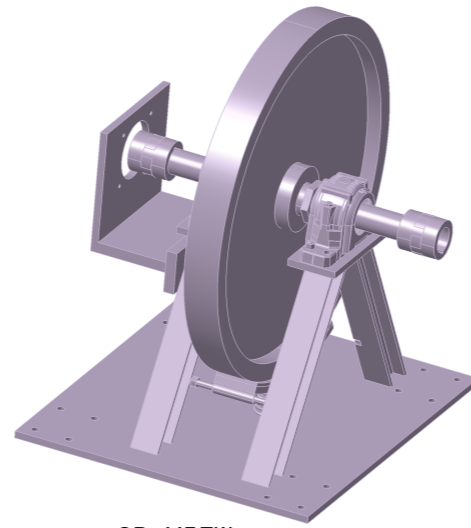
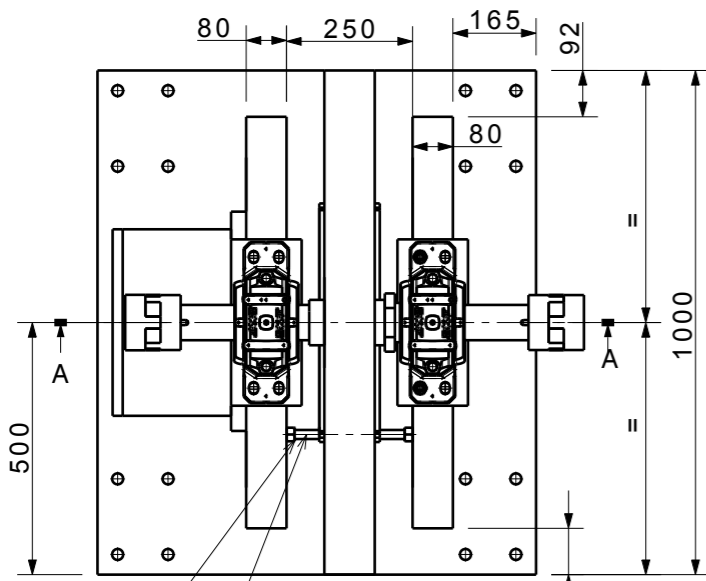
Form No: IPR-MFW-01.V1

INSTRUCTIONS TO BIDDERS AND TERMS AND CONDITIONS

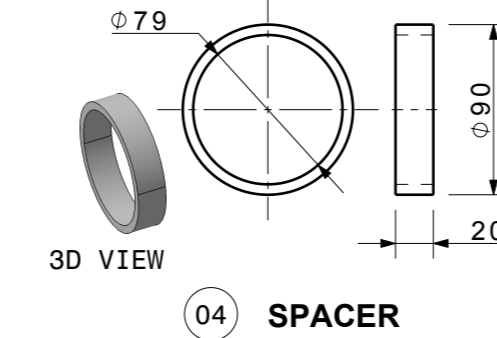
1. The Quotation and any order resulting from this enquiry shall be governed by our Conditions of Work Order and Contractor quoting this enquiry shall be deemed to have read and understood the same completely.
 2. Where counter terms and conditions have been offered by the Tenderer, the same shall not be deemed to have been accepted by IPR unless our specific written acceptance thereof is obtained.
 3. **Quotation:** Quotation should be submitted in the prescribed QUOTATION FORMAT attached with this Enquiry and the same should be submitted in a sealed envelope super-scribing the same with our enquiry No., date, due date and brief description of item on or before the due date. Late/delayed/incomplete/unsigned quotations will not be considered. Envelopes received without Enquiry number, date, due date and brief description of item may be rejected. The quoted prices should be firm for a period of 90 days from due date for placing order. IPR is not bound to accept lowest rate/s. IPR reserves the right to place on one or more parties. The scope of supply includes insurance by the Contractor.
 4. **Specifications:** Goods should be offered strictly conforming to our specifications/drawings. Deviation, if any, should be clearly indicated by the contractor in their quotation. The Tenderer should also indicate the Make/Type number of the goods offered and catalogues, technical literature and samples, wherever necessary should accompany the quotation. Clarification/s on drawings should be obtained before submitting quotation.
 5. **Terms of Prices:** Quotation should be submitted on door delivery basis without extra charge wherever possible. For quotations on Ex-Works, Ex-godown basis the approximate packing and forwarding charges should be indicated by the contractor. In the case of local contractors, the goods are to be delivered at our stores free of charge.
 - 5.1 In respect of tenders on Ex-works basis, in case the tenderer has not mentioned in the offer packing, forwarding and transportation charges for safe delivery up to Purchaser's site, 2% of the price quoted towards packing (in respect of both local and outstation firms), 1% of the basic price quoted towards safe delivery charges in respect of local tenderer and 3% of the basic price quoted towards safe delivery charges in respect of outstation firm will be added for comparison of offers on safe door delivery at Purchaser's site.
 - 5.2 Prices are required to be quoted according to the units indicated in the tender form/Enquiry. When Quotations are given in terms of units other than those specified in the tender form, relationship between the two sets of units must be furnished
 6. Tender should be free from Correction and Erasures. Corrections, if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amounts quoted in words and figures, amount quoted in words shall prevail. Unsigned quotations will summarily be rejected. If there is a discrepancy between the unit price and total price, unit price shall prevail.
 7. IPR shall be under no obligation to accept the lowest or any tender and reserves the right of acceptance of the whole or any part of the tender or portion of the quantity offered and the tenderers shall supply the same at the rate quoted.
 8. **Goods & Services Tax (GST):** The details of Taxes/GST and other levies legally applicable and intended to be claimed should be clearly indicated in the tender. Where this is not done, no claim on these accounts would be admissible later.
 - a) **GST for Goods (IGST/CGST/SGST TAX BENEFITS):**
IPR is entitled to avail tax benefit as per the following notifications issued by Ministry of Finance, Department of Revenue, Government of India:
(1) No: 47/2017-INTEGRATED TAX (RATE) DATED 14/11/17 for IGST
(2) No: 45/2017-CENTRAL TAX (RATE) DATED 14/11/17 for CGST
And,
IPR is entitled to avail tax benefit as per the following notifications issued by Finance Department, Government of Gujarat:
(1) No. 45/2017-STATE TAX (RATE) DATED 15/11/17 for SGST
As per above notifications IPR will bear only 5% IGST for procurement of goods from outside Gujarat & 2.5% CGST and 2.5% SGST (total 5%) for procurement of goods within Gujarat. Vendors are required to charge tax as per these notifications while quoting/supplying the goods. Deviations, (if any) should be clearly mentioned in the quotation/offer.
- Please specify the HSN codes while quoting.**
- b) **GST for Services:**
As applicable. **Specify the SAC codes wherever services are involved.**
9. **Delivery Date:** Delivery period is essence of the Contract. Contractor must indicate the firm delivery date by which the goods will be dispatched or delivered by them from the date of our order. Delivery period shall be clearly indicated against each item separately.
10. **Price/ Purchase Preference:** Purchase/Price preference to industries will be given as per the policy of the Government of India in force at the time of evaluation provided their offer is in compliance with the conditions of the policy.



