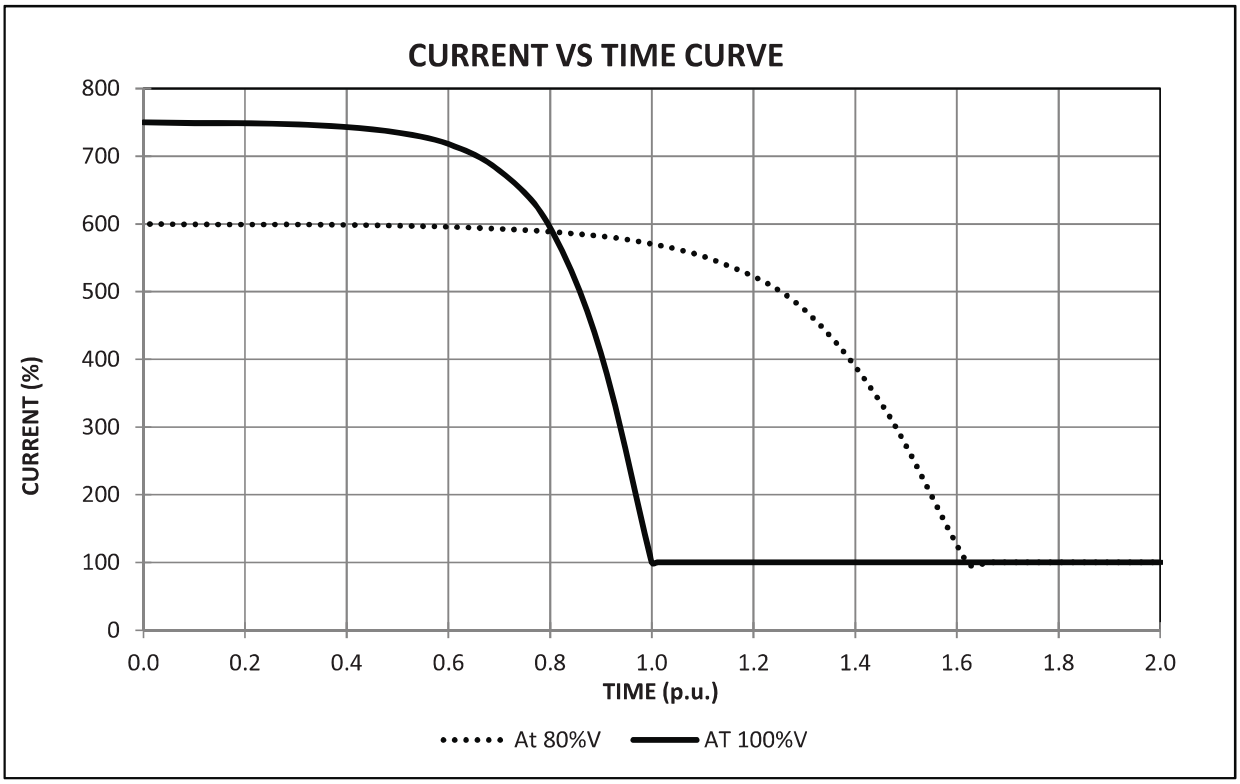
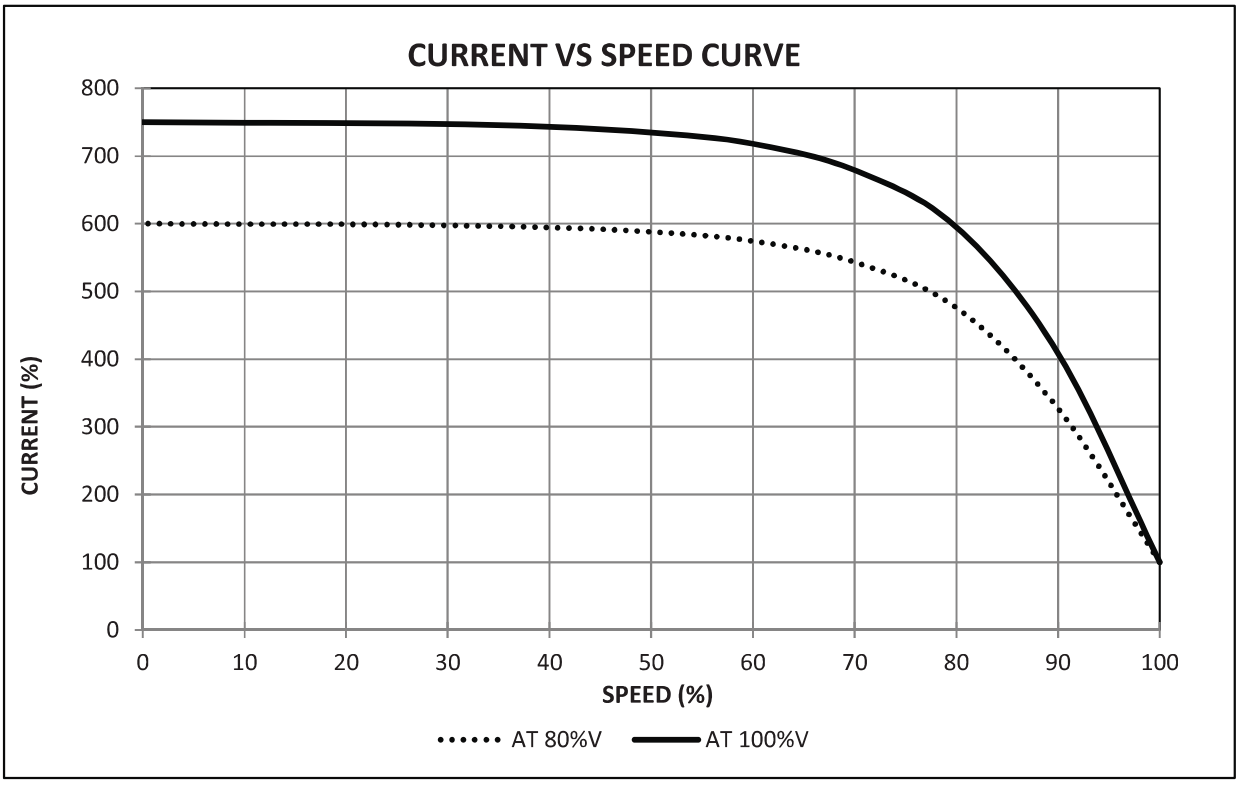
hindustan ELECTRIC MOTORS

MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 5.5/7.5	Poles : 6	Efficiency Class : IE3	





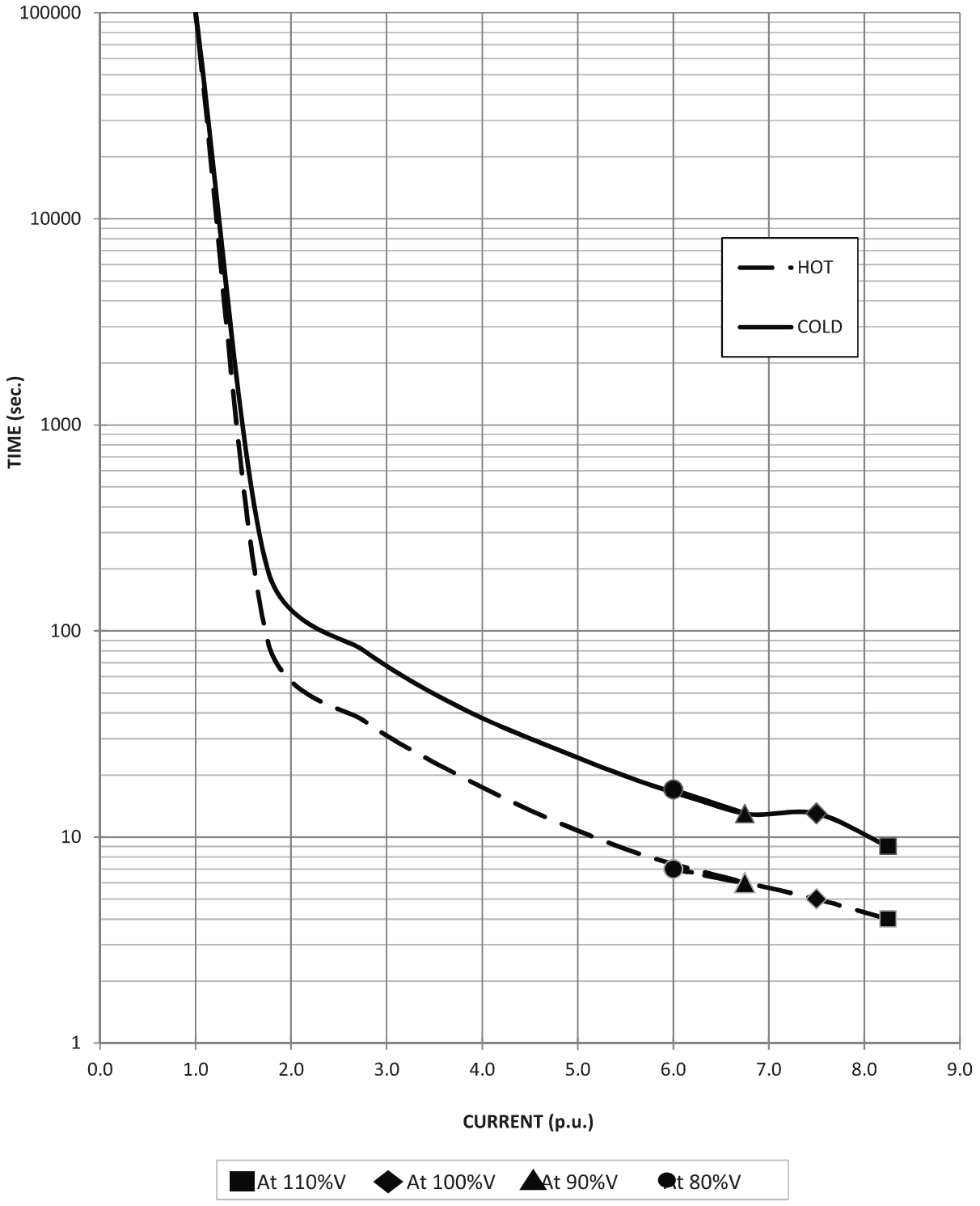
Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS

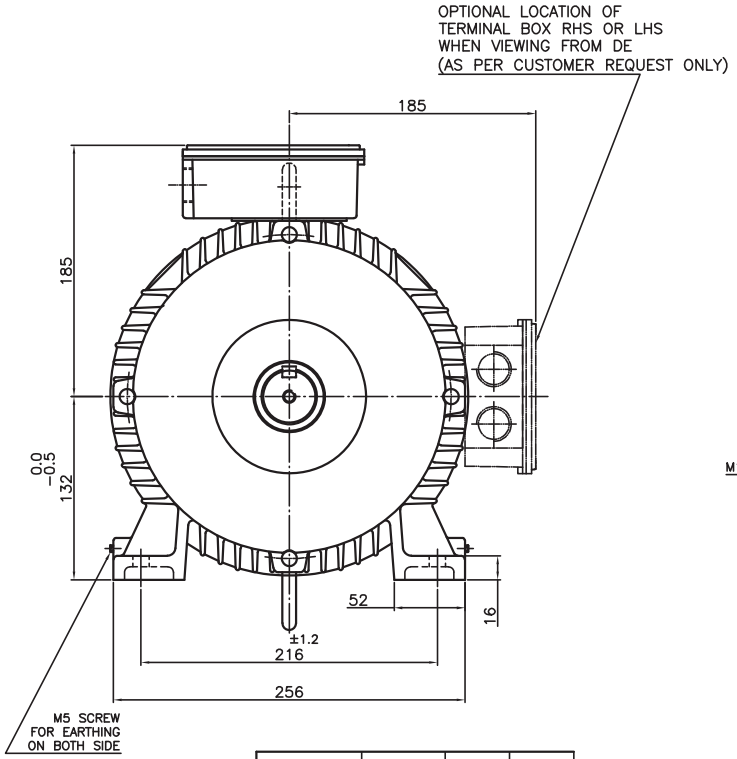
MOTOR PERFORMANCE CURVE

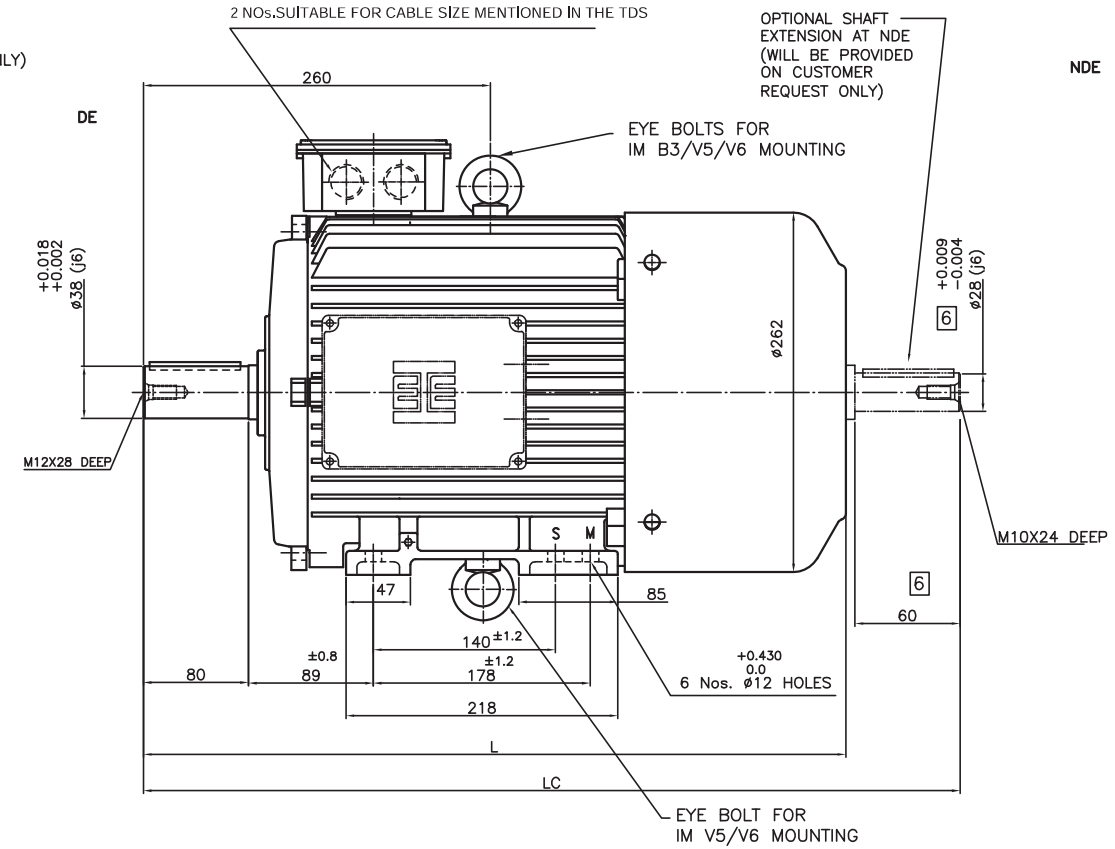
Rated Output (kW/HP) : 5.5/7.5	Poles : 6	Efficiency Class : IE3	

THERMAL WITHSTAND CURVE

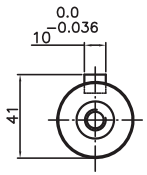


Prep.: SK	Date: 25-12-2021	Revision: 0	

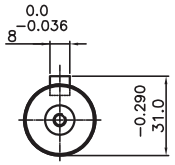




5	TYPE DESIGNATION	POLE	L	LC	
	2HE2	4,6	491	558	6
	2HE3	4			
		6	531	598	6
	2HS5	4/2 6/4 8/4	491	558	6
	2HT1	4,8			



SHAFT EXTENSION DETAILS
AT DE



SHAFT EXTENSION DETAILS
AT NDE

6

REV. STATUS	No.	REVISIONS	BY	DATE
	6	NDE SIDE SHAFT EXTN. DIA.28x60LG. WAS DIA.38x80LG. & DIMS 491, 558, 531, 598 WAS 489, 576, 508, 595 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	LANKESH	03-01-20
	5	TABLE UPDATED, TYPE DESIGNATION WAS P.No & 2HE2, 2HE3, 2HS5, 2HT1 WAS P.No.1, P.No.2, TO UPLOAD THIS DRG. ON PORTAL	ARUN	09/4/19
	4	LENGTH TABLE CHANGE, PART NO. WAS EFFICIENCY, 1 WAS EFF-2 & 2 WAS EFF-1.	KIRAN	20/02/18
	3	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. NO. & ALL THE FEATURES,	AKSHAY	18/11/13

	NAME	DATE
DRN.	P.N.RAOTE	09-12-05
CHD.	S.P.JADIA	09-12-05
APPD.	S.P.JADIA	09-12-05

Dim. without tolerance as per IS:2102,very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSIONS DRAWING
B3/STD TEFC MOTOR

SCALE NTS

SHT 1/1

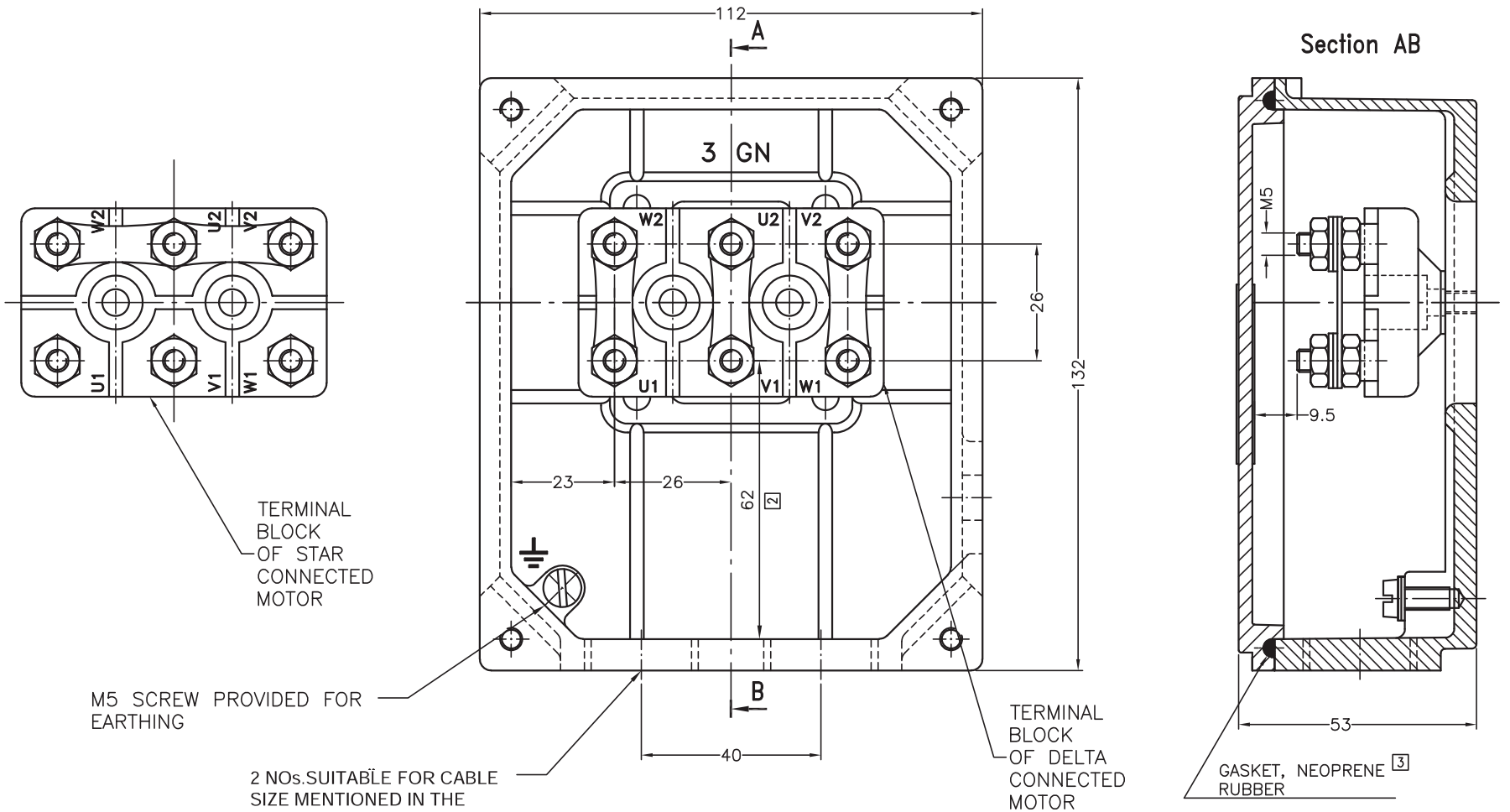
PROJECTION

DRG. NO.: A1-132M-49(GN)

REV. 6

REF.: A1-132M-0ADIMN-B3

FRAME SIZE 132S/M (GN)



REV. STATUS				
	[3]	GASKET INDICATED IN SECTION AB	ARUN	07/12/16
	[2]	DIMN. 62 SPECIFIED, STANDARD ADDED IN TITLE	P.N.RAOTE	21/02/15
	[1]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR	05/07/13

Dim. without tolerance as per IS:2102 very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

	NAME	DATE
DRN.	GANESH	02/08/11
CHD.	S.P.JADIA	02/08/11
APPD.	S.P.JADIA	02/08/11

TITLE

STANDARD [2] TERMINAL BOX ASSEMBLY

PROJECTION

DRG. NO.: A3-100/132-33(GN) REV. 3

REF. 10-13-TBOX-ASSLY

SCALE NTS

SHT 1/1

FRAME SIZE 100-132 (GN)

hindustan ELECTRIC MOTORS	DATA SHEET: INDUCTION MOTOR	Motor Type 2HE3 106-06

No. of Phases			3	Reference Standard			IS:12615
Frame Designation			100L	Protection IS:4691			IP 55
Rated Output		kW	1.5	Vibration Standard			IS:12075
		HP	2.0	Noise Standard			IS:12065
No. of Poles			6	Duty			S1
Rated Voltage		V	415	Insulation Class			F
Rated Frequency		Hz	50	Cooling IS:6362			IC411
Rated Current		A	3.3	Terminal Box Details	Type		HM3GN
Rated Speed		rpm	945		Terminal Size		M5
Rated Torque		kgm	1.55		No. of Terminal		6
Efficiency	Full load	%	82.5		Max. cable size (Cu)	mm²	1x3Cx2.5
	3/4 load	%	82.5	Bearing Data	DE		6206ZZ
	1/2 load	%	80.0		NDE		6206ZZ
Power factor	Full load		0.77		Lubrication		Prelubricated
	3/4 load		0.71		Life L10 (Direct Coupled)	hrs.	50,000
	1/2 load		0.60		Regreasing Time	hrs.	-
Max. Temp. Rise (Res.)		°C	70	Lifting Eyebolt			M8
Acceleration Time		sec.	-	Motor Weight (approx)		kg	34.0
Stator Connection			Y	Rotor GD²		kgm²	0.0336
Tropicalised? (Yes / No)			Yes	Ambient Temp.		°C	50
I_{st} / I_r			5.5	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r			2.2	-			
T_{po} / T_r			2.6	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec.	10	Frequency Variation ±		%	5
	Cold	sec.	23	Combiend Variation ±		%	10

Remarks:
(1) Efficiency Class : IE3
(2) Motor Construction : TEFC
(3) Suitable Cable Gland & Lugs BY AVPL
(4) Minimum Starting Voltage : 80%
(5) Permissible Fault Level: 50KA for 0.25 sec
(6) No. of Hot/Cold Starts: 3/3

Data subject to tolerance as per IEC 60034-1

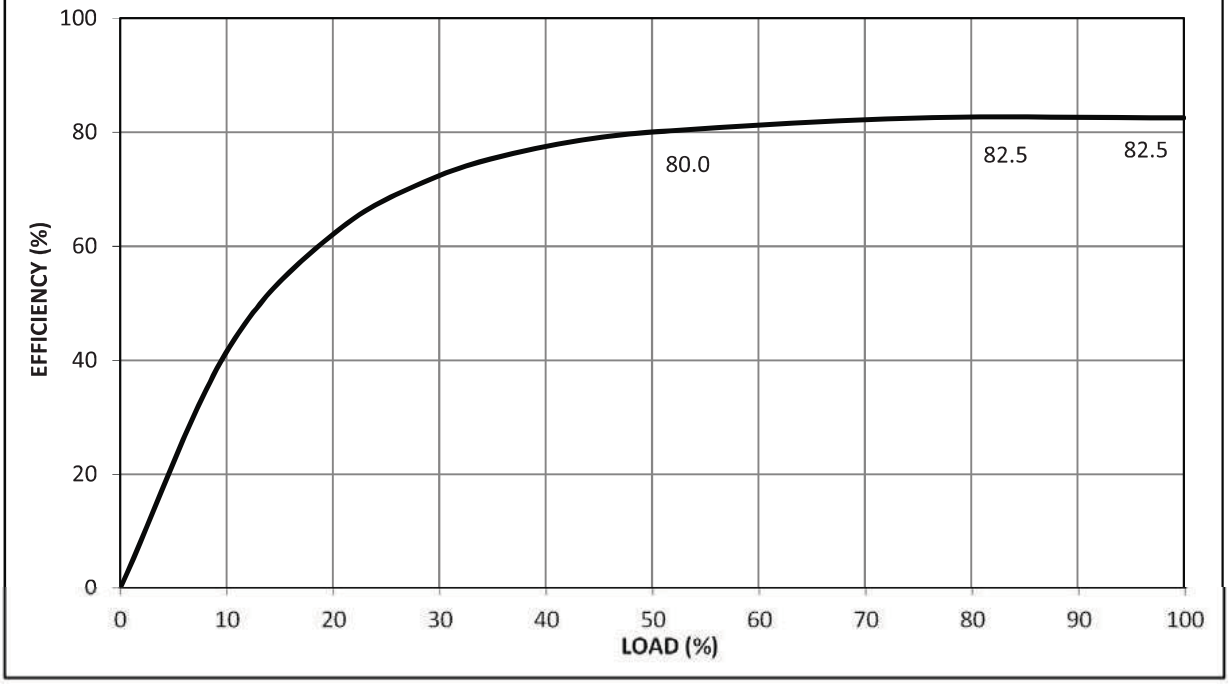
Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS

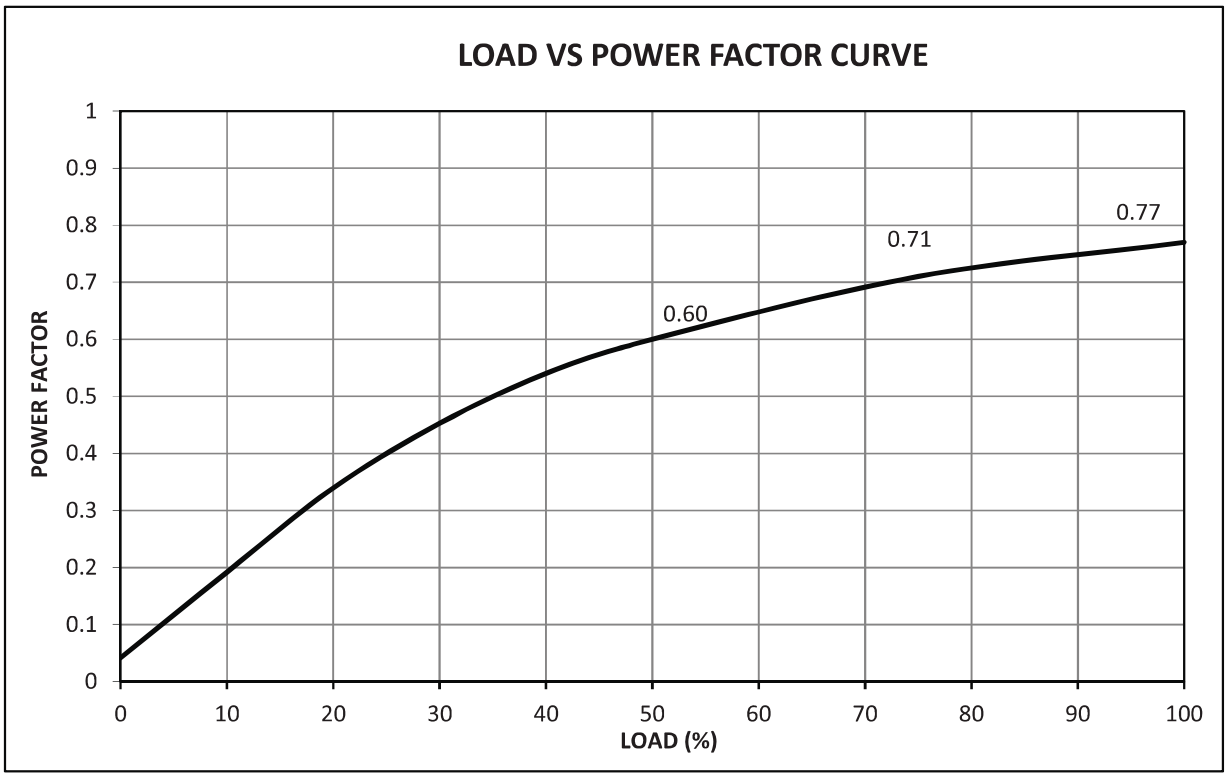
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0	Poles : 6	Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE

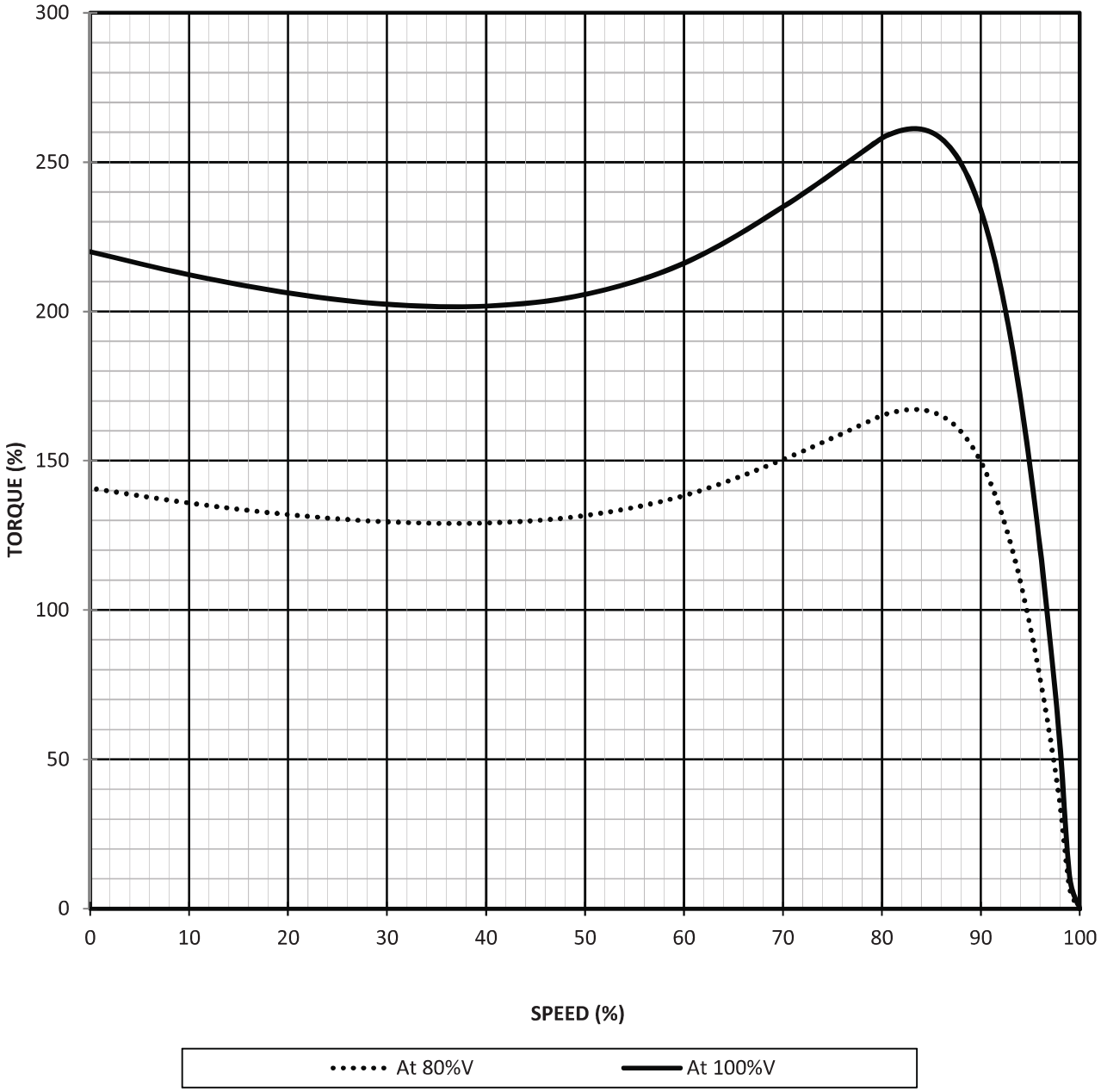


Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0	Poles : 6	Efficiency Class : IE3	

TORQUE SPEED CURVE

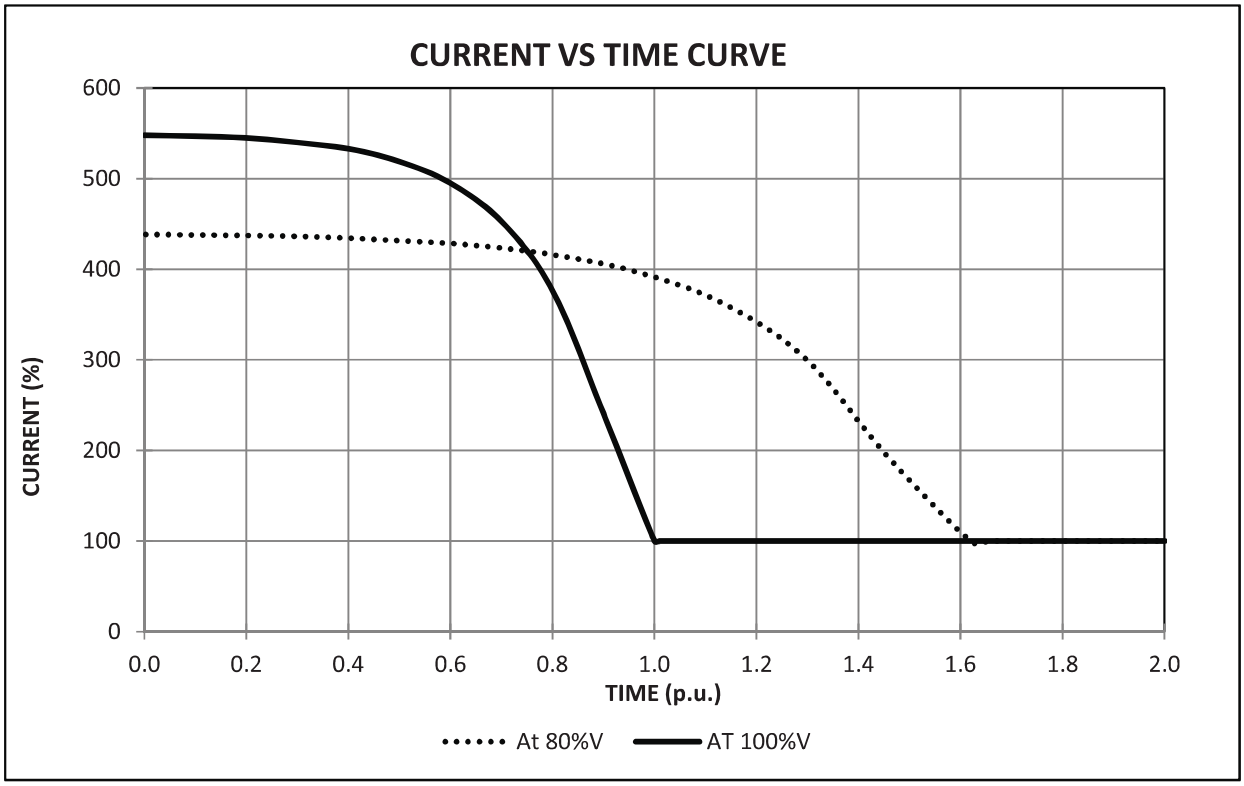


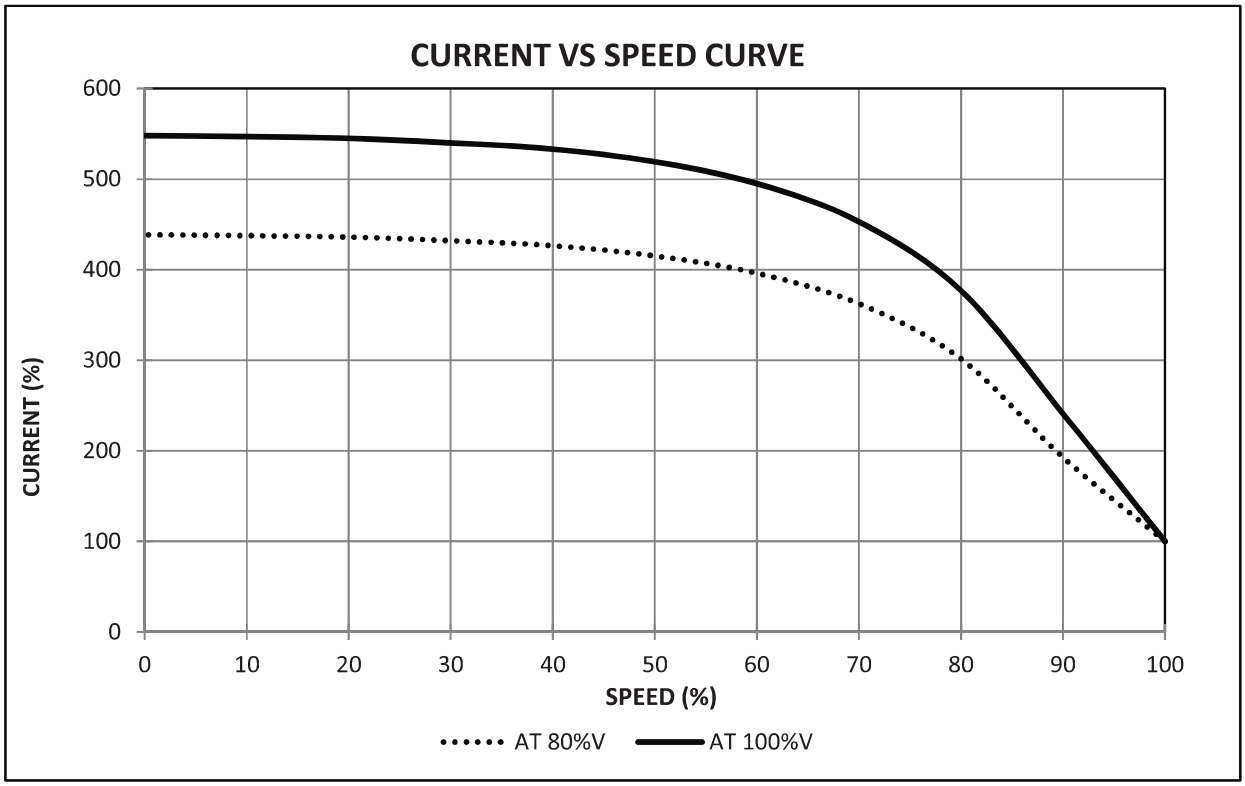
Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS

MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0	Poles : 6	Efficiency Class : IE3	



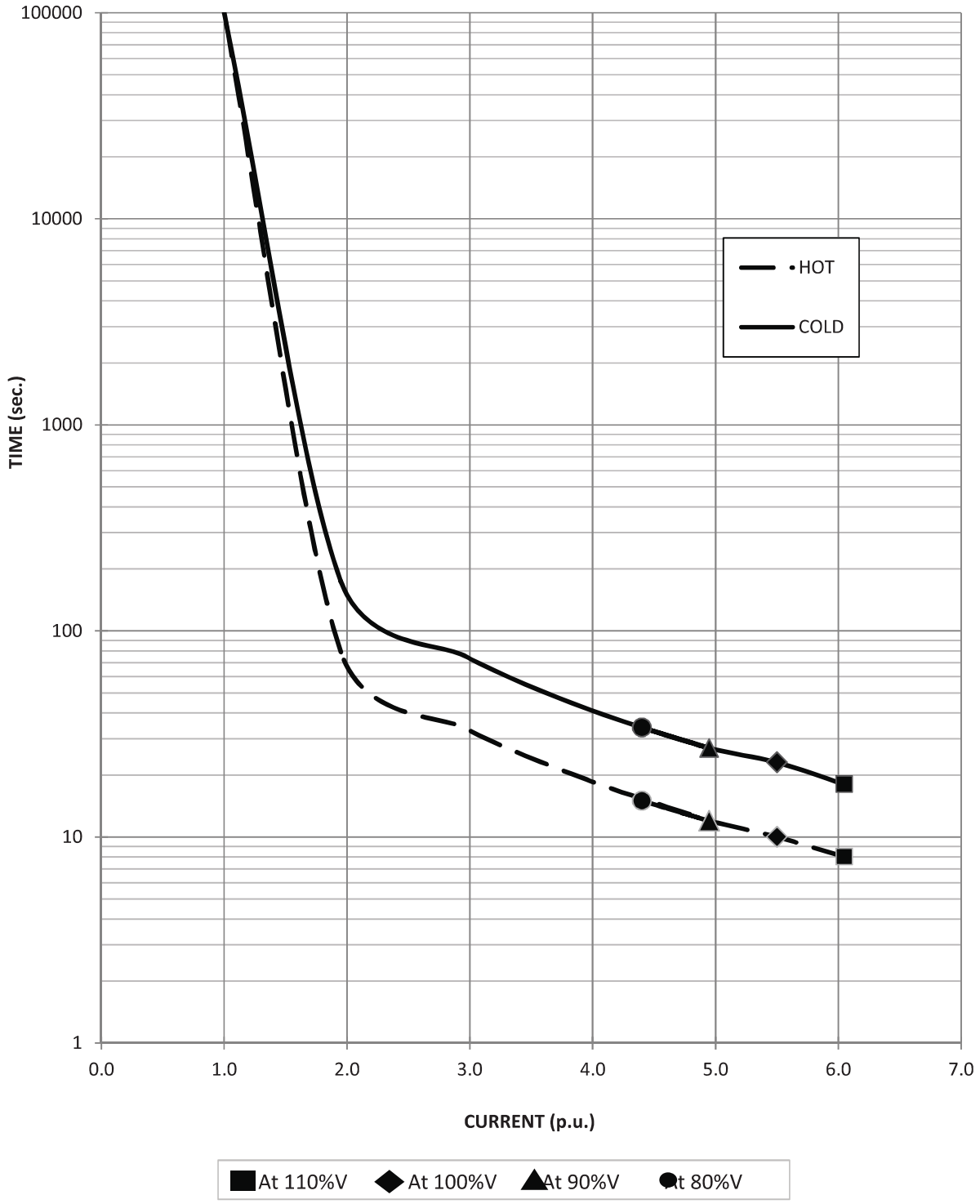


Prep.: SK	Date: 25-12-2021	Revision: -	

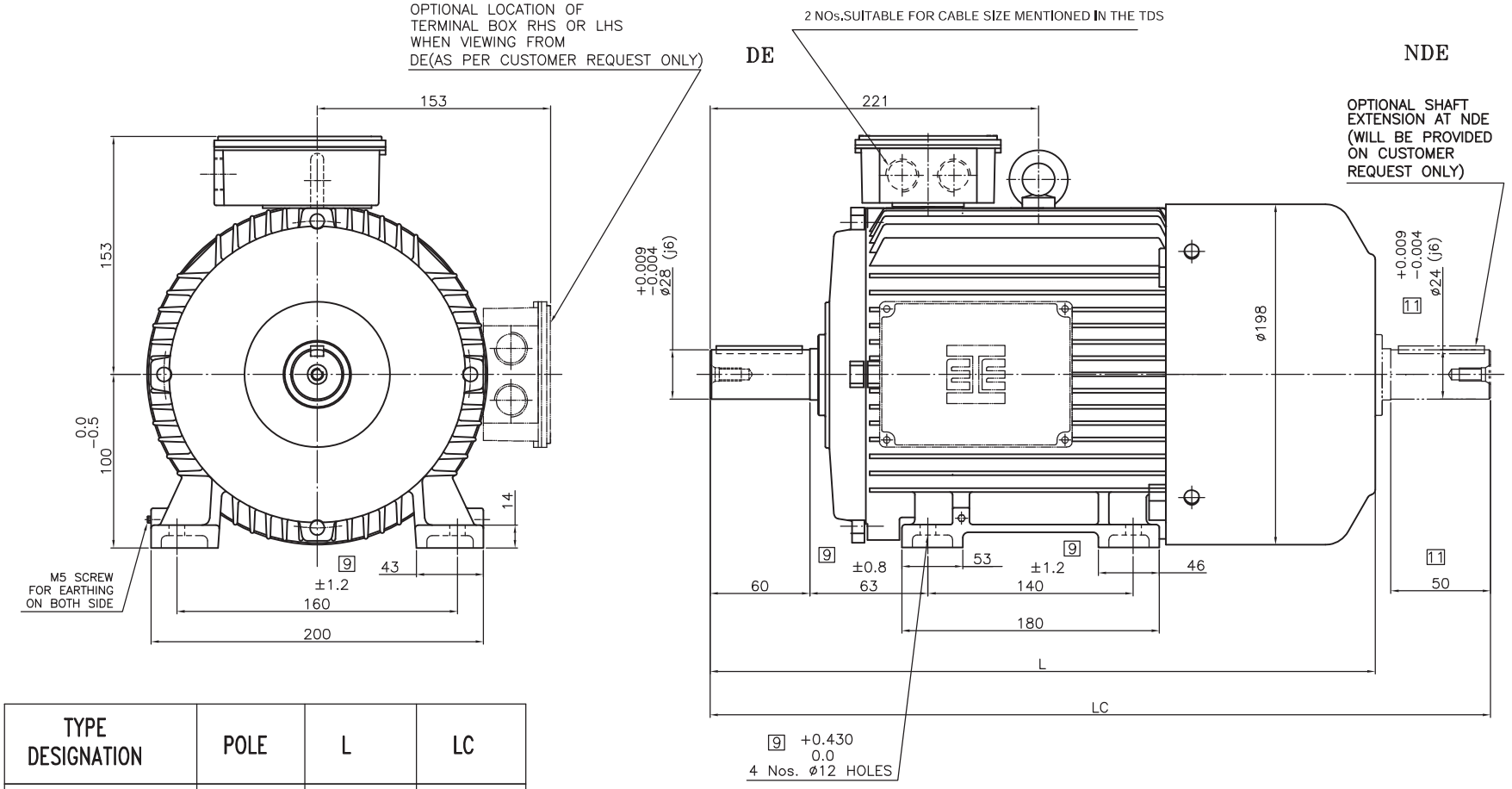
hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0	Poles : 6	Efficiency Class : IE3	

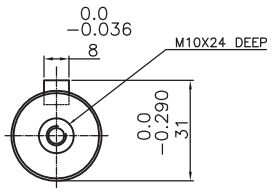
THERMAL WITHSTAND CURVE



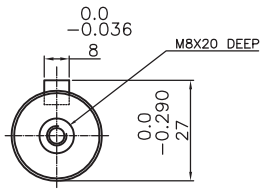
Prep.: SK	Date: 25-12-2021	Revision: 0	



TYPE DESIGNATION	POLE	L	LC	
2HE2	2,4,6,8	384	440	11
2HE3	2,4	418	474	11
2HE3	6,8	384	440	11



SHAFT EXTENSION DETAILS AT DE



SHAFT EXTENSION DETAILS AT NDE 11

REV. STATUS			
11	NDE SIDE SHAFT EXTN. DIA.24x50LG. WAS DIA.28x60LG. & DIMS 384, 440, 418, 474 WAS 374, 440, 384,450 & AS PER Cat. : D08, Print : 01/2020 TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE	LANKESH	30-12-19
10	TABLE UPDATED, TYPE DESIGNATION WAS P.No & 2HC1, 2HE2, 2HE3, 2HS1, 2HS5, 2HT1 WAS P.No1, P.No2, P.No.3 TO UPLOAD THIS DRG. ON PORTAL	ARUN	19-11-18
9	TOLERANCE AT HOLE CENTRES & STD ADDED IN TITLE & IE3 , IE2 WAS EFF1 ,EFF2	LANKESH	08-08-18
8	P. No. 3 AND EFFICIENCY COLUMN ADDED	ARUN	08-9-17
7	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. AND ALL THE FEATURES, P.No. SPECIFIED WAS EFFICIENCY.	NIMKAR	27-1-14

Dim. without tolerance as per IS:2102, very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

	NAME	DATE
DRN.	P.V.SHINDE	28/02/04
CHD.	S.P.JADIA	28/02/04
APPD.	S.P.JADIA	28/02/04

TITLE: OVERALL DIMENSIONS DRAWING
B3 FOOT MOUNTED/TEFC/STD.[9] MOTOR

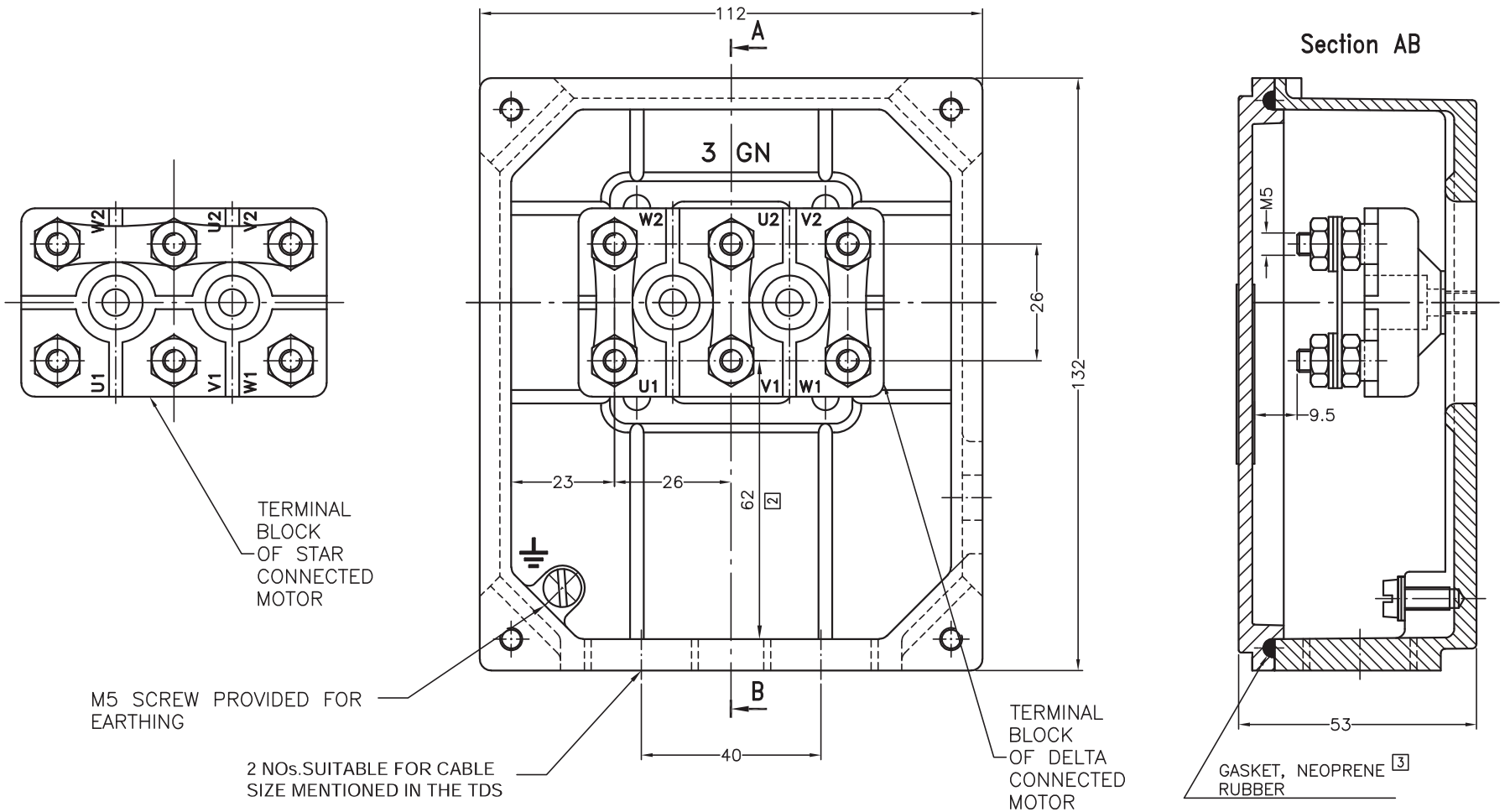
SCALE NTS | SHT 1/1

PROJECTION

DRG. NO.: A1-100L-49(GN) | REV. 11

REF. A1-100L-OADIMN

FRAME SIZE 100L (GN)



REV. STATUS				
	[3]	GASKET INDICATED IN SECTION AB	ARUN	07/12/16
	[2]	DIMN. 62 SPECIFIED, STANDARD ADDED IN TITLE	P.N.RAOTE	21/02/15
	[1]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR	05/07/13

Dim. without tolerance as per IS:2102 very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

	NAME	DATE
DRN.	GANESH	02/08/11
CHD.	S.P.JADIA	02/08/11
APPD.	S.P.JADIA	02/08/11

TITLE

STANDARD [2] TERMINAL BOX ASSEMBLY

PROJECTION

DRG. NO.: A3-100/132-33(GN) REV. 3

REF. 10-13-TBOX-ASSLY

SCALE NTS

SHT 1/1

FRAME SIZE 100-132 (GN)

hindustan ELECTRIC MOTORS	DATA SHEET: INDUCTION MOTOR	Motor Type 2HE3 106-04

No. of Phases			3	Reference Standard			IS:12615
Frame Designation			100L	Protection IS:4691			IP 55
Rated Output		kW	2.2	Vibration Standard			IS:12075
		HP	3.0	Noise Standard			IS:12065
No. of Poles			4	Duty			S1
Rated Voltage		V	415	Insulation Class			F
Rated Frequency		Hz	50	Cooling IS:6362			IC411
Rated Current		A	4.3	Terminal Box Details	Type		HM3GN
Rated Speed		rpm	1440		Terminal Size		M5
Rated Torque		kgm	1.49		No. of Terminal		6
Efficiency	Full load	%	86.7		Max. cable size (Cu)	mm²	1x3Cx2.5
	3/4 load	%	86.7	Bearing Data	DE		6206ZZ
	1/2 load	%	84.0		NDE		6206ZZ
Power factor	Full load		0.82		Lubrication		Prelubricated
	3/4 load		0.78		Life L10 (Direct Coupled)	hrs.	50,000
	1/2 load		0.67		Regreasing Time	hrs.	-
Max. Temp. Rise (Res.)		°C	70	Lifting Eyebolt			M8
Acceleration Time		sec.	-	Motor Weight (approx)		kg	34.0
Stator Connection			D	Rotor GD²		kgm²	0.0237
Tropicalised? (Yes / No)			Yes	Ambient Temp.		°C	50
I_{st} / I_r			7.5	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r			2.5	-			
T_{po} / T_r			3.0	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec.	5	Frequency Variation ±		%	5
	Cold	sec.	13	Combiend Variation ±		%	10

Remarks:
(1) Efficiency Class : IE3
(2) Motor Construction : TEFC
(3) Suitable Cable Gland & Lugs BY AVPL
(4) Minimum Starting Voltage : 80%
(5) Permissible Fault Level: 50KA for 0.25 sec
(6) No. of Hot/Cold Starts: 3/3

Data subject to tolerance as per IEC 60034-1

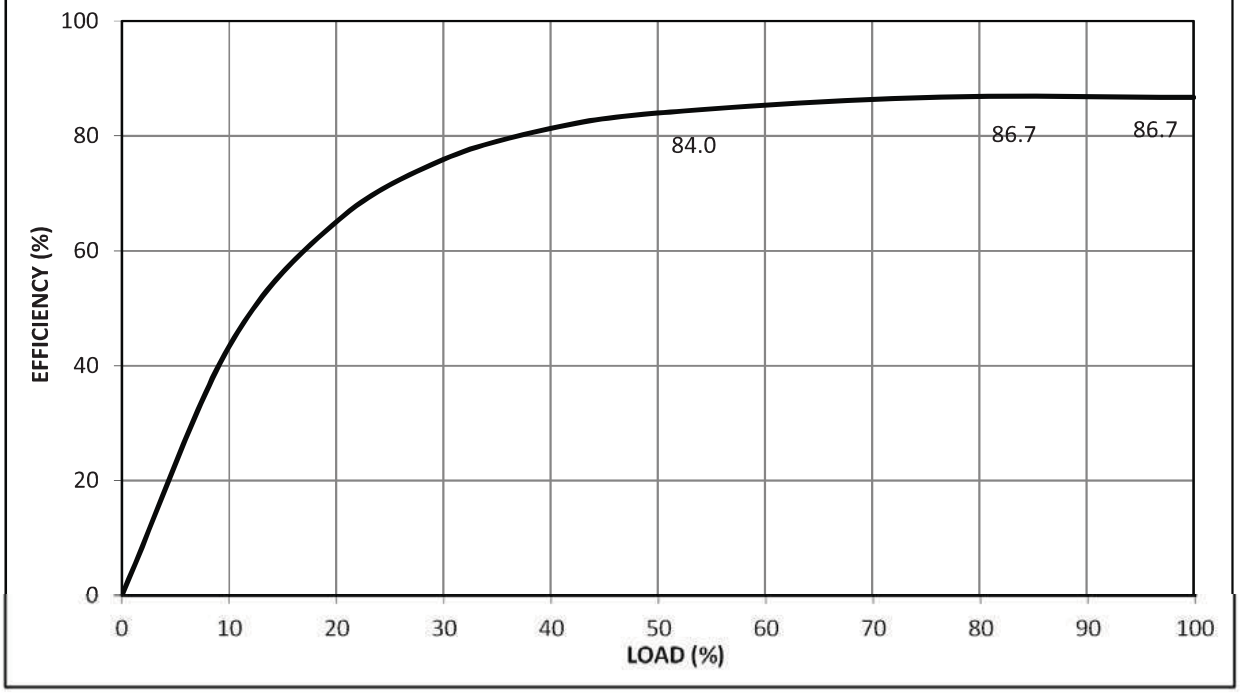
Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS

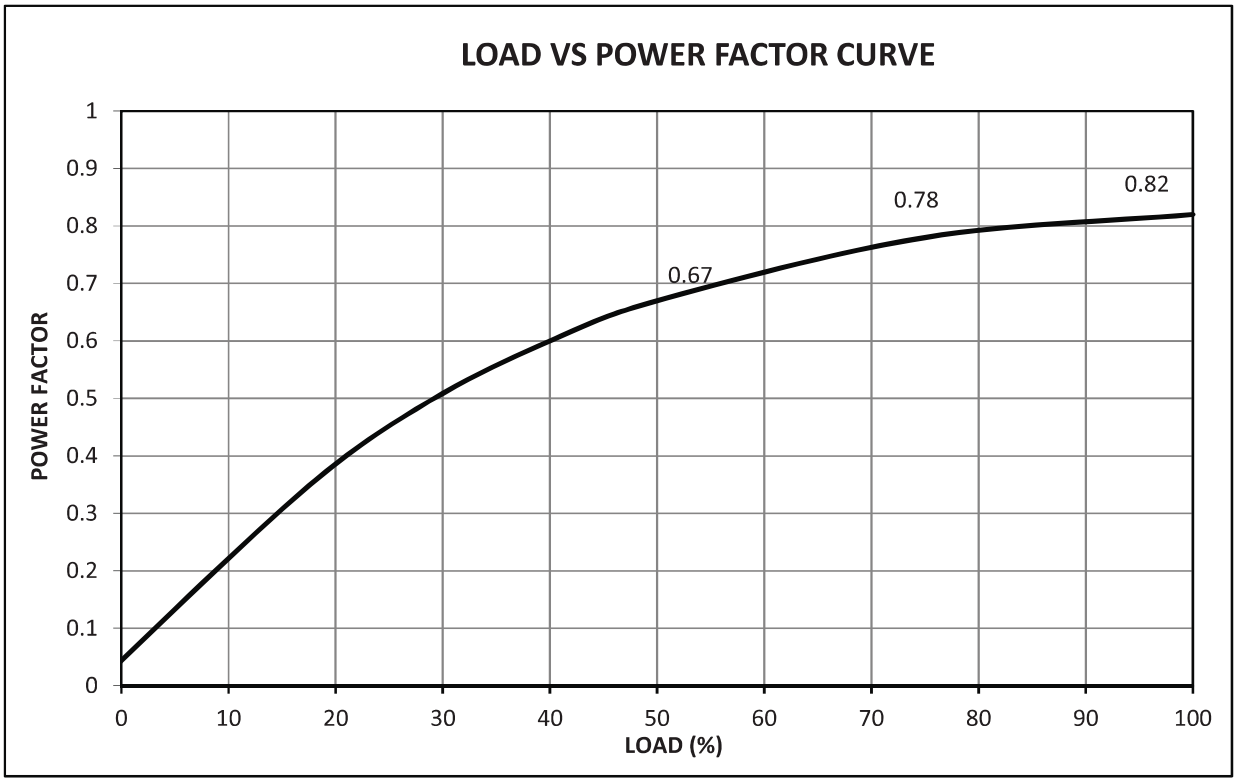
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 2.2/3.0	Poles : 4	Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



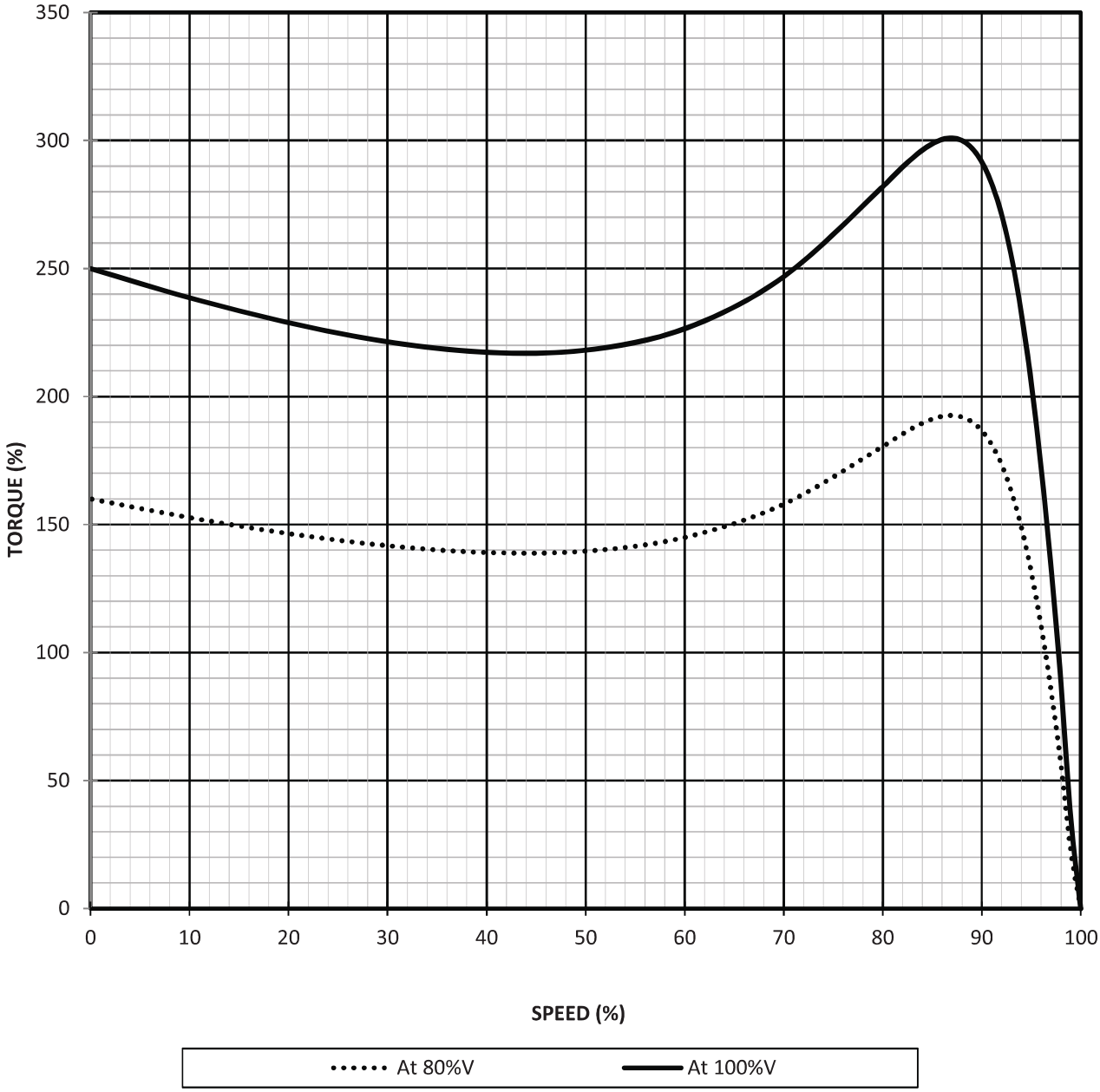
LOAD VS POWER FACTOR CURVE



Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 2.2/3.0	Poles : 4	Efficiency Class : IE3	

TORQUE SPEED CURVE

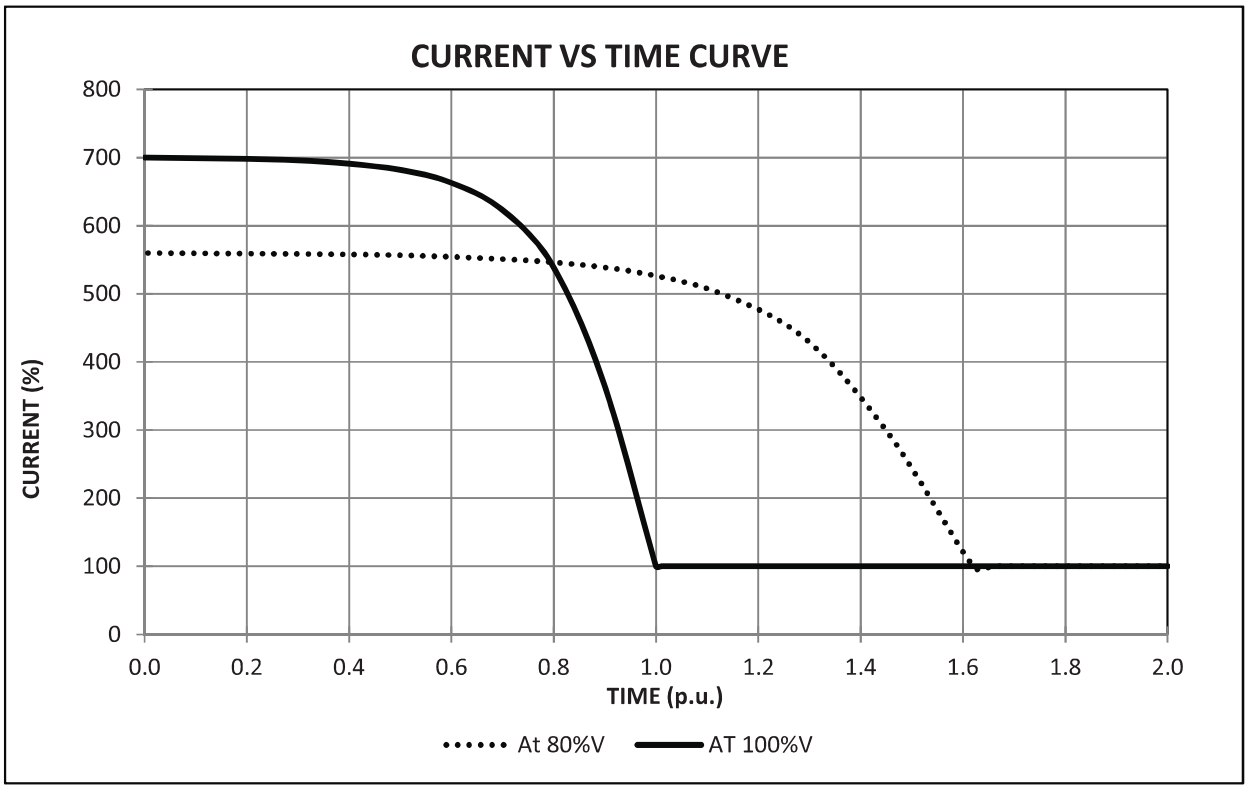


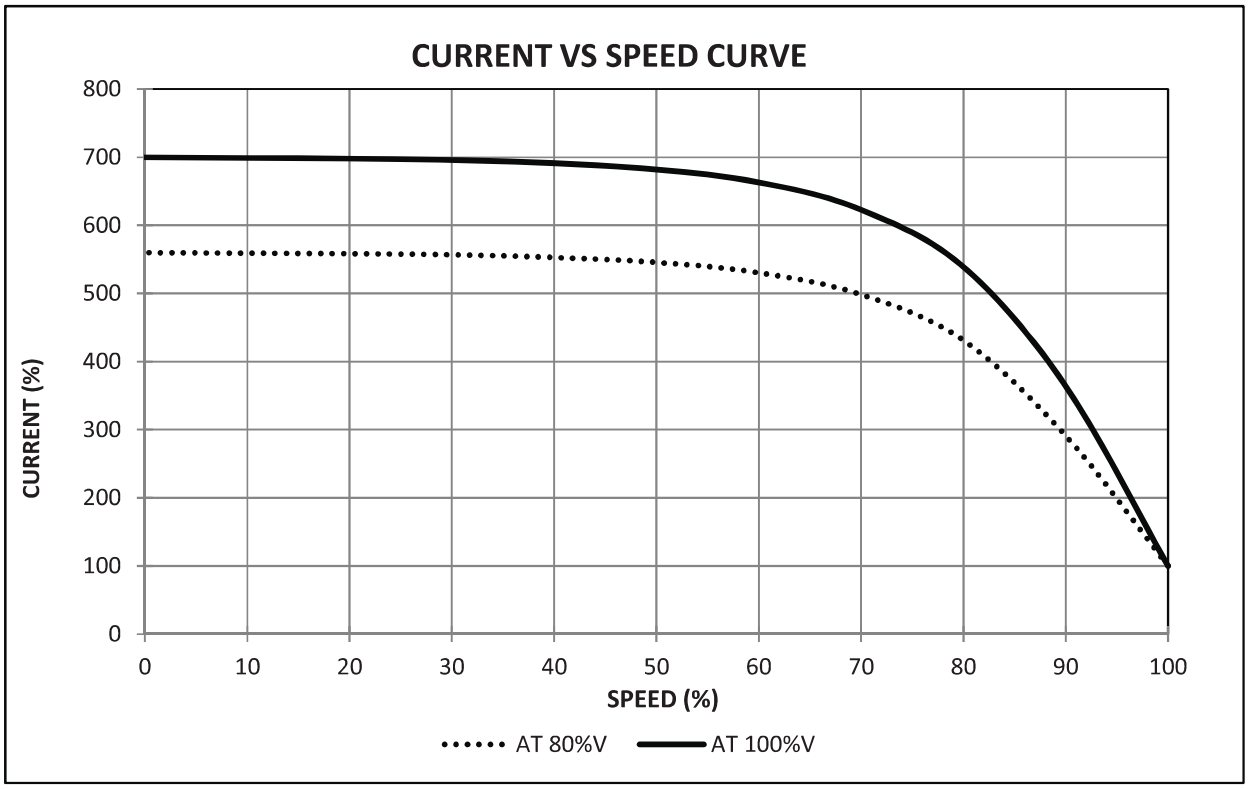
Prep.:	SK	Date:	25-12-2021	Revision:	-	

hindustan ELECTRIC MOTORS

MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 2.2/3.0	Poles : 4	Efficiency Class : IE3	





