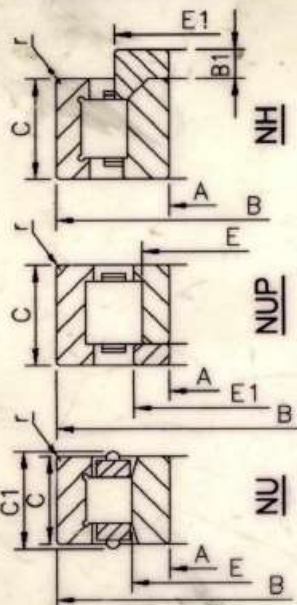


2. ITEM 021 & 022 ARE FOR DEVELOPMENT PURPOSE-  
AND CAN BE USED WITH PRIOR PERMISSION OF-  
ENGG. DIVISION.



NOTES: -

3. SUPPLIER TO FURNISH INFORMATION EVERY TIME WITH OFFERS AS PER C450067(SHEET I).  
4. ITEM 021 & 022 ARE FOR DEVELOPMENT PURPOSE- AND CAN BE USED WITH PRIOR PERMISSION OF- ENGG. DIVISION.

REV. 43 8.6.18	IT. 035 & 036 ADDED.
REV NO 42 17.8.16	IT. 022 & 023, M/C REF. AND ASSY. DRG. REF. ADDED. IT 033 & 034 RIVETLESS BEARING DELETED.
REV NO 41 26/05/15	IT. 033, 034 ADDED, NOTE-3 ADDED
REV NO 40 22/5/15	IN BOM IT. 023, ASSY. REF. 14394388001 CHANGED TO 04394328002.
REV NO 39	M/C REF. TM4303 (PE), DRG. NO. - 04394328002 WAS NOT ON.
REV NO 39 28.12.14	IN ITEM 29, M/C REF. TM3701 (CE), DRG. NO. 14394431001 & STYLE NO. BL3024706769 ADDED. IN ITEM 32, DRG. NO. 143944331104 & STYLE NO. BL3024663036 ADDED. - CONTD -
REV NO 38 26.11.14	NOTE-2 WAS ON. MACHINE REF. TM4906, TM4907 & 165M DELETED FROM ITS. 001, 002, 024. AND REF. ADDED IN TTS. 021, 022.
REV NO 37 26.9.14	M/C REF. TA10102 & TA10106 AND DRG. REF. 24304423002 DELETED FROM IT. 001 & ADDED TO IT. 021.
REV NO 36	IN BOM IT. 001 DIM. 193 WAS 190.
REV NO 35	DT. 05-05-12
REV NO 35	M/C REF. TA10102 & TA10106 AND DRG. REF. 24304423002 DELETED FROM IT. 021 AND ADDED TO IT. 001.
REV NO 34	IT. NO. 32 WAS NOT ON. DT. 26-05-08
REV NO 33	IT NOS 308 & 31 WERE NOT ON. VALUE OF Y FOR IT. 5 WAS 5. M/C REF. TA7003, TA6301 & OA7001 & THEIR ASSY. REF. ADDED FOR IT. 005. M/C REF. & ASSY. REF. TA10102 & FOR IT. 001 WAS ON. TA10102 & TA10106 ADDED FOR IT. 021
REV NO 32	IT. NO 30 WAS NOT ON.

I.T. NO.	BEARING NO.	MACHINE REF.	ASSY. DRG. REF.	STYLE NO. CODE NO.	BOUNDARY DIMENSIONS							CLEARANCE		MAX. SPEED OVER SPEED	DYNAMIC LOAD(N) STATIC LOAD(N)
					A	B	C	E	E1	B1	C1	r	DIA.		
1	NJ330 EM/C4	TM4906 +65M(PE) TM4939 TG10931AZ TG10919AZ TA10102AZ <del>TA10102</del> <del>TA10102</del>	04394001001 G250 04314015001 04304059001 24394429002 24394429002	-	150.000 149.975	320.000 319.960	65.00 64.75	193	-	-	65	5	0.165 0.000 0.215 0.000	2275 2250	781000 965000
2	NJ320+ HJ320 (NH320EM/C4)	TM4906 +65M(CE) TM4939	04394001001 G250	-	100.000 99.980	215.000 214.970	47.001 46.80	-	140	13	-	4	0.105 0.210 0.140 0.405	2275 2750	391000 440000
3	NJ418EM/C4	TM3603 133AW 133AZ(PE)	H022(9) G791(29)	BP7211553987	90.000 89.980	225.000 224.970	54.00 53.80	123.5	-	-	-	5	0.105 0.000 0.140 0.000	2320 3000	380000 415000