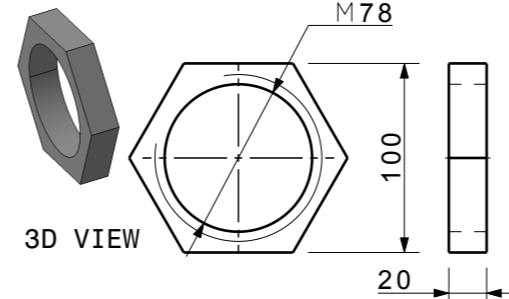
11. **Liquidated Damages:** The successful Vendor/Bidder should pay liquidated damages @ ½% (half percent) of the total work order value for the delay of each week in the scheduled date of completion of the work envisaged in the Work Order subject to a maximum of 5% (Five percent) of the total Work Order value.
12. **Inspection:** Goods on its arrival at IPR will be inspected by Stores, and his decision in the matter will be final. However, where the items are required to be inspected at the Contractors Premises, Contractor has to give advance notice regarding readiness of the Goods to enable us to depute our representative for inspection.
13. **Payment:** Payment will be arranged for accepted goods only within 30 days from the date of receipt of goods at IPR and bills in our accounts section, completed in all respects.
14. No correspondence will be entertained within 30 days from the date of receipt of good and bills, whichever is later.
15. **Guarantee:** The Stores offered should be guaranteed for a minimum period of twelve months, from that date of acceptance, against defective Goods, design, workmanship, operation or manufacture. For defects noticed and communicated during the Guarantee period, replacement/rectification should be arranged free of cost within a reasonable period of such notifications. In case where our specifications call for a guarantee period more than 12 months specifically, then such a period shall apply.
16. **Performance Bank Guarantee:** If demanded by IPR, the successful bidder will have to furnish Performance Bank Guarantee for 10% of the order value (basic price) from a Nationalized/Scheduled Bank/State Bank of India, valid throughout the Guarantee/Warranty period. The scheduled banks approved by IPR are Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank. Bank Guarantees submitted other than from banks approved by IPR will not be accepted.
17. **Security Deposit:** If demanded the successful Bidder will have to furnish to the Purchaser an interest free security deposit for 10% (Ten percent) of the order value in the form of Bank Guarantee of an equivalent amount from a nationalized/ scheduled Bank/State Bank of India within 15 days from the date of work order and the said Guarantee should be valid till the goods are accepted by IPR. The scheduled banks approved by IPR are Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank. Bank Guarantees submitted other than from banks approved by IPR will not be accepted. The Security deposit shall be forfeited in case the selected Bidder does not start the work within the time limit specified or fail to complete the work within the stipulated delivery period or fail to comply with any of the terms and conditions in the work order. On successful completion of scope of work and its acceptance by IPR, Contractor should send a letter requesting return of the original BG.
18. The Contractor shall at all times indemnify the purchase against all claims which may be made in respect of the stores for infringement of any right protected by Patent Registration of design or Trade Mark and shall take all risk of accidents or damage, which may cause failure of supply from whatever cause arising and the entire responsibility for sufficiency of all means used by him for the fulfilment of the contract.
19. **Free Issue Material (FIM):** Successful tenderer will have to arrange insurance showing beneficiary as “Institute for Plasma Research” at their risk and cost towards adequate security for the materials/property provided/issued by the Purchaser as Free Issue Material for the due execution of the contract.
20. The Director, IPR reserves the right to accept or reject any quotations fully or partly or to cancel the enquiry without assigning any reason.
21. **Jurisdiction:** The contract shall be governed by the Laws of India for the time being in force. The Courts of Gandhinagar only shall have jurisdiction to deal with and decide any legal or dispute arising out of this Contract.



