



VILMA  
MOTORS

ΕΜΒΕΛΙΑ ΟΝΟΜΑ ΑΠΟΔΟΣΗ  
ΒΗΛΜΑ VILMA  
IMPACT REPUTATION EFFICIENCY

**TEFC - HOLLOW SHAFT**

**3M Series**

**Three Phases Squirrel Cage Electric Motors  
Low Voltage**

# 3M SERIES HOLLOW SHAFT

## Three Phases Low Voltage Asynchronous Motors



### PRODUCT OVERVIEW

Low Voltage Totally Enclosed Compact Type (TEFC) 3-Phase Induction hollow shaft electric Motors are traditionally manufactured VILMA motors for more than 30 years experience, based on advanced technology and high level production methods. The particular motor advantages are the compact structure, light weight, fine looking and high protection class. The motors can be used to drive deep – well axial or mixed flow pumps and so on.

This series of motors are manufactured at a high level with new materials and new techniques. The installation dimensions and power classes meet the IEC Standard. The motors are characterized high level, low noise, low vibration, high reliability and easy installation.

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#### CE certified

3M series are certified with CE marking according to the updated norms for:

**Low Voltage Directive**  
**Electromagnetic Compatibility Directive**  
**Machine Directive**

Electric Motors nameplates are stamped with CE mark

#### ISO Certified.

3M HOLLOW SHAFT series are manufactured according to the quality standard ISO 9001:2008.



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## General Specifications

#### Nominal Voltage

380V, 400 V , 415 V /440 V

#### Nominal Frequency

50 Hz / 60 Hz

#### Cooling Method

3M series are IC 411 Standard

#### Continuous Duty S1

Duty S1 is for continuous operation at a constant load for time in order motor to reach its thermal equilibrium

#### Vibration Grade

3M series are N grade

**R & S** grade can be provided  
Upon request

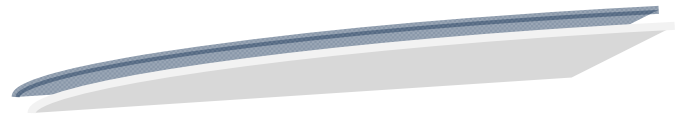
#### Protection Enclosure

3M series are IP 54 standard

#### Insulation Class F

Insulation class F allows a temperature rise of 105 K with maximum hot spot of 155 °C

Insulation Class H can be provided upon request



## STANDARDS

TITLE	DIN/EN	IEC
DIRECTION ROTATION AND MARKING OF TERMINALS OF RATING PLATE MARKINGS	DIN VDE 0530 / 8	IEC 60034 - 8
CLASSIFICATION OF TYPES OF ENCLOSURE	DIN EN 60034 -1	IEC 60034 - 1
CLASSIFICATION OF METHODS OF COOLING	DIN EN 60034 -5	IEC 60034 - 5
DUTY AND RATING	DIN EN 60034 -6	IEC 60034 - 6
SERVICE AND OPERATING CONDITIONS	DIN EN 60034 -1	IEC 60034 - 1
LIMITS AND MEASUREMENT OF TEMPERATURE	DIN EN 60034 -1	IEC 60034 - 1
METHODS OF DETERMINE LOSSES AND EFFICIENCY	DIN EN 60034 - 2	IEC 60034 - 2
VIBRATION LIMITS	DIN EN 60034 - 14	IEC 60034 - 14
NOISE LEVEL LIMITS	DIN EN 60034 -9	IEC 60034 - 9
TESTS	DIN EN 60034 -1	IEC 60034 - 1
TOLERANCES	DIN EN 60034 -1	IEC 60034 - 1
IEC STANDARD VOLTAGES	DIN EN 60038	IEC 60038
STARTING PERFORMANCE	DIN EN 60034 -12	IEC 60034 - 12
BUILT - IN THERMAL PROTECTION	DIN EN 60034 -11	IEC 60034 - 11

## Tolerances

IEC 34-1, AS 1359-69. Specifies allowable tolerances for efficiency, power factor, speed, locked rotor torque, pull out torque, starting current and moment of inertia.

