TECHNICAL SPECIFICATION FOR SCAVENGE BLOWER FOR TRACTION MOTOR/ OIL COOLING UNIT ALONG WITH MOTOR FOR 3-PHASE ELECTRIC LOCOMOTIVES

Specification No: CLW/ES/3/0021/I

Enclosure:

(a) Drawing No: (i) CLW/ES/3/SK-1/0021/I
(ii) CLW/ES/3/SK-2/0021/I
(iii) CLW/ES/3/SK-3/0021/I
(iv) CLW/ES/3/SK-4/0021/I

(b) i) RDSO Specification No.: E-10/3/09 (MOTOR) with Amendment No-1 to 6 (For Motor)
(ii) CLW specification No.: CLW/ES/3/0455 (For Blower)

ISSUE DATE: 11.05.2001

DRAFT

ISSUED BY:

DY. CHIEF ELECTRICAL ENGINEER/D-III
CHITTARANJAN LOCOMOTIVE WORKS
P.O : CHITTARANJAN – 713331
DIST. BARDHAMAN (WEST), WEST BENGAL (INDIA)

Prepared By	Checked By	Issued By
SSE/DESIGN	AEE/D/Conv.-I	Dy. CEE/ D-III

ALTERATION RECORD SHEET

Amend. No.	Date of Amendment	Page No.	Alteration	Reason	Authority
1	26.02.1997	4, 5	A	Ambient Temp., Technical Data of Blower, Air delivery, Motor speed, Insulation, Temp. rise, degree of protection, rating etc. added at page No. 4 & 5.	S/d
2	22.03.2001	8	B	Details of drilled holes & fixing of inlet flange & cone shown at sheet No.8.	S/d
3	11.05.2001		C	The specn. had been revised completely and details of test procedure has been deleted and ref. has been made to CLW/ES/3/0454 and CLW/ES/3/0455 which gives the details of testing procedure as per RDSO's instructions. Dimensions of Duct assembly (Sh.9) has been corrected.	S/d
4	11.12.2002	8	D	Note: - 6) added at sheet No.8.	S/d
5	14.02.2003	7, 8	E	i) Note: - 7) & 8) added at sheet No. 8 as per RDSO letter No. EL/3.2.176/2 dtd. 03.02.2003 ii) Note: - 2) added at sheet No.7	S/d
6	29.03.2003	8	F	One rain water drain pipe provided on blower housing at sheet no. 8 & Note (9) added.	S/d
7	20.10.2005		G	Note: - added at sheet no. 5 is foot mounted horizontally at sheet 8	S/d
8	11.10.2019	8	H	Rain water drain pipe is 10 mm (max.) (O/D) instead of 6 mm (O/D) as per RDSO MS no. ELRS/MS/0328 (Rev.0) vide letter No.EL/3.2.176/2 dtd. 29.10.2003.	S/d
9		8	I	Warranty Clause Added	

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

Prepared By	Checked By	Issued By
SSE/DESIGN	AEE/D/Conv.-I	Dy. CEE/ D-III

DRAFT

INDEX

SL. No	DESCRIPTION	SHEET NO
1	Scope	4
2	Climatic and Environmental condition	4
3	Standards.	5
4	Technical data	5 – 6
5	Tests.	6 – 7
6	Scope of Supply	7
7	Warranty	8

DRAFT

SPECIFICATION FOR SCAVENGE BLOWER FOR TRACTION MOTOR

1. SCOPE :-

Two Scavenge blowers are used in the ventilation system of the Indian Railways locomotive. This Scavenge Blower is used to remove contaminated air from both the Traction Motor and Oil Cooler Filter panels.

2. Climatic and environmental condition:

- Maximum atmospheric temperatures : 70°C (Under Sun)
  : 50°C (In shade)
- Humidity : 100% saturation during rainy season.
- Reference Site condition:
  (i) Ambient Temp. : Max.65°C and min.-10°C
  (ii) The contactor will indicate the expected temperature rise in the machine room under reference site condition.
  (iii) Humidity : 60%.
  (iv) Altitude : 160 meters above mean sea level.
- Rainfall : Very heavy in certain areas. The locomotive will be designed to permit it's running at 10 km 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 , subsystem and their mounting arrangement will be designed to withstand vibrations and shocks encountered in service as specified in corresponding IEC publications unless otherwise prescribed.