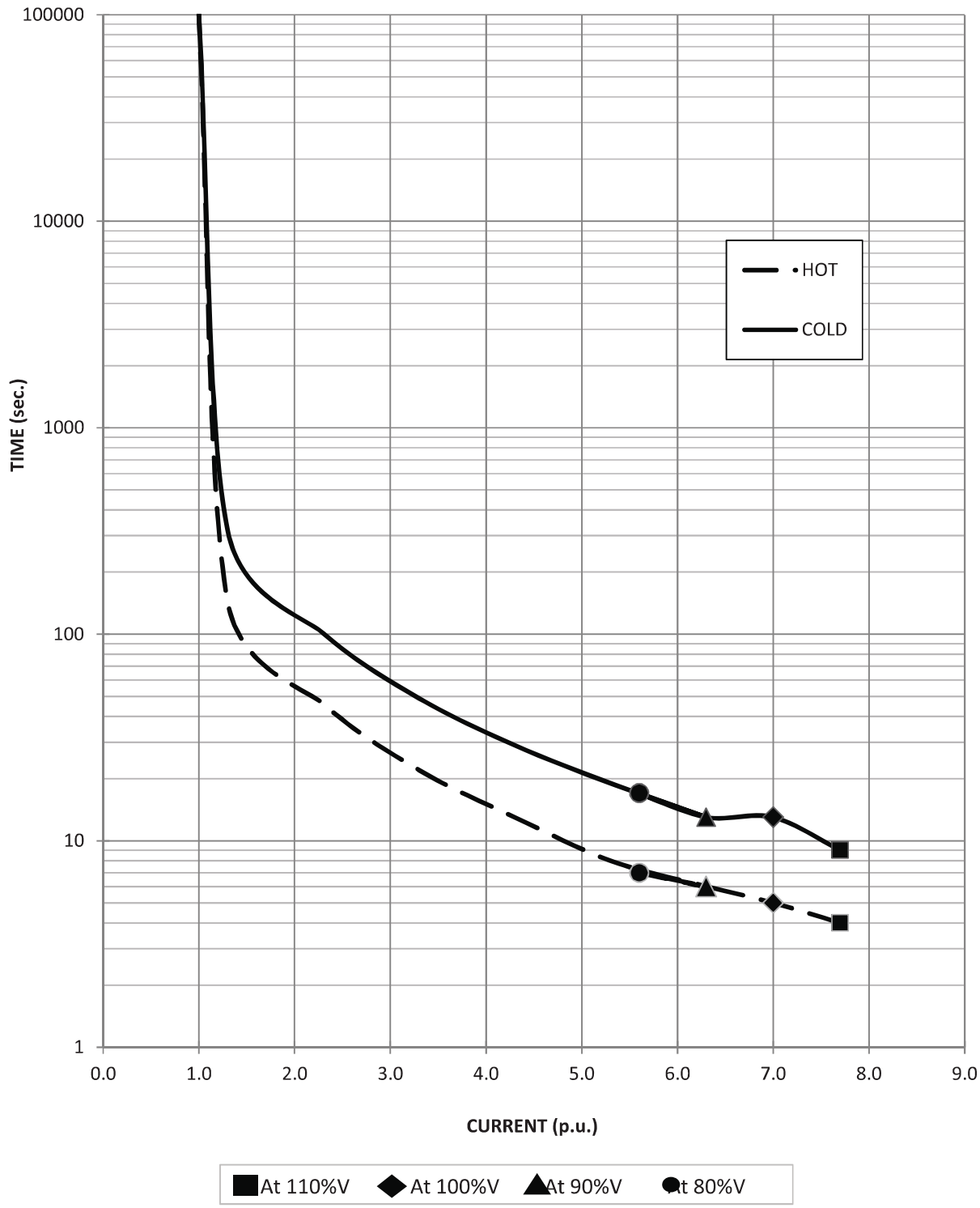
Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS

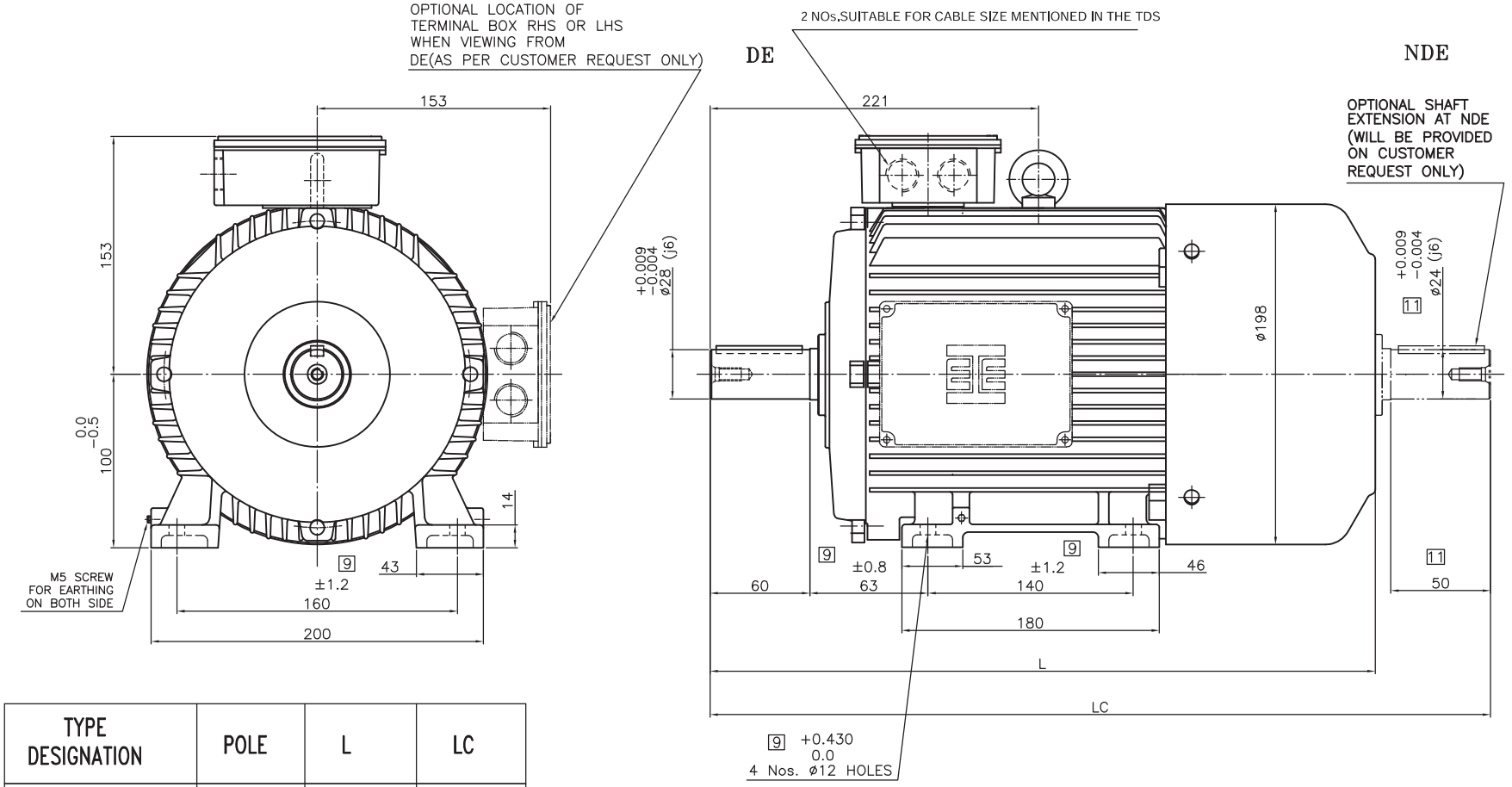
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 2.2/3.0	Poles : 4	Efficiency Class : IE3	

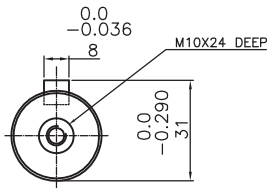
THERMAL WITHSTAND CURVE



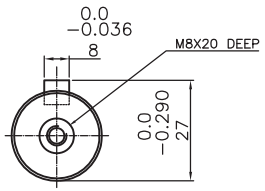
Prep.: SK	Date: 25-12-2021	Revision: 0	



TYPE DESIGNATION	POLE	L	LC	
2HE2	2,4,6,8	384	440	11
2HE3	2,4	418	474	11
2HE3	6,8	384	440	11



SHAFT EXTENSION DETAILS AT DE



SHAFT EXTENSION DETAILS AT NDE 11

REV. STATUS			
11	NDE SIDE SHAFT EXTN. DIA.24x50LG. WAS DIA.28x60LG. & DIMS 384, 440, 418, 474 WAS 374, 440, 384,450 & AS PER Cat. : D08, Print : 01/2020 TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE	LANKESH	30-12-19
10	TABLE UPDATED, TYPE DESIGNATION WAS P.No & 2HC1, 2HE2, 2HE3, 2HS1, 2HS5, 2HT1 WAS P.No1, P.No2, P.No.3 TO UPLOAD THIS DRG. ON PORTAL	ARUN	19-11-18
9	TOLERANCE AT HOLE CENTRES & STD ADDED IN TITLE & IE3 , IE2 WAS EFF1 ,EFF2	LANKESH	08-08-18
8	P. No. 3 AND EFFICIENCY COLUMN ADDED	ARUN	08-9-17
7	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. AND ALL THE FEATURES, P.No. SPECIFIED WAS EFFICIENCY.	NIMKAR	27-1-14

Dim. without tolerance as per IS:2102, very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

	NAME	DATE
DRN.	P.V.SHINDE	28/02/04
CHD.	S.P.JADIA	28/02/04
APPD.	S.P.JADIA	28/02/04

TITLE: OVERALL DIMENSIONS DRAWING
B3 FOOT MOUNTED/TEFC/STD.[9] MOTOR

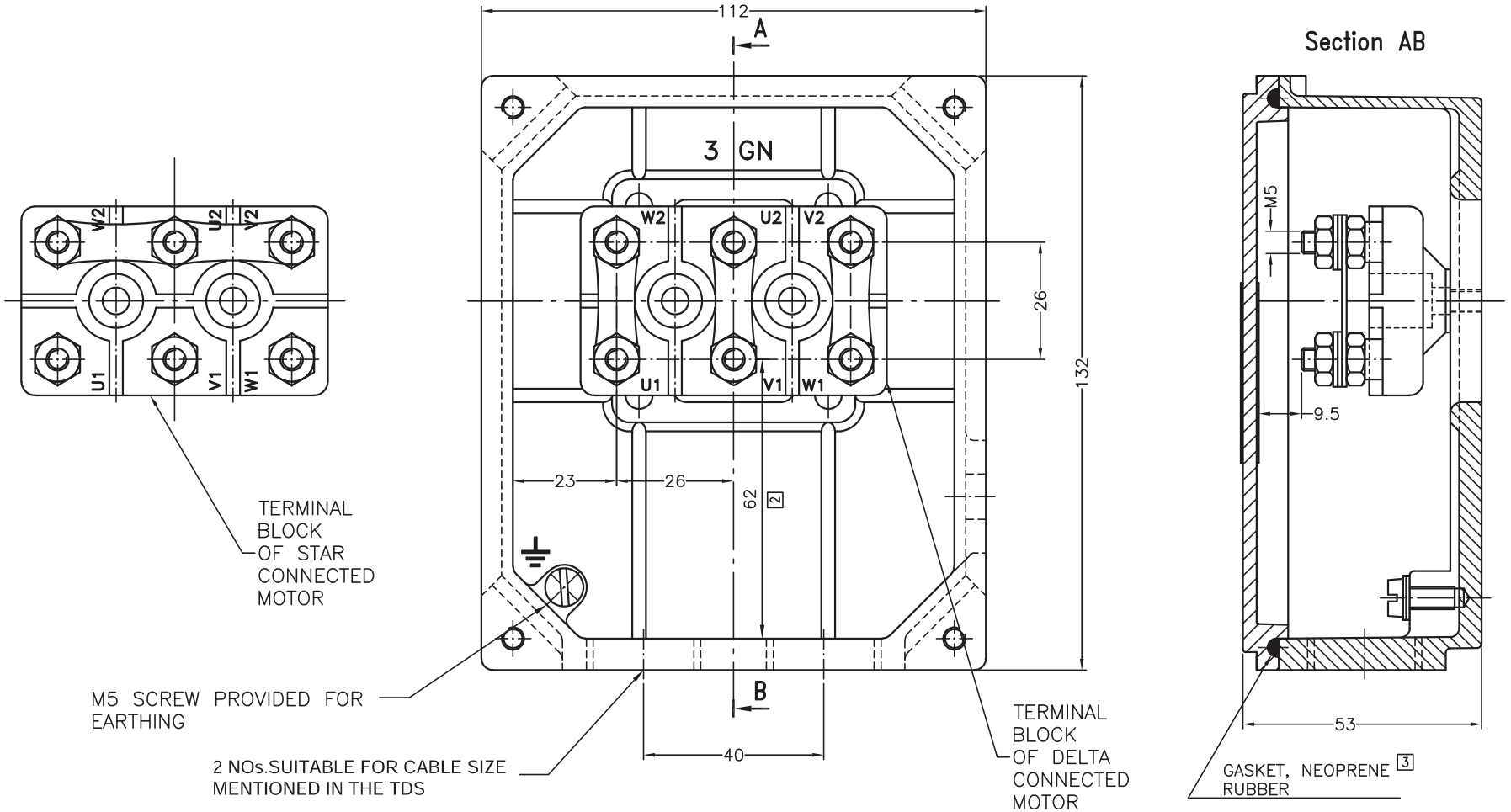
SCALE NTS | SHT 1/1

PROJECTION

DRG. NO.: A1-100L-49(GN) | REV. 11

REF. A1-100L-OADIMN

FRAME SIZE 100L (GN)



REV. STATUS				
	[3]	GASKET INDICATED IN SECTION AB	ARUN	07/12/16
	[2]	DIMN. 62 SPECIFIED, STANDARD ADDED IN TITLE	P.N.RAOTE	21/02/15
	[1]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR	05/07/13

Dim. without tolerance as per IS:2102 very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

	NAME	DATE
DRN.	GANESH	02/08/11
CHD.	S.P.JADIA	02/08/11
APPD.	S.P.JADIA	02/08/11

TITLE

STANDARD [2] TERMINAL BOX ASSEMBLY

PROJECTION

DRG. NO.: A3-100/132-33(GN) REV. 3

REF. 10-13-TBOX-ASSLY

SCALE NTS

SHT 1/1

FRAME SIZE 100-132 (GN)

hindustan ELECTRIC MOTORS	DATA SHEET: INDUCTION MOTOR	Motor Type 2HE3 096-06

No. of Phases			3	Reference Standard			IS:12615
Frame Designation			90L	Protection IS:4691			IP 55
Rated Output		kW	1.1	Vibration Standard			IS:12075
		HP	1.5	Noise Standard			IS:12065
No. of Poles			6	Duty			S1
Rated Voltage		V	415	Insulation Class			F
Rated Frequency		Hz	50	Cooling IS:6362			IC411
Rated Current		A	2.7	Terminal Box Details	Type		HM2GN
Rated Speed		rpm	940		Terminal Size		M4
Rated Torque		kgm	1.14		No. of Terminal		6
Efficiency	Full load	%	81.0		Max. cable size (Cu)	mm²	1x3Cx2.5
	3/4 load	%	81.0	Bearing Data	DE		6205ZZ
	1/2 load	%	76.0		NDE		6205ZZ
Power factor	Full load		0.70		Lubrication		Prelubricated
	3/4 load		0.62		Life L10 (Direct Coupled)	hrs.	50,000
	1/2 load		0.50		Regreasing Time	hrs.	-
Max. Temp. Rise (Res.)		°C	70	Lifting Eyebolt			-
Acceleration Time		sec.	-	Motor Weight (approx)		kg	30.0
Stator Connection			Y	Rotor GD²		kgm²	0.0190
Tropicalised? (Yes / No)			Yes	Ambient Temp.		°C	50
I_{st} / I_r			5.5	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r			2.2	-			
T_{po} / T_r			2.6	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec.	12	Frequency Variation ±		%	5
	Cold	sec.	25	Combiend Variation ±		%	10

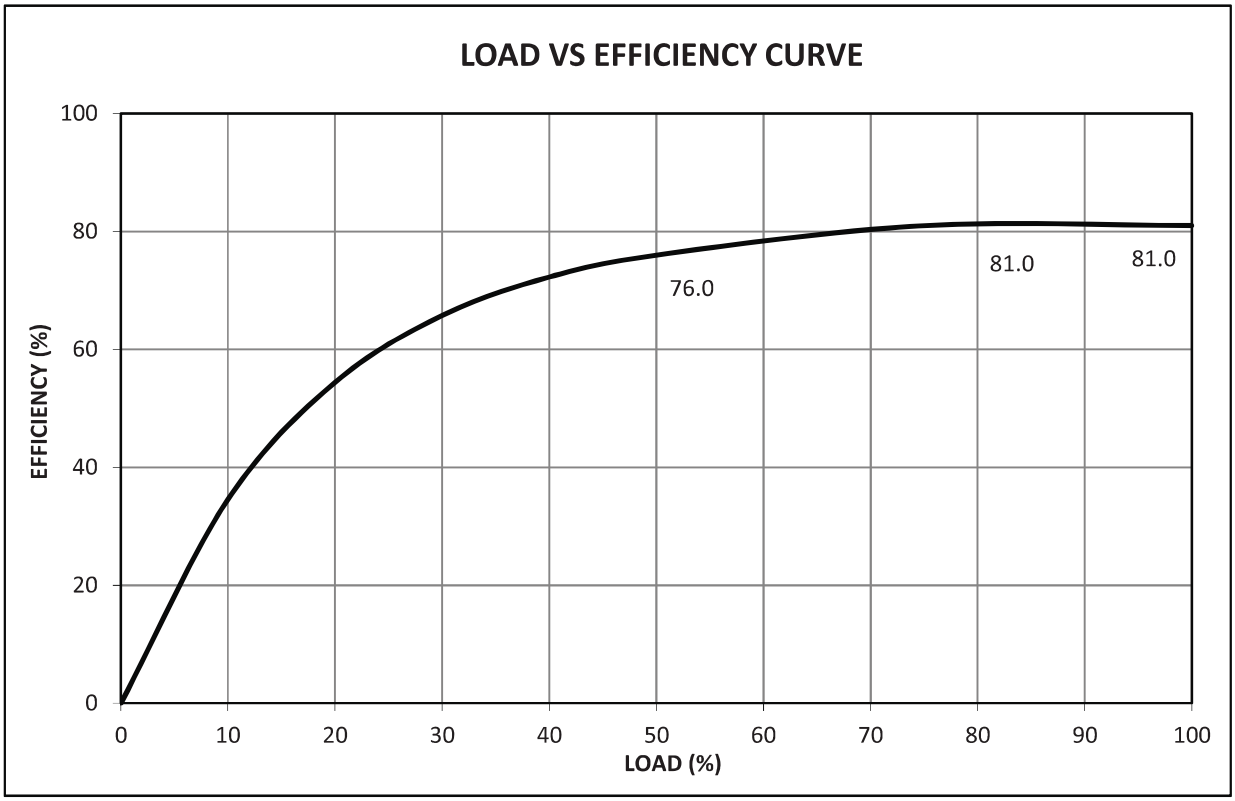
Remarks:
(1) Efficiency Class : IE3
(2) Motor Construction : TEFC
(3) Suitable Cable Gland & Lugs BY AVPL
(4) Minimum Starting Voltage : 80%
(5) Permissible Fault Level: 50KA for 0.25 sec
(6) No. of Hot/Cold Starts: 3/3

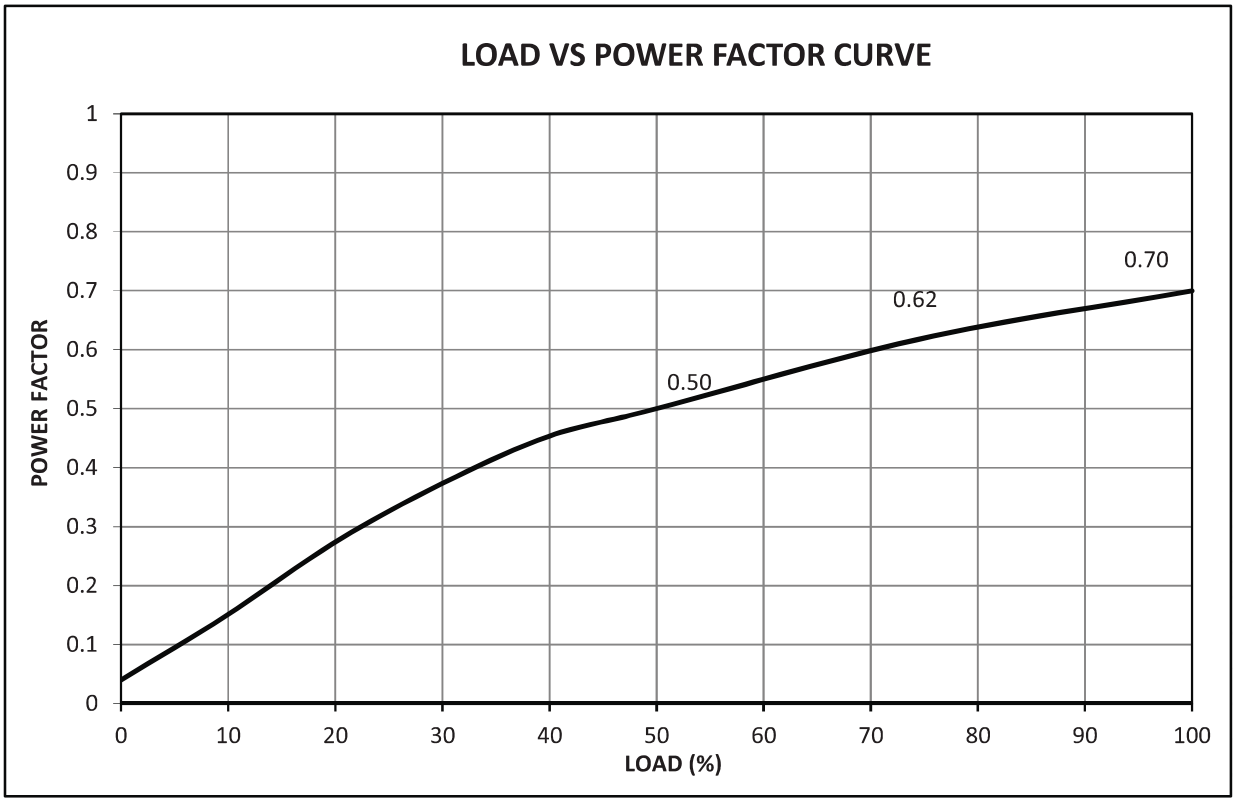
Data subject to tolerance as per IEC 60034-1

Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5	Poles : 6	Efficiency Class : IE3	

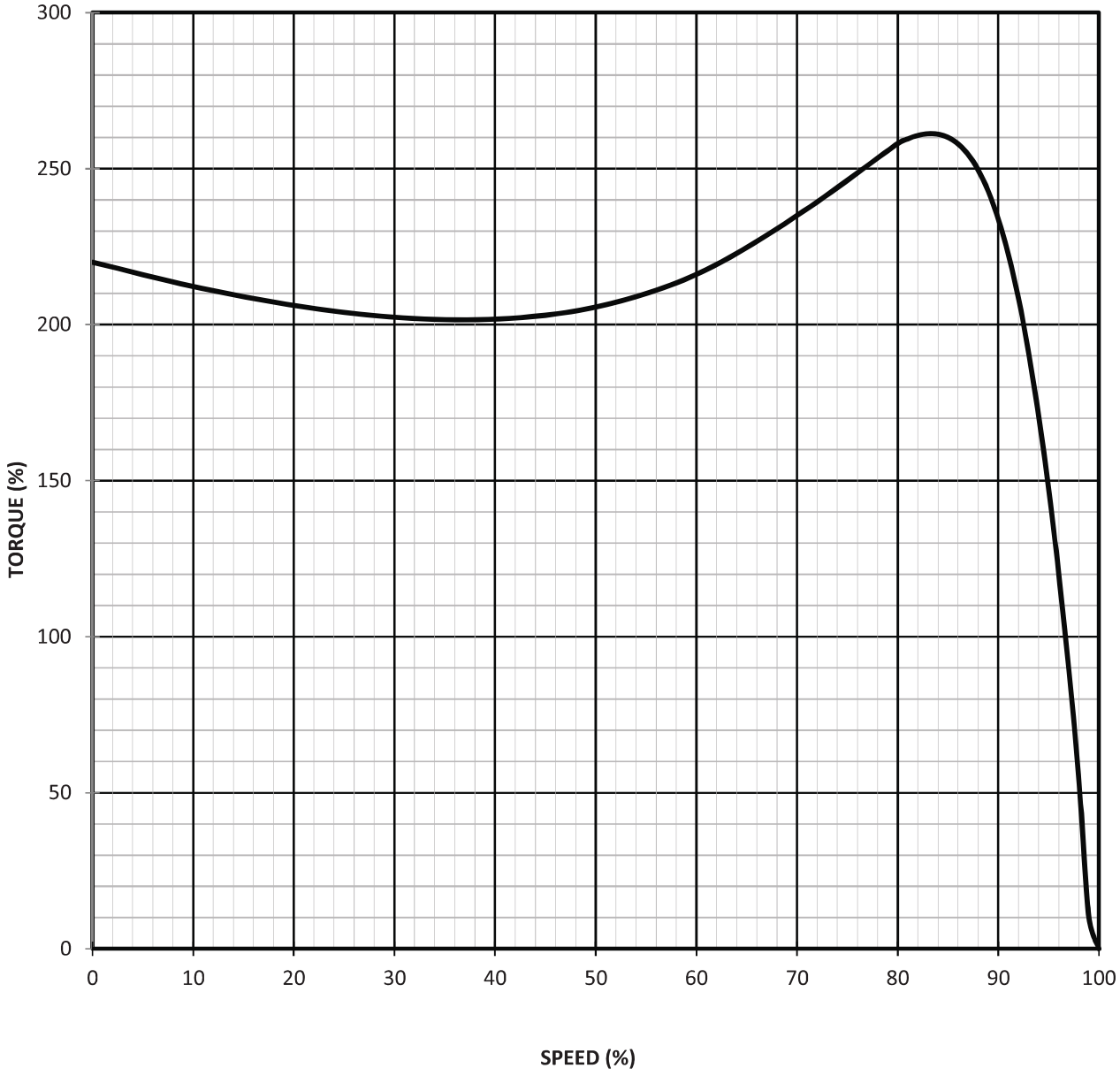




Prep.: SK	Date: 14/07/2022	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 1.1/1.5	Poles : 6	Efficiency Class : IE3	

TORQUE SPEED CURVE

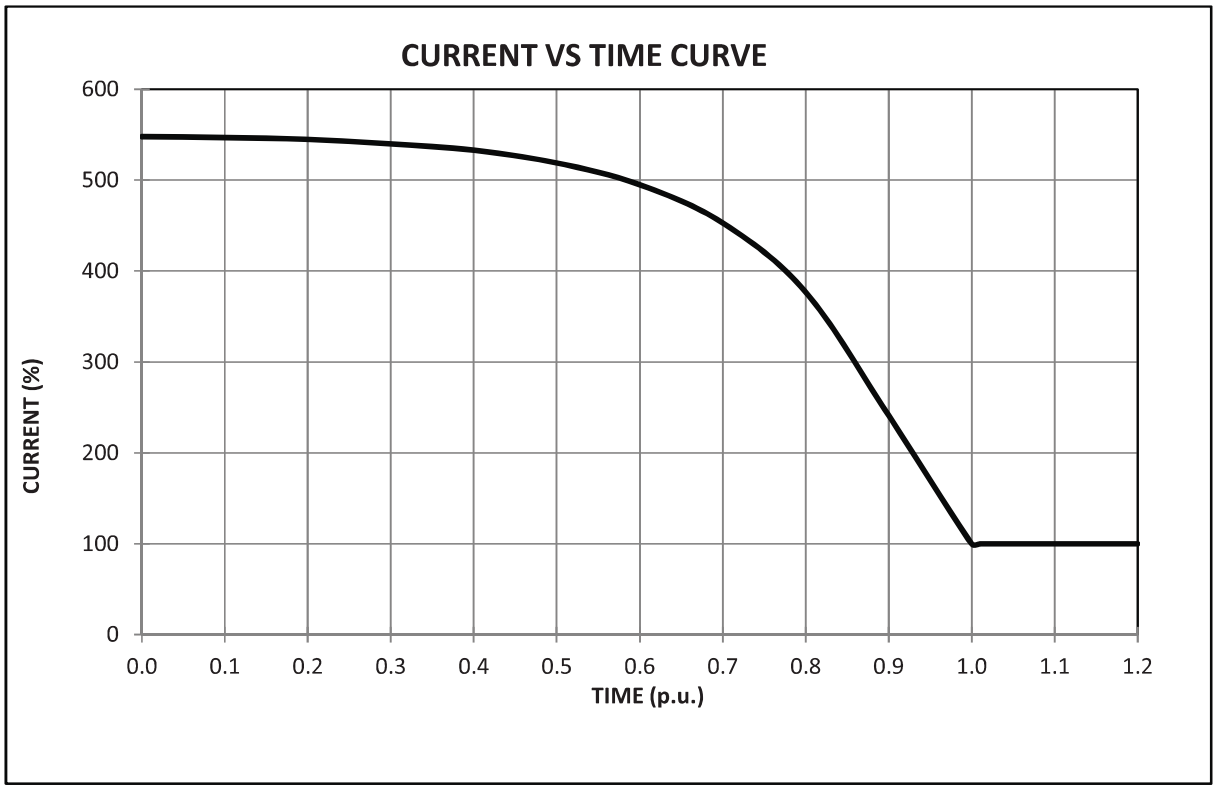


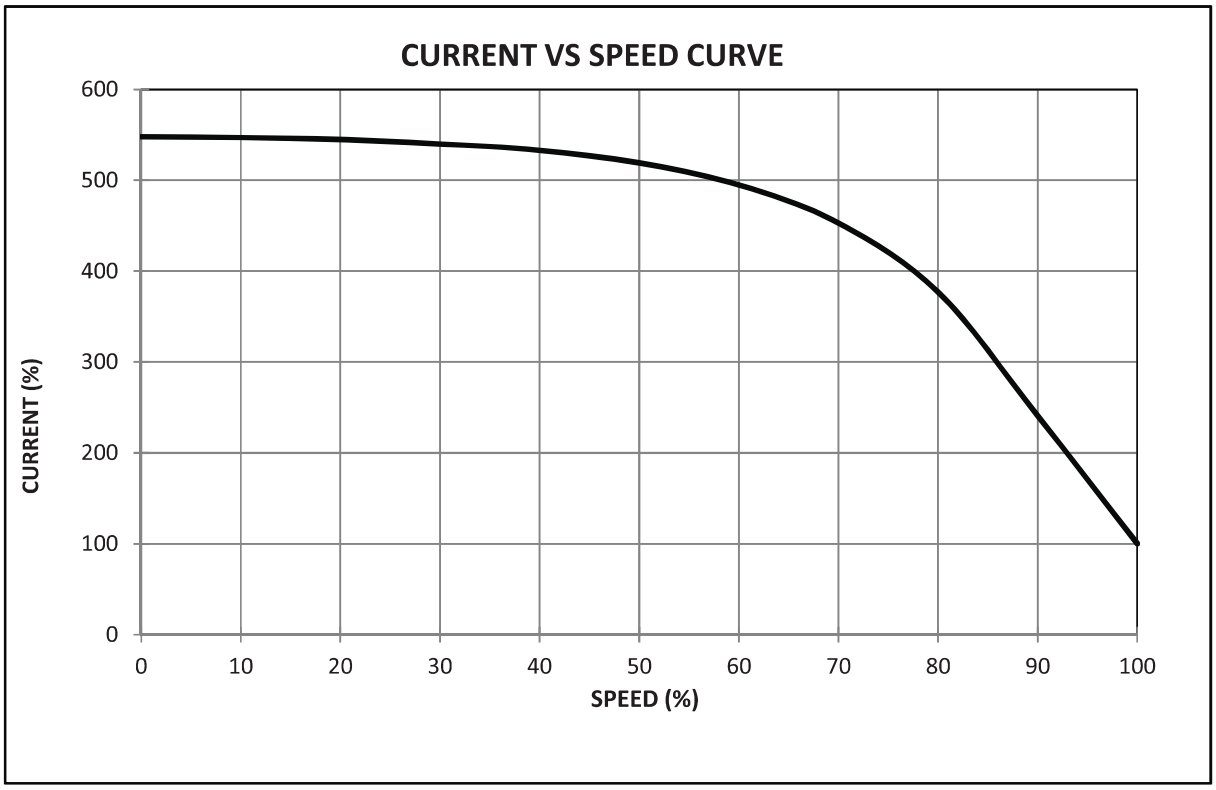
Prep.:	SK	Date:	14/07/2022	Revision:	-	

hindustan ELECTRIC MOTORS

MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5	Poles : 6	Efficiency Class : IE3	





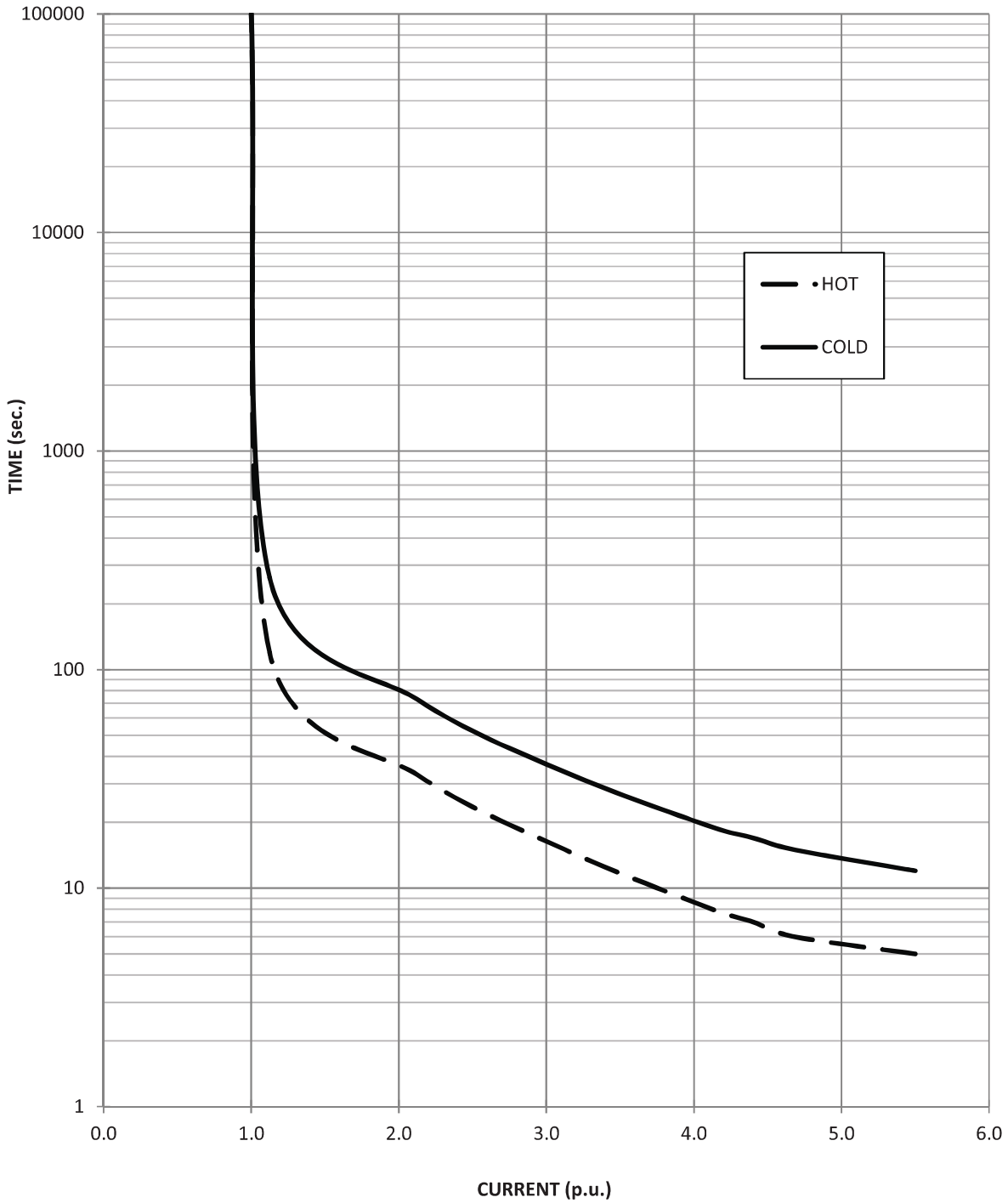
Prep.: SK	Date: 14/07/2022	Revision: -	

hindustan ELECTRIC MOTORS

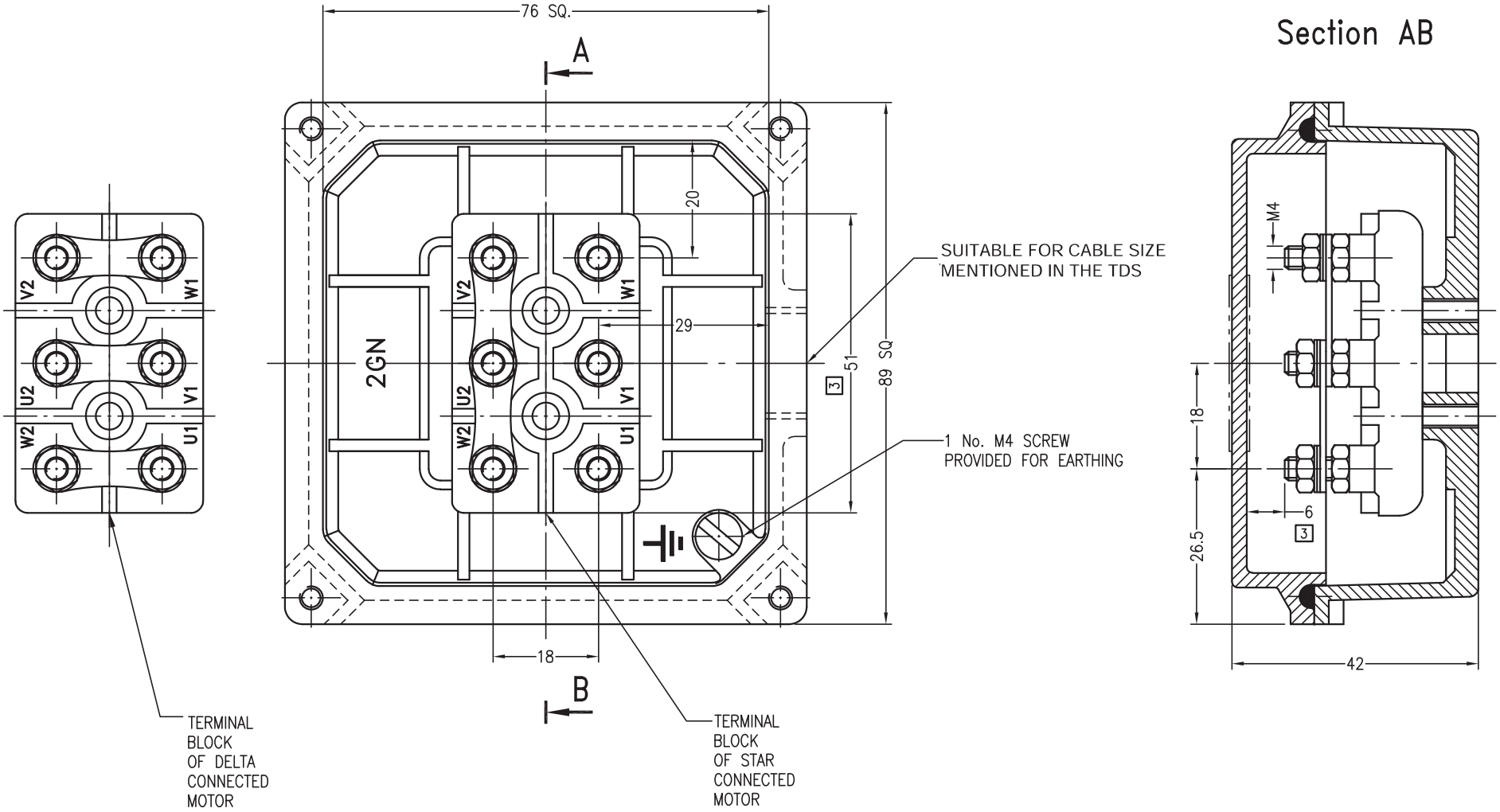
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5	Poles : 6	Efficiency Class : IE3	

THERMAL WITHSTAND CURVE



Prep.: SK	Date: 14/07/2022	Revision: 0	



REV. STATUS			
3	TERMINAL BLOCK DIMN. 51 WAS 68 LG. [TERMINAL BLOCK AS PER DRG. No. A4-56/100-17(3G) WAS TERMINAL BLOCK DRG. No. A4-56T090-17] DIMN. 29 REMOVED & DIMN. 6 WAS 6.5	NIMKAR	01/10/16
2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR	11/11/14

Dim. without tolerance as per IS:2102 very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: STD. TERMINAL BOX ASSEMBLY

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	GANESH	16-07-11
CHD.		
APPD.		

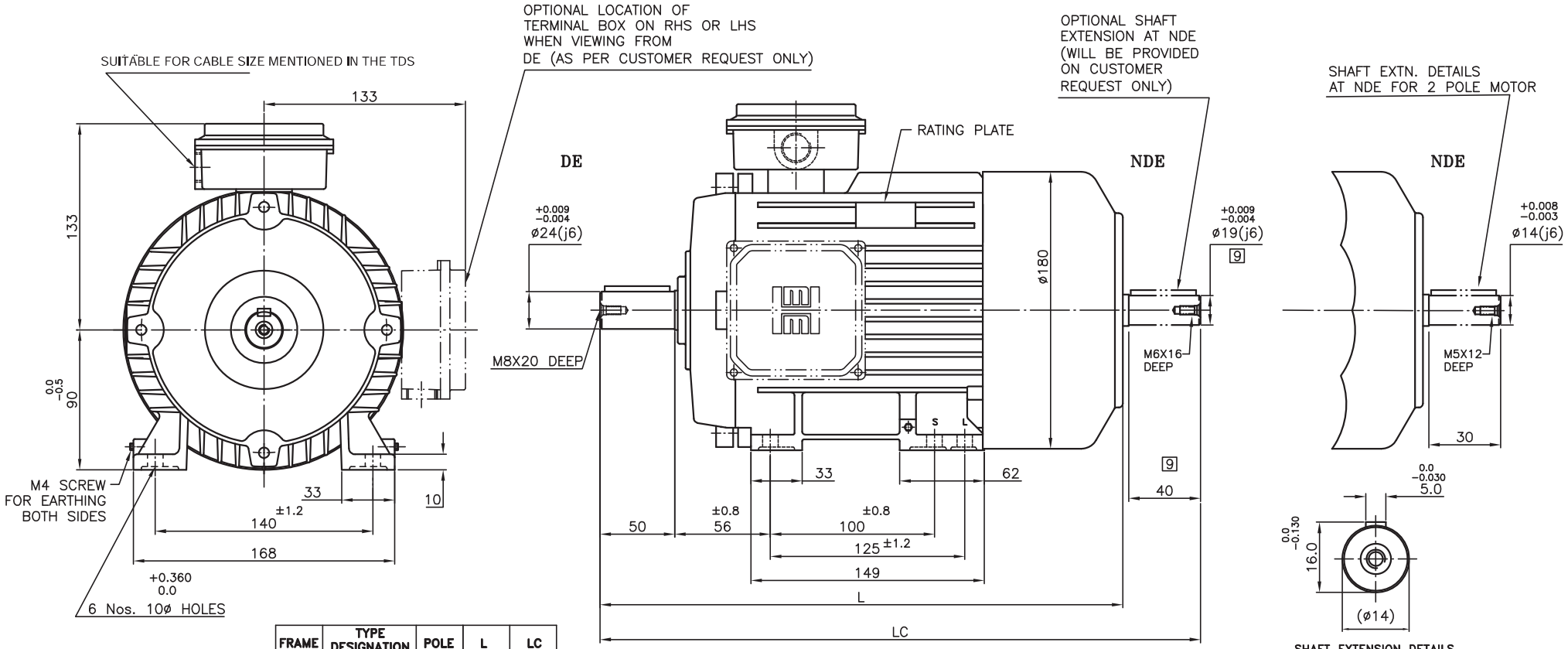
PROJECTION

DRG. NO.: A4-80/90-33(GN)

REV. 3

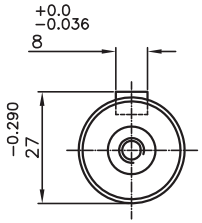
REF.: TB-ASLY-63-90

FRAME SIZE 63-90 (GN)

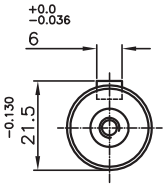


FRAME	TYPE DESIGNATION	POLE	L	LC	
90S	2HE2–2HE3	2	344	381	11
		4,6,8		391	

FRAME	TYPE DESIGNATION	POLE	L	LC	
90L	2HE2	2	344	381	
	2HE3		375	412	
	2HE2	4,8	344	391	10
	2HE3	4,6,8	375	422	
	2HE2	6			10



SHAFT EXTENSION DETAILS AT DE



SHAFT EXTENSION DETAILS AT NDE 9

NOTE : THIS DRAWING SUPERSEDES DRG. No. A1-90S-49(GN)

REV. STATUS			
11	L DIM 319 & LC 356, 366 REMOVED FROM 90S IN TABLE OF 90S AS PER MAIL RECD FROM. CUSTOMER CARE DT– 9–03–22/15–03–22 & NOTE ADDED	LANKESH	19–03–22
10	4 POLE ADDED IN 90L FRAME FOR TYPE DESIGNATION 2HE2 AS PER MAIL RECD FROM Mr. SANJAY JADIA DT. 21–06–21 & 4 POLE REMOVED FROM TYPE DESIGNATION– 2HE2 TABLE FOR MOTOR LENGTH L–375, LC– 422	ARUN	14–09–21
9	NDE SIDE SHAFT EXTN. DIA.19x40LG. WAS DIA.24x50LG. & DIMS 391 WAS 401 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE & 2 POLE MOTOR VIEW ADDED	LANKESH	23–09–19
8	TYPE DESIGNATION TABLE ADDED TO UPLOAD THIS DRG. ON PORTAL	ARUN	30–10–18
7	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. AND ALL THE FEATURES.	NIMKAR	24–1–14

Dim. without tolerance as per IS:2102, very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSIONS DRAWING B3/TEFC STD. MOTOR

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	P.V.SHINDE	28–02–04
CHD.	S.P.JADIA	28–02–04
APPD.	S.P.JADIA	28–02–04

PROJECTION

DRG. NO.: A1–90L–49(GN)

REV. 11

REF. 90SL–0ADIM–B3

FRAME SIZE 90S/L (GN)

hindustan ELECTRIC MOTORS	DATA SHEET: INDUCTION MOTOR	Motor Type 2HE3 080-02

No. of Phases			3	Reference Standard			IS:12615
Frame Designation			80	Protection IS:4691			IP 55
Rated Output		kW	0.75	Vibration Standard			IS:12075
		HP	1.0	Noise Standard			IS:12065
No. of Poles			2	Duty			S1
Rated Voltage		V	415	Insulation Class			F
Rated Frequency		Hz	50	Cooling IS:6362			IC411
Rated Current		A	1.6	Terminal Box Details	Type		HM2GN
Rated Speed		rpm	2850		Terminal Size		M4
Rated Torque		kgm	0.26		No. of Terminal		6
Efficiency	Full load	%	80.7		Max. cable size (Cu)	mm²	1x3Cx2.5
	3/4 load	%	80.7	Bearing Data	DE		6204ZZ
	1/2 load	%	78.0		NDE		6204ZZ
Power factor	Full load		0.81		Lubrication		Prelubricated
	3/4 load		0.76		Life L10 (Direct Coupled)	hrs.	50,000
	1/2 load		0.63		Regreasing Time	hrs.	-
Max. Temp. Rise (Res.)		°C	70	Lifting Eyebolt			-
Acceleration Time		sec.	-	Motor Weight (approx)		kg	15.0
Stator Connection			Y	Rotor GD²		kgm²	0.0049
Tropicalised? (Yes / No)			Yes	Ambient Temp.		°C	50
I_{st} / I_r			7.0	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r			2.5	-			
T_{po} / T_r			2.5	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec.	6	Frequency Variation ±		%	5
	Cold	sec.	14	Combiend Variation ±		%	10

Remarks:
(1) Efficiency Class : IE3
(2) Motor Construction : TEFC
(3) Suitable Cable Gland & Lugs BY AVPL
(4) Minimum Starting Voltage : 80%
(5) Permissible Fault Level: 50KA for 0.25 sec
(6) No. of Hot/Cold Starts: 3/3

Data subject to tolerance as per IEC 60034-1

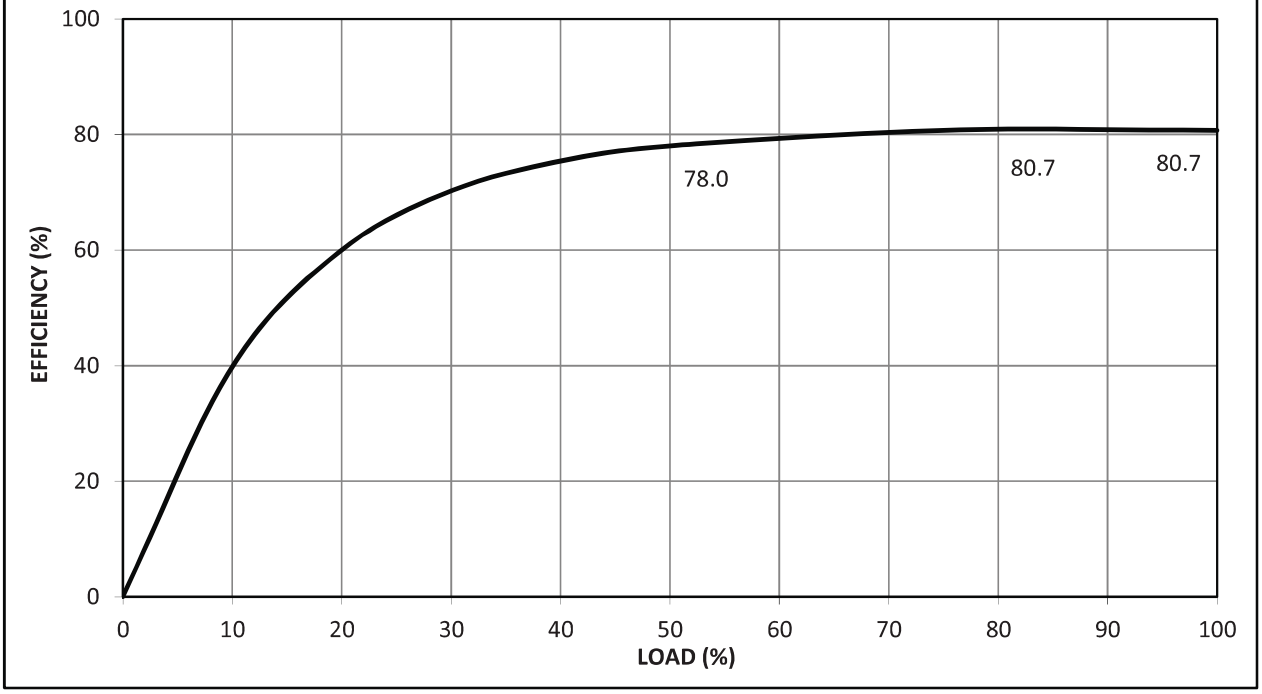
Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS

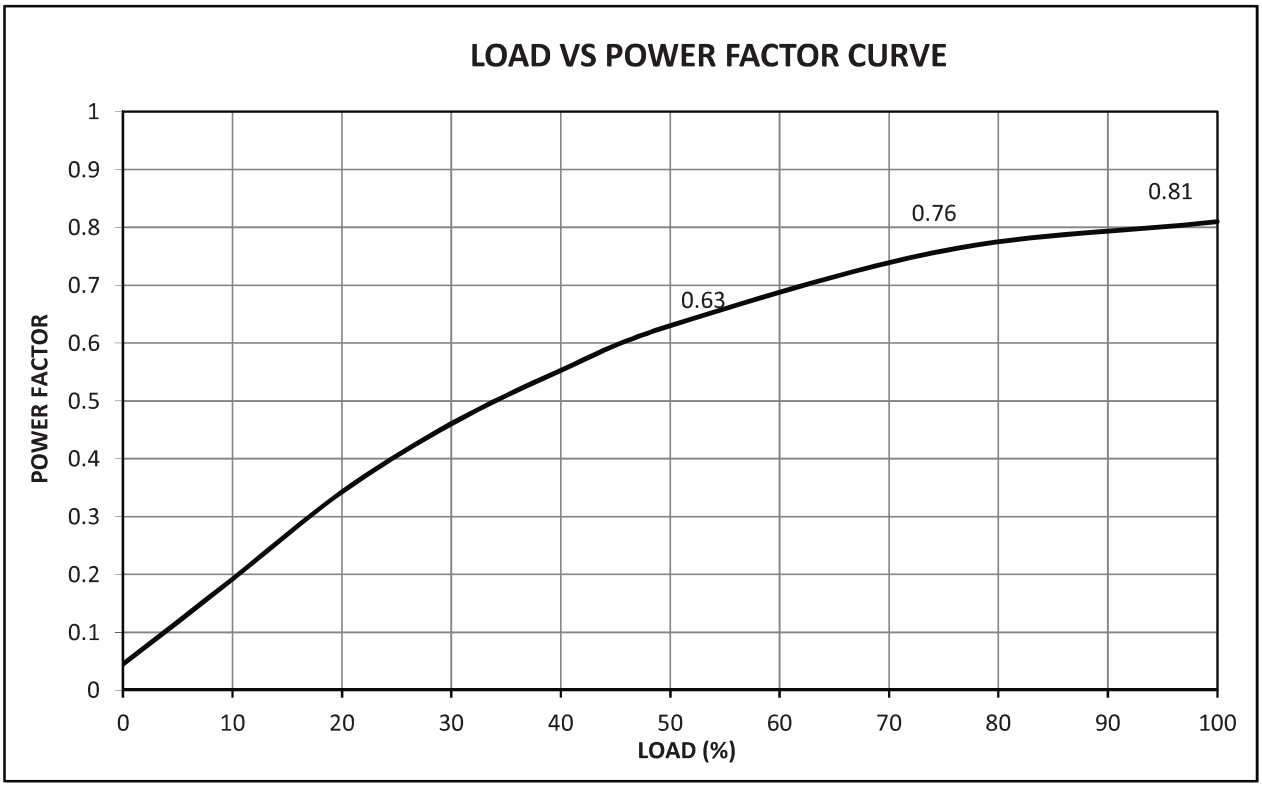
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0	Poles : 2	Efficiency Class : IE3	

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE

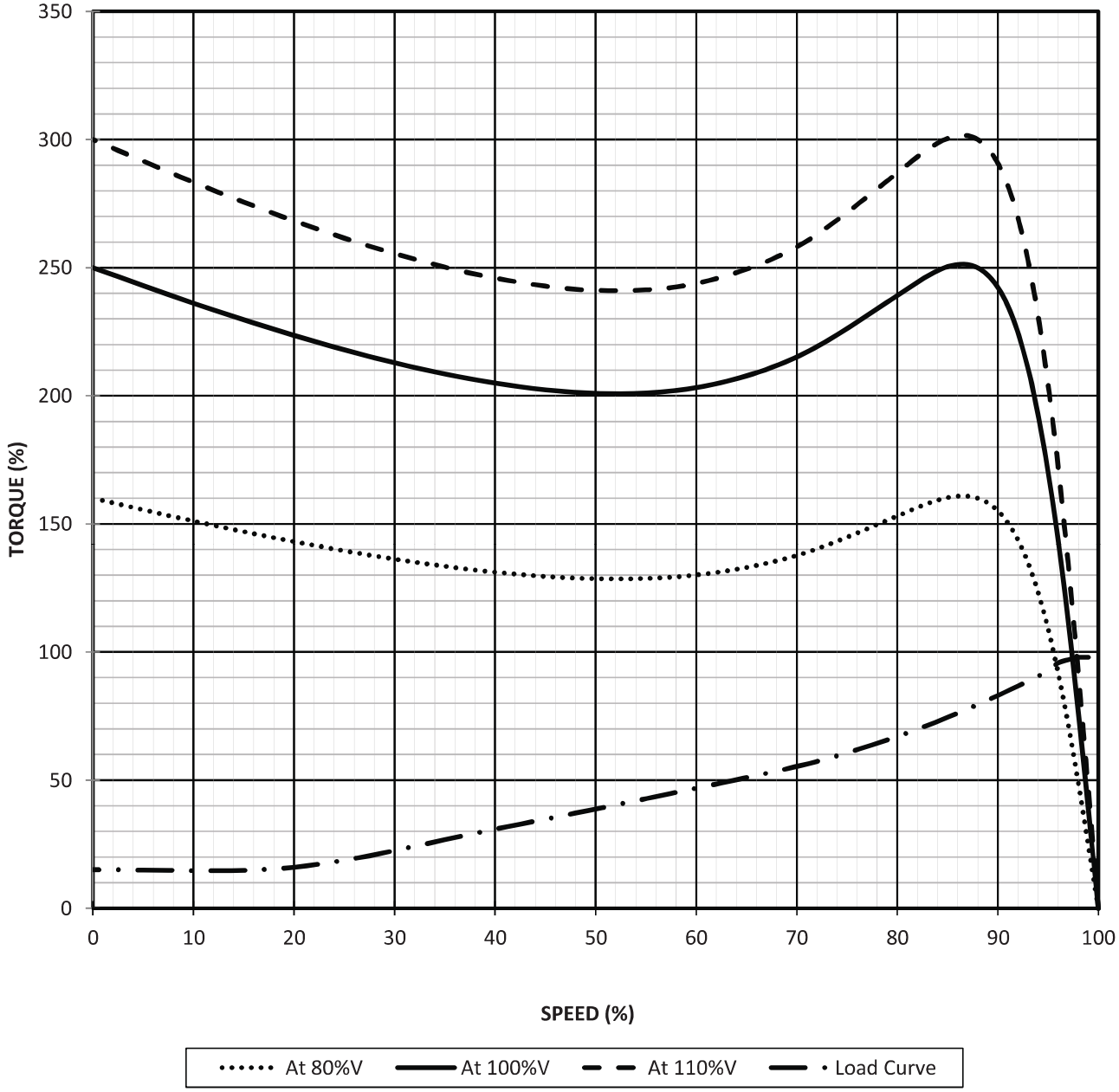


Prep.: SK	Date: □□□□□□□□	Revision: □	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0	Poles : 2	Efficiency Class : IE3	

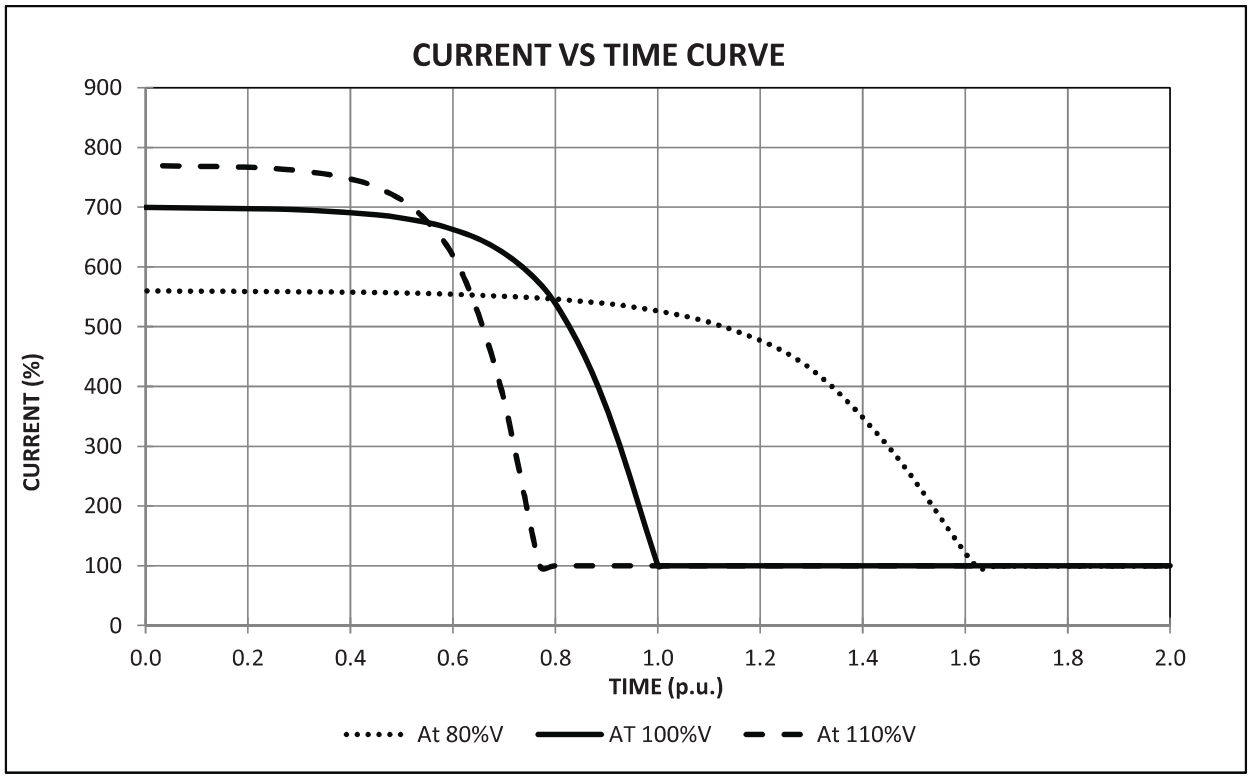
TORQUE SPEED CURVE

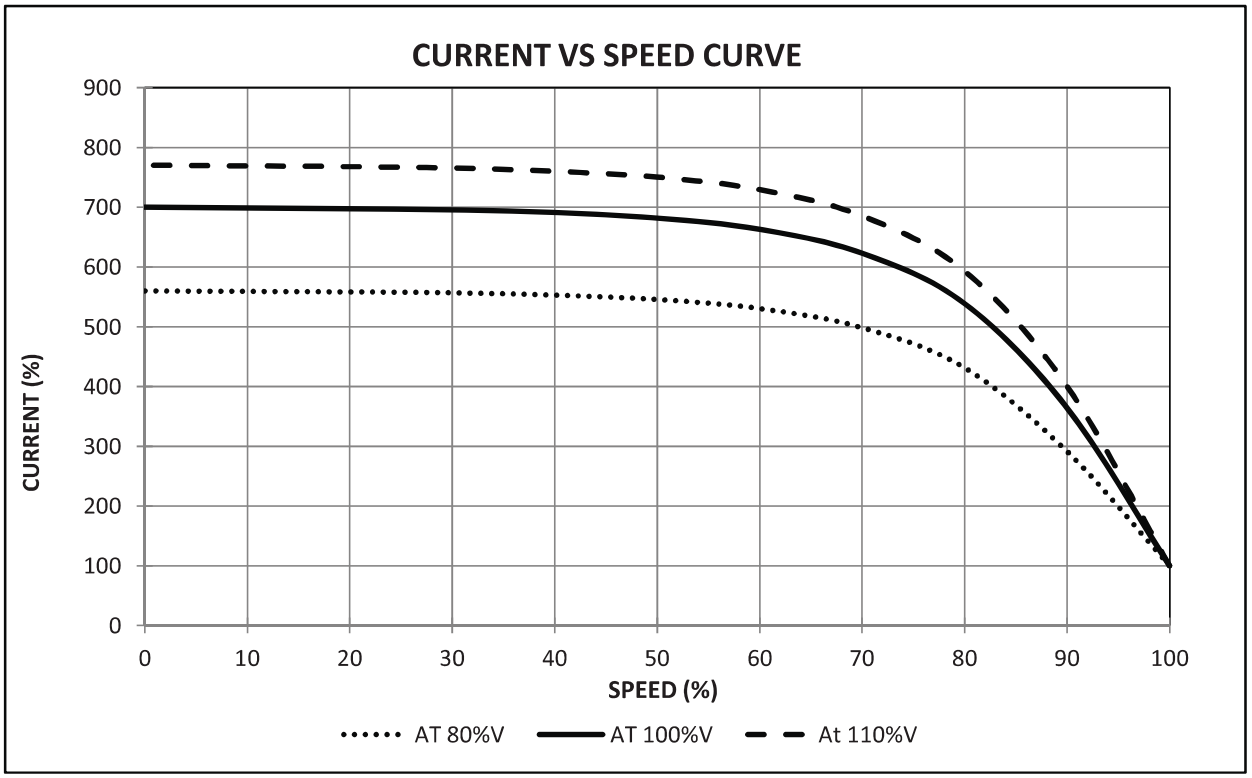


Prep.: SK	Date: □□□□□□□□	Revision: □	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0	Poles : 2	Efficiency Class : IE3	





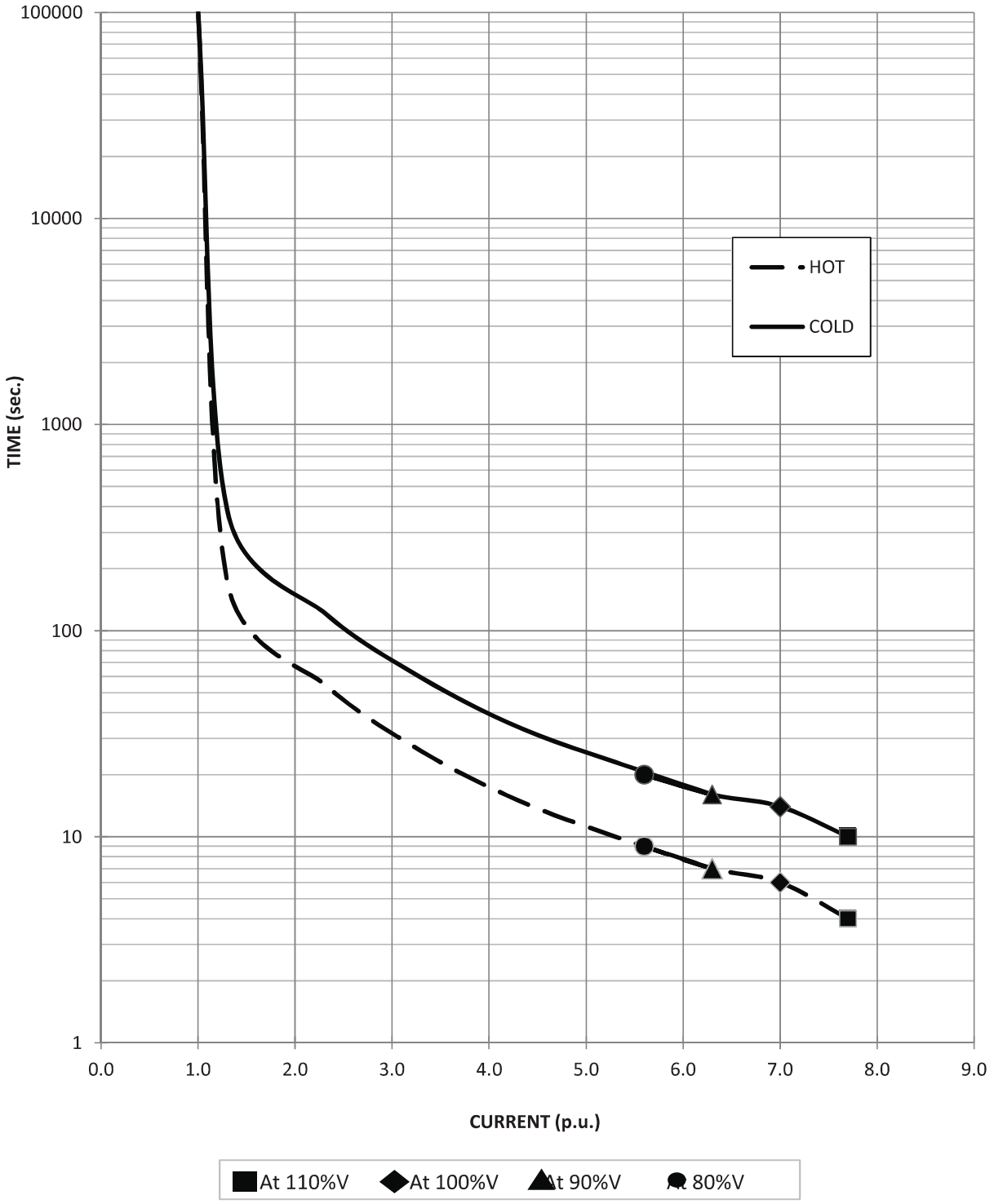
Prep.: SK	Date: □□□□□□□□	Revision: □	

hindustan ELECTRIC MOTORS

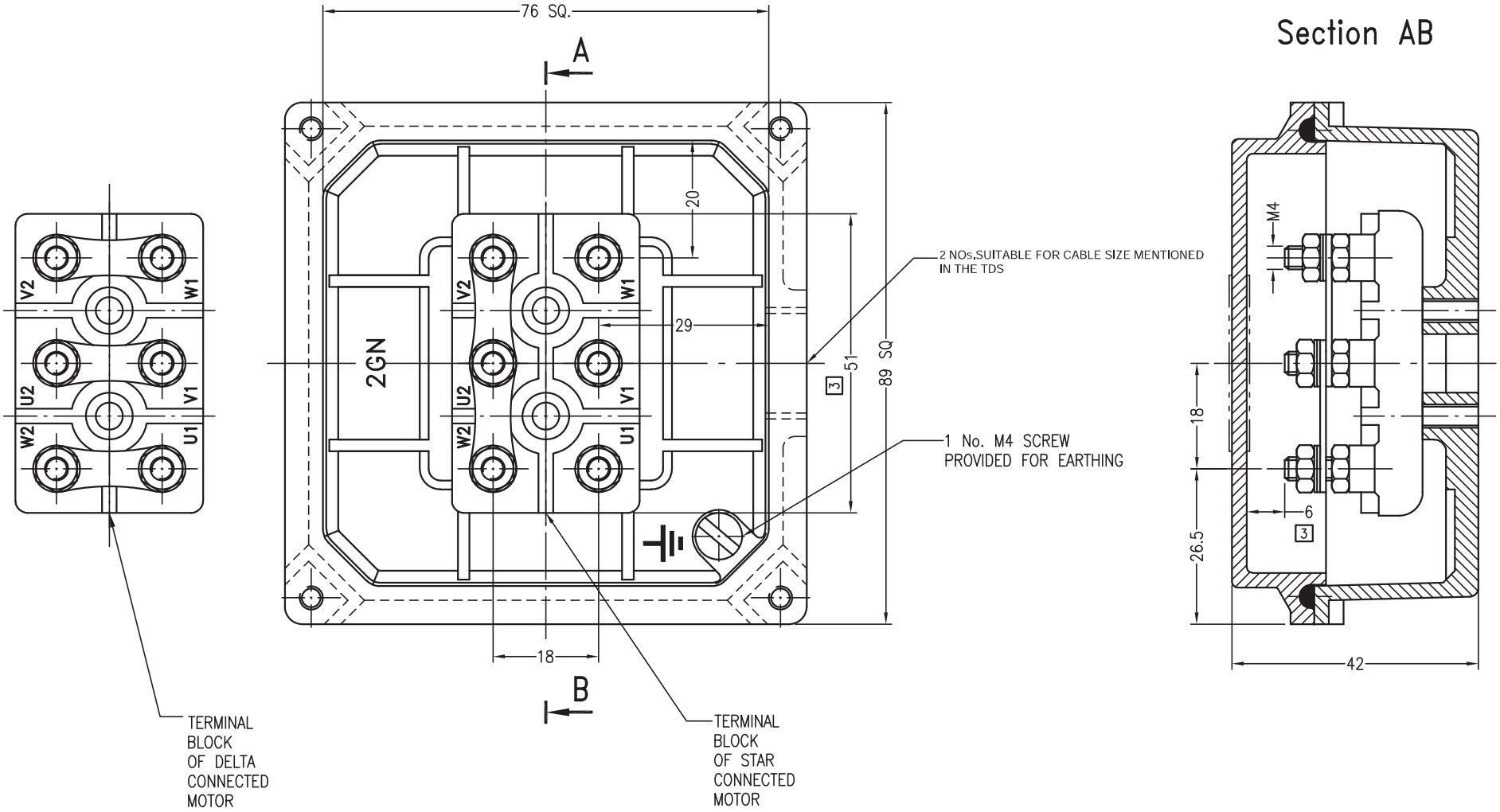
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0	Poles : 2	Efficiency Class : IE3	

THERMAL WITHSTAND CURVE



Prep.: SK	Date: □□/□□/□□□□	Revision: □	



REV. STATUS			
3	TERMINAL BLOCK DIMN. 51 WAS 68 LG. [TERMINAL BLOCK AS PER DRG. No. A4-56/100-17(3G) WAS TERMINAL BLOCK DRG. No. A4-56T090-17] DIMN. 29 REMOVED & DIMN. 6 WAS 6.5	NIMKAR	01/10/16
2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR	11/11/14

Dim. without tolerance as per IS:2102 very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: STD. TERMINAL BOX ASSEMBLY

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	GANESH	16-07-11
CHD.		
APPD.		

