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**Enclosure:**

Drawing No: (i) CLW/ES/3/SK-1/0110/E

(ii) CLW/ES/3/SK-2/0110/E

(iii)CLW/ES/3/SK-3/0110/E

## TECHNICAL SPECIFICATION FOR CREW FAN FOR 3-PHASE ELECTRIC LOCOMOTIVES

Specification No: CLW/ES/3/0110/E

ISSUE DATE: 21.04.1997

**ISSUED BY:**

DY. CHIEF ELECTRICAL ENGINEER/D-II

CHITTARANJAN LOCOMOTIVE WORKS

P.O : CHITTARANJAN – 713331

DIST. BARDHMAN (WEST), WEST BENGAL (INDIA)

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### **ALTERATION SHEET**

SL. NO.	DATE	PAGE No.	ALT.	DESCRIPTION	REMARKS (SIGN.)
1.	29.01.1999	9	A	Dimensional front view of fittings of Crew Fan is added in Sheet no.9.	s/d
2.	22.05.2000	9	B	Sizes of item no. 10, 11 & 12 changed from M6 to M10.	s/d
3.	10.03.2003	3,6,9	C	(i) Fan air delivery capacity increased to 417 L./Sec i.e. 25 M <sup>3</sup> /Min. At sheet no. 3, clause no. 4(vi). Overall dimensions increase to suit increased air delivery at sheet no.9.  (ii) Note:-2 added at Sheet no.6.	s/d
4.	01.09.2011	3	D	As per XXXIV MSG meeting of item No.19, it has been decided that the air delivery of 65 W fan is comfortable to Loco Pilots. Alteration has been done in sheet no.3. (Ref: - Rly. Board Letter no. 2011/Elect (TRS)/138/2 dated 16.08.11)	S/d
5.	25.07.2016	5	E	Vibration in both horizontal & vertical planes with an amplitude of 3.5 mm at 50 c/s & 10 mm at 50 c/s have been changed to 3.5 mm at 20 c/s & 10 mm at 5 c/s as per approval of CEE/L &S dated 23.07.2016	S/d

**NOTE:** "Specifications have been digitized and all alterations have been incorporated"

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**SPECIFICATION FOR CREW FAN****1. SCOPE :**

This specification covers the manufacture and supply of Crew Fan for 3-Phase Electric Locomotives.

**2. SERVICE CONDITION :****2.1 Climatic and environmental condition: -**

- Maximum atmospheric temperature : 70°C (In Sun) & 50°C.(In Shade)
- Ambient Temperature(operating) : -20°C . . . +70°C
- Ambient Temperature (Storage) : -30°C. . . +80°C
- Humidity (Mean value) : < 95% RH
- Humidity (Max. 90 days a year) : 95.....100% RH and temp. < 40°C
- Normal Humidity : 60%
- Maximum humidity : 100% saturation during rainy season
- Altitude : 160 m above mean sea level.
- Rainfall. : Very heavy in certain areas. The locomotive will be designed to permit it's running at 10 kilometer per hour in flood water level of 102 millimeter above rail level.
  
- Atmosphere during hot weather : Extremely dusty and desert terrain in certain areas.
  
- Coastal areas : Locomotive and equipment will be designed to work in coastal areas in humid and salt laden atmosphere.
  
- Vibration : The equipment, sub-system and their mounting arrangement will be designed to withstand vibration and shocks encountered in service as specified in correspondence unless otherwise prescribed.

**3. STANDARD :**

The relevant IS: 6680 standard shall apply with respect to all materials used in the manufacture of CREW FAN.