**IEC 34-1 / EN 60034-1 & DIN VDE 0530 specify the following tolerances**

<b>Efficiency <math>\eta</math></b>	<b>Power Factor <math>\cos\phi</math></b>	<b>Slip <math>s</math></b>	<b>Locked Rotor current <math>I_A</math></b>	<b>Locked Rotor Torque <math>M_A</math></b>	<b>Breakdown Torque <math>M_k</math></b>
- 0,15 (1- $\eta$ ) $P_n \leq 50$ kW	- (1 - $\cos\phi$ )/ 6 min 0.02 max 0.07	+20%	+20%	+25 %	- 10%
- 0,15 (1- $\eta$ ) $P_n > 50$ kW		-20%		- 15 %	

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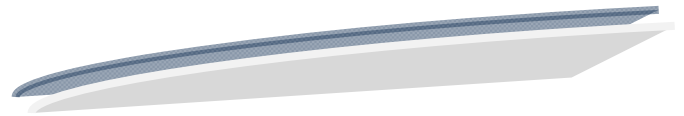
### VIBRATION LIMITS

Vibration limits: EN 60034-14 specifies limits of vibration severity					
<i>SERIES 3M.3HS &amp; AMV MOTORS are dynamically balanced with half keys fitted also according to DIN ISO 8821</i>					
LIMITS OF VIBRATION SEVERITY IN mm / sec					
TOLERANCES OF DEVIATION +/- 10 %					
VIBRATION CLASS	RATED SPEED	FRAME < /=132	132 < FRAME < /=225	225 < FRAME < /= 400	FRAME > 400
N	600 ~ 3600	1.8	2.8	3.5	3.5
R	600 ~ 1800	0.71	1.12	1.8	2.8
	>1800 ~ 3600	1.12	1.8	2.8	2.8
S	600 ~ 3600	0.45	0.71	1.12	
	>1800 ~ 3600	0.71	1.12	1.8	

### MOTORS PAINTING

TABLE IS APPLIED TO ALL TYPE OF VILMA ELECTRIC MOTORS		
PAINTING (PRIMER)	STANDARD F96833	PAINT FORMULATED WITH SOLID EPOXY RESINS MODIFIED WITH VINYL POLYAMIDE CATALYSERS
FINAL PAINTING	STANDARD	RAL 5010
FINAL PAINTING	ON REQUEST	ALL RAL colours

- For applications such as: marine, air mixed with salt, environment with acids, basic liquids, anhydride gases WE SUGGEST SPECIAL PAINTING as an example: epoxy vinyl followed by polyacrillic paint
- TROPICALISATION with insulated enamel in the internal of motor is already applied special tropicalisation can be applied on request



## BUILD IN PROTECTION

PTC THERMISTOR VILMA MOTORS STANDARD	Pt 100	ANTICONDENSATION HEATER
<p>PTC thermistors are temperature dependent resistors manufactured from barium titanate and should be chosen when a drastic change in resistance is required at a specific temperature or current level. PTCs can operate by temperature sensing, switching at temperature 155°C,</p>	<p>Pt 100 are used by temperature sensing and resistance recording in OHMS, the switching is succeed by control equipment.</p>	<p>Anticondesation heaters (winding D-end ) are used to prevent motor after long term storage and power off where the environment has water condensations or when the temperature difference of the environment is continuous.</p>
<p>Motors can be provided with 1~ 230V or 3~ 400 V heaters</p>		
<p>FRAMES</p>		<p>POWER ( W)</p>
<p>up to 180</p>		<p>50</p>
<p>up to 250</p>		<p>65</p>
<p>280</p>		<p>100</p>
<p>315S</p>		<p>130</p>
<p>315M</p>		<p>200</p>
<p>315L</p>		<p>200</p>
<p>355</p>		<p>300</p>