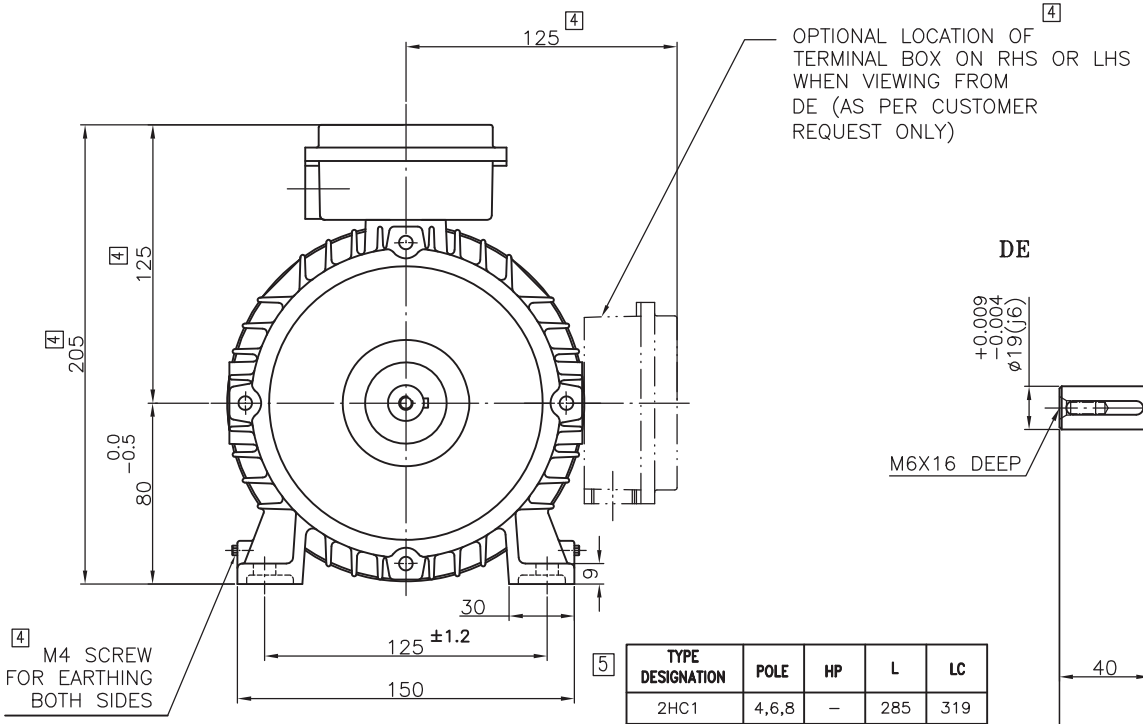
PROJECTION

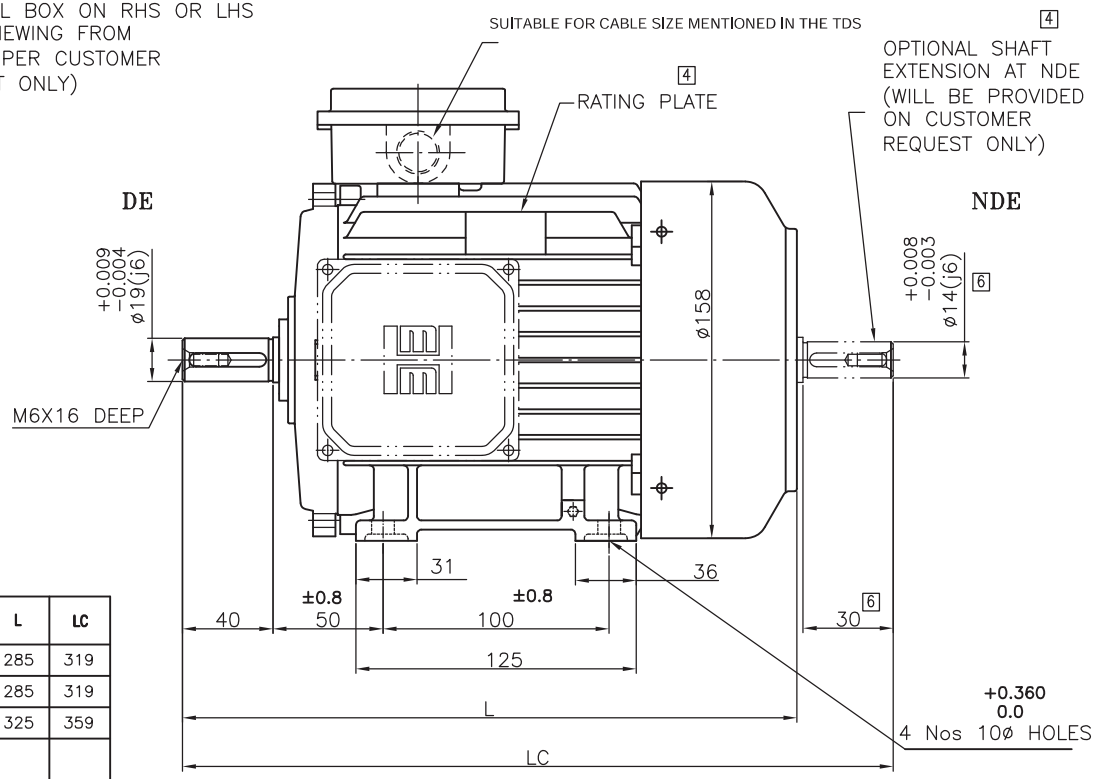
DRG. NO.: A4-80/90-33(GN)

REV. 3

REF.: TB-ASLY-63-90

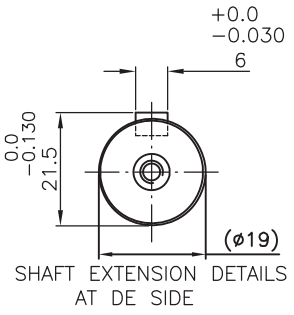
FRAME SIZE 63-90 (GN)



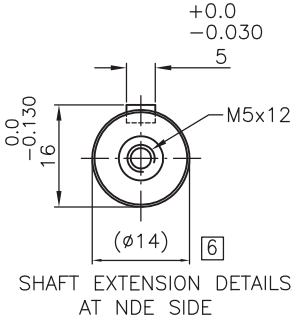


5

TYPE DESIGNATION	POLE	HP	L	LC
2HC1	4,6,8	–	285	319
2HE2	2,4,6	–	285	319
	4	1	325	359
2HE3	2	1	285	329
	4	0.75		
	6	0.50		
	2	1.5	325	359
	4	1		
	6	0.75	285	319
2HS1	8	–		
2HS5	4/2			
	8/4			
	6/4			
2HT1	4,8			



SHAFT EXTENSION DETAILS AT DE SIDE



SHAFT EXTENSION DETAILS AT NDE SIDE

REV. STATUS	SYM	REVISIONS	BY	DATE
	6	NDE SIDE SHAFT EXTN. DIA.14x30LG. WAS DIA.19x40LG. & DIMS 319, 359 WAS 329, 369 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	ARUN	16-09-19
	5	TABLE UPDATED, TYPE DESIGNATION WAS P.No & 2HC1, 2HE2, 2HE3, 2HS5, 2HT1 WAS P.No1 & P.No. 2 & DIMS 302, 346 REMOVED FROM TABLE & ADDED 325, 369 DIMS IN TABLE & DIMS 285, 329 WAS 282, 326, TO UPLOAD THIS DRG. ON PORTAL	ARUN	23-11-18
	4	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.& DIMS.302,282,125,205,WAS 301,281,122 ,202 & EARTHING SCREW SIZE M4 WAS M5, P.No.1,2 WAS EFFICIENCY EFF1, EFF2 & RATING PLATE ADDED	ARUN	12-12-16

Dim. without tolerance as per IS:2102, very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSION DRAWING STD./TEFC/B3 MOUNTED MOTOR

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	P.V.SHINDE	19/04/05
CHD.	S.P.JADIA	19/04/05
APPD.	S.P.JADIA	19/04/05

PROJECTION

DRG. NO.: A1-80-49(GN)

REV. 6

REF.: A1-80-OADIMNS-B3

FRAME SIZE 80 (GN)

hindustan ELECTRIC MOTORS	DATA SHEET: INDUCTION MOTOR	Motor Type 2HE3 083-02

No. of Phases			3	Reference Standard			IS:12615
Frame Designation			80	Protection IS:4691			IP 55
Rated Output		kW	1.1	Vibration Standard			IS:12075
		HP	1.5	Noise Standard			IS:12065
No. of Poles			2	Duty			S1
Rated Voltage		V	415	Insulation Class			F
Rated Frequency		Hz	50	Cooling IS:6362			IC411
Rated Current		A	2.2	Terminal Box Details	Type		HM2GN
Rated Speed		rpm	2850		Terminal Size		M4
Rated Torque		kgm	0.38		No. of Terminal		6
Efficiency	Full load	%	82.7		Max. cable size (Cu)	mm²	1x3Cx2.5
	3/4 load	%	82.7	Bearing Data	DE		6204ZZ
	1/2 load	%	80.0		NDE		6204ZZ
Power factor	Full load		0.84		Lubrication		Prelubricated
	3/4 load		0.80		Life L10 (Direct Coupled)	hrs.	50,000
	1/2 load		0.72		Regreasing Time	hrs.	-
Max. Temp. Rise (Res.)		°C	70	Lifting Eyebolt			-
Acceleration Time		sec.	-	Motor Weight (approx)		kg	17.0
Stator Connection			Y	Rotor GD²		kgm²	0.0062
Tropicalised? (Yes / No)			Yes	Ambient Temp.		°C	50
I_{st} / I_r			7.0	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r			2.6	-			
T_{po} / T_r			2.5	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec.	6	Frequency Variation ±		%	5
	Cold	sec.	13	Combiend Variation ±		%	10

Remarks:
(1) Efficiency Class : IE3
(2) Motor Construction : TEFC
(3) Suitable Cable Gland & Lugs BY AVPL
(4) Minimum Starting Voltage : 80%
(5) Permissible Fault Level: 50KA for 0.25 sec
(6) No. of Hot/Cold Starts: 3/3

Data subject to tolerance as per IEC 60034-1

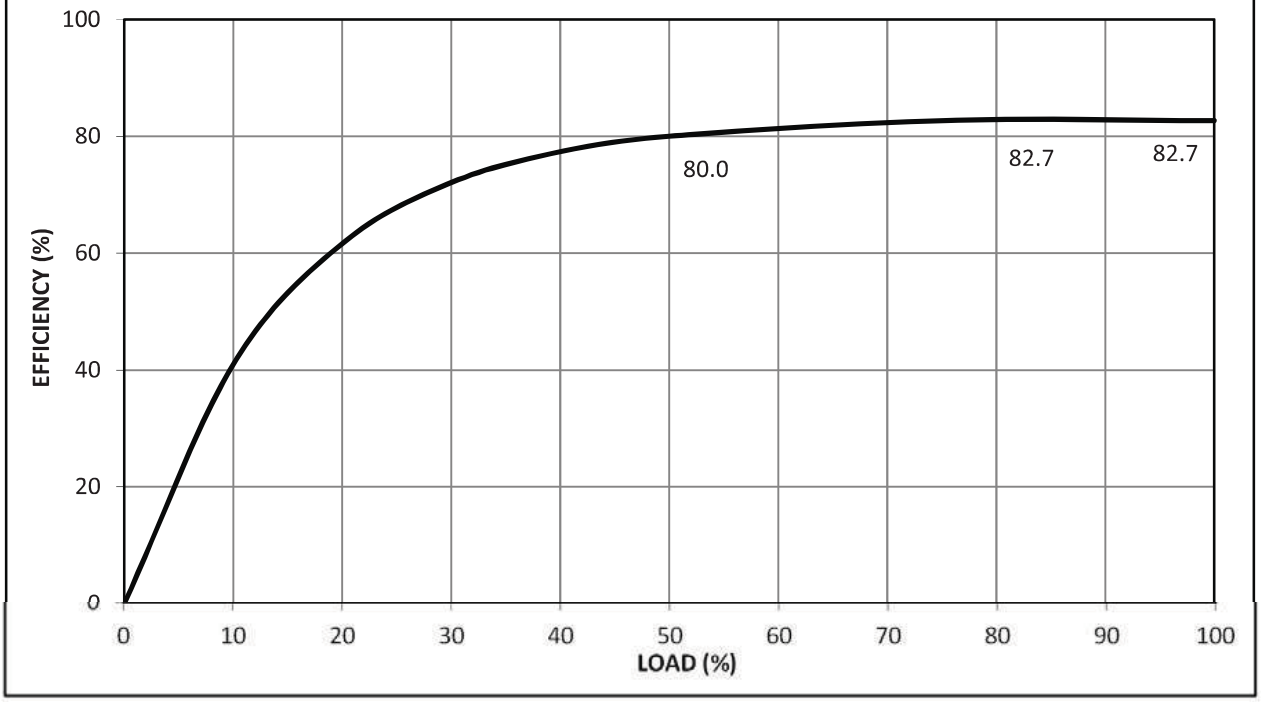
Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS

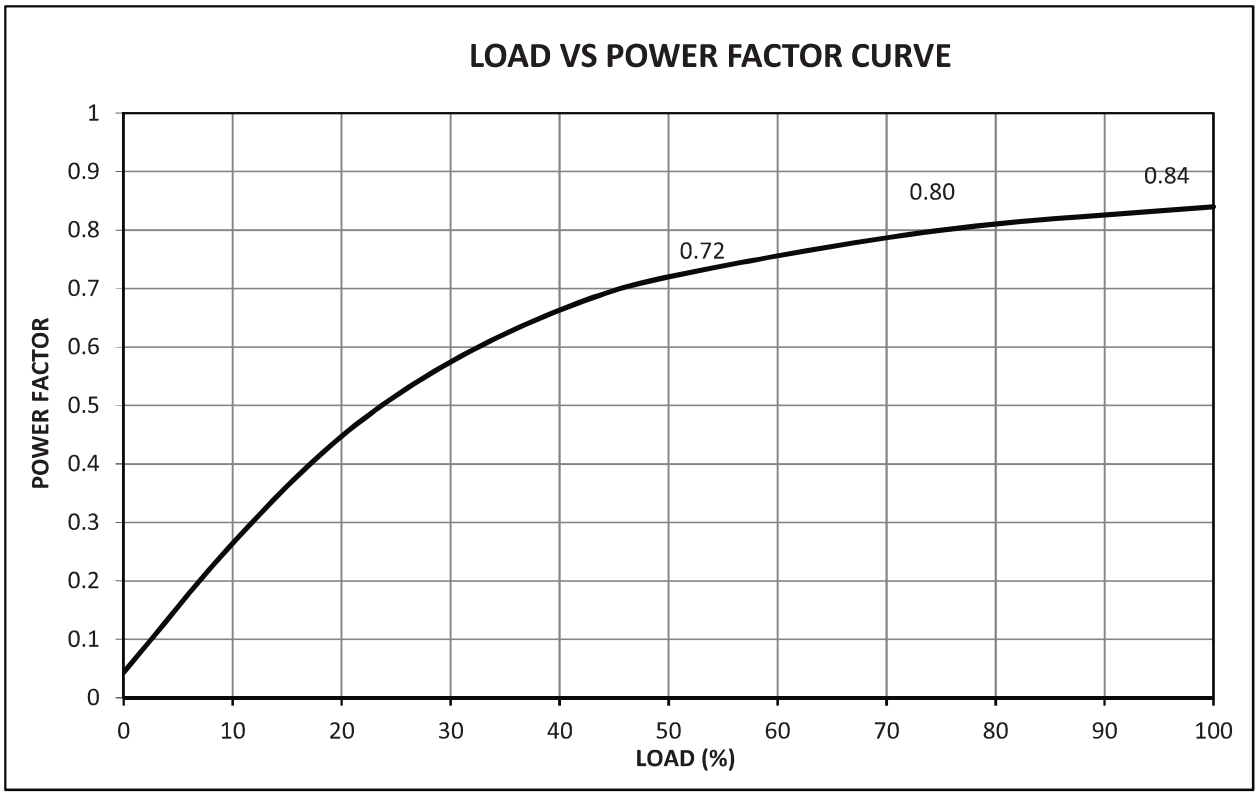
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5	Poles : 2	Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



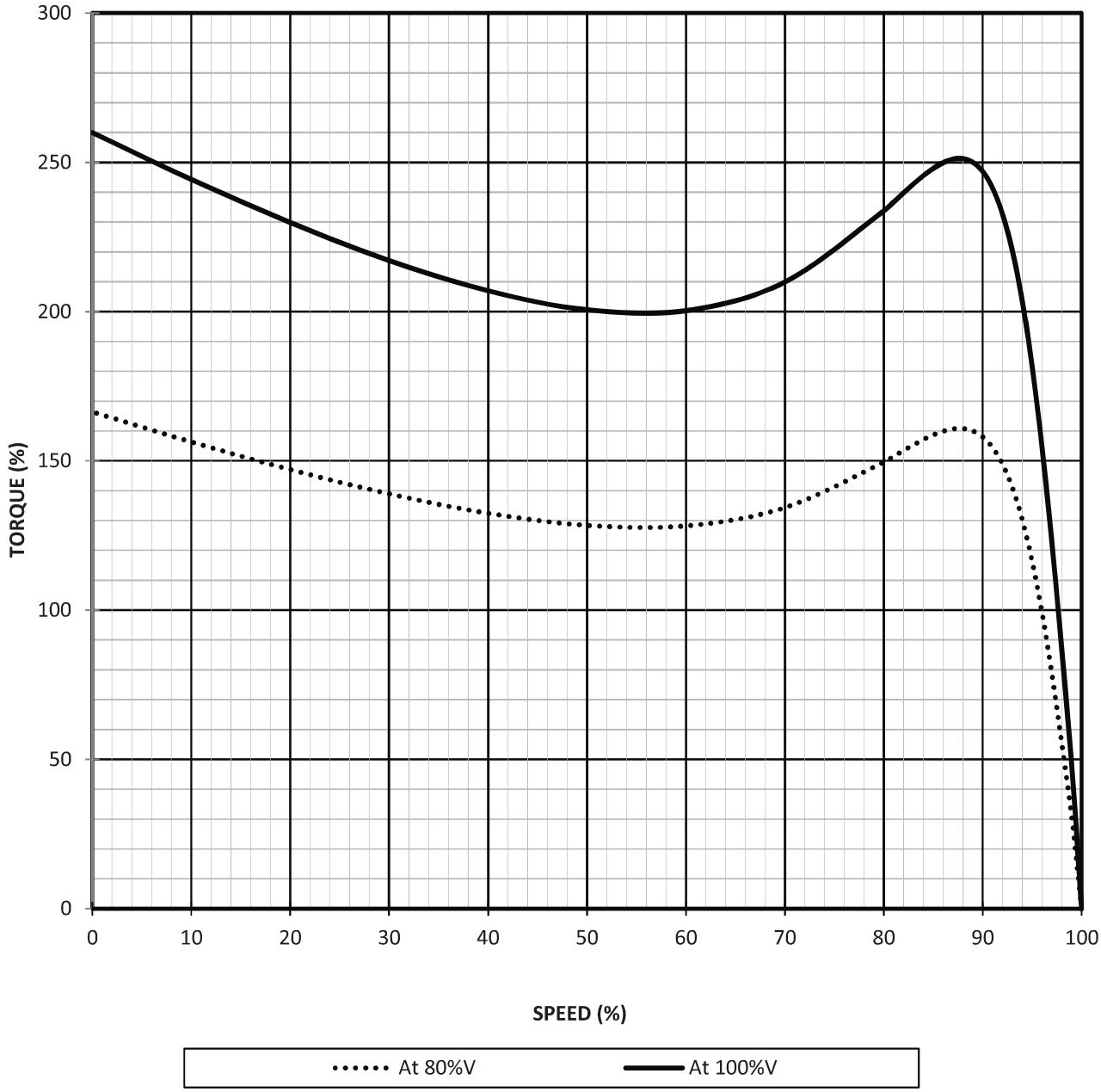
LOAD VS POWER FACTOR CURVE



Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 1.1/1.5	Poles : 2	Efficiency Class : IE3	

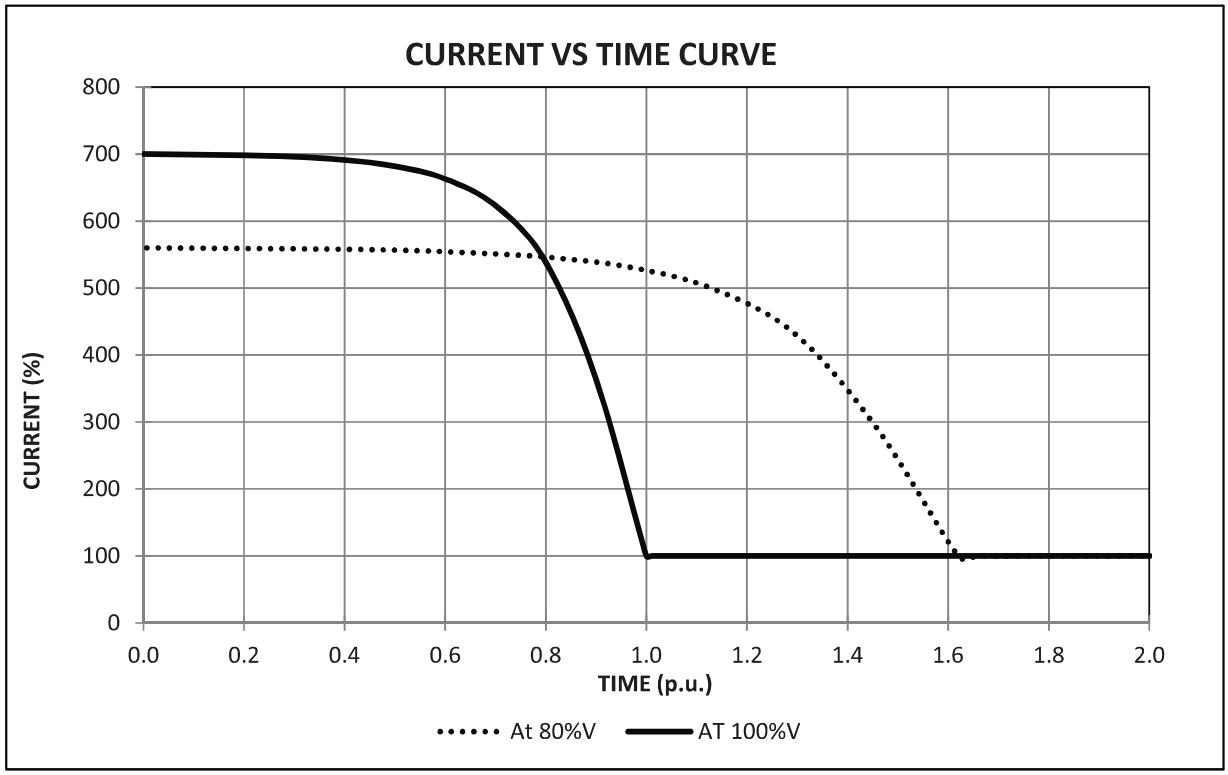
TORQUE SPEED CURVE

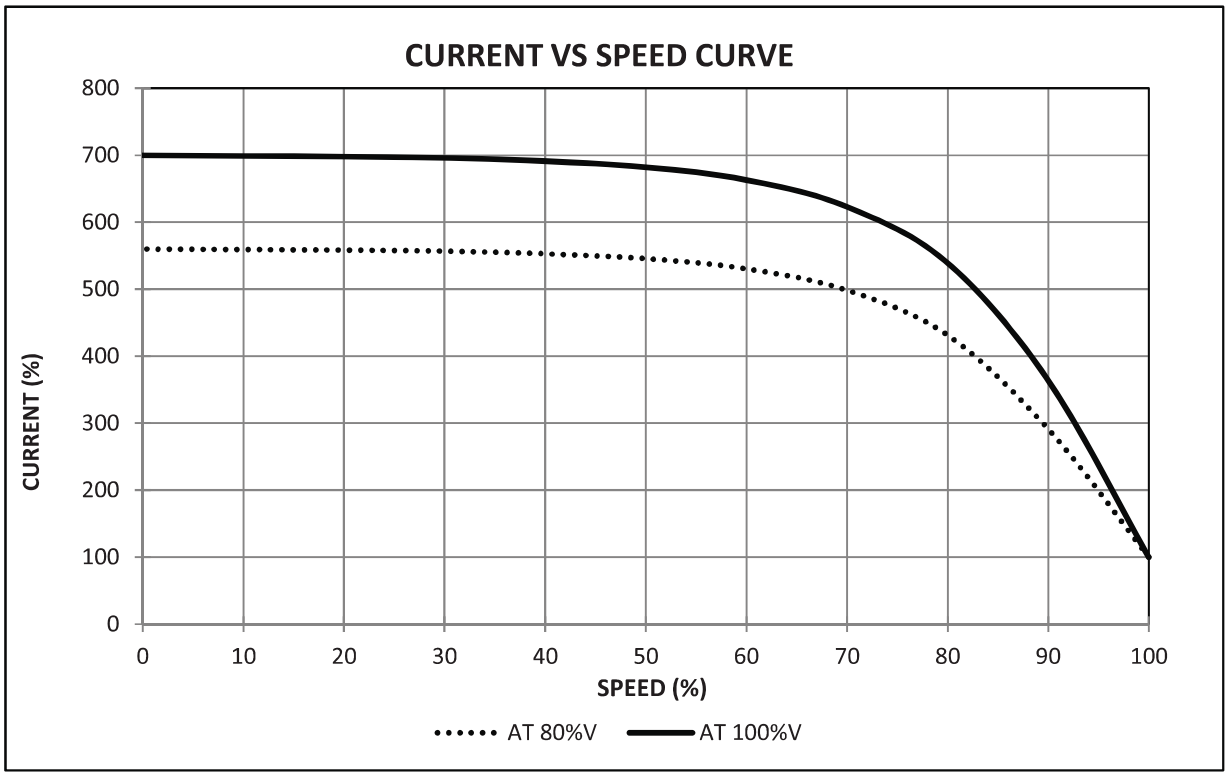


Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5	Poles : 2	Efficiency Class : IE3	

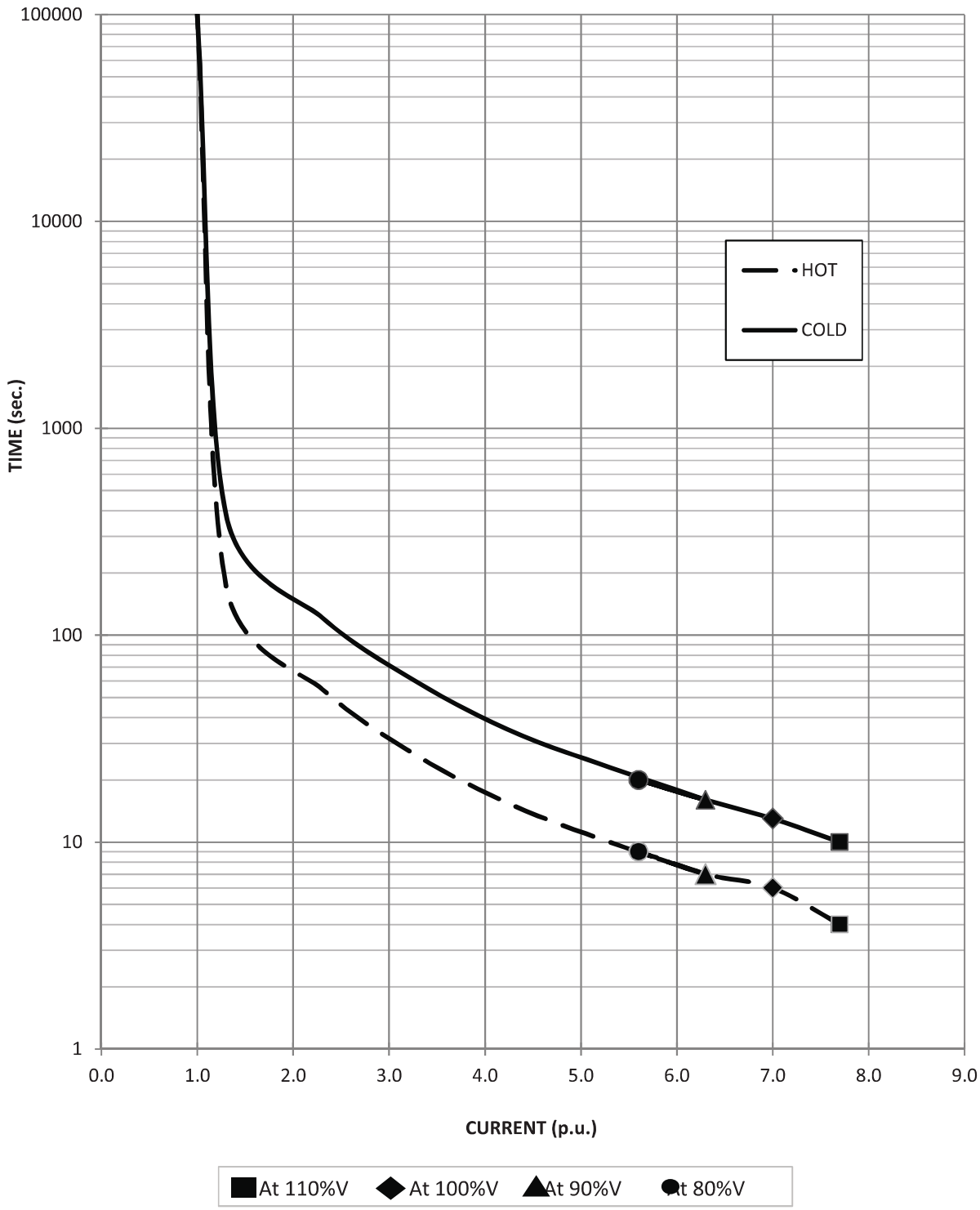




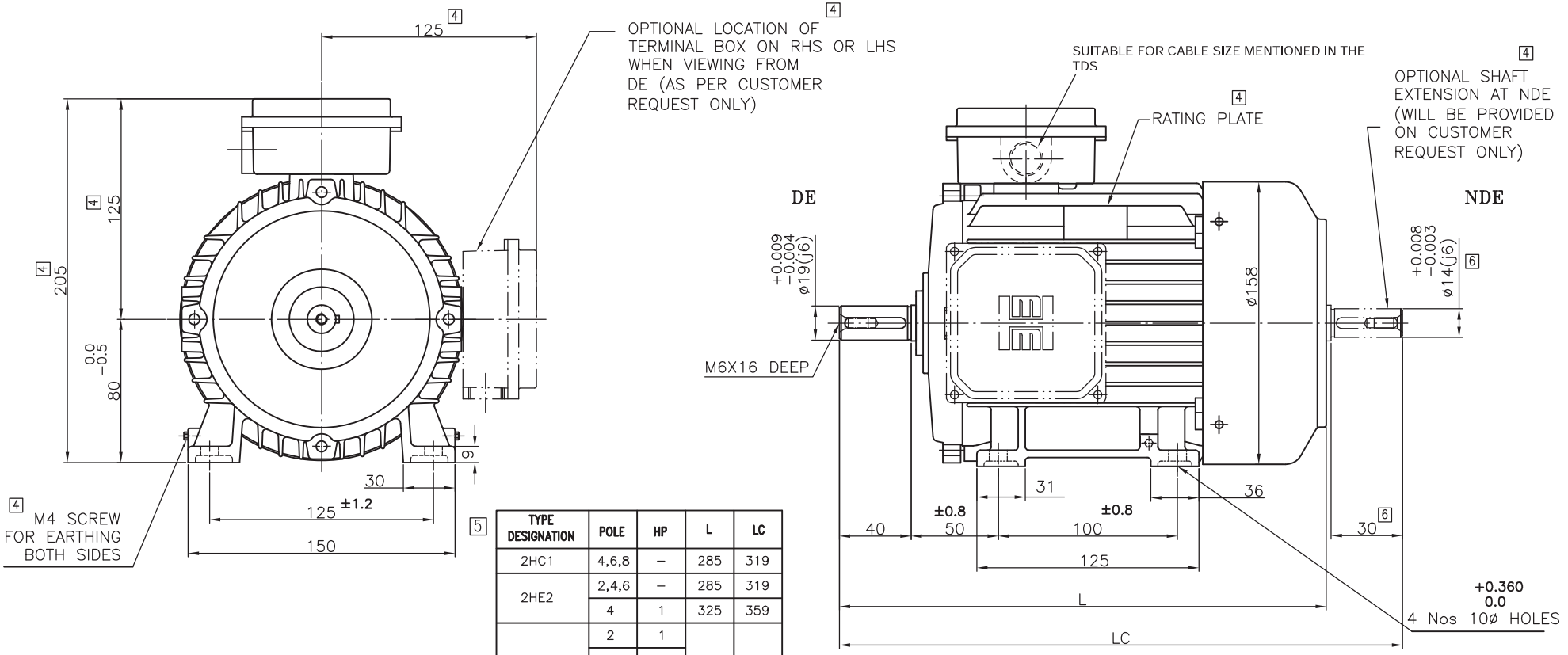
Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 1.1/1.5	Poles : 2	Efficiency Class : IE3	

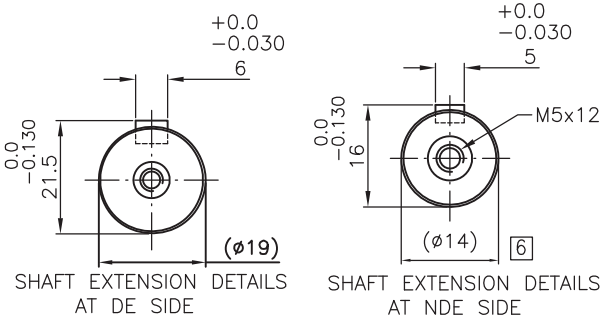
THERMAL WITHSTAND CURVE



Prep.: SK	Date: 25-12-2021	Revision: 0	



TYPE DESIGNATION	POLE	HP	L	LC
2HC1	4,6,8	–	285	319
2HE2	2,4,6	–	285	319
	4	1	325	359
2HE3	2	1	285	329
	4	0.75		
	6	0.50		
	2	1.5	325	359
	4	1		
	6	0.75	285	319
2HS1	8	–		
2HS5	4/2			
	8/4			
	6/4			
2HT1	4,8			



REV. STATUS	SYM	REVISIONS	BY	DATE
	6	NDE SIDE SHAFT EXTN. DIA.14x30LG. WAS DIA.19x40LG. & DIMS 319, 359 WAS 329, 369 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	ARUN	16-09-19
	5	TABLE UPDATED, TYPE DESIGNATION WAS P.No & 2HC1, 2HE2, 2HE3, 2HS5, 2HT1 WAS P.No1 & P.No. 2 & DIMS 302, 346 REMOVED FROM TABLE & ADDED 325, 369 DIMS IN TABLE & DIMS 285, 329 WAS 282, 326, TO UPLOAD THIS DRG. ON PORTAL	ARUN	23-11-18
	4	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.& DIMS.302,282,125,205,WAS 301,281,122 ,202 & EARTHING SCREW SIZE M4 WAS M5, P.No.1,2 WAS EFFICIENCY EFF1, EFF2 & RATING PLATE ADDED	ARUN	12-12-16

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

Dim. without tolerance as per IS:2102, very coarse

All dimensions in mm unless otherwise specified.

	NAME	DATE
DRN.	P.V.SHINDE	19/04/05
CHD.	S.P.JADIA	19/04/05
APPD.	S.P.JADIA	19/04/05

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSION DRAWING STD./TEFC/B3 MOUNTED MOTOR

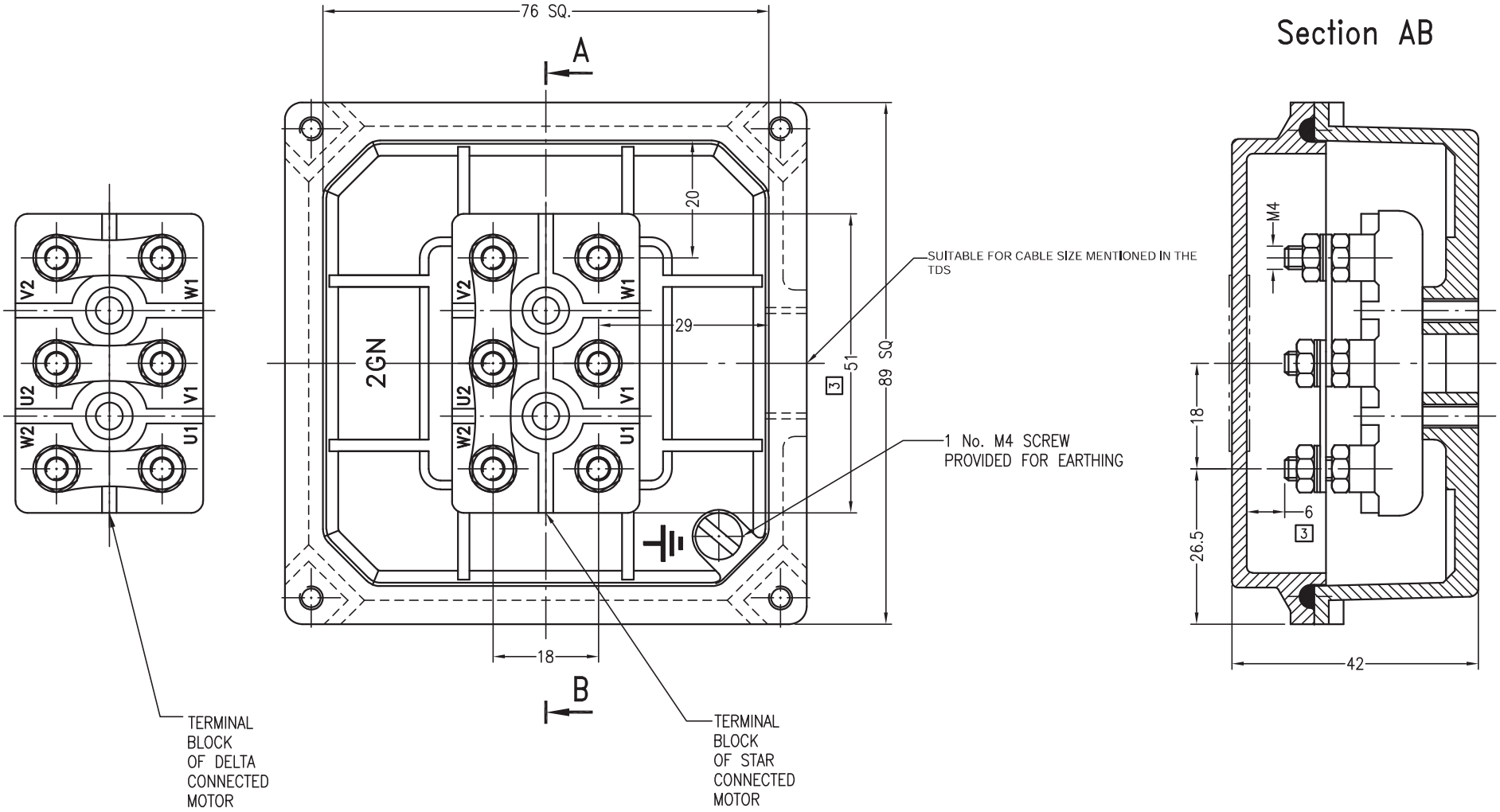
SCALE NTS | SHT 1/1

PROJECTION

DRG. NO.: A1-80-49(GN) | REV. 6

REF.: A1-80-OADIMNS-B3

FRAME SIZE 80 (GN)



REV. STATUS			
3	TERMINAL BLOCK DIMN. 51 WAS 68 LG. [TERMINAL BLOCK AS PER DRG. No. A4-56/100-17(3G) WAS TERMINAL BLOCK DRG. No. A4-56T090-17] DIMN. 29 REMOVED & DIMN. 6 WAS 6.5	NIMKAR	01/10/16
2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR	11/11/14

Dim. without tolerance as per IS:2102 very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: STD. TERMINAL BOX ASSEMBLY

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	GANESH	16-07-11
CHD.		
APPD.		

PROJECTION

DRG. NO.: A4-80/90-33(GN)

REV. 3

REF.: TB-ASLY-63-90

FRAME SIZE 63-90 (GN)

hindustan ELECTRIC MOTORS	DATA SHEET: INDUCTION MOTOR	Motor Type 2HE3 080-04

No. of Phases			3	Reference Standard			IS:12615
Frame Designation			80	Protection IS:4691			IP 55
Rated Output		kW	0.55	Vibration Standard			IS:12075
		HP	0.75	Noise Standard			IS:12065
No. of Poles			4	Duty			S1
Rated Voltage		V	415	Insulation Class			F
Rated Frequency		Hz	50	Cooling IS:6362			IC411
Rated Current		A	1.3	Terminal Box Details	Type		HM2GN
Rated Speed		rpm	1430		Terminal Size		M4
Rated Torque		kgm	0.37		No. of Terminal		6
Efficiency	Full load	%	80.8		Max. cable size (Cu)	mm²	1x3Cx2.5
	3/4 load	%	80.8	Bearing Data	DE		6204ZZ
	1/2 load	%	74.0		NDE		6204ZZ
Power factor	Full load		0.73		Lubrication		Prelubricated
	3/4 load		0.66		Life L10 (Direct Coupled)	hrs.	50,000
	1/2 load		0.53		Regreasing Time	hrs.	-
Max. Temp. Rise (Res.)		°C	70	Lifting Eyebolt			-
Acceleration Time		sec.	-	Motor Weight (approx)		kg	15.0
Stator Connection			Y	Rotor GD²		kgm²	0.0049
Tropicalised? (Yes / No)			Yes	Ambient Temp.		°C	50
I_{st} / I_r			6.0	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r			2.2	-			
T_{po} / T_r			2.6	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec.	6	Frequency Variation ±		%	5
	Cold	sec.	14	Combiend Variation ±		%	10

Remarks:
(1) Efficiency Class : IE3
(2) Motor Construction : TEFC
(3) Suitable Cable Gland & Lugs By AVPL
(4) Minimum Starting Voltage : 80%
(5) Permissible Fault Levl : 50KA for 0.25 sec
(6) No. of Holt/Cold Starts: 3/3

Data subject to tolerance as per IEC 60034-1

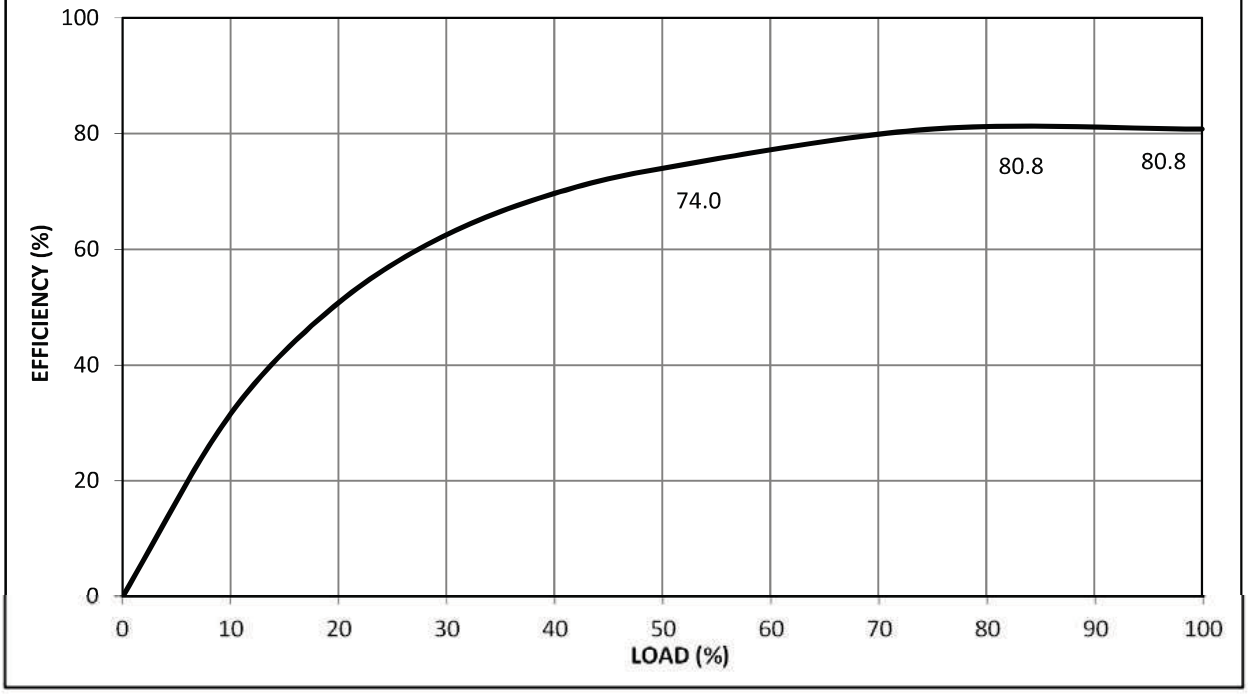
Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS

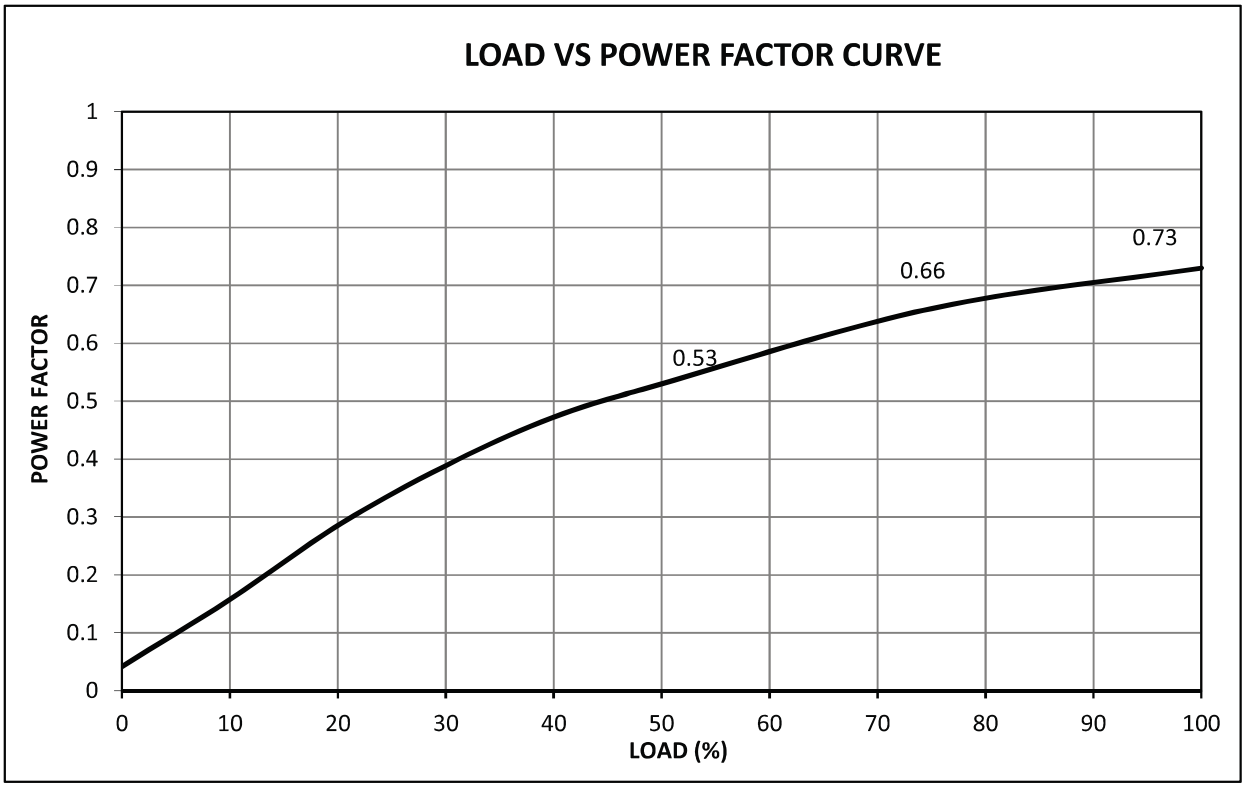
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75	Poles : 4	Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



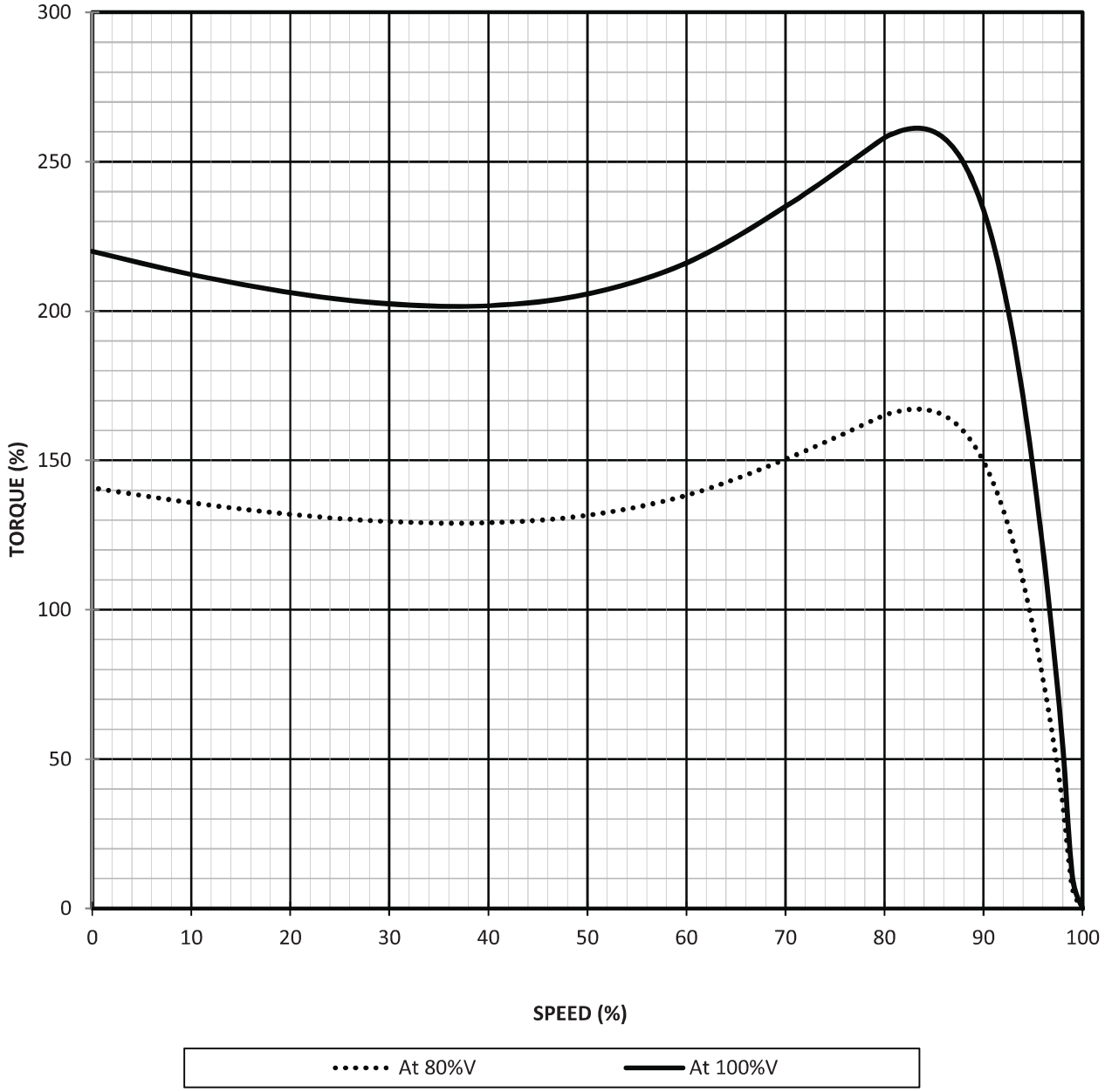
Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS

MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75	Poles : 4	Efficiency Class : IE3	

TORQUE SPEED CURVE

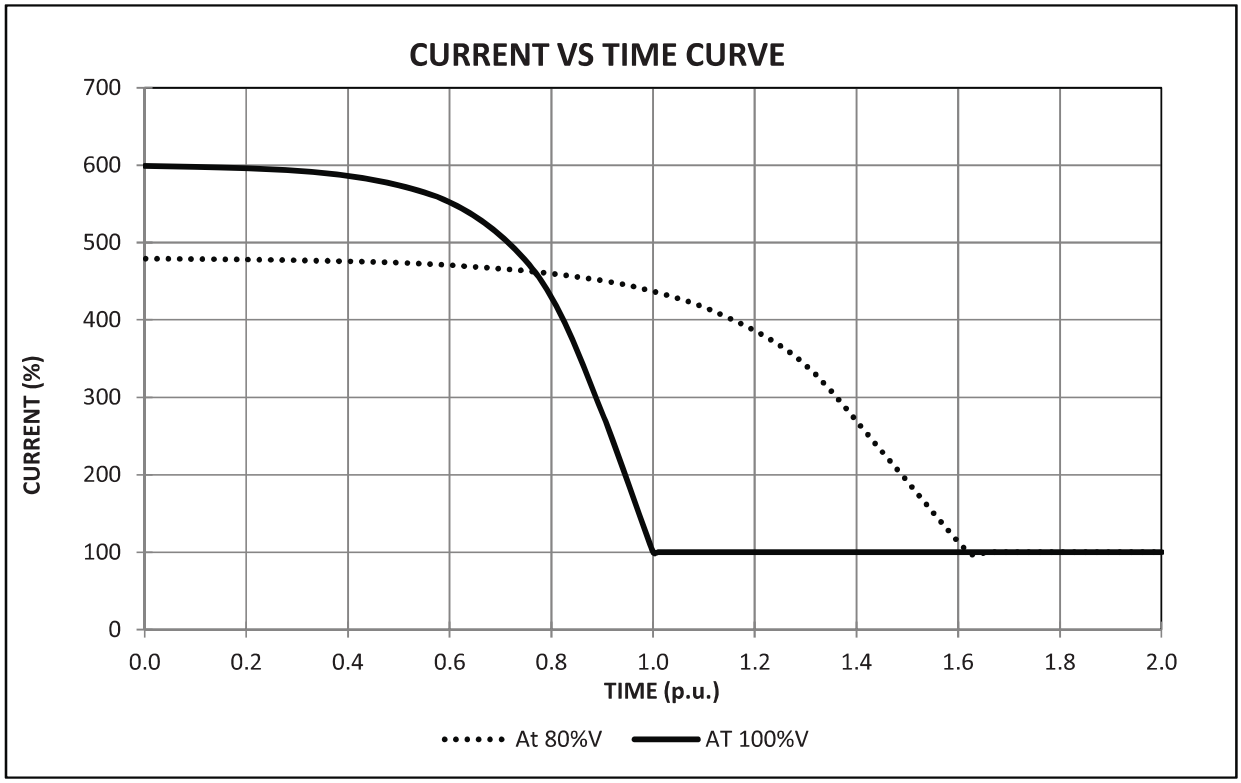


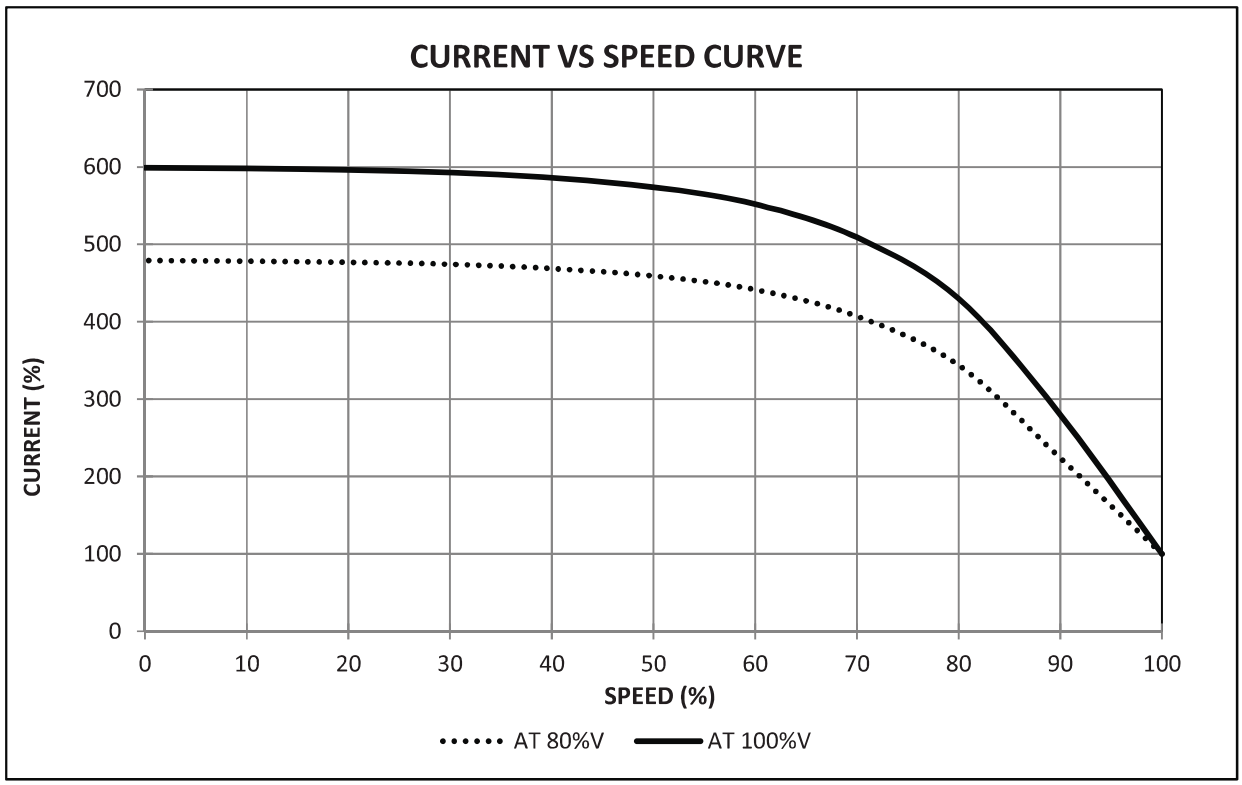
Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS

MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75	Poles : 4	Efficiency Class : IE3	



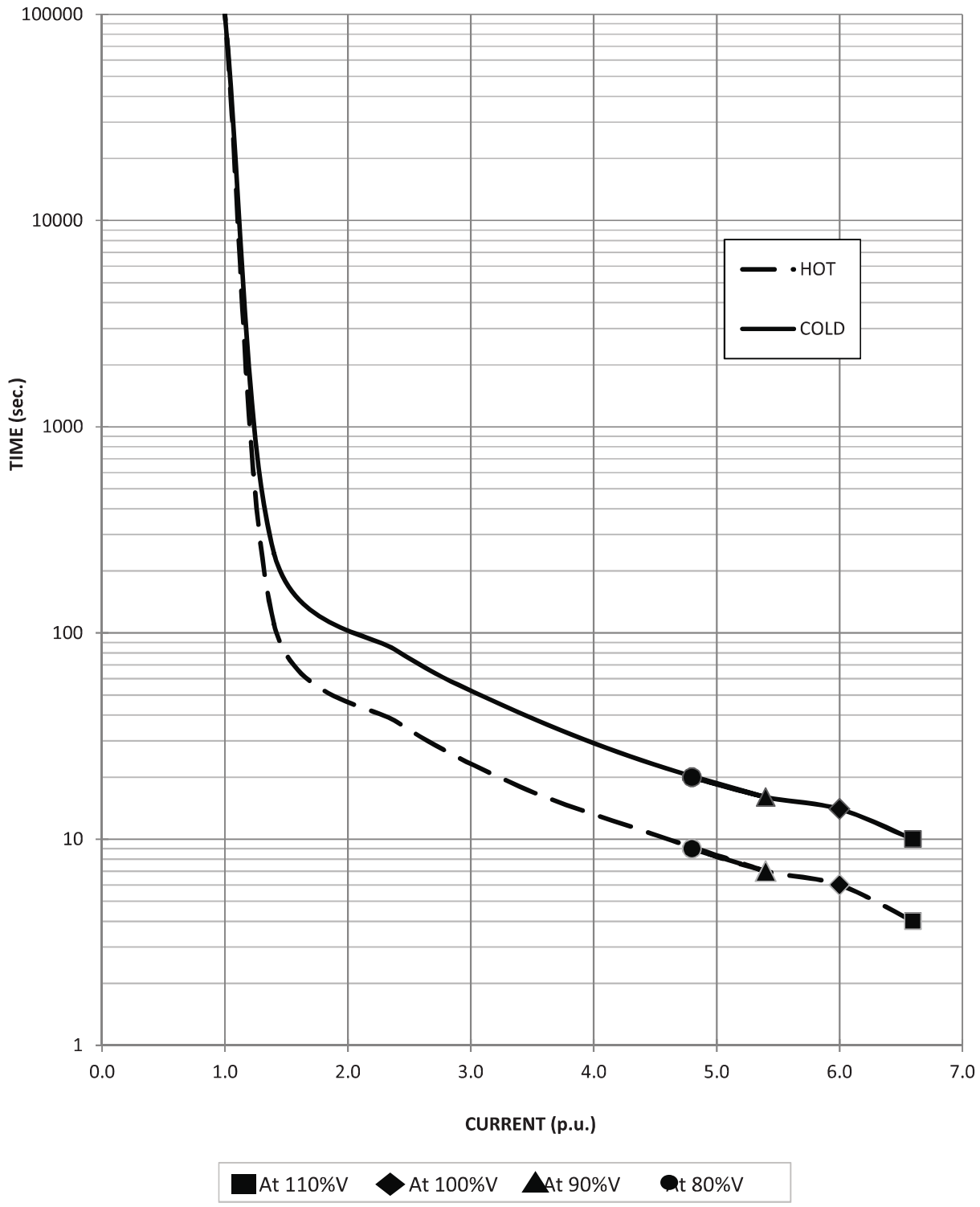


Prep.: SK	Date: 25-12-2021	Revision: -	

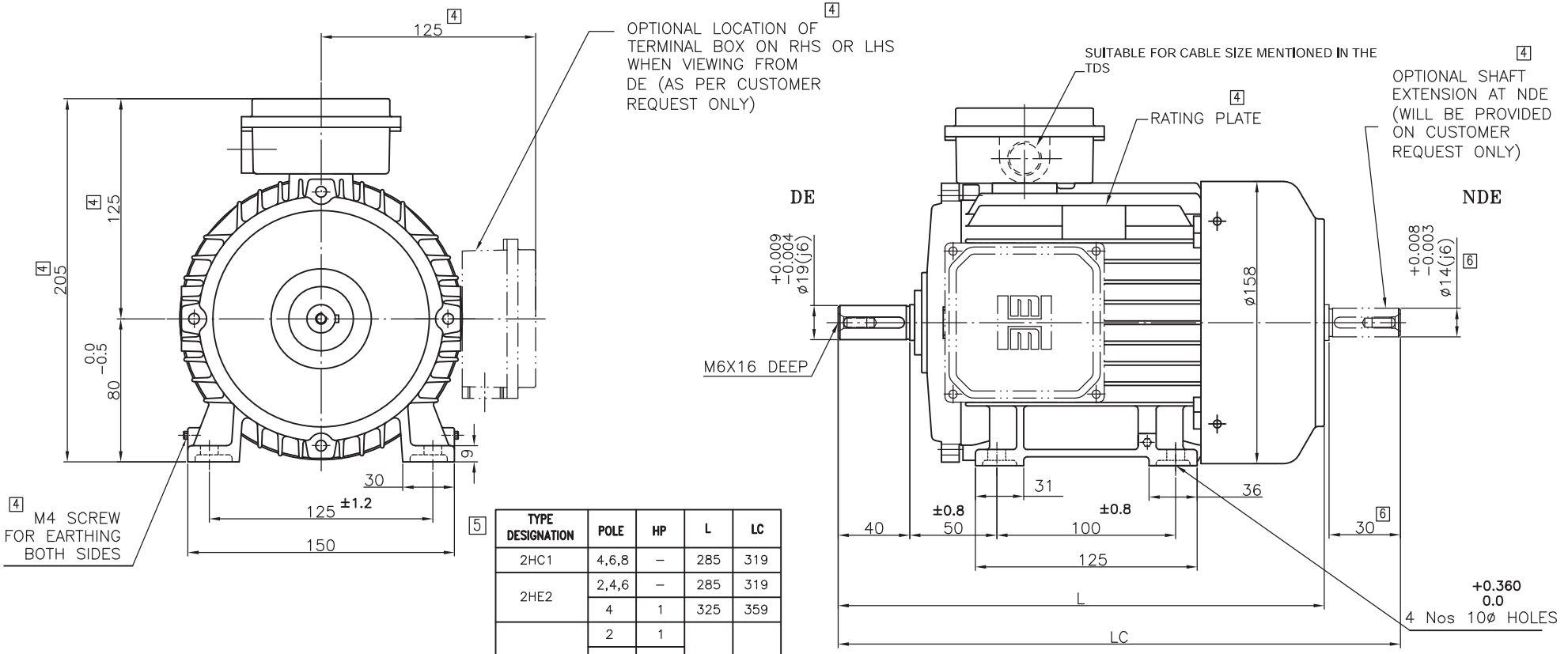
hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75	Poles : 4	Efficiency Class : IE3	

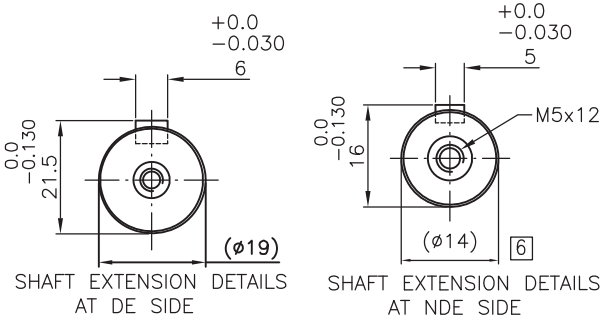
THERMAL WITHSTAND CURVE



Prep.: SK	Date: 25-12-2021	Revision: 0	



TYPE DESIGNATION	POLE	HP	L	LC
2HC1	4,6,8	–	285	319
2HE2	2,4,6	–	285	319
	4	1	325	359
2HE3	2	1	285	329
	4	0.75		
	6	0.50		
	2	1.5	325	359
	4	1		
	6	0.75	285	319
2HS1	8	–		
2HS5	4/2			
	8/4			
	6/4			
2HT1	4,8			



REV. STATUS	SYM	REVISIONS	BY	DATE
	6	NDE SIDE SHAFT EXTN. DIA.14x30LG. WAS DIA.19x40LG. & DIMS 319, 359 WAS 329, 369 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	ARUN	16-09-19
	5	TABLE UPDATED, TYPE DESIGNATION WAS P.No & 2HC1, 2HE2, 2HE3, 2HS5, 2HT1 WAS P.No1 & P.No. 2 & DIMS 302, 346 REMOVED FROM TABLE & ADDED 325, 369 DIMS IN TABLE & DIMS 285, 329 WAS 282, 326, TO UPLOAD THIS DRG. ON PORTAL	ARUN	23-11-18
	4	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.& DIMS.302,282,125,205,WAS 301,281,122 ,202 & EARTHING SCREW SIZE M4 WAS M5, P.No.1,2 WAS EFFICIENCY EFF1, EFF2 & RATING PLATE ADDED	ARUN	12-12-16

Dim. without tolerance as per IS:2102, very coarse
All dimensions in mm unless otherwise specified.
NO MACHINING ~
ROUGH MACHINING ▽
SMOOTH MACHINING ▽▽
FINE MACHINE/GRIND ▽▽▽
POLISH/HONE/LAP ▽▽▽▽
MACHINING SYMBOLS

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSION DRAWING STD./TEFC/B3 MOUNTED MOTOR

SCALE NTS | SHT 1/1

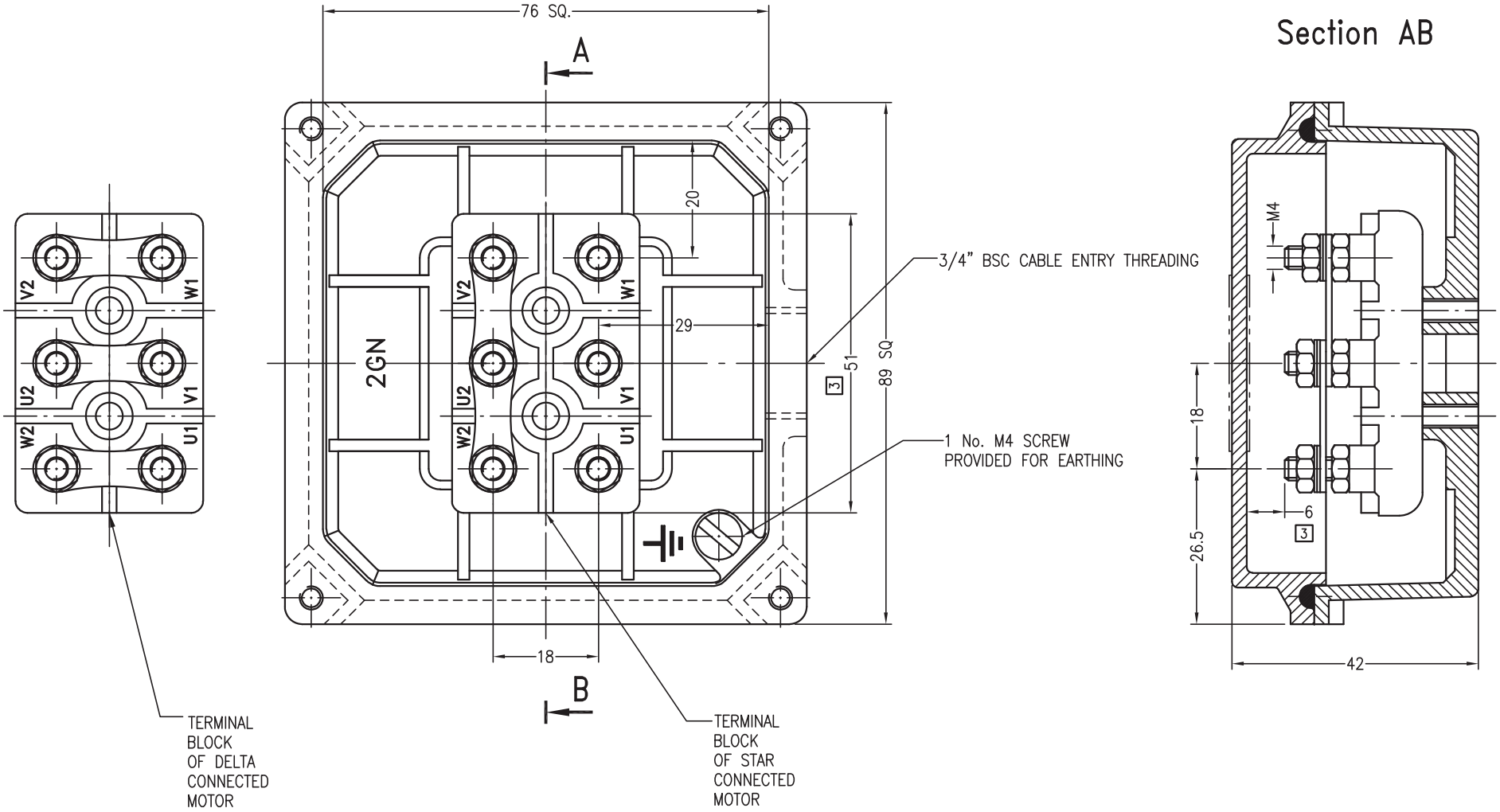
	NAME	DATE
DRN.	P.V.SHINDE	19/04/05
CHD.	S.P.JADIA	19/04/05
APPD.	S.P.JADIA	19/04/05

PROJECTION

DRG. NO.: A1-80-49(GN) | REV. 6

REF.: A1-80-OADIMNS-B3

FRAME SIZE 80 (GN)



REV. STATUS			
3	TERMINAL BLOCK DIMN. 51 WAS 68 LG. [TERMINAL BLOCK AS PER DRG. No. A4-56/100-17(3G) WAS TERMINAL BLOCK DRG. No. A4-56T090-17] DIMN. 29 REMOVED & DIMN. 6 WAS 6.5	NIMKAR	01/10/16
2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR	11/11/14

Dim. without tolerance as per IS:2102 very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: STD. TERMINAL BOX ASSEMBLY

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	GANESH	16-07-11
CHD.		
APPD.		

