Presentation

The Lexium 23 Plus offer features a range of servo drives and a range of BCH servo motors. There are a large number of possible combinations to suit the requirements of motion control applications and optimize the performance of the installation.

The servo drives range covers a wide range of power ratings from 0.1 kW to 7.5 kW, with two types of power supply:
- 200…255 V single phase, 0.1 kW to 1.5 kW
- 170…255 V three-phase, 0.1 kW to 7.5 kW

BCH motors provide a nominal torque from 0.3 Nm to 48 Nm and a nominal speed of between 1000 rpm and 3000 rpm, depending on the model. They are suitable for a very wide variety of applications due to the four levels of inertia offered (see page 62322/2).

An offer to boost performance

When used with BCH servo motors and with the addition of options and accessories, Lexium 23 Plus servo drives provide a complete, very high performance system, designed in particular for installations equipped with simple machines. See page 62320/6.

Compact range

The compact dimensions of Lexium 23 Plus servo drives mean they fit very easily into small spaces, thus reducing the size of the installation and the cost of the equipment.

Simple commissioning

Commissioning is simple with the Lexium 23 CT PC commissioning software which has an auto-tuning function enabling extremely fast start-up. The simplicity of the wiring of Lexium 23 Plus servo drives also makes installation easier and reduces installation costs.

Flexibility

Lexium 23 Plus servo drives have digital and analog I/O as standard, and one of the following communication interfaces, depending on the model:
- Interface for CANopen/CANmotion machine bus (LXM 23A)
- Pulse/direction (P/D) interface (LXM 23D)

The servo drives incorporate numerous functions, including auto-tuning, position, speed and torque control, etc. (see page 62320/5).

This open communication concept enables integration into numerous different control system architectures.

Applications

- Material handling (conveying, palletizers, warehousing, etc.)
- Assembly (clamping, etc.)
- Printing
- Packaging
- Winding and unwinding
- Machine tools (multi-axis machines, cutting machines, etc.)
- Etc.
The Lexium 23 Plus servo drive range

Configuration

The drives can be configured via the integrated graphic display terminal or using the Lexium 23 CT PC commissioning software.

Control

Control via CANopen machine bus: Lexium 23A servo drive

The Lexium 23 A servo drive features a CANopen/CANmotion machine bus control interface.

- It also has numerous I/O:
  - 2 inputs for high performance position capture
  - 8 digital inputs
  - 4 digital outputs
  - 2 analog inputs
  - 2 analog outputs

- It has a closed loop current regulation function (sampling time 62.5 μs).

- It is compatible with PLCopen function blocks which offer applications such as flying shear, rotary knife, etc.

Control via I/O: Lexium 23D servo drive

The Lexium 23 D drive can be used in standalone operation, with no axis controller (control via digital I/O).

- It can also be used with an axis controller and can therefore be incorporated in numerous architectures.

- It provides, for example, the following features:
  - Creation of position registers up to 8 positions
  - Switching between the speed/position/torque parameters

- It has a closed loop current regulation function (sampling time 62.5 μs).

- It also has a pulse/direction interface (up to 4 m/s) as well as numerous I/O:
  - 8 digital inputs
  - 4 digital outputs
  - 2 analog inputs
  - 2 analog outputs
Lexium 23 CT PC commissioning software: for rapid commissioning and easy configuration

The commissioning time for Lexium 23 Plus servo drives is considerably reduced using Lexium 23 CT PC software. It is used for commissioning, parameter setting, diagnostics and maintenance.

It can also be used to install Lexium 23 Plus servo drives in existing installations, keeping downtime to a minimum.

Functions
Lexium 23 CT software includes the following functions:
- Auto-tuning
- Manual tuning
- Entry and display of parameters
- Oscilloscope function
- Fault diagnostics

Auto-tuning
The auto-tuning function can be activated with the Lexium 23 CT software in two ways:
- Theoretical parameter setting: to calculate the gain parameters according to conditions selected by the user.
- Dynamic parameter setting: for optimum control, calculating the gain parameters in real time, according to the behaviour of the machine.

