

GENERAL PURPOSE 3-PHASE INDUCTION MOTORS



NEMA PREMIUM

including motors for JM/JP close coupled pumps and for Hazardous Locations

A large blue industrial electric motor with a flange and a shaft, positioned in front of a background of repeating text.

FRANK & DVORAK
ELEKTROMOTOREN



Product Catalogue

Product range

LOW VOLTAGE GENERAL PURPOSE 3-PHASE INDUCTION MOTORS	Three-phase motors with squirrel-cage rotor series (2)Sg(m), Sh, SIE-K HIGH (IE2), PREMIUM (IE3) and SUPER PREMIUM (IE4) efficiency motors	from 0,04kW up to 2200kW	for general purpose applications like pumps, fans, compressors; complying with the newest efficiency requirements
GENERAL PURPOSE 1-PHASE INDUCTION MOTORS	Single-phase motors with squirrel-cage rotor series SEh, SEMh Single-phase motors PREMIUM (IE3) efficiency class, series 3SSIE	from 0,04kW up to 2,2kW	for general purpose applications like pumps, fans, compressors, woodworking machines, devices for food processing, concrete mixers etc.
HIGH VOLTAGE INDUCTION MOTORS UP TO 11kV	Three-phase squirrel-cage high voltage and high efficiency motors series Sh with cast-iron housing. High voltage motors with module construction (steel/welded housing) series Sf (-E), Sfw, Sfr.	from 160kW up to 7000kW	for general industrial use, drives used for own needs of power plants (pumps, fans, coal mills, conveyors)
BRAKE MOTORS	Three-phase and single-phase brake motors with AC and DC brakes	from 0,04kW up to 200kW	for applications with high safety requirements or where immediate stopping of the drive is required e.g.: theatres, concert, halls, lifts, platforms, etc.
MOTORS WITH FORCED VENTILATION	Three-phase induction motors with forced ventilation	from 0,06kW up to 2500kW	for variable frequency drives with very wide speed regulation
EXPLOSION-PROOF MOTORS	Standard and PREMIUM (IE3) efficiency increased safety motors Standard, HIGH (IE2) and PREMIUM (IE3) efficiency flame-proof motors	from 0,06kW up to 22kW from 0,37kW up to 3200kW	adapted for operation in areas endangered by explosion (without methane) for applications in chemical and mining industry where explosive atmosphere of gases, vapours or dust can occur
NEMA MOTORS	Low voltage NEMA motors SIE series (in compliance with the NEMA PREMIUM requirements).	from 1HP up to 350HP	for general industrial applications like pumps (including JM and JP), fans, compressors also for Hazardous Locations up to 250HP (Class I Div 2, Class II Div 2) with CSA certificate
TRACTION MOTORS	Traction motors and traction generators.	from 50kW up to 1500kW	various traction vehicles: trams (including low-deck trams), trolleybusses, subway and locomotives

Contents

General information.....	2
Efficiency of motors in the USA	2
Ratings – Tolerances	3
Standards.....	3
Insulation classification.....	4
Hazardous Locations Classification.....	5
Temperature Codes	6
Material of housing, end shields and feet	6
Cooling.....	7
Standard terminal box equipment.....	8
Vibration level	8
Noise level.....	8
Terminal box.....	9
Degree of protection IP	10
Painting and corrosivity classes.....	11
Mounting arrangements	12
NEMA Frame Letters	13
NEMA Design Letters	14
Definitions	15
Permissible shaft end loads	16
Bearing types and bearing nodes	17
JM/JP Pump Motors	18
Motors with UL (UR) certificate	18
Nomenclature	19
Frequency converter operation (VSD).....	19
Totally Enclosed Motors IP 55, f=60Hz	20
Overall and Mounting Dimensions	22
List of Motor parts	30
Ordering information	32
Cantoni Group – Certifications.....	33
Our approach	34
Cantoni Group, Cantoni Motor	35

Efficiency of motors in the USA

USA began to regulate efficiency of electric motors in 1992 with the “Energy Efficiency Provision” of the Energy Policy Act (EPAct). In 1997, USA was the first country in the world to establish minimum energy performance standards (MEPS) for electric motors manufactured in or sold to USA. General-purpose motors 1HP-200HP were required to meet NEMA Energy Efficient standard (EPACT).

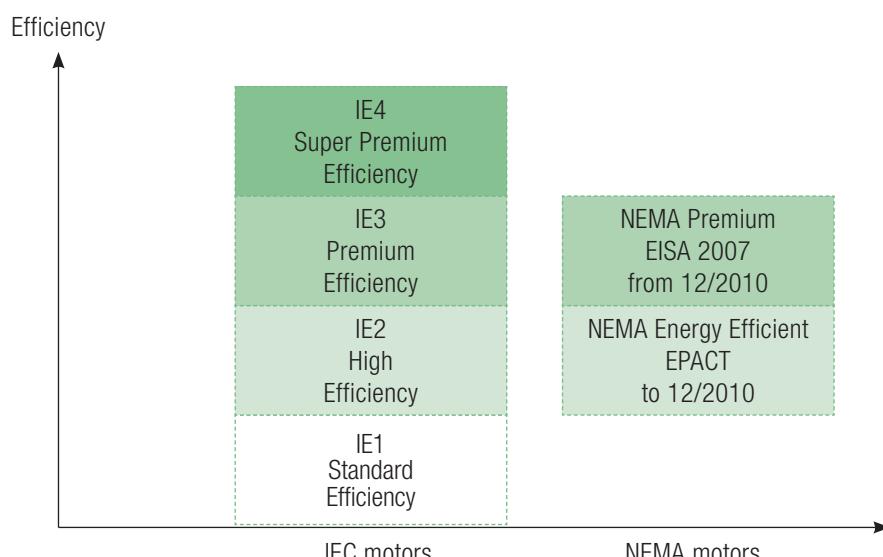
On 10 December 2010 the EISA (Energy Independence and Security Act of 2007) increased the requirement for general-purpose motors 1HP-200HP to NEMA Premium Efficiency.

Complying with above requirements the efficiency has to be determined in accordance with the requirements given in the CSA C390-10 or IEEE Std 112-2004 (Test Method B, Input-Output With Loss Segregation) standards.

From 1 June 2016: motors with a rated output between 1HP – 500HP shall have a minimum efficiency class NEMA PREMIUM.

New efficiency requirements are valid for single speed polyphase AC induction electric motors (60Hz) with the following specifications:

- with squirrel-cage rotor
- with rated voltage up to 600V
- with rated output from 1HP up to 500HP (or kW equivalents)
- rated for continuous duty operation (NEMA MG-1) or for duty type S1 (IEC 60034-1)
- 2p=2, 4, 6, 8
- complying with performance requirements of a NEMA design A, B or C or an IEC design N or H
- with three or four digit NEMA frame size (or IEC metric equivalent), including those designs between two consecutive NEMA frame sizes (or IEC metric equivalent) or an enclosed 56 NEMA frame size (or IEC metric equivalent).



As a Manufacturer participating in the NEMA Premium Efficient Electric Motor Program, Cantoni Motor S.A. has determined that our electric motors marked with NEMA Premium Mark meet NEMA Premium Efficient Electric Motor requirements.



NEMA Premium is a certification mark of the National Electrical Manufacturers Association

Ratings – Tolerances

Tolerances of motor parameters

Permissible deviations between catalogue values and real values:

Power factor $\cos \varphi$	$\Delta \cos \varphi = -1/6 (1 - \cos \varphi_N)$
Efficiency η	NEMA PREMIUM minimum according to NEMA MG-1
Speed n	$\Delta n = \pm 20\% (n_s - n_N)$
Locked rotor current ratio I_L/I_N	$\Delta (I_L/I_N) = +20\% (I_L/I_N)$
Locked rotor torque ratio T_L/T_N	$\min (T_L/T_N) = -15\% (T_L/T_N)$ $\max (T_L/T_N) = +25\% (T_L/T_N)$
Breakdown torque ratio T_B/T_N	$\Delta (T_B/T_N) = -10\% (T_B/T_N)$
Moment of inertia J [kgm ²]	$\Delta J = \pm 10\% J$
Sound pressure level L_{PA} [dB]	$\Delta L_{PA} = +3$ dB /A

Tolerances of supply voltage value and frequency

Motors comply in standard with voltage value and voltage frequency variations according to the NEMA MG-1:

Voltage value U	$\Delta U = \pm 10\%$ at rated frequency
Voltage frequency f	$\Delta f = \pm 5\%$ at rated voltage

Other extended tolerances of supply voltage and their frequency are available on request.

Standards

Depending on the execution, electric motors are manufactured according to the following standards and requirements:

Motors and Generators	NEMA MG-1
General requirements – Canadian Electrical Code, Part II	CSA C22.2 No. 0
Bonding of electrical equipment	CSA C22.2 No. 0.4
Motors and generators	CSA C22.2 No. 100
Rotating Electrical Machines – General Requirements	UL 1004-1, 2 nd Edition
Nonincendive electrical equipment for use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations	CSA C22.2 No. 213
Electric motors and generators for use in Hazardous (Classified) Locations	CSA C22.2 No. 145
Enclosures for use in Class II, Division 1, Groups E, F, and G Hazardous Locations	CSA C22.2 No. 25
Electric Motors and Generators for Use in Hazardous (Classified) Locations	UL Std. 674
Test Methods, Marking Requirements, and Energy Efficiency Levels for Three-Phase Induction Motors	CSA C390-10
Standard Test Procedure for Polyphase Induction Motors and Generators	IEEE 112-2004

All of our NEMA PREMIUM motors are also registered in DOE (CC number: CC117A) and Natural Resources Canada.

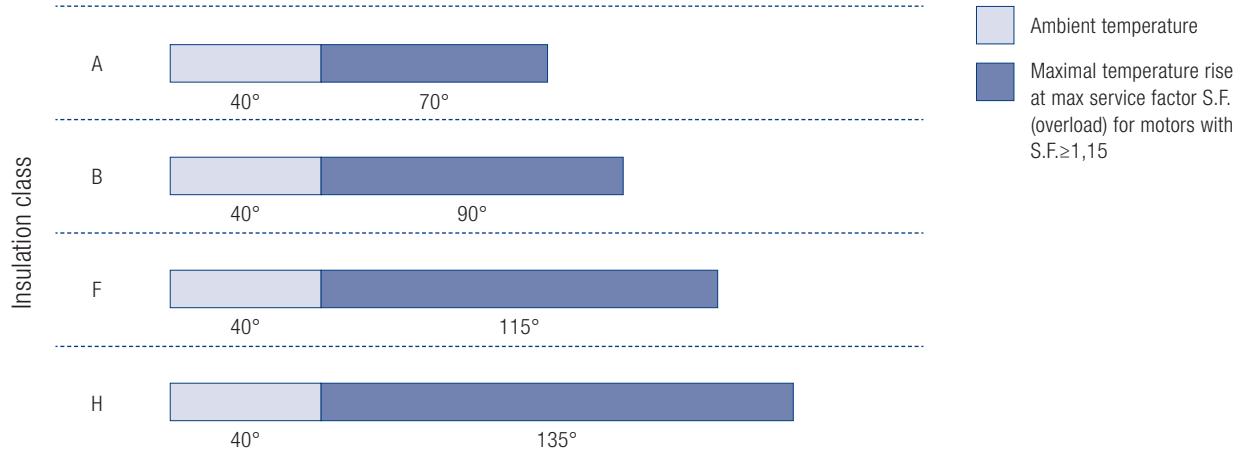
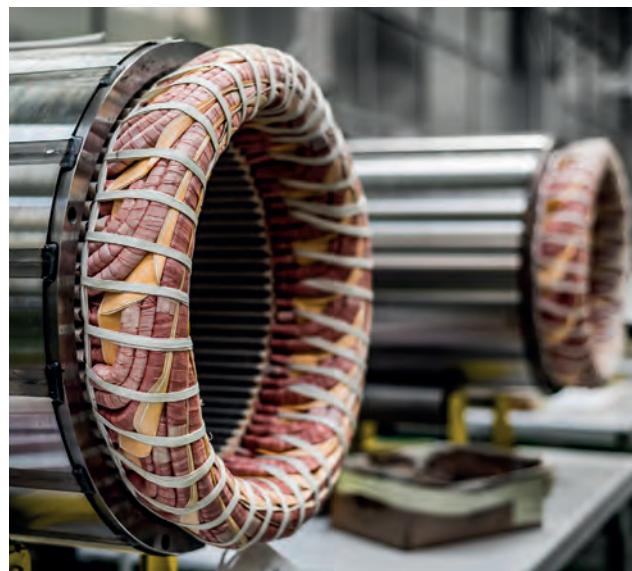
At the same time, our NEMA PREMIUM motors comply with European requirements – they can be CE marked.

Insulation classification

The insulation system of an electric motor is determined by a given insulation class on the basis of its thermal resistance. This thermal resistance should be guaranteed by the entire set of electric insulating materials used in the motor insulating system.

Thermal resistance classification is related to the temperature of the hotspot in the insulation occurring during rated operating conditions of the electric motor, allowing for the highest permissible rise in average temperature.

This rise should be selected so that at the highest permissible ambient temperature, the temperature of the hotspot in insulation will not exceed the value assigned to a given thermal resistance class.



Insulation class F in an electric motor means that at ambient temperature of 40°C and max service factor S.F. (overload) the temperature rise of the winding may be max. 115°C (under specified measuring conditions in accordance with the IEEE Std 112 standard).

4

Symbols of thermal resistance classes (permissible insulation temperatures at 40°C ambient temperature)

Symbol	Temperature [°C]
A	105
B	130
F	155
H	180

SIE series Class F/B

The standard SIE NEMA motors made by Cantoni Motor in their basic version have the insulation class F while the temperature rise is limited to class B (at S.F.=1,0). This means longer life for motors.

For special request we can deliver motors equipped with insulation class H.

Strengthened insulation system gives possibility to safe operation with frequency converters – please check page 19.

Hazardous Locations Classification

Our NEMA PREMIUM motors can be delivered in special execution for Hazardous Locations and are certified for Groups A, B, C, D, F and G.

Class I Div 2

Class II Div 2

CLASS – Defines the type of hazardous material (explosive or ignitable substances).

Class I	flammable gases, vapors or liquids, such as acetylene, hydrogen, ethylene, gasoline, etc.
Class II	combustible dust such as: coke dust, grain dust, etc.
Class III	easily ignitable fibers or flyings, such as: textile, saw dust, etc.

DIVISION – Defines the likelihood of the hazardous material being present in an explosive or ignitable concentration.

DIVISION 1	hazard can exist under normal, everyday operating conditions
DIVISION 2	hazard is not likely to exist during regular operation

GROUP – Hazardous materials classification based on their ignition temperatures and explosion pressures.

Group A	acetylene	
Group B	hydrogen, butadiene, ethylene oxide, propylene oxide and acrolein	Class I
Group C	ethylene, cyclopropane and ethyl ether	
Group D	acetone, ammonia, benzene, butane, ethanol, gasoline, hexane, methane, methanol, naphtha, natural gas, propane and toluene	
Group E	combustible metal dusts: aluminum, commercial alloys and magnesium	
Group F	combustible carbonaceous dusts: carbon black, charcoal, coal and coke dusts	Class II
Group G	other combustible dusts: chemicals, flour, grain, plastic and wood	

CAUTION: Design of equipment used in the Hazardous Locations should be always chosen based on the analysis of the final application done by the user in agreement with Local Safety Authorities.

Temperature Codes

T2B

The T-Code identifies the maximum absolute motor surface temperature that will develop under any conditions of operation.

