

Product assortment

Battery Backups



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MILLETEKNIK was founded in 1993; we have long experience dedicated to alternate power using batteries. We are a Swedish manufacturer and supplier, market leaders for Battery Backups for industry, and the security & and safety industry in Sweden.

We have taken a new step in our development by initiating work with "LEAN Production", which involves a complex process to enable the introduction of an integrated management system for quality, environment and work environment.

Our main areas are Battery Backups (12, 24, 48 Vdc) and UPSs (230, 400 Vac). We have a broad product range from small units with low power, to Battery Backups of 24V / 30A as well as UPSs; 1 PHASE, 3 PHASE 3.6kW, and larger units for frequency converters (rotational speed control of motors) up to 15kW.

Our environmental thinking is demonstrated by our energy efficient products, which we develop based on our own high-tech research. All of our products are energy efficient and have a low current consumption in stand-by mode, as well as a long battery life (10-12 years as standard). Our strong focus on research and development make it possible for us to work at the technological cutting edge of our field, so we can therefore meet the market's demands and needs for customised solutions.

The products are constructed as a modular system, suitable for easy use, freedom of choice and upgrading.





Overview of our Battery Backup "Families"

Our complete battery backups (including as standard; power supply unit, space for batteries, battery fuses, deep discharge protection as well as monitoring) are available as two "families".

THE ECO FAMILY

The ECO family is an excellent battery backup with fundamental functions, without expansion options.

Power supply with inbuilt alternate power

The ECO Battery Backup product family is a power supply unit with inbuilt alternate power. For all of the 8700 hours in the year, the load is powered by the mains supply. In the event of a mains failure, the unit continues to run on the alternate power from the inbuilt batteries.

Reliability

The reliability of the battery backup is assured by means of inbuilt protection. A reliable unit with monitoring of overload, over-current, over-voltage, over-temperature, 2-pole fused load output, extra EMC filter against mains interference and short-circuiting. Moreover, the batteries are protected against harmful deep discharge.

Modern technology

The primary switch technology in our mains supply provides high efficiency, low energy consumption and heat dissipation, resulting in a long service life.

THE BAS FAMILY

The BAS family is easy to expand, using our jack plug and modular system to give increased reliability (self diagnosis - indicates when it is time to change the batteries), and integrated customisations (fuse modules, monitored alarm loops and earth fault indication etc.) in the existing enclosure.

Power supply with inbuilt alternate power

The BAS Battery Backup product family is a power supply unit with inbuilt alternate power. For all of the 8700 hours in the year, the load is powered by the mains supply. In the event of a mains failure, the unit continues to run on the alternate power from the inbuilt batteries.

The battery backup is flexible with many options and can be supplemented with modules for intelligent monitoring of the functions.

Reliability

The reliability of the battery backup is assured by means of inbuilt protection. A reliable unit with monitoring of overload, over-current, over-voltage, over-temperature, 2-pole fused load output, extra EMC filter for mains interference as well as protection against short-circuiting. Moreover, the batteries are protected against harmful deep discharge.

Protection and monitoring of the battery's backup function; control of the power supply unit and any installation errors are checked by the XST, self diagnosis module SDS, which also checks the alternate power section and the batteries' life, thus guaranteeing the reliability of the complete battery backup and generating an alarm if the batteries need changing.

Protection and monitoring of the system checks that the battery backup is running; earth fault indication JFI, loop monitoring Slingshot[A2], load current monitoring, digital display+, fuse card and 10-OUT for voltage converter DC / DC.

Modern technology

The primary switch technology in our mains supply provides high efficiency, low energy consumption and low heat formation, resulting in a long service life.

The ECO family

Our battery backups contain power supply unit, space for batteries, battery fuses, deep discharge protection as well as monitoring.

The ECO family is an excellent battery backup with fundamental functions, without expansion options.

In a simple way, we can upgrade the power supply with a larger power supply unit and extend the alternate operating time with a battery box.

ECO XU

ECO XXS

ECO XS

ECO XM



- Primary Switch Technology
- Protection against overloading, over-voltage, over-temperature, short circuiting and deep discharge.
- 1.2 and 3.2Ah Batteries
- Faulty function alarm and relay switching (faulty power supply unit or power failure) as standard.
- 12V up to 1.5A
24V up to 1A

ECO XU

Construction & Design

The ECO XU is a compact and well-ventilated electrical cabinet in white painted steel. The construction is well designed, with a lockable door as well as light emitting diode indicators on the cabinet front. The construction is suitable for 1.2 and 3.2 Ah batteries that can be delivered ready installed in the cabinet.

