

# CONTACTS



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ELECTRONIC BODY PROTECTOR (EBP)  
**TECH GUIDE**  
2007



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## CONCEPT & SYSTEM DESCRIPTION

Differentiation between permitted and prohibited striking techniques by means of the EBP:

In developing the EBP, from the outset, the question of whether a technique employed in Taekwondo is permissible or not according to the official and currently applicable set of rules, was of crucial importance for the electronic setting of the system. To ensure the necessary flexibility in this respect in the future – even allowing for possible changes to the rules – rigid or graduated adjustment was rejected in favour of aiming at infinitely adjustable triggering (from 0 to virtually infinity), which was also achieved.

Several years of testing and recording analogue curve patterns produced suitable means for precise technique analysis. Here, the aim was to make a clear classification possible of permitted and prohibited techniques on the basis of specific curve patterns.

The focus here was on the following permitted Taekwondo techniques, as they are used to the greatest extent at international level and have the highest probability of efficiency in contests:

1. Baldung-chagi (instep kick)
2. Dwit-chagi (rotary kick)
3. Jirugi (punch)

On the other hand, it was necessary to examine prohibited techniques that had to be filtered out:

1. Murup-chiki (knee strike)
2. Palkup-chiki (elbow strike)
3. Palm strike

When comparing the curves of the permitted striking techniques with those of the prohibited ones, the prohibited techniques are found to show a perceptibly higher loss of energy than the permitted ones.

Below, the techniques mentioned, for example with the average values measured, are listed in order of striking force developed and energy measured (in Joule):

1. Dwit-chagi	25 000
2. Baldung-chagi	20 000
3. Jirugi	17 000
4. Murup-chiki	13 000
5. Palkup-chiki	12 000
6. Palm strike	8 000

It is possible to derive from this the following statements which therefore form a part of the EBP system:

1. The Baldung-chagi, insofar as it is correctly executed - i.e. with the entire instep - achieves a perceptibly higher striking value than the prohibited techniques that were to be eliminated.
2. The palm strike values are too low and are therefore automatically non-scoring.
3. The Dwit-chagi achieves higher values than the Baldung-chagi, which, in the view of the world federation, is also desirable, as they would like rotation techniques and the risk involved, as well as the increased spectator appeal, to be rewarded.
4. Even with maximum force behind it, the Jirugi cannot match the values of the Baldung-chagi, which also agrees with the ideas of the world federation, as they would like Taekwondo to remain predominantly a "foot-based" Martial Art.
5. The Murup and Palkup-chiki only approach the values of the permitted techniques if performed with high "precision" and the utmost force. That means

that both the knee strike and elbow strike must be performed with a maximum swing, which will not be the case in a contest as the referee would immediately recognise these techniques and stop or penalise them accordingly. If required, it would undoubtedly be useful, in addition to the fighters' existing protective equipment, such as jockstrap, forearm and shin guards, to introduce regulation knee and elbow guards. As a result, the energy of these prohibited strikes would be further reduced and incorrect scoring ruled out, even without a referee. It would also be a useful injury prevention feature for the athletes.

Due to the classification of fighters in various categories (women, men, juniors, youths, cadets, various weight classes, etc.) and in view of the fact that Taekwondo is a full-contact discipline and therefore only "hard" hits may be taken into consideration for scoring, harmonised threshold values for the necessary striking force must be specified for each category. These threshold values must at least be reached in order to score a point in the respective category. Careful definition of category-specific threshold values excludes the occurrence of incorrect system-related scoring in contests.

The EBP is calibrated in joules and may be progressively adjusted so that any body protector may be used for all categories and weight classes.



# TECHNICAL BENEFITS

OF THE ELECTRONIC BODY PROTECTOR (EBP)



## 1) Technical Data / Tools

- The competition vests are global compatible.
- The hit message to the computer through Bluetooth frequency is worldwide licensed.
- Total security against disturbances during transfer is secured and guaranteed (encoded data transmission).
- High transmission range of >100 m through doors and concrete walls.
- Up to 16 competition areas can be operated simultaneously.
- Per accumulator charge until 10 hours competition is assured.
- Low accumulator capacity signalled by in time warning to the charging station.
- Registering frequency: up to four hits per second.
- No additional hardware is required.
- Software can be used on normal Windows PC or notebook.
- Can be operated on single base or within a network.