DRAFT

3. STANDARDS:

IEC standard publication 34-1 Rotating electric machine, Part, <Rating and Performances.
IEC Standard Publication 34-5 Part 5, Classification of degrees of protection provided by enclosures for rotating electric machines (H3-Code).
IEC 34-6/1972/Part 6: Methods of cooling (IC-Code).
IEC 34-8/1972/Part 8 : Terminal markings and direction of rotation of rotating machines.
IEC 38/1983: IEC Standard Voltages.
IEC 72-1/1991: Dimensions and output series for rotating electric machines.
IEC 85/Second edition 1984 Thermal evaluation and classification of electric insulation § 2 : Thermal classes Part 1 : Flame numbers 56 to 400 and flange numbers 55 to 1080.
IEC 349-2/1993-3/First edition/pages 39 formula. Group 1 <Insulation test voltages.
IS 325/1991/specification for three phase induction motors, Rating and Performance.
IS 1231/1991/Dimension of three phase foot mounted induction motors.
IS 2223/1983/Dimension of three phase flange mounted induction motors.
IS 4029/1991/Guide for testing three phase induction motors.
13730 (Pt.8)/1993/specification for polyesterimide enameled round copper winding wires with temperature class 180.
IS 13730 (Pt.13)/specification for dual coated enameled round copper wires with temperature class 200.
IS 11184/1994/Enamelled and varnish bonded glass fibre covered round copper wires.

4. TECHNICAL DATA OF BLOWER:-

Type	: Centrifugal
Air Delivery at 20°C	: 0.67 M^3/sec.
Total pressure at 20°C	: 475 Pa
Speed	: 2910 r.p.m.
Power Consumption	: 2.6 kW
Dimensional Details	: Refer Drg. No. CLW/ES/3/SK-1/0021/G
Weight of Blower Unit	: 42 Kg. Approx.
Size	: 300 mm

Technical Data of Motor:

Supply wave form	: Quasi square wave -Harmonics in Voltage – 50% -Harmonics in Current – 50%
Frame Size	: 100L
Power	: 3 kW
Pole	: 2 Pole
Type	: 3 phase, SQ, Totally enclosed fan cooled.
Supply Voltage	: 415 V AC ± 10%
Insulation	: 'H' Class V.P.I
Degrees of Protection	: IP 55

DRAFT

Rating : S1 (Continuous)
Speed : 2910 r.p.m.

At 415 V, 50 Hz Supply:

dv / dt : Less than 1000 v/micro second
Starting Torque (Ts) : 15 NM
Nominal Torque (Tn) : 10 NM
Starting Current (I s) : 31 A
Running Current (I n) : 8.7 A
I s / I n : 356%
Weight of Motor : 34 Kg. Approx.
Dimensional Details : As per Drg. No. CLW/ES/3/SK-3/0021
Bearing size : ~~6206 (open type bearing)~~ Firm may use sealed bearing or higher size bearing however firm needs to get their drawing approved, vendors may also suggest any change in BOM to get better quality.
Terminal box : 1 x PG 16
Ambient Temperature : 65°C
Frequency : Varies in three steps – 24Hz, 37 Hz, 50 Hz
Power factor (Cos φ) : 0.9
Temperature rise : 80°C max. for winding wires.
Temperature rise : 30°C max. for bearing.

5. TYPE TEST AND ROUTINE TESTS:-

Tests are classified as type test and routine tests.

5.1 TESTS ON MOTORS:- For Type test and Routine Test: Refer to RDSO Specification No.: E-10/3/09 (Motor) with amendment no-1 to 6 or latest.

A) **Type tests:** - (To be conducted on Prototype Motors)

- Resistance Measurement
- Direction of rotation
- No Load Test
- Locked Rotor Test
- Pull Up and Pull Out Torque Test
- Load Test
- Temperature Rise Test
- Over Speed Test
- High Voltage Test
- Surge Test
- Vibration Test
- Starting Test
- Measurement of “Noise Level”
- Visual and Dimensional check

DRAFT

B) Routine Tests:-

- Resistance Measurement
- Direction of Rotation
- No Load Test
- Locket Rotor Test
- Temperature Rise Test
- High Voltage Test
- Vibration Test
- Surge Test
- Visual and Dimensional check

5.2 TESTS ON BLOWER: - (Refer Specification No.: CLW/ES/3/0455)

A) **Type Tests: -**

- Air delivery test
- Starting time test
- Starting Duty Test
- Endurance test
- Vibration level test
- Weighment test
- Checking of bearing by shock pulse meter
- Checking of dimensions, workmanship, clearance of impeller fixing and locking arrangement, Intensity of sound in decibel.
- Starting current, Running current at i) 373V 33Hz (ii) 415V 50 Hz - to be recorded.

