Main Motor Data Sheet and Curve

Purging for motor is not acceptable.

PURCHASER'S COMMENT/APPROVAL STATUS		Purchaser: NARGAN
1	AP: Approved (Released for Manufacturing)	
2	AN: Approved With Minor Comments (Fabrication may Proceed)	Requisition No.: DPIC98-12-001-000-ME-MR-4150-0001-D1
3	NF: Approved With Comments (Fabrication not Proceed)	
X	RJ: Rejected	Item No. (Tag No.): PK-6101
5	NR: Not be Returned	
Date: 29.08.2022	Signature: A.AB	Vendor Doc. No.: DPIC9812-000-VD-1002-ME-DS-0042

REV.	DATE ISSUE	Purpose of Issue	PREPARED	CHECKED	APPROVED
D2	20-July-22	IFA	P.Sh	E.S	N.S
D1	21-Feb-22	IFA	NA.PR	M.M	A.V
D0	23-Jan-22	IFA	NA.PR	M.M	A.V

KASRAVAND Engineering & Construction

Page	Rev-D0	Rev-D1	Rev-D2	Rev-D3	Rev-D4
1	x	x	x		
2	x	x	x		
3	x	x	x		
4	x	x	x		
5	x	x	x		
6	x	x	x		
7	x	x	x		
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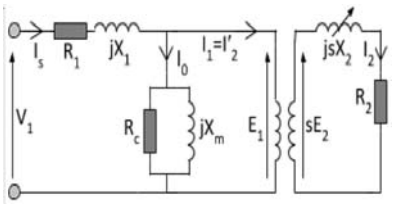
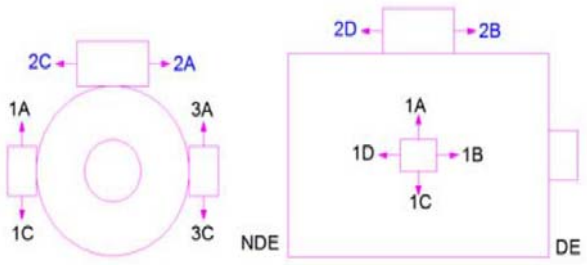
MV MOTOR Data Sheet FOR ZONE 2 + H2 PRESENCE			
APPLICABLE TO:	[ ] PROPOSAL	[X] PURCHASE	[ ] AS BUILT
A:	**MOTOR MAIN DATA**		
1	ITEM : **CM-6101A & CM-6101B**	QUANTITY: **2**	
2	GENERAL FEATURES ACCORDING TO : **IEC Standards - IPS Standards - ISO Standards** **DPC-EL-SPC-0020- Medium Voltage Motor Specification**		
3	MOTOR TESTING ACCORDING TO: **IEC Standards - IPS Standards**		
4	RATED POWER : **1340** kW	NUMBER OF POLES : **2** N°	
5	RATED VOLTAGE : **6 kV ± 5%**	NUMBER OF PHASES : **3** N°	
6	RATED FREQUENCY : **50 Hz ± 2%**	POWER FACTOR REQUIRED: **cosϕ≥ 0.85**	
7	FRAME SIZE: **450**	CONNECTION TYPE: [**X**]STAR [ ] DELTA [ ] WYE	
8	TYPE OF DUTY: CONTINOUS (S1) [ ] FOR EXTRUDER	[X] OTHERS: **Screw Compressor**	
9	DIRECTION OF ROTATION (seen from shaft end): [**X**] CLOCKWISE [ ] COUNTER-CLOCKWISE [ ] BOTH		
10	NAME PLATE INCLUDES FOLLOWING ITEMS: [X] 1.IP classification 2.Bearing and lubrication references 3.Purchase order number and year of manufacture 4.Weight 5.Type of protection (for safe use in hazardous areas) 6.Apparatus group 7.Temperature group 8.Temperature classification 9.Certification mark and certification number **10.Rated voltage, current, PF and efficiency**	FAULT LEVEL: **#** ……	
11	COOLING:[ ] WATER COOLED TYPE: **IC611** [**X**] FAN COOLED, TOTALLY ENCLOSED TYPE:……		
12	**MOUNTING ARRANGEMENT:** **(Note 2)**		
13	[ ] CODE 1 [**X**] IM B3	[ ] IM B5	[ ] IM B7
14	[ ] CODE 2 SPECIFY: ……		
15	**ENCLOSURE: (Note 3)**	MANUFACTURER: **HELMKE**	
16	[ ] IP44 [X] IP55 (for MOTOR) [X] IP55 (for T.B.)	MANUFACTURER'S CODE: **NDKK450-02-G**	
17	[ ] OTHERS: SPECIFY	ORDER N°:	
18	[ ] MATERIAL TYPE: **Welded steel**	PROJECT LOCATION: **DEHDASHT (IRAN)**	
B:	**DATA OF DRIVEN MACHINE**		
1	TYPE OF MACHINE: **Screw Compressor**	SERVICE DESCRIPTION: **Propylene Refrigeration Package**	
2	ITEM: **C-PK-6101-1A/B**	MOMENT OF INERTIA AT MOTOR AXIS: **16,0** kg*m²	
3	DATA SHEET: **DPIC9812-000-VD-1002-ME-DS-0041**	STARTING RESISTING TORQUE: **~ 10** %	
4	ORDER AND SUPPLIER: **KASRAVAND**	MAXIMUM RESISTING TORQUE: **960** Nm	
5	INPUT POWER: **1206 kW (input electrical power)**	SPEED: **2950** rpm	
6	MECHANICAL REQUIRED POWER: **1160** kW	CUOUPLING TYPE: [ ] STIFF [X] FLEXIBLE [ ] BELT [ ]OTHER	
C:	**PROTECTION FOR HAZARDOUS LOCATIONS DUE TO GAS AND VAPOURS (Note 3)**		
1	ZONE:[ ] NON HAZARDOUS [ ] ZONE 0	[ ] ZONE 1	[X] ZONE 2
2	EQUIPMENT CATEGORY: [ ] 1G	[ ] 2G	[X] 3G
3	GAS & VAPOURS GROUP: [ ] IIA	[ ] IIB + HZ	[X] IIC
4	TEMPERATURE CLASS: [X] T3 [ ] T4	[ ] T5	[ ] T6
5	TYPE OF PROTECTION:[ ] Ex-d [ ] Ex-de	[X] **Ex-ec** [ ] Ex-p	[ ] Ex-n

D:	**PROTECTION FOR HAZARDOUS LOCATIONS DUE TO DUSTS (Note 3)**		
1	ZONE: [ ] ZONE 20	[ ] ZONE 21	[ ] ZONE 22
2	TYPE OF DUSTS: [ ] CONDUCTIVE	[ ] NON CONDUCTIVE	REFER TO :TM 751.1
3	EQUIPMENT CATEGORY: [ ] 1D	[ ] 2D	[ ] 3D
4	TYPE OF PROTECTION: [ ] Ex-tD	[ ] Ex-pD	SURFACE TEMPERATURE (Tmax.): .....°C
E:	**NETWORK CHARACTERISTICS**		
1	SHORT CIRCUIT CURRENT, R.M.S : 25 /1 kA / s		SHORT CIRCUIT CURRENT, PEAK: kA
2	NEUTRAL STATUS [ ] SOLIDLY EARTHED	[**X**] EARTHED THROUGH RESISTOR	[ ] INSULATED
F:	**MOTOR OPERATING CHARACTERISTICS AND PARAMETERS**		
1	RATED SPEED: **2984** RPM		STARTING TORQUE: **(Note 22)** **0,6** Nm
2	CONTINOUS VARIABLE SPEED FROM/TO **N/A**		BREAK-DOWN TORQUE: **2.50** Nm
3	FULL LOAD AMPERE: **150** A		SLIP AT FULL LOAD:
4	FULL LOAD TORQUE: **4289** Nm		PULL-UP TORQUE (AT RATED VOLTAGE): **0.59** %
5	STARTING CURRENT: **(Note 4) 5,5 x FLA (550% In)**		OPEN CIRCUIT TIME CONSTANT: S
6	STARTING TIME AT FULL LOAD: **3** S		**SYSTEM EARTHING: Grounded trough Resistance**
7	NO LOAD CURRENT: A		Min. GROUNDING CONDUCTOR:
8	**SERVICE FACTOR: (Note 5)** **1**		**THERMAL TIME CONSTANT** .....
9	NOISE PRESSURE LEVEL AT 1 m: **78+3** dB(A) **≤ 82**		COOLING: **176** min
10	NUMBER OF STARTS PER HOUR:LOAD % **100 80**		HEATING: min
11	COLD: **3**		
12	HOT: **2**		**CURVES REQUIRED BASED ON MOTOR SATURATION AT RATED V.**
13	INERTIA CONSTANT (H): **0.52**		[**X**] SPEED VS TORQUE(ALSO AT **80%** RATED VOLTAGE)
14	MOMENT OF INERTIA: **16,0** kg*m²		[ ] SPEED VS POWER FACTOR
15	IMPEDANCE/PHASE: OHM Ucc%		[**X**] SPEED VS CURRENT (ALSO AT **80%** RATED VOLTAGE)
16	ROTOR CLASS		TIME-CURRENT HEATING CURVE: **YES**
17	AC STATOR RESISTANCE: .....OHM AT.....°C		
18	**REACTANCE AND EQUIVALENT CIRCUIT PARAMETERS :**		**DIMENSIONS:**
19	SUB TRANSIENT (X"d):		LENGTH: **3482** mm
20	TRANSIENT (X'd):		WIDTH: **1743** mm
21	SYNCHRONOUS (Xd):		DEPTH: **1848** mm
22	STATOR LEACKEGE REACTANCE X1 : **FOR MOTOR EQUIVALENT CIRCUIT PARAMETERS PLEASE REFER TO ATTACHMENTS**		DISTANCE TO REMOVE ROTOR: mm
23	ROTOR CIRCUIT REACTANCE X2:		NET WEIGHT: **5100±5%** Kg
24	MAGNETIZING REACTANCE XM:		SHIPPING WEIGHT: Kg
25	STATOR CIRCUIT RESISTANCER1 :		ROTOR WEIGHT: Kg
26	ROTOR CIRCUIT RESISTANCE R2 :		MAX. ERECTION WEIGHT: Kg
27	CORE LOSSES RESISTANCE RC : ..... Ω		**STARTING: (Note 8)**
28	**ROTOR RUNNING**		[**X**] DIRECT ON LINE [ ] REDUCED VOLTAGE
29	RESISTANCE ..... REACTANCE:		%TAP:.....
30	OPEN CIRCUIT TIME CONSTANT (T'do):		[ ] LOADED [ ] UNLOADED
31	TRANSIENT SHORT CIRCUIT TIME CONSTANT (T"d):		[ ] N DESIGN [ ] NY DESIGN
32	D.C. SHORT-CIRCUIT TIME CONSTANT (Ta):		
33	**EFFICIENCY, CURRENT AND POWER FACTOR AS FUNCTION OF LOAD**		LOCKED ROTOR POWER FACTOR: **~25 %**
34	LOAD% **100** **75** **50**		**ALLOWABLE LOCKED ROTOR WITHSTAND TIME**
35	EFFICIENCY % /PF **96,1 /0.9** **96,3/0.89** **95,8/0.84**		**VOLTAGE** % **100** **80**
36	CURRENT A **150A** **113A** **80A**		COLD: **35s** **~ 50s**
37	POWER FACTOR % **0,90** **0,89** **0,84**		HOT: **18s** **~ 25s**

