

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)							
شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 1 از 48
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	
	BK	GCS	AA	120	EL	DS	0001	
							V00	

طرح نگهداشت و افزایش تولید 27 مخزن

Motor Data Sheets Including Curves and Drawing
نگهداشت و افزایش تولید میدان نفتی بینک

V00	DEC. 2024	IFA	AAC	M.FAKHARIAN	M.SADEGHIAN	
Rev.	Date	Purpose of Issue/Status	Prepared by:	Checked by:	Approved by:	CLIENT Approval

Status:

IFA: Issued For Approval
IFI: Issued For Information
AFC: Approved For Construction

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)							 شرکت توسعه و پیمان 	
شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 2 از 48	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001		V00

REVISION RECORD SHEET

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 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)							
شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 3 از 48
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	
	BK	GCS	AA	120	EL	DS	0001	
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 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)								
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	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001		V00

1.0 INTRODUCTION

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.

With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO). Also PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.

GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – Manufacturing (w/Engineering & Material Supply) of Air Coolers
EPD/EPC CONTRACTOR (GC):	Petro Iran Development Company (PEDCO)
OWNER:	OWNER is collectively refer to National Iranian South Oil Company (NISOC) and Petro Iran Development Company (PEDCO)
EPC CONTRACTOR:	Joint Venture of : Hirgan Energy – Design & Inspection(D&I) Companies
VENDOR:	Aban Air Cooler (AAC)
EXECUTOR:	Executor is the party which carries out all or part of construction and/or commissioning for the project.
THIRD PARTY INSPECTOR (TPI):	Third Party Inspector
SHALL:	Is used where a provision is mandatory.
SHOULD:	Is used where a provision is advisory only.
WILL:	Is normally used in connection with the action by CLIENT rather than by an EPC/EPD CONTRACTOR, supplier or VENDOR.
MAY:	Is used where a provision is completely discretionary.

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)								
شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 5 از 48	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001		V00

Data Sheets for LV Induction Motors			
Item	Category	Required Specification	Vendor Data
1	Driven Machine	Electrical Motor	Electrical Motor
2	Driven Machine Tag No.	-	AEM-2101
3	Manufacturer	By Vendor	VE M
4	Manufacturer's Number / Type	By Vendor	K8KR 132 S4
5	Manufacturing Standard	IEC 60034 & IPS-M-EL-131(2)	IEC 60034
6	Location	[X] Outdoor (Under Shelter) [] Indoor	Outdoor
7	Area Classification	EExd IIB T3	EExd IIC T3
8	Ambient Temperature	5 to +55°C	5 to +55°C
9	Relative Humidity	100 %	
10	Dust	[X] Yes [] No	Yes
11	Corrosion	[X] Yes [] No	Yes
12	Elevation	12.5m Above Sea Level	12.5m Above Sea Level
13	Quantity	Acc. To Load List (BK-GCS-PEDCO-120-EL-LI-0001)	6
14	Tag Number	Acc. To Load List (BK-GCS-PEDCO-120-EL-LI-0001)	AEM-2101-1~6
15	Motor Type	Asynchronous, Squirrel Cage	Asynchronous, Squirrel Cage
16	Mounting	[] Horizontal [] Vertical	Vertical, IMV3
17	Rotor Construction	[] Brazed Copper Bars [] Aluminum Die Cast	Die Cast Aluminum
18	Frame Material	Steel Sheet or Cast Iron	Cast Iron
19	Rotor Cage Material	By Vendor	Die Cast Aluminum
20	Cooling Method	IC411 According to IPS-M-EL-131(2)	IC 411
21	Ingress Protection Degree for Motor	IP 54	IP55
22	Ingress Protection Degree for Terminal Box	IP 55	IP55
23	Explosion Protection of Motor	N/A for Safe Area Zone 2, IIB, T3	EExd IIC T3
24	Explosion Protection of Terminal Box	N/A for Safe Area Zone 2, IIB, T3	EExd IIC T3
25	Ex. Certificate Authority/Certificate No.	By Vendor	CESI15ATEX017X
26	Driven Machine Shaft Power Requirement (P _{mp})	As Per Related Mechanical Data sheet (to be Specified by Vendor)	3.3 Kw
27	De-Rating Factor due to Ambient Temperature (K _t)	Vendor Shall Advise	0.86

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)							 	
شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 6 از 48	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001		V00

28	De-Rating Factor Due to Altitude (K_a)	1	1
29	Design margin (K_m)	Acc. to IPS Standard (Note 1)	API661
Data Sheets for LV Induction Motors			
Item	Category	Required Specification	Vendor Data
30	Motor Shaft Power Requirement @ Site condition ($=K_m \times P_{mp}$)	By Vendor	$3.3 \times 1.1 = 3.63 \text{ Kw}$
31	Standard Rated Motor Output $=K_m \times P_{mp} / (K_a K_t)$	By Vendor	4.73
32	Frame Size	By Vendor	132S
33	Frame Earth Boss	External	External
34	Rated Voltage	400 V $\pm 10\%$	400 V $\pm 10\%$
35	Rated Frequency	50 Hz $\pm 5\%$	50 Hz $\pm 5\%$
36	Protection Devices	Switch-Fuse	Switch-Fuse
37	Neutral Earthing System	TNS	TNS
38	Voltage During Motor Start	80% U_n	80% U_n
39	Synchronous Speed	By Vendor	1500
40	Full Load Speed [RPM]	By Vendor	1435
41	Over Speed Capability	By Vendor	120 %
42	Number of Poles	By Vendor	4
43	Starting Method	Direct on Line	DOL
44	Direction of Rotation (Viewed from coupling end)	Shall be Proposed by MFR Based on Driven Load Rotation of Direction	[] CW [] CCW [] Unidirectional [X] Bidirectional
45	Stator Winding Connection	Delta	Delta
46	Location of Terminal Box (Viewed from DE)	[] Right [] Left	Top
47	Insulation Class	Class F	F
48	Class of Temperature Rise	Class B	B
49	Max. Permissible Starting Time [s]	By Vendor	
50	Accelerating Time DOL starting, at 100% U_n [s]	By Vendor	3
51	Accelerating Time DOL starting, at 80% U_n [s]	By Vendor	5.16
52	Starting Torque at 100% U_n [N.m]	By Vendor	87.84
53	Starting Torque at 80% U_n [N.m]	By Vendor	56.22
54	Maximum Torque [N.m]	By Vendor	109
55	Pull-Up Torque	By Vendor	80.52
56	Locked Rotor Torque	By Vendor	84

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شماره پیمان: 053 - 073 - 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 7 از 48	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001	V00	

57	Rated Torque [N.m]	By Vendor	36.6
58	Rated Current [A]	By Vendor	11
Data Sheets for LV Induction Motors			
Item	Category	Required Specification	Vendor Data
59	Max Starting Current	By Vendor	≤700 In
60	No Load Current [A]	By Vendor	4.6
61	Locked Rotor Current [A]	<7In	6.1
62	Locked Rotor Power Factor [A]	By Vendor	0.49
63	Torque-Speed Class	Shall be Selected Based on Driven Load Torque Requirement	[] A [] B [] C [] D
64	Duty Cycle	S1	S1
65	Current at ½ Rated Load	By Vendor	6.35
66	Current at ¾ Rated load	By Vendor	8.46
67	Current at Rated Load	By Vendor	11
68	Starting Power Factor	By Vendor	0.49
69	Power Factor at ½ Rated Load	By Vendor	0.71
70	Power Factor at ¾ Rated load	By Vendor	0.8
71	Power Factor at Rated Load	By Vendor	0.85
72	Efficiency at ½ Rated Load	By Vendor	83.2
73	Efficiency at ¾ Rated Load	By Vendor	85
74	Efficiency at Rated Load	By Vendor	84.7
75	No Load Losses	By Vendor	0.35
76	Stall Time (Hot/Cold) (Sec)	By Vendor	10/15
77	Transient Reactance (X'd)	By Vendor	
78	Sub - Transient Reactance (X"d)	By Vendor	
79	Acceleration Time At 80% Un (Sec)	By Vendor	5.16
80	Bearing (DE)		
	Type (Detail Description by Vendor)	Anti Friction (Ball Bearing)	6208-2Z C3
	Manufacturer	By Vendor	SKF Or NSK
	Minimum Life Without Load	Minimum 40000 Hours	40000
	Minimum Life With Load	Minimum 32000 Hours	32000
	Lubrication	Grease	Grease
	Cooling Water/ Oil Capacity	N/A	N/A
	Permissible Trust Force [N]	By Vendor	
	Bearing (NDE)		

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شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 8 از 48	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001		V00

81	Type (Detail Description by Vendor)	Anti friction (ball bearing)	6208-2Z C3
	Manufacturer	By Vendor	SKF Or NSK
Data Sheets for LV Induction Motors			
Item	Category	Required Specification	Vendor Data
	Minimum Life Without Load	Minimum 40000 Hours	40000
	Minimum Life With Load	Minimum 32000 Hours	32000
	Lubrication	Grease	Grease
	Cooling Water/ Oil Capacity	N/A	N/A
	Permissible Trust Force [N]	By Vendor	
	Space Heater	Not Required	N/A
	Space Heater Voltage [V]	230VAC, 50Hz, 1Ph	N/A
	Space Heater Power [W]	By Vendor	N/A
82	Temp. Detector (Winding/Bearing)	By Vendor	N/A
83	Terminal Boxes	[X] Power Terminal Box [X] Space heater (if required)	Power TB
84	Main Power Cable Specification & Size & Orientation	According to (BK-GCS-PEDCO-120-EL-CN-0003)	
85	Motor Weight (Net/Shipped)	By Vendor	79
86	Rotor Moment of Inertia	By Vendor	0.02
87	Method of Cable Entry	[X] Cable Gland [] Sealing Gasket	Gland
88	Cable Gland Hub of Main Terminal Box	By Vendor	2 x M32 x1.5
89	Cable Gland Entry for aux. Terminal Box (if applicable)	1 X M25 (if Required)	N/A
90	Short Circuit Capability of Terminal Box	30 kA for 0.2 S	10KA for 1Sec
91	Sound Level at 1 distance meter From Motor	Max. 85 dB(A)	Below 85 dB
92	Finish Color	Manufacturer Standard	7031
93	Load Torque/Slip, Current/Slip Curves	By Vendor	After fan finalization
94	Motor Torque/Slip, Current/Slip Curves	By Vendor	Attached
95	Time - Current Heating (Thermal Limit) Curve	By Vendor	Attached
96	Motor Thermal Capacity Data	By Vendor	Attached
97	Installation, Operation & Maintenance Instruction	By Vendor	Attached
98	Spare Parts List for Two Years Operation	By Vendor	Please refer to relevant document
99	Commissioning Spare Part List	By Vendor	N/A
100	Dimensional Outline Drawing	By Vendor	As per attached DWG

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)																									
شماره پیمان: 053 – 073 – 9184	<table><tr><th colspan="8">Motor Data Sheets Including Curves and Drawing</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادر کننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>V00</td><td>0001</td><td>DS</td><td>EL</td><td>120</td><td>AA</td><td>GCS</td><td>BK</td></tr></table>	Motor Data Sheets Including Curves and Drawing								نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه	V00	0001	DS	EL	120	AA	GCS	BK	شماره صفحه : 9 از 48
Motor Data Sheets Including Curves and Drawing																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
V00	0001	DS	EL	120	AA	GCS	BK																			

101	Certified Type Test Report & Written Statement	By Vendor	After Manufacturing test report would be provided.
102	Certified Conformity for EX Type Motors	By Vendor	Attached
103	Deviation List (if Any)	By Vendor	
Data Sheets for LV Induction Motors			
Item	Category	Required Specification	Vendor Data
104	Test & Inspection	Factory Routine Test Report Shall be Submitted	After Manufacturing test report would be provided

DE: Drive End
NDE: Non
Drive End
CW:
Clockwise
CCW: Counter Clockwise

Note 1: IPS design margin is defined in accordance with standard output power rating of motor:

	Standard Output Power Rating	Design margin
1	Up to 22kW	1.25
2	from 22kW to 55kW	1.15
3	Above 55kW	1.10

Note 2: The following values are default unless otherwise specified during finalization of motors:

	Standard Output Power Rating	Cable Size	Gland Size
1	5.5kW	3x6	M25
2	7.5kW	3x6	M25
3	15kW	3x16	M32
4	18.5kW	3x16	M32
5	30kW	3x50	M40
6	37kW	3x50	M40
7	45kW		M50
8	55kW	3x95	M50

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شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 10 از 48	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001		V00

Data Sheets for LV Induction Motors			
Item	Category	Required Specification	Vendor Data
1	Driven Machine	Electrical Motor	Electrical Motor
2	Drive Machine Tag No.	-	AEM-2102
3	Manufacturer	By Vendor	VEM
4	Manufacturer's Number / Type	By Vendor	K8KR 132 M4
5	Manufacturing Standard	IEC 60034 & IPS-M-EL-131(2)	IEC 60034
6	Location	☒ Outdoor (Under Shelter) ☐ Indoor	Outdoor
7	Area Classification	EExd IIB T3	EExd IIC T3
8	Ambient Temperature	5 to +55°C	5 to +55°C
9	Relative Humidity	100 %	
10	Dust	☒ Yes ☐ No	Yes
11	Corrosion	☒ Yes ☐ No	Yes
12	Elevation	12.5m Above Sea Level	12.5m Above Sea Level
13	Quantity	Acc. To Load List (BK-GCS-PEDCO-120-EL-LI-0001)	6
14	Tag Number	Acc. To Load List (BK-GCS-PEDCO-120-EL-LI-0001)	AEM-2102-1~6
15	Motor Type	Asynchronous, Squirrel Cage	Asynchronous, Squirrel Cage
16	Mounting	☐ Horizontal ☐ Vertical	Vertical, IMV3
17	Rotor Construction	☐ Brazed Copper Bars ☐ Aluminum Die Cast	Die Cast Aluminum
18	Frame Material	Steel Sheet or Cast Iron	Cast Iron
19	Rotor Cage Material	By Vendor	Die Cast Aluminum
20	Cooling Method	IC411 According to IPS-M-EL-131(2)	IC 411
21	Ingress Protection Degree for Motor	IP 54	IP55
22	Ingress Protection Degree for Terminal Box	IP 55	IP55
23	Explosion Protection of Motor	N/A for Safe Area Zone 2, IIB, T3	EExd IIC T3

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)							 	
شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 11 از 48	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001		V00

24	Explosion Protection of Terminal Box	N/A for Safe Area Zone 2, IIB, T3	EExd IIC T3
25	Ex. Certificate Authority/Certificate No.	By Vendor	CESI15ATEX017X
26	Driven Machine Shaft Power Requirement (Pmp)	As Per Related Mechanical Data sheet (to be Specified by Vendor)	3.58 Kw
27	De-Rating Factor due to Ambient Temperature (Kt)	Vendor Shall Advise	0.86
28	De-Rating Factor Due to Altitude (Ka)	1	1
29	Design margin (Km)	Acc. to IPS Standard (Note 1)	API661