Areas of application

- Suitable for installation indoors, for example, in smaller premises as well as for small systems and individual door environments.
- It can be used to supply power, instead of a transformer with an inbuilt battery backup.

The ECO XU is often used for smaller entry control systems or individual door environments.



Individual systems, such as those used in kindergarten and schools need smaller battery backups, such as the ECO XU.





- Primary Switch Technology
- Protection against overloading, over-voltage, over-temperature, short circuiting and deep discharge.
- Space for 2.2 - 7Ah Batteries.
- Faulty function alarm and relay switching (faulty power supply unit or power failure) as standard.
- 12V up to 4A
24V up to 5A

ECO XXS

Construction & Design

The ECO XXS is a compact and well-ventilated electrical cabinet in white painted steel. The construction is well designed, with a lockable door, panel with status information, as well as light emitting diode indicators on the cabinet front. The construction is suitable for 2.2 and 7 Ah batteries that can be delivered ready installed in the cabinet. There is the option for increased functionality with an alarm for low battery voltage. It is delivered with an anti-sabotage plug.

Areas of application

Suitable for installation indoors, for example, in smaller premises as well as for small to medium-sized systems. For examples of the areas of application, see the pictures.

Flexibility

Factory installed batteries.

Quick and easy installation. The unit can be delivered with or without batteries installed.

Small systems such as smoke hatches only require small battery backup, such as ECO XXS.



The ECO XXS is often used for smaller entry control systems or individual door environments.





19" angle brackets or external wall fastener, with the special feature that the electrical cabinet extends slightly from the wall. Electrical cables can therefore be run on the wall behind the cabinet.



- **Primary Switch Technology**
- **Protection against overloading, over-voltage, over-temperature, short circuiting and deep discharge.**
- **Space for 2 batteries (7-14Ah)**
- **There is the option for an extra battery box XS[A4] for longer alternate operating time with 2-4 batteries.**
- **Faulty function alarm and relay switching (faulty power supply unit or power failure) as standard.**
- **12V up to 10A**
24V up to 10A

ECO XS

Construction & Design

The ECO XU is a compact and well-ventilated electrical cabinet in white painted steel. The construction is well designed, with a lockable door, panel with status information, as well as light emitting diode indicators on the cabinet front. It is easily installed on a wall with the enclosed cardboard drilling template or with 19" angle brackets. The construction is suitable for two 7Ah and 14Ah batteries. There is the option for increased functionality with an alarm for low battery voltage. It is delivered with an anti-sabotage plug.

Areas of application

Suitable for installation indoors, for example, in smaller premises as well as for small to medium-sized systems. For examples of the areas of application, see the pictures.

Flexibility

Option

An extra optional PCB for low battery voltage. The option can be easily plugged in afterwards, or ordered as installed direct from the factory. Quick and easy installation. The unit can be delivered with or without batteries installed.

Power supply

Flexibility, thanks to the fact that the power supply unit can be easily upgraded with an electronic cassette with a larger DIN rail mounted power supply unit for increased loads.

Extra battery box

There is the option for an extra battery box XS, with space for 2-4 batteries.

The ECO XS is a simple battery backup for use in the same environments as the BAS XX. The difference between these two is that the ECO XS does not have the option to expand the protection and monitoring of the battery's backup function or of the system that the battery backup is running.



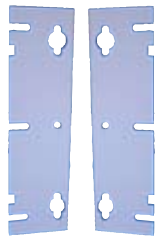
The ECO XS is often used for smaller or medium-sized entry control systems.



The ECO XS is installed on a 19" stand with the enclosed 19" angle brackets.



19" angle brackets or external wall fastener, with the special feature that the electrical cabinet extends slightly from the wall. Electrical cables can therefore be run on the wall behind the cabinet.



- **Primary Switch Technology**
- **Protection against overloading, over-voltage, over-temperature, short circuiting and deep discharge.**
- **Space for 2 batteries (7, 14 or 20Ah).**
- **There is the option for an extra battery box XM, for longer alternate operating time, with 2-4 batteries.**
- **Faulty function alarm and relay switching (faulty power supply unit or power failure) as standard.**
- **24V up to 10A**

ECO XM

Construction & Design

The ECO XM is a compact and well-ventilated electrical cabinet in white painted steel. The construction is well designed, with a lockable door, panel with status information, as well as light emitting diode indicators on the cabinet front. It is easily installed on a wall with the enclosed cardboard drilling template or with 19" angle brackets. The construction is suitable for two 7Ah, 14Ah or 20Ah batteries. There is the option for increased functionality with an alarm for low battery voltage. It is delivered with an anti-sabotage plug.