G:	MOTOR FEATURES	
1	INSULATION CLASS: [X] F TEMPERATURE RISE AS PER: (Note 20) [X] CLASS B	
2	**MOTOR TYPE:**	**DC EXCITATION**
3	[X] SQUIRREL CAGE [ ] BRUSH-LESS	kW REQUIRED:
4	[ ] SLIP RING [ ] SYNCHRONOUS	V REQUIRED:
5	**DRIVE SYSTEM:**	[ ] BY PURCHASER:
6	[X] DIRECTED CONNECTED [ ] GEAR	[ ] BY MANUFACTURER:
7	[ ] OTHERS ……	DESCRIPTIONS:
8	**BEARING: (Note 9)**	
9	DRIVE END BEARING:	NON-DRIVE END BEARING:
10	BEARING TYPE: **Sleeve bearings with self-lubrication**	**VARIABLE SPEED DRIVE: (Note 10)**
11	LUBRIFICATION: [X] OIL **VG 22 (ISO 3448)** [ ] GREASE	[ ] FOR STARTING
12	LUBE OIL REQUIRED: **3 LITRER FOR EACH BEARING**	[ ] FOR CONTINOUS VARIABLE SPEED
13	**BEARING TEMPERTURE INDICATORS:**	[ ] OTHERS:
14	[ ] N.O. CONTACTS [ ] N.C. CONTACTS	**BEARING TEMPERTURE DETECTORS (Note 11)**
15	[X] SET AT **95°C** FOR ALARM [ ] THERMISTORS	[X] RESISTANCE TEMP. DETECTOR: **PT100**
16	[X] SET AT **100°C** FOR SHUTDOWN	NUMBERING PER BEARING:
17	[ ] DESCRIPTIONS	[ ] RESISTANCE MATERIALS: **Resistance value at 0°C is 100Ω / Platinum**
18	**WINDING TEMPERATURE DETECTORS: (Note 11)**	
19	[ ] THERMISTOR: NUMBER FOR PHASE N°	TEMPERATURE SWITCH: [ ] YES [X] NO
20	[X] TEMPERATUER COEFFICIENT **(PT100) 6 x RTD's Pt100 (TWO PER PHASE)**	RESISTANCE TEMPERATURE DETECTORS: No./Phase **2**
21	[ ] NEG. TEMPERATURE COEFFICIENT	[ ] RESISTANCE MATERIALS **Platinum** [ ] OHM **100**
22	SELECTOR SWITCH AND INDICATOR BY:	[ ] MAX. STATOR WINDING TEMPERATURE:
23	[ ] PURCHASER [ ] MANUFACTURER	ALARM: **135°C** SHUTDOWN: **140°C**
24	**FEEDING CABLE(S):** **3C-185mm2 (1 RUN)**	
25	CABLE TYPE: (CU XLPE INSULATED, ARMOURED, PVC JACKETED)	
26	**VIBRATION: (Note 12)**	**MOTOR DIFFERENTIAL PROTECTION: (Note 13)** **NOT APPLICABLE FOR P<1500KW**
27	[X] VIBRATION GRADE "A"[ ] VIBRATION GRADE "B"	[ ] SELF BALANCED
28	[ ] VIBRATION TRANSDUCERS: **N/A**	[ ] START POINT CT-METHOD
29	MAKE: ……	[ ] CT DESCRIPTION:
30	[X] KEYPHASER LOCATION: **On Motor Shaft N/A**	
31	[X] WIRING UP TO A DEDICATED JUNCTION BOX	
32	**TEWAC & TEIGF MOTORS**	
33	COOLING WATER REQUIRED: …… TEMPERATURE RAISE: ……	
34	PRESSURE DROP: ……	

H:	TERMINAL BOX & COUPLING (Note 14)	
1	**MAIN TERMINAL BOXES (VDE):**	**Connections possible from directions 2A, 2B, 2C and 2D**
2	EXECUTION: **Ex eb IIC IP66**	
3	LOCATION: [X] RIGHT [ ] LEFT	
4	CABLE ENTRY: NO. **1** HOLE(S) **M80**	
5	THREADED: ISO M	
6	**AUX. TERMINAL BOXES (VDE):** **Two Boxes (Space heater&RTDs)**	
7	EXECUTION: **Ex eb IIC IP66**	
8	LOCATION: [X] RIGHT [ ] LEFT	
9	CABLE ENTRY: **1xM20 (Space Heater) + 1xM32 (Windings RTDs)**	
10	THREADED: ISO **M20** **1xM25 bearing RTDs**	
1	**STAR POINT TERMINL BOX (VDE)**	**COUPLING:**
2	EXECUTION:	SUPPLIED BY:

I:	**ACCESSORIES AND VARIOUS**		
1	SPACE HEATERS:N°: POWER: **400** W RATED VOLTAGE: [X]230 V (<3kW) [ ] 400 V (≥3kW) **(Note21)**		
2	NAME PLATES LANGUAGE: **ENGLISH** **Indication as per Std + Degree of Protection**		
3	EXTERNAL COLOUR: **RAL 5010 (GENTIAN BLUE)** TYPE: Qty PAINTING SPECIFICATION: **(Note 15)**		
4	[ ] VIBRATION DETECTOR AND MONITORING **N/A** @ @		
5	[ ] COOLING AIR TEMPERATURE DETECTORS @ @		
6	[ ] WATER LEAKAGE DETECTOR (COOLING SYSTEM) **N/A** @ @		
7	[ ] CONTROL FLOW SWITCH @ @		
8	[ ] STAR POINT TERMINAL BOX @ @		
9	[ ] INTERNAL AIR FILTER		
10	[ ] AXIALLY-MOUNTED SPEEDOMETER DYNAMO (IF NECESSARY)		
11	[ ] ACCESSORIES		
12	[ ] SUN SHADES CANOPY @ @		
13	[X] LIFTING EYES @ @		
14	[ ] DRAIN PLUG @ @		
15	[X] EARTHING BOLT @ @		
16	[ ] CABLE GLANDS @ @		
17	**AIR FILTER @**		
18	[ ] DIFFERENTIAL PRESSURE SWITCH		
19	[ ] TYPE: ……		
J:	**SITE CONDITION (See Spec. DPC-EL-SPC-0001)**		
1	INSTALLATION: [ ] INDOOR [X] OUTDOOR	USE OF CANOPY REQUIRED: [ ] YES [ ] NO	
2	MAX. AMBIENT TEMPERATURE: **+ 48°C**	MIN. AMBIENT TEMPERATURE: **- 4°C**	
3	DESIGN TEMPERATURE: **+ 48°C**	EQUIPMENT EXPOSED TO SUNLIGHT: [X] **(Note 6)**	
4	UNUSUAL CONDITIONS:**(Note 16)**[ ] DUST[ ]FUMES [**X**]OTHERS:	BAROMETRIC PRESSURE (Avg): **914 mbar**	
5	HEIGH ABOVE SEA LEVEL: **915 m**	MAX. HUMIDITY % AT -°C: **100%**	
K:	**MATERIAL TYPE**		
1	ROTOR CAGE BARS:	INTERNAL OR EXTERNAL FANS / FAN GUARD:	
2	STATOR WINDING:	SHAFT:	
3	TERMINAL BOXES:	BEARING ELEMENTS:	
4	NAME PLATE:	NUT & BOLTS:	
L:	**TESTS**		
1	**ROUTINE TESTS: (Note 17)**	**TYPE TESTS: (Note 18)**	
2	[X] RESISTANCE CIRCUITS	[X] ON LOAD TEST ACCORDING TO: IEC 60034-2	
3	[X] NO LOAD TEST	[ ] TYPE TEST REQUIRED BY RELEVANT	
4	[X] SHORT CIRCUIT TEST	STANDARD FOR HAZARDOUS MOTORS AS PER IEC	
5	[X] MEASUREMENT OF VIBRATION AND SOUND LEVEL	[X]TYPE TEST FOR NON HAZARDOUS MOTORS AS PER IEC STANDARDS.	
6	[ ] OVER SPEED TEST	HIGH-VOLTAGE TEST AND INSULATION RESISTANCE BEFORE AND AFTER [X] HEAT RUN	
7	[X] WINDING INSULATION TEST	[X] FULL LOAD HEAT RUN	
8	[X] INSULATION RESISTANCE	[X] MEASUREMENT OF SLIP AT FULL LOAD	
9	[ ] FOR Ex MOTORS ROUTINE TEST REQUIRED BY RELAVANT STD.	[X] MEASUREMENT TO ALLOW CALCULATION OF PULL-OUT TORQUE	
10	[X] CHECKING OF PROTECTION DEGREE	MEASUREMENT TO ALLOW CALCULATION OF EFFICIENCY AT FULLY, [X] THREE-QUARTER AND HALF LOAD	
11	[X]MEASUREMENT OF WINDING RESISTANCE (COLD)	[X] HIGH-VOLTAGE AND CONTINUITY TESTS ON BUILT-IN TEMPERATURE DETECTORS	
12	[X] MEASUREMENT TO ALLOW CALCULATION OF LOCKED ROTOR **ADDITIONAL TESTS** CURRENT AND TORQUE		
13	[X] HIGH-VOLTAGE TEST [ ] AIR GAP MEASURING [X] VISUAL INSPECTION AND DIMENSIONAL CHECK		
14	[ ] ROTOR INERTIA MEASURING [X] REVIEW OF TEST CERTIFICATE		