Data Sheets for LV Induction Motors			
Item	Category	Required Specification	Vendor Data
30	Motor Shaft Power Requirement @ Site condition (=Km X P _{mp})	By Vendor	4
31	Standard Rated Motor Output =Km X P _{mp} / (Ka Ki)	By Vendor	6.45
32	Frame Size	By Vendor	132M
33	Frame Earth Boss	External	External
34	Rated Voltage	400 V ±10%	400 V ±10%
35	Rated Frequency	50 Hz ±5%	50 Hz ±5%
36	Protection Devices	Switch-Fuse	Switch-Fuse
37	Neutral Earthing System	TNS	TNS
38	Voltage During Motor Start	80% Un	80% Un
39	Synchronous Speed	By Vendor	1500
40	Full Load Speed [RPM]	By Vendor	1440
41	Over Speed Capability	By Vendor	120 %
42	Number of Poles	By Vendor	4
43	Starting Method	Direct on Line	DOL
44	Direction of Rotation (Viewed from coupling end)	Shall be Proposed by MFR Based on Driven Load Rotation of Direction	[] CW [] CCW [] Unidirectional [X] Bidirectional
45	Stator Winding Connection	Delta	Delta
46	Location of Terminal Box (Viewed from DE)	[] Right [] Left	Top
47	Insulation Class	Class F	F
48	Class of Temperature Rise	Class B	B
49	Max. Permissible Starting Time [s]	By Vendor	
50	Accelerating Time DOL starting, at 100% U _n [s]	By Vendor	2.18
51	Accelerating Time DOL starting, at 80% U _n [s]	By Vendor	3.66

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)								
شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 12 از 48	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001		V00

52	Starting Torque at 100% U _n [N.m]	By Vendor	154.18
53	Starting Torque at 80% U _n [N.m]	By Vendor	98.67
54	Maximum Torque [N.m]	By Vendor	174
55	Pull-Up Torque	By Vendor	144.23
56	Locked Rotor Torque	By Vendor	154
57	Rated Torque [N.m]	By Vendor	49.73
58	Rated Current [A]	By Vendor	16.5

Data Sheets for LV Induction Motors

Item	Category	Required Specification	Vendor Data
59	Max Starting Current	By Vendor	≤700 I _n
60	No Load Current [A]	By Vendor	6.3
61	Locked Rotor Current [A]	<7I _n	6.6
62	Locked Rotor Power Factor [A]	By Vendor	0.44
63	Torque-Speed Class	Shall be Selected Based on Driven Load Torque Requirement	[] A [] B [] C [] D
64	Duty Cycle	S1	S1
65	Current at ½ Rated Load	By Vendor	10.27
66	Current at ¾ Rated load	By Vendor	13.25
67	Current at Rated Load	By Vendor	16.5
68	Starting Power Factor	By Vendor	0.44
69	Power Factor at ½ Rated Load	By Vendor	0.62
70	Power Factor at ¾ Rated load	By Vendor	0.71
71	Power Factor at Rated Load	By Vendor	0.76
72	Efficiency at ½ Rated Load	By Vendor	85
73	Efficiency at ¾ Rated Load	By Vendor	86.3
74	Efficiency at Rated Load	By Vendor	86
75	No Load Losses	By Vendor	0.52
76	Stall Time (Hot/Cold) (Sec)	By Vendor	7/11
77	Transient Reactance (X'd)	By Vendor	-
78	Sub - Transient Reactance (X''d)	By Vendor	-
79	Acceleration Time At 80% U _n (Sec)	By Vendor	3.66
	Bearing (DE)		
	Type (Detail Description by Vendor)	Anti Friction (Ball Bearing)	6208-2Z C3
	Manufacturer	By Vendor	SKF Or NSK
	Minimum Life Without Load	Minimum 40000 Hours	40000

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)								
شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing							شماره صفحه : 13 از 48	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	AA	120	EL	DS	0001	V00	

80	Minimum Life With Load	Minimum 32000 Hours	32000
	Lubrication	Grease	Grease
	Cooling Water/ Oil Capacity	N/A	
	Permissible Trust Force [N]	By Vendor	
81	Bearing (NDE)		
	Type (Detail Description by Vendor)	Anti friction (ball bearing)	6208-2Z C3
	Manufacturer	By Vendor	
Data Sheets for LV Induction Motors			
Item	Category	Required Specification	Vendor Data
	Minimum Life Without Load	Minimum 40000 Hours	40000
	Minimum Life With Load	Minimum 32000 Hours	32000
	Lubrication	Grease	Grease
	Cooling Water/ Oil Capacity	N/A	
	Permissible Trust Force [N]	By Vendor	
	Space Heater	Not Required	N/A
	Space Heater Voltage [V]	230VAC, 50Hz, 1Ph	N/A
	Space Heater Power [W]	By Vendor	N/A
82	Temp. Detector (Winding/Bearing)	By Vendor	N/A
83	Terminal Boxes	[X] Power Terminal Box [X] Space heater (if required)	Power TB
84	Main Power Cable Specification & Size & Orientation	According to (BK-GCS-PEDCO-120-EL-CN-0003)	
85	Motor Weight (Net/Shipped)	By Vendor	87
86	Rotor Moment of Inertia	By Vendor	0.167
87	Method of Cable Entry	[X] Cable Gland [] Sealing Gasket	Gland
88	Cable Gland Hub of Main Terminal Box	By Vendor	2 x M32 x1.5
89	Cable Gland Entry for aux. Terminal Box (if applicable)	1 X M25 (if Required)	N/A
90	Short Circuit Capability of Terminal Box	30 kA for 0.2 S	10KA for 1Sec
91	Sound Level at 1 distance meter From Motor	Max. 85 dB(A)	Below 85 dB
92	Finish Color	Manufacturer Standard	7031
93	Load Torque/Slip, Current/Slip Curves	By Vendor	After fan finalization
94	Motor Torque/Slip, Current/Slip Curves	By Vendor	Attached
95	Time - Current Heating (Thermal Limit) Curve	By Vendor	Attached
96	Motor Thermal Capacity Data	By Vendor	Attached

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)															
شماره پیمان: 053 – 073 – 9184	Motor Data Sheets Including Curves and Drawing	شماره صفحه : 14 از 48														
	<table><tr><td>پروژه</td><td>بسته کاری</td><td>صادر کننده</td><td>تسهیلات</td><td>رشته</td><td>نوع مدرک</td><td>سریال</td><td>نسخه</td></tr><tr><td>BK</td><td>GCS</td><td>AA</td><td>120</td><td>EL</td><td>DS</td><td>0001</td><td>V00</td></tr></table>		پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	BK	GCS	AA	120	EL	DS
پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه									
BK	GCS	AA	120	EL	DS	0001	V00									

97	Installation, Operation & Maintenance Instruction	By Vendor	Attached
98	Spare Parts List for Two Years Operation	By Vendor	Please refer to relevant document
99	Commissioning Spare Part List	By Vendor	N/A
100	Dimensional Outline Drawing	By Vendor	As per attached DWG
101	Certified Type Test Report & Written Statement	By Vendor	After Manufacturing test report would be provided.
102	Certified Conformity for EX Type Motors	By Vendor	Attached
103	Deviation List (if Any)	By Vendor	

Data Sheets for LV Induction Motors

Item	Category	Required Specification	Vendor Data
104	Test & Inspection	Factory Routine Test Report Shall be Submitted	After Manufacturing test report would be provided

DE: Drive End
NDE: Non
Drive End
CW:
Clockwise
CCW: Counter Clockwise

Note 1: IPS design margin is defined in accordance with standard output power rating of motor:

	Standard Output Power Rating	Design margin
1	Up to 22kW	1.25
2	from 22kW to 55kW	1.15
3	Above 55kW	1.10

Note 2: The following values are default unless otherwise specified during finalization of motors:

	Standard Output Power Rating	Cable Size	Gland Size
1	5.5kW	3x6	M25
2	7.5kW	3x6	M25
3	15kW	3x16	M32
4	18.5kW	3x16	M32
5	30kW	3x50	M40
6	37kW	3x50	M40
7	45kW		M50
8	55kW	3x95	M50

Manufacturer

VEM motors GmbH - Werk Wernigerode
Carl-Friedrich-Gauß-Straße 1

38855 WERNIGERODE
Deutschland

Customer

AAC Co.
Inq.#17208
Rev.0

Three-phase motors with squirrel cage rotor, explosion protected version,
protection type 'Ex db', device group IIC, category 2G

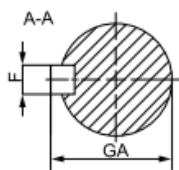
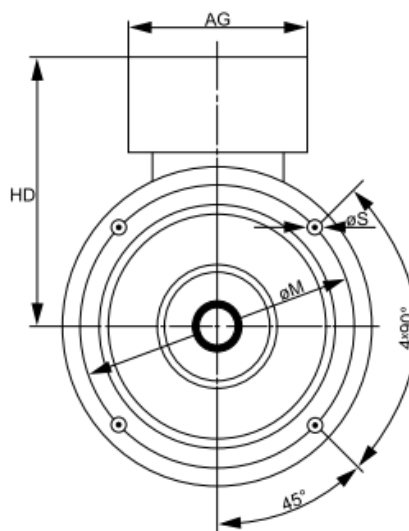
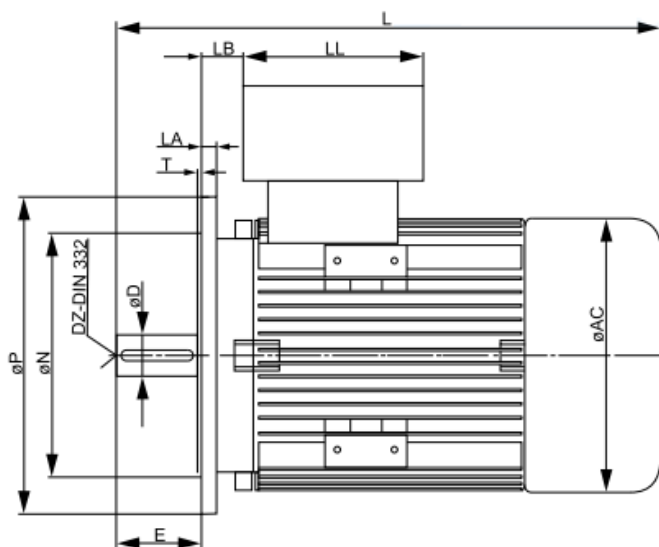
K8KR 132 S4 Ex db IIC T4

Mounting position



Type of mounting: IM V3
Flange: FF 265[A 300]
Brake type:
Forced-ventilation:

Terminal box: IEC 132
Cable entry threads O: 2 x M32x1,5
connection cable: max. Ø 14...24 mm