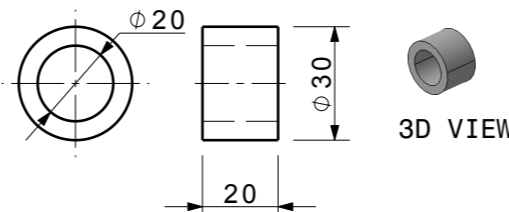
3D VIEW



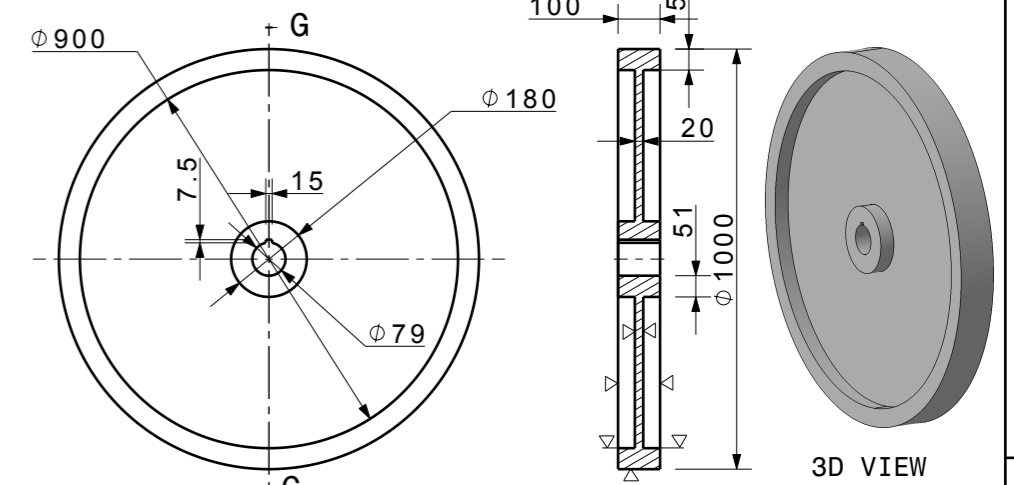
04 SPACER



05 CHECK NUT

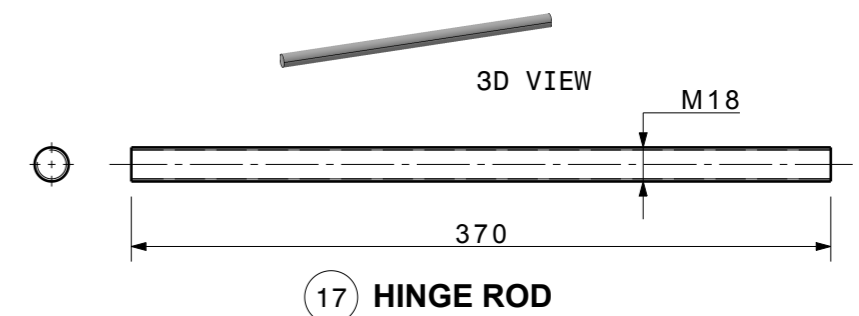


16 BOSS FOR HINGE

