

		उत्पाद मानक		
		PRODUCT STANDARD		पृष्ठ 5 का 1
गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेवी इलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूपसे कम्पनी के हितों को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जावे	<u>SPECIFICATION OF HYDRAULIC TORQUE WRENCH</u>			
	<p>This Product standard covers the Technical requirement of Hydraulically operated torque wrenches along with power pack and associated items required for tightening/loosening of nuts and bolts of various sizes for Hydro generator. FOR SCOPE OF SUPPLY, Refer <u>Annexure</u> attached.</p> <p>TECHNICAL REQUIREMENT:</p> <p>1. PREQUALIFICATION OF VENDOR: - Supplier should have supplied at least 10 sets of hydraulic torque Wrenches to hydro sites. Purchase order details to be submitted.</p> <p>2. MOTORISED HYDRAULIC POWER PACK</p> <p>2.1 Motorized hydraulic power pack unit shall be provided with positive displacement type pump with direct/ flexible coupling with motor. This pump motor unit shall be mounted on the oil tank along with its auxiliaries like relief valve and pressure gauges. It shall be suitable for a working pressure of 700 kg/cm² & a test pressure of 1050 Kg/cm² for 30 minutes excluding motor pump.</p> <p>2.2 The oil tank shall be of minimum 10 liters capacity.</p> <p>2.3 The motorized hydraulic power pack shall be provided with Digital Pressure Sensor (0-1000 Kg/cm²) and digital pressure & torque indicator showing corresponding torque read-out. Digital pressure sensor & indicator shall be calibrated at an external agency approved by the Govt. of India (Test Certificate shall be provided).</p> <p>2.4 The motor's shall be of reputed make of 230V ± 10%, 50 ± 5%Hz AC single phase power supply. The motor shall conform to Class 'F' insulation system & IS-325/IS-4722. The motor shall be capable of withstanding an over- frequency of 60 to 70 Hz for one minute.</p> <p>2.5 The motorized hydraulic power pack shall be mounted on a trolley with suitable wheels/rollers for easy movement from one place to another.</p> <p>2.6 The motorized hydraulic power pack shall be provided with 12 (+5%) meter twin high pressure hydraulic hoses, with a working pressure of 1000 Kg/cm² and a test pressure of 1500 kg/cm² (Test Certificate shall be provided). The hydraulic hoses shall be provided with quick couplers.</p> <p>2.7 The motorized hydraulic power pack shall have auto shut off facility in the event of non-cycling of pump to prevent overheating.</p> <p>2.8 The remote control pendant shall be provided to operate the motorized hydraulic power pack for remote operation at lower control voltage.</p>			
	REV-01	Date- 17.02.2010	हाइड्रोजनरेटर इंजीनियरिंग विभाग भारत हेवी इलेक्ट्रिकल्स लिमिटेड	
	Product standard is totally reviewed & updated.	K.K.JAIN	K.K.JAIN	J.K.BHATI
		K.K.JAIN		जासी करने की दिनांक 22-12-2009

उत्पाद मानक
PRODUCT STANDARD

पष्ठ 5 का 2

गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेवी इलेक्ट्रिकल्स लिमिटेड की संपत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूप से कम्पनी के हिस्से को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जावे

2.9 The motorized power pack shall be suitable for use of turbine oil grade ISO: VG 32/46/57/ 68.

3. HYDRAULIC TORQUE WRENCH

- 3.1** The hydraulic torque wrench shall be suitable to both tightening and loosening of nuts/bolts. The loosening torque may normally require approximately **50%** more than the tightening torque. The capacity of the hydraulic torque wrench shall be designed accordingly. The accuracy of the hydraulic torque wrench should be +/- 2% or better (Test Certificate shall be provided).
- 3.2** The hydraulic torque wrench specified shall be suitable for the space given in the sketches given in Annexure and nose radius shall be kept accordingly. The dimensional drawings showing the placement of hydraulic torque wrench along with socket and reaction arms shall be submitted along with the technical bid. Reaction arms should be 360° adjustable.
- 3.3** The direct hex link, adaptors, insert sockets etc. shall be able to tighten and loosen the nuts/bolts in combination as per spaces given in our sketches.
- 3.4** The weight of hex link, wrenches, adaptor, and socket shall be kept as low as possible by using chrome vanadium steel and high strength aluminum alloy such as IS 24345 (Test Certificate shall be provided).

4. SOCKETS

Design and requirement of various sizes sockets to be done as per requirement given in Annexure.

5. SPARES & TOOL KIT

- 5.1** Description of tools & accessories required for use of torque wrench shall be clearly mentioned in the offer with itemized list.
- 5.2** Description of the spares and quantity shall be as per scope of supply clause A.1.7 of page -5.

6. INSPECTION & TESTING

- 6.1** The supplier shall have the facility to calibrate the hydraulic torque wrenches at his premises (test certificate shall be provided).
- 6.2** The torque sensor and torque indicator used for testing/calibrating the hydraulic torque wrench shall have valid calibration certificate traceable to NPL standards. (Valid Calibration Certificate shall be provided).
- 6.3** The supplier shall accept for re-testing/calibration of hydraulic torque wrench once a year or as per BHEL's customer requirement. Within guarantee period supplier has to do retesting/calibration at free of cost.

उत्पाद मानक इ
PRODUCT STANDARD

पृष्ठ 5 का 3

गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेवी इलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूप से कम्पनी के हितो को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जावे

6.4 The supplier shall accept to carry-out testing/calibration of hydraulic torque wrench in Presence of BHEL/ Customer /Third party Inspection Engineers for authenticity, if required on prior intimation.

