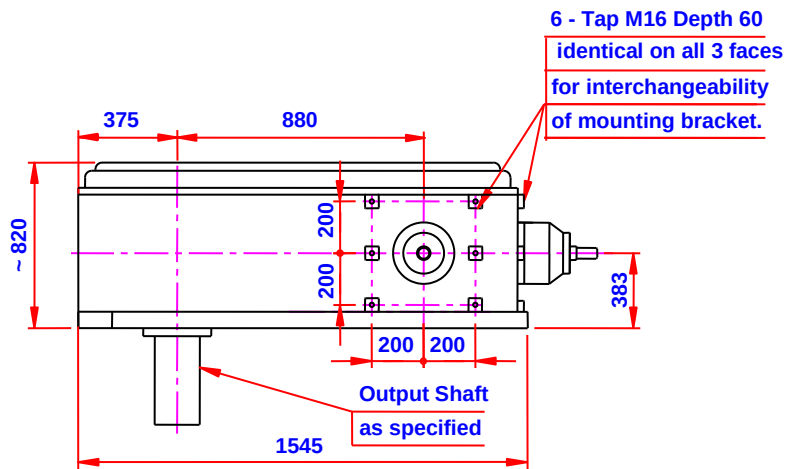


		Bharat Heavy Electricals Ltd Boiler Auxiliaries Plant Ranipet - 632 406		EDC / AIR PREHEATERS TECHNICAL SPECIFICATION Effective Date: 06.06.2017	
Specification No : APSQ - 113			Rev. No : 03		Page No : 01 of 03
01.	Item	Main Drive Speed Reducer - Type 8 APB			
02.	Material code CW / CCW = Output shaft rotation when looking from the top.	NAW make	CW	96 324 101 0100	
		NAW make	CCW	96 324 102 0100	
		Shanthi Gears make	CW	96 324 101 0200	
		Shanthi Gears make	CCW	96 324 102 0200	
		G Elli make	CW	97 324 101 0400	
		G Elli make	CCW	97 324 102 0400	
03.	Application	Used to drive the rotor of Regenerative Air Preheater.			
04.	Prime Movers	a) Main Drive: Electric Motor 3 Ph, 50 Hz. b) Auxiliary Drive : Air Motor of lower speed & KW			
05.	Input & Output RPMs	1440 & 14.64			
06.	Transmitting Power	a) Continuous - 30 KW b) Peak - 90 KW c) Motor Rating - 30 KW (Design Condition)			
07.	Peak Input Torque	60 Kg-m			
08.	Conditions of service	a) Duration : 24 hours daily b) Nature of load : smooth c) Starting torque : 40 Kg-m d) Momentary Max over load : 400 % e) Ambient Temperature : 55°C f) Environment: Dusty Humid and Outdoor installation. g) Direction of rotation of high speed shaft : Must be capable of rotating in either directions (clockwise or counter-clockwise)			
09.	General arrgt & Overall dimensions	As per sketch in page 03 of 03.			
10.	Coupling method: a) High speed shaft – Electric motor by fluid coupling / Air motor by flexible coupling. b) Low speed shaft - Pinion mounted (PCD of Pinion - 1270 mm, Pressure angle - 20°)				
03	06.06.17	Sd(SCH)	Sd(RSB)	Sd(RSB)	Stieber make added in Clause 11h.
02	06.02.17	Sd(VMR)	Sd(SCH)	Sd(RSB)	In Clause 12q, DFT was 40 microns. In 12r, three coats was two coats and in 12s, total DFT was 100 microns. Clause 12 modified in line with SQP:APH:111.
01	25.08.15	Sd(GA)	Sd(KP)	Sd(KP)	Clause 11a), 11h),6c)&Drg updated.
00	20.09.13	Sd(KP)	Sd(KPchamy)	Sd(PPS)	FRESH ISSUE
Rev.No	Date	Prepared	Checked	Approved	Record of Revisions.

