JETI model®

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model electronics

DUPLEX 2.4 GHz

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II/2009

DUPLEX 2.4 GHz

The DUPLEX System has been developed for model remote control purposes in the open 2.4 GHz Band. It is not merely a matter of replacement of the classical radio control equipment working in the 35 MHz Band (also 40 MHz etc.), as a matter of fact there had to be developed a complex product system for unproblematic remote control, surveillance and online transmission of information (acoustical or on screen) showing operational conditions on board of models. Interference problems as well as frequency selection problems belong to the past now and thanks to real time transmission of telemetric data from the model will result in a completely new approach to radio control technology.

receivers

Technical Data	DUPLEX R4	DUPLEX R5 (R5 indoor)	DUPLEX R6	DUPLEX R6F (R6G) indoor	DUPLEX R7 (R7 indoor)	DUPLEX R8	DUPLEX R14	DUPLEX R18	DUPLEX RSat
Dimensions [mm]	35x20x7	42x20x8	45x24x12	38x20x6	44x20x7	50x30x12	62x38x16	62x38x16	27x20x4
Weight	5 g	5 g (4 g)	11 g	3 g	5,5 g	15 g	30 g	30 g	4 g
Antenna Length	2 x 100 mm	2x 100 mm (2x 45 mm)	2x 100 mm	30 mm	2x 100 mm (2x 45 mm)	2x 200 mm	2x 400 mm	2x 400 mm	2x 200 mm
Number of Channels	4	5	6	6	7	8	14	18	PPM 16
Operation Temperature	-10 to +85°C	-10 to +85°C	-10 to +85°C	-10 to +85°C	-10 to +85°C	-10 to +85°C	-10 to +85°C	-10 to +85°C	-10 to +85°C
Supply Voltage	3,2 - 8,4V	3,2 - 8,4V	3,2 - 8,4V	3,2 - 8,4V	3,2 - 8,4V	3,2 - 8,4V	3,2 - 8,4V	3,2 - 8,4V	3,2 - 8,4V
Average Current	39 mA	39 mA	40 mA	39 mA	39 mA	48 mA	40 mA	40 mA	35 mA
Real Time Transmission of Telemetric Data	✓	✓	✓	✓	✓	✓	✓	✓	–
Programming	JETIBOX	JETIBOX	JETIBOX	JETI BOX	JETI BOX	JETIBOX	JETI BOX	JETI BOX	JETI BOX
Support of a Satellite Receiver	–	–	–	–	–	–	✓	✓ 1 SAT in the package	–
Maximum Output Power	6 dBm	6 dBm	20 dBm	6 dBm	6 dBm	20 dBm	20 dBm	20 dBm	6 dBm
Receiver Sensitivity	-98 dBm	-98 dBm	-100 dBm	- 98 dBm	- 98 dBm	-106 dBm	- 106 dBm	- 106 dBm	- 98 dBm

DUPLEX 2.4 GHz

Real Time Transmission of Telemetric Data

One of the great advantages of the DUPLEX-System is its full ability to support bidirectional communication. All receivers and transmitter modules of the DUPLEX- System are adapted to the requirements of real time wireless data transmission. For instance in its basic configuration an arbitrary combination of transmitter and receiver already can transmit actual values of receiver supply voltages.

DUPLEX 2.4 GHz

JETIBOX COMPATIBLE

Complementary modules and equipment which enable an easy follow up of important operational data during flight. The measured values can be directly transmitted with the aid of the 2.4 GHz DUPLEX System from the model to the transmitter and interpreted by the JETIBOX inclusive acoustic signals.

JETIBOX

The JETIBOX is an universal communication instrument which is able to expand the applicability of all products labelled with the „JETIBOX compatible“ logo. Thanks to vivid presentation of values and simple parameter adjustment methods only now the system can be exploited to its full capacity.

MUI 30, MUI 50, MUI 75 und MUI 150

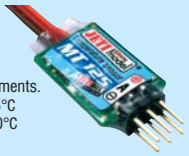
These modules are on board instruments for measurements of current, voltage and consumed battery capacity.

- Voltages from 0 up to 60 V with recording of minimum and maximum values.
- Currents from 0 up to 30 A / 50 A / 75 A / 150 A with recording of the maximum value.
- Consumed battery capacity [mAh].
- In flight motor runtime.

