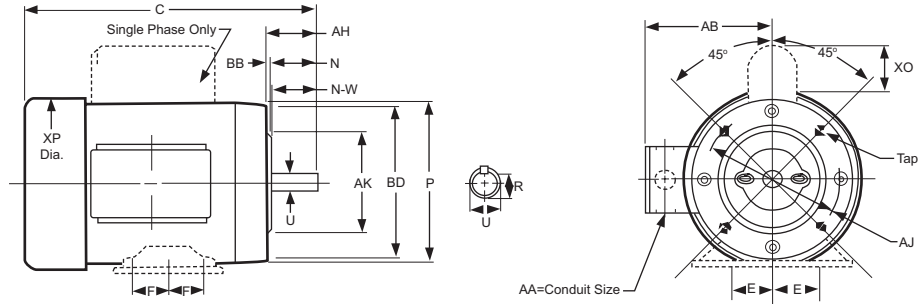


FLUID POWER DATA

ELECTRIC MOTOR DIMENSIONS



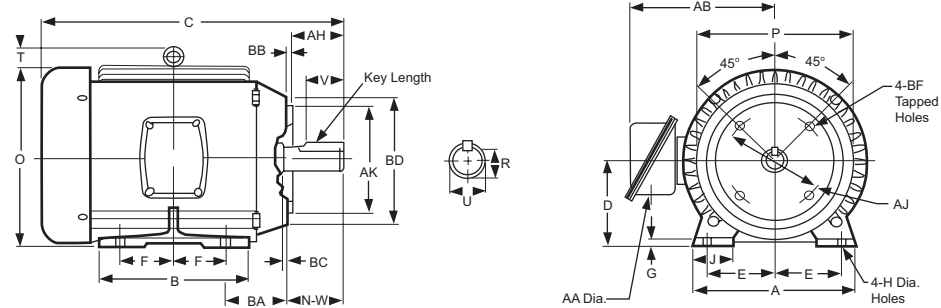
STEEL FRAME
ELECTRIC MOTORS
SINGLE PHASE
AND LOW HP 3 PHASE
(FRAME SIZES 56TC THRU
184TC)



FRAME SIZE	SINGLE PHASE: HP, C DIM		THREE PHASE: HP, C DIM			MOUNTING						
	1800 RPM	3450 RPM	1800 RPM	1200 RPM	3450 RPM	F	E	BA	D	N	O	P
56TC	1/2, 10.81 3/4, 11.31 1, 11.81 1 1/2, 12.81	1/2, 10.81 3/4, 11.31 1, 11.81 1 1/2, 12.31	1/2, 10.44 3/4, 11.81	1/2, 11.31	1/2, 10.81 3/4, 10.81 1, 10.81	1.5	2.44	2.75	3.5	1.94	6.81	6.59
143TC				3/4, 13.25		2						
145TC	2, 14.25	2, 13.75 3, 14.25				2.5	2.75	2.75	3.5	2.38	6.81	6.59
184TC	3, 16.47 5, 17.47	5, 17.47				2.75	3.75	3.5	4.5	2.88	8.75	8.47

FRAME SIZE	AH	AB	AA	KEY (SQ.)		KEYSET R	FLANGE							
				WIDTH	THICK		AK	AJ	BF	BB	BD	XO	N-W	U
56TC	2.0625	5.313	0.5	0.188	0.188	0.516	4.5	5.875	3/8-16	0.125	6.5	2.25	1.875	0.625
143TC	2.125	5.313	0.75	0.188	0.188	0.766	4.5	5.875	3/8-16	0.125	6.5	2.25	2.25	.0875
145TC	2.125	5.313	0.75	0.188	0.188	0.766	4.5	5.875	3/8-16	0.125	6.5	2.25	2.25	0.875
184TC	2.625	6.375	0.75	0.25	0.25	0.984	8.5	7.25	1/2-13	0.25	8.88	2.25	2.75	1.125

CAST IRON 3 PHASE
ELECTRIC MOTORS
(FRAME SIZES 143TC THRU
405TC)