Entry and display of parameters
The Lexium 23 CT software can be used to configure all the functions of a given operating mode.

The user interface of the Lexium 23 CT software enables quick, easy navigation. All the parameters can be displayed on a single graphic screen, which gives the experienced user a great deal of flexibility.

Frequency analysis (FFT)
The frequency analysis, based on the Fast Fourier Transform (FFT) algorithm, is used to diagnose noise and vibration in machines.

To carry out the FFT analysis, the motor records the behaviour of the axis in terms of current and speed. Once the movement has been executed, the Lexium 23 CT commissioning software analyses the resonance peaks and displays them on the oscilloscope screen.

It is possible to enter the gain as a numerical value, a variable or an expression in the gain parameter field.

Filters can be applied to reduce resonance.

Oscilloscope function
The Lexium 23 CT PC commissioning software provides an Oscilloscope function which can be used in two ways:
- Realtime mode: to monitor the evolution of a value measured in real time
- Precision mode: to capture a precise moment of the application This function records all the information before displaying it, which enables very precise information to be obtained and very fine tuning to be carried out.

Required configuration
The Lexium 23 CT software runs on a PC with the Microsoft Windows® 2000/XP/Vista operating systems. The servo drive is commissioned via the RS 232 serial link interface.

Downloading
The Lexium 23 CT PC commissioning software can be downloaded from our website www.schneider-electric.com.
Motion control
Lexium 23 Plus
Servo drives

Main functions
Lexium 23 Plus servo drives feature numerous functions enabling them to be used in a wide range of motion control applications.

Main functions of Lexium 23 Plus servo drives
- Automatic recognition of the motor
- Filtering:
  - Reduction of resonance
  - Low pass filter for attenuation of high frequency disturbance
  - Command smoothing
- Monitoring functions:
  - Status monitoring, I/O monitoring
  - Fault log, fault reset
  - Monitoring of closed loop control, etc.

Tuning functions
- Manual mode (JOG) for position and speed
- Auto-tuning: This function is used to optimize application performance

Operating modes for the Lexium 23D version (activation/setting parameters of functions via the digital I/O)

Position control
In this mode position and speed control are carried out via a pulse train sent by an axis controller, such as a PLC, a motion controller or a numerical controller.

This mode is particularly suitable for the following applications:
- Material handling
- Cutting to length
- Packaging

Speed control
In this mode the Lexium 23 Plus servo drive is controlled with an axis controller with analog output. It is suitable for any application requiring high-performance speed control.

This mode is particularly suitable for the following applications:
- Winding
- Unwinding

Current regulation
Current regulation is required in applications in which servo motor torque control is crucial.

This mode is particularly suitable for the following applications:
- Printing
- Winding

Parameter switching
This function enables switching between three sets of parameters:
- Speed/position
- Speed/torque
- Torque/position

This function is specifically for machines with numerous manufacturing processes.

Other functions
- Speed limiting
- Torque limiting
- Encoder simulation (ESIM): control of speed, torque or frequency

Operating modes for the Lexium 23A version (activation/setting parameters of functions via the CANopen machine bus)
The following operating modes are available:
- Homing (in accordance with functional profile CiA DSP 402)
- Point-to-point mode (in accordance with functional profile CiA DSP 402)
- Position gear mode
- Sync (cyclic)

For details of all the functions integrated in Lexium 23 Plus servo drives, please consult our website www.schneider-electric.com.
### BCH servo motor/Lexium 23 Plus servo drive combinations

