

DUCATI energia

HISTORY DRIVES THE FUTURE



Since 1926



**Low voltage power factor correction: capacitors, components,
fixed & automatic equipment and active harmonic filters**

DUCATI ENERGIA

About us, quality, services

DUCATI, founded in 1926 by Ducati brothers, has been among the first in the world to start industrial production of capacitors, and has been a market leader ever since.

Since its foundation, DUCATI Energia has always been in the forefront of technical and industrial development, leading the research shaping today's technology and cooperating to the upgrades and improvements leading to the current IEC and EN Standards for Capacitors.

DUCATI energia firstly introduced the Metallised Polypropylene Film technology and its innovative PPM and PPMh film set the reference for this technology, outclassing the obsolete paper/oil and gas technology in terms of superior performance and reduced dimensions.



DUCATI energia Group main fields of activities are:

- Motor Lighting Capacitors
- Power Electronics Capacitors
- Power Factor Correction Capacitors and Systems (LV and MV)
- Alternators and Ignition Systems
- Electrical Vehicles and Charging Stations for Electrical Vehicles
- Energy Analysers
- Control Systems for energy grids
- Railways Signalling systems
- Ticketing and Transport Automation systems

Quality

Utmost attention to product quality and customer service are constants in DUCATI's history and the main factors contributing to its success worldwide. DUCATI has always been one of the first companies in its field, in Italy and

in Europe, to adopt the most modern standards and procedures in order to assure the highest level of product quality and reliability.

The QUALITY SYSTEM of DUCATI Energia SpA, capacitor division, as described in the Quality Manual, was one of the first in Italy to be approved by the BSI in accordance with ISO 9002 (EN 29002) procedures: Certificate of Registration N. FM22004. DUCATI Energia is fully certified following ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007.

All this has been achieved thanks to fully automated and integrated production processes, completely new and innovative machines, production process control methods based on accurate specifications and the assigning of responsibility to operators at all levels.

Capacitors, systems and relays comply with the requirements set forth in EC Directives 73/23 and 93/68 ("Low Voltage Directive"), 89/336 and 92/31 ("Electromagnetic Compatibility Directive").

The harmonized European standards of reference are EN 60831- 1 and EN 60831-2.

Nearly all models are certified by international institutes and all are manufactured in full compliance with the requirements of said standards. The failure rate (for capacitors only) is 300 per 109 components x hours (reliability according to DIN 40040).

Services

In the design and choosing of a PFC equipment, the experience and expertise are the main characteristics that can make a difference. DUCATI Energia guides you all along the process, from the choice of the most suitable PFC system to the commissioning, maintenance and management of the same unit.

A team of experts is dedicated to the design: any prerogative of the equipment is analyzed to obtain the most efficient solution based on the operating condition and the needs of the overall system.

The analysis of the field conditions sometime is essential for the choice of the best equipment to be installed; DUCATI offers the service of analysis measurement by using the most advanced tools on the market.

The after sales service is essential to help the customer in the proper installation of various units. A dedicated number that provides service that will guide the customer in the setting of the various parameters and help you solve small problems that normally can occur when starting the equipment.

The best results are obtained by combining the experience gained over the years with deep knowledge of the technologies used. In one word, DUCATI.



Certification of Quality Management System ISO
9001:2008



Certification of Environmental
Management System ISO 14001:2004



Certification of Occupational Health and Safety Management System BS OHSAS 18001:2007



CAPACITORS



TECHNOLOGY

Capacitors' technology

DUCATI was the first company in Italy, and among the first in the world, to introduce capacitors for the radiobroadcasting equipment designed by Guglielmo Marconi.

Building upon this tradition, which has always seen DUCATI in the forefront of capacitor technology, the company has developed the innovative PPM and PPMh film with 4In capacitor.

Superior performance and reduced dimensions compared to the by now obsolete paper and oil and gas solutions make PPM/PPMh capacitors the new standard of reference for industrial power factor correction systems.

All the capacitors manufactured by DUCATI Energia feature a protection device conforming to standards EN 60831-1/2. This protection has been achieved by means of a special engineering technology: if a fault occurs the connections will be broken due to overpressure, leaving the insulation of the case intact and preventing the capacitor from exploding or burning.

