MU SERIES
AC MOTOR START CAPACITORS

UL APPROVED CAPACITORS FOR USA AND CANADIAN MARKET

KELTRON MU Series Motor Start Capacitors have been investigated by UL India Pvt. Limited, a subsidiary of Underwriters Laboratories Inc. for the standards for safety 'UL 810 Standard for Capacitors' and 'Canadian standard C 22.2 No.190 for Capacitors'. All the MU series capacitors manufactured at Keltron bears component recognition mark for USA and Canadian market c UL us. The manufacturing facility at KCCL is under 'FOLLOW UP SERVICE INSPECTION PLAN' of UL India Pvt. Ltd. They also carry out periodic review of the product file. The UL file for MU series capacitors is **"CZDS2E251759."**

MU series motor start capacitors are constructed using high purity etched & formed Aluminum foil interlaced with condenser grade absorbent insulating paper and then encapsulated in PHENOLIC CASING and sealed hermetically using rubber Bakelite cover. Connections are taken out through solder tag and flexible Plastic sheathed multi strand copper wire with SNAP-ON terminals.

The intended use is for generating starting torque in single-phase induction motors when connected in series with the starting coil of the motor. The intended application is for intermittent duty cycle of 1.7 %. Capacitors are supplied with or without mounting bracket as per customer requirement

1. SPECIFICATIONS

Series	MU series
Type	Aluminium Electrolytic Motor Start.
Reference Standard	UL 810, C 22.2 No.190, EIA - 463 - B
Operating Temperature	-30^0C to $+70^0$C
Working Voltage	(i) 110 VAC Single phase 50/60 Hz (150 VAC surge) (ii) 230 VAC Single phase 50/60 Hz (275 VAC surge) (iii) 330 VAC Single phase 50/60 Hz (400 VAC surge)
Capacitance Range	20µF to 552µF (Capacitance will be within specified limits of minimum and maximum value when measured at $+27^0$C)
Power factor	Power factor shall be determined by recording current in amperes within 3 seconds after application of rated voltage and power in watts within 4 seconds after application of test voltage. Power factor shall not exceed 10% of rated voltage & frequency.
Duty cycle	20 starts per hour maximum each start shall be of not more than 3 seconds per 3 minutes duration at rated Voltage confirming to 1.7% duty cycle. Other duty cycles are available on special request.
High voltage withstand Test	Capacitors shall be capable of withstanding the application of 2000 volts AC rms. 50 Hz for 1 second between the terminals and a metal foil wrapped tightly surrounding the lateral surface of the PHENOLIC CASE with out breakdown or flash over

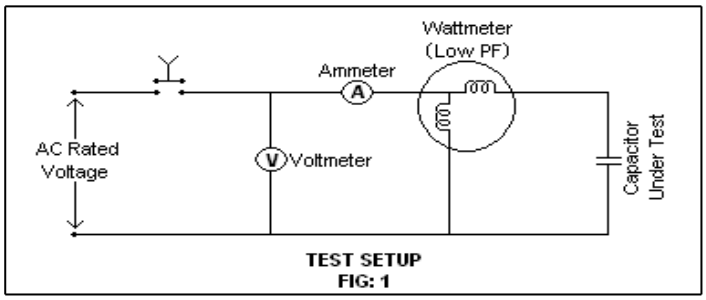
2. OTHER INFORMATION

Type of packing and Lead configuration	Bulk packing. Lead out provided using UL approved PVC sheathed wire with SNAP-ON terminals. For details refer section 10
Capacitor codification system	Refer section 7 for details
Dimensional specification	Refer section 5 for details
Marking specification	Refer section 8 for details
Mounting Accessories	Mounting brackets suitable for defined case size can be supplied along with the Capacitors.

3. SCHEMATIC TEST SET UP FOR MEASURING CURRENT AND DETERMINATION OF POWER FACTOR AND CAPACITANCE:

Capacitance:

Capacitance shall be determined by recording current within 3 seconds after the application of rated voltage at temperature 27^0C as per the schematic set up in figure1.



TEST SETUP
FIG: 1

$$C = \frac{I \times 10^6}{2 \times 3.14 \times f \times V}$$

Where C = Capacitance in µF
I = Current in Ampere

f = Frequency in Hz
V = Applied line voltage.