FRAME SIZE	HP			MOUNTING												
	1800 RPM	1200 RPM	3600 RPM	E	F	H	BA	A	B	C	D	G	J	P	L	BC
143TC	1		1.5	2.75	2	0.34	2.25	7	5	12.473	3.5	0.512	1.45	7.16	7.08	0.12
145TC	1.5, 2	1	2	2.75	2.5	.034	2.25	7	6	13.466	3.5	0.512	1.45	7.16	7.08	0.12
182TC	3	1.5	2	3.75	2.25	0.41	2.75	9	6.5	15.11	4.5	0.59	1.97	8.82	10.39	0.12
184TC	5	2	3	3.75	2.75	0.41	2.75	9	7.5	16.116	4.5	0.59	1.97	8.82	10.39	0.12
213TC	7.5	3	5	4.25	2.75	0.41	3.5	10.5	7.5	18.89	5.25	0.709	2.36	10.4	12.26	0.25
215TC	10	5	7.5	4.25	3.5	0.41	3.5	10.5	9	20.488	5.25	0.709	2.36	10.4	12.26	0.25
254TC	15	7.5	10	5	4.125	0.53	4.25	12.5	10.8	23.292	6.25	0.787	2.76	12.6	14.94	0.25
256TC	20	10	20	5	5	0.53	4.25	12.5	12.5	25.058	6.25	0.787	2.76	12.6	14.94	0.25
284TC	25	15	25	5.5	4.75	0.53	4.75	14	12.5	26.634	7	0.866	2.76	13.98	16.33	0.25
286TC	30	20	30	5.5	5.5	0.53	4.75	14	14	28.182	7	0.866	2.76	13.98	16.33	0.25
324TC	40	25	40	6.25	5.25	0.66	5.25	16	14	29.95	8	0.984	2.76	15.55	18.35	0.25
326TC	50	30	50	6.25	6	0.66	5.25	16	15.5	31.236	8	0.984	2.76	15.55	18.35	0.25
364TC	60	40	60	7	5.625	0.66	5.88	18	15.2	32.582	9	1.102	2.95	17.4	20.57	0.25
365TC	75	60	75	7	6.125	0.66	5.88	18	16.2	34.114	9	1.102	2.95	17.4	20.57	0.25
405TC	100	75	100	8	6.875	0.81	6.62	20	17.8	38.35	10	1.18	3.15	21.42	23.46	0.25

FRAME SIZE	AH	AB	AA	KEY (SQ.)			KEYSET R	FLANGE						
				WIDTH	THICK	LENGTH		AK	AJ	BF	BB	BD	N-W	U
143TC	2.12	6.89	3/4	0.188	0.188	1.41	0.771	4.5	5.875	3/8-16	0.16	6.5	2.25	0.875
145TC	2.12	6.89	3/4	0.188	0.188	1.41	0.771	4.5	5.875	3/8-16	0.16	6.5	2.25	0.875
182TC	2.62	7.45	1	0.25	0.25	1.78	0.986	8.5	7.25	1/2-13	0.25	9	2.75	1.125
184TC	2.62	7.45	1	0.25	0.25	1.78	0.986	8.5	7.25	1/2-13	0.25	9	2.75	1.125
213TC	3.12	8.63	1	0.312	0.312	2.41	1.201	8.5	7.25	1/2-13	0.25	9	3.375	1.375
215TC	3.12	8.63	1	0.312	0.312	2.41	1.201	8.5	7.25	1/2-13	0.25	9	3.375	1.375
254TC	3.75	11.2	1.5	0.375	0.375	2.91	1.416	8.5	7.25	1/2-13	0.25	10	4	1.625
256TC	3.75	11.2	1.5	0.375	0.375	2.91	1.416	8.5	7.25	1/2-13	0.25	10	4	1.625
284TC	4.38	12	1.5	0.5	0.5	3.28	1.591	10.5	9	1/2-13	0.25	11.25	4.625	1.875
286TC	4.38	12	1.5	0.5	0.5	3.28	1.591	10.5	9	1/2-13	0.25	11.25	4.625	1.875
324TC	5	13.4	2	0.5	0.5	3.91	1.845	12.5	11	5/8-11	0.25	14	5.25	2.125
326TC	5	13.4	2	0.5	0.5	3.91	1.845	12.5	11	5/8-11	0.25	14	5.25	2.125
364TC	5.62	15.7	3	0.625	0.625	4.28	2.021	12.5	11	5/8-11	0.25	14	5.875	2.375
365TC	5.62	15.7	3	0.625	0.625	4.28	2.021	12.5	11	5/8-11	0.25	14	5.875	2.375
405TC	7	18.07	3	0.75	0.75	5.65	2.45	12.5	11	5/8-11	0.25	15.5	7.25	2.875

