DUCATI energia

HISTORY DRIVES THE FUTURE

Since 1926

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

IVD GmbH, Max-Eyth-Strasse 10, 74405 Gaildorf Tel. 07971/9789-0 info@ivdgmbh.de www.ivdgmbh.de

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

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CAPACITORS

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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 Continuousus 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 Continuousus 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 technlogy 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

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MODULO XD

Three phase capacitors

MODULO XD capacitors are used for the fixed and automatic PFC systems in a wide range of industrial applications.
The three elements are housed in a plastic container which, together with the impregnating agents, assures dual insulation between the wound cores and metal enclosure.
To guarantee perfect filling during the resin impregnation process, the process itself is carried out prior to the elements being placed in the enclosure; in this way the distribution and uniformity of the impregnation can be subjected to a complete visual and dimensional inspection.
The overpressure protection system is specifically dimensioned so as to constantly ensure maximum safety in terms of ground protection and protection against the risk of arcing, even in conditions where there is a high energy density.
The characteristics of these capacitors are especially suitable for continuous duty under highly demanding conditions in harmonic rich environments.

General Characteristics

Power Range	1.5 ÷ 50 kVAr
Voltage range	230 ÷ 800 V
Rated frequency	50 Hz/60 Hz
Capacitance tolerance	-5 +10%
Duty	Continuous
Dielectric losses	≤ 0.2 W/kVAr
Life expectancya	≥110000h –25/D ≥130000h –25/C
Max dV/dt	100 V /µs
Temperature class	-25/D
Max overload In	4 x I_n
Max inrush current	200 I_n
Terminals	Screw clamps
Protection rating	IP20 (IP54 on request)
Internal connection	Delta
Discharge resistance	External (50 V after 60")
Impregnating material	Eco-friendly resin
Altitude	≤ 4000 m s.l.m.
Storage Temperature	–40 +80 °C
Test voltage (AC) between terminals	2.15 Un x 2"
Test voltage between terminals and case	3kV x 10" (UN≤660 V)
Standards	IEC 831 - 1/2
Approvals	c UL us Excluding Ø 125 mm

Un (V)	Qn (kVAr)	In (A)	C (µF)	DxH (mm)	Type	Pcs x box	Part n. 41646.	Dim. Box
240 (60Hz)	1.5	3.6	3x23	65x165	A	14	**0020**	E
	2.5	6	3x28	65x165	A	14	**0030**	E
	5	12	3x77	75x255	A	6	**0050**	F
	7.5	18	3x115	85x255	A	6	**0080**	F
	10	24	3x154	100x255	A	6	**0100**	G
	12.5	30	3x192	100x255	A	6	**0150**	H
	15	36	3x230	116x255	A	6	**0200**	H
400	1.5	2.2	3x9.9	65x165	A	14	**1020**	E
	2.5	3.6	3x17	65x165	A	14	**1030**	E
	5	7.2	3x33	75x165	A	6	**1050**	C
	7.5	10.8	3x50	75x255	A	6	**1080**	F
	10	14.4	3x66	75x255	A	6	**1100**	F
	12.5	18.0	3x83	85x255	A	6	**1150**	F
	15	21.7	3x99	90x255	A	6	**1200**	F
	20	28.9	3x133	100x255	A	6	**1260**	G
	25	36.1	3x166	116x255	A	4	**1310**	H
	30	43.3	3x199	116x290	A	4	**1360**	H
	40	57.7	3x265	116x370	A	4	**1370**	I
	45	65	3x298	125x370	B	4	**1375**	I
	50	72.2	3x332	125x370	B	4	**1380**	I
415	1.5	2.1	3x9.2	65x165	A	14	**2020**	E
	2.5	3.5	3x15	65x165	A	14	**2030**	E
	5	7.0	3x31	75x165	A	6	**2050**	C
	7.5	10.4	3x46	75x255	A	6	**2080**	F
	10	13.9	3x62	75x255	A	6	**2100**	F
	12	17.4	3x77	85x255	A	6	**2150**	F
	15	20.9	3x92	90x255	A	6	**2200**	F
	20	27.8	3x123	100x255	A	6	**2260**	G
	25	34.8	3x154	116x255	A	4	**2310**	H
	30	41.7	3x185	116x290	A	4	**2360**	H
	40	55.6	3x246	116x370	A	4	**2370**	I
	45	62.6	3x277	116x370	A	4	**2375**	I
	50	69.6	3X308	125x370	B	4	**2380**	I

Standard box dimensions: C= 190x285x325 mm G= 225x340x270 mm
E= 195x390x255 mm H= 330x340x225 mm F= 185x290x270 mm
I= 270x270x450 mm
Weight: 10÷12 kg

