

# **TECO Westinghouse**

ISSUED

TYPE

### 8/29/2014

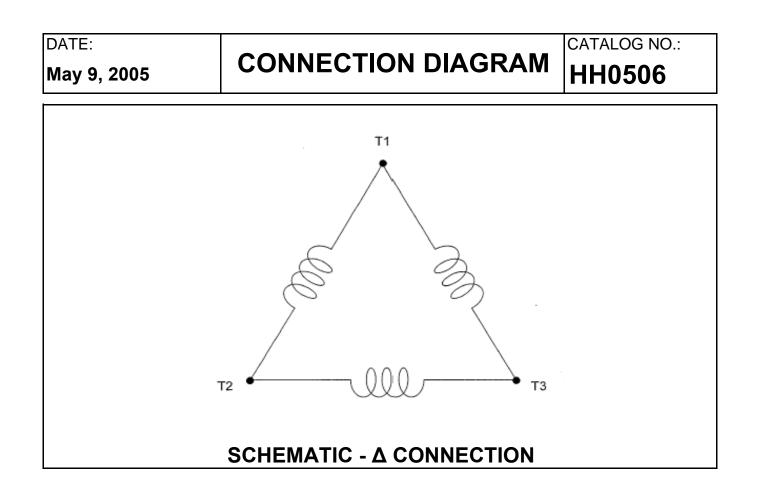
AEHH

# **PERFORMANCE DATA** 3-PHASE INDUCTION MOTOR

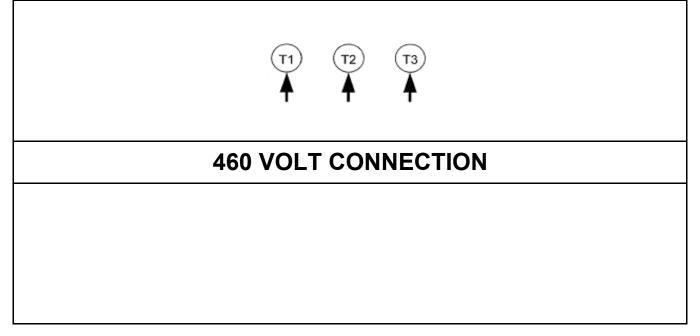
ENCLOSURE TEFC CATALOG#

HH0506

CONSTANT TORQUE         CONSTANT HORSEPOWER           HZ         HP         RPM         TORQUE (lb-ft)         HZ         HP         RPM         TORQUE (lb-ft)           6-60         5-50         120-1200         222.5         60-90         50         1200-1800         222.5-148           TYPICAL PERFORMANCE           FULL         EFFICIENCY         POWER FACTOR         SOUND           FULL         0.04D         3/4 LOAD         1/2 LOAD         3/4 LOAD         1/2 LOAD           RPM         MIN.%         NOM.%         %         %         %         %         Db(A)           1180         93         94.1         94.5         93.6         86         83         75.5         75           CURRENTS         NEMA KVA         CODE CODE           AT         AT         AT         CODE 460         CODE         COLD         IMEMA KVA         CODE         COLD           20.9         57.80         363         6         29         ACCEL TIME (DOL)         ALLOWAI START           FULL         LOCKED         PULL         BREAK         ROTOR         NEMA LOAD         MAX ALLOWABLE         ALLOWABLE <th></th> <th>1111000</th> <th></th>		1111000														
HP         KW         POLE         SIZE         VOLTAGE         HZ         AMBIENT         CLASS         DESIGN         RATING         FACTOR           50         37.3         6         365T         460         60         40°C         F         B         CONT.         1.15           VARIABLE FREQUENCY DRIVE SERVICE           VARIABLE TORQUE         OHMS/PHASE EQUIVALENT WYE CIRC (AT RATED OPERATING TEMPERATURE 26 (AT AT A					1	ΑΤΙΟΙ	FORM/	E II	PLAT	NAME						
HP         KW         SL2E         AMBIENI         CLASS         DESIGN         RATING         PACTOR           50         37.3         6         365T         460         60         40°C         F         B         CONT.         1.15           VARIABLE TORQUE           HZ         HP         RPM         TORQUE         OHMS/PHASE EQUIVALENT WYE CIRC (AT RATED OPERATING TEMPERATURE 22           HZ         HP         RPM         (b-ft)         0.0551-222.5         0.0502         0.1436         0.3901         0.6604         12           HZ         HP         RPM         TORQUE         CONSTANT HORSEPOWER         TORQUE         0.0502         0.1436         0.3901         0.6604         12           HZ         HP         RPM         TORQUE         CONSTANT HORSEPOWER         TORQUE         0.0502         0.1436         0.3901         0.6604         12           HZ         HP         RPM         TORQUE         HZ         HP         RPM         (b-ft)         (b-ft)         0.0502         0.1436         0.3901         0.6604         12           LOAD         SVELD         HZ         HP         RPM         (b-ft)         (b-ft)         (b-ft)         0.55										F H7			1 - 1	PO		
VARIABLE FREQUENCY DRIVE SERVICE           VARIABLE TORQUE           HZ         HP         RPM         TORQUE (lb-ft)         OHMS/PHASE EQUIVALENT WYE CIRC (AT RATED OPERATING TEMPERATURE 22           HZ         HP         RPM         TORQUE (lb-ft)         R1         R2         X1         X2           CONSTANT TORQUE         CONSTANT TORQUE         CONSTANT HORSEPOWER           HZ         HP         RPM         TORQUE (lb-ft)         HZ         HP         RPM         (lb-ft) (lb-ft)           6-60         5-50         120-1200         222.5         60-90         50         1200-1800         222.5-148           TYPICAL PERFORMANCE           FULL COAD         FULL LOAD         3/4 LOAD         1/2 LOAD         FULL LOAD         3/4 LOAD         1/2 LOAD         SOUND           RPM         MIN.%         NOM.%         %         86         83         75.5         75           CURRENTS         SAFE ST         SAFE ST         SAFE ST         SAFE ST           NO LOAD         FULL LOAD         LOAD         LOCKED ROTOR         NEMA KVA         SAFE ST           VOLT         VOLT         VOLT         VOLT         VOLT         START           V						SS							S			
