

Application note

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CANopen PLC commissioning

1 – GENERAL DESCRIPTION

This document describes how to set up a CANopen PLC (master) with an INFRANOR® XtrapulsPac™-ak or XtrapulsPacHP-ak drive (slave). It is not written for a specific PLC. So, depending on the manufacturer, some terms might be slightly different.

The following documents are referred to (and can be downloaded from our website www.infranor.com):

- XtrapulsPac™ and XtrapulsPacHP™ Installation Guides,
- XtrapulsPac™ and XtrapulsPacHP™ User Guides (functionalities such as 'SDO', 'PDO', 'SYNC', 'Node Guarding' are described in this document),
- XtrapulsPac™ and XtrapulsPacHP™ EDS files,

Addressees of this application note must have at least a basic knowledge in PLC or industrial PC programming.

2 – CONFIGURATION

2.1 – INSTALLATION

For the wiring, node addressing, etc., please refer to the XtrapulsPac™ and XtrapulsPacHP™ Installation Guides.

2.2 – PLC SOFTWARE TOOL CONFIGURATION

2.2.1) Import of the EDS file

The EDS (Electronic Data Sheet) file provides the PLC software tool with a description of the communication functionalities and objects available in the XtrapulsPac™-ak and XtrapulsPacHP™-ak drives.

Please, refer to your PLC documentation for importing an EDS file.

2.2.2) CANopen configuration: MASTER

If it has not been done automatically, you must add a CANopen Master to your PLC configuration.

Then, configure your Master with the most common parameters:

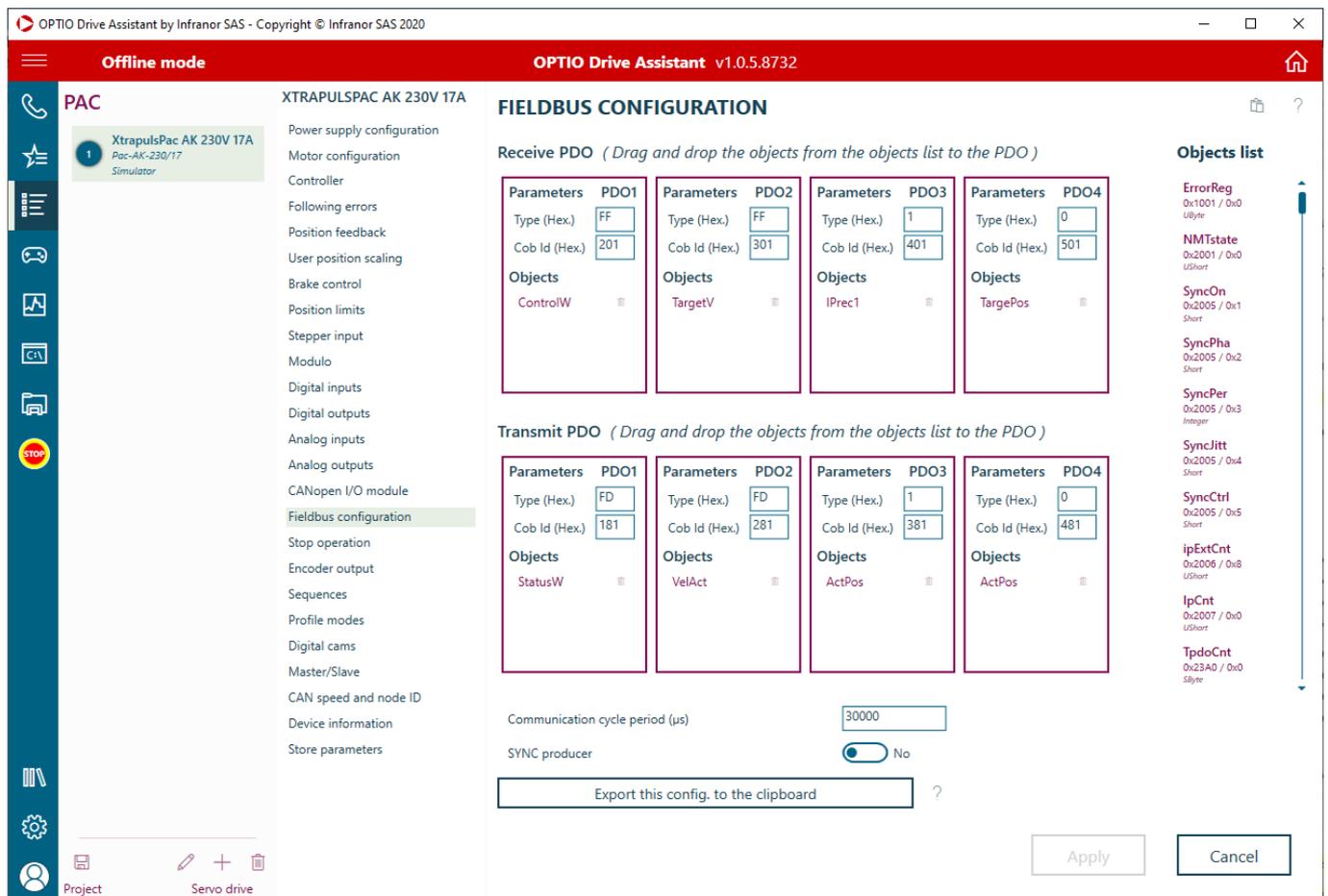
- ✚ Transmission speed (or baud rate): it must be set according to the slaves connected to the bus,
- ✚ SYNC COB-ID: identifier of the synchronization messages; default value is 0x80,
- ✚ Period of the SYNC messages: communication cycle. Please, note that the XtrapulsPac™-ak and XtrapulsPacHP-ak drives only support a cycle lower than 150 milliseconds.