PROJECTION

DRG. NO.: A4-80/90-33(GN)

REV. 3

REF.: TB-ASLY-63-90

FRAME SIZE 63-90 (GN)

hindustan ELECTRIC MOTORS	DATA SHEET: INDUCTION MOTOR	Motor Type 2HE3 166-04

No. of Phases			3	Reference Standard			IS:12615
Frame Designation			160L	Protection IS:4691			IP 55
Rated Output		kW	15.0	Vibration Standard			IS:12075
		HP	20.0	Noise Standard			IS:12065
No. of Poles			4	Duty			S1
Rated Voltage		V	415	Insulation Class			F
Rated Frequency		Hz	50	Cooling IS:6362			IC411
Rated Current		A	26.2	Terminal Box Details	Type		HM4GN
Rated Speed		rpm	1470		Terminal Size		M6
Rated Torque		kgm	9.94		No. of Terminal		6
Efficiency	Full load	%	92.1		Max. cable size (AL)	mm²	1x3Cx25.0
	3/4 load	%	92.1	Bearing Data	DE		6309ZZ
	1/2 load	%	91.4		NDE		6209ZZ
Power factor	Full load		0.86		Lubrication		Prelubricated
	3/4 load		0.83		Life L10 (Direct Coupled)	hrs.	50,000
	1/2 load		0.74		Regreasing Time	hrs.	-
Max. Temp. Rise (Res.)		°C	70	Lifting Eyebolt			M12
Acceleration Time		sec.	-	Motor Weight (approx)		kg	132.0
Stator Connection			D	Rotor GD²		kgm²	0.3032
Tropicalised? (Yes / No)			Yes	Ambient Temp.		°C	50
I_{st} / I_r			7.0	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r			2.4	-			
T_{po} / T_r			2.7	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec.	9	Frequency Variation ±		%	5
	Cold	sec.	20	Combiend Variation ±		%	10

Remarks: (1) Efficiency Class : IE3

(2) Motor Construction : TEFC

(3) Suitable Cable Gland & Lugs BY AVPL

(4) Minimum Starting Voltage : 80%

(5) Permissible Fault Level: 50KA for 0.25 sec

(6) No. of Hot/Cold Starts: 3/3

Data subject to tolerance as per IEC 60034-1

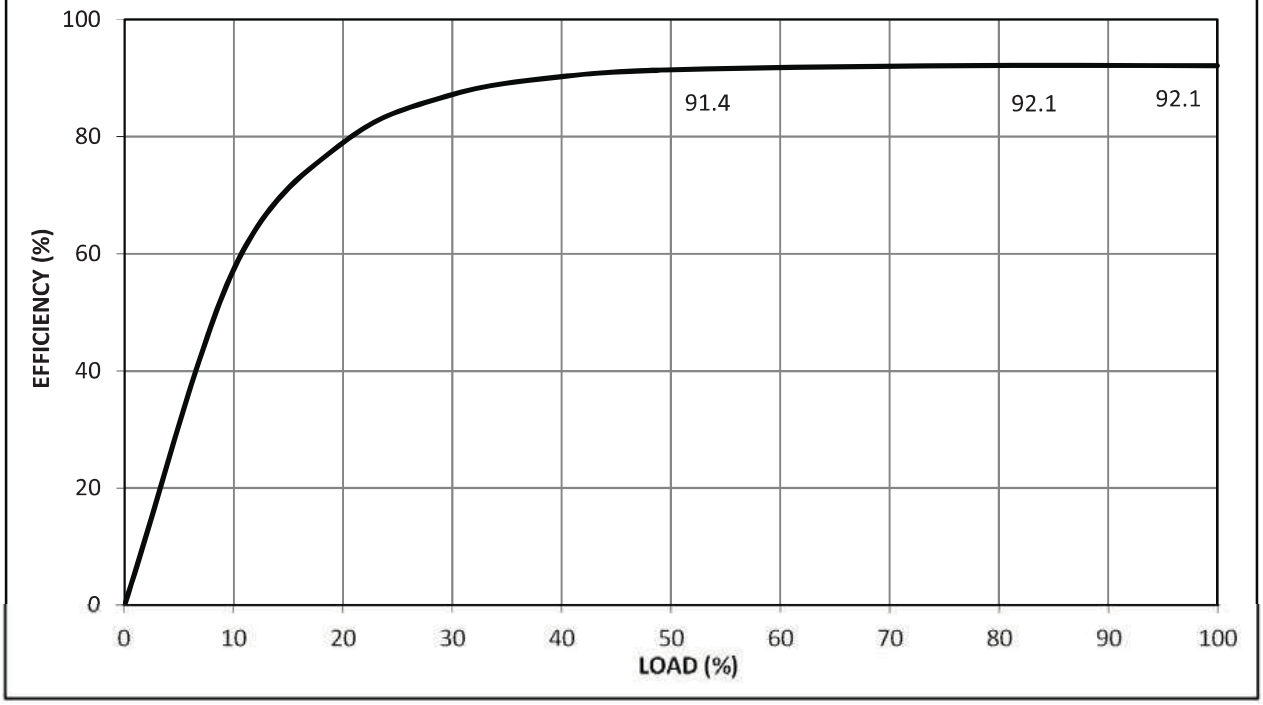
Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS

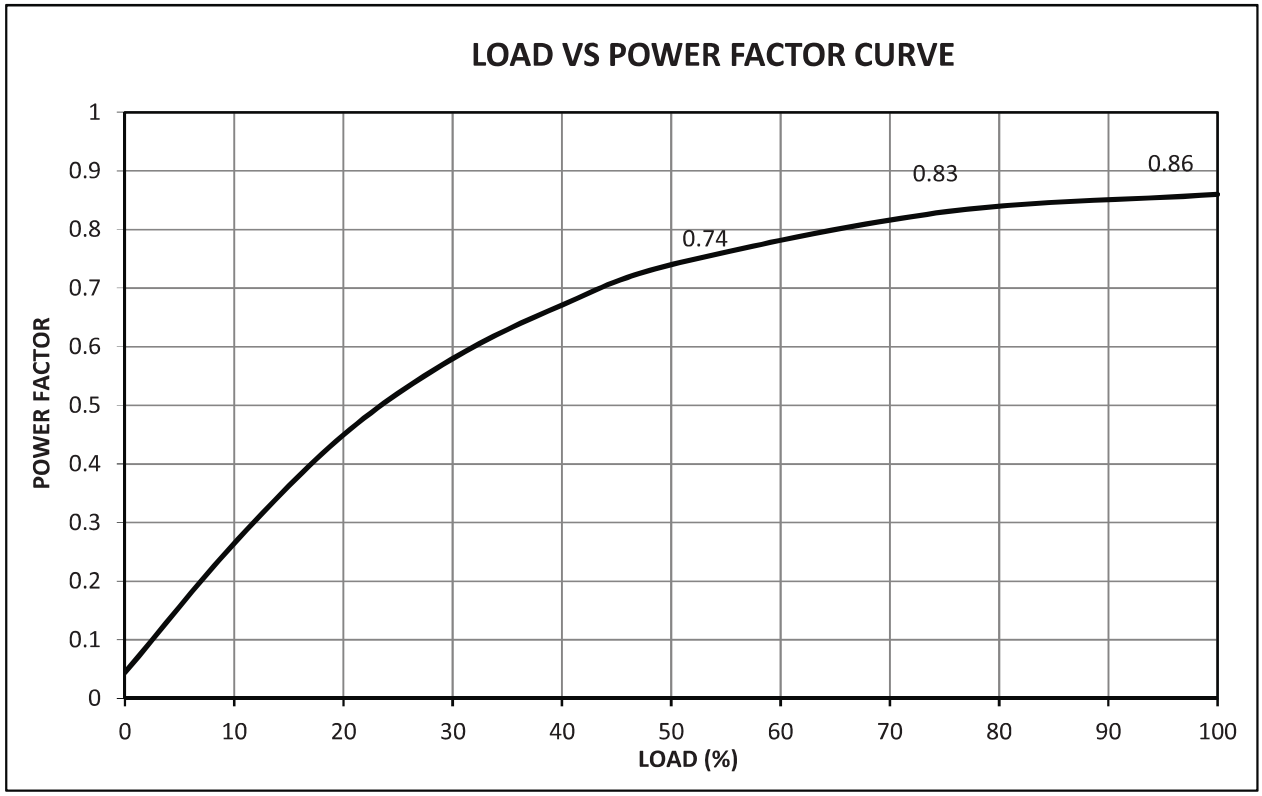
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 15.0/20.0	Poles : 4	Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



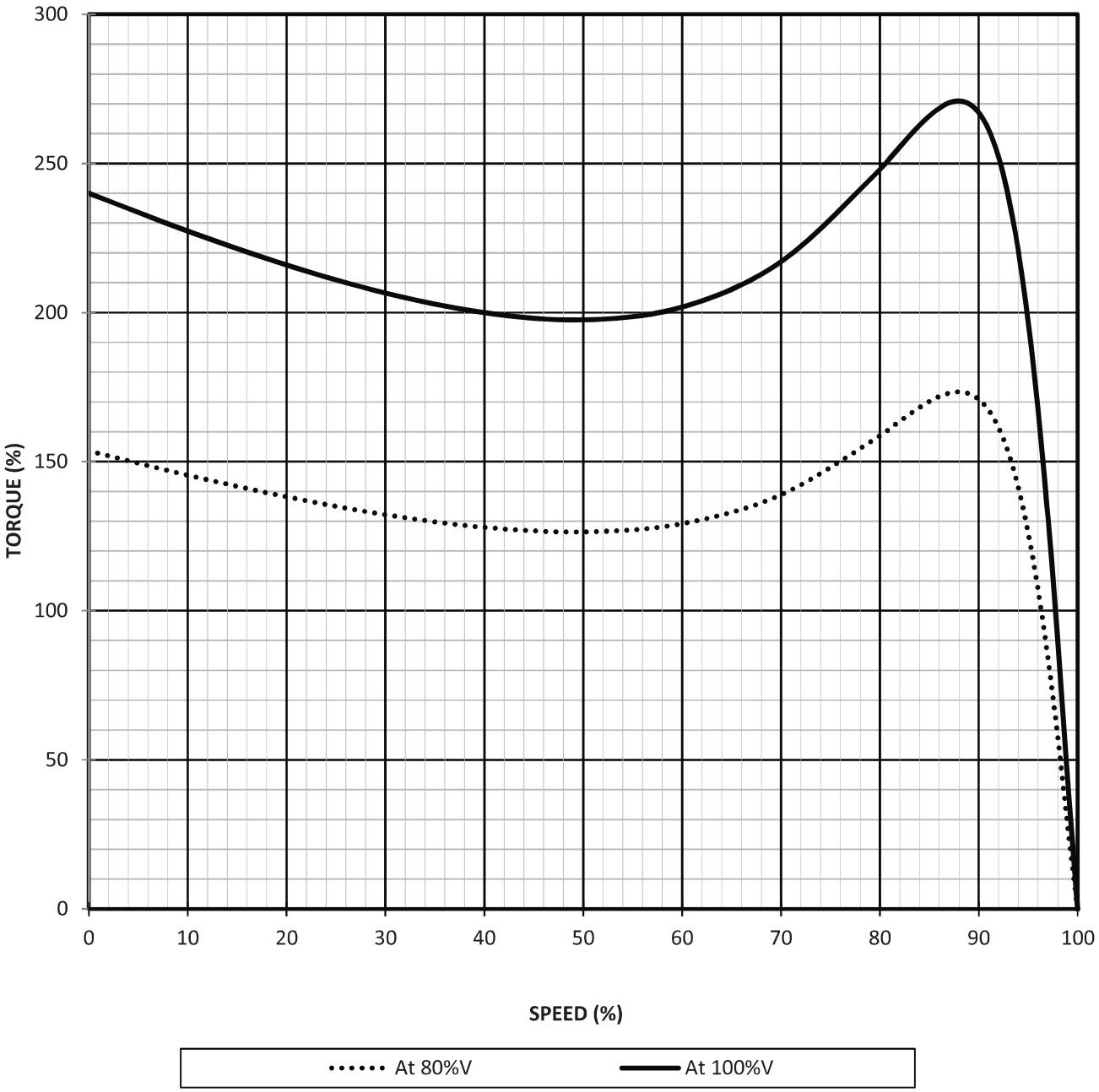
Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS

MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 15.0/20.0	Poles : 4	Efficiency Class : IE3	

TORQUE SPEED CURVE

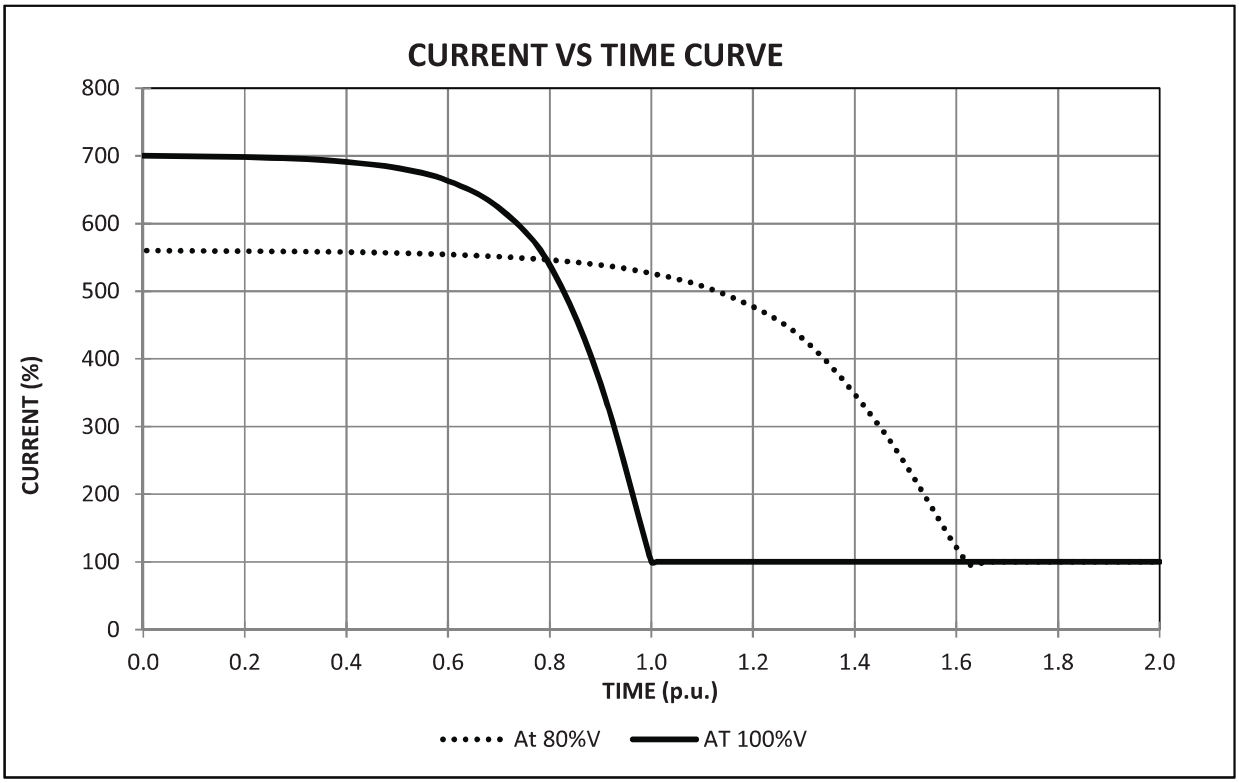


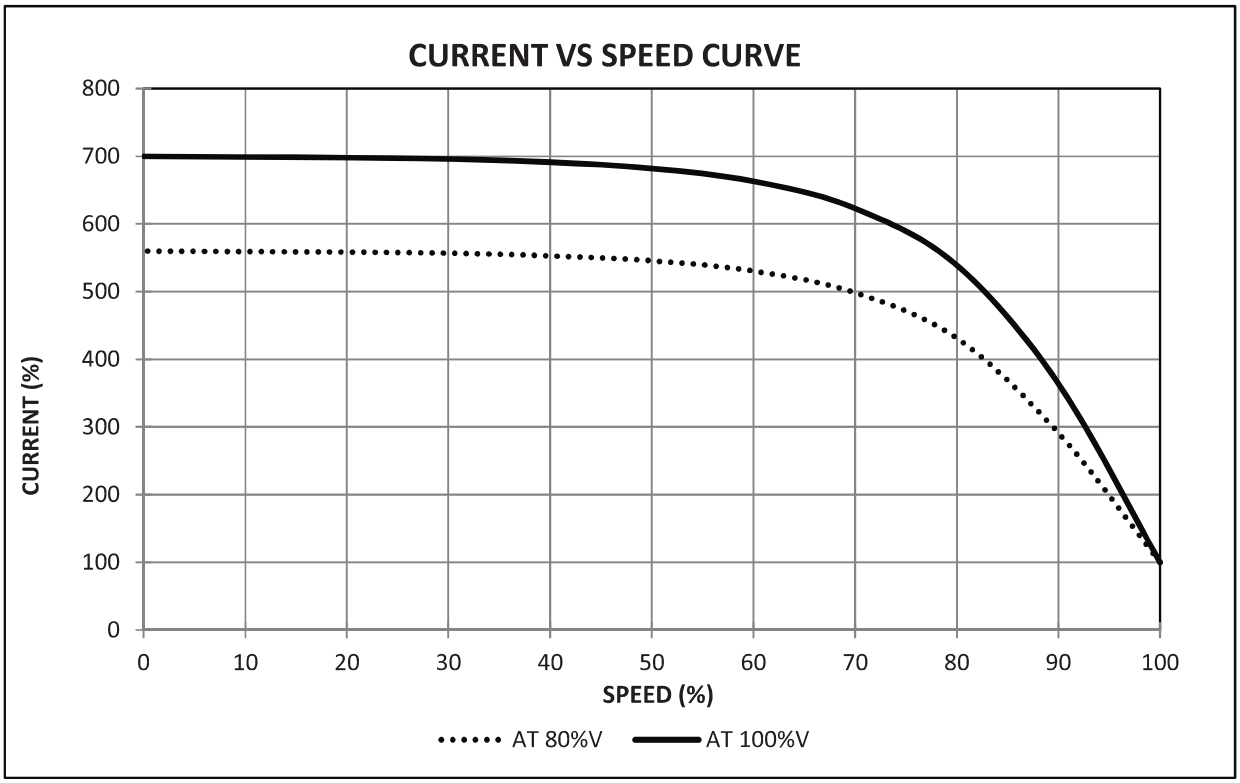
Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS

MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 15.0/20.0	Poles : 4	Efficiency Class : IE3	



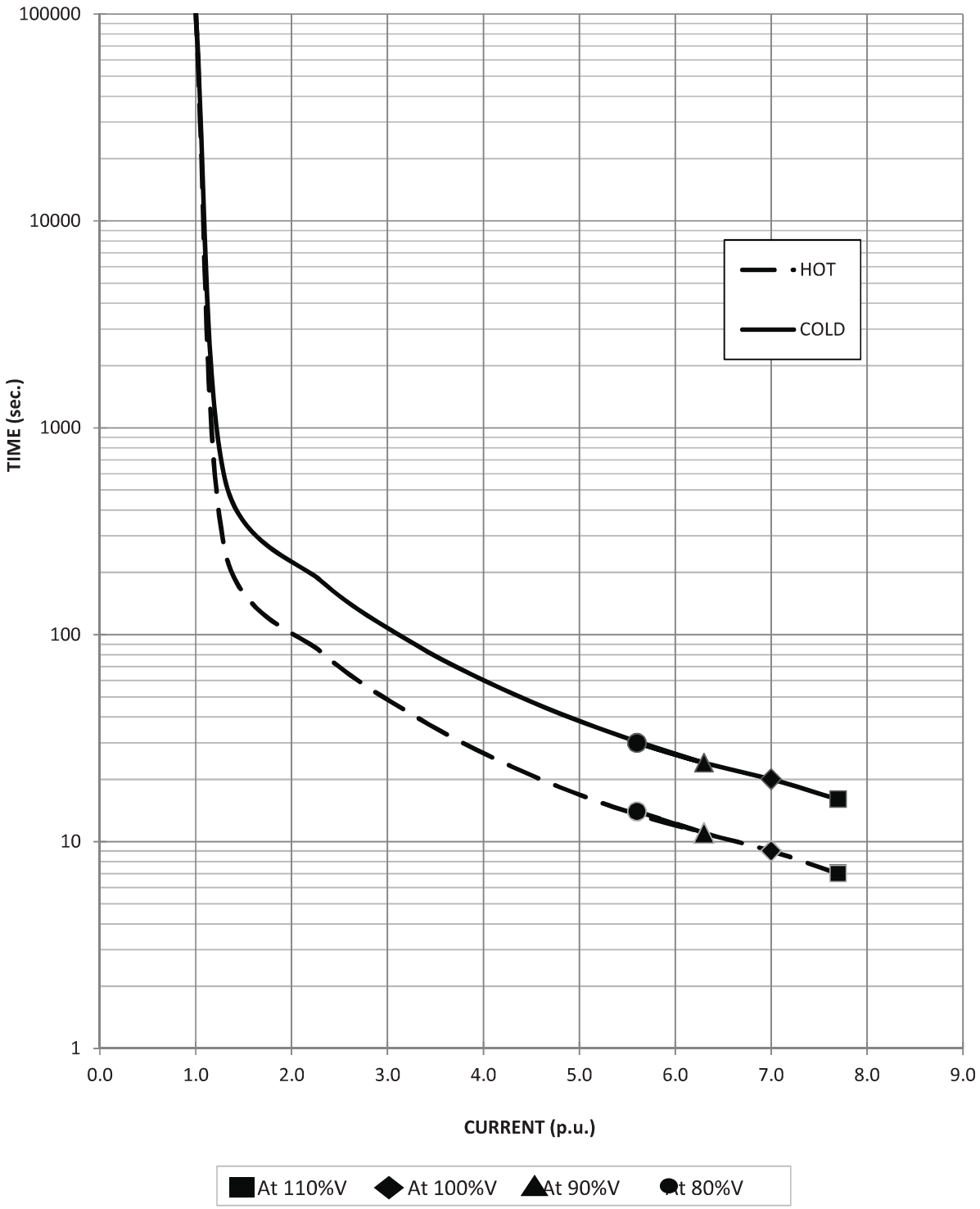


Prep.: SK	Date: 25-12-2021	Revision: -	

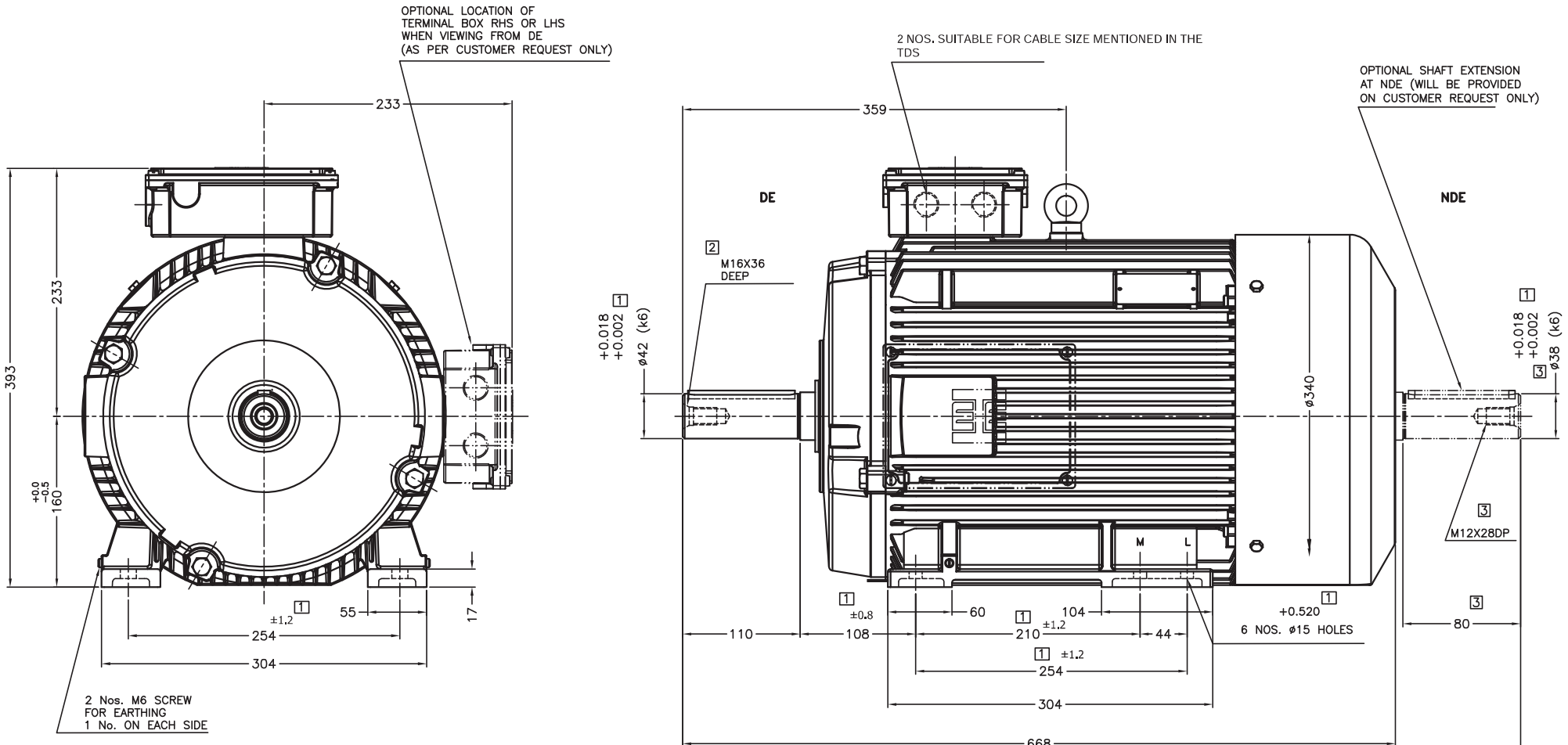
hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

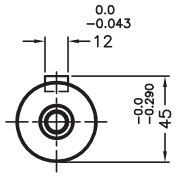
Rated Output (kW/HP) : 15.0/20.0	Poles : 4	Efficiency Class : IE3	

THERMAL WITHSTAND CURVE

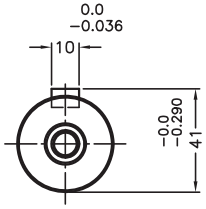


Prep.: SK	Date: 25-12-2021	Revision: 0	





SHAFT EXTENSION DETAILS AT DE



SHAFT EXTENSION DETAILS AT NDE [3]

REV. STATUS				
	3	NDE SIDE SHAFT EXTN. DIA.38x80LG. WAS DIA.42x110LG. & DIMS 755 WAS 785 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	LANKESH	10-01-20
	2	M16x36 TAP DEEP WAS M16x32 AS PER PRESENT SHAFT DESIGN	ARUN	25/9/18
	1	TOLERANCE +0.002 WAS – 0.002, TOLERANCE ADDED ON DIMN. 210,254,108, & ø15 , STD, ADDED IN TITLE.	LANKESH	11/6/18
	SYM	REVISIONS	BY	DATE

Dim. without tolerance as per IS:2102, very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSION DRAWING TEFC/B3/ [1] IE3 STD/FOOT MOUNTED MOTOR

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	AKSHAY	21-12-13
CHD.	S.P.JADIA	21-12-13
APPD.	S.P.JADIA	21-12-13

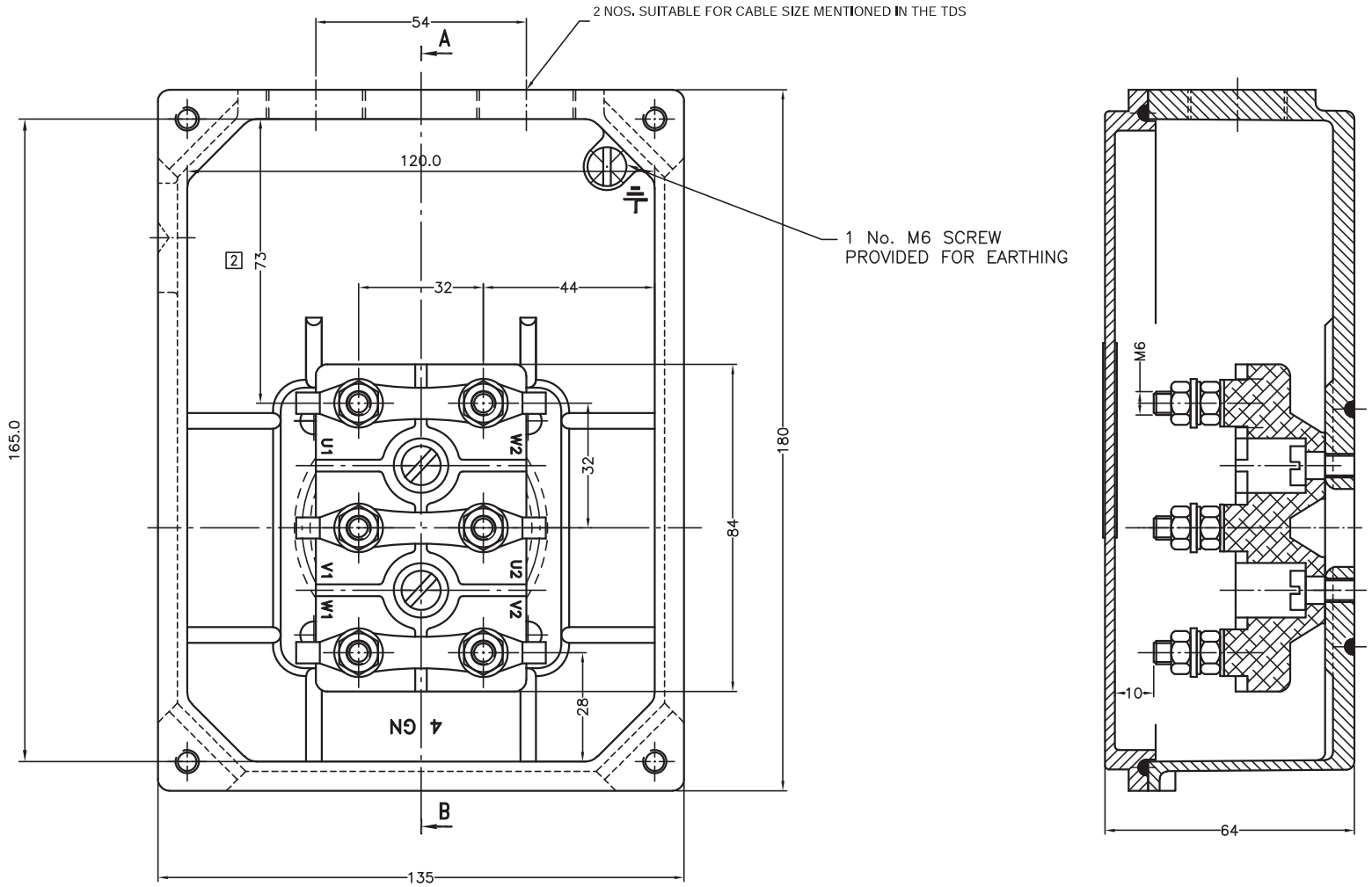
PROJECTION

DRG. NO.: 44-16-051-0058

REV. 3

REF : 160ML-IE3-OADIM-B3

FRAME SIZE 160M/L (GN)



REV. STATUS			
2	DIMN. 73 ADDED.	SAURABH	03/06/15
1	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR	05/07/13

hindustan ELECTRIC MOTORS

TITLE: TERMINAL BOX ASSEMBLY

SCALE NTS

SHT 1/1

All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

	NAME	DATE
DRN.	GANESH	05/08/11
CHD.	S.P.JADIA	05/08/11
APPD.	S.P.JADIA	05/08/11

PROJECTION

DRG. NO.: A3-160/180-33(GN) | REV. 2

REF. 3-tbassy

FRAME SIZE 160-180 (GN)

hindustan ELECTRIC MOTORS	DATA SHEET: FLAMEPROOF INDUCTION MOTOR	Motor Type 2FE3 106-06

No. of Phases			3	Reference Standard	Performance		IS:12615
Frame Designation			90 FLP		Enclosure		IS:60079-1
Rated Output		kW	1.1	Protection IS:4691			IP 55
		HP	1.5	Vibration Standard			IS:12075
No. of Poles			6	Noise Standard			IS:12065
Rated Voltage		V	415	Duty			S1
Rated Frequency		Hz	50	Insulation Class			F
Rated Current		A	2.7	Cooling IS:6362			IC411
Rated Speed		rpm	945	Terminal Box Details	Terminal Size		M4
Rated Torque		kgm	1.14		No. of Terminal		6
Efficiency	Full load	%	81.0		Max. cable size	mm²	2x3Cx2.5
	3/4 load	%	81.0	Bearing Data	DE		6205ZZ
	1/2 load	%	76.0		NDE		6205ZZ
Power factor	Full load		0.70		Lubrication		Prelubricated
	3/4 load		0.67		Life L10 (Direct coupled)	hrs.	50,000
	1/2 load		0.60		Regreasing Time	hrs.	-
Temp. Rise (Res.)		°C	70	Lifting Eyebolt IS:4190			M8
Acceleration Time		sec.	-	Motor Weight (approx)		kg	30
Stator Connection			Y	Rotor GD²		kgm²	0.019
Tropicalised? (Yes/No)			Yes	Ambient Temp.		°C	50
I_{st} / I_r		%	5.5	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r		%	2.2	-			
T_{po} / T_r		%	2.6	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec	12	Frequency Variation ±		%	5
	Cold	sec	26	Combiend Variation ±		%	10

Remarks:
(1) Efficiency Class : IE3
(2) Motor construction: TEFC
(3) Suitable Cable Gland & Lugs BY AVPL
(3) Temp Class: T5 & Explosion Protection : Ex'd'
(4) Motor suitable for Gas Gr. IIA / IIB, Zone I & II
(5) Minimum Starting Voltage : 80%
(6) Permissible Fault Level: 50KA for 0.25 sec
(7) No. of Hot/Cold Starts: 3/3

Data subject to tolerance as per IS:12615.

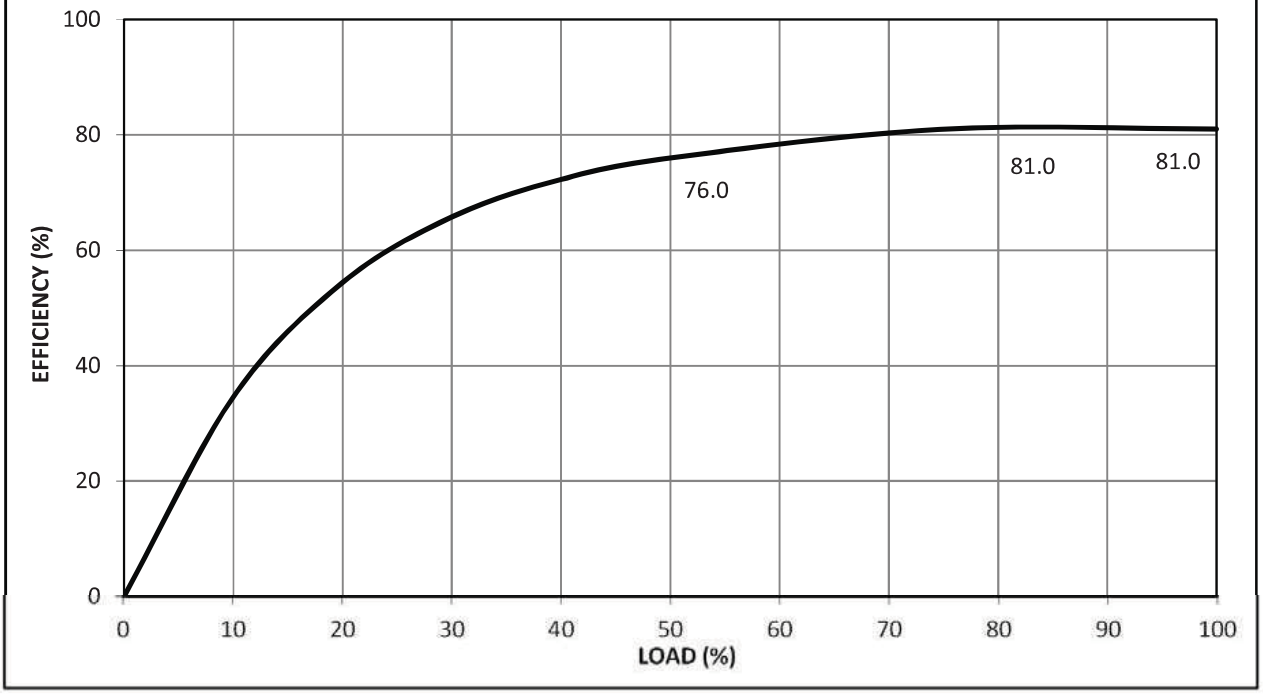
Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS

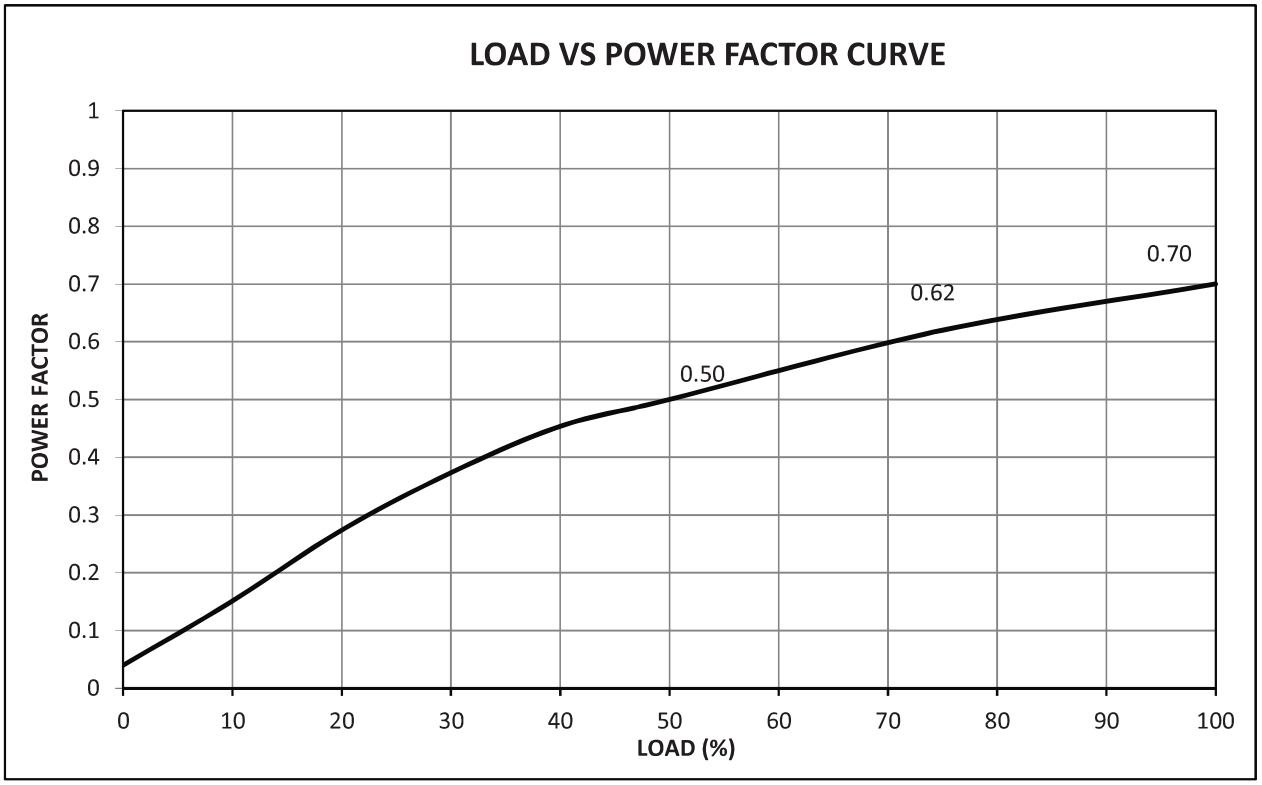
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5	Poles : 6	Efficiency Class : IE3	

LOAD VS EFFICIENCY CURVE



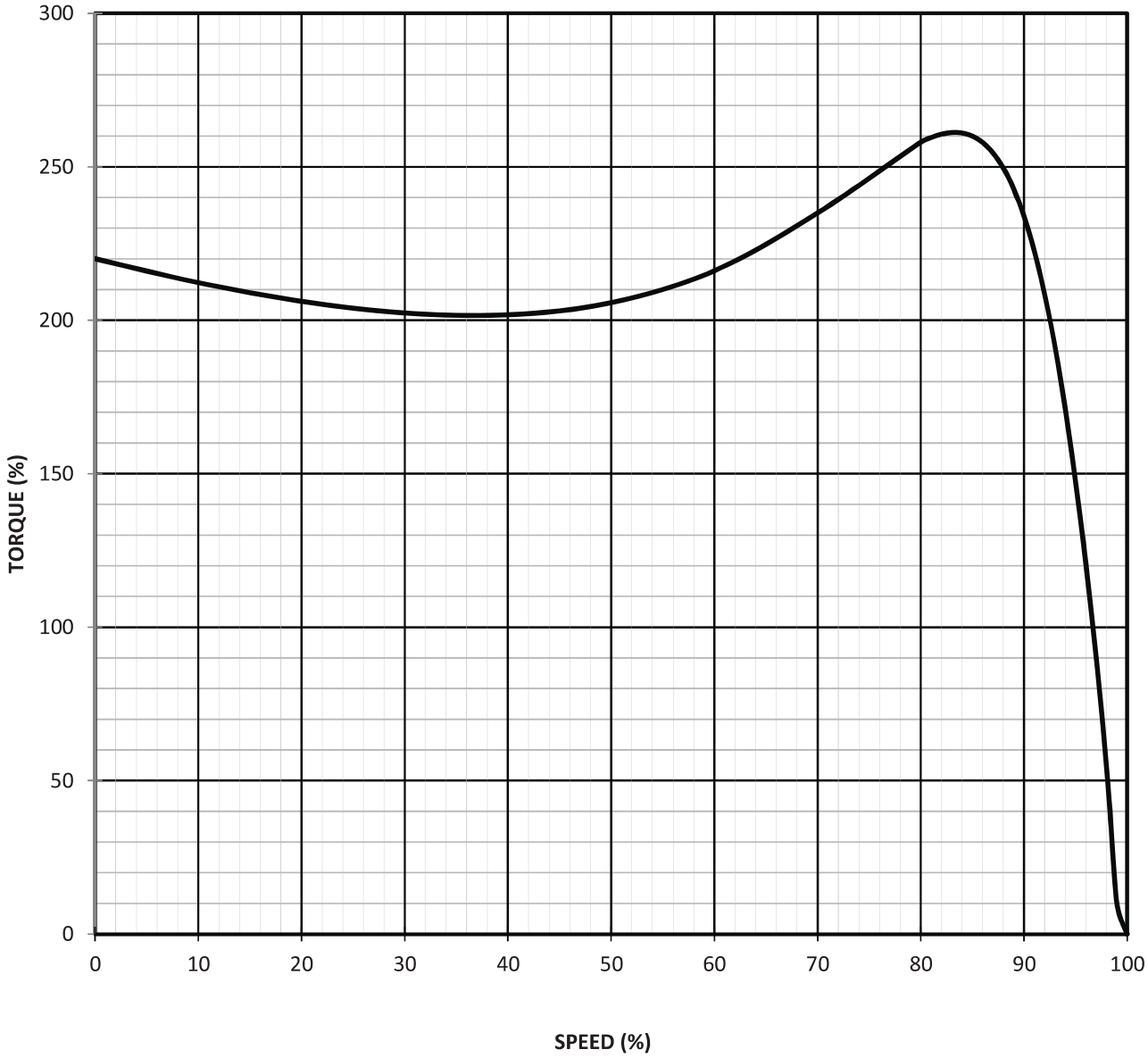
LOAD VS POWER FACTOR CURVE



Prep.: SK	Date: 3/25/2022	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 1.1/1.5	Poles : 6	Efficiency Class : IE3	

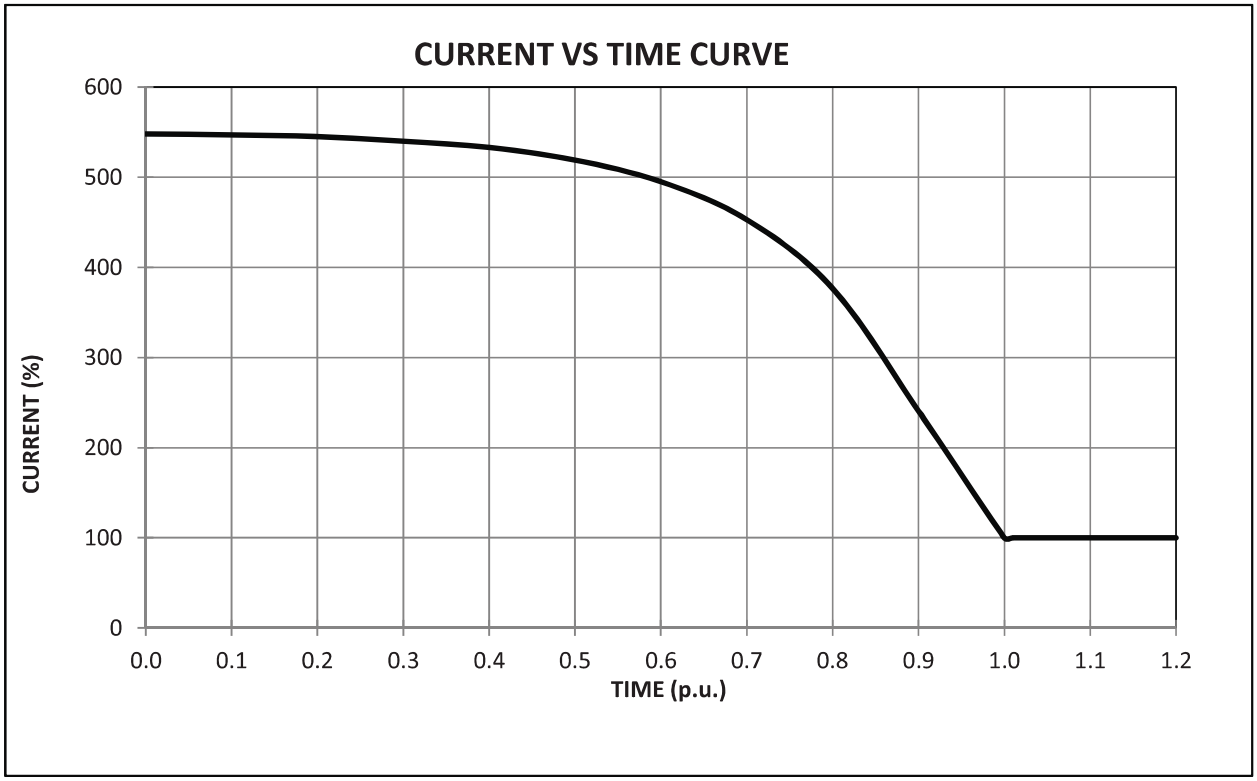
TORQUE SPEED CURVE

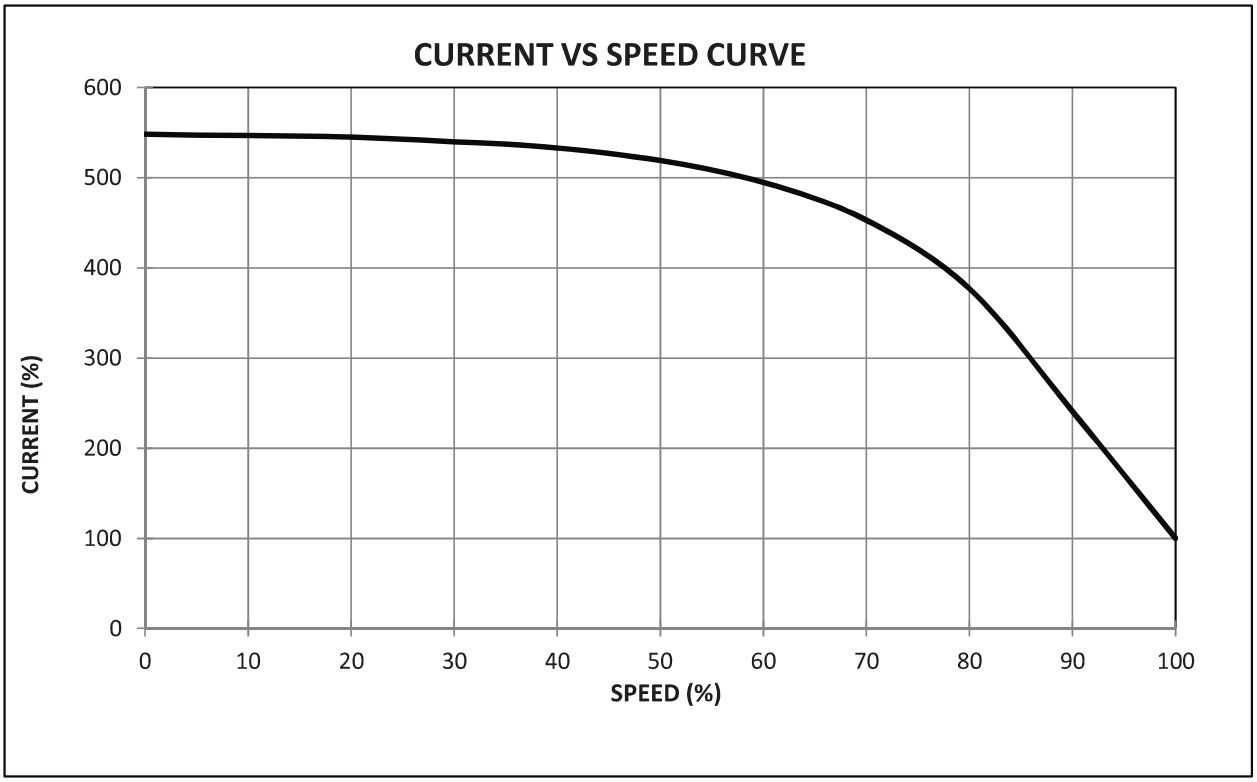


Prep.: SK	Date:	Revision:	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5	Poles : 6	Efficiency Class : IE3	



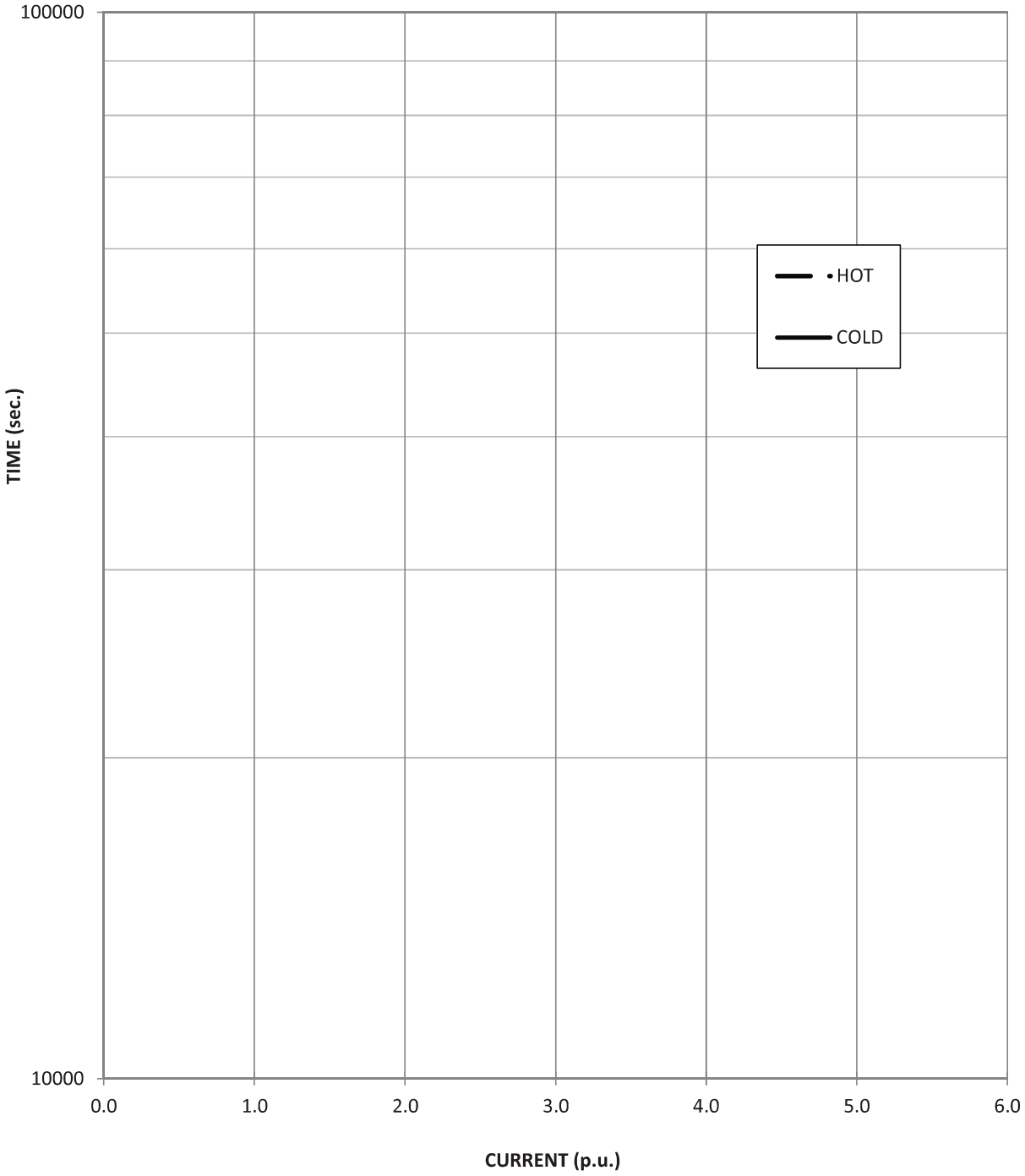


Prep.: SK	Date:	Revision:	

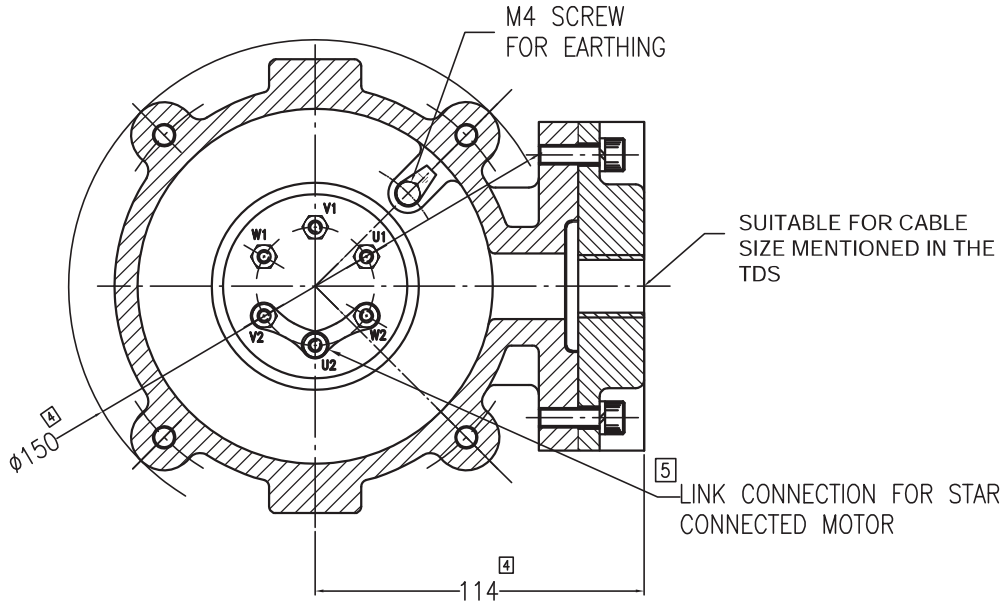
hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5	Poles : 6	Efficiency Class : IE3	

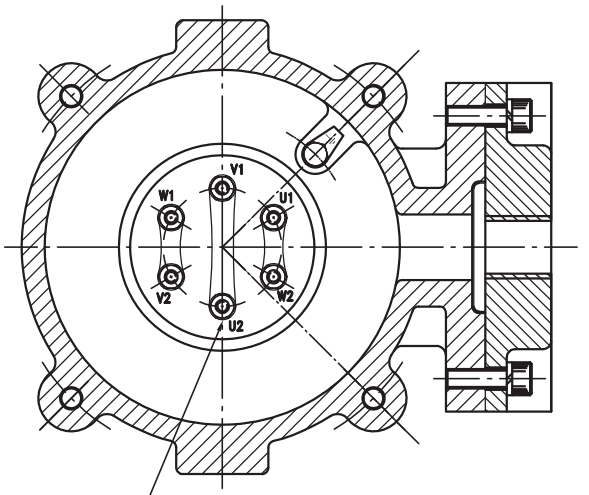
THERMAL WITHSTAND CURVE



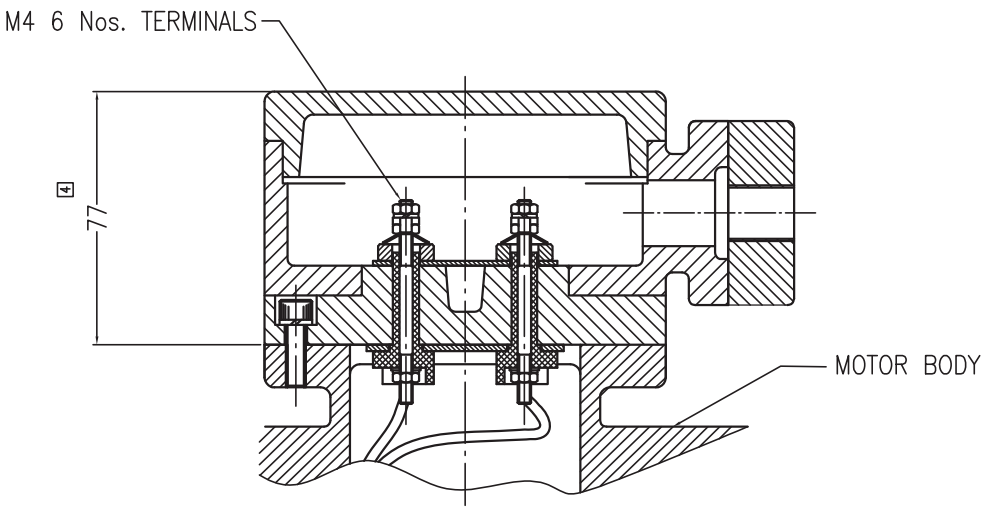
Prep.: SK	Date: □□□□□□□□	Revision: □	



VIEW AFTER REMOVAL OF TERMINAL BOX [4] COVER



[5] LINK CONNECTION FOR DELTA CONNECTED MOTOR



[5] NOTE:–
REFERENCE GENERAL CONSTRUCTION DETAILS DRG. No. 80F–HEM–GA–01 FOR 80 FLP & DRG. No. 90F–HEM–GA–01 FOR 90 FLP.

REV. STATUS	SYM.	REVISION	DATE	BY
	[5]	FRAME SIZE 63–71 WAS 80–90 IN TITLE BLOCK, AND SEPERATE DRAWING MADE FOR 63–71FLP HAVING DRG. No. 24–06–044–0016 VIEW INCLUDED FOR DELTA CONNECTED MOTOR AND STAR CONNECTED SPECIFIED FOR EXISTING VIEW & NOTE ADDEED.	31–7–18	KIRAN
	[4]	OVERALL DIMENSIONS, NOTE & STANDARD SPECIFIED IN TITLE	11–04–15	P.N.RAOTE
	[3]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. NO. & ALL THE FEATURES.	27–07–15	SAURABH

All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

hindustan ELECTRIC MOTORS

	NAME	DATE
DRN.	NIMKAR	28–11–12
CHD.	S.P.JADIA	28–11–12
APPD.	S.P.JADIA	28–11–12

TITLE [4] STANDARD TERMINAL BOX ASSEMBLY FLAMEPROOF MOTOR

PROJECTION

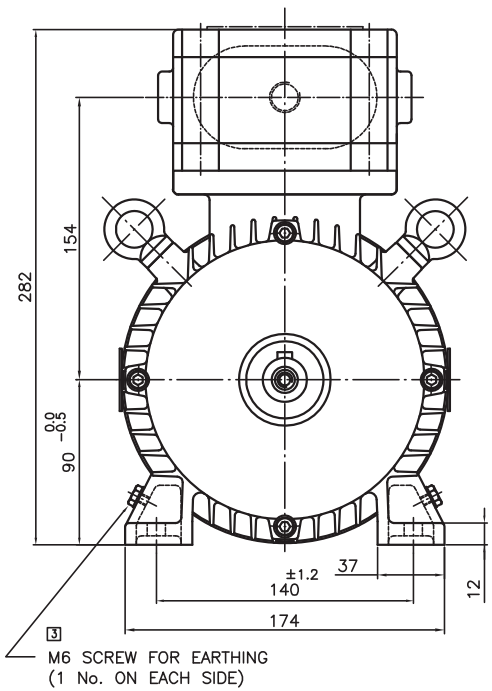
DRG. NO.: 33–06–044–0001 REV. 5

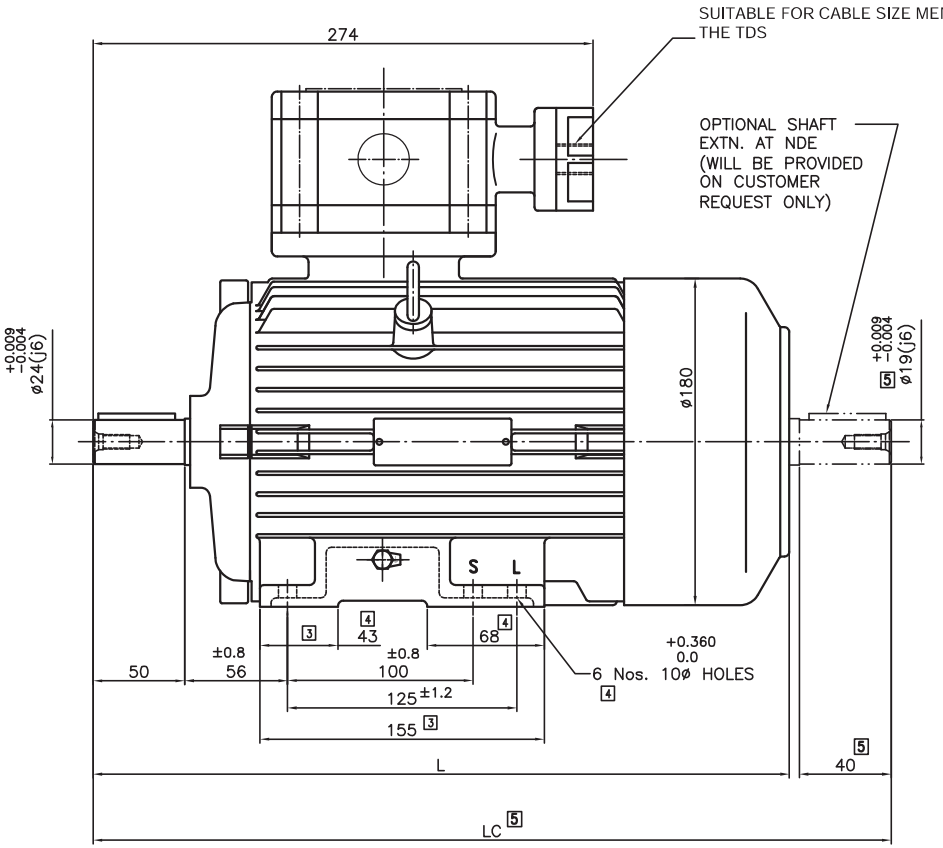
REF.: 63–71FLP–TBOX–ASSY

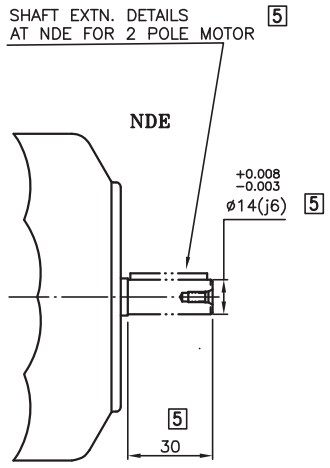
SCALE NTS

SHT 1/1

FRAME SIZE 80–90 [5] FLP

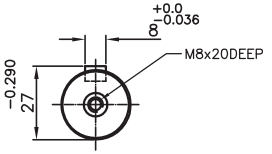




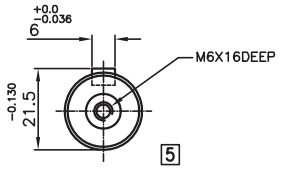


FRAME	MOTOR TYPE	POLE	L	LC
90S	FD1,FE2,FE3	2	380	415 5
		4,6,8		425 5

FRAME	MOTOR TYPE	POLE	L	LC
90L	FD1,FE2,FE3	2	380	415 5
		4,6,8		425 5
	FE3	2(2.2KW)	410	445 5
	FE2, FE3	4,6,8		455 5



SHAFT EXTENSION DETAILS AT DE



SHAFT EXTENSION DETAILS AT NDE

REV. STATUS			
5	NDE SIDE SHAFT EXTN. DIA.19x40LG. WAS DIA.24x50LG. & DIMS 410,415,425,445,455 WAS 435 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE & 2 POLE MOTOR VIEW ADDED	LANKESH	30-01-20
4	PROVISION FOR 90S FRAME HOLES MADE ON FEET AT DIMN. 100, 6 HOLES WAS 4 HOLES DIMN. 68 WAS 43, FRAME 90S/L FLP WAS 90FLP IN TITLE.	NIMKAR	25-3-16
3	DIMN. 274 WAS 260. M6 EARTHING SCREW INDICATED. DIMN. 43 & 155 ADDED.	SAURABH	27-8-15
2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES	NIMKAR	25-9-14

Dim. without tolerance as per IS:2102, very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSIONS DRAWING B3 MOUNTING/TEFC/STD. FLAMEPROOF MOTOR

	NAME	DATE
DRN.	P.N.RAOTE	02-01-07
CHD.	S.P.JADIA	02-01-07
APPD.	S.P.JADIA	02-01-07

PROJECTION

DRG. NO.: F-90-0-10 REV. 5

REF. : 90FLP-0ADIM-B3

SCALE NTS

SHT 1/1

FRAME SIZE 90S/L 4 FLP

hindustan ELECTRIC MOTORS	DATA SHEET: FLAMEPROOF INDUCTION MOTOR	Motor Type 2FE3 080-04

No. of Phases			3	Reference Standard	Performance		IS:12615
Frame Designation			80 FLP		Enclosure		IS:60079-1
Rated Output		kW	0.55	Protection IS:4691			IP 55
		HP	0.75	Vibration Standard			IS:12075
No. of Poles			4	Noise Standard			IS:12065
Rated Voltage		V	415	Duty			S1
Rated Frequency		Hz	50	Insulation Class			F
Rated Current		A	1.3	Cooling IS:6362			IC411
Rated Speed		rpm	1430	Terminal Box Details	Terminal Size		M4
Rated Torque		kgm	0.37		No. of Terminal		6
Efficiency	Full load	%	80.8		Max. cable size (Cu)	mm²	1x3Cx2.5
	3/4 load	%	80.8	Bearing Data	DE		6204ZZ
	1/2 load	%	74.0		NDE		6204ZZ
Power factor	Full load		0.73		Lubrication		Prelubricated
	3/4 load		0.66		Life L10 (Direct coupled)	hrs.	50,000
	1/2 load		0.53		Regreasing Time	hrs.	-
Temp. Rise (Res.)		°C	70	Lifting Eyebolt IS:4190			-
Acceleration Time		sec.	-	Motor Weight (approx)		kg	29
Stator Connection			Y	Rotor GD²		kgm²	0.0049
Tropicalised? (Yes/No)			Yes	Ambient Temp.		°C	50
I_{st} / I_r		%	6.0	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r		%	2.2	-			
T_{po} / T_r		%	2.6	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec	6	Frequency Variation ±		%	5
	Cold	sec	14	Combiend Variation ±		%	10

Remarks:
(1) Efficiency Class : IE3
(2) Motor construction: TEFC
(3) Suitable Cable Gland & Lugs BY AVPL
(4) Temp Class: T4 & Explosion Protection : Ex 'd'
(5) Motor suitable for Gas Gr. IIA / IIB, Zone I & II
(4) Minimum Starting Voltage : 80%
(6) Permissible Fault Level: 50KA for 0.25 sec
(7) No. of Hot/Cold Starts: 3/3

Data subject to tolerance as per IS:12615.