6.5 Inspection & testing of complete equipment along with sockets shall be carried out as per approved QA Plan (to be submitted by supplier along with offer).

7. GUARANTEE

The motorized power pack, hydraulic torque wrench & all accessories shall be guaranteed for satisfactory operation for 5 years after dispatch or 2 years after commissioning whichever is earlier with total free replacement of defective parts (Guarantee Certificate shall be provided).

8. GENERAL

Following Documents & Confirmations Shall Be Enclosed Along With Technical Offer:

- 8.1** The dimensional drawings showing the placement of hydraulic torque wrench along with socket and reaction arms shall be submitted.
- 8.2** Quotation shall be submitted with item wise price.
- 8.3** The testing & calibration procedure may be carried out in presence of BHEL /Customer/ Third Party Inspection Engineers for authenticity, if required on prior intimation.
- 8.4** Supplier should have supplied at least 10 sets of hydraulic torque wrenches to hydro sites. Purchase order details to be submitted.
- 8.5** The supplier should extend service back up for Training/Demonstration at project sites free of cost.
- 8.6** Offers having incomplete information may be rejected at first instant.
- 8.7** QA plan clearly specifying inspection stages.

9. FOLLOWING DOCUMENTS SHALL BE SUPPLIED WITH DISPATCH

- 9.1** 10 hard copies of TC, GC, drawings and O & M manual in BHEL format along with four soft copies.
- 9.2** 10 copies of packing list indicating item numbers, quantity & weight of each box shall be furnished.

10. PACKING

The item covered shall be packed individually as specified below, in sturdy water proof boxes suitable for rough & tough handling at site during use. These boxes shall be suitable for rough handling during transportation & long term storage of 2 to 10 years.

उत्पाद मानक
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पृष्ठ 5 का 4

ANNEXURE

Requirement of tightening of different size of Nuts/Bolt Head

SL No	Description	Nut Size M__	A/F mm	Required Torque(Approx) Kg-M
1.	Stator			
	a) Joint Bolt of Stator Segment	48	75	340
	b) Studs between Sole plats & Concrete	64	95	610
	c) Holding Down bolts with Sole plate	64	95	610
	d) Core Studs	48	75	340
2.	Rotor			
	a) Joining two halves of Spider	80	115	1800
	b) Rim Studs	36	65	310
	c) Fixing of Spider with Top Shaft	64	95	800
	d) Fixing of Spider with Bottom Shaft	80	115	800
3.	Lower/Bottom Bracket			
	a) Centre & Arm	48	75	340
	b) Spring Plate Joint	42	65	220
	c) Spring Plate with Bracket centre	48	75	340
	d) Holding Down bolts with Sole plate	56	85	810
	e) Studs between Sole plats & Concrete	56	85	810
4.	Upper/Top bracket			
	a) Centre & Arm	30	46	80
	b) Holding down with Stator	64	95	340
5.	Turbine & Generator Shafts coupling Studs & Nuts	125	170	2500

Note: -

- 1. Fasteners below M20 are not to be considered.**
- 2. Reference sketches for application & space limitation are enclosed.**
- 3. User to make his own project specific sketches & enclose with the product standard and mention in the table above while raising the purchase indent.**

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उत्पाद मानक
PRODUCT STANDARD

पृष्ठ 5 का 5

SCOPE OF SUPPLY

1. For reference following set of data may be used

S.N.	DESCRIPTION	QTY.
1	System Matched, Motorized Power Pack, With Twin Flexible Hose Pipe Having 12 Meter Length (Approx) With Digital Pressure & Torque Gauge.	01 No.
2	<p>a. Basic Hydraulic Torque Wrench, Suitable For Nut A/F 46 Mm, 65mm & 75mm, Capacity 500kgm.</p> <p>b. Direct Ratcheting Type Hex Link Suitable For Above Basic Wrench 2 (a) For Nut 65mm A/F.</p> <p>c. Direct Ratcheting Type Hex Link Suitable For Above Basic Wrench 2 (a) For Nut 75mm A/F.</p> <p>d. Insert Socket Having 75mm A/F Male To 46mm A/F Female Suitable For Above Basic Wrench 2 (c) For Nut 46mm A/F</p> <p>The Above Items Are Suitable For Joint Bolt Of Stator Segment (75mm), Core Stud (75mm), Rim Studs (65mm), Centre & Arm Bolts (75mm), Spring Plate Joint Bolts (65mm), Spring Plate With Bracket Bolts (75mm) & Centre & Arm Bolts (46mm)</p>	<p>01 No.</p> <p>01 No.</p> <p>01 No.</p> <p>01 No.</p>
3	<p>a. Basic Hydraulic Torque Wrench, Suitable For Nut A/F 85mm, 95mm, & 115mm, Capacity 2750kgm.</p> <p>b. Direct Ratcheting Type Hex Link Suitable For Above Basic Wrench 3 (a) For Nut 95mm A/F</p> <p>c. Insert Socket Having 95 Mm A/F Male To 85mm A/F Female Suitable For Above Basic Wrench 3 (a) For Nut 85mm A/F</p> <p>d. Insert Socket Having 95 Mm A/F Male To 115mm A/F Female Suitable For Above Basic Wrench 3 (a) For Nut 115mm A/F</p> <p>The Above Items Are Suitable For Studs Between Sole Plate & Concrete Bolts (86mm), Holding Down Bolts (95mm), Joining Two Halves Of Spider Bolts (115mm), Fixing Of Spider With To Shaft Bolts (95mm), Holding Down With Sole Plate Bolts (85mm), Studs Between Sole Plate & Concrete Bolts (85mm) & Holding Down With Stator Bolts (95mm).</p>	<p>01 No.</p> <p>01 No.</p> <p>01 No.</p> <p>01 No.</p>
4	<p>a. Basic Hydraulic Torque Wrench, Suitable For Nut A/F 170mm, Capacity 4000kgm.</p> <p>b. Direct Ratcheting Type Hex Link Of 150mm A/F Suitable For Above Basic Wrench 4 (a) & Insert Socket Having 150mm A/F Male To 170mm A/F Female Suitable For Above Basic Wrench 4 (a) For Nut 115mm A/F</p>	<p>01 No.</p> <p>01 No.</p>
5	<p>a. Direct Ratcheting Type Hex Link Or Adapter With 1-1/2" Square Drive Suitable For Basic Torque Wrench Specified In Clause 2 (a)</p> <p>b. 1-1/2" Square Drive Adapter For Above</p>	<p>01 No.</p> <p>01 No.</p>
6	<p>Heavy Duty Impact Deep Socket With 1-1/2" Square Drive Suitable For Direct Hex Link Or Adapter 5 (a) For The Following Across Flat</p> <p>a. Socket A/F 46mm-1no. b. Socket A/F 65mm-1no. c. Socket A/F 75mm-1no.</p>	01 set

गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेवी इलेक्ट्रिकल्स लिमिटेड की संपत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूप से कम्पनी के हितो को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जावे

REFERENCE SKETCHES

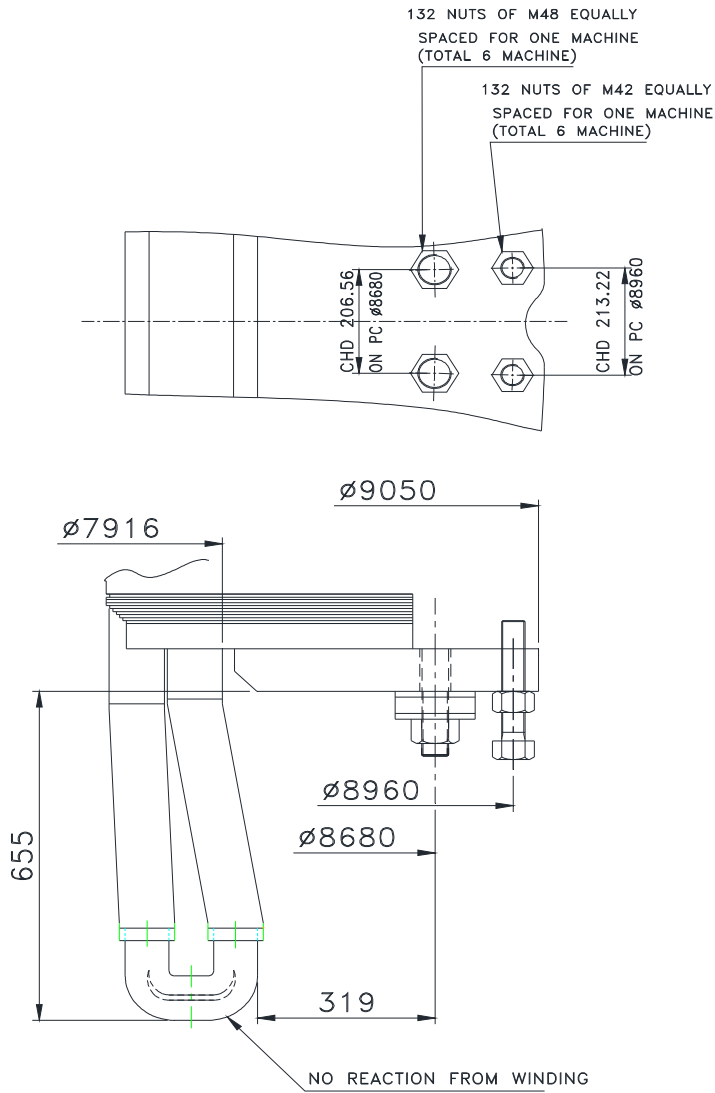
Annexure

**उत्पाद मानक
PRODUCT STANDARD**

पृष्ठ 11 का 1

Illustrative sketch for reference

STATOR CORE STUDS

