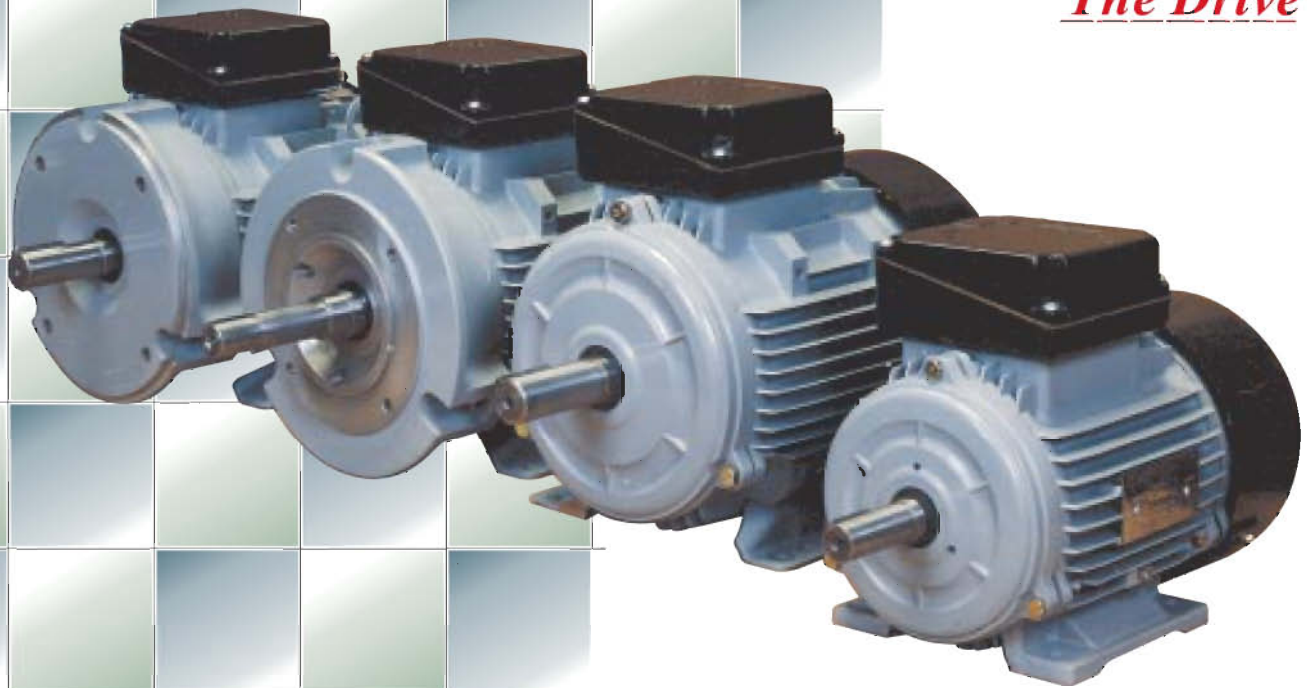


Energy Efficient

EPAct
NEMA
Motors

*Power Behind
The Drive*



 **Crompton
Greaves**
EVERYDAY SOLUTIONS

EPAct COMPLIANT ENERGY EFFICIENT MOTORS TO NEMA / CSA STANDARDS

1. THREE PHASE, SCR, TEFC IP55
2. INVERTER DUTY
3. CLASS 1 DIV 2 GROUP A, B, C, D

1.15 SERVICE FACTOR, CLASS 'F' INSULATION WITH CLASS 'B' RISE, VOLTAGE 208-230/460V OR 575V FREQ - 60HZ, CSA CERTIFIED, EPAAct CERTIFICATE OF COMPLIANCE BY DOE No. 047A, ISO-9001-2000

Performance

Energy efficient - meeting the mandated efficiency standards of EPAAct 92, The efficiencies are tested as per CSA 390, Method 1 (equivalent to IEEE 112, Method B) calling for actual measurement of stray load losses. Each motor is tested in sophisticated test plant with high accuracy test equipments and data acquisition instrumentation The test plant is approved by CSA

Motors are marked with



for EPAAct efficiencies and safety compliance.

The motors are listed by DOE.

DOE No. **CC047A**

Efficiencies at 50% and 75% load are close to the full load efficiencies for true energy saving.