VARIABLE TORQUE           HZ         HP         RPM         TORQUE (b-ft)         OHMS/PHASE EQUIVALENT WYE CIRC (AT RATED OPERATING TEMPERATURE 26           3-60         0.0063-50         60-1200         0.551-222.5         R1         R2         X1         X2           CONSTANT TORQUE         CONSTANT TORQUE           HZ         HP         RPM         TORQUE (b-ft)         HZ         HP         RPM         TORQUE (b-ft)         HZ         HP         RPM         TORQUE (b-ft)         CONSTANT HORSEPOWER           HZ         HP         RPM         TORQUE (b-ft)         HZ         HP         RPM         TORQUE (b-ft)         CONSTANT HORSEPOWER           HZ         HP         RPM         TORQUE (b-ft)         HZ         HP         RPM         TORQUE (b-ft)         RPM         TORQUE (b-ft)         HZ         HP         RPM         TORQUE (b-ft)         RPM         TORQUE         SOUND         222.5         60-90         50         120-1800         222.5-148           FULL LOAD         3/4 LOAD         3/4 LOAD         1/2 LOAD         SOUND         RPM         RESUR KVA         SOUND         RESUR KVA         SOUND         RESUR KVA         SAFE ST TIME IN         SAFE ST TIME IN SECON		1.15	ONT.	C	В		F	0°C	40	60	460	65T	6 36	6	37.3	50
VARIABLE TORQUE         (AT RATED OPERATING TEMPERATURE 22           HZ         HP         RPM         TORQUE (lb-ft)         (AT RATED OPERATING TEMPERATURE 22           3-60         0.0063-50         60-1200         0.551-222.5         0.0502         0.1436         0.3901         0.6604         12           CONSTANT TORQUE         CONSTANT TORQUE         CONSTANT HORSEPOWER           HZ         HP         RPM         (lb-ft)         HZ         HP         RPM         TORQUE           Ge-60         5-50         120-1200         222.5         60-90         50         1200-1800         222.5-148           TYPICAL PERFORMANCE           FULL         COAD         3/4 LOAD         1/2 LOAD         SOUND         PRESSUR LEVEL @ 3         Db(A)           I180         93         94.1         94.5         93.6         86         83         75.5         75           VOLOAD         FULL LOAD         FULL LOAD         LOCKED ROTOR         NEMA KVA         SAFE ST TIME II SECONI           460         460         460         460         460         ALLOWAN         SAFE ST           VOLT         VOLT         VOLT         VOLT         ALLOWAN         ALLOWAN         ALLOWAN				E		VE S		JEN	REQL	ABLE FI	VARI					
HZ         HP         KPM         (lb-ft)         K1         K2         X1         X2           3-60         0.0063-50         60-1200         0.551-222.5         0.0502         0.1436         0.3901         0.6604         12           Image: HZ         HP         RPM         TORQUE         CONSTANT HORSEPOWER           HZ         HP         RPM         TORQUE         HZ         HP         RPM         TORQUE           FULL         CA         3/4 LOAD         3/4 LOAD         3/4 LOAD         3/4 LOAD         1/2 LOAD         PRESSUR           FULL         COAD         FULL LOAD         S4         86         83         75.5         75           MIN:%         NO LOAD         FULL LOAD         LOAD         LOCKED ROTOR         NEMA KVA         SAFE ST           Attor         Attot         Attor         Attot <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>E TORQUE</td><td>RIABLE</td><td>VAI</td><td></td><td></td><td></td></t<>											E TORQUE	RIABLE	VAI			
CONSTANT TORQUE         CONSTANT HORSEPOWER           HZ         HP         RPM         TORQUE         HZ         HP         RPM         TORQUE           6-60         5-50         120-1200         222.5         60-90         50         1200-1800         222.5-148           TYPICAL PERFORMANCE           FULL         EFFICIENCY         POWER FACTOR         SOUND           RPM         MIN.%         NOM.%         %         %         3/4 LOAD         1/2 LOAD         RPKESSUR           RPM         MIN.%         NOM.%         %         %         %         %         Db(A)           1180         93         94.1         94.5         93.6         86         83         75.5         75           CURRENTS           NO LOAD         FULL LOAD         LOAD         LOCKED ROTOR         NEMA KVA         SAFE ST.           460         460         460         460         COLT         COLT         COLT         COLD         COLD         COLD         SAFE ST.           20.9         57.80         363         G         29         SAFE ST.         START PER HO           FULL         LOCKED         PULL         BREAK <td>X<sub>m</sub></td> <td>X2</td> <td>X1</td> <td>R2</td> <td></td> <td>R</td> <td></td> <td colspan="2"></td> <td></td> <td colspan="2">RPM</td> <td colspan="2">HP</td> <td>Z</td> <td>Н</td>	X <sub>m</sub>	X2	X1	R2		R					RPM		HP		Z	Н
