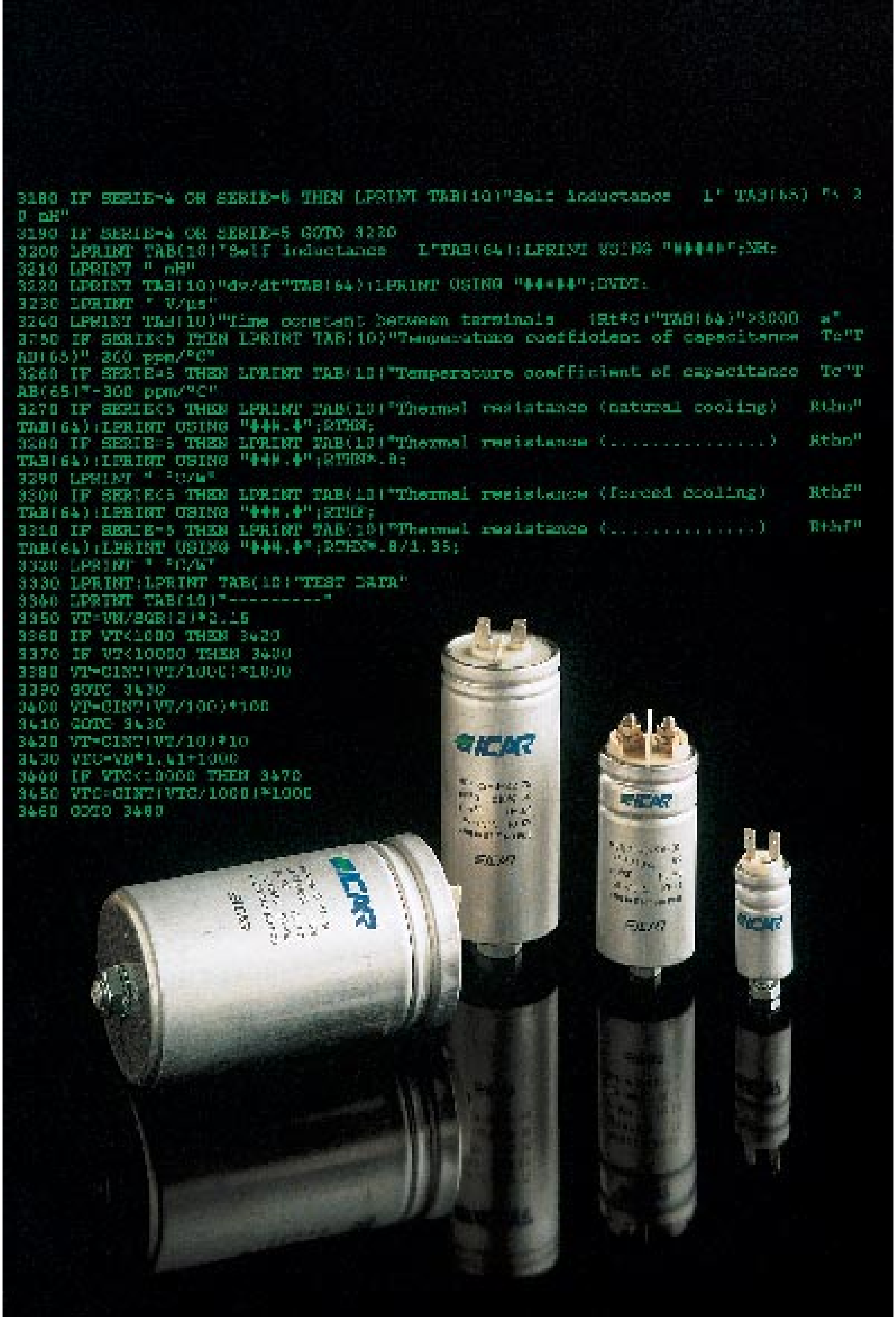


3190 IF SERIE=4 OR SERIE=5 GOTO 3220
3210 LPRINT " nH"
3230 LPRINT " V/µs"
3270 IF SERIE<5 THEN LPRINT TAB(10)"Thermal resistance (natural cooling) Rthn"
TAB(64);LPRINT USING "###.#";RTHN;
3300 IF SERIE<5 THEN LPRINT TAB(10)"Thermal resistance (forced cooling) Rthf"
3330 LPRINT:LPRINT TAB(10)"TEST DATA"
3350 VT=VN/SQR(2)*2.15
3360 IF VT<1000 THEN 3420
3370 IF VT<10000 THEN 3400
3380 VT=CINT(VT/1000)*1000
3390 GOTO 3430
3400 VT=CINT(VT/100)*100
3410 GOTO 3430
3420 VT=CINT(VT/10)*10
3430 VTC=VN*1.41+1000
3440 IF VTC<10000 THEN 3470
3450 VTC=CINT(VTC/1000)*1000
3460 GOTO 3480
ICAR

MSR 25

SELF- HEALING CAPACITORS FOR A.C./D.C. APPLICATIONS

ICAR
capacità & sicurezza

CERT. N.9170.ICAR
CSQ
UNI EN 29001 (ISO 9001)
CERTIFIED
EQNet
QUALITY SYSTEM
BSI
REGISTERED FIRM
CERT. N.FM 20175
BS EN ISO 9001:1994

MSR 25
Self healing capacitors for A.C./D.C. applications

HIGH RELIABILITY CAPACITORS FOR DAMPING, FILTERING, PULSE, COMMUTATION, POWER FACTOR CORRECTION FOR FLUORESCENT LAMPS, VOLTAGE STABILIZER, ETC.