Energy efficiency is achieved by the following steps in design and construction of the motors -

Low-loss and superior magnetizing quality cores are used to minimize iron loss

Stator and rotor lamination designs are optimized to reduce copper loss

Friction & Windage losses are reduced by optimized design of fan and fan cover.

The components are made with high accuracy and close tolerances to reduce stray load losses.

Standards Conformance

- NEMA MG1
- CSA C 22.2 No. 100 - 04: Motors and Generators.
- CAN/CSA C 390 - 93: Energy Efficiency Methods for Three Phase Induction Motors.
- CSA C 22.2 No. O - M91: General Requirements - Canadian Electrical Code, Part II.
- CSA C 22.2 No. 0.4 - M1982: Bonding and Grounding of Electrical Equipment (Protective Grounding).
- UL1004: Electric Motors (5th Edition).

Construction

General

Heavy duty rugged cast iron body for 143 to 504 frame. Base is integrally cast with the frame to avoid vibration and loosening / breakage of feet

Pressure die cast, aluminum body with bolt on base for frame size 143 to 215 are available as option

Terminal box position (foot mounted motors) -

Aluminum frame Standard on top. These are convertible to F1 or F2 at site by changing the position of foot.

Cast Iron frame Standard F1

Convertible to F2 at site by swapping rotor position except the ratings 75hp-2pole, 4pole, 100hp-2pole, 4pole.

Mounting of C face or D flange at DE is possible on all motors.

Option of C face and D flange without base is available (aluminum motors the base can be removed at site only)

Rotor

1045 heat treated and stress relieved carbon steel shaft

Squirrel cage rotor / Aluminum die cast with double cage for high starting characteristics.

Rotors are dynamically balanced to precision class G2.5. Fans are individually balanced to ensure replacement without disturbing the balancing of total rotating mass

Bearing

Ball bearings at DE & ODE as standard. Option of roller bearing for higher load capacity is available. ODE bearing is locked for high axial thrust capacity.

Up to 215 frame motors, bearings are greased for life. Larger frames are provided with on-line greasing arrangement.

Terminal Box

Diagonally split, oversize terminal box with cable entry shift in steps of 90 degrees NPT threaded cable entry as per NEMA standard

Approx. 9" long terminal lead wires for supply connections. Each lead numbered as per NEMA nomenclature.

Connection diagram available in the terminal box.

Gasketed conduit box for hose proof protection

Others

All motors are hose proof to IP55 with V ring slinger.

Stainless steel AISI 316 nameplate



Automatic Winding Machine, STATOMAT - Germany



Trickle Impregnation



Test Plant, BENNING - Germany

Paint

Aluminum motors are Epoxy powder coated in two tone colour

Cast Iron motors are liquid painted with Synthetic Enamel paint on Alkyd based high build Primer (ASTM Salt Spray life >200 hrs)

Standard Specifications

Design

Continuously rated, with design B to NEMA standards for General Applications.

Enclosure: totally enclosed fan cooled.

Voltage & Frequency

208-230/460V, 60 Hz, AC or 575V, 60 Hz, AC. Motors can be marked also for 190-380V 50hz

Insulation and Ambient temp

Class F insulation with class B temperature rise on ambient of 104°F (40°C).

Service factor

1.15 service factor except for 208V supply, when SF would be 1 and motor

efficiency may not meet the declared value.

Inverter duty

Motors are suitable for MGI Part 31 rating to use with VFD - 5:1 constant torque and 10:1 variable torque speed range. Speed range can be extended with optional Blower kit

The motor winding insulation scheme is suitable for 2000V spike resistance.

Class 1 Div 2 marking

All motors can be marked for class 1 Div 2. Group A,B,C,D temperature class T3. The motors are tested and certified by CSA

Options

- NEMA C face, D flange with / without foot
- Motor leads terminated on a terminal block in Terminal Box.
- Thermisters, Thermostats, winding RTDs, bearing temperature sensing devices and separate terminal box for these auxiliaries.

- Motors for closed coupled pumps upto 326 frame

Special Motors

- **NEMA D design Oil well Pump motors, see details on last page.**

Manufacturing Plant

Crompton Greaves had started manufacturing electric motors of various types way back in 1937.