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C450068 (SH.1 OF 5)



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APPD (A.K. DAS) SD/-		SCALE:-NTS	C450068 (SH.2 OF 5)
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DIVISIONAL STANDARD

C450068 (SH.3 OF 5)

BEARINGS

BEARINGS																
I.T. NO.	BEARING NO.	MACHINE REF.	ASSY.DRG. REF.	STYLE NO. CODE NO.	BOUNDARY DIMENSIONS							CLEARANCE		MAX. SPEED OVER SPEED	DYNAMIC LOAD(N) STATIC LOAD(N)	
					A	B	C	E	E1	B1	C1	r	DIA.			AXIAL
12	NJ312 +HJ312 (NH312EQMC4)	G320(CE)	04394038001 (34)	BP7211534958	60.000 59.985	130.000 129.982	31.00 30.88	-	-	-	-	2.1	0.080 0.110	0.150 0.250	2097 2620	151000 160000
13	NU324M/C4	TM3701(PE)	14394331001	BP7211532882	120.000 119.980	260.000 259.965	55.00 54.80	154	-	-	-	3	0.105 0.160	0.000 0.000	2600 3200	539000 620000
14	NH318MC4 EX26	TM3701(CE) TM5002AZ TAO 659(CE)	14394431001 24394427002 24394455002	BP7211534974	90.000 89.980	190.000 189.970	43.00 42.98	165	-	-	-	3	0.090 0.140	0.205 0.385	2753 3200	319000 360000
15	NU446826 W2/W23B	TM4501(PE)	34394353002		130.000 129.975	280.000 279.965	58.00 57.75	167	-	-	-	5	0.145 0.190	0.000 0.000	3100 3800	627000 750000
16	NH324 EMACG175	HS15250(CE)	14394460003	BP7211534990	119.998 119.985	260.000 259.075	55.00 54.88	154	168.514.0	-	-	4	0.165 0.205	0.260 0.475	2200 2800	475000 550000
17	NU330 EMA/C188	HS15250(PE)	14394360003	BP7211532920	149.998 149.982	320.000 319.972	65.00 64.75	193	-	-	-	4	0.165 0.210	0.000 0.000	2200 2800	715000 855000
18	NH309C4	MG51CW ME	24414433003	-	45.00 44.988	100.00 99.985	25.00 24.88	-	64	7.0	-	1.5	0.070 0.100	0.12 0.18	1320 2400	79000 77500
19	SKF NU2236 EMRDC4 VA301 FAG NU2236 E 801488	6FRA6068 (DE)	14454364001	-	180.00 179.975	320.00 319.972	86 85.75	215	-	-	-	4	0.170 0.220	0.000 0.000	2584 3230	1010000 1500000
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DIVISIONAL STANDARD

C450068 (SH.4 OF 5)