2.2.3) CANopen configuration: SLAVE

For the next step, add your slaves and configure each one with:

- ✚ Node ID: node address,
- ✚ Communication cycle time: XtrapulsPac™ and XtrapulsPacHP™: the period must be defined in the drive:
 - a) automatically by the PLC at startup:
 - in the appropriate field of the slave's configuration window (software CoDeSys, ...)
 - by sending an SDO (object 0x1006,0) at startup (software Unity, Sycon, ...) (see Appendix I).
 - b) or by writing the desired cycle into object 0x1006,0 (communication cycle period) via Optio

Launch the Optio software, connect it to your drive, then open the 'Fieldbus configuration' window:



Define the communication cycle, 'Apply' then store the drive parameters.

Note: if the master is configured to write this parameter, it will overwrite your saved value each time the CANopen bus is restarted.

2.2.4) PDO mapping

The PDO mapping defines which application objects are transmitted within a PDO. This is made by means of the master's configuration tool (then, the mapping is automatically sent to the slave at the CANopen start-up). Typically, objects which are usually used or requiring a real-time access are mapped (such as "Control Word", "Status Word", ...).

For each slave, proceed as follows:

- add / remove the desired objects to/from the various PDOs,
- configure the transmission type for each PDO: if you do not need to optimize the bandwidth or if you are not well aware of the compatibility of your PLC, we recommend to use synchronous (transmission type 0x1 to 0xF0) instead of asynchronous (transmission type 0xFF or 0xFD).

Note: Once the communication established, the slave's mapping can be checked with Optio ('Fieldbus configuration' window).

2.3 – OPTIONAL CONFIGURATION

Depending of the Master functionality, an unexpected slave may be discovered at the XtrapulsPac Node ID + 64. This is due to the 2nd SDO channel used by the Optio software for multi-axis communication.

If required, this feature can be disabled the following way (the drive will then not answer to Node ID + 64 but the operator will also lose the multi-axis communication with Optio):

- in all XtrapulsPac drives, set bit 15 of object 0x2301,0
- save the drives parameters.

2.4 – TROUBLESHOOTING

SYMPTOM	REMEDY
PLC cannot establish communication with the drive	- check the NodeID and baud rate configuration - check wiring, termination resistors
Communication is instable (communication lost ...)	- check grounding, termination resistors
The ' <i>Fieldbus SYNC cycle</i> ' error is displayed in the drive	- check if the communication cycle period (object 0x1006) corresponds to the value set in the PLC
PDOs are not correctly updated	- check the PDOs configuration (on both PLC and drive sides)

3 – APPLICATION EXAMPLES

3.1 – POSITIONING

The following describes how to start a positioning with the drive in Profile Position mode. If sending Service Data Object (SDO) is required, please refer to your PLC documentation for sending SDO.