Motor

A	AA	AB	AC	AD	B	B1	BA	BB	C	CA	K	K'	L	LB
-	-	-	257	-	-	-	-	-	-	-	-	-	512	41

LF	H	HA	HD	HH	Terminal box				
-	-	-	256	-	AG	LL	165	165	

Flange

P	N	LA	M	T	S	Tolerances				
300	230	18	265	4	14	H	N	D	DA	
						-	j6	k6	-	

Shaft-DS

D	E	GA	F	DZ
38	80	41	10	DIN 332-D M12

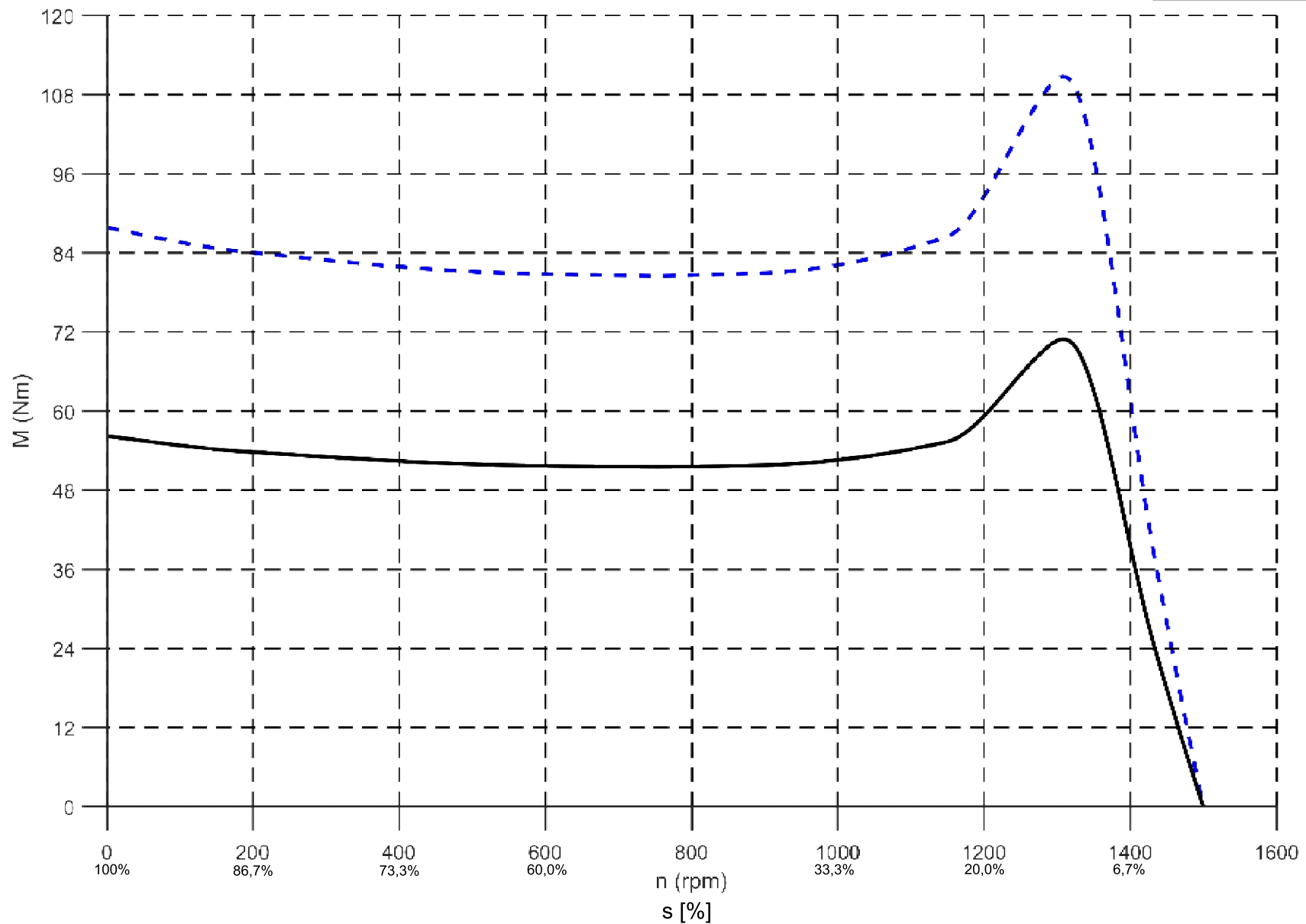
Shaft-NS

DA	EA	GC	FA	DY
-	-	-	-	-

Delivery conditions and/or official regulations: IEC / EN 60034-1

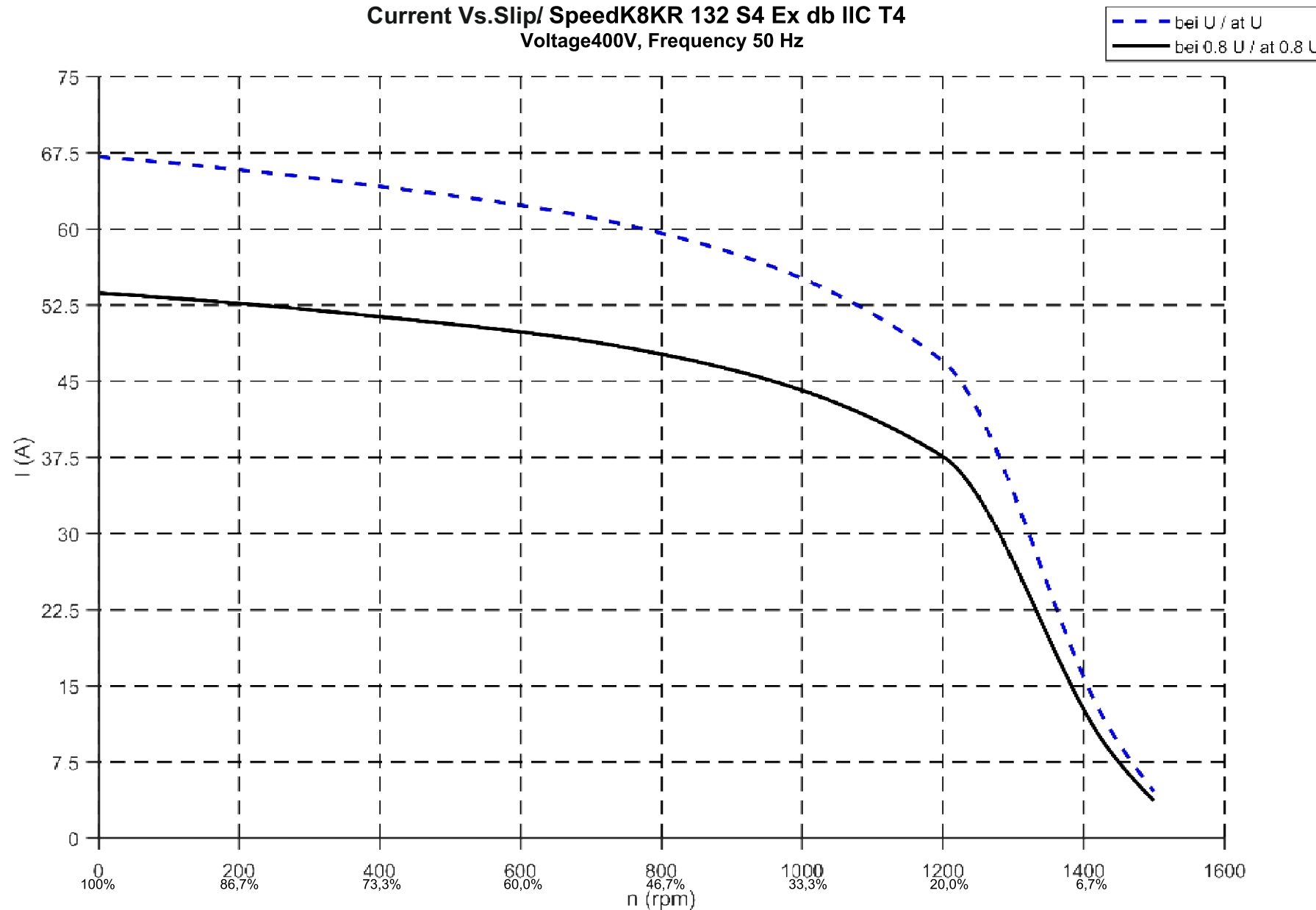
This document was produced electronically, all specifications are valid only after confirmation of the manufacturer

Torque Vs. Slip/Speed K8KR 132 S4 Ex db IIC T4
 Voltage 400V, Frequency 50 Hz

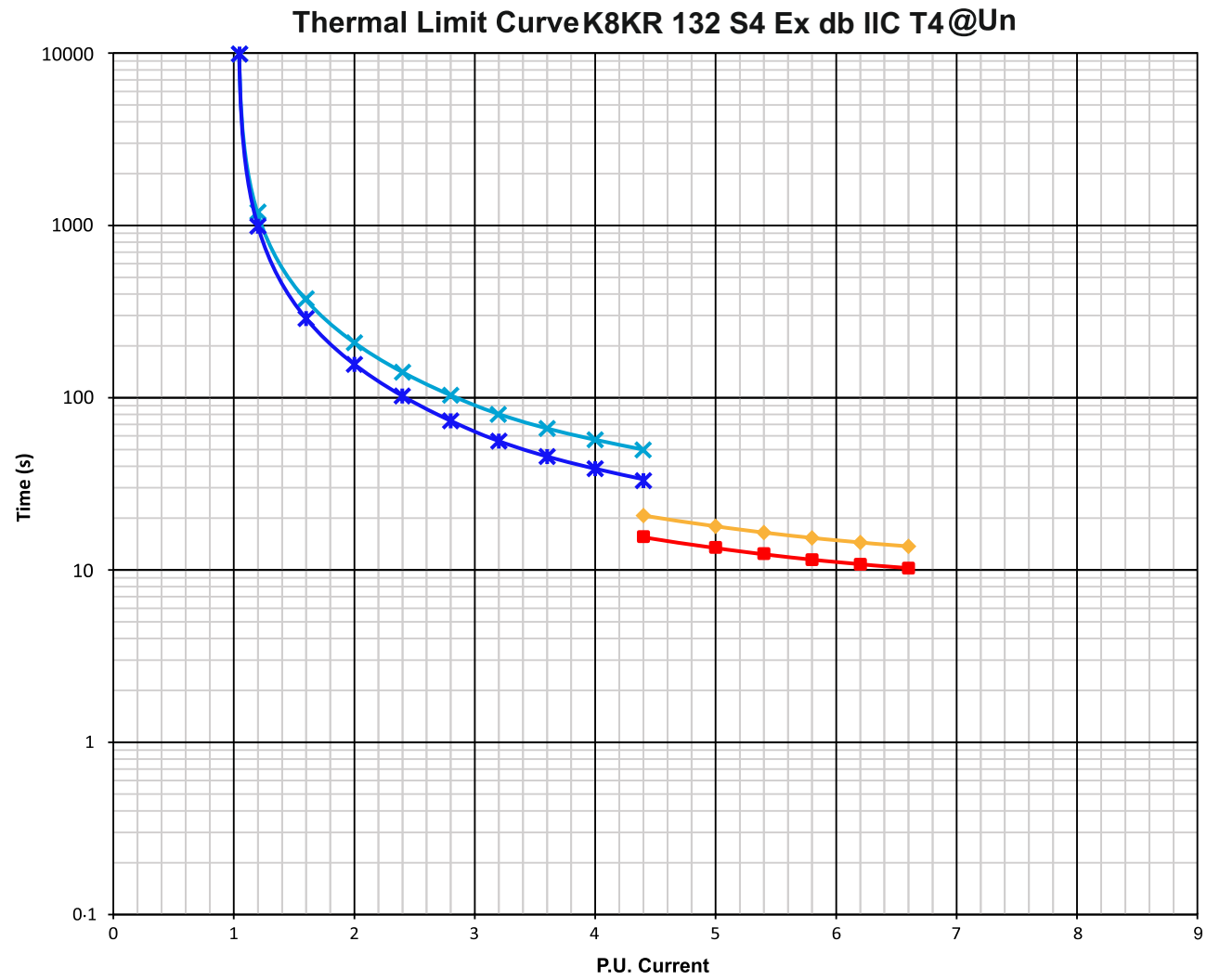
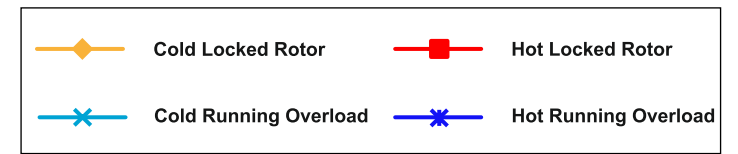


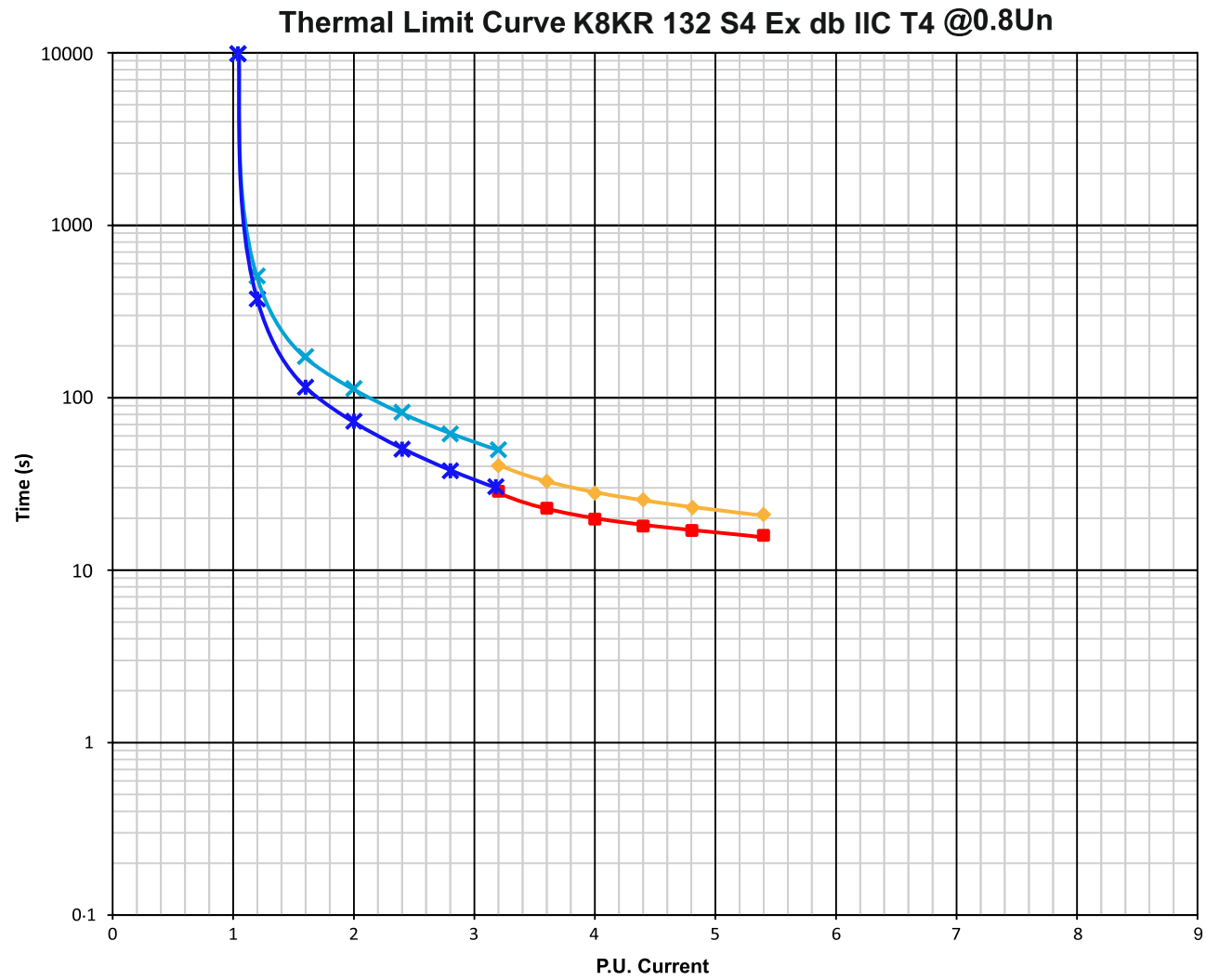
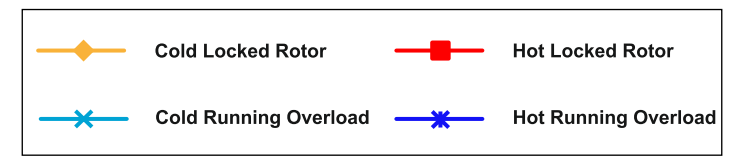
K8KR 132 S4 Ex db IIC T4
 Three-phase motors with squirrel cage rotor, explosion protected
 version protection type 'Ex db', device group IIC, category 2G

Current Vs.Slip/ SpeedK8KR 132 S4 Ex db IIC T4
Voltage400V, Frequency 50 Hz



K8KR 132 S4 Ex db IIC T4
 Three-phase motors with squirrel cage rotor, explosion protected
 version protection type 'Ex db', device group IIC, category 2G





Data sheet

MADE WITH VEM EKAT 2023



Manufacturer

VEM motors GmbH - Werk Wernigerode
Carl-Friedrich-Gauß-Straße 1

38855 WERNIGERODE
Deutschland

Customer

AAC Co.
Inq.#17208
Rev.0

Three-phase motors with squirrel cage rotor, explosion protected version,
protection type 'Ex db', device group IIC, category 2G

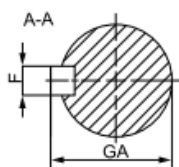
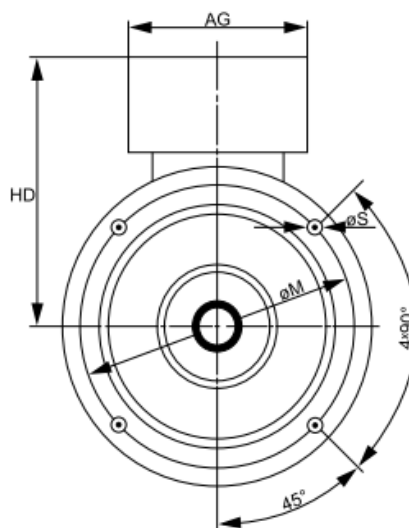
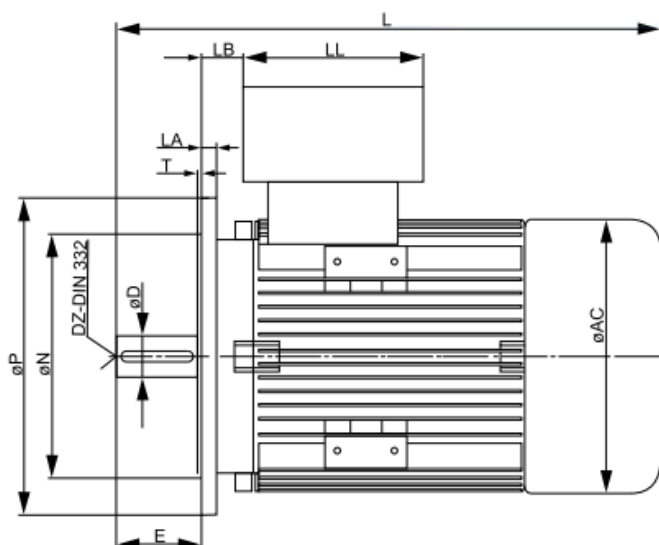
K8KR 132 M4 Ex db IIC T4