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**4. TECHNICAL DESCRIPTION :**

- (i) Feathered Edge for lower noise as shown in the diagram.
- (ii) Weight : 4.4 lbs ( 2.0 Kgs.)
- (iii) Watts : 65, Line amps : 1.0, Locked Rotor amps : 1.3, RPM : 1400, Ball bearing.
- (iv) Size : 10.00 " diameter X 3.50 " deep (254.0 mm X 88.9 mm)
- (v) The fan shall work satisfactory on single phase 115 V +/- 22.5%, 50 c/s +/-3% AC. Supply.
- (vi) The fan shall have capacity to deliver the minimum air quantity of 417 L / Sec or 25 M<sup>3</sup>/mm at specified voltage and frequency at clause 4 (v).
- (vii) The fan shall be of bracket type suitable for all mounting arrangements shown in the attached sketch.
- (viii) Adequate protection shall be provided against personal injury due to moving fan blades.

**4.1 MOTOR**

Insulation: class 'B'

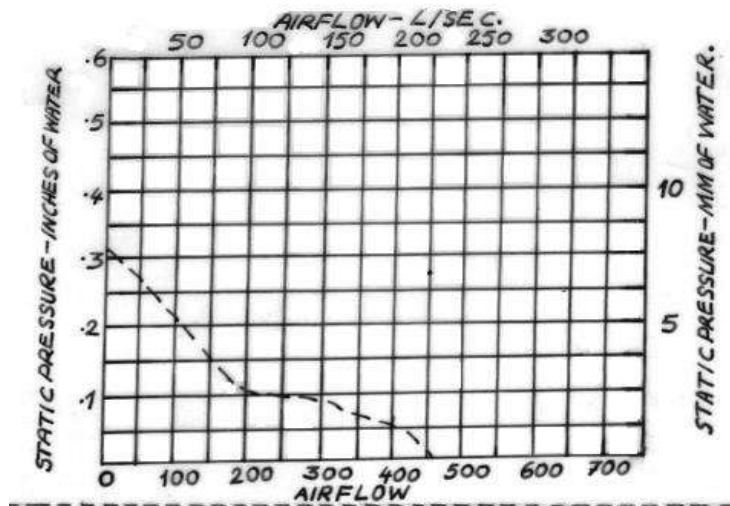
Automatic reset thermal protection.

Sealed ball bearing

Di-electric test 100 % at 100% at 1800 VAC./Sec./500 micro amps maximum leakage.

**4.2 CONSTRUCTION**

Housing single piece die cast aluminum, painted black propeller and terminal block. Injection moulded of flame retardant polycarbonate, black.



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**5. SUBMISSION OF TENDER QUOTATION:**

**5.1** The tenderer shall give sufficient information to prove that his factory has adequate facilities and capacity to manufacture the Crew Fan to meet fully the technical requirements of the specification and quality of materials and workmanship.

**5.2** Quotations shall not be considered complete unless all information is furnished and are therefore liable to be rejected.

**5.3** List of recommended spare for maintenance of the Crew Fan for two years.

**5.4** Detailed drawing of the Crew Fan.

**6. DRAWINGS :**

The following drawings are attached with the specification,

1. CLW/ES/3/SK-1/0110/E to CLW/ES/3/SK-3/0110/E

**7. Technical documents to be supplied by the tenderer:**

- i) Type test report
- ii) Routine test reports along with each set
- iii) Maintenance manual
- iv) Detailed drawings
- v)

**8. TECHNICAL DATA SHEET :**

The following information shall be furnished as a part of the contract:-

- (i) Make, type, and model no.
- (ii) Range of working voltage
- (iii) Current, Power, and Power Factor at rated voltage (115 V), Minimum Voltage.
- (iv) Rated speed in R.P.M
- (v) Service value at rated voltage
- (vi) Air delivery in m<sup>3</sup>/minute at minimum voltage
- (vii) Blade Sweep
- (viii) No. of blades material
- (ix) Type, class of insulation
- (x) Type & make of "ON – OFF" Switch

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- (xi) Type of bearing / make & Drg. No.
- (xii) Lubrication arrangement
- (xiii) Starting method
- (xiv) Ratings of capacitor (if any) type and make
- (xv) Details and sources of winding wire, stampings, insulating materials need for fan motor.