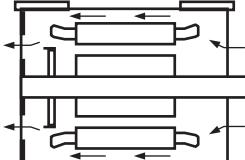
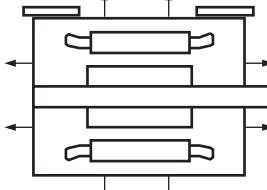
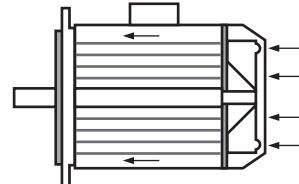
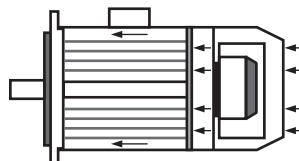
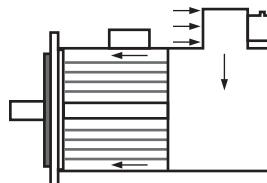
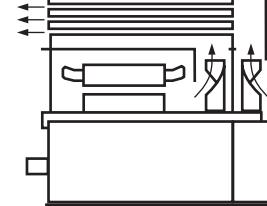
Temperature class marking	Maximum Temperature
T1	450°C (842°F)
T2	300°C (572°F)
T2A	280°C (536°F)
T2B	260°C (500°F)
T2C	230°C (446°F)
T2D	215°C (419°F)
T3	200°C (392°F)
T3A	180°C (356°F)
T3B	165°C (329°F)
T3C	160°C (320°F)
T4	135°C (275°F)
T4A	120°C (248°F)
T5	100°C (212°F)
T6	85°C (185°F)

Material of housing, end shields and feet

Frame size	Motor housing	End shields	Feet
SIE143, 145	Cast iron	Cast iron	Cast iron – integrated
SIE182, 184	Cast iron	Cast iron	Cast iron – integrated
SIE213, 215	Cast iron	Cast iron	Cast iron – integrated
SIE254, 256	Cast iron	Cast iron	Cast iron – integrated
SIE284, 286	Cast iron	Cast iron	Cast iron – integrated
SIE324, 326	Cast iron	Cast iron	Cast iron – screwed
SIE364, 365	Cast iron	Cast iron	Cast iron – screwed
SIE404, 405	Cast iron	Cast iron	Cast iron – screwed
SIE444, 445	Cast iron	Cast iron	Cast iron – screwed
SIE447, 449	Cast iron	Cast iron	Cast iron – screwed

Cooling

General purpose motors from Cantoni Group are equipped with standard IC411 cooling. Other cooling methods (for example motors with external/separate cooling) are available on request.

IC code	Description	Drawing
IC01	<ul style="list-style-type: none"> – Open machine – Fan mounted on shaft – Often called “drip-proof” motor 	
IC410	<ul style="list-style-type: none"> – Enclosed machine – Surface cooled by natural convection and radiation – Without internal or external fan 	
IC411	<ul style="list-style-type: none"> – Enclosed machine – Smooth or finned casing – External shaft-mounted fan – Often called TEFC motor 	
IC416A	<ul style="list-style-type: none"> – Enclosed machine – Smooth or finned casing – External motorized axial fan integrated with the motor 	
IC416R	<ul style="list-style-type: none"> – Enclosed machine – Smooth or finned casing – External motorized radial fan integrated with the motor 	
IC611	<ul style="list-style-type: none"> – Enclosed machine – Heat Exchanger fitted – Two separate air circuits – Shaft-mounted Fans – Often called CacA motor 	

Standard terminal box equipment

Motor frame size	Number of supply leads	Number of threaded inlet holes	Size of threaded inlet holes [inch]	Optional rotation of terminal box	Temperature sensors in the winding	Thermal protection of bearings
143, 145	9	1	0.75	180°	on request	no
182, 184	9	1	1	180°	on request	no
213, 215	12	1	1	180°	on request	on request
254, 256	12	1	1.25	180°	on request	on request
284, 286	12	1	1.5	180°	on request	on request
324, 326	12	1	2	4x90°	3xPTC	on request
364, 365	12	1	3	4x90°	3xPTC	on request
404, 405	12	1	3	4x90°	3xPTC	on request
444, 445, 447, 449	12	2	3	4x90°	3xPTC	on request

Vibration level

The rotors balancing method guarantees that standard vibration level of motors is much lower than required for general industrial motors according to NEMA MG-1 (0.15in/s). On customer's demand the motors can be produced with even more reduced vibration level.

Vibration level in standard and reduced execution:

Vibration level	Mounting	in/s
Standard	Resiliently	0.087
	Rigid	0.071
Reduced	Resiliently	0.043
	Rigid	0.035

Remark:

Limits stated in the table mentioned above are applicable for uncoupled (disconnected from the driven machine) and operating at no load motors.

Noise level

Motors in standard comply with a permissible sound power level according to NEMA MG-1.

On customer's demand the motors can be delivered with reduced noise level by using special cooling systems or additional external sound-absorbing covers.

Terminal box

The standard mounting position for NEMA motors is F1 – the terminal box is located on the left side of the motor facing the output shaft and it is equipped with 9 (size 143T...184T) or 12 (size 213T...449T) supply leads (without terminal block).

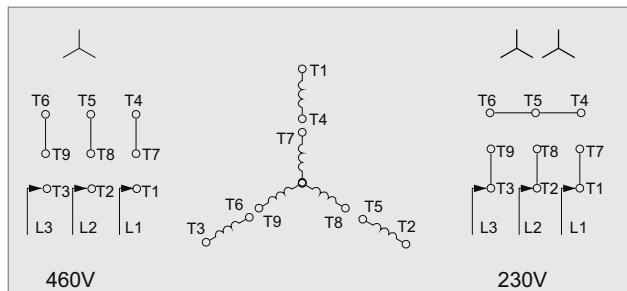
Our NEMA PREMIUM motors are also available with terminal box on right side (F2) or on top (F3).

As standard, motors are offered with aluminium terminal box for sizes 143–286, and cast iron for sizes 320–440.

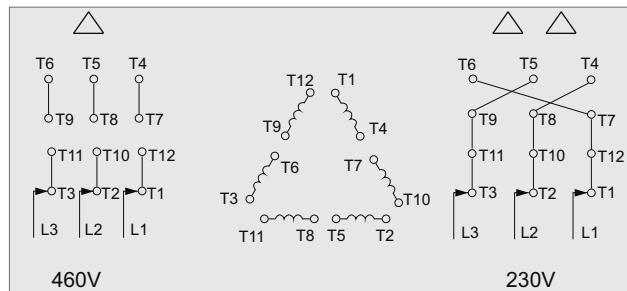
As optional execution, for sizes 143–286 can be also cast iron terminal box.

Basic Connection Diagrams

Connection diagram of 143T÷184T motors,
nominal voltage 230/460V

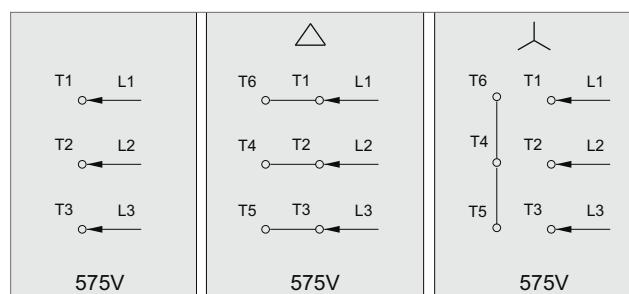


Connection diagram of 213T÷449T motors, nominal voltage 230/460V except 449TS2 & 449TS2C (only 460V)



Motors in 230V/460V execution are capable of Part Winding Starting (PWS).

Connection diagram of 143T÷449T motors, in special execution with nominal voltage 575V – 3 or 6 supply leads



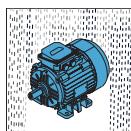
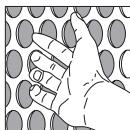
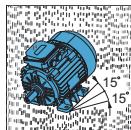
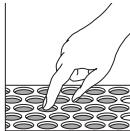
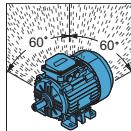
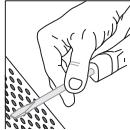
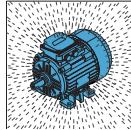
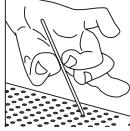
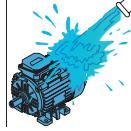
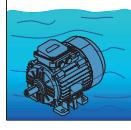
Degree of protection IP

IP 55

Standard degree of protection of our NEMA Premium general purpose and Class I Div 2 motors is IP55.

Class II Div 2 motors comply with requirements of IP66.

IP 66

Protection against penetration of solid matter		Protection against penetration of fluids	
1st digit	Description	2nd digit	Description
0		0	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	

10

Motors size 143 to 286 are equipped with seal rings (Simmerring or V-ring) on drive side and on non drive side. Labyrinth seals protect the motors from size 324 and above. The terminal box is sealed with a gasket.

Higher degree of protection is available on request.

Painting and corrosivity classes

Standard painting system with RAL7011 color used in all our motors comply with C3 corrosion class according to ISO 12944.

RAL 7011/C3

For special request motors can be painted with other colors and with alternative painting systems (up to C5M corrosion class).

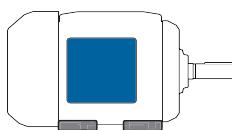


Corrosion class	Environment	
	Interior	Exterior
C1 (very low)	Heated buildings with a clean atmosphere such as hotels, offices, shops, schools.	N/A
C2 (low)	Unheated buildings, where condensation may occur e.g. storehouses, sports halls.	Atmosphere contaminated to a small extent, mostly rural regions.
C3 (medium)	Production space of high humidity and certain air contamination e.g. foodstuff plants, laundries, breweries, dairies.	Industrial and urban atmosphere with an average Sulphur oxide (IV) contamination level. Inshore areas of low salinity.
C4 (high)	Chemical plants, swimming pools, ship repair yards.	Industrial areas and inshore areas of medium salinity.
C5I (very high – industrial)	Buildings and areas of almost constant condensation and high contamination.	Industrial areas of high humidity and aggressive atmosphere.
C5M (very high – marine)	Buildings and areas of almost constant condensation and high contamination.	Coast and offshore areas with high salt content.

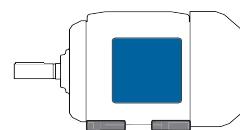
Mounting arrangements

According to the NEMA MG-1 standard

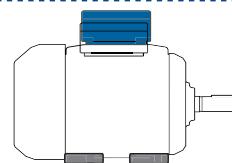
NEMA Floor Mountings



F1 ASSEMBLY

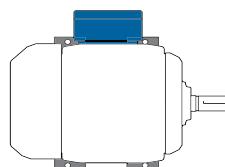


F2 ASSEMBLY

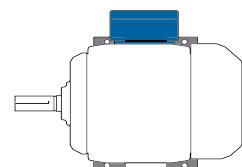


F3 ASSEMBLY

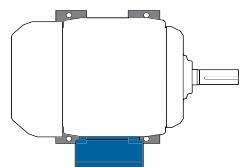
NEMA Wall Mountings



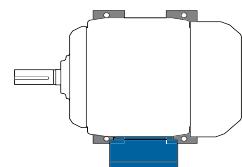
W1 ASSEMBLY



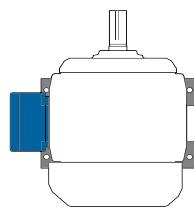
W2 ASSEMBLY



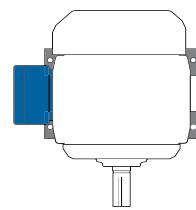
W3 ASSEMBLY



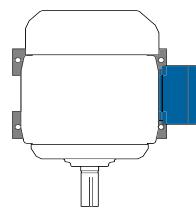
W4 ASSEMBLY



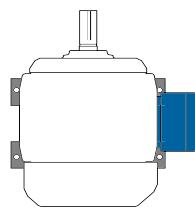
W5 ASSEMBLY



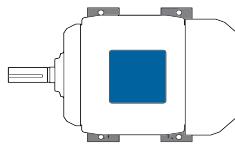
W6 ASSEMBLY



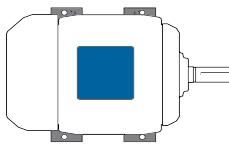
W7 ASSEMBLY



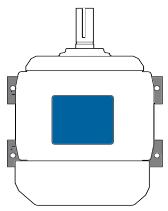
W8 ASSEMBLY



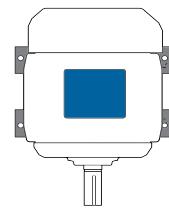
W9 ASSEMBLY



W10 ASSEMBLY

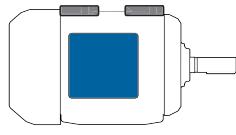


W11 ASSEMBLY

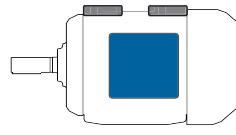


W12 ASSEMBLY

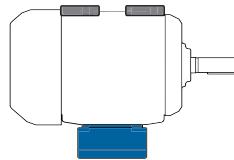
NEMA Ceiling Mountings



C1 ASSEMBLY



C2 ASSEMBLY



C3 ASSEMBLY

In standard, motors are offered in F1 execution – other mounting arrangements are available on request. Cantoni NEMA Premium motors frames 143 up to 286 can be easily converted from F1 to F2 terminal box position by housing rotation.

Additionally, motors frames 324 up to 449 can be converted to round body by removing screwed feet.

NEMA Frame Letters

Our SIE NEMA PREMIUM motors are offered in different executions marked in motor type with proper Frame Letters according to NEMA MG-1 requirements: C, D, JM, JP and S. Frame Letter T is our standard execution. Other special executions of motors are available on request.

C-face D-flange

Frame letters according to NEMA MG-1:

Letter	Definition
A	Industrial direct-current machine
B	Carbonator pump motors (see NEMA MG-1, 18.270–18.281)
C	Type C face mounting on drive end
CH	Face mounting dimensions are different from those for the frame designator having the suffix letter „C”
D	Type D flange mounting on drive end
E	Shaft extension dimensions for elevator motors in frames larger than 326T frames
FC	Face mounting on opposite drive end
G	Gasoline pump motors (see NEMA MG-1, 18.91)
H	Indicates a small machine having an „F” dimension larger than that of the same frame without the suffix letter „H” (See NEMA MG-1, 4.4.1 and 4.5.1)
HP, HPH	Type P flange-mounted, vertical solid-shaft motors having dimensions in accordance with NEMA MG1-1, 18.252
J	Jet pump motors (see NEMA MG1-1, 18.132)
JM	Face-mounted, close-coupled pump motor having antifriction bearings and dimensions in accordance with Table 1 of MG-1, 18.250
JP	Type C face-mounted, close-couple pump motor having antifriction bearings and dimensions in accordance with Table 2 of MG-1, 18.250
K	Sump pump motors (see NEMA MG-1, 18.78)
LP, LPH	Type P flange-mounted, vertical solid-shaft motors having dimensions in accordance with MG-1, 18.251
M	Oil burner motors (see NEMA MG-1, 18.106)
N	Oil burner motors (see NEMA MG-1, 18.106)
P, PH	Type P flange-mounted, vertical hollow-shaft motors having dimensions in accordance with NEMA MG-1, 18.238
R	Drive end tapered shaft extension having dimensions in accordance with NEMA MG-1, 4.4.2
S	Standard short shaft for direct connection
T	Included as part of a frame designation for which standard dimensions have been established
U	Previously used as part of a frame designation for which standard dimensions had been established
V	Vertical mounting only
VP	Type P flange-mounted, vertical solid-shaft motors having dimensions in accordance with NEMA MG-1, 18.237
X	Wound-rotor crane motors with double shaft extension (see NEMA MG-1, 18.229 and 18.230)
Y	Special mounting dimensions
Z	All mounting dimensions are standard except the shaft extension(s). It is also used to designate double shaft extension.

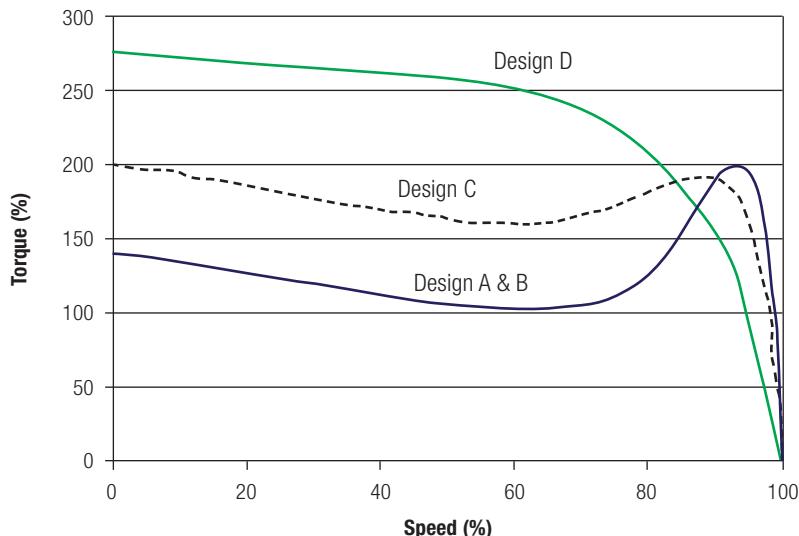
NEMA Design Letters

Standard definitions for design A, B, C and D. The letter designation describes the torque and current characteristics of the motors.