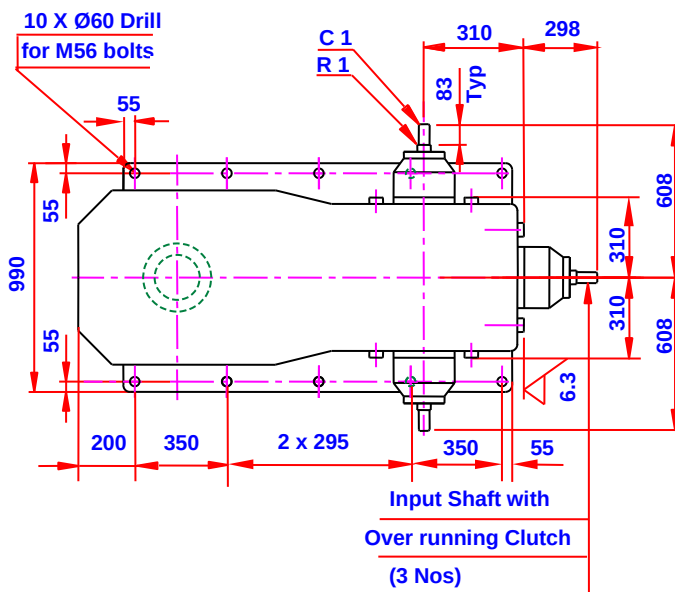
Specification No : APSQ – 113	Rev. No : 03	Page No : 02 of 03
11	General a) Reducer shall be designed with 4 stages of reduction and overall dimensions mentioned in the sketch are not to be exceeded. Reducer & Motor brackets mounting dimension, Shaft diameter/centerline/extension dimension and center distance shall be maintained as per sketch for interchangeability. b) Speed reducers have to satisfy AGMA specifications for durability of 120,000 hours life at rated KW. c) Service factor 1.25 Minimum. d) Bearings to have minimum B-10 life of 50,000 hours at rated KW. All Bearings shall be of 'SKF' or 'FAG' or 'TIMKEN' make only. e) At 400% of motor rating, tooth stress should not exceed 70% of yield point of tooth material. f) Lubricating oil pump has to be provided to lubricate top bearings, gear meshing points above oil level and all over running clutches. g) All input shafts should have over-running clutches built-in as a part of the speed reducer and mounted such that when reducer is driven by one input shaft, the other two input shaft(s) shall not rotate. h) The Over Running Clutch shall be without Oil Seal and shall be suitable for Sump Oil Lubrication. It shall be of size FSO 600 or equivalent and shall be of Formsprag / Daido / Renold / Ringspann / Stieber make only. i) Drywell arrangement shall be provided for output shaft and double seal is required at high speed shafts & low speed shaft to avoid oil leakage. j) In the event of first order on a vendor, the first lot of speed reducers will be subject to a test at our works. The procedure before each starting is to obtain full backlash inside the reducer plus 1 degree backlash between the tooth of pinion on the low speed shaft and a stop. The motor is then turned on. This is to be done 500 times without fracture of speed reducer components. k) The casing of the speed reducer shall be of fine-grained Cast Iron as per IS 210 FG 260 or equivalent. All the motor brackets will be attached to the speed reducer casing. l) All input and output shafts shall be supplied with keys. m) Speed Reducer component shall be packed properly to avoid damage during transit. n) 3 copies of O & M manual to be supplied along with Reducer. o) Only latest revision shall be followed for all the Standards / SQP specified.	
12	Painting p) All external surfaces, which require painting, shall be cleaned as per surface preparation standard SSPC - SP3 grade before applying paint. q) Two coats of Red Oxide Zinc Phosphate (IS : 12744) primer paint shall be applied to have a dry film thickness of 60 microns. r) Finally applied with three coats of synthetic enamel (IS : 2932) finish paint of Grey shade no : 692 of IS : 5 to have a dry film thickness of 60 microns. s) Total dry film thickness shall be minimum 120 microns after final coat.	
13	a) Vendor shall submit the Dimensional drawing indicating Materials of Construction of all the parts with weight, and quality plan for our approval once in 5 years or whenever vendor makes any changes in the drawing. b) In the event of first order on a vendor, the vendor shall submit Gear calculations as per AGMA and Tooth stress calculations at 400% rated power for our approval.	
14	Inspection a) Inspection by BHEL. b) Necessary Material Compliance Certificate and No-load Run Test certificate (indicating Noise level, Vibration, and Temperature Rise) shall be submitted.	

Speed Reducer 8 APB – 3 Input, Output Downshaft, 3 ORC

GENERAL ARRANGEMENT



ELEVATION

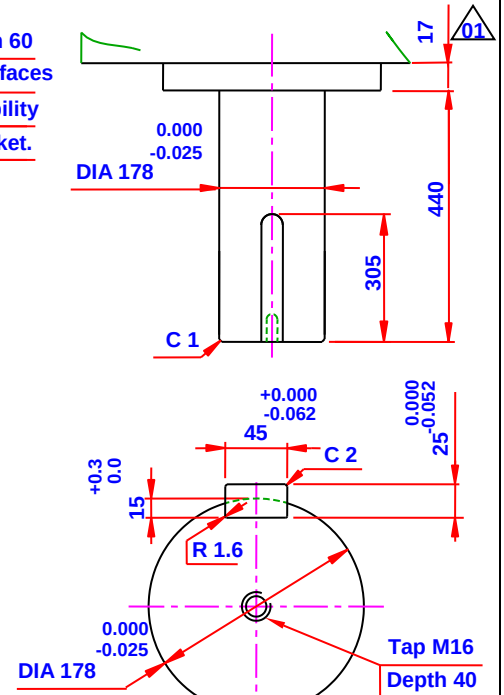


PLAN

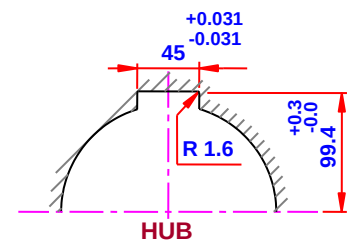
All dimensions are in mm

Tolerance for untoleranced dimensions are as per Medium Class of IS 2102 Part I (Latest revision)

OUTPUT SHAFT DETAILS

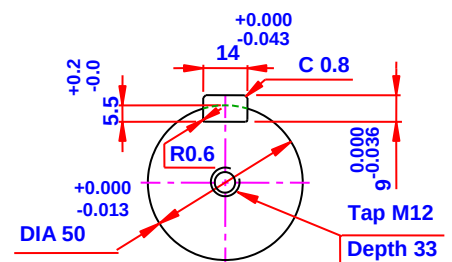


OUTPUT SHAFT END

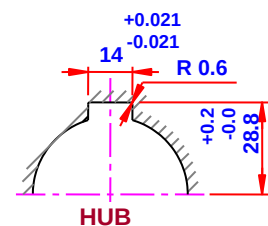


HUB

INPUT SHAFT DETAILS



INPUT SHAFT END



HUB