## 9. **TESTS :**

**9.1** All tests specified shall be carried out on the fans.

**9.2** The fan in working condition shall be subjected to vibration tests as detailed below (only type test)

The fan shall be mounted on the test table and switched 'ON'. The table shall then be subjected to vibration in both horizontal and vertical planes with an amplitude of 3.5mm at 20 c/s for a duration of one hour each, at the end of which the vibration shall be changed to an amplitude of 10mm at 5 c/s and the test continued for one hour more. During the test there will be no interruption of current or sparking at any parts. At the end of the test the fan shall be examined and there shall not be any mechanical damage to any of the parts.

## 10. **NAME PLATE:**

The tenderer shall fix name plate on the equipment including:-

- (i) Manufacturer's name and Monogram/ Brand.
- (ii) Range of electrical ratings in watts.
- (iii) Max. Rated Voltage.
- (iv) Month & year of Manufacture.
- (v) Sl. No. of the equipment.
- (vi) Air delivery in M<sup>3</sup>/Min.

## 11. **QUANTITY /LOCO AND ASSEMBLY SECTION :**

Quantity / Loco : 04 Nos.  
Assembly Section : Cab 1 & Cab 2

## 12. **QUALITY ASSURANCE AS PER ISO 9000**

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**13. REFERENCE :**

This Specification has the reference to the original manufacturer as follows : -

M/s. EMAIL Electronics  
37 Smith Drive  
Eagle Farm QLD 4009  
Phone : 07 3868 1055  
Fax : 07 3868 1525