<table>
<thead>
<tr>
<th>Motor</th>
<th>Servo drive</th>
<th>Combination</th>
<th>Servo drive</th>
<th>Servo motor</th>
<th>Motor inertia type</th>
</tr>
</thead>
<tbody>
<tr>
<td>kW</td>
<td>kg/cm²</td>
<td>Nm</td>
<td>rpm</td>
<td>rpm</td>
<td></td>
</tr>
<tr>
<td>0.1</td>
<td>0.037</td>
<td>0.32</td>
<td>0.96</td>
<td>5000</td>
<td>3000</td>
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<tr>
<td>0.2</td>
<td>0.177</td>
<td>0.64</td>
<td>1.92</td>
<td>5000</td>
<td>3000</td>
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<td>0.87</td>
<td>2.86</td>
<td>8.59</td>
<td>2000</td>
<td>1000</td>
</tr>
<tr>
<td>0.4</td>
<td>0.277</td>
<td>1.27</td>
<td>3.82</td>
<td>5000</td>
<td>3000</td>
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<tr>
<td>0.4</td>
<td>0.68</td>
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<td>3000</td>
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<td>1000</td>
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<td>0.75</td>
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<td>25.78</td>
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<td>1000</td>
</tr>
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<td>0.9</td>
<td>11.18</td>
<td>8.59</td>
<td>25.78</td>
<td>2000</td>
<td>1000</td>
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<td>3000</td>
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<tr>
<td>1</td>
<td>11.18</td>
<td>4.77</td>
<td>14.32</td>
<td>3000</td>
<td>2000</td>
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<tr>
<td>1.1</td>
<td>11.18</td>
<td>7.16</td>
<td>21.48</td>
<td>3000</td>
<td>2000</td>
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</table>

### Three-phase supply voltage: 170...255 V 50/60 Hz

<table>
<thead>
<tr>
<th>Power on rating plate</th>
<th>Inertia (without brake)</th>
<th>Nominal torque</th>
<th>Maximum peak torque</th>
<th>Maximum speed</th>
<th>Nominal speed</th>
<th>Servo drive</th>
<th>Servo motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>kW</td>
<td>kg/cm²</td>
<td>Nm</td>
<td>rpm</td>
<td>rpm</td>
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<td>2</td>
<td>4.45</td>
<td>6.37</td>
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<td>3000</td>
<td>LXM23eU20M3X</td>
<td>BCH1002e02e1C</td>
</tr>
<tr>
<td>2</td>
<td>14.59</td>
<td>9.55</td>
<td>26.65</td>
<td>3000</td>
<td>2000</td>
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<td>BCH1304e02e1C</td>
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<td>34.58</td>
<td>9.55</td>
<td>26.65</td>
<td>3000</td>
<td>2000</td>
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<td>BCH1801e02e1C</td>
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<td>42.96</td>
<td>3000</td>
<td>2000</td>
<td>LXM23eU30M3X</td>
<td>BCH1802e02e1C</td>
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<td>1500</td>
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<td>BCH1802e02e1C</td>
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<td>16.71</td>
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<td>2000</td>
<td>LXM23eU45M3X</td>
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<td>2000</td>
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<td>5.5</td>
<td>99.78</td>
<td>35.01</td>
<td>87.53</td>
<td>3000</td>
<td>1500</td>
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<td>7.5</td>
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<td>119.36</td>
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<td>1500</td>
<td>LXM23eU75M3X</td>
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### References

Example: LXM = Lexium servo drive

<table>
<thead>
<tr>
<th>Example</th>
<th>L X M</th>
<th>2 3 A</th>
<th>U 0 1 M 3 X</th>
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<tbody>
<tr>
<td>Servo drive</td>
<td>L X M</td>
<td>2 3 A</td>
<td>U 0 1 M 3 X</td>
</tr>
<tr>
<td>Drive type 23 = standard</td>
<td>L X M</td>
<td>2 3 A</td>
<td>U 0 1 M 3 X</td>
</tr>
<tr>
<td>Interface  A = CANopen machine bus</td>
<td>L X M</td>
<td>2 3 A</td>
<td>U 0 1 M 3 X</td>
</tr>
<tr>
<td>D = pulse/direction interface</td>
<td>L X M</td>
<td>2 3 A</td>
<td>U 0 1 M 3 X</td>
</tr>
</tbody>
</table>

### Power

<table>
<thead>
<tr>
<th>U01</th>
<th>U02</th>
<th>U04</th>
<th>U07</th>
<th>U05</th>
<th>U10</th>
<th>U15</th>
<th>U20</th>
<th>U30</th>
<th>U45</th>
<th>U55</th>
<th>U75</th>
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<tbody>
<tr>
<td>0.1</td>
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<td>0.75</td>
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<td>1.5</td>
<td>2</td>
<td>3</td>
<td>4.5</td>
<td>5.5</td>
<td>7.5</td>
</tr>
</tbody>
</table>

