

6GK7542-6UX00-0XE0

产品名称	6GK7542-6UX00-0XE0
公司名称	浔之漫智控技术（上海）有限公司总部
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公司地址	上海市松江区石湖荡镇塔汇路755弄29号1幢一层A区213室
联系电话	15021292620 15021292620

产品详情

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[6GK7542-6UX00-0XE0](#)

通信处理器 CP 1542SP-1，用于连接 SIMATIC S7-ET 200SP 到 工业以太网；开放式 IE 通信 (TCP/IP，ISO-on-TCP，UDP)，PG/OP，S7 路由，IP-Broadcast/Multicast，SNMPV1，DHCP，电子邮件，IPV4/IPV6，时间同步通过 NTP，网络服务器接入上，需要总线适配器。

Energy efficiency classes in accordance with IEC 61800-9-2

概述 Step by step to more efficiency

One of the core objectives of the European Union is a sustainable power industry. In industrial plants today, around 70 % of the power demand is from electrically driven systems. This high percentage contains huge potential for saving energy in electrical drives. For that reason, the European Union introduced minimum requirements for the energy efficiency of electric motors in the form of a statutory motor regulation as early as 2011.

These activities are expanded by EU Directive 2019/1781, which deals with more stringent requirements for DOL motors (Direct On Line) and defines the efficiency limits for frequency converters. The directive offers a legal basis for technical content in terms of the efficiency of specific products and services. However, standardization plays a leading role in determining the range and available market technology.

Improving energy efficiency is supported by a systematic selection of the most efficient converter and drive system technologies on the IEC 618009 series of standards. Part 1 specifies the methodology to determine the energy efficiency index of an application on the basis of the expanded product approach (EPA) and semi-analytical models (SAMs), whereas part 2 entails indicators for the evaluation of the energy efficiency performance and classification of converters and drive systems.

First of all, the consideration of eight application-relevant operating points is introduced as mandatory, in order to take the different applications into account in a targeted manner. Determination of loss values at these eight points and definition of efficiency classes are laid down by the standard in a uniform way. This enables data relevant to operation, such as application-specific load profiles, to now be taken into account more easily in the energy efficiency analysis.

The standard is especially important for variable-speed drives of the following types:

for AC/AC converters without energy recovery functionality

for motors with integrated converters

for supply voltages of 100 V to 1000 V

for power ratings of 0.12 kW to 1000 kW

To cover all applications of driven machines, the IEC 6180092 standard defines operating points in full-load and partial-load operation, at which the losses of the motor and drive systems have to be determined. Based on the loss data at the operating points in partial-load operation, variable-speed drives can be explicitly considered in more detail. This makes their advantages especially clear.

Duty cycles for different driven machines

Moreover, frequency converters and motor systems are classified in efficiency classes, which permit an initial rough estimate of the potential saving. Definition of reference systems is a key aspect of this because they provide standard reference values. The positioning of these reference systems defines the efficiency class. The relative distance from the reference system can be used as an absolute measure of the efficiency at the operating point in question.

Advantages of the detailed loss consideration of IEC 6180092 over the previous consideration of efficiencies and maximum loss values

For motors, the efficiency consideration was previously only defined for operation without a converter at 50/60 Hz. It provides a good way of comparing the energy efficiency of motors from different manufacturers for this use case.

The more detailed loss analysis of IEC 6180092, on the other hand, is aimed at speed-controlled operation and therefore now also includes motors especially designed for converter operation in the energy analysis. These were previously not covered by the applicable standards. Moreover, a loss analysis over the entire setting and load range of the motor is possible. This is done in accordance with the standard IEC 6180092 with typical values.

For holistic consideration, it is essential to include all the relevant components of a drive system. The IEC 6180092 standard defines this in detail. The standardized expression of power loss data as a percentage makes comparison considerably easier and more transparent.

The method also makes it possible to consider a motor that produces a holding torque at speed zero, for example. In this case, the efficiency is zero, but a power loss from current producing magnetization and holding torque does occur.

In summary, the key advantage of standard IEC 6180092 is the ability to perform the energy analysis of an electrical drive system based on standardized load profiles in all operating ranges due to uniform general conditions. This provides the user with complete transparency irrespective of the manufacturer.

Establishing efficiency classes of frequency converters (Complete Drive Modules CDM)

To avoid overmodulation and to ensure comparability between makes, which cannot be achieved otherwise, the efficiency classes of CDMs refer to the 90/100 operating point (90 % motor stator frequency, 100 % torque current).

Standard IEC 6180092 defines the relative losses of a CDM in efficiency classes IE0 to IE2. With reference to the value of a CDM of efficiency class IE1 (reference converter), a CDM of efficiency class IE2 has 25 % lower losses and a CDM of efficiency class IE0 has 25 % higher losses.

The publication of EU Directive 2019/1781 makes compliance with the eco-design requirements for the product declaration of conformity mandatory. AC/AC transformers, that belong to the aforementioned categories (specific voltage and performance level without regenerative feedback capability), must meet efficiency class IE2, in order to be authorized for installation/use within the EU.