## 2) Handling & Maintenance

- Simple handling.
- The punching power for each weight class and age can be adjusted (cadets, juniors, women, fin-weight, heavy-weight, beginners, master-class, etc.).

- Infinitely variable tuning, Joule by Joule (0-1000).
- All punching limits will be registered in the tournament software and within the tournament is automatically allocated to the respective weight classes and courts.
- All hits are electronically measured (Joule) and registered with their respective value in an informative way indicated through screen or Vidi-Wall. However, only hits, which have reached or exceeded the threshold value of the respective weight class, are evaluated as points. Hits below the threshold value will not be rated.
- The indications of the hits are according to the rules. Priority: foot technique over hand technique, only a very powerful punch makes a point. No hit rating through elbow hits or finger stitches (except rude, irregular behaviour, which can easily identified by the referee and will be penalized) or collision of the fighters.
- Valid points to the head can be registered via joy-stick system (wireless) through 2-4 judges.
- All hits will be registered by the system, including time and power (Joule).
- Any fighter worldwide can come to a tournament with his own Hogu (when entering the fighting area, registration will be done through initialisation by tournament software).
- Every normal PC with Bluetooth can be used.

- Software package with total tournament management (participants, drawing lots, pool lists, result lists, etc.) as part of the complete system.
- Worldwide support is guaranteed.
- Update via download through the internet when rules have been changed or a new release of software is available.
- If the shell of the Electronic Body Protector needs to be replaced because of damage or wear and tear, the electronic inlay can be transferred from the present EBP to a new EBP shell (low investment).

## 3) Market

- Market presence in time through worldwide presence of the brand mark adidas. Therefore, equal opportunities for competitors on tournaments in the future, through in-time training with the new equipment.
- Simple equipment for the fighter, no additional equipment necessary.
- Unbeatable, attractive price for the complete system "E-Hogu" (vest including the complete hard- and software for tournament and training).
- Fair prices also for the individual components.
- Support centre is reachable worldwide.

## 4) WTF - Rules

- No alteration of present WTF rules is required.
- No change of the present fighting style is necessary.
- The optical attractiveness will be visibly improved (Fan enthusiasm!).
- No additional equipment, which would disturb the plain lines of the Taekwondo sport, is required.
- The visual focus remains on the competitors (reduction of the equipment to the necessary minimum).
- According to the WTF rules for big tournaments (OL, WM, WC) head points are registered through 2-4 corner judges with joy-stick. During smaller tournaments the judgement can be done directly through the centre referee by hand signs to the operator (cost reduction for regional and small tournaments).
- Options:
  - Multilevel scoring:
    - Double point awarding when reaching an extreme high punching power (i.e. hit level welterweight = 1 point for punches from 120 to 150 Joule, 2 points for punches more than 150 Joule).
  - Ranking system:
    - Results can be transferred into a ranking list (similar to tennis ATP ranking).

## 5) Sportive Fairness / Media

- More fairness in sports, point awarding is understandable for the public audience.
- Better view for the audience and the media through fewer judges at the sides and corners.
- Through less visible protection equipment, less aggressive effect of the sport (Olympic vision >> sports to play, no brutal Martial Arts).
- Ergo better identification of the fighters (better public relation, more identification of the audience with the fighters).
- Before starting of the fights or during the breaks, pictures of the fighters or advertisement of sponsors can be shown on the displays, if required.

## 6) Experience / Development

- Operation of the E-Hogu in training centres and in different national and international tournaments with great success.
- Software for training with evaluation available, to control technique and staying power.
  - Left: characteristic of punch
  - Right: scores above and below the hit level (black line)
- Additional tools for training (sandbags, etc.) in preparation.
- Immediate availability for worldwide distribution.
- Additional information to be seen under:
  - [www.atm-sport.eu](http://www.atm-sport.eu)



# MANUAL

## Information

You have purchased a high-quality product from adidas. It has been produced and tested using state-of-the-art technology. The Electronic Body Protector markedly reduces the risk of injury due to punches and kicks in unarmed Martial Arts, but cannot remove this risk completely. In order to maintain the protective function for as long as possible, please note the following instructions.