3.1.1) Configuration

Map object 0x6040,0 (Control Word) and 0x6041,0 (Status Word) in PDOs (it is not mandatory for this kind of application but these objects are often used, so this will only make the program writing easier).

3.1.2) Application1: Profile position

- Syntax:

► "!=" affectation:

Example: `0x6060,0 := 1` write '1' in object `0x6060,0`

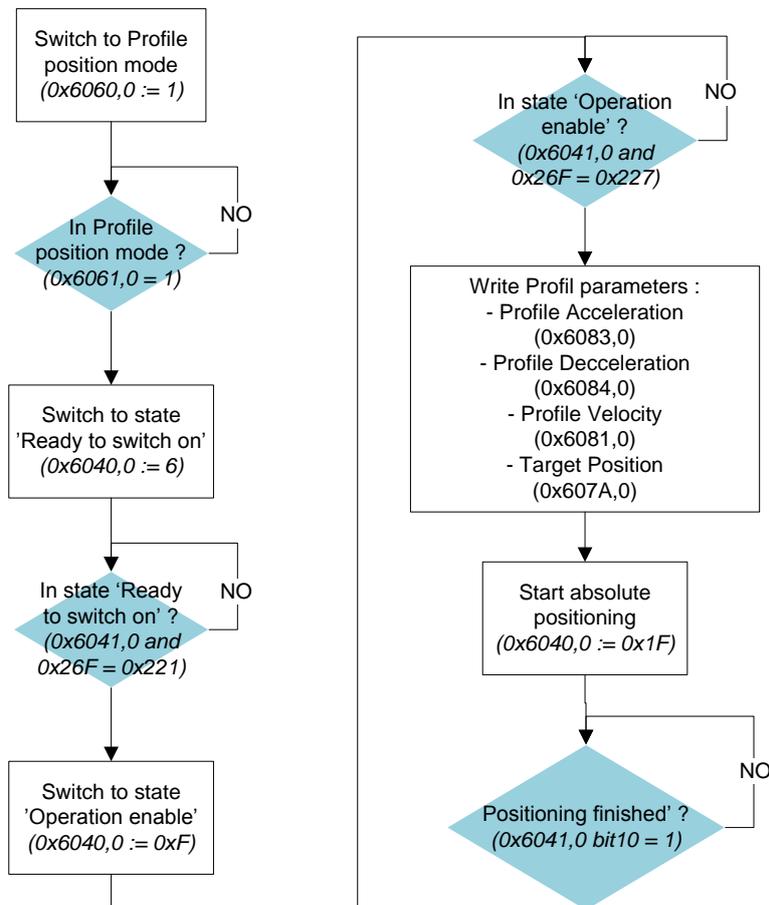
► "=" test if:

Example: `0x6061,0 = 1` read object `0x6061,0` and test if equal to '1'

- Description:

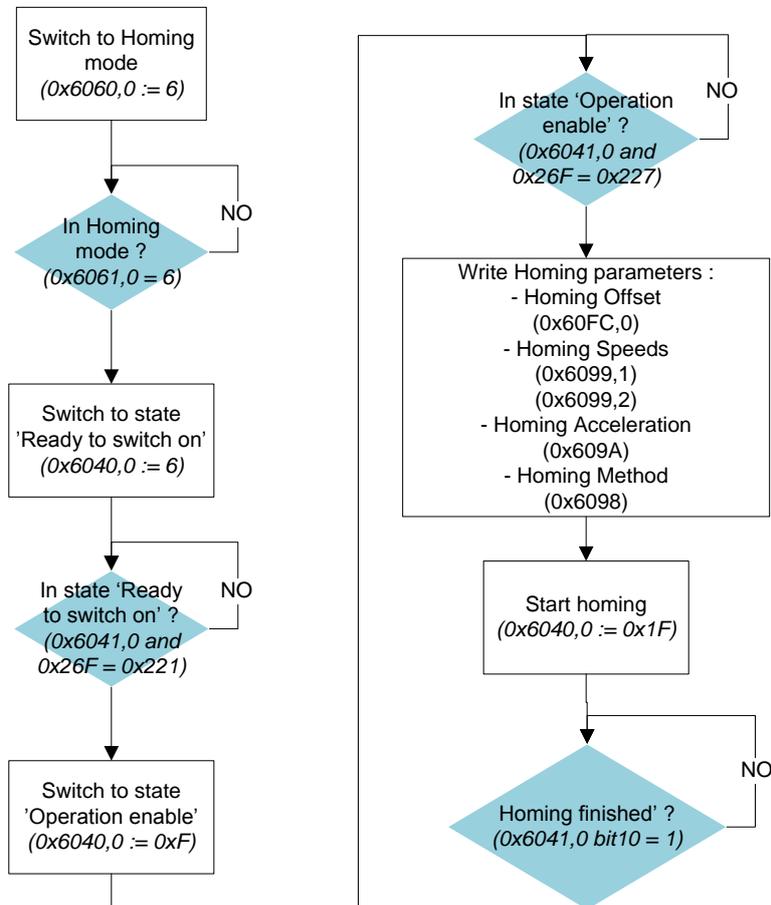
Enable the drive, write the profile parameters, then start the movement. Only basics are shown here, error handling must also be considered.

See *XtrapulsPac User Guide* for the object description.



3.1.3) Application2: Homing

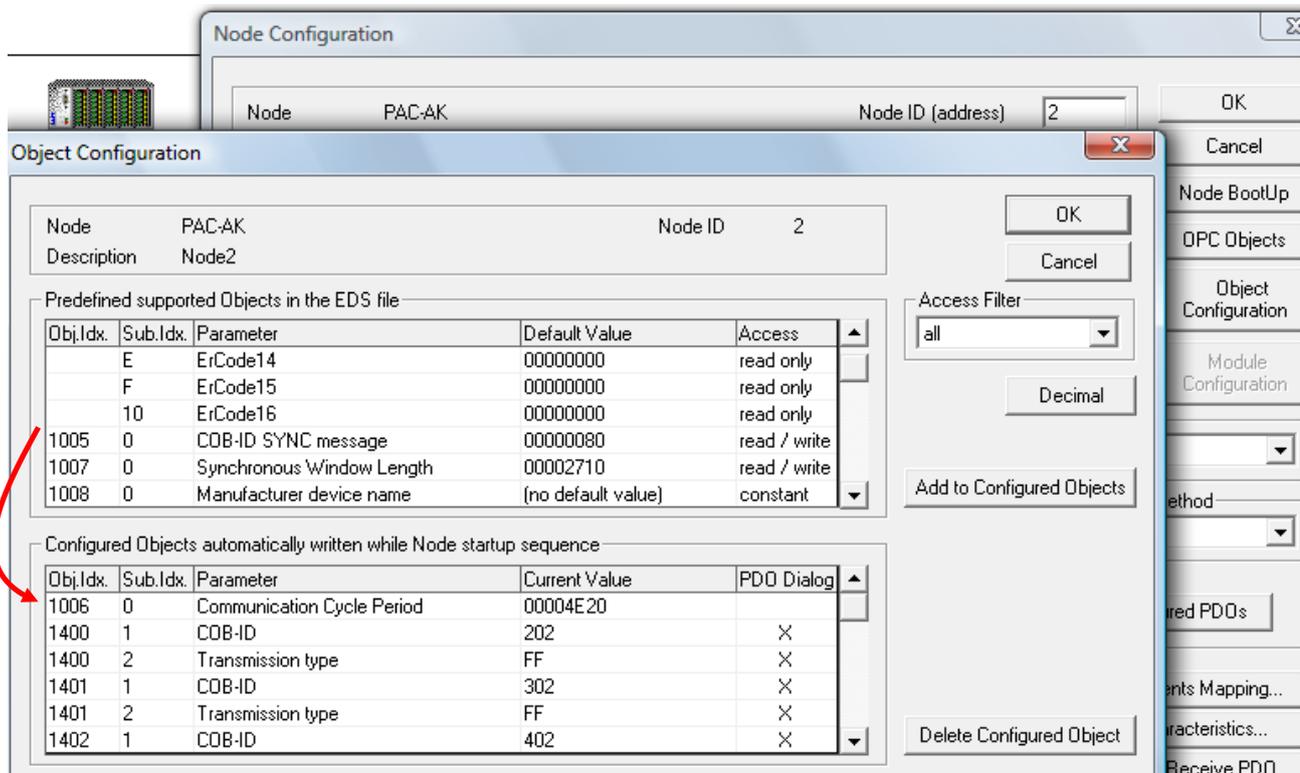
- Description:
Enable the drive, write the homing parameters, then start the homing. Only basics are shown here, error handling must also be considered.