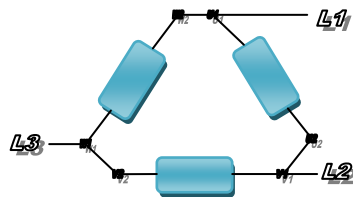
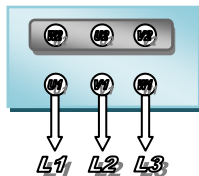
# 3M SERIES HOLLOW SHAFT

## Three Phases Low Voltage Asynchronous Motors



### CONNECTIONS

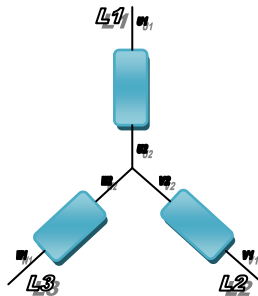
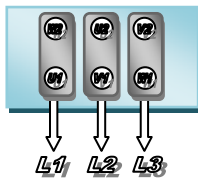
DELTA



### Direct On Line Starting

Direct insertion at the feeding line  
Starting Current & Starting Torque are given in the performance table in this catalogue

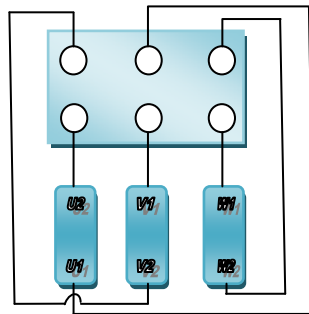
STAR



### Star / Delta Starting

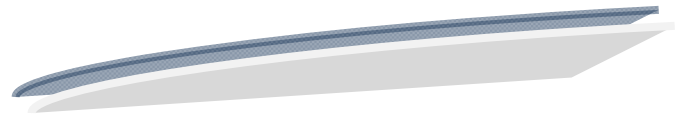
With Star / Delta starting the starting current is Low & the resistant torque very Low. Torque and Current can be 27 to 30 % reduced in the starting phase from the values in the performance tables with a negligible transient at delta insertion

STAR -DELTA



### Soft Starter Starting

With Soft Starters abrupt insertion is avoided, the starting current is limited, because the device supplies voltage gradually. The starting current depends directly of the resistant torque of the coupled torque value, the inertia & pre-set starting times. When starting with low loads , device saves energy



### 3M Hollow shaft series performance table for 2 poles

FRAME SIZE	Pn kW	VOLTAGE			Speed RPM	Eff %	P.F. COSΦ	LRT	LRA	BDT	Noise LwdB(A)	W kg
		380 I (A)	400 I (A)	415 I (A)				-----RLT	-----RLA	-----RLT		
160 M1	11	21.2	20.2	19.5	2930	88.4	0.89	2.2	7.5	2.3	76	110
160 M2	15	28.6	27.2	26.2	2930	89.4	0.89	2.2	7.5	2.3	76	120
160 L	18.5	34.7	33.0	31.8	2930	90.0	0.90	2.2	7.5	2.3	76	135
180 M	22	41	39.0	37.6	2940	90.5	0.90	2.0	7.5	2.3	79	165
200 L1	30	55.4	52.6	50.7	2950	91.4	0.90	2.0	7.5	2.3	81	218
200 L2	37	67.9	64.5	62.2	2950	92.0	0.90	2.0	7.5	2.3	82	230
225 M	45	82.1	78.0	75.2	2960	92.5	0.90	2.0	7.5	2.3	82	280
250 M	55	100	94.8	91.4	2970	93.0	0.90	2.0	7.5	2.3	84	365
280 S	75	135	129	124	2975	93.6	0.90	2.0	7.0	2.3	87	495
280 M	90	160	152	147	2975	93.9	0.91	2.0	7.1	2.	88	565
315 S	110	195	186	179	2975	94.0	0.91	1.8	7.1	2.2	87	890
315 M	132	233	222	214	2975	94.5	0.91	1.8	7.1	2.2	87	980
315 L1	160	279	265	256	2975	94.6	0.92	1.8	7.1	2.2	88	1055
315 L2	200	348	331	319	2975	94.8	0.92	1.8	7.1	2.2	89	1100
355 M	250	433	412	397	2980	95.2	0.92	1.8	7.1	2.2	90	1800
355 L	315	545	518	499	2980	95.4	0.92	1.8	7.1	2.2	90	2300