1. GENERAL

The MSR 25 capacitors are designed for high reliability A.C. applications as voltage stabilizer, damping, commutation, power factor correction for fluorescent lamps, ecc. This sectional specification comprises definitions, application criteria and test modalities. Standards of reference: IEC 1071-1048-1049-664.

2. BASIC DESIGN

The winding of these capacitors consists of alternating layers of polypropylene and bimetallized paper. The impregnant is pure high-quality mineral oil, without environmental or toxicological problems. The paper does not work as dieletric but it is the means of impregnation and supports the metallization.
This technology gives many advantages:
- good impregnation, i.e. long life
- very low losses
- good capability to withstand inrush currents
- reduction of the field strength at the edges of the electrodes

An over-pressure disconnector prevents the case bursting due to excess pressure when the capacitor is overloaded or at the end of its life. Total elongation of the case is about 7 mm after the over-pressure disconnector release. Don't make use of rigid connections.

3. CASING

Casing is made with aluminium

4. DEFINITIONS

4.1 **Rated capacitance** (C_N) **and tolerance**
Rated capacitance is the capacitance value indicated on the capacitor.
It is measured at 20°C at 50 Hz at a voltage equal to rated voltage divided by $\sqrt{2}$. Capacitance tolerance is ±10% or ±5% on request.

4.2 **Rated Voltage** (U_N)
The rated voltage is the maximum peak recurrent voltage of either polarity of a reversing type wave form that may be applied continuously to the capacitor within the temperature category limits.

4.3 **Rated A.C. voltage** (U_{rms})
The rated a.c. voltage is the maximum r.m.s. voltage applicable to the capacitor.

$$U_N = \sqrt{2}\, U_{rms}$$

4.4 **Rated D.C. voltage** (U_{dc})
Rated d.c. voltage is the maximum operating peak voltage of either polarity but of a non reversing type waveform for which the capacitor has been designed for continous operation.

$$U_{dc} = 2\, U_{rms}$$

4.5 **Non-recurrent surge voltage** (U_S)
Non recurrent surge voltage is the maximum peak voltage that can be enduced by a switching or any other disturbance of the system which is allowed for a limited number of times and for durations shorter than 10 ms.
MSR 25 capacitors can withstand a peak voltage equal to $3 \cdot U_{rms}$.

4.6 **Insulation voltage** (U_I)
The rated insulation voltage is the maximum r.m.s. voltage that can be applied in service between the terminals and the casing. Unless stated otherwise, the rated insulation voltage should be taken as equal to the capacitor's rated a.c. voltage

4.7 **Maximum current** (I_{max})
The maximum current is the maximum r.m.s. value that may continuously flow through the capacitor. It is limited by losses in terminals and internal current paths.

4.8 **Duration of fundamental oscillation** (T_0)
Is the duration of the fundamental oscillation process according to which all process are repeated cyclically. The duration of fundamental oscillation and the fundamental frequency (f_0) are connected as follows:

$$f_0 = 1/T_0$$

4.9 **Power dissipation** (P)
Is the sum of all the actual power produced in the capacitor:
this is in the main: (U is the peak recurrent voltage)

$$P = U^2 \cdot \pi \cdot f_0 \cdot C \cdot \tan \delta_0 + I^2_{rms} \cdot R_S$$

4.10 **Dieletric dissipation factor** ($\tan \delta_0$)
Is the dissipation factor of the dieletric, wich may be regarded as constant in the dieletric in the frequency range in which it is employed. Typical $\tan \delta_0$ for polypropylene is $2 \cdot 10^{-4}$

4.11 **Series resistance** (R_S)
Is the resistance produced by the current heat losses ($I^2_{rms} \cdot R_S$) in the capacitor.

4.12 **Equivalent series resistance** (R_{ESR})
The equivalent series resistance represents the total actual power of the capacitor.

$$R_{ESR} = R_S + \frac{\tan \delta_0}{2 \cdot \pi \cdot f \cdot C}$$

4.13 **Dissipation factor** ($\tan \delta$)
The tangent of the loss angle is the ratio between the equivalent series resistance and the capacitive reactance of a capacitor at specified sinusoidal frequency: this is calculated as follows:

$$\tan \delta = \tan \delta_0 + 2\, \pi\, f \cdot C \cdot R_S$$

4.14 **The dv/dt value**
The dv/dt value is the maximum slope of the voltage waveshape during charging or discharging of the capacitor and is expressed in V/µs.
The dv/dt value also corresponds to the maximum peak current value per µF and could also be expressed in A/µF

4.15 **Time constant between terminals** ($R_t \cdot C$)
The time constant between terminals is the product of insulation resistance between terminals at 20°C and the actual value of the capacitor capacitance. The time constant between terminals for the MSR25 series is greater then 3000 s.

4.16 **Thermal resistance** R thn
R thn is the thermal resistance between the hot-spot in the winding and the environment during natural air cooling. The following formula is valid:

$$(\vartheta h - \vartheta_0) / R thn = P$$

4.17 **Self-inductance** (L)
The self-inductance of the capacitor is due to internal connections, terminals, winding characteristics and physical dimensions.

4.18 **Hot-spot temperature** (ϑ h)
h is the hottest point in the capacitor winding. During stationary operation h must not exceed 85°C.

4.19 **Operating ambient temperature** (ϑ_0)
The operating ambient temperature is the temperature of the air under steady state conditions and with natural convection measured at point approximately 0.1 m away from the capacitor container and at two-thirds of the height from its base.