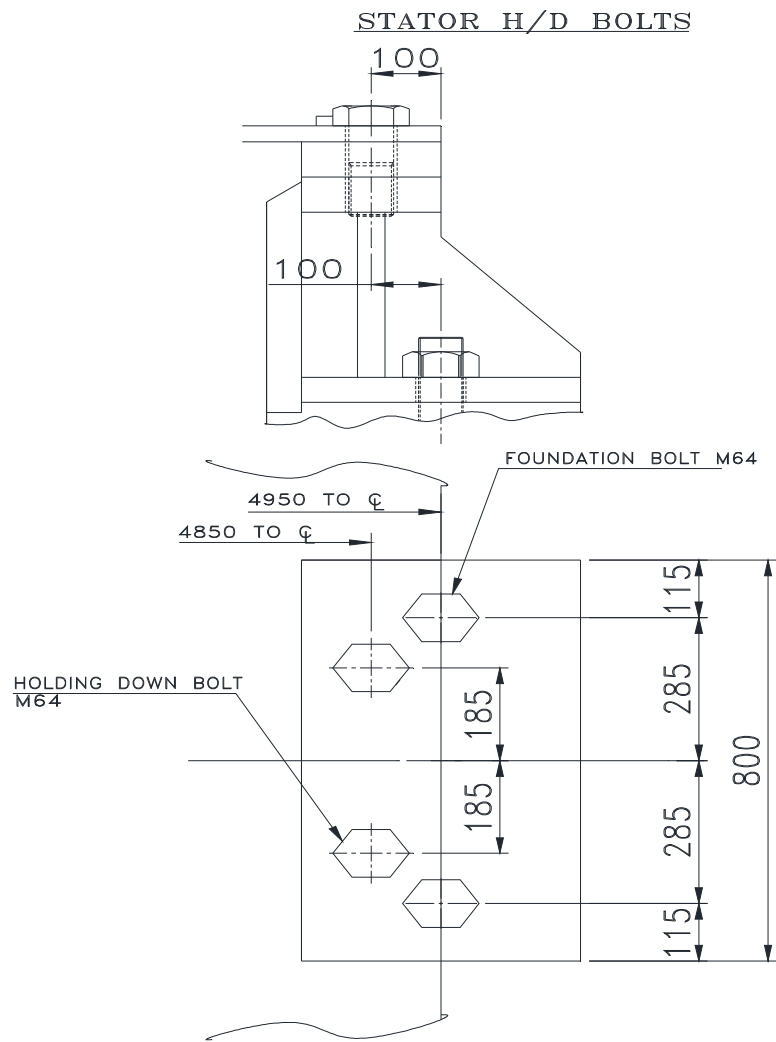


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उत्पाद मानक
PRODUCT STANDARD

पृष्ठ 11 का 2

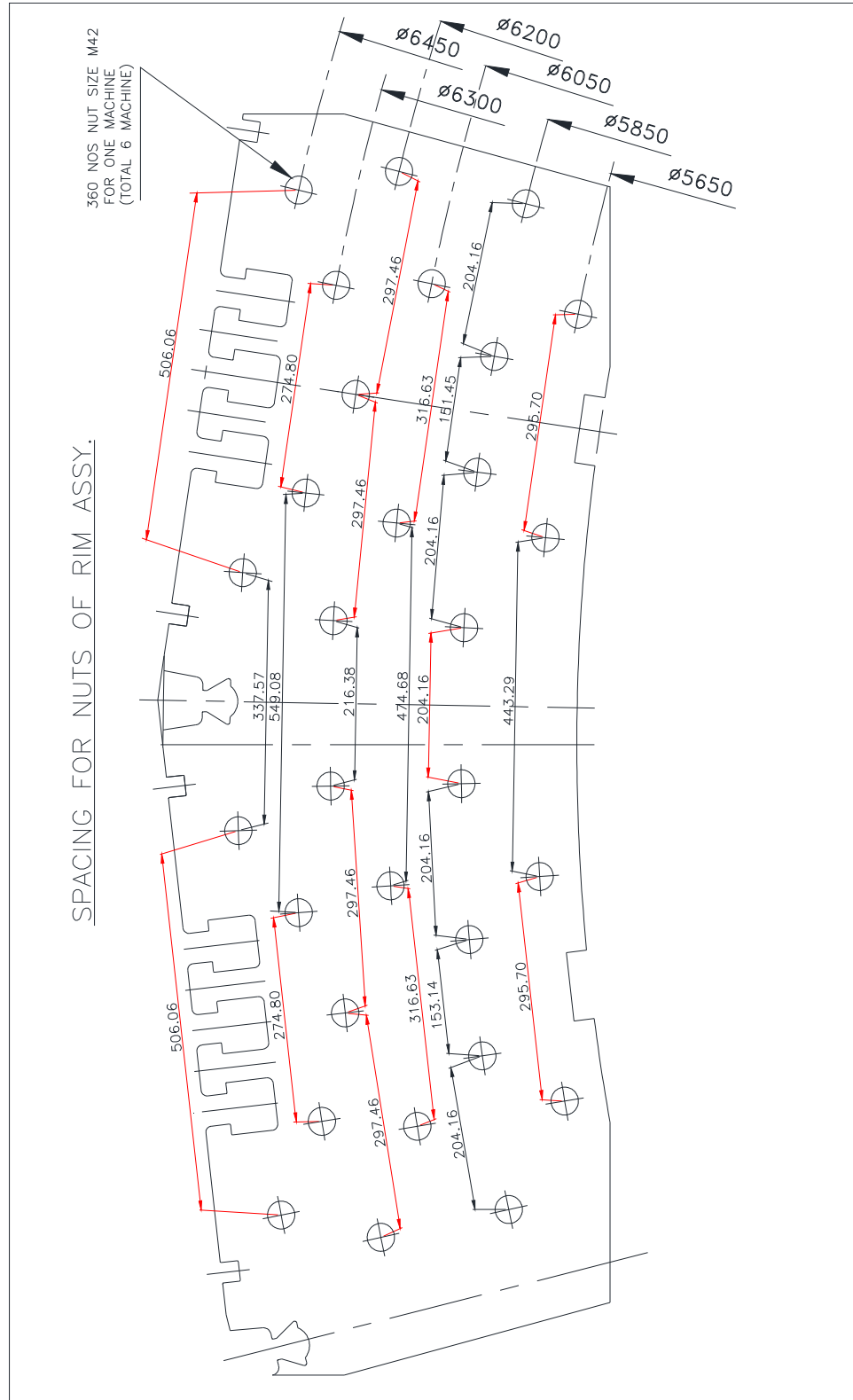
Illustrative sketch for reference



गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेची इलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूप से कम्पनी के हितो को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जाये