The founders of motor manufacturing in India, have since then maintained its leadership in LT motors till date. The manufacturing plant of LT motors is accredited for ISO 9001:2000 by BVQI. The test plant is certified by CSA for carrying out energy efficient motor testing of the whole range up to 250hp. The manufacturing plant is also certified by CSA under ongoing category certification scheme which recognizes its quality system and facilities for manufacturing and testing the CSA certified products

The product quality is rolled out through Six Sigma approach to deliver "Product Quality As Perceived By Consumer".

BEARING REFERENCE

FRAME	POLARITY	DE BEARING	ODE BEARING
143T / 145T	2/4/6/8	6205ZZ	6205ZZ
182T / 184T	2/4/6/8	6306ZZ	6205ZZ
213T / 215T	2/4/6/8	6308ZZ	6305ZZ
213T / 215T	2/4/6/8	6308ZZ	6208ZZ
254T / 256T	2/4/6/8	6309 C3	6309 C3
284T / 286T	2/4/6/8	6310 C3	6310 C3
324T / 325T	2/4/6/8	6312 C3	6312 C3

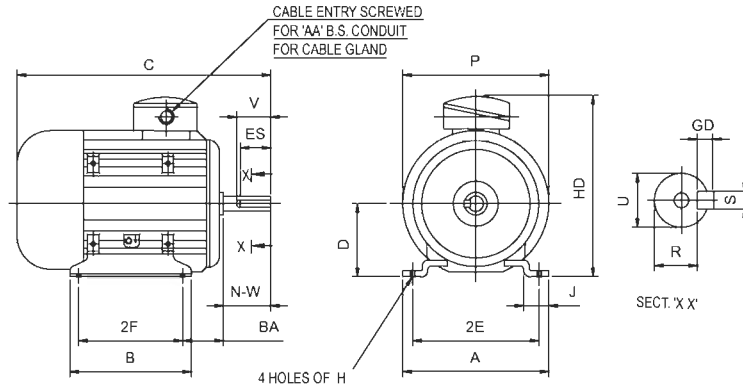
FRAME	POLARITY	DE BEARING	ODE BEARING
364T / 365T	2/4/6/8	6313 C3	6313 C3
404T / 405T	2/4/6/8	6315 C3	6314 C3
444T / 445T / 447T	2	6314 C3	6314 C3
444T / 445T / 447T	4/6/8	6318 C3	6318 C3
504T	2	6315 C3	6315 C3
504T	4/6/8	6319 C3	6319 C3

DIMENSIONS AND WEIGHTS

FRAME	PACKING	NET WT WT.(lb)	GR WT WT. (lb)	VOL (cu. in.)
ALUMINIUM FRAME				
143T	CARTON	33	38	1665
145T	CARTON	40	45	1665
145TC/FT	CARTON	44	49	1665
182T	CARTON	64	70	2860
182TC/FT	CARTON	71	77	2860
184T	CARTON	68	75	2860
184TC/FT	CARTON	75	82	2860
213T	WOODEN CRATE	110	132	5370
213TC/FT	WOODEN CRATE	119	141	5370
215T	WOODEN CRATE	117	139	5370
215TC/FT	WOODEN CRATE	125	147	5370
CAST IRON FRAME				
143T	CARTON	49	54	2000
145T	CARTON	55	60	2000
145TC/FT	CARTON	62	67	2000
182T	CARTON	77	88	3440
182TC/FT	CARTON	86	97	3440
184T	CARTON	77	88	3440