Areas of application

Suitable for installation indoors, for example, in smaller premises as well as for small to medium-sized systems. For examples of the areas of application, see the pictures.

Flexibility

Option

An extra optional PCB for low battery voltage. The option can be easily plugged in afterwards, or ordered as installed direct from the factory. Quick and easy installation. The unit is delivered without batteries installed.

Power supply

Flexibility, thanks to the fact that the power supply unit can be easily upgraded with an electronic cassette with a larger DIN rail mounted power supply unit for increased loads.

Extra battery box

There is the option for an extra battery box XM, with space for 2-4 batteries.

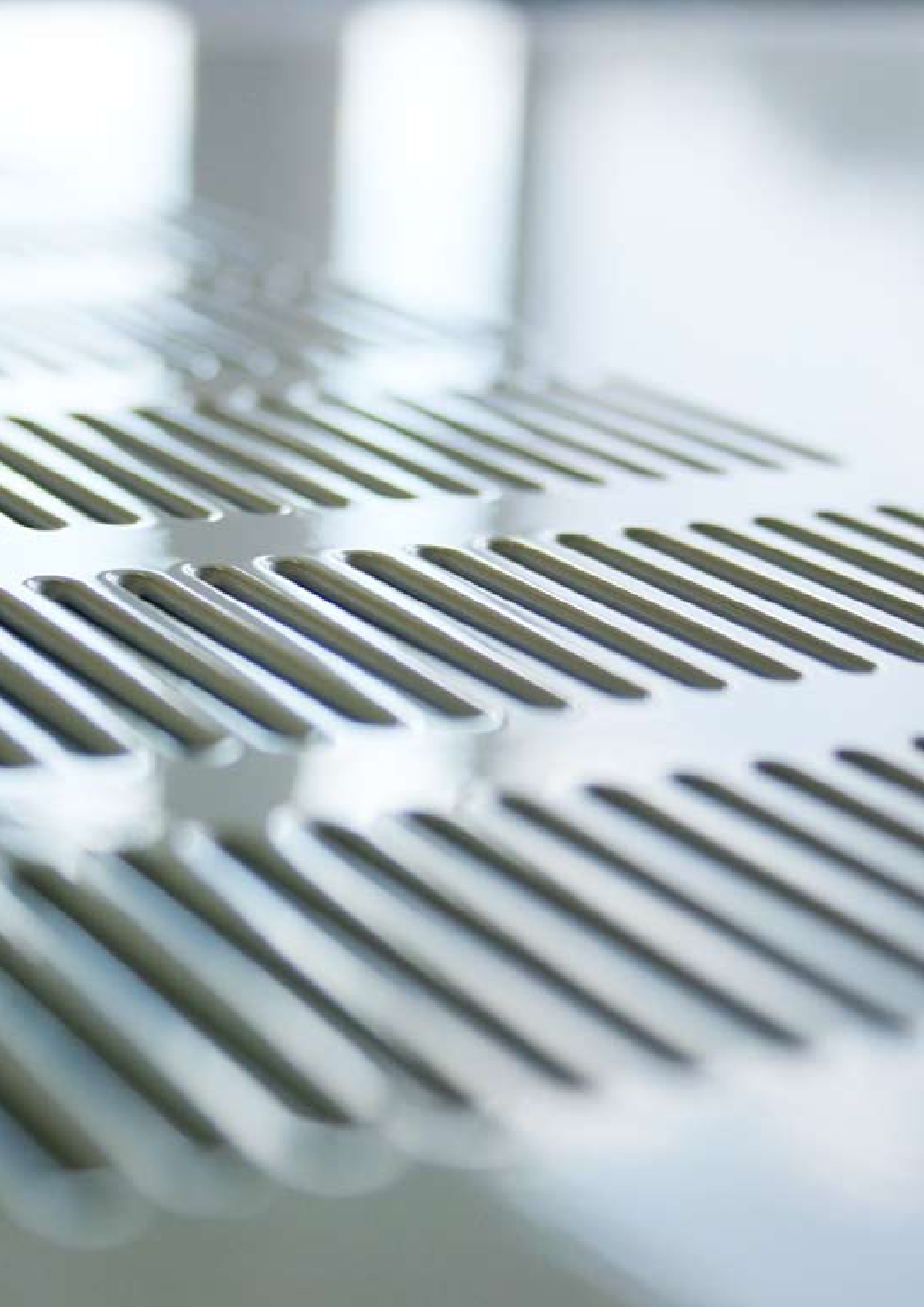
The ECO XM is often used for smaller or medium-sized entry control systems. The ECO XM battery backup is suitable for running the security and safety systems in office buildings, with requirements for slightly longer alternate operating times.