## Important safety instructions:

Please read the instructions carefully and keep these in a safe place. The Electronic Body Protector is not a toy and should not be given to children except under supervision. Please ensure that it is stored out of the reach of children. The Electronic Body Protector as well as all accessories and component parts should not be disposed of in the domestic waste. They must be taken for controlled disposal.

The electronic sensor unit [B] should only be connected and charged via the designated contact [8] using the plug-in charger [C] supplied. The device is powered with a rechargeable lithium ion battery. Incorrect use may lead to explosion. Replacement of the rechargeable battery should only be carried out by the manufacturer. The Electronic Body Protector as well as all accessories and component parts should be kept at a safe distance from naked flames or other

sources of heat etc. The inlay [A], the electronic sensor unit [B] and the plug-in charger [C] should not be opened. If these items are opened, any right to a guarantee lapses. Incorrect assembly may result in injury. Any defects should be reported to the manufacturer immediately. Any damaged or malfunctioning accessories or component parts must be replaced by the manufacturer. Only use the Electronic Body Protector in a dry environment and protect from moisture. The Electronic Body Protector should not be allowed to come into contact with water. The Electronic Body Protector can be seriously damaged by sharp or pointed objects.

**It should be noted that if the Electronic Body Protector is used for a different purpose than that for which it is designed or is used incorrectly, no liability will be accepted for any potential damage which may arise.** If the Electronic Body Protector is passed to a third party, the instructions for use must accompany it.

## Before using for the first time:

- The Electronic Body Protector is supplied with the sensor unit [B] uncharged. The sensor unit should first be charged using the accompanying plug-in charger [C]. Put the charging connector [7] into the electronic sensor

unit [8] and then connect the plug-in charger [C] with the power supply [AC voltage 110 – 240 volts]. The battery will be charged after approx. 4 hours of continuous charging time and the electronic sensor unit [B] will be ready to use.

- After disconnecting the electronic sensor unit [B] from the charger [C], it can be attached to the body protector. Join the black tube coupling [4] to the tube connector [3] by pushing it carefully onto the fitting. Make sure that the other components are properly connected with one another via the plug-in connectors. Now place the electronic sensor unit [B] in the designated pocket and close this with the hook-and-loop fastener.

- If it is necessary to open the Electronic Body Protector, for example for cleaning, and to remove the separate components (tube coupling [4], tube connector [3], connecting tube [2], valve [1], inlay [A]), then be sure to attach these in the same order and the same position when reassembling the body protector in order to ensure correct functioning. **Warning:** without the inlay [A] the body protector has an insufficient protective function.

## Operation and tips for optimal use:

- To begin using the Electronic Body Protector, first start your notebook and insert the accompanying CD. Follow the on-screen instructions (see also the Combat Tournament Manager [CTM] Documentation online handbook). As soon as the program is installed you can

begin using it.

- If the program is already installed, proceed to the next step.

- To activate the sender [B] press the recessed on/off button [6] on the top of the small box using a ballpoint pen or similar until the indicator light [5] comes on. The sender [B] is now activated and can be connected to the body protector. Now close the protective pocket with the hook-and-loop fastener again. The Electronic Body Protector is now ready for use.

- Start the competition program and activate your sender with the "Device Control" menu item. Follow the instructions in the CTM handbook provided.

- **Warning:** When you wish to stop the device again, first deactivate the sensors in the CTM program. Then press the on/off button [6] until the indicator light goes [5] out. This indicates that the sender [B] and therefore the body protector [A] are deactivated. You can now end the competition program on your PC.

The Electronic Body Protector is equipped with a modern high-power rechargeable battery which will operate for 5-8 hours when fully charged. In order to always have the full battery capacity available for a planned activity, it is advisable to recharge the sensor unit [B] a few hours before use with the accompanying plug-in charger [C] as a matter of routine. With this type of rechargeable battery there is no danger of a "memory



effect". During operation, as soon as the battery capacity has reached a specified minimum value the message "low battery" appears on the PC. When this happens, stop using the Electronic Body Protector within the next 15 minutes and recharge the battery.

**Our tips:** Always use full protective equipment when training in Martial Arts. The Electronic Body Protector can be combined with other essential protective equipment unless they are not compatible.