M:	NOTES
1	VENDOR SHALL FILL IN THE PRESENT DATA SHEET FORM SEPARATELY FOR EACH MOTOR.
2	AS PER IEC 60034-7 "CLASSIFICATION OF TYPES OF CONSTRUCTION AND MOUNTING ARRANGEMENT (IM CODE)".
3	AS PER SELECTION OF EQUIPMENT FOR CLASSIFIED HAZARDOUS AND UNCLASSIFIED AREAS SPECIFICATION DPC-EL-SPC-0004.ALSO MECHANICAL PROTECTION DEGREE ACCORDONG TO IEC 60034-5 & IEC 60529.
4	STARTING CURRENT TO RATED CURRENT RATIO SHALL NOT EXCEED THE FOLLOWING VALUES: - MOTORS RATED POWER LESS THAN 2.000 KW: 5,5 IN - MOTORS RATED POWER HIGHER THAN OR EQUAL TO 2.000 KW: 4,0 IN
5	SERVICE FACTOR GREATER THAN 1.0 ARE PERMITTED ONLY WHEN SPECIFIED IN THE DATA SHEET.
6	OUTDOOR LOCATIONS ELECTRICAL EQUIPMENT SHALL BE SUITABLE FOR THE ENVIRONMENTAL CONDITIONS (E.G. DUST, MOISTURE, SNOW OR RAIN) WITH ADDITIONAL PROTECTION PROVIDED (E.G. RAIN SHIELDS, SUN SHIELDS) WHERE REQUIRED.
7	SUPPLIER OF ALL EQUIPMENT SHALL BE INCLUDED.
8	STARTING PERFORMANCE OF SINGLE-SPEED THREE-PHASE CAGE INDUCTIONS MOTORS ACCORDING TO IEC 60034-12. MOTORS SHALL BE SUITABLE TO START AND ACCELERATE THE LOAD AT 80% OF RATED VOLTAGE AT ITS TERMINALS AND CAPABLE TO WITHSTANDING ANY TRANSIENT TORQUE DUE TO THE POWER NETWORK.
9	BEARING SHALL BE IN COMPLIANCE WITH THE REQUIREMENTS OF ISO 281. MOTORS FOR VERTICAL PUMPS, INCLUDING IN LINE SHALL HAVE RAIN PROTECTION COVER.ALSO VERTICAL MOTORS SHALL HAVE THRUST BEARINGS SUITABLE FOR THE LOAD IMPOSED BY THE DRIVEN MACHINERY; HOUSING OF SLEEVE BEARING SHALL BE EQUIPPED WITH SIGHT-FEED OILER OR SIGHT GAUGE MARKED WITH PROPER OIL LEVEL.
10	IN CASE OF MOTOR WITH VARIABLE SPEED DRIVE (VSD), VENDOR SHALL FILL IN ALSO VSD DAT SHEET.ONLY FOR VARIABLE SPEED MOTORS. IF SYNCHRONOUS MOTORS HAVE TO BE STARTED VIA STARTING CONVERTER (DEPENDING ON THE NETWORK CONDITIONS) THE MOTOR DESIGN SHALL BE ACCORDINGLY AND SHALL BE EXECUTED IN CLOSE COORDINATION WITH THE VSD (VARIABLE SPEED DRIVES) SYSTEM DESIGN.
11	RTDs SHALL BE PROVIDED FOR MV MOTORS (≥ 150kW) AND WHERE REQUIRED BY MACHINE MONITORING SYSTEM. A MINIMUM OF THREE (ONE PER PHASE) DETECTORS SHALL BE PROVIDED BETWEEN THE COIL SIDES TO MEASURE THE WINDING TEMPERATURE AND THREE (ONE PER PHASE) AT THE BASE OF THE SLOTS TO MEASURE CORE TEMPERATURE, EACH PLACED 120° APART. SLEEVE BEARINGS FOR MV-MOTORS SHALL BE EQUIPPED WITH A DOUBLE RESISTANCE TEMPERATURE DETECTOR OF THE PT 100, 3 OR 4 WIRE TYPE.
12	LIMITS OF MAXIMUM MECHANICAL VIBRATION MAGNITUDE ACCORDING TO IEC 60034-14.
13	DIFFERENTIAL PROTECTION SHALL BE PROVIDED ONLY FOR MOTOR LARGER THAN 1500 kW. MOTORS SHALL INCLUDE THE SIX CURRENT TRANSFORMERS FOR DIFFERENTIAL PROTECTION (THREE CT'S INSIDE THE STAR POINT TERMINAL BOX AND THREE CT'S FOR THE INSTALLATION IN THE FEEDING UNIT).THE ENCLOSURE TYPE OF THE TERMINAL BOX SHALL NOT BE LOWER THAN THE MAIN MOTOR ENCLOSURE.
14	1- THE BOX SHALL BE OVERSIZED AND COMPATIBLE WITH THE DIMENSIONS OF POWER CABLES AND RELEVANT ACCESSORIES (LUGS AND TERMINATIONS), SO LOCATED AS TO ENSURE AN EASY SET-UP OF CABLE ENDS AND ACCESS TO TERMINALS. 2- THERE SHALL BE SEPARATE TERMINAL BOXES FOR MAINS, SPACE HEATER AND MEASURING SENSORS FOR TEMPERATURE OF BEARINGS AND VIBRATIONS. SEPARATED BOXES LOCATED ON THE OPPOSITE SIDE OF THE MAIN ONE. 3- ALL INLET HOLES SHALL BE PROVIDED WITH THREADED PLUGS SUITABLE FOR THE TYPE OF PROTECTION OF THE TERMINAL BOXES. 4-MAIN BOX FOR 6 KV MOTORS WILL BE ALSO CAPABLE TO ACCOMMODATE THE SURGE ARRESTERS. 5-GASKETS SHALL BE LOCATED IN SUITABLE SEATS AND SHALL BE OF MATERIALS WITH AGE-RESISTING CHARACTERISTICS AND ELASTIC PROPERTIES PRACTICALLY UNAFFECTED BY TEMPERATURE VARIATIONS OCCURRING DURING MOTOR RUNNING. 6-FOR MOTOR RATED POWER EQUAL TO OR HIGHER THAN 3.5 KW, A STAR POINT TERMINAL BOX SHALL BE INCLUDED

15	AS PER PAINTING SPECIFICATION DPIC9812-000-000-PI-JSD-2300-0001.
16	DUST OVER THE FLAT TERRAIN AND A HIGH CORROSION IN THIS AREA MUST BE CONSIDERED. THE PRESENCE OF CORROSIVE GAS MIXTURES AND POLLUTED RAINFALL MUST BE CONSIDERED. MOTORS CAN BE DIRECTLY EXPOSED TO SUNLIGHT AND TO WEATHER INJURY, WITHOUT ANY ADDITIONAL PROTECTION.
17	FOR FURTHER DETAILS REGARDING ROUTINE TESTS AND FOR WITNESS TESTS REFER TO RELATED SPECIFICATION.
18	TYPE TEST SHALL BE QUOTED SEPARATELY IN THE BID.
19	THE SUPPLY SHALL BE IN COMPLIANCE WITH JOB SPECIFICATION FOR SUPPLY MEDIUM VOLTAGE MOTORS DPC-EL-SPC-0020.
20	WINDING INSULATION PHASE TO PHASE AND PHASE TO EARTH, SHALL BE CLASS F NON HYGROSCOPIC WITH A 85 °K TEMPERATURE RISE MEASURED BY SLOT-EMBEDDED RESISTANCE TEMPERATURE DETECTOR (RTD) AND 80 °K AVERAGE TEMPERATURE RISE (ACCORDING TO IEC 60034) OVER 40 °C AMBIENT MAXIMUM AT RATED OUTPUT (1.0 SERVICE FACTOR RATING).
21	LEAD OF SPACE HEATERS, CONTROL OR DETECTION SIGNAL SHALL BE TERMINATED IN TERMINAL BOXES SEPARATE FROM THAT HAVE BEEN USED FOR THE MAIN POWER LOAD TERMINAL BOXES. SPACE HEATERS SHALL BE PROVIDED FOR MOTORS ABOVE 150KW.
22	THE MOTOR TORQUES DURING STARTING (LOCKED-ROTOR TORQUE, PULL-UP TORQUE, BREAKDOWN TORQUE), AT RATED FREQUENCY AND AT MINIMUM VOLTAGE ALLOWED, SHALL ENSURE A CORRECT STARTING, ACCORDING TO IEC 60034 UNLESS LOAD TORQUE REQUIRES MOTOR WITH SPECIAL CHARACTERISTICS.
23	VENDOR SHALL SUPPLY THE REQUIRED ELECTRICAL CERTIFICATIONS AND DOCUMENTS AS PER SPECIFICATION (DPC-EL-SPC-0020).
24	MANUFACTURER SHALL ALSO QUOTE SEPARATELY, SUPERVISION ON SITE FOR COMMISSIONING AND START UP OF THE MOTOR
25	INFORMATION TO BE COMPLETED BY MANUFACTURER INFORMATION TO BE COMMUNICATED OR CONFIRMED LATER

Note:
Motor need to be prepurging before start:
Prepurging volume: 37.5 m^3 for minimum 15 minute (flow rate minimum 150 m^3/h)

Is this motor able to start compressor in 80% voltage of mains

HELMKE

Technical data sheet
Technisches Datenblatt

Three-phase induction motor with squirrel cage rotor
Drehstromasynchronmotor mit Kurzschlußläufer

Electrical data / Elektrische Daten

Rated motor power / Bemessungsleistung	kW	1340		
Rated motor voltage / Bemessungsspannung	V	Y 6000		
Rated voltage tolerance / Bemessungsspannungsbereich		Zone A (V: ±5%; f: ±2%)		
Rated frequency / Bemessungsfrequenz	Hz	50		
Number of poles / Polzahl		2		
Rated motor speed / Bemessungsdrehzahl	rpm	2984		
Rated motor current / Bemessungsstrom	A	150		
Power factor / Leistungsfaktor (at / bei 100% - 75% - 50%)		0,90	0,89	0,84
Efficiency / Wirkungsgrad (at / bei 100% - 75% - 50%)		96,1%	96,3%	95,8%
Breakdown-/Rated torque / Kipp-/Bemessungsmoment (Tb/Tn)		2,5		
Starting-/Rated torque / Anzugs-/Bemessungsmoment (Ts/Tn)		0,6		
Starting-/Rated current / Anzugs-/Bemessungsstrom (Is/In)		5,5		

Mechanical data / Mechanische Daten

Weight / Gewicht	kg	5100±5%
Rotor inertia / Rotorträgkeitsmoment	kgm²	16,0
Direction of rotation (from DE side) / Drehrichtung (von A-Seite)		clockwise / rechts
Balance / Wuchtart		Half-key / Halbkeil
Vibration grade / Schwinggrößenstufe		A
Bearing / Lagerart		Sleeve bearings with self lubrication
Bearing type DE / Lagertyp AS		EM-ZLB 09S100 12-100 10-100
Oil content DE / Öl-Inhalt AS	l	3
Bearing type NDE / Lagertyp BS		EMkZLB 09S100 12-100 10-100
Oil content NDE / Öl-Inhalt BS	l	3
Lubricating oil / Schmieröl		DIN 51517-CL/CLP / VG 22 (ISO 3448)

General data / Allgemeine Daten

Frame size / Baugröße		450
Type of construction / Bauform		IM B3
Material of housing / Gehäusematerial		Welded steel / Stahl geschweißt
Material of terminal box / Klemmenkastenmaterial		Welded steel / Stahl geschweißt
Degree of protection / Schutzart		IP55
Method of cooling / Kühlart		IC611
Thermal class - temperature rise / Wärmeklasse - Erwärmung		F/B
Duty type / Betriebsart		S1
Sound presure level, no load at 1 m / Schalldruckpegel, Leerlauf bei 1 m	dB(A)	78+3
Painting / Anstrich		RAL 5010
Standards / Normen		EN 60034-1; EN 60079-0; EN 60079-7
Ex-Protection / Ex-Schutz		Ex ec IIC T3 Gc

Site conditions / Aufstellbedingungen

Ambient temperature / Umgebungstemperatur (min / max)	°C	−5	+50
Max. altitude above sea level / Max. Höhe über NHN	m	1000	

Accessories / Zubehör

Thermal protection / Temperaturüberwachung		6 + 2 x PT100 / PT100		
Space heater / Stillstandsheizung	V	220-240	W	?
Space heater bearings / Stillstandsheizung Lager	V		W	?

The rating plate values may vary from the calculated values. / Abweichungen zwischen berechneten und Leistungsschilddaten sind möglich.