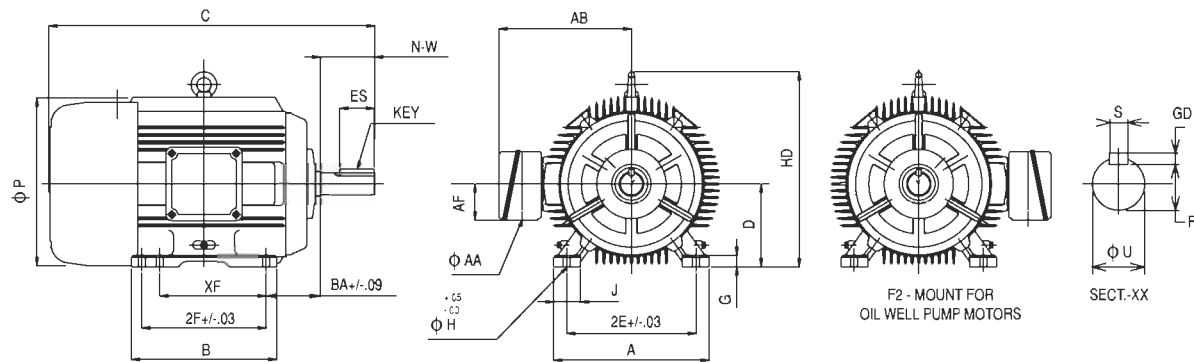
FRAME	PACKING	NET WT WT.(lb)	GR WT WT. (lb)	VOL (cu. in.)
CAST IRON FRAME				
184TC/FT	CARTON	86	97	3440
213T	WOODEN CRATE	150	172	5858
213TC/FT	WOODEN CRATE	160	182	5858
215T	WOODEN CRATE	174	196	5858
215TC/FT	WOODEN CRATE	184	206	5858
254T	WOODEN CRATE	267	405	15500
256T	WOODEN CRATE	315	453	15500
284T	WOODEN CRATE	383	563	19528
286T	WOODEN CRATE	450	607	19528
324T	WOODEN CRATE	560	810	44547
326T	WOODEN CRATE	592	843	44547
364T	WOODEN BOX	770	990	44547
365T	WOODEN BOX	836	1087	44547
405T	WOODEN BOX	1100	1410	64685
444T	WOODEN BOX	2323	2873	118386
445/447T	WOODEN BOX	2486	3036	118386
504T	WOODEN BOX	2640	3256	137303

ALUMINIUM FOOT MOUNTED



Frame Size	Mounting				A	B	C	D	J	P	HD	AA	Keyway					Shaft Ext.	
	2E	2F	H	BA									S	GD	R	ES	V	N-W	U
143T	5.50	4.00	0.34	2.25	6.70	5.95	12.40	3.50	1.50	7.10	9.00	NPT 3/4"	0.188	0.188	0.771	1.41	1.575	2.25	0.875
145T		5.00					13.40												
182T	7.50	4.50	0.41	2.75	8.75	6.70	15.35	4.50	2.00	8.75	11.00	NPT 3/4"	0.250	0.250	0.986	1.78	1.900	2.75	1.125
184T		5.50					7.00												
213T	8.50	5.50	0.41	3.50	9.92	7.00	18.94	5.25	2.00	10.24	12.53	NPT 1"	0.312	0.312	1.201	2.41	2.560	3.38	1.375
215T		7.00					8.50												

