

PROFINET ON CMZ SERVODRIVES

#THE OTHER SIDE OF MOTION CONTROL

CMZ Sistemi Elettronici extends the offering for servodrives by introducing PROFINET fieldbus in its latest generation series: **SBD** and **IBD**.



SBD

IBD
flange 60



IBD
flange 80,100



SBD Stand alone Brushless Drives
PROFINET is available on all sizes
and it is described by the acronym **PNT**

IBD Integrated Brushless Drives
PROFINET PNT is available on motors
with flange 60, 80, 100 mm

1. PROFINET Certification

CMZ reached PROFINET certification in October 2021. SBD and IBD servo drives with PROFINET bus have successfully passed all required test reports. During 2022, CMZ is planning the registration of its drives to PROFINET organization.

2. PROFINET and PROFIdrive: some definitions



PROFINET is an open fieldbus based on Ethernet that provides the following services:

- General Ethernet services
- Services from fieldbus:
 - Cyclic data (similar to PDO in CANopen)
 - Acyclic data (similar to SDO in CANopen)
 - Diagnostics messages (similar to Emergency in CANopen).

PROFINET defines 3 Conformance Classes (CC):

- **CC-A:** provides basic functions for PROFINET IO with RT communication. All IT services can be used without restrictions
- **CC-B:** extends the concept in order to include the network diagnostics through IT working mechanisms and information about topology
- **CC-C:** describes the basic functions for devices with reservation and synchronization of the bandwidth supported by the hardware (IRT communication) and it is therefore the base for isochronous applications.



PROFIdrive is a profile of PROFINET for devices named drives.

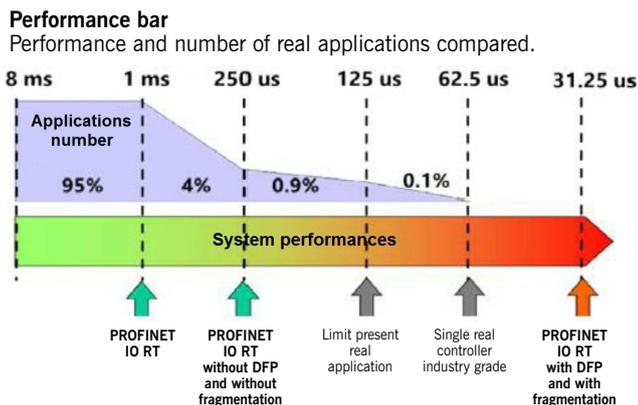
PROFIdrive defines 6 Application Classes (AC):

- **AC 1:** for standard drives with speed regulation (RT)
- **AC 2:** as AC 1 but with extended modes
- **AC 3:** for servo-drives with speed and position regulation and with profiles generator, as for the actuators for single-axis positioning (RT)
- **AC4-5:** for servo-drives for centralized control of the movement with several axes (IRT)
- **AC 6:** for servo-drives for decentralized automation (IRT).

3. PROFINET technology by CMZ

In its servodrives, CMZ offers the profile **PROFIdrive AC 3**.

The implementation of this profile allows to “solve” most of cases for applications made with PROFINET.



CMZ PROFINET DRIVES SOLUTION

- Not isochronous real-time cyclic data exchange (RT)
- Application Class 3 functionality for axes “command mode”
- The servodrives PNT of CMZ can be used in IRT networks
- Custom telegrams and PROFIdrive vocabulary
- HW architecture based on chip HMS.

IN ADDITION TO CMZ TYPICAL FUNCTIONALITIES:

- Interface with SD-Setup
- Integrated PLC.

CMZ servodrives SBD and IBD can be used in a PROFINET network and be recognized and controlled by Siemens controllers (or any other PROFINET controller) thanks to the GSDML descriptor file.

CMZ SBD drives, defined in class 3 (RT), can be used also in networks with devices of superior class (IRT).

CMZ has implemented both the **cyclic communication** (for the servodrives management) and the **acyclic communication** (for access to the PROFIdrive vocabulary).