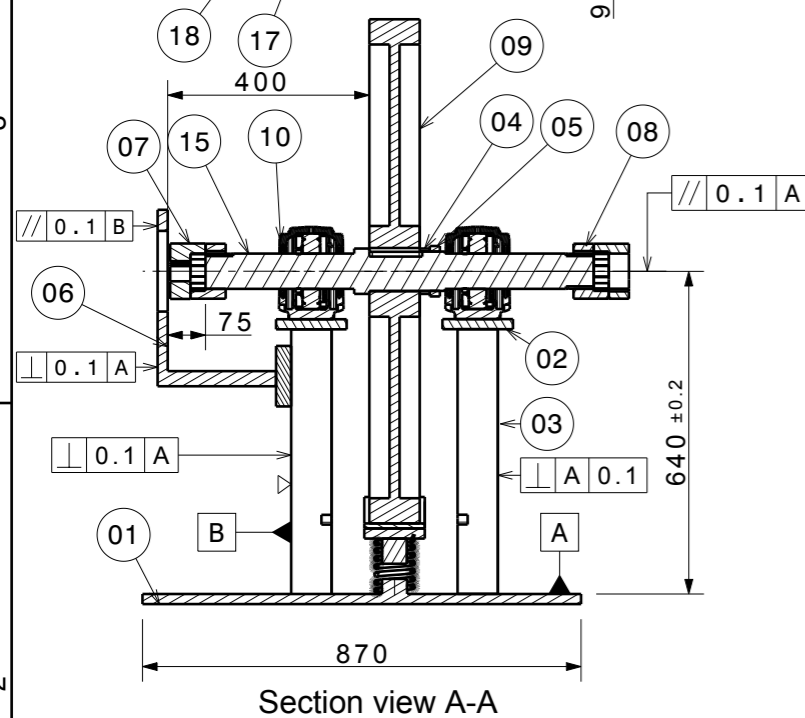


09 FLYWHEEL

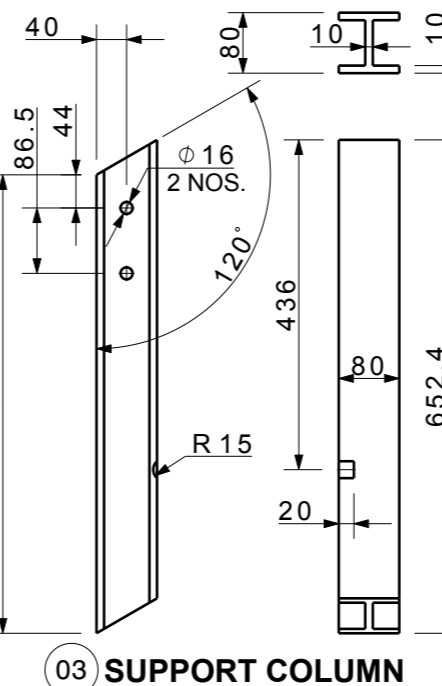
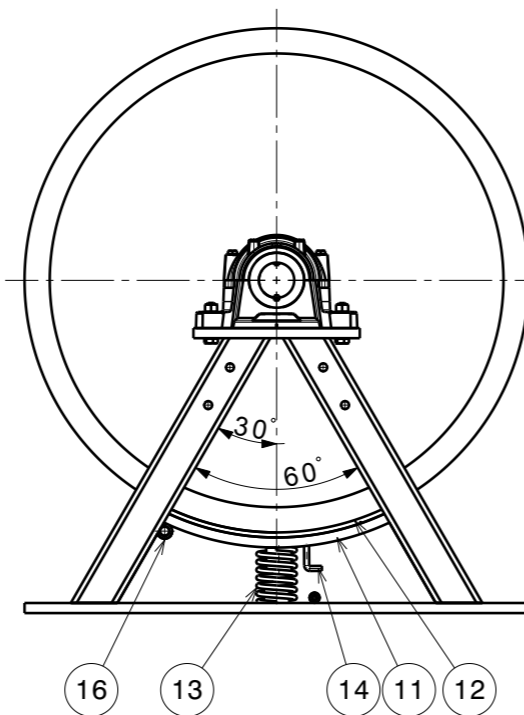
Section view G-G
Scale: 1:18