Technology Long Life 4I_N

The Continuous research conducted in DUCATI Energia laboratories has led to the development of a polypropylene film with a special metallization, whose purpose is to favour the self-healing process and reduce dielectric losses.

Thanks to this innovative metallization treatment, the polypropylene is subjected to less stress during operation. Therefore it maintains its dielectric properties for a significantly longer time while delivering significantly better performance in terms of both 4In current and voltage.

The above-described characteristics make these capacitors especially suitable for Continuous duty under highly demanding conditions in harmonic rich environments.

The **Long Life 4I_N** series of single phase capacitors for industrial PFC, with winded elements made of PPMh film, is the top notch in terms of reliability, performances and reduced size.

The **MONO Long Life 4I_N** series, equipped in every DUCATI PFC units, use this kind of technology.

EXTRA DUTY (XD) and STANDARD LIFE series

Metallized polypropylene technology (PPM / MKP) utilizes a vacuum evaporation technique to deposit an extremely thin layer of metal on one side of the polypropylene film.

The capacitor elements built using this technology are obtained by winding two polypropylene films. The capacitor plates consist in the metallized surface of the two films and the dielectric is the propylene film itself.

The main advantage of capacitors with metallized plates is their self-healing capacity. This means that they are capable of restoring their electrical properties following the occurrence of a short circuit between the plates.

In these capacitors the impregnating agent is a special type of resin. DUCATI Energia has developed an ecofriendly resin composition displaying high dielectric stability, which completely eliminates every possible risk of air and water molecules being present inside the capacitor.

The capacitors which use this kind of technology are:

- Three phases capacitors EXTRA DUTY **MODULO XD** series
- Three phases capacitors EXTRA DUTY **MODULO XD MINI** series
- Mono phase capacitors STANDARD LIFE **FLOPPY CAP** series

For further information about the usage of the capacitors, please check the **reference notes** and the **installation notes** at page 36.

Single phase capacitors

| | Technology | Power Range (kVAr) | Voltage Range (V) |
|------------|------------------|-----------------------|----------------------|
| MONO | 4 I _N | 1.67 - 8.33 | 400 - 525 |
| FLOPPY CAP | Standard Life | 1.67 - 4.17 | 400 - 550 |

Three phase capacitors

| | Technology | Power Range (kVAr) | Voltage Range (V) |
|----------------|------------------|-----------------------|----------------------|
| MODULO XD | Extra Duty | 1.5 - 50 | 240 - 800 |
| MODULO XD Mini | Extra Duty | 0.5 - 10 | 400 - 550 |
| F50 | 4 I _N | 5 - 60 | 415 - 525 |




MONO Long Life 4I_n

Single phase capacitors

The capacitors making up the series **MONO Long Life 4I_n** are manufactured using elements wound with the PPMh film and housed in metal cases with metal lids. The parts are assembled by crimping to ensure perfect airtightness of the system and efficient operation of the overpressure safety device. The use of resin impregnation technology greatly enhances the capacitor's performance in terms of heat dissipation as well as ensuring a long life and excellent ground insulation.

These characteristics make these capacitors especially suitable for Continuous duty under highly demanding condition in harmonic rich environments.

General Characteristics

| | |
|--|--|
| Power Range | 1.67 – 8.33 kVAr |
| Voltage range | 400 ÷ 525 V |
| Rated frequency | 50 Hz/60 Hz |
| Capacitance tolerance | -5 +10% |
| Duty | Continuous |
| Dielectric losses | ≤ 0.2 W/kVAr |
| Life expectancy | ≥ 110000h – 25/D ≥ 130000h – 25/C |
| Max dV/dt | ≤ 100 V /μs |
| Temperature class | -25/D |
| Max overload I _n | 4 x I _n |
| Max inrush current | 200 I _n |
| Terminals | Double faston M5 bolt for Q= 8.33 kVAr |
| Protection rating | IP 00 |
| Discharge resistance | NO. Option discharge resistance 68kΩ 4W 315.99.0116 |
| Impregnating material | Eco-friendly resin |
| Altitude | ≤ 2000 m s.l.m. |
| Test voltage (AC) between terminals | 2.15 U _n x 2 s |
| Test voltage (AC) between terminals and case | 3kV x 10 s |
| Standards | IEC 831 - 1/2 |
| Approvals |  * with modified PN 416.84. |