Design A or B

	Locked Rotor Torque [%]	Pull Up Torque [%]	Breakdown Torque [%]	Slip	Typical applications	Features
NEMA DESIGN A	70-275	65-190	175-300	<5%	Fans, blowers, centrifugal pumps and compressors, motorgenerator sets, etc. where starting torque requirements are relatively low	Have normal starting torques but high starting currents. This is useful for applications with brief heavy overloads.
NEMA DESIGN B	70-275	65-190	175-300	<5%	Fans, blowers, centrifugal pumps and compressors, motorgenerator sets, etc. where starting torque requirements are relatively low	Have normal starting torque combined with a low starting current. This motors have sufficient locked rotor torques to start a wide variety of industrial applications.
NEMA DESIGN C	200-285	140-195	190-225	<5%	Conveyors, crushers, stirring motors, agitators, reciprocating pumps and compressors, etc., where starting under load is required	Have high starting torques with low starting currents. These motors are designed for starting heavy loads due to their high, locked rotor torques.
NEMA DESIGN D	275	N/A	N/A	≥5%	High peak loads with or without flywheels such as punch presses, shears, elevators, winches, hoists, oil-well pumping and wire drawing motors	Have high starting torques and low starting current, however, they feature high slip. This reduces power peaks in the event that peak power is encountered, motor slip will increase.

Torque vs Speed Characteristics



Relative torque characteristics of NEMA Design A, B, C, D motors

Cantoni NEMA Premium motors fulfil and even exceed (torque values) requirements for Design A, B or C. Other Design types are available upon request.

Definitions

Relation between rated output power and rated torque on motor shaft:

$$T = \frac{5252 \times P}{n}$$

where:

- T [Lbft] is rated output torque on motor shaft
- P [HP] is rated output power on motor shaft
- n [rpm] is rated speed of motor shaft

Relation between rated output power on shaft and rated consumed power from mains:

$$P_1 = \frac{745,6 \times P}{\eta} \times 100$$

where:

- P_1 [W] is rated consumed power from mains by motor
- P [HP] is rated output power on motor shaft
- η [%] is rated efficiency of motor

Relation between rated consumed power from mains and rated voltage, current, power factor:

$$P_1 = \sqrt{3} \times U \times I \times \cos\varphi$$

where:

- P_1 [W] is rated consumed power from mains by motor
- U [V] is rated supply voltage of motor
- I [A] is rated current consumed from mains by motor
- $\cos\varphi$ is rated power factor of motor

Units of measurement

15

Parameter name	Symbol	Unit name	Symbol
Frequency	f	Hertz	Hz
Active power	P_1	Watt	W
Shaft power	P	Horse Power	HP
Voltage	U	Volt	V
Electric Current	I	Amper	A
Power factor	$\cos\varphi$	N/A	N/A
Resistance	R	Ohm	Ω
Sound power level	L_{WA}	decibel	dB
Sound pressure level	L_{PA}	decibel	dB

Permissible shaft end loads

Frame size	Number of poles	Horizontal operation		Vertical operation		Frame size	Number of poles	Horizontal operation		Vertical operation		
		F_R	F_p	F_p	F_{a1}			F_p	F_{a1}	F_{a2}		
		$F_R(x=0)$ [kN]	$F_R(x=\text{max})$ [kN]					$F_R(x=0)$ [kN]	$F_R(x=\text{max})$ [kN]			
SIE 143, 145	2	0,79	0,66	0,64	0,44	0,84	SIE365TS	2	2,91	2,52	2,33	
	4	1,00	0,83	0,80	0,65	1,05	SIE365T	4	3,46	2,78	2,88	
	6	1,15	0,95	0,90	0,77	1,17	6	3,98	3,2	3,66	2,47	
SIE 182, 184	2	1,56	1,22	1,23	0,84	1,60	SIE404T	6	5,15	4,05	4,13	2,63
	4	1,92	1,58	1,50	1,19	1,96	SIE405TS	2	3,84	3,31	2,94	2,17
	6	2,20	1,80	1,69	1,26	2,20	SIE405T	4	4,23	3,32	3,53	2,15
SIE 213, 215	2	2,11	1,65	1,82	0,98	2,37	SIE444TS	6	4,92	3,87	4,07	2,41
	4	2,67	2,08	2,31	1,36	3,00	SIE444T	2	3,44	2,98	2,83	1,65
	6	3,06	2,39	2,51	1,40	3,26	SIE444T	4	5,71	4,48	4,55	2,88
SIE 254, 256	2	2,43	1,88	1,97	1,00	2,56	SIE445TS	6	6,46	5,07	3,35	1,34
	4	3,06	2,38	2,54	1,43	3,31	SIE445T	2	3,25	2,81	2,77	1,49
	6	3,54	2,81	2,83	1,80	3,68	SIE445T	4	5,33	4,18	4,44	2,54
SIE 284, 286	2	2,61	2,13	2,20	1,00	2,87	SIE445T	6	5,95	4,66	5,04	2,69
	4	3,30	2,68	2,83	1,37	3,68	SIE447TSA	2	2,87	2,53	2,74	1,22
	6	3,78	3,07	3,17	1,93	4,12	SIE447TA	4	4,66	3,74	4,25	1,85
SIE324TS	2	2,86	2,45	2,14	1,68	2,74	SIE447TSB	2	2,3	2,02	2,4	0,57
	4	3,36	2,72	2,63	1,93	3,53	SIE447TB	4	4,09	3,34	4,08	1,28
	6	3,96	3,21	3,37	2,62	4,38	SIE449TS2	2	3,04	2,76	2,90	N/A
SIE326TS	2	2,73	2,34	2,1	1,58	2,78	SIE449TS2C	2	2,51	2,28	2,76	N/A
	4	3,11	2,52	2,55	1,73	3,63	SIE449T4	4	7,86	6,65	6,39	3,34
	6	3,87	3,14	3,35	2,55	4,41	SIE449T4C	4	7,15	6,05	5,73	2,29
SIE364TS	2	3,08	2,66	2,38	1,78	3,16	SIE449T6	6	8,70	7,37	7,23	2,99
	4	3,67	2,95	2,94	2,05	4,09	SIE449T6C	6	8,09	6,84	7,06	2,41
	6	4,15	3,33	3,72	2,61	5,17	SIE449T6D	6	7,35	6,22	6,84	1,65

Value of radial force F_R acting on the shaft end for a given belt pulley diameter is calculated according to the following formula:

$$F_R = \frac{19600 \times P \times k}{D_k \times n} \text{ [N]}$$

where: P – motor output [kW]

D_k – belt pulley diameter [m]

n – speed [rpm]

k – belt tension factor:

for V-belts k=2,2

for flat belts k=3

Value of force F_R acting on any point of the shaft end (between points $X=\text{max}$ and $X=0$) may be calculated according to the following formula:

$$F_R = F_{x0} - \frac{X}{E} \times (F_{x0} - F_{x\text{MAX}}) \text{ [N]}$$

where: F_{x0} – value of F_R force acting on the beginning of the shaft end

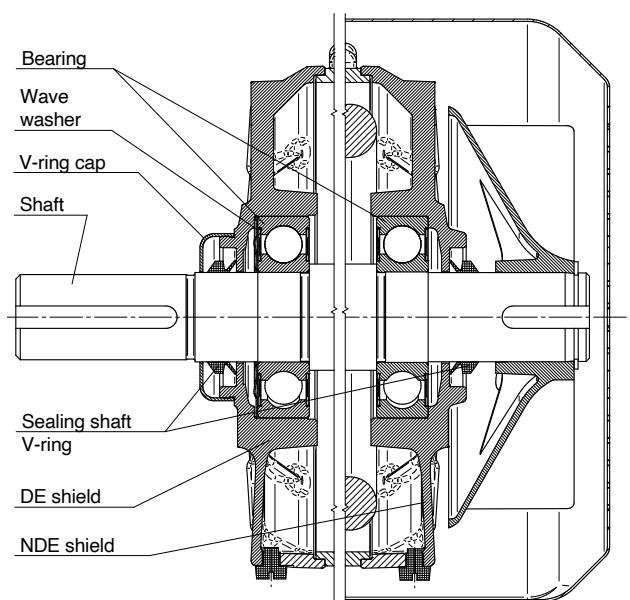
$F_{x\text{MAX}}$ – value of F_R force acting on the end of the shaft end

E – lenght of the shaft end

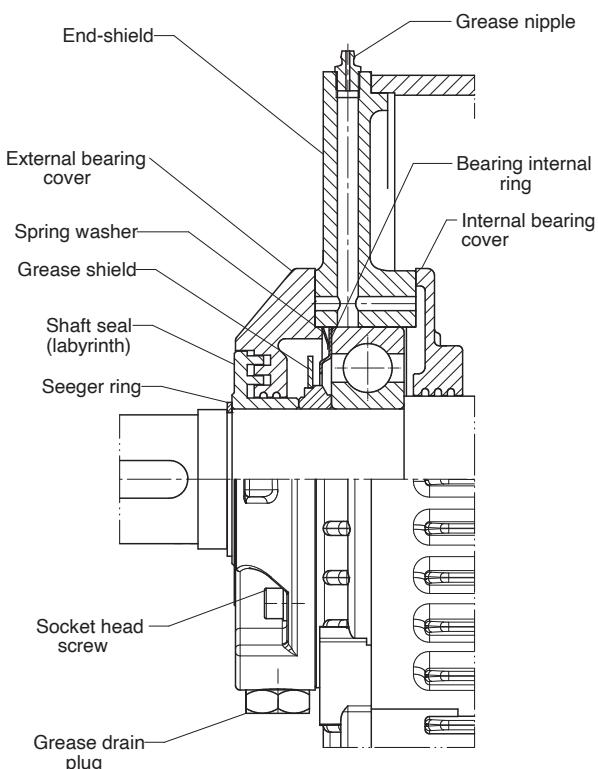
Bearing types and bearing nodes

Frame size	Number of poles	Bearings	Frame size	Bearings lubrication on the run
143, 145	2÷6	6205 2Z C3	143, 145	no
182, 184	2÷6	6306 2Z C3	182, 184	no
213, 215	2÷6	6308 2Z C3/ 6306 2Z C3	213, 215	on request
254, 256	2÷6	6309 2Z C3	254, 256	on request
284, 286	2÷6	6311 2Z C3	284, 286	on request
324, 326	2÷6	6312 C3	324, 326	yes
364, 365	2÷6	6313 C3	364, 365	yes
404, 405	2÷6	6315 C3	404, 405	yes
444, 445, 447	2	6315 C3	444, 445, 447	yes
444, 445, 447	4÷6	6318 C3		
449	2	6317 C3	449	yes
449	4÷6	6322 C3		

Frame size
SIE143 ÷ 286



Frame size
SIE324 ÷ 449



JM/JP Pump Motors

Three-phase JM/JP Pump Motors are designed for use with close-coupled pumps having NEMA JP or JM mounting end shaft dimensions. In such applications, the pump impeller is mounted directly on the motor shaft. All motors are designed for continuous duty service.

JM pump motors are available in frame sizes 143 up to 326 and JP pump motors are available in frame sizes from 143 up to 365 according to standard NEMA MG-1.

Except for dimensions, all motor features and electrical parameters of JM/JP pump motors offered by Cantoni Group are the same as in standard NEMA Premium motors.



Motors with UL (UR) certificate

We can deliver our SIE NEMA PREMIUM motors designed and produced according to UL requirements delivered with Certificate Of Compliance.



CERTIFICATE OF COMPLIANCE

Certificate Number	20160630 – E233211
Report Reference	E233211 - 20111214
Issue Date	2016-JUNE-30
Issued to:	CANTONI MOTOR SA ul 3 Maja 28 43-400 Cieszyn, POLAND
This is to certify that representative samples of	Motors - Component (See following page for additional model information.)
Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.	
Standard(s) for Safety:	ANSI/UL 1004-1, "Rotating Electrical Machines - General Requirements" and CSA-C22.2 No. 100, "Motors and Generators."
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

The UL Recognized Component Mark generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark:  may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

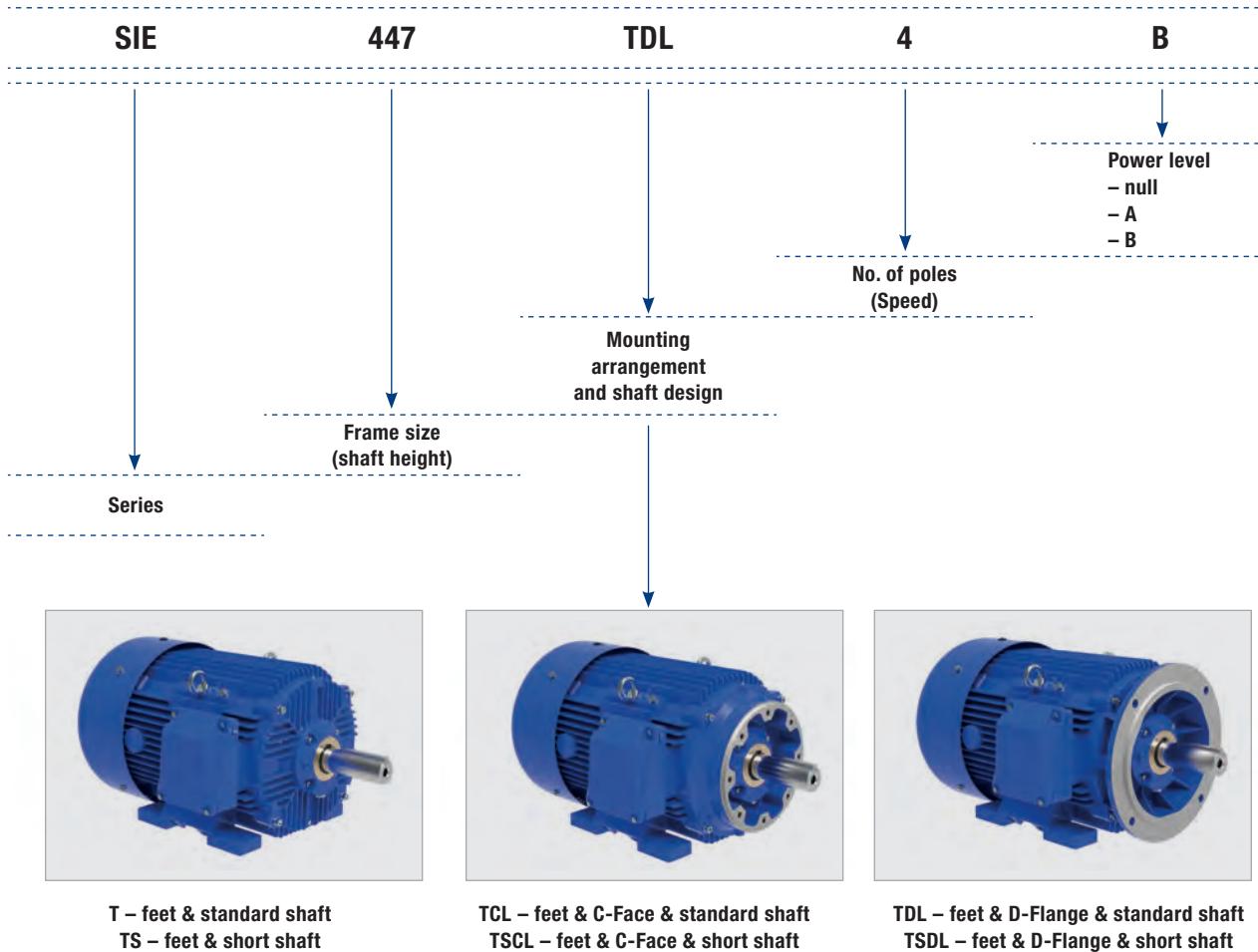
Look for the UL Certification Mark on the product.


Bruce Mahrholz, Director North American Certification Program
UL LLC
Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at ul.com/aboutul/contact.



In order to see Cantoni Motor's current range of UL certified products, you can log into UL Product iQ™ database at <https://productiq.ulprospector.com/>.

Nomenclature



Frequency converter operation (VSD)

Electronic speed control is carried out using a frequency converter (VSD) that adjusts the speed of the motor – and therefore the torque produced – based on the energy needed.