Public premises, such as libraries, are an excellent example of where the ECO XM battery backup can run entry control and fire alarm systems. There is the option to use the same battery size, 20Ah, as in most fire alarm centres.



The ECO XM is installed on a 19" stand with the enclosed 19" angle brackets.



The BAS family

Our battery backups contain power supply unit, space for batteries, battery fuses, deep discharge protection as well as monitoring.

The BAS family is easy to expand with our alarm card which can be plugged in for increased reliability. In a simple way, we can upgrade the power supply with a larger mains supply and extend the alternate operating time with a battery box or battery shelves.

The BAS family also offers several other types of optional PCB.

BAS XM

BAS XX

BAS XL

BAS XXL

BAS 19"



- Primary Switch Technology
- Protection against overloading, over-voltage, over-temperature, short circuiting and deep discharge.
- Space for 2 batteries (7-14Ah, can be delivered ready installed)
- There is the option for an extra battery box XX, for longer alternate operating time, with 2-4 batteries, which can be delivered ready installed.
- Faulty function alarm and relay switching (faulty power supply unit or power failure) as standard.
- Modular construction
- 12V up to 10A
24V up to 10A

BAS XX

Construction & Design

The BAS XX is a compact and well-ventilated electrical cabinet in white painted steel. The construction is well designed, with a lockable door, panel with status information, as well as light emitting diode indicators on the cabinet front. It can be easily installed on a wall with the enclosed cardboard drilling template. Fans to cool the batteries for increased battery service life from 5 to 10 years. The construction is suitable for two 7Ah and 14Ah batteries that can be delivered ready installed in the cabinet. It is delivered with an anti-sabotage plug.

Areas of application

Suitable for installation indoors, for example, in smaller premises as well as for small to medium-sized systems. For examples of the areas of application, see the pictures.

Flexibility

Option

Option for protection and monitoring, see the overview of the BAS family. The option can be easily plugged in afterwards, or ordered as installed direct from the factory. Quick and easy installation. The unit can be delivered with or without batteries installed.

Factory installed batteries.

Quick and easy installation with up to a couple of hours alternate operating time, if you choose our units with installed batteries.

Power supply

A cassette with all the electronics provides further flexibility, thanks to the fact that the power supply unit can be easily upgraded with an electronic cassette with a larger power supply unit for increased loads.

Extra battery box

There is the option for an extra battery box XX, with space for 2-4 batteries.

Many smaller offices use our BAS XX battery backups to run their security and safety systems throughout the day.

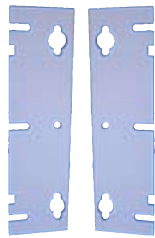


The BAS XX is often used to run small to medium-sized entry control systems or fire alarms in environments such as, for example, smaller schools.





Optional " angle brackets or external wall fastener, with the special feature that the electrical cabinet extends slightly from the wall. Electrical cables can therefore be run on the wall behind the cabinet.



- **Primary Switch Technology**
- **Protection against overloading, over-voltage, over-temperature, short circuiting and deep discharge.**
- **Space for 2 batteries (7, 14 or 20Ah).**
- **There is the option for an extra battery box XM, for longer alternate operating time, with 2-4 batteries.**
- **Faulty function alarm and relay switching (faulty power supply unit or power failure) as standard.**
- **Modular construction**
- **12V up to 20A**
24V up to 10A

BAS XM

Construction & Design

The BAS XM is a compact and well-ventilated electrical cabinet in white painted steel. The construction is well designed, with a lockable door, panel with status information, as well as light emitting diode indicators on the cabinet front. The enclosed angle brackets make wall installation with spacing possible or installation on a 19" stand. A drilling template is provided on the carton. Fans to cool the batteries for increased battery service life from 5 to 10 years. The construction is suitable for two 7Ah, 14Ah or 20Ah batteries.

Areas of application

Suitable for installation indoors, for example, in smaller premises as well as for small to medium-sized systems. For examples of the areas of application, see the pictures.

Flexibility

Option

Option for protection and monitoring, see the overview of the BAS family. The optional PCB can be easily plugged in afterwards, or ordered as installed direct from the factory. Quick and easy installation. The unit can be delivered with or without batteries installed.

Factory installed batteries.