CAST IRON FOOT MOUNTED

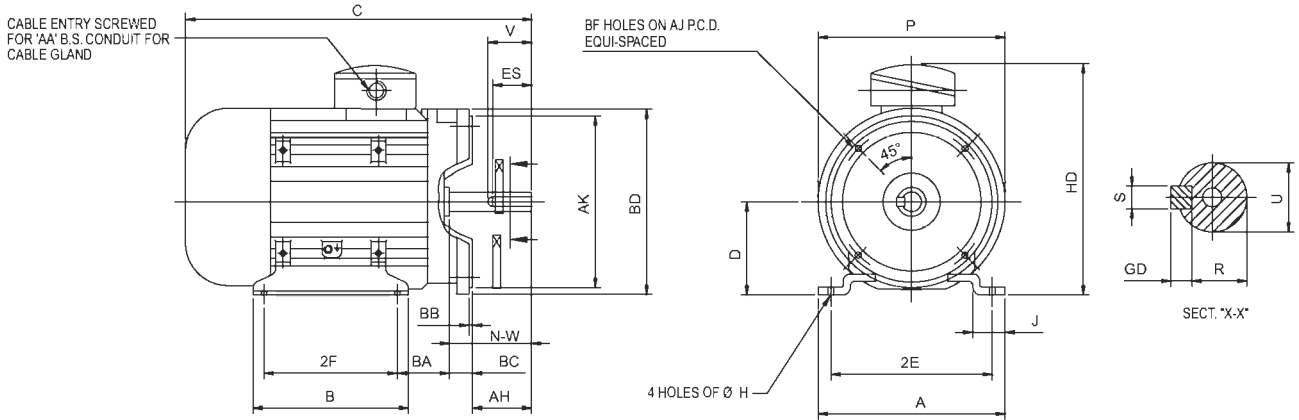


ALL DIMENSIONS IN INCHES

Frame	A	B	C	D	2E	2F	G	H	J	BA	P	HD	U	R	N-W	XF	KEY			AB	AF	AA			
																	S	GD	ES						
143T	6.614	5.00	12.683	3.50	5.50	4.00	0.511	0.34	1.377	2.25	7.48	--	0.875	0.771	2.25	-	0.188	0.188	1.41	5.90	2.46	3/4			
145T		5.984	13.667			5.00										4.00									
182T	8.74	6.692	15.348	4.50	7.50	4.50	0.511	0.41	1.417	2.75	9.055	10.82	1.125	0.986	2.75	-	0.250	0.250	1.78	6.69	2.46	3/4			
184T		6.692	16.332			5.50										4.50									
213T	10.00	7.00	18.734	5.25	8.50	5.50	0.629	0.41	1.889	3.50	10.62	12.59	1.375	1.201	3.38	-	0.312	0.312	2.41	7.48	2.46	1			
215T		8.50	20.309			7.00										5.50									
254T	12.125	11.75	25.30	6.25	10.00	8.25	0.875	0.55	2.87	4.25	12.52	14.8	1.625	1.416	4.00	-	0.375	0.375	2.91	10.48	2.83	1 1/4			
256T						10.00										8.25									
284TS	13.70	12.75	27.0	7.00	11.00	9.50	0.875	0.55	3.3	4.75	13.86	16.5	1.625	1.416	3.25	-	0.375	0.375	1.91	11.25	2.83	1 1/2			
284T			28.44			11.00							1.875	1.591	4.62	9.50							0.500	0.500	3.28
286T			32.2			11.00							1.875	1.591	3.75	-							0.500	0.500	2.03
324TS	15.00	14.0	32.2	8.00	12.50	10.50	1.00	0.66	2.6	5.25	16.85	18.9	1.875	1.591	3.75	-	0.500	0.500	3.91	13.19	2.83	2			
324T			33.7			12.00							2.125	1.845	5.25	10.50							0.500	0.500	2.03
326T			33.0			12.00							2.125	1.845	5.25	10.50							0.500	0.500	2.03
364TS	16.73	15.75	33.00	9.00	14.00	11.25	1.00	0.66	2.75	5.88	18.50	21.02	1.875	1.591	3.75	-	0.500	0.500	2.03	15.98	5.35	3			
364T			12.25			2.375							2.021	5.88	11.25	0.625							0.625	4.28	
365T	19.00	17.75	35.01	10.00	16.00	12.25	1.25	0.81	3.15	6.62	19.68	23.54	2.875	2.450	7.25	-	0.75	0.75	5.65	17.08	5.35	3			
404T			13.75			12.25							2.875	2.450	7.25	12.25									
444T	21.25	23.4	50.0	11.0	18.0	14.50	1.40	0.81	4.0	7.5	23.15	28.5	3.375	2.88	8.5	-	0.875	0.875	6.91	18.5	5.35	3			
445T						16.50																			
447T						20.00																			
504T						16.00																			

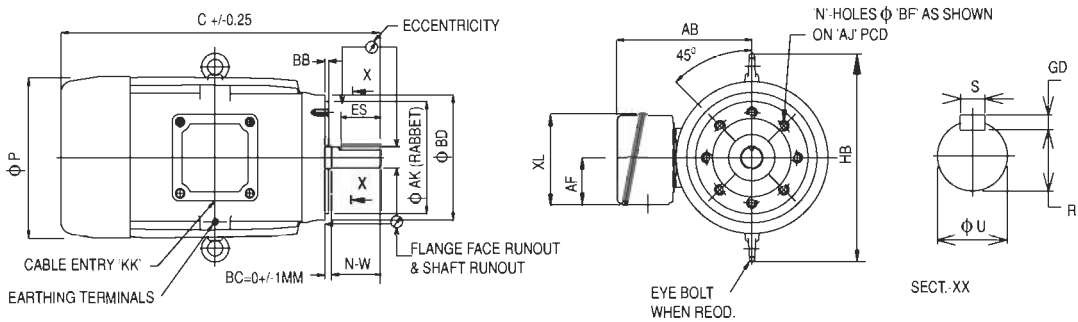
All dimensions are in inches. Please call for certified drawing for engineering purpose.