Type	Identification	Prepared	Date	Checked	Revision	Status	Sheet
NDKK450-02-S	11000101138-39	Gae	25.04.22	PR	00	C	1/2

Accessories / Zubehör

Winding: 6 x RTD's Pt100 ohms at 0°C, 2 to 4-wire, with transmitters (2/phase)
Bearings: 2 x double RTD's Pt100 ohms at 0°C, 2 to 4-wire, with transmitters (1/bearing)
Space heater: 220-240V, 1ph , a.c.
Number of consecutive starts cold/hot: 3/2
Starting method: DOL
Application: screw compressor

Three-Phase-Induction Motor with Squirrel Cage Rotor

Operating and Installation Data

Rated-					
-power	P_N	1340 kW	Connection		Y
-voltage	U_N	6000 V	Class of rating		S1
-frequency	f_N	50 Hz	Absolute altitude		<1000 m ab.s.l.
-current	I_N	150 A	Coolant temperature		50 °C
-speed	n_N	2984 1/min	Therm. class (design/util.)		155 (F) / 130 (B)
-torque	M_N	4289 Nm			
Power factor	cosφ	0.9			

Standard: IEC/EN 60034-1
Tolerances: IEC/EN 60034-1
Type of ignition protection: Ex ec IIC T3 Gc, IEC/EN 60079-0,-7

Calculated Start-Up Data

Motor voltage	U/U_N	1.00	0.80		
Locked-rotor torque	M_A/M_N	0.60	0.37		
Pull-up torque	M_S/M_N	0.59	0.37		
Breakdown torque	M_K/M_N	2.50	1.58		
Locked-rotor current	I_A/I_N	5.50	4.27		

Calculated Partial Load Data

P/P_N	1.25	1.00	0.75	0.50	
cos φ	0.89	0.90	0.89	0.84	
η [%]	95.7	96.1	96.3	95.8	

Additional Technical Ratings and Information

Rotor material: E-CU
Measuring surface sound pressure level (no-load): 78 dB(A), tol.: 3 dB(A)

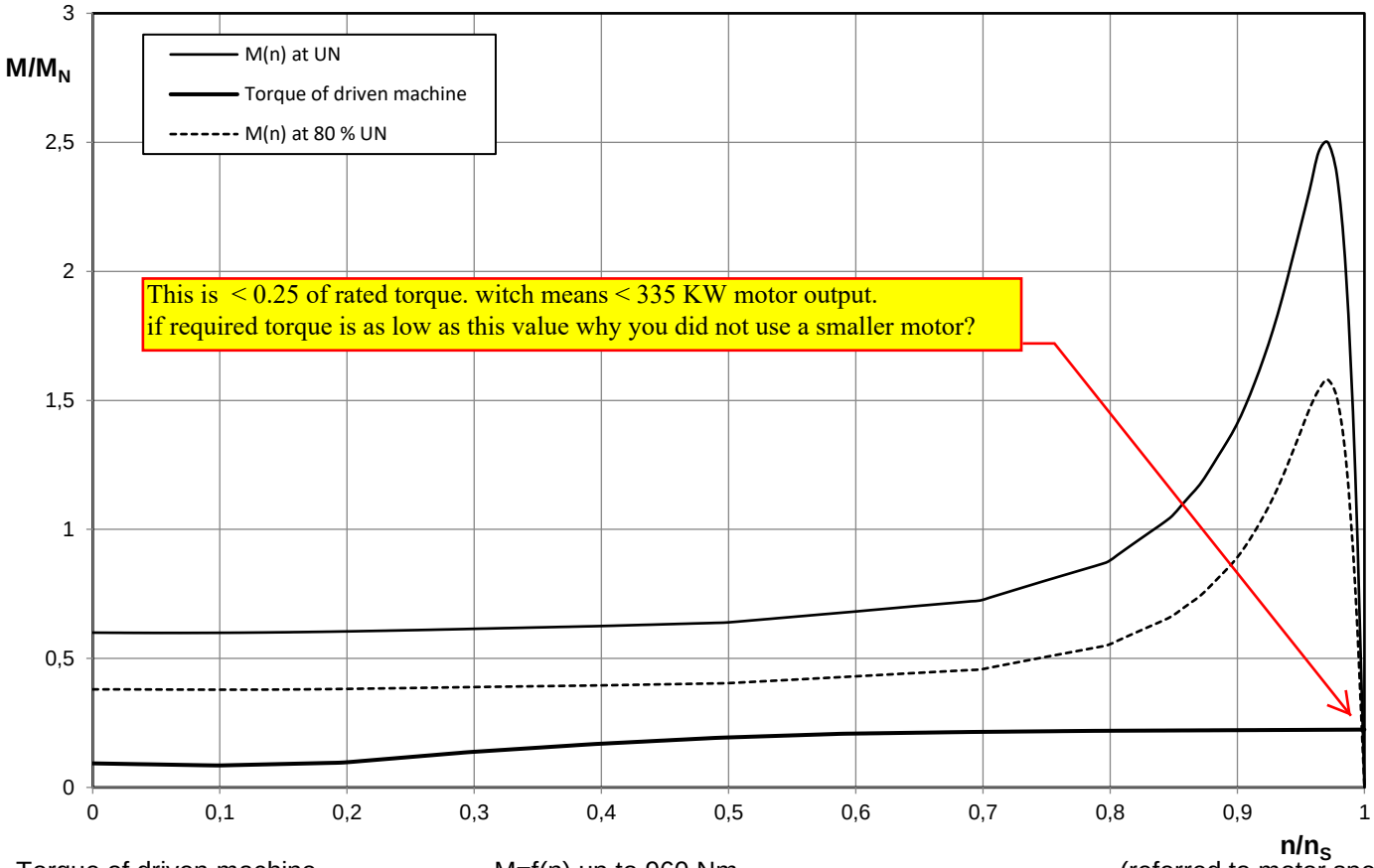
The mains voltage may vary by up to +-5% and the mains frequency
by up to +-2% from the rated values, in keeping with zone A according to IEC 60034-1

Three-Phase-Induction Motor with Squirrel Cage Rotor

Operating and Installation Data

Rated-					
-power	P_N	1340 kW	Connection		Y
-voltage	U_N	6000 V	Class of rating		S1
-frequency	f_N	50 Hz	Absolute altitude		<1000 m ab.s.l.
-current	I_N	150 A	Coolant temperature		50 °C
-speed	n_N	2984 1/min	Therm. class (design/util.)		155 (F) / 130 (B)
-torque	M_N	4289 Nm			
Power factor	cosφ	0.9			

Standard: IEC/EN 60034-1
Tolerances: IEC/EN 60034-1
Type of ignition protection: Ex ec IIC T3 Gc, IEC/EN 60079-0,-7



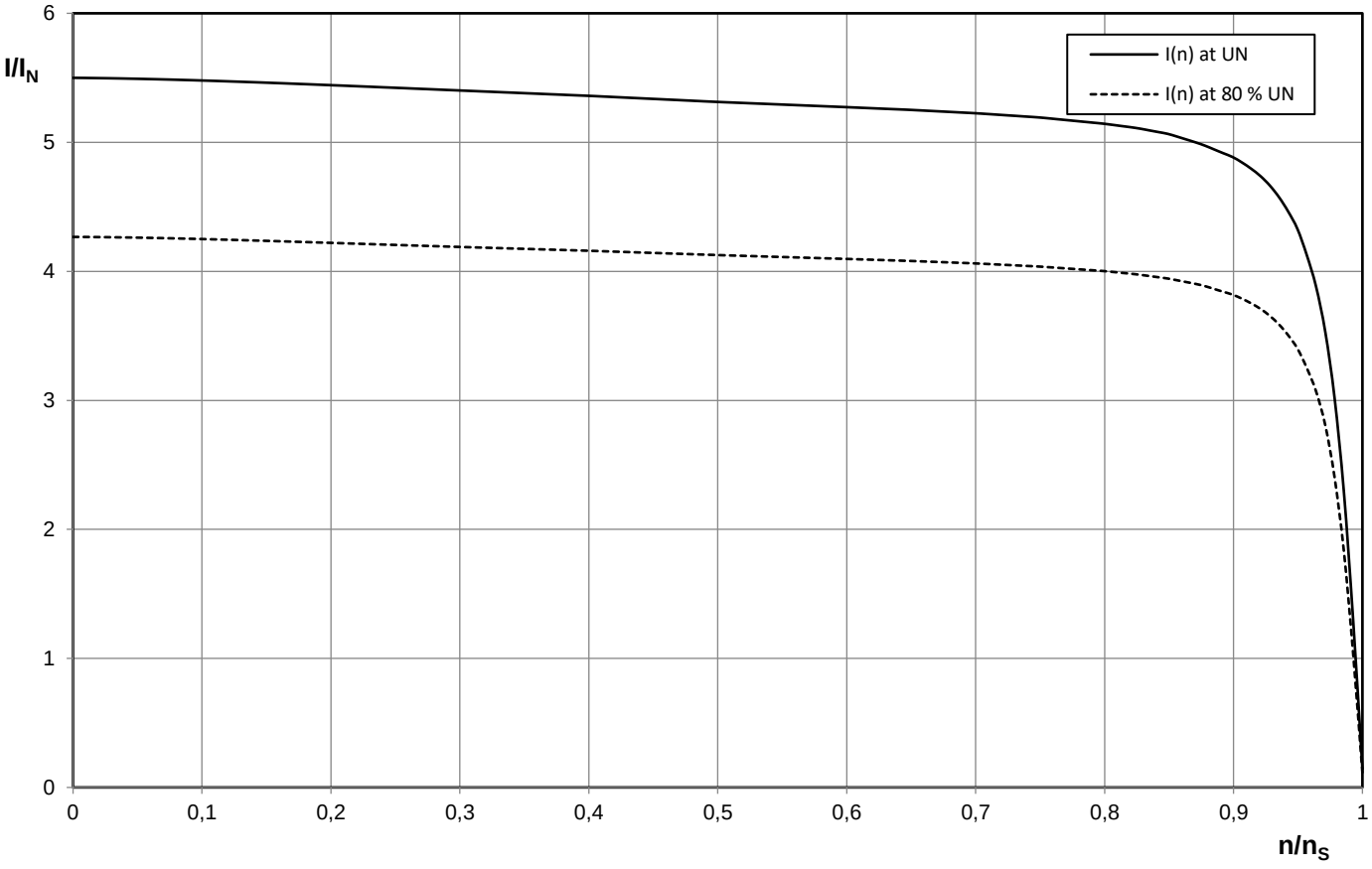
Torque of driven machine	M=f(n) up to 960 Nm		(referred to motor speed)
Driven machine	Srew compressor		
Required power			
Moment of inertia (load)	3.1 kgm²		(referred to motor speed)
Starting time	3 s	at U/U_N = 1.00	
	6 s	at U/U_N = 0.80	
Perm. number of starts	3 cold, 2 warm	at U/U_N = 1.00	
	3 cold, 2 warm	at U/U_N = 0.80	1000 per year

Three-Phase-Induction Motor with Squirrel Cage Rotor

Operating and Installation Data

Rated-					
-power	P_N	1340 kW	Connection		Y
-voltage	U_N	6000 V	Class of rating		S1
-frequency	f_N	50 Hz	Absolute altitude		<1000 m ab.s.l.
-current	I_N	150 A	Coolant temperature		50 °C
-speed	n_N	2984 1/min	Therm. class (design/util.)		155 (F) / 130 (B)
-torque	M_N	4289 Nm			
Power factor	cosφ	0.9			

Standard: IEC/EN 60034-1
Tolerances: IEC/EN 60034-1
Type of ignition protection: Ex ec IIC T3 Gc, IEC/EN 60079-0,-7