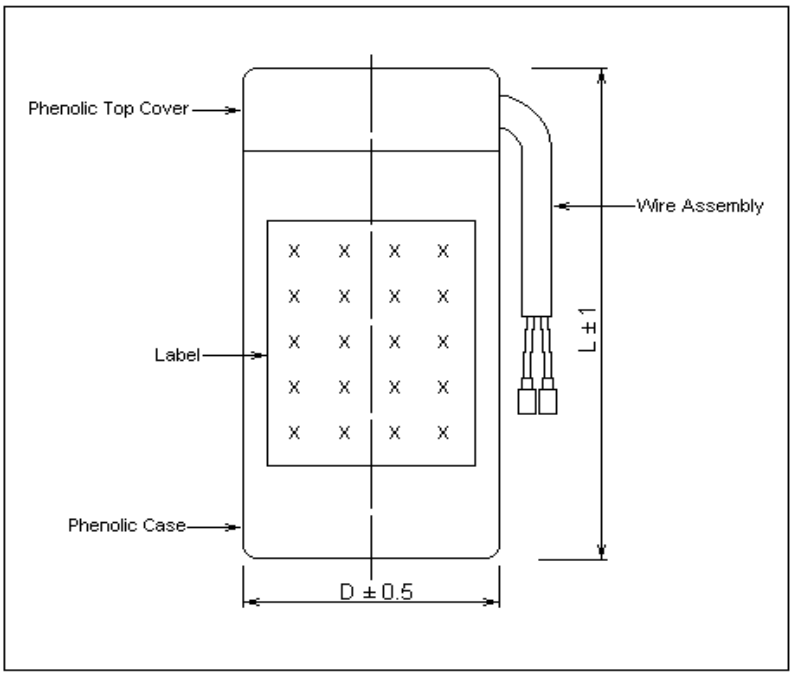
Power Factor:

Power factor shall be determined by recording current in Amperes within 3 seconds and power in watts within 4 seconds after application of rated voltage in the setup in figure 1.

$$PF\ (\%) = \frac{P}{V \times I} \times 100$$

Where PF= Power Factor in %
P = Power in Watts
V = Applied Voltage in Volts
I = Current in Amperes

4. PHYSICAL OUTLINE - MU SERIES



All Dimensions in mm

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5. DIMENSIONS (All units in mm)

Case Code	Diameter D ± 0.5	Length L ± 1
DM	36	81
DQ	36	97
FQ	46	97
FS	46	122

6. STANDARD RATING TABLE

Part No.	Capacitance Range (µf)	Case size		Case Code	Rated Voltage VAC
		Ø D mm	L mm		
MU 400 2N A DM FO	40 ~ 60	36	81	DM	110
MU 600 2N A DM FO	60 ~ 80	36	81	DM	110
MU 800 2N A DM FO	80 ~ 100	36	81	DM	110
MU 101 2N A DM FO	100 ~ 120	36	81	DM	110
MU 121 2N A DQ FO	120 ~ 150	36	97	DQ	110
MU 151 2N A DQ FO	150 ~ 200	36	97	DQ	110
MU 201 2N A FQ FO	200 ~ 250	46	97	FQ	110
MU 251 2N A FQ FO	250 ~ 320	46	97	FQ	110
MU 321 2N A FS FO	320 ~ 400	46	122	FS	110
MU 401 2N A FS FO	400 ~ 480	46	122	FS	110
MU 481 2N A FS FO	480 ~ 552	46	122	FS	110
MU 400 2Z A DM FO	40 ~ 60	36	81	DM	230
MU 600 2Z A DM FO	60 ~ 80	36	81	DM	230
MU 800 2Z A DQ FO	80 ~ 100	36	97	DQ	230
MU 101 2Z A DQ FO	100 ~ 120	36	97	DQ	230
MU 121 2Z A FS FO	120 ~ 150	46	122	FS	230
MU 151 2Z A FS FO	150 ~ 200	46	122	FS	230
MU 201 2Z A FS FO	200 ~ 250	46	122	FS	230
MU 200 2Q A DM FO	20 ~ 25	36	81	DM	330
MU 250 2Q A DM FO	25 ~ 30	36	81	DM	330
MU 300 2Q A DM FO	30 ~ 40	36	81	DM	330
MU 400 2Q A DQ FO	40 ~ 60	36	97	DQ	330