B) **Routine Tests:-**

- Checking of obligatory dimensions and clearance of impeller fixing and locking arrangement.
- Starting time test
- Vibration level test
- Condition of bearing by shock pulse meter.

For Details of type test and routine test of Blower please refer Specification No. CLW/ES/3/0455.

Vibration level in microns when blower is discharging its rated delivery at rated pressure & Voltage : -

Motor : 10 microns max.
Blower : 15 microns max.

DRAFT

6. **SCOPE OF SUPPLY:-**

For details refer Drg. No. CLW/ES/3/SK-1/0021/I
CLW/ES/3/SK-2/0021/I
CLW/ES/3/SK-3/0021/I
CLW/ES/3/SK-4/0021/I

Sl. No.	Description	Qty.
1.	Motor – 3 phase, SQ, TEFC, 415 Volt ± 10%, 2 Pole, Frame Size – 100L, 3KW, 'H' Class Insulation, Foot mounted.	1 No.
2.	Blower Housing	1 No.
3.	Inlet Cone with Flange	1 No.
4.	Impeller	1 No.
5.	Name Plate, Arrow for direction of Rotation and direction of air flow made of 'Alluminium' to be riveted on Blower Housing.	1 Set
6.	Neoprene rubber gasket 3 mm thick shore hardness 50±5 to be provided for fixing inlet cone flange with blower housing.	1 No.
7.	Removable stool made of mild steel to be provided on motor blower unit to avoid damage of Duct Assembly during transit/storage.	1 No.

7. **WARRANTY** :- The supplier must give a clear warranty for a period of 42 month from the date of Supply or 36 Month from the date of commissioning in locomotives whichever is earlier.

8. **NAME PLATE:-**

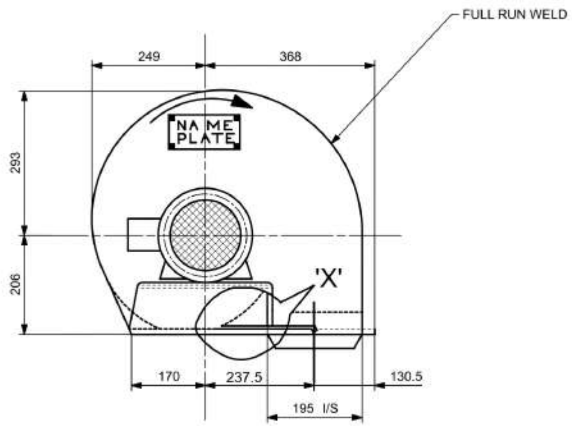
i) Manufacturer's name, type & serial number
ii) Air delivery
iii) Power consumption in KW
iv) Impeller diameter
v) Rated speed
vi) Weight
vii) Manufacturing date & year
viii) Arrow for direction of rotations and direction of airflow to be provided