4.20 **Lowest operating ambient temperature** (ϑ_{min})
The lowest operating ambient temperature is the lowest temperature at which the capacitor may be energized.

4.21 **Maximum operating temperature** (ϑ_{max})
The maximum operating ambient temperature is the highest temperature at which the capacitor may operate.

4.22 **Lowest storage temperature** (ϑs_{min})
The lowest storage temperature is the lowest temperature at which the capacitor may be continuosly maintained non-operating.

4.23 **Maximum storage temperature** (ϑs_{max})
The maximum storage temperature is the highest temperature at which the capacitor may be continuosly maintained non-operating.

4.24 **Temperature coefficient of capacitance** (T_c)
The temperature coefficient is equal to - 260 ppm/°C

5. SERVICE CONDITIONS

5.1 Normal service conditions. This specification gives requirements for capacitors intended for use in the following conditions:
a) altitude not exceeding 2000 m corresponding to 0.7 bar.
b) residual voltage at energization of a.c. capacitors not to exceed 10% rated voltage
c) operating temperatures:

Lowest operating ambient temperature	- 25°C
Maximum operating ambient temperature	85°C
Lowest storage temperature	- 55°C
Maximum storage temperature	85°C

6. TESTS

The following routine tests shall be carried out on every capacitor before delivery:
a) capacitance and tangent of the loss angle measurement with low voltage bridge, 100 Hz frequency (capacitance must be in tolerance and tan $\delta < 5 \cdot 10^{-4}$)
b) A.C. voltage test between terminals (2.15 U_{rms}, 2_s)
c) A.C. voltage test between terminals and container (2 U_{rms} + 1000 V, but not less than 2500 V)
d) sealing test (90°C, 4 h)
MSR25 capacitors can withstand mechanical and climatic tests according to IEC standard:
e) vibration test (according to IEC Publication 68-2-6 Test Fc)

Frequency range	10 to 55 Hz
Displacement amplitude	0,35 mm
Acceleration	5g

The capacitance is measured before and after the test. The maximum permitted variation of capacitance is 3%.
f) shock test (according to IEC publication 68-2-27 Test Ea)

Pulse	half-sine
Peak acceleration	15 g
Endurance duration	11 ms

The capacitance is measured before and after the test. The maximum permitted variation of capacitance is 3%.
g) robustness of terminations (according to IEC 68-2-21 Test U)
h) damp-heat test.
This test shall be carried out in conformity with IEC Publication 68-2-3. The severity of 56 days shall be employed. No voltage shall be applied to the samples and no measurement shall be taken during the test. After the damp-heat period, the capacitor shall be stored under standard atmospheric conditions for recovery for not less than 1 h and not more than 2 h. Immediately after recovery the insulation resistance between terminals and casing is carried out. The value of resistance shall be higher than 10 Gohm.

7. FAILURE CRITERIA

Capacitors are considered failed when one of the following conditions happens:
a - short circuit
b - open circuit
c - capacitance variation + 3% of initial value
d - tan δ 1.5 max requirement
e - time constant between terminals 2000 s
f - insulation resistance between terminals and casing less than 10 Gohm.

8. RELIABILITY

The expected life Ln of the MSR25 capacitors is 97% survival:
- 100000 hours at rated voltage and hot-spot temperature of 85°C.
- 30000 hours at about 110% rated voltage and hot-spot temperature of 85°C.

9. CODE AND TYPE DESIGNATION

MSR 25 - B - 10 - 40:
25 means cylindrical case and it is the case code
B is the terminals code (**A** means single faston terminals, **B** double faston, **C** M6 screw, **D** M8 screw)
10 means 10μF
40 means 400V i.e. the rated A.C. voltage U_{rms} divided by ten.