MGPS

The MGPS Module detects the exact location of the model in space. Furthermore the distance from the start position as well as the rate of climb and rate of descent can be measured. At the same time the flying altitude and the flying speed can be determined.

MT 125 and MT 300



These modules represent exact temperature measuring instruments.

- MT 125 comprises two sensors with a range of -55°C up to 125°C
- MT 300 comprises two sensors with a range of -40°C up to 300°C

REX JBC (Jeti Box Compatible)

REX JBC receivers are assigned for reception of FM signals in the 27, 35, 35B, 36, 40 and 41 MHz bands. They contain a microprocessor decoder and their ability to communicate with the universal JETIBOX terminal considerably increases their utilization domain.

Receiver Type	Supply Voltage [V]	Sensitivity [µV]	Antenna Length [mm]	Number of Output Channels	Dimensions [mm]	Weight [g]
REX 4 JBC	3,5 - 8,4	8	800	4	35 x 20 x 7	6
REX 6 JBC	3,5 - 8,4	6	1000	6	45 x 24 x 12	13
REX 8 JBC	3,5 - 8,4	5	1000	8	50 x 30 x 12	17

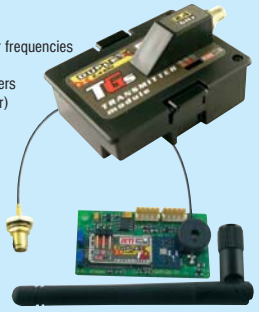
REX MPD (Microprocessor Pulse Decoding)

These FM receivers are produced for the 27, 35, 35B, 36, 40, 41 and 72 MHz bands. Their main benefit is brought about by the application of an intelligent decoder which gives them properties similar to PCM receivers.

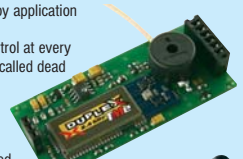
OPTIC 8

This product ensures an absolute galvanic decoupling of the RC receiver from further electric equipment in the model. The optical decoupling interrupts all ground loops which may considerably influence the HF signal and receiver reception quality. OPTIC ensures blocking of all unwanted signals which may arise during current passage through servos, controllers and other equipment connected to the on board network.

Advantages



- operation without crystals - no necessity to consider frequencies
- it is not necessary to buy a new transmitter
- simple and reliable pairing of receivers and transmitters (unrestricted number of receivers for each transmitter)
- insensitiveness to interference allows safe operation even within areas with high interference levels
- digital data transfer ensures undistorted data transmission up to the model
- maximum reliability
- bidirectional communication between receiver and transmitter
- real time telemetric data transfer allows at all times to follow up the on board model situation
- high receiver sensitivity and transmitter power ensure control range up to visual range
- possibilty to increase the number of channels up to 16 by application of two receivers
- two receiver antennas ensure an undisturbed model control at every position and eliminate at the same time formation of so called dead spots caused by signal reflection
- acoustic signalling showing receiver state (condition of the receiver current supply, transmission quality etc.)
- the DUPLEX-System enables simultaneous operation of several receivers with a single transmitter, the so called interception (cloning)
- clear data presentation and simple parameter adjustment with the aid of the JETIBOX
- Failsafe with defined transfer time lag before switching to the preset channel exit values
- any arbitrary receiver exit can be related to any arbitrary transmitter channel
- all receivers allow the use of mixers, channel reverse, ATV and delay settings for every receiver channel output even with the simplest type of transmitter.



Transmitter modules

Basic Data	DUPLEX TU	DUPLEX TF	DUPLEX TG/ TGi/TGi2/TGs	DUPLEX TMe	DUPLEX TMp
Dimensions [mm]	55x29x9	59x37x20	60x44x21	65x28x16	65x28x16
Weight	15 g	40 g	50 g	30 g	30 g
Antenna	2 dBi	2 dBi	2 dBi	2 dBi	2 dBi
Acoustic Signal	✓	✓	✓	✓	✓
Max. PPM-Channels	16	16	16	16	16
Operation Temperature	-10 to +85°C	-10 to +85°C	-10 to +85°C	-10 to +85°C	-10 to +85°C
Supply Voltage	3,5 - 16V	3,5 - 16V	3,5 - 16V	3,5 - 16V	3,5 - 16V
Average Current	38 mA	38 mA	38 mA	38 mA	38 mA
Max. Power Output	20 dBm	20 dBm	20 dBm	20 dBm	20 dBm