HZ         HP         RPM         TORQUE (lb-ft)         HZ         HP         RPM         TORQUE (lb-ft)           6-60         5-50         120-1200         222.5         60-90         50         1200-1800         222.5-148           TYPICAL PERFORMANCE           FULL LOAD RPM         FULL LOAD         3/4 LOAD         1/2 LOAD         SOUND %         PRESSUR           FULL LOAD RPM         FULL LOAD         3/4 LOAD         1/2 LOAD %         SUBAL         1/2 LOAD %         Db(A)           1180         93         94.1         94.5         93.6         86         83         75.5         75           CURRENTS         NEMA 460         At T 460         At T 460         At T 460         At T 460         CODE 460         COLD           VOLT         VOLT         VOLT         VOLT         ACCEL TIME (DOL)         ALLOWAD START PER HO           FULL LOAD (b-ft)         LOCKED %FLT         PULL %FLT         BREAK MOWN         ROTOR WR <sup>2</sup> ((b-ft <sup>2</sup> )         MAX ALLOWABLE (WK <sup>2</sup> )         NEMA ALLOWABLE WK <sup>2</sup> )         MAX ALLOWABLE WK <sup>2</sup> COLD WK <sup></sup>	12.3 <sup>-</sup>	0.6604	0.3901	1436 0	02 0.	0.0		2.5	1~222	0.55	~1200	60	063~50	0.0	60	3~
HZ         HP         KPM         (lb-ft)         HZ         HP         RPM         (lb-ft)           6-60         5-50         120-1200         222.5         60-90         50         1200-1800         222.5-148           TYPICAL PERFORMANCE           FULL         EFFICIENCY         POWER FACTOR         SOUND           RPM         MIN.%         NOM.%         3/4 LOAD         1/2 LOAD         3/4 LOAD         1/2 LOAD         3/4 LOAD         %         1/2 LOAD         %         %         Db(A)           1180         93         94.1         94.5         93.6         86         83         75.5         75           CURRENTS         NEMA         NEMA         KVA         CODE         SAFE ST.           AT         AT         AT         AT         CODE         COLD		ER	SEPOWE	NT HORS		С					ORQUE	ΓΑΝΤ Τ	CONST			
6-60         5-50         120-1200         222.5         60-90         50         1200-1800         222.5-148           TYPICAL PERFORMANCE           FULL LOAD RPM         FULL LOAD MIN.%         NOM.%         3/4 LOAD %         1/2 LOAD %         FULL LOAD %         3/4 LOAD %         1/2 LOAD %         Yeessue b(A)           1180         93         94.1         94.5         93.6         86         83         75.5         75           CURRENTS         NEMA KVA         NEMA KVA         SAFE ST. TIME II SECONI           AT         AT         AT         AT         CODE 460         460         CODE 460         CODE LETTER         COLD	E			RPM	<b>)</b>	Н	HZ			RPM TORQU			HP		Z	н
FULL LOAD RPM         EFFICIENCY         POWER FACTOR         SOUND PRESSUR LEVEL @ 3           RPM         FULL LOAD         3/4 LOAD         1/2 LOAD         3/4 LOAD         1/2 LOAD         3/4 LOAD         1/2 LOAD         SOUND           MIN.%         NOM.%         %         1/2 LOAD         3/4 LOAD         1/2 LOAD         %         1/2 LOAD         %         Db(A)           1180         93         94.1         94.5         93.6         86         83         75.5         75           CURRENTS           NO LOAD         FULL LOAD         LOCKED ROTOR         NEMA KVA         SAFE ST.           AT         AT         AT         CODE 460         460         LETTER         COLD           VOLT         VOLT         VOLT         VOLT         COLD         COLD         COLD           20.9         57.80         363         G         29         START           FULL LOAD         INERTIA         ACCEL TIME (DOL)         ALLOWAS         START           FULL LOAD         PKL         BREAK DOWN         ROTOR %FLT         NEMA LOAD         MAX LOAD         ALLOWABLE WK <sup>2</sup> MAX ALLOWABLE WK <sup>2</sup> COLD         COLD         COLD         COLD	8.3	· · · · ·	00	1200~18	)	5	0~90				120~1200		5~50		60	6~