Fluid Power Data

FLUID POWER DATA

HORSEPOWER/ AMPERAGE REQUIREMENTS



ELECTRIC MOTOR HORSEPOWER REQUIRED TO DRIVE A HYDRAULIC PUMP

FLOW (GPM)	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	5000
1/2	.09	.17	.26	.34	.43	.51	.60	.69	.77	.86	.94	1.0	1.7
1	.17	.34	.51	.69	.86	1.0	1.2	1.4	1.5	1.7	1.9	2.1	3.4
1 1/2	.26	.51	.77	1.0	1.3	1.5	1.8	2.1	2.3	2.6	2.8	3.1	5.2
2	.34	.69	1.0	1.4	1.7	2.1	2.4	2.8	3.1	3.4	3.8	4.1	6.9
2 1/2	.43	.86	1.3	1.7	2.1	2.6	3.0	3.4	3.9	4.3	4.7	5.2	8.6
3	.51	1.0	1.5	2.1	2.6	3.1	3.6	4.1	4.6	5.2	5.7	6.2	10.3
4	.69	1.4	2.1	2.8	3.43	4.1	4.8	5.5	6.2	6.9	7.6	8.2	13.7
5	.86	1.7	2.6	3.4	4.3	5.2	6.0	6.9	7.7	8.6	9.4	10.3	17.2
6	1.0	2.1	3.1	4.1	5.2	6.2	7.2	8.2	9.3	10.3	11.3	12.4	20.6
7	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	10.8	12.0	13.2	14.4	24.0
8	1.4	2.8	4.1	5.5	6.9	8.2	9.6	11.0	12.4	13.7	15.1	16.5	27.5
9	1.5	3.1	4.6	6.2	7.7	9.3	10.8	12.4	13.9	15.4	17.0	18.5	30.9
10	1.7	3.4	5.2	6.9	8.6	10.3	12.0	13.7	15.4	17.2	18.9	20.6	34.3
11	1.9	3.8	5.7	7.6	9.4	11.3	13.2	15.1	17.0	18.9	20.8	22.7	37.8
12	2.1	4.1	6.2	8.2	10.3	12.4	14.4	16.5	18.5	20.6	22.7	24.7	41.2
13	2.2	4.5	6.7	8.9	11.2	13.4	15.6	17.9	20.1	22.3	24.5	26.8	44.6
14	2.4	4.8	7.2	9.6	12.0	14.4	16.8	19.2	21.6	24.0	26.4	28.8	48.0
15	2.6	5.2	7.7	10.3	12.9	15.4	18.0	20.6	23.2	25.7	28.3	30.9	51.5
16	2.8	5.5	8.2	11.0	13.7	16.5	19.2	22.0	24.7	27.5	30.2	33.0	54.9
17	2.9	5.8	8.8	11.7	14.6	17.5	20.4	23.3	26.3	29.2	32.1	35.0	58.3
18	3.1	6.2	9.3	12.4	15.4	18.5	21.6	24.7	27.8	30.9	34.0	37.1	61.8
19	3.3	6.5	9.8	13.0	16.3	19.6	22.8	26.1	29.3	32.6	35.9	39.1	65.2
20	3.4	6.9	10.3	13.7	17.2	20.6	24.0	27.5	30.9	34.3	37.8	41.2	68.6
25	4.3	8.6	12.9	17.2	21.5	25.7	30.0	34.3	38.6	42.9	47.2	51.5	85.8
30	5.2	10.3	15.4	20.6	25.7	30.9	36.0	41.2	46.3	51.5	56.6	61.8	103
35	6.0	12.0	18.0	24.0	30.0	36.0	42.0	48.1	54.1	60.1	66.1	72.1	120
40	6.9	13.7	20.6	27.5	34.3	41.2	48.1	54.9	61.8	68.6	75.5	82.4	137
45	7.7	15.4	23.2	30.9	38.6	46.3	54.1	61.8	69.5	77.2	84.9	92.7	154
50	8.6	17.2	25.7	34.3	42.9	51.5	60.1	68.6	77.2	85.8	94.4	103	172
60	10.3	20.6	30.9	41.2	51.5	61.8	72.1	82.4	92.7	103	113	124	206
70	12.0	24.0	36.0	48.1	60.1	72.1	84.1	96.1	108	120	132	144	240
80	13.7	27.5	41.2	54.9	68.6	82.4	96.1	110	124	137	151	165	275
90	15.4	30.9	46.3	61.8	77.2	92.7	108	124	139	154	170	185	309
100	17.2	34.3	51.5	68.6	85.8	103	120	137	154	172	189	206	343