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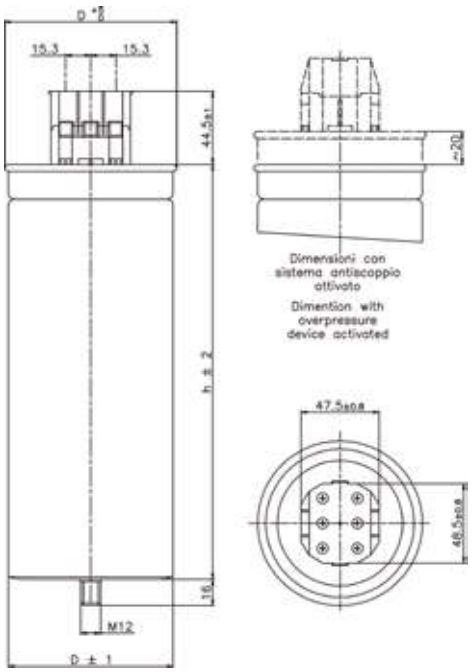
MODULO XD

Three phase capacitors

TECHNICAL DRAWING TYPE A



Terminals and stud	Fixing torque
Screw terminals	1.5 Nm
M10**	6 Nm
M12	10 Nm

(**) Complete the tightening using two wrenches.

Un (V)	Qn (kVAr)	In (A)	Cn (µF)	DxH (mm)	Type	Pcs x box	Part n. 41646.	Dim. Box
440	1.5	2	3x8.2	65x165	A	14	**3023**	E
	2.5	3.3	3x14	65x165	A	14	**3033**	E
	5	6.6	3x27	75x165	A	6	**3053**	C
	7.5	9.8	3x41	75x255	A	6	**3083**	F
	10	13.1	3x55	75x255	A	6	**3103**	F
	12.5	16.4	3x69	85x255	A	6	**3153**	F
	15	19.7	3x82	90x255	A	6	**3203**	F
	20	26.2	3x110	100x255	A	6	**3263**	G
	25	32.8	3x137	116x255	A	4	**3313**	H
	30	39.4	3x164	116x290	A	4	**3363**	H
	40	52.5	3x219	116x370	A	4	**3373**	I
	45	59.0	3x247	116x370	A	4	**3378**	I
	50	65.6	3x274	125x370	A	4	**3383**	I
450	1.5	1.9	3x7.9	65x165	A	14	**3020**	E
	2.5	3.2	3x13	65x165	A	14	**3030**	E
	5	6.4	3x26	75x165	A	6	**3050**	C
	7.5	9.6	3x39	75x255	A	6	**3080**	F
	10	12.8	3x52	75x255	A	6	**3100**	F
	12.5	16.0	3x65	85x255	A	6	**3150**	F
	15	19.2	3x79	90x255	A	6	**3200**	F
	20	25.7	3x105	100x255	A	6	**3260**	G
	25	32.1	3x131	116x255	A	4	**3310**	H
	30	38.5	3x157	116x290	A	4	**3360**	H
	40	51.3	3x210	116x370	A	4	**3370**	I
	45	57.7	3x236	116x370	A	4	**3375**	I
	50	64.2	3x262	125x370	A	4	**3380**	I
500	1.5	1.7	3x6.4	65x165	A	14	**4020**	E
	2.5	2.9	3x11	65x165	A	14	**4030**	E
	5	5.8	3x21	75x165	A	6	**4050**	C
	7.5	8.7	3x32	75x255	A	6	**4080**	F
	10	11.5	3x42	75x255	A	6	**4100**	F
	12.5	14.4	3x53	85x255	A	6	**4150**	F
	15	17.3	3x64	90x255	A	6	**4200**	F
	20	23.1	3x85	100x255	A	6	**4260**	G
	25	28.9	3x106	116x255	A	4	**4310**	H
	30	34.6	3x127	116x290	A	4	**4360**	H
	40	46.2	3x170	116x370	A	4	**4370**	I
	45	52.0	3x191	116x370	A	4	**4375**	I
	50	57.7	3x212	125x370	A	4	**4380**	I

Standard box dimensions:
C= 190x285x325 mm G= 225x340x270 mm E= 195x390x255 mm H= 330x340x225 mm
F= 185x290x270 mm I= 270x270x450 mm