BEARINGS																	
I.T. NO.	BEARING NO.	MACHINE REF.	ASSY.DRG. REF.	STYLE NO. CODE NO.	BOUNDARY DIMENSIONS							CLEARANCE		MAX. SPEED OVER SPEED	DYNAMIC LOAD(N) STATIC LOAD(N)		
					A	B	C	E	E1	B1	C1	r	DIA.			AXIAL	
20	SKF NU320 ECM C4 VA 309+HJ320 EC VA 301 FAG NU320 EM 1 C4 F1 J 20 A +HJ320EF1	6FRA6068 (NDE)	14454464002	-	100.000 99.980	215.00 214.97	47.001 46.80	-	140	13	-	4	0.105 0.140	0.210 0.405	2584 3230	391000 440000	
21	NU330/ECMRD/ C4/VA301 (CYL CAGE PROFILE)	TM4906AZ (PE) <del>TM4907</del> <del>TM4908</del> <del>TM4909</del> <del>TM4910</del> <del>TM4911</del> <del>TM4912</del> <del>TM4913</del> <del>TM4914</del> <del>TM4915</del> <del>TM4916</del> <del>TM4917</del> <del>TM4918</del> <del>TM4919</del> <del>TM4920</del> <del>TM4921</del> <del>TM4922</del> <del>TM4923</del> <del>TM4924</del> <del>TM4925</del> <del>TM4926</del> <del>TM4927</del> <del>TM4928</del> <del>TM4929</del> <del>TM4930</del> <del>TM4931</del> <del>TM4932</del> <del>TM4933</del> <del>TM4934</del> <del>TM4935</del> <del>TM4936</del> <del>TM4937</del> <del>TM4938</del> <del>TM4939</del> <del>TM4940</del> <del>TM4941</del> <del>TM4942</del> <del>TM4943</del> <del>TM4944</del> <del>TM4945</del> <del>TM4946</del> <del>TM4947</del> <del>TM4948</del> <del>TM4949</del> <del>TM4950</del> <del>TM4951</del> <del>TM4952</del> <del>TM4953</del> <del>TM4954</del> <del>TM4955</del> <del>TM4956</del> <del>TM4957</del> <del>TM4958</del> <del>TM4959</del> <del>TM4960</del> <del>TM4961</del> <del>TM4962</del> <del>TM4963</del> <del>TM4964</del> <del>TM4965</del> <del>TM4966</del> <del>TM4967</del> <del>TM4968</del> <del>TM4969</del> <del>TM4970</del> <del>TM4971</del> <del>TM4972</del> <del>TM4973</del> <del>TM4974</del> <del>TM4975</del> <del>TM4976</del> <del>TM4977</del> <del>TM4978</del> <del>TM4979</del> <del>TM4980</del> <del>TM4981</del> <del>TM4982</del> <del>TM4983</del> <del>TM4984</del> <del>TM4985</del> <del>TM4986</del> <del>TM4987</del> <del>TM4988</del> <del>TM4989</del> <del>TM4990</del> <del>TM4991</del> <del>TM4992</del> <del>TM4993</del> <del>TM4994</del> <del>TM4995</del> <del>TM4996</del> <del>TM4997</del> <del>TM4998</del> <del>TM4999</del>	04394001001	9024684307	150.000 149.975	320.000 319.960	65.00 64.75	190	-	-	65	5	0.165 0.215	0.000 0.000	2275 2250	781000 965000	
22	NH320/ECMRD/ C4P/VA301 (CYL CAGE PROFILE)	TM4906AZ (CE) <del>TM4907</del> <del>TM4908</del> <del>TM4909</del> <del>TM4910</del> <del>TM4911</del> <del>TM4912</del> <del>TM4913</del> <del>TM4914</del> <del>TM4915</del> <del>TM4916</del> <del>TM4917</del> <del>TM4918</del> <del>TM4919</del> <del>TM4920</del> <del>TM4921</del> <del>TM4922</del> <del>TM4923</del> <del>TM4924</del> <del>TM4925</del> <del>TM4926</del> <del>TM4927</del> <del>TM4928</del> <del>TM4929</del> <del>TM4930</del> <del>TM4931</del> <del>TM4932</del> <del>TM4933</del> <del>TM4934</del> <del>TM4935</del> <del>TM4936</del> <del>TM4937</del> <del>TM4938</del> <del>TM4939</del> <del>TM4940</del> <del>TM4941</del> <del>TM4942</del> <del>TM4943</del> <del>TM4944</del> <del>TM4945</del> <del>TM4946</del> <del>TM4947</del> <del>TM4948</del> <del>TM4949</del> <del>TM4950</del> <del>TM4951</del> <del>TM4952</del> <del>TM4953</del> <del>TM4954</del> <del>TM4955</del> <del>TM4956</del> <del>TM4957</del> <del>TM4958</del> <del>TM4959</del> <del>TM4960</del> <del>TM4961</del> <del>TM4962</del> <del>TM4963</del> <del>TM4964</del> <del>TM4965</del> <del>TM4966</del> <del>TM4967</del> <del>TM4968</del> <del>TM4969</del> <del>TM4970</del> <del>TM4971</del> <del>TM4972</del> <del>TM4973</del> <del>TM4974</del> <del>TM4975</del> <del>TM4976</del> <del>TM4977</del> <del>TM4978</del> <del>TM4979</del> <del>TM4980</del> <del>TM4981</del> <del>TM4982</del> <del>TM4983</del> <del>TM4984</del> <del>TM4985</del> <del>TM4986</del> <del>TM4987</del> <del>TM4988</del> <del>TM4989</del> <del>TM4990</del> <del>TM4991</del> <del>TM4992</del> <del>TM4993</del> <del>TM4994</del> <del>TM4995</del> <del>TM4996</del> <del>TM4997</del> <del>TM4998</del> <del>TM4999</del>	04394001001	9024684315	100.000 99.980	215.000 214.970	47.001 46.80	-	140	13	-	-	4	0.105 0.140	0.120 0.320	2275 2750	391000 440000
23	NU328/ECMRD/ C4/VA301 RIVETLESS	TM5002 (PE) <del>TM4303 (PE)</del> <del>TM4701AZ</del> <del>TM4303 (PE)</del>	14394327001	9024706084	140.000 139.975	300.000 299.965	62.0 61.75	180	-	-	-	5	0.145 0.190	-	2470 3350	682000 830000	
24	NH320ECP/C4 POLYAMIDE CAGE	TM4907 <del>TM4906</del> <del>TM4303 (PE)</del>	04394001001	9024752531	100.000 99.980	215.000 214.970	47.001 46.80	-	140	13	-	4	0.105 0.140	0.210 0.405	2275 2750	391000 440000	
25	NU2332ECMC4 VA301	TA10103AZ	24304490001	9024697573	160.000 159.975	340.000 339.96	114.000 113.75	-	-	-	-	4	0.165 0.215	-	-	1320000 1830000	
26	N332-ECM-SRL 340-370-VA309 TO DIN43283 (OIL LUBRICATED ELECTRICALLY INSULATED)	IM4507 (DE)	24454392002	9024720125	160.000 159.975	340.000 339.96	68.000 67.85	-	-	-	-	4	0.165 0.215	-	-	865000 1060000	
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C450068 (SH.4 OF 5)