APPENDIX I: Sending SDO at startup

1) Sycon software (Hilsher, Telemecanique):

Open the 'Node configuration' window, then 'Object Configuration':



In this example, select objet 0x1006,0 in 'Predefined supported Objets in the EDS file', then 'Add to Configured Objects'.

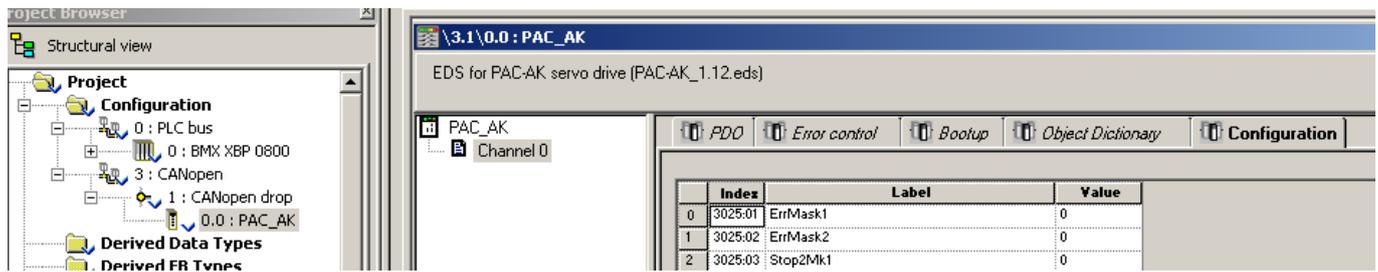
Once the object added, you can change its 'Current Value' (example: 0x4E20 for a communication cycle of 20 ms).

2) Unity software (Schneider):