Weight: 10÷12 kg

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Un (V)	Qn (kVAr)	In (A)	Cn (µF)	DxH (mm)	Type	Pcs x box	Part n. 41646.	Dim. Box
	10	11	3x38	85x255	A	6	**5130**	F
	12.5	13.7	3x48	85x255	A	6	**5170**	F
	15	16.5	3x58	100x255	A	6	**5230**	G
	20	22	3x77	116x255	A	4	**5270**	H
525	25	27.5	3x96	116x255	A	4	**5330**	H
	30	33	3x115	116x290	A	4	**5370**	H
	40	44	3x154	116x370	A	4	**5373**	I
	45	49.5	3x173	116x370	A	4	**5377**	I
	50	55	3x192	125x370	A	4	**5385**	I
	1.5	1.6	3x5.3	65x165	A	14	**5020**	E
	2.5	2.6	3x8.8	65x165	A	14	**5030**	E
	5	5.2	3x18	75x165	A	6	**5050**	C
	7.5	7.9	3x26	75x255	A	6	**5080**	F
	10	10.5	3x35	75x255	A	6	**5100**	F
	12.5	13.1	3x44	85x255	A	6	**5150**	F
550	15	15.7	3x53	90x255	A	6	**5200**	F
	20	21	3x70	100x255	A	6	**5260**	G
	25	26.2	3x88	116x255	A	4	**5310**	H
	30	31.5	3x105	116x290	A	4	**5360**	H
	40	42	3x140	116x370	A	4	**5372**	I
	45	47.2	3x158	116x370	A	4	**5375**	I
	50	52.5	3x175	125x370	A	4	**5380**	I
	10	8.4	3x22	75x255	A	6	**6100**	F
	12.5	10.5	3x28	85x255	A	6	**6150**	F
	15	12.6	3x33	90x255	A	6	**6200**	F
	20	16.7	3x45	100x255	A	6	**6260**	G
690 (*)	25	20.9	3x56	116x255	A	4	**6310**	H
	30	25.1	3x67	116x290	A	4	**6360**	H
	40	33.5	3x89	116x370	A	4	**6370**	I
	45	37.7	3x100	116x370	A	4	**6375**	I
	50	41.8	3x111	125x370	A	4	**6380**	I
	10	7.2	3x17	75x255	A	6	**8100**	F
	12.5	9.0	3x21	85x255	A	6	**8150**	F
	15	10.8	3x25	90x255	A	6	**8200**	F
	20	14.4	3x33	100x255	A	6	**8260**	G
800 (*)	25	18.0	3x41	116x255	A	4	**8310**	H
	30	21.7	3x50	116x290	A	4	**8360**	H
	40	28.9	3x66	116x370	A	4	**8370**	I
	45	32.5	3x75	116x370	A	4	**8375**	I
	50	36.1	3x83	125x370	A	4	**8380**	I

(*) Without discharge resistance.
Standard box dimensions:
C= 190x285x325 mm G= 225x340x270 mm E= 195x390x255 mm H= 330x340x225 mm
F= 185x290x270 mm I= 270x270x450 mm
Weight: 10 ÷ 12 kg

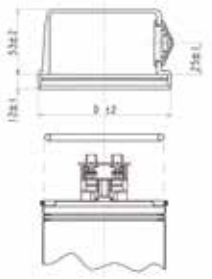
To enable the overpressure protection device to operate efficiently, it is necessary to leave a gap of at least 30 mm. above the element and use flexible leads for the connection.

TECHNICAL DRAWING TYPE B

Terminals and stud	Fixing torque
Screw terminals	1.5 Nm
M10**	6 Nm**
M12 stud	10 Nm

(**) Complete the tightening using two wrenches.

Terminal cover IP54



Code 316.52	Diam. (mm)	Packages n. pz. per box
.3338	85	30
.3339	90	30
.3340	100	30
.3341	116	30

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MODULO XD MINI

Three phase capacitors

MODULO XD Mini – COMPACT PERFORMANCE capacitors integrate the excellent MODULO XD technology with an innovative mechanical construction, which has been optimized for the 0,5 ÷ 10 kVAr/400 ÷ 550 V power/voltage ranges. Thanks to their mechanical construction and a particularly effective dry-resin impregnation process, **MODULO XD mini** capacitors deliver excellent performance in a very compact package. The faston connections, integrated discharge resistors and IP20 protection cap simplify their installation and maintenance in every type of application.

