

# Drive solutions for the recycling industry



**WE ANSWER THE FOLLOWING QUESTIONS WITH THIS FLYER:** \_\_\_\_\_

1. Why is efficiency so important in the recycling process?
2. What are the trends and guidelines for electric motors?
3. Which frequency converters can I use for my systems?
4. How can I optimise my entire system?
5. Why is Mitsubishi Electric active in the recycling market?

## Metal recycling and processing of special materials

The large number of very different metal compounds containing components and materials requires special processing technologies and methods. This is the only way to optimally recover their value and increase sustainability by selling and recycling them as secondary raw materials. At the same time, the quest for greater sustainability brings with it new directives, such as the IE4 directive from July 2023.

These set the goal for the recycling industry not only to optimally separate and sort the materials, but also to implement this at the same time with optimised and energy-efficient processes and machines.



## Why efficiency is crucial

Due to the fact that up to 97% of the total cost of an engine over its entire lifetime is attributable to energy consumption, the desire for the most efficient solutions possible is as much an imperative of economic as of ecological responsibility and common sense.

In addition, there are industries for which the „green footprint“ itself is an economic and perspective necessity.



## Efficiency enhancement trends

With the already very high motor efficiencies, appreciable increases in energy efficiency are only possible through an expanded approach in the overall system. The trend is therefore clearly moving in the direction of optimised motor-frequency converter systems (IE4 as of July 2023) that are tailored to the respective application.



Such systems enable the use of more efficient motor technologies that cannot normally be operated on the pure sinusoidal grid. To ensure greater flexibility, inverters are used that control the motor appropriately for each requirement so that the drive runs in an energy-optimised manner even at partial load.

## A800-E construction



### Some highlights

- Particularly powerful capacitors in the optimised DC link are one of the reasons why Mitsubishi Electric frequency inverters can compensate for large overloads and load peaks.
- Particularly resistant corrosion protection due to double-painted circuit boards.
- Optimum availability from our warehouse in Duisburg thanks to Body & Brain concept (modularly combinable power and control parts).



## Medium voltage frequency converter

The use of energy-saving frequency converter solutions from Mitsubishi Electric on the main motor of the shredder reduces energy costs by 7–10%. High penalties to the utility company can be reduced due to avoidable load peaks and the power distribution network can be stabilised. The IEEE-519 standard on mains harmonics is complied with when using our frequency converters. For medium voltages in the range of 3.3–11 kV, we achieve power ratings up to 7350 kVA while guaranteeing grid-friendly operation with max. 2% harmonic distortion. Modular power units „Made in Japan” offer a wide range of industrial applications: pumps, compressors, mixers, conveyors, presses, mills and shredders.

Due to the power factor  $\cos\Phi = 1$ , the power factor correction is directly integrated in the inverter, so that no compensation system is necessary. In addition, an optional energy recovery system can be integrated, which ensures fast braking in regenerative operation through the Active Front End.



## Low voltage frequency inverter

In the low-voltage range, Mitsubishi Electric supplies a portfolio of frequency inverters for every application. The categorisation into five different model series offers the right model for every application.

The FR-A800 and FR-F800 model series cover the power classes from 0.4–630 kW and are designed for pump and fan applications or for applications with high overload and a wide range of functions. The FR-A800 in particular offers the advantage of body&brain modularity, where the unit can be assembled on site depending on the choice of functionality and power class. Mitsubishi Electric thus achieves a particular advantage in this area in terms of availability and delivery capability.