$$HP = \frac{GPM \times PSI}{1714 \times \text{EFFICIENCY}^*}$$

*CHART BASED ON PUMP EFFICIENCY OF (.85)

Fluid Power Data

MOTOR TERMINAL AMPERES AT FULL LOAD (AVERAGE VALUES SHOWN)

HP	SINGLE-PHASE A-C		POLYPHASE A-C (INDUCTION TYPE) SQUIRREL-CAGE AND WOUND ROTOR								DIRECT CURRENT		
	115 VOLTS	230 VOLTS*	115 VOLTS		230 VOLTS		460 VOLTS		575 VOLTS		180 VOLTS	240 VOLTS	500 VOLTS
			3-PH	2-PH 4-WIRE*	3-PH	2-PH 4-WIRE*	3-PH	2-PH 4-WIRE*	3-PH	2-PH 4-WIRE*			
1/4	5.8	2.9									2.0		
1/3	7.2	3.6									2.6		
1/2	9.8	4.9	4.0	2.0	2.0	1.0	.8	.8	3.4	2.7			
3/4	13.8	6.9	5.6	4.8	2.8	2.4	1.4	1.2	1.1	1.0	4.8	3.8	
1	16	8	7.2	6.4	3.6	3.2	1.8	1.6	1.4	1.3	6.1	4.7	
1 1/2	20	10	10.4	9.0	5.2	4.5	2.6	2.3	2.1	1.8	8.3	6.6	
2	24	12	13.6	11.8	6.8	5.9	3.4	3.0	2.7	2.4	10.8	8.5	
3	34	17			9.6	8.3	4.8	4.2	3.9	3.3	16	12.2	
5	56	28			15.2	13.2	7.6	6.6	6.1	5.3	27	20	
7 1/2	80	40			22.0	19.0	11.0	9	9	8		29	13.6
10	100	50			28.0	24.0	14.0	12	11	10		38	18
15					42.0	36.0	21	18	17	14		55	27
20					54	47	27	23	22	19		72	34
25					68	59	34	29	27	24		89	43
30					80	69	40	35	32	28		106	51
40					104	90	52	45	41	36		140	67
50					130	113	65	56	52	45		173	83
60					154	133	77	67	62	53		206	99
70					192	166	96	83	77	66		255	123

* FOR CURRENTS OF 208 AND 200 VOLT MOTORS, INCREASE THE CORRESPONDING 230 VOLT FULL LOAD CURRENT BY 10 AND 15 PERCENT RESPECTIVELY.

▼CURRENT IN COMMON CONDUCTOR OF 2-PHASE, 3WIRE SYSTEM WILL BE 1.41 TIMES GIVEN

FLUID POWER DATA

MOTOR STARTER, CONDUIT & WIRE SIZES



3 - PHASE MOTOR STARTERS, 1/2 TO 20 H.P.