उत्पाद मानक
PRODUCT STANDARD

Illustrative sketch for reference



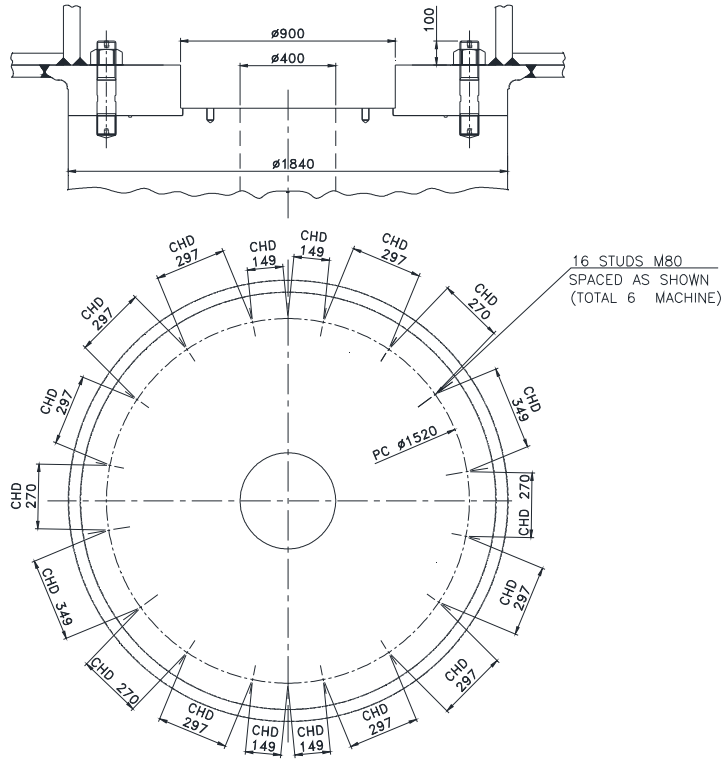
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उत्पाद मानक
PRODUCT STANDARD

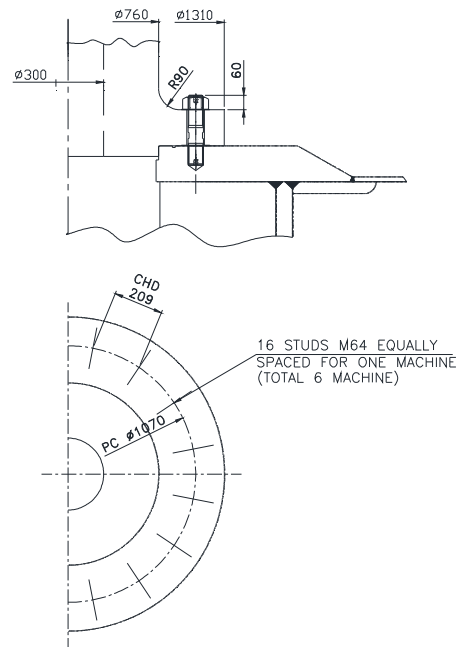
Illustrative sketch for reference

गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेवी इलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूप से कम्पनी के हितों को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जावे

(A) BOTTOM SHAFT & SPIDER



(A) TOP SHAFT & SPIDER

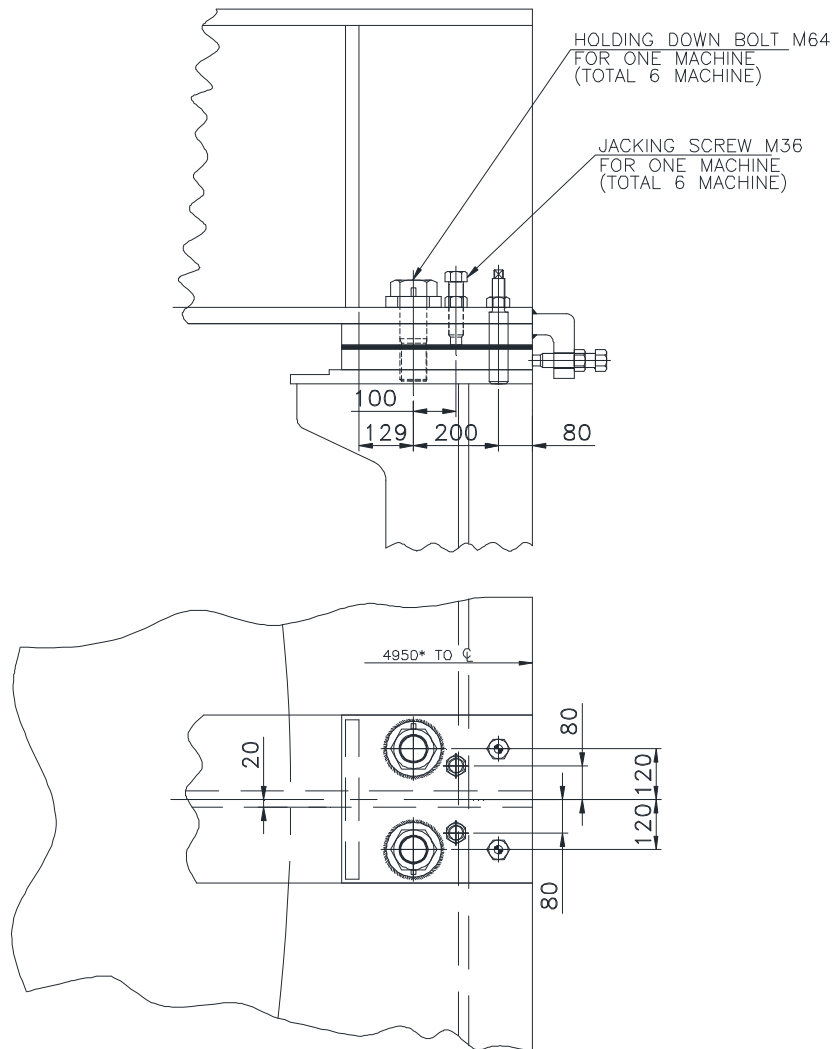


उत्पाद मानक
PRODUCT STANDARD

पृष्ठ 11 का 5

Illustrative sketch for reference

STATOR AND TOP BRACKET FIXING (BOLT-M64)