### Supply voltage

- M3X = 200...240 V ~ single phase or three-phase
- LXM = 200...255 V or three-phase: 170...255 V 50/60 Hz

### Dimensions (overall in mm)

<table>
<thead>
<tr>
<th>Servo drives</th>
<th>LXM 23</th>
</tr>
</thead>
<tbody>
<tr>
<td>U01M3X</td>
<td>U02M3X</td>
</tr>
<tr>
<td>W x H</td>
<td>60 x 162</td>
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</tbody>
</table>
Motion control
Lexium 23 Plus
Connection accessories

CANopen and CANmotion machine bus for Lexium 23 Plus servo drives

Lexium 23 Plus servo drives can be connected directly to the CANopen machine bus using an RJ45 connector. To simplify daisy chain connection, each servo drive is equipped with two RJ45 connectors. The communication function provides access to the servo drive’s configuration, adjustment, control and monitoring functions. Used with a Lexium Motion Controller, the CANmotion bus can be used to control motion for applications with up to eight Lexium 23 Plus servo drives.

Connection accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Use</th>
<th>Item no.</th>
<th>Reference</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP 20 CANopen tap</td>
<td>Tap-off from trunk cable for RJ45 cabling</td>
<td>1</td>
<td>VW3 CAN TAP2</td>
<td>0.480</td>
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<tr>
<td>Line terminator</td>
<td>Connection to the RJ45 connector</td>
<td>2</td>
<td>TCS CAR 013M120</td>
<td>0.009</td>
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</table>

Cordsets and cables

<table>
<thead>
<tr>
<th>Description</th>
<th>Use</th>
<th>Item no.</th>
<th>Length m</th>
<th>Reference</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>CANopen cordsets equipped with 2 RJ45 connectors</td>
<td>VW3 CAN TAP2 junction box LXM 23A servo drive</td>
<td>3</td>
<td>0.3</td>
<td>VW3 CAN CARR03</td>
<td>0.320</td>
</tr>
<tr>
<td>CANopen cordsets equipped with one 9-way female SUB-D connector with integrated line terminator and one RJ45 connector</td>
<td>Twido programmable LXM 23A servo drive controller LMC 20, LMC 20A130</td>
<td>4</td>
<td>1</td>
<td>VW3 M3 805R010</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
<td>VW3 M3 805R030</td>
<td>–</td>
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<tr>
<td>CANopen cables</td>
<td>PLC VW3 CAN TAP2 junction box</td>
<td>5</td>
<td>50</td>
<td>TSX CAN CA 50</td>
<td>4.930</td>
</tr>
<tr>
<td>Standard cables, CE marking</td>
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<td></td>
<td>100</td>
<td>TSX CAN CA 100</td>
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<tr>
<td>Low smoke, zero halogen Flame retardant (IEC 60332-1)</td>
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<td></td>
<td>300</td>
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<tr>
<td>CANopen cables</td>
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<td>50</td>
<td>TSX CAN CB 50</td>
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<td>Flame retardant (IEC 60332-2)</td>
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<td>50</td>
<td>TSX CAN CD 50</td>
<td>3.510</td>
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<tr>
<td>Cables for harsh environments (2) or mobile installations, CE marking</td>
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<td></td>
<td>100</td>
<td>TSX CAN CD 100</td>
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<td>300</td>
<td>TSX CAN CD 300</td>
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</tr>
</tbody>
</table>

(1) For other CANopen machine bus connection accessories, please consult our website www.schneider-electric.com.
(2) Harsh environment:
- Resistance to hydrocarbons, industrial oils, detergents, solder splashes
- Relative humidity up to 100%
- Saline atmosphere
- Significant temperature variations
- Operating temperature between -10°C and +70°C

Options:
page 62320/8
Motor starters:
page 62321/2
BCH servo motors:
page 62322/2
Presentation

Internal braking resistor
A braking resistor is built into the servo drive to absorb the braking energy. If the DC bus voltage in the servo drive exceeds a specified value, this braking resistor is activated. The restored energy is converted into heat by the braking resistor.