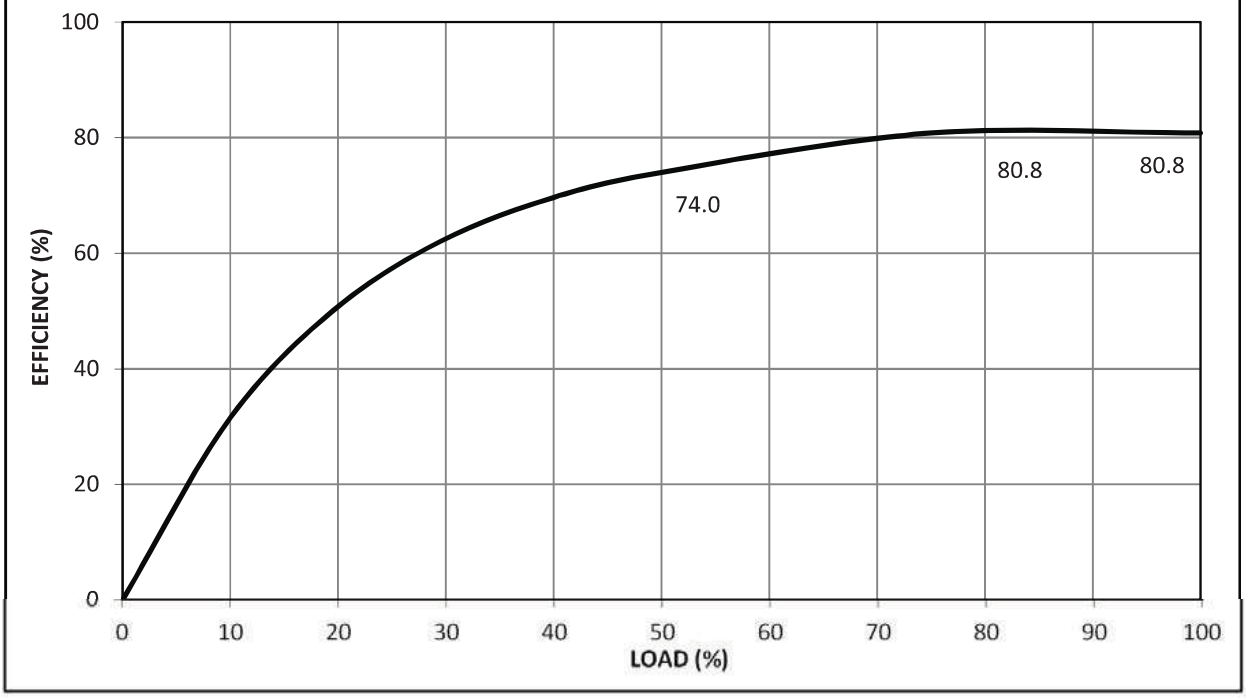
Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS

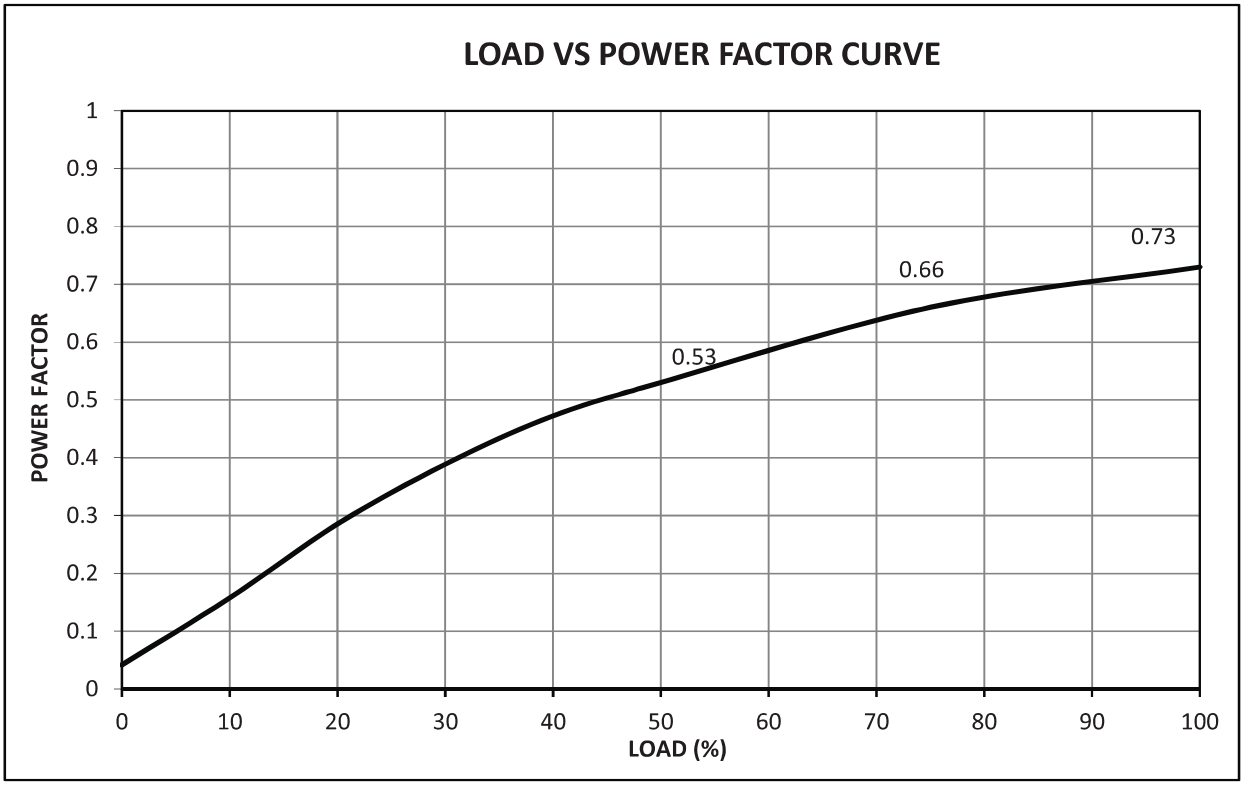
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75	Poles : 4	Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE

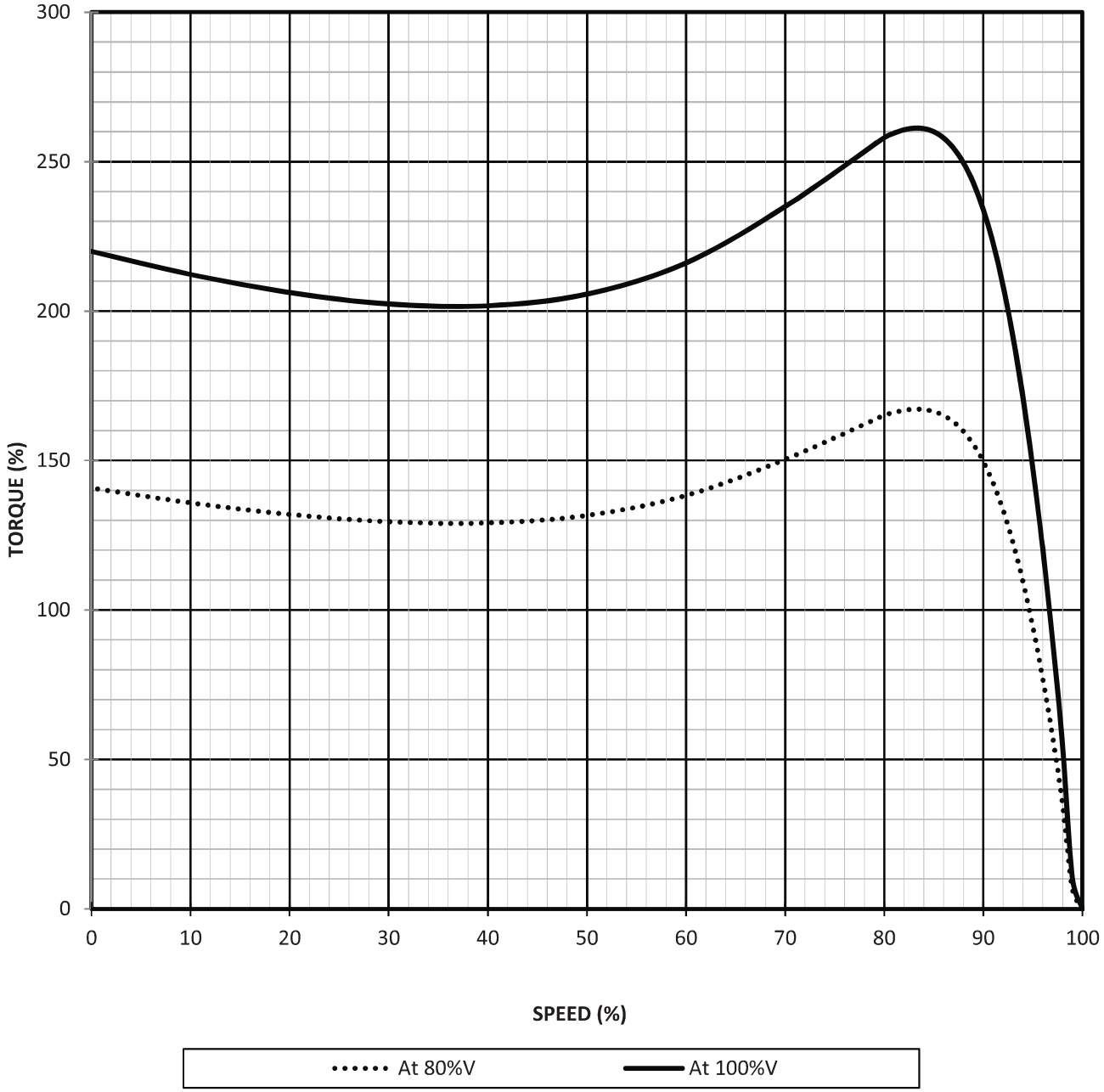


Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75	Poles : 4	Efficiency Class : IE3	

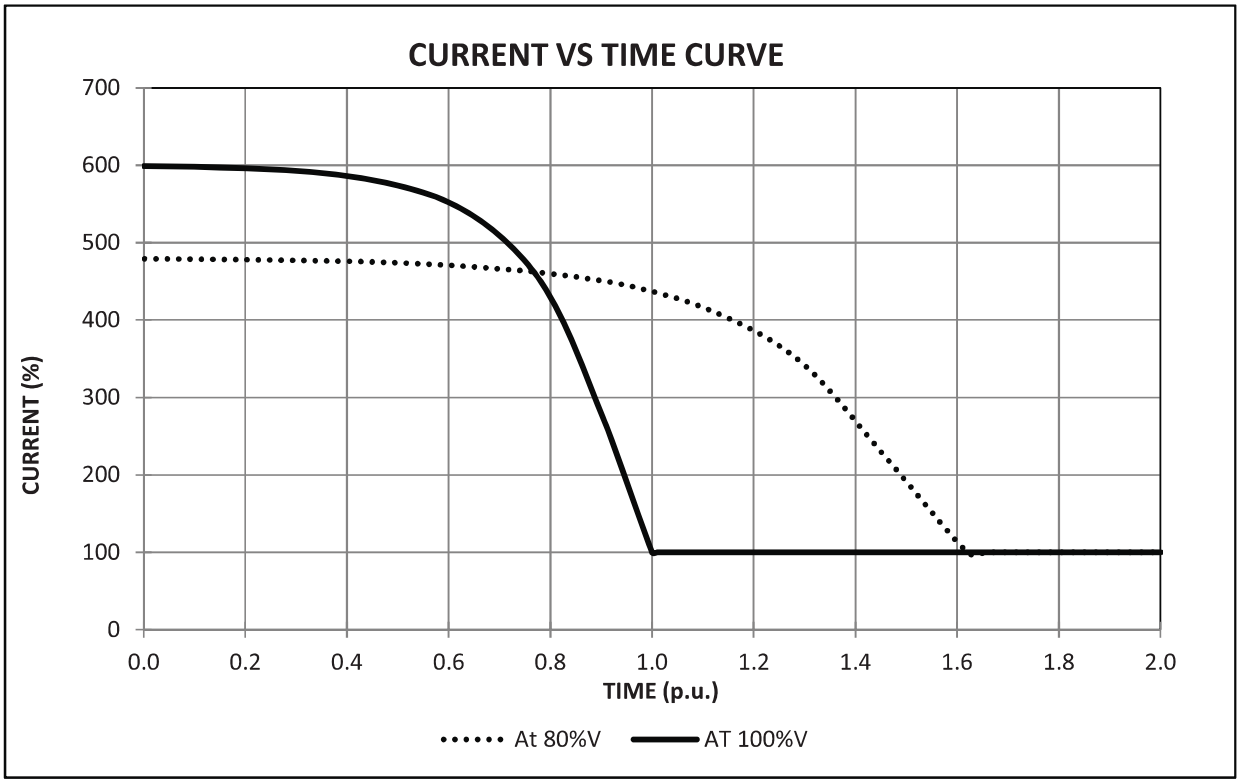
TORQUE SPEED CURVE

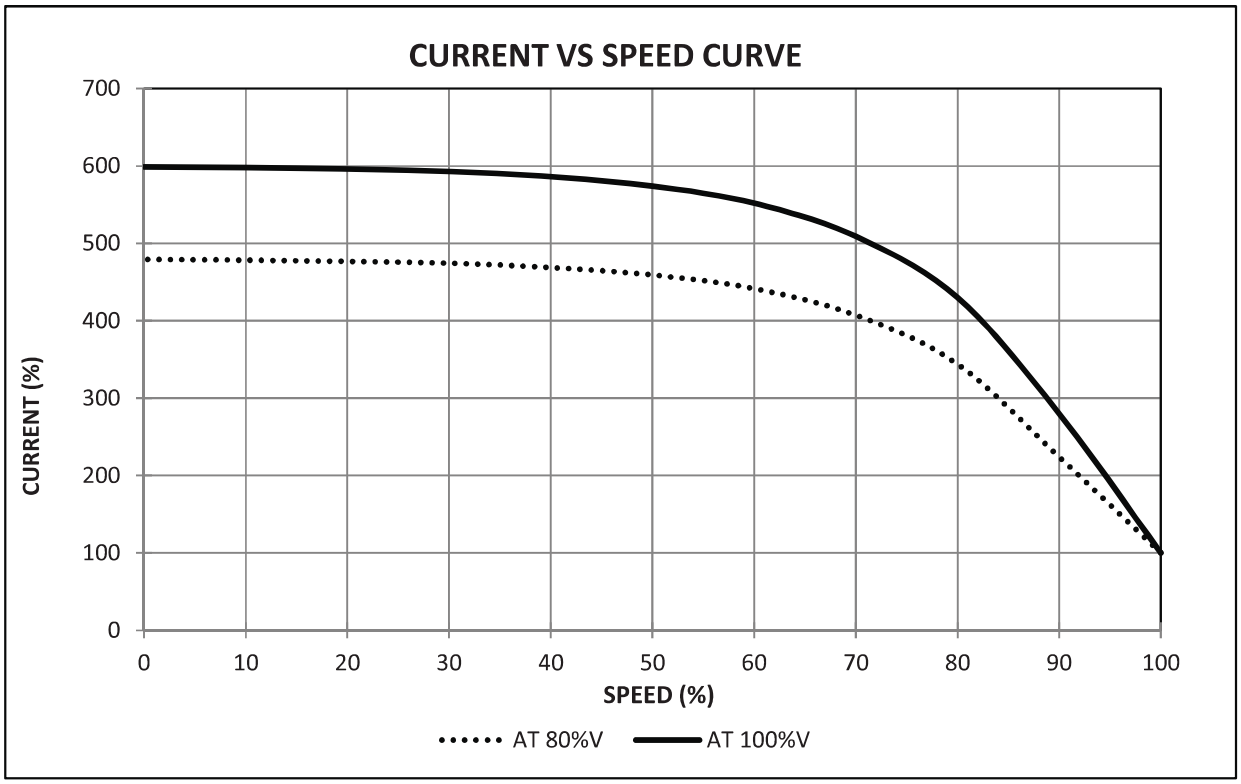


Prep.: SK	Date: 25-12-2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75	Poles : 4	Efficiency Class : IE3	



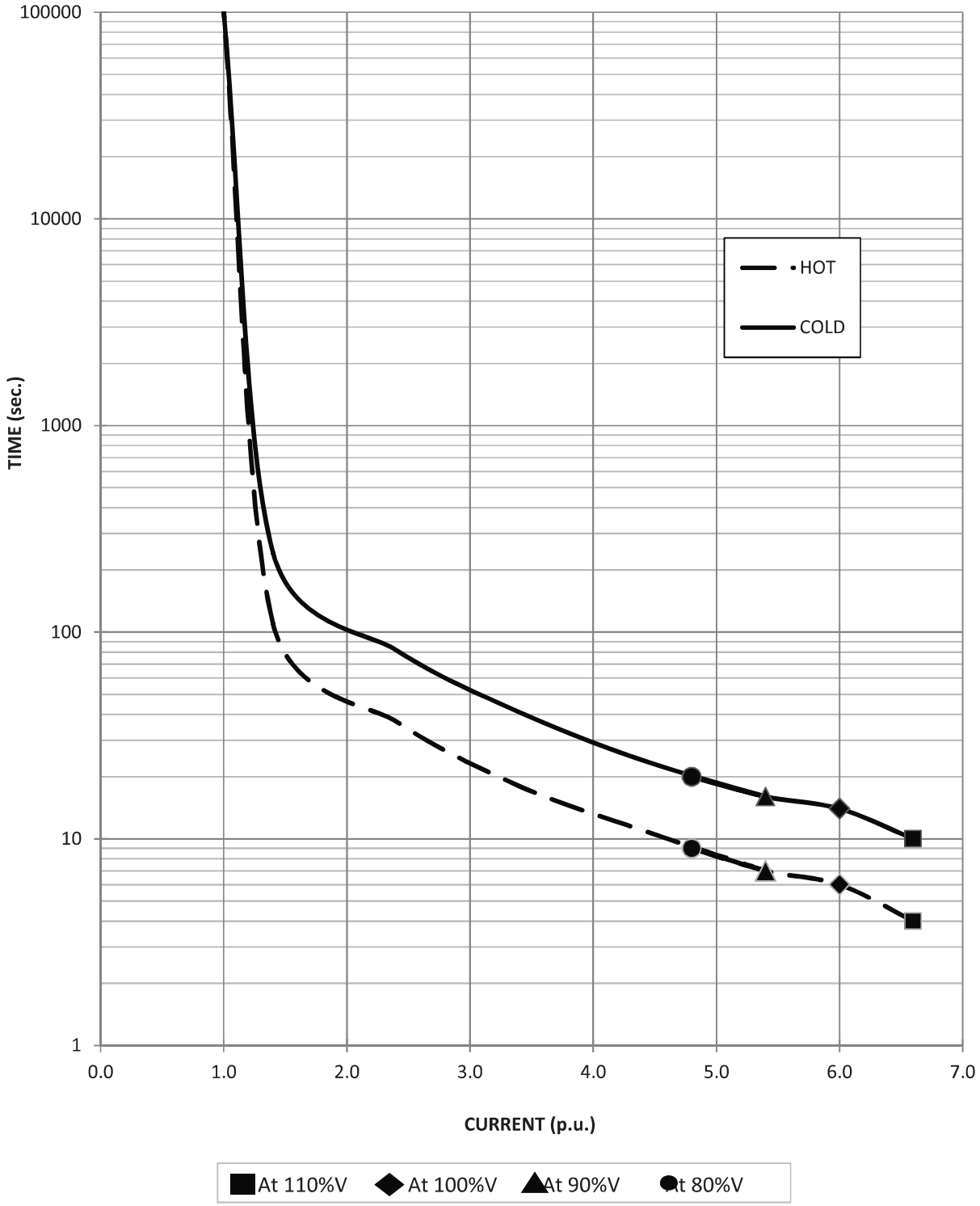


Prep.: SK	Date: 25-12-2021	Revision: -	

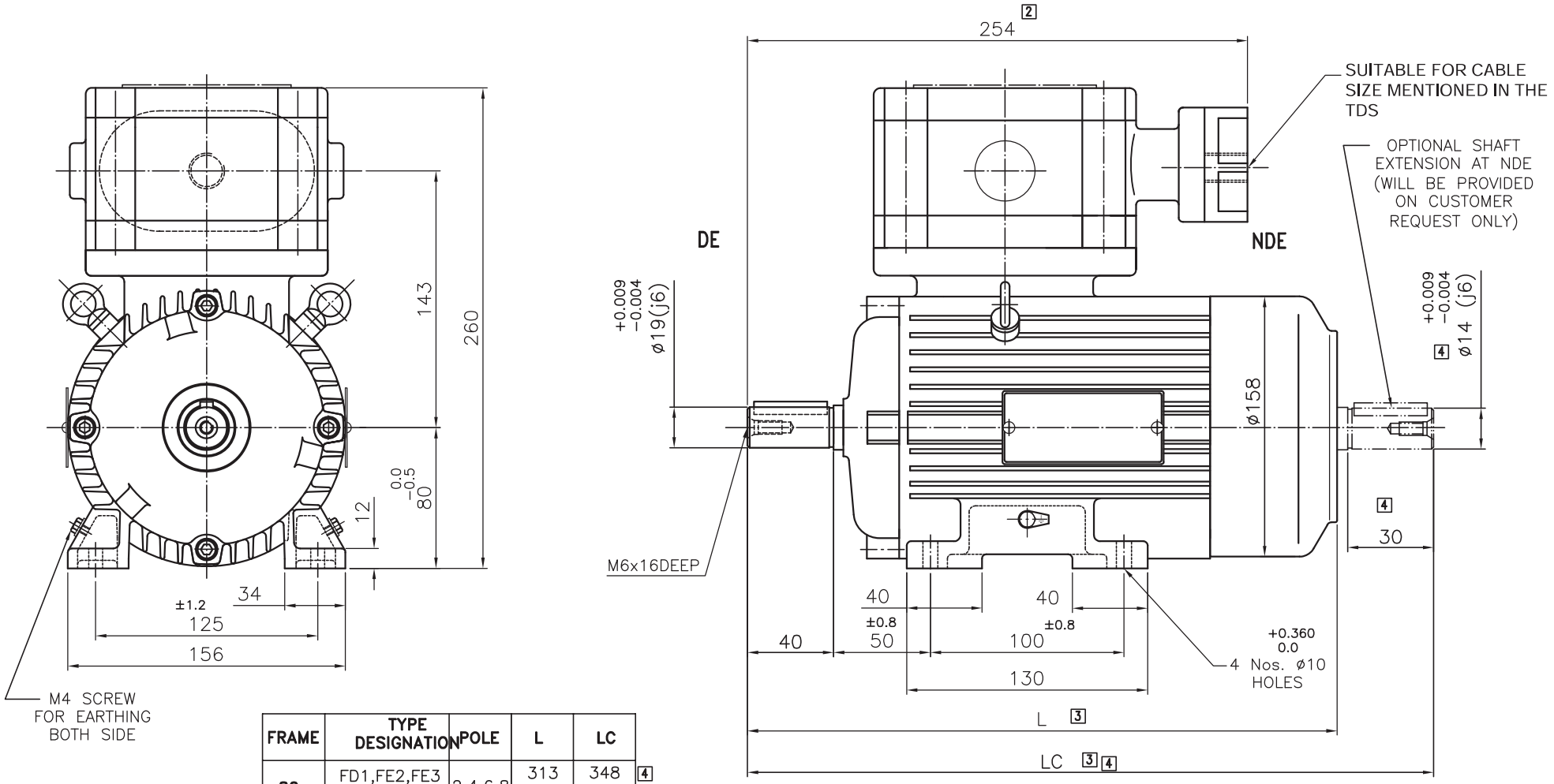
hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75	Poles : 4	Efficiency Class : IE3	

THERMAL WITHSTAND CURVE



Prep.: SK	Date: 25-12-2021	Revision: 0	



FRAME	TYPE DESIGNATION	POLE	L	LC
80	FD1,FE2,FE3	2,4,6,8	313	348 [4]
	FE2,FE3		359	394 [4]

REV. STATUS			
[4]	NDE SIDE SHAFT EXTN. DIA.14x30LG. WAS DIA.19x40LG. & DIMS 359,394,348 WAS 358 AS PER VERBAL INSTRUCTIONS RECD.FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE & TYPE DESIGNATION TABLE ADDED , TO UPLOAD THIS DRG. ON PORTAL	22-01-20	LANKESH
[3]	DIMN. 313, 358 WAS 310, 355, TO SUIT PRESENT COWL LENGTH 80 WAS 77	27/10/18	ARUN
[2]	DIMN. 254 WAS 240. TAPPING SHOWN IN SHAFT EXTN. DETAILS.	25/8/15	SAURABH
[1]	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES	8/1/14	NIMKAR

Dim. without tolerance as per IS:2102, very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSIONS DRAWING FOR B3 MOUNTING, TEFC, FLAMEPROOF MOTOR

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	P.N.RAOTE	18-01-07
CHD.	S.P.JADIA	18-01-07
APPD.	S.P.JADIA	18-01-07

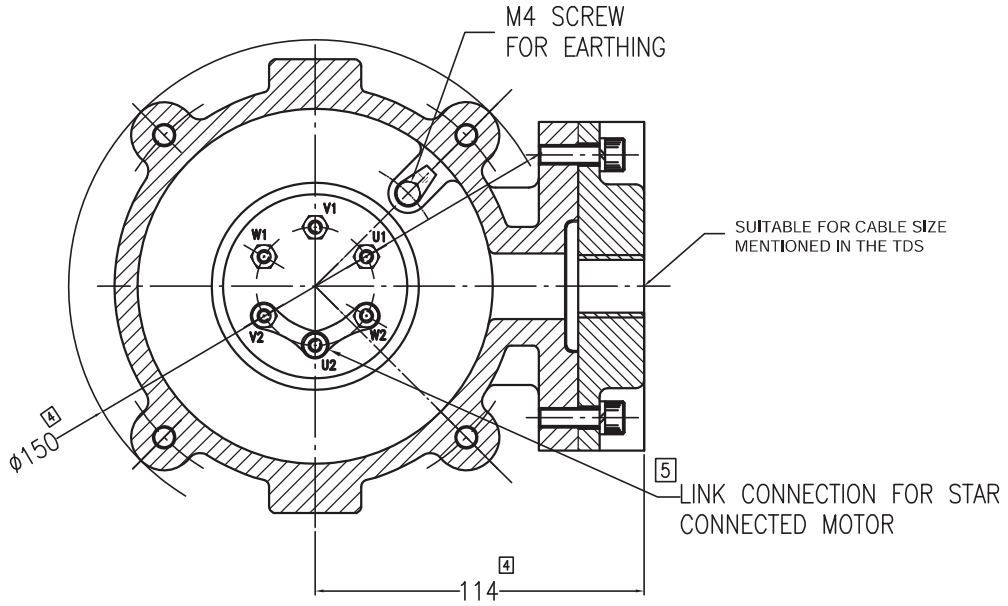
PROJECTION

DRG. NO.: F-80-0-10

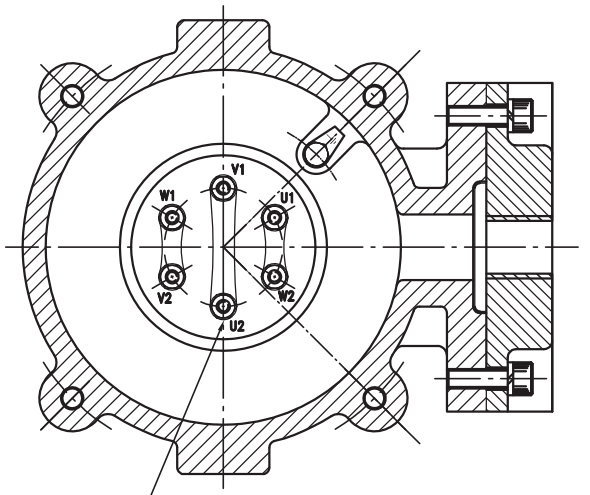
REV. 4

REF : 80FLP-0ADIM-B3

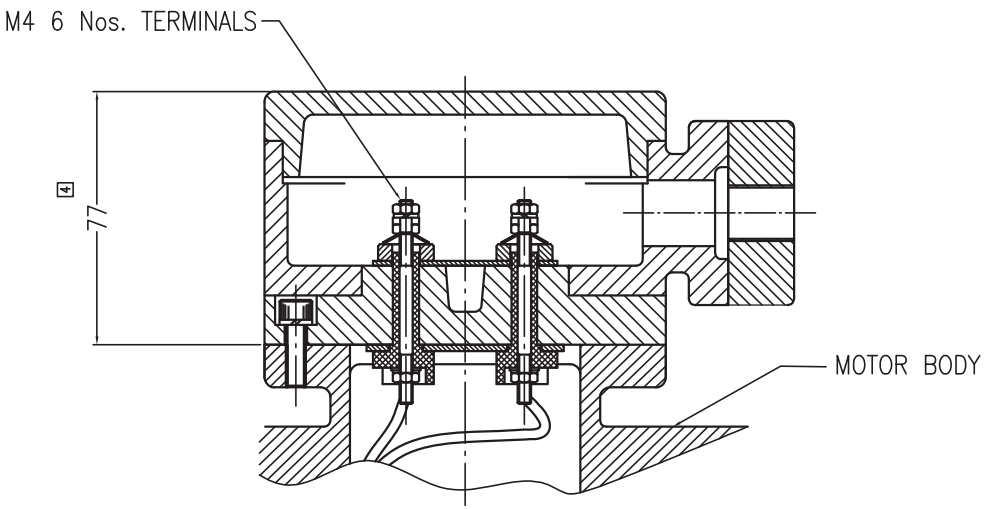
FRAME SIZE 80 FLP



VIEW AFTER REMOVAL OF TERMINAL BOX [4] COVER



[5] LINK CONNECTION FOR DELTA CONNECTED MOTOR



[5] NOTE:–
REFERENCE GENERAL CONSTRUCTION DETAILS DRG. No. 80F–HEM–GA–01 FOR 80 FLP & DRG. No. 90F–HEM–GA–01 FOR 90 FLP.

REV. STATUS	SYM.	REVISION	DATE	BY
	[5]	FRAME SIZE 63–71 WAS 80–90 IN TITLE BLOCK, AND SEPERATE DRAWING MADE FOR 63–71FLP HAVING DRG. No. 24–06–044–0016 VIEW INCLUDED FOR DELTA CONNECTED MOTOR AND STAR CONNECTED SPECIFIED FOR EXISTING VIEW & NOTE ADDEED.	31–7–18	KIRAN
	[4]	OVERALL DIMENSIONS, NOTE & STANDARD SPECIFIED IN TITLE	11–04–15	P.N.RAOTE
	[3]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. NO. & ALL THE FEATURES.	27–07–15	SAURABH

All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

hindustan ELECTRIC MOTORS

	NAME	DATE
DRN.	NIMKAR	28–11–12
CHD.	S.P.JADIA	28–11–12
APPD.	S.P.JADIA	28–11–12

TITLE [4] STANDARD TERMINAL BOX ASSEMBLY FLAMEPROOF MOTOR

PROJECTION

DRG. NO.: 33–06–044–0001 REV. 5

REF.: 63–71FLP–TBOX–ASSY

SCALE NTS

SHT 1/1

FRAME SIZE 80–90 [5] FLP

hindustan ELECTRIC MOTORS	DATA SHEET: INDUCTION MOTOR	Motor Type 2HE3 080-02

No. of Phases			3	Reference Standard			IS:12615
Frame Designation			90S	Protection IS:4691			IP 55
Rated Output		kW	0.75	Vibration Standard			IS:12075
		HP	1.0	Noise Standard			IS:12065
No. of Poles			6	Duty			S1
Rated Voltage		V	415	Insulation Class			F
Rated Frequency		Hz	50	Cooling IS:6362			IC411
Rated Current		A	1.9	Terminal Box Details	Type		HM2GN
Rated Speed		rpm	930		Terminal Size		M4
Rated Torque		kgm	0.79		No. of Terminal		6
Efficiency	Full load	%	78.9		Max. cable size (Cu)	mm²	1x3Cx2.5
	3/4 load	%	78.9	Bearing Data	DE		6205ZZ
	1/2 load	%	74.0		NDE		6205ZZ
Power factor	Full load		0.70		Lubrication		Prelubricated
	3/4 load		0.68		Life L10 (Direct Coupled)	hrs.	50,000
	1/2 load		0.63		Regreasing Time	hrs.	-
Max. Temp. Rise (Res.)		°C	70	Lifting Eyebolt			-
Acceleration Time		sec.	-	Motor Weight (approx)		kg	15.0
Stator Connection			Y	Rotor GD²		kgm²	0.0135
Tropicalised? (Yes / Yes)			Yes	Ambient Temp.		°C	50
I_{st} / I_r			7.0	Overall Dimensions of Packed motor (LxBxH) (mm)			
T_{st} / T_r			2.6	-			
T_{po} / T_r			2.6	Voltage Variation ±		%	10
Locked rotor withstand time	Hot	sec.	6	Frequency Variation ±		%	5
	Cold	sec.	14	Combiend Variation ±		%	10

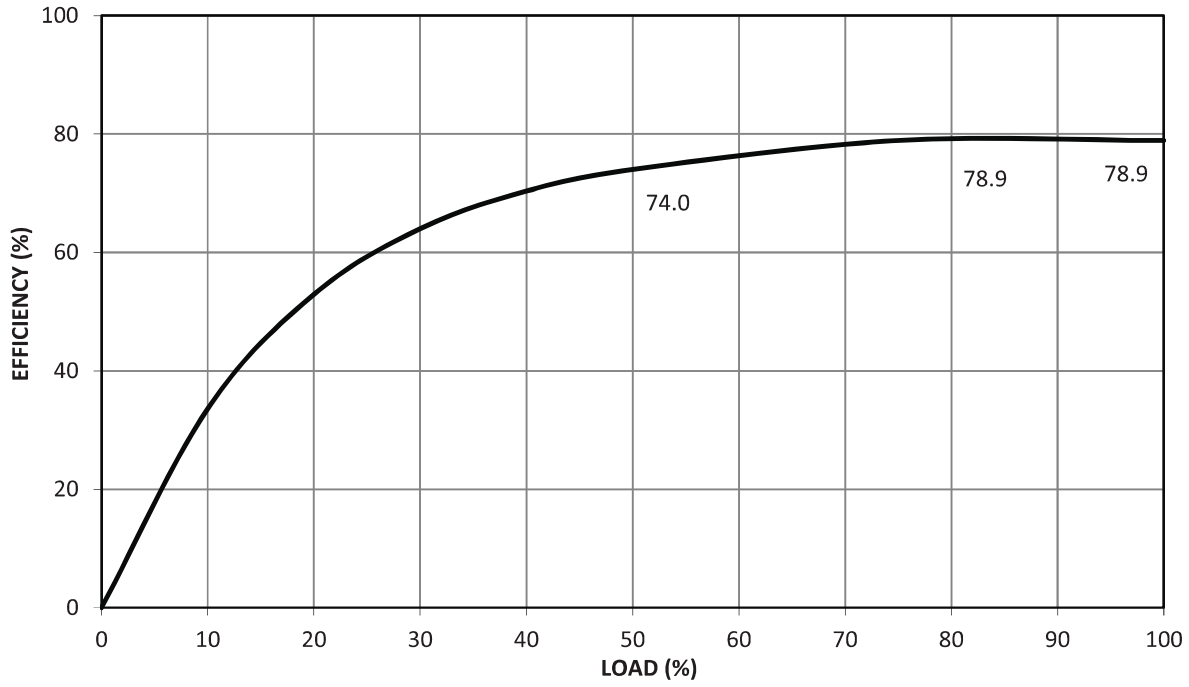
Remarks:
(1) Efficiency Class : IE3
(2) Motor Construction : TEFC
(3) Suitable Cable Gland & Lugs BY AVPL
(4) Minimum Starting Voltage : 80%
(5) Permissible Fault Level: 50KA for 0.25 sec
(6) No. of Hot/Cold Starts: 3/3

Data subject to tolerance as per IEC 60034-1

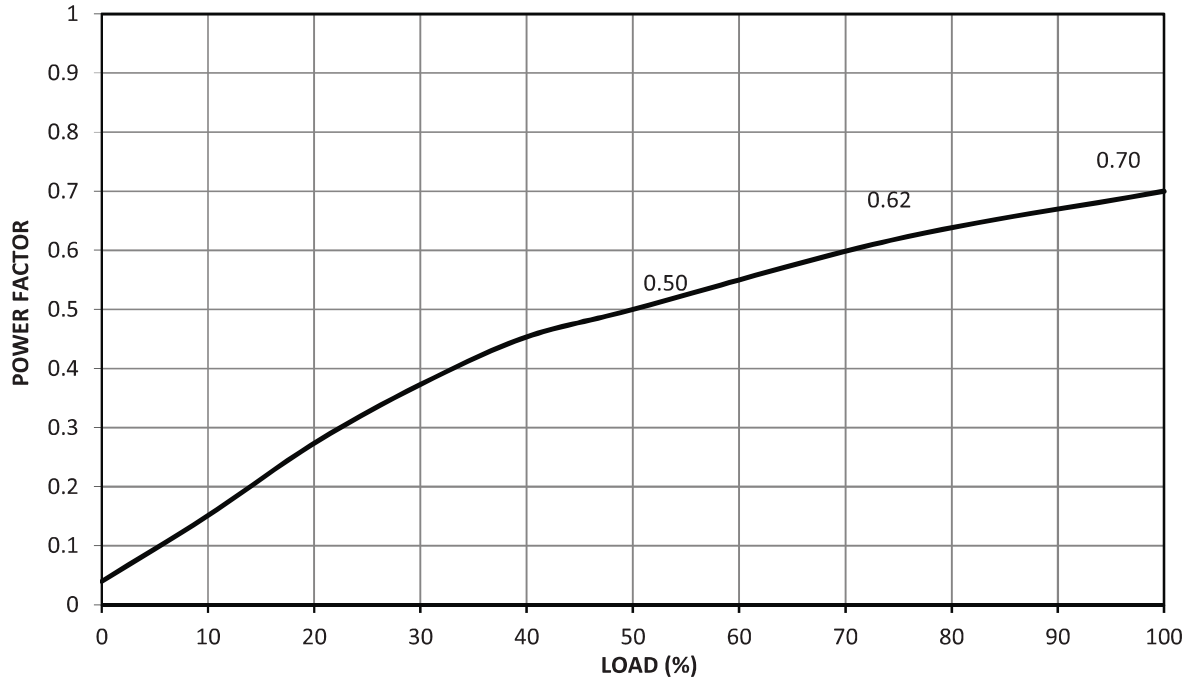
Prep.: Engg	Chkd.:	
Date:	Date:	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 0.75/1.0	Poles : 6	Efficiency Class : IE3	

LOAD VS EFFICIENCY CURVE



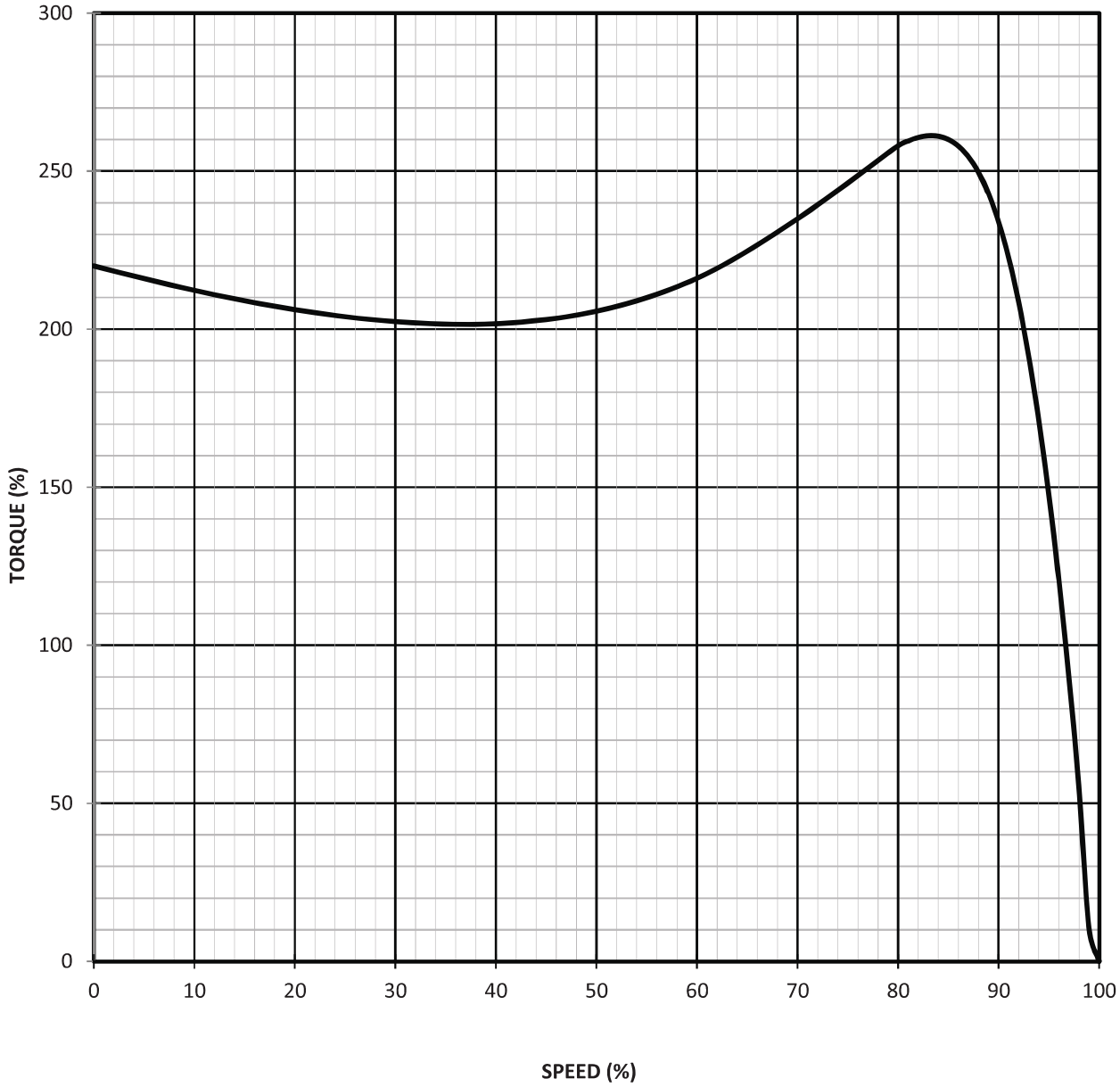
LOAD VS POWER FACTOR CURVE



Prep.: SK	Date: 3/26/2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 0.75/1.0	Poles : 6	Efficiency Class : IE3	

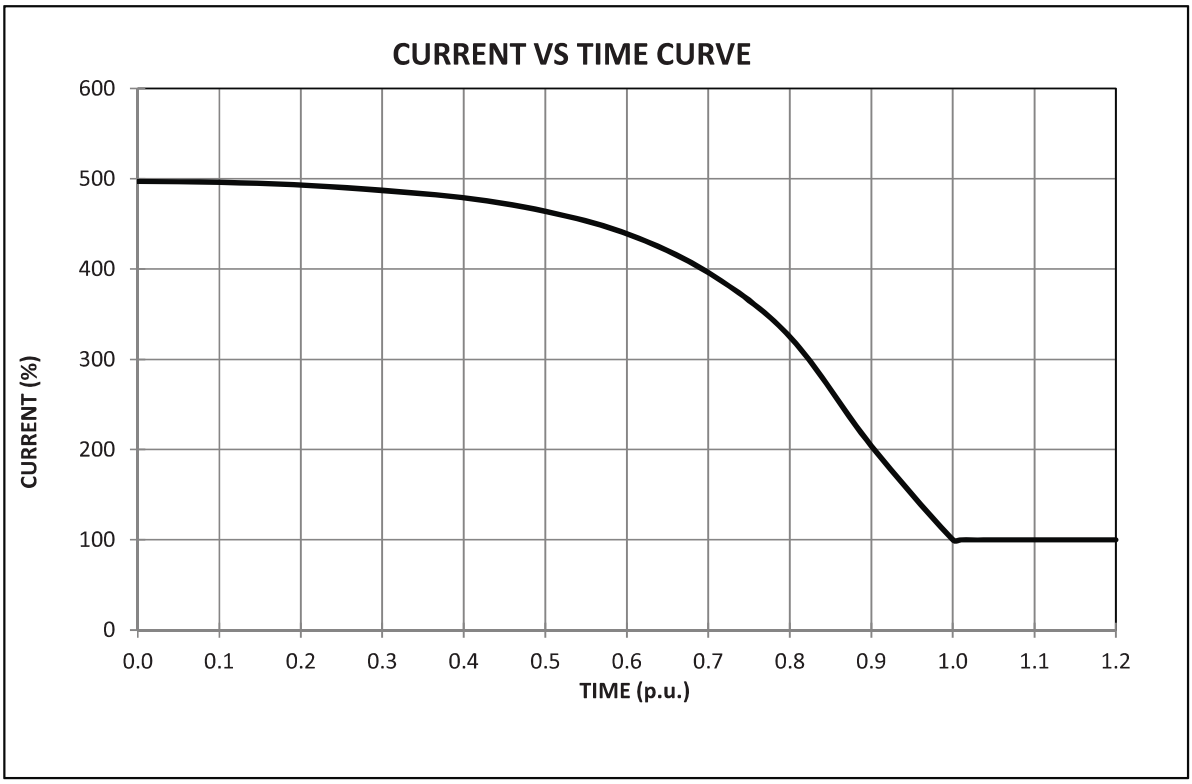
TORQUE SPEED CURVE

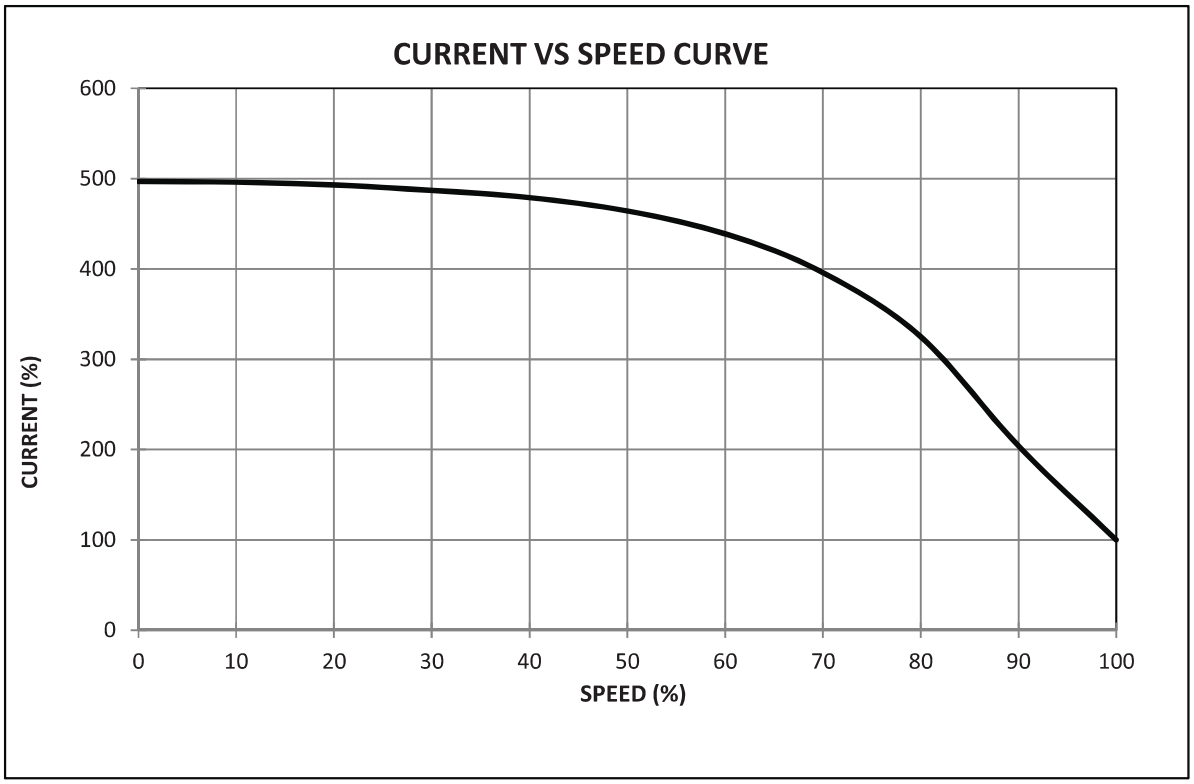


Prep.:	SK	Date:	3/26/2021	Revision:	-	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0	Poles : 6	Efficiency Class : IE3	



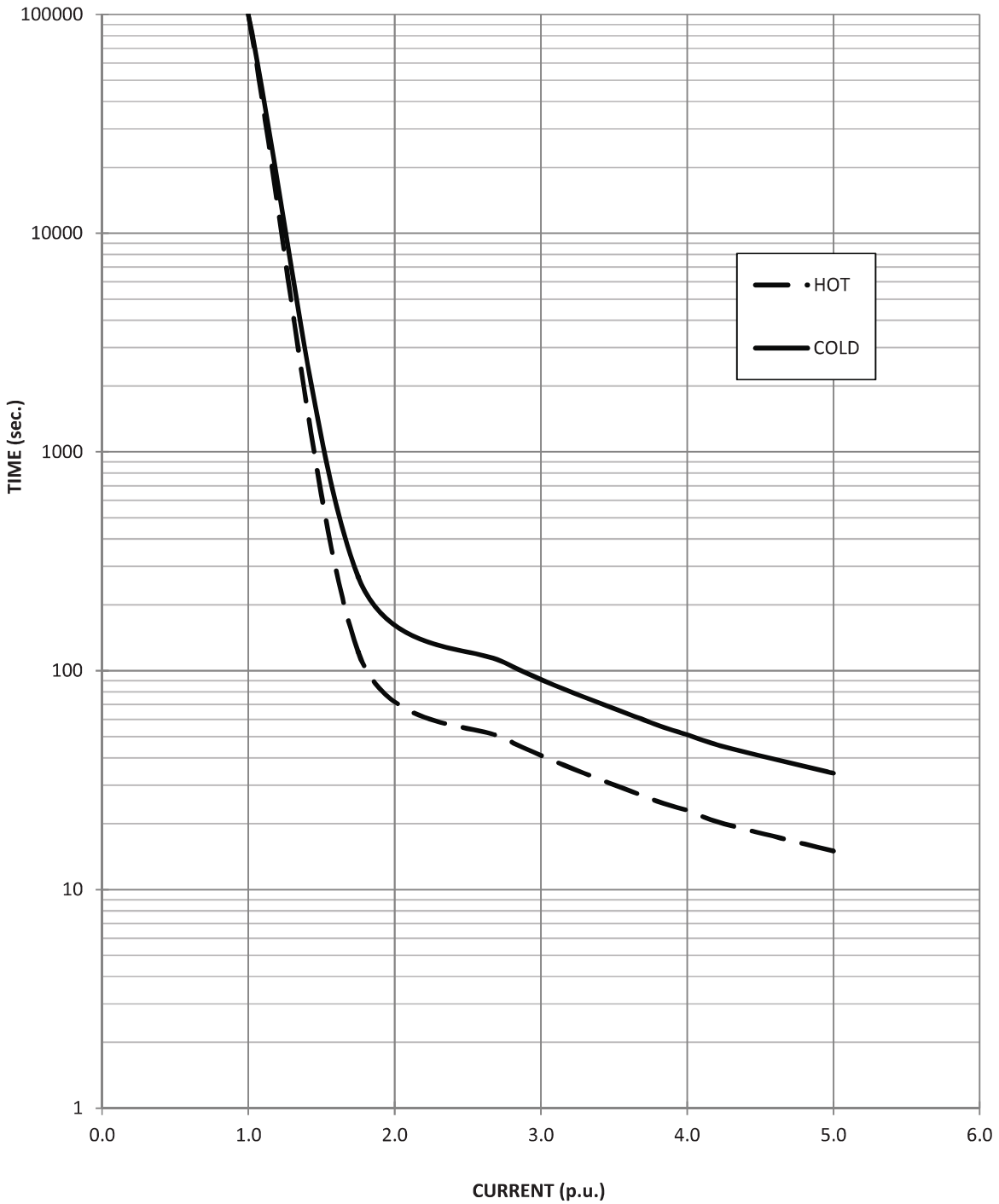


Prep.: SK	Date: 3/26/2021	Revision: -	

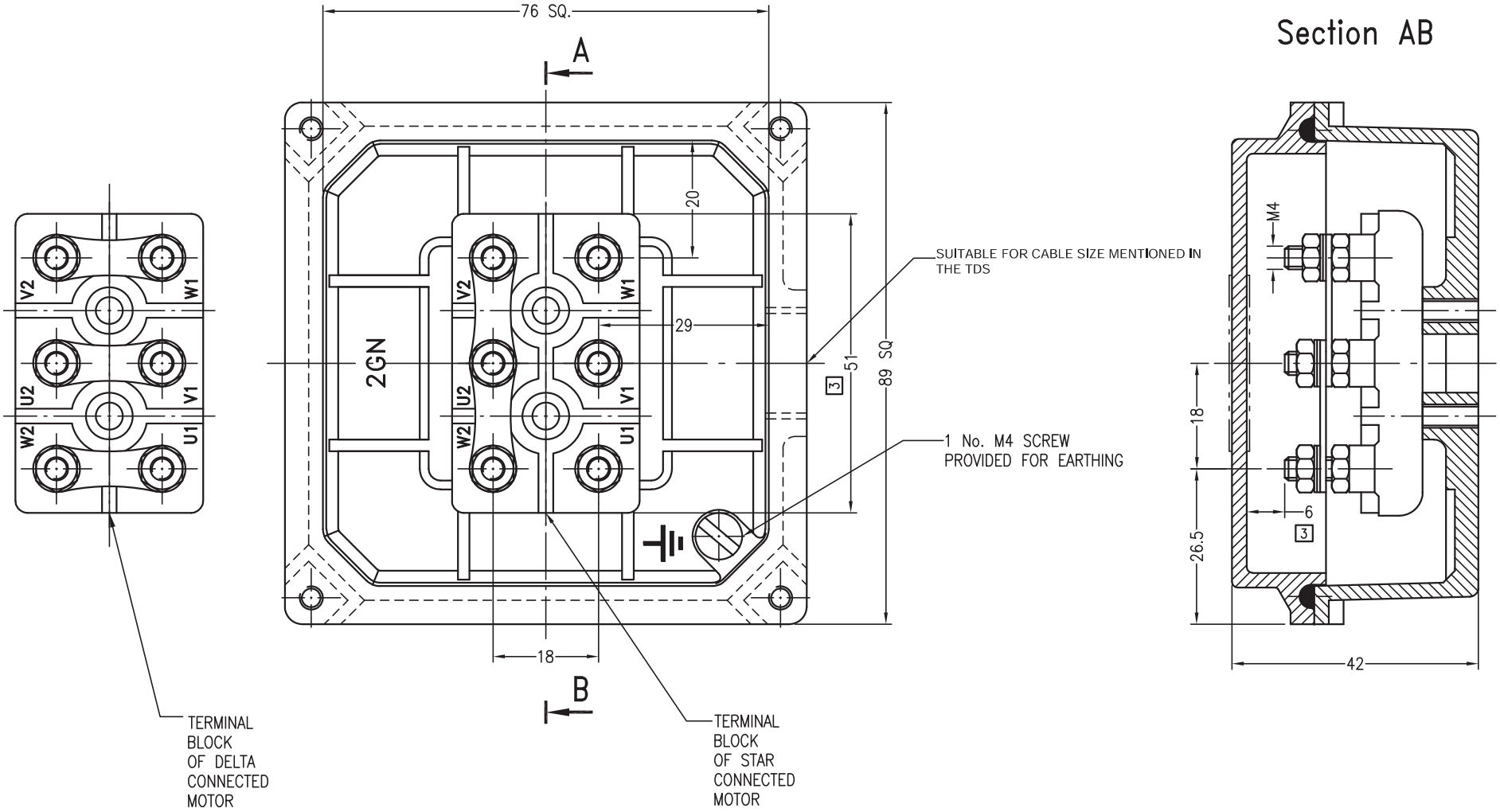
hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0	Poles : 6	Efficiency Class : IE3	

THERMAL WITHSTAND CURVE



Prep.: SK	Date: 3/26/2021	Revision: 0	



REV. STATUS			
	3	TERMINAL BLOCK DIMN. 51 WAS 68 LG. [TERMINAL BLOCK AS PER DRG. No. A4-56/100-17(3G) WAS TERMINAL BLOCK DRG. No. A4-56T090-17] DIMN. 29 REMOVED & DIMN. 6 WAS 6.5	NIMKAR 01/10/16
	2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR 11/11/14

Dim. without tolerance as per IS:2102 very coarse

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

hindustan ELECTRIC MOTORS

TITLE: STD. TERMINAL BOX ASSEMBLY

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	GANESH	16-07-11
CHD.		
APPD.		

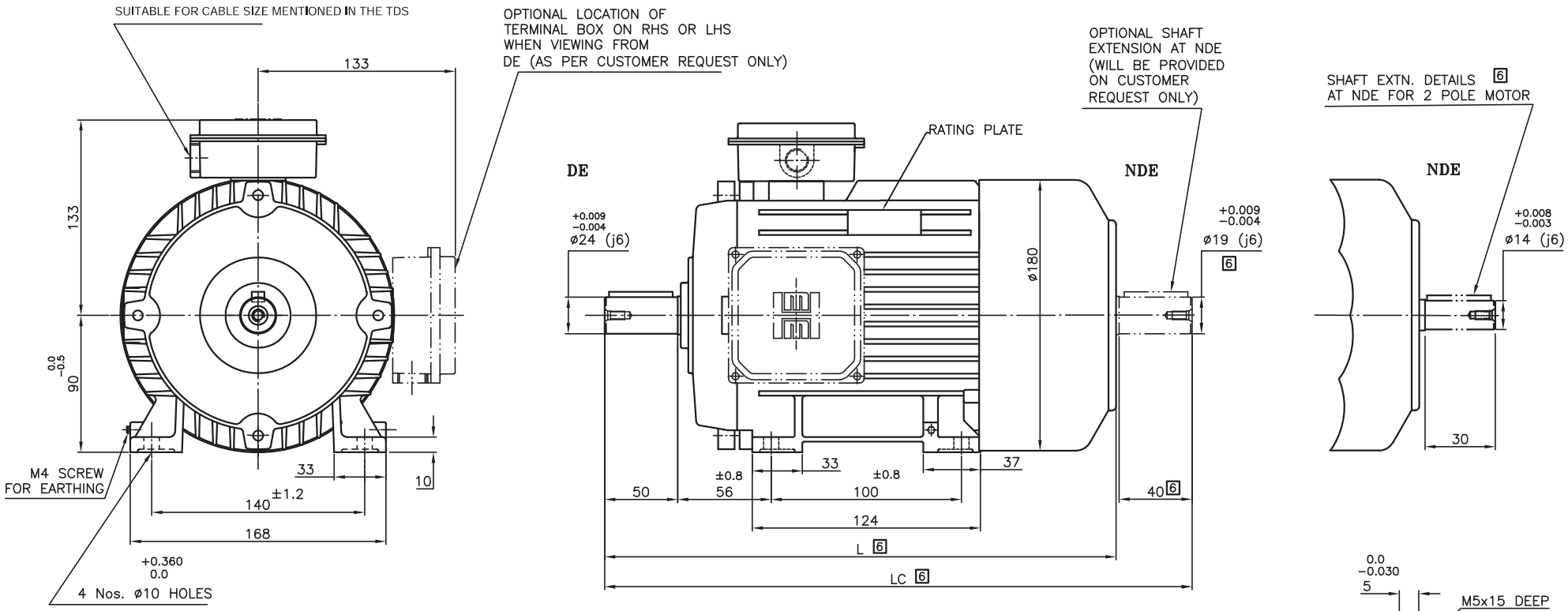
PROJECTION

DRG. NO.: A4-80/90-33(GN)

REV. 3

REF.: TB-ASLY-63-90

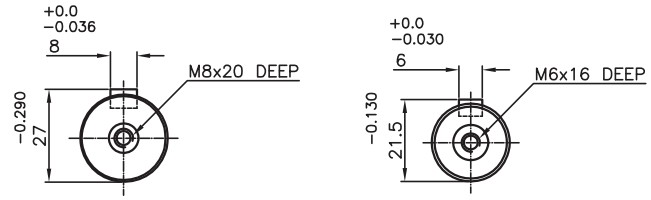
FRAME SIZE 63-90 (GN)



SHAFT EXTENSION DETAILS AT NDE FOR 2POLE MOTOR [6]

[6]

FRAME	TYPE DESIGNATION	POLE	L	LC
90S	2HE2	2	319	356
		4,6,8		366 [6]
	2HE3	2	344	381
		4,6,8		391



SHAFT EXTENSION DETAILS AT DE

SHAFT EXTENSION DETAILS AT NDE [6]

REV. STATUS				
	6	TYPE DESIGNATION TABLE ADDED. NDE SIDE SHAFT EXTN. ø19x40LG. WAS ø24x50LG. & RELATED MECHANICAL DIMS FOR IE2-IE3 UPDATED AS PER TECHNICAL SPECIFICATION CATALOGUE CAT.: D08 PRINT: 01/2020. NDE SIDE SHAFT EXTN. DETAILS VIEW ADDED & 2 POLE NDE SIDE MOTOR VIEW ADDED.	PRAFUL	01-07-21
	5	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	ARUN	26-10-18

Dim. without tolerance as per IS:2102, very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSIONS DRAWING B3/TEFC STD. MOTOR

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	P.N.RAOTE	17-06-06
CHD.	S.P.JADIA	17-06-06
APPD.	S.P.JADIA	17-06-06

PROJECTION

DRG. NO.: A1-90S-49(GN)

REV. 6

REF.: A1-OADIM-B3-90S(GN)

FRAME SIZE 90S (GN)

CG Power and Industrial Solutions Limited
LT Motors Division
Ahmednagar

Apex IE3

DATA SHEET OF 3 PHASE INDUCTION MOTOR

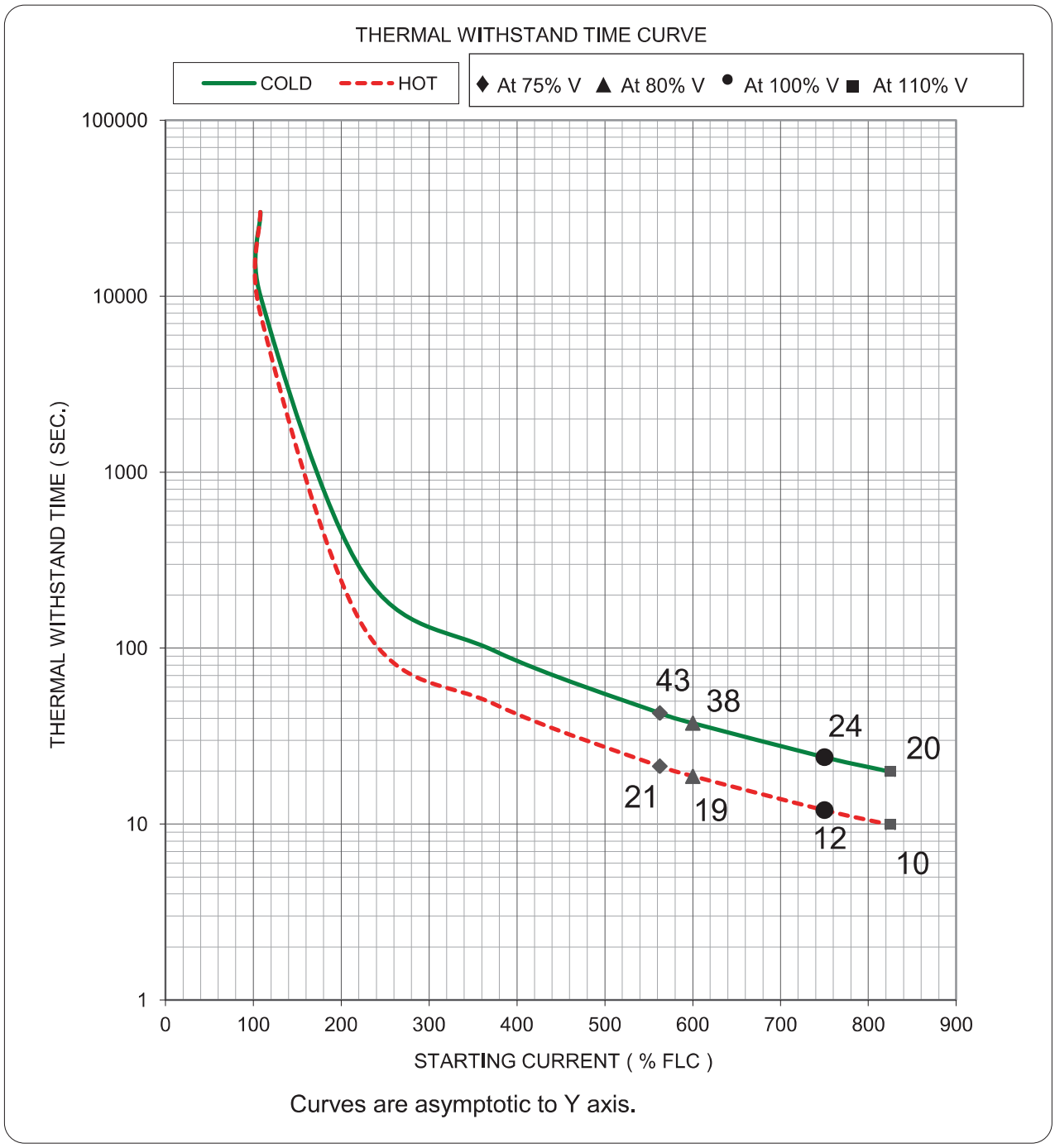
Customer : Advance Ventilation Pvt. Ltd. Enquiry / INDENT NO : NMPI906861/1600 (Dated: 02/26/2019)

Frame	ND225S	Rated Output (kW)	37
Voltage (V)	415 +-10%	Rated Current (A)	64.00
Rated Speed (RPM)	1475	No of poles	4
Frequency (Hz)	50 +-5%	Duty	S1
Method of Cooling	IC411	Degree of Protection	IP55
Gas Group	Not applicable	Mounting	B3
Temp Class	T3		
Enclosure	TEFC Safe Area		
Load	100% Load	75% Load	50% Load
Efficiency	IE3 - 93.9 %	93.9 %	93 %
Power factor	0.86	0.82	0.74
AMB. Temp/Temp rise	50°C/70°C (By Resistance Method)		
Insulation class	F (Temp. rise limited to class 'B')		
Rated Torque (kg-m)	24.42		
Locked rotor current % FLC	700		
Starting torque % FLT	225		
Pull out torque % FLT	275		
Pull Up torque % FLT	220		
Life Of Beraing	40000 Hours greased For Life		
Method of starting	Direct On Line		
Winding connections	Delta		
No of terminals	6		
Direction of rotation	Bidirectional		
Noise Level	As Per IEC Standard		
Motor GD Sq. (kg-m²)	3.53		
Load GD Sq. (kg-m²)	3.02		
Starting time @100% V (Sec)	0.3		
Locked rotor Withstand time hot (Sec.)	12		
Locked rotor Withstand time cold (Sec.)	24		
Stator Thermal / Cooling time constant (min)	45 / 90		
Successive Cold / HotStart	3/2 When Load GD2=Motor GD2		
Terminal box position	RHS From DE		
Cable size	1*3C, 95 SQMM (AL)		
Bearing DE/ODE	6313-ZZ / 6213-ZZ		
Type of lubrication	Sealed Bearing. No Lubrication Required		
Shaft Material	EN8 OR C40	Stator Body Material	Cast Iron
Minimum Starting Voltage	80% Of The Rated When Load GD2= Motor GD2		
Net Weight (Approx.) kg	325		
Paint shade	As per approved painting schedule		
Applicable standards	IEC 60034		
Space heaters	SPACE HEATER 60WX1 (200/225)		Voltage: 220-240V
Winding Resistance	0.118/0.124mΩ Per Phase and 0.079/0.083B/W Terminal		

(1) Suitable Cable Gland & Lugs BY AVPL
(2) Minimum Starting Voltage : 80%
(3) Permissible Fault Level: 50KA for 0.25 sec
(4) No. of Hot/Cold Starts: 3/3

All performance data is subject to tolerance as per IEC 60034
All performance shall be measured on sinusoidal supply
Temp rise test shall be carried at rated kW & voltage for 1 hour other than S1 duty

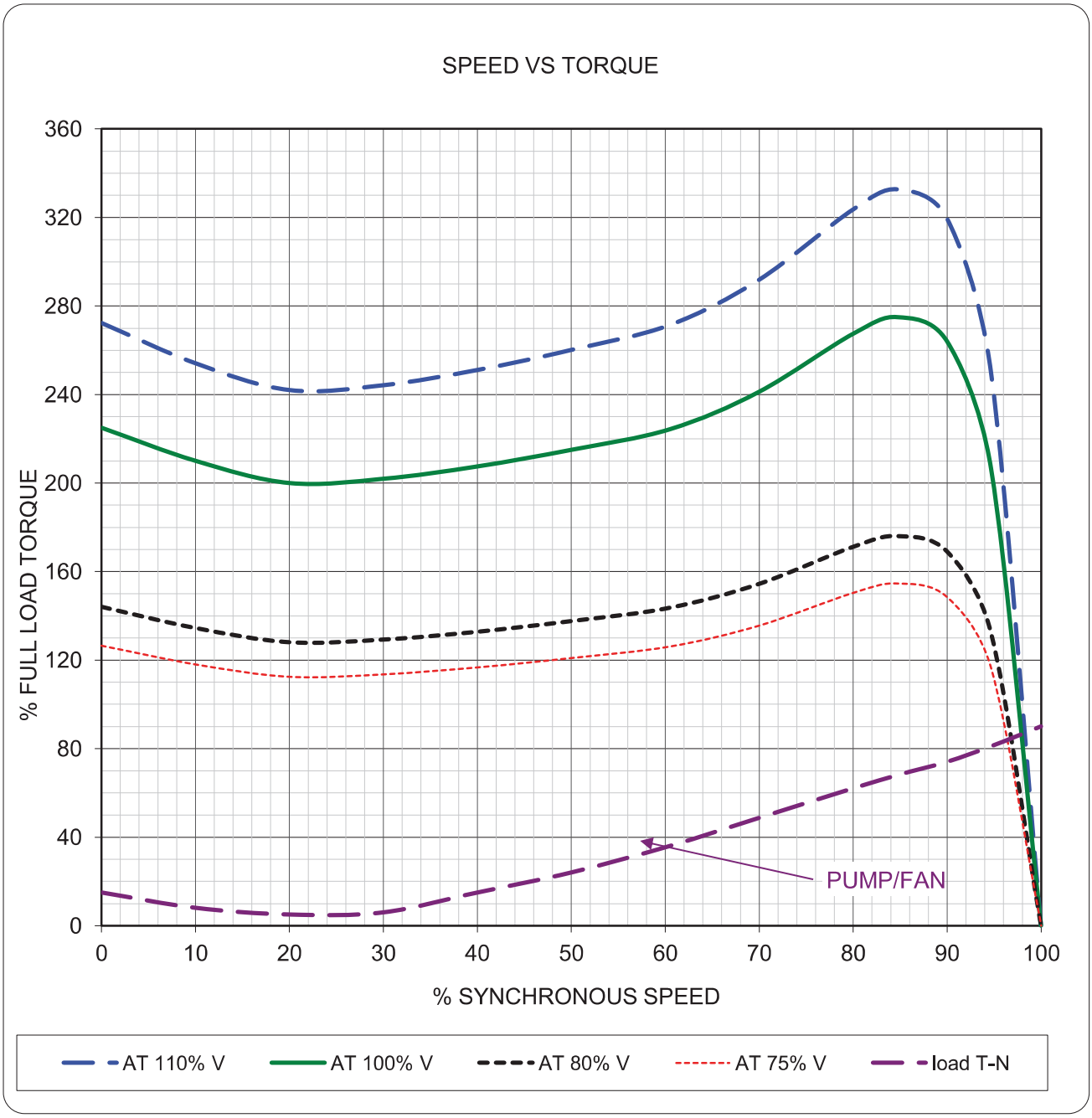
Customer specific paint shade and paint thickness will not be applicable on powder coated components.