| Un (V) | Qn (kVAr) | In (A) | C (μF) | DxH (mm) | Pcs x box | Part n. 416.53 |
|-----------|--------------|-----------|-----------|-------------|--------------|-------------------|
| 400 | 1.67 | 4.2 | 33.2 | 45x115 | 40 | 1100 |
| | 2.5 | 6.3 | 49.8 | 50x115 | 28 | 1150 |
| | 3.33 | 8.3 | 66.3 | 50x150 | 28 | 1200 |
| | 4.17 | 10.4 | 83 | 55x150 | 28 | 1250 |
| | 5 | 12.5 | 99.5 | 60x150 | 25 | 1300 |
| | 6.66 | 16.7 | 132.6 | 60x165 | 18 | 1350 |
| | 8.33 | 20.8 | 165.8 | 65x165 | 16 | 1400 |
| 415 | 1.67 | 4 | 30.9 | 45x115 | 40 | 2100 |
| | 2.5 | 6 | 46.2 | 50x115 | 28 | 2150 |
| | 3.33 | 8 | 61.6 | 50x150 | 28 | 2200 |
| | 4.17 | 10 | 77.1 | 55x150 | 28 | 2250 |
| | 5 | 12 | 92.5 | 60x150 | 25 | 2300 |
| | 6.66 | 16 | 123.2 | 60x165 | 18 | 2350 |
| | 8.33 | 20 | 154 | 65x165 | 16 | 2400 |
| 450 | 1.67 | 3.7 | 26.3 | 45x115 | 40 | 3100 |
| | 2.5 | 5.6 | 39.3 | 50x115 | 28 | 3150 |
| | 3.33 | 7.4 | 52.4 | 50x150 | 28 | 3200 |
| | 4.17 | 9.3 | 65.6 | 55x150 | 28 | 3250 |
| | 5 | 11.1 | 78.6 | 60x150 | 25 | 3300 |
| | 6.66 | 18.8 | 104.7 | 60x165 | 18 | 3350 |
| | 8.33 | 18.5 | 131 | 65x165 | 16 | 3400 |
| 525 | 1.67 | 3.2 | 19.3 | 45x115 | 40 | 4100 |
| | 2.5 | 4.8 | 28.9 | 50x115 | 28 | 4150 |
| | 3.33 | 6.3 | 38.5 | 50x150 | 28 | 4200 |
| | 4.17 | 7.9 | 48.2 | 55x150 | 28 | 4250 |
| | 5 | 9.5 | 57.8 | 60x150 | 25 | 4300 |
| | 6.66 | 12.7 | 77 | 60x165 | 18 | 4350 |
| | 8.33 | 15.9 | 96.2 | 65x165 | 16 | 4400 |

Standard box dimensions: 195x390x255 mm
Weight: 9 Kg.

Terminal cover IP54

| Code | Diam. (mm) | Packages n. pz. per box |
|-------------|---------------|----------------------------|
| 316. | | |
| 23.0860 | 45 | 100 |
| 23.1070 | 50 | 200 |
| 52.3350 | 55 | 72 |
| 52.3355 | 60 | 60 |
| 52.3360 | 65 | 60 |

To enable the overpressure protection device to operate efficiently, it is necessary to leave a gap of at least 30 mm. above the element and use flexible leads for the connection.







FLOPPY CAP

Single phase capacitors

The capacitors making up the **FLOPPY CAP - STANDARD LIFE** series are housed in metal cases. The lids are made of self-extinguishing plastic (Class V2 under the inflammability classification of standard UL 94). The capacitor is sealed closed by reading the case over the lid, a solution that guarantees perfect airtightness, which is necessary to ensure the efficiency of the over-pressure safety device.