STANDARD MODELS AND RATINGS MSR 25 SERIES

U_{rms}= 420V U_n= 590V Udc= 850V L_n= 100.000h

U_{rms}= 450V U_n= 635V Udc= 900V L_n= 30.000h

MODEL MSR 25	CAPAC. µF	FIG. n°	DIMENSIONS ø mm	H mm	I mm	D	L mm	I_{max} dv/dt A	V/µs	Rs m Ω	Rthn °C/W	L n H
A - 0.47 - 40	0.47	1	25	63	10.0	M 8	10	16	300	18.08	35.8	60
A - 0.68 - 40	0.68	1	25	63	10.0	M 8	10	16	300	13.32	34.5	60
A - 1 - 40	1.00	1	25	63	10.0	M 8	10	16	300	9.91	32.7	60
C - 1 - 40	1.00	3	45	72	18.0	M 8	10	40	300	8.08	33.4	60
B - 1.50 - 40	1.50	2	30	63	13.4	M 8	10	16	300	7.50	30.3	60
C - 1.50 - 40	1.50	3	45	72	18.0	M 8	10	40	300	5.67	31.2	60
B - 2.20 - 40	2.20	2	30	83	13.4	M 8	10	16	200	12.14	23.0	70
C - 2.20 - 40	2.20	3	45	72	18.0	M 8	10	40	300	4.13	28.8	60
B - 3.30 - 40	3.30	2	30	83	13.4	M 8	10	16	200	9.18	21.4	70
C - 3.30 - 40	3.30	3	45	72	18.0	M 8	10	40	300	3.03	26.0	60
B - 4.70 - 40	4.70	2	35	83	13.4	M 8	10	16	200	7.41	19.8	70
C - 4.70 - 40	4.70	3	45	72	18.0	M 8	10	40	300	2.38	23.3	60
B - 5.60 - 40	5.60	2	35	103	13.4	M 8	10	16	100	10.58	16.4	90
C - 5.60 - 40	5.60	3	45	72	18.0	M 8	10	40	300	2.13	21.9	60
B - 6.80 - 40	6.80	2	35	103	13.4	M 8	10	16	100	9.39	15.7	90
C - 6.80 - 40	6.80	3	45	92	18.0	M 8	10	40	200	3.87	18.0	80
B - 8.20 - 40	8.20	2	40	103	17.3	M 8	10	16	100	8.44	15.1	90
C - 8.20 - 40	8.20	3	45	92	18.0	M 8	10	40	200	3.38	17.0	80
B - 10 - 40	10.00	2	40	103	17.3	M 8	10	16	100	7.61	14.4	90
C - 10 - 40	10.00	3	45	100	18.0	M 8	10	40	100	3.62	15.2	90
B - 12 - 40	12.00	2	45	128	17.3	M 8	10	16	80	10.30	12.0	120
C - 12 - 40	12.00	3	45	112	18.0	M 8	10	40	100	4.29	13.4	100
B - 15 - 40	15.00	2	45	128	17.3	M 8	10	16	80	9.15	11.3	120
C - 15 - 40	15.00	3	45	137	18.0	M 8	10	40	80	5.92	11.0	120
B - 18 - 40	18.00	2	45	128	17.3	M 8	10	16	80	8.39	10.8	120
C - 18 - 40	18.00	3	45	137	18.0	M 8	10	40	80	5.15	10.5	120
B - 20 - 40	20.00	2	45	128	17.3	M 8	10	16	80	8.01	10.5	120
C - 20 - 40	20.00	3	45	147	18.0	M 8	10	40	70	5.60	9.7	130
D - 20 - 40	20.00	4	65	100	24.0	M12	12	70	100	1.81	9.4	90
B - 22 - 40	22.00	2	55	128	17.3	M12	12	16	80	7.69	10.5	120
C - 22 - 40	22.00	3	55	147	18.0	M12	12	40	70	5.22	9.8	130
D - 22 - 40	22.00	4	65	137	24.0	M12	12	70	80	3.79	7.4	120
B - 33 - 40	33.00	2	60	138	17.3	M12	12	16	70	7.40	9.1	120
C - 33 - 40	33.00	3	55	147	18.0	M12	12	40	70	3.95	8.7	130
D - 33 - 40	33.00	4	65	137	24.0	M12	12	70	80	2.75	6.7	120
D - 47 - 40	47.00	4	80	137	24.0	M12	12	70	80	2.13	6.9	120

U_{rms}= 470V U_n= 660V Udc= 950V L_n= 100.000h

U_{rms}= 515V U_n= 725V Udc=1050V L_n= 30.000h

MODEL MSR 25	CAPAC. µF	FIG. n°	DIMENSIONS ø mm	H mm	I mm	D	L mm	I_{max} dv/dt A	V/µs	Rs m Ω	Rthn °C/W	L n H
A - 0.33 - 45	0.33	1	25	63	10.0	M 8	10	16	300	21.48	36.3	60
A - 0.47 - 45	0.47	1	25	63	10.0	M 8	10	16	300	15.88	35.1	60
A - 0.68 - 45	0.68	1	25	63	10.0	M 8	10	16	300	11.80	33.6	60
B - 1 - 45	1.00	2	30	63	13.4	M 8	10	16	300	8.88	31.4	60
C - 1 - 45	1.00	3	45	72	18.0	M 8	10	40	300	7.05	32.3	60
B - 1.50 - 45	1.50	2	30	63	13.4	M 8	10	16	300	6.81	29.1	60
C - 1.50 - 45	1.50	3	45	72	18.0	M 8	10	40	300	4.98	29.9	60
B - 2.20 - 45	2.20	2	30	83	13.4	M 8	10	16	200	10.87	22.2	70
C - 2.20 - 45	2.20	3	45	72	18.0	M 8	10	40	300	3.66	27.4	60
B - 3.30 - 45	3.30	2	35	83	13.4	M 8	10	16	200	8.33	20.5	70
C - 3.30 - 45	3.30	3	45	72	18.0	M 8	10	40	300	2.72	24.5	60
B - 4.70 - 45	4.70	2	35	103	13.4	M 8	10	16	100	10.72	16.3	90
C - 4.70 - 45	4.70	3	45	92	18.0	M 8	10	40	200	4.56	18.8	80
B - 5.60 - 45	5.60	2	35	103	13.4	M 8	10	16	100	9.61	15.7	90
C - 5.60 - 45	5.60	3	45	92	18.0	M 8	10	40	200	3.98	17.9	80
B - 6.80 - 45	6.80	2	40	103	17.3	M 8	10	16	100	8.59	15.0	90
C - 6.80 - 45	6.80	3	45	92	18.0	M 8	10	40	200	3.46	16.9	80
B - 8.20 - 45	8.20	2	40	103	17.3	M 8	10	16	100	7.78	14.3	90
C - 8.20 - 45	8.20	3	45	100	18.0	M 8	10	40	200	3.74	15.2	90
B - 10 - 45	10.00	2	45	128	17.3	M 8	10	16	90	10.46	11.9	120
C - 10 - 45	10.00	3	45	112	18.0	M 8	10	40	100	4.38	13.3	100
D - 10 - 45	10.00	4	65	92	24.0	M12	12	70	200	2.17	11.3	80
B - 12 - 45	12.00	2	45	128	17.3	M 8	10	16	90	9.48	11.4	120
C - 12- 45	12.00	3	45	137	18.0	M 8	10	40	90	6.24	11.1	120
D - 12 - 45	12.00	4	65	92	24.0	M12	12	70	200	1.89	10.8	80
B - 15 - 45	15.00	2	45	128	17.3	M 8	10	16	90	8.50	10.7	120
C - 15 - 45	15.00	3	45	137	18.0	M 8	10	40	90	5.26	10.4	120
B - 15 - 45	15.00	4	65	100	24.0	M12	12	70	200	2.00	9.7	90
B - 18 - 45	18.00	2	55	128	17.3	M12	12	16	90	7.84	10.5	120
C - 18 - 45	18.00	3	55	137	18.0	M12	12	40	90	4.61	10.3	120
D - 18 - 45	18.00	4	65	112	24.0	M12	12	70	100	2.37	8.5	100
B - 20 - 45	20.00	2	55	128	17.3	M12	12	16	90	7.51	10.2	120
C - 20 - 45	20.00	3	55	137	18.0	M12	12	40	90	4.28	10.0	120
D - 20 - 45	20.00	4	65	137	24.0	M12	12	70	90	3.61	7.2	120
B - 22 - 45	22.00	2	55	128	17.3	M12	12	16	90	7.25	9.9	120
C - 22 - 45	22.00	3	55	137	18.0	M12	12	40	90	4.01	9.7	120
D - 22 - 45	22.00	4	65	137	24.0	M12	12	70	90	3.34	7.1	120
B - 33 - 45	33.00	2	60	138	17.3	M12	12	16	80	7.04	8.5	120
D - 33 - 45	33.00	4	80	112	24.0	M12	12	70	100	1.55	8.1	100
D - 47 - 45	47.00	4	80	137	24.0	M12	12	70	90	1.92	6.4	120