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### 3M Hollow shaft series performance table for 4 poles

FRAME SIZE	Pn kW	VOLTAGE			Speed RPM	Eff %	P.F. COSΦ	LRT	LRA	BDT	Noise LwdB(A)	W kg
		380 I (A)	400 I (A)	415 I (A)				-----RLT	-----RLA	-----RLT		
160 M	11	22.5	21.4	20.6	1460	88.4	0.84	2.2	7.0	2.3	76	110
160 L	15	30	28.5	27.5	1460	89.4	0.85	2.2	7.5	2.3	76	120
180 M	18.5	36.3	34.5	33.3	1470	90	0.86	2.2	7.5	2.3	76	135
180 L	22	43.2	40.8	39.3	1470	90.5	0.86	2.2	7.5	2.3	79	165
200 L	30	57.6	55.1	53.1	1470	91.4	0.86	2.2	7.2	2.3	81	218
225 S	37	70.2	66.7	64.3	1475	92	0.86	2.2	7.2	2.3	81	230
225 M	45	84.9	80.7	77.8	1475	92.5	0.87	2.2	7.2	2.3	81	280
250 M	55	103	98.1	94.6	1480	93	0.87	2.2	7.2	2.3	82	365
280 S	75	138.3	131	127	1480	93.6	0.87	2.2	6.8	2.3	83	495
280 M	90	165	157	152	1480	93.9	0.88	2.2	6.8	2.3	84	565
315 S	110	201	191	184	1480	94.5	0.88	2.1	6.9	2.2	86	890
315 M	132	240	228	220	1480	94.8	0.88	2.1	6.9	2.2	86	980
315 L1	160	288	273	264	1480	94.9	0.88	2.1	6.9	2.2	87	1055
315 L2	200	360	342	329	1480	94.9	0.88	2.1	6.9	2.2	87	1100
355 M	250	443	421	406	1490	95.2	0.90	2.1	6.9	2.2	90	1900
355 L	315	559	531	511	1490	95.2	0.90	2.1	6.9	2.2	90	2300

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Duty : (S1)  
 Insulation Class : F  
 Protection Class : IP55  
 Cooling Method : IC 411

Rated Voltage : 400 V / 440 V  
 Rated Frequency : 50 Hz / 60 Hz  
 Ambient Temperature : -15 °C ~ 40 °C

LRT/RLT : DOL Starting torque ratio  
 LRA/RLA : DOL Starting current ratio  
 BDT/RLT : DOL Starting pull out torque ratio