CUSTOMER	ADVANCE VENTILATION PVT. LTD.	RATED O/P kW	37
P.O.NO		NO OF POLES	4
IND.NO:	QNMVI22025/700	FRAME	ND225S

	NAME	DATE	TITLE
DRN	PLP	31-Jan-22	THERMAL WITHSTAND TIME CURVE
CHD	PLP	31-Jan-22	
APPROVED	RGV	31-Jan-22	SC12/24/750

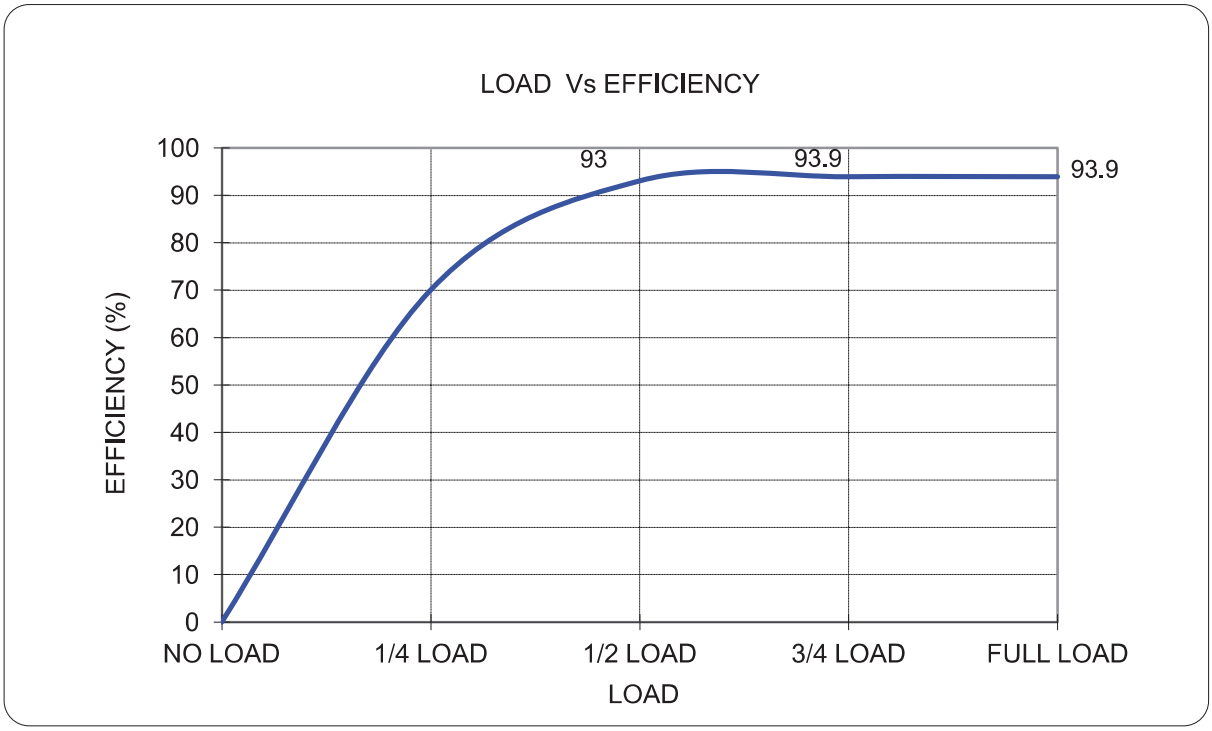
CG Power and Industrial Solutions Limited
LT Motors Division
Ahmednagar

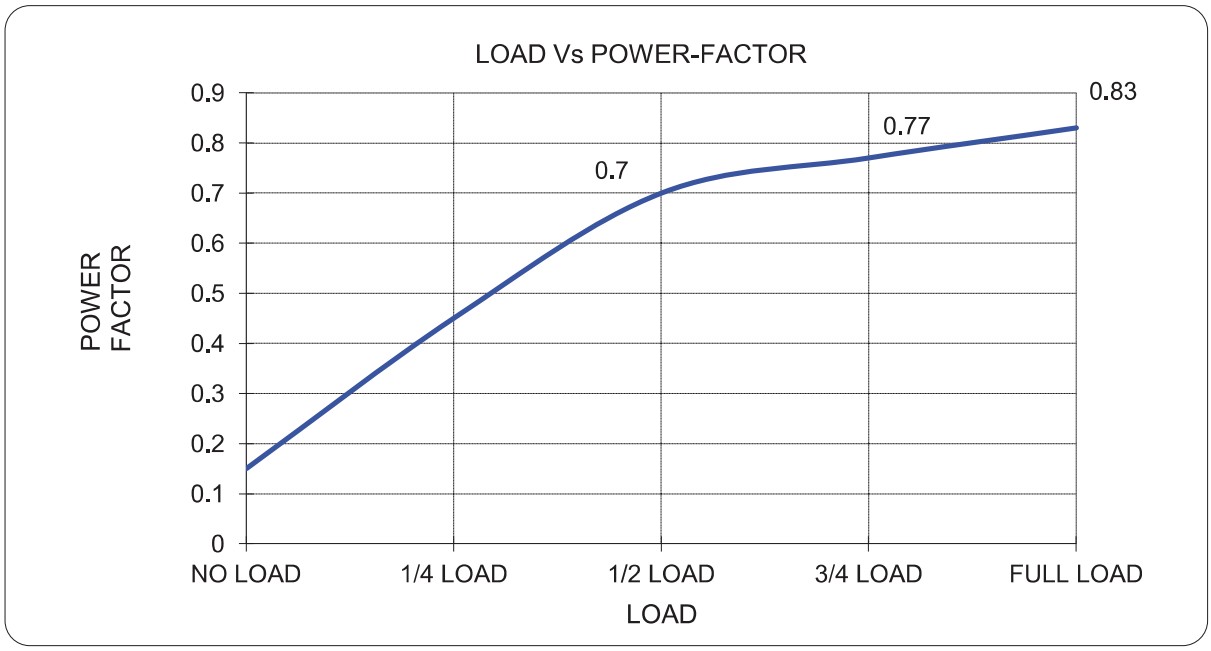


CUSTOMER	ADVANCE VENTILATION PVT. LTD.	RATED O/P kW	37
P.O.NO		NO OF POLES	4
IND.NO:	QNMVI22025/700	FRAME	ND225S

	NAME	DATE	TITLE
DRN	PLP	31-Jan-22	SUPERIMPOSED TORQUE SPEED CURVE
CHD	PLP	31-Jan-22	
APPROVED	RGV	31-Jan-22	SC225/750

CG Power and Industrial Solutions Limited
LT Motors Division
Ahmednagar

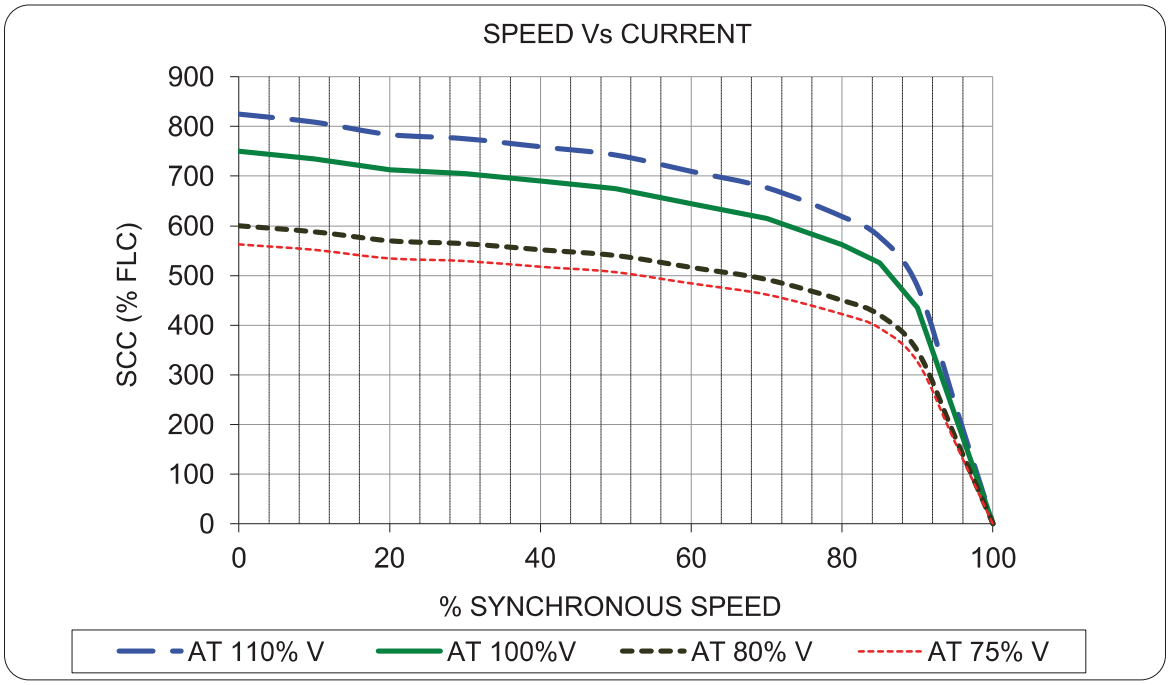


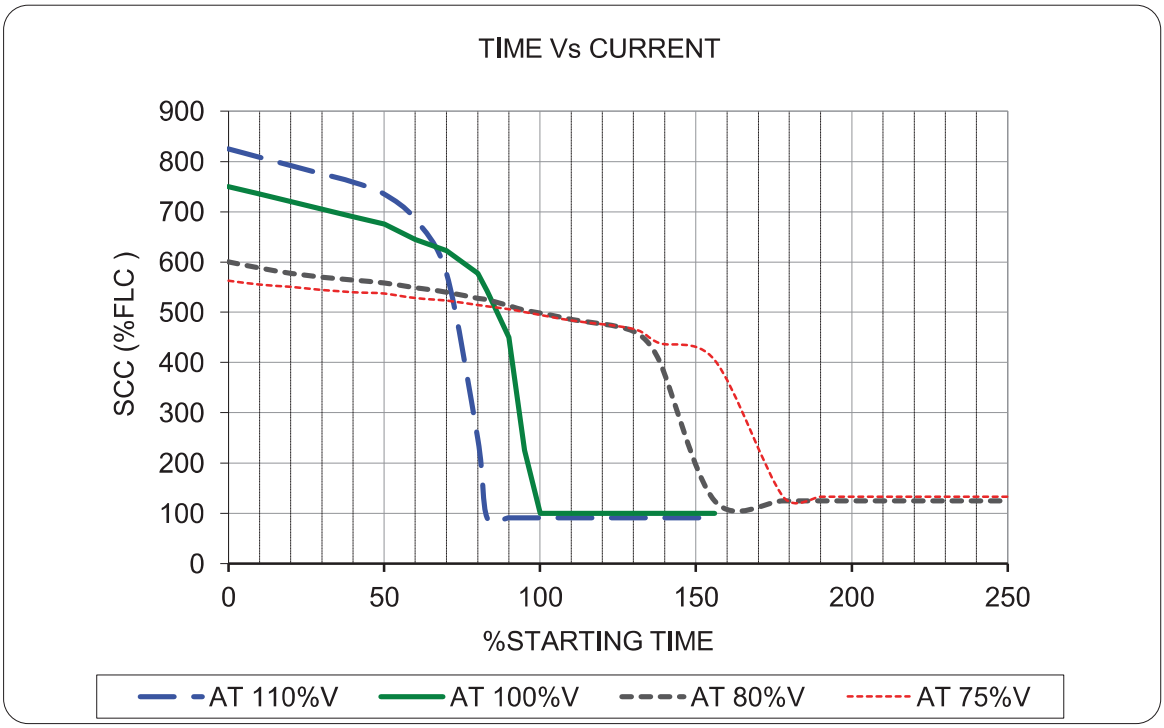


CUSTOMER	ADVANCE VENTILATION PVT. LTD.	RATED O/P kW	37
P.O.NO		NO OF POLES	4
IND.NO:	QNMVI22025/700	FRAME	ND225S

	NAME	DATE	TITLE
DRN	PLP	31-Jan-22	LOAD Vs EFFICIENCY & POWER FACTOR CURVE
CHD	PLP	31-Jan-22	
APPROVED	RGV	31-Jan-22	SC93.90/0.83

CG Power and Industrial Solutions Limited
LT Motors Division
Ahmednagar





CUSTOMER	ADVANCE VENTILATION PVT. LTD.	RATED O/P kW	37
P.O.NO		NO OF POLES	4
IND.NO:	QNMVI22025/700	FRAME	ND225S

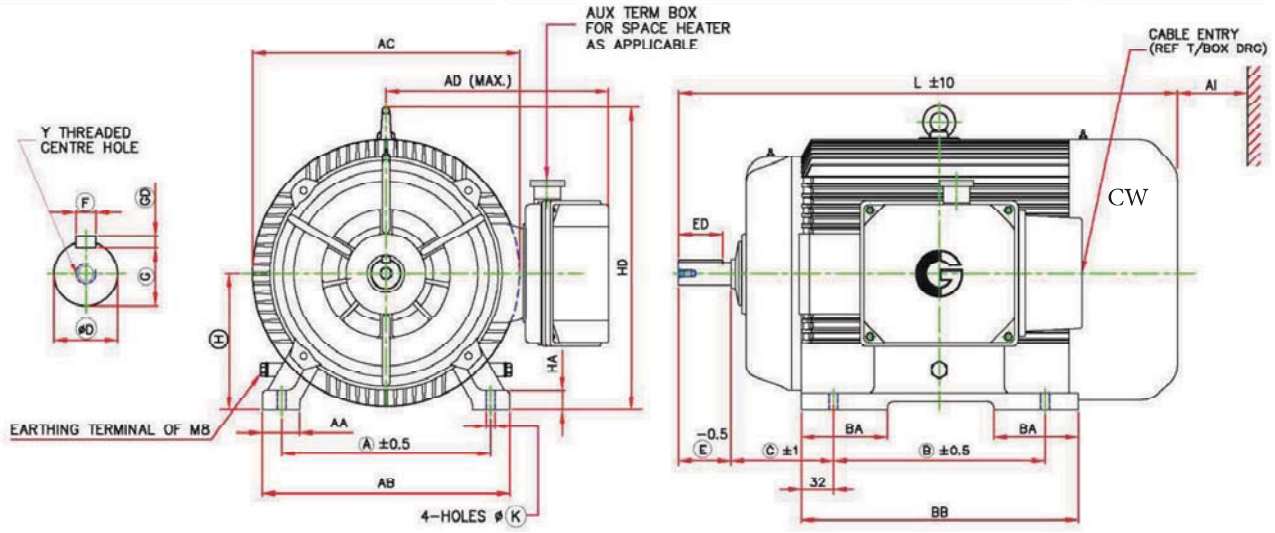
	NAME	DATE	TITLE
DRN	PLP	31-Jan-22	CURRENT SPEED & CURRENT TIME CURVE
CHD	PLP	31-Jan-22	
APPROVED	RGV	31-Jan-22	SC1475/100

CG Power and Industrial Solutions Limited
LT Motors Division
Ahmednagar

DIMENSION DRAWING OF 3 PH SQUIRREL CAGE TEFC INDUCTION MOTOR

PROJECTION

DO NOT SCALE | PLEASE ASK, IF IN DOUBT



FRAME	FOOT FIXING										OVER ALL					MOTOR wt (kg)	AI**
	A	B	B1	C	H TOL	AA	AB	BA	BB	K TOL	AD	AC	L	HD	HA		
ND225S	356	286		149	225.0 / 224.5	70	425	102	350	19.0 / 19.5	400	470	830	534	25	325	110

D END SHAFT EXTENSION AND KEY						
D TOL	E	ED	F TOL	GD TOL	G	Y
60.030 / 60.011	140	110	18.00 / 17.957	11.0 / 10.9	53.0 / 52.8	M20X40

NOTES TERMINAL BOX CAN BE ROTATED IN 360 DEG @90 DEG.
ONE EARTHING TERMINAL IS PROVIDED INSIDE MAIN TERMINAL BOX.
MOTOR MAY HAVE ADDITIONAL FOOT HOLES FOR CUSTOMER/SITE FLEXIBILITY
**MINIMUM DISTANCE FOR EFFICIENT COOLING OF MOTOR TO BE MAINTAINED BY USER

ALL DIMENSIONS ARE IN mm			Rev. 1 Dt:		
RINGED DIMENSIONS ARE AS PER IS:1231/IEC60072			Rev. 2 Dt:		
CUSTOMER	ADVANCE VENTILATION PVT. LTD.	RATED O/P kW	37	NO OF POLES	4
P.O. NO.		FRAME	ND225S	MAIN CABLE SIZE	1 * 3C,35-MM²
IND. NO.	QNMVI22025/700	MOUNTING	B3 (HORIZONTAL FOOT)		

	NAME	DATE	REMARKS
DRN	SBK	31-Jan-22	
CHD	SBK	31-Jan-22	
APPROVED	SSN	31-Jan-22	

TITLE

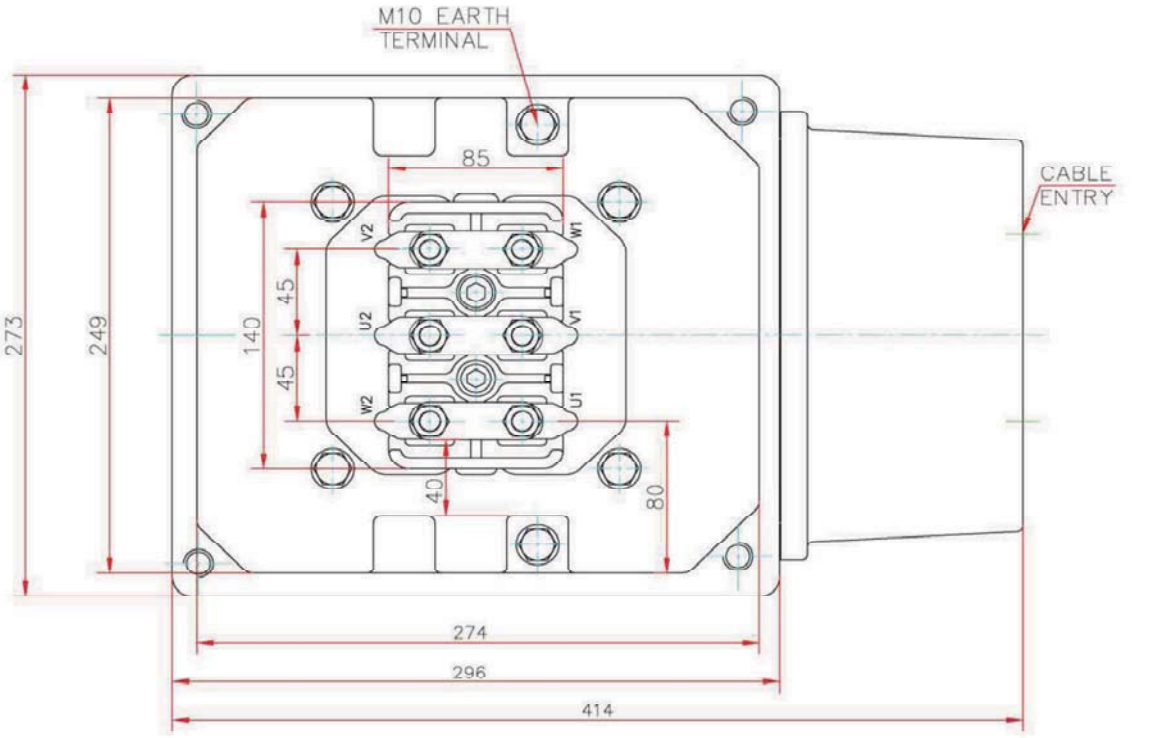
DIMENSIONAL DRAWING

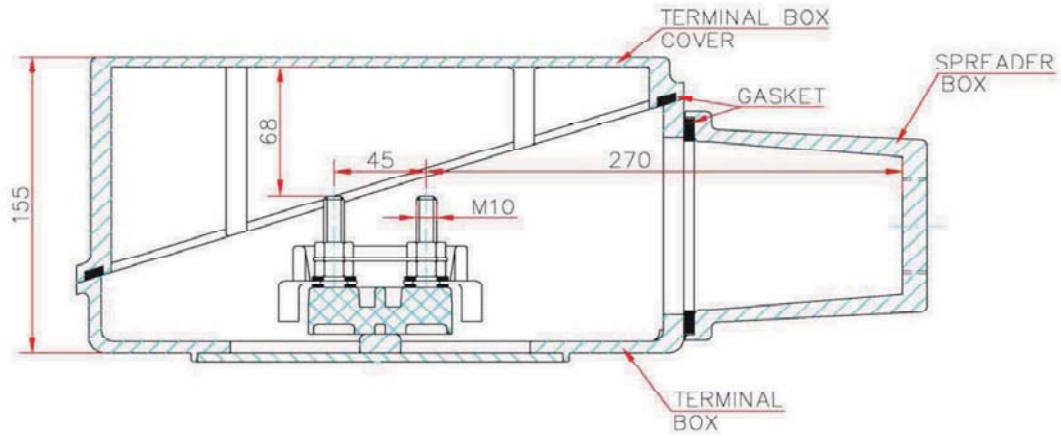
CG Power and Industrial Solutions Limited
LT Motors Division
Ahmednagar

DRG NO

QNMVI22025/700-ND225S

REV 0





CREEPAGE = 25
CLEARNCE =13

MATERIAL OF T/BOX
CAST IRON

ACCESSORIES	SPACE HEATER		THERMISTOR	RTD	TB Construction
APPLICABLE	YES		NA	NA	IP55
CABLE SIZE (ENTRY)	1 * 3C,2.5-MM² (M20 x 1.5P)		NA	NA	Fault Level
MAIN CABLE SIZE	1*3C, 95 SQMM (AL)		**CABLE ENTRY** SUITABLE FOR CABLE SIZE		50kA for 0.25sec
CUSTOMER	ADVANCE VENTILATION PVT. LTD.			RATED O/P kW	37
PO No				NO OF POLES	4
INDENT / ENQ No	QNMVI22025/700			FRAME	ND225S
	NAME	DATE	ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED		
DRAWN BY	SBS	31-01-2022	**TITLE :**		
CHECKED BY	SBK	31-01-2022	TERMINAL BOX ARRANGEMENT		
APPROVED BY	SA	31-01-2022			

CG Power and Industrial Solutions Limited
LT Motors Division
Ahmednagar

EA9256R2

DRG No :

61911101

	TITLE	SPECIFICATION NO.
BHEL	LV MOTOR DATA SHEET - C	VOLUME II B SECTION D REV NO. 00 DATE SHEET 1 OF 2

S. No.	Description		Data to be filled by successful bidder
A.	**General**		
1	Manufacturer & country of origin		Hindustan Electric Motors & India
2	Motor type		Squirrel Cage Induction Motor
3	Type of starting		Hindustan Electric Motors, Daman
4	Name of the equipment driven by motor & Quantity		Ple.Ref. annexure-1
5	Maximum Power requirement of driven equipment		Ple.Ref. annexure-1
6	Rated speed of Driven Equipment		Ple.Ref. annexure-1
7	Design ambient temperature		50 deg. C
B.	**Design and Performance Data**		
1	Frame size & type designation		2HE3 166-0403 & 160L
2	Type of duty		S1
3	Rated Voltage		415V
4	Permissible variation for		
5	a	Voltage	± 10%
6	b	Frequency	± 5%
7	c)	Combined voltage & frequency	10%
8	Rated output at design ambient temp (by resistance method)		15kW/20HP
9	Synchronous speed & Rated slip		1500RPM & 1470RPM
10	Minimum permissible starting voltage		332V
11	Starting time in sec with mechanism coupled		
12	a) At rated voltage		< 1 sec. (Load GD2 = Motor GD2)
13	b) At min starting voltage		< 1 sec. (Load GD2 = Motor GD2)
14	Locked rotor current as percentage of FLC (including IS tolerance)		840%
15	Torque		
	a) Starting		240% of rated torque
	b) Maximum		270% of rated torque
16	Permissible temp rise at rated output over ambient temp & method		70 deg. C
17	Noise level at 1.0 m (dB		85dB
18	Amplitude of vibration		1.8 mm/s
19	Efficiency & P.F. at rated voltage & frequency		
	a) At 100% load		Efficiency = 92.1% / P.F. = 0.86
	c) At 75% load		Efficiency = 92.1% / P.F. = 0.83

NAME OF VENDOR				REV.	
NAME	SIGNATURE	DATE	SEAL		

S. No.	Description		Data to be filled by successful bidder
	c) At starting		Efficiency = N.A. / P.F. = 0.45
C.	**Constructional Features**		
1	Method of connection of motor driven equipment		Belt Driven
2	Applicable Standard		IS 12615, IS 12065, IS 12075
3	DOP of Enclosure		IP 55
4	Method of cooling		IC 411
5	Class of insulation		Class F
6	Main terminal box		
	a) Type		Stud type
	b) Power Cable details (Conductor, size, armour/unarmour)		3Cx25 sqmm AL (armoured cable)
	c) Cable Gland & lugs details (Size, type & material)		Client Scope
	d) Permissible Fault level (kArms & duration in sec)		50kA / 0.25sec.
7	Space heater details (Voltage & watts)		
8	Flame proof motor details (if applicable)		
	a) Enclosure		N.A.
	b) suitability for hazardous area		
	i	Zone	-
	ii	Group	-
9	No. of Stator winding		6
10	Winding connection		Delta
11	Kind of rotor winding		Die cast aluminium rotor
12	Kind of bearings		Deep groove ball bearing
13	Direction of rotation when viewed from NDE		Bi-directional
14	Paint Shade & type		RAL 7032 (Siemens Grey)
15	Net weight of motor		186 kg
16	Outline mounting drawing No (To be enclosed as annexure)		Attached
D.	**Characteristic curves/ drawings** (To be enclosed for motors of rating ≥ 55KW)		
	a) Torque speed characteristic		-
	b) Thermal withstand characteristic		-
	c) Current vs time		-
	d) Speed vs time		-

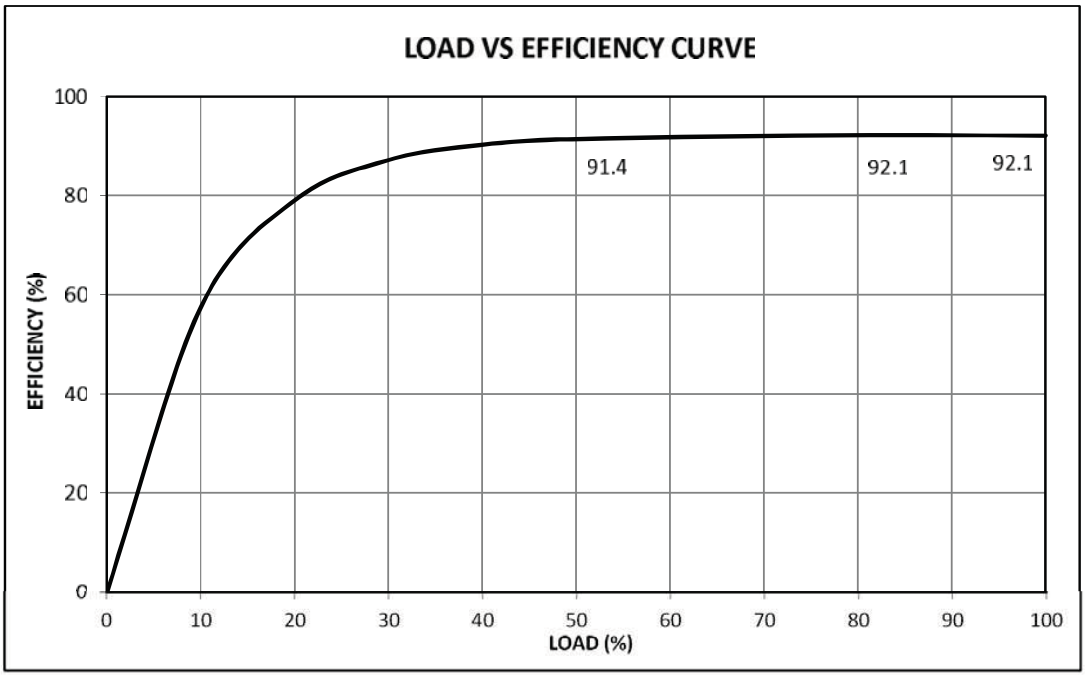
REMARK:

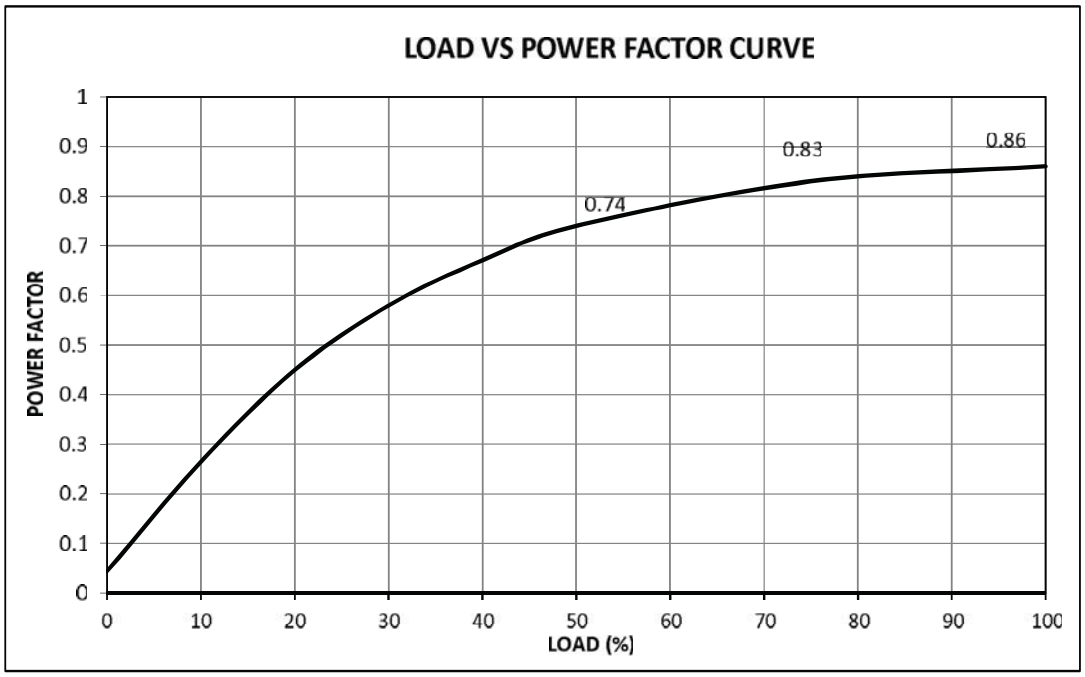
1. Efficiency Class: IE3
2. Motor Mounting : IM B3 (Foot mounted)
3. Maximum permissible time at 75% of rated voltage during running at full load shall be 5 min.
4. Acceleration time of with & without load shall be indicated: Starting time for motor at rated voltage, at 110% of rated voltage, at 80% of rated voltage.
5. Motor shall not stall at 70% of rated voltage for duration of 2sec.
6. Permissible Starting Duty Cycle -2 Hot/ 3 Cold starts.
7. Terminal Box shall be capable for rotating 360degree in steps of 90 degree.
8. Safe Stall Time for Motor for Hot Condition and Cold Condition at 80 % of rated voltage, at rated voltage and 110% of rated voltage.
9. Maximum permissible time at 75% of rated voltage during running at full load shall be 300 sec.
10. Maximum permissible voltage During high speed bus transfer & special design feature shall be150 5 of rated voltage.

hindustan ELECTRIC MOTORS

MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 15.0/20.0	Poles : 4	Efficiency Class : IE3	

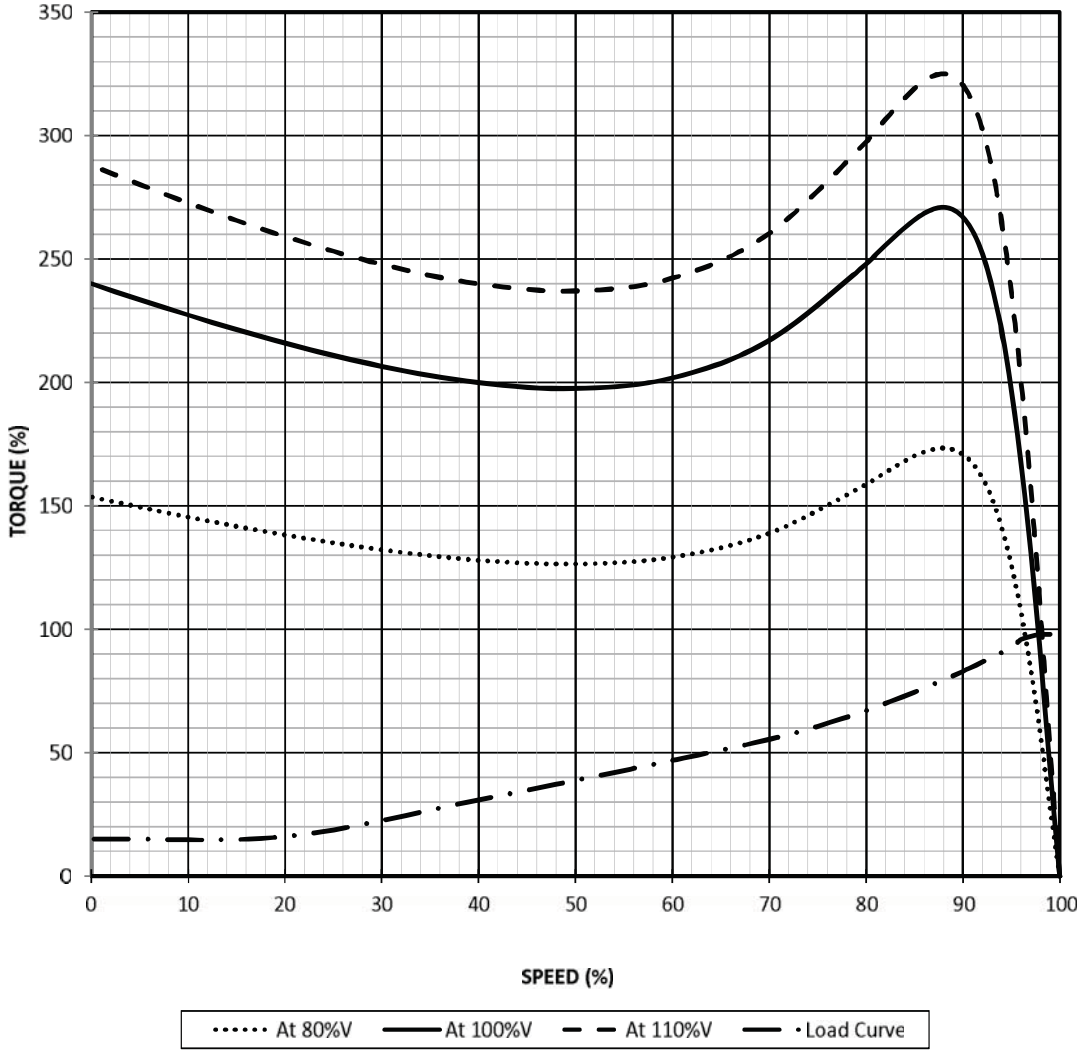




Prep.: SK	Date: 10-12-2021	Revision: -	

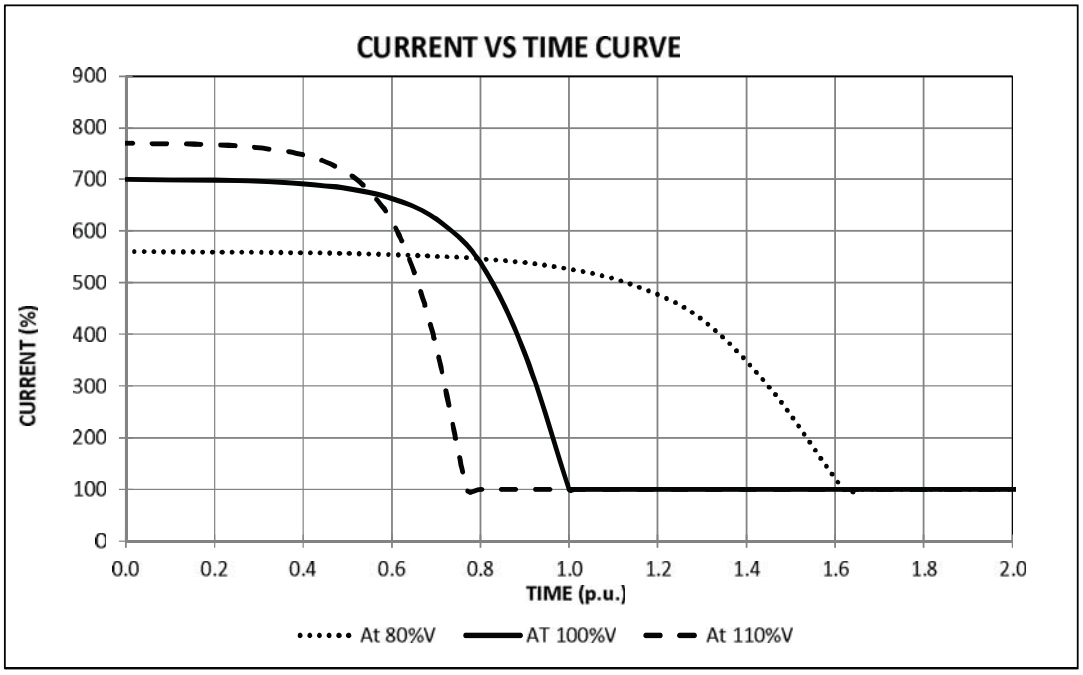
hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 15.0/20.0	Poles : 4	Efficiency Class : IE3	

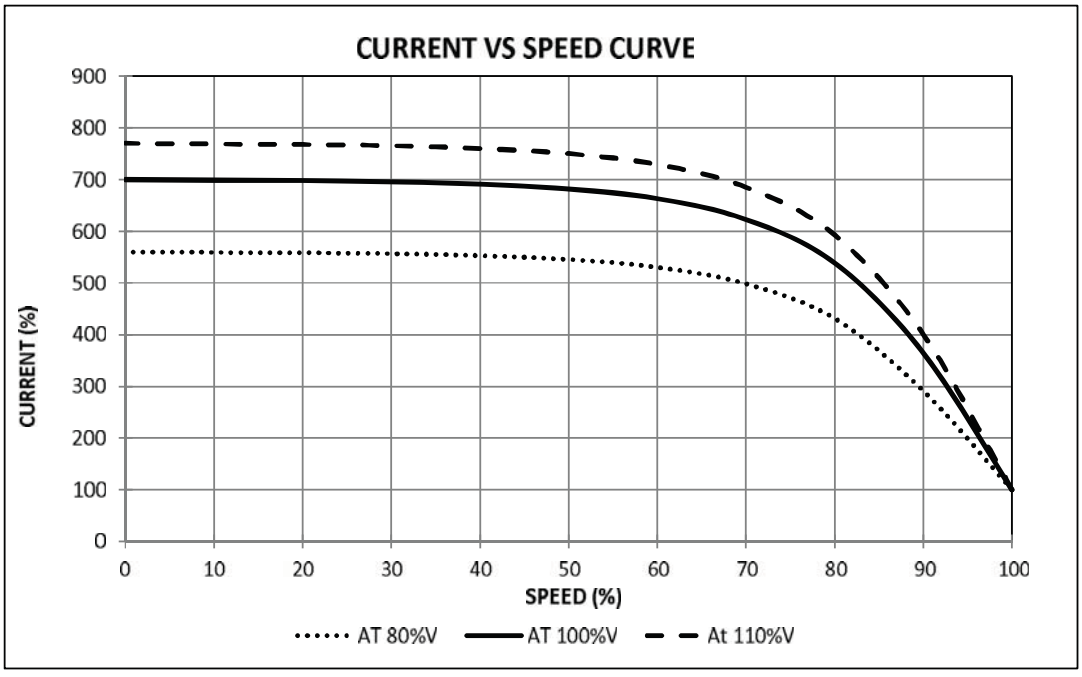
TORQUE SPEED CURVE



Prep.: SK	Date: 10-12-2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 15.0/20.0	Poles : 4	Efficiency Class : IE3	

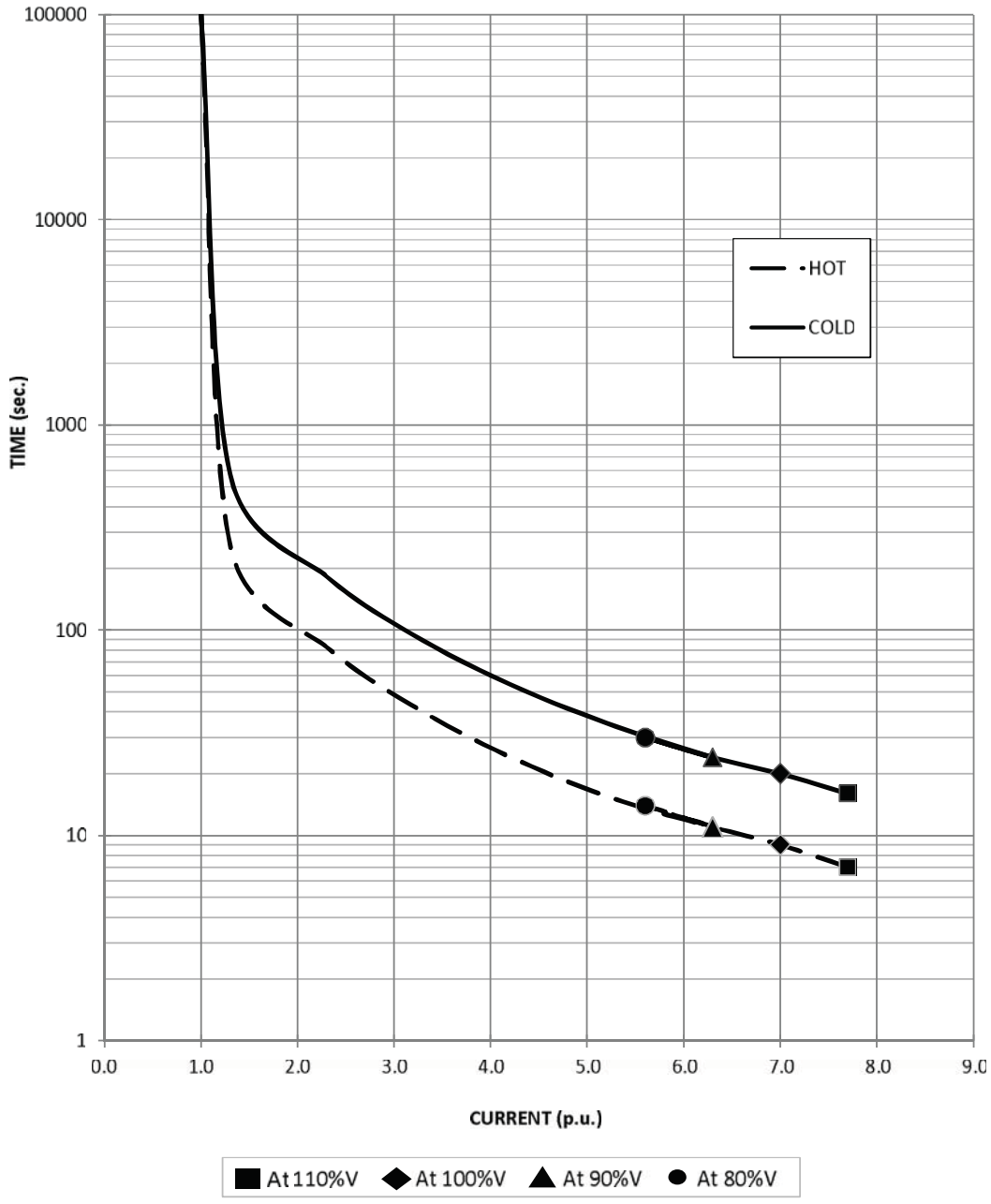




Prep.: SK	Date: 10-12-2021	Revision: -	

hindustan ELECTRIC MOTORS	MOTOR PERFORMANCE CURVE		
Rated Output (kW/HP) : 15.0/20.0	Poles : 4	Efficiency Class : IE3	

THERMAL WITHSTAND CURVE



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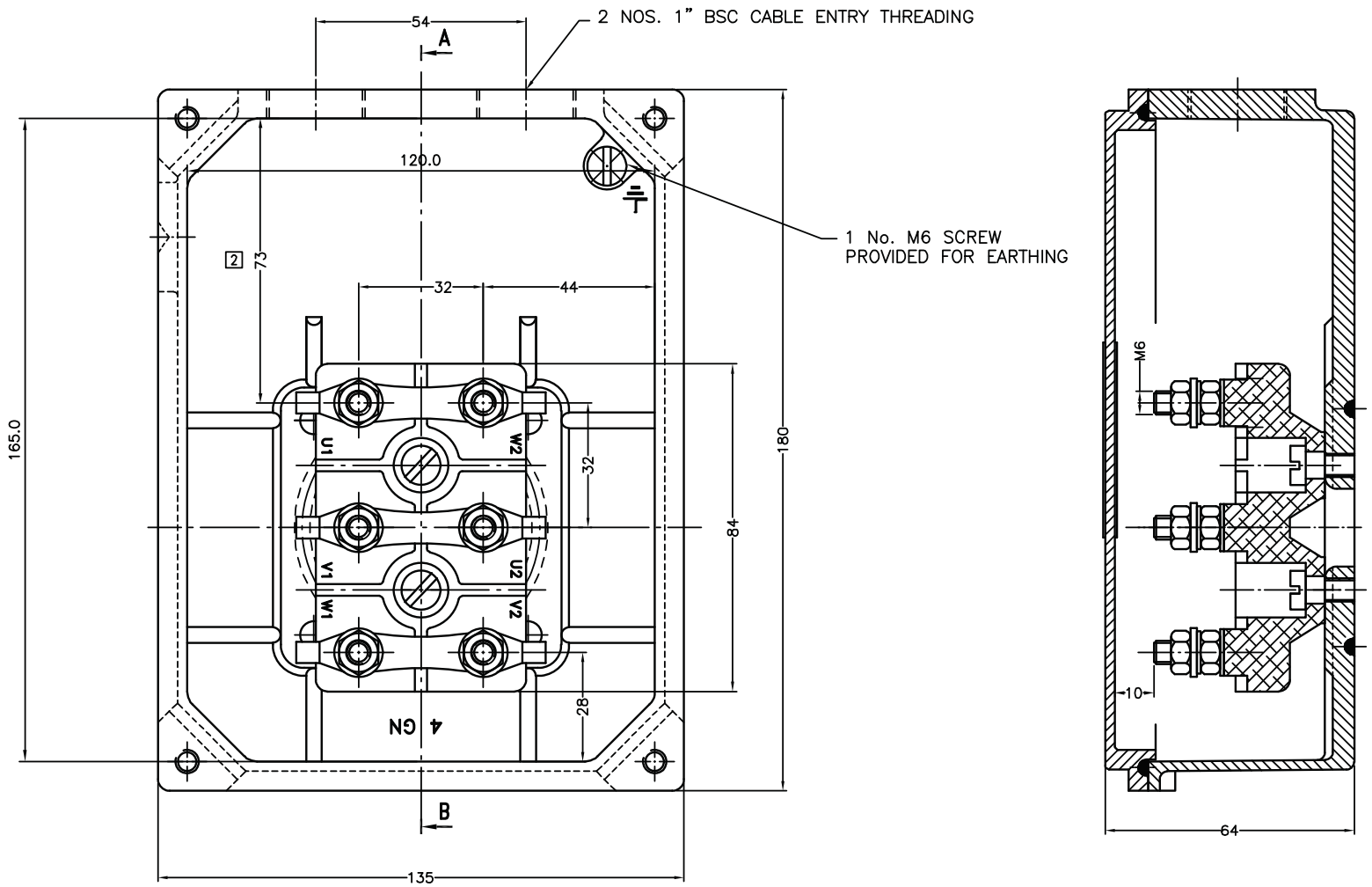


REV. STATUS			
2	DIMN. 73 ADDED.	SAURABH	03/06/15
1	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	NIMKAR	05/07/13

hindustan ELECTRIC MOTORS

TITLE: TERMINAL BOX ASSEMBLY

SCALE NTS

SHT 1/1

All dimensions in mm unless otherwise specified.

MACHINING SYMBOLS	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

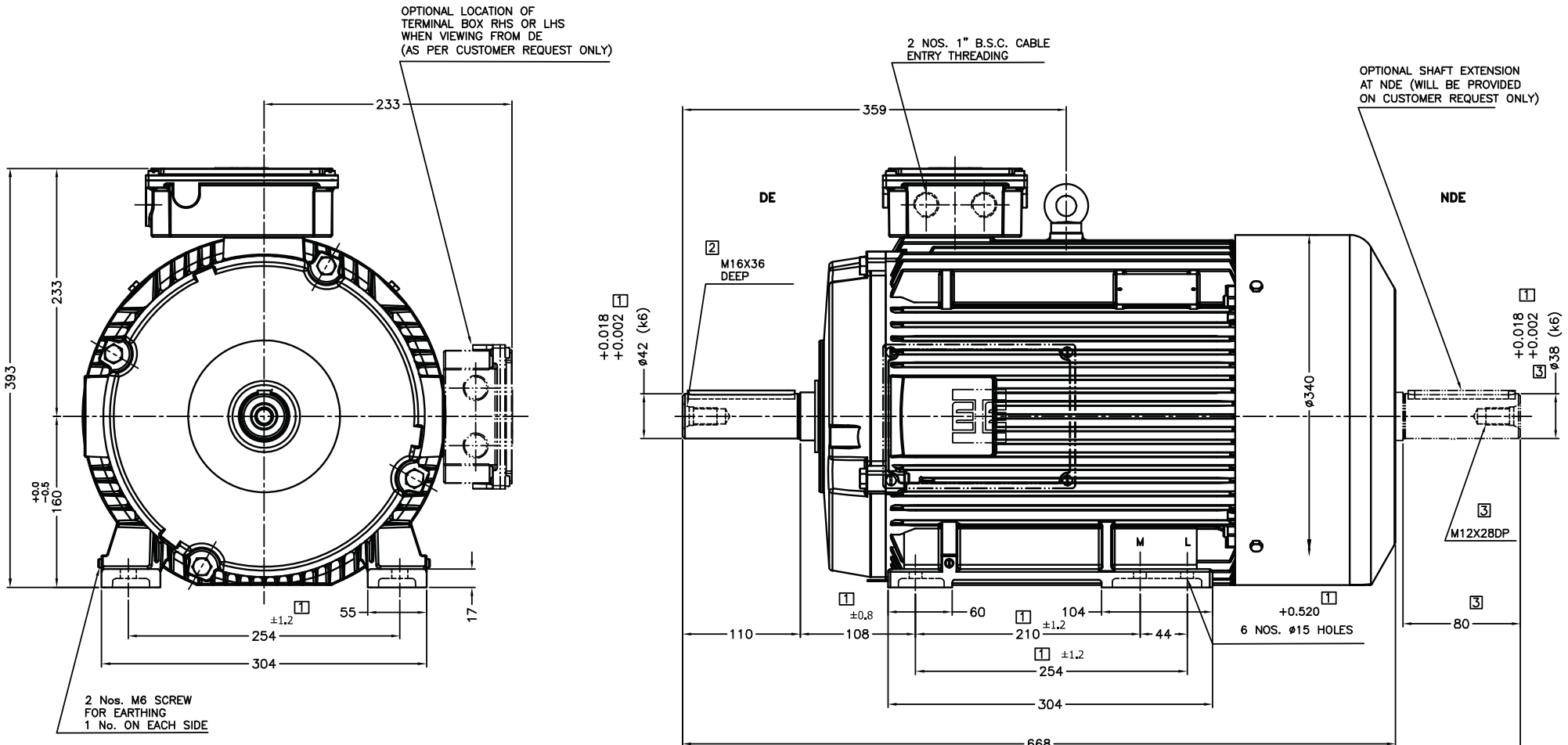
	NAME	DATE
DRN.	GANESH	05/08/11
CHD.	S.P.JADIA	05/08/11
APPD.	S.P.JADIA	05/08/11

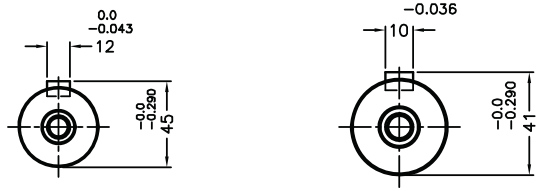
PROJECTION

DRG. NO.: A3-160/180-33(GN) REV. 2

REF. 3-tbassy

FRAME SIZE 160-180 (GN)





REV. STATUS	SYM	REVISIONS	BY	DATE
	3	NDE SIDE SHAFT EXTN. DIA.38x80LG. WAS DIA.42x110LG. & DIMS 755 WAS 785 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	LANKESH	10-01-20
	2	M16x36 TAP DEEP WAS M16x32 AS PER PRESENT SHAFT DESIGN	ARUN	25/9/18
	1	TOLERANCE +0.002 WAS – 0.002, TOLERANCE ADDED ON DIMN. 210,254,108, & ø15 , STD. ADDED IN TITLE.	LANKESH	11/6/18

Dim. without tolerance as per IS:2102, very coarse

All dimensions in mm unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

hindustan ELECTRIC MOTORS

TITLE: OVERALL DIMENSION DRAWING TEFC/B3/ 1 IE3 STD/FOOT MOUNTED MOTOR

SCALE NTS | SHT 1/1

	NAME	DATE
DRN.	AKSHAY	21-12-13
CHD.	S.P.JADIA	21-12-13
APPD.	S.P.JADIA	21-12-13

PROJECTION

DRG. NO.: 44-16-051-0058 | REV. 3

REF : 160ML-IE3-OADIM-B3

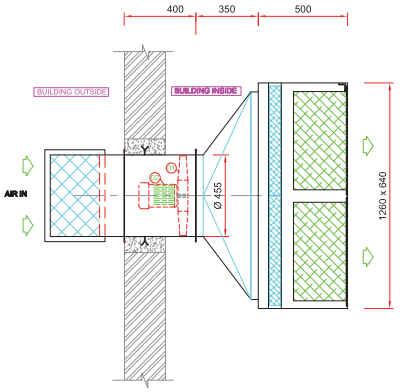
FRAME SIZE 160M/L (GN)

TDS & GA of Fresh Air Fan

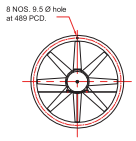
TDS & GA Drawing of Supply Air Fans			
Sr. No.	**Description**	**Unit**	Particulars
1	Manufacturer		
2	Model No.		AdTV-450
3	Type of Fan		**Supply Air Fan Fans**
4	Capacity	CMH	Provided - 6000, Reqd. 5610
5	Quantity		2 Nos., As per HLC for AC System
6	Static pressure	mmWG	30
7	Total pressure	mmWG	44
8	Impeller Diameter	mm	450
9	No. of blade	Nos.	8
10	Blade angle	Degree	20
11	Fan/Impeller Speed	RPM	2870
12	Critical Speed	RPM	3587
13	Shaft Power	BkW	1.22
14	Fan Static Efficiency at Duty Point	%	41
15	Fan Total Efficiency at Duty Point	%	60
16	Bearing Type	BALL BEARING	
17	Selection curves enclosed (yes/No)	yes	yes
18	Fan Dynamic Load	Kg	
19	Motor Data		
	a) Rating	kW/Pole	1.1/2
	b) Speed	RPM	2870
TECHNICAL DATA SHEETS & GA DRAWING FOR AXIAL FANS ALONG WITH FIXING DETAILS			
	c) Type of Mounting	**B3**	
	d) Direction of Rotation	CLOCKWISE/ANTICLOCKWISE	
	e) Motor Bearing No.		DE:6204.ZZ NDE:6203.ZZ
20	Material		
	a) Impeller	CAST ALUMINIUM BADE OF AERO -FOIL DESIGN	
	b) Casing	MS	
	c) Casing thickness (mm)		3
	d) Shaft	MOTOR SHAFT (EN-8)	
21	Accessories	RAIN PROTECTION COWL, BIRDMESH	
22	Pre Filter	PRE FILTER	
	a) Filter size		610x610x50
	b) No. of filters		2
	d) Filter type		610x610x305
	e) Filter size		2
	f) No. of filters		
23	Painting	AS PER SPECIFICATION	
24	Noise Level	DB(A)	≤ 85 DB(A)
25	Balancing Grade		AS PER ISO 1940-6.3
26	Vibration Level		AS PER ISO 14694
27	Inspection & Testing		AS PER APPROVED QAP

Fan Flow Rate shall be adjusted at site as per heat load calculation during commissioning through Volume Control Damper provided at Fan discharge

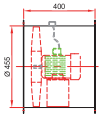
TYPICAL ARRANGEMENT OF FAN WITH FILTER & COWL ARRANGEMENT APPLICABLE FOR ANNEXURE-I, ITEM NO. B4, B5, B6, B7, B8 AS PER APPLICABILITY



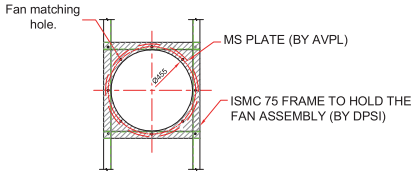
SUPPLY FAN ASSEMBLY PLAN VIEW



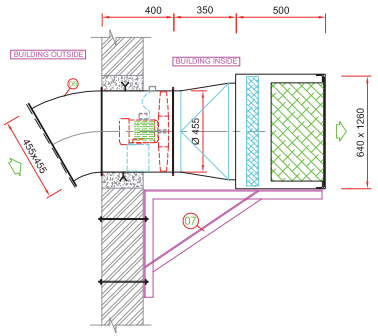
FAN IMPELLER END VIEW



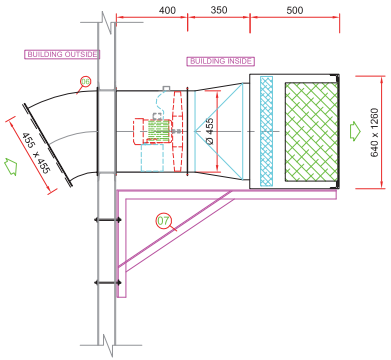
FAN SIDE VIEW



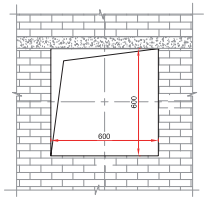
FAN MOUNTING STEEL FRAME



SIDE ELEVATION



SIDE ELEVATION



WALL OPENING DETAILS

NOTES: –

1. ALL DIMENSIONS ARE IN MM.
2. SUPPLY AIR FAN ENCLOSURE SUPPORTED ON THE ANGLE FRAME AND SAME IS BOLTED WITH FAN ENCLOSURE.
3. ITEM LISTED IN BOQ IS FOR SINGLE FAN ONLY.
4. FAN WILL BE INSTALLED AS PER APPROVED VENTILATION CALCULATION IN VARIOUS BUILDINGS.
5. KKS TAG FOR THE FANS WILL BE INCLUDED IN CONCERN VENTILATION EQUIPMENT LAYOUT OF CONCERN BUILDING.
6. QUANTITY OF FAN AS PER APPROVED LAYOUT.
7. FAN MOUNTING SLEEVE. GROUTING SHALL BE DONE BY

LEGEND/SYMBOL:-

SYMBOL	DESCRIPTION
	PRE FILTER
	FINE FILTER
	FAN

Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Dynamic Load Fan with unit (Kg.)
6000	30	AdTV–450/8B	2870	Refer Note No.6	1.1/2P	150

PART NO.	DESCRIPTION	QTY.	MATERIAL	MAKE
07.	FRESH AIR UNIT SUPPORT	02 nos.	ISA – 40x5	
06.	AIR DISCHARGE COWL WITH BIRD MESH–455x455x30°	01 no.	G.I	
05.	FILTER BOX – 1260x640x500	01 no.	G.I	
04.	AIR FINE FILTER – 610x610x305	02 nos.	HDPE MESH	Anfilco, Spectrum, Puromatic, FMI
03.	AIR PRE FILTER –610x610x50	02 nos.	HDPE MESH	Anfilco, Spectrum, Puromatic, FMI
02.	MOTOR 1.1Kw/2POLE	01 no.	–	ABB/BBL/CGL
01.	SUPPLY AIR FAN AdTV–450/8B	01 no.	MS	

FOR APPROVAL

Rev.	Date (DD/MM/YYYY)	Prepared	Checked	Approved	Details of Revision
0	2.03.23	A Jatin	A gaur	F.J	For Approval

Owner

Owner's Engineer

NTPC LIMITED
A GOVERNMENT OF INDIA ENTERPRISED

Contractor

BHARAT HEAVEY ELECTRICAL LTD
PS-PEM, PPEI-BUILDING
SECTOR -164A, PLOT NO.25, NOIDA-201301

Project

3X200+3X500+1X500 MW NTPC KORBA

	Date	Name
Drawn	2.03.23	A JAIN
Checked	2.03.23	A GAUR
Approved	2.03.23	FJ
Vetted by AE (DHC)		

Scale

Title: TECHNICAL DATA SHEETS & GA DRAWING FOR AXIL FANS ALONG WITH FIXING DETAILS

Package/ Equipment Name: HVAC

Drawing No.: PE-V0-466-(571-13000-A)A202

Supplier Drawing No.

Project Code | UAS Code | Unit Code | KKS Code | Reg. No | Rev. | Page No.

A3 (420x297)

APPLICABLE FOR ANNEXURE-I, ITEM NO. C6 (INSTRUMNETS)

Date	Rev	Description of Revision	PREP	CHD	APPD

PROJECT	
PACKAGE	**HVAC FOR FGD**
	CUSTOMER **NTPC Limited** **(A GOVERNMENT OF INDIA ENTERPRISE)**
	EPC CONTRACTOR **BHARAT HEAVY ELECTRICALS LTD** PS-PEM, PPEI-BUILDING, SECTOR-16A, PLOT NO. 25, NOIDA-201301

Ce ifica ion igna e b ARUP GHOSHAL <a gho hal@n c.co.in> Verified
Digi all igned b ARUP GHOSHAL
Da e: 2023.03.14 15:44:38 IST
Rea on: CAT ca e
Loca ion: NTPCEOC

DOCUMENT TITLE			**TECHNICAL DATA SHEET FOR INSTRUMENTS (PRESSURE GAUGE,TEMPERATURE GAUGE,LEVEL GAUGE ETC) FOR AC AND VENTILATION SYSTEM**
PREP	CHD	APD	JOB NO.
			M22/DEL-019.BHEL

NTPC DOC. NO	0270-109APVM-B-337	BHEL DOC. NO	PE-V0-463-(571-13000-A)-A218	REV:	0

TECHNICAL DATASHEET OF PRESSURE GAUGE

Customer	**NTPC**	**Job No.**	**M22/DEL- 019.BHEL**
Project		**Date**	**10.03.2023**
BHEL Doc. No.		**Doc No**	

Sr.No.	Item	Description
	Item	Pressure Gauge
1	Manufacturer	Gauge Bourdon India Pvt. Ltd., Panvel
2	Type	Bourdon sensing Pressure Gauge
3	Model No.	BSPG-V-150-S4S-S6S-S6S-S4S-T15NTM-(0-6)-KSC-L
4	Quantity	2 Nos
5	Dial Size	150 mm, Aluminium, white background with black marking
6	Location	Discharge & suction of UAF Pump
7	Case & Bezel	SS 304, Bayonet type Bezel, weatherproof to IP-68 as per IEC:60529
8	Windows	Shatterproof Glass
9	Bourdon	SS 316 Seamless
10	Socket	SS 316
11	Movement	SS 316
12	Range	1.5- 3 kg/cm² (Operating pressure Range) & 0- 6 kg/cm²(Instrument pressure Range)
13	Scale	Linear
14	Connection	1/2 " NPT (M)
15	Accuracy	±1% F.S.D
16	Over Range	130% F.S.D
17	Zero Reset	Provided (Micrometer Pointer)
18	Blow out Disc	Provided (Neoprene) on top of case
19	Tag Plate	SS Tag Plate provided

Bourdon Sensing Pressure Gauges

MODEL : BSPG (Dry Case)
LFBSPG (Liquid Filled Case)

Features

- Compliance to latest EN-837 standard
- Range : (-)1 to 1600 kg/cm²
- Bourdon in SS316 Ti as standard providing better mechanical properties guaranteeing repeatability and accuracy
- Accuracy ±1% FSD (Standard), ± 0.5% FSD on request
- Unit of measurement - kg/cm², bar, psi, kPa, MPa

- Pressure Gauges intended for Process Industries such as Chemicals, Petro-chemicals, Energy or Gas industry, Food processing, Nuclear etc.
- These pressure gauges have been designed to satisfy requirements to operate in aggressive environment.

Specifications

Ref. Standard	EN-837
Dial	100 mm / 150 mm in Aluminium, white background, black markings
Case	SS304 / SS316 with bayonet bezel Phenol with screwed bezel
Protection	IP-68 (IS:13947 part I / IEC:60529)
Window	Safety glass (Shatter proof / Toughened glass)
Bourdon	SS316, SS316 Ti, SS316L, Monel
Socket	22mm Square in SS316, SS316 Ti, SS316L, Monel
Movement	SS304, SS316
Range	As per EN 837 (refer table) minimum span 0.6 kg/cm2, maximum 1600 kg/cm2
Connection	1/2" NPT (M) as standard* (other optional)
Accuracy	±1% FSD (0.5% on request)
Over range	As per EN 837
Zero adjustment	Micrometer Pointer
Blow out disc	Provided (on top)
Temperature suitability	Ambient (-)20°C to 60°C, Media 200°C
Temperature Effect	Within ±0.4% FSD/10°C, when temperature changes from reference temperature of 20°C (as per EN-837 standard)
Optional	IBR certification Maxima pointer NACE compliance External Knob for zero setting Built in Snubber Built in Gauge Saver Liquid filled Case (SS case only) Vacuum Protection CE Atex

* For ranges above 1000 bar, connection shall be 1/2"BSP(M) with Bottom Entry only

Ranges

Gauge	bar, kg/cm2	Least count
Vacuum	(-)1 to 0	0.02
	-760 to 0mmHg	20
Compound	(-)1 to 0.6	0.05
	(-)1 to 1.5	0.05
	(-)1 to 3	0.10
	(-) 1 to 5	0.10
	(-)1 to 9	0.20
	(-)1 to 15	0.50
	(-)1 to 24	0.50
	(-)1 to 39	1.0
Pressure	0 to 0.6	0.01
Gauge	0 to 1	0.02
('C' shaped	0 to 1.6	0.05
Bourdon)	0 to 2.5	0.05
	0 to 4	0.10
	0 to 6	0.10
	0 to 10	0.20
	0 to 16	0.50
	0 to 25	0.50
	0 to 40	1.0
	0 to 60	1.0
Pressure	0 to 100	2.0
Gauge	0 to 160	5.0
Coil type	0 to 250	5.0
Bourdon	0 to 400	10.0
	0 to 600	10.0
	0 to 800	20.0
	0 to 1000	20.0
	0 to 1600	50.0

For range other than above please contact our design dept.

The parameters mentioned here are the standard specifications/ values generally used for most of the process applications. Any other specification not appearing here also can be provided as per customer requirement. For higher temperature services above 100°C, we recommend to provide suitable cooling arrangement (Syphon, Cooling Tower, Impulse Tubing, Diaphragm Seal etc.)

Under Technical Collaboration with M/s. Gauges Bourdon, France

Ordering Information

MODEL

BASIC MODEL CODE

BSPG	Dry Case
LFBSPG	Liquid Filled Case

MOUNTING

V	Bottom Entry, Local Mounting
S	Bottom Entry, Surface Mounting
Y	Bottom Entry, 2" Pipe Mounting
C	Back Entry, Local Mounting
P	Back Entry, Flush Panel Mounting

DIAL SIZE

100 - 100 mm **150** - 150 mm

CASE

S4S	SS 304
S6S	SS 316
PHN	Phenolic

BOURDON

S6S	SS 316
S6L	SS 316L
S6T	SS 316Ti
MN4	Monel

SOCKET

S6S	SS 316
S6L	SS 316L
S6T	SS 316Ti
MN4	Monel

MOVEMENT

S4S	SS 304
S6S	SS 316

CONNECTION

Conn	Code	Size	Code	Type	Code	Male/ Female	Code
Thread	T	1/4"	**06**	NPS	**NS**	Male	**M**
		3/8"	**10**	NPT	**NT**	Female	**F**
		1/2"	**15**	BSP	**BP**		
		3/4"	**20**	BSPT	**BT**		
		1"	**25**	JIS-PF	**PF**		
		M20	**M20**	JIS-PT	**PT**		
				Gas	**GS**		
				R	**RR**		
				Rp	**RP**		
				Pitch 1.5	**C**		

e.g. For 1/2"NPT(M), Code: **T15NTM**
For M20x1.5 (F), Code: **TM20CF**

OPTION

A05	Accuracy ±0.5%FSD
ATX	Atex
BGS	Built In Gauge Saver
BOB	Blow out disc at back
BSN	Built In Snubber
CLB	Colour Band
CEM	CE marking
DC2	Silicone Oil Filled Case
DUS	Dual Scale
EXZ	External Knob for Zero Adjustment
FLG	Flanged Process Conn
GLY	Glycerine filled Case
IBR	IBR
MXP	Maxima pointer with Acrylic Window
NAC	NACE
OXY	O2 Cleaning
OR5	150% FSD Over range
PHD	Phenolic / Plastic Dial
S4D	SS DIAL (SS304)
S6D	SS DIAL (SS316)
VCP	Vacuum Protection
L	Nil
CSU	Chemical Seal
ACC	Accessory
XXX	Other

UNIT

KSC	kg/cm2(g)
BAR	bar(g)
PSI	psi(g)
KPA	kPa(g)
MPA	MPa(g)
MBR	mbar(g)
MMW	mm WC(g)
CMW	cm WC(g)
MWC	m WC(g)
INW	inch WC(g)
MMH	mm Hg(g)
CMH	cm Hg(g)
INH	inch Hg(g)
XXX	Other (Please specify)

RANGE

Please select from Table

FLG - FLANGE

Conn	Code	Size	Code	Rating#	Code	Facing	Code
Flange	**F**	1/2"	**15**	150	**A**	RF	**RF**
		3/4"	**20**	300	**B**	FF	**FF**
		1"	**25**	600	**C**	RTJ	**RJ**
		1-1/2"	**40**	900	**D**	LT	**LT**
		2"	**50**	1500	**E**	LG	**LG**
		3"	**80**	2500	**F**		

e.g. For 40 NB 300# RF flange, Model Code: **F40BRF**

Sample Model Code: BSPG-V-150-S4S-S6S-S6S-S4S-T15NTM-(0-10)-BAR-BOB

TECHNICAL DATASHEET OF PRESSURE TRANSMITTER

Datasheet For Pressure Transmitter

	Model no.		266HSH.M.S.B.A.2-.....L1..B6	
	Model Description		Model 266HSH Gauge Pressure Transmitter	
GENERAL	Tag Number			
	Service			
	Type		Two wire, Loop Powered	
	Function		Transmit & Indicate	
	Mounting	Housing Material	2"(Pipe/Wall)	Aluminum alloy
	Area Classification		Safe Area	
	Enclosure Protection class	Intrinsic Safe	Weather proof IP67	NO
	Enclosure/Housing Material and type		Aluminium alloy (Barrel version)	
	Electrical entry		1/2"-14 NPT	
	Output Type	Driving Voltage	Profibus PA	Loop Powered
TRANSMITTER	Protocol		Profibus PA	
	Power supply		10.5 - 30 VDC	
	Performance Accuracy		Base accuracy 0.06% of calibrated span	
	Ambient Temperature		– 40 °C and +85 °C	
	Over pressure limit		14 MPa (140 bar, 2030 psi)	
	Stability		±0.15 % of URL for 10 years	
	Turn down ratio		100:1	
	Range		0~4 bar	
	Instrument Span		6 and 600 kPa (0.06 and 6 bar, 0.87 and 87 psi)	
TRANSMITTER WETTED PART	Element Type		Diaphragm	
	Body Material		AISI 316L	
	Element Material		AISI 316L	
	Over Range Protection		150 % of operating pressure	
	Process Connection (NPT Female)		1/2"-14 NPT	
	Connection Location		Bottom entry	
	Fill Fluid		Silicone oil	
	Diaphragm Material		AISI 316L	
	Process Connection Material		AISI 316L	
OPTIONS	Integral LCD		Provided	
	Mounting Barckets		Provided CS Material	
	SS Tag Plate		Yes	
CERTIFIACATION	Calibration certificate		Standard Calibration Reports shall be proivided	
	Accesories		-	
	Make		ABB India Limited	

Instrument Specification		Gauge Pressure Transmitter		
				Rev0

TECHNICAL DATASHEET OF TEMPERATURE CUM RELATIVE HUMIDITY SENSOR

Customer	**NTPC**	**Job No.**	**M22/DEL- 019.BHEL**
Project		**DATE**	**10.03.2023**
BHEL Doc. No.		**Doc No**	

Sr.No.	Item	Description
1	Item	RH+T Sensor
2	Manufacturer	SIEMENS, India
3	Model No.	QFM2171
4	Quantity	1 Nos
5	Location	AHU Room at FGD Control Building
6	Instrument Range	Temperature 0 - 50 Degree C , RH - 0 - 100%
7	Purpose of Measurement	Temperature + RH
8	Range	TEMPERATURE 0 - 50 DEGREE C , RH - 0 - 100%
9	Accuracy	(+/-)1K For Temp(-35 to 50 C) & (+/-) 3% for RH.(30% to 70%)
10	Process connection	NA
11	Repeatability	(+/-) 0.8K & (+/-) 5%
12	Maximum Process value	28 Degree C & 55% RH
13	Design Process value	27 Degree C (Normal) & 45% RH (Min)
14	Cable gland type	Double compression Brass
15	Cable Entry Type & Size	3C X 1.5 sqmm
16	Sensor	NTC-10K (inbuilt)
17	Sensor material	Semiconducting material (metal oxides)
18	Housing Material	Fiber glass reinforced Polycarbonate
19	Mounting Type	DUCT Mounted / Wall Mounted
20	Signal type	4 - 20 mA
21	Ambient Temperature	(-)30 to +85 degree Centigrade
22	Input Power	24VDC (from microcontroller)

Symaro™

Duct sensors

QFM21...

for relative humidity and temperature

- **Operating voltage AC 24 V / DC 13.5...35 V**
- **Signal output DC 0...10 V / 4…20 mA for relative humidity**
- **Signal output DC 0...10 V / 4…20 mA / T1 / LG-Ni 1000 for temperature**
- **Measuring accuracy ±3 % r. h. within the comfort range**
- **Range of use –15…+60 °C / 0…95 % r. h. (non-condensing)**

Use

The QFM21… duct sensors are for use in air ducts of ventilation and air conditioning plant for acquiring:

- The relative humidity and
- The temperature.

