

Cover Story

The ESS31-T is absolutely unique

E-T-A System Technology for Utility Vehicles Customised Power Distribution

Six in one

New accessory for circuit breaker switch combination
Type 3130



Floodwaters and Photovoltaics

E-T-A Director
Dr. Clifford Sell on
Disconnection of
PV Systems in the
Event of Floodwaters





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E-T-A System Technology for
Utility Vehicles
Customised Power Distribution



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is absolutely unique



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FAQ – Frequently Asked Questions
All you ever wanted to know about
E-T-A products



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Typically Japanese:
»Lamb Yakitori«

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Electronic DC24 V Circuit Breaker
Type ESS31-T

Impressum

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Our memory of the latest catastrophic flood is still very near and still very much alive. Assets worth millions were destroyed within a few hours, leaving thousands of people fighting for their existence. And there is another risk in such a situation that is often underestimated.



A firefighter switch will trip automatically as soon as the utility company disconnects the building connection line. In addition, it is possible to manually disconnect it on-site with an emergency stop – making it safe to enter even a flooded house.

Even if the utility companies cut power supplies in time, photovoltaic systems on roofs are still running. They continue to produce energy under light irradiation with dangerous voltages of up to 1000 V DC. Installing a disconnect switch, that is commonly known as a firefighter switch, will eliminate this safety hazard by ensuring early disconnection.

An investment in this additional safety mechanism will make photovoltaic systems hazard-free and controllable even in dangerous situations.

E-T-A is your competent partner for all aspects of safety and protection. Do you have any questions? Talk to us! We look forward to speaking with you!

Floodwaters and Photovoltaics

When a flood occurs the inverters, which are usually installed in the basement, and DC lines will be partly or totally submerged. In a situation like this, residents or rescue teams are no longer allowed to enter the building and equipment can only be disconnected with a remotely controllable DC Disconnect.



Dr. Clifford Sell

Executive Committee
E-T-A Elektrotechnische Apparate GmbH



At a glance – the benefits of automotive circuit breakers

- Automotive circuit breakers in ATO* or MINI* design (*Littelfuse Ltd.), direct replacement of standard blade fuses
- Electronic relays with special functions such as
 - overload disconnection,
 - automatic reset,
 - timer functions,
 - signalling
- Power distribution systems on pcb including circuit breakers, relays and terminals as a replacement of manually wired line distributors

E-T-A System Technology for Utility Vehicles

Power distribution tailor-made to customers' needs

Modern technology and information processing are now used in agricultural machinery and construction vehicles. Modern tractors, fertilizers, seeders and harvesters already have satellite-controlled navigation systems and are highly automated.

Both construction vehicles and agricultural machinery have always been designed as robust, mobile working tools but, similar to passenger cars, there is a strong demand to design more for user convenience – including air conditioning, all kinds of control gear and additional electronic features. Designs are straying away from hydraulic drives and are moving towards electrification of many individual motors that are controlled by BUS systems. Due to this shift, control panels with touch displays are now the standard in almost every modern driver's cabin.

Despite the move to electrification and modernisation of construction vehicles and agricultural machinery one factor still remains: the vehicles must be robust and constantly available with limited downtime - because a machine standing still does not “earn” money.

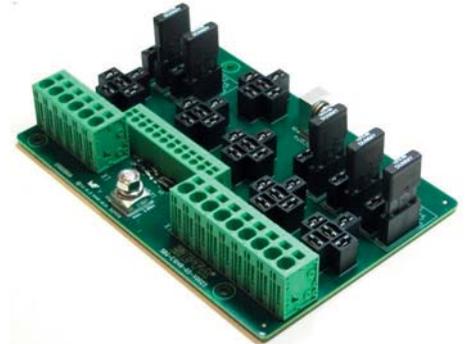
Owners and users cannot afford standstills due to an on-board electrical system failure. A blown fuse becomes a nightmare when a replacement is not available. A defective relay may shut down the machine for hours. With E-T-A's sophisticated power distribution and protection concepts, cables and loads are protected in the event of a short circuit or overload.

Reduced complexity in vehicle body work

When using E-T-A's “plug-and-play” power distribution and protection solutions, customers no longer need to focus on the procurement of individual parts because



Power distribution system including wiring and water-proof enclosure



Power distribution system on a pcb with screwless terminals, sockets for relays and circuit breakers

each system is designed to hold all the relevant components. This helps reduce the number of suppliers, and facilitates easier ordering, inventory management and logistics.