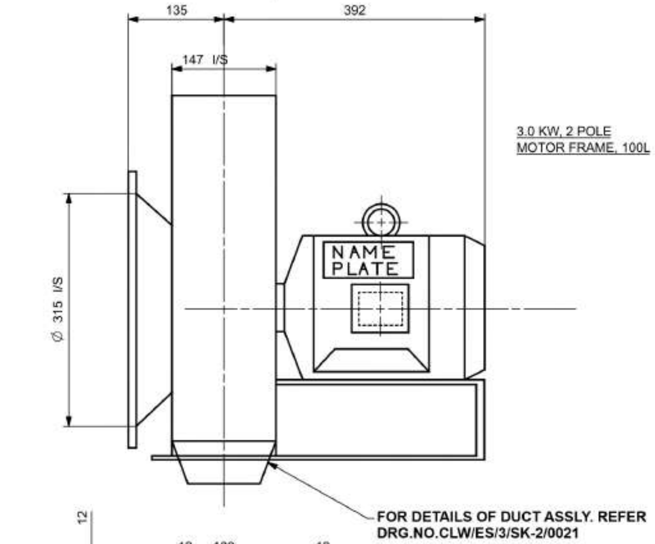
Note to the firm:-

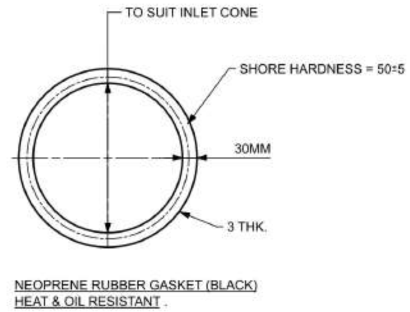
1) The firm should have in-house facility for separate and combined balancing of motor. Impeller and complete assembly to grade G 2.5 of ISO 1940 as per RDSO's letter no. EL/3.2.14 dtd. 12/03/2001.
2) All hardware and fasteners are to be used from UVAM Approved/Developmental source only.
3) All non-metallic parts of TM Blower including motor should be fire retardant and self-Extinguishing properties as per IS: 11731 (Part-I &Part-II) or any other equivalent DIN, IEC standard.

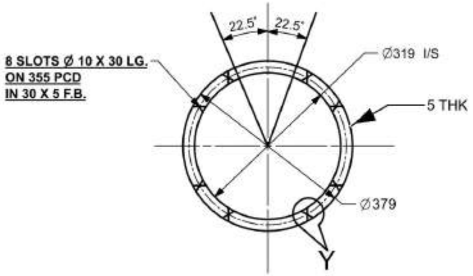
Prepared By	Checked By	Issued By
SSE/DESIGN	AEE/D/Conv.-I	Dy. CEE/ D-III

DRAFT

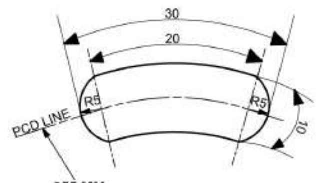




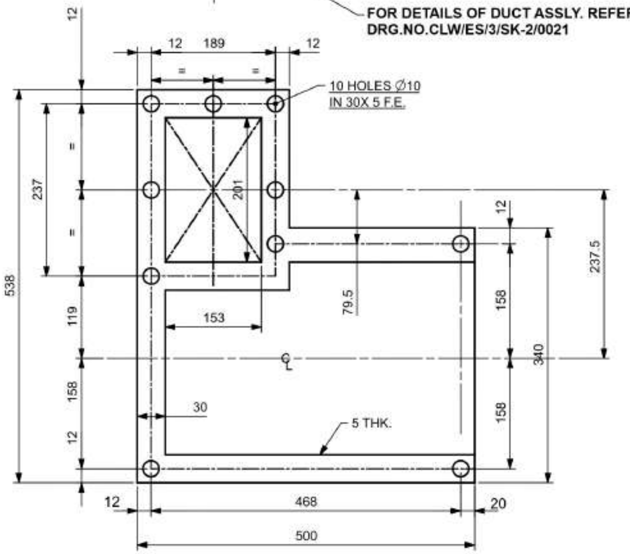




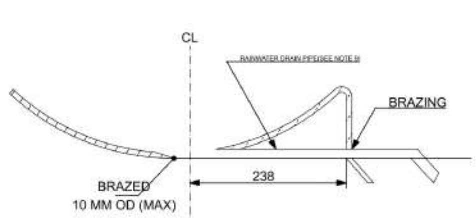
INLET FLANGE



DETAILS OF 'Y'



DISCHARGE FLANGE AND BASE DETAILS



DETAILS OF 'X'

NOTE :-

1) SURFACE PROTECTION :- EPOXY RESIN.
2) PAINTING :- TOP COAT RAL 7030 STONE GREY SILK 45±5% .
3) ALL DRILLING HOLES TO BE MADE BY JIG .
4) GROSS WEIGHT :- 76 KG.(APPROX.), WEIGHT OF MOTOR :- 34 KG.(APPROX.) MOTOR IS FOOT MOUNTED HORIZONTALLY.
5) NEOPRENE RUBBER GASKET TO BE PROVIDED FOR FIXING INLET CONE ON BLOWER CASING WITH SIKA-FLEX TO ARREST AIR LEAKAGE.
6) DIRECTION OF ROTATION, DIRECTION OF AIR FLOW AND NAME PLATE TO BE RIVETTED ON BLOWER HOUSING. ARROWS FOR DIRECTION OF ROTATION & DIRECTION OF AIR FLOW TO BE PAINTED RED.
7) IMPELLER HUB SHOULD HAVE PUNCH MARK INDICATING MAKE & YEAR OF MANUFACTURING.
8) IMPELLER SHOULD HAVE SERIAL NO. OF CASING AND MAKE PAINTED ON THE BACK PLATE OF IMPELLER .
9) COLD DRAWN SEAMLESS COPPER TUBE 10 MM (MAX) O/D -TO IS:2501 , CHEMICAL COMPOSITION AS PER IS:191. LENGTH 300MM (APPROX) TO BE BRAZED AS SHOWN IN DETAIL 'X'.
10) ALL DIMENSIONS ARE IN mm.

चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS, INDIA

वर्णन / DESCRIPTION: SCAVENGE BLOWER FOR TRACTION MOTOR/OIL COOLER INCLUDING MOTOR

पैमाना / SCALE: NTS

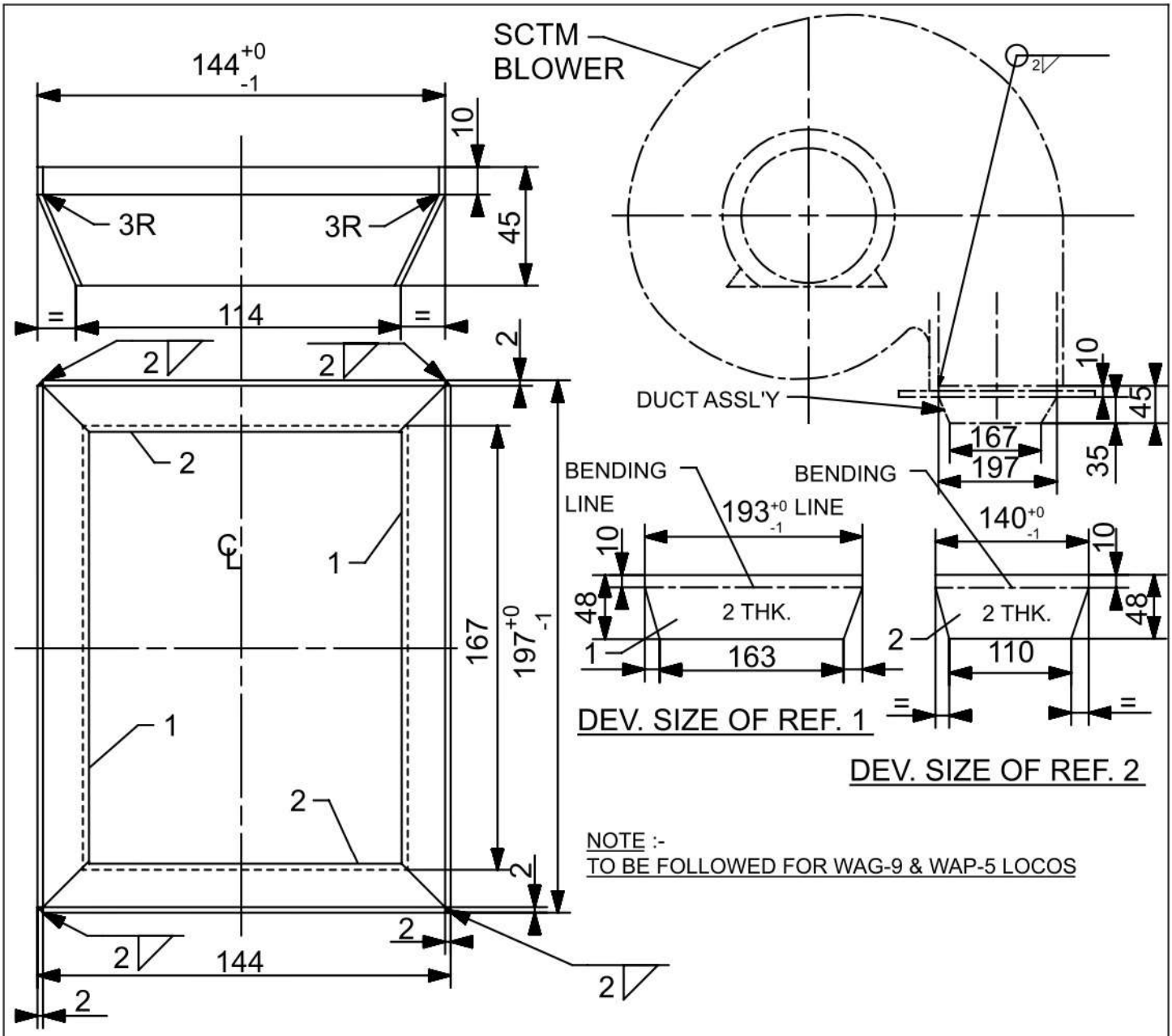
आरेखण संख्या / DRAWING NO.: CLWES/3/SK-1/0021/I

परिवर्तन संख्या / ALTERATION NO.