3.1 The cyclic telegram 200

For cyclic data exchange, CMZ has defined its own custom telegram: the telegram 200.

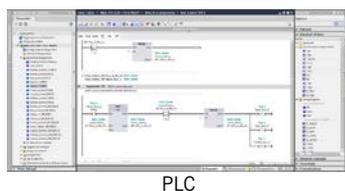
The cyclic telegram 200 equalizes CMZ servodrives with other drives.

2 frames identify the telegram:

- Output frame: data that the controller cyclically sends to CMZ servo-drive (similar to an RPDO) made by a Control word and a series of parameters
- Input frame: data that CMZ servo-drive cyclically sends to PROFINET controller (similar to TPDO) made by a status word and a series of parameters related to the servo-drive.

Thanks to CMZ telegram 200, the machine PLC can both command the drive with the classic axis commands (positioning, speed command, homing, etc.) and know the typical values of the axis (position, speed, torque, etc.).

This functioning mode places the CMZ servodrive as a perfect solution for that market field of “non-synchronized axes” which can be used both in “simple” machines where the non-synchronized movement is sufficient, and as “service axes” on more complex machines.



3.2 The cyclic telegram 400

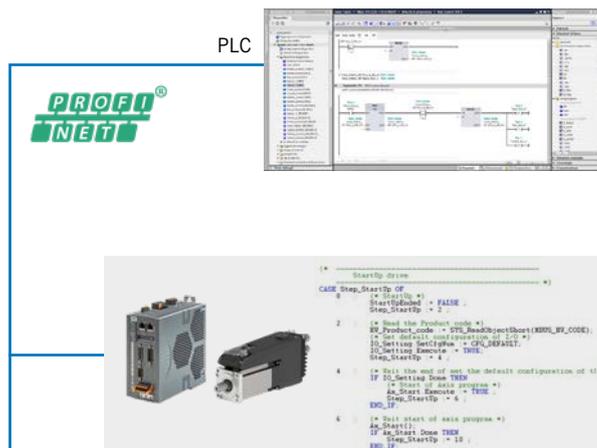
The real key point of SBD and IBD drives developed by CMZ is the combination: “Integrated PLC” + “Telegram 400”.

Telegram 400 (and 401, 402) is a cyclic telegram with CMZ integrated PLC for servo-drives: in this way, it becomes possible to make the PROFINET controller interact with the “CMZ integrated PLC” by taking advantage of all functionalities that this solution provides.

The “CMZ integrated PLC” is not a simple sequencer but a true PLC IEC61131 that allows to entirely manage the drive: in fact there are variables, functions, complex types that allow to write a complex program.

The combination “integrated PLC” + “telegram 400” on PROFINET increases the level of the “service axis” provided by the telegram 200.

CMZ servodrives with PROFINET fieldbus is not simply an “executor muscle”, but it becomes an intelligent unit which is decentralized from the machine controller logic.



3.3 The cyclic telegram 201

The cyclic telegram 201 is a hybrid telegram: it allows to directly interact with the DS402 machine and with the PLCopen profile that is present in the servo-drives of CMZ, providing direct commands to the axis.

3.4 Il vocabolario PROFIdrive

It is possible to access the parameters of the PROFIdrive vocabulary through the acyclic messages (similar to SDO of CANopen).

- The access to the single parameter and the one to the multi-parameter are both implemented with a unique frame.
- It is possible to use Siemens standard function blocks (SINA_PARA, SINA_PARA_S).

The vocabulary allows accessing all the parameters of the drive.

4. Application Note and PROFINET examples

CMZ website www.cmz.it has a download area where you can download an Application Note including many motion examples realized for the Siemens TIA Portal environment both by using directly the output and input frames, as well as by using the FB provided by CMZ.

In the download area you can also find the GSDML files for SBD and IBD systems.

For more specific information we invite you to contact our Technical Office: support@cmz.it