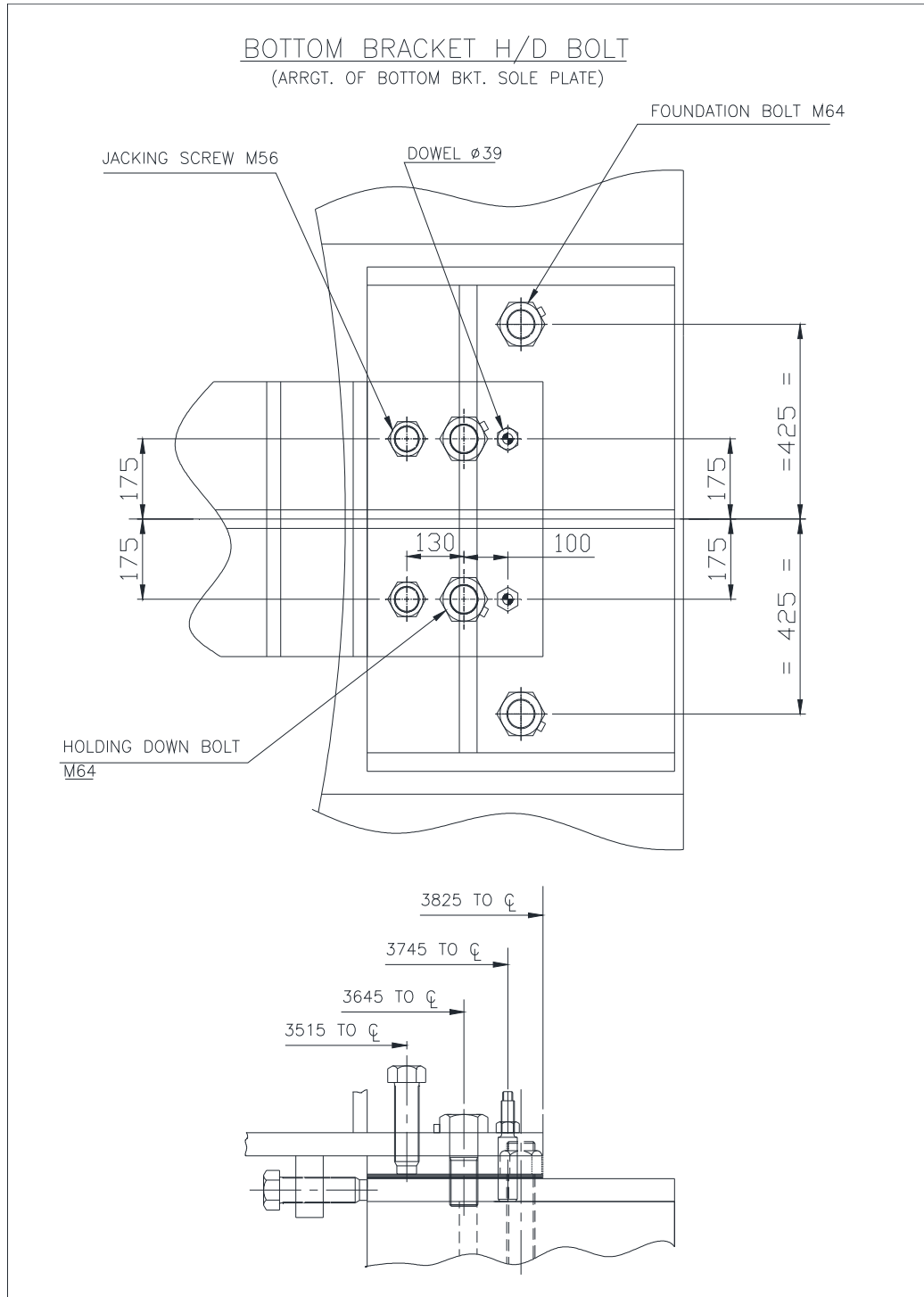


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उत्पाद मानक
PRODUCT STANDARD

पृष्ठ 11 का 6

Illustrative sketch for reference



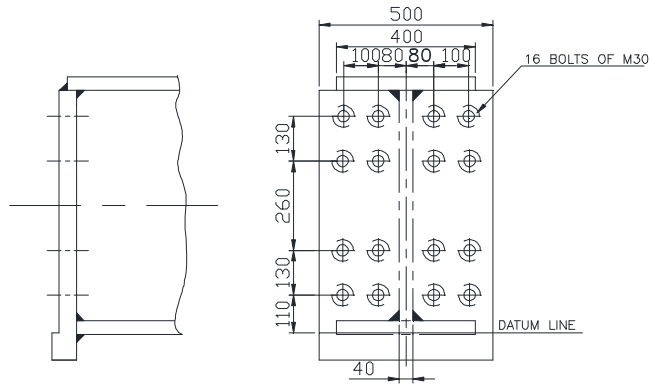
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उत्पाद मानक
PRODUCT STANDARD