19

Motor size	SIE143-286	SIE324-444	SIE445-449
In standard designed for frequency converter supply	Yes	Yes	Yes
Permissible output parameters of the frequency converter (measured on motor terminals – including supply cable between motor and frequency converter):	$U_{\text{peak}} \leq 1,35 \text{ kV}$ $t \geq 0,8 \mu\text{s}$		
	In case of higher voltage peaks and/or lower time rise it's necessary to use motors with special insulation systems (available on request) or to use proper output filters in the frequency converter (which can reduce voltage peaks and increase voltage time rise).		
Insulated bearing or bearing chamber on NDE-side	N/A	Available on request	Recommended in motors designed for frequency converter supply with rated power >125HP
Speed control range	Permissible speed control range will depend on the application (load curve) and parameters of the frequency converter thus it should be established individually.		

Totally Enclosed Motors IP55 f=60Hz

Item	Type	Rated power	Rated speed	Rated torque		Rated Efficiency [%]		Power factor				Current Amps at 460V		Current Amps at 575V		Locked rotor torque ratio		Breakdown torque ratio		NEMA Code Letter	Wk ²	Service factor	Net Weight
		HP	RPM	Lbft	50% load	75% load	100% load	50% load	75% load	100% load	Full load [A]	Locked rotor [A]	Full load [A]	Locked rotor [A]	%	%	-	Lb-Ft ²	-	Lbs			
RPM=3600 min-1																							
1	SIE 143T2	1.5	3540	2.2	79.8	83.2	84.0	0.57	0.69	0.78	2.1	20.0	1.7	16.0	350	410	M	0.07	1.4	56			
2	SIE 145T2	2	3525	3.0	83.3	85.7	85.5	0.62	0.75	0.82	2.7	25.4	2.2	20.3	360	400	L	0.08	1.4	57			
3	SIE 182T2	3	3500	4.5	84.4	86.4	86.5	0.65	0.76	0.82	4.0	32.0	3.2	25.6	310	320	K	0.12	1.4	76			
4	SIE 184T2	5	3535	7.4	86.7	88.6	88.5	0.68	0.80	0.85	6.2	73.0	5.0	58.4	450	530	N	0.2	1.4	102			
5	SIE 213T2	7.5	3525	11.2	88.7	90.0	89.5	0.81	0.89	0.92	8.5	76.0	6.8	60.8	290	315	K	0.45	1.3	159			
6	SIE 215T2	10	3535	14.8	89.3	90.4	90.2	0.80	0.88	0.91	11.4	93.0	9.1	74.4	300	335	J	0.5	1.3	173			
7	SIE 254T2	15	3540	22.3	90.5	91.8	91.7	0.77	0.85	0.87	17.6	112	14.1	90.0	240	250	G	1.15	1.3	258			
8	SIE 256T2	20	3540	29.7	91.7	92.4	91.7	0.82	0.88	0.89	22.9	138	18.3	110	230	260	F	1.47	1.3	306			
9	SIE 284TS2	25	3555	36.9	91.3	92.4	92.4	0.74	0.82	0.86	29.5	205	23.6	164	260	300	H	1.72	1.2	348			
10	SIE 286TS2	30	3540	44.5	91.2	92.0	91.7	0.80	0.85	0.87	35.2	215	28.2	172	250	300	G	1.92	1.2	390			
11	SIE 324TS2	40	3552	59	92.7	93.0	92.4	0.88	0.91	0.92	44.0	290	35.0	234	145	200	G	4.0	1.2	608			
12	SIE 326TS2	50	3552	74	93.5	93.7	93.0	0.89	0.92	0.92	55.0	362	44.0	290	145	200	G	4.7	1.2	655			
13	SIE 364TS2	60	3562	88.5	93.8	94.1	93.6	0.87	0.91	0.92	65.0	435	52.0	348	125	200	G	6.5	1.2	860			
14	SIE 365TS2	75	3560	111	94.2	94.3	93.6	0.89	0.91	0.92	82.0	545	65.0	435	120	200	G	7.9	1.2	933			
15	SIE 405TS2	100	3565	147	95.3	95.6	95.4	0.83	0.88	0.90	109	725	87.0	580	170	240	G	10.0	1.2	1058			
16	SIE 444TS2	125	3578	184	95.1	95.3	95.0	0.86	0.90	0.92	134	956	107	768	140	260	G	22.5	1.2	1488			
17	SIE 445TS2	150	3578	220	95.2	95.3	95.0	0.86	0.91	0.92	161	1192	129	955	160	270	G	28.4	1.2	1594			
18	SIE 447TS2A	200	3578	294	95.8	95.8	95.4	0.88	0.92	0.93	211	1507	169	1206	150	250	G	29.1	1.2	2161			
19	SIE 447TS2B	250	3579	367	96.1	96.2	95.8	0.89	0.92	0.93	263	1912	210	1528	180	270	G	36.9	1.2	2271			
20	SIE 449TS2	300	3572	441	93.2	95.3	95.8	0.91	0.93	0.94	312	2340	249	1868	160	350	G	69.5	1.15	3109			
21	SIE 449TS2C	350	3575	514	93.2	95.3	95.8	0.92	0.94	0.95	360	2700	288	2160	170	360	G	83.1	1.15	3439			
RPM=1800 min-1																							
22	SIE 143T4	1	1765	3	81.3	84.5	85.5	0.57	0.70	0.78	1.4	12.9	1.1	10.3	300	320	M	0.09	1.4	53			
23	SIE 145T4	1.5	1750	4.5	85.0	86.8	86.5	0.59	0.72	0.79	2.1	16.6	1.6	13.3	300	400	K	0.1	1.4	57			
24	SIE 145T4	2	1745	6	85.8	87.1	86.5	0.64	0.77	0.83	2.6	19.2	2.1	15.4	260	340	J	0.13	1.4	59			
25	SIE 182T4	3	1775	8.9	85.8	88.5	89.5	0.54	0.67	0.75	4.2	38.0	3.4	30.4	320	400	M	0.27	1.4	102			
26	SIE 184T4	5	1770	14.8	87.6	89.2	89.5	0.58	0.71	0.78	6.7	61.0	5.4	48.8	300	380	L	0.34	1.3	108			
27	SIE 213T4	7.5	1765	22.3	90.5	91.6	91.7	0.67	0.78	0.82	9.3	71.0	7.4	56.8	240	290	J	0.87	1.3	167			
28	SIE 215T4	10	1770	29.6	90.4	91.7	91.7	0.66	0.77	0.82	12.5	87.0	10.0	69.6	230	280	H	0.99	1.3	185			
29	SIE 254T4	15	1775	44.3	90.7	92.0	92.4	0.76	0.84	0.88	17.3	168	13.8	134.4	380	440	K	2.89	1.3	301			
30	SIE 256T4	20	1775	59.1	91.4	92.7	93.0	0.76	0.84	0.88	22.9	230	18.3	184	380	450	L	3.57	1.2	390			
31	SIE 284T4	25	1780	73.7	91.6	93.1	93.6	0.66	0.76	0.82	30.5	300	24.4	240	380	420	L	3.59	1.2	397			
32	SIE 286T4	30	1780	88.4	91.3	93.0	93.6	0.61	0.73	0.80	37.5	350	30.0	280	370	390	L	3.84	1.2	441			
33	SIE 324T4	40	1780	118	94.3	94.7	94.1	0.78	0.86	0.88	45.0	290	36.0	232	240	270	G	9.3	1.3	690			
34	SIE 326T4	50	1781	148	94.9	95.1	94.5	0.78	0.85	0.88	56.0	362	45.0	290	250	270	G	11.6	1.3	769			
35	SIE 364T4	60	1786	177	95.3	95.6	95.0	0.80	0.87	0.88	67.0	435	54.0	348	140	200	G	15.5	1.2	926			
36	SIE 365T4	75	1787	221	95.5	95.8	95.4	0.80	0.86	0.88	84.0	542	67.0	434	150	210	G	17.8	1.2	1012			
37	SIE 405T4	100	1785	294	95.7	95.9	95.4	0.84	0.89	0.91	108	790	86.0	632	220	230	G	29.8	1.2	1241			
38	SIE 444T4	125	1788	367	95.7	95.8	95.4	0.85	0.89	0.90	136	909	109	726	175	210	G	42.9	1.2	1662			
39	SIE 445T4	150	1788	441	96.1	96.2	95.8	0.86	0.90	0.91	161	1085	129	868	180	200	G	52.7	1.2	1823			
40	SIE 447T4A	200	1790	587	96.2	96.7	96.5	0.81	0.87	0.89	218	1550	174	1240	170	200	G	68.0	1.2	2310			
41	SIE 447T4B	250	1788	735	96.5	96.6	96.2	0.85	0.90	0.91	267	1825	214	1460	160	200	G	81.5	1.2	2447			
42	SIE 449T4	300	1782	884	95.6	96.1	96.2	0.83	0.88	0.88	332	2025	265	1617	170	230	F	68.9	1.15	3142			
43	SIE 449T4C	350	1785	1030	96.5	96.5	96.2	0.84	0.89	0.90	378	2419	303	1939	180	240	F	86.9	1.15	3351			

We offer special JM pump motors up to frame size 326 and JP pump motors up to frame size 365.

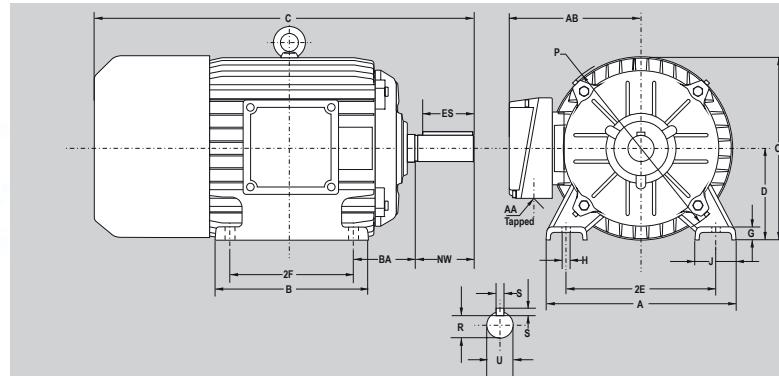
Totally Enclosed Motors IP55 f=60Hz

Item	Type	Rated power			Rated speed			Rated torque			Efficiency [%]		Power factor			Current Amps at 460V			Current Amps at 575V			Locked rotor torque ratio			NEMA Code Letter		Wk ²	Service factor	Net Weight	
		HP	RPM	Lbft	50% load	75% load	100% load	50% load	75% load	100% load	Full load [A]	Locked rotor [A]	Full load [A]	Locked rotor [A]	%	%	—	Lb-Ft ²	—	Lbs	%	%	Breakdown torque ratio							
RPM=1200 min-1																														
44 SIE 145T6	1	1160	4.5	78.6	81.9	82.5	0.46	0.59	0.68	1.7	10.0	1.4	8.0	240	300	K	0.15	1.4	55											
45 SIE 182T6	1.5	1170	6.7	84.5	86.9	87.5	0.47	0.59	0.68	2.4	14.0	1.9	11.2	190	280	J	0.4	1.4	85											
46 SIE 184T6	2	1170	9.0	86.9	88.6	88.5	0.51	0.64	0.72	3.0	25.0	2.4	20.0	200	300	L	0.45	1.4	98											
47 SIE 213T6	3	1165	13.5	88.0	89.5	89.5	0.56	0.68	0.74	4.2	32.0	3.4	25.6	260	360	K	1.45	1.4	205											
48 SIE 215T6	5	1170	22.4	88.2	89.6	89.5	0.57	0.69	0.75	7.0	46.0	5.6	36.8	250	350	J	1.56	1.3	220											
49 SIE 254T6	7.5	1185	33.2	88.6	90.6	91.0	0.54	0.67	0.74	10.4	77.5	8.3	62.0	320	350	K	2.63	1.3	321											
50 SIE 256T6	10	1180	44.5	89.2	90.8	91.0	0.58	0.70	0.77	13.4	94.0	10.7	75.2	290	330	J	3.31	1.3	363											
51 SIE 284T6	15	1185	66.4	89.0	91.2	91.7	0.61	0.73	0.79	19.5	180	15.6	144	470	380	L	5.19	1.3	371											
52 SIE 286T6	20	1185	88.5	89.1	91.1	91.7	0.63	0.74	0.80	25.5	221	20.4	177	380	320	L	6.03	1.2	421											
53 SIE 324T6	25	1190	110	92.4	93.3	93.0	0.65	0.75	0.80	31.5	182	25	146	230	240	G	12.9	1.3	653											
54 SIE 326T6	30	1190	132	92.6	93.3	93.0	0.69	0.78	0.82	37.0	217	30	174	230	240	G	14.7	1.3	681											
55 SIE 364T6	40	1192	176	93.5	94.2	94.1	0.68	0.78	0.82	48.5	290	39	232	180	210	G	23.1	1.3	917											
56 SIE 365T6	50	1191	221	93.7	94.3	94.1	0.71	0.80	0.83	60.0	362	48	290	170	200	G	25.9	1.3	970											
57 SIE 404T6	60	1192	264	93.7	94.4	94.5	0.68	0.78	0.82	72.0	435	58	348	180	200	G	36.8	1.3	1127											
58 SIE 405T6	75	1191	331	94.4	94.9	94.5	0.70	0.79	0.82	91.0	542	73	434	140	200	G	41.9	1.2	1210											
59 SIE 444T6	100	1192	441	93.9	94.9	95.0	0.65	0.75	0.80	123	725	98	580	190	200	G	64.1	1.2	1726											
60 SIE 445T6	125	1192	551	95.3	95.6	95.4	0.67	0.77	0.80	153	910	122	728	190	200	G	76.3	1.2	1931											
61 SIE 449T6	200	1192	881	94.2	95.5	95.8	0.64	0.76	0.80	244	1562	195	1248	240	260	G	88.1	1.15	2939											
62 SIE 449T6C	250	1192	1101	94.4	95.4	95.8	0.61	0.74	0.79	309	1947	247	1556	270	270	G	104.8	1.15	3194											
63 SIE 449T6D	300	1192	1321	94.2	95.5	95.8	0.66	0.77	0.81	362	2353	289	1879	230	270	G	123.4	1.15	3726											

We offer special JM pump motors up to frame size 326 and JP pump motors up to frame size 365.