## adidas Electronic Body Protector

Item: 089159 (red), 089338 (blue)

Year of manufacture: 2007

Sizes: XS, S, M, L, XL, XXL

## Material:

**Body protector:** synthetic leather, polyurethane, ethylene vinyl acetate, natural rubber and others

**Inlay:** vulcanised PP/EPDM

**Sensor unit casing and connectors:** ABS (acrylonitrile-butadiene styrene)

**Tubing:** FKM (fluorinated elastomer)

# MANUAL

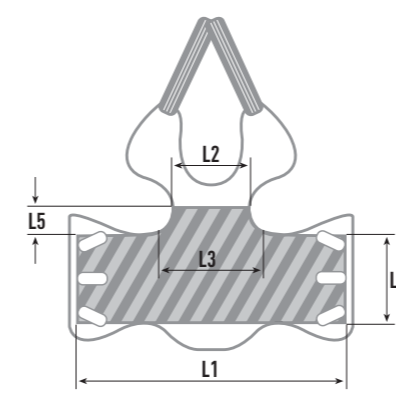
Height	Minimum size	L1 (cm) min.	L2 (cm) min.	L3 (cm) min.	L4 (cm) min.	L5 (cm) min.
<134	XS	61	14	17	15	9
134-152	S	66	15	19	16	10
152-170	M	71	16	21	17,5	11
170-188	L	76	18	23	19	13
188-206	XL	81	20	25	21	15
>206	XXL	86	22	27	23	17

## Instructions for fitting and use:

The best possible protection is achieved by using an Electronic Body Protector of the correct size for your body, as shown in the table below (sizes in cm): Wear the Electronic Body Protector with the coloured side facing out. Make sure that the Electronic Body Protector is not significantly larger than the actual reinforced protective area L1-5. The protective area is shown hatched on the diagram. The Electronic Body Protector must be fitted to individual requirements. Aim for a comfortable and secure fit without impeding blood circulation.

The Electronic Body Protector should be secured in such a way that it remains in the correct position during normal use. The body protector should be fastened as shown in the diagram. The body protector should be stored and transported in its original shape, kept dry and away from prolonged exposure to strong sunshine. Reduction in the operating lifetime can arise due to large fluctuations in temperature or mechanical action. A reduction in the cushioning value normally occurs after 3-4 years depending on wear. With excessive or disproportionately high wear, this time can be reduced.

**Warning:** damage, e.g. nicks, tears, broken seams and even soiling can lower the protective action. The Electronic Body Protector should be checked for damage e.g. tears, holes etc. before and after use. Damaged Electronic Body Protector should be replaced immediately.  
**Note:** do not carry out any structural alterations or use the Electronic Body Protector incorrectly as this might seriously reduce performance. Note that use of the body protector without the inlay does not provide adequate cushioning and protection properties. The body protector should therefore not be used without the inlay.



To charge the rechargeable battery and to replace the inlay [A], the Electronic Body Protector can be opened and closed with hook-and-loop fastener. However, ensure that neither the inlay [A] nor the electronic sensor unit [B] are opened or damaged under any circumstances, as the guarantee will then lapse. To clean, use a soft damp cloth. Stubborn stains can be treated with a soap solution. The Electronic Body Protector can be dried with a soft cloth. Cloths soaked in alcohol, paint thinner, petroleum or chemicals should never be used for cleaning as these could damage the surface of the Electronic Body Protector.

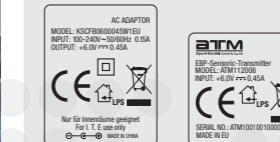


Compulsory information according to European standards.  
**EN 13277 1/3 and EN 60950.**

**Standards applied:**  
Health and safety:  
EN 60950-1 1997, EN 50371

Noise immunity:  
ETS EN 301 489-17, EN 61000-4-2, EN 61000-4-3

Radio parameters, emitted interference:  
EN 30328  
EN 55022:1998 + A1:2000 + A2:2003



**Manufacturer:**  
adidas AG, World of Sports, 91074 Herzogenaurach, Germany

**Test site:**  
TÜV South (German technical inspection association) Product Service GmbH, Ridlerstr. 65, 80339 Munich, Germany, Notified body 0123

According to the guidelines for personal protection equipment 89/686/EWG

## FAQs

### 1. Reliability of data transfer between EBP and Laptop?

The transfer is multiply secured. First, each transmitter has its worldwide unique mac-address. Second, all data is coded and transmitted by channel hopping.