The sensors are used as:

- Control sensors in the supply or extract air
- Reference sensors, e.g. for shifting the dew point
- Limit sensors, e.g. in connection with steam humidifiers
- Limit sensors, e.g. for measured value indication or for connection to a building automation and control system
- Sensors for enthalpy and absolute humidity, together with SEZ220 (see Data Sheet N5146)

Type summary

Type reference	*Temperature measuring range*	*Temperature signal output*	*Humidity measuring range*	*Humidity signal output*	*Operating voltage*
QFM2100	None	None	0...100 %	active, DC 0...10 V	AC 24 V or DC 13.5…35 V
QFM2101	None	None	0...100 %	active, 4…20 mA	DC 13.5…35 V
QFM2120	−35...+50 °C	passive, LG-Ni 1000	0...100 %	active, DC 0...10 V	AC 24 V or DC 13.5…35 V
QFM2140	−35...+50 °C	passive, T1 (PTC)	0...100 %	active, DC 0...10 V	AC 24 V or DC 13.5…35 V
QFM2160	0...50 °C / −35...+35 °C or −40...+70 °C	active, DC 0...10 V	0...100 %	active, DC 0...10 V	AC 24 V or DC 13.5…35 V
QFM2171	0...50 °C / −35...+35 °C or −40...+70 °C	active, 4…20 mA	0...100 %	active, 4…20 mA	DC 13.5…35 V

Ordering and delivery

When ordering, please give name and type reference, e.g.:
Duct sensor **QFM2120**
The sensor is supplied with mounting flange and cable entry gland M16.

Equipment combinations

All systems and devices capable of acquiring and handling the sensor's DC 0...10 V, 4...20 mA, LG-Ni 1000 or T1 output signal.
When using the sensors for minimum or maximum selection, for averageing, or to calculate enthalpy, enthalpy difference, absolute humidity, and dewpoint, we recommend to use the SEZ220 signal converter (see Data Sheet N5146).

Function

Relative humidity

The sensor acquires the relative humidity in the air duct via its capacitive humidity sensing element whose electrical capacitance changes as a function of the relative humidity.
The electronic measuring circuit converts the sensor's signal to a continuous DC 0...10 V or 4…20 mA signal, which corresponds to 0...100 % r. h.

Temperature

The sensor acquires the temperature in the air duct via its sensing element whose electrical resistance changes as a function of the temperature.
Depending on the type of sensor this change in resistance is converted either to an active DC 0…10 V or 4…20 mA output signal corresponding to a temperature range of 0… 50 °C, –35…+35 °C, or –40...+70 °C. The measuring range can be selected. The temperature is provided as a simulated passive LG-Ni 1000- or T1-output signal (≙ –35…50 °C) as an alternative to the active output signal.

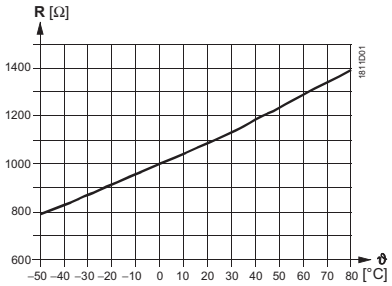
Simulated passive output signal

The measuring current of systems / devices for acquiring the electrical resistance of the passive sensor differs greatly and impacts self-heating of the temperature sensing element at the end of the measuring tip. To compensate the impact, the passive output signal is simulated with an electronic circuit.

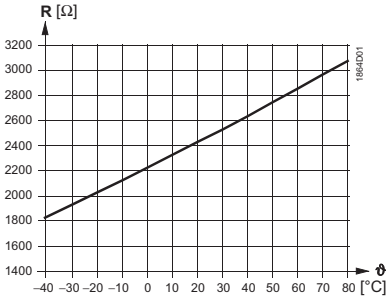
Sensing elements, simulated

Characteristic:

LG-Ni 1000



T1 (PTC)

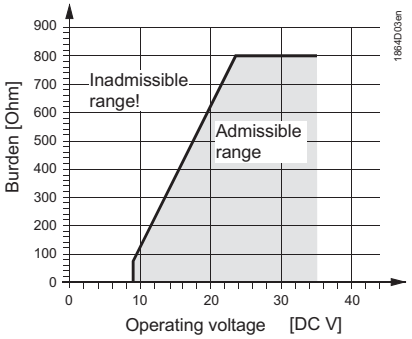


Legend

R	Resistance value in Ohm
ϑ	Temperature in degrees Celsius

Burden diagram

Output signal, terminal I1 / I2

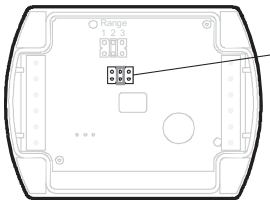


Mechanical design

The duct sensor consists of a housing, a printed circuit board, connection terminals, a mounting flange and an immersion rod having a measuring tip.
The 2-sectional housing comprises a base and a removable cover (snap-on design).
The measuring circuit and the setting element are located on the printed circuit board inside the cover, the connection terminals on the base.
The sensing elements are located at the end of the measuring tip and protected by a filter cap.
Cable entry is made via the screwed cable gland M16 supplied with the sensor.
Immersion rod and housing are made of plastic and are rigidly connected.

The sensor is fitted with the mounting flange supplied with the sensor. The flange is to be placed over the immersion rod and then secured in accordance with the required immersion length.

Setting element



Measuring range 1|2|3


	Test function active				
	U1	U2	BS-MS	I1	I2
	10 V	5 V	⏏ 20 °C	20 mA	12 mA
	5 V	10 V	⏏ 75 °C	12 mA	20 mA
	0 V	5 V	⏏ 20 °C	4 mA	12 mA
	5 V	0 V	⏏ –35 °C	12 mA	4 mA

1864Z05en

The setting element is located inside the cover. It comprises 6 pins and a jumper. It is used to select the required measuring range and to activate the test function.

The different jumper settings have the following meaning:

- *For the passive temperature measuring range:*
  Jumper in the middle position (R2) = –35...+50 °C (factory setting)
- *For the active temperature measuring range:*
  Jumper in the left position (R1) = –35...+35 °C,
  Jumper in the middle position (R2) = 0...50 °C (factory setting)
  Jumper in the right position (R3) = –40...+70 °C
- *For activating the test function:*
  Jumper in the horizontal position: The values according to the table "Test function active" will be made available at the signal output.

Malfunction

- Should the temperature sensor become faulty a voltage of 0 V (4 mA) will be applied at signal output U2 (I2) or signal output BS-MS becomes high impedance (>1 MΩ) after 60 seconds, and the humidity signal at signal output U1 (I1) will reach 10 V (20 mA).
- Should the humidity sensor become faulty a voltage of 10 V (20 mA) will be applied at signal output U1 (I1) after 60 seconds, and the temperature signal will remain active.

Accessories

Name	*Type reference*
Filter cap (for replacement)	**AQF3101**

Engineering notes

A transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty is required to power the sensor. When sizing and protecting the transformer, local safety regulations must be complied with.
When sizing the transformer, the power consumption of the duct sensor must be taken into consideration.
For correct wiring, refer to the Data Sheets of the devices with which the sensor is used.
The permissible cable lengths must be considered.

Cable routing and cable selection

It must be considered for routing of cables that the longer the cables run side by side and the smaller the distance between them, the greater electrical interference. Shielded cables must be used in environments with EMC problems.
Twisted pair cables are required for the secondary supply lines and the signal lines.

Note to **QFM2171**

Terminals G1(+) and I1(–) of the humidity output must always be connected to power, even if only terminals G2(+) and I2(–) of the temperature output are used!

Mounting notes

Location	Mount the sensor in the center of the duct wall. If used together with steam humidifiers, the minimum distance after the humidifier must be 3 m to max 10 m. Fit the sensor in the extract air duct if the application involves dew point shifting. Fit only the flange to the duct wall. The sensor is then inserted through the flange and engaged.
Caution!	• To ensure degree of protection IP 54, fit the sensor with the cable entry pointing downward. • The sensing elements inside the measuring tip are sensitive to impact. Avoid any impact on mounting.
Mounting instructions	The mounting instructions are printed on the inside of the package of the device.

Commissioning notes

Check wiring before switching on power. The temperature measuring range must be selected on the sensor, if required.
Wiring and the output signals can be checked by making use of the test function (refer to "Mechanical design").

⚠ We recommend not to use voltmeters or ohmmeters directly at the sensing element. In the case of the simulated passive output signals, measurements with commercially available meters cannot be made (measuring current too small).

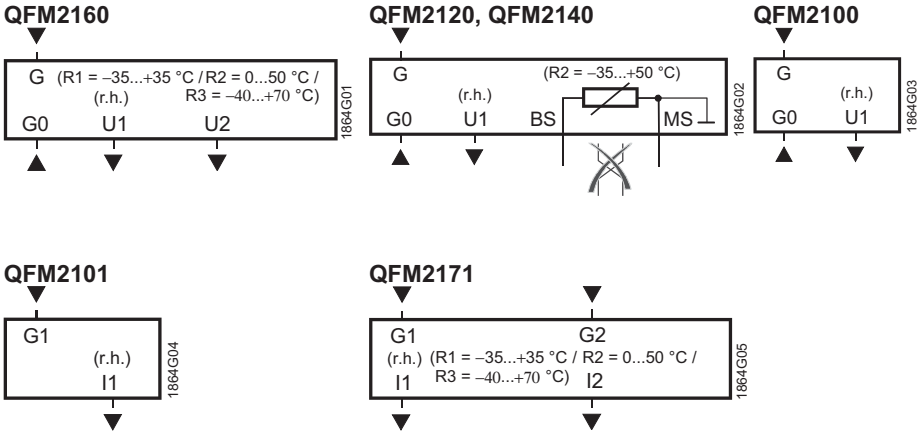
Technical data

Power supply	Operating voltage	AC 24 V ±20 % or DC 13.5...35 V
	Frequency	50/60 Hz at AC 24 V
	Power consumption	≤1 VA
Cable lengths for measuring signal	Perm. cable lengths	See data sheet of the device handling the signal
Functional data of humidity sensor	Range of use	0…95 % r. h. (non-condensing)
	Measuring range	0…100 % r. h.
	Measuring accuracy at 23 °C and AC/DC 24 V in 0...95 % r. h. 30...70 % r. h.	 ±5 % r. h. ±3 %, r. h. typically
	Temperature dependency	≤0.1 % r. h./°C
	Time constant at 0...50 °C and 10...80 % r.h.	< 20 s
	Perm. air velocity	20 m/s
	Output signal, linear (terminal U1)	DC 0...10 V ≙ 0...100 % r. h., max. ±1 mA
	Output signal, linear (terminal I1) Burden	4…20 mA ≙ 0...100 % r. h. See "Function"
Functional data of temperature sensor with QFM2160, QFM2171	Measuring range	0...50 °C (R2 = factory setting), −35...+35 °C (R1) or −40…+70 °C (R3)
	Sensing element	NTC 10 kΩ
	Measuring accuracy at AC/DC 24 V in 15...35 °C −35...+50 °C	 ±0.8 K ±1 K
	Time constant	< 3.5 min. in with 2 m/s moved air
	Output signal, linear (terminal U2)	DC 0...10 V ≙ 0...50 °C /−35...+35 °C /−40...+70 °C max. ±1 mA

	Output signal, linear (terminal I2)	4…20 mA ≙ 0...50 °C /−35...+35 °C /−40...+70 °C
	Burden	See "Function"
Functional data of temperature sensor with QFM2120, QFM2140	Measuring range	−35...+50 °C
	Sensing element simulated, corresponding to	
	QFM2120	LG-Ni 1000
	QFM2140	T1 (PTC)
	Measuring accuracy at AC/DC 24 V in the range of	
	15...35 °C	±0.8 K
	−35...+50 °C	±1 K
	Time constant	< 3.5 min. in with 2 m/s moved air
	Perm. measuring current with	
	QFM2120	1.18…4.21 mA
	QFM2140	0.53…1.89 mA
Protective data	Degree of protection of housing	IP 54 as per IEC 60 529 in built-in state
	Safety class	III as per EN 60 730
Electrical connections	Connection terminals for	1×2.5 mm^2 or 2×1.5 mm^2
	Cable entry gland (enclosed)	M 16 x 1.5
Environmental conditions	Operation	IEC 60721-3-3
	Climatic conditions	Class 3K5
	Temperature (housing with electronics)	−15...+60 °C
	Humidity	0...95 % r. h. (non-condensing)
	Mechanical conditions	Class 3M2
	Transport	IEC 60721-3-2
	Climatic conditions	Class 2K3
	Temperature	−25...+70 °C
	Humidity	<95 % r. h.
	Mechanical conditions	Class 2M2
Materials and colors	Base	Polycarbonate, RAL 7001 (silver-grey)
	Cover	Polycarbonate, RAL 7035 (light-grey)
	Immersion rod	Polycarbonate, RAL 7001 (silver-grey)
	Filter cap	Polycarbonate, RAL 7001 (silver-grey)
	Mounting flange	PA66 – GF35 (black)
	Cable entry gland	PA, RAL 7035 (light-grey)
	Sensor (complete assembly)	Silicone-free
	Packaging	Corrugated cardboard
Standards and directives	Product standard: Automatic electrical controls for household and similar use	EN 60 730-1
	Electromagnetic compatibility	
	Immunity	EN 61 000-6-1
	Emissions	EN 61 000-6-3
	CE conformity to	EMC directive 2004/108/EC
	C-tick conformity (EMC) to	EN 61 000-6-3
	UL conformity [1]	UL 873
Environmental compatibility	Environmental product declaration CE1E1864en provides information on environmentally compatible product design and assessment (RoHS compliance, composition of substances, packaging, environmental benefit, disposal).	ISO 14001 (environment) ISO 9001 (quality) SN 36350 (environmental comp. products) RL 2002/95/EC (RoHS)
Weight	Incl. packaging	
	QFM21…	Approx. 0.18 kg

1) Does not apply to the **QFM2160** duct sensor!

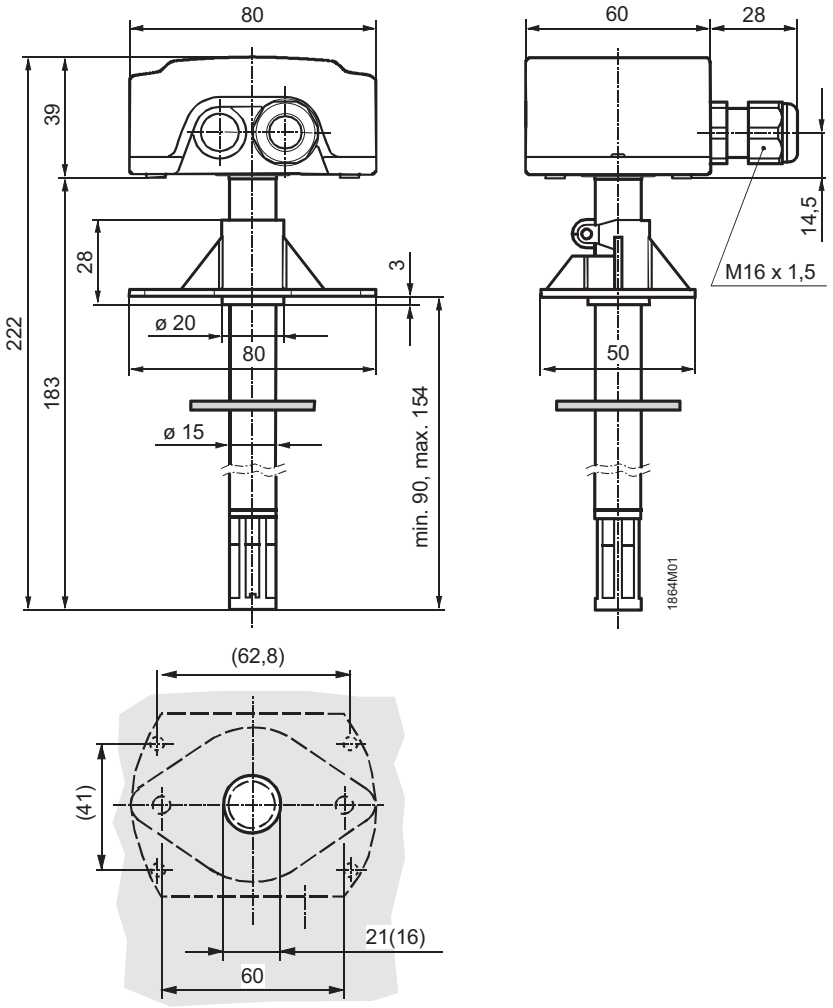
Connection terminals



G, G0	Operating voltage AC 24 V (SELV) or DC 13.5...35 V
G1, G2	Operating voltage DC 13.5...35 V
U1	Signal output DC 0...10 V for 0...100 % r. h.
U2	Signal output DC 0...10 V for temperature range 0...50 °C (R2 = factory setting), –35...+35 °C (R1) or –40...+70 °C (R3)
I1	Signal output 4…20 mA for 0...100 % r. h.
I2	Signal output 4…20 mA for temperature range 0...50 °C (R2 = factory setting), –35...+35 °C (R1) or –40...+70 °C (R3)
BS, MS	Signal output LG-Ni 1000- or T1 for temperature range –35...+50 °C (passive, simulated); wires must not be interchanged

*Note on connection terminals of the **QFM2171**:*
Terminals G1(+) and I1(–) for the humidity output must always be connected to power, even if only the temperature output G2(+) and I2(–) is used!

Dimensions



Drilling plan with (without) mounting flange

Dimensions in mm

TECHNICAL DATASHEET OF LEVEL TRANSMITTER

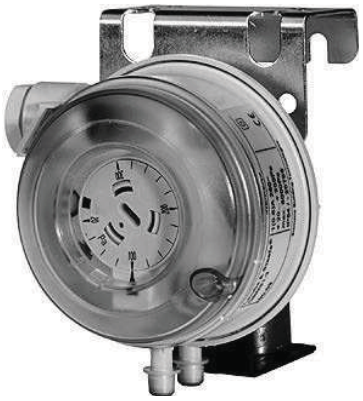
Datasheet For Pressure Transmitter

GENERAL	Model no.		266DSH.H.S.S.B.2.A.2-.....L1..B1	
	Description		Model 266DSH Differential Pressure Transmitters	
	Tag Number			
	Service			
	Type		Two wire, Loop Powered	
	Function		Transmit & Indicate	
	Mounting	Case	2"(Pipe/Wall)	Aluminium Alloy (Barrel version)
	Area Classification		General Purpose	
	Enclosure	Intrinsic Safe	Weather proof IP67	NA
	Enclosure Housing		Epoxy Coated Aluminium Alloy	
	Electrical Entry		1/2"-14 NPT	
	Output Type	Driving Voltage	Profibus PA	Loop Powered
TRANSMITTER	Protocol		Profibus PA	
	Power Supply		10.5 - 30VDC	
	Performance Accuracy		± 0.06 % of calibrated span.	
	Turn down Ratio		100:1	
	Ambient Temperature		– 40°C and +85 °C	
	Instrument Span		16 and 1600 mbar	
MEASURING UNIT	Inst. Range Min.	Max. UOM	0-10000 mmwc	
	Cal. Range Min.	Max. UOM	0-10000 mmwc	
	Element Type		Diaphragm	
	Body Material		AISI 316L ss	
	Element Material		AISI 316L ss	
	Over Range Protection		150 % of operating pressure	
	Surge Protection/Mounting Brackets Material		Provided/CS Material	
	Process Flanges		AISI 316Lss/1/2 in. – 14 NPT-f through adapter	
	Fill Fluid		Silicone Oil	
CERTIFICATION	Calibration certificate		Provided	
	Accesories		-	
	Make		ABB Inida Limted	
				Rev 00

TECHNICAL DATASHEET OF AIRSTAT

Customer	**NTPC**	**Job No.**	**M22/DEL- 019.BHEL**
Project		**Date**	**10.03.2023**
BHEL Doc. No.		**Doc No**	

Sr.No.	Description	Technical Data
1	Item	Airstat (DP Type)
2	Make	Siemens, Germany
3	Model No.	QBM 81-3
4	Range	20-300 Pascal
5	Qty	3 Nos. As per P&ID- AC System
6	Location	Duct
7	Type	Spring Loaded Diaphragm
8	Max. Operating Pressure	7500 Pascal
9	Repeatability	±0.5%
10	Type of Switch	Single pole change over, Multilayer contact
11	Connection	PG11 Cable gland for electrical, Male dia 6.2 mm Pressure connection
12	Service Life	>1000000 Switching cycle.
13	Catalogue	Enclosed.
14	Material of Housing	Fibre glass reinforced polycarbonate
15	Enclosure for Housing	IP-54
16	Contact Rating	AC/DC 24V
17	Electrical Connection	3 Screw Terminals.
18	Tag Plate	SS



Differential Pressure Switch QBM81-…

for air and nonaggressive gases

- **For ventilation and air conditioning plants**
- **To monitor air filters, air flow, fan belts**
- **To monitor pressure in clean rooms, kitchens etc.**
- **Easy to mount**
- **>1 mio switching cycles**
- **Highly precise setting**
- **Long-term stability**

Use

In ventilation and air conditioning plants to:

- Monitor differential pressure, underpressure and overpressure
- Monitor air filters and air flows
- Recognize torn fan belts

Differential pressure switches can be used in clean rooms, kitchens, etc.

Type summary

Type	*Pressure range*		
QBM81-3	0,2…3 mbar	20…300 Pa	0.08…1.2 inH_2O
QBM81-5	0,5…5 mbar	50...500 Pa	0.2…2 inH_2O
QBM81-10	1…10 mbar	100…1000 Pa	0.4…4 inH_2O
QBM81-20	5…20 mbar	500…2000 Pa	2…8 inH_2O
QBM81-50	10…50 mbar	1000…5000 Pa	4…20 inH_2O

Ordering

When ordering, please indicate quantity, name and product number. *Example:*
1 differential pressure switch QBM81-5
The accessory duct probe FK-PZ3 are included in the delivery.
Additional accessories must be ordered separately.

Mechanical design

The differential pressure switch QBM81-... consists of:
- Housing and cover
- Diaphragm
- 1 sheet-steel mounting bracket

Accessory duct probe connection kit (FK-PZ3):
- 2 duct adaptors
- 4 fixing screws
- 2 m tubing, 5/8 mm dia.

Accessories

For precise measurements, two additional duct probe sets must be delivered; see also data sheet CA1N1589E:

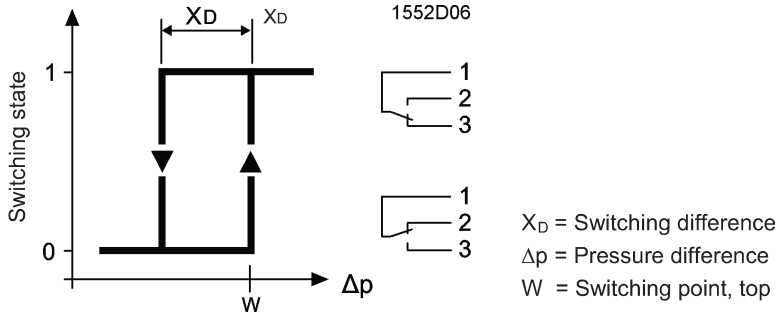
FK-PZ1 Set containing two stainless steel duct adaptors with rubber grommet
FK-PZ2 Set containing two duct adaptors with aluminum fixing rosettes, 4 screws

Technical design

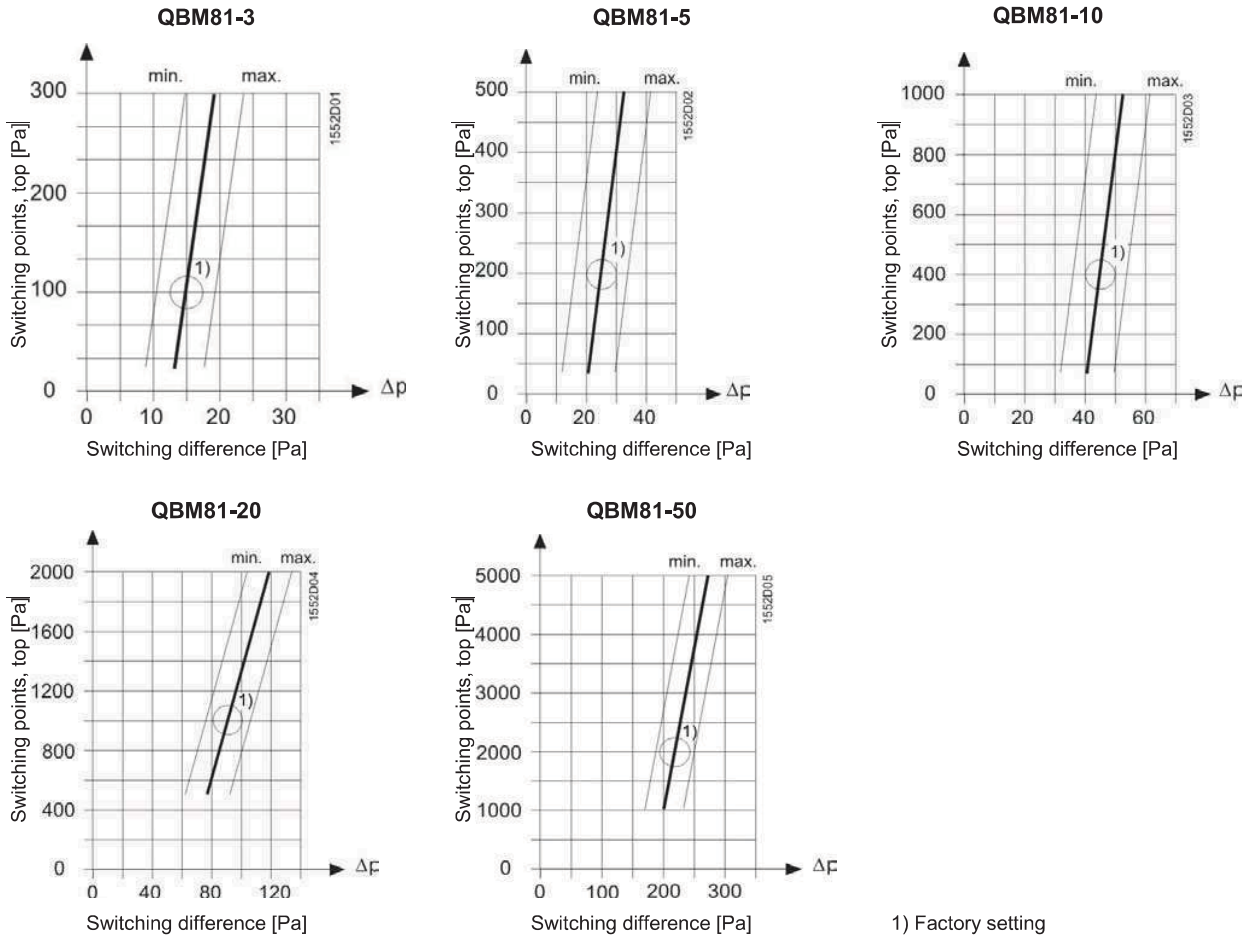
The differential pressure between the two pressure connections deflects a spring-loaded diaphragm. This special diaphragm ensures the long-term stability of switching points.
Each type is engraved with individual scales for very precise adjustment. The adjustment options are illustrated in the 5 diagrams in Section "Functions" below.

Functions

Function diagram

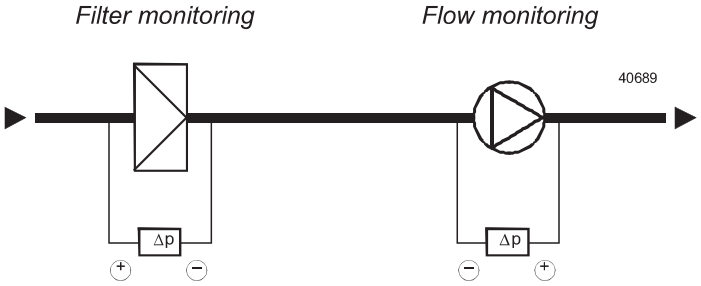


Switching points



1) Factory setting

Application examples



+ Pressure upstream of filter
− Pressure downstream of filter

+ Pressure downstream of fan
− Pressure upstream of fan on inlet side or open to atmospheric pressure. With radial fans, locate at inlet centre.

Mounting notes

Mounting instructions are enclosed with the differential pressure switch.
The pressure switch is suitable for mounting on air ducts or walls. Vertical orientation is recommended, but any orientation is acceptable in principle.
Mounting positions other than vertical affects the switching point of the differential pressure switch; see “Commissioning notes” below.

The pressure connection tubes can be any length, but the response time increases if longer than 2 meters.
Mount the pressure switch above the pressure connection points. To prevent accumulation of condensation, route the tubing to ensure gradual incline from the pressure connection points to the differential pressure switch (no looping).

Commissioning notes

Select the required setpoint using the setpoint knob [5] located under the cover (see “Dimensions”).
The differential pressure switch is factory-calibrated in vertical position. Horizontal installation affects the switching point as follows:

- With cover facing upward: Switching point is 11 Pa higher than scale
- With cover facing downward: Switching point is 11 Pa lower than scale.

Disposal

The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

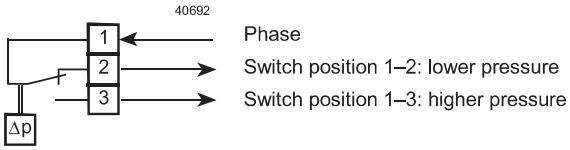
Technical data

Electrical interface	Type of switch	Single-pole change-over, multi-layer contact
	Contact rating	AC / DC 24 V, ≥ 0.01 A AC 250 V, max. 5 A res. max. 3 A ind., cos φ > 0.6 (0.8 A starting current sixfold, cos φ > 0.6)
	Voltage against earth	Max. AC 250 V
⚠ Warning	No internal fuse	
	External preliminary protection required in all cases	
	External supply line protection (EU)	Fuse slow max. 10 A or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898
	Switching differential	Factory set
	Reset	Automatic
	Service life	>1 000 000 switching cycles
Functional data	Measuring range	See “Type summary”
	Max. unilateral overload	
	-30…75 °C	7500 Pa
	-30…85 °C	5000 Pa
	Permitted media	Air, non-corrosive gases
	Reproducibility for range	
	20…300 Pa	<±2.5 Pa
	50…2000 Pa	<±5 Pa
	1000…5000 Pa	<±15 Pa
Degree of protection	Protection class	III according to EN 60730-1
	Protection degree of housing	IP54 according to EN 60529
Materials	Housing	Fiber-glass reinforced polycarbonate
	Cover	Polycarbonate
	Diaphragm	Silicone. low-swell rubber, emission-free
	Mounting bracket	Sheet-steel (galvanized)
	Duct adaptors	ABS
	Tubing	PVC, soft
Mounting	Orientation	Any; See “Commissioning notes”
Connections	Electrical connection	3 screw terminals
	Cable entry	PG11 cable gland
	Pressure connections	Male, dia. 6.2 mm

General ambient conditions	Ambient temperature:	
	Operation	–30... +85 °C
	Storage	–40... +85 °C
	Ambient humidity	< 90 % r.h. (non-condensing)
Directives and Standards	Product standard	EN 60730-1
		Automatic electrical controls for household and similar use
	EU Conformity (CE)	CA1T1552xx *)
	DVGW approval	to DIN 1854
Combustion class		According to UL94
	Pressure casing and housing	V-0
	Cover	HB
	Plastic tubing	V-2
	Duct adaptors	HB
Environmental compatibility	The product environmental declaration CA1E1552*) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
Weight	Weight (including packaging)	0.19 kg with mounting bracket

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection terminals



TECHNICAL DATASHEET OF PRESSURE SWITCH

Customer	**NTPC**	**Job No.**	**M22/DEL- 019.BHEL**
Project		**Date**	**10.03.2023**
BHEL Doc. No.		**Doc No**	

Sr.No.	Item	Description
1	Item	Pressure Switch
2	Make	SWITZER, Chennai
3	Model No.	PS01-W1-32-M11-F-55-C-P-C-Z
4	Qty	2 nos
5	Location	Duct-AHU Room
6	Range	0 to 2.5 mbar
7	**Sensor Details**	
7.1	Type & Material	Diaphragm & 316LSS
7.2	Wetted Parts	316SS with Nitrile o ring
7.3	Max. Working Pressure	0.5 Bar
7.4	Max. Working Temp.	110° C
8	**Switching**	
8.1	Switch Type	Snap Acting Micro Switch
8.2	Contact Type & Rating	2 X SPDT (for DPDT action) &5A 250V AC
8.3	No. of set Point	One
8.4	Set Pressure	0.65 mbar
8.5	On-Off Differential	Fixed
8.6	Repeatability	1% FSR
9	**General**	
9.1	Access to setting	External
9.2	Paint Finish	Epoxy powder coated
9.3	Electrical Connection	7 pin plugs in connector
9.4	Enclosure	Pressure Die Cast Aluminium
9.5	Protection Category	Weatherproof to IP 66
9.6	Mounting	Panel
9.7	Process Connection /Location	½" NPTM through adaptor /Bottom
9.8	Accessories / special	a) SS tag plate b) ¼" NPTM X ½" NPTM 316SS Adaptor

Pressure switch
Model PS01

Applications

- Hydraulics and pneumatics
- Steel
- Power
- Special purpose machine

Special features

- Diaphragm-sealed piston sensor and diaphragm
- High static pressure
- Field adjustable setpoint
- Robust design

Fig. top: Pressure switch, model W1 weatherproof
Fig. bottom: Pressure switch, model F1 flameproof

Description

These high quality pressure switches have been developed especially for safety-critical applications. High quality of the product with established systems and manufacturing process will ensure reliable monitoring of your plant.

Rugged in construction, supreme in performance PS01 pressure switches are designed as cost effective solutions to meet a variety of applications in oil, gas, power, steel and petrochemical industries.

The sensing element consists of a time-proven diaphragm sealed piston affording high integrity, reliable switching and a very high overload protection. Variety of combinations in features are available to make it versatile.

For low ranges, diaphragm is used as a measuring element.

Standard version

Switch enclosure
- W1: Aluminium pressure die cast weatherproof as per IS/IEC 60529
- F1: GR style aluminium pressure die cast, weatherproof and flameproof to Gr.IIA, IIB or IIC as per IS/IEC 60079

Repeatability of the setpoint (note 4)
± 1.0% FSR

Permissible ambient temperature
–10°C ... +60°C

Permissible medium temperature
- –20°C ... +110°C for SS and Buna-N
- –20°C ... +95°C for Neoprene
- –20°C ... +130°C for EPDM
- –20°C ... +200°C for Silicone

Process connection
- 1/4" NPT(F) direct
- Other connections through adaptor

Measuring element
- 316L SS diaphragm sealed piston for high ranges (standard)
- Buna-N diaphragm for low ranges (standard)

Wetted parts
- 316 SS standard (high ranges)
- Aluminium standard (low ranges)
- Monel® optional (high ranges)

Sealing
- Nitrile standard
- EPDM / Teflon® / Viton® optional, depending on setting range and operating conditions

Ranges
Several ranges from –1 ... +700 bar

Switching contacts with microswitch
1 x SPDT or 2 x SPDT (single pole double throw)

Switching function (notes 10)
Instrument quality snap acting microswitch

On-off differential
- Fixed (standard)
- Wideband adjustable for low ranges in weatherproof enclosure only

Maximum working pressure
Refer table 1

Electrical connection
- 1/2" NPT(F) single entry standard
- Dual entry on request

Ingress protection
IP66

Scale accuracy (note 6)
± 5% FSR

Mounting
Panel / wall / on-line / 2" pipe

Conformity
Generally to BS 6134:1991

Weight
- Weatherproof: approx. 1.3 Kg
- Flameproof: approx. 2.0 Kg

Ordering matrix

Sample model number	PS01	W1	32	B02	F	5	A	P	C	SA
		---	---	---	---	---	---	---	---	---

Switch enclosure

Aluminium pressure die cast weatherproof to IP66 — **W1**

GR style aluminium pressure die cast, weatherproof to IP66 and flameproof to Gr.IIA, IIB or IIC. — **F1**

Material of sensing element and wetted parts

Sensing element for high ranges

316L SS — **3**

Monel — **M**

Sensing element for low ranges

Buna-N — **B**

Neoprene — **N**

EPDM — **E**

Silicone — **S**

316L SS — **3**

Wetted parts

316 SS — **2**

Aluminium (applicable only for low ranges) — **A**

Monel (applicable only for high ranges) — **M**

Range code: Refer table 1 for available ranges — □

Differential (Refer table 1 for available differential) — □

Fixed — **F**

Adjustable (applicable only for weatherproof low ranges) — **A**

Switch code and rating: Refer table 2 — □

Electrical entry: Refer table 3 — □

Mounting

Panel — **P**

Surface, wall — **W**

2" Pipe — **2**

Mounting material

Mild steel — **C**

304 SS — **4**

316 SS — **2**

Options: Refer table 4 — □

Remarks

- Weatherproof gasket: Nitrile gasket standard and EPDM on request for corrosive environment
- For special requirements, which is not listed in the above ordering matrix, will be indicated as Code 'Z' at the end of ordering code in quotation.

Table 1: Range code and availability

Range code	Range	Fixed (F)	Adjustable (A)	Maximum working pressure
High ranges, measuring element diaphragm sealed piston				
B02	–1 ... 1.5 bar	✓	×	15
B88	–1 ... 7 bar	✓	×	27
B42	0.25 ... 1.6 bar	✓	×	27
B43 *	0.4 ... 2.5 bar	✓	×	27
B44 *	1 ... 6 bar	✓	×	27
B45 *	1.6 ... 10 bar	✓	×	70
B46 *	2.5 ... 16 bar	✓	×	70
B37 *	4 ... 25 bar	✓	×	110
B39 *	10 ... 40 bar	✓	×	110
B47 *	10 ... 100 bar	✓	×	155
B48	7 ... 160 bar	✓	×	1000
B49	25 ... 250 bar	✓	×	1000
B50	50 ... 400 bar	✓	×	1000
B51	100 ... 700 bar	✓	×	1000
Low ranges, measuring element diaphragm				
M11	0 ... 2.5 mbar	✓	×	0.5
M36	0.5 ... 5 mbar	✓	✓	0.5
M37	1 ... 10 mbar	✓	✓	0.5
M38	2.5 ... 15 mbar	✓	✓	0.5
M39	2.5 ... 25 mbar	✓	✓	0.5
M41	5 ... 50 mbar	✓	✓	0.5
M45	7.5 ... 75 mbar	✓	✓	0.5
M46	10 ... 100 mbar	✓	✓	0.5
M57	20 ... 200 mbar	✓	✓	0.5
M47	40 ... 400 mbar	✓	✓	1
B25	0.2 ... 1 bar	✓	✓	4
B24	0.16 ... 1.6 bar	✓	✓	4
B30	0.4 ... 4 bar	✓	✓	7
M08	–5 ... 0 mbar	✓	✓	0.5
M06	–10 ... 0 mbar	✓	✓	0.5
M04	–20 ... 0 mbar	✓	✓	0.5
M03	–25 ... 0 mbar	✓	✓	0.5
M01	–50 ... 0 mbar	✓	✓	0.5
M49	–100 ... 0 mbar	✓	✓	0.5
M09	–2.5 ... +2.5 mbar	✓	×	0.5
M07	–10 ... +10 mbar	✓	✓	0.5
M05	–20 ... +20 mbar	✓	✓	0.5
M02	–50 ... +50 mbar	✓	✓	0.5

* Optional MWP 600 bar is available

Table 2: Switch code, rating and availability (note 10)

Switch code		Contact version	AC rating	DC rating in Ampere					
SPDT	DPDT			Resistive			Inductive		
				220V	110V	24V	220V	110V	24V
D	DD	General purpose	15A 250, 125V	0.2	0.4	2.0	0.02	0.03	1.0
W ★	WW ★	General purpose	15A 250, 125V	0.3	0.6	10	0.05	0.1	4.0
5	55	General purpose	5A 250, 125V	0.2	0.4	4.0	0.2	0.4	3.0
9	99	Hermetically sealed, inert gas filled with Silver alloy contact	1A 115V, 400 Hz	N.A	N.A	3.0	N.A	N.A	1.0
G	GG	Hermetically sealed, inert gas filled with gold plated contact	N.A	N.A	N.A	1.0	N.A	N.A	0.25

- N.A – Not available
- ★ Applicable only for adjustable differential model

Table 3: Electrical entry

Size	Single entry		Dual entry	
	W1	F1	W1	F1
1/2" NPTF	A	A	N	N
Through connector				
7 pin plug	C	---	---	---
★ Cable gland available on request				

Note:

- All pin connectors housing material are of aluminium alloy
- In explosionproof pin connectors are not applicable.
- Cable gland available on request

Table 4: Options

Details	Code
Optional maximum working pressure	S5
Chemical seal ★	S1
Ammonia service	SA
Oxygen service	SO
NACE preparation	SC
Blow-out disc ★★	S8
Seal 'O' ring – Viton ★	OV
Seal 'O' ring – EPDM ★	OE
Seal 'O' ring – Teflon ★	OT
EPDM cover gasket for weatherproof enclosure W1	EW
★ Applicable for high ranges only ★★ Not applicable for flameproof	

Switching differential data for high ranges

Range code	Range in bar	On-off differential in bar						Maximum working pressure	
		Standard maximum working pressure			Optional maximum working pressure				
		D	5	9 / G	D	5	9 / G	Standard	Optional
B02	–1 ... 1.5	0.10	0.25	0.45	×	×	×	15	×
B88	–1 ... 7	0.30	0.35	4.0	×	×	×	27	×
B42	0.25 ... 1.6	0.15	0.15	0.15	×	×	×	27	×
B43	0.4 ... 2.5	0.15	0.15	0.15	0.30	0.50	0.50	27	600
B44	1 ... 6	0.20	0.35	0.40	0.45	0.70	0.75	27	600
B45	1.6 ... 10	0.25	0.50	0.80	0.60	1.00	1.20	70	600
B46	2.5 ... 16	0.30	0.60	1.00	0.60	1.20	2.00	70	600
B37	4 ... 25	1.00	1.20	2.30	1.00	2.00	4.00	110	600
B39	10 ... 40	1.30	1.70	3.50	1.80	2.60	5.00	110	600
B47	10 ... 100	2.25	3.50	5.00	3.50	5.70	8.00	155	600
B48	7 ... 160	5.25	9.00	10	×	×	×	1000	×
B49	25 ... 250	10	10	25	×	×	×	1000	×
B50	50 ... 400	18	20	35	×	×	×	1000	×
B51	100 ... 700	25	25	50	×	×	×	1000	×

- Above differential table is applicable for weatherproof and flameproof enclosures
- To arrive differential for DPDT arrangement apply multiplication factor 1.6
- Tabulated differential value is achievable at midscale
- Differential would be twice at upper limit of the range

Switching differential data for low ranges with 316L SS diaphragm

Range code	Range	Weatherproof switch enclosure				Flameproof switch enclosure		
		on-off differential in mbar						
		Fixed			Adjustable	Fixed		
		D	5	9 / G	W	D	5	9 / G
Positive ranges								
M11	0 ... 2.5 mbar	1.0	1.0	×	×	1.1	1.3	×
M36	0.5 ... 5 mbar	1.2	1.2	×	×	1.4	1.8	×
M37	1 ... 10 mbar	1.4	1.4	×	4 ... 6	1.4	1.8	×
M38	2.5 ... 15 mbar	1.5	1.5	×	5 ... 9	1.6	2.3	×
M39	2.5 ... 25 mbar	1.6	1.6	5	6 ... 15	2.3	2.5	7
M41	5 ... 50 mbar	1.8	1.9	7	6 ... 30	2.3	3.3	8
M45	7.5 ... 75 mbar	2.2	2.4	7	7 ... 45	2.6	3.6	8
M46	10 ... 100 mbar	2.6	2.8	8	10 ... 60	3	4	8.5
M57	20 ... 200 mbar	40	40	50	25 ... 80	40	50	50
M47	40 ... 400 mbar	60	65	70	70 ... 240	50	70	75
B25	0.2 ... 1 bar	80	85	125	115 ... 600	70	125	130
B24	0.16 ... 1.6 bar	100	100	150	160 ... 960	90	150	175
B30	0.4 ... 4 bar	130	135	200	300 ... 2400	135	200	220
Negative ranges								
M08	–5 ... 0 mbar	1.2	1.3	×	×	1.2	2.2	×
M06	–10 ... 0 mbar	1.4	1.8	×	4 ... 6.0	1.8	3.0	×
M04	–20 ... 0 mbar	1.6	2.8	7	5 ... 12.0	2.2	4.6	7
M03	–25 ... 0 mbar	2.0	3.0	8	6 ... 15.0	3.0	5.0	8
M01	–50 ... 0 mbar	3.0	3.6	10	10 ... 30.0	4.0	6.0	10
M49	–100 ... 0 mbar	3.4	4.2	12	15 ... 50.0	5.0	7.0	12
Compound ranges								
		in +ve ranges	in –ve ranges	in +ve ranges	in –ve ranges	in +ve ranges	in –ve ranges		in +ve ranges	in –ve ranges	in +ve ranges	in –ve ranges	in +ve ranges	in –ve ranges
M09	–2.5 ... +2.5 mbar	1.0	1.4	1.0	1.3	×	×	x	1.1	1.6	1.2	2.0	×	×
M07	–10 ... +10 mbar	1.2	1.5	1.3	2.0	×	×	7 ... 10	1.3	2.2	1.6	3.0	×	×
M05	–20 ... +20 mbar	1.4	2.0	1.5	3.0	5	8	7 ... 20	1.6	3.0	2.8	4.0	6	8
M02	–50 ... +50 mbar	2.0	3.0	2.2	4.0	6	10	9 ... 50	2.2	4.0	3.0	6.0	7	10

■ To arrive differential for DPDT arrangement apply multiplication factor 1.8

Switching differential data for low ranges with elastomer diaphragm

Range code	Range	Weatherproof switch enclosure				Flameproof switch enclosure		
		on-off differential in mbar						
		Fixed			Adjustable	Fixed		
		D	5	9 / G	W	D	5	9 / G
Positive ranges								
M11	0 ... 2.5 mbar	1.0	1.0	×	×	1.0	1.1	×
M36	0.5 ... 5 mbar	1.4	1.2	×	×	1.5	1.6	×
M37	1 ... 10 mbar	1.5	1.2	×	3 ... 6	1.6	1.6	×
M38	2.5 ... 15 mbar	1.5	1.2	×	4 ... 9	1.6	2.1	×
M39	2.5 ... 25 mbar	1.5	1.5	5	6 ... 15	1.6	2.3	6.5
M41	5 ... 50 mbar	1.5	1.6	6	7 ... 30	2.0	2.9	7.0
M45	7.5 ... 75 mbar	1.6	1.8	6	10 ... 45	2.3	3.2	7.0
M46	10 ... 100 mbar	1.5	2.0	8	12 ... 60	2.7	3.6	10
M57	20 ... 200 mbar	15	20	40	25 ... 80	27	35	50
M47	40 ... 400 mbar	20.0	30	60	60 ... 240	36	40	70
B25	0.2 ... 1 bar	50	60	100	100 ... 600	60	90.0	120
B24	0.16 ... 1.6 bar	70	60	150	150 ... 960	80	90.0	170
B30	0.4 ... 4 bar	120	140	200	200 ... 2400	130	135.0	220
Negative ranges								
M08	–5 ... 0 mbar	1.2	1.1	×	×	3	2.0	×
M06	–10 ... 0 mbar	1.4	1.5	×	3 ... 6	8	2.7	×
M04	–20 ... 0 mbar	1.5	2.3	7	4 ... 12	2.2	4.1	8
M03	–25 ... 0 mbar	1.6	2.5	8	5 ... 15	3.0	4.5	10
M01	–50 ... 0 mbar	2.0	3.0	10	5.5 ... 30	4.0	5.4	12
M49	–100 ... 0 mbar	2.5	3.5	11	10 ... 50	5.0	6.3	13
Compound ranges								

		in +ve ranges	in –ve ranges	in +ve ranges	in –ve ranges	in +ve ranges	in –ve ranges		in +ve ranges	in –ve ranges	in +ve ranges	in –ve ranges	in +ve ranges	in –ve ranges
M09	–2.5 ... +2.5 mbar	1.0	1.3	0.9	1.3	×	×	x	1.1	1.4	1.1	1.8	×	×
M07	–10 ... +10 mbar	1.1	1.5	1.2	1.6	×	×	3.2 ... 10	1.2	2.0	1.4	2.7	×	×
M05	–20 ... +20 mbar	1.3	1.5	1.3	2.0	4	6	5.0 ... 20	1.4	2.7	1.8	3.6	6	8.0
M02	–50 ... +50 mbar	1.5	2.0	1.5	3.0	6	8	10 ... 50	2.0	3.6	2.7	5.4	8	12

■ To arrive differential for DPDT arrangement apply multiplication factor 1.3

Notes

1. Gr.IIA and IIB of IS/IEC 60079-1 is equivalent to NEC CL.1, Div.1, Gr.C and D. Gr.IIC of IS/IEC 60079-1 is equivalent to NEC CL.1, DIV.1, Gr.A and B.

2. Style W1 is weatherproof only when all entries and joint faces are properly sealed. Style F1 is flameproof only when cover 'O' ring is retained in position and proper FLP cable gland is used. It is recommended to procure cable glands along with F1 instruments to avoid neglect of it while installation.

3. Intrinsic Safety (Exi) — Pressure switches are classified as simple apparatus as they neither generate nor store energy. Hence pressure switches in weatherproof enclosures also may be used in intrinsically safe systems without certification provided the power source is certified Intrinsically Safe. Because of the low voltages and currents it is recommended to use gold contact and / or sealed contacts.

4. Accuracy and Repeatability are not different for all blind pressure switches. A shift of ±2% may be observed in setpoint when pressure falls from full static pressure. Settings will also shift with varying temperature

.

5. The instrument is calibrated in the mounting position depicted in the drawing. Mounting in any other direction will cause a minor range shift, especially in low and compound ranges. Ranges above 1 bar will not experience this shift.

6. A pressure switch is a switching device and not a measuring instrument eventhough it has a scale in W1 enclosure to assist setting. For this reason, Test Certificates will not contain individual ON-OFF switching values at different scale readings. Maximum differential obtained alone will be declared, besides other specifications.

7. Select working range of the instrument such that the set value lies in the mid 35% of the range i.e., between 35% and 70% of range span.

8. For switching differential values please refer Differential table. Switching differentials furnished are nominal values under test conditions at mid-scale and will vary with range settings and operating conditions.

9. On and off settings should not exceed the upper or lower range value.

10. DPDT action is achieved by two SPDT switches synchronised to practical limits i.e., ±2% of FSR. Deadband for DPDT contacts are higher than that of SPDT as force required to actuate the contacts are more. Please refer respective range table for exact values.

11. Fluid Temperature: A pressure switch when connected to the process is not subjected to through flow and therefore is not fully exposed to the fluid temperature. Use of adequate length of impulse piping will greatly reduce excessive heating of the sensing element. For e.g., connection of 75 mm of 12 mm dia impulse piping will reduce water temperature of 100°C to 65°C at an ambient temperature of 50°C. Consult sales for piping nomogram for different temperatures.

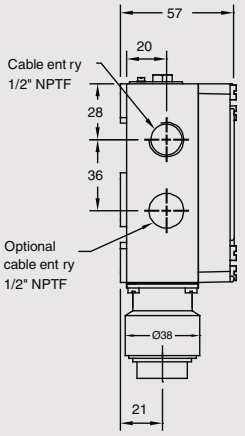
12. Ambient temperature range: PS01 suitable for operating within a range of ambient temperature from –10°C ... +60°C provided the process does not freeze within this range. Below 0°C, precautions should be taken in humid atmospheres to prevent frost formation inside the instrument from jamming the mechanism. Occasional escalation beyond this range are possible but accuracy might be impaired. The microswitch is the limiting factor which should never exceed the limits –25°C ... +80°C.

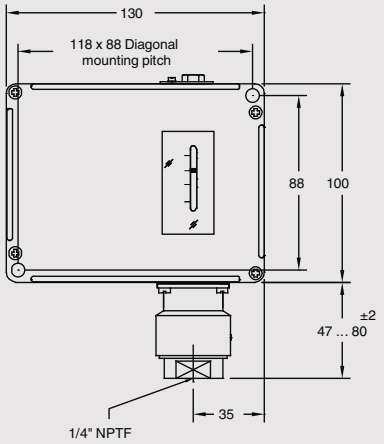
13. Ensure that impulse pipework applies no stress on sensing element housing and use spanners to hold pressure port / housing when connections are made.

Dimensions in mm

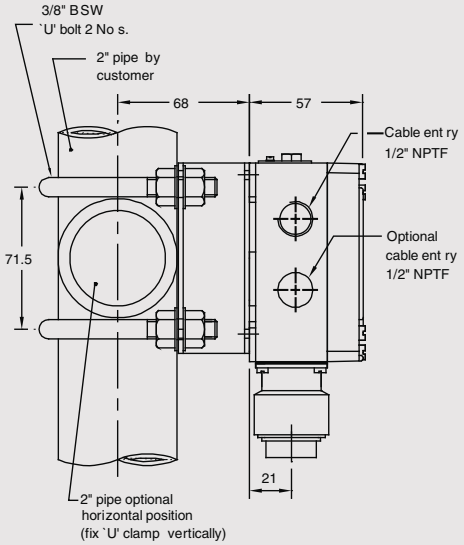
Version PS01–W1

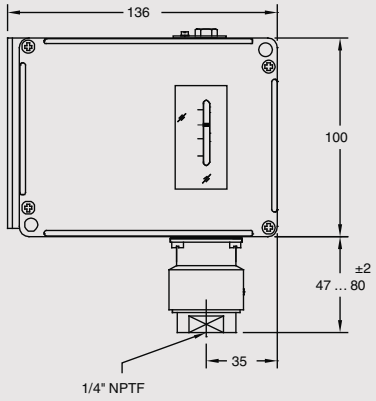
High range direct or panel mouning



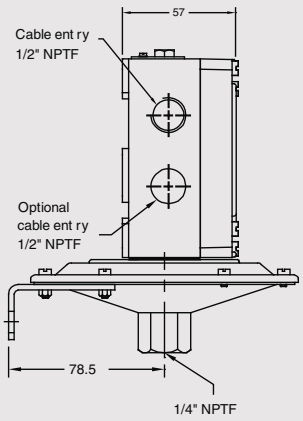


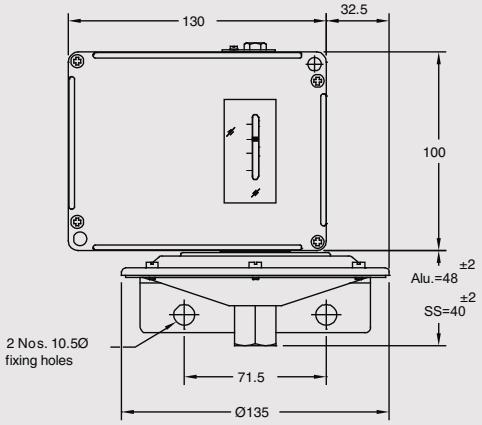
High range 2" pipe mouning





Low range surface mouning

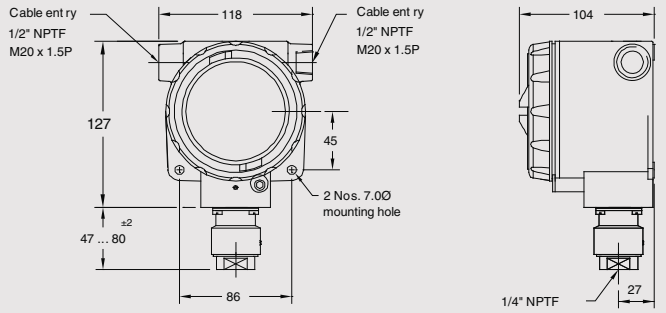




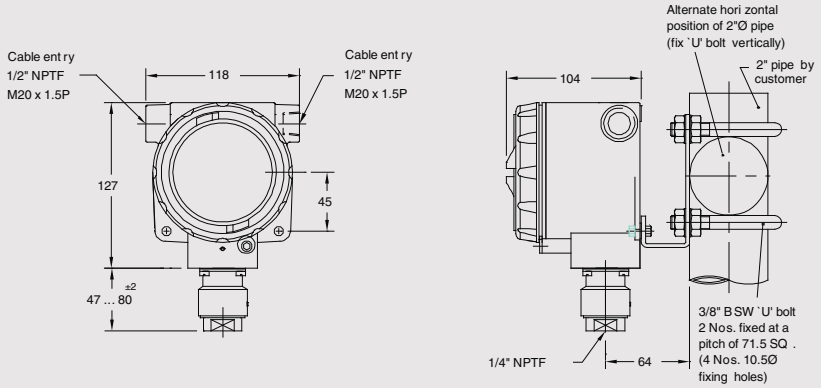
Dimensions in mm

Version PS01–F1

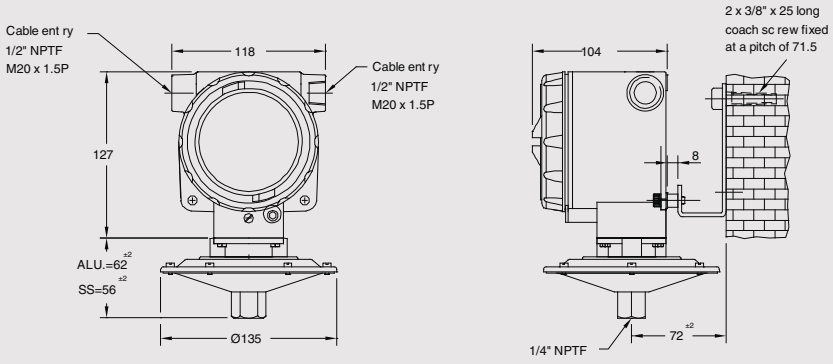
High range direct or panel mouning



High range 2" pipe mouning



Low range surface mouning



Ordering information

Model / Sensing element, Wetted parts / Range code / Differential / Switch code and rating / Electrical entry / Mounting / Mounting material / Options

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Chennai 600 050
Tel. +91 44 2625 2017 / 2018 / 4991 / 4324
sales@switzerprocess.co.in
www.switzerprocess.co.in

DIFFERENTIAL PRESSURE SWITCHES

DIAPHRAGM SENSOR WEATHERPROOF FLAMEPROOF

SERIES 310

● VERY LOW RANGES ● CLEAN ROOMS ● FILTER BLOCKAGE ●
● AIR PURGE SYSTEMS ● FAN FAILURE ● FAN EXHAUST ●
● REFRIGERATION COILS ● DRYING OVENS ●

MODEL 310 IN GN WEATHERPROOF ENCLOSURE

MODEL 310 IN GK FLAMEPROOF ENCLOSURE

SWITZER Series 310 differential pressure switches are specially designed for sensing very low differential pressure in mmWC / mbar ranges for reliable setting in varied applications.

A precision contoured synthetic elastomer diaphragm senses low differential pressures applied to either side of it and actuates a snap-acting microswitch when the input differential pressure is slightly above or below the pre-set value.

The switch mechanism and the set point adjustment are external to the sensing chamber and completely isolated from contact with the process medium.

While Style GN housing offers limited very low ranges and microswitches to meet OEM requirements, Style GM & GK versions offer more ranges, microswitch options and wideband adjustment facility.

A scale is provided for approximate switch setting.

GENERAL SPECIFICATIONS

Enclosure	
GN	Aluminium die cast weatherproof to IP : 66
GM	Aluminium pressure die cast weatherproof to IP : 67
GK	Aluminium die cast weatherproof to IP : 66 & flameproof to Gr.IIA, IIB & IIC ***(Note 1)***
Ranges	Refer Table
Sensor	Neoprene Diaphragm std. Nitrile, EPDM & Silicone are optional
Wetted Parts	Aluminum std.
Mounting	Vertical only
Repeatability	± 2 % FSR ***(Note 4)***
Scale Accuracy	± 5 % FSR ***(Note 6)***
Ambient Temp.	– 10°C to + 60°C ***(Note 12)***
Max. Working Pr.	0.5 bar for all ranges
Max. Working Temp.	95°C for Neoprene, 110°C for Nitrile, 130°C for EPDM and 200°C for Silicone ***(Note 13)***
Switching	
Element	Instrument quality snap-acting SPDT microswitch ***(Note 10)***
Differential	
GN–310	Fixed, 1 SPDT switch only
GM / GK–310	Fixed
GM / GK–313	Wideband adjustable. Refer tables A, B & C for values
Connection	
Process	1/4" NPTF Std. Others through Adaptors.
Electrical	3/4" ETF std., 1/2" NPTF optional Dual entry on request.
Conformity	Generally to BS:6134:1991

ORDERING MATRIX

ENCLOSURE

Aluminium die cast weatherproof to IP:66. ——— **GN**

Aluminium pressure die cast weather-proof to IP:67 with Nitrile gasket. ——— **GM**

Aluminium die cast flameproof cum weatherproof. CIMFR approved to Gr.IIA, IIB & IIC of IS/IEC 60079–1:2007 for flame-proofness and IP:66 for weatherproofness **GK**

MODEL

This is the basic Differential Pressure Switch meant for low / ultra low range spans having very low fixed switching differential. ——— **310**

Same as 310 but with auxiliary mechanism providing adjustment of switching differential between 6 to 10% minimum to 60% maximum of FSR (not available in GN enclosure). ——— **313**

SENSORS AND WETTED PARTS

Neoprene diaphragm and cast Aluminium wetted parts ——— **N5**

Silicone diaphragm and cast Aluminium wetted parts ——— **S5**

EPDM diaphragm and cast Aluminium wetted parts ——— **E5**

Nitrile diaphragm and cast Aluminium wetted parts ——— **B5**

RANGE CODE : Refer Table–1 ——— □

SWITCH CODE AND RATING : Refer Table–2 ——— □

ELECTRICAL ENTRY CODE : Refer Table–3 ——— □

Table–1 : RANGE CODE & AVAILABILITY

RANGE CODE	RANGE mbar	MWP bar	310		313
			GN	GM/GK	GM/GK
B3D	–2.5 to +2.5	0.5	✓	✓	×
B3X	0 to 2.5	0.5	×	✓	×
B5D	0.5 to 5	0.5	✓	✓	✓
B7D	1 to 10	0.5	×	✓	✓
C2D	2.5 to 15	0.5	✓	✓	✓
D3B	2.5 to 25	0.5	✓	✓	✓
D4C	5 to 50	0.5	×	✓	✓
D5C	7.5 to 75	0.5	✓	✓	✓
D8D	10 to 100	0.5	×	✓	✓

Table–2 : SWITCH CODE, RATING & AVAILABILITY *(Note 8)*

SWITCH CODE (SPDT)	AC RATING	DC RATING IN AMPS						AVAILABILITY OF SPDT IN MODELS		AVAILABILITY OF DPDT IN MODELS	
		RESISTIVE			INDUCTIVE						
		220V	110V	24V	220V	110V	24V	GN	GM / GK	GN	GM / GK
2 *	5A 250 / 125V	0.25	0.5	5.0	0.1	0.25	3.0	N.A.	310	↑	310
D	15A 250 / 125V	0.2	0.4	2.0	0.02	0.03	1.0	310	310	N	310
3	15A 250 / 125V	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	310	310	O	310
W	15A 250 / 125V	0.3	0.5	6.0	0.05	0.1	4.0	N.A.	313	T	313
4	1A 125V	N.A.	0.5	0.5	N.A.	0.25	0.25	310	310	A	310
5	5A 250 / 125V	0.2	0.4	4.0	0.2	0.4	3.0	N.A.	310	V	310
6	0.1A 125V	N.R.	N.R.	0.1	N.R.	N.R.	N.A.	310	310	A	310
S	5A 250 / 125V	0.25	0.5	3.0	0.1	0.2	2.0	N.A.	310	I	310
J	5A 250V	N.A.	N.A.	5.0	N.A.	N.A.	3.0	N.A.	310	L	310
K	1A 125V	N.A.	N.A.	1.0	N.A.	N.A.	0.5	N.A.	310	A	310
										B	
										L	
										E	
										↓	

Codes 2, 3, D & W – For General purpose usages.
Code 4 – Gold Alloy contact.
Code 5 – For General purpose with good DC rating.
Code 6 – Gold Alloy contact (Low Rating)
Code S – IP:67 sealed microswitch with silver Nickel contact.
Code J – Hermetically sealed, inert gas filled with Silver alloy contact.
Code K – Hermetically sealed, inert gas filled with Gold plated contact.

* For Code '2' Microswitch DPDT option available in selected ranges only – Consult factory

For DPDT, change switch code '3' to "33", '4' to '44', etc., while ordering

N.A. – Not Available **N.R.** – Not Recommended

PRESSURE CONVERSION TABLE

bar	Kgf / Cm²	lbf / in²	atm.	in H_2O	m H_2O	In Hg	torr (mm Hg)
1	1.01972	14.5038	0.9869	401.864	10.1972	29.530	750.062
0.98067	1	14.2233	0.96784	394.094	10	28.959	735.56
0.06895	0.07031	1	0.06805	27.71	0.70307	2.0360	51.715
1.01325	1.03323	14.6959	1	407.189	10.3323	29.9213	760
0.00249	0.00254	0.0361	0.00246	1	0.0254	0.0734	1.87
0.09807	0.1	1.422	0.0968	39.41	1	2.896	73.356
0.03386	0.03453	0.4911	0.03342	13.609	0.3453	1	25.4
0.00133	0.00136	0.01934	0.00132	0.5358	0.0136	0.03937	1

Table 3 : ELECTRICAL ENTRY CODE

Size *	Single Entry			Dual Entry		
	GN	GM	GK	GN	GM	GK
3/4" ETF	A	A	---	---	M	---
1/2" NPTF	B	B	B	---	N	N
3/4" NPTF	---	C	---	---	O	---
M20 × 1.5 **	---	D	D	---	P	P
M16 × 1.5	---	E	---	---	Q	---
Through Connector						
3 pin plug	---	2	---	---	---	---
7 pin plug	---	3	---	---	---	---
9 pin plug	---	4	---	---	---	---

* Cable gland available on request.
** Cable Entry is optional. Available on request.

SWITCHING DIFFERENTIAL DATA

TABLE – A : MODEL GN 310 — FIXED DIFFERENTIAL

Range Code	Range mbar	On–off Differentials in mbar	
		GN 310	
		3 / D / 6	4
B3D	± 2.5	0.5 +Ve 0.8 –Ve	0.5 +Ve 0.8 –Ve
B5D	0.5 to 5	0.8	0.4
C2D	2.5 to 15	1.0	0.5
D3B	2.5 to 25	1.0	0.5
D5C	7.5 to 75	5.0	2.5
DPCO not possible			

TABLE – B : MODEL GM / GK 313 — WIDEBAND DIFFERENTIAL

Range Code	Range mbar	On–off Differentials in mbar	
		GM 313	GK 313
		W	W
B3X	0 to 2.5	×	×
B5D	0.5 to 5	1.7 to 3	2.4 to 3
B7D	1 to 10	1.7 to 6	2.4 to 6
C2D	2.5 to 15	2.0 to 9	2.8 to 9
D3B	2.5 to 25	2.3 to 15	3.1 to 15
D4C	5 to 50	3.5 to 30	4.0 to 30
D5C	7.5 to 75	4.0 to 45	4.6 to 45
D8D	10 to 100	5.5 to 60	6.3 to 60

TABLE – C : MODEL GM / GK 310 — FIXED DIFFERENTIAL

Range Code	Range mbar	On–off Differentials in mbar							
		GM 310				GK 310			
		2	3 / D / 6	4	5	2	3 / D / 6	4	5
B3D	± 2.5	×	0.9 –Ve 0.7 +Ve	0.9 –Ve 0.7 +Ve	×	×	1.6 –Ve 1.1 +Ve	1.6 –Ve 1.1 +Ve	×
B3X	0 to 2.5	0.6	0.4	0.6	0.7	1.0	0.7	1.1	1.3
B5D	0.5 to 5	0.8	0.6	0.8	0.9	1.4	1.1	1.4	1.6
B7D	1 to 10	0.8	0.6	0.8	0.9	1.5	1.2	1.6	1.6
C2D	2.5 to 15	1.5	0.8	1.0	1.3	2.7	1.4	1.8	2.3
D3B	2.5 to 25	1.6	0.9	1.2	1.5	2.7	1.6	2.1	2.7
D4C	5 to 50	3.0	1.3	1.5	2.2	5.4	2.3	2.7	3.9
D5C	7.5 to 75	3.2	1.5	1.7	2.5	5.8	2.7	3.0	4.5
D8D	10 to 100	3.5	2.0	2.2	2.8	6.3	3.6	3.9	5.0

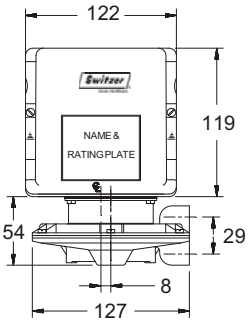
Notes : 1. Codes other than '3', 'D', '4' & '6' are not available in GN310.
2. DPDT not available in Model GN 310.
3. For on-off differential values with switch codes 'S', 'J' & 'K' consult factory.
4. To arrive at differentials for DPDT switching, apply multiplication factor of 1.1 to the above values.