1/2 TO 20 H.P. MOTOR HP, 3 PHASE	1/2	3/4	1	1 1/2	2	3	5	7 1/2	10	15	20
VOLTAGE	230 460	230 460	230 460	230 460	230 460	230 460	230 460	230 460	230 460	230 460	230 460
NEMA STARTER SIZE	00 00	00 00	00 00	00 00	0 00	0 0	0 0	1 1	2 1	2 2	3 2
FULL LOAD CURRENT	2.0 1.0	2.8 1.4	3.6 1.8	5.2 2.6	6.8 3.4	9.6 4.8	15.2 7.6	22 11	28 14	42 21	54 27
STD. N.E.C.	6 3	10 3	10 6	15 10	20 10	25 15	45 20	60 30	80 40	125 60	150 80
MAXIMUM FUSE AMP DUAL ELEMENT	3 1	3 1	6 1	6 3	10 6	15 6	25 10	35 15	45 25	70 35	90 45
CIRCUIT BREAKER MAXIMUM AMPS	15 15	15 15	15 15	15 15	20 15	25 15	40 20	60 30	70 40	110 60	150 70
MINIMUM WIRE SIZE T, TW	14 14	14 14	14 14	14 14	14 14	14 14	12 14	10 14	8 12	6 10	4 8
MAXIMUM 3 WIRES, CONDUIT SIZE INCHES	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1 1/2	1 1/2
MINIMUM WIRE SIZE RH, RHW, THW, THWN RHH, THHN, XHHW	14 14	14 14	14 14	14 14	14 14	12 14	12 14	10 14	8 12	6 10	6 8
MAXIMUM 3 WIRES, CONDUIT SIZE INCHES	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	3/4 1/2	1 1/2	1 3/4

3 - PHASE MOTOR STARTERS, 25 TO 200 H.P.

25 TO 200 H.P. MOTOR HP, 3 PHASE	25	30	40	50	60	75	100	125	150	200
VOLTAGE	230 460	230 460	230 460	230 460	230 460	230 460	230 460	230 460	230 460	230 460
NEMA STARTER SIZE	3 2	3 3	4 3	4 3	5 4	5 4	5 4	6 5	6 5	6 5
FULL LOAD CURRENT	68 34	80 40	104 52	130 65	154 77	192 96	248 124	312 156	360 180	480 240
STD. N.E.C.	200 100	200 100	300 150	350 175	450 225	500 250	700 350	800 450	1000 500	600
MAXIMUM FUSE AMPS DUAL ELEMENT	100 50	125 70	175 90	200 100	250 125	300 150	400 200	500 250	600 300	700 400
CIRCUIT BREAKER MAXIMUM AMPS	175 90	200 100	300 150	350 175	400 200	500 250	700 350	800 400	1000 450	1200 600
MINIMUM WIRE SIZE T, TW	3 6	1 6	00 4	000 3	0000 2	300 0	500 000	750 0000	1000 300	500
MAXIMUM 3 WIRES, CONDUIT SIZE INCHES	1 1/4 1/2	1 1/4 1/2	1 1/2	2 1 1/4	2 1 1/4	2 1/2 1 1/2	2 1/2 2	3 1/2 2	4 2 1/2	3
MINIMUM WIRE SIZE RH, RHW, THW, THWN RHH, THHN, XHHW	4 8	3 6	1 6	00 4	000 3	250 1	250 00	600 000	750 0000	1500 350
MAXIMUM 3 WIRES, CONDUIT SIZE INCHES	1 3/4	1 1/4 1	1 1/4 1	1 1/2 1	2 1 1/4	2 1/2 1 1/2	2 1/2 1 1/2	3 2	3 1/2 2	2 1/2

SINGLE PHASE MOTOR STARTERS 1/6 TO 5HP

1/6 TO 5 H.P. 1 PHASE	1/6	1/4	1/3	1/2	3/4	1	1 1/2	2	3	5
VOLTAGE	115 230	115 230	115 230	115 230	115 230	115 230	115 230	115 230	115 230	115 230
FULL LOAD CURRENT	4.4 2.2	5.8 2.9	7.2 3.6	9.8 4.9	13.8 6.9	16 8	20 10	24 12	34 17	56 28
STD. N.E.C.	15 6	15 10	20 10	25 15	40 20	45 20	60 30	70 35	100 50	150 80
MAXIMUM FUSE AMPS. DUAL ELEMENT	7 3.2	9 4.5	12 5.6	15 8	20 10	25 12	30 15	35 17.5	50 25	90 45
CIRCUIT BREAKER MAXIMUM AMPS.	15 15	15 15	20 15	25 15	35 20	40 20	50 25	60 30	90 45	150 70
MINIMUM WIRE SIZE T, TW	14 14	14 14	14 14	14 14	12 14	12 14	10 14	10 14	6 10	4 8
MAXIMUM 3 WIRES, CONDUIT SIZE INCHES	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1 1/2	1 1/2
MINIMUM WIRE SIZE RH, RHW, THW, THWN RHH, THHN, XHHW	14 14	14 14	14 14	14 14	12 14	12 14	12 10	10 14	8 10	4 8
MAXIMUM 3 WIRES, CONDUIT SIZE INCHES	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	1/2 1/2	3/4 1/2	1 3/4