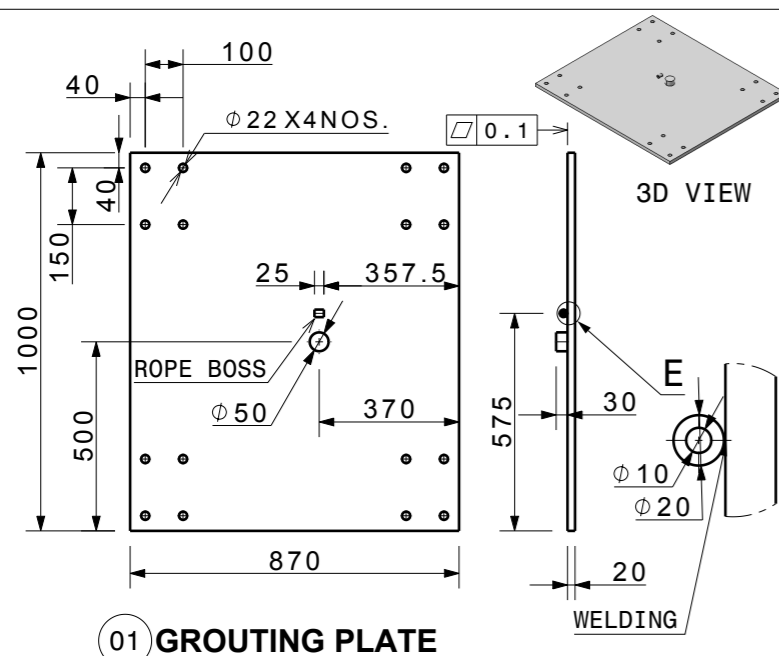
17 HINGE ROD



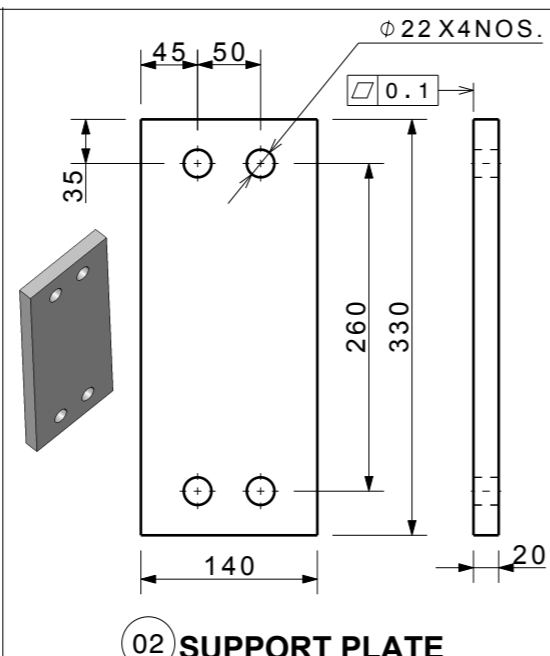
Section view A-A



03 SUPPORT COLUMN



01 GROUTING PLATE



02 SUPPORT PLATE

PART NO	REF.DRG. NO.	DESCRIPTION	MATERIAL	QTY.	REMARKS
21	--/--	BOLTS (AS PER REQ.)	MILD STEEL / CARBON STEEL		
20	--/--	KEYS (AS PER REQ.)	AISI 4140		
19	--/--	HILTI CHEMICAL ANCHOR GROUTING BOLTS	AS PER DOCUMENT	08	M20x150L
18	--/--	M18 NUT FOR HINGE	MILD STEEL / CARBON STEEL	02	
17	SHEET-1	HINGE ROD	MILD STEEL / CARBON STEEL	01	
16	SHEET-1	BOSS FOR HINGE	MILD STEEL / CARBON STEEL	01	
15	SHEET-2	SHAFT	AISI 4140 ALLOY STEEL	01	
14	SHEET-2	LOCKING ROD	MILD STEEL / CARBON STEEL	01	
13	--/--	COMPRESSION SPRING	STD. SPRING STEEL	01	
12	SHEET-2	BRAKE SHOE	AS PER DOCUMENT	01	
11	SHEET-2	BRAKE HOLDER	MILD STEEL / CARBON STEEL	01	
10	SHEET-2	BEARING HOUSING	AS PER DOCUMENT	02	
9	SHEET-1	FLY WHEEL	IS2062 E300 A	01	
8	SHEET-2	JAW COUPLING-02	AS PER DOCUMENT	01	
7	SHEET-2	JAW COUPLING-01	AS PER DOCUMENT	01	
6	SHEET-2	MOTOR SUPPORT	MILD STEEL / CARBON STEEL	01	
5	SHEET-1	CHECK NUT	MILD STEEL / CARBON STEEL	01	
4	SHEET-1	SPACER	MILD STEEL / CARBON STEEL	01	
3	SHEET-1	SUPPORT COLUMN	MILD STEEL / CARBON STEEL	04	
2	SHEET-1	SUPPORT PLATE	MILD STEEL / CARBON STEEL	02	
1	SHEET-1	GROUTING PLATE	MILD STEEL / CARBON STEEL	01	

ANGULAR DIMENSIONS	LENGTH OR DIA	NOTE/REMARK
UP TO 10	±1'	UP TO 6 ±0.1
10-50	±0'30'	6-30 ±0.2
50-120	±0'20'	30-120 ±0.3
120-400	±0'10'	120-400 ±0.5
OVER 400	±0'05'	400-1000 ±0.8
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6
	▽▽ 1.6-8	▽▽▽▽ < 0.025

ALL DIMENSIONS ARE IN MM

DRAWN BY	PINAKIN	06-01-21
CHECKED BY		
APPROVED BY		

Institute for Plasma Research
 प्लाज्मा अनुसंधान संस्थान
 Bhat, Near Indira Bridge, Gandhinagar 382 428, Gujarat (India)