Mounting position



Type of mounting: IM V3
Flange: FF 265[A 300]
Brake type:
Forced-ventilation:

Terminal box: IEC 132
Cable entry threads O: 2 xM32x1,5
connection cable: max. Ø 14...24 mm



Motor

A	AA	AB	AC	AD	B	B1	BA	BB	C	CA	K	K'	L	LB
-	-	-	257	-	-	-	-	-	-	-	-	-	512	41
											Terminal box			
LF	H	HA	HD	HH									AG	LL
-	-	-	256	-									165	165

Flange

P	N	LA	M	T	S	H	N	D	DA
300	230	18	265	4	14	-	j6	k6	-

Tolerances

Shaft-DS

D	E	GA	F	DZ
38	80	41	10	DIN 332-D M12

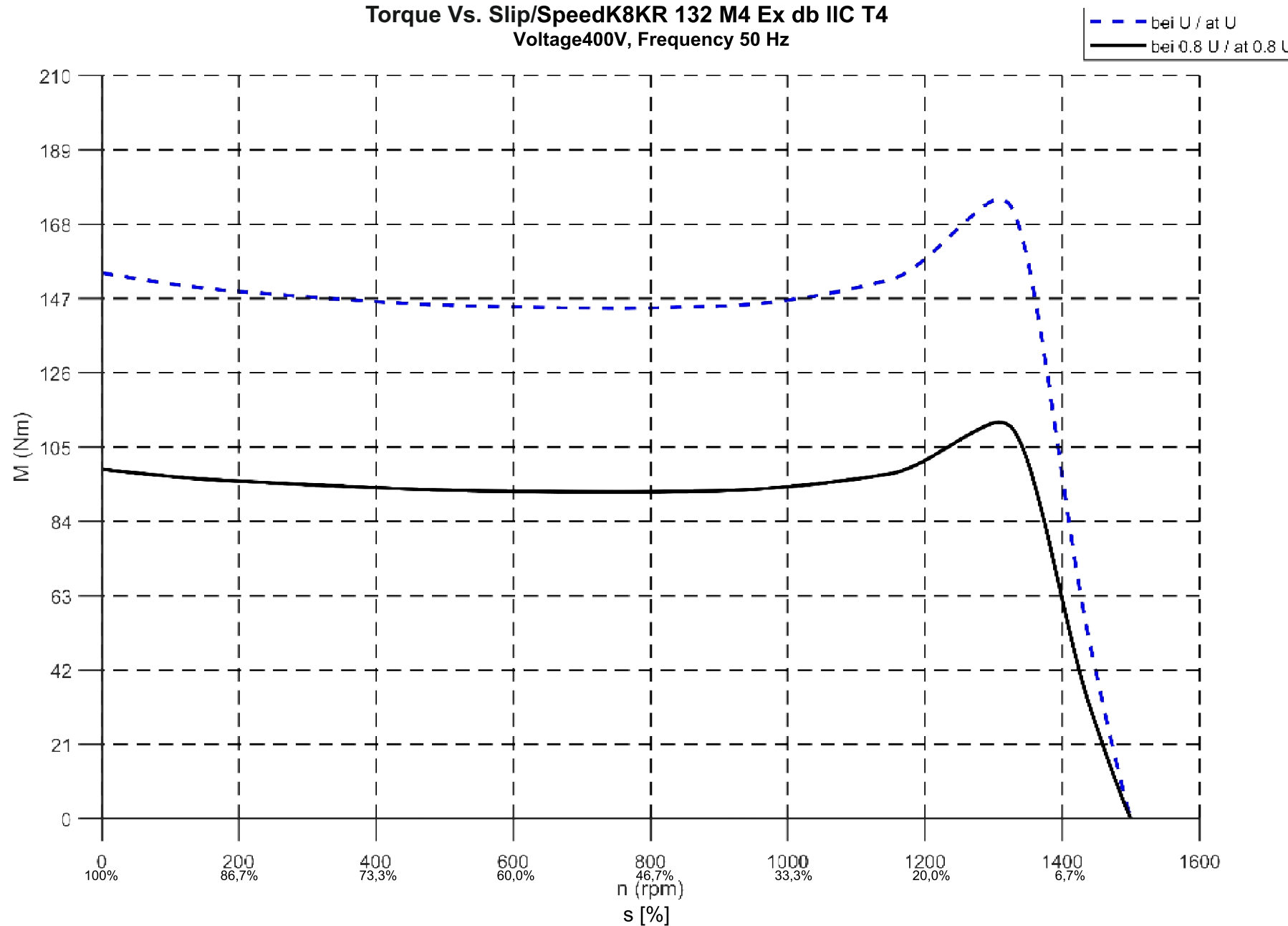
Shaft-NS

DA	EA	GC	FA	DY
-	-	-	-	-

Delivery conditions and/or official regulations: IEC / EN 60034-1

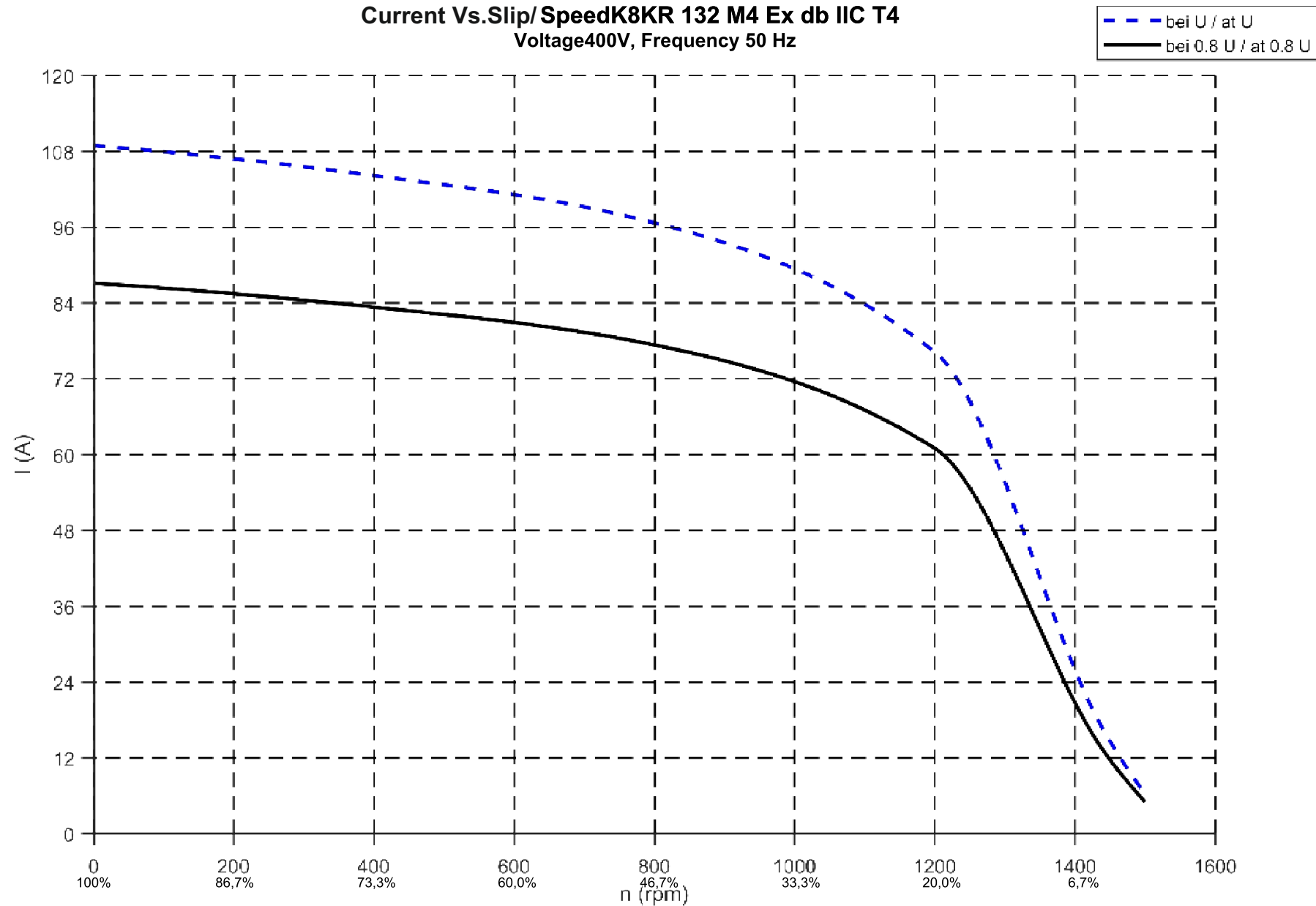
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Torque Vs. Slip/SpeedK8KR 132 M4 Ex db IIC T4 Voltage400V, Frequency 50 Hz

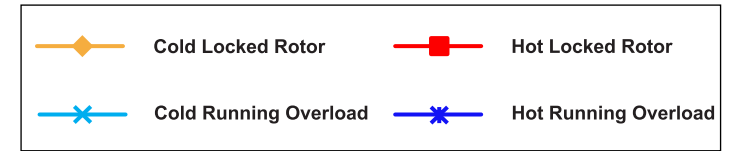


K8KR 132 M4 Ex db IIC T4
Three-phase motors with squirrel cage rotor, explosion protected
version protection type 'Ex db', device group IIC, category 2G

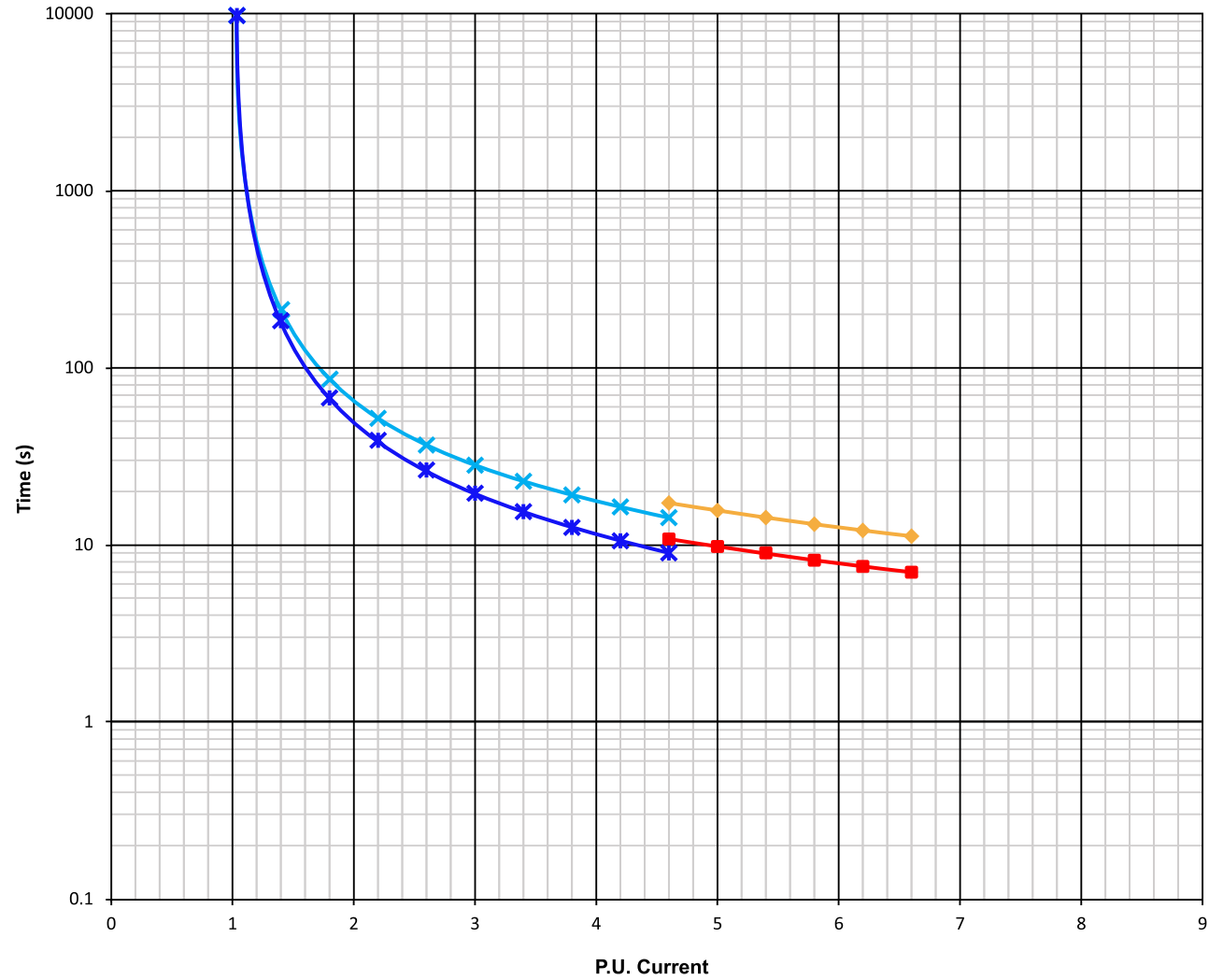
Current Vs.Slip/ SpeedK8KR 132 M4 Ex db IIC T4 Voltage400V, Frequency 50 Hz