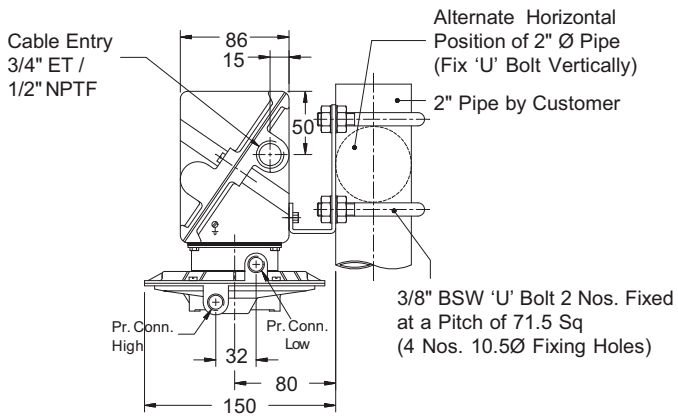
NOTES

1. Gr.IIA & IIB of IS/IEC 60079–1:2007 is equivalent to NEC CL.1, Gr.C & D. Gr.IIC of IS/IEC 60079–1:2007 is equivalent to NEC CL.1, DIV.1, Gr.A & B.
2. Style GM / GN is weatherproof only if all entries and joint faces are properly sealed. Style GK is weatherproof only if cover 'O' ring is retained in position and flameproof only if proper FLP cable gland is used. It is recommended to procure cable glands along with GK instruments to avoid neglect of it while installation.
3. Intrinsic Safety (Exi) — Differential Pressure switches are classified as simple apparatus as they neither generate nor store energy. Hence differential pressure switches in weatherproof (GM / GA) enclosures also may be used in intrinsically safe systems without certification provided the power source is certified Intrinsically Safe. Because of the low voltages and currents it is recommended to use gold contact and / or sealed contacts.
4. Accuracy & Repeatability are not different for all blind differential pressure switches. A shift of ±2% may be observed in setpoint when pressure falls from full static pressure. Settings will also shift with varying temperature.
5. The instrument is calibrated in the mounting position depicted in the drawing. Mounting in any other direction will cause a minor range shift, especially in low and compound ranges.
6. A differential pressure switch is a switching device and not a measuring instrument — eventhough it has a scale to assist setting. For this reason, Test Certificates will not contain individual ON-OFF switching values at different scale readings. Maximum differential obtained alone will be declared, besides other specifications.
7. Select working range of the instrument such that the set value lies in the mid 35% of the range i.e., between 35% and 70% of range span.
8. For switching differential values please refer respective Differential Table. Switching differentials furnished are nominal values under test conditions at mid-scale and will vary with range settings and operating conditions.
9. On and off settings should not exceed the upper or lower range value.
10. DPDT action is achieved by two SPDT switches synchronised to practical limits i.e., ±2% of FSR. Deadband for DPDT contacts are higher than that of SPDT as force required to actuate the contacts are more.
11. Contact life of microswitches are 5×10^5 switching cycles for nominal load. To quench DC sparks, use diode in parallel with inductance, ensuring polarity. A 'R–C' network is also recommended with 'R' value in Ohms equal to coil resistance and 'C' value in micro Farads equal to holding current in Amps.
12. Ambient temperature range: All models are suitable for operating within a range of ambient temperature from (–) 10°C to (+) 60°C provided the process does not freeze within this range. Below 0°C, precautions should be taken in humid atmospheres to prevent frost formation inside the instrument from jamming the mechanism. Occasional excursions beyond this range are possible but accuracy might be impaired. The microswitch is the limiting factor which should never exceed the limits (–) 25°C to (+) 80°C.
13. Fluid Temperature: A differential pressure switch when connected to the process is not subjected to through flow and therefore is not fully exposed to the fluid temperature. Use of adequate length of impulse piping will greatly reduce excessive heating of the sensing element. For e.g., connection of 7.5 cm of 12 mm dia impulse piping will reduce water temperature of 100°C to 65°C at an ambient temperature of 50°C. Ask factory for piping nomogram #441184–4 for different temperatures.
14. Ensure that impulse pipework applies no stress on sensing element housing and use spanners to hold pressure port / housing when connections are made.
15. **Accuracy figures are exclusive of test equipment tolerance on the claimed values.**
16. **All performance data are guaranteed to ±5%.**

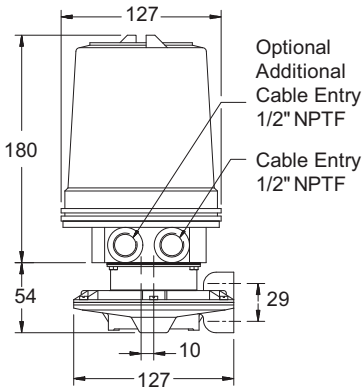
MOUNTING DIMENSIONS

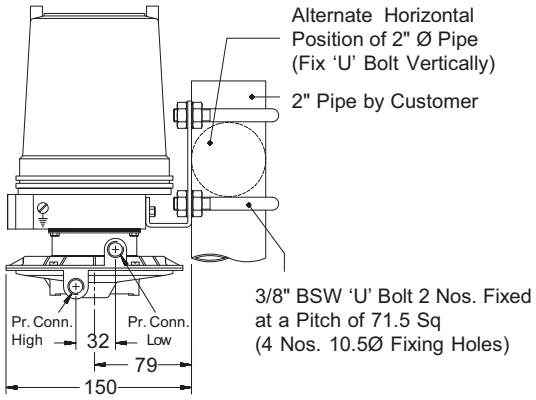
GM – 310 / 313



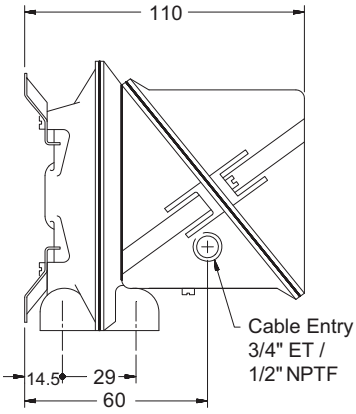


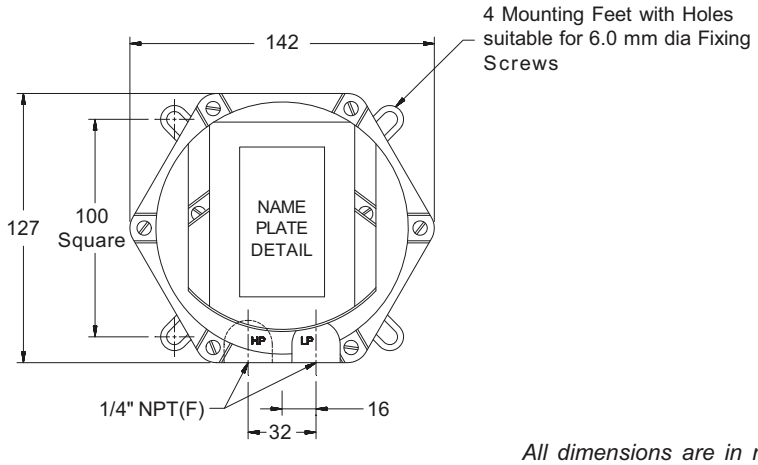
GK – 310 / 313





GN – 310





All dimensions are in mm

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DPS-GN310-00-12/2015

TECHNICAL DATASHEET OF DIFFERENTIAL PRESSURE SWITCH

Customer	**NTPC**	**Job No.**	**M22/DEL-019.BHEL**
Project		**Date**	**10.03.2023**
BHEL Doc. No.		**Doc No**	

Sr.No	Description	Technical Parameters
	Item	Differential Pressure Switch
1	Manufacturer	Switzer, Chennai
2	Type	Neoprene Diaphragm
3	Model No.	GM-310-N5-M036
4	Qty.	2 Nos.
	Location	For AC across Fine Filter
5	Enclosure	Die cast Aluminium pressure
6	Protection	Weatherproof IP-66 to IEC:60529
7	Wetted Parts Material	Aluminium
8	Range	50 to 500 Pascal
9	Max. Working Pressure	0.5 kg/cm²
10	Max. Working Temperature	95 Degree C
11	Process Connection	1/4" NPTF through Adaptor / Sides
12	Electrical Connection	7 pin plug in connector
13	Repeatability	+/- 1% FSR
14	Switch	Snap Acting Micro switch
15	Contact and Rating	2 No. of SPDT (For DPDT Action), 5A 250/125V AC; 5A 24V DC Res..
16	ON OFF Differential Type	Fixed
17	Set Points	1 Nos.
18	Mounting	Wall Mounting
19	Accessories	1/4" NPTM X 1/2" NPTF , Brass Adaptor -2 Nos., SS Tag Plate

Sr.No.	Description	Technical Parameters
1	Item	Differential Pressure Switch
2	Manufacturer	Switzer
3	Type	Neoprene Diaphragm
4	Model No.	GM-310-N5-M011
5	Qty.	1 Nos.
6	Location	UAF-Across Pre Filter
7	Enclosure	Die cast Aluminium pressure
8	Protection	Weatherproof IP-66 to IEC:60529
9	Wetted Parts Material	Aluminium
10	Range	0 to 250 Pascal
11	Max. Working Pressure	0.5 kg/cm²
12	Max. Working Temperature	95 Degree C
13	Process Connection	1/4" NPTF through Adaptor / Sides
14	Electrical	7 pin plug in connector
15	Repeatability	+/- 1% FSR
16	Switch	Snap Acting Micro switch
17	Contact and Rating	2 No. of SPDT (For DPDT Action), 5A 250/125V AC; 5A 24V DC Res..
18	ON OFF Differential Type	Fixed
19	Set Points	1 Nos.
20	Mounting	Wall Mounting
21	Accessories	1/4" NPTM X 1/2" NPTF , Brass Adaptor -2 Nos., SS Tag Plate

Differential pressure switches

Diaphragm sensor
Weatherproof
Flameproof

Series 310

● Very low ranges ● Clean rooms ● Filter blockage ●
● Air purge systems ● Fan failure ● Fan exhaust ●
● Refrigeration coils ● Drying ovens ●

Model 310 in GN Weatherproof Enclosure

Model 310 in GM Weatherproof Enclosure

Series 310 differential pressure switches are specially designed for sensing very low differential pressure in mmWC / mbar ranges for reliable setting in varied applications.

A precision contoured synthetic elastomer diaphragm senses low differential pressures applied to either side of it and actuates a snap-acting microswitch when the input differential pressure is slightly above or below the pre-set value.

The switch mechanism and the set point adjustment are external to the sensing chamber and completely isolated from contact with the process medium.

While Style GN housing offers limited very low ranges and microswitches to meet OEM requirements, Style GM & GK versions offer more ranges, microswitch options and wideband adjustment facility.

A scale is provided for approximate switch setting.

General specifications

Enclosure	
GN	GN style Aluminium die cast, weatherproof to IP66
GM	GM style aluminium pressure die cast, weatherproof to IP66
GK	GK style aluminium pressure die cast, weatherproof to IP66 and flameproof to group IIC as per IS/ IEC 60079 ***(Note 1)***
Ranges	Refer Table
Sensor	Neoprene Diaphragm std. Nitrile, EPDM & Silicone are optional
Wetted Parts	Aluminum std.
Mounting	Vertical only
Repeatability	± 2 % FSR ***(Note 4)***
Scale Accuracy	± 5 % FSR ***(Note 6)***
Ambient Temp.	– 10°C to + 60°C ***(Note 12)***
Max. Working Pr.	0.5 bar for all ranges
Max. Working Temp.	95°C for Neoprene, 110°C for Nitrile, 130°C for EPDM and 200°C for Silicone ***(Note 13)***
Switching	
Element	Instrument quality snap-acting SPDT microswitch ***(Note 10)***
Differential	
GN–310	Fixed, 1 SPDT switch only
GM / GK–310	Fixed
GM / GK–313	Wideband adjustable. Refer tables A, B & C for values
Process Connection	1/4" NPTF standard Others through Adaptors
Electrical Connection	1/2" NPTF standard Dual entry on request.
Conformity	Generally to BS:6134:1991

Ordering matrix

ENCLOSURE

GN style aluminium die cast, weatherproof to IP66. ——— **GN**

GM style aluminium pressure die cast, weatherproof to IP66 – **GM**

GK Style aluminium pressure die cast, weatherproof to IP66 and flameproof to group IIC as per IS/IEC 60079 ——— **GK**

MODEL

Basic Differential Pressure Switch meant for low / ultra low range spans having very low fixed switching differential. ——— **310**

Same as 310 but with auxiliary mechanism providing adjustment of switching differential between 6 to 10% min. 60% max. of FSR (not available in GN enclosure). —— **313**

SENSOR AND WETTED PARTS

Neoprene diaphragm and cast Aluminium wetted parts ——— **N5**

Silicone diaphragm and cast Aluminium wetted parts ——— **S5**

EPDM diaphragm and cast Aluminium wetted parts ——— **E5**

Nitrile diaphragm and cast Aluminium wetted parts ——— **B5**

RANGE CODE: Refer Table-1 ——— □

SWITCH CODE AND RATING: Refer Table-2 —— □

ELECTRICAL ENTRY CODE: Refer Table-3 ——— □

MOUNTING TYPE

Wall ——— **W**

2" Pipe ——— **2**

Universal ——— **U**

MOUNTING MATERIAL

Mild steel ——— **C**

304 SS ——— **4**

316 SS ——— **2**

OPTION

Non CE conformity ——— **ZZ**

CE conformity ——— **CE**

Table–1 : RANGE CODE & AVAILABILITY

RANGE CODE	RANGE mbar	MWP bar	310		313
			GN	GM/GK	GM/GK
M009	–2.5 to +2.5	0.5	✓	✓	×
M011	0 to 2.5	0.5	×	✓	×
M036	0.5 to 5	0.5	✓	✓	✓
M037	1 to 10	0.5	×	✓	✓
M038	2.5 to 15	0.5	✓	✓	✓
M039	2.5 to 25	0.5	✓	✓	✓
M041	5 to 50	0.5	×	✓	✓
M045	7.5 to 75	0.5	✓	✓	✓
M046	10 to 100	0.5	×	✓	✓

Table–2 : SWITCH CODE, RATING & AVAILABILITY *(Note 8)*

SWITCH CODE (SPDT)	AC RATING	DC RATING IN AMPS						AVAILABILITY OF SPDT IN MODELS		AVAILABILITY OF DPDT IN MODELS	
		RESISTIVE			INDUCTIVE						
		220V	110V	24V	220V	110V	24V	GN	GM / GK	GN	GM / GK
D *	15A 250 / 125V	0.2	0.4	2.0	0.02	0.03	1.0	310	310	↑ NOT AVAILABLE ↓	310
3	15A 250 / 125V	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	310	310		310
W	15A 250 / 125V	0.3	0.5	6.0	0.05	0.1	4.0	N.A.	313		313
4	1A 125V	N.A.	0.5	0.5	N.A.	0.25	0.25	310	310		310
5	5A 250 / 125V	0.2	0.4	4.0	0.2	0.4	3.0	N.A.	310		310
J	5A 250V	N.A.	N.A.	5.0	N.A.	N.A.	3.0	N.A.	310		310
K	1A 125V	N.A.	N.A.	1.0	N.A.	N.A.	0.5	N.A.	310		310
9	1A 115V 400 Hz	N.A.	N.A.	3.0	N.A.	N.A.	1.0	N.A.	310		310
G	N.R.	N.R.	N.R.	1.0	N.R.	N.R.	0.25	N.A.	310		310

Codes 3, D & W – For General purpose usages.
Code 4 – Gold Alloy contact.
Code 5 – For General purpose with DC rating.
Code J – Argon sealed micro switch with silver contact.
Code K – Argon sealed micro switch with gold contact.
Code 9 – Hermetically sealed, inert gas filled with silver alloy contact.
Code G – Hermetically sealed, inert gas filled with gold plated contact.

For DPDT, change switch code '3' to "33", '4' to '44', etc., while ordering

N.A. – Not Available **N.R.** – Not Recommended

Pressure conversion table

bar	Kgf / Cm²	lbf / in²	atm.	in H_2O	m H_2O	In Hg	torr (mm Hg)
1	1.01972	14.5038	0.9869	401.864	10.1972	29.530	750.062
0.98067	1	14.2233	0.96784	394.094	10	28.959	735.56
0.06895	0.07031	1	0.06805	27.71	0.70307	2.0360	51.715
1.01325	1.03323	14.6959	1	407.189	10.3323	29.9213	760
0.00249	0.00254	0.0361	0.00246	1	0.0254	0.0734	1.87
0.09807	0.1	1.422	0.0968	39.41	1	2.896	73.356
0.03386	0.03453	0.4911	0.03342	13.609	0.3453	1	25.4
0.00133	0.00136	0.01934	0.00132	0.5358	0.0136	0.03937	1

Table 3 : ELECTRICAL ENTRY CODE

Size *	Single Entry			Dual Entry		
	GN	GM	GK	GN	GM	GK
1/2" NPTF	A	A	A	---	N	N
3/4" NPTF **	---	L	---	---	O	---
M20 × 1.5 **	---	E	E	---	EB	EB
Through Connector						
7 pin plug #	---	C	---	---	---	---
9 pin plug #	---	D	---	---	---	---

* Cable gland available on request.
** Cable entry is optional through adaptor. M20×1.5 direct is possible in GK.
# Available only in GM enclosure.

Switching differential data

TABLE – A : MODEL GN 310 — FIXED DIFFERENTIAL

Range Code	Range mbar	On–off Differentials in mbar	
		GN 310	
		3 / D	4
M009	± 2.5	0.5 +Ve 0.8 –Ve	0.5 +Ve 0.8 –Ve
M036	0.5 to 5	0.8	0.4
M038	2.5 to 15	1.0	0.5
M039	2.5 to 25	1.0	0.5
M045	7.5 to 75	5.0	2.5
DPDT not possible			

TABLE – B : MODEL GM / GK 313 — WIDEBAND DIFFERENTIAL

Range Code	Range mbar	On–off Differentials in mbar	
		GM 313	GK 313
		W	W
M036	0.5 to 5	1.7 to 3	2.4 to 3
M037	1 to 10	1.7 to 6	2.4 to 6
M038	2.5 to 15	2.0 to 9	2.8 to 9
M039	2.5 to 25	2.3 to 15	3.1 to 15
M041	5 to 50	3.5 to 30	4.0 to 30
M045	7.5 to 75	4.0 to 45	4.6 to 45
M046	10 to 100	5.5 to 60	6.3 to 60

TABLE – C : MODEL GM / GK 310 — FIXED DIFFERENTIAL

Range Code	Range mbar	On–off Differentials in mbar							
		GM 310				GK 310			
		2	3 / D	4	5	2	3 / D	4	5
M009	± 2.5	×	0.9 –Ve 0.7 +Ve	0.9 –Ve 0.7 +Ve	×	×	1.6 –Ve 1.1 +Ve	1.6 –Ve 1.1 +Ve	×
M011	0 to 2.5	0.6	0.4	0.6	0.7	1.0	0.7	1.1	1.3
M036	0.5 to 5	0.8	0.6	0.8	0.9	1.4	1.1	1.4	1.6
M037	1 to 10	0.8	0.6	0.8	0.9	1.5	1.2	1.6	1.6
M038	2.5 to 15	1.5	0.8	1.0	1.3	2.7	1.4	1.8	2.3
M039	2.5 to 25	1.6	0.9	1.2	1.5	2.7	1.6	2.1	2.7
M041	5 to 50	3.0	1.3	1.5	2.2	5.4	2.3	2.7	3.9
M045	7.5 to 75	3.2	1.5	1.7	2.5	5.8	2.7	3.0	4.5
M046	10 to 100	3.5	2.0	2.2	2.8	6.3	3.6	3.9	5.0

Notes :

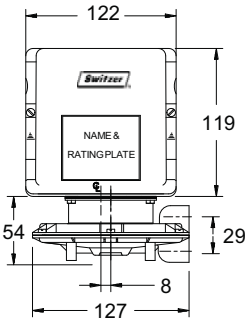
1. For GN310 micro switch codes '3', 'D' and '4' are only possible. DPDT is not available in model GN310.
2. For on-off differential values with switch codes '9', 'G', 'J' and 'K' consult sales.
3. To arrive at differentials for DPDT switching, apply multiplication factor of 1.1 to the above values.
4. Chemical seals are not available
5. 2" pipe mounting is not possible in GN enclosure
6. For M009 range in GM/GK 310 micro switch code 2 & 5 are not available

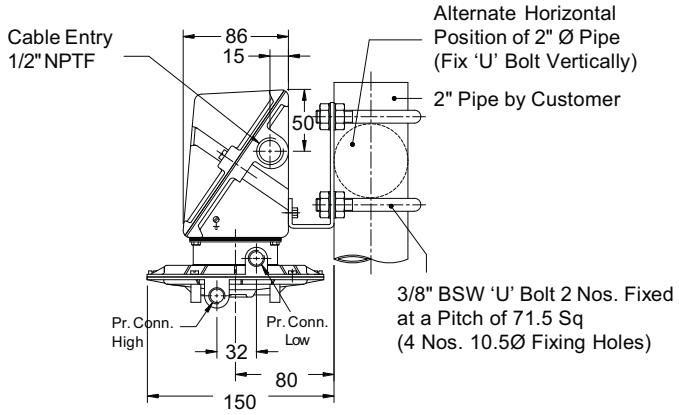
Notes

1. IS/IEC 60079–1 is equivalent to NEC CL.1, DIV.1, Gr.A & B.
2. Style GM / GN is weatherproof only if all entries and joint faces are properly sealed. Style GK is weatherproof only if cover 'O' ring is retained in position and flameproof only if proper FLP cable gland is used. It is recommended to procure cable glands along with GK instruments to avoid neglect of it while installation.
3. Intrinsic Safety (Exi) — Differential Pressure switches are classified as simple apparatus as they neither generate nor store energy. Hence differential pressure switches in weatherproof (GM) enclosures also may be used in intrinsically safe systems without certification provided the power source is certified Intrinsically Safe. Because of the low voltages and currents it is recommended to use gold contact and / or sealed contacts.
4. Accuracy & Repeatability are not different for all blind differential pressure switches. A shift of ±2% may be observed in setpoint when pressure falls from full static pressure. Settings will also shift with varying temperature.
5. The instrument is calibrated in the mounting position depicted in the drawing. Mounting in any other direction will cause a minor range shift, especially in low and compound ranges.
6. A differential pressure switch is a switching device and not a measuring instrument — eventhough it has a scale to assist setting. For this reason, Test Certificates will not contain individual ON-OFF switching values at different scale readings. Maximum differential obtained alone will be declared, besides other specifications.
7. Select working range of the instrument such that the set value lies in the mid 35% of the range i.e., between 35% and 70% of range span.
8. For switching differential values please refer respective Differential Table. Switching differentials furnished are nominal values under test conditions at mid-scale and will vary with range settings and operating conditions.
9. On and off settings should not exceed the upper or lower range value.
10. DPDT action is achieved by two SPDT switches synchronised to practical limits i.e., ±2% of FSR. Deadband for DPDT contacts are higher than that of SPDT as force required to actuate the contacts are more.
11. Contact life of microswitches are 5×10^5 switching cycles for nominal load. To quench DC sparks, use diode in parallel with inductance, ensuring polarity. A 'R–C' network is also recommended with 'R' value in Ohms equal to coil resistance and 'C' value in micro Farads equal to holding current in Amps.
12. Ambient temperature range: All models are suitable for operating within a range of ambient temperature from (–) 10°C to (+) 60°C provided the process does not freeze within this range. Below 0°C, precautions should be taken in humid atmospheres to prevent frost formation inside the instrument from jamming the mechanism. Occasional excursions beyond this range are possible but accuracy might be impaired. The microswitch is the limiting factor which should never exceed the limits (–) 25°C to (+) 80°C.
13. Fluid Temperature: A differential pressure switch when connected to the process is not subjected to through flow and therefore is not fully exposed to the fluid temperature. Use of adequate length of impulse piping will greatly reduce excessive heating of the sensing element. For e.g., connection of 7.5 cm of 12 mm dia impulse piping will reduce water temperature of 100°C to 65°C at an ambient temperature of 50°C. Ask factory for piping nomogram #441184–4 for different temperatures.
14. Ensure that impulse pipework applies no stress on sensing element housing and use spanners to hold pressure port / housing when connections are made.
15. **Accuracy figures are exclusive of test equipment tolerance on the claimed values.**
16. **All performance data are guaranteed to ±5%.**

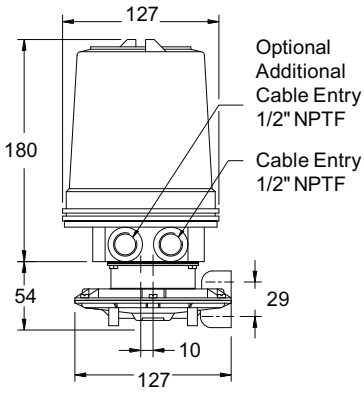
Dimensions in mm

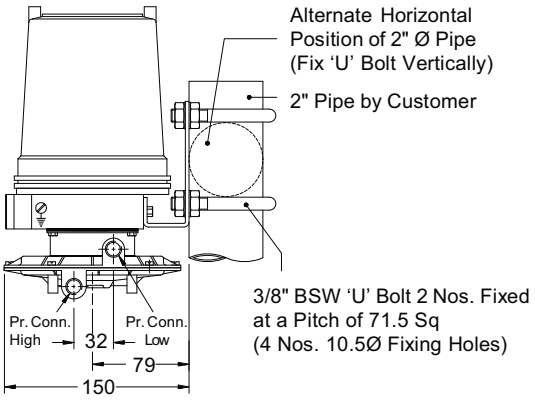
GM – 310 / 313



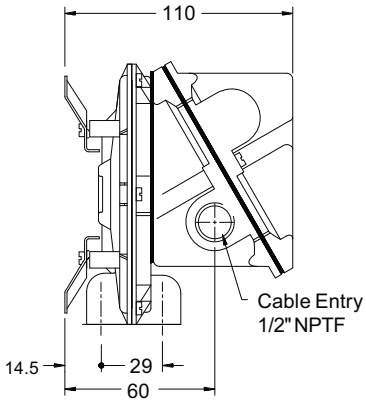


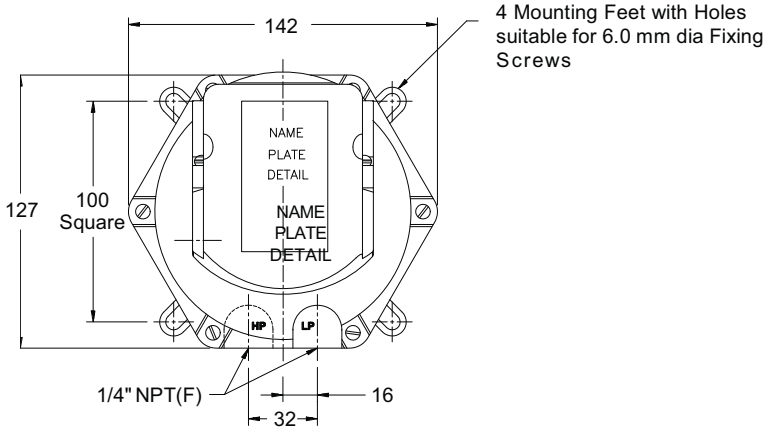
GK – 310 / 313





GN – 310





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DPS-GN310-00-07/2020

S.NO.	DESCRIPTION	PREPARED BY	CHKD BY	APPRD BY	DATE
0	Document for review/approval	Rahul	Deepak	Deepak	13.12.2022
01	Document for review/approval	RAHUL	Deepak	Deepak	14-02-2023

APPLICABLE FOR ANNEXURE-I, ITEM NO. A1B2 (VFD)

CLIENT:	NTPC LIMITED (A GOVT. OF INDIA ENTERPRISE) ENGINEERING DIVISION PLOT-8A, SECTOR- 24, NOIDA, U.P- 201301.
PROJECT:	2 x500MW NTPC MOUDA TPP STAGE-I (FGD SYSTEM PACKAGE)
PACKAGE:	HVAC FOR FGD SYSTEM
EPC CONTRACTOR:	**BHARAT HEAVY ELECTRICALS LIMITED** POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA

TITLE :-

TDS of VFD for

Date: 2023.02.27 14:48:38 IST
Reason: CAT I
Location: NTPCEOC

PREPARED BY	CHKD. BY	APPD BY.	DATE	BHEL DOC NO.	PE-V0-444-571-A220
Rahul	Deepak	Deepak	13.12.2022	NTPC DOC NO.	9561-109-PEM-PVM-Y-354
					REV 01

TDS of VFD for AHU

Customer	**NTPC**	**Job No.**	**M21/DEL-80.BHEL**
Project	**3X660MW NORTH KARANPURA TPP (FGD SYSTEM PACKAGE)**	**Date**	**15.04.2021**
BHEL Doc. No.	**PE-V0-441-571-A220**		

Datasheet For VFD (VSX Series)		
Sr.No.	**Description**	**Details**
1	Item	VFD
2	Make	CGL
3	Model	VSX Series
4	Qty	2 nos
5	Location	AHU Room at 13.600M, FGD Control Building
6	Input Voltage	415VAC ± 10%
7	Input Frequency	50 hz , ±5%
8	Input power factor	0.95 (min.)
9	Output Frequency	0-600 Hz
10	Output Switching Frequency	0.7 KHz to 16 KHz
11	Efficiency at nominal load	96%
12	Nominal ambient temperature	50°C
13	Relative humidity	0-95%
14	Vibrations	less than 5.9 M/S2
15	Analog Input Voltage /current	0- 10 VDC /4-20 mA
16	Nos. Analog Input	3
17	Nos. Analog Output	2
18	Digital Input voltage	24VDC
19	Nos. of Digital Input	7
20	Digital Output	Relay type & Transistor type
21	Nos. of Digital Output	2

CG POWER INDUSTRIAL SOLUTIONS LIMITED

D&A-DRIVE AND AUTOMATION
MANDIDEEP(MP) - 462046

Smart solutions.
Strong relationships.

PROJECT DESCRIPTION	18.5 kW Drive Panel
JOB No.	3X660MW NORTH KARANPURA TPP

INCOMING SUPPLY	415VAC	MOTOR RATINGS	CGAC DRIVE RATINGS	QTY	PANEL QTY.
CONTROL VOLTAGE	230 VAC	18.5kW	VSX48-032		2 nos
LOCATION					
COSTOMER PROJECT NO.					

Created on : 16/09/2019

Created By : Arvind Mehra

Modification	Date	Revised By
Rev. R04	04/09/2020	Arvind Mehra
Rev. R03	25/01/2020	Arvind Mehra
Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

Date	16/09/2019
Creator	Arvind Mehra
Ckd. by	Tarun Choudhary
APP. By	Murleedhara Rao

Project: 18.5 kW Drive Panel

STATUS: FOR APPROVAL

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description: COVER PAGE

Details: 18.5kW Drive Panel

=TOC/1

= CP

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Page 1

Table of contents

Column X: An automatically generated page was edited

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Page	Page description	supplementary page field	Date	Edited by	X
=CP/1	COVER PAGE		16/09/2019		
=TOC/1	Table of contents : =CP/1 - =TD/8		16/09/2019		
=GN/1	GENERAL NOTES		16/09/2019		
=SLD/1	SINGLE LINE DIAGRAM		16/09/2019		
=VFD PANEL/1	INCOMING POWER WIRING		16/09/2019		
=VFD PANEL/2	AUXILLARY WIRING		16/09/2019		
=VFD PANEL/3	CONTROL WIRING-1		16/09/2019		
=VFD PANEL/4	CONTROL WIRING-2		16/09/2019		
=VFD PANEL/5	DRIVE CONTROL WIRING		16/09/2019		
=TD/1	Power Terminal diagram		16/09/2019		

Modification	Date	Revised By
Rev. R04	04/09/2020	Arvind Mehra
Rev. R03	25/01/2020	Arvind Mehra
Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

Date	22.01.2018
Creator	tarun.choudhary
Ckd. by	Tarun Choudhary
APP. By	Murleedhara Rao

Project: 18.5 kW Drive Panel

STATUS: FOR APPROVAL

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED

DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description
Table of contents : =CP/1 - =TD/8

Details
18.5kW Drive Panel

=CP/1

=GN/1

= TOC

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Page 1

GENERAL NOTES

1. ALL DIMENSION ARE IN MM

2. ENCLOSURE	IP42
3. CABLE ENTRY	BOTTOM
4. CABLE EXIT	BOTTOM

5. SHEET STEEL:-

DOORS	2 mm. Thk. CRCA
MOUNTING PLATE	3 mm. Thk. GI
GLAND PLATE	3 mm. Thk. CRCA
LOAD BEARING MEMBER	2 mm. Thk. CRCA

6. ACCESS-FRONT DOOR,REAR DOOR

7. SHADE:-

INTERIOR	RAL 7035
EXTERIOR	RAL 7035
MOUNTING PLATE	RAL 7035

8. BUSBAR

EARTH BUS	35Sq. mm. Power Terminal
INCOMMING BUSBAR	35Sq. mm. Power Terminal
OUTGING BUSBAR	35Sq. mm. Power Terminal

9. CONTROL CABLES:-

230V AC(P)	: 1.5 Sq mm Cu, Grey (FRLS)
0V(N)	: 1.5 Sq mm Cu, Black (FRLS)
EARTHING	: 1.5 Sq mm Cu, Green (FRLS)
ANALOG SIGNAL	: 0.5 Sq mm (FRLS) Cu. SCREENED.
DRIVE TB	: 0.5 Sq mm ,BLACK (FRLS)

Modification	Date	Revised By
Rev. R04	04/09/2020	Arvind Mehra
Rev. R03	25/01/2020	Arvind Mehra
Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

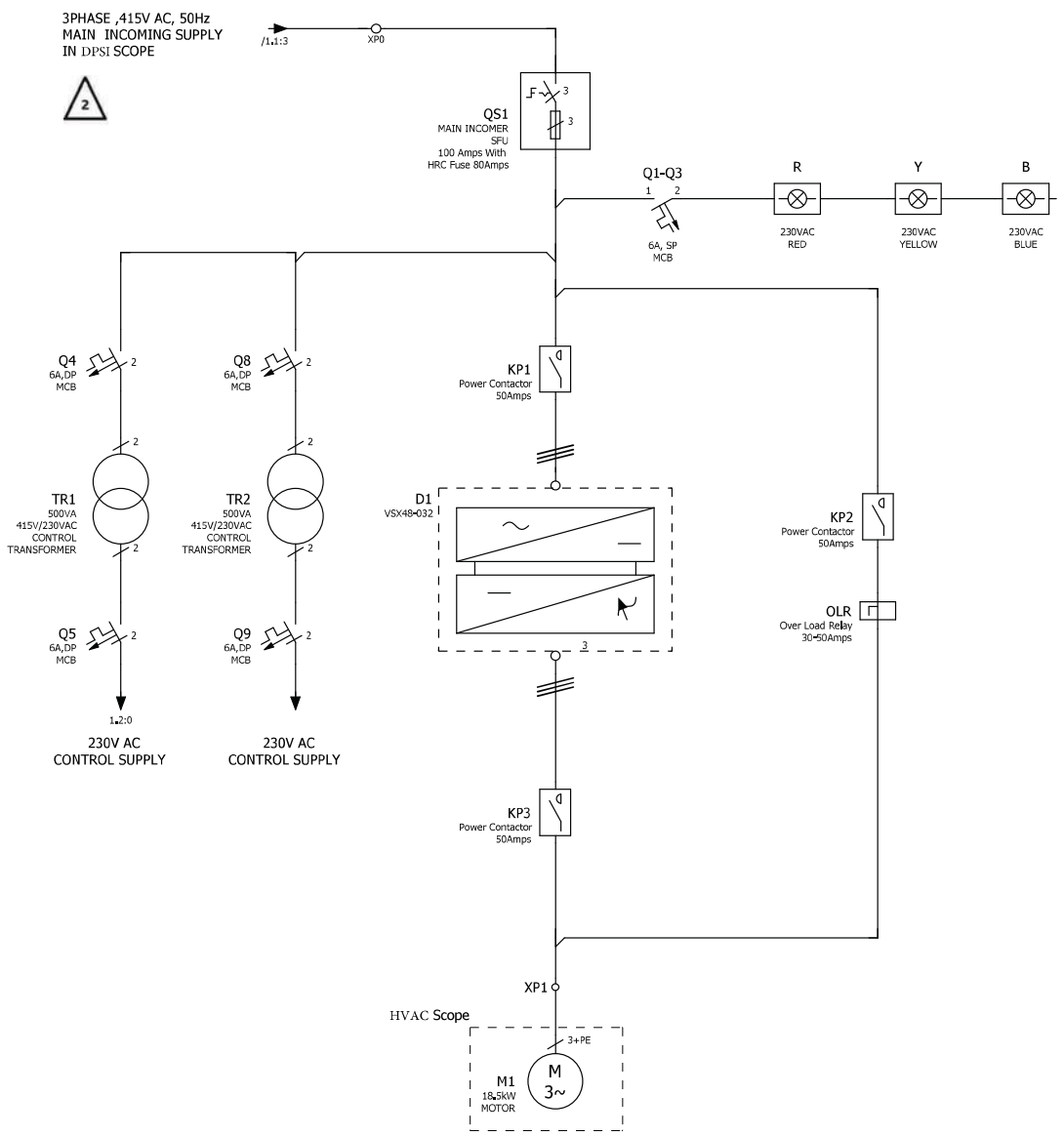
Date 16/09/2019
Creator Arvind Mehra
Ckd. by Tarun Choudhary
APP. By Murleedhara Rao

Project: 18.5 kW Drive Panel
STATUS: FOR APPROVAL

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description: GENERAL NOTES
Details: 18.5kW Drive Panel

=SLD/1
= GN
+
Page 1



Rev.	Date	Revised By
Rev. R04	04/09/2020	Arvind Mehra
Rev. R03	25/01/2020	Arvind Mehra
Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

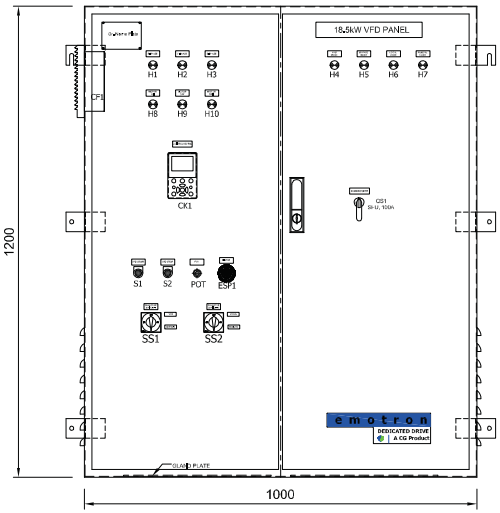
Modification	Date	Revised By	APP. By
			Murleedhara Rao

Date 16/09/2019
Creator Arvind Mehra
Ckd. by Tarun Choudhary
Project: 18.5 kW Drive Panel
STATUS: FOR APPROVAL

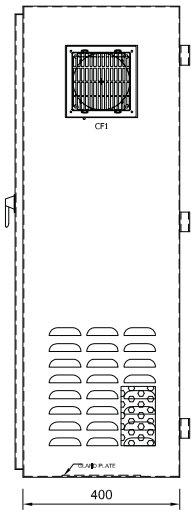
CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description
SINGLE LINE DIAGRAM
Details
18.5kW Drive Panel

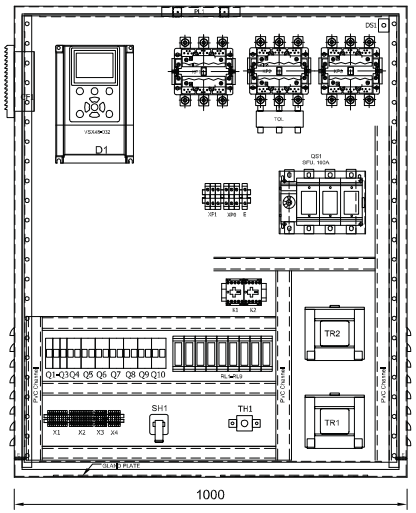
=VFD PANEL/1
= SLD
+
Page 1



FRONT VIEW WITH DOOR



SIDE VIEW WITH COVER



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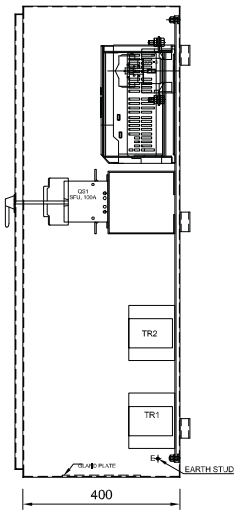
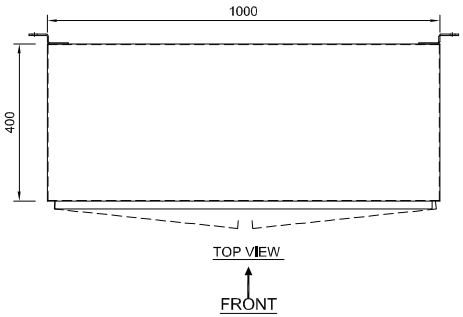
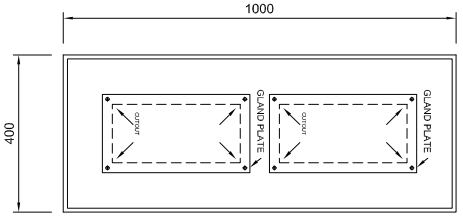


SIDE VIEW WITHOUT COVER



TOP VIEW

FRONT



BOTTOM VIEW WITH GLAND PLATE
FOR CABLE ENTRY

LEGENDS:

S.NO.	EQU. DESIGNATION	DESCRIPTION
1	QS1	SFU 100A
2	D1	VFD UNIT
3	H1	R PHASE INDICATION
4	H2	Y PHASE INDICATION
5	H3	B PHASE INDICATION
6	H4	VFD MODE INDICATION
7	H5	BYPASS MODE INDICATION
8	H6	LOCAL MODE INDICATION
9	H7	REMOTE MODE INDICATION
10	H8	VFD RFS INDICATION
11	H9	VFD RUN INDICATION
12	H10	VFD TRIP INDICATION
13	S1	START PUSH BUTTON
14	S2	STOP PUSH BUTTON
15	ESP-1	EMERGENCY STOP P.B.
16	POT	POTENTIOMETER
17	SS1,SS2	SELECTOR SWITCH
18	Q1,Q2,Q3	MCB'S (SP)
19	Q4-Q10	MCB'S (DP)
20	RL1-RL9 :	CONTRACTOR RELAY
21	K1-K2 :	AUX. CONTRACTOR
22	TR1,TR2 :	CONTROL TRANSFORMER
23	KP1-3 :	POWER CONTRATOR
24	TOL1 :	OVER LOAD RELAY
25	CF1:	FAN WITH FILTER
26	X1-X4:	CONTROL TERMINAL BLOCKS
27	PL1	PANEL LAMP
28	DS1	DOOR LIMIT SWITCH
29	SH1:	SPACE HEATER
30	TH1:	THEMOSTATE

NOTE:-

01. All Dimensions are in mm.
02. Colour of Panel Interior & Exterior-RAL 7035
03. Mounting Plate - GI 2mm.
04.Door/Side Covers - 2mm.
05. All Gland Plate - 3mm.
06. Cable Entry from bottom side

Note:-. Internal & External Componet Arrangement & Layout May Change During Actual Manufacturing.

Modification	Date	Revised By		
Rev. 04	04.09.2020	Arvind Mehra		
Rev. 03	25.01.2020	Arvind Mehra		
Rev. 02	06.11.2019	Arvind Mehra	Date	16.09.2019
Rev. 01	25.09.2019	Arvind Mehra	Creator	Arvind Mehra
Rev. 00	16.09.2019	Arvind Mehra	Ckd.by	Tarun Choudhary
			App.by	Murleedha Rao

Project: 18.5kW VFD PANEL

STATUS: FOR APPROVAL

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED

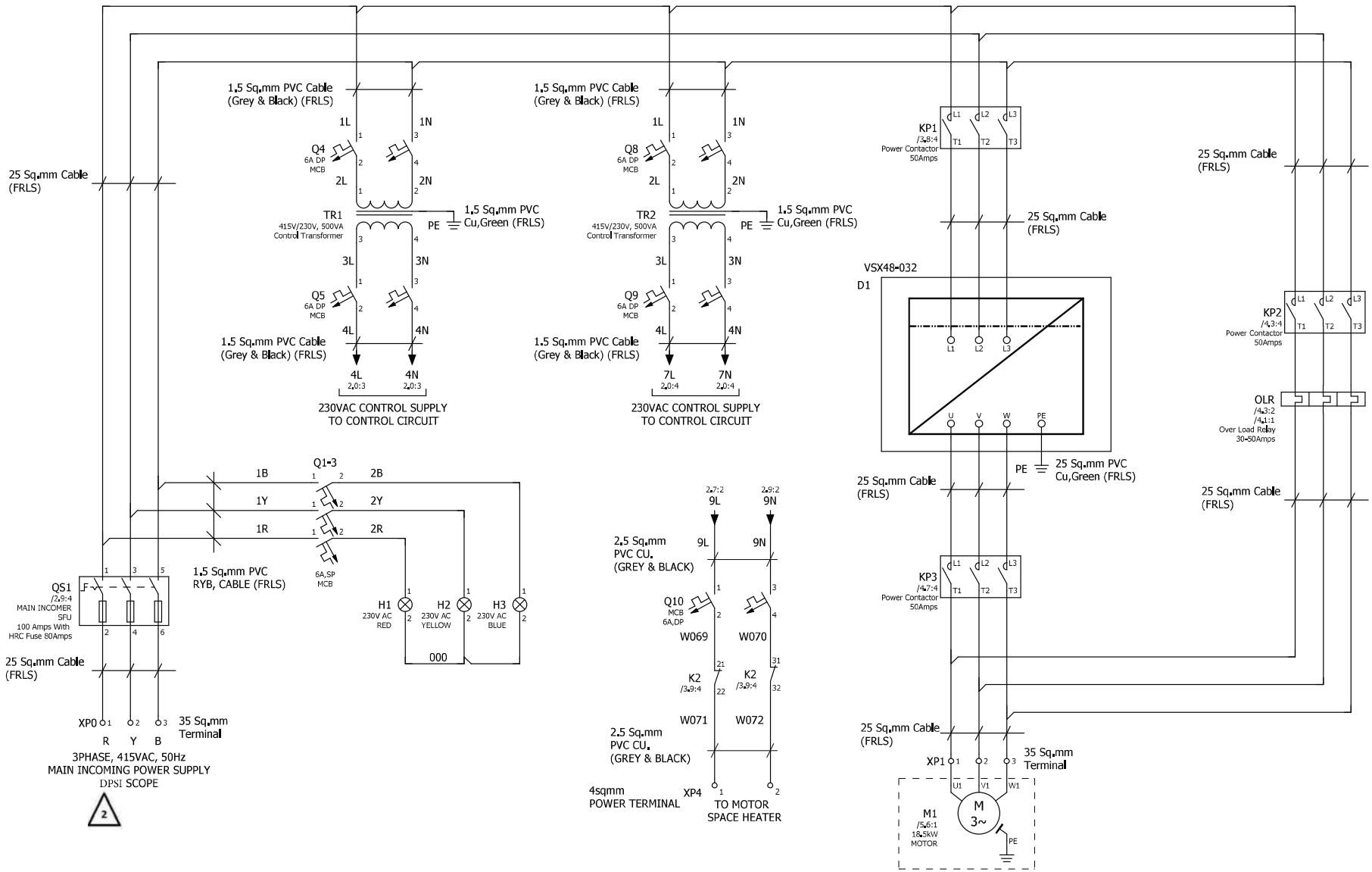
DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Smart solutions. Strong relationships.

Description
External & Internal Layout Drawing
Details
18.5kW VFD PANEL

=VFD PANEL

Page-1 of 1



Rev.	Date	Revised By
Rev. R04	04/09/2020	Arvind Mehra
~~Rev. R03~~	25/01/2020	Arvind Mehra
Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

Modification	Date	Revised By

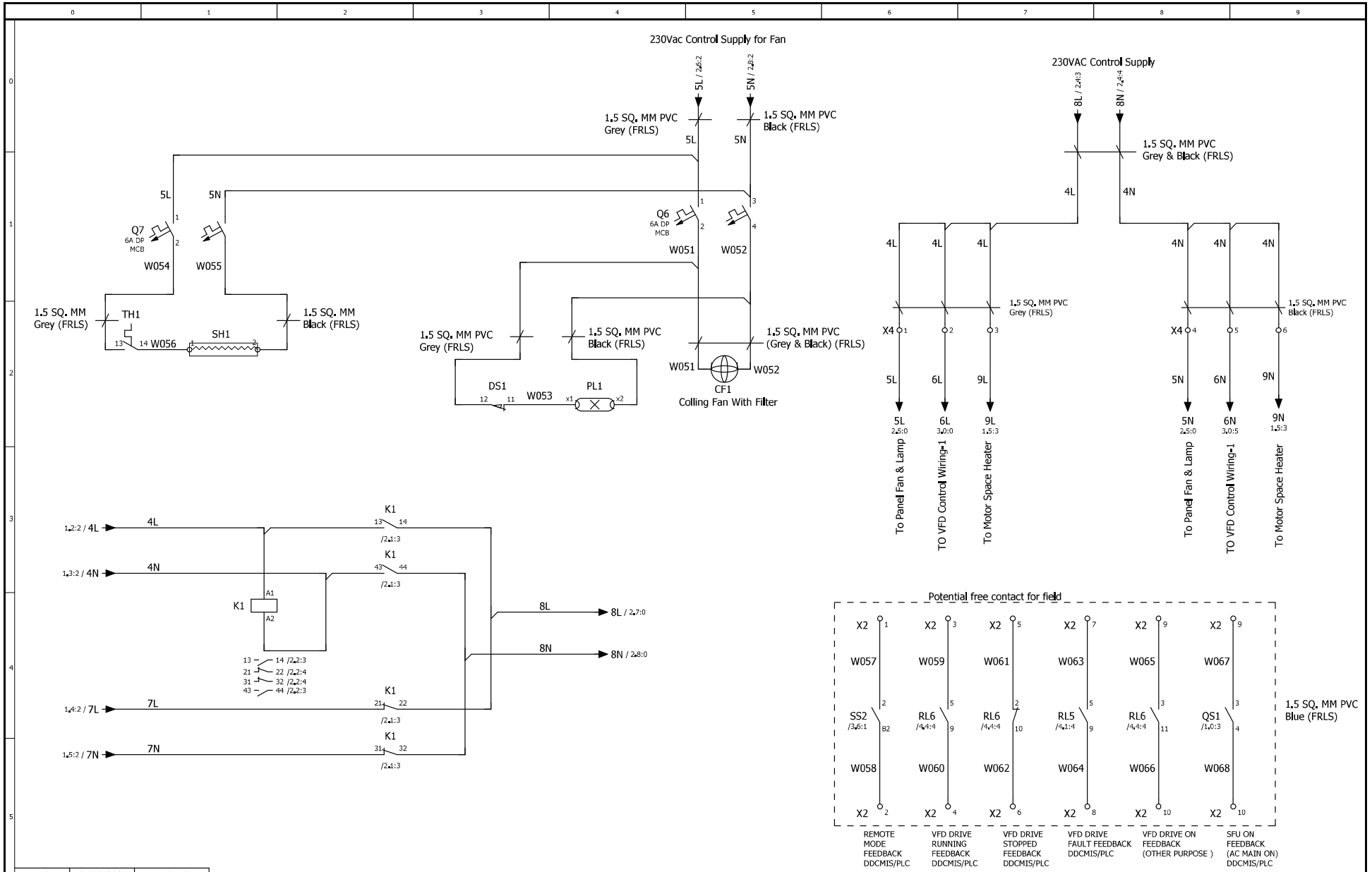
Date 16/09/2019
Creator Arvind Mehra
Ckd.by Tarun Choudhary
APP. By Murleedhara Rao

Project: 18.5 kW Drive Panel
STATUS: FOR APPROVAL

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description
INCOMING POWER WIRING
Details
18.5kW Drive Panel

= VFD PANEL
+
Page 1



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Rev. R03	25/01/2020	Arvind Mehra
Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

Date	16/09/2019	APP. By	Murleedhara Rao
Creator	Arvind Mehra		
Ckd. by	Tarun Choudhary		

Client :

Project: 18.5 kW Drive Panel

STATUS: FOR APPROVAL

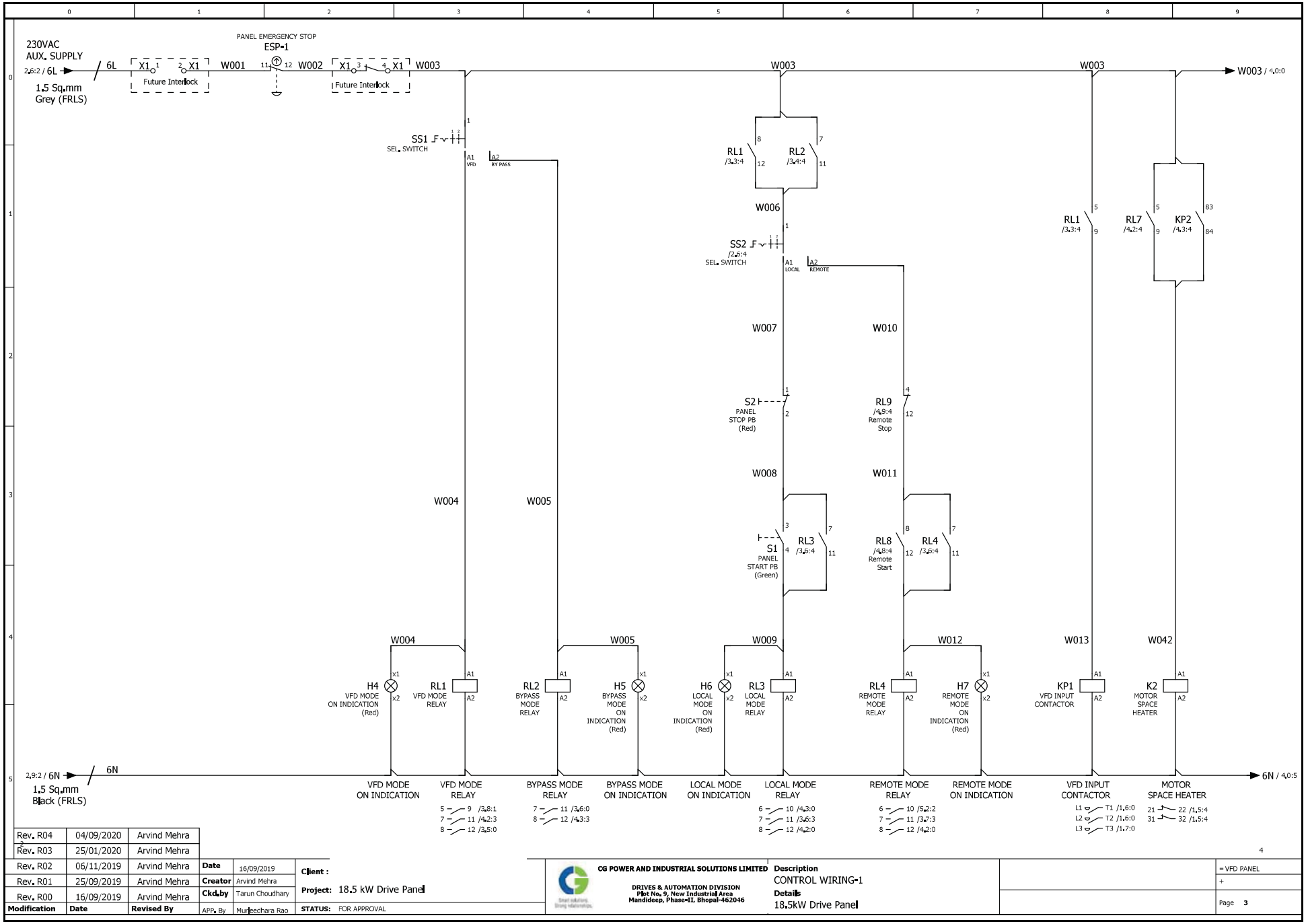
CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description: AUXILLARY WIRING

Details: 18.5kW Drive Panel

= VFD PANEL

Page 2



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Rev. R03	25/01/2020	Arvind Mehra
Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

Modification	Date	Revised By

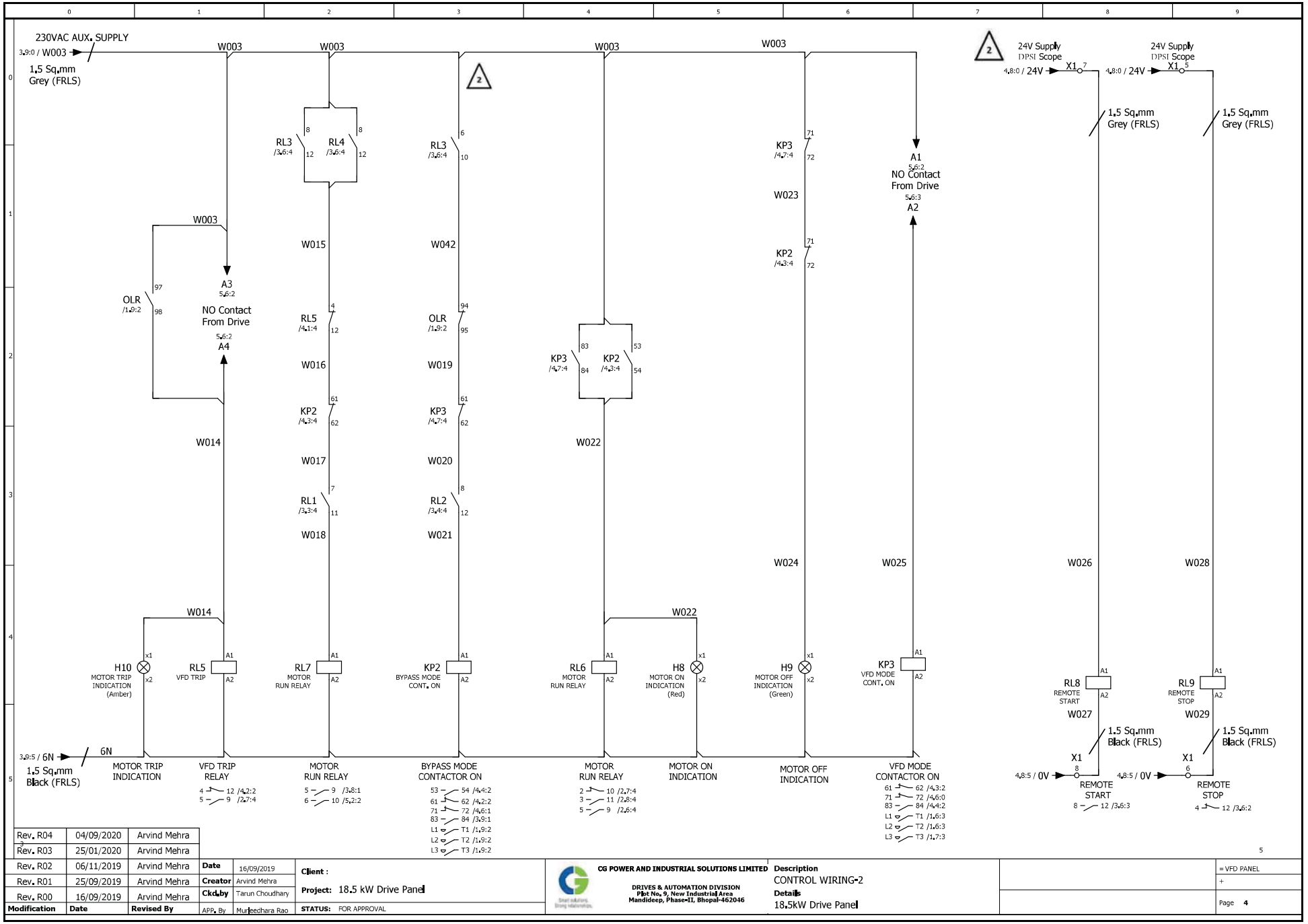
Date 16/09/2019
Creator Arvind Mehra
Ckd. by Tarun Choudhary
APP. By Murleedhara Rao

Client :
Project: 18.5 kW Drive Panel
STATUS: FOR APPROVAL

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description
CONTROL WIRING-1
Details
18.5kW Drive Panel

= VFD PANEL
+
Page 3



Rev.	Date	Revised By
Rev. R04	04/09/2020	Arvind Mehra
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Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

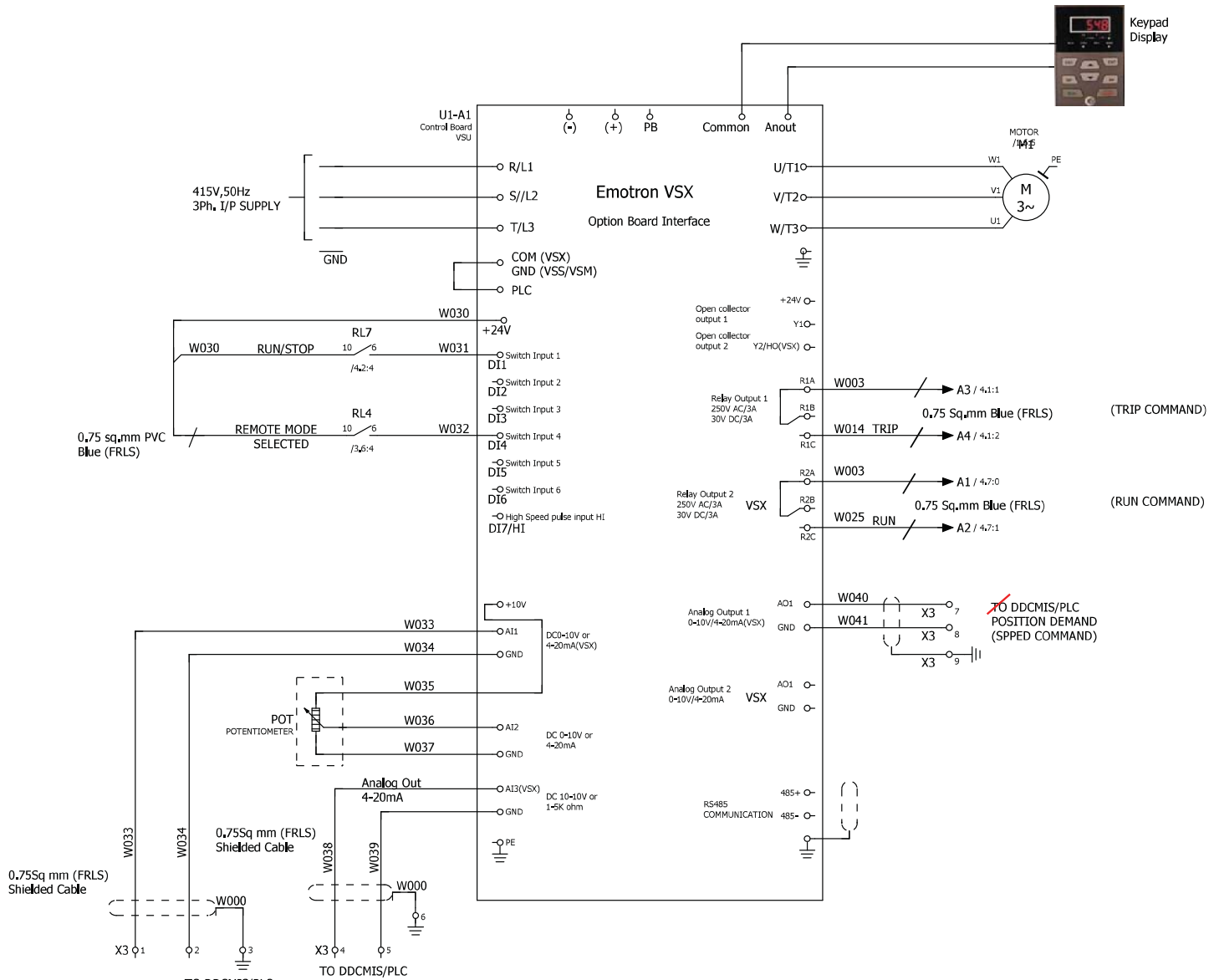
Modification	Date	Revised By	APP. By
			Murleedhara Rao

Date 16/09/2019
Creator Arvind Mehra
Ckd. by Tarun Choudhary
Client :
Project: 18.5 kW Drive Panel
STATUS: FOR APPROVAL

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description: CONTROL WIRING-2
Details: 18.5kW Drive Panel

= VFD PANEL
+
Page 4



Rev.	Date	Revised By
Rev. R04	04/09/2020	Arvind Mehra
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Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

Modification	Date	Revised By

Date	16/09/2019
Creator	Arvind Mehra
Ckd. by	Tarun Choudhary
APP. By	Murleedhara Rao

Client :

Project: 18.5 kW Drive Panel

STATUS: FOR APPROVAL

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED

DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description
DRIVE CONTROL WIRING

Details
18.5kW Drive Panel

=TD/1

= VFD PANEL

+

Page 5

Terminal Details

Power Terminal Details

XP0

1	INCOMING SUPPLY 415VAC,50HZ
2	
3	

35 Sq. mm. Power Terminal

XP2

1	VFD O/P SUPPLY
2	
3	

35 Sq. mm. Power Terminal

Control Terminal Details

X1

1	FUTURE INTERLOCK
2	
3	FUTURE INTERLOCK
4	
5	TO DDCMIS/PLC REMOTE STOP
6	
7	TO DDCMIS/PLC REMOTE START
8	
9	SPARE
10	

2.5 Sq.mm Terminal (Grey)

Digital Feedback Signals

X2

1	TO DDCMIS/PLC REMOTE MODE FEEDBACK
2	
3	TO DDCMIS/PLC VFD DRIVE RUNNING FEEDBACK
4	
5	TO DDCMIS/PLC VFD DRIVE STOPPED FEEDBACK
6	
7	TO DDCMIS/PLC VFD DRIVE FAULT FEEDBACK
8	
9	VFD DRIVE ON FEEDBACK (OTHER PURPOSE)
10	
11	TO DDCMIS/PLC SFU ON FEEDBACK (AC MAIN ON)
12	
13	SPARE
14	

2.5 Sq mm (Blue)

Control Terminal Details

X3

1	TO DDCMIS/PLC POSITION FEDBACK (SPEED REFERENCE)
2	
3	Shield
4	TO DDCMIS/PLC CURRENT SIGNAL
5	
6	Shield
7	TO DDCMIS/PLC POSITION DEMAND (SPPED COMMAND)
8	
9	Shield

2.5 Sq mm TB (Yellow)

Control Terminal Details

X4

1	To Panel Fan & Lamp
2	TO VFD Control Wiring-1
3	SPARE
4	To Panel Fan & Lamp
5	TO VFD Control Wiring-1
6	SPARE

2.5 sq.mm TB Grey & Black

TO MOTOR SPACE HEATER

XP4

1	TO MOTOR SPACE HEATER
2	

4sqmm POWER TERMINAL

Modification	Date	Revised By
Rev. R04 — VFD PANEL/5	04/09/2020	Arvind Mehra
Rev. R03	25/01/2020	Arvind Mehra
Rev. R02	06/11/2019	Arvind Mehra
Rev. R01	25/09/2019	Arvind Mehra
Rev. R00	16/09/2019	Arvind Mehra

Date 22.01.2018
Creator tarun.choudhary
Ckd. by Tarun Choudhary
APP. By Murleedhara Rao

Client
Project: 18.5 kW Drive Panel
STATUS: FOR APPROVAL

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES & AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

Description
POWER TERMINAL DIAGRAM
Details
18.5kW Drive Panel

= TD
+
Page 1

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES AUTOMATION DIVISION
Plot No. 9, New Industrial Area
Mandideep, Phase-II, Bhopal-462046

BOM/1	Date: 16/09/2019 FOR APPROVAL					
S.No.	**ITEM DESIGNATION**	**Item DESCRIPTION**	**TECHNICAL SPECIFICATION**	**Part No.**	**MAKE**	**Qty**
	(DRIVE ASSEMBLY)					
1	D1	Drive Module	Drive Module VSX48-032	VSU48-032	CGPISL	1
2	CK1	Keypad door mounting kit (PPU)	Drive control Keypad Door mounting kit		CGPISL	1
	(MAGNETICS)					
3	TR1-TR2	Control Transformer	500VA,PRI:415V,SEC:230V,1PH LT,Control Transformer		StepUP/Smisen/Reputed	2
	(SWITCHGEARS)					
4	Q1-Q3	Miniature Circuit Breaker	6A/SP, C-Curve, 10kA		L&T/Hager/Schneider	3
5	Q4	Miniature Circuit Breaker	6A/DP, C-Curve, 10kA		L&T/Hager/Schneider	1
6	Q5	Miniature Circuit Breaker	6A/DP, C-Curve, 10kA		L&T/Hager/Schneider	1
7	Q6	Miniature Circuit Breaker	6A/DP, C-Curve, 10kA		L&T/Hager/Schneider	1
8	Q7-Q10	Miniature Circuit Breaker	6A/DP, C-Curve, 10kA		L&T/Hager/Schneider	4
9	QS1	SFU	SFU-100 Amps with Extended Rotary Handle		L&T/ABB/Schneider/Reputed	1
10		SFU add on	add on Contact for SFU (1NO+1NC)		L&T/ABB/Schneider/Reputed	1
11		HRC Fuse	HRC Fuse 80 Amps		L&T/Bussmann/Reputed	3
12	RL1-RL7	Control Relay	3Amps, coil voltage-230VAC (4CO)		Omron/Schneider/Reputed	7
13	RL8-RL9	Control Relay	3Amps, coil voltage-24VDC (4CO)		Omron/Schneider/Reputed	2
14	OLR	Thermal Over Load Relay	Thermal Over Load Relay - 30-50 Amps		L&T/Schneider/Reputed	1
15	KP1-KP3	Power Contactor	Power Contactor 50 Amps (CV.230Vac)		L&T/Schneider/Reputed	3
16		ADD ON	Add-on Aux. contact Block (2NO+2NC)		L&T/Schneider/Reputed	3
17	K1-K2	Aux.Contactor	Aux. Contactor (2NO+2NC) , 230 V AC		L&T/Schneider/Reputed	2
	(ENCLOSURE)					
18	PNL1	Enclosure	H=1200, W= 1000, D=400 in mm		CGPISL Standard /Reputed	1

CG POWER AND INDUSTRIAL SOLUTIONS LIMITED
DRIVES AUTOMATION DIVISION
Plot No. 9, New Industrial Area
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	(SELECTOR SWITCH & PUSHBUTTONS)					
19	DS1	Door Limit Switch	Change over type 1NO+1NC		Suraj/Reputed	1
20	S1	Start PB	Flush mount type PB Green		L&T (esbee)/Teknic/Reputed	1
21	S2	Stop PB	Flush mount type PB Red		L&T (esbee)/Teknic/Reputed	1
22	ESP-1	Emergency Stop PB	22.5mm Dia. Mushroom Head Latched Type Red with 1NC.Aux.		L&T (esbee)/Teknic/Reputed	1
23		ADD ON	ADD ON 1NC		L&T (esbee)/Teknic/Reputed	2
24		ADD ON	ADD ON 1NO		L&T (esbee)/Teknic/Reputed	1
25	POT	Potentiometer	Potentiometer With Knob		Bourns/Reputed	1
26	SS1-SS2	Selector Swicth	2 Pole2 Way, With OFF, 6 Amps		Salzer/Reputed	2
	(FAN)					
27	CF1	Cooling Fan	Cooling Fan		Rexnord/Reputed	1
28	FILTER	Filter	Air Vent Filter		Elettro/Reputed	1
	(INDICATION LAMPS)					
29	H1	Indication lamps	RED , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
30	H2	Indication lamps	YELLOW , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
31	H3	Indication lamps	BLUE , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
32	H4	Indication lamps	RED , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
33	H5	Indication lamps	RED , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
34	H6	Indication lamps	RED , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
35	H7	Indication lamps	RED , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
36	H8	Indication lamps	RED , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
37	H9	Indication lamps	GREEN , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
38	H10	Indication lamps	AMBER , 230Vac,cluster LED Type		L&T (esbee)/Teknic/Reputed	1
39	PL1	Panel Illumination Lamp	6W, 230Vac		Bajaj/Syska/Reputed	1
	(ACCESSORIES)					
40	TH1	Thermostate	25-75ºC/220VAC		APT Control/Reputed	1
41	SH1	Space Heater	80W/220V		APT Control/Reputed	1
42		Power Cables	25 Sq. mm. Cable		KEI/Polycab/Finolex/Reputed	As required
43		Incomming Bus Link	35 Sq. mm. Terminal		Connectwell/Reputed	As required
44		Outgoing Bus Link	35 Sq. mm. Terminal		Connectwell/Reputed	As required
45		Earth Bus Link	35 Sq. mm. Terminal		Connectwell/Reputed	As required
46		Control Terminal	2.5 sq mm terminal		Connectwell/Reputed	As required
47		Control Cables	2.5 Sq. mm1.5Sq.mm, 0.75Sq.mm wire & Shielded Cable		KEI/Polycab/Finolex/Reputed	As required