FULL LOAD RPM         EFFICIENCY         POWER FACTOR         SOUND PRESSUR LEVEL @ 3           RPM         FULL LOAD         3/4 LOAD         1/2 LOAD         3/4 LOAD         1/2 LOAD         3/4 LOAD         1/2 LOAD         SOUND           MIN.%         NOM.%         %         1/2 LOAD         3/4 LOAD         1/2 LOAD         %         1/2 LOAD         %         Db(A)           1180         93         94.1         94.5         93.6         86         83         75.5         75           CURRENTS           NO LOAD         FULL LOAD         LOCKED ROTOR         NEMA KVA         SAFE ST.           AT         AT         AT         CODE         LETTER         COLD           460         460         460         LETTER         COLD         COLD           VOLT         VOLT         VOLT         VOLT         COLD         COLD         START           20.9         57.80         363         G         29         COLD         START           FULL         LOCKED         PULL         BREAK DOWN         ROTOR WR <sup>2</sup> MAX LOAD         ALLOWABLE WK <sup>2</sup> NEMA ALLOWABLE WK <sup>2</sup> ALLOWABLE WK <sup>2</sup> COLD         COLD         COLD <td< td=""><td></td><td></td><td></td><td></td><td></td><td>NCE</td><td>ORMA</td><td>PER</td><td>CAL F</td><td>ТҮРІ</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>						NCE	ORMA	PER	CAL F	ТҮРІ						
LOAD RPM         FULL LOAD         3/4 LOAD         1/2 LOAD         FULL LOAD         3/4 LOAD         1/2 LOAD         MRESSUR Solution         PRESSUR LEVEL @ 3 Db(A)           1180         93         94.1         94.5         93.6         86         83         75.5         75           Immodel         93         94.1         94.5         93.6         86         83         75.5         75           Immodel         FULL LOAD         FULL LOAD         LOCKED ROTOR         NEMA KVA CODE         NEMA KVA CODE         SAFE ST. TIME II SECONI COLD         SAFE ST. TIME II SECONI COLD         SAFE ST.           AT         AT         AT         AT         CODE         LETTER         COLD         START         PER HO	5	SOUN		R	FACTO							EFF				
RPM         MIN.%         NOM.%         % <th< td=""><td></td><td></td><td colspan="2">1/2 L OAD</td><td colspan="2"></td><td colspan="2">1/2 LOAD FUL</td><td>) 1/2 L</td><td colspan="2">3/4 LOAD</td><td colspan="2">JLL LOAD</td><td colspan="2"></td></th<>			1/2 L OAD				1/2 LOAD FUL		) 1/2 L	3/4 LOAD		JLL LOAD				
1180         93         94.1         94.5         93.6         86         83         75.5         75           CURRENTS         NEMA KVA CODE         SAFE ST. TIME II SECONI KVA CODE           AT         AT         AT         AT         AT         CODE         KVA CODE         COLD         COLD         COLD         SAFE ST. TIME II SECONI           AT         AT         AT         AT         AT         CODE         LOCKED ROTOR         NEMA KVA         CODE         LETTER         COLD         STATT         STATT         PER HO         STATT         STATT         PER HO         STATT         STATT         STATT         STATT         STATT         STATT         STATT         STATT				%					6			)M %	%   NO	/IN 9	1	
NO LOADFULL LOADLOCKED ROTORNEMA KVA CODE LETTERTIME II SECONIATATATATCODE 460CODE LETTERCOLDCOLDCOLDCOLD20.957.80363G29COLDALLOWAI STARTSTARTACCEL TIME (DOL)ALLOWAI STARTFULL LOAD (Ib-ft)LOCKED %FLTPULL %FLTBREAK %FLTROTOR %FLTNEMA WR2 (Ib-ft2)MAX (Ib-ft2)NEMA (Ib-ft2)MAX STARTALLOWAI STARTALLOWAI STARTFULL LOCKED (Ib-ft2)PULL %FLTBREAK %FLTROTOR %FLTNEMA WR2 (Ib-ft2)MAX (Ib-ft2)NEMA SECMAX ALLOWABLE WK2MAX WK2 SecCOLD222.5022517024021.3962013855.2211.442			5	75.	33		86		8.6	93	94.5					118
NO LOADFULL LOADLOCKED ROTORNEMA KVA CODE LETTERTIME II SECONIATATATATCODE 460CODE LETTERCOLDCOLDCOLD20.957.80363G29COLDALLOWAI STARTSTARTFULL LOAD (Ib-ft)LOCKED WFLTPULL WFLTBREAK WFLTROTOR WFLTNEMA WFLTMAX LOAD WFLTNEMA WFLTMAX NEMA LOAD WFLTACCEL TIME (DOL)ALLOWAI START PER HODFULL LOCKED WFLTPULL WFLTBREAK WFLTROTOR WFLTNEMA WFLTMAX NEMA LOAD WF2 (Ib-ft2)NEMA LOAD WK2 (Ib-ft2)NEMA MAX ALLOWABLE WK2 SecMAX MAX ALLOWABLE WK2 SecCOLD WK2 Sec222.5022517024021.3962013855.2211.442										I	l					