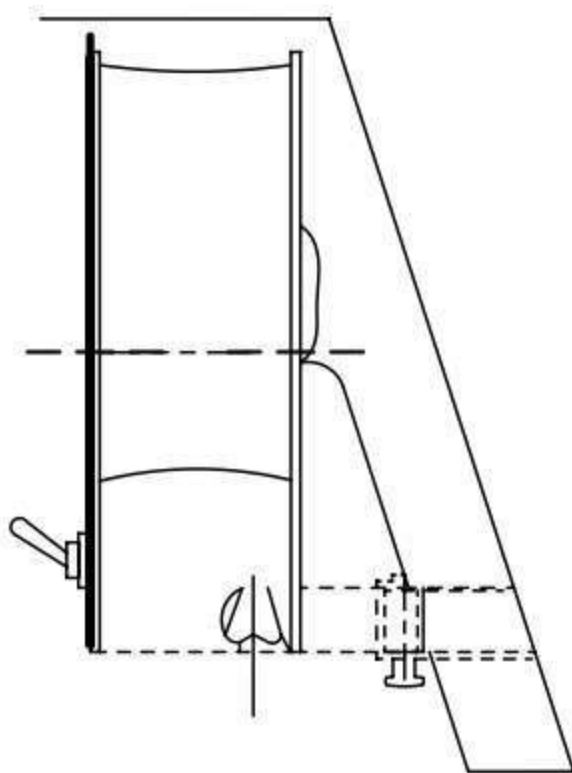
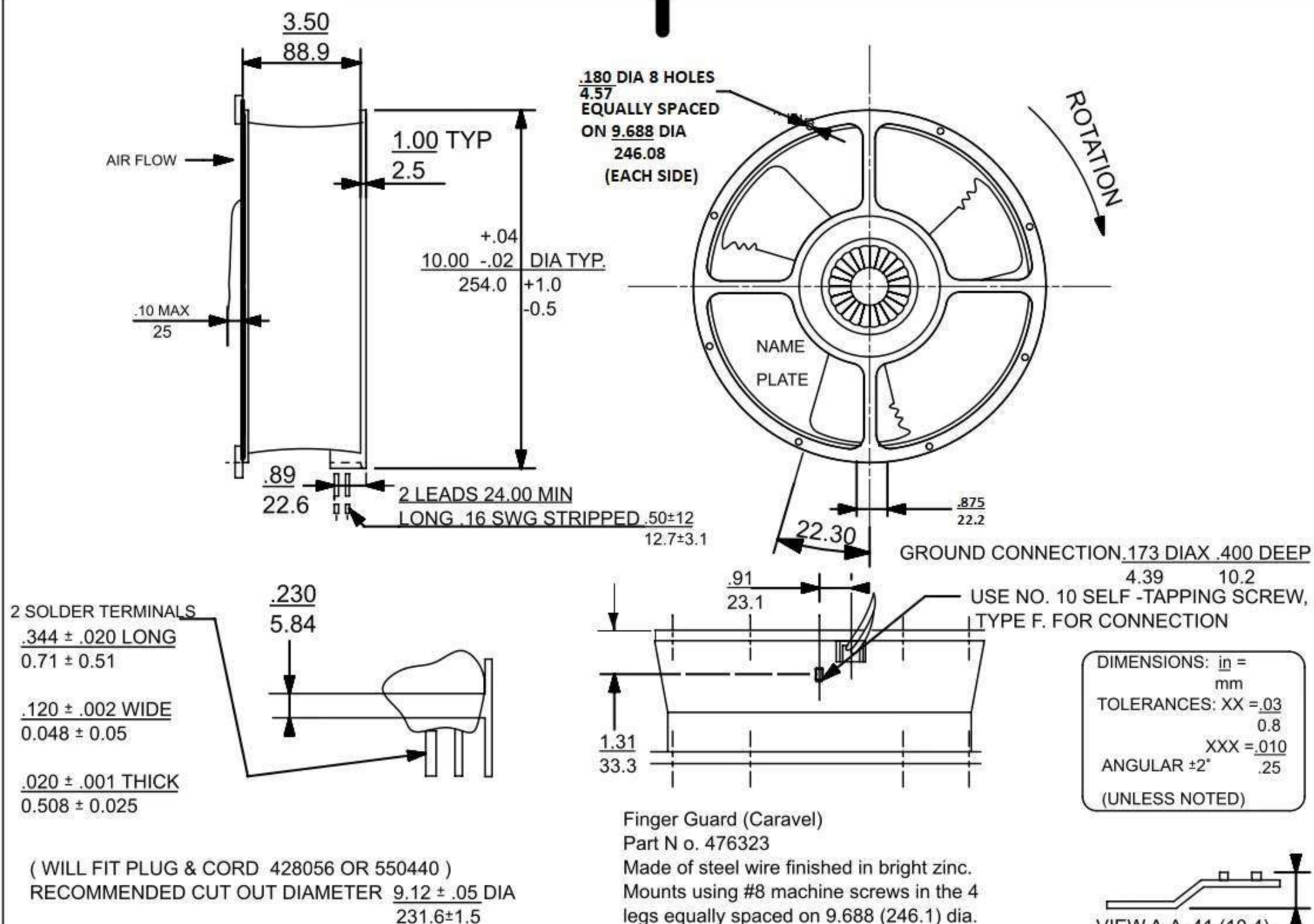
Schematic Position : 69. 7

**NOTE :**

- 1) All hardware's are to be used should be any of the following makes :-
  - a) Unbrako (Precision Fasteners)
  - b) Laxmi Precision (L.P.S.)
  - c) Sundaram Fasteners (T.V.S.)
  - d) All spring washers of Forbes Gokak Ltd. make Mumbai only.
- 2) All non-metallic parts of Crew should be fire retardant and self-extinguishing properties as per IS: 11731(Part-I & Part-II) or any other equivalent DIN, IEC standard.