Switching and protecting

Using electronic relays in the main distribution panel of the vehicle combines dual functionality into one component. Thus a single device can provide line protection between battery and loads and act as an ON/OFF switch.

Saving space

The new multi-way terminals in the sub-distribution can protect up to four loads. Intermediate distribution terminals are eliminated which helps significantly reduce the number of cables in E-T-A power distribution systems. This cuts the overall weight of the design, saves space, and reduces the chance of cable damage or wire breakage.

Cable harness

Cable harnesses supplied as part of an overall solution allows efficient installation, i.e. wiring is already in place in the control



Power distribution system on a pcb with screw terminals and electronic relays

cabinet and only has to be connected on the load side. In addition the cable length is adjusted and assigned to the factory pre-set of the vehicle type.

In close cooperation with its customers all over the world E-T-A is looking for the best solutions for your electrical protection and control requirements.

At a glance – the features of the ESS31-T

- Globally unique electronic DC 24 V circuit breaker
- Switching contact in the load circuit causes complete load disconnection
- A single trip curve for all types of loads – makes e-construction and logistics easier
- Perfect disconnection of short circuit and overload – and the DC 24 V control voltage remains stable
- Integral current limitation protects the contacts in switchgear and connectors
- Reliable disconnection even with high cable attenuation
- Direct rail mounting with integral power distribution system





Electronic DC 24 V Circuit Breaker

The **ESS31-T** is absolutely **unique**

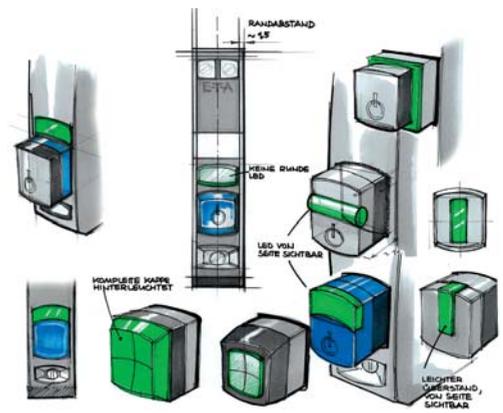
Overcurrent protection against overloads and short circuits must be provided whenever the current in a control circuit can either exceed the ampacity of a conductor or the rated value of a component. The ESS31-T is the first device ever to provide the ideal combination of a mechanical circuit breaker with electronic overcurrent protection in a track-mountable enclosure.

Versatile overcurrent protection - featuring current limitation

In addition to standard automation components (i.e. controls, bus and I/O modules) the DC 24 V control voltage also powers safety equipment such as safety PLCs, safety switchgear, emergency circuitries or small DC drives. The ESS31-T features a single trip curve for all types of loads that ensures standard-compliant protection. In applications with long load lines or small cable cross sections, the **ESS31-T** disconnects the overcurrent in 1.25 times rated current within 500 ms with final physical isolation after 5 seconds. In the event of a low-resistance short circuit in a load path, disconnection will occur after 100 ms. The additional integral current limitation of the **ESS31-T** to 1.25 times rated current ensures that the DC 24 V switch-mode power supply remains stable. This is also true when a failure occurs and can easily be calculated in advance:

Max. current = 1.25 x rated current

In the event of a failure, the ESS31-T will only selectively disconnect the faulty path while the other circuits remain unaffected. This ensures a controlled stoppage of the machinery and allows efficient trouble-shooting. High short currents or capacitive inrush currents of electronic



Combines mechanical circuit breaker with electronic overcurrent protection: The new ESS31-T

modules are limited by the integral current limitation and prevents wear of the mechanical contacts or switchgear. This eliminates the need to regularly replace mechanical components and reduces machine downtime all while saving on maintenance and service costs.

International approvals will please any Design Engineer.

The ESS31-T is a fully featured circuit breaker for equipment protection with an electronic-hybrid trip characteristic which is approved as a UL1077 supplementary protector and also to EN /IEC 60934 for fixed current ratings from 0.5A to 10 A. This makes the **ESS31-T** the first internationally approved rail mounted mechatronic circuit breaker. It ensures globally certified protection of equipment in control cabinets and field components without having to change the electrical

design in any way. This is also true for the protection of DC24V control circuits in control cabinets designed in accordance with UL 508A ("Industrial Control Panel").