NO LOAD     FULL LOAD     LOCKED ROTOR     KVA CODE LETTER       AT     AT     AT     AT     COLD       460     460     460     460     LETTER     COLD       VOLT     VOLT     VOLT     VOLT     COLD     COLD       20.9     57.80     363     G     29       FULL LOAD       LOCKED     PULL     BREAK     ROTOR     NEMA     MAX     NEMA     MAX       [b-ft]     LOCKED     PULL     BREAK     ROTOR     NEMA     LOAD     MAX     ALLOWABLE     START       FULL     LOCKED     PULL     BREAK     ROTOR     NEMA     MAX     ALLOWABLE     START       Ib-ft)     %FLT     PLT     BREAK     ROTOR     NEMA     MAX     ALLOWABLE     COLD       222.50     225     170     240     21.39     620     1385     5.22     11.44     2	TALL	SAFE S						-	5	JRRENT	C					
460 VOLT       460 VOLT       460 VOLT       LETTER       COLD         20.9       57.80       363       G       29         TORQUE       INERTIA       ACCEL TIME (DOL)       ALLOWAI START PER HO         FULL LOAD (Ib-ft)       PULL %FLT       BREAK DOWN %FLT       ROTOR WR <sup>2</sup> (Ib-ft <sup>2</sup> )       NEMA LOAD (Ib-ft <sup>2</sup> )       MAX ALLOWABLE WK <sup>2</sup> (Ib-ft <sup>2</sup> )       NEMA LOAD WK <sup>2</sup> (Ib-ft <sup>2</sup> )       MAX ALLOWABLE WK <sup>2</sup> (Ib-ft <sup>2</sup> )       MAX START PER HO         222.50       225       170       240       21.39       620       1385       5.22       11.44       2					ROTOR	CKED	LO	L		ULL LOAD		AD		NO LOAD		
VOLT         VOLT         VOLT         VOLT         VOLT           20.9         57.80         363         G         29           TORQUE         INERTIA         ACCEL TIME (DOL)         ALLOWAL START PER HO           FULL LOAD (lb-ft)         PULL %FLT         BREAK DOWN %FLT         ROTOR WR <sup>2</sup> (lb-ft <sup>2</sup> )         NEMA LOAD WK <sup>2</sup> (lb-ft <sup>2</sup> )         MAX ALLOWABLE WK <sup>2</sup> (lb-ft <sup>2</sup> )         MAX ALLOWAB				460 LETTE						0		460				
20.9         57.80         363         G         29           TORQUE         INERTIA         ACCEL TIME (DOL)         ALLOWAL START PER HO           FULL LOAD (Ib-ft)         LOCKED WFLT         PULL UP %FLT         BREAK DOWN %FLT         ROTOR WR <sup>2</sup> (Ib-ft <sup>2</sup> )         NEMA LOAD WK <sup>2</sup> (Ib-ft <sup>2</sup> )         MAX ALLOWABLE WK <sup>2</sup> Sec         COLD           222.50         225         170         240         21.39         620         1385         5.22         11.44         2	HO	COLD	EIIER													
TORQUEINERTIAACCEL TIME (DOL)START PER HOFULL LOAD (lb-ft)LOCKED ROTOR %FLTPULL UP %FLTBREAK DOWN %FLTROTOR WR2 (lb-ft2)NEMA LOAD WK2 (lb-ft2)MAX ALLOWABLE WK2 (lb-ft2)NEMA LOAD WK2 WK2 (lb-ft2)NEMA LOAD WK2 WK2 WK2MAX ALLOWABLE WK2 WK2 WK2MAX ALLOWABLE WK2 WK2 WK2MAX ALLOWABLE WK2 WK2MAX ALLOWABLE WK2 WK2COLDI222.5022517024021.3962013855.2211.442	20	29	G													
TORQUEINERTIAACCEL TIME (DOL)START PER HOFULL LOAD (lb-ft)LOCKED ROTOR %FLTPULL UP %FLTBREAK DOWN %FLTROTOR WR2 (lb-ft2)NEMA LOAD WK2 (lb-ft2)MAX ALLOWABLE WK2 (lb-ft2)NEMA LOAD WK2 WK2 (lb-ft2)NEMA LOAD WK2 WK2 WK2MAX ALLOWABLE WK2 WK2 WK2MAX ALLOWABLE WK2 WK2 WK2MAX ALLOWABLE WK2 WK2MAX ALLOWABLE WK2 WK2COLDI222.5022517024021.3962013855.2211.442		1									l					
FULL LOAD (lb-ft)LOCKED ROTOR %FLTPULL UP WFLTBREAK DOWN %FLTROTOR WR2 (lb-ft2)LOAD WK2 (lb-ft2)ALLOWABLE WK2 (lb-ft2)LOAD WK2 WK2 (lb-ft2)LOAD WK2 WK2 SecALLOWABLE WK2 SecCOLD222.5022517024021.3962013855.2211.442	TS	STA	TIA ACCEL TIME (DOL) STA			INERTIA			TORQUE							
222.50       225       170       240       21.39       620       1385       5.22       11.44       2	HO	COLD	VABLE K <sup>2</sup>	ALLOV W	LOAD WK <sup>2</sup>		LLOWAB WK <sup>2</sup>	AD ( <sup>2</sup>	LOA WK	$WR^2$	DOWN	UP	R L	ото	D R	LOA
				-							240	70		205		222
APPROVED: M. PRATER DRAWING NO. 31057HH0506 REVISION:	1	2	.44	11.	5.22		1385	U	62	21.39	240	/U	1	225	5U	222.
APPROVED: M. PRATER DRAWING NO. 31057HH0506 REVISION:																
	1	EVISION:	R	)6	H050	<b>57</b> ⊦	310	·	g no.	DRAWIN	FER	PRA	М.	D:	ROVE	APP