ALL INFORMATION BASED ON N.E.C. AND NEMA STANDARDS. AMPACITY OF CONDUCTORS IN CONDUIT BASES ON ROOM TEMPERATURE OF 30° (86°F). AMPACITY OF CONDUCTORS SHALL NOT BE LESS THAN 125 PERCENT OF MOTOR FULL LOAD CURRENT. N.E.C. 430-22

- (1) THE FULL LOAD CURRENTS SHOWN ARE AVERAGE VALUES.
- (2) MOTOR BRANCH CIRCUIT PROTECTION.
- (3) USE ONE SIZE SMALLER WIRE FOR RHH, THHN, XHHW.
- (4) USE ONE SIZE SMALLER CONDUIT FOR RHW, THW, RHH, XHHW.

- (5) USE ONE SIZE SMALLER CONDUIT FOR THWN, THHN, XHHW.
- (6) WITHOUT OUTER COVERING.
- (7) WITH OUTER COVERING.

WIRE AND CONDUIT SIZES

CONDUIT SIZE INCHES	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
MAXIMUM NUMBER OF NO. 14 CONTROL WIRES IN CONDUIT	9	15	25	44	60	99	142			
T, TW, XHHW	6	10	16	29	40	65	93	143	192	
(6)RHW, (6)RHH, THW	13	24	39	69	94	154	220			
THWN, THHN	3	6	10	18	25	41	58	90	121	155
(7)RHW, (7)RHH										

Fluid Power Data

FLUID POWER DATA

ELECTRIC MOTOR PERFORMANCE DATA/ ELECTRICAL EQUATIONS



ELECTRIC MOTOR PERFORMANCE DATA (1800RPM):

MODEL #	HP	FRAME SIZE	FULL LOAD CURRENT AT 230V (A)	FULL LOAD CURRENT AT 460V (A)	FULL LOAD TORQUE (LB. FT.)	LOCKED ROTOR TORQUE (%)	BREAKDOWN TORQUE (%)	EFFICIENCY			POWER FACTOR			SERVICE FACTOR	APPROX WEIGHT (Lb.)
								100	75	50	100	75	50		
WW1-143TC	1	143TC	3.0	1.5	3.00	260%	350%	84.0%	83.0%	79.4%	0.71	0.63	0.44	1.15	58
WW1.5-145TC	1.5	145TC	4.2	2.1	4.41	240%	320%	85.5%	85.6%	83.5%	0.74	0.66	0.54	1.15	60
WW2-145TC	2	145TC	5.4	2.7	6.05	240%	260%	85.5%	86.0%	85.0%	0.77	0.70	0.58	1.15	70
WW3-182TC	3	182TC	7.7	3.9	9.07	280%	330%	88.5%	88.1%	86.3%	0.81	0.75	0.63	1.15	90
WW5-184TC	5	184TC	11.8	5.9	15.10	240%	310%	88.5%	89.0%	88.6%	0.83	0.78	0.66	1.15	110
WW7.5-213TC	7.5	213TC	18.6	9.3	22.00	200%	330%	90.2%	90.6%	89.1%	0.81	0.75	0.64	1.15	160
WW10-215TC	10	215TC	24.8	12.4	30.10	200%	300%	90.2%	90.6%	90.0%	0.83	0.76	0.66	1.15	180
WW15-254TC	15	254TC	35.4	17.7	43.70	170%	270%	91.7%	90.5%	89.5%	0.84	0.81	0.72	1.15	325
WW20-256TC	20	256TC	47.6	23.8	59.70	170%	240%	91.7%	91.5%	91.2%	0.84	0.82	0.75	1.15	370
WW25-284TC	25	284TC	56.4	28.2	73.60	170%	290%	93.0%	93.5%	93.0%	0.87	0.86	0.79	1.15	420
WW30-286TC	30	286TC	67.2	33.6	87.40	170%	270%	93.0%	93.2%	92.0%	0.88	0.86	0.80	1.15	470
WW40-324TC	40	324TC	93.0	46.5	119.00	190%	300%	93.6%	94.0%	93.3%	0.86	0.83	0.75	1.15	590
WW50-326TC	50	326TC	114.6	57.3	147.00	180%	290%	93.6%	93.8%	93.4%	0.86	0.83	0.75	1.15	650
WW60-364TC	60	364TC	139.4	69.7	179.00	180%	260%	94.1%	94.3%	93.7%	0.85	0.83	0.77	1.15	780
WW75-365TC	75	365TC	172.8	86.4	221.00	180%	250%	94.5%	94.7%	94.0%	0.84	0.83	0.76	1.15	870
WW100-405TC	100	405TC	230.0	115.0	296.00	180%	260%	95.0%	95.3%	93.4%	0.87	0.86	0.80	1.15	1350