More information?
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QR code!

»Get Smart With Your Systems«

More than just a slogan

Smart power distribution, control and monitoring with E-T-A **PowerPlex**®



Albert Keizer,
Director of
No Limit Ships

*In previous editions of Current we mentioned the use of E-T-A's **PowerPlex**® on the No Limit Ships workboats for smart control and protection of loads. The Dutch shipyard manufactures sounding vessels*

*for global use in close cooperation with their customers. Current talked to Albert Keizer, Managing Director of No Limit Ships, about the benefits of **PowerPlex**®*



Photo: No Limit Ships

PowerPlex® works absolutely reliably and precisely even under most extreme conditions.

Current: Mr Keizer, what do you consider the advantages of a **PowerPlex**® installation as opposed to conventional wiring?

Albert Keizer: **PowerPlex**® simplifies electrical installation while significantly increasing the functionality. Scenarios, test functions and control tasks can easily be implemented together with the configuration software. The total quantity of cables and connections are tremendously reduced when using **PowerPlex**®. This provides easy installation and helps reduce possible failures.

Current: Does **PowerPlex**® meet your expectations as an intelligent bus system for on-board electrical systems?

Albert Keizer: Many of our ships are used in areas where there is no service available. Therefore we expect full system functionality, independent of the environmental conditions. Experience has shown that **PowerPlex**® works impeccably both in the Arctic and in tropical regions. It is user-friendly and

our customers highly appreciate its convenient functions.

Current: What system revisions were required and what problems did you face when installing **PowerPlex**®?

Albert Keizer: First thing we had to do was revise our thinking. After doing that, installation was very simple. Every new installation on board and every start up of new technology can cause initial difficulties. Those were significantly reduced and were solved much faster and easier since we were using **PowerPlex**® instead of conventional wiring.

Current: The Gladius has been used for quite some time now in Arctic surroundings. What was your experience with this watercraft?

Albert Keizer: When signing the contract, we had to offer an additional warranty insuring the customer with regard to downtimes caused by system problems. When the new owner started to use the boat, we explained the **PowerPlex**® system and its functionalities to the

crew. We also showed them all available possibilities for updating and adjusting the system. Up to now, the Gladius has experienced no downtimes whatsoever and the owner praises her as an extremely reliable watercraft.

Current: Thank you for your time. We wish you ongoing success for the future.



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Reinhold Gümpelein



Reinhold Gümpelein became the new Key Account Manager in the TRA Division responsible for the Daimler group on June 1, 2013. Reinhold has worked for E-T-A for quite

a while and brings with him strong product knowledge as well as internal connections to many departments within the E-T-A organization - both of which are necessary for a successful cooperation with the Daimler group.

Within the framework of the strategic key account management process it is his task to ensure the best possible service for the customer in cooperation with our sales organisation and the global key account team. Our goal is to extend E-T-A's successful design and supplier partnerships with the various Daimler company segments (Truck, Car, Van, Buses) across the globe.

Gorka Brocal



On 2 January 2012, Basque-born, Gorka Brocal joined the sales team of our subsidiary in Spain. Gorka is working in his home office in Madrid and services prospective

customers in machine construction and process control in Central Spain. He is focusing on selling electronic circuit protectors and power distribution systems to machinery manufacturers and continuing to build a reputation in the DC24V power distribution systems sector.

Dieter Lettner



In January 2013 Dieter Lettner started working for the Industry, Energy & Equipment (IEE) Division as a Key Account Manager for one of E-T-A's primary partners,

Phoenix Contact. He has a wealth of experience in international sales of circuit breakers and automation components, which will help him to successfully serve Phoenix and continue to extend E-T-A's long-standing international cooperation with them.

Dieter will focus on developing and managing relationships with Phoenix's purchasing departments, logistics, sales and business units which in the end will offer a strong advantage to end customers. In addition to working on developing new markets, innovative technologies and over-current protection and power distribution products Dieter will also coordinate E-T-A's international KAM team.

Patrick Aben



On 1st July 2012 Patrick Aben joined the E-T-A Benelux sales team and is responsible for sales activities in the Netherlands.