Quick and easy installation with up to a couple of hours alternate operating time, if you choose our units with installed batteries.

Power supply

A cassette with all the electronics provides further flexibility. The DIN-rail power supply unit can be upgraded easily for increased loads.

Extra battery box

There is the option for an extra battery box XM, with space for 2-4 batteries.

The BAS XM is suitable for use to run the security and safety systems in office buildings.



Public premises, such as libraries, are an excellent example of where the BAS XM battery backup can run entry control and fire alarm systems. The BAS family provides great flexibility, with a large selection of optional PCBs for several functions. The BAS XM is suitable for the most common battery sizes for entry control and fire alarm systems.



The BAS XM is installed on a 19" stand with the enclosed 19" angle brackets.



- Primary Switch Technology
- Protection against overloading, over-voltage, over-temperature, short circuiting and deep discharge.
- Space for 2 batteries (28-14Ah), delivered without batteries.
- Hot swap (replacement of power supply unit during the operating time is possible)
- There is the option for an extra battery box XL, for longer alternate operating time, with 2-4 batteries.
- Quick connection using truck battery connector.
- Modular construction
- Faulty function alarm and relay switching (faulty power supply unit or power failure) as standard.
- Fans for longer battery service life
- 12V up to 30A
24V up to 30A
48V up to 15A

BAS XL

Construction & Design

The BAS XL is a well-ventilated electrical cabinet in white painted steel. The construction is well designed, with a lockable door, panel with status information, as well as light emitting diode indicators on the cabinet front. It is easy to install on a wall with the drilling template on cardboard, and the fastening holes are also suitable for the mounting rail on Ericsson's 19" stand. Fans to cool the batteries for increased battery service life from 5 to 10 years. The construction is suitable for two 28 and 45Ah batteries.

Areas of application

Suitable for installation indoors, for example, in larger premises as well as for medium-sized to large systems. For examples of the areas of application, see the pictures.

Flexibility

Option

Option for protection and monitoring, see the overview of the BAS family. The option can be easily plugged in afterwards, or ordered ready installed direct from the factory.

Power supply

The DIN rail mounted power supply unit provides even more flexibility, thanks to the fact that the power supply unit can be easily upgraded with a larger power supply for increased loads.

Extra battery box

There is the option for an extra battery box XL, with space for 2-4 batteries.

NOTE! The BAS 2750-XL cannot be equipped with an extra battery box.

Hot Swap

In battery operation, the power supply unit can be disconnected using cabling with jack plugs. This makes it simple to upgrade, or if necessary, replace a faulty power supply unit without affecting the system that the battery backup is running.

When upgrading the power on a Hot Swap unit, the load voltage must be interrupted, since higher power presupposes a change of the automatic load fuses.

SSF1014 - Grade 2 and 3

The BAS XL series has a certified unit that complies with SSF1014, grade 2 and 3 and meets EN50131-6, thanks to mechanical additions as well as extended protection and monitoring with SDX and 6OUT. Grade 3 requires integration over bus communication I2C or RS485 to the customer's system.

University buildings are complex with many security and safety systems that require alternate power. In these medium-sized to large systems, the BAS XL assures that, among other things, the entry control system and fire alarm work. The BAS XL is also available in a version that complies with SSF1014 - Grade 2 or 3 requirements and meets EN 50131-6.

Today, entry control systems are to be found more or less in all companies, industries and in public buildings (hospitals, schools, official organisations etc.). In order to ensure that larger entry control systems have a high reliability, the BAS XL is used. The battery backups are needed in order to assure the reliability of the entry control system, so people do not become locked in and the buildings are protected in the event of power failures.





- **Primary Switch Technology**
- **Protection against overloading, over-voltage, over-temperature, short circuiting and deep discharge.**
- **Space for 4 batteries (14Ah), delivered without batteries**
- **Hot swap (replacement of power supply unit during the operating time is possible)**
- **Option for extra battery box NOTE! XL for longer alternate operating time, with 2-4 batteries.**
- **Quick connection using truck battery connector.**
- **Modular construction**
- **Faulty function alarm and relay switching (faulty power supply unit or power failure) as standard.**
- **Fans for longer battery service life**
- **24V up to 30A**
48V up to 15A

BAS XXL

Construction & Design

The BAS XXL is a well-ventilated electrical cabinet in white painted steel. The construction is well designed, with a lockable door, panel with status information, as well as light emitting diode indicators on the cabinet front. It is easy to install on a wall with the drilling template on cardboard, and the fastening holes are also suitable for the mounting rail on Ericsson's 19" stand. Fans to cool the batteries for increased battery service life from 5 to 10 years. The construction is suitable for (2 - 4) 45 Ah batteries.