Overall and Mounting Dimensions

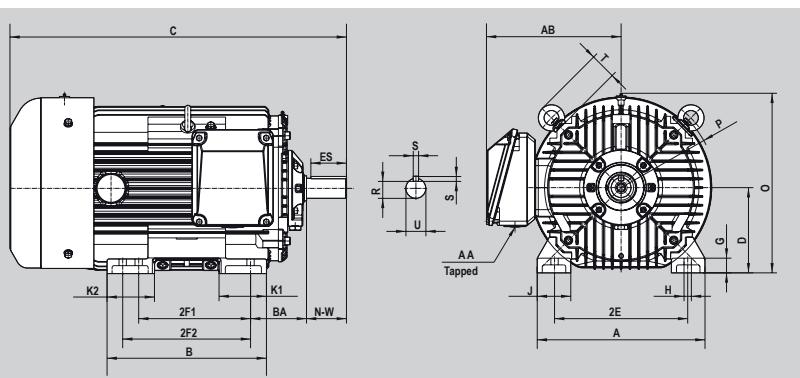
Rigid Base



Motor Type	Mounting Dimensions (inches)												Overall Dimensions (inches)										
	Shaft End																						
	D	2E	2F	G	H	BA	ES	N-W	R	S	U	A	AA	AB	B	C	J	O	P				
SIE 143T	3.50	5.50	4.00	0.39	0.34	2.25	1.52	2.25	0.771	0.188	0.875	6.85	3/4	6.5	5.83	12.96	1.66	7.48	8.27				
SIE 145T	3.50	5.50	5.00	0.39	0.34	2.25	1.52	2.25	0.771	0.188	0.875	6.85	3/4	6.5	7.00	14.15	1.66	7.48	8.27				
SIE 182T	4.5	7.5	4.5	0.6	0.41	2.75	1.94	2.75	0.986	0.25	1.125	9	1	7.9	8.31	16.63	2.13	9.09	9.53				
SIE 184T	4.5	7.5	5.5	0.6	0.41	2.75	1.94	2.75	0.986	0.25	1.125	9	1	7.9	8.31	16.63	2.13	9.09	9.53				
SIE 213T	5.25	8.5	5.5	0.72	0.41	3.5	2.55	3.38	1.201	0.312	1.375	10.24	1	8.45	9.60	20.66	2.2	10.96	11.61				
SIE 215T	5.25	8.5	7	0.72	0.41	3.5	2.55	3.38	1.201	0.312	1.375	10.24	1	8.45	9.60	20.66	2.2	10.96	11.61				
SIE 254T	6.25	10	8.25	0.58	0.55	4.25	3.11	4	1.416	0.375	1.625	12.28	1.25	10.08	9.92	24.04	2.36	13.18	14.17				
SIE 256T	6.25	10	10	0.58	0.55	4.25	3.11	4	1.416	0.375	1.625	12.28	1.25	10.08	11.65	25.77	2.36	13.18	14.17				
SIE 284T	7	11	9.5	0.89	0.55	4.75	3.53	4.62	1.591	0.5	1.875	13.78	1.5	10.34	13.11	28.54	2.75	14.01	14.17				
SIE 284TS	7	11	9.5	0.89	0.55	4.75	2.1	3.25	1.416	0.375	1.625	13.78	1.5	10.34	13.11	27.17	2.75	14.01	14.17				
SIE 286T	7	11	11	0.89	0.55	4.75	3.53	4.62	1.591	0.5	1.875	13.78	1.5	10.34	13.11	28.54	2.75	14.01	14.17				
SIE 286TS	7	11	11	0.89	0.55	4.75	2.1	3.25	1.416	0.375	1.625	13.78	1.5	10.34	13.11	27.17	2.75	14.01	14.17				

Overall and Mounting Dimensions

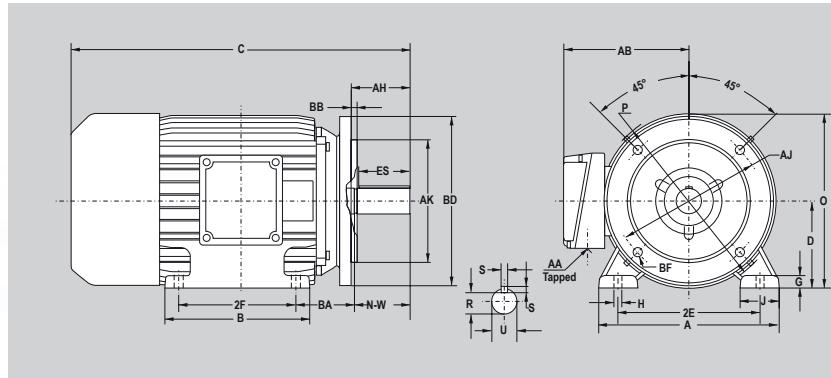
Rigid Base



Motor Type	Mounting Dimensions (inches)												Overall Dimensions (inches)											
	Shaft End												Shaft End											
D	2E	2F1	2F2	G	H	BA	ES	N-W	R	S	U	A	AA	AB	B	C	J	K1	K2	O	P	T		
SIE 324TS2	8	12.5	10.5	12	1.38	0.66	5.25	2.75	3.75	1.591	0.5	1.875	15.8	2	13	15	31.6	3.15	4.45	4.45	16.9	17.9	2.5	
SIE 324T	8	12.5	10.5	12	1.38	0.66	5.25	4.33	5.25	1.845	0.5	2.125	15.8	2	13	15	33.1	3.15	4.45	4.45	16.9	17.9	2.5	
SIE 326TS2	8	12.5	10.5	12	1.38	0.66	5.25	2.75	3.75	1.591	0.5	1.875	15.8	2	13	15	31.6	3.15	4.45	4.45	16.9	17.9	2.5	
SIE 326T	8	12.5	10.5	12	1.38	0.66	5.25	4.33	5.25	1.845	0.5	2.125	15.8	2	13	15	33.1	3.15	4.45	4.45	16.9	17.9	2.5	
SIE 364TS2	9	14	11.25	12.25	1.49	0.66	5.88	2.75	3.75	1.591	0.5	1.875	17.5	3	14.2	15	33.6	3.35	4.53	4.53	18.8	19.9	2.5	
SIE 364T	9	14	11.25	12.25	1.49	0.66	5.88	4.92	5.88	2.021	0.625	2.375	17.5	3	14.2	15	35.7	3.35	4.53	4.53	18.8	19.9	2.5	
SIE 365TS2	9	14	11.25	12.25	1.49	0.66	5.88	2.75	3.75	1.591	0.5	1.875	17.5	3	14.2	15	33.6	3.35	4.53	4.53	18.8	19.9	2.5	
SIE 365T	9	14	11.25	12.25	1.49	0.66	5.88	4.92	5.88	2.021	0.625	2.375	17.5	3	14.2	15	35.7	3.35	4.53	4.53	18.8	19.9	2.5	
SIE 404T	10	16	12.25	13.75	1.57	0.81	6.62	6.3	7.25	2.45	0.75	2.875	18.9	3	15.5	17.6	40.4	3.54	5.32	5.32	20.8	21.3	2.95	
SIE 405TS2	10	16	12.25	13.75	1.57	0.81	6.62	3.5	4.25	1.845	0.5	2.125	18.9	3	15.5	17.6	37.4	3.54	5.32	5.32	20.8	21.3	2.95	
SIE 405T	10	16	12.25	13.75	1.57	0.81	6.62	6.3	7.25	2.45	0.75	2.875	18.9	3	15.5	17.6	40.4	3.54	5.32	5.32	20.8	21.3	2.95	
SIE 444TS2	11	18	14.5	16.5	1.57	0.81	7.5	4.3	4.75	2.021	0.625	2.375	21.7	2x3	17.6	20.5	42	4.15	5.12	6.5	23.4	24.4	3.75	
SIE 444T	11	18	14.5	16.5	1.57	0.81	7.5	7.9	8.5	2.88	0.875	3.375	21.7	2x3	17.6	20.5	45.7	4.15	5.12	6.5	23.4	24.4	3.75	
SIE 445TS2	11	18	14.5	16.5	1.57	0.81	7.5	4.3	4.75	2.021	0.625	2.375	21.7	2x3	17.6	20.5	42	4.15	5.12	6.5	23.4	24.4	3.75	
SIE 445T	11	18	14.5	16.5	1.57	0.81	7.5	7.9	8.5	2.88	0.875	3.375	21.7	2x3	17.6	20.5	45.7	4.15	5.12	6.5	23.4	24.4	3.75	
SIE 447TS2	11	18	20	—	1.654	0.81	7.5	4.3	4.75	2.021	0.625	2.375	22.1	2x3	19.5	24	46.3	4.18	6.8	6.8	23.4	24.4	3.75	
SIE 447T4A	11	18	20	—	1.654	0.81	7.5	7.9	8.5	2.88	0.875	3.375	22.1	2x3	19.5	24	50	4.18	6.8	6.8	23.4	24.4	3.75	
SIE 447T4B	11	18	20	—	1.654	0.81	7.5	7.9	8.5	2.88	0.875	3.375	22.1	2x3	19.5	24	53.5	4.18	7.95	5.63	23.4	24.4	3.75	
SIE 449TS	11	18	16.5	20/25	1.24	0.81	7.5	4.3	4.75	2.021	0.625	2.375	22.1	2x3	19.5	32	60.2	4.6	—	—	23.4	24.4	3.75	
SIE 449T	11	18	16.5	20/25	1.24	0.81	7.5	7.9	8.5	2.88	0.875	3.375	22.1	2x3	19.5	32	60.2	4.6	—	—	23.4	24.4	3.75	

Overall and Mounting Dimensions

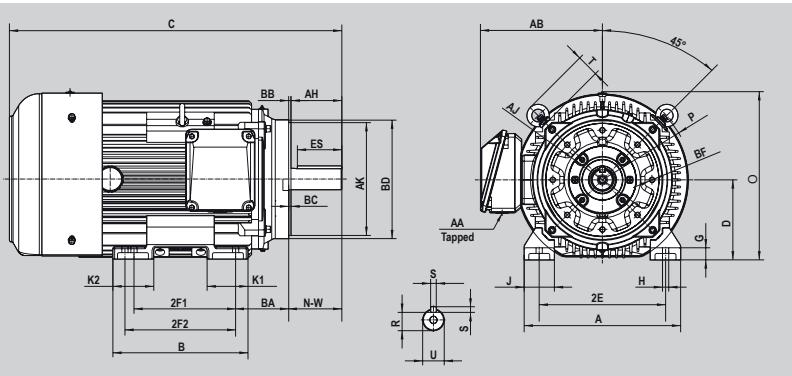
C-Face with Rigid Base



Motor Type	Mounting Dimensions (inches)														Overall Dimensions (inches)													
	Shaft End							C-Face							Shaft End							C-Face						
	D	2E	2F	G	H	BA	ES	N-W	R	S	U	AH	AJ	AK	BB	BF	A	AA	AB	B	BD	C	J	O	P			
SIE 143TCL	3.50	5.50	4.00	0.39	0.34	2.25	1.52	2.25	0.771	0.188	0.875	2.12	5.875	4.5	0.16	3/8-16	6.85	3/4	6.50	5.83	6.50	12.96	1.66	7.48	8.27			
SIE 145TCL	3.50	5.50	5.00	0.39	0.34	2.25	1.52	2.25	0.771	0.188	0.875	2.12	5.875	4.5	0.16	3/8-16	6.85	3/4	6.50	7.00	6.50	14.15	1.66	7.48	8.27			
SIE 182TCL	4.50	7.50	4.50	0.60	0.41	2.75	1.94	2.75	0.986	0.250	1.125	2.62	7.25	8.5	0.25	1/2-13	9.00	1	7.90	8.31	8.90	16.63	2.13	9.09	9.53			
SIE 184TCL	4.50	7.50	5.50	0.60	0.41	2.75	1.94	2.75	0.986	0.250	1.125	2.62	7.25	8.5	0.25	1/2-13	9.00	1	7.90	8.31	8.90	16.63	2.13	9.09	9.53			
SIE 213TCL	5.25	8.50	5.50	0.72	0.41	3.50	2.55	3.38	1.201	0.312	1.375	3.13	7.25	8.5	0.25	1/2-13	10.24	1	8.45	9.60	8.90	20.66	2.20	10.96	11.61			
SIE 215TCL	5.25	8.50	7.00	0.72	0.41	3.50	2.55	3.38	1.201	0.312	1.375	3.13	7.25	8.5	0.25	1/2-13	10.24	1	8.45	9.60	8.90	20.66	2.20	10.96	11.61			
SIE 254TCL	6.25	10.00	8.25	0.58	0.55	4.25	3.11	4.00	1.416	0.375	1.625	3.75	7.25	8.5	0.25	1/2-13	12.28	1 1/4	10.08	9.92	10.00	24.04	2.36	13.18	14.17			
SIE 256TCL	6.25	10.00	10.00	0.58	0.55	4.25	3.11	4.00	1.416	0.375	1.625	3.75	7.25	8.5	0.25	1/2-13	12.28	1 1/4	10.08	11.65	10.00	25.77	2.36	13.18	14.17			
SIE 284TCL	7.00	11.00	9.50	0.89	0.55	4.75	3.53	4.62	1.591	0.500	1.875	4.38	9.00	10.5	0.25	1/2-13	13.78	1 1/2	10.34	13.11	11.25	28.54	2.75	14.01	14.17			
SIE 284TSCL	7.00	11.00	9.50	0.89	0.55	4.75	2.10	3.25	1.416	0.375	1.625	3.00	9.00	10.5	0.25	1/2-13	13.78	1 1/2	10.34	13.11	11.25	27.17	2.75	14.01	14.17			
SIE 286TCL	7.00	11.00	11.00	0.89	0.55	4.75	3.53	4.62	1.591	0.500	1.875	4.38	9.00	10.5	0.25	1/2-13	13.78	1 1/2	10.34	13.11	11.25	28.54	2.75	14.01	14.17			
SIE 286TSCL	7.00	11.00	11.00	0.89	0.55	4.75	2.10	3.25	1.416	0.375	1.625	3.00	9.00	10.5	0.25	1/2-13	13.78	1 1/2	10.34	13.11	11.25	27.17	2.75	14.01	14.17			

Overall and Mounting Dimensions

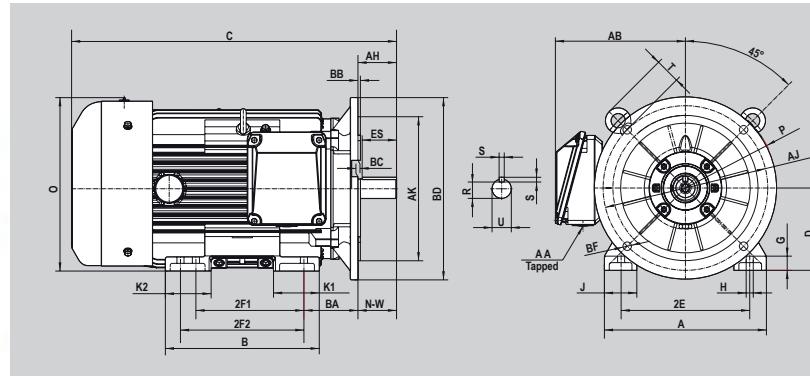
C-Face with Rigid Base



Motor Type	Mounting Dimensions (inches)														Overall Dimensions (inches)															
	Shaft End							C-Face							BB/ BF							size								
	D	2E	2F1	2F2	G	H	BA	ES	N-W	R	S	U	AH	AJ	AK	BC	size	No.	A	AA	AB	B	BD	C	J	K1	K2	O	P	T
SIE 324TSL2	8	12.5	10.50	12.00	1.38	0.66	5.25	2.75	3.75	1.591	0.5	1.875	3.50	11	12.5	0.25	5/8-11	4	15.8	2	13	15	13	31.6	3.15	4.45	4.45	16.9	17.9	2.5
SIE 324TCL	8	12.5	10.50	12.00	1.38	0.66	5.25	4.33	5.25	1.845	0.5	2.125	5.00	11	12.5	0.25	5/8-11	4	15.8	2	13	15	13	33.1	3.15	4.45	4.45	16.9	17.9	2.5
SIE 326TSL2	8	12.5	10.50	12.00	1.38	0.66	5.25	2.75	3.75	1.591	0.5	1.875	3.50	11	12.5	0.25	5/8-11	4	15.8	2	13	15	13	31.6	3.15	4.45	4.45	16.9	17.9	2.5
SIE 326TCL	8	12.5	10.50	12.00	1.38	0.66	5.25	4.33	5.25	1.845	0.5	2.125	5.00	11	12.5	0.25	5/8-11	4	15.8	2	13	15	13	33.1	3.15	4.45	4.45	16.9	17.9	2.5
SIE 364TSL2	9	14	11.25	12.25	1.49	0.66	5.88	2.75	3.75	1.591	0.5	1.875	3.50	11	12.5	0.25	5/8-11	8	17.5	3	14.2	15	13.2	33.6	3.35	4.53	4.53	18.8	19.9	2.5
SIE 364TCL	9	14	11.25	12.25	1.49	0.66	5.88	4.92	5.88	2.021	0.625	2.375	5.63	11	12.5	0.25	5/8-11	8	17.5	3	14.2	15	13.2	35.7	3.35	4.53	4.53	18.8	19.9	2.5
SIE 365TSL2	9	14	11.25	12.25	1.49	0.66	5.88	2.75	3.75	1.591	0.5	1.875	3.50	11	12.5	0.25	5/8-11	8	17.5	3	14.2	15	13.2	33.6	3.35	4.53	4.53	18.8	19.9	2.5
SIE 365TCL	9	14	11.25	12.25	1.49	0.66	5.88	4.92	5.88	2.021	0.625	2.375	5.63	11	12.5	0.25	5/8-11	8	17.5	3	14.2	15	13.2	35.7	3.35	4.53	4.53	18.8	19.9	2.5
SIE 404TCL	10	16	12.25	13.75	1.57	0.81	6.62	6.30	7.25	2.450	0.75	2.875	7.00	11	12.5	0.25	5/8-11	8	18.9	3	15.5	17.6	13.2	40.4	3.54	5.32	5.32	20.8	21.3	2.95
SIE 405TSL2	10	16	12.25	13.75	1.57	0.81	6.62	3.50	4.25	1.845	0.5	2.125	4.00	11	12.5	0.25	5/8-11	8	18.9	3	15.5	17.6	13.2	37.4	3.54	5.32	5.32	20.8	21.3	2.95
SIE 405TCL	10	16	12.25	13.75	1.57	0.81	6.62	6.30	7.25	2.450	0.75	2.875	7.00	11	12.5	0.25	5/8-11	8	18.9	3	15.5	17.6	13.2	35.7	3.35	4.53	4.53	18.8	19.9	2.95
SIE 444TSL2	11	18	14.50	16.50	1.57	0.81	7.5	4.30	4.75	2.021	0.625	2.375	4.50	14	16	0.25	5/8-11	8	21.7	2x3	17.6	20.5	16.6	42.0	4.15	5.12	6.5	23.4	24.4	3.75
SIE 444TCL	11	18	14.50	16.50	1.57	0.81	7.5	7.90	8.50	2.880	0.875	3.375	8.25	14	16	0.25	5/8-11	8	21.7	2x3	17.6	20.5	16.6	45.7	4.15	5.12	6.5	23.4	24.4	3.75
SIE 445TSL2	11	18	14.50	16.50	1.57	0.81	7.5	4.30	4.75	2.021	0.625	2.375	4.50	14	16	0.25	5/8-11	8	21.7	2x3	17.6	20.5	16.6	42.0	4.15	5.12	6.5	23.4	24.4	3.75
SIE 445TCL	11	18	14.50	16.50	1.57	0.81	7.5	7.90	8.50	2.880	0.875	3.375	8.25	14	16	0.25	5/8-11	8	21.7	2x3	17.6	20.5	16.6	45.7	4.15	5.12	6.5	23.4	24.4	3.75
SIE 447TSL2	11	18	20.00	—	1.654	0.81	7.5	4.30	4.75	2.021	0.625	2.375	4.50	14	16	0.25	5/8-11	8	22.1	2x3	19.5	24	16.6	46.3	4.18	6.8	6.8	23.4	24.4	3.75
SIE 447TCL4A	11	18	20.00	—	1.654	0.81	7.5	7.90	8.50	2.880	0.875	3.375	8.25	14	16	0.25	5/8-11	8	22.1	2x3	19.5	24	16.6	50.0	4.18	6.8	6.8	23.4	24.4	3.75
SIE 447TCL4B	11	18	20.00	—	1.654	0.81	7.5	7.90	8.50	2.880	0.875	3.375	8.25	14	16	0.25	5/8-11	8	22.1	2x3	19.5	24	16.6	53.5	4.18	7.95	5.63	23.4	24.4	3.75
SIE 449TSL	11	18	16.5	20/25	1.24	0.81	7.5	4.3	4.75	2.021	0.625	2.375	4.5	14	16	0.25	5/8-11	8	22.1	2x3	19.5	32	16.6	60.2	4.6	—	—	23.4	24.4	3.75
SIE 449TCL	11	18	16.5	20/25	1.24	0.81	7.5	7.9	8.5	2.880	0.875	3.375	8.25	14	16	0.25	5/8-11	8	22.1	2x3	19.5	32	16.6	60.2	4.6	—	—	23.4	24.4	3.75