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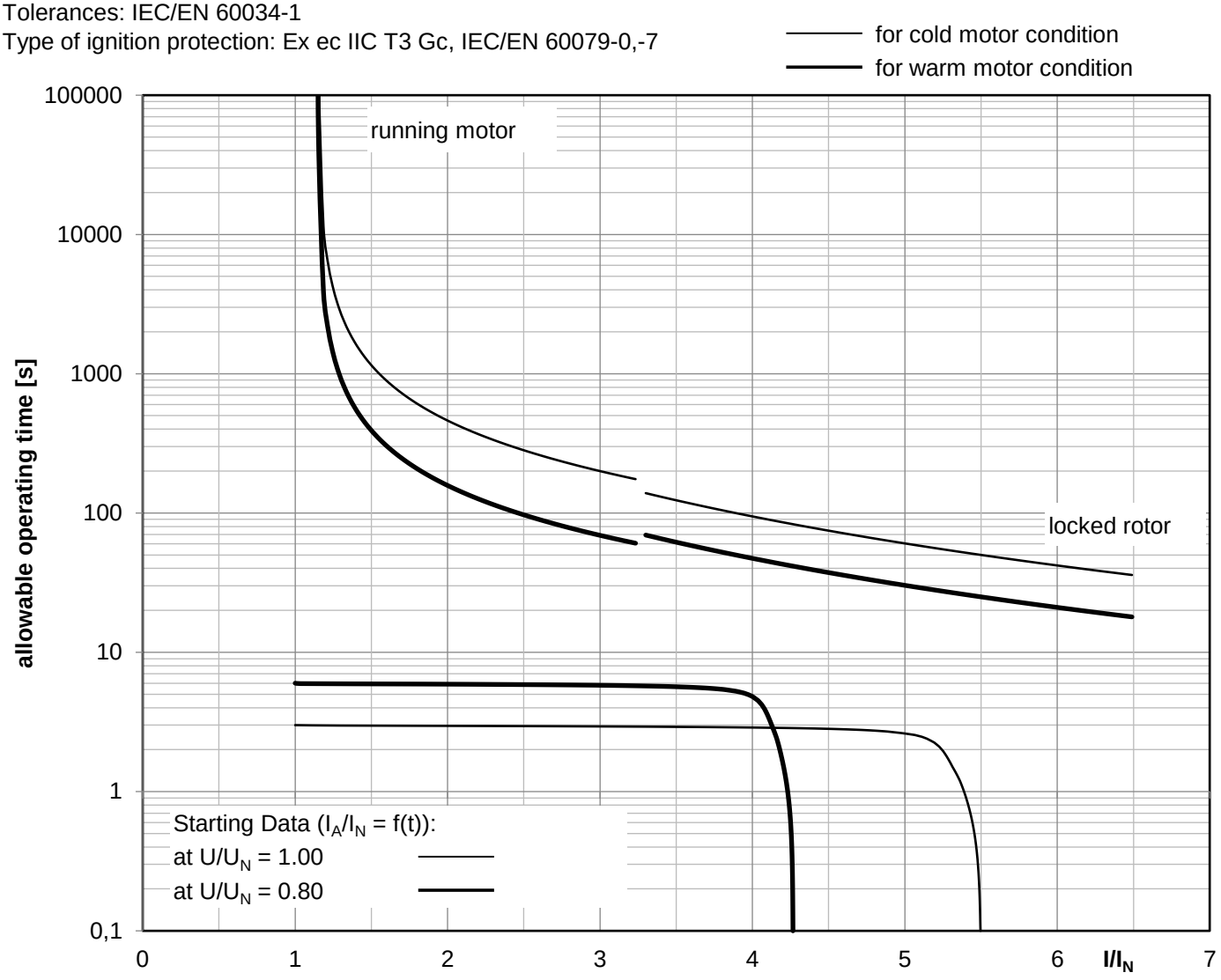
	Title: Type : NDKK450-02-G Order No. : 11000101138-39	Approved by: Pr		
		Rev.	Date of issue: 2022-03-21	Sheet: 3/7

Three-Phase-Induction Motor with Squirrel Cage Rotor

Operating and Installation Data

Rated-					
-power	P_N	1340 kW	Connection		Y
-voltage	U_N	6000 V	Class of rating		S1
-frequency	f_N	50 Hz	Absolute altitude		<1000 m ab.s.l.
-current	I_N	150 A	Coolant temperature		50 °C
-speed	n_N	2984 1/min	Therm. class (design/util.)		155 (F) / 130 (B)
-torque	M_N	4289 Nm			
Power factor	cosφ	0.9			

Standard: IEC/EN 60034-1
Tolerances: IEC/EN 60034-1
Type of ignition protection: Ex ec IIC T3 Gc, IEC/EN 60079-0,-7



Thermal copper time constant (short-term load variation)	12 min
Thermal time constant (long-term load variation)	25 min
Thermal time constant for cooling down (standstill)	176 min

HELMKE	Document type: Thermal Limit Curve		Created: Gae		
	Title: Type : NDKK450-02-G Order No. : 11000101138-39		Approved by: Pr		
		Rev.	Date of issue: 2022-03-21		Sheet: 4/7

Three-Phase-Induction Motor with Squirrel Cage Rotor

Operating and Installation Data

Rated-					
-power	P_N	1340 kW	Connection		Y
-voltage	U_N	6000 V	Class of rating		S1
-frequency	f_N	50 Hz	Absolute altitude		<1000 m ab.s.l.
-current	I_N	150 A	Coolant temperature		50 °C
-speed	n_N	2984 1/min	Therm. class (design/util.)		155 (F) / 130 (B)
-torque	M_N	4289 Nm			
Power factor	cosφ	0.9			

Standard: IEC/EN 60034-1
Tolerances: IEC/EN 60034-1
Type of ignition protection: Ex ec IIC T3 Gc, IEC/EN 60079-0,-7

Trans. Torque in Air Gap: $M(t)/M_N = \Sigma\ (M/M_N \times e^{(t*\tau)} \times \sin(2\pi \times f \times t + \varphi))$

Starting with locked rotor and U_{Line} = 100 %

M/M_N	τ/s^{-1}	f/Hz	φ/degree
0.51	0.00	0.00	90.00
0.51	-39.35	0.00	90.00
4.14	-0.26	50.00	-172.95
4.14	-39.09	50.00	-7.05

M_{max}/M_N = 4.48 at t = 134.6ms

3-pole terminal short circuit

M/M_N	τ/s^{-1}	f/Hz	φ/degree
-0.53	-24.17	0.00	90.00
-0.22	-54.53	0.00	90.00
5.98	-39.35	48.90	162.89

M_{max}/M_N = 5.37 at t = 5.6ms

2-pole terminal short circuit

M/M_N	τ/s^{-1}	f/Hz	φ/degree
0.19	0.00	0.00	90.00
-0.53	-24.17	0.00	90.00
-0.06	-54.53	0.00	90.00
2.87	-12.09	49.84	175.15
1.48	-27.27	0.93	15.36
3.00	-39.35	48.90	162.64
1.44	0.00	100.00	-5.24
0.39	-12.09	50.16	91.15
1.49	-27.27	99.07	-15.16

M_{max}/M_N = 6.93 at t = 7ms

The value of the mechanical torque of the whole shafting can only be determined by using the above transient torques in a torsional analysis calculation. The plant manufacturer is responsible for the torsional vibrations analysis.

Three-Phase-Induction Motor with Squirrel Cage Rotor

Operating and Installation Data

Rated-					
-power	P_N	1340 kW	Connection		Y
-voltage	U_N	6000 V	Class of rating		S1
-frequency	f_N	50 Hz	Absolute altitude		<1000 m ab.s.l.
-current	I_N	150 A	Coolant temperature		50 °C
-speed	n_N	2984 1/min	Therm. class (design/util.)		155 (F) / 130 (B)
-torque	M_N	4289 Nm			
Power factor	cosφ	0.9			

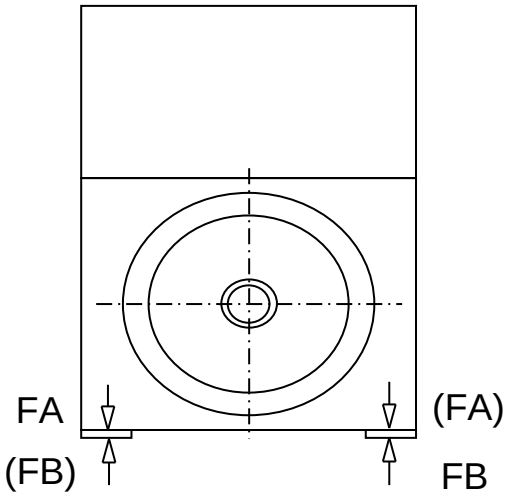
Standard: IEC/EN 60034-1
Tolerances: IEC/EN 60034-1
Type of ignition protection: Ex ec IIC T3 Gc, IEC/EN 60079-0,-7

Foundation Load

The listed foundation loads are derived from a stress analysis for a rigid foundation, caused by the maximum dynamic torque and the machine weight. The forces occur alternately on each side of the machine, irrespective of the direction of rotation.
Transfer of vibrations from the surrounding has to be avoided by appropriate layout of foundation. On the basis of DIN 4024 Part 1 the natural frequencies fn of the system - machine on foundation - must differ as follows from the operating frequencies fm (for mains-fed operation: Rotating frequency, double rotating frequency, line frequency and double line frequency, for converter-fed operation: Rotating frequency, double rotating frequency, supply frequency and double supply frequency):

- 1. Natural frequency of system: f1 ≥ 1.25 fm or f1 ≤ 0.8 fm
- Higher natural frequencies: fn ≥ 1.1 fm or fn ≤ 0.9 fm

→ The plant manufacturer is responsible for the design of the foundations!



2-pole terminal short circuit

compressive force FA = 60 kN
tensile force FB = 8 kN

(forces on one side of the machine)

Three-Phase-Induction Motor with Squirrel Cage Rotor

Operating and Installation Data

Rated-					
-power	P_N	1340 kW	Connection		Y
-voltage	U_N	6000 V	Class of rating		S1
-frequency	f_N	50 Hz	Absolute altitude		<1000 m ab.s.l.
-current	I_N	150 A	Coolant temperature		50 °C
-speed	n_N	2984 1/min	Therm. class (design/util.)		155 (F) / 130 (B)
-torque	M_N	4289 Nm			
Power factor	$\cos\varphi$	0.9			

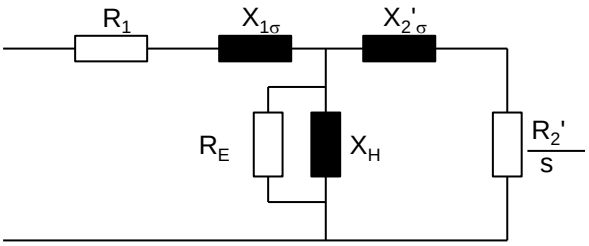
Standard: IEC/EN 60034-1
Tolerances: IEC/EN 60034-1
Type of ignition protection: Ex ec IIC T3 Gc, IEC/EN 60079-0,-7

Resistances, Reactances (Calculated Values per Phase)

Values (p.u.) refered to Z_N — $Z_N = U_{PH} / I_{PH}$ — 23.1 Ω

at slip		s = 0.0053	s = 1
Stator-resistance	R_1 / Z_N	0.00713	0.00713
Stator-leakage reactance	$X_{1\sigma} / Z_N$	0.20684	0.12954
Rotor-resistance	R_2' / Z_N	0.00529	0.01613
Rotor-leakage reactance	$X_{2\sigma}' / Z_N$	0.07390	0.05946
Magnetizing-reactance	X_H / Z_N	5.688	5.956
Ironloss-resistance	R_E / Z_N	186.40	186.40

The resistances apply to the warm machine.
The rotor-resistances / -reactances refer to the stator.



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	Title: Type : NDKK450-02-G Order No. : 11000101138-39	Approved by: Pr		
		Rev.	Date of issue: 2022-03-21	Sheet: 7/7

Technical data for configuration

Contents

1 Legend for machine dimension drawing

Position	Designation
COG	Center of gravity
DR	Direction of rotation
LA	Air discharge
LB	Attachment eye (self aligning)
LE	Air intake
ML	Maintain minimum clearance air intake and/or air outlet
WA	DE shaft end
XA	Undercut DE
⏚	Ground connection

Position	Designation
1	Terminal box stator line connection
3	Terminal box auxiliary circuits
5	Terminal box anti-condensation heating
10	Sleeve bearings DE
11	Sleeve bearings NDE
14	Air intake sound absorber
21	Connection for purge air intake
22	Connection, purge air outlet

2 Technical data

2.1 Mechanical data

Type of construction	IM B3 / IM 1001
Total weight	See dimension drawing
Weight of the cooler housing	0.67 t
Rotor weight	See Shaft dimension drawing
Rotor balancing	Dynamically balanced with half a feather key, without coupling half

2.2 Ambient conditions

Degree of protection	IP55
Cooling method	IC611
Ambient temperature	-5 ... 50 °C

2.3 Vibration behavior

The values are valid for measurements taken in the manufacturer's test field.
These are valid for rated speed.