### 2. Lifespan of the EBP?

The electronic components of the EBP have an estimated lifespan of 15 years. The shell and the PU core are subject to the natural wear of a conventional vest and can be exchanged with new shell or core. This has no adverse effect whatsoever on the function.

### 3. What is included in the EBP unit?

1 x EBP shell, 1 x inlay, 1 x transmitter, 1x battery charger, 1 x carrier bag, 1 x software competition match and tournament administration, 1 x update licence, 1 x spare parts kit

### 4. Is the EBP approved and certified by the WTF?

The EBP was approved by the WTF-Reform commission 5:3. The certification and licensing are presently in process.

### 5. What other approvals exist?

- European Taekwondo Union (ETU)  
- Oceania Taekwondo Union (OTU)  
- Additional continental Unions approval in process

### 6. Have Tournaments been already held with the EBP?

Up till present roughly 30 larger and smaller tournaments have been successfully carried out with the EBP. Especially significant were the Price Albert Cup/Monaco on 6 May 2006 and the Olympic Youth Festival in Sydney 17-21 January 2007.

### 7. Where else is the EBP being used?

Immediately following the introduction of the prototype a number of federations and national teams were supplied with the EBP. They are presently being used by Australia, Austria, Canada, China, Egypt, France, Germany, Greece, Indonesia, Ireland, Italy, Japan, Korea, Malaysia, Mexico, Oceanic, Philippines, Singapore, Sweden, Taiwan, Thailand, Turkey and USA.

### 8. Does the EBP score "illegal techniques"?

Due to the physical characteristics the scoring of illegal techniques is principally possible. It is, however, eliminated to a great extent as part of the EBP-software. Critical is the transition to the shin area. As the lower shin area in daily competition over the past 20 years is regarded as a valid point, an exact graduation in regard to the point where the shin is to not be considered a valid point is extremely difficult to define. In practice it is senseless to be able to score with the upper shin as this would result in forfeiting the appropriate distance to the opponent and this technique leads to the reduced leverage of the hit and, thus, less impact. Additionally, the individual referee can decide if such techniques are to be regarded as a low blow with the corresponding warning or point withdrawal and negation of the hit. This greatly reduces the temptation to even learn such illegal practices.

### 9. How long does a single battery charge hold?

Depending on the number of hits a battery charge holds for 5-8 hours online. This depends also on the battery temperature. At warmer temperatures this period is longer, at colder temperatures shorter.

### 10. Does the transmitter give a warning tone when the battery runs down?

As soon as the battery charge reaches a critical point a warning is automatically sent to the computer (receiver). From this point on the battery charge is sufficient for an additional two matches. It should, however, be exchanged immediately.

### 11. Can the transmitter be damaged while in use?

The transmitter is positioned in such a manner that it is not subject to any impairment due to hits. Should a competitor, however, fall against a hard object exactly on this point it is possible that the housing could be damaged. It should be exchanged immediately. The new generation of transmitters will be fitted with a housing that can withstand the force of a car driving over it.

### 12. Will TKD turn into a boxing sport due to the EBP?

No, unless two competitors stand intentionally in front of each other chest to chest and utilize the Kyokpa. Fist punches can certainly be scored, but they require an exceptional degree of force. It is inevitable that scoring of a fist be favored in a counter situation where two bodies come together (physical law). In an infight it is extremely difficult to place a valid punch, especially in view of the fact that the opponent actively takes energy away from the delivered punch and, additionally, can basically prevent the punch from even being effected.

## PRODUCT INFOS



089338



089159

### Electronic Body Protector

Because accuracy and power in scoring is critical to decide without technical support, these chest protectors have been fitted with electronic sensors that tally the number of landed hits and measure the power used. Beyond offering protection, this intelligent product efficiently enhances the technique, power and speed during exercise.

### Electronic Body Protector

- Wireless
- Capable of registering up to four hits per second
- Including training software that evaluates your technique and endurance
- Adjustable in size and thickness to match your size and weight
- Compact design – easy to store and transport
- No trained professionals are needed for operation
- Worldwide support center offers assistance if needed

089159 red

089338 blue

Material: Special Vinyl, Sponge, EVA

Size run: XS-XXL

CE