U_{rms}= 550V U_n= 775V U_{dc}=1100V L_n= 100.000h

U_{rms}= 600V U_n= 850V U_{dc}=1200V L_n= 30.000h

MODEL MSR 25	CAPAC. µF	FIG. n°	DIMENSIONS ø mm	H mm	I mm	D	L mm	I_{max} dv/dt A	V/µs	Rs m Ω	Rthn °C/W	L n H
A - 0.33 - 50	0.33	1	25	63	10.0	M 8	10	16	400	19.13	35.7	60
A - 0.47 - 50	0.47	1	25	63	10.0	M 8	10	16	400	14.23	34.4	60
A - 0.68 - 50	0.68	1	25	63	10.0	M 8	10	16	400	10.66	32.7	60
B - 1 - 50	1.00	2	30	63	13.4	M 8	10	16	400	8.10	30.4	60
C - 1 - 50	1.00	3	45	72	18.0	M 8	10	40	400	6.27	31.3	60
B - 1.50 - 50	1.50	2	30	83	13.4	M 8	10	16	200	13.03	23.0	70
C - 1.50 - 50	1.50	3	45	72	18.0	M 8	10	40	400	4.46	28.8	60
B - 2.20 - 50	2.20	2	30	83	13.4	M 8	10	16	200	9.92	21.5	70
C - 2.20 - 50	2.20	3	45	72	18.0	M 8	10	40	400	3.31	26.1	60
B - 3.30 - 50	3.30	2	35	83	13.4	M 8	10	16	200	7.70	19.6	70
C - 3.30 - 50	3.30	3	45	72	18.0	M 8	10	40	400	2.48	23.1	60
B - 4.70 - 50	4.70	2	35	103	13.4	M 8	10	16	100	9.86	15.7	90
C - 4.70 - 50	4.70	3	45	92	18.0	M 8	10	40	200	4.11	17.9	80
B - 5.60 - 50	5.60	2	40	103	17.3	M 8	10	16	100	8.89	15.1	90
C - 5.60 - 50	5.60	3	45	92	18.0	M 8	10	40	200	3.61	17.0	80
B - 6.80 - 50	6.80	2	40	103	17.3	M 8	10	16	100	8.00	14.4	90
C - 6.80 - 50	6.80	3	45	100	18.0	M 8	10	40	200	3.89	15.2	90
B - 8.20 - 50	8.20	2	45	128	17.3	M 8	10	16	100	10.86	12.0	120
C - 8.20 - 50	8.20	3	45	112	18.0	M 8	10	40	100	4.60	13.4	100
B - 10 - 50	10.00	2	45	128	17.3	M 8	10	16	100	9.72	11.4	120
C - 10 - 50	10.00	3	45	137	18.0	M 8	10	40	100	6.49	11.1	120
D - 10 - 50	10.00	4	65	92	24.0	M12	12	70	200	1.96	10.8	80
B - 12 - 50	12.00	2	45	128	17.3	M 8	10	16	100	8.86	10.8	120
C - 12 - 50	12.00	3	45	137	18.0	M 8	10	40	100	5.63	10.5	120
D - 12 - 50	12.00	4	65	100	24.0	M12	12	70	200	2.13	9.8	90
B - 15 - 50	15.00	2	55	128	17.3	M12	12	16	100	8.01	10.5	120
C - 15 - 50	15.00	3	55	112	18.0	M12	12	40	100	3.03	11.6	100
D - 15 - 50	15.00	4	65	112	24.0	M12	12	70	100	2.46	8.5	100
B - 18 - 50	18.00	2	55	128	17.3	M12	12	16	100	7.43	10.0	120
C - 18 - 50	18.00	3	55	147	18.0	M12	12	40	100	4.90	9.3	130
D - 18 - 50	18.00	4	65	137	24.0	M12	12	70	100	3.53	7.1	120
B - 20 - 50	20.00	2	55	128	17.3	M12	12	16	100	7.15	9.6	120
C - 20 - 50	20.00	3	55	147	18.0	M12	12	40	100	4.55	9.0	130
D - 20 - 50	20.00	4	65	137	24.0	M12	12	70	100	3.24	6.9	120
B - 22 - 50	22.00	2	60	138	17.3	M12	12	16	100	7.71	9.1	120
D - 22 - 50	22.00	4	65	137	24.0	M12	12	70	100	3.01	6.8	120
D - 33 - 50	33.00	4	80	137	24.0	M12	12	70	100	2.23	6.8	120