DIVISIONAL STANDARD										C450068 (SH.5 OF 5)									
										BEARINGS									
I.T. NO.	BEARING NO.	MACHINE REF.	ASSY DRG. REF.	STYLE NO. CODE NO.	BOUNDARY DIMENSIONS						CLEARANCE		MAX. SPEED OVER SPEED	DYNAMIC LOAD(N) STATIC LOAD(N)					
					A	B	C	E	E1	B1	r	DIA. AXIAL							
27	NU1964 M1 A C4 TOLERANCE TO DIN620	6FRA6068 SUSPENSION DE	04451564002	9024726271	319.990 319.960	439.985 439.955	55.9 55.6	-	-	-	-	3	0.305 0.385	-	580000 1050000				
28	NU1044-566185 CAGE M1 RAD CL-C4 HU1044 F 55 TOLERANCE TO DIN620	6FRA6068 SUSPENSION NDE	04451564002	9024726280	220.000 219.970	340.00 339.96	56.00 55.7	-	261.7	-	14	3	0.220 0.280	-	510000 765000				
29	NH318 ECMRD/CA VA 301 (CYL CAGE PROFILE)	TM5002AZ (CE) TM3701AZ (CE) TM3701 (CE)	24394427002 24394488002 14394431 001	BL 9024 706769	90.00 89.980	190.00 189.970	43.00 42.98	165	-	-	-	3	0.090 0.140	0.205 0.385	2753 3200				
30	NH324EM/C4 VA-301	TA-7003 BX (NDE)			120.000 119.980	260.000 259.965	55	-	168	14	3	0.125 0.165	0.260 0.475	1900 2200	539000 620000				
31	NH326EM/C4 VA-301	TA-7003AZ AY (NDE)	34304473001		130.000 129.975	280.000 279.965	58.00 57.75	-	182	14	4	0.145 0.190	0.260 0.475	1800 2160	627000 750000				
32	NU328AECM RD/CAVA301 RIVETLESS (CYL CAGE PROFILE)	TM3701 (PE)	14394331104	BL 902467366	120.000 119.980	240.000 239.965	55.00 54.80	154	-	-	3	0.105 0.160	0.000 0.000	2400 3200	539000 620000				
33	NU328ECM/C4 (RIVETED)	TM4303 (PE)	14394331104	BL 902467366	140.000 139.975	300.000 299.965	62.0 61.75	180	-	-	5	0.145 0.190	-	2470 3350	682000 830000				
34	NH320ECM/C4 (RIVETED)	TM4303 (CE)	14394331104	BL 902467366	100.000 99.980	215.000 214.970	47.00 46.80	-	140	13	4	0.105 0.140	0.120 0.380	2225 2750	391000 440000				
35	NU324 ECMRA /C4 VA301	IM3601AZ IM3301AZ/BZ IM3302	24454303001		120.000 119.980	240.000 239.965	55.00 54.80	154	-	-	3	0.105 0.160	0.000 0.000	2400 3200	539000 620000				
36	NH318 ECMRD/CA VA3091 (INSULATED)	IM3601AZ IM3301AZ/BZ IM3302	24454403001 24454409001		90.00 89.980	190.00 189.970	43.00 42.98	165	-	-	3	0.090 0.140	0.205 0.385	2753 3200	319000 360000				