Transmitter/Module	TU	TF	TG/TGi2	TGi	TGs	TMe	TMp
Futaba: 7U, 8U, 8J, 9C,9Z, FN, T10C, 3PK, 3PJ, FC-18+, FC-28	✓	✓	–	–	–	–	–
Futaba: FC-16, FC-18 JUNIOR, T6EXHP, 12FG, 12Z, 14MZ, FX-18, FX-14, T6EXA	✓	–	–	–	–	–	–
Hitec: Optic 6, Eclipse 7, Prism 7, Aggressor CRX/SRX	✓	✓	–	–	–	–	–
Hitec: Laser 4, Laser 6, Flash 5, Optic 6 sport	✓	–	–	–	–	–	–
Graupner/JR: X-347, X-388, X-9303, MX-22, X-3810 ADT, PCM-10S, PCM-10, XPCM-9X, PCM-9XII	✓	–	✓	–	–	–	–
Graupner/JR: FM-6014, MC-17/18/20/24	✓	–	–	✓	–	–	–
Graupner: MC-10/12/14/15/16/19/22, MC-16/20, MX-12, MX-16s Graupner/JR: X-2610, XP6102FM	✓	–	–	–	–	–	–
Graupner: MX-24s	✓	–	–	–	✓	–	–
Multiplex: EVO 7, 9, 12	✓	–	–	–	–	✓	–
Multiplex: Profi 3000, 4000	✓	–	–	–	–	–	✓
Multiplex: Cockpit SX	✓	–	–	–	–	–	–
Other transmitters	✓	–	–	–	–	–	–

DUPLEX 2.4 GHz

JETIBOX COMPATIBLE

MU 3

The module MU 3 precisely measures three independent voltages. It comprises an input with a range of 0 up to 5 V and two inputs with ranges of 0 up to 15 V.

MVARIO

The MVario Module measures the rate of climb, rate of descent and the relative altitude. It records the maximum altitude, the maximum rate of descent and the maximum rate of climb (in m/s). Thanks to the connection between the MVario Module and the DUPLEX System signalling of the model rate of climb and rate of descent can be transposed to acoustic signals.

MULI6s

This module measures voltages of single cells (up to 6) in the battery during discharge. The sensor must be connected to the battery via the battery (balancer) service connector. Within the sensor menu there exists the possibility to set a single cell low voltage alert signal including an acoustic signal from the transmitter module. MULI6s also records maximum and minimum voltage values of all single cells.

MRPM and MRPM-AC

These modules are intended for motor speed measurements of all motor types. In the MRPM Module the measurement itself is executed by an optical sensor, in the MRPCM-AC Module by connecting the module itself to a brushless electric motor. Both MRPM modules measure the actual rpm and the actual propeller output power. Also here values of maximum speed and maximum propeller output power become recorded.

EXPANDER E4

The modules E4 are used to expand the number of connecting places for further telemetric sensors. In this mannner it becomes possible to connect up to 4 sensors to a DUPLEX receiver. The expander can be set in a manner which enables the JETIBOX to show measured values of concern simultaneously.

SPIN CONTROLLERS FOR BRUSHLESS MOTORS

The SPIN controller family for brushless (AC) motor control are able to operate with all types of batteries like NiCd, NiMH, Li-Po, Li-Ion and LiFe (A 123). Due to their numerous adjustment possibilities they are preferred for all airborne applications including helicopters and belong to the usual equipment of top pilots.
In the course of development of new brushless motor controllers we were eager to fulfill most user requirements and at the same time offer a product with simple handling properties and high comfort.
All controllers comprise a new type of voltage regulator for receivers and servos, the so called switch mode BEC with a voltage of 5,5 V. By application of this unit a way was opened for BEC systems even in models with higher cell numbers. It must also be taken into account that the number of servos became independent of the level of the supply voltage.
Adjustment of the SPIN controller family is carried out via the JETIBOX. By connection of the SPIN controllers and the JETIBOX a new system is formed which allows optimum set-up of any type of drive.