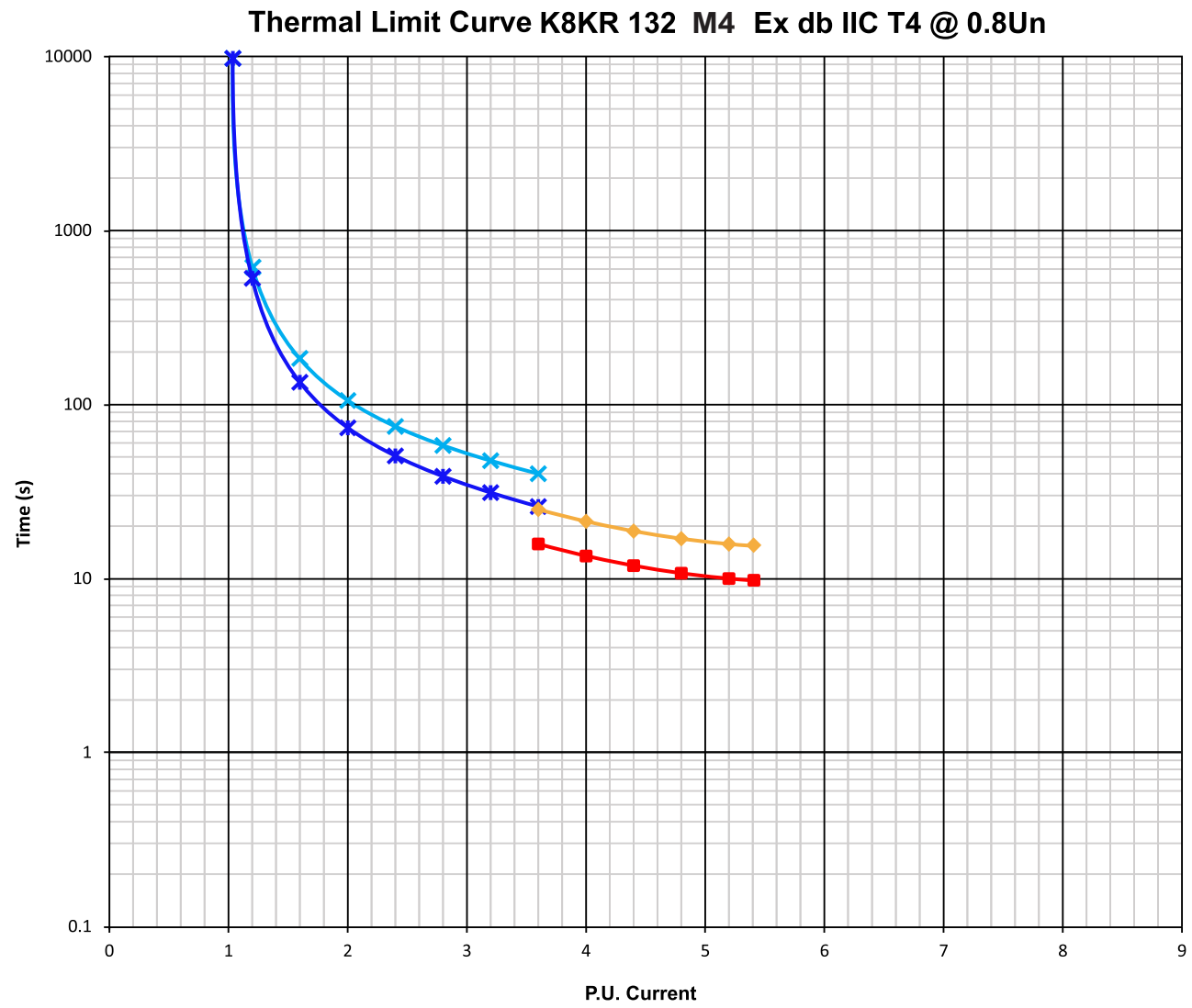
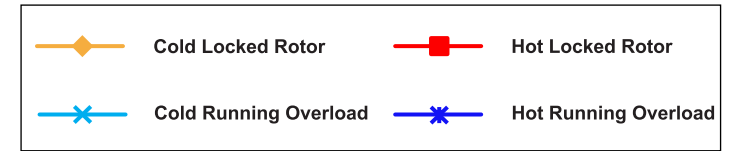


K8KR 132 M4 Ex db IIC T4
Three-phase motors with squirrel cage rotor,explosion protected
version protection type'Ex db',device group IIC, category 2G



Thermal Limit Curve K8KR 132 M4 Ex db IIC T4 @ Un





CESI



CESI S.p.A.

Via Rubattino 54
I-20134 Milano - Italy
Tel: +39 02 21251
Fax: +39 02 21255440
e-mail: info@cesi.it
www.cesi.it

Schema di certificazione

CESI-ATEX



PRD N. 018B
Membro degli Accordi di Mutuo
Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC
Mutual Recognition Agreements

ATEX B6003477-1-EN

CERTIFICATE



[1] SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE

[2] **Equipment or Protective System intended for use
in potentially explosive atmospheres
Directive 2014/34/EU**

[3] Supplementary EU-Type Examination Certificate number:

CESI 15 ATEX 017X /02

[4] **Product:** Three-phase asynchronous motors series K8K. 90.., 100.., 132.., 160.., 180.., 200.., 225.., 250.., 280.., 315..

[5] **Manufacturer:** **VEM Motors GmbH**

[6] **Address:** Carl Friedrich Gauss str.1 D -38855 Wernigerode - Germany

[7] This supplementary certificate extends EC-Type Examination Certificate CESI 15 ATEX 017X to apply to products designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to..

[8] CESI, notified body n. 0722 in accordance with Article 17 of the Directive 2014/34/EU of the Parliament and Council of 26 February 2014, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.4

[9] The examination and test results are recorded in confidential report n. EX- B7009094 In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016

[10] If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

[12] The marking of the equipment or protective system shall include the following:

	I M2 Ex db I Mb	or	I M2 Ex db eb I Mb
	II 2G Ex db IIB T3 Gb ;	or	II 2G Ex db eb IIB T3 Gb
	II 2G Ex db IIC T4, T3 Gb ;	or	II 2G Ex db eb IIC T4, T3 Gb
	II 2D Ex tb IIIC T130°C, T160°C Db		

This certificate may only be reproduced in its entirety and without any change, schedule included.

Date 28/04/2017 - Translation issued the 28/04/2017

Prepared
Sergio Mezzetti

Verified
Mirko Balaz

Approved
Roberto Piccin

CESI S.p.A.
Testing & Certification Division
Business Area Certification
Il Responsabile

(Roberto Piccin)

[13]

Schedule

[14] **SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 15 ATEX 017X/02**

[15] **Description of the variation**

- New motor frame sizes K8K. 90..-100..-112..
- Constructive variation on motor size 132..
- New design of motors with efficiency class IE2 and IE3.
- New additional code for motors with efficiency class IE2 and IE3.
- Reassessment for temperature class T5 for standard motors series K8K. 90.. ÷ 315 at Ambient Temperature +40°C
- Upgrading the name-plate
- Reassessment of all motors on basis of the new standard IEC 60079-7 Ed. 5th: 2015..

Description of the equipment

The three-phase asynchronous motors series K8K. 90..-100..-112..-132..-160..-180..-200..-225..-250..-280..-315.. are manufactured by different constructive typologies; they can be supplied by mains or by inverter, with Simple or double polarity, self-ventilated or with forced ventilation.

The motors are manufactured with two separate compartments: motor (Ex-db) and terminal box (Ex-db or Ex-eb) for supply and auxiliary circuits connection or can be provided with permanently connected cable. The motors can be equipped with auxiliary devices (heaters, thermal detectors) and with separate brake and/or encoder.

The motors series K8K. 90.. ÷ 315.. can be assembled with two "Ex db" terminal boxes (connected by sealing bushing 3 piece fitting or by barrier cable glands and cable) or with two "Ex e" terminal boxes (connected by piece fitting or by cable glands and cable).

The three-phase asynchronous motors series K8K. 90.. ÷ 315.. can be manufactured with efficiency class IE2 and IE3 according to IEC 60034-30 standard.

The motors with efficiency level IE2 and IE3, differ from standard motors IE1 for better quality of laminations, higher length of stator/rotor package and higher filling factor of copper.

The motors with efficiency class IE2 and IE3 are identified by proper code on name plate.

The motors, for temperature class T3/T4, are produced with insulation system in class F and are designed with temperature limit of the insulation class B (120°C) at ambient temperature Ta = +40°C

The standard motors series K8K. 90.. ÷ 315.. are suitable for temperature classes T5 at Ta + 40°C

Depending on the type of protection mode, ambient temperature and of the Temperature class, the three-phase asynchronous motors series K8K. 90.. ÷ 315.. can have the following markings:

Motors in temperature class T3 and T4

- | | | |
|---|-------------------------------------|--|
|  | II 2G Ex db IIC T3, T4 Gb | <u>Ambient Temperature : - 20°C / + 40°C /+ 50°C /+ 60°C</u> |
|  | II 2G Ex db eb IIC T3, T4 Gb | |
|  | I M2 Ex db I Mb | |
|  | I M2 Ex db eb I Mb | |

This certificate may only be reproduced in its entirety and without any change, schedule included.

SP

[13]

Schedule

[14] SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 15 ATEX 017X/02

Motors in temperature class T3

	II 2G Ex db IIB T3 Gb	<u>Ambient Temperature: - 20°C / + 80°C</u>
	II 2G Ex db eb IIB T3 Gb	
	II 2D Ex tb IIC T160°C Db	

Motors in temperature class T5

	II 2G Ex db IIC T5 Gb	<u>Ambient Temperature: - 20°C / +40°C</u>
	II 2G Ex db eb IIC T5 Gb	

Only for Motor types: 180M4 (max. Power 15.0 kW); 200L4 (max. Power 22.0 kW);

	II 2G Ex db IIC T5 Gb	<u>Ambient Temperature: - 20°C / +45°C</u>
	II 2G Ex db eb IIC T5 Gb	

Only for Motor type 132M4 (max. Power 5.0 kW);

	II 2G Ex db IIC T5 Gb	<u>Ambient Temperature: - 20°C / +50°C</u>
	II 2G Ex db eb IIC T5 Gb	

Motors in temperature class T6

Only for Motor types: 132SA2 (max. Power 3.4 kW);

	II 2G Ex db IIC T6 Gb	<u>Ambient Temperature: - 20°C / +40°C</u>
	II 2G Ex db eb IIC T6 Gb	

Only for Motor type: 132MA4 (max. Power 4.8 kW)

	II 2G Ex db IIC T6 Gb	<u>Ambient Temperature: - 20°C / +45°C</u>
	II 2G Ex db eb IIC T6 Gb	



[13]

Schedule

[14] SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 15 ATEX 017X/02

Equipment identification codes

The various motors types are identified by a code as follows:

A B C D E F G H I J K L

A = Efficiency class:

IE2; IE3 (blank = IE1)

B = Type of motor

K = motor with squirrel-cage rotor

B = motor with brake

C = Design:

8K purchase motors

D = Type of cooling:

R = IC411;

O = IC410.

F = IC416

E = Size:

90, 100, 112, 132, 160, 180, 200, 225, 250, 280, 315

F = Shaft height:

S = Short, M = Medium L = Long e X per longer laminations (SX, MX, LX)

A,B,.. = different length of stator/rotor lamination

G = Number of poles:

(2 ÷ 8); (12/6...., 8/4/2; 6/4/2; ...)

H = Ex Symbol

Motors realized in compliance with EN 60079-0; EN 60079-1; EN 60079-7; EN 60079-31 standards

I = Type of protection

Ex d = "Ex db"; Ex de = "Ex db eb" ; "Ex tb"

J= Gas or Dust group

I; IIB; IIC; IIIC

K= Temperature class (for gas)

T3; T4; T5; T6* (* Not for all motors)

Max. surface temperature (for dust)

T160°C; T130°C

L= Special marking (if applicable)

[13]

Schedule

[14] SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 15 ATEX 017X/02

Electrical characteristics of motors in temperature classes T4/T3

Motors supplied by mains

- Maximum rated voltage: 750 V
 - Maximum rated power (S1): 225 kW
 - Maximum rated current: 335 A
 - Rated frequency: 50/60 Hz
 - Rated speed: 750 ÷ 3600 rpm
 - Number of poles: 2 ÷ 8
 - Insulation class: F – H (with limit Δt B)
 - Duty: S1 – S10
 - Degree of protection: IP54 or IP 55 or IP 56 or IP 65 or IP 66
-
- Ambient temperature:
 - 20 ÷ + 40 °C (standard motors)
 - 20 ÷ + 50 °C (motors provided with permanently connected cables)
 - 20 ÷ + 60 °C (on request)
 - 20 ÷ + 80 °C (group IIB motors, with power derating for reducing the winding rise-temperature within the limits of the insulation class B (120 °C))

Motors supplied by inverter

- rated voltage maximum: 750 V
- peak voltage maximum: 1060 V
- frequency range:
 - 5 ÷ 87 Hz (motors 2p=2)
 - 5 ÷ 100 Hz (motors 2p=4, 6, 8)

The three-phase asynchronous motors supplied by inverter are provided with a suitable label reporting electrical operating characteristics and shall be provided, inside the stator winding, with thermal detectors (PTC); these thermal detectors shall be connected to suitable protection devices of the supply system.

The operation of the thermal detector shall guarantee the disconnection of the supply at:

- 150 °C maximum for motors with temperature class T3
 - 130 °C maximum for motors with temperature class T4. and motors for group I M2 (mining).
- The resetting of the supply shall not be automatic.

[13]

Schedule

[14] SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 15 ATEX 017X/02

Electrical characteristics of motors series K8K. with Temperature class T5

	Sample of standard motors				Motors for $T_a > + 40^{\circ}\text{C}$						
Motor	160M-4		180 L-4		180 M-4			200 L-4		132M-4	
Rated Voltage (V)	400	690	400	440	400	575	690	480	690	400	440
Rated Power -S1 (kW)	11.0	11.0	16.0	18.0	15.0	13.3	15.0	22.0	22.0	5.0	5.5
Rated frequency (Hz)	50	60	50	60	60	50	60	50	50	50	60
Rated current (A)	21.7	12.5	31.3	29.0	29.8	17.2	17.2	63.0	23.0	10.0	10.0
Number of poles	4	4	4	4	4	4	4	4	4	4	4
Connection	delta	star	delta	delta	delta	star	star	delta	delta	delta	delta
Temperature Class	T5	T5	T5	T5	T5	T5	T5	T5	T5	T5	T5
Ambient Temp.(°C)	-20 ÷ + 40				-20 ÷ + 45					20 ÷ + 50 -	
Degree of protection	IP 54 o IP 55 o IP 56 o IP 65 o IP 66										

Electrical characteristics of motors series K8K. with Temperature class T6

Motor	132 SA-2		132 MA-4
Rated Voltage (V)	400		440
Rated Power -S1 (kW)	3.0		4.8
Rated frequency (Hz)	50		60
Rated current (A)	6.5		8.4
Number of poles	2		4
Connection	delta		delta
Temperature Class	T6		T6
Ambient Temperature (C°)	-20 ÷ + 40		-20 ÷ + 45
Degree of protection	IP 54 o IP 55 o IP 56 o IP 65 o IP 66		

Motors with brake and/or encoder

Brake and/or encoder, coupled to the motor, shall be suitable for group, category, type of protection and ambient temperature range foreseen from the motor.

Motors with forced ventilation unit (only for motors 132 ÷ 315)

These equipment are provided with a motor-driven blower mounted on the primary motor. The motor used for forced ventilation shall be suitable for group, type of protection and ambient temperature range foreseen from the primary motor.

[13]

Schedule

[14] **SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 15 ATEX 017X/02**

Cable entries

The accessories used for cable entries, for unused holes and for connecting the separated terminal boxes shall be subject of separate certification according to the following standards:

Motors of Category 2G: EN 60079-0 and EN 60079-1 for terminal box “Ex db”

EN 60079-0 and EN 60079-7 for terminal box “Ex eb”

Motors of category 2D: EN 60079-0; EN 60079-1 and EN 60079-31 for terminal box “Ex db” and “Ex tb”

EN 60079-0; EN 60079-7 and EN 60079-31 for terminal box “Ex eb” and “Ex tb”

In all cases, the minimum degree of protection IP54, for motors of category 2G, and the minimum degree of protection IP 66, for motors of category 2D, shall be guaranteed according to EN 60034-5 and EN 60529 standards.