# ACROSS THE LINE CONNECTION



**TECO** Westinghouse

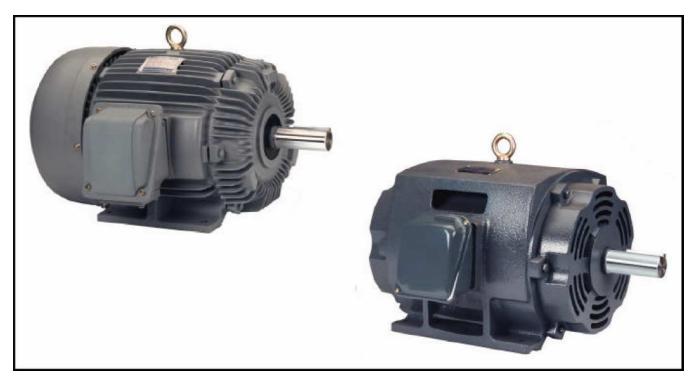
DWG NO.

**DAC-1547-4** 

# TECO Westinghouse

# INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR THREE PHASE INDUCTION MOTORS

Frames 143T - 449TZ



5100 North IH 35 Round Rock, Texas 78681

# RECEIVING

- 1. Check nameplate data.
- 2. Check whether any damage has occurred during transportation.
- 3. After removal of shaft clamp, turn shaft by hand to check that it turns freely.
- 4. If motor is to be reshipped (alone or installed to another piece of equipment) the shaft must again be clamped to prevent axial movement.

Note: Remove the bearing clamp before turning the shaft on 284T-449TZ frame motors.

# WARNING

# THE FOLLOWING SAFETY PRECAUTIONS MUST BE OBSERVED:

- 1. Electric rotating machinery and high voltage can cause serious or fatal injury if improperly installed, operated or maintained. Responsible personnel should be familiarized with NEMA MG-1; Safety Standards for Construction and Guide Selection. Installation and Use of Electric Motors and Generators; National Electric Code and all local safety requirements.
- 2. When servicing, all power sources to the motor and to the accessory devices should be de-energized and disconnected and all rotating parts should be at standstill.
- 3. Lifting means, when supplied, are intended for lifting the motor only. When two lifting devices are supplied with the motor a dual chain must be used.
- 4. Suitable protection must be used when working near machinery with high noise levels.
- 5. Safeguard or protective devices must not be by-passed or rendered inoperative.
- 6. The frame of this machine must be grounded in accordance with the National Electric Code and applicable local codes.
- 7. A suitable enclosure should be provided to prevent access to the motor by other than authorized personnel. Extra caution should be observed around motors that are automatically or have automatic re-setting relays as they may restart unexpectedly.
- 8. Shaft key must be fully captive or removed before motor is started.
- 9. Provide proper safeguards for personnel against possible failure of motor-mounted brake, particularly on applications involving overhauling loads.
- 10. Explosion proof motors are constructed to comply with the label service procedure manual, repair of these motors must be made by TECO-Westinghouse Motor Company or U/L listed service center in order to maintain U/L listing.

# LOCATION

- 1. Drip-proof motors are intended for use where atmosphere is relatively clean, dry, well ventilated and non-corrosive.
- 2. Totally enclosed motors may be installed where dirt, moisture, or dust are present and in outdoor locations.
- 3. Explosion-proof motors are built for use in hazardous locations as indicated by Underwriters' label on the motor.
- 4. Chemical duty enclosed motors are designed for installation in high corrosion or excessive moisture locations.

Note: in all cases, no surrounding structure should obstruct normal flow or ventilating air through or over the motor.