Areas of application

Suitable for installation indoors, for example, in larger premises as well as for large systems. For examples of the areas of application, see the pictures.

Flexibility

Option

Option for protection and monitoring, see the overview of the BAS family. The option can be easily plugged in afterwards, or ordered ready installed direct from the factory.

Power supply

The DIN rail mounted power supply unit provides even more flexibility, thanks to the fact that the power supply unit can be easily upgraded with a larger mains supply for increased loads.

Extra battery box

There is the option for an extra battery box XL, with space for 2-4 batteries.

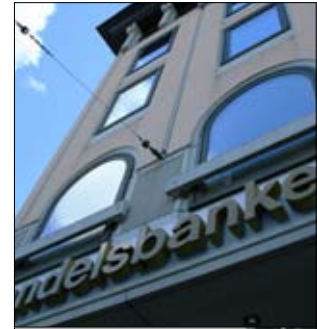
Hot Swap

In battery operation, the mains supply can be disconnected using cabling with jack plugs. This makes it simple to upgrade, or if necessary, replace a faulty supply unit without affecting the system that the battery backup is running. When upgrading the power on a Hot Swap unit, the load voltage must be interrupted, since higher power presupposes a change of the automatic load fuses.

SSF1014 - Grade 2 and 3

The BAS XXL series has a certified unit that complies with SSF1014, grade 2 and 3 and meets EN50131-6, thanks to mechanical additions as well as extended protection and monitoring with SDX and 6UT. Grade 3 requires integration over bus communication I2C or RS485 to the customer's system.

Banks use buildings that require large security systems. The BAS XL is used to run, for example, large integrated systems. The BAS XXL is also available in a version that complies with SSF1014 - Grade 2 or 3 requirements and meets EN50131-6.



Embassies have large security systems with requirements for long operating times. This means that the BAS XXL, with the option of installing four large batteries, is a suitable choice.





- Primary Switch Technology
- Protection against overloading, over-voltage, over-temperature, short circuiting and deep discharge.
- External batteries on 19" battery shelves or floor cube
- Quick connection using truck battery connector.
- Hot swap (replacement of power supply unit during reserve operation is possible)
- Modular construction
- Faulty function alarm and relay switching (faulty power supply unit or power failure) as standard.
- There is an option to top up the battery capacity during operation from batteries that are fetched in, with the help of the optional accessory Reserve Tank.
- Fans for longer battery service life
- 12V up to 30A
24V up to 30A
48V up to 15A



Battery shelf for mounting on a 19" stand, complete with truck battery connector for easy connection.



Floor cube that can be fitted in a 19" stand for really long, alternate, operating times.

BAS 19"

Construction & Design

The BAS 19" has a designer 19" enclosure with an arched, silver elox, aluminium front as well as a service hatch on the rear. The compact and well-ventilated construction is well designed and is equipped with a panel with status information as well as light emitting diode indicators on the cabinet front. The batteries are connected using quick connectors / truck battery connectors on battery shelves or floor cubes. It is easy to expand to enable extra long reserve time (up to 368Ah / 24V)

Areas of application

Suitable for installation indoors in electrical rooms for operation of medium-sized to large systems. For examples of the areas of application, see the pictures.

Flexibility

Option

- Option for protection and monitoring, see the overview of the BAS family. The option can be easily plugged in afterwards in a 19R (19" rack), or ordered ready installed direct from the factory.
- Extra 19" fuse panel for clear visualisation for combined 1-3 SlingX or 10-UT.
- The "refill" tank provides the option during a power cut to regularly top up the battery power from new batteries without any voltage dip to the load.
- Further flexibility can be obtained as the power supply unit can be easily upgraded with a larger power supply unit for increased loads.

Power supply

The DIN rail mounted power supply unit provides even more flexibility, thanks to the fact that the power supply unit can be easily upgraded with a larger power supply for increased loads.

Battery shelves or floor cube

The battery power time can be increased by up to five battery shelves (24V) or two floor cubes.

Hot Swap

In battery operation, the mains supply can be disconnected using cabling with jack plugs. This makes it simple to upgrade, or if necessary, replace a faulty power supply unit without affecting the system that the battery backup is running. *When upgrading the power on a Hot Swap unit, the load voltage must be interrupted, since higher power presupposes a change of the automatic load fuses.*

The BAS 19" is suitable for installation in electrical rooms for operation of medium-sized to large systems, for example in shopping precincts and shopping centres etc. The units assure operation of, for example, security and safety systems (including burglary alarms, entry control, fire alarms and speaker evacuation alarms).