If cylindrical threads are used the coupling between the cable gland and terminal box shall be provided with block to prevent loosening.

Warning label

For motors size 315LB, motors without terminal box and motors with ambient temperature +60°C:
“Supply cables of motors shall be suitable at least for an operating temperature of 92°C”

For motor supply by inverter:

“Winding protected with PTC thermistors”

In case of use of anticondensate heaters:

“Warning – energised resistors”

[16] **Report n. EX- B7009094**

Routine tests

“Ex db” motor enclosures

On the motor enclosures the manufacturer shall carry out the overpressure routine tests according to paragraph 15.2.3.2 of EN 60079-1 standard, at the following pressure values:

- Motor enclosure sizes 90, 112, 180 and 200:	14.5 bar
- Motor enclosure size 100:	13.5 bar
- Motor enclosure size 132MX:	13.0 bar
- Motor enclosure sizes 132 and 160:	11.7 bar
- Motor enclosure size 225 :	17.6 bar
- Motor enclosure size 250 :	24.3 bar
- Motor enclosure size 280:	28.2 bar
- Motor enclosure size 315:	23.5 bar
- Motor enclosure size 315LB:	27.8 bar

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[13]

Schedule

[14] **SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 15 ATEX 017X/02**

"Ex db" terminal boxes

On the terminal boxes "Ex db" (drw. TR-122016/9B2), the manufacturer shall carry out the overpressure routine tests according to paragraph 15.2.3.2 of IEC 60079-1 standard, at the following pressure values:

- Terminal box for motor sizes 90 ÷ 112 : 12.6 bar

On the terminal boxes "Ex db", (dwg. TR-122016/7B1) the manufacturer shall carry out the overpressure routine tests according to paragraph 15.2.3.2 of IEC 60079-1 standard, at the following pressure values:

- Terminal box for motor size 132 ÷ 280 : 13.2 bar
- Terminal box for motor size 315 : 15.5 bar

On the terminal boxes "Ex db", (dwg. TR-122016/7B4) for motors sizes 200, 225, 250 and 280, the manufacturer shall carry out the overpressure routine tests according to paragraph 15.2.3.2 of IEC 60079-1 standard, at the following pressure values:

- Terminal box for motor size 200 ÷ 225 : 12.8 bar
- Terminal box for motor size 250 ÷ 280: 13.7 bar

The terminal boxes "Ex db" (drw. TR-122016/7B4) for motors sizes 132, 160 e 180 are exempted from overpressure test since they have been submitted, with positive result, to an overpressure test at corresponding to 4 times the reference pressure at the following values:

- 35.3 bar (8.8 x 4) terminal box for motors 132
- 33.2 bar (8.3 x 4) terminal box for motors 160, 180:

"Ex eb" terminal boxes

For the terminal boxes with type of protection "Ex eb", the dielectric test with applied voltage shall be performed (according to clause 7.1 of the IEC 60079-7) at $2U + 1000V$ with a minimum value of 1500V (U = rated voltage of the motor).

[17] **Special conditions for safe use**

- Supply cables of motors size 315LB, motors without terminal box and motors for the ambient temperature +60°C shall be suitable for an operating temperature equal or greater than 92°C;
- Screws used for fastening the parts of motor enclosure, shields and terminal box shall have a yield strength equal or higher than:
 - 800 N/mm² for motors size 90, 100, 112, 132, 160, 180, 280 and 315;
 - 1200 N/mm² for motors size 200, 225 and 250.
- The motor provided with the cables permanently connected, shall have these cables protected against the risk of damage due to mechanical stresses. The free end connections shall be made according to one of the types of protection indicated in the IEC 60079-0 standard according to the installation rules in force in the site of installation.
- The flamepaths are specified in the manufacturer drawings. For information regarding the dimensions of the flameproof joints the manufacturer shall be contacted.

[18] **Essential Health and Safety Requirements**

Compliance with the Essential Health and Safety Requirements is not affected by this variation.

The Essential Health and Safety Requirements are covered by compliance to the following standards:

- EN 60079-0: 2012 +/A11: 2013 - Electrical apparatus for explosive gas atmospheres: General requirements
- EN 60079-1 : 2014- Explosive atmospheres: Flameproof enclosures "d"
- EN 60079-7: 2015- Explosive atmospheres: increased safety "e"
- EN 60079-31: 2014- Explosive atmospheres : dust ignition protection by enclosure "t"

[13]

Schedule

[14] **SUPPLEMENTARY EU-TYPE EXAMINATION CERTIFICATE n. CESI 15 ATEX 017X/02**

[19] **Descriptive documents (prot. EX-B7009110)**

- Technical Note Nr. VEM-A52420 Annex 2 (27 pg.)	Ed. 2	dated	10/01/2017
- Drawing n. VEM-122016/6A	Rev. C	dated	25/11/2016
- Drawing n. 122016/9A		dated	30/09/2016
- Drawing n. 122016/9B (2pg.)		dated	30/09/2016
- Drawing n. A69192-5	Rev. B	dated	30/09/2016
- Drawing n. A69192-6	Rev. C	dated	30/09/2016
- Drawing of nameplate n. VEM-122016/6C4 (2 pg)	Rev. B	dated	25/11/2016
- Drawing n. 122016/9B3		dated	30/09/2016
- Drawing n. TR-122016/9B2 (2 pg.)		dated	30/09/2016
- Drawing n. TR-122016/9B1 (2 pg.)		dated	30/09/2016
- Drawing n. TR-122016/7B1	Rev. D	dated	25/11/2016
- Drawing n. TR-122016/7B2	Rev. D	dated	25/11/2016
- Drawing n. TR-122016/7B3	Rev. A	dated	25/11/2016
- Drawing n. TR-122016/7B4	Rev. A	dated	25/11/2016
- Drawing n. TR-122016/7B5	Rev. D	dated	25/11/2016
- Drawing n. 122016/9D1		dated	30/09/2016
- Drawing n. 122016/9D2		dated	30/09/2016
- Operation and Manual Instruction VEM n. 152178 (22 pg.)		dated	---/11/2016

One copy of all documents is kept in CESI files.

Certificate history

Issue n.	Issue Date	Summary description of variation
02	201/04/28	- New motor frame sizes K8K. 90..-100..-112.. - Constructive variation on motor size 132.. - New design of motors with efficiency class IE2 and IE3. - New additional code for motors with efficiency class IE2 and IE3. - Reassessment for temperature class T5 for standard motors series K8K. 90÷315 at Ambient Temperature +40°C - Upgrading the name-plate - Reassessment of all motors on basis of the new standard IEC 60079-7 Ed. 5th: 2015..
01	2016/07/04	- New terminal blocks KM5, KM8, KM12 - New multicore bushing type RSM - New temperature class T5 for motors type K8K. 132MX4 - New type of protection "tb" in accordance to EN 60079-31: 2014 Standard - Updating to new standard edition EN 60079-1: 2014
00	2015/30/03	First issue of certificate CESI 15 ATEX 017X

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ELECTRIC DRIVES

FOR EVERY DEMAND



Operating and service instructions

Explosion-protected motors

Type of protection flameproof enclosure "d"

Series K8K. 71-315

1. General

These instructions relate to IEC compliant explosion-proof (flameproof enclosure Ex d) low voltage fully enclosed squirrel cage induction motors with ribbed frames in sizes 71-315. Series, version and type can be determined from the motor designation. The designation consists of a combination of letters and

numbers the meaning of which is defined in an internal manufacturer's standard. All installation and maintenance work must be carried out by authorized personnel only. In particular, the provisions of Directive 2014/34/EU, the standards of series 60034 and 60079 and the national regulations must be observed.

Motor designation

A	B	C	D	E	F	G	H
(IE3-)	K	8K	R	225	M6	Ex de IIC T4	KR

In the basic version, motors are designed with an IP 55 protection rating. This protects users from contact with live parts and moving internal components, as well as protecting against harmful dust deposits and water jets from all directions. The protection rating is marked on the motor nameplate, and should be taken into account when installing the motor in its operating position. Motors can be designed with other protection ratings, most commonly IP 56, IP 65 and IP 66.

2. Transportation and storage

Motors should be transported so as to exclude the possibility of damage, i.e., positioned as they were in the original shipping packaging. It is recommended that they be stored in a dry and sheltered area, away from potential corrosive hazards. In the event of prolonged storage, the rotor should be turned through one complete revolution by hand at least once a year. If more than 3 years have elapsed from the date of delivery and the motor has not been put into operation, the bearings should be replaced, or, if the original ones are used, they should be re-greased, as described in section 6. The motor must be handled properly when in storage, using the lifting lugs provided or a pallet system.

3. Installation in operating position

Motors with legs should be placed on a hard surface in accordance with their size and the IEC/EN 60034-7 requirements, and fixed with bolts. Flange-mounted

Designation

- A** Efficiency - IE Classification
(IF IE2, IE3 is defined)
- B** Motor type K-induction motor, B-motor with brake
- C** Version (8) and series (K) designation
- D** Cooling type R-IC411, O-IC 410, F-IC416
- E** IEC size 71-80-90-100-112-132-160-180-200-225-250-280-315
- F** Frame size and number of poles
- G** Types of ignition protection
- H** Special model

motors are fastened with bolts directly to the counter-flange of the device that they drive. Immediately prior to installation, remove the protective sleeve from the drive shaft.

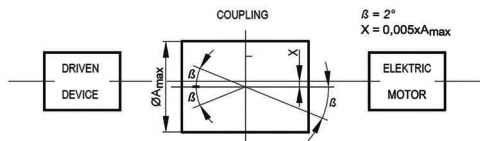
Motors must be installed so as to insure sufficient space for ventilation and heat dissipation. The minimum distance between the fan cover intake or the intake/exhaust hood and any obstacles must not be less than the rated axial motor height in mm.

The motors are applicable for both outdoor and indoor mounting for operation in environments of moderate humidity and low corrosive aggressiveness, within the temperature range of -20 to + 40 °C, up to 1000 m above sea level. They should be installed in a closed, clean space. In the event of reduced cooling conditions due to increased ambient temperature or higher altitudes, motor power should be adjusted according to the following table:

Temperature of cooling air	30 °C	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C
Motor power as % of rated power	100 %	100 %	100 %	96 %	91 %	86 %	80 %

Altitude above sea level (m)	2000	3000	4000
Motor power as % of rated at air temperature of 40°C	92 %	84 %	78 %
Rated motor power at temperature of cooling air	32 °C	24 °C	16 °C

Motors made with winding protection for tropical conditions are labelled „TROPICALIZED“. Prior to each installation of the motor, checks should be carried out for possible damage as well as for any possible adverse environmental conditions that might affect proper operation. When mounting the motor on transmission units or machines, avoid impacts and forces, particularly along the motor drive axis, as this may lead to bearing damage or permanent damage of the safety features in motors with type of protection flameproof enclosure „d“. If necessary, ask the manufacturer for information about permitted radial and axial forces on the drive end of the shaft, depending on the installation position. All fixing bolts should be tightened with adequate tightening torque in order to ensure smooth operation of the motor without vibrations, deformations or oversteering. Ensure that these bolts are protected against loosening. Where torque is transferred by means of rigid couplings, ensure required coaxial alignment with the drive shaft during installation (according to the diagram). Where belt transmissions are used, pay attention of the belt tension force and if it is aligned right-angled to the drive shaft.



Motor rotors are dynamically balanced with a half-key according to ISO 8821, therefore all components mounted directly on the motor drive shaft should be dynamically balanced in the same way.

4. Mains connection and safety/protection measures

Before connecting the motor to the electrical network, special attention should be paid to the following:

- Whether the data on the motor nameplate matches the voltage and frequency of the network
- Whether the connections have been made according to the appropriate connection diagram enclosed in the motor terminal box and/or the data on the motor nameplate and the characteristics of the network itself (in the case of a Y/D start, the relevant links must be removed from the motor terminal plate!)
- Whether protection from live parts has been ensured in accordance with local safety regulations. The earthing cable should be connected to the designated point inside the terminal box and the motor should be earthed via the earthing bolt, situated on the exterior of the frame. The cross sectional area of the earthing conductor must be greater than or equal to that of the phase conductor. Depending on the cross-sectional area of the motor's power supply, the cross-sectional area of the earthing conductor has to be measured as follow:

Prime conductor cross section	Earthing conductor cross section
$\leq 4 \text{ mm}^2$	$\geq 4 \text{ mm}^2$
$4 \text{ mm}^2 - 25 \text{ mm}^2$	Same or larger cross-section
$25 \text{ mm}^2 - 50 \text{ mm}^2$	$\geq 50 \text{ mm}^2$
$\geq 50 \text{ mm}^2$	$\geq 50 \% \text{ cross section}$

- That all applicable safety procedures are observed in accordance with the system used for protection against electric shock
- That the inside of the motor terminal box contains no dirt, particles of conductive material or similar
- That all connections on the motor terminal plate are firmly tightened. Max. tightening torques are: M4 – 2Nm, M5 – 2,6Nm, M6 – 5Nm, M8 – 9Nm, M10 – 15Nm, M12 – 24Nm and M16 – 34Nm and terminals 0,45 Nm
- That the power cable (and any auxiliary circuit cables) are appropriately sealed at the cable glands of the motor terminal box
- That appropriate protection against short-circuit and overload is provided (fuses, bimetal relays, thermal protection, etc.)
- That the connection of the electrical motor to the network is made with a cable of suitable dimensions and thermal stability
- That anti-condensation heaters are supplied by a separate cable from that of the motor power supply. Ensure that the supply voltage matches that specified on the nameplate. Heaters must not operate while the motor is running.
- Instructions for accessories (e.g., encoder, brake,...) can be found on the manufacturer's website.

Motors with the nameplate data D/Y 400/690 V can be connected to a three-phase 400 V network in a delta (D) connection, according to the wiring diagram enclosed in the terminal box.

Motors with the same data can also be connected to a three-phase 230 V network, but in a delta connection (D). In general, motors are connected to the supply network via a three-pole switch or a three-pole circuit breaker.

When starting via a star - delta (Y/D) switch, the connection of the motor winding to the rated voltage must be delta (D). In this case starting current amounts to 1/3 of the current in direct connection, but it should be taken into account that the same goes for the starting torque, i.e. only motors with no load should be started this way. Two-speed motors with Dahlander connection (speed ratio 1:2) are started by means of a special switch.

Two- and multi-speed motors are connected to the network according to the connection diagram in the motor terminal box, with adequate protection against short circuit and overload.

In general, three phase motors are designed in accordance with IEC/EN 60038 and can operate without problems at rated power and torque values with variations in network voltage of $\pm 10 \%$ and frequency

of +3/-5 % of the rated value. If the voltage deviation is greater, the motor should not be loaded with the rated torque, but rather the torque should be adjusted in proportion to the deviation in voltage.