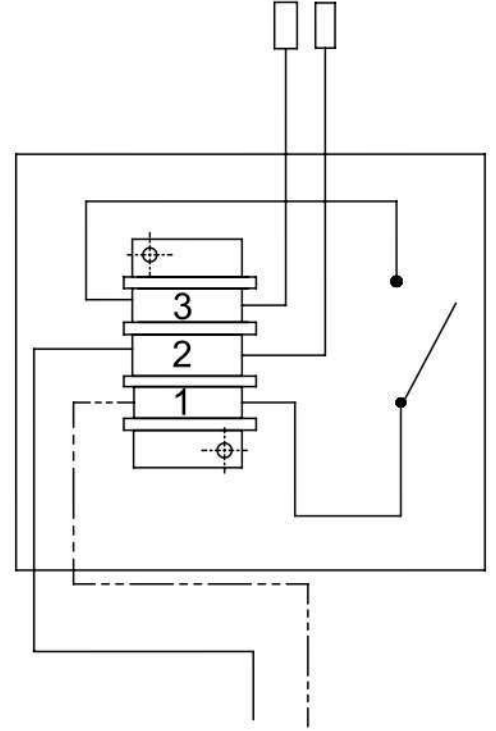
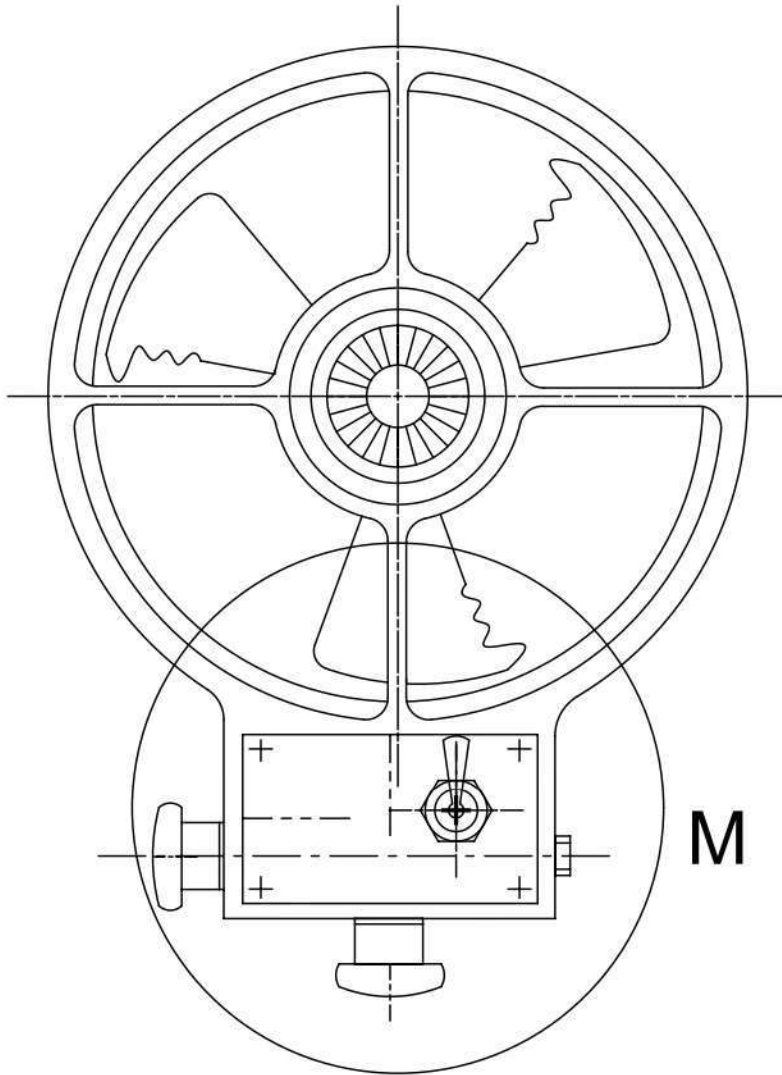
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## FIXING POSITION IN CAB