शीट / SHEET: 1 OF 1

A1

REDRAWN BY TCS



NOTE :-
TO BE FOLLOWED FOR WAG-9 & WAP-5 LOCOS

2		SHEET	4	STEEL	IRS M41 Gr.4	
1		SHEET	4	STEEL	IRS M41 Gr.4	
		DUCT ASSL'Y	2	----		
निर्देश संख्या REF. NO.	अंग आरेखण संख्या PART DRG. NO.	वर्णन DESCRIPTION	मात्रा QTY./ LOCO	पदार्थ MATL	विशिष्टि SPECN	प्रति भार कि. ग्रा. WT. EACH IN K.G.

परिवर्तन संख्या ALT.NO.	प्राधिकार AUTHY	वर्णन DESCRIPTION	दिनांकित बाद्वार DATED INITIAL

सतह – रुक्षता का मान भा. मा. 3073 / अ. मा. सं. 1302 SURFACE ROUGHNESS VALUE TO IS:3073 / ISO:1302

अनिर्दिष्ट सह्य – सीमा भा. मा. : 2102 / अ. मा. सं. : 2768 UNSPECIFIED TOLEARANCE TO IS : 2102 / ISO : 2768 TOL. CLS.

धातु–वेल्डन चिन्ह भा. मा. : 813 / अ. मा. सं. :2553 WELDING SYMBOLS TO IS:813 / ISO:2553

पदांक 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
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
Ra μm	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50
चिन्ह SYMBOL												

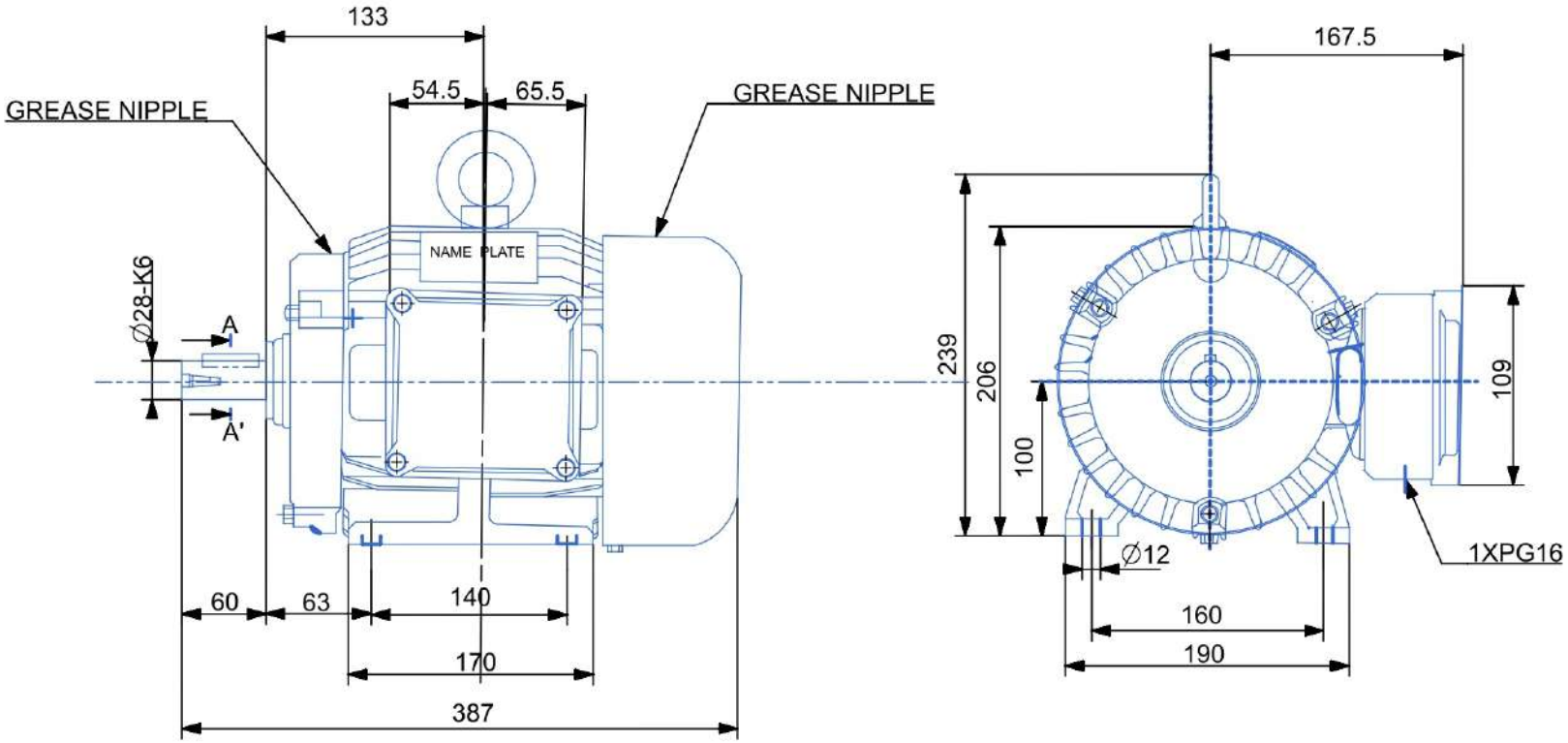
अभिकल्पित DGN	
जाँचा व.अ.अ. CHD SSE	
समीक्षित स.वि.अ. / व.वि.अ. REVIEWED AEE / SEE	
अनुमोदित उ.मु.वि.अ. APPROVED DYCEE	
दिनांक DATE	
रैखिक अनुपात SCALE	NTS
संदर्भ / REF. ALT.-	