U_{rms}= 660V U_n= 930V U_{dc}=1300V L_n= 100.000h

U_{rms}= 730V U_n=1050V U_{dc}=1450V L_n= 30.000h

MODEL MSR 25	CAPAC. µF	FIG. n°	DIMENSIONS ø mm	H mm	I mm	D	L mm	I_{max} dv/dt A	V/µs	Rs m Ω	Rthn °C/W	L n H
A - 0.22 - 66	0.22	1	25	63	10.0	M 8	10	16	500	22.42	36.1	60
A - 0.33 - 66	0.33	1	25	63	10.0	M 8	10	16	500	15.84	34.6	60
A - 0.47 - 66	0.47	1	25	63	10.0	M 8	10	16	500	11.91	33.0	60
B - 0.68 - 66	0.68	2	30	63	13.4	M 8	10	16	500	9.06	30.8	60
B - 1 - 66	1.00	2	30	83	13.4	M 8	10	16	300	14.99	23.3	70
C - 1 - 66	1.00	3	45	72	18.0	M 8	10	40	500	5.18	29.4	60
B - 1.50 - 66	1.50	2	30	83	13.4	M 8	10	16	300	11.08	21.8	70
C - 1.50 - 66	1.50	3	45	72	18.0	M 8	10	40	500	3.73	26.6	60
B - 2.20 - 66	2.20	2	35	83	13.4	M 8	10	16	300	8.59	20.1	70
C - 2.20 - 66	2.20	3	45	72	18.0	M 8	10	40	500	2.81	23.8	60
B - 3.30 - 66	3.30	2	35	103	13.4	M 8	10	16	200	10.70	15.8	90
C - 3.30 - 66	3.30	3	45	92	18.0	M 8	10	40	300	4.55	18.1	80
B - 4.70 - 66	4.70	2	40	103	17.3	M 8	10	16	200	8.66	14.6	90
C - 4.70 - 66	4.70	3	45	100	18.0	M 8	10	40	200	4.33	15.5	90
B - 5.60 - 66	5.60	2	45	128	17.3	M 8	10	16	100	11.93	12.1	120
C - 5.60 - 66	5.60	3	45	112	18.0	M 8	10	40	200	5.19	13.7	100
B - 6.80 - 66	6.80	2	45	128	17.3	M 8	10	16	100	10.63	11.6	120
C - 6.80 - 66	6.80	3	45	137	18.0	M 8	10	40	100	7.40	11.3	120
B - 8.20 - 66	8.20	2	45	128	17.3	M 8	10	16	100	9.60	11.0	120
C - 8.20 - 66	8.20	3	45	137	18.0	M 8	10	40	100	6.36	10.7	120
B - 10 - 66	10.00	2	55	128	17.3	M12	12	16	100	8.69	10.8	120
C - 10 - 66	10.00	3	55	112	18.0	M12	12	40	200	3.41	12.0	100
D - 10 - 66	10.00	4	65	112	24.0	M12	12	70	200	2.84	8.7	100
B - 12 - 66	12.00	2	55	128	17.3	M12	12	16	100	8.01	10.2	120
C - 12 - 66	12.00	3	55	137	18.0	M12	12	40	100	4.77	10.0	120
D - 12 - 66	12.00	4	65	137	24.0	M12	12	70	100	4.10	7.2	120
B - 15 - 66	15.00	2	55	128	17.3	M12	12	16	100	7.32	9.5	120
C - 15 - 66	15.00	3	55	147	18.0	M12	12	40	100	4.76	8.9	130
D - 15 - 66	15.00	4	65	137	24.0	M12	12	70	100	3.42	6.9	120
B - 18 - 66	18.00	2	60	138	17.3	M12	12	16	100	7.65	8.8	120
D - 18 - 66	18.00	4	80	112	24.0	M12	12	70	200	1.83	8.5	100
B - 20 - 66	20.00	2	60	138	17.3	M12	12	16	100	7.37	8.5	120
D - 20 - 66	20.00	4	80	112	24.0	M12	12	70	200	1.70	8.2	100
D - 22 - 66	22.00	4	80	137	24.0	M12	12	70	100	2.54	7.0	120