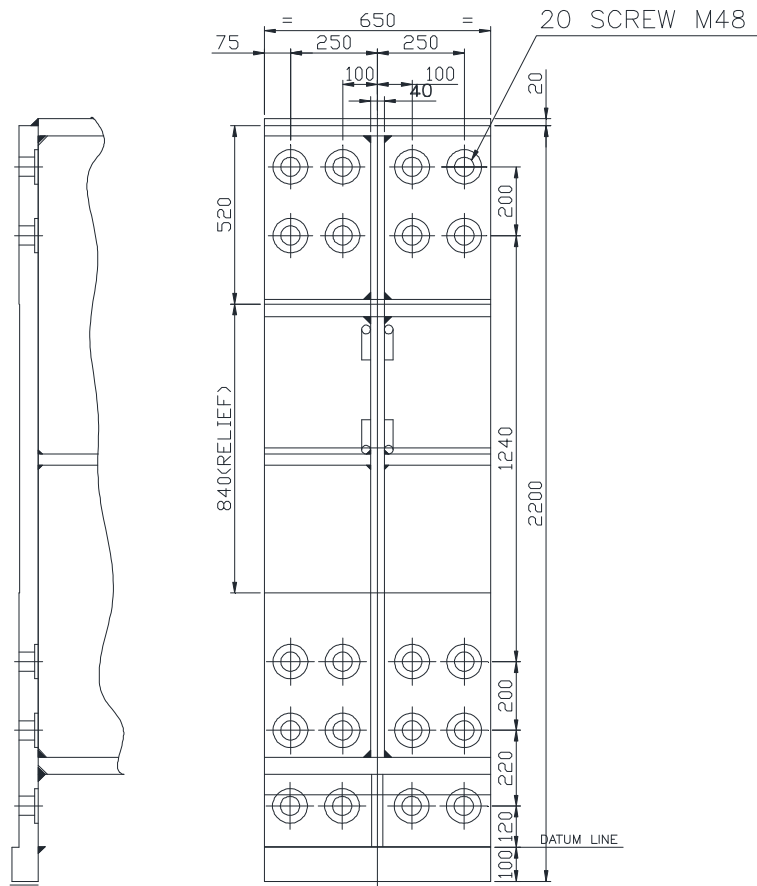
पृष्ठ 11 का 7

Illustrative sketch for reference

TOP BRACKET ARM FIXING



BOTTOM BRACKET ARM FIXING



गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेवी इलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूप से कम्पनी के हितो को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जावे

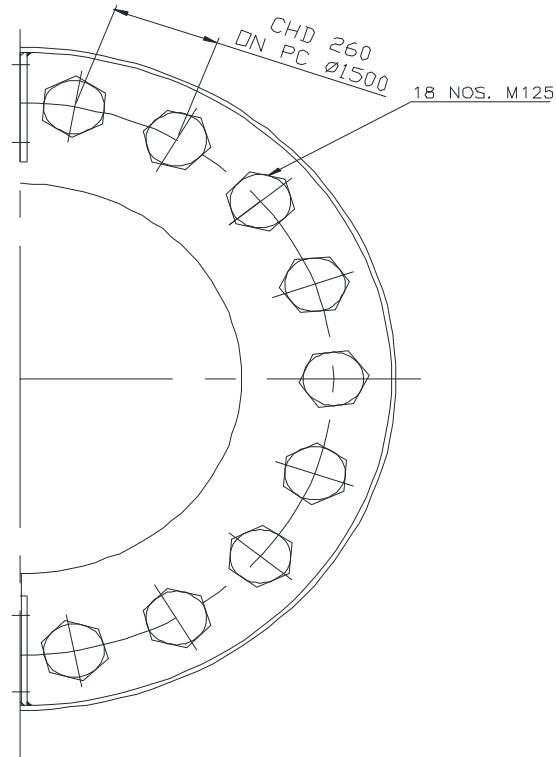
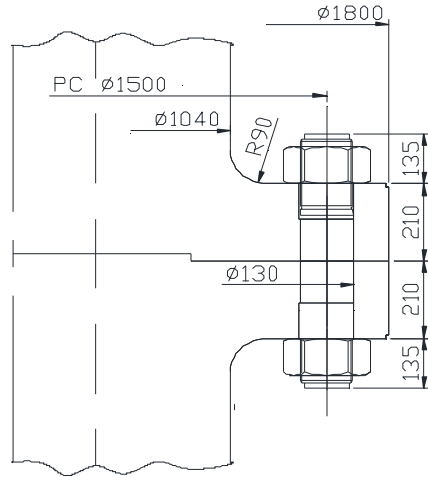
उत्पाद मानक
PRODUCT STANDARD

पृष्ठ 11 का 8

गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेवी इलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूप से कम्पनी के हितों को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जाये