Overall and Mounting Dimensions

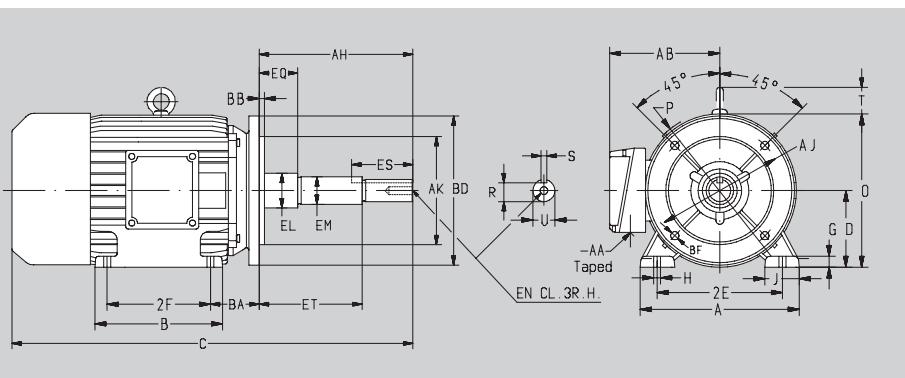
D-Flange with Rigid Base



Motor Type	Mounting Dimensions (inches)														Overall Dimensions (inches)															
	Shaft End							D-Flange							BF															
D	2E	2F1	2F2	G	H	BA	ES	N-W	R	S	U	AH	AJ	AK	BB	size No.	A	AA	AB	BD	C	J	K1	K2	O	P	T			
SIE 324TSDL2	8	12.5	10.5	12	1.38	0.66	5.25	2.75	3.75	1.591	0.5	1.875	3.75	16	14	0.25	0.83	4	15.8	2	13	15	17.8	31.6	3.15	4.45	4.45	16.9	17.9	2.50
SIE 324TDL	8	12.5	10.5	12	1.38	0.66	5.25	4.33	5.25	1.845	0.5	2.125	5.25	16	14	0.25	0.83	4	15.8	2	13	15	17.8	33.1	3.15	4.45	4.45	16.9	17.9	2.50
SIE 326TSDL2	8	12.5	10.5	12	1.38	0.66	5.25	2.75	3.75	1.591	0.5	1.875	3.75	16	14	0.25	0.83	4	15.8	2	13	15	17.8	31.6	3.15	4.45	4.45	16.9	17.9	2.50
SIE 326TDL	8	12.5	10.5	12	1.38	0.66	5.25	4.33	5.25	1.845	0.5	2.125	5.25	16	14	0.25	0.83	4	15.8	2	13	15	17.8	33.1	3.15	4.45	4.45	16.9	17.9	2.50
SIE 364TSDL2	9	14	11.25	12.25	1.49	0.66	5.88	2.75	3.75	1.591	0.5	1.875	3.75	16	14	0.25	0.83	4	17.5	3	14.2	15	17.8	33.6	3.35	4.53	4.53	18.8	19.9	2.50
SIE 364TDL	9	14	11.25	12.25	1.49	0.66	5.88	4.92	5.88	2.021	0.625	2.375	5.88	16	14	0.25	0.83	4	17.5	3	14.2	15	17.8	35.7	3.35	4.53	4.53	18.8	19.9	2.50
SIE 365TSDL2	9	14	11.25	12.25	1.49	0.66	5.88	2.75	3.75	1.591	0.5	1.875	3.75	16	14	0.25	0.83	4	17.5	3	14.2	15	17.8	33.6	3.35	4.53	4.53	18.8	19.9	2.50
SIE 365TDL	9	14	11.25	12.25	1.49	0.66	5.88	4.92	5.88	2.021	0.625	2.375	5.88	16	14	0.25	0.83	4	17.5	3	14.2	15	17.8	35.7	3.35	4.53	4.53	18.8	19.9	2.50
SIE 404TDL	10	16	12.25	13.75	1.57	0.81	6.62	6.30	7.25	2.45	0.75	2.875	7.25	20	18	0.25	0.83	8	18.9	3	15.5	17.6	21.7	40.4	3.54	5.32	5.32	20.8	21.3	2.95
SIE 405TSDL2	10	16	12.25	13.75	1.57	0.81	6.62	3.50	4.25	1.845	0.5	2.125	4.25	20	18	0.25	0.83	8	18.9	3	15.5	17.6	21.7	37.4	3.54	5.32	5.32	20.8	21.3	2.95
SIE 405TDL	10	16	12.25	13.75	1.57	0.81	6.62	6.30	7.25	2.45	0.75	2.875	7.25	20	18	0.25	0.83	8	18.9	3	14.2	15	17.8	35.7	3.35	4.53	4.53	18.8	19.9	2.50
SIE 444TSDL2	11	18	14.5	16.5	1.57	0.81	7.50	4.30	4.75	2.021	0.625	2.375	4.75	20	18	0.25	0.83	8	21.7	2x3	17.6	20.5	21.7	42	4.15	5.12	6.5	23.4	24.4	3.75
SIE 444TDL	11	18	14.5	16.5	1.57	0.81	7.50	7.90	8.50	2.88	0.875	3.375	8.50	20	18	0.25	0.83	8	21.7	2x3	17.6	20.5	21.7	45.7	4.15	5.12	6.5	23.4	24.4	3.75
SIE 445TSDL2	11	18	14.5	16.5	1.57	0.81	7.50	4.30	4.75	2.021	0.625	2.375	4.75	20	18	0.25	0.83	8	21.7	2x3	17.6	20.5	21.7	42	4.15	5.12	6.5	23.4	24.4	3.75
SIE 445TDL	11	18	14.5	16.5	1.57	0.81	7.50	7.90	8.50	2.88	0.875	3.375	8.50	20	18	0.25	0.83	8	21.7	2x3	17.6	20.5	21.7	45.7	4.15	5.12	6.5	23.4	24.4	3.75
SIE 447TSDL2	11	18	20	—	1.654	0.81	7.50	4.30	4.75	2.021	0.625	2.375	4.75	20	18	0.25	0.83	8	22.1	2x3	19.5	24	21.7	46.3	4.18	6.8	6.8	23.4	24.4	3.75
SIE 447TDL4A	11	18	20	—	1.654	0.81	7.50	7.90	8.50	2.88	0.875	3.375	8.50	20	18	0.25	0.83	8	22.1	2x3	19.5	24	21.7	50	4.18	6.8	6.8	23.4	24.4	3.75
SIE 447TDL4B	11	18	20	—	1.654	0.81	7.50	7.90	8.50	2.88	0.875	3.375	8.50	20	18	0.25	0.83	8	22.1	2x3	19.5	24	21.7	53.5	4.18	7.95	5.63	23.4	24.4	3.75
SIE 449TSDL	11	18	16.5	20/25	1.24	0.81	7.50	4.30	4.75	2.021	0.625	2.375	4.75	20	18	0.25	0.83	8	22.1	2x3	19.5	32	21.7	60.2	4.6	—	—	23.4	24.4	3.75
SIE 449TDL	11	18	16.5	20/25	1.24	0.81	7.50	7.90	8.50	2.88	0.875	3.375	8.50	20	18	0.25	0.83	8	22.1	2x3	19.5	32	21.7	60.2	4.6	—	—	23.4	24.4	3.75

Overall and Mounting Dimensions

JM/JP Pump Motors



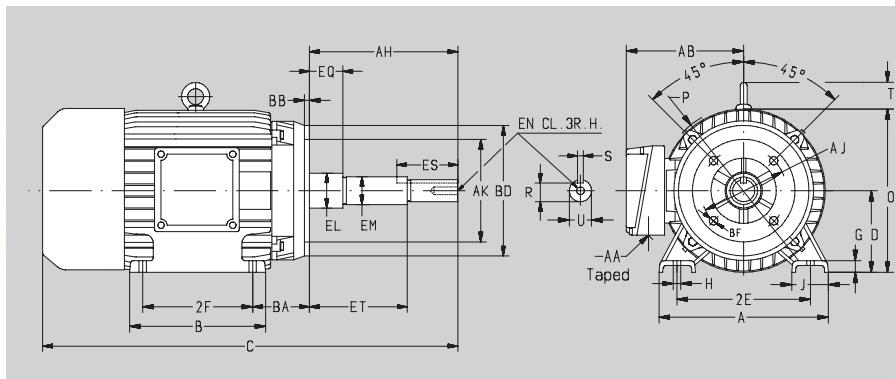
Frame	U	AH	AJ	AK	BB	BD Max	BF			EN			Keyseat						
							Number	Tap size	Bolt Penetration Allowance	EL	EM	Tap size	Tap Drill Depth Max	Bolt Penetration Allowance	EQ	R	ES Min	S	ET
143 JP	0.8745	7.343	4.500	0.156		6.50	4	3/8-16	0.56	1.156	1.0000	-3/8-16	1.12	0.85	1.578	0.771	1.65	0.190	5.952
	0.8740	7.281	4.497	0.125						1.154	0.9995				1.548	0.756	0.188	5.922	
145 JP	0.8745	7.343	4.500	0.156		6.50	4	3/8-16	0.56	1.156	1.0000	-3/8-16	1.12	0.85	1.578	0.771	1.65	0.190	5.952
	0.8740	7.281	4.497	0.125						1.154	0.9995				1.548	0.756	0.188	5.922	
182 JP	0.8745	7.343	4.500	0.156		6.50	4	3/8-16	0.56	1.250	1.0000	-3/8-16	1.12	0.85	1.578	0.771	1.65	0.190	5.952
	0.8740	7.281	4.497	0.125						1.248	0.9995				1.548	0.756	0.188	5.922	
184 JP	0.8745	7.343	4.500	0.156		6.50	4	3/8-16	0.56	1.250	1.0000	-3/8-16	1.12	0.85	1.578	0.771	1.65	0.190	5.952
	0.8740	7.281	4.497	0.125						1.248	0.9995				1.548	0.756	0.188	5.922	
143 JM	0.8745	4.281	4.500	0.156		6.50	4	3/8-16	0.56	1.156	1.0000	-3/8-16	1.12	0.85	0.640	0.771	0.190	2.890	
	0.8740	4.219	4.497	0.125						1.154	0.9995				0.610	0.756	0.188	2.860	
145 JM	0.8745	4.281	4.500	0.156		6.50	4	3/8-16	0.56	1.156	1.0000	-3/8-16	1.12	0.85	0.640	0.771	0.190	2.890	
	0.8740	4.219	4.497	0.125						1.154	0.9995				0.610	0.756	0.188	2.860	
182 JM	0.8745	4.281	4.500	0.156		6.50	4	3/8-16	0.56	1.250	1.0000	-3/8-16	1.12	0.85	0.640	0.771	0.190	2.890	
	0.8740	4.219	4.497	0.125						1.248	0.9995				0.610	0.756	0.188	2.860	
184 JM	0.8745	4.281	4.500	0.156		6.50	4	3/8-16	0.56	1.250	1.0000	-3/8-16	1.12	0.85	0.640	0.771	0.190	2.890	
	0.8740	4.219	4.497	0.125						1.248	0.9995				0.610	0.756	0.188	2.860	

27

Frame	D	2E	2F	G	H	BA	A	AA	AB	B	C	J	O	P	T
143 JP	3.50	5.50	4.00	0.39	0.34	2.36	6.85	3/4	6.50	5.83	18.18	1.66	7.48	8.27	-
145 JP	3.50	5.50	5.00	0.39	0.34	2.36	6.85	3/4	6.50	7.00	19.37	1.66	7.48	8.27	-
182 JP	4.50	7.50	4.50	0.60	0.41	2.78	9.00	1	7.90	8.31	21.35	2.13	9.09	9.53	1.77
184 JP	4.50	7.50	5.50	0.60	0.41	2.78	9.00	1	7.90	8.31	21.35	2.13	9.09	9.53	1.77
143 JM	3.50	5.50	4.00	0.39	0.34	2.36	6.62	3/4	6.50	5.83	15.12	1.66	7.48	8.27	-
145 JM	3.50	5.50	5.00	0.39	0.34	2.36	6.62	3/4	6.50	7.00	16.31	1.66	7.48	8.27	-
182 JM	4.50	7.50	4.50	0.60	0.41	2.78	9.00	1	7.90	8.31	18.29	2.13	9.09	9.53	1.77
184 JM	4.50	7.50	5.50	0.60	0.41	2.78	9.00	1	7.90	8.31	18.29	2.13	9.09	9.53	1.77