Patrick started his career at a Wholesaler for engine builders and then worked for Panasonic Electric Works BV for the South Holland (Limburg, Brabant and Gelderland) region. There is huge market for automation and process control, machine construction and distribution in the Netherlands. It is Patrick's goal to increase E-T-A's brand in the Netherlands and to acquire new customers which will generate profitable growth.



Our FAQ pages are meant to intensify the dialogue between manufacturer and customers. We discuss topical subjects from practice as briefly and yet as detailed as possible

to support you in your daily work.

Do you have any questions you need answer to? Send it to us - we are looking forward to hearing from you.

E-T-A Elektrotechnische Apparate GmbH

Keyword: [Current FAQ](#)

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What is meant by applied voltage?

The applied voltage is the voltage available at the terminals of a circuit breaker for equipment protection immediately before connection and after disconnection of the current. In the event of d.c. current it is the rms value.

What is the exact definition of the term circuit breaker?

A circuit breaker is a mechanical switching device, which is able to connect, carry and disconnect currents under operating conditions. Even under unusual conditions, such as short circuit, a circuit breaker for equipment protection (CBE) can connect currents, carry them for a pre-determined period and disconnect automatically. (definition to EN 60934)

What is a circuit breaker for equipment protection (CBE)?

A circuit breaker for equipment protection is a circuit breaker specifically designed to protect motors, transformers etc.

What is the working principle of thermal circuit breakers? (abbreviation: TO for thermal only)

Thermal circuit breakers are based on the temperature rise within the live, current-carrying heating elements (i.e. a thermo-bimetal). They are one of the simplest, most reliable and most cost-effective protection devices available. The thermo-bimetal can either be a bimetal strip with a latching mechanism and a separate spring-based contact mechanism or a snap-acting bimetal disc

on which a contact is sitting. Normally, circuit breakers for equipment protection with a disk-type bimetal are less expensive and are also a bit faster than a circuit breaker with a bimetal strip, but they also have drawbacks.

Another thermal principle, the hot wire, uses a particularly high coefficient of expansion of some specific types of metal to open the contact pieces. Current flows through a wire hung between two springs made of this material. When a certain temperature is reached, the wire will expand and the element will snap. Thermal circuit breakers for equipment protection are ideally suited to protect a wide range of components and systems - from motors to transformers and on-board electrical systems in aircraft, on and off road vehicles and watercraft.

These applications all require a distinction between an inrush current peak and detrimental long-term overcurrents. Thermal circuit breakers can decipher between current peaks created by lamp loads or motor starts and actual failures, such as a blocked motor, where the circuit is disconnected to prevent further equipment damage.

»Closing ranks« with frequency converters



Dipl. Ing. Dieter Arenz,
application specialist
in the Division
Communications &
Systems at E-T-A

Extension of the standard range "Power distribution systems with selective protection" for applications involving compact frequency converters for machinery and equipment with a great number of drive units.



Weaving machine in textile industry with a great number of individual drives

Large quantities of frequency converters are used in applications in the textile industry (weaving and spinning machines), the printing industry, the tobacco industry and others for controlling and activating AC power drives. This is always the case when production plants have a large number of drive units. Because of the high power loss and the related temperature increase in the converters, they are often mounted onto water-cooled mounting plates in control cabinets. This is done with an incremental mounting field where the converters, made-up of compact discs, are placed side-by-side.

Additional circuits for sensors, controllers and data exchange - particularly in the DC24V range - must be built up separately by using individual standard MCBs, power supplies, terminal blocks etc. in the control cabinets. This requires additional space somewhere on the sidewalls or doors, does not have a clear layout, and involves enormous wiring efforts and causes a potential risk of failure.

E-T-A's new SBG-V0057 compact power distribution system is the solution

to overcome these problems. It is an eight-way power distribution system, protected with the REF16-S selective electronic plug-in type current protectors, with a 3-phase switch-mode power supply DC24V/20A. All components are mounted on an installation carrier, which is compatible with frequency converters. This

standard component can be installed very easily between the converters. This creates a more clearly laid-out structure, shortens wiring distances, minimises failure risk, simplifies logistics and offers professional power distribution and protection including monitoring functions.



DC24V power distribution module mounted between frequency converters

E-T-A solutions for many products

E-T-A offers tailor-made solutions for a wide range of industries and products. Here are some interesting examples.