### MOUNTING

- 1. Mount motor securely on a firm, flat base. All ball bearing normal thrust motors up to and including 256T frame size may be side-wall or ceiling mounted; all others check nearest TECO-Westinghouse office for mounting recommendations.
- 2. Align motor accurately, using a flexible coupling if possible. For drive recommendations, consult with drive or equipment manufacturer, or TECO-Westinghouse.
- 3. Mounting bolts must be carefully tightened to prevent changes in alignment and possible damage to the equipment. The recommended tightening torque's for medium carbon steel bolts, identified by three radial lines at 120 degrees on the head, are:

Bolt Size	Recommended Torque (Ft-lb.)			
Bolt Size	Minimum	Maximum		
2/8	25	37		
1/2	60	90		
5/8	120	180		
3/4	210	320		

- 4. V-belts Sheave Pitch Diameters should not be less than those shown in Table 1 (NEMA recommended values)
- 5. Tighten belts only enough to prevent slippage. Belt speed should not exceed 5000 ft. per min.

TABLE 1. V-Belt Sheave Pitch Diameters (MG1-14.42)

						V-Belt	Sheave	
						ntional D AND E		rrow AND 8V
Frame Number	3600		power at s Speed, RPN 1200	И 900	Minimum Pitch Diameter Inches	*Maximum Width Inches	Minimum Outside Diameter Inches	**Maximum Width Inches
143T	1.5	1	.75	.5	2.2	4.25	2.2	2.25
145T	2-3	1.5-2	1	.75	2.4	4.25	2.4	2.25
182T	3	3	1.5	1	2.4	5.25	2.4	2.75
182T	5				2.6	5.25	2.4	2.75
184T			2	1.5	2.4	5.25	2.4	2.75
184T	5				2.6	5.25	2.4	2.75
184T	7.5	5			3.0	5.25	3.0	2.75
213T	7.5-10	7.5	3	2	3.0	6.5	3.0	3.375
215T	10		5	3	3.0	6.5	3.0	3.375
215T	15	10			3.8	6.5	3.8	3.375
254T	15		7.5	5	3.8	7.75	3.8	4
254T	20	15			4.4	7.75	4.4	4
256T	20-25		10	7.5	4.4	7.75	4.4	4
256T		20			4.6	7.75	4.4	4
284T			15	10	4.6	9	4.4	4.625
284T		25			5.0	9	4.4	4.625
286T		30	20	15	5.4	9	5.2	4.625

				V-Belt Sheave					
						Conventional A, B, C, D AND E		Narrow 3V, 5V, AND 8V	
Frame Number	3600		power at s Speed, RPM 1200	1900	Minimum Pitch Diameter Inches	*Maximum Width Inches	Minimum Outside Diameter Inches	**Maximum Width Inches	
324T		40	25	20	6.0	10.25	6.0	5.25	
326T		50	30	25	6.8	10.25	6.8	5.25	
364T			40	30	6.8	11.5	6.8	5	
364T		60			7.4	11.5	7.4	5.785	
365T			50	40	8.2	11.5	8.2	5.785	
365T		75			9.0	11.5	8.6	5.785	
404T			60		9.0	14.25	8.0	7.25	
404T				50	9.0	14.25	8.4	7.25	
404T		100			10.0	14.25	8.6	7.25	
405T			75	60	10.0	14.25	10.0	7.25	
405T		100			10.0	14.25	8.6	7.25	
405T		125			11.5	14.25	10.5	7.25	
444T			100		11.0	16.75	10.0	8.5	
444T				75	10.5	16.75	9.5	8.5	
444T		125			11.0	16.75	9.5	8.5	
444T		150				16.75	10.5	8.5	
445T			125		12.5	16.75	12.0	8.5	
445T				100	12.5	16.75	12.0	8.5	
445T		150				16.75	10.5	8.5	

TABLE 1. V-Belt Sheave Pitch Diameters (MG1-14.42)

\*Max. Sheave width = 2(N-W) - .25

\*\*Max Sheave width = N-W

\*\*\*Sheave ratios grater than 5:1 and center-to-center distance less than the diameter of the large sheave should be referred to TECO-Westinghouse.

# **POWER SUPPLY & CONNECTIONS**

- 1. Wiring of motor and control, overload protection and grounding should be in accordance with National Electrical Code and all local safety requirements.
- Nameplate voltage and frequency should agree with power supply. Motor will operate satisfactorily on line voltage within ±10% of nameplate voltage; or frequency with ±5% and with a combined variation not to exceed ±10%. 230-volt motors can be used on 208-volt network systems, but with slightly modified performance characteristics as shown on the nameplate.
- 3. Dual voltage and single voltage motors can be connected for the desired voltage by following connection diagram shown on the nameplate or inside of the conduit box.
- 4. All Explosion Proof motors have Temperature Limiting Devices in the motor enclosure to prevent excessive external surface temperature of the motor in accordance with U/L standards. Terminals of thermal protectors (P1 & P2) should be connected to the motor control equipment, according to the connection diagram inside of the conduit box.
- 5. Standard connection diagram for three phase, not thermally protected, dual rotation motors are shown in diagrams A through E. (Note: To change rotation, Interchange any two line leads)