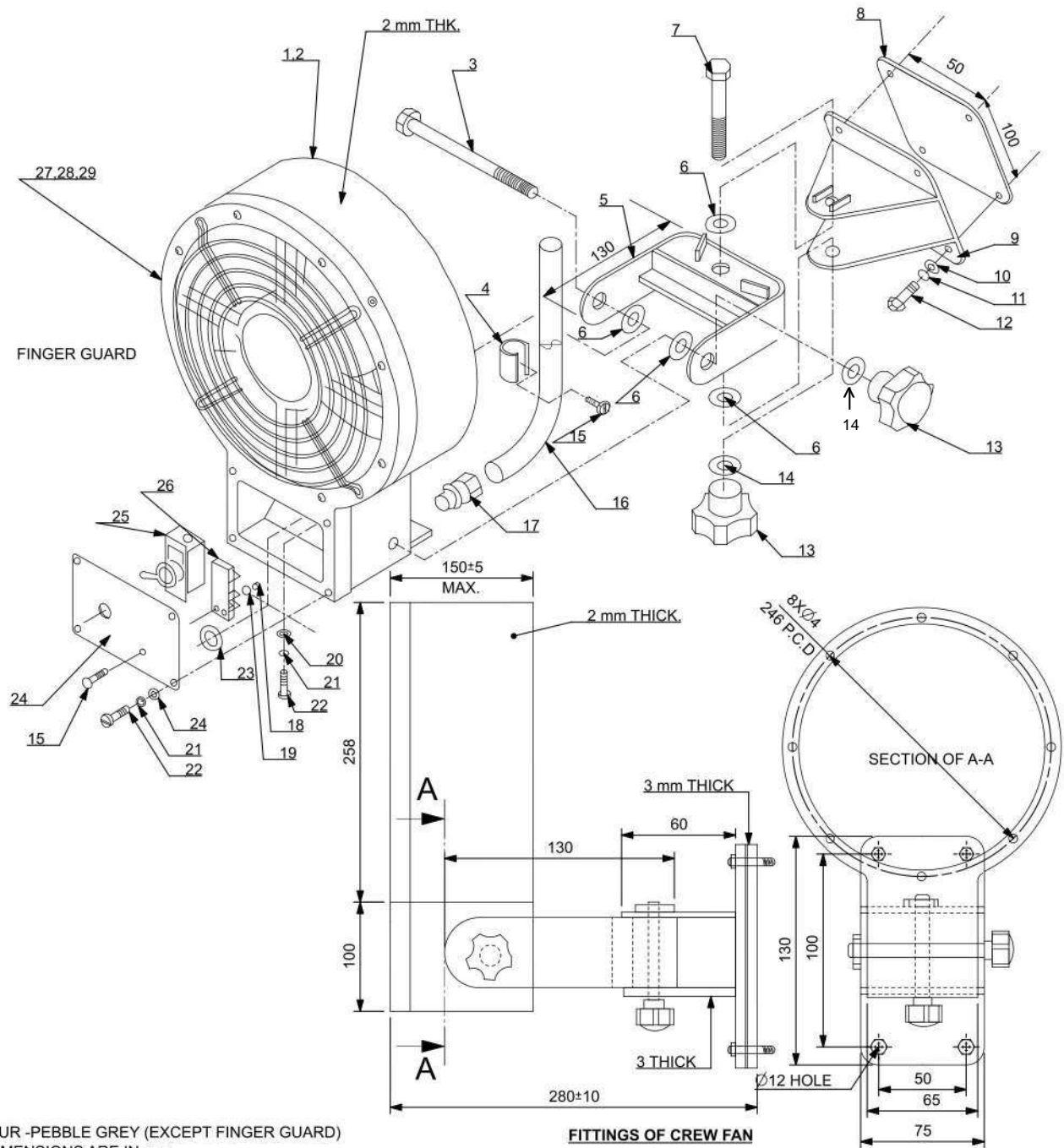
अधिकृत DGN				चितरंजन रेलइंजन कारखाना CHITTARANJAN LOCOMOTIVE WORKS, INDIA			
जोचा व.अ.अ. CHD SSE				प्रति भार कि. ग्रा. WT. EACH IN KG			
समीक्षित स.वि.अ. / व.वि.अ. REVIEWED AEE / SEE				पदार्थ MATL			
अनुमोदित उ.मु.वि.अ. APPROVED DYCEE				विशिष्ट SPECN			
दिनांक DATE				वर्णन DESCRIPTION			
रेखिक अनुपात SCALE				आरेखण संख्या DRAWING NO.			
संदर्भ / REF.				परिवर्तन संख्या ALTERATION. NO.			
ALT. -				पर्ण SHEET			
A4				OF			