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C450067 (SH/1/5)

DIVISIONAL STANDARDS

151964/2024/HEP-TXM20581

# BEARINGS

AKD Copy

85/101

## Technical Specification for Rolling Bearings

### DRAWINGS AND TECHNICAL INFORMATION TO BE SUBMITTED WITH QUOTATION EVERY TIME ON BEARING OFFERED

1. Dimensioned drawing of the bearing.
2. Type & Make of bearing.
3. Significance of each suffix/prefix.
4. Accuracy class; (Normal/P5/P6)
5. Suitability for application : (Traction / Industrial)
6. Number of rollers & size.
7. Radial internal clearance.
8. Axial clearance.
9. Type of cage construction : (Standard/Drop roller).
10. Type of cage guiding : (Roller/Outer race)
11. Cage Material : (Brass/Steel)
12. Material specification for rollers & races.
13. Surface finish on rollers and races.
14. Dynamic capacity of bearing.
15. Static capacity of bearing.
16. Maximum permissible speed (with Grease lubrication)

### GENERAL REQUIREMENTS:

Bearings offered should conform to the below mentioned requirements :

1. Bearings should be of special execution for traction application with suffix VA301 (SKF), F1 (FAG), SV1 (STEYR), MT (RHP) etc. Following special features may be envisaged in design and manufacturing processes.
  - 1.1 Improved and uniform surface finish by grinding of track chamfers, honning of tracks and lapping of rollers.
  - 1.2 Optimized cage construction for efficient lubrication.
  - 1.3 Vibration and noise level specially controlled.
  - 1.4 Bearings rings stabilised for higher temperatures.
  - 1.5 Uniform hardness on bearing rings and rollers, variation not exceeding 1/2 RC with in the same element.
  - 1.6 WE REQUIRE BEARINGS WITH INTERCHANGABLE ASSEMBLY ONLY.
2. Boundary dimensions and its tolerance to be as per this drawing and is generally based on ISO 15:1981 and ISO 492:1981.
3. Radial Bearing clearance & Axial clearance in roller bearing to be as per this drawing and is generally based on draft ISO 5742 Rev., DIN 620 & DIN 43283 unless stated otherwise in the drawing.
4. Accuracy class for internal dimensions of bearing to be P5/P6.
5. Rollers should be designed to cater for increased load carrying capacity.

REV. 15 REVISD & REDRAWN

BHARAT HEAVY ELECTRICALS LTD  
BHOPAL

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ISSUED BY: TRACTION MRS D.C

CHANGED OR DRAFTED BY: DE - I, PAN-B  
DIVISIONAL STANDARDS ENGINEER

SCALE: NTS C450067 (SH/1/5)