#### A. 3 Lead, Single Voltage



#### B. 6 Lead, Dual Voltage & Voltage Ration 1 to 3

B-1 Across the Line Start & Run





#### C. 9 Leads; Dual Voltage & Voltage Ratio 1 to 2, Wye Connected

C-1 Across the Line Start & Run

Low Williage	High Voltage
L1 L2 L3	L1 L2 I3
11 e T2 e T3 e	т1 е т2 е т3 е
17 • 18 • 19 •	17 T8 T9
T4 T5 T6	T4 . IS . T6.4



#### D. 9 Leads; Dual Voltage & Voltage Ration 1 to 2, Delta Connected

D-1 Across the Line Start & Run

LOW VOLTAGE (24)	HIGH VOLTAGE (△)
L1 L3 L2	11 13 L2
T1 0 T3 0 T2 0	11 13 120
T7 0 T5 0 T8 0	170 150 120



#### E. 12 Leads, Dual Voltage

E-1 Across the Line	e Start & Run
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Low	Voltage	High Voltage
L1	12 L3	L1 L2 L3
TI   T2	νп	ינד ינד יוד
17 78	9 13 9	T12 T10 T11
тб т4	., <b>т</b> 5 о	16° 14° 12°
T12 T10		n n n





#### E-2-2 Wye Start & Delta Run (High Voltage only)





\*Important: For Part Winding Start, M2 contactor should be closed within two (2) seconds after M1 contactor is closed. Only 4 pole and above (e.g., 6P, 8P...) motors are satisfactory for Part Winding Start at low voltage.

# **START UP**

- Disconnect load and start motor. Check direction of rotation. If rotation must be changed, ALLOW THE MOTOR TO STOP COMPLETLEY. Interchange any two leads of a three-phase motor.
- 2. Connect load. The motor should start quickly and run smoothly. If no, shut power off at once. Recheck the assembly including all connections before restarting.
- 3. If excessive vibration is noted, check for loose mounting bolts too flexible motor support structure or transmitted vibration from adjacent machinery. Periodic vibration checks should be made; foundations often settle.
- 4. Operate under load for short period of time and check operating current against nameplate.

# TESTING

If the motor has been in storage for an extensive period or has been subjected to adverse moisture conditions, it is best to check the insulation resistance of the stator winding with a megometer. Depending on the length and conditions of storage it may be necessary to regrease or change rusted bearings.

If the resistance is lower than one megohm the windings should be dried in one of the following two ways:

- 1. Bake in oven at temperatures not exceeding 194°F until insulation resistance becomes constant.
- 2. With rotor locked, apply low voltage and gradually increase the current through windings until temperature measured with a thermometer reaches 194°F. Do not exceed this temperature.

## MAINTENANCE

#### INSPECTION

Inspect motor at regular intervals. Keep motor clean and ventilation openings clear.

#### LUBRICATION

- 1. Frame 143T-256T: Double shielded and pre-lubricated ball-bearing motors without grease fittings and don't need re-lubrication, except on MAX-E1<sup>®</sup> and MAX-E2<sup>®</sup> products which have re-greasable features.
- Frames 280TS, 320-449TZ(TS): Motors having grease fittings and grease discharge devices at brackets. Motors are shipped with grease for initial running. It is necessary to re-lubricate anti-friction bearing motors periodically, depending on size and type of service. See Table 2 to provide maximum bearing life. Excessive or too frequent lubrication may damage the motor.

#### TABLE 2

Horsepower	Standard Conditions	Severe Conditions	Extreme Conditions
1 Thru 30 Hp, 1800 rpm and below	7 years	3 years	180 days
40 Thru 75 Hp, 1800 rpm and below	210 days	70 days	30 days
100 Thru 150 Hp, 1800 rpm and below	90 days	30 days	15 days
1 Thru 20 Hp, 3600 rpm 25 Thru 75 Hp, 3600 rpm	5 years 180 days	2 years 60 days	90 days 30 days
100 Thru 150 Hp, 3600 rpm	90 days	30 days	15 days

Note:

- A. Standard conditions: 8 hours operation per day, normal or light loading, clear and 40°C ambient conditions.
- B. Severe conditions: 24-hour operation per day or light shock loading, vibration or in dirty or dusty conditions.
- C. Extreme conditions: With heavy shock loading or vibration or dusty conditions.
- D. For double shielded bearings, above data (lubrication frequency) means that the bearing must be replaced.
- 3. Be sure fittings are clean and free from dirt. Using a low-pressure grease gun, pump in the recommended grease until new grease appears at grease discharge hole.
- 4. Use the POLYUREA grease unless special grease is specified on the nameplate.
- 5. If re-lubrication is to be performed with the motor running, stay clear of rotating parts. After re-greasing, allow the motor to run for ten to thirty minutes.

# **RENEWAL PARTS**

- 1. Use only genuine TECO-Westinghouse renewal parts or as recommended by TECO-Westinghouse Motor Company.
- 2. When you order renewal parts please specify complete information to TECO-Westinghouse office/agent such as type, frame no., poles, horsepower, voltage, series no., quantity, etc.

# FOR FURTHER INFORMATION PLEASE CONTACT TECO-WESTINGHOUSE MOTOR COMPANY

Round Rock, TX 800-873-8326