When selecting the frequency converter for variable-speed drives, the recommendations of the standard IEC / EN 60034-17 must be taken into account.

To supply the motor, it is desirable to use a frequency converter (rotational speed regulator) equipped with an output dU/dt filter, in order to ensure the long life of the motor winding.

In such cases, it is useful to consult the manufacturer regarding the motor operating characteristics and the regulation range.

If the motor has built-in anti-condensation heaters, they are to be connected according to the attached connection instructions and energized when the motor is not running.

5. Change in direction of rotation and number of starts/reversals

Motors of standard design have a clockwise direction of rotation when viewed from the drive end of the shaft, and are connected according to the enclosed instructions. The direction of rotation is usually changed by changing the sequence of connection of the two supply phases. With frequent changes of direction of rotation, use a special switch for reversing whilst respecting the permissible number of reversals per hour for a particular drive and load (if necessary, consult the manufacturer). The same is true for the allowed number of starts, in order not to thermally overload the motor.

The direction of rotation in single phase motors is changed by swapping the connections of either the main or the auxiliary phase. The rotor must be at a standstill before reversing.

6. Maintenance

The motors are designed so that they are easy and simple to maintain. If properly installed and electrically/thermally protected, they should work for many years. Periodically, the exterior should be cleaned. If operation is in an environment where particles are likely to obstruct the ventilation openings on the fan cover or fill the spaces between the cooling fins, these should be cleared with compressed air or removed with a brush.

Where any deviation from the rated values or irregular motor operation occurs, it must be carefully inspected to determine the cause (e.g., increased current, temperature rise above the permitted value for the declared insulation class, increased vibration, unusual noise, increased presence of insulation odour, activation of the motor protection or similar).

If these are caused by the motor, repair should be performed by authorized and experienced personnel. For spare parts, contact the manufacturer, referencing the motor type identifier and the code number on the motor nameplate (see ordering instructions).

Motor bearings used in standard installations (2Z or 2RS) are single-row ball bearings with C3 clearance,

and are listed in the table below. The bearings have lifetime lubrication. Replacement of the bearings in case of defect, noise, or as part of regular servicing should be performed with prescribed tools/devices without use of excess force or impacts.

For bearings supplied with the option of additional lubrication, lubrication intervals are given in the diagram provided. During an overhaul, these bearings are removed from the shaft in the prescribed manner, and lubricated with an appropriate grease so that the grease fills approximately 2/3 of the bearing's free internal space. Otherwise, lubrication can be performed during operation via the grease nipples on the bearing shields, by using a hand pump to ensure consistent greasing. Depending on the size of the motor (usually 132-315), for each lubrication about 20 – 40 grams of grease should be injected. The recommended grease types are SKF LIS-2 (INA), Shell Alvania G3, ESSO UNIREX N3, and all other lithium soap based lubricants with a drip temperature of 180 °C - 200 °C and a range of use from -20 °C to +150 °C.

Motor size	Bearing type on both sides for K8K series
71	6203 – 2Z oder 2RS
80	6204 – 2Z oder 2RS
90	6205 – 2Z oder 2RS
100	6206 – 2Z oder 2RS
112	6306 – 2Z oder 2RS
132	6208 – 2Z oder 2RS
160	6309 – 2Z oder 2RS
180	6310 – 2Z oder 2RS
200	6312 – 2Z oder 2RS
225	6313 – 2Z oder 2RS
250	6314 – 2Z oder 2RS
280	6316 C3
315	6319 C3

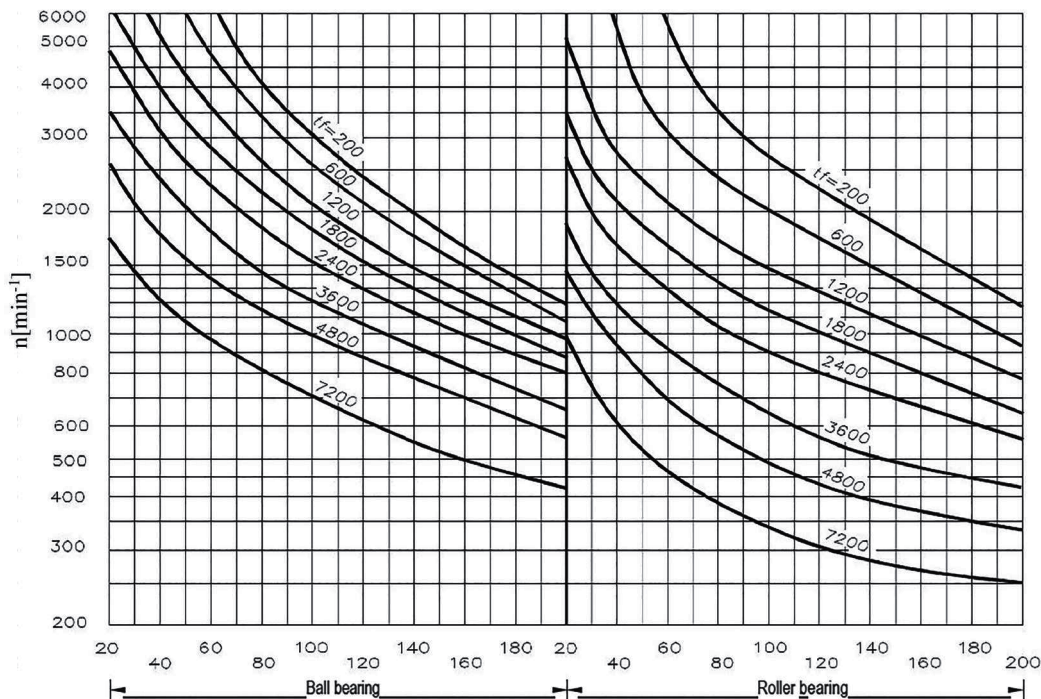
For motors of sizes 132 – 315, on special request, NU series single-row roller bearings can be installed.

Note

- The table applies to all polarities of single- and multi-speed motors and all positions/ mounting arrangements according to IEC/EN 60034-7.
- Nominal bearing life under normal operating conditions is a minimum of 40 000 hours of operation for

4-, 6- and 8-pole motors and a minimum of 25 000 hours of operation for 2-pole motors connected to a 50 Hz supply network.

Diagram for determining the interval for additional bearing lubrication



Recommended lubrication intervals are marked on the additional nameplate of each motor.

It is important to note that the amount and types of grease, as well as the recommended intervals listed on this plate, are based on average use. If the motor is operating in conditions of increased dirt, corrosion, abrasive dust, heavy shock loads and/or vibration, lubrication intervals should be at least halved or reduced even further, depending on the severity of these conditions. Also note that excessive injection of grease into the bearings can cause overheating of bearings, premature degradation of the grease, and seized bearings. When performing lubrication, run the motor for 15 minutes with the grease cap removed. This will allow excess grease to drain.

With every disassembly of the motor, we recommend installation of new shaft seals and seals ensuring the protection level of the motor.

7. Basic Designation of motors from the product range

Each motor from the product range is equipped with a nameplate that provides basic information about the product as well as rated electrical data for the product in question.

		VEM motors GmbH D-38855 Wernigerode			
Code 1743851 N° 883382 03/19 23,5 kg					
3-Mot IE3-K8KR 90L2 ExdellCT4 AL SW TPM B3					
Ta 40 °C IC 411 CLF Rise B IP55 IE3-85,9%					
Hz	kW	V	A	cosφ	rpm
50	2,2	D 400	4,6	0,8	2875
50	2,2	Y 690	2,65	0,8	2875
3PTC T130 20262468					
© DE/NDE 8205 E2 2ZC3 S1			IEC/EN 60034		

Basic motor nameplate

The following data can be found on the nameplate:

Code	Motor number used for identification during the production process. During maintenance it is used as the basis for ordering spare parts for the motor in question
N°	Serial number of the motor and date of manufacture
~	Number of motor phases (1 – one-phase, 3 – three-phase)
Type	Type designation of motor as explained in the introductory section of this manual in combination with the type of installation of the motor (B3, B5, B14 ...)
V, Hz	Network voltage and frequency and connection type for which the motor is designed. Rated data when loaded at rated power defined in the kW section
A, rpm	Rated current, Rated speed
cos φ	Rated data for the motor when loaded at rated power
Ta	Ambient temperature for which the motor is manufactured and at which it may be loaded at rated power
CI	Insulation system used in the motor (F – maximum permitted temperature 155 °C, H - 180 °C)
IP	Protection level provided by the housing and bearing shields in respect of ingress of water and dust
S	Mode of operation for which the motor is designed (S1 – S10)

The second-last line on the nameplate contains data on installed auxiliary equipment:

- For motors with Ex protection, data on installed protection components (PTC...),
- For motors with heaters – heater power and voltage,
- For motors with installed external ventilation set – fan voltage and power..

For motors with a nameplate listing a range of voltages, or Ex d motors running in frequency converter mode, the columns contain data on individual rotational speeds and the corresponding rated data. Additional information can be found on the nameplates, such as:

IC	Type of motor cooling (IC 411 – own fan, IC 410 - no ventilation...)
Therm.	Information about the rated temperature rise of the motor at rated data (B - 80K, F - 105K at ambient temperature of 40 °C); example 155 (F/B), 180 (H/F)
CI	
DE/NDE	Information about the installed bearing type

Motors for variable speed drive

This series of motors K8KR 71-315 is designed and tested in accordance with IEC 60034-1 and can work over the static frequency converter under conditions in accordance with IEC 60034-25 in regulation range from 5 to 87 Hz for motor polarity 2p=2 and for other polarities in regulation range from 5 to 100 Hz. Motors suited for supply over static frequency converter have in their winding built-in thermal protection. The static frequency converter itself is situated outside of dangerous zone. On additional name plate are characteristics of motors for different frequency.

		VEM motors GmbH D-38855 Wernigerode			
Code 1743851 N° 883382 03/19 23,5 kg					
3-Mot IE3-K8KR 90L2 ExdellCT4 AL SW TPM B3					
Ta 40 °C IC 411 CLF Rise B IP55 IE3-85,9%					
Hz	kW	V	A	Nm	rpm
10	0,3	D 80	4,15	5,1	575
20	0,88	D 160	4,6	7,3	1150
50	2,2	D 400	4,6	7,3	2875
80	2,2	D 400	4,6	6,1	3450
3PTC T130 20262468					
INVERTER FEEDING (FOR VSD) S1			IEC/EN 60034		

Basic name plate Ex motors for variable speed drive motors

For using motors in different drive conditions than on name plate (loads or voltage or frequencies) it is necessary to contact manufacturer.

Nameplates are usually riveted to the main motor housing; where this is not possible, they are placed either on the fan cover or in the case of single-phase motors on the plastic enclosure, or in a location where the legibility of the data is assured.

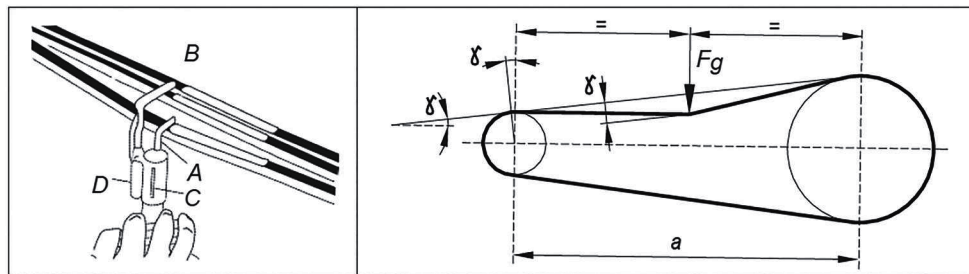
When ordering spare parts for the motor, the most important information is the listed motor code and, of course, details of the part that needs to be replaced during servicing or regular maintenance.

An exploded-view drawing of the motor as well as ordering information is supplied with these instructions.

Inspection of the belt drive

Where a belt drive is employed, it should be regularly inspected during initial hours of operation. The drive belt should be checked and re-tightened – if necessary – after an operating period of between 0.5 and 4 hours

under full load, and then at intervals of about 24 operating hours.



Checking the belt tension is done on the basis of the deflection caused by the force F_g . To measure the deflection, position the measuring gauge with load hook A in the centre of the belt path. Set the trailing pointer to zero. Apply test force in accordance with scale C. To do this, pull the measuring gauge away from the belt at an angle of 90 degrees. Read the depth of the impression on scale D of the trailing pointer.

Relation between the tension force F_p , the pulling force

F_g and the deflection can be expressed according to the following approximating formula:

$$F_p = 0,25(a/f)F \cos \gamma - (10 \dots 20)N$$

Value of force F_g for belts is determined according to their cross-sectional area, where the deflection is not less than $f > 0.016a$ (a – distance between axis), for belts in Table 1.

Table 1

Amount of tension force F_g

Belt cross-section	SPZ	SPA	SPB	SPC	Y	Z	A	B	C	D	E
$F_g[N]$	25...27	45...50	75	125...140	13	24	40	70	120	240	360

If necessary, properly set the belt tension until the specified depth of impression „f“ is achieved. If the drive belt is not properly tightened, the result will be inadequate power transmission and premature failure of the drive belt. Excessive tension can be an additional cause

of damage to the bearings. When tightening the belt, make sure that the lateral alignment of the belt does not deviate more than 1 degree.

8. Special operating and service instructions motors of series designation K8KR 71-315 with ex protection by flameproof enclosure "d"

For motors of this series, a „Manufacturer's Declaration“ is issued as evidence of inspection and testing, as well as manufacture in accordance with the certified documentation.

- Motors must be installed and used in accordance with the relevant regulations for explosion protection taking into account the classification of hazardous areas, areas of application, temperature class and explosive groups of flammable substances,

- in accordance with information given on the motor nameplate and the explosion protection plate. Motors with Ex protection „d“ can be supplied via a static frequency converter under the conditions described in IEC/EN 60034-17. In that case, motors must have thermal protection built into the stator winding. These motors also have a multi-voltage plate defining the regulation range and the required torque/power reduction depending on the operating conditions. If in doubt, consult the manufacturer.
- Connections must be made using the cable entry, in accordance with the applicable standards. Cable entries must be made without modifying the specific characteristics of the type of protection as defined

in the IEC/EN 60079-1 standard for Ex d motors (protection by flameproof enclosure) and the IEC/EN 60079-7 standard for Ex d e motors (protection by increased safety).

Where the cable is inserted using a cable gland, it is necessary to properly select a gland appropriate for the type of plant and type of cable. Cable glands must be fully tightened so that the sealing rings ensure appropriate pressure:

- to prevent transmission of mechanical stress to the motor terminals
- to ensure a degree of mechanical protection-grade of the terminal box.

Cable entries to Ex d terminal boxes must be made using Ex d cable glands, certified in accordance with the IEC/EN 60079-0 and IEC/EN 60079-1 standards and ATEX Directive (2014/34/CE). Furthermore, they must be made with a minimum protection rating of IP 55. For Ex d e terminal boxes, Ex e cable glands, certified according to ATEX class IEC/EN 60079-0 and IEC/EN 60079-7, must be used.