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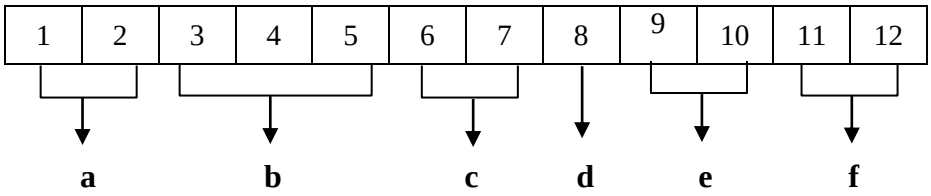
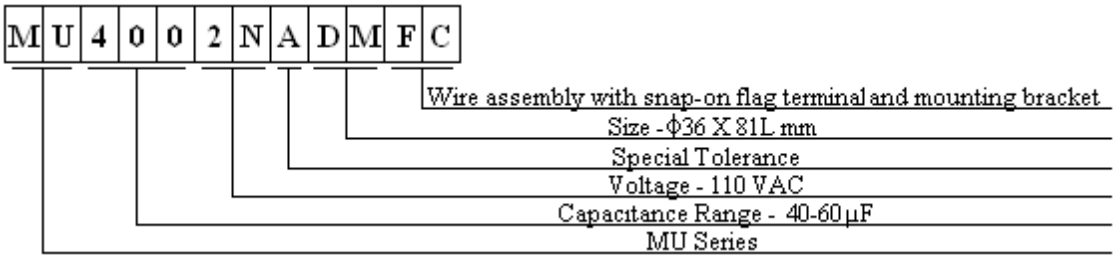
7. CAPACITOR ORDERING INFORMATION

Capacitors are identified with the help of a 12-digit code. Expansion of part Nos are detailed below.



a	b	c
Series Code	**Min. Capacitance Value Code**	**Voltage Code**
MU: UL approved motor start capacitors in PHENOLIC case	Eg: (1) 20 µF is coded as 200 (ii) 280 µF is coded as 281 (For the range of Capacitance refer rating table)	110 VAC – 2N
		220 VAC – 2R
		230 VAC – 2Z
		330 VAC – 2Q
d	**e**	**f**
Capacitance Tolerance Code	**Size Case Code**	**Capacitor lead wire Termination Code**
A: Special Tolerance (within specified limits of Minimum & maximum value provided in the rating table)	36 X 81 = DM	Provided by factory based on customer requirements. Eg. FC: Wire assembly with snap-on flag terminal and mounting bracket FO: wire assembly with snap-on flag terminal.
	36 X 97 = DQ	
	46 X 97 = FQ	
	46 X 122 = FS	

Eg: MU Series 40 - 60µF/110VAC
Wire assembly with snap on terminal and mounting bracket



Note: Requirement of mounting bracket to be indicated separately.

8. MARKING ON THE CAPACITOR

For AC Aluminum electrolytic capacitors MU series product information is printed on UL approved adhesive labels affixed on the outer phenolic can. The following information are marked on the capacitor:

a) Manufacturer's name & logo KELTRON®
b) A distinctive part No.
c) The capacitance in microfarad
d) The voltage rating
e) The frequency in Hz
f) Applicable duty cycle.
g) The temperature rating
h) Date code (Year- Month).
i) Component recognition mark c UL us.
j) Canadian Standard No. C 22.2 No. 190

9. DATE CODE

Date code is printed on the capacitors in year-month format. Year code and month code are detailed below.

Year code

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Letter Code	M	N	P	R	S	T	U	V	W	X

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Letter Code	A	B	C	D	E	F	H	J	K	L

Year code repeats after each cycle of 20 years

Month code

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Character code	1	2	3	4	5	6	7	8	9	0	N	D

10. PACKING QUANTITY

MU series motor capacitors are generally packed in primary cardboard cartons by employing suitable SEPARATORS to avoid damage during transit. The primary cartons are then inserted into MOTHER cardboard cartons before shipment. Packing quantity in Nos per carton are detailed below.

MU Series

Case Code	Nos/ Carton
DM	81
DQ	81
FQ	49
FS	49

Note: Indicated quantity per primary carton may change when item is ordered with mounting bracket. Appropriate quantity will be decided by the factory.