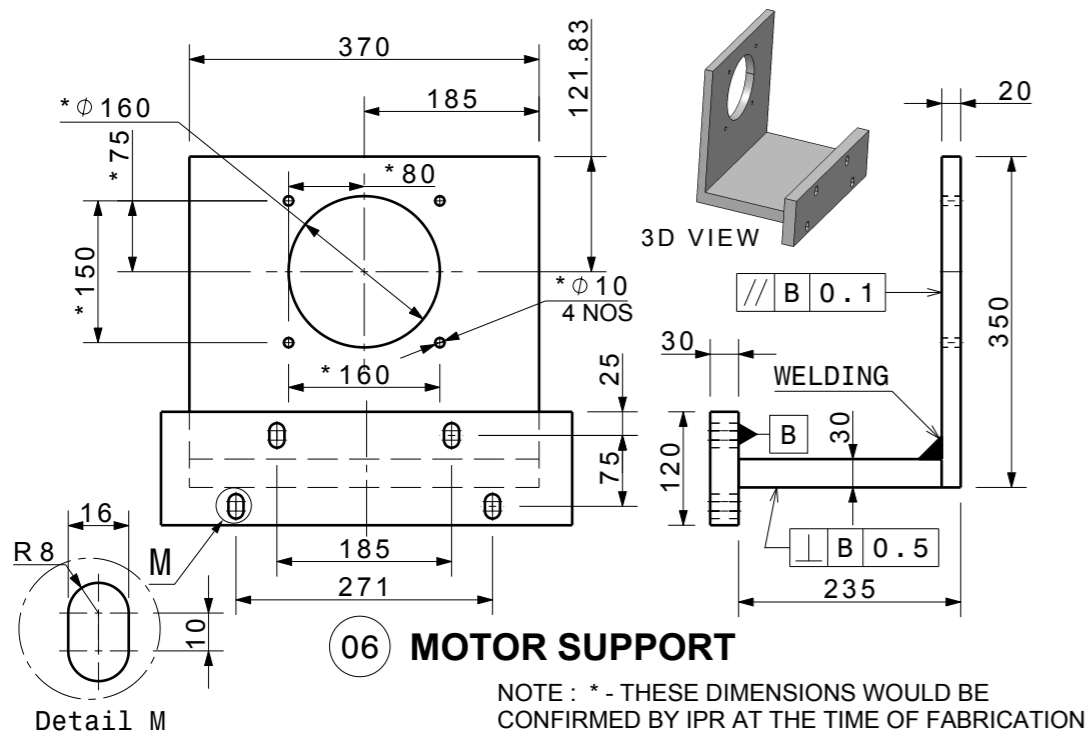
TITLE
FLYWHEEL SYSTEM

SCALE
 1:1 / NTS

DRG. NO. IPR-20-A3-F_S_A-8921

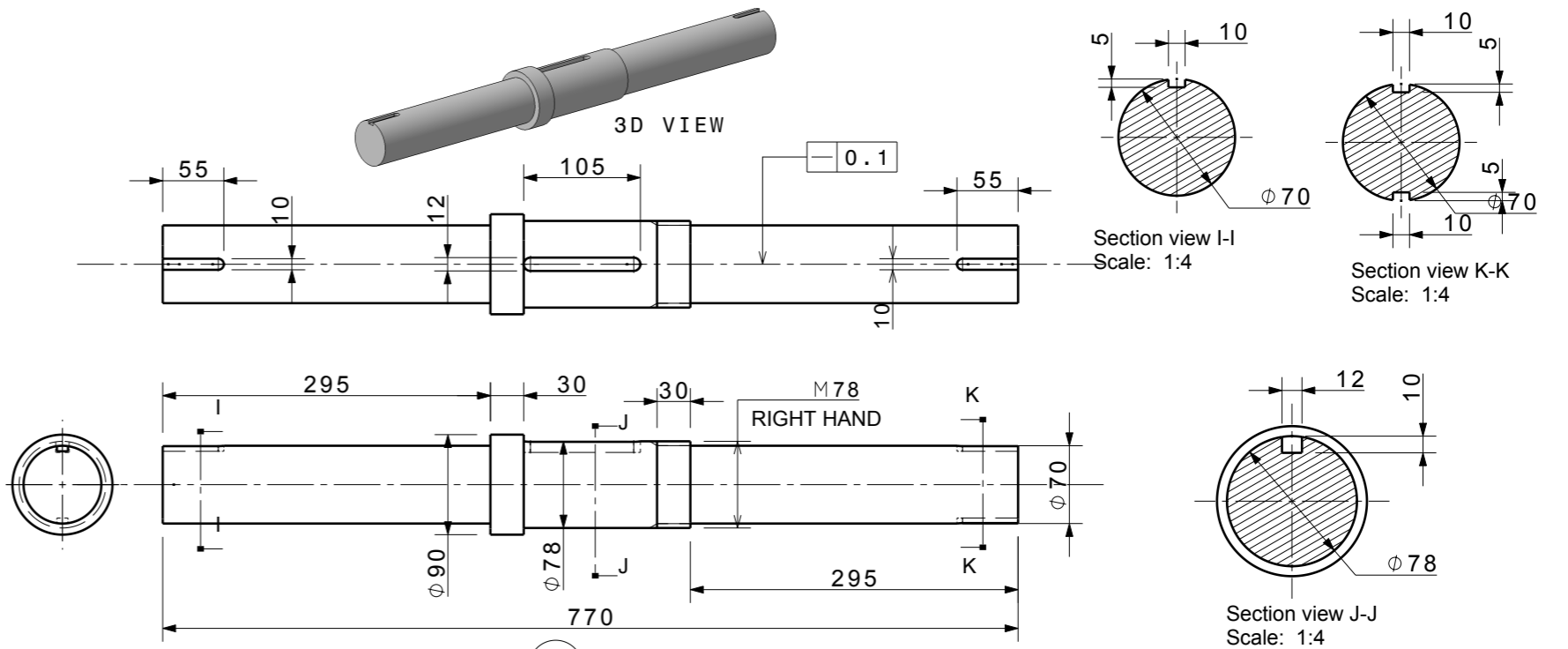
REV 03

SHEET 1/2

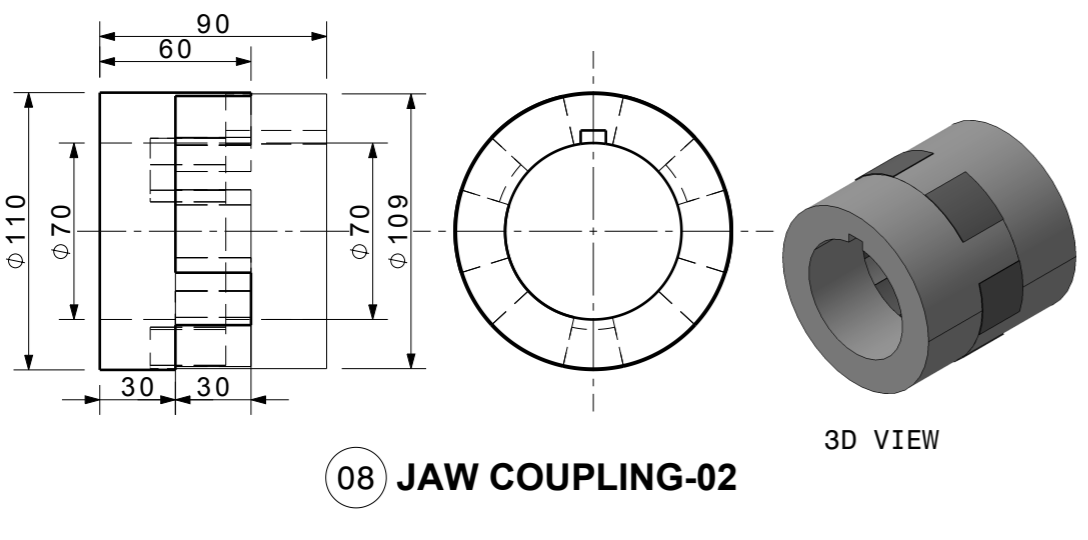


06 MOTOR SUPPORT

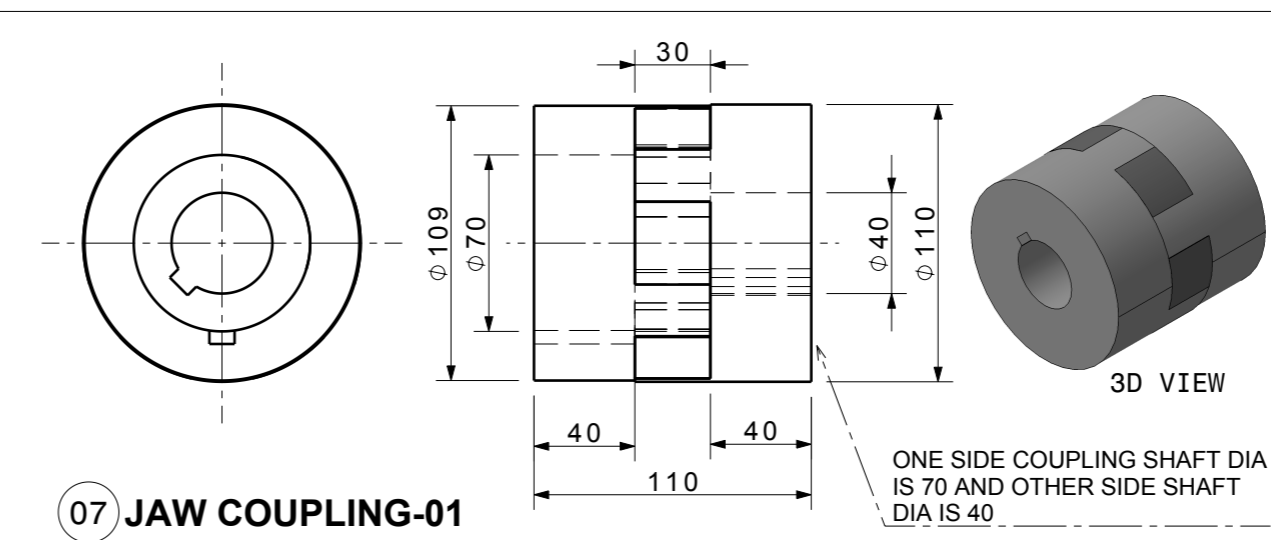
NOTE: * - THESE DIMENSIONS WOULD BE CONFIRMED BY IPR AT THE TIME OF FABRICATION