# 3M SERIES HOLLOW SHAFT

## Three Phases Low Voltage Asynchronous Motors



3M Hollow shaft series performance table for 6 poles

FRAME SIZE	Pn kW	VOLTAGE			Speed RPM	Eff %	P.F. COSΦ	LRT	LRA	BDT	Noise LwdB(A)	W kg
		380 I (A)	400 I (A)	415 I (A)				-----RLT	-----RLA	-----RLT		
160 M	7.5	17.2	16.3	15.8	970	86	0.77	2.0	6.5	2.1	61	118
160 L	11	24.5	23.3	22.4	970	87.5	0.78	2.0	6.5	2.1	61	145
180 L	15	31.6	30.0	28.9	970	89	0.81	2.0	7	2.1	61	178
200 L1	18.5	38.6	36.6	35.3	980	90	0.81	2.1	7	2.1	65	200
200 L2	22	44.7	42.5	41.0	980	90	0.83	2.0	7	2.1	65	228
225 M	30	59.3	56.3	54.3	980	91.5	0.84	2.0	7	2.1	66	265
250 M	37	71	67.5	65.1	980	92	0.86	2.1	7	2.1	68	370
280 S	45	86	81.7	78.7	980	92.5	0.86	2.1	7	2	68	490
280 M	55	104	99.5	95.9	980	92.8	0.86	2.1	6.7	2	69	540
315 S	75	142	135	130	985	93.5	0.86	2.0	6.7	2	70	900
315 M	90	169	161	155	985	93.8	0.86	2.0	6.7	2	70	980
315 L1	110	207	190	189	985	94	0.86	2.0	6.7	2	71	1045
315 L2	132	246	232	224	985	94.2	0.87	2.0	6.7	2	71	1100
355 M1	160	292	278	268	990	94.5	0.88	1.9	6.7	2	73	1550
355 M2	200	365	347	335	990	94.5	0.88	1.9	6.7	2	75	1600
355 L	250	457	434	418	990	94.5	0.88	1.9	6.7	2	78	1700

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3M Hollow shaft series performance table for 8 poles

FRAME SIZE	Pn kW	VOLTAGE			Speed RPM	Eff %	P.F. COSΦ	LRT	LRA	BDT	Noise LwdB(A)	W kg
		380 I (A)	400 I (A)	415 I (A)				-----RLT	-----RLA	-----RLT		
160 M1	4	10.3	9.76	9.41	720	81	0.73	1.9	6	2	60	95.5
160 M2	5.5	13.6	12.9	12.5	720	83	0.74	1.9	6	2	67	107
160 L	7.5	17.8	16.9	16.3	720	85.5	0.75	1.9	6	2	68	128
180 L	11	25.5	24.2	23.3	730	87.5	0.75	2	6.5	2	70	169
200 L	15	34.1	32.4	31.2	730	88	0.76	2	6.6	2	70	236
225 S	18.5	41.1	39.0	37.6	730	90	0.76	1.9	6.6	2	71	274
225 M	22	48.9	45.0	43.4	730	90.5	0.78	1.9	6.6	2	72	290
250 M	30	63	60.2	58.1	735	91	0.79	1.9	6.5	2	74	370
280 S	37	78	73.9	71.2	735	91.5	0.79	1.9	6.6	2	74	488
280 M	45	94	89.4	86.1	740	92	0.79	1.9	6.6	2	75	563
315 S	55	111	106	102	735	92.8	0.81	1.8	6.6	2	76	852
315 M	75	150	143	138	735	93.5	0.81	1.8	6.2	2	76	933
315 L1	90	178	169	163	735	93.8	0.82	1.8	6.4	2	76	1027
315 L2	110	217	206	199	735	94	0.82	1.8	6.4	2	77	1117
355 M1	132	261	248	239	740	93.7	0.82	1.8	6.4	2	79	2000
355 M2	160	315	299	288	740	94.2	0.82	1.8	6.4	2	80	2150
355 L	200	387	368	355	740	94.5	0.83	1.8	6.4	2	82	2250

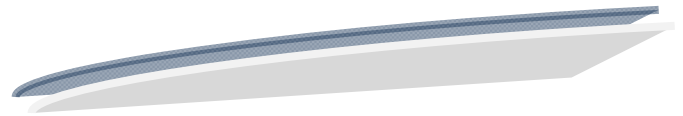
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Duty : (S1)  
 Insulation Class : F  
 Protection Class : IP55  
 Cooling Method : IC 411

Rated Voltage : 400 V / 440 V  
 Rated Frequency : 50 Hz / 60 Hz  
 Ambient Temperature : -15 °C ~ 40 °C