The placement of an insulating container between the capacitor element and the metal case, combined with the embedding of the capacitor element in resin, makes the capacitor extremely safe from an electrical point of view (ground insulation) and insensitive to vibrations.

General Characteristics

| | |
|--|--|
| Power Range | 1.67 – 4.17 kVAr |
| Voltage range | 230 ÷ 550 V |
| Rated frequency | 50 Hz /60 Hz |
| Capacitance tolerance | -5 +10% |
| Duty | Continuous |
| Dielectric losses | ≤ 0.3 W/kVAr |
| Life expectancy | ≥ 50000h – 25/D ≥ 80000h – 25/C |
| Max dV/dt | ≤ 25 V /μs |
| Temperature class | -25/D |
| Max overload In | 2 x In |
| Max inrush current | 100 I _n |
| Terminals | Double faston |
| Protection rating | IP 00 |
| Discharge resistance | NO |
| Impregnating material | Eco-friendly resin |
| Altitude | ≤ 2000 m s.l.m. |
| Test voltage (AC) between terminals | 2.15 U _n x 2 s |
| Test voltage (AC) between terminals and case | 3kV x 10 s |
| Standards | IEC 831 - 1/2 |
| Approvals |  (excluding 500-550 V models)  (excluding U _n >440 V models) |

| Un (V) | Qn (kVAr) | In (A) | Cn (μF) | DxH (mm) | Pcs x box | Part n. 416.30 | Dim. Box |
|--------|-----------|--------|---------|----------|-----------|----------------|----------|
| 230 | 0.83 | 3.6 | 50.2 | 45x122 | 25 | 0764 | A |
| | 1.67 | 7.2 | 100 | 60x137 | 25 | 0564 | A |
| 400 | 1.67 | 4.2 | 33.2 | 50x122 | 25 | 3964 | B |
| | 2.5 | 6.3 | 50 | 55x132 | 25 | 4064 | A |
| | 3.33 | 8.3 | 66.3 | 60x137 | 25 | 3764 | A |
| | 4.17 | 10.4 | 83 | 60x137 | 25 | 5064 | A |
| 415 | 1.67 | 4 | 30.9 | 50x122 | 25 | 3264 | A |
| | 2.5 | 6 | 46.2 | 55x132 | 25 | 3464 | A |
| | 3.33 | 8 | 61.6 | 60x137 | 25 | 3664 | A |
| | 4.17 | 10 | 77 | 60x137 | 25 | 5264 | A |
| 450 | 1.67 | 3.7 | 26.3 | 50x132 | 25 | 6464 | A |
| | 2.5 | 5.6 | 39.3 | 55x132 | 25 | 6164 | A |
| | 3.33 | 7.4 | 52.4 | 60x137 | 25 | 6264 | A |
| | 4.17 | 9.3 | 65.5 | 60x137 | 25 | 5364 | A |
| 500 | 1.67 | 3.3 | 21.3 | 50x132 | 25 | 8664 | A |
| | 2.5 | 5 | 31.8 | 55x132 | 25 | 7664 | A |
| | 3.33 | 6.6 | 42.4 | 60x137 | 25 | 7964 | A |
| | 4.17 | 8.3 | 53.1 | 60x137 | 25 | 5664 | A |
| 550 | 1.67 | 3 | 17.6 | 45x132 | 25 | 8164 | B |
| | 2.5 | 4.5 | 26.3 | 55x132 | 25 | 7464 | A |
| | 3.33 | 6.1 | 35.1 | 60x137 | 25 | 7764 | A |
| | 4.17 | 7.6 | 43.4 | 60x137 | 25 | 8064 | A |

Standard box dimensions: A= 195x390x255 mm. B= 195x390x200 mm.
Weight: 9 Kg.

Terminal cover IP54

| Code 316. | Diam. (mm) | Packages n. pz. per box |
|-----------|------------|-------------------------|
| 23.0860 | 45 | 100 |
| 23.1070 | 50 | 200 |
| 52.3350 | 55 | 72 |
| 52.3355 | 60 | 60 |

To enable the overpressure protection device to operate efficiently, it is necessary to leave a gap of at least 20 mm. above the element and use flexible leads for the connection.