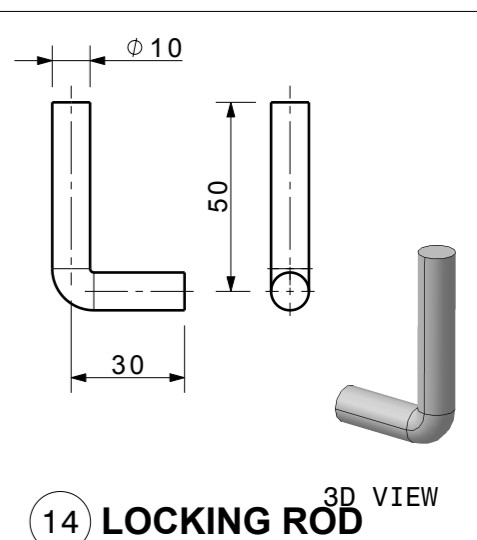
15 SHAFT



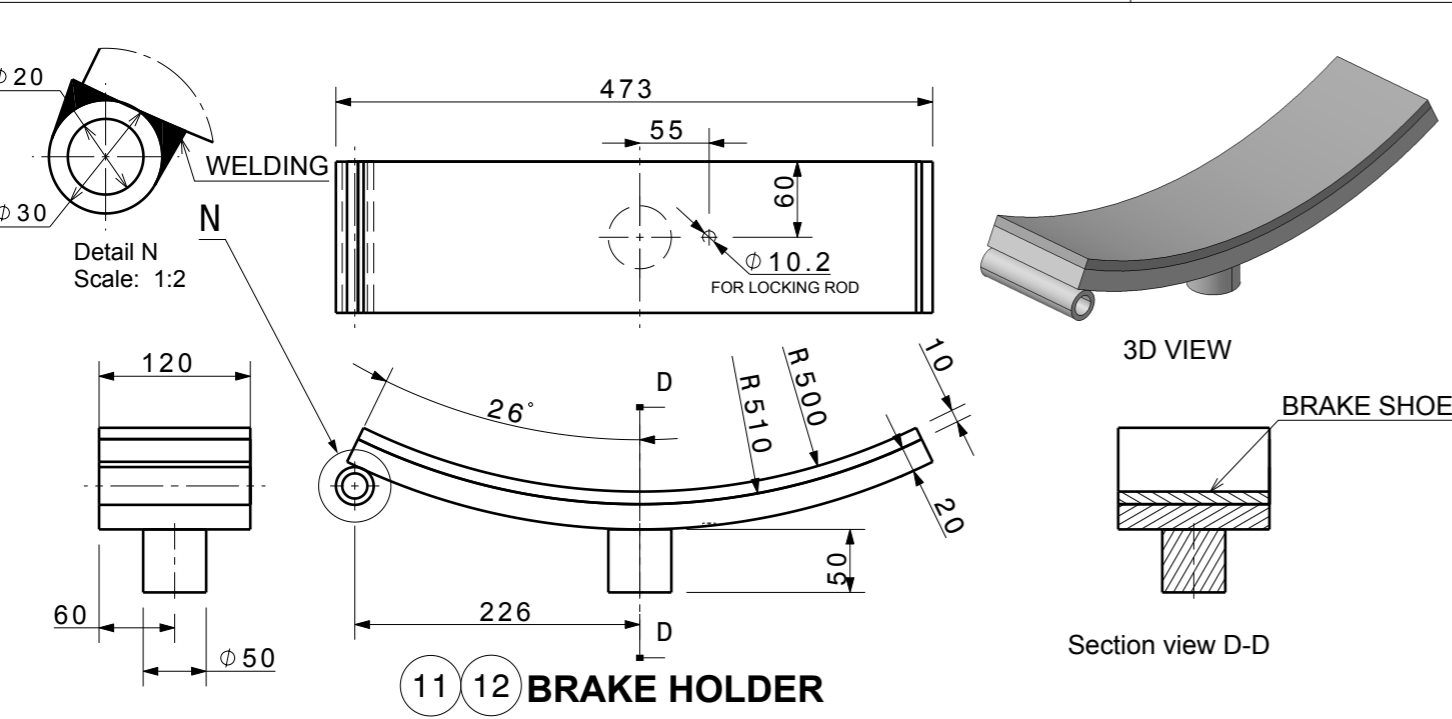
08 JAW COUPLING-02



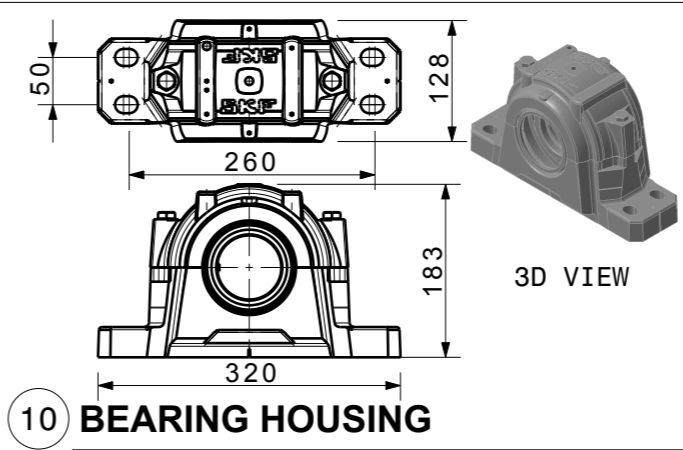
07 JAW COUPLING-01



14 LOCKING ROD



11 12 BRAKE HOLDER



10 BEARING HOUSING

ANGULAR DIMENSIONS	LENGTH OR DIA	NOTE/REMARK
UP TO 10	±1'	UP TO 6 ±0.1
10-50	±0'30'	6-30 ±0.2
50-120	±0'20'	30-120 ±0.3
120-400	±0'10'	120-400 ±0.5
OVER 400	±0'05'	400-1000 ±0.8
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6
	▽▽ 1.6-8	▽▽▽▽ < 0.025

ALL DIMENSIONS ARE IN MM

DRAWN BY: PINAKIN 06-01-21

CHECKED BY:

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 Bhat, Near Indira Bridge, Gandhinagar 382 428, Gujarat (India)

TITLE: **FLYWHEEL SYSTEM**

SCALE: NTS

DRG. NO. IPR-20-A3-F_S_A-8921

REV 03

SHEET 2/2