Application: Caravans
E-T-A type used: 2-5700

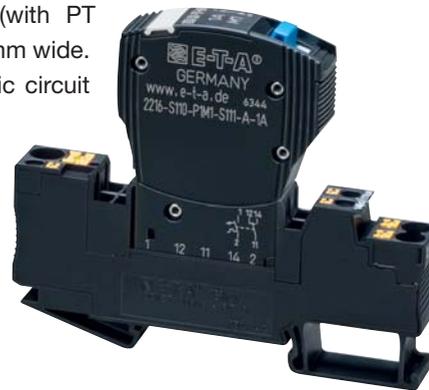
The Hobby Caravan Builders, located in Fockbek, Germany, is the world's largest manufacturer of caravans and a leading manufacturer of mobile homes in Europe. Since the company was founded by Harald Striewski in 1967 it has produced more than 500,000 caravans and more than 20,000 mobile homes. All Hobby vehicles feature a unique design, ultramodern equipment and unsurpassed driving comfort and safety. For instance, all Autark Caravans, which have their own auxiliary battery, are fitted with 2-5700 thermal circuit breakers with push-push operation. The thermal circuit breaker reliably protects the battery against the effects of overcurrents and serves as a main switch for the battery. If the caravan is unused for a long period of time, a short "click" completely disconnects the battery from the on-board electrical system, and eliminates inadvertent discharge.



Application: Rail vehicles
E-T-A type used: 2216-S and 80plus socket

There is very limited space available in rail vehicles to accommodate electrical equipment. Because of this, the smaller the electrical components are the better. Vossloh-Kiepe, a rolling stock and rail vehicle specialist, is using the E-T-A's 2216-S plug-in type circuit breakers with the 80plus socket to protect its DC 24 V control circuits. The single-way 80plus sockets, which can easily be mounted side by side (with PT terminals), are only 12.5 mm wide. Just like thermal-magnetic circuit

breakers, the 2216-S can be snapped onto symmetrical rails and only requires an installation depth of 70 mm and a height of 90 mm. In addition, Vossloh Kiepe uses E-T-A's pluggable busbar technology to ensure simple, reliable and quick realisation of collective power supplies and signalling loops.



Applications

Application: Electric Daily for
Deutsche Post / DHL
E-T-A type used: 2210-T

The Italian IVECO group has a design centre for alternative drive developments, which was founded 1991 and now is one of the world's major design centres for electrical and hybrid drives. The company was looking for an innovative solution to protect their power distribution in the charging unit for its latest version of the electrically powered IVECO Daily.

The first 28 vehicles designed for the Deutsche Post AG/DHL are now equipped with E-T-A's 2210-T circuit breakers (rated 3 A, 10 A and 20 A). The IVECO design engineers appreciate that these thermal-magnetic devices provide a quicker, more reliable and much more precise trip characteristic compared to their previous solution all while requiring 30% less space.



Application: Special Vehicles
E-T-A type used: E-1048-8D

The Binz GmbH & Co. KG, located in Lorch, Germany, is a long-standing customer of E-T-A and uses the E-1048-8D Smart Power Relay. Binz builds special vehicles such as limousines, hearses and municipal cars. Binz also modifies sports cars, including interior decoration and loudspeakers as well as outer decoration, chassis frame and performance.

There are loading platforms in hearses that lift the coffin and place it into the car. Four spindle drives run the loading platform and are activated and protected by E-T-A's E-1048-8D Smart Power Relay. The motors not only have to be switched on and off, but they must also be controlled in a synchronized motion. Because of this, the E-1048-8D is controlled with a PWM signal (pulse-width-modulation). In the event of blocking (i.e. if the load platform tilts) the E-1048-8D will automatically disconnect the motor. After the failure is identified and resolved, the loading or unloading process can continue without replacing any components.



Six in one: New accessory for circuit breaker switch combination type 3130

The 3130 circuit breaker is one of the best-selling devices in E-T-A's product range. The thermal circuit breaker, available in a one-, two- or three-pole version, is attractively styled, requires little space and has international approvals.

Typical applications include leisure boats, medical equipment and office machines. A major Japanese manufacturer of paper shredders has used the 3130 for many years and is highly satisfied with its performance. The company uses E-T-A's 3130 circuit breaker in its paper shredders to reliably protect against overcurrent and serve as the main ON/OFF switch. This helps reduce mounting and wiring time, material planning and inventory costs. This dual-functionality also provides the paper shredder with enhanced overall reliability, because less individual components also means less possible failures.