Without coupling half
Converter-fed motors are tested as standard the same as line motors.

Bearing housing vibration

Vibration severity grade	A (DIN EN IEC 60034-14:2019)
Vibration velocity (rms value)	2.3 / 2.8* mm s^{-1}

* See also DIN EN IEC 60034-14:2019, Section 8.2

2.4 Shaft end

DE shaft end

Dimension drawing position	WA
Centering bore	DR M24×50 - DIN 332

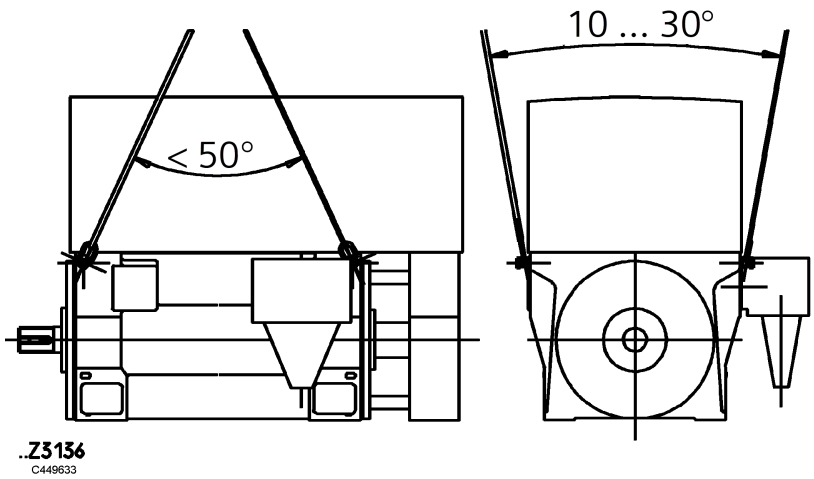
Undercut

Dimension drawing position	XA
Design	E2.5×0.4 - DIN 509

2.5 Paint finish

Standard paint finish	
Color	RAL 5010
Total paint coat thickness	100 µm

2.6 Lifting and transporting

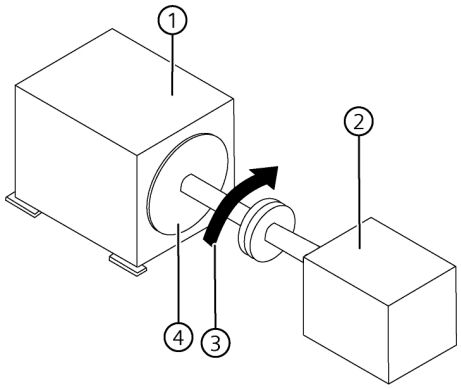


Lifting the machine, attachment points

The following applies when lifting:
Velocity $v < 20\,\mathrm{m\,min^{-1}}$; Acceleration $a < 0.4 \cdot g$

The attachment points at the machine are only designed to lift the weight of the machine itself. Do not lift the machine together with base frames, adapter or sole plates.

2.7 Direction of rotation



① Motor
② Driven machine
③ Direction of rotation
④ DE

Dimension drawing position	DR
Direction of rotation	only clockwise rotation viewed at the DE
Connection, clockwise rotation	
Line phases in their associated phase sequence	L1 L2 L3
at the machine terminals	U V W

2.8 Prepurging

see the Operating Instructions

Overpressure Housing	Max. 50 mbar
Flow rate	Min. 150 $m^3 h^{-1}$
Prepurging volumes	37.5 m^3
Prepurging time	Min. 15 min

The final operational values are stamped on the purging plate attached to the machine. The purge plate is only created after measurement.

2.9 Bearing DE

Sleeve bearings

Dimension drawing position	10
Type	EM-ZLB 09S100 12-100 10-100
Manufacturer	RENK
Lubricating oil	DIN 51517-CL/CLP
Viscosity class	VG 22 (ISO 3448)
Scope of delivery	Without oil
Changing the oil	Only with the shaft stationary

Oil ring lubrication

Oil quantity	3 L

Additional details are provided in the associated Operating and Maintenance Instructions.

2.10 Bearing NDE

Sleeve bearings

Dimension drawing position	11
Type	EMkZLB 09S100 12-100 10-100
Manufacturer	RENK
Lubricating oil	DIN 51517-CL/CLP
Viscosity class	VG 22 (ISO 3448)
Scope of delivery	Without oil
Changing the oil	Only with the shaft stationary

Oil ring lubrication

Oil quantity	3 L

Additional details are provided in the associated Operating and Maintenance Instructions.

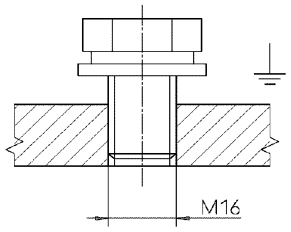
The bearing is installed so that it is insulated.
During operation, it is not permissible that the insulation is jumpered.

3 Electrical connection

3.1 Machine grounding

Ground connection

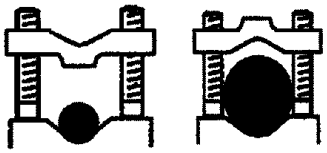
Dimension drawing position	⏚	
Conductor connection	Cable lug according to standard	
	DIN 46234	DIN 46235
Conductor cross-section max.	240 mm^2	400 mm^2



3.2 Stator

Main terminal box

Dimension drawing position	1
Material	Steel
Degree of protection	IP66
Type of protection	Ex eb
Ground connection	185 mm^2
Outer cable diameter	35 ... 75 mm
Cable seal	Sealing ring that can be cut
Conductor connection	Terminal clamp
Conductor cross-section	Max. 50...300 / 120...400 mm^2



3.3 Auxiliary circuits

Auxiliary terminal box

Dimension drawing position	3
Material	Stainless steel 1.4301
Degree of protection	IP66
Type of protection	Ex eb
Conductor cross-section	Max. 4 mm^2
Connecting terminals	Intrinsically safe for circuits Ex i
Cable entry	Plate, removable, undrilled Customers are responsible for selecting the cable glands and machining the threaded bores.

3.4 Anti-condensation heating

Auxiliary terminal box

Dimension drawing position	5
Material	Stainless steel 1.4301
Degree of protection	IP66
Type of protection	Ex eb
Conductor cross-section	Max. 4 mm^2
Cable entry	Plate, removable, undrilled Customers are responsible for selecting the cable glands and machining the threaded bores.

4 Auxiliary units

4.1 Heating

Anti-condensation heating electrical machine

Voltage	220 ... 240 V
Heating power	364 ... 433 W
Ambient temperature ϑ_a	-5 ...+50°C
Surface temperature $\vartheta_{B\,max}$	175 °C
Type of protection	II 2G Ex eb IIC T3 Gb
Certificate	EPS 18 ATEX 1145U
	IECEx EPS 18.0068U

5 Monitoring

5.1 Bearing temperature

Resistance thermometer

Type	2 × Pt100 / B (IEC 60751)
Number at DE	1
Number at NDE	1
Type of protection	Ex eb

5.2 Slot temperature

Resistance thermometer

Type	1 × Pt100 / B (IEC 60751)
Number	6
Type of protection	Ex eb

Assignment, thermometer to the monitored phase

Phase	Connecting terminals
U	20:1R1
V	20:2R1
W	20:3R1
U	20:4R1
V	20:5R1
W	20:6R1

Only temperature sensors integrated in the winding are suitable to monitor the winding temperature. Temperature sensors located at a different position supply incorrect values.

5.3 Measured value conversion

Measuring transducer

Number 5

Set the measuring transducer to the measuring range. Additional details are provided in the associated Operating and Maintenance Instructions.

6 Monitoring setpoints

6.1 Slot temperature

First setting before commissioning	Shutdown	ϑ_0 = 120 °C
Setting in operation	Alarm	$\vartheta_1 = \vartheta$ + 10 K; max. 135 °C
	Shutdown	$\vartheta_2 = \vartheta$ + 15 K; max. 140 °C

ϑ = temperature in the steady-state condition / °C

6.2 Bearing temperature

First setting before commissioning	Shutdown	ϑ_0 = 95 °C
Setting in operation	Alarm	$\vartheta_1 = \vartheta$ + 2 K; max. 97 °C
	Shutdown	$\vartheta_2 = \vartheta$ + 5 K; max. 100 °C

ϑ = temperature in the steady-state condition / °C

6.3 Bearing housing vibration

Comply with the specifications laid down in standard DIN ISO 10816-3.
Setting values according to DIN ISO 10816-3.

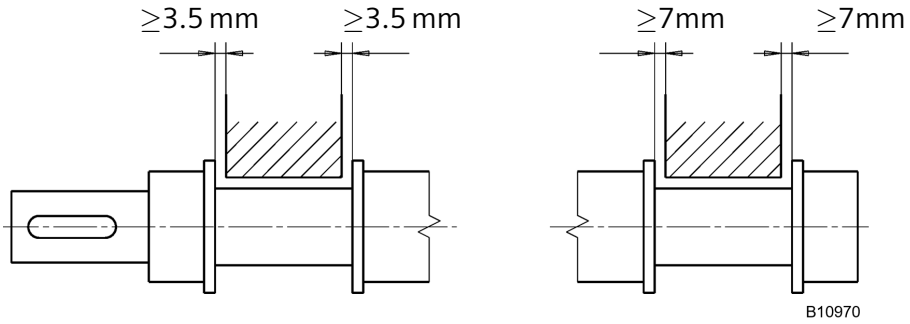
Subassembly (foundation)		Rigid	Flexible
First setting before commissioning	Alarm	4.5 mm s^{-1}	7.1 mm s^{-1}
	Shutdown	7.1 mm s^{-1}	11 mm s^{-1}
Setting in operation	Alarm	$v \times 1.25$	$v \times 1.25$
	Shutdown	7.1 mm s^{-1}	11 mm s^{-1}

v = measured basis value of the vibration velocity

7 Assembly

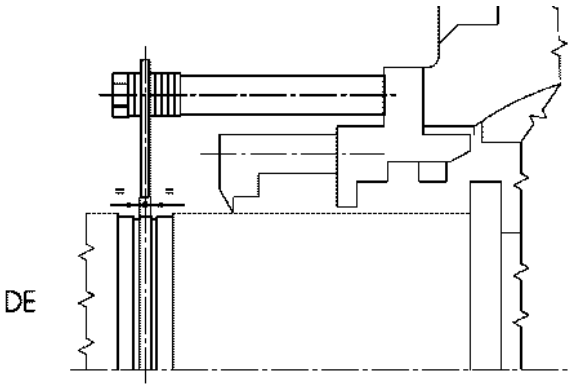
7.1 Axial bearing clearance

The bearings are floating bearings. The rotor must be axially guided using a locating bearing in the driven machine (driven load) or in the gearbox via the coupling.
Only use a coupling with fixed axial clearance. (±0.5 mm up to ±1.0 mm).



Floating bearing DE Floating bearing NDE

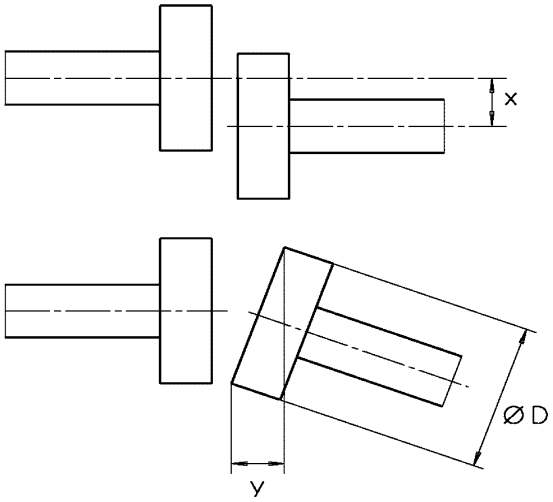
7.2 Pointer for the magnetic center of the axial rotor position



Before attaching the coupling, set the rotor to its magnetic center.
The axial bearing clearance has been correctly set if the pointer is located centered above the marking on the shaft. As a result of production tolerances, the bearing clearance can be somewhat higher than the specified values.