Furthermore, they must have a minimum protection rating of IP 55.

- Overload protection in the control box (on installations), should be set in accordance with the IEC/EN 60079-14 standard.
- All motors must be equipped with appropriate cable glands in accordance with the requirements of the relevant standards. For cable glands with cylindrical threads, protection against unfastening is achieved by a nut on the inside of the housing (counter-nut) or the appropriate thread lock, e. g. (LOCTITE 243). The motors are delivered from the factory with no thread lock and the responsibility for securing the gland against loosening lies with authorized personnel during motor installation.
- Cable entry is normally achieved with glands Mxx x 1.5 according to the table. In other cases, refer to the nameplate or the manufacturer's declaration.

IEC motor size	Series K8K	
	Number of glands x gland size	Diameter of the connection cable M (mm)
71	1 x M20 x 1.5	6 – 12
80	1 x M20 x 1.5	6 – 12
90	1 x M20 x 1.5	6 – 12
100	1 x M25 x 1.5	13 – 18
112	1 x M25 x 1.5	13 – 18
132	1 x M32 x 1.5 + plug	18 – 25
160	1 x M32 x 1.5 + plug	18 – 25
180	1 x M40 x 1.5 + plug	22 – 32
200	2 x M40 x 1.5	22 – 32
225	2 x M50 x 1.5	29 – 38
250	2 x M50 x 1.5	29 – 38
280	2 x M50 x 1.5	29 – 38
315	2 x M63 x 1.5	34 – 44

- Where motors are supplied with threaded holes for attaching cable glands and sealed with plastic plugs to protect the thread, the authorized installation contractor shall install certified cable glands in those holes, and, if there are any extra holes, close them with certified plugs according to the relevant regulations. Motor connections should be made using insulated terminals.
- In case of assembly and disassembly of the motor, existing mechanical protection must be provided (use of sealants on joint seals, coating of screw joints with thread lock, lubrication of bearings, lubrication of shaft seals,...)

Specifics regarding the „X“ mark on the certificate designation

Given the specific issues concerning limitations on use, installation and maintenance of Ex motors from our product range and the inability to list them all here, we ask that users, or authorized equipment installation contractors, study the Manufacturer's Declaration that lists all limitations for the relevant product (motor). Servicing these motors must be performed by the manufacturer or repairers appearing on the list of approved repairers. In other countries, repair service providers should be employed in compliance with local regulations.

Without special written permission from the manufacturer, any intervention which has or may have an impact on the motor's explosion protection (either in or out of warranty) is performed exclusively at the risk of the person performing such an action.

This particularly applies to the following:

- When work is carried out on protective systems of Ex d protected motors it is necessary to seek guidance (and gap dimensions) from the manufacturer since the openings are smaller than those specified in the IEC/EN 60079-0, -1 standards.
- For motor series K8K. 71 – 112: The supply cables of motors for the ambient temperature of + 60°C shall be suitable for an operating temperature equal or greater than 85°C, for ambient temperature +80°C supply cable shall be suitable for an operating temperature equal or greater than 105°C.
- For motor series K8K. 90 – 315: The supply cables of motors size 315LB, motors without terminal box and motors for the ambient temperature + 60° C shall be suitable for an operating temperature equal or greater than 92° C.
- For motors K8K 71 – 12: The screws used for fastening the parts of motor enclosure, shields and terminal box shall have a yield stress higher than 800N/mm².
- For motors K8K 90 – 315: the screws used for fastening the parts of motor enclosure, shields and terminal box shall have a yield strength equal or higher than:
 - 800 N/mm² for motors size 90, 100, 112, 132, 160, 180, 280 and 315
 - 1200 N/mm² for motors size 200, 225 and 250.
- Connections terminating in motors with direct entry must be connected to a terminal box with one of the types of explosion protection indicated in IEC/EN 60079-0 or outwith the hazardous area. For motors with direct entry, the connection of the motor winding tails must be made in a terminal box with one of the types of explosion protection indicated in IEC/EN 60079-14 or outwith the hazardous area. The cable from the entry into the motor to a connection point outwith the hazardous area must be adequately mechanically protected (minimum IP 20).
- The flamepaths are specified in manufacturer drawings. For information regarding the dimensions of flameproof joints the manufacturer shall be contacted.
- Concerning operation via a frequency converter: The motor is compliant with IEC/EN 60034-25, and is capable of operating via a frequency converter ($2p = 2$; 5 to 87 Hz and $2p = 4, 6, 8$; 5 to 100 Hz). $3 \times \text{PTC} - 130^\circ\text{C} \pm 5^\circ\text{C}$ (T4) or $150^\circ\text{C} \pm 5^\circ\text{C}$ (T3) threshold temperature sensors (depending on the temperature class) are built into the motor winding according to the IEC/EN 60034-11 standard. The characteristics of thermal probes are compatible with the requirements of the DIN 44081/44082 standard. Diagram M/Mn and the data on the name plate give the range of speed regulation and the associated reduction of torque and power of the electric motor. To protect the electric motor from overvoltage and excessive voltage increase rate, the converter employed must comply with the requirements specified

in the IEC/EN 60034-25 standard. Protection of electric motor from short-circuit and earth fault must be implemented by means of a protective device inside the frequency converter itself.

Ex motors must be protected against overload by automatic supply cut-off using a countdown device or using a device that directly controls the temperature through temperature sensors built into the winding. The motor terminal box must be closed before starting the motor.

For Ex d type terminal boxes

lightly lubricate the machined surfaces of the openings, position the cabinet cover and tighten the connecting bolts with the following torque:

Table of tightening torques for cabinet covers

Bolt size	M6	M8	M10	M12
Torque	10 Nm	23 Nm	35 Nm	80 Nm

For Ex e type terminal boxes

Check the gasket for damages, wipe the mating surface between the gasket and the terminal box and tighten the connecting bolts until the gasket is firmly pressed against the surface, ensuring a tight seal.

Checks and maintenance of the explosion-proof motor should be carried out in accordance with the criteria in the IEC/EN 60079-17 standard. Electrical connections must be fully tightened to avoid large contact resistances and consequent overheating.

It is necessary to pay attention to maintaining insulation distances in the air and over surfaces between conductive elements, as defined in the standards.

All bolts used to secure the motor and terminal box must be tightened using the tightening torque values, as defined in the **table of tightening torques for cabinet covers**. All bolts for securing the motor and terminal box must be fully tightened.

Replacement of the gaskets and cable entry parts should be performed using components identical to those supplied by the manufacturer in order to ensure that the protection-grade rating is maintained.

Surfaces around openings must not be machined, and no gaskets other than those supplied by the manufacturer should be inserted. These surfaces must be kept clean. Apply a thin layer of grease to protect against corrosion and to prevent water from entering. This layer of grease must be renewed after each disassembly. The motor should be cleaned of any accumulated dust and other impurities at regular intervals (depending on conditions), in particular the openings on the fan cap and the air ducts, in order to ensure sufficient air flow for proper cooling during motor operation (make sure that there is no accumulated dust between the ribs, under the protective cover and, if present, it should be removed).

Labelling of explosion-proof motors

Alongside the basic nameplate described in section 7 of these instructions, each explosion-proof motor has an additional nameplate on its housing, containing information about the type of explosion protection.

Explosion-proof motors with protection by flameproof enclosure Ex d

Nameplate for Ex d(e) motors with CESI certificate

The following data is to be found on the nameplate:

Code	Motor number, used for identification during the production process as a basis for ordering spare parts for the motor during maintenance
N°	Serial number
Type rating	Reference number of the manufacturer's declaration of conformity with the certificate
Type Protection	Motor type designation Type of explosion protection

9. Possible Faults and operational disruptions with squirrel cage induction motors and their remedies

Fault/Disruption	Possible Cause	Remedy
Motor cannot spin up, there is no noise at all or there is strong humming	- Supply interrupted, one supply cable interrupted, e.g. a fuse - Interruption in the stator winding circuit, Y/D switch, protection failure - Damaged bearings - Improper connection - Auxiliary or main phase interrupted	- Check fuses, motor switch, contactor, fuses... - Disconnect supply cables, check the winding on terminal plate terminals, check electrical protection elements - Replace bearings - Connect motor according to the appropriate instructions - Repair or replace windings
Motor cannot spin up under load or spins up only with difficulty, rotational speed under load drops suddenly	- Excessive counter-torque from load (overload) - Motor intended for D connection, but is connected in a Y arrangement - Network undervoltage - Fault in supply - Rotor rods or shorting ring interrupted	- Adjust torque in accordance with the motor size - Ensure the proper motor connections - Stabilize network voltage - Check that the supply is correct - Replace the rotor
When starting, the fuse blows or circuit breaker trips	- Cabling from the protective switch to the motor has shorted - Two phases of the stator winding are shorted or have a connection to ground - Incorrectly selected electrical protection	- Separate and insulate cables - Disconnect motor from supply – motor needs rewinding - Ensure that protection is properly chosen
The motor gets too hot when running, scratching noises, motor protection trips after some time	- Motor is overloaded (Klixon trips on single phase motor) - Supply overvoltage or undervoltage - Frequency of starts too high - Motor working in single phase - Rotor scratching the stator	- Measure the motor current. If much greater than the rated value, remove the cause of the overload - Stabilize supply voltage - Reduce the number of switching operations - Check cables - Repair the rotor or motor

Fault/Disruption	Possible Cause	Remedy
The motor is very warm even when idle, drawing a large amount of current, humming (one phase motors – thermal protection trips)	– Wrong stator winding connection – Network overvoltage – Inadequate cooling – Connection between windings or to earth	– Properly connect the motor according to the nameplate data and the relevant instructions – Stabilize network voltage – Provide uninterrupted airflow to and around the motor – Replace windings
Increased and abnormal noise during motor operation	– Electrical issues – Damaged bearings – Damage to gear to which the motor is connected – Rotor imbalance – Insufficient fixing of the base or the flange – Brake disc scratching	– Consult the manufacturer – Replace bearings – Check gear – Perform additional dynamic balancing of rotor or drive – Tighten the appropriate bolts with the prescribed torque – Check opening or lining wear

10. Motor lifetime

- Under normal conditions of use anticipated in the operating and maintenance instructions, and with regular maintenance, the expected life of the motor will be significantly prolonged.
- The manufacturer ensures the availability of spare parts for a period of up to 7 years, including the warranty period. Service by the manufacturer is also possible for products older than 7 years, under special conditions
- All product documentation is available for 10 years following the end of production
- We use environmentally friendly packaging materials that can be reprocessed (recycled), discarded, or destroyed with no damage to the environment. To this end, the packaging materials have been appropriately labelled.

11. Warranty claims

Shortcomings in operation or damage occurring to products within the warranty period should, if they are caused by a defect in material or manufacturing quality, be reported to the manufacturer, with the following data indicated:

- Number of the dispatch note or invoice under which the product was delivered
- Catalogue information for the defective product (serial number and code number)
- Reason for the claim, description of the defect, with photograph or video attached

Note:

We cannot accept a description stating "Not working"; instead, the specific problem should be described. Defects in operation or damage caused by improper

and careless use during transportation/storage/commissioning are not considered to justify warranty claims within the warranty period. The same holds true if, prior to shipment to the manufacturer, the product has been disassembled during the warranty period.

12. Declaration of warranty

The warranty is valid for 12 months in accordance with the General Conditions of Sale or as defined in the agreement, and runs from the date of sale/delivery of the product. The buyer is obliged to comply with the operating and maintenance instructions supplied with each product.

In the case of warranty claims and requests for return of a delivered product, the buyer is obliged to provide the dispatch note or invoice under which the product was purchased, which also serves as the warranty document.

If an inspection determines that the cause of the failure is a defect in the product within the warranty period, then, in accordance with the warranty, all service costs will be borne by the manufacturer. If an inspection establishes that the cause of the failure is a defect in the product outwith the warranty period, the service costs will be borne by the customer.

13. Replacement parts

All listed standard parts are different according to motor, size, model series and potential special features.

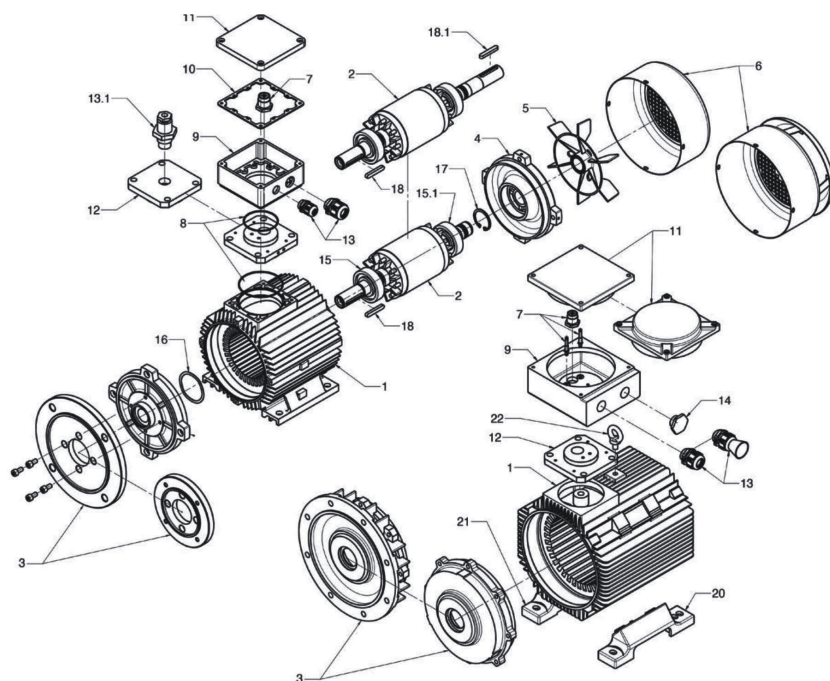
To enable us to exactly identify the spare part, please specify the following data in your order:

- Name and position number of the spare part according to list and exploded drawing
- Type name of the motor
- Motor item number

Example

Pos. 5 Fan impeller 71B 2; B3 A500201

Pos.	Name
1	Wound stator
2	Rotor (half-key balanced)
3	DE shield - B3, B5, B14
4	NDE shield
5	Fan
6	Fan cover
7	Bushing insulators
8	Terminal box O-seal
9	Terminal box
10	Terminal box lid O-seal
11	Terminal box lid
12	Lid
13	Cable gland
13.1	Cable adapter
14	Plug
15	Bearing DE
15.1	Bearing NDE
16	Resilient preloading ring
17	Circlip
18	Shaft key
18.1	Shaft key NDE
20	Frame foot, right
21	Frame foot, left
22	Lifting ring





ELECTRIC DRIVES

FOR EVERY DEMAND

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ELECTRIC DRIVES

FOR EVERY DEMAND

Recommended Spare Parts List

1 Set of:

Bearings

Fan

Terminal block