Controller Type	Sustained Current [A]	Number of Battery Cells NiXX/LiXX/Voltage	Max. Current BEC [A]	Max. Number of Servos	Dimensions [mm]	Weight (including cables) [g]
SPIN 11	11	5-12/2-4/5-17V	2,5	6	32 x 23 x 6	12
SPIN 22	22	5-12/2-4/5-17V	2,5	6	32 x 23 x 7	26
SPIN 33	33	5-14/2-5/5-21V	3	7	42 x 23 x 7	32
SPIN 44	44	5-18/2-6/5-26V	5	8	52 x 25 x 10	44
SPIN 55	55	5-24/2-8/5-34V	5	8	52 x 25 x 12	60
SPIN 66	70	5-18/2-6/5-26V	5	8	52 x 25 x 12	56

controllers for brushless motors

SPIN OPTO

These controllers comprise a receiver voltage supply with complete galvanic separation of the driving system and hence a minimum receiver interference. This, of course, induces the necessity of a separate battery supply for the receiver and servos.
SPIN controllers can be easily programmed without a computer – all you need is a JETIBOX. SPIN controllers are also able to store operational data and by this means you are in a position to check and set adjustments of your model airplane or helicopter. Measured data of controller temperatures, maximum and minimum currents, speeds, motor runtimes and many other parameters become stored and can be read out by the JETIBOX directly after flight termination. This enables you to change your adjustments and fly again – you will immediately see results. Fine tuning of your motor was never easier.

Controller Type	Sustained Current [A]	Number of Battery Cells NiXX/LiXX/Voltage	Dimensions [mm]	Weight (including cables) [g]
SPIN 44 OPTO	44	6-18/2-6/6-26	52 x 25 x 10	35
SPIN 48 OPTO	48	14-30/4-10/12-42	52 x 25 x 12	45
SPIN 66 OPTO	70	6-18/2-6/6-26V	52 x 25 x 12	45
SPIN 75 OPTO	75	14-30/4-10/12-42	52 x 25 x 15	55
SPIN 77 OPTO	77	14-36/4-12/12-50	65 x 55 x 17	110
SPIN 99 OPTO	90	14-36/4-12/12-50	65 x 55 x 17	110
SPIN 125 OPTO	125	14-36/4-12/12-50	65 x 55 x 25	120
SPIN 200 OPTO	170	24-40/6-14/18-59	63 x 120 x 27	326
SPIN 300 OPTO	220	24-40/6-14/18-59	63 x 120 x 27	360

controllers for brushless motors

Advance PRO
FOR BRUSHLESS MOTORS

These controllers contain a sum of experiences accumulated during many years of development work on our motor control equipment.
The Advance PRO controllers comply with all ambitious expectations of users and in connection with the new programming card ProgCard PRO they come up to these expectations.
Several controllers of this family are equipped with BEC voltage control systems for receivers and servos. Controllers with the labelling SB contain switch mode BEC voltage regulators with a voltage of 5,5 V. Controllers without BEC are labelled Opto and must be operated with a separate receiver and servo battery as for instance 4 x NiXX cells or with an external voltage regulator like the MAXBEC. Controllers with the marking HS are special designs optimized for high speed motors (up to 200.000 rpm/2-pole motors).

Basic data of the Advance Pro

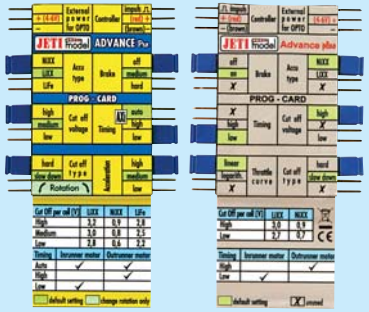
Type	Sustained Current [A]	Input Voltage [V]	BEC Voltage [V]	Max. BEC Current [A]	Dimensions [mm]	Weight [g]
Advance 08 Pro	8	5–15	5,0	2	28 x 17 x 5	2/6
Advance 12 Pro	12	5–15	5,0	2	28 x 17 x 7	4/9
Advance 18 Pro	18	5–15	5,0	2	33 x 23 x 9	11/21
Advance 18 Pro SB	18	5–15	5,5	2,5	33 x 23 x 9	11/21
Advance 30 Pro	30	5–15	5,0	2	44 x 26 x 9	15/28
Advance 30 Pro SB	30	5–15	5,5	3	44 x 26 x 9	15/28
Advance 40 Pro	40	5–15	5,0	3	53 x 26 x 10	18/35
Advance 40 Pro Opto	40	5–25,2	–	–	53 x 26 x 9	18/35
Advance 40 Pro SB HS	40	5–25,2	5,5	5	53 x 26 x 10	18/35
Advance 70 Pro	70	5–15	5,0	3	53 x 26 x 13	20/38
Advance 70 Pro SB HS	70	6–25,2	5,5	5	53 x 26 x 13	20/38
Advance 70 Pro Opto	70	5–25,2	–	–	53 x 26 x 11	20/38
Advance 77 Pro Opto	77	6–42	–	–	53 x 26 x 14	22/40
Advance 90 Pro Opto	90	12–50	–	–	65 x 55 x 17	110