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DETAIL-M

													अधिकृत DGN				चितरंजन रेलइंजन कारखाना CHITTARANJAN LOCOMOTIVE WORKS, INDIA	
													जॉचा व.अ.अ. CHD SSE					
परिवर्तन संख्या ALT.NO.	प्राधिकार AUTHY		वर्णन DESCRIPTION						दिनांकित बाबत DATED INITIAL		समीक्षित स.वि.अ. / व.वि.अ. REVIEWED AEE / SEE		पदार्थ MATL		प्रति भार कि. ग्रा. WT. EACH IN KG			
सतह - रफता का मान मा. मा. 3073 / अ. मा. सं. 1302 SURFACE ROUGHNESS VALUE TO IS:3073 / ISO:1302		अनिर्दिष्ट सतह - सीमा मा. मा. : 2102 / अ. मा. सं. : 2768 UNSPECIFIED TOLERANCE TO IS : 2102 / ISO : 2768						TOL. CLS.		अनुमोदित स.मु.वि.अ. APPROVED DYCEE		वर्णन DESCRIPTION		CREW FAN				
		धातु-वेल्डन चिन्ह मा. मा. : 813 / अ. मा. सं. : 2563 WELDING SYMBOLS TO IS:813 / ISO:2553								दिनांक DATE								
पदार्थ GRADE NO.	सं1 N1	सं2 N2	सं3 N3	सं4 N4	सं5 N5	सं6 N6	सं7 N7	सं8 N8	सं9 N9	सं10 N10	सं11 N11	सं12 N12	रैखिक अनुपात SCALE	N.T.S	आरेखण संख्या DRAWING NO.			
Rz	0.16-0.3	0.5-0.7	0.9-1.1	1.5-2.0	2.5-3.8	5.0-6.3	9.0-12	16-25	30-40	50-63	75-100	160-250			CLW/ES/3/SK-2/0110/E			
Ra $\mu m$	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50	संदर्भ / REF.		परिवर्तन संख्या ALTERATION. NO.			
चिन्ह SYMBOL													ALT. -			परिचय SHEET	OF	A4



NOTE:-  
 1. COLOUR - PEBBLE GREY (EXCEPT FINGER GUARD)  
 2. ALL DIMENSIONS ARE IN mm.  
 3. SUPPLY ALL THE HARDWARE ITEMS EXCEPT REF. 10, 11 & 12  
 4. WEIGHT:- 2 Kg IMPORTED  
 7.6 Kg (GTR) OF 25M<sup>3</sup>/MIN AIR DELIVERY.

ग्राहक-नेलन चिह्न		अतिरिक्त सतह - सीमा मा. मा. : 2102 / अ. मा. सं. : 2768 UNPROFOTED TO GRADE 10 - 2767 / ISO 2768												TO CLC
ग्राहक संख्या - 813 / अ. मा. सं. : 2553														
WELCH SYMBOLS TO 5.011 / ISO 2553														
ग्राहक - कलाल का चान														
मा. मा. 3073 / अ. मा. सं. 1302														
SURFACE ROUGHNESS VALUE TO IS 1973 / ISO 1302														
चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न	चिह्न
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1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350
1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365
1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380
1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395
1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407			