STANDARD MODELS AND RATINGS MSR 25 SERIES

U_{rms}= 780V U_n=1100V U_{dc}=1550V L_n= 100.000h

U_{rms}= 840V U_n=1180V U_{dc}=1680V L_n= 30.000h

MODEL MSR 25	CAPAC. µF	FIG. n°	DIMENSIONS ø mm	H mm	I mm	D	L mm	I_{max} dv/dt A	V/µs	Rs m Ω	Rthn °C/W	L n H
A - 0.15 - 75	0.15	1	25	63	10.0	M 8	10	16	600	25.54	36.2	60
A - 0.22 - 75	0.22	1	25	63	10.0	M 8	10	16	600	18.26	34.8	60
A - 0.33 - 75	0.33	1	25	63	10.0	M 8	10	16	600	13.06	33.0	60
B - 0.47 - 75	0.47	2	30	63	13.4	M 8	10	16	600	9.97	31.0	60
B - 0.68 - 75	0.68	2	30	83	13.4	M 8	10	16	300	17.25	23.6	70
B - 1 - 75	1.00	2	30	83	13.4	M 8	10	16	300	12.77	22.2	70
C - 1 - 75	1.00	3	45	72	18.0	M 8	10	40	600	4.27	27.1	60
B - 1.50 - 75	1.50	2	35	83	13.4	M 8	10	16	300	9.60	20.4	70
C - 1.50 - 75	1.50	3	45	72	18.0	M 8	10	40	600	3.12	24.1	60
B - 2.20 - 75	2.20	2	35	103	13.4	M 8	10	16	200	12.26	16.2	90
C - 2.20 - 75	2.20	3	45	92	18.0	M 8	10	40	300	5.32	18.6	80
B - 3.30 - 75	3.30	2	40	103	17.3	M 8	10	16	200	9.45	14.8	90
C - 3.30 - 75	3.30	3	45	100	18.0	M 8	10	40	300	4.86	15.7	90
B - 4.70 - 75	4.70	2	45	128	17.3	M 8	10	16	200	11.79	11.8	120
C - 4.70 - 75	4.70	3	45	112	18.0	M 8	10	40	200	5.09	13.2	100
B - 5.60 - 75	5.60	2	45	128	17.3	M 8	10	16	200	10.63	11.3	120
C - 5.60 - 75	5.60	3	45	137	18.0	M 8	10	40	200	7.39	11.0	120
B - 6.80 - 75	6.80	2	55	128	17.3	M12	12	16	200	9.56	11.1	120
C - 6.80 - 75	6.80	3	45	147	18.0	M 8	10	40	100	7.50	10.0	130
B - 8.20 - 75	8.20	2	55	128	17.3	M12	12	16	200	8.71	10.5	120
C - 8.20 - 75	8.20	3	55	137	18.0	M12	12	40	200	5.47	10.3	120
B - 10 - 75	10.00	2	55	128	17.3	M12	12	16	200	7.96	9.9	120
C - 10 - 75	10.00	3	55	137	18.0	M12	12	40	200	4.73	9.7	120
D - 10 - 75	10.00	4	65	137	24.0	M12	12	70	200	4.06	7.1	120
B - 12 - 75	12.00	2	60	138	17.3	M12	12	16	100	8.31	9.1	120
C - 12 - 75	12.00	3	55	147	18.0	M12	12	40	100	4.86	8.7	130
D - 15 - 75	15.00	4	80	137	24.0	M12	12	70	200	2.93	7.2	120
D - 18 - 75	18.00	4	80	137	24.0	M12	12	70	200	2.55	6.8	120
D - 20 - 75	20.00	4	80	137	24.0	M12	12	70	200	2.36	6.6	120

U_{rms}= 900V U_n=1270V U_{dc}=1800V L_n= 100.000h

U_{rms}= 950V U_n=1350V U_{dc}=1900V L_n= 30.000h

MODEL MSR 25	CAPAC. µF	FIG. n°	DIMENSIONS ø mm	H mm	I mm	D	L mm	I_{max} dv/dt A	V/µs	Rs m Ω	Rthn °C/W	L n H
A - 0.10 - 85	0.10	1	25	63	10.0	M 8	10	16	800	30.12	36.4	60
A - 0.15 - 85	0.15	1	25	63	10.0	M 8	10	16	800	20.97	35.0	60
A - 0.22 - 85	0.22	1	25	63	10.0	M 8	10	16	800	15.14	33.4	60
B - 0.33 - 85	0.33	2	30	63	13.4	M 8	10	16	800	10.98	31.1	60
B - 0.47 - 85	0.47	2	30	63	13.4	M 8	10	16	800	8.51	29.0	60
B - 0.68 - 85	0.68	2	30	83	13.4	M 8	10	16	400	14.45	22.4	70
B - 1 - 85	1.00	2	35	83	13.4	M 8	10	16	400	10.87	20.7	70
C - 1 - 85	1.00	3	45	72	18.0	M 8	10	40	800	3.58	24.6	60
B - 1.50 - 85	1.50	2	35	103	13.4	M 8	10	16	300	13.72	16.3	90
C - 1.50 - 85	1.50	3	45	92	18.0	M 8	10	40	400	6.07	18.8	80
B - 2.20 - 85	2.20	2	40	103	17.3	M 8	10	16	300	10.58	15.1	90
C - 2.20 - 85	2.20	3	45	100	18.0	M 8	10	40	400	5.62	16.0	90
B - 3.30 - 85	3.30	2	45	128	17.3	M 8	10	16	200	12.80	11.9	120
C - 3.30 - 85	3.30	3	45	112	18.0	M 8	10	40	300	5.64	13.3	100
B - 4.70 - 85	4.70	2	45	128	17.3	M 8	10	16	200	10.35	10.8	120
C - 4.70 - 85	4.70	3	45	147	18.0	M 8	10	40	200	8.45	10.1	130
B - 5.60 - 85	5.60	2	55	128	17.3	M12	12	16	200	9.42	10.7	120
C - 5.60 - 85	5.60	3	55	147	18.0	M12	12	40	200	7.32	10.0	130
B - 6.80 - 85	6.80	2	55	128	17.3	M12	12	16	200	8.56	10.1	120
C - 6.80 - 85	6.80	3	55	137	18.0	M12	12	40	200	5.33	9.8	120
D - 6.80 - 85	6.80	4	65	137	24.0	M12	12	70	200	4.66	7.2	120
B - 8.20 - 85	8.20	2	60	138	17.3	M12	12	16	200	8.90	9.3	120
C - 8.20 - 85	8.20	3	55	147	18.0	M12	12	40	200	5.45	8.9	130
B - 10 - 85	10.00	2	60	138	17.3	M12	12	16	200	8.17	8.7	120
D - 10 - 85	10.00	4	80	112	24.0	M12	12	70	300	2.05	8.3	100
D - 12 - 85	12.00	4	80	137	24.0	M12	12	70	200	2.93	7.0	120
D - 15 - 85	15.00	4	80	137	24.0	M12	12	70	200	2.48	6.5	120