Overall and Mounting Dimensions

JM/JP Pump Motors

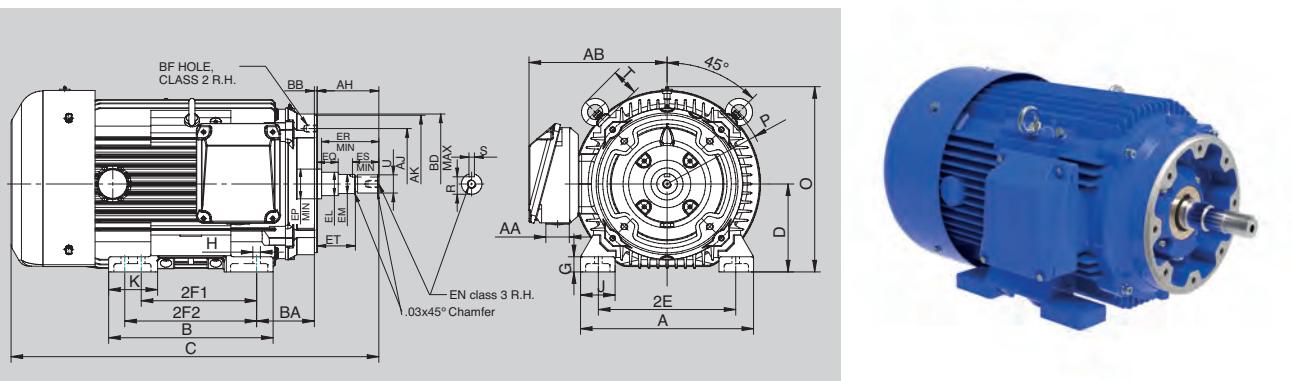


Frame	U	AH	AJ	AK	BB	BD Max	Number	BF		EN		Keyseat						
								Tap size	Bolt Penetration Allowance	EL	EM	Tap size	Bolt Penetration Allowance	EQ	R	ES Min	S	ET
213 JP	1.2495	8.156	8.500	0.312	9.00	4	3/8-16	0.85	1.750	1.3750	3/8-16	1.12	0.85	2.390	1.112	1.65	0.252	5.890
		8.094	8.497	0.250	9.00	4	3/8-16	0.85	1.748	1.3745				2.360	1.097		0.250	5.860
215 JP	1.2495	8.156	8.500	0.312	9.00	4	3/8-16	0.85	1.750	1.3750	3/8-16	1.12	0.85	2.390	1.112	1.65	0.252	5.890
	1.2490	8.094	8.497	0.250	9.00	4	3/8-16	0.85	1.748	1.3745				2.360	1.097		0.250	5.860
254 JP	1.2495	8.156	8.500	0.312	10.00	4	1/2-13	1.00	1.750	1.3750	1/2-13	1.50	1.00	2.390	1.112	2.53	0.252	5.890
	1.2490	8.094	8.497	0.250	10.00	4	1/2-13	1.00	1.748	1.3745				2.360	1.097		0.250	5.860
256 JP	1.2495	8.156	8.500	0.312	10.00	4	1/2-13	1.00	1.750	1.3750	1/2-13	1.50	1.00	2.390	1.112	2.53	0.252	5.890
	1.2490	8.094	8.497	0.250	10.00	4	1/2-13	1.00	1.748	1.3745				2.360	1.097		0.250	5.860
284 JP	1.2495	8.156	12.500	0.312	14.00	4	1/2-13	1.00	1.750	1.3750	1/2-13	1.50	1.00	2.390	1.112	2.53	0.252	5.890
	1.2490	8.094	12.495	0.250	14.00	4	1/2-13	1.00	1.748	1.3745				2.360	1.097		0.250	5.860
286 JP	1.2495	8.156	12.500	0.312	14.00	4	1/2-13	1.00	1.750	1.3750	1/2-13	1.50	1.00	2.390	1.112	2.53	0.252	5.890
	1.2490	8.094	12.495	0.250	14.00	4	1/2-13	1.00	1.748	1.3745				2.360	1.097		0.250	5.860
213 JM	0.8745	4.281	8.500	0.312	9.00	4	1/2-13	0.85	1.250	1.0000	3/8-16	1.12	0.85	0.640	0.771	1.65	0.190	2.890
	0.8740	4.219	8.497	0.250	9.00	4	1/2-13	0.85	1.248	0.9995				0.610	0.756		0.188	2.860
215 JM	0.8745	4.281	8.500	0.312	9.00	4	1/2-13	0.85	1.250	1.0000	3/8-16	1.12	0.85	0.640	0.771	1.65	0.190	2.890
	0.8740	4.219	8.497	0.250	9.00	4	1/2-13	0.85	1.248	0.9995				0.610	0.756		0.188	2.860
254 JM	1.2495	5.281	8.500	0.312	10.00	4	1/2-13	1.00	1.750	1.3750	1/2-13	1.50	1.00	0.640	1.112	2.53	0.252	3.015
	1.2490	5.219	8.497	0.250	10.00	4	1/2-13	1.00	1.748	1.3745				0.610	1.097		0.250	2.985
256 JM	1.2495	5.281	8.500	0.312	10.00	4	1/2-13	1.00	1.750	1.3750	1/2-13	1.50	1.00	0.640	1.112	2.53	0.252	3.015
	1.2490	5.219	8.497	0.250	10.00	4	1/2-13	1.00	1.748	1.3745				0.610	1.097		0.250	2.985
284 JM	1.2495	5.281	12.500	0.312	14.00	4	5/8-11	1.00	1.750	1.3750	1/2-13	1.50	1.00	0.645	1.112	2.53	0.252	3.020
	1.2490	5.219	12.495	0.250	14.00	4	5/8-11	1.00	1.748	1.3745				0.605	1.097		0.250	2.980
286 JM	1.2495	5.281	12.500	0.312	14.00	4	5/8-11	1.00	1.750	1.3750	1/2-13	1.50	1.00	0.645	1.112	2.53	0.252	3.020
	1.2490	5.219	12.495	0.250	14.00	4	5/8-11	1.00	1.748	1.3745				0.605	1.097		0.250	2.980

Frame	D	2E	2F	G	H	BA	A	AA	AB	B	C	J	O	P	T
213 JP	5.25	8.50	5.50	0.72	0.41	3.80	10.24	1	8.45	9.60	25.68	2.20	10.55	10.94	1.77
215 JP	5.25	8.50	7.00	0.72	0.41	3.80	10.24	1	8.45	9.60	25.68	2.20	10.55	10.94	1.77
254 JP	6.25	10.00	8.25	0.58	0.55	4.50	12.28	1 1/4	10.08	9.92	28.44	2.36	13.18	14.17	2.08
256 JP	6.25	10.00	10.00	0.58	0.55	4.50	12.28	1 1/4	10.08	11.65	30.17	2.36	13.18	14.17	2.08
284 JP	7.00	11.00	9.50	0.89	0.55	4.95	13.78	1 1/2	10.34	13.11	32.31	2.75	14.01	14.17	2.08
286 JP	7.00	11.00	11.00	0.89	0.55	4.95	13.78	1 1/2	10.34	13.11	32.31	2.75	14.01	14.17	2.08
213 JM	5.25	8.50	5.50	0.72	0.41	3.80	10.24	1	8.45	9.60	21.81	2.20	10.55	10.94	1.77
215 JM	5.25	8.50	7.00	0.72	0.41	3.80	10.24	1	8.45	9.60	21.81	2.20	10.55	10.94	1.77
254 JM	6.25	10.00	8.25	0.58	0.55	4.50	12.28	1 1/4	10.08	9.92	25.57	2.36	13.18	14.17	2.08
256 JM	6.25	10.00	10.00	0.58	0.55	4.50	12.28	1 1/4	10.08	11.65	27.30	2.36	13.18	14.17	2.08
284 JM	7.00	11.00	9.50	0.89	0.55	4.95	13.78	1 1/2	10.34	13.11	29.44	2.75	14.01	14.17	2.08
286 JM	7.00	11.00	11.00	0.89	0.55	4.95	13.78	1 1/2	10.34	13.11	29.44	2.75	14.01	14.17	2.08

Overall and Mounting Dimensions

JM/JP Pump Motors

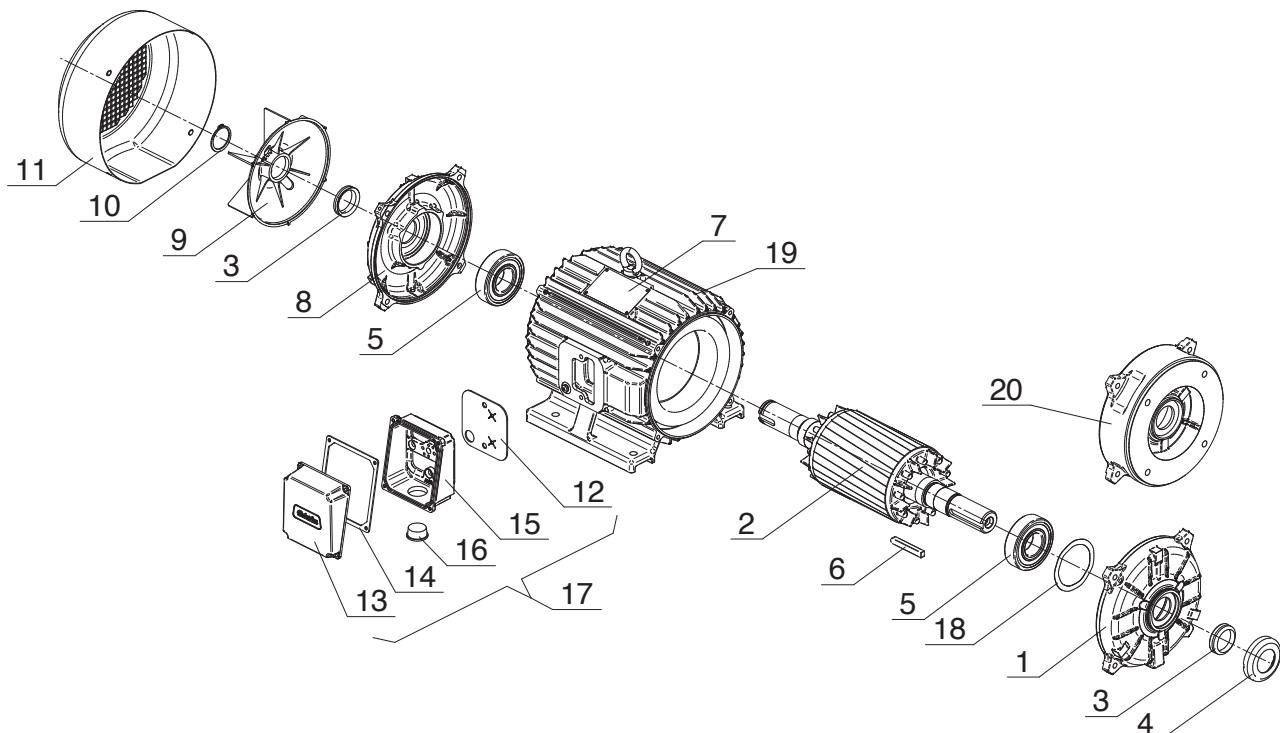


Frame	U	AH	AJ	AK	BB	BD Max	BF			EN			Keyseat							
							Number	Tap size	Bolt Penetration Allowance	EL	EM	Tap size	Tap Drill Depth Max	Bolt Penetration Allowance	EP Min	EQ	ER Min	R	ES Min	S
324 JP	1.2495	8.156		12.500	0.312	14.0	4	5/8-11	0.94	1.750	1.3750	1/2-13	1.50	1.00	2.395					5.895
	1.2490	8.094		12.495	0.250					1.748	1.3745				2.355					5.855
326 JP	1.2495	8.156		12.500	0.312	14.0	4	5/8-11	0.94	1.750	1.3750	1/2-13	1.50	1.00	2.395					5.895
	1.2490	8.094		12.495	0.250					1.748	1.3745				2.355					5.855
364 JP	1.6245	8.156		12.500	0.312	14.0	4	5/8-11	0.94	2.125	1.7500	1/2-13	1.50	1.00	2.395					5.895
	1.6240	8.094		12.495	0.250					2.123	1.7495				2.355					5.855
365 JP	1.6245	8.156		12.500	0.312	14.0	4	5/8-11	0.94	2.125	1.7500	1/2-13	1.50	1.00	2.395					5.895
	1.6240	8.094		12.495	0.250					2.123	1.7495				2.355					5.855
324 JM	1.2495	5.281		12.500	0.312	14.0	4	5/8-11	0.94	1.750	1.3750	1/2-13	1.50	1.00	0.645					3.020
	1.2490	5.219		12.495	0.250					1.748	1.3745				0.605					2.980
326 JM	1.2495	5.281		12.500	0.312	14.0	4	5/8-11	0.94	1.750	1.3750	1/2-13	1.50	1.00	0.645					3.020
	1.2490	5.219		12.495	0.250					1.748	1.3745				0.605					2.980

Frame	D	2E	2F1	2F2	G	H	BA	A	AA	AB	B	C	J	K	O	P	T
324 JP	8	12.5	10.50	12.00	1.38	0.66	5.25	15.8	2	13.0	15.0	36.26	3.15	4.45	16.9	17.9	2.5
326 JP	8	12.5	10.50	12.00	1.38	0.66	5.25	15.8	2	13.0	15.0	36.26	3.15	4.45	16.9	17.9	2.5
364 JP	9	14.0	11.25	12.25	1.49	0.66	5.88	17.5	3	14.2	15.0	38.30	3.35	4.53	18.8	19.9	2.5
365 JP	9	14.0	11.25	12.25	1.49	0.66	5.88	17.5	3	14.2	15.0	38.30	3.35	4.53	18.8	19.9	2.5
324 JM	8	12.5	10.50	12.00	1.38	0.66	5.25	15.8	2	13.0	15.0	33.38	3.15	4.45	16.9	17.9	2.5
326 JM	8	12.5	10.50	12.00	1.38	0.66	5.25	15.8	2	13.0	15.0	33.38	3.15	4.45	16.9	17.9	2.5

List of Motor parts

Frame Size: 143÷286
Motor series SIE



Item	Description
1	DE shield
2	rotor
3	shaft seal
4	shaft seal cover
5	bearing
6	key
7	name plate
8	NDE shield
9	fan
10	seeger ring
11	fan cover
12	rubber gasket
13	terminal box cover
14	rubber gasket
15	terminal box
16	plug
17	terminal box complete
18	spring washer
19	stator
20	flange C

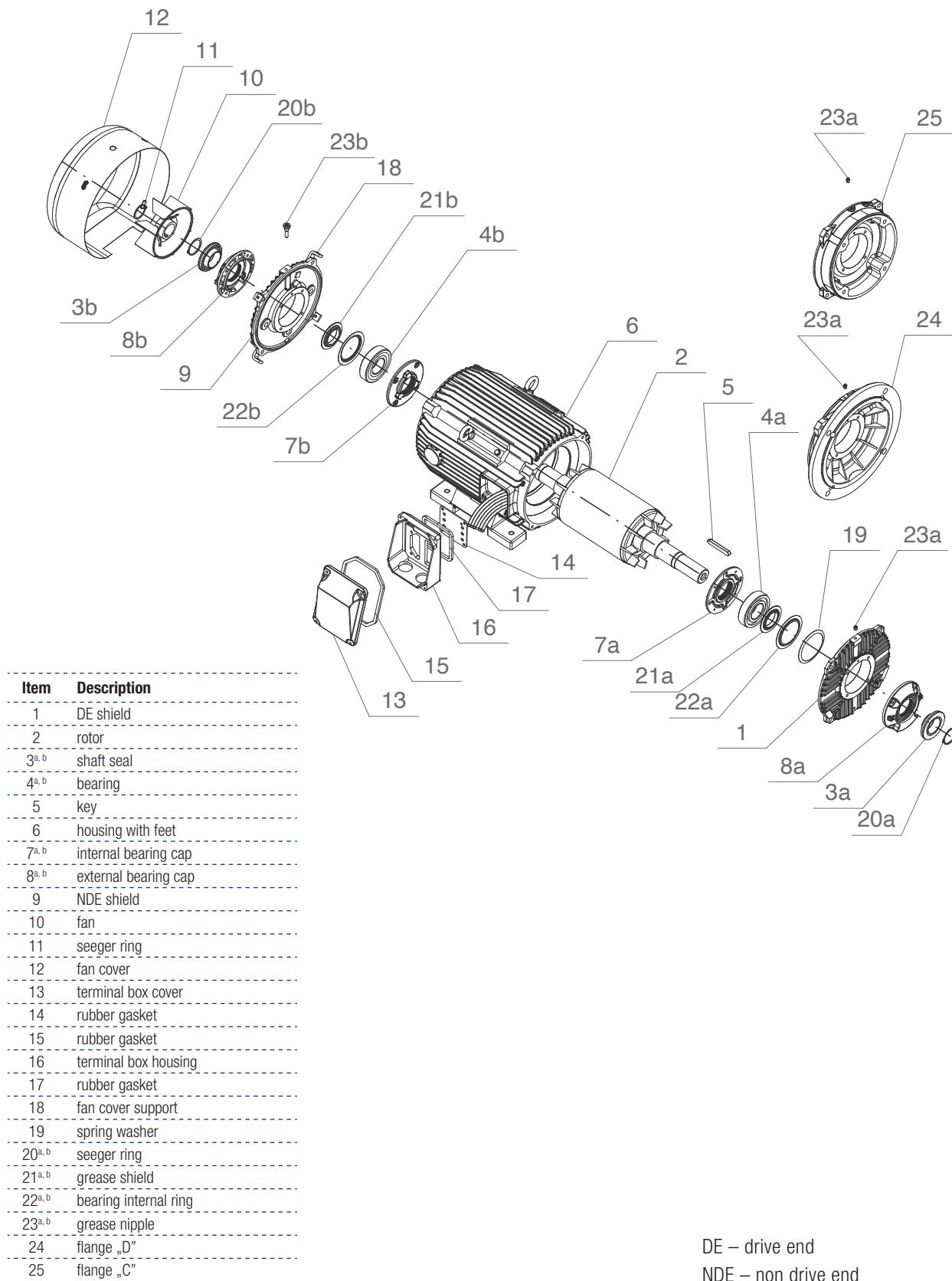
DE – drive end

NDE – non drive end

List of Motor parts

Frame Size: 320÷449

Motor series SIE



DE – drive end

NDE – non drive end

Ordering information

In order to select the proper motor and provide you the most accurate offer as the requirements of customer's applications are various, we ask you to specify below motor details:

Orders for motors should specify

- » motor type designation,
- » rated output,
- » rated speed,
- » operating duty,
- » supply voltage and connection,
- » frequency,
- » mounting arrangements, end shield material,
- » degree of protection,
- » type of driven machine,
- » other details regarding special requests,

and information concerning additional accessories e.g.