The BAS 19" is suitable for installation in electrical rooms for operation of medium-sized to large systems, for example in shopping precincts and shopping centres. The units assure operation of security and safety systems, such as fire alarms, burglary alarms, entry control systems as well as speaker evacuation alarms.



Three loop monitoring PCB, SlingX, for monitoring of alarms installed in 19R, enclosure for 19" mounting.



Three fuse cards with 10 outputs (10UT) installed in 19R, enclosure for 19" mounting.



BAS 19" with battery shelf-mounted on 19" stand.

EUROBAT classification

- Standard Commercial (SC)
3-5 year battery
- General purpose (GP)
6-9 year battery
- High performance (HP)
10-12 year battery
- Long life
12+ years battery

For how long does a battery last at a given load and temperature?

Temperature	[°C]	20	25	30
Battery 3-5 years service life according to EUROBAT				
"Expected" Battery Service Life	[years]	5	3	2,5
Battery 6-9 years service life according to EUROBAT				
"Expected" Battery Service Life	[years]	9	6	4,5
Battery 10-12 years service life according to EUROBAT				
"Expected" Battery Service Life	[years]	12	10	6
Battery 12+ years service life according to EUROBAT				
"Expected" Battery Service Life	[years]	18	15	9

table 1

The service life is halved for every 10°C rise in temperature.

The batteries "discharge time"	3-5 year Approximate battery capacity	6-9 year / 10-12 year Approximate battery capacity	12+ years Approximate battery capacity
20 h	100%	100%	105%
10 h	95%	95%	100%
5 h	85%	85%	95%
2 h	70%	70%	85%
1 h	60%	60%	70%
0.5 h	45%	45%	60%

table 2

According to the table, it requires more battery capacity for the desired battery operating time, if the discharge time is less than calculated, 20h. (20 h 6-9 year / 10-12 year, 10 h 12+ years). The batteries only achieve the stated Ah if they are emptied during 20 / 10 h. If the battery is emptied in less time, then a lower capacity than the stated nominal capacity is obtained. For batteries with the same nominal capacity, more capacity is obtained for a 12+ year battery than an equivalent 10-12 year battery.

When are the batteries old?

The stated service life for a battery is defined as when there is 80% of the capacity remaining, according to EUROBAT. Thereafter, the aging accelerates and the batteries are at an increased risk of cell short-circuits. The cause of batteries aging prematurely is primarily the effect of the ambient temperature.

Choose high quality batteries with long service life. Nevertheless, choosing a good battery is not enough; the battery must also be taken care of and given the best possible circumstances.

- Temperature around 20°C
- The primary switch technology, together with the high efficiency and well-ventilated enclosure, provides low heat formation, low energy costs and the correct charging voltage.

Example

Did you know that...

In a system with 0.5 h battery operating time (10-12 year batteries) only 45% (table 2) x 80% (defined service life) = 1/3 of the batteries' stated capacity / assumed alternate operating time will be available when the batteries are aged and it is time to replace the batteries.

Never mix batteries with different capacities or ages!

Voltage drop in cables

Voltage losses in cables result in lower voltages under load than those supplied from the power supply unit. The voltage drop depends on the loading, the cable's dimension and length (thicker cable = lower voltage drop). Systems that are run with low voltage, 12V, are more sensitive.

Voltage drop during battery operation

In battery operation, the batteries discharge from their normal voltage 27.3V (nominal 24V) down to the level where the deep discharge protection for the batteries kicks in, 21V. This is a further voltage drop of 6.3V, in addition to the voltage drop in the cables. The most important point to consider is that the load should still function at the low voltage; otherwise not all of the battery capacity can be used.

Recharging batteries

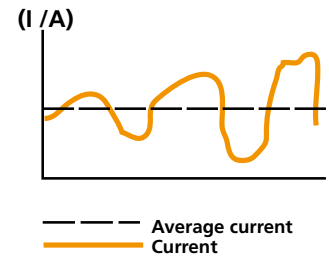
The recharging time for batteries depends on the charger's maximum capacity. The time needs to be increased by 25% due to losses when electrical energy is converted to chemically stored energy in the battery.

For further help on the dimensioning of batteries, use our calculation service (support / beräkningstjänst / batterioptimering) on our website www.milleteknik.se

Eurobat = European battery manufacturers who have reached agreement on performance and service life classification.