It enables maximum braking torque.

External braking resistor
When the servo motor has to be braked frequently, an external braking resistor must be used to dissipate the excess braking energy. In this case, the internal braking resistor must be deactivated.

Several external braking resistors can be connected in parallel.
The servo drive monitors the power dissipated in the braking resistor.

The degree of protection of the unit is IP 21.

Applications
Machines with high inertia, driving loads and machines with fast cycles.

References

<table>
<thead>
<tr>
<th>Ohmic value</th>
<th>Continuous power (PPr)</th>
<th>Peak energy (EPk)</th>
<th>Reference</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Omega$</td>
<td>$W$</td>
<td>$Ws$</td>
<td></td>
<td>$kg$</td>
</tr>
<tr>
<td>40</td>
<td>400</td>
<td>4000</td>
<td>VW3 M7 111</td>
<td>0.930</td>
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<tr>
<td>20</td>
<td>1000</td>
<td>4000</td>
<td>VW3 M7 112</td>
<td>2.800</td>
</tr>
</tbody>
</table>

Note: The total continuous power dissipated in the external braking resistor(s) must be less than or equal to the nominal power of the Lexium 23 Plus servo drive (see page 62320/8).
Motion control
Lexium 23 Plus
Option: additional EMC input filters for servo drives

Additional EMC input filters

Applications
Combined with Lexium 23 Plus servo drives, additional EMC input filters can be used to meet more stringent requirements and are designed to reduce conducted emissions on the line supply below the limits of standard IEC/EN 61800-3 edition 2 category C2 or C3 (EMC immunity and conducted and radiated EMC emissions).

The additional EMC filters have tapped holes for mounting in an enclosure.

Use according to the type of line supply
EMC filters can only be used on TN (neutral connection) and TT (neutral to earth) type systems.

Lexium 23 Plus servo drives cannot be used on IT (isolated or impedance earthed neutral) systems. Standard IEC/EN 61800-3, appendix D2.1, states that on IT systems, filters can cause permanent insulation monitors to operate in a random manner.

In addition, the effectiveness of additional filters on this type of system depends on the type of impedance between neutral and earth, and therefore cannot be predicted.

If a machine has to be installed on an IT system, an isolation transformer must be inserted in order to re-create a TT system on the secondary side.

References

For servo drive | Maximum servo motor shielded cable length conforming to | Reference | Weight
--- | --- | --- | ---
 | EN 55011 class A Gr1 | EN 55011 class A Gr2 | IEC/EN 61800-3 category C2 (1) in environment 1 | IEC/EN 61800-3 category C3 (1) in environment 2 |
| m | m | kg |

**Single phase supply voltage**

- LXM23pU01M3X
- LXM23pU02M3X
- LXM23pU04M3X
- LXM23pU07M3X
- LXM23pU10M3X
- LXM23pU15M3X

<table>
<thead>
<tr>
<th>Servo drive</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>–</td>
<td>VW3 A31 401</td>
</tr>
<tr>
<td>–</td>
<td>VW3 A31 403</td>
</tr>
</tbody>
</table>

**Three-phase supply voltage**

- LXM23pU07M3X
- LXM23pU10M3X
- LXM23pU15M3X
- LXM23pU20M3X
- LXM23pU30M3X
- LXM23pU45M3X
- LXM23pU55M3X
- LXM23pU75M3X

<table>
<thead>
<tr>
<th>Servo drive</th>
<th>Reference</th>
</tr>
</thead>
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<td>VW3 A31 404</td>
</tr>
<tr>
<td>20 40</td>
<td>VW3 A31 406</td>
</tr>
<tr>
<td>20 40</td>
<td>VW3 A31 407</td>
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</tbody>
</table>

(1) Standard IEC/EN 61800-3: EMC immunity and conducted and radiated EMC emissions:
- Category C2 in environment 1: restricted distribution, for domestic use, sale conditional on the competence of the user and the distributor in the reduction of current harmonics.
- Category C3 in environment 2: industrial premises.