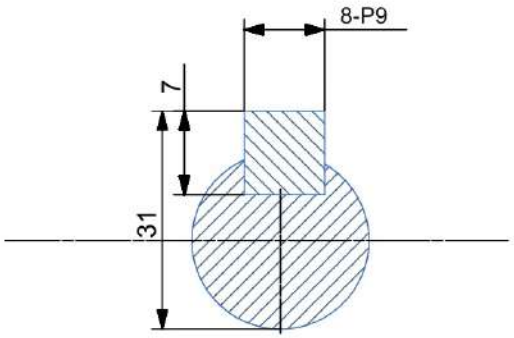
चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS, INDIA

पदार्थ MATL	प्रति भार कि. ग्रा. WT. EACH IN KG
विशिष्टि SPECN	
वर्णन DESCRIPTION	DUCT ASSLY FOR T/M SCAVENGE BLOWER
आरेखण संख्या DRAWING NO.	CLW/ES/3/SK-2/0021/I
परिवर्तन संख्या ALTERATION. NO.	पर्ण SHEET 1 OF 1 — A4

This document/drawing was prepared by or on behalf of CLW and the copyright belongs to CLW. Reproduction in whole or in part requires prior written consent of CLW. As the drawing incorporates confidential information of CLW its disclosure to third parties also requires CLW's prior written consent.

REDRAWN BY COE





NOTE
ALL DIMENSIONS ARE IN MM.

धातु–वेल्डन चिन्ह भा. मा. : 813 / अ. मा. सं. :2553 WELDING SYMBOLS TO IS:813 / ISO:2553	अनिर्दिष्ट सद्य – सीमा भा. मा. : 2102 / अ. मा. सं. : 2768 UNSPECIFIED TOLEARANCE TO IS : 2102 / ISO : 2768											TOL. CLS.	
	ग्रेडांक 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
सतह – रुक्षता का मान भा. मा. 3073 / अ. मा. सं. 1302 SURFACE ROUGHNESS VALUE TO IS:3073 / ISO:1302	Rz	0.16-0.3	0.5-0.7	0.9-1.1	1.5-2.0	2.5-3.0	5.0-6.3	9.0-12	16-25	30-40	50-63	75-100	100-250
	Ra μm	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50
	चिन्ह SYMBOL												

परिवर्तन संख्या ALT. NO.	प्राधिकार AUTHY	वर्णन DESCRIPTION	दिनांकित आद्यक्षर DATED INITIAL