7.3 Alignment accuracy, coupling

Also comply with the coupling manufacturer's instructions.



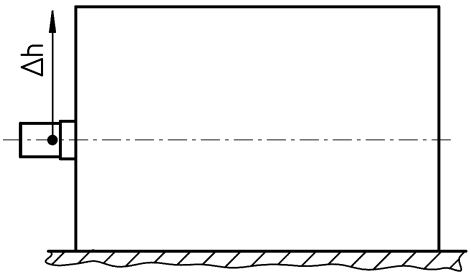
n 0 ... 900 min^{-1}
x Max. 0.09 mm
y Max. 0.09 mm / 100 mm $\varnothing D$

n 900 ... 1800 min^{-1}
x Max. 0.06 mm
y Max. 0.05 mm / 100 mm $\varnothing D$

n 1800 ... 3600 min^{-1}
x Max. 0.03 mm
y Max. 0.025 mm / 100 mm $\varnothing D$

7.4 Thermal expansion

Shift of the non-coupled shaft end when operated with high thermal utilization levels:

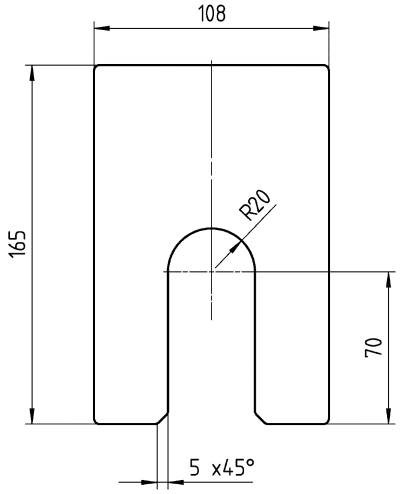


Δh = 0.17 mm

To calculate the relative shifts of the machine referred to the environment, temperature expansion coefficient $\alpha = 12 \cdot 10^{-6}$ K^{-1} applies.

7.5 Fastening

Shim geometry Material Steel / Brass



Mounting parts for fastening the machine onto a steel foundation.
(Not included in the scope of delivery)
Tightening torque for fastening screws M_A = 1080 Nm ±15 %

Designation	Number	Standard	Specification
Mounting screw	4	ISO 4017	M36×140 - 8.8
Washer	4	ISO 7091	36 - 100HV
Jack screw	4	ISO 4017	M24×100 - 8.8

7.6 Connection for purge air intake

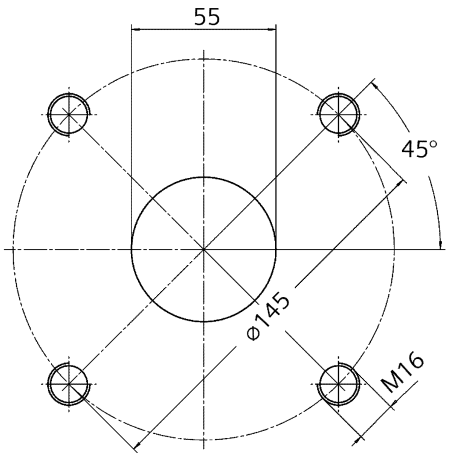
Dimension drawing position 21

Air intake

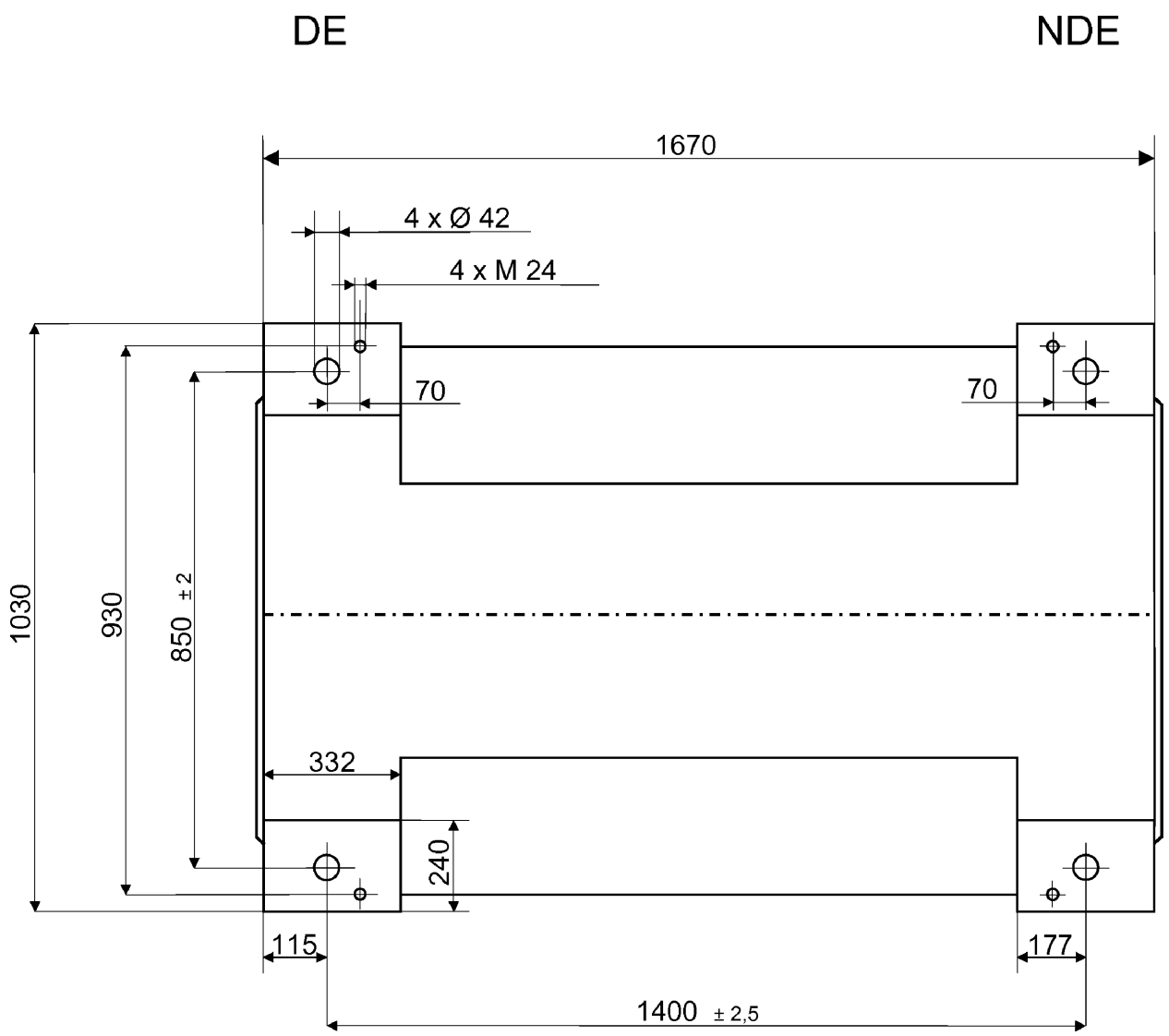
Female thread 2× Rp 1/2″ + 1× Rp 1″

7.7 Purge air outlet

Dimension drawing position 22



8 Footprint drawing

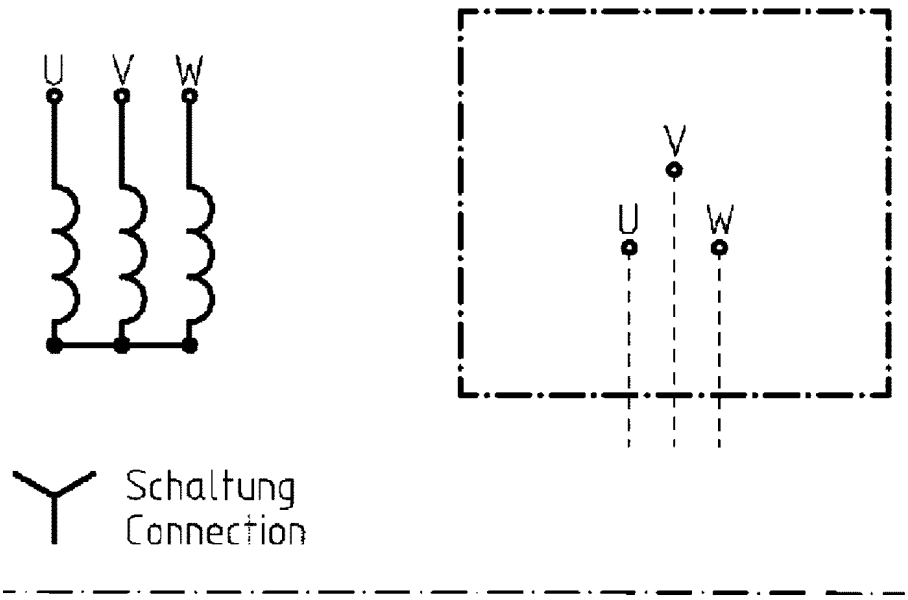


View from below

9 Circuit diagrams/terminal diagrams

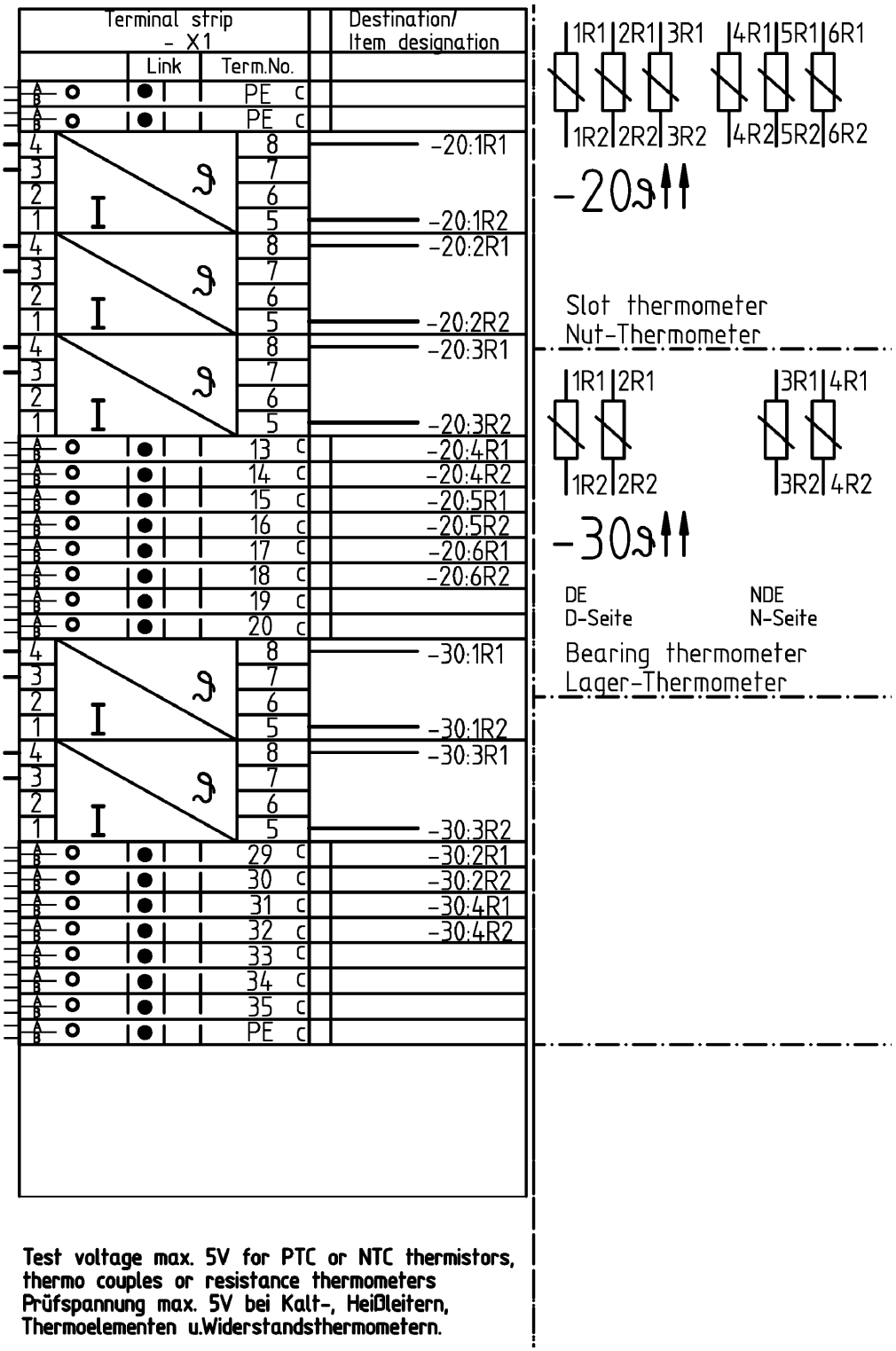
9.1 Circuit diagram Stator line connection