LRT/RLT : DOL Starting torque ratio  
 LRA/RLA : DOL Starting current ratio  
 BDT/RLT : DOL Starting pull out torque ratio





### 3M Hollow shaft series performance table for 10 poles

FRAME SIZE	Pn kW	VOLTAGE			Speed RPM	Eff %	P.F. COSΦ	LRT	LRA	BDT	Noise LwdB(A)	W kg
		380 I (A)	400 I (A)	415 I (A)				----- RLT	----- RLA	----- RLT		
315 S	45	100	95	91	590	91.5	0.75	1.5	6.2	2	68	818
315 M	55	121	115	111	590	92	0.75	1.5	6.2	2	69	903
315 L1	75	162	154	148	590	92.5	0.76	1.5	5.8	2	70	1007
315 L2	90	191	181	175	590	93	0.77	1.5	5.9	2	72	1100
355 M1	110	230	218	211	590	93.2	0.78	1.3	6.0	2	76	1800
355 M2	132	275	261	252	590	93.5	0.78	1.3	6.0	2	78	2000
355 L	160	334	317	305	590	93.5	0.78	1.3	6.0	2	80	2500

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Duty : (S1)  
 Insulation Class : F  
 Protection Class : IP55  
 Cooling Method : IC 411

Rated Voltage : 400 V / 440 V  
 Rated Frequency : 50 Hz / 60 Hz  
 Ambient Temperature : -15 °C ~ 40 °C

*LRT/RLT : DOL Starting torque ratio*  
*LRA/RLA : DOL Starting current ratio*  
*BDT/RLT : DOL Starting pull out torque ratio*

### Bearing Sizes

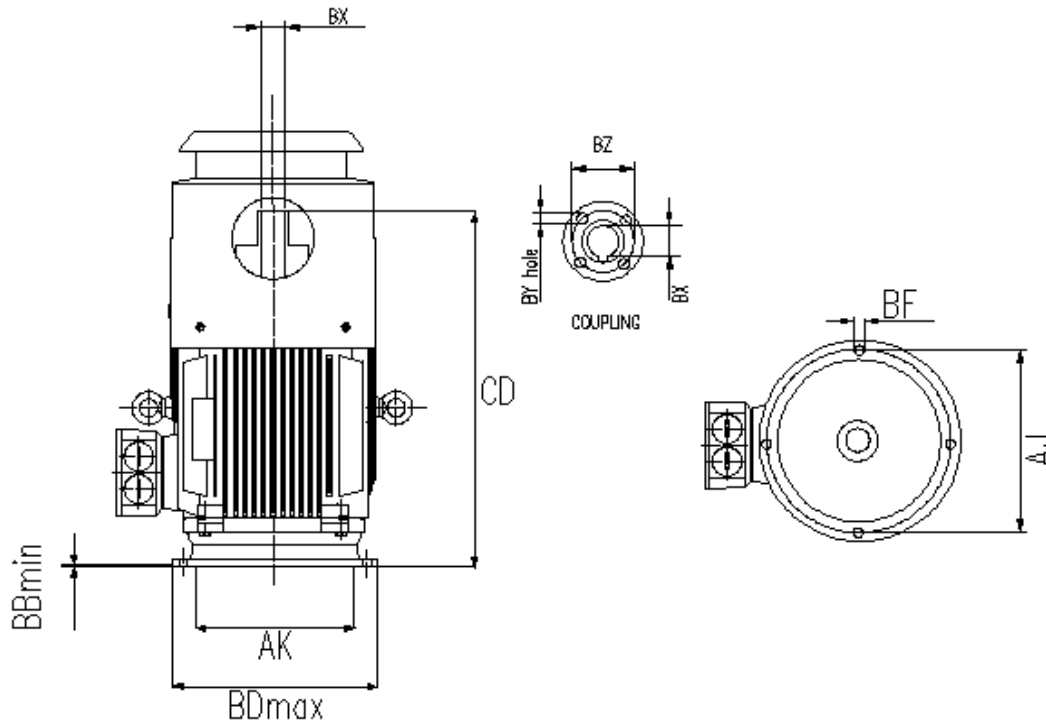
Frame	DE	NDE
160	NU 311 or 6311 C3	7311
180	NU 311 or 6311 C3	7311
200	NU 312 or 6312 C3	7312
225	NU 313 or 6313 C3	7313
250	NU 314 or 6314 C3	7314
280	NU 317 or 6317 C3	7317
315	NU 319 or 6319 C3	7319
355	NU 322 or 6322 C3	7322