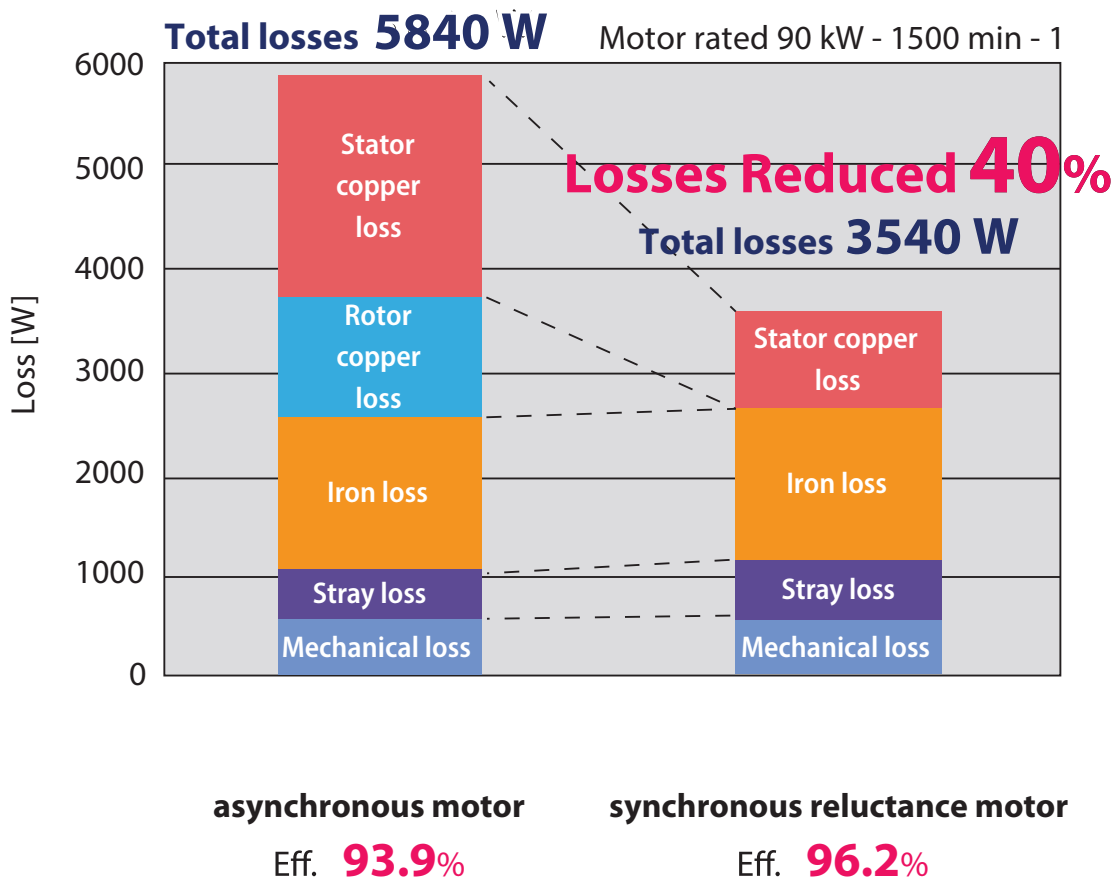


## New guidelines for energy efficiency

New ecodesign requirements, such as the IE4 minimum efficiency class from July 1, 2023 for three-phase motors  $\geq 75.0$  to 200 kW and 2-, 4- and 6-pole (does not apply to explosion-proof motors, brake motors, 8-pole motors), make it necessary to revise existing concepts and use new architectures and technologies. These specifications from the EU Commission

help to fulfill the obligations from the Paris Climate Conference and to achieve the targets set. Mitsubishi Electric offers the possibility to operate very energy efficient motors like the synchronous reluctance motors. The advantage here is not only energy efficiency but also the design of the motors, which do not require materials such as rare earths.

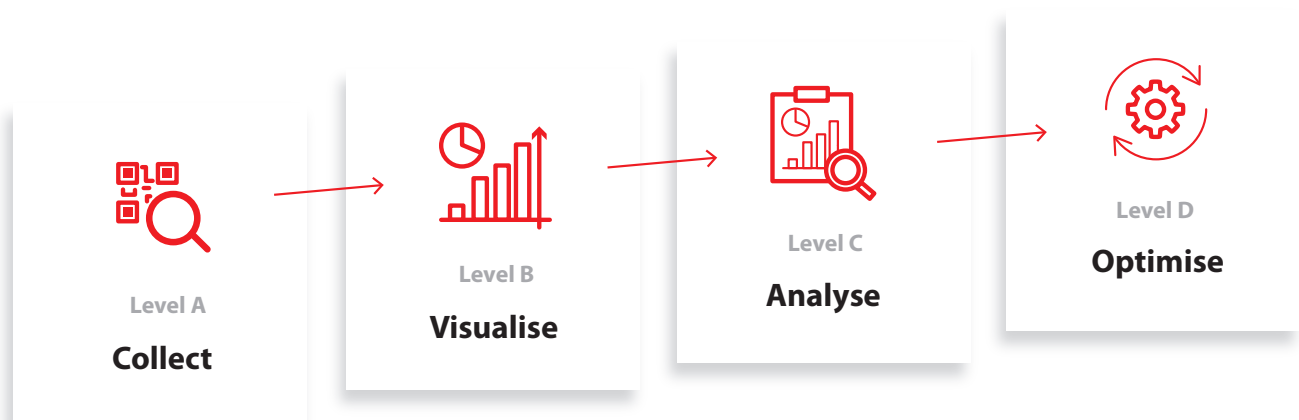
### ■ Reduction of motor losses



## One step ahead with process data handling

The Smart Manufacturing Kaizen Level, or SMKL, is a matrix used to plan and execute smart manufacturing solutions. It was developed by Mitsubishi Electric and is currently being developed into an international standard. The focus is on the gradual introduction of various innovations based on „Collect“, „Visualise“, „Analyse“ and „Optimise“.

Using the experience and suitable solutions from this matrix to take the appropriate step in each case enables you to easily implement digitisation projects for your company. Because implementing a holistic solution with all products and experience has been in Mitsubishi Electric's DNA ever since.



## Why do we love recycling

Since 1921 Mitsubishi Electric has been supporting not only its own production sites for a wide range of products in the field of electric drives, for example, but also locally and globally active companies in a wide range of industries. Recycling and sustainability, for

example in the recycling of our Mitsubishi Electric air-conditioning units, is thus a goal that is as important as it is ambitious: Mitsubishi Electric is pursuing a vision of becoming climate-neutral in 2050 and implementing further sustainability projects.

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