Dimension drawing position 1



9.2 Terminal diagram Auxiliary circuits

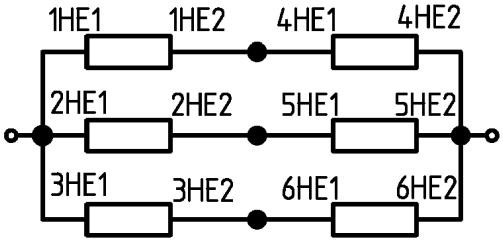
Dimension drawing position 3



9.3 Terminal diagram Anti-condensation heating

Dimension drawing position 5

Terminal strip - X2					Destination/ Item designation
	Link		Term.No.		
			PE	A	
				B	
			1	A	-80:1HE1
				B	-80:2HE1
			2	A	-80:3HE1
				B	
			3	A	-80:4HE2
				B	-80:5HE2
			4	A	-80:6HE2
				B	
			5	A	-80:1HE2
				B	-80:4HE1
			6	A	-80:2HE2
				B	-80:5HE1
			7	A	-80:3HE2
				B	-80:6HE1
			8	A	
				B	



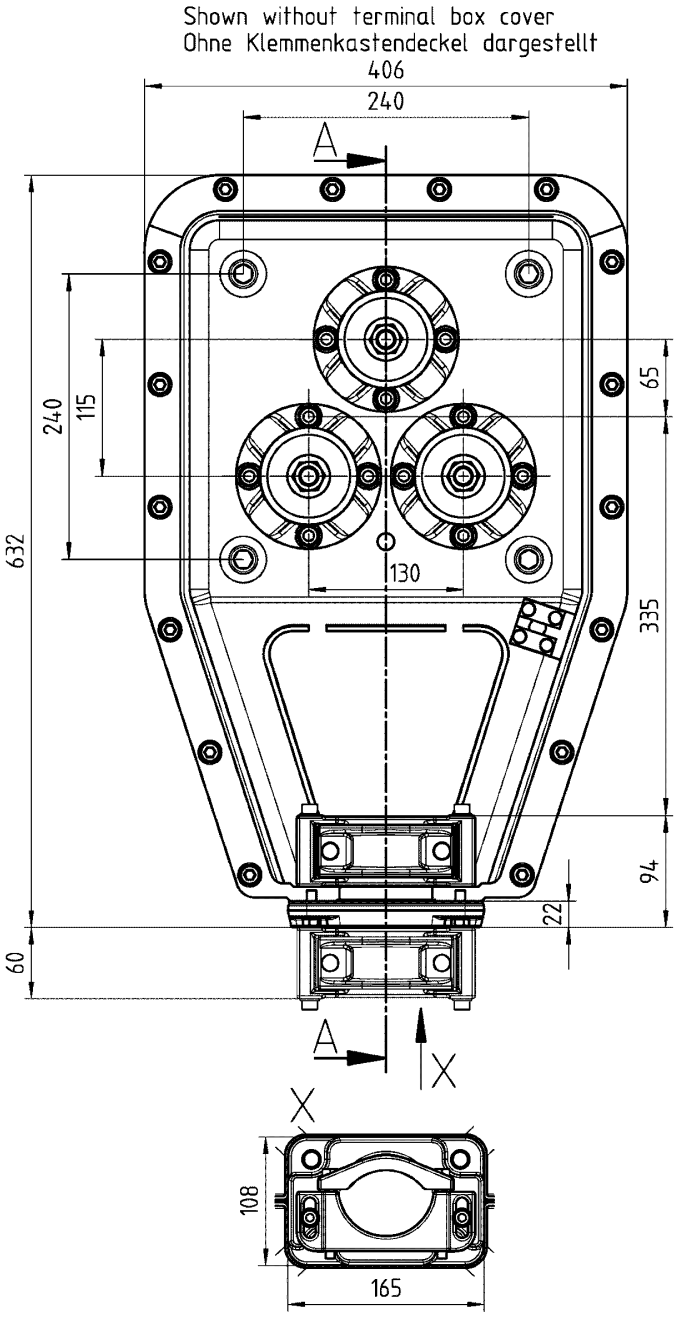
-80

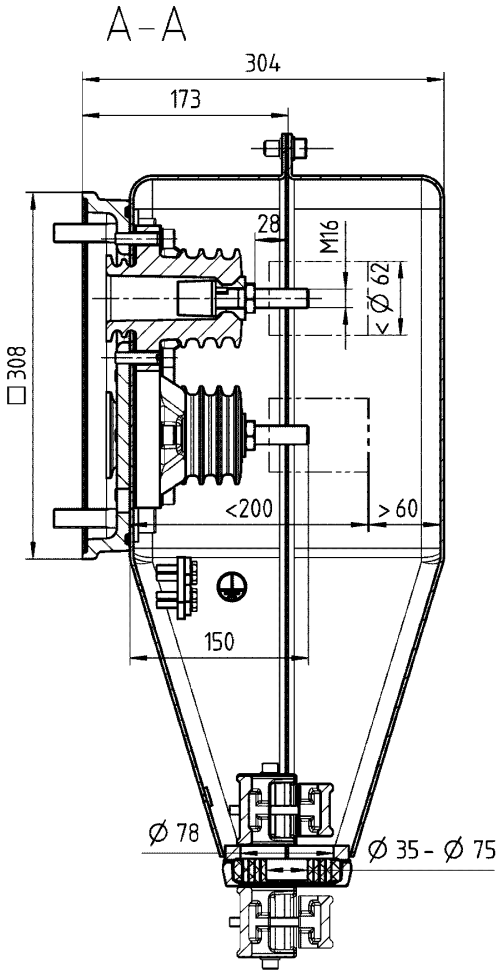
Anti-condensation heater
Stillstandsheizung

10 Dimension drawings, terminal box

10.1 Terminal box Stator line connection

Dimension drawing position 1





CT for Differential protection?

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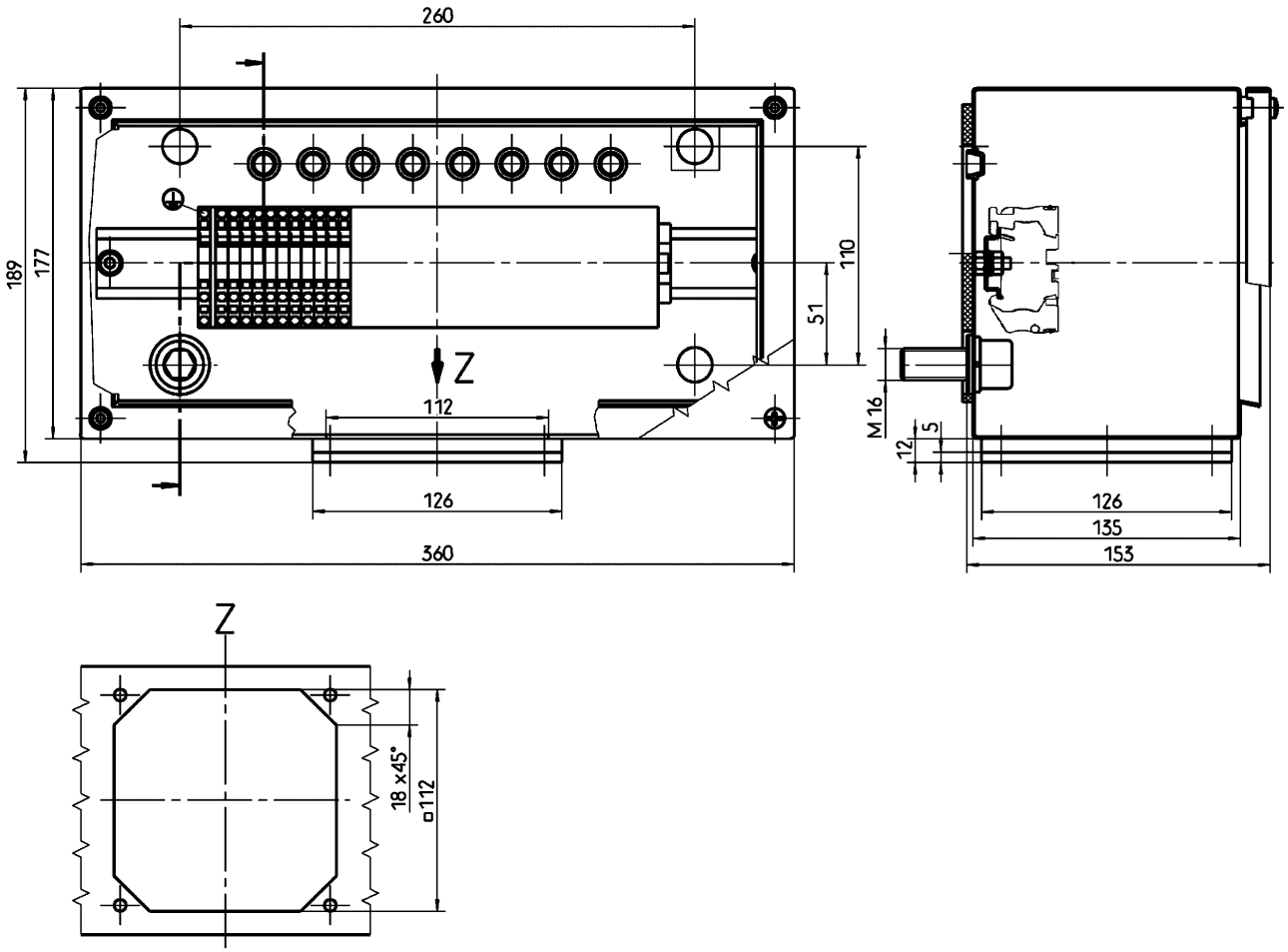
		Rev.	Date of issue: 2022-04-07		Sheet: 21/23

10.2 Terminal box Auxiliary circuits

Dimension drawing position 3



10.3 Terminal box Anti-condensation heating

Dimension drawing position 5