Fig. 1

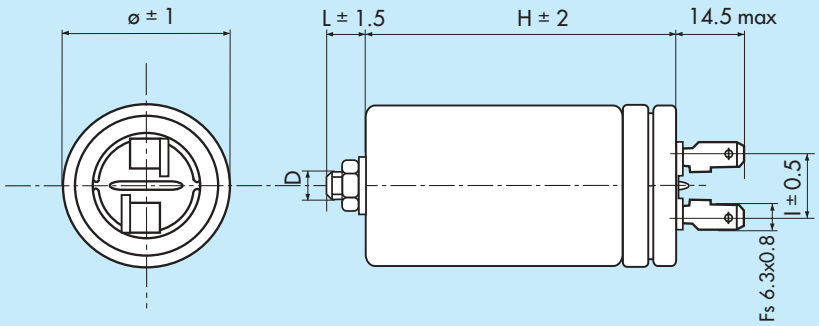


Fig. 2

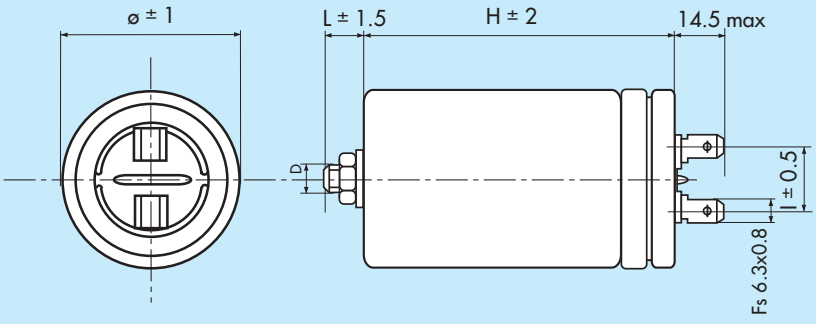


Fig. 3

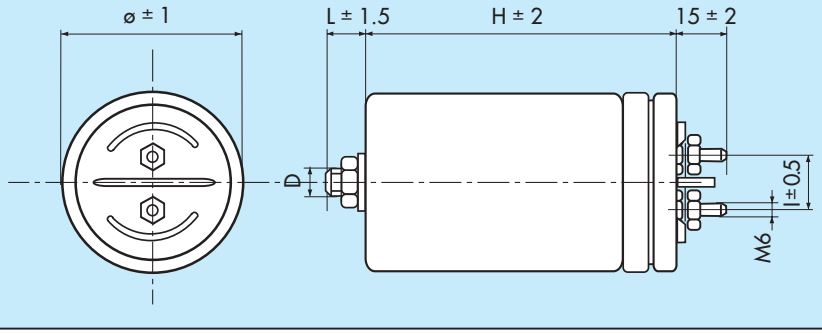
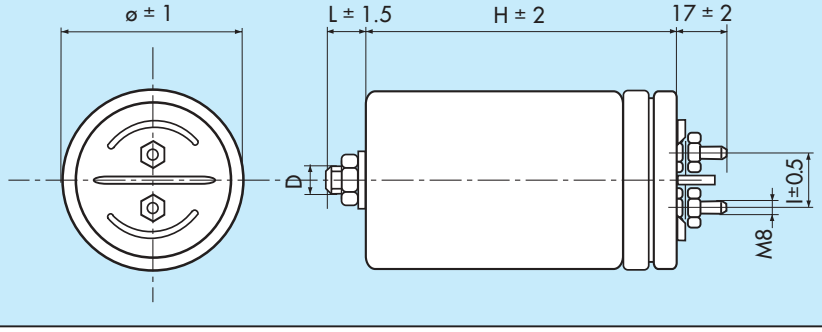


Fig. 4



IKONOS/ICAR MSR 25/3-963000

ICAR provides a first class service in the following products:

- power electronics capacitors;
- metallized capacitors for A.C. applications, with metal or plastic case, and overpressure disconnector;
- low and high voltage, medium and high frequency power factor correction capacitors and automatically switched banks with harmonic filtering systems;
- coupling capacitors and capacitor voltage transformers;
- energy storage and pulse capacitors;
- high voltage D.C. generators;
- radio interference suppression filters;
- delay and pulse networks.

ICAR

ICAR spa
Operative headquarters and sales office
Via Isonzo, 10 - 20052 MONZA (Milano)
Tel. (039) 83.92.51 - Fax (039) 83.32.27
Tlx 33.33.39 ICAR I