अभिकल्पित DSN	
जाँचा व.अ.अ. CHD SSE	
समीक्षित च.वि.अ. / व.वि.अ. REVIEWED AEE / SEE	
अनुमोदित च.मु.वि.अ. APPROVED DYEE	
दिनांक DATE	
रैखिक अनुपात SCALE	NTS
संदर्भ / REF.	ALT-

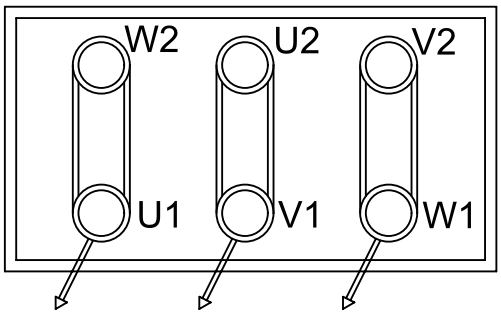
चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS, INDIA

पदार्थ MATL	प्रति भार कि. ग्रा. WT. EACH IN KG
विशिष्टि SPECN	
वर्णन DESCRIPTION	MOTOR FOR SCAVENGE BLOWER TO TRACTION MOTOR/OIL COOLER (100L)
आरेखण संख्या DRAWING NO.	CLW/ES/3/SK-3/0021/I
परिवर्तन संख्या ALTERATION NO.	पृष्ठ SHEET 1 OF 1
	A3

This document/drawing was prepared by or on behalf of CLW and the copyright belongs to CLW. Reproduction in whole or in part requires prior written consent of CLW. As the drawing incorporates confidential information of CLW its disclosure to third parties also requires CLW's prior written consent.

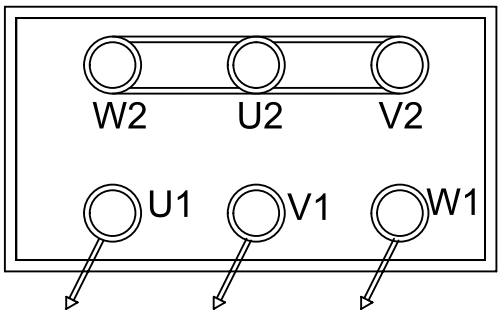
REDRAWN BY TCS

To change the rotation direction,
change over two supply leads.



LOW TENSION

△ CONNECTION



HIGH TENSION

Y-CONNECTION

DIAGRAM: 6 TERM

S 2 31 320e

परिवर्तन संख्या ALT.NO.	प्राधिकार AUTHY	वर्णन DESCRIPTION	दिनांकित अद्याक्षर DATED INITIAL

सतह – रुक्षता का मान भा. मा. 3073 / अ. मा. सं. 1302 SURFACE ROUGHNESS VALUE TO IS:3073 / ISO:1302	अनिर्दिष्ट सद्य – सीमा भा. मा. : 2102 / अ. मा. सं. : 2768 UNSPECIFIED TOLEARANCE TO IS : 2102 / ISO : 2768	TOL. CLS.
	धातु–वेल्डन चिन्ह भा. मा. : 813 / अ. मा. सं. :2553 WELDING SYMBOLS TO IS:813 / ISO:2553	

पदांक 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
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
Ra μm	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50
चिन्ह SYMBOL												

अभिकल्पित DGN	
जाँचा व.अ.अ. CHD SSE	
सभीक्षित स.वि.अ. / व.वि.अ. REVIEWED AEE / SEE	
अनुमोदित उ.मु.वि.अ. APPROVED DYCEE	
दिनांक DATE	
रैखिक अनुपात SCALE	NTS
संदर्भ / REF.	ALT.-

चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS, INDIA

पदार्थ MATL	प्रति भार कि. ग्रा. WT. EACH IN KG
विशिष्टि SPECN	

वर्णन DESCRIPTION: MOTOR CONNECTION OF SCAVENGE BLOWER FOR TRACTION MOTOR

आरेखण संख्या DRAWING NO.: CLW/ES/3/SK-4/0021/I

परिवर्तन संख्या ALTERATION. NO. | पर्ण SHEET 1 OF 1 | A4

This document/drawing was prepared by or on behalf of CLW and the copyright belongs to CLW. Reproduction in whole or in part requires prior written consent of CLW. As the drawing incorporates confidential information of CLW its disclosure to third parties also requires CLW's prior written consent.

REDRAWN BY COE