General Characteristics

Power Range	0.5 ÷10 kVAr
Voltage range	400 ÷ 550 V
Rated frequency	50 Hz/60 Hz
Capacitance tolerance	-5 +10%
Duty	Continuous
Dielectric losses	≤ 0.2 W/kVAr
Life expectancya	≥110000h –25/D ≥130000h –25/C
Max dV/dt	100 V /µs
Temperature class	-25/D
Max overload In	3 x I_n
Max inrush current	200 I_n
Terminals	Faston 6.3x0.8 mm
Protection rating	IP20 (with included protection cap)
Internal connection	Delta
Discharge resistance	Internal (50 V after 60")
Impregnating material	Eco-friendly resin
Altitude	≤ 4000 m s.l.m.
Storage Temperature	–40 +80 °C
Test voltage (AC) between terminals	2.15 Un x 2"
Test voltage between terminals and case	3 kV x 10"
Standards	IEC 831 - 1/2

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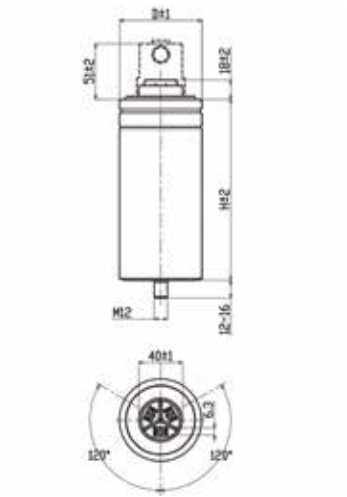
Un (V)	Qn (kVAr) 50 Hz	In (A)	Cn (µF)	DxH (mm)	Pcs x box	Part n. 416.12.	Dim. Box
	0.5	0.7	3x3.32	50x150	21	**1010**	E
	1	1.4	3x6.63	50x150	21	**1020**	E
400	1.5	2.2	3x9.95	50x150	21	**1040**	E
	2.5	3.6	3x16.6	60x150	18	**1060**	E
	5	7.2	3x33.2	75x175	6	**1130**	C
	7.5	10.8	3x49.7	75x265	12	**1150**	D
	10	14.4	3x66.3	75x265	12	**1170**	D
	0.5	0.7	3x3.08	50x150	21	**2010**	E
	1	1.4	3x6.16	50x150	21	**2020**	E
	1.5	2.1	3x9.24	50x150	21	**2040**	E
415	2.5	3.5	3x15.4	60x150	18	**2060**	E
	5	7.0	3x30.8	75x175	6	**2130**	C
	7.5	10.4	3x46.2	75x265	12	**2150**	D
	10	13.9	3x61.6	75x265	12	**2170**	D
	0.5	0.7	3x2.74	50x150	21	**3010**	E
	1	1.3	3x5.48	50x150	21	**3020**	E
	1.5	2.0	3x8.22	50x150	21	**3040**	E
440	2.5	3.3	3x13.7	60x150	18	**3060**	E
	5	6.6	3x27.4	75x175	6	**3130**	C
	7.5	9.8	3x41.1	75x265	12	**3150**	D
	10	13.1	3x54.8	75x265	12	**3170**	D
	0.5	0.6	3x2.62	50x150	21	**4010**	E
	1	1.3	3x5.24	50x150	21	**4020**	E
	1.5	1.9	3x7.86	50x150	21	**4040**	E
450	2.5	3.2	3x13.1	60x150	18	**4060**	E
	5	6.4	3x26.2	75x175	6	**4130**	C
	7.5	9.6	3x39.3	75x265	12	**4150**	D
	10	12.8	3x52.4	75x265	12	**4170**	D
	0.5	0.6	3x1.92	50x150	21	**5010**	E
	1	1.3	3x3.85	50x150	21	**5020**	E
	1.5	1.9	3x5.77	50x150	21	**5040**	E
525	2.5	3.2	3x9.62	60x150	18	**5060**	E
	5	6.4	3x19.2	75x175	6	**5130**	C
	7.5	9.6	3x28.9	75x265	12	**5150**	D
	10	12.8	3x38.5	75x265	12	**5170**	D
	0.5	0.6	3x1.75	50x150	21	**6010**	E
	1	1.3	3x3.51	50x150	21	**6020**	E
	1.5	1.9	3x5.26	50x150	21	**6040**	E
550	2.5	3.2	3x8.77	60x150	18	**6060**	E
	5	6.4	3x17.5	75x175	6	**6130**	C
	7.5	9.6	3x26.3	75x265	12	**6150**	D
	10	12.8	3x35.1	75x265	12	**6170**	D

TECHNICAL DRAWING



Terminals and stud	Fixing torque
Screw terminals	1.5 Nm
M12	11 Nm

Standard box dimensions: C= 190x285x325 mm D= 250x360x345 mm E= 195x390x255 mm.

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.

IVD GmbH, Max-Eyth-Strasse 10, 74405 Gaildorf Tel. 07971/9789-0 info@ivdgmbh.de www.ivdgmbh.de

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Vertrieb in Deutschland:
IVD GmbH
D-74405 Gaildorf
T.: 079 71 97 89 0
m.:info@ivdgmbh.de
www.ivdgmbh.de

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