ELECTRICAL DATA

MOTOR FORMULAS

$$\text{TORQUE (LB-FT)} = \frac{5250 \times \text{HORSEPOWER}}{\text{RPM}}$$

$$\text{SYNCHRONOUS RPM} = \frac{\text{HERTZ} \times 120}{\text{POLES}}$$

D.C. CIRCUIT POWER FORMULAS

$$\text{WATTS} = \text{VOLTS} \times \text{AMPERES}$$

$$\text{AMPERES} = \frac{\text{WATTS}}{\text{VOLTS}}$$

$$\text{VOLTS} = \frac{\text{WATTS}}{\text{AMPERES}}$$

$$\text{HORSEPOWER} = \frac{\text{VOLTS} \times \text{AMPERES} \times \text{EFFICIENCY}^*}{746}$$

OHM'S LAW

$$\text{AMPERES} = \frac{\text{VOLTS}}{\text{OHMS}}$$

$$\text{OHMS} = \frac{\text{VOLTS}}{\text{AMPERES}}$$

$$\text{VOLTS} = \text{AMPERES} \times \text{OHMS}$$

A.C. CIRCUIT POWER FORMULAS

SINGLE - PHASE

$$\text{WATTS} = \text{VOLTS} \times \text{AMPS} \times \text{POWER FACTOR}^*$$

$$\begin{aligned} \text{AMPERES} &= \frac{\text{WATTS}}{\text{VOLTS} \times \text{POWER FACTOR}^*} \\ &= \frac{\text{kVA} \times 1000}{\text{VOLTS}} \\ &= \frac{\text{HORSEPOWER} \times 746}{\text{VOLTS} \times \text{EFFICIENCY}^* \times \text{POWER FACTOR}^*} \end{aligned}$$

$$\text{KILOWATTS} = \frac{\text{AMPS} \times \text{VOLTS} \times \text{POWER FACTOR}^*}{1000}$$

$$\text{kVA} = \frac{\text{AMPS} \times \text{VOLTS}}{1000}$$

$$\text{HORSEPOWER} = \frac{\text{VOLTS} \times \text{AMPS} \times \text{EFFIC.}^* \times \text{PWR. FACTOR}^*}{746}$$

THREE - PHASE

$$\text{WATTS} = 1.73 \times \text{VOLTS} \times \text{AMPS} \times \text{POWER FACTOR}^*$$

$$\begin{aligned} \text{AMPERES} &= \frac{\text{WATTS}}{1.73 \times \text{VOLTS} \times \text{POWER FACTOR}^*} \\ &= \frac{\text{kVA} \times 1000}{1.73 \times \text{VOLTS}} \\ &= \frac{\text{HORSEPOWER} \times 746}{1.73 \times \text{VOLTS} \times \text{EFFIC.}^* \times \text{POWER FACTOR}^*} \end{aligned}$$

$$\text{KILOWATTS} = \frac{1.73 \times \text{AMPS} \times \text{VOLTS} \times \text{POWER FACTOR}^*}{1000}$$

$$\text{kVA} = \frac{1.73 \times \text{AMPS} \times \text{VOLTS}}{1000}$$

$$\text{HORSEPOWER} = \frac{1.73 \times \text{VOLTS} \times \text{AMPS} \times \text{EFFIC.}^* \times \text{PWR. FACT.}^*}{746}$$

*EXPRESSED AS A DECIMAL

Fluid Power Data