Battery Operating Time

- Calculate the load's average current for battery operation
- Available battery capacity (life, current usage)
- Battery operating time = Available battery capacity / average current



Example

A fire alarm system draws an average current of 2A, 5A max current with a requirement for 72h recharging time and 24h alternate operating time.

Requisite battery capacity = 2A x 24h / 0.8 (= battery aging) = 60Ah

On expansion by 20%, this gives a requisite battery capacity = 72Ah.

Choose: 2x45Ah= 90Ah

Necessary recharging current for the 72h requirement

Recharging current = consumed capacity / recharging time x 1.25 (60Ah/72h x 1.25= 1A)

The power supply unit is dimensioned based on either the max current or the average current and recharging current.

Alt. 1 Max current consumption + 20% expansion gives 6A.

Alt. 2 Average current + recharging current + 20% expansion gives (2A average current + 1A recharging current) x 20% = 3.6A.

Result Choose: BAS 27100 with two battery shelf 45Ah, totally 90Ah or BAS 27100-XXL with 90Ah.

Primary switch technology and ventilation make the battery power reliable with a long service life.

Milleteknik's Primary Switch Technology

An active technique that only uses the energy that the load needs at each moment, no waste. The switching is implemented directly on the mains supply (230V); it provides the correct charging voltage and low heat dissipation. The battery service life is therefore lengthened.

Traditional Linear Technology

A passive technique that always uses the max energy in order to be capable of delivering the maximum power on demand. Since the system rarely runs at max, only a fraction of the power is used and the rest is converted to waste heat/energy that ages the batteries.

Secondary Switch Technology

The switching is implemented on the load side (24V), where the current is 10 times greater than the mains supply side. The power losses therefore increase while the idling energy is being consumed the whole time over a large mains transformer, 50 Hz. Taken together, unnecessary waste heat/energy is increased.

Example

24V / 5A Power supply unit (150W)

Primary Switch Technology

85% efficiency = 15% waste heat/energy

Waste heat = 0.15 x 0.150kW x 8700 h/year = 195 kWh

1kWh ca 1.25 SEK = 245 SEK / year

Secondary Switch Technology

75% efficiency = 25% waste heat/energy

Waste heat = 0.25 x 0.150kW x 8700 h/year = 325 kWh

1kWh ca 1.25 SEK = 405 SEK / year

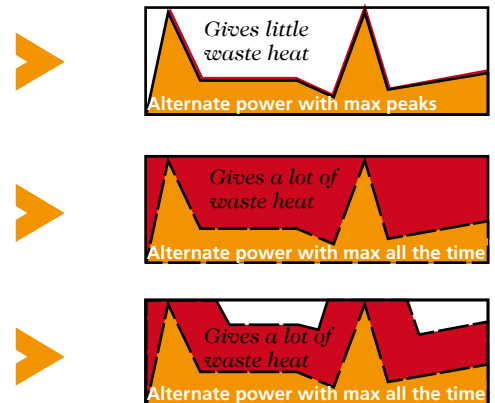
Linear

60% efficiency = 40% waste heat/energy

Waste heat = 0.4 x 0.150kW x 8700 h/year = 520 kWh

1kWh ca 1.25 SEK = 650 SEK / year

In summary, primary switch technology gives a saving after 5 years, compared to linear technology, of 5x(650-245)=2025 SEK. (This is roughly what a battery backup unit costs).



The graphs above show how much of the energy used turns into waste heat (red) during conversion from, for example, 230 VAC to 24VDC for the three different techniques.

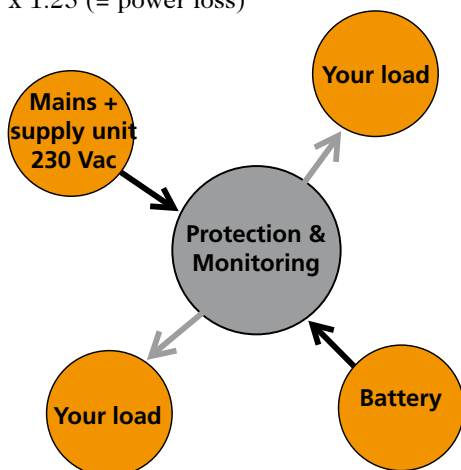
Dimension of battery backup, this is how you calculate the max current

The power supply unit is determined by the magnitude of the max current

The power supply unit has to be capable of starting the load without help from the batteries. In the case of any expansion and recharging, the max load should not exceed the power supply's max.

Recharging current =
power supply's max current - the load's average current

Recharging time =
consumed battery capacity / recharging current
x 1.25 (= power loss)



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