PROG CARD PRO

The programming cards are set for easy and fast adjustments of the ADVANCE controller family. They fundamentally extend the setting possibilities and handling comfort of the controllers. The new programming card is compatible with the controller family ADVANCE Plus, on the other hand controllers ADVANCE Pro are compatible with the programming card ProgCard Plus.

Setting possibilities of the ADVANCE Pro controller with the aid of the programming card PROG CARD PRO:

- Brake – off/medium/fast
- Timing – automatic/high advance/low advance
- Acceleration – high/medium/low
- Type of cells: NiCd/NiMH, Li-Pol, Li-Ion/Li-Fe
- Cut-off voltage of the controller – higher/medium/lower
- Motor cut-off mode when voltage decreases below the set cut-off voltage of the controller – immediate cut-off/continual power decrease
- Direction of rotation – change of direction of rotation



ECO FOR ALL BRUSHLESS MOTORS OPTIMIZED UNIVERSAL CONTROLLER

These controllers have gained high popularity due to their reliability and easy handling. All controllers of the ECO family contain a powerful BEC receiver power supply and they are equipped with all standard safety provisions as well as with an automatic motor timing set-up. Setting of the ECO controller family has been greatly simplified and is executed by a shorting plug directly at the controller. Further characteristics are evaluated automatically. ECO controllers operate with NiCd, NiMH, Li-Pol and Li-Ion batteries.

Controller Type	Sustained Current [A]	Number of Battery Cells NiXX/LiXX/Voltage	Dimensions [mm]	Weight (including cables) [g]
ECO 08	8	- / 2-3 / 5-12,6 V	27 x 17 x 5	7 / 10
ECO 12	12	6-10 / 2-3 / 5-12,6 V	32 x 23 x 6	6 / 10
ECO 18	18	6-10 / 2-3 / 5-12,6 V	32 x 23 x 7	11 / 21
ECO 25	25	6-10 / 2-3 / 5-12,6 V	32 x 23 x 8	15 / 28
ECO 40	40	6-12 / 2-3 / 5-14,4 V	50 x 23 x 8	35 / 43

SENSOR 3000

This Controller is intended for controlling and regulating purposes of brushless (BLDC) as well as direct current (DC) motors. With aid of the JETIBOX there exists the possibility to carry out a data readout of the CAR Sensor 3000 controller, which have been non-stop collected during operation.

Basic data of the CAR Sensors 3000

Dimensions [mm]	Weight (including cables)	Sustained Current / max. 30 S	Input Voltage	Number of Battery Cells
41 x 31 x 37	80 g	60 A / 100 A	3 - 9 V	1–2 LiXX / 4–7 NiXX

BEC Voltage	Max. BEC Current	Max. Temperature	On State Resistance [Ω]	Programming
5,4 V	5 A	100° C	2 x 0,00055	JETIBOX

controllers for brushed motors

JES 600 NAVY
SPECIAL CONTROLLER FOR BRUSHLESS MOTORS WITH THE POSSIBILITY OF WATER COOLING

Advantages of this controller: Large range of applicable supply voltages, galvanic decoupling of the receiver (OPTO), long term load carrying capacity and adaptability to water cooling.

JES 300 CAR
CONTROLLER FOR FORWARD AN BACKWARD DRIVE OF BRUSHED MOTORS

By RC CAR pilots very much appreciated controller due to its easy application and handling.

JES
CONTROLLERS FOR BRUSHED MOTORS

A controller for brushed motors with automatic set-up to arbitrary transmitters and with soft start brake. All controllers contain a powerful BEC receiver current supply and they are equipped with all standard safety provisions. Setting of the controller has been greatly simplified and is executed by a shorting plug directly at the controller.