Operating points for CDMs

Complete Drive Module (CDM) – determining the efficiency class

Establishing the efficiency classes of drive systems (Power Drive Systems PDS)

What is possible for the individual systems, of course, also applies to the entire electrical PDS (frequency converter plus motor). Detailed comparisons are now possible at this level, too. The reference values for the reference system provide clear indications of the energy performance of the PDS.

Because targeted matching of the motor and CDM provides additional potential for optimization in electrical drive systems, it is especially important for the user to consider the entire drive system.

For the efficiency class of a PDS, too, a specific load point is defined. In this case, the reference point used is the 100/100 operating point (100 % motor stator frequency, 100 % torque).

Standard IEC 6180092 defines the relative losses of a PDS in efficiency classes IES0 to IES2. With reference to the value of a PDS of efficiency class IES1 (reference drive), a PDS of efficiency class IES2 has 20 % lower losses and a PDS of efficiency class IES0 has 20 % higher losses.

Operating points for PDS

Power Drive System (PDS) – determining the efficiency class

SINAMICS G130 变频调速柜内置单元，框架型号 FX 和 HX

SINAMICS G130 变频器是一款变频装置，可以非常灵活地与相关选件组合，集成到客户机柜中或直接集成到机器设备内。

SINAMICS G130 变频调速柜的电压和功率范围：

线路电压

功耗

380 ... 480 V 3 AC	110 ... 560 kW
500 ... 600 V 3 AC	
660 ... 690 V 3 AC	75 ... 800 kW

可以用大量附加电气部件对驱动系统进行优化以满足特定应用要求。组态和调试工作因预定义接口而被大大简化。

无编码器矢量控制的控制精度适合绝大多数应用，即，无需额外的实际转速值编码器。

但，SINAMICS G130 变频调速柜配有编码器评估单元，以适应由于工厂原因需要编码器的应用场合。

控制单元、电源模板和其它有源 SINAMICS 部件之间的通讯通过 DRIVE-
CliQ（变频调速柜的内部接口）进行。通过具有各种预组装电缆长度的 DRIVE-CLiQ
连接，可以快速形成一个完整的变频器系统。

为了与过程控制系统通信，CU320-2 控制单元标配 PROFIBUS 或 PROFINET
接口。该接口也可通过数字量和模拟量输入和输出进行扩展。为此，可使用 TM31 端子模块和 TB30
端子扩展板。为了能够通过 CANopen 或 EtherNet/IP 进行通信，也可安装附加扩展板卡。

优势

采用了新的 IGBT 的电力半导体技术和革新的冷却方法，因而运行安静，结构紧凑；

各模块和功率部件可快速、方便地进行更换，从而确保较高的设备可用性。可更换的部件都可快速、方便地更换。另外，通过“Spares On Web”因特网工具，可方便地查看具体订单的备件
(<http://www.siemens.com/sow>)。

借助于一个标准通信接口以及多个模拟量和数字量接口，可方便地集成到自动化解决方案中。

使用配有图形 LCD 和文本显示屏的 AOP30 增强型操作面板或安装有 STARTER 调试工具的
PC，可方便地进行调试和参数设置 (<http://www.siemens.com/starter>)。

通过预置软件功能，可更方便地根据具体设备调整变频器。

所有组件（从具体部件到随时可连接的机柜）在整个生产过程中都经过严格测试。这就保证了它们在安装、调试和运行过程中具有极高的功能可靠性。

应用

变频驱动器适用于涉及运动、传送、泵送或对固体、液体或气体进行压缩的所有应用。

主要应用包括：

泵和风机

压缩机

挤出机和混合机

轧钢机

设计

SINAMICS G130 变频调速柜内置单元为机器制造商和工厂建设者提供了一种模块化传动系统，可根据具体应用进行量身定制。

SINAMICS G130 变频调速柜内置单元主要包括以下模块化独立组件：

电源模块

控制器单元

它们可以分开，也可以组合进同一个装置中。电源模板上有一个用于控制单元的插槽。

变频装置配有与控制单元相连的一根 DRIVE-CLiQ 通信电缆和一根 24 V 电源电缆。这些电缆经过预组装，可用于安装变频装置中的控制单元。如果这两个单元分开安装，那么必须订购适当长度的电缆。

AOP30 增强型操作面板和数值型 BOP20 精简操作面板可用于调试和本地操作。

通过端子排上或采用 PROFIBUS 或 PROFINET 的 CU320 2

控制单元上的预定义接口，可更方便地进行传动装置调试和控制。CU320 2

控制单元的接口可通过插入式 TB30 端子扩展板或 TM31 端子模块等附加模块加以补充。

如果与变频器通信需要使用其它用户接口，则必须提供外部 24 V 电源。

下面两个图可在组装所需的变频调速柜组件时提供帮助。第一个图显示了 SINAMICS G130 变频调速柜的设计与具体组件。第二个图是一个包含各个组件的判定和选型标准的流程图。

喷漆模块

以下变频器组件标配喷漆模块：

电源模板

控制装置

传感器模块

端子模块

操作员面板 (AOP30)

部件涂层可保护 SMD 组件中的敏感元件免受有害气体、粉尘和湿气的腐蚀。

镀镍母排

为了达到高的抗环境影响水平，变频装置的所有铜母排都镀镍。裸铜接头无需清洁即用于连接。

1) 出厂设置：未被激活（可被编程）

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