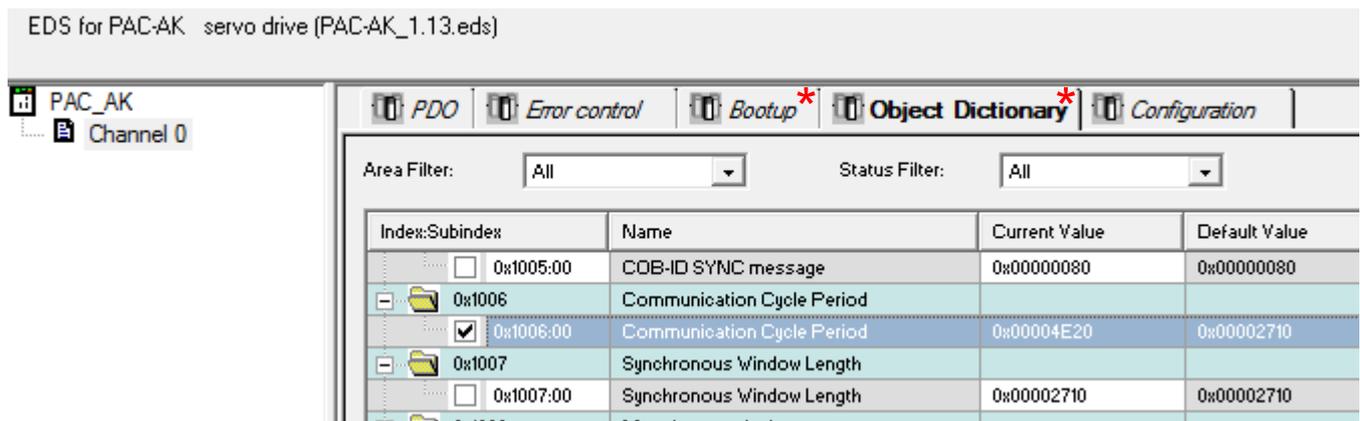
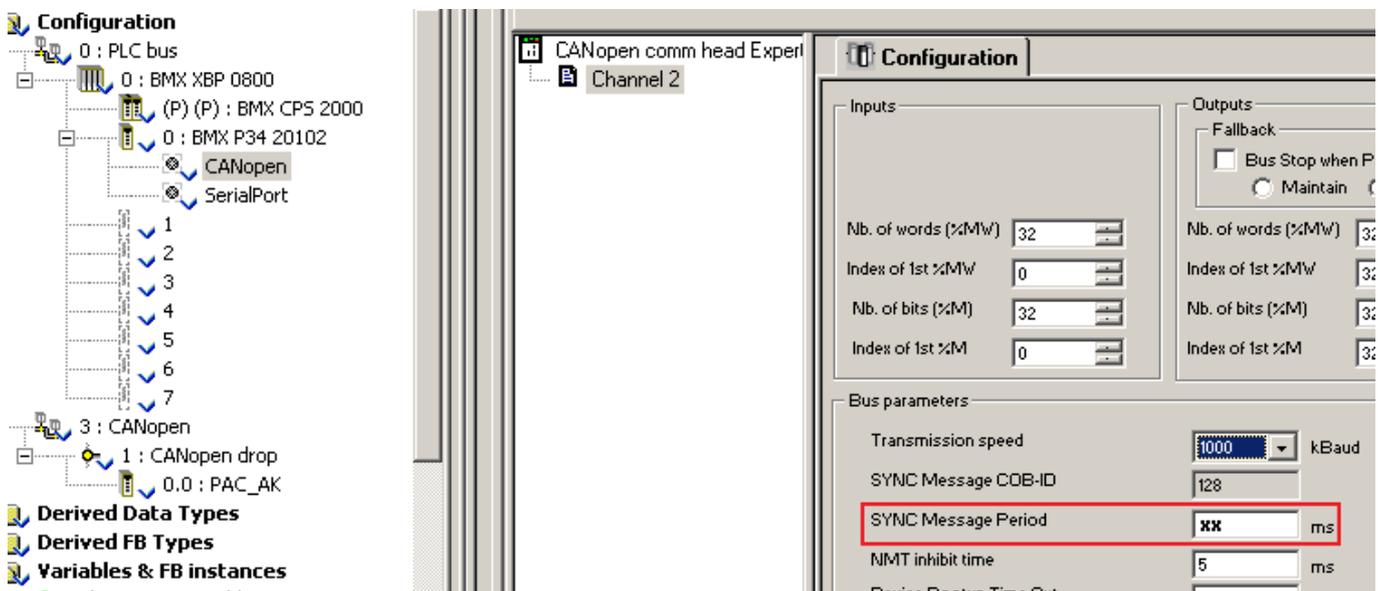
- In the hardware catalogue manager, edit the Xtrapuls-Pac-ak drive: in Expert Mode, click on the bootup procedure tab and make sure that "No Restore" is selected.

The screenshot shows the Hardware Catalog Manager interface for editing the device profile PAC_AK. The 'Expert Mode' checkbox is checked. The 'Bootup Procedure' tab is active, showing a sequence of steps from 'Power ON' to 'PDO transfer'. The 'Restore' step is selected, and the 'No Restore' radio button is chosen. The 'Reset' step has 'Reset node' selected. The 'Check node' step has 'Device type' and 'Device identity' checked. The 'Download Configuration' step has 'Force communication parameters' and 'Force application parameters' unchecked. The 'Start' step has 'Start node' checked. A 'Default' button is visible at the bottom right.

- ✚ In the Unity software, after having added the PAC_AK slave, open the node configuration window.
 - The tab 'Configuration' allows changing the application parameters:



- To configure the communication parameters, click on the 'Object Dictionary' tab. Set object 0x1006,0 (**communication cycle period in μ s**) according to the master cycle time ("SYNC message period"):



* Tabs only available with CPU BMX 20102 and BMX 20302

If the tab Object Dictionary is not available, the parameter 0x1006,0 can be saved in the XtrapulsPac-ak memory (see chapter 2.2.3.b).