- » thermal protection,
- » anticondensation heaters,
- » vibration sensors,
- » etc.

When ordering special purpose motors one should also indicate:

- » required direction of rotation,
- » required degree of interior protection,
- » method of start-up,
- » method of coupling with the driven unit (gears, dimensions of belt pulleys, etc.),
- » type of driven machine (type of load), including the moment of inertia J or flywheel effect GD^2 calculated to motor shaft,
- » other customer's specifications.

When ordering spare parts one should specify:

- » full designation of the motor type including its serial number (provided on the nameplate) or catalogue number,
- » degree of protection,
- » mounting arrangement,
- » name of part,
- » number of pieces.

As part of our development program, we reserve the right to alter or amend any of the specifications without giving prior notice.



Dear Customer,

Please complete the above Order Form and send it to ffd@frank-dvorak.at. In case you need assistance, do not hesitate to contact us at phone number: 0043 263 180 05. It will be our pleasure to help you.

Cantoni Group - Certifications

Cantoni Group's factory, Celma Indukta was one of the first companies obtaining ISO 9001 certificate in Poland

All Cantoni Group manufacturing plants comply with the most important standards.

ISO 9001 is based on a number of quality management principles including a strong customer focus, the motivation and involvement of top management, the process approach and continuous improvement. Using ISO 9001 helps to ensure that customers get consistent, good quality products and services. Our aim is to produce high quality products certified according to the most important standards. We always focus our work to provide a product that meets the customer requirements, define the approach to continuous improvement and monitor

customer satisfaction. All employees in our Group are fully engaged and motivated to provide the top quality products. We achieve this thanks to skilled technicians, trained workers and customer oriented attitude.

As a demonstration of our aim to meet all high level international standard requirements, we are also certified ISO 14001 and OHSAS 18001 to prove our internal processes and behaviour.

ISO 14001 certification confirms that the organization manages their environmental responsibilities in an effective and internationally accepted way.

In Cantoni Group we know that taking care of the environment means taking care of our present and future.



With **OHSAS 18001** certificate, Cantoni Group confirms the necessity of controlling and improving health and safety aspects within the organization.

Employees are Cantoni Group's main asset, thus, their well-being and safety are our priority.

Our laboratory Celma Indukta is also **ISO 17025** certified by Canadian Standard Association (CSA) for two aspects: safety and energy efficiency verification requirements as independent unit.

The safety part – Supervised Manufacturers Testing Certification (SMT) confirms that our laboratory is allowed for supervised manufactured safety certification program.

The energy efficiency part confirms that energy verification program for motors operating as SMT can be performed according to CSA 390 standard at our facilities.

All our prototype motors are tested and approved before series production and samples of our final products are tested periodically to check compliance with all parameters defined. Our production range has also different types of products certifications based on specific technical requirements, like UL-CSA, GOST, EAC, ATEX, IEC Ex, CCC, Bureau Veritas, DNV-GL, etc.

Our technicians are constantly updated, informed and trained about every new regulation in order to provide all possible solutions to meet final customer requirements and also study and engineer ad-hoc products with customers developers.

Top quality electric motors

Cantoni Group's electric motors are manufactured in such a way as to provide a durable product that our customers can rely on:

- motors manufactured using high quality raw materials and components
- long-life bearings
- robust and tough construction
- raw materials only from European qualified suppliers
- production process from the beginning to the end at our facilities
- proven electrical performance

Our motors for many applications

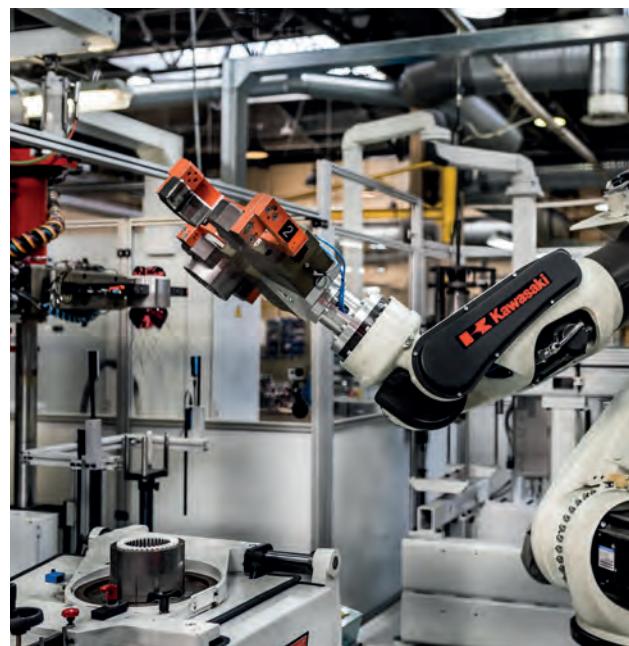
Our motors are produced with the aim to be flexible and adaptable to many different applications. The long tradition and experience of our technical departments, supported by a flexible and strong organization, can assure an engineering of the motor series that meet the most common requirements and the more and more specific requests from the manufacturers of cutting-edge machines.

Our long collaboration with some of the most important players in the global industrial market has built a strong and stable organization that is able to support the customer in the development of the best solutions for its applications.

Cantoni Group continuous investments

The strategy of Cantoni Group is to realize a strong and continuous plan of investments with the aim to constantly increase the range of products, quality level and high productivity. Cantoni Group international market leadership has been created thanks to such open and future oriented attitude. Investments into the new professional machinery, equipment and infrastructure increase the quality control, capacity and save the environment.

The use of world class CNC, automatic and semi-automatic machinery guarantees precision, repeatability and accuracy. Such considerable development plan of Cantoni Group enhances the already wide range of production, maximizes the quality of offered products and has led to a growing number of innovations (new series for specific applications, new design and solutions) and international approvals.



Cantoni Group



Giampiero Cantoni, Founder of Cantoni Group

Since almost a century, the Cantoni Group has been known worldwide as a leader in manufacturing and supplying electric motors, components and tools.

Thanks to the entrepreneurial commitment and great talent, the founder of the Group, **Prof. Giampiero Cantoni**, created diversified Group Enterprise that has gained outstanding success on the Domestic and International markets, placing us among the most important European manufacturers.



Company History – Frank & Dvorak (FFD)



For over 75 years, Frank & Dvorak (FFD) has stood for top quality and technical expertise in the manufacturing of electric motors.

Since its founding, the company has established itself as a reliable partner for industrial companies and repair workshops.

In 2000, FFD became part of the Cantoni Group, a globally leading manufacturer of electric motors. Through this integration, our customers benefit from an expanded product portfolio, state-of-the-art manufacturing technology, and a global service network.

Today, FFD offers a wide range of standard and customized motors for various industrial applications. With high stock

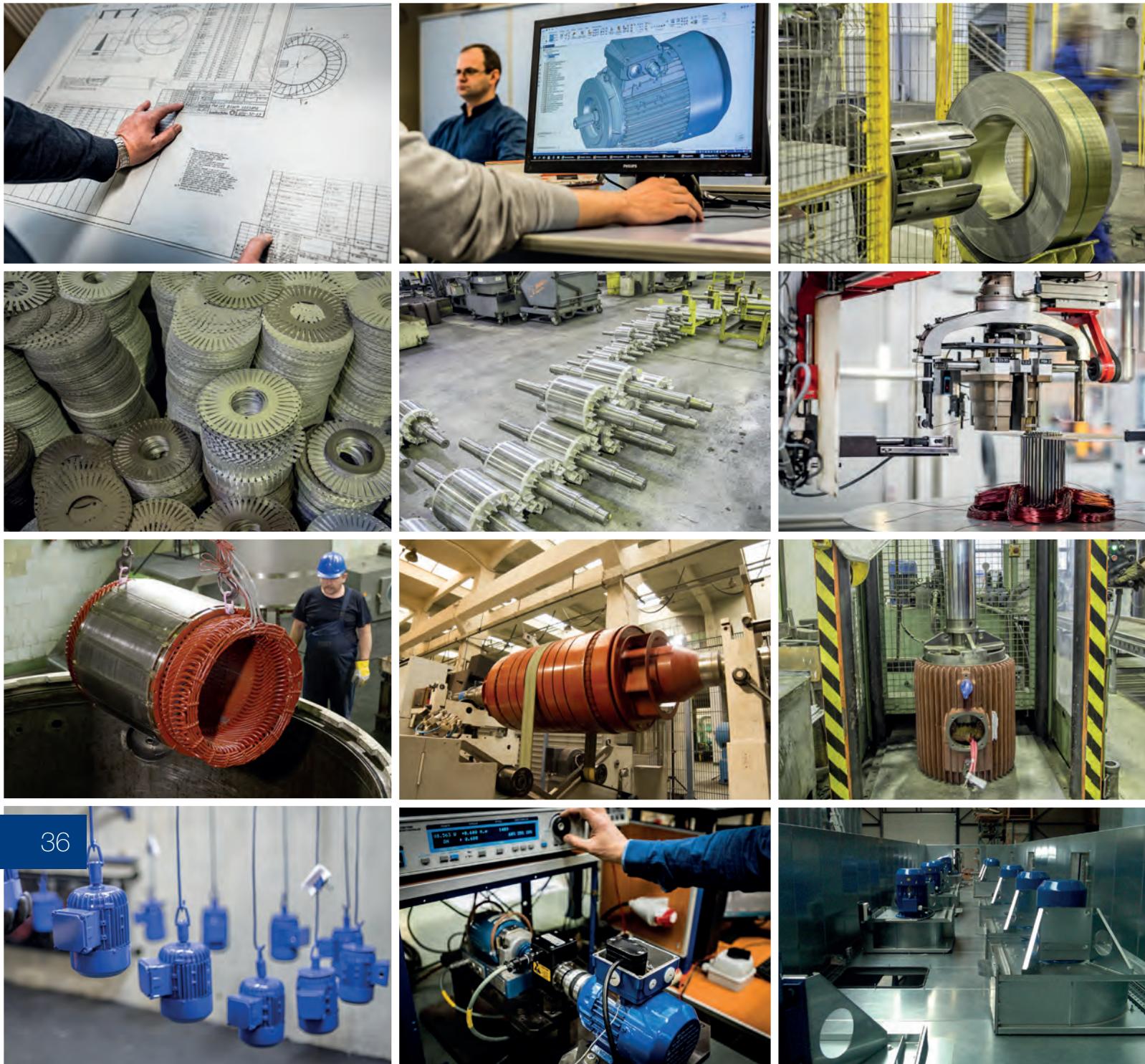
availability, flexible production, and customer-specific solutions, we meet the highest standards of quality and performance.

As part of the Cantoni Group, we combine decades of experience with international strength, ensuring the highest precision, fast availability, and sustainable production in accordance with ISO 9001 and ISO 14001.

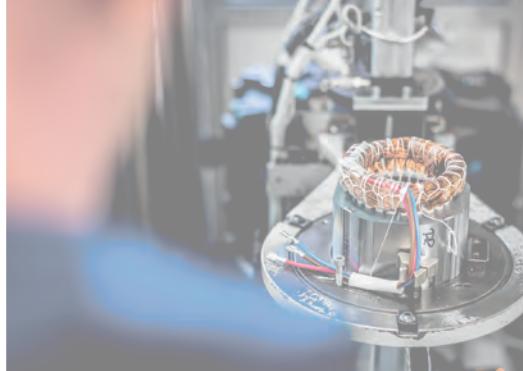
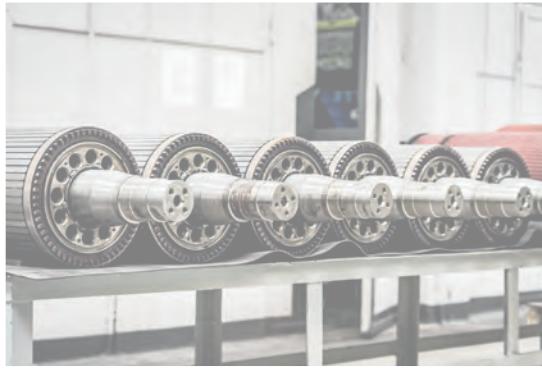
Frank & Dvorak – Your specialist for electric motors, powered by the global expertise of the Cantoni Group.

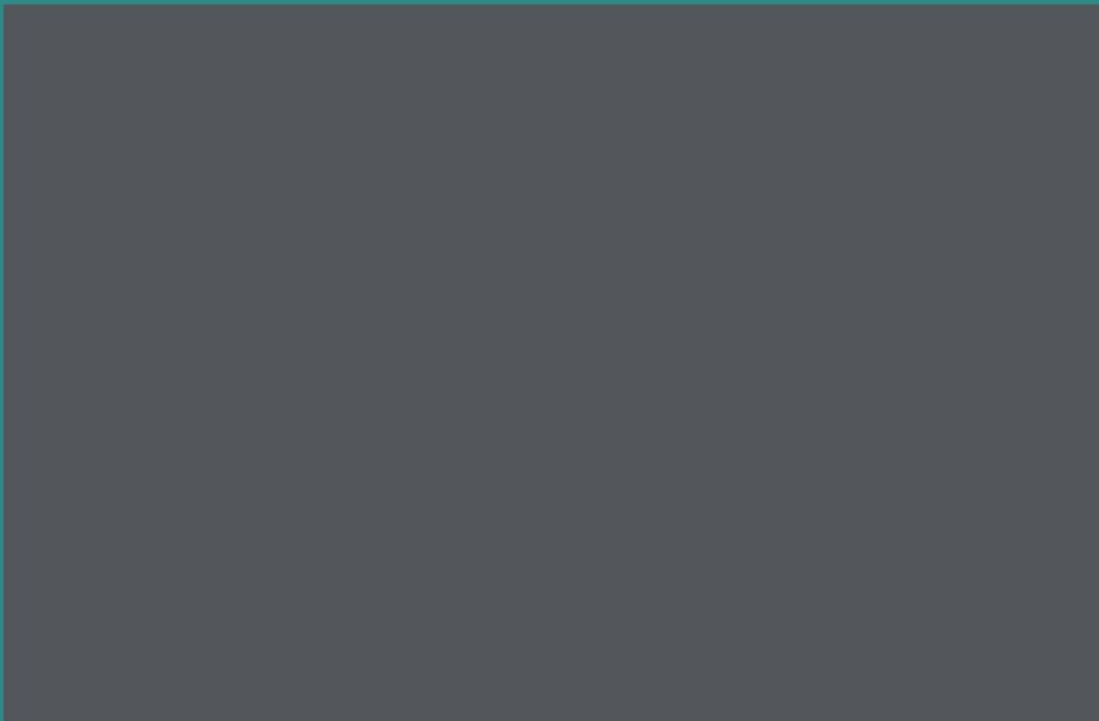


From the project to the application



THE WORLD OF ELECTRIC MOTORS





FRANK & DVORAK
ELEKTROMOTOREN



Cantoni®
GROUP

FRANK & DVORAK
Elektromaschinenbau- und Vertriebsgesellschaft m.b.H. & Co. KG.
A-7033 Pötsching, Industriestraße 1, +43 2631/8005, ffd@frank-dvorak.at
www.frank-dvorak.at