Controller Type	Sustained/ Peak Current*[A]	Number of Battery Cells NiXX/LiXX/Voltage	Max. BEC Current [A]	Max. Servo Number	Dimensions [mm]	Weight (including cables) [g]
JES 006	6/8	4-8/2/4-12 V	2	3	18x14x5	6
JES 012 plus	12/15	4-12/2-3/4-14,4 V	3	5	29x19x8	15
JES 020 plus	20/22	4-12/2-3/4-14,4 V	3	5	29x19x8	20
JES 030 plus	30/35	4-12/2-3/4-14,4 V	5	6	33x25x8	26
JES 045 plus	45/50	4-12/2-3/4-14,4 V	5	6	33x25x8	26

*) Peak Current max. 30 sec.

accessories

MAX BEC CURRENT SUPPLY OF RECEIVER AND SERVOS IN THE MODEL

The MAX BEC takes care of the receiver and servo current supply in the model. In fact it is a linear voltage regulator with adjustable output voltages. Setting up is carried out to four voltage values of 5.0 V; 5.4 V; 5.7 V or 6.0 V via a shorting plug (jumper).
The MAX BEC can obtain its current supply from Ni-XX or Li-XX cells. The regulator also comprises four LEDs which indicate the discharge condition of the connected batteries.
The MAX BEC is basically an electronic switch built up around MOSFET transistors. Its most important advantages are the high load carrying capacity, low current consumption in the cut-off condition (170 µA) and, last but not least, due to the analog voltage stabilization no interference signals transmission which might be harmful to the receiver function.

Basic Data	MAX BEC	MAX BEC 2
Recommended Input Voltage	5,5 – 8,4V	5,5 – 8,4V
Max. Input Voltage	16V	16V
Number of Inputs [batteries]	1	2
Output Voltage	5,0V / 5,4V / 5,7V / 6,0V	5,0V / 5,4V / 5,7V / 6,0V
Peak Current	12 A	20 A
Rated Current	5 A	12 A
Quiescent Current	170 µA	170 µA
Max. Power Loss	7 W	20 W
Max. Temperature	130°C	130°C
Weight	25 g	85 g
Dimensions	50 x 25 x 10 mm	100 x 29 x 16 mm

SWITCHING OF AUXILIARY FUNCTIONS IN MODEL AIRPLANES, SHIPS AND VEHICLES

SP 06

The SP 06 switch carries out switching of auxiliary functions in model airplanes, ships and vehicles, as for instance additional glow plug heating, switching different light systems a.s.o. The switching moment is indicated by flash up of a LED. The SP06 also offers the function of a reverse channel as known from many transmitters. The maximum long-term load of the switch are 6 A and it can be operated within a broad voltage range. Arbitrary voltages between 0,1 V and 15 V can be switched.

batteries – motors

POWER ION BATTERIES

Power Ion batteries have convincingly shown their promising position as safe, unproblematic and long durability current source for model applications. As a standard we deliver battery packs with 2S1P, 2S2P, 3S1P, 3S1P (triangle or flat) and 3S2P wiring.
On special order we produce cell combinations up to 10S5P. All types of POWER ION cells comprise an outside diameter of 18 mm and a length of 65 mm.

POWER ION Batteries	Rated Capacity [Ah]	Voltage of Charged Battery [V]	Sustained/ Peak Current (30 sec.) [A]	Charge Current [A]	Weight of One Cell
POWER ION 1100 – standard type	1,1	4,1	11 / 16	3	41
POWER ION 1300 – high current	1,3	4,1	19 / 25	3	44
POWER ION 1600 – high capacity	1,6	4,2	10 / 16	2	44

MOTORS PHASOR

PHASOR motors belong to the family of brushless alternating current motors, also called BLDC.
All motors comprise 6 poles and 5 mm diameter shafts.

Motor Type	Voltage Range of Battery connected to the Controller [V]	RPM per Volt [min-1]	Max. Current [A]	Number of Turns	Winding Resistance of one Phase [Ω]	Dimensions (diameter x length) [mm]	Weight [g]
PHASOR 15/3	6 - 13 V	2050	35	3	0,0125	36 x 37	136
PHASOR 15/4	7 - 14 V	1600	32	4	0,022	36 x 37	135
PHASOR 30/3	8 - 17 V	1050	35	3	0,017	36 x 52	220
PHASOR 45/3	12 - 23 V	700	38	3	0,022	36 x 67	305