# 3M SERIES HOLLOW SHAFT

## Three Phases Low Voltage Asynchronous Motors



Dimension Table



FRAME		BASIC DIMENSIONS IN INCHES											
		POLES	BD max	AJ	AK	B-B min	BF	BX	EW	BY	BZ	CD (mm)	AXIAL LOAD (Kg)
160	M	2-8	10	9.125	8.250	0.19	4 x 0.44	1.001	0.25 x 0.12	¼ - 20	1.375	592	1800
160	L	2-8	10	9.125	8.250	0.19	4 x 0.44	1.001	0.25 x 0.12	¼ - 20	1.375	613	1800
180	M	2-8	10	9.125	8.250	0.19	4 x 0.44	1.001	0.25 x 0.12	¼ - 20	1.375	668	2200
180	L	2-8	12	9.125	8.250	0.19	4 x 0.44	1.001	0.25 x 0.12	¼ - 20	1.375	705	2200
200	L	2-8	12	9.125	8.250	0.19	4 x 0.44	1.188	0.25 x 0.12	¼ - 20	1.750	756	3000
200	L	2-8	16,5	14.750	13.500	0.25	4 x 0.69	1.188	0.25 x 0.12	¼ - 20	1.750	756	3000
225	S	2-8	12	9.125	8.250	0.19	4 x 0.44	1.188	0.25 x 0.12	¼ - 20	1.750	750	3500
225	M	2-8	16,5	14.750	13.500	0.25	4 x 0.69	1.188	0.25 x 0.12	¼ - 20	1.750	780	3500
250	M	2-8	12	9.125	8.250	0.19	4 x 0.49	1.188	0.38 x 0.19	¼ - 20	1.750	842	4000
250	M	2-8	16,5	14.750	13.500	0.25	4 x 0.69	1.438	0.38 x 0.19	¼ - 20	2.125	842	4000
280	S	2-8	16,5	14.750	13.500	0.25	4 x 0.69	1.688	0.38 x 0.19	¼ - 20	2.500	890	4500
280	M	2-8	16,5	14.750	13.500	0.25	4 x 0.69	1.688	0.38 x 0.19	¼ - 20	2.500	940	4500
315	S	2-8	20	14.750	13.500	0.25	4 x 0.69	1.938	0.50 x 0.22	¼ - 20	2.500	1140	5000
315	M	2-8	24.5	14.750	13.500	0.25	4 x 0.69	1.938	0.50 x 0.22	¼ - 20	2.500	1260	5000
355	S	4-8	20	14.750	13.500	0.25	4 x 0.69	1.938	0.50 x 0.22	¼ - 20	2.500	*	6000
355	M	4-8	30.5	26.000	22.000	0.25	4 x 0.81	1.938	0.50 x 0.22	¼ - 20	2.500	*	6000

- For all the CD the measure unit is in (mm). Please contact with UMI S.A. sales department for double check of CD before you proceed.
- AK tolerances up to 8.250 inches is 0.000 ~ + 0.300 inches. From 13.500 up to 22.000 inches tolerance is 0.000 ~ +0.005.
- AJ tolerance is +/- 0.025 inches

# **VILMA MOTORS**

[www.vilmamotors.com](http://www.vilmamotors.com)

GREECE

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