Illustrative sketch for reference

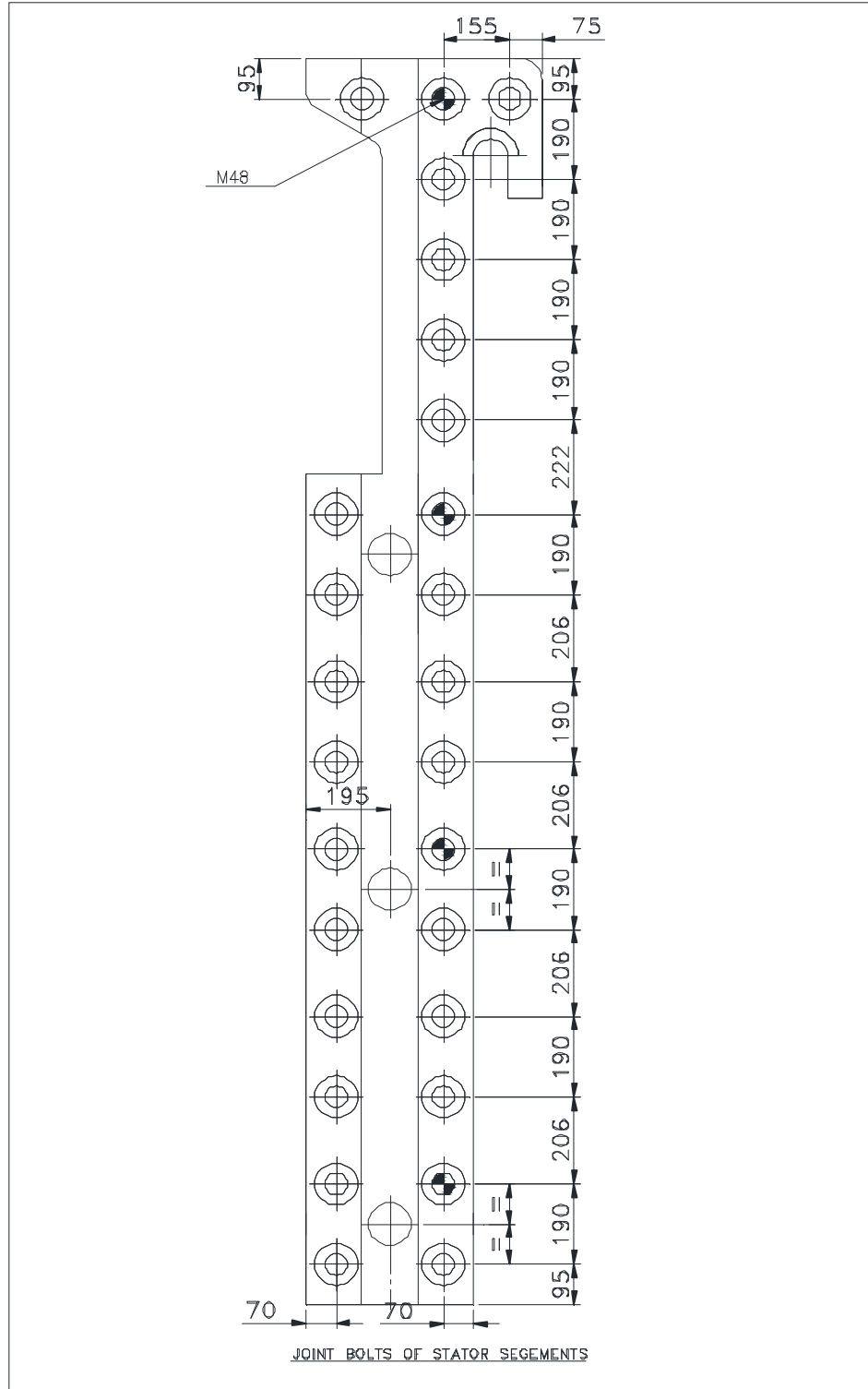
GENERATOR AND TURBINE SHAFT



उत्पाद मानक
PRODUCT STANDARD

Illustrative sketch for reference

गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेवी इलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूप से कम्पनी के हितो को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जाये

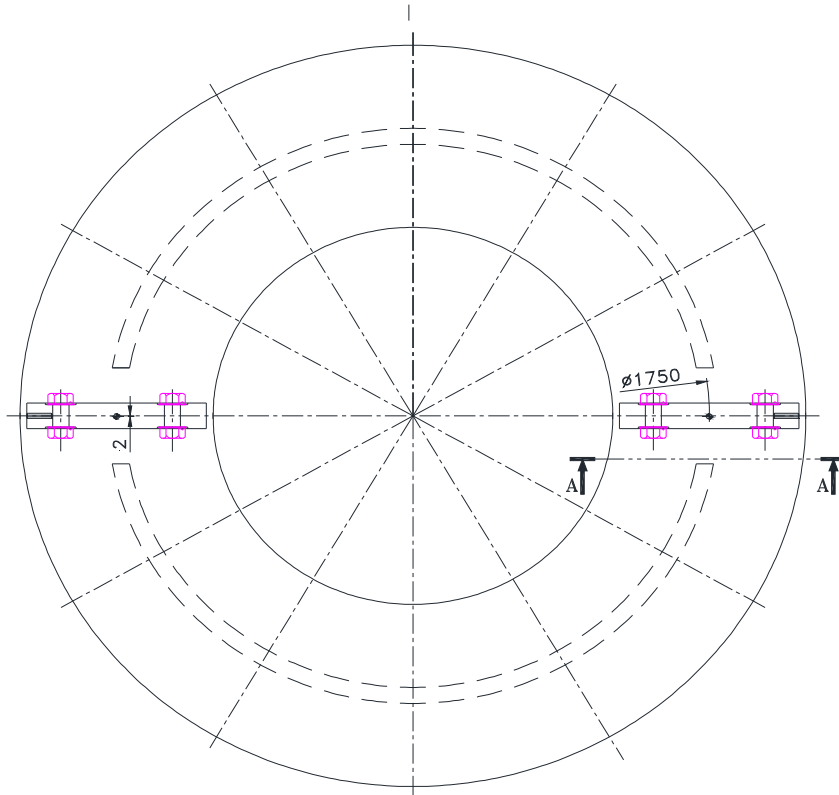


उत्पाद मानक
PRODUCT STANDARD

Illustrative sketch for reference

गोपनीय एवं अधिकार सुरक्षित इस प्रपत्रा पर दी गई जानकारी भारत हेवी इलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसे प्रत्यक्ष या अप्रत्यक्ष रूप से कम्पनी के हितों को नुकसान पहुँचाने के लिए कदापि उपयोग नहीं किया जावे

SPRING PLATE SEGMENT ASSY.



① ASSY.