ALUMINIUM 'C' TYPE FLANGE MOUNTED



FRAME SIZE	MOUNTING				A	B	C	D	J	P	HD	AA	KEYWAY				SHAFT EXT.		FLANGE				BF		BOLT PENETR			
	2E	2F	H	BA									S	GD	R	ES	V	N-W	U	AJ	AK	BD	BB	BC		AH	NO.	TAP SIZE
143TC	5.50	4.0	0.34	2.25	6.70	5.95	12.4	3.5	1.5	7.1	9.0	NPT 3/4"	0.188	0.188	0.771	1.41	1.575	2.25	0.875	5.875	4.50	6.50	0.16	0.12	2.12	4	UNC 3/8"x16	0.56
145TC		5.0				13.4																						
182TC	7.50	4.50	0.41	2.75	8.75	6.70	15.35	4.5	2.0	8.75	11.0	NPT 3/4"	0.25	0.25	0.986	1.78	1.9	2.75	1.125	7.250	8.50	9.00	0.25	2.62	4	UNC 1/2"x13	0.75	
184TC		5.50				18.94																						
213TC	8.50	5.50	0.41	3.50	9.92	7.0	18.94	5.25	2.0	10.24	12.53	NPT 1"	0.312	0.312	1.201	2.41	2.56	3.38	1.375	7.250	8.50	9.00	0.25	2.62	4	UNC 1/2"x13	0.75	
215TC		7.0				8.5																						

CAST IRON 'C' TYPE FLANGE MOUNTED



ALL DIMENSIONS IN INCHES

Frame Size	Face Fixing				Shaft and Keyway								Overall						
	AJ	AK	BB max	BD max	ØBF	N	U	N-W	R	ES min	S	GD	AB	Ø P	C	HB	XL	AF	KK
143TC	5.875	4.5	0.16	6.5	3/8-16	4	0.875	2.12	0.771	1.41	0.188	0.188	5.90	7.48	12.56	--	5.07	2.46	1x3/4"
145TC															13.55				
182TC	7.25	8.5	0.25	9.0	1/2-13	4	1.125	2.62	0.986	1.78	0.25	0.25	6.69	9.05	15.21	--	5.07	2.46	1x3/4"
184TC															16.20				
213TC	7.25	8.5	0.25	9.0	1/2-13	4	1.375	3.12	1.201	2.41	0.312	0.312	7.48	10.62	18.5	--	5.07	2.46	1x1"
215TC															20.04				
254TC	7.25	8.5	0.25	10	1/2-13	4	1.625	4	1.416	2.91	0.375	0.375	10.48	12.52	25.3	16.57	6.49	2.83	1x1"
256TC																			
284TC	9.0	10.5	0.25	11.25	1/2-13	4	1.875	4.62	1.591	3.28	0.500	0.500	11.25	13.86	28.44	18.82	6.49	2.83	1x1.5"
286TC																			
324TC	11	12.5	0.25	14	5/8-11	4	2.125	5.25	1.845	3.91	0.500	0.500	13.19	16.85	33.7	21.93	6.49	2.83	1x2"
326TC																			
364TC	11	12.5	0.25	14	5/8-11	8	2.375	5.88	2.021	4.28	0.625	0.625	15.98	18.5	35.01	24.33	10.32	5.35	1x3"
365TC																			
404TC	11	12.5	0.25	15.5	5/8-11	8	2.875	7.25	2.450	5.65	0.75	0.75	17.08	19.68	40.2	27.08	10.32	5.35	1x3"
405TC																			
444TC	14	16.0	0.25	18.0	5/8-11	8	3.375	8.5	2.88	6.91	0.875	0.875	18.5	23.15	50.0	32.3	10.32	5.35	1x3"
445TC																			
447TC																			
504TC	14	16.0	0.25	18.0	5/8-11	4	3.625	10.63	3.134	8.64	0.875	0.875	18.5	28.5	52.36	32.3	10.32	5.35	1x3"

All dimensions are in inches. Please call for certified drawing for engineering purpose.