**New accessory:
Appliance Inlet Module X3130**

The new X3130 appliance inlet module combines three functions into a single component: A C14 appliance inlet, a rocker switch and resettable overcurrent protection. This creates additional space in applications and enables the design of extremely compact products.



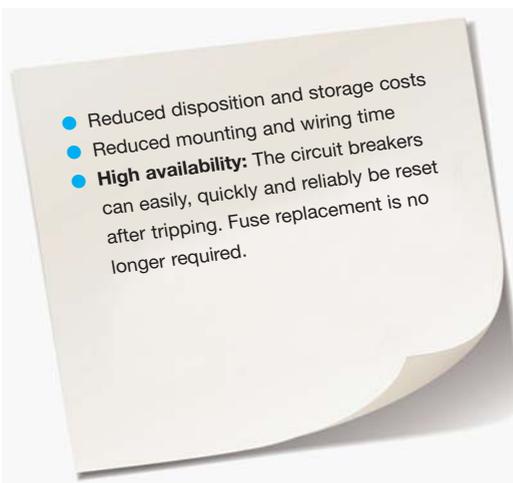
Double function: The circuit breaker/switch combination protects against overcurrent and serves as ON/OFF switch.

The 3130-FA.A two-pole circuit breaker/switch combination functions as an ON/OFF switch and provides integral overcurrent protection. The rocker actuator can be supplied with illumination and is available in a range of colours. The X3130 has screw-type mounting and is available up to 10 A (IEC) and 15 A (UL/CSA). The new appliance inlet module is

most commonly used in electro-medical apparatus and laboratory equipment as well as professional audio equipment and office machines.



More information?
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QR code!



In appliances that require double pole protection (e.g. medical equipment), the new appliance inlet module X3130 replaces two fuse holders, two blade fuse inserts, one rocker switch and one appliance inlet, i.e. a total of six individual components. This helps design engineers to reduce the number of single parts used.

Typically Japanese: »Yakitori Lamb«

Originally »Yakitori« - the literal translation means »grilled chicken« - consists of chicken parts and vegetables. Today often fish or only vegetarian food is put on the skewers. Yakitori are normally served with a spicy sauce based on Mirin (sweet Japanese rice wine), soy sauce and sugar. The skewers with the meat are brushed with sauce and grilled and served with the dip.



Tenderly grilled and a wealth of variations: Yakitori are offered everywhere in Japan

Preparation of the various skewers

Marinated lamb skewers

Mix chopped garlic, basil leaves, juice of a lime, paprika, a little olive oil, salt and pepper. Add lamb cubes and marinate for a few minutes, until the other skewers are prepared.

Skewers with lamb meat balls

Mix the minced lamb meat, turmeric, chopped coriander, salt and pepper. Form 18 small balls and thread them onto 8 skewers.

Lamb skewers with cheese

Thread the Emmental cheese sticks onto 8 skewers, wrap with the thin lamb slices, salt and pepper. Drain lamb cubes, thread onto 8 skewers.

Fry all 24 skewers for 3 - 4 minutes on the grill or in the pan on all sides. Put 6 skewers for each person (2 of each sort) on a pre-heated plate and baste with Yakitori sauce.

Serve with rice. If you wish to have a complete Japanese menu, you may serve a Miso soup as a starter and offer Japanese coleslaw.

Preparation: 15 minutes

Cooking time: 4 minutes

Total: 19 minutes

Enjoy!

Ingredients (4 servings)

8 marinated lamb skewers

- 16 cubes of the lamb weighing 30g each
- ½ bunch of Thai basil leaves
- 2 garlic cloves
- 1 lime
- mild paprika
- 5 cl olive oil

8 skewers with lamb meat balls

- 300 g minced lamb
- ½ bunch of coriander
- turmeric

8 lamb skewers with cheese

- 200 g very finely chopped lamb slices from the gigot (carpaccio)
- 8 Emmental cheese sticks 8 cm long, 1.5 cm thick

For all skewers

- 10 cl Yakitori sauce (sweet soy sauce